TRANSMISSION

Power transmission

TRANSMISSION

CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION (B8444S, TF-80SC AWD)

CHECKING SOLENOIDS AND TEMPERATURE SENSOR

CHECKING SHIFT SOLENOIDS

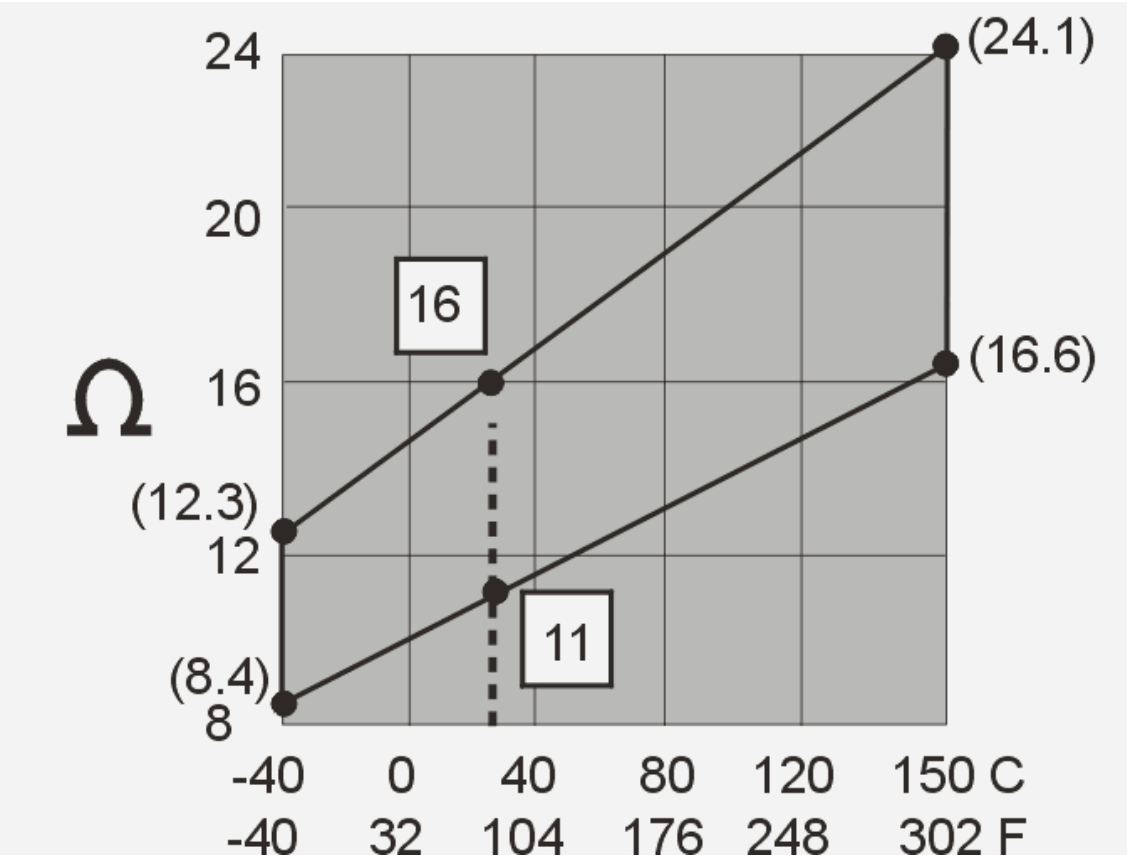


Fig. 1: Identifying Ohms Resistance Temperature Graph
Courtesy of VOLVO CARS CORPORATION

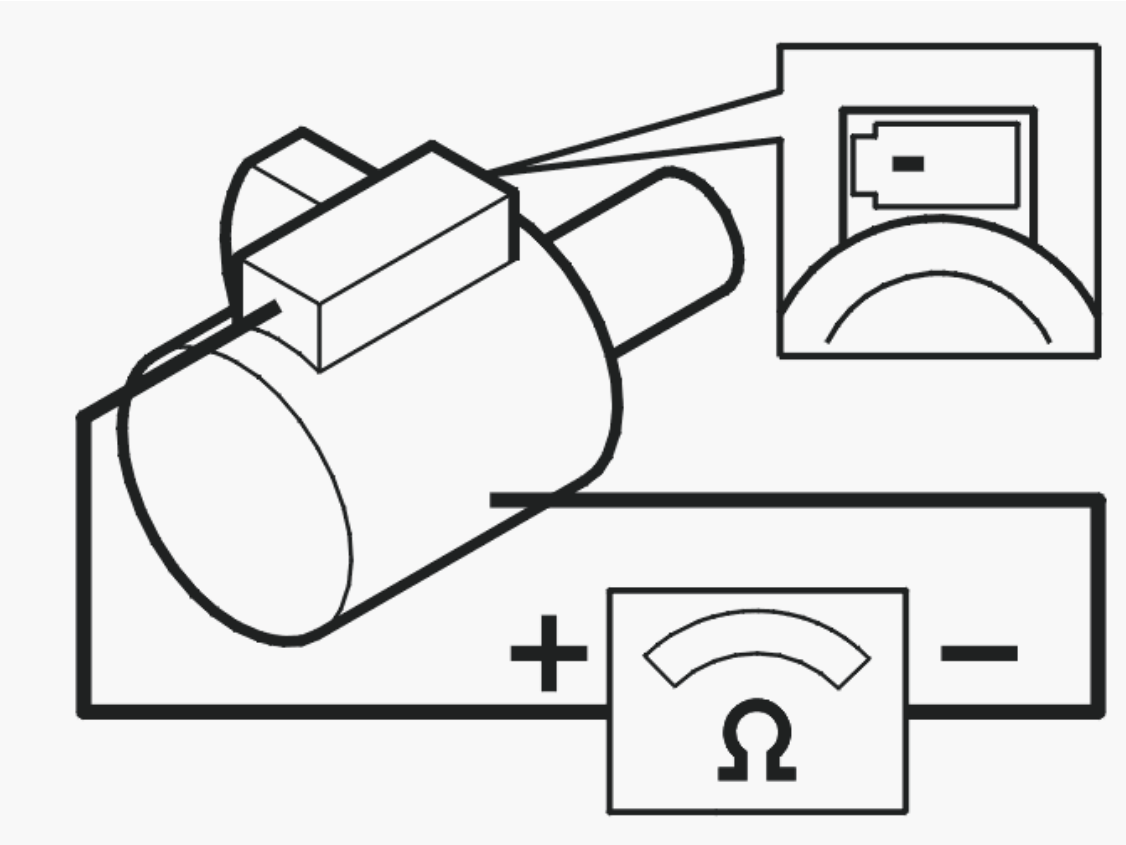


Fig. 2: Identifying Check For Ohms Resistance
Courtesy of VOLVO CARS CORPORATION

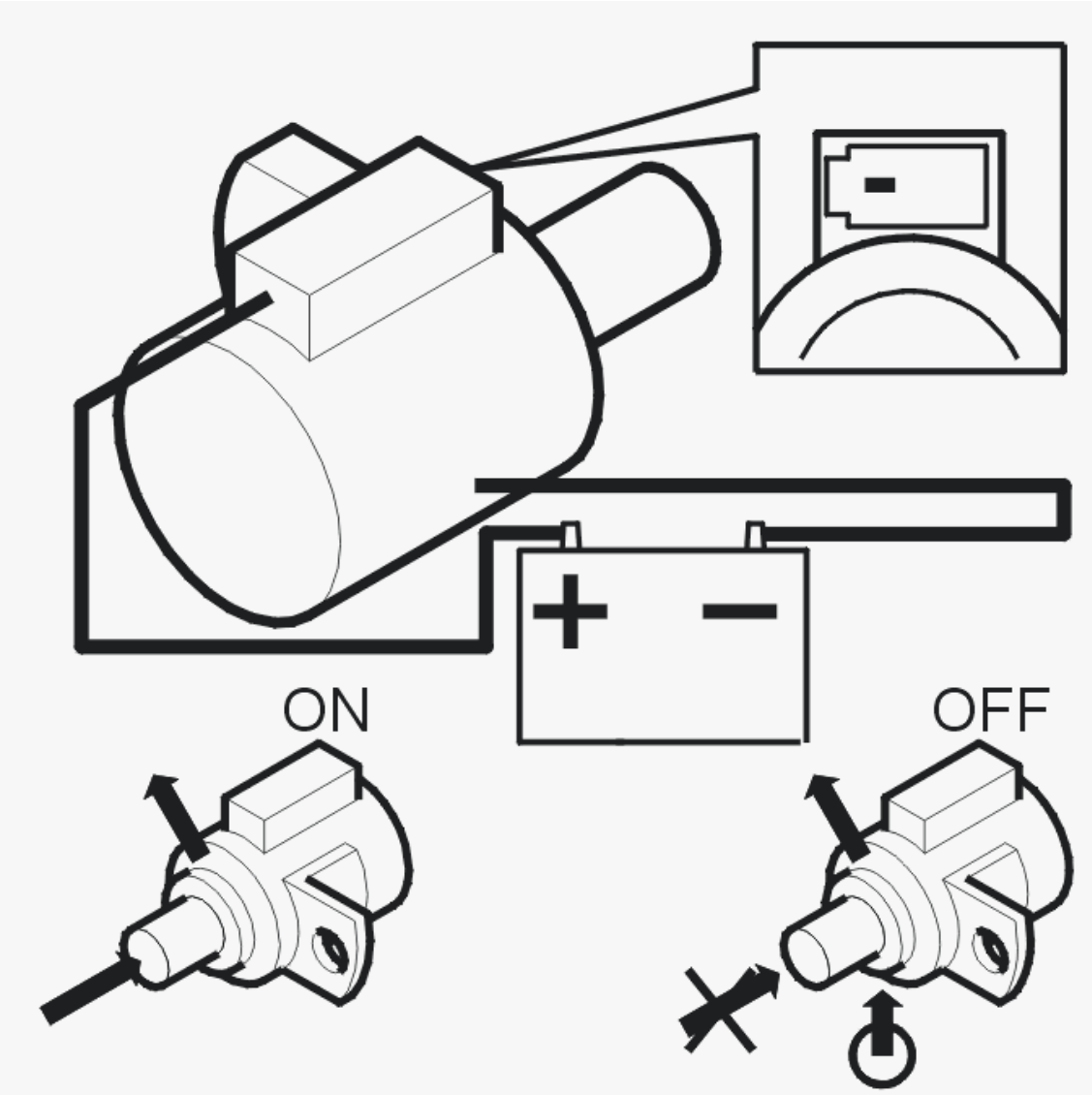


Fig. 3: Identifying Gear Shift Solenoid Check
Courtesy of VOLVO CARS CORPORATION

NOTE: Do not damage components and terminals when test measuring. Handle components and terminals carefully.

Check 1

Connect an ohmmeter between terminal #1 and the outer casing of the gear shift solenoid. For resistance values, see the table below.

When measuring at temperatures other than +20 °C a test measurement must be taken at +20 °C. This is to establish if the resistance is correct or not.

Component	Note	Resistance (ohms)

Gear shift solenoid S1, S2	Resistance between the solenoid pins and the solenoid casing/transmission housing	+20 °C= 11-16 ohms

Check 2

Connect a temporary voltage supply (+) to gear shift solenoid terminal # 1 and a temporary ground terminal (-) to the gearshift solenoid outer casing. Check the function of the solenoid.

Check 3

Connect a temporary voltage supply (+) to gear shift solenoid terminal # 1 and a temporary ground terminal (-) to the gearshift solenoid outer casing. Blow using compressed air according as shown in the illustration. Check the function of the solenoid.

CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

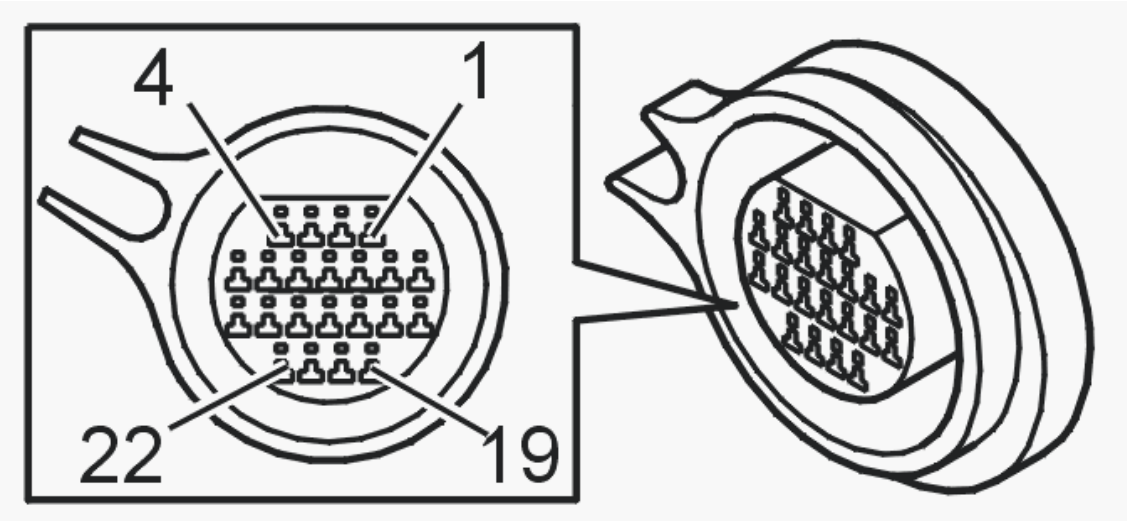


Fig. 4: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

Connect the breakout box. See:**CONNECTING THE BREAKOUT BOX**

NOTE: Do not damage components and terminals when test measuring. Handle components and terminals carefully.

Check 1

Connect an ohmmeter to the breakout box between the terminals for the selected solenoid. For resistance values, see the table below.

for line pressure solenoid SLT:

- terminals #B3 (#3) and #B1 (#1)

for lock-up solenoid SLU:

- terminals #B9 (#9) and #B4 (#4)

for line pressure solenoid SLB1:

- terminals #B21 (#21) and #B16 (#16)

for line pressure solenoid SLC1:

- terminals #B11 (#11) and #B10 (#10)

for line pressure solenoid SLC2:

- terminals #B17 (#17) and #B18 (#18)

for line pressure solenoid SLC3:

- terminals #B14 (#14) and #B22 (#22)

When measuring at temperatures other than +20 °C a test measurement must be taken at +20 °C. This is to establish if the resistance is correct or not.

Component	Note	Resistance (ohms)
Lock-up solenoid (SLU) Line pressure solenoids (SLT), (SLC1),(SLC2),(SLC3),(SLB1)	Resistance between solenoid pins	+20 °C= 5.0-5.6 ohms

CHECKING THE OIL TEMPERATURE SENSOR

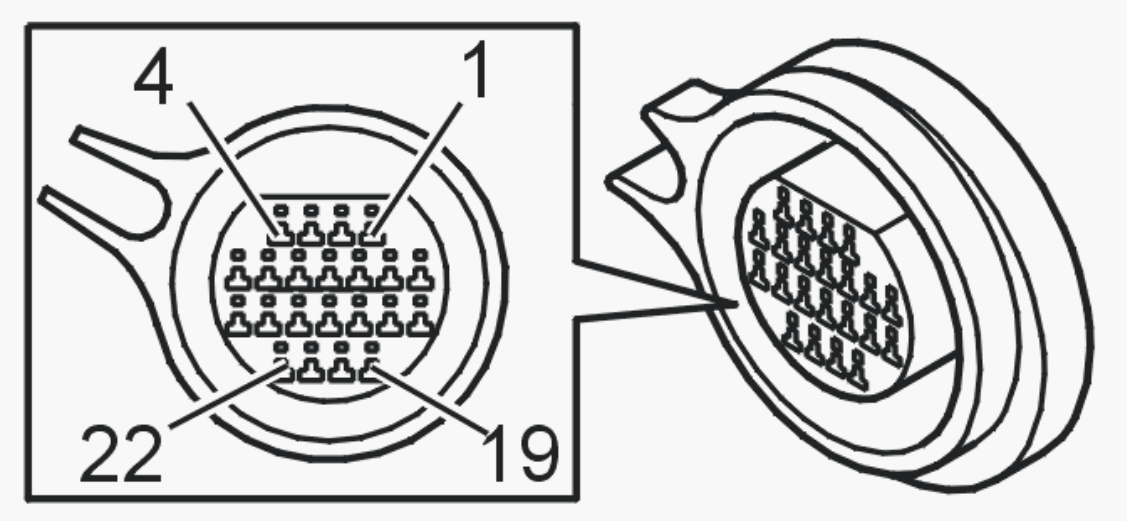


Fig. 5: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

Connect the breakout box. See:**CONNECTING THE BREAKOUT BOX**

NOTE: Do not damage components and terminals when test measuring. Handle components and terminals carefully.

Check 1

Connect an ohmmeter between # A7 and #A8 on the breakout box.

Start the engine and run it at idle speed to raise the temperature of the transmission.

For resistance values, see the table below.

A test measurement must be taken at all three temperatures. This is to establish if the resistance is correct or not.

Component	Note	Resistance (ohms)
Oil temperature sensor	Resistance between the temperature sensor terminals	+10 °C= 5620-7310 ohms
		+25 °C= 3500 ohms
		+110 °C= 220-270 ohms

CHECKING INPUT AND OUTPUT SPEED SENSORS FOR TRANSMISSION

CHECKING THE INPUT AND OUTPUT SPEED SENSORS FOR THE TRANSMISSION

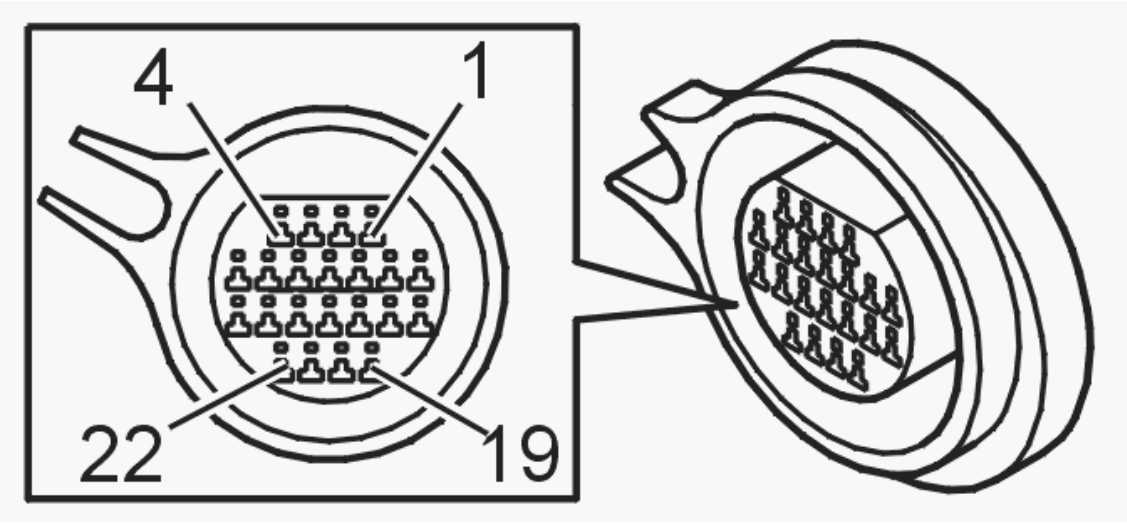


Fig. 6: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

NOTE: The transmission control module (TCM) must not be connected.

Connect the breakout box. See:**CONNECTING THE BREAKOUT BOX**

NOTE: Do not damage components and terminals when test measuring. Handle components and terminals carefully.

Check 1

Connect an ohmmeter between the sensor terminals on the breakout box. Check the resistance. The resistance must be more than 1 Mohms but not infinite.

For transmission input speed sensor:

- terminal #12 and #13 on the breakout box

For transmission output speed sensor:

- terminal #19 and #20 on the breakout box

NOTE: Check the resistance using an ohmmeter which can measure resistances above 10 Mohms.

If the resistance is 0 ohms it means that the cables are short-circuited to each other or that the sensor is faulty.

If resistance is infinite it means that there is an open circuit in the circuit.

Check the wiring. Measure the resistance between a terminal and a ground point.

If the resistance is 0 ohms it means that the cable has a short-circuit to ground.

If resistance is infinite it means that there is an open circuit in the circuit.

Check 2

Connect a temporary voltage supply to:

transmission input speed sensor:

- terminal #A12 on the breakout box

transmission output speed sensor:

- terminal #A19 on the breakout box

Connect a temporary ground terminal via a 100 ohms resistor and an ammeter/voltmeter to:

transmission input speed sensor:

- terminal #A13 on the breakout box

transmission output speed sensor:

- terminal #A20 on the breakout box

Move the gear selector lever to gear position **N** . Raise the vehicle so that the drive wheels hang freely. Measure the current/voltage while spinning the wheels in the same direction. For values, see the table below.

Component	Note	Current (mA)
Transmission input speed sensor Transmission output speed sensor	Current between the sensor terminals	High = 12-16 mA Low= 4-8 mA

Component	Note	Voltage (V)
Transmission input speed sensor Transmission output speed sensor	Voltage between the sensor terminals	Highapprox. 1.4 V below Ubat Lowapprox. 0.8 V below U_{bat}

CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION (B6324S, TF-80SC; B6324S, TF-80SC AWD)

CHECKING SOLENOIDS AND TEMPERATURE SENSOR

CHECKING SHIFT SOLENOIDS

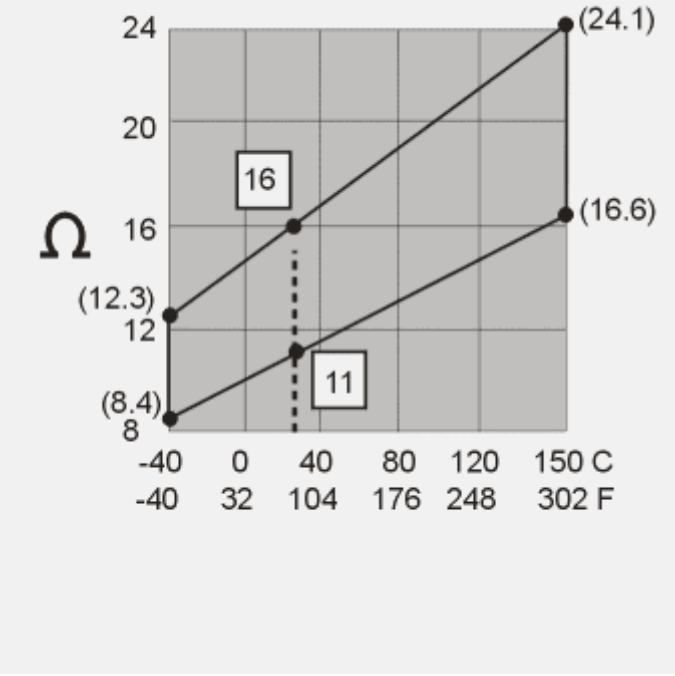


Fig. 7: Identifying Ohms Resistance Temperature Graph

Courtesy of VOLVO CARS CORPORATION

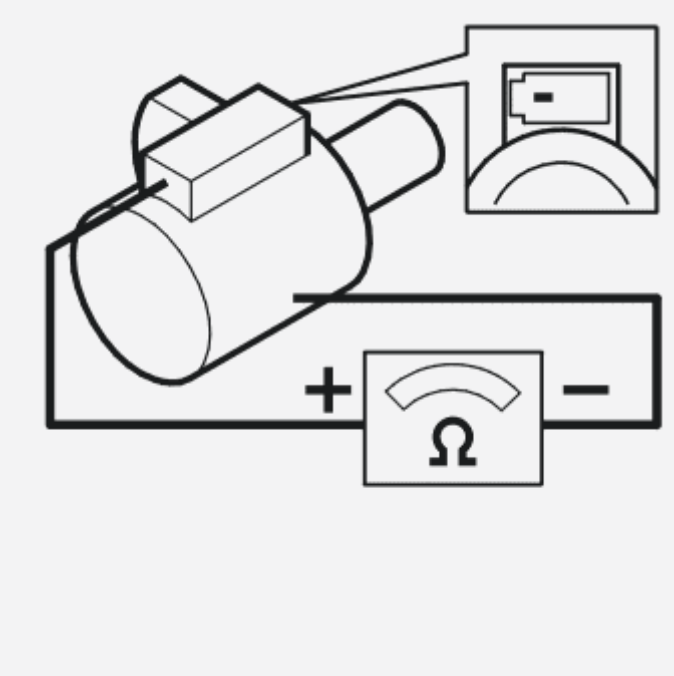


Fig. 8: Identifying Transmission Shift Solenoid Positive (+) And Negative (-) Terminals
Courtesy of VOLVO CARS CORPORATION

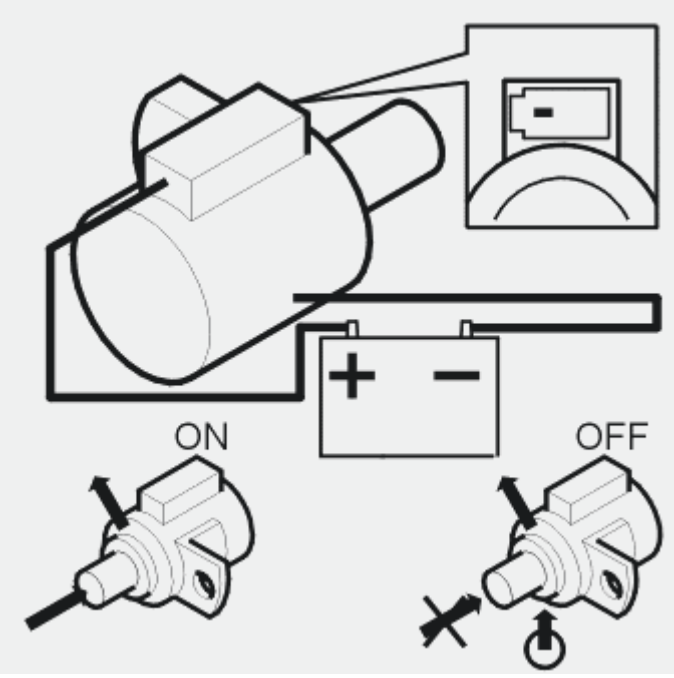


Fig. 9: Identifying Transmission Shift Solenoid On/Off Function With Supplied Battery Voltage
Courtesy of VOLVO CARS CORPORATION

NOTE: Do not damage components and terminals when test measuring. Handle

components and terminals carefully.

Check 1

Connect an ohmmeter between terminal #1 and the outer casing of the gear shift solenoid. For resistance values, see the table below.

When measuring at temperatures other than +20 °C a test measurement must be taken at +20 °C. This is to establish if the resistance is correct or not.

Component	Note	Resistance (ohms)
Gear shift solenoid S1, S2	Resistance between the solenoid pins and the solenoid casing/transmission housing	+20 °C= 11-16 ohms

Check 2

Connect a temporary voltage supply (+) to gear shift solenoid terminal # 1 and a temporary ground terminal (-) to the gearshift solenoid outer casing. Check the function of the solenoid.

Check 3

Connect a temporary voltage supply (+) to gear shift solenoid terminal # 1 and a temporary ground terminal (-) to the gearshift solenoid outer casing. Blow using compressed air according as shown in the illustration. Check the function of the solenoid.

CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

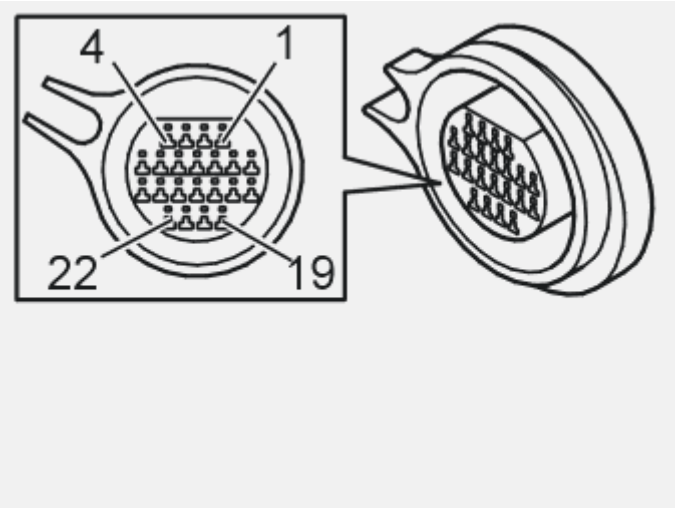


Fig. 10: Identifying 22--Pin Connector
Courtesy of VOLVO CARS CORPORATION

Connect the breakout box. See: **CONNECTING THE BREAKOUT BOX**

NOTE: Do not damage components and terminals when test measuring. Handle components and terminals carefully.

Check 1

Connect an ohmmeter to the breakout box between the terminals for the selected solenoid. For resistance values, see the table below.

for line pressure solenoid SLT:

- terminals #B3 (#3) and #B1 (#1)

for lock-up solenoid SLU:

- terminals #B9 (#9) and #B4 (#4)

for line pressure solenoid SLB1:

- terminals #B21 (#21) and #B16 (#16)

for line pressure solenoid SLC1:

- terminals #B11 (#11) and #B10 (#10)

for line pressure solenoid SLC2:

- terminals #B17 (#17) and #B18 (#18)

for line pressure solenoid SLC3:

- terminals #B14 (#14) and #B22 (#22)

When measuring at temperatures other than +20 °C a test measurement must be taken at +20 °C. This is to establish if the resistance is correct or not.

Component	Note	Resistance (ohms)
Lock-up solenoid (SLU) Line pressure solenoids (SLT), (SLC1),(SLC2),(SLC3),(SLB1)	Resistance between solenoid pins	+20 °C= 5.0-5.6 ohms

CHECKING THE OIL TEMPERATURE SENSOR

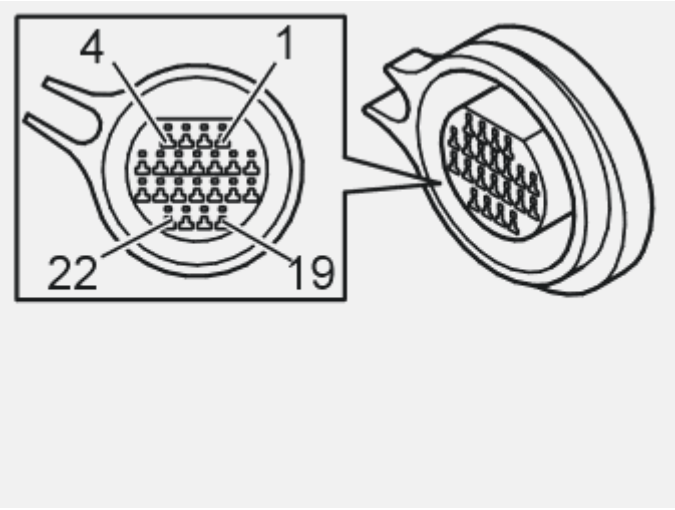


Fig. 11: Identifying 22--Pin Connector
Courtesy of VOLVO CARS CORPORATION

Connect the breakout box. See: **CONNECTING THE BREAKOUT BOX**

NOTE: Do not damage components and terminals when test measuring. Handle components and terminals carefully.

Check 1

Connect an ohmmeter between # A7 and #A8 on the breakout box.

Start the engine and run it at idle speed to raise the temperature of the transmission.

For resistance values, see the table below.

A test measurement must be taken at all three temperatures. This is to establish if the resistance is correct or not.

Component	Note	Resistance (ohms)
Oil temperature sensor	Resistance between the temperature sensor terminals	+10 °C= 5620-7310 ohms
		+25 °C= 3500ohms
		+110 °C= 220-270 ohms

CHECKING INPUT AND OUTPUT SPEED SENSORS FOR TRANSMISSION

CHECKING THE INPUT AND OUTPUT SPEED SENSORS FOR THE TRANSMISSION

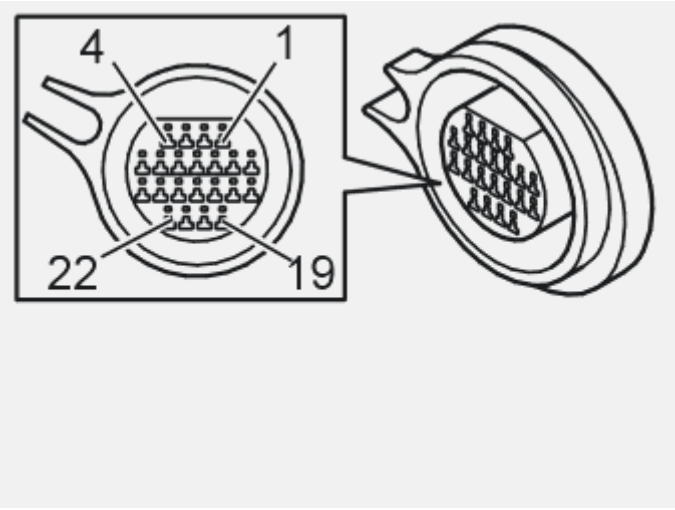


Fig. 12: Identifying 22--Pin Connector
Courtesy of VOLVO CARS CORPORATION

NOTE: The transmission control module (TCM) must not be connected.

Connect the breakout box. See: **CONNECTING THE BREAKOUT BOX**

NOTE: Do not damage components and terminals when test measuring. Handle components and terminals carefully.

Check 1

Connect an ohmmeter between the sensor terminals on the breakout box. Check the resistance. The resistance must be more than 1 Mohms but not infinite.

For transmission input speed sensor:

- terminal #12 and #13 on the breakout box

For transmission output speed sensor:

- terminal #19 and #20 on the breakout box

NOTE: Check the resistance using an ohmmeter which can measure resistances above 10 Mohms.

If the resistance is 0 ohms it means that the cables are short-circuited to each other or that the sensor is faulty.

If resistance is infinite it means that there is an open circuit in the circuit.

Check the wiring. Measure the resistance between a terminal and a ground point.

If the resistance is 0 ohms it means that the cable has a short-circuit to ground.

If resistance is infinite it means that there is an open circuit in the circuit.

Check 2

Connect a temporary voltage supply to:

transmission input speed sensor:

- terminal #A12 on the breakout box

transmission output speed sensor:

- terminal #A19 on the breakout box

Connect a temporary ground terminal via a 100 ohms resistor and an ammeter/voltmeter to:

transmission input speed sensor:

- terminal #A13 on the breakout box

transmission output speed sensor:

- terminal #A20 on the breakout box

Move the gear selector lever to gear position **N** . Raise the vehicle so that the drive wheels hang freely. Measure the current/voltage while spinning the wheels in the same direction. For values, see the table below.

Component	Note	Current (mA)
Transmission input speed sensor Transmission output speed sensor	Current between the sensor terminals	High = 12-16 mA Low= 4-8 mA

Component	Note	Voltage (V)
Transmission input speed sensor Transmission output speed sensor	Voltage between the sensor terminals	Highapprox. 1.4 V below Ubat Lowapprox. 0.8 V below U_{bat}

CONNECTING BREAKOUT BOX, TRANSMISSION CONTROL MODULE (TCM)

Special tools:

see **9511428**

see **9511504**

CONNECTING THE BREAKOUT BOX TO THE AUTOMATIC TRANSMISSION CONTROL MODULE (TCM)

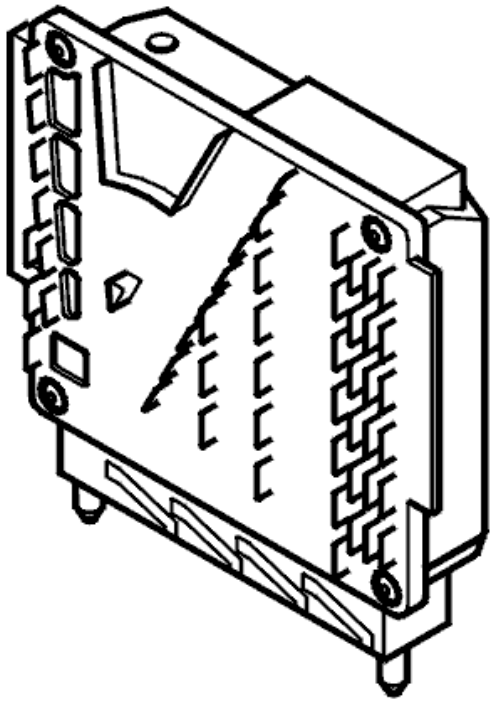


Fig. 13: Identifying Transmission Control Module
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Disconnect the automatic transmission control module (TCM)) according to. See **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .
- Check that the male and female terminals in the control module and control module connector are intact and secure and that the wiring to the female terminals is properly secured to the pins.
- Pay particular attention to the terminals related to the diagnostic trouble code (DTC)/symptom. See **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .
- Connect adapter see **9511504** to the control module connector (wiring side) and connect breakout box see **9511428** to the adapter.
- The breakout box is designed to facilitate reading off the control module input and output signals when the control module is connected; and the cable and component resistance when the control module is disconnected. Using a breakout box reduces the risk of accidental short-circuits and damaged connector pins.

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter

is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.

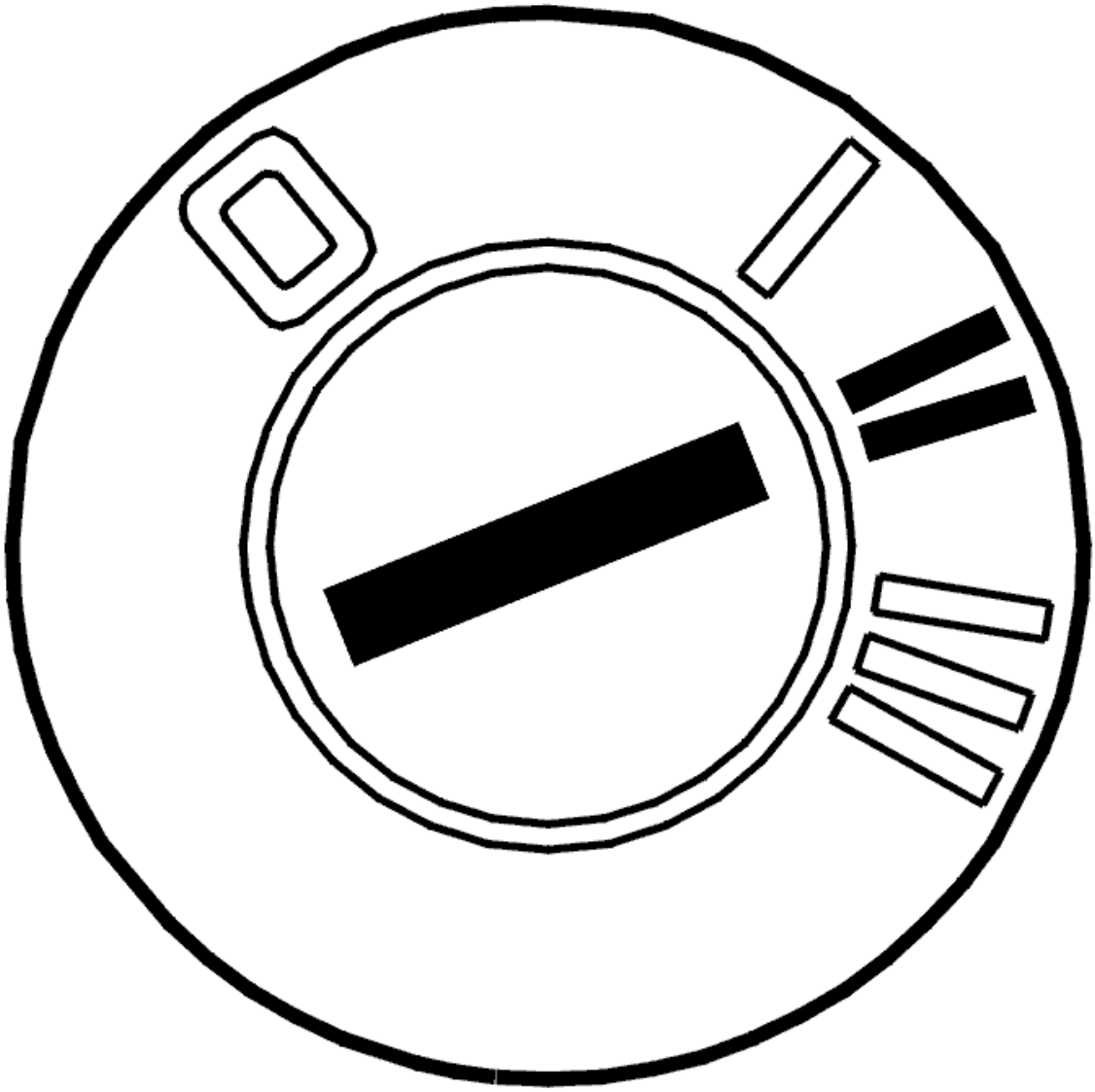


Fig. 14: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by using the VCT2000 (or appropriate scan tool).

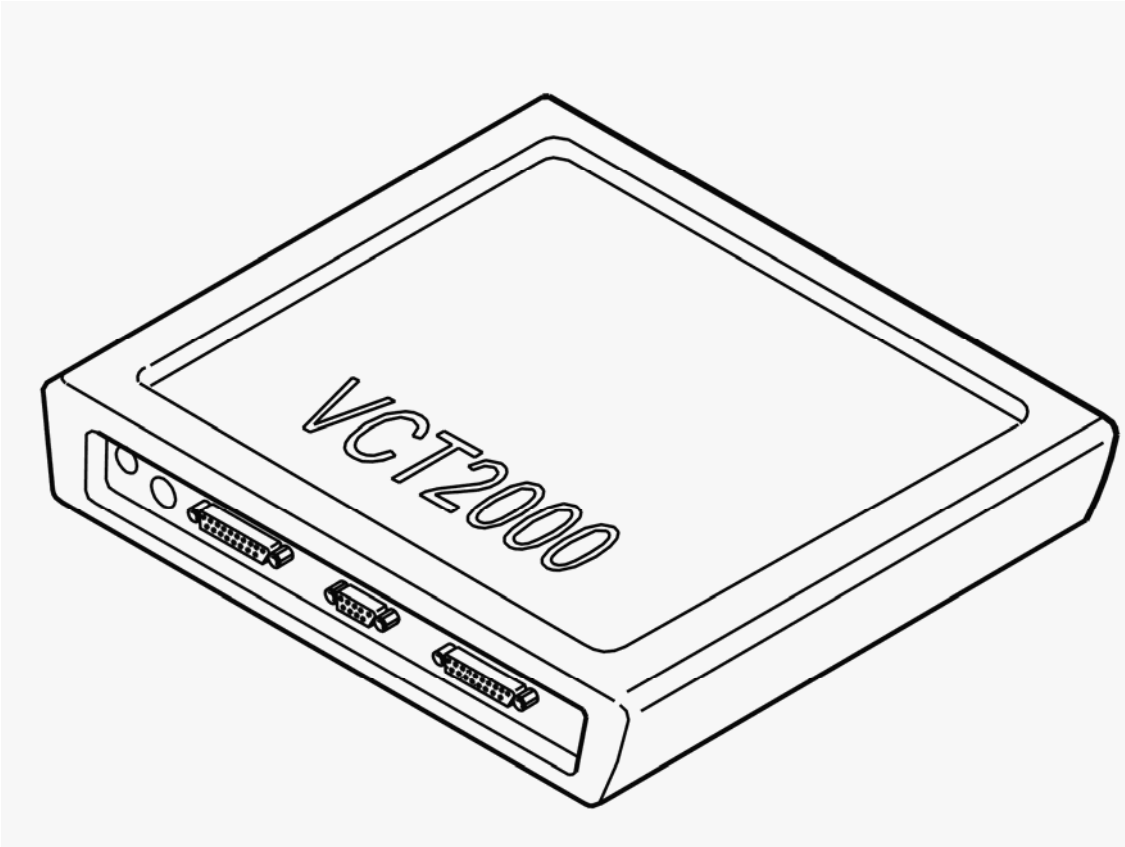


Fig. 15: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVE SCHEDULE, DESCRIPTION** .

TRANSMISSION

Power transmission

TRANSMISSION

EMERGENCY MODE IN CASE OF MALFUNCTION

EXPLANATION

The Transmission Control Module (TCM) activates the Emergency mode function in the event of certain malfunctions so that any damage is not made worse, resulting in complete transmission breakdown. The Transmission Control Module (TCM) can activate the function in 2 different stages, depending on the severity of the malfunction.

Function	Description
Emergency mode 1	-Adaptation function is blocked. -The lock-up function is blocked. -Slip lock-up function is blocked. -Neutral check function is blocked. -The transmission only shifts to 3rd gear and reverse gear. All other shifts are blocked.
Emergency mode 2	-The transmission only shifts to 5th gear and reverse gear. All other shifts are blocked.

TRANSMISSION

Engine with mountings and equipment-Ignition and control systems

TRANSMISSION

PEDAL POSITION SENSOR, CLUTCH, REPLACING

NOTE: **As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.**

REMOVAL

CLUTCH PEDAL POSITION SENSOR

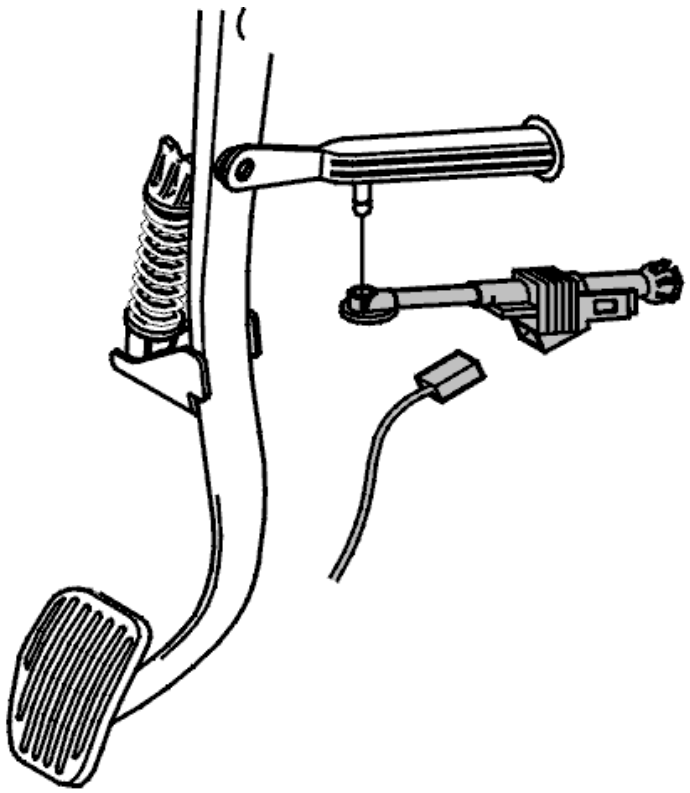


Fig. 1: Clutch Pedal Position Sensor
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Remove the soundproofing panel. See **SOUNDPROOFING PANEL, REPLACING**
- Remove the two ball connectors from the master cylinder and the arm

- Disconnect the connector.

INSTALLATION

CLUTCH PEDAL POSITION SENSOR

In reverse order.

TRANSMISSION

Power transmission

TRANSMISSION

FROZEN VALUES FOR THE TRANSMISSION CONTROL MODULE (TCM), DESCRIPTION

GENERAL INFORMATION

Frozen values are parameter values that are stored when a diagnostic trouble code (DTC) is stored.

Not all the parameters described need to be implemented in the control module. This varies from system to system. Parameters can also vary depending on which type of transmission the car has.

Certain parameters can be displayed without a value or with implausible values. This can occur if the control module has not stored a value, when a base value has been stored instead or if the parameter is received via the CAN network when there is an error on the CAN network. For example, the transmission speed value may be excessive if the fault occurs for the transmission speed sensor.

Definition of an operating cycle

The definition of an operating cycle varies depending on the software version.

Alternative definitions

- The ignition has been switched off, then switched on and finally switched off again
- The ignition has been switched off, the engine started and finally the ignition switched off again
- The ignition has been off, the engine started, the car driven at a speed above 30 km/h for more than 3 minutes and finally the ignition switched off again.

DIAGNOSTIC TROUBLE CODE (DTC)

The diagnostic trouble code (DTC) the frozen values are stored for.

COUNTER 2

Counts the number of operating cycles in which the tests have been completed without the fault being detected again. If the value is zero there is a fault or the control module test for the fault has not been carried out.

ENGINE, STATUS

The value indicates the status of the engine when the diagnostic trouble code (DTC) was stored.

OFF = Engine not running.

On = Engine running.

OUTSIDE TEMPERATURE

The value indicates the outside temperature when the diagnostic trouble code (DTC) was stored. The transmission control module (TCM) obtains the value via the Control Area Network (CAN) from the central electronic module.

COUNTS - THE OPERATING CYCLES SINCE THE DIAGNOSTIC TROUBLE CODE (DTC) WAS FIRST/LAST STORED

The value indicates the number of operating cycles since the diagnostic trouble code (DTC) was **first** or **last** stored.

TIME SINCE THE DIAGNOSTIC TROUBLE CODE (DTC) WAS FIRST/LAST STORED

The time in hours since the diagnostic trouble code (DTC) was **first** or **last** stored. The transmission control module (TCM) obtains the value via the Control Area Network (CAN) from the central electronic module. The time is the total time that the central electronic module has been running.

The difference between the "last" time and the "first" time is the time from the when the diagnostic trouble code (DTC) was first stored to when it was last stored. If the same amount of hours are displayed, the fault has only been detected once.

THE VOLTAGE IN THE CENTRAL ELECTRONIC MODULE WHEN THE DIAGNOSTIC TROUBLE CODE (DTC) WAS FIRST/LAST STORED

The value indicates the voltage in volts the **first** or **last** time the diagnostic trouble code (DTC) was stored. The transmission control module (TCM) obtains the value via the Control Area Network (CAN) from the central electronic module.

TOTAL MILEAGE SINCE THE DIAGNOSTIC TROUBLE CODE (DTC) WAS FIRST / LAST STORED

The value indicates the mileage in kilometers and miles the **first** and **last** time the diagnostic trouble code (DTC) was stored. The transmission control module (TCM) obtains the value via the Control Area Network (CAN) from the central electronic module.

PASSENGER COMPARTMENT TEMPERATURE

The value indicates the passenger compartment temperature when the diagnostic trouble code (DTC) was stored. The transmission control module (TCM) obtains the value via the Control Area Network (CAN) from the central electronic module.

OIL TEMPERATURE

The value indicates the temperature of the transmission fluid. The value is calculated based on the oil temperature sensor signal.

GEAR RATIOS

The value indicates the transmission gear ratio.

EXPECTED GEAR RATIO

The value indicates the gear ratio anticipated by the transmission control module (TCM).

CALCULATED SPEED OF THE SIGNAL FROM THE TRANSMISSION SPEED SENSOR (OUTPUT SPEED)

The value indicates the calculated speed based on the signal from the transmission speed sensor (output speed).

SPEED SIGNAL, CALCULATED FROM THE ENGINE SPEED (RPM)

The value indicates the speed, calculated using the engine speed.

GEAR ACCORDING TO THE SHIFT SOLENOIDS

The value indicates the selected gear (according to the gear solenoids). The value indicated depends on the transmission type.

The following values can be displayed: Back-up (reverse) gear, Gear 1, Gear 2, Gear 3, Gear 4, Gear 5.

GEAR-SHIFT POSITION SENSOR

The value indicates the gear-shift position sensor gear-shift position sensor based on the signal from the gear selector assembly. The following values can be displayed: P, R, N, D, 4/Tip, 3/Tip, 2, L.

ACCELERATOR PEDAL (AP) POSITION

The value indicates the position of the accelerator pedal (AP). The transmission control module (TCM) obtains the value via the Control Area Network (CAN) from the central electronic module.

TRANSMISSION SPEED SENSOR, OUTPUT SPEED

The value indicates the output speed from the transmission speed sensor.

TRANSMISSION SPEED SENSOR, INPUT SPEED

The value indicates the input speed from the transmission speed sensor. The speed can be generated with the engine idling and the gear selector in P/N position. If the gear selector is in any other position, a gear is engaged and the transmission input shaft is connected to the output shaft and an RPM will not be indicated until the car is driven. Depending on slippage in the torque converter the transmission speed and the engine speed will differ when the lock-up function is not engaged. With lock-up engaged the transmission speed should be the same as engine speed (RPM).

GEAR-SHIFT POSITION SENSOR, POSITION

The value indicates the calculated position of the gear-shift position sensor. The following values can be displayed: P, R, N, D, 4/Tip, 3/Tip, 2, L.

ENGINE SPEED (RPM)

The engine control module (ECM) transmits the engine speed (RPM) on the Control area network (CAN) from which the transmission control module (TCM) retrieves the signal which it then compares with its own speed sensor signal.

The value indicates the engine speed (RPM).

POSITION OF THE GEAR-SHIFT POSITION SENSOR ABCPA

The value indicates the position of the gear-shift position sensor. See the table below.

• = High signal

- = Low signal (grounded)

AW50-42 (WITH 6 AND 7 GEAR POSITIONS)

Gear shift position	A	B	C	PA
P	-	•	•	-
R	-	-	•	•
N	•	-	•	-
D	•	-	-	•
3	-	-	-	-
2 (L)	-	•	-	•
1	•	•	-	-

AW55-50 (ALSO WITH GEARTRONIC)

Gear shift position	A	B	C	PA
P	-	•	•	-
R	-	-	•	•
N	•	-	•	-
D (Geartronic)	•	-	-	•
4	-	-	-	-
3	-	•	-	•
L	•	•	-	-

4T65 (ALSO WITH GEARTRONIC)

Gear shift position	A	B	C	PA
P	-	•	•	-
R	-	-	•	•
N	•	-	•	-
D	•	-	-	•
3 (Geartronic)	-	-	-	-
2	-	•	-	•
1	•	•	-	-

SYSTEM VOLTAGE

The value indicates the system voltage. The value is given in volts (V).

ENGINE TORQUE

The value indicates the engine torque. The value is given in Nm.

ENGINE COOLANT TEMPERATURE (ECT)

The engine control module (ECM) transmits a signal indicating the engine coolant temperature (ECT) on the Control area network (CAN). The value indicates the temperature. The value is given in °C.

KICKDOWN, STATUS

The engine control module (ECM) transmits a signal indicating the accelerator pedal (AP) position. During rapid acceleration, with the accelerator pedal (AP) almost fully depressed, the transmission control module (TCM) receives a signal about kickdown.

Off = Kickdown is not activated.

On = Kickdown is activated.

GEAR ACCORDING TO SOLENOIDS

The value indicates the calculated gear position according to the control module. The value indicated depends on the transmission type.

The following values can be displayed: Back-up (reverse) gear, Gear 1, Gear 2, Gear 3, Gear 4, Gear 5.

TRANSMISSION

Power transmission

TRANSMISSION

GEARBOX CABLES, REPLACING

Special tools:

see **9997071**

see **9997077**

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

REMOVAL

REMOVING THE AIR CLEANER (ACL) HOUSING

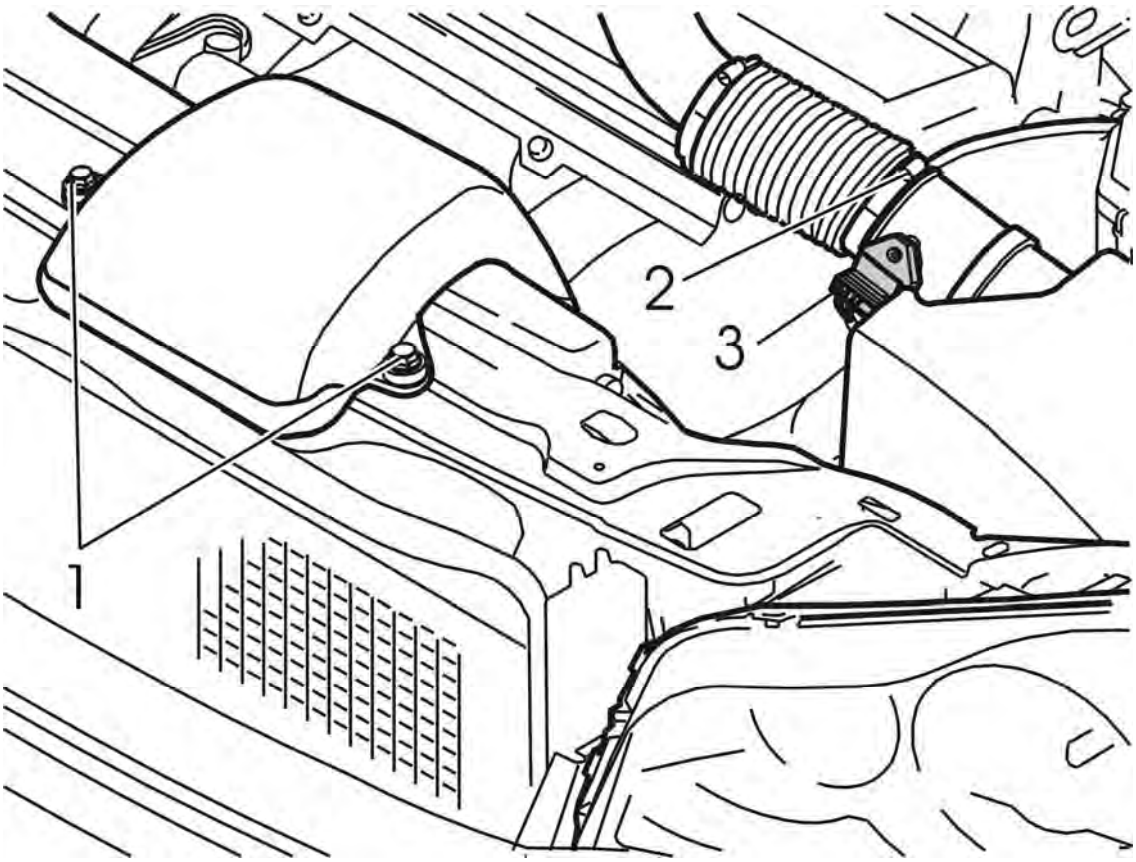


Fig. 1: Air Cleaner (ACL) Housing

Courtesy of VOLVO CARS CORPORATION

Remove:

- the fresh air intake hose
- the air cleaner (ACL) housing assembly with the intake pipe.

REMOVE THE MECHANICAL GEAR SELECTOR CABLES FROM THE BRACKET AND THE LEVERS ON THE GEARBOX

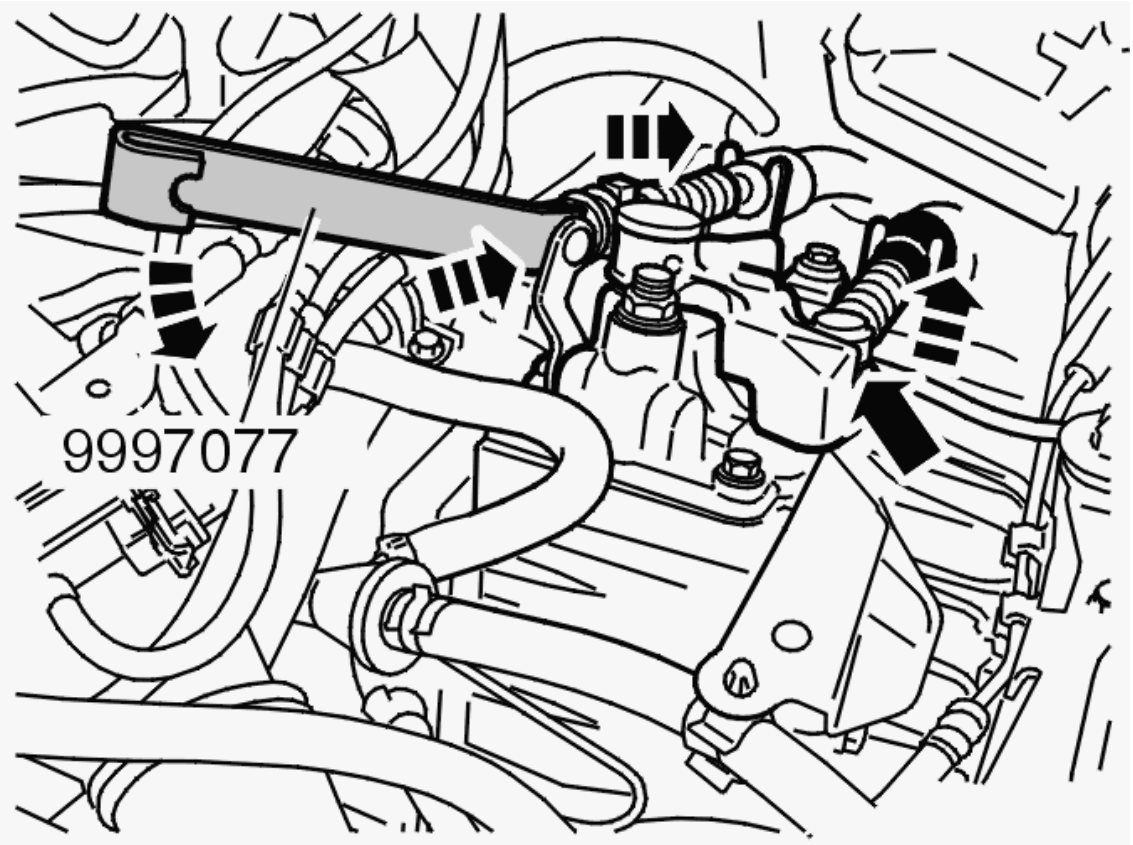


Fig. 2: Identifying Gear Selector Cables
Courtesy of VOLVO CARS CORPORATION

Remove:

- the gear selector cables from the levers. Use jimmy bar see **9997077**
- the mechanical cables from the bracket by moving the sleeves back on the cable sleeves.

REMOVING CENTRE TUNNEL CONSOLE

Remove the center console. See **CENTER CONSOLE, REPLACING** .

REMOVING THE RUBBER LEAD-IN

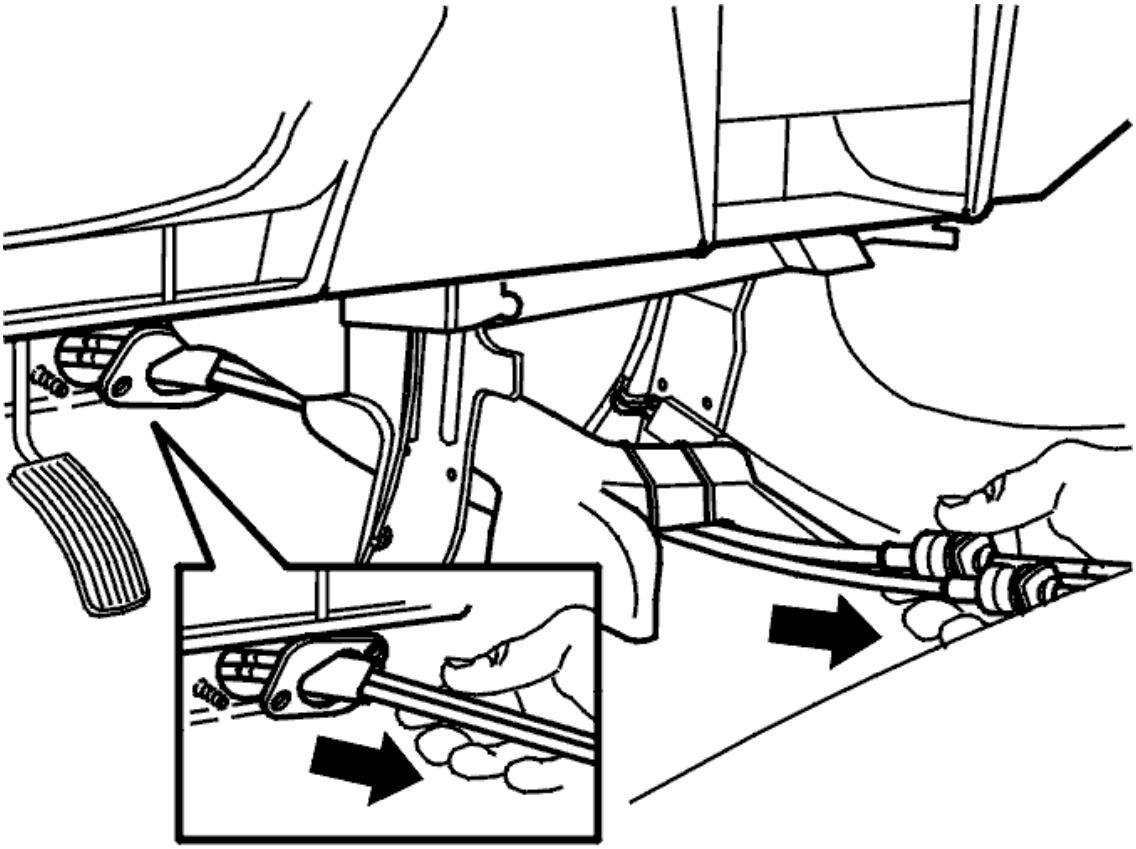


Fig. 3: Removing Rubber Lead-In
Courtesy of VOLVO CARS CORPORATION

Fold and roll the carpet under the accelerator pedal (AP). Fold and roll the carpet under the accelerator pedal (AP).

Remove the 2 nuts for the grommet for the gear selector cables at the firewall. Pull the gear selector cables approximately 10 cm into the passenger compartment.

REMOVING THE GEAR SELECTOR CABLE FROM THE BALL JOINT

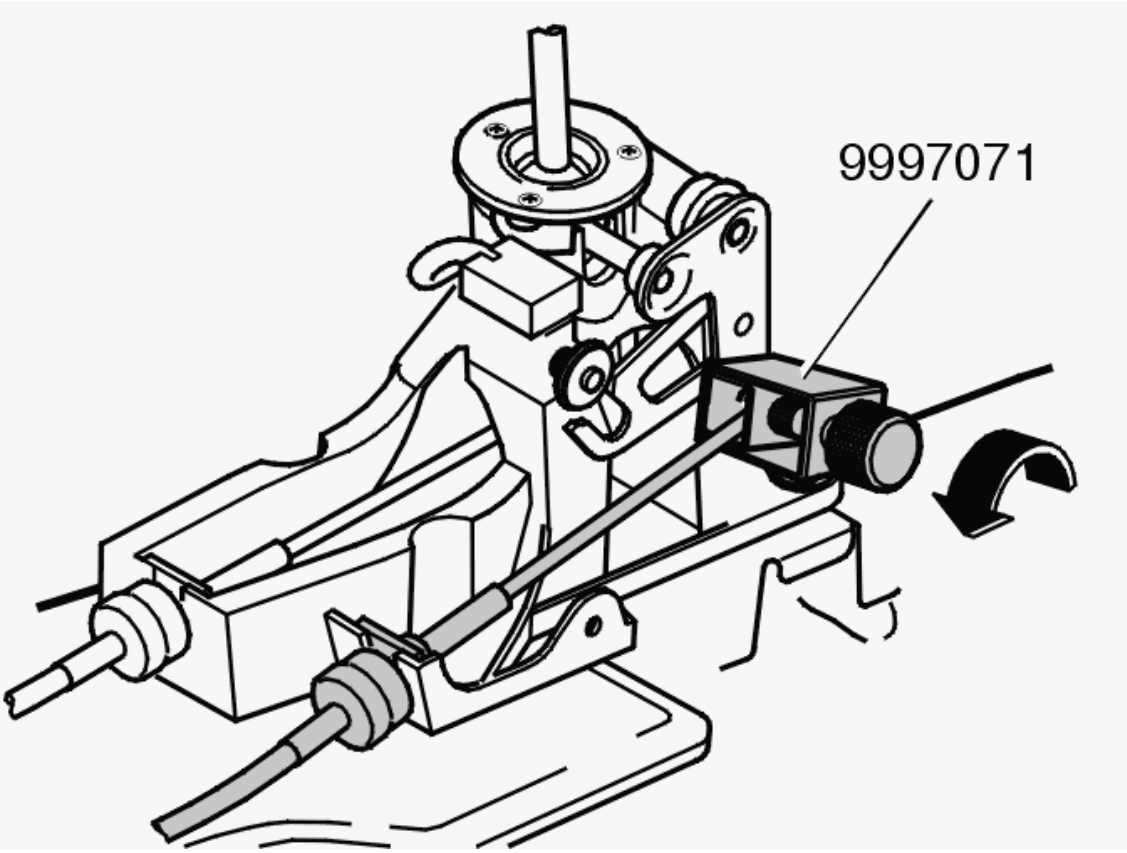


Fig. 4: Identifying Gear Selector Cable Removed From Ball Joint
Courtesy of VOLVO CARS CORPORATION

Remove the gear selector cable from the ball joint. Use puller see **9997071** .

HINT: The screw on the puller is turned counter-clockwise to pull the gear selector cable loose.

REMOVING THE GEAR SELECTOR ASSEMBLY

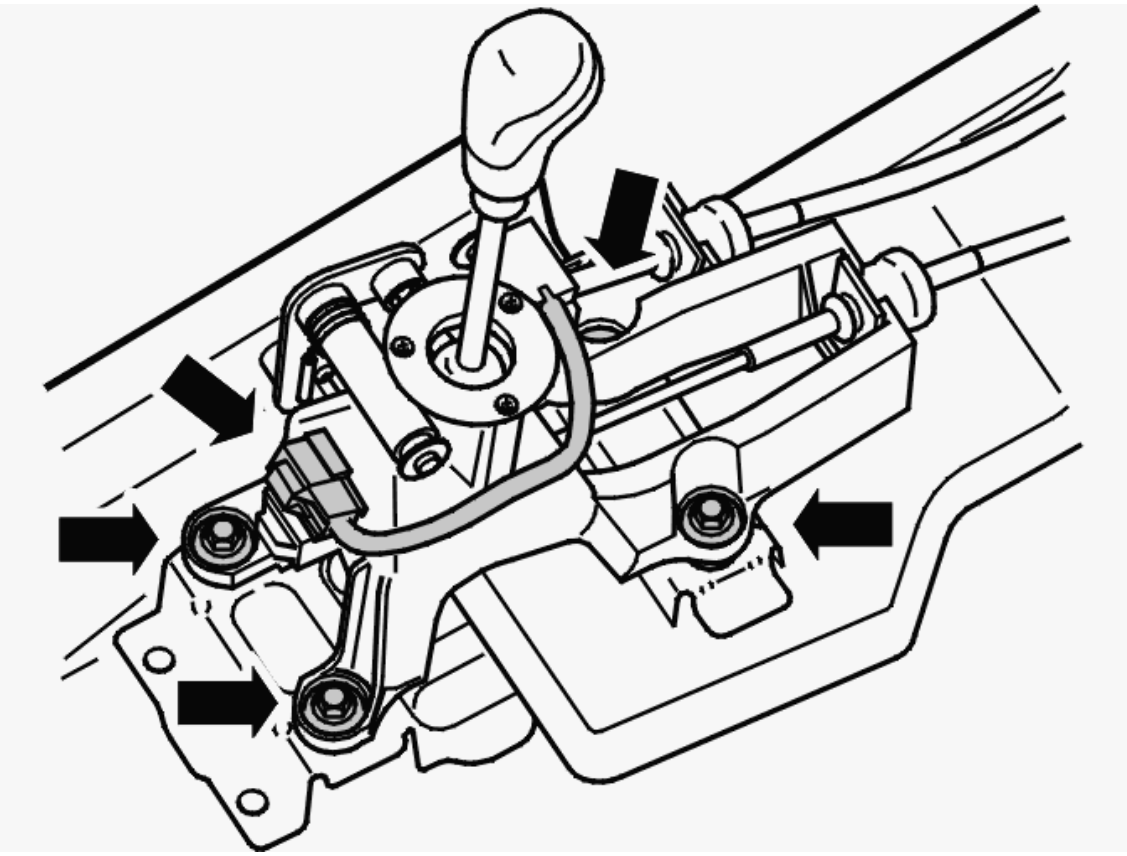


Fig. 5: Identifying Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Remove:

- the connector
- the screws for the gear selector assembly.

Lift the gear selector assembly and twist it so that the lower gear selector cable is accessible.

REMOVING THE GEAR SELECTOR CABLE FROM THE BALL JOINT AND GEAR SELECTOR ASSEMBLY

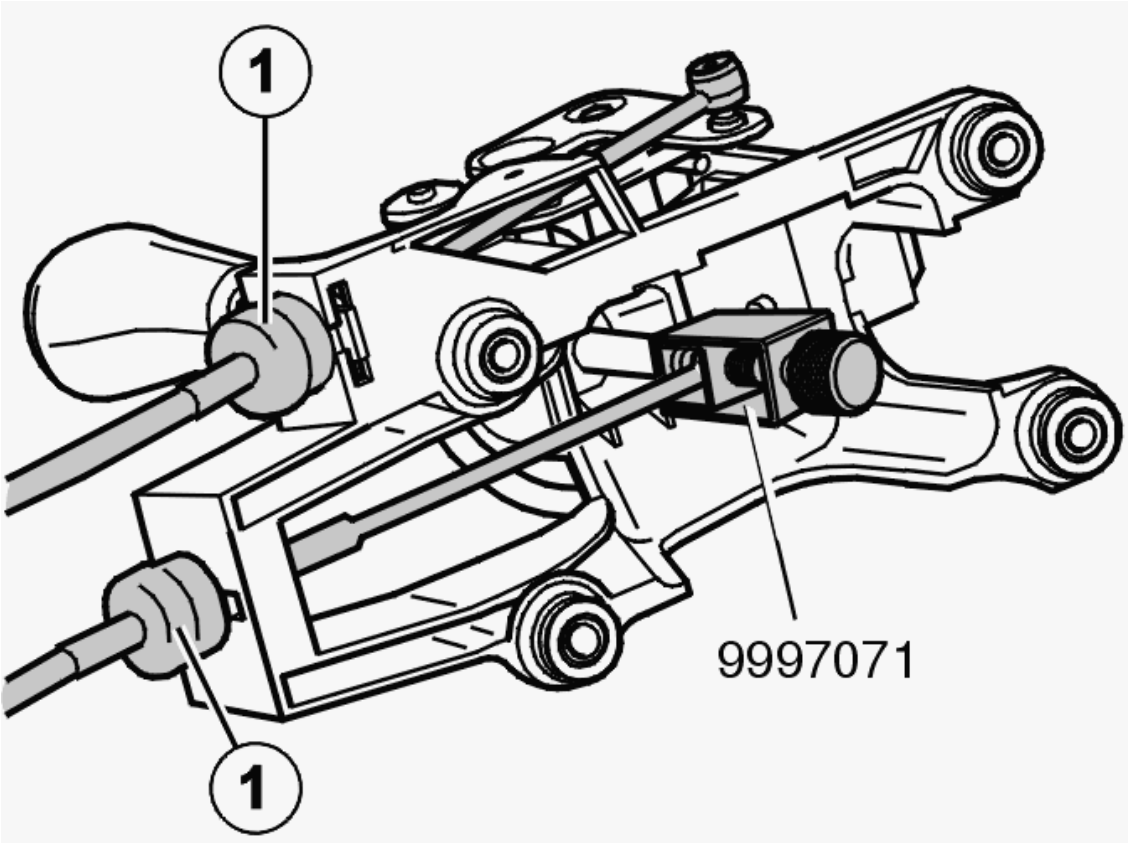


Fig. 6: Identifying Gear Selector Cable Removal From Ball Joint And Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Remove the gear selector cable from the ball joint. Use puller see **9997071** .

HINT: The screw on the puller is turned counter-clockwise to pull the gear selector cable loose.

Carefully pry up the catches (1) and slide the cable sleeves upwards on both the gear selector cables.

Remove the gear selector assembly.

PREPARATIONS FOR INSTALLING THE MECHANICAL CABLES

Secure a cable using tape to the engine compartment end of the mechanical cable before pulling it out to make reinstallation easier

REMOVING THE GEAR SELECTOR CABLES

Pull the gear selector cables straight out.

HINT: It is easier taking one gear selector cable through the firewall at a time.

HINT: Do not damage the cable harnesses in the center console when removing the gear selector cable.

INSTALLATION

NOTE: For tightening torques, see TIGHTENING TORQUE .

INSTALLING THE GEAR SELECTOR CABLES FROM THE INSIDE OF THE PASSENGER COMPARTMENT

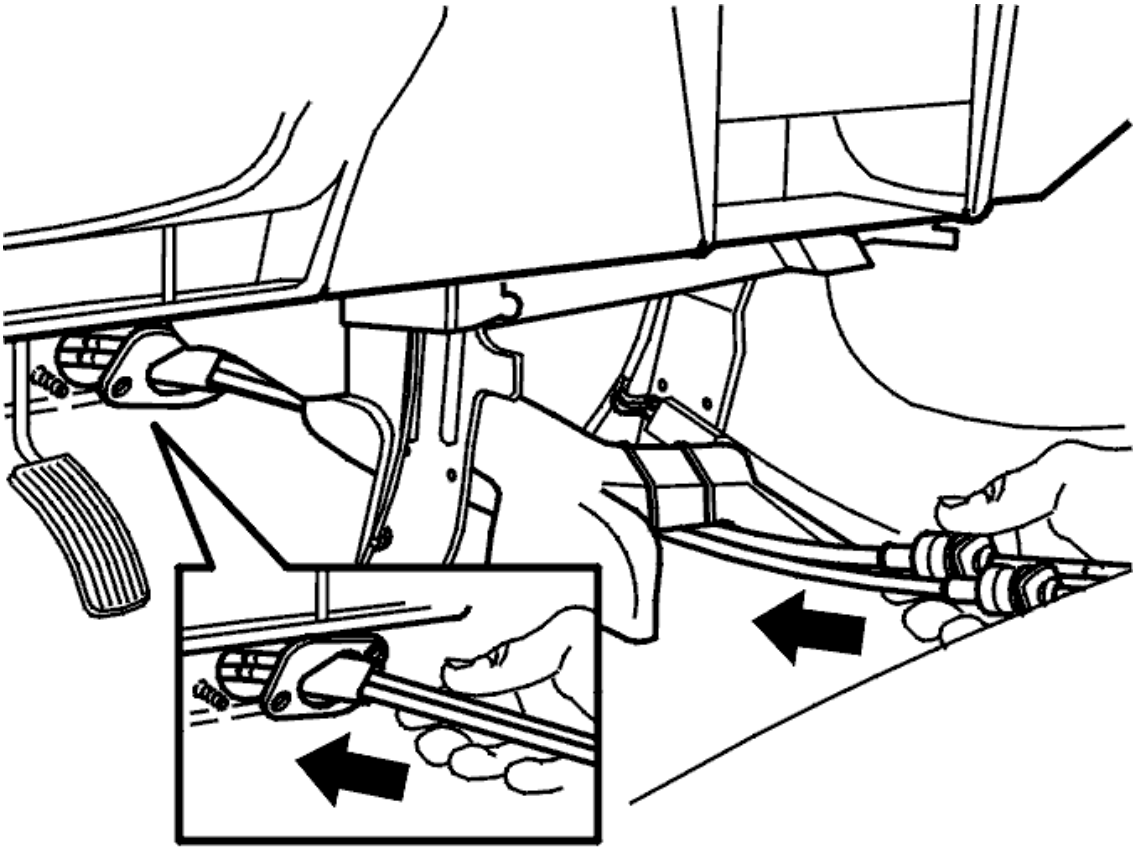


Fig. 7: Installing Gear Selector Cables From Inside Of Passenger Compartment
Courtesy of VOLVO CARS CORPORATION

Install the gear selector cables under the heater unit on the left-hand side, down towards the hole in the firewall.

NOTE: Be extremely careful when running the rubber bellows for the gear selector cables through the hole in the firewall. Do not damage the gear selector cables.

Feed the gear selector cables through the hole slightly.

HINT: Have a colleague pull through the pre-routed cable.

Pull out the gear selector cables so that the rubber grommet is approximately 10 cm from the firewall.

INSTALLING THE GEAR SELECTOR CABLES AND GEAR SELECTOR ASSEMBLY

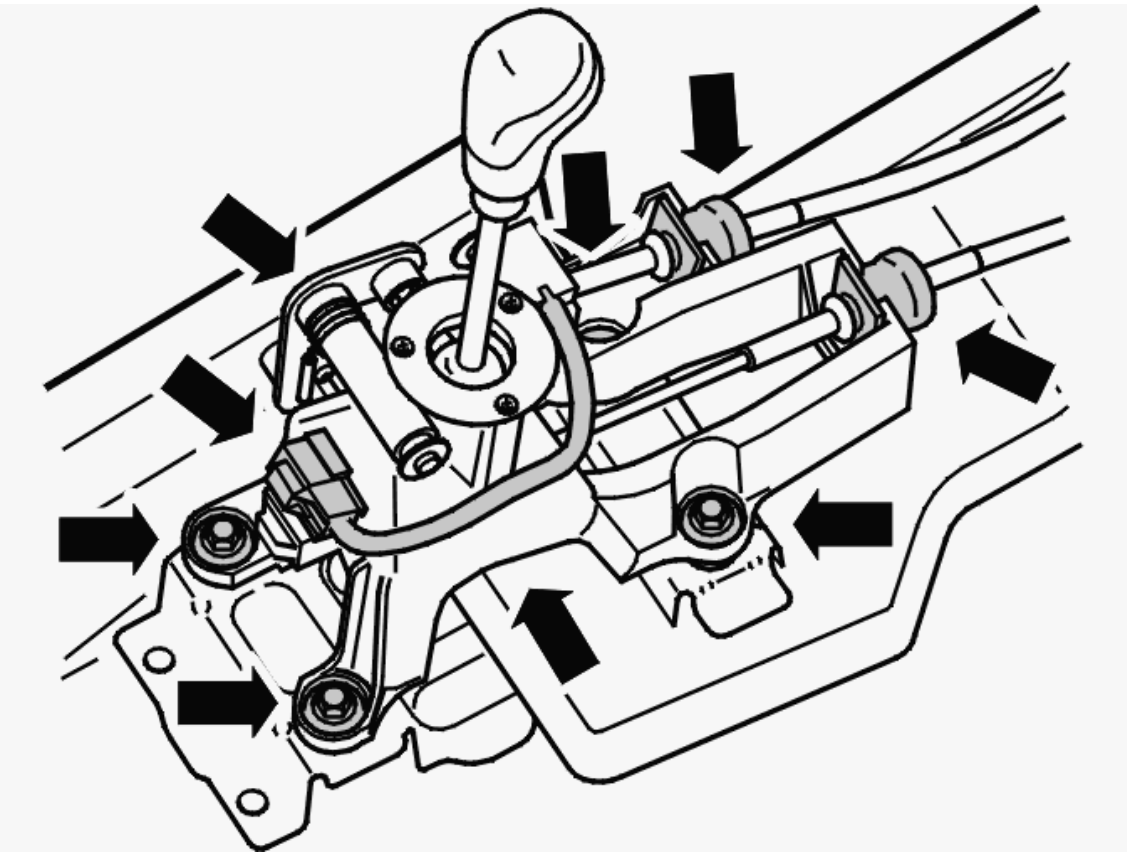


Fig. 8: Identifying Gear Selector Cables And Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Install:

- the gear selector cables on the levers on the gear selector assembly. Press into place by hand
- the sleeves for the gear selector cables on the gear selector assembly
- the gear selector assembly on the bodywork (M8)
- the connector on the gear selector assembly.

INSTALLING SERVICE CLIPS

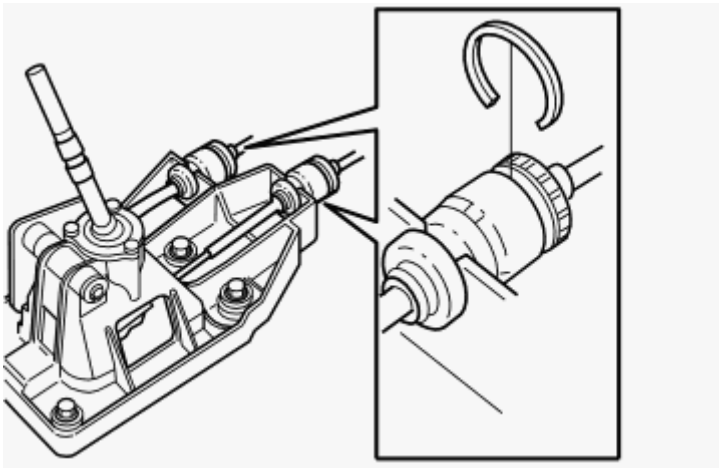


Fig. 9: Gear Selector And Clip
Courtesy of VOLVO CARS CORPORATION

NOTE: The automatic transmission has a gear selector cable while the manual transmission has two gear selector cables.

Ensure that the gear selector cable is engaged before fitting the blue clip. Press the clip into position as shown in the illustration.

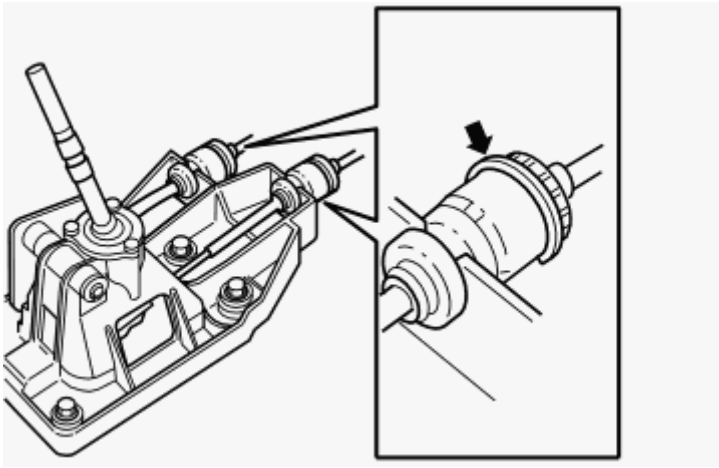


Fig. 10: Clip Positioned In Groove
Courtesy of VOLVO CARS CORPORATION

Check that the clip is positioned in the groove as shown in the illustration.

INSTALLING THE RUBBER GROMMET

Align the grommet on the studs. Install the M6 nuts.

FEEDING IN THE GEAR SELECTOR CABLE FROM THE ENGINE COMPARTMENT

Use the cable to correctly route the gear selector cables. The gear selector cable must be routed past the steering

gear and up to the gearbox bracket.

INSTALLING THE CENTRE TUNNEL CONSOLE

Install the center console. See **CENTER CONSOLE, REPLACING** .

INSTALLING THE GEAR SELECTOR CABLES ON THE GEARBOX

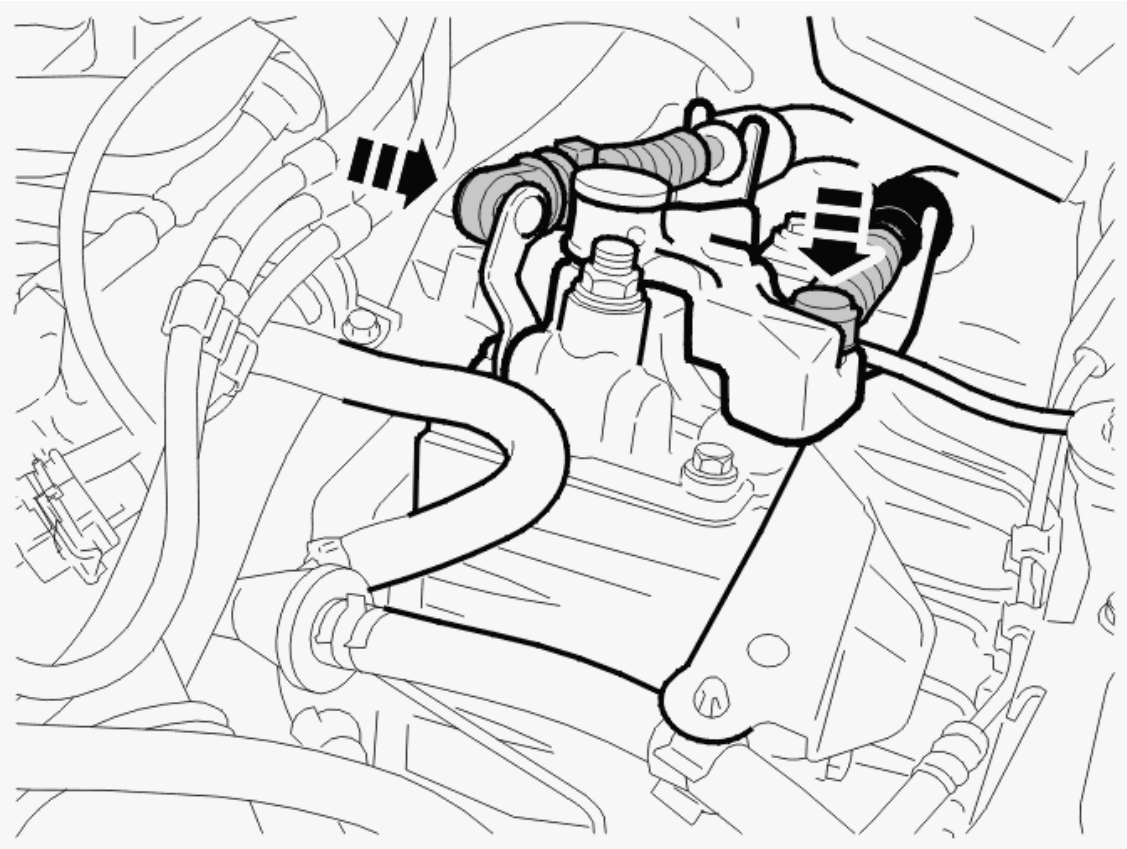


Fig. 11: Connecting Gear Selector Cables On Bracket And Inner Lever
Courtesy of VOLVO CARS CORPORATION

NOTE: Connect the gear selector cable with the white sleeve to the inner hole on the bracket and the inner lever to the gearbox.

Release the adjuster on the mechanical cable before installing it.

Install:

- the gear selector cables on the bracket
- the outer gear selector cable on the gear selector cable. Press into place by hand.

Fig. 12: Identifying Gear Selector Lever
Courtesy of VOLVO CARS CORPORATION

Check that the gear selector lever is in neutral.

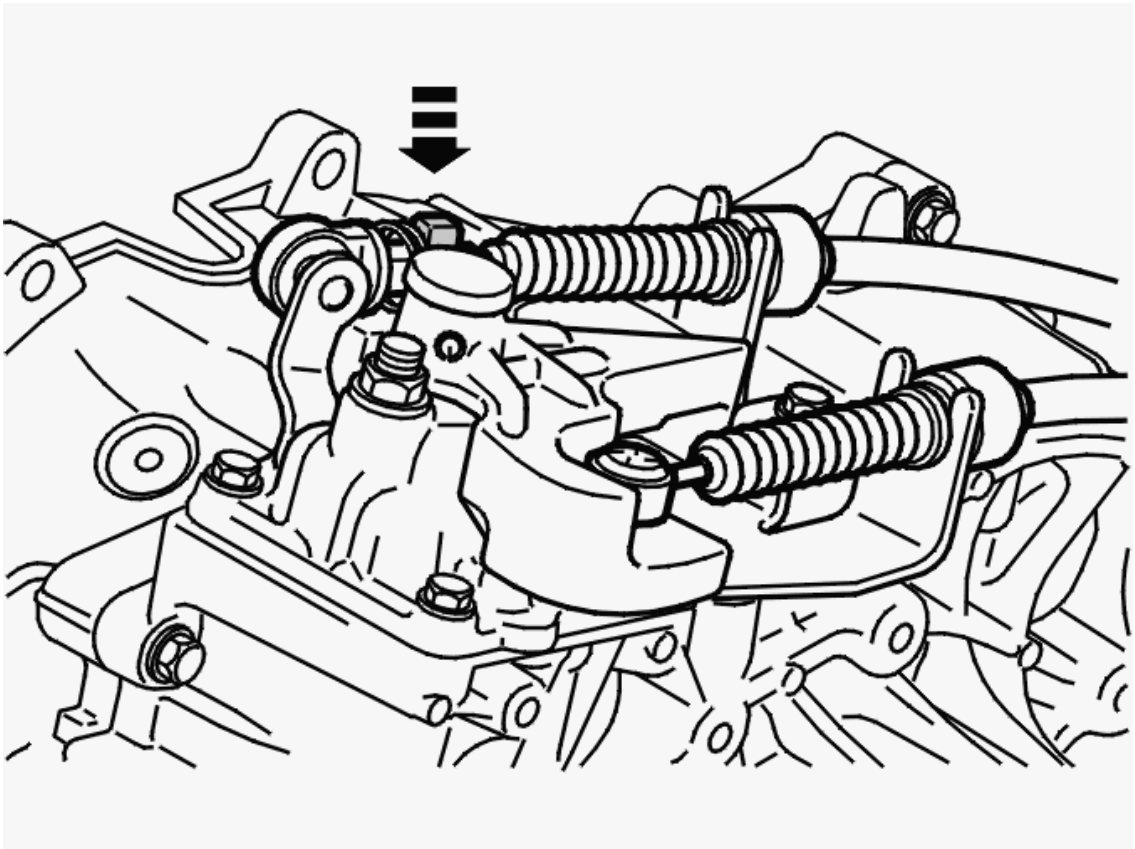


Fig. 13: Installing Inner Gear Selector Cable On Lever
Courtesy of VOLVO CARS CORPORATION

Install the inner gear selector cable on the lever. Press into place by hand.

Press the adjuster into place so that it is locked on the cable.

INSTALLING SERVICE CLIPS

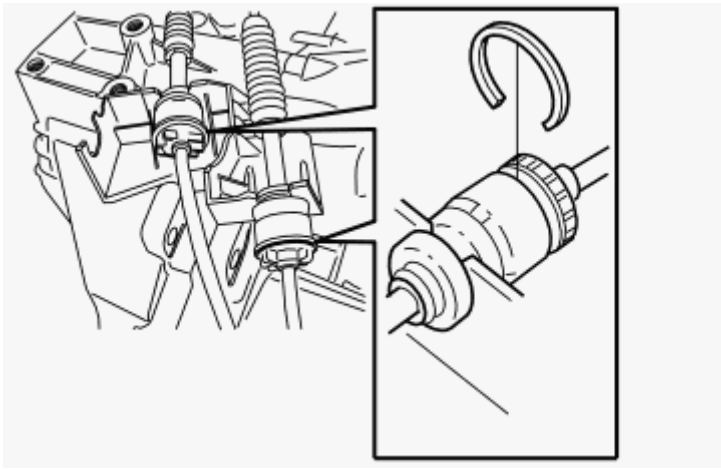


Fig. 14: Gear Selector Cable And Clip
Courtesy of VOLVO CARS CORPORATION

NOTE: The automatic transmission has a gear selector cable while the manual transmission has two gear selector cables.

Ensure that the gear selector cable is engaged before fitting the blue clip. Press the clip into position as shown in the illustration.

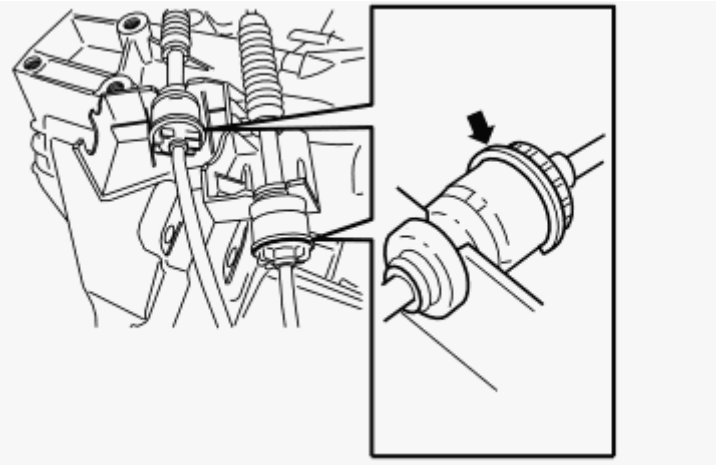


Fig. 15: Clip Positioned In Groove
Courtesy of VOLVO CARS CORPORATION

Check that the clip is positioned in the groove as shown in the illustration.

INSTALLING THE AIR CLEANER (ACL) HOUSING

Install the air cleaner (ACL) housing, including all hoses and electrical terminals.

FINAL CHECK

Check that the gear positions are working.

GEARBOX INPUT SPEED SENSOR, REPLACING

NOTE: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

REMOVING/INSTALLING

REMOVAL

Remove/install the control module. See: **CONTROL SYSTEM, REPLACING** .

INSTALLATION

NOTE: For tightening torques, see: SUMMARY OF TIGHTENING TORQUES FOR

SPECIFIC COMPONENTS .

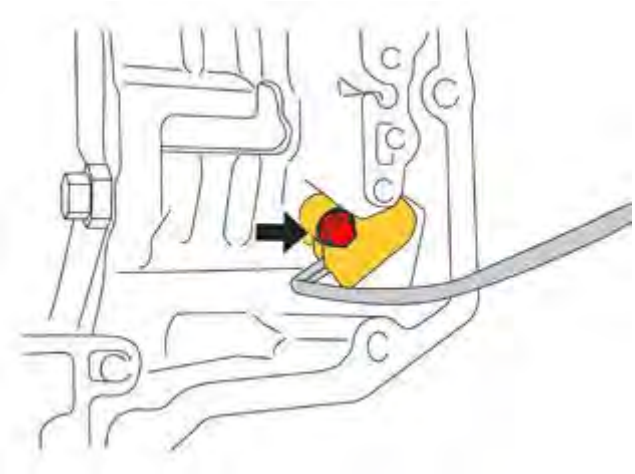


Fig. 16: Identifying Bolt
Courtesy of VOLVO CARS CORPORATION

GUIDE SLEEVE, KEY INTERLOCK CABLE

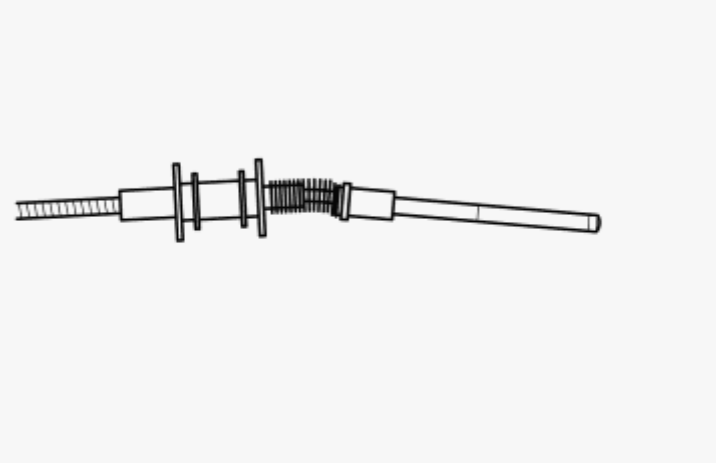


Fig. 17: Center Console Assembly
Courtesy of VOLVO CARS CORPORATION

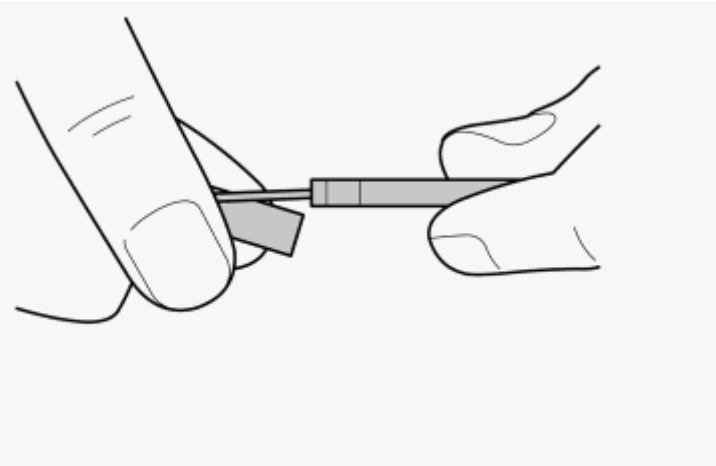


Fig. 18: Identifying Cable Pulled Out Of Cable Sleeve
Courtesy of VOLVO CARS CORPORATION

Press the spring towards the cable sleeve.

Pull the cable out of the cable sleeve (approximately 10 mm).

Remove the guide sleeve.

Remove the spring. Ensure that the broken section of the guide sleeve is removed from the cable sleeve.

Install a new guide sleeve in reverse order.

DRIVELINE/AXLES

General - Design And Function

TRANSMISSION (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DESIGN

see **DESIGN**

FUNCTION

see **FUNCTION**

OVERVIEW

see **OVERVIEW**

TRANSMISSION (TF-80SC; TF-80SC AWD; 2011-2012)

DESIGN AND FUNCTION

UPDATES IN AUTOMATIC TRANSMISSION TF80-SC GENERATION 2

1

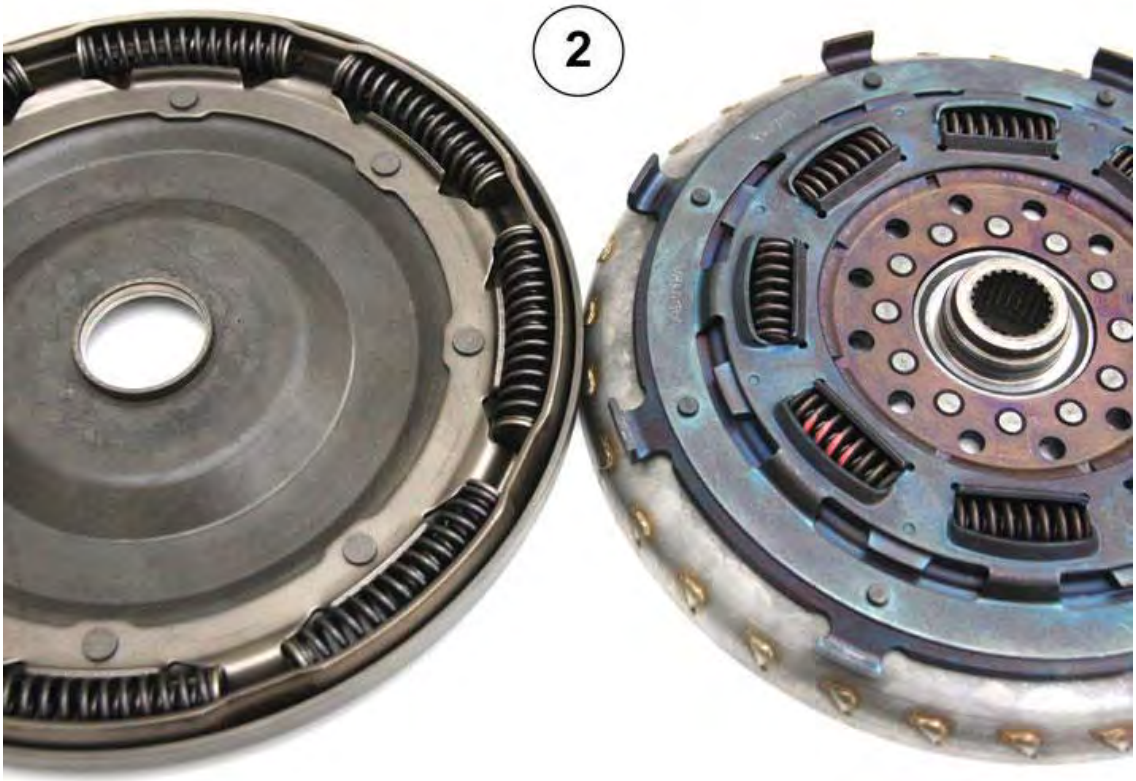
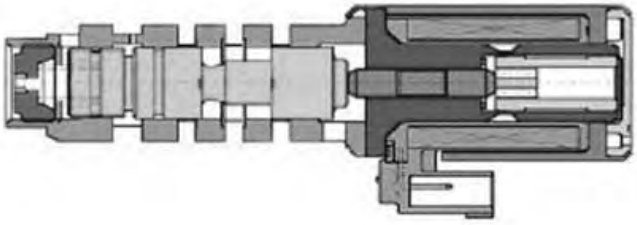

2

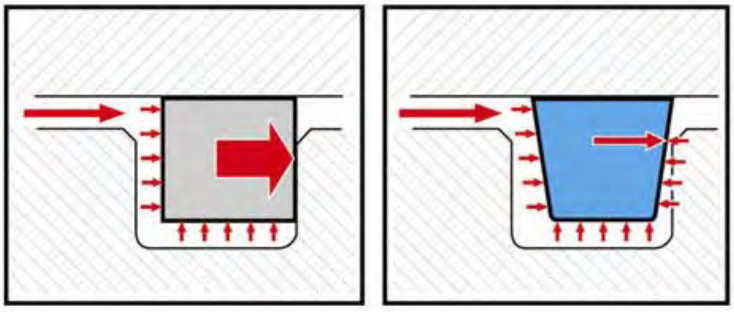
Fig. 1: Tarered Bearing, Torque Converter
Courtesy of VOLVO CARS CORPORATION

3

4



5



6

Fig. 2: TCM, Solenoid, Seal Rings, And Friction Pad
Courtesy of VOLVO CARS CORPORATION

1. **Tapered bearings** - To reduce the inner friction losses, some of the tapered bearings now have bigger diameter and shorter length of bearing rollers. This change gives fewer rollers and thus less friction.
2. **Torque converter** - To reduce noise/sound when locking at lower engine rpms, the LTD (Long Travel Damper) has been provided with an inner circle of damping springs
3. **TCM** (**T** ransmission **C** ontrol **M** odule) - TCM has the same hardware as before but the software has been changed.
4. **Solenoids** - Faster shifting has been achieved by making all linear solenoids that control the clutch systems more effective. This change has been achieved by removing the hydraulic part of the solenoids. Further, the magnetic flow in the solenoid has been increased and gap between thrust piston and magnetic coil has been reduced to increase power.
5. **Seal rings** - New seal rings with smaller sealing surface contributes to reducing the inner friction. By tapering the seal, the sealing surface is reduced as is the pressure on the sealing surface.
6. **Friction pads** - The new friction pads on the discs reduce the impact of drag losses between the friction pads. This has been achieved by optimizing the oil flow channels between the friction surfaces.

TRANSMISSION COMPONENTS

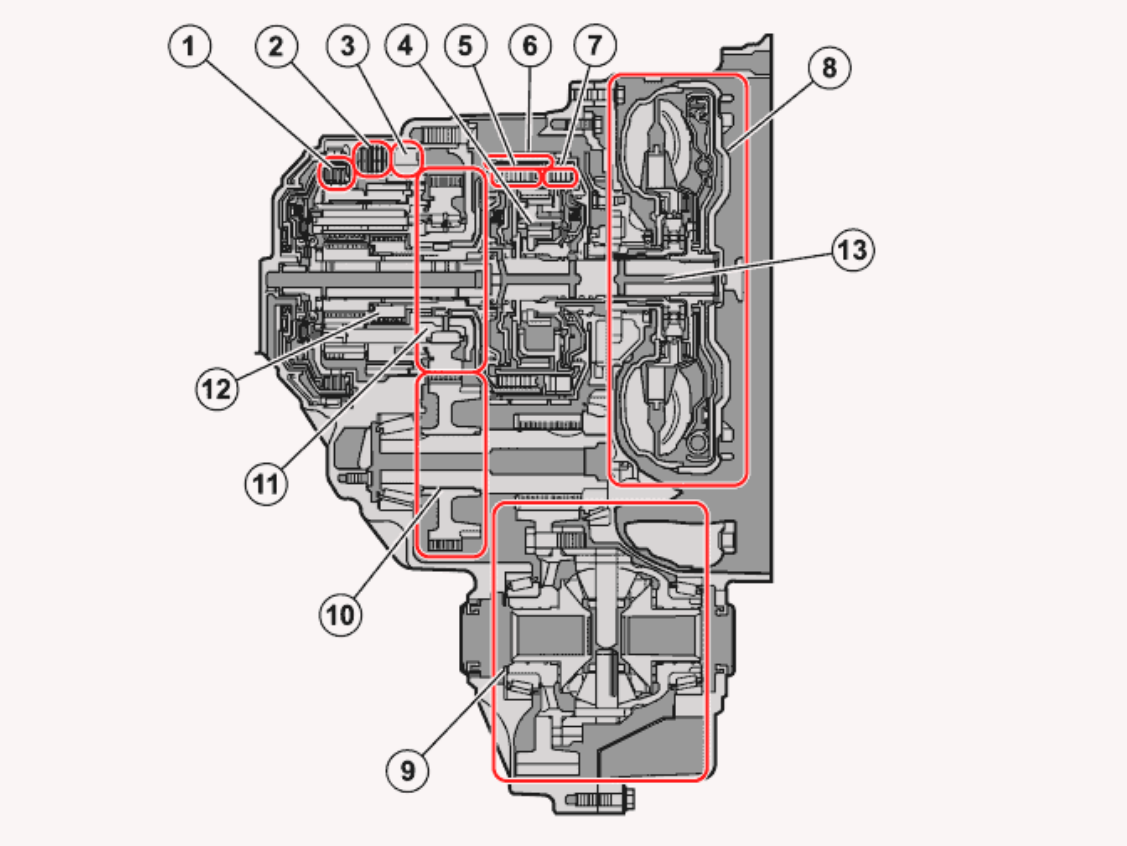


Fig. 3: Identifying Cross-Section Of Transmission
Courtesy of VOLVO CARS CORPORATION

Number	Designation	Number	Designation
1	Clutch C2	8	Torque converter
2	Brake B2	9	Differential unit
3	Freewheel F1	10	Driven counter rotating gear
4	Front planetary train	11	Driven gear
5	Clutch C1	12	Rear planetary train, Ravigneaux
6	Brake B1	13	Input shaft
7	Clutch C3		

TORQUE CONVERTER WITH LOCK-UP

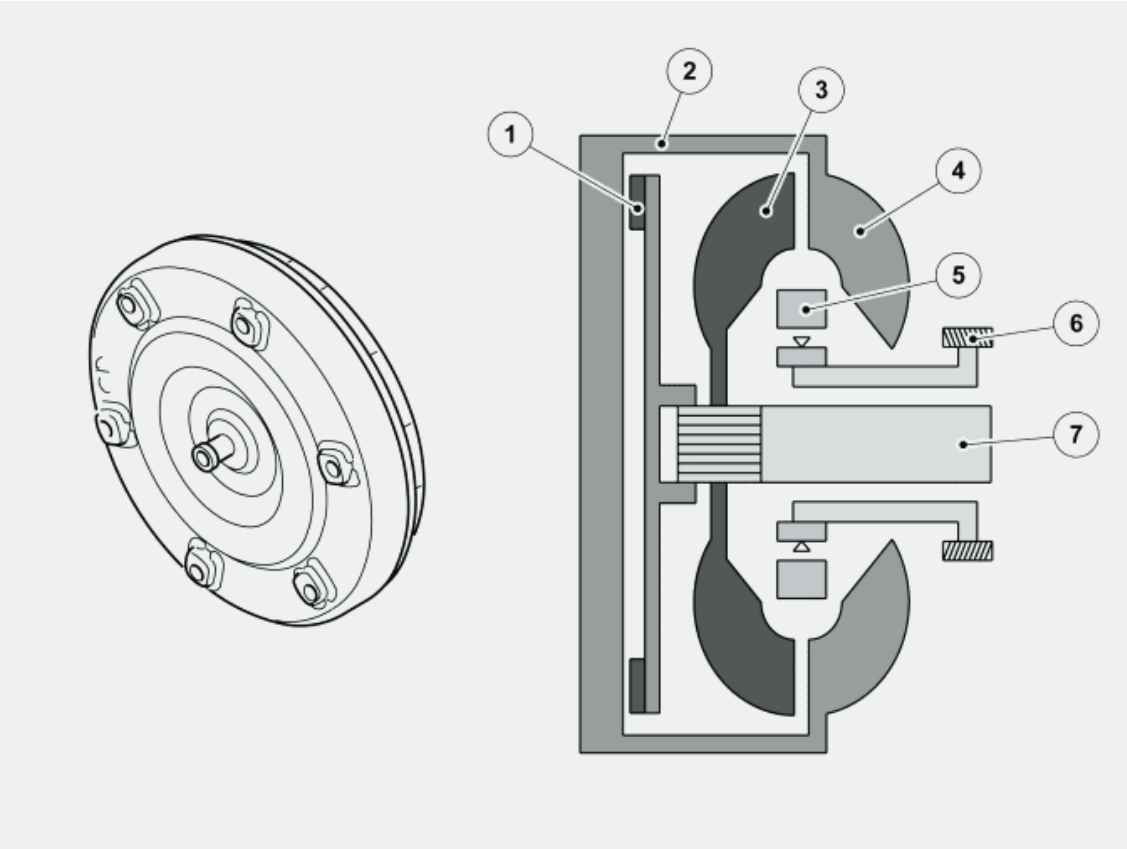


Fig. 4: Identifying Cross Section Of Torque Converter With Lock-Up
Courtesy of VOLVO CARS CORPORATION

Number	Designation	Number	Designation
1	Lock-up-clutch	5	Stator
2	Casing	6	Oil pump
3	Turbine rotor	7	Input shaft
4	Pump rotor		

The torque converter is between the engine and the automatic transmission. It consists of a round metal casing

which contains three impellers. The torque converter is filled with oil. The first impeller, pump rotor, is secured in the torque converter casing, which is connected to the engine's crankshaft via a carrier plate. The pump rotor rotates with the crankshaft.

The second impeller, the turbine rotor, is connected to the transmission's input shaft and is driven by the oil that is circulated by the pump rotor.

The third impeller, the stator, is located between the pump rotor and the turbine rotor.

There is a hydraulically controlled lock-up clutch with a friction plate in the torque converter. The turbine rotor can connect with the torque converter housing via the lock-up clutch. This reduces fuel consumption.

The torque converter functions like a hydraulic automatic clutch. At idle, the pump action is too weak to drive the turbine rotor and thus the vehicle is stationary. When the engine speed is increased the turbine rotor starts to drive in a smooth way. Thanks to the stator rotor, the torque converter can also reinforce the engine's torque when starting and low driving speed.

The rotating impellers and the oil in the torque converter "slip" slightly. This gives a certain power loss, which slightly increases fuel consumption.

When the vehicle is moving the torque converter's reinforcement of the engine's torque is not needed. In this situation the lock-up function is activated and, at a certain speed, mechanically connects the transmission's input shaft with the engine. This is automatic and cannot be affected by the driver. The engine speed drops and, since the torque converter's slipping disappears, fuel consumption is also reduced.

PLANETARY TRAIN

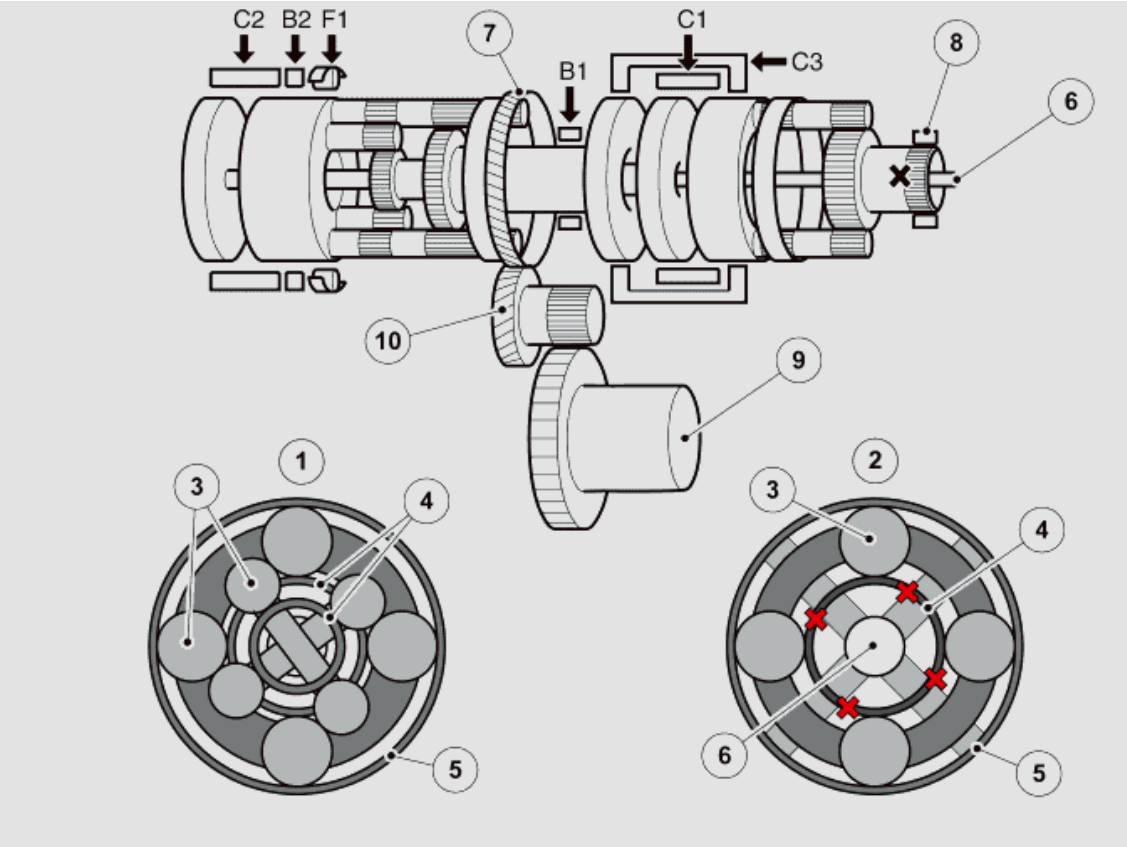


Fig. 5: Identifying Planetary Train
Courtesy of VOLVO CARS CORPORATION

X = locked

Number	Designation	Number	Designation
1	Rear planetary train, (Ravigneaux)	6	Input shaft
2	Front planetary train	7	Driven gear
3	Planetary gear	8	Oil pump
4	Sun gear	9	Differential
5	Ring gear	10	Driven counter rotating gear

Unique to the TF-80SC is a Ravigneaux planetary gear connected in series to a conventional planetary gear. The conventional planetary gear creates a reduction in RPM in the Ravigneaux planetary gear for 1st gear up to 5th gear and reverse.

The planetary gear's ratios are controlled by 3 clutches (C1, C2, C3) and 2 brakes (B1, B2).

The number of planetary gears depends on the engine's cylinder displacement and can therefore differ from what is shown here.

Planetary train, Ravigneaux

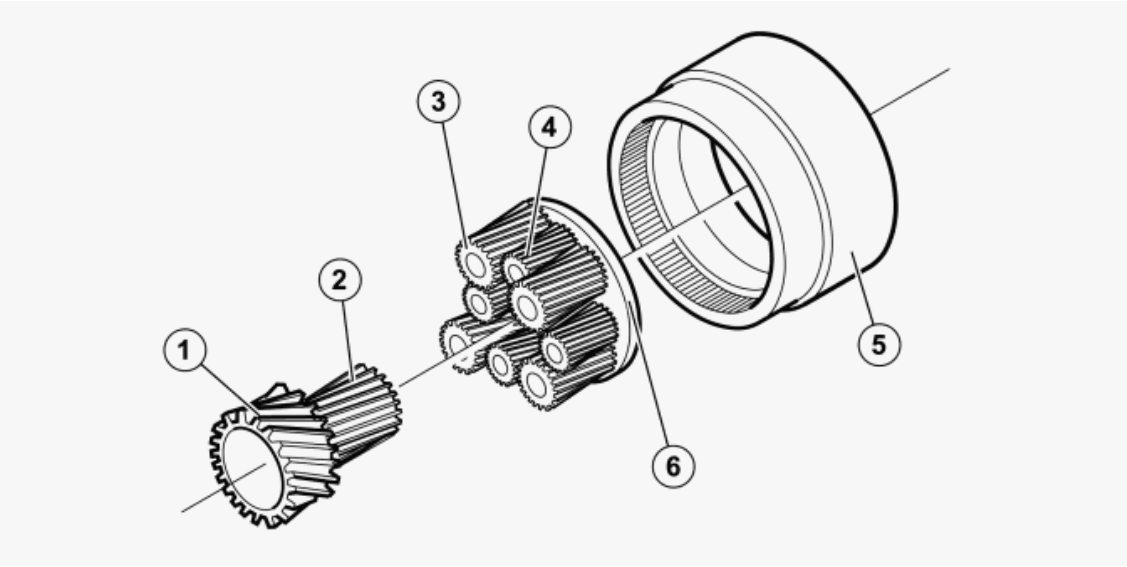


Fig. 6: Identifying Ravigneaux Planetary Train
Courtesy of VOLVO CARS CORPORATION

Number	Designation	Number	Designation
1	Large sun gear	4	Inner planetary gear
2	Small sun gear	5	Ring gear
3	Outer planetary gear	6	Planetary wheel carrier

The characteristic of a Ravigneaux planetary train is that several gears can be used in comparison to a conventional planetary train. It is compact (takes up little room) in relation to the number of possible ratios. The Ravigneaux planetary train has two sun gears of different diameters and sets of two planetary gears, an inner and outer set. The inner planetary gears are constantly connected to the outer planetary gears and the small sun gear. The outer planetary gears are constantly connected to the ring gear and large sun gear.

The planetary train has a common planetary gear carrier for both sets of planetary gears.

Principles of function

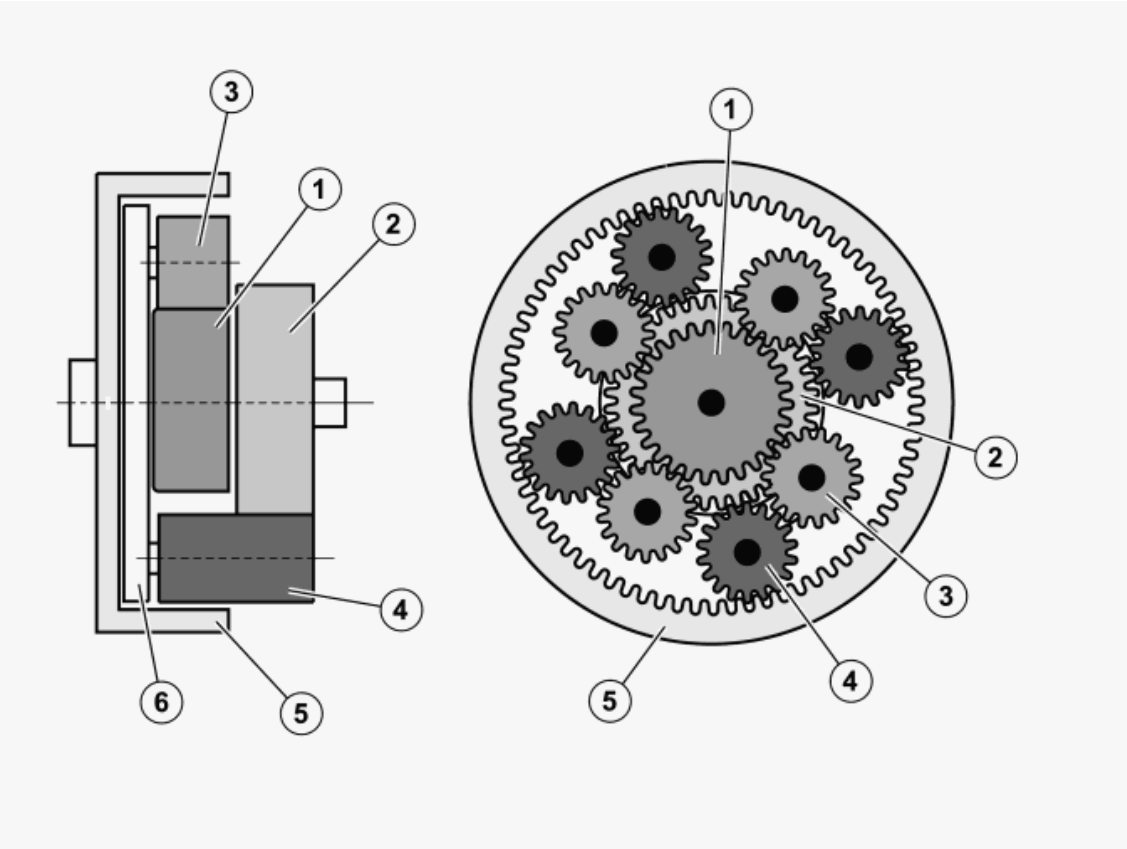


Fig. 7: Identifying Cross-Section Of Ravigneaux Planetary Train
Courtesy of VOLVO CARS CORPORATION

Number	Designation	Number	Designation
1	Small sun gear	4	Outer planetary gear
2	Large sun gear	5	Ring gear
3	Inner planetary gear	6	Planetary wheel carrier

The ratios are obtained through different combinations of locked and/or connected components. The table displays the principle for how the ratios are obtained from large ratio, 1, to small ratio, 6, and counter rotation (i. e. reverse with large ratio).

Combination	Power in	Locked	Power out
1	Small sun gear	Planetary gear carrier	Ring gear
2	Small sun gear	Large sun gear	Ring gear
3	Small sun gear and large sun gear	No component	Ring gear
4	Small sun gear and planetary gear carrier	No component	Ring gear
5	Large sun gear and planetary gear carrier	No component	Ring gear
6	Planetary gear carrier	Large sun gear	Ring gear

Reverse	Large sun gear	Planetary gear carrier	Ring gear

OIL PUMP

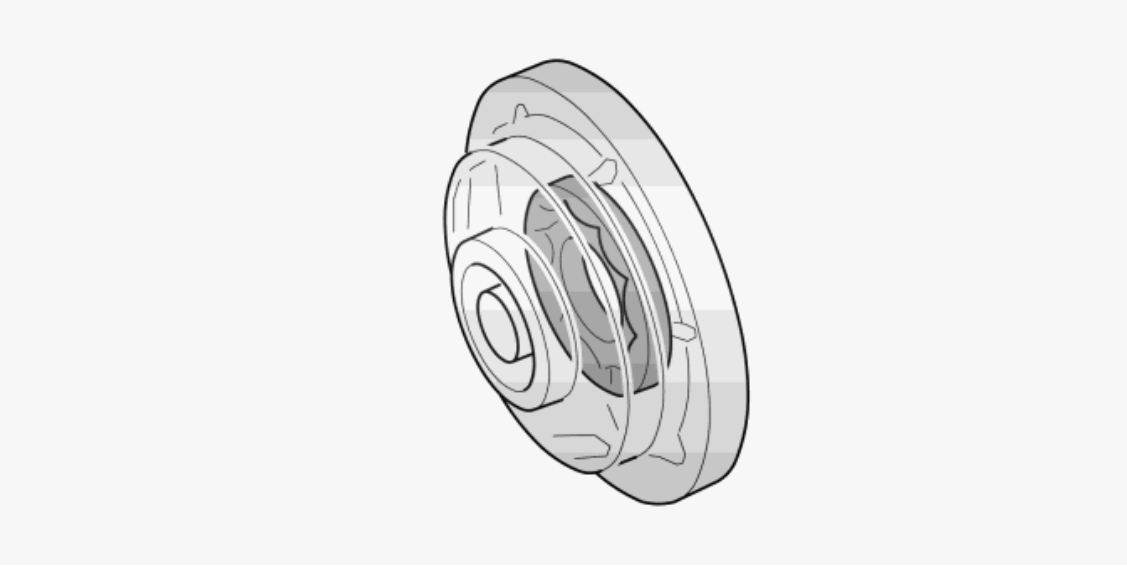


Fig. 8: Identifying Oil Pump
Courtesy of VOLVO CARS CORPORATION

The oil pump is of "non-crescent" type and is located after the torque converter. It is driven by the engine's crankshaft via the torque converter housing.

The oil pump supplies the hydraulics with oil and supplies the other components of the transmission with oil for lubrication and cooling. Excess oil is routed back to the oil sump.

OIL COOLER

The oil is routed in/out in separate lines to the external oil cooler.

THE HYDRAULIC SYSTEM

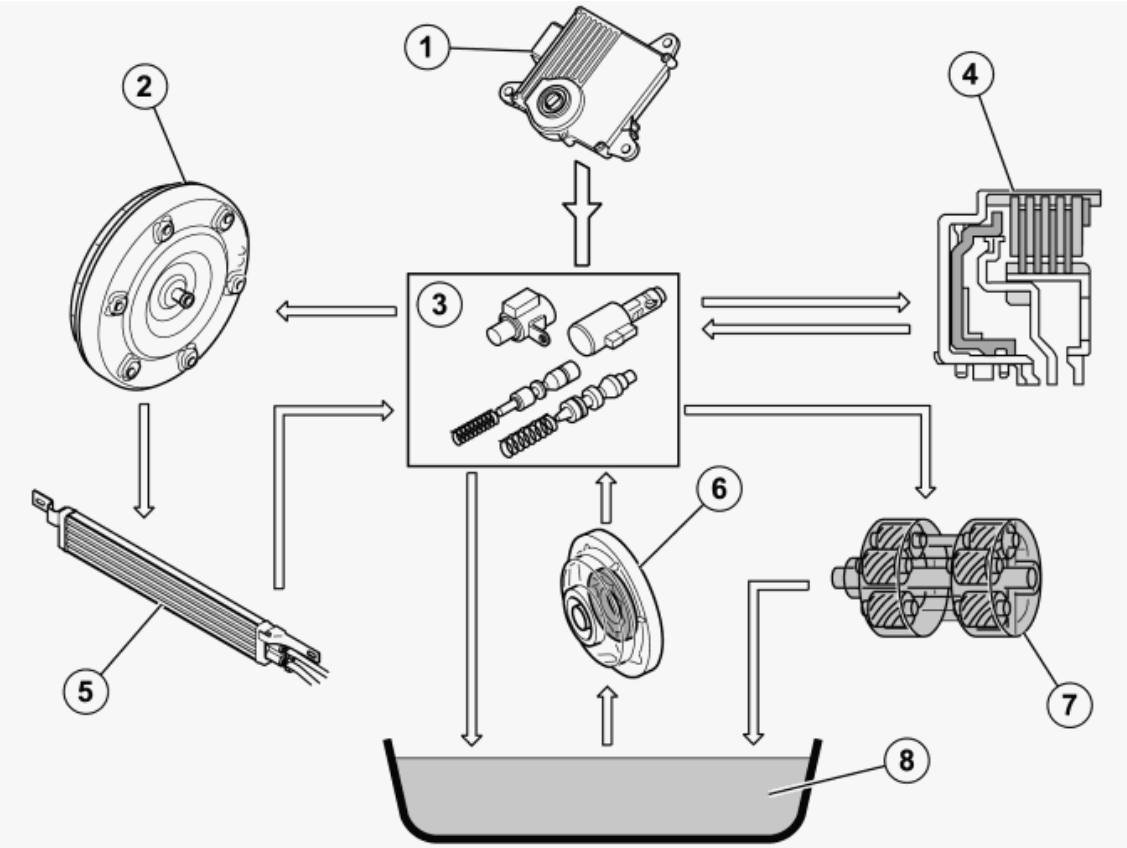


Fig. 9: Identifying Hydraulic System
Courtesy of VOLVO CARS CORPORATION

Number	Designation	Number	Designation
1	Transmission control module (TCM)	5	Oil cooler
2	Torque converter	6	Oil pump
3	Valves and solenoids	7	Planetary train
4	Clutches and brakes	8	Oil sump

The transmission's hydraulic system consists of oil pump, torque converter, hydraulic control system and oil cooler.

The solenoids, which control the hydraulic valves, are located in the transmission's control system, which are mounted on the front edge of the transmission. The solenoids are activated by the Transmission control module (TCM).

The oil pump supplies the hydraulics with oil and supplies the other components of the transmission with oil for lubrication and cooling. Excess oil is routed back to the oil sump.

CAUTION: The transmission oil differs from conventional ATF oil properties. Always use transmission oil that is specified for this transmission. Otherwise the

function of the transmission will be damaged.

The oil level is checked though a level pipe (transmission does not have conventional oil dipstick).

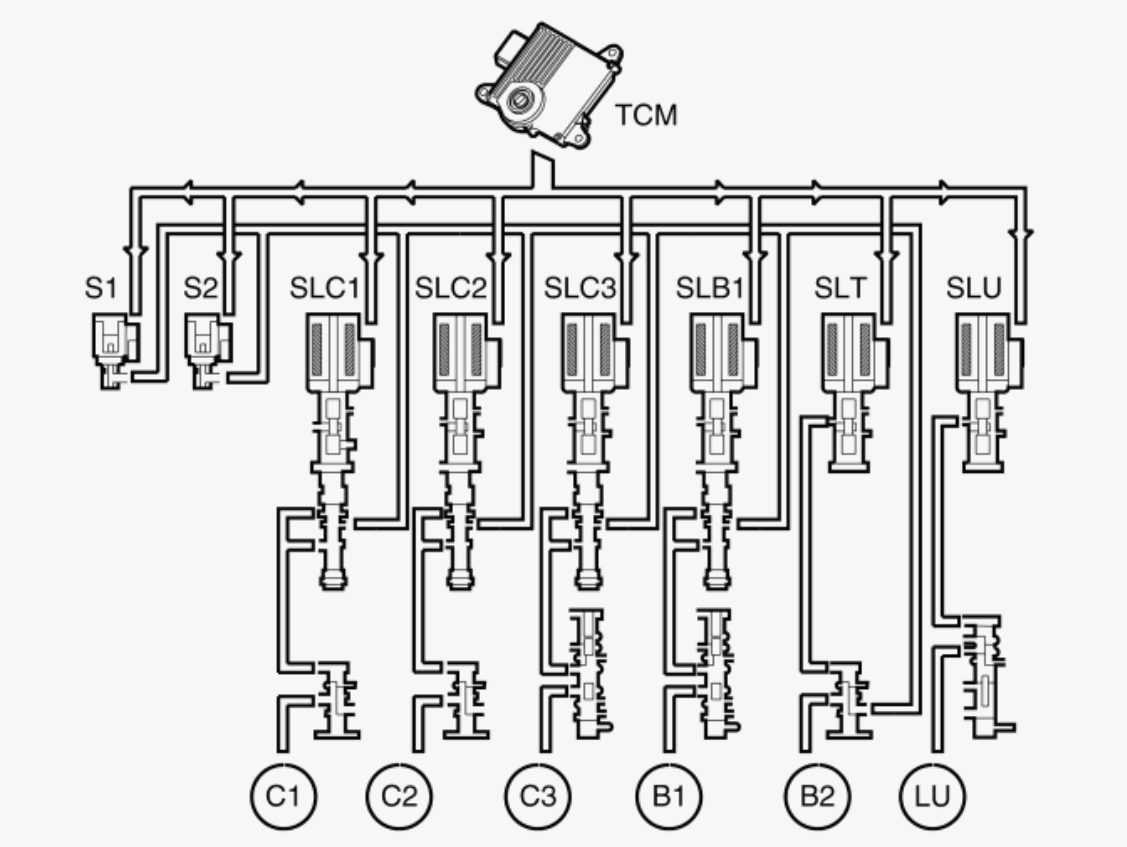


Fig. 10: Identifying Transmission Control Module (TCM), Solenoids And Sensors
Courtesy of VOLVO CARS CORPORATION

S1 = Solenoid, S1	SLU = Lock-up solenoid, SLU
S2 = Solenoid, S2	C1 = Clutch, C1
SLC1 = Line pressure solenoid, SLC1	C2 = Clutch, C2
SLC2 = Line pressure solenoid, SLC2	C3 = Clutch, C3
SLC3 = Line pressure solenoid, SLC3	B1 = Brake, B1
SLB1 = Line pressure solenoid, SLB1	B2 = Brake, B2
SLT = Line pressure solenoid, SLT	LU = Lock-up

Shifting occurs by the oil pump building up hydraulic pressure. The hydraulic valves, which are controlled by their respective solenoids, send the hydraulic pressure to the relevant clutch, brake or lock-up depending on which signals come from the Transmission control module (TCM).

Hydraulic pressure chamber

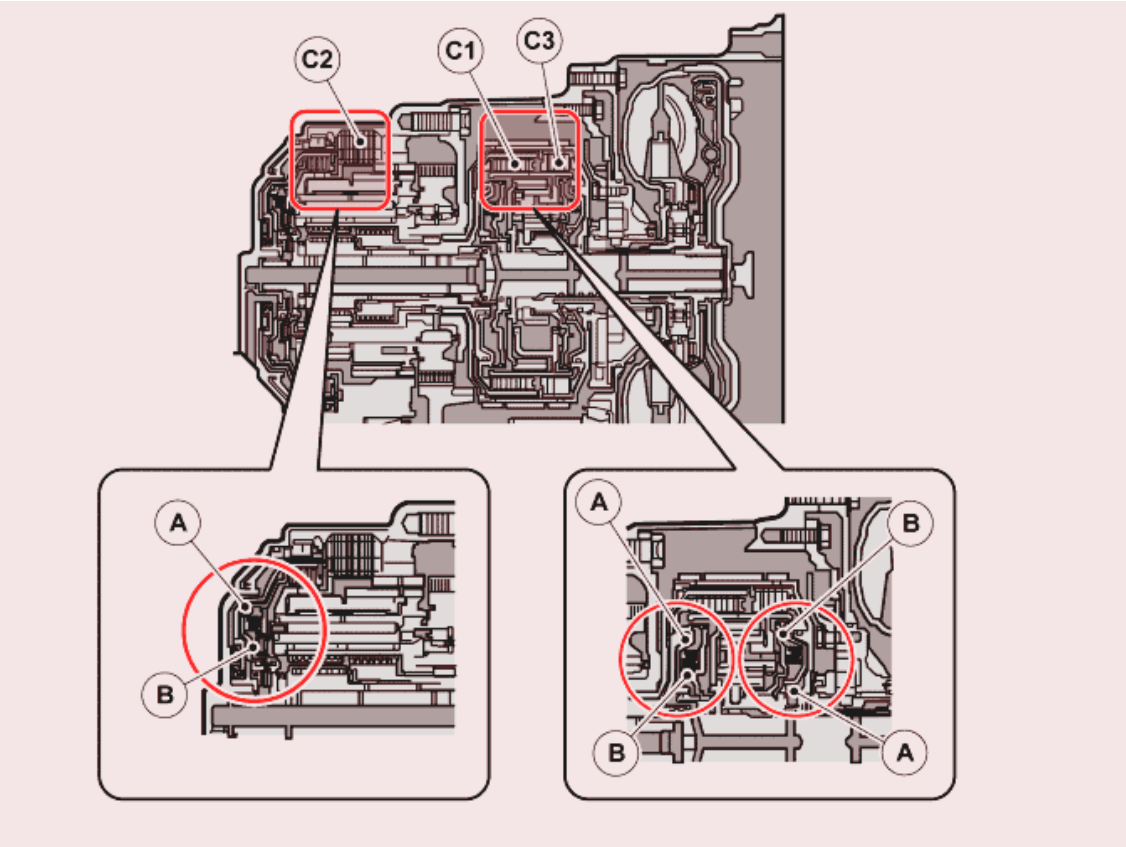


Fig. 11: Identifying Hydraulic Pressure Chambers
Courtesy of VOLVO CARS CORPORATION

A = Piston's hydraulic pressure chamber

B = Counter acting hydraulic pressure chamber

When the rotation of the clutch increases, the centrifugal force affects the oil inside the clutch. The hydraulic pressure increases and the clutch engages. The centrifugal force means that a difference occurs in the rotation between the input and output shafts, which can mean a shift judder. To solve this, there is an extra pressure chamber opposite the piston's hydraulic pressure chamber. This extra pressure chamber means that the centrifugal force also works in the opposite direction and therefore affects the pressure from the piston's hydraulic pressure chamber. In addition, the clutch does not engage too soon.

GEAR SELECTOR ASSEMBLY

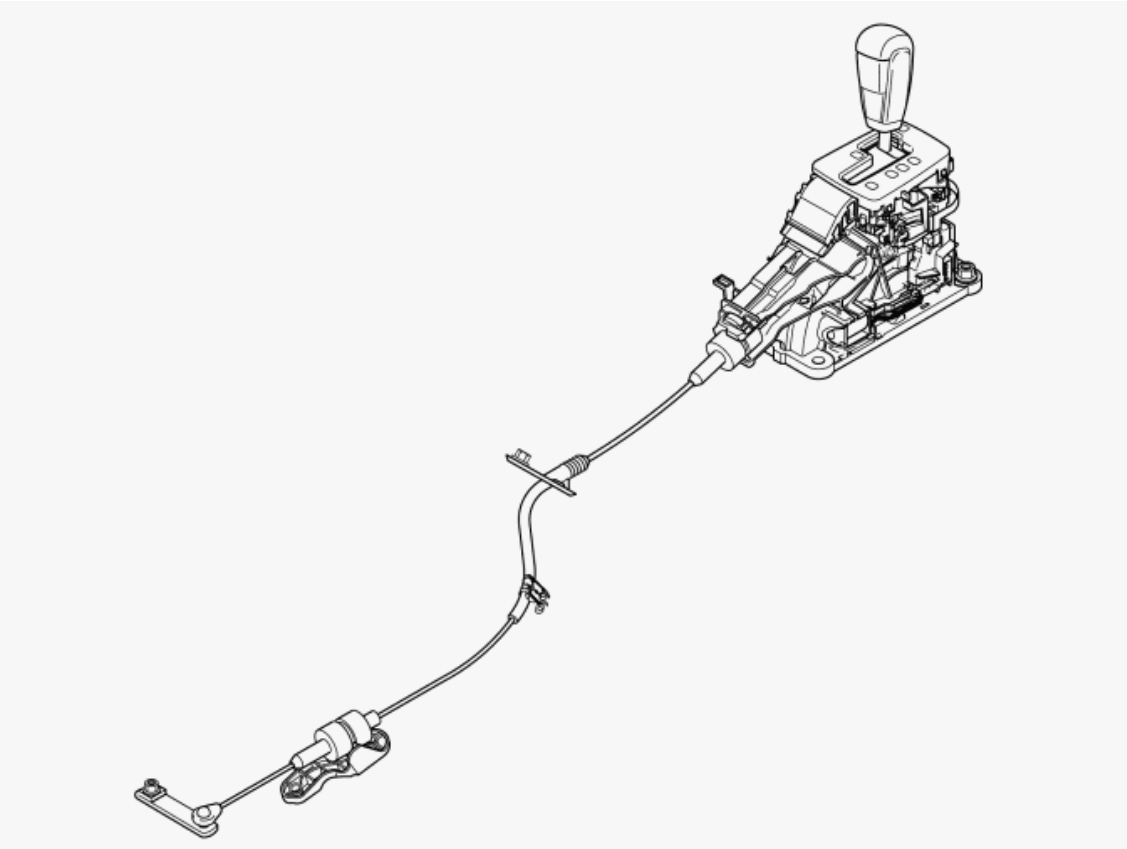


Fig. 12: Identifying Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

The gear selector assembly is in the tunnel console. It is mechanically connected to the transmission by a cable which moves the gear valve. The gear valve is integrated in the Transmission control module (TCM). The gear selected is indicated by a row of LEDs in the top panel on the gear selector assembly.

Gear selector assemblies with Geartronic, in addition to P/R/N/D modes, have a manual (M) shifting mode. The manual gear positions can be selected at any point while driving. The engaged gear is locked until the driver selects another gear. The automatic transmission only down shifts if the vehicle slows down to very low speed. To downshift the gear selector must be moved to minus (-). To upshift the gear selector must be moved to plus (+). At start, 3rd is the highest possible gear.

The engine can only be started in position P or N.

THE DIFFERENT GEAR SELECTOR POSITIONS:

Position	Meaning	Function
P	Park	The transmission's output shaft is locked, so that the vehicle does not roll. This position should be selected when the engine is started or the vehicle is parked.
R	Reverse	Reverse gear. This mode may only be engaged when the vehicle is completely

		stationary.
N	Neutral	Neutral means that no gear is engaged. The engine can start and run freely.
D	Drive	When D is engaged, the engine drives the vehicle forward except when idling. The D position is used for all forward motion. Up and down shifting occurs automatically depending on acceleration and speed.
M	Manual	This position allows the driver to change gears manually.

POWER FLOW

Clutches, brakes and freewheel

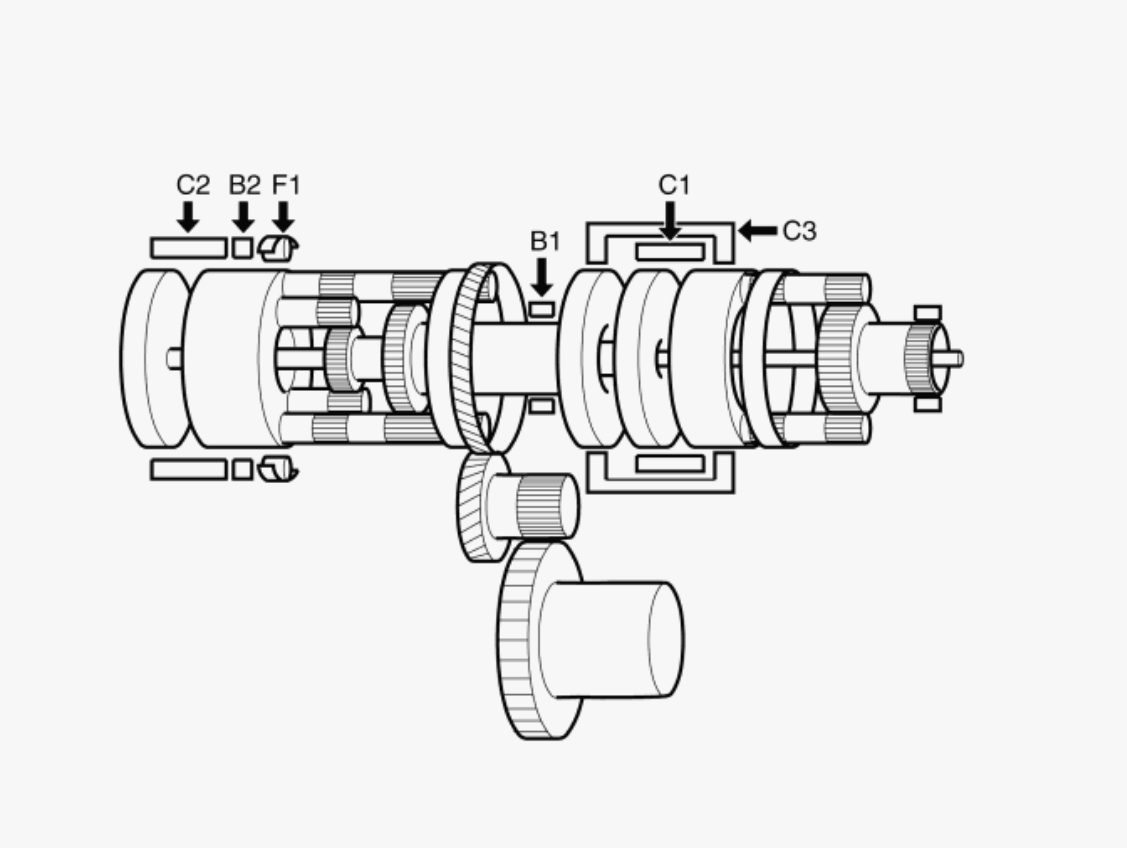


Fig. 13: Identifying Clutches, Brakes And Freewheel
Courtesy of VOLVO CARS CORPORATION

Clutch/Brakes	Function
Clutch C1	Connects the front planetary gear carrier with the rear planetary train's small sun gear.
Clutch C2	Connects the input shaft with the rear planetary gear carrier.
Clutch C3	Connects the front planetary gear carrier with the rear planetary train's large sun gear.

Brake B1	Locks the rear planetary train's large sun gear.
Brake B2	Locks the rear planetary train's planetary gear carrier.
Freewheel F1	Locks the rear planetary gear carrier so that it does not go counter-clockwise.

Position D, 1st gear

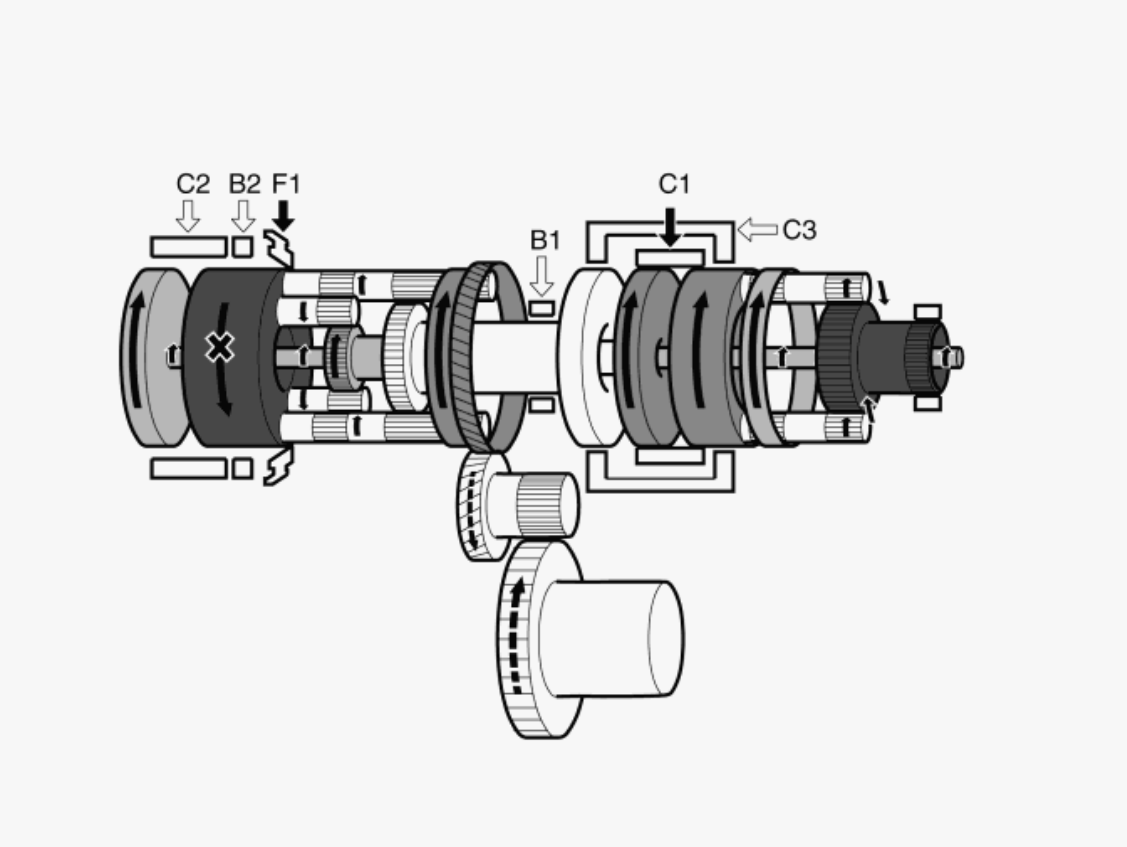


Fig. 14: Identifying Position D For 1st Gear
Courtesy of VOLVO CARS CORPORATION

Solenoid						Clutch			Brakes		Freewheel
SLC1	SLC 2	SLC 3	SLB1	S1	S2	C1	C2	C3	B1	B2	F1
-	X	X	X	-	-	X	-	-	-	-*	X

X = activated

- = not activated

* B2 is only active during engine braking.

Planetary train unit	Power in	Locked	Power out
Front	Ring gear	Sun gear	Planetary gear carrier
Rear	Small sun gear	Planetary gear carrier	Ring gear

The input shaft rotates clockwise, the same direction as the torque converter's turbine rotor.

The front planetary train's ring gear rotates clockwise.

The front planetary train's planetary gear rotates clockwise on its shafts. Because the front planetary train's sun gear is locked by the oil pump, the planetary train's planetary gear presses against the front planetary train's ring gear, and therefore rotates around the sun gear. Because the front planetary train's ring gear has inner teeth, the direction of rotation does not change.

The front planetary gear carrier rotates clockwise.

Clutch C1 rotates clockwise and connects the front planetary gear carrier with the rear planetary train's small sun gear.

Rear planetary train's sun gear rotates clockwise.

The rear planetary train's inner planetary gear rotates counter-clockwise on its shaft. The rear planetary gear carrier attempts to rotate counter-clockwise but is prevented by freewheel F1.

The rear planetary train's outer planetary gear rotates clockwise on its shafts. The rear planetary train's small sun gear rotates counter-clockwise, at idle.

The rear planetary train's ring gear rotates clockwise using the rear planetary train's outer planetary gear. Because the rear planetary train's ring gear has inner teeth, the direction of rotation does not change.

The driven gear rotates clockwise. Because the rear planetary train's ring gear is on the driven gear, the driven gear rotates in the same direction as the rear planetary train's ring gear.

The counter-rotating gear rotates counter-clockwise.

The differential's ring gear rotates clockwise.

Position D, 2nd gear

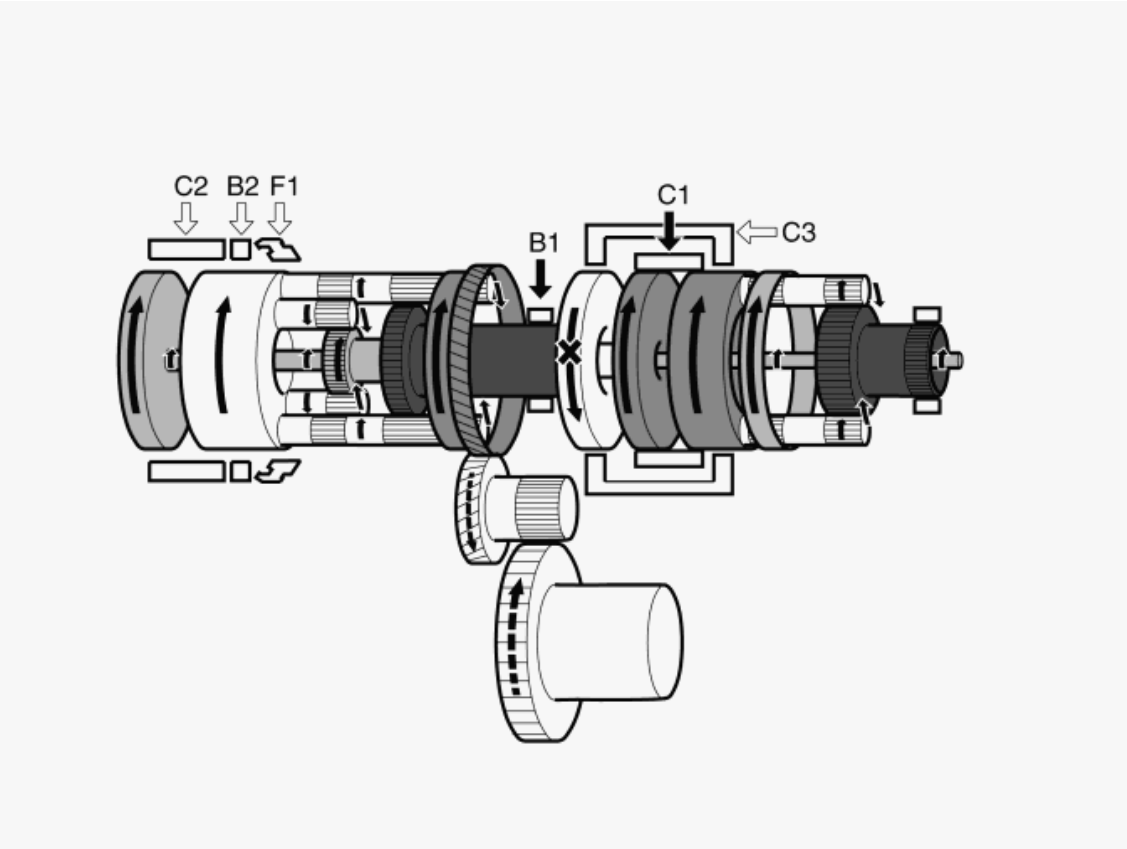


Fig. 15: Identifying Position D For 2nd Gear
Courtesy of VOLVO CARS CORPORATION

Solenoid						Clutch			Brakes		Freewheel
SLC1	SLC 2	SLC 3	SLB1	S1	S2	C1	C2	C3	B1	B2	F1
-	X	X	-	-	-	X	-	-	X	-	-

X = activated

- = not activated

Planetary train unit	Power in	Locked	Power out
Front	Ring gear	Sun gear	Planetary gear carrier
Rear	Small sun gear	Large sun gear	Ring gear

The input shaft rotates clockwise, the same direction as the torque converter's turbine rotor.

The front planetary train's ring gear rotates clockwise.

The front planetary train's planetary gear rotates clockwise on its shafts. Because the front planetary train's sun gear is locked by the oil pump, the planetary train's planetary gear presses against the front planetary train's ring gear, and therefore rotates around the sun gear. Because the front planetary train's ring gear has inner teeth, the

direction of rotation does not change.

The front planetary gear carrier rotates clockwise.

Clutch C1 rotates clockwise and connects the front planetary gear carrier with the rear planetary train's small sun gear.

Rear planetary train's sun gear rotates clockwise.

The rear planetary train's large sun gear is locked by brake B1.

The rear planetary train's inner planetary gear rotates counter-clockwise on its shaft.

The rear planetary train's outer planetary gear rotates clockwise on its shafts.

The rear planetary train's ring gear rotates clockwise using the rear planetary train's outer planetary gear. Because the rear planetary train's ring gear has inner teeth, the direction of rotation does not change.

The driven gear rotates clockwise. Because the rear planetary train's ring gear is on the driven gear, the driven gear rotates in the same direction as the rear planetary train's ring gear.

The counter-rotating gear rotates counter-clockwise.

The differential's ring gear rotates clockwise.

Engine brake

When the engine brake works, the driven force is transferred from the tires.

Position D, 3rd gear

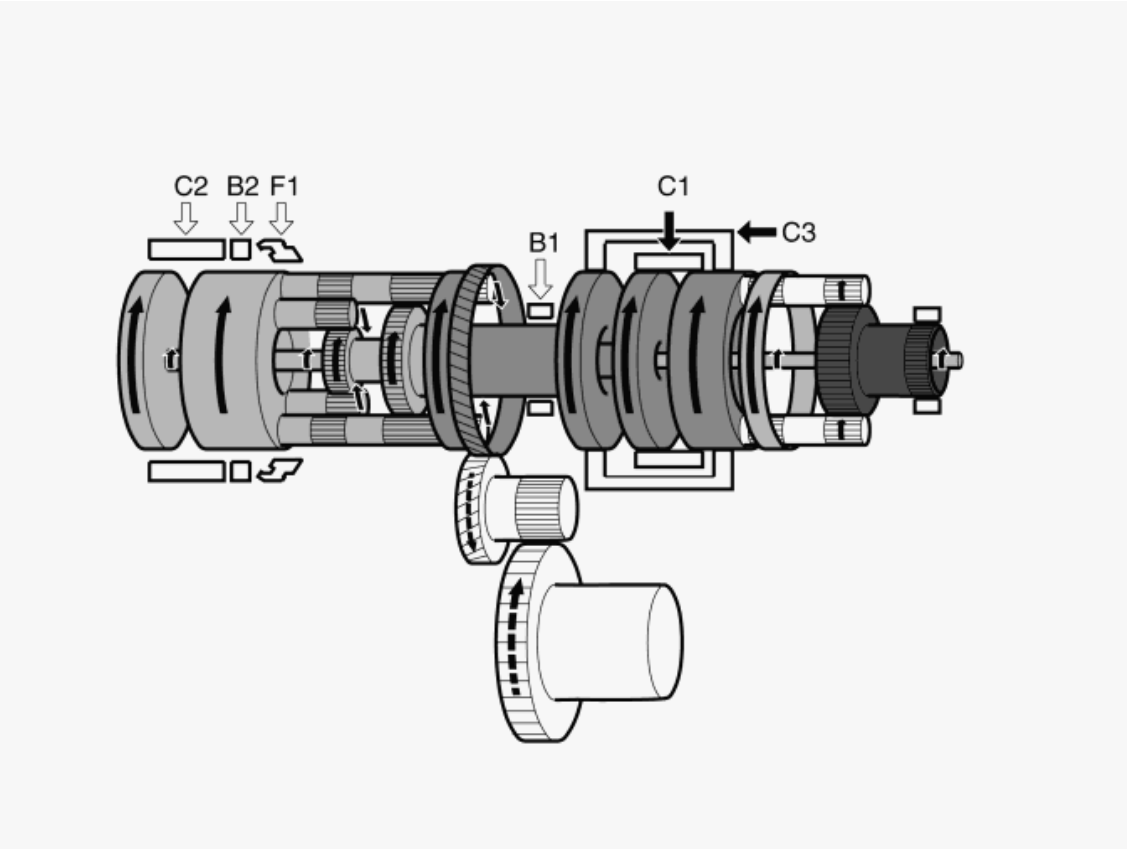


Fig. 16: Identifying Position D For 3rd Gear
Courtesy of VOLVO CARS CORPORATION

Solenoid						Clutch			Brakes		Freewheel
SLC1	SLC 2	SLC 3	SLB1	S1	S2	C1	C2	C3	B1	B2	F1
-	X	-	X	-	-	X	-	X	-	-	-

X = activated

- = not activated

Planetary train unit	Power in	Locked	Power out
Front	Ring gear	Sun gear	Planetary gear carrier
Rear	Small sun gear and large sun gear	No component	Ring gear

The input shaft rotates clockwise, the same direction as the torque converter's turbine rotor.

The front planetary train's ring gear rotates clockwise.

The front planetary train's planetary gear rotates clockwise on its shafts. Because the front planetary train's sun gear is locked by the oil pump, the planetary train's planetary gear presses against the front planetary train's ring

gear, and therefore rotates around the sun gear. Because the front planetary train's ring gear has inner teeth, the direction of rotation does not change.

The front planetary gear carrier rotates clockwise.

Clutch C1 rotates clockwise and connects the front planetary gear carrier with the rear planetary train's small sun gear.

Clutch C3 rotates clockwise and connects the front planetary gear carrier with the rear planetary train's large sun gear.

The rear planetary train rotates clockwise. Because the rear planetary train's inner and outer planetary gears are in constant engagement with each other, they are kinetically locked in relation to each other. The kinetic energy from both the rear planetary train's sun gears is therefore transferred to the rear planetary train's ring gear.

The rear planetary train's ring gear rotates clockwise.

The driven gear rotates clockwise. Because the rear planetary train's ring gear is on the driven gear, the driven gear rotates in the same direction as the rear planetary train's ring gear.

The counter-rotating gear rotates counter-clockwise.

The differential's ring gear rotates clockwise.

Engine brake

When the engine brake works, the driven force is transferred from the tires.

Position D, 4th gear

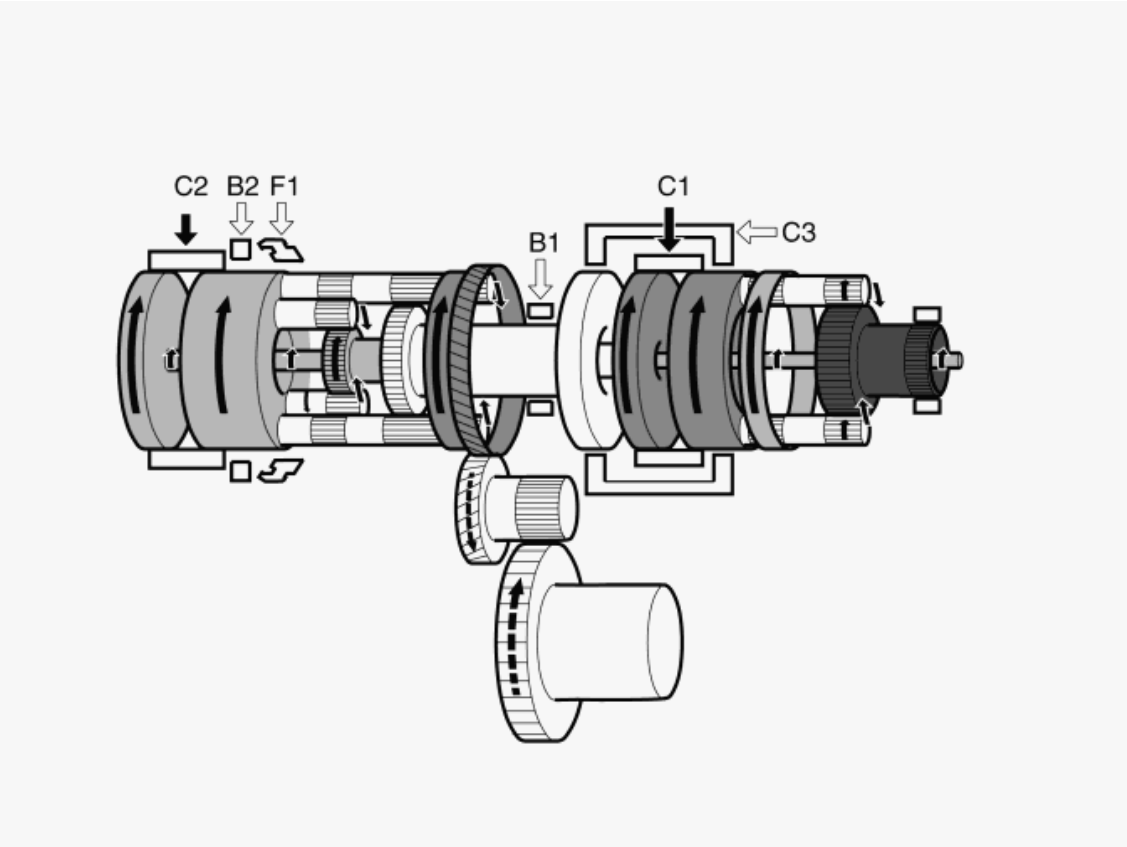


Fig. 17: Identifying Position D For 4th Gear
Courtesy of VOLVO CARS CORPORATION

Solenoid						Clutch			Brakes		Freewheel
SLC1	SLC 2	SLC 3	SLB1	S1	S2	C1	C2	C3	B1	B2	F1
-	-	X	X	-	-	X	X	-	-	-	-

X = activated

- = not activated

Planetary train unit	Power in	Locked	Power out
Front	Ring gear	Sun gear	Planetary gear carrier
Rear	Small sun gear and planetary gear carrier	No component	Ring gear

The input shaft rotates clockwise, the same direction as the torque converter's turbine rotor.

The front planetary train's ring gear rotates clockwise.

The front planetary train's planetary gear rotates clockwise on its shafts. Because the front planetary train's sun gear is locked by the oil pump, the planetary train's planetary gear presses against the front planetary train's ring

gear, and therefore rotates around the sun gear. Because the front planetary train's ring gear has inner teeth, the direction of rotation does not change.

The front planetary gear carrier rotates clockwise.

Clutch C1 rotates clockwise and connects the front planetary gear carrier with the rear planetary train's small sun gear.

The intermediate shaft rotates clockwise, the same direction as the input shaft.

Clutch C2 rotates clockwise.

The rear planetary gear carrier rotates clockwise.

The rear planetary train's inner planetary gear rotates clockwise on its shafts.

The rear planetary train's outer planetary gear rotates counter-clockwise on its shafts.

The rear planetary train's ring gear rotates clockwise. Because the rear planetary train's outer planetary gear rotation pulls away from the rear planetary gear carrier's rotation, the ring gear's speed is lower than the speed at the planetary carrier.

The driven gear rotates clockwise. Because the rear planetary train's ring gear is on the driven gear, the driven gear rotates in the same direction as the rear planetary train's ring gear.

The counter-rotating gear rotates counter-clockwise.

The differential's ring gear rotates clockwise.

Engine brake

When the engine brake works, the driven force is transferred from the tires.

Position D, 5th gear

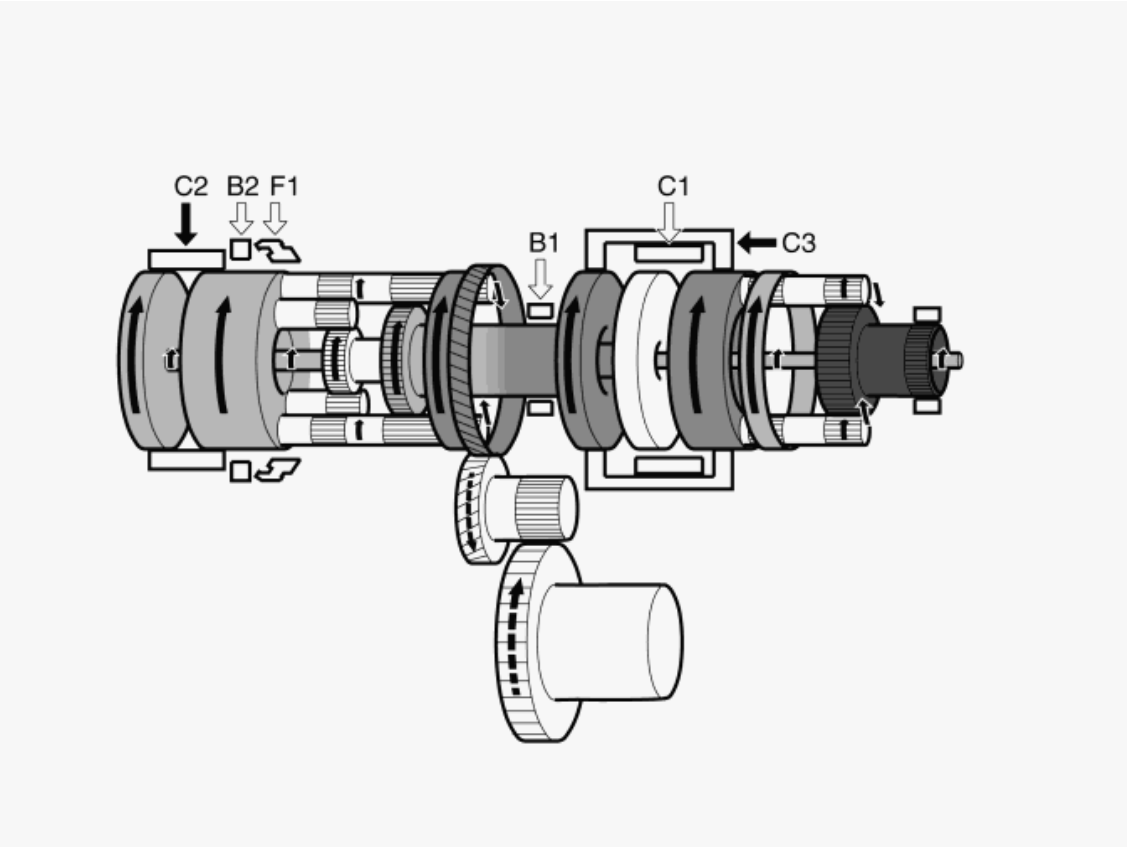


Fig. 18: Identifying Position D For 5th Gear
Courtesy of VOLVO CARS CORPORATION

Solenoid						Clutch			Brakes		Freewheel
SLC1	SLC 2	SLC 3	SLB1	S1	S2	C1	C2	C3	B1	B2	F1
X	-	-	X	-	-	-	X	X	-	-	-

X = activated

- = not activated

Planetary train unit	Power in	Locked	Power out
Front	Ring gear	Sun gear	Planetary gear carrier
Rear	Large sun gear and planetary gear carrier	No component	Ring gear

The input shaft rotates clockwise, the same direction as the torque converter's turbine rotor.

The front planetary train's ring gear rotates clockwise.

The front planetary train's planetary gear rotates clockwise on its shafts. Because the front planetary train's sun gear is locked by the oil pump, the planetary train's planetary gear presses against the front planetary train's ring

gear, and therefore rotates around the sun gear. Because the front planetary train's ring gear has inner teeth, the direction of rotation does not change.

The front planetary gear carrier rotates clockwise.

Clutch C3 rotates clockwise and connects the front planetary gear carrier with the rear planetary train's large sun gear.

The rear planetary train's large sun gear rotated clockwise. Its speed is reduced by the front planetary train so that the speed becomes lower than the speed of the input shaft.

The intermediate shaft rotates clockwise, the same direction as the input shaft.

Clutch C2 rotates clockwise.

The rear planetary gear carrier rotates clockwise.

The rear planetary train's outer planetary gear rotates clockwise. Because the rear planetary gear carrier rotates faster than the rear planetary train's large sun gear, the inner planetary gears are pressed outwards by the speed difference and rotate clockwise on their shafts.

The rear planetary train's ring gear rotates clockwise. Because the rear planetary train's outer planetary gear rotation is added to the rear planetary gear carrier's rotation, the ring gear's speed is greater than the speed at the planetary carrier.

The driven gear rotates clockwise. Because the rear planetary train's ring gear is on the driven gear, the driven gear rotates in the same direction as the rear planetary train's ring gear.

The counter-rotating gear rotates counter-clockwise.

The differential's ring gear rotates clockwise.

Engine brake

When the engine brake works, the driven force is transferred from the tires.

Position D, 6th gear

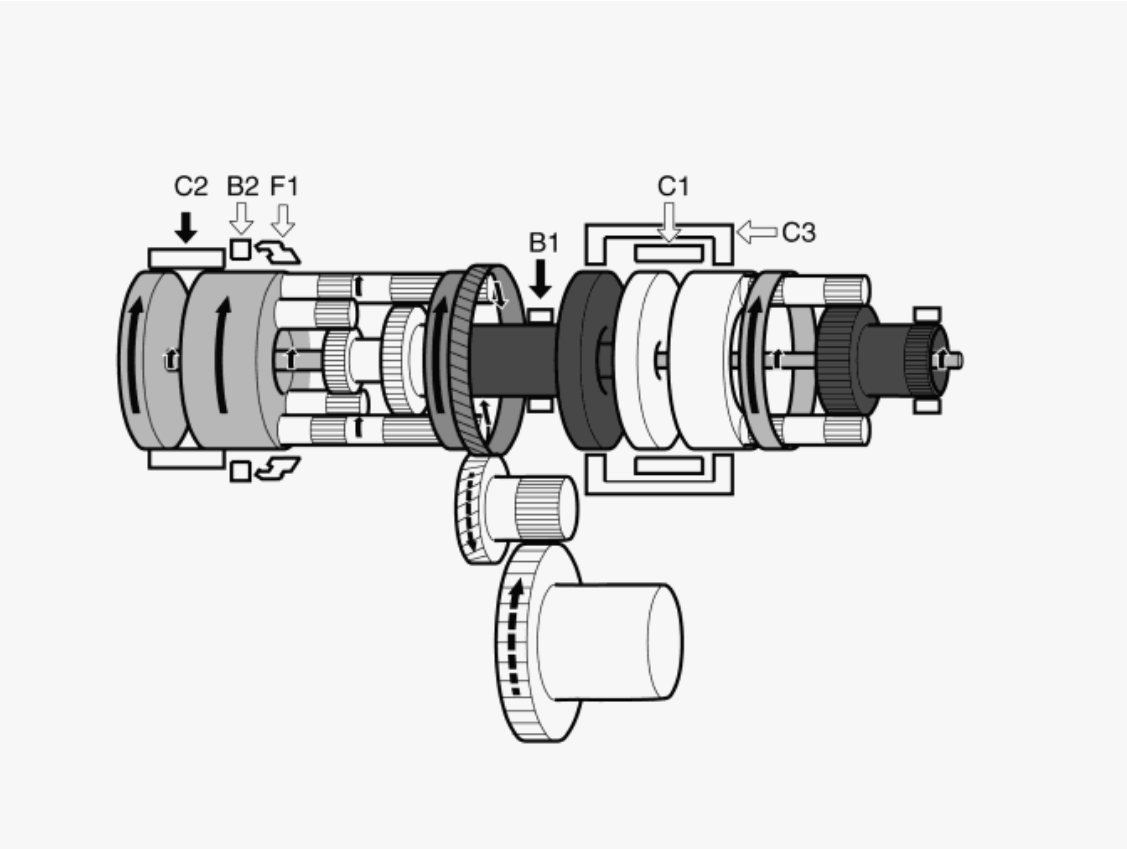


Fig. 19: Identifying Position D For 6th Gear
Courtesy of VOLVO CARS CORPORATION

Solenoid						Clutch			Brakes		Freewheel
SLC1	SLC 2	SLC 3	SLB1	S1	S2	C1	C2	C3	B1	B2	F1
X	-	X	-	-	-	-	X	-	X	-	-

X = activated

- = not activated

Planetary train unit	Power in	Locked	Power out
Front	No component	No component	No component
Rear	Planetary gear carrier	Large sun gear	Ring gear

The input shaft rotates clockwise, the same direction as the torque converter's turbine rotor.

The intermediate shaft rotates clockwise, the same direction as the torque converter's turbine rotor

Brake B1 locks the rear planetary train's large sun gear.

Clutch C2 connects the intermediate shaft with the rear planetary gear carrier.

The rear planetary gear carrier rotates clockwise.

The rear planetary train's outer planetary gear rotates clockwise on its shafts. Because the rear planetary train's large sun gear is locked, the planetary train's outer planetary gear can always increase the speed.

The rear planetary train's ring gear rotates clockwise. Because the rear planetary train's outer planetary gear rotation is added to the rear planetary gear carrier's rotation, the ring gear's speed is greater than the speed at the planetary carrier.

The driven gear rotates clockwise. Because the rear planetary train's ring gear is on the driven gear, the driven gear rotates in the same direction as the rear planetary train's ring gear.

The counter-rotating gear rotates counter-clockwise.

The differential's ring gear rotates clockwise.

Engine brake

When the engine brake works, the driven force is transferred from the tires.

Position R, reverse gear

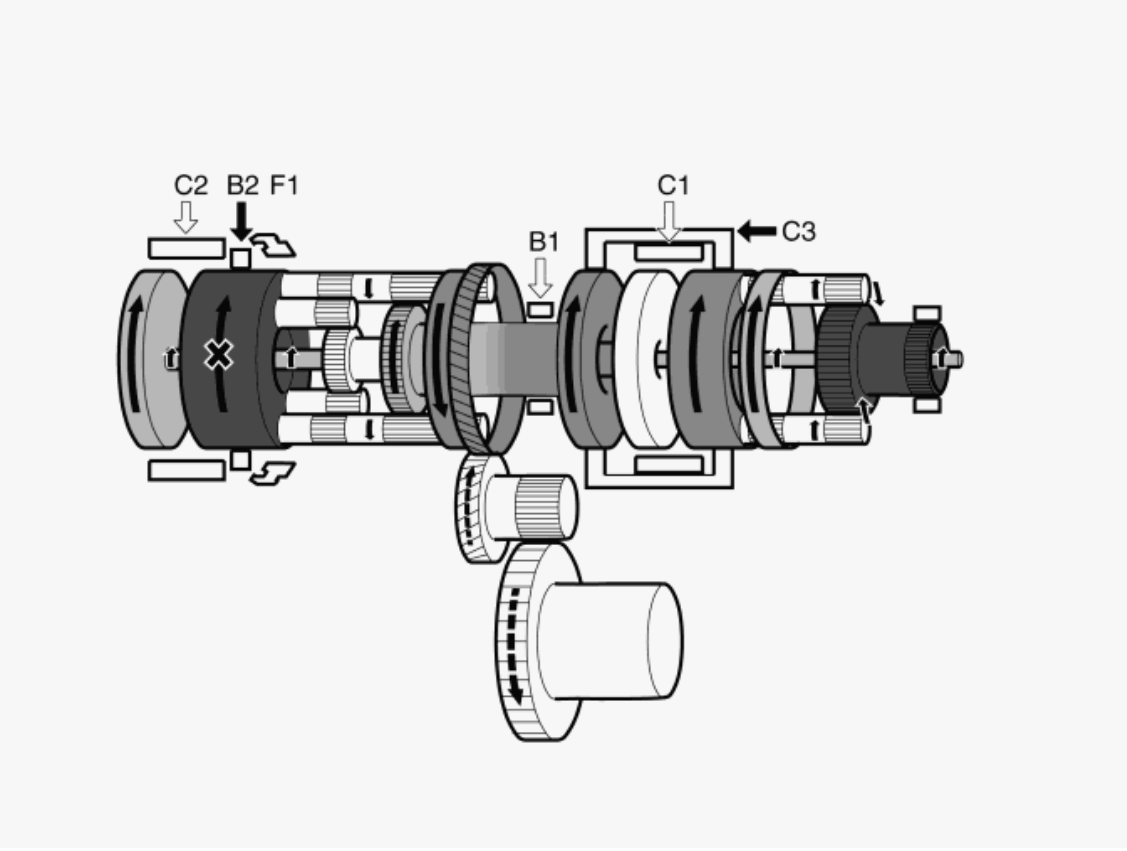


Fig. 20: Identifying Position R For Reverse Gear
Courtesy of VOLVO CARS CORPORATION

Speed	Solenoid						Clutch			Brakes		Freewheel
	SLC1	SLC 2	SLC 3	SLB1	S1	S2	C1	C2	C3	B1	B2	F1
Max 7 km/h	X	X	X	-	X	-	-	-	X	-	X	-
Above 7 km/h	X	X	X	X	X	-	-	-	-	-	X	-

X = activated

- = not activated

Planetary train unit	Power in	Locked	Power out
Front	Ring gear	Sun gear	Planetary gear carrier
Rear	Large sun gear	Planetary gear carrier	Ring gear

The input shaft rotates clockwise, the same direction as the torque converter's turbine rotor.

The front planetary train's ring gear rotates clockwise.

The front planetary train's planetary gear rotates clockwise on its shafts. Because the front planetary train's sun gear is locked by the oil pump, the planetary train's planetary gear presses against the front planetary train's ring gear, and therefore rotates around the sun gear. Because the front planetary train's ring gear has inner teeth, the direction of rotation does not change.

The front planetary gear carrier rotates clockwise.

Clutch C3 rotates clockwise and connects the front planetary gear carrier with the rear planetary train's large sun gear.

The rear planetary train's large sun gear rotates clockwise.

Brake B2 locks the rear planetary gear carrier.

The rear planetary train's outer planetary gear rotates counter-clockwise.

The rear planetary train's ring gear rotates counter-clockwise using the rear planetary train's outer planetary gear. Because the rear planetary train's ring gear has inner teeth, the direction of rotation does not change.

The driven gear rotates counter-clockwise. Because the rear planetary train's ring gear is on the driven gear, the driven gear rotates in the same direction as the rear planetary train's ring gear.

The counter-rotating gear rotates clockwise.

The differential's ring gear rotates counter-clockwise.

Engine brake

When the engine brake works, the driven force is transferred from the tires.

DIFFERENTIAL

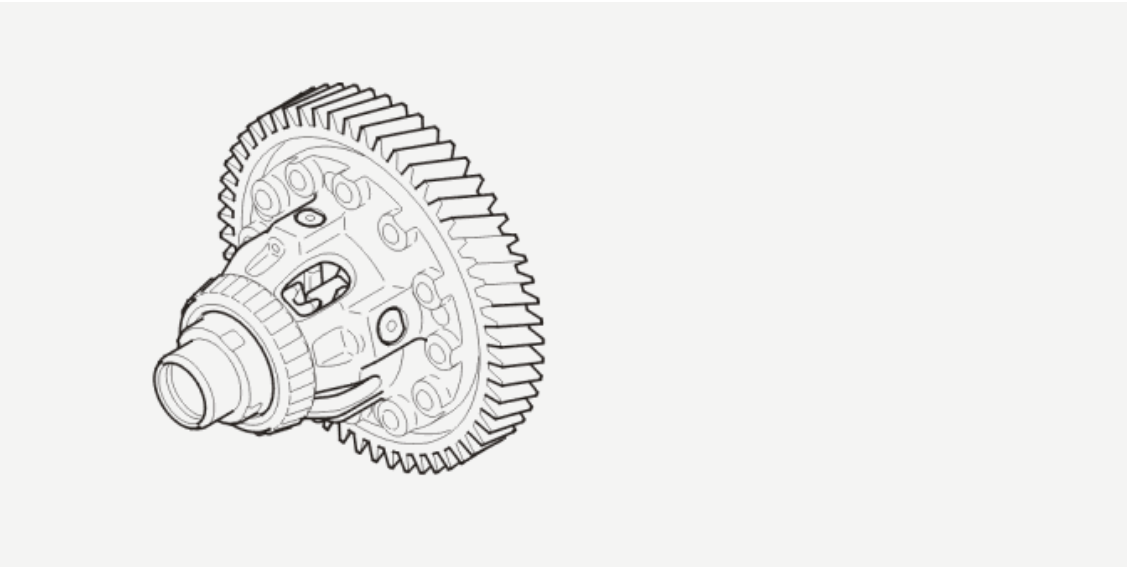


Fig. 21: Identifying Differential
Courtesy of VOLVO CARS CORPORATION

The differential consists of the differential housing, large and small differential gears, shaft journals and thrust washers. The differential housing is completely sealed so that if a drive shaft is removed no dirt can penetrate and no oil can run out.

The differential distributes power equally between the drive wheels, even if they are rotating at different speeds. When driving straight ahead, the ring gear and differential housing rotate at the same speed as the drive shafts and the driving wheels. When cornering, the differential gears rotate to compensate for the different speeds of the wheels. Because the small differential gears are rotating on the shaft journal, the drive shafts can rotate at different speeds. Power is transferred from the differential housing to the drive shafts via the small differential gears in the same way as when driving straight ahead. Both drive wheels still have the same driven power.

AWD

Cars with four wheel drive have a splined pin on the differential housing. The sleeve on the pin connects the differential housing with the bevel gear. This transfers the power to the rear wheels.

TEST PLUGS

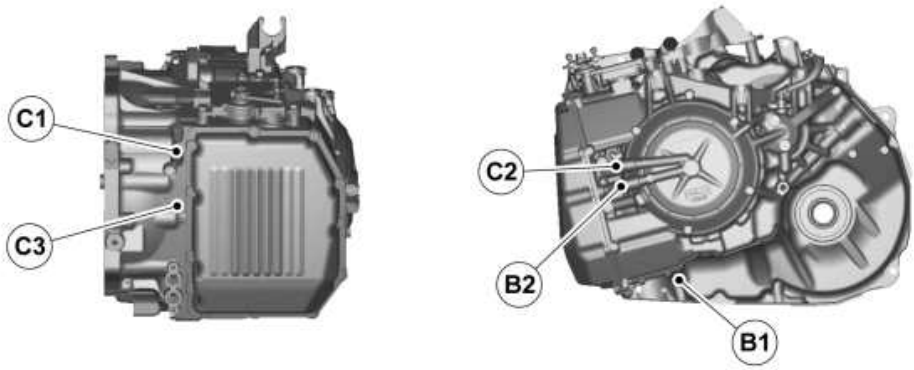


Fig. 22: Locating Test Plugs
Courtesy of VOLVO CARS CORPORATION

IDENTIFICATION PLATE

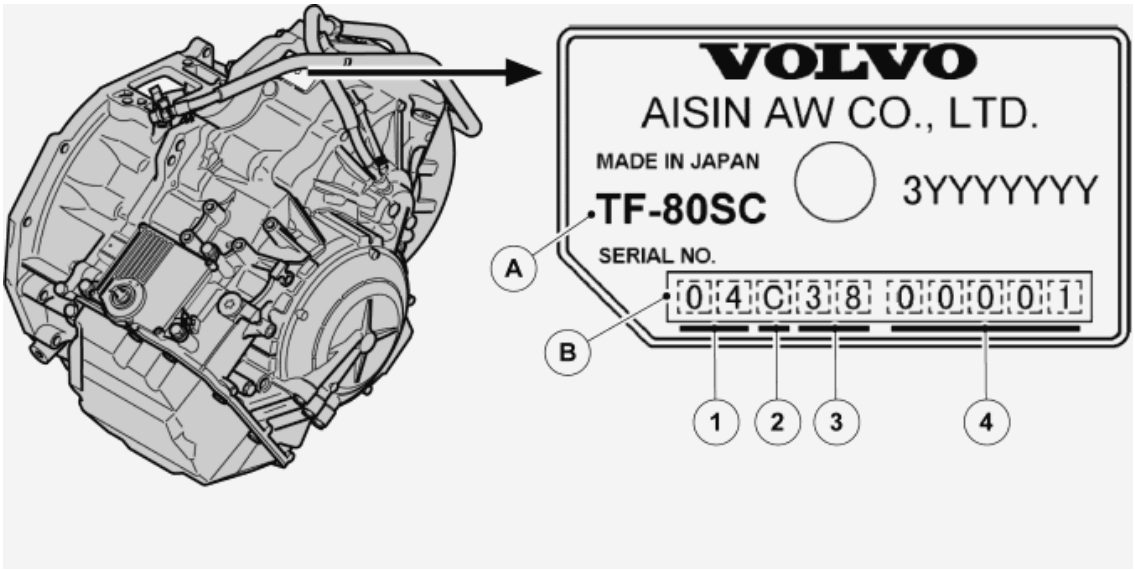


Fig. 23: Identifying Identification (ID) Plate
Courtesy of VOLVO CARS CORPORATION

A. Model number (**T** ransverse **F** wd, **S** lipping lock-up, integrated **C** omputer)

B. Serial number

1. Production year (04 indicates 2004)
2. Production month (C indicates March)
3. Transmission model (38 indicates TF-80SC)
4. Sequence number

	A	B	C	D	E	F	G	H	J	K	L	M

Month	1	2	3	4	5	6	7	8	9	10	11	12

OVERVIEW

AUTOMATIC TRANSMISSION TF80SC GENERATION 2

Fig. 24: Transmission Unit
Courtesy of VOLVO CARS CORPORATION

HINT: The shape of the transmission casing differs depending on which engine is included in the driveline.

This transmission has been updated on several points to meet high demands for fuel economy and comfort. TF80SC Gen 2 replaces earlier versions of TF80SC.

Changes compared to earlier version:

- Solenoids
- tapered bearings
- friction pads
- Seals
- oil with lower viscosity

- "lock-up" at lower engine rpm
- software in **TCM** (**T** ransmission **C** ontrol **M** odule)
- fastening AC bracket (6-cyl. engines)

These changes contribute to lower internal losses and, together with upshifting at lower engine rpms, faster downshifts, the result is lower fuel consumption, better shifting quality, and higher efficiency.

TF-80SL (TF-80SL AWD) is an electronically controlled 6-speed automatic transmission with Geartronic.

The Geartronic function combines two transmissions in one. One adaptive 6-gear automatic transmission which enables relaxed driving, and a "manually" shifted transmission which enables more active driving with manual shifting. In case of manual shifting, the gear selector is pushed forward to upshift to a higher gear and it's pulled back to downshift to a lower gear. However, in certain situations the Transmission control module (TCM) assumes the gearshifting decisions

TF-80SL has a lock-up-function on all forward gears except 1st gear. The torque converter has a locked and slipping lock-up-function.

Gearshifts are controlled by an hydraulic operating system. Gearshifts take place without freewheeling and completely automatically in terms of load and speed.

TF-80SL has two planetary gear units, a front and a rear, whose shifts are controlled by a number of clutches and brakes. The rear planetary gear is of the Ravigneaux type.

The oil level is checked by level pipe (the transmission does not have a conventional dipstick).

The transmission has a total of 8 solenoids that control the hydraulic flow. 6 of these solenoids control the shift process, 1 solenoid controls the torque converter's lock-up function and 1 solenoid controls the system pressure.

The gear selector sensor is integrated in the Transmission control module (TCM). The Transmission control module (TCM) is integrated in the transmission.

TRANSMISSION (TF-80SC AWD; 2005-2012)

DESIGN AND FUNCTION

see **DESIGN AND FUNCTION**

OVERVIEW

see **OVERVIEW**

TRANSMISSION (TF-80SC; 2007-2012)

DESIGN AND FUNCTION

see **DESIGN AND FUNCTION**

OVERVIEW

see **OVERVIEW**

TRANSMISSION

Power transmission

TRANSMISSION

INPUT SPEED SENSOR TRANSMISSION, REPLACING (4T65AWD 2003-)

INPUT SPEED SENSOR TRANSMISSION, REPLACING

REMOVING THE LINE PRESSURE SOLENOID

NOTE: The line pressure solenoid must be removed to access the input speed sensor.

See **SOLENOID LINE PRESSURE, REPLACING** .

REMOVING THE INPUT SPEED SENSOR

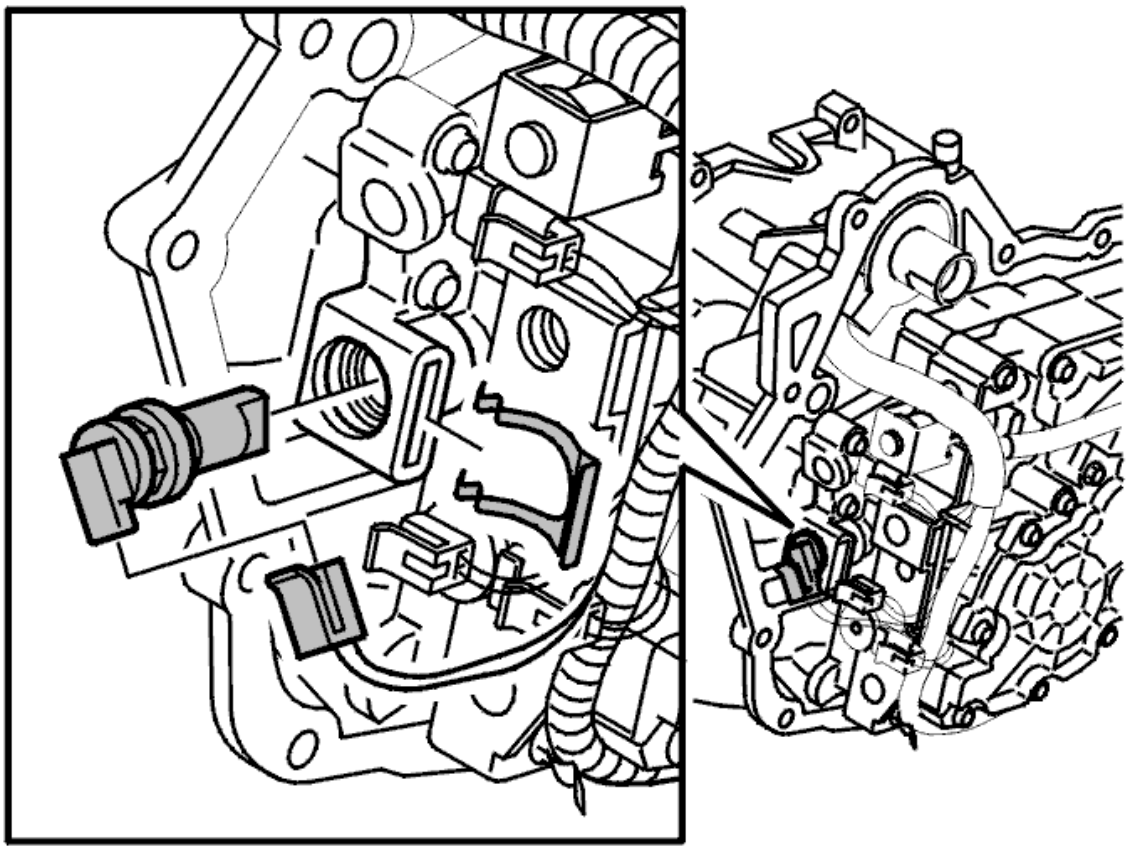


Fig. 1: Input Speed Sensor
Courtesy of VOLVO CARS CORPORATION

NOTE: Note the position of the input speed sensor during removal. This is important for installation.

Remove:

- the connector
- the clip. Use a narrow screwdriver to remove the clip
- the speed sensor.

INSTALLING THE INPUT SPEED SENSOR

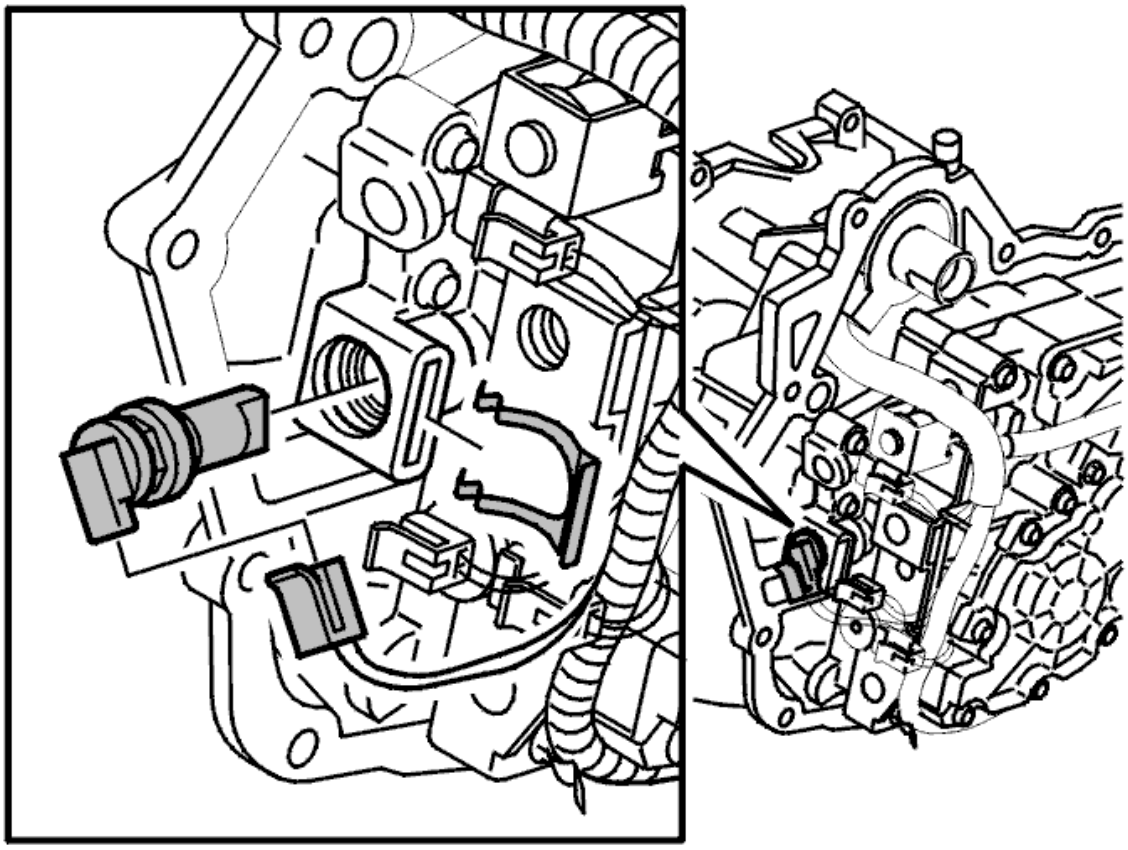


Fig. 2: Input Speed Sensor
Courtesy of VOLVO CARS CORPORATION

NOTE: Install the input speed sensor in the same position noted when it was removed.

Install:

- the input speed sensor
- the clip
- the connector.

Check that the input speed sensor is secure.

INSTALLING THE LINE PRESSURE SOLENOID

See **SOLENOID LINE PRESSURE, REPLACING** .

INPUT SPEED SENSOR/OUTPUT SPEED SENSOR, REPLACING (AW50/51 AWD; AW55-50/51SN; 2003-2007)

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

REMOVAL

PREPARATIONS

Switch off the ignition.

REMOVING THE AIR CLEANER (ACL) HOUSING

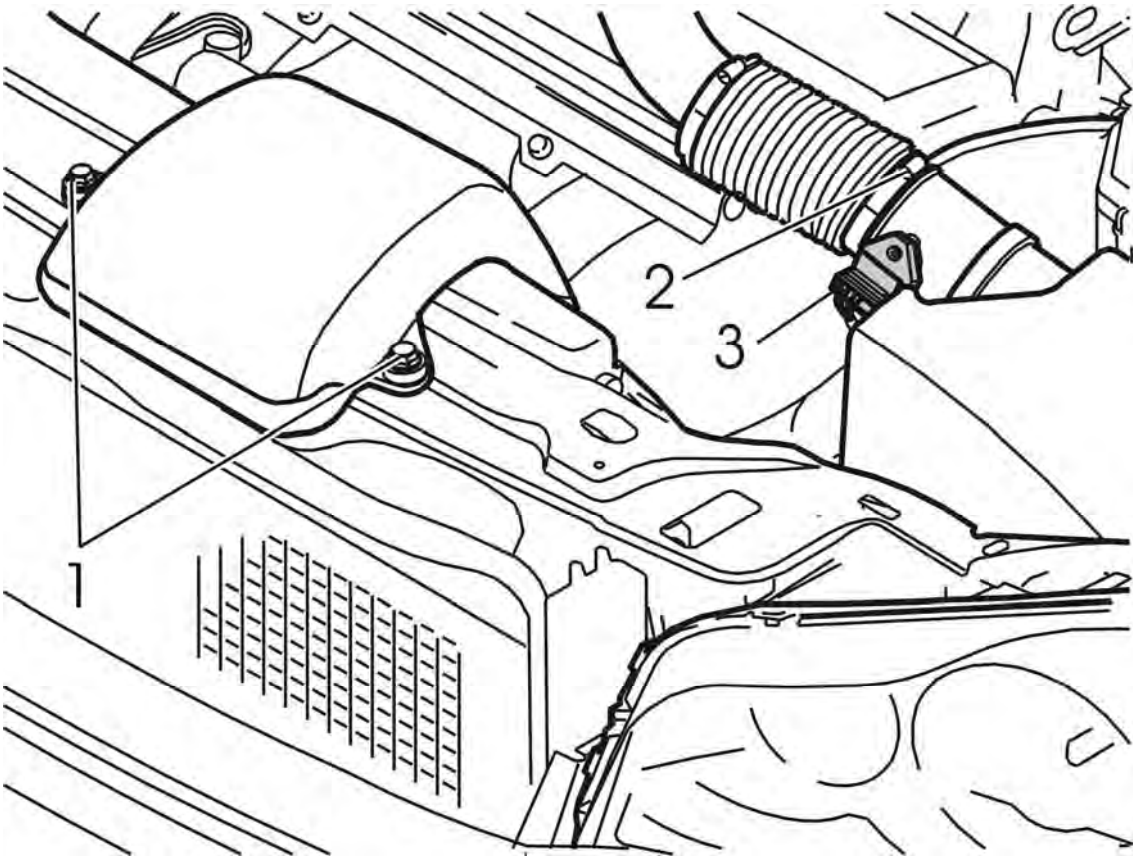


Fig. 3: Air Cleaner (ACL) Housing
Courtesy of VOLVO CARS CORPORATION

Ignition off.

Remove the air cleaner housing ACL assembly with the intake pipe.

1. The intake manifold
2. The hose from the mass air flow (MAF) sensor
3. Connector.

Pull the air cleaner (ACL) housing out of its mountings.

REMOVING THE CABLE HARNESS

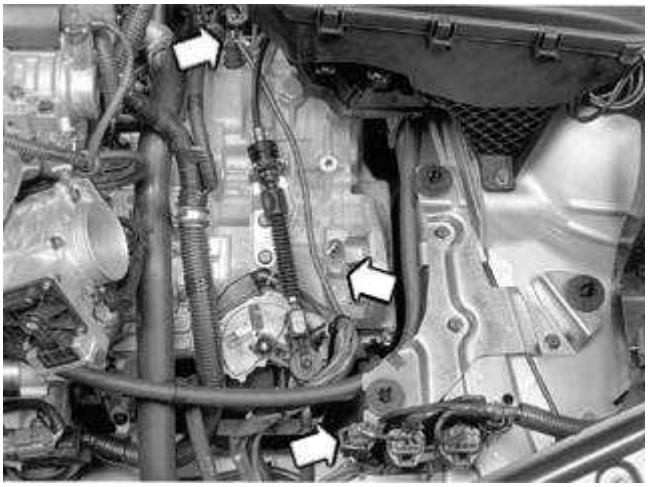


Fig. 4: Air Cleaner (ACL) Housing Cable Harness
Courtesy of VOLVO CARS CORPORATION

Remove the mounting for the cable harness from the cover for the control system.

Unhook the mounting with the connectors for the cable harness from the bracket for the air cleaner (ACL) housing.

Remove the tie straps from the cable harness.

Separate the connectors for the transmission output speed sensor and the transmission input speed sensor.

Unhook the connectors from the mounting.

Clean thoroughly around the sensors.

Remove the sensors and the cable harness.

INSTALLATION

NOTE: For tightening torques, see TIGHTENING TORQUE .

INSTALLING THE SENSOR

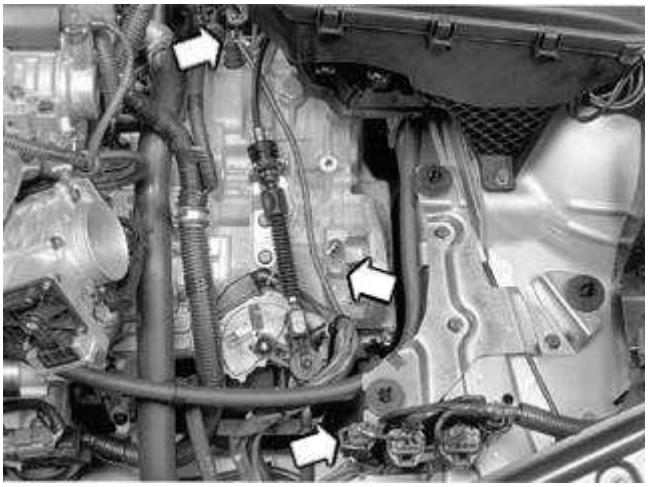


Fig. 5: Air Cleaner (ACL) Housing Cable Harness
Courtesy of VOLVO CARS CORPORATION

Install the new sensors.

Apply a little petroleum jelly to the O-rings for the sensors. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** .

- Install the connectors for the sensors on the mounting. Assemble the connectors
- Install the tie straps for the cable harness
- Hook the mounting for the connectors on to the bracket for the air cleaner (ACL) housing
- Secure the cable harness mounting in the control system cover.

INSTALLING THE AIR CLEANER (ACL) HOUSING

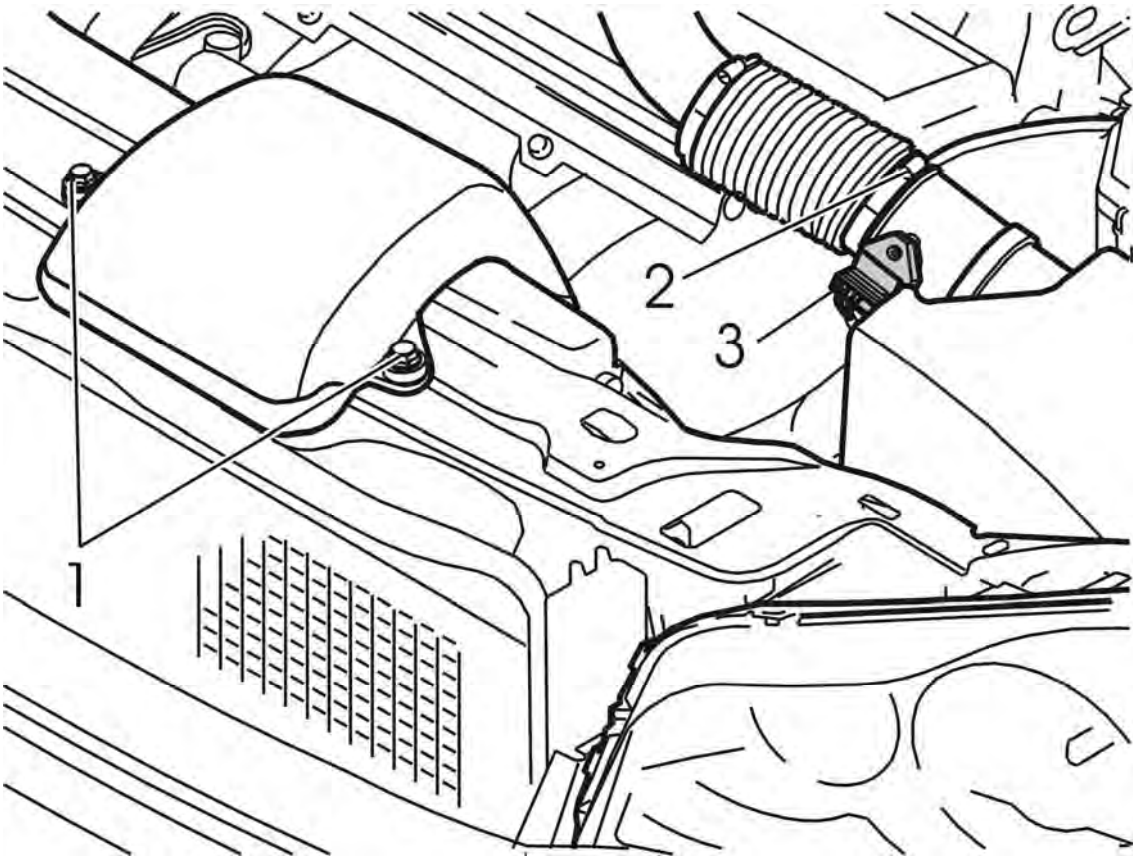


Fig. 6: Air Cleaner (ACL) Housing
Courtesy of VOLVO CARS CORPORATION

Install the air cleaner (ACL) housing, including all hoses and electrical terminals.

Check and erase any diagnostic trouble codes (DTCs).

LINE PRESSURE/STALL SPEED, CHECKING

Special tools:

see **9992531**

see **9995074**

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

CHECKING THE OIL LEVEL

Check the oil level. See **OIL LEVEL, CHECKING**

Ignition off.

REMOVING THE AIR CLEANER (ACL) HOUSING

Remove the air cleaner housing. See **INTAKE AND EXHAUST SYSTEM - REMOVAL, REPLACEMENT AND INSTALLATION**

MANOMETER CONNECTION

Connect the hose and manometer see **9992531** to the transaxle (position D).

Installing the air cleaner (ACL) housing

Install the air cleaner (ACL) housing, including all hoses and electrical terminals.

CHECKING THE ENGINE IDLING SPEED

Start the engine. Allow it to idle in neutral.

Check the idling speed. See: **SYSTEM PRESSURE/STALL SPEED**

CHECKING THE LINE PRESSURE

Depress the brake pedal.

Move the gear selector to position D and read off the line pressure. See: **SYSTEM PRESSURE/STALL SPEED**

CHECKING THE STALL SPEED

Check the stall speed when checking the line pressure.

The stall speed test gives an indication of the condition of the torque converter, the transmission clutches and the engine.

For the test to be accurate the following conditions must be met:

- the engine must be properly tuned
- the line pressure must be correct
- the oil level in the transmission must be correct and the transmission must be at operating temperature.

NOTE: Never conduct a stall speed check when the line pressure is too low.

CHECK

Air conditioning (AC) must be off.

Chock all four wheels.

Start the engine.

CAUTION: Apply the parking brake. Press down hard on the brake pedal using your left foot during the test.

NOTE: Do not test the stall speed for longer than 5 seconds.

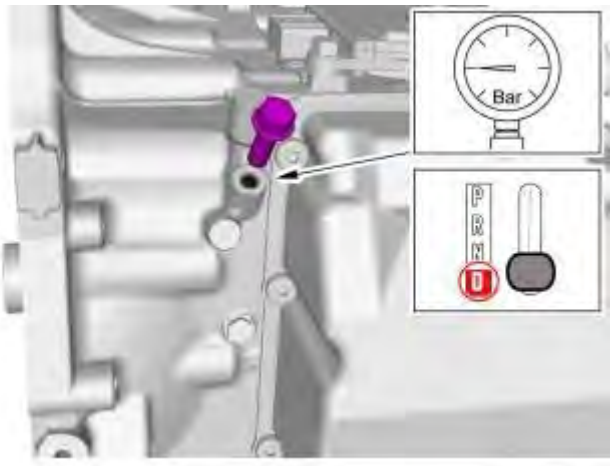


Fig. 7: View Of Inspecting Pressure
Courtesy of VOLVO CARS CORPORATION

Move the gear selector to position **D** .

Depress the accelerator pedal all the way, **max 5 seconds** .

Read off the speed (RPM) as well line pressure. See **SYSTEM PRESSURE/STALL SPEED**

If the speed exceeds the table values, see **High stall speed** if speed is below the table values, see **Low stall speed** .

NO TITLE

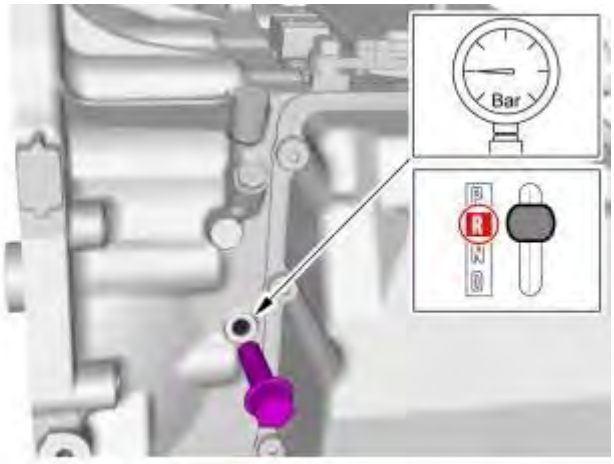


Fig. 8: View Of Inspecting Pressure On R Position
Courtesy of VOLVO CARS CORPORATION

Transfer the manometer to the socket for checking in position R.

Move the gear selector to position **R** .

Depress the accelerator pedal all the way, **max 5 seconds** .

Read off the speed (RPM) as well line pressure. See **SYSTEM PRESSURE/STALL SPEED**

If the speed exceeds the table values, see **High stall speed** if speed is below the table values, see **Low stall speed** .

HIGH STALLING SPEED

The test conditions described in, see **CHECK** above, have been met. Is the acceleration time from 0-100 km/h normal?

If the stalling speed recorded exceeds the normal value by more than 300 RPM:

Check if the oil is discolored or smells burnt. See **OIL GRADE, CHECKING (AW50/51 AWD; AW55-50/51SN)**

If the oil is OK, replace the torque converter.

see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

Dirty oil indicates worn or burnt clutch plates. Replace the transmission.

see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

Check the stall speed again after replacing the transmission.

LOW STALLING SPEED

The test conditions described in, see **CHECK** above have been met.

Try a new torque converter if the stall speed recorded is below the normal value by more than 300 RPM.

see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

Check the stalling speed again after replacing the torque converter

If the fault remains, replace the transmission. See **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

After the check is completed:

Ignition off.

Remove both the manometer connection and the manometer.

Install:

- the test plug. Check that the O-ring is undamaged. Replace if necessary. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS**
- the bracket for the side member
- the holder for the connectors on the bracket
- the cover for the bracket.

LUBRICATION TRANSMISSION

TRANSMISSION, MANUAL

Designation	P/N	Package quantity
M56, M58, M59, M65, M66	1161 745	1 liter
MMT6, MTX75, IB5	1161 723	1 liter
	1161 724	4 liters

TRANSMISSION, AUTOMATIC

Designation	P/N	Package quantity
AW50-42, AW42AWD, 4T65xxx	1161 521	1 liter
	1161 621	4 liters
AW50/55-50, AW50AWD, TF-80SCAWD	1161 540	1 liter
	1161 640	4 liters
MPS6	1161 838	1 liter
	1161 839	4 liters

OTHER

Designation	P/N	Package quantity
Bevel gear	1161 648	1 liter
Chain housing	1161 745	1 liter
Clutch four-wheel drive	1161 641	0.3 liters
Final drive	1161 620	1 liter
Universal oil	1161 657	0, 2 liter
PFPE-grease aerosol	307 59651	0.15 liters

CONSTANT VELOCITY JOINT BOOT, GREASE QUANTITY

Engine/transmission	Wheel side	Transmission side
B8444S/B6324S/TF-80SCAWD	150g / 2X80g = 160g	180g / 3x65g = 195g
D5244T4/TF-80SC	150g / 2X80g = 160g	180g / 3x65g = 195g
D5254T6/TF-80SC	203g / 2X80g + 1X60g = 220g	140g / 1X85g + 1X65g = 150g
B5254T6/M66	150g / 2X80g = 160g	100g / 1X120g
D5244T4/M66	150g / 2X80g = 160g	100g / 1X120g
D4204T/MPS6	120g / 1X120g	174g / 3X65g = 195g

TRANSMISSION

Power transmission

TRANSMISSION

OIL COOLER, FLUSH CLEANING

NOTE: When replacing the transmission, the oil cooler must always be flushed clean because there may be particles in the oil cooler.

PREPARATIONS

A vacuum oil extractor is used to suck the oil through the oil cooler when flushing the oil cooler.

The following material is required to flush the oil cooler:

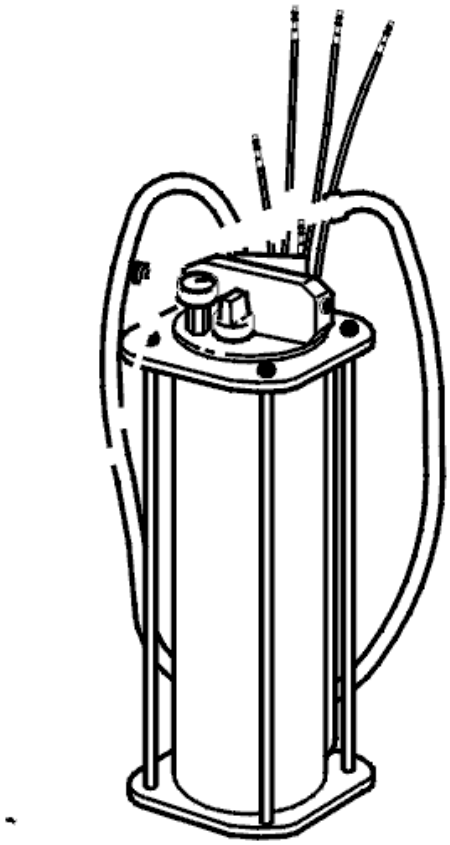


Fig. 1: Identifying Vacuum Extractor
Courtesy of VOLVO CARS CORPORATION

Vacuum extractor.

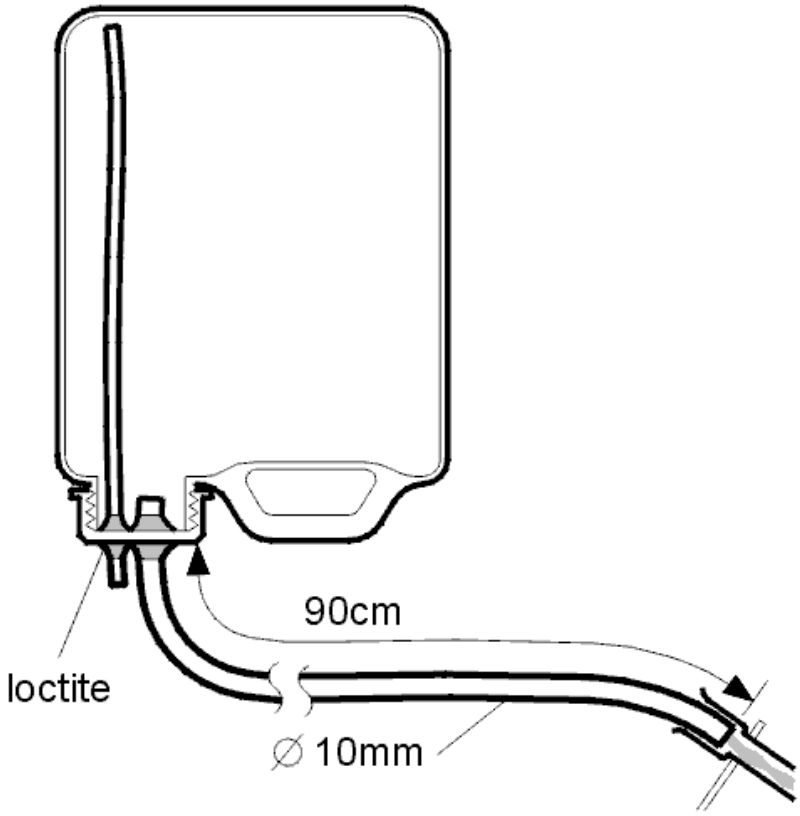


Fig. 2: 5 L. Plastic Container
Courtesy of VOLVO CARS CORPORATION

5 l. Plastic container.

Plastic hose

Inner diameter: O 10 mm.

Length: 900 mm.

Assemble as shown in the illustration.

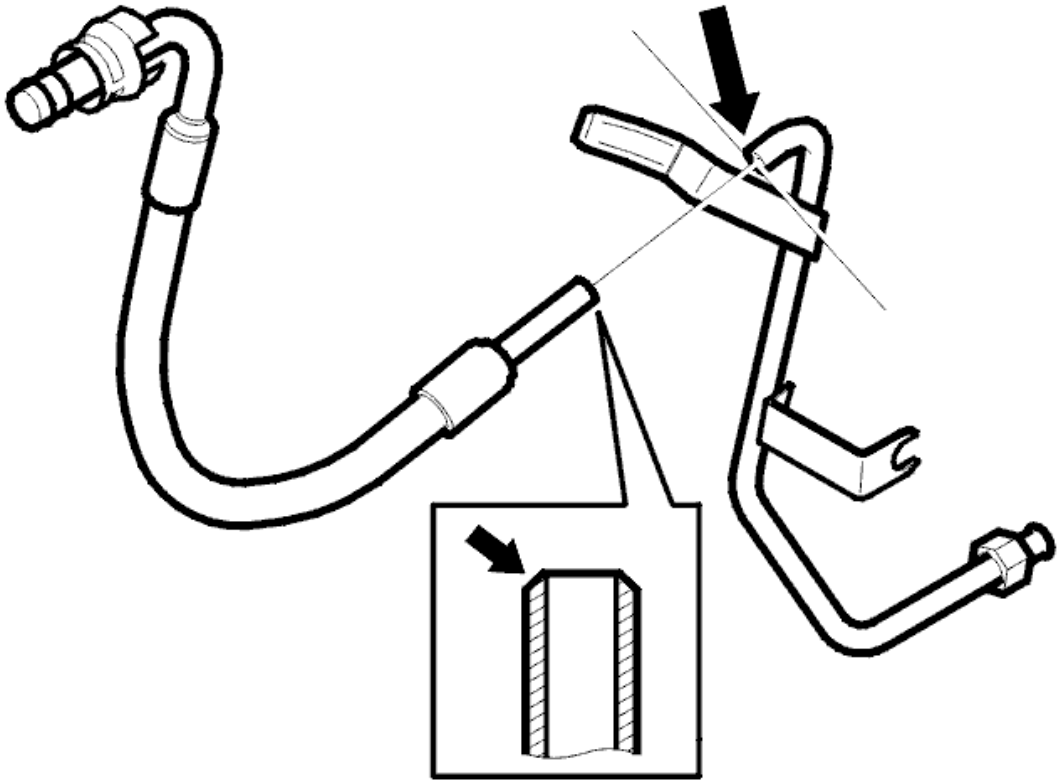


Fig. 3: Cutting Pipe
Courtesy of VOLVO CARS CORPORATION

Upper oil hose and pipe. This oil hose must be on the upper section of the oil cooler.

Cut the pipe as shown in the illustration. Smooth of the edge of the pipe.

NOTE: Blow the pipe clean.

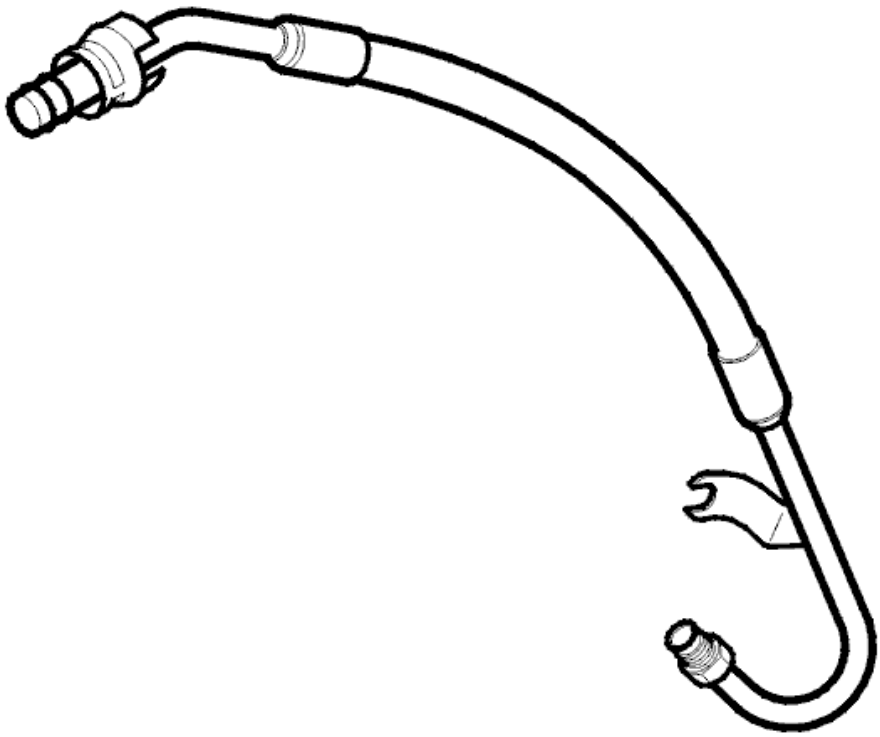


Fig. 4: Locating Lower Oil Hose And Pipe
Courtesy of VOLVO CARS CORPORATION

Lower oil hose and pipe. This oil hose must be on the lower section of the oil cooler.

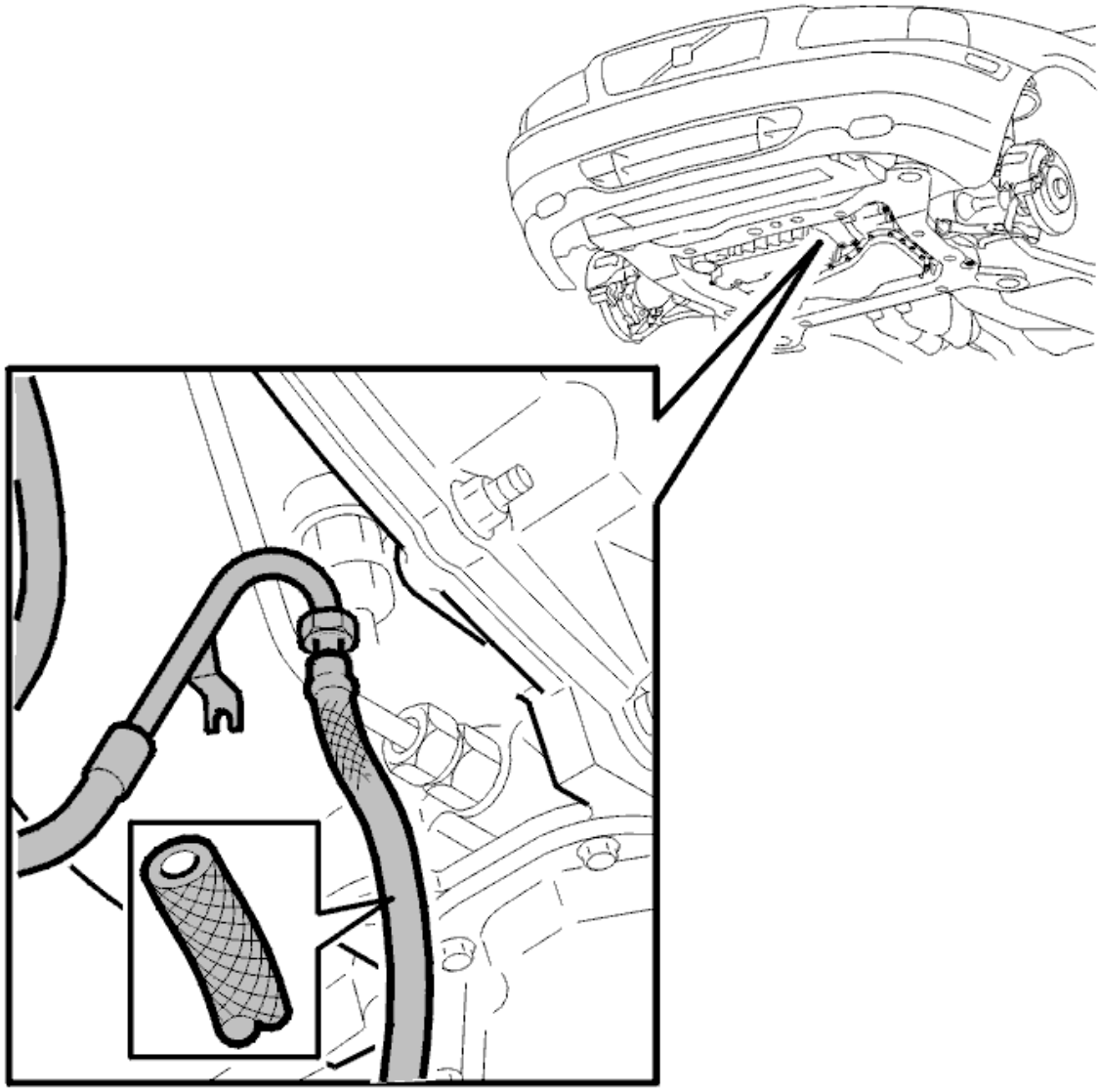


Fig. 5: Hose Installed On The Oil Pipe
Courtesy of VOLVO CARS CORPORATION

Plastic hose (compressed air hose).

Inner diameter: O 10 mm.

Length: 200 mm.

Press the hose into place on the lower oil pipe.

CONNECTING COMPONENTS TO THE VACUUM EXTRACTOR

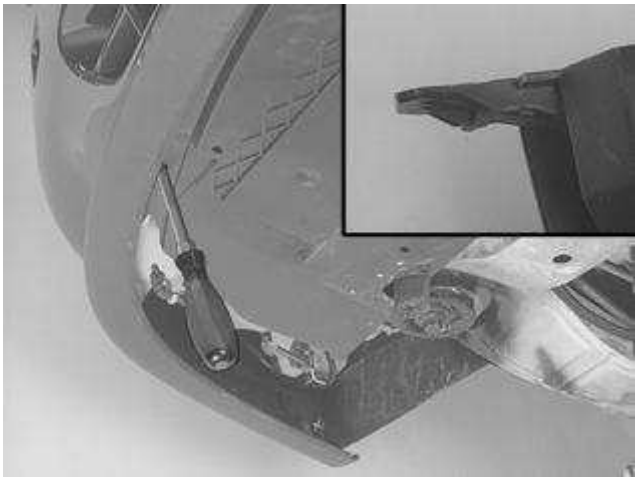


Fig. 6: Identifying Air Baffle And Splash Guard Under Engine
Courtesy of VOLVO CARS CORPORATION

Raise the car.

Remove the front air baffle.

Detach and push the lower oil hose away from the **oil cooler** . A small amount of oil will run out.

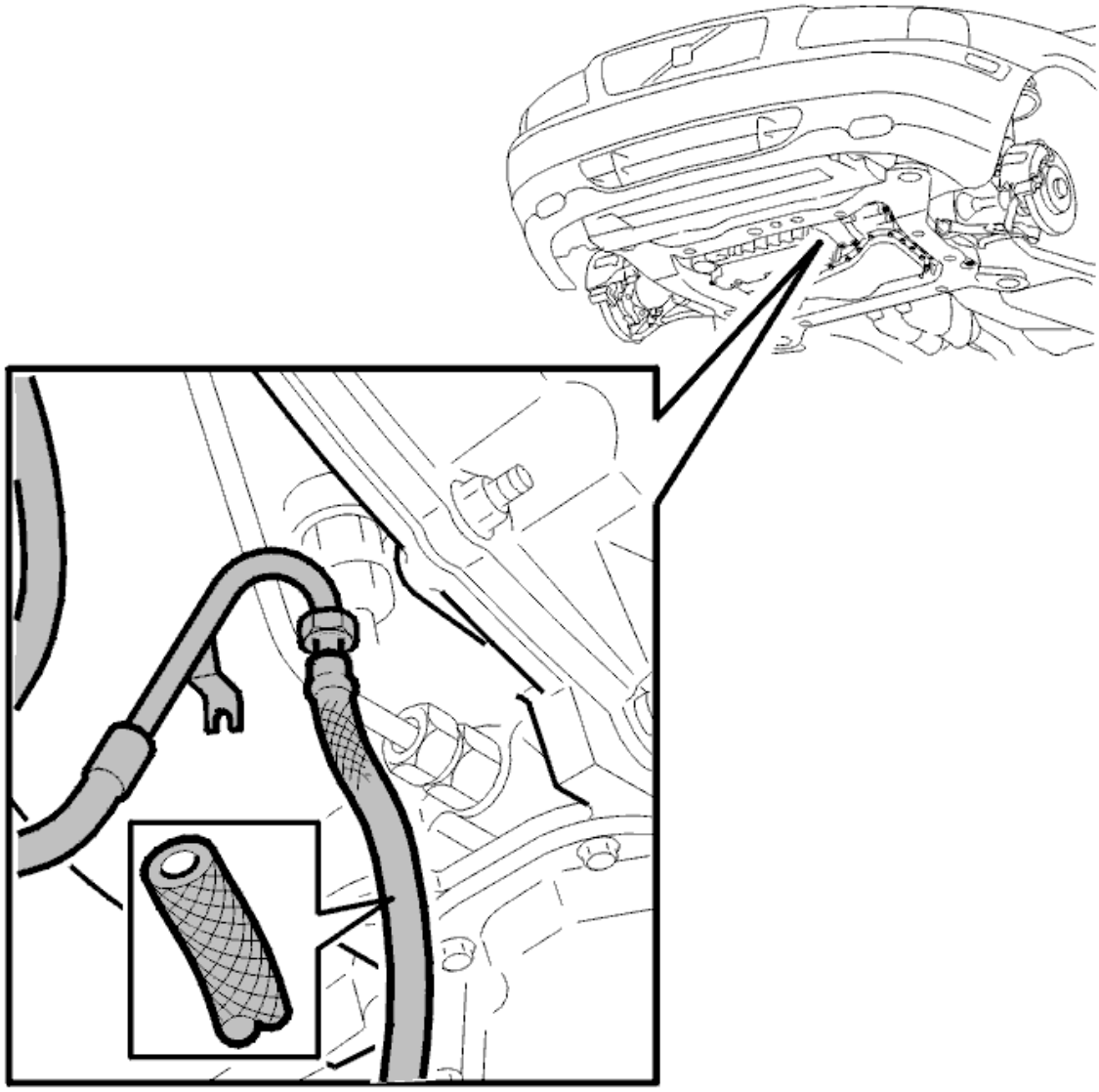


Fig. 7: Hose Installed On The Oil Pipe
Courtesy of VOLVO CARS CORPORATION

Connect the loose lower oil hose to the oil cooler. Move the loose hose out of the way.

Lower the car.

DETACHING AND INSTALLING THE UPPER OIL HOSE AND PIPE

Detach and push the upper oil hose away from the oil cooler.

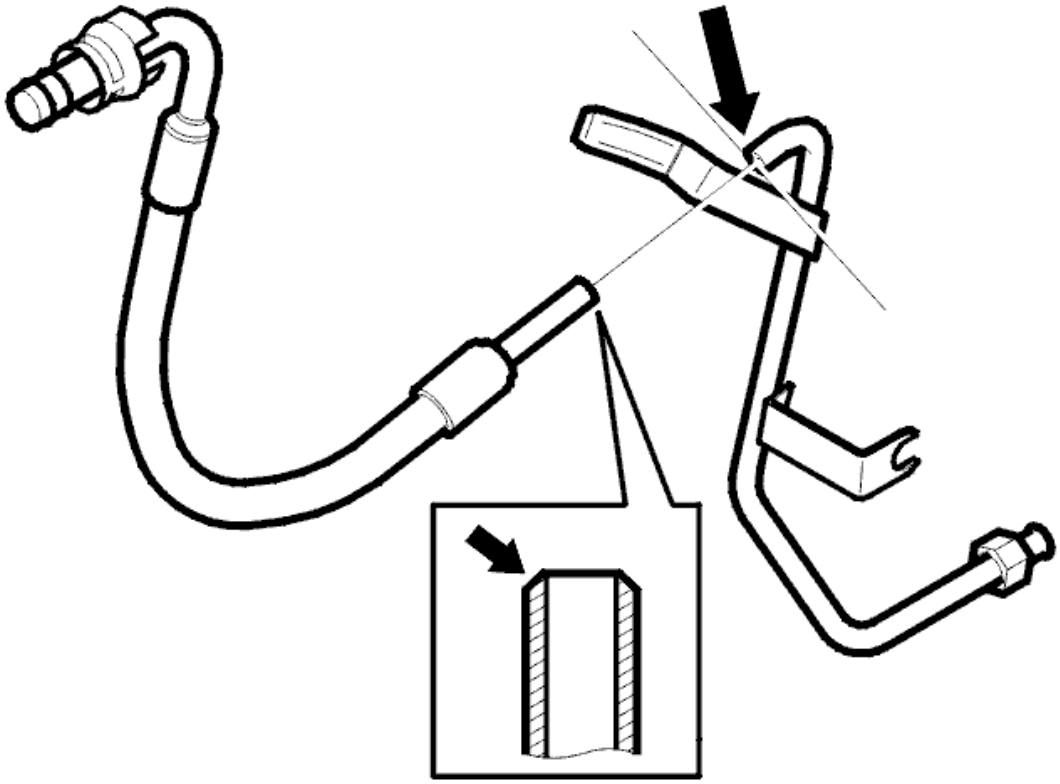


Fig. 8: Cutting Pipe
Courtesy of VOLVO CARS CORPORATION

Install the cut oil hose and pipe on the oil cooler.

Filling with oil

Fill the plastic container with 2 liters of oil.

NOTE: Only approved automatic transmission fluid may be used.

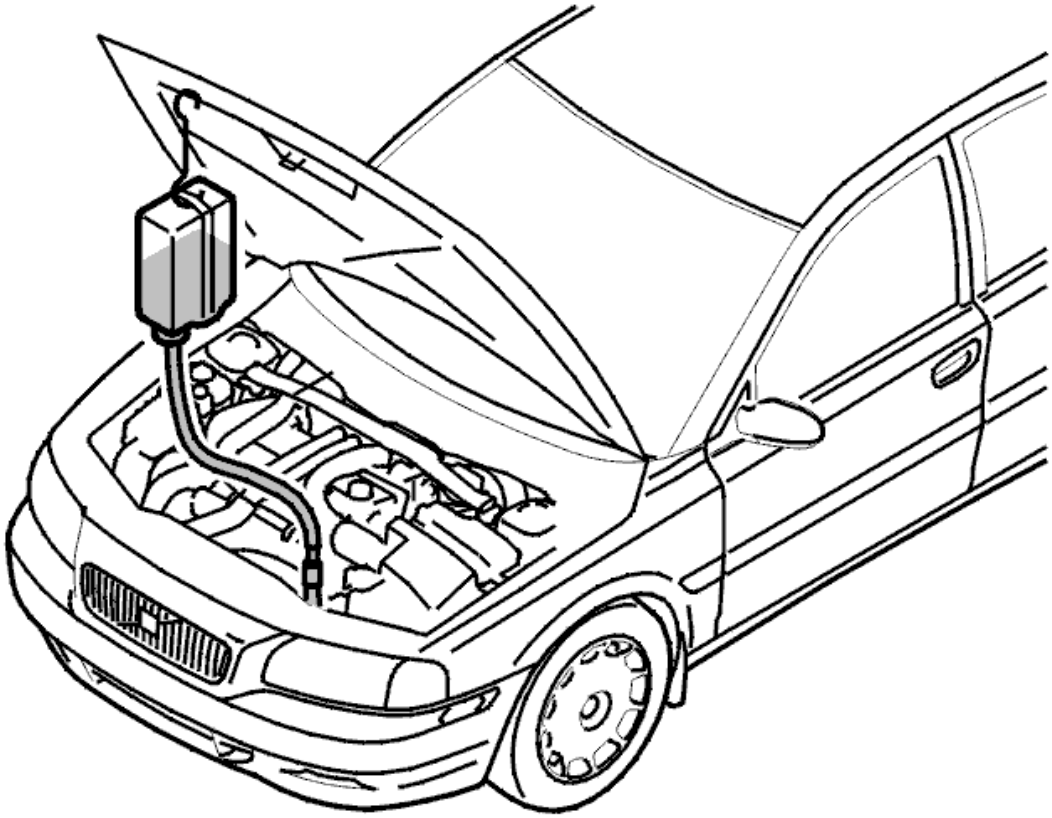


Fig. 9: Plastic Container Hanging Under Hood
Courtesy of VOLVO CARS CORPORATION

Connect the hose from the plastic container to the cut oil pipe. Hang the plastic container under the hood.

Raise the car.

FLUSHING

Charge the vacuum extractor.

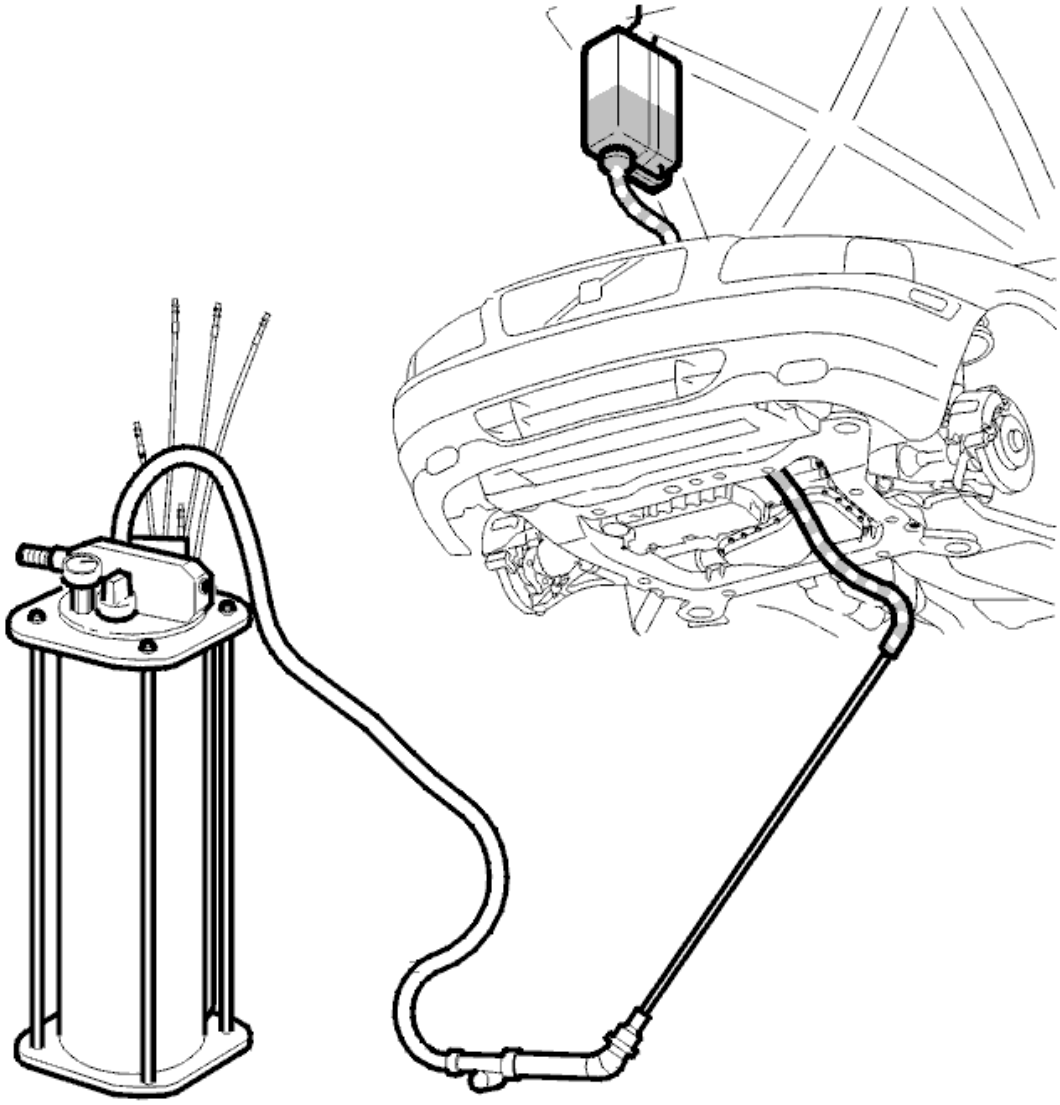


Fig. 10: Connecting Vacuum Extractor
Courtesy of VOLVO CARS CORPORATION

Connecting the vacuum extractor

Connect an oil pipe with an external diameter of O 10 mm from the vacuum extractor. Connect the oil pipe to the short hose.

Flushing

Open the cock and suck the oil out of the oil cooler. Check that the filler container is not completely drained. (There should be a little oil left in the hose.) Flow: 2 liters take approximately 40 seconds.

If the level sinks slowly the flushing must be repeated. If the level still sinks slowly replace the oil cooler.

REMOVING AND INSTALLING THE EXISTING OIL HOSES

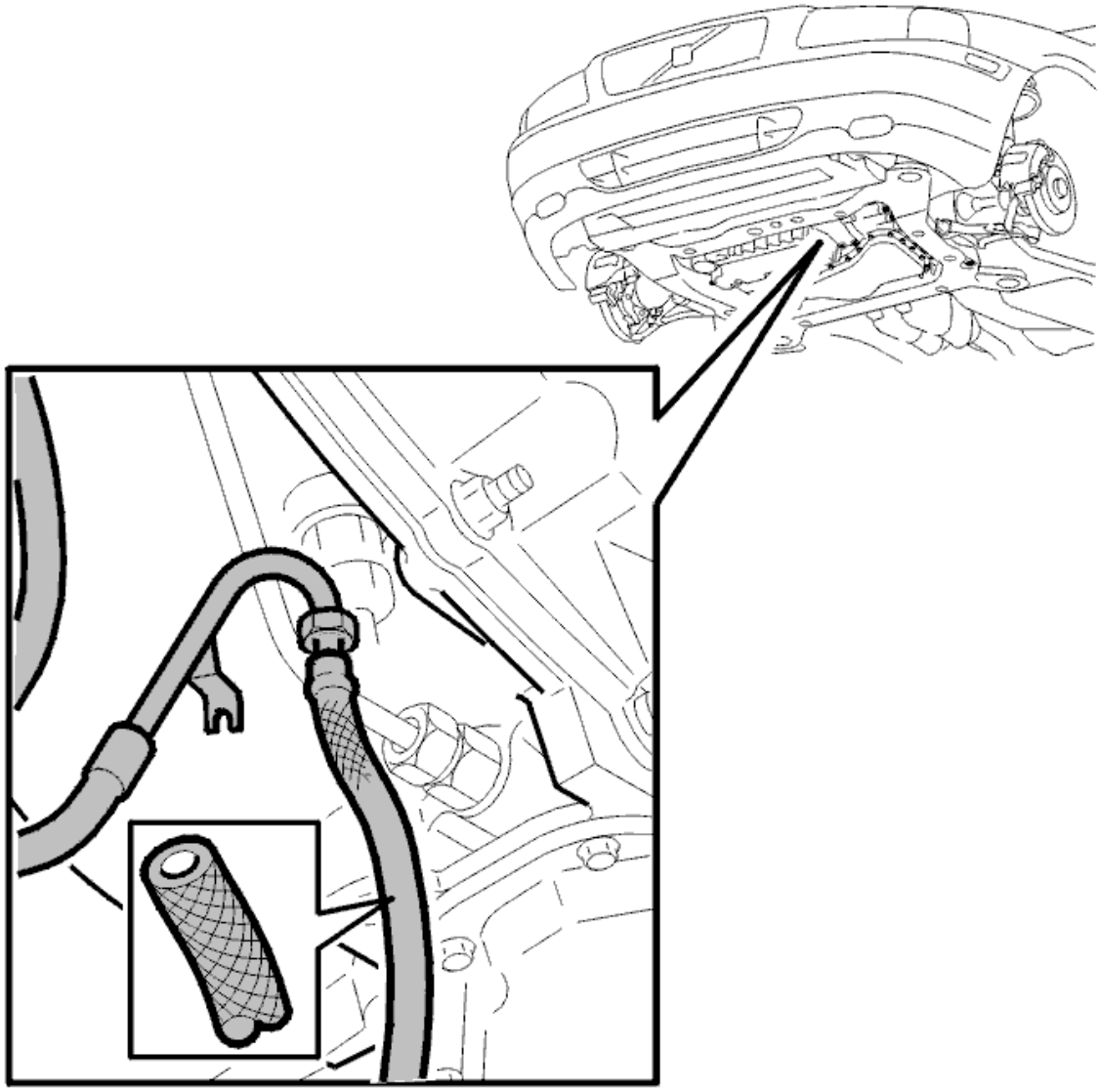


Fig. 11: Hose Installed On The Oil Pipe
Courtesy of VOLVO CARS CORPORATION

Remove the hose and reinstall the existing hose for the oil cooler.

Reinstall the air baffle.

Lower the car.

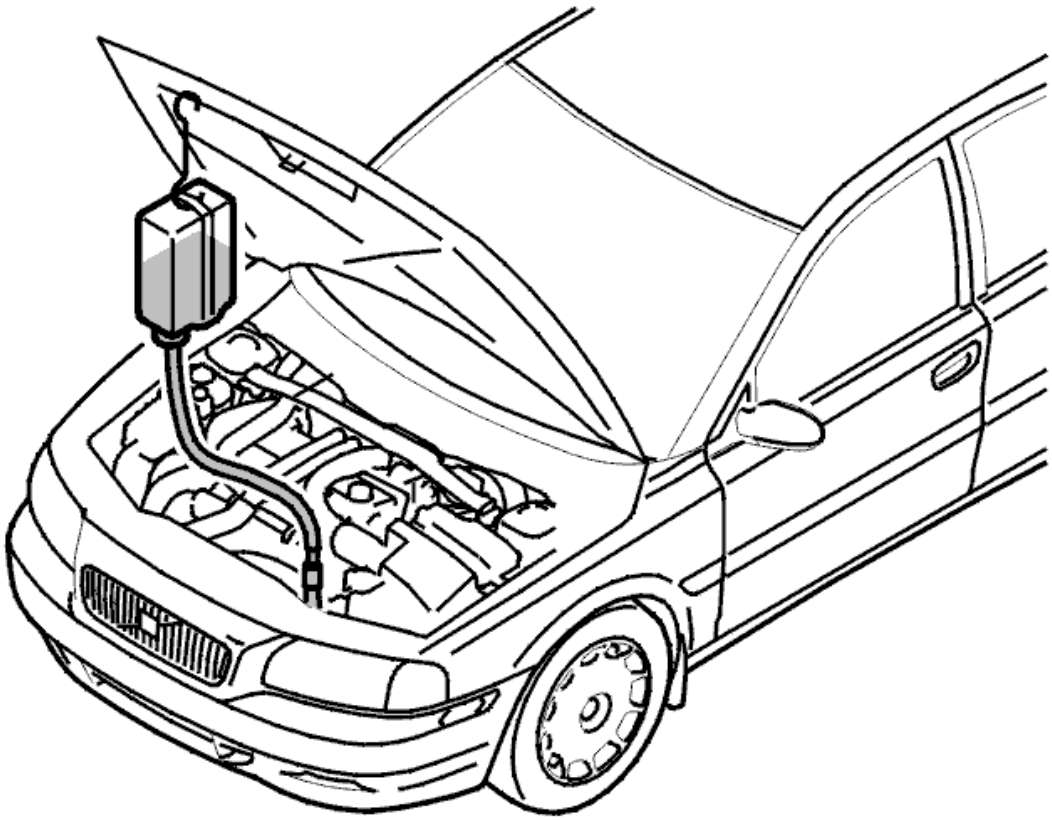


Fig. 12: Plastic Container Hanging Under Hood
Courtesy of VOLVO CARS CORPORATION

Remove the plastic container and the oil pipe from the oil cooler.

Reinstall the existing oil hose on the oil cooler.

Checking the transmission fluid level

Check the level. See **OIL LEVEL, CHECKING** .

OIL GRADE, CHECKING (AW50/51 AWD; AW55-50/51SN)

CHECK THE OIL

NOTE: Oil grade: Only ATF-oil, Volvo part number 1161540-8 (1-liter container) may be used.

WARNING: Avoid skin contact with the oil.

Check the oil. Take a sample with the dipstick.

Is the oil discolored or does it smell burnt?

- Check if diagnostic trouble code TCM-0042, TCM-0046 is stored.
- Also troubleshoot the transmission according to code TCM-0046.
- When changing the oil. See **TRANSMISSION FLUID, REPLACING** .

Is there coolant in the oil (oil grey-colored)?

- Check the oil for coolant, see **CHECKING FOR COOLANT IN THE OIL**
- Determine the cause why there is coolant in the oil.
- Replace the gearbox. See **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

NOTE: Always replace the cooler and the additional oil cooler (where applicable) if there are signs of water in the transmission oil.

Flush the oil cooler, pipes and oil hoses

Use only ATF-oil, Volvo part no. 1161540-8 (1-liter container).

WARNING: Avoid skin contact with the oil.

OIL GRADE, CHECKING (TF-80SC; TF-80SC AWD)

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

WARNING: Avoid skin contact with the transmission fluid.

CHECK

CHECKING OIL

NOTE: Oil grade: Only automatic transmission fluid, Volvo P/N 116 1540-8 (1 liter container) may be used.

Check the oil. Take a sample with the dipstick.

Is the oil discolored or does it smell burnt?

- Check whether diagnostic trouble codes (DTC) TCM 0042 or TCM 0046 are stored

- Also fault-trace the transmission for diagnostic trouble code (DTC) TCM-0046
- When replacing oil, see: **TRANSAXLE OIL** .

Is there water in the oil (gray discoloration)?

- Determine the cause of the water in the oil
- Replace the transmission. See: **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

NOTE: Always replace the radiator and the additional oil cooler (where applicable) if there are signs of water in the transmission fluid.

Flush out the oil lines

Only automatic transmission fluid, Volvo P/N 116 1540-8 (1 liter containers) may be used.

WARNING: Avoid skin contact with the transmission fluid.

OIL LEVEL, CHECKING

WARNING: Oil grade: Only automatic transmission fluid (ATF). Dexron III (the fluid must have a G license). This is usually given as "Dexron III (G-xxxxx)" where xxxxx is a 5 digit serial number. "Dexron III-G" (without a number) may also occur. The Volvo P/N for this oil is 1161521-8 (1 liter container).

WARNING: Avoid skin contact with the transmission fluid.

CONDITIONS

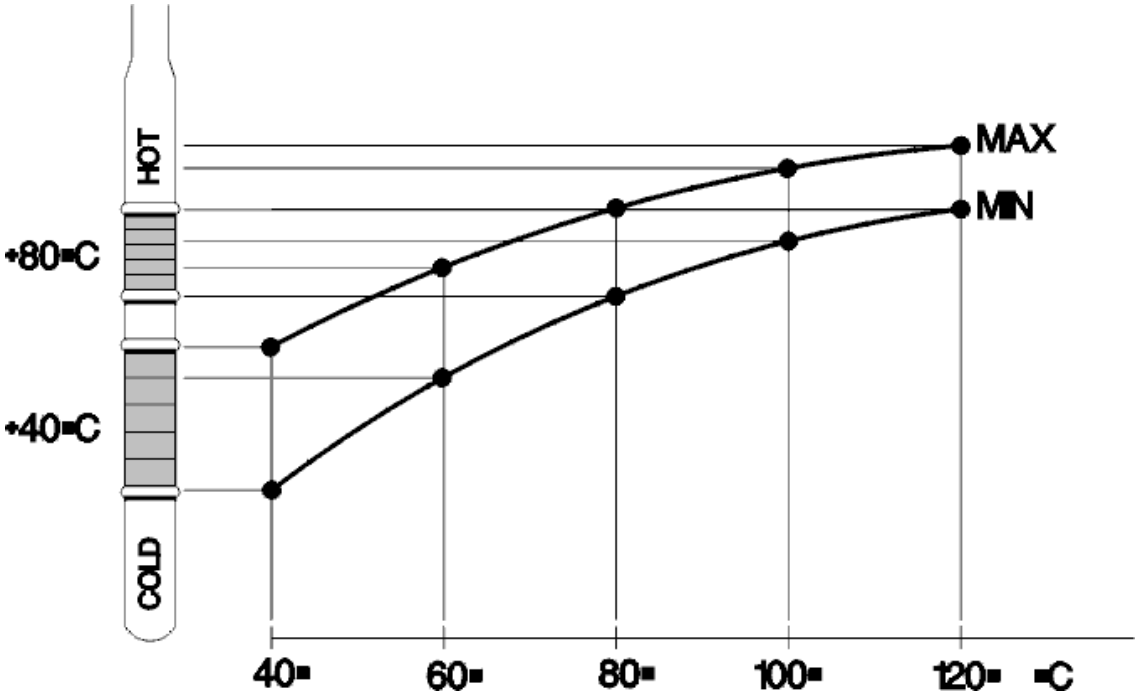


Fig. 13: Identifying Oil Level Graph
Courtesy of VOLVO CARS CORPORATION

The difference between the MAX and MIN volumes is 0.5 liters. Check the oil temperature in the transmission.

At room temperature (+20 °C) the oil level is close to the MIN mark on the "cold area".

At room temperature (+20 °C) and **low oil level** the oil barely reaches the dipstick.

The "cold range" (+40 °C) is reached after approximately 15 minutes idling in the workshop, while the "hot range" (+80 °C) is reached after approximately 30 minutes highway driving at an air temperature above +15 °C.

NOTE: Carry out the check at an oil temperature of +80 °C. Go to car communication function group 4. Select the digital display parameter. Select the parameter for the transmission oil temperature.

PREPARING TO CHECK THE OIL LEVEL

Park the car on a level surface.

Apply the parking brake.

Apply the foot brake.

Let the engine idle.

Move the gear selector lever to position P.

MOVE THE GEAR SELECTOR THROUGH ALL POSITIONS. WAIT IN EACH POSITION FOR APPROXIMATELY 3 SECONDS

Move gear selector to position P and wait approximately 2 minutes before checking the oil level.

The dipstick must be pushed down **as far as possible** into the dipstick tube.

CAUTION: Wipe the dipstick with a nylon cloth or similar. Do not use a cloth which may leave fluff or threads.

LOW LEVEL (TOPPING UP)

TOP UP WITH OIL THROUGH THE DIPSTICK PIPE

Take account of the temperature when topping up with oil. See **PREPARING TO CHECK THE OIL LEVEL**.

HIGH LEVEL (OVERFILLING)

WARNING: The oil may be very hot if the car has just been driven. Avoid skin contact with the transmission fluid.

WARNING: The transmission must not be operated if the oil level is too high. This can cause increased operating temperatures and oil leakage.

DRAIN OFF OIL

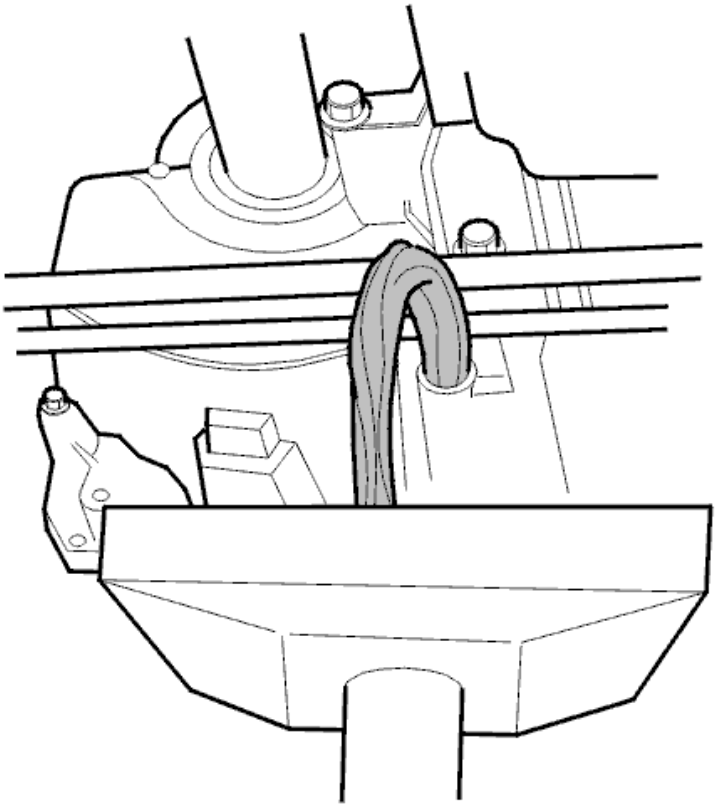


Fig. 14: Draining Off Oil
Courtesy of VOLVO CARS CORPORATION

Undo the drain plug.

Allow some of the oil to drain out and reinstall the plug. Tighten to **40 Nm** .

Check the level taking account of the temperature. See **CONDITIONS**, **PREPARING TO CHECK THE OIL LEVEL** and **MOVE THE GEAR SELECTOR THROUGH ALL POSITIONS. WAIT IN EACH POSITION FOR APPROXIMATELY 3 SECONDS**.

The oil can also be sucked out through the dipstick pipe using an oil suction syringe with a narrow gauge hose.

NOTE: Strict cleanliness is important.

OUTPUT SPEED SENSOR TRANSMISSION, REPLACING

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

CAUTION: Avoid skin contact with the transmission fluid.

PREPARATORY WORK

REMOVING THE WHEELS AND COMPONENTS

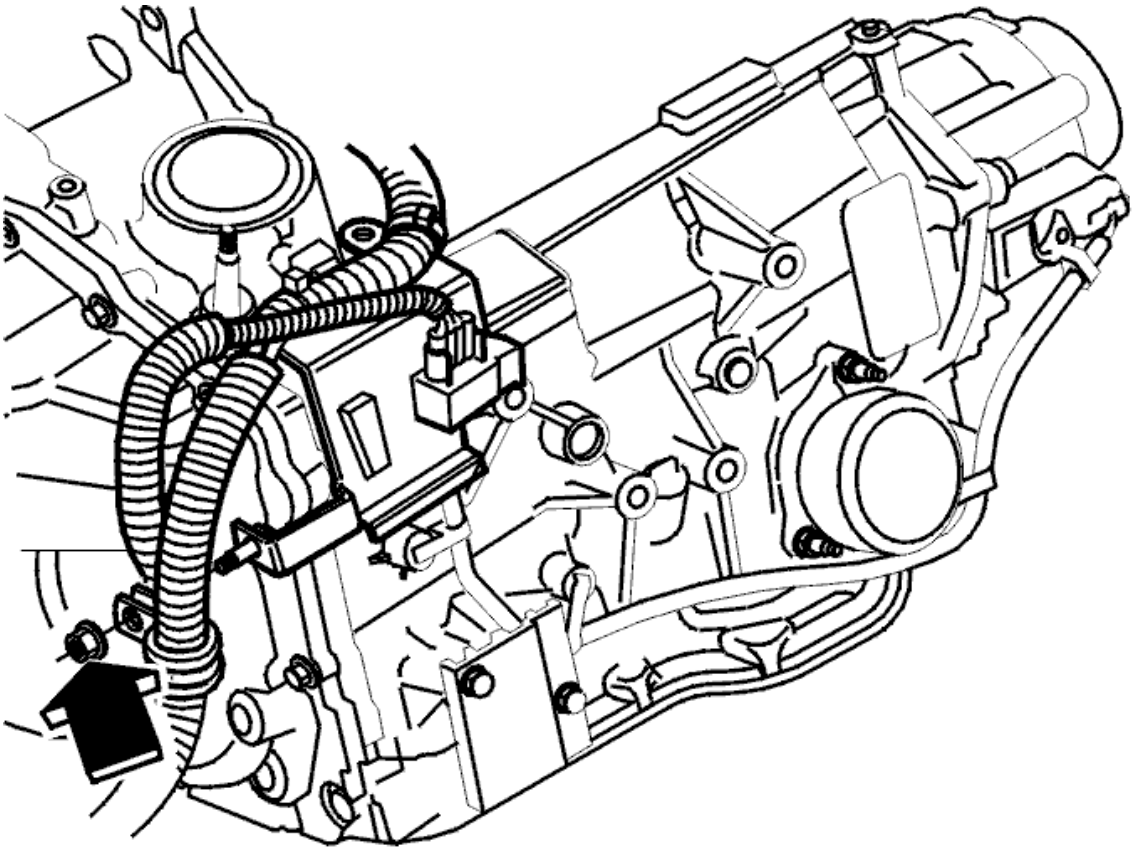


Fig. 15: Heated Oxygen Sensor Connector
Courtesy of VOLVO CARS CORPORATION

Remove:

- the left front wheel
- the nut for the holder for the heated oxygen sensor (HO2S) connectors.

Unhook the clamp from the stud.

REMOVAL

REMOVING ENGINE COMPARTMENT COMPONENTS

Remove:

- the air cleaner (ACL) housing. See **GEAR SELECTOR CABLES, REPLACING**
- the preheating hose.

REMOVING THE SCREW HOLDING THE BRACKET FOR THE HEATED OXYGEN SENSORS (HO2S)

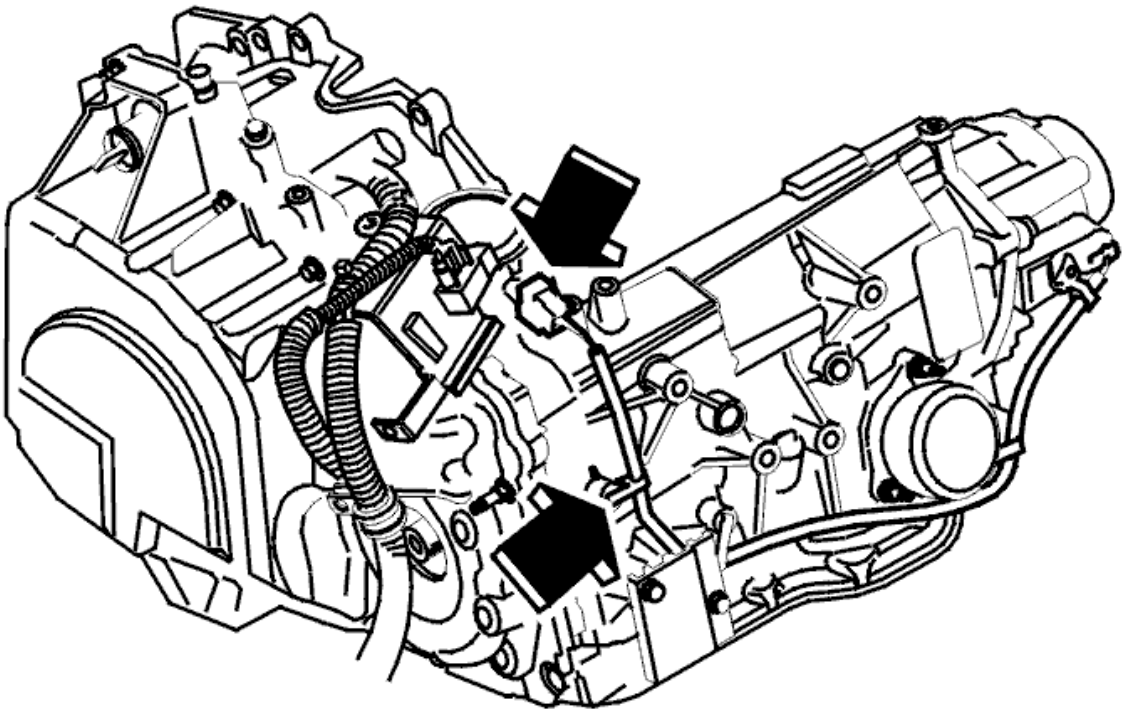


Fig. 16: Heated Oxygen Sensors Bracket
Courtesy of VOLVO CARS CORPORATION

Unhook the bracket from the stud on the transmission. Move it to one side.

Separate the vehicle speed sensor (VSS) connectors.

Disconnect the connector from the holder on the transmission and the nearest clamp.

NOTE: New clamps are included with the new sensor.

REMOVING THE SENSOR

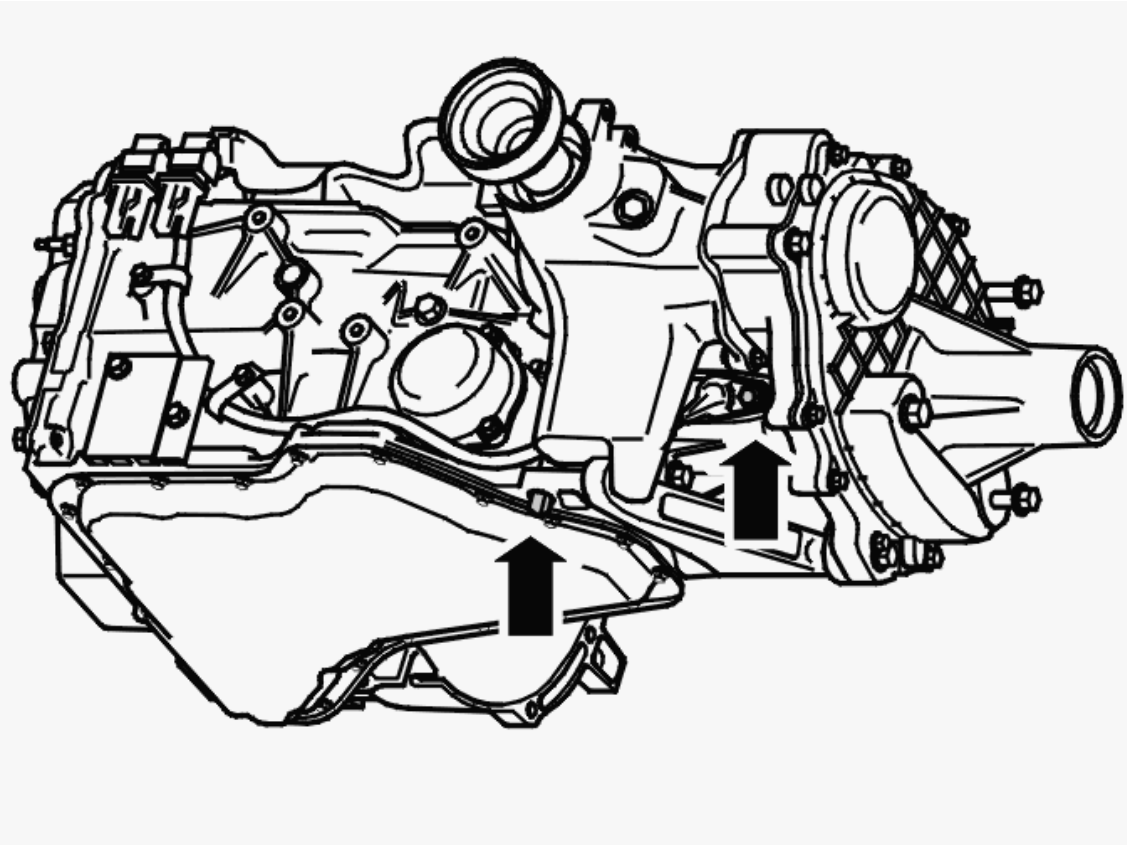


Fig. 17: Removing Transmission Output Speed Sensor (1 Of 2)
Courtesy of VOLVO CARS CORPORATION

Remove the splash guard under the engine. See **TRANSMISSION OIL / OIL FILTER, REPLACING** .

Place a container underneath the transmission.

Press the clamp nearest the sensor up out of its hole. Use a large screwdriver.

Remove:

- the screw holding the sensor
- the sensor.

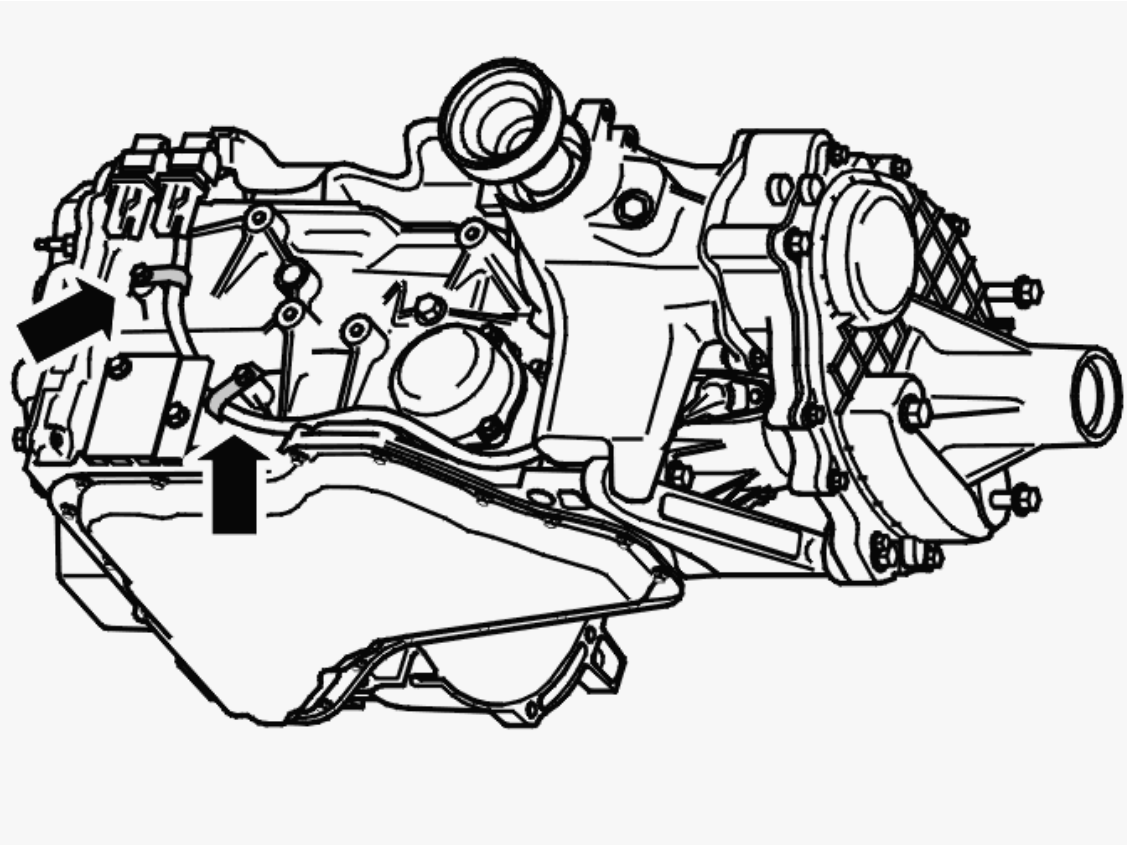


Fig. 18: Removing Transmission Output Speed Sensor (2 Of 2)
Courtesy of VOLVO CARS CORPORATION

Remove the remaining clamps.

INSTALLATION

INSTALLING THE SENSOR

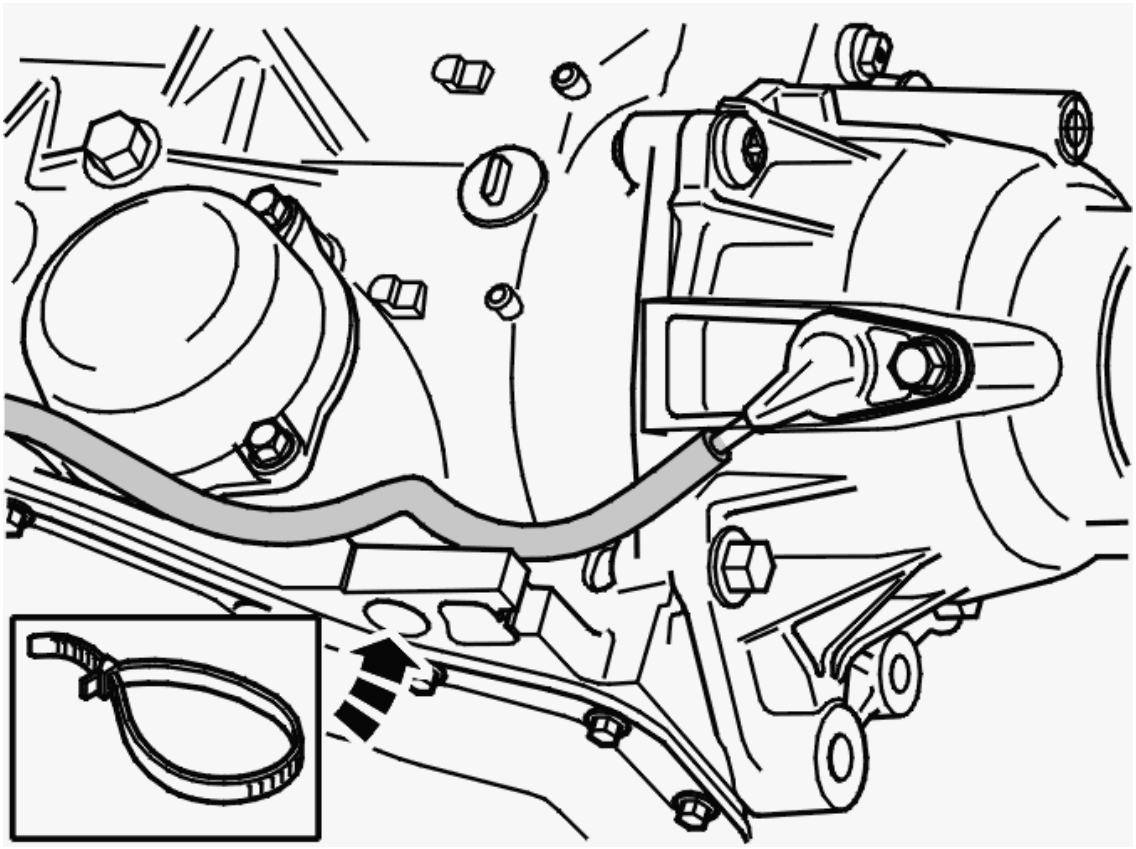


Fig. 19: Installing Transmission Output Speed Sensor (1 Of 2)
Courtesy of VOLVO CARS CORPORATION

Lubricate the new sensor's O-ring. Tighten the screw. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** .

Use a tie strap through the hole to secure the cable instead of the original clamp nearest the sensor.

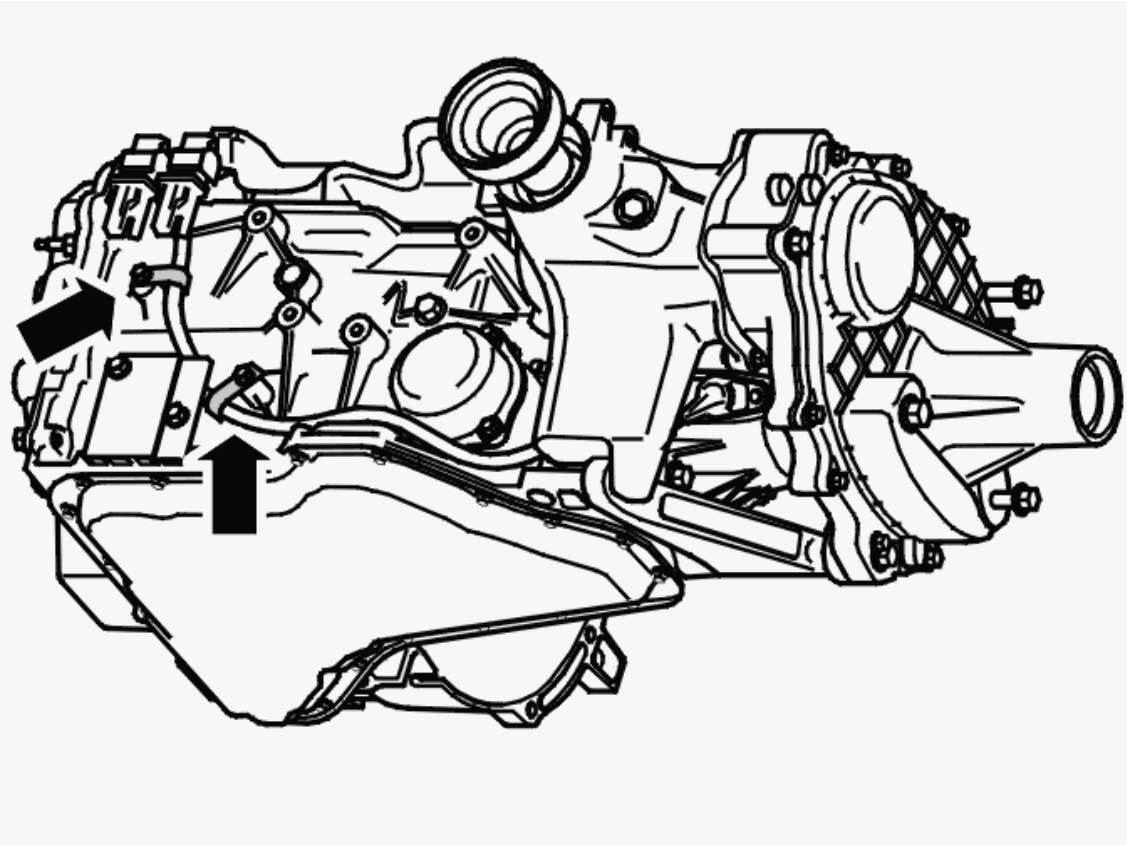


Fig. 20: Installing Transmission Output Speed Sensor (2 Of 2)
Courtesy of VOLVO CARS CORPORATION

Slide the cable up. Press the clamp for the sensor cable into place on the transmission.

Install the splashguard under the engine.

CONNECT THE CONNECTOR. SECURE THE CONNECTOR TO THE HOLDER

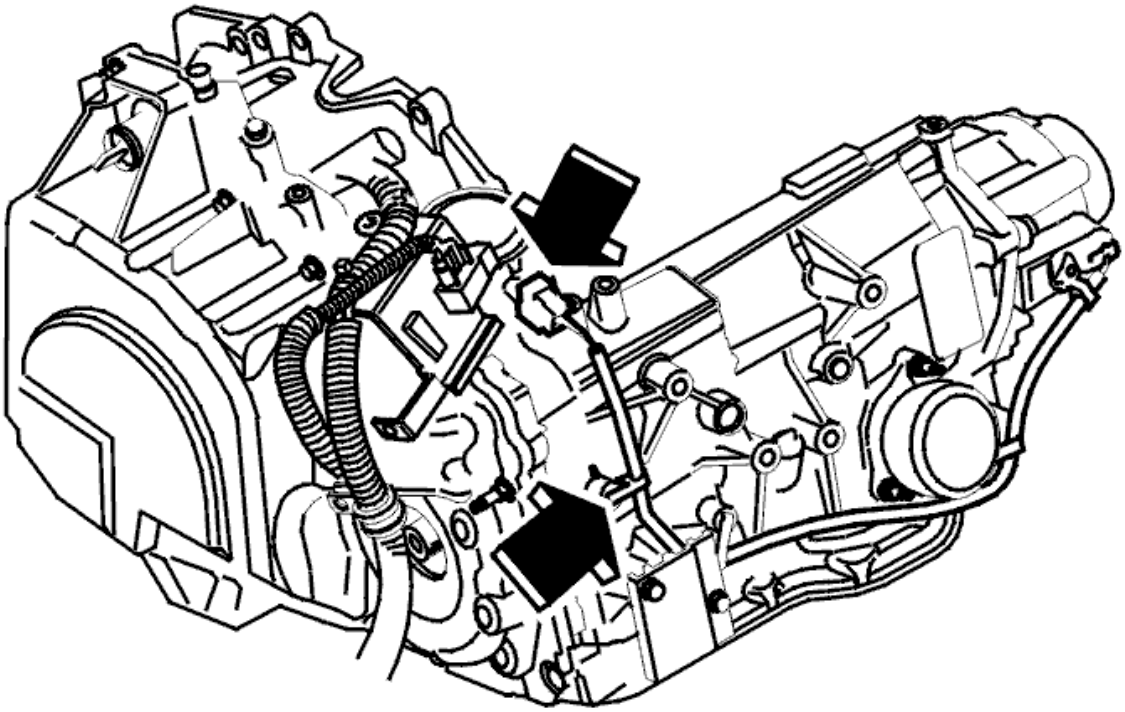


Fig. 21: Heated Oxygen Sensors Bracket
Courtesy of VOLVO CARS CORPORATION

Press the remaining clamps onto the cable.

Install:

- the bracket for the heated oxygen sensor (HO2S) cable harness. Tighten the screw
- the air cleaner (ACL) housing. See **GEAR SELECTOR CABLES, REPLACING**
- the preheating hose.

FINISHING

INSTALLING AND CHECKING COMPONENTS

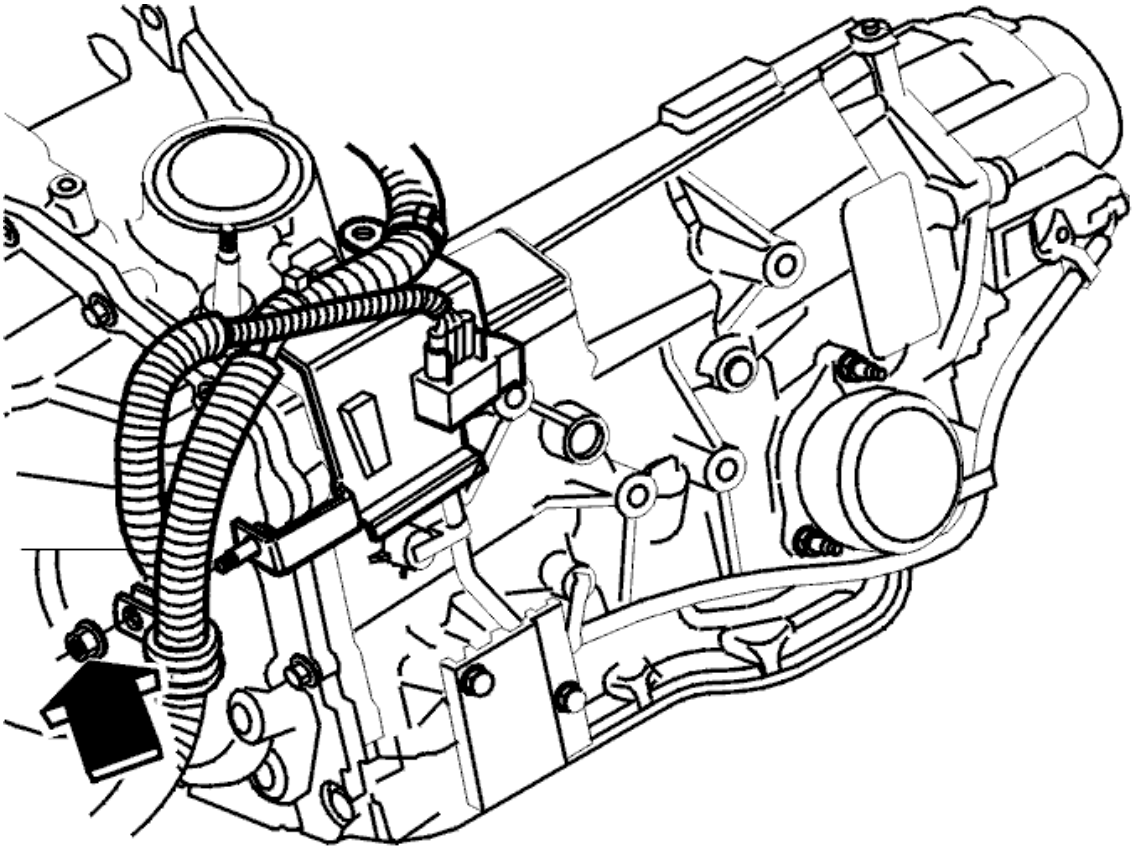


Fig. 22: Heated Oxygen Sensor Connector
Courtesy of VOLVO CARS CORPORATION

Install:

- the clamp and nut on the stud for the cable harness bracket for the heated oxygen sensor (HO2S)
- the wheel. See **INSTALLING WHEELS** .

Check the transmission oil level

Erase diagnostic trouble codes (DTCs)

MISCELLANEOUS

Miscellaneous - Removal, Replacement And Installation

OIL COOLER, TRANSMISSION (B6294T, 4T65 AWD; 2003-06)

AUXILIARY OIL COOLER, REPLACING

NOTE: As the graphics in this service information are used for different model years and/or models, some variation may occur. However, the essential information in the graphics is always correct.

FRONT LOWER OIL COOLER, REPLACING

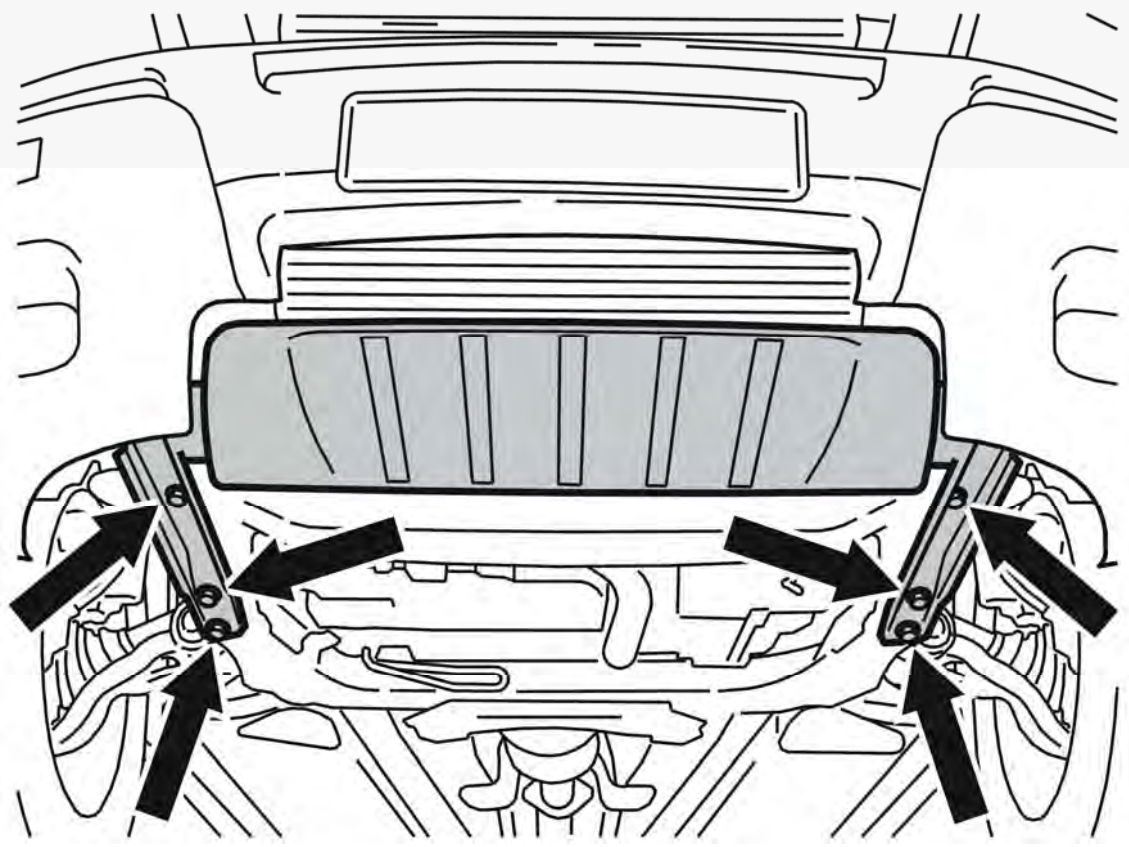


Fig. 1: Splash Guard. Protective Plate And Screws
Courtesy of VOLVO CARS CORPORATION

Remove the 6 M10 screws from the front protective panel.

BLOCK BOTH THE OIL HOSES USING HOSE CLIPS

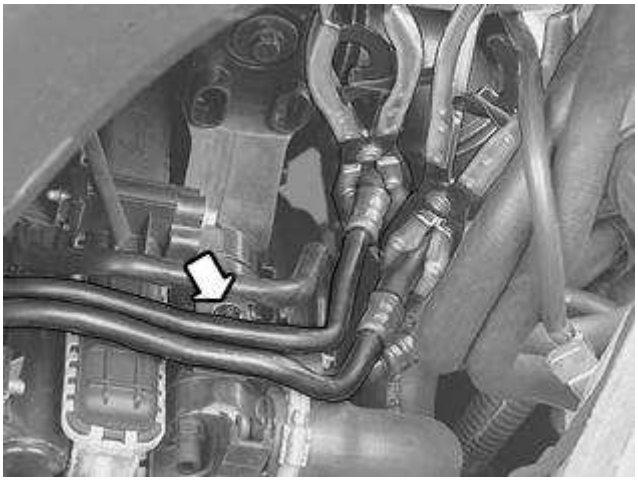


Fig. 2: Oil Hoses
Courtesy of VOLVO CARS CORPORATION

Remove the screw holding the oil pipes in the radiator on the left-hand side.

REMOVE THE OIL COOLER FROM THE COOLER UNIT

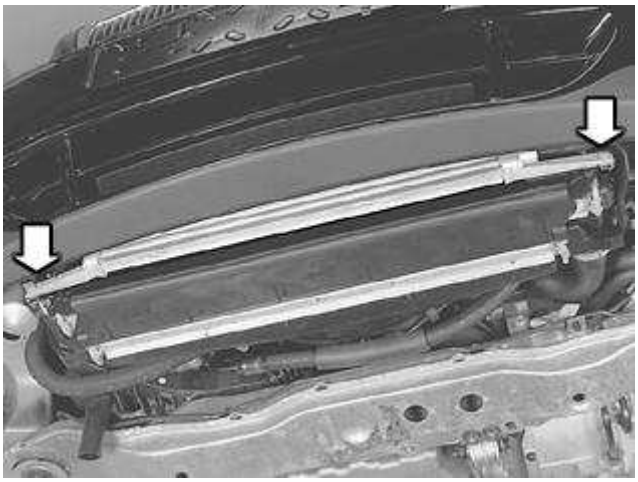


Fig. 3: Oil Pipe
Courtesy of VOLVO CARS CORPORATION

Remove:

- the 2 screws securing the oil cooler in the radiator assembly
- the oil pipes from the oil cooler.

Use a container to collect any fluid spillage.

REMOVE THE COMPONENTS FROM THE OIL COOLER

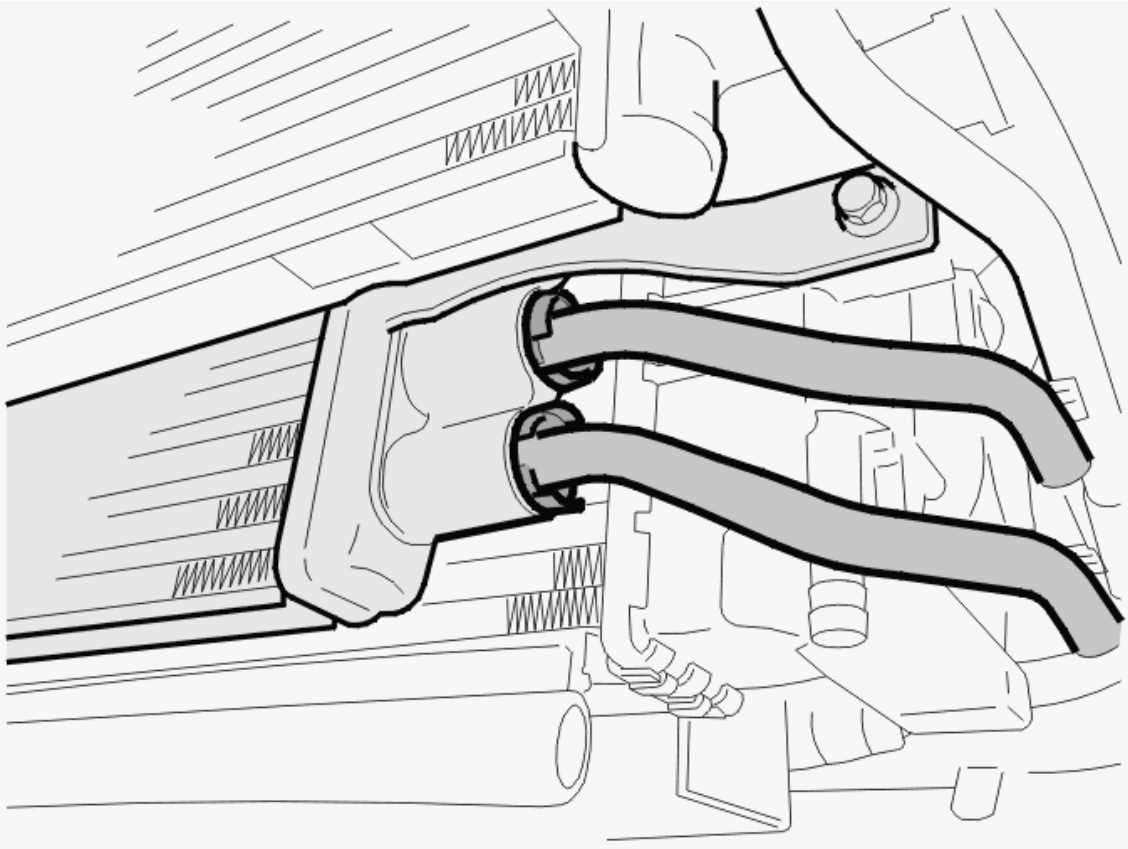


Fig. 4: Identifying Oil Cooler And Pipes
Courtesy of VOLVO CARS CORPORATION

Remove:

- the oil pipes by clamping the clips together and pulling straight out
- the oil cooler.

NOTE: There is a small amount of oil still in the oil cooler.

NOTE: Measure the amount of oil remaining in the oil cooler. Fill the transmission with the same quantity of new oil.

INSTALL THE OIL COOLER IN THE COOLER UNIT

NOTE: For tightening torques, see TIGHTENING TORQUE .

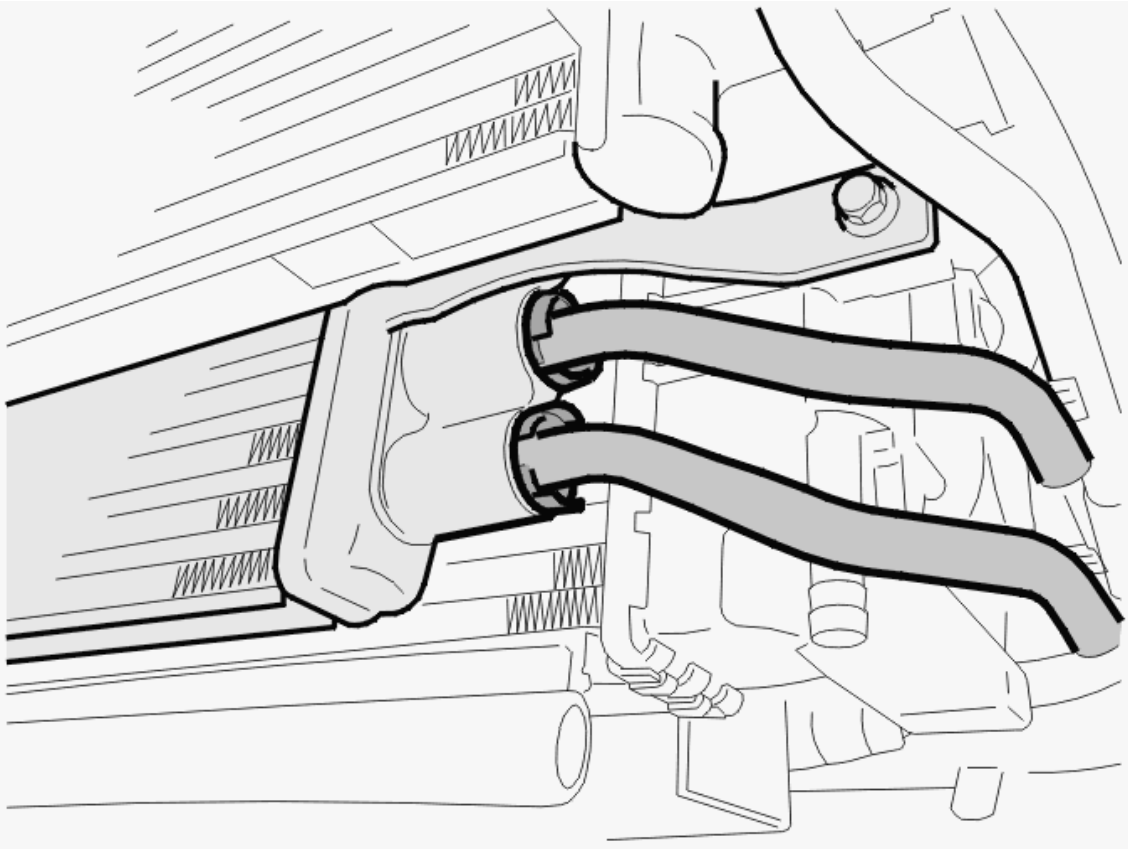


Fig. 5: Identifying Oil Cooler And Pipes
Courtesy of VOLVO CARS CORPORATION

Install:

- new O-rings on the oil pipes. Lubricate the O-rings using Automatic Transmission Fluid (ATF), ATF. Press the oil pipes into position.

INSTALL THE OIL COOLER IN THE COOLER UNIT

Fig. 6: Oil Pipe

Courtesy of VOLVO CARS CORPORATION

Tighten the two (M6) mounting screws.

INSTALL THE SCREW FOR THE OIL PIPES ON THE LEFT-HAND SIDE

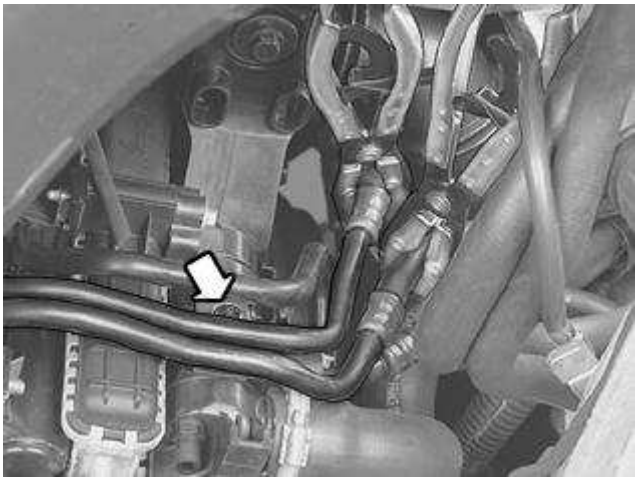


Fig. 7: Oil Hoses
Courtesy of VOLVO CARS CORPORATION

Tighten the screw (M6).

Remove the hose clips.

Fill with new oil according to the specifications for the car

Start the engine and check for any **leakage** at the oil cooler and the oil pipes.

Check the oil level .

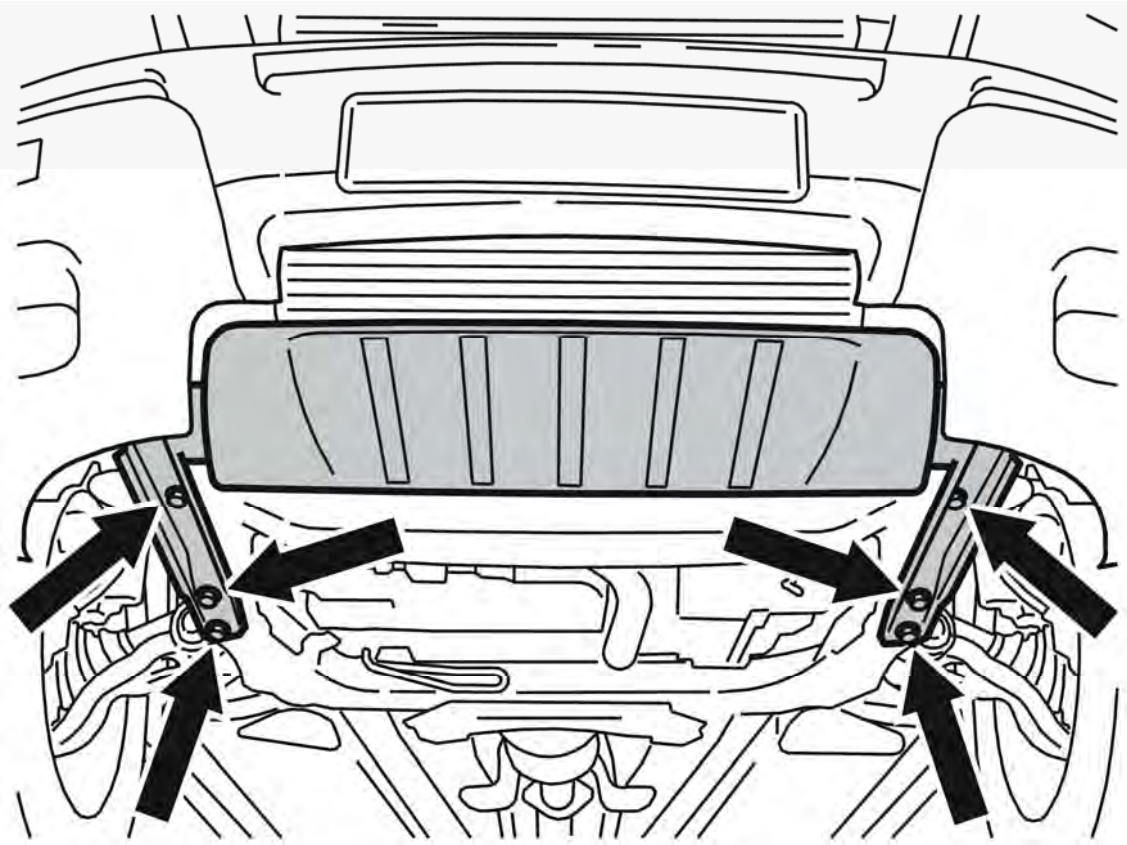


Fig. 8: Splash Guard. Protective Plate And Screws
Courtesy of VOLVO CARS CORPORATION

Install:

- the 6 M10 screws for the front protective panel.

MISCELLANEOUS

Miscellaneous - Installation Instructions, Accessories

OIL COOLER (2003-2012)

OIL COOLER

PREPARATIONS

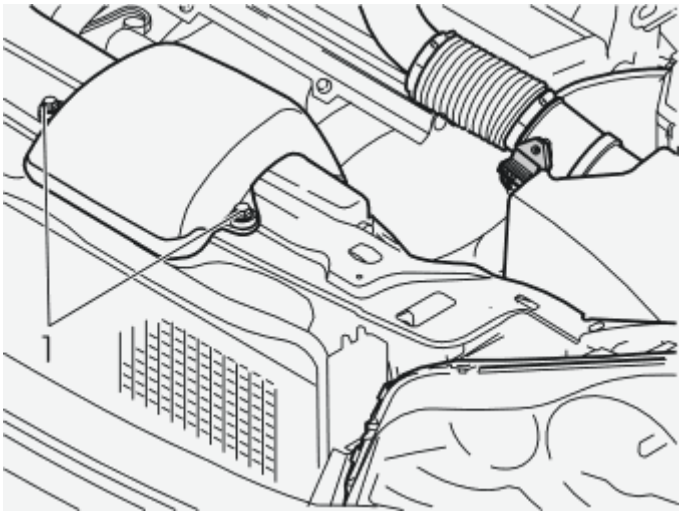


Fig. 1: Removing Air Cleaner Intake Manifold
Courtesy of VOLVO CARS CORPORATION

- remove the two screws (1) from the intake pipe for the air cleaner (ACL)
- Remove the intake pipe. Place the intake manifold to one side.

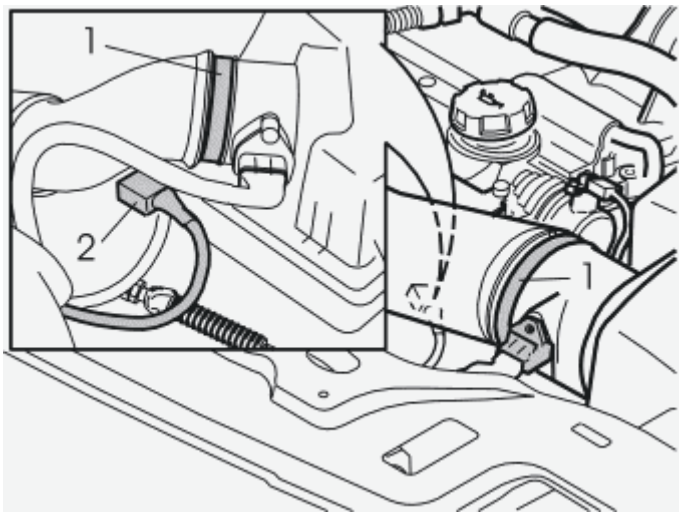


Fig. 2: Identifying Hose Clamp And Cable
Courtesy of VOLVO CARS CORPORATION

- Fully disconnect the hose clamp (1)
- Remove the vacuum valve and its hoses and the cable (2) from the mounting on the reverse of the air cleaner (ACL), in the lower right-hand corner. Move the vacuum valve away from the gearbox
- Pull the air cleaner (ACL) from its mounting in the side member. Pull the air cleaner (ACL) up slightly. Detach the hose from the air cleaner (ACL). The hose may need to be heated with a hot-air gun before it can be detached
- Move the air cleaner (ACL) to one side so that the gearbox is accessible.

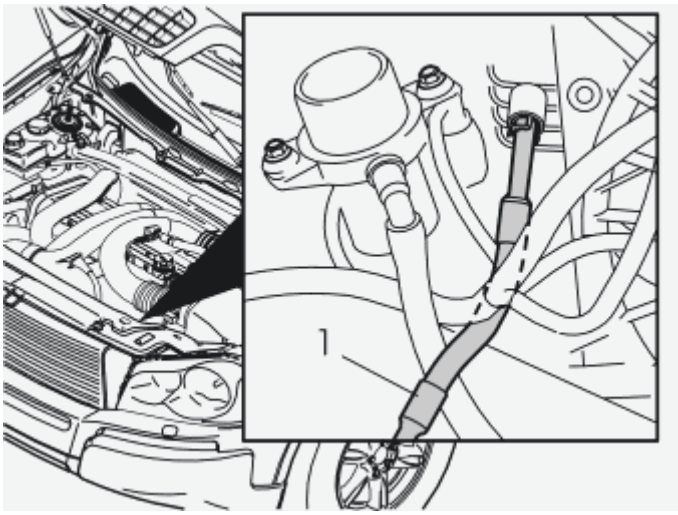


Fig. 3: Identifying Hose Between Radiator And Gearbox
Courtesy of VOLVO CARS CORPORATION

- Remove the hose (1) between the radiator and the gearbox
- Place the hose to one side. It will not be reused.

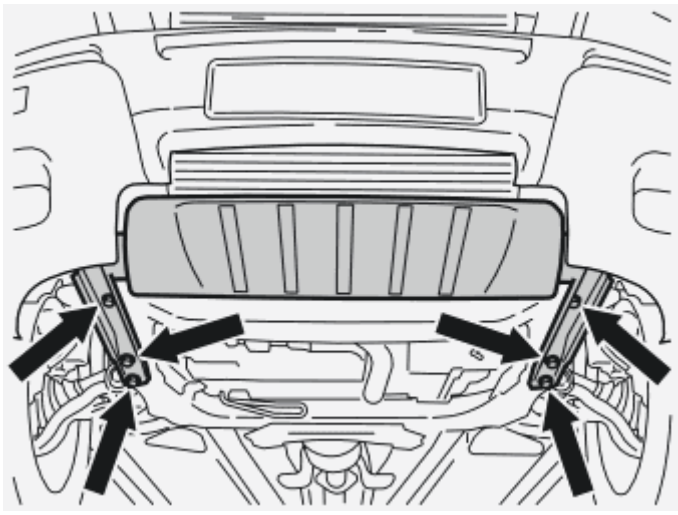


Fig. 4: Skid Plate
Courtesy of VOLVO CARS CORPORATION

- Remove the front skid plate. First remove the six screws (1) on the underneath

- With the assistance of a colleague, pull the skid plate forwards. Pull one of the corners until the mounting lug on that side of the skid plate releases from the sub-frame. Then pull off the other corner

NOTE: It may be necessary to carefully bend down the lower edge of the bumper cover while pulling the skid plate forward.

INSTALLING THE OIL COOLER

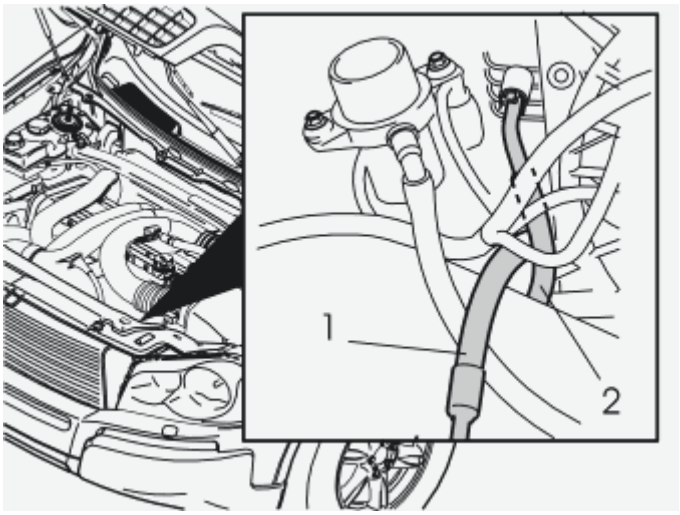


Fig. 5: Identifying Hoses Connected To Gearbox And Oil Cooler
Courtesy of VOLVO CARS CORPORATION

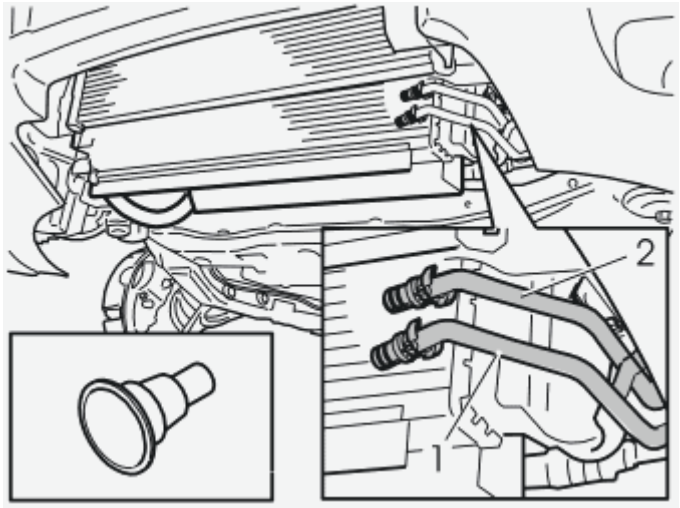


Fig. 6: Identifying Hoses Routed To Oil Cooler
Courtesy of VOLVO CARS CORPORATION

- Remove the two hoses from the kit and remove the dust covers
- Insert the hoses down to the left-hand side of the radiator. Connect the hoses in the engine compartment to the gearbox (1) and radiator (2) where the hose was removed earlier. Do not tighten the connection nut
- Route the hoses between the left-hand side of the radiator and the pipe to the air conditioning (A/C)

system.

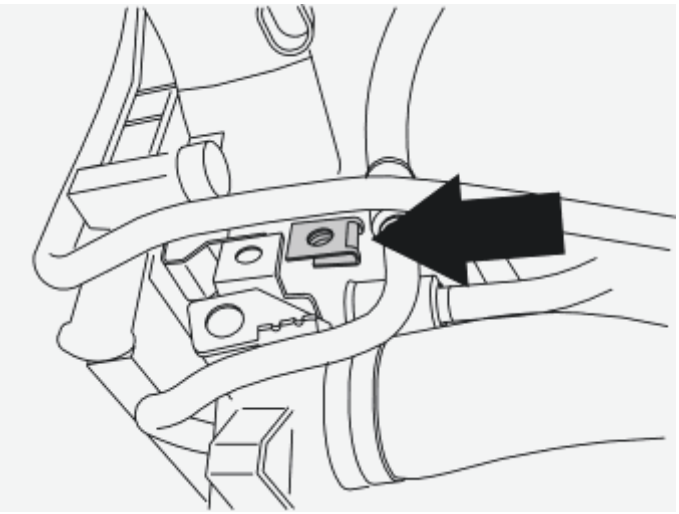


Fig. 7: Identifying Nut Clip
Courtesy of VOLVO CARS CORPORATION

- Take the nut clip from the kit and press it into place on the lower left edge of the radiator on the existing mounting.

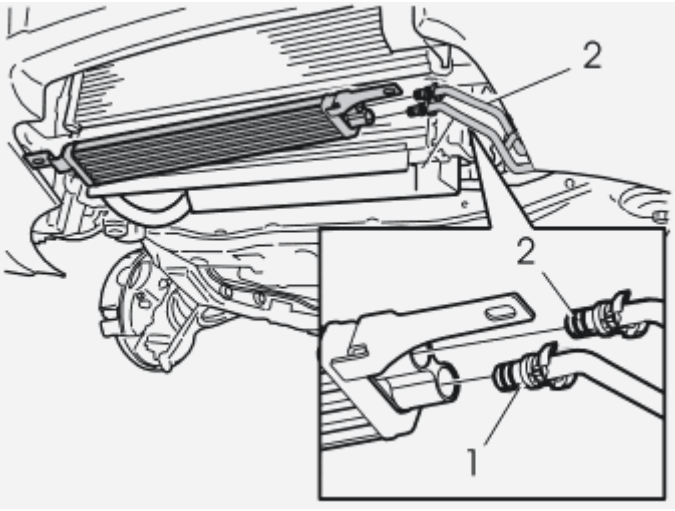


Fig. 8: Identifying Hoses Connected To Oil Cooler
Courtesy of VOLVO CARS CORPORATION

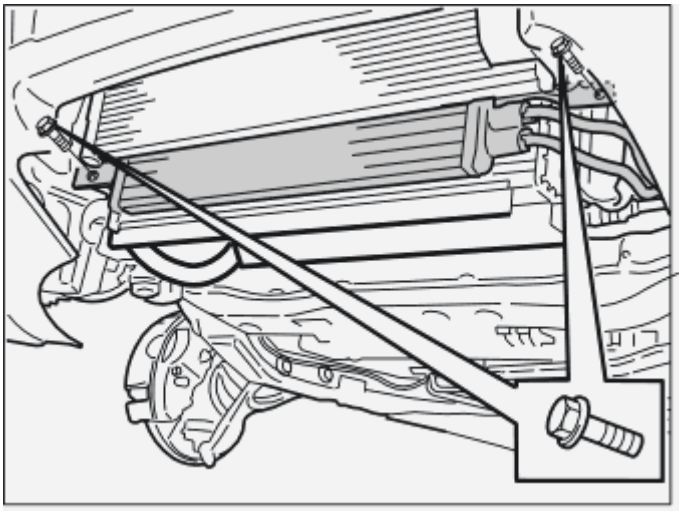


Fig. 9: Identifying Oil Cooler
Courtesy of VOLVO CARS CORPORATION

- Take the oil cooler from the kit. Connect the hose from the gearbox (1) and the hose from the radiator (2) to the oil cooler
- Ensure that the mounting lug for the lower hose is beneath the mounting lug for the upper hose
- Take the two M6x16 screws from the kit. Secure the oil cooler to the existing mountings. Tighten the screws. Tighten to **10 Nm (7 lbf. ft)** .

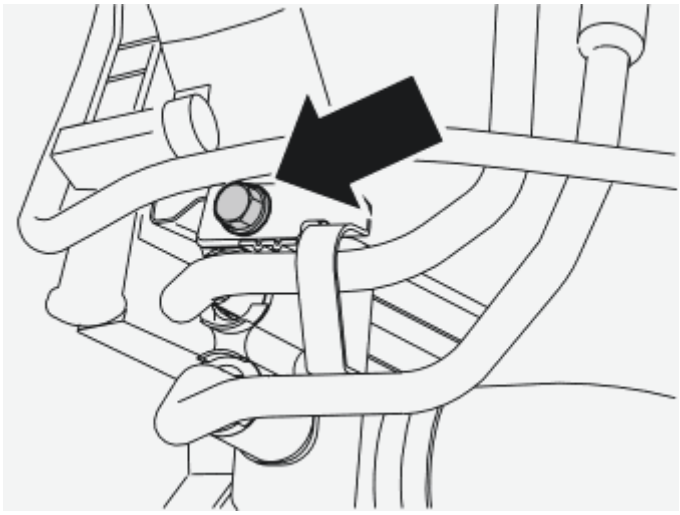


Fig. 10: Identifying M6 Screw
Courtesy of VOLVO CARS CORPORATION

- Take the M6x14 screw from the kit. Tighten both the mounting lugs for the hoses to the mounting in the radiator. Tighten the screw. Tighten to **10 Nm (7 lbf. ft)**
- Tighten the connection nut on the hose to the gearbox. Tighten to **40 Nm (29 lbf. ft.)** .

FINISHING WORK

- Reinstall the front skid plate. Tighten the screws. Tighten to **50 Nm (37 lbf. ft.)**
- Reinstall the air cleaner (ACL). Connect the removed components
- Reinstall the intake manifold on the air cleaner (ACL). Tighten the screws. Tighten to **10 Nm (7 lbf. ft.)** .

- Fill with 0.2 l of oil (see the manual for the oil type)
- Run the engine and top up the oil to the correct level.

TRANSMISSION

Power transmission

TRANSMISSION

PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, GEARTRONIC, REPLACING

REMOVAL

REMOVING THE GEAR SELECTOR KNOB

Remove the gear selector knob. See **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

REMOVING THE CENTER CONSOLE

See **CENTER CONSOLE, REPLACING** .

REMOVING THE TOP PANEL FROM THE GEAR SELECTOR ASSEMBLY

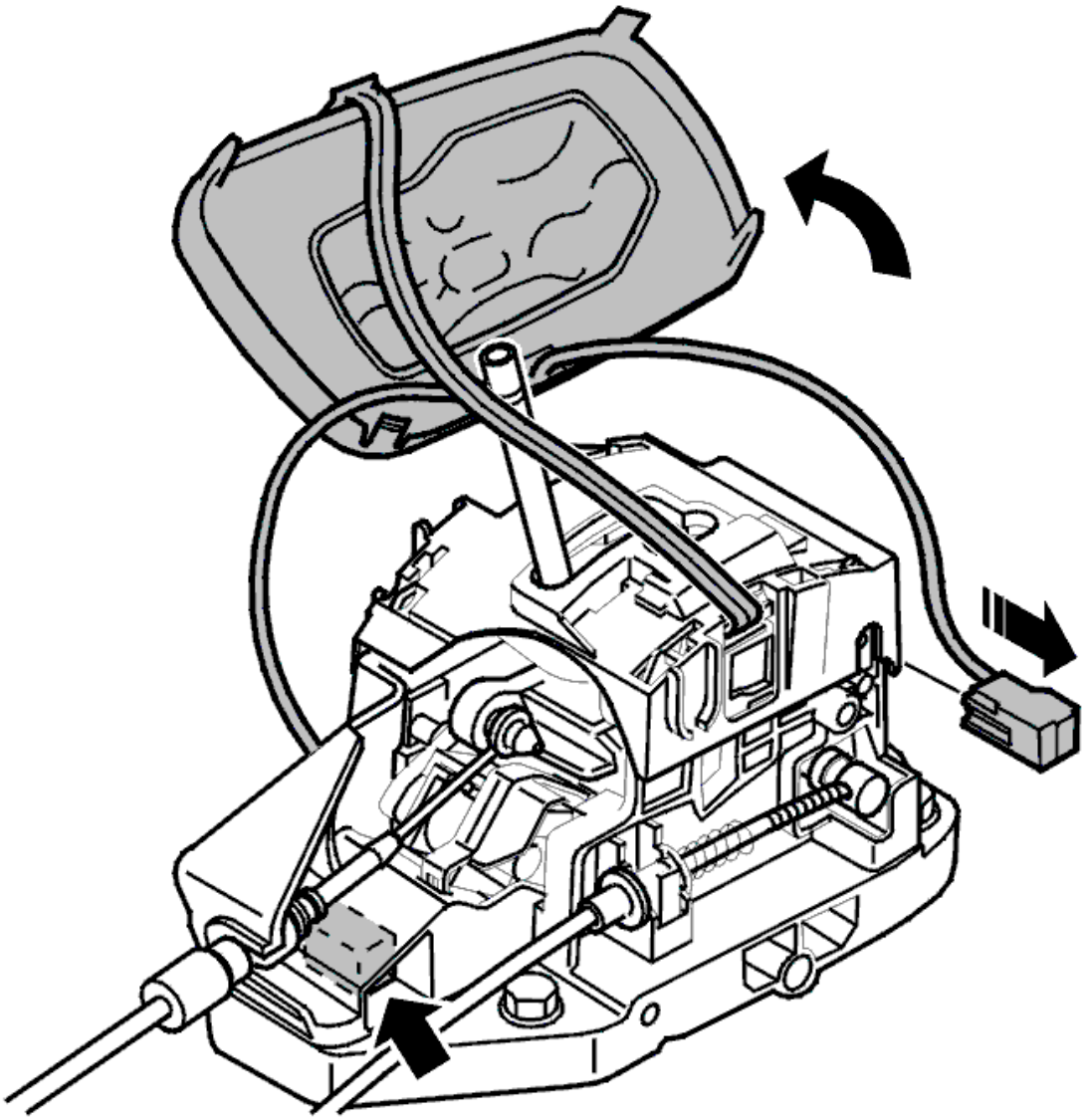


Fig. 1: Identifying Removal Of Top Panel From The Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Separate the connectors.

Remove:

- the rear connector
- the cables from the clips.

REMOVING THE GEAR SELECTOR ASSEMBLY STOP

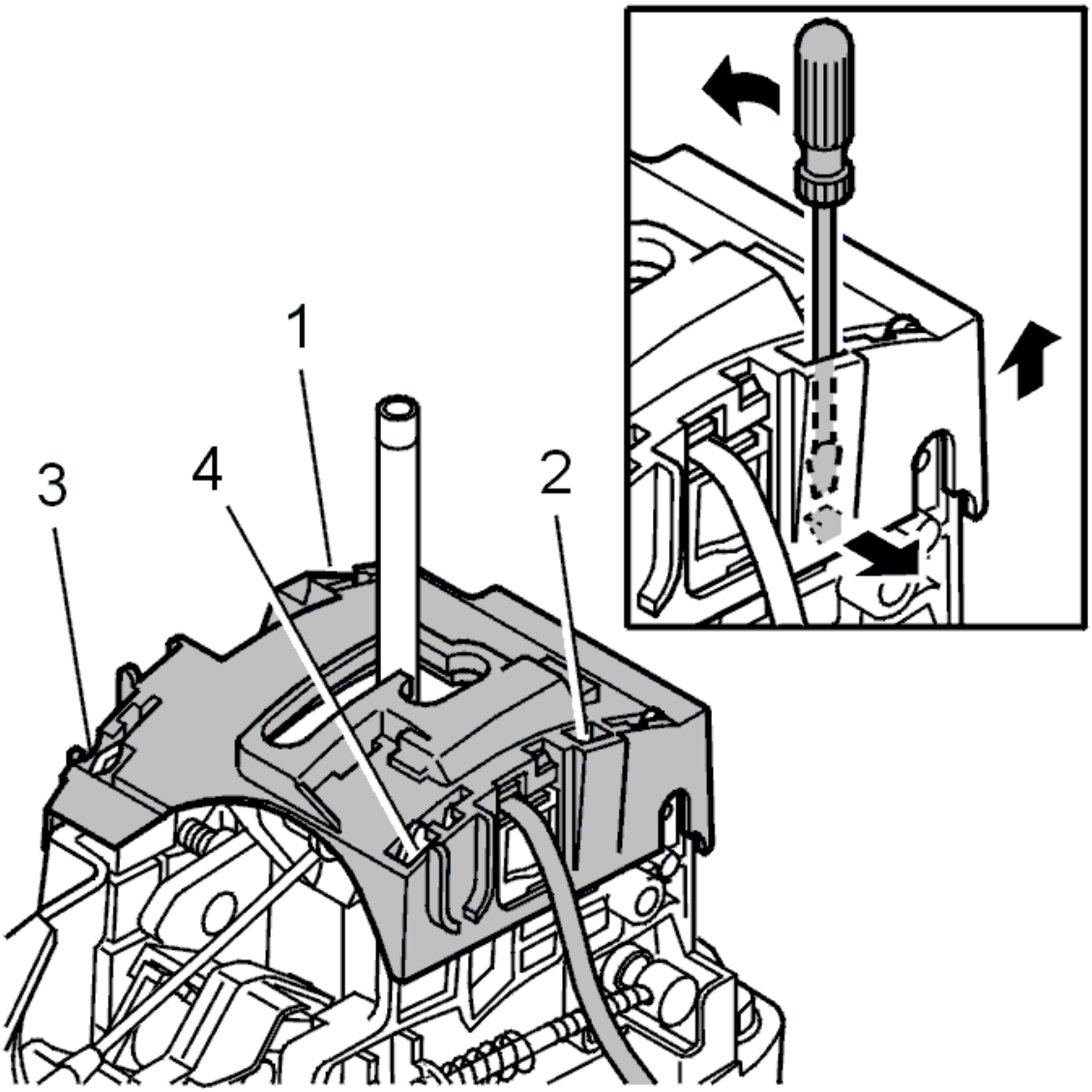


Fig. 2: Identifying Removal of Gear Selector Assembly Stop
Courtesy of VOLVO CARS CORPORATION

Use a screwdriver.

Insert the screwdriver in the slots (1-4). Carefully pry in towards the gear selector assembly with the screwdriver. Pull the gear selector assembly stop up to release the catch

REMOVING THE PRINTED CIRCUIT BOARD FROM THE GEAR SELECTOR ASSEMBLY STOP

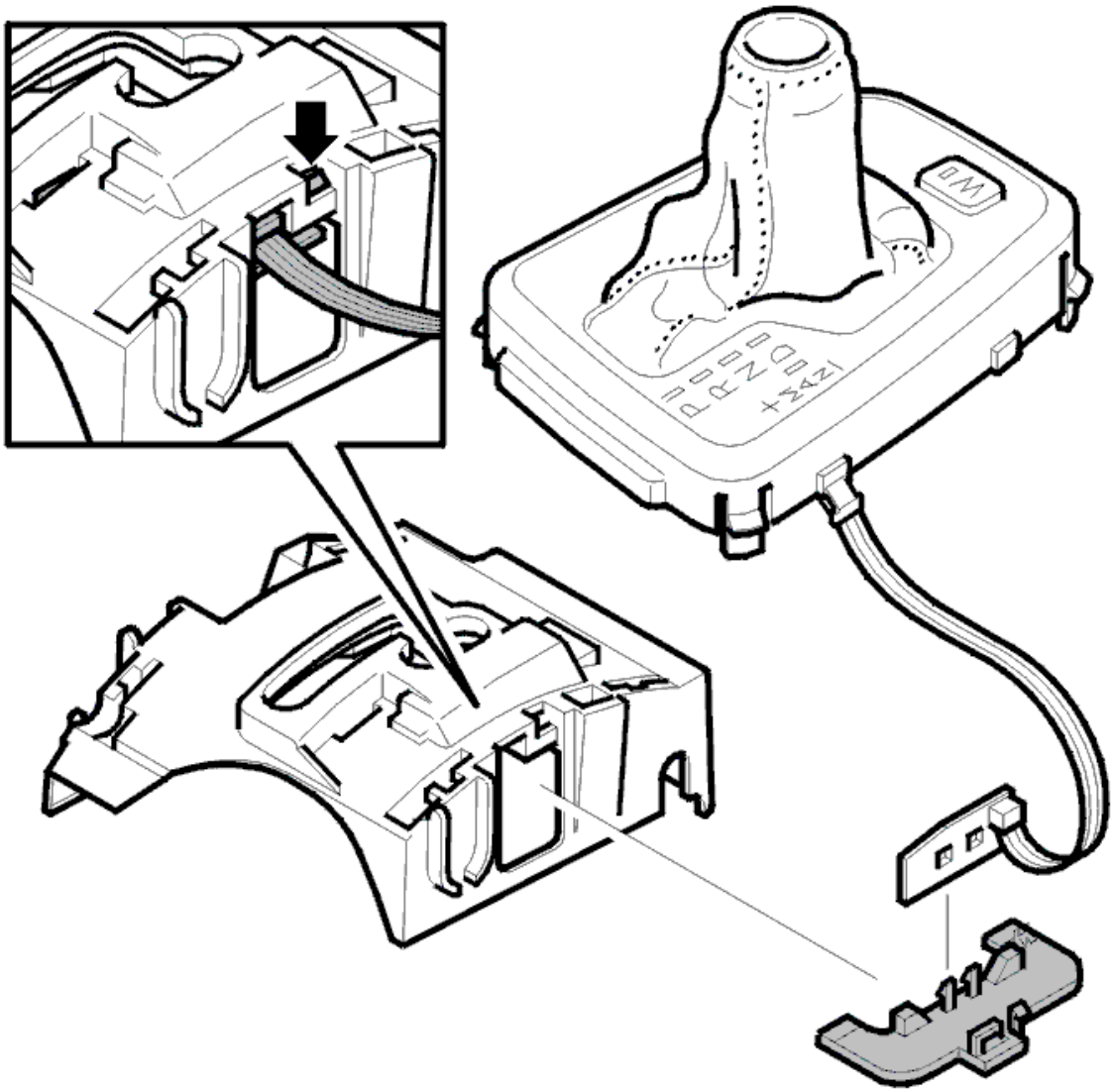


Fig. 3: Identifying Removal Of Printed Circuit Board From The Gear Selector Assembly Stop
Courtesy of VOLVO CARS CORPORATION

Release the holder from the gear selector assembly stop.

Remove the printed circuit board. Press out both the catches in the printed circuit board.

Pull the printed circuit board straight out of the holder.

REMOVING THE GEAR SELECTOR BOOT FROM THE TOP PANEL

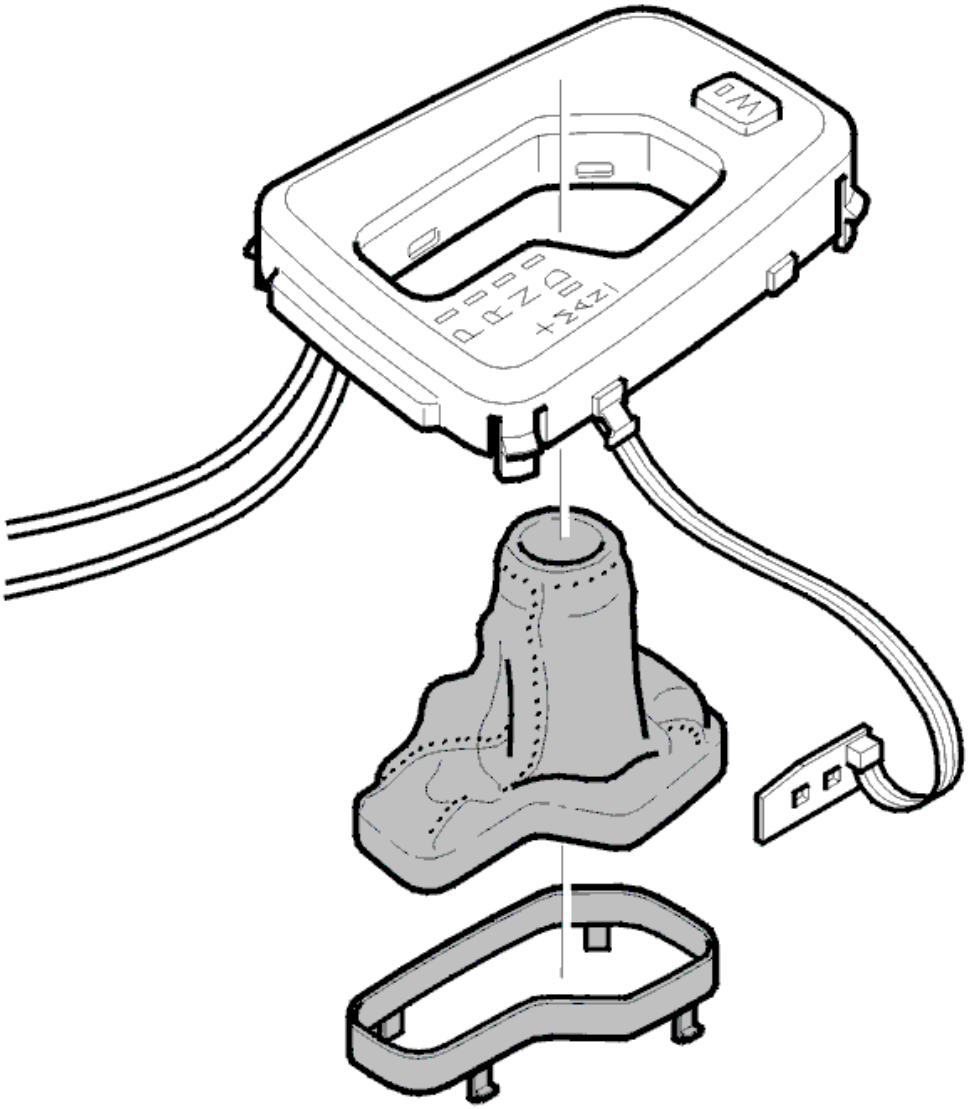


Fig. 4: Gear Selector Boot And Top Panel
Courtesy of VOLVO CARS CORPORATION

Press out the 4 catches from the top panel. Remove the boot.

Replace the top panel and printed circuit board.

Transfer the boot to the new top panel.

INSTALLATION

INSTALLING THE PRINTED CIRCUIT BOARD ON THE HOLDER AND GEAR SELECTOR ASSEMBLY STOP

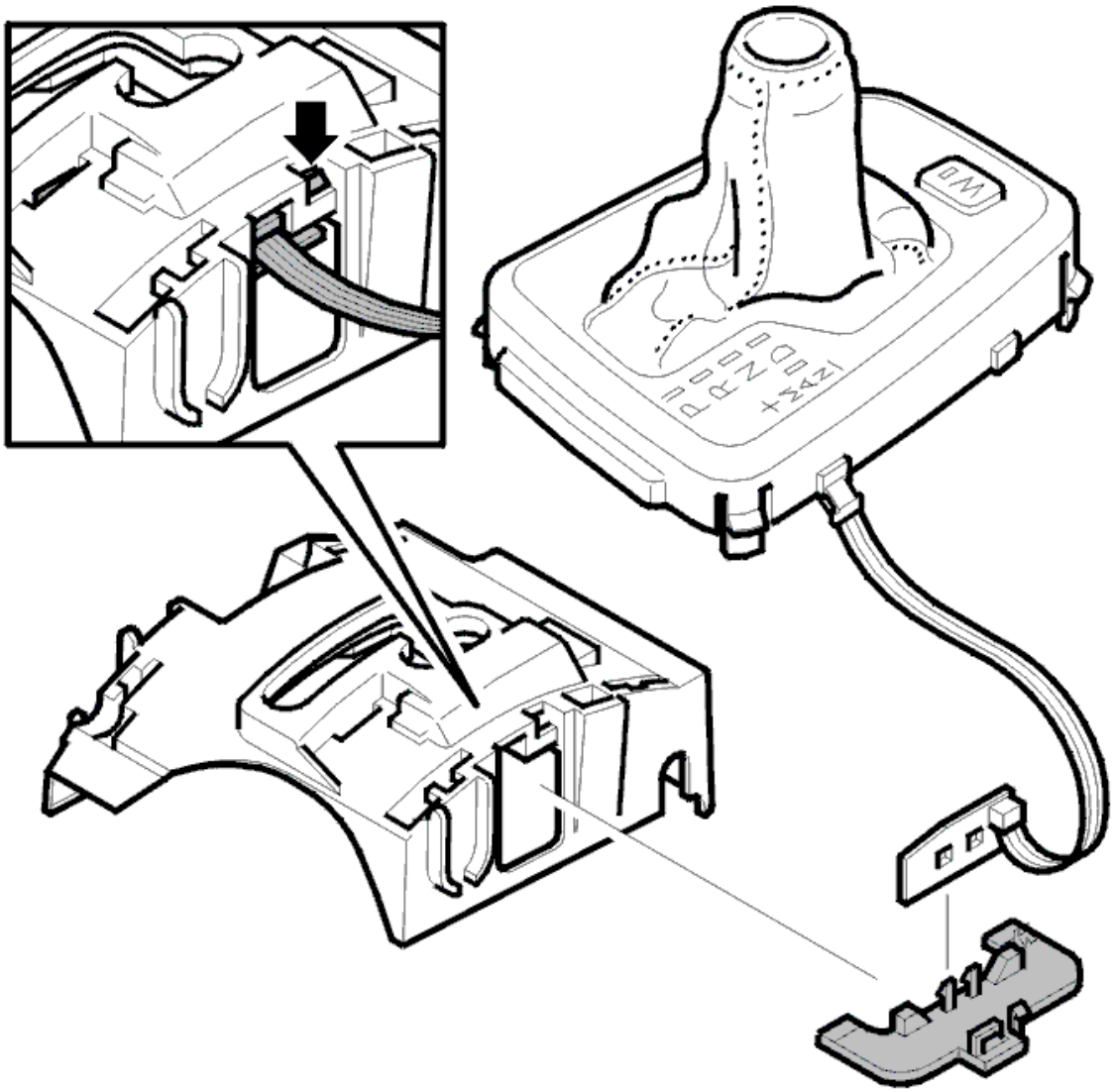


Fig. 5: Identifying Removal Of Printed Circuit Board From The Gear Selector Assembly Stop
Courtesy of VOLVO CARS CORPORATION

Install:

- the printed circuit board in its holder. Secure it with its two locks
- the holder for the gear selector assembly stop. Lock it into place.

INSTALLING THE GEAR SELECTOR ASSEMBLY STOP

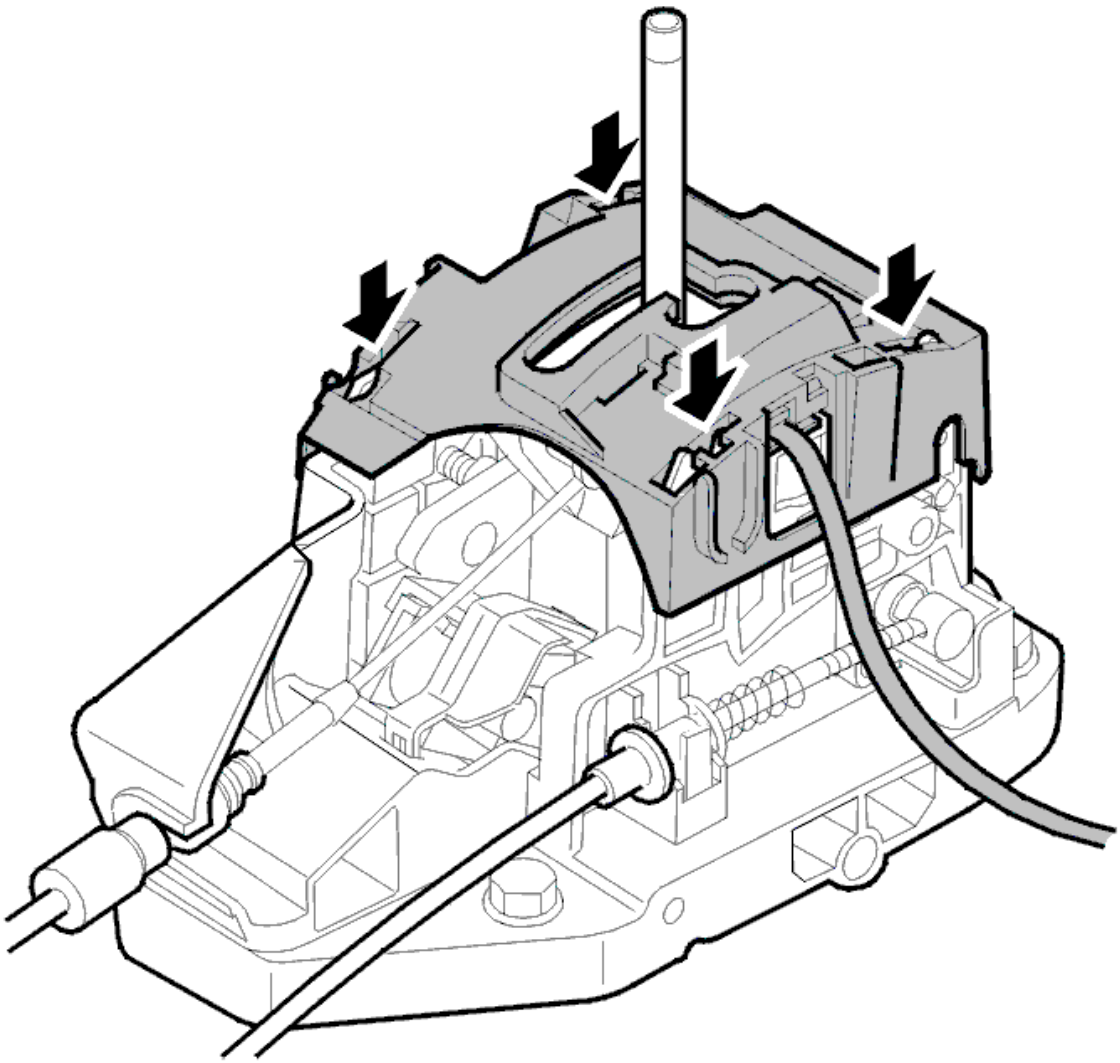


Fig. 6: Identifying Installation Of Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Press the gear selector assembly stop into place on the gear selector assembly.

NOTE: Check that the gear selector assembly stop is secure.

INSTALLING THE TOP PANEL ON THE GEAR SELECTOR ASSEMBLY

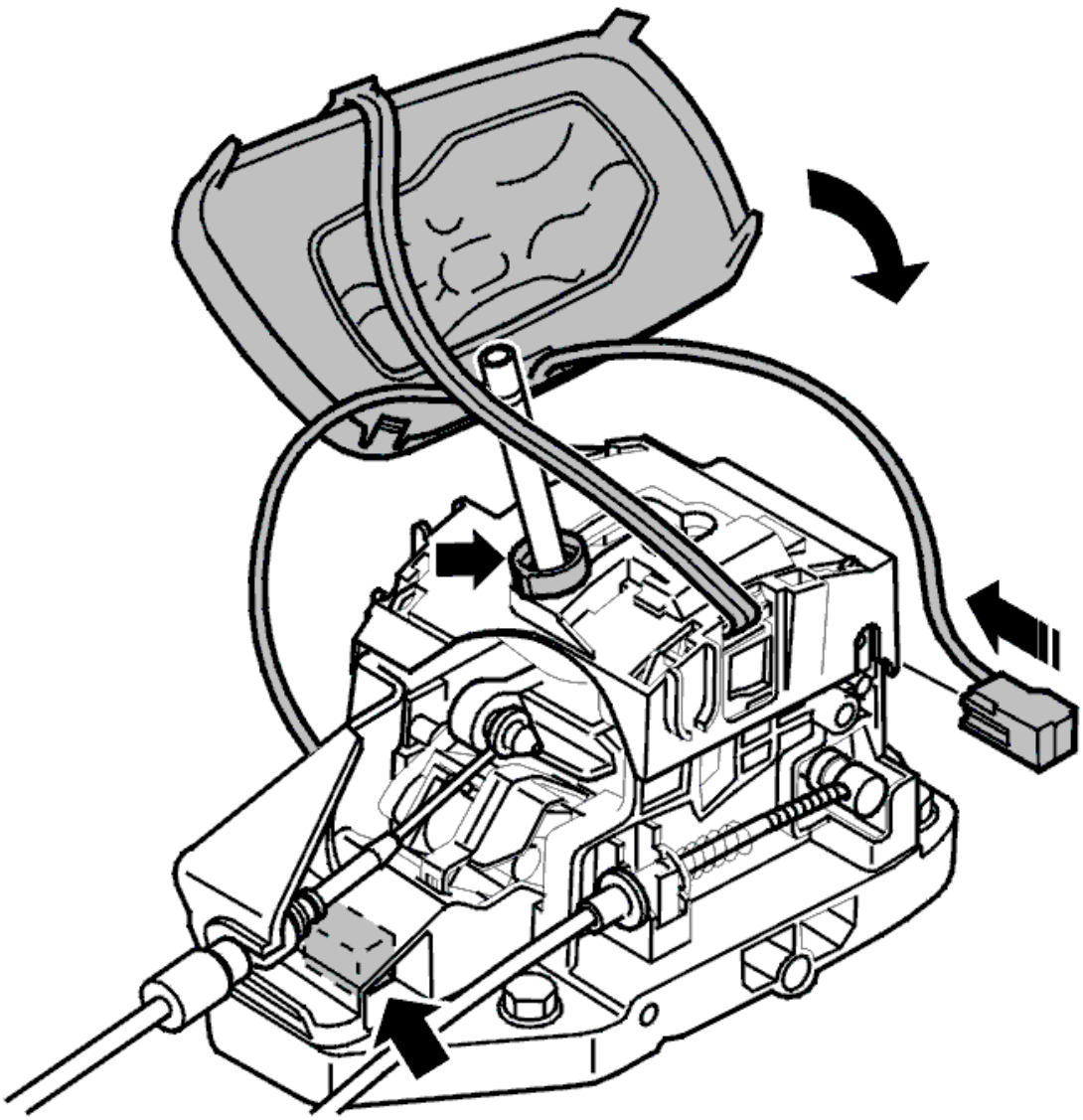


Fig. 7: Identifying Installation Of Top Panel On The Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

NOTE: First install the locking sleeve for the boot on the gear selector lever.

Connect the connectors to the gear selector assembly switches.

Install the connectors on the gear selector assembly.

INSTALLING THE GEAR SELECTOR KNOB

Install the gear selector knob. See:**TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

CHECKING THE SHIFT POSITIONS

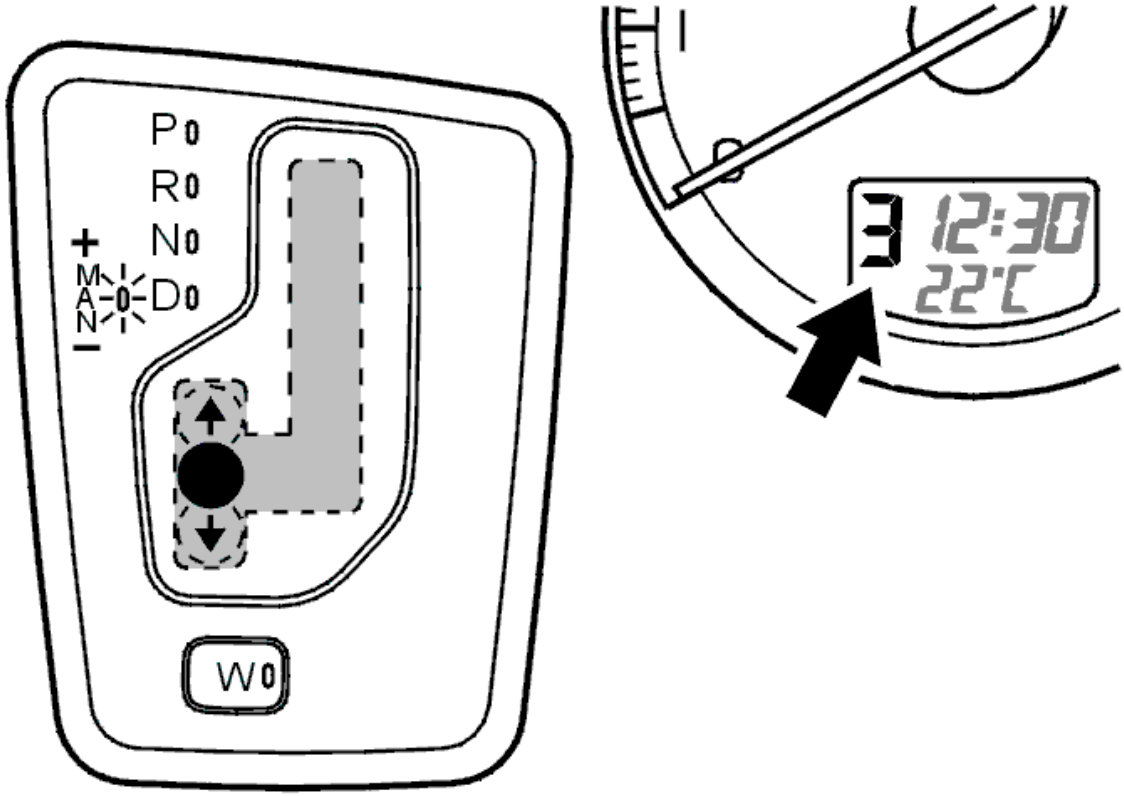


Fig. 8: Checking Shift Positions
Courtesy of VOLVO CARS CORPORATION

Switch on the ignition.

Shift the gear selector through all the shift positions.

Ensure that the letters and/or digits on the display on the combined instrument panel correspond to the shift positions on the top panel.

INSTALLING THE CENTER CONSOLE

See **CENTER CONSOLE, REPLACING** .

PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, REPLACING

REMOVAL

REMOVING THE GEAR SELECTOR KNOB

Remove the gear selector knob. See:**TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

REMOVING THE CENTER CONSOLE

Remove center console. See:**CENTER CONSOLE, REPLACING** .

REMOVING THE TOP PANEL FROM THE GEAR SELECTOR ASSEMBLY

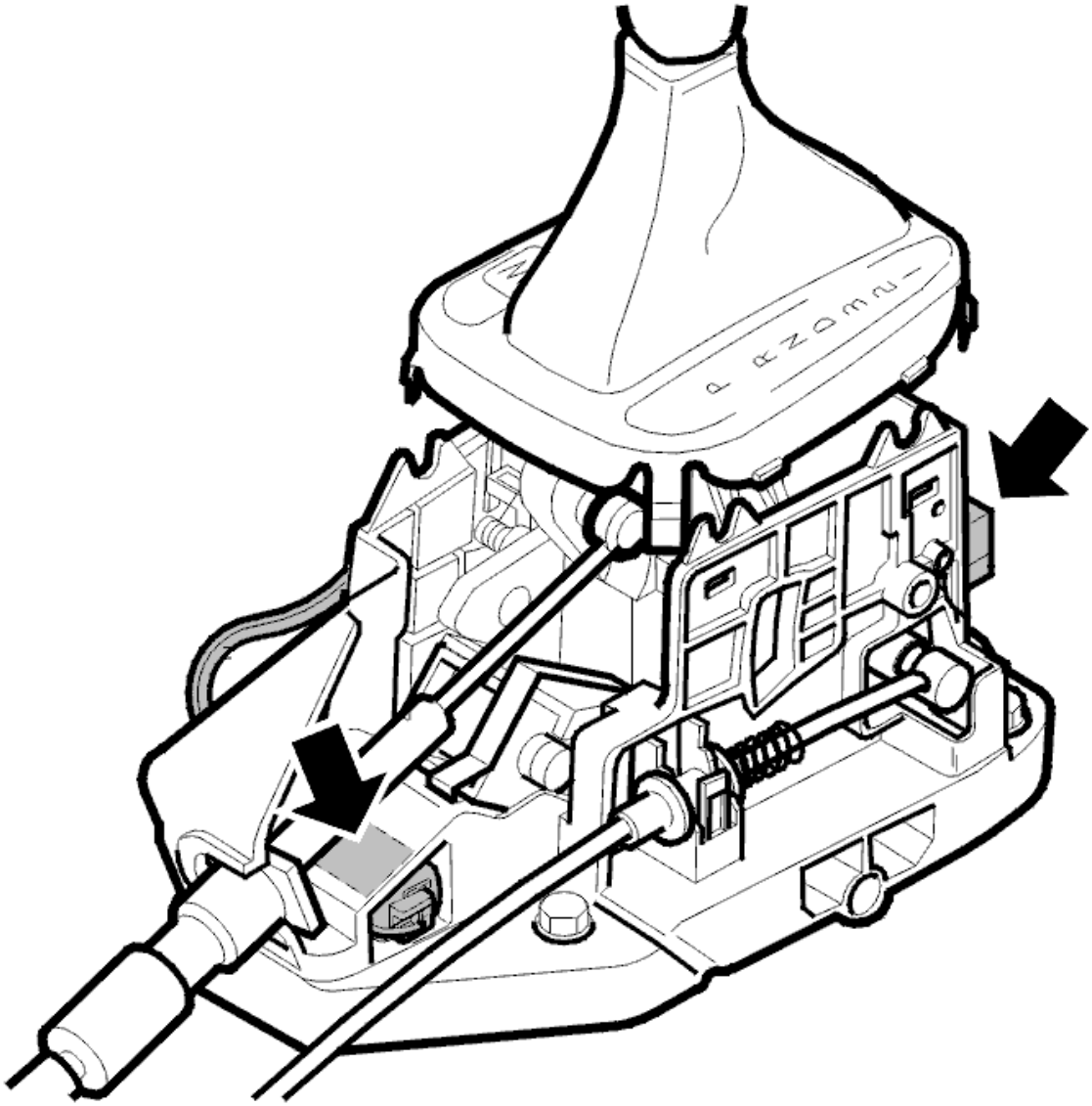


Fig. 9: Removing/Installing Top Panel From Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Remove:

- the wiring from the clips at the gear selector assembly
- the connectors from the gear selector assembly. Separate the connectors
- the top panel with the boot from the gear selector assembly.

REMOVING THE GEAR SELECTOR BOOT FROM THE TOP PANEL

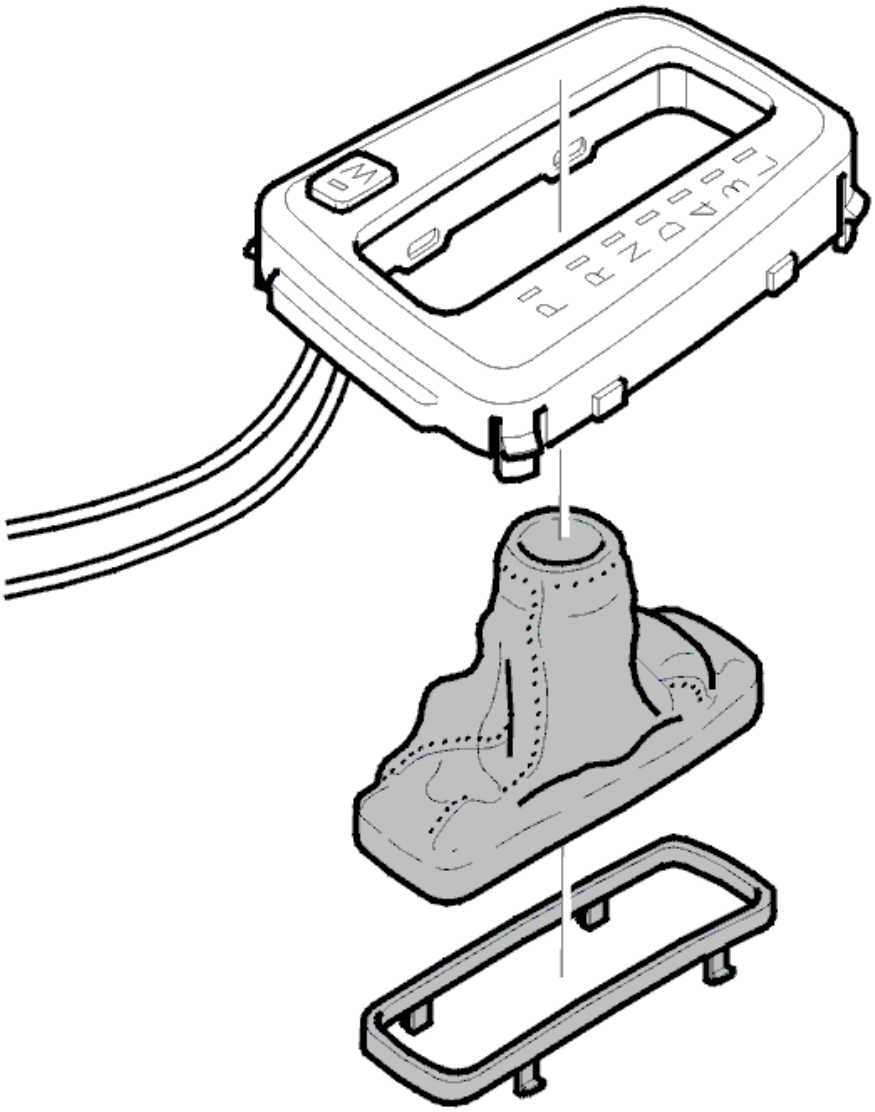


Fig. 10: Gear Selector Boot And Top Panel
Courtesy of VOLVO CARS CORPORATION

Remove the boot holder from the top panel.

Replace the top panel and printed circuit board.

Transfer the boot to the new top panel.

INSTALLATION

INSTALLING THE GEAR SELECTOR BOOT ON THE TOP PANEL

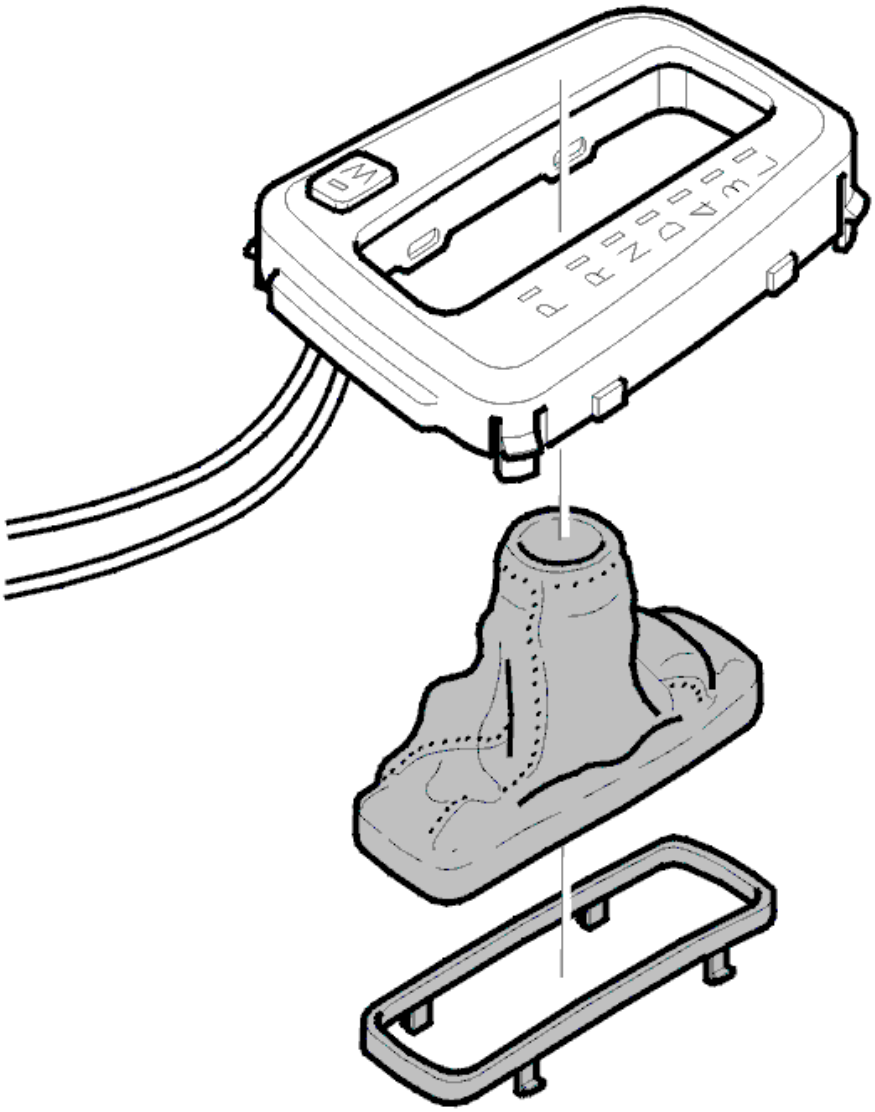


Fig. 11: Gear Selector Boot And Top Panel
Courtesy of VOLVO CARS CORPORATION

Install the boot on the top panel.

INSTALLING THE TOP PANEL ON THE GEAR SELECTOR ASSEMBLY

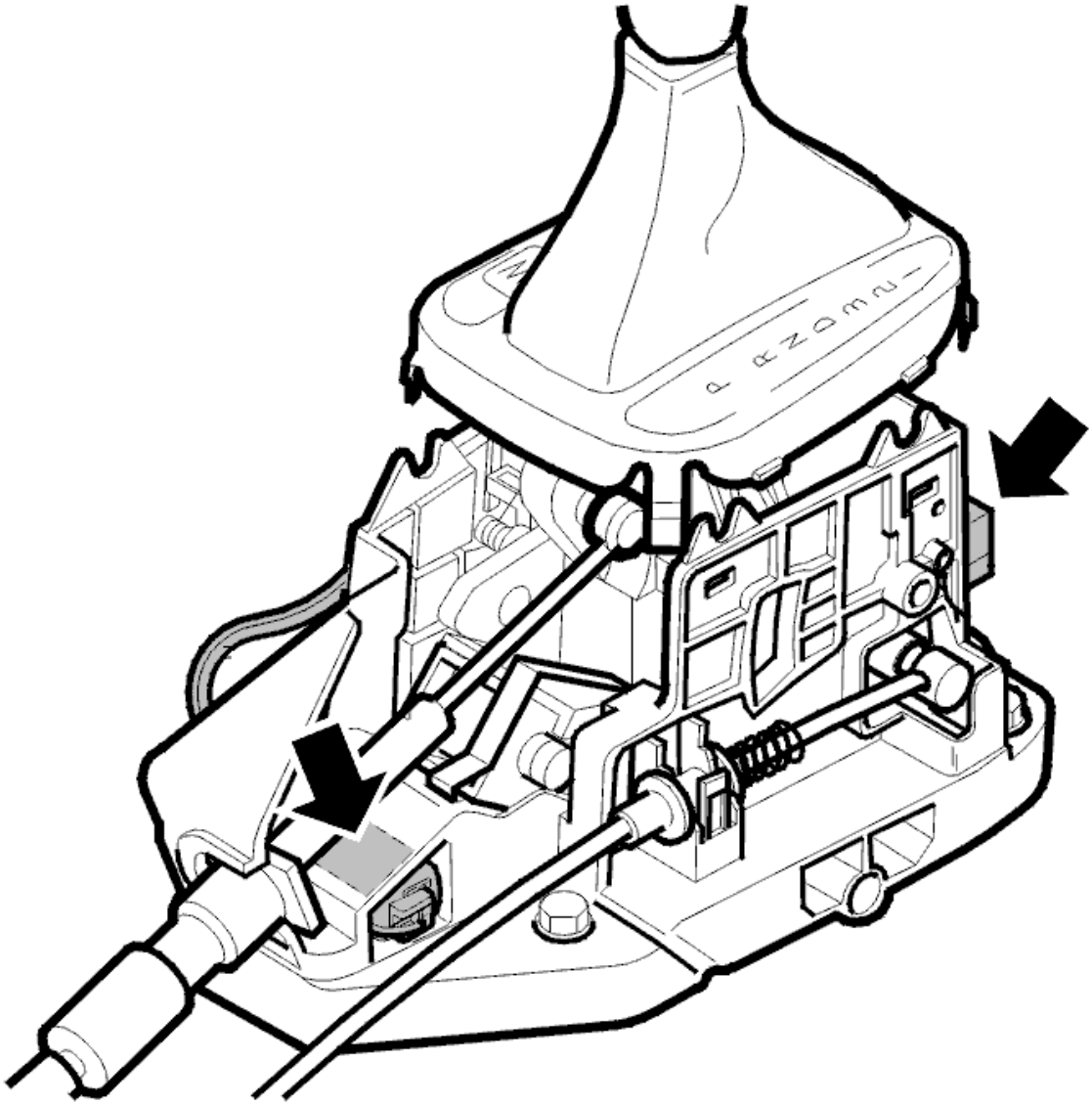


Fig. 12: Removing/Installing Top Panel From Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Install the top panel and boot on the gear selector assembly.

Connect the connectors to the gear selector assembly switches.

INSTALLING THE GEAR SELECTOR KNOB

Install the gear selector knob. See:**TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

INSTALLING THE CENTER CONSOLE

Install the center console. See:**CENTER CONSOLE, REPLACING** .

TRANSMISSION

Power transmission

TRANSMISSION

REPLACING THE SEALING RING FOR THE OIL PUMP

Special tools:

see **9995069**

see **9995117**

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

REMOVAL

REMOVING THE TRANSMISSION

Remove the transmission according to **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

REMOVING THE TORQUE CONVERTER

Pull the torque converter straight out of the transmission. Check the torque converter throat for damage.

REMOVING THE SEALING RING FROM THE OIL PUMP

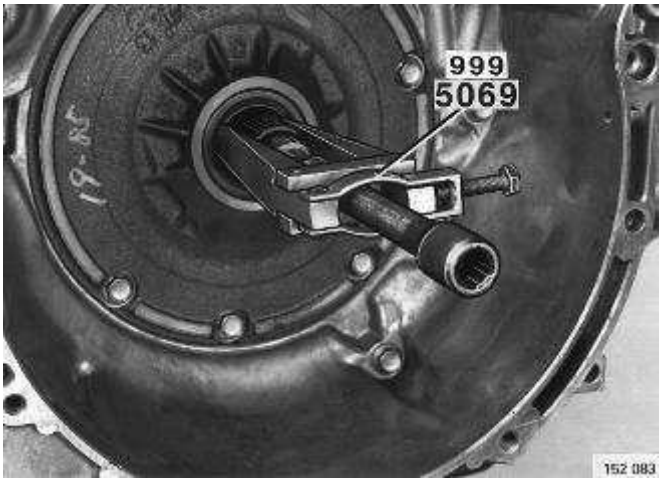


Fig. 1: Identifying Oil Pump Sealing Ring
Courtesy of VOLVO CARS CORPORATION

Use extractor see **9995069** .

INSTALLATION

INSTALLING A NEW SEALING RING ON THE OIL PUMP

Fig. 2: Identifying Oil Pump Sealing Ring & Drift Tool 9995117
Courtesy of VOLVO CARS CORPORATION

Use drift see **9995117** .

NOTE: Drift 9995117 has been modified according to the Volvo Workshop Guide.

INSTALLING THE TORQUE CONVERTER

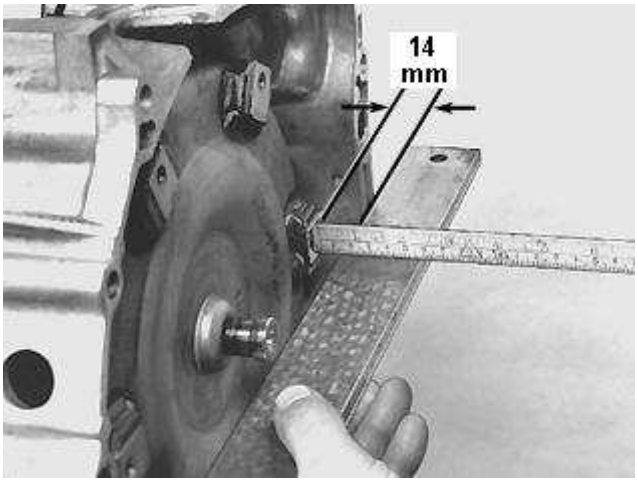


Fig. 3: Checking Distance Between Cover And Mounting Lugs Using Ruler
Courtesy of VOLVO CARS CORPORATION

Lubricate the torque converter throat with ATF oil.

NOTE: Take care not to damage the oil pump during installation.

Make sure torque converter is as far into the transmission as possible. Check with a ruler. The distance between the cover and retaining tabs must be **approximately 14 mm** .

INSTALLING THE TRANSMISSION

Install the transmission according to **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)

All values contained below are between the terminal in column 1 and #A53 (signal ground), unless otherwise indicated in brackets.

NOTE: It is important to connect the breakout box and check ground terminals before taking readings.

U =	DC voltage in volts (V)	U_{AC} =	AC voltage in volts (V)
U_{bat} =	battery voltage	f =	frequency in Hertz (Hz)
U_{low} =	voltage approximately 0 V	%duty =	duty cycle (pulse ratio) as a percentage (%)
t =	time in milliseconds (ms)		

CONNECTOR A #A35 - #A70

Breakout box terminal	Control module terminal	Signal type	Ignition on	Engine idling	Other
#A35	#A35	Power supply	Ubat		Supply from fuse 16 in the integrated relay/fusebox in the engine compartment
#A37	#A37	Signal, oil temperature sensor	Cold transmission (+20°C): U=2.4 V Hot transmission (+100°C): U=0.3-0.5 V		U decreases with increasing temperature
#A39	#A39	Signal, vehicle speed sensor (VSS)	Tooth against sensor: 14 mA Cover against sensor: 7 mA		The sensor generates a pulsed signal (quadratic wave) with fixed pulse ratio when the pulse wheel rotates. Frequency increases with speed
#A41	#A41	Signal, transmission speed sensor	Tooth against sensor: 14 mA Cover against sensor: 7 mA		The sensor generates a pulsed signal (quadratic wave) with fixed pulse ratio when the pulse wheel rotates. Frequency increases with speed

#A45	#A45	Signal, gear-shift position sensor C	Gear selector position D, 3, L: U=0-0.5 V Other positions: U=0-2 V below Ubat	Signal grounded in positions D, 3, L
#46	#A46	Signal, gear-shift position sensor A	Gear selector position P, R, 3, L: U=0-0.5 V Other positions: U=0-2 V below Ubat	Signal grounded in positions N, D
#A50	#A50	Control signal, shift solenoid S1	Activated: U=0-2 V below Ubat Not activated: Ulow	The solenoid receives a signal when activated by the transmission control module (TCM) it is in 2nd and 3rd gears
#A51	#A51	Control signal, lock-up solenoid SL	Activated: U=0-2 V below Ubat Not activated: Ulow	The solenoid receives voltage when it is activated by the transmission control module (TCM)
#A52	#A52	Control signal, line pressure solenoid STH	U=1.6 V	Voltage decreases with increasing throttle opening
#A53	#A53	Signal ground (SG)	Ulow	-
#A55	#A55	Signal ground oil temperature sensor (OTG)	Ulow	Ground
#A57	#A57	Power supply, vehicle speed sensor (VSS)	Uapprox.1 V	-
#A59	#A59	Power supply, engine speed (RPM) sensor	Uapprox.1 V	-
#B3	#A63	Signal, gear-shift position sensor PA	Gear selector position P, N, 3: U=0-0.5 V Other positions: U=0-2 V below Ubat	Signal grounded in positions P, N, 3
#B4	#A64	Signal, gear-shift position sensor B	Gear selector position R, N, D, 3, L: U=0-0.5 V Other positions: U=0-2 V below Ubat	Signal grounded in positions R, N, D, 3
#B8	#A68	Control signal, shift solenoid S2	Activated: U=0-2 V below Ubat Not activated: Ulow	The solenoid receives voltage when activated by the transmission control module (TCM) in 1st and 2nd gears
#B10	#A70	Signal ground, line pressure solenoid STH	f=300 Hz Frequency is constant, independent of driving conditions. The signal duty cycle is modified when line pressure is adapted	-

CONNECTOR B #B1 - #B22

Breakout box terminal	Control module terminal	Signal type	Ignition on	Engine idling	Other
#B11	#B1	Communication cable control modules (Control area network (CAN))	2-3 V		Between transmission control module (TCM) and engine control module (ECM)
#B12	#B2	Communication cable control modules (Control area network (CAN))	2-3 V		Between transmission control module (TCM) and ABS control unit and also central electronic module (CEM)
#B23	#B13	Communication cable control modules (Control area network (CAN))	2-3 V		Between transmission control module (TCM) and engine control module (ECM)
#B24	#B14	Communication cable control modules (Control area network (CAN))	2-3 V		Between transmission control module (TCM) and ABS control unit and also central electronic module (CEM)
#B31	#B21	Communication cable VULCANO light	-		Between transmission control module (TCM) and gear selector module (GSM)
#B32	#B22	Diagnosis cable K-link	-		-

TRANSMISSION

Power transmission

TRANSMISSION

SPLINES GREASING

NOTE: Since the illustrations in this service information are used for different model years and/or models, some variation may occur. However, the essential information in the illustrations is always correct.

GREASING THE SPLINES

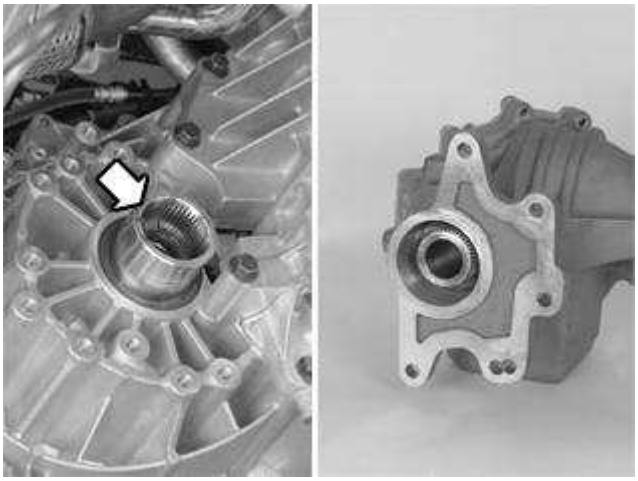


Fig. 1: Identifying Splines
Courtesy of VOLVO CARS CORPORATION

NOTE: Use all the grease in the package.

Always grease the splines joint between the transmission and the bevel gear. Greasing is carried out to avoid corrosion between the terminal sleeve and the bevel gear tubular shaft.

Check that the terminal sleeve on the transmission is free of damage and corrosion. Otherwise the sleeve must be replaced with a new one.

Use grease, P/N 1161748. Thoroughly lubricate the splines in the terminal sleeve.

TABLES - RATIOS AND SHIFT PATTERNS

NOTE: When comparing the ratio with table 1, the relationship can vary up to ± 1%, which is normal.

TABLE 1 - RATIO

Gear	non-turbo XC90
1	3.275
2	1.758
3	1.121
4	0.790

TABLE 2 - SOLENOID POSITION

Solenoid locked in position	Shift pattern	Action
S1 locked in position On	1 - 1 - 4 - 4	Replace control system
S1 locked in position Off	2 - 2 - 3 - 3	Replace control system
S2 locked in position On	1 - 2 - 2 - 1	Replace control system
S2 locked in position Off	4 - 3 - 3 - 4	Replace control system

TABLE 3 - VALVE STUCK DURING UPSHIFT

Mechanical shift valve	Shift pattern	Action
Valve 1-2 stuck	2 - 2 - 3 - 4	Replacing the control system
Valve 2-3 stuck	1 - 3 - 3 - 4	Replacing the control system
Valve 2-3 stuck	3 - 3 - 3 - 4	Replacing the control system
Valve 3-4 stuck	1 - 2 - 4 - 4	Replacing the control system

TABLE 4 - VALVE STUCK DURING DOWNSHIFT

Mechanical shift valve	Shift pattern	Action
Valve 1-2 stuck	1 - 1 - 3 - 4	Replacing the control system
Valve 2-3 stuck	1 - 2 - 2 - 2	Replacing the control system
Valve 2-3 stuck (or internal fault in gearbox)	1 - 2 - 2 - 4	Checking engine braking
Valve 3-4 stuck	1 - 2 - 3 - 3	Replacing the transmission

TEMPERATURE SENSOR, GEARBOX FLUID, REPLACING

TEMPERATURE SENSOR FLUID TRANSMISSION, REPLACING (4T65AWD)

SIDE COVER, TRANSMISSION, REMOVING

See **SIDE COVER TRANSMISSION, REMOVING** .

REMOVING THE TEMPERATURE SENSOR

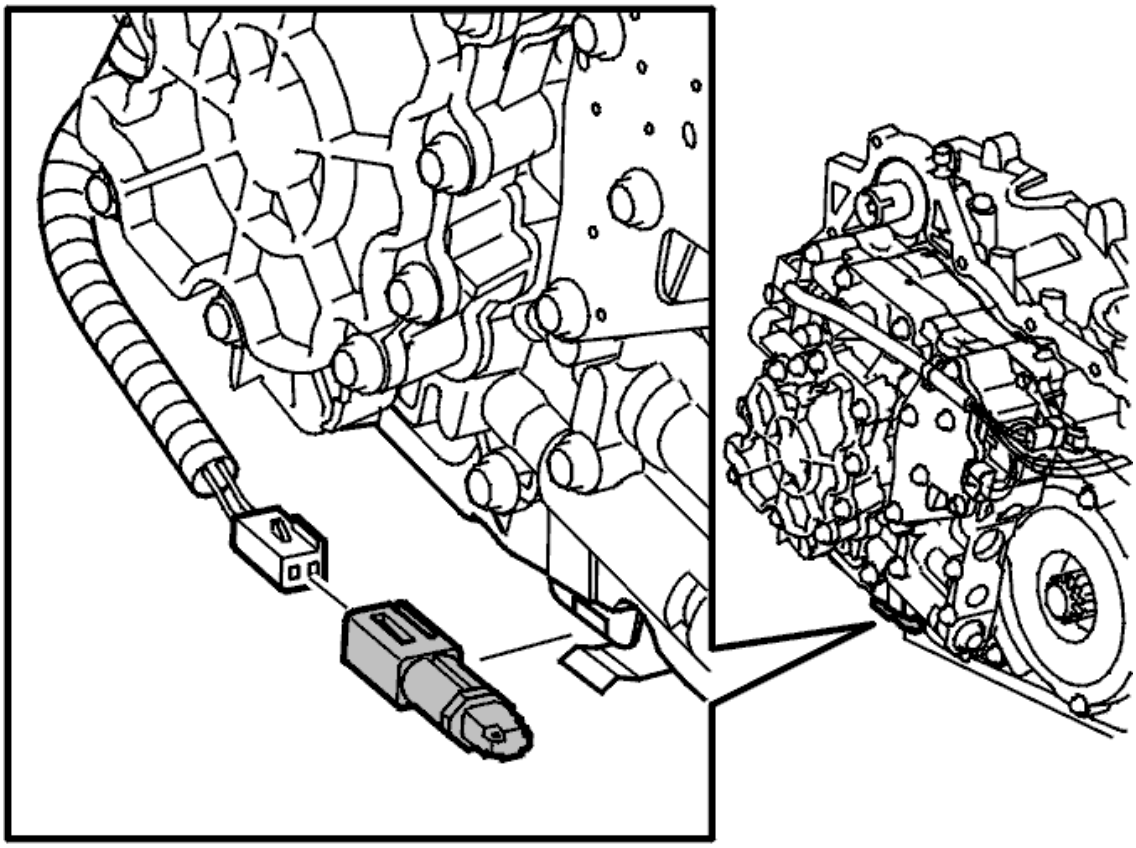


Fig. 2: Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Remove:

- the temperature sensor from the clip
- the temperature sensor from the connector. Use a small screwdriver. Bend up the mounting so that the small catch is released when the connector is pulled.

INSTALLING THE TEMPERATURE SENSOR

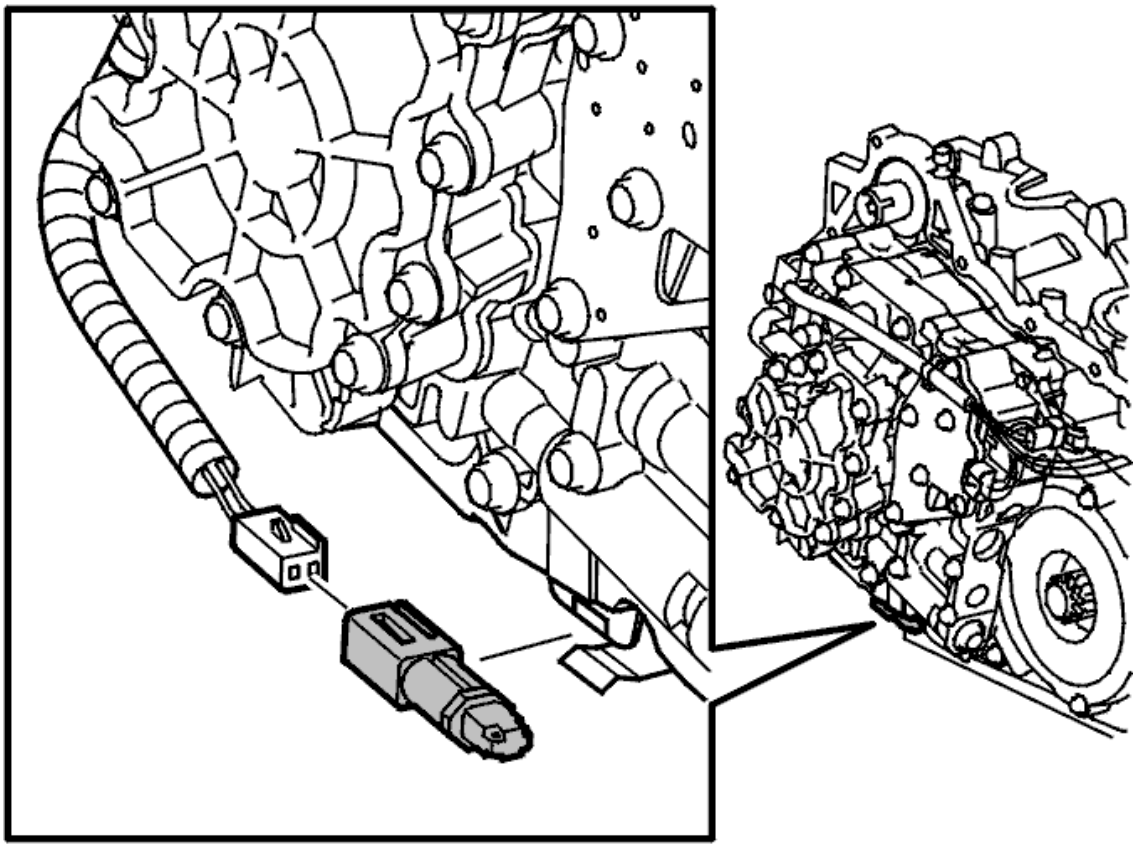


Fig. 3: Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Install:

- the temperature sensor to the connector
- the temperature sensor from the clip.

INSTALLING THE SIDE COVER ON THE TRANSMISSION

See **SIDE COVER TRANSMISSION, INSTALLING** .

TEST DRIVING ACTIVE ON DEMAND COUPLING, MANUAL TRANSMISSION

TEST DRIVING

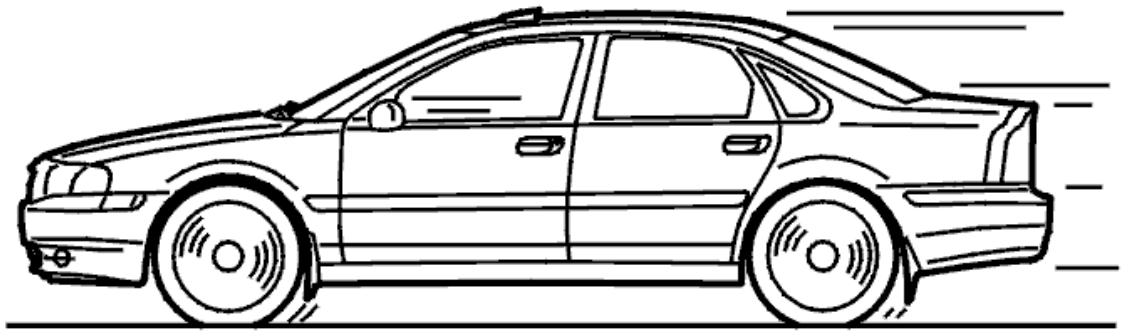


Fig. 4: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

WARNING: Observe all traffic regulations during the test drive.

HINT: The test drive consists of two tests. The first test is at low engine speeds (RPM). The second is at higher engine speeds (RPM).

HINT: At low engine speeds (RPM), four wheel drive is normally disengaged. At high engine speeds, four wheel drive will be engaged. This will have a braking effect when the clutch is depressed and the accelerator pedal (AP) is released.

HINT: The stopping distance with four wheel drive engaged must be approximately half the distance of that when four wheel drive is disengaged.

The test drive

Drive the car in a circle at full lock (the smallest turning circle) at a speed of approximately 10 km/h. Press the clutch and release the accelerator pedal (AP). Let the car come to a standstill.

Note how long it took for the car to stop.

Repeat the test. Increase the engine speed to 3000-4000 RPM. Let the car come to a standstill.

The car will stop in half the distance it took to stop in the first test if the function is correct.

Drive the car while looking out for any faults in functions or noise from the rear suspension.

If there is a fault or noise, stop the test drive. Return to the workshops. Fault trace the symptoms.

TEST-DRIVE SCHEDULE, AW55-50/51SN WITH TCM-002E

Perform the following test-drive:

NOTE: Read through the whole document before starting to test-drive.

1. Check the oil temperature in the transmission via read-out. Suitable temperature range is 40-65 °C.

   Vehicles with GearTronic lever carrier:

   1. Perform the same step as above once more with the gear lever in GearTronic-position with 4th gear selected. Try also to keep the engine in the same engine speed range as during the previous check. In this position, slipping lock-up will not be possible, only locked lock-up. Then the indicator light will be on with a steady glow.
2. Start Activation of gear indication using VIDA (Volvo scan tool)

   NOTE: The activation only applies during one driving cycle.

   Vehicles with GearTronic lever carrier:

   1. Perform the same step as above once more with the gear lever in GearTronic-position with 4th gear selected. Try also to keep the engine in the same engine speed range as during the previous check. In this position, slipping lock-up will not be possible, only locked lock-up. Then the indicator light will be on with a steady glow.
3. Drive the vehicle with light load, approx. 60 km/h (37 mph) in 4th gear (engine speed approx. 1600 RPM). Check status of lock-up via control light IND.

   HINT: The problems occur at slipping lock-up (IND-light flashes).

   Vehicles with GearTronic lever carrier:

   1. Perform the same step as above once more with the gear lever in GearTronic-position with 4th gear selected. Try also to keep the engine in the same engine speed range as during the previous check. In this position, slipping lock-up will not be possible, only locked lock-up. Then the indicator light will be on with a steady glow.
4. When the IND-light flashes, throttle up slightly on a slight uphill grade. Pay attention to if a brief vibration occurs, and that slipping lock-up is turned off. The engine speed should increase by approx. 500 RPM.

Vehicles with GearTronic lever carrier:

1. Perform the same step as above once more with the gear lever in GearTronic-position with 4th gear selected. Try also to keep the engine in the same engine speed range as during the previous check. In this position, slipping lock-up will not be possible, only locked lock-up. Then the indicator light will be on with a steady glow.

5. Check if the vibrations follow the speed or if they are brief vibrations.

NOTE: It is likely that no new diagnostic trouble code will be stored as the diagnosis requires that the malfunction occurs during a number of driving cycles to enable storing of the diagnostic trouble.

Perform one of the alternatives below:

1. Vibrations occur both at slipping and locked lock-up: replace transmission.

   see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

2. Vibrations only occur at slipping lock-up: replace torque converter.
3. Vibrations only occur at locked lock-up: replace transmission.

   see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

4. Vibrations follow the speed:

   Investigate other components, such as tire imbalance and similar.

5. No vibrations can be detected:

   No further troubleshooting is required.

TEST PRESSURIZATION

Special tools:

see **9985496**

COOLING SYSTEM TEST PRESSURIZATION

Fig. 5: Identifying Pressure Tester 9985496 On Expansion Tank Cover
Courtesy of VOLVO CARS CORPORATION

Use pressure tester see **9985496** .

Connect the tester to the expansion tank cover.

Pump up the pressure and check for leaks.

- the pressure must be **150 kPa**
- the pressure in the system must be stable.

NOTE: Allow the pressure to stabilize for a few minutes.

TRANSMISSION

Electrical system

TRANSMISSION

TEMPERATURE SENSOR, TRANSAXLE FLUID, (TFT)

The temperature sensor is a part of the control system's cable harness.

Replace the control system's wiring harness. See **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**

To install, reverse the removal procedure

TRANSMISSION INPUT SPEED SENSOR, INPUT SHAFT, TRANSAXLE (TSS)

NOTE: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Remove the control system. See **CONTROL SYSTEMS** .

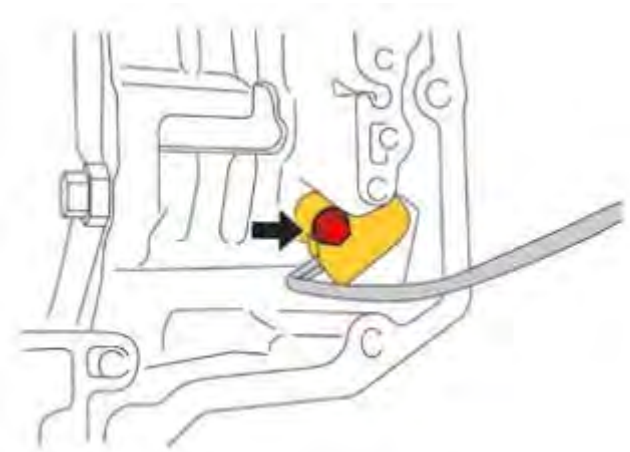


Fig. 1: Identifying Transmission Input Speed Sensor Bolt
Courtesy of VOLVO CARS CORPORATION

Tightening torque: M6. See: **TIGHTENING TORQUE** .

Install the control system. See **CONTROL SYSTEMS** .

TRANSMISSION

Power transmission

TRANSMISSION

TIGHTENING TORQUE

GENERAL TIGHTENING TORQUES

CAUTION: Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

See the table below to find the tightening torques for components not included in the summary.

Nuts and screws which are not self locking can be reused provided that they are in good condition.

Applies to screwed joint with strength class 8.8.	
Thread	Tightening torque (Nm)
M5	5
M6	10
M7	17
M8	24
M10	50
M12	80
M14	130

SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS

CAUTION: Screws coated with locking fluid or sealant must always be replaced with new when reinstalled.

Always use **new screws and nuts** when angle tightening. Any exceptions to this rule will be indicated in the method.

Angle tightening in tight spaces, see **SCREWED JOINT, TORQUE/ANGLE TIGHTENING** .

AW

The nut for the lever and gear shift linkage rod	16 Nm
Oil plug for transmission	40 Nm
Screw, carrier plate - torque converter 6 screws	35 Nm
Screw, oil pipe - dipstick pipe - transmission	15 Nm

Screw, oil pipe - transmission	6 Nm
Transmission input speed sensor/transmission output speed sensor	5.5 Nm
Mounting to transmission, (M10)	Step 1 30 Nm Step 2 160°

M56/M66

Back-up (reversing) lamps switch	25 Nm
Engine mount (M12)	Step 1 30 Nm Stage 2 80°
Oil plug for transmission	35 Nm

MMT6/MTX75/IB5/B6/MPS6

Engine mount, left side	Screw, M14, 120 Nm, Nuts, 4 pieces., 35 Nm + 60°
Oil plug for transmission	35 Nm
Screw drive shaft - wheel hub	35 Nm + 90°
Screw clutch cylinder	10 Nm
Flywheel (applies to MPS6)	114 Nm

AWD

Final drive against rear bushing	80 Nm
Bevel gear screw - transmission	75 Nm
Propeller shaft CV	Stage 1..... The screws opposite each other. Tighten to 10 Nm Stage 2..... All screws. Tighten to 25 Nm.
Level/filler plug final drive housing **NOTE:** **2 plugs, 1 for the Active on Demand Coupling and 1 for the final drive**	35 Nm
Level/filler plug, bevel gear	35 Nm
Oil plug, final drive	35 Nm
Oil plug, Active On-Demand Coupling	35 Nm
Pinion nut (Active on Demand Coupling)	100 Nm
Screw oil pump (Active on Demand Coupling)	5.5 Nm
Screw control module (Active on Demand Coupling)	5.5 Nm
Adjusting nut bevel gear	50 Nm

TRANSMISSION

Transmission - Component location

COMPONENT PLACEMENT, TRANSMISSION CONTROL MODULE (TCM) (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2012)

LOCATION OF COMPONENTS

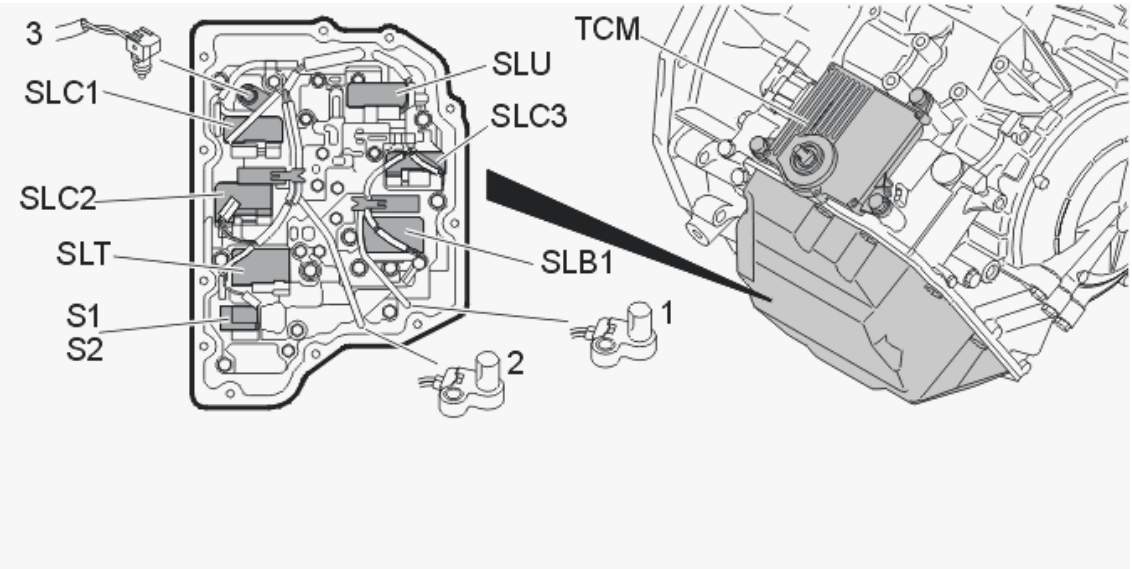


Fig. 1: Locating Transmission Output, Input And Oil Temperature Sensors
Courtesy of VOLVO CARS CORPORATION

1. Transmission input speed sensor:
2. Transmission output speed sensor:
3. Oil temperature sensor.

LOCATION OF COMPONENTS (AW50/51 AWD; AW55-50/51SN; 2003-2007)

LOCATION OF COMPONENTS, SOLENOIDS

SOLENOIDS

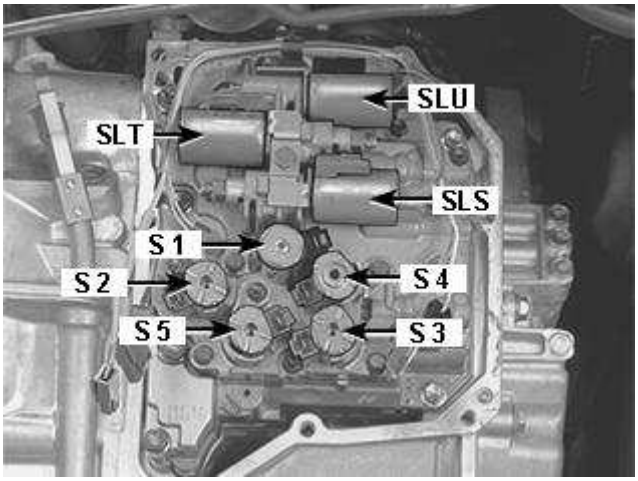


Fig. 2: Identifying S1-S5, SLT, SLU And SLS Solenoids
Courtesy of VOLVO CARS CORPORATION

Shift solenoid S1
Shift solenoid S2
Shift solenoid S3
Shift solenoid S4
Shift solenoid S5
Lock-up solenoid SLU
Throttle solenoid SLT
Line pressure solenoid SLS.

LOCATION OF COMPONENTS, TRANSMISSION CONTROL MODULE (TCM) (4T65 AWD; 2003-2006)

LOCATION OF COMPONENTS

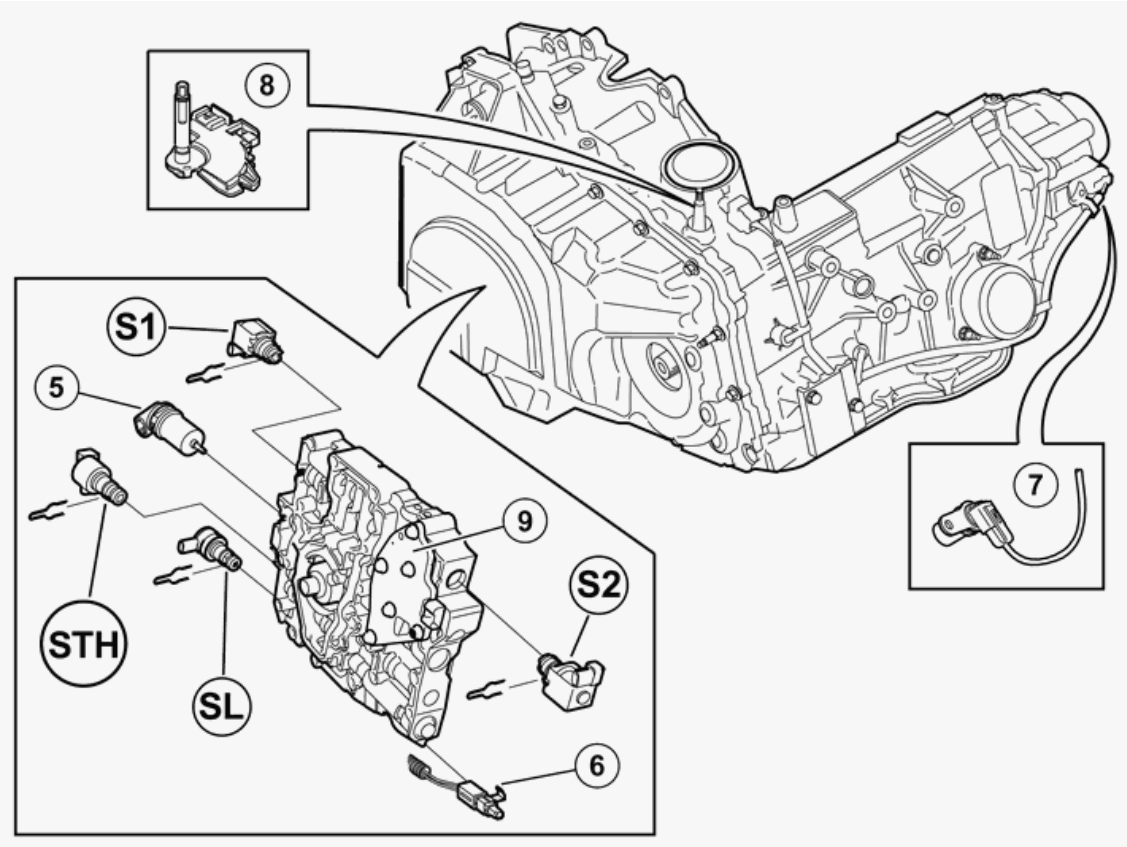


Fig. 3: Locating Transmission Input, Output, Oil Temperature, Gear-Shift Position And Pressure Sensors.
Courtesy of VOLVO CARS CORPORATION

- 5. Transmission input speed sensor.
- 6. Oil temperature sensor.
- 7. Transmission output speed sensor.
- 8. Gear-shift position sensor
- 9. Pressure sensor, lock-up function.

LOCATION OF COMPONENTS, TRANSMISSION CONTROL MODULE (TCM) (B8444S, TF-80SC AWD; 2006-2011)

LOCATION OF COMPONENTS

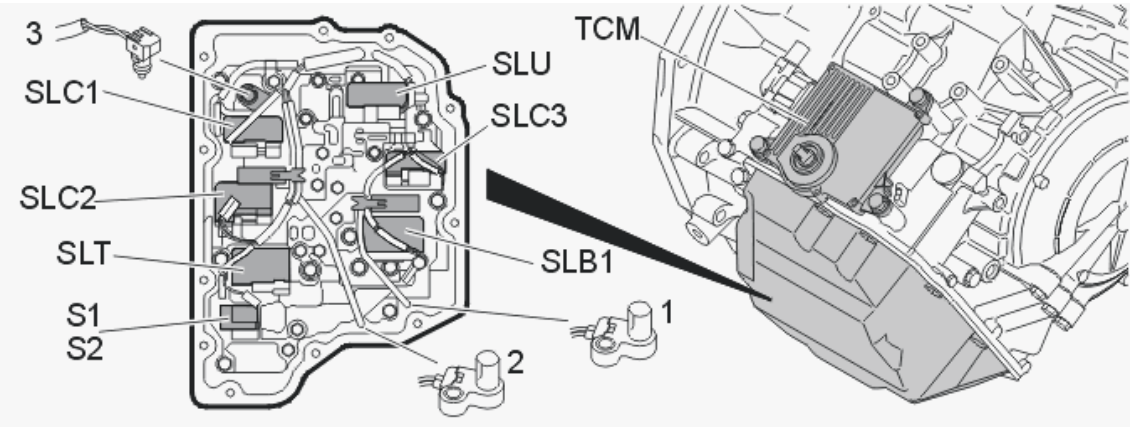


Fig. 4: Locating Transmission Output, Input And Oil Temperature Sensors
Courtesy of VOLVO CARS CORPORATION

1. Transmission input speed sensor:
2. Transmission output speed sensor:
3. Oil temperature sensor.

LOCATION OF COMPONENTS, TRANSMISSION CONTROL MODULE (TCM) (TF-80SC AWD; 2005)

LOCATION OF COMPONENTS

see **LOCATION OF COMPONENTS**

TRANSMISSION

Transmission - Design and Function

EMERGENCY PROGRAMS IN THE EVENT OF A FAULT (4T65 AWD; 2003-2006)

EMERGENCY PROGRAMS IN THE EVENT OF A FAULT

An emergency program is activated to deal with the fault when the transmission control module (TCM) detects a transmission fault (permanent fault). The control system then implements corrective action to protect the transmission, while leaving the car in the best possible driveable condition. Minor malfunctions do not activate an emergency program.

There are different programs depending on the type of fault:

Emergency mode I
Emergency mode II
Emergency mode III
Limp-home mode

Emergency mode I is activated in the event of minor faults and the Limp-home mode is activated for the most serious faults. If the malfunction is intermittent, the transmission control module (TCM) returns to normal operation the next time the ignition is switched on.

Emergency mode I

- The warning lamp in the combined instrument panel lights (S80), flashes (S/V/C70) for certain diagnostic trouble codes (DTCs).
- The transmission shifts in all gears but transmits no signal to the lock-up solenoid. This means that lock-up is not available.

Emergency mode II

- Remedy as for Emergency mode I.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D. This results in harsh shifting.
- No torque limiting request from the engine control module (ECM) during gear shifting.
- The warning lamp in the combined instrument panel lights / flashes.

Emergency mode III

- Remedy as for Emergency modes I and II.
- No control of line pressure solenoid SLT. Constant maximum system pressure. This results in harsh shifting and harsher gear engagement in positions P-R, N-R and N-D.

Limp-home mode

- The transmission control module (TCM) interrupts the activation of all solenoids. This results in the transmission not shifting at all. The transmission operates only in 3rd gear in positions 3 and L, 4th gear in position D and reverse in position R. Shifting can only be carried out manually between 3rd and 4th gear and reverse gear.
- No control of line pressure solenoid STH. Constant maximum system pressure. This results in harsh shifting and harsher gear engagement in positions P-R, N-R and N-D.
- The warning lamp in the combined instrument panel flashes.

NOTE: When starting and driving, the gear selector should first be moved to position L to minimize stress on the transmission.

TRANSMISSION CONTROL MODULE (TCM) (4T65 AWD; 2003-2006)

DESIGN

see **DESIGN**

DOWNLOADING SOFTWARE AND REPLACING THE CONTROL MODULE

see **DOWNLOADING SOFTWARE AND REPLACING THE CONTROL MODULE**

FUNCTION

see **FUNCTION**

SYSTEM OVERVIEW

see **SYSTEM OVERVIEW**

TCM DIAGNOSTIC FUNCTIONS

see **TCM DIAGNOSTIC FUNCTIONS**

TRANSMISSION CONTROL MODULE (TCM) (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DESIGN

see **DESIGN**

DOWNLOADING SOFTWARE AND REPLACING THE CONTROL MODULE

see **DOWNLOADING SOFTWARE AND REPLACING THE CONTROL MODULE**

FUNCTION

see **FUNCTION**

SYSTEM OVERVIEW

see **SYSTEM OVERVIEW**

TRANSMISSION CONTROL MODULE (TCM) DIAGNOSTIC FUNCTIONS

see **TRANSMISSION CONTROL MODULE (TCM) DIAGNOSTIC FUNCTIONS**

TRANSMISSION CONTROL MODULE (TCM) (TF-80SC; 2007-2012)

DESIGN

see **DESIGN**

DIAGNOSTIC FUNCTIONS

see **DIAGNOSTIC FUNCTIONS**

DOWNLOADING SOFTWARE AND REPLACING THE CONTROL MODULE

see **DOWNLOADING SOFTWARE AND REPLACING THE CONTROL MODULE**

FUNCTION

see **FUNCTION**

SYSTEM OVERVIEW

see **SYSTEM OVERVIEW**

TRANSMISSION CONTROL MODULE (TCM) (TF-80SC AWD; 2005-2012)

DESIGN

see **DESIGN**

DIAGNOSTIC FUNCTIONS

see **DIAGNOSTIC FUNCTIONS**

DOWNLOADING SOFTWARE AND REPLACING THE CONTROL MODULE

see **DOWNLOADING SOFTWARE AND REPLACING THE CONTROL MODULE**

FUNCTION

see **FUNCTION**

SYSTEM OVERVIEW

see **SYSTEM OVERVIEW**

TCM-0001: SHIFT SOLENOID S1. SIGNAL TOO HIGH (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

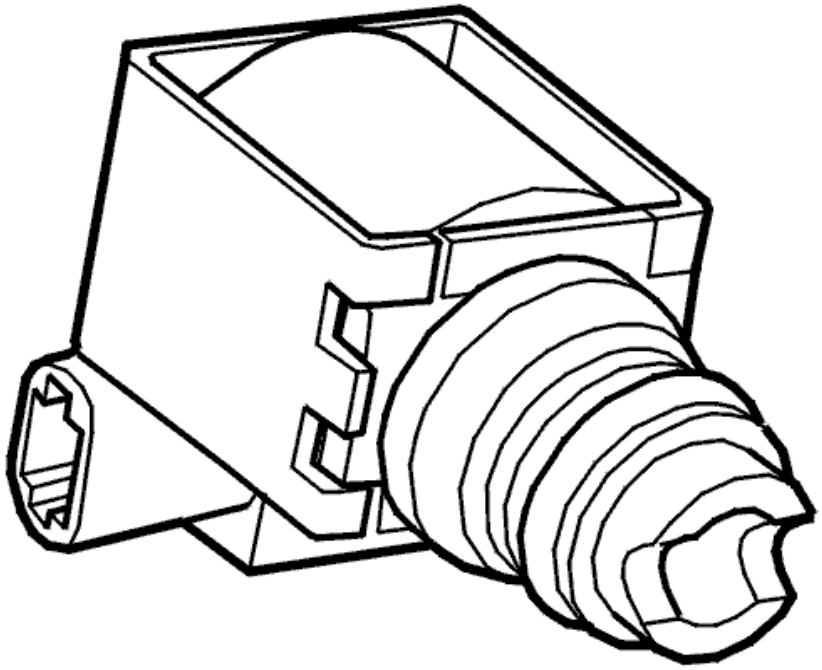


Fig. 1: Identifying Shift Solenoid S1 And S2
Courtesy of VOLVO CARS CORPORATION

Shift solenoids S2 and S1 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Solenoid S1 is activated in 1st and 4th gears. Diagnostic trouble code (DTC) TCM-0001 is stored if the control module registers that the signal in the solenoid S1 circuit is too high when the solenoid should not be activated.

Substitute Value

- The control module "Limp Home" program has been initiated.

Possible Source

- Short-circuit to supply voltage in the signal cable.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

HINT: Harsh shifting - due to disabled line pressure solenoid STH control. This results in constant maximum line pressure and leads to harsher shifting and gear engagement.

HINT: No shifting -because the transmission control module (TCM) prevents activation of the solenoids. This stops gear-shifting.

SIGNAL TOO HIGH

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

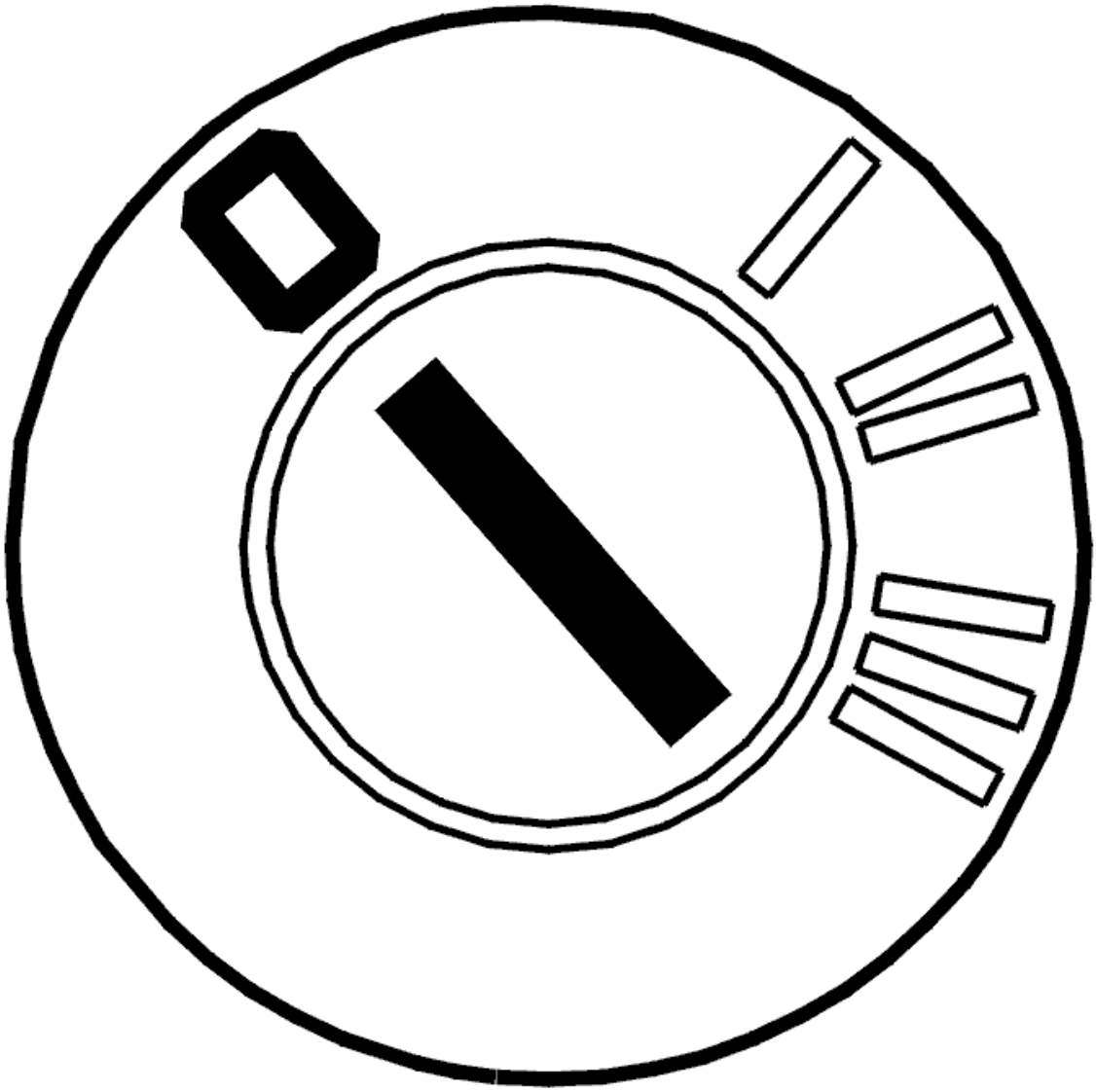


Fig. 2: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

  HINT: If the temperature is outside its permitted range, fault-trace the temperature sensor.

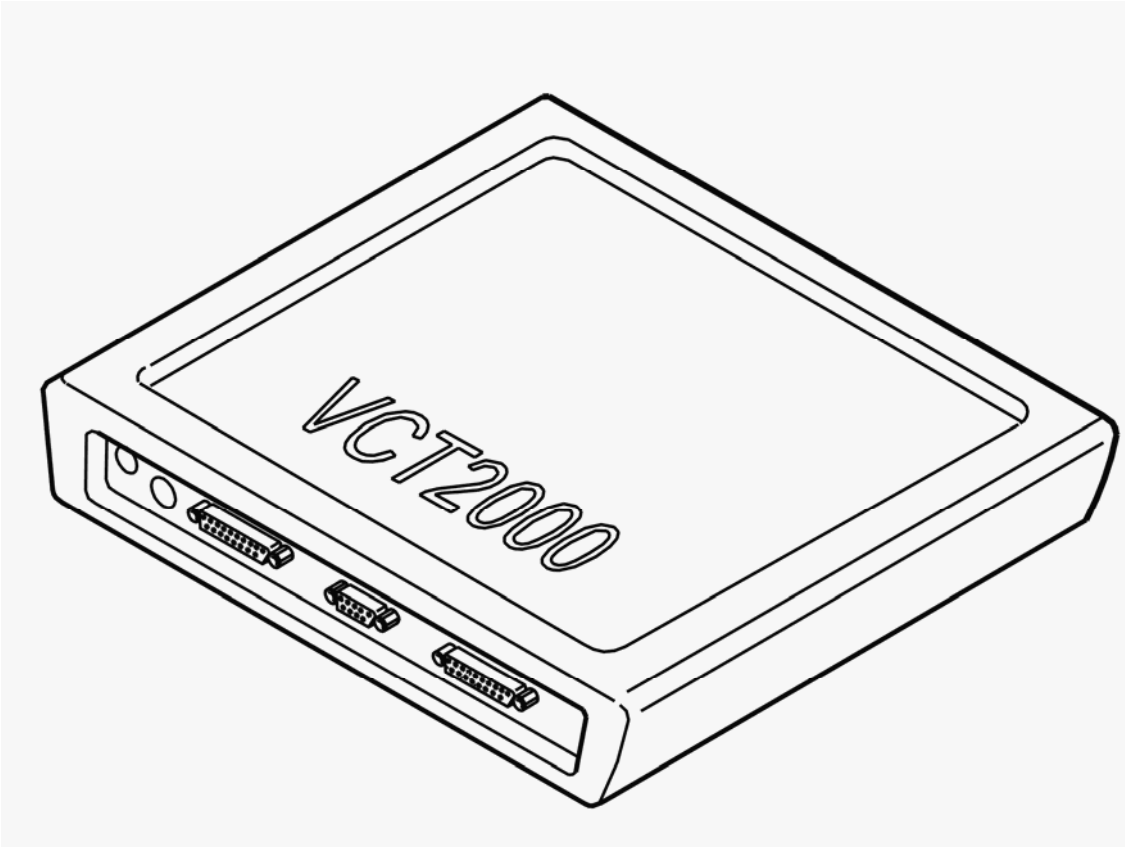


Fig. 3: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S1**

- **NO**

  Refer to **SIGNAL TOO HIGH**

CHECKING SHIFT SOLENOID S1

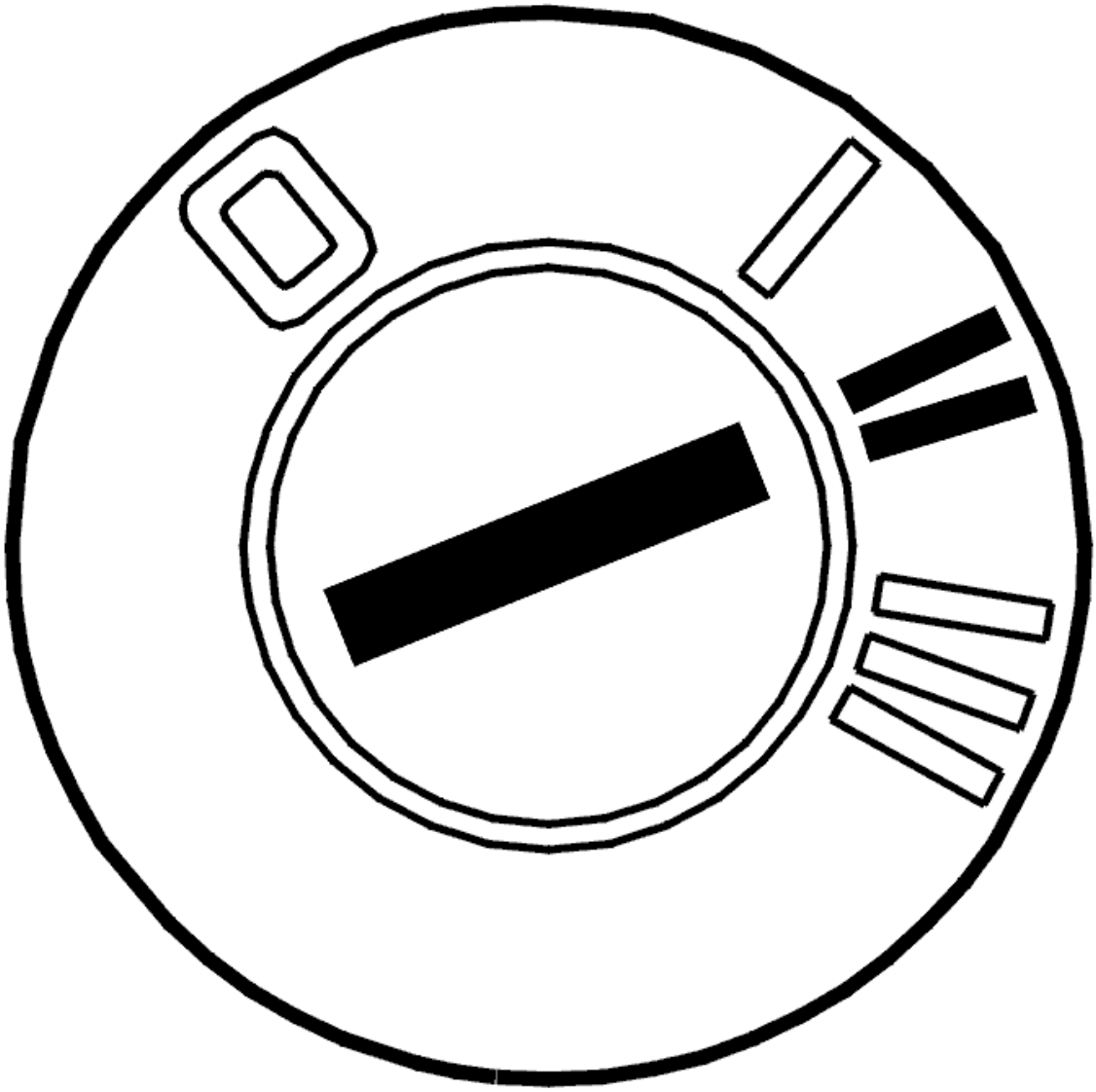


Fig. 4: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S1.

  The value must change between OFF and ON.

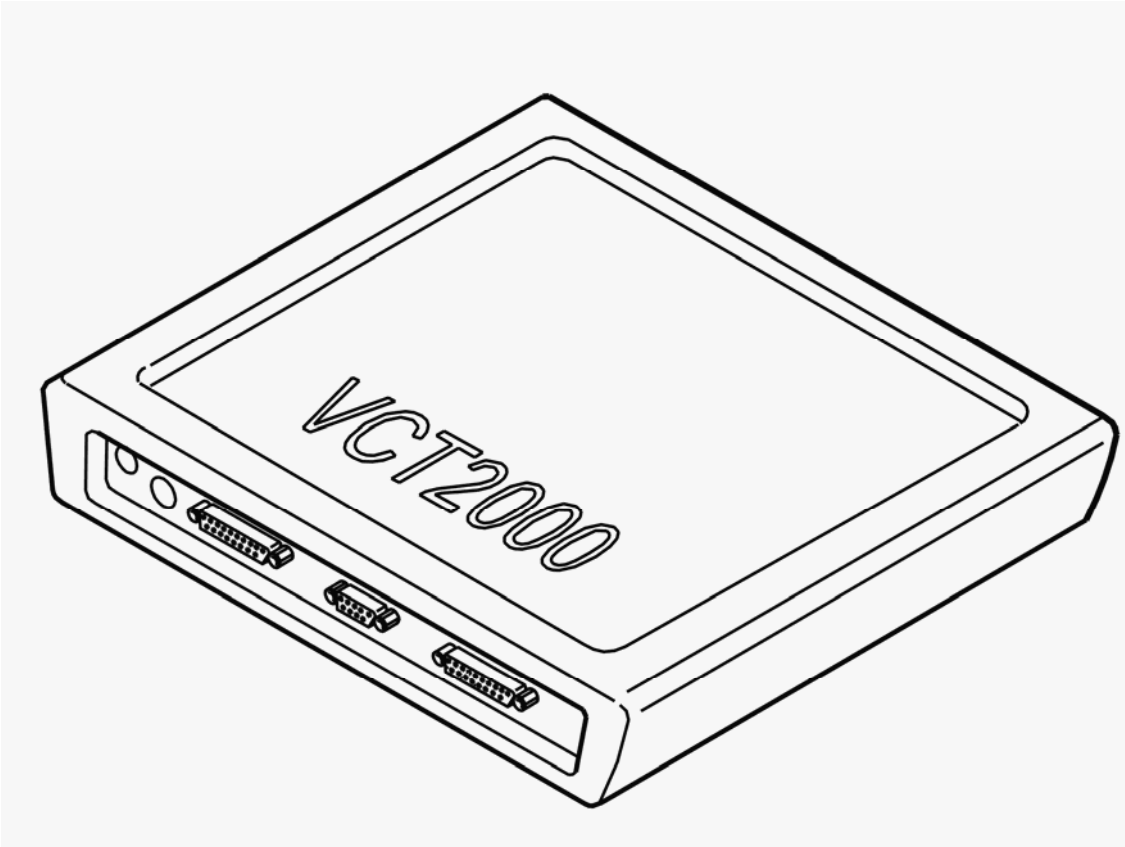


Fig. 5: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  see **CHECKING THE WIRING**

CHECKING THE WIRING

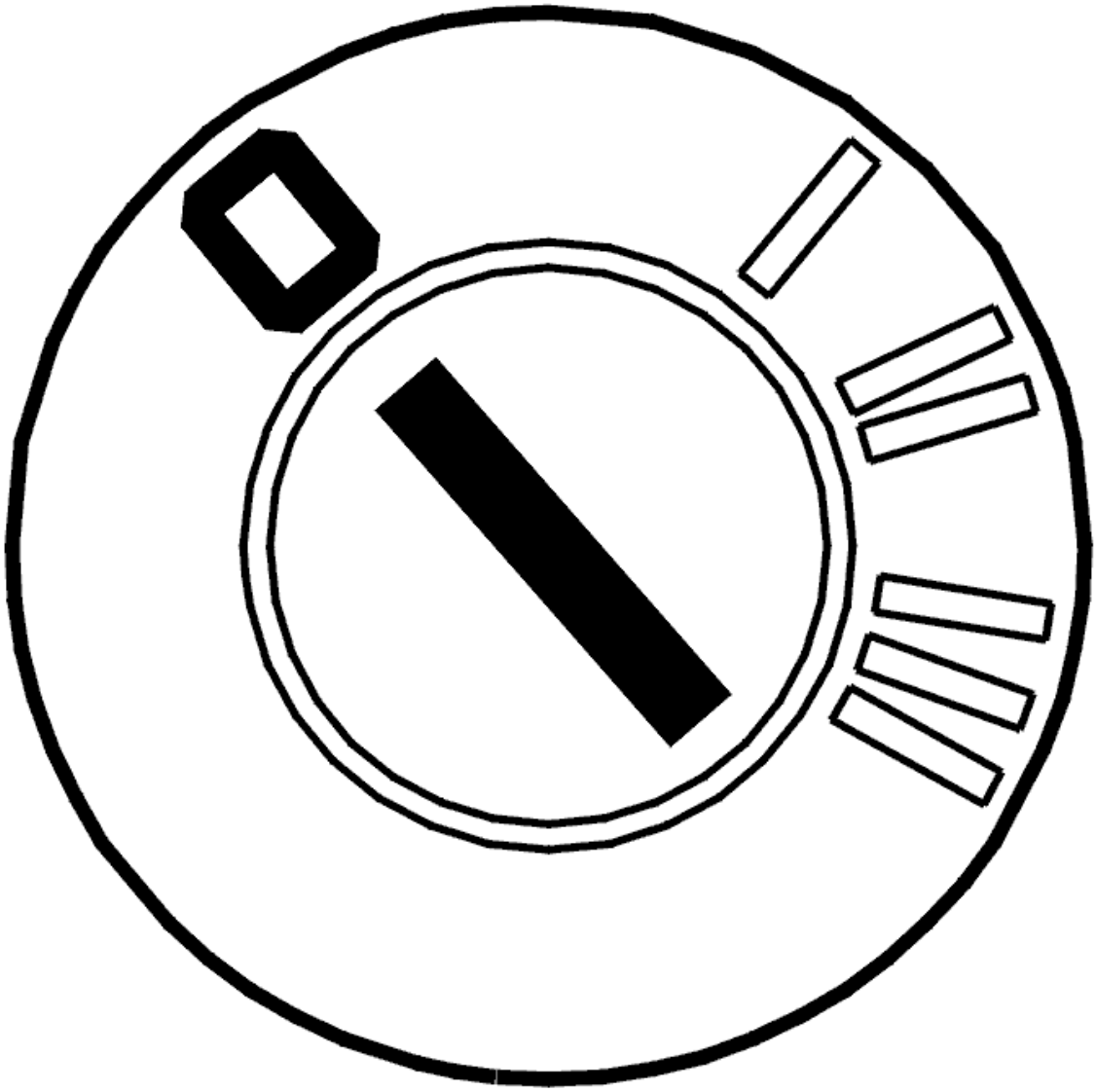


Fig. 6: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

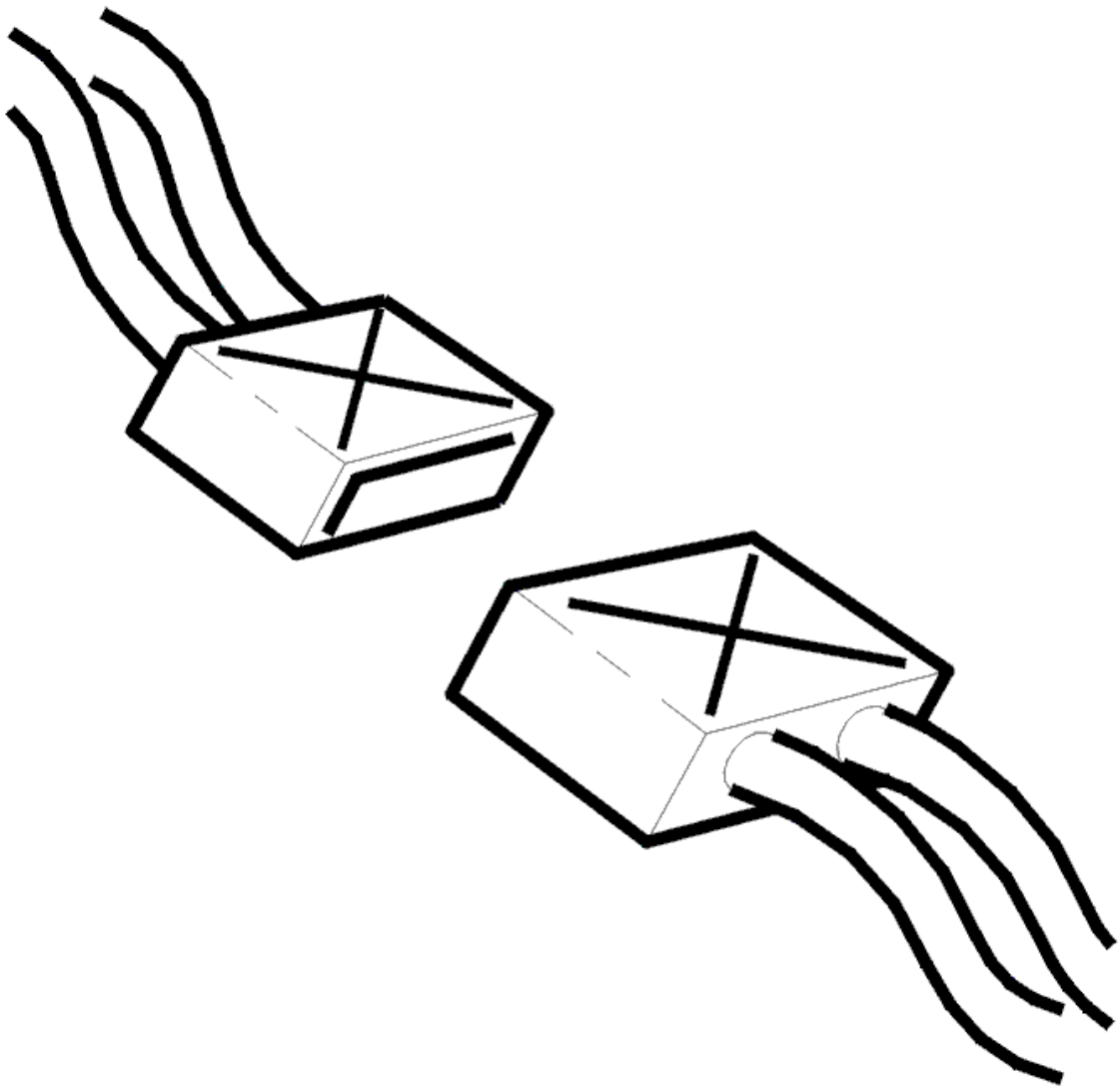


Fig. 7: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

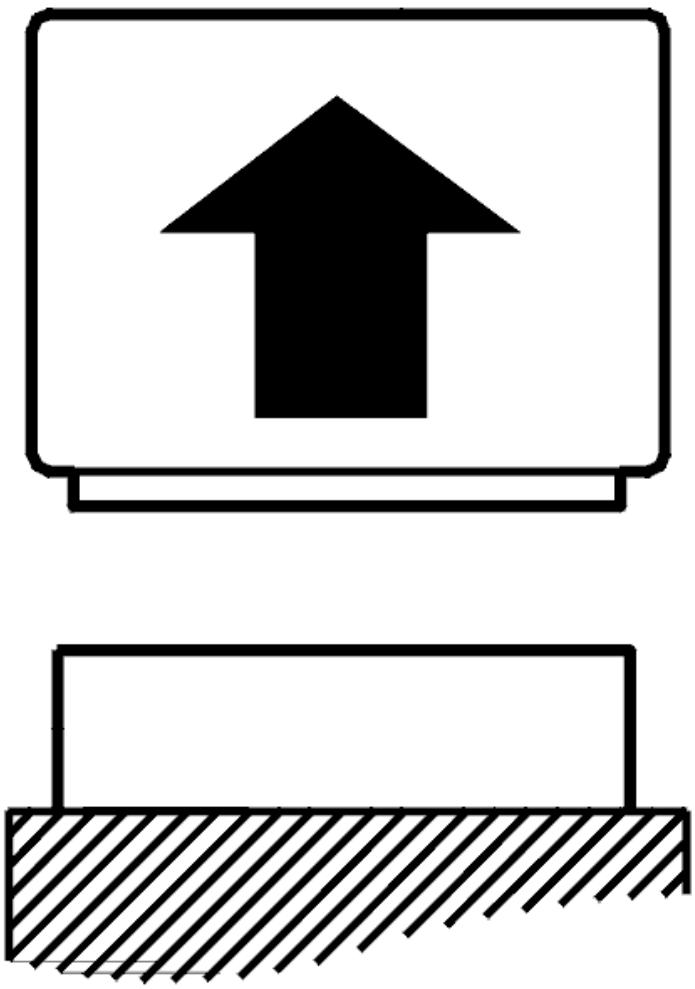


Fig. 8: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box
- Disconnect the control module.
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side).

  Check the cable between control module terminal #50 (#A50) and transmission connector terminal #A (#A1). Check for a short-circuit to supply voltage.

  Check the cable between control module terminal #53 (#A53) and transmission connector terminal #E (#A5) (control module side). Check for a short-circuit to supply voltage.

HINT: Also check all the other power supply cables in the circuit.

Remedy as necessary.

Other information:

- To connect the breakout box to the control module, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

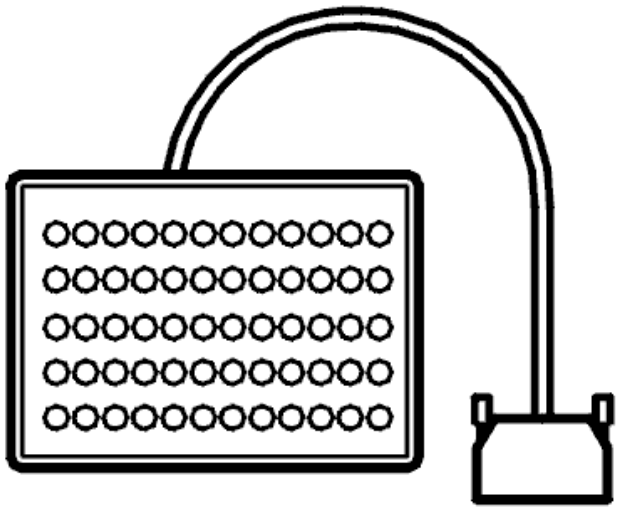


Fig. 9: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

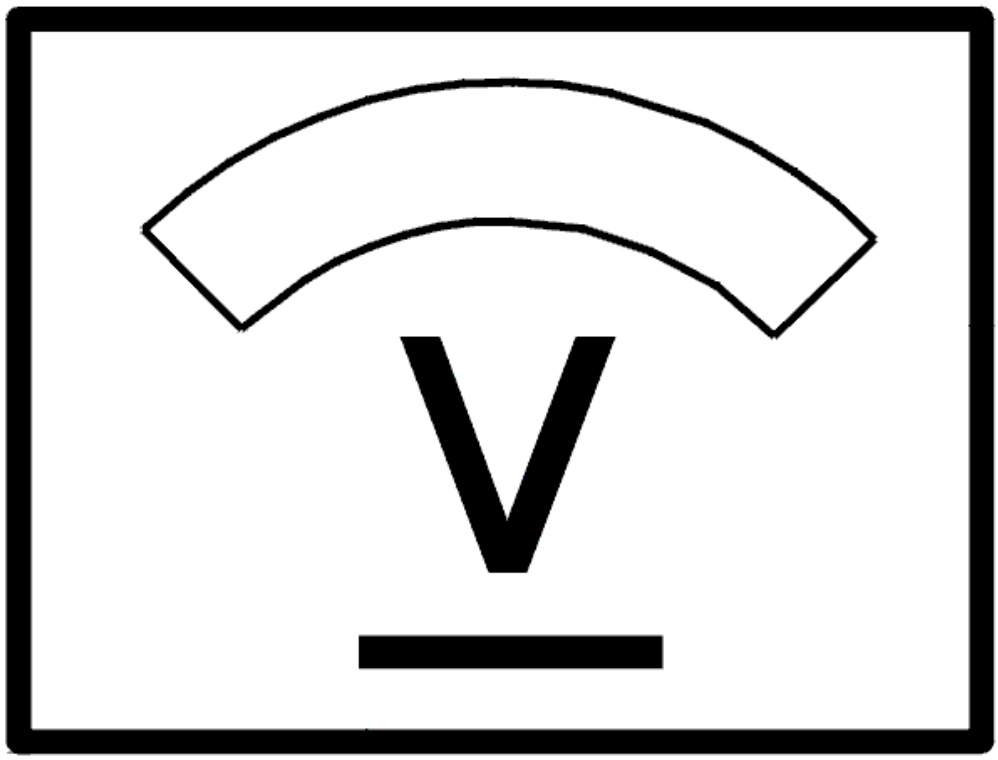


Fig. 10: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

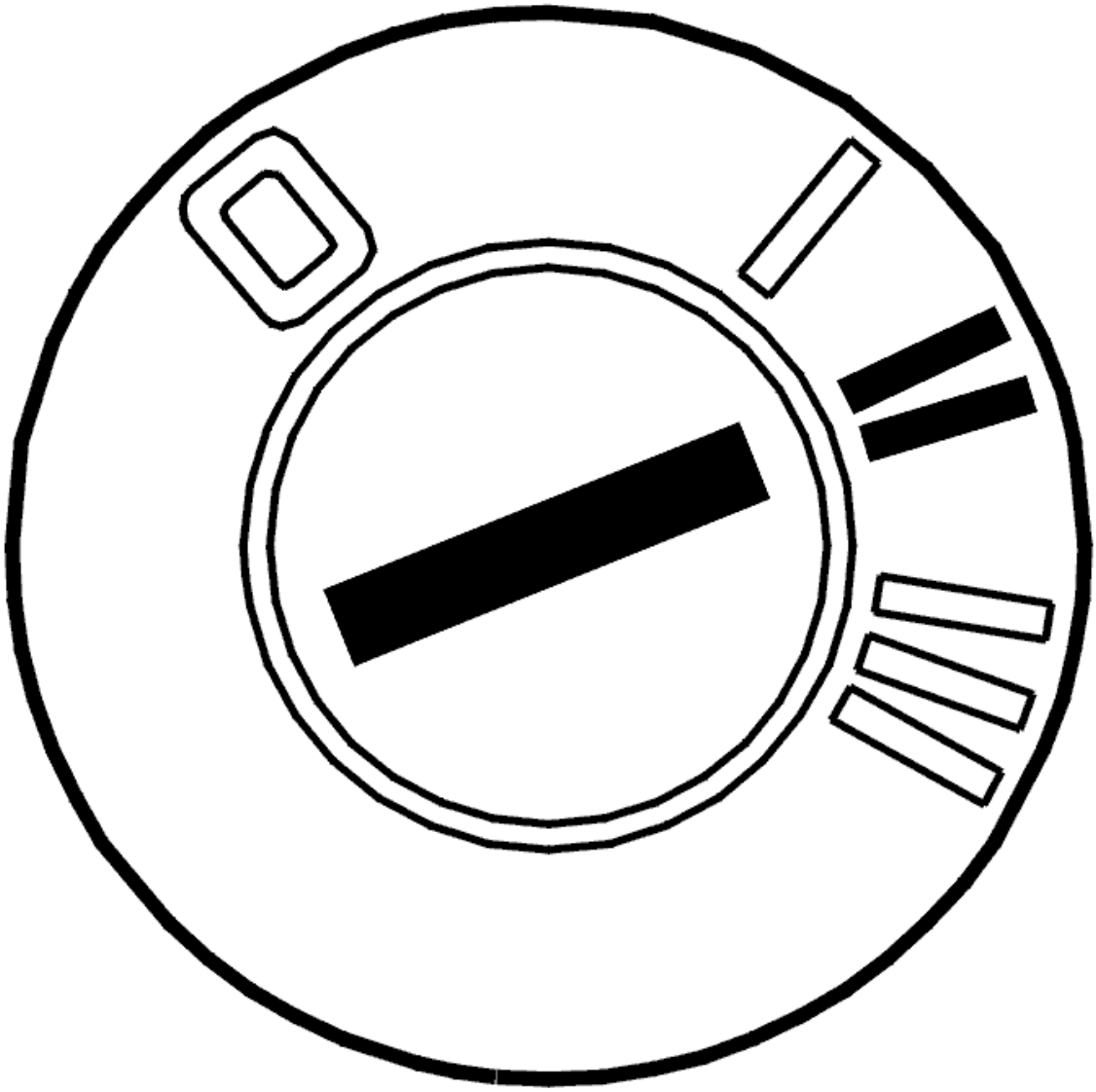


Fig. 11: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

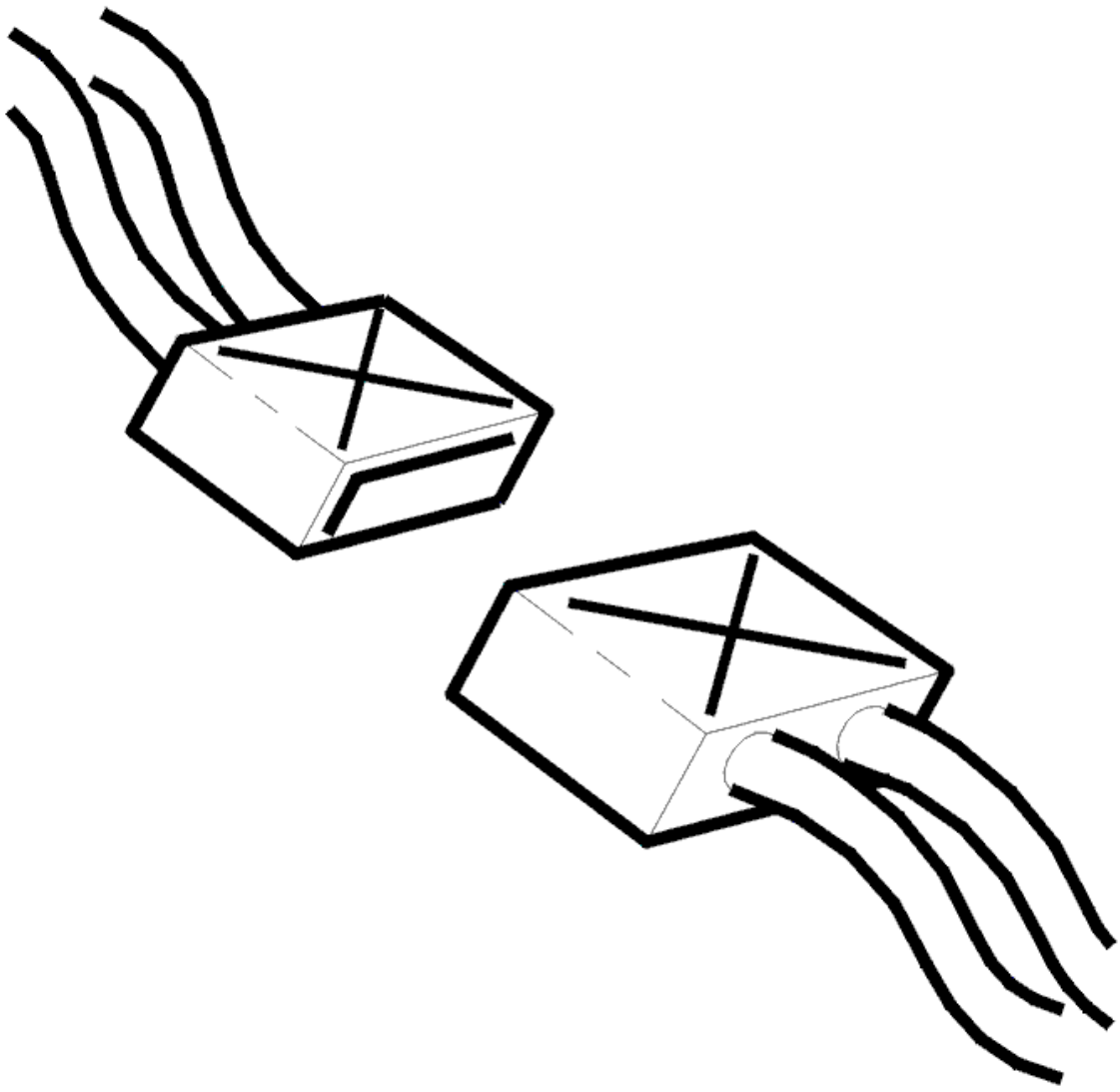


Fig. 12: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

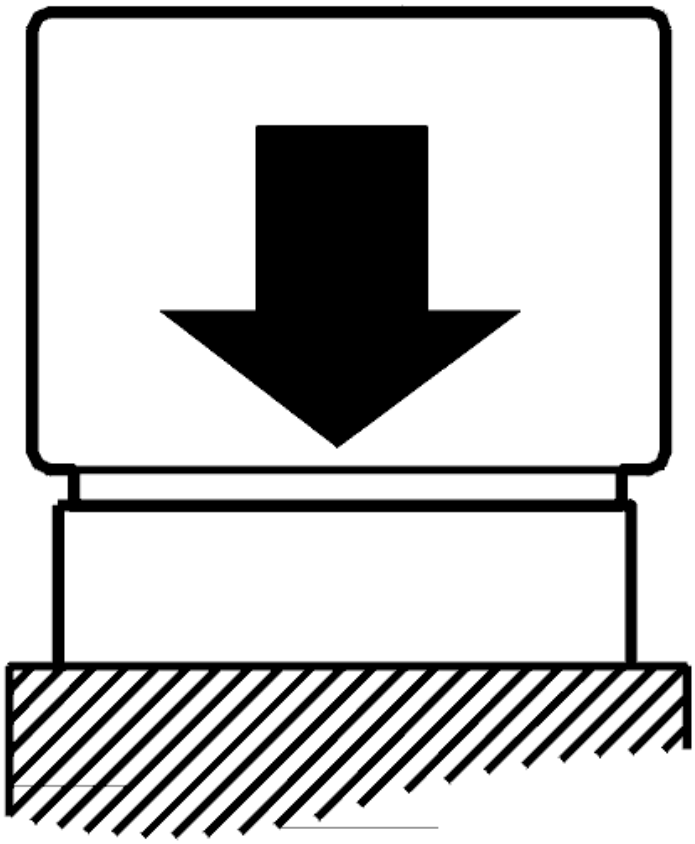


Fig. 13: Identifying Connecting Control Module
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Control module connected.
- Transmission connector disconnected
- Ignition on
- Gear selector in position P
- Activate and read off the status of solenoid S1.

  Connect a voltmeter between terminals #50 (#A50) and #53 (#A53) while activating solenoid S1. The voltage must be approximately 0 V when the solenoid is not activated (OFF) and above 9 V when the solenoid is activated (ON).

The control module is OK if the voltage changes as above when the solenoid is activated/not activated. The control module is defective if the voltage does not change.

NOTE: If the system voltage is too low, this may result in a low voltage value when solenoid S1 is activated. Check the system voltage and remedy as necessary.

NOTE: When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids and the temperature sensor etc.

Other information

- To disconnect the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION** .

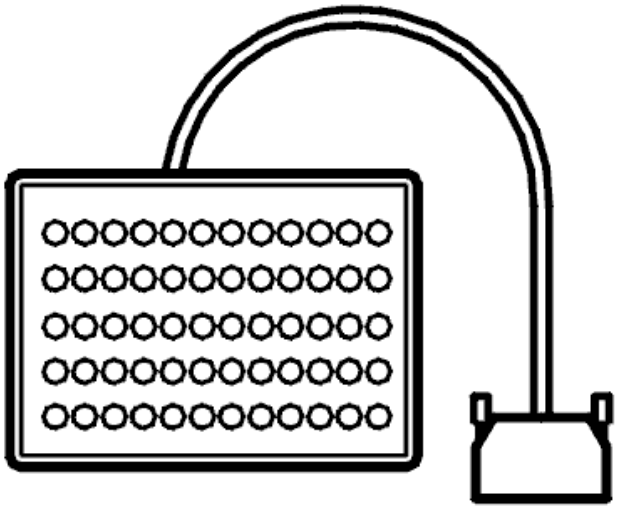


Fig. 14: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

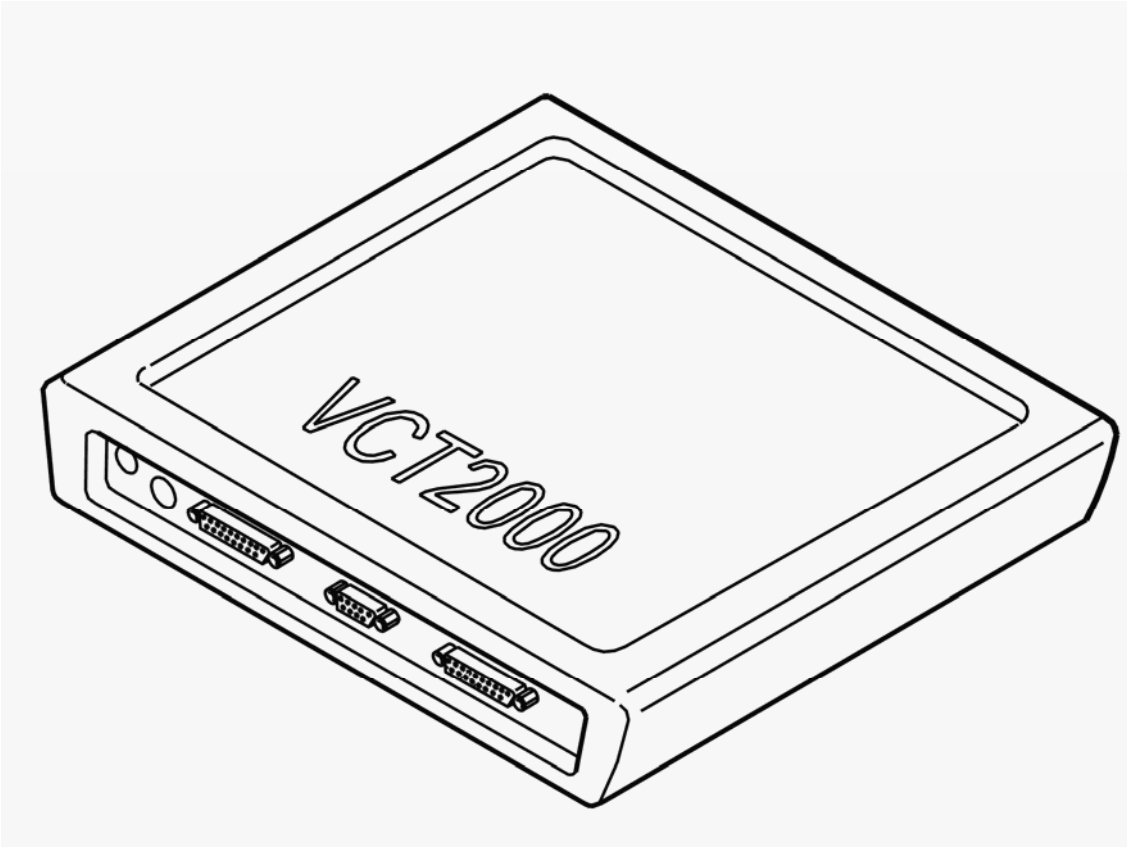


Fig. 15: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the control module defective?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

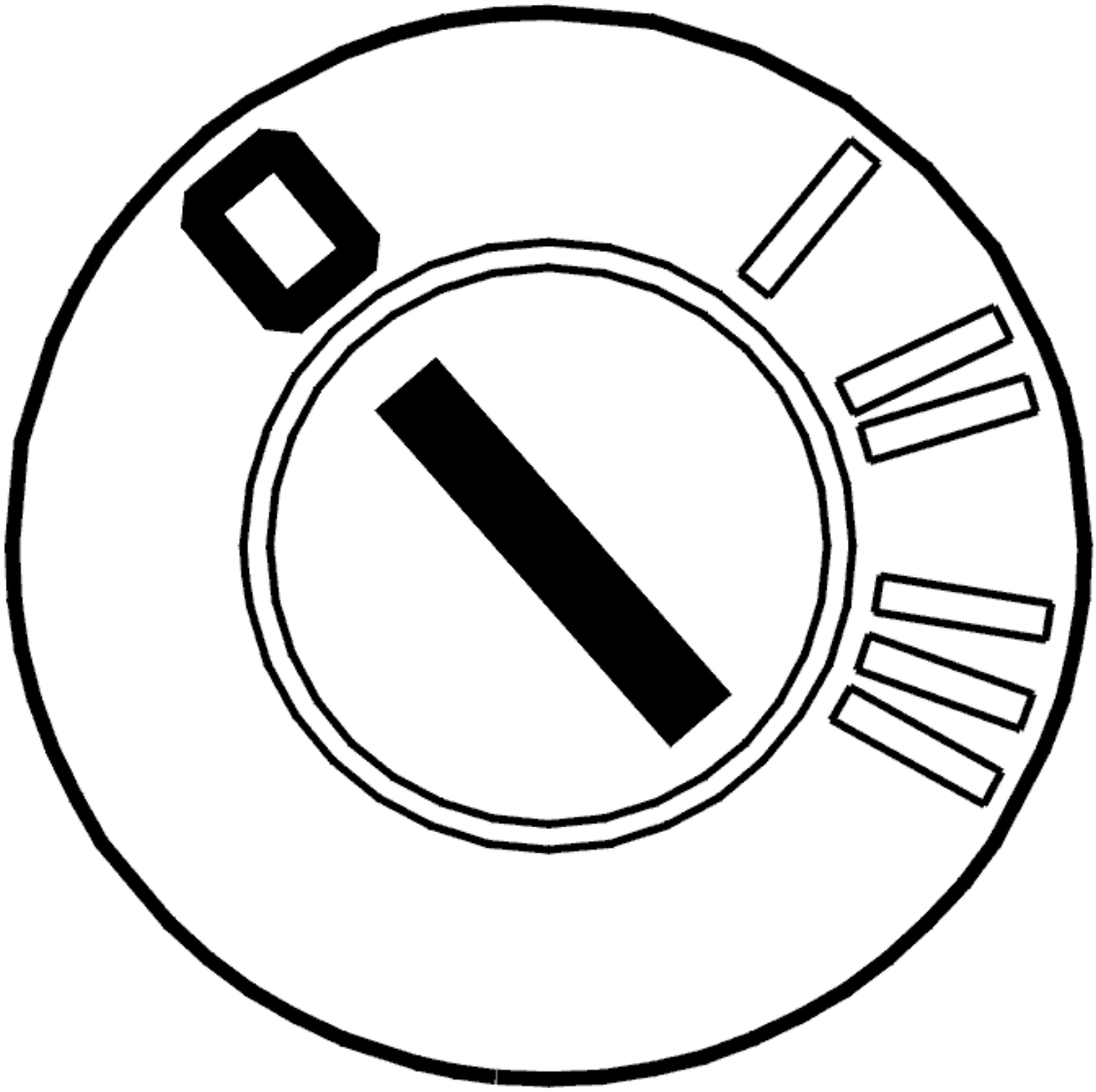


Fig. 16: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission connector (transmission side) terminal #A (#A1) and solenoid S1 terminals #A and #E (#A5) and solenoid S1 terminal B. Check for a short-circuit to supply voltage.

  Check all the cables in the wiring harness from the transmission connector to the transmission components. Check for a short-circuit to each other.

  HINT: Check solenoid S1 by measuring the solenoid resistance between terminals #A and #B. The resistance must be between 18 and 25 ohms.

  Remedy as necessary.

Other information:

- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** . To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To replace solenoid S1, see **SOLENOID SHIFTING 2-3, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

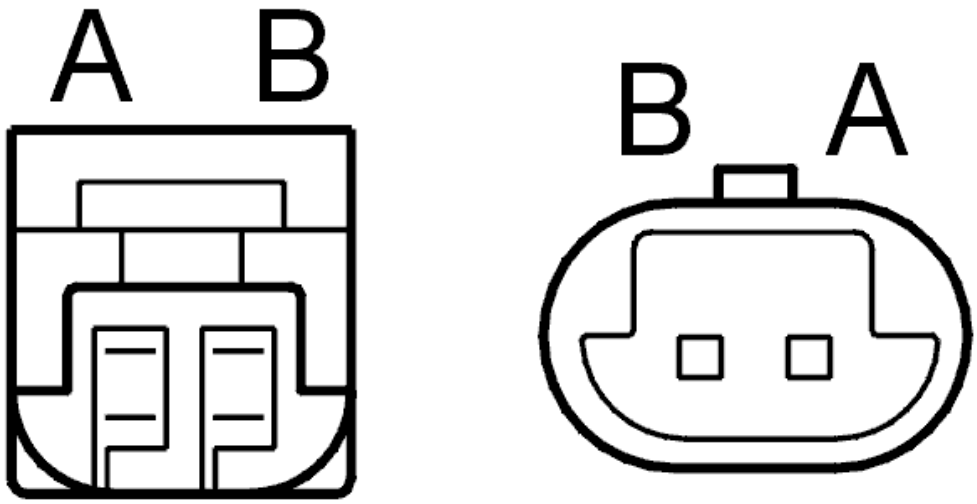


Fig. 17: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

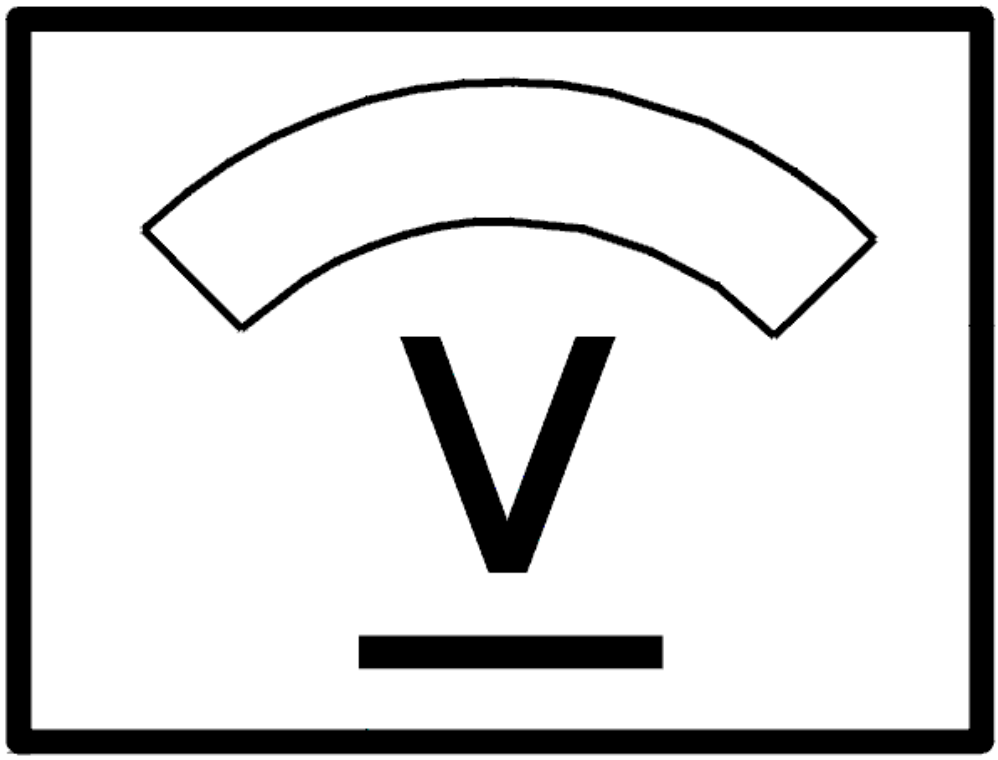


Fig. 18: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

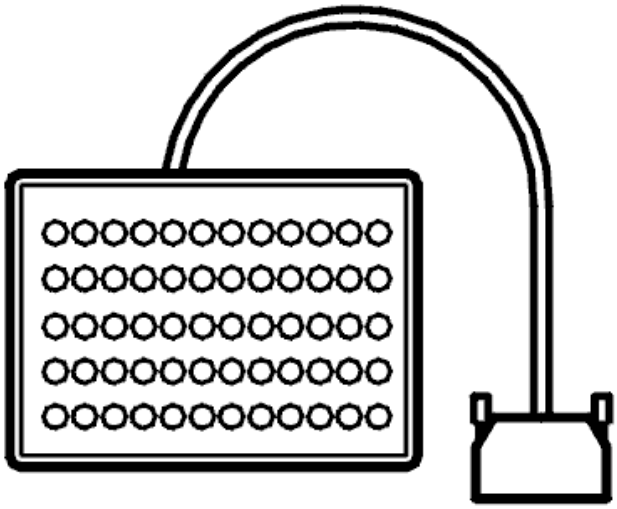


Fig. 19: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the cable between control module terminal #50 (#A50) and transmission connector (control module side) terminal #A (#A1). Check for an intermittent short-circuit to supply voltage.

Check the cable between control module terminal #53 (#A53) and transmission connector (control module side) terminal #A (#A5). Check for an intermittent short-circuit to supply voltage.

HINT: With the ignition off and an ohmmeter connected to control module terminals #50 (#A50) and #53 (#A53), the resistance must be 18-25 ohms.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid S1, see **SOLENOID SHIFTING 2-3, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

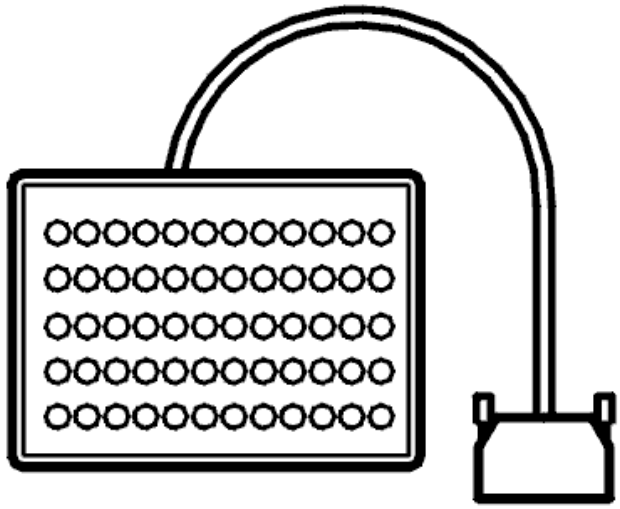


Fig. 20: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

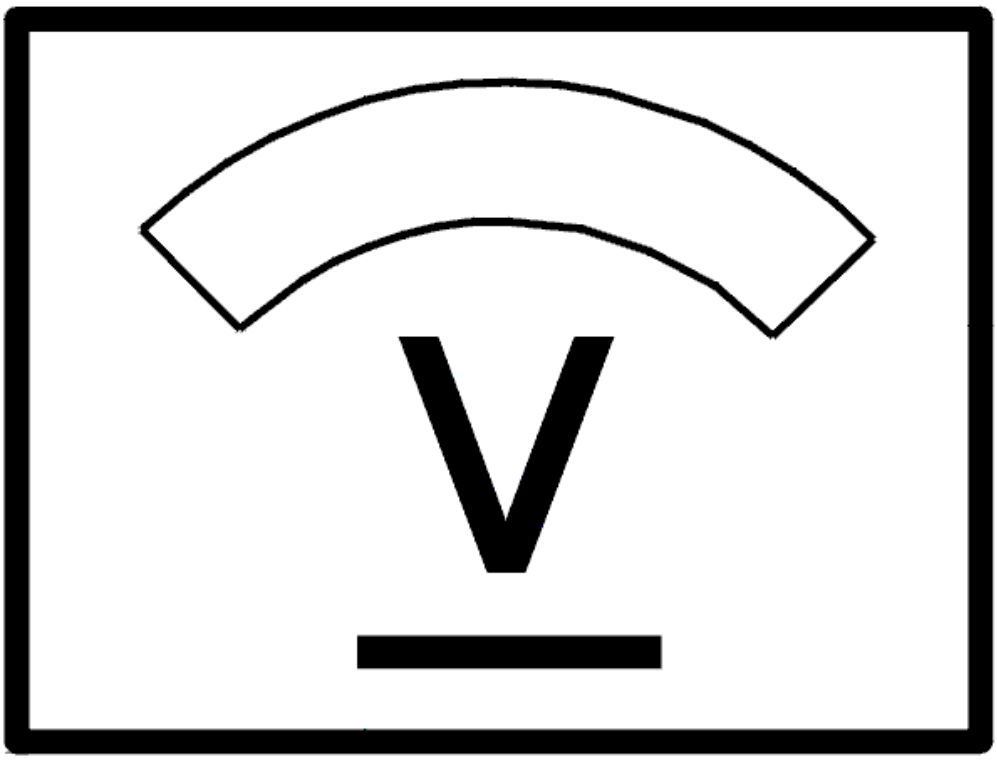


Fig. 21: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

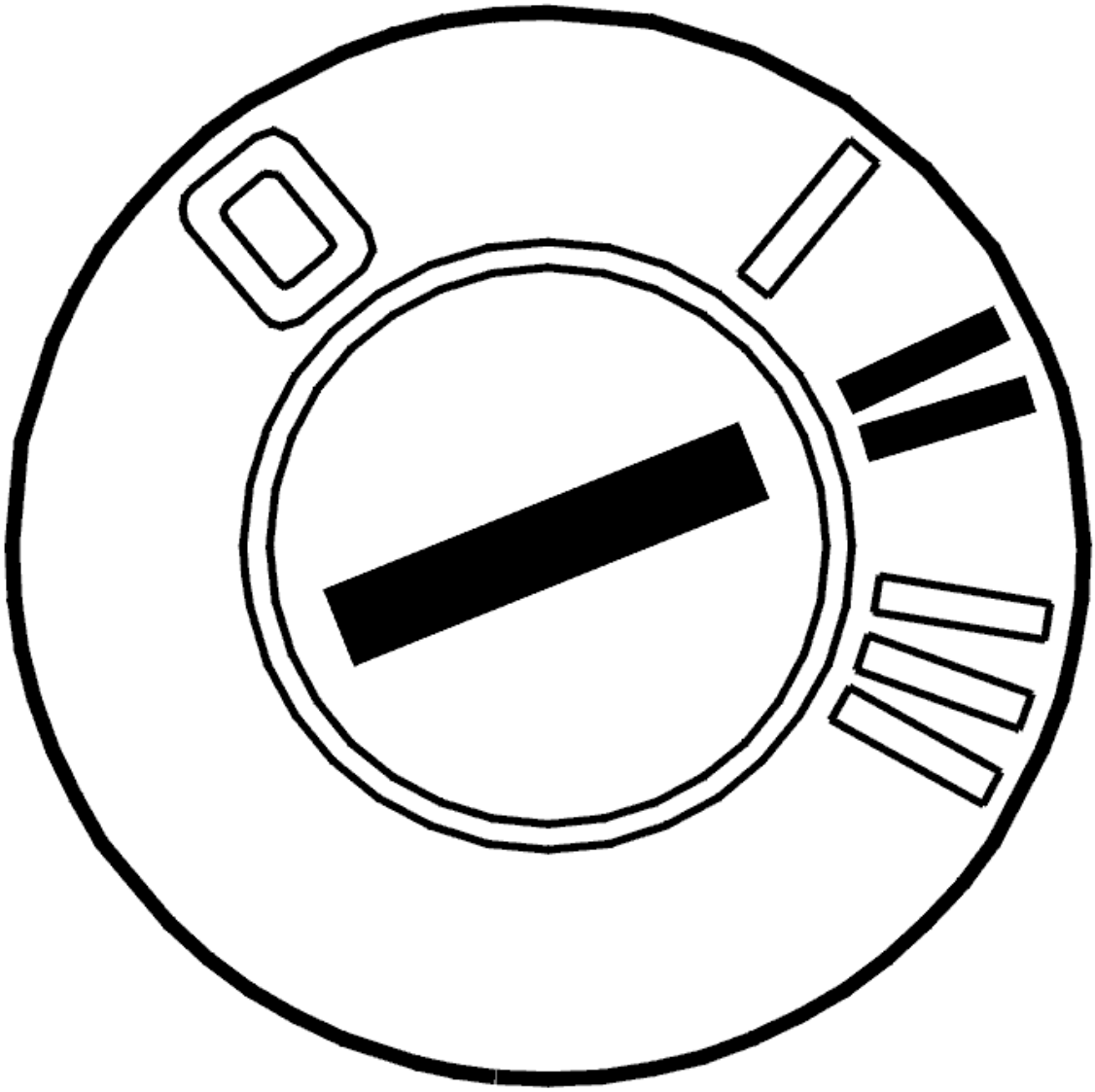


Fig. 22: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

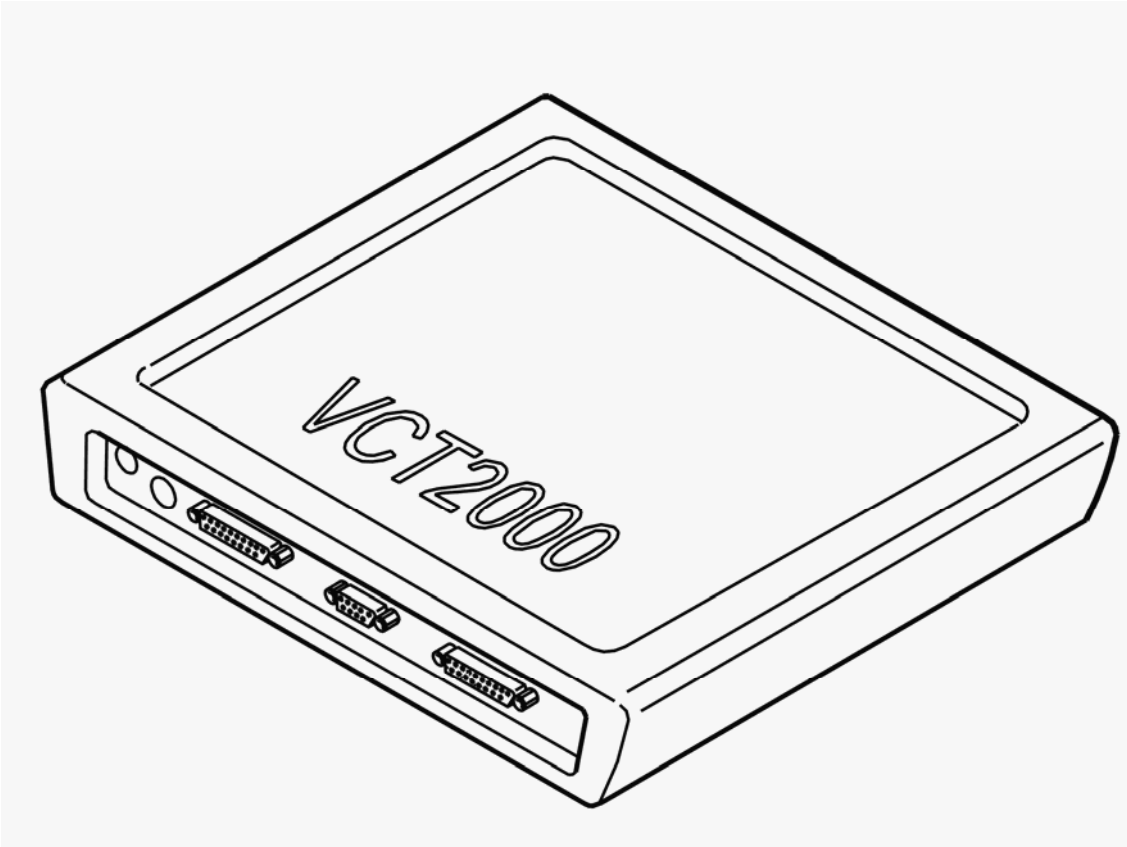


Fig. 23: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

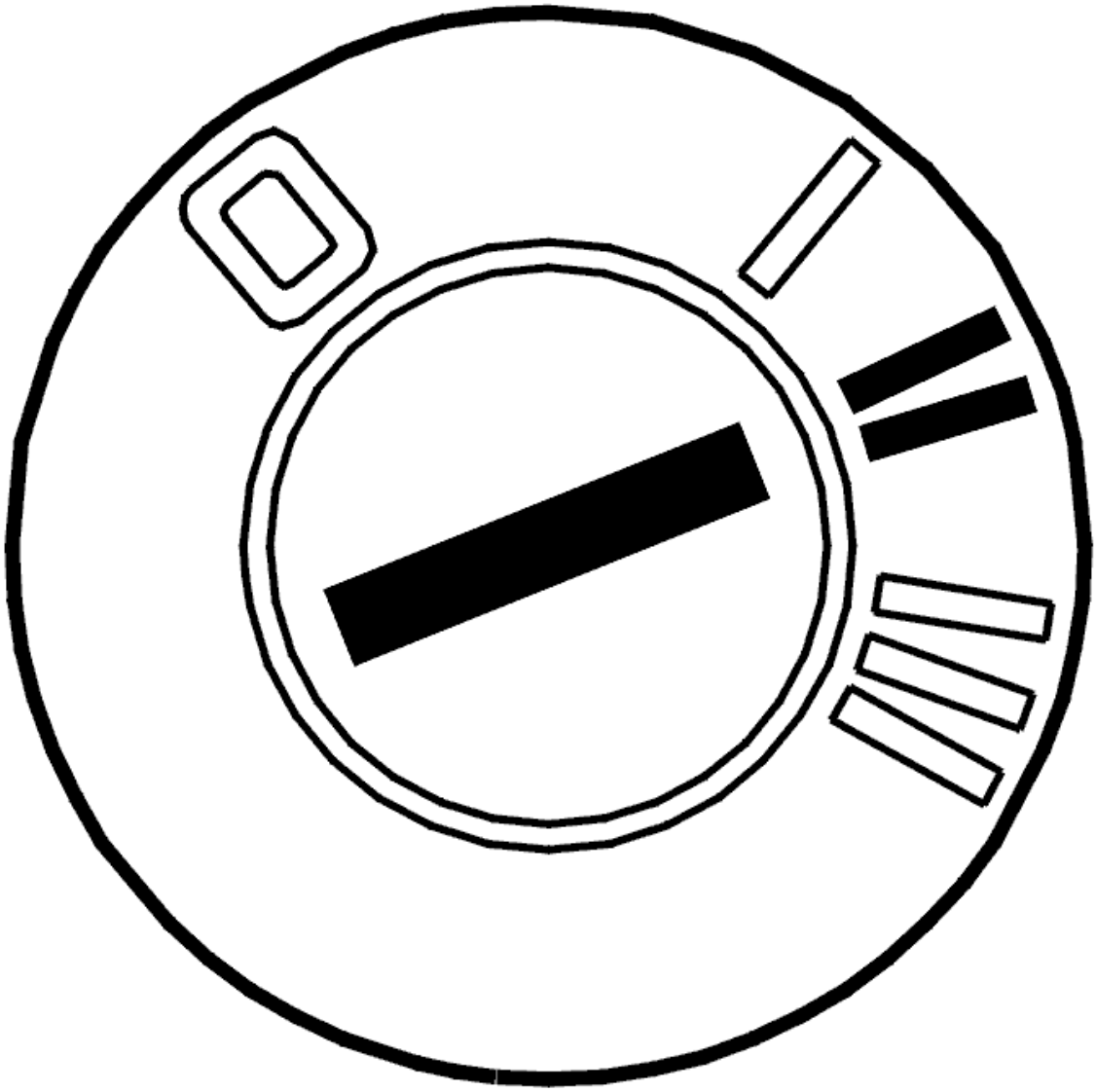


Fig. 24: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

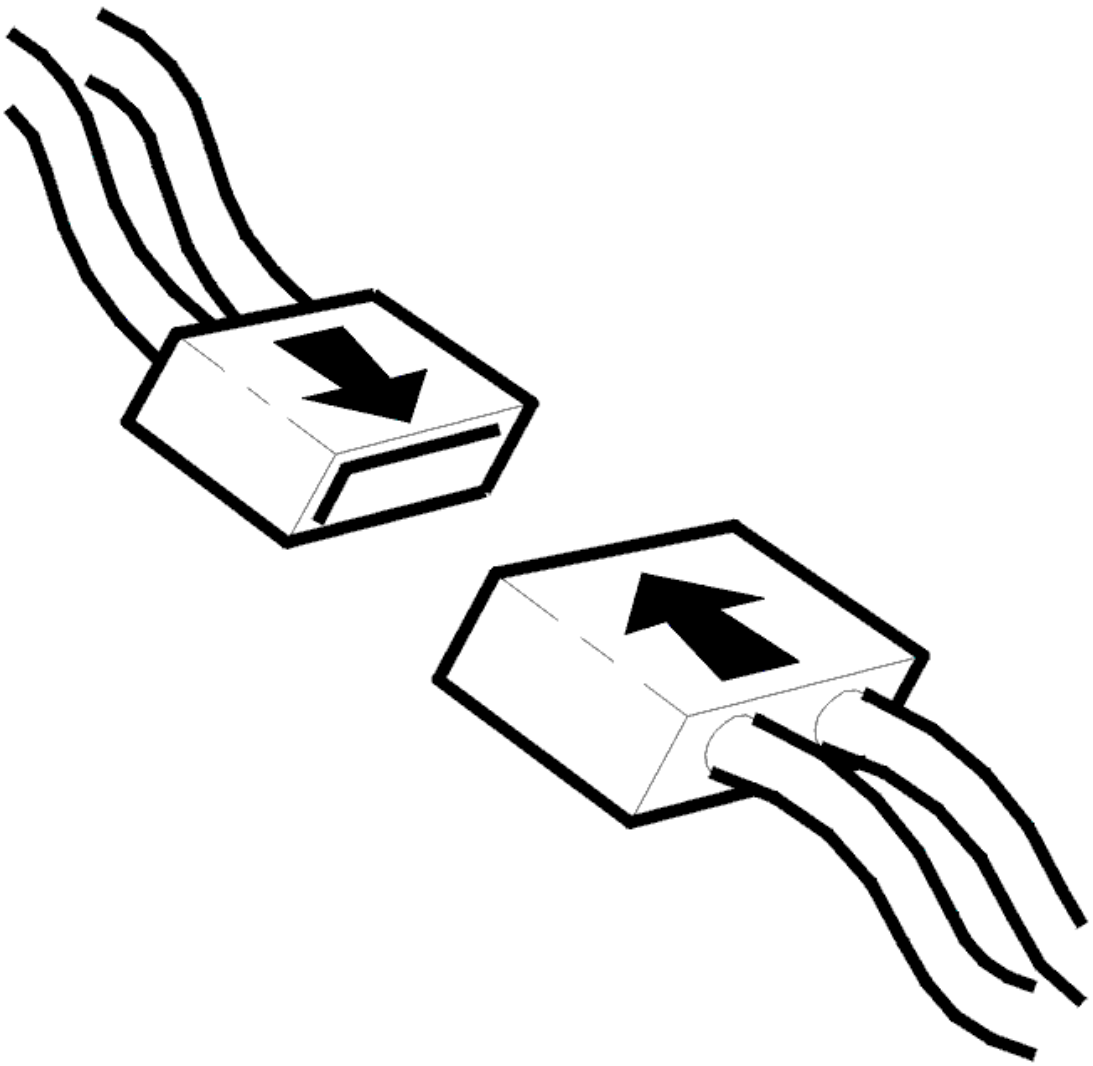


Fig. 25: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Wait at least 90 seconds.
- Reconnect the connectors, reinstall components etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S1.

The value should change between OFF and ON.

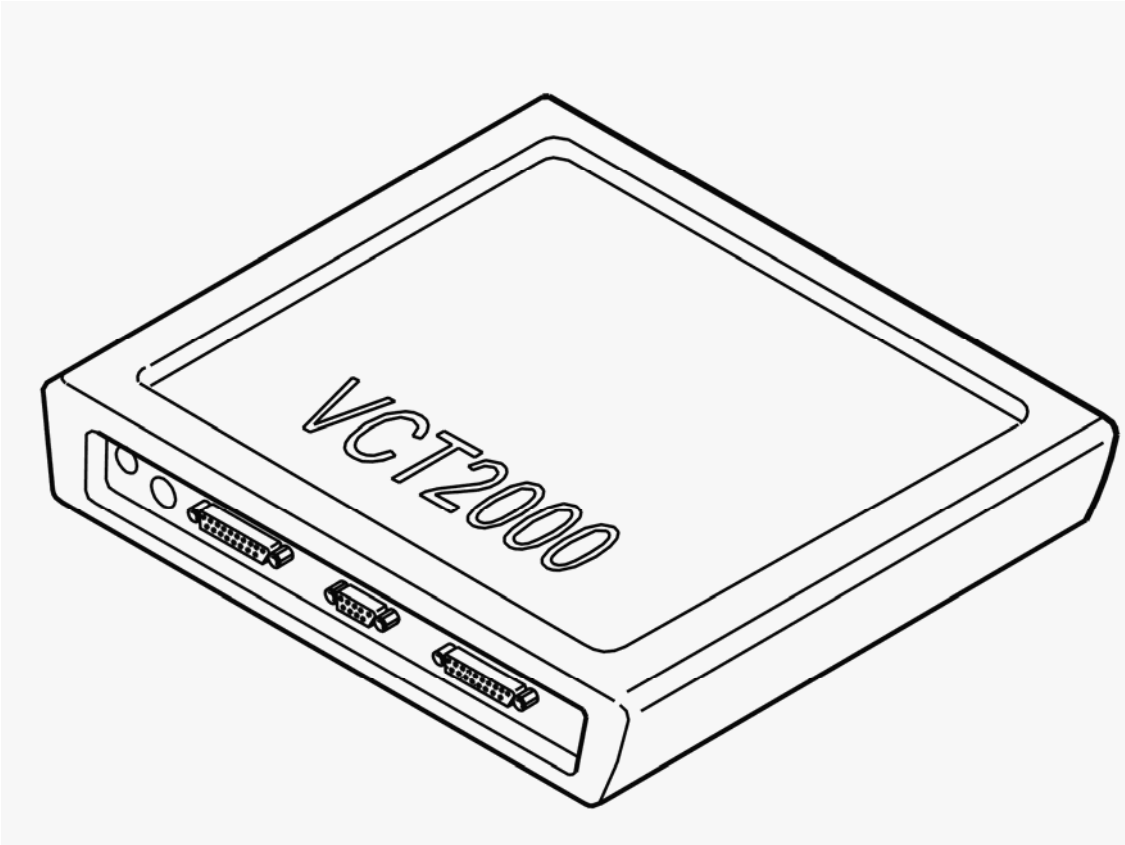


Fig. 26: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

SIGNAL TOO HIGH

CHECKING THE FUNCTION OF THE OIL TEMPERATURE SENSOR

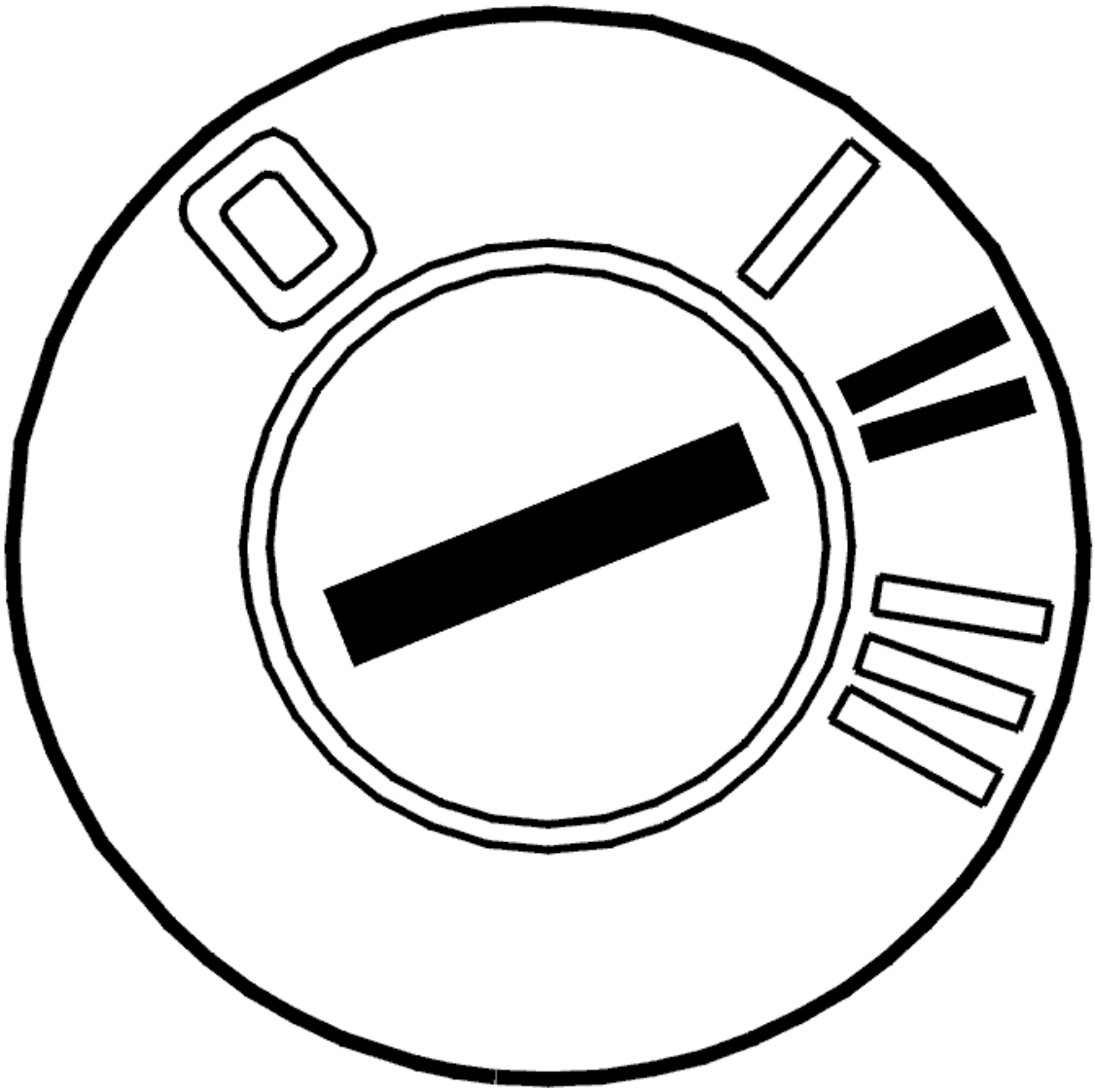


Fig. 27: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

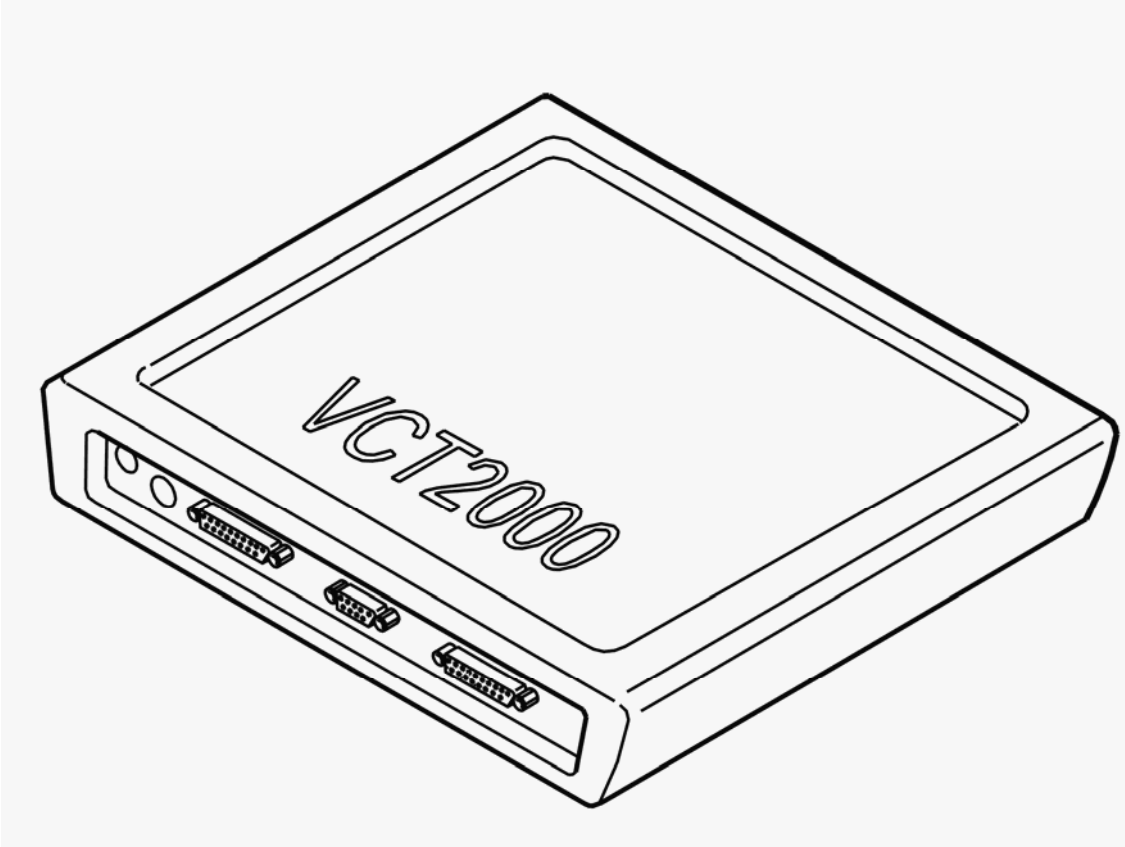


Fig. 28: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

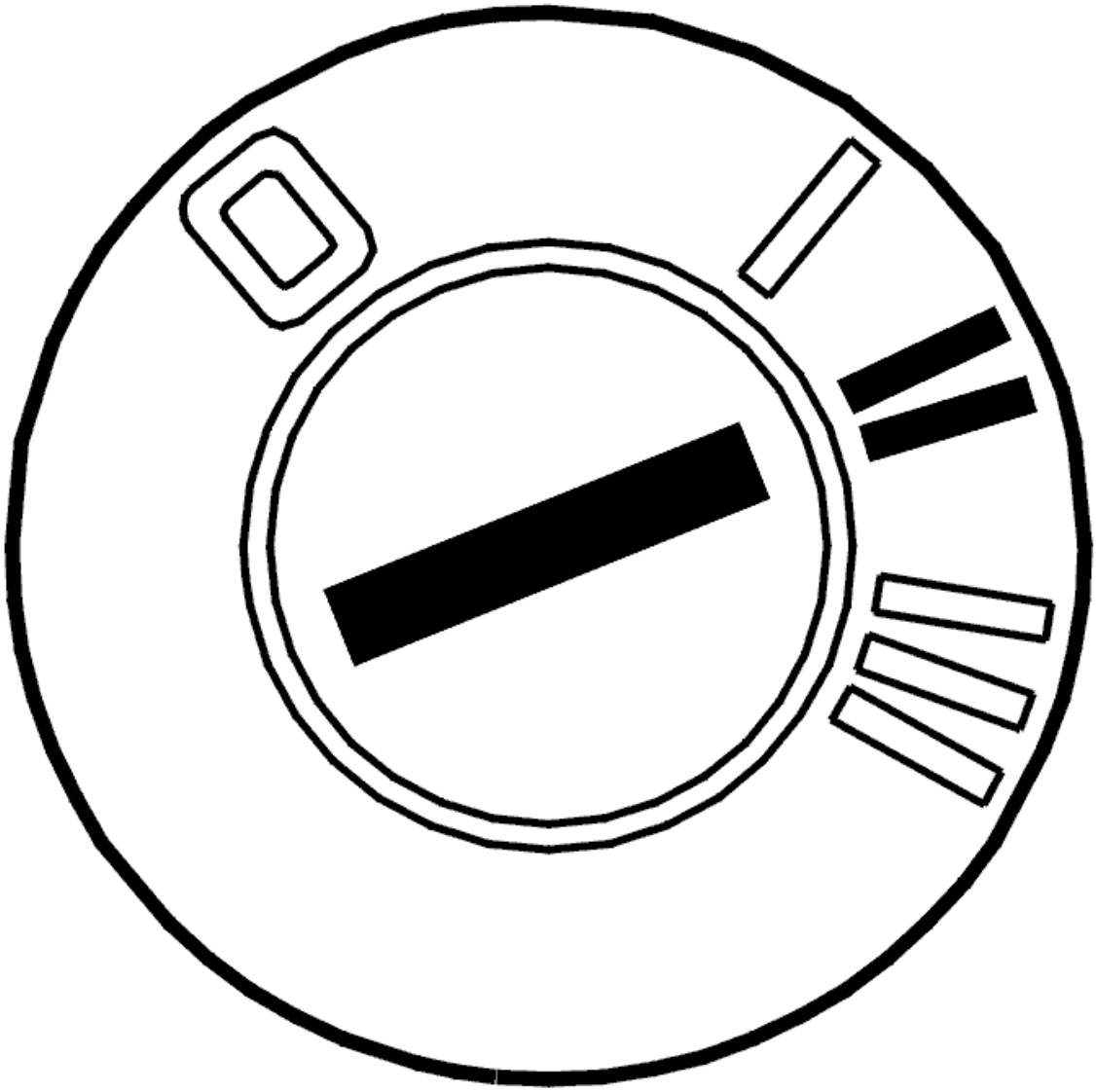


Fig. 29: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

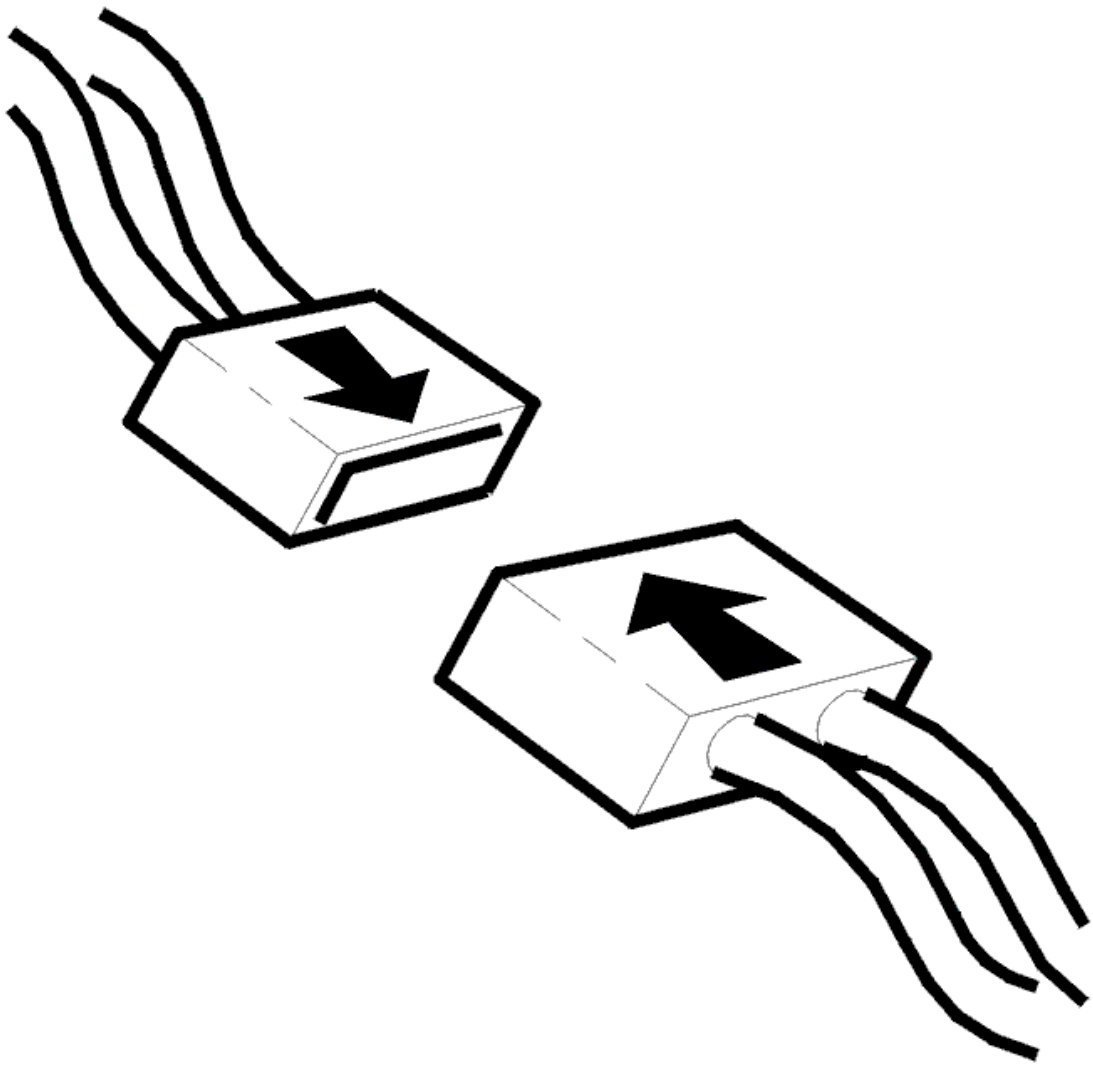


Fig. 30: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and transmission connectors. Check for contact resistance and oxidation
- Reconnect the control module and transmission connectors
- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

  If the transmission temperature is within its permitted range, the cause of the fault was contact resistance or oxidation in the control module or transmission connector.

Other information

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- see **CHECKING WIRING AND TERMINALS**

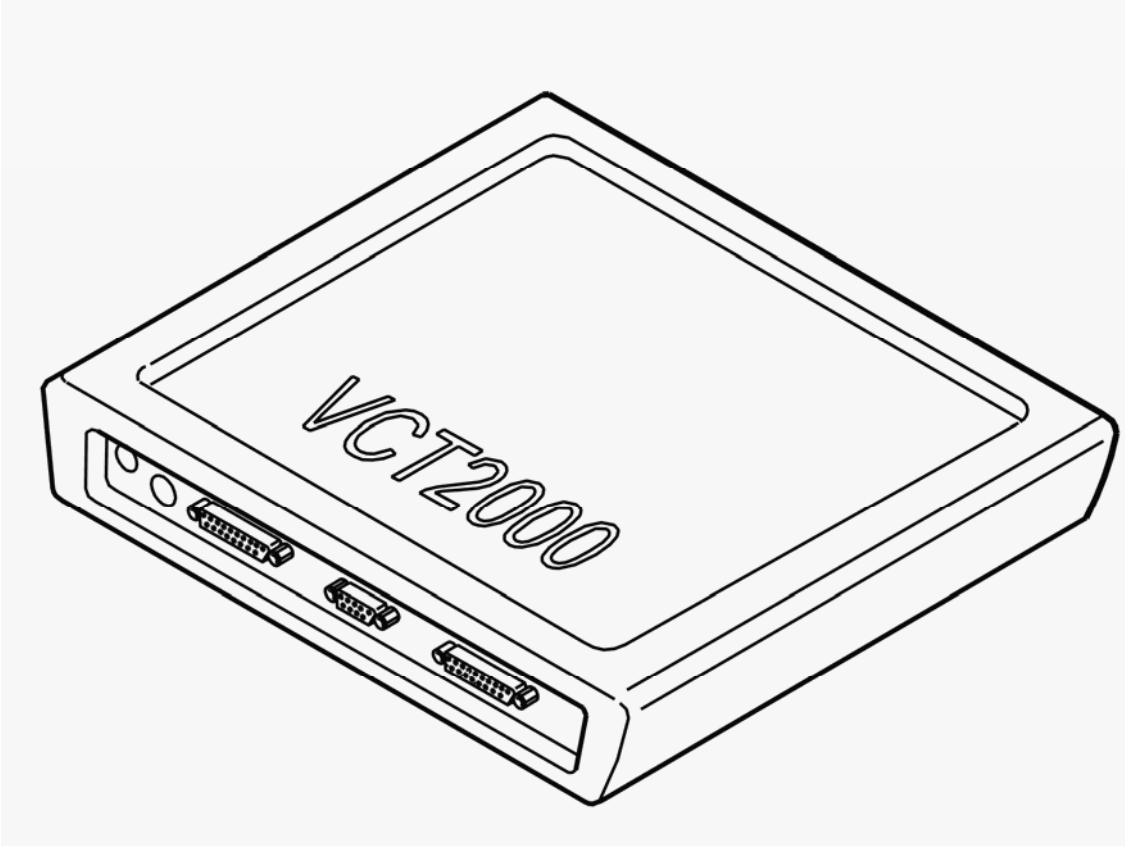


Fig. 31: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING THE TEMPERATURE SENSOR**

CHECKING THE TEMPERATURE SENSOR

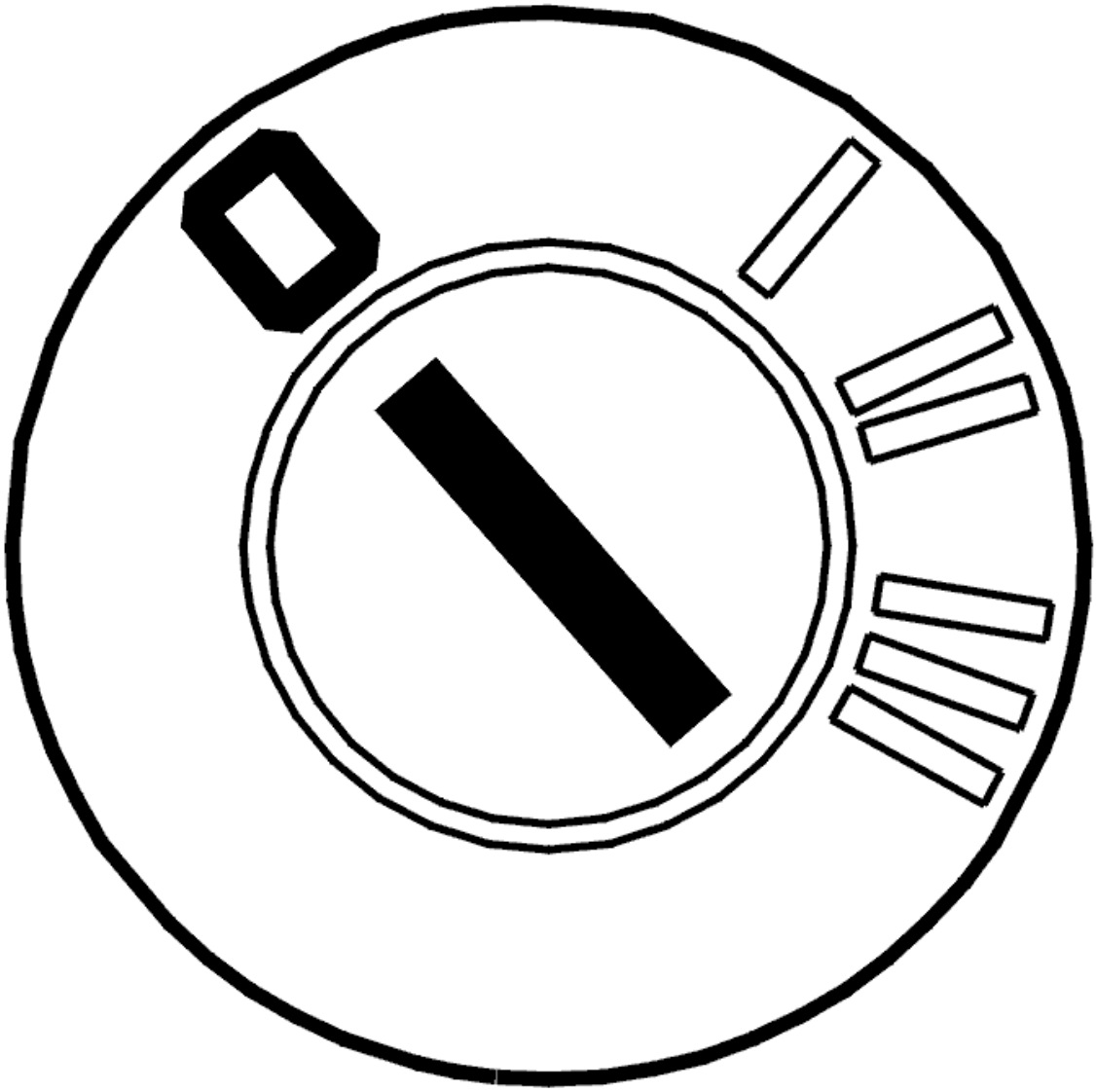


Fig. 32: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector
- Connect adapter see **9511505** and see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals #L (terminal #A11) and #M (terminal #A12).

  The resistance must be 3.4-3.6 kohms at 20 °C.

  Other information

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - For information about signals, see **SIGNAL SPECIFICATION**

- For information about the resistance values, see **COMPONENT RESISTANCE VALUES**

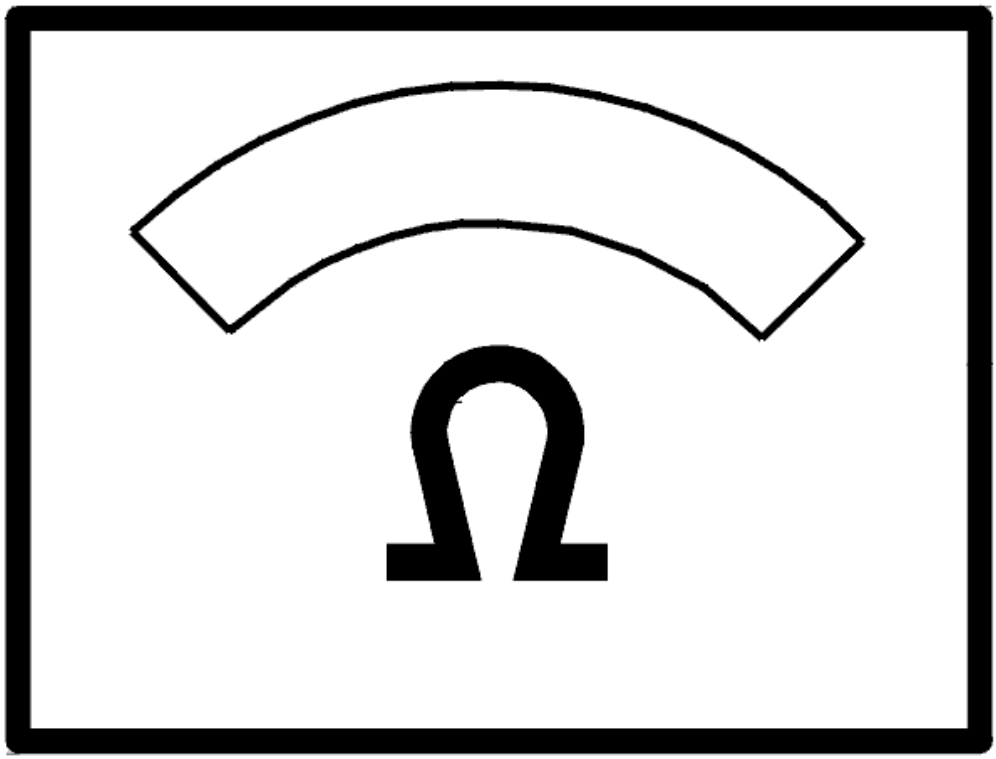


Fig. 33: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

- Breakout box connected to the control module
- Breakout box connected to the transmission connector.

Check the cable between control module terminal #37 (#A37) and transmission connector (control module side) terminal #L (#A11). Check for an open-circuit. Check for a short-circuit to supply voltage.

Check the cable between control module terminal #55 (#A55) and transmission connector (control module side) terminal #M (#A12). Check for an open-circuit. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

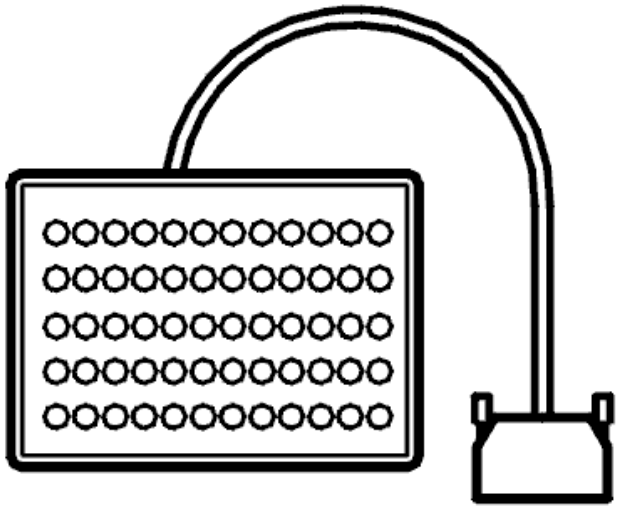


Fig. 34: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

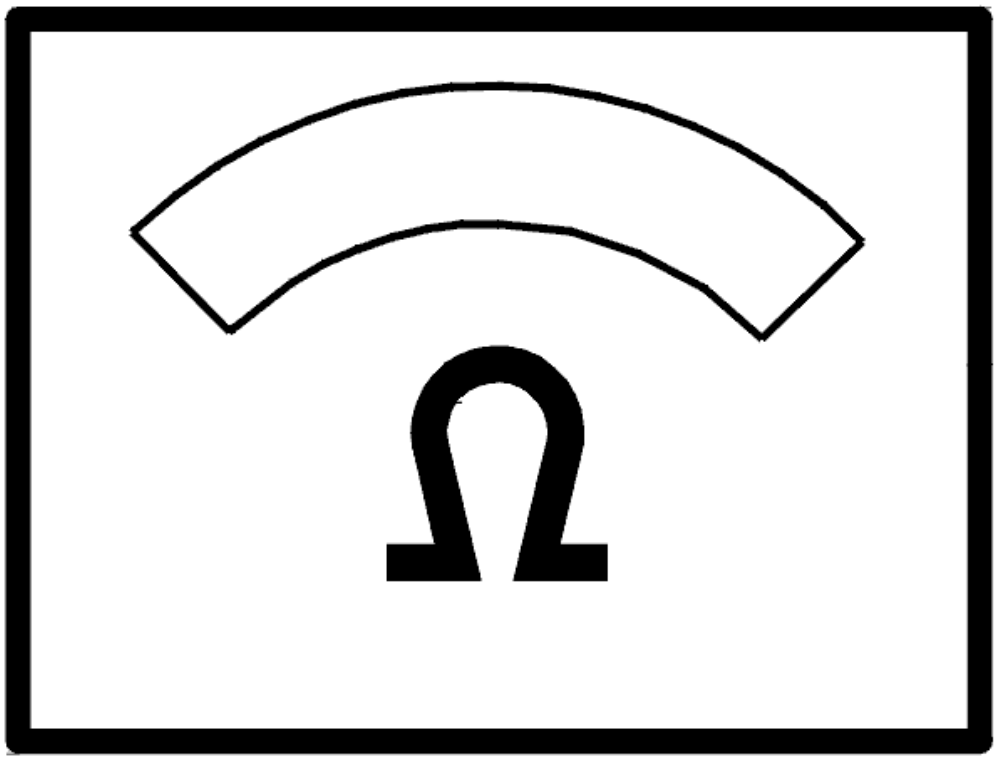


Fig. 35: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

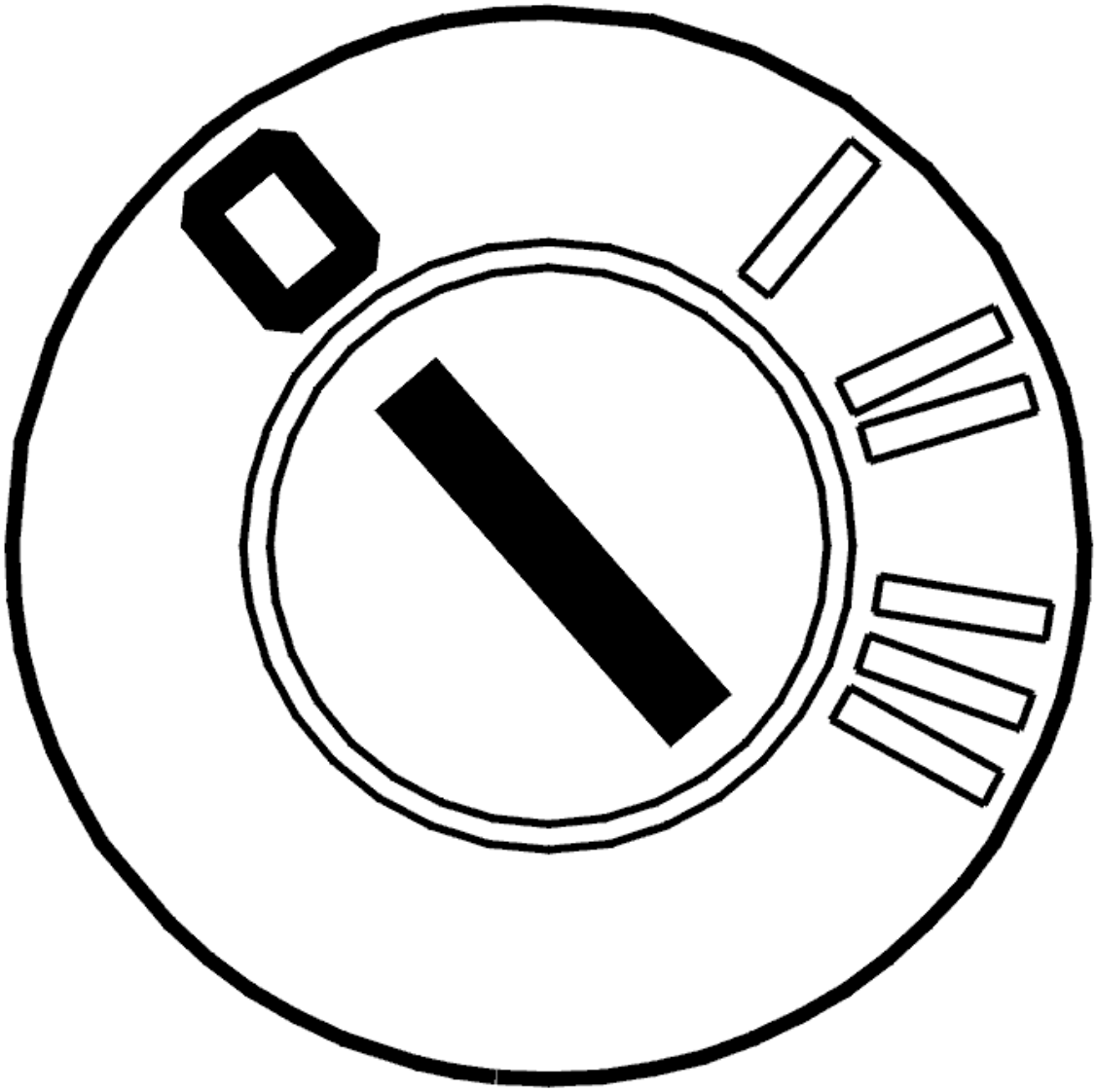


Fig. 36: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission terminal #L (#A11) and temperature sensor terminal #A. Check for an open-circuit. Check for a short-circuit to supply voltage.

  Check the cable between transmission terminal #M (#A12) and temperature sensor terminal #B. Check for an open-circuit. Check for a short-circuit to supply voltage.

  HINT: Check the temperature sensor by measuring the resistance between temperature sensor connector terminals #A and #B. The resistance must be between 3.5-3.6 kohms at 20° C.

  Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- To replace the temperature sensor, see **TEMPERATURE SENSOR FLUID TRANSMISSION, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES**
- see **CHECKING WIRING AND TERMINALS**

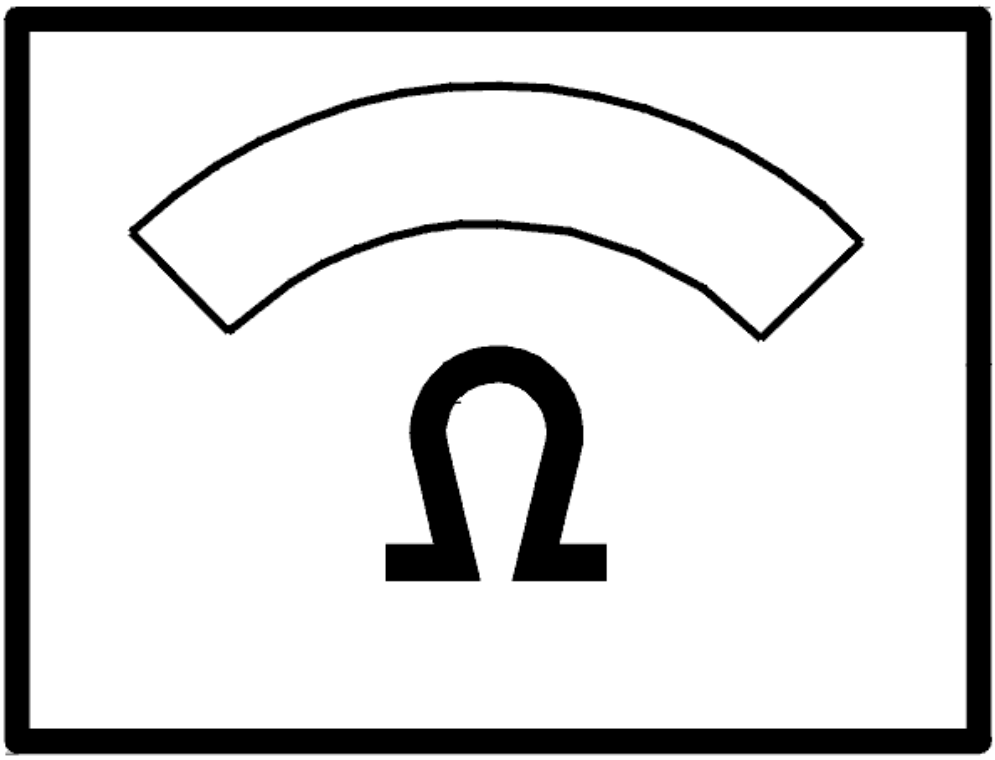


Fig. 37: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the control module and automatic transmission connector. Check for contact resistance and oxidation. Remedy if necessary.

Check the cable between control module terminal #A37 (#A37) and transmission connector (control module side) terminal #11. Check for an intermittent open-circuit. Check for an intermittent short-circuit to supply voltage.

Check the cable between control module terminal #A55 (#A55) and transmission connector (control module side) terminal #12. Check for an intermittent open-circuit. Check for an intermittent short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

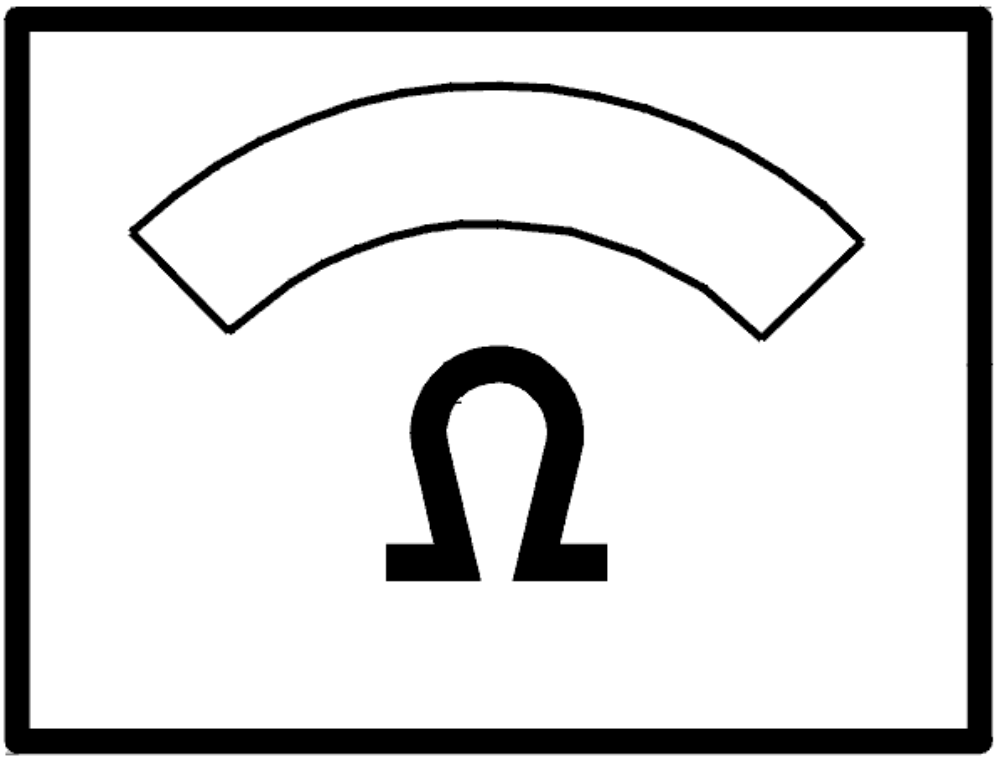


Fig. 38: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

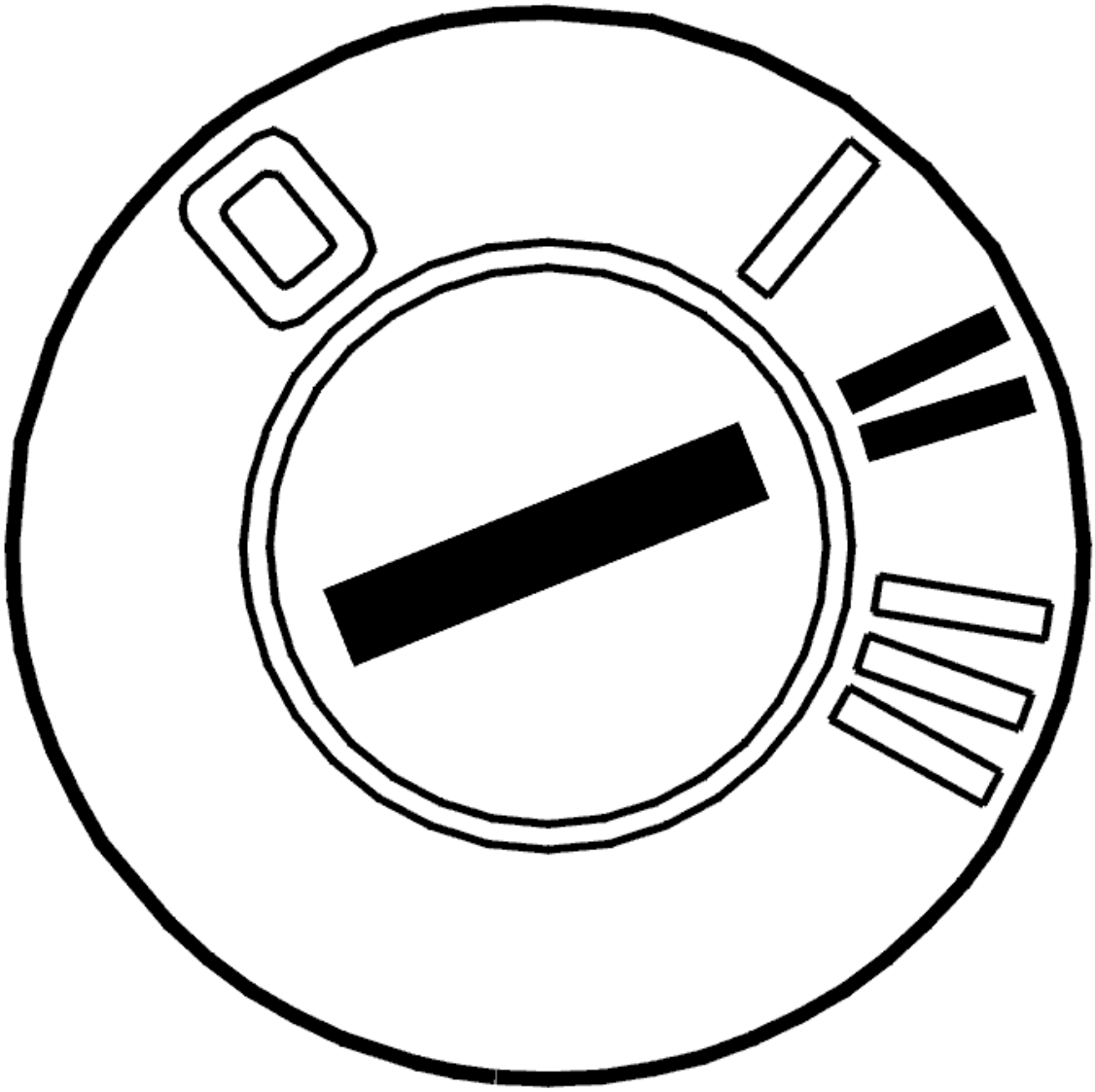


Fig. 39: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

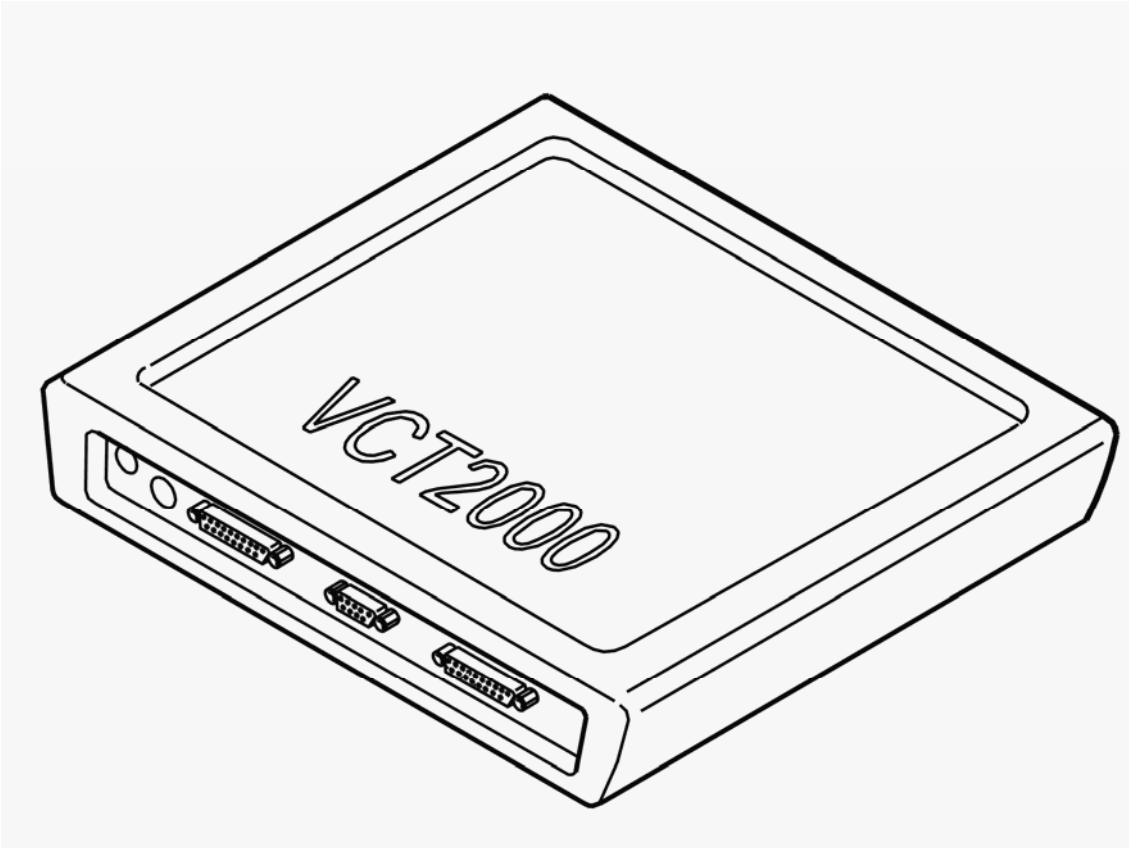


Fig. 40: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair check that the fault has been remedied.

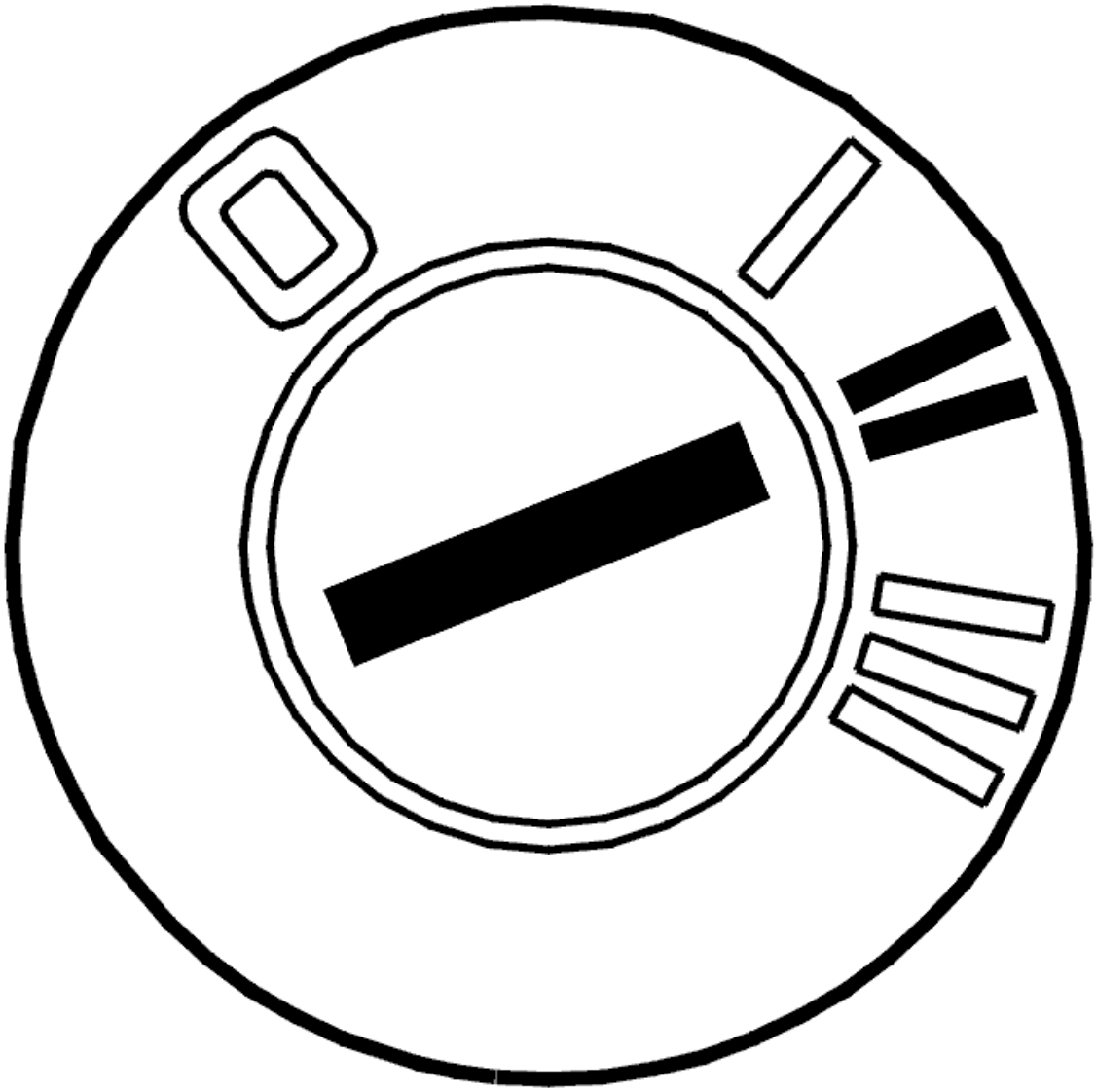


Fig. 41: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

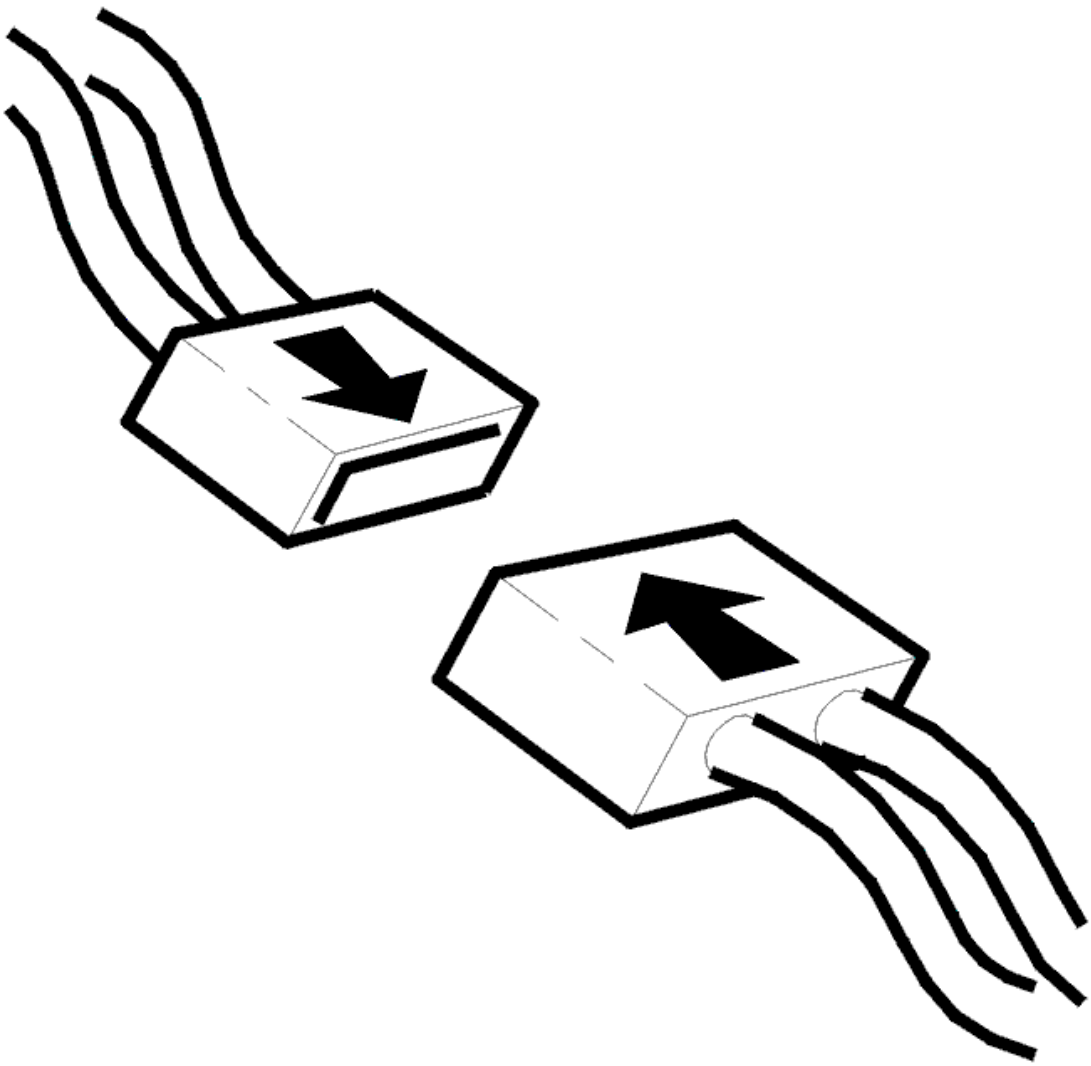


Fig. 42: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.
- Read off oil temperature.

  Check that the transmission oil temperature is within its permitted range. Compare with the transmission temperature.

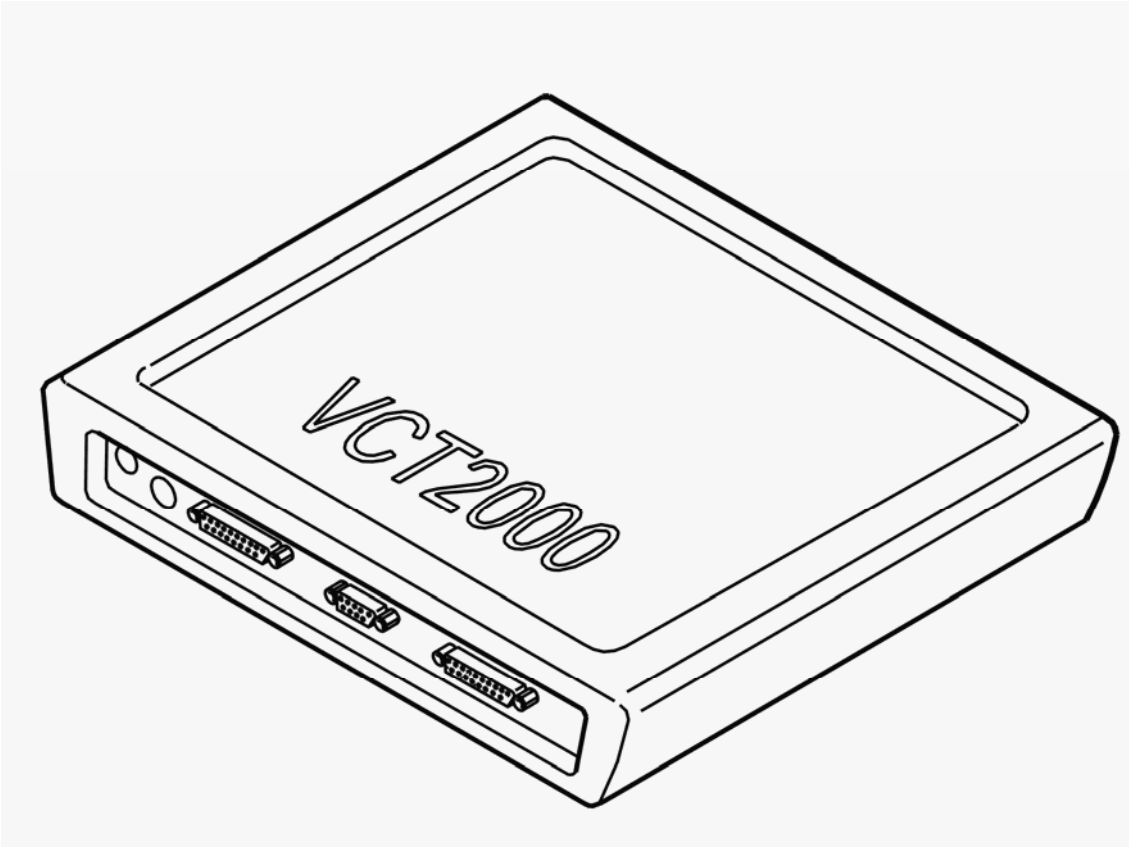


Fig. 43: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-0001: SHIFT SOLENOID S1. SIGNAL TOO HIGH (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

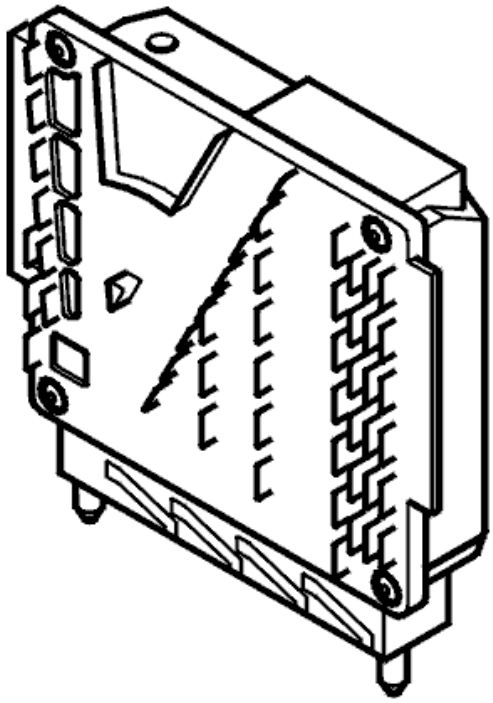


Fig. 44: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0001, TCM-0007, TCM-0101 TCM-0107 or TCM-010A are stored (depending on the solenoid) if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is too high when the solenoid should not be activated.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Short-circuit to supply voltage in the signal cable.
- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.

- Harsh gear shifting.
- No shifting.
- No lock-up function.

SIGNAL TOO HIGH

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

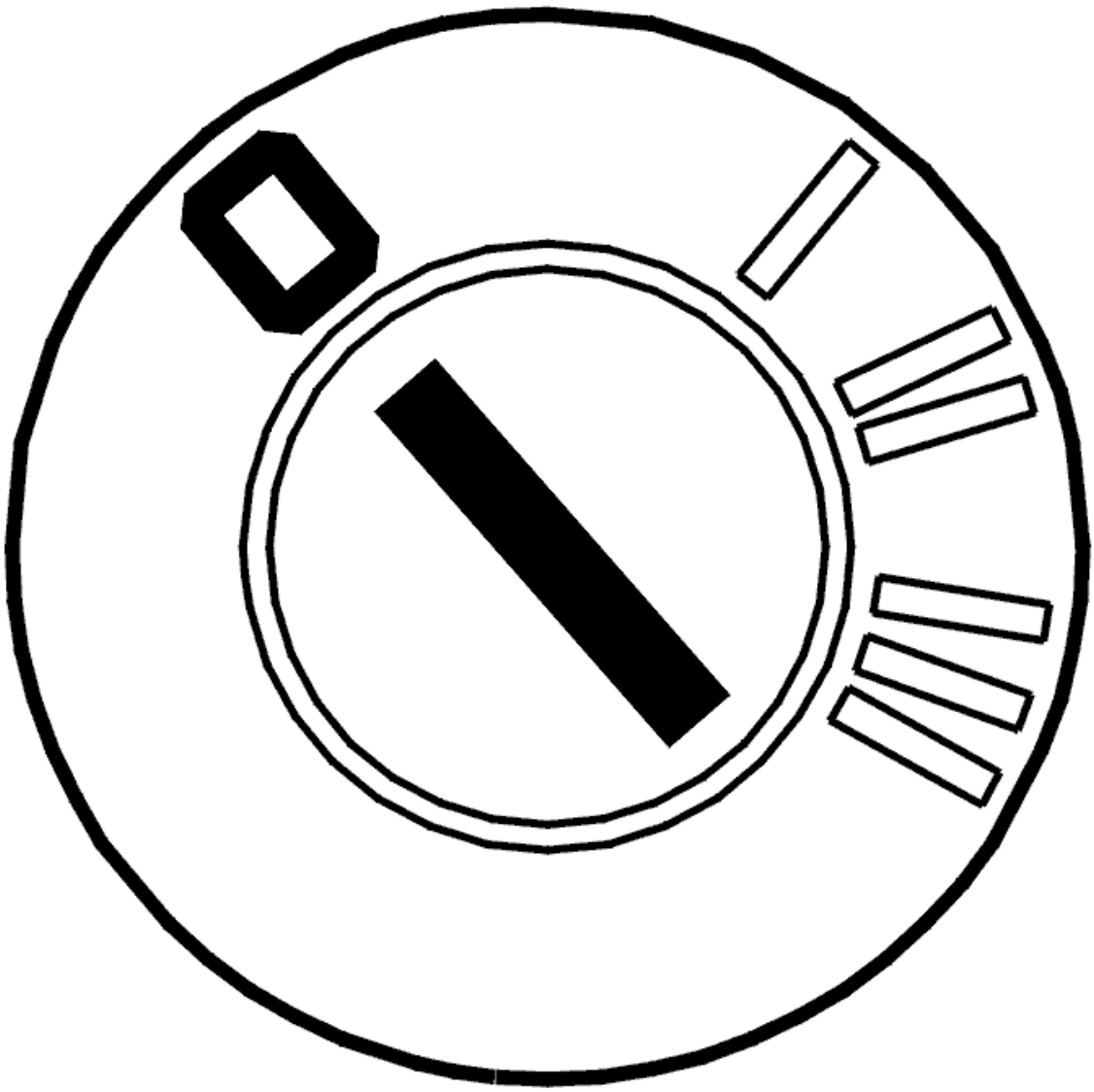


Fig. 45: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

NOTE: If the temperature is outside its permitted range, fault-trace the temperature sensor.

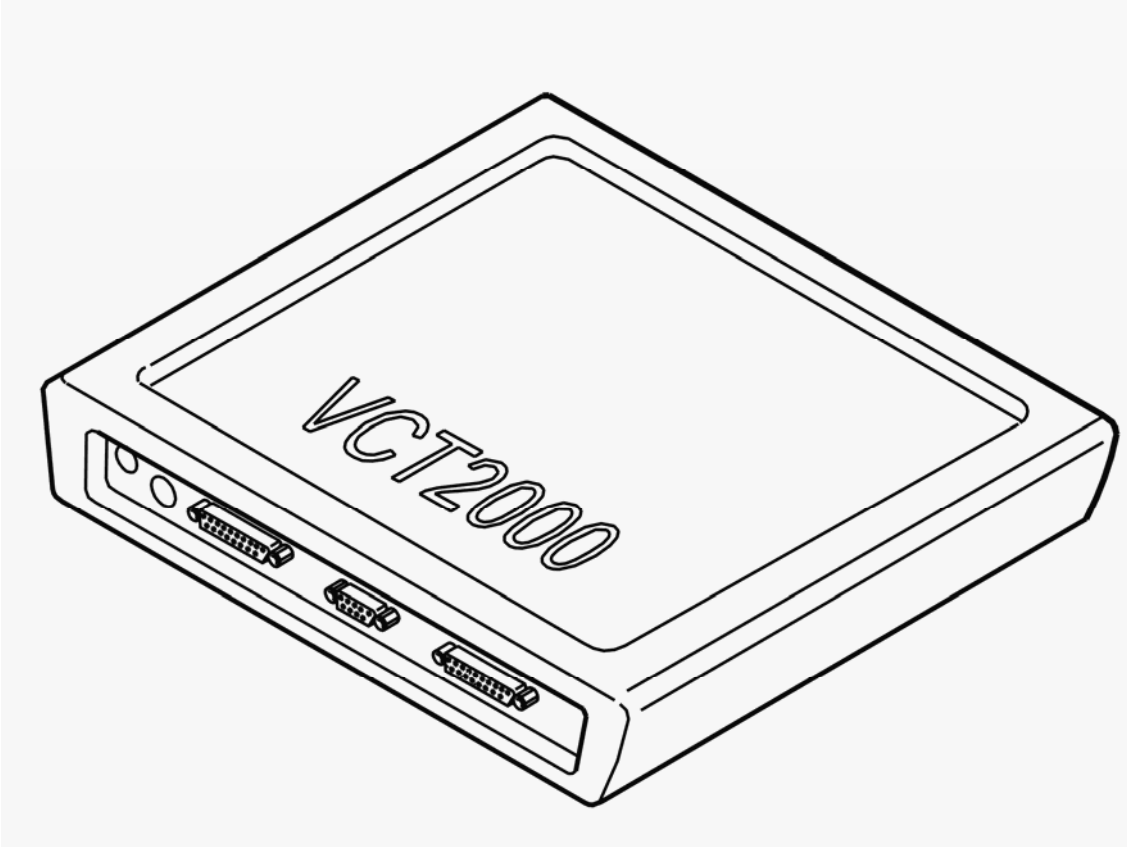


Fig. 46: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S1**

- **NO**

  Refer to **FAULTY SIGNAL**

CHECKING SHIFT SOLENOID S1

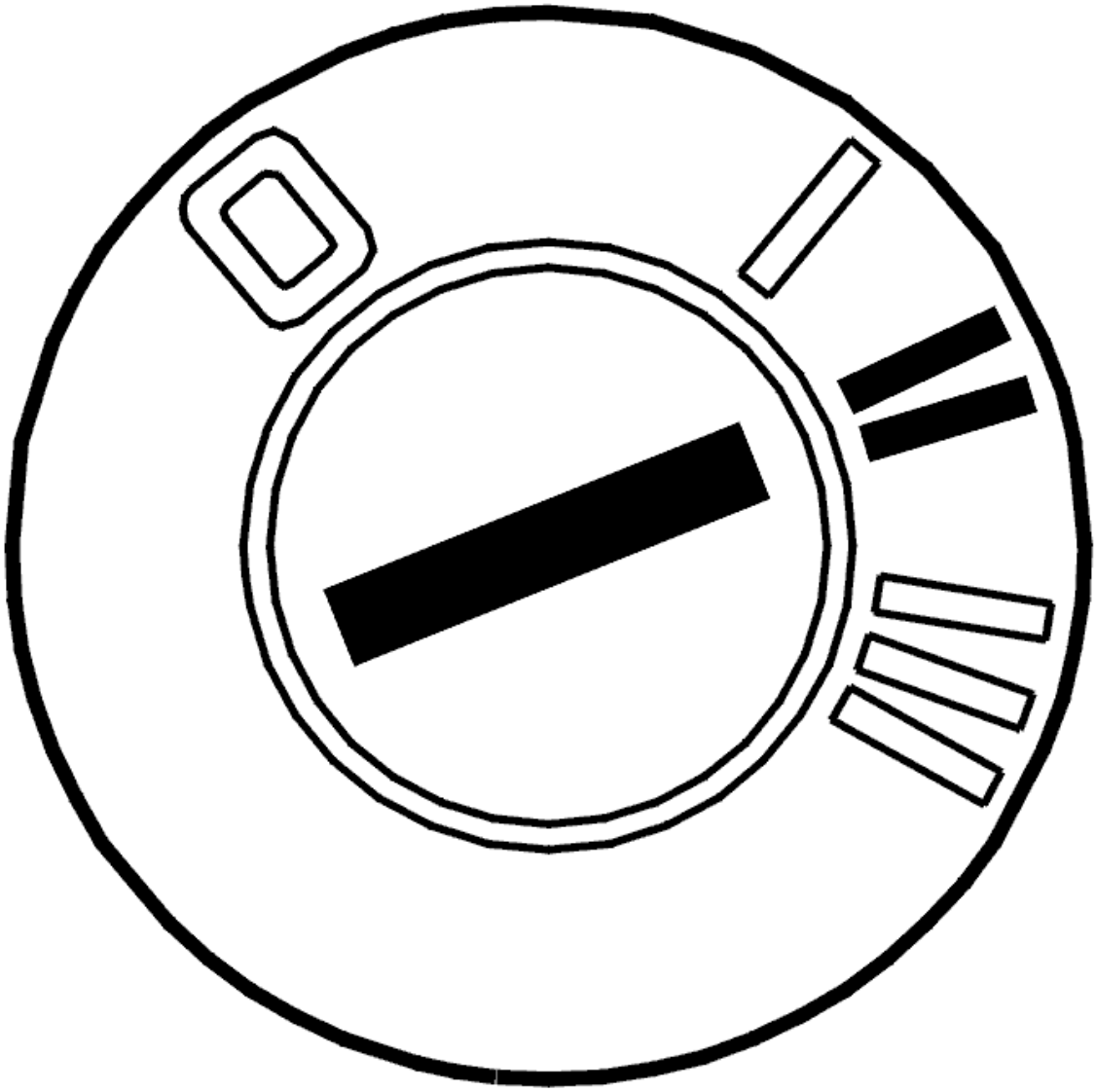


Fig. 47: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S1.

  The value must change between OFF and ON.

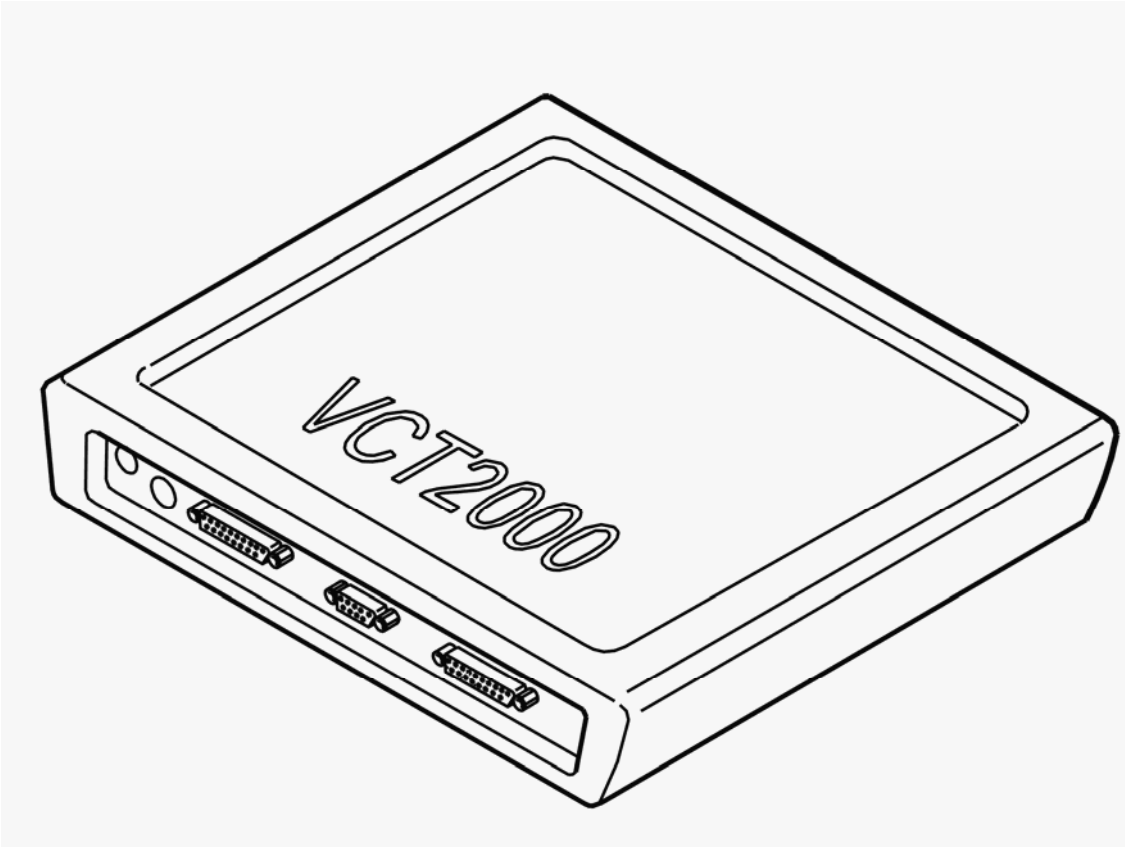


Fig. 48: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

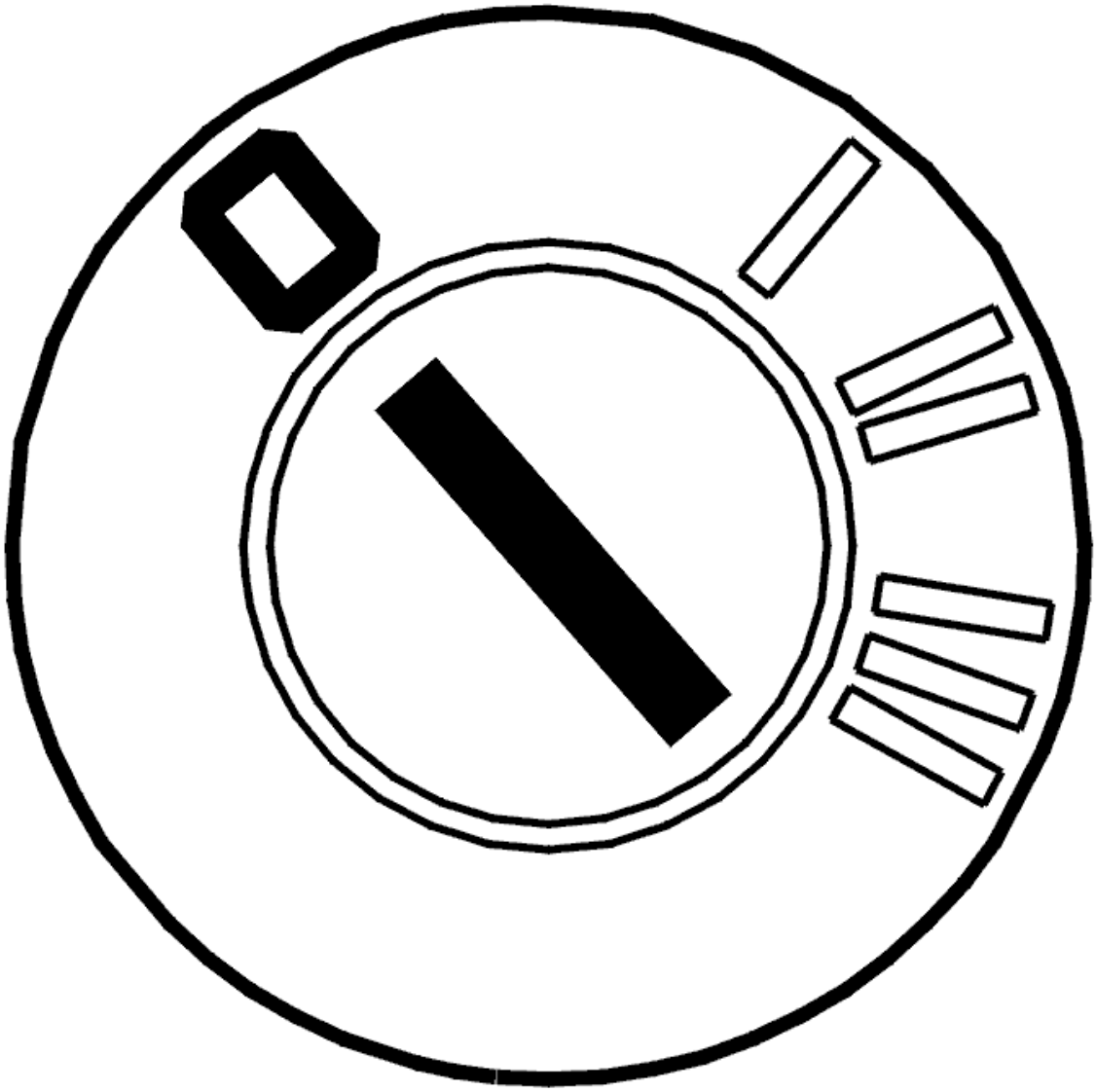


Fig. 49: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

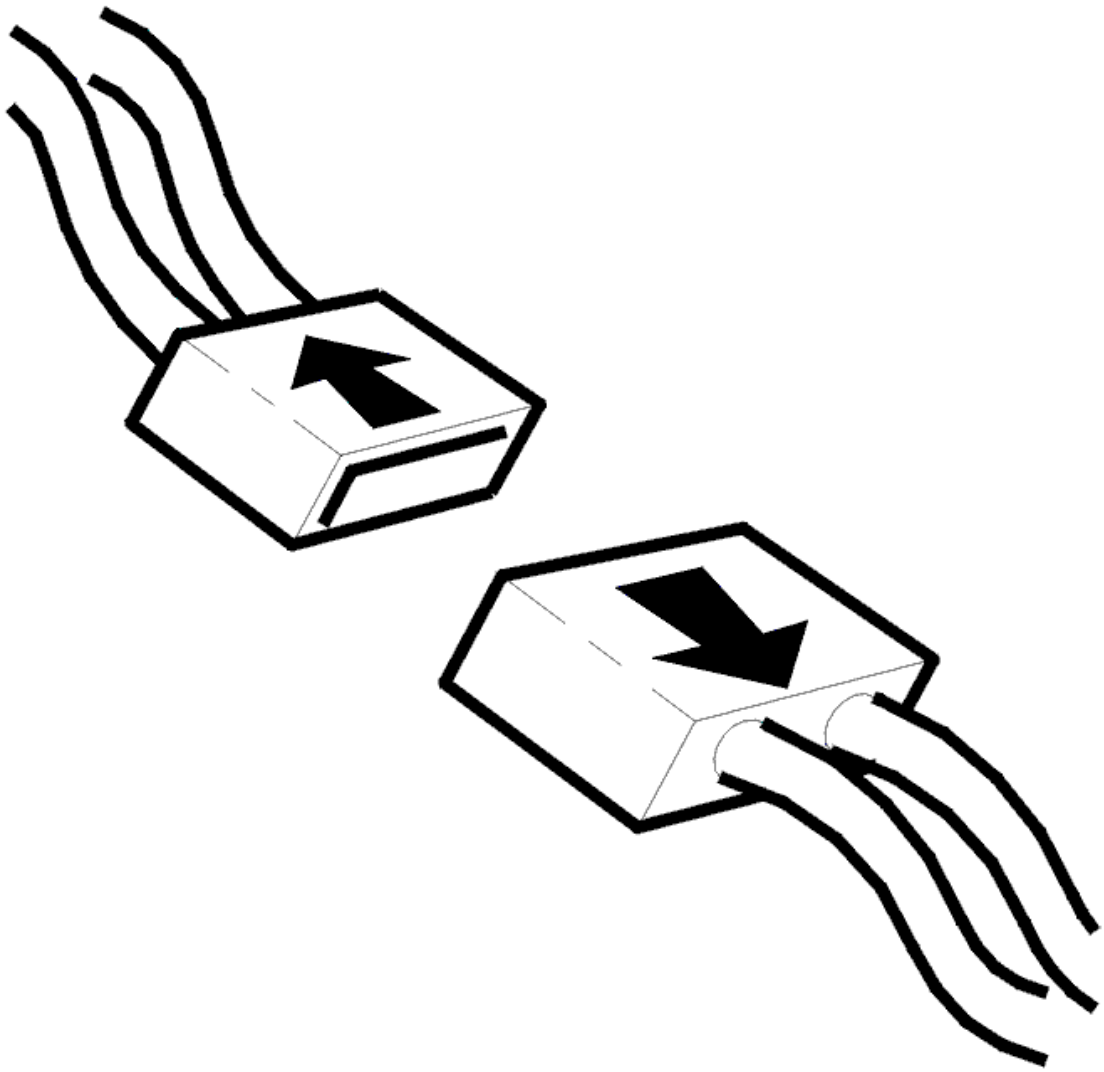


Fig. 50: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect transmission connector C.

Check the cable between control module terminal #A50 (#A50) and transmission connector terminal #C1 (control module side). Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** . Also check against the other cables in the circuit.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**

- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

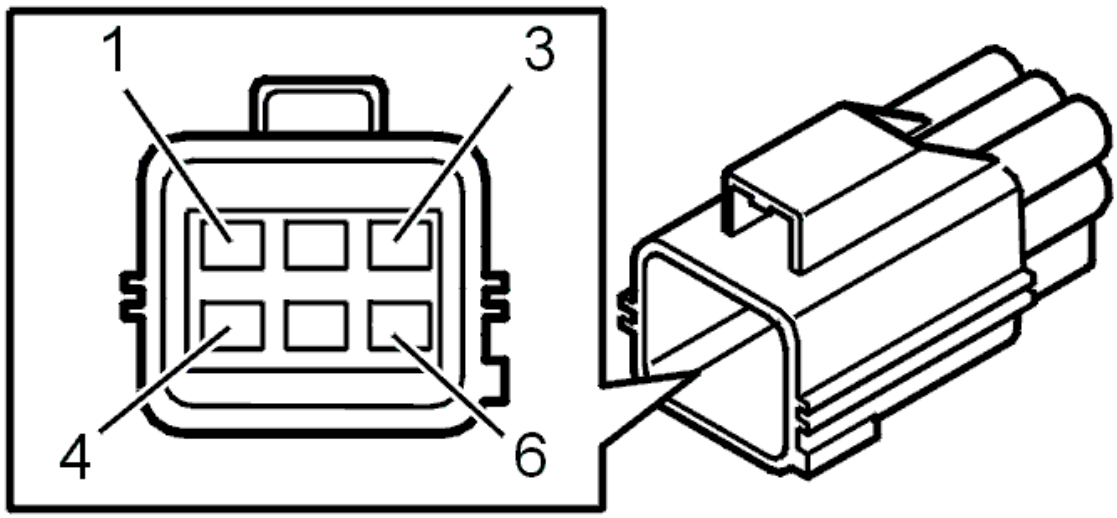


Fig. 51: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

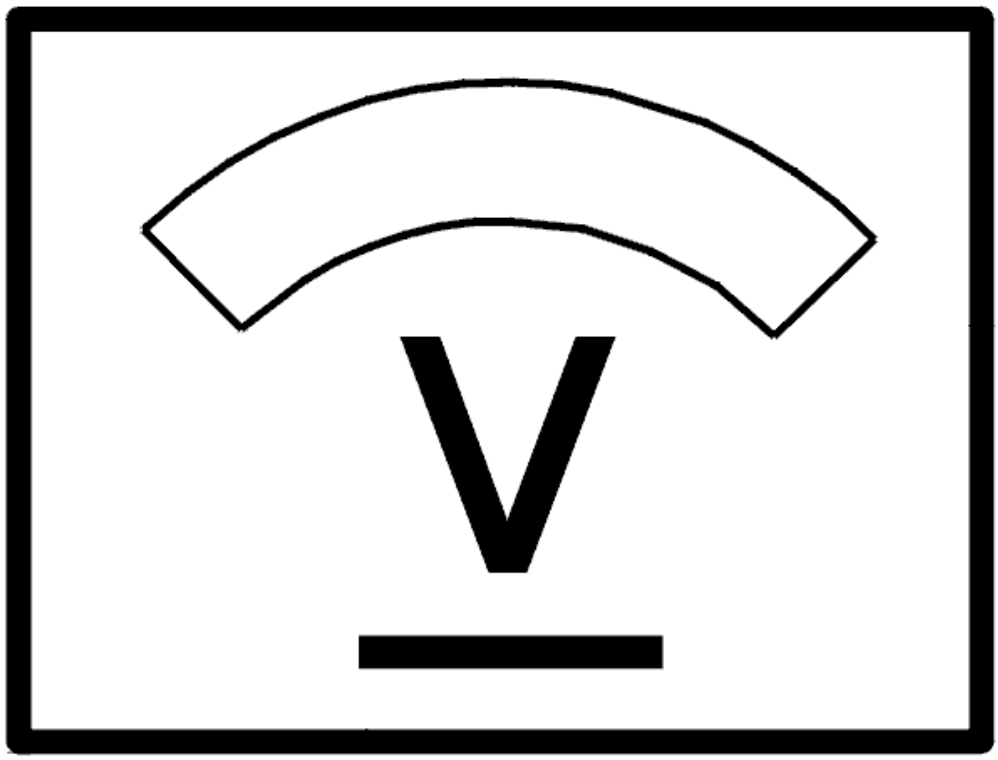


Fig. 52: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

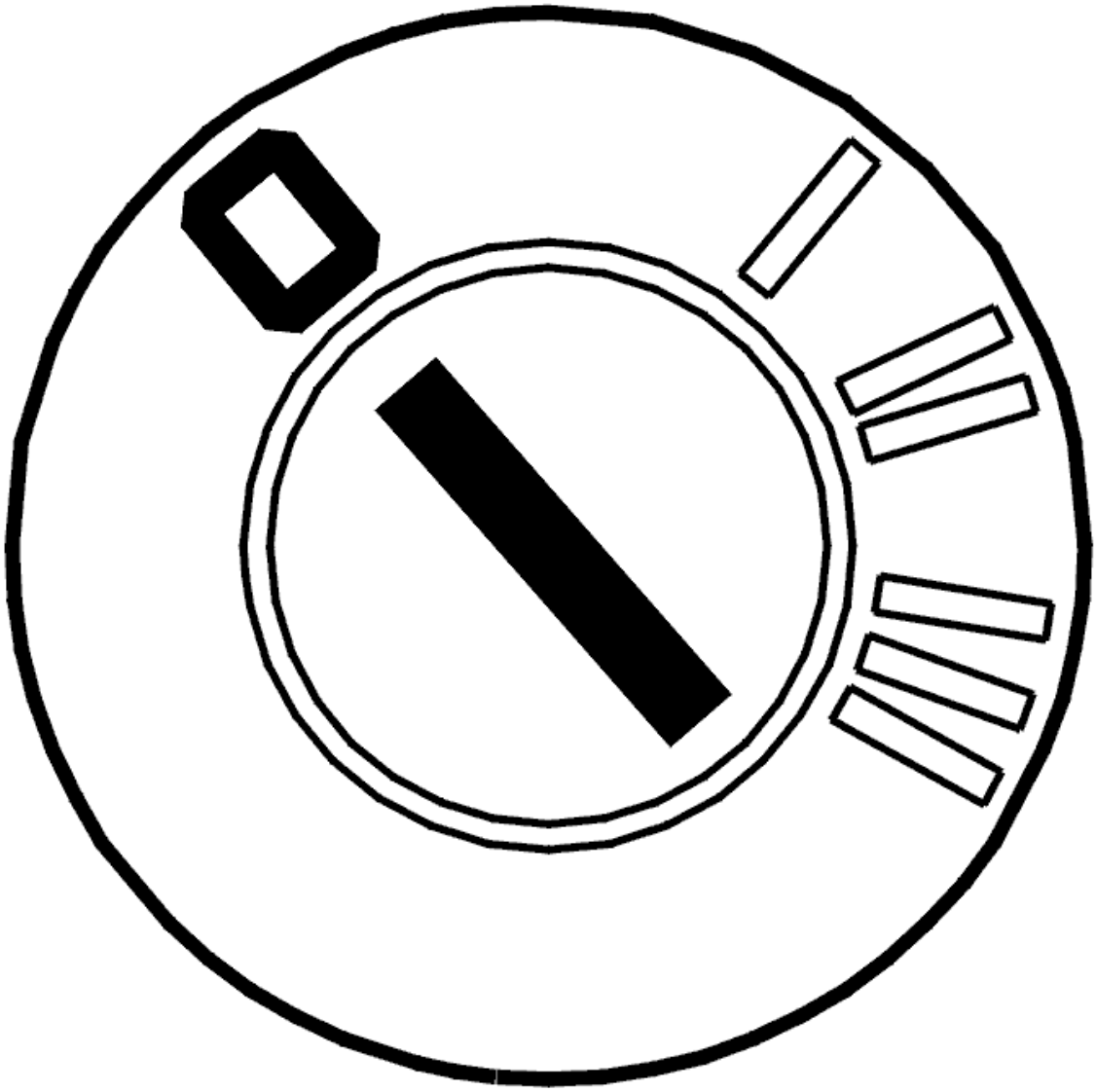


Fig. 53: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C1 (transmission side) and the connector for solenoid S1. Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** . Also check against the other cables in the circuit.

Replace solenoid S1 if no faults are found in the cable.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- To open the control system and to check or replace solenoid S1, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

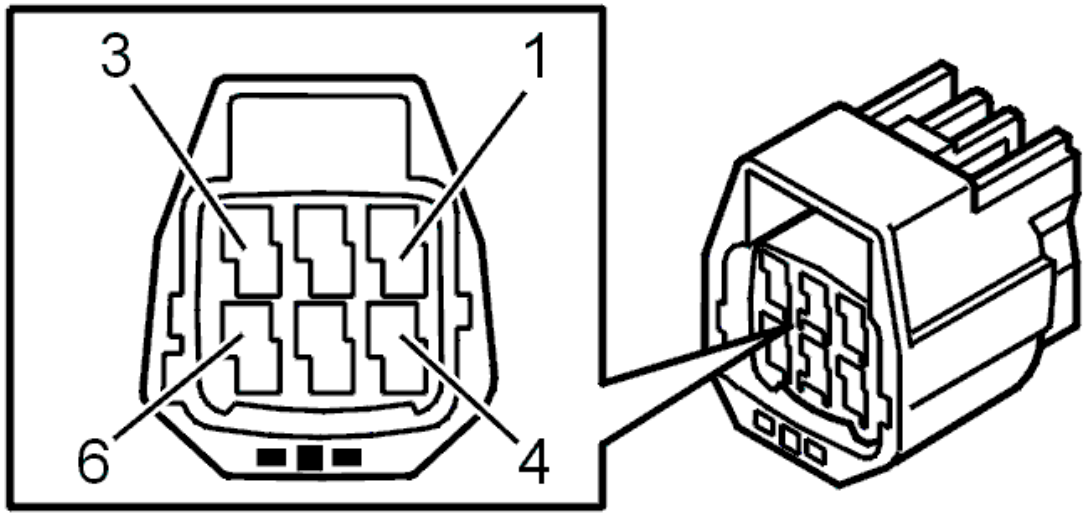


Fig. 54: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

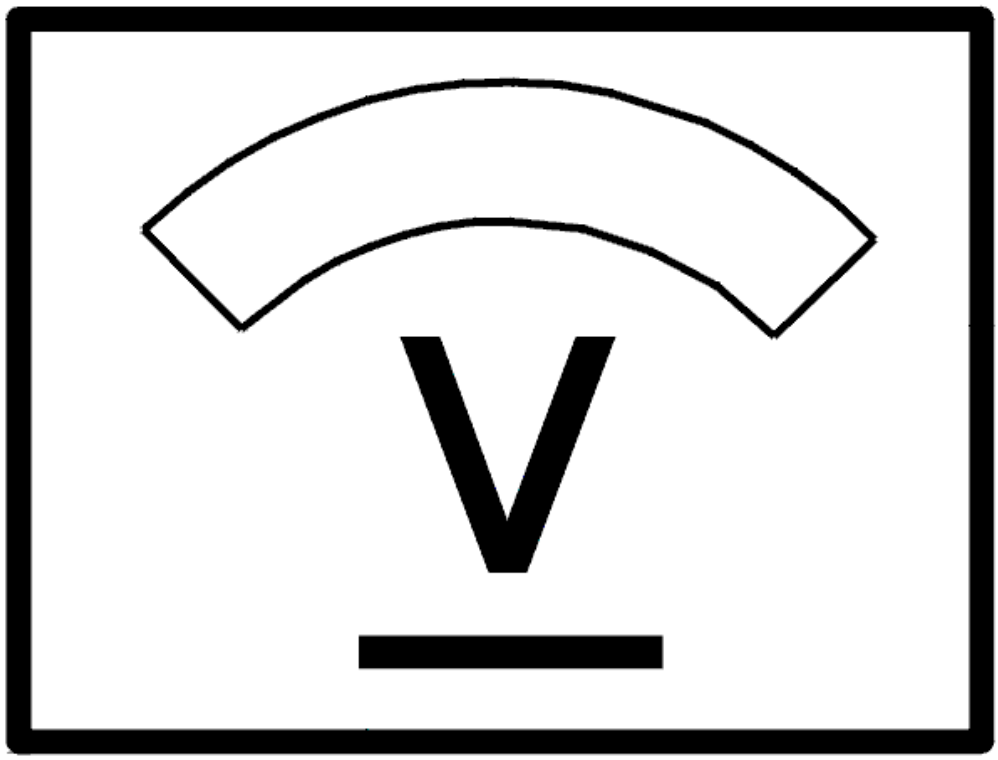


Fig. 55: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the cable between control module terminal #A50 (#A50)and transmission connector terminal #C1. Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

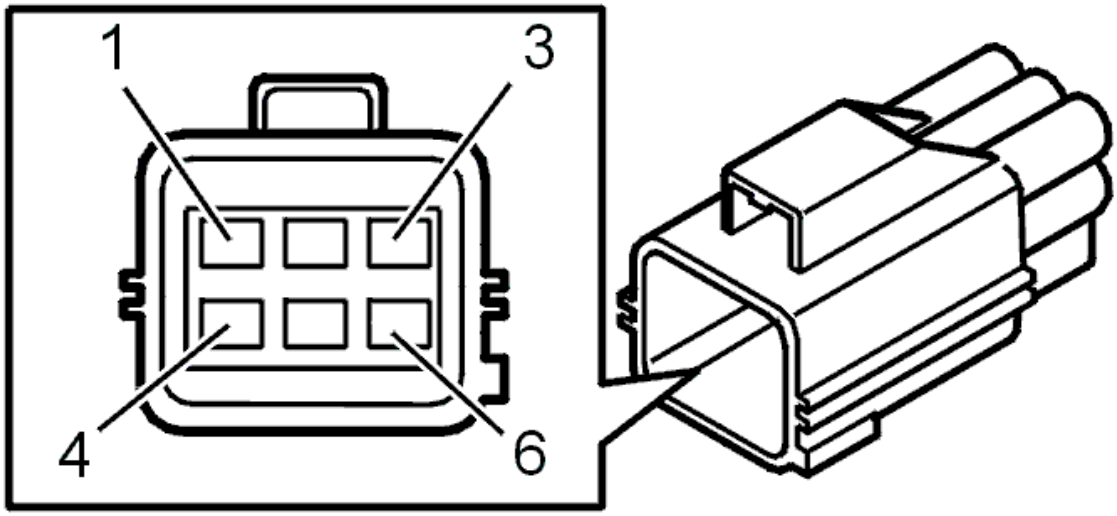


Fig. 56: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

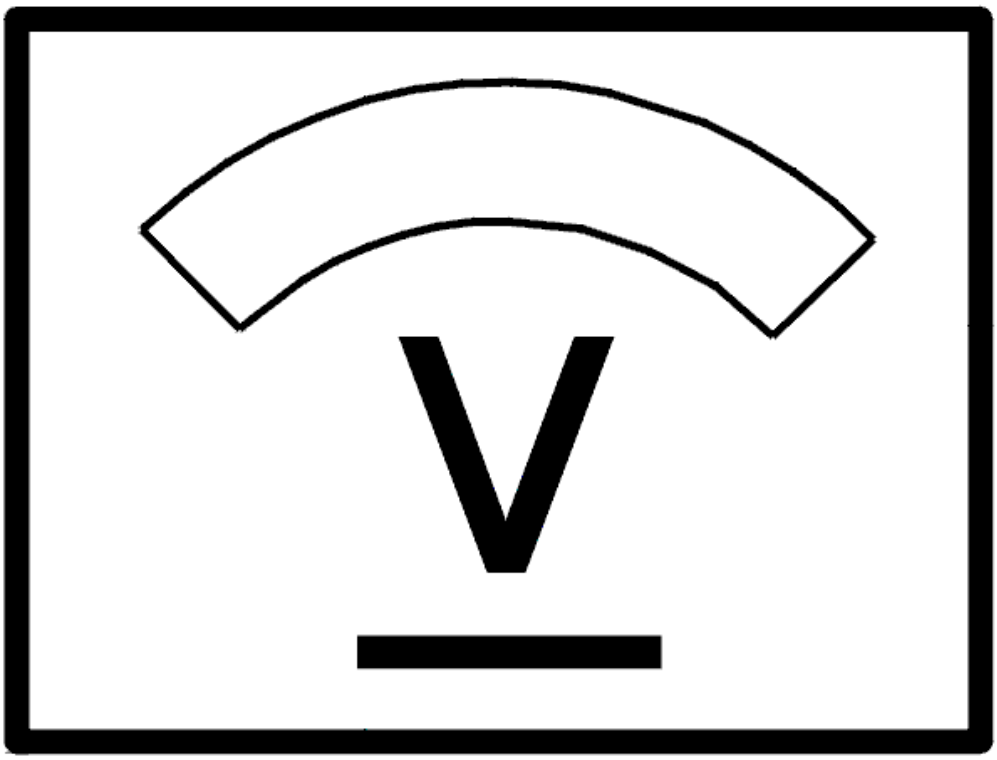


Fig. 57: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

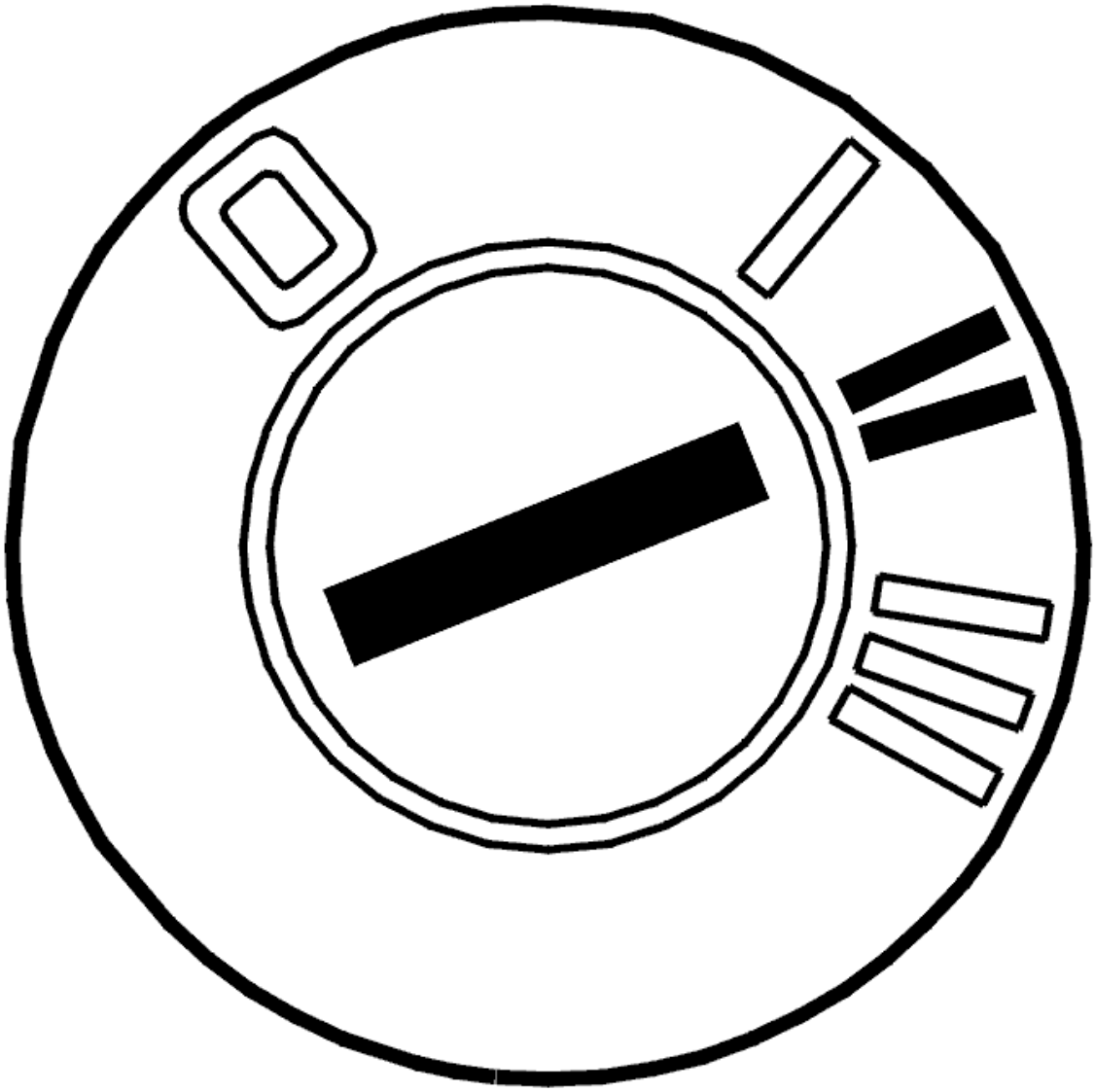


Fig. 58: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

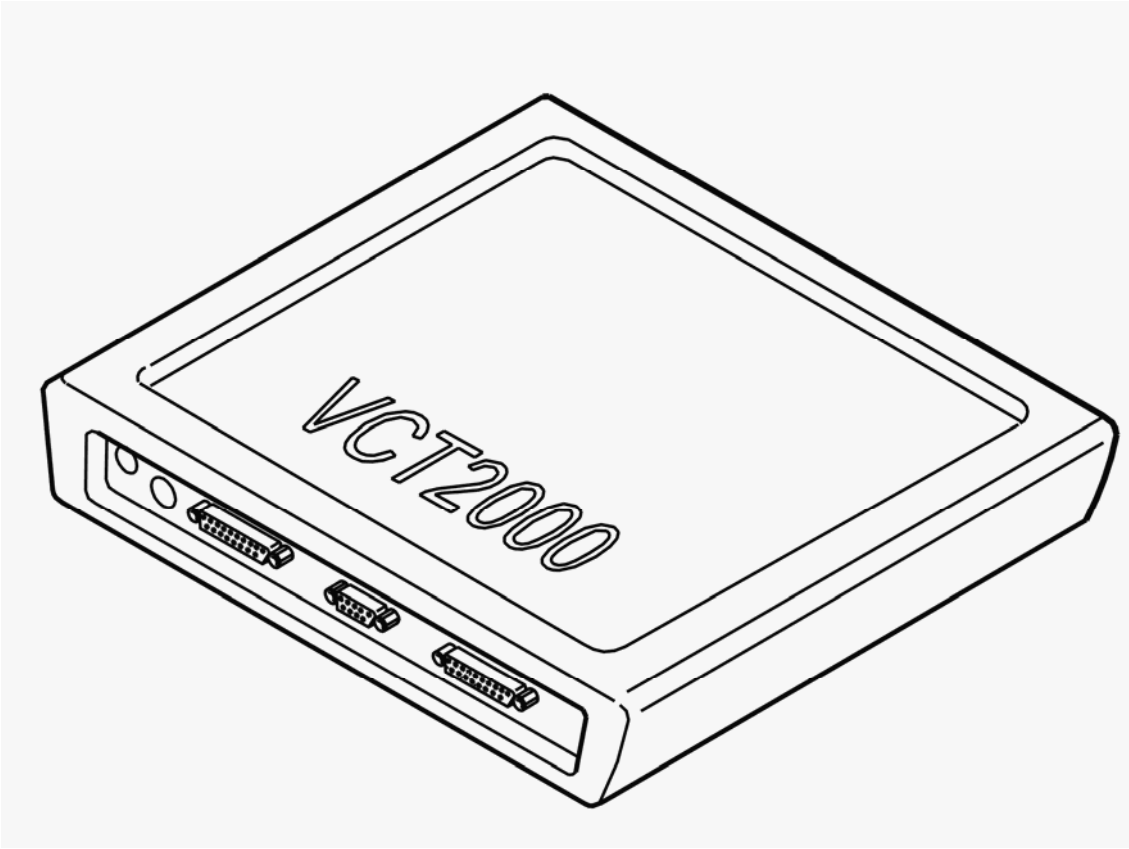


Fig. 59: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After the repair it is necessary to check that the fault has been rectified.

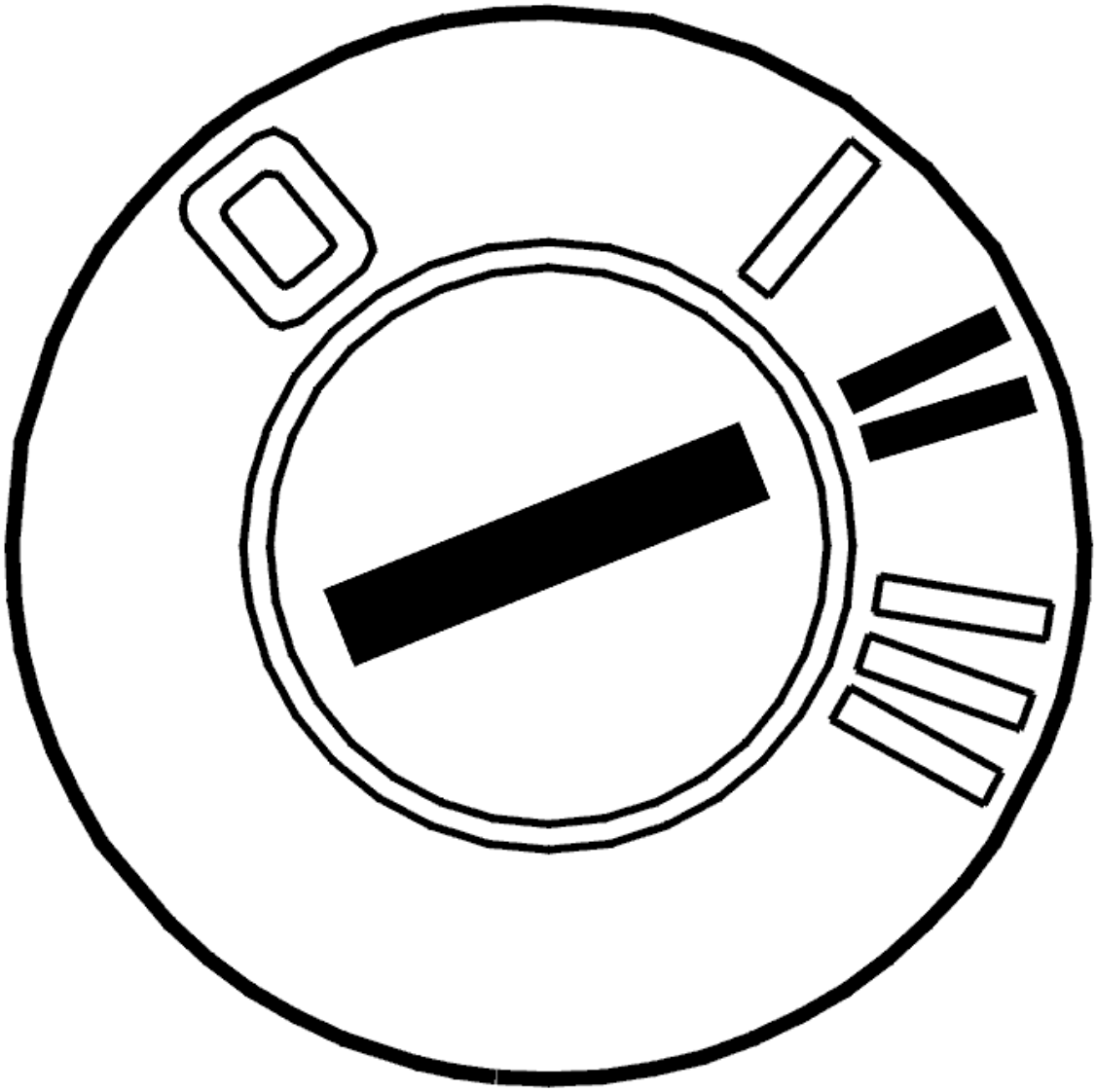


Fig. 60: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

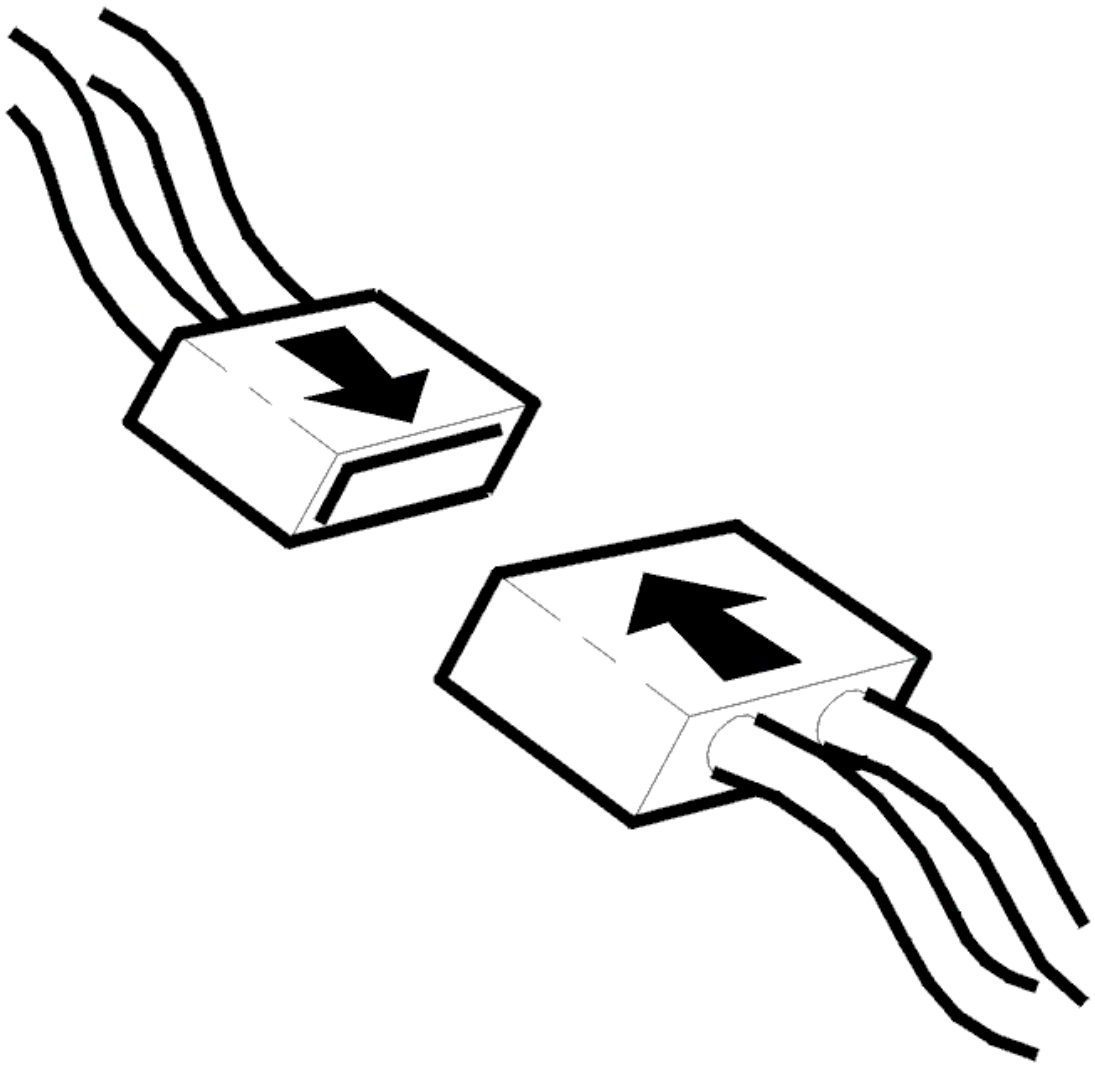


Fig. 61: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Wait for at least 90 seconds.
- Connect the connectors, install the components etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S1.

The value should change between OFF and ON.

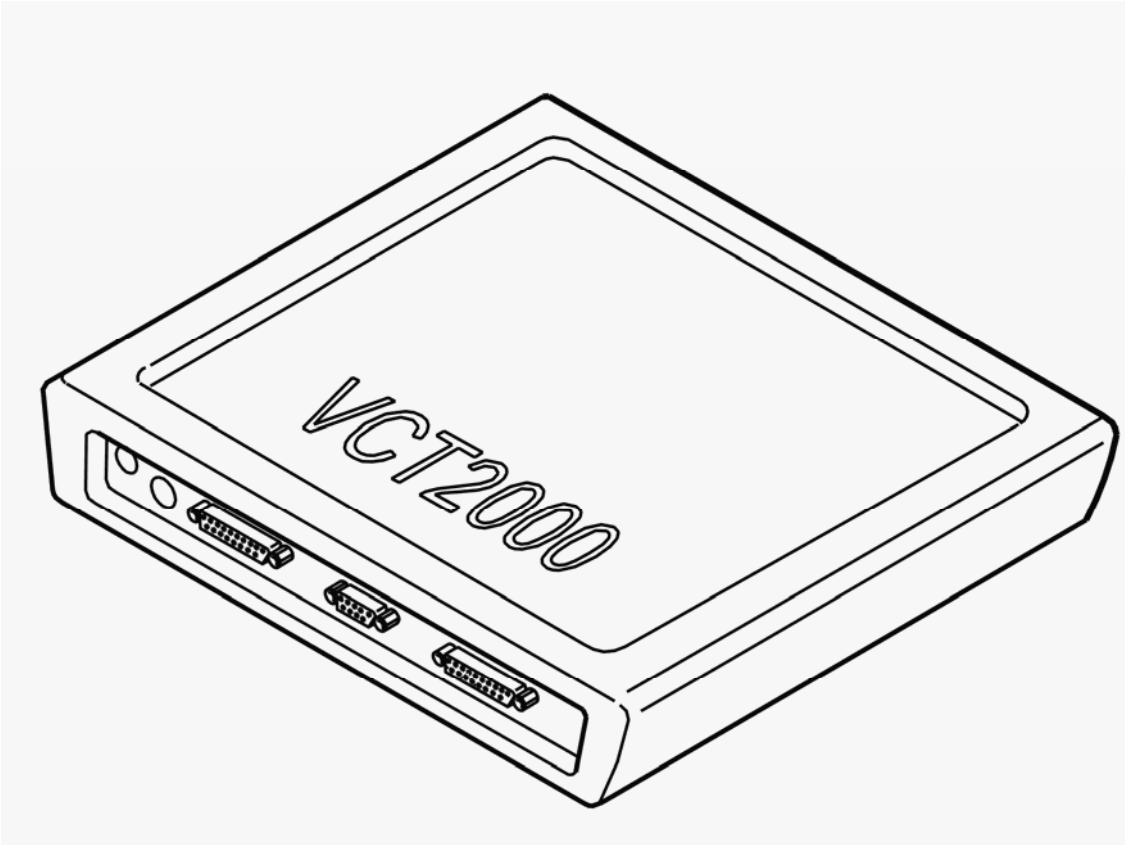


Fig. 62: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

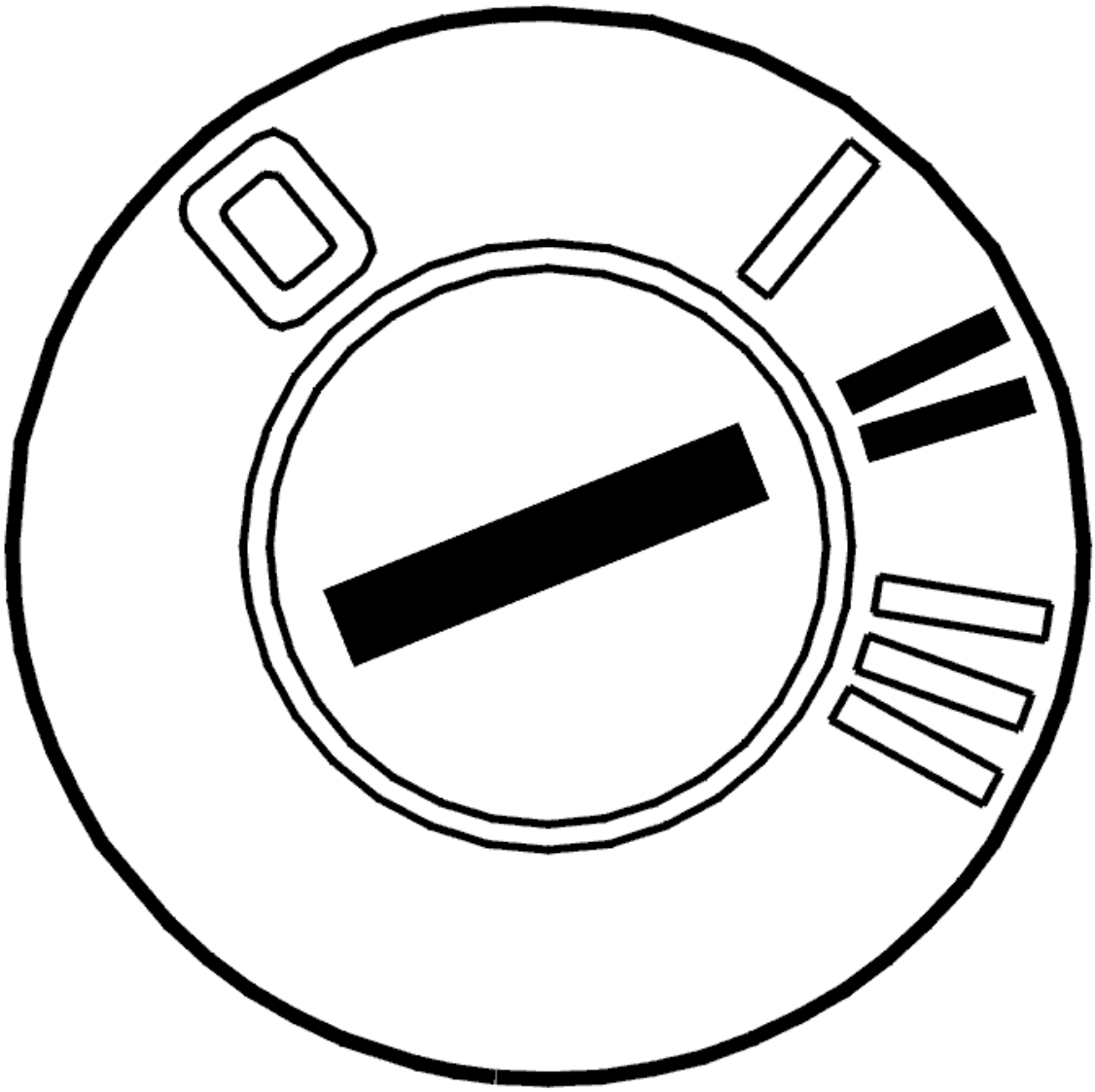


Fig. 63: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

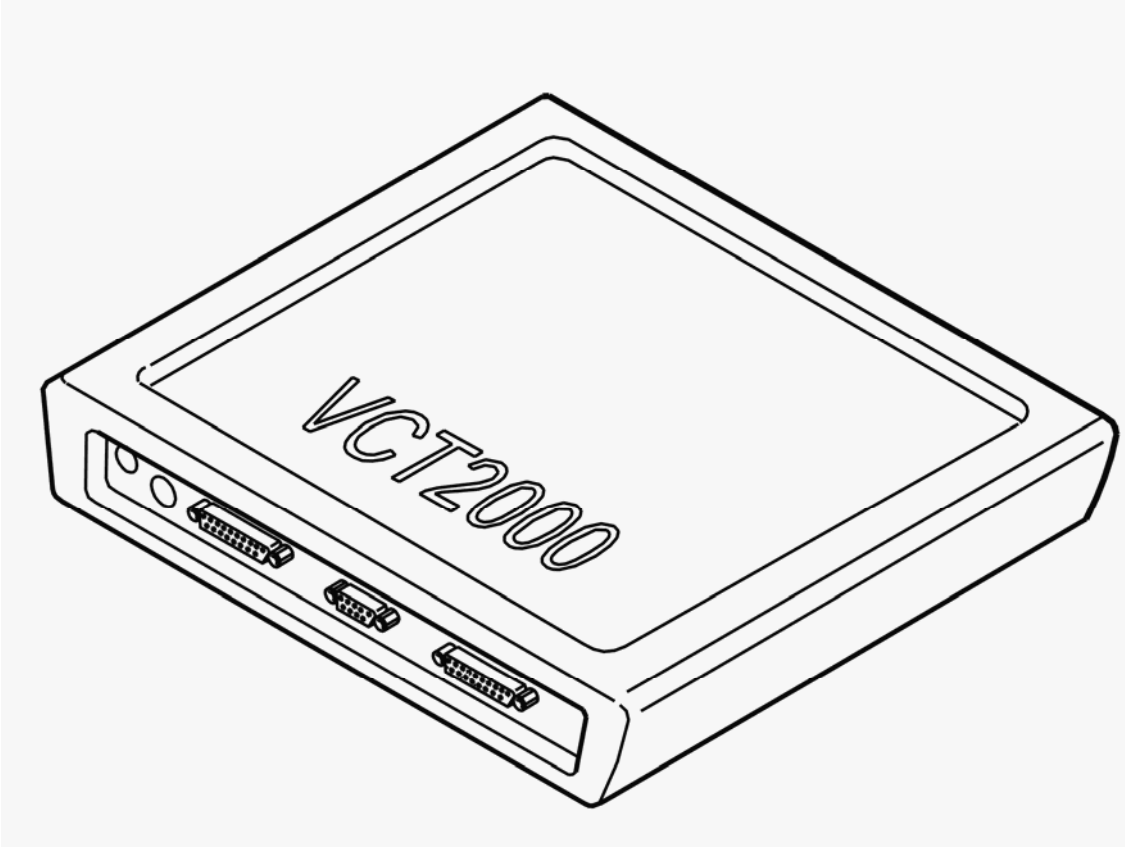


Fig. 64: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

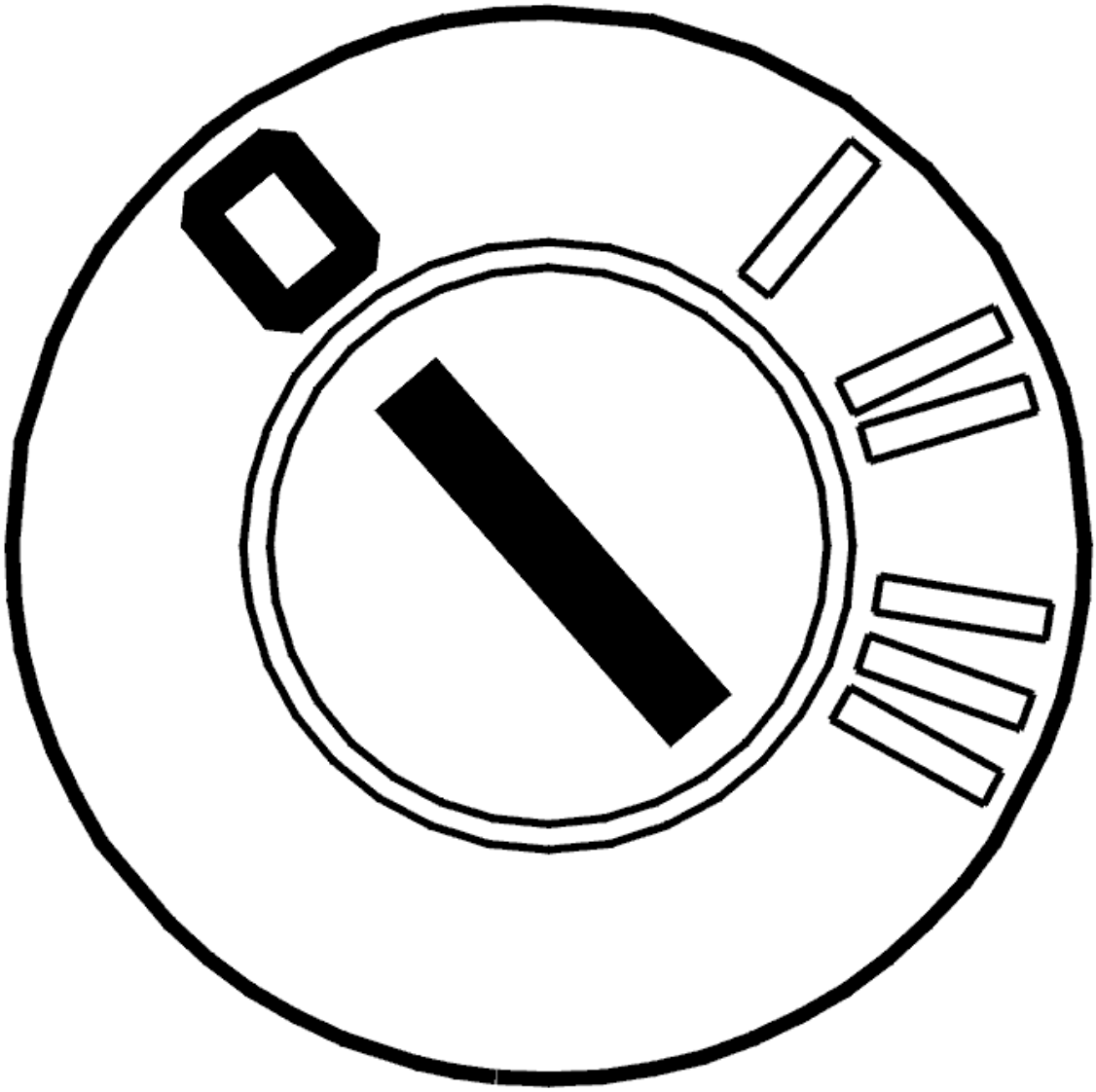


Fig. 65: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

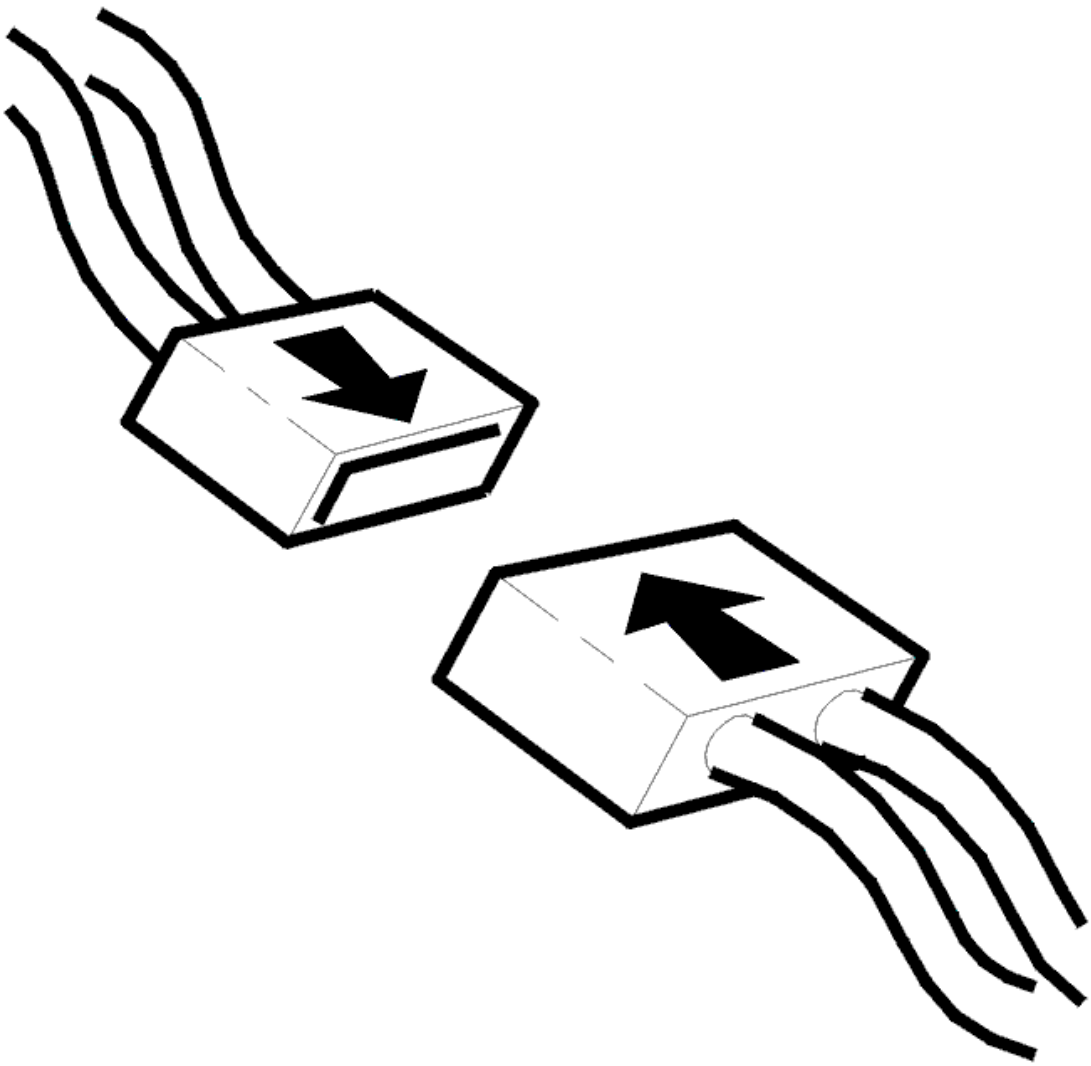


Fig. 66: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

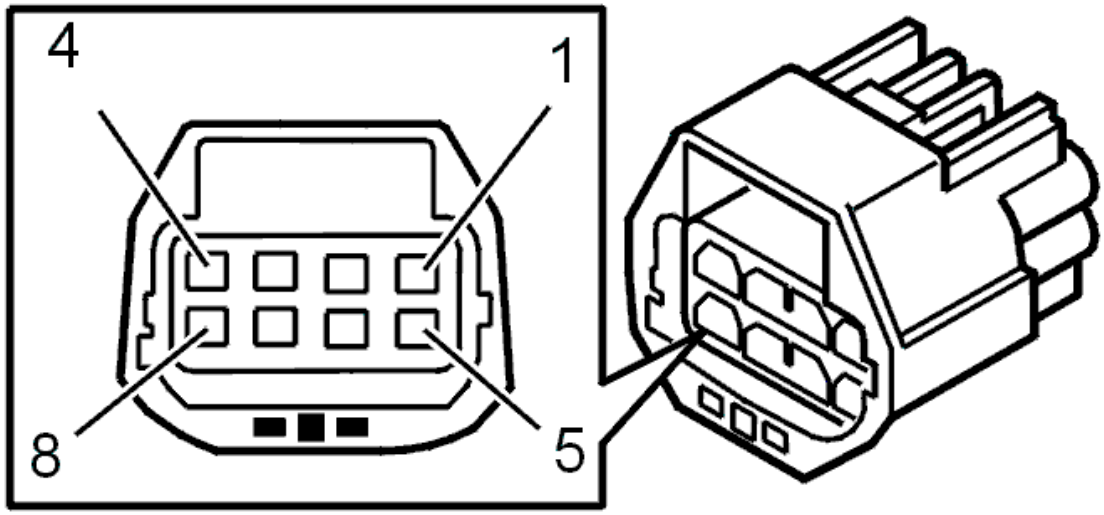


Fig. 67: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

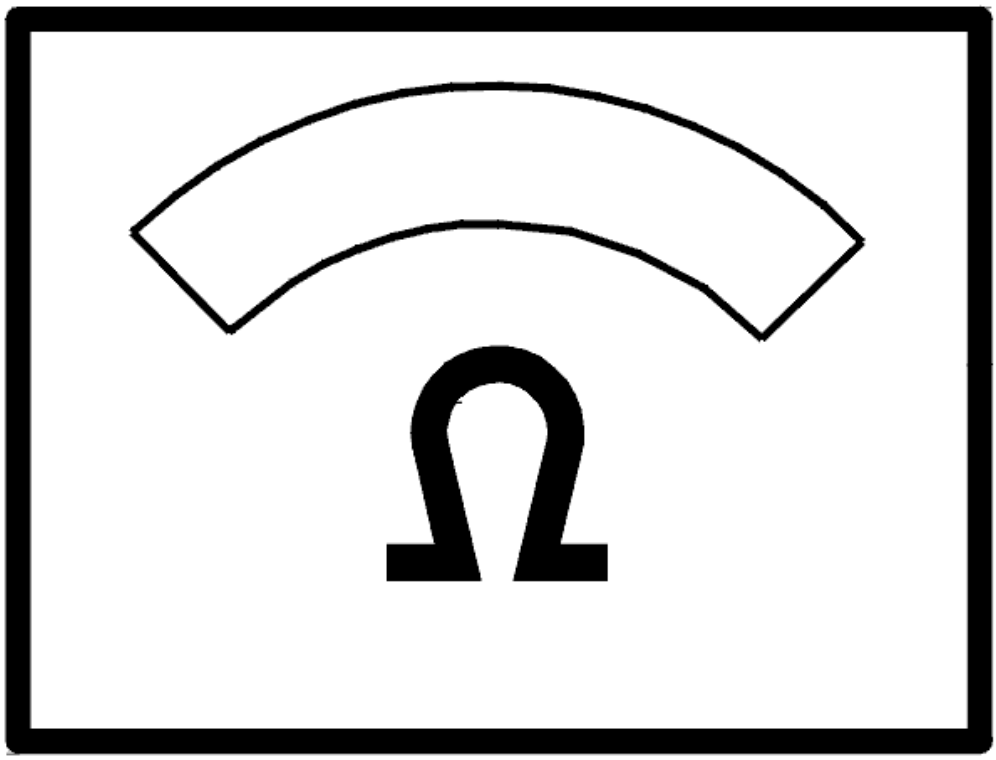


Fig. 68: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

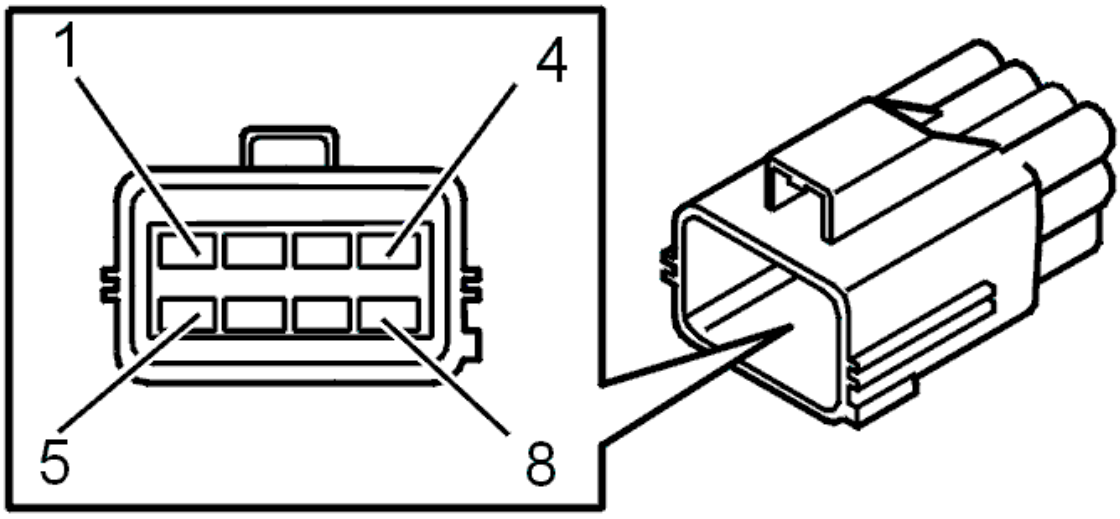


Fig. 69: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

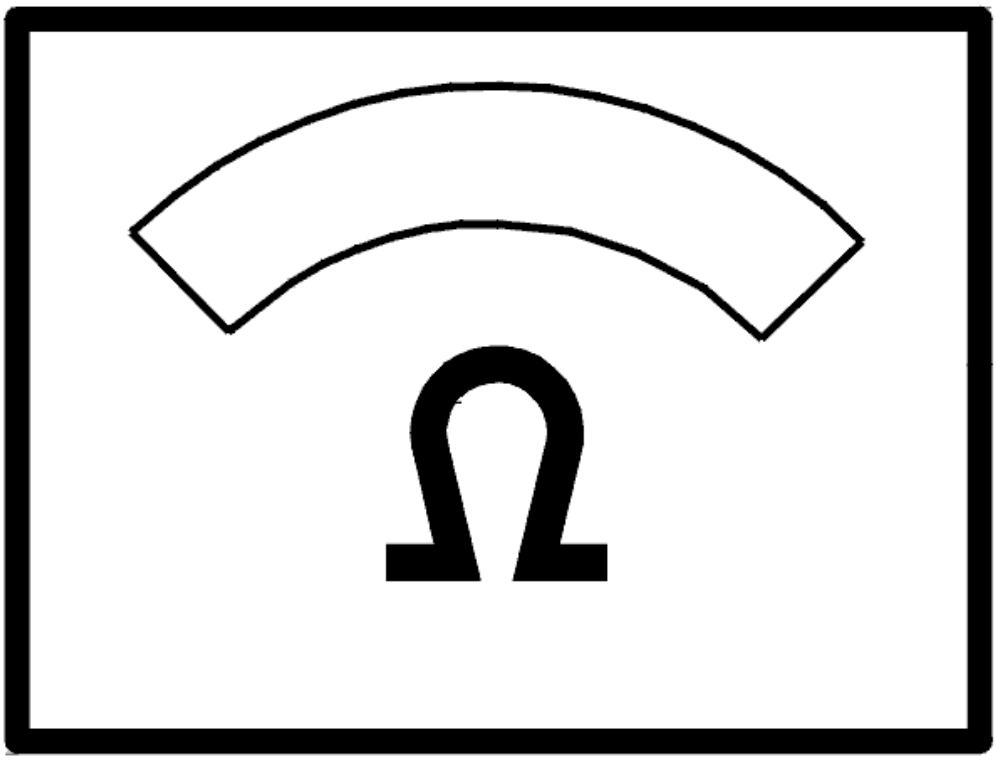


Fig. 70: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

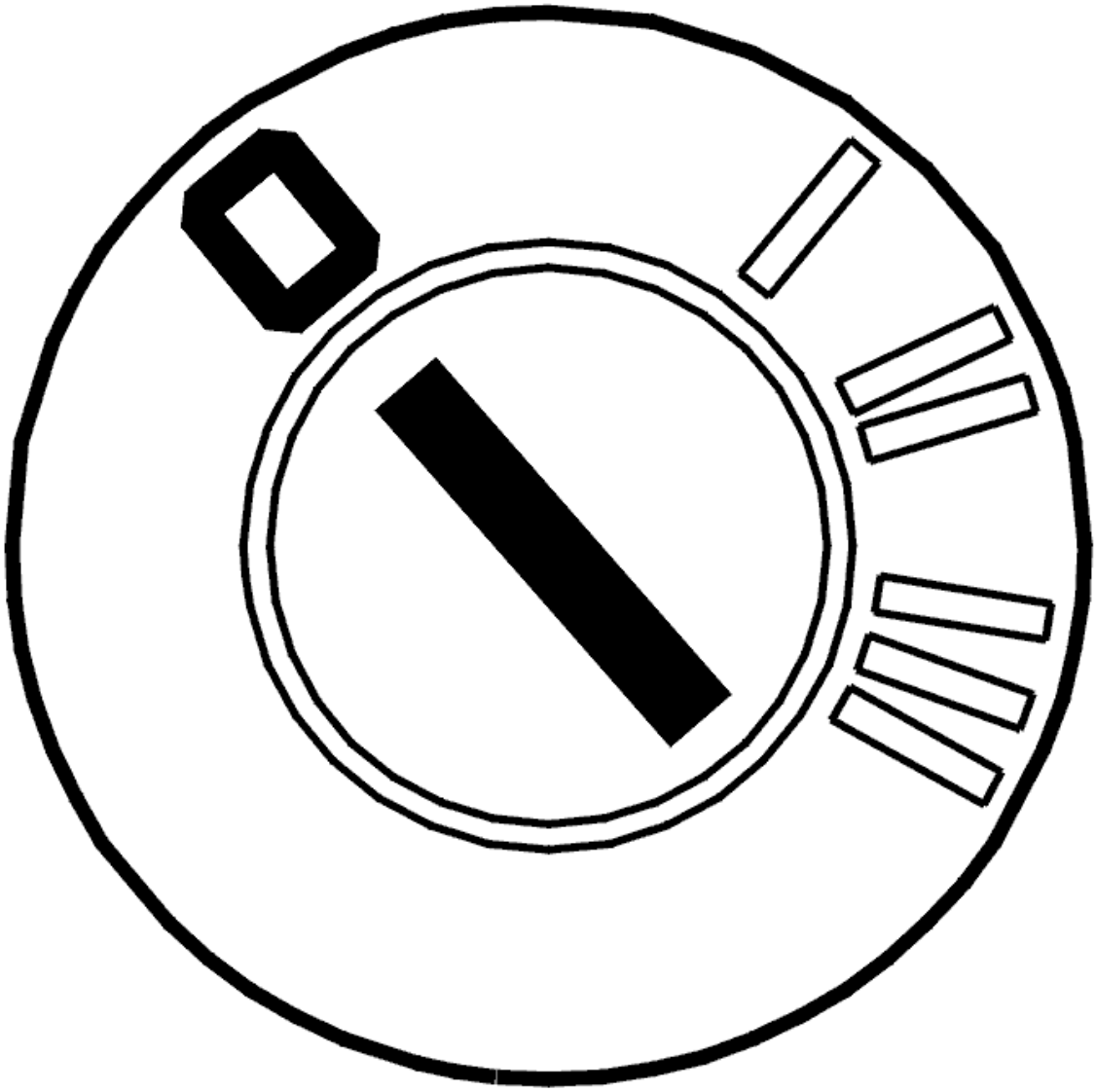


Fig. 71: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

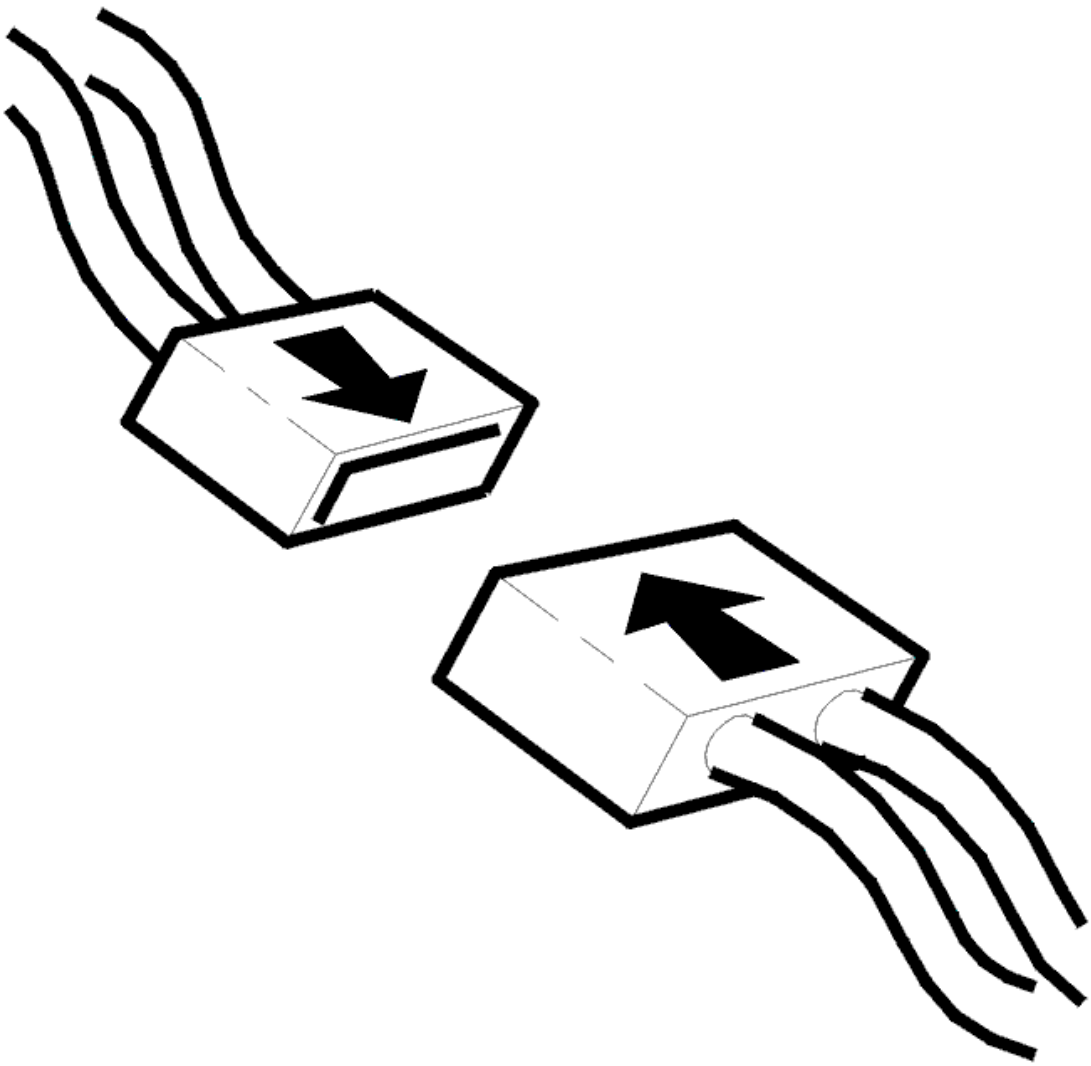


Fig. 72: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

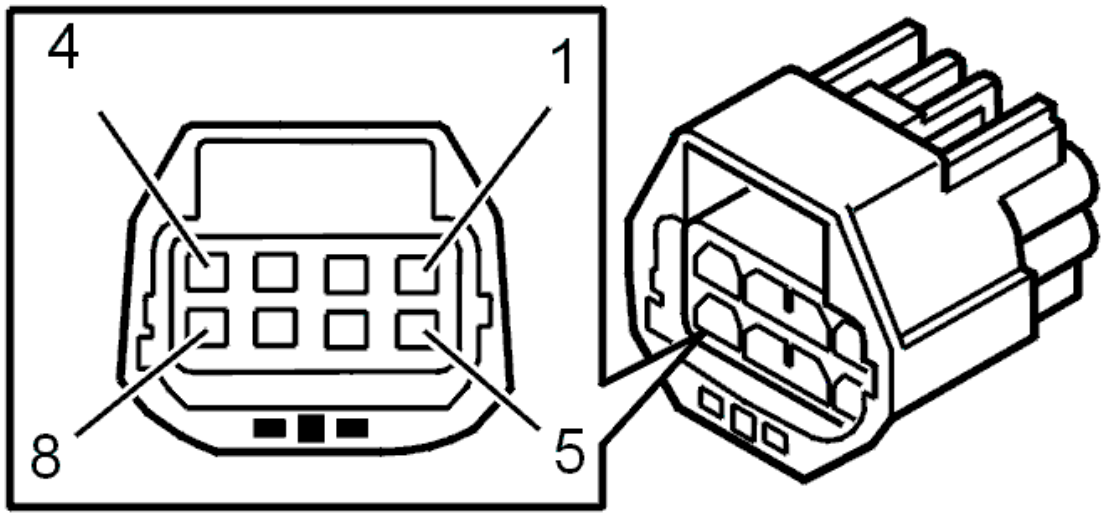


Fig. 73: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

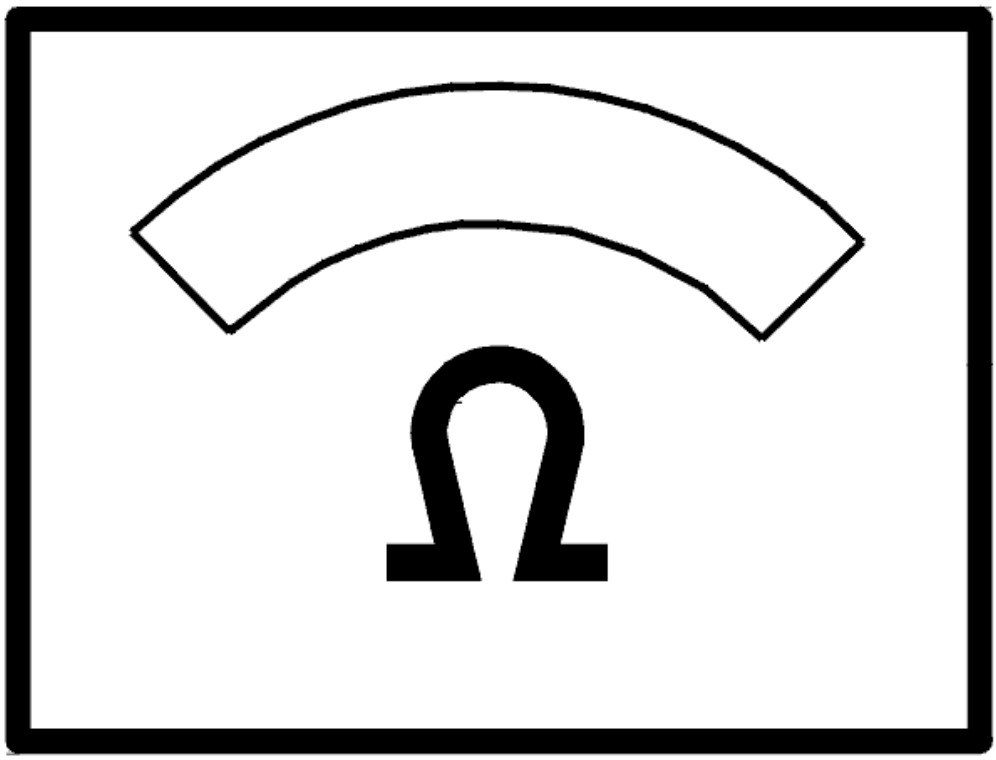


Fig. 74: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

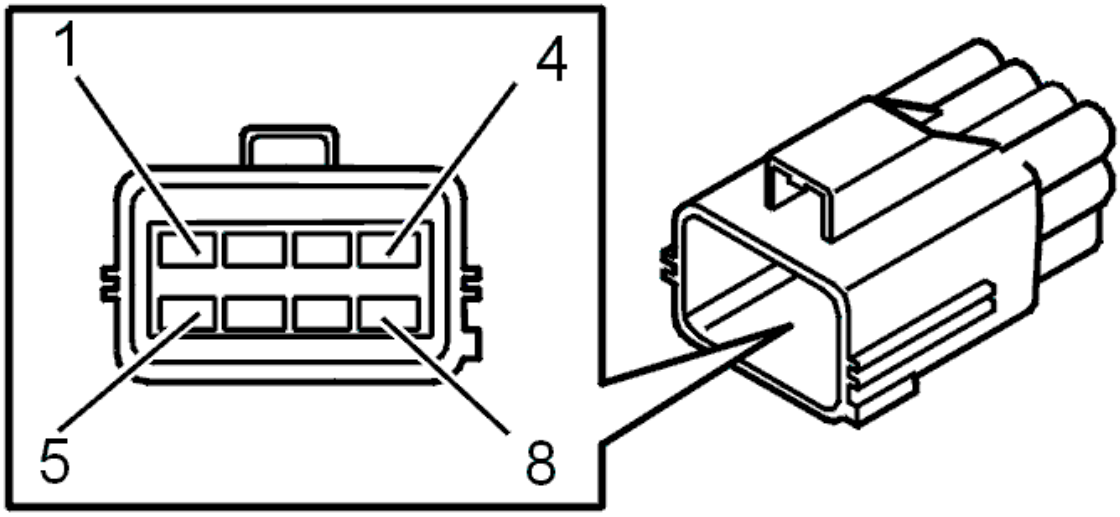


Fig. 75: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

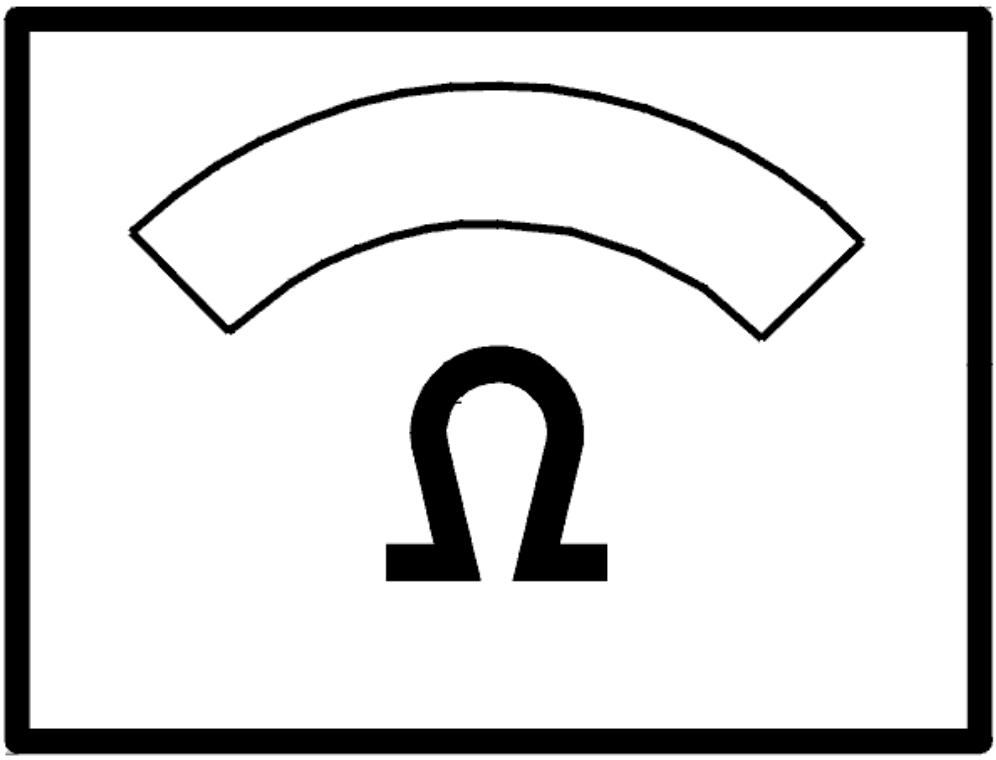


Fig. 76: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

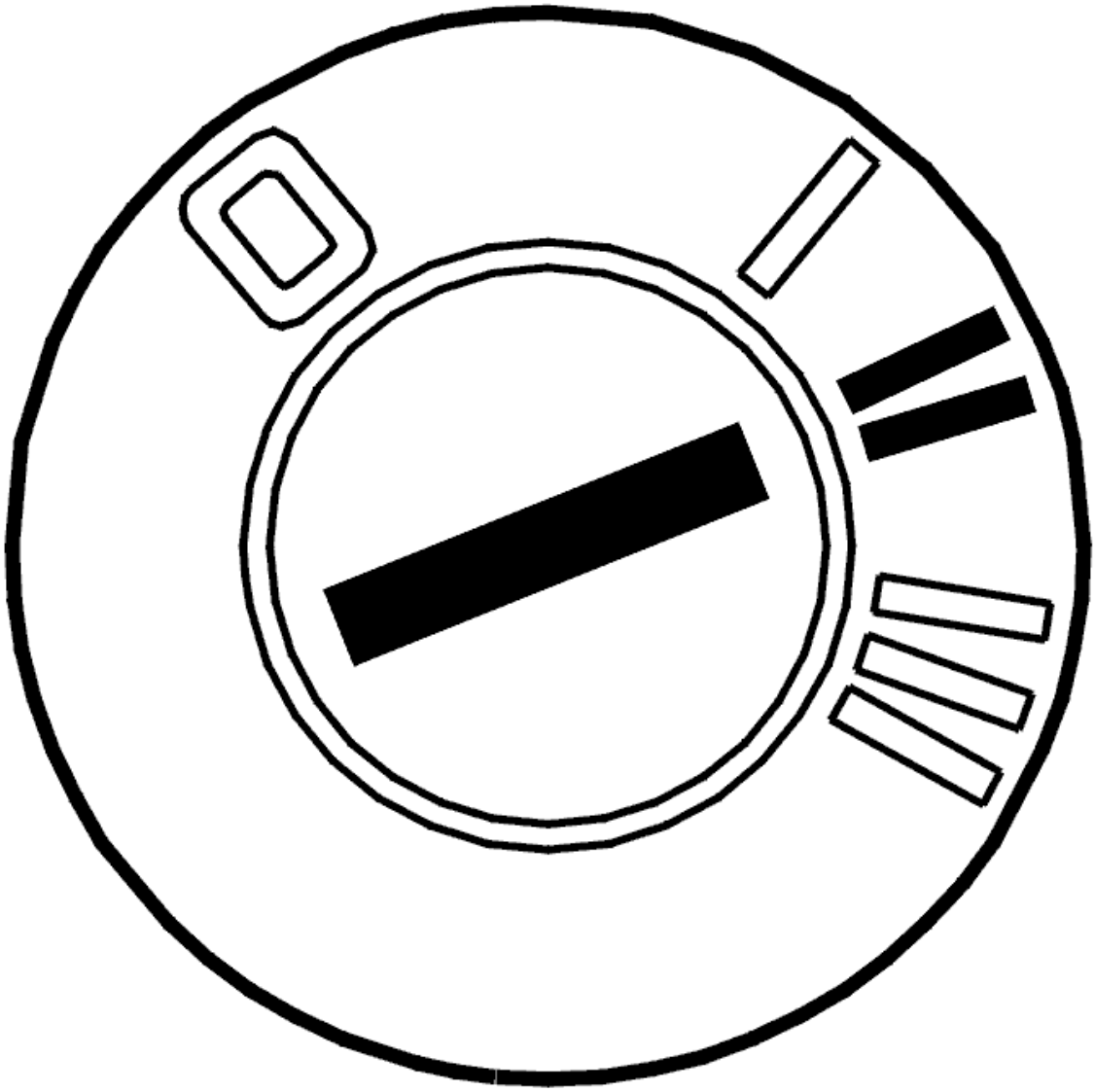


Fig. 77: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

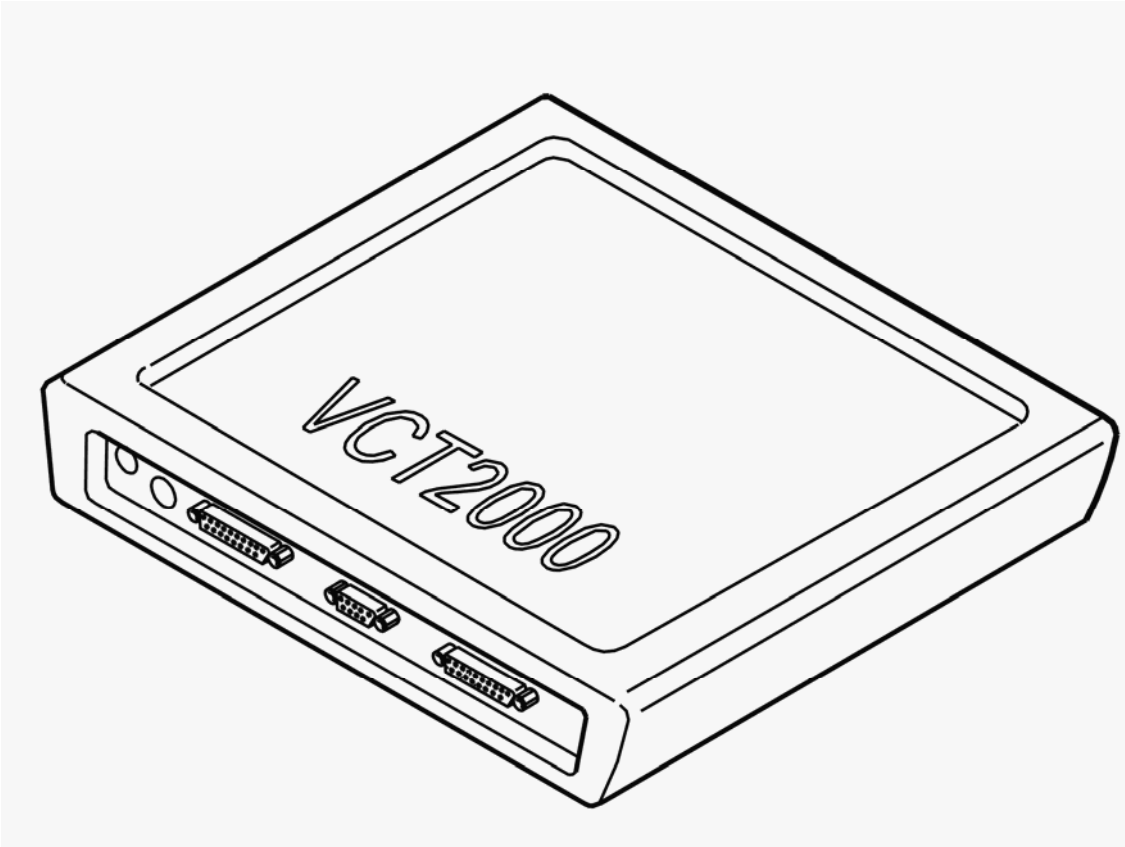


Fig. 78: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

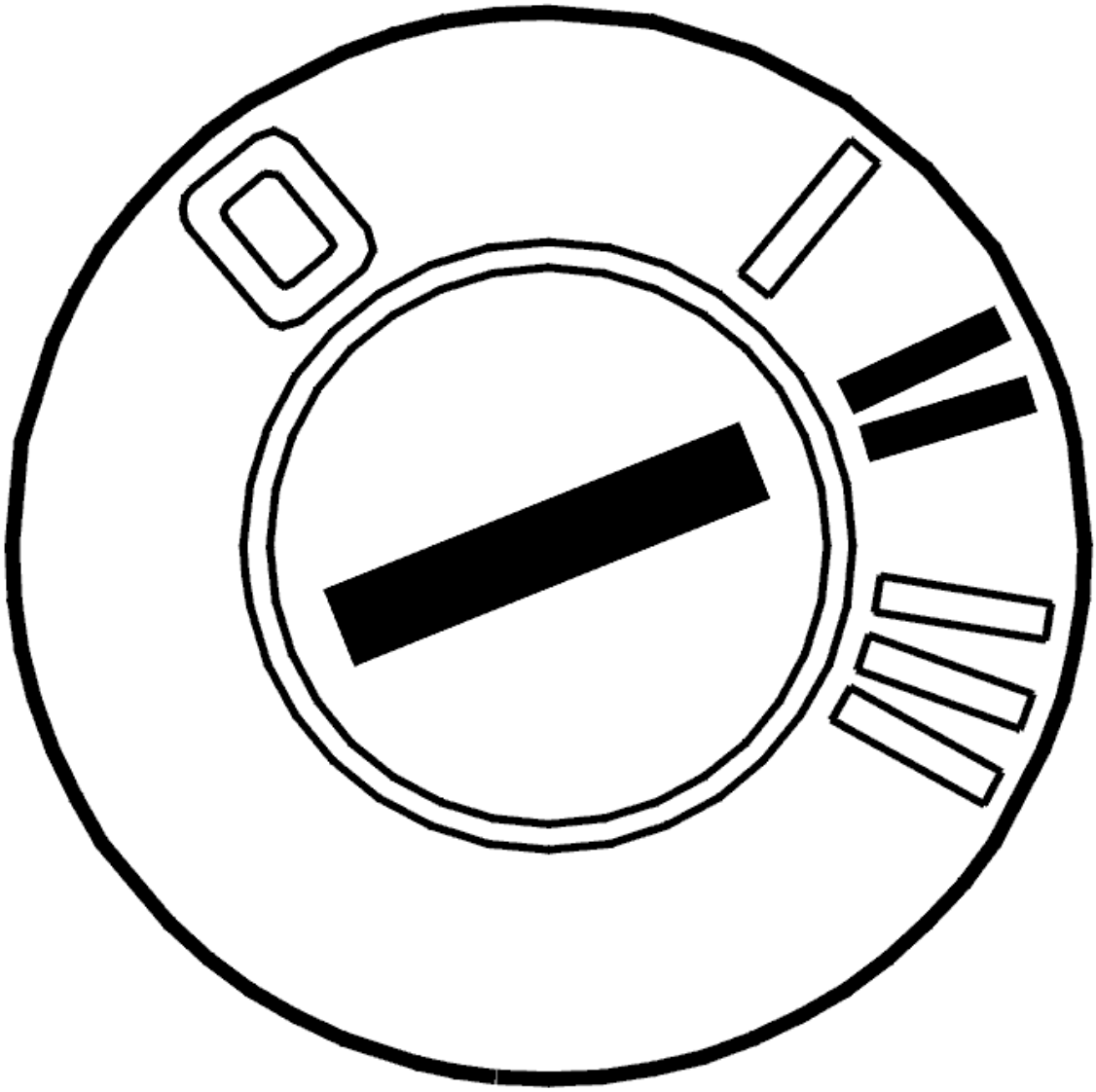


Fig. 79: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

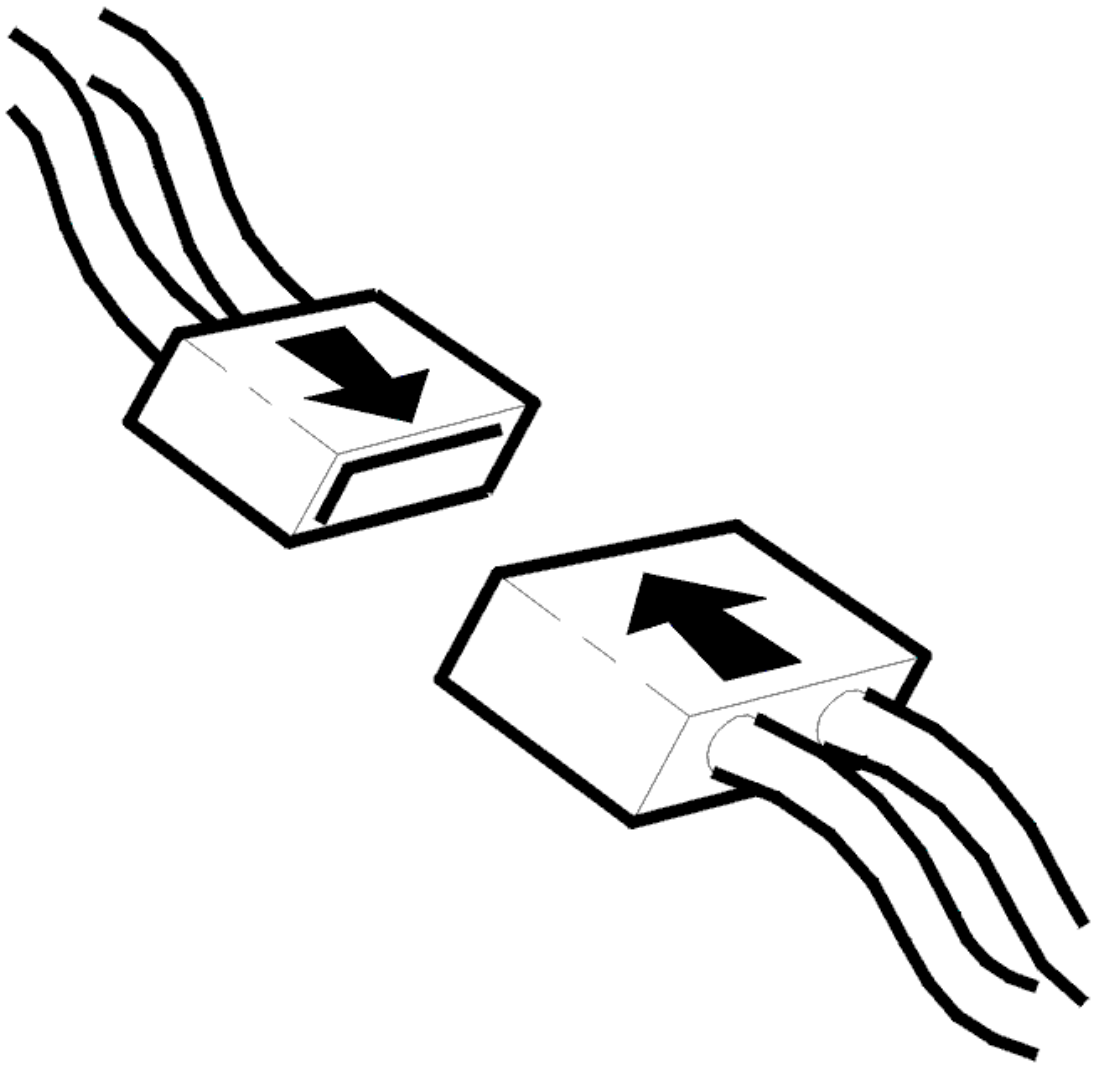


Fig. 80: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

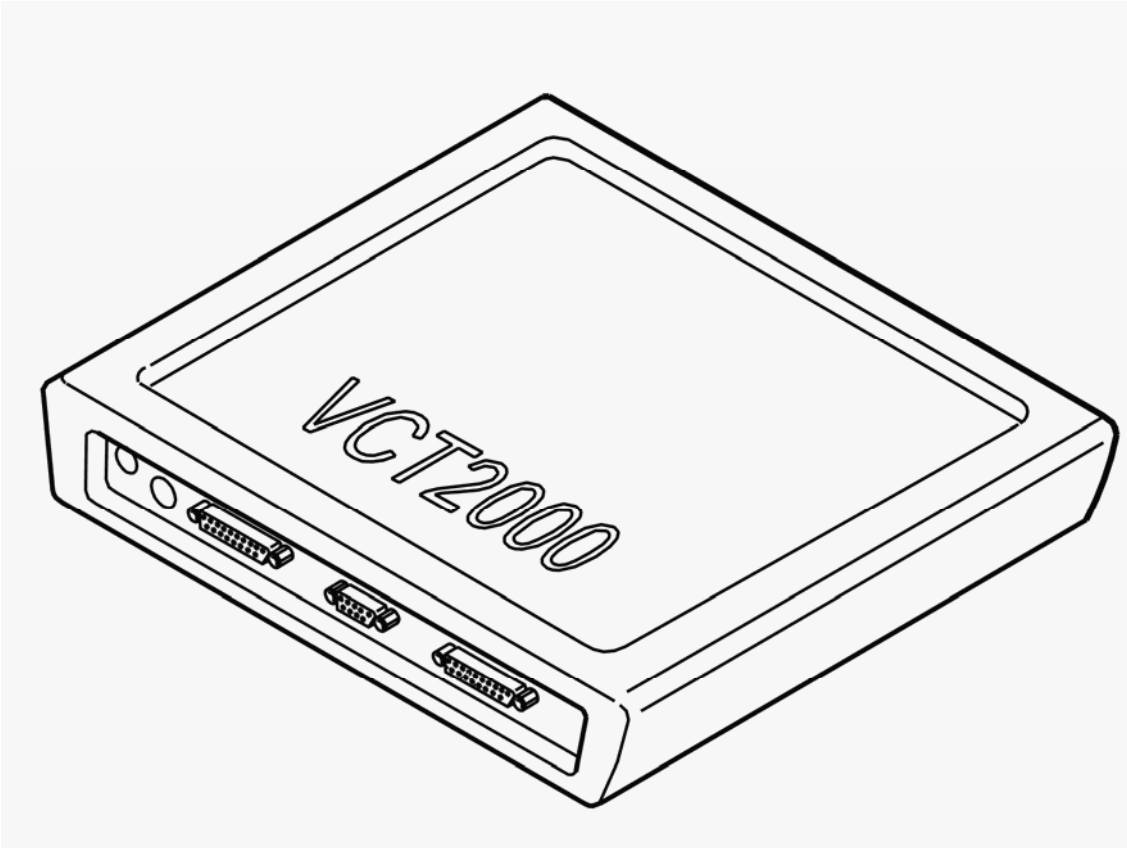


Fig. 81: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-0002: SHIFT SOLENOID S1. SIGNAL MISSING (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

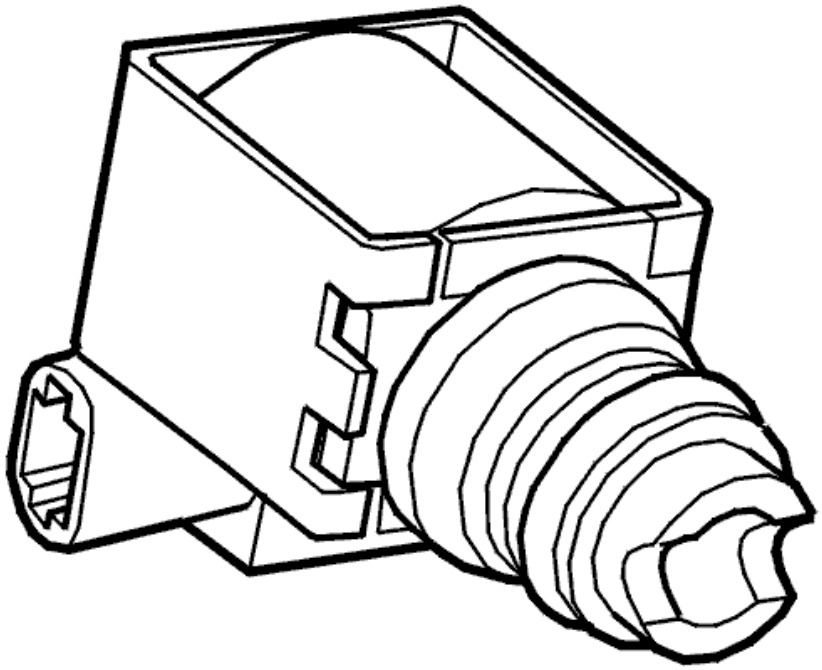


Fig. 82: Identifying Shift Solenoid S1 And S2
Courtesy of VOLVO CARS CORPORATION

Shift solenoids S2 and S1 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Solenoid S1 is activated in 1st and 4th gears. Diagnostic trouble code (DTC) TCM-0002 is stored if the control module registers that the signal in the solenoid S1 circuit is missing when the solenoid is activated.

Substitute Value

- The control module "Limp Home" program has been initiated.

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the signal cable.
- Defective solenoid.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.

- Harsh gear shifting.
- No shifting.
- No lock-up function.

HINT: Harsh shifting - due to disabled line pressure solenoid STH control. This results in constant maximum line pressure and leads to harsher shifting and gear engagement.

HINT: No shifting -because the transmission control module (TCM) prevents activation of the solenoids. This stops gear-shifting.

SIGNAL MISSING

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

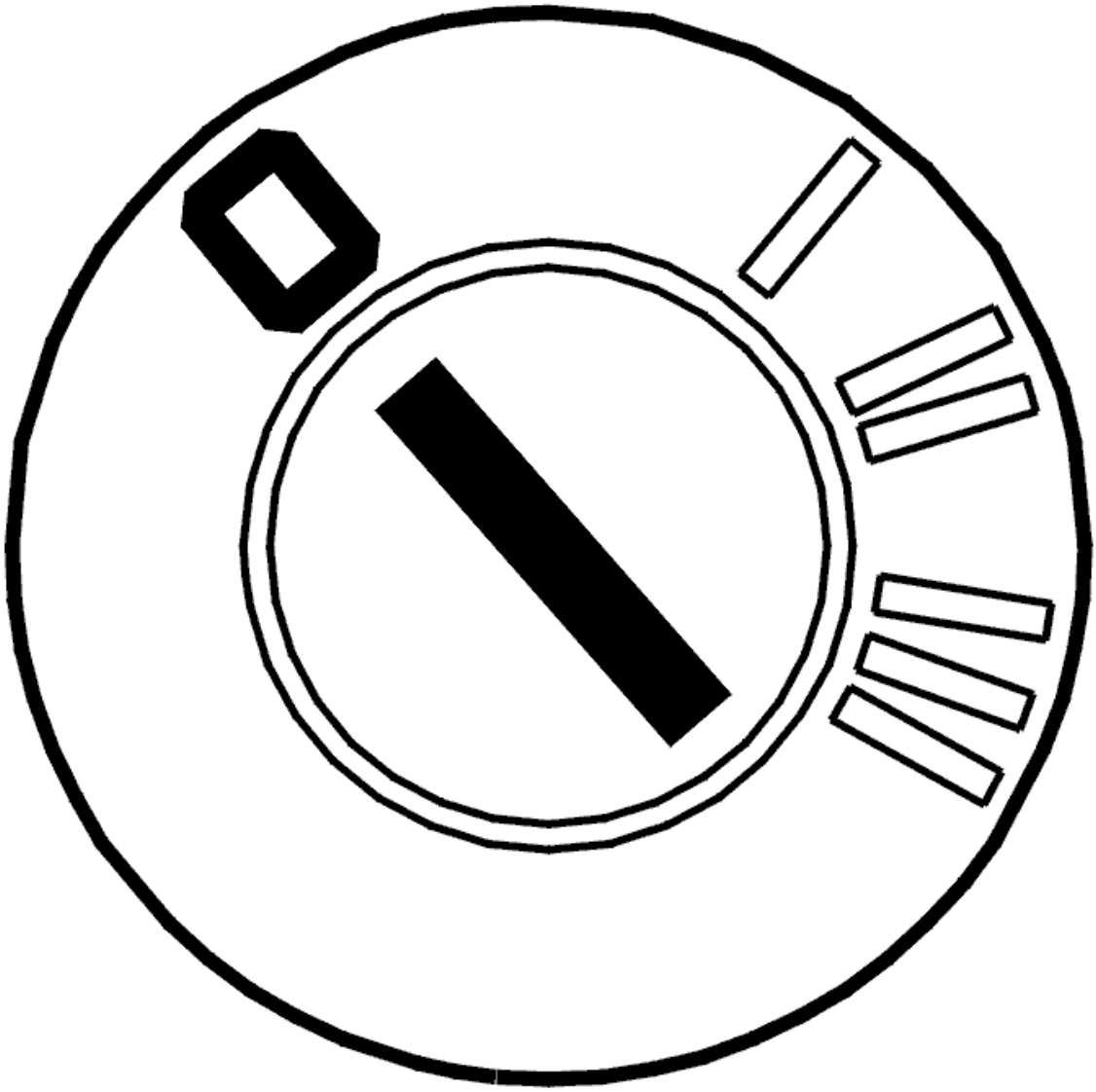


Fig. 83: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

  HINT: If the temperature is outside its permitted range, fault-trace the temperature sensor.

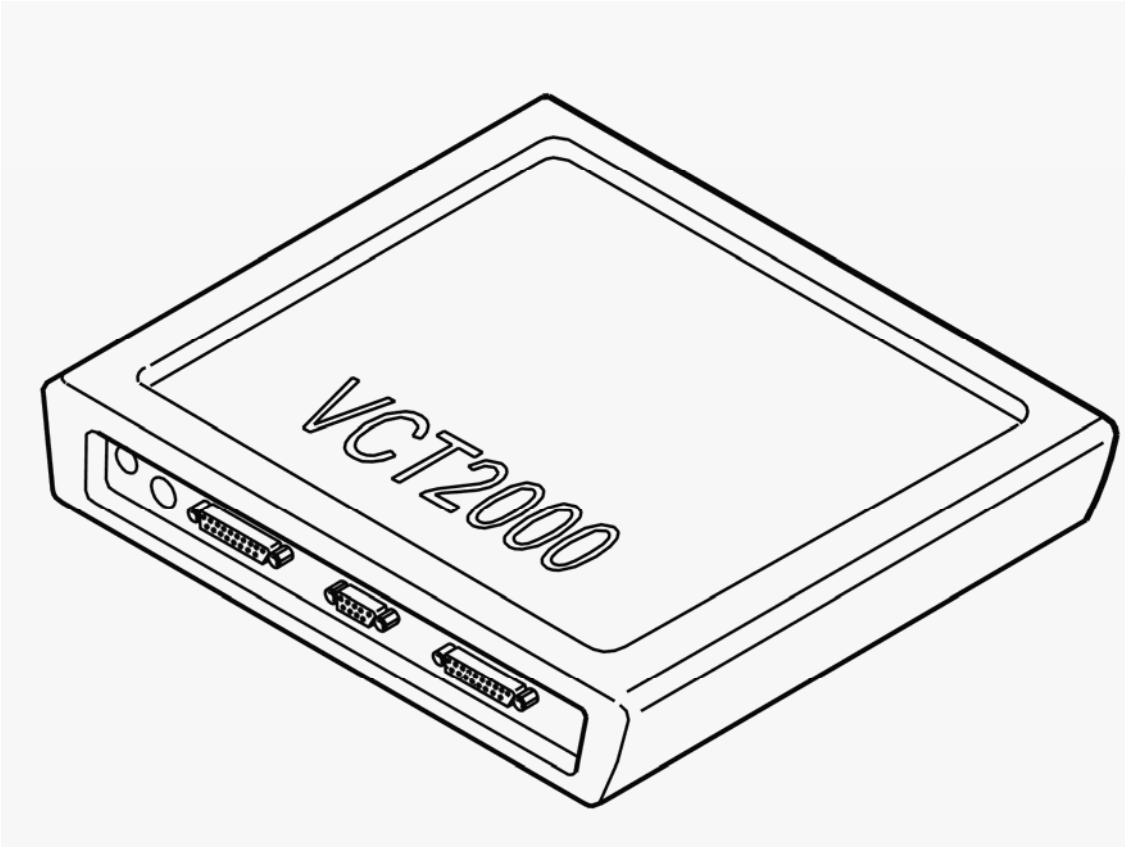


Fig. 84: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S1**

- **NO**

  Refer to **SIGNAL TOO HIGH**

CHECKING SHIFT SOLENOID S1

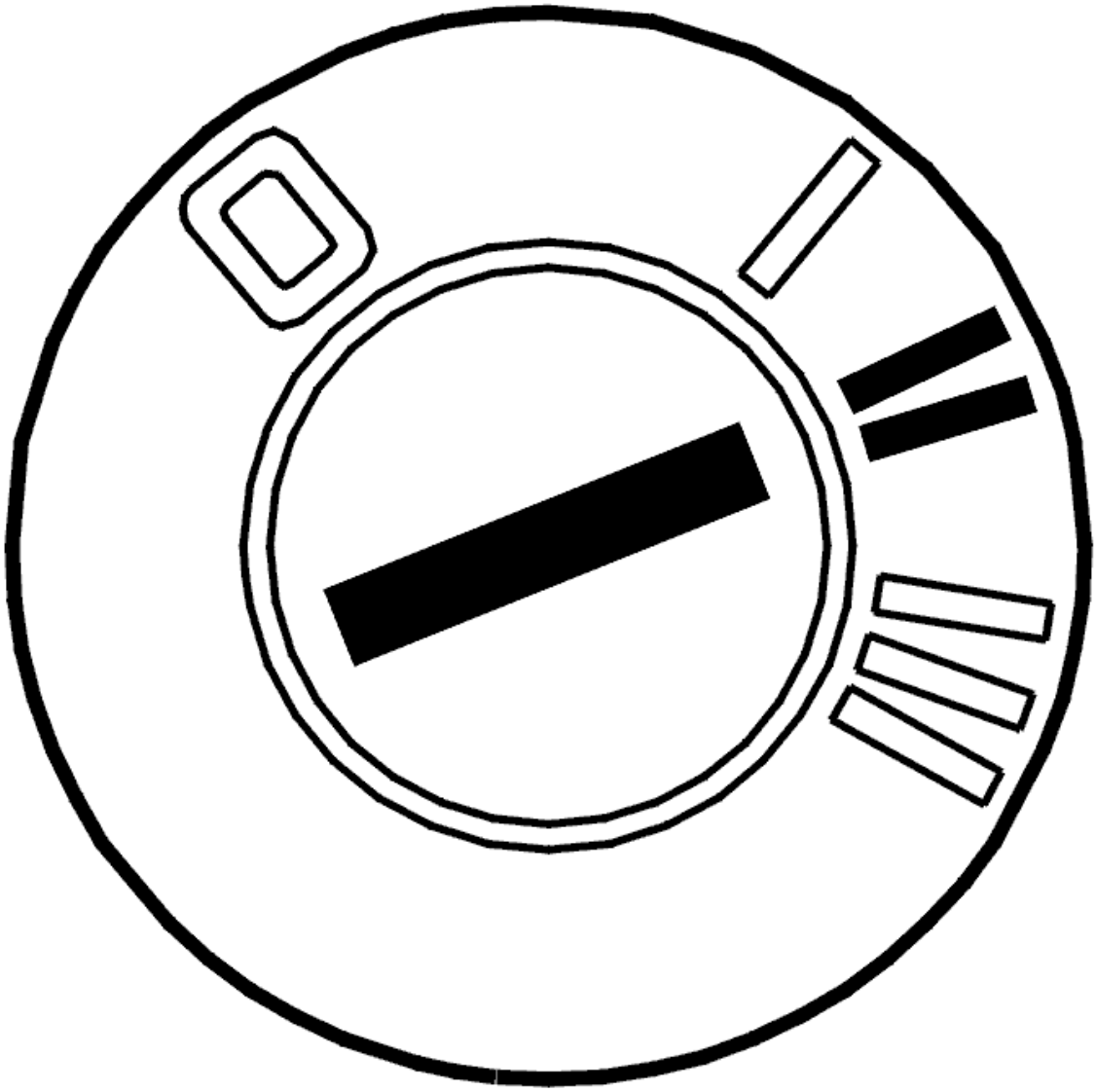


Fig. 85: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and automatic transmission connectors for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary
- Ignition on
- Gear selector in position P
- Activate solenoid S1
- Read off the current across solenoid S1.

  The current must oscillate between approximately 0 and 1.5 A.

  If the current oscillates, the problem was caused by contact resistance and oxidation.

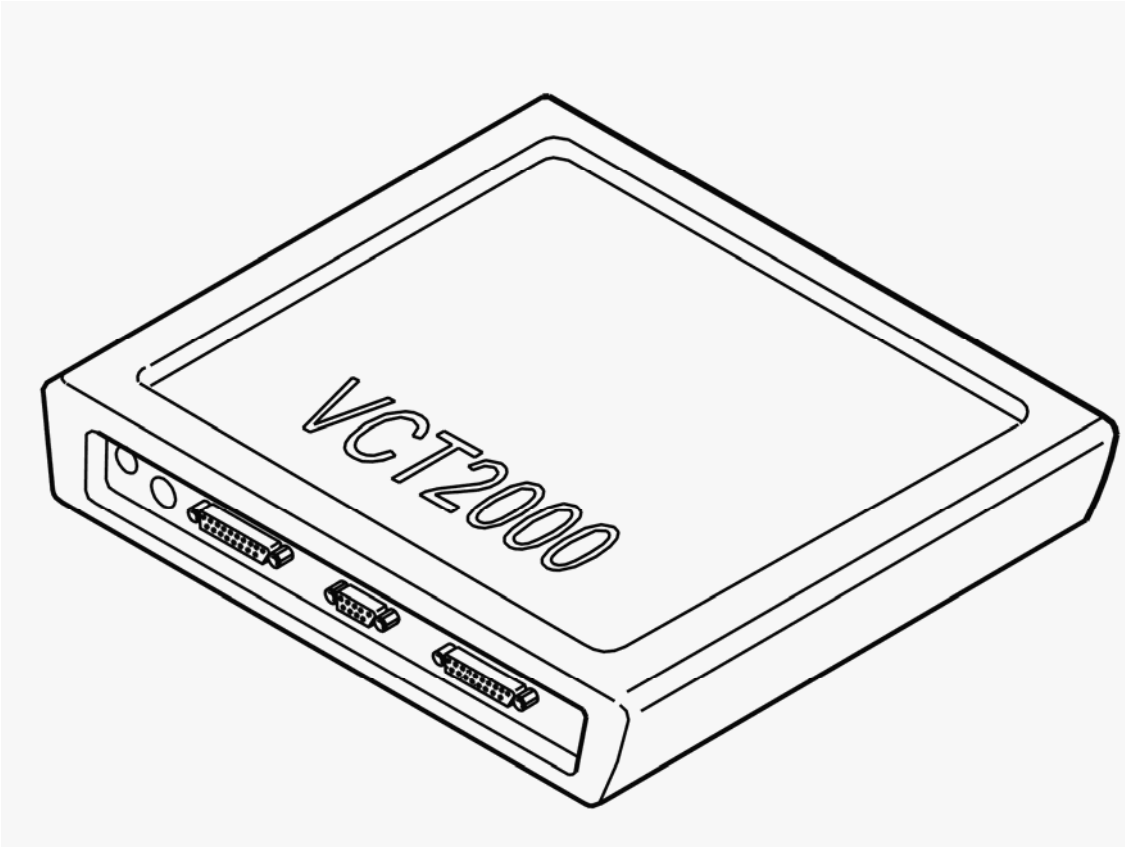


Fig. 86: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING SOLENOID S1**

CHECKING SOLENOID S1

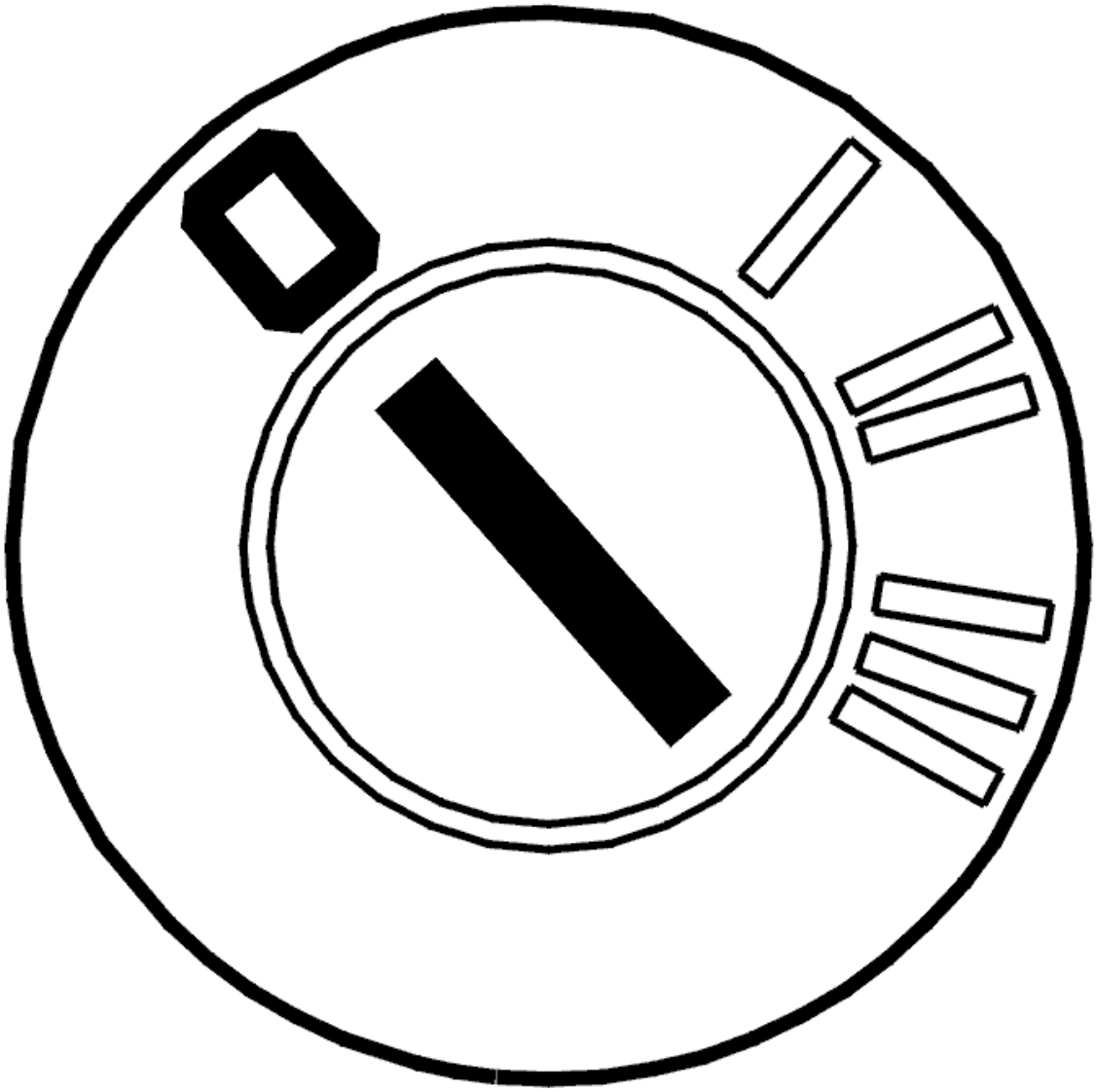


Fig. 87: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

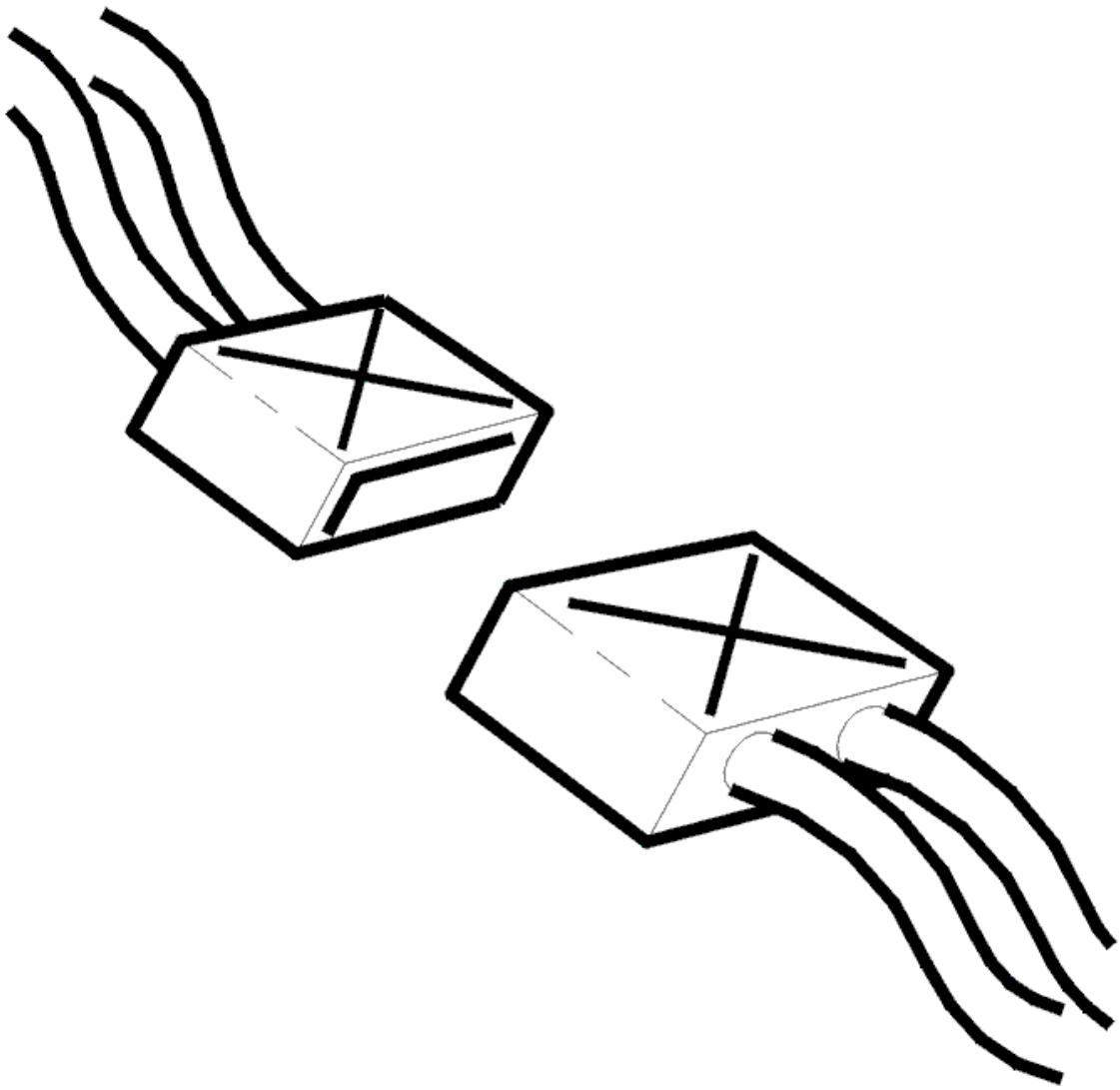


Fig. 88: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the automatic transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals #A (#A1) and #E (#A5).

  The resistance for solenoid S1 resistance must be between 18 and 30 ohms.

  Other information:

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- For information about signals, see **SIGNAL SPECIFICATION** .

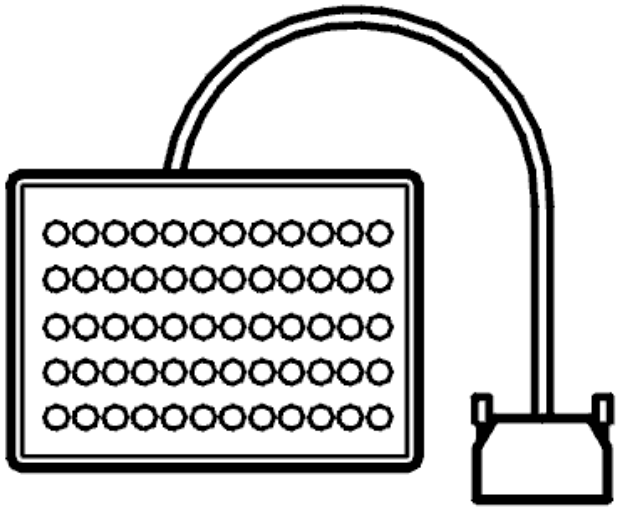


Fig. 89: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

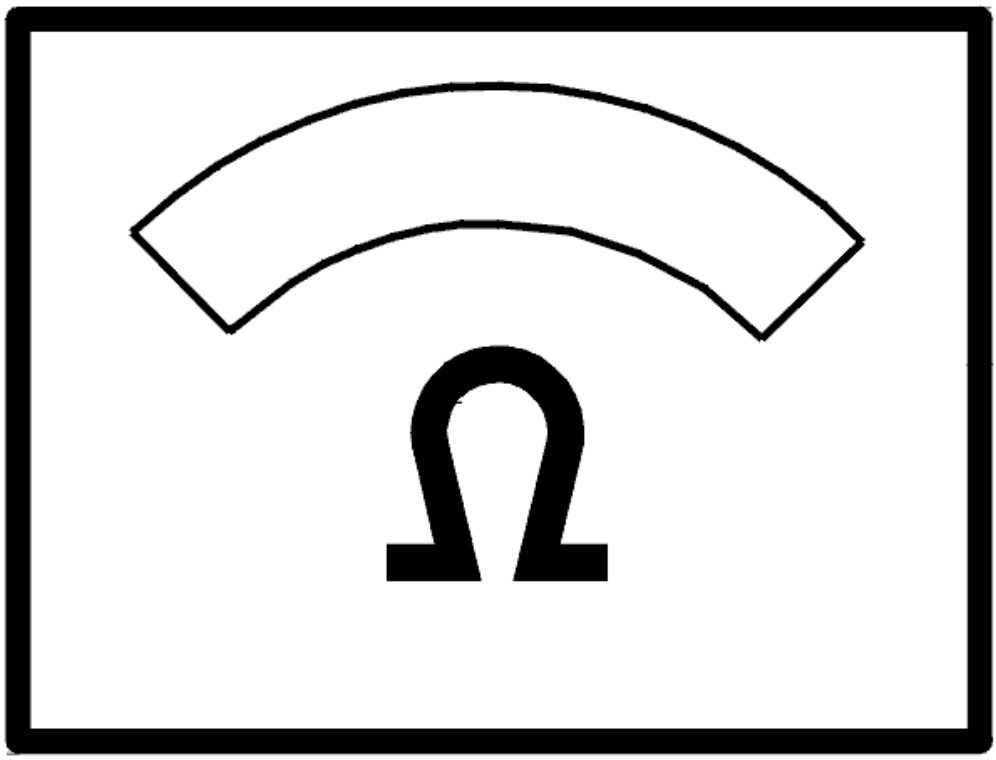


Fig. 90: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

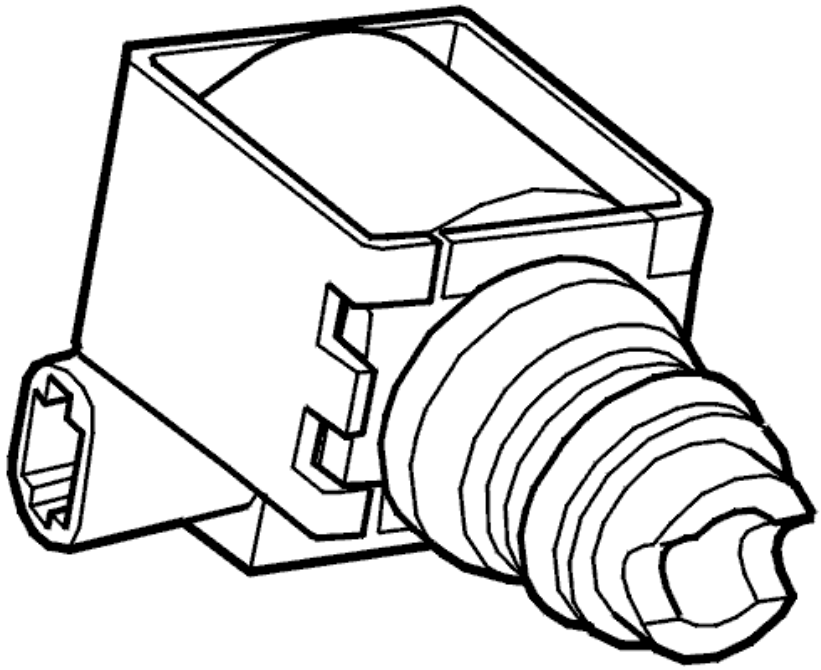


Fig. 91: Identifying Shift Solenoid S1 And S2
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE CONTROL MODULE

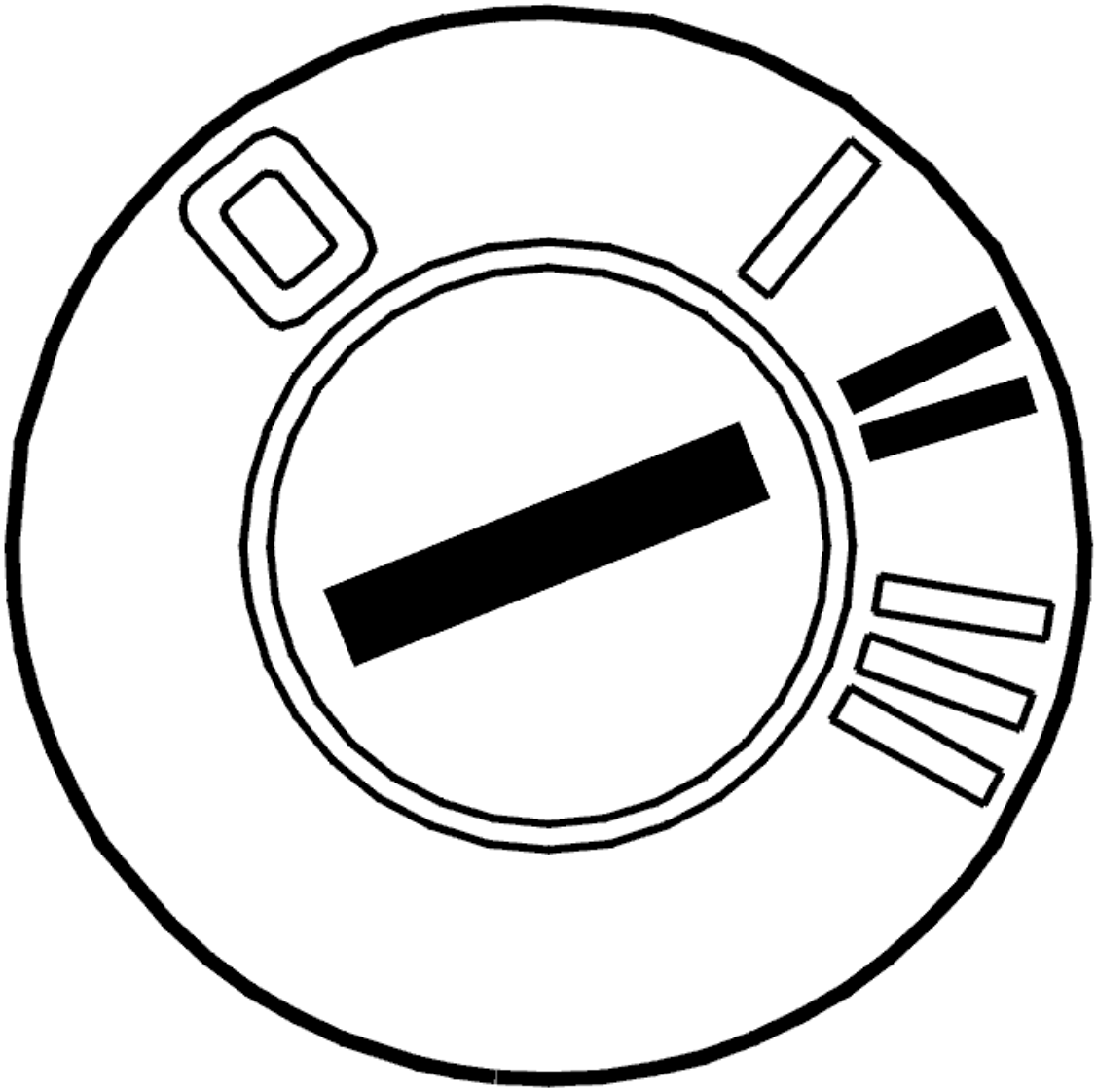


Fig. 92: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

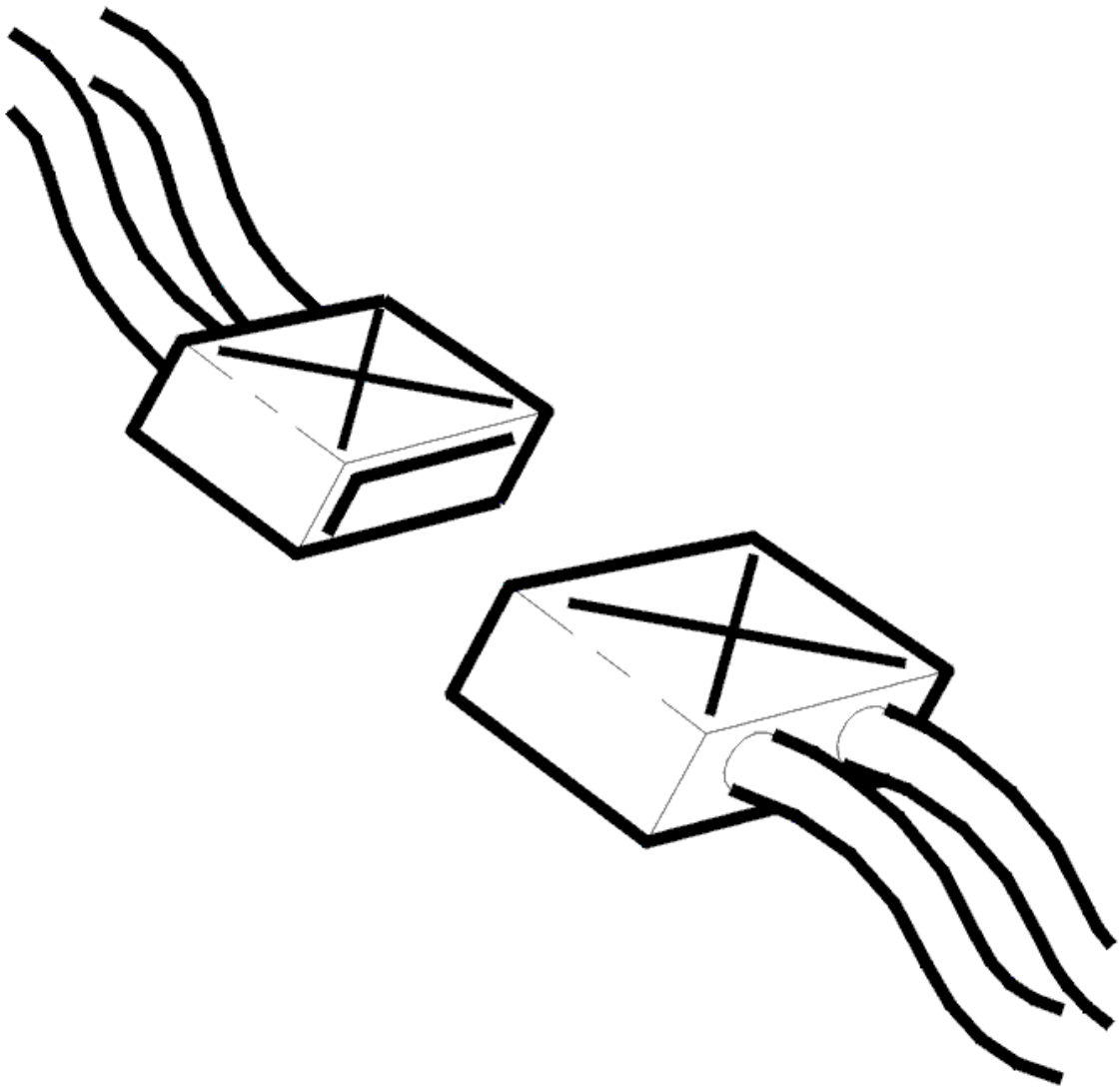


Fig. 93: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

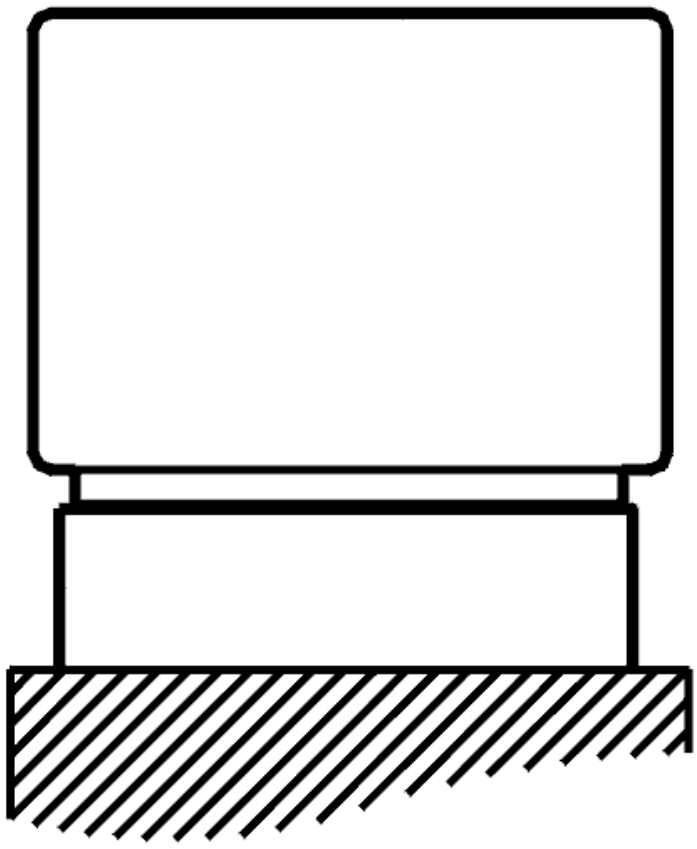


Fig. 94: Identifying Control Unit Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Control module connected.
- Transmission connector disconnected
- Ignition on
- Gear selector in position P.

Check the circuit for solenoid S1 by connecting an ohmmeter between terminals #50 (#A50) and #53 (#A53). The resistance must be between 7 and 13 Kohms. Try a new control module if the resistance is infinite.

Remedy as necessary.

NOTE: Diagnostic trouble codes (DTCs) for the gear-shift position sensor and the solenoids may be stored when disconnecting the transmission connector.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION** .

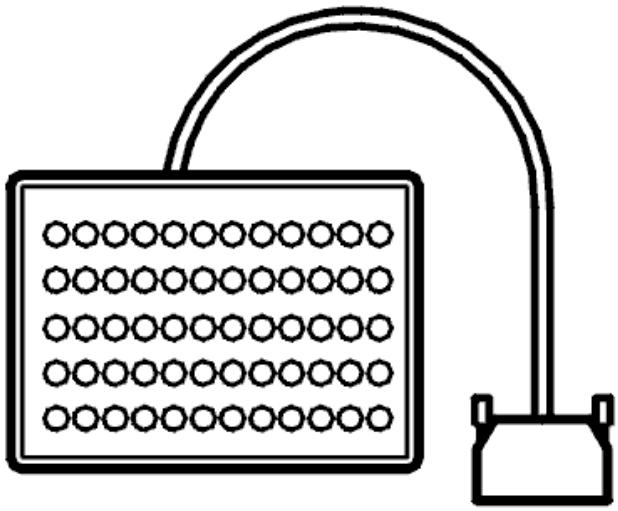


Fig. 95: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

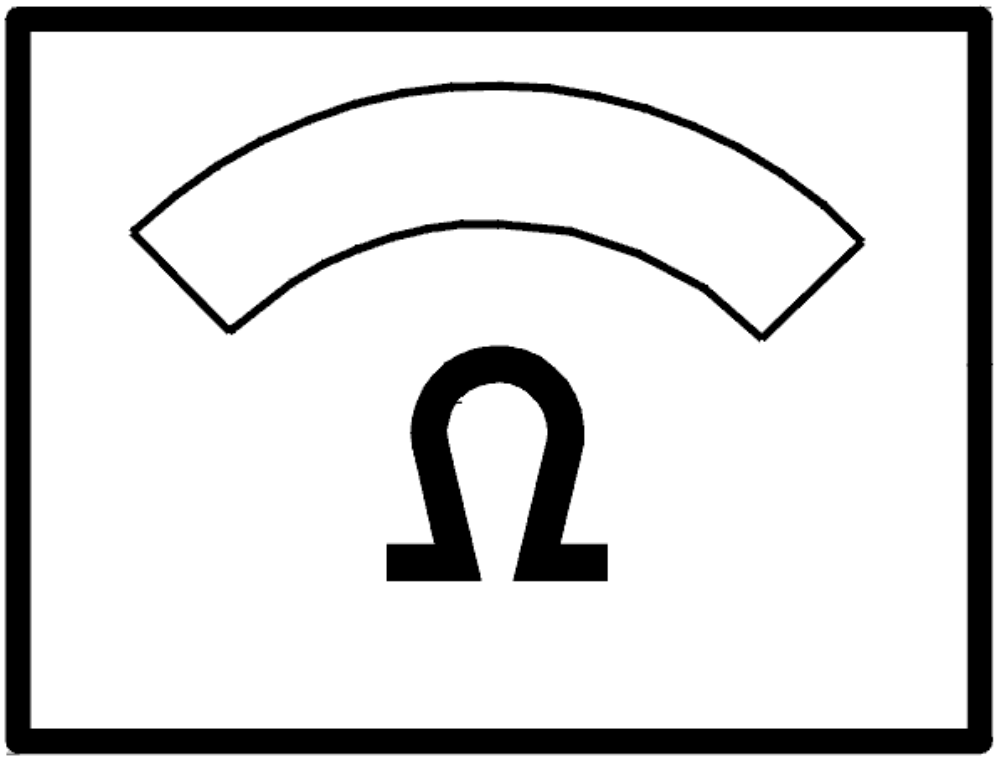


Fig. 96: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance incorrect?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

CHECKING THE WIRING

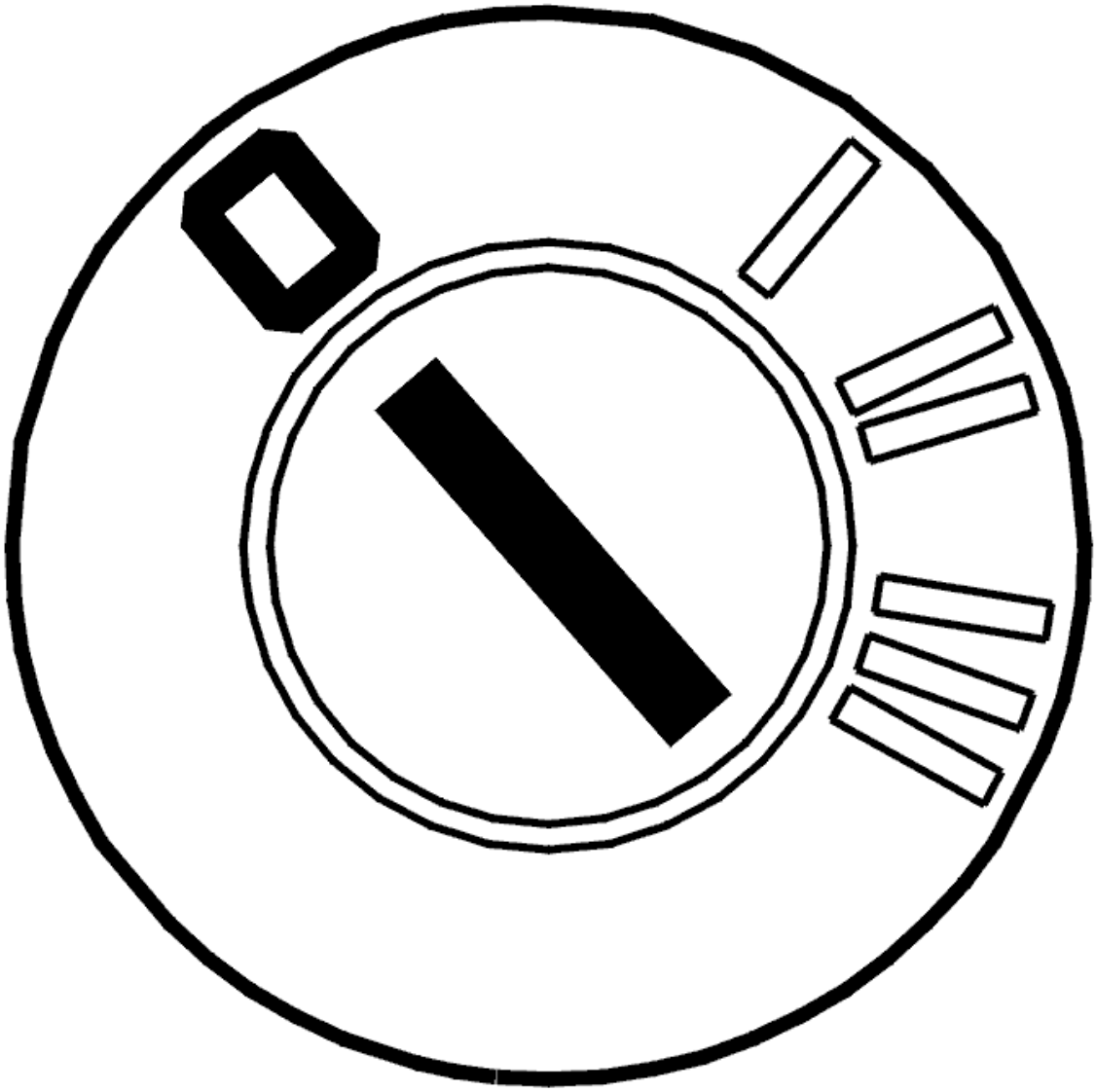


Fig. 97: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

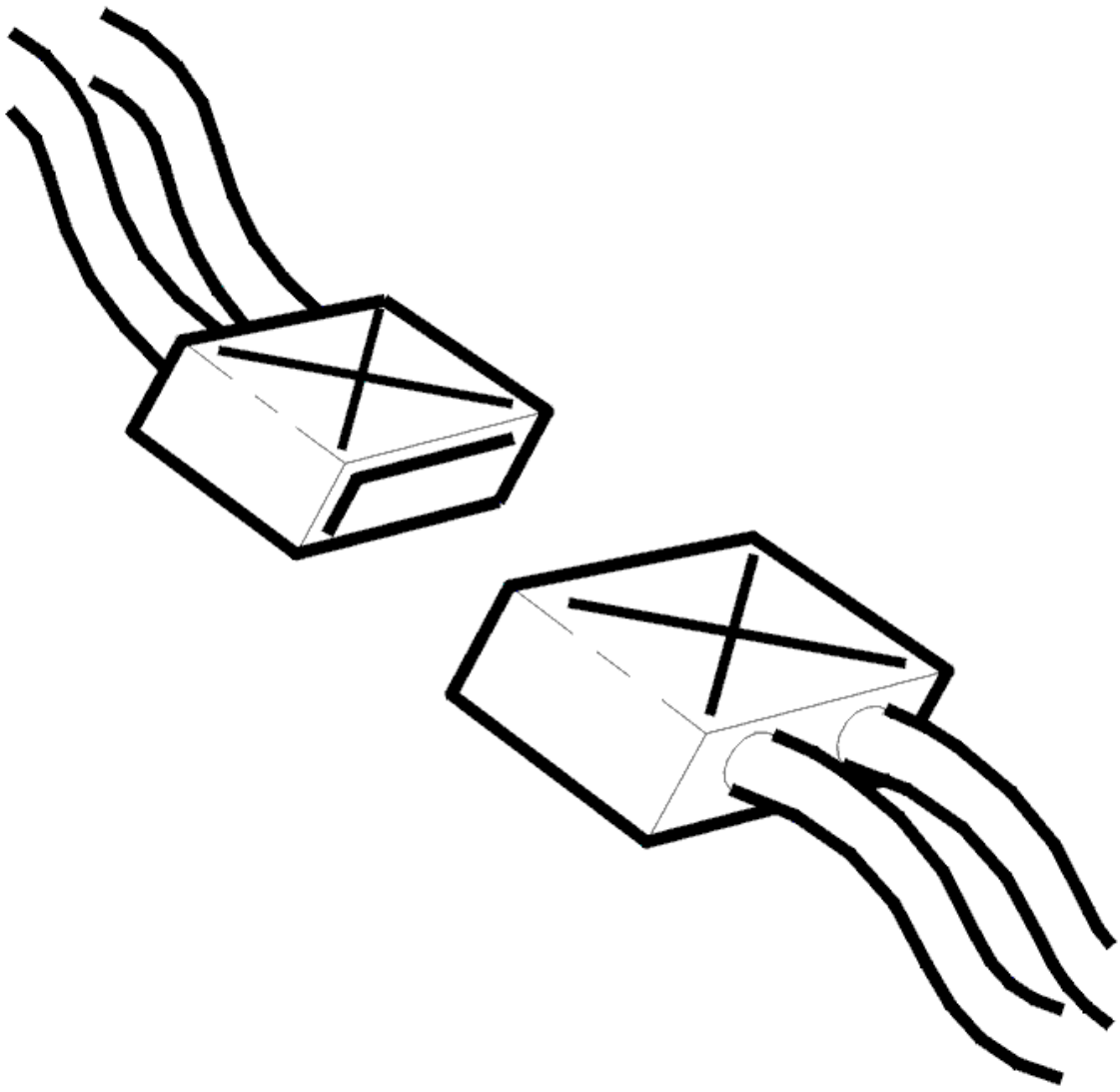


Fig. 98: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

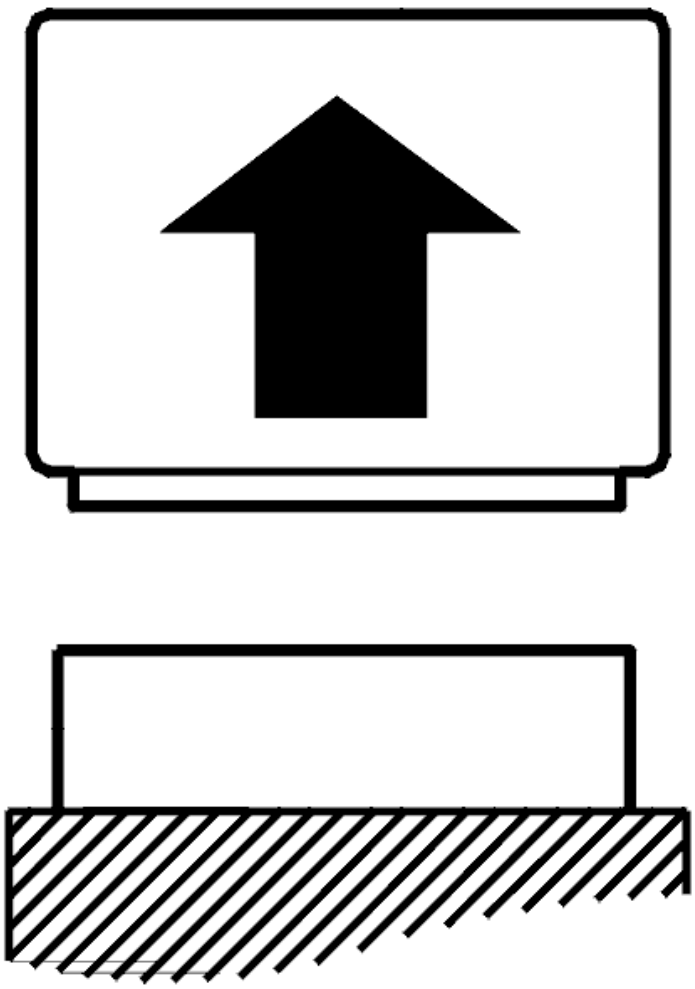


Fig. 99: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the transmission
- Disconnect the control module
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (control module side).

  Check the cable between control module terminal #A50 (#A50) and transmission connector terminal #A (#A1). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

  Check the cable between control module terminal #A53 and transmission connector terminal #E (#A5). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

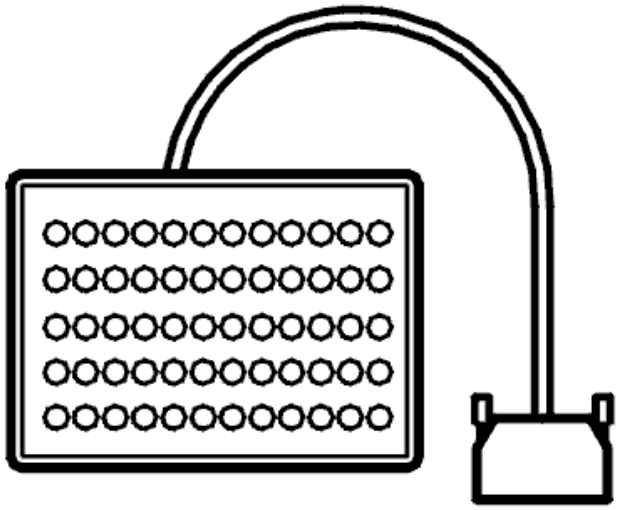


Fig. 100: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

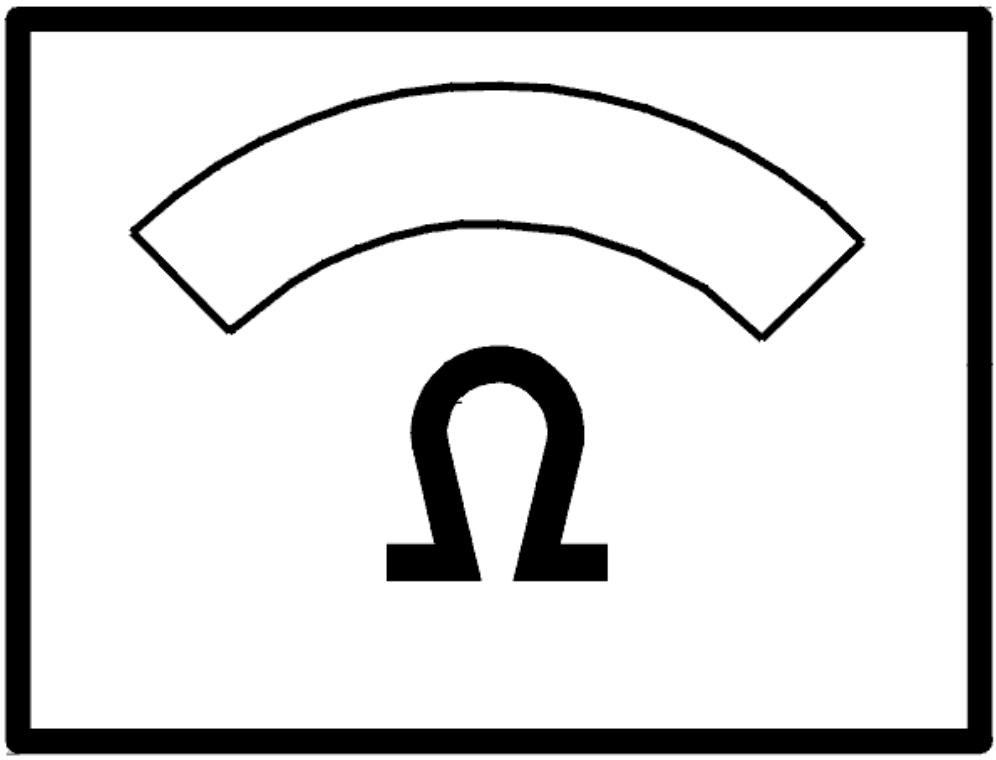


Fig. 101: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE WIRING AND COMPONENT

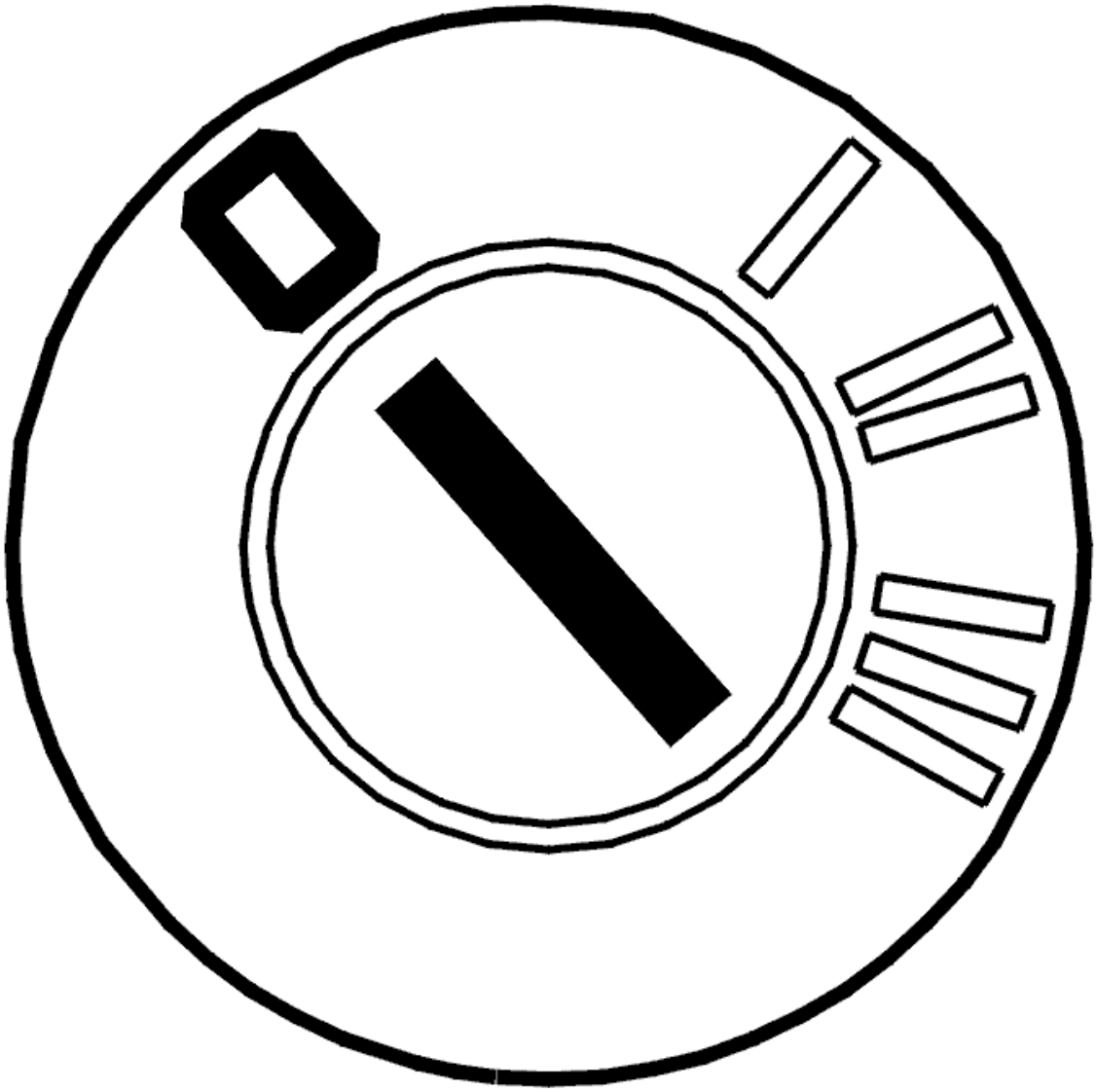


Fig. 102: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission connector (transmission side) terminal #A (#A1) and solenoid S1 terminals #A and #E (#A5) and solenoid S1 terminal #B. Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

  HINT: Check solenoid S1 by measuring the solenoid resistance between terminals A and B. The resistance must be between 18 and 30 ohms.

  Remedy as necessary.

  Other information:

- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid S1, see **SOLENOID SHIFTING 2-3, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION** .

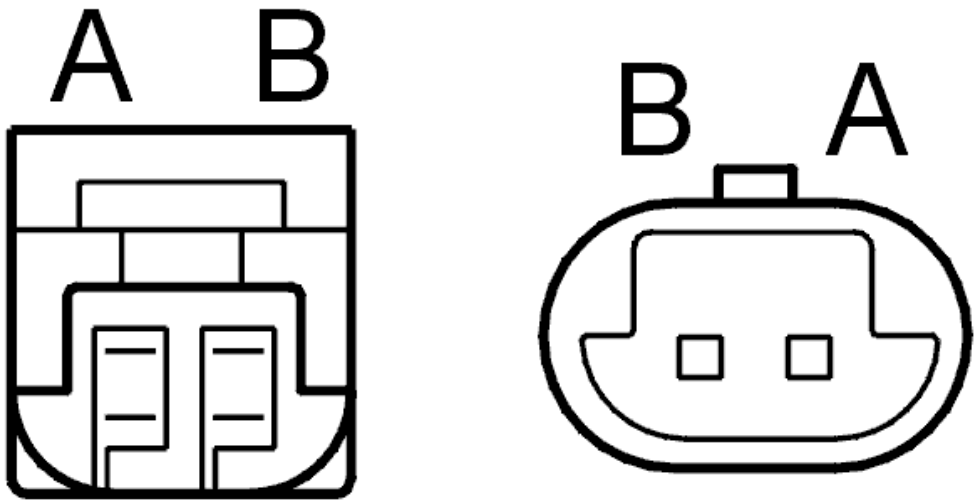


Fig. 103: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

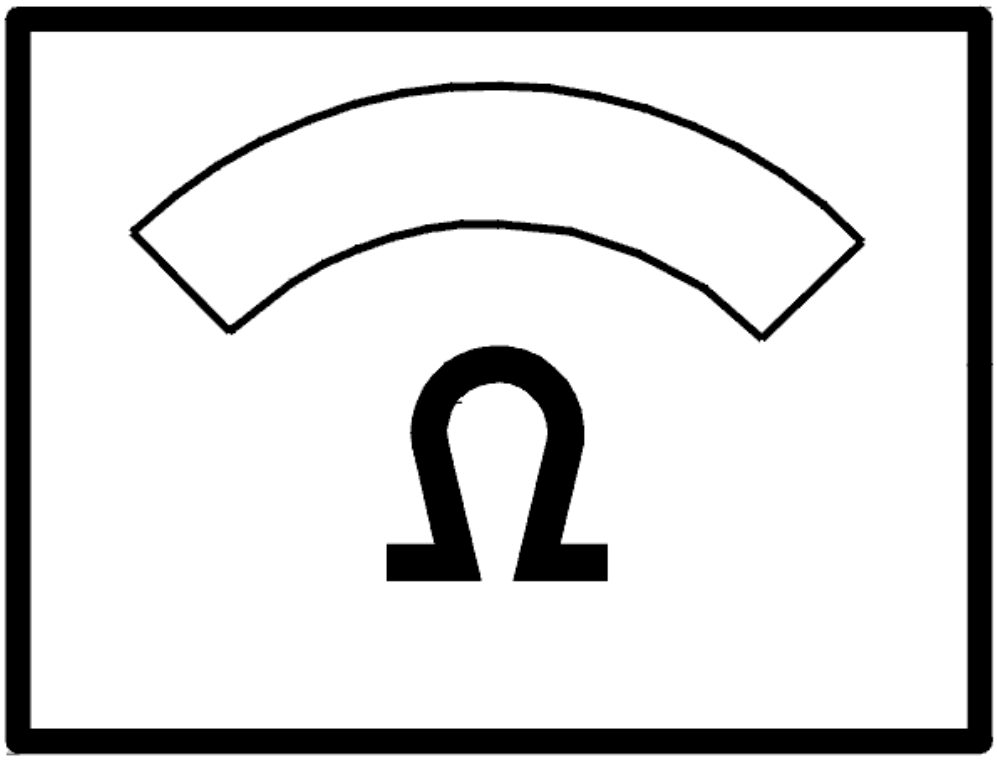


Fig. 104: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the cable between control module terminal #A50 and transmission connector terminal #A (#A1) (control module side). Check for an intermittent open-circuit. See **OPEN-CIRCUIT, INTERMITTENT FAULTS** . Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between control module terminal #A53 and transmission connector terminal #E (#A5) (control module side). Check for an intermittent open-circuit. See **OPEN-CIRCUIT, INTERMITTENT FAULTS** . Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid S1, see **SOLENOID SHIFTING 2-3, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION** .

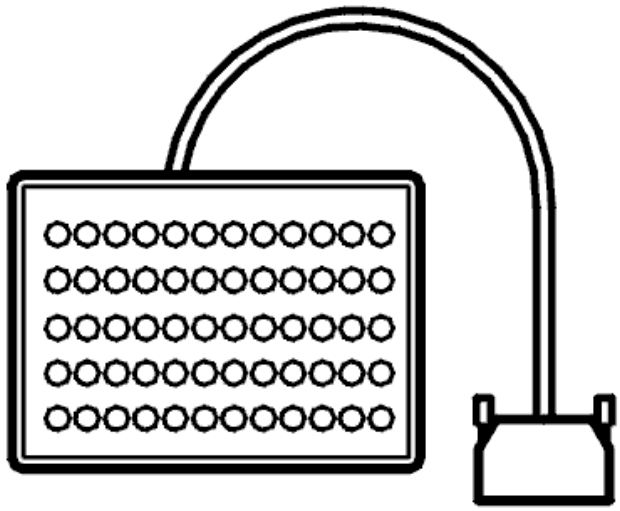


Fig. 105: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

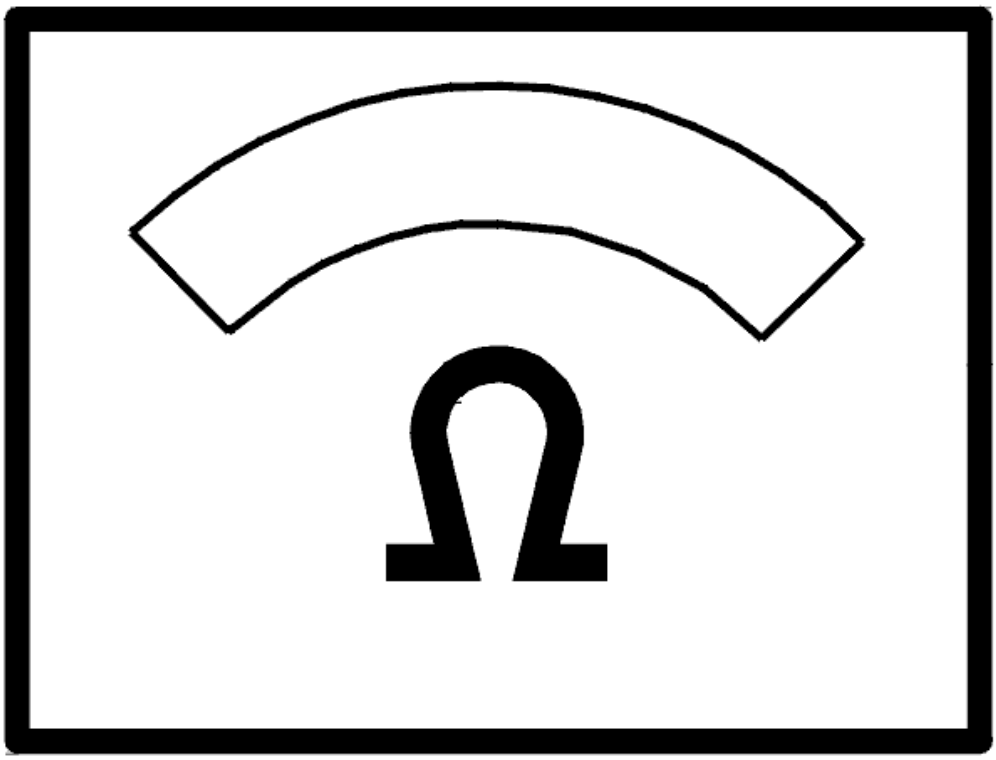


Fig. 106: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

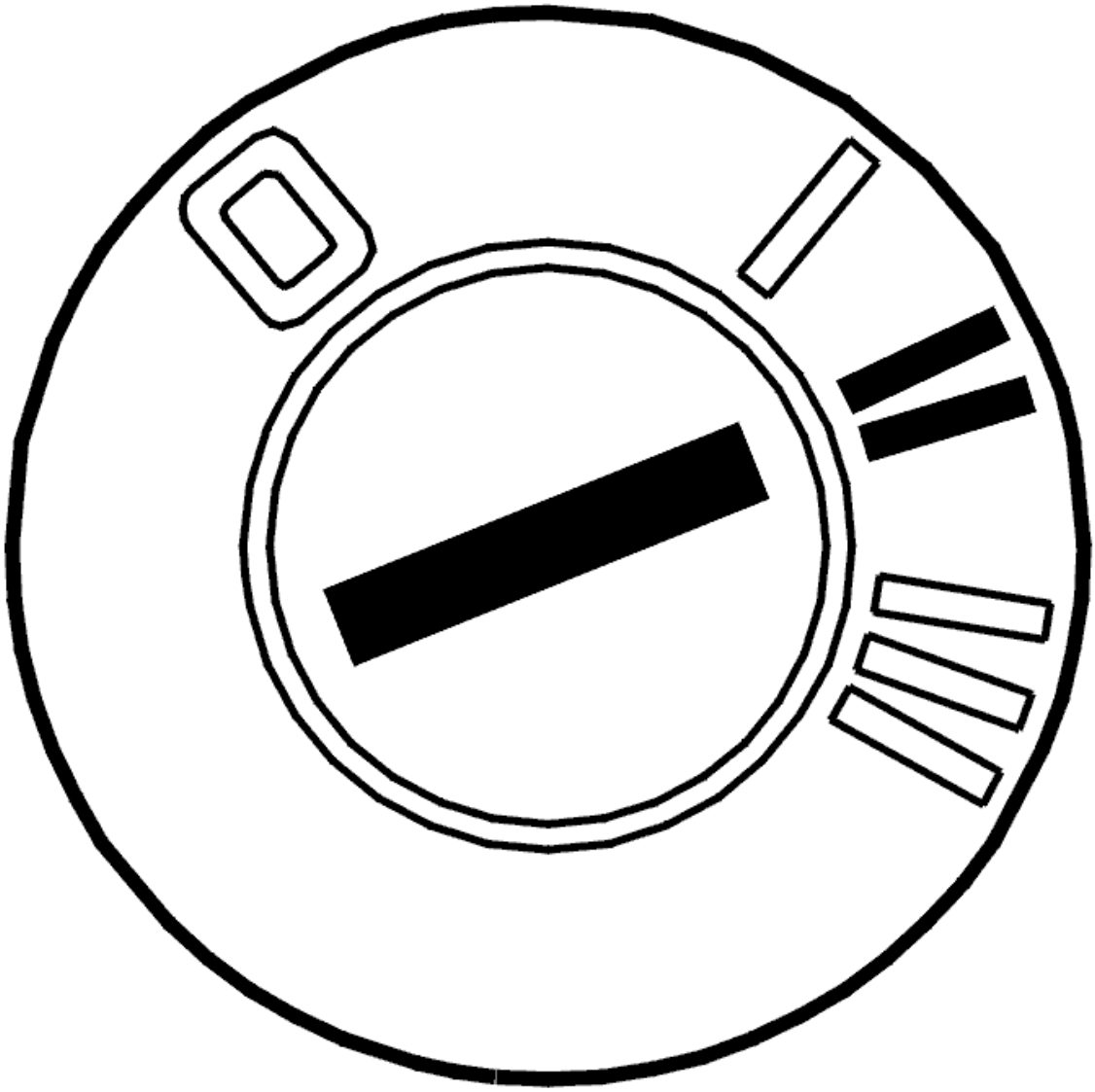


Fig. 107: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

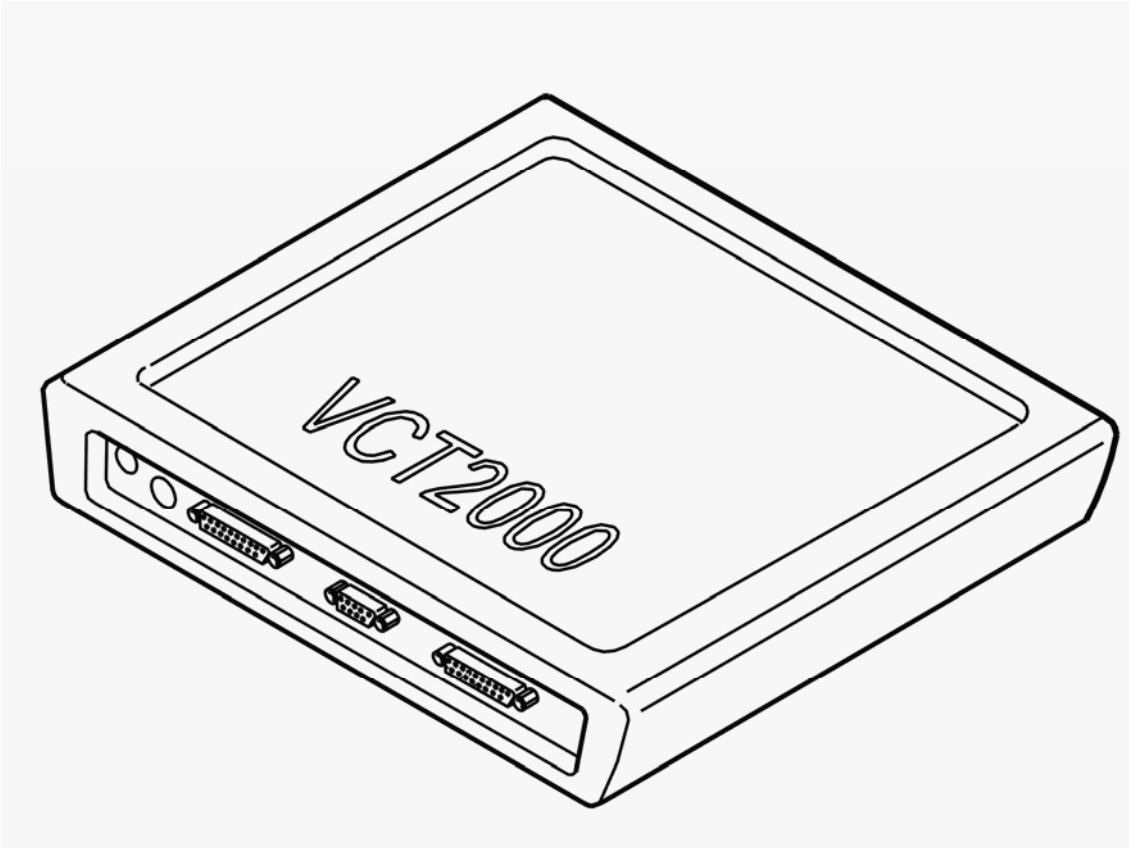


Fig. 108: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

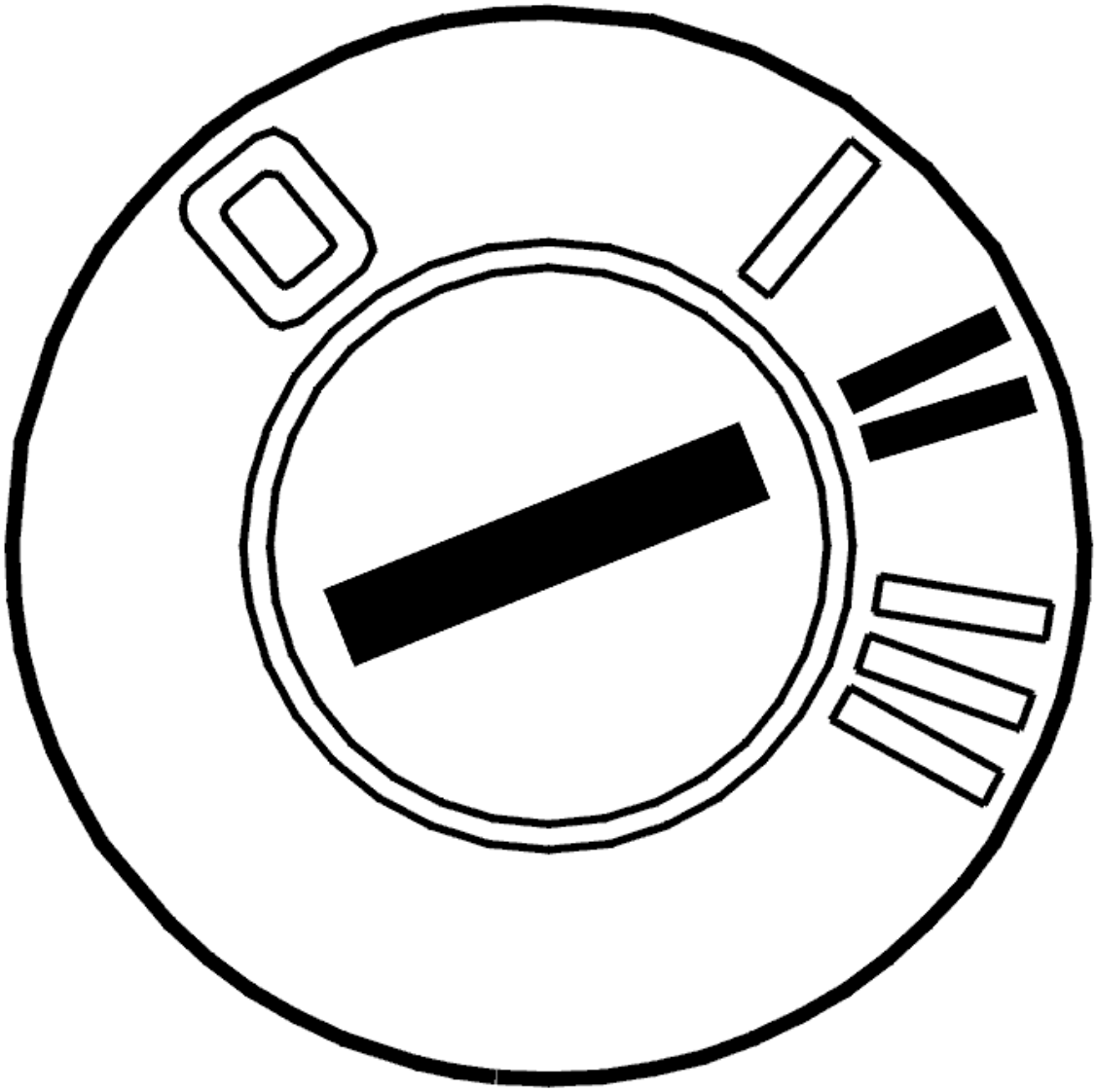


Fig. 109: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Gear selector in position P.
- Activate solenoid S1.
- Read off the current across solenoid S1.

The current should oscillate between approximately 0 and 1.5 A.

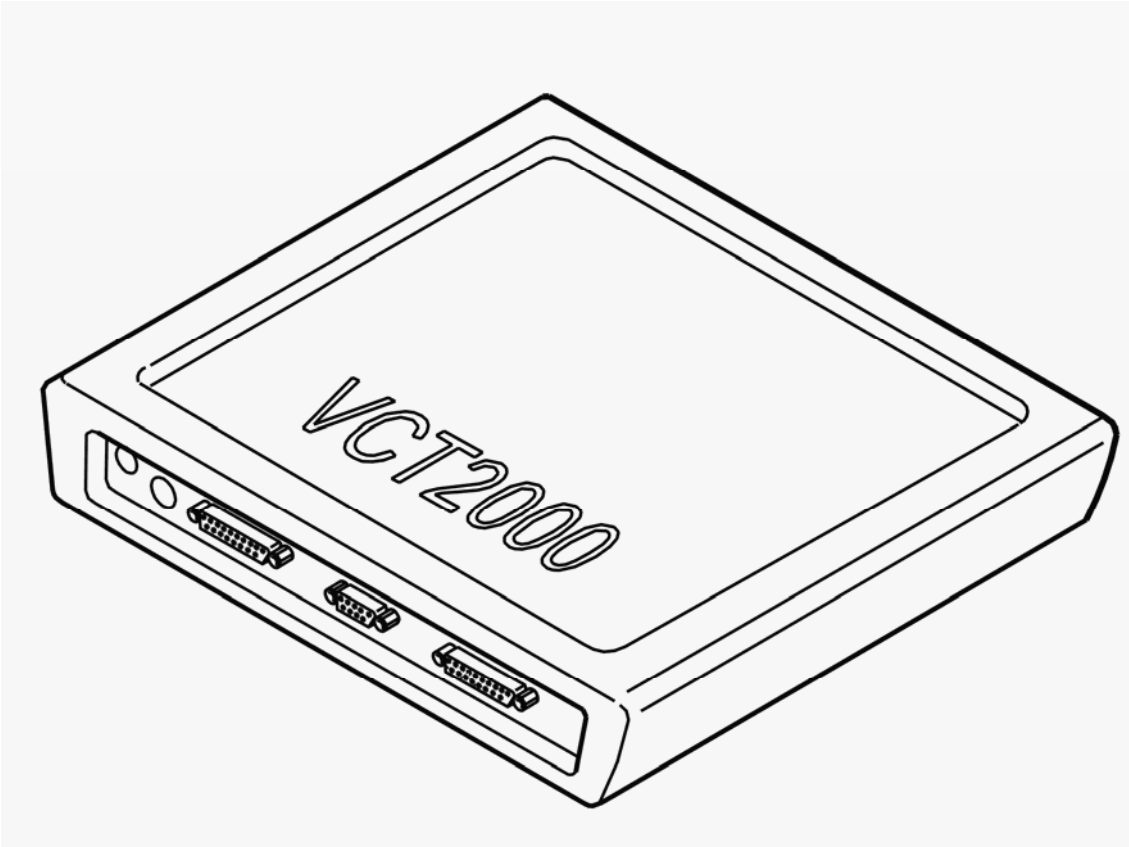


Fig. 110: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

SIGNAL TOO HIGH

CHECKING THE FUNCTION OF THE OIL TEMPERATURE SENSOR

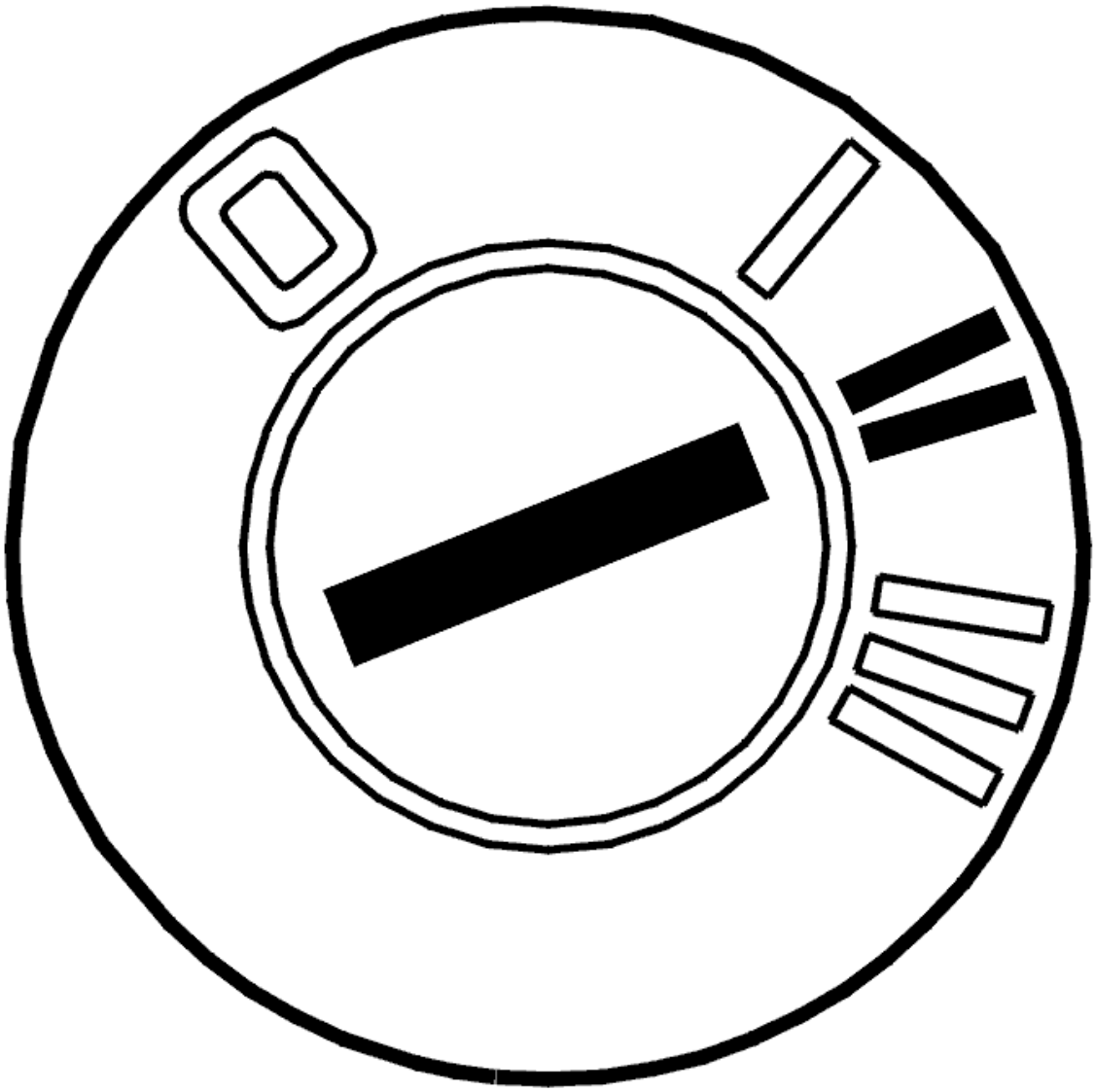


Fig. 111: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

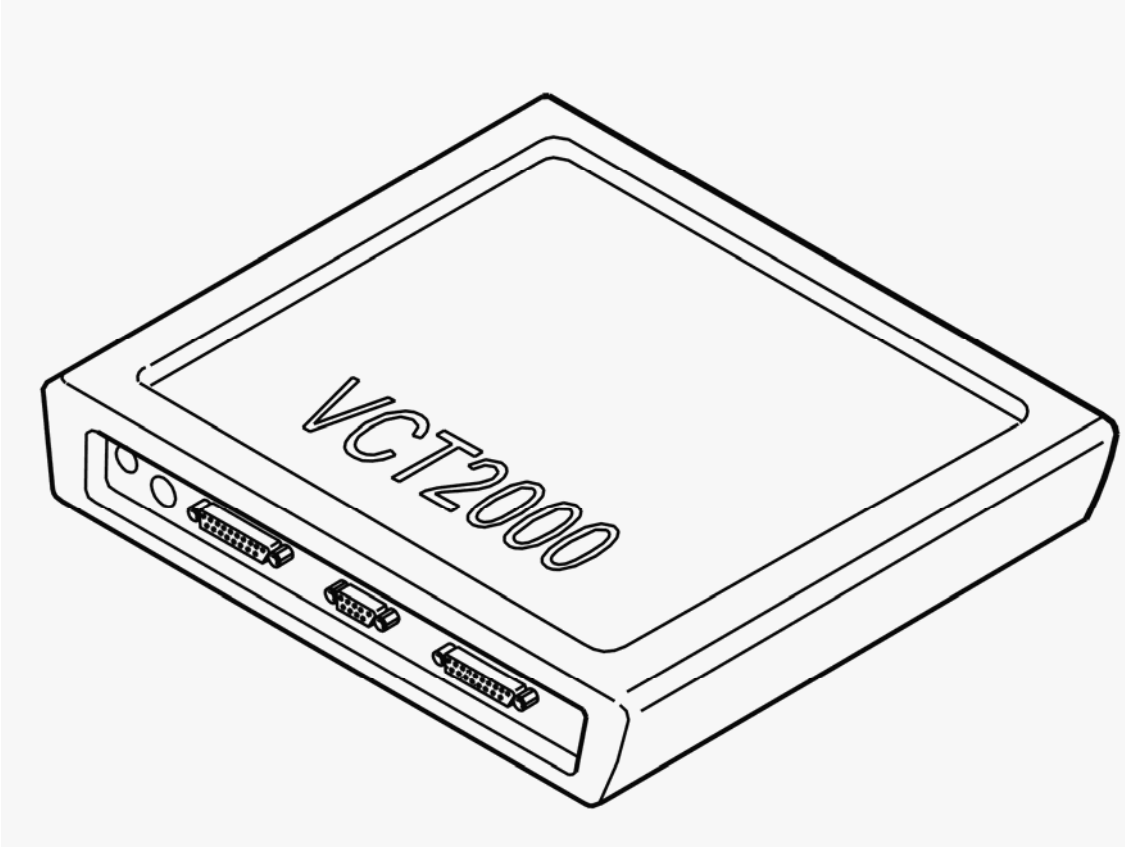


Fig. 112: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

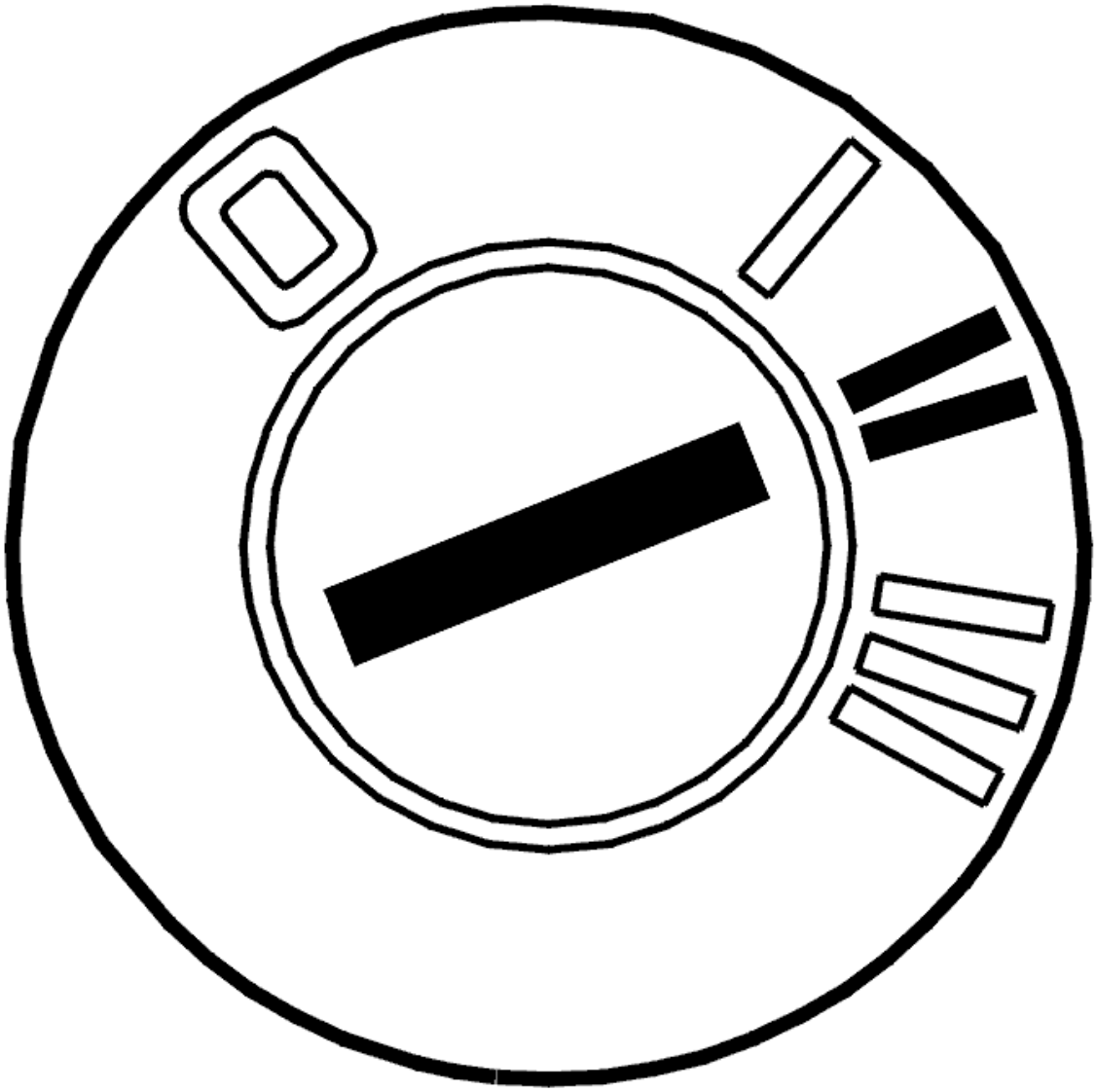


Fig. 113: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

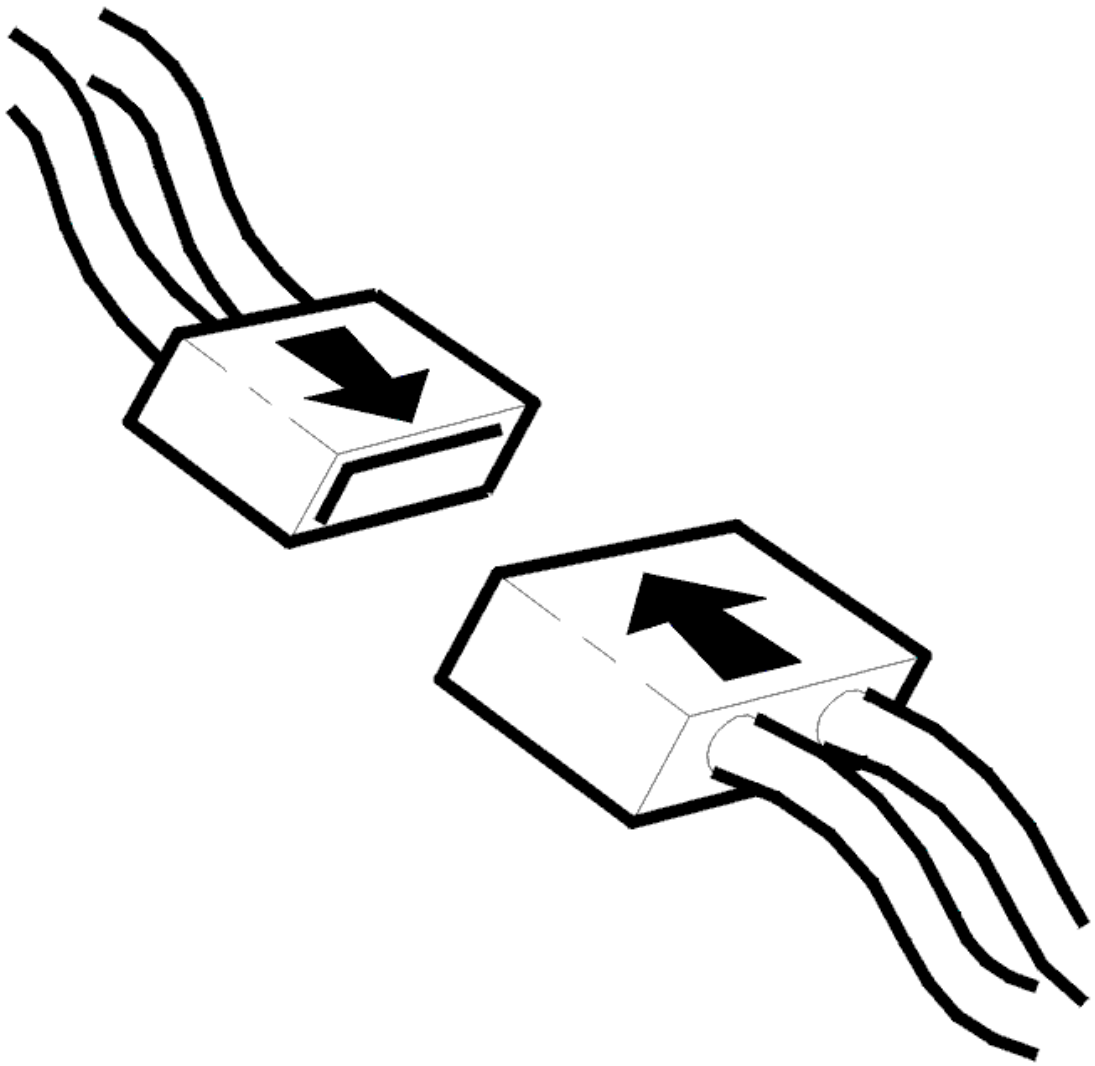


Fig. 114: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and transmission connectors. Check for contact resistance and oxidation
- Reconnect the control module and transmission connectors
- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

  If the transmission temperature is within its permitted range, the cause of the fault was contact resistance or oxidation in the control module or transmission connector.

Other information

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- see **CHECKING WIRING AND TERMINALS**

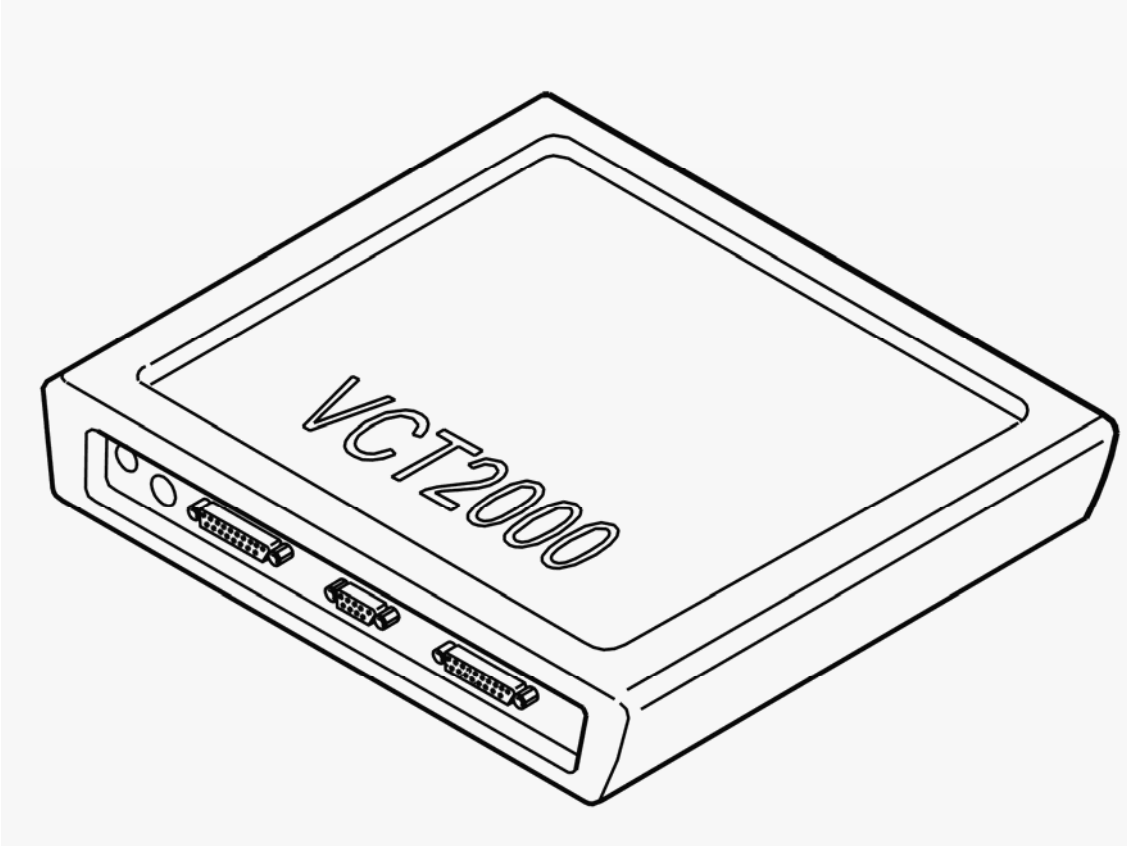


Fig. 115: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING THE TEMPERATURE SENSOR**

CHECKING THE TEMPERATURE SENSOR

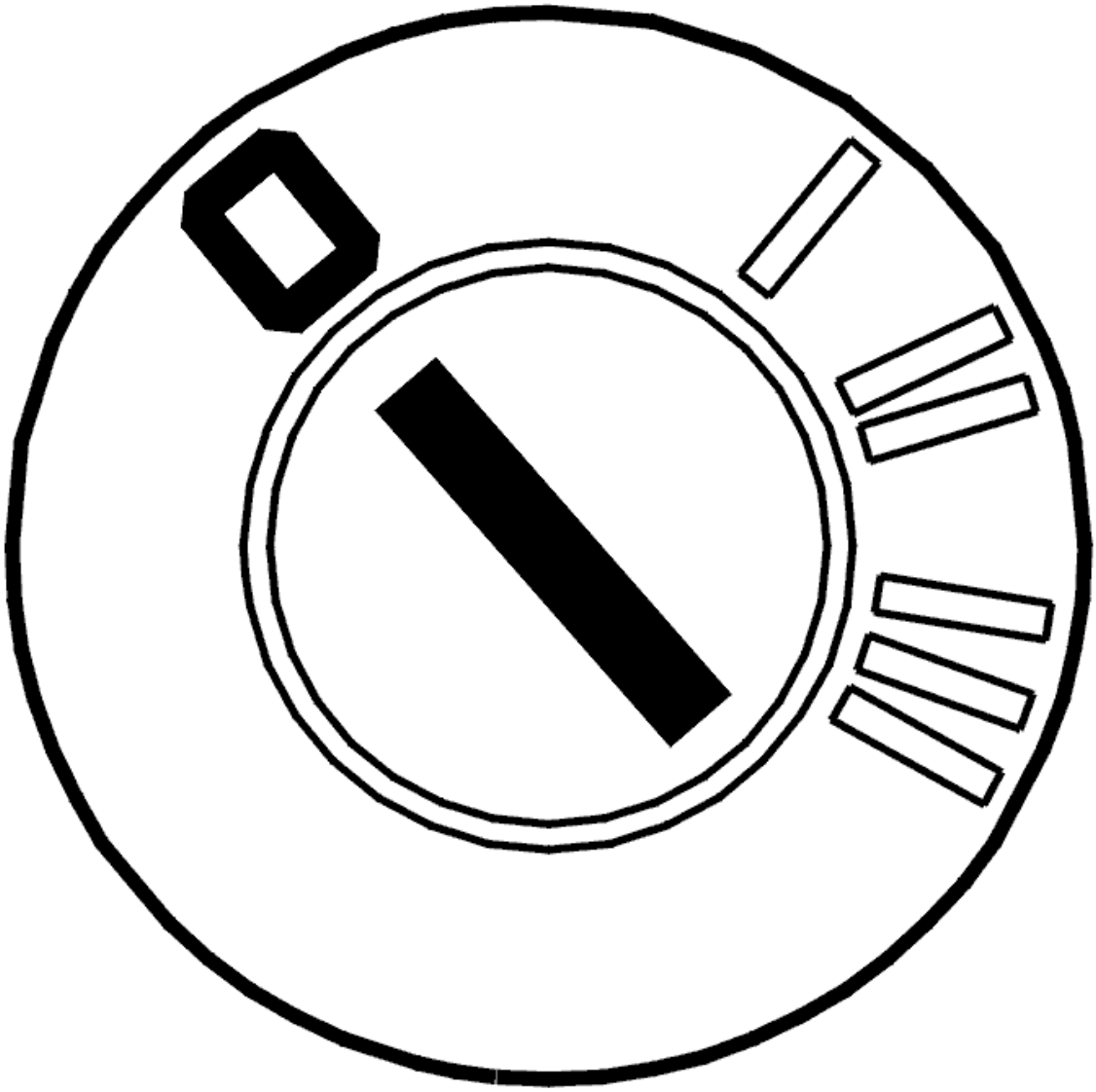


Fig. 116: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector
- Connect adapter see **9511505** and see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals #L (terminal #A11) and #M (terminal #A12).

  The resistance must be 3.4-3.6 kohms at 20 °C.

  Other information

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - For information about signals, see **SIGNAL SPECIFICATION**

- For information about the resistance values, see **COMPONENT RESISTANCE VALUES**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES** .

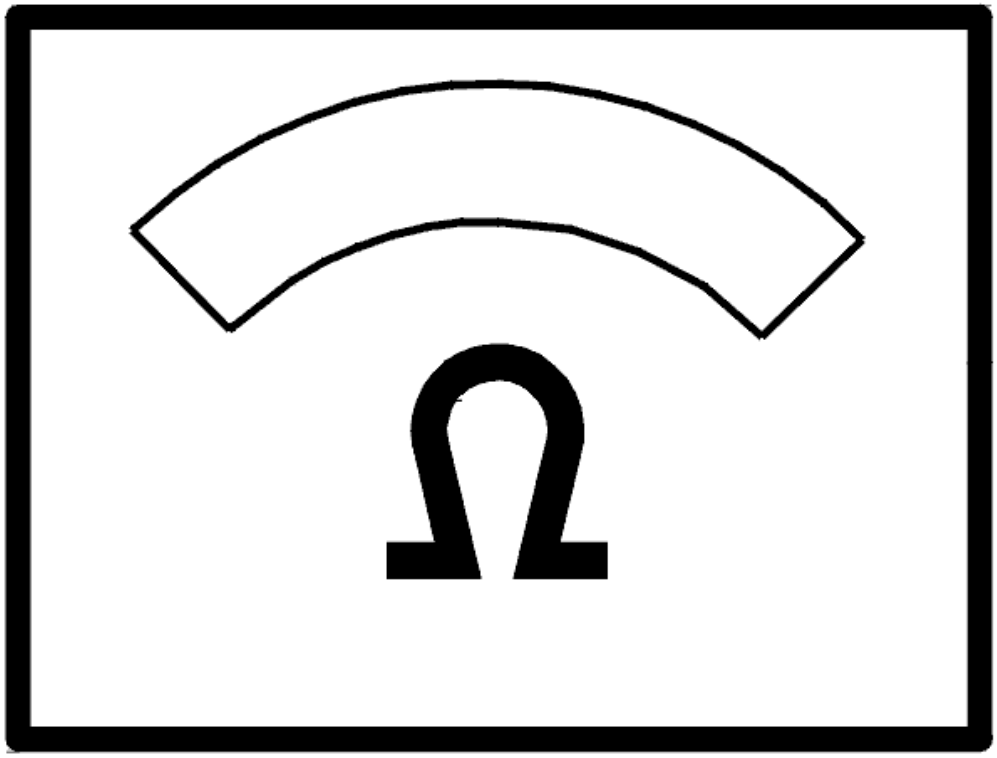


Fig. 117: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

- Breakout box connected to the control module
- Breakout box connected to the transmission connector.

Check the cable between control module terminal #37 (#A37) and transmission connector (control module side) terminal #L (#A11). Check for an open-circuit. Check for a short-circuit to supply voltage.

Check the cable between control module terminal #55 (#A55) and transmission connector (control module side) terminal #M (#A12). Check for an open-circuit. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

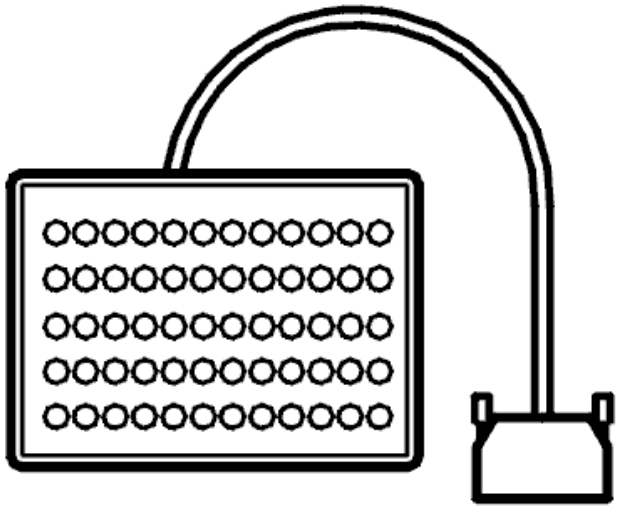


Fig. 118: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

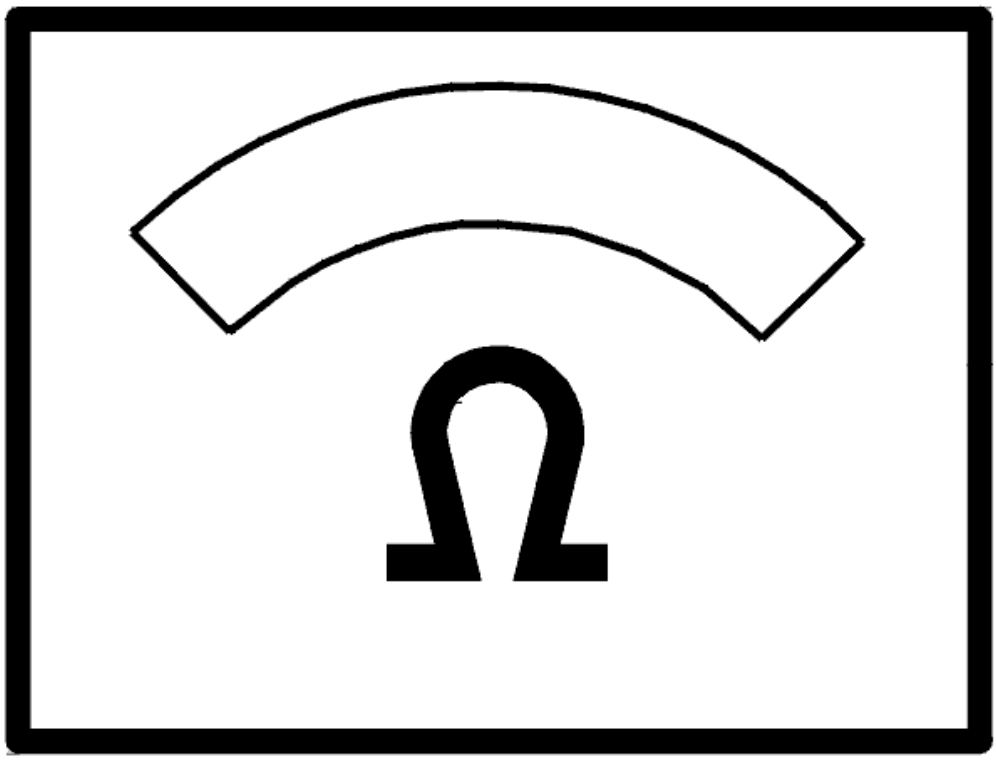


Fig. 119: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

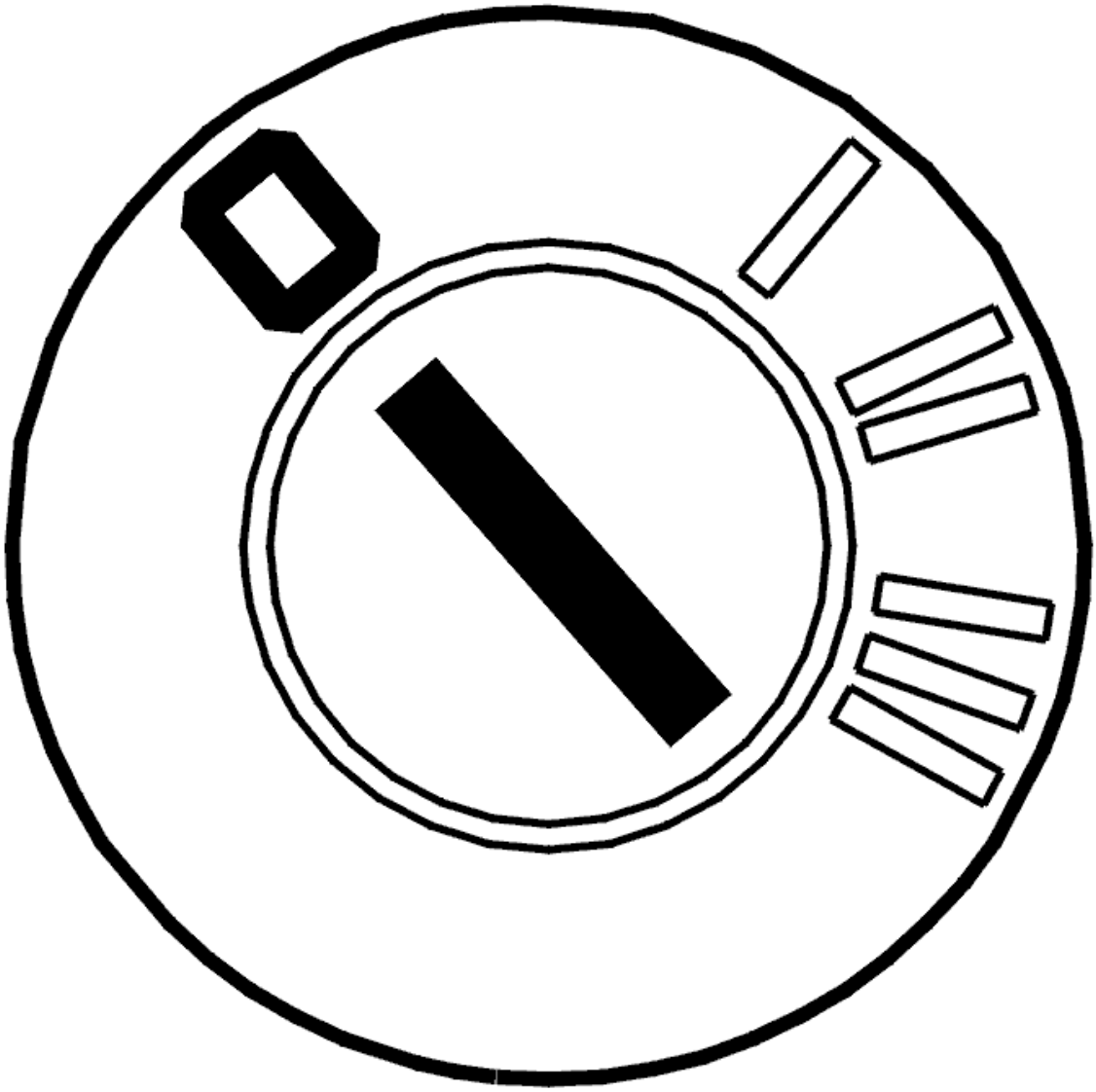


Fig. 120: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission terminal #L (#A11) and temperature sensor terminal #A. Check for an open-circuit. Check for a short-circuit to supply voltage.

  Check the cable between transmission terminal #M (#A12) and temperature sensor terminal #B. Check for an open-circuit. Check for a short-circuit to supply voltage.

  HINT: Check the temperature sensor by measuring the resistance between temperature sensor connector terminals #A and #B. The resistance must be between 3.5-3.6 kohms at 20° C.

  Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- To replace the temperature sensor, see **TEMPERATURE SENSOR FLUID TRANSMISSION, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES**
- see **CHECKING WIRING AND TERMINALS**

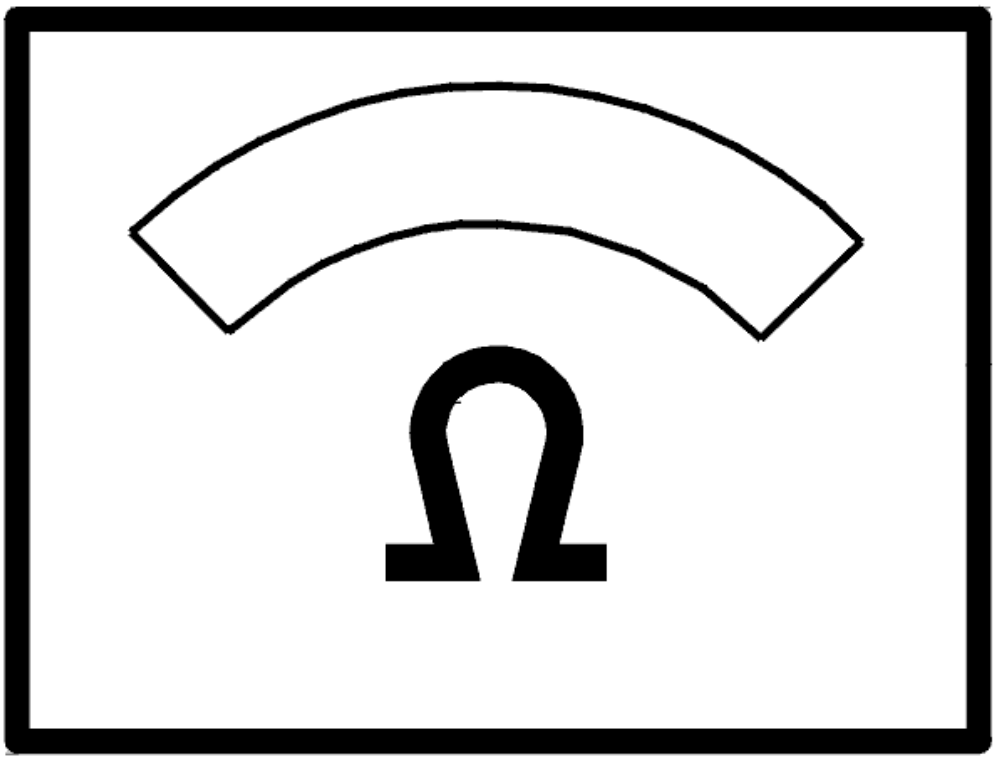


Fig. 121: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the control module and automatic transmission connector. Check for contact resistance and oxidation. Remedy if necessary.

Check the cable between control module terminal #A37 (#A37) and transmission connector (control module side) terminal #11. Check for an intermittent open-circuit. Check for an intermittent short-circuit to supply voltage.

Check the cable between control module terminal #A55 (#A55) and transmission connector (control module side) terminal #12. Check for an intermittent open-circuit. Check for an intermittent short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

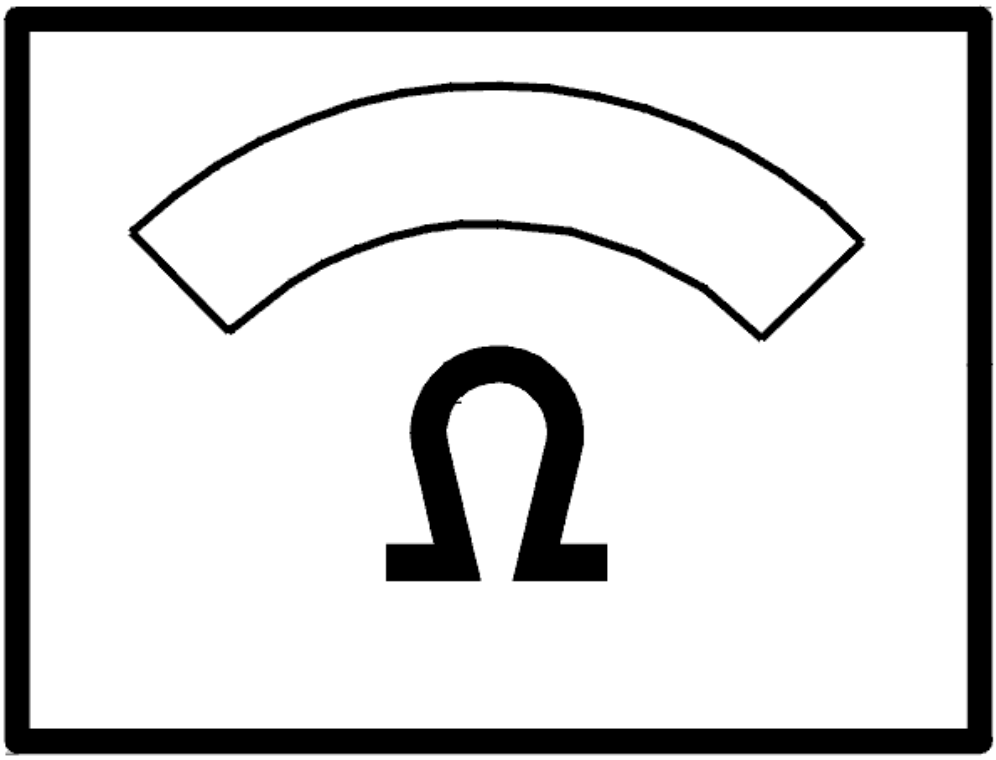


Fig. 122: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

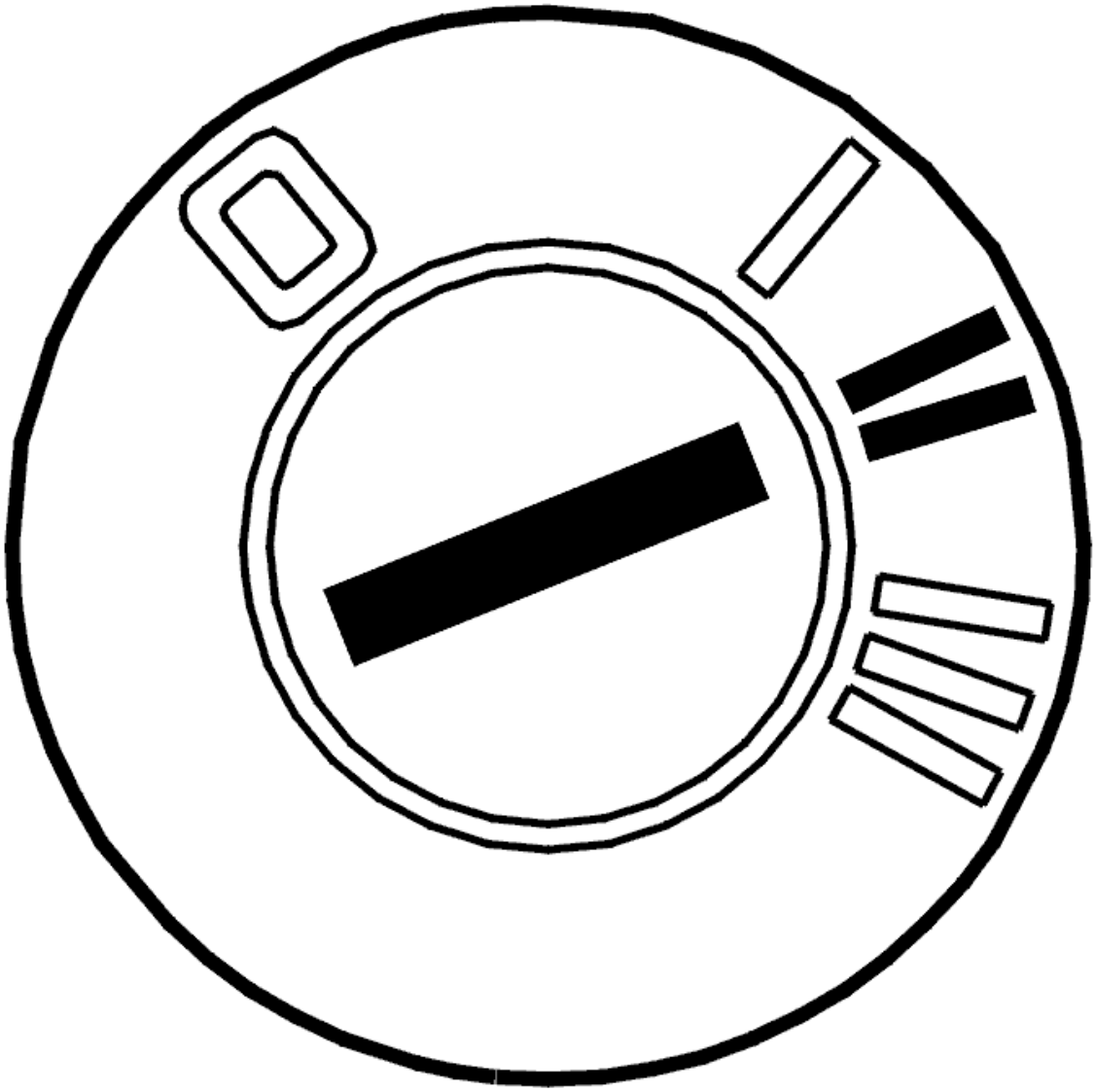


Fig. 123: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

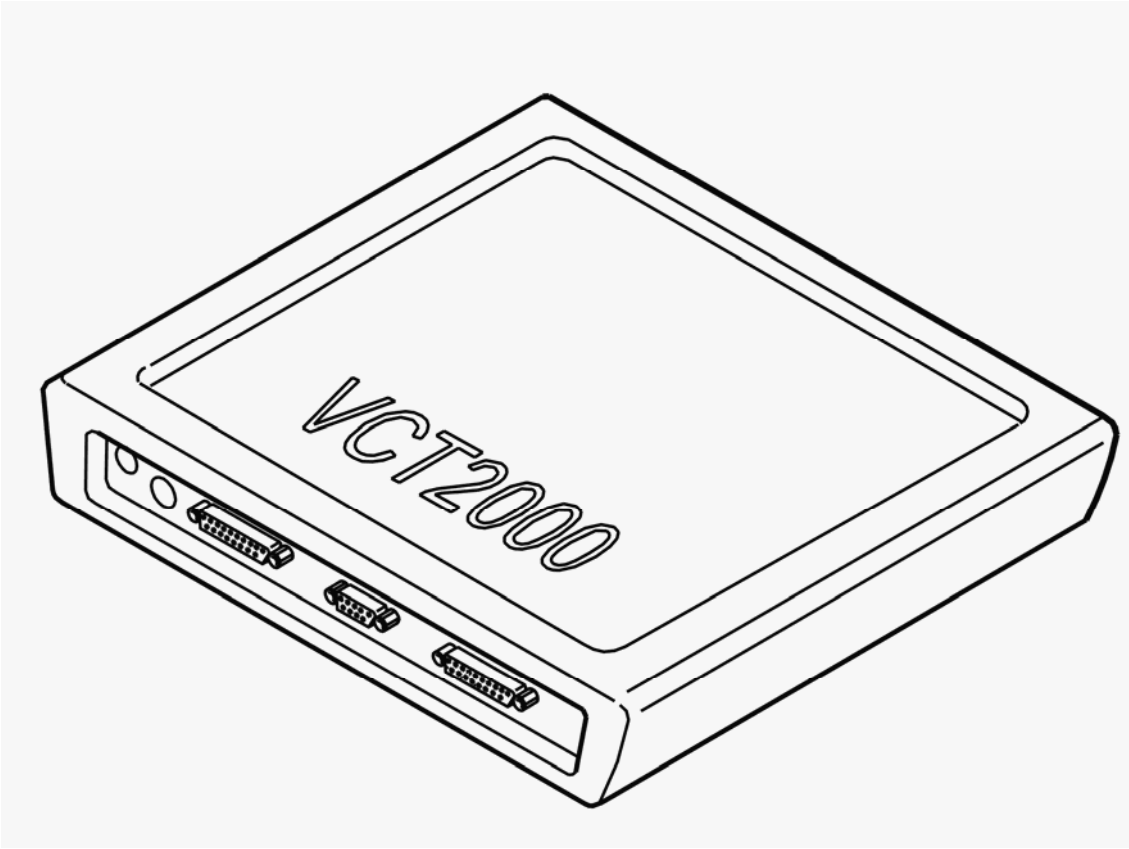


Fig. 124: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair check that the fault has been remedied.

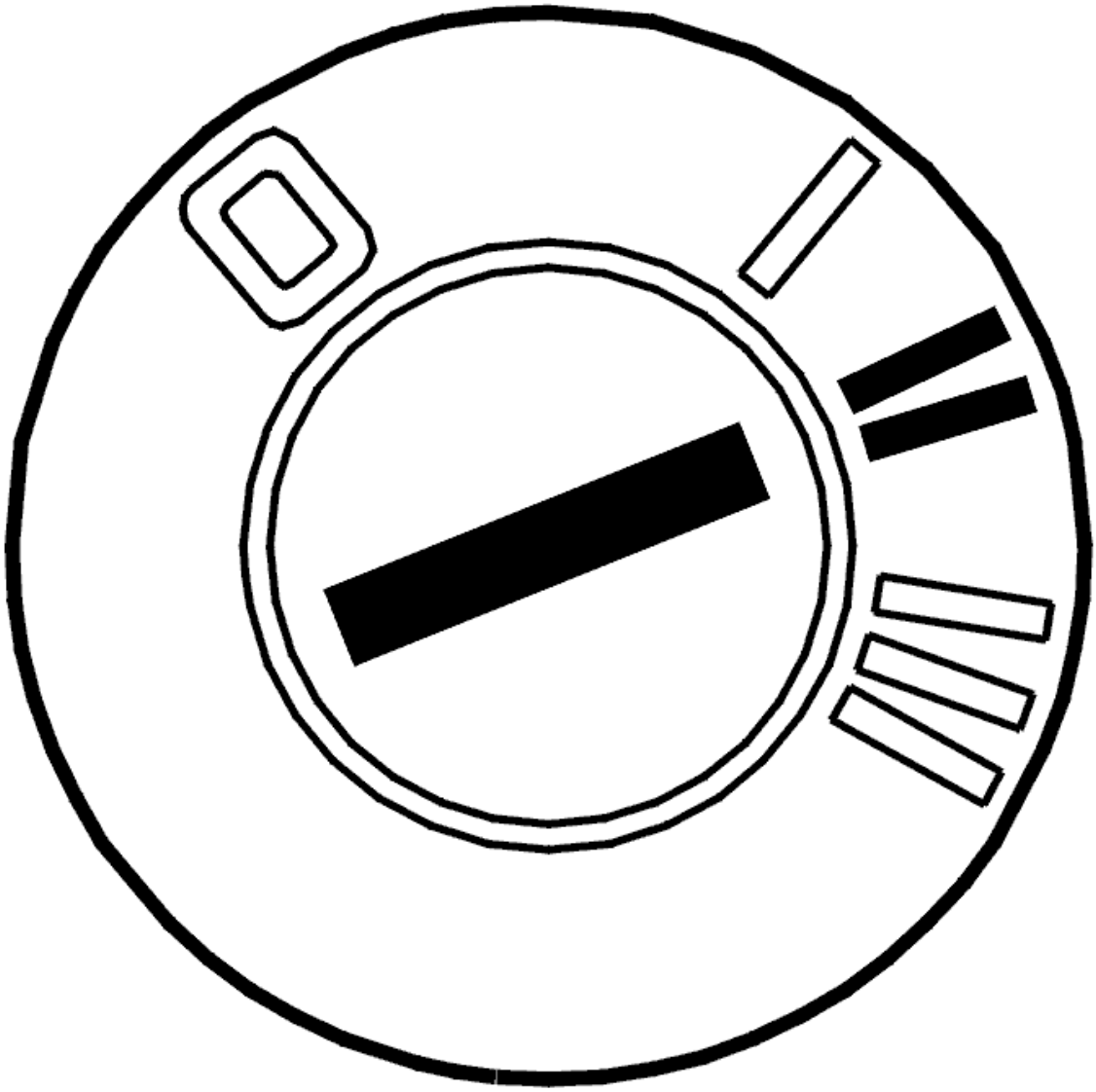


Fig. 125: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

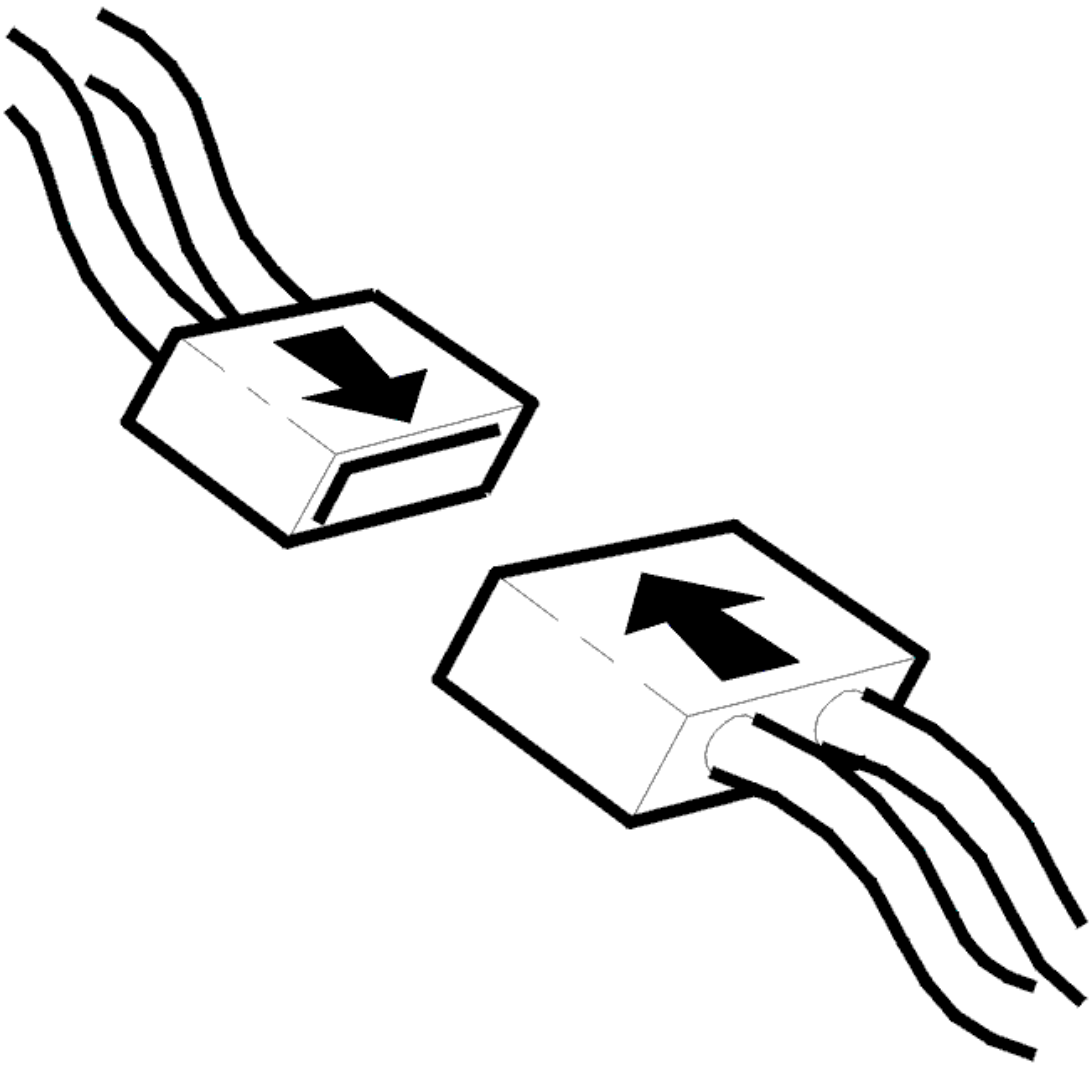


Fig. 126: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.
- Read off oil temperature.

  Check that the transmission oil temperature is within its permitted range. Compare with the transmission temperature.

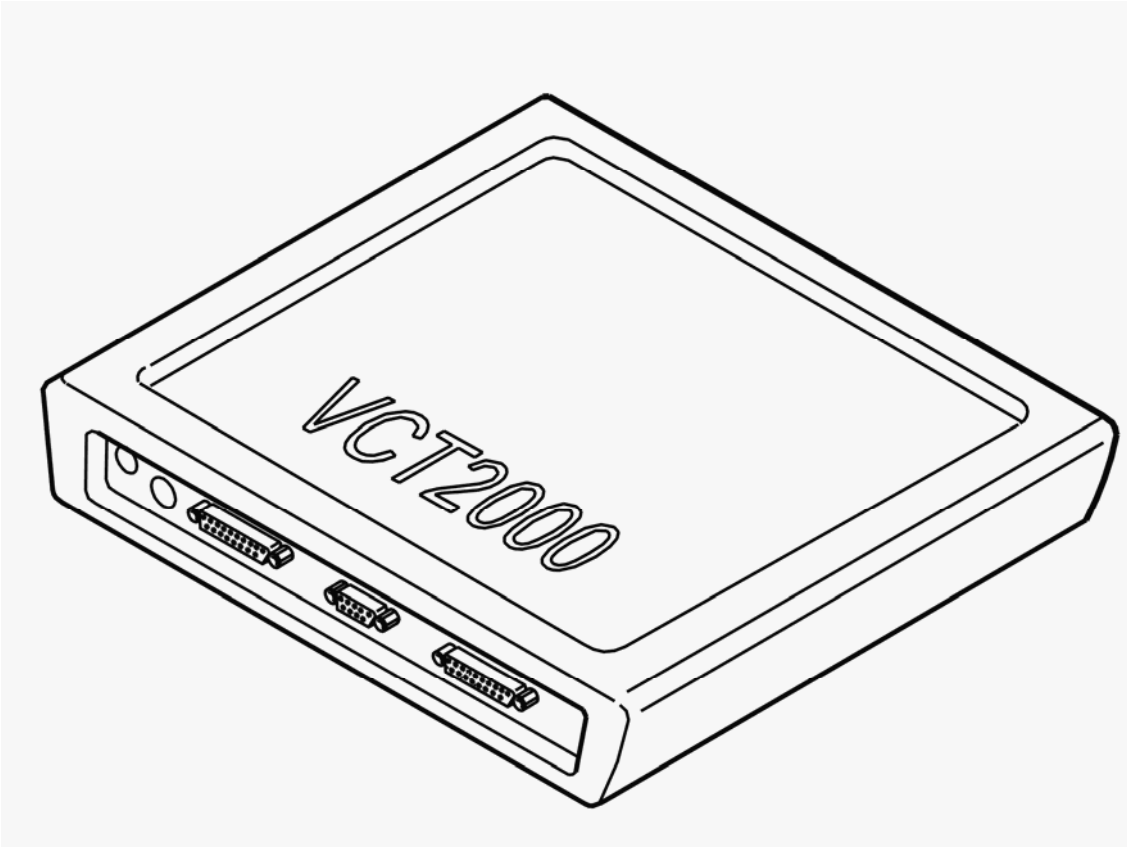


Fig. 127: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-0002: SHIFT SOLENOID S1. SIGNAL MISSING (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

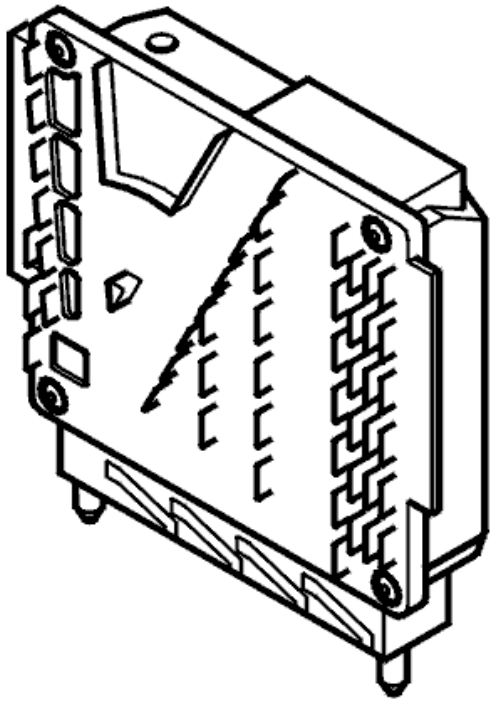


Fig. 128: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0002, TCM-0008, TCM-0102, TCM-0108 or TCM-010B are stored (depending on the solenoid) if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is missing when the solenoid is activated.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Contact resistance in terminals.
- Open-circuit in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

SIGNAL MISSING

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

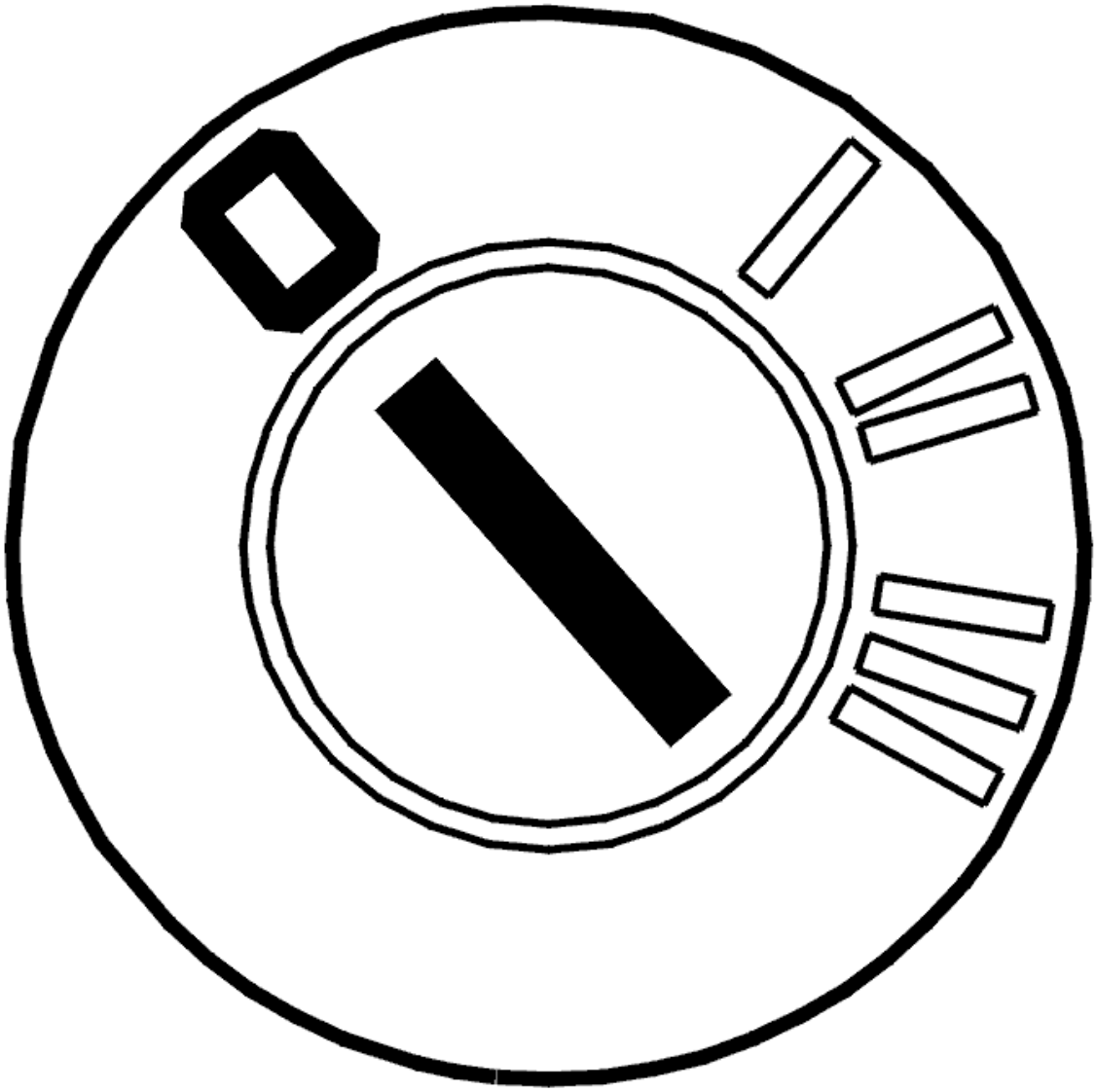


Fig. 129: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

  HINT: If the temperature is outside its permitted range, fault-trace the temperature sensor.

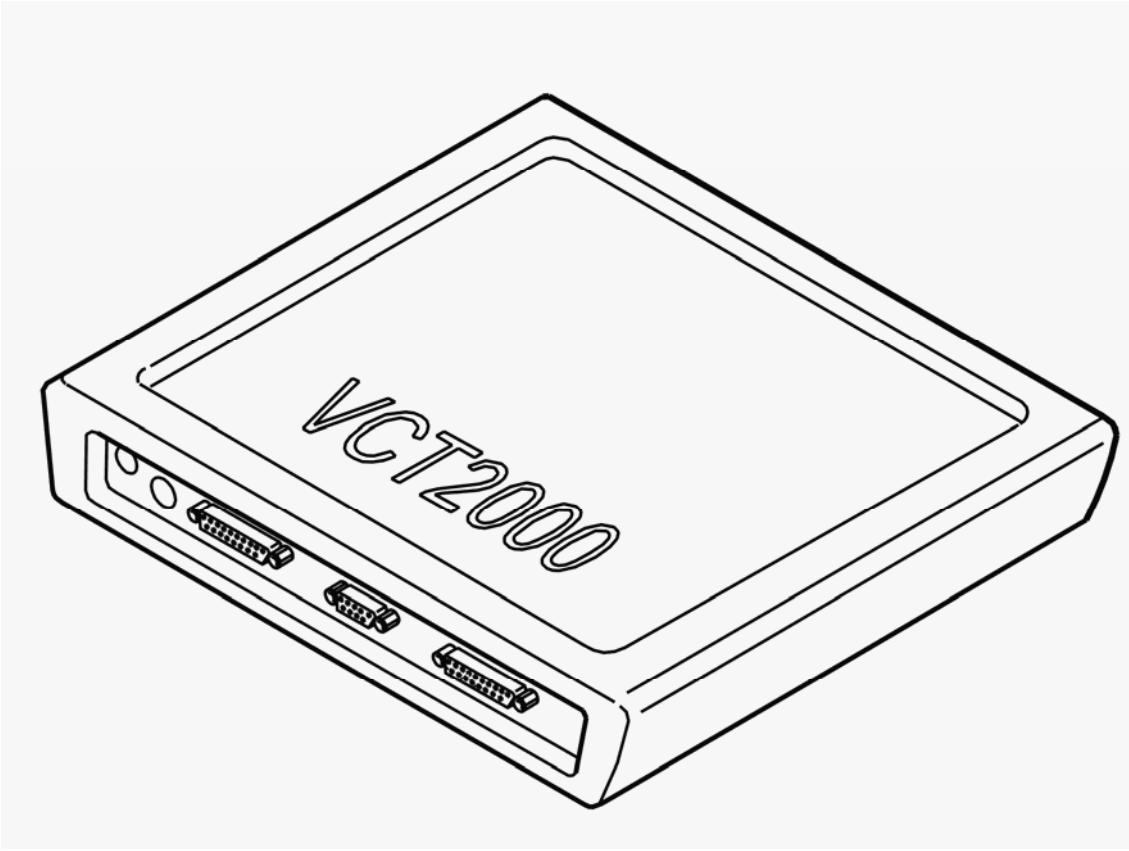


Fig. 130: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S1**

- **NO**

  Refer to **FAULTY SIGNAL**

CHECKING SHIFT SOLENOID S1

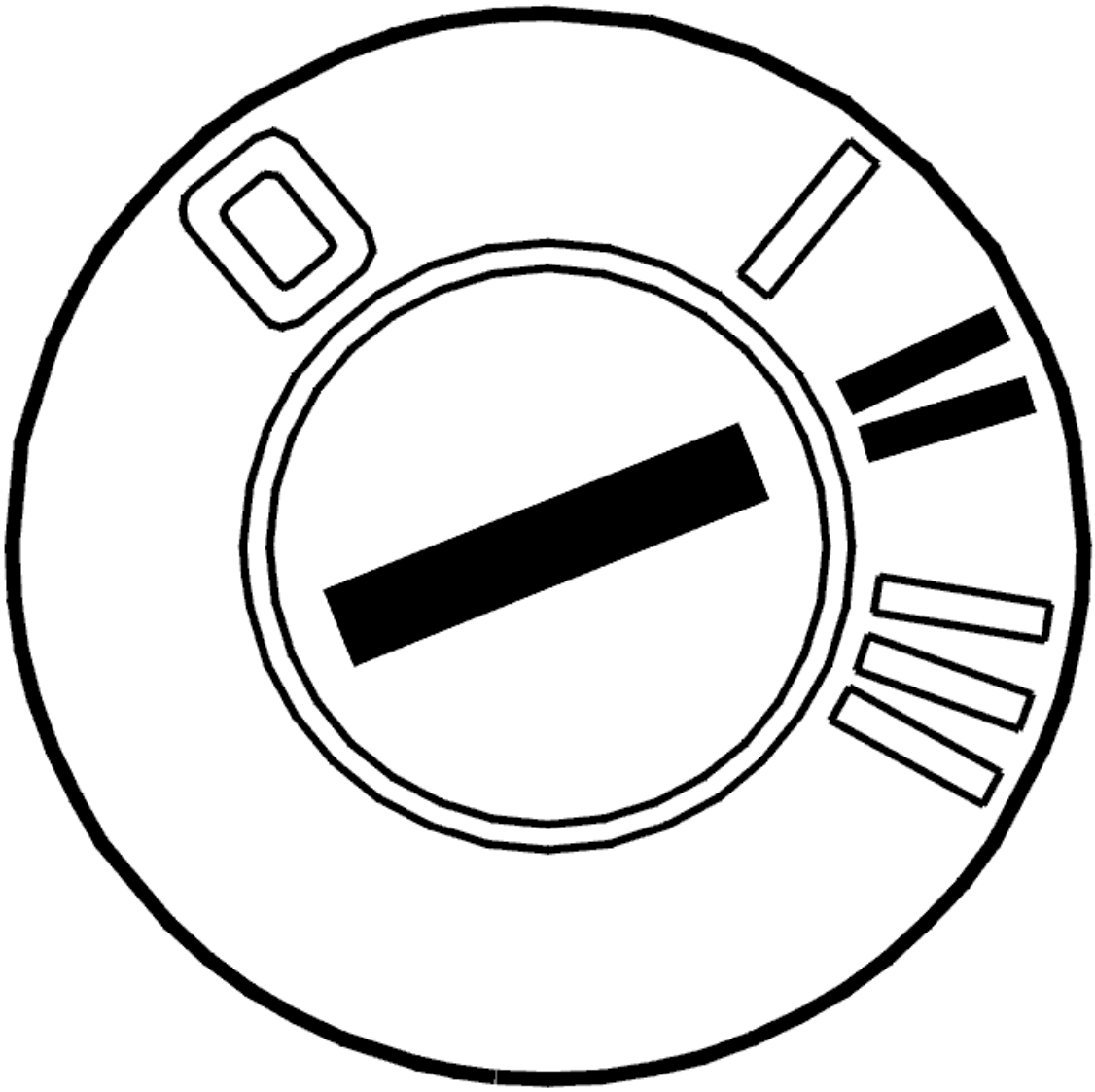


Fig. 131: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S1.

  The current should oscillate between 0 and approximately 1.5 A.

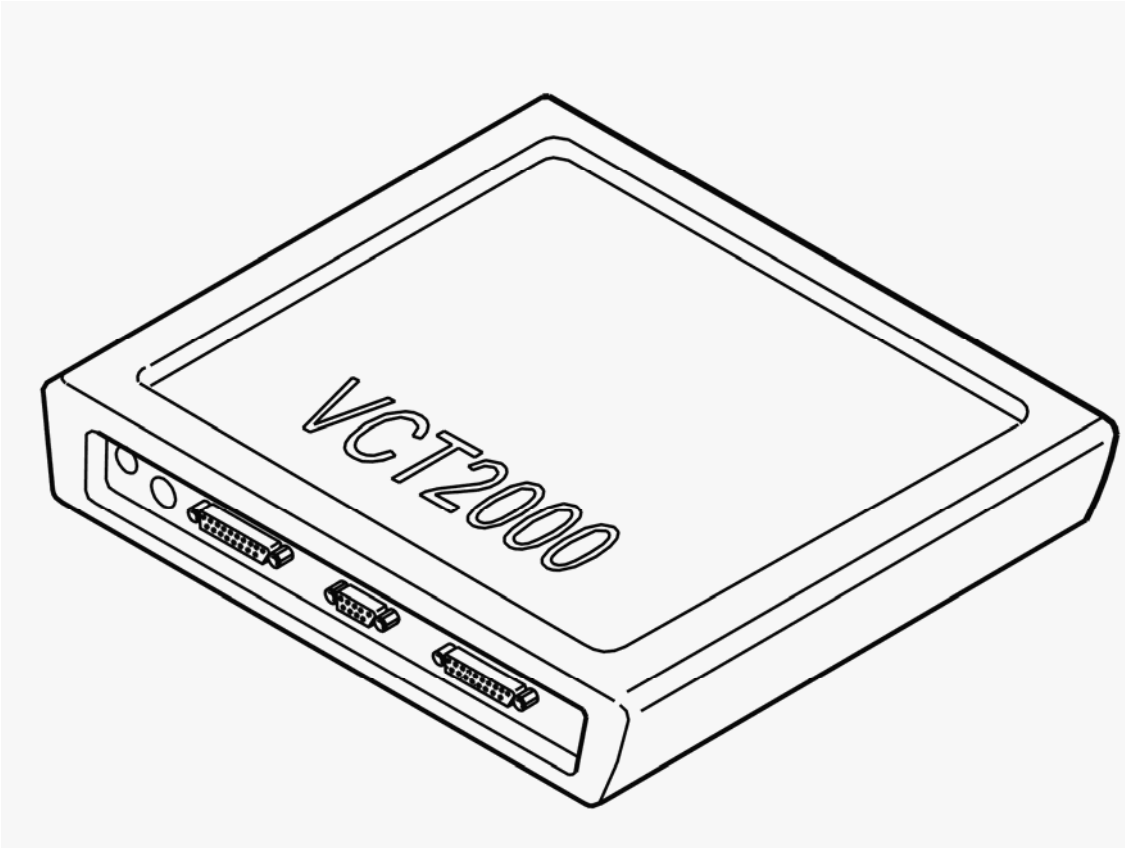


Fig. 132: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING RESISTANCE**

CHECKING RESISTANCE

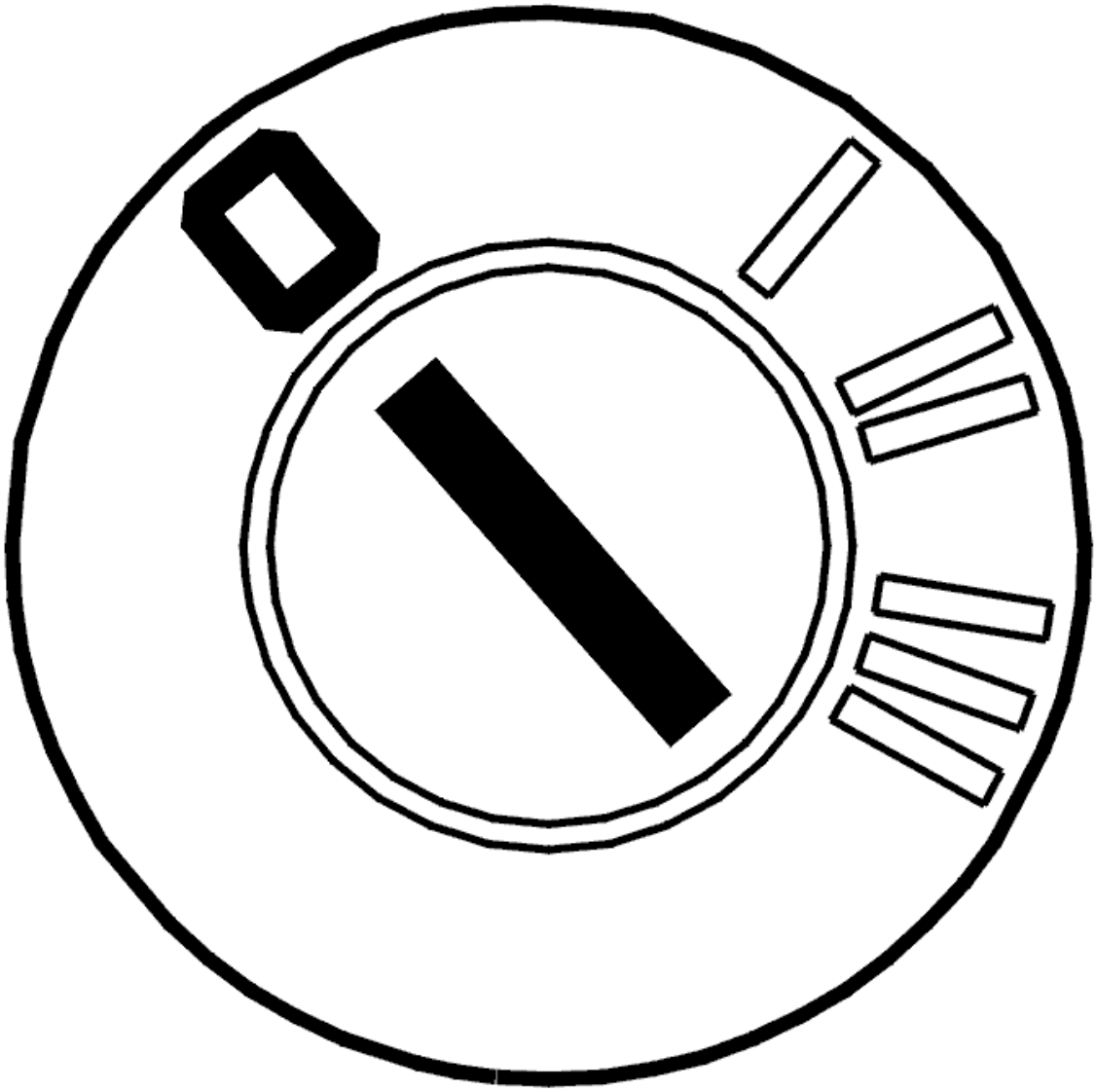


Fig. 133: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector.

Check solenoid S1 by measuring the resistance between transmission connector terminal #C1 and the transmission housing. The resistance must be 12-16 ohms.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

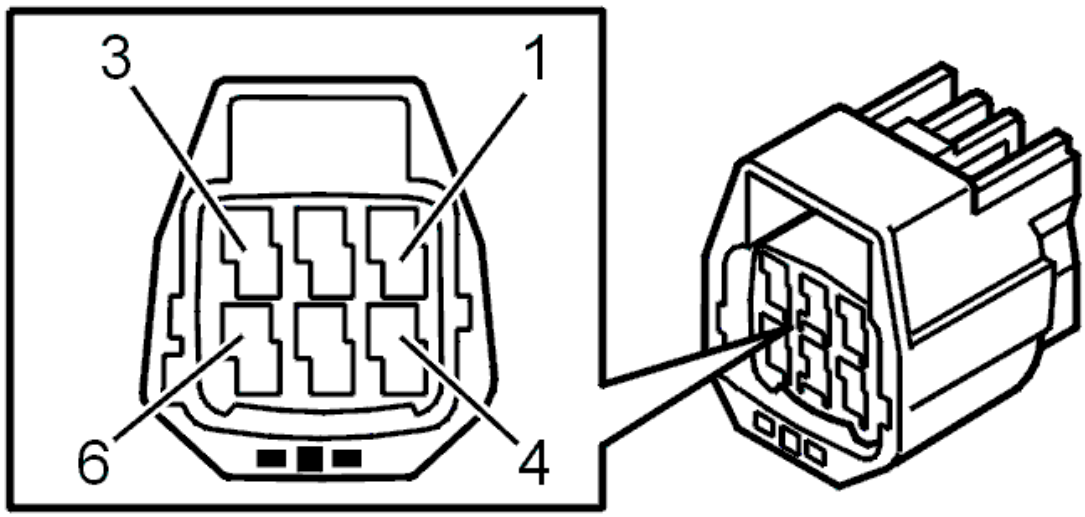


Fig. 134: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

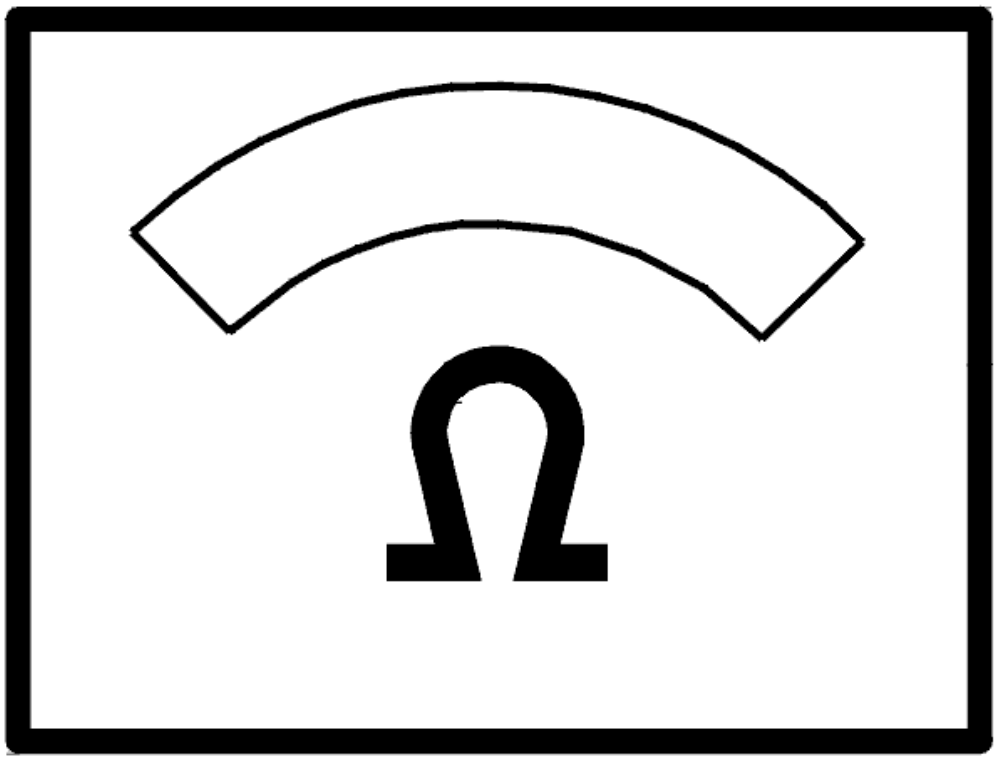


Fig. 135: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

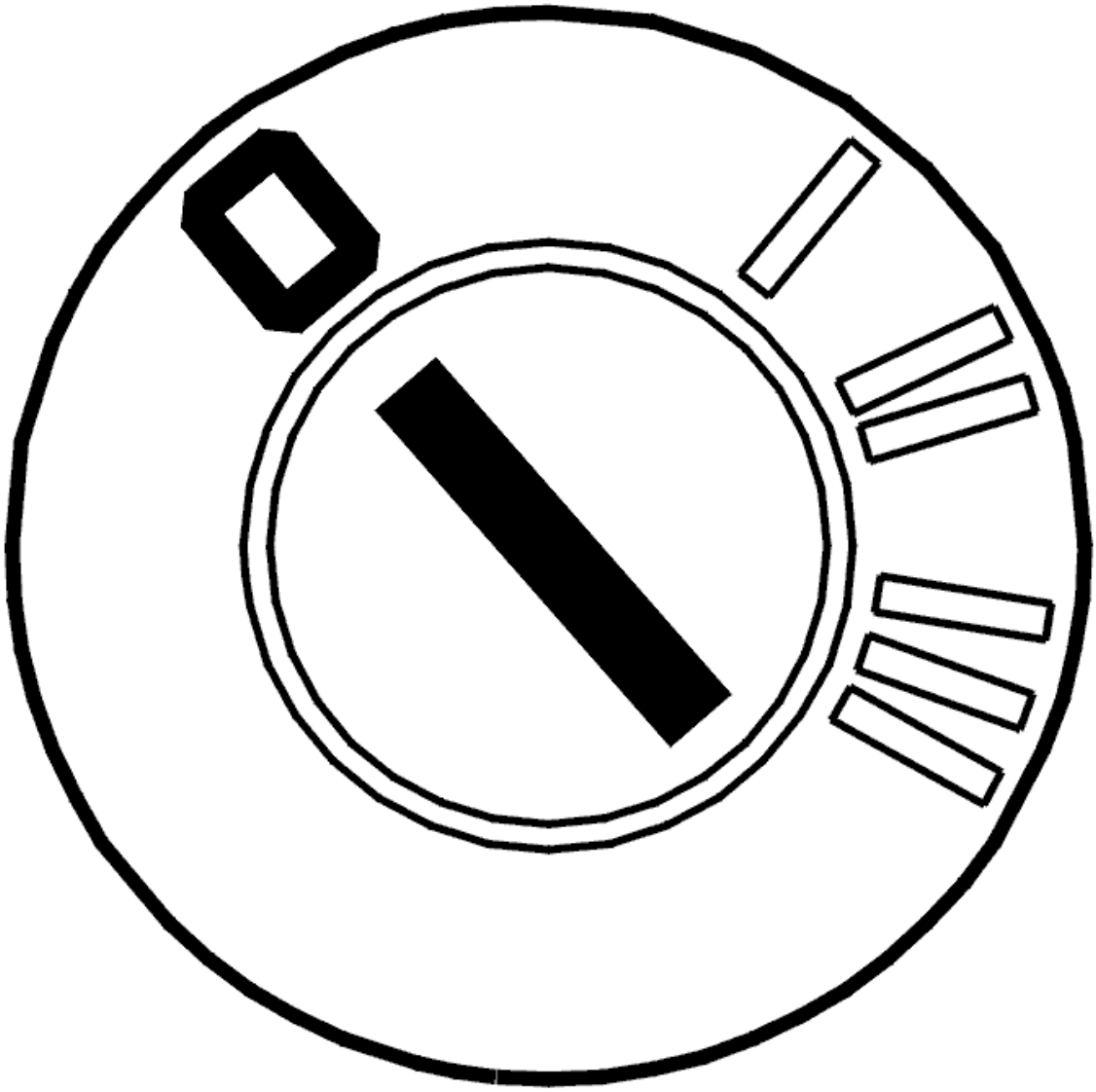


Fig. 136: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the cable between control module terminal #A50 (#A50) and transmission connector terminal #C1 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

  Remedy as necessary.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**

- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

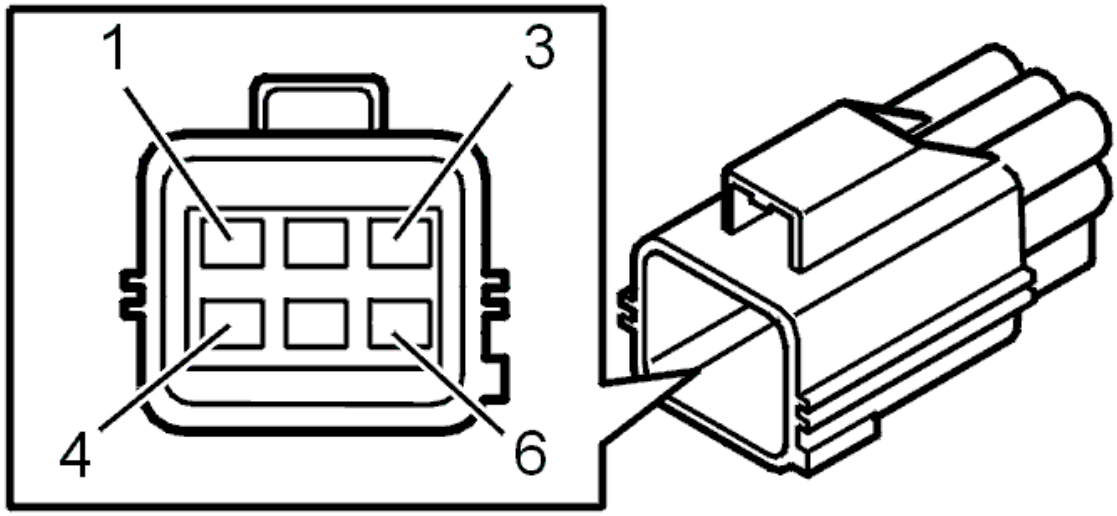


Fig. 137: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

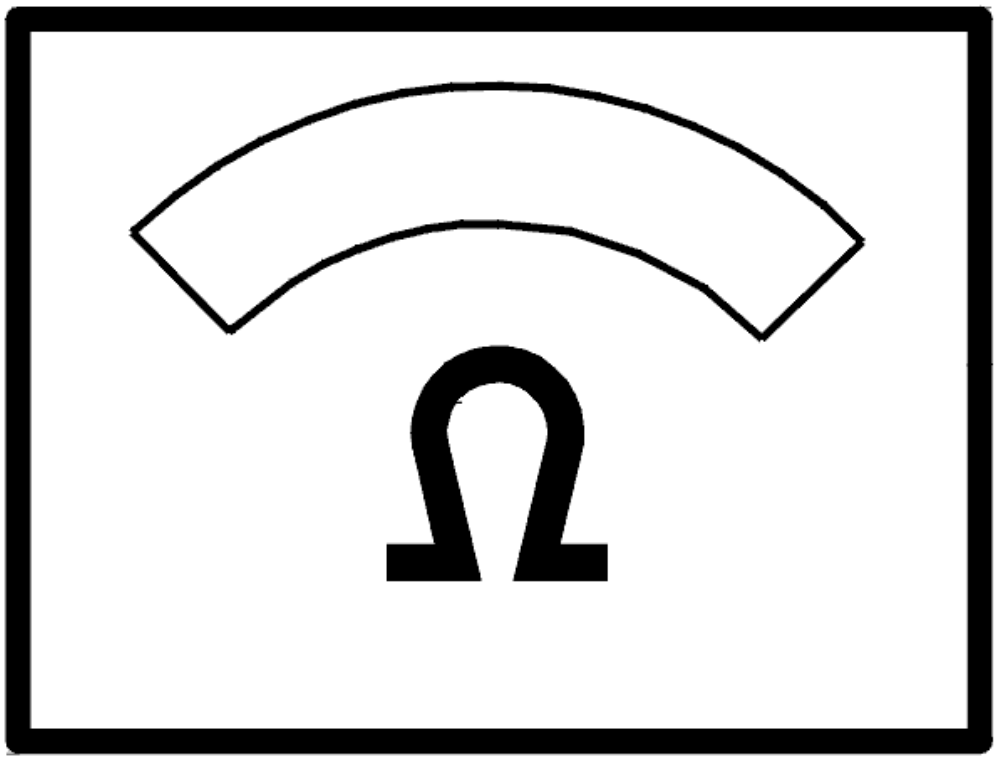


Fig. 138: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

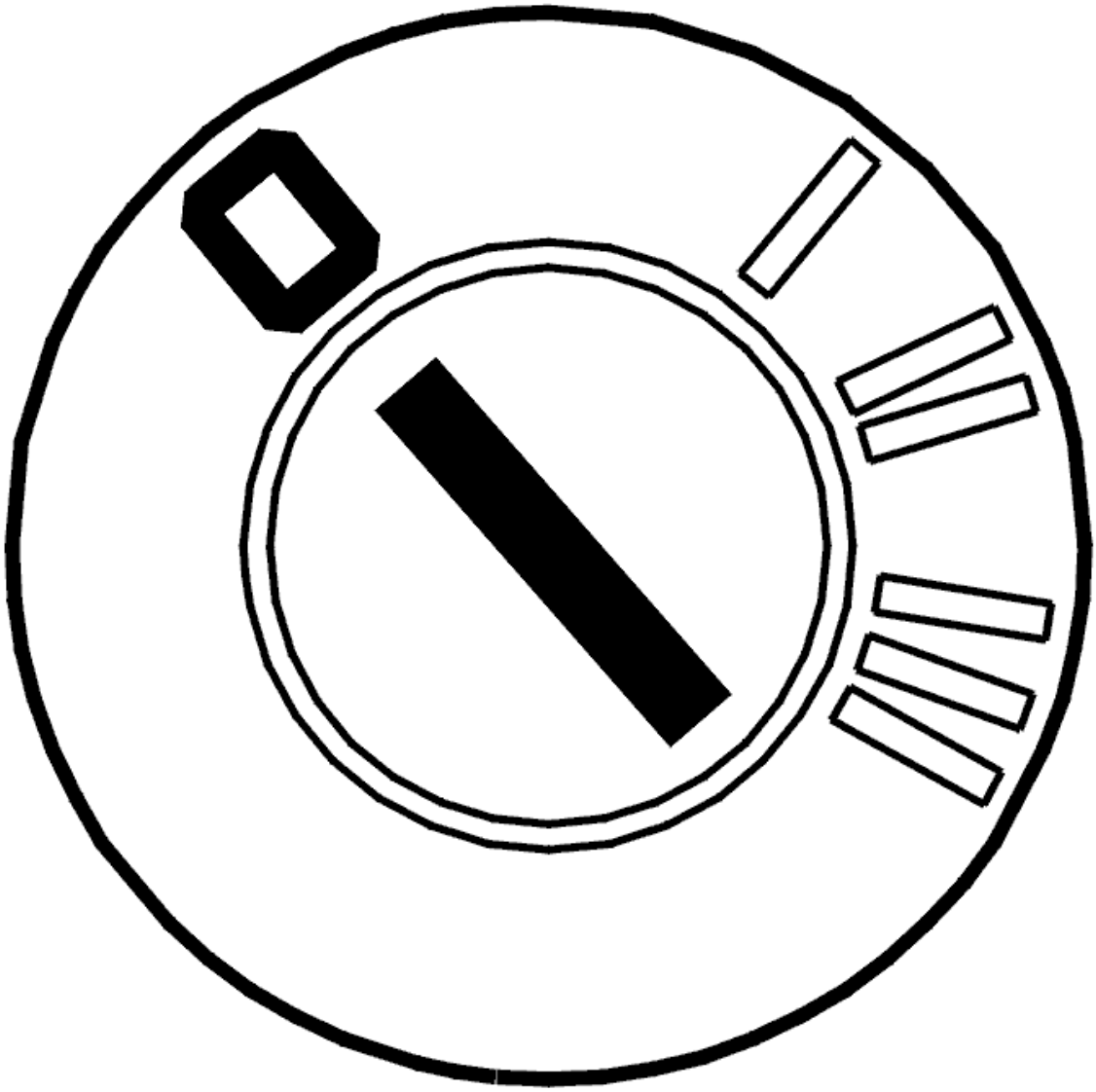


Fig. 139: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

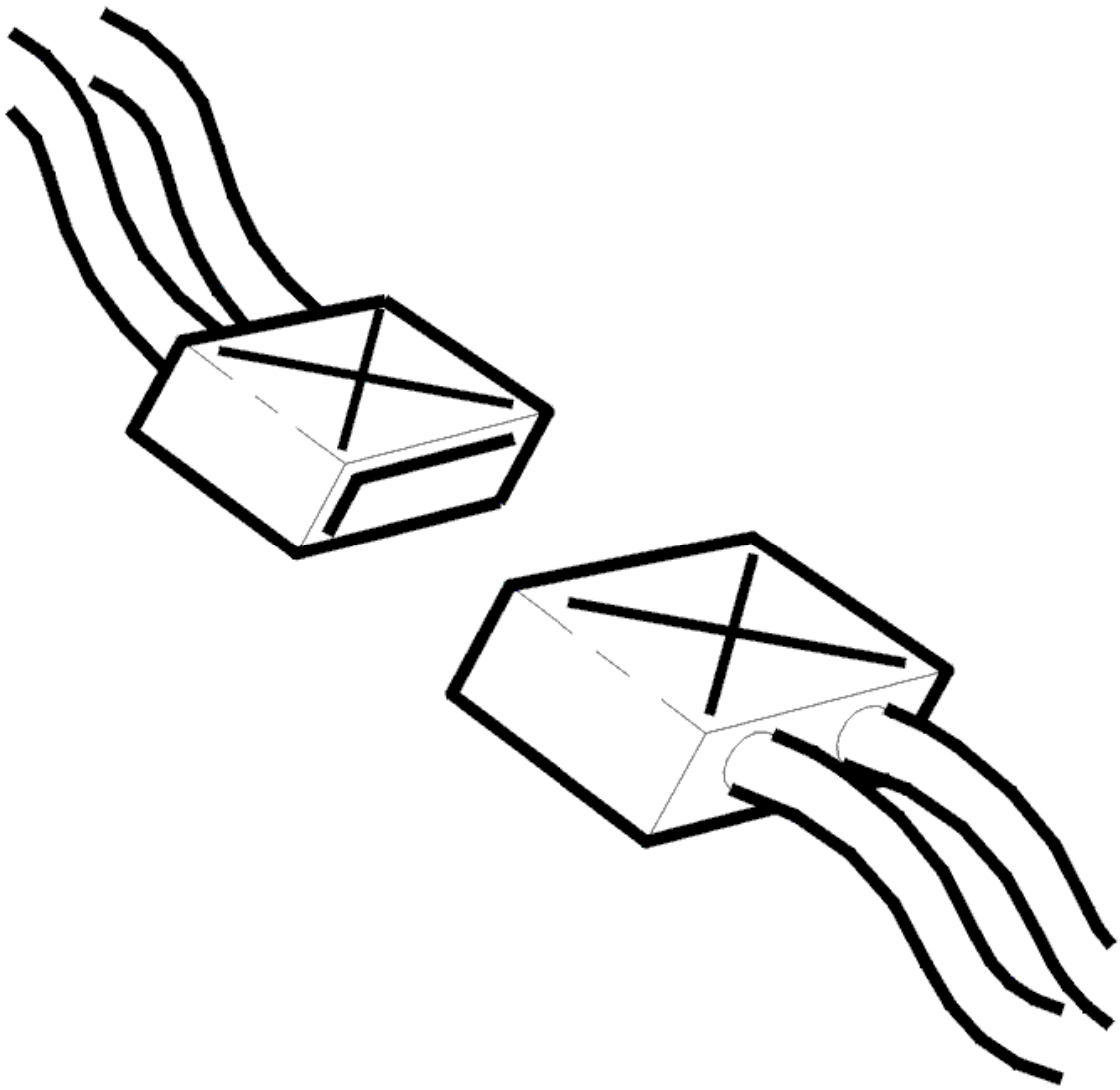


Fig. 140: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

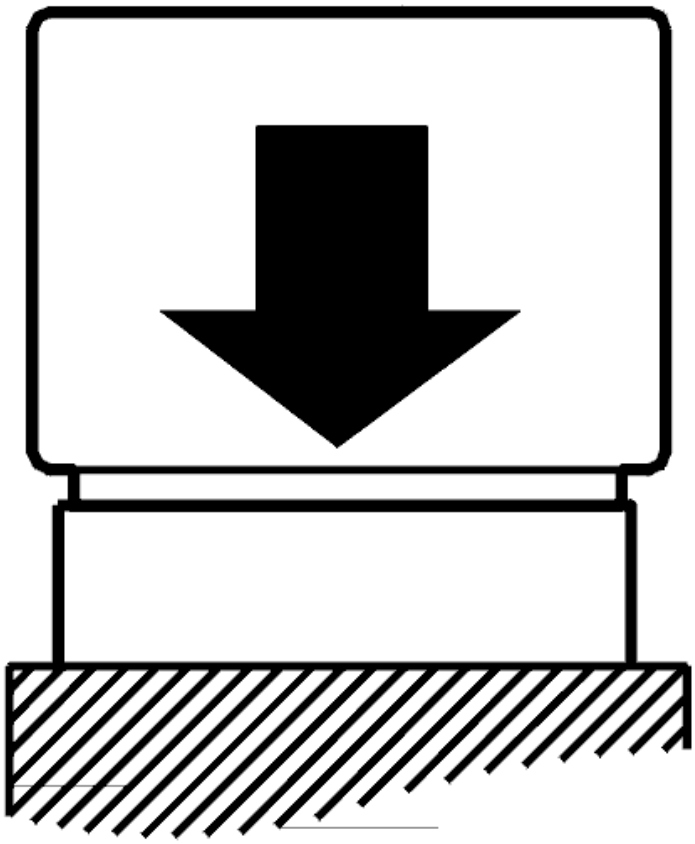


Fig. 141: Identifying Connecting Control Module
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector disconnected
- Gear selector in position P.

Check the transmission control module (TCM) by measuring the resistance between terminals #A50 (#A50) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

NOTE: When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

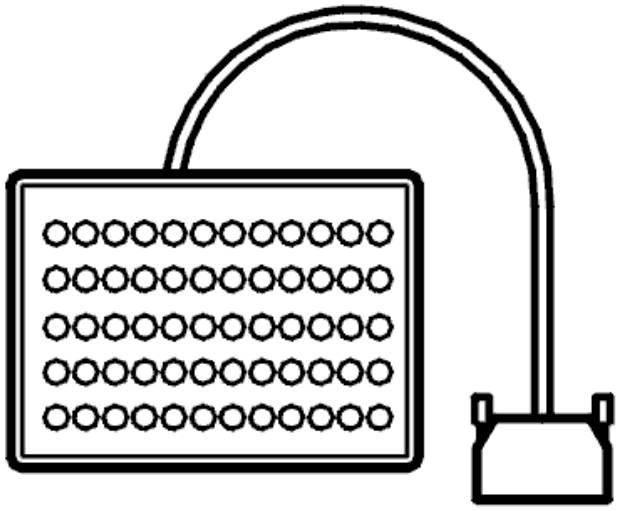


Fig. 142: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

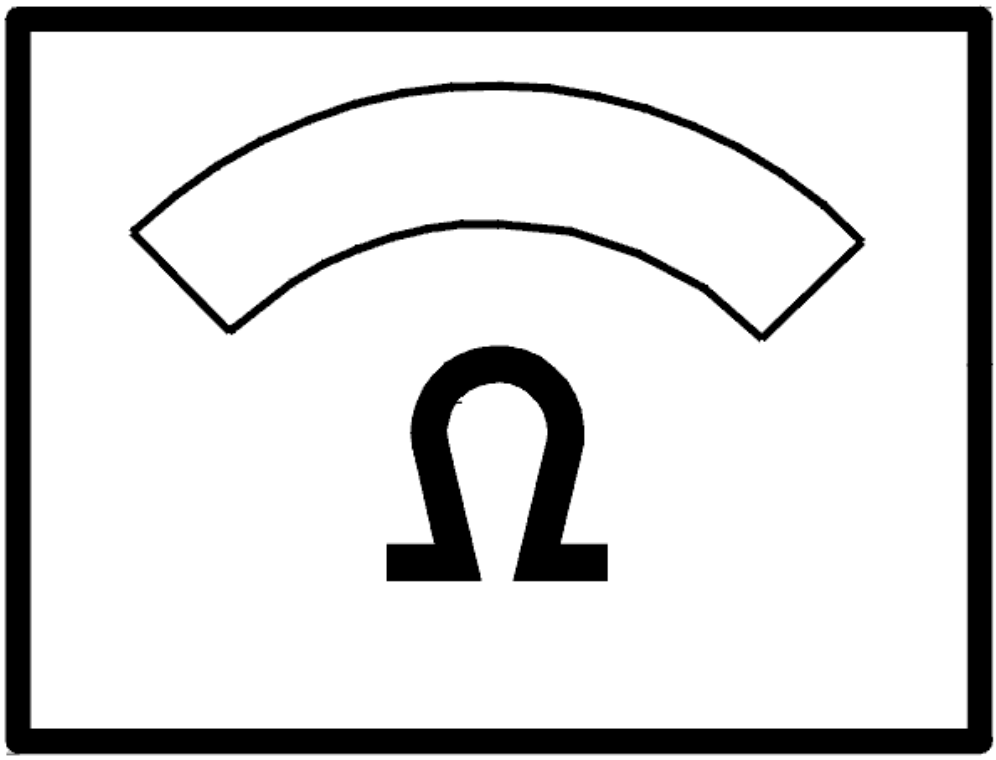


Fig. 143: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

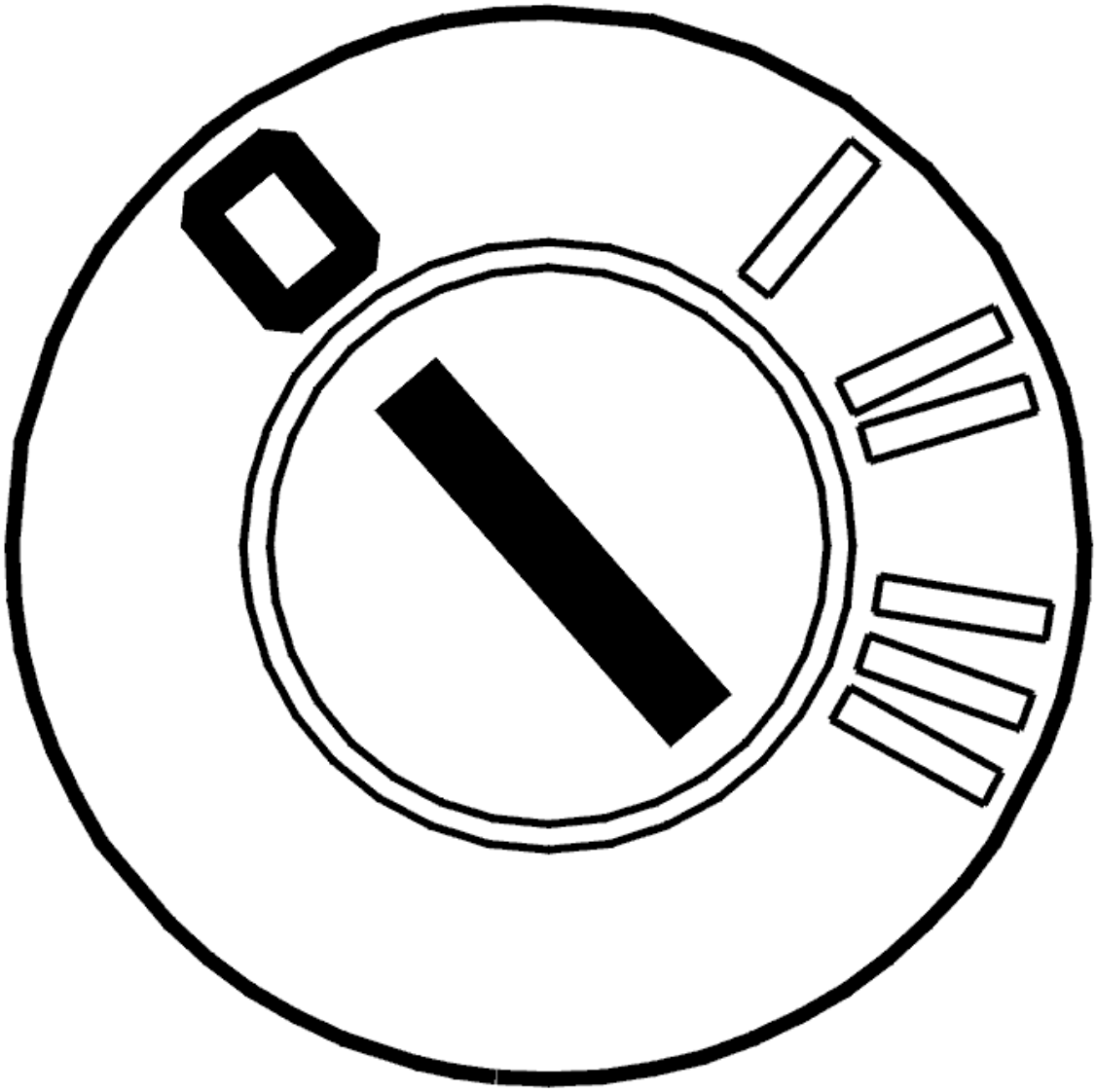


Fig. 144: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the control system.

  Check the cable between transmission connector terminal #C1 (transmission side) and the connector for solenoid S1. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

  - Check solenoid S1. Measure the resistance between the terminal on solenoid S1 and the transmission housing. The resistance must be 12-16 ohms.

  Remedy as necessary.

  Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- To open the control system and to check or replace solenoid S1, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

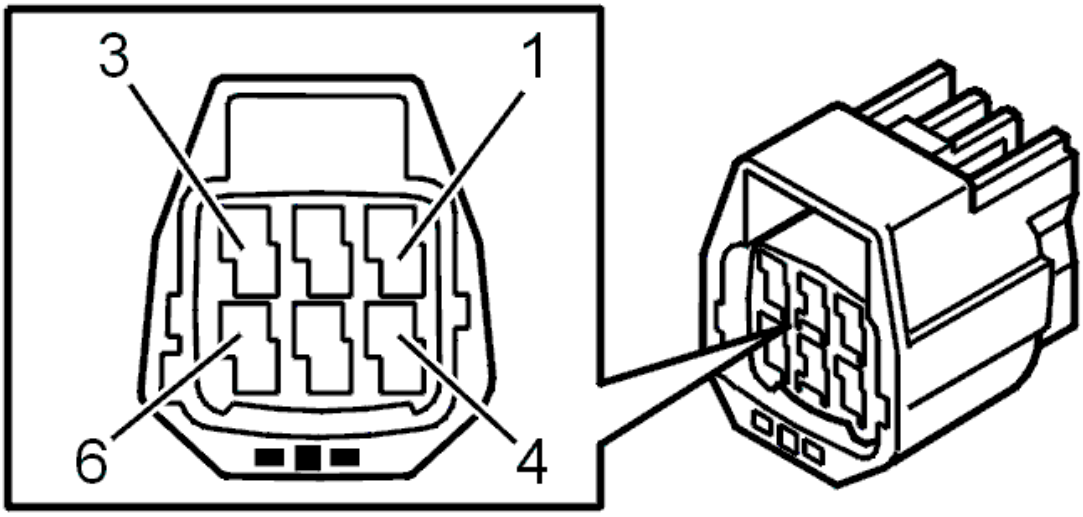


Fig. 145: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

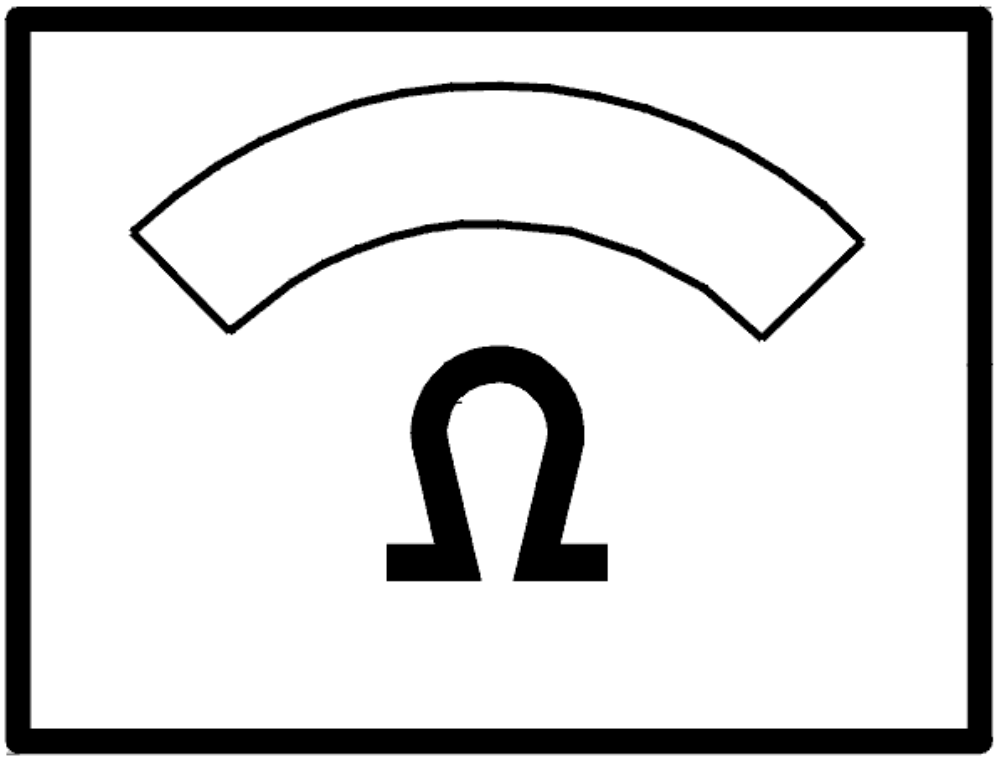


Fig. 146: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

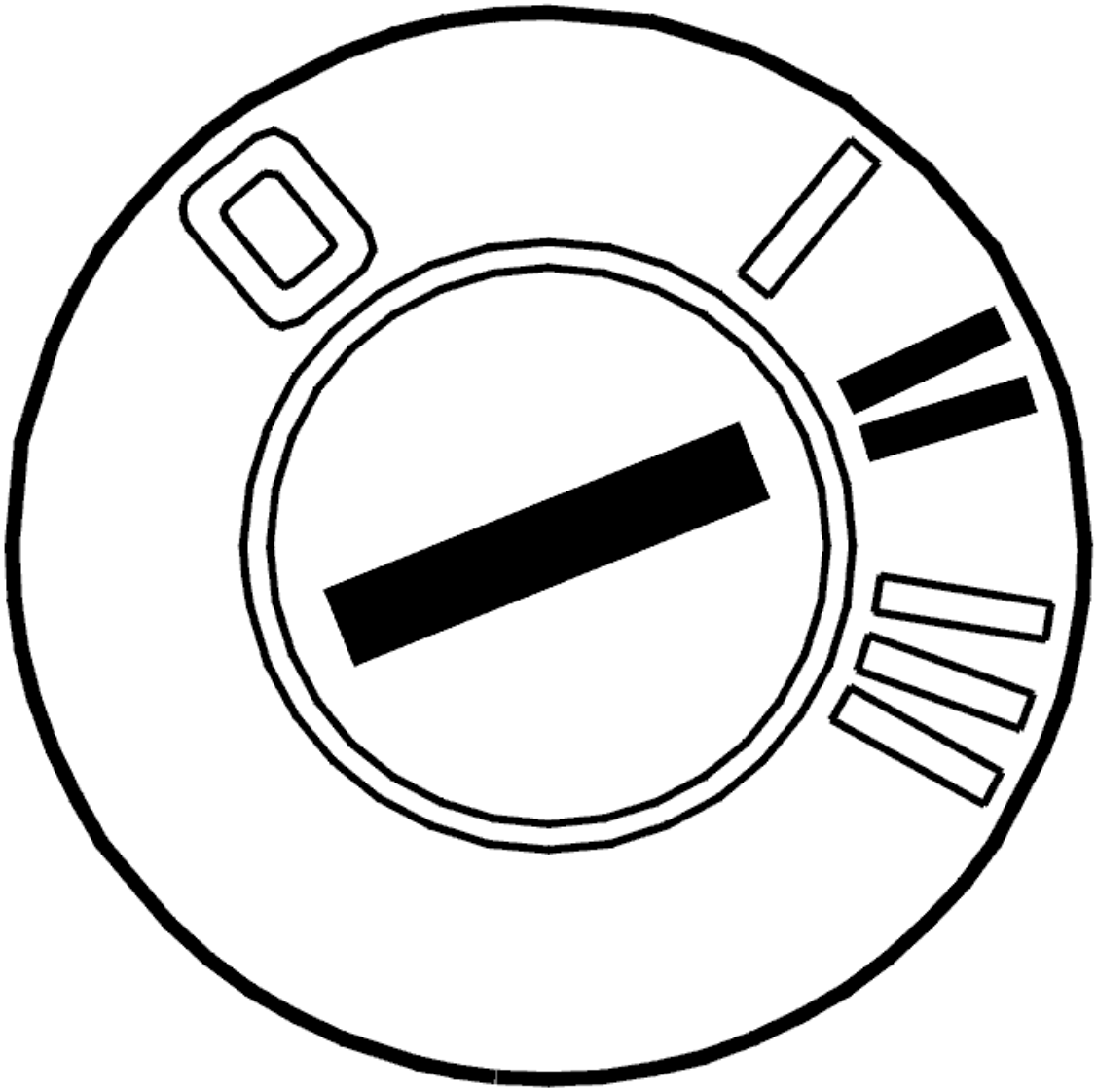


Fig. 147: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S1.

The current should oscillate between 0 and approximately 1.5 A.

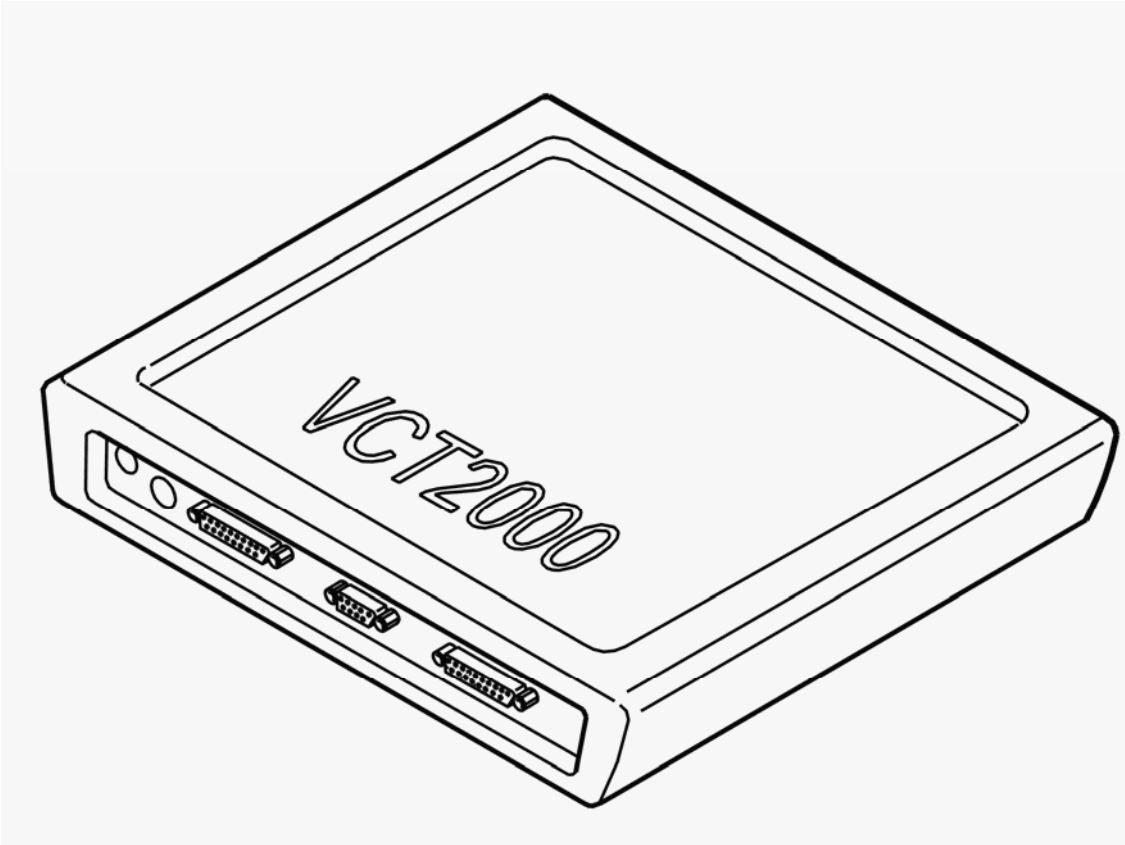


Fig. 148: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INTERMITTENT FAULT

Check the control module and transmission connectors for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION**

Check the cable between control module terminal #50 (#A50) and transmission connector terminal #C1. Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

- Check the circuit for solenoid S1: Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #A50 (#A50) and #A53 (#A53) on the breakout box. The resistance must be 12-16 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

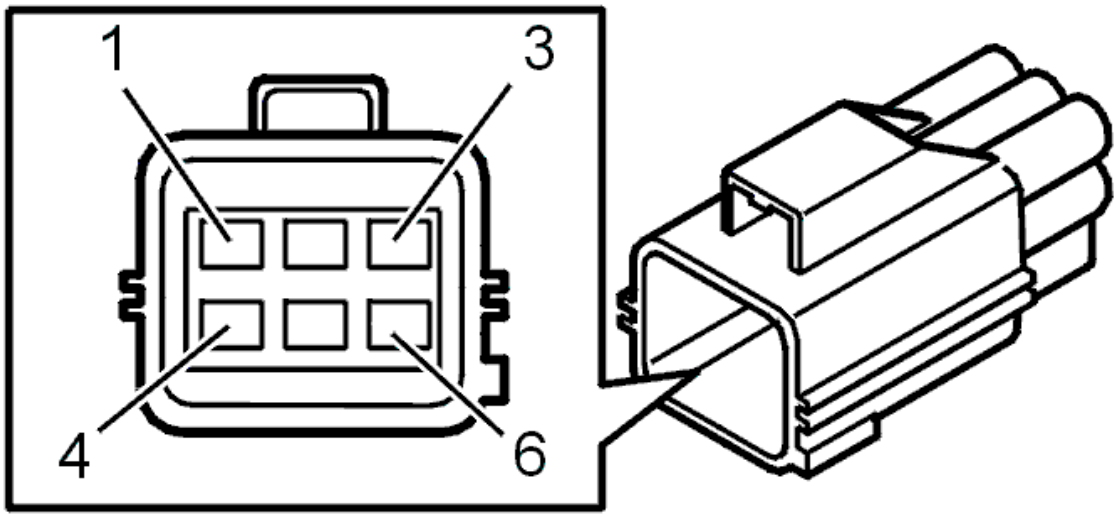


Fig. 149: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

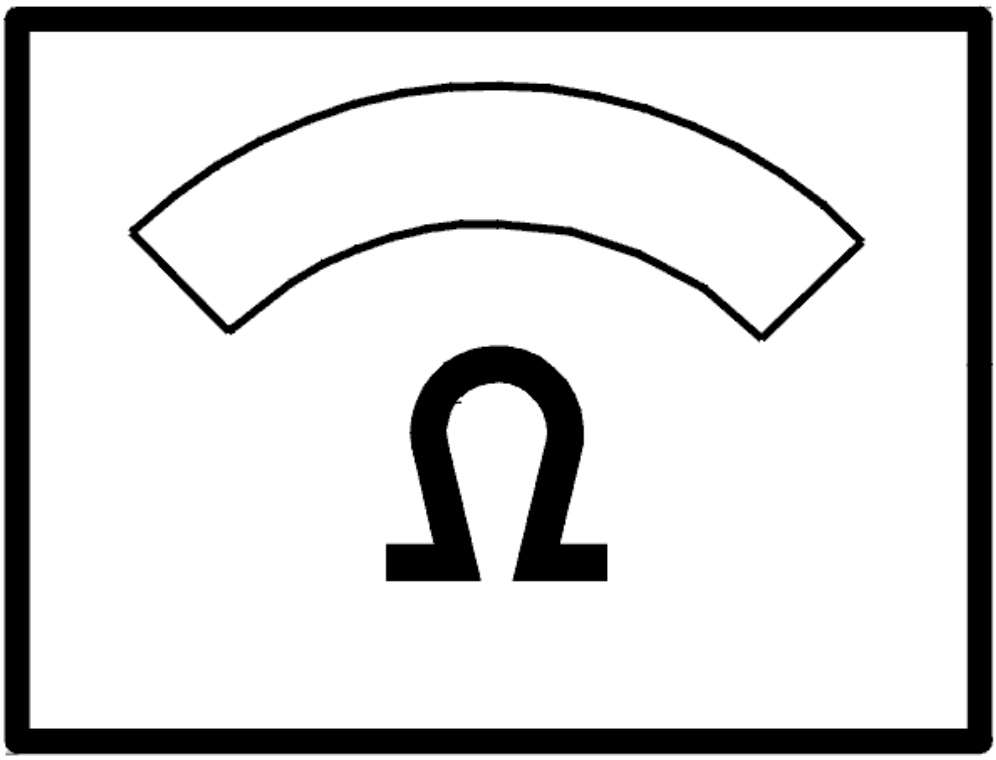


Fig. 150: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

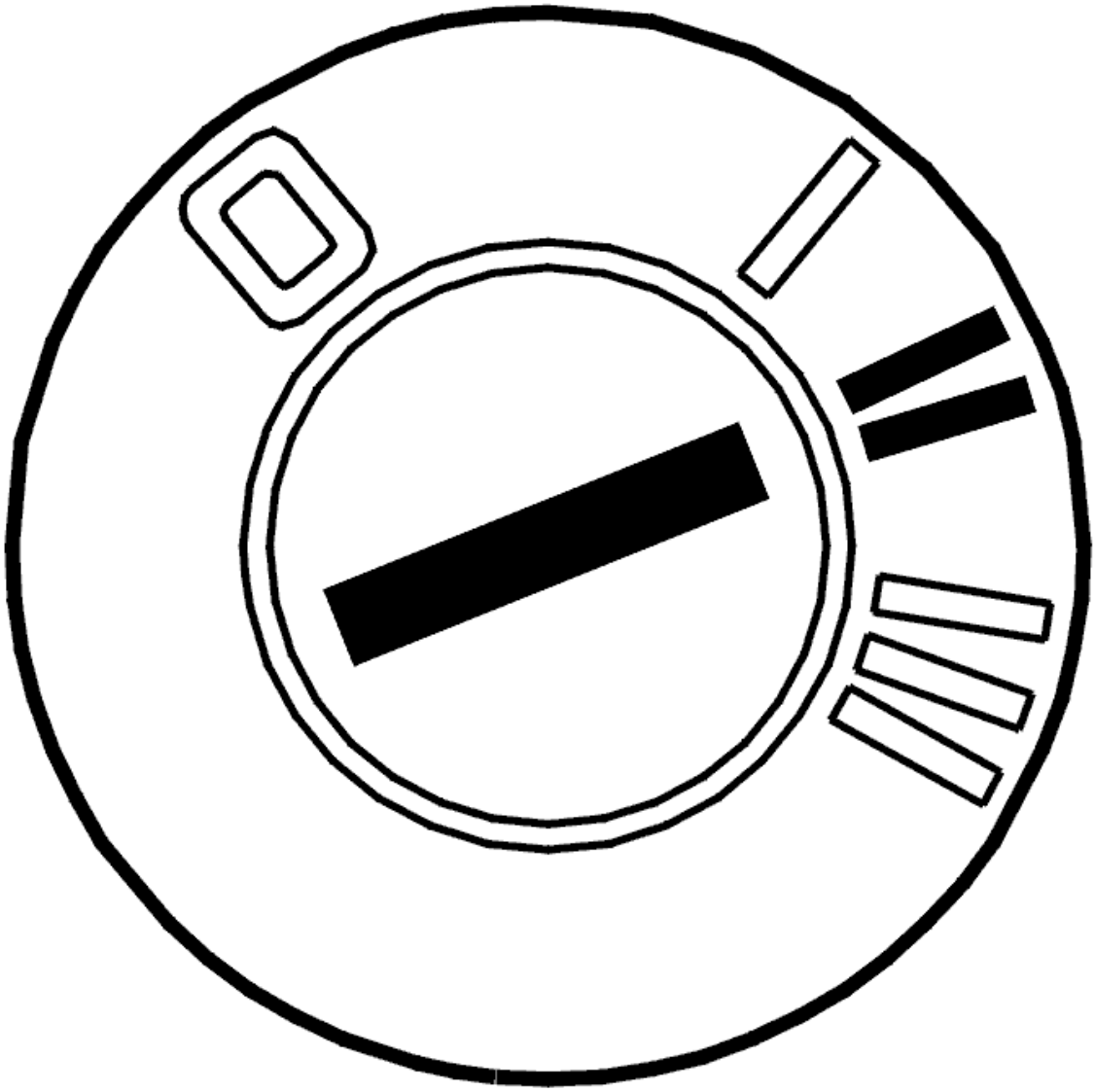


Fig. 151: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

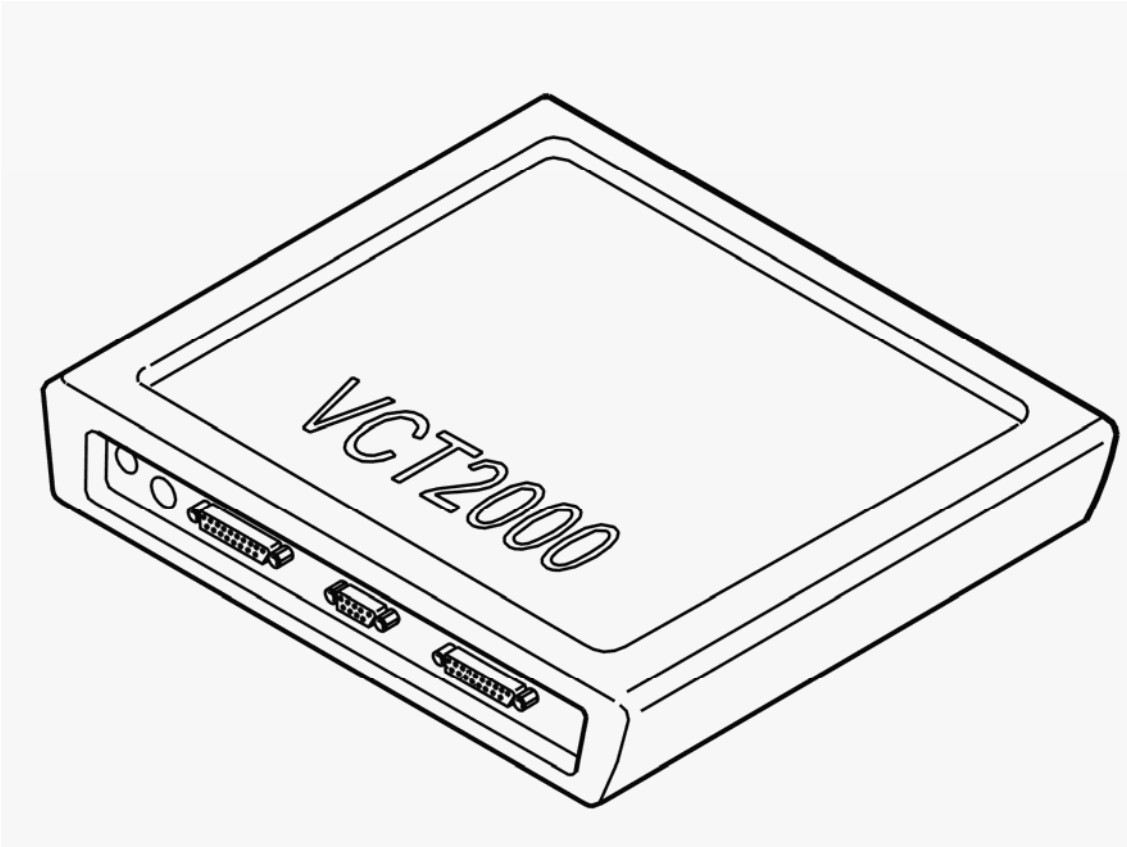


Fig. 152: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

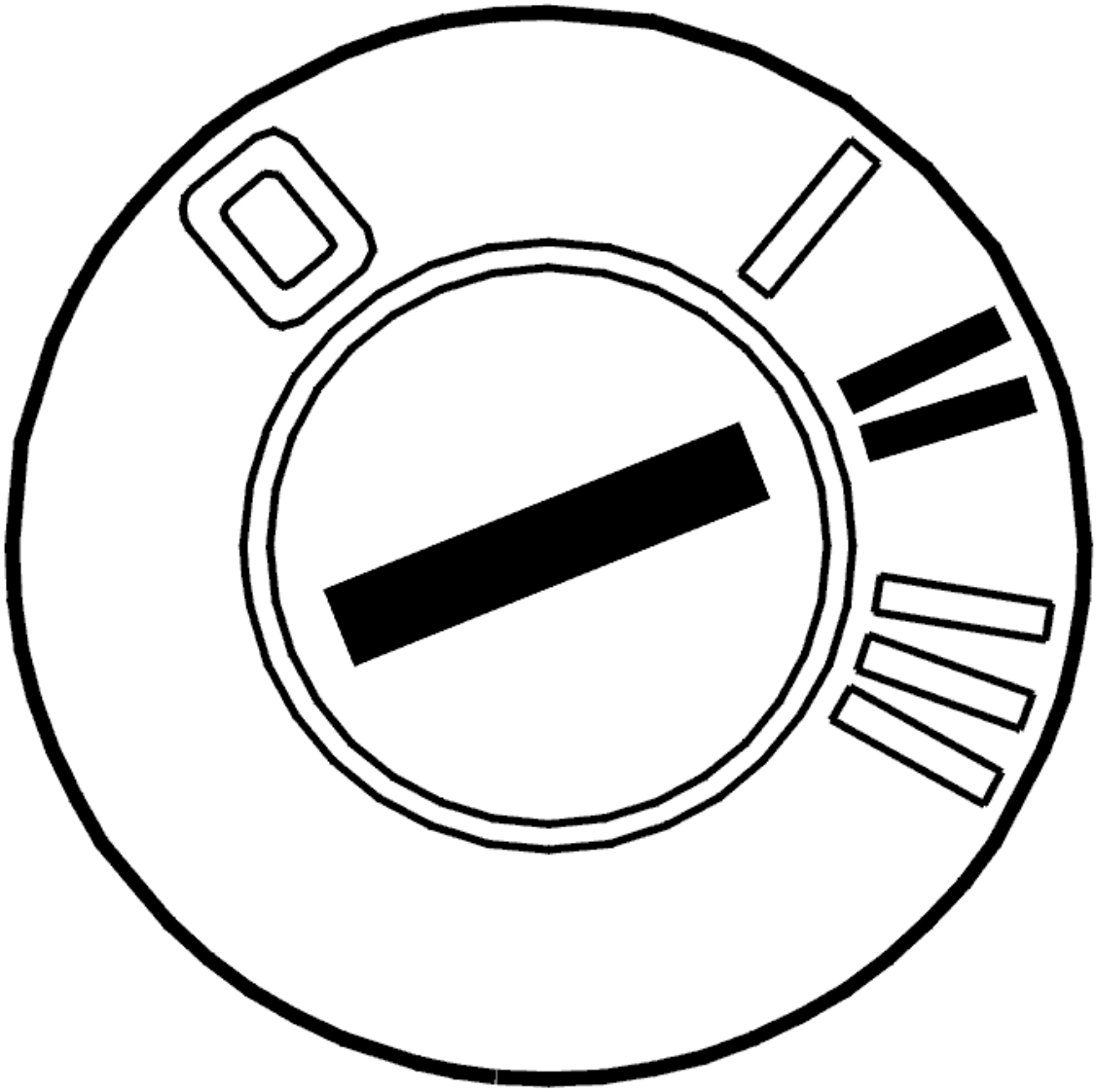


Fig. 153: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

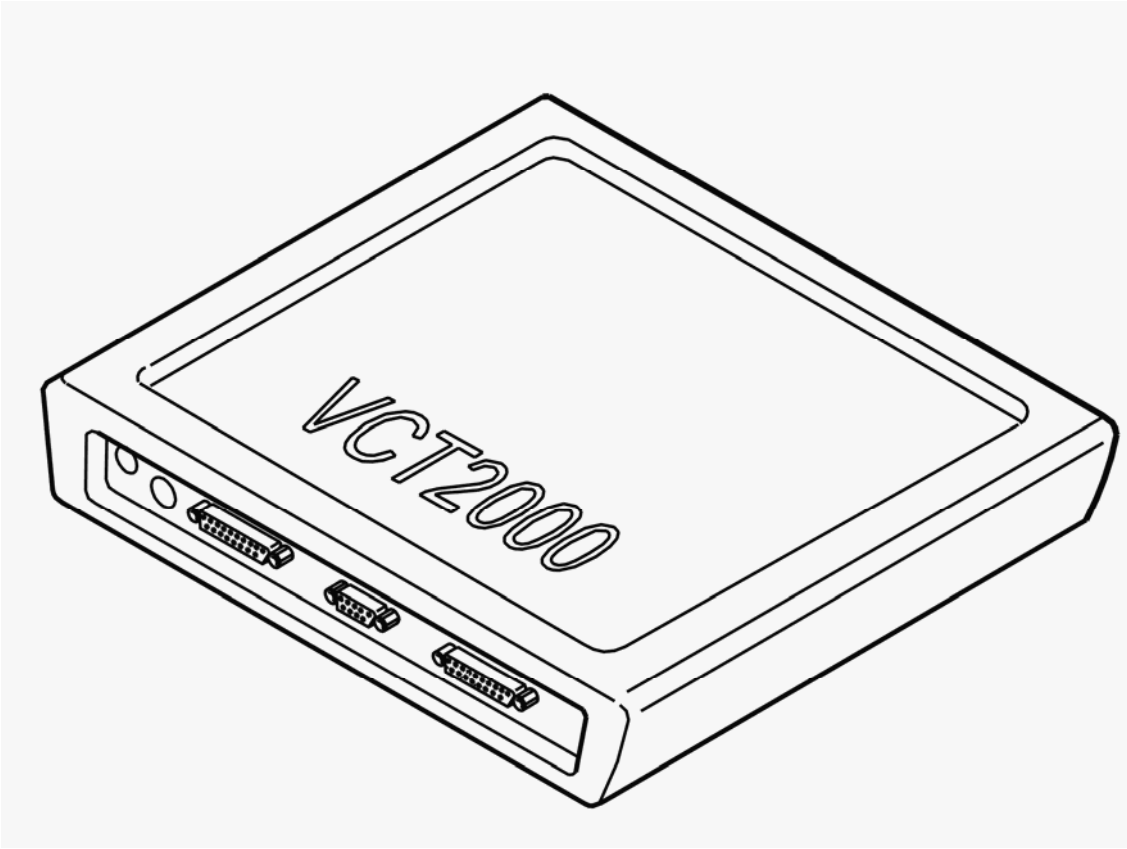


Fig. 154: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

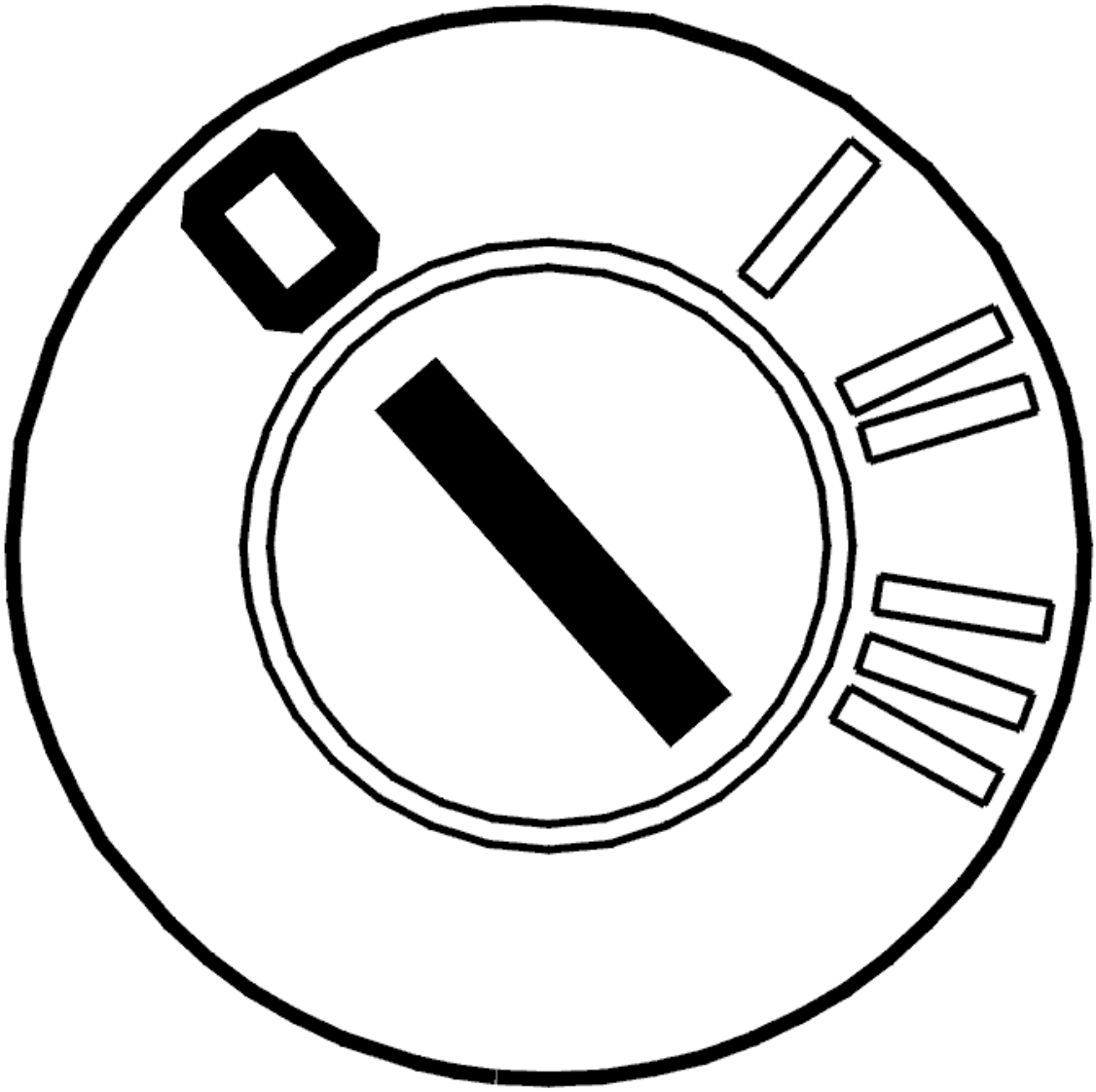


Fig. 155: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

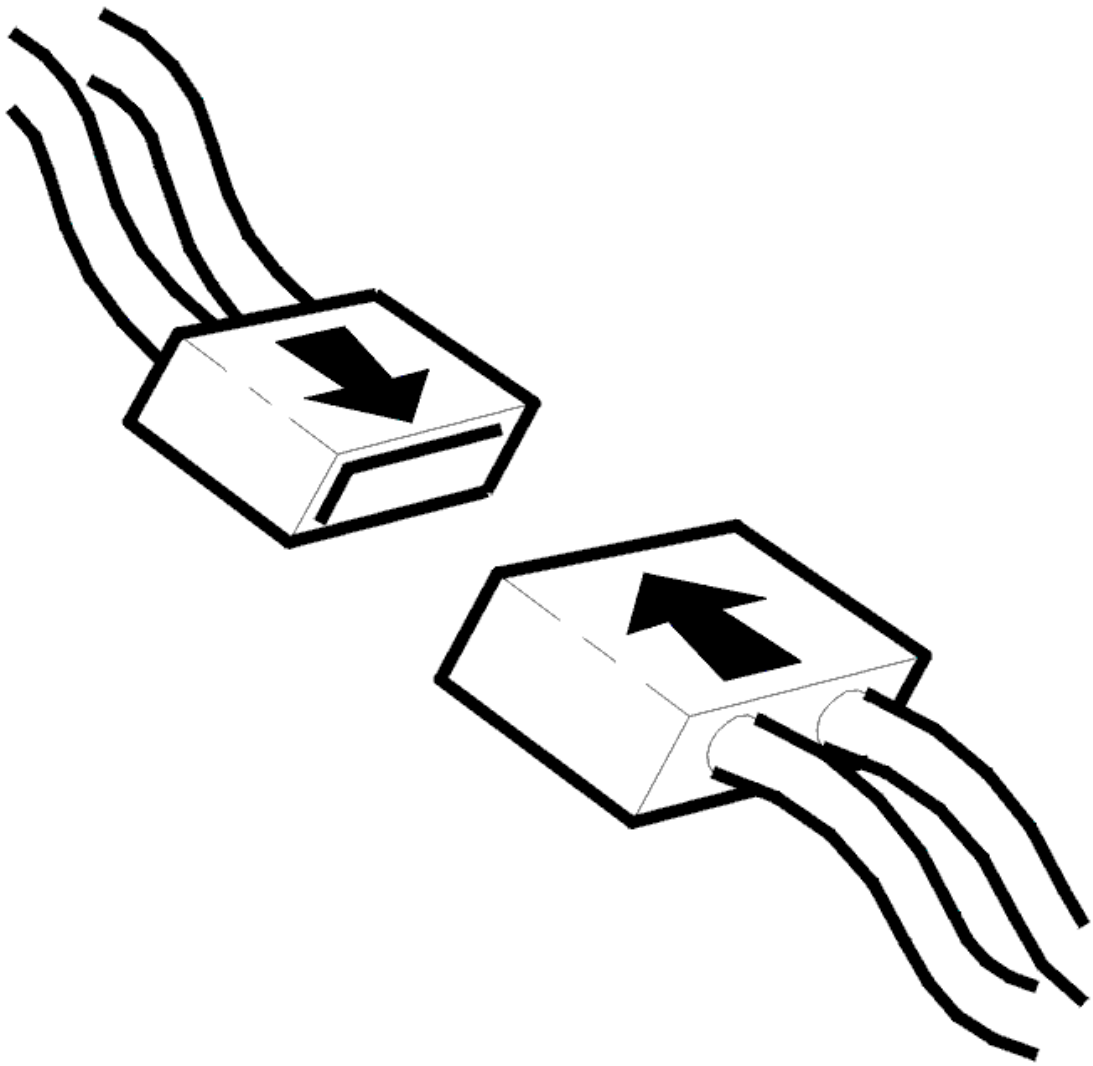


Fig. 156: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

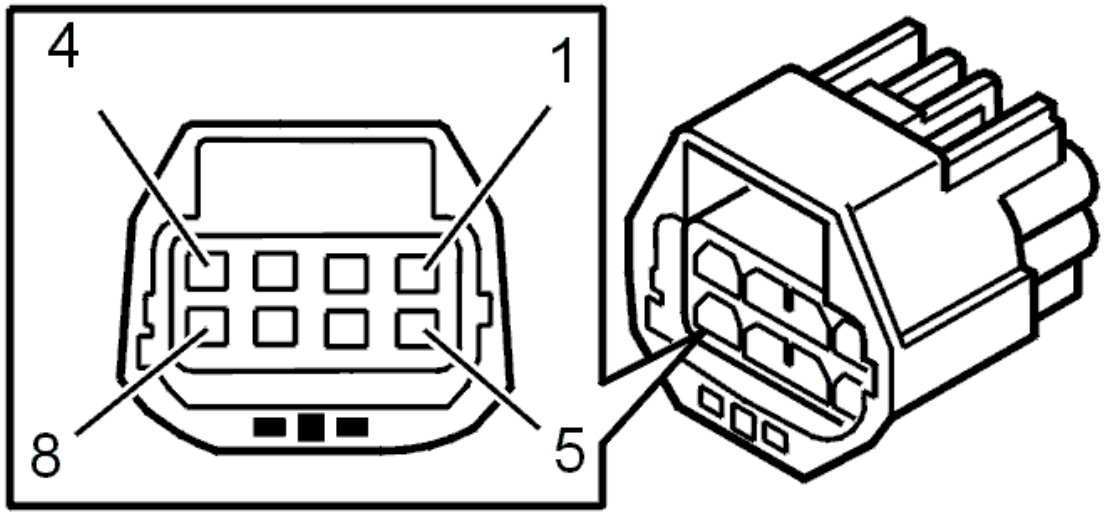


Fig. 157: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

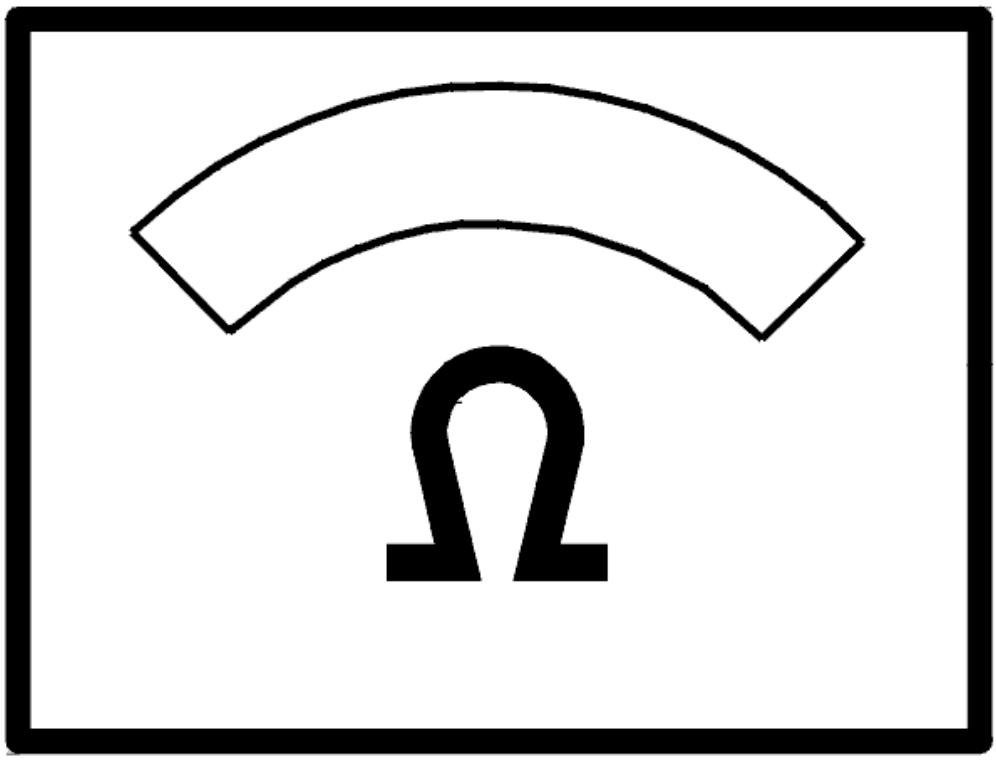


Fig. 158: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

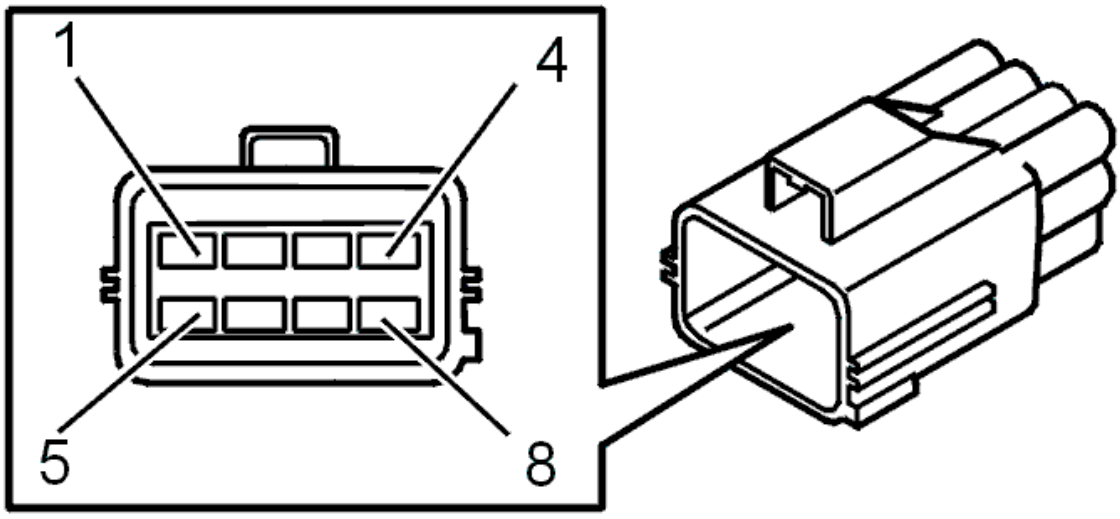


Fig. 159: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

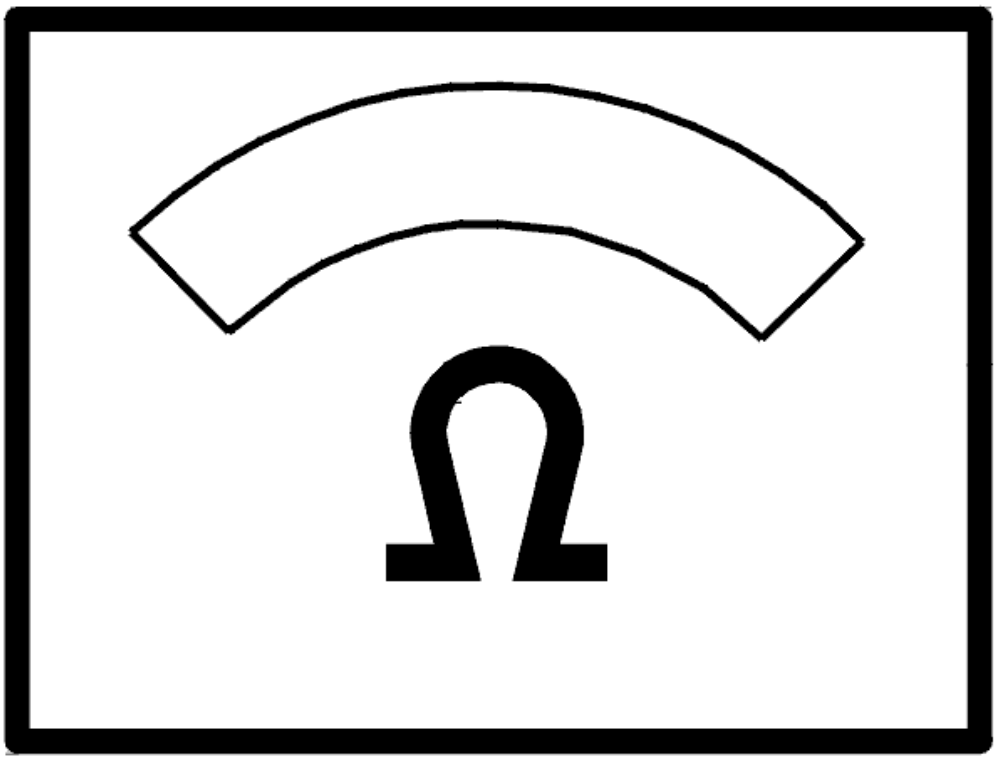


Fig. 160: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

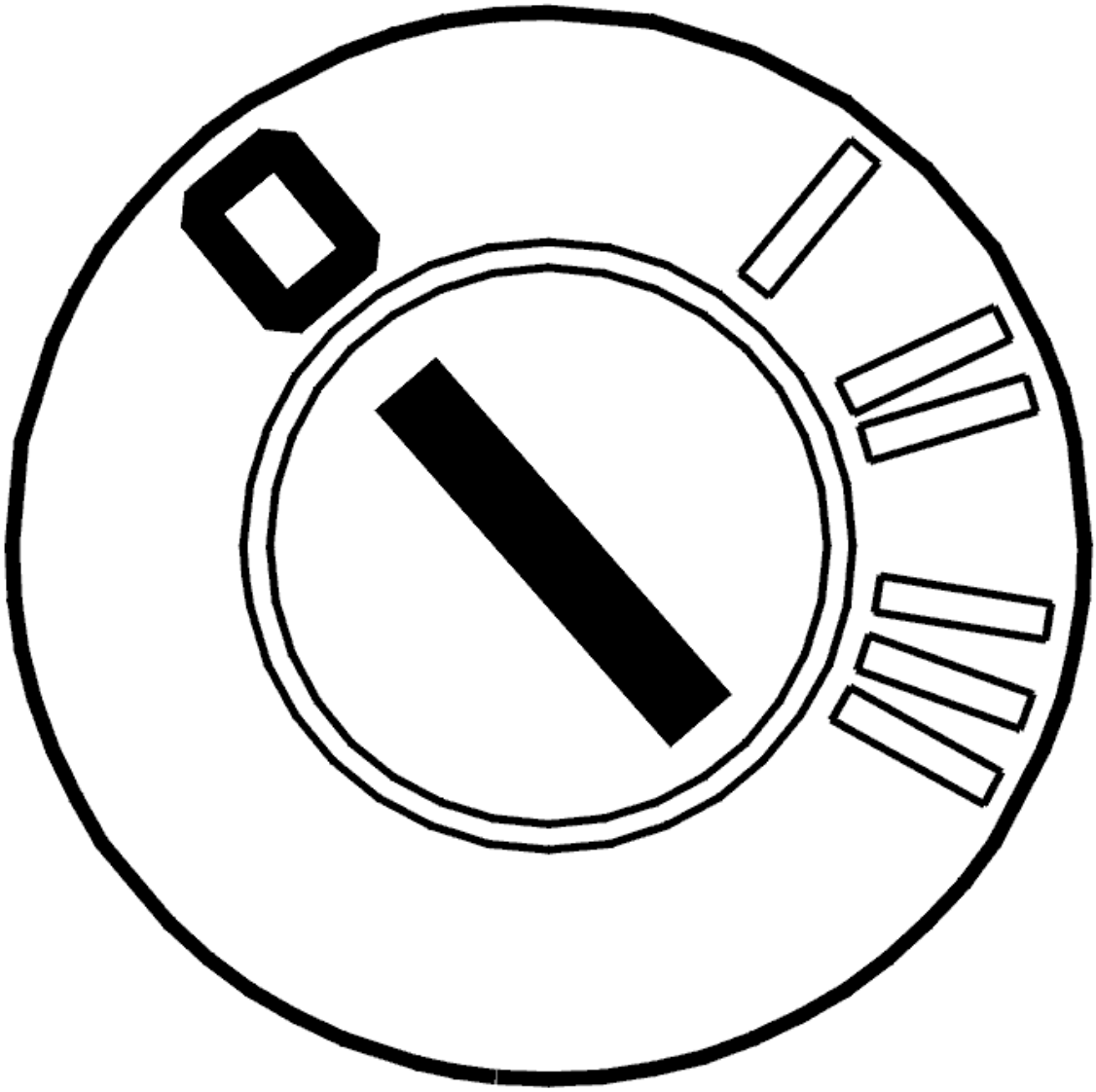


Fig. 161: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

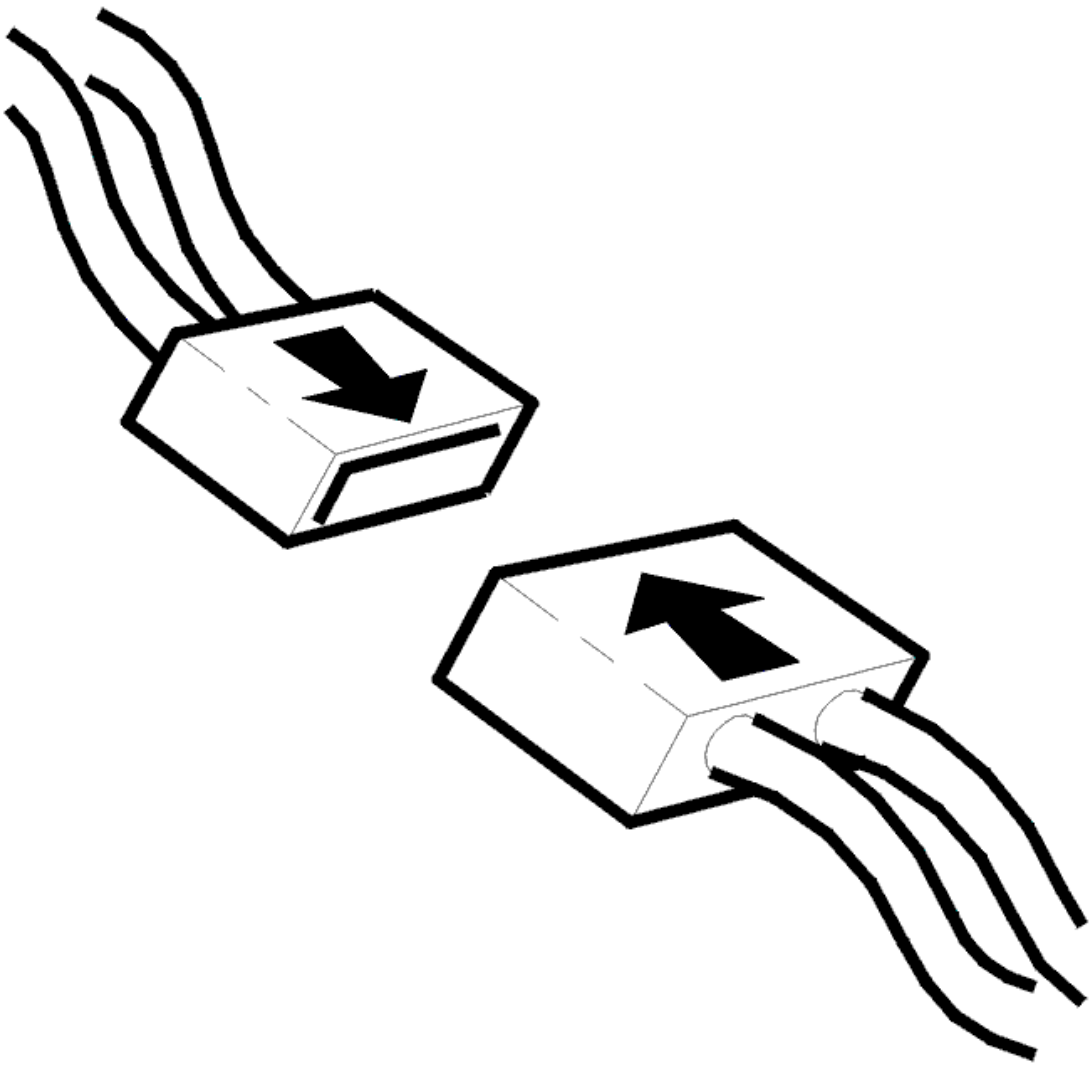


Fig. 162: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

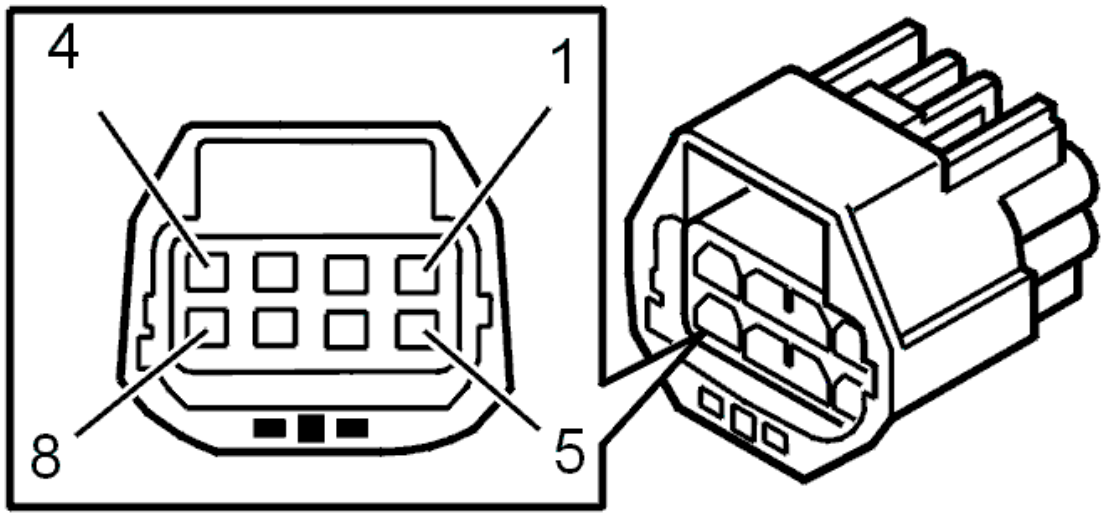


Fig. 163: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

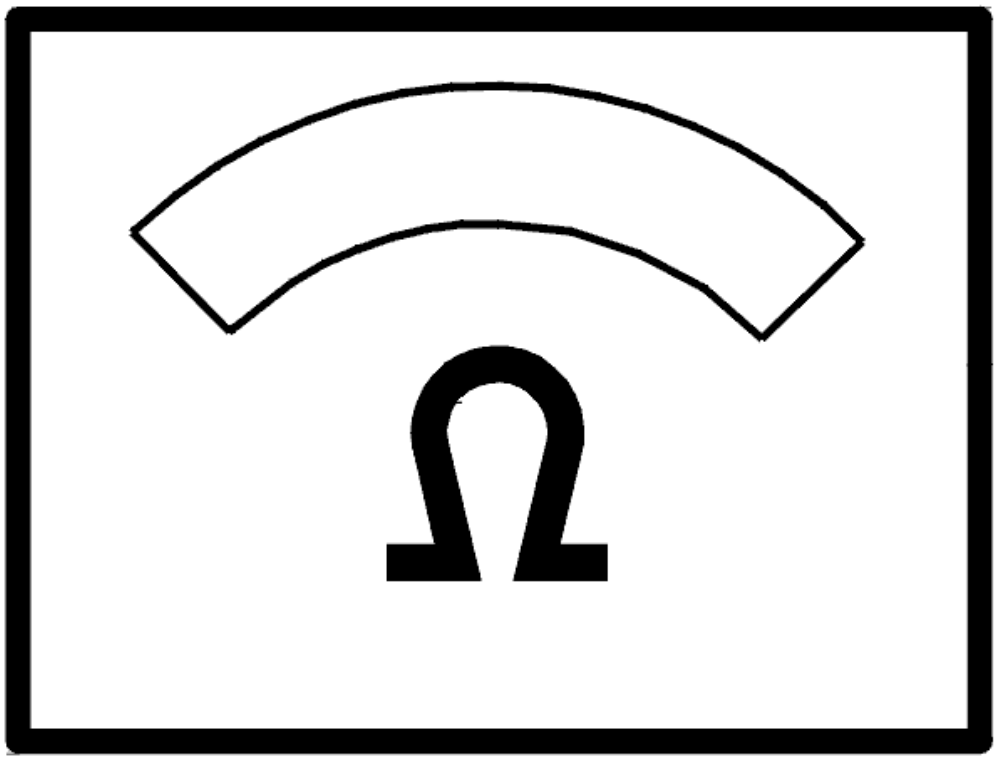


Fig. 164: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

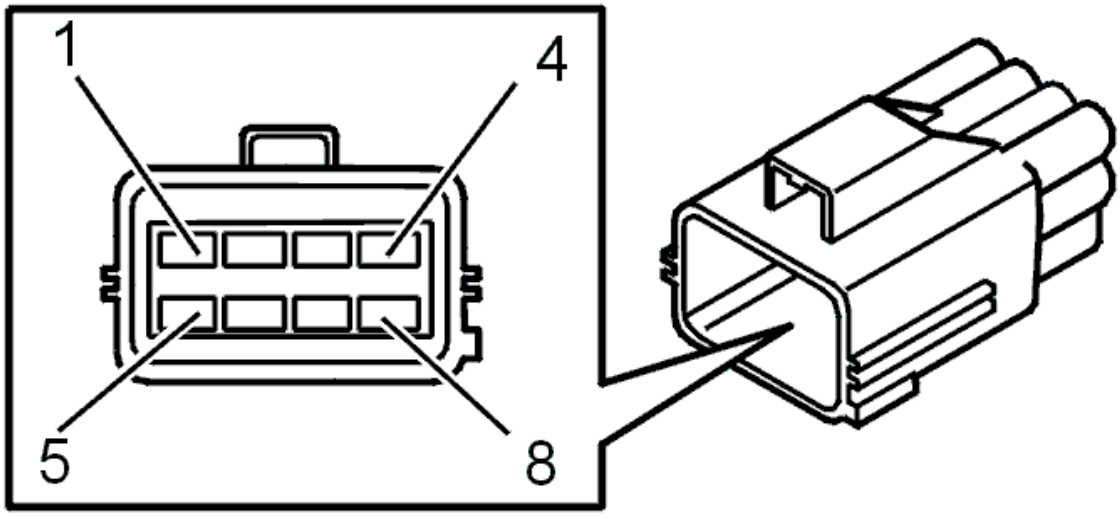


Fig. 165: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

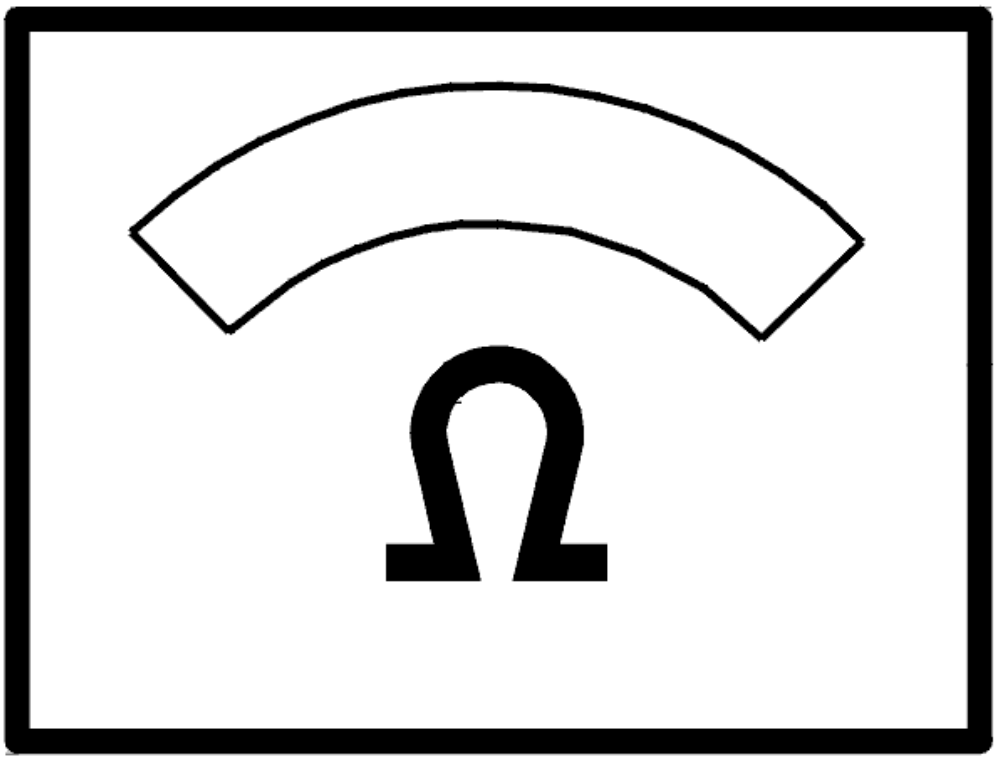


Fig. 166: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

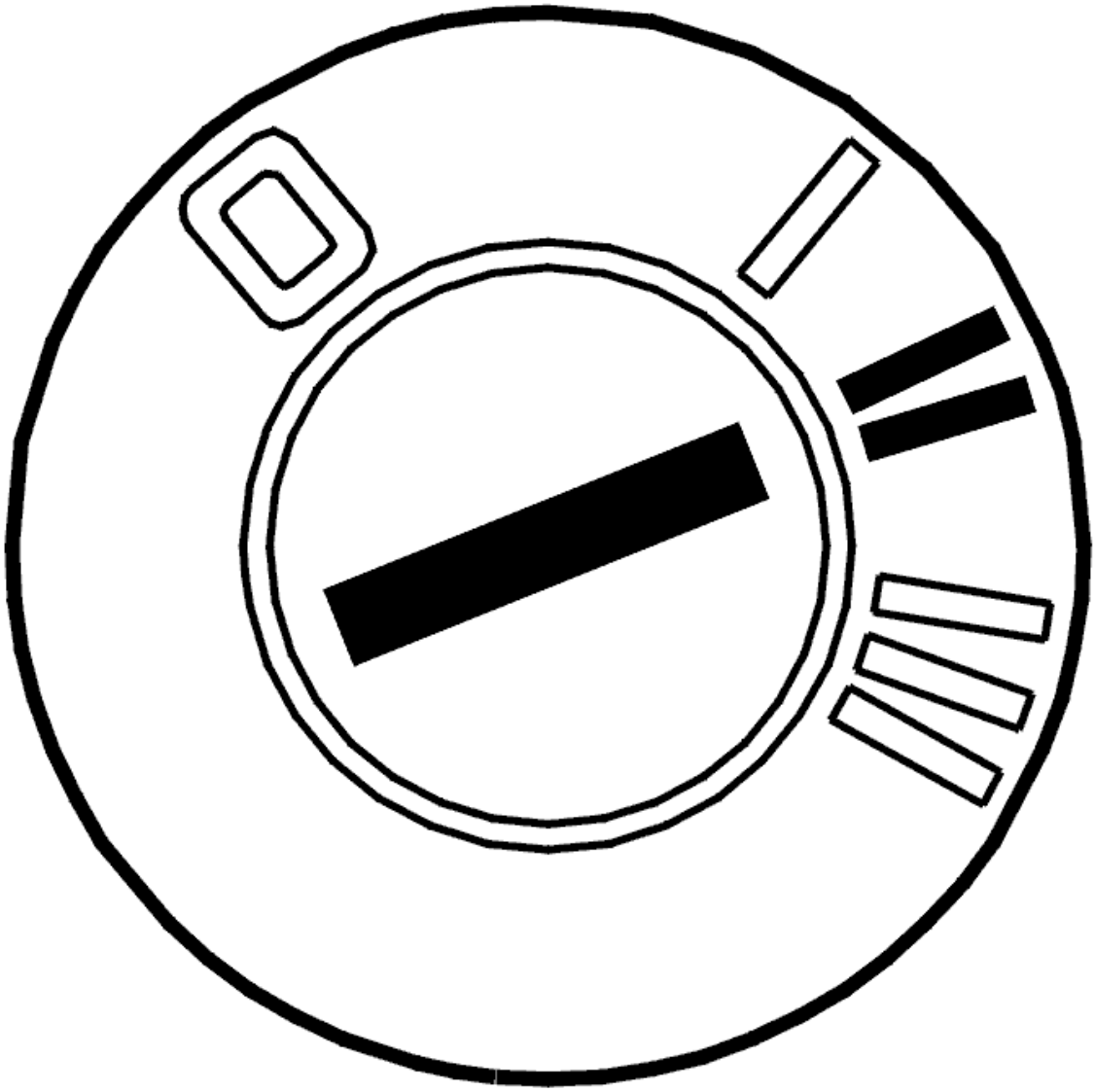


Fig. 167: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

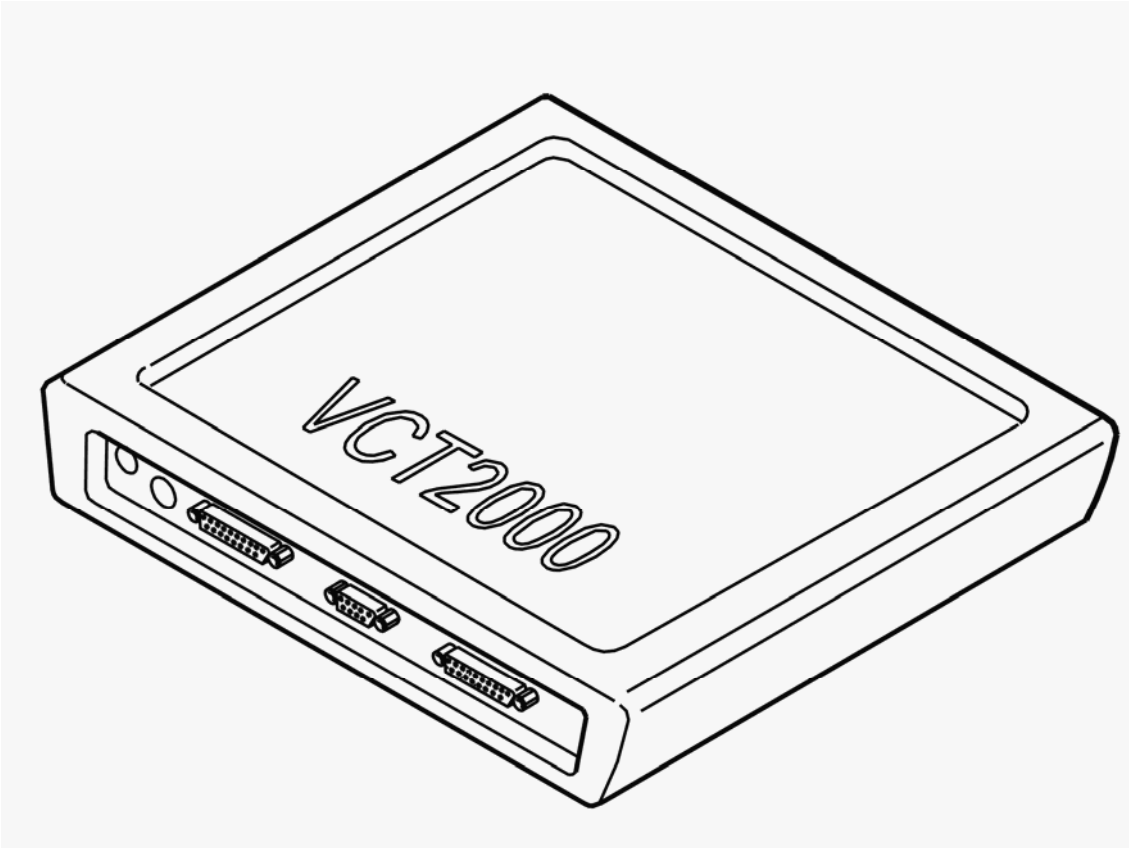


Fig. 168: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

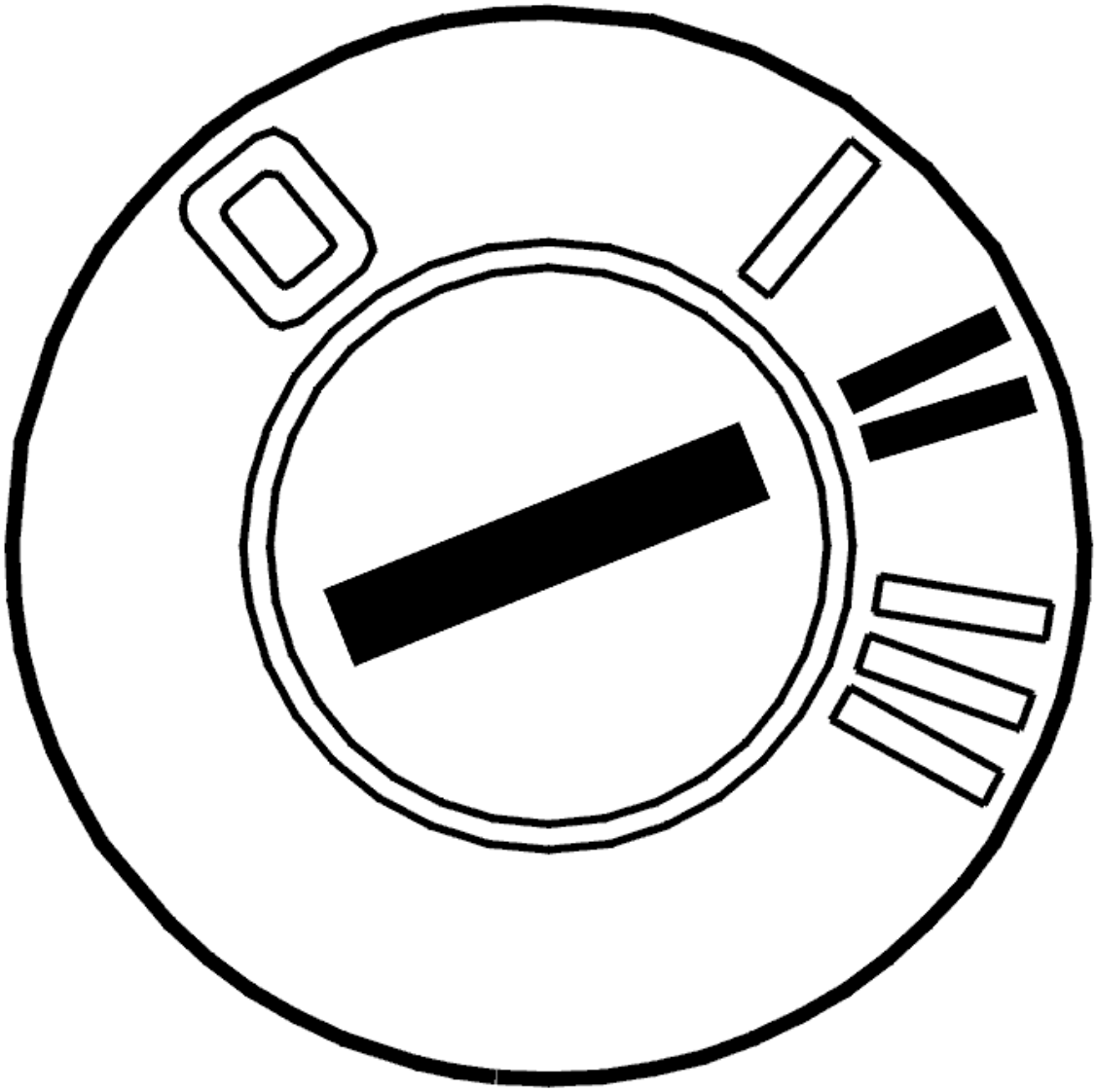


Fig. 169: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

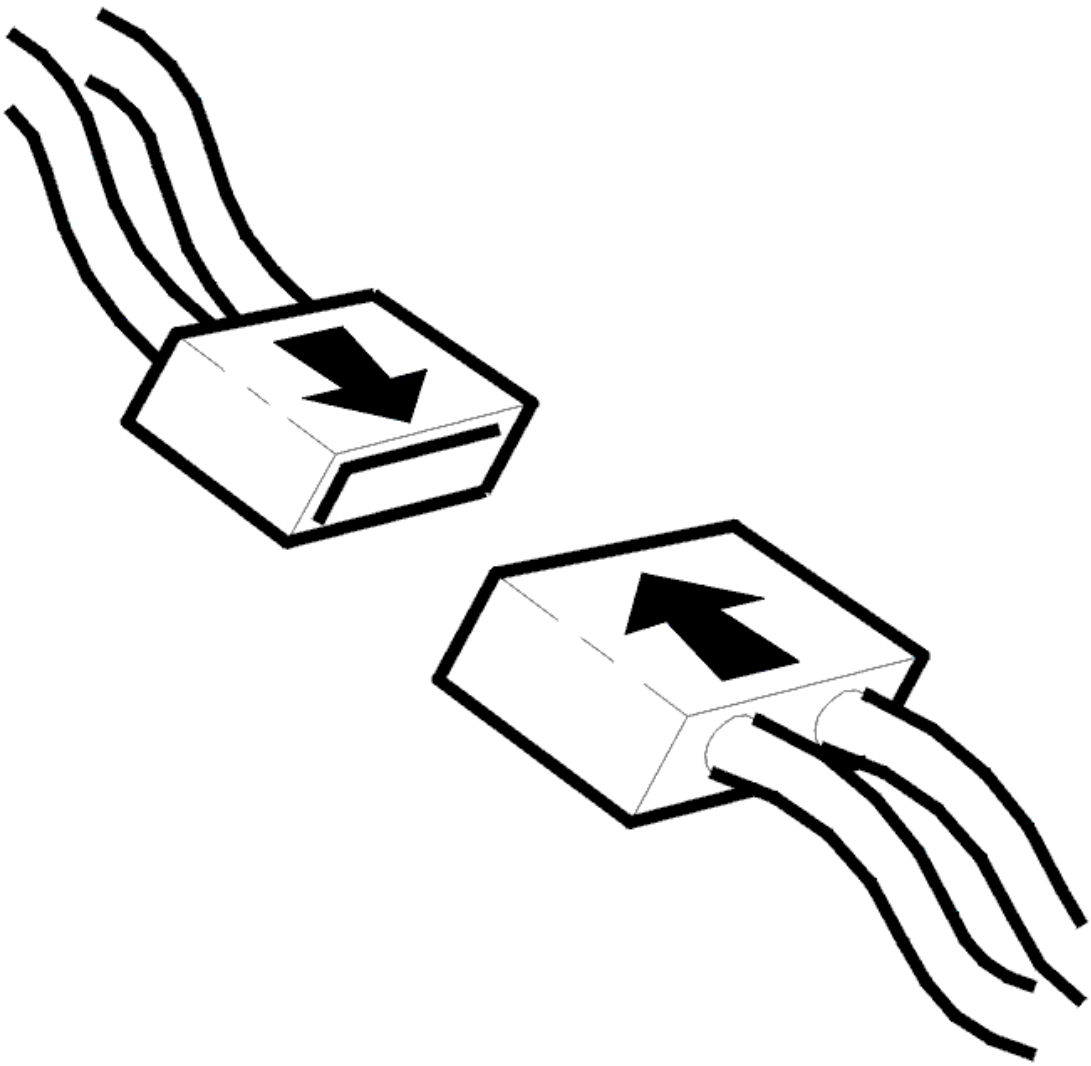


Fig. 170: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

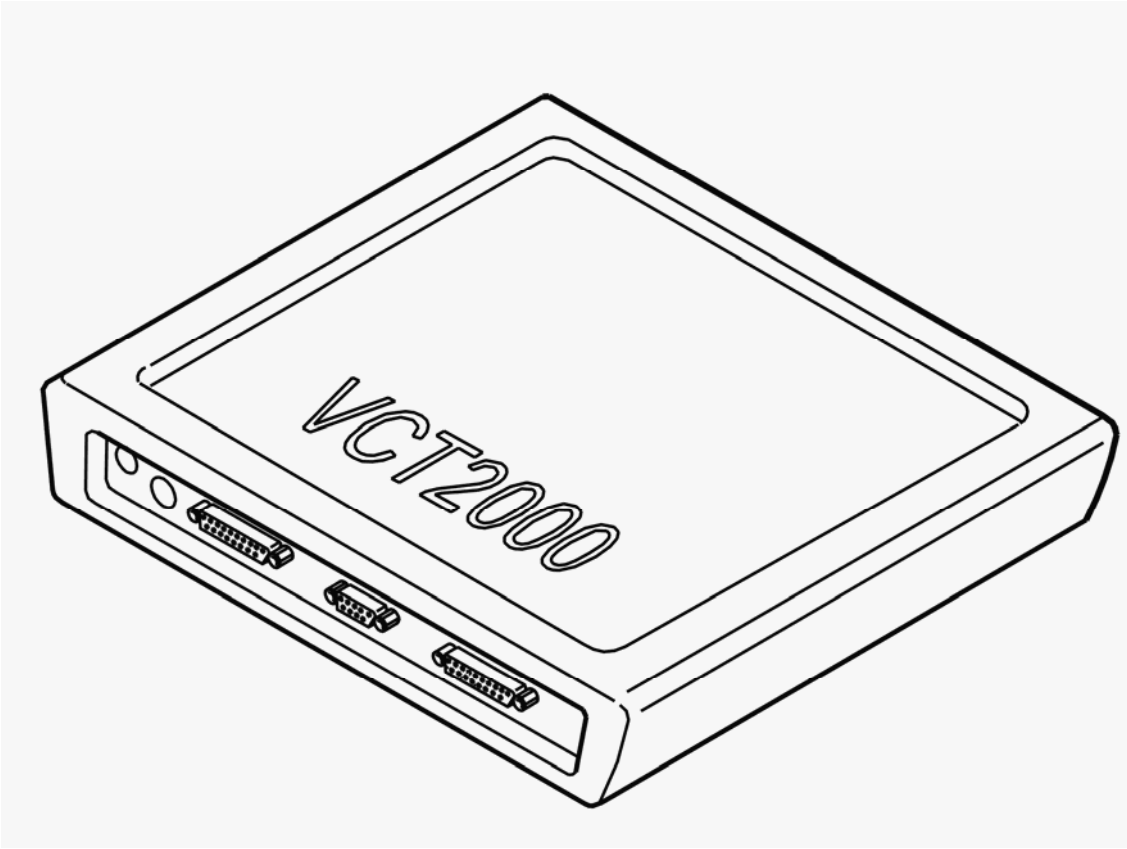


Fig. 171: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-0003: SHIFT SOLENOID S1. SIGNAL TOO LOW (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

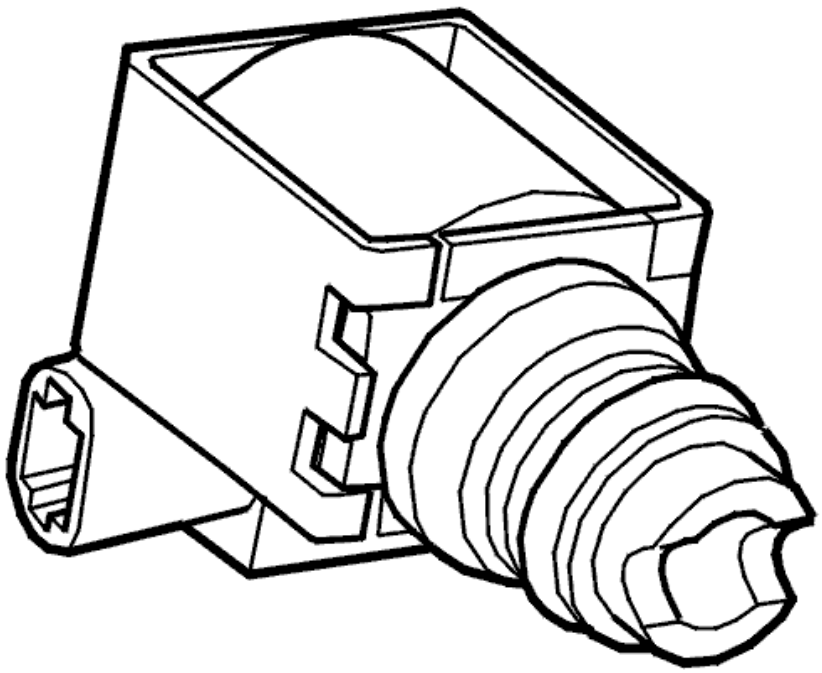


Fig. 172: Identifying Shift Solenoid S1 And S2
Courtesy of VOLVO CARS CORPORATION

Shift solenoids S2 and S1 operate in tandem to control gear-shifting. Solenoid S1 is activated in 1st and 4th gears. Diagnostic trouble code (DTC) TCM-0003 is stored if the control module registers that the signal in the solenoid S1 circuit is too low when the solenoid should be activated. Solenoid S1 cannot then be activated.

Substitute Value

- The control module "Limp Home" program has been initiated.

Possible Source

- Short-circuit to ground in the signal cable.
- Defective solenoid.

Fault symptom[s]

- The automatic transmission warning lamp flashes.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

HINT: Harsh shifting because there is no line pressure solenoid STH control. This results in constant maximum line pressure.

HINT: No shifting -because the transmission control module (TCM) prevents activation of the solenoids. This stops gear-shifting.

SIGNAL TOO LOW

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

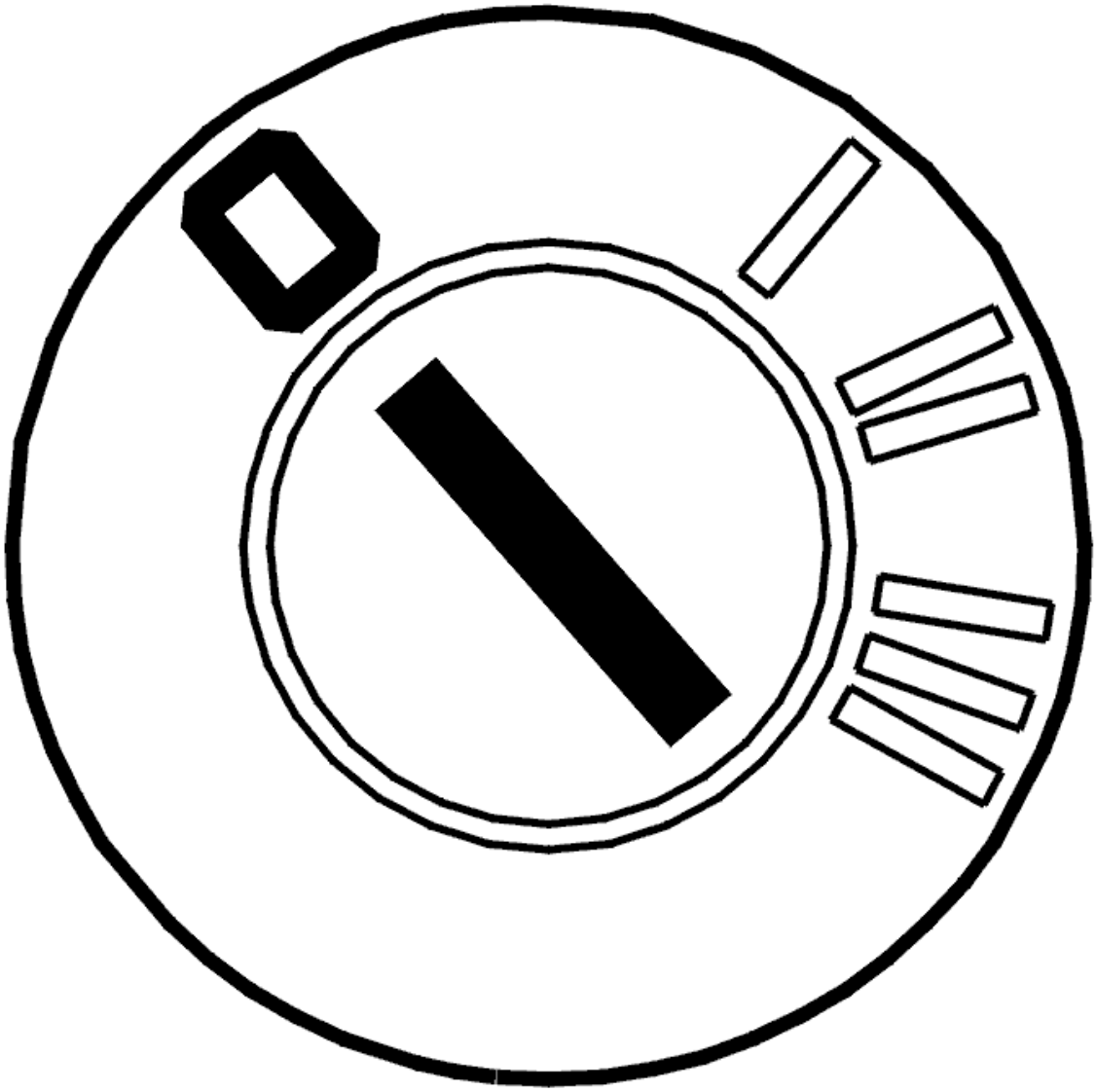


Fig. 173: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

  HINT: If the temperature is outside its permitted range, fault-trace the temperature sensor.

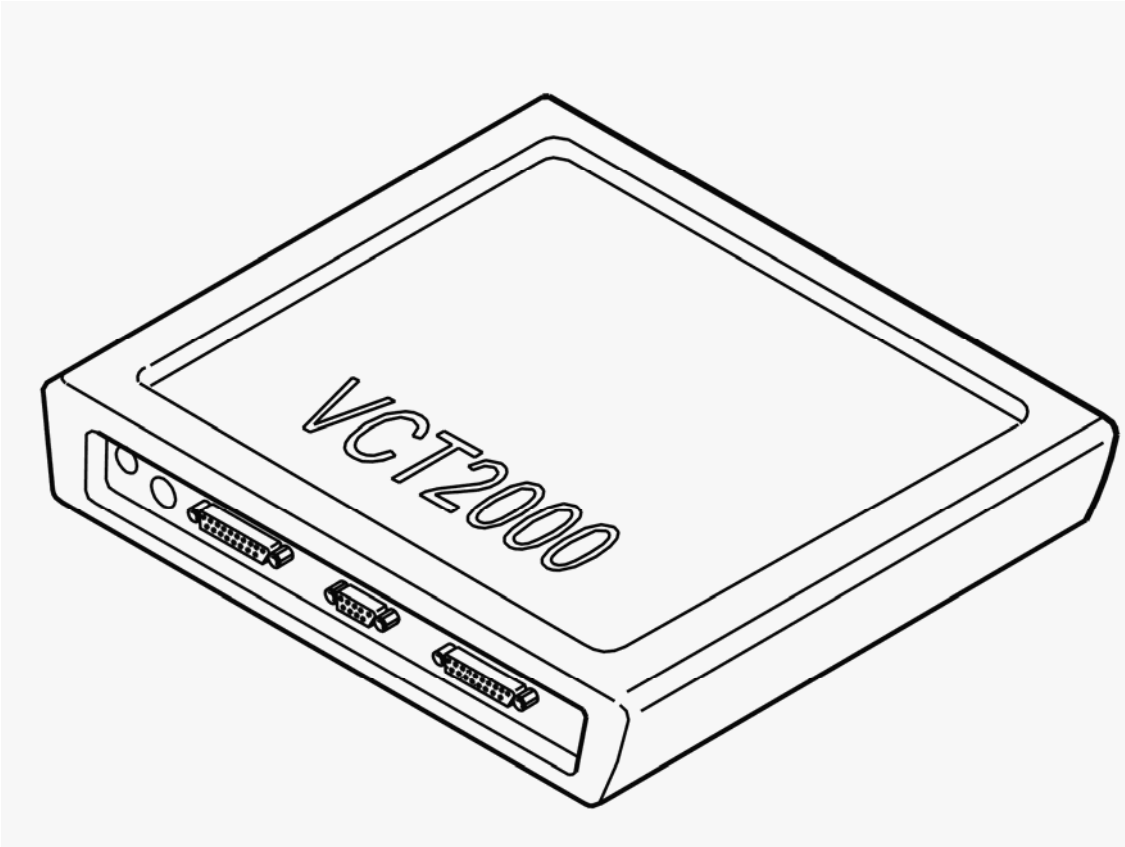


Fig. 174: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S1**

- **NO**

  Refer to **SIGNAL TOO HIGH**

CHECKING SHIFT SOLENOID S1

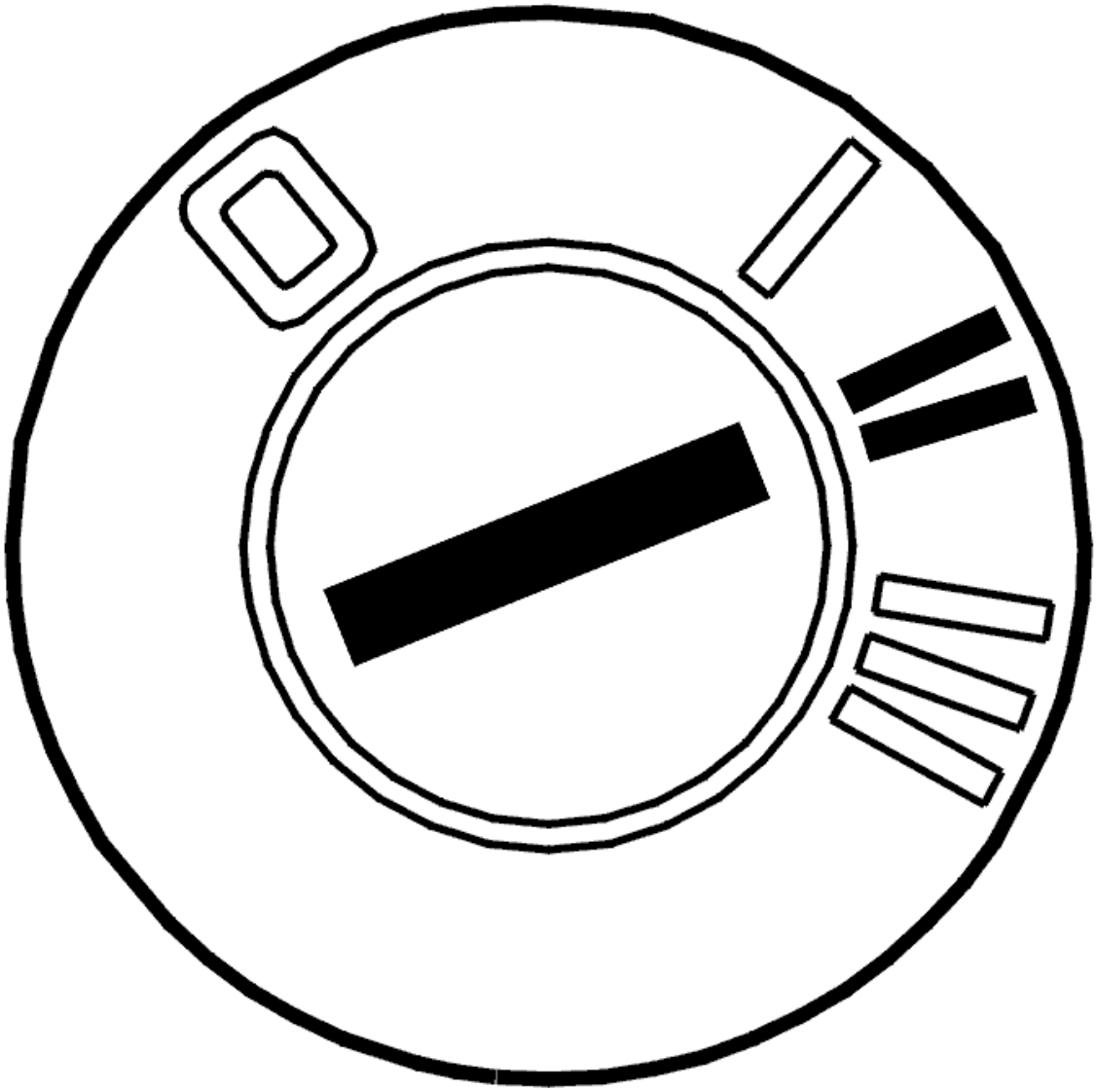


Fig. 175: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and automatic transmission connectors for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary
- Ignition on
- Gear selector in position P
- Activate solenoid S1.

  The value must change between OFF and ON.

  If the value oscillates, the fault was caused by contact resistance and oxidation.

  Other information:

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

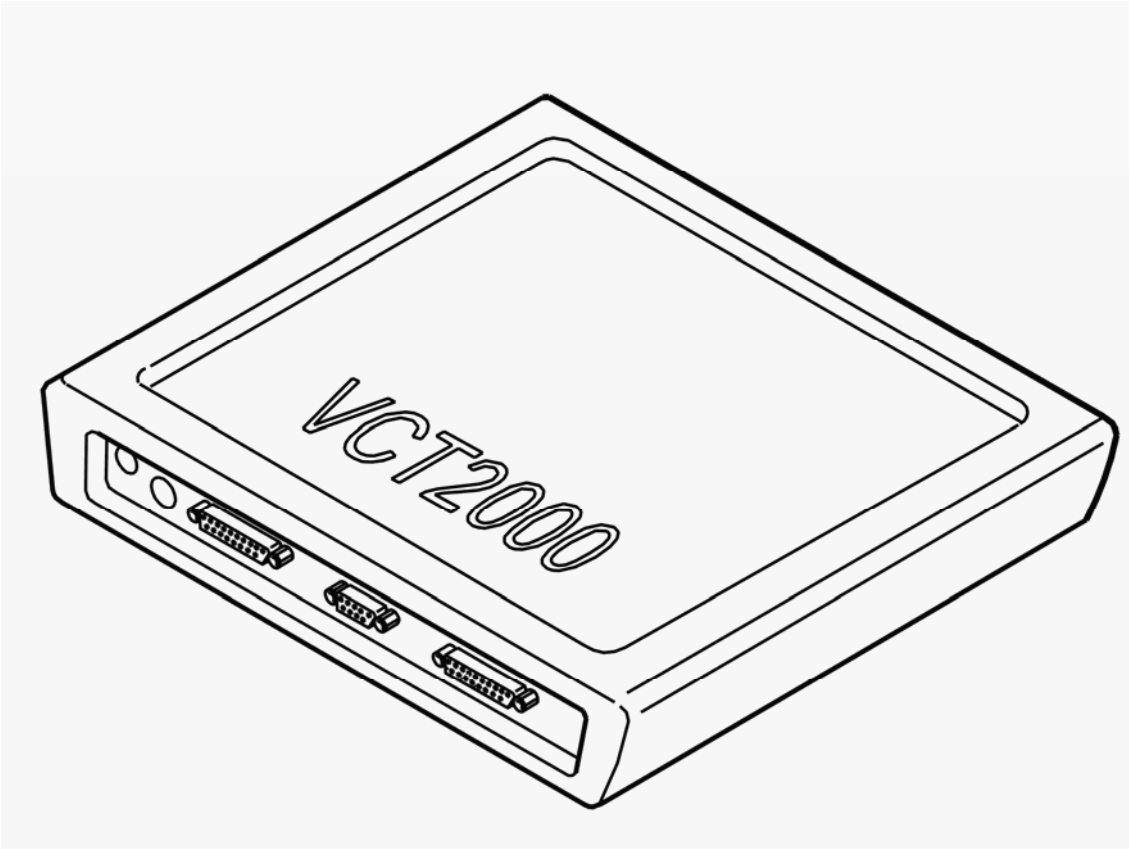


Fig. 176: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING SOLENOID S1**

CHECKING SOLENOID S1

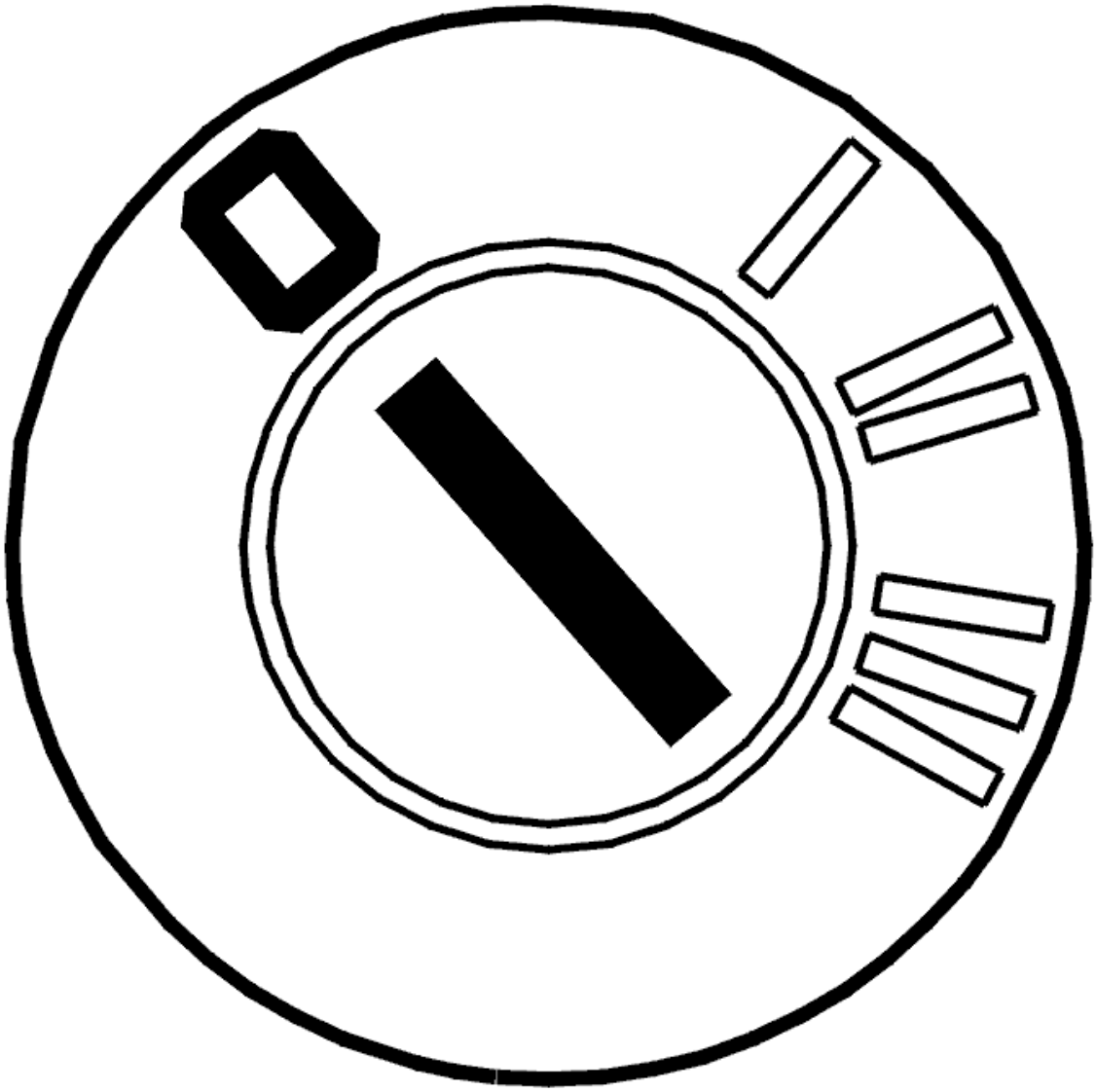


Fig. 177: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

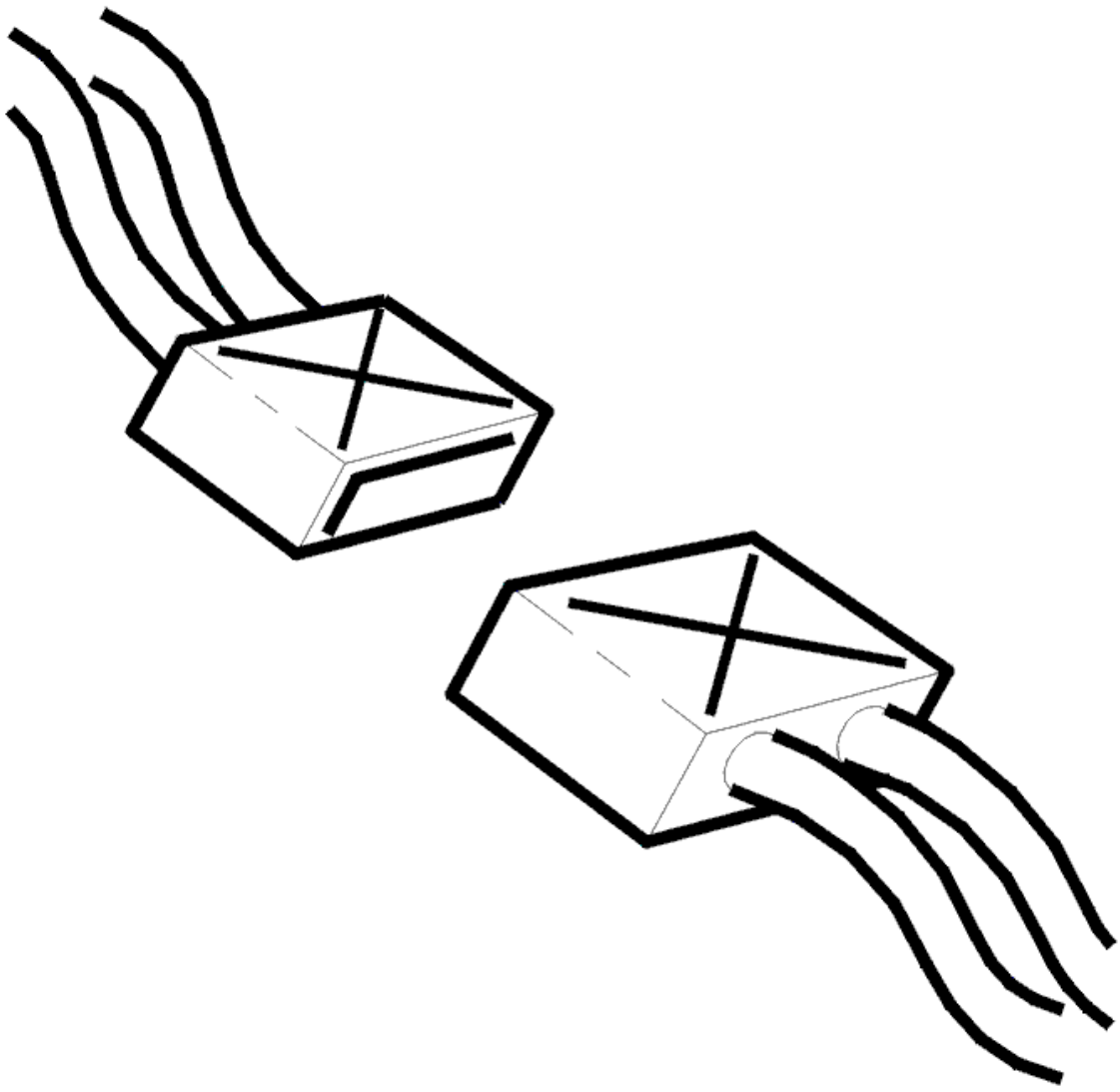


Fig. 178: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

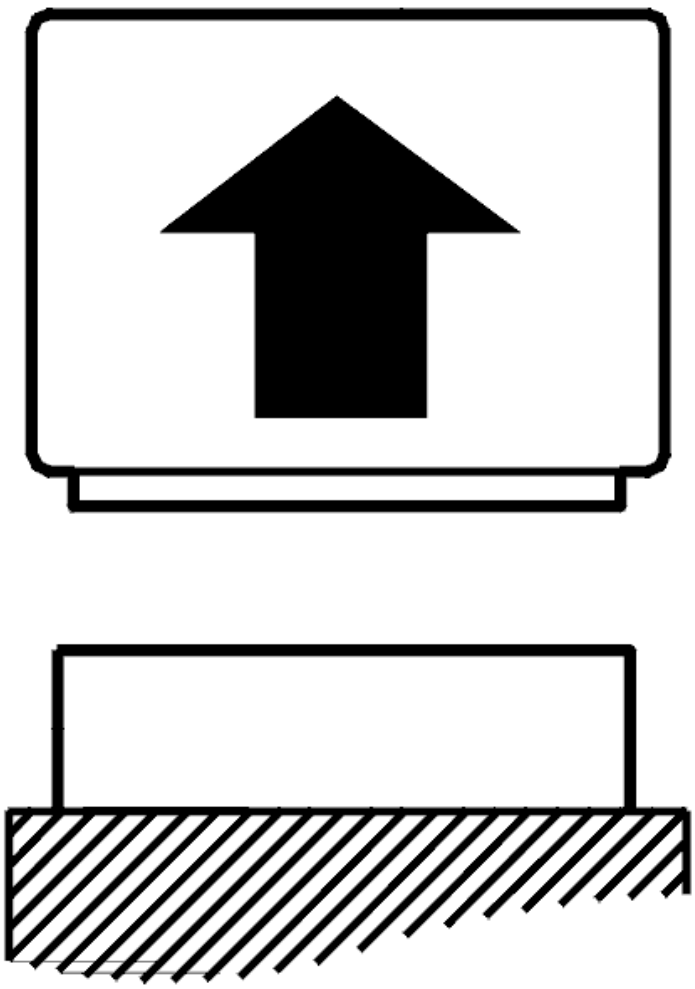


Fig. 179: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the automatic transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals #A (#A1) and #E (#A5).

  The resistance for solenoid S1 resistance must be between 18 and 30 ohms.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - To connect the breakout box to the transmission connector, see **CONNECTING THE**

BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS

- For information about signals, see **SIGNAL SPECIFICATION** .

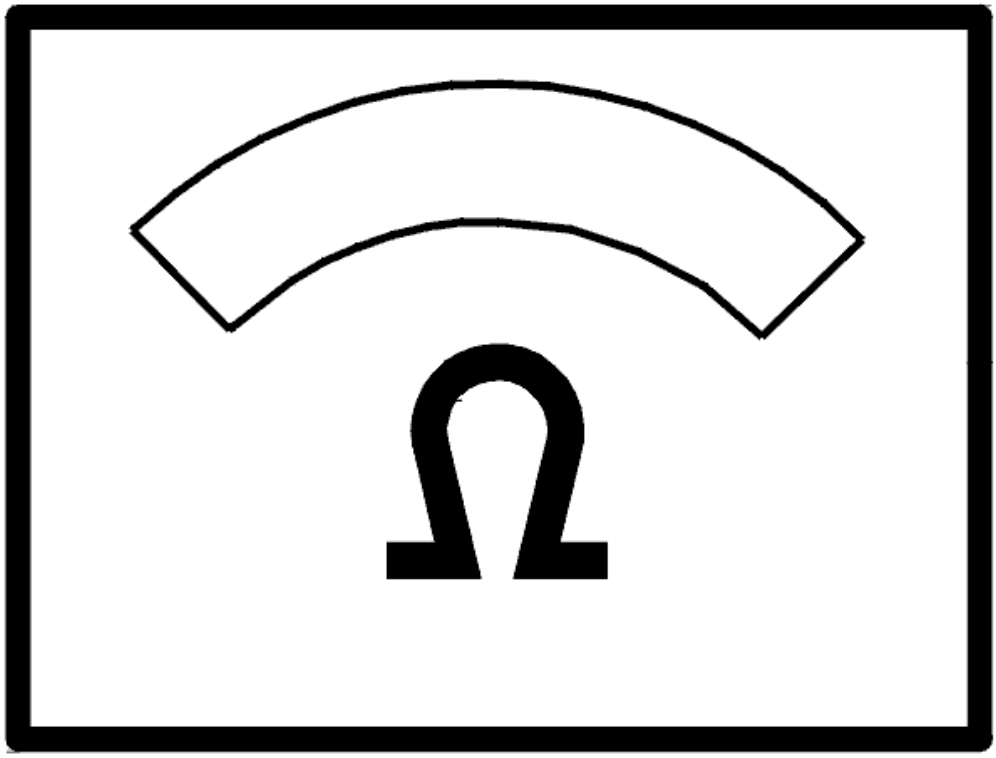


Fig. 180: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

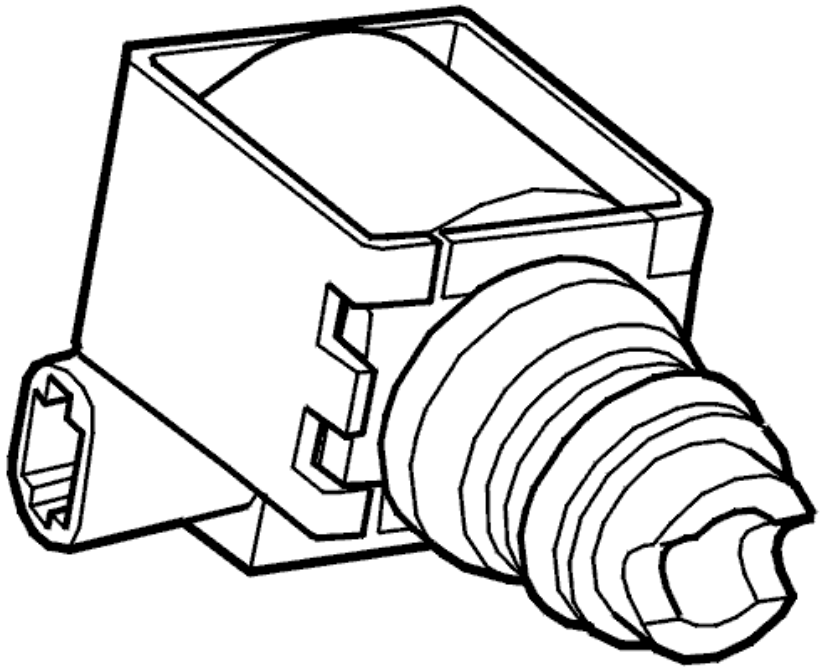


Fig. 181: Identifying Shift Solenoid S1 And S2
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE CONTROL MODULE

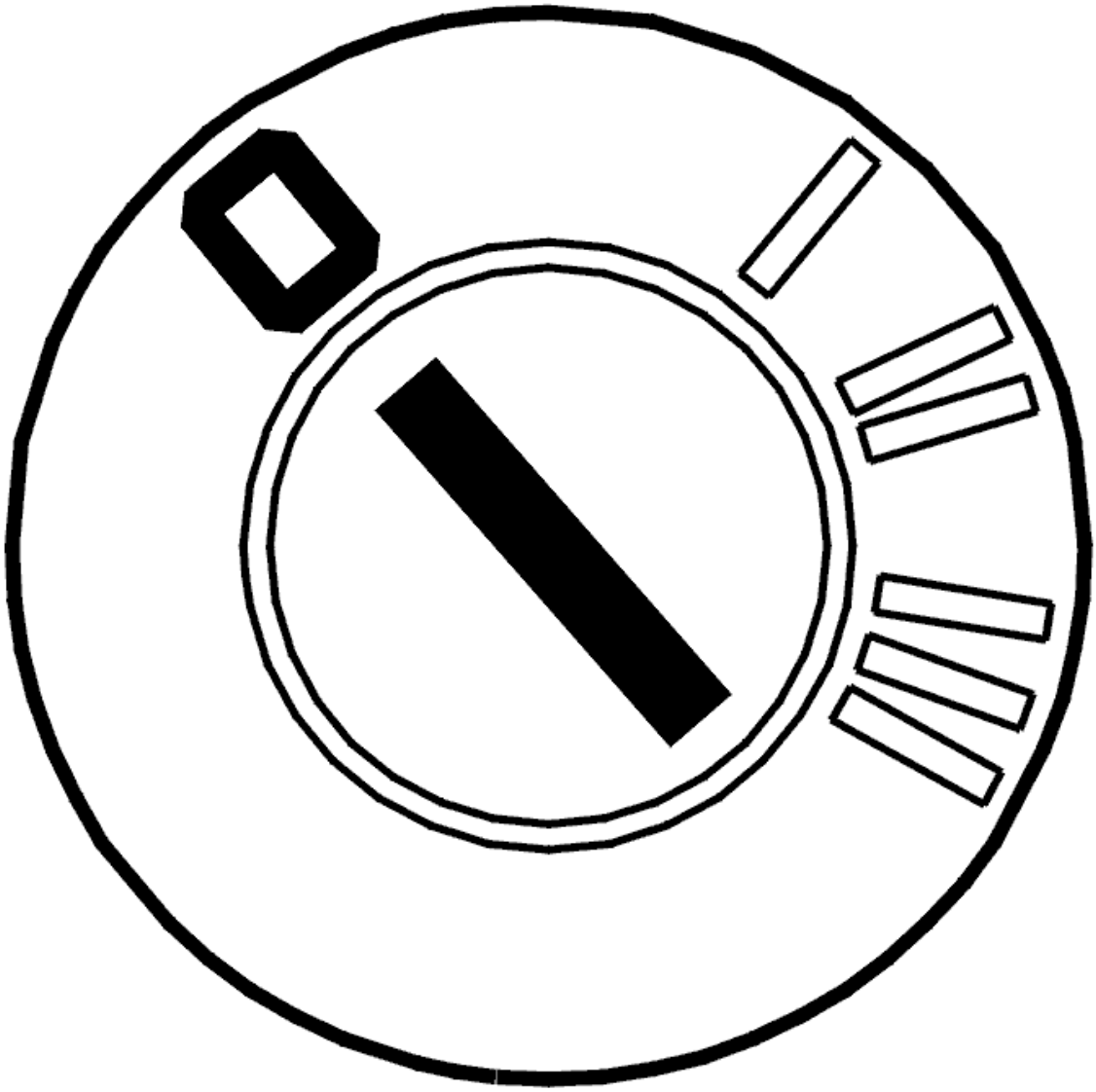


Fig. 182: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

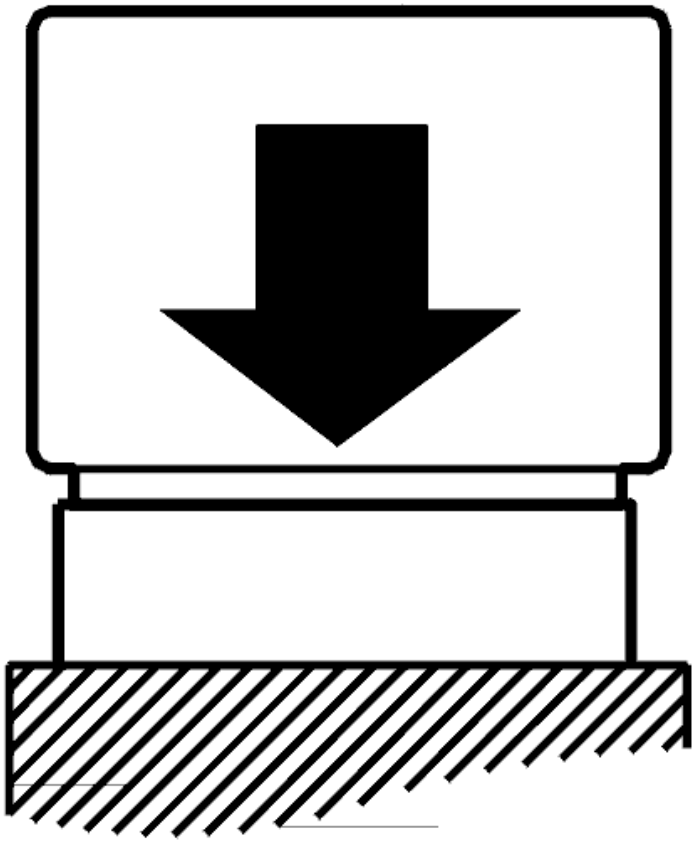


Fig. 183: Identifying Connecting Control Module
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Control module connected
- Transmission connector disconnected
- Ignition on
- Gear selector in position P.

Check the circuit for solenoid S1 by connecting an ohmmeter between terminals #50 (#A50) and #53 (#A53). The resistance must be between 7 and 13 Kohms. Try a new control module if the resistance is 0.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION** .

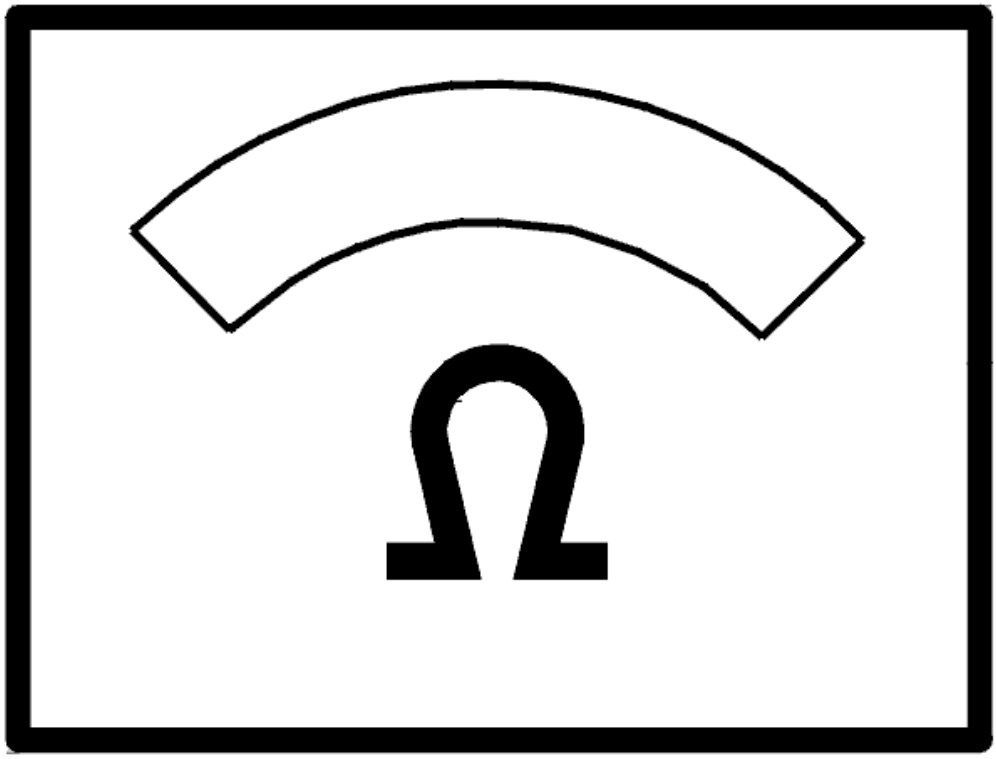


Fig. 184: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

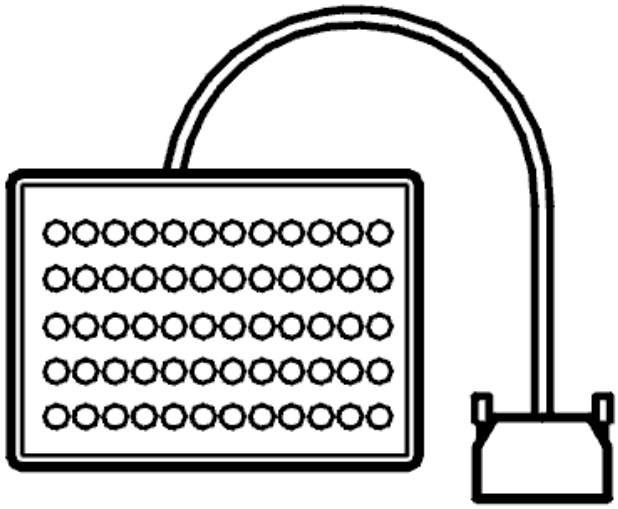


Fig. 185: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

Was the resistance incorrect?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

CHECKING THE WIRING

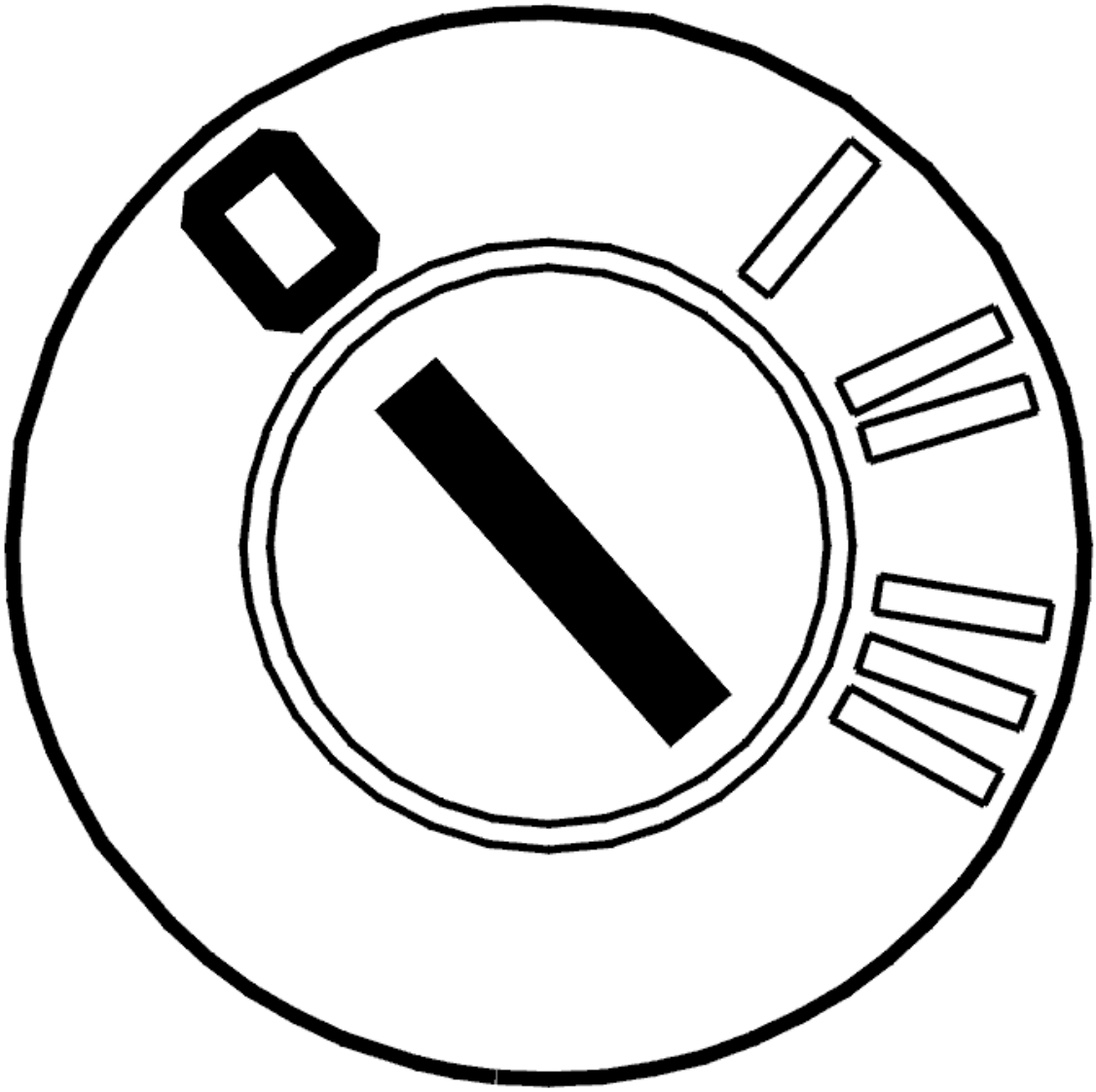


Fig. 186: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

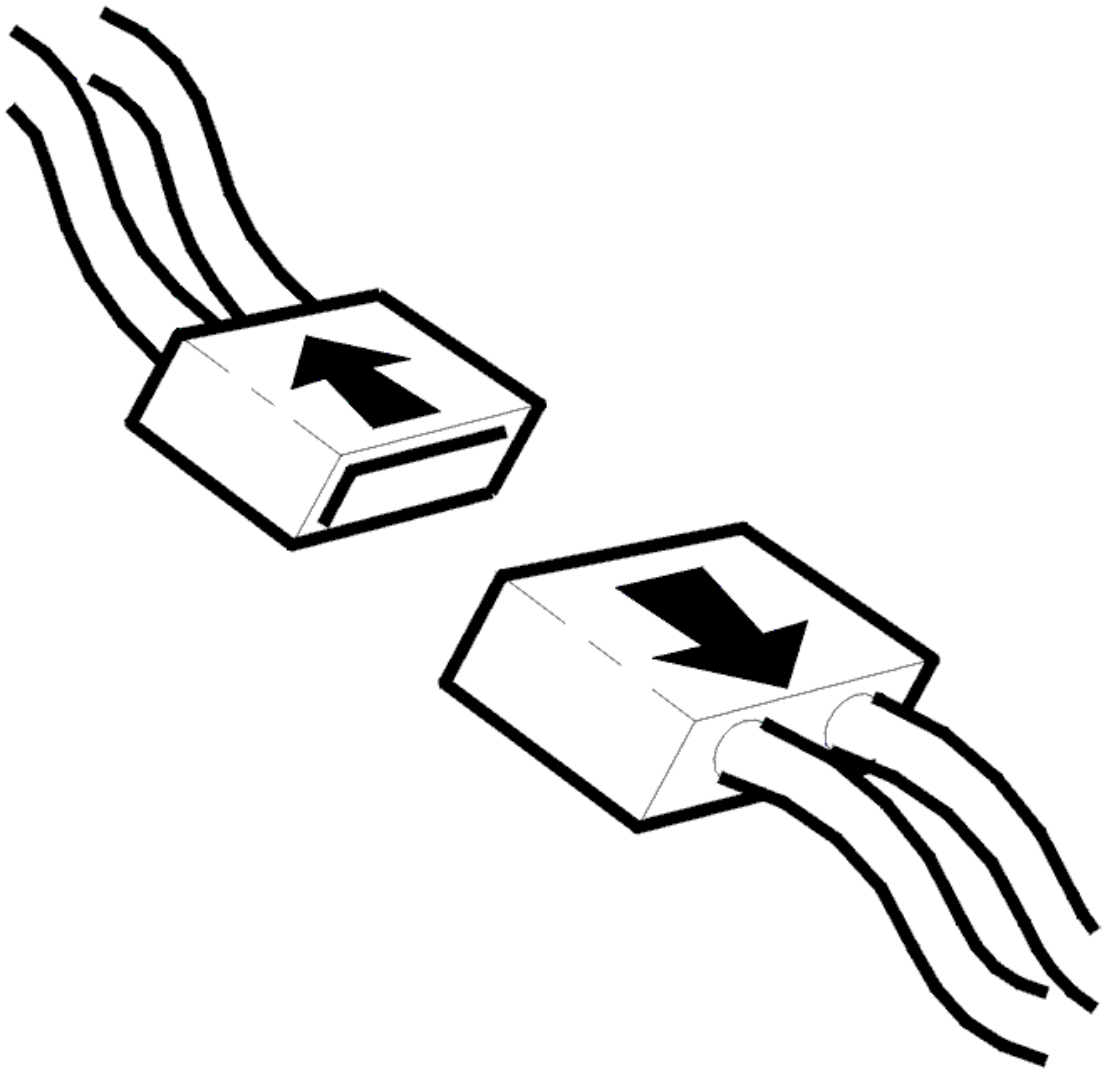


Fig. 187: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

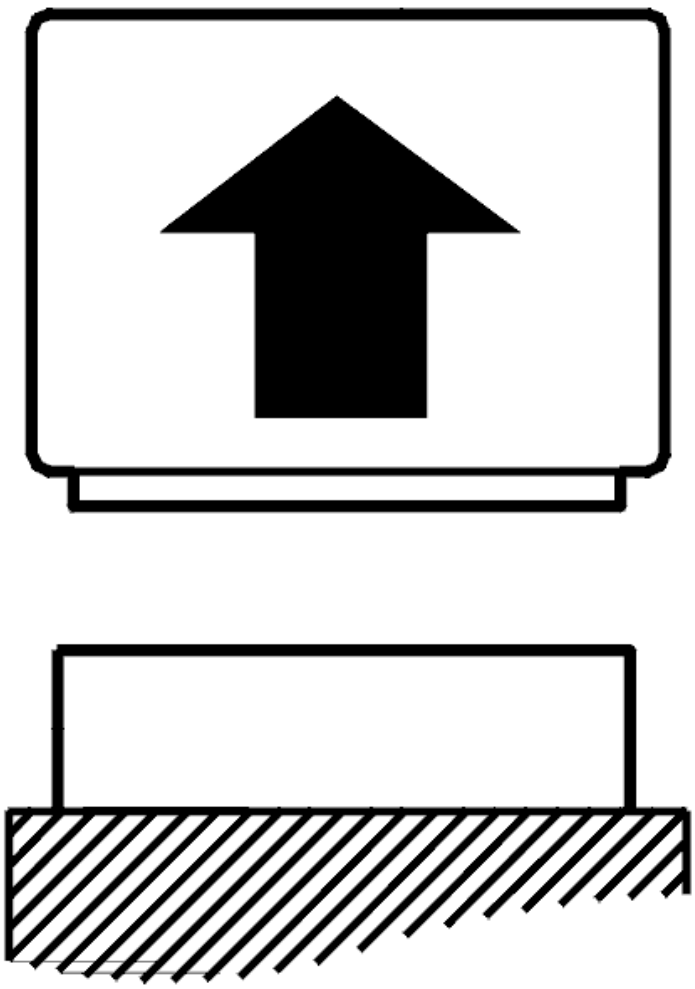


Fig. 188: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box
- Disconnect the control module.
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side).

  Check the cable between control module terminal #50 (#A50) and transmission connector terminal #A (#A1). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

  Check the cable between control module terminal #53 (#A53) and transmission connector terminal #E

(#A5). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

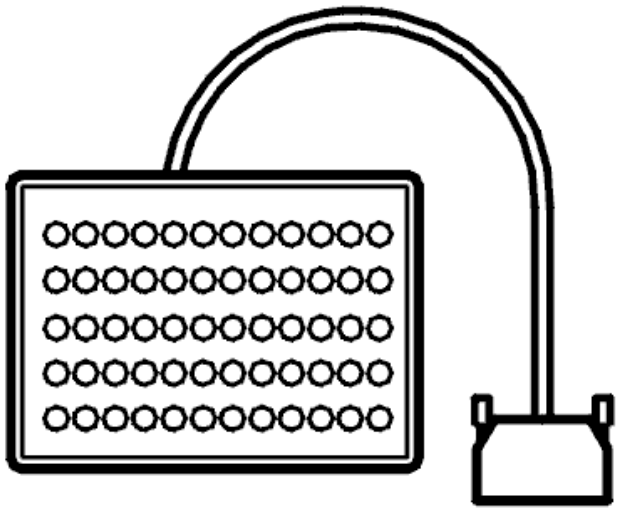


Fig. 189: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

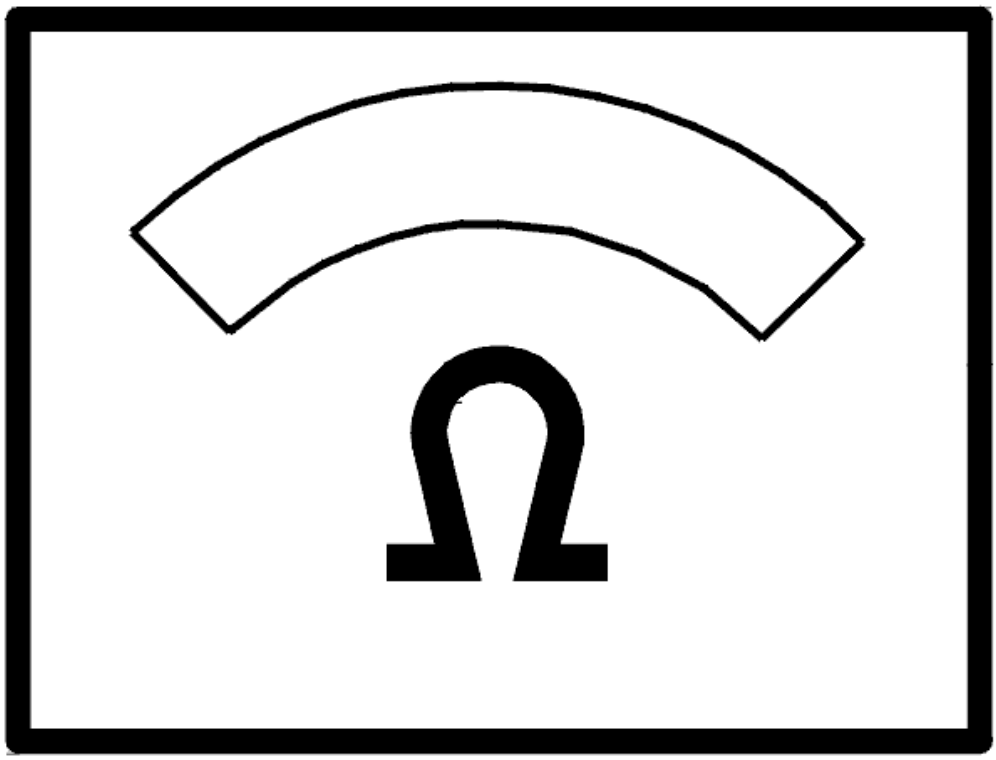


Fig. 190: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

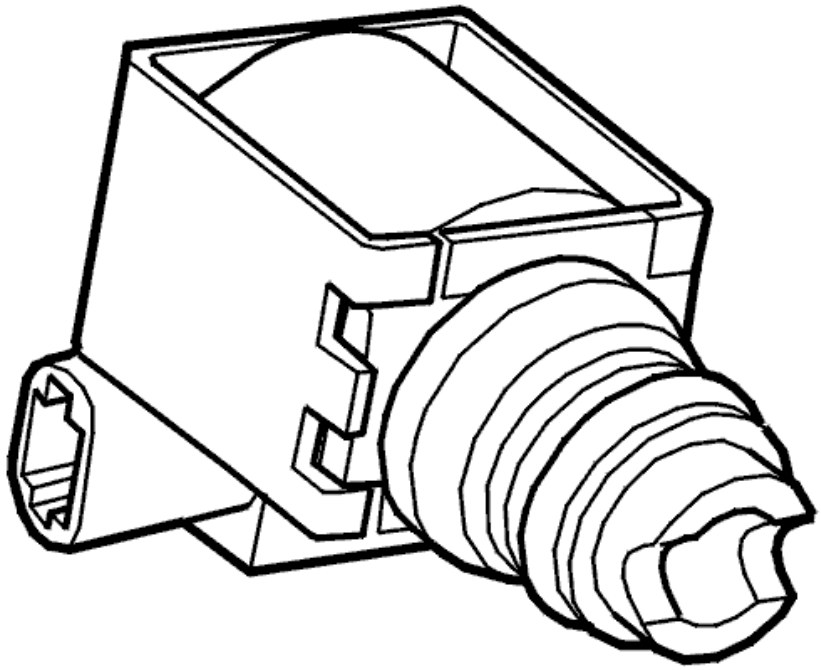


Fig. 191: Identifying Shift Solenoid S1 And S2
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE WIRING AND COMPONENT

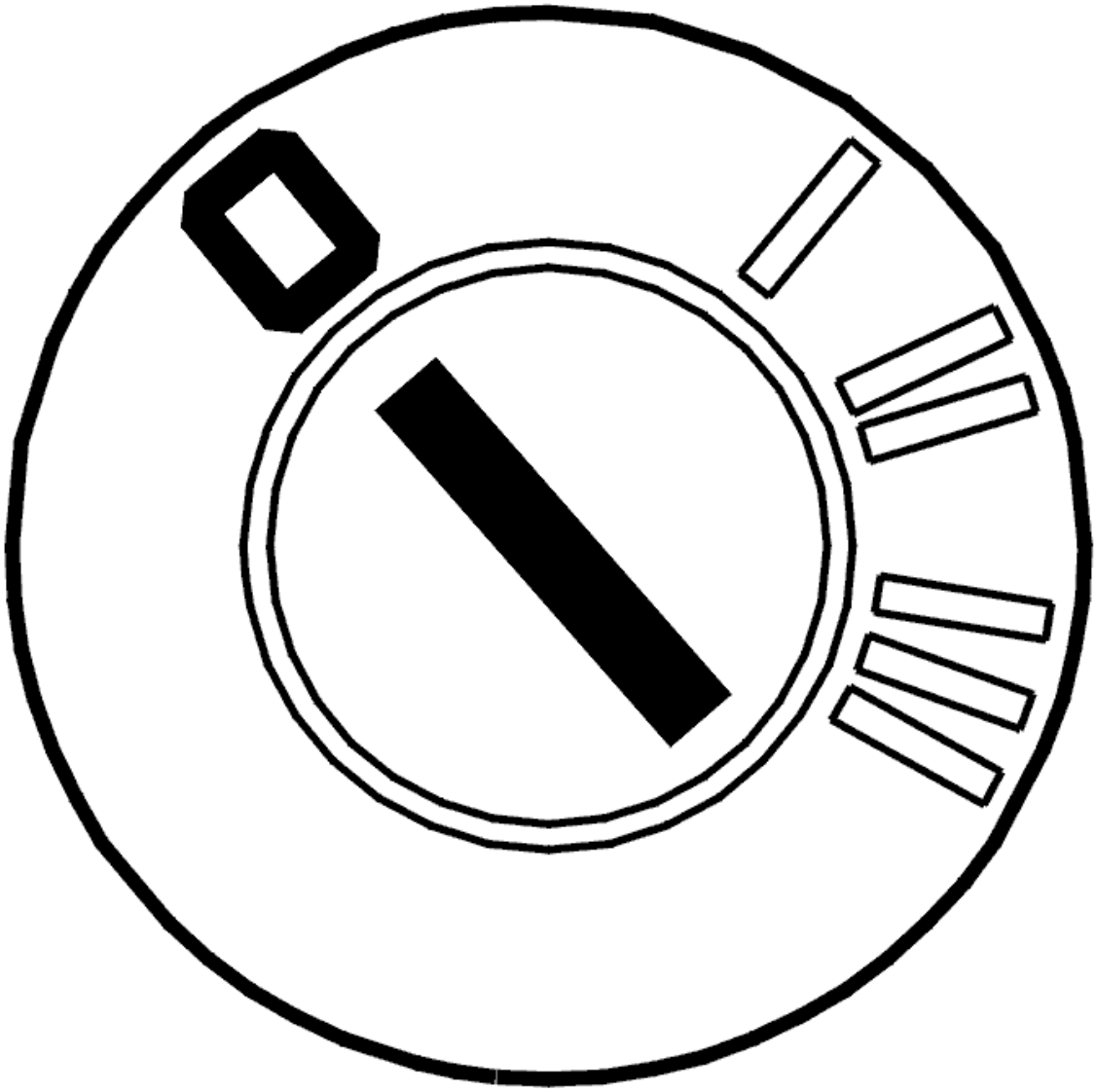


Fig. 192: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission connector (transmission side) terminal #A (#A1) and solenoid S1 terminals #A and #E (#A5) and solenoid S1 #B. Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

  HINT: Check solenoid S1 by measuring the solenoid resistance between terminals A and B. The resistance must be between 18 and 25 ohms.

  Remedy as necessary.

  Other information:

- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** .
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid S1, see **SOLENOID SHIFTING 2-3, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION** .

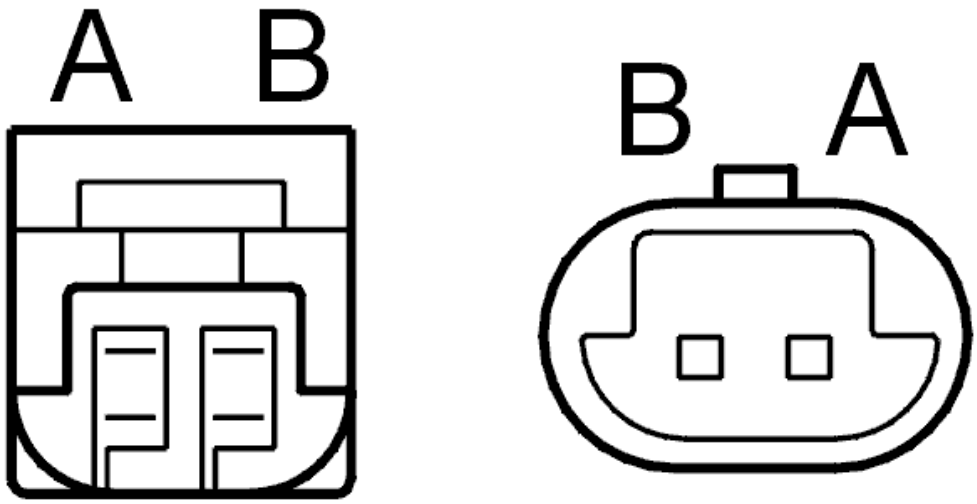


Fig. 193: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

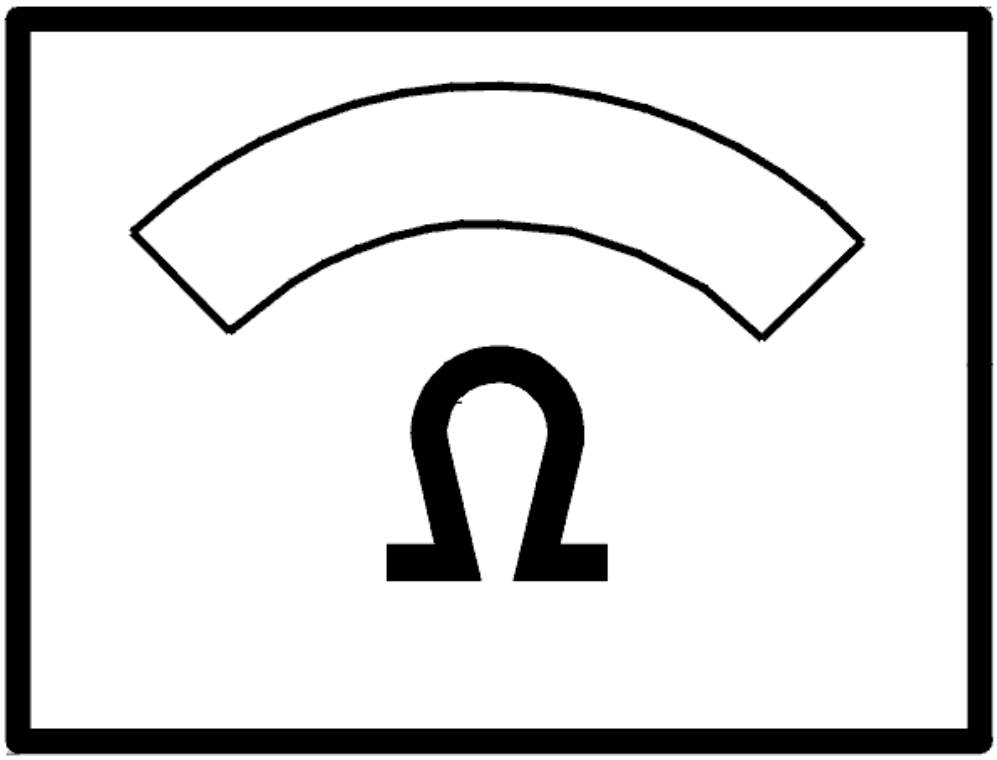


Fig. 194: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the cable between control module terminal #A50 and transmission connector terminal #A (#A1) (control module side). Check for an intermittent short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** . Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between control module terminal #A53 and transmission connector terminal #E (#A5) (control module side). Check for an intermittent short-circuit to ground. See **SHORT-CIRCUIT TO GROUND,**

INTERMITTENT FAULTS . Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

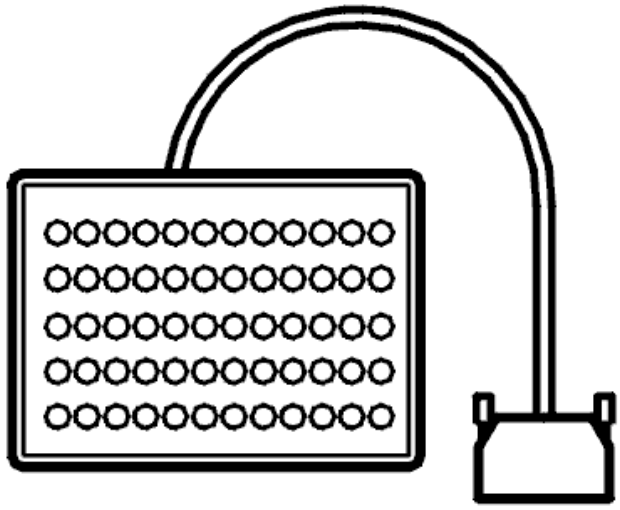


Fig. 195: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

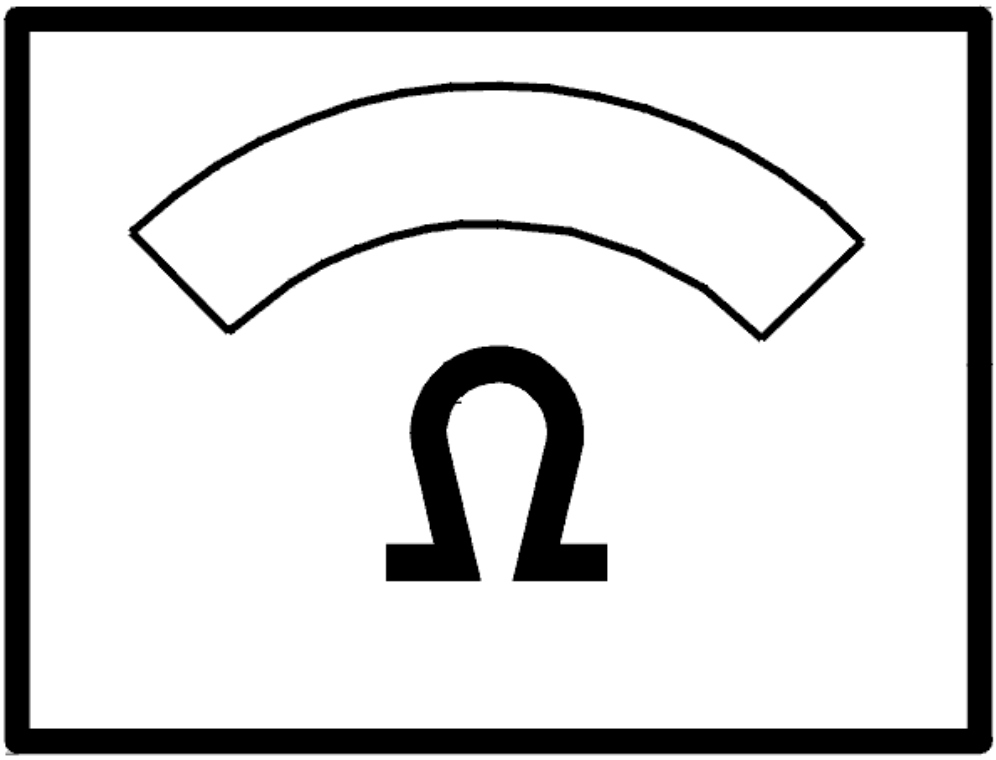


Fig. 196: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

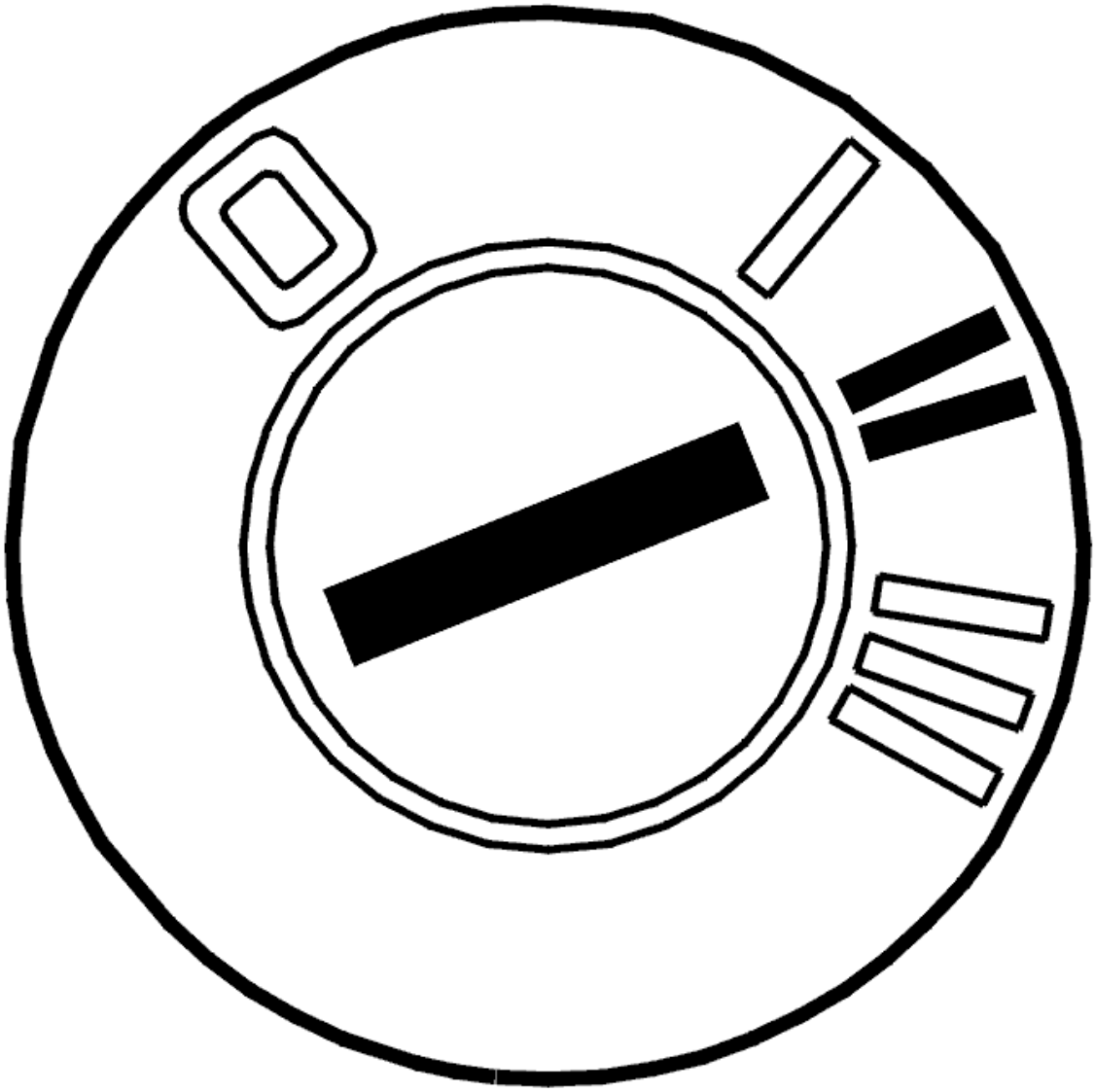


Fig. 197: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

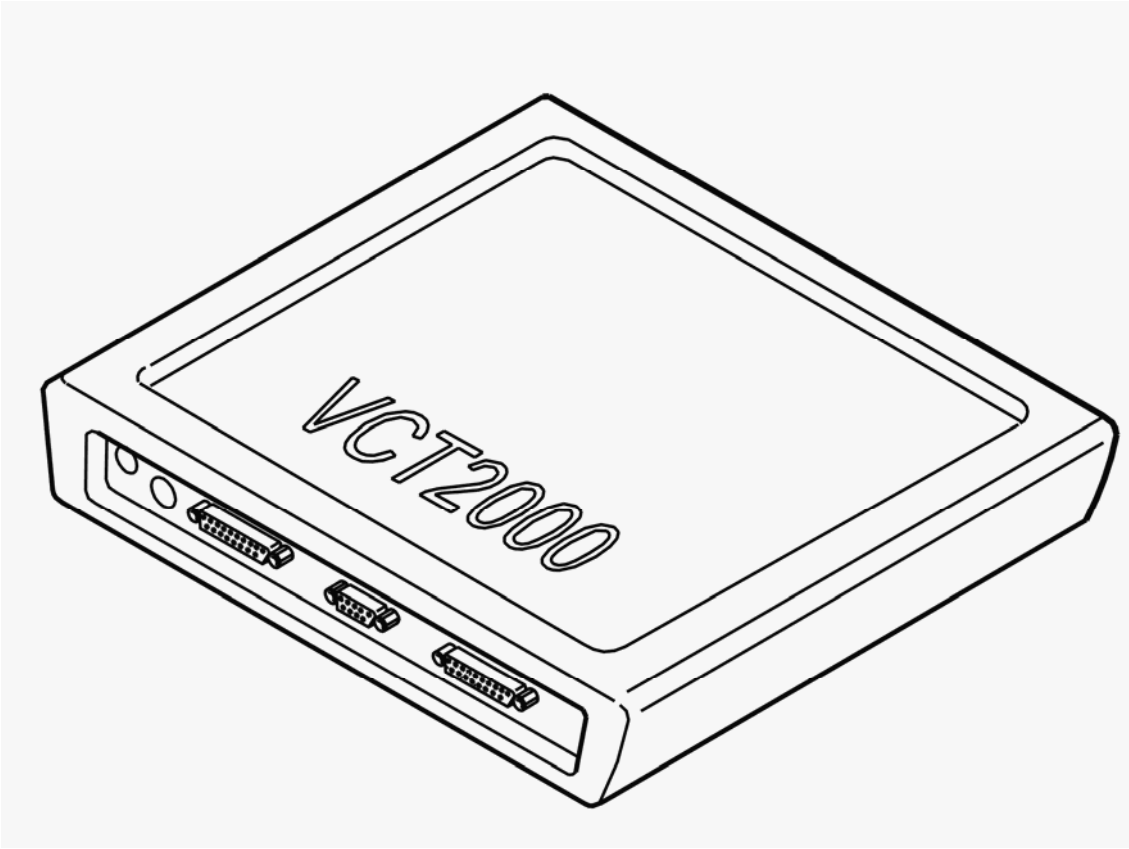


Fig. 198: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION.**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

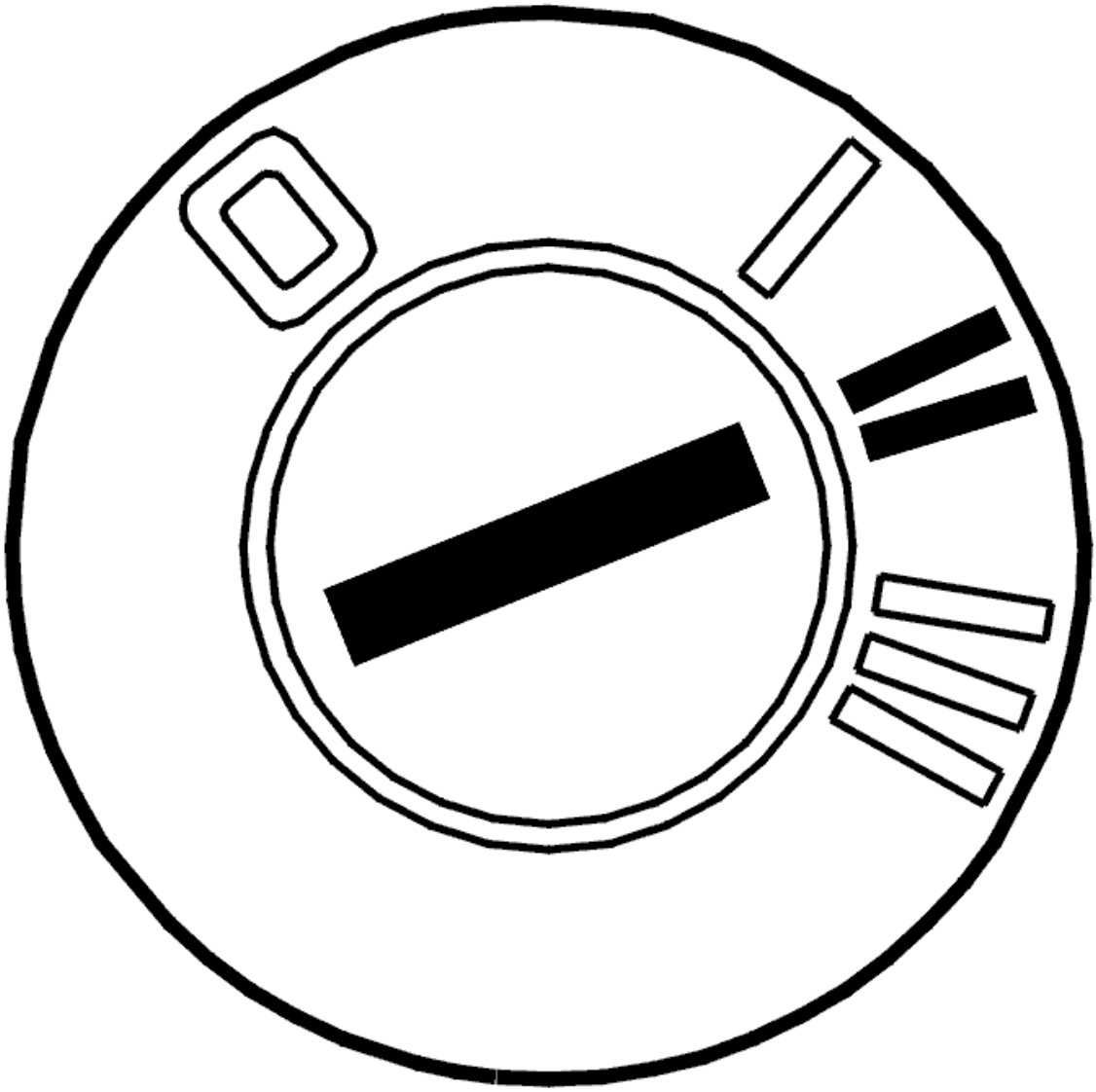


Fig. 199: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

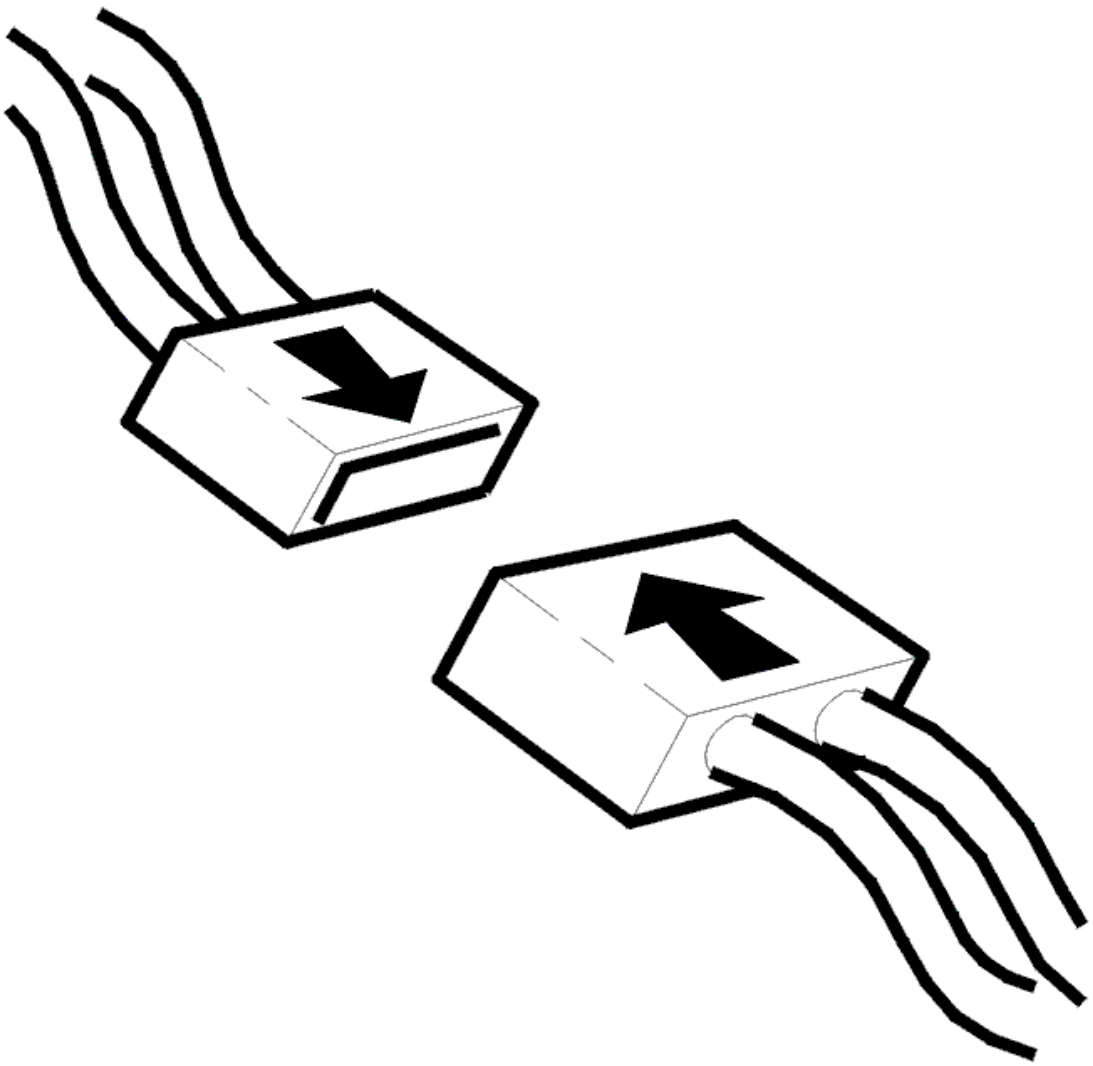


Fig. 200: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Wait at least 90 seconds.
- Reconnect the connectors, reinstall components etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S1.

The value should change between OFF and ON.

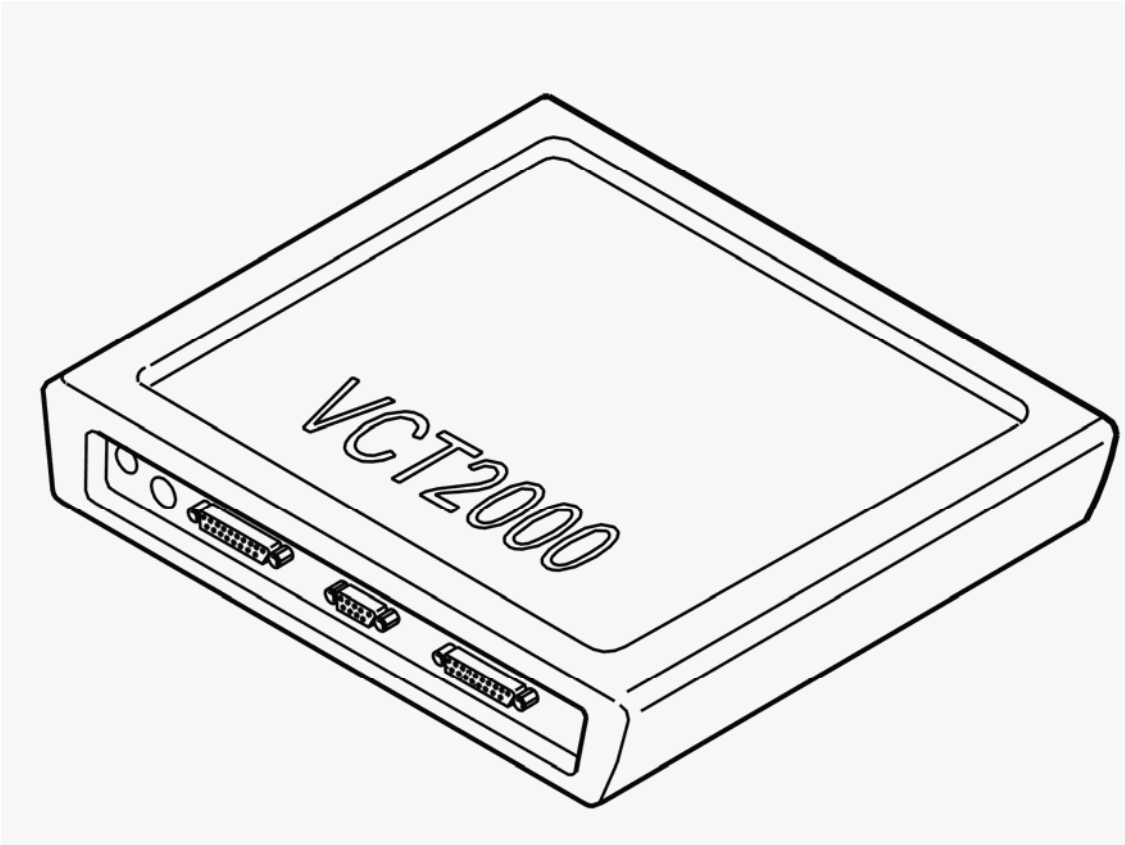


Fig. 201: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

SIGNAL TOO HIGH

CHECKING THE FUNCTION OF THE OIL TEMPERATURE SENSOR

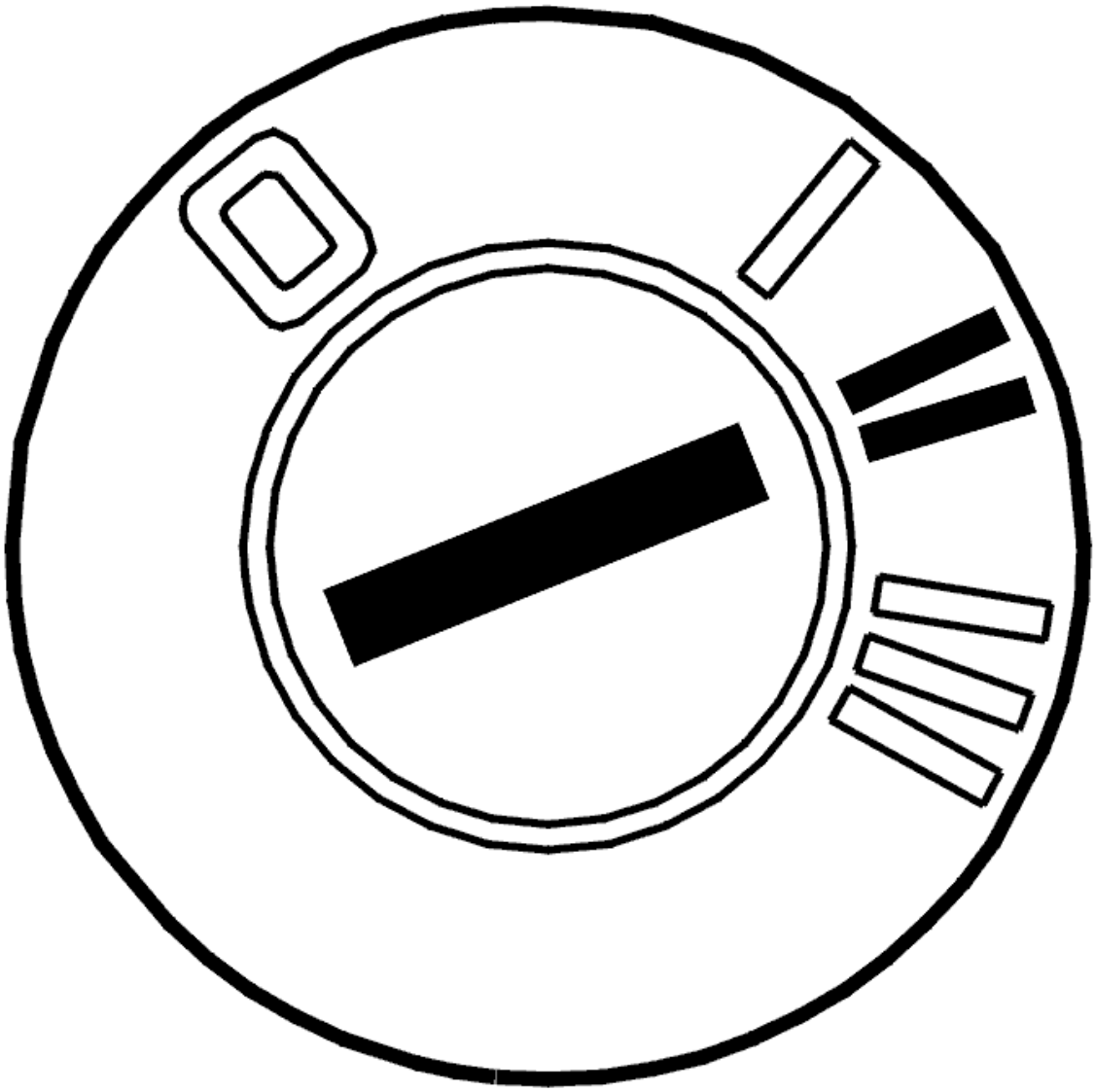


Fig. 202: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

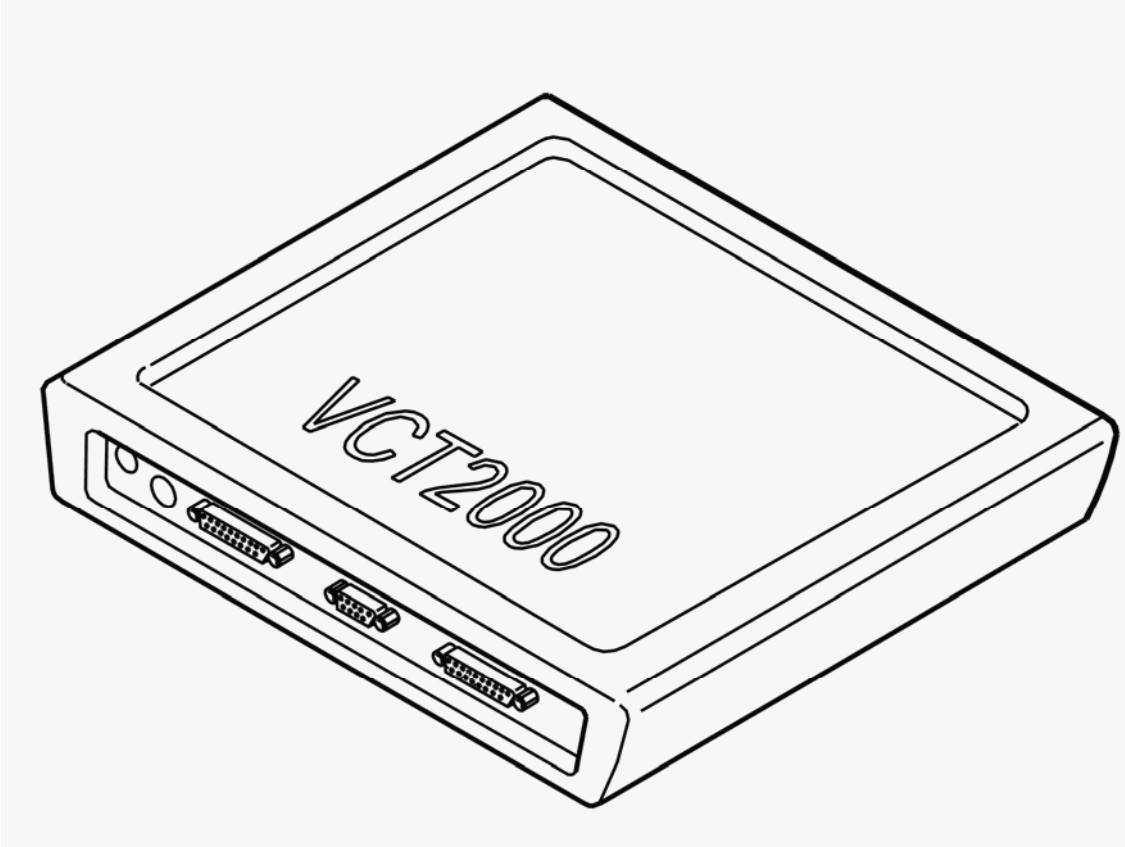


Fig. 203: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

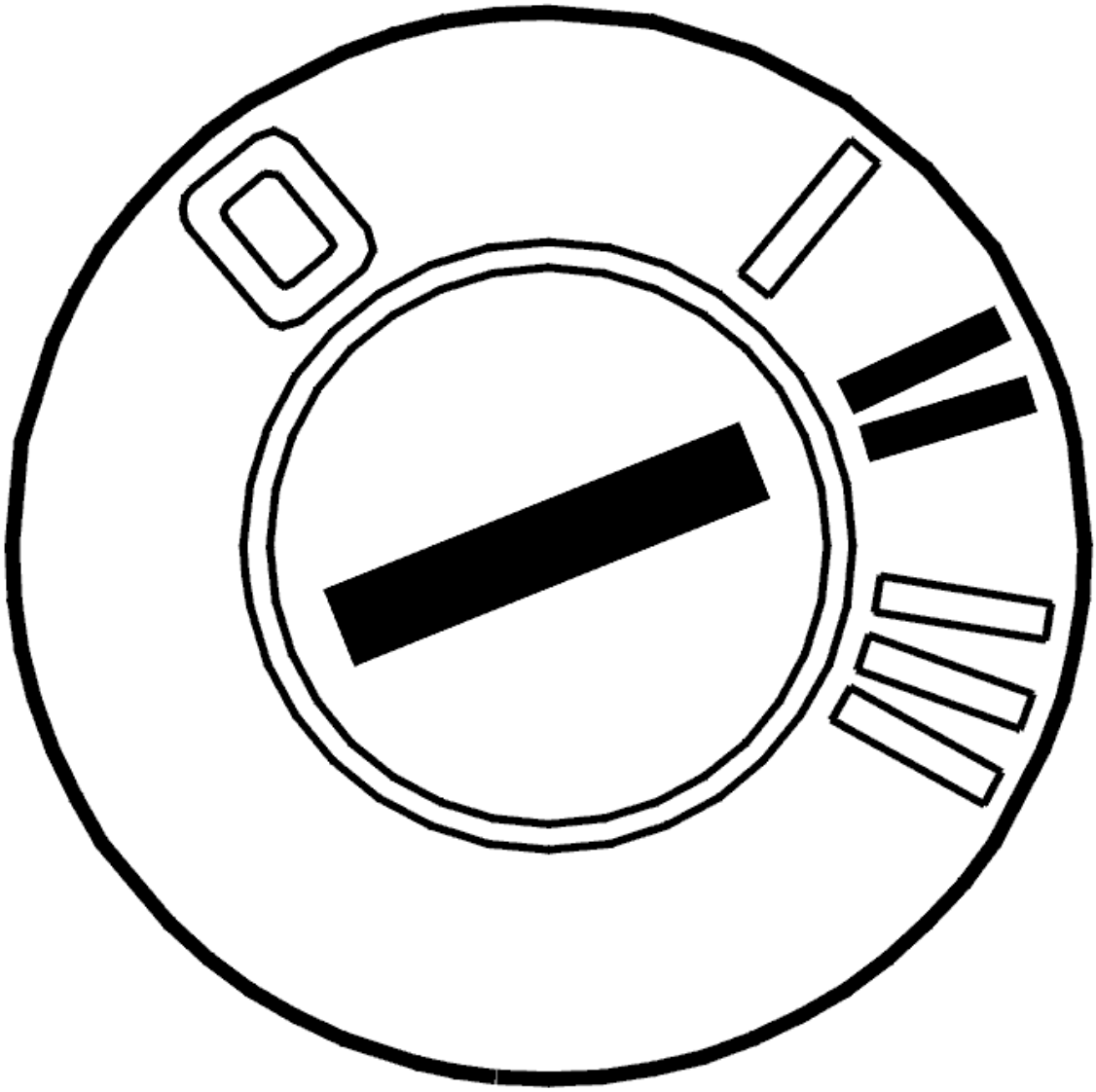


Fig. 204: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

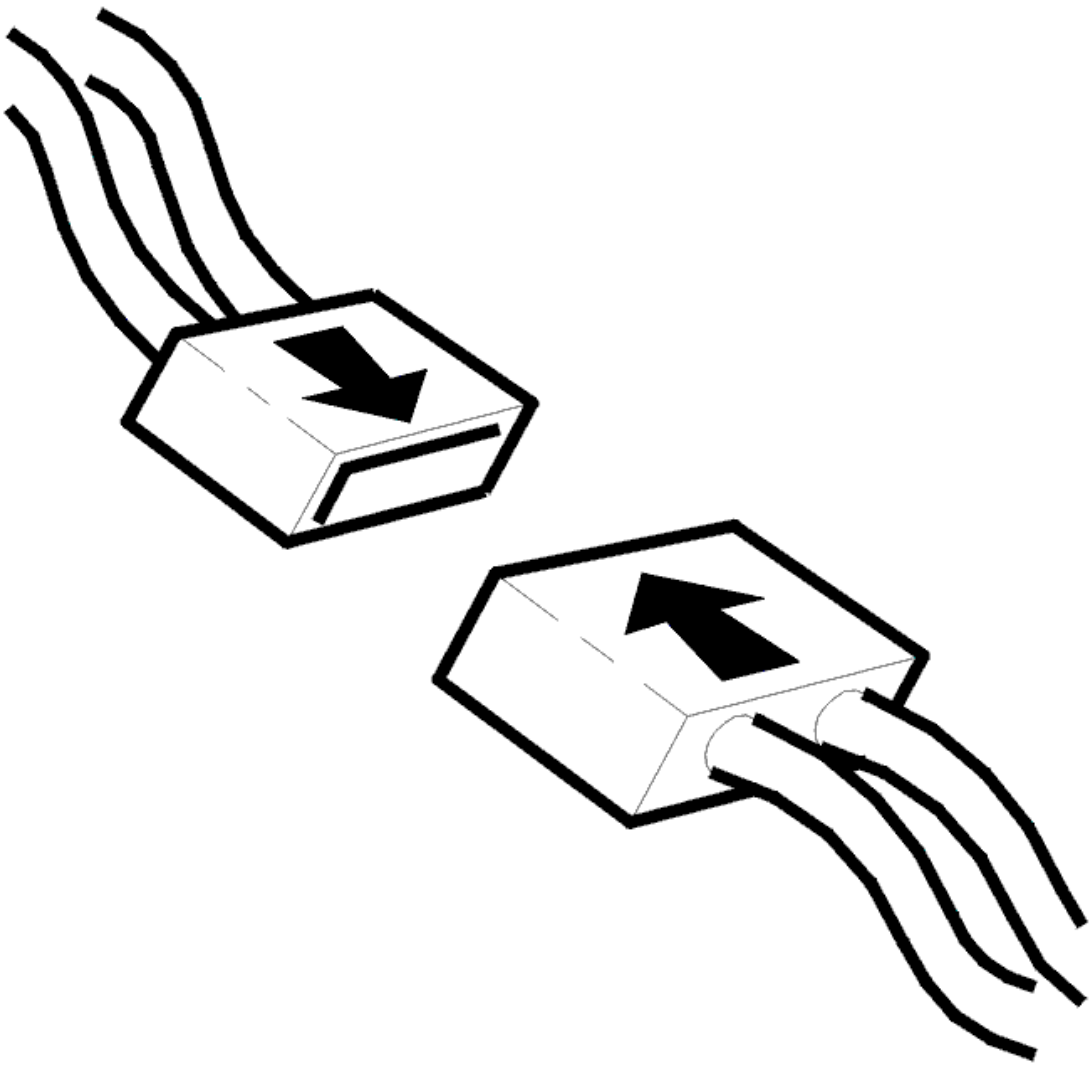


Fig. 205: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and transmission connectors. Check for contact resistance and oxidation
- Reconnect the control module and transmission connectors
- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

  If the transmission temperature is within its permitted range, the cause of the fault was contact resistance or oxidation in the control module or transmission connector.

Other information

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- see **CHECKING WIRING AND TERMINALS**

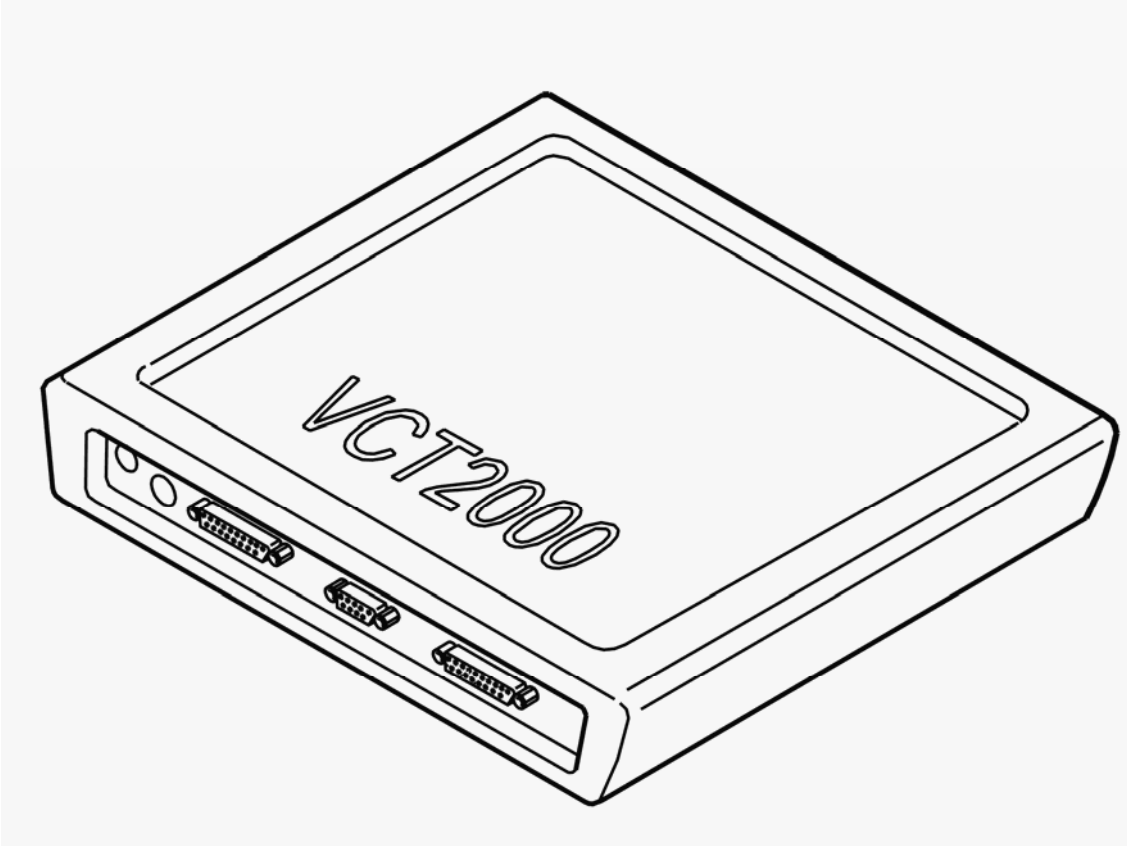


Fig. 206: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING THE TEMPERATURE SENSOR**

CHECKING THE TEMPERATURE SENSOR

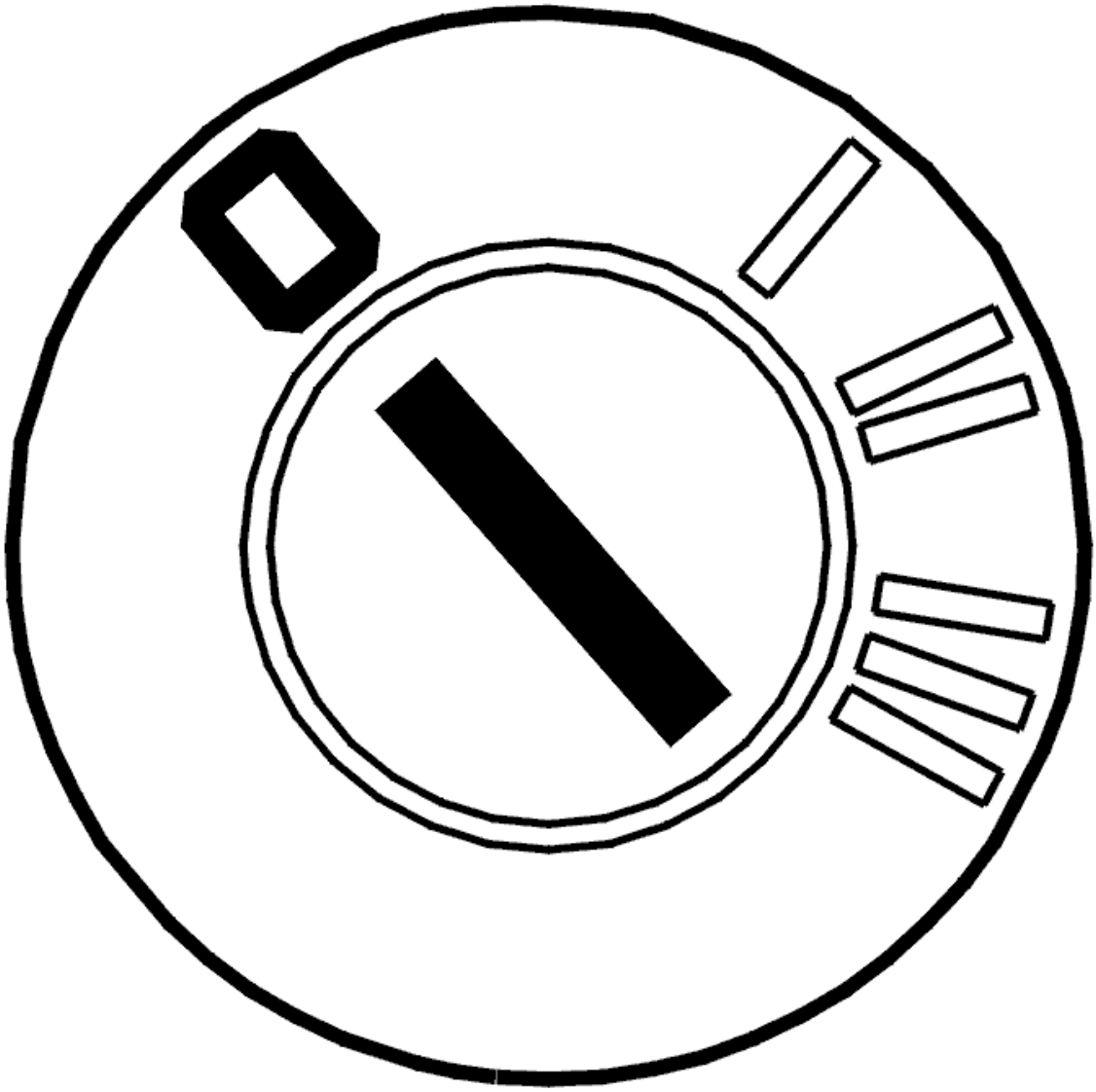


Fig. 207: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector
- Connect adapter see **9511505** and see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals #L (terminal #A11) and #M (terminal #A12).

  The resistance must be 3.4-3.6 kohms at 20 °C.

  Other information

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - For information about signals, see **SIGNAL SPECIFICATION**

- For information about the resistance values, see **COMPONENT RESISTANCE VALUES**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES** .

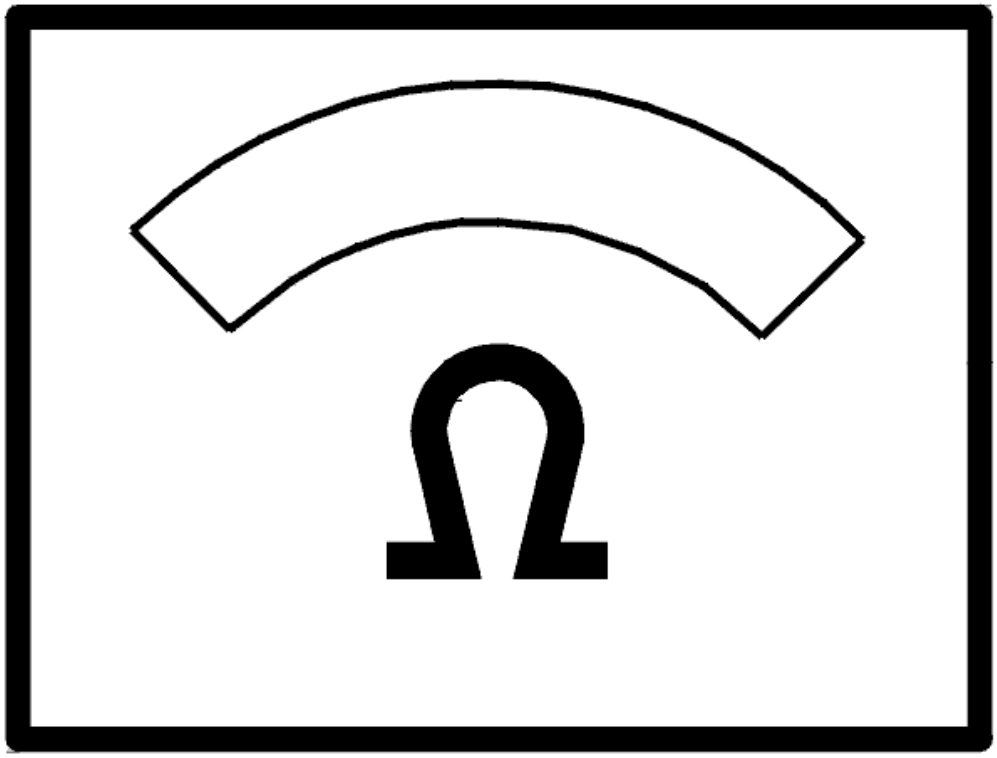


Fig. 208: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

- Breakout box connected to the control module
- Breakout box connected to the transmission connector.

Check the cable between control module terminal #37 (#A37) and transmission connector (control module side) terminal #L (#A11). Check for an open-circuit. Check for a short-circuit to supply voltage.

Check the cable between control module terminal #55 (#A55) and transmission connector (control module side) terminal #M (#A12). Check for an open-circuit. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

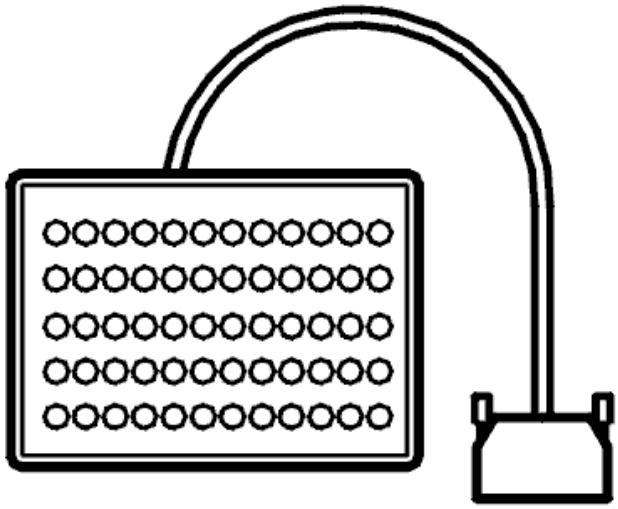


Fig. 209: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

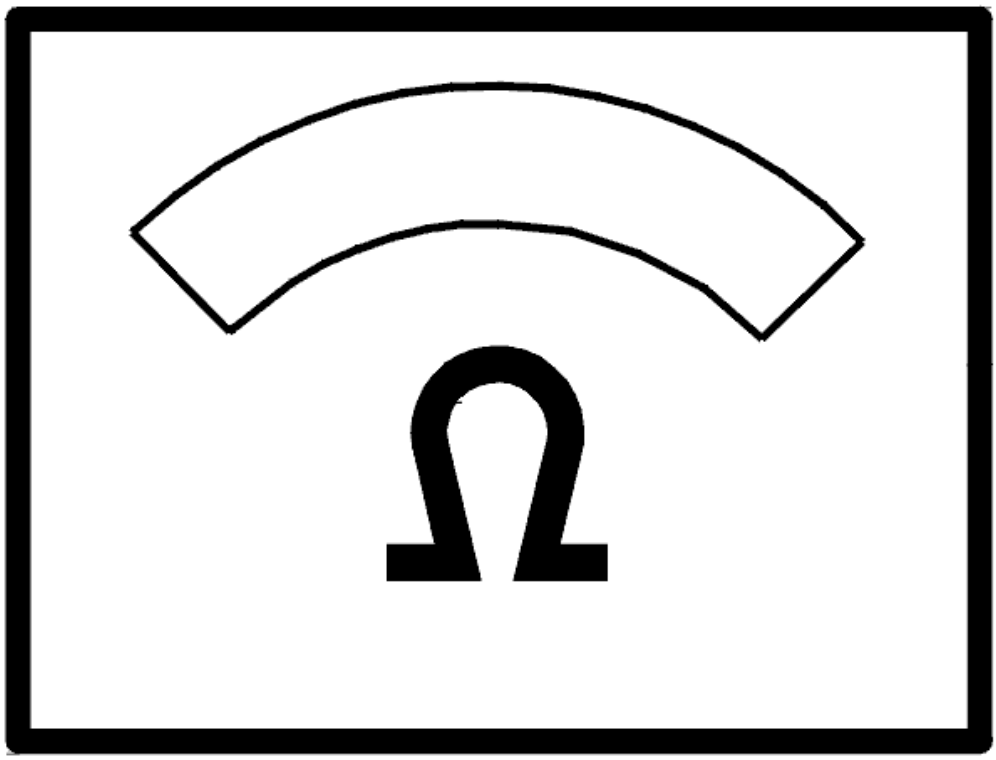


Fig. 210: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

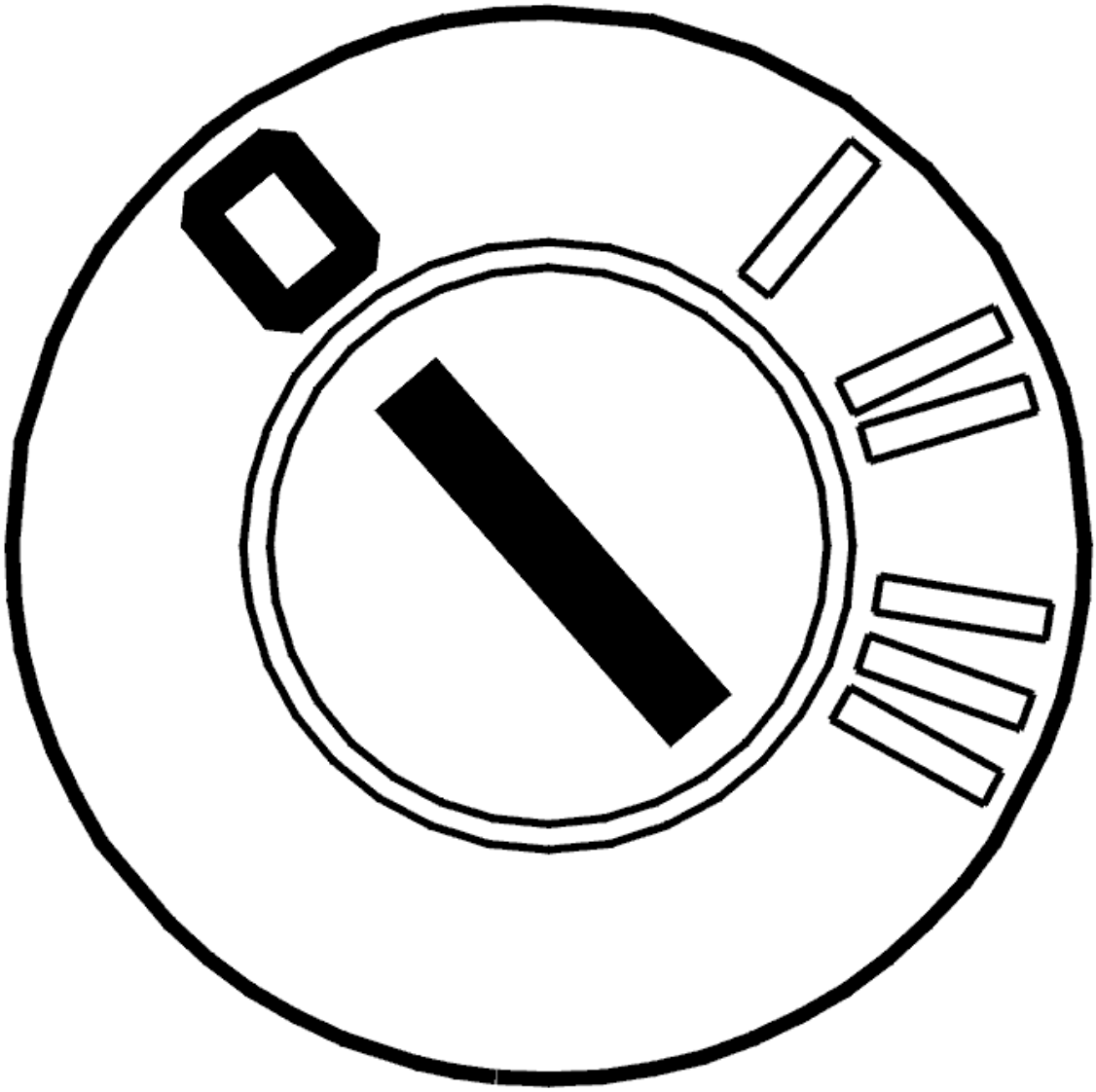


Fig. 211: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission terminal #L (#A11) and temperature sensor terminal #A. Check for an open-circuit. Check for a short-circuit to supply voltage.

  Check the cable between transmission terminal #M (#A12) and temperature sensor terminal #B. Check for an open-circuit. Check for a short-circuit to supply voltage.

  HINT: Check the temperature sensor by measuring the resistance between temperature sensor connector terminals #A and #B. The resistance must be between 3.5-3.6 kohms at 20° C.

  Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- To replace the temperature sensor, see **TEMPERATURE SENSOR FLUID TRANSMISSION, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES**
- see **CHECKING WIRING AND TERMINALS**

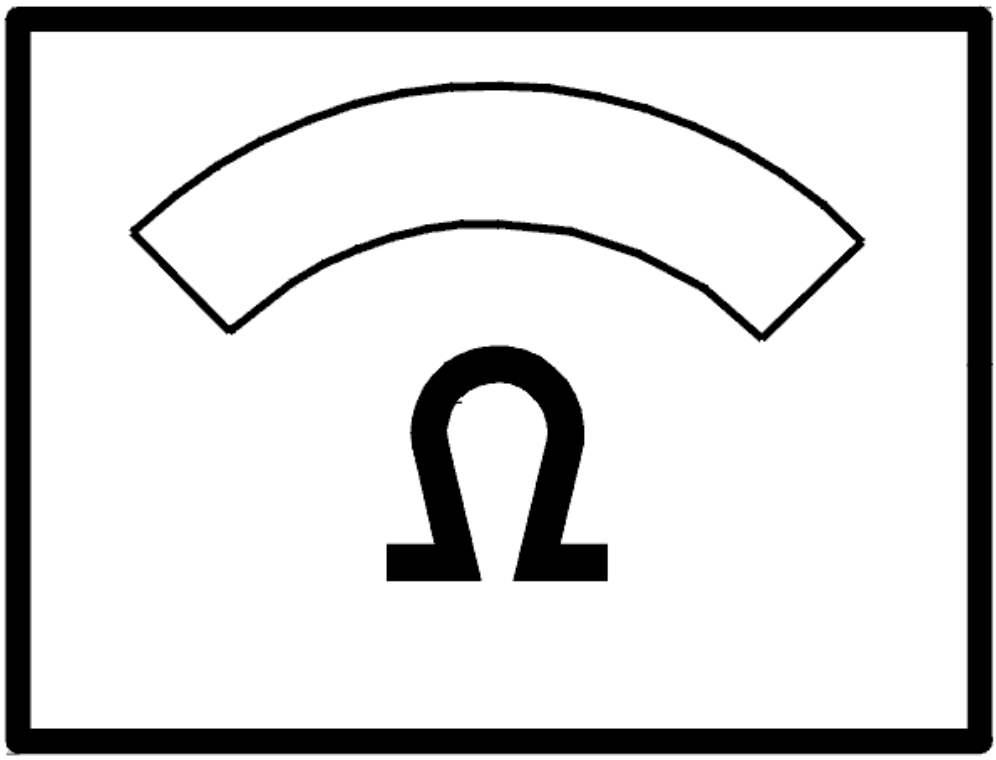


Fig. 212: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the control module and automatic transmission connector. Check for contact resistance and oxidation. Remedy if necessary.

Check the cable between control module terminal #A37 (#A37) and transmission connector (control module side) terminal #11. Check for an intermittent open-circuit. Check for an intermittent short-circuit to supply voltage.

Check the cable between control module terminal #A55 (#A55) and transmission connector (control module side) terminal #12. Check for an intermittent open-circuit. Check for an intermittent short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

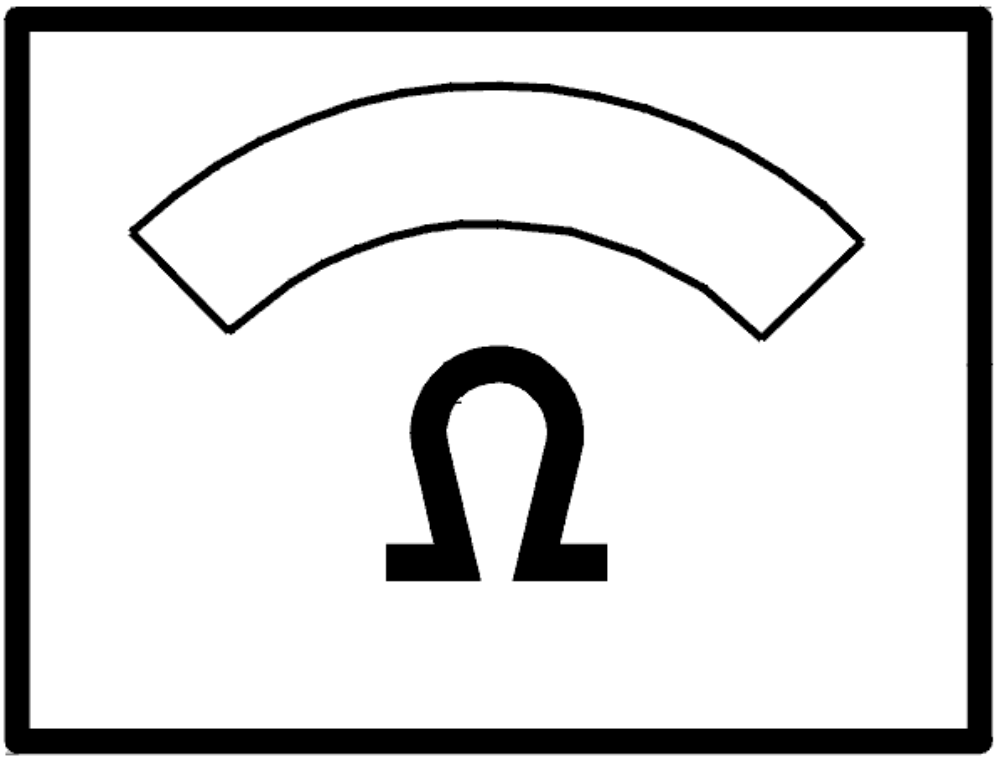


Fig. 213: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

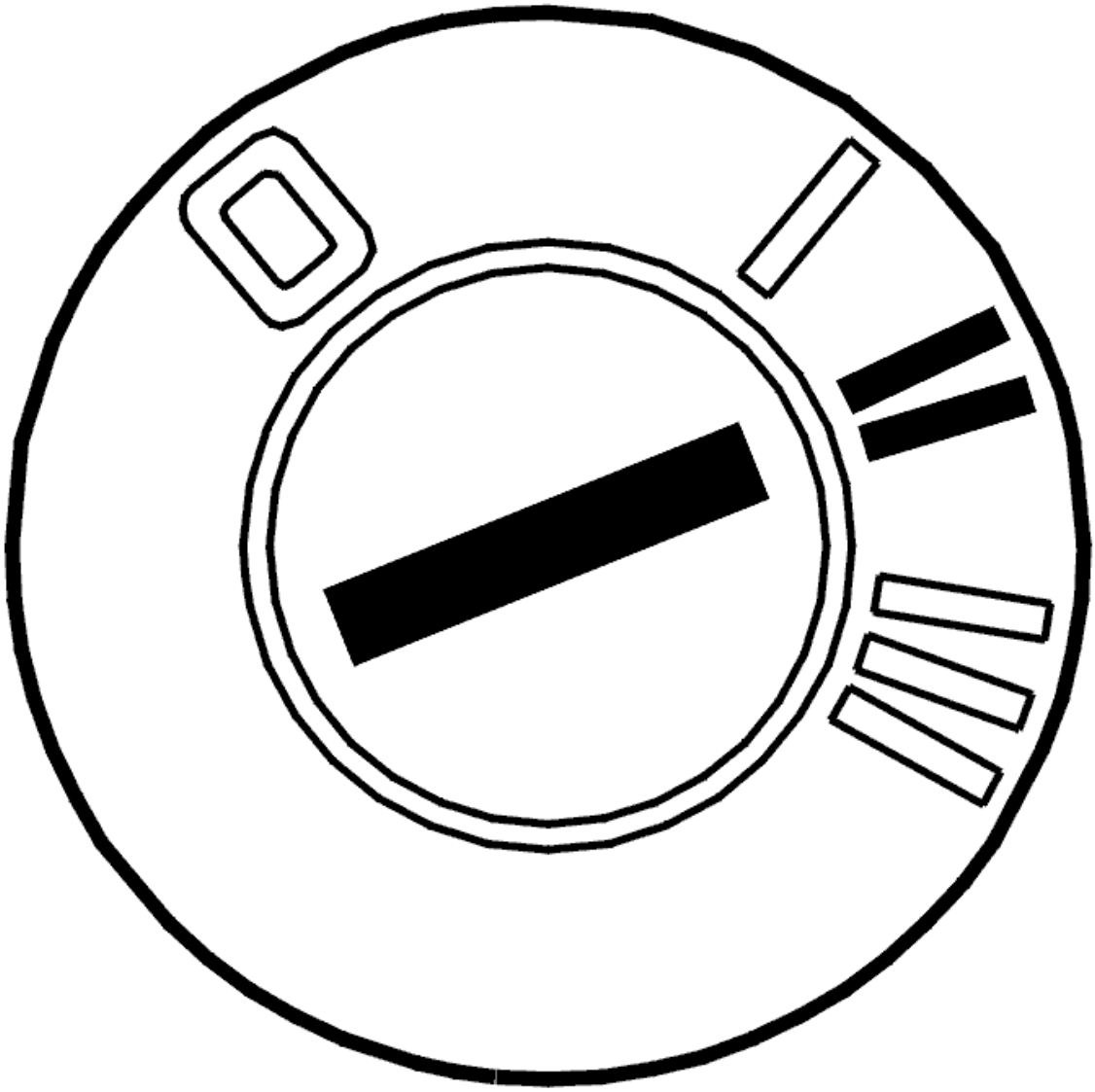


Fig. 214: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

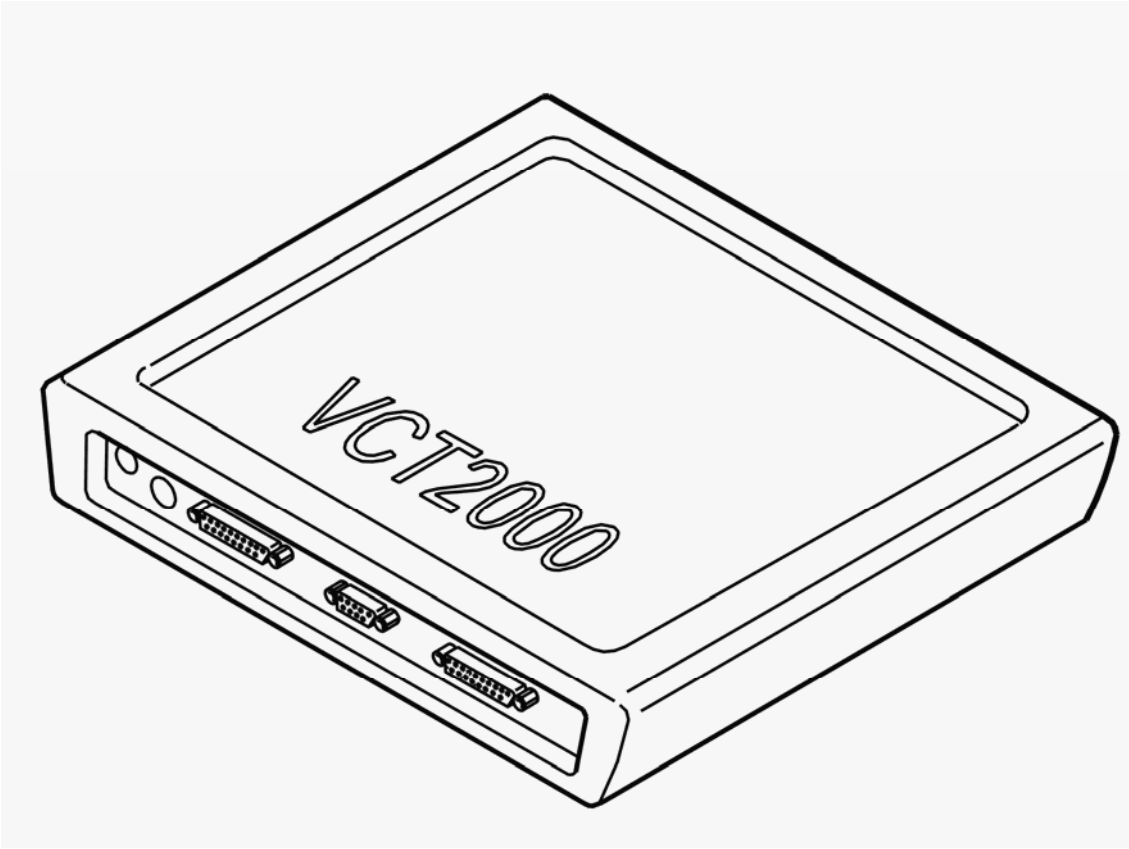


Fig. 215: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair check that the fault has been remedied.

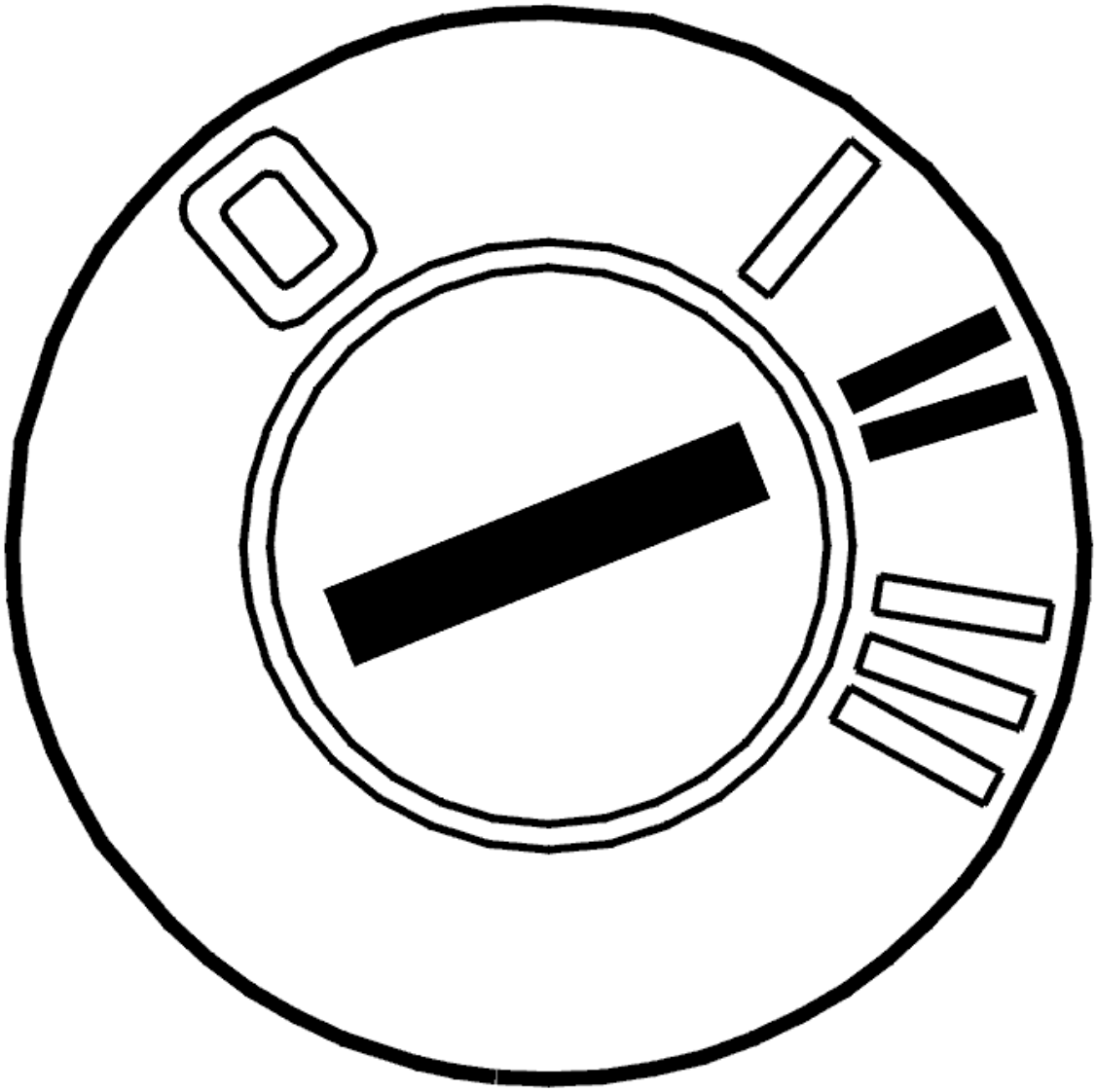


Fig. 216: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

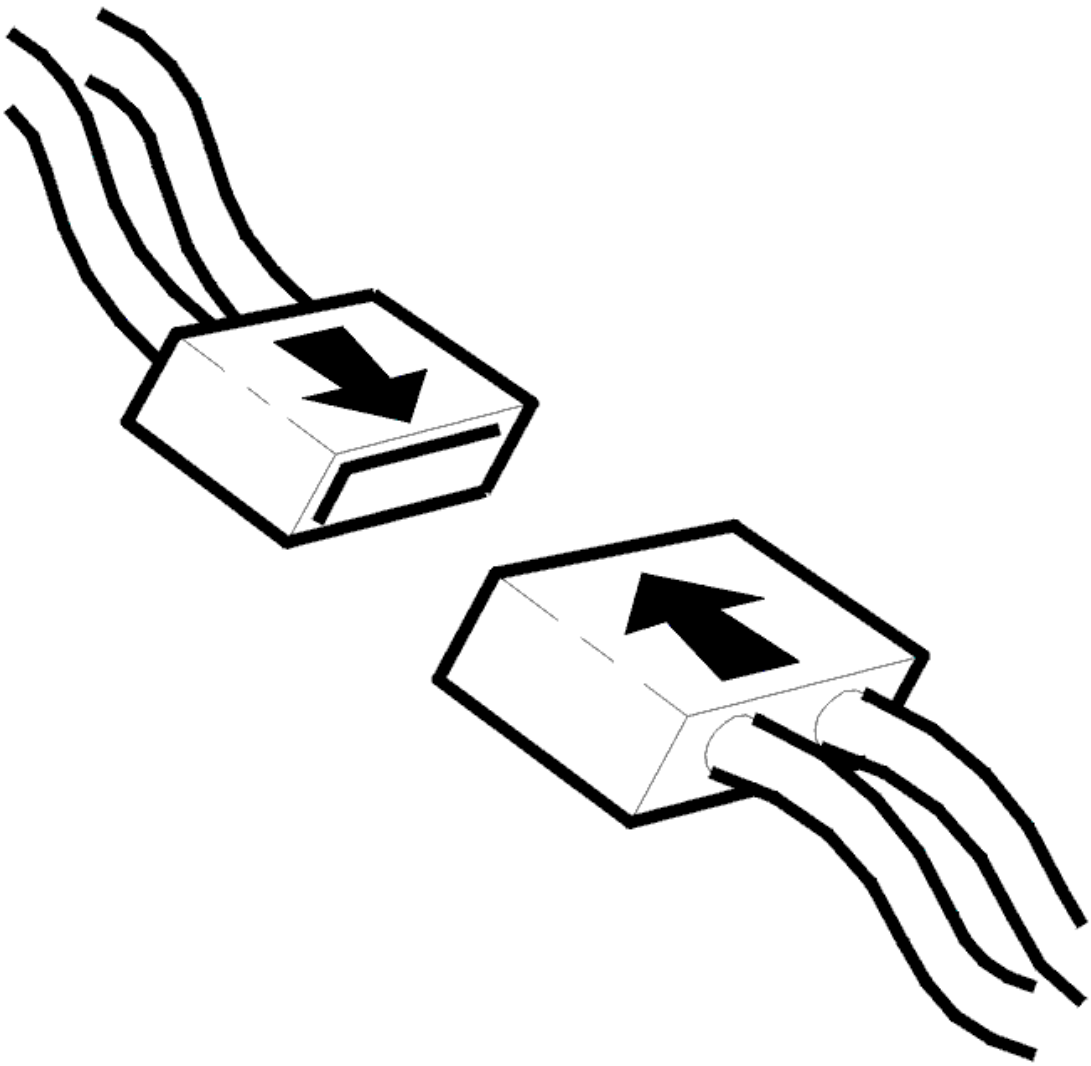


Fig. 217: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.
- Read off oil temperature.

  Check that the transmission oil temperature is within its permitted range. Compare with the transmission temperature.

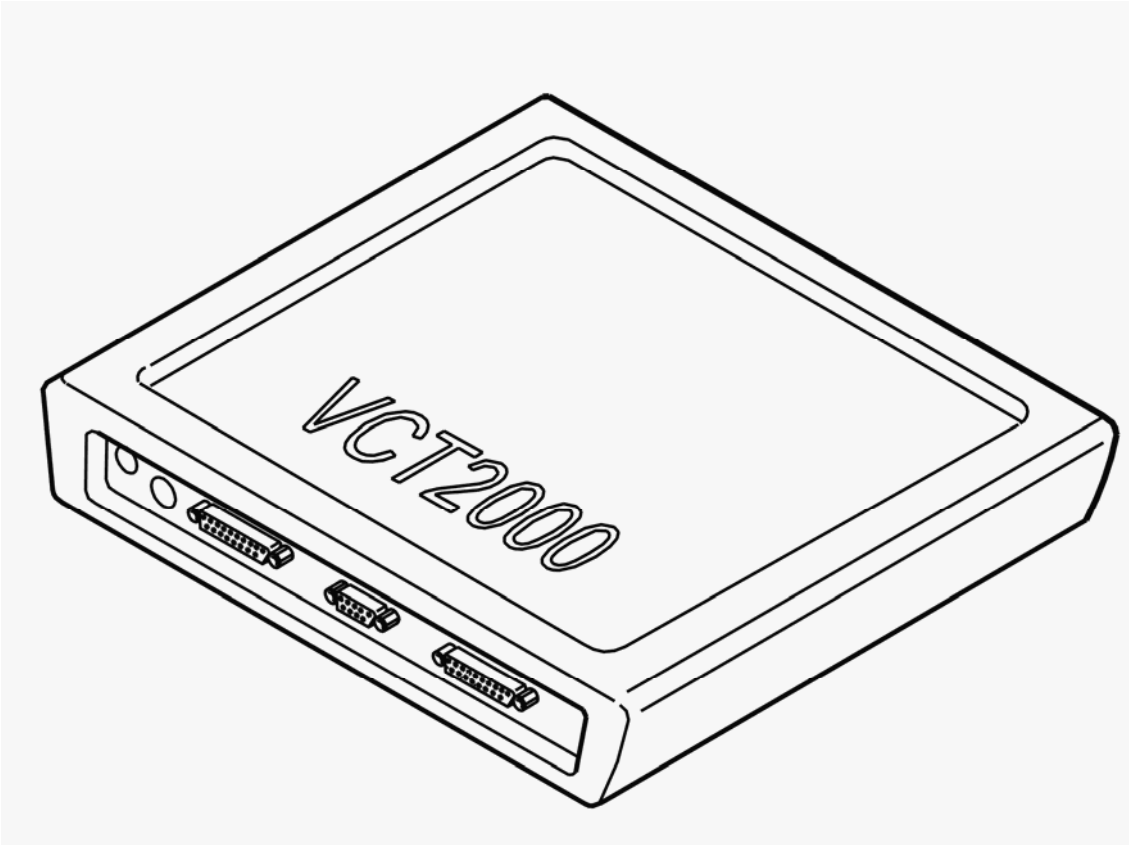


Fig. 218: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-0003: SHIFT SOLENOID S1. SIGNAL TOO LOW (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. Diagnostic trouble codes (DTCs) TCM-0003, TCM-0009, TCM-0103, TCM-0109 or TCM-010C are stored if the transmission control module (TCM) registers that there is a short-circuit to ground in circuits S1, S2, S3, S4 or S5 when the solenoid

should be activated.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Short-circuit to ground in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

SIGNAL TOO LOW

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

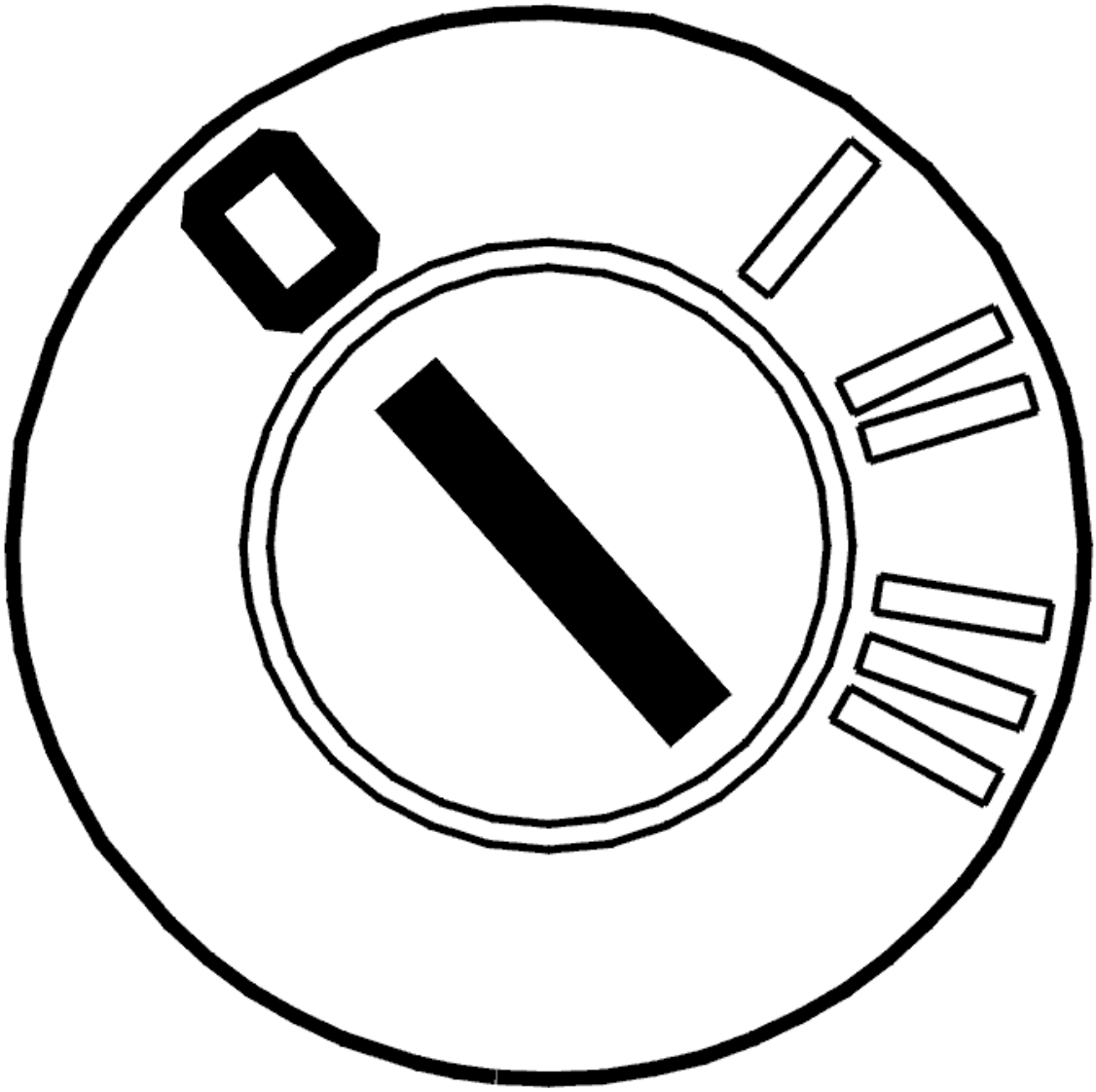


Fig. 219: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

  HINT: If the temperature is outside its permitted range, fault-trace the temperature sensor.

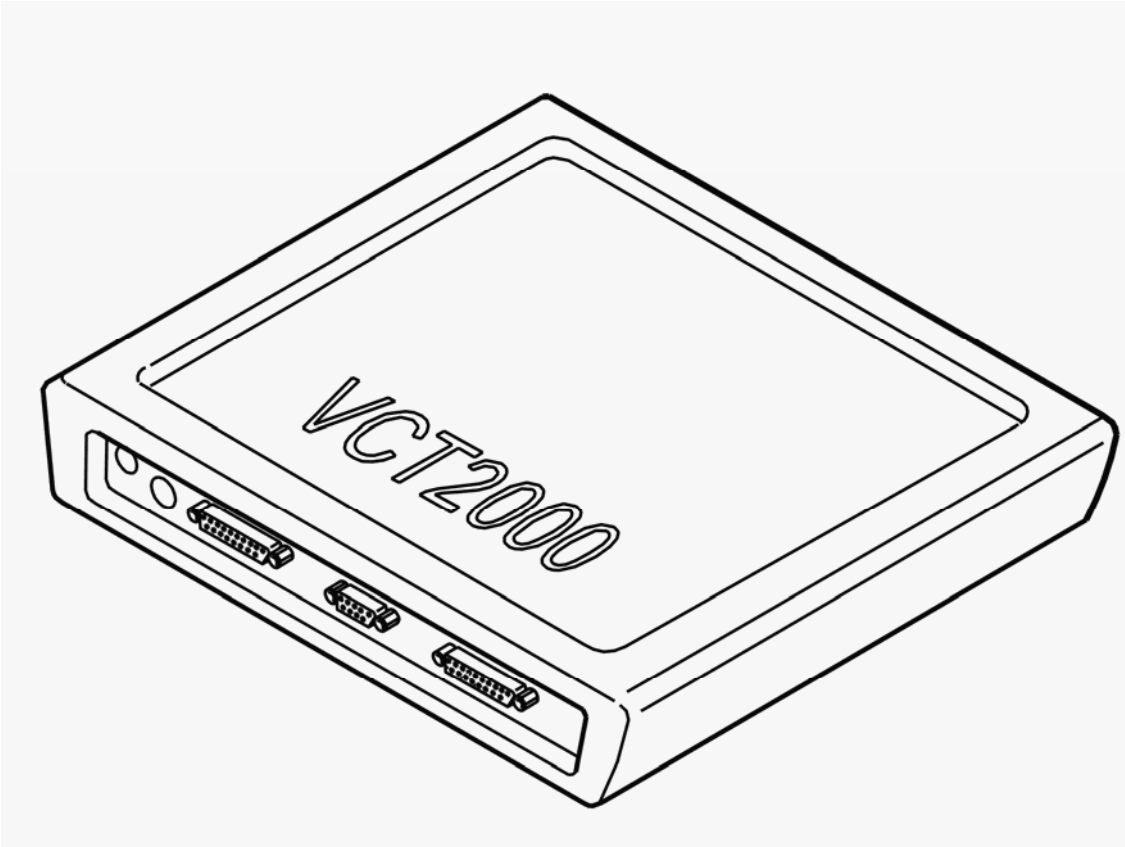


Fig. 220: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S1**

- **NO**

  Refer to **FAULTY SIGNAL**

CHECKING SHIFT SOLENOID S1

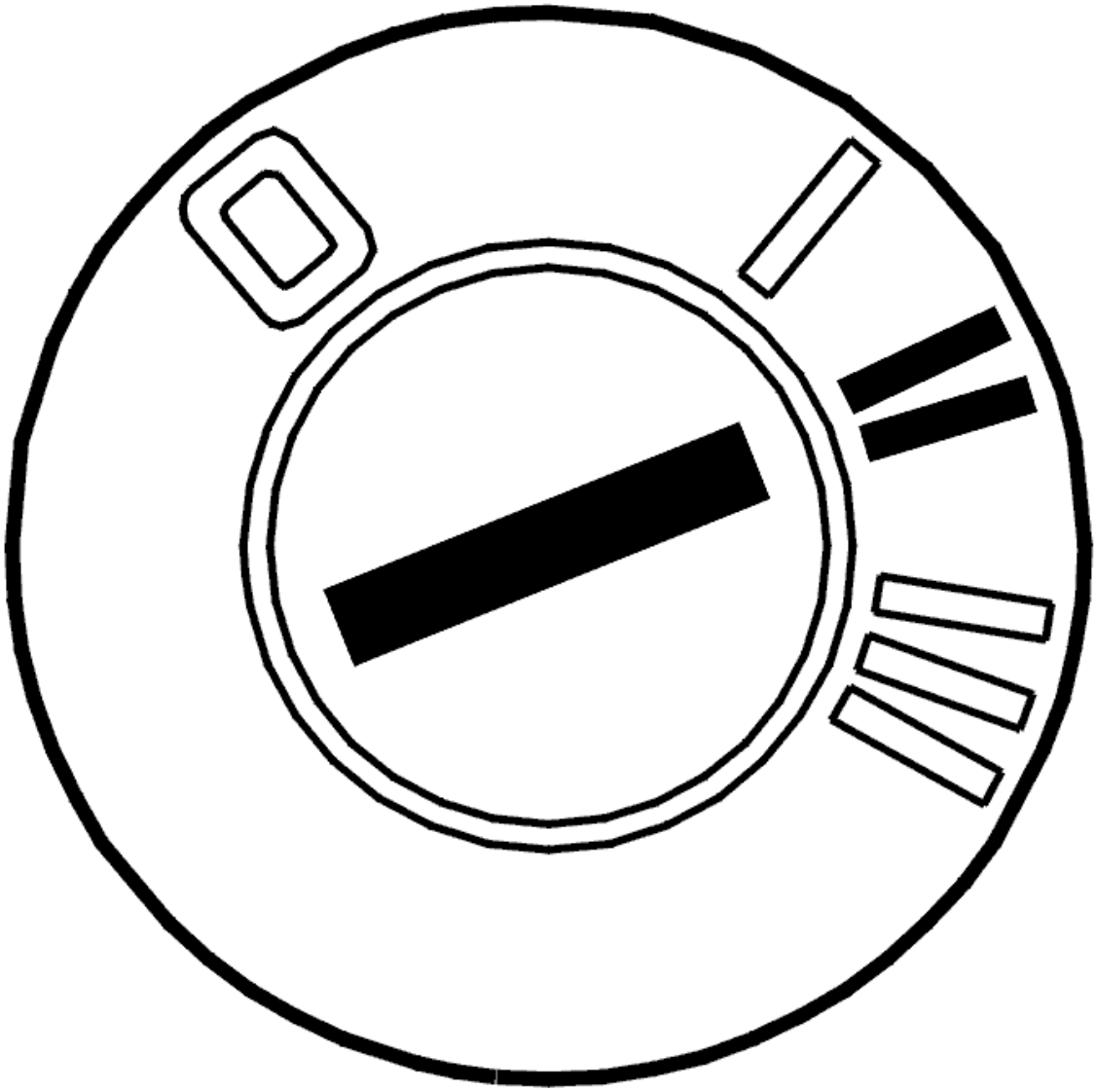


Fig. 221: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S1.

  The value must change between OFF and ON.

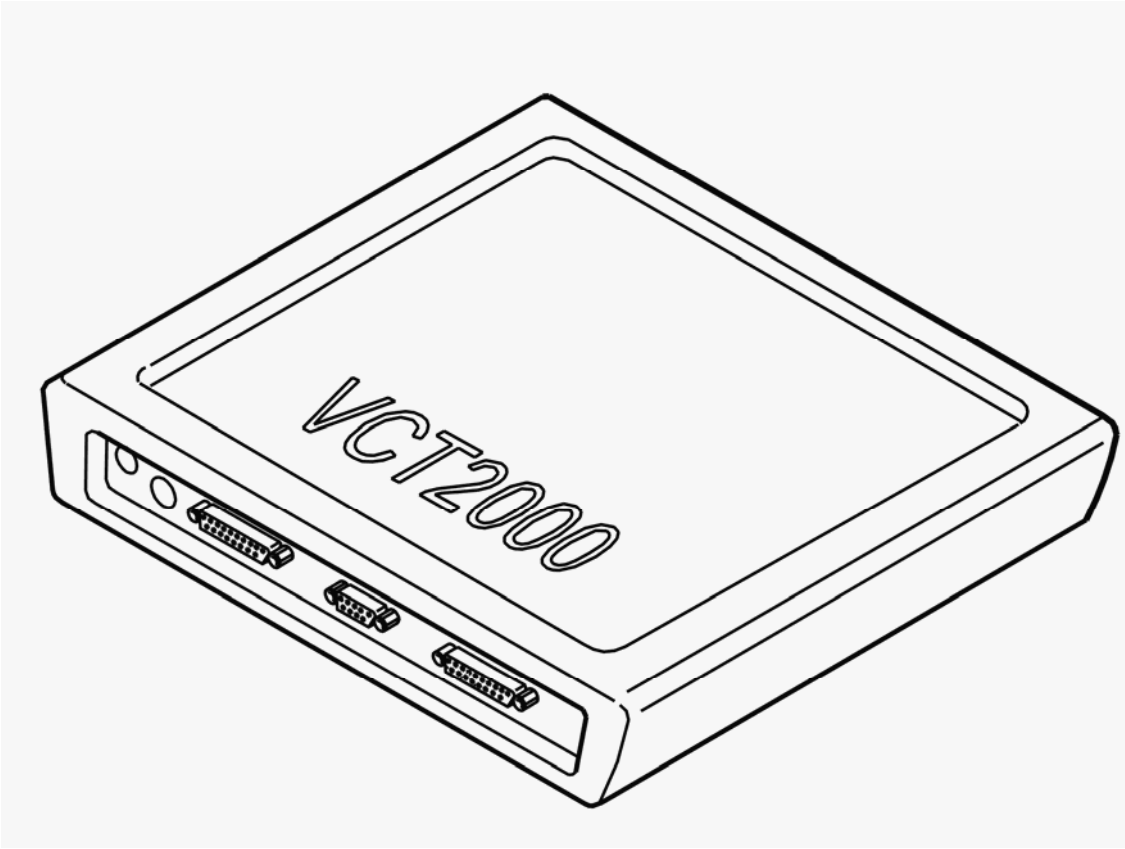


Fig. 222: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING RESISTANCE**

CHECKING RESISTANCE

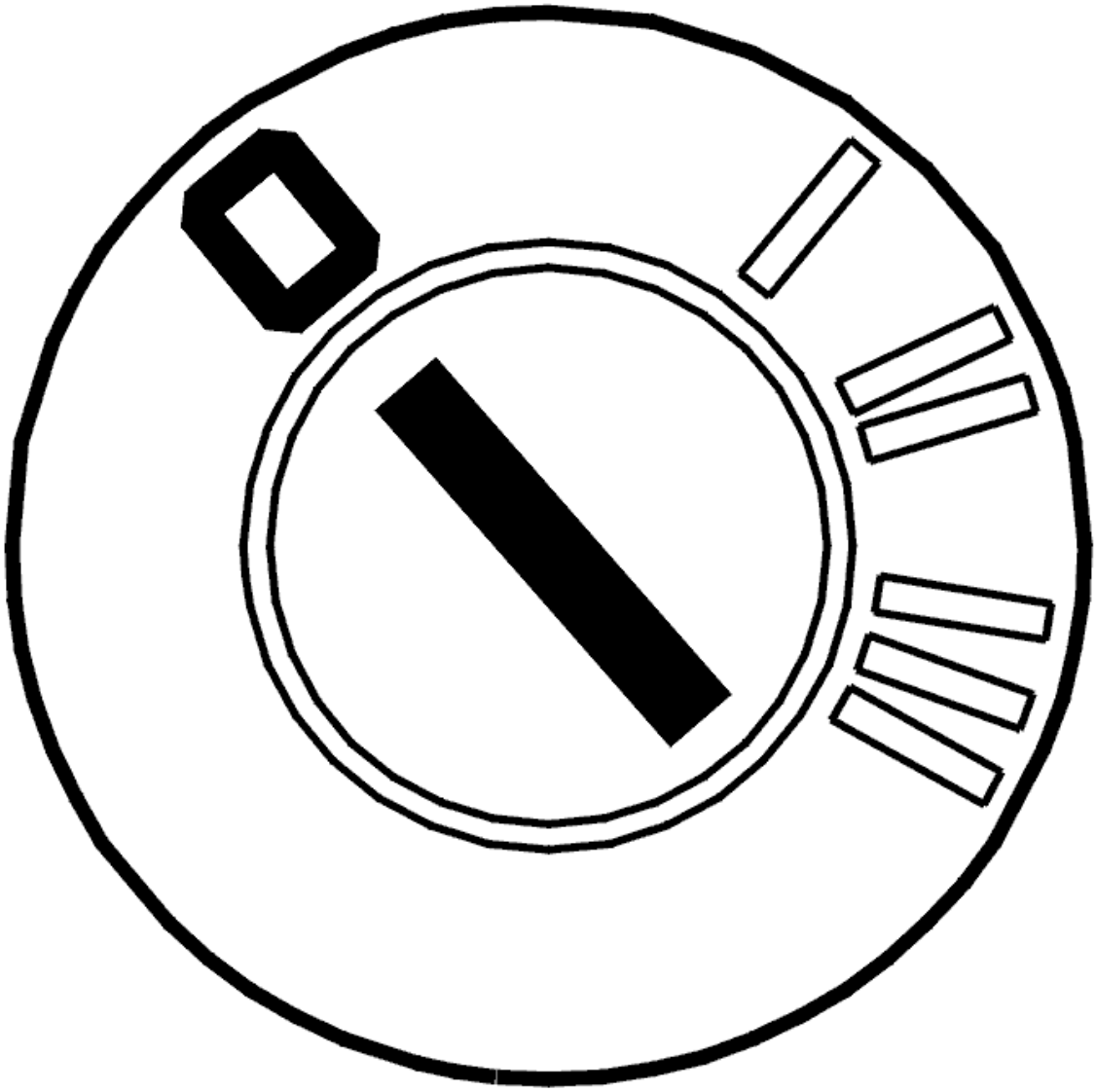


Fig. 223: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

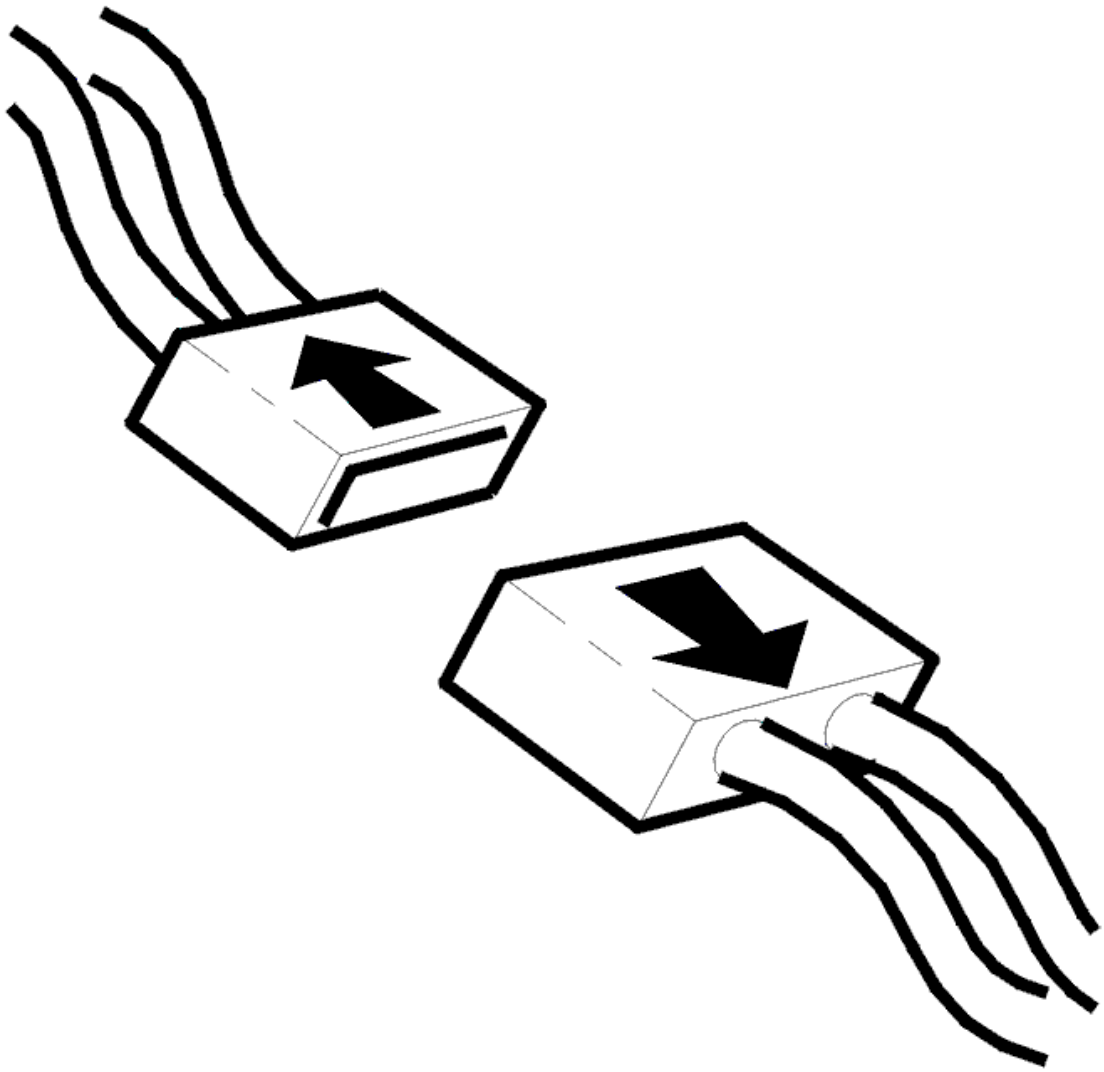


Fig. 224: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect transmission connector C.

Check solenoid S1 by measuring the resistance between transmission connector terminal #C1 and the transmission housing. The resistance must be 12-16 ohms.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

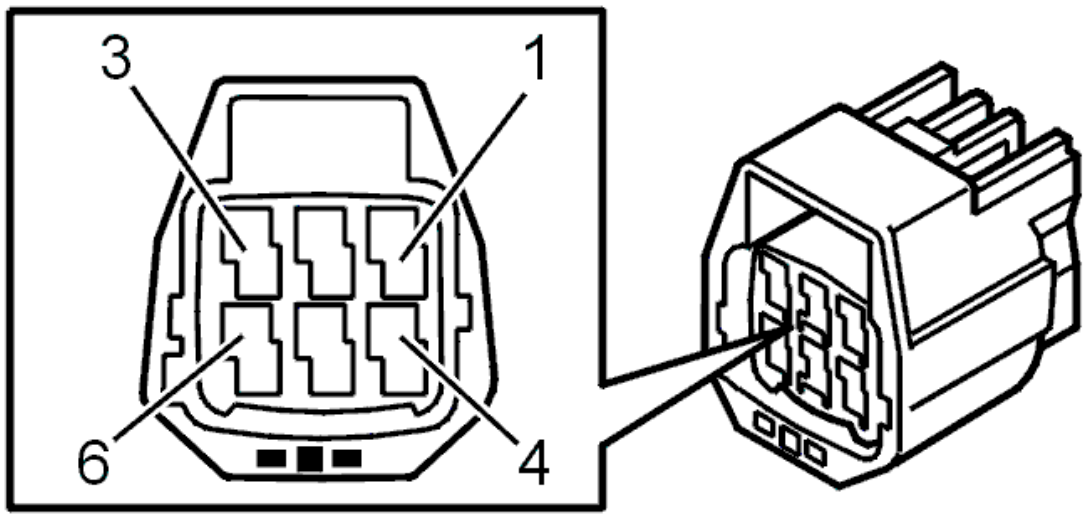


Fig. 225: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

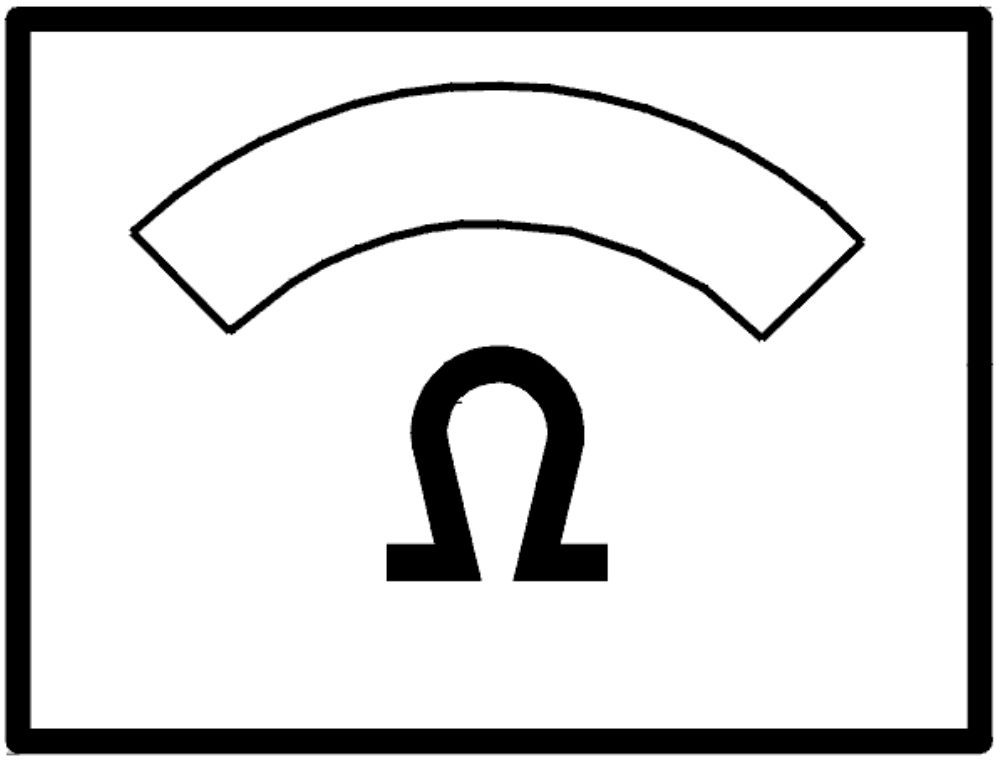


Fig. 226: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

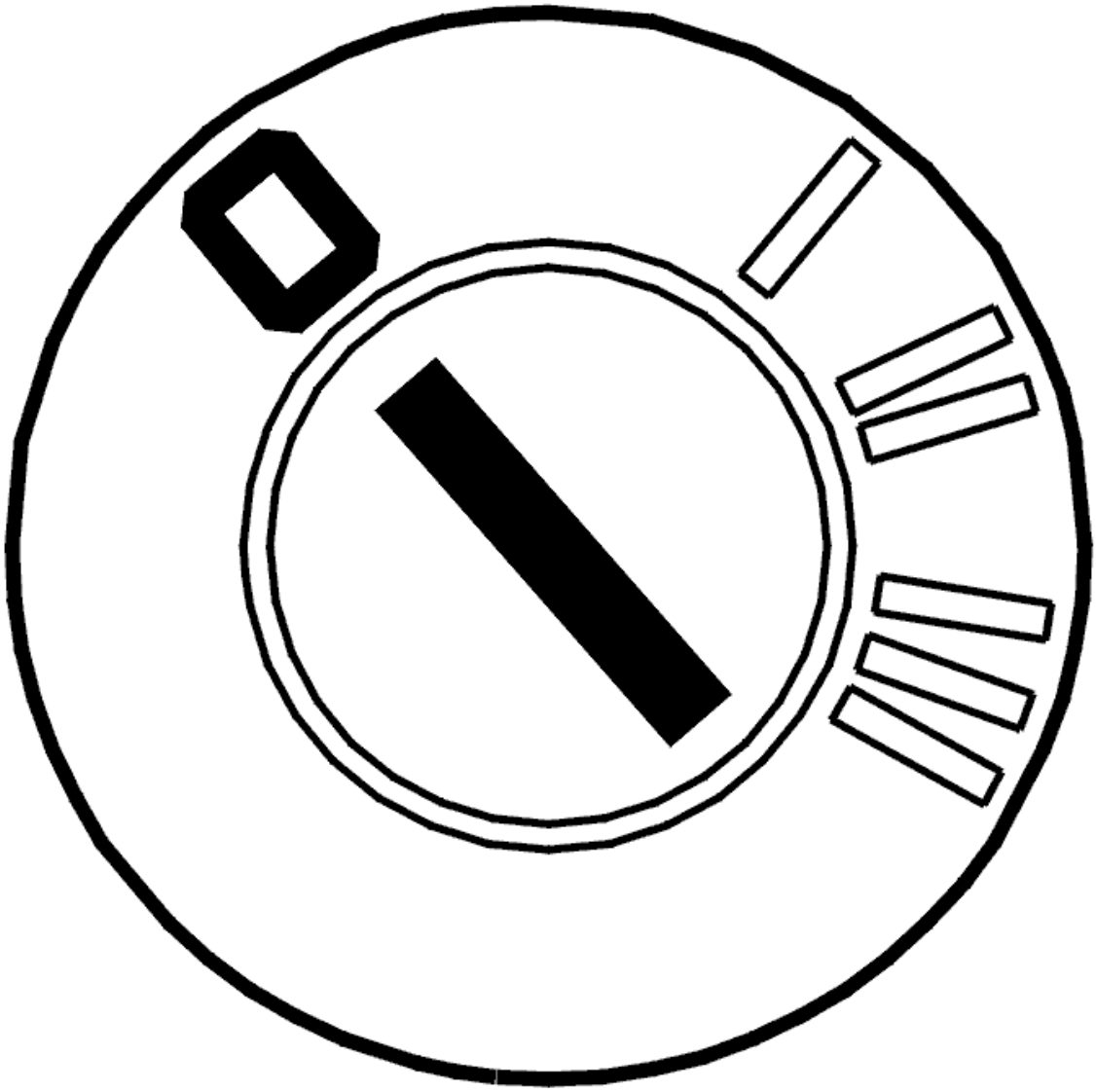


Fig. 227: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the cable between control module terminal #A50 (#A50) and transmission connector terminal #C1 (control module side). Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

  Remedy as necessary.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**

- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

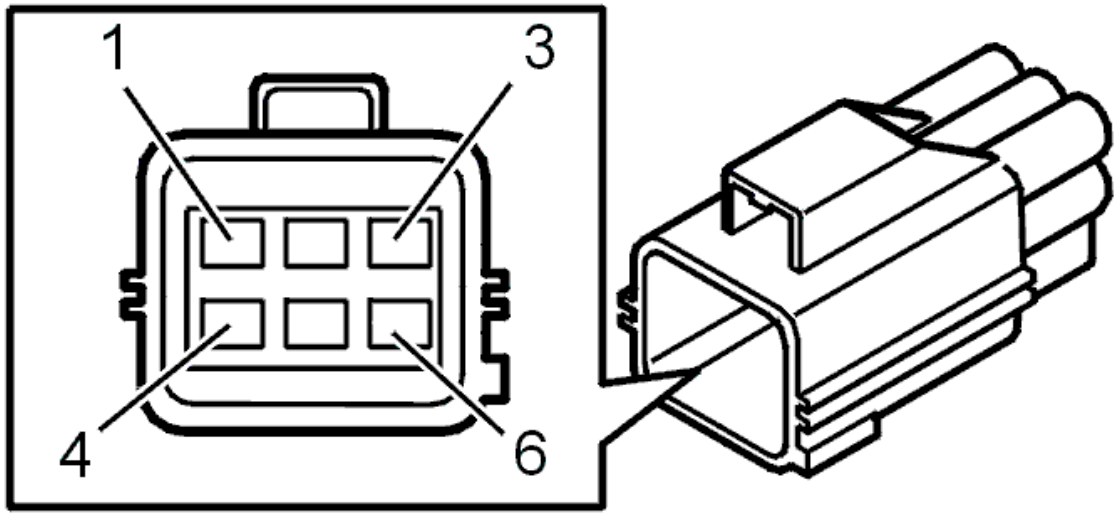


Fig. 228: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

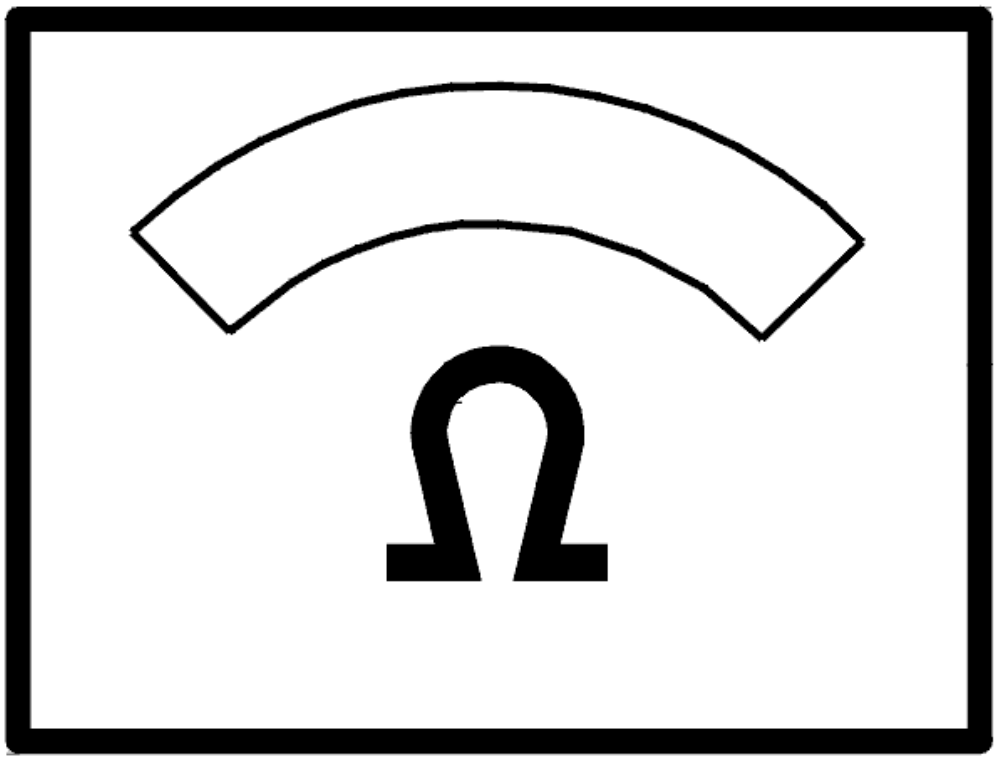


Fig. 229: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

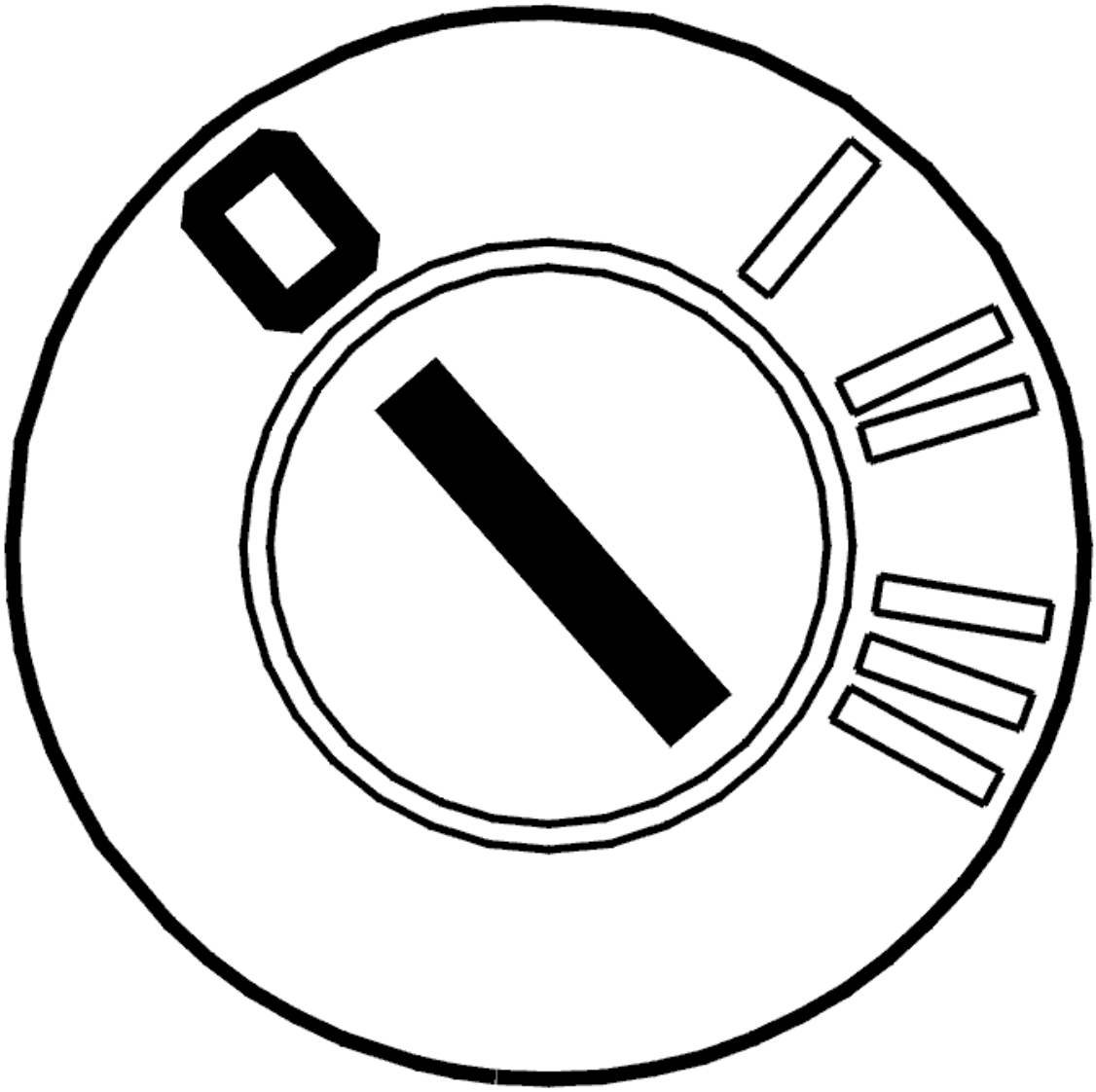


Fig. 230: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

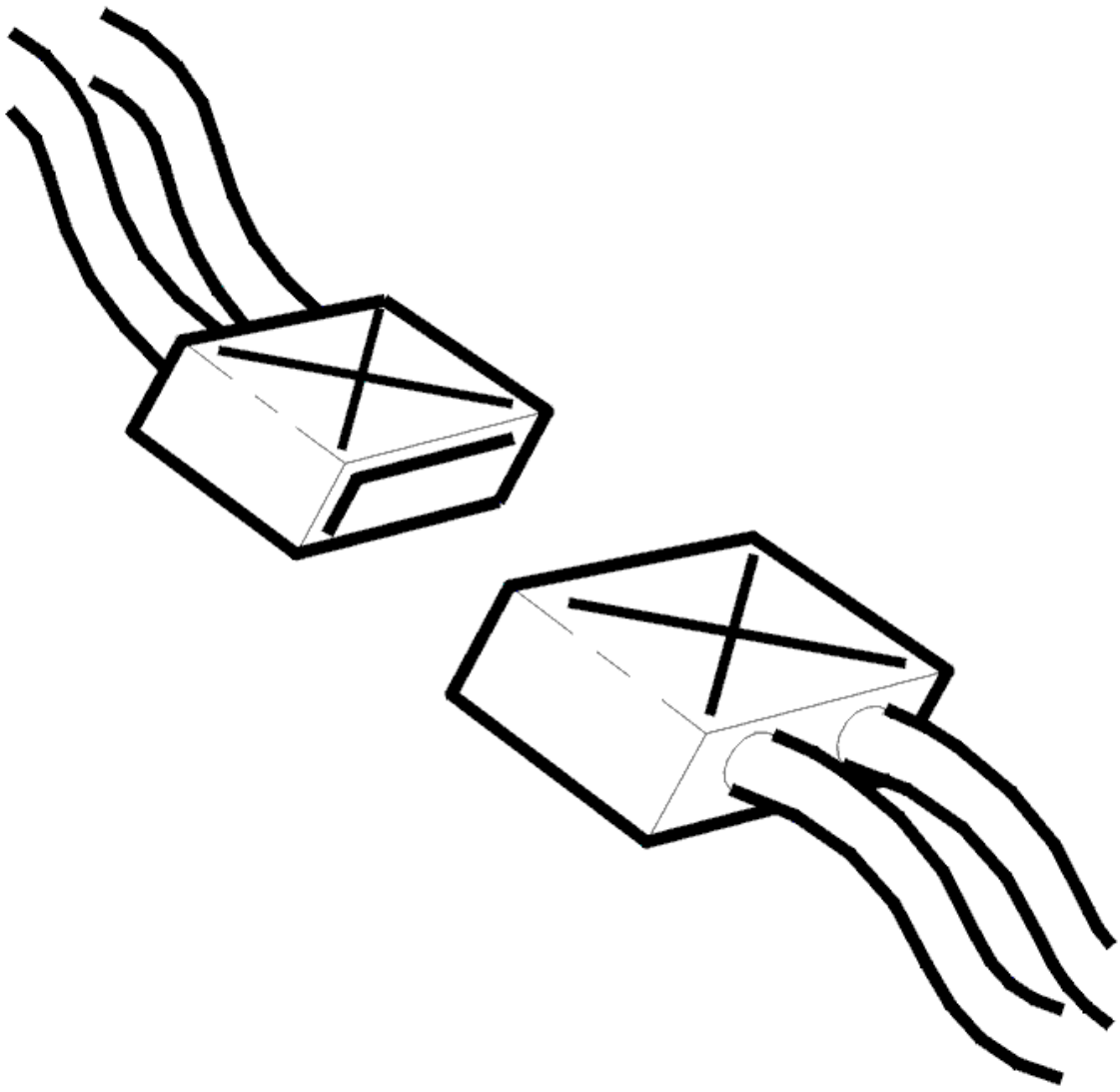


Fig. 231: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

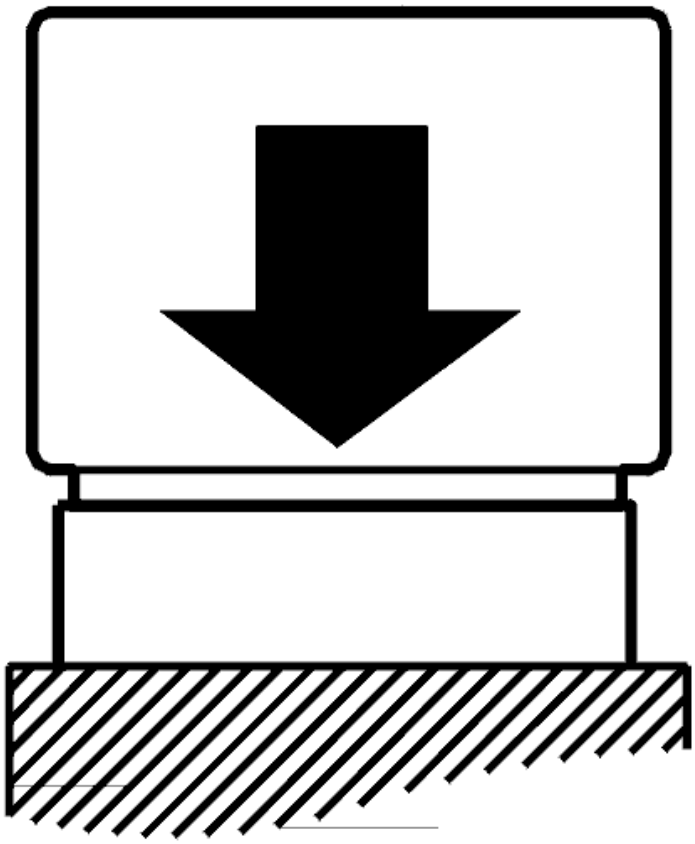


Fig. 232: Identifying Connecting Control Module
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector disconnected
- Gear selector in position P.

Check the transmission control module (TCM) by measuring the resistance between terminals #A50 (#A50) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

NOTE: When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

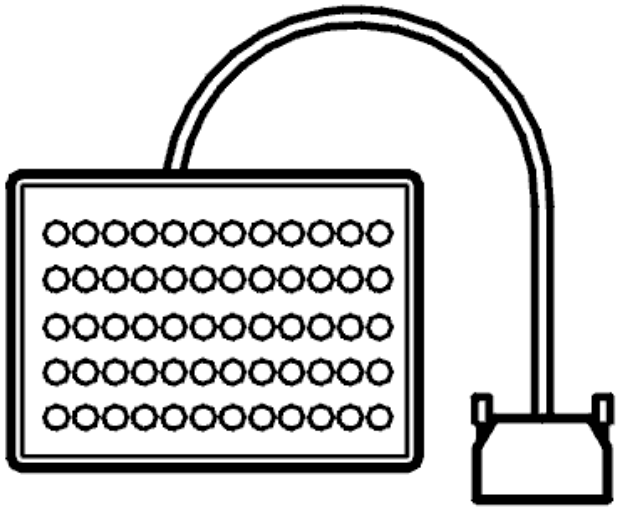


Fig. 233: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

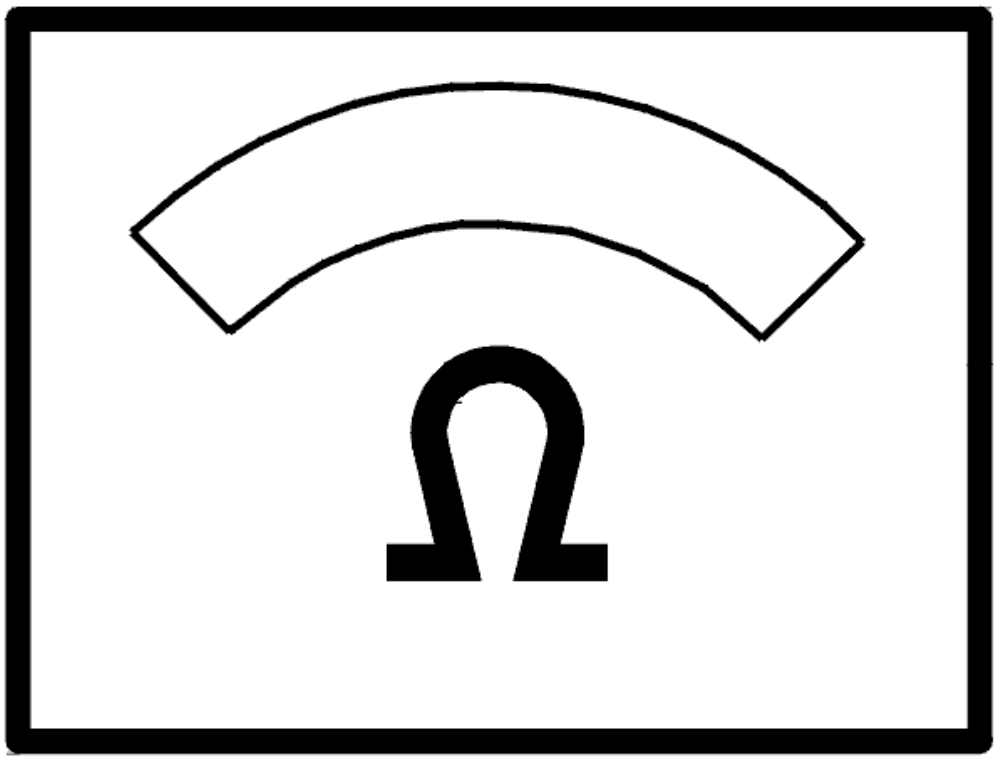


Fig. 234: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

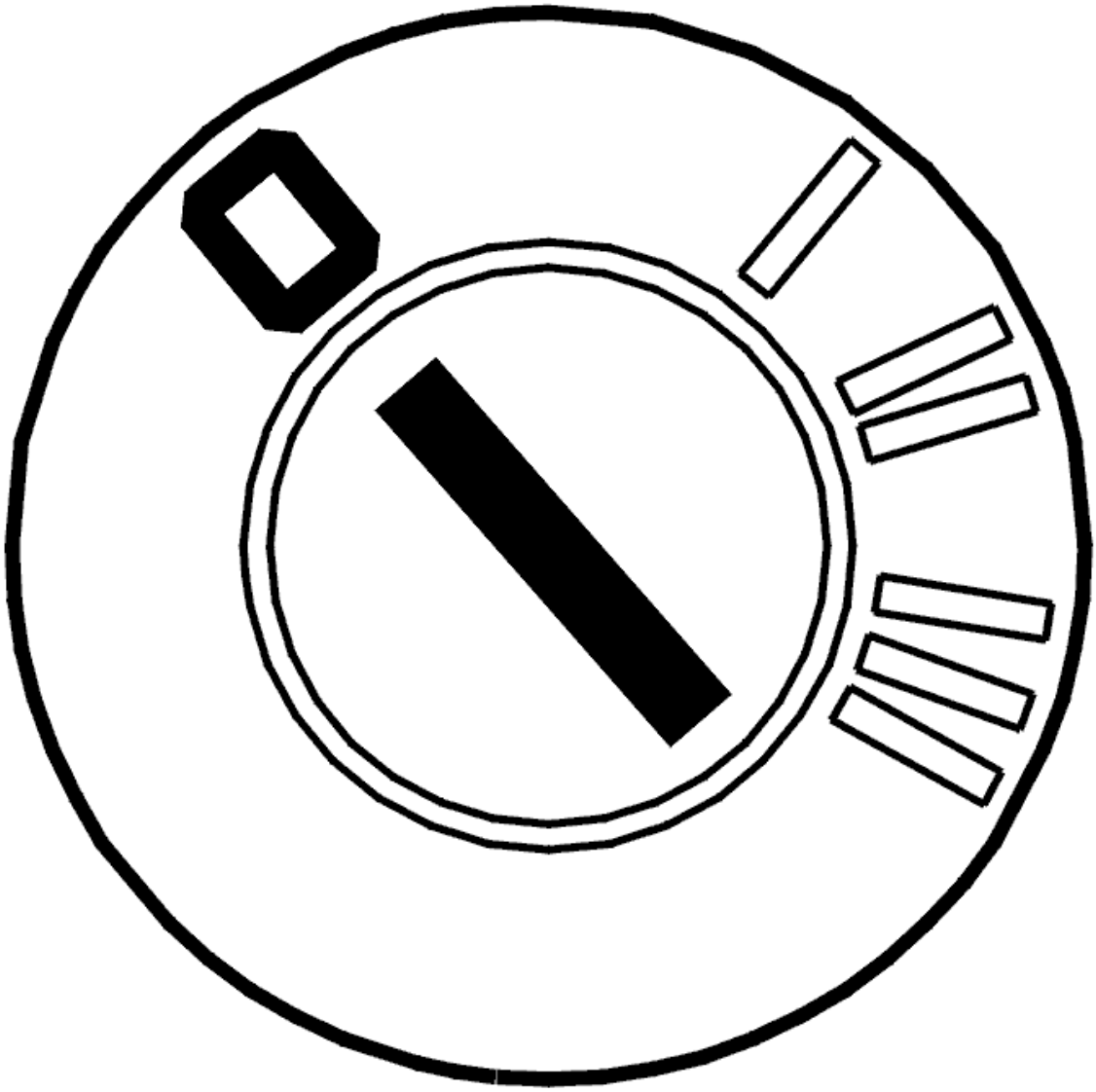


Fig. 235: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C1 (transmission side) and the connector for solenoid S1. Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Check solenoid S1 by measuring the resistance between the terminal pin on solenoid S1 and the transmission housing. The resistance must be 12-16 ohms. Replace solenoid S1 if the resistance is incorrect.

Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- To open the control system and to check or replace solenoid S1, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

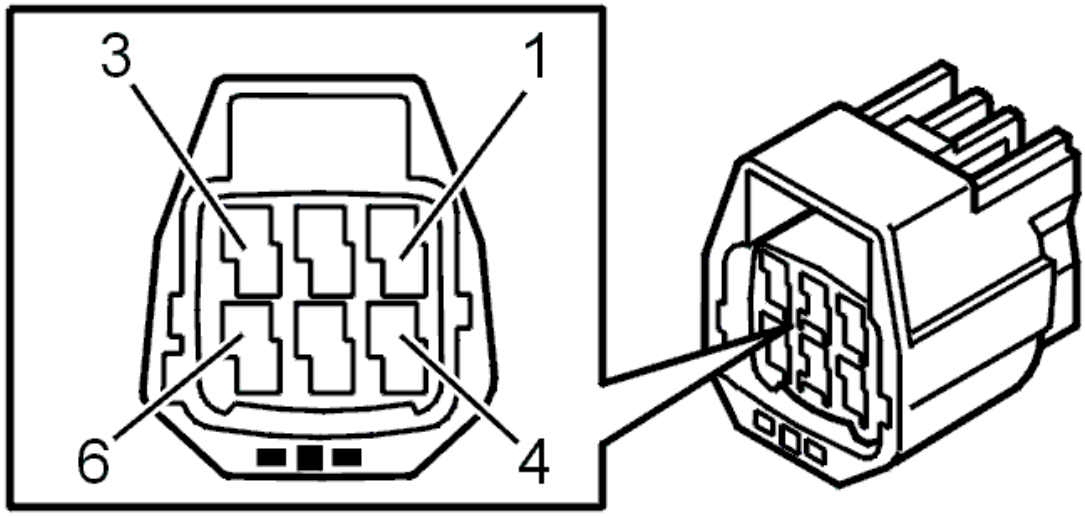


Fig. 236: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

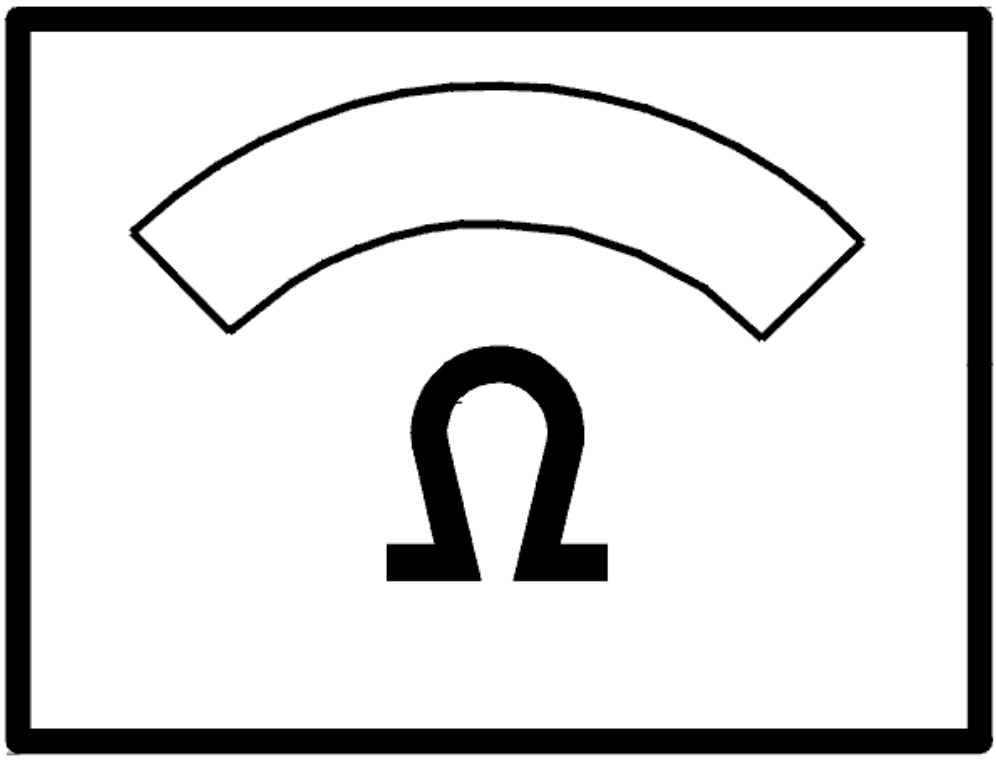


Fig. 237: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the control module and transmission connectors for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** . Check the cable between control module terminal #A50 (#A50)and transmission connector terminal #C1. Check for an intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** .

- Check the circuit for solenoid S1: Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #A50 (#A50) and #A53 (#A53) on the breakout box. The resistance must be

12-16 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

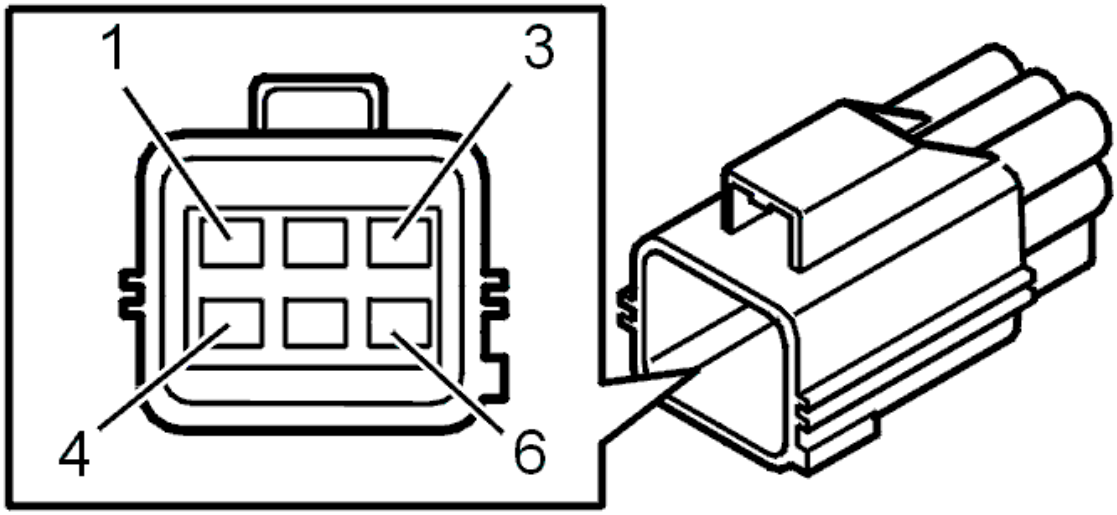


Fig. 238: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

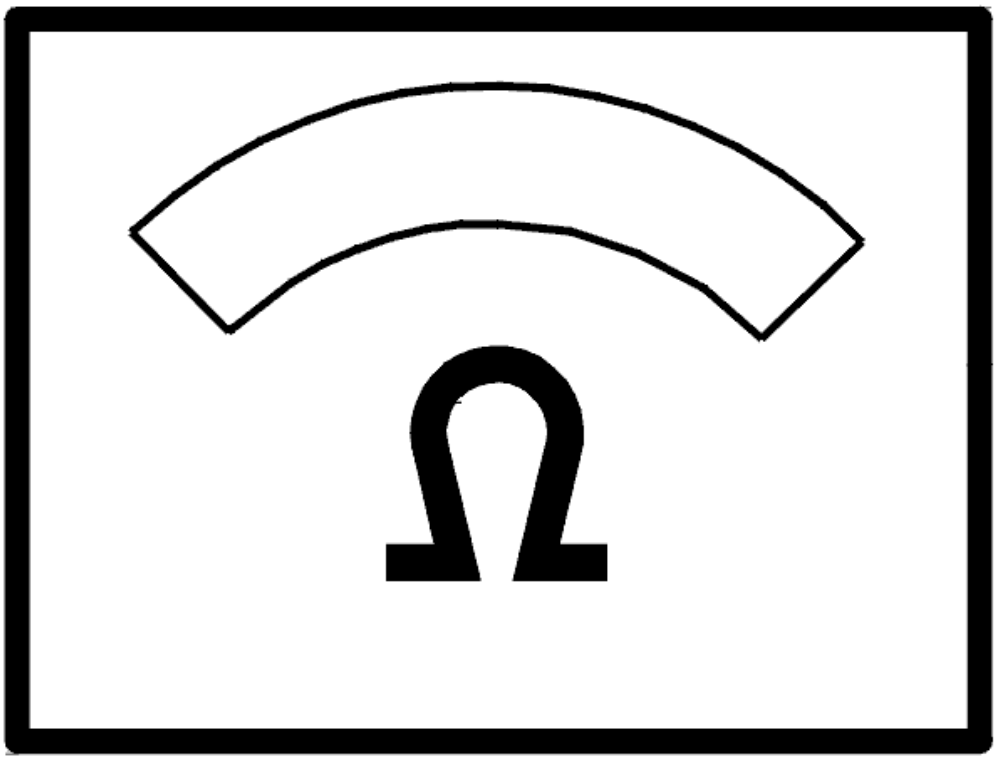


Fig. 239: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

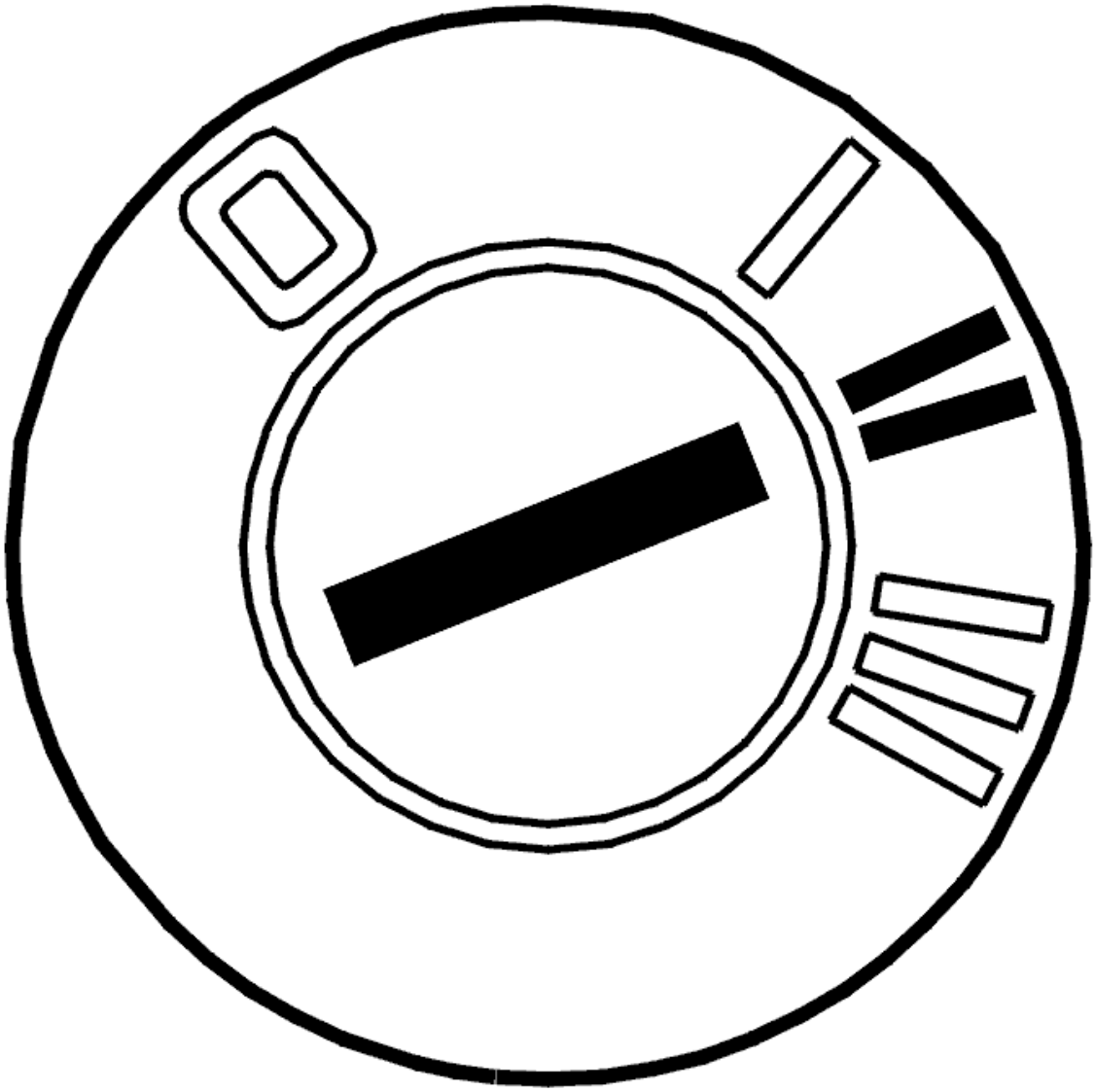


Fig. 240: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

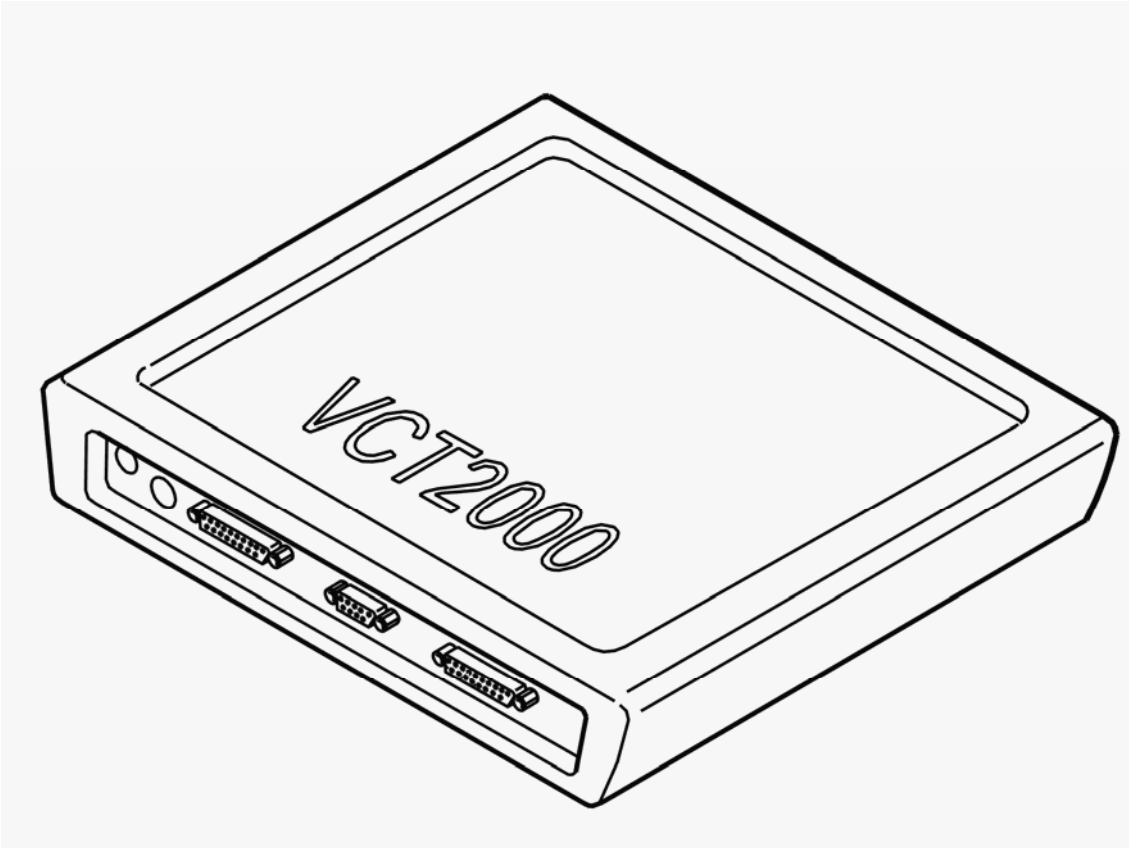


Fig. 241: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After the repair it is necessary to check that the fault has been rectified.

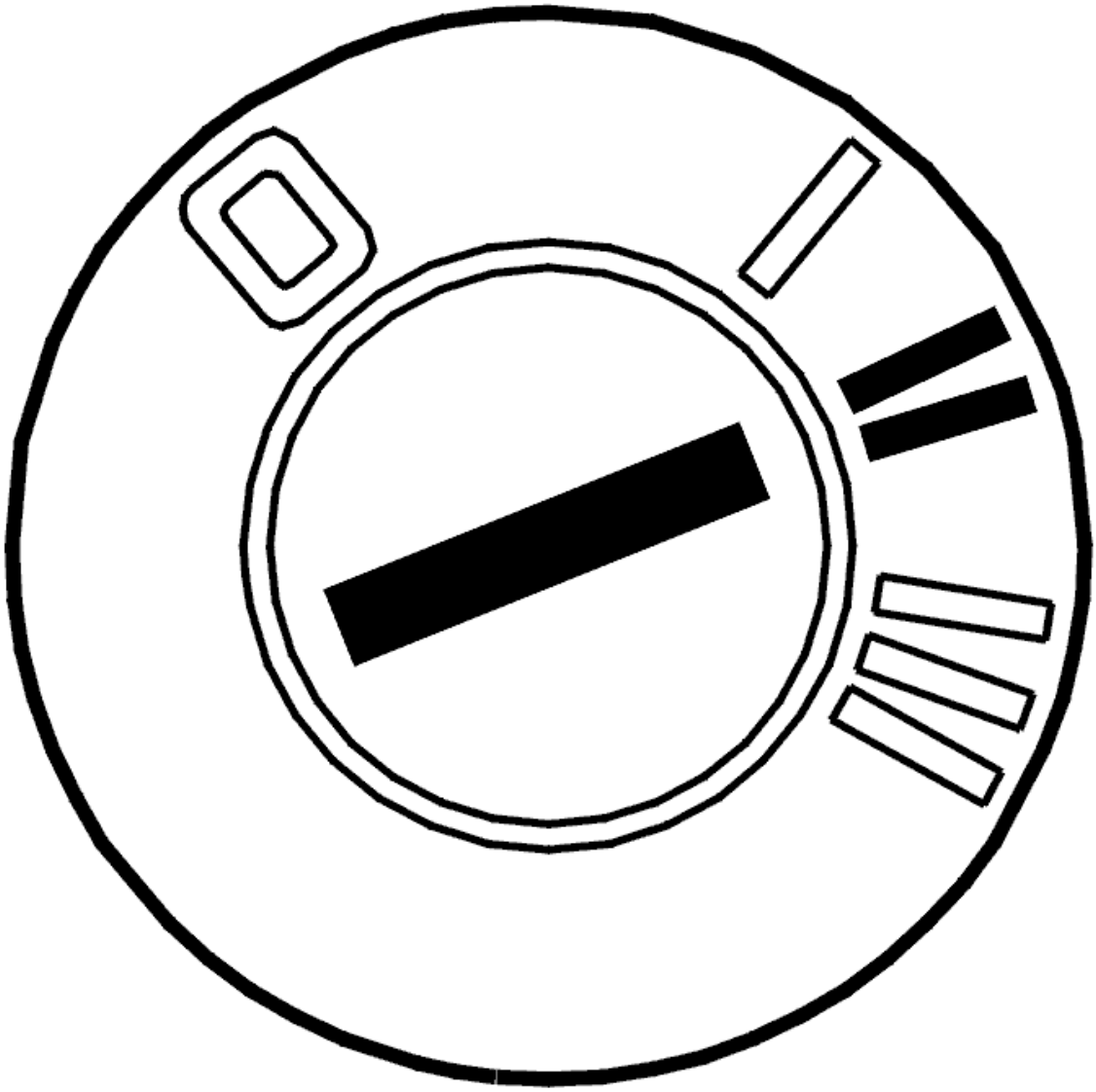


Fig. 242: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

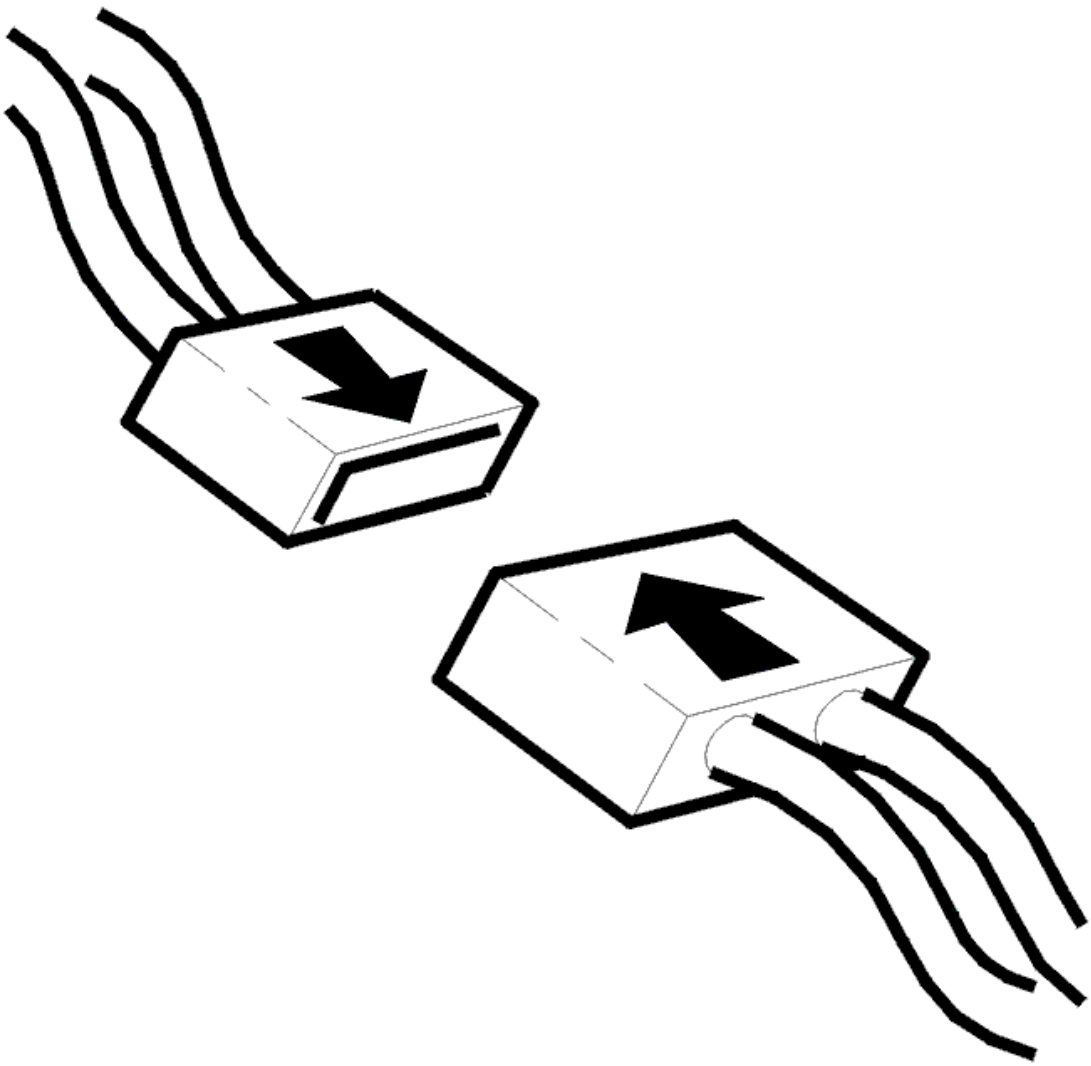


Fig. 243: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Wait for at least 90 seconds.
- Connect the connectors, install the components etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S1.

The value should change between OFF and ON.

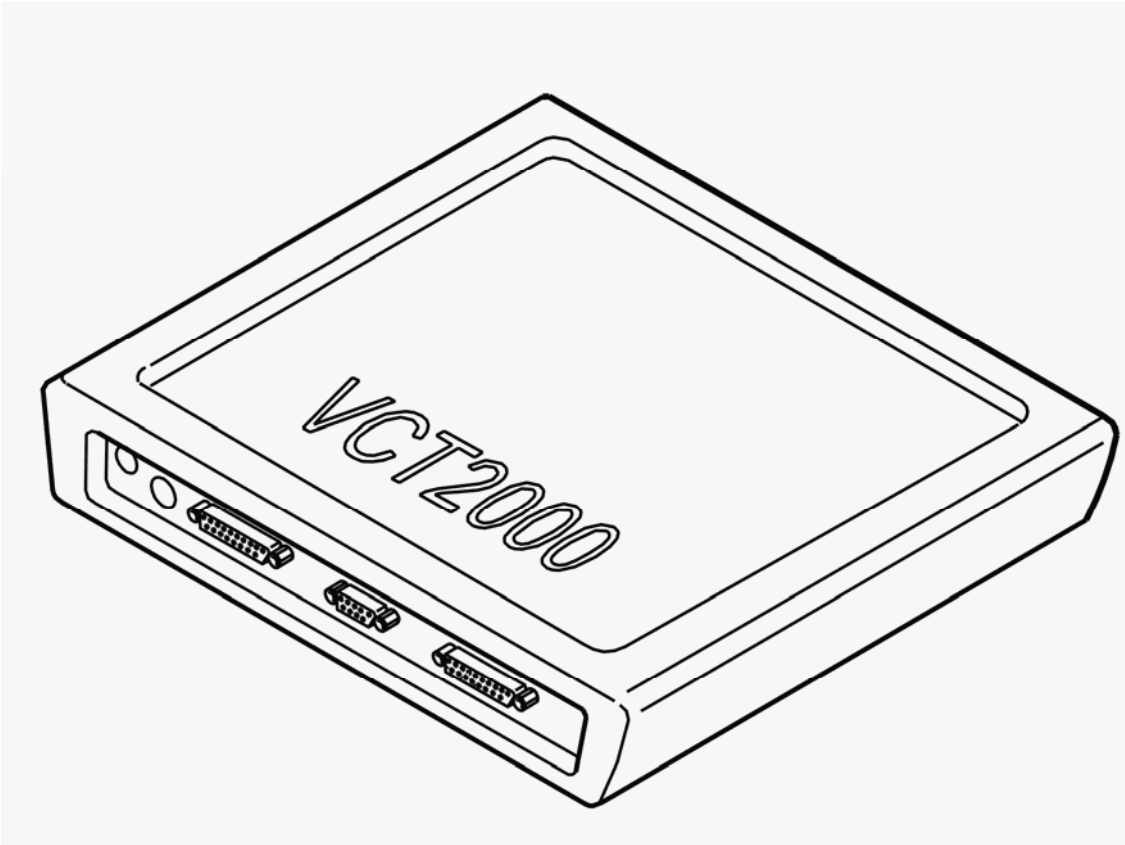


Fig. 244: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

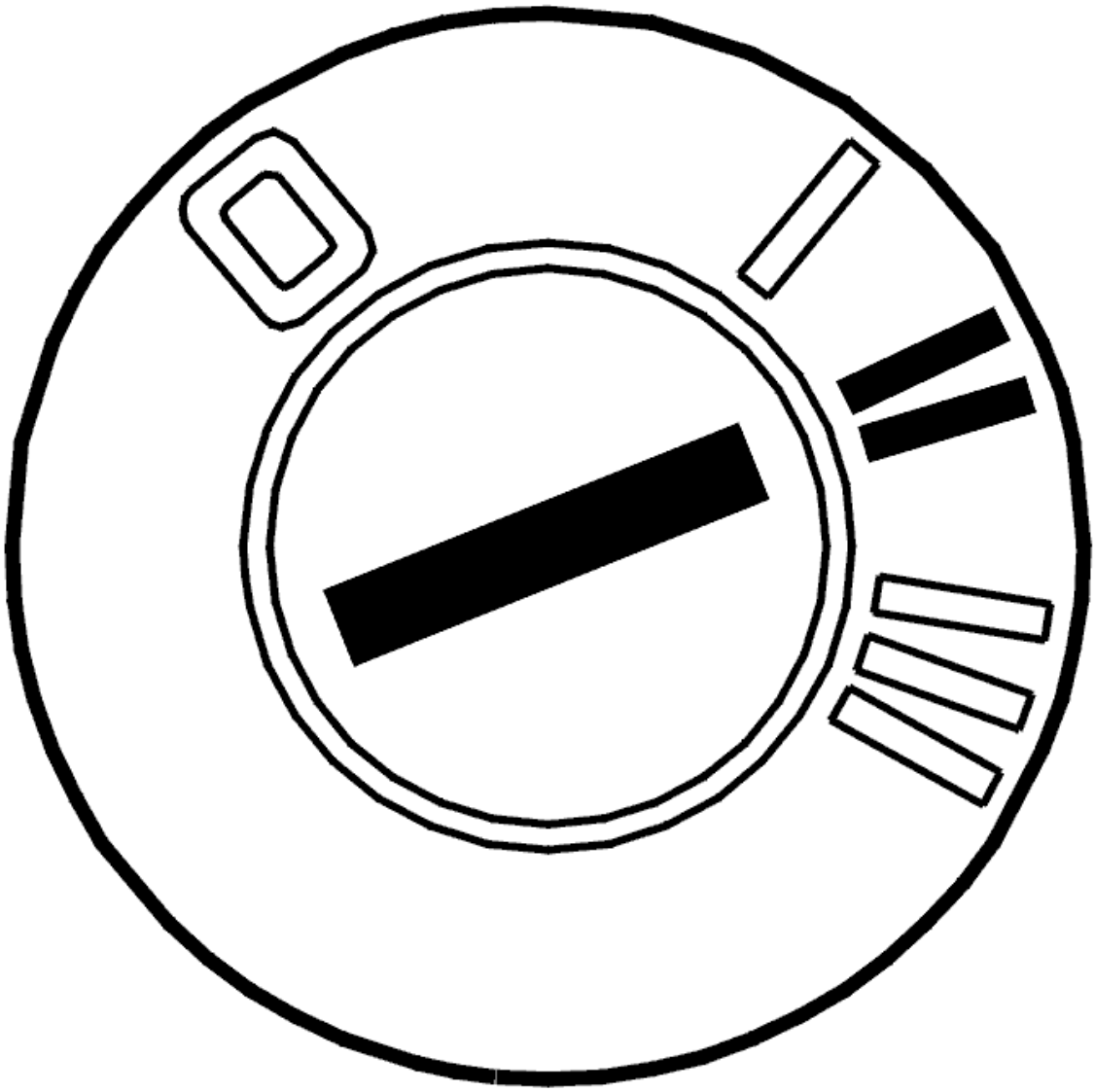


Fig. 245: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

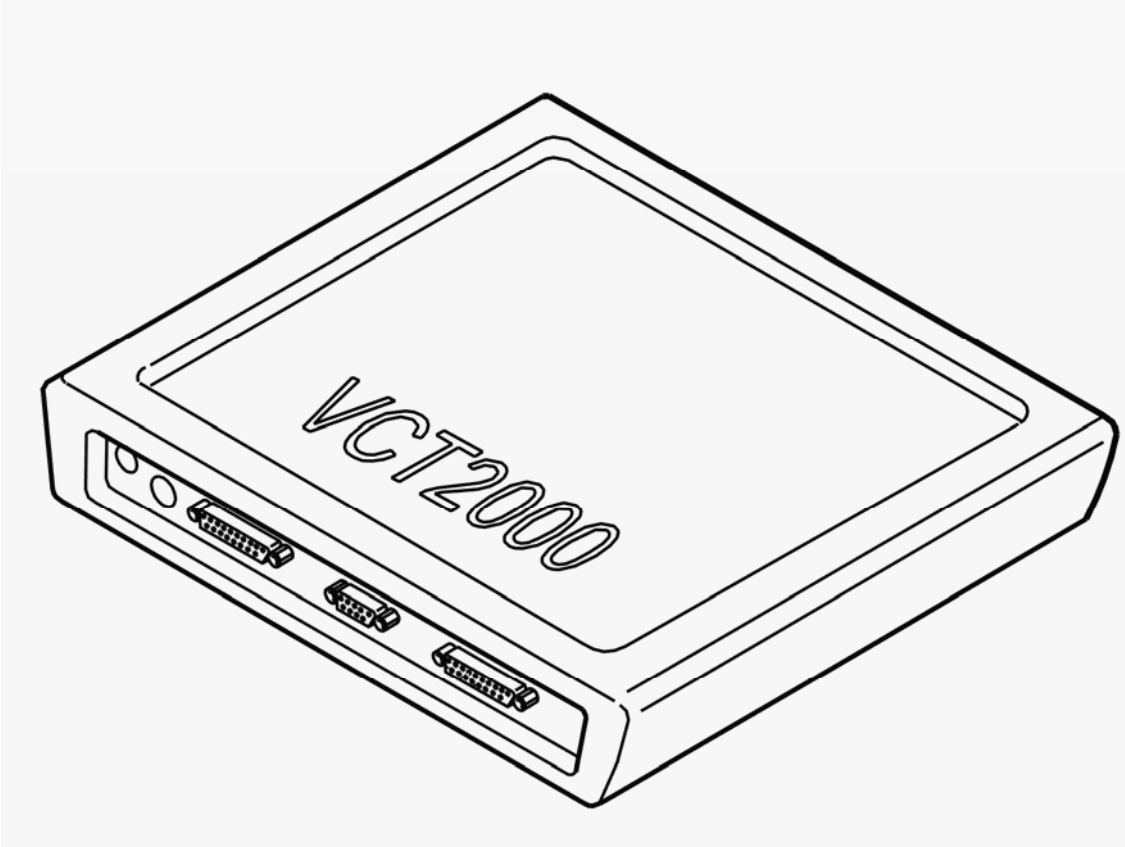


Fig. 246: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

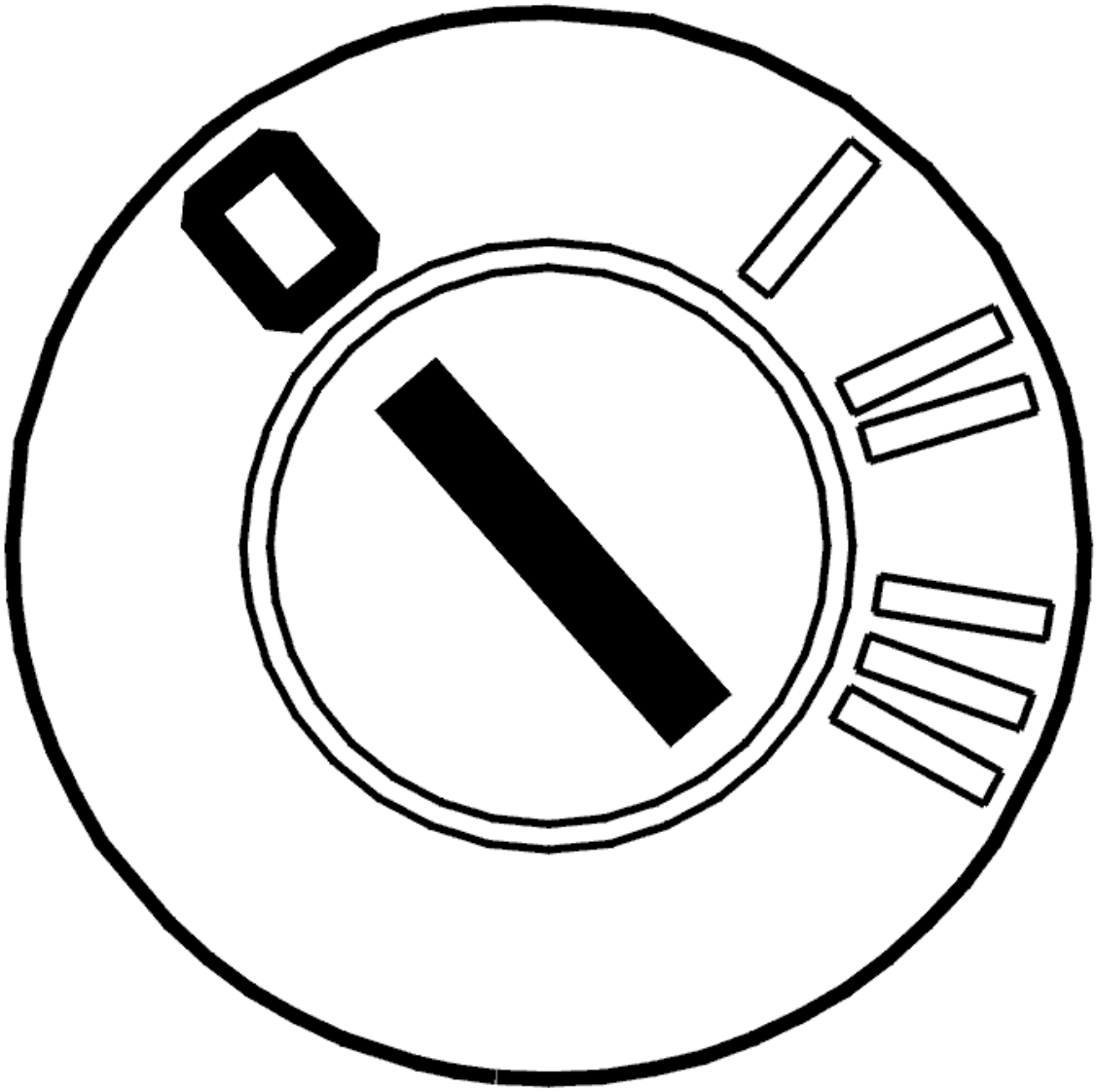


Fig. 247: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

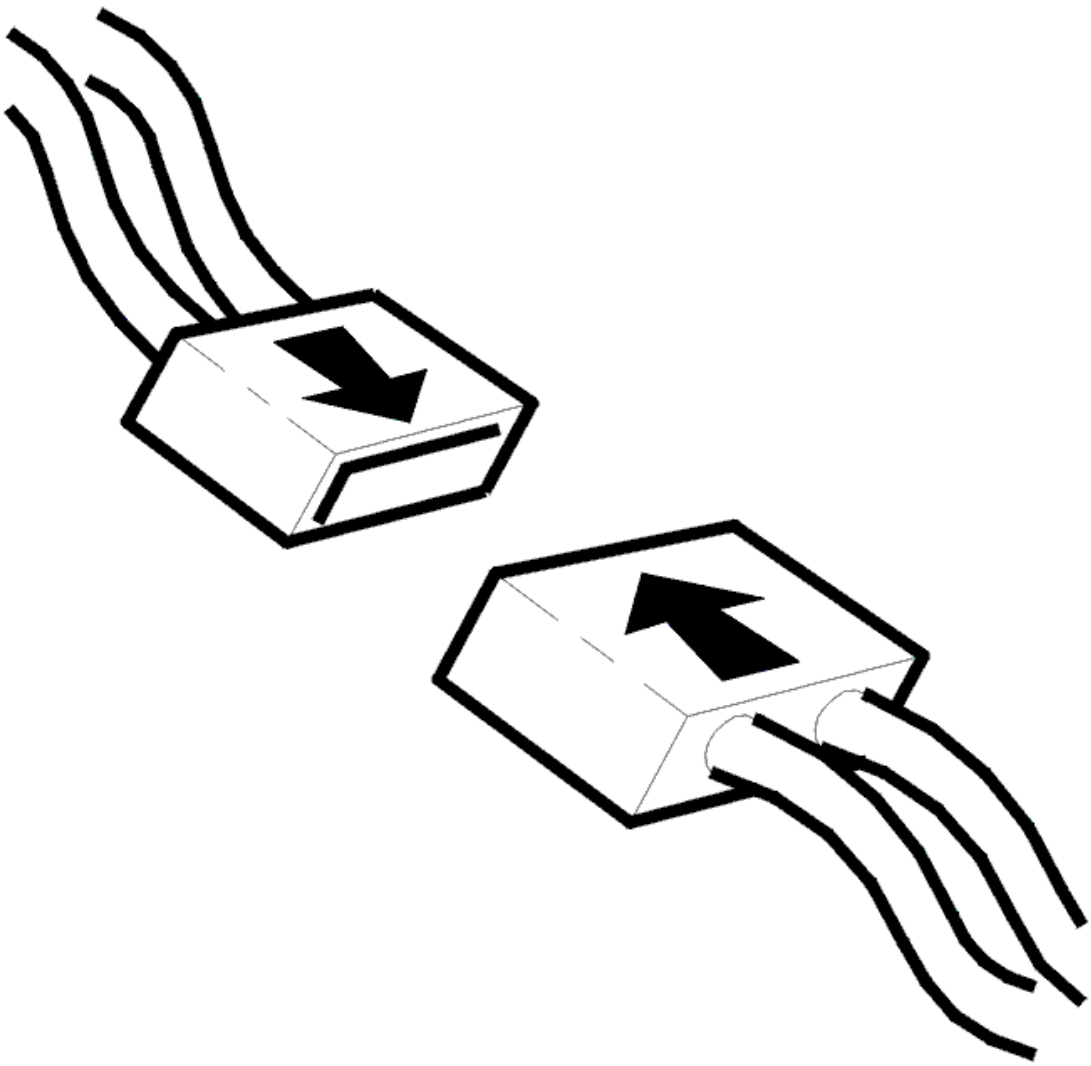


Fig. 248: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

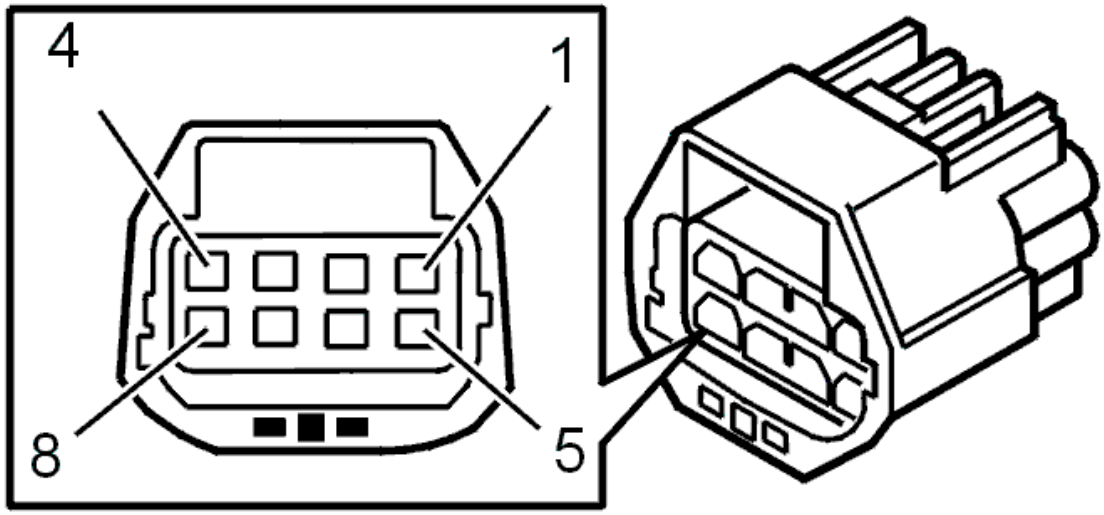


Fig. 249: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

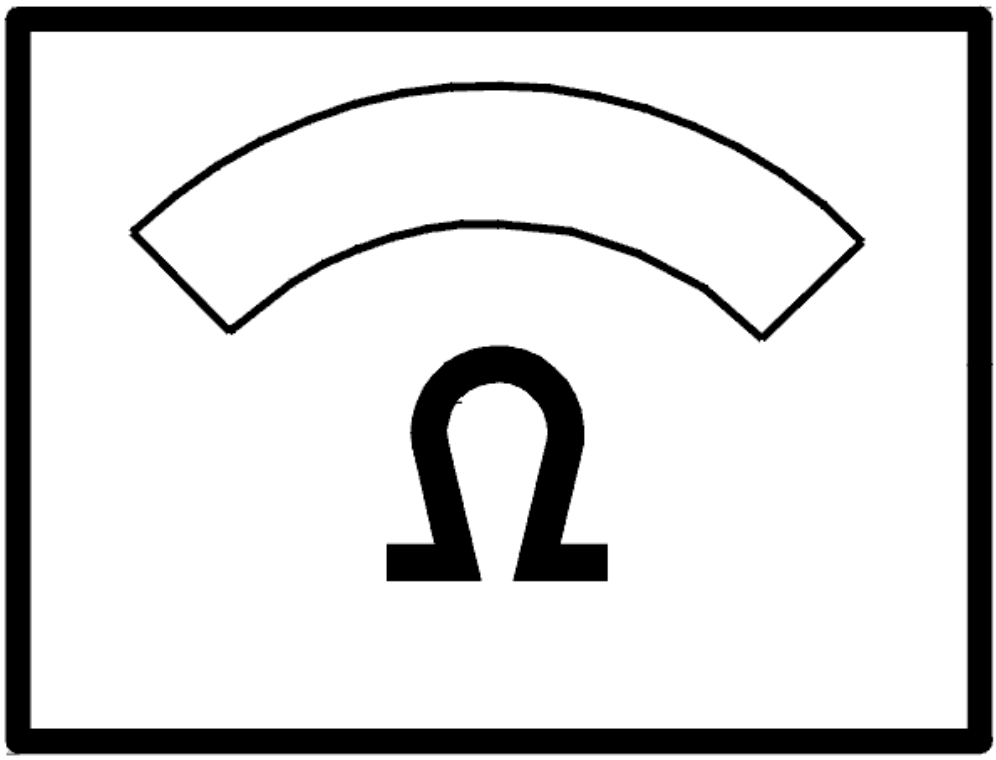


Fig. 250: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

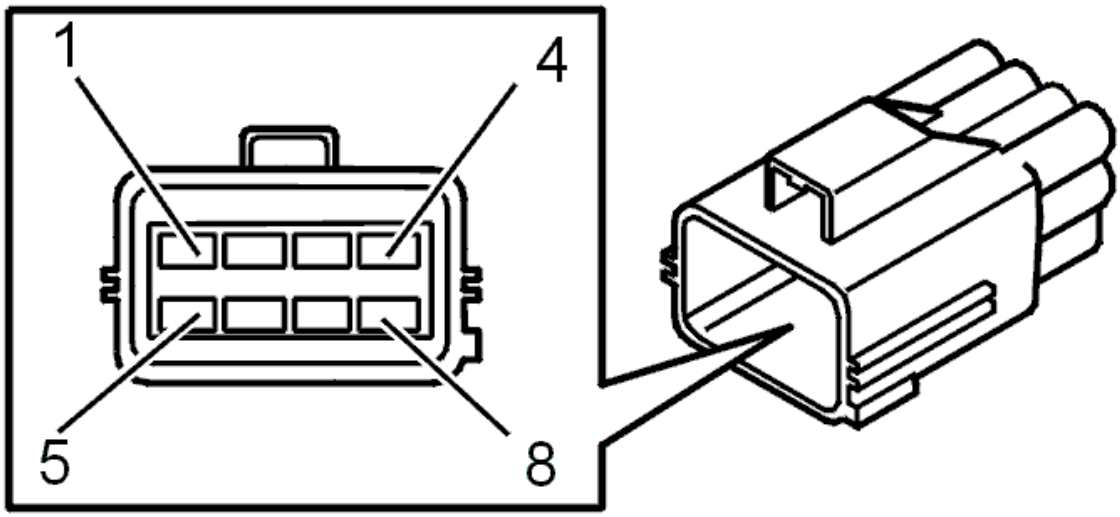


Fig. 251: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

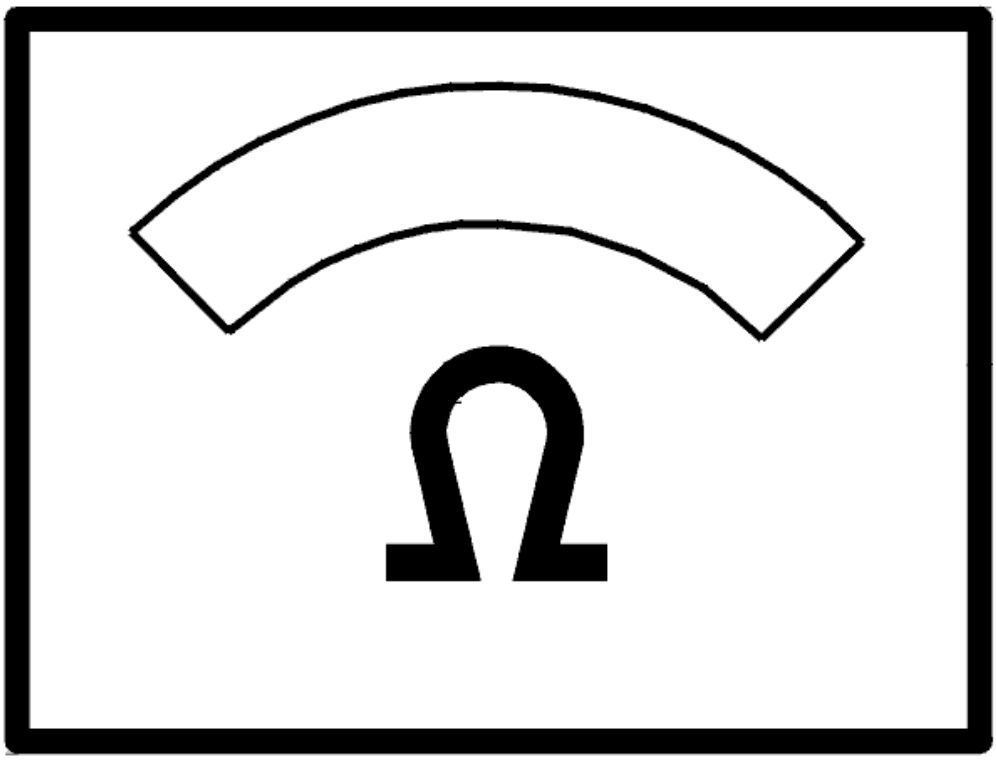


Fig. 252: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

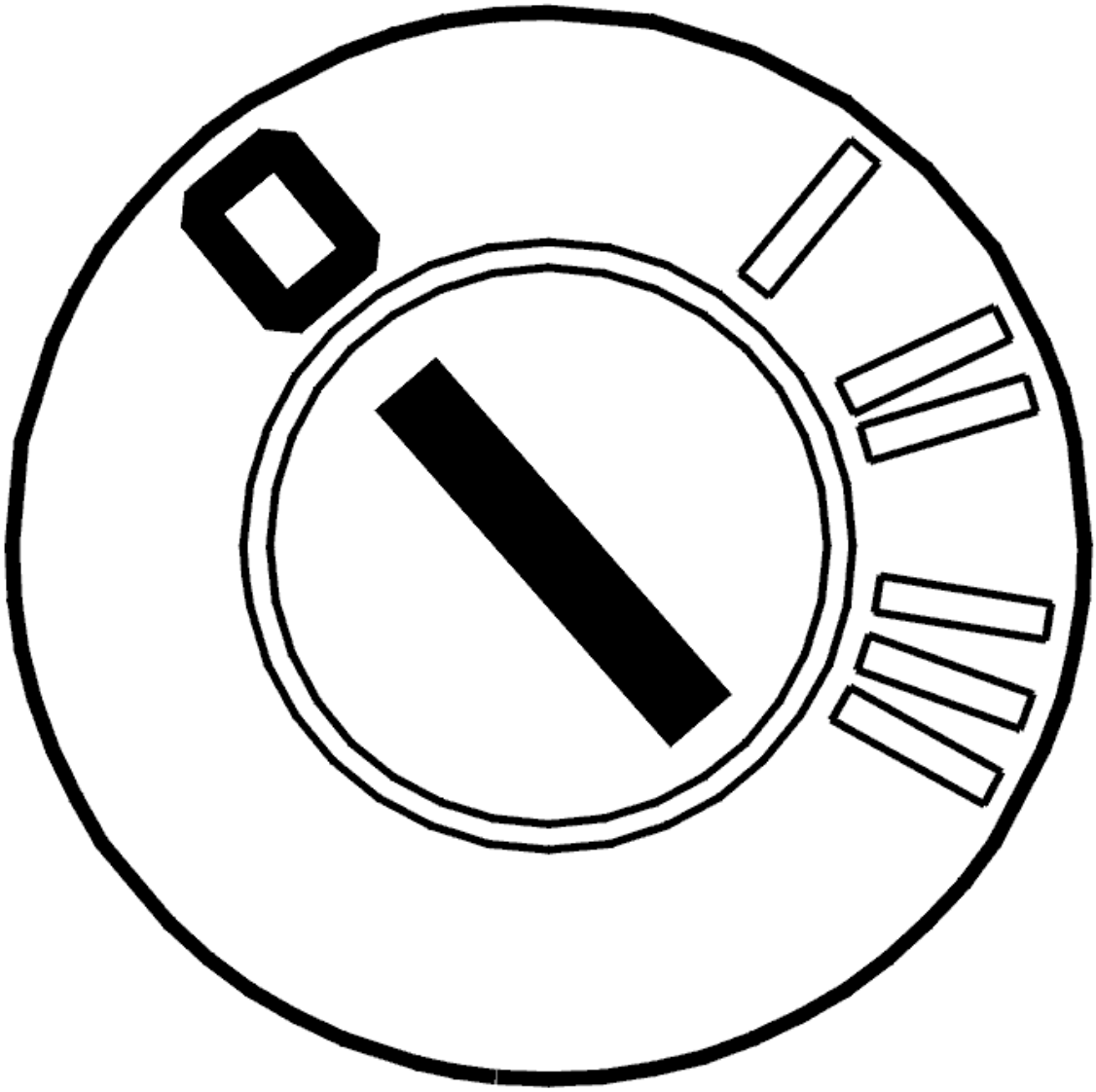


Fig. 253: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

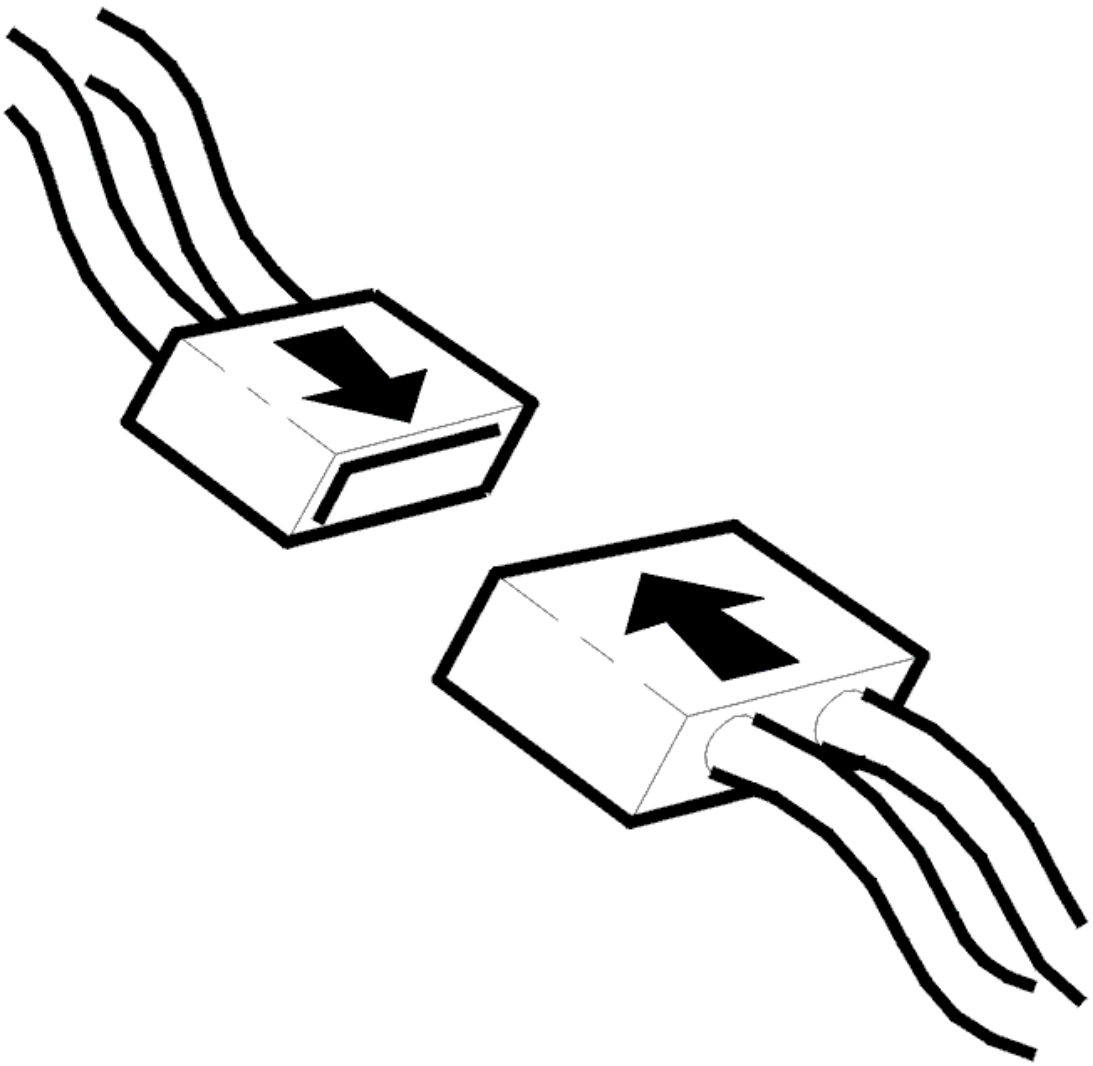


Fig. 254: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

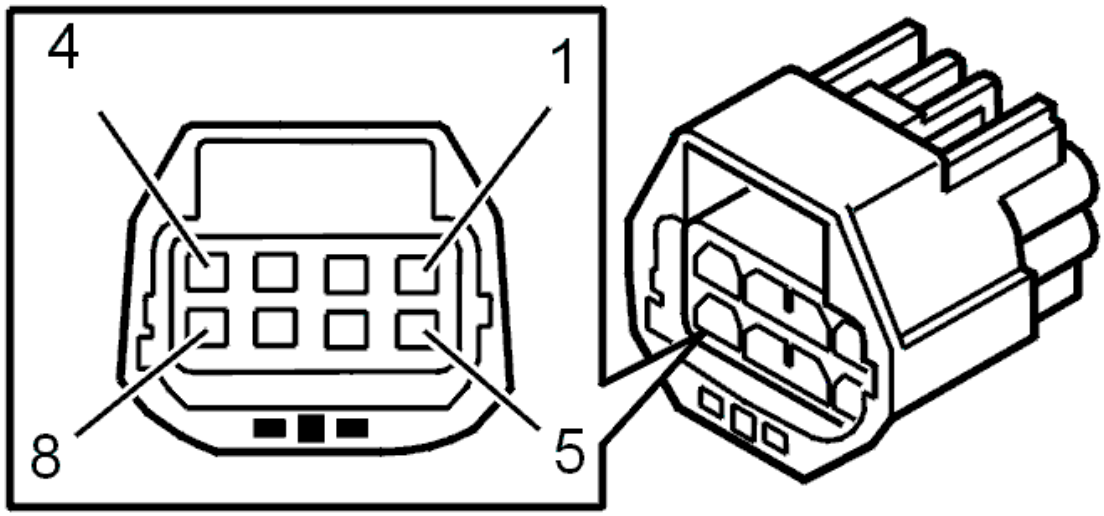


Fig. 255: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

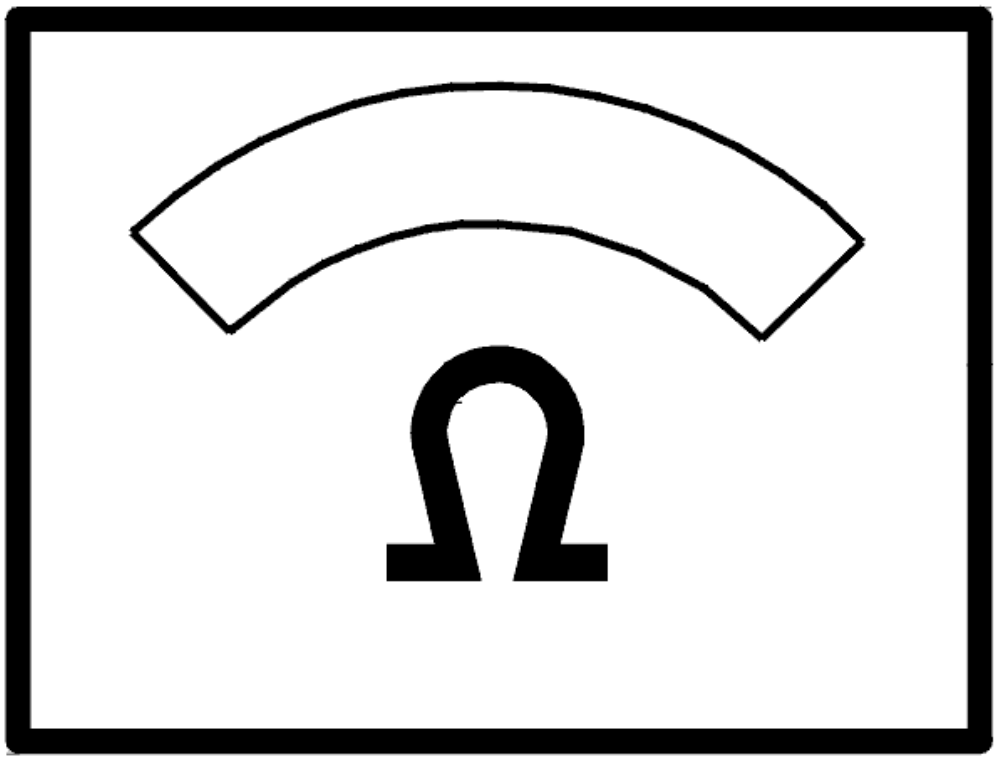


Fig. 256: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

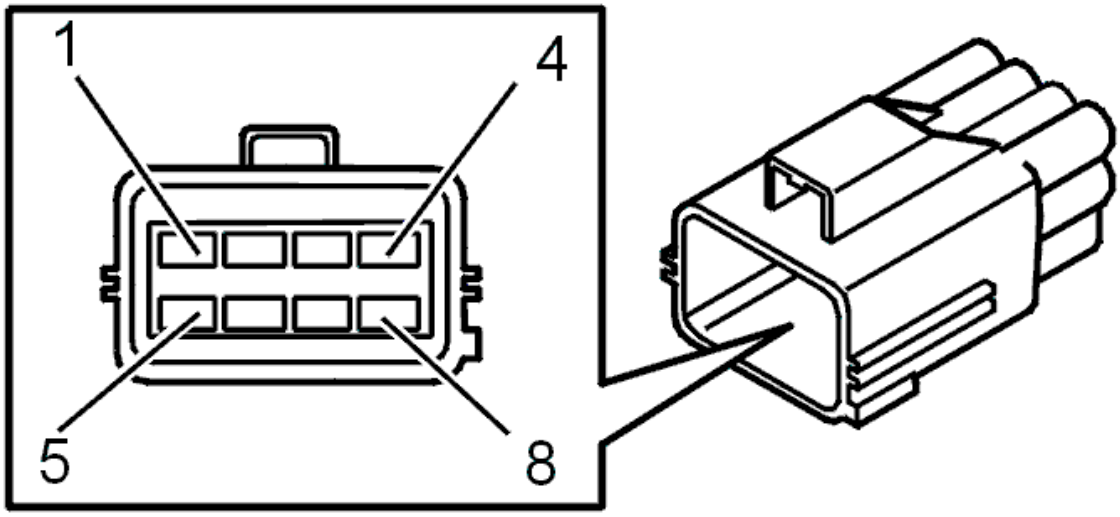


Fig. 257: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

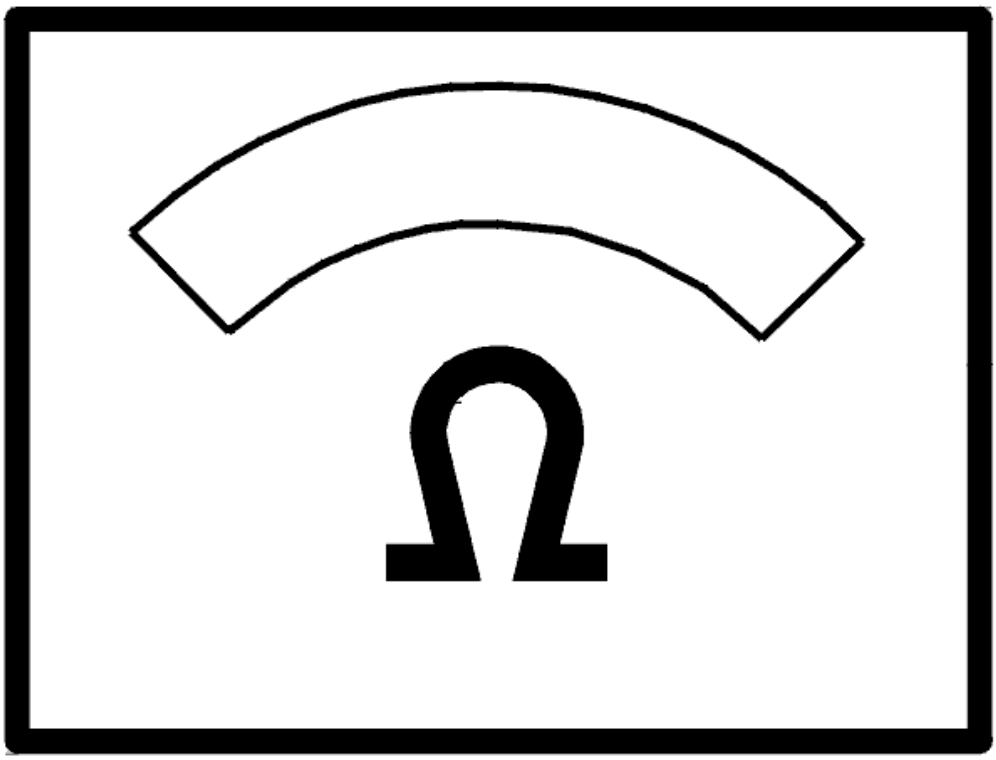


Fig. 258: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

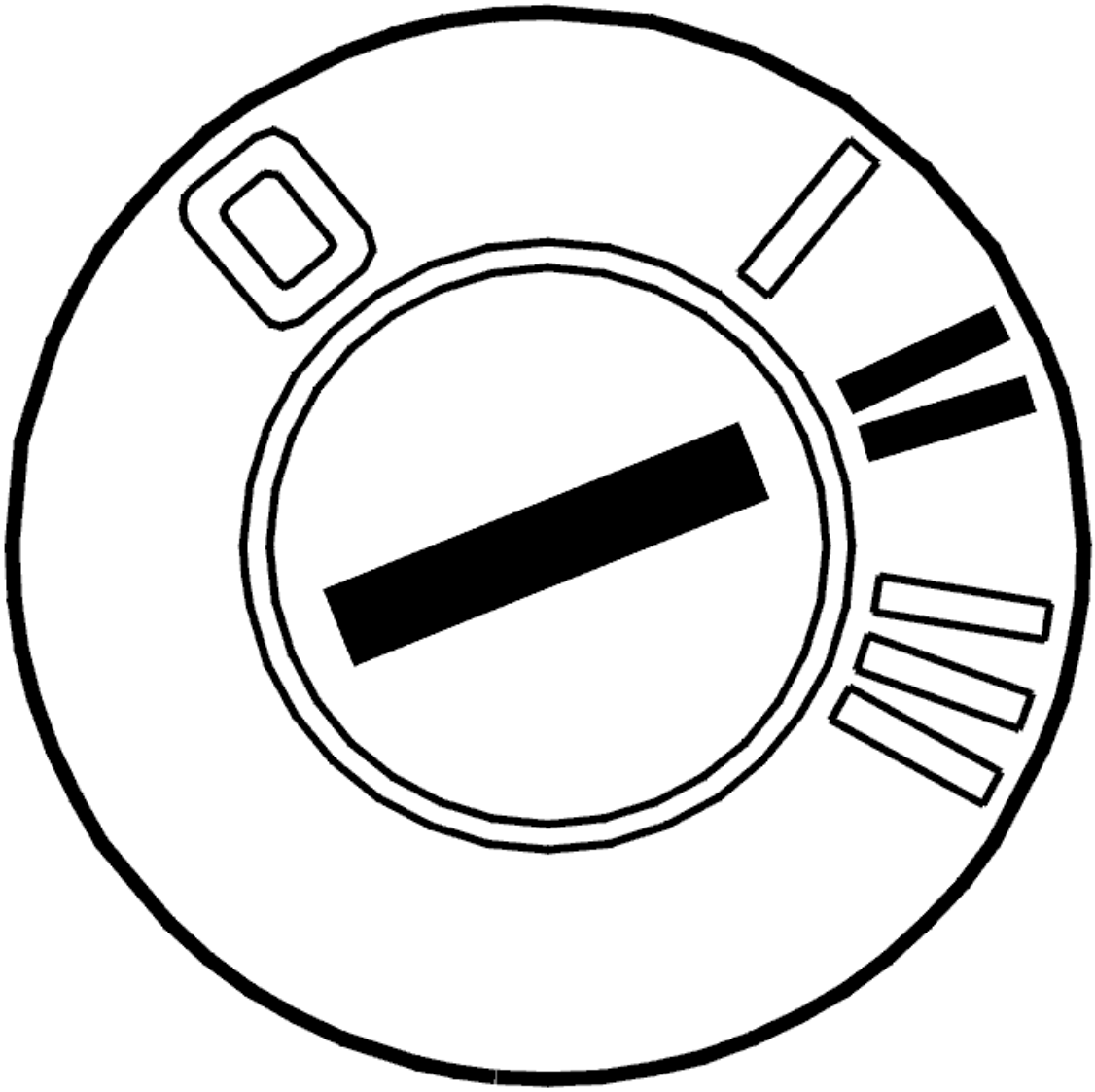


Fig. 259: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

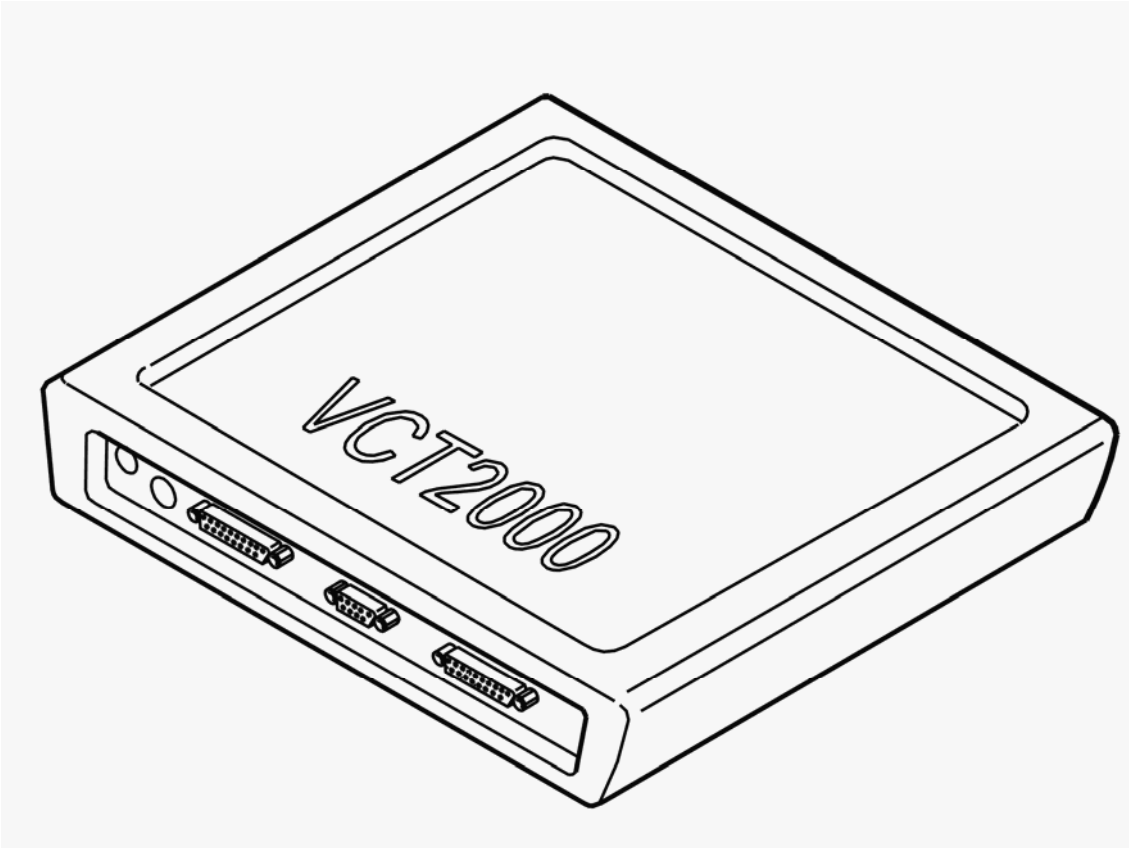


Fig. 260: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

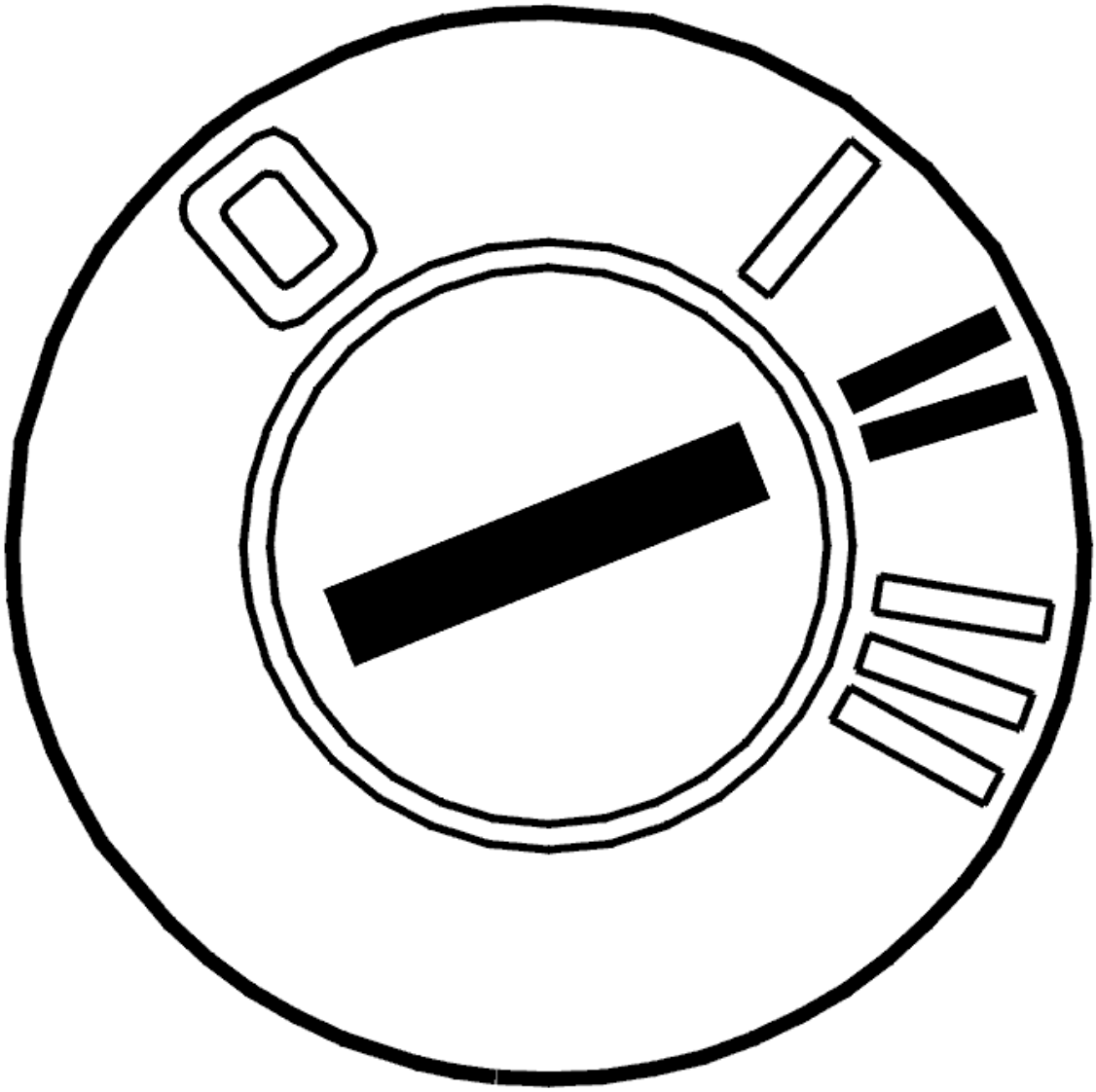


Fig. 261: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

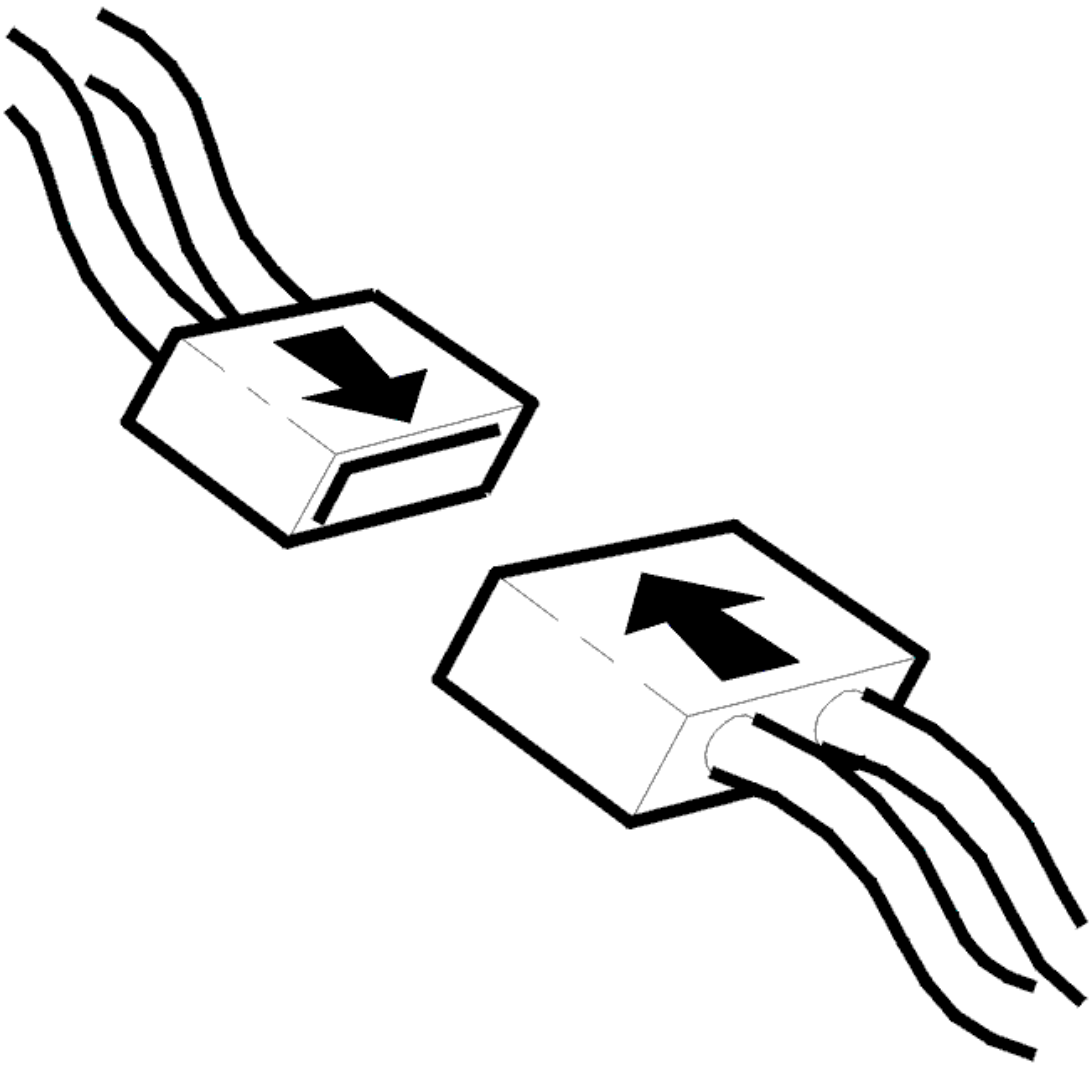


Fig. 262: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

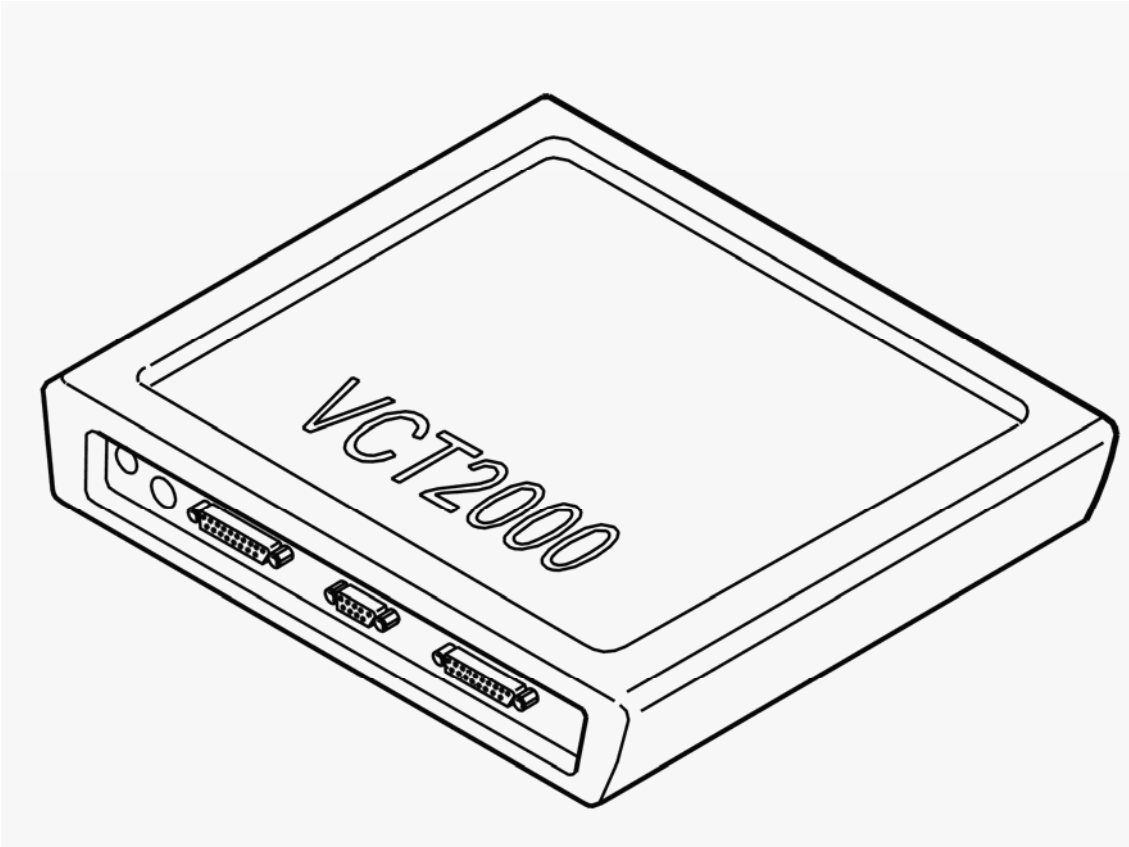


Fig. 263: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-0007: SHIFT SOLENOID S2. SIGNAL TOO HIGH (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

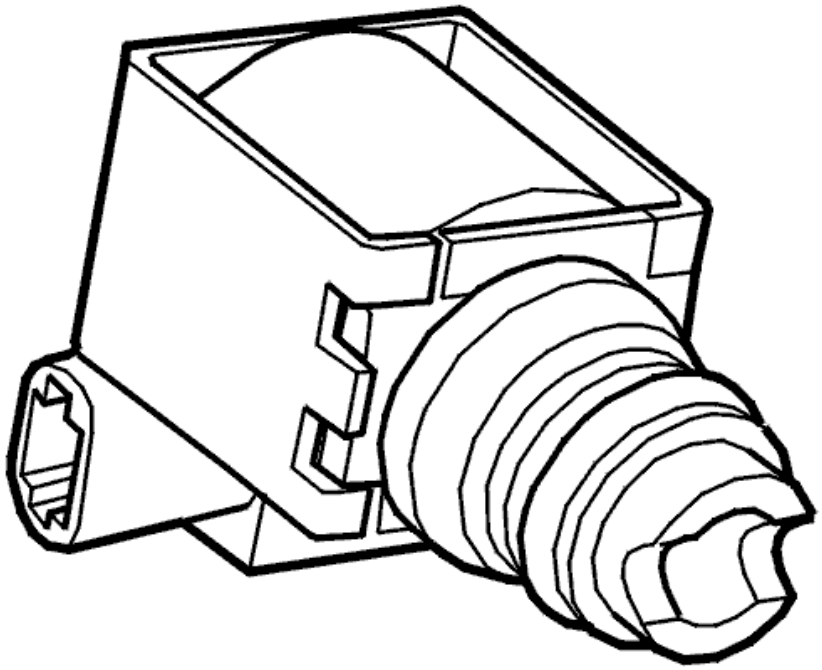


Fig. 264: Identifying Shift Solenoid S1 And S2
Courtesy of VOLVO CARS CORPORATION

Shift solenoids S2 and S1 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Solenoid S2 is activated in 1st and 2nd gears. Diagnostic trouble code (DTC) TCM-0007 is stored if the control module registers that the signal in the circuit is too high when the solenoid should not be activated.

Substitute Value

- The control module "Limp Home" program has been initiated.

Possible Source

- Short-circuit to supply voltage in the signal cable.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

- No shifting.

HINT: Harsh shifting - due to disabled line pressure solenoid STH control. This results in constant maximum line pressure and leads to harsher shifting and gear engagement.

HINT: No shifting -because the transmission control module (TCM) prevents activation of the solenoids. This stops gear-shifting.

SIGNAL TOO HIGH

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

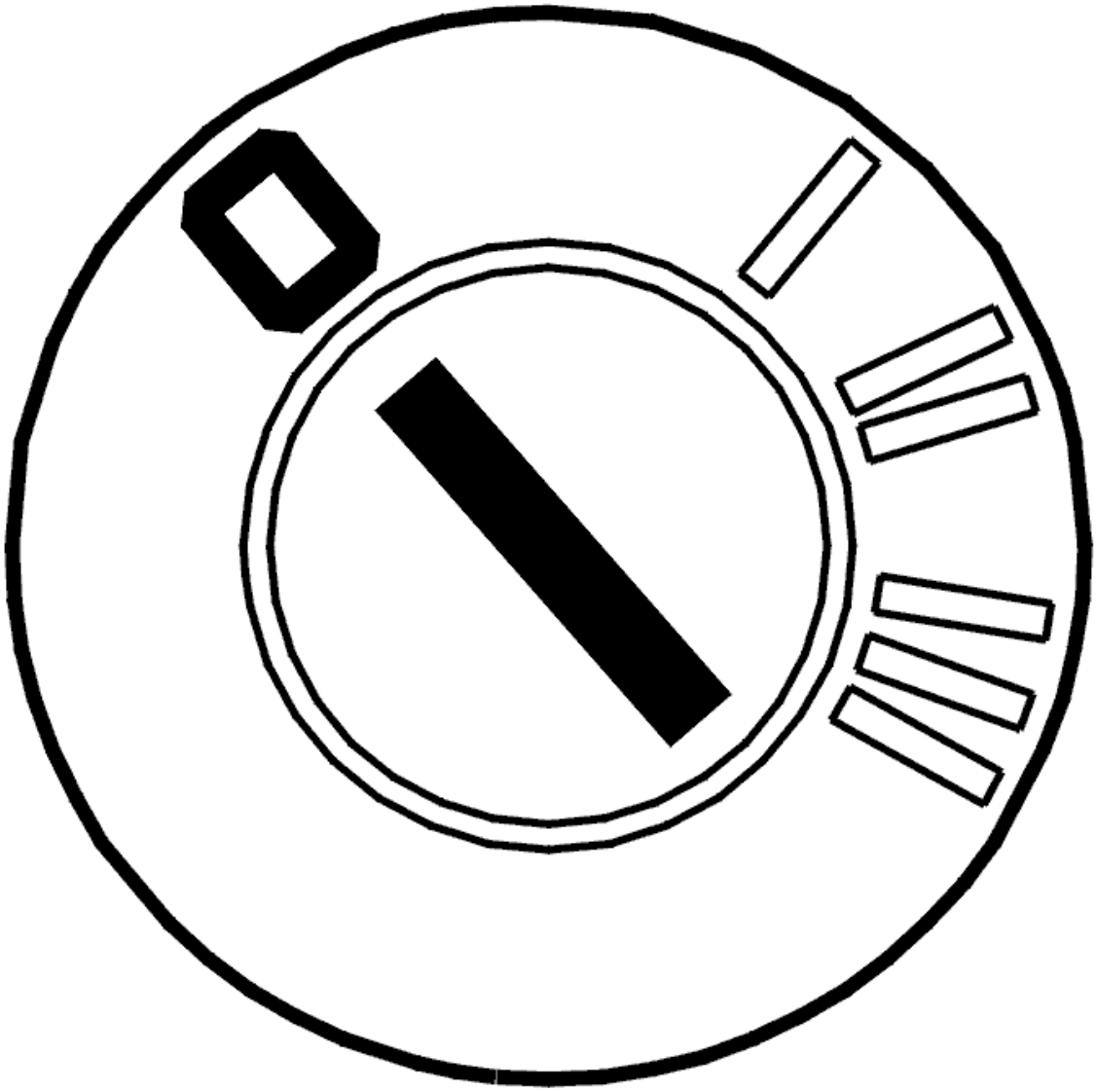


Fig. 265: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

  HINT: If the temperature is outside its permitted range, fault-trace the temperature sensor.

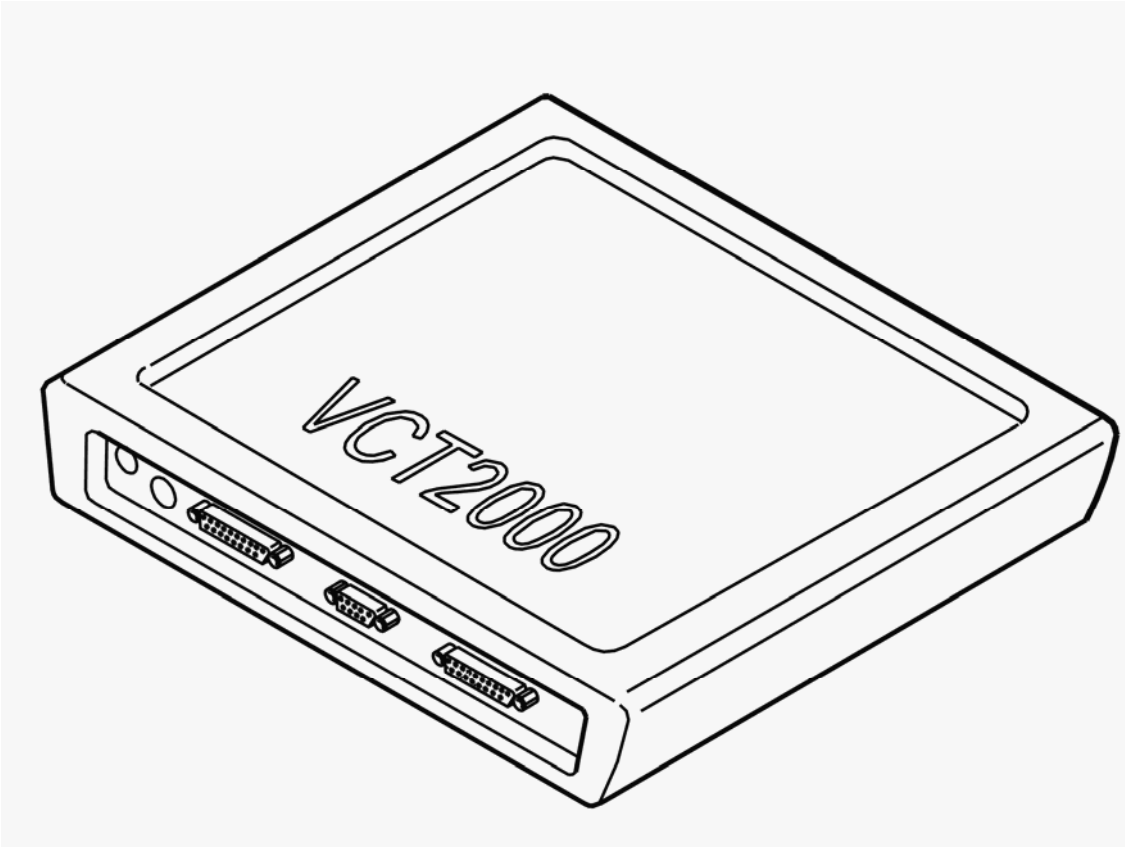


Fig. 266: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S2**

- **NO**

  Refer to **SIGNAL TOO HIGH**

CHECKING SHIFT SOLENOID S2

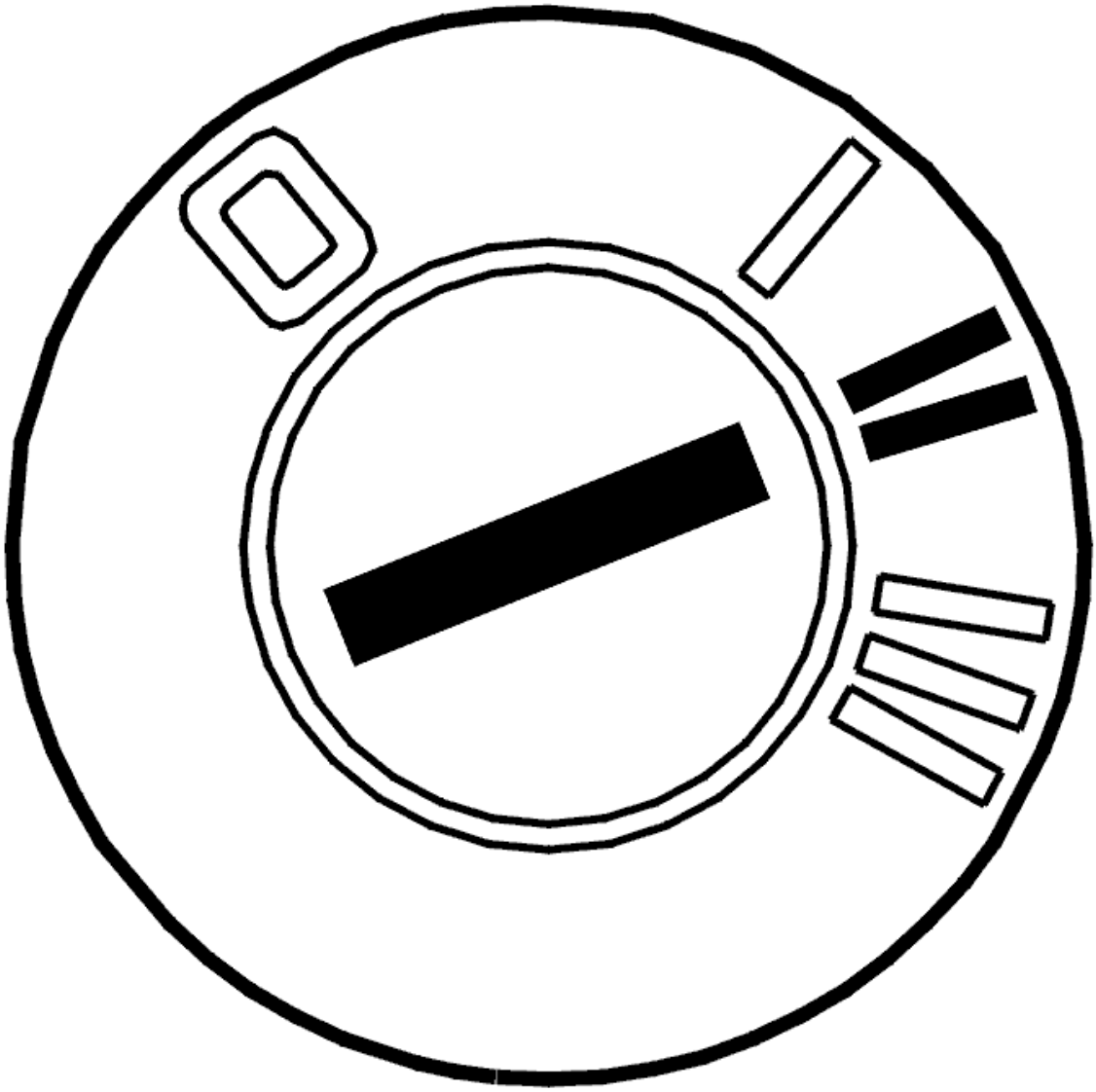


Fig. 267: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S2.

  The value must change between OFF and ON.

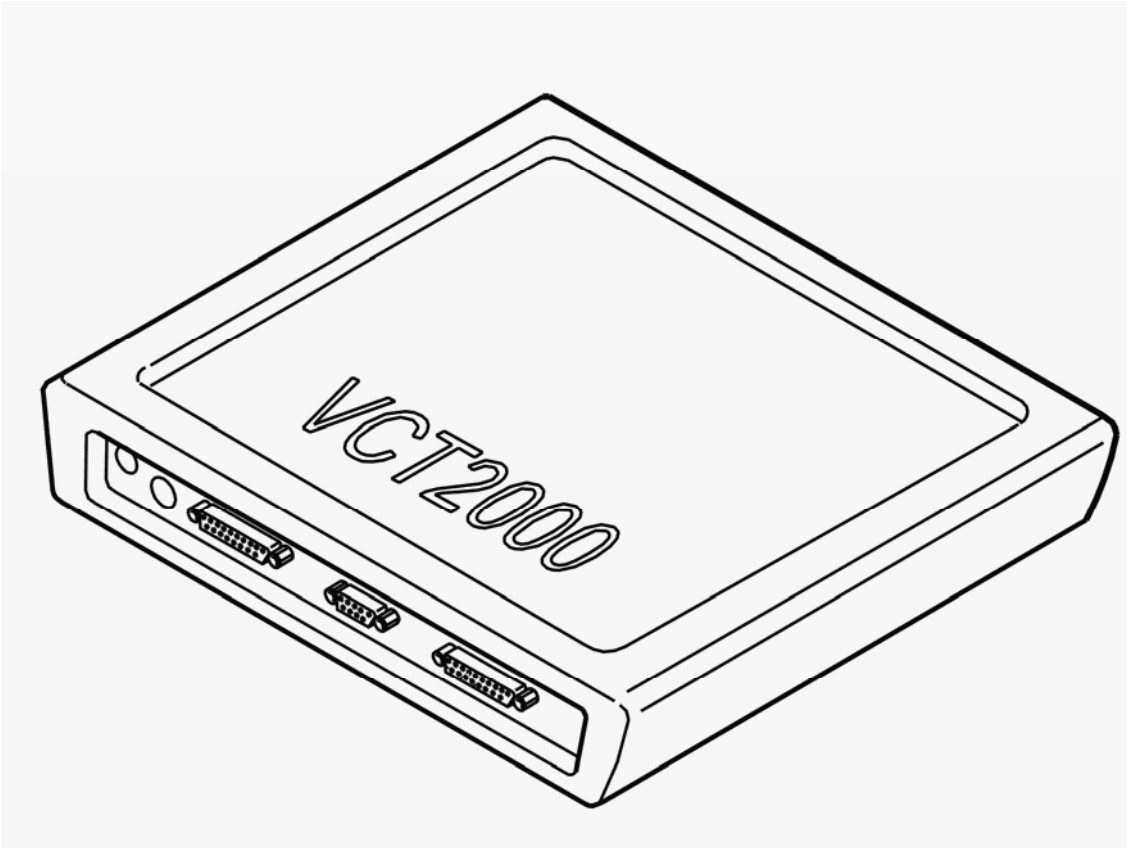


Fig. 268: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

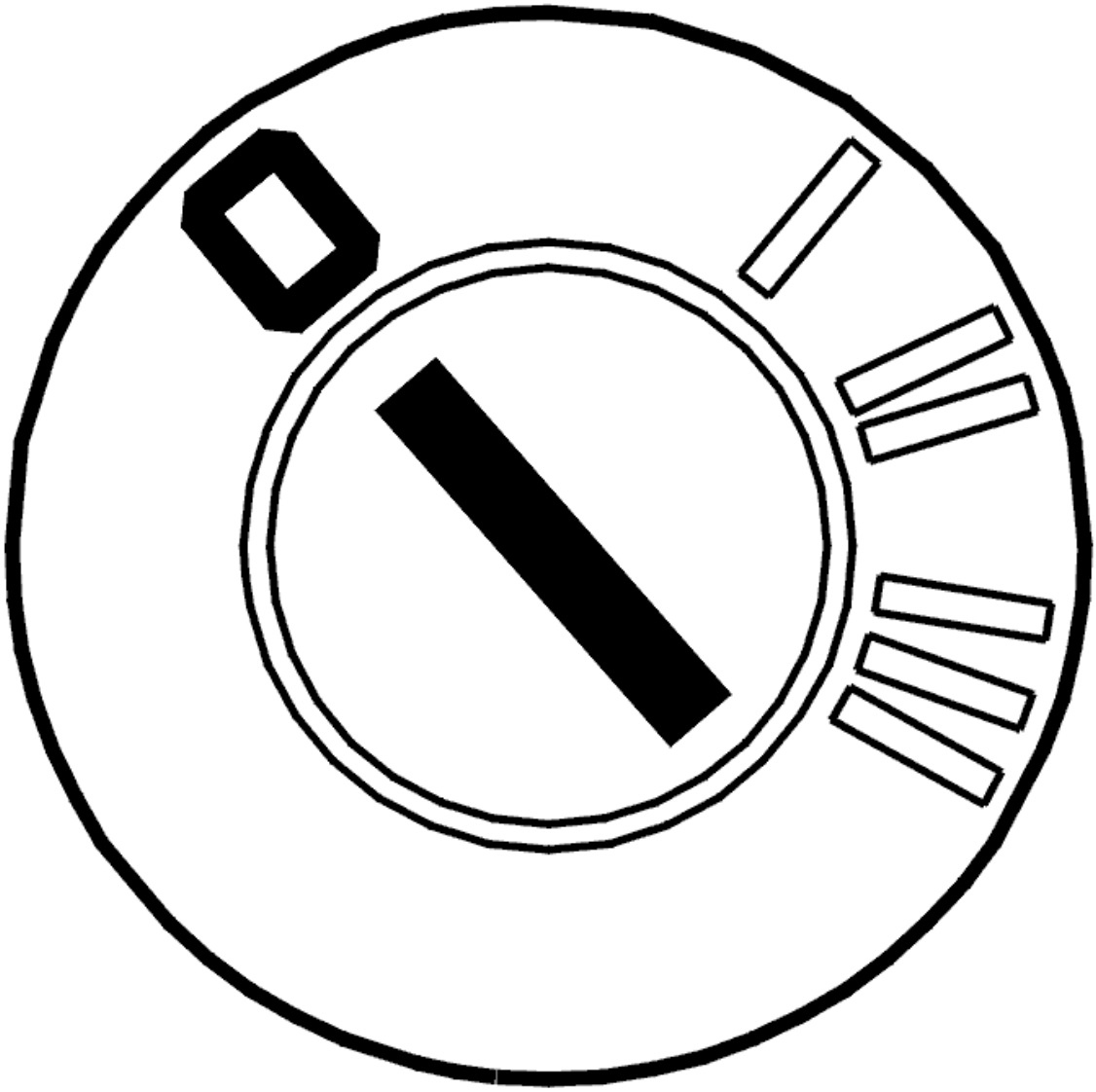


Fig. 269: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

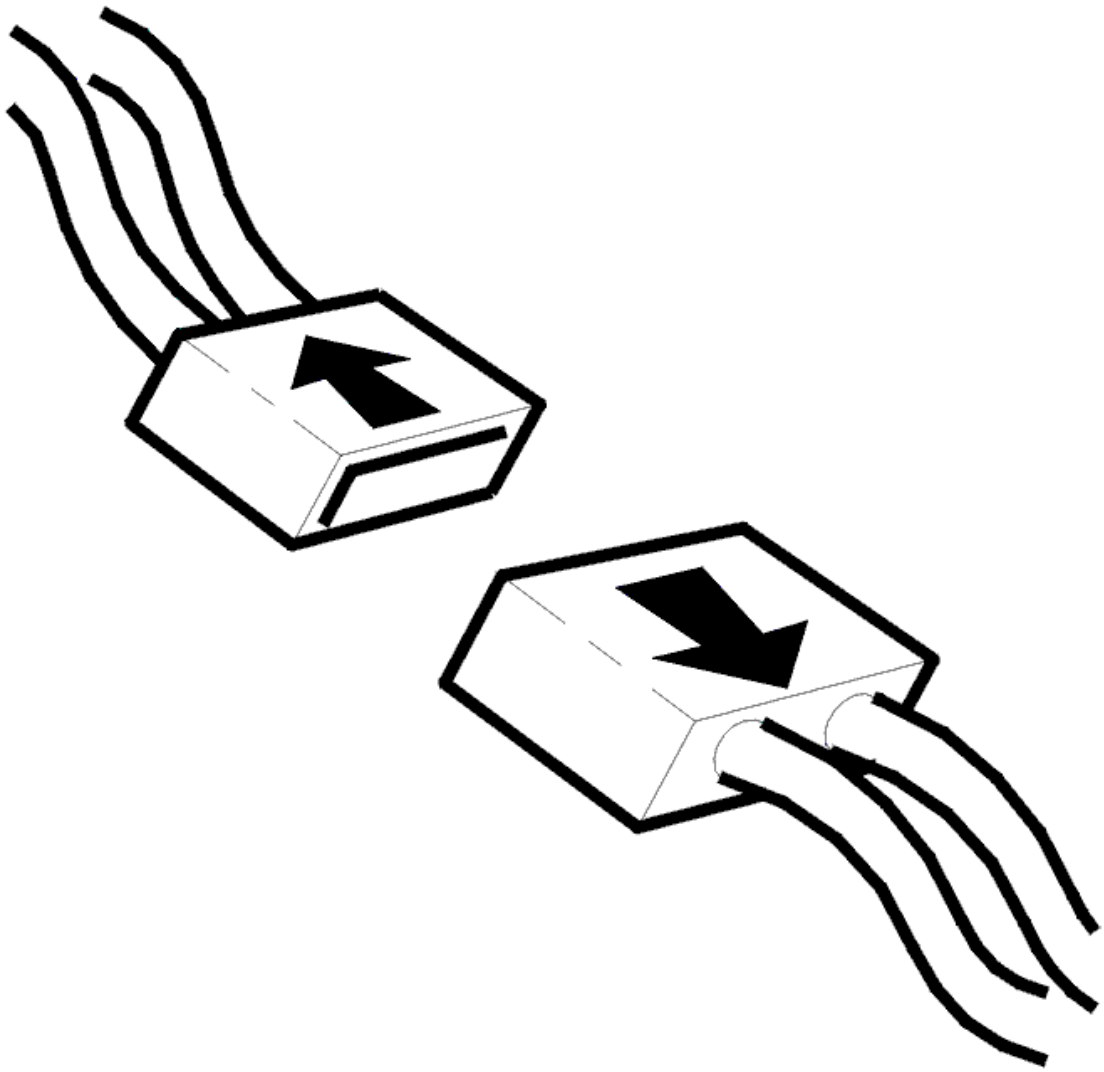


Fig. 270: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (control module side).

  Check the cable between control module terminal #A68 (#B8) and transmission connector terminal #B (#A2) (control module side). Check for a short-circuit to supply voltage.

  Check the cable between control module terminal #53 (#A53) and transmission connector terminal #E (#A5) (control module side). Check for a short-circuit to supply voltage.

  HINT: Also check all the other power supply cables in the circuit.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

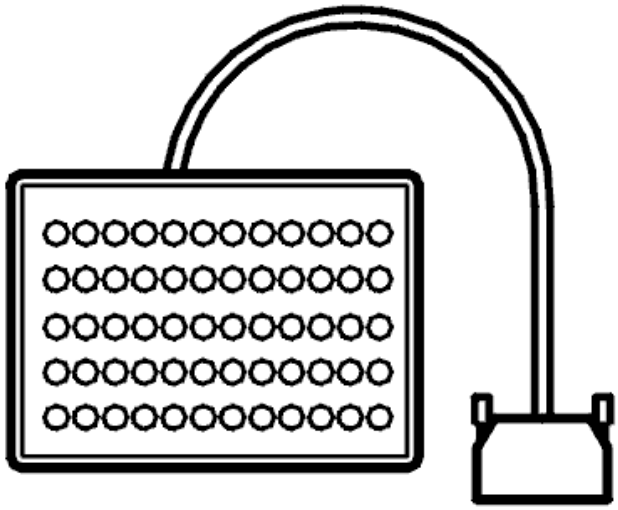


Fig. 271: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

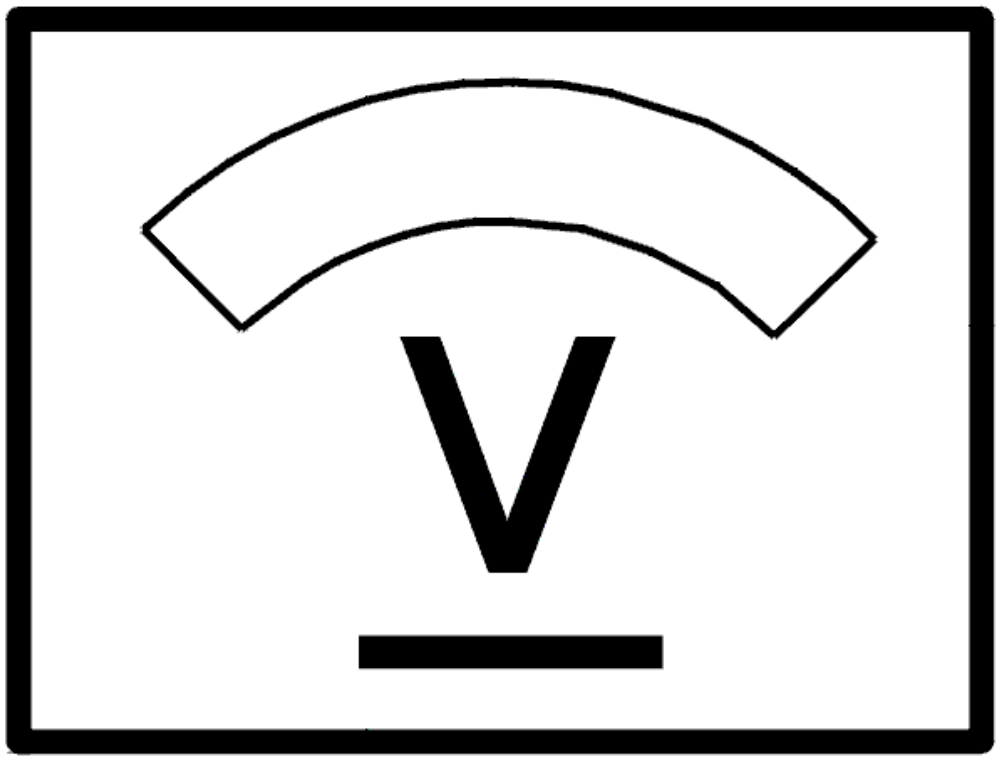


Fig. 272: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

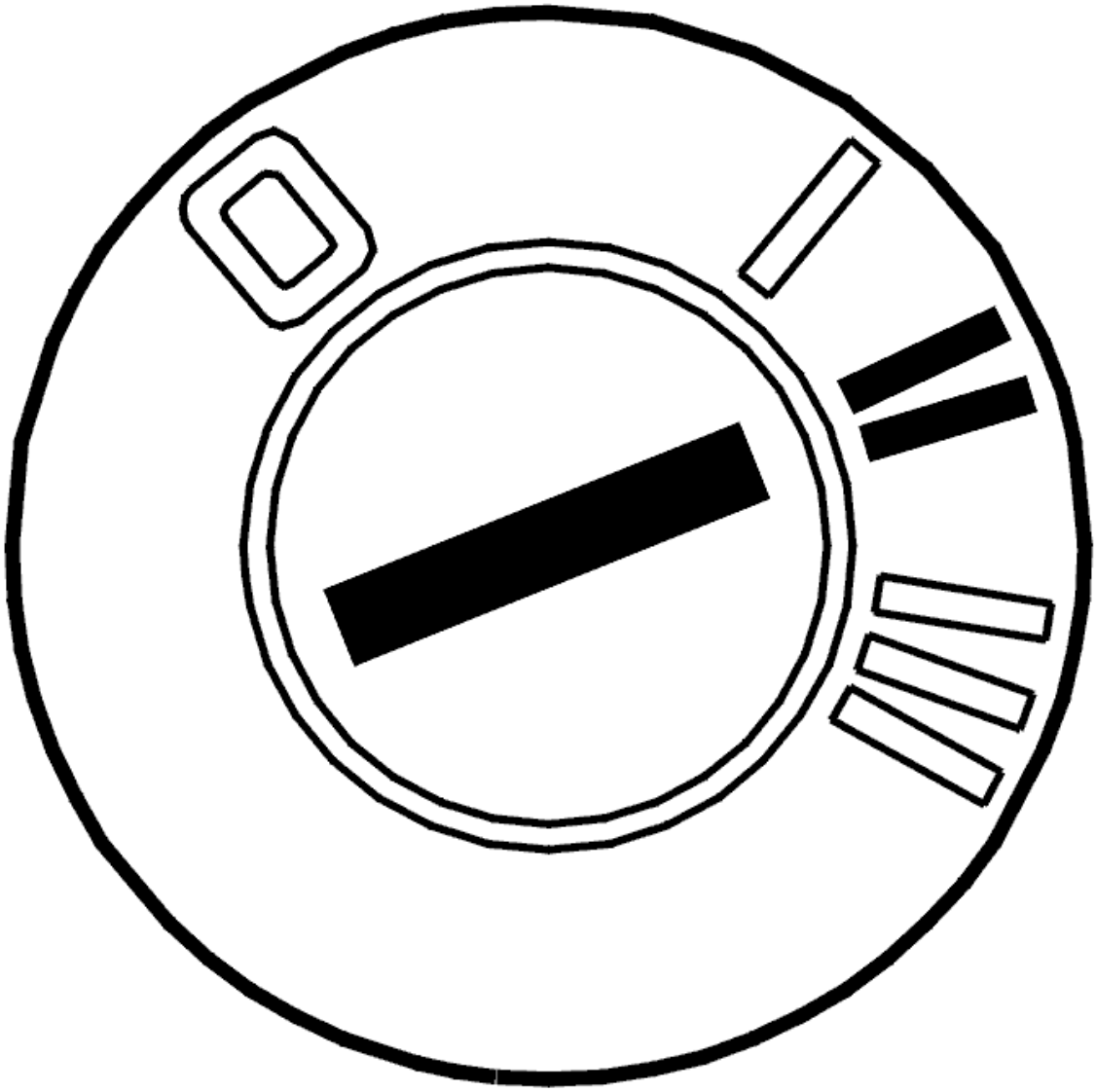


Fig. 273: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

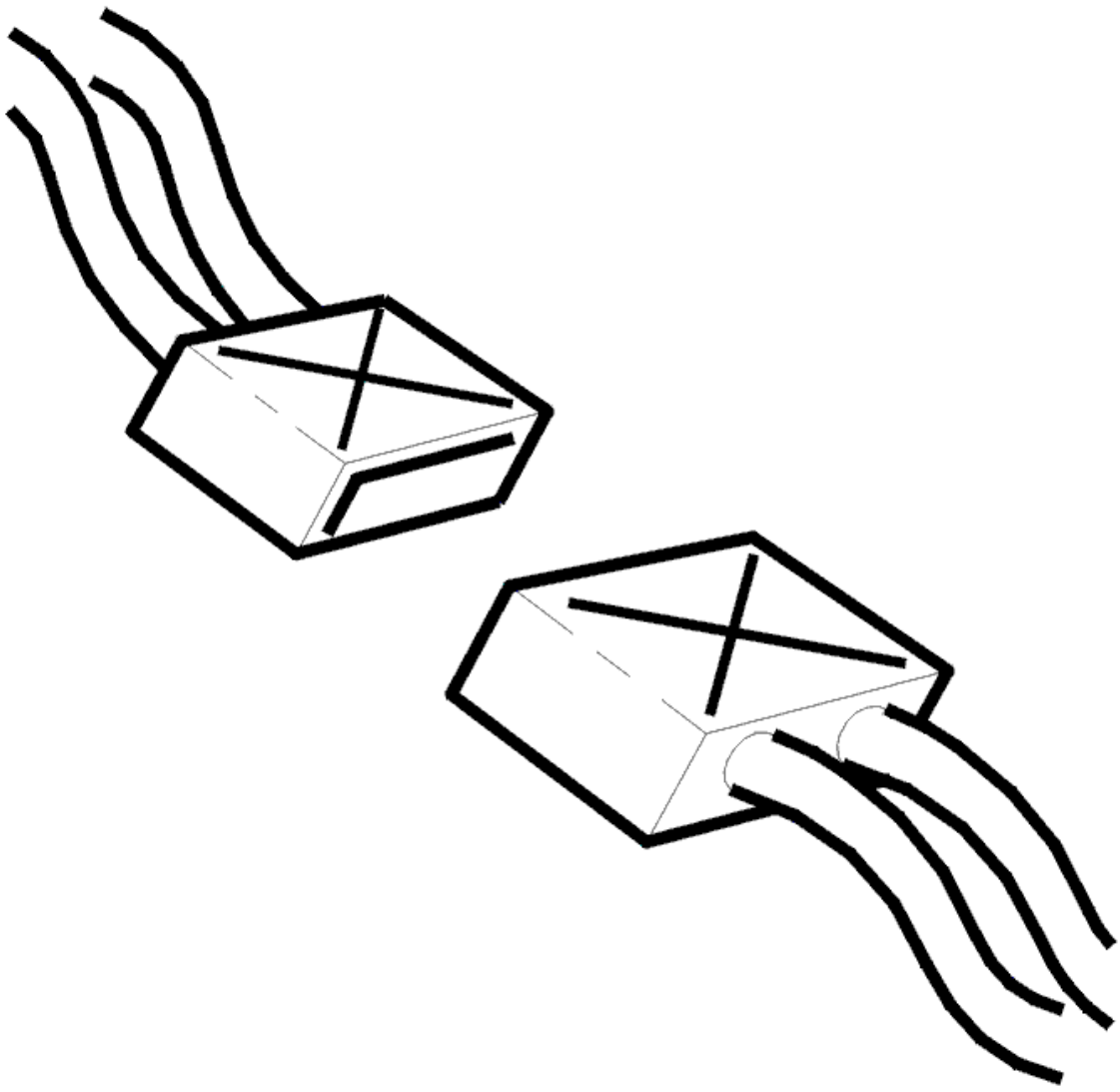


Fig. 274: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

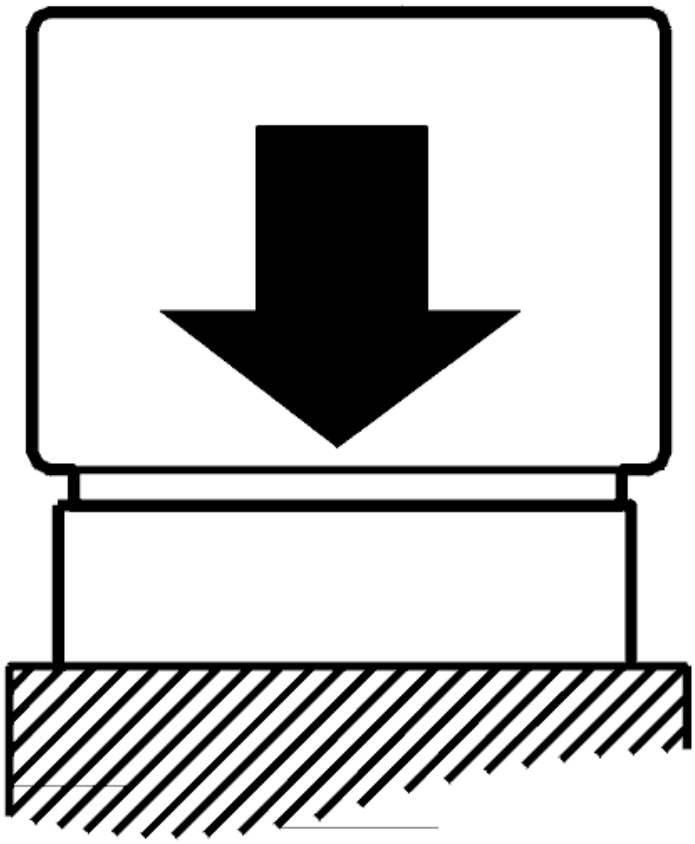


Fig. 275: Identifying Connecting Control Module
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Transmission control module (TCM) connected.
- Transmission connector disconnected
- Ignition on
- Gear selector in position P
- Activate and read off the status of solenoid S2.

  Connect a voltmeter between terminals #B8 (#A68) and #A53 (#A53) while activating solenoid S2. The voltage must be approximately 0 V when the solenoid is not activated (OFF) and above 9 V when the solenoid is activated (ON).

The control module is OK if the voltage changes as above when the solenoid is activated/not activated. The control module is defective if the voltage does not change.

NOTE: If the system voltage is too low this may result in a low voltage value when solenoid S2 is activated. Check the system voltage and remedy as necessary.

NOTE: When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids and the temperature sensor etc.

Other information:

- To disconnect the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION** .

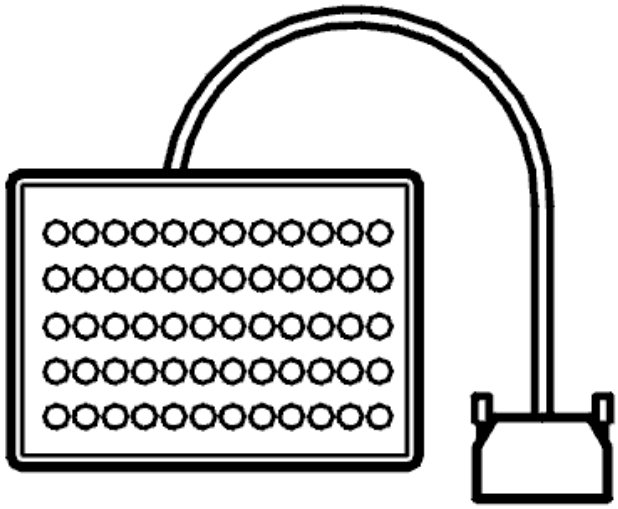


Fig. 276: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

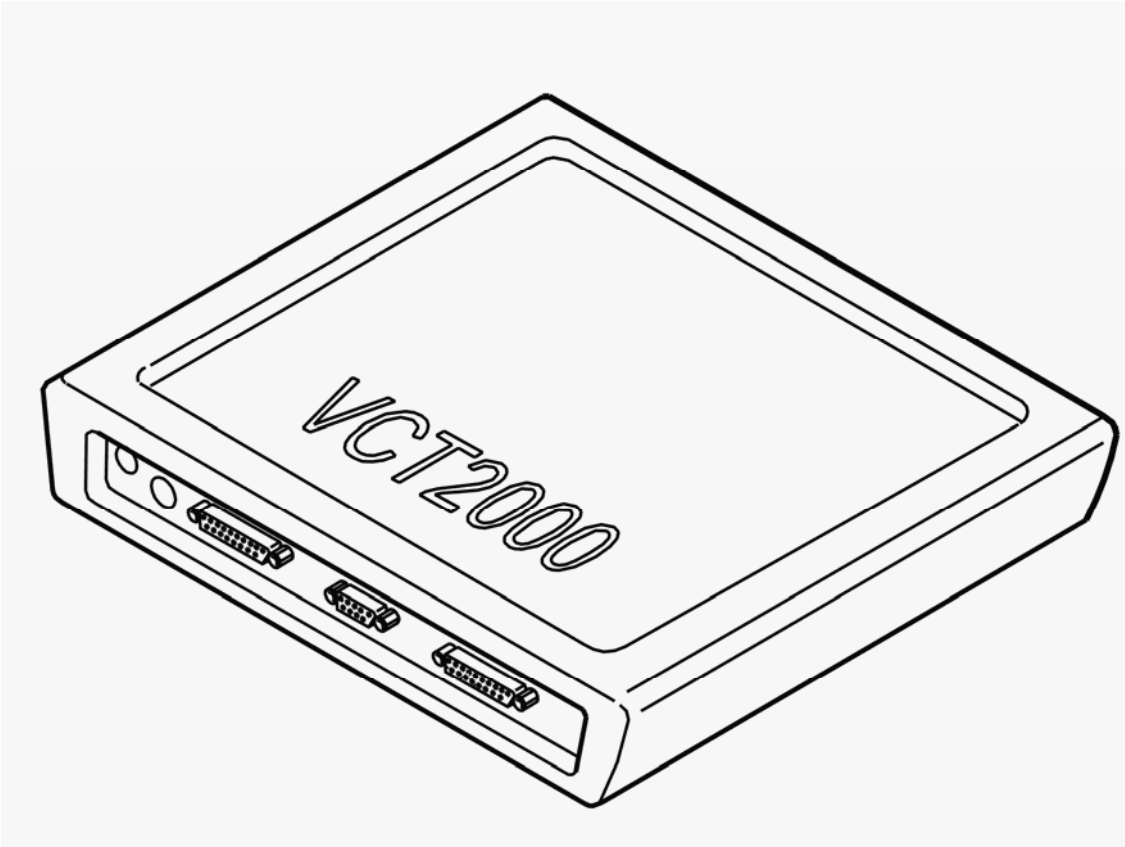


Fig. 277: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the control module defective?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

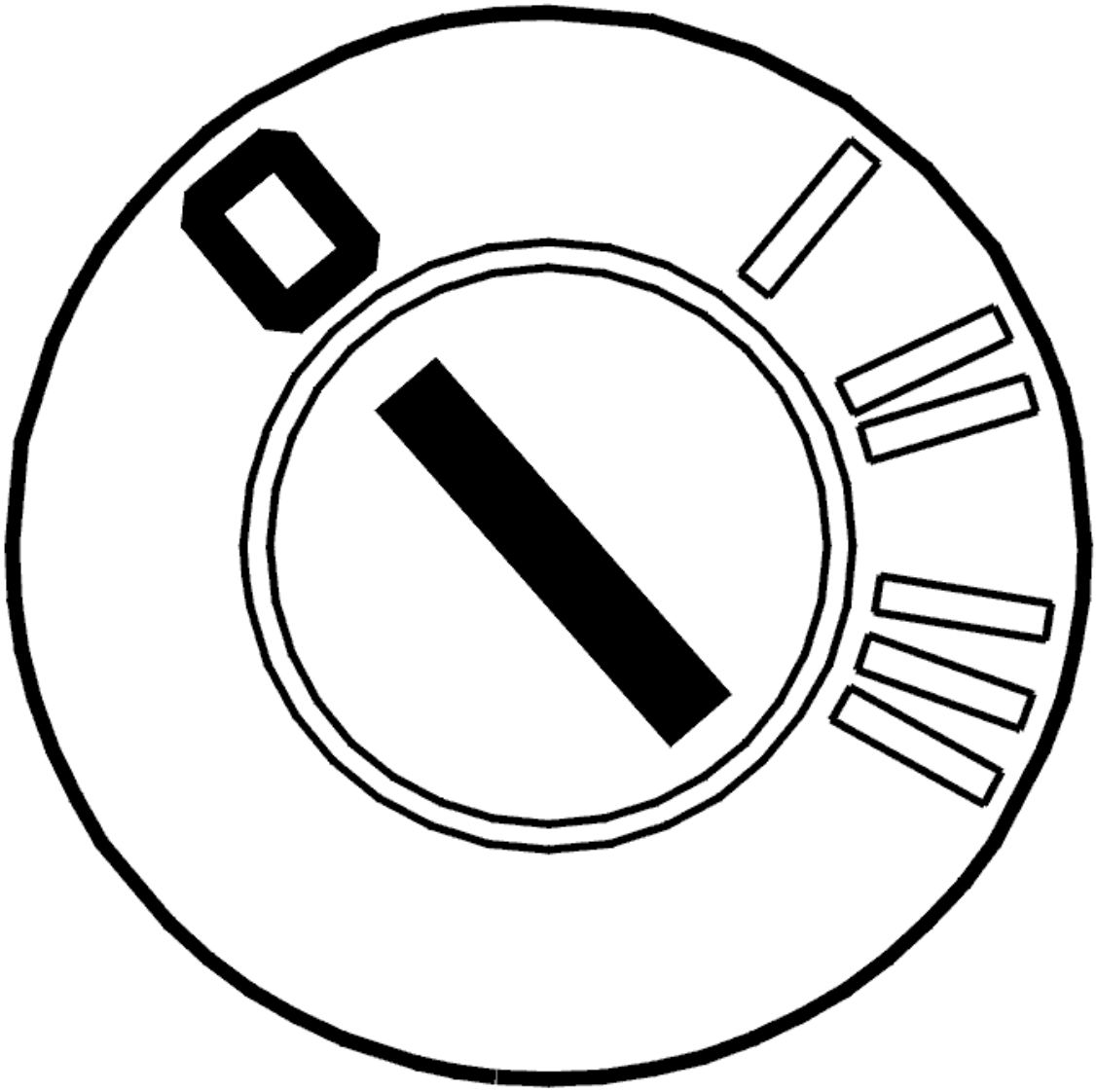


Fig. 278: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission connector (transmission side) terminal #B (#A2) and solenoid S2 terminals #A and #E (#A5) and solenoid S2 terminal #B. Check for a short-circuit to supply voltage.

  Check all the cables in the wiring harness from the transmission connector to the transmission components. Check for a short-circuit to each other.

  HINT: Check solenoid S2 by measuring the solenoid resistance between terminals #A and #B. The resistance must be between 18 and 25 ohms.

  Remedy as necessary.

Other information:

- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** To install, see
- To replace solenoid S2, see **SOLENOID SHIFTING 2-3, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

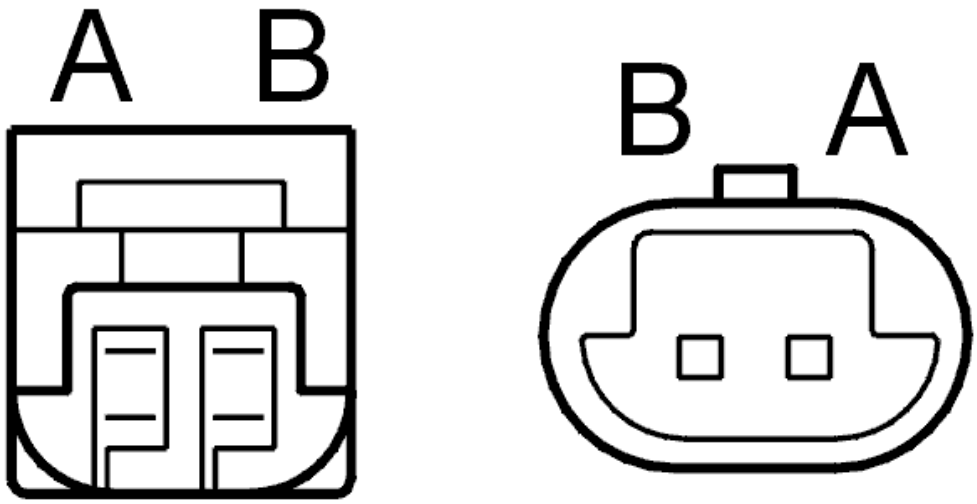


Fig. 279: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

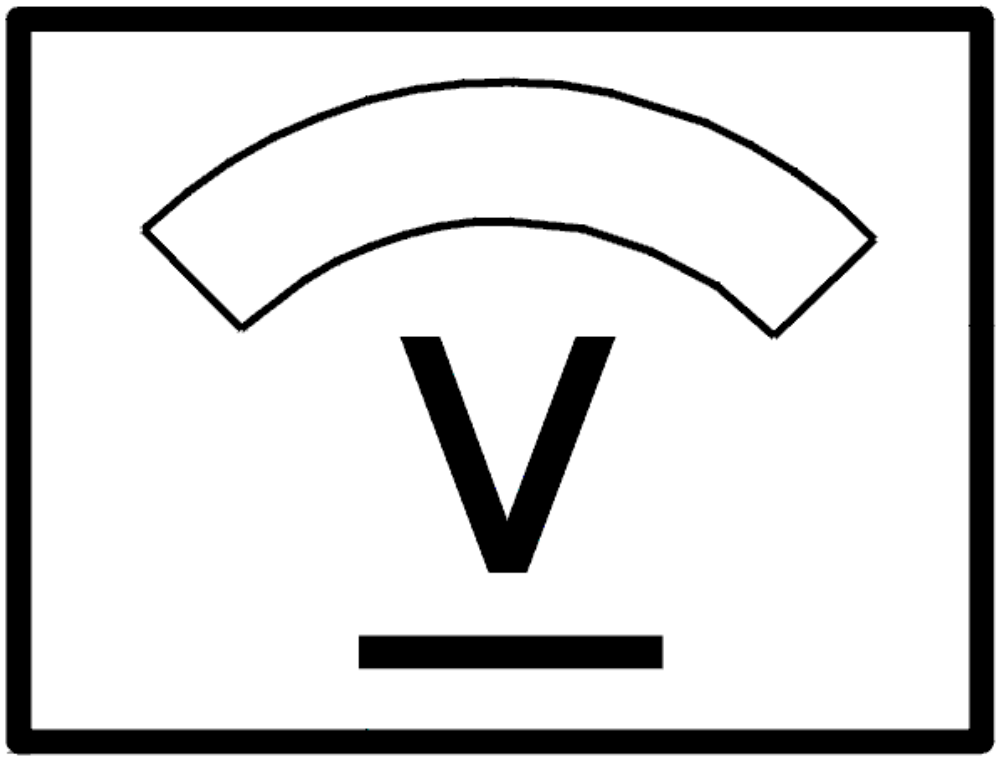


Fig. 280: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the cable between control module terminal #A68 (#B8) and transmission connector terminal #B (#A2) (control module side). Check for an intermittent short-circuit to supply voltage.

Check the cable between control module terminal #53 (#A53) and transmission connector terminal #E (#A5) (control module side). Check for an intermittent short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box to the control module, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid S2, see **SOLENOID SHIFTING 2-3, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

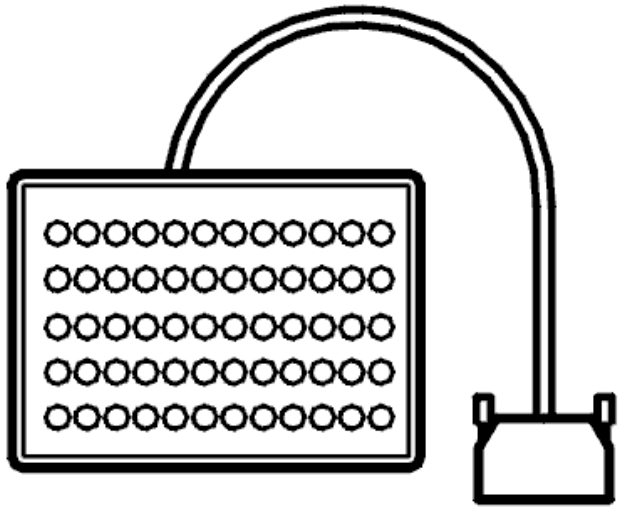


Fig. 281: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

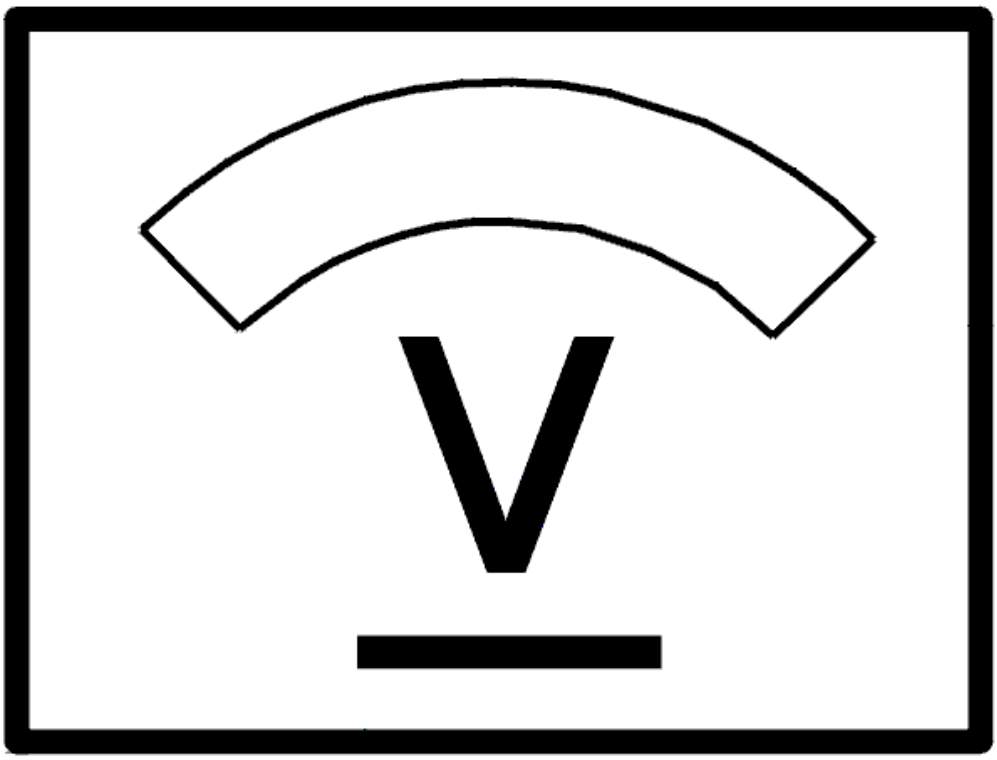


Fig. 282: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

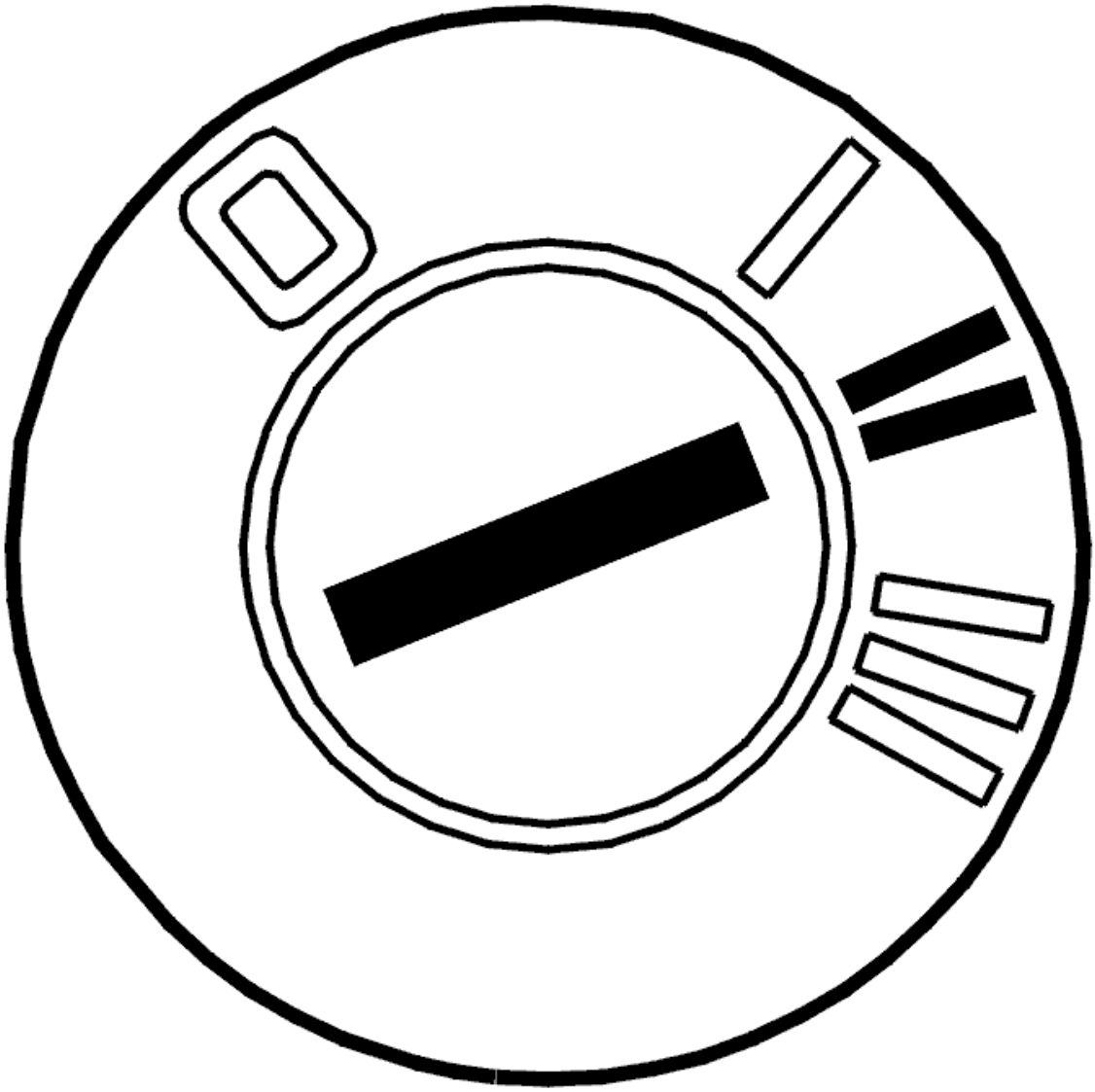


Fig. 283: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

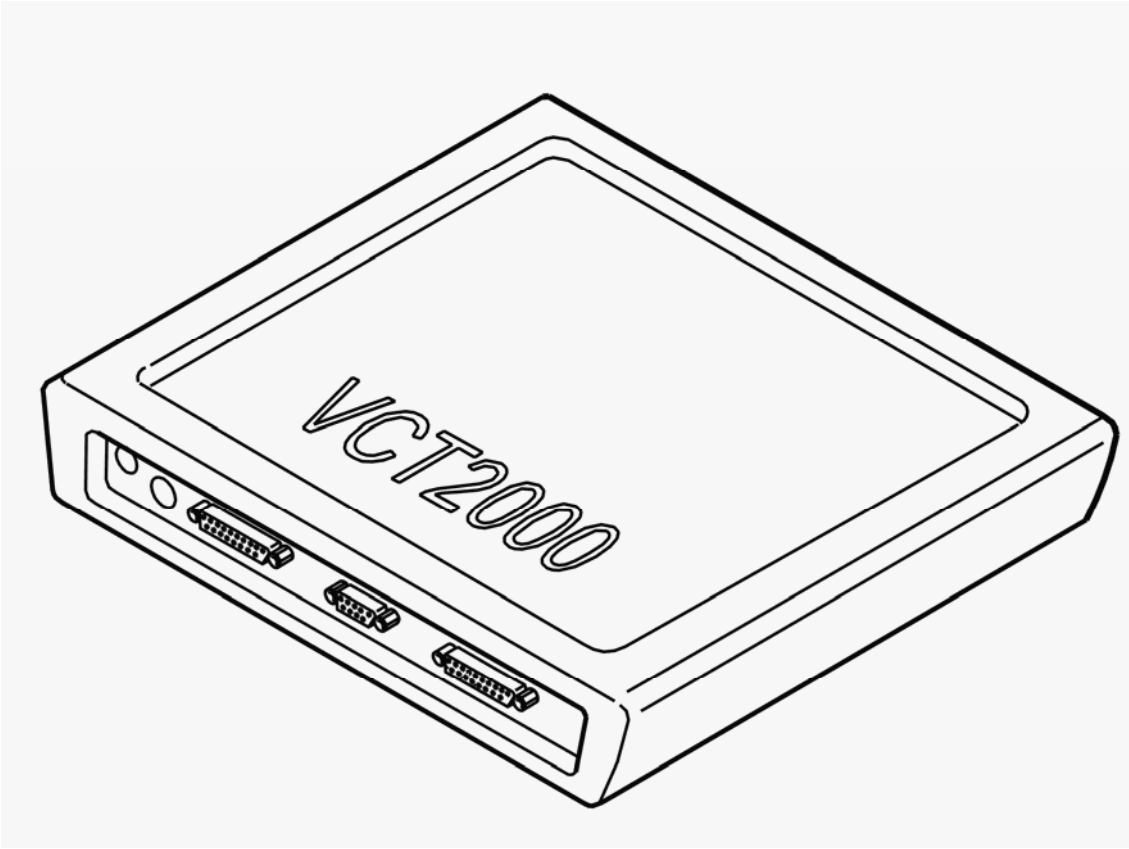


Fig. 284: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

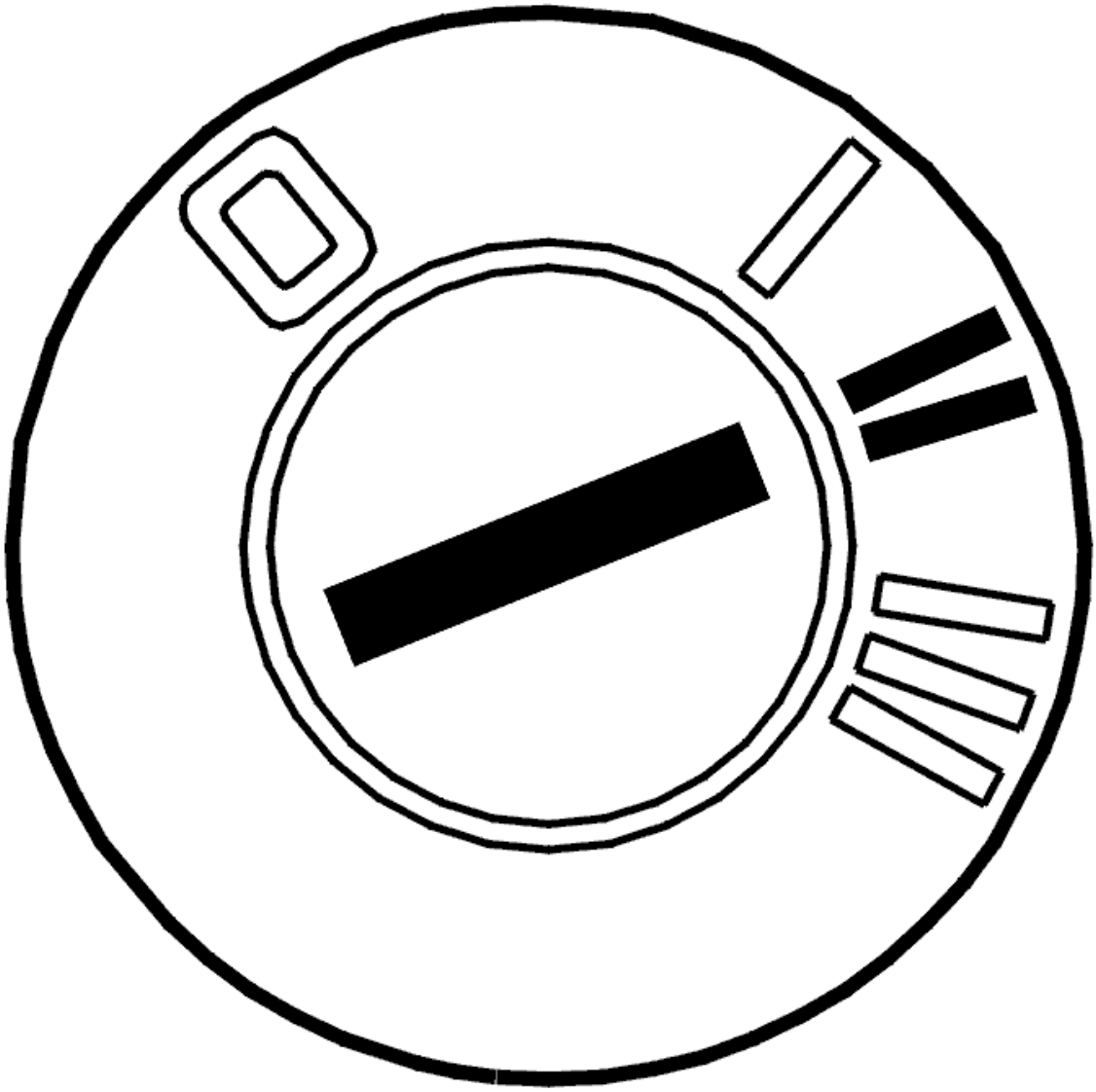


Fig. 285: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

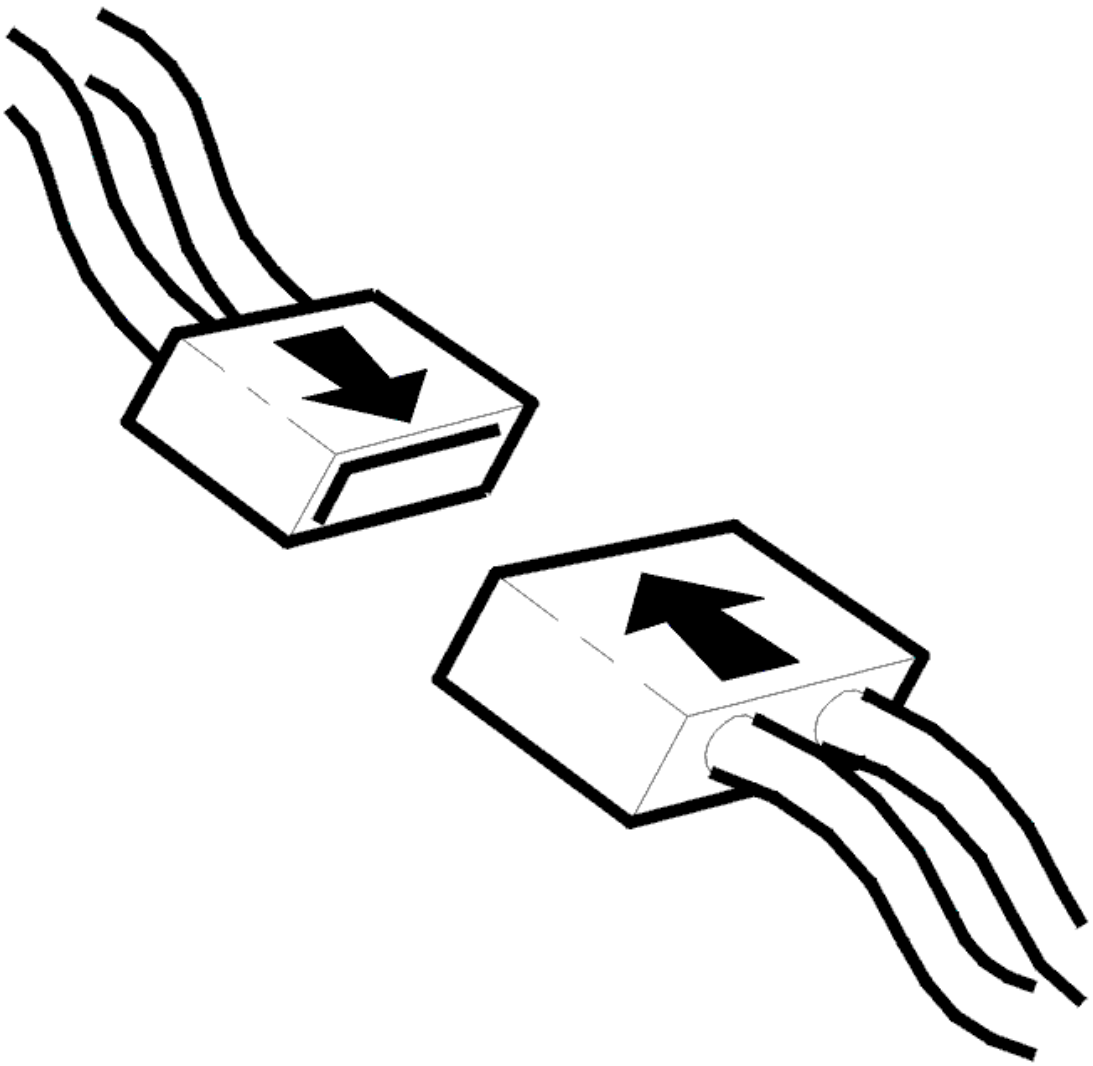


Fig. 286: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Wait at least 90 seconds.
- Reconnect the connectors, reinstall components etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S2.

The value should change between OFF and ON.

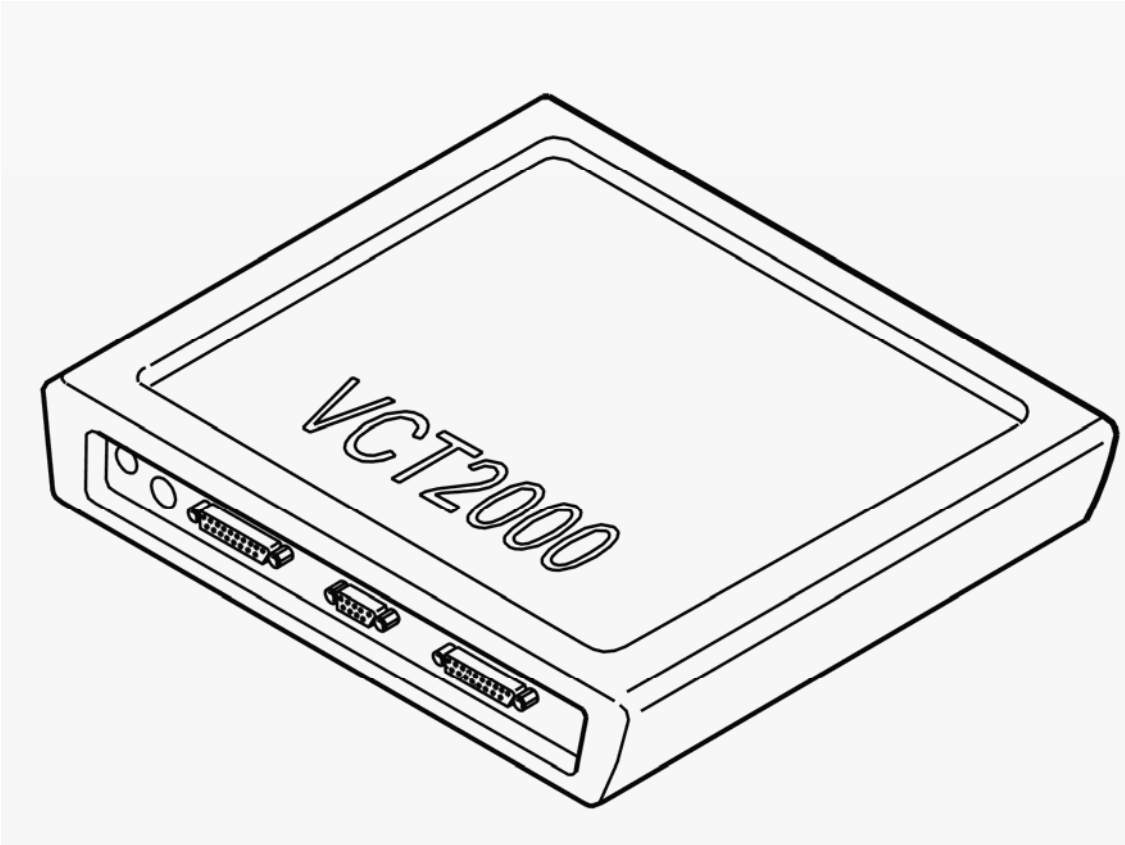


Fig. 287: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

SIGNAL TOO HIGH

CHECKING THE FUNCTION OF THE OIL TEMPERATURE SENSOR

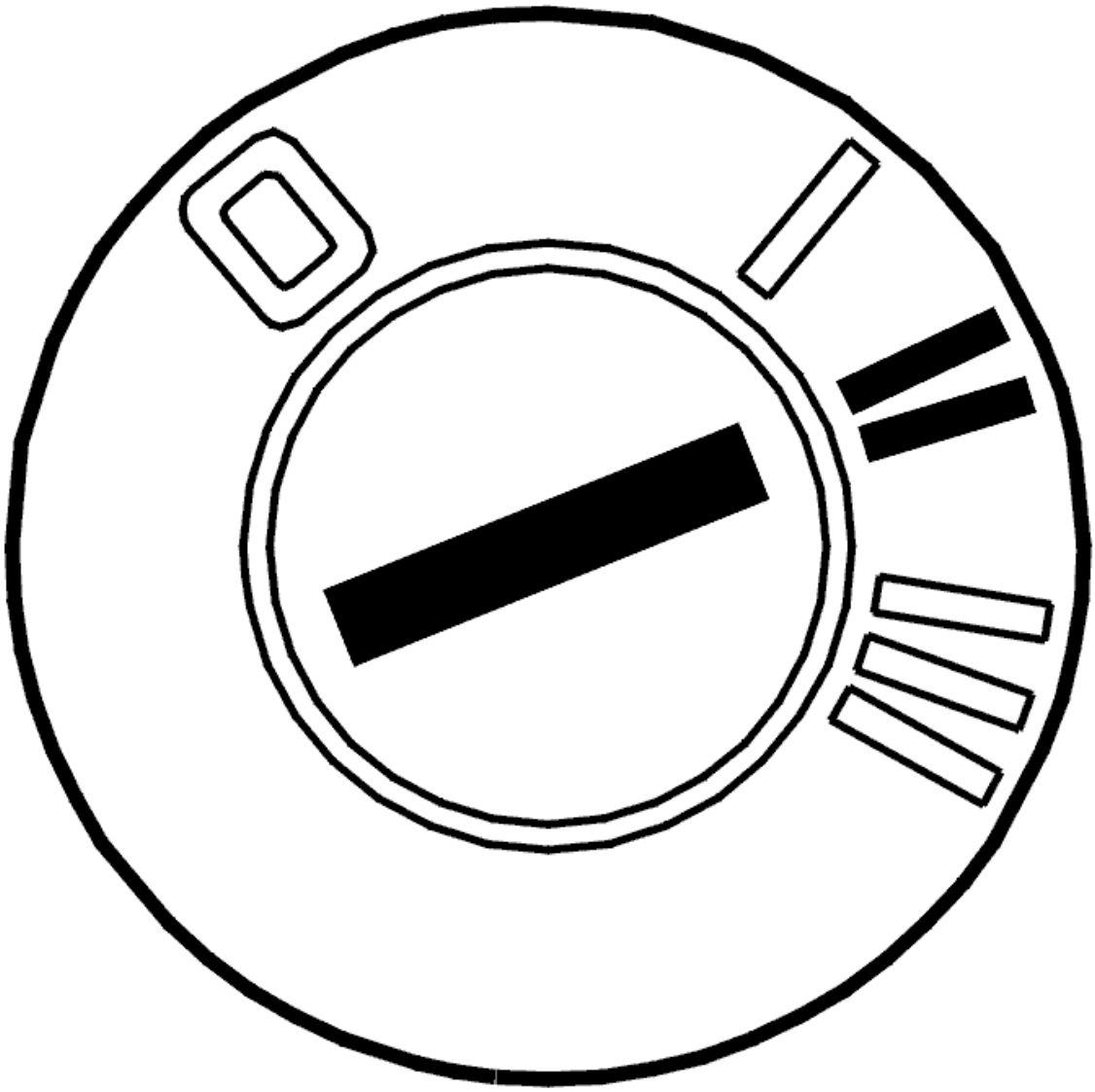


Fig. 288: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

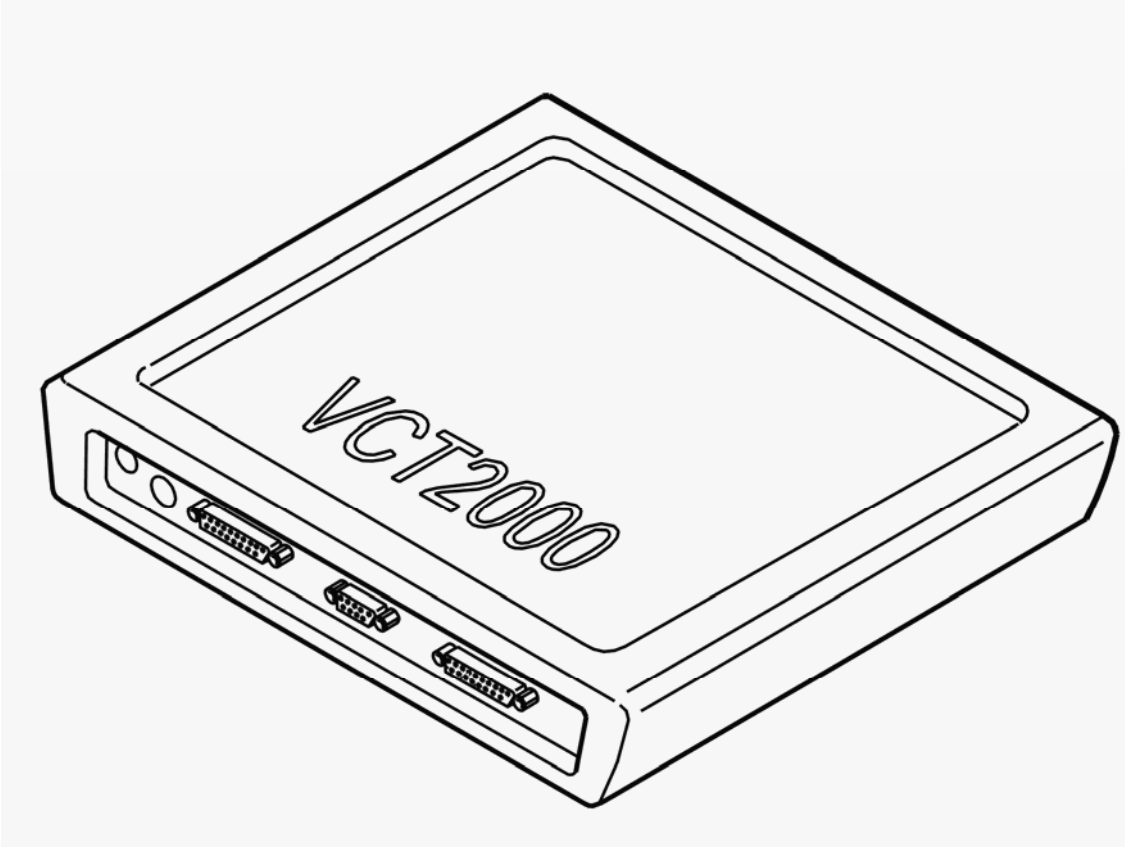


Fig. 289: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

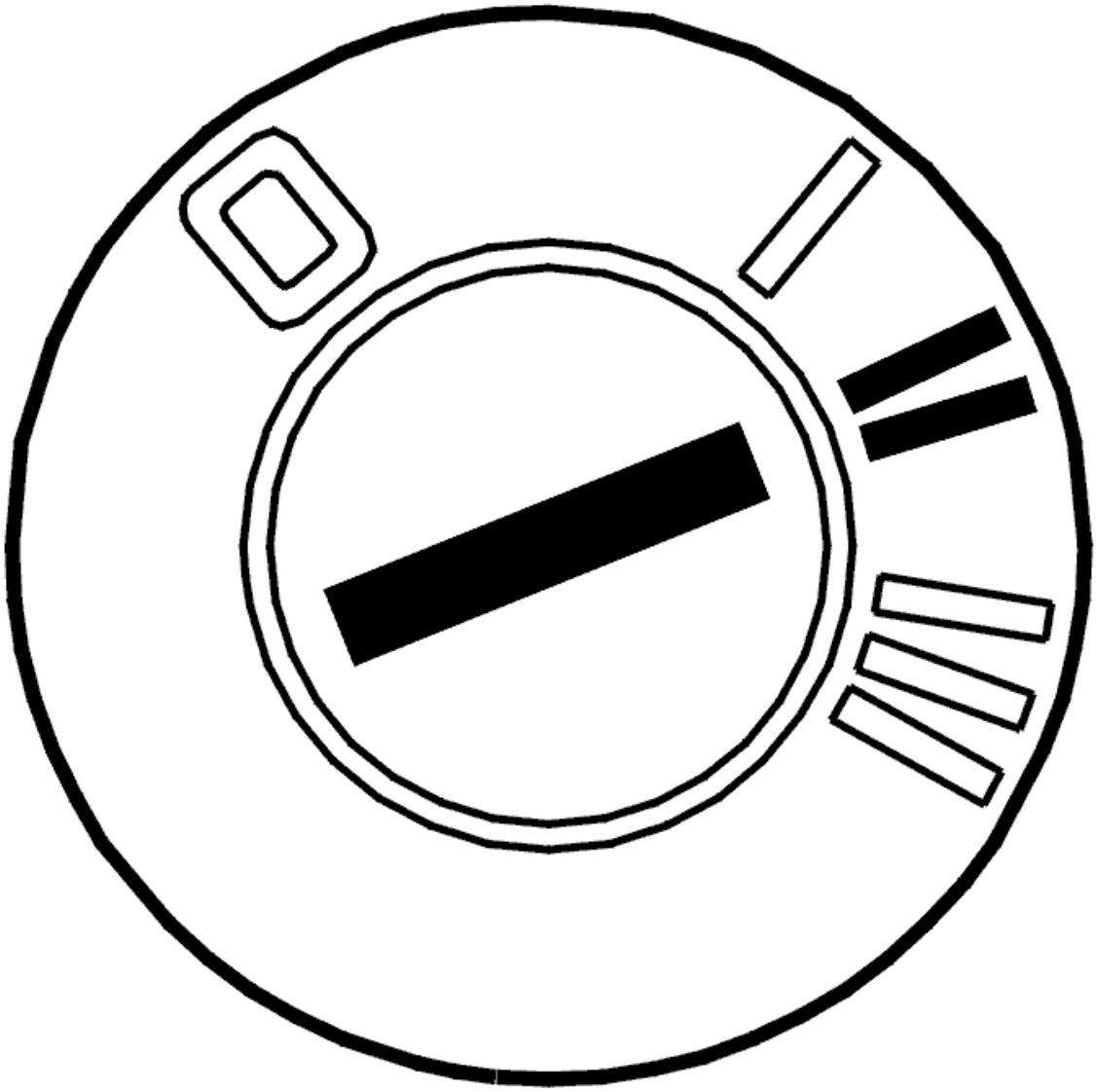


Fig. 290: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

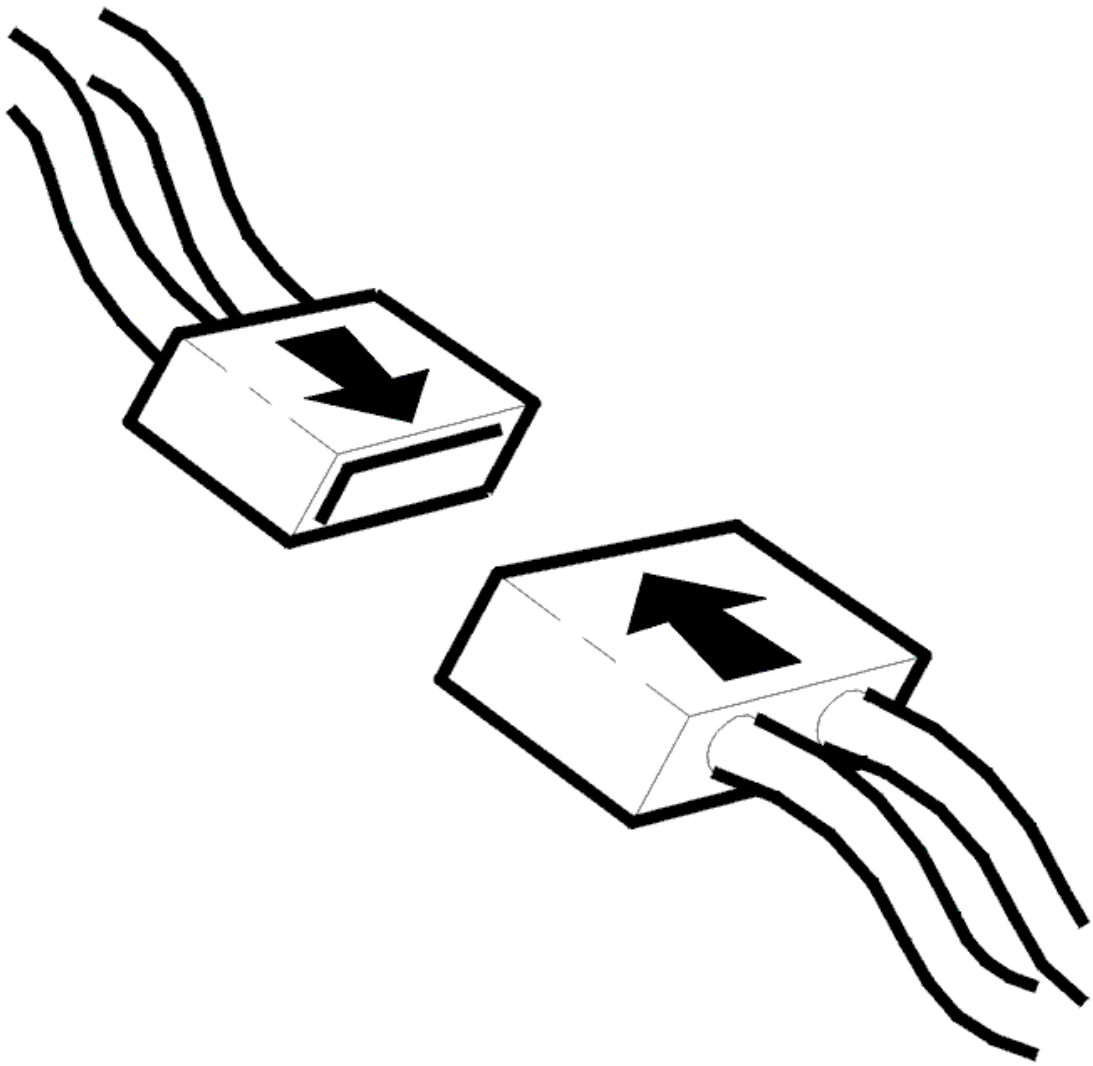


Fig. 291: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and transmission connectors. Check for contact resistance and oxidation
- Reconnect the control module and transmission connectors
- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

  If the transmission temperature is within its permitted range, the cause of the fault was contact resistance or oxidation in the control module or transmission connector.

Other information

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- see **CHECKING WIRING AND TERMINALS**

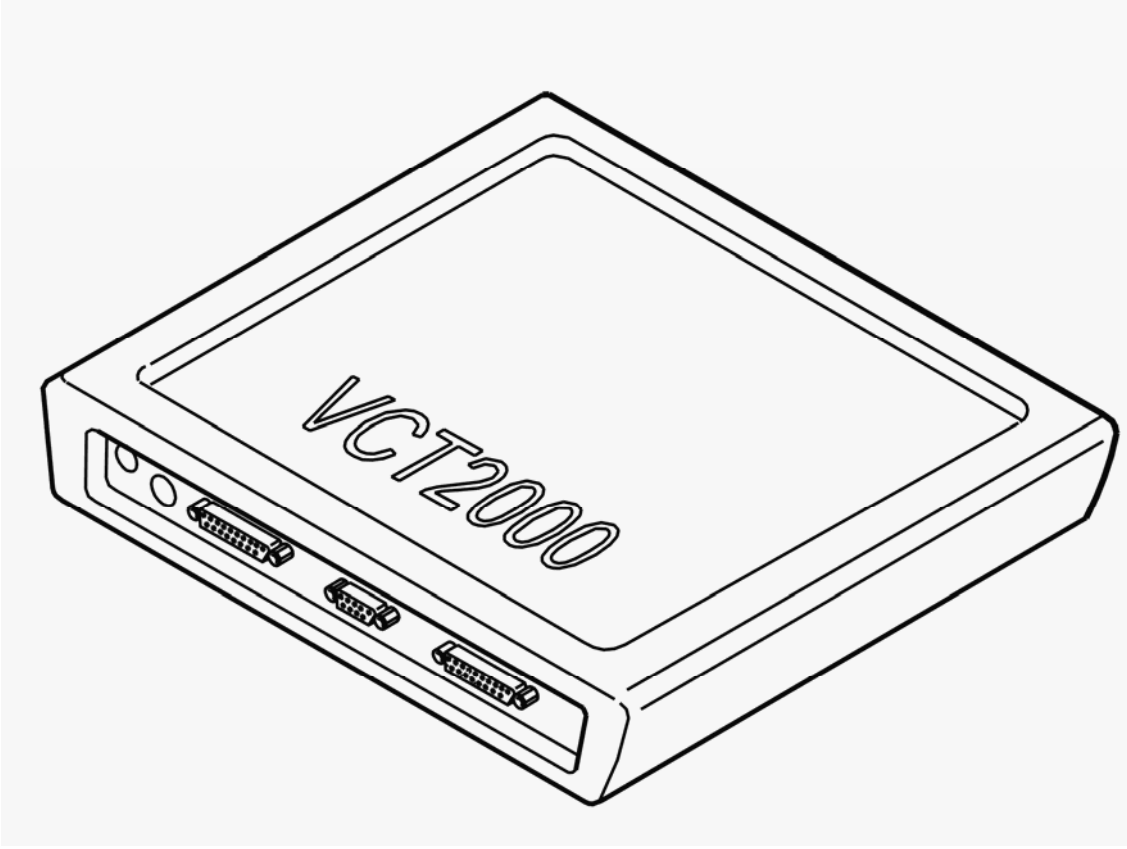


Fig. 292: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING THE TEMPERATURE SENSOR**

CHECKING THE TEMPERATURE SENSOR

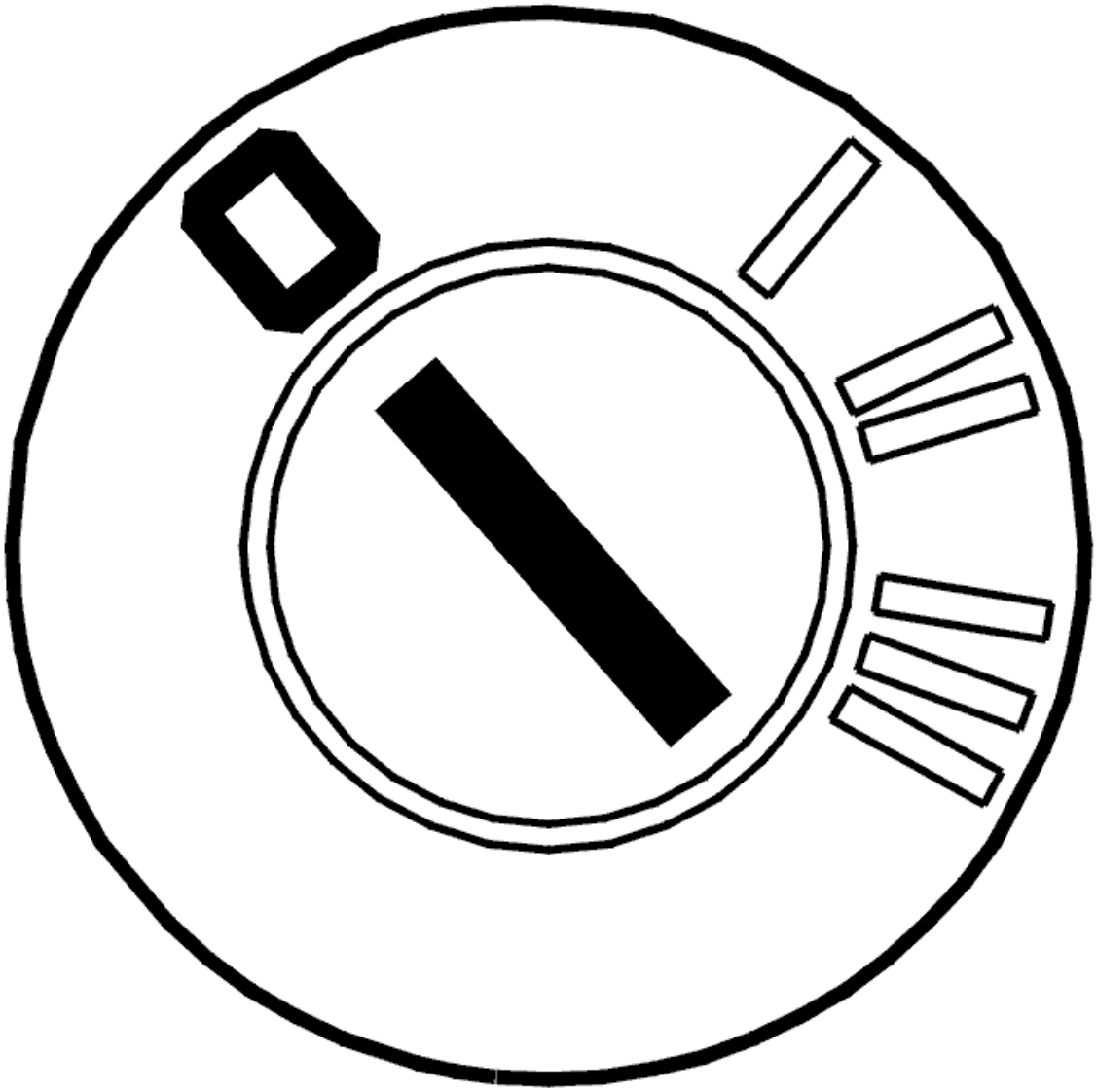


Fig. 293: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector
- Connect adapter see **9511505** and see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals #L (terminal #A11) and #M (terminal #A12).

  The resistance must be 3.4-3.6 kohms at 20 °C.

  Other information

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - For information about signals, see **SIGNAL SPECIFICATION**

- For information about the resistance values, see **COMPONENT RESISTANCE VALUES**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES** .

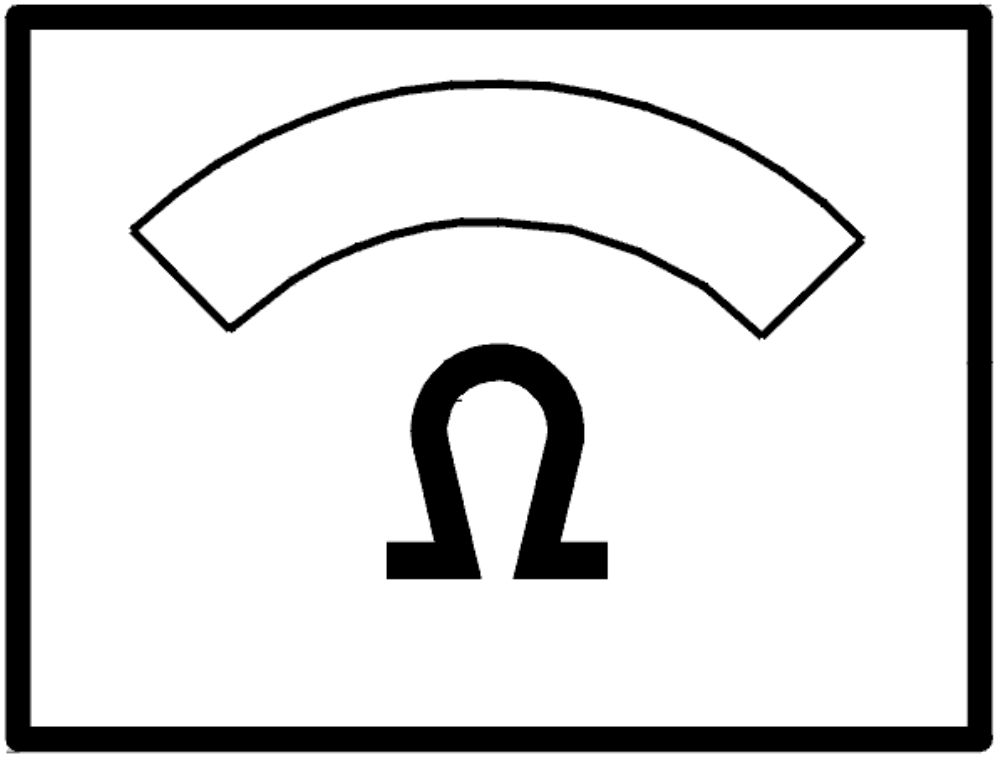


Fig. 294: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

- Breakout box connected to the control module
- Breakout box connected to the transmission connector.

Check the cable between control module terminal #37 (#A37) and transmission connector (control module side) terminal #L (#A11). Check for an open-circuit. Check for a short-circuit to supply voltage.

Check the cable between control module terminal #55 (#A55) and transmission connector (control module side) terminal #M (#A12). Check for an open-circuit. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

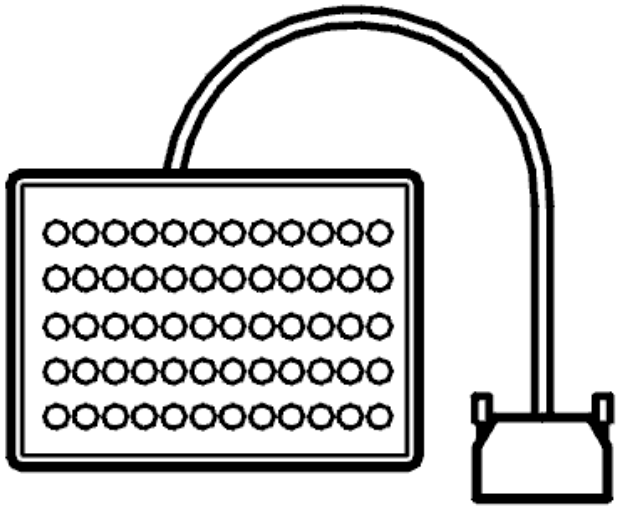


Fig. 295: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

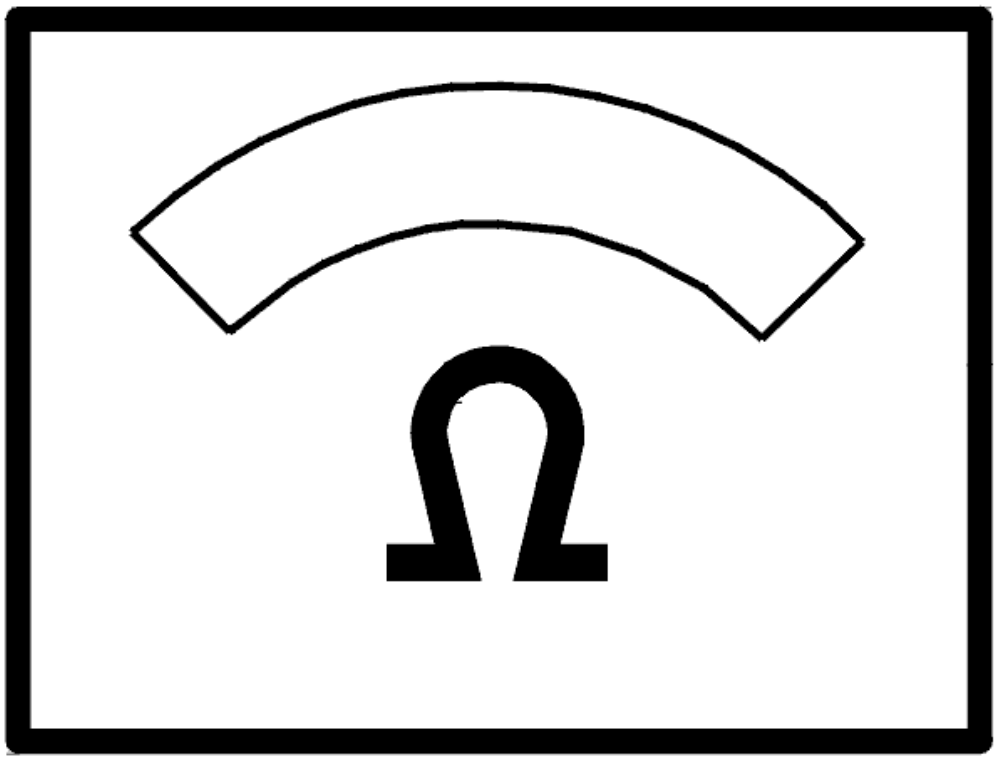


Fig. 296: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

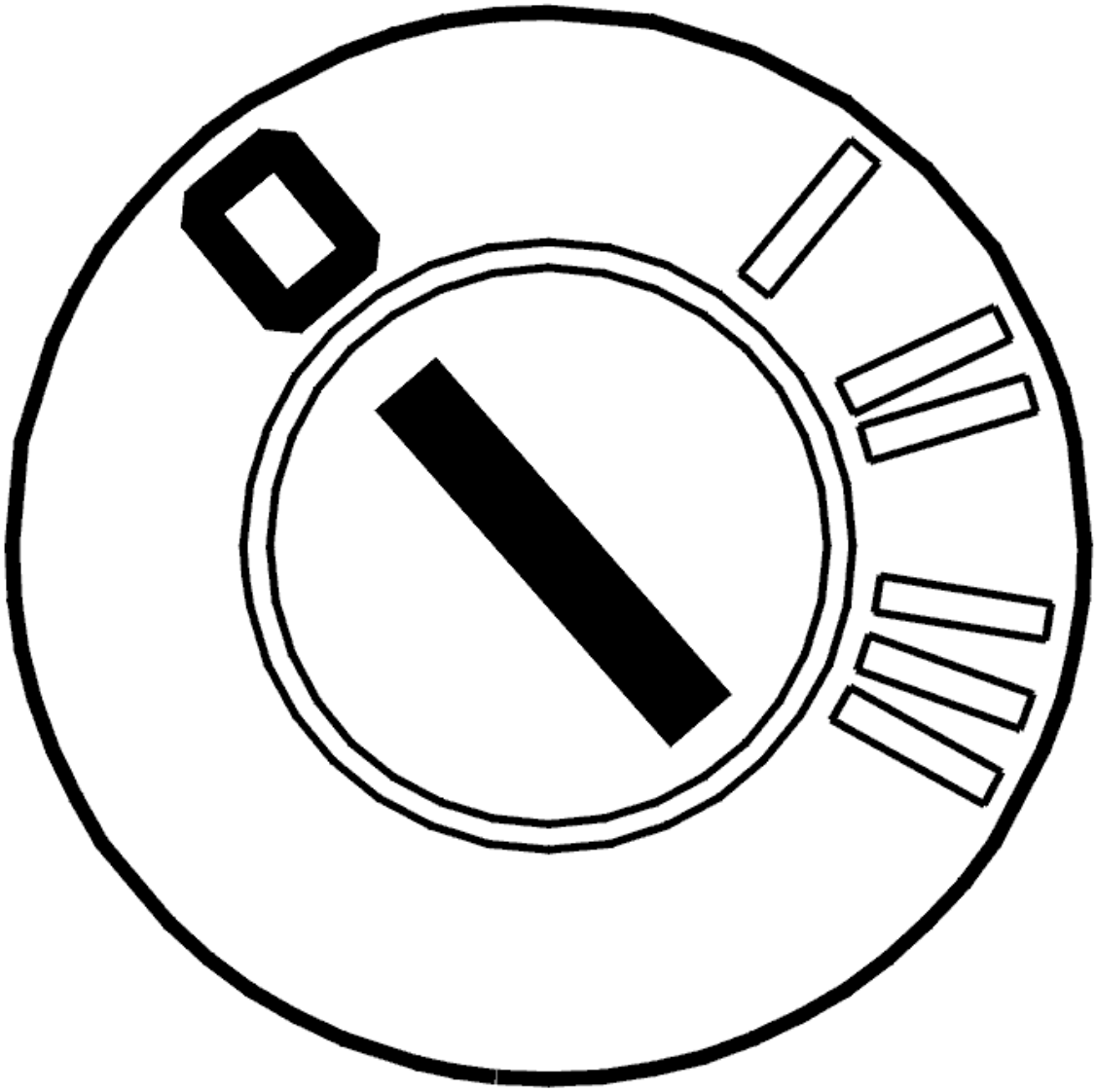


Fig. 297: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission terminal #L (#A11) and temperature sensor terminal #A. Check for an open-circuit. Check for a short-circuit to supply voltage.

  Check the cable between transmission terminal #M (#A12) and temperature sensor terminal #B. Check for an open-circuit. Check for a short-circuit to supply voltage.

  HINT: Check the temperature sensor by measuring the resistance between temperature sensor connector terminals #A and #B. The resistance must be between 3.5-3.6 kohms at 20° C.

  Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- To replace the temperature sensor, see **TEMPERATURE SENSOR FLUID TRANSMISSION, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES**
- see **CHECKING WIRING AND TERMINALS**

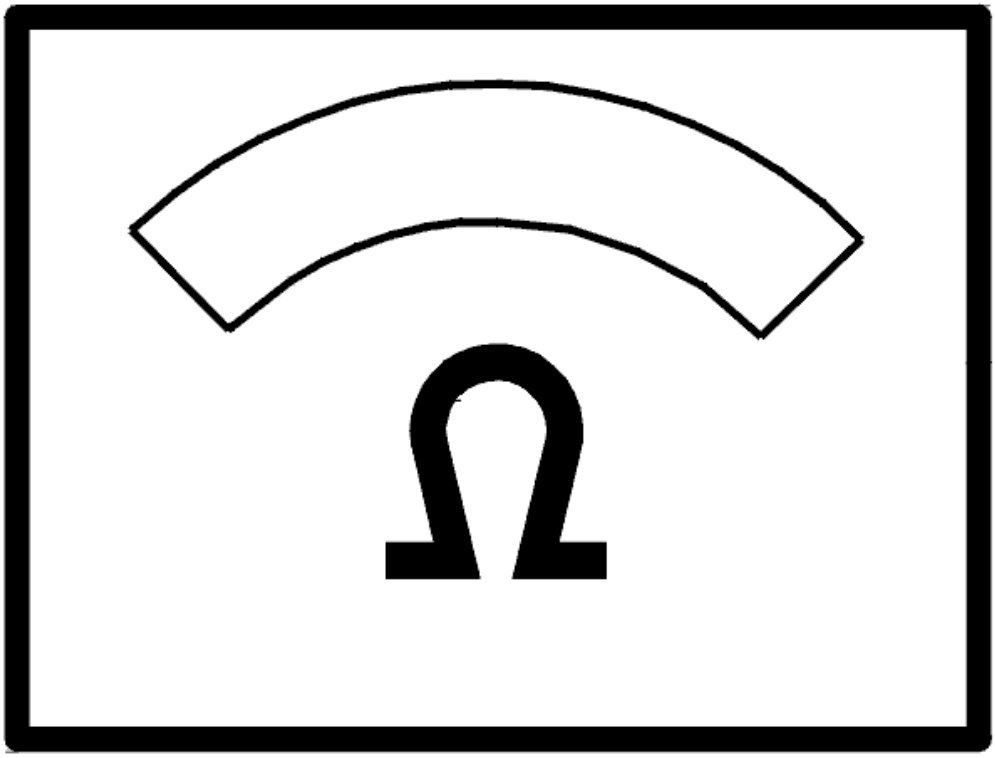


Fig. 298: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the control module and automatic transmission connector. Check for contact resistance and oxidation. Remedy if necessary.

Check the cable between control module terminal #A37 (#A37) and transmission connector (control module side) terminal #11. Check for an intermittent open-circuit. Check for an intermittent short-circuit to supply voltage.

Check the cable between control module terminal #A55 (#A55) and transmission connector (control module side) terminal #12. Check for an intermittent open-circuit. Check for an intermittent short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

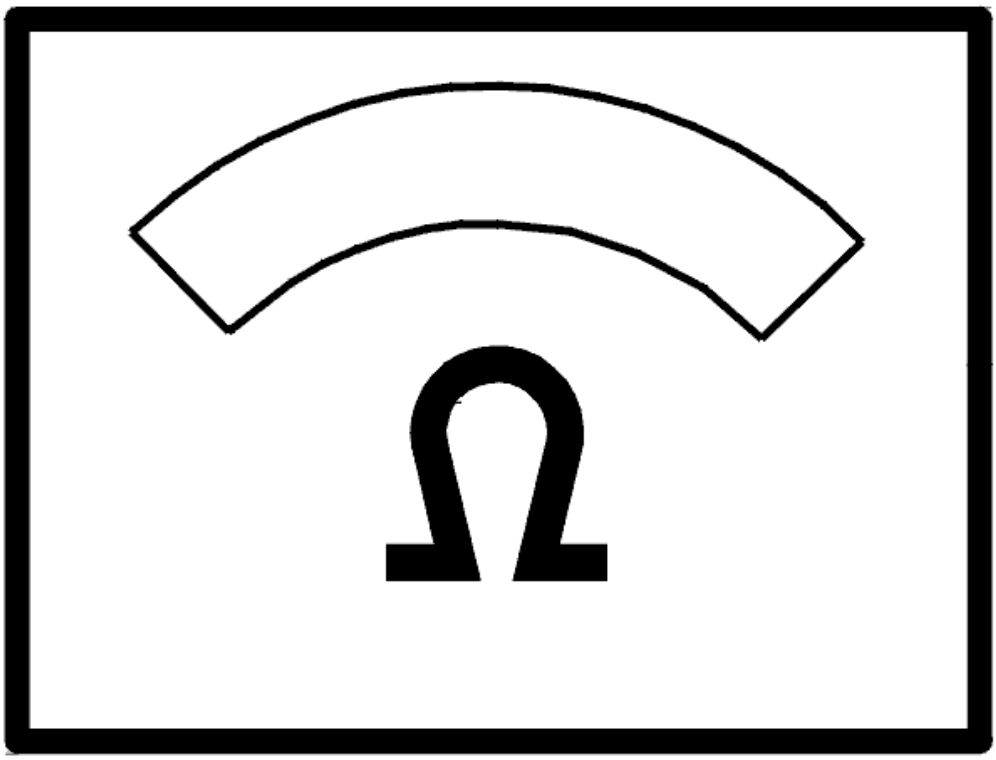


Fig. 299: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

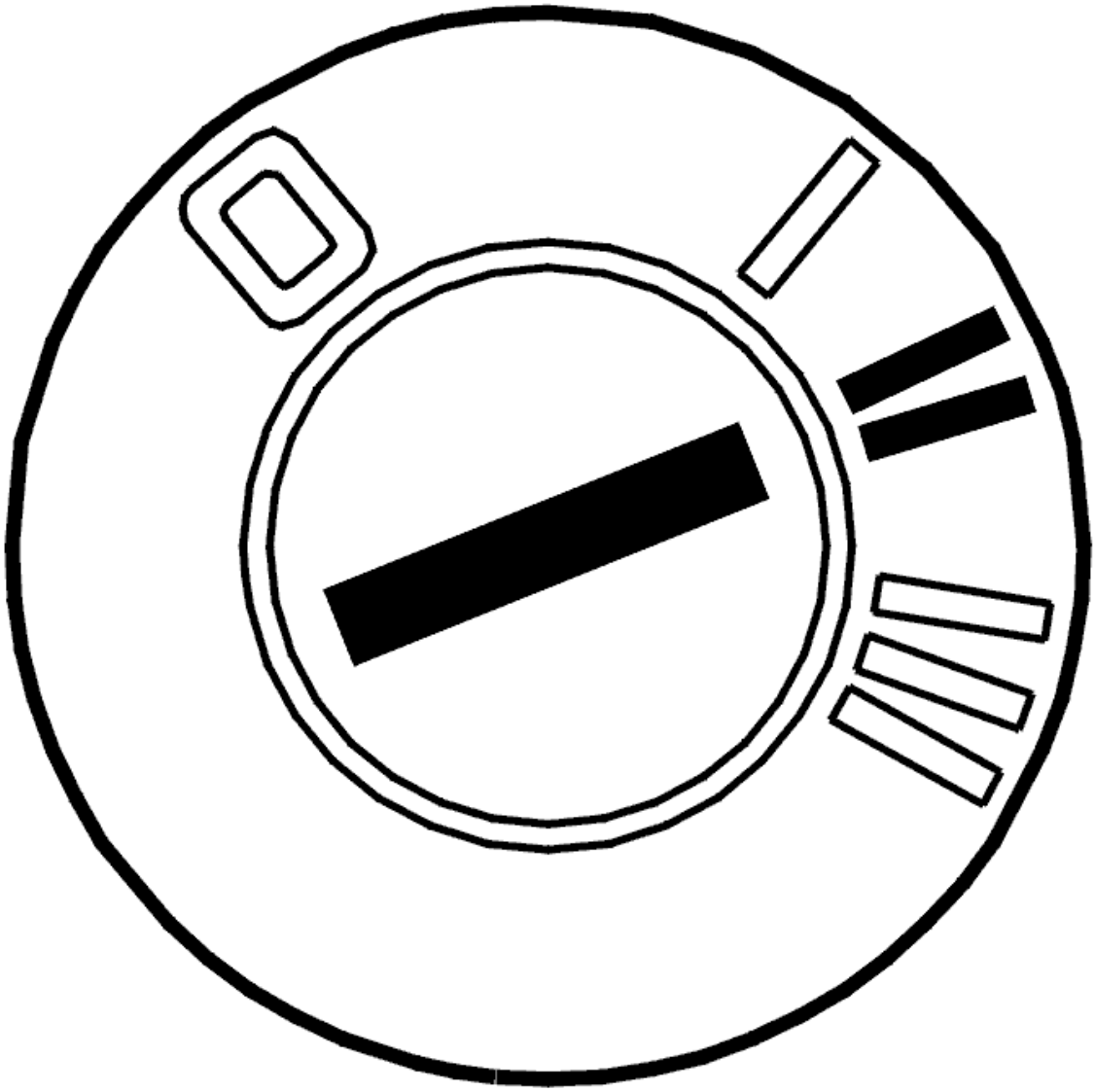


Fig. 300: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

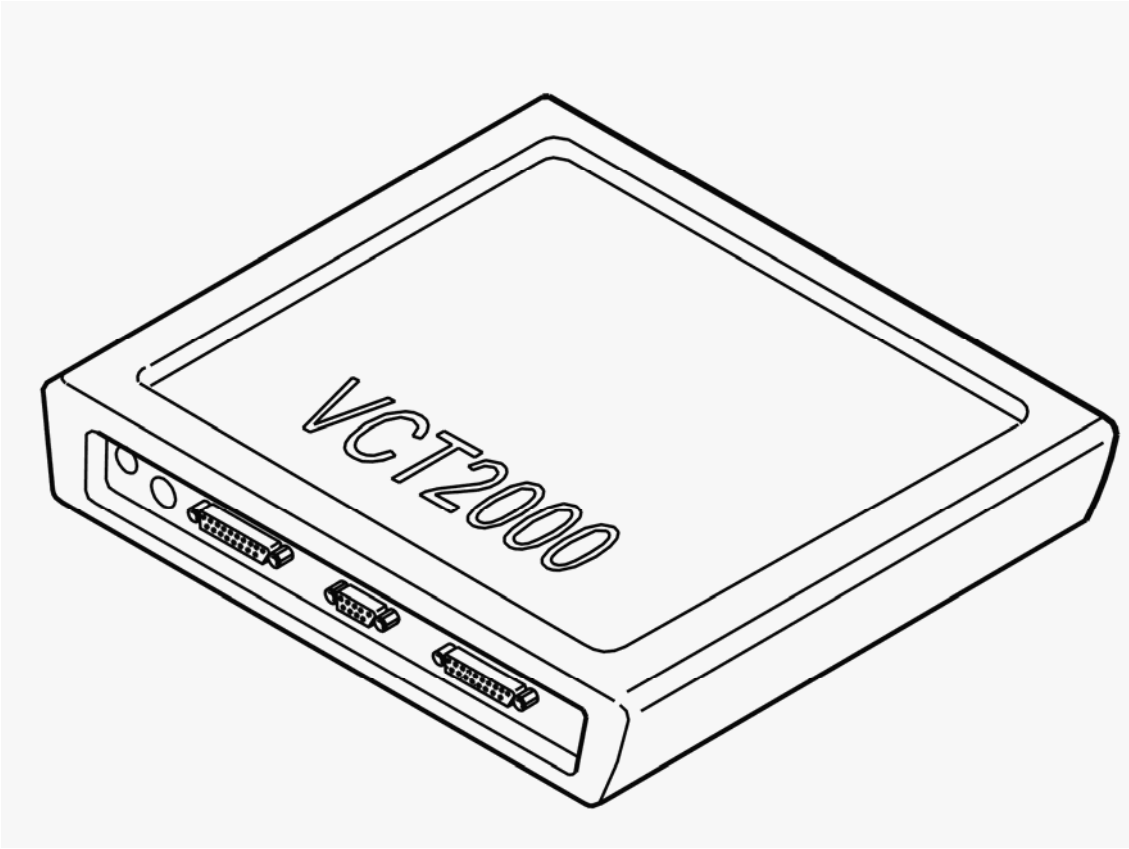


Fig. 301: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair check that the fault has been remedied.

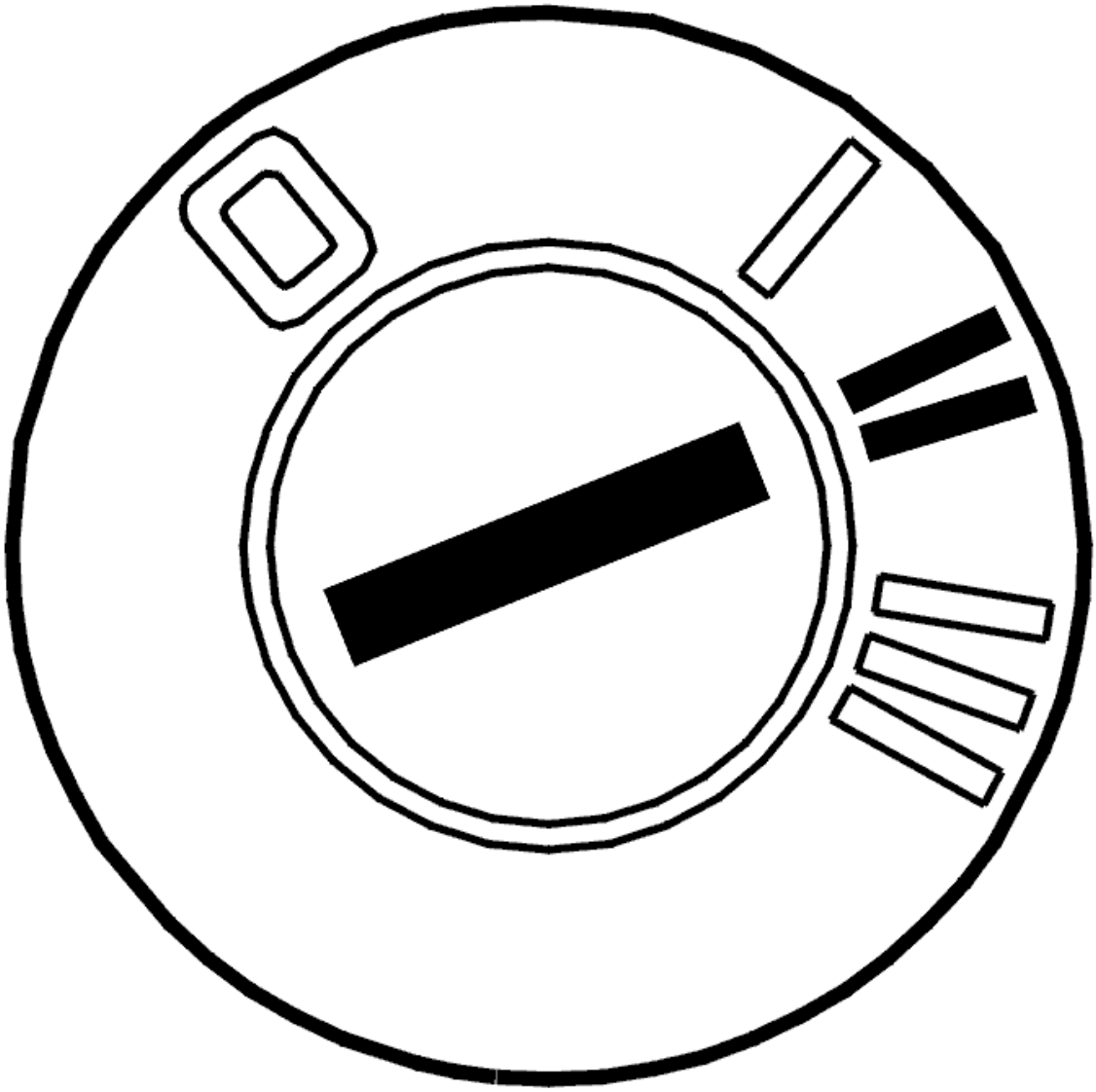


Fig. 302: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

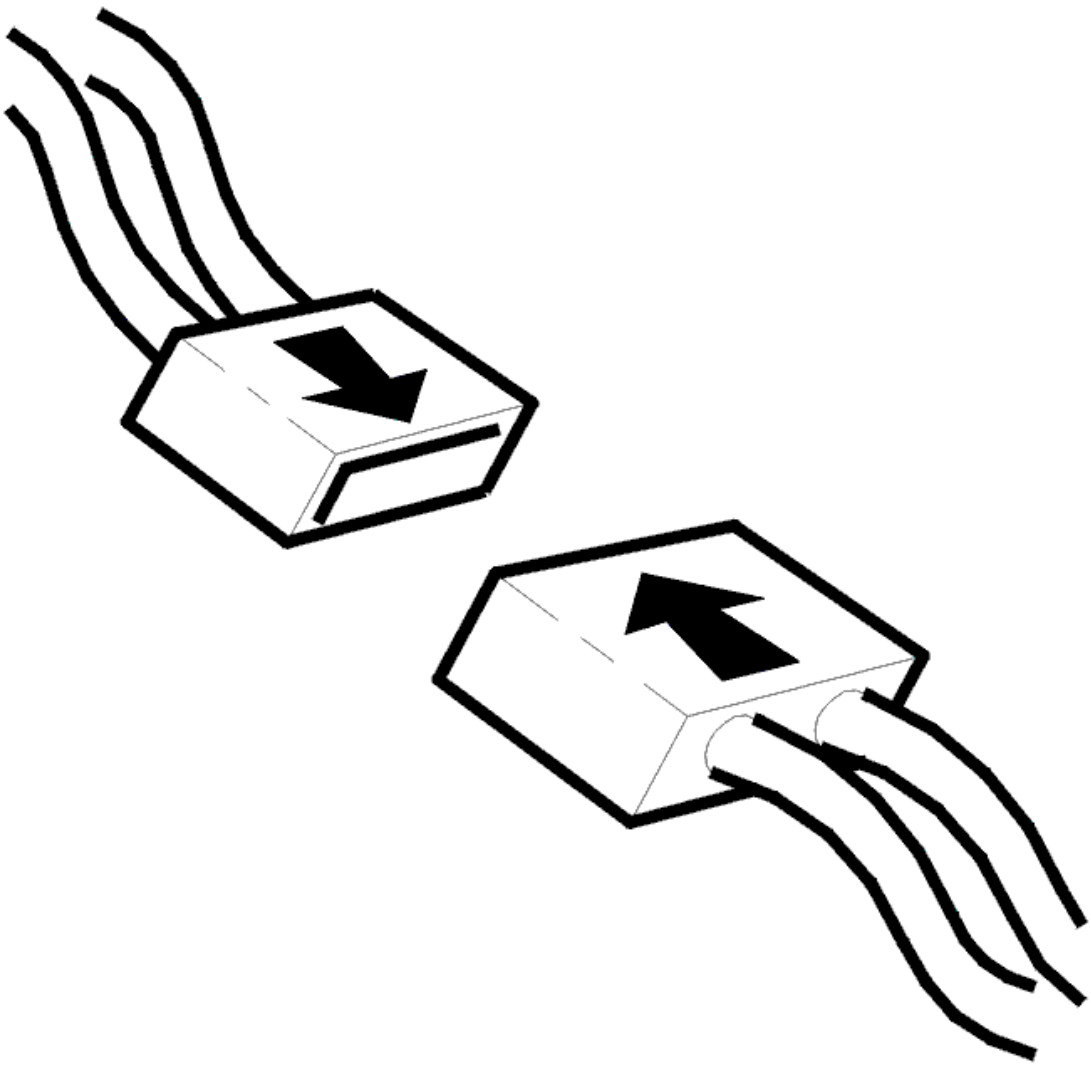


Fig. 303: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.
- Read off oil temperature.

  Check that the transmission oil temperature is within its permitted range. Compare with the transmission temperature.

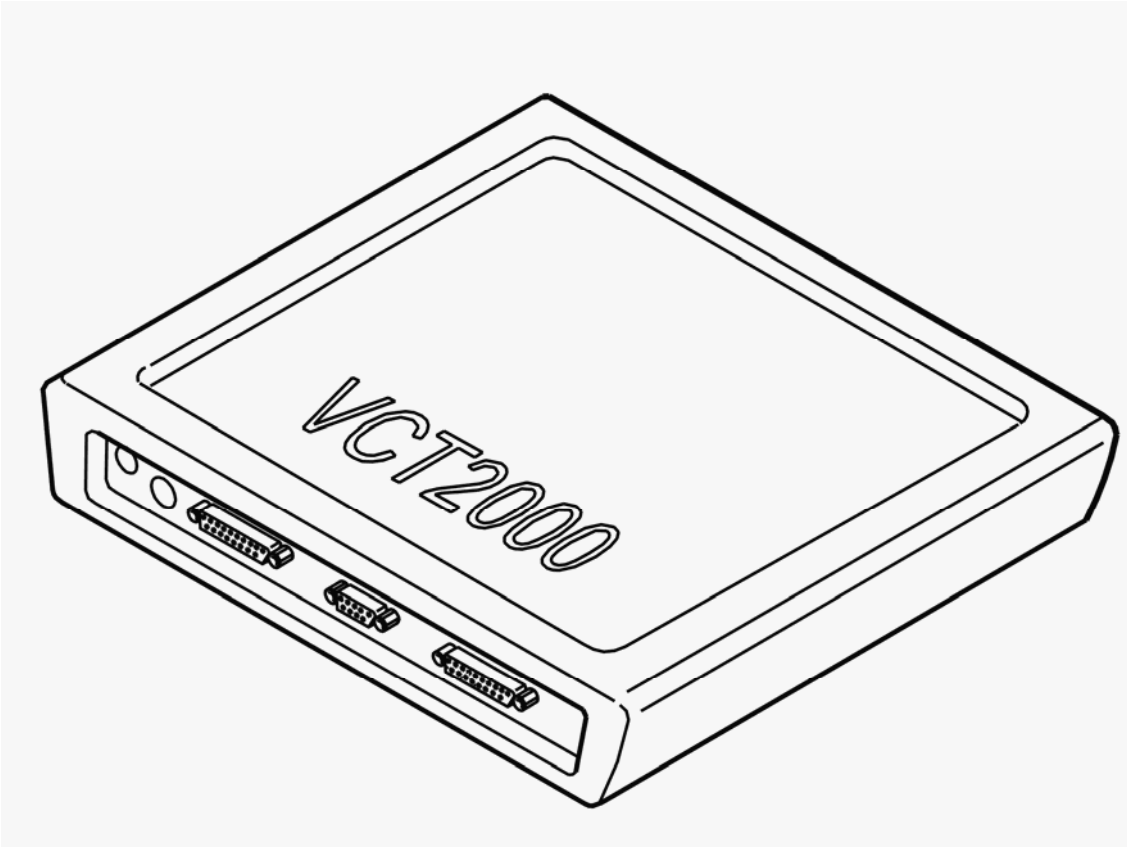


Fig. 304: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-0007: SHIFT SOLENOID S2. SIGNAL TOO HIGH (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL TOO HIGH

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

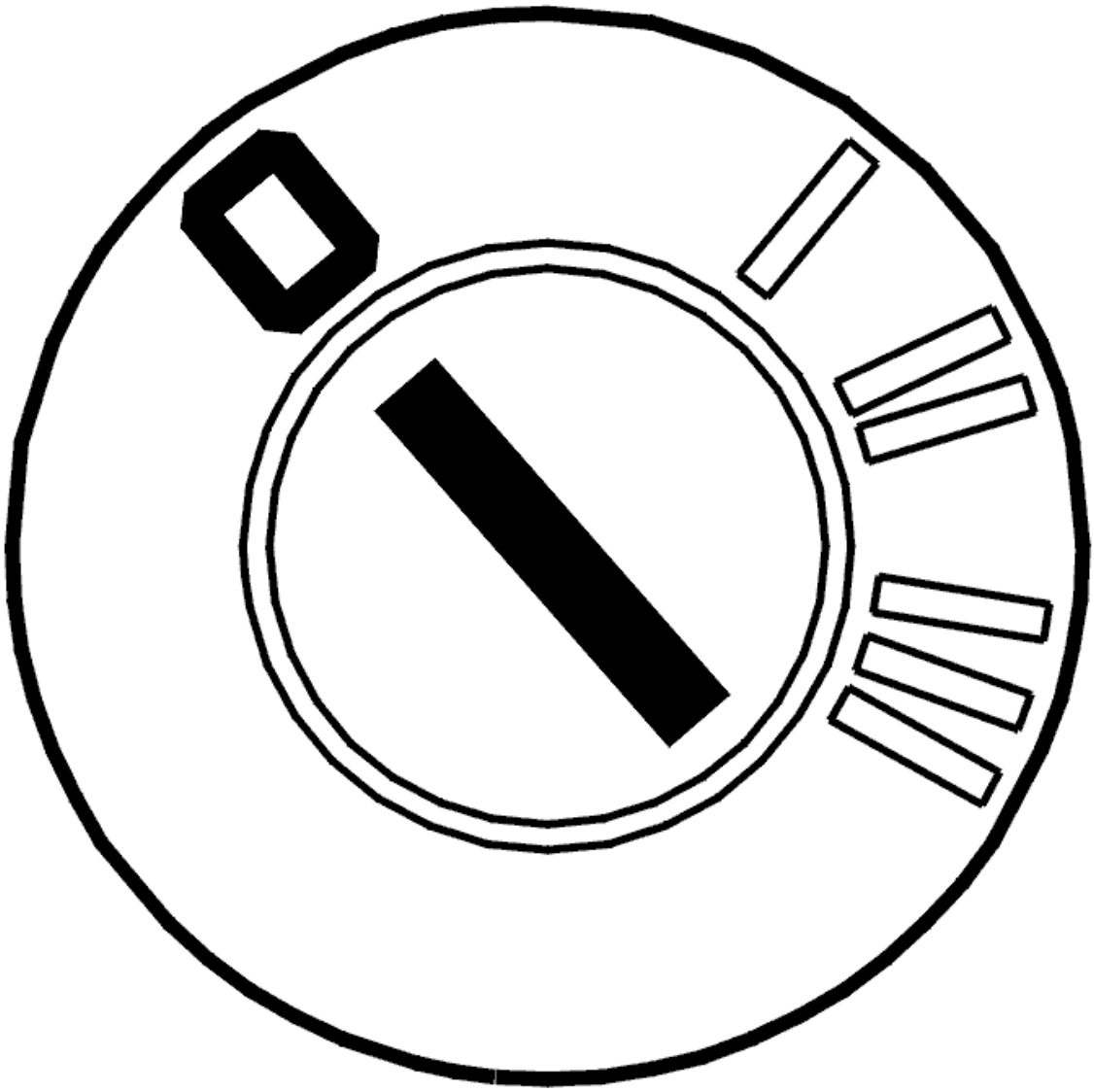


Fig. 305: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

NOTE: If the temperature is outside its permitted range, fault-trace the

temperature sensor.

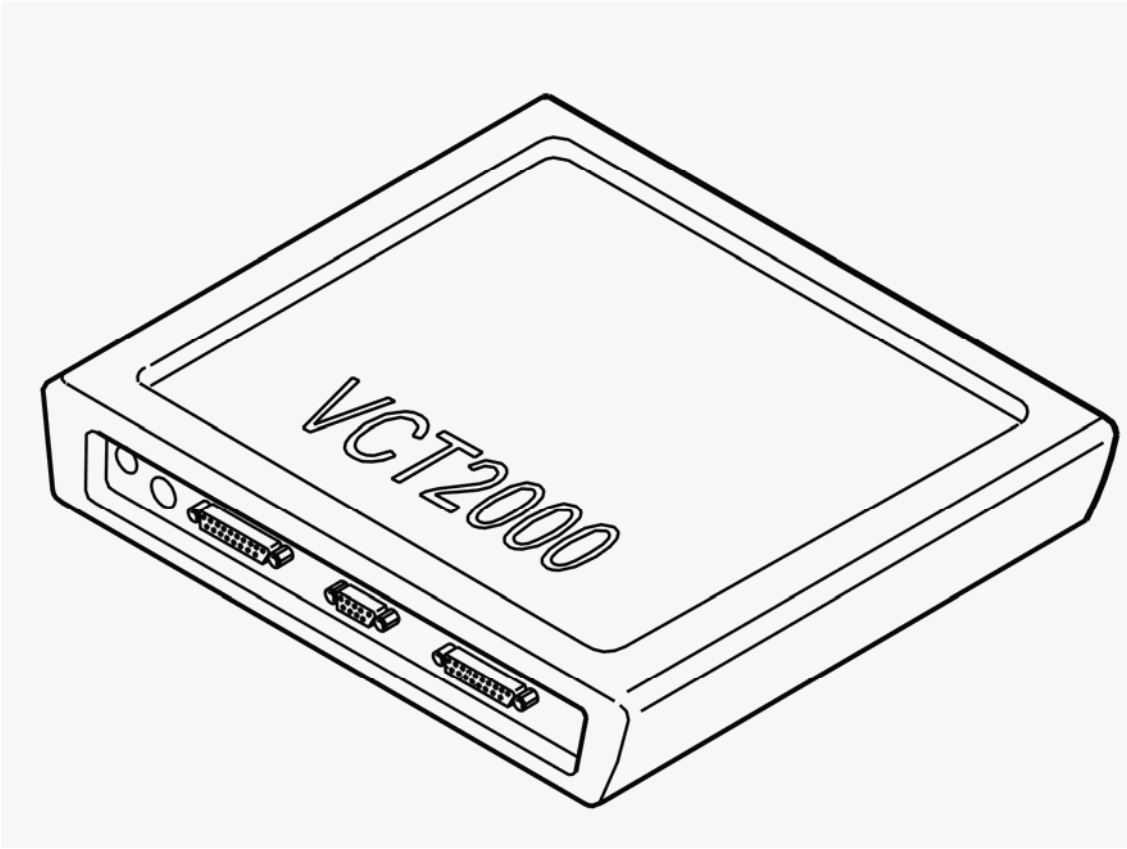


Fig. 306: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S2**

- **NO**

  Refer to **FAULTY SIGNAL**

CHECKING SHIFT SOLENOID S2

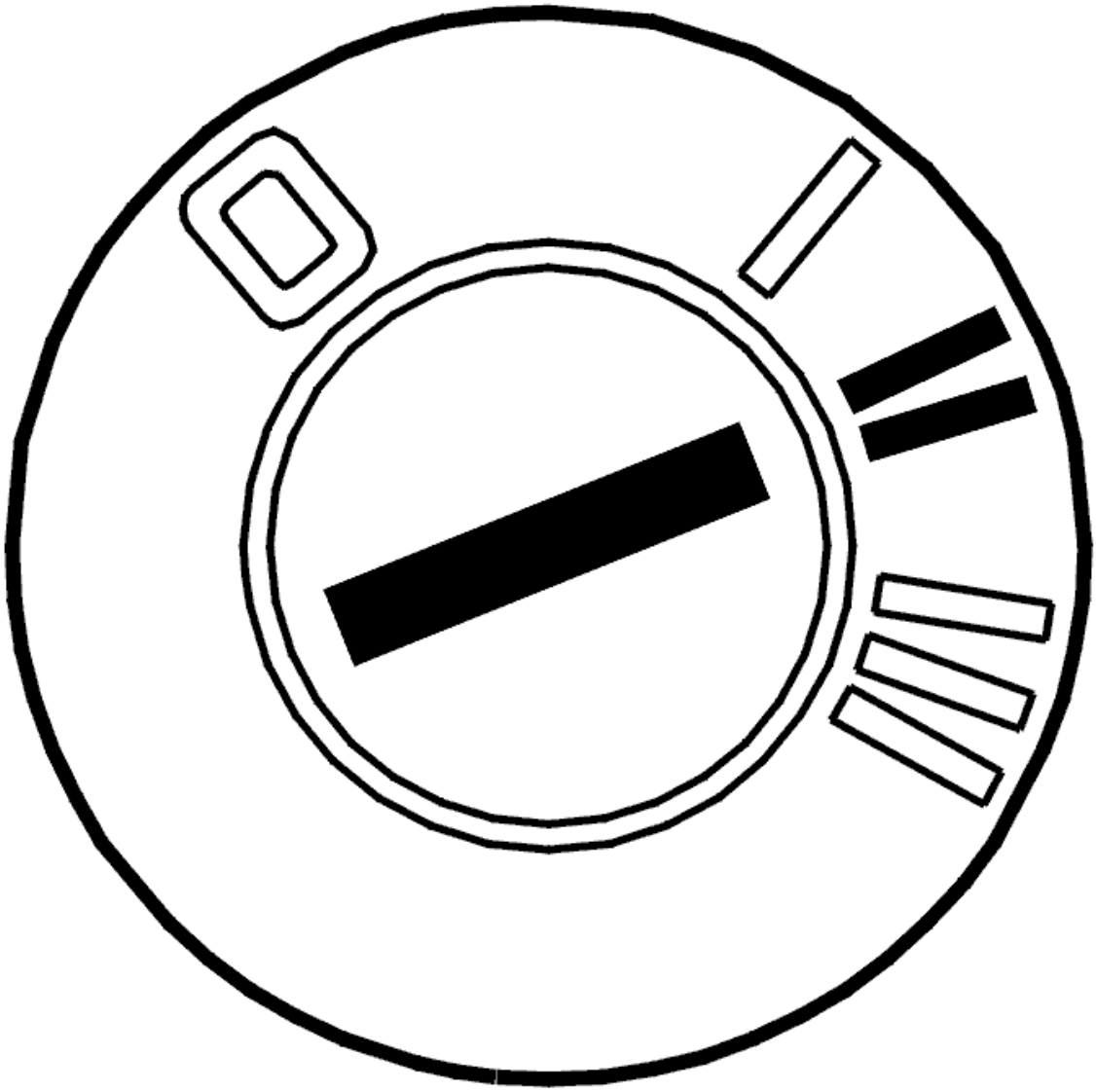


Fig. 307: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S2.

  The value must change between OFF and ON.

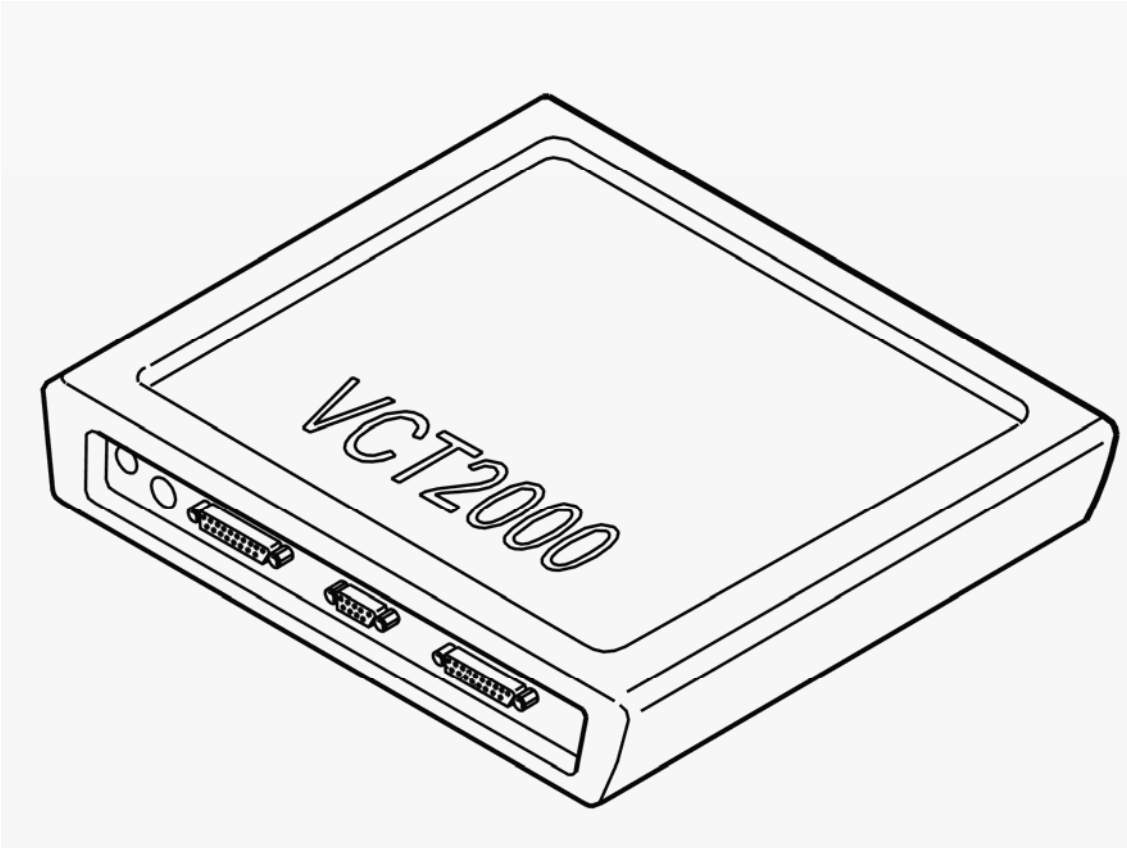


Fig. 308: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

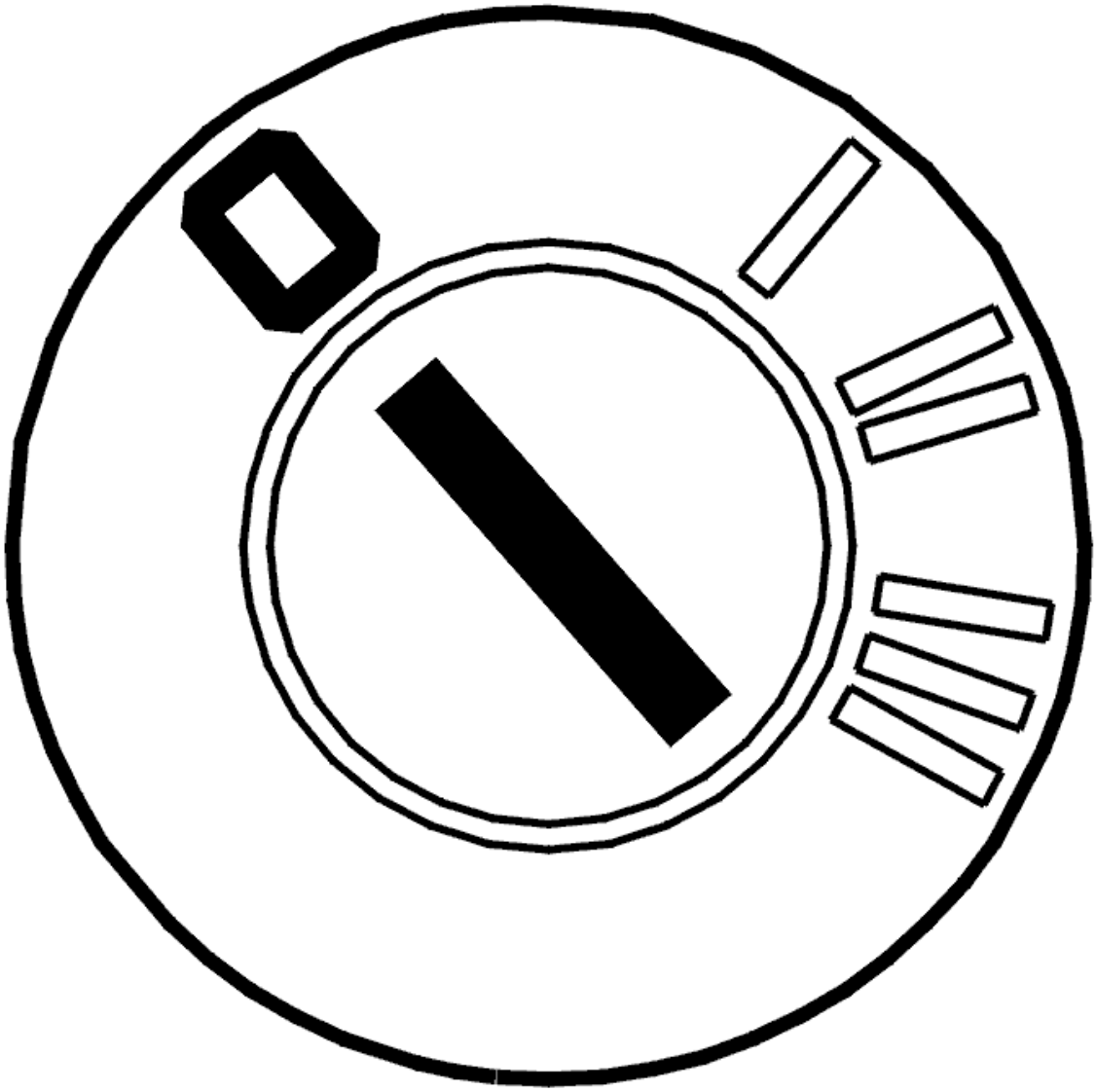


Fig. 309: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

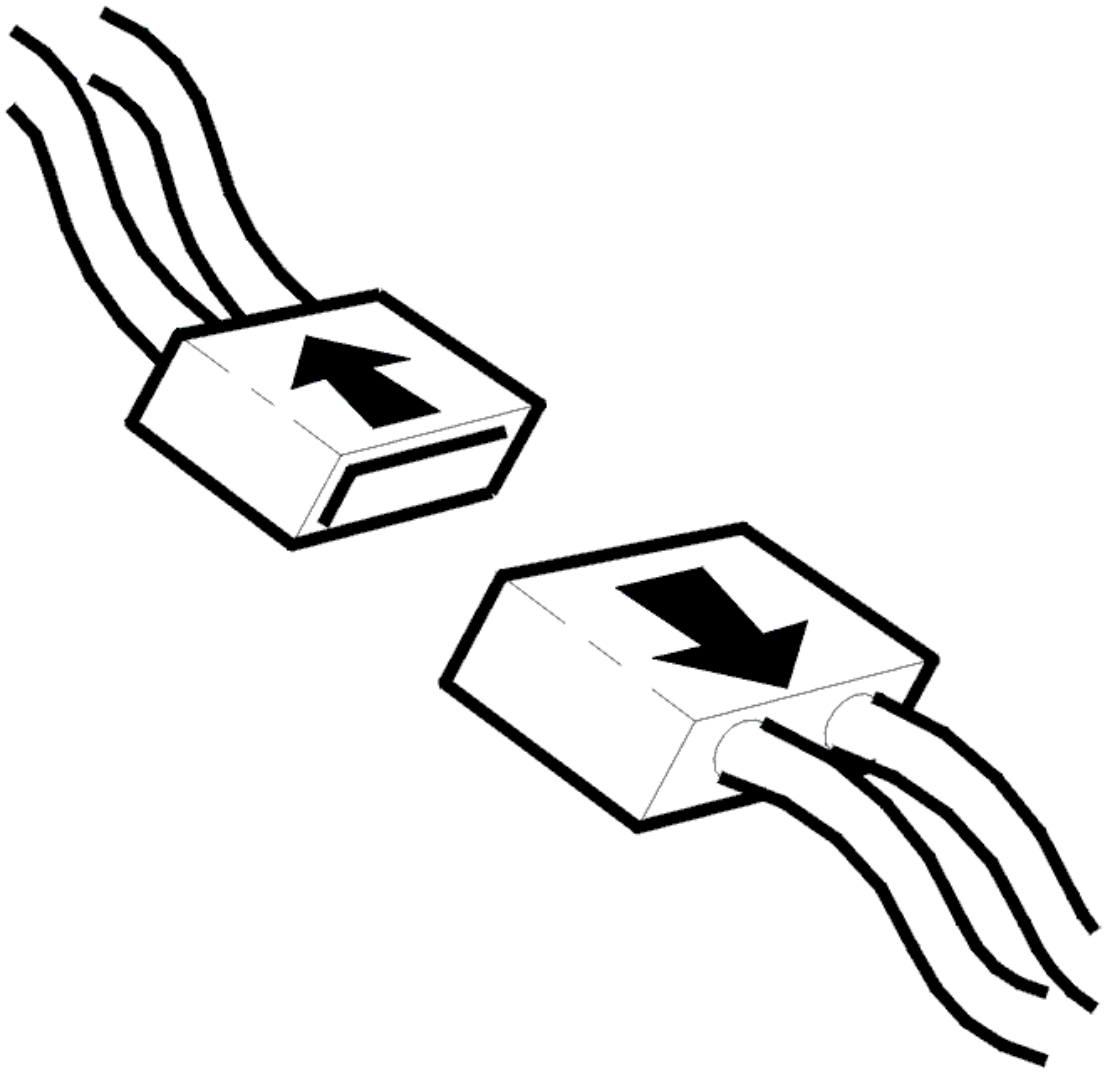


Fig. 310: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect transmission connector C.

Check the cable between control module terminal #B8 (#A68) and transmission connector terminal #C2 (control module side). Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** . Also check against the other cables in the circuit.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**

- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

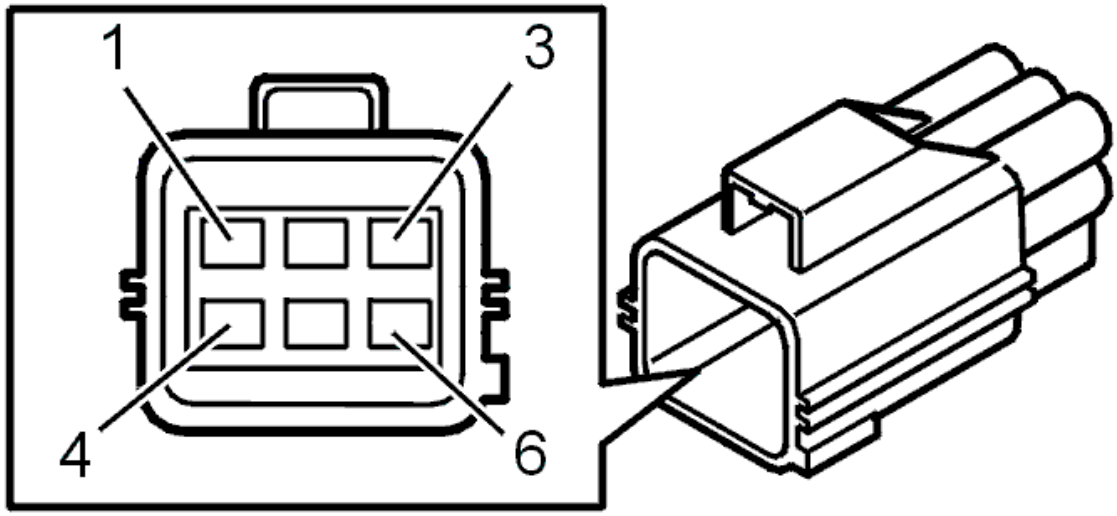


Fig. 311: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

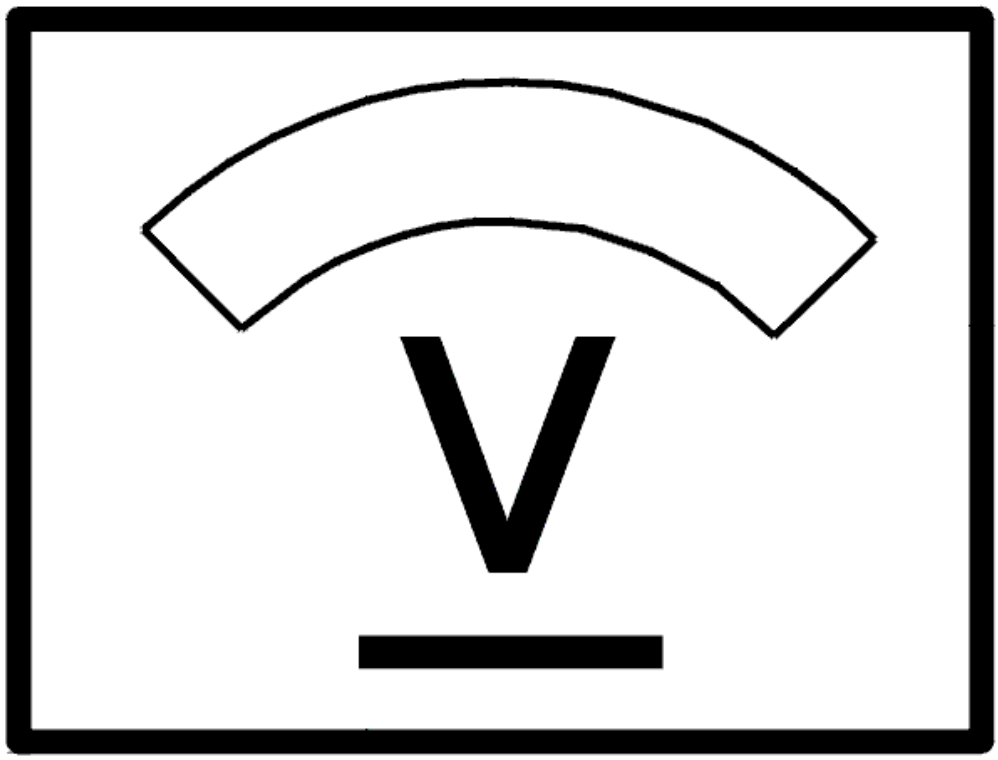


Fig. 312: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

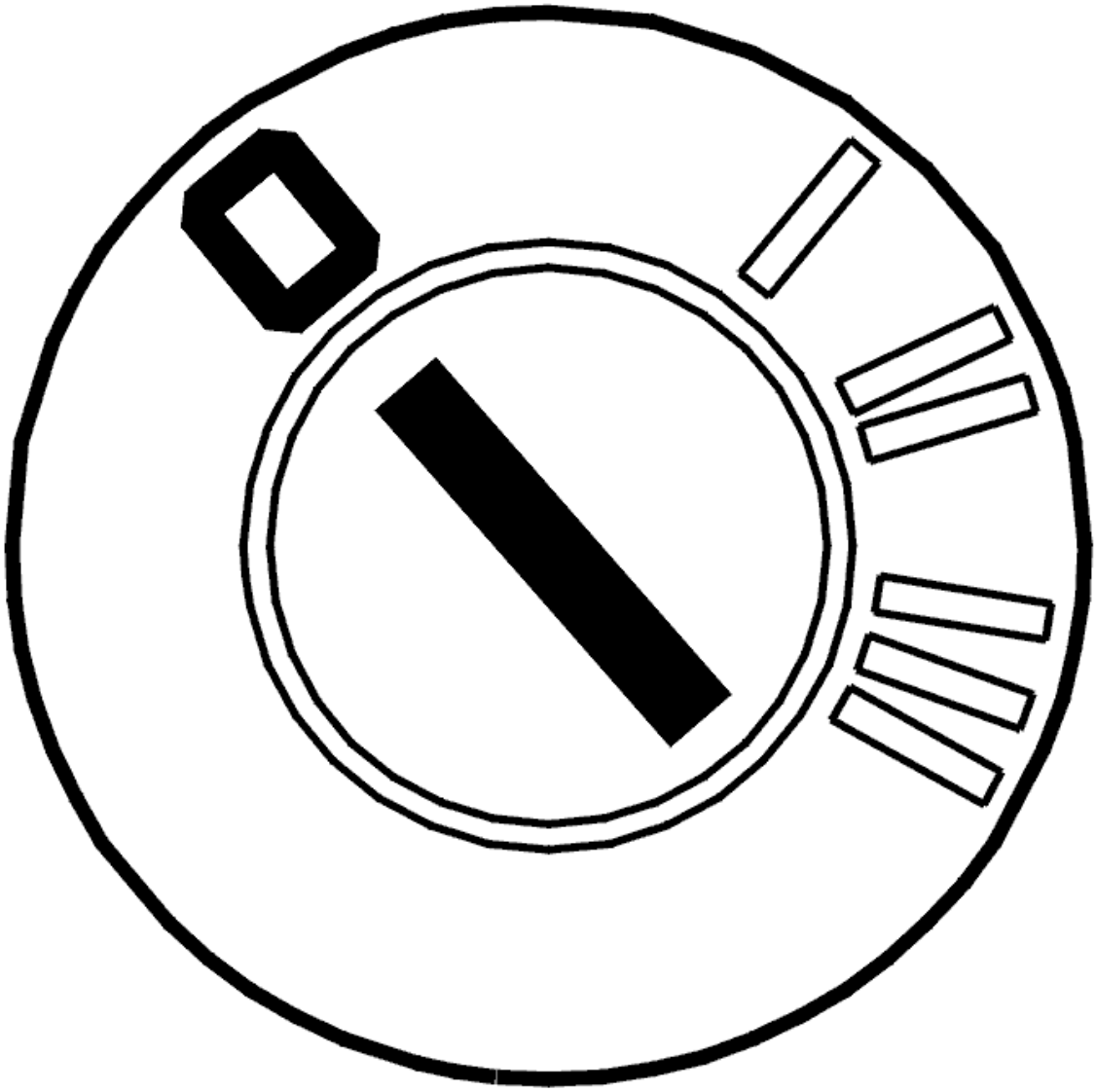


Fig. 313: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the control system.

  Check the cable between transmission connector terminal #C2 (transmission side) and the connector for solenoid S2. Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** . Also check against the other cables in the circuit.

  Replace solenoid S2 if no faults are found in the cable.

  Remedy as necessary.

  Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- To open the control system and to check or replace solenoid S2, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

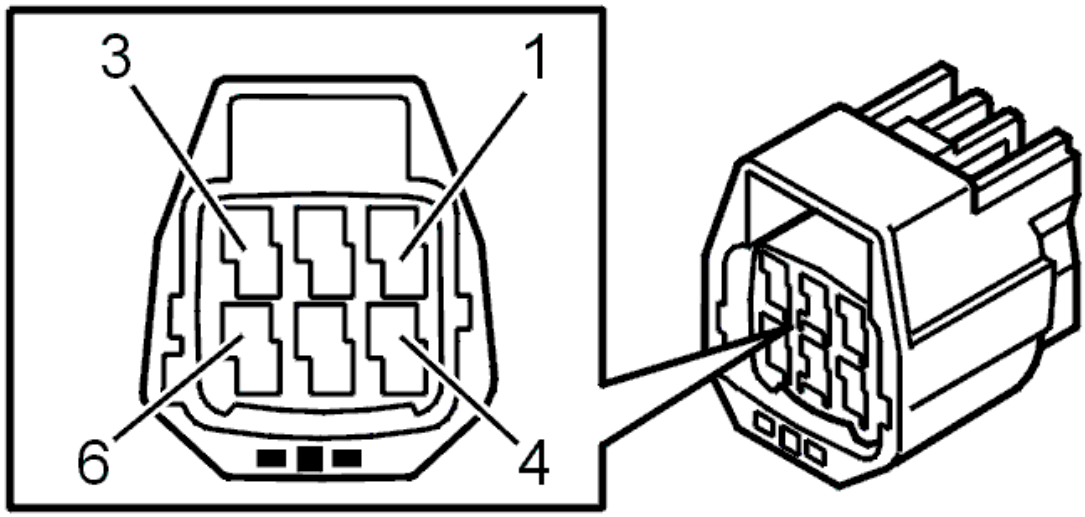


Fig. 314: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

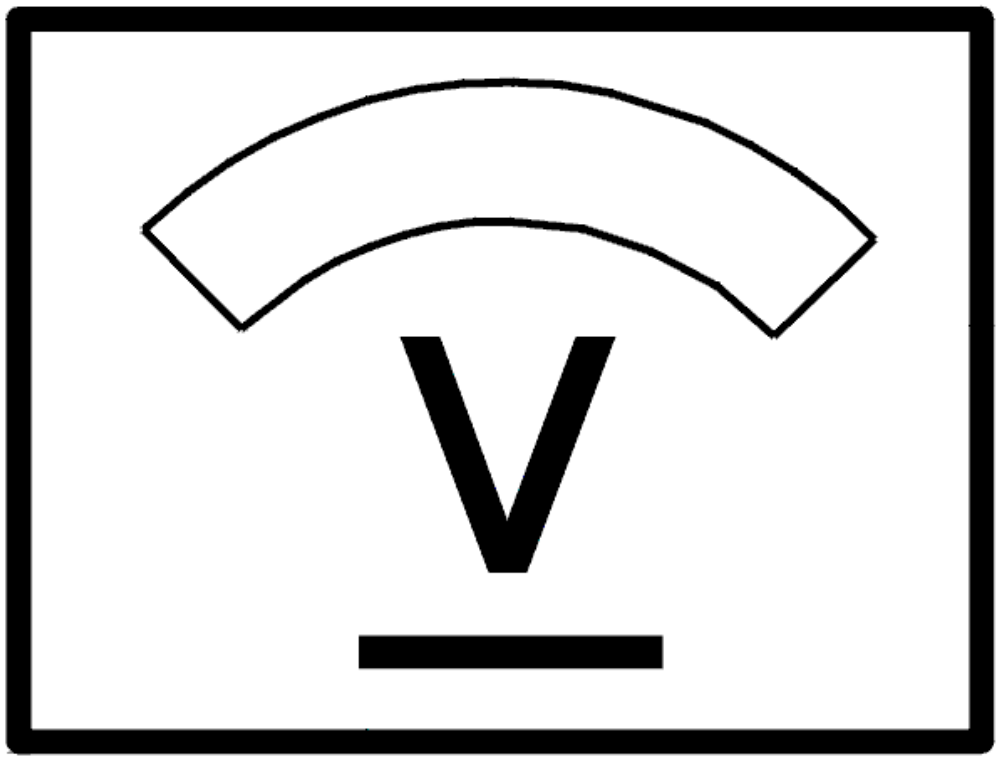


Fig. 315: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the cable between control module terminal #B8 (#A68) and transmission connector terminal #C2. Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

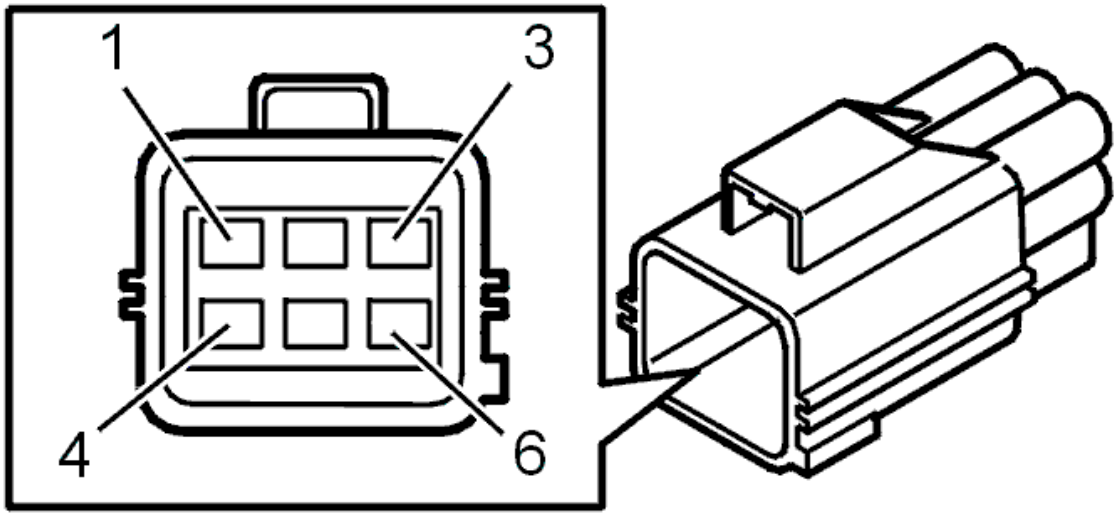


Fig. 316: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

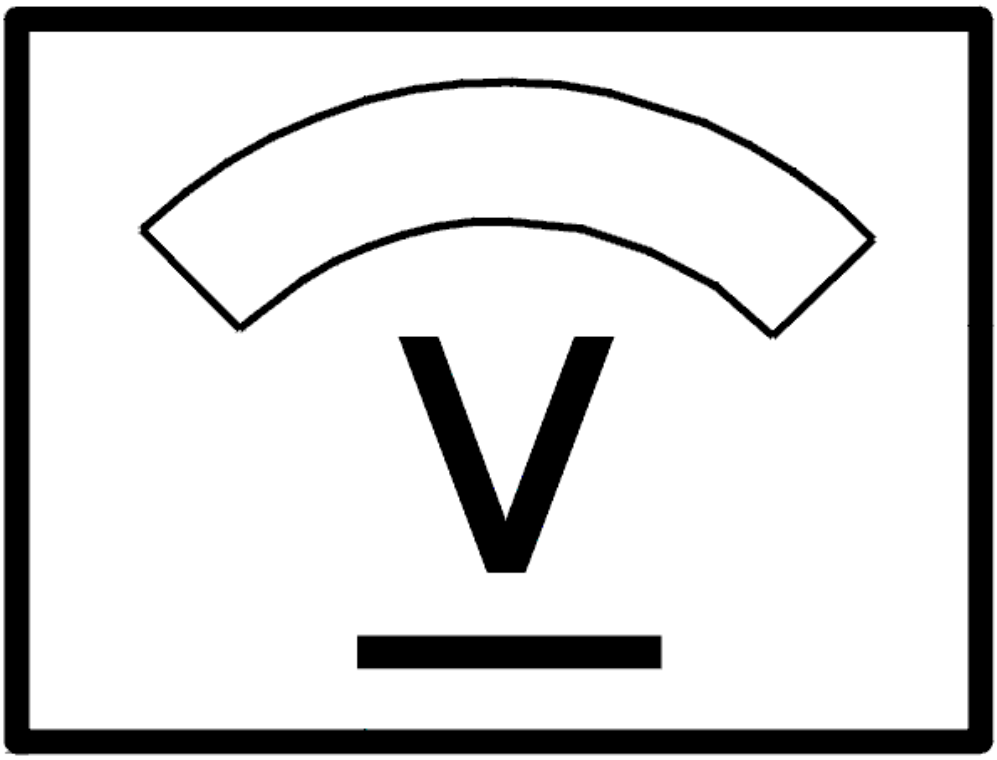


Fig. 317: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

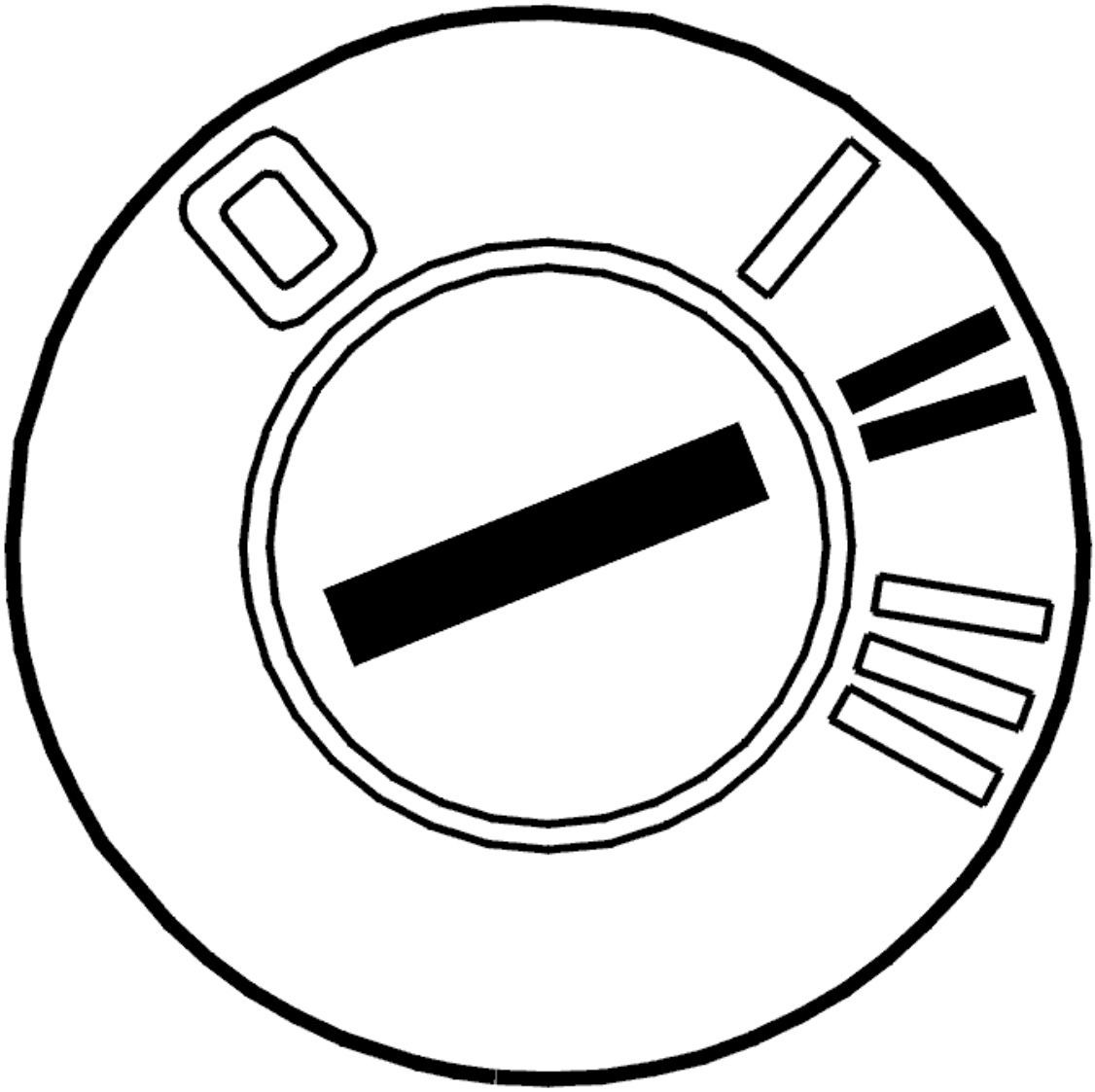


Fig. 318: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

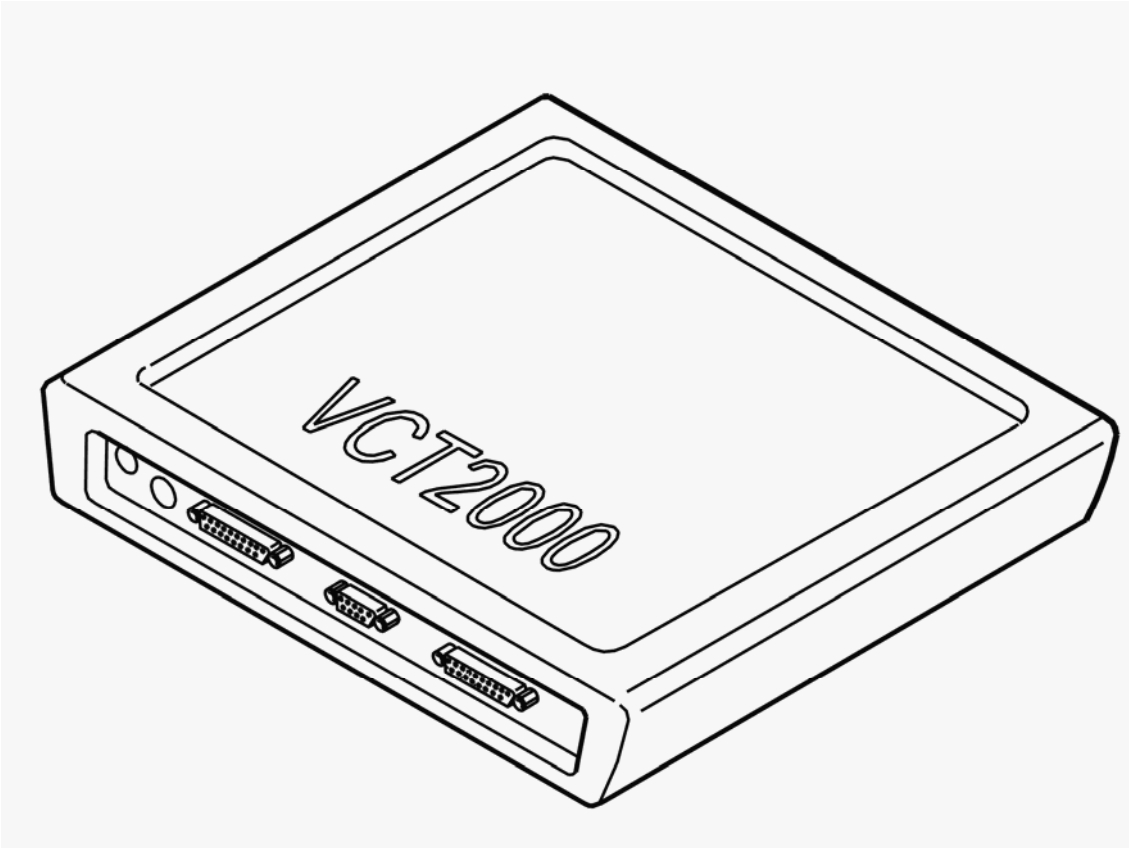


Fig. 319: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After the repair it is necessary to check that the fault has been rectified.

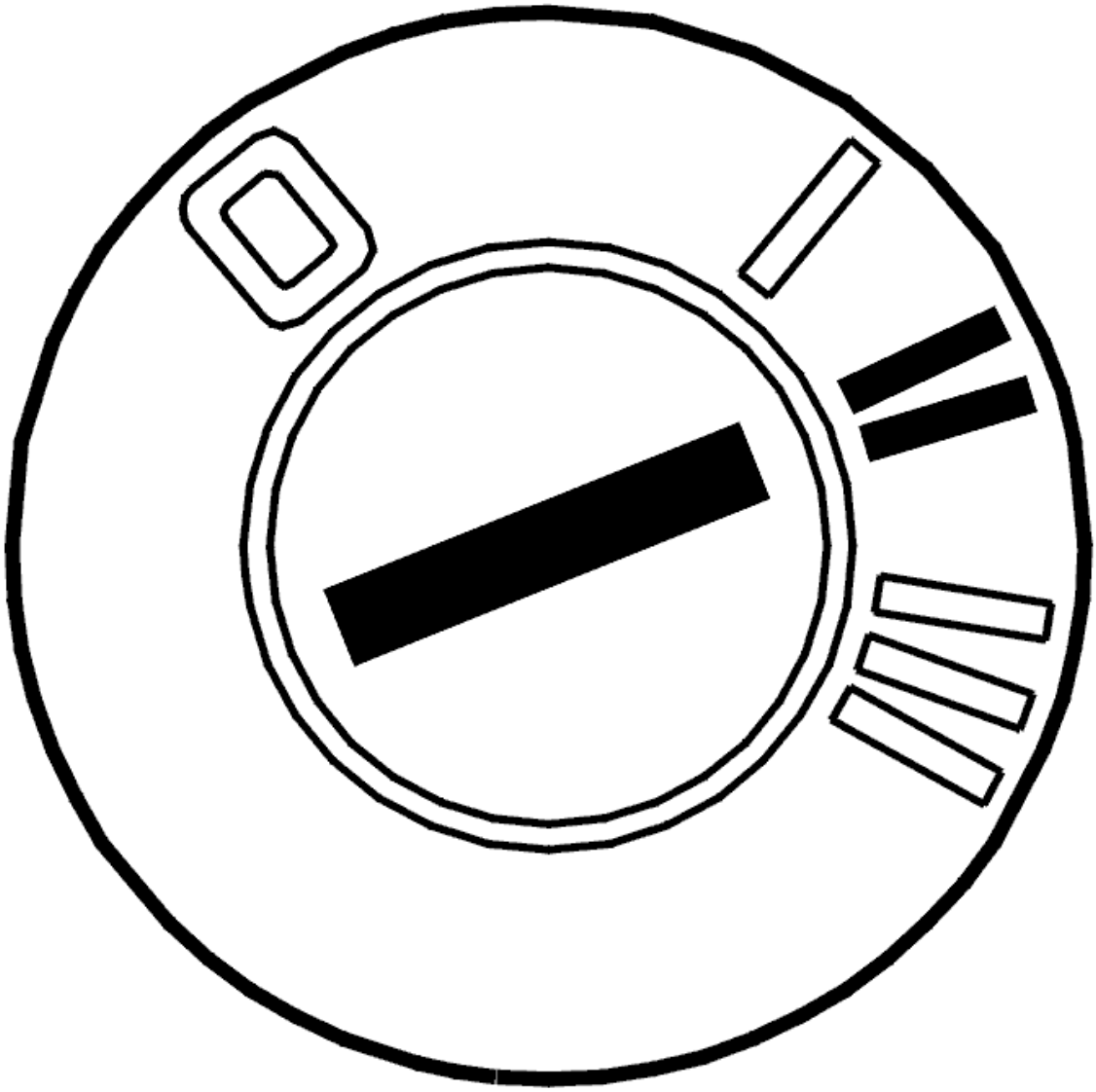


Fig. 320: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

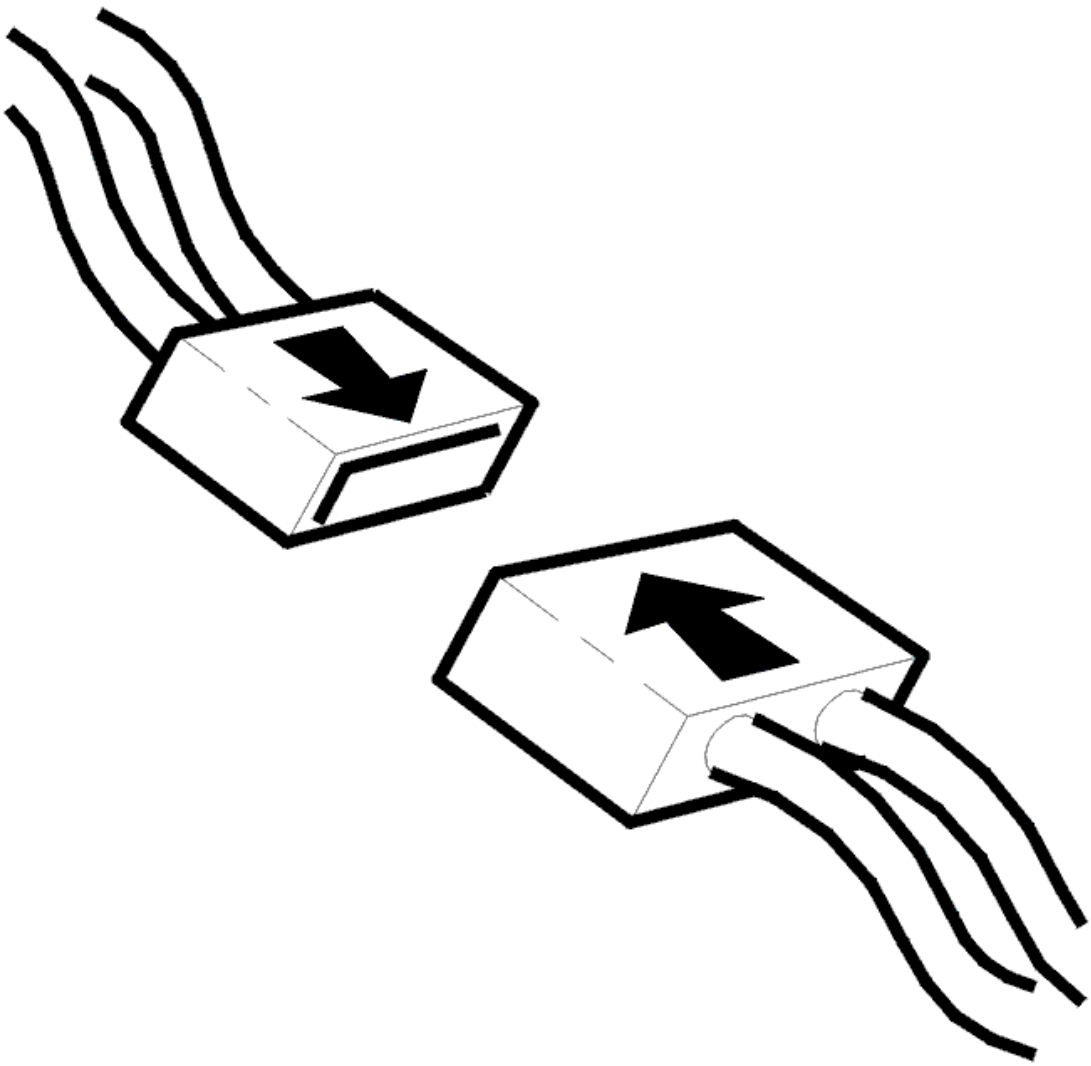


Fig. 321: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Wait for at least 90 seconds.
- Connect the connectors, install the components etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S2.

The value should change between OFF and ON.

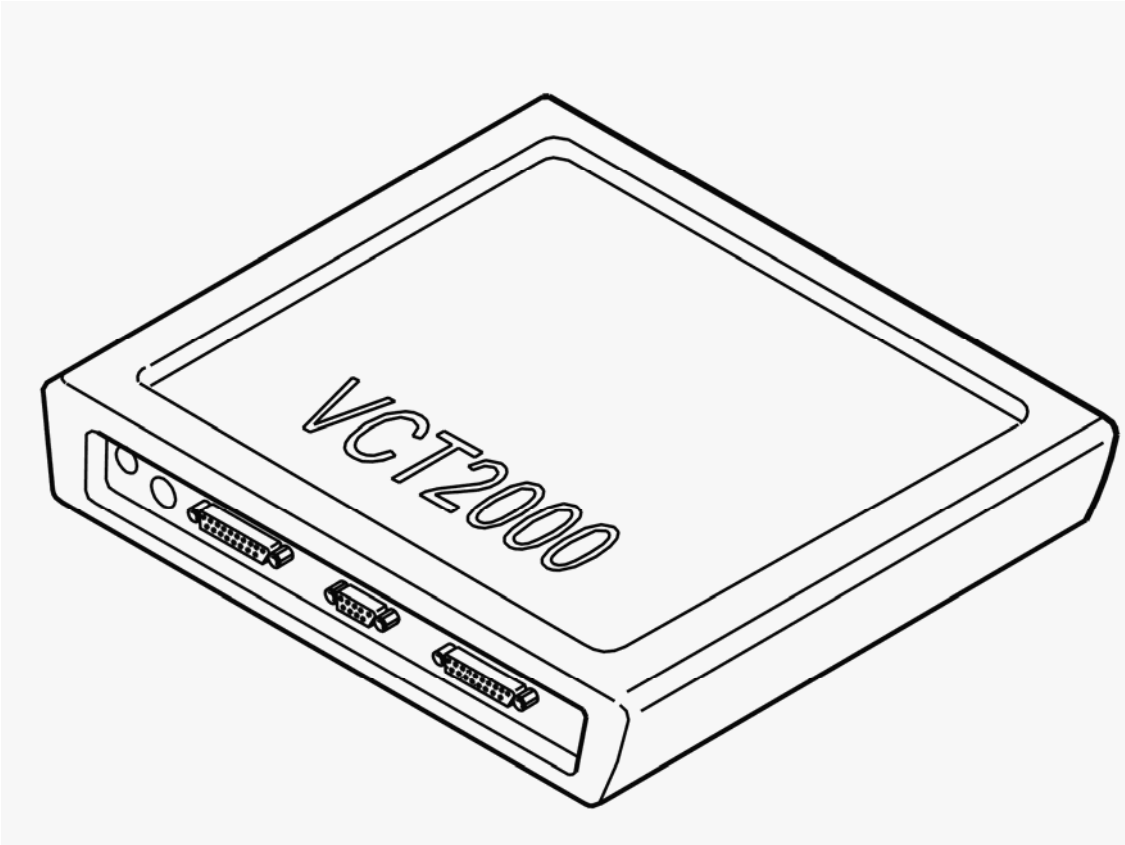


Fig. 322: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

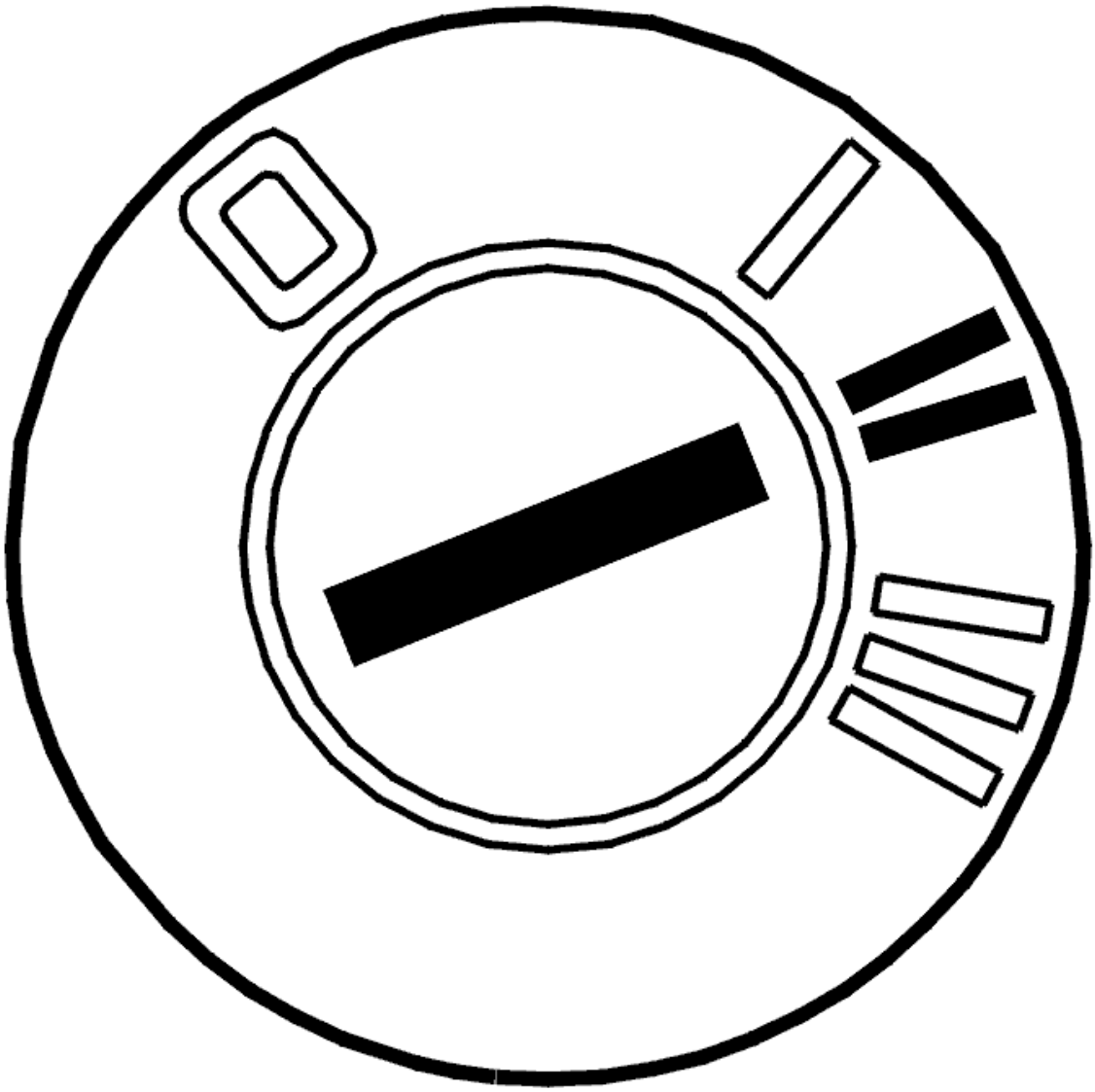


Fig. 323: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

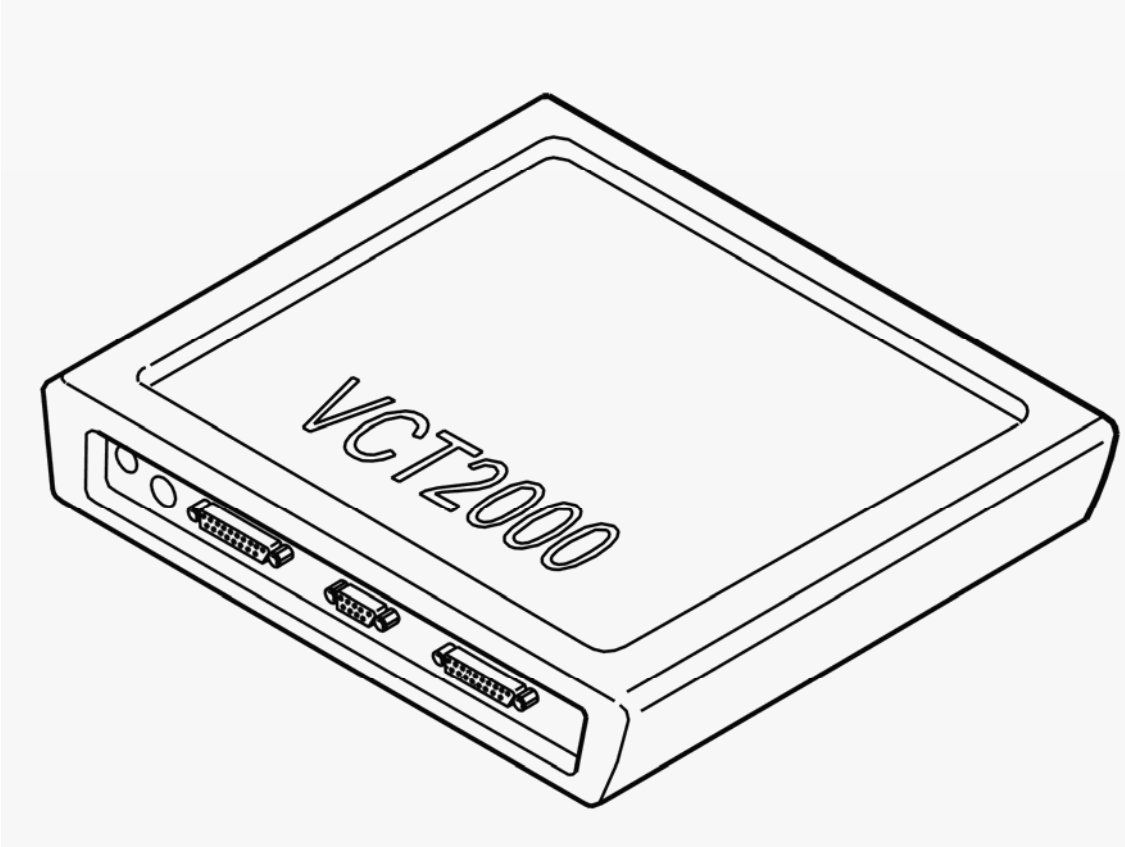


Fig. 324: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

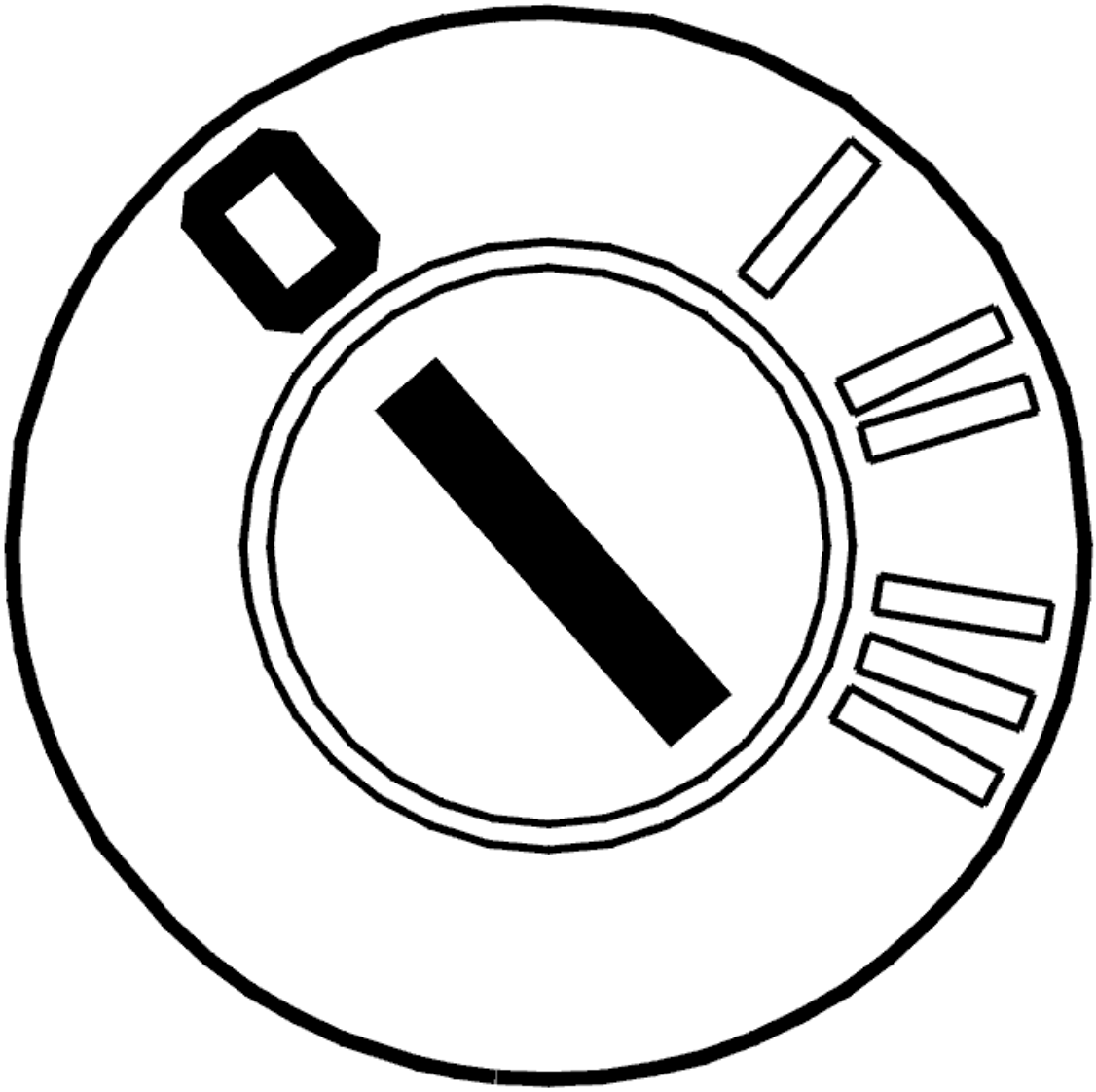


Fig. 325: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

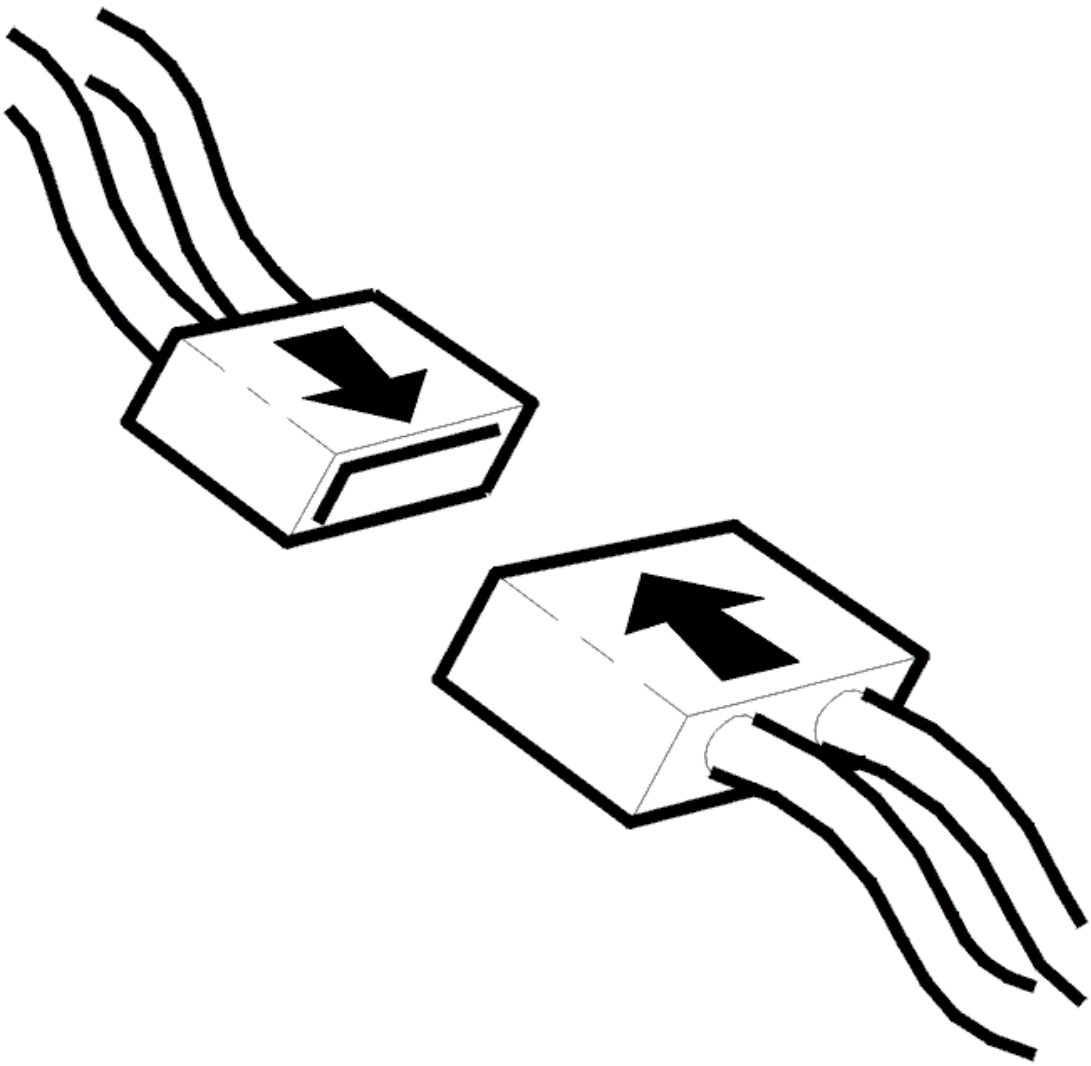


Fig. 326: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

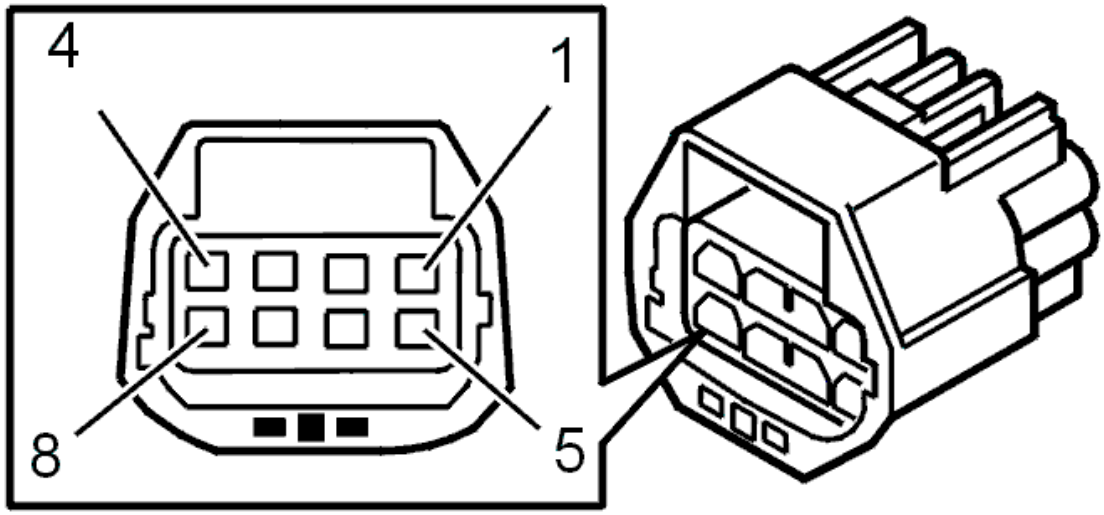


Fig. 327: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

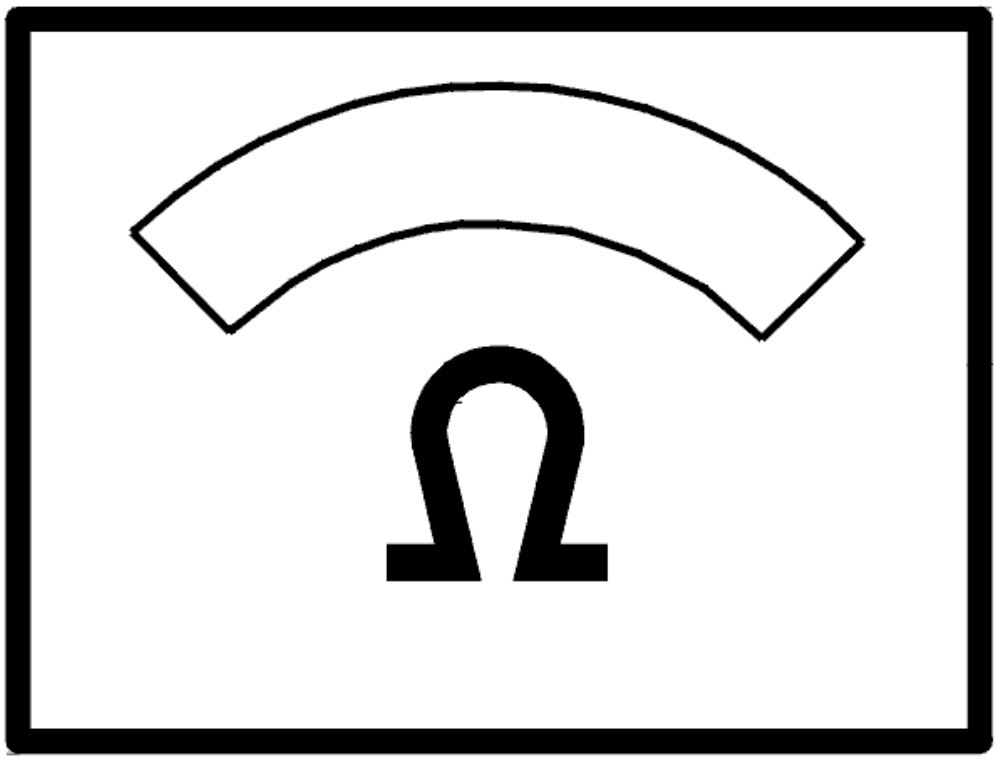


Fig. 328: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

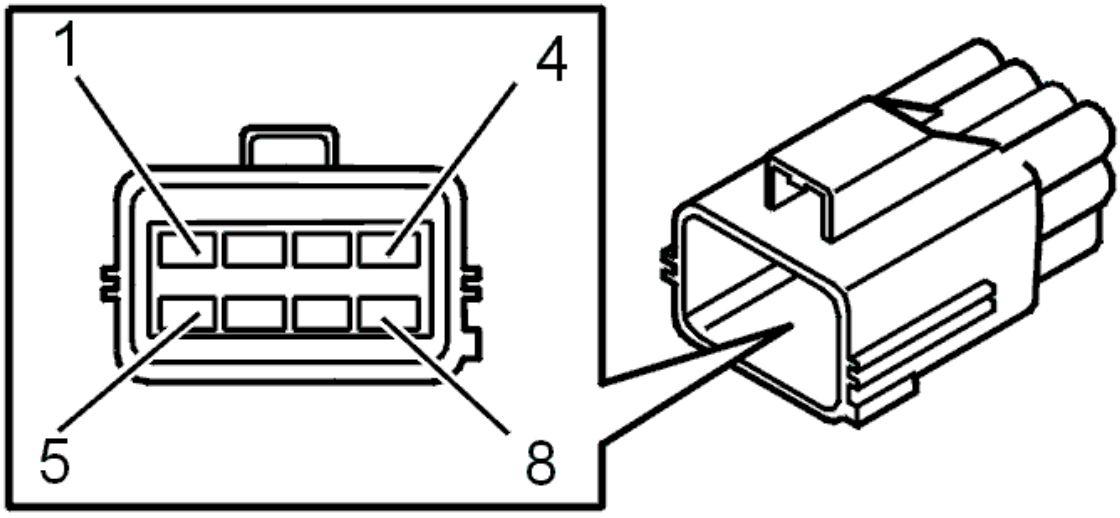


Fig. 329: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

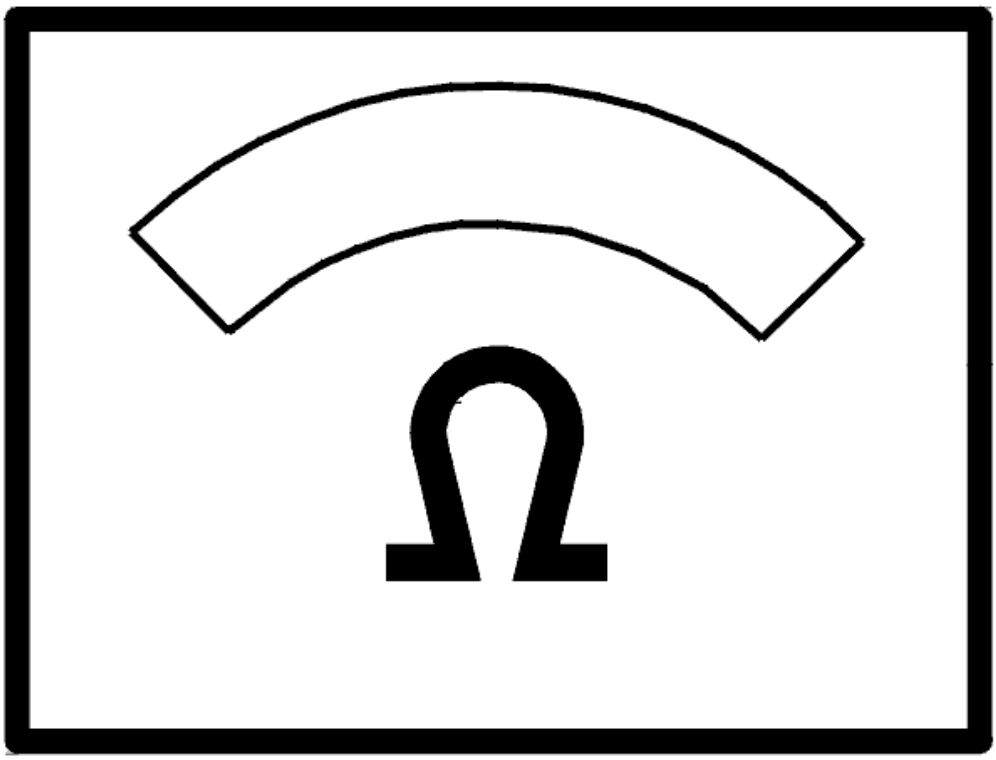


Fig. 330: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

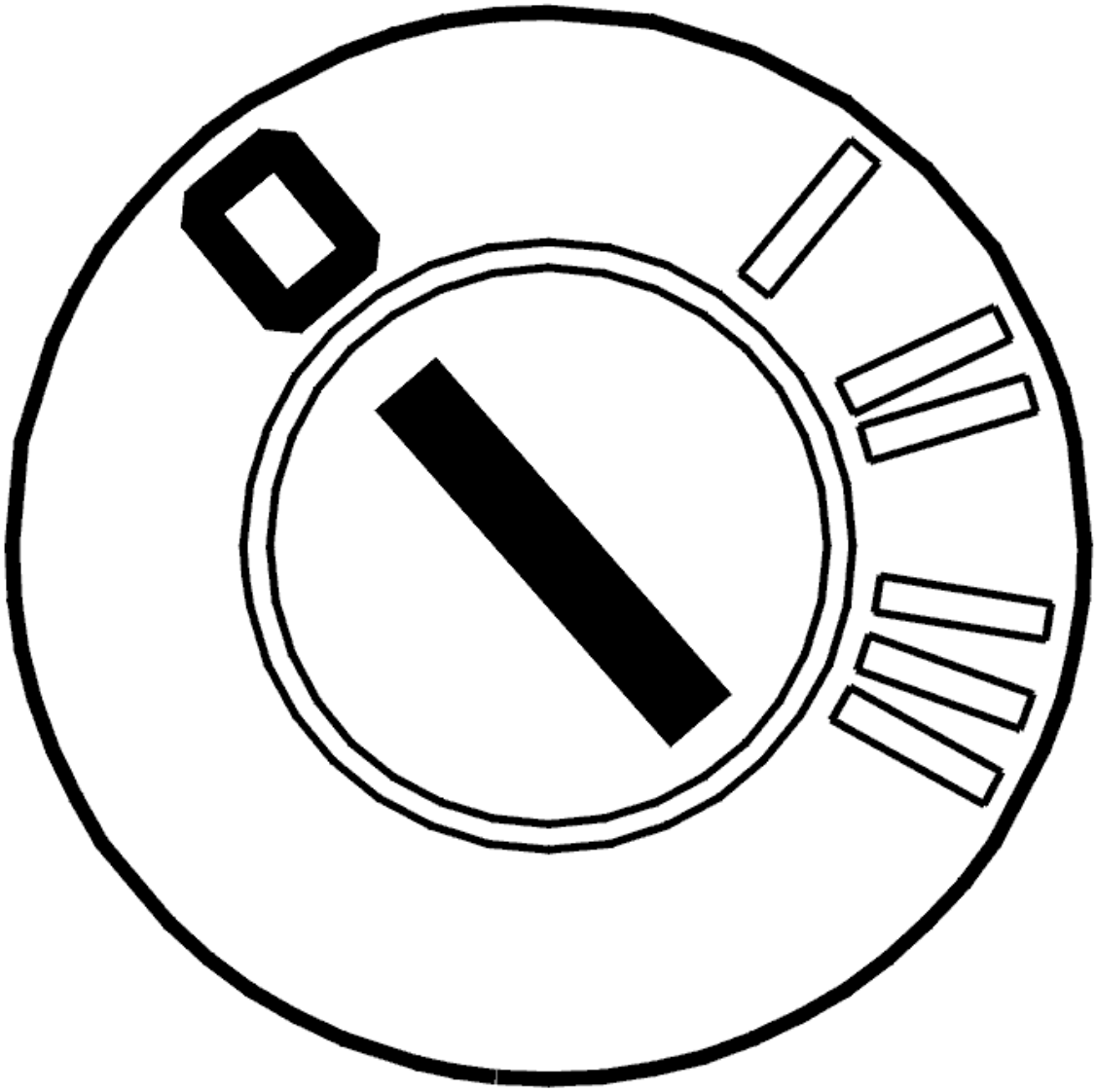


Fig. 331: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

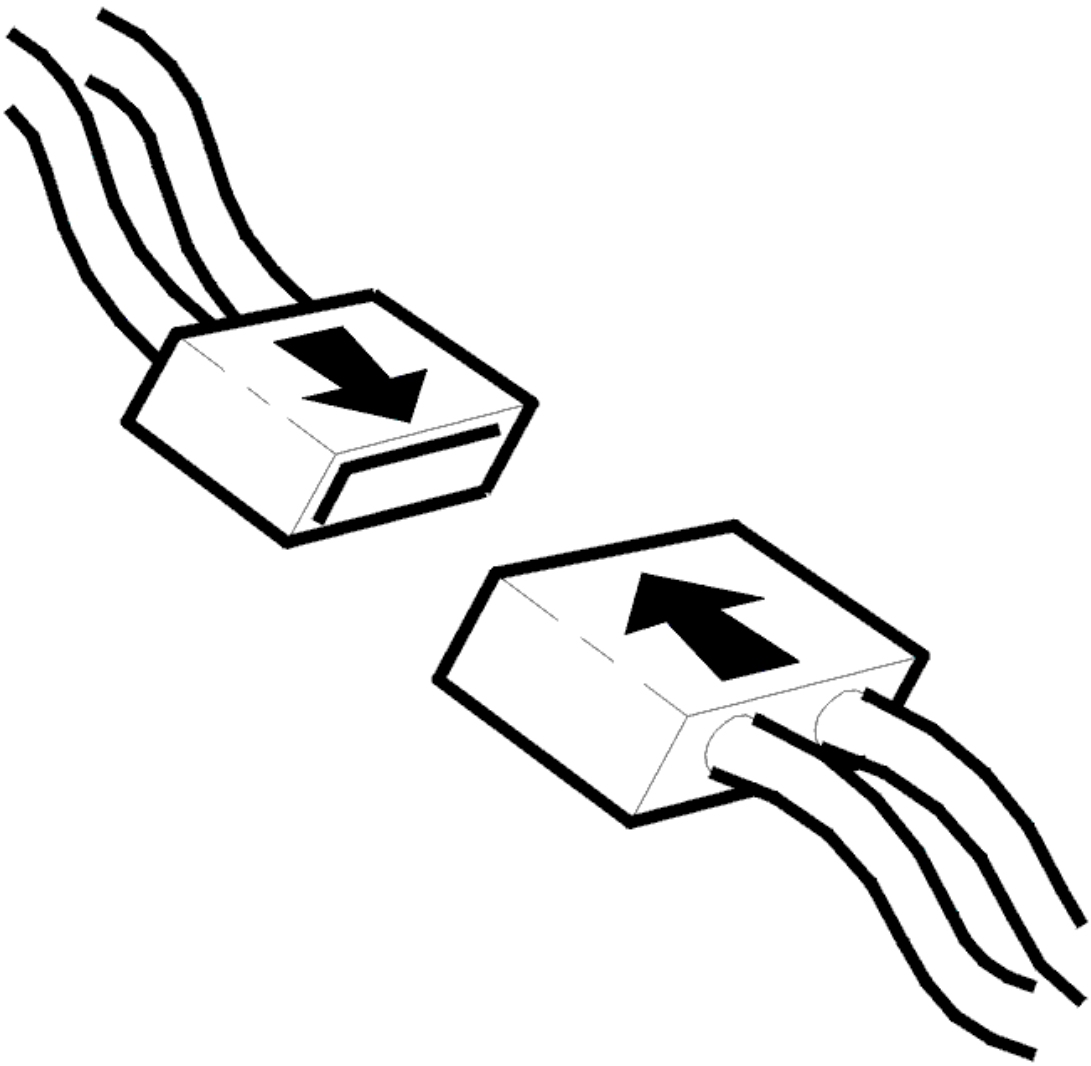


Fig. 332: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

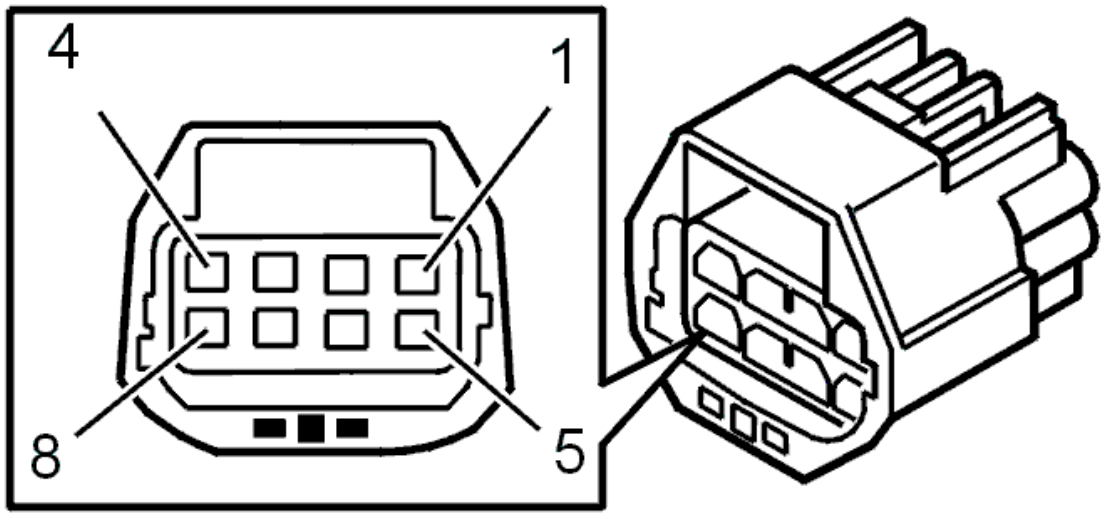


Fig. 333: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

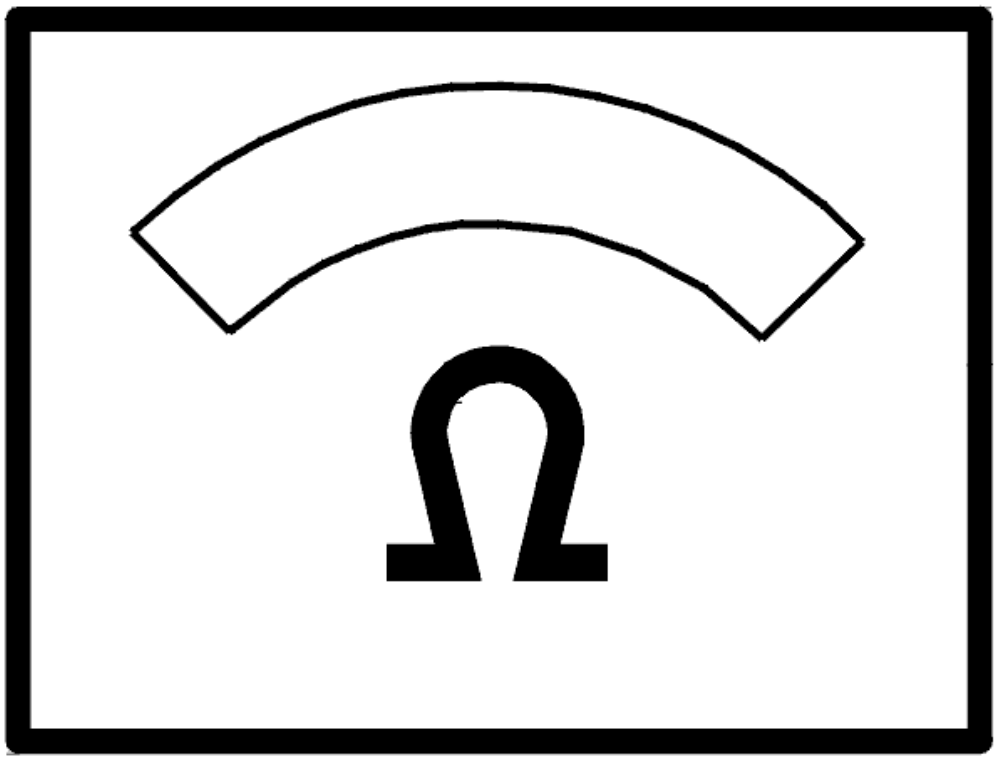


Fig. 334: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

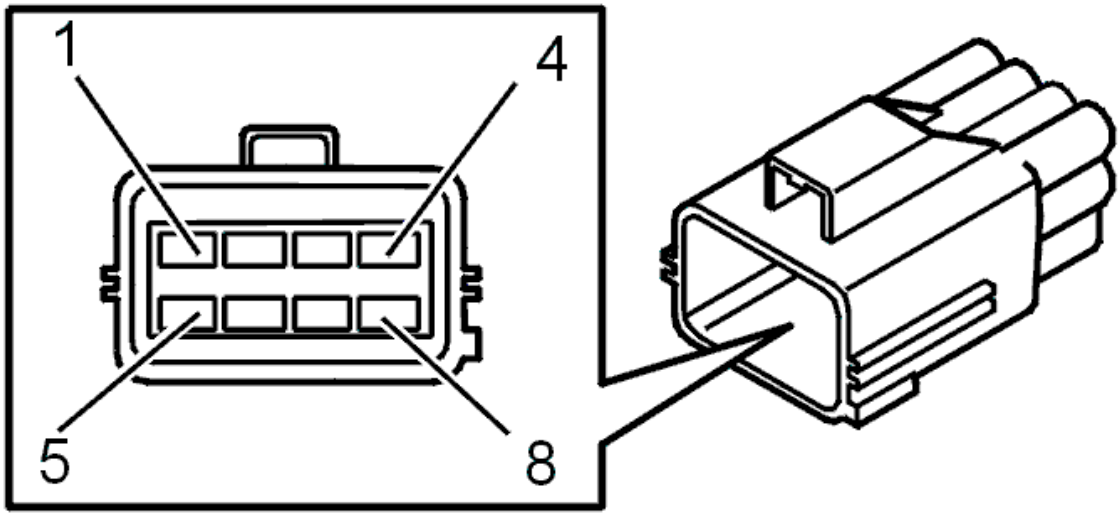


Fig. 335: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

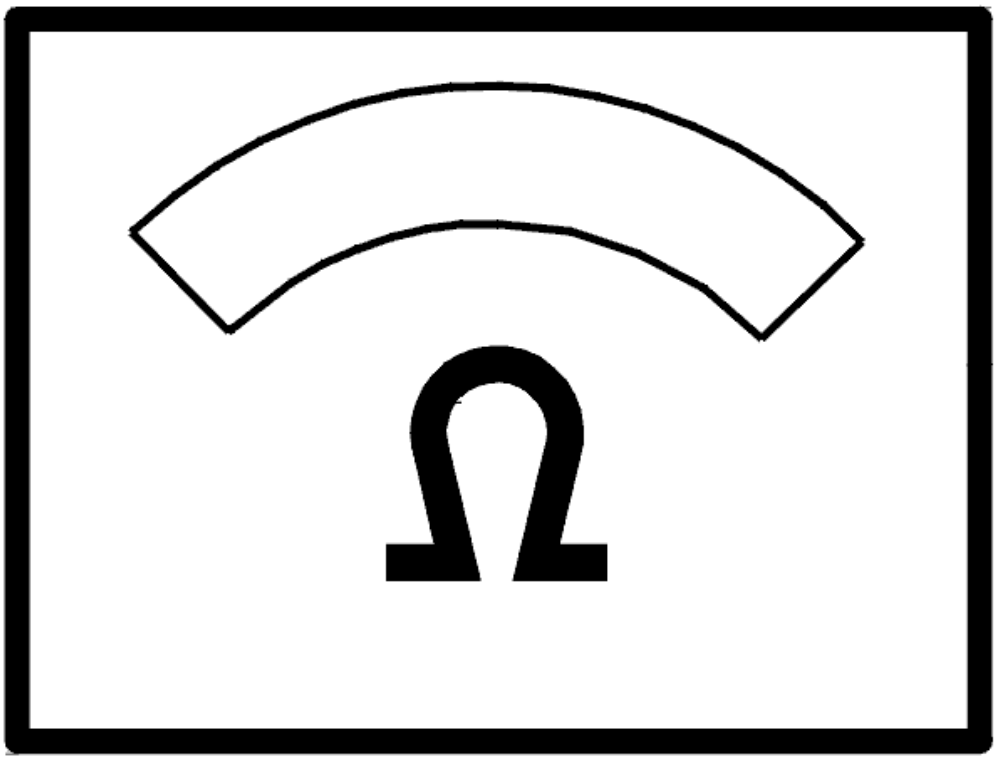


Fig. 336: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

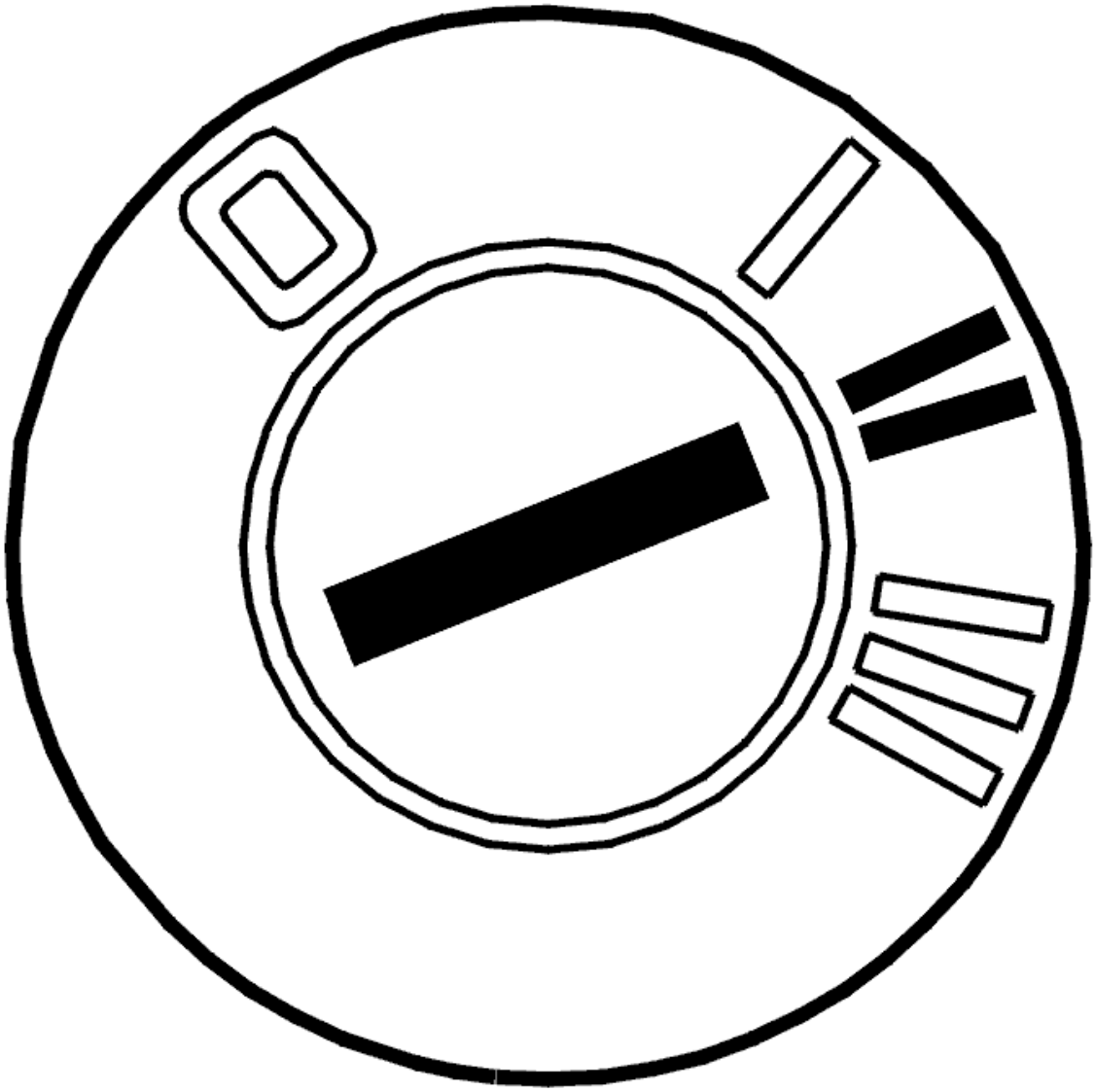


Fig. 337: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

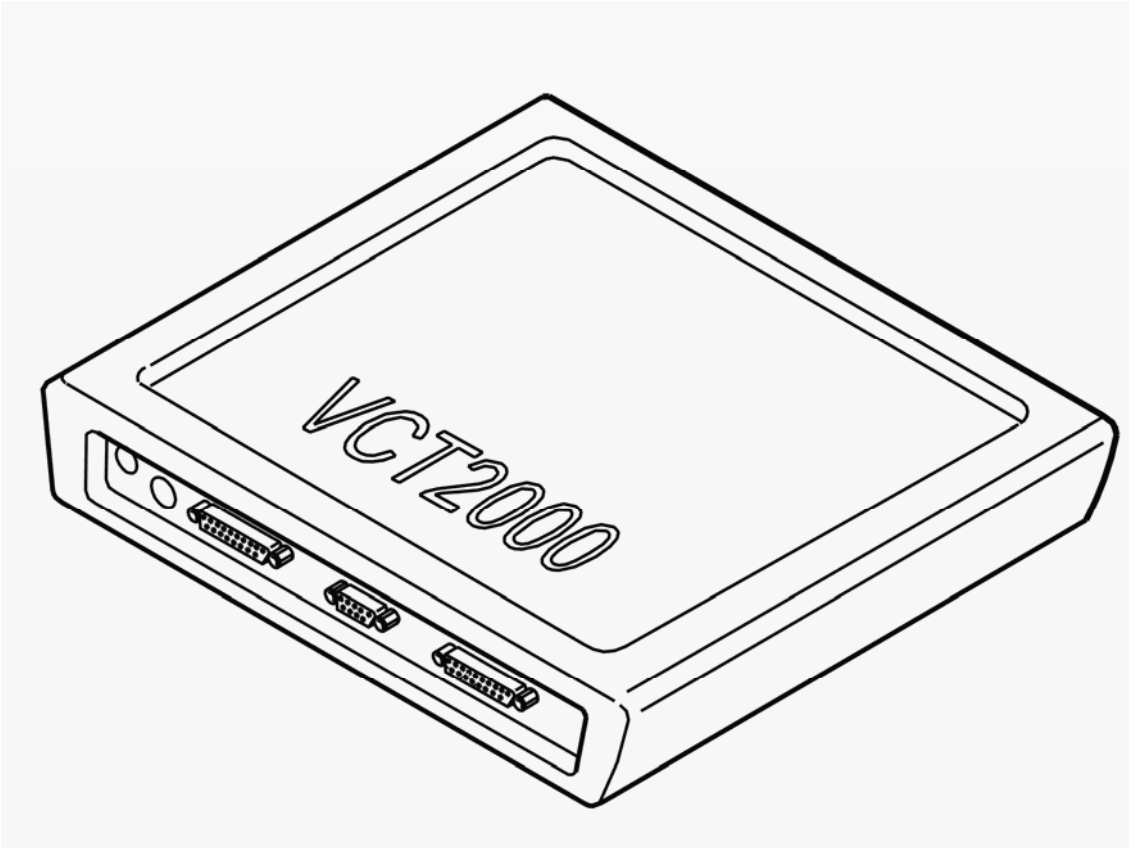


Fig. 338: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

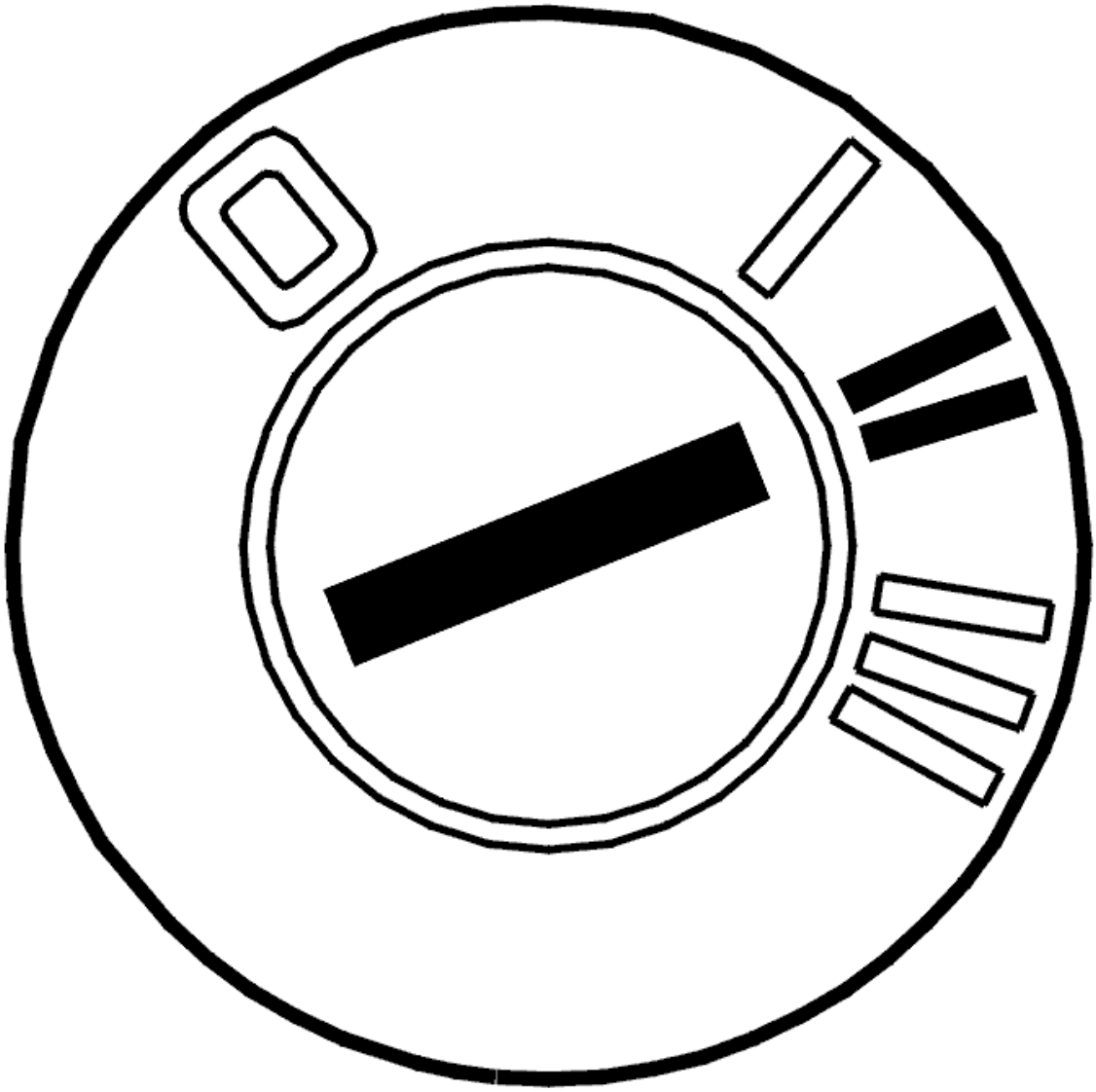


Fig. 339: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

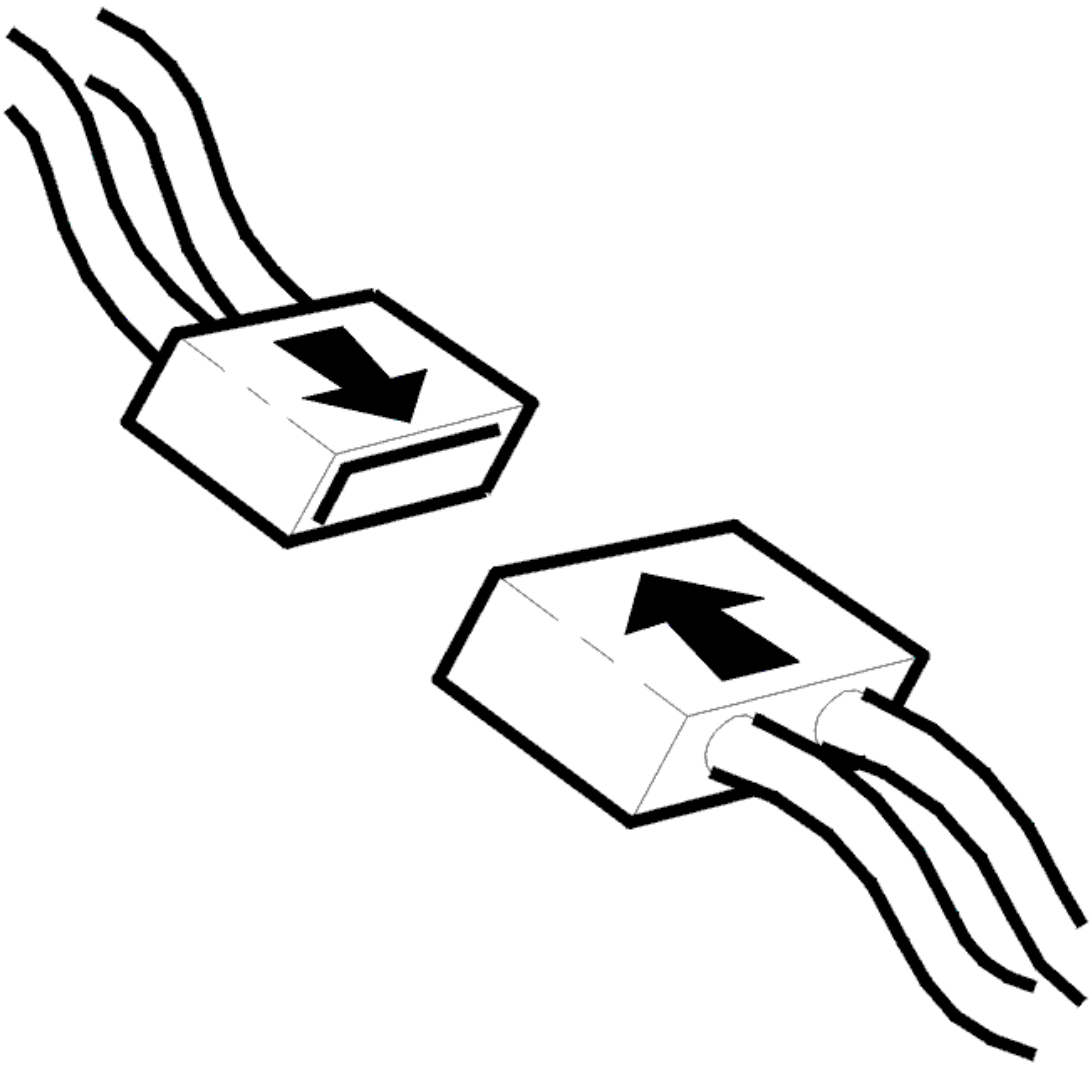


Fig. 340: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

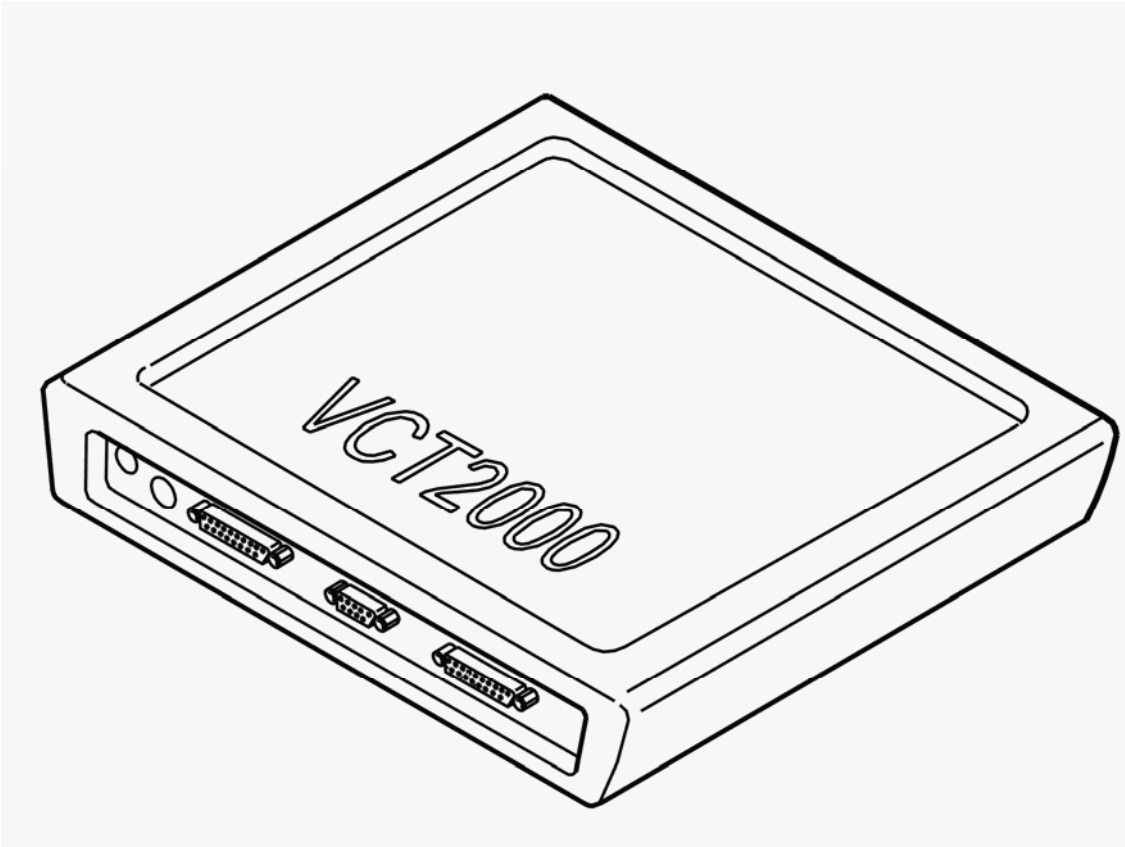


Fig. 341: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-0008: SHIFT SOLENOID S2. SIGNAL MISSING (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

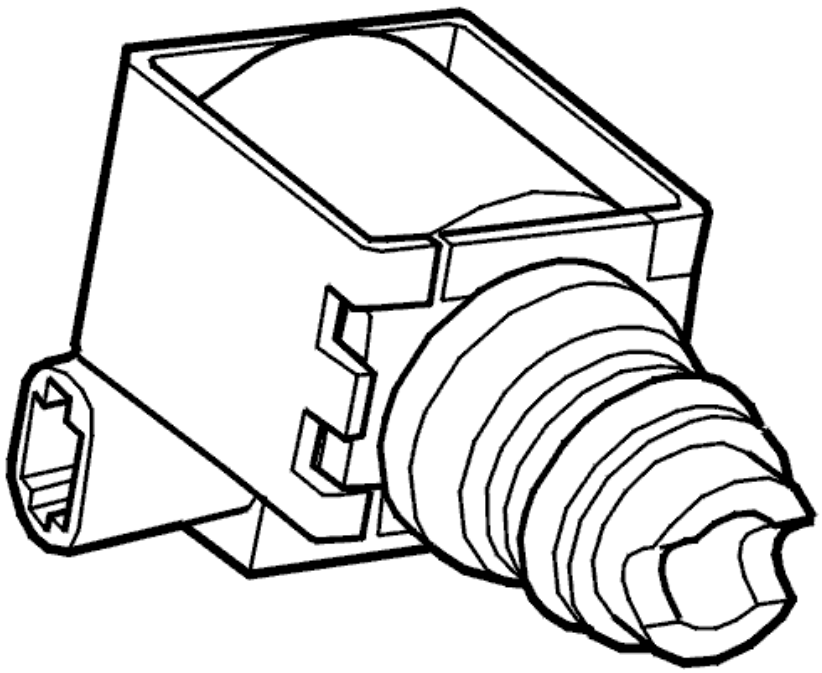


Fig. 342: Identifying Shift Solenoid S1 And S2
Courtesy of VOLVO CARS CORPORATION

Shift solenoids S2 and S1 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Solenoid S2 is activated in 1st and 2nd gears. Diagnostic trouble code (DTC) TCM-0008 is stored if the control module registers an open-circuit in the solenoid S2 circuit when the solenoid is activated.

Substitute Value

- The control module "Limp Home" program has been initiated.

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the signal cable.

- Defective solenoid.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- No shifting.
- Harsh gear shifting.

HINT: Harsh shifting - due to disabled line pressure solenoid STH control. This results in constant maximum line pressure and leads to harsher shifting and gear engagement.

HINT: No shifting -because the transmission control module (TCM) prevents activation of the solenoids. This stops gear-shifting.

SIGNAL MISSING

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

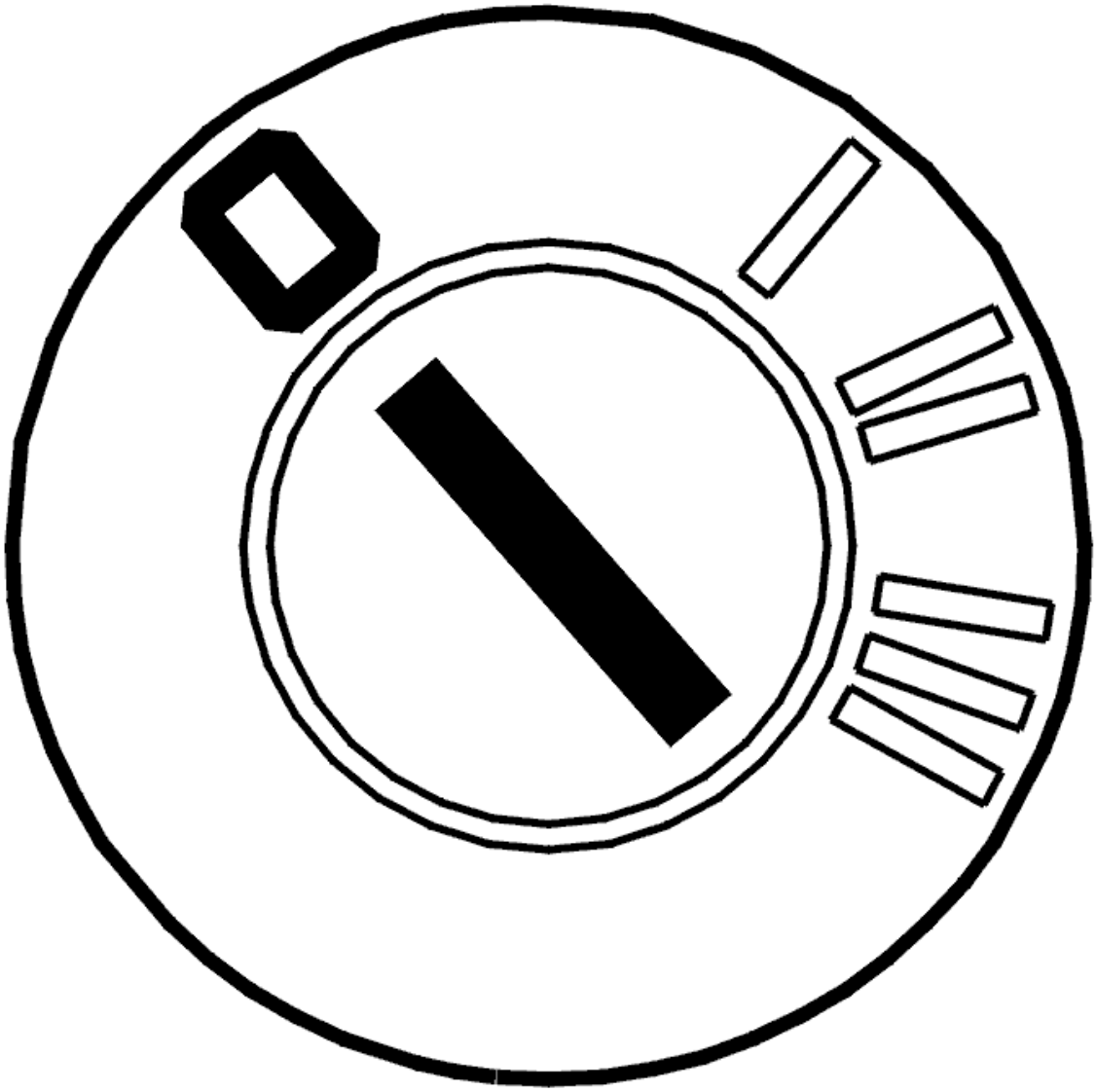


Fig. 343: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

  HINT: If the temperature is outside its permitted range, fault-trace the temperature sensor.

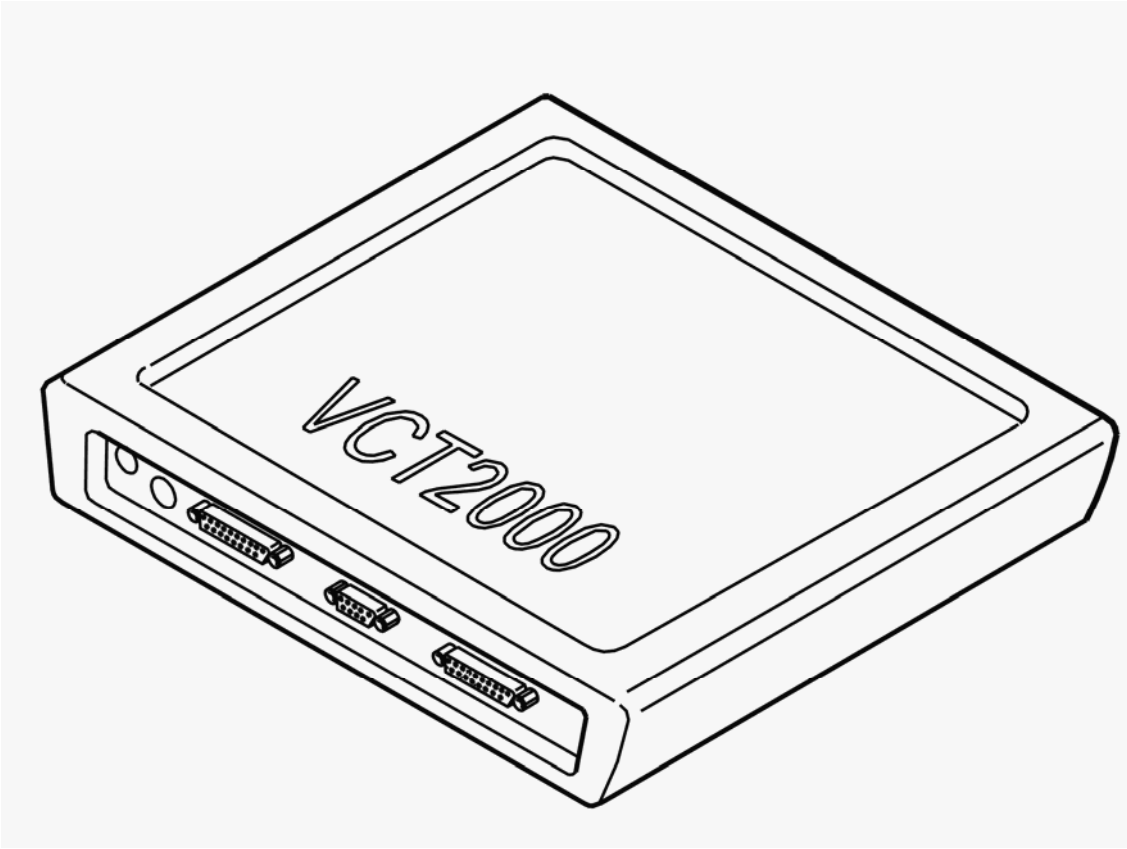


Fig. 344: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S2**

- **NO**

  Refer to **SIGNAL TOO HIGH**

CHECKING SHIFT SOLENOID S2

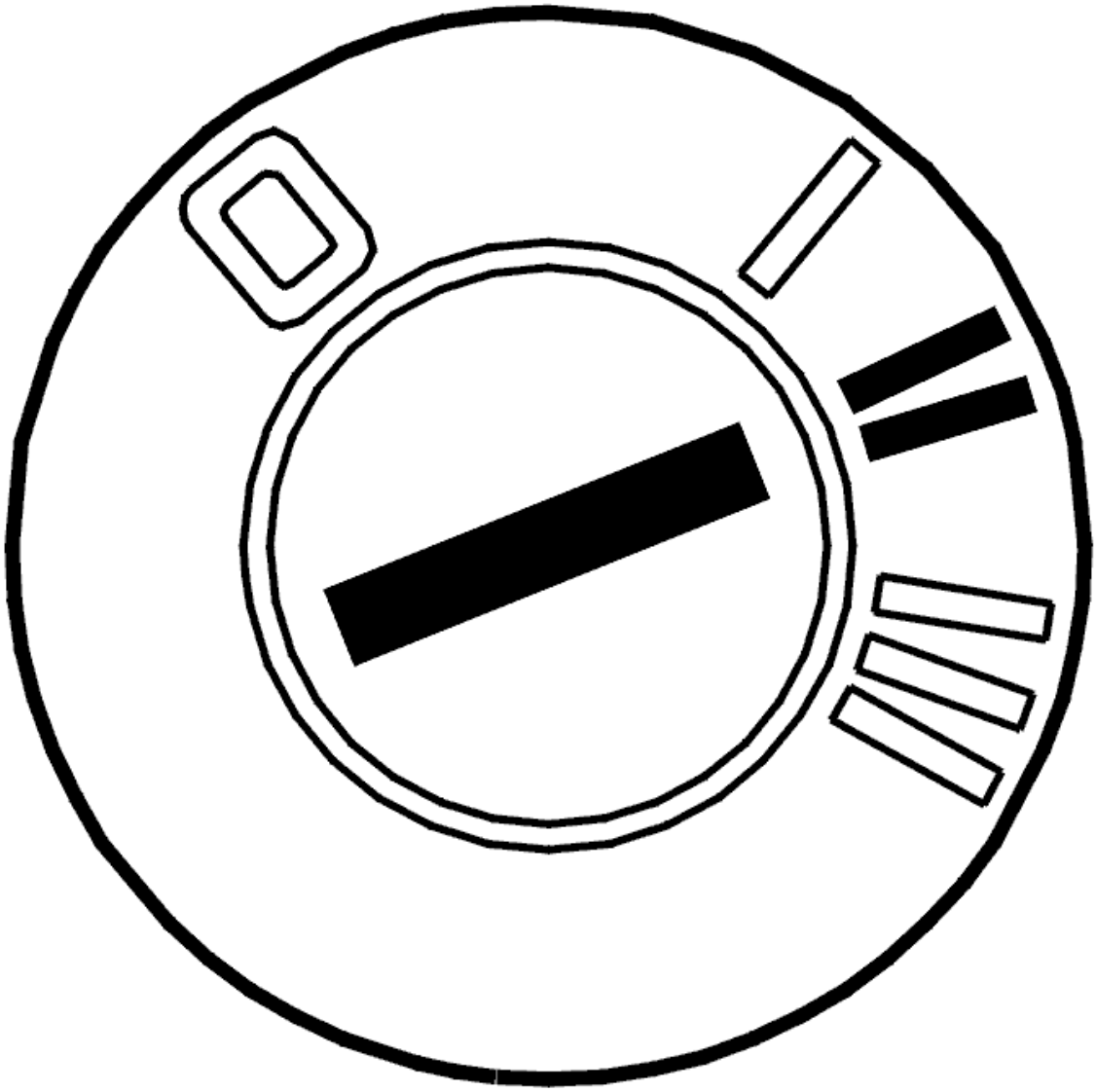


Fig. 345: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and automatic transmission connectors for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary
- Ignition on
- Gear selector in position P
- Activate solenoid S2
- Read off the current across solenoid S2.

  The current must oscillate between approximately 0 and 1.5 A.

  Other information:

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

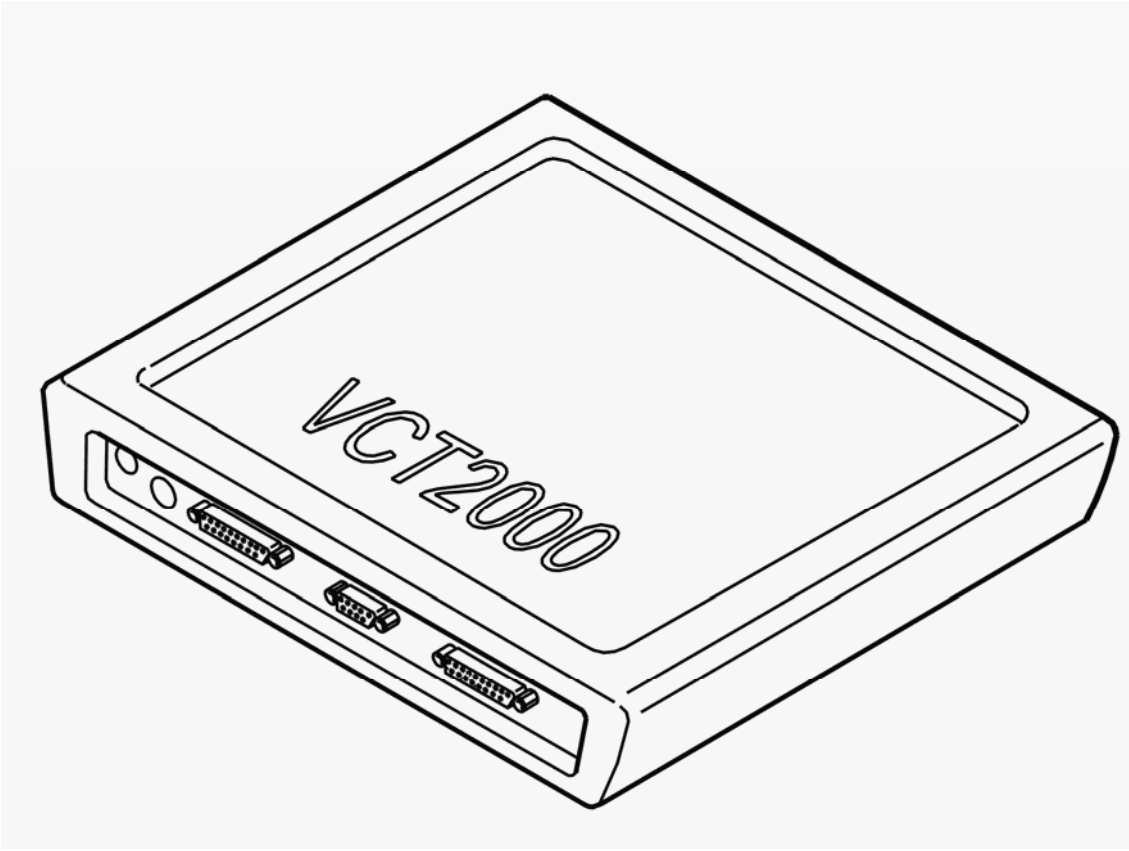


Fig. 346: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING SOLENOID S2**

CHECKING SOLENOID S2

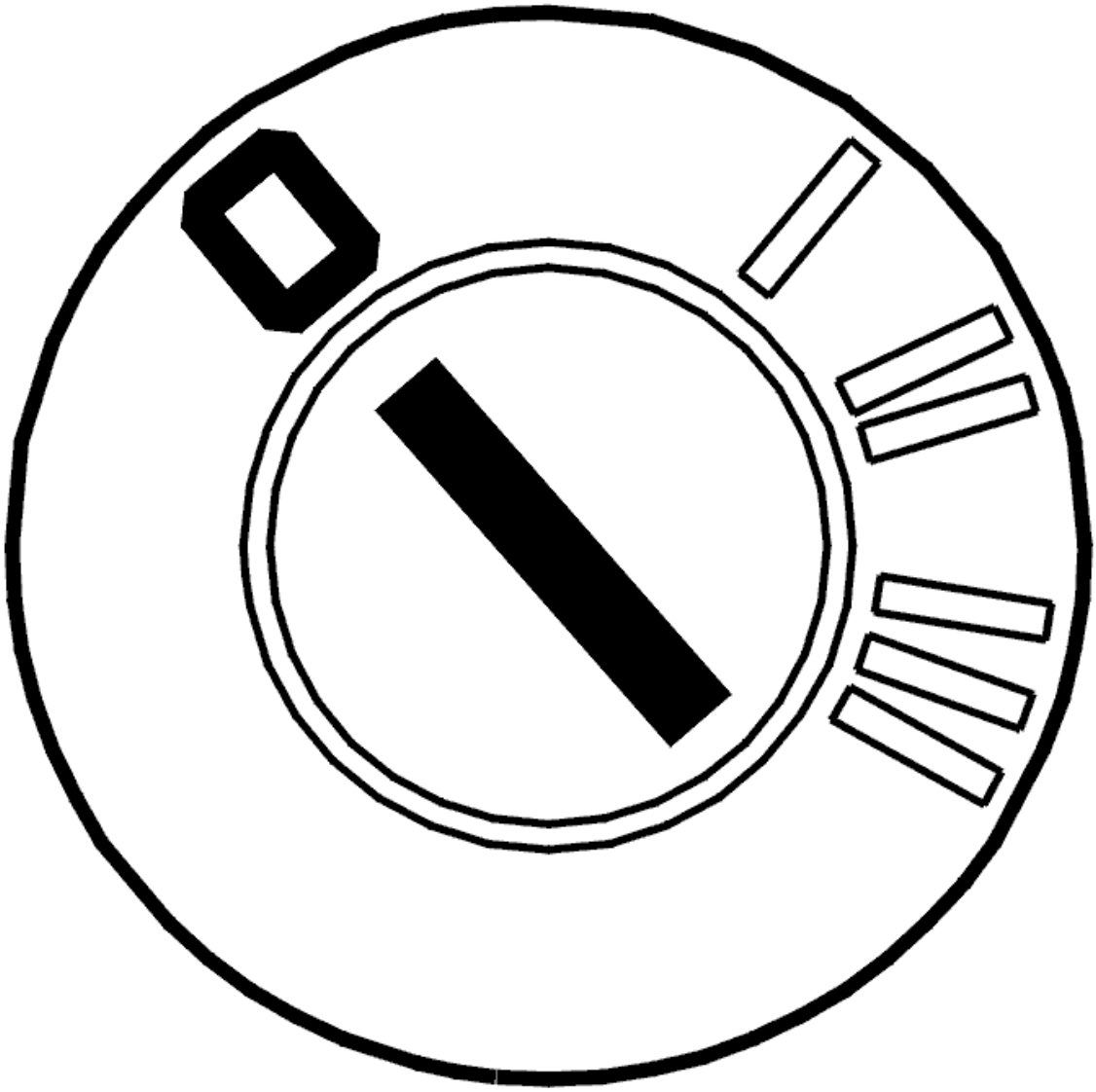


Fig. 347: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

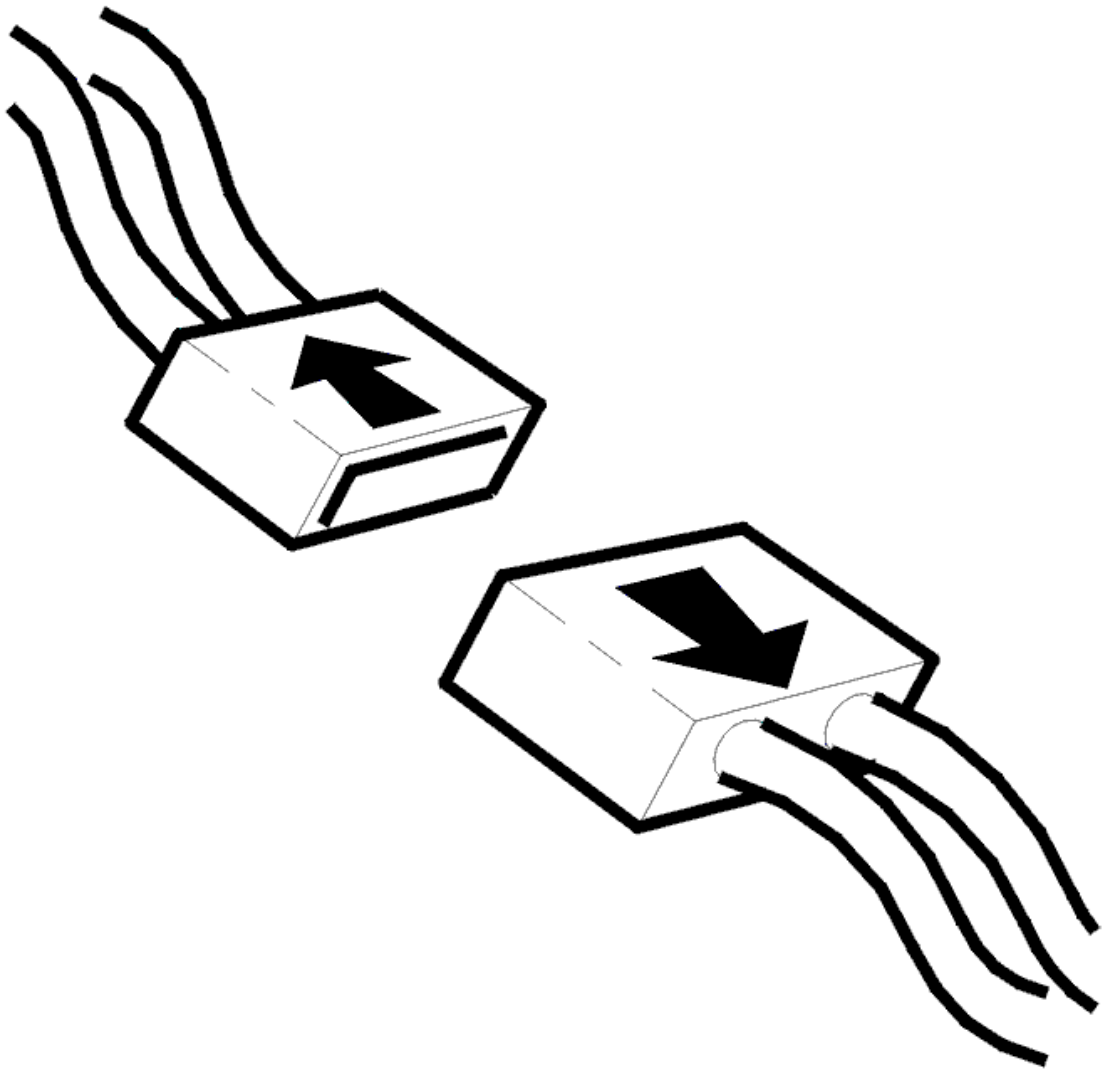


Fig. 348: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the automatic transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals #B (#A2) and #E (#A5).

  The solenoid S2 resistance must be between 18 and 30 ohms.

  Other information:

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**

- For information about signals, see **SIGNAL SPECIFICATION** .

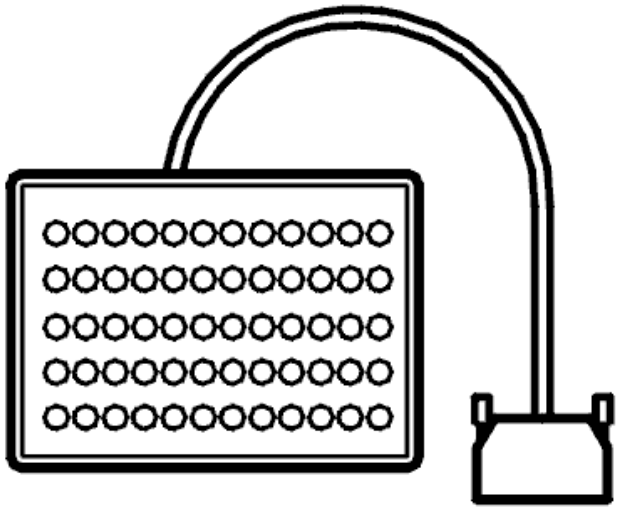


Fig. 349: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

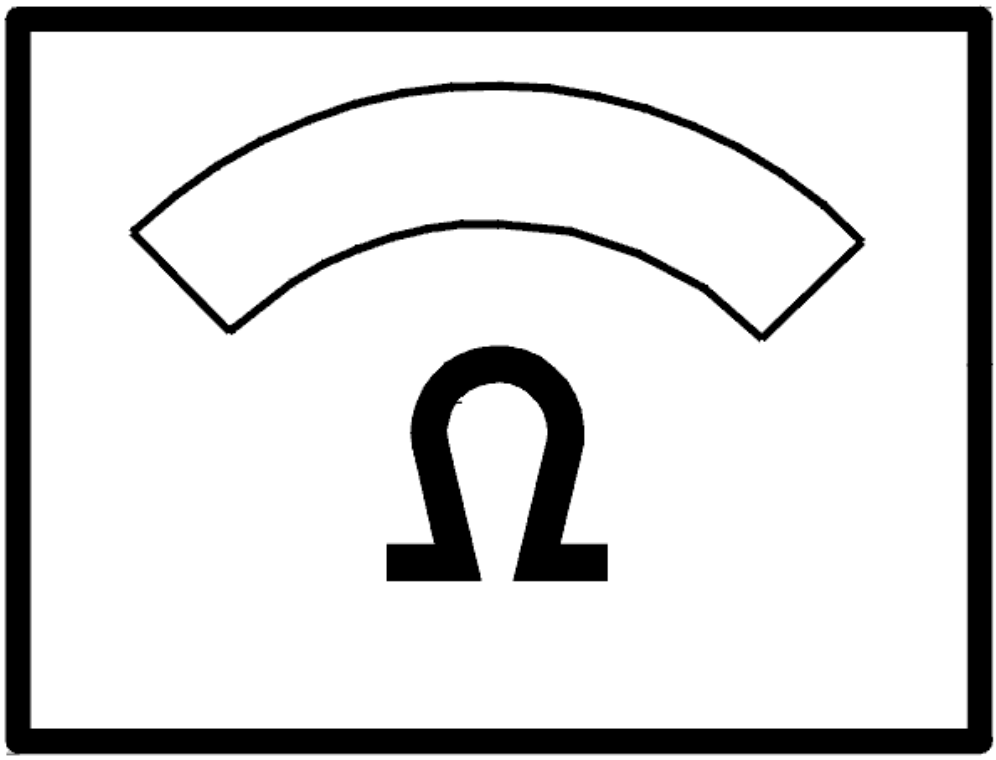


Fig. 350: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

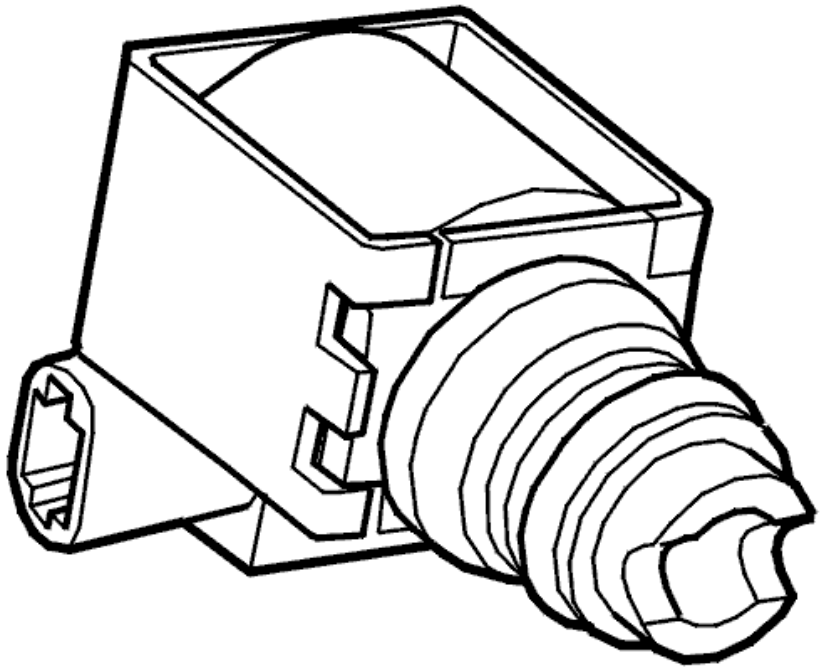


Fig. 351: Identifying Shift Solenoid S1 And S2
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE CONTROL MODULE

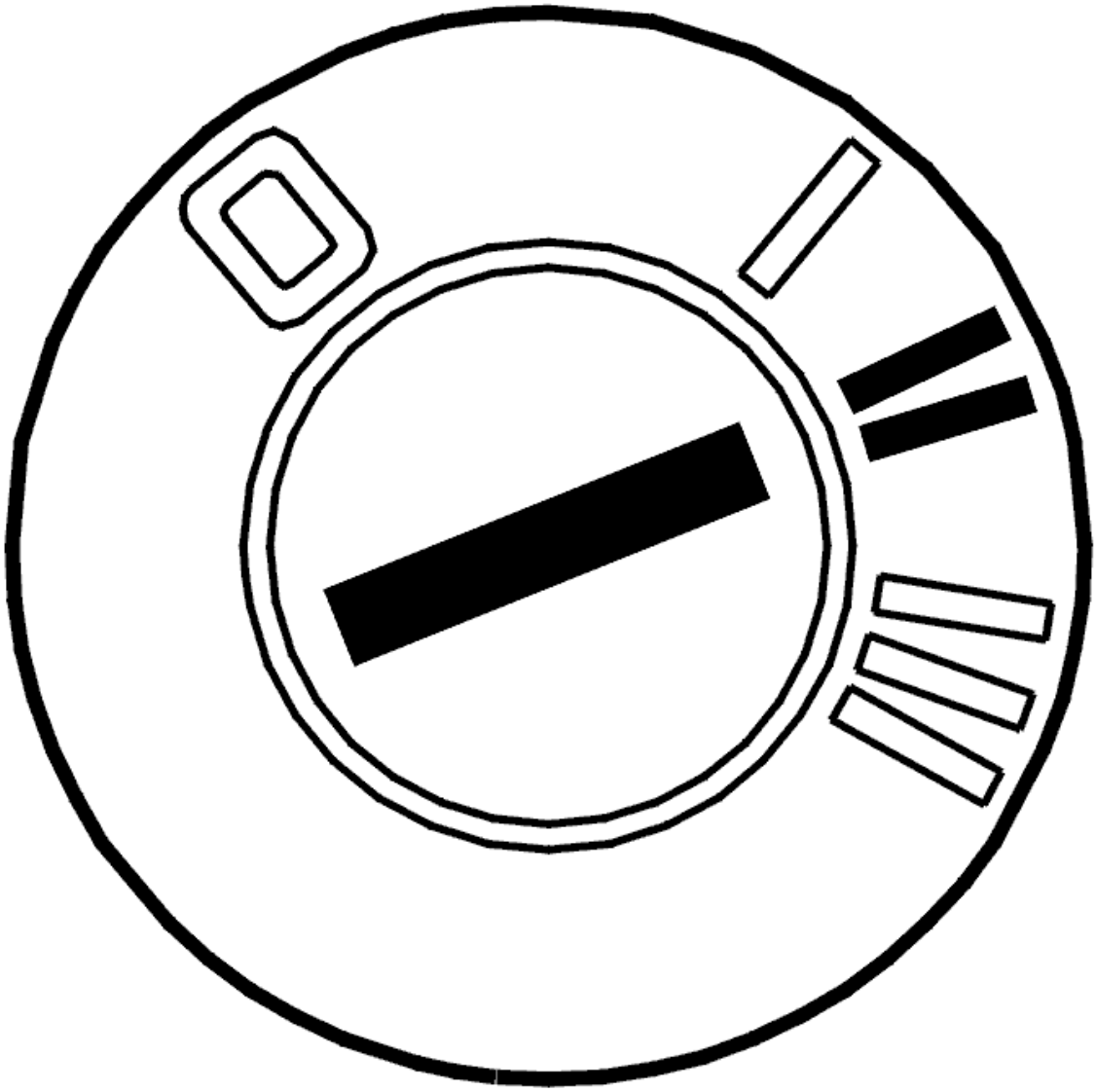


Fig. 352: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

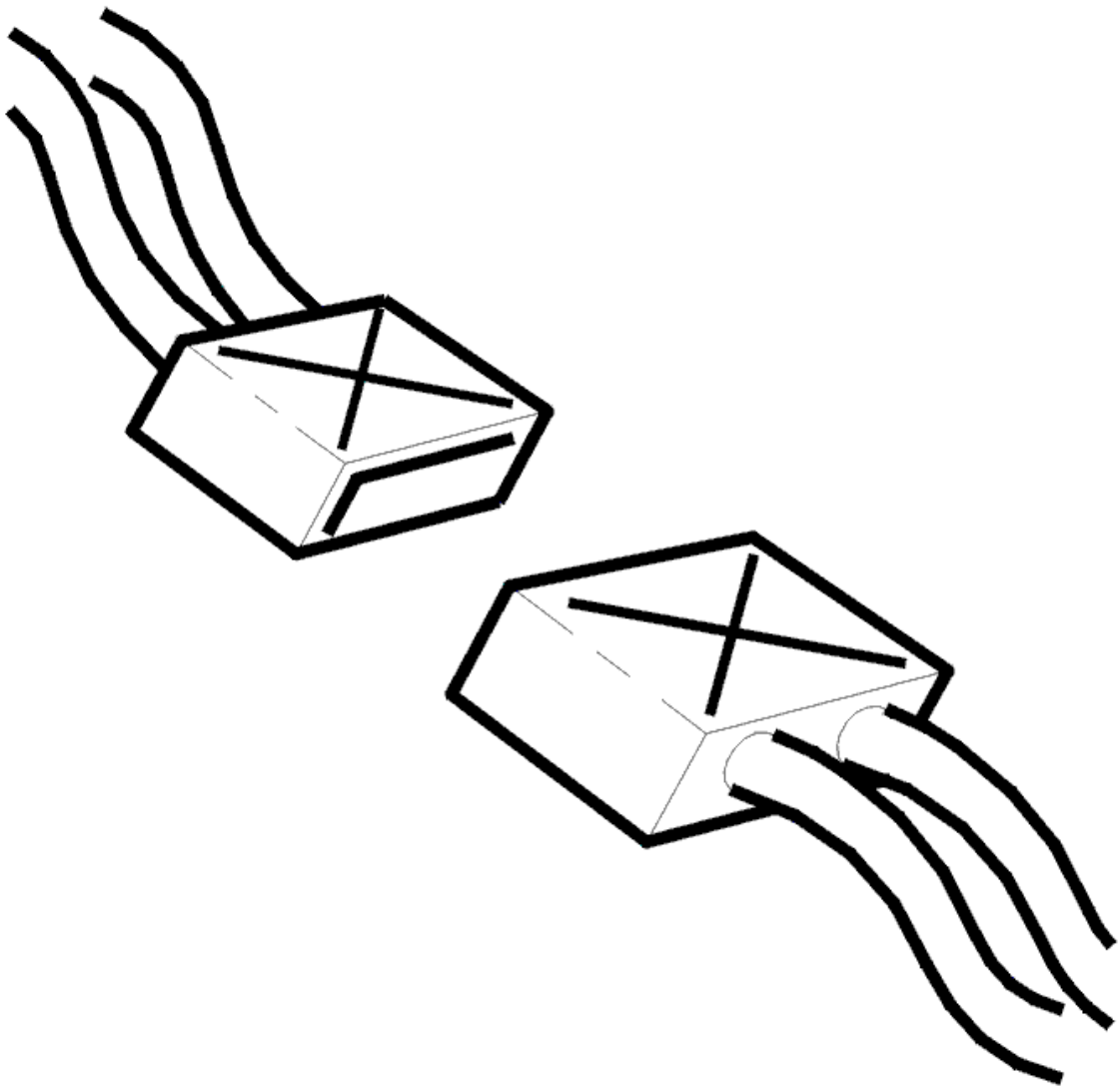


Fig. 353: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

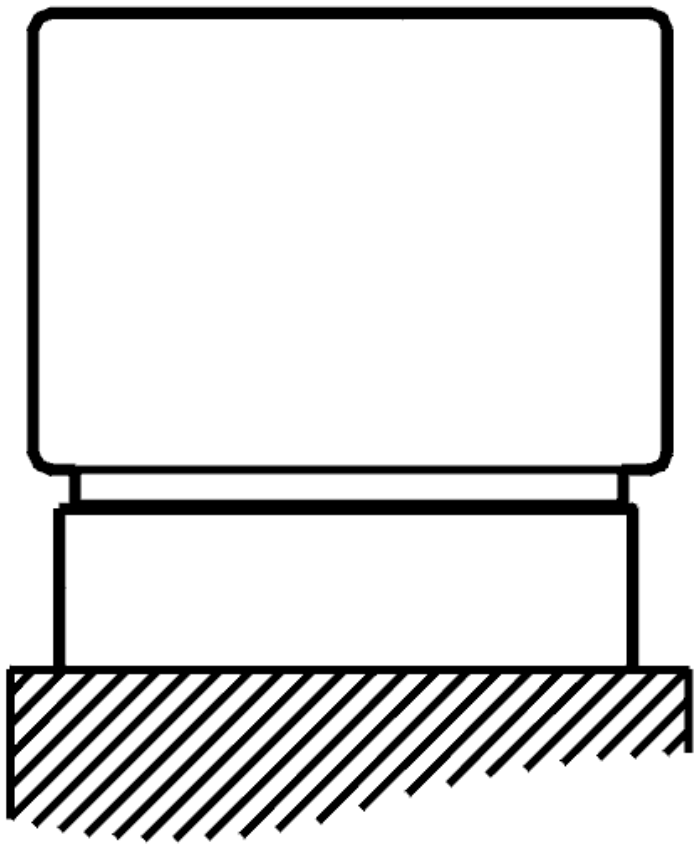


Fig. 354: Identifying Control Unit Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Control module connected.
- Transmission connector disconnected
- Ignition on
- Gear selector in position P.

Check the circuit for solenoid S2 by connecting an ohmmeter between terminals #68 (#B8) and #53 (#A53). The resistance must be between 7 and 13 kohms. Try a new control module if the resistance is infinite.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION** .

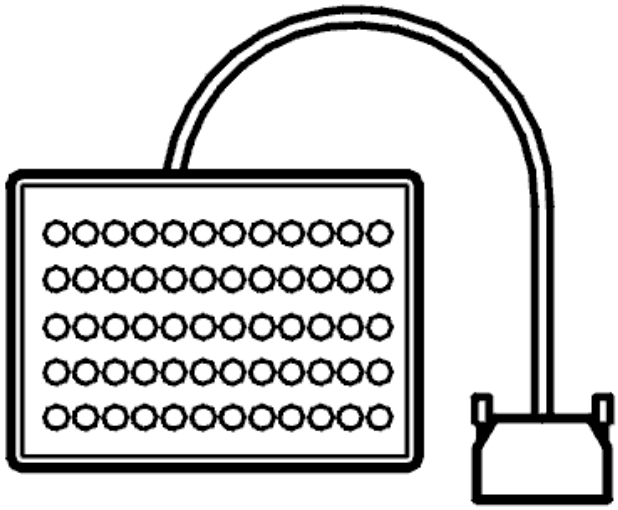


Fig. 355: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

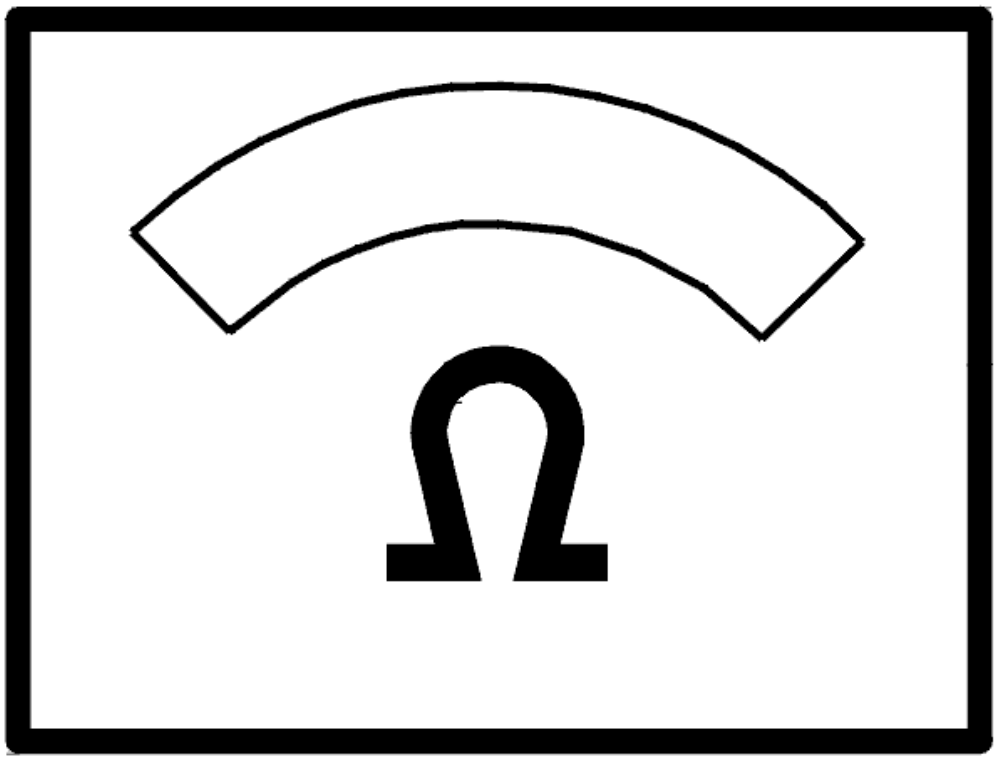


Fig. 356: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance incorrect?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

CHECKING THE WIRING

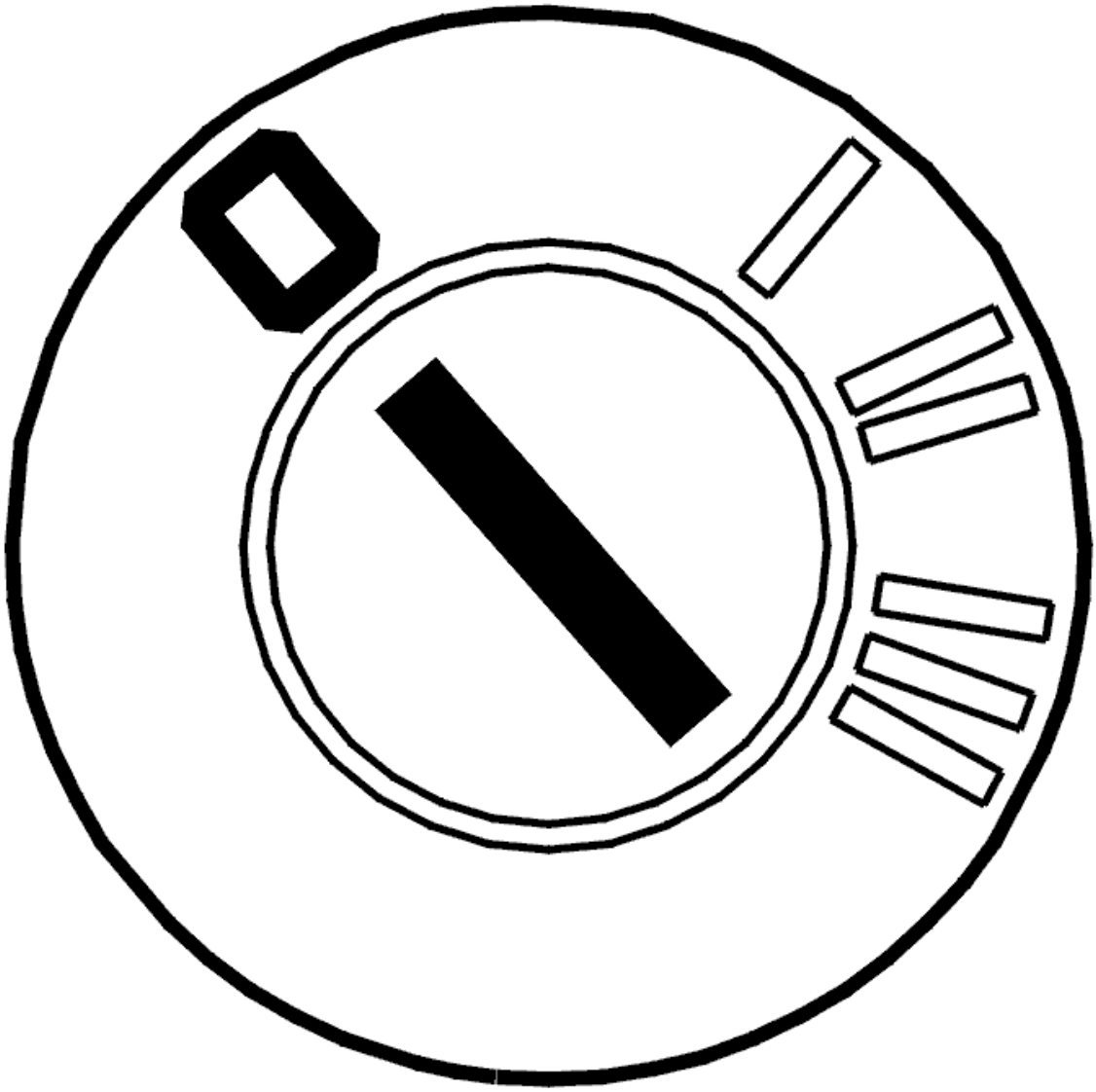


Fig. 357: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

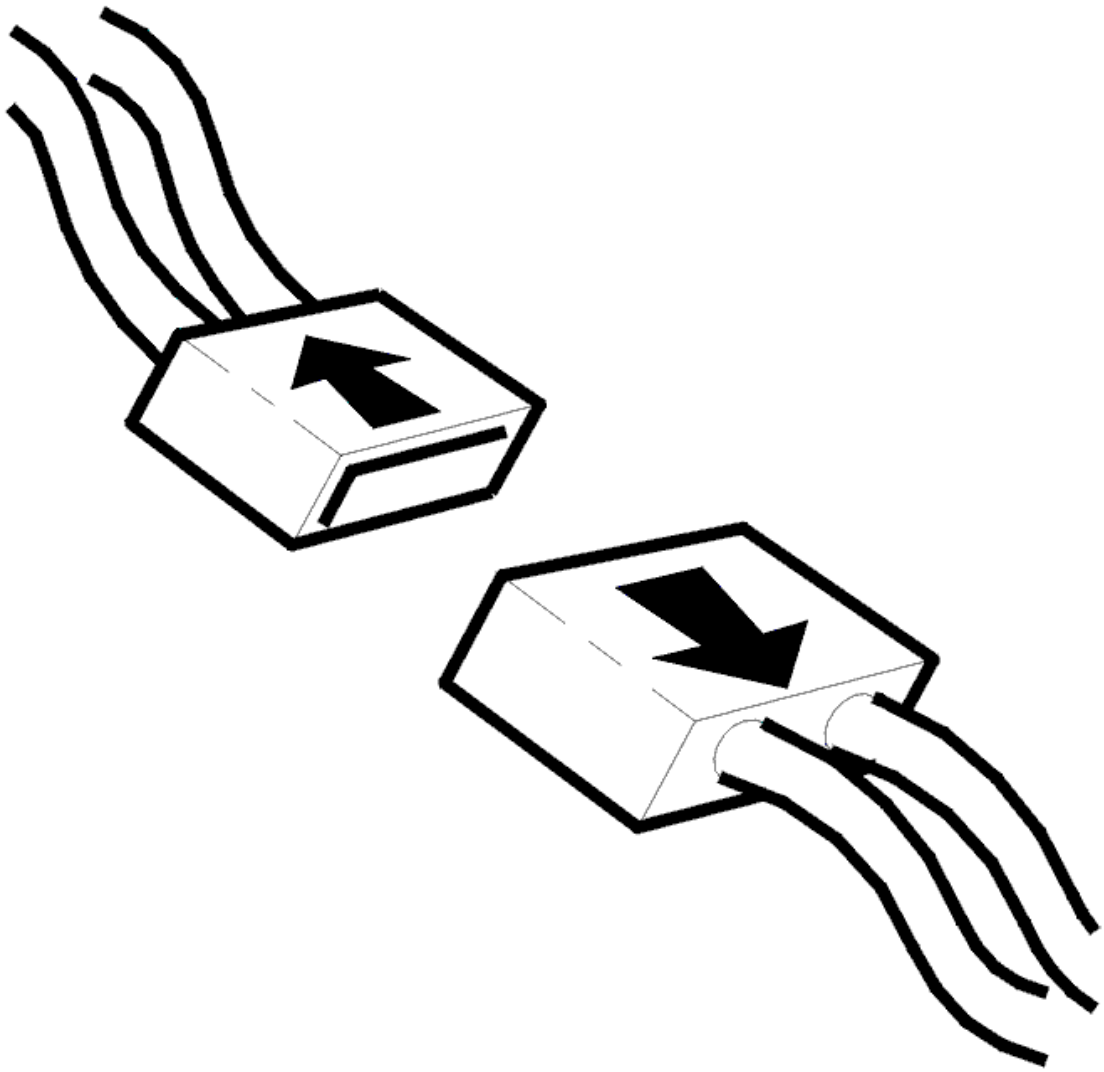


Fig. 358: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

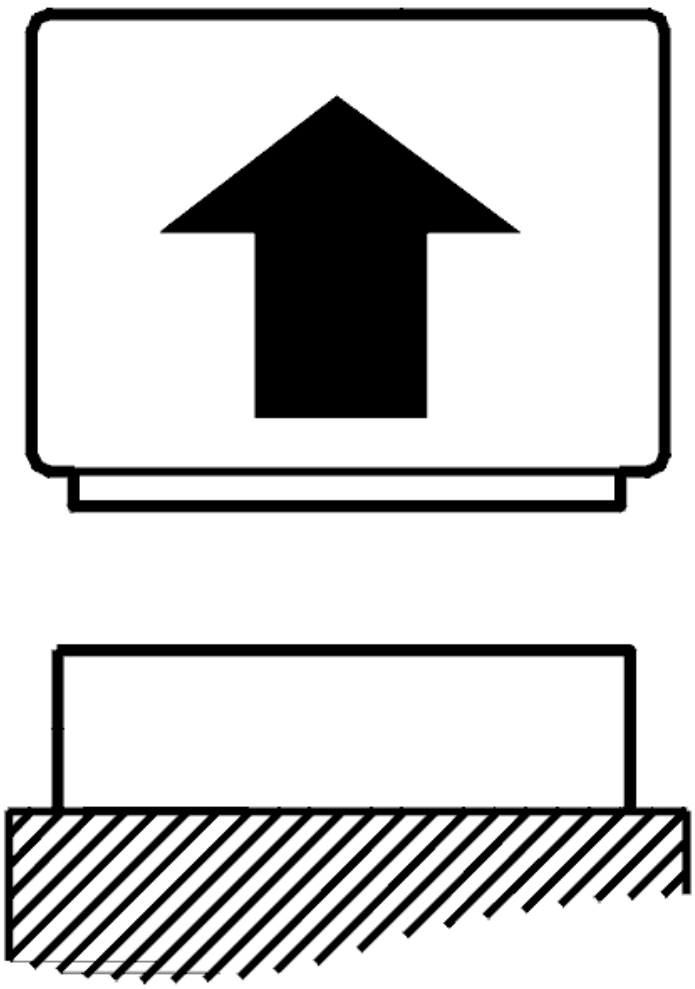


Fig. 359: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the transmission
- Disconnect the control module.
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side).

  Check the cable between control module terminal #A68 (#B8) and transmission connector terminal #B (#A2) (control module side). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

  Check the cable between control module terminal #A53 and transmission connector terminal #E (#A5)

(control module side). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

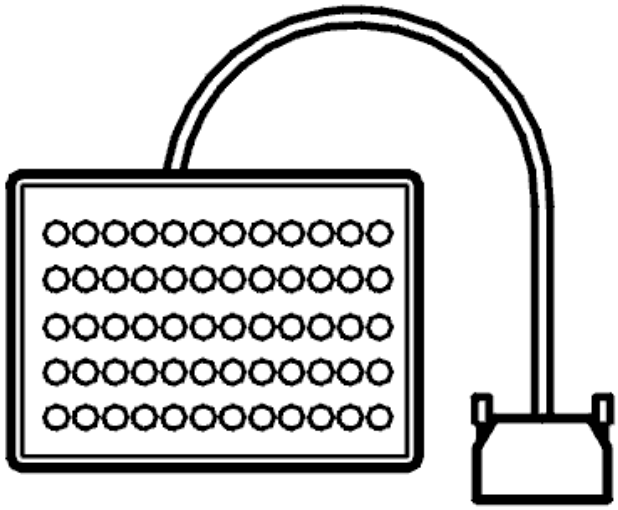


Fig. 360: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

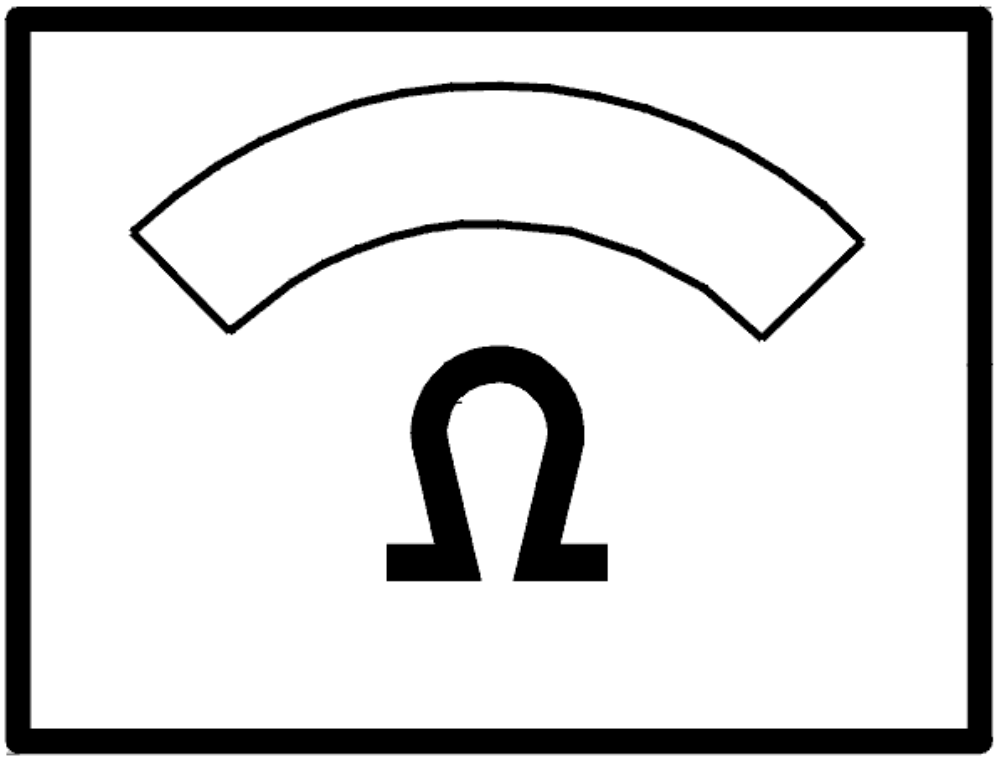


Fig. 361: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE WIRING AND COMPONENT

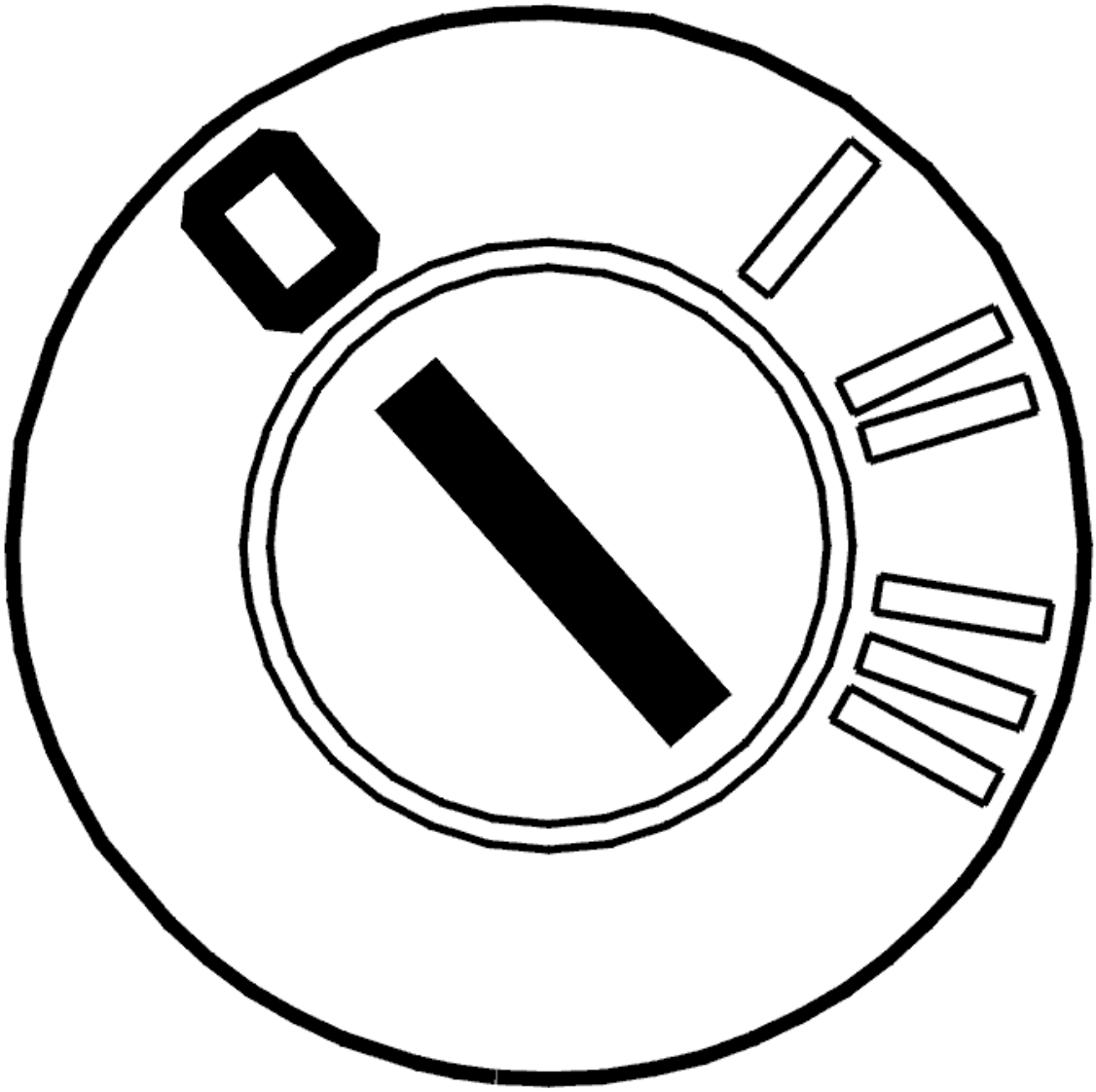


Fig. 362: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** To install, see **SIDE COVER TRANSMISSION, INSTALLING**

  Check the cable between transmission connector (transmission side) terminal #B (#A2) and solenoid S2 terminals #1 and #E (#A5) and solenoid S2 terminal #2. Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

  HINT: Check solenoid S2 by measuring the solenoid resistance between terminals 1 and 2. The resistance must be between 18 and 25 ohms.

  Remedy as necessary.

Other information:

- To remove the transmission, see **TRANSMISSION, REMOVING**
- To install the transmission, see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid S2, see **SOLENOID SHIFTING 2-3, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION** .

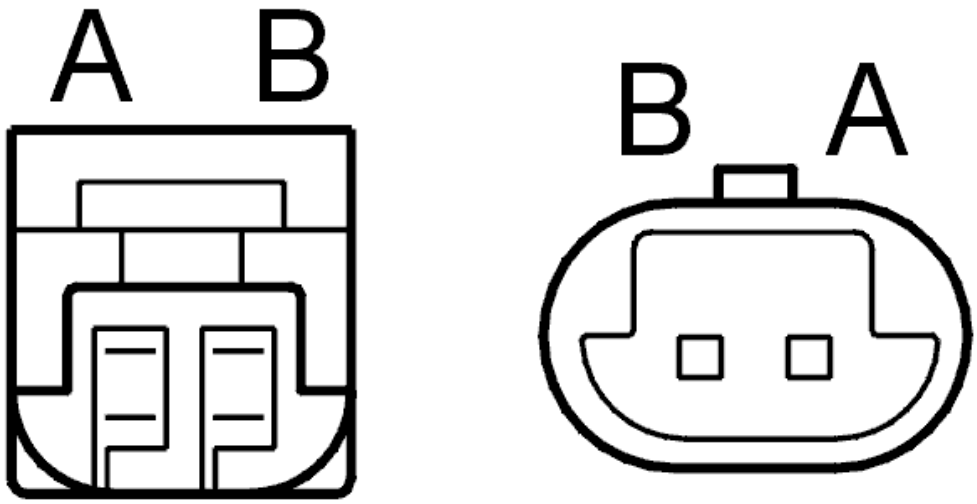


Fig. 363: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

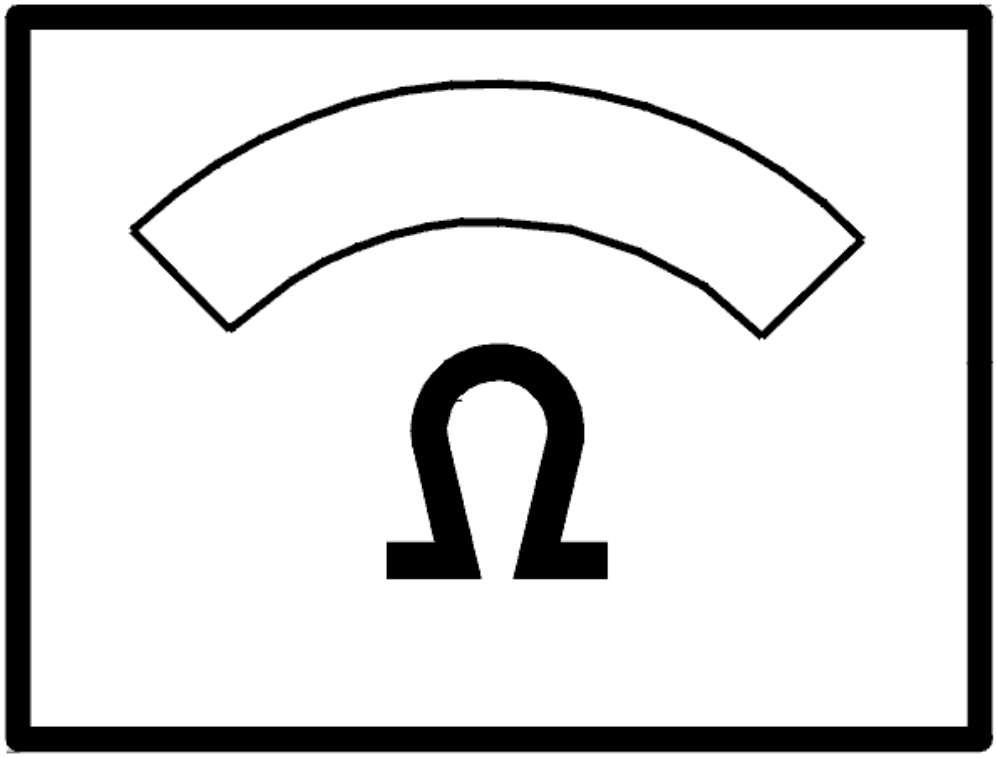


Fig. 364: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

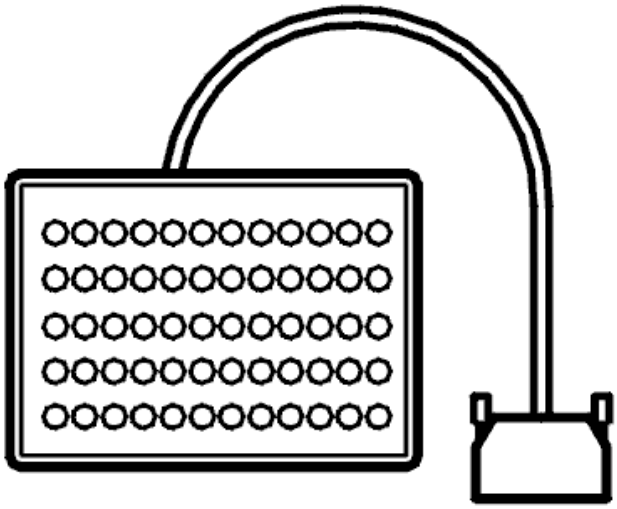


Fig. 365: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the cable between control module terminal #A68 (#B8) and transmission connector terminal #B (#A2) (control module side). Check for an intermittent open-circuit. See **OPEN-CIRCUIT, INTERMITTENT FAULTS** . Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between control module terminal #A53 and transmission connector terminal #E (#A5) (control module side). Check for an intermittent open-circuit. See **OPEN-CIRCUIT, INTERMITTENT FAULTS** . Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid S2, see **SOLENOID SHIFTING 2-3, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION** .

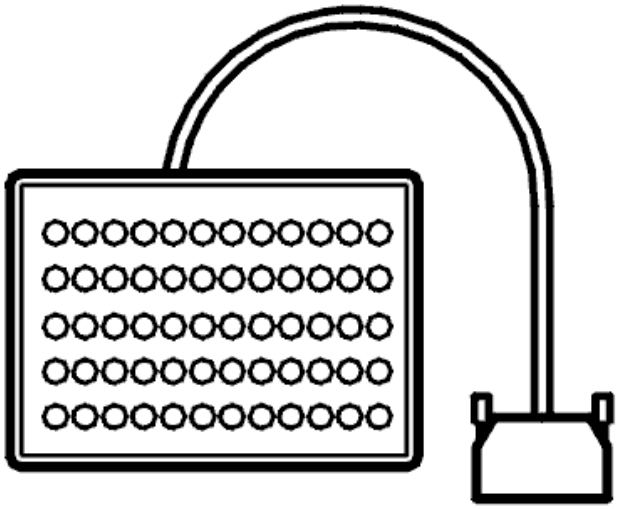


Fig. 366: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

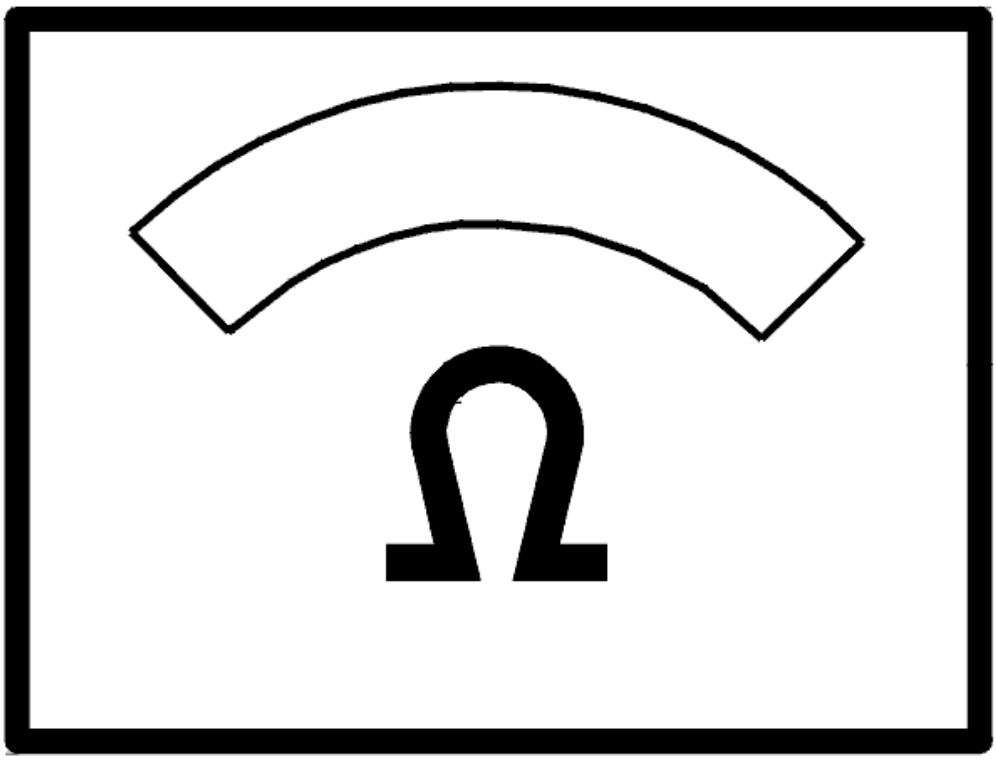


Fig. 367: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

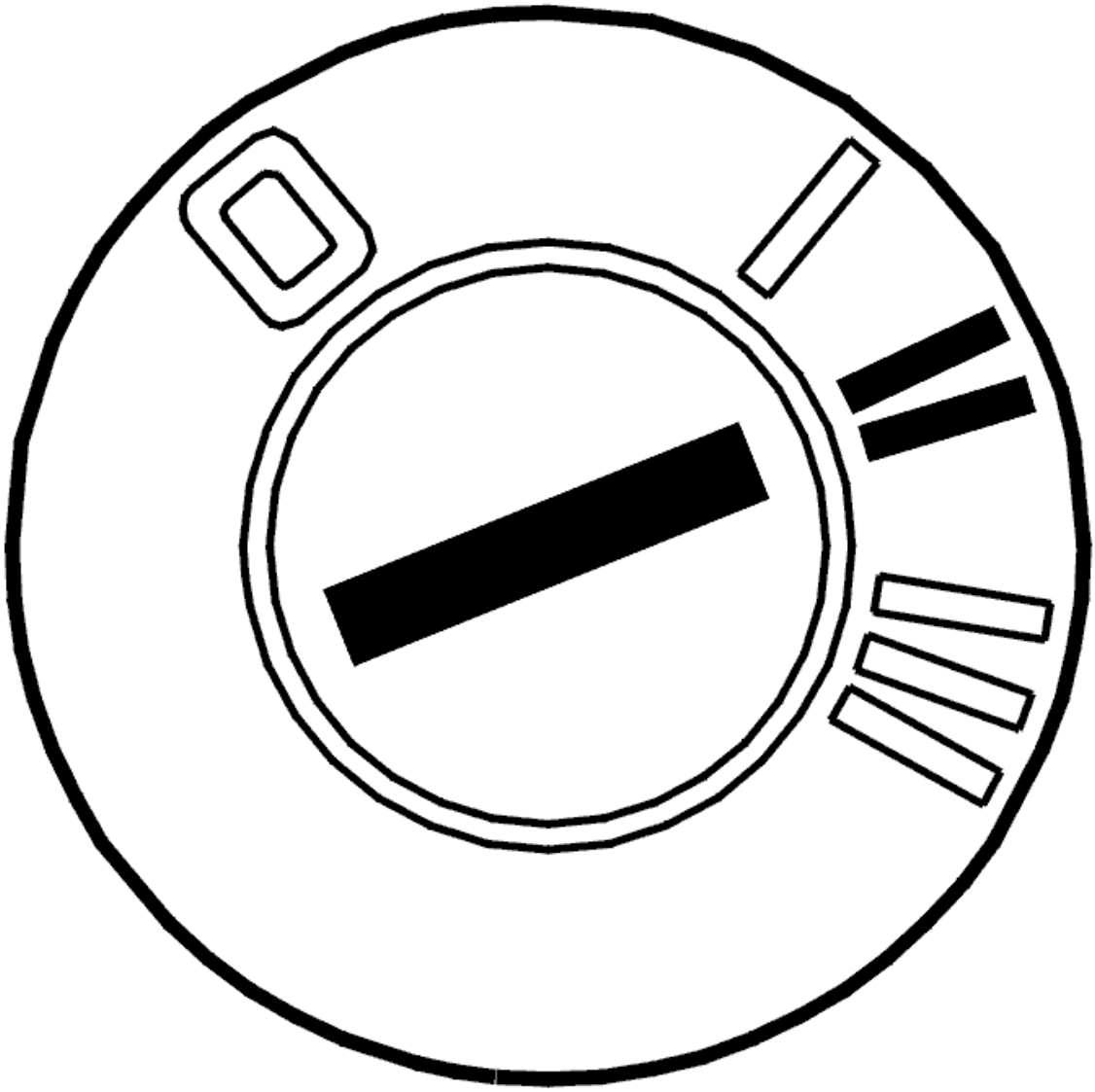


Fig. 368: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

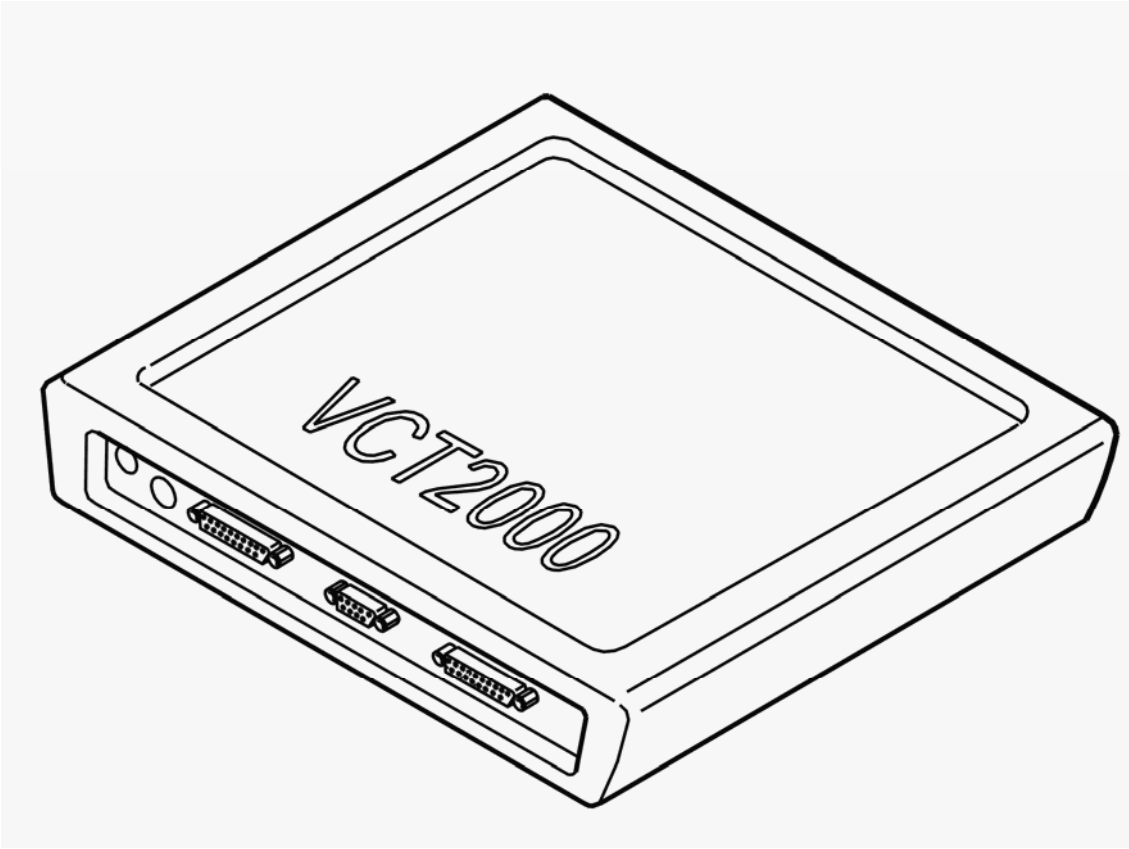


Fig. 369: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

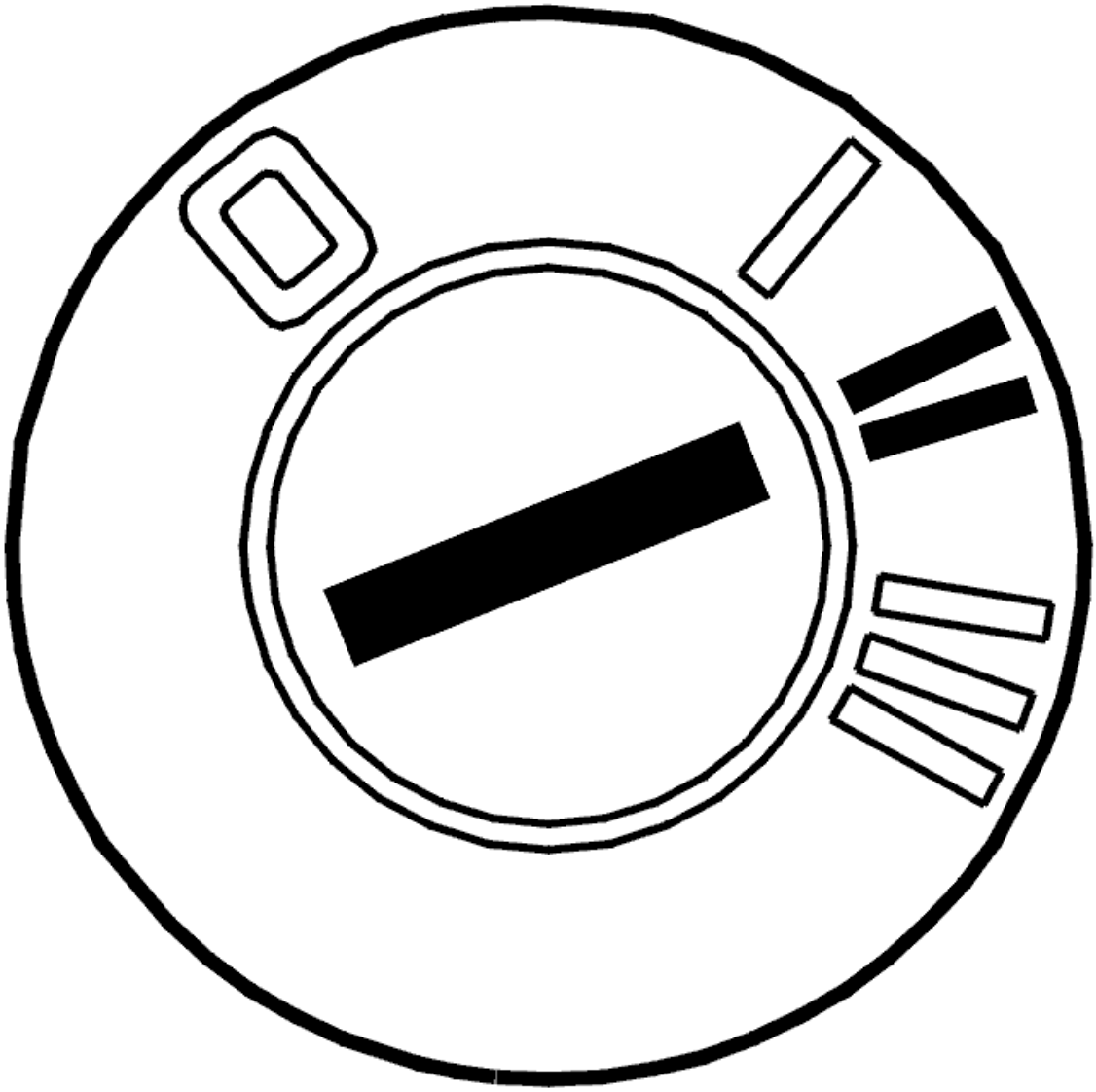


Fig. 370: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Gear selector in position P.
- Activate solenoid S2.
- Read off the current across solenoid S2.

The current should oscillate between approximately 0 and 1.5 A.

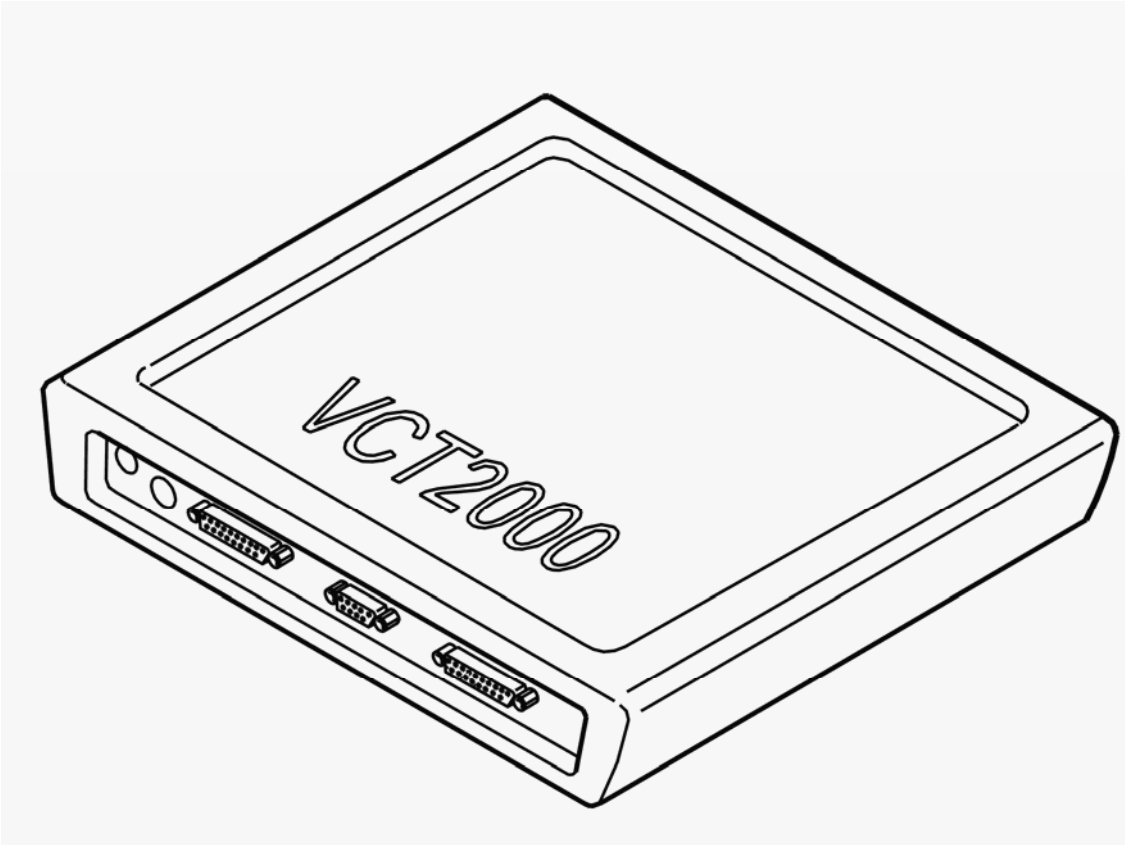


Fig. 371: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

SIGNAL TOO HIGH

CHECKING THE FUNCTION OF THE OIL TEMPERATURE SENSOR

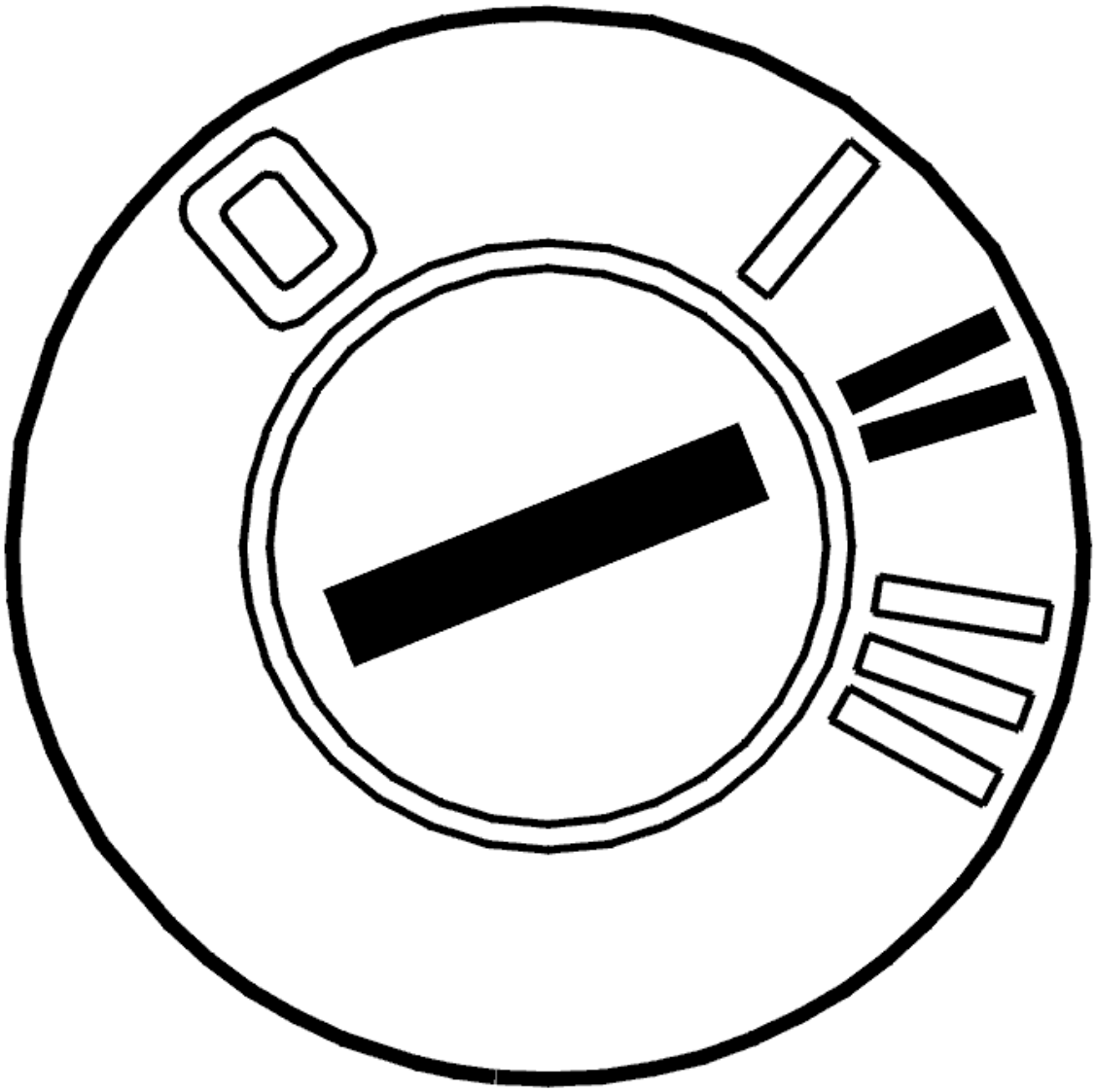


Fig. 372: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

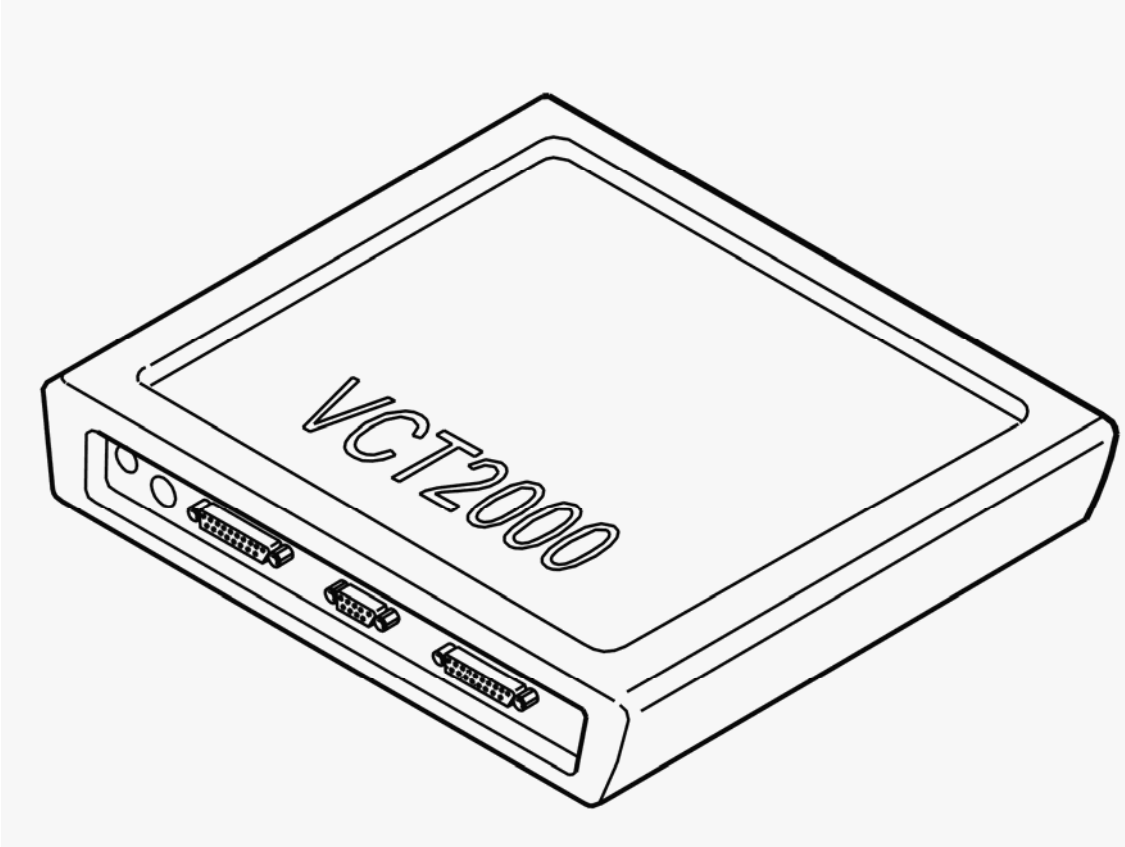


Fig. 373: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

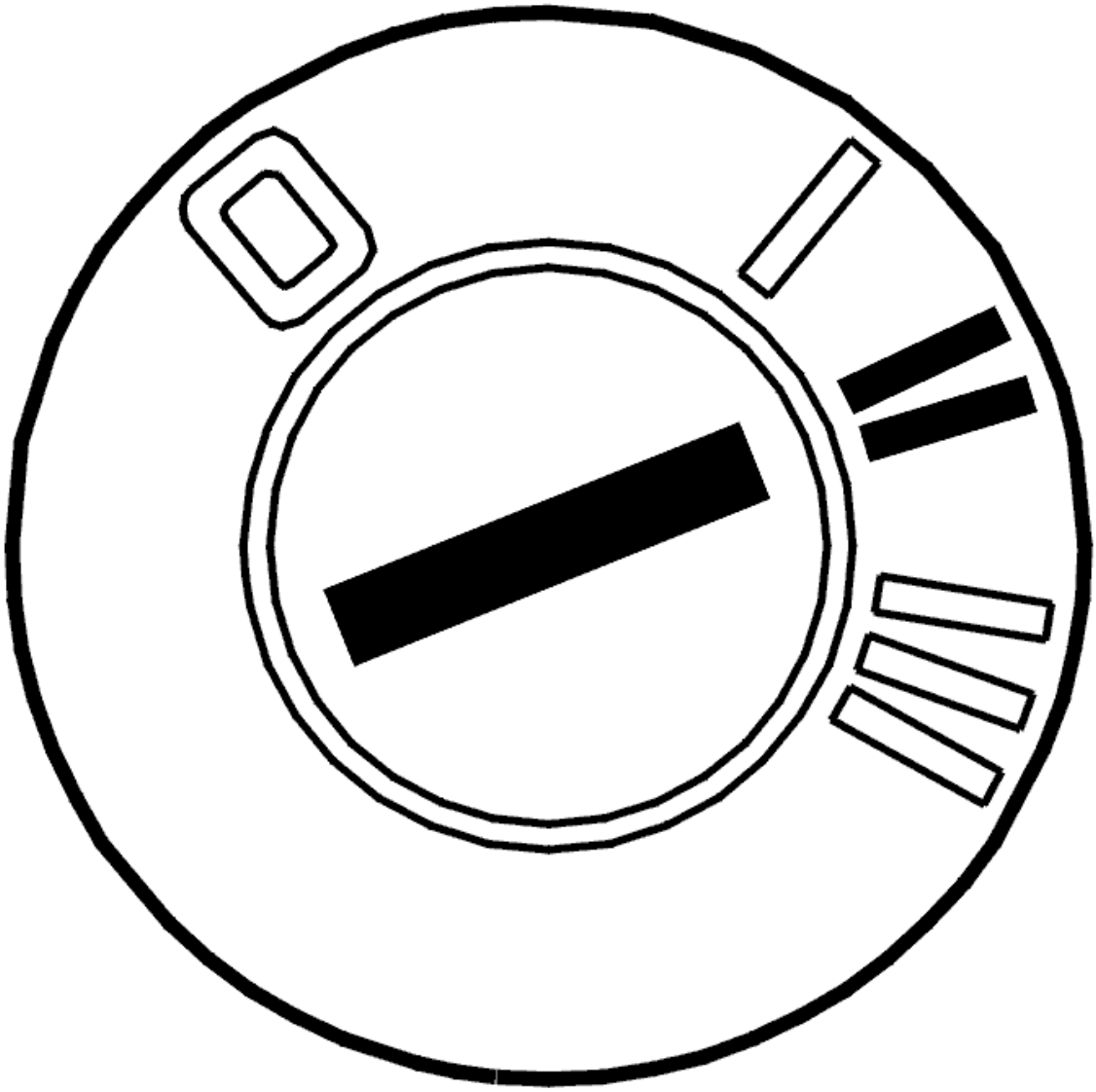


Fig. 374: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

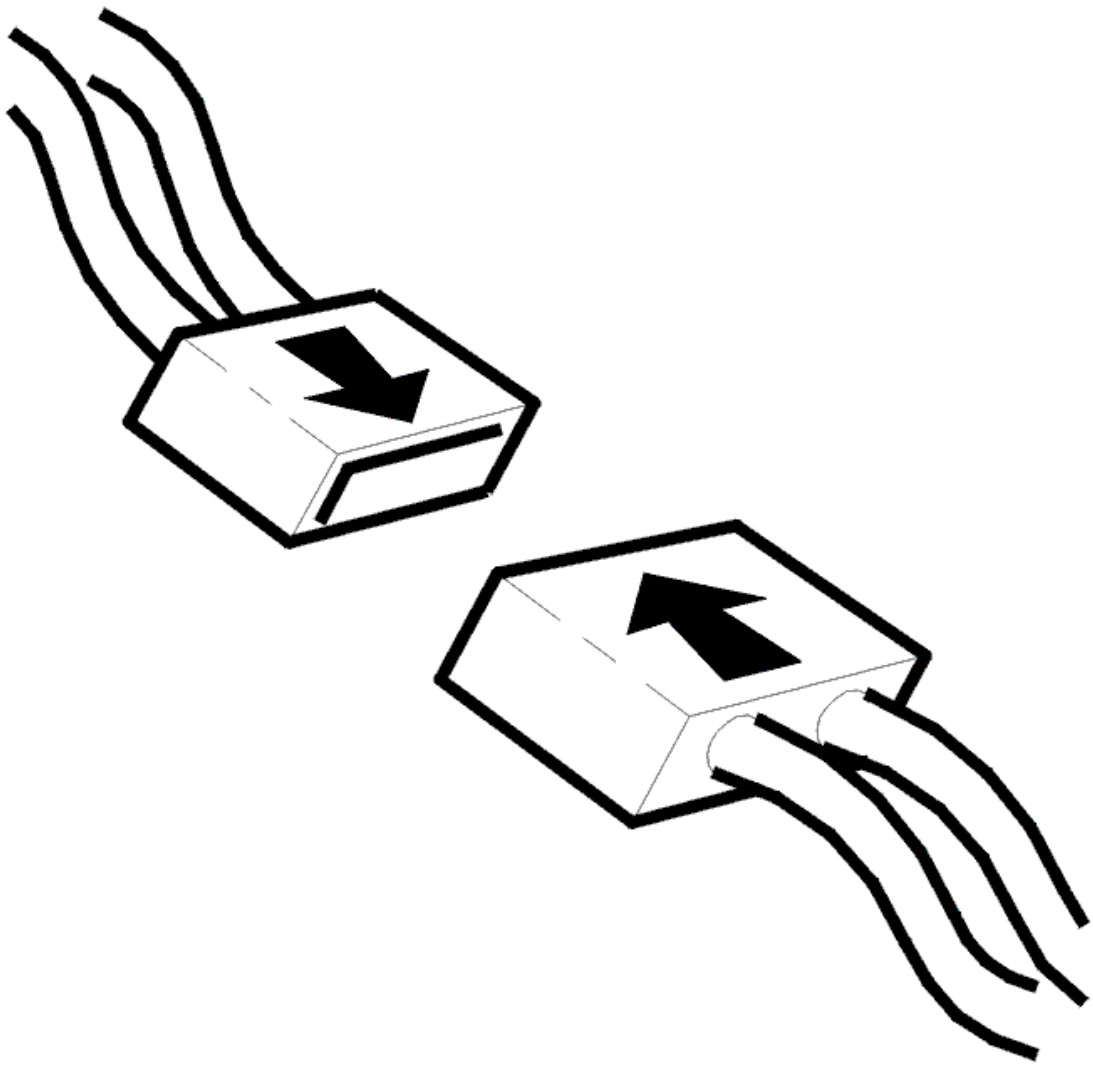


Fig. 375: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and transmission connectors. Check for contact resistance and oxidation
- Reconnect the control module and transmission connectors
- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

  If the transmission temperature is within its permitted range, the cause of the fault was contact resistance or oxidation in the control module or transmission connector.

Other information

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- see **CHECKING WIRING AND TERMINALS**

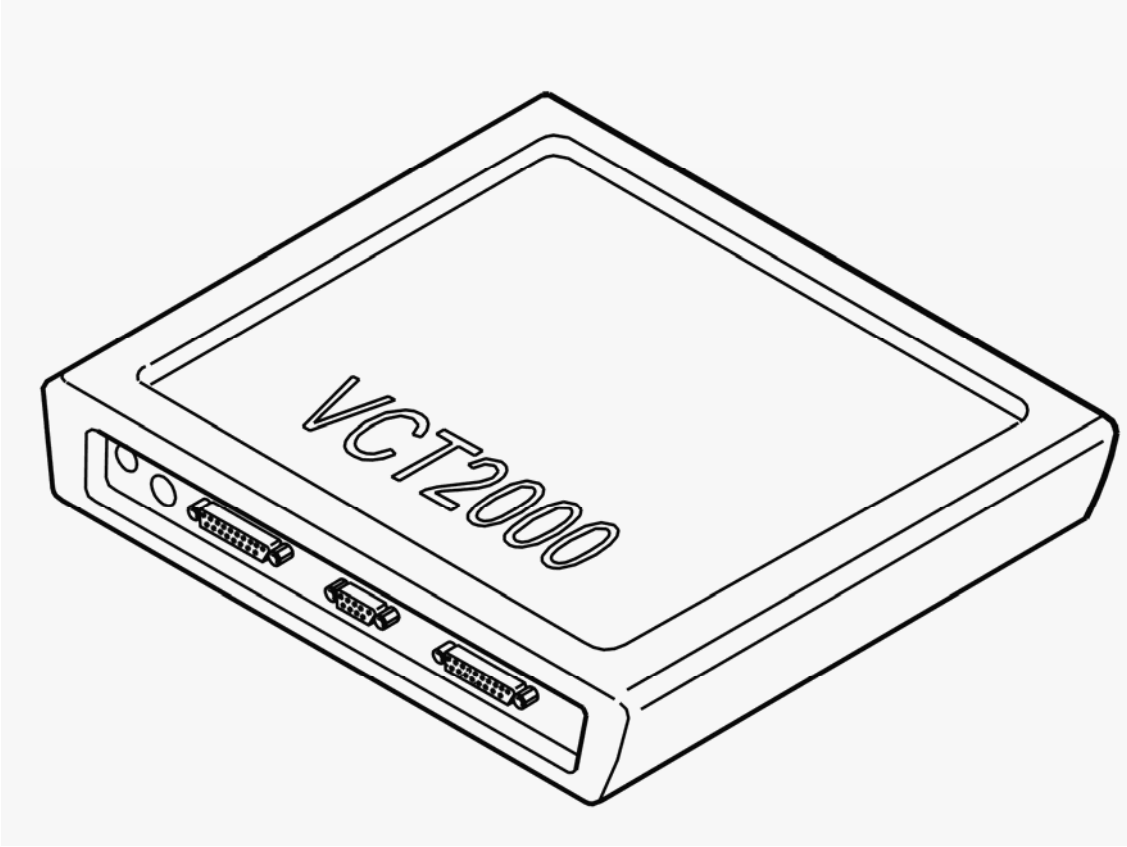


Fig. 376: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING THE TEMPERATURE SENSOR**

CHECKING THE TEMPERATURE SENSOR

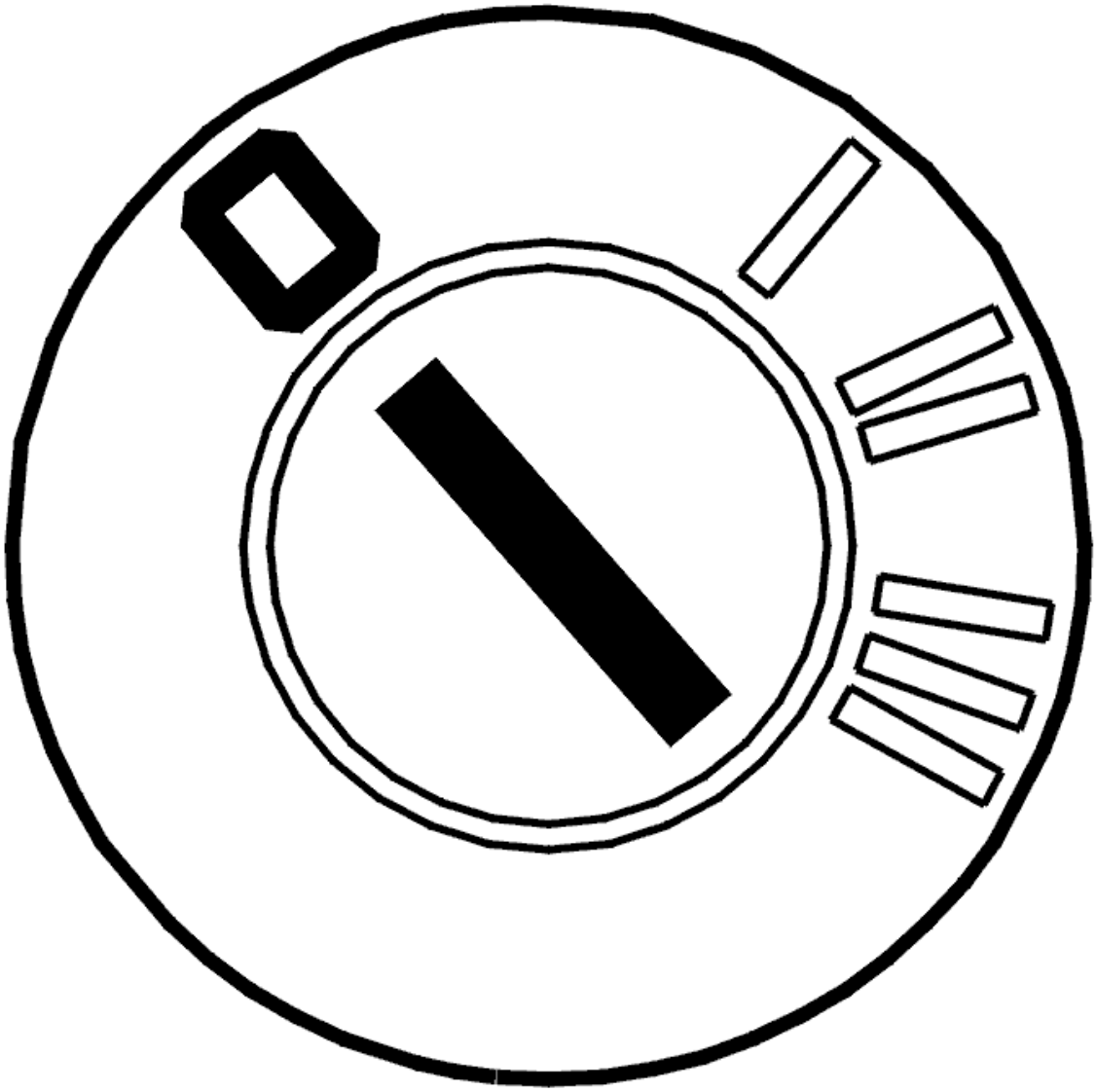


Fig. 377: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector
- Connect adapter see **9511505** and see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals #L (terminal #A11) and #M (terminal #A12).

  The resistance must be 3.4-3.6 kohms at 20 °C.

  Other information

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - For information about signals, see **SIGNAL SPECIFICATION**

- For information about the resistance values, see **COMPONENT RESISTANCE VALUES**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES** .

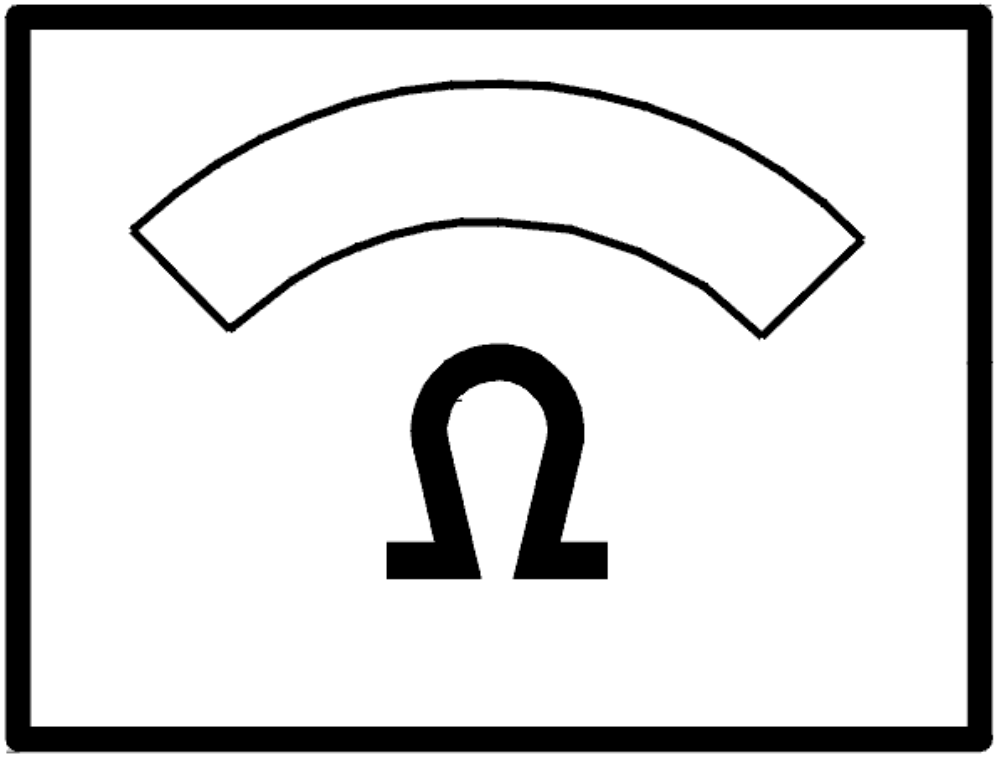


Fig. 378: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

- Breakout box connected to the control module
- Breakout box connected to the transmission connector.

Check the cable between control module terminal #37 (#A37) and transmission connector (control module side) terminal #L (#A11). Check for an open-circuit. Check for a short-circuit to supply voltage.

Check the cable between control module terminal #55 (#A55) and transmission connector (control module side) terminal #M (#A12). Check for an open-circuit. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

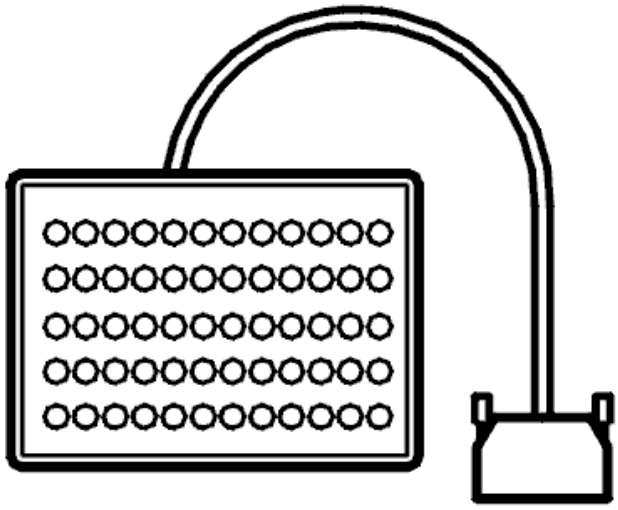


Fig. 379: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

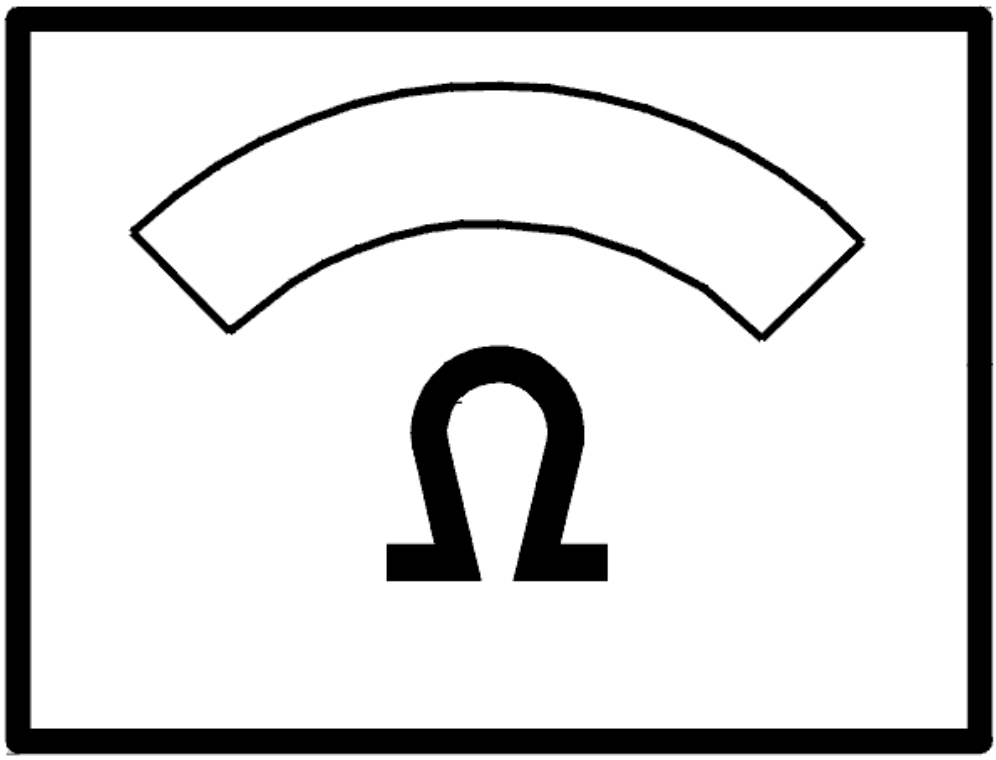


Fig. 380: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

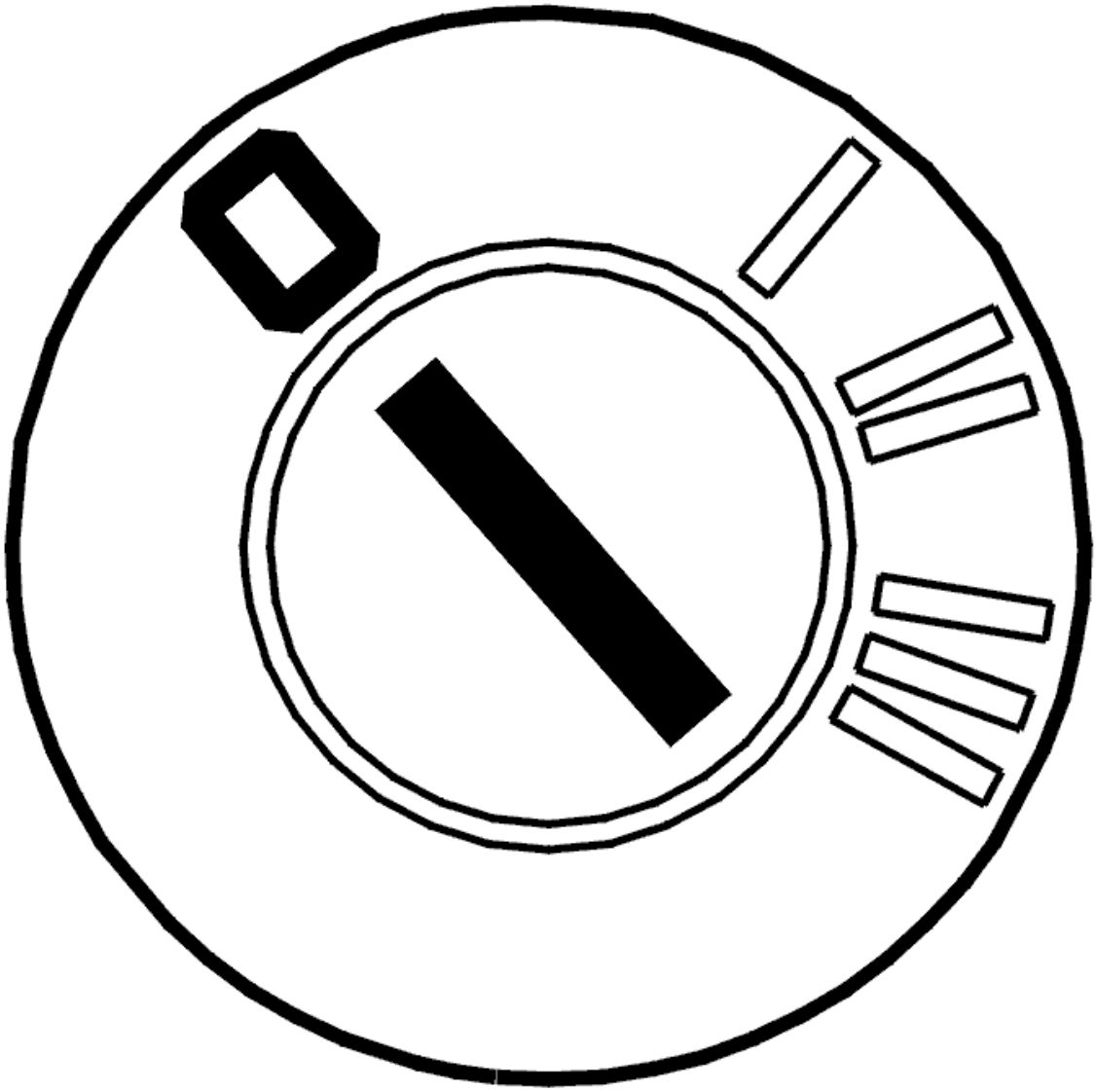


Fig. 381: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission terminal #L (#A11) and temperature sensor terminal #A. Check for an open-circuit. Check for a short-circuit to supply voltage.

  Check the cable between transmission terminal #M (#A12) and temperature sensor terminal #B. Check for an open-circuit. Check for a short-circuit to supply voltage.

  HINT: Check the temperature sensor by measuring the resistance between temperature sensor connector terminals #A and #B. The resistance must be between 3.5-3.6 kohms at 20° C.

  Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- To replace the temperature sensor, see **TEMPERATURE SENSOR FLUID TRANSMISSION, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES**
- see **CHECKING WIRING AND TERMINALS**

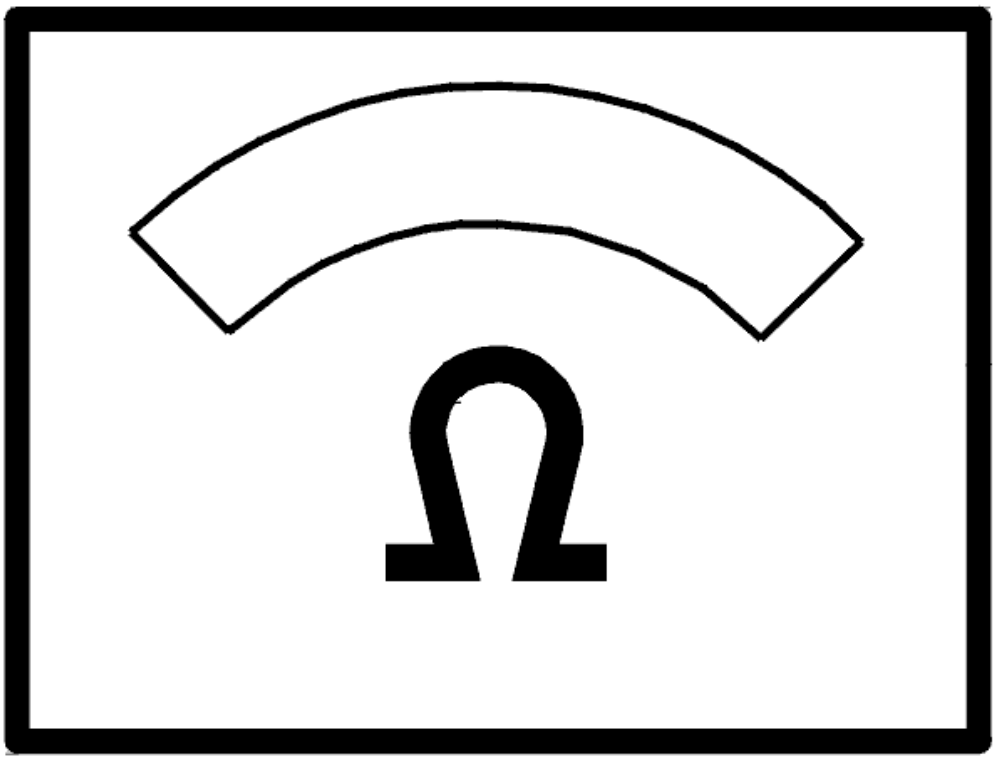


Fig. 382: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the control module and automatic transmission connector. Check for contact resistance and oxidation. Remedy if necessary.

Check the cable between control module terminal #A37 (#A37) and transmission connector (control module side) terminal #11. Check for an intermittent open-circuit. Check for an intermittent short-circuit to supply voltage.

Check the cable between control module terminal #A55 (#A55) and transmission connector (control module side) terminal #12. Check for an intermittent open-circuit. Check for an intermittent short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

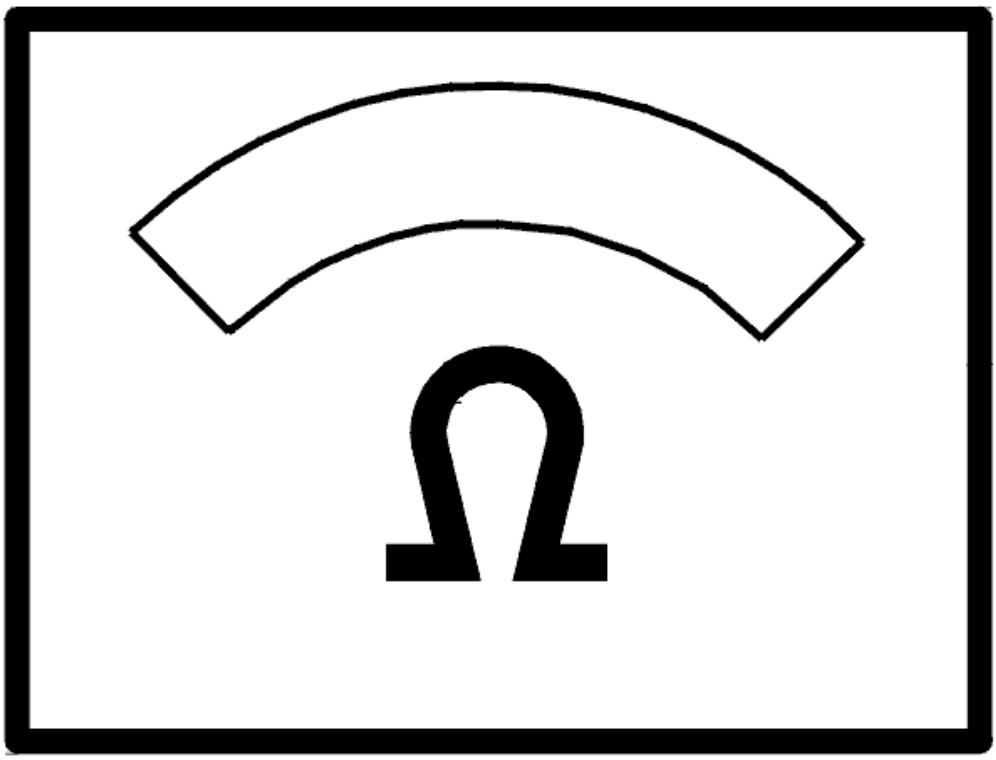


Fig. 383: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

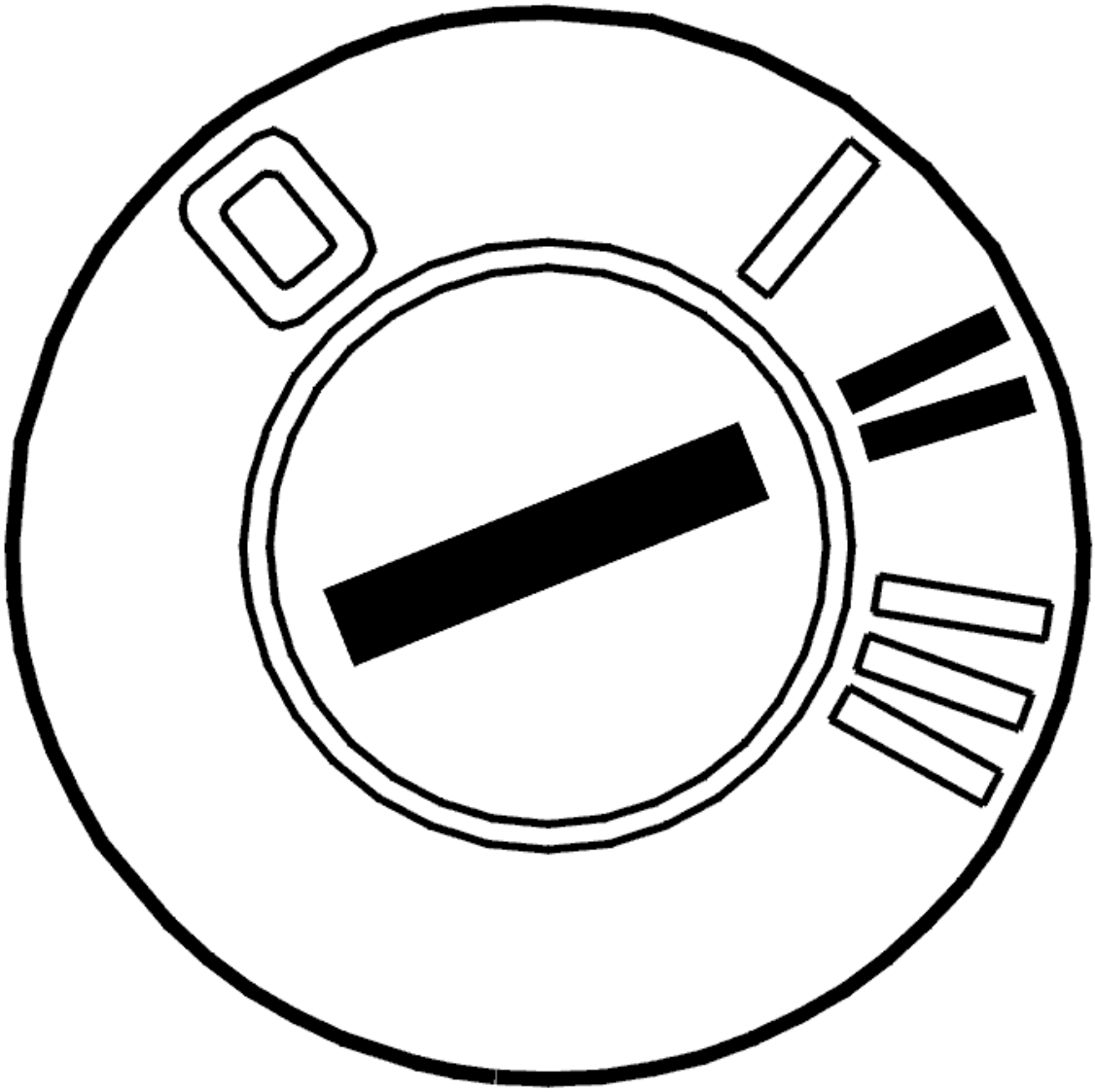


Fig. 384: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

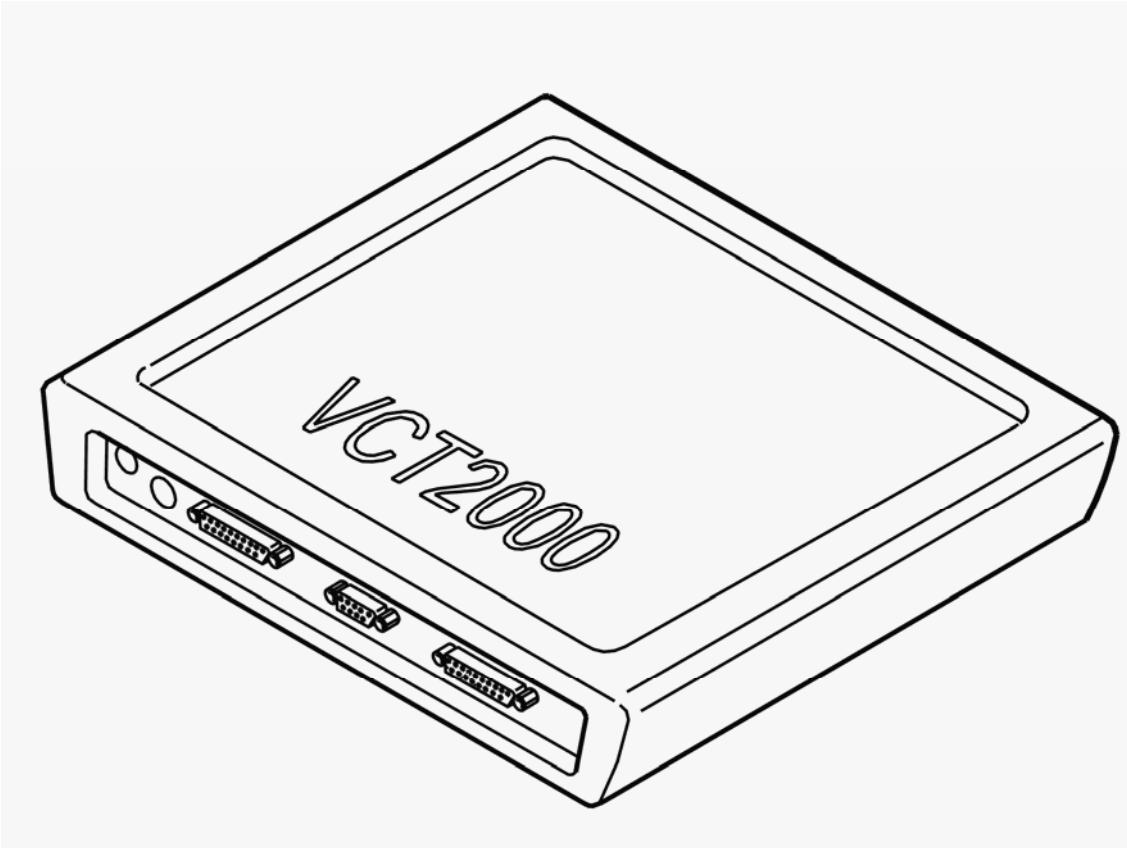


Fig. 385: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair check that the fault has been remedied.

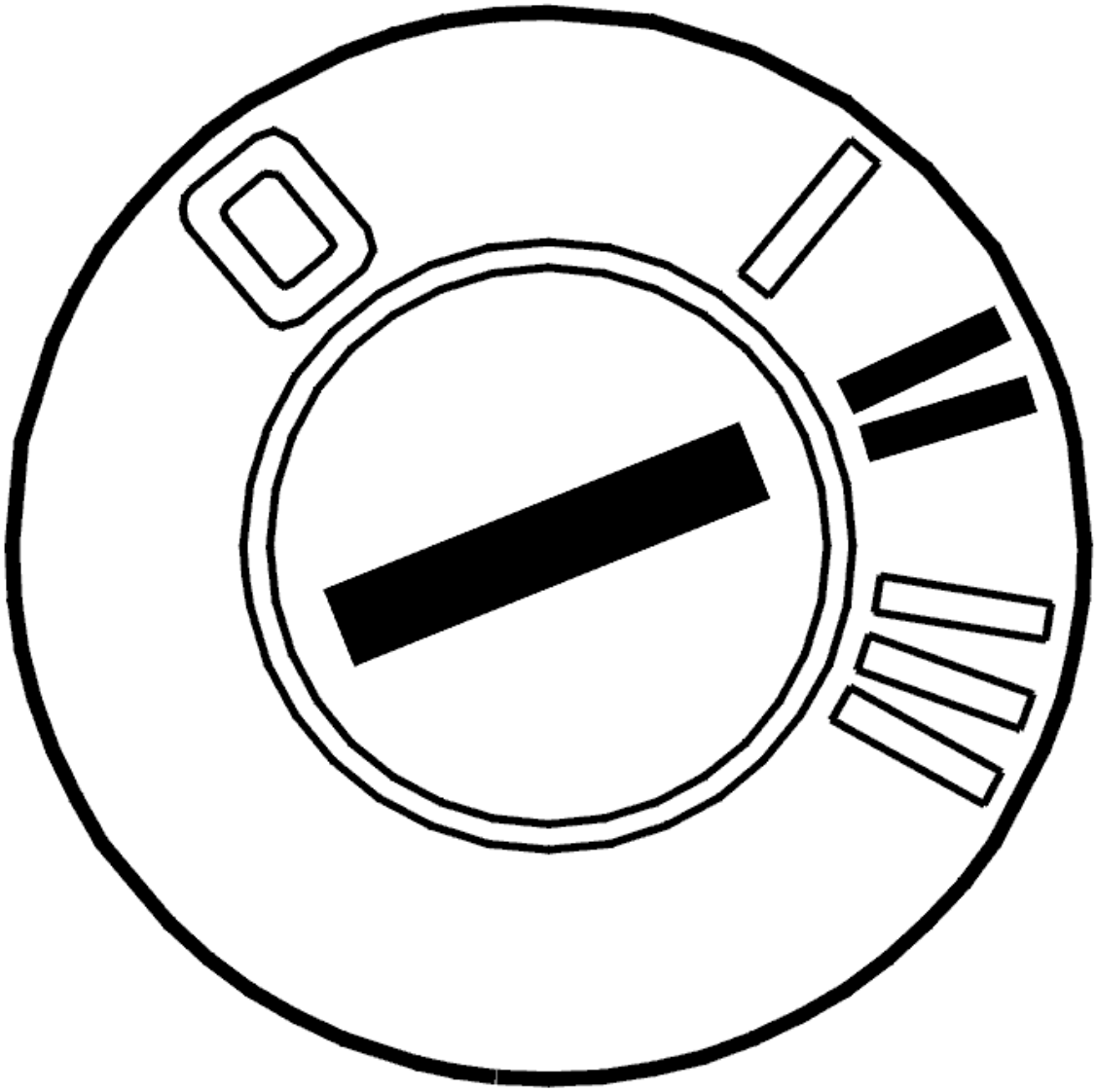


Fig. 386: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

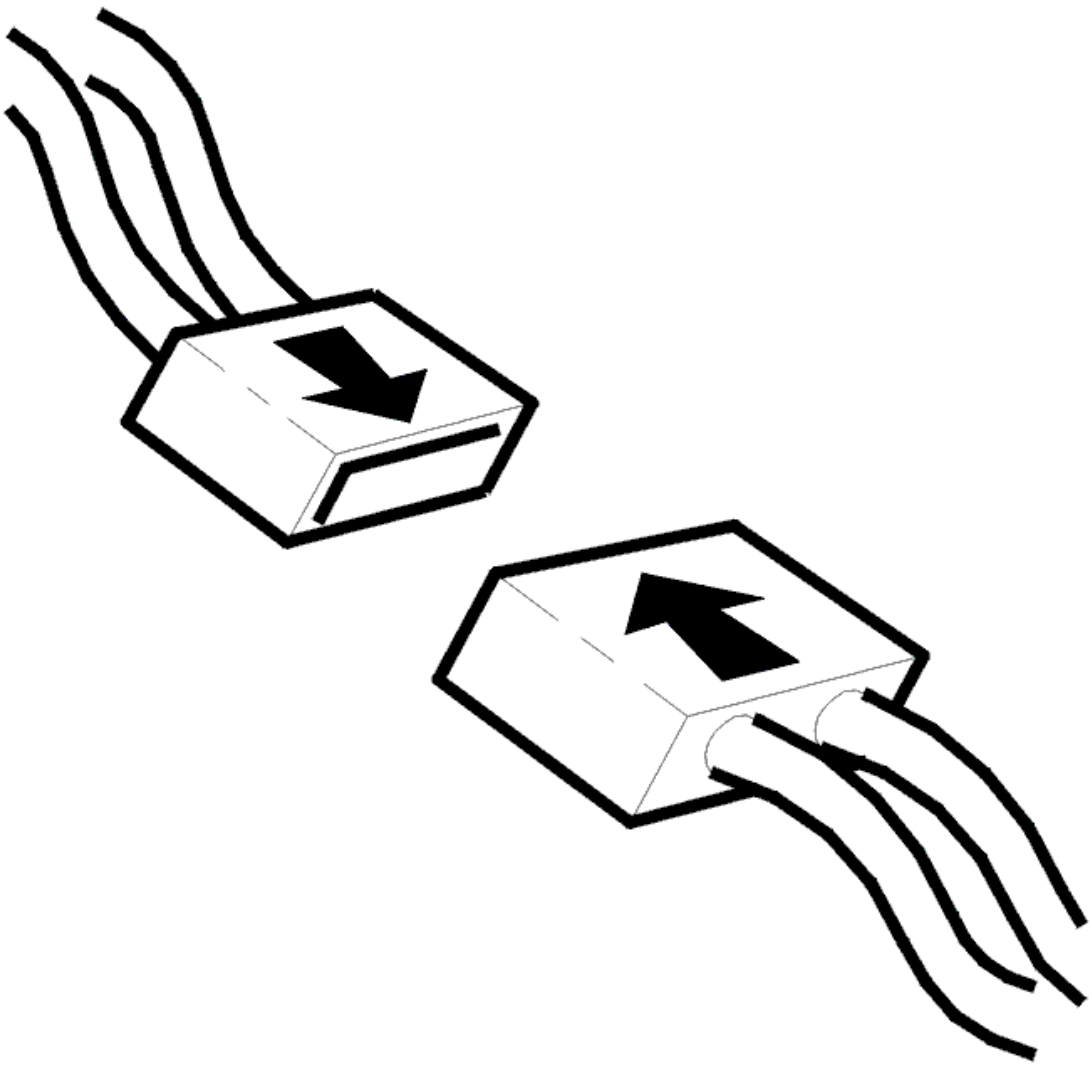


Fig. 387: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.
- Read off oil temperature.

  Check that the transmission oil temperature is within its permitted range. Compare with the transmission temperature.

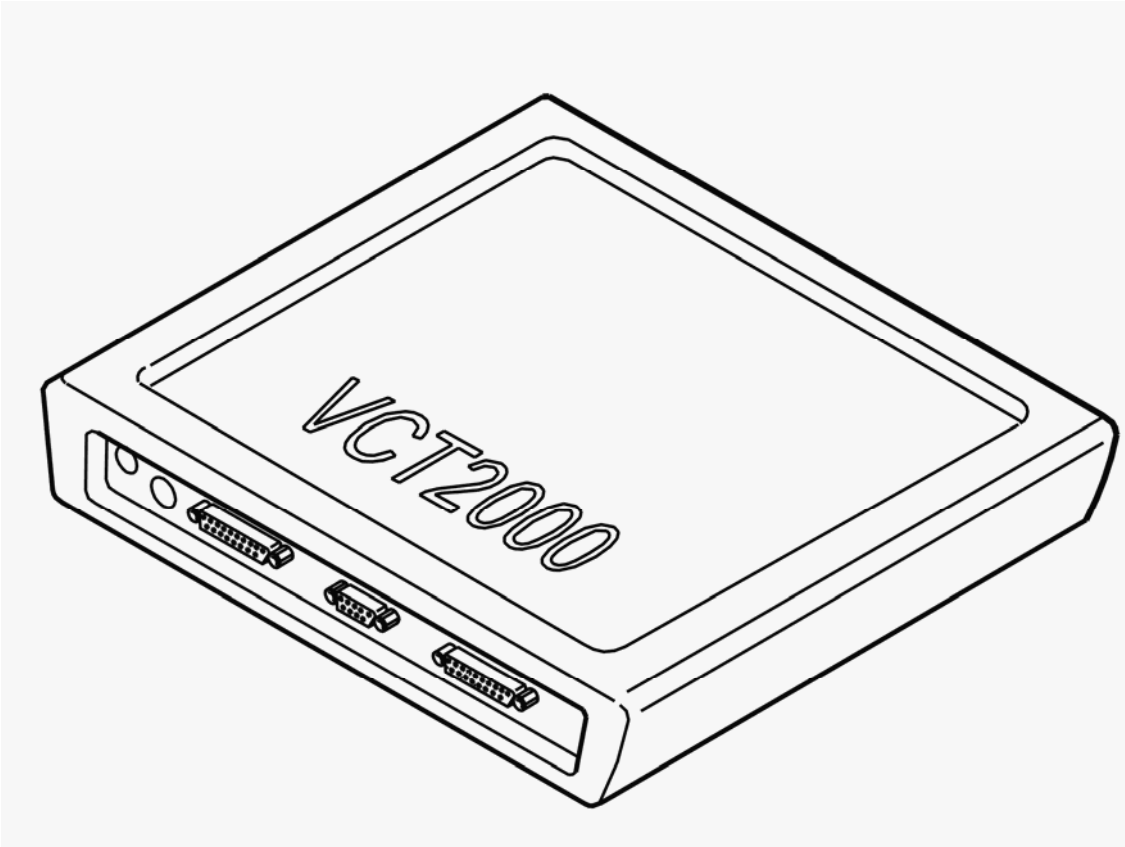


Fig. 388: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-0008: SHIFT SOLENOID S2. SIGNAL MISSING (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL MISSING

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

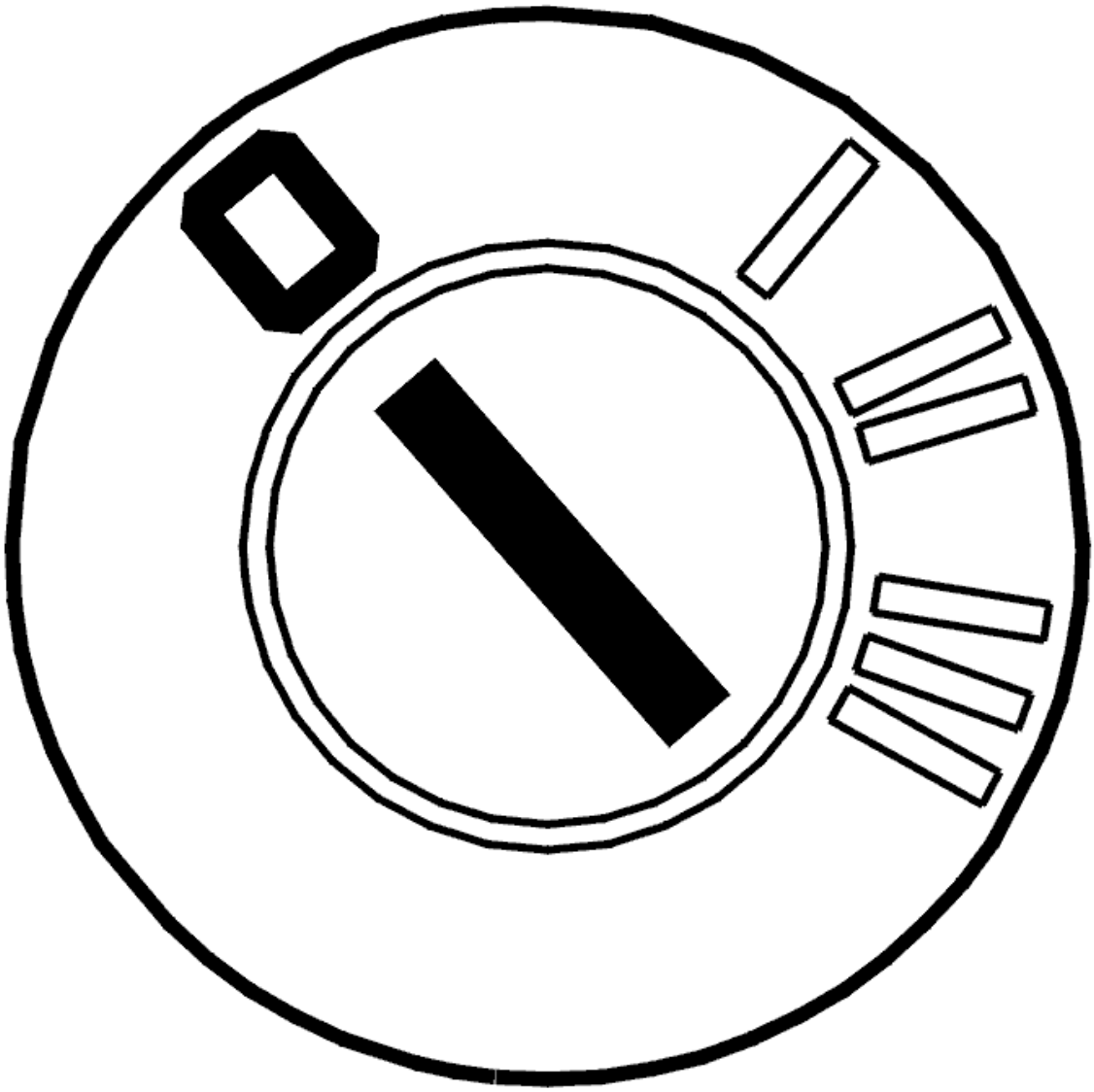


Fig. 389: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

  HINT: If the temperature is outside its permitted range, fault-trace the temperature sensor.

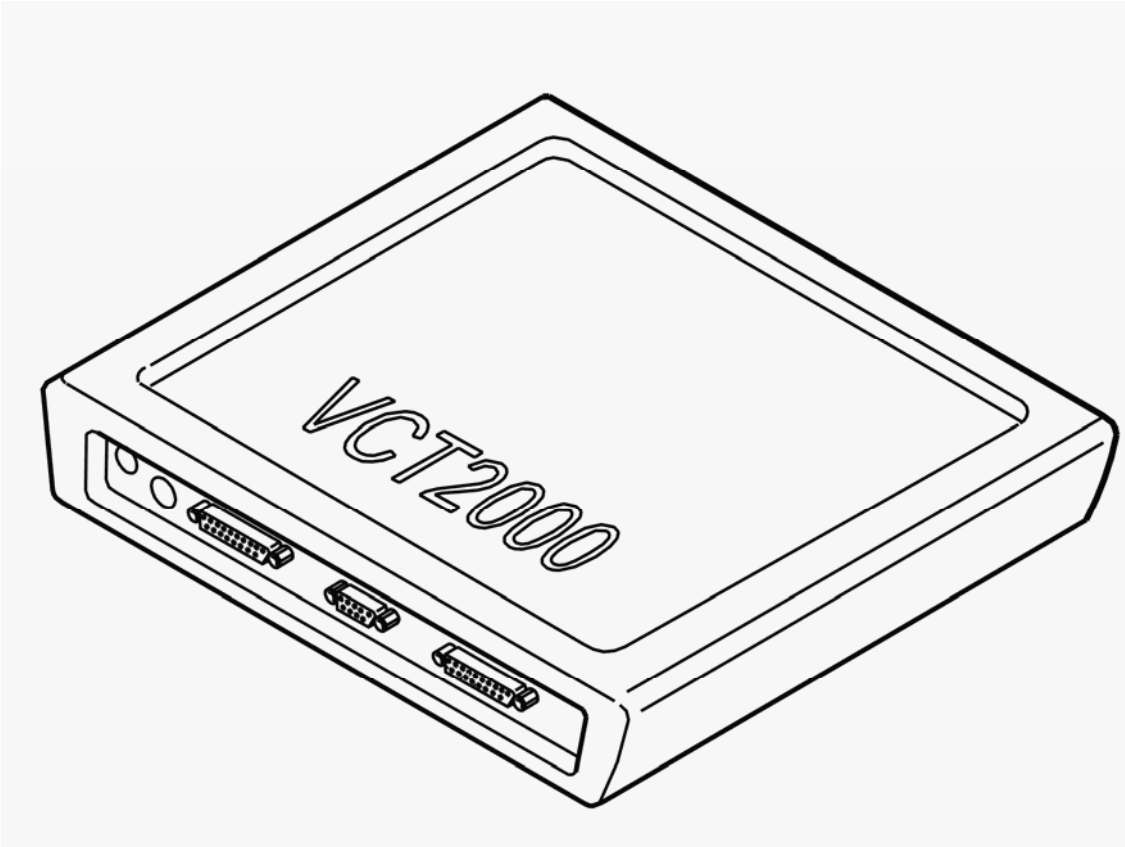


Fig. 390: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S2**

- **NO**

  Refer to **FAULTY SIGNAL**

CHECKING SHIFT SOLENOID S2

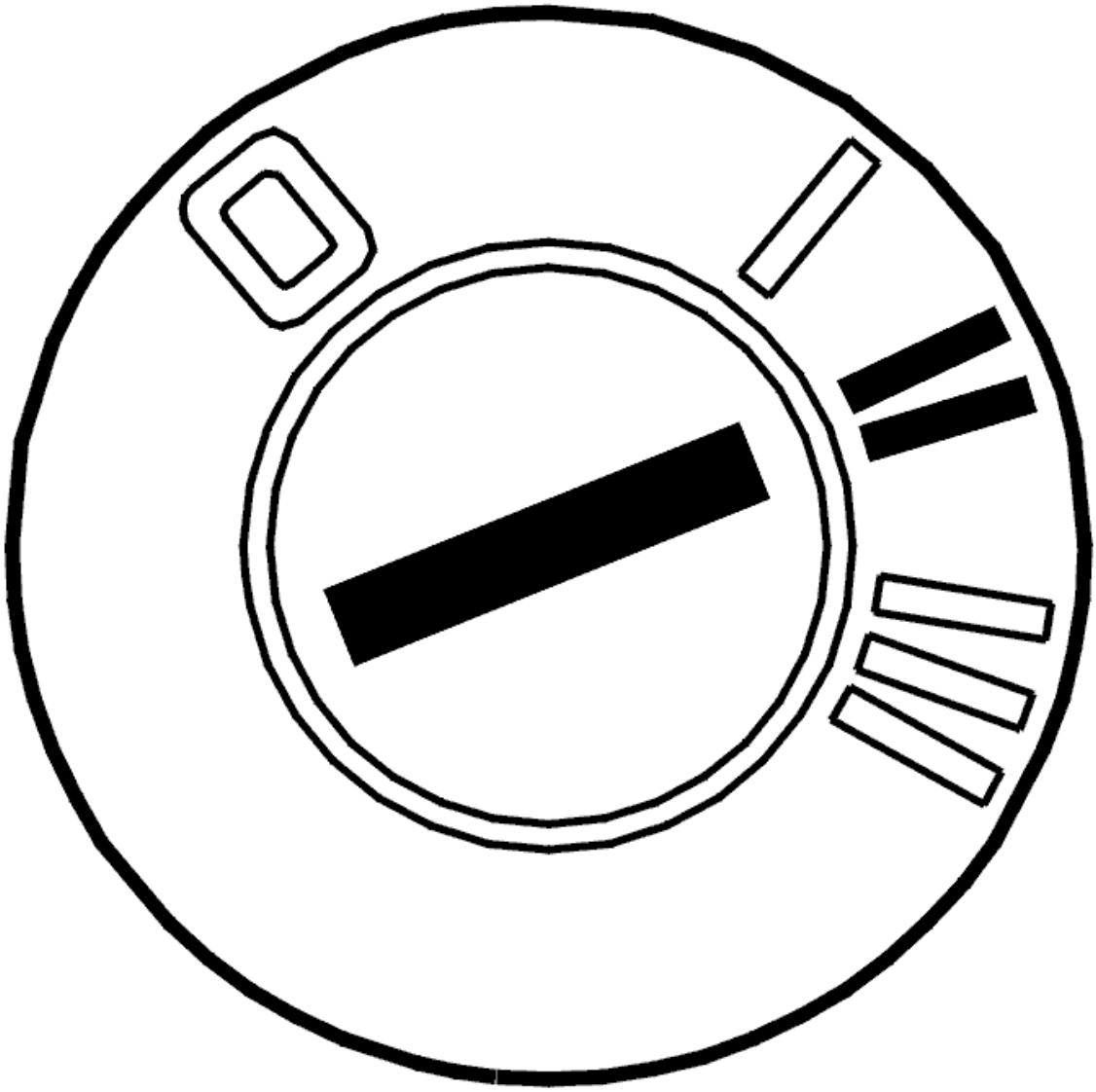


Fig. 391: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S2.

The current should oscillate between 0 and approximately 1.5 A.

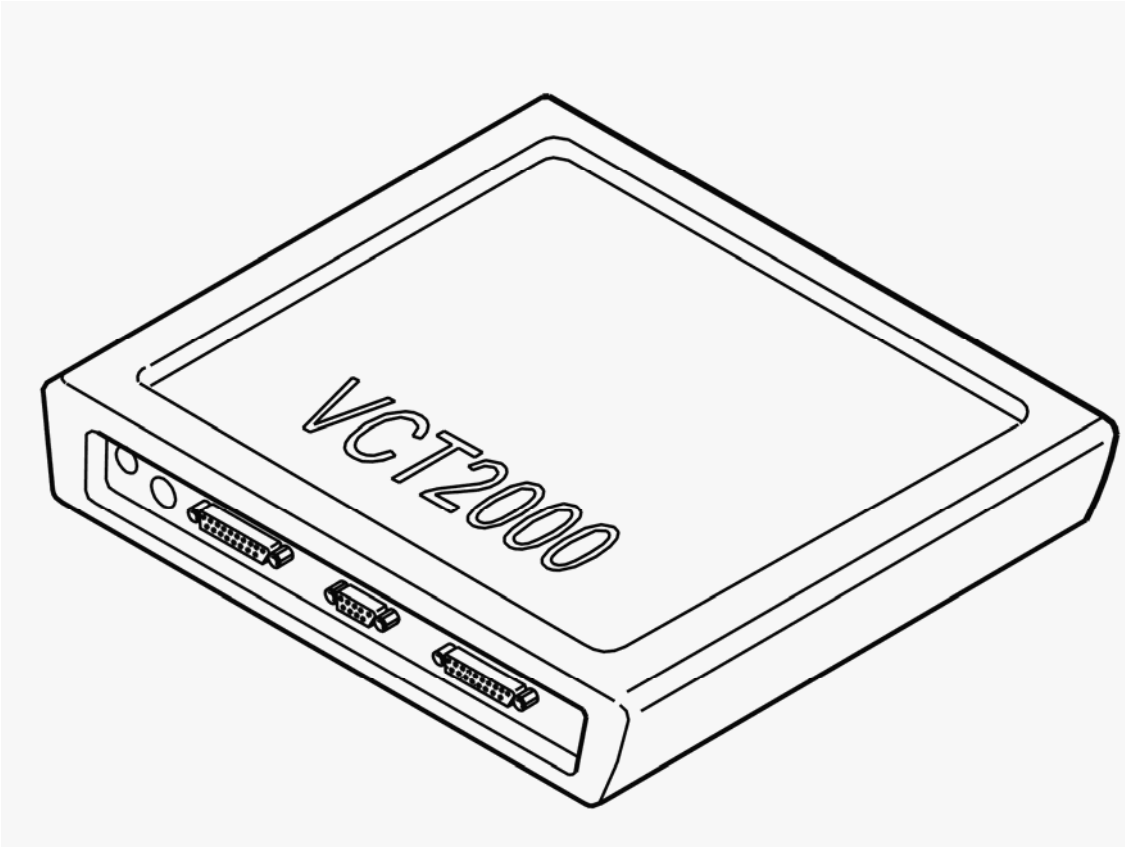


Fig. 392: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING RESISTANCE**

CHECKING RESISTANCE

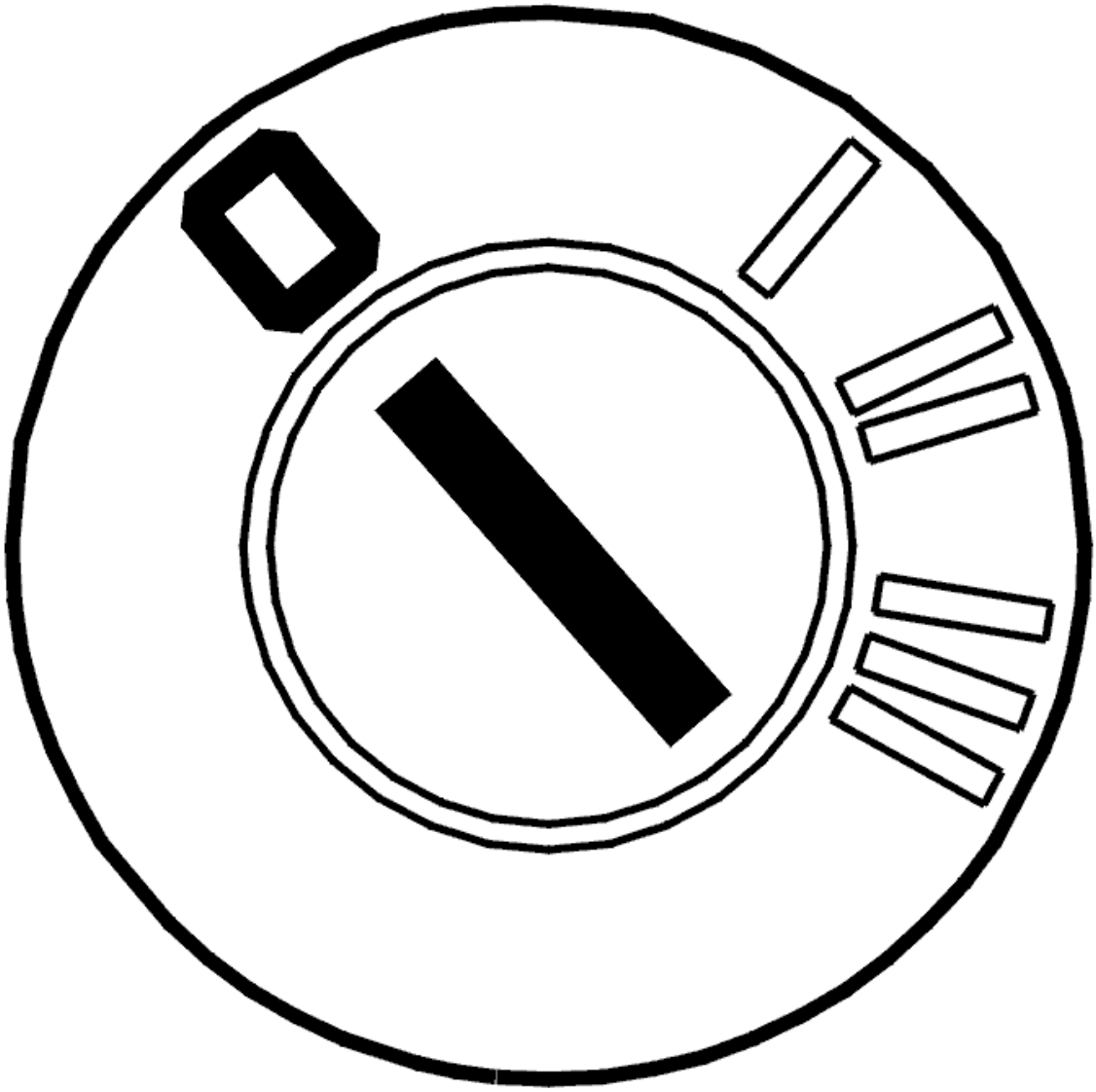


Fig. 393: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

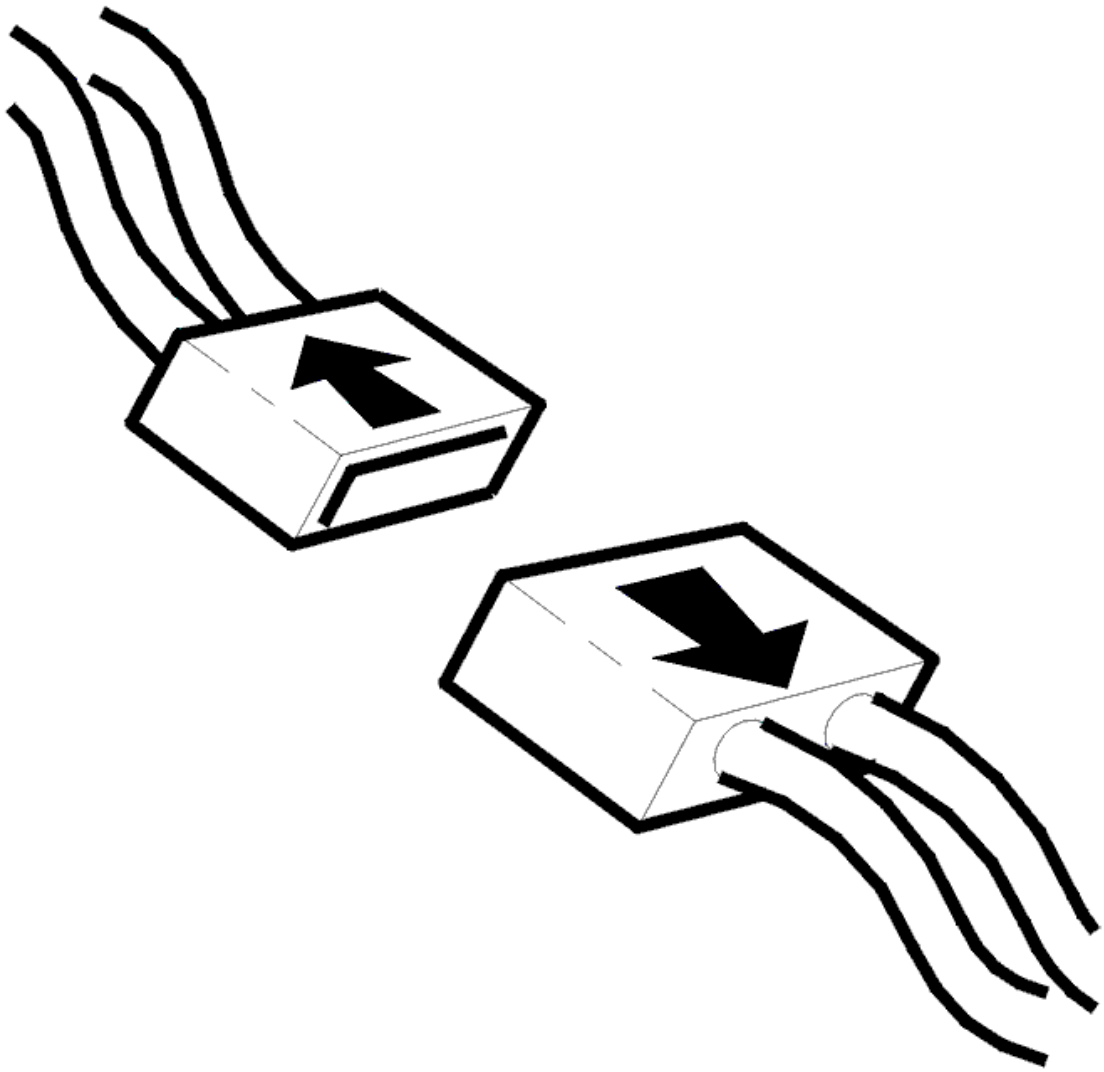


Fig. 394: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect transmission connector C.

Check solenoid S2. Measure the resistance between transmission connector terminal #C2 and the transmission housing. The resistance should be 11-15 ohms at 20°C.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

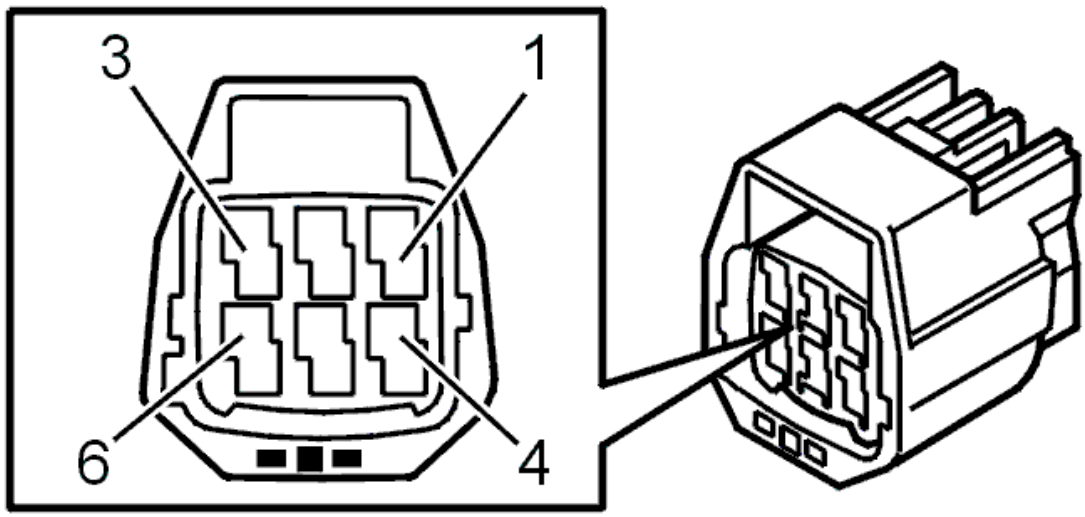


Fig. 395: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

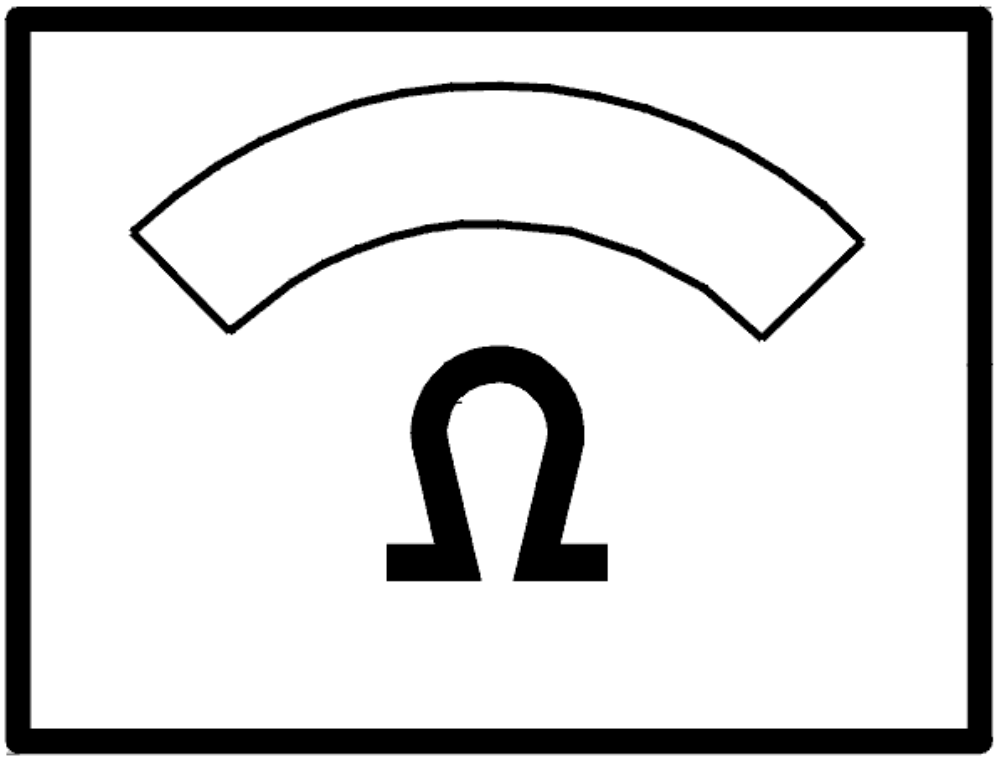


Fig. 396: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

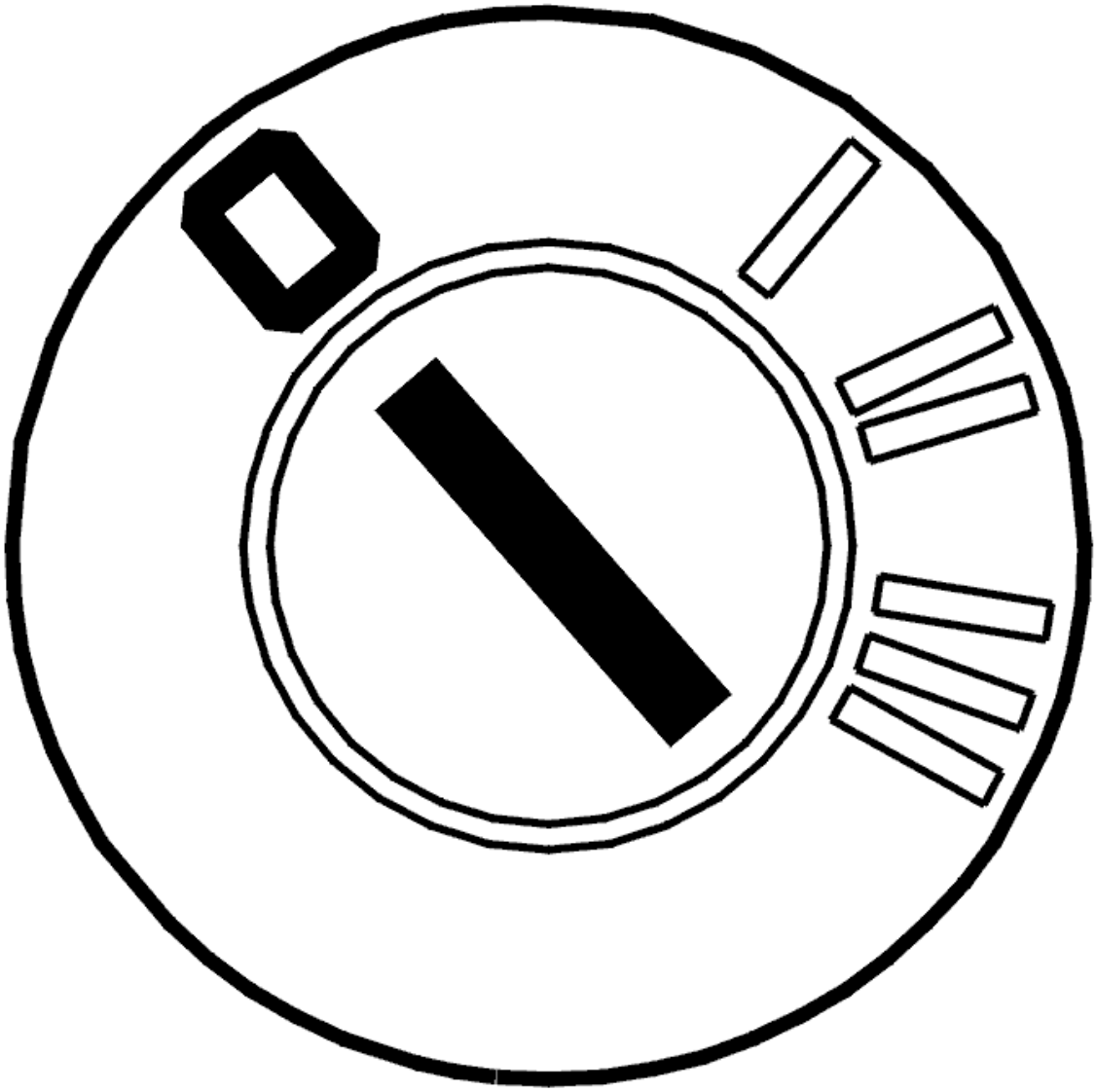


Fig. 397: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the cable between control module terminal #B8 (#A68) and transmission connector #C2 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

  Remedy as necessary.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**

- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

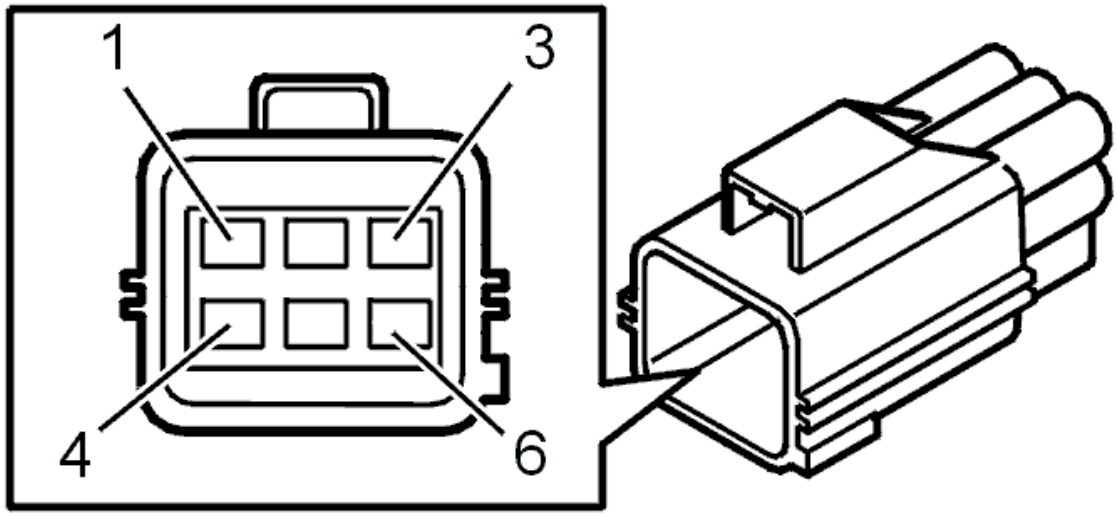


Fig. 398: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

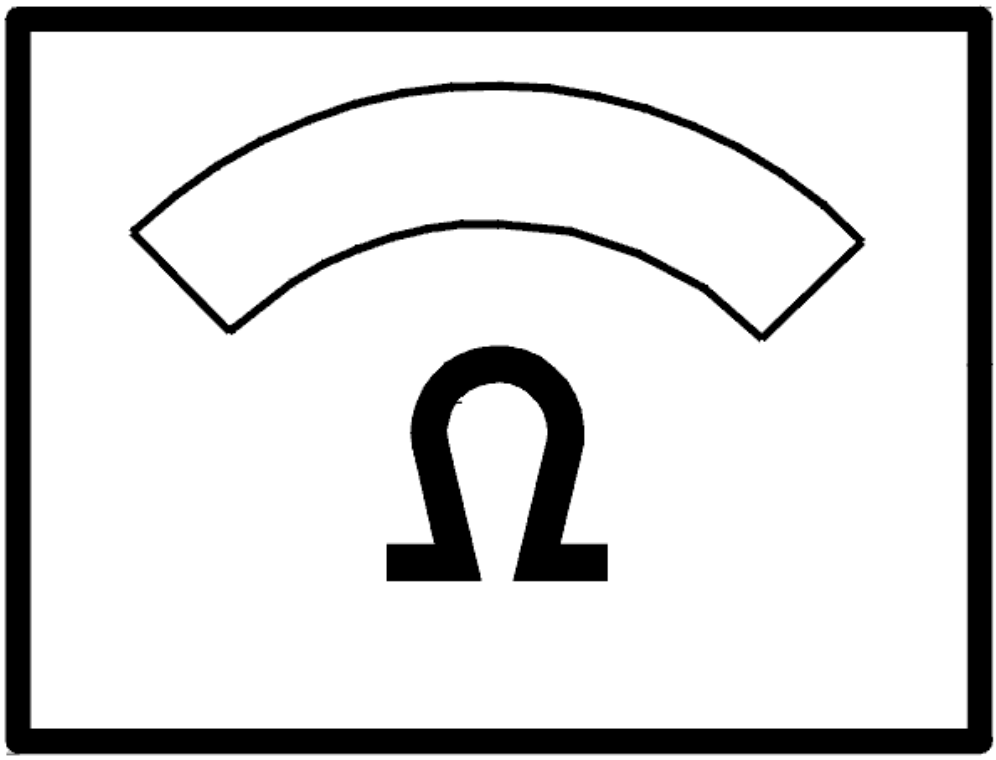


Fig. 399: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

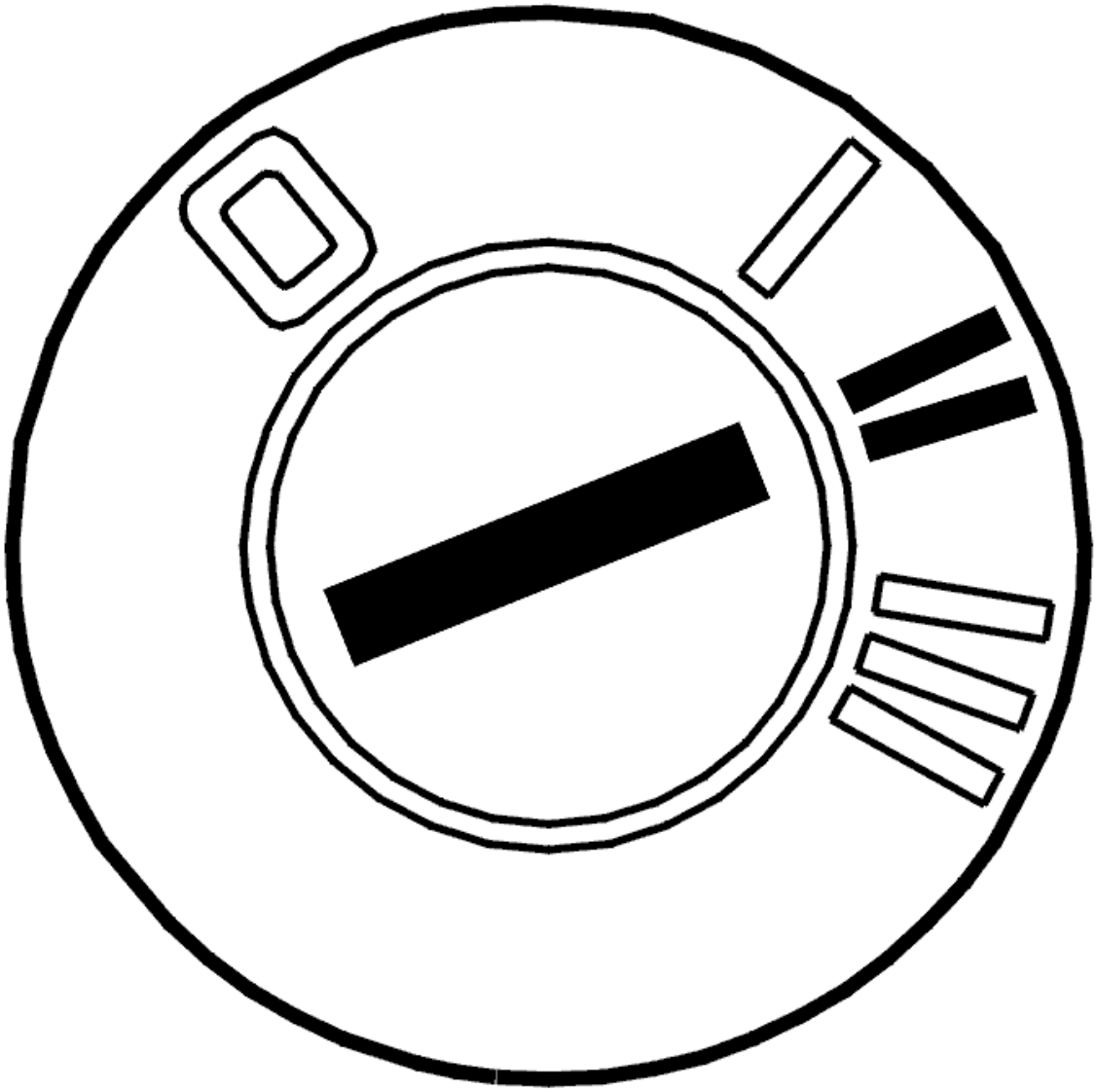


Fig. 400: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

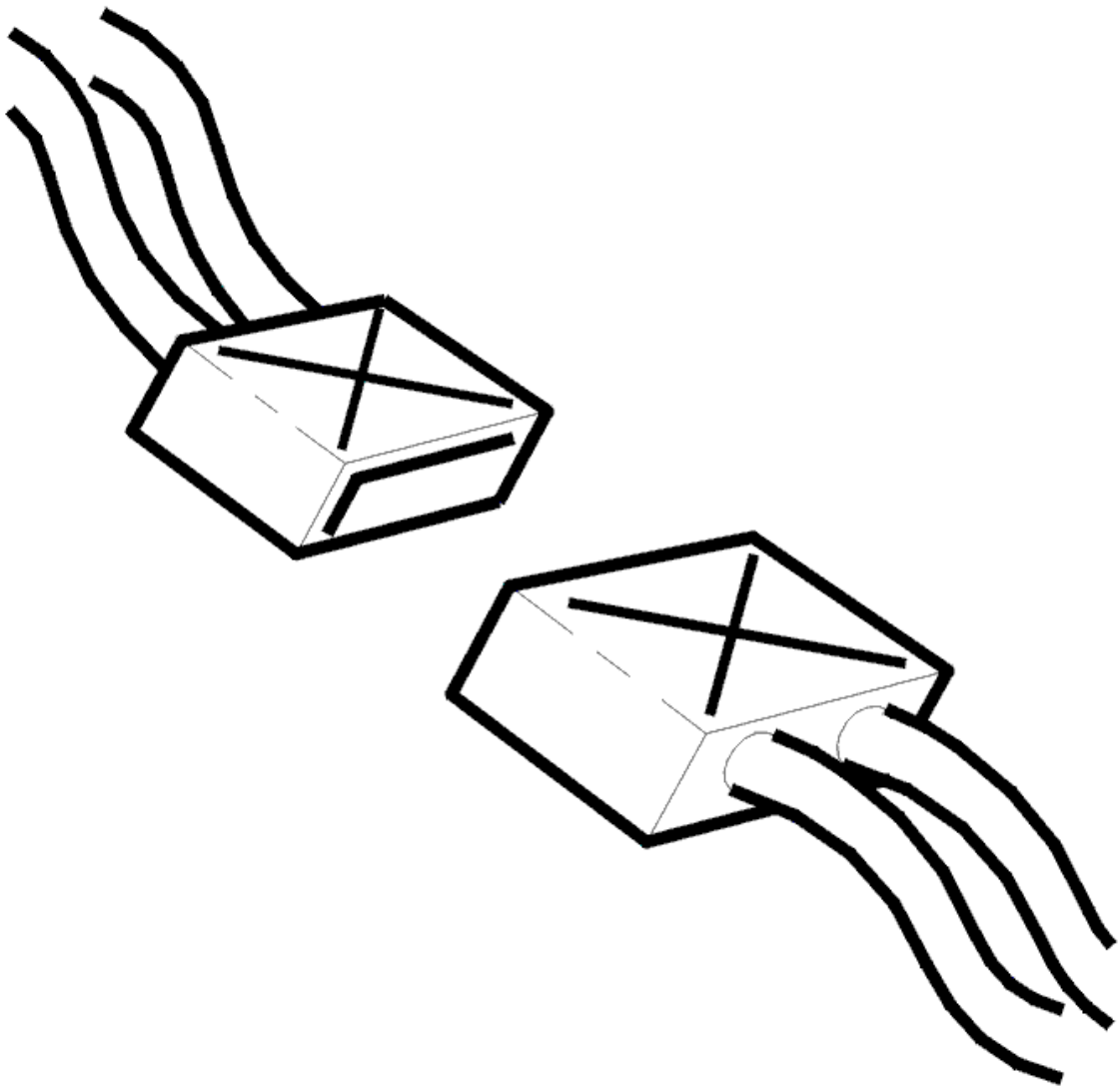


Fig. 401: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

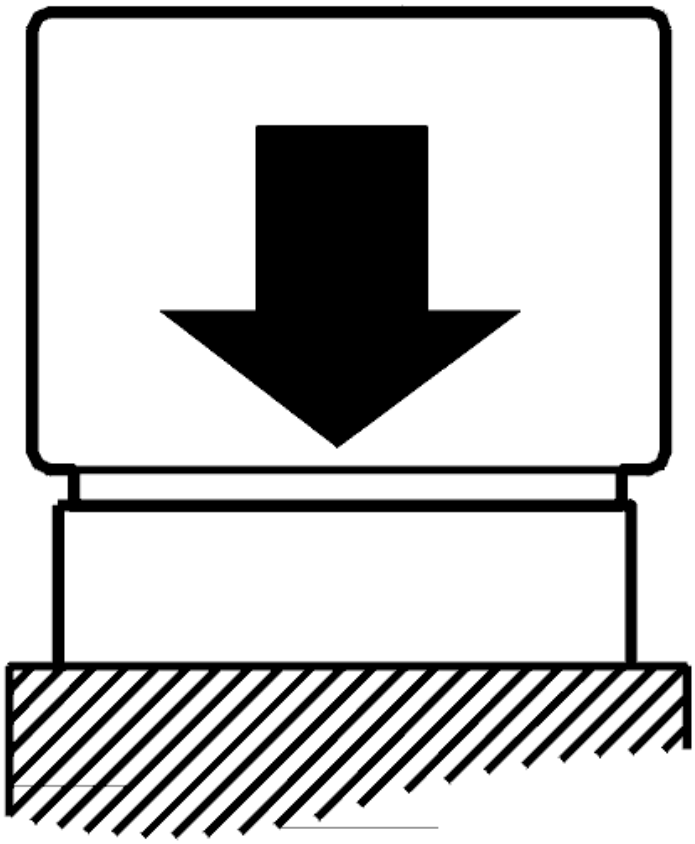


Fig. 402: Identifying Connecting Control Module
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector disconnected
- Gear selector in position P.

Check the transmission control module (TCM) by measuring the resistance between terminals #B8 (#A68) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

NOTE: When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

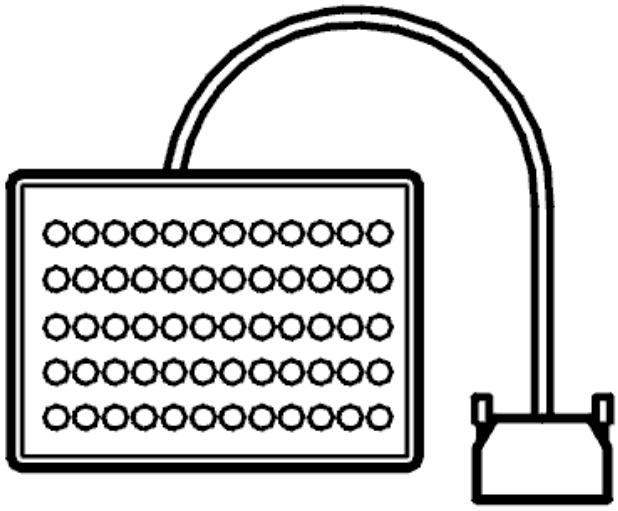


Fig. 403: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

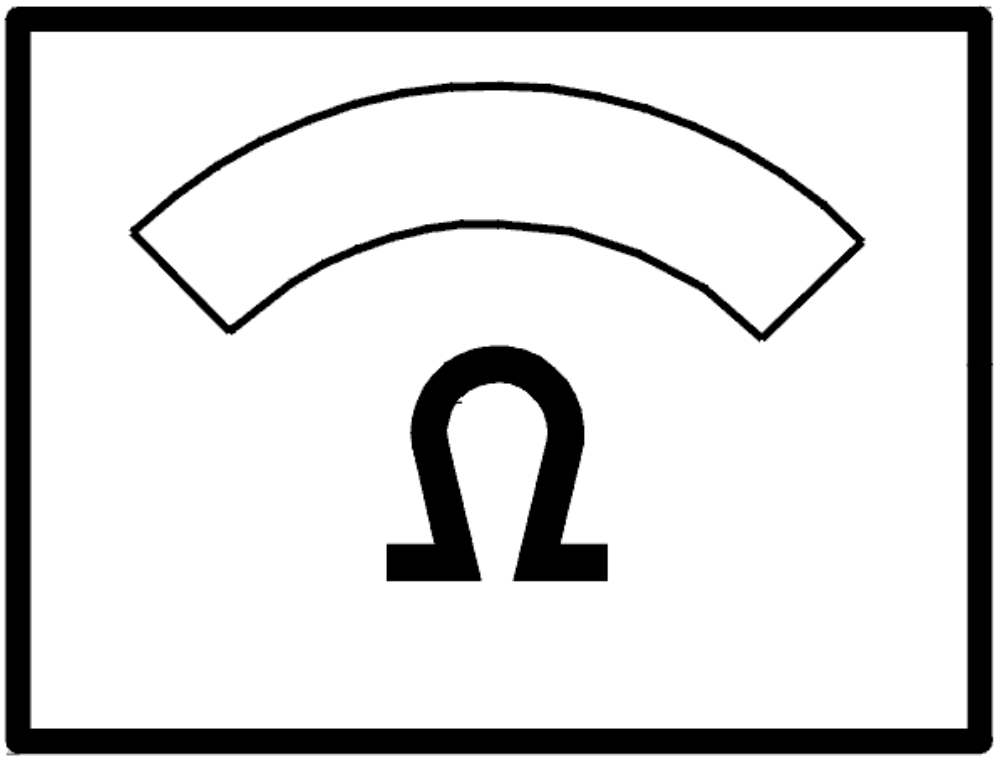


Fig. 404: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

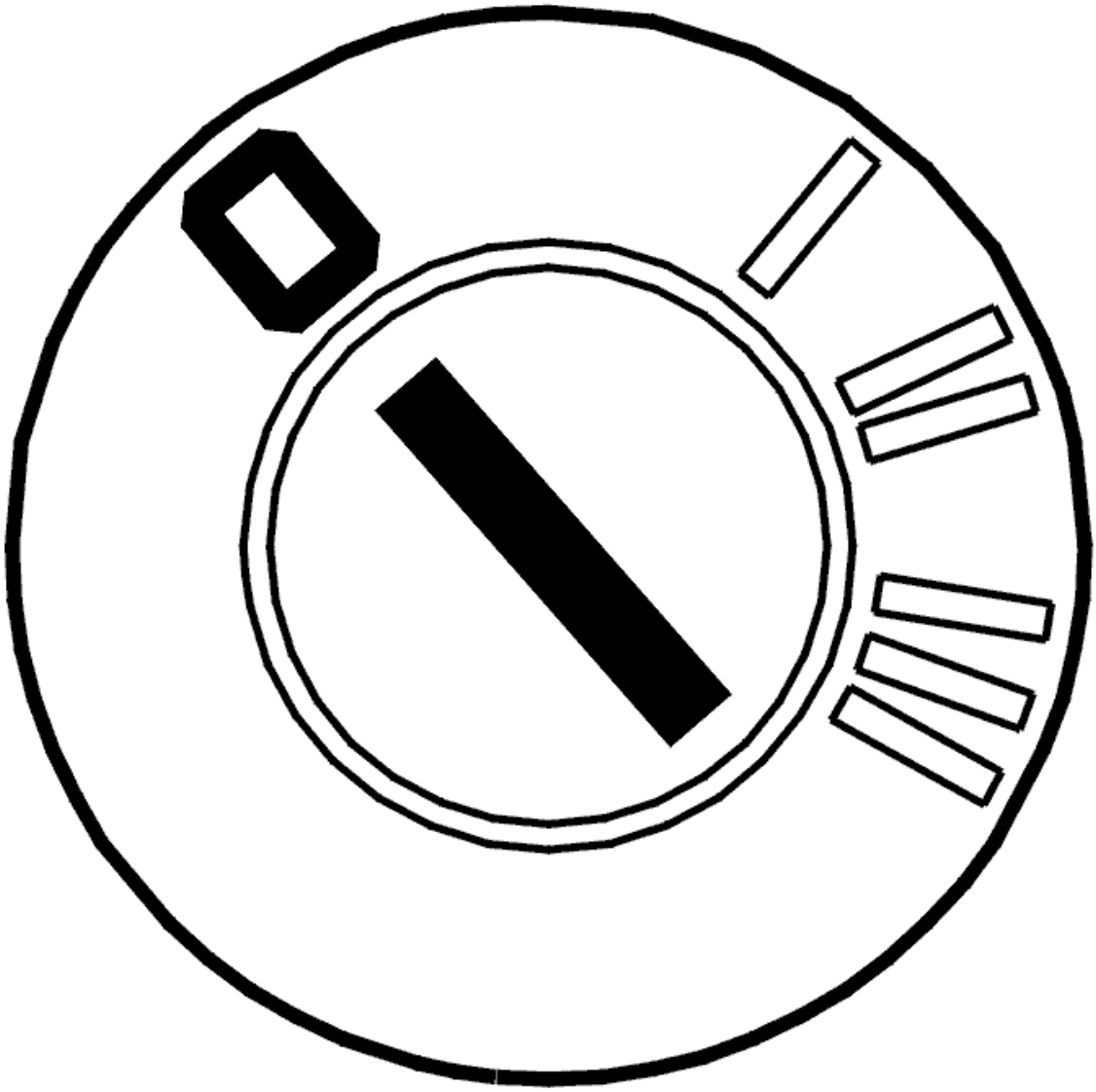


Fig. 405: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C2 (transmission side) and the connector for solenoid S2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

- Check solenoid S2 by measuring the resistance between the terminal pin on solenoid S2 and the transmission housing. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- To open the control system and to check or replace solenoid S2, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

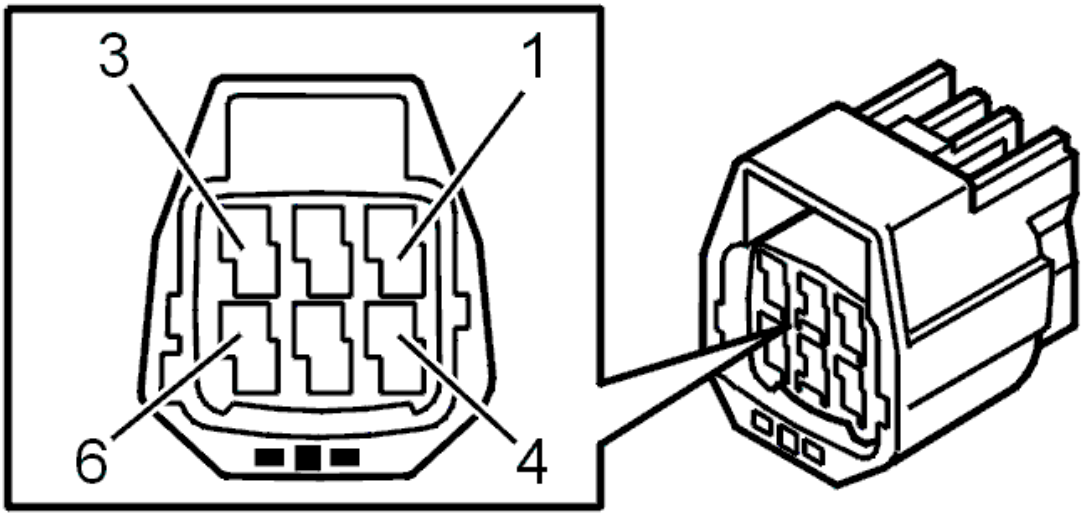


Fig. 406: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

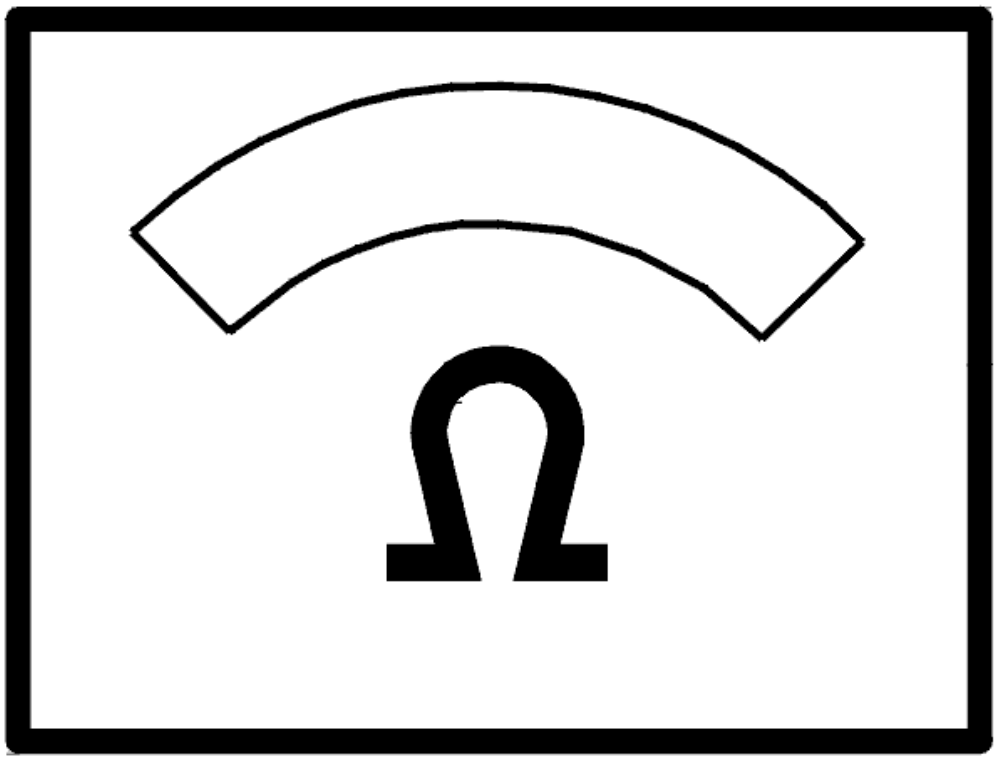


Fig. 407: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

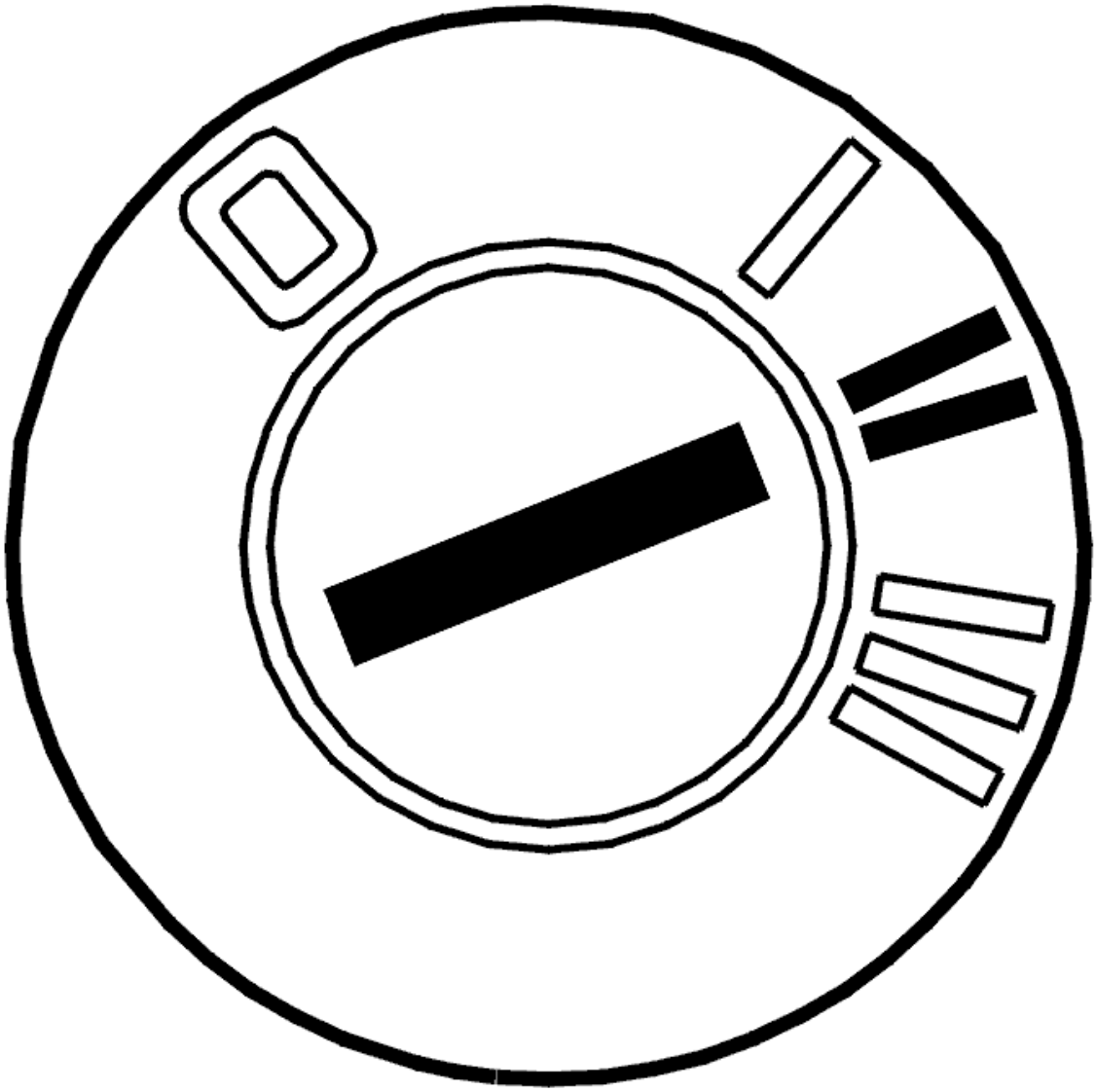


Fig. 408: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S2.

The current should oscillate between 0 and approximately 1.5 A.

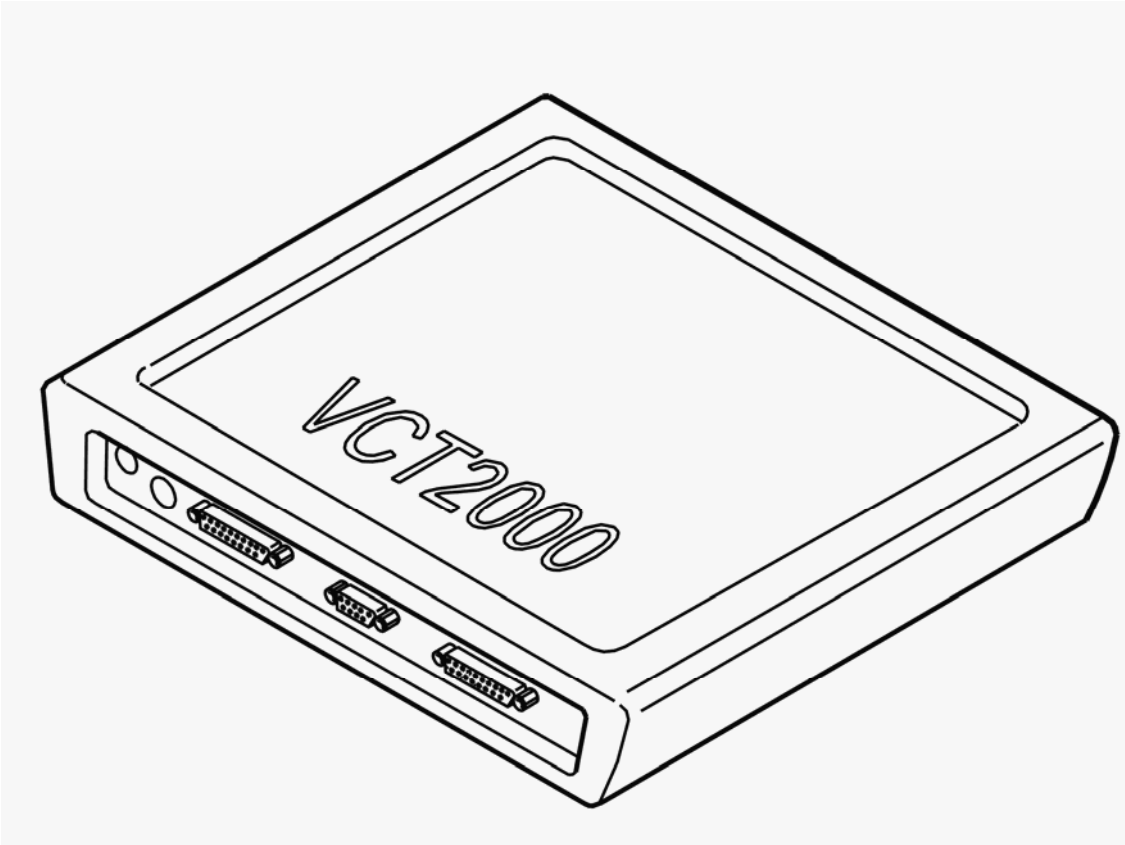


Fig. 409: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INTERMITTENT FAULT

Check the control module and transmission connectors. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between control module terminal #B8 (#A68) and transmission connector terminal #C2. Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

- Check the circuit for solenoid S2. Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #B8 (#A68) and #A53 (#A53) on the breakout box. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

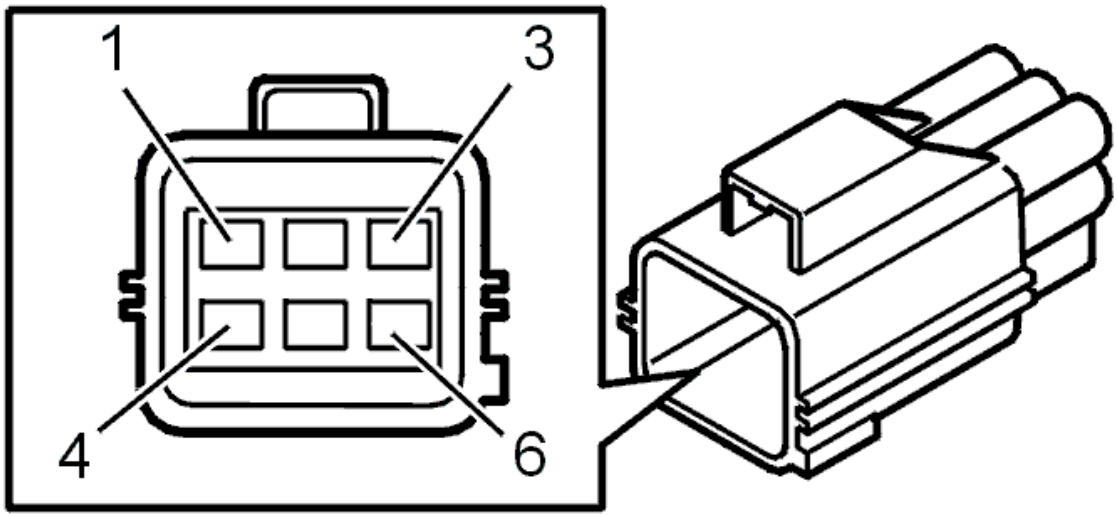


Fig. 410: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

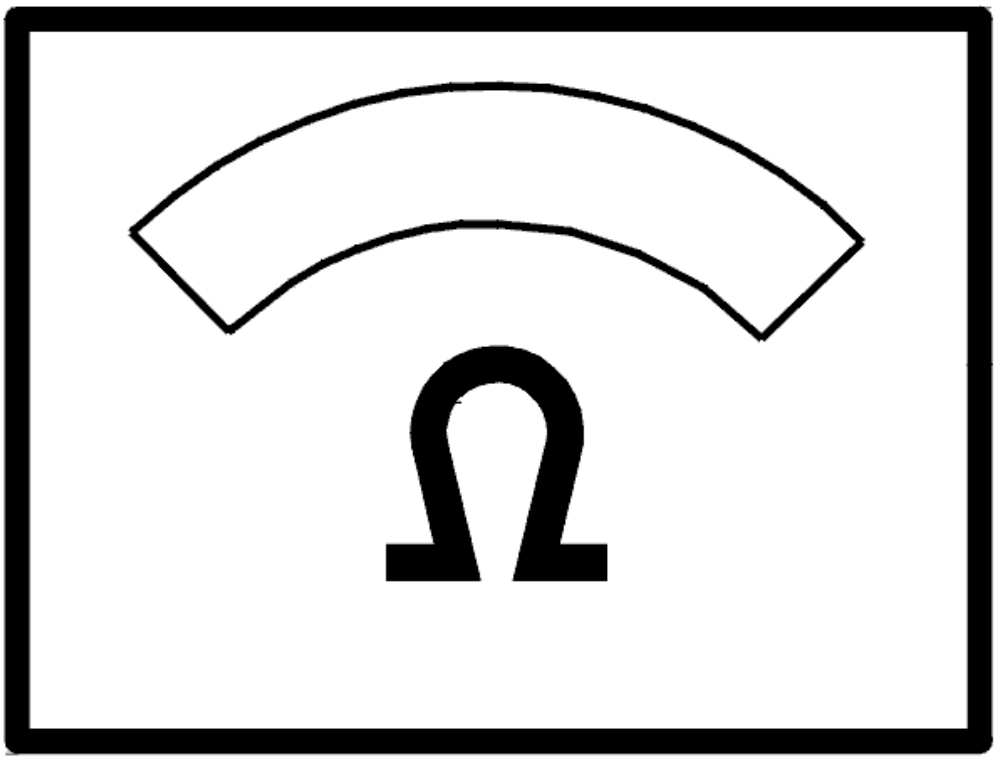


Fig. 411: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

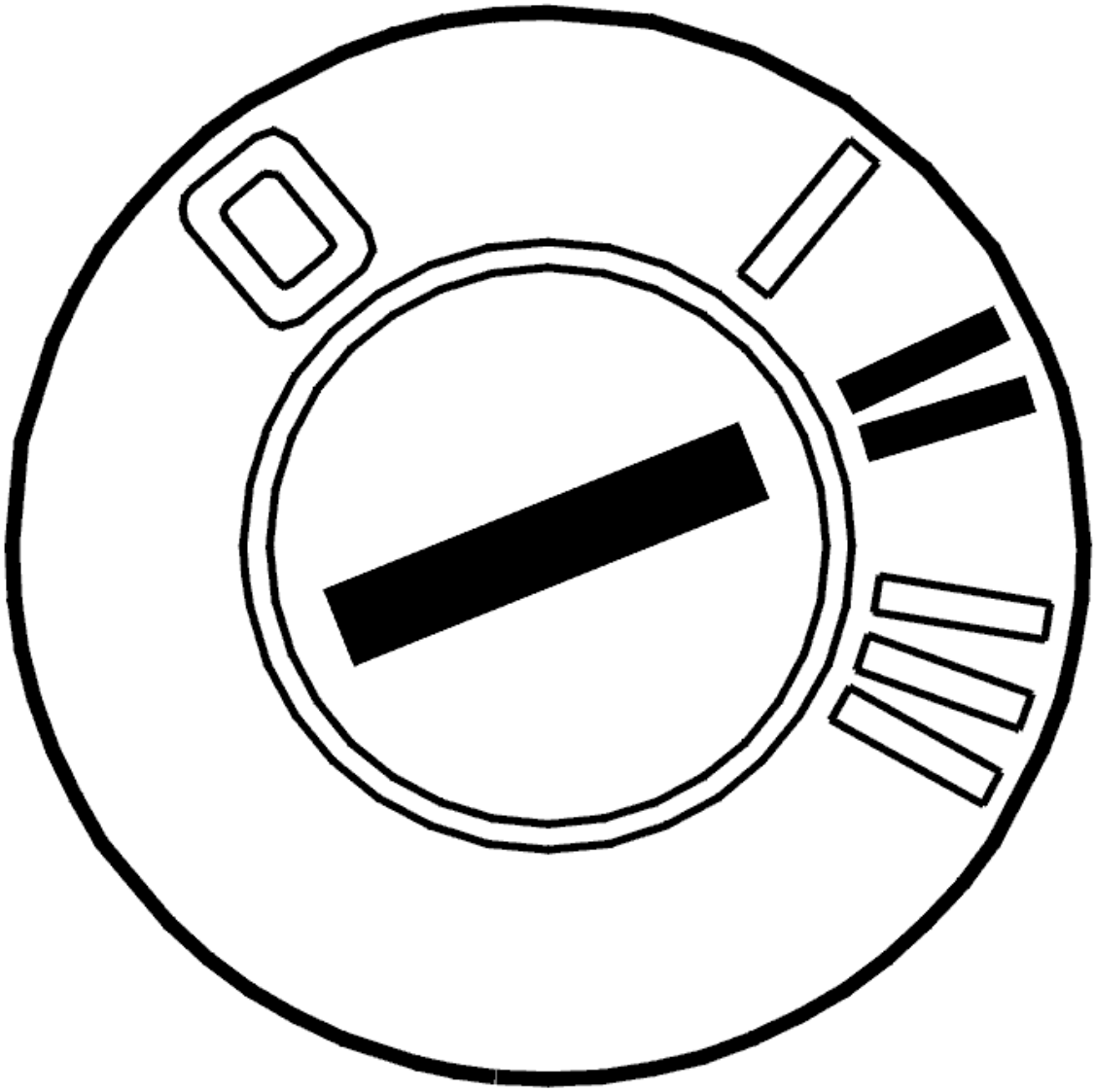


Fig. 412: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

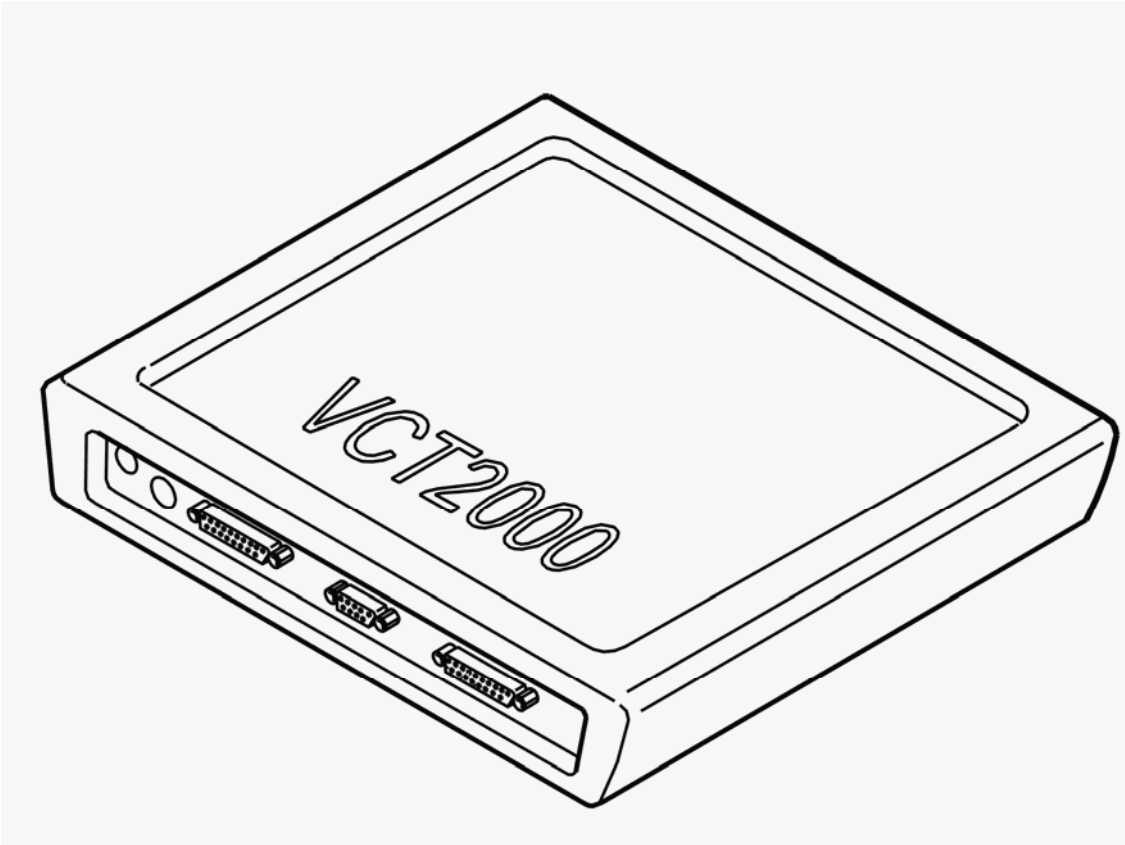


Fig. 413: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

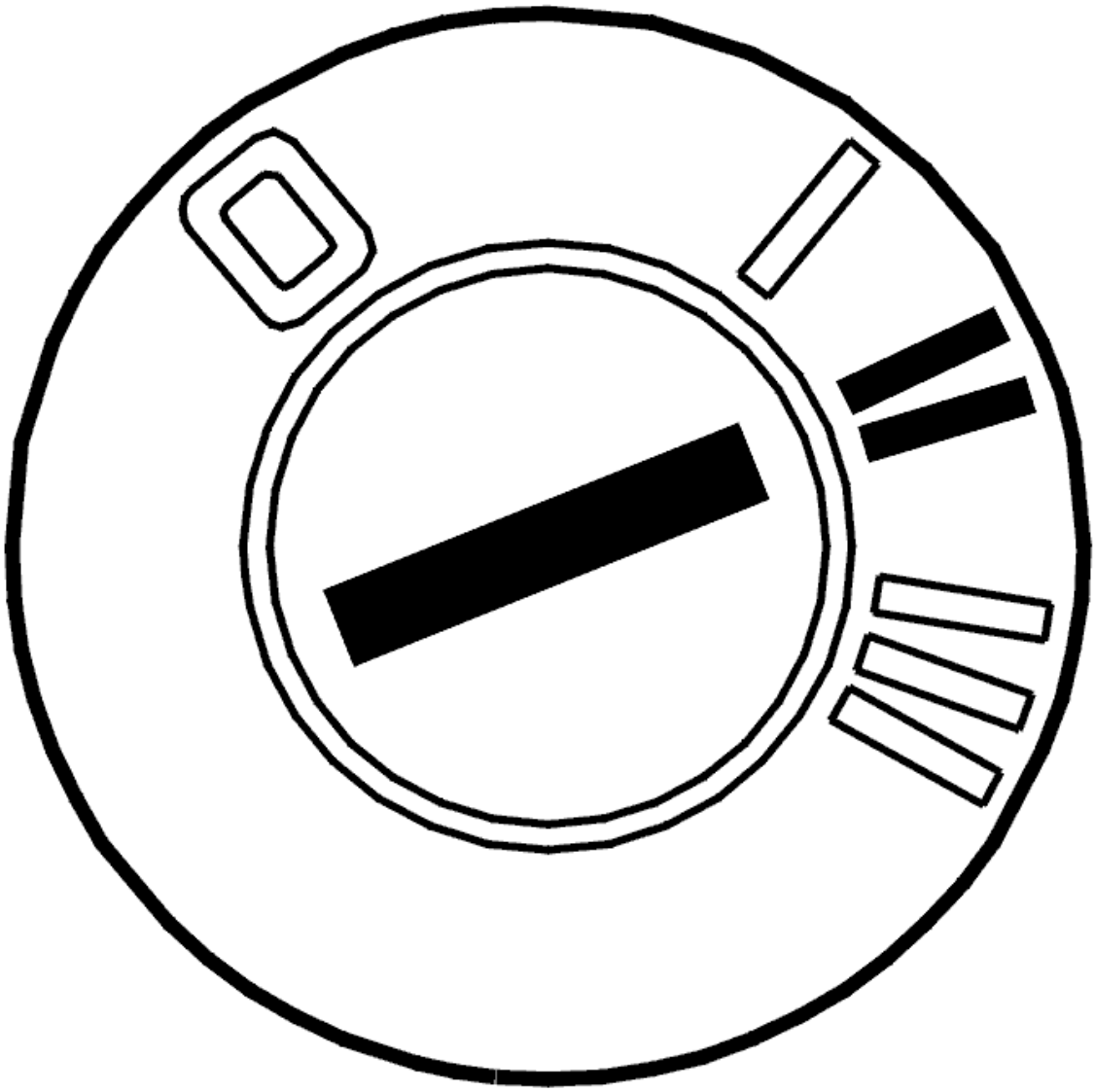


Fig. 414: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

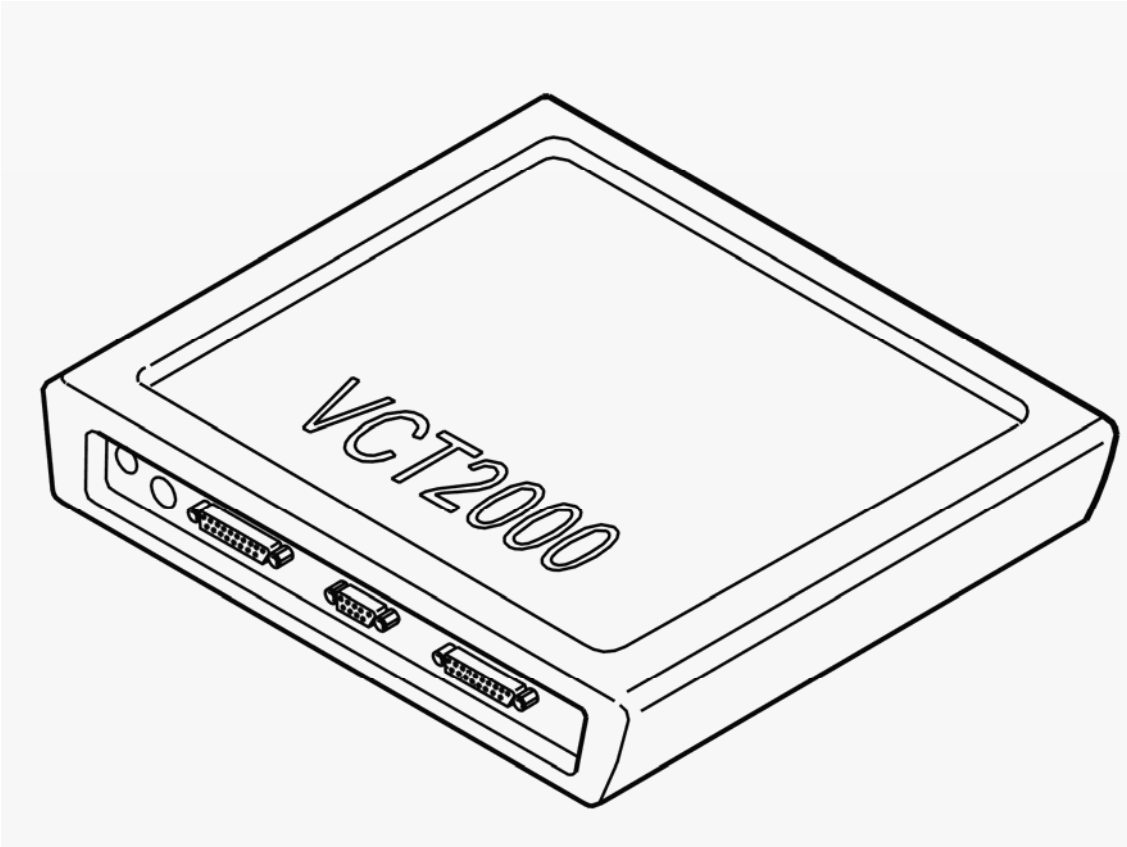


Fig. 415: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

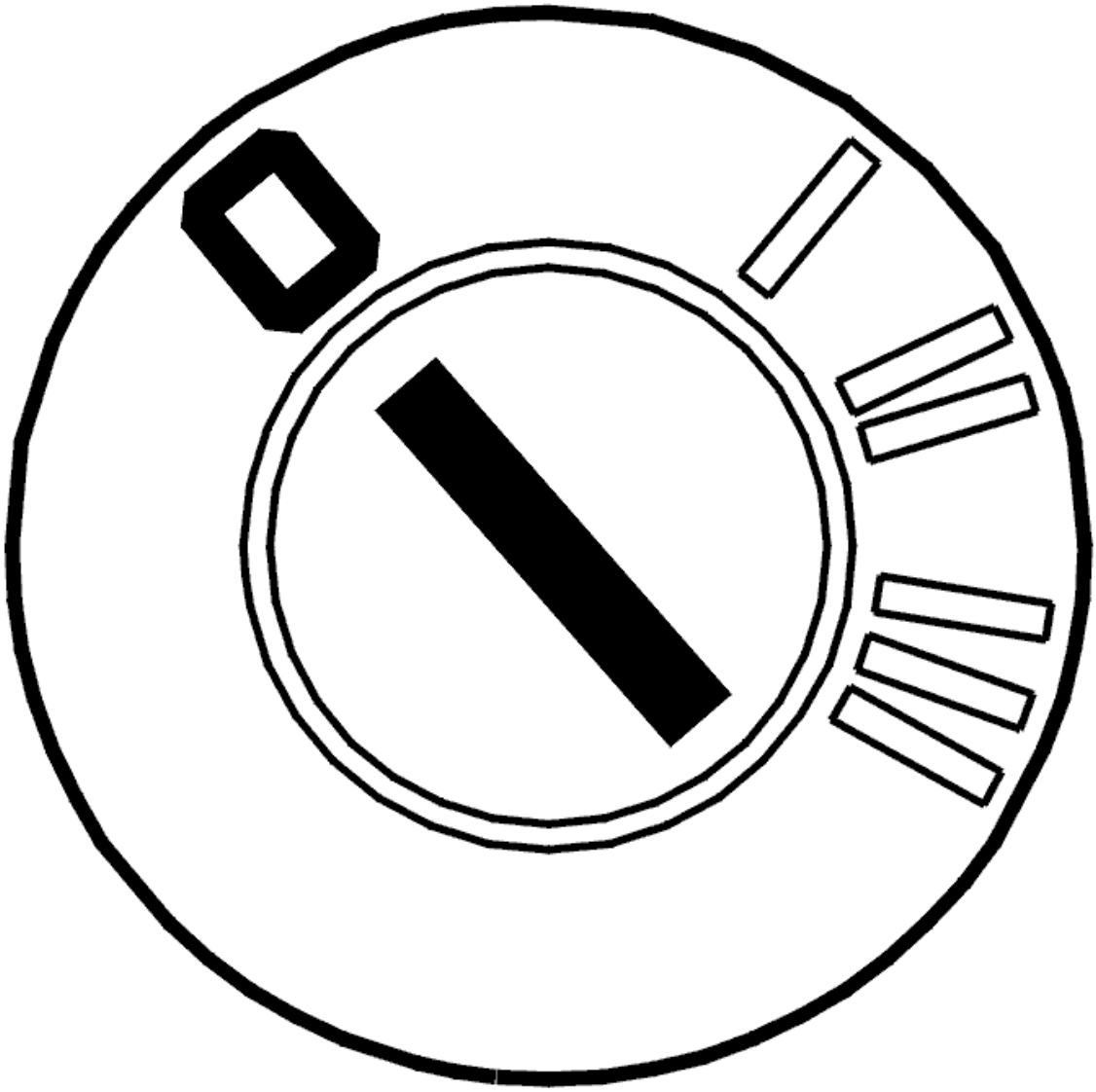


Fig. 416: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

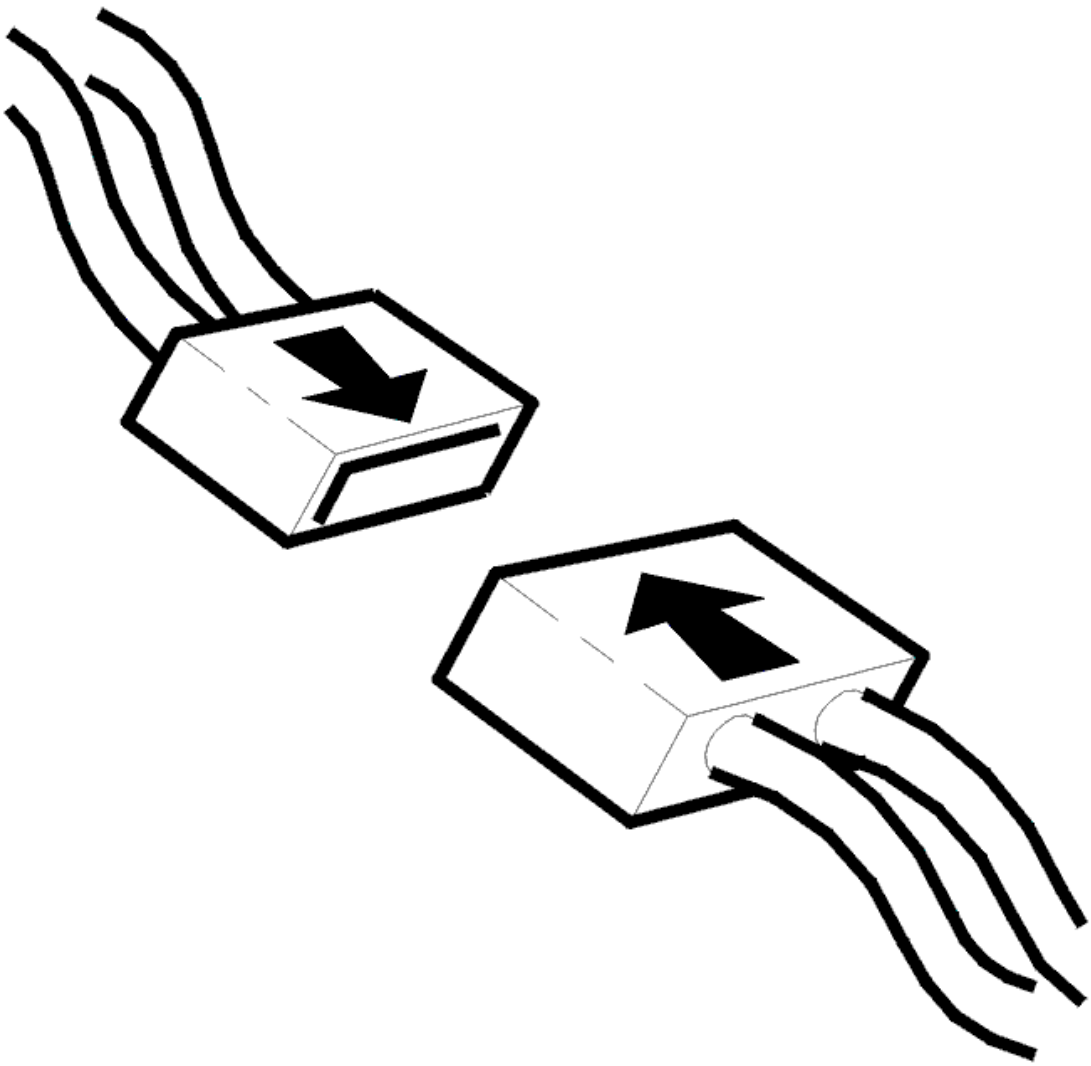


Fig. 417: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

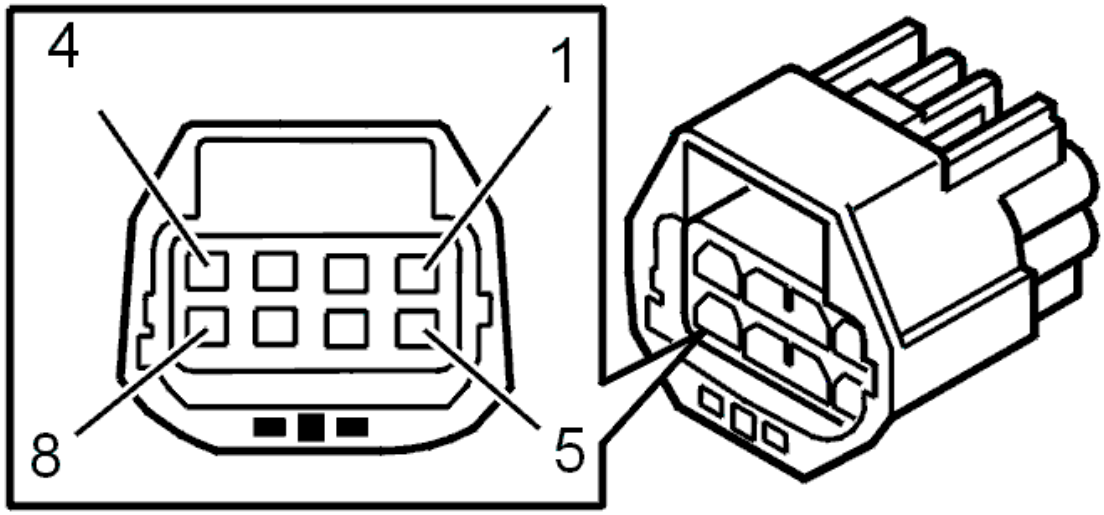


Fig. 418: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

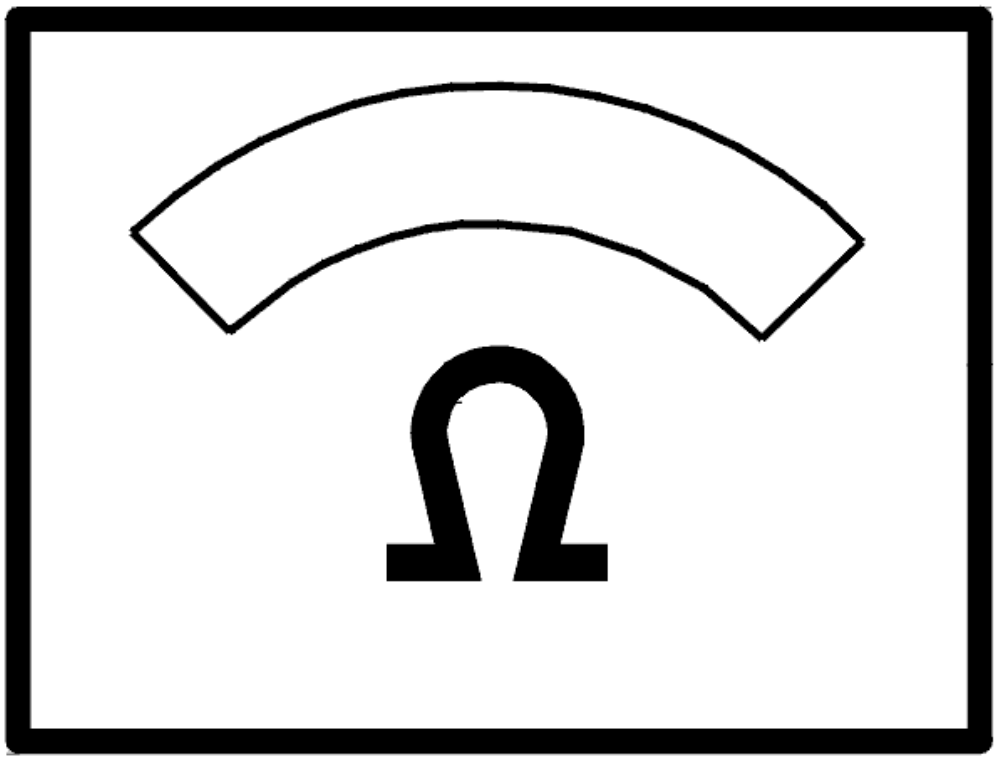


Fig. 419: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

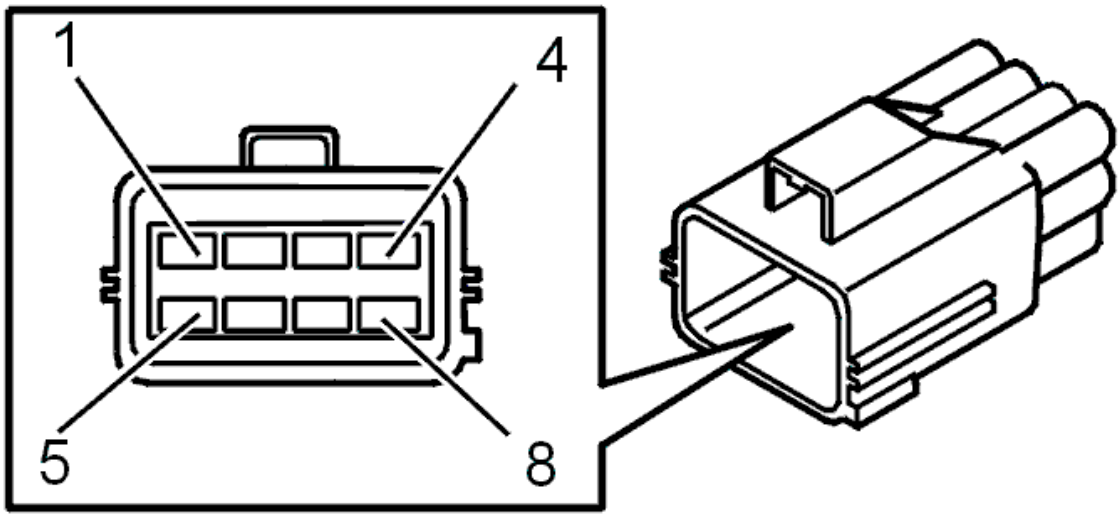


Fig. 420: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

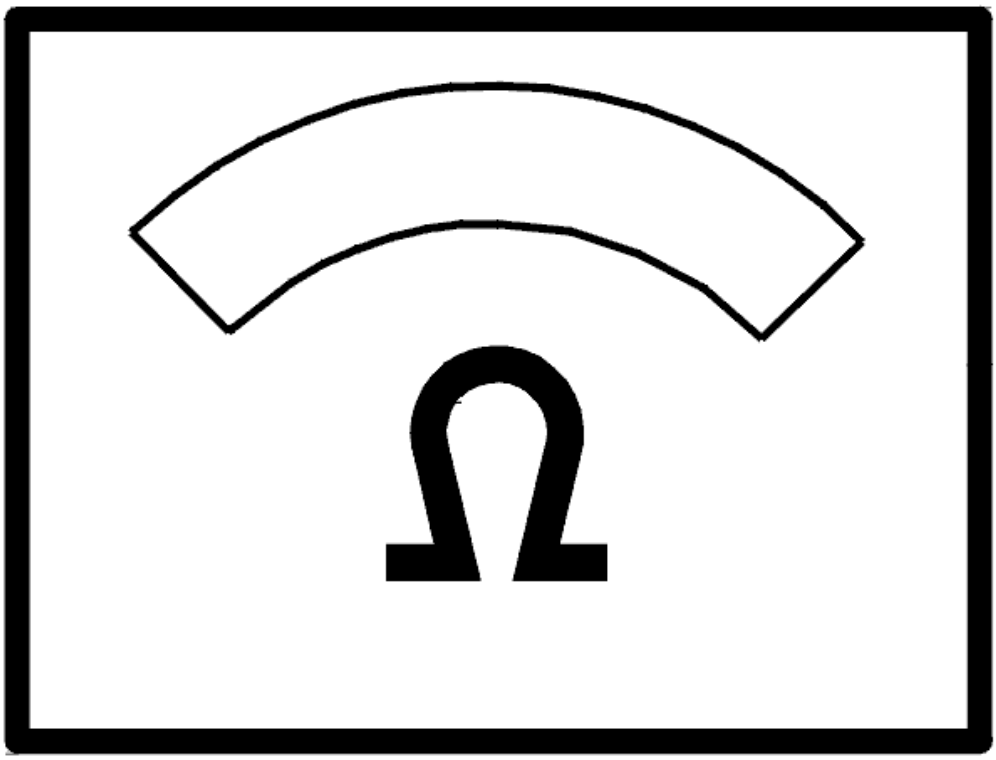


Fig. 421: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

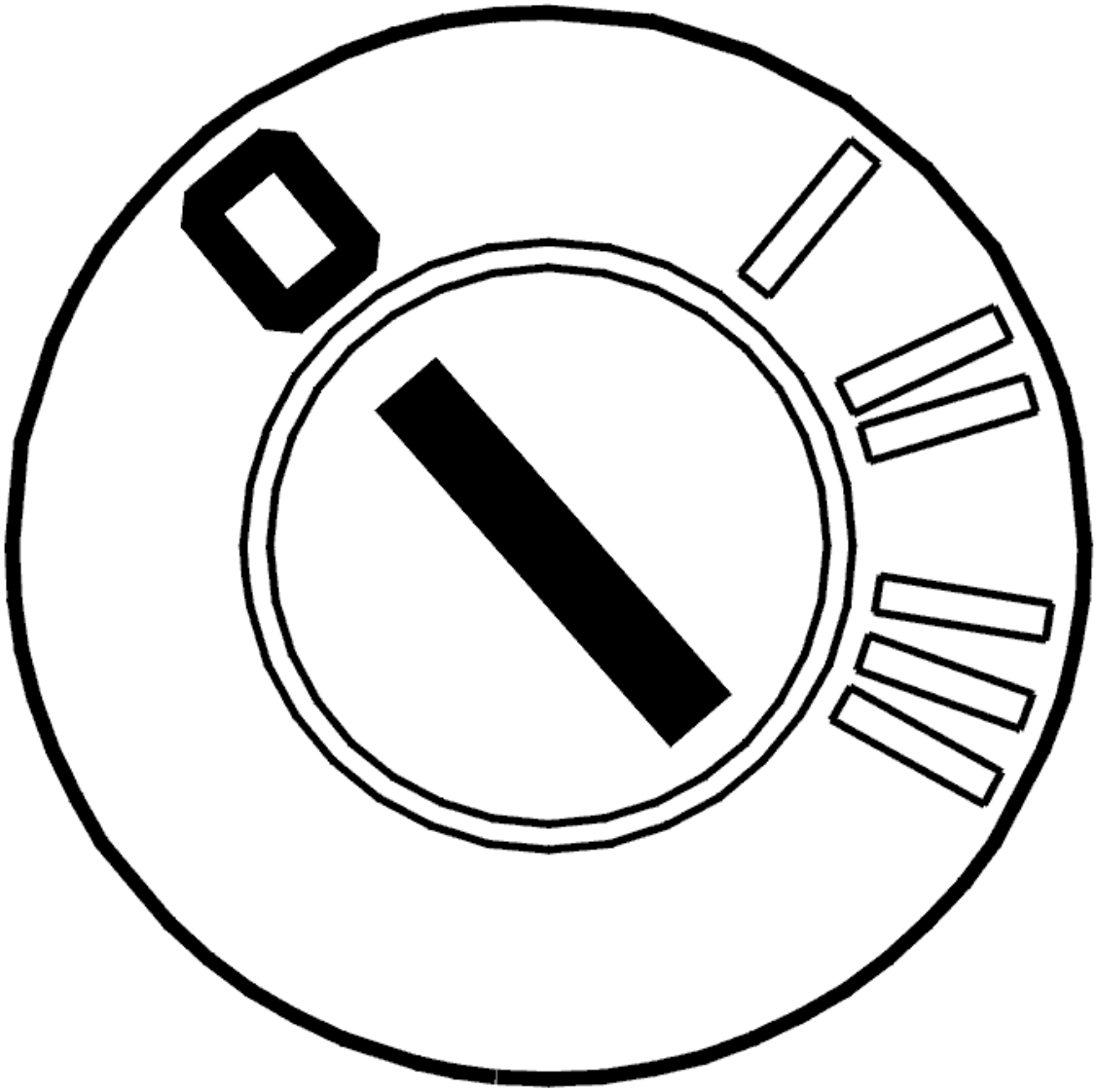


Fig. 422: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

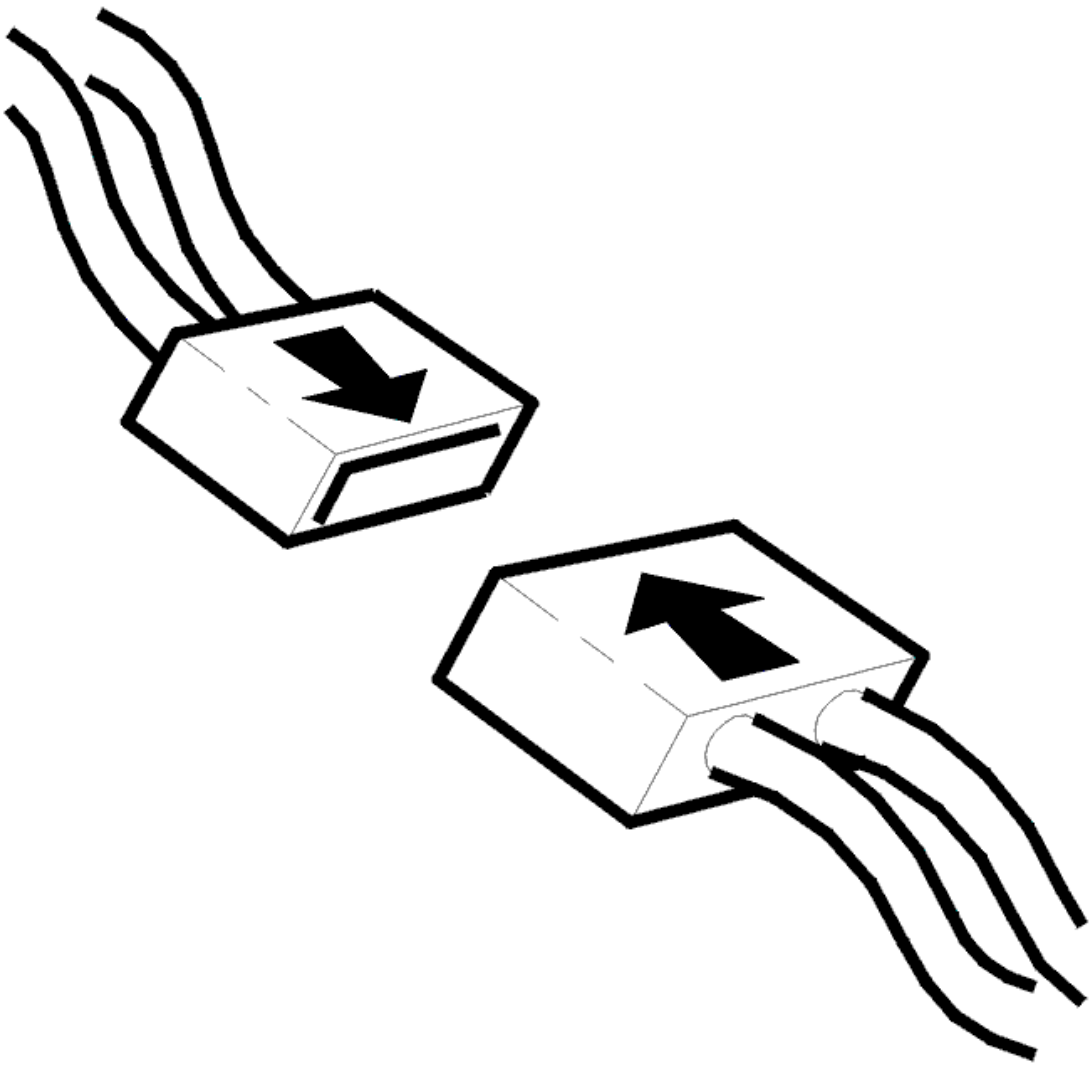


Fig. 423: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

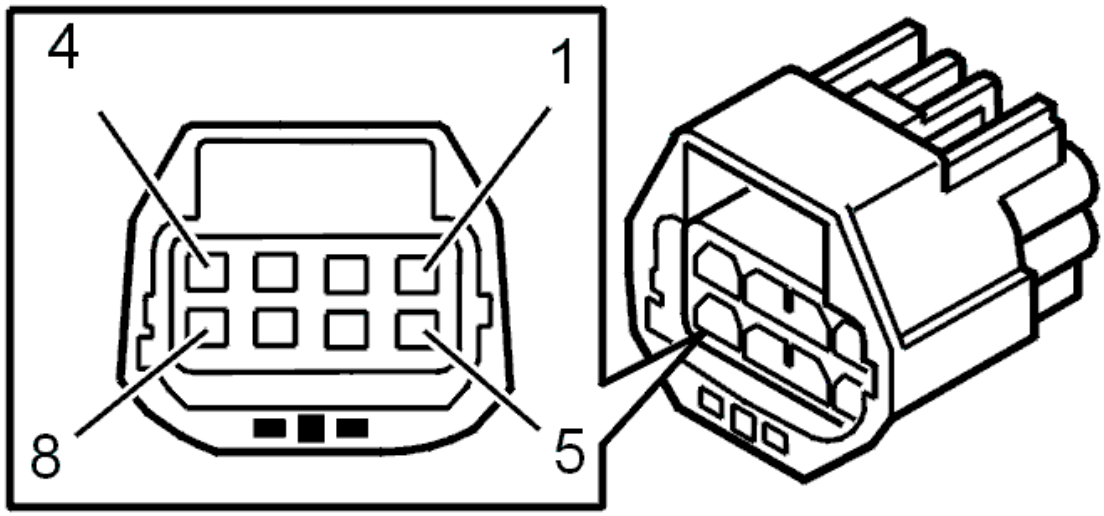


Fig. 424: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

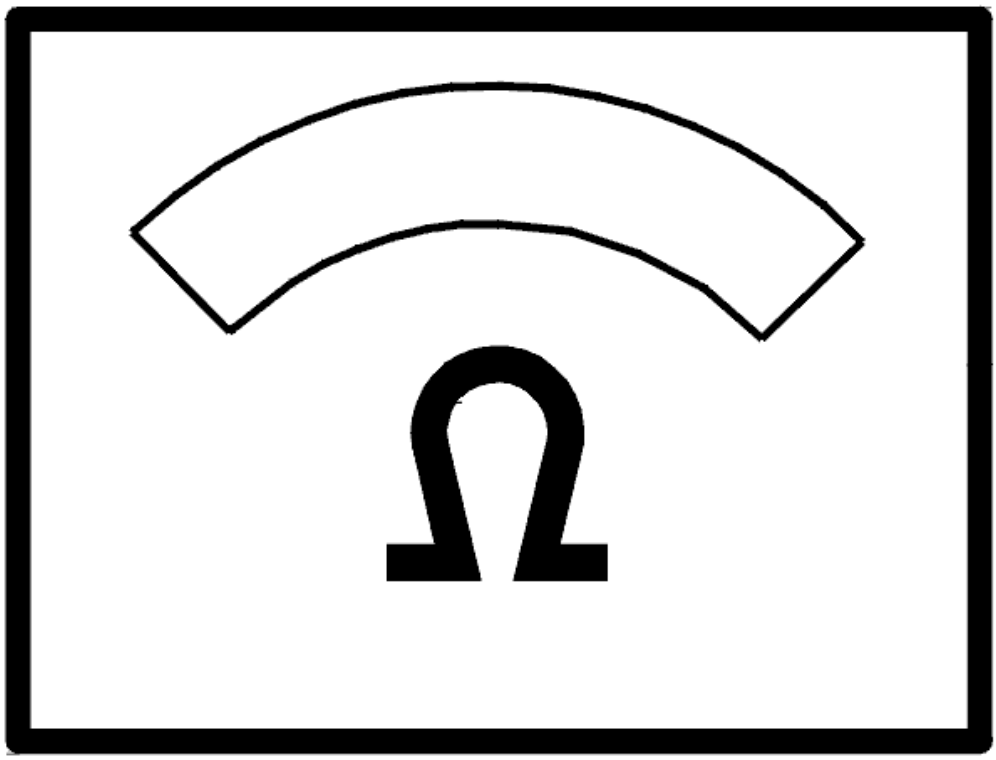


Fig. 425: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

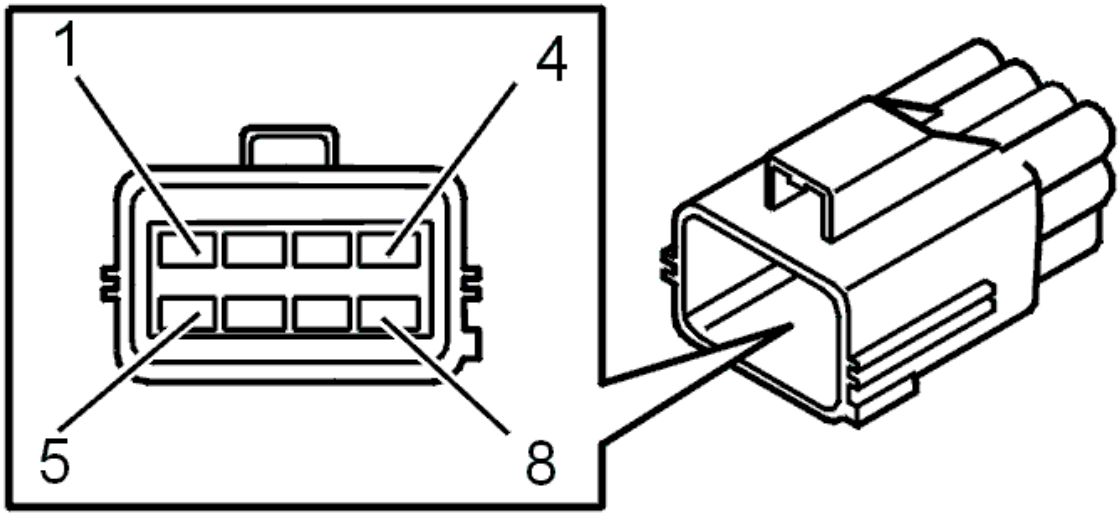


Fig. 426: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

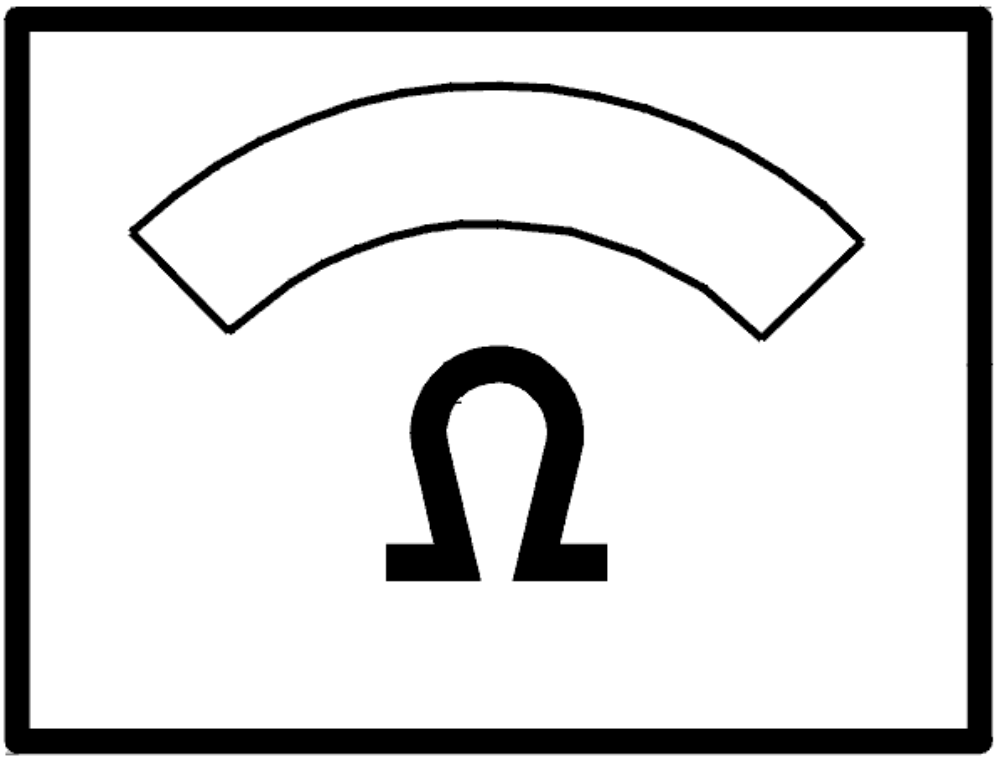


Fig. 427: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

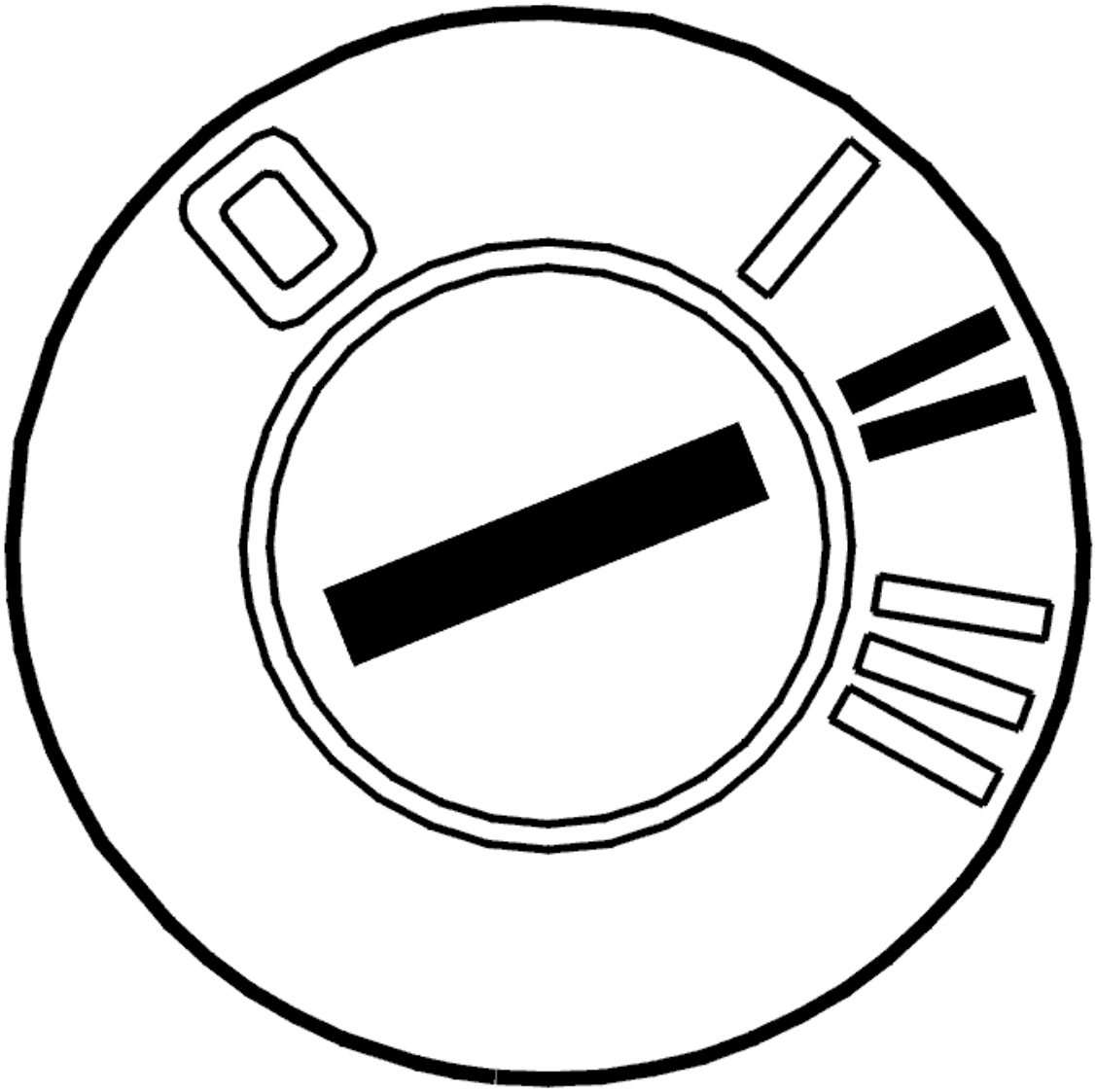


Fig. 428: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

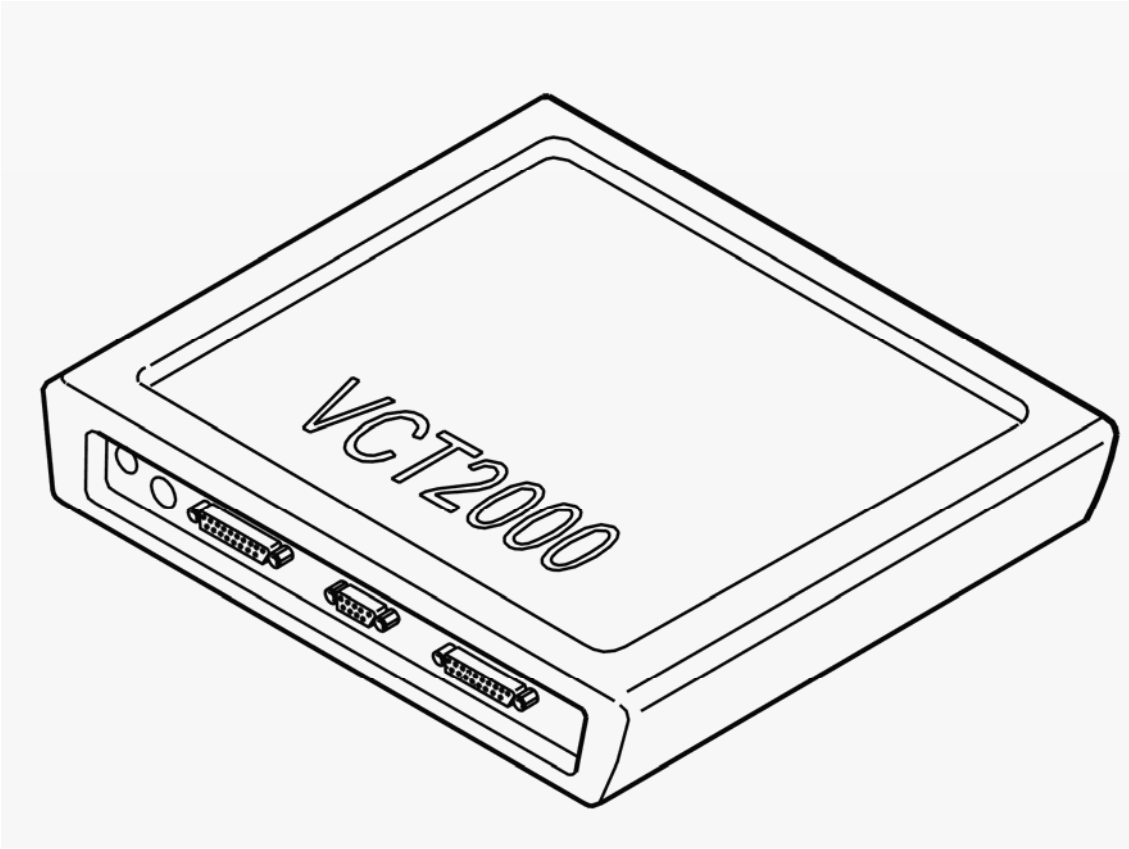


Fig. 429: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

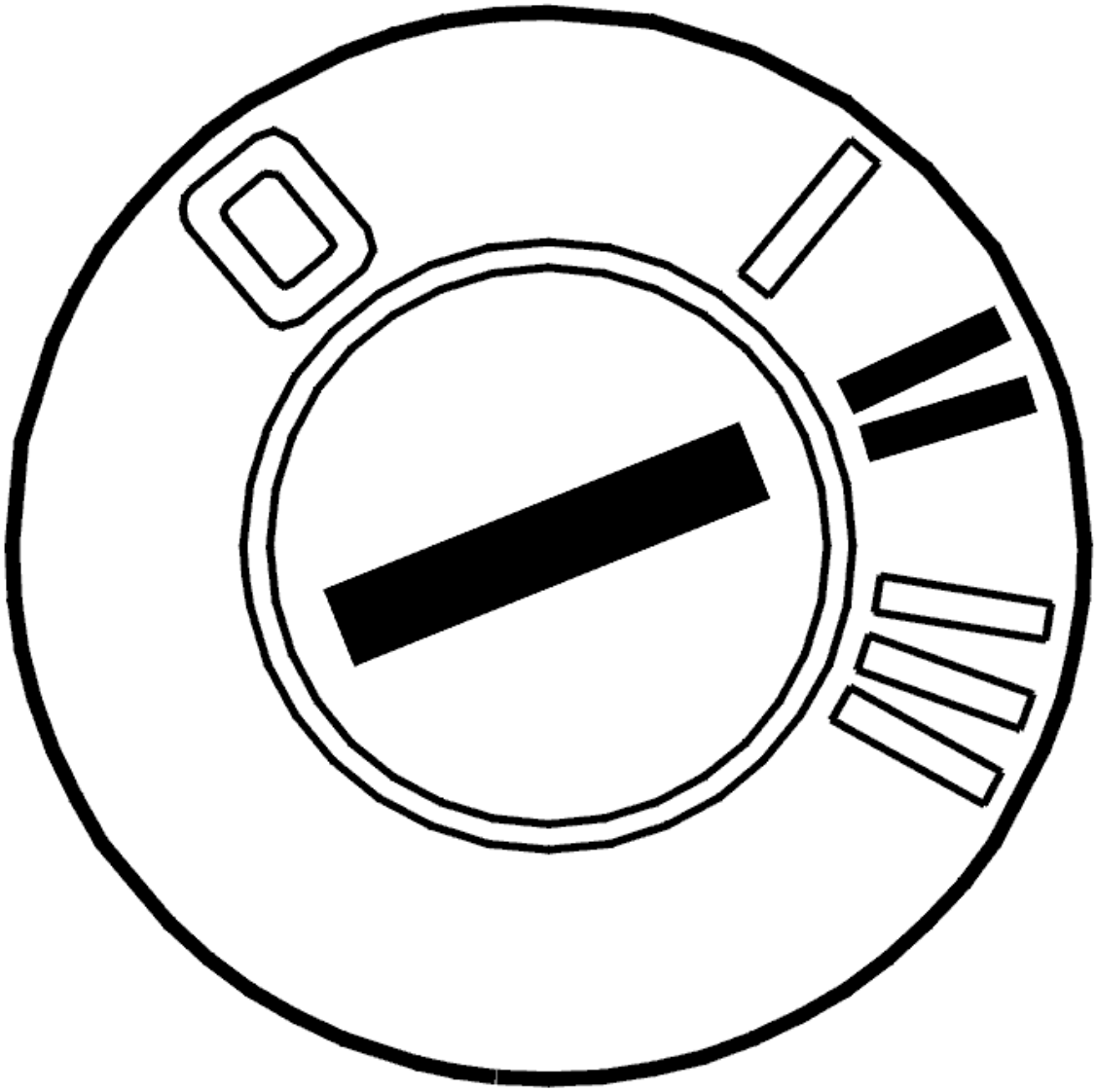


Fig. 430: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

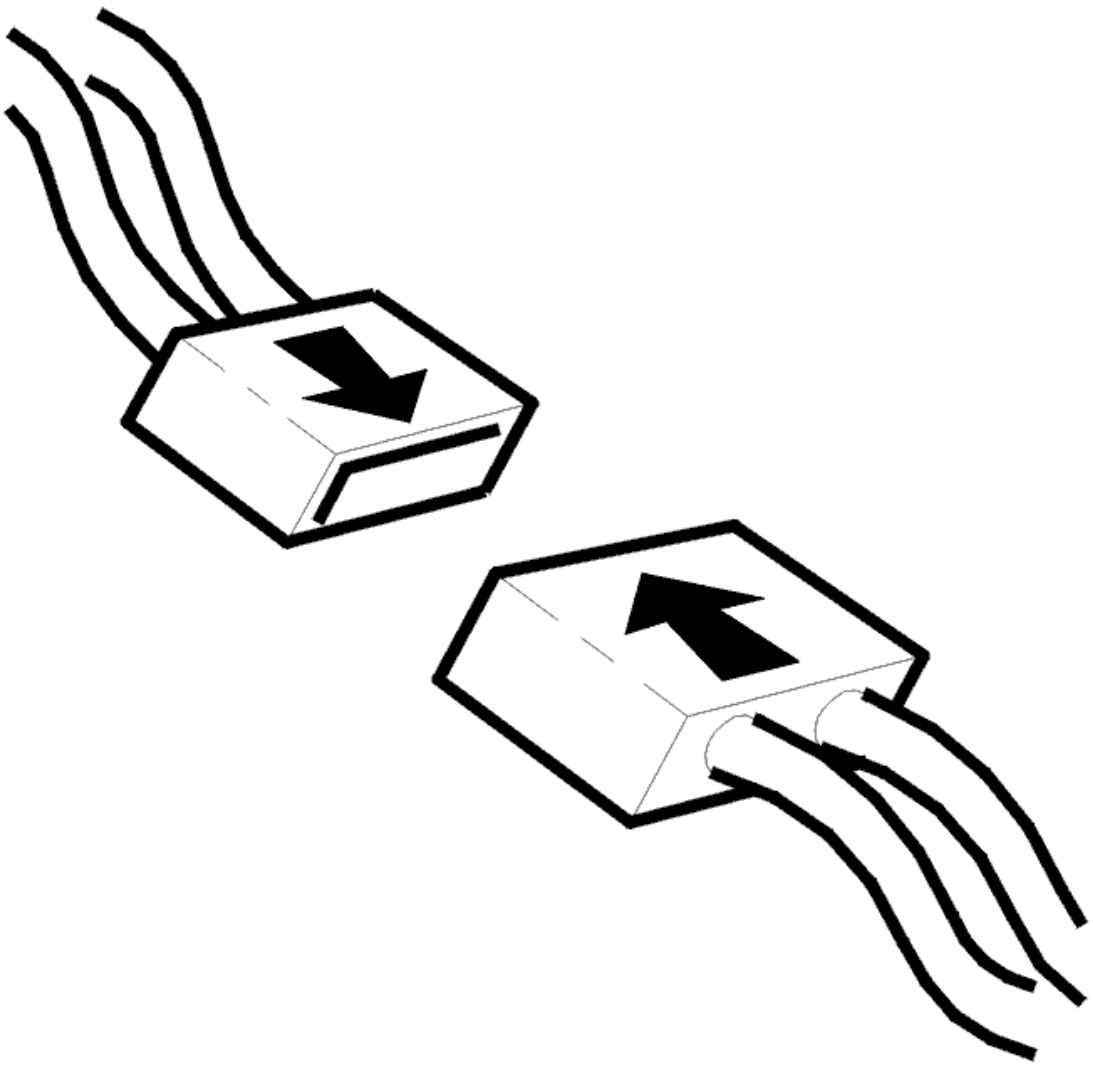


Fig. 431: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

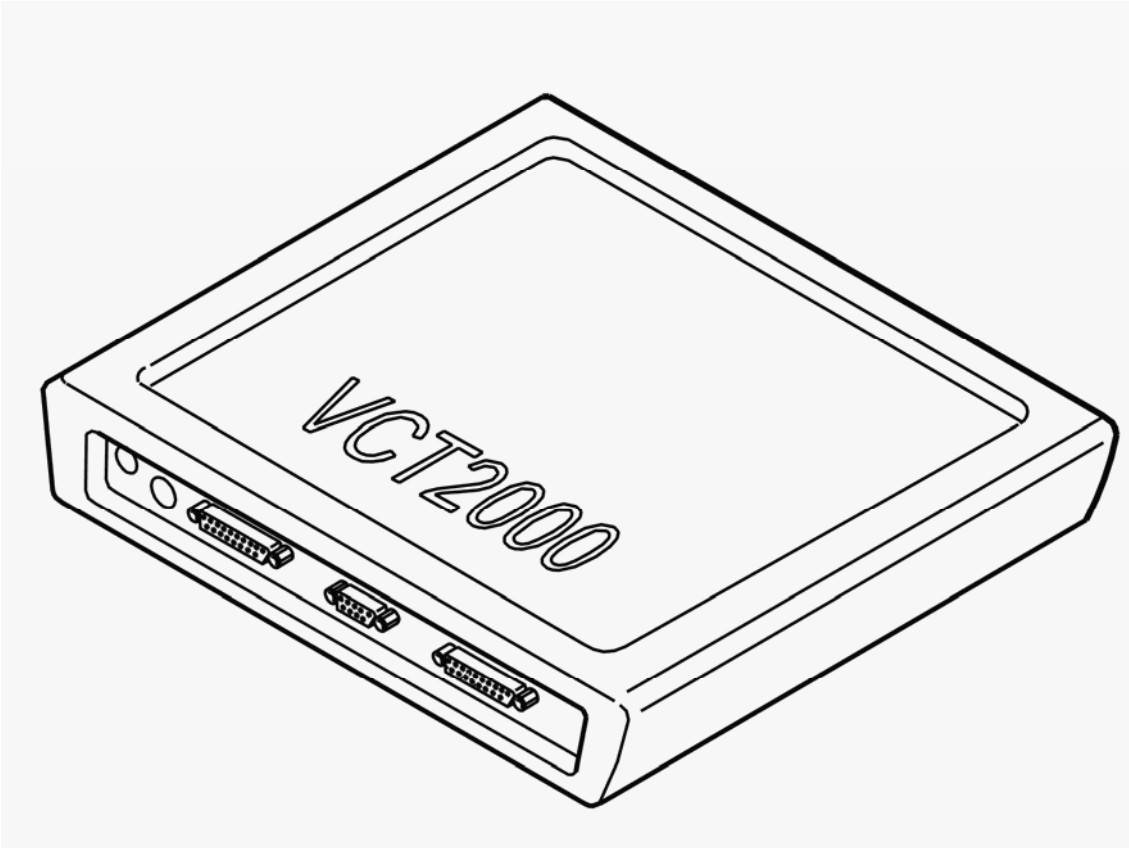


Fig. 432: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-0009: SHIFT SOLENOID S2. SIGNAL TOO LOW (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

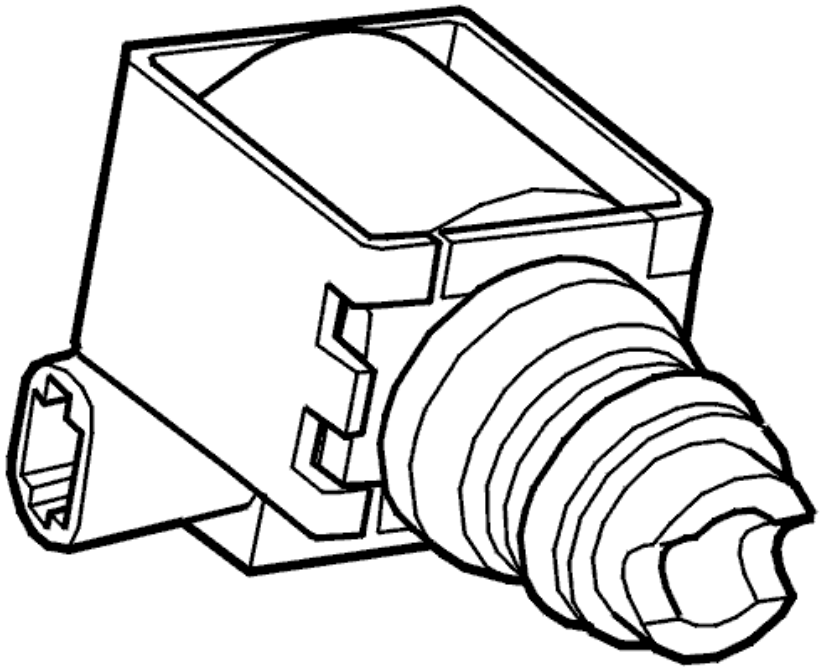


Fig. 433: Identifying Shift Solenoid S1 And S2
Courtesy of VOLVO CARS CORPORATION

Shift solenoids S2 and S1 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Solenoid S2 is activated in 1st and 2nd gears. Diagnostic trouble code (DTC) TCM-0009 is stored if the control module registers that the signal in the solenoid S2 circuit is too low when the solenoid should be activated. Solenoid S2 cannot then be activated.

Substitute Value

- The control module "Limp Home" program has been initiated.

Possible Source

- Contact resistance in the terminals.
- Short-circuit to ground in the signal cable.
- Defective solenoid.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.

- Harsh gear shifting.
- No shifting.
- No lock-up function.

HINT: Harsh shifting - due to disabled line pressure solenoid STH control. This results in constant maximum line pressure and leads to harsher shifting and gear engagement.

HINT: No shifting -because the transmission control module (TCM) prevents activation of the solenoids. This stops gear-shifting.

SIGNAL TOO LOW

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

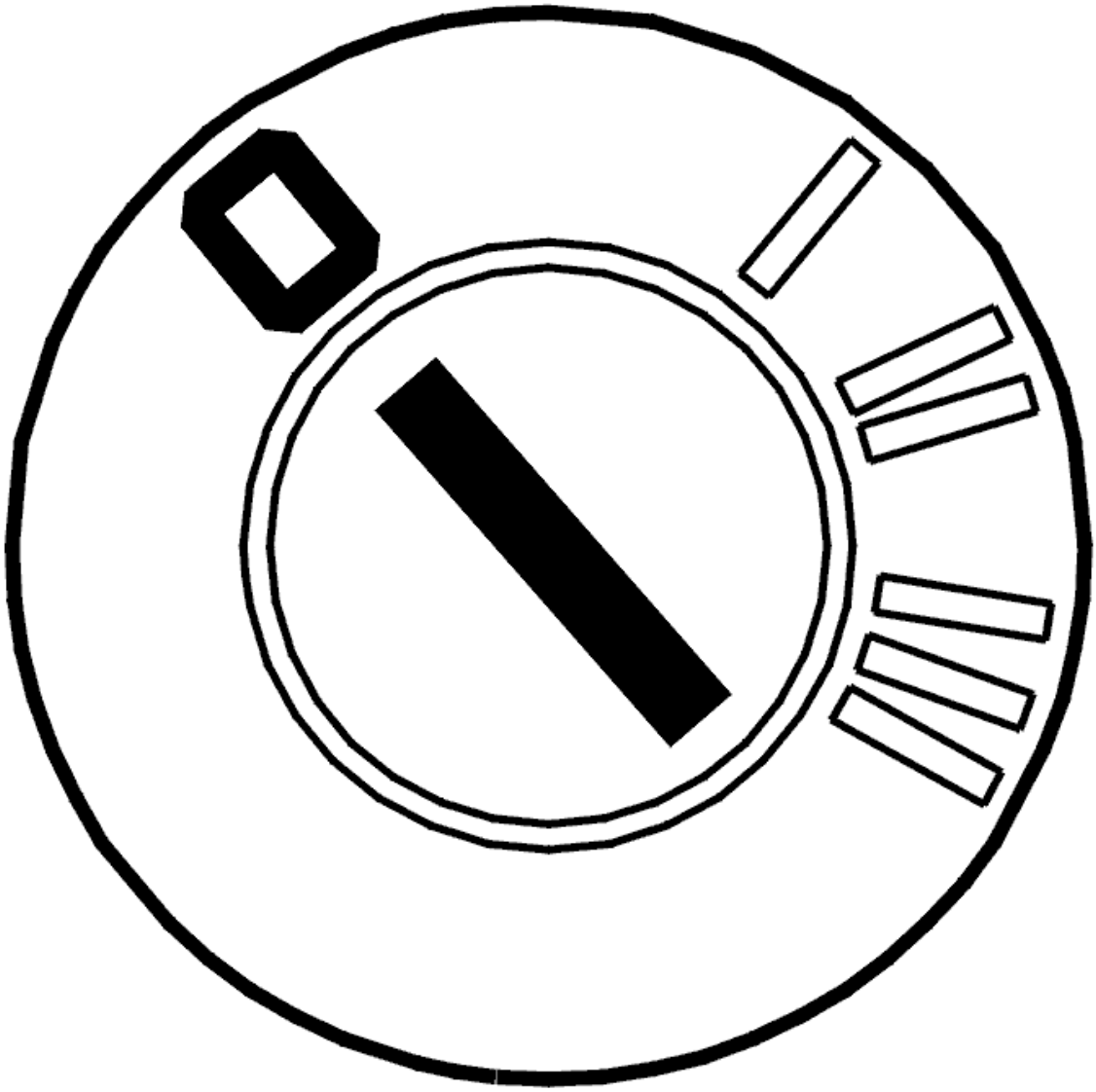


Fig. 434: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

  HINT: If the temperature is outside its permitted range, fault-trace the temperature sensor.

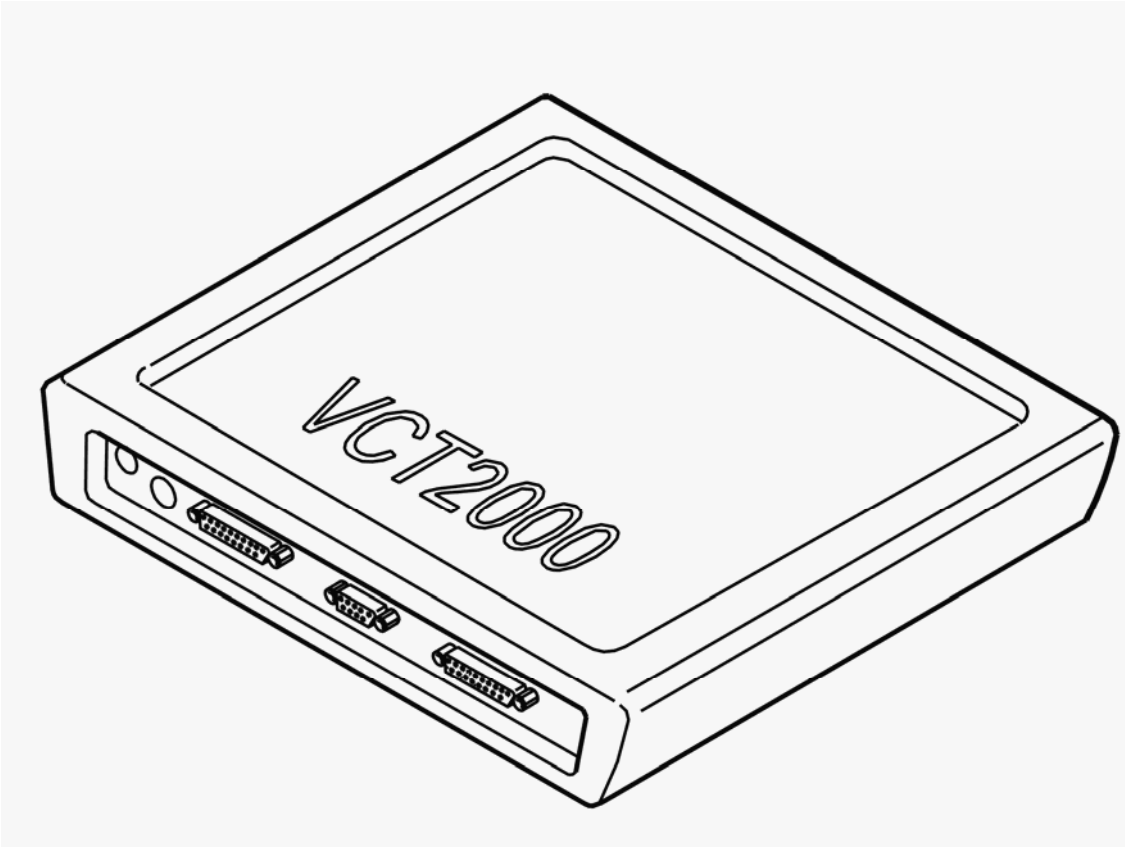


Fig. 435: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S2**

- **NO**

  Refer to **SIGNAL TOO HIGH**

CHECKING SHIFT SOLENOID S2

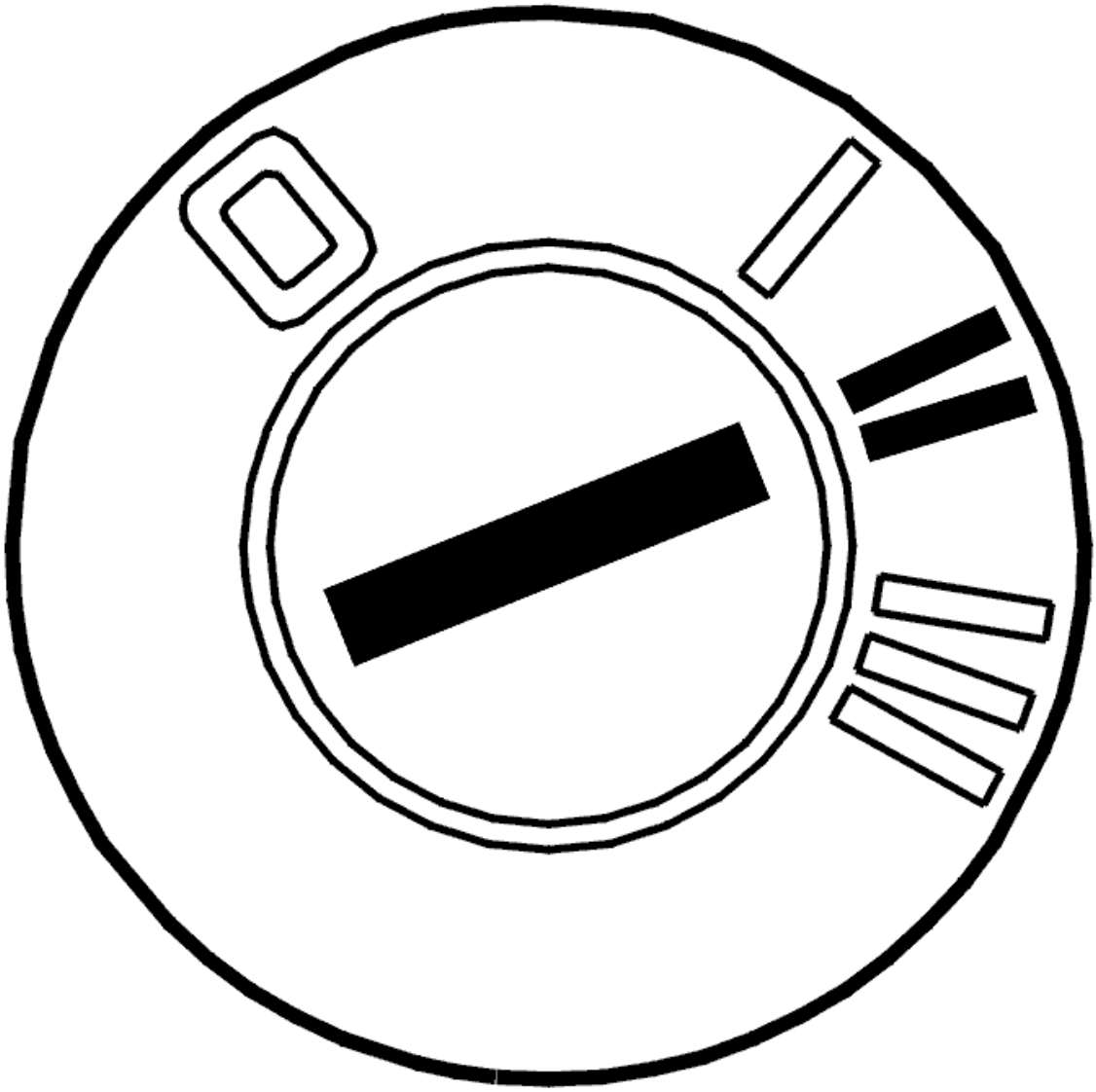


Fig. 436: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and automatic transmission connectors for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary
- Ignition on
- Gear selector in position P
- Activate solenoid S2.

  The value must change between OFF and ON.

  If the value changes, the problem was caused by contact resistance and oxidation.

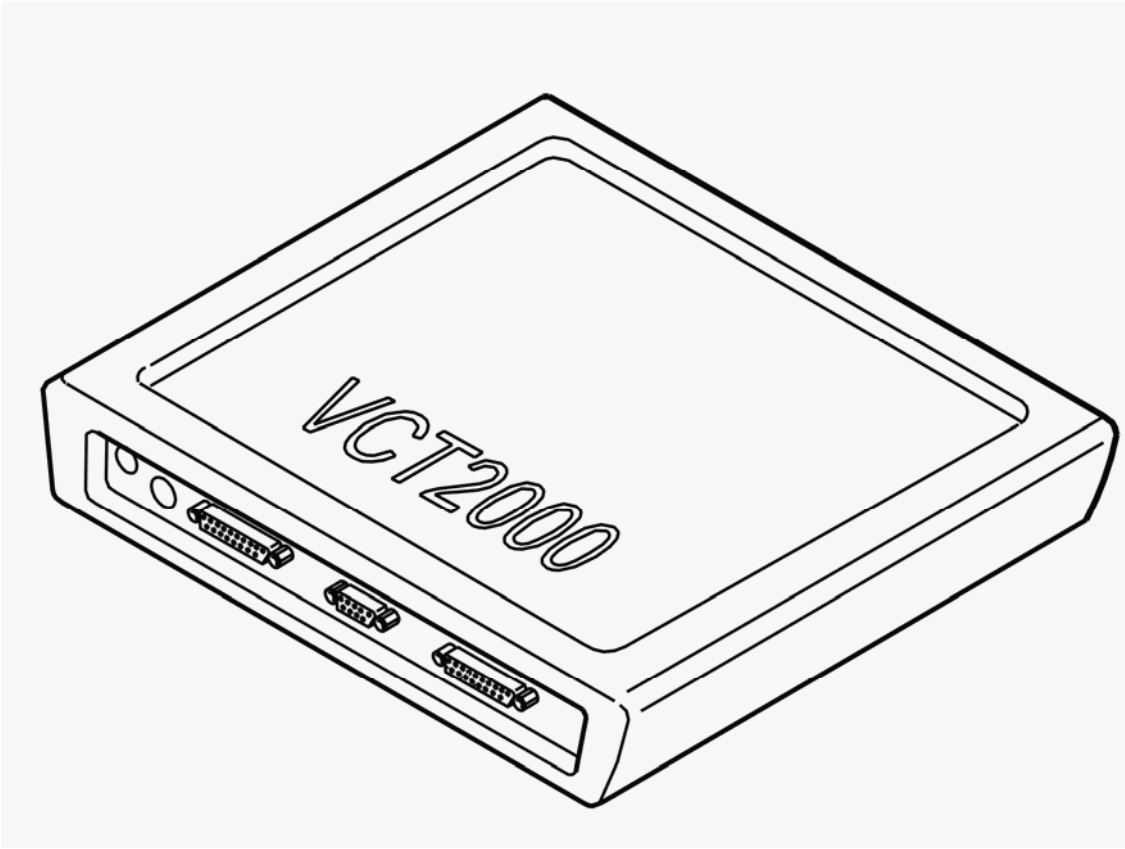


Fig. 437: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING SOLENOID S2**

CHECKING SOLENOID S2

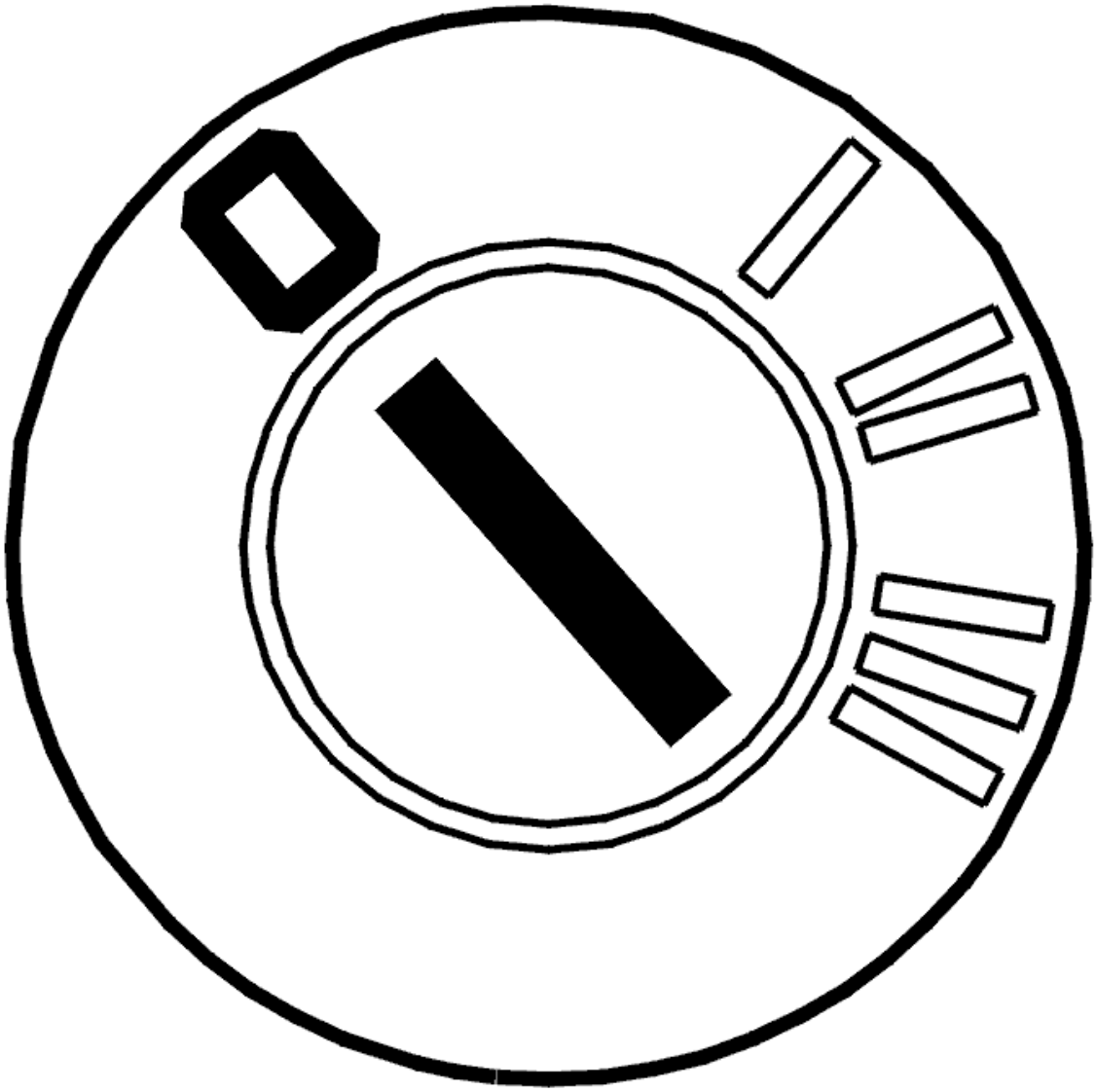


Fig. 438: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

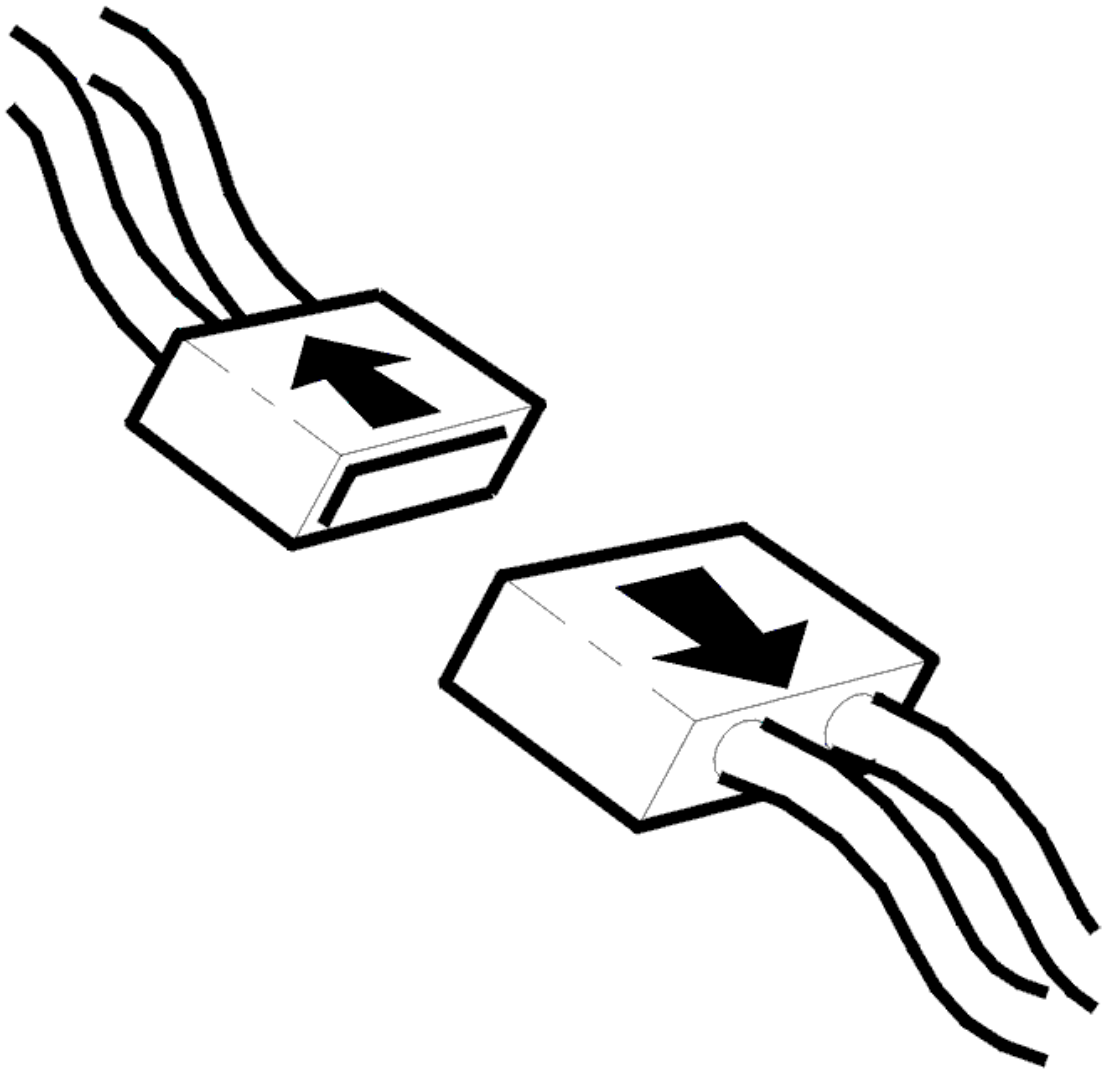


Fig. 439: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

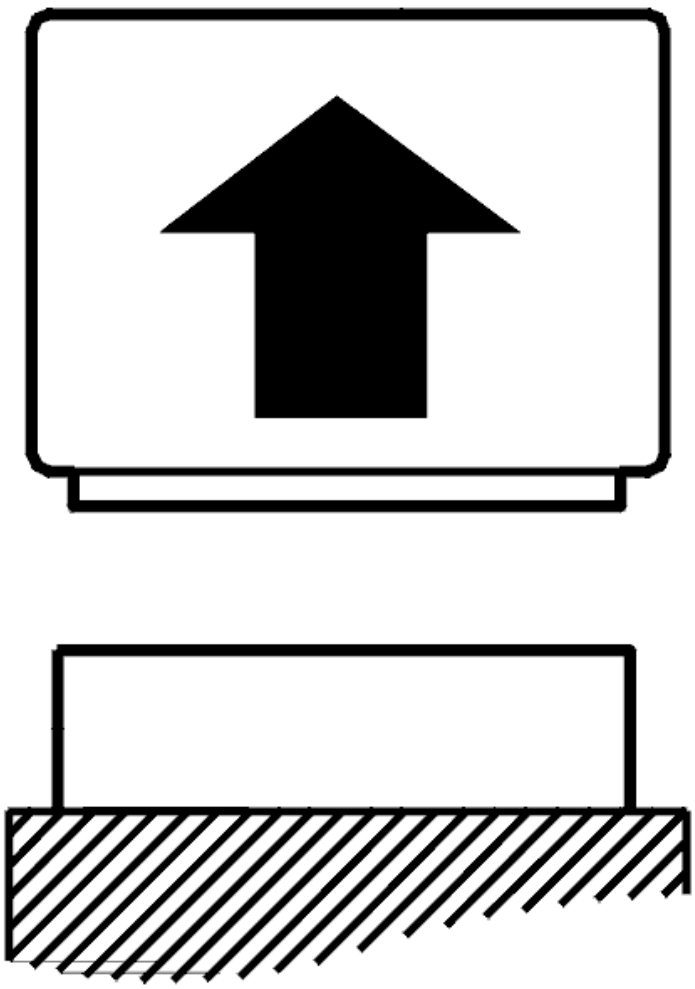


Fig. 440: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the automatic transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals #B (#A1) and # E (#A5).

  The solenoid S2 resistance must be between 18 and 30 ohms.

  Other information:

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- For information about signals, see **SIGNAL SPECIFICATION** .

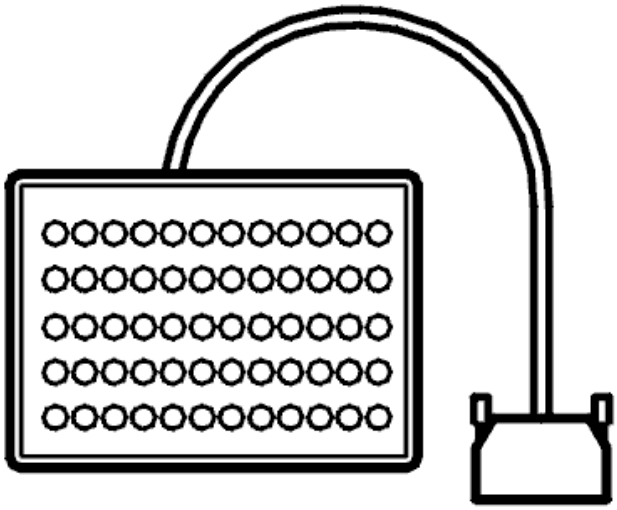


Fig. 441: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

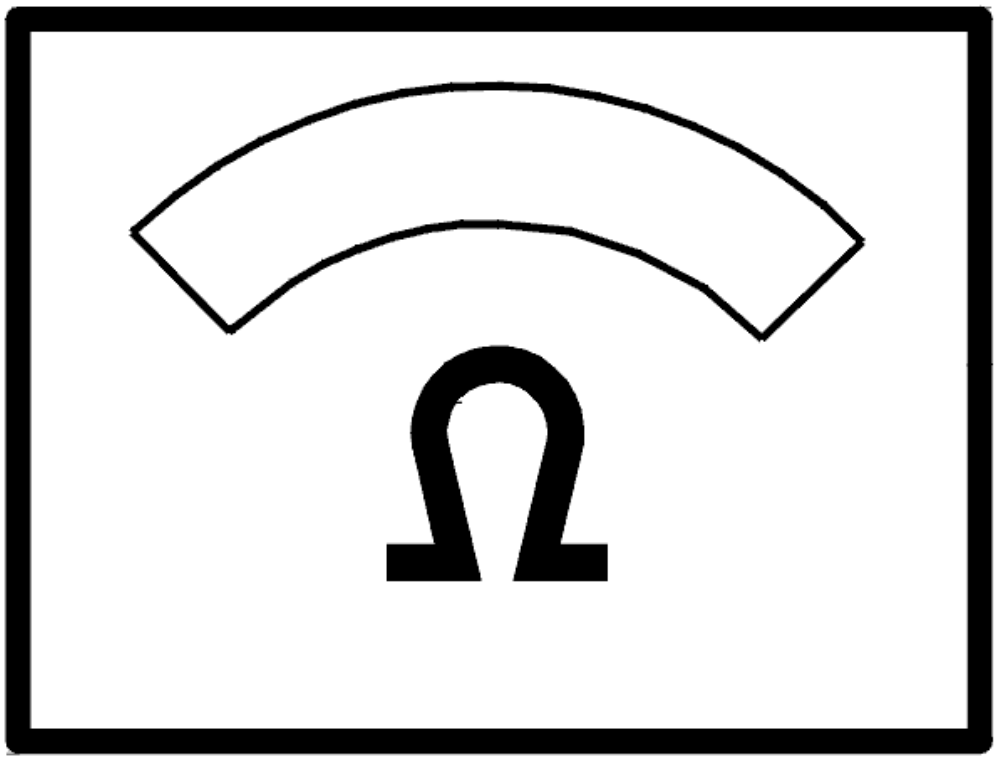


Fig. 442: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

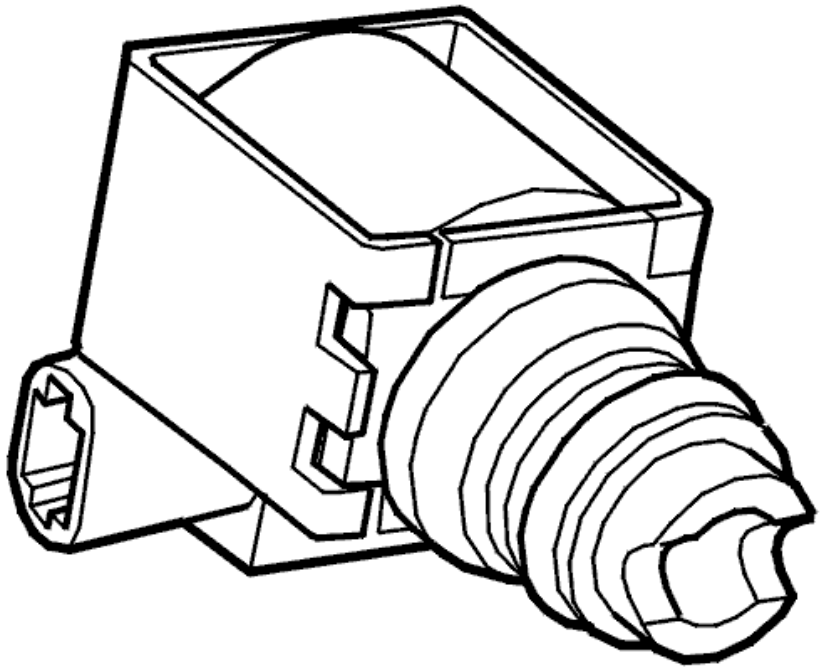


Fig. 443: Identifying Shift Solenoid S1 And S2
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE CONTROL MODULE

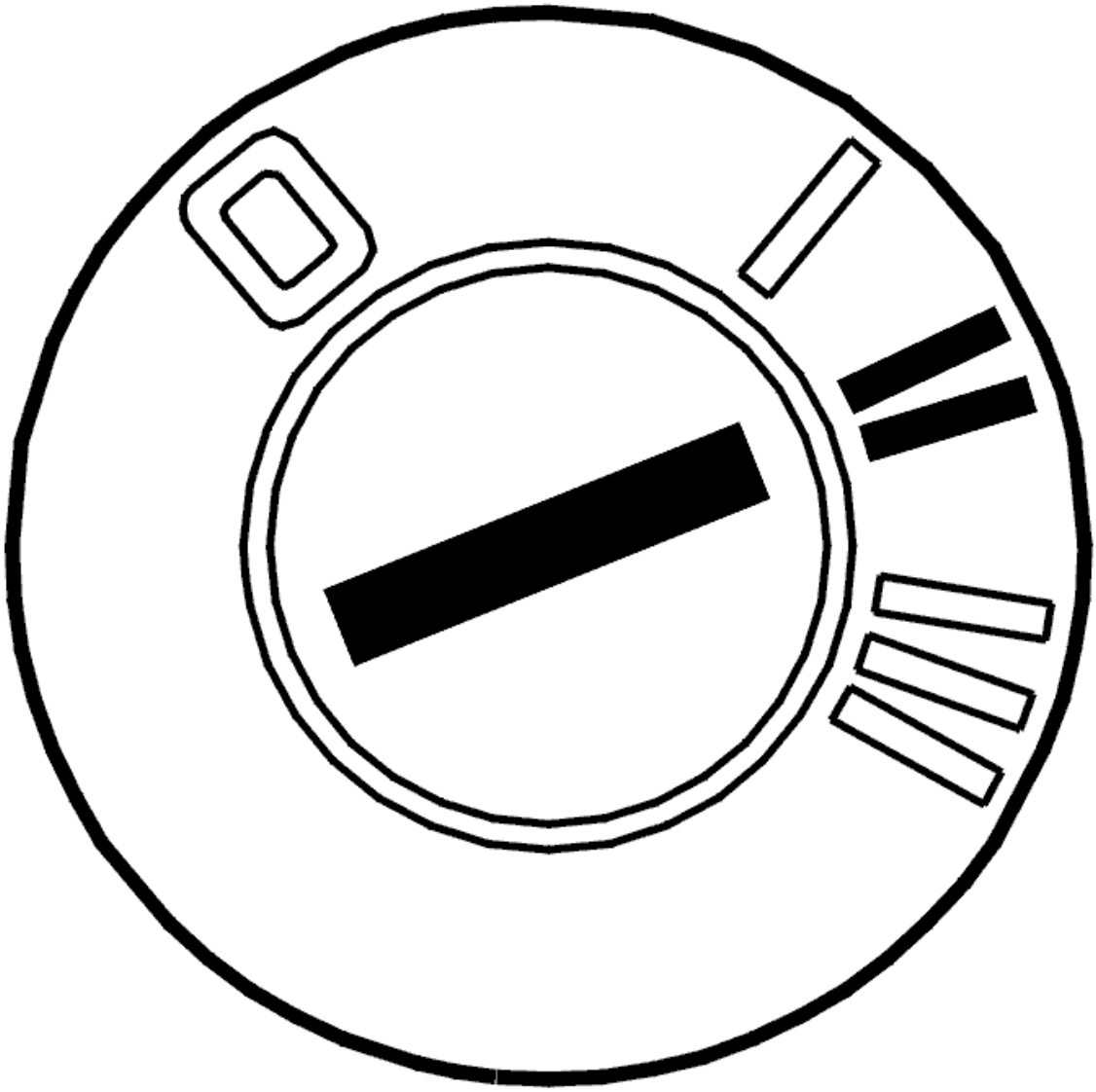


Fig. 444: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

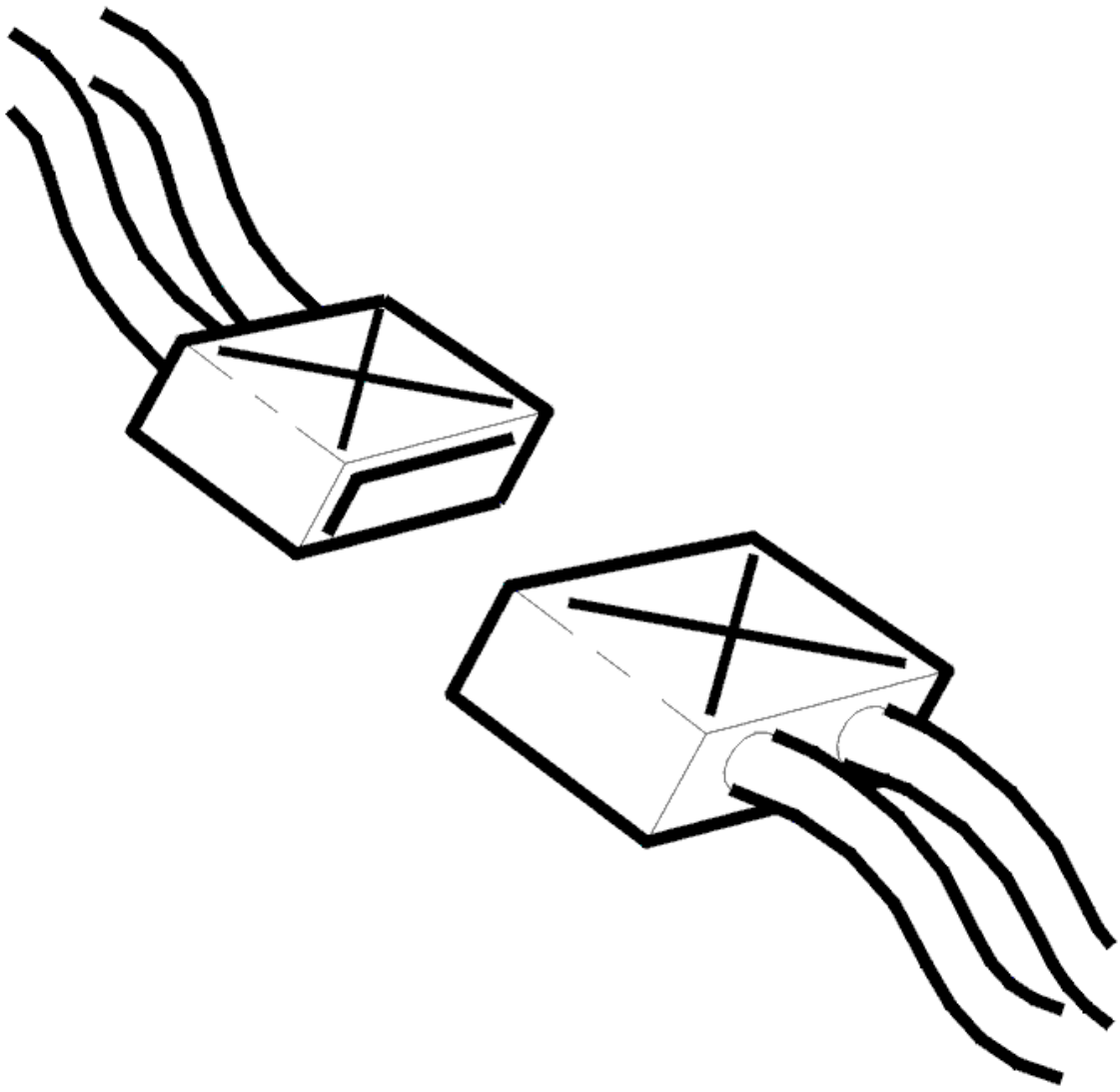


Fig. 445: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

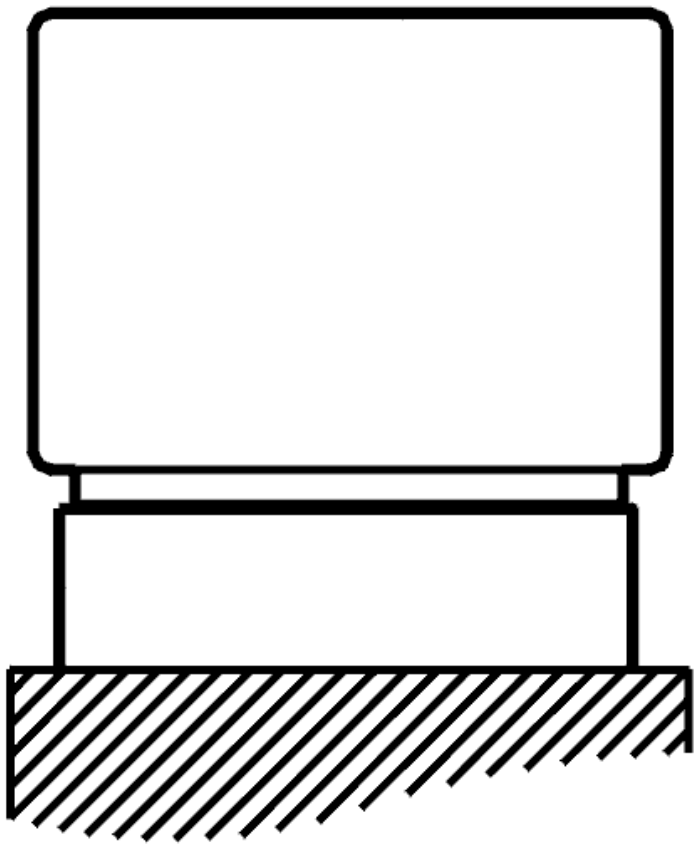


Fig. 446: Identifying Control Unit Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Control module connected.
- Transmission connector disconnected
- Ignition on
- Gear selector in position P.

Check the circuit for solenoid S2 by connecting an ohmmeter between terminals #68 (#B8) and #53 (#A53). The resistance must be between 7 and 13 kohms. Try a new control module if the resistance is infinite.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION** .

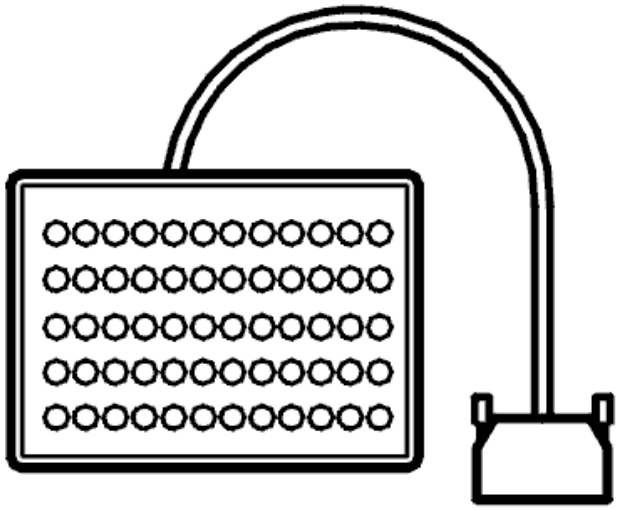


Fig. 447: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

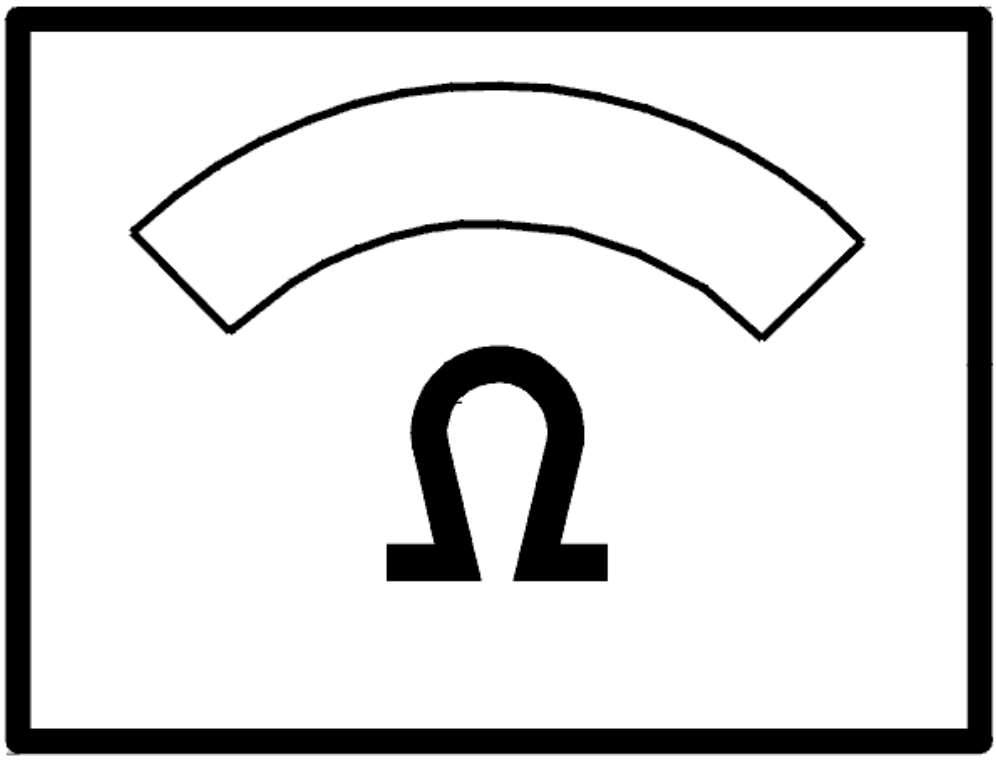


Fig. 448: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance incorrect?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

CHECKING THE WIRING

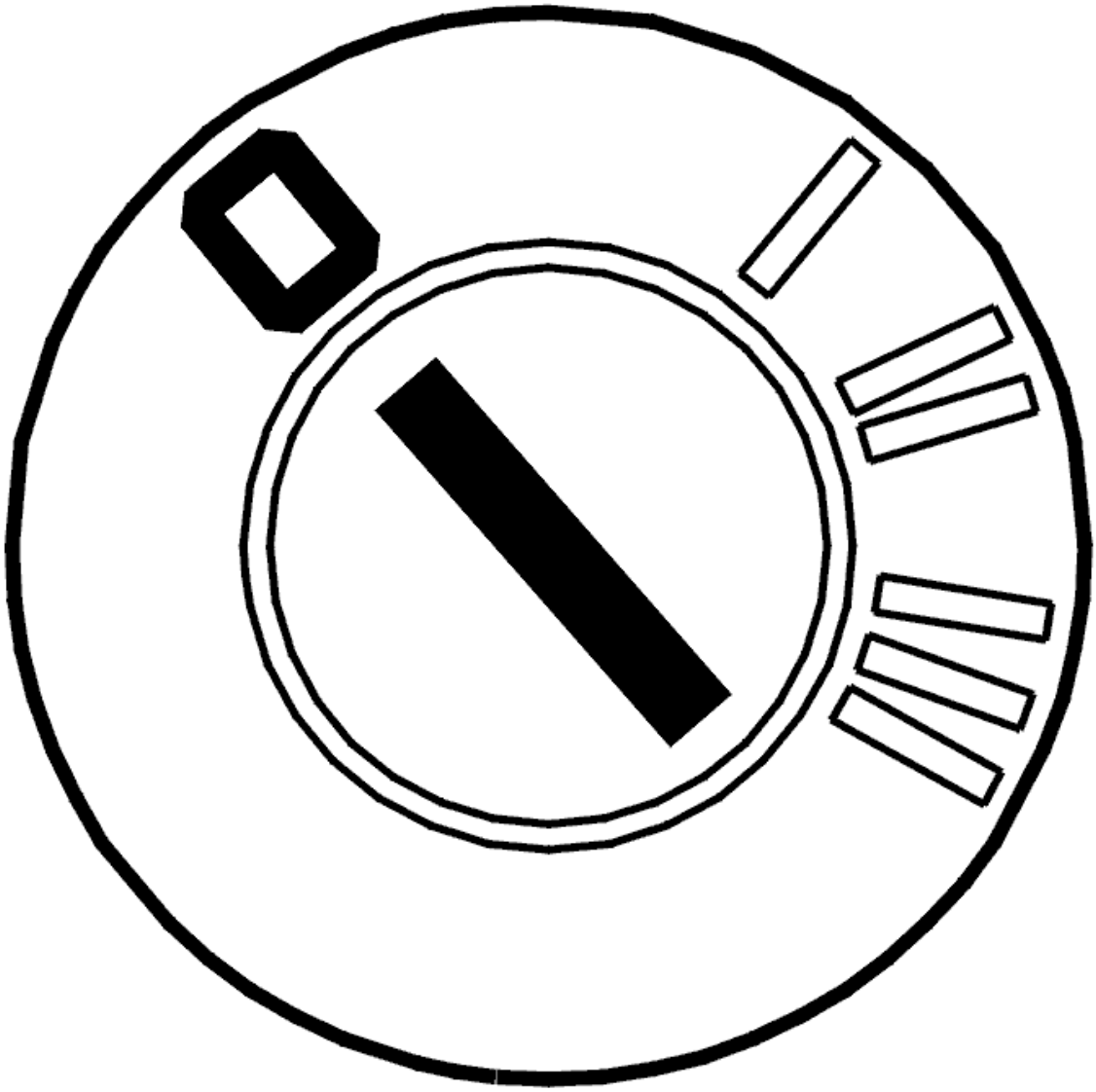


Fig. 449: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

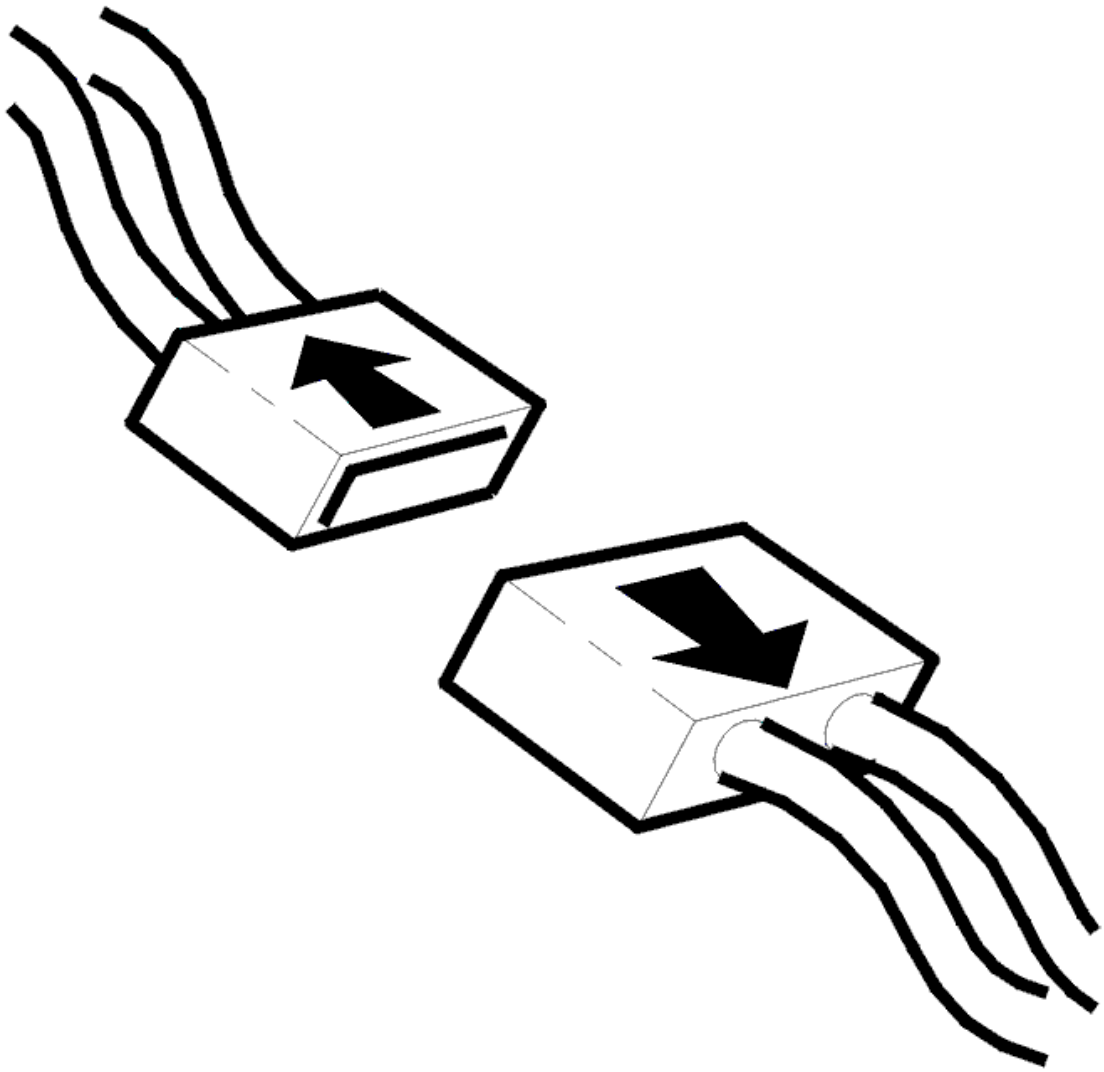


Fig. 450: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

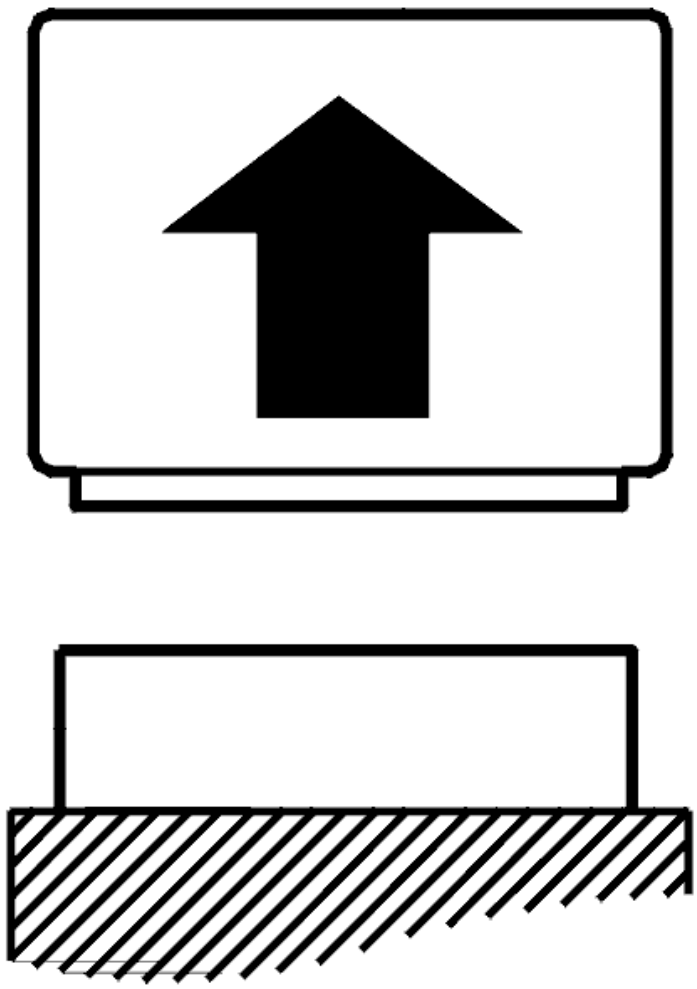


Fig. 451: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box
- Disconnect the control module.
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side).

  Check the cable between control module terminal #A68 (#B8) and transmission connector terminal #B (#A2) (control module side). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

  Check the cable between control module terminal #A53 and transmission connector (control module side)

terminal #E (#A5). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS**

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

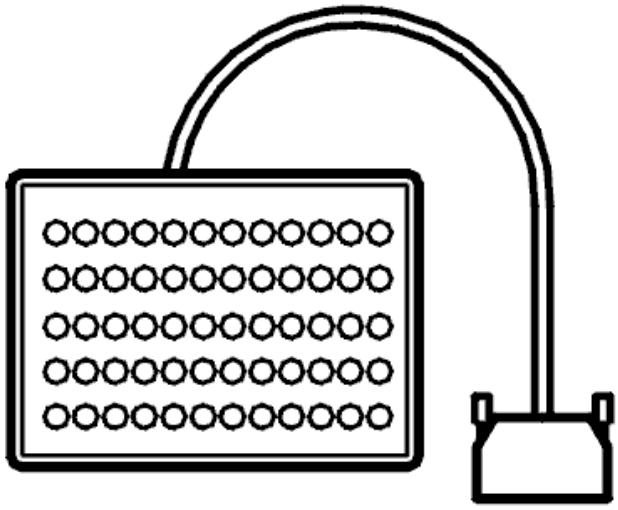


Fig. 452: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

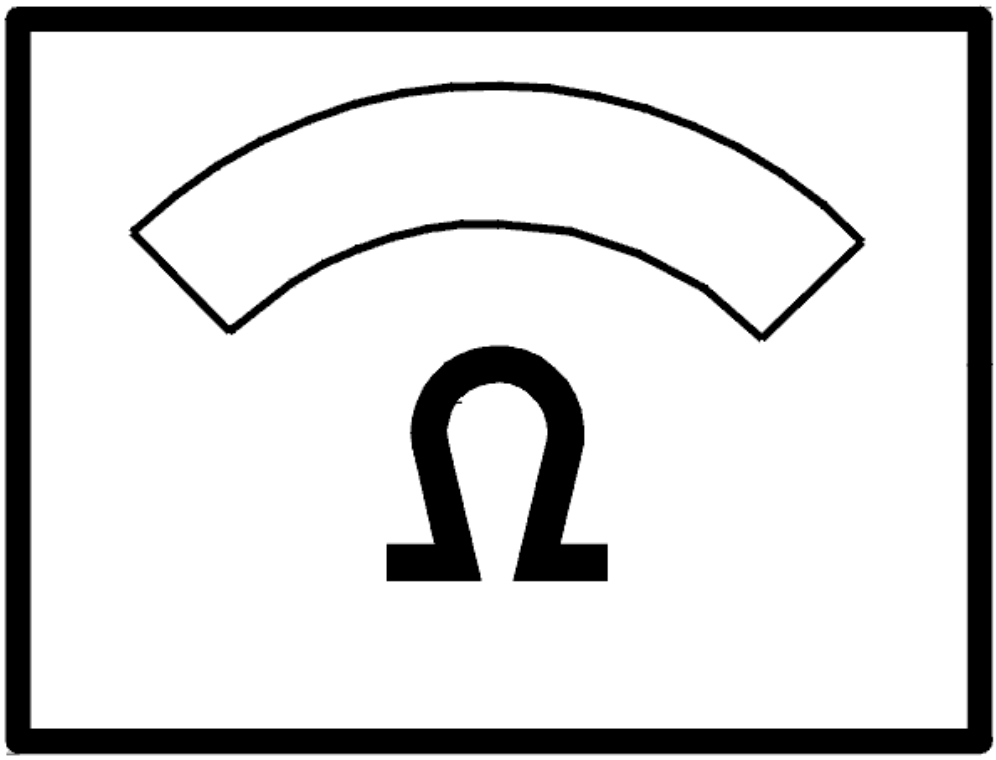


Fig. 453: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE WIRING AND COMPONENT

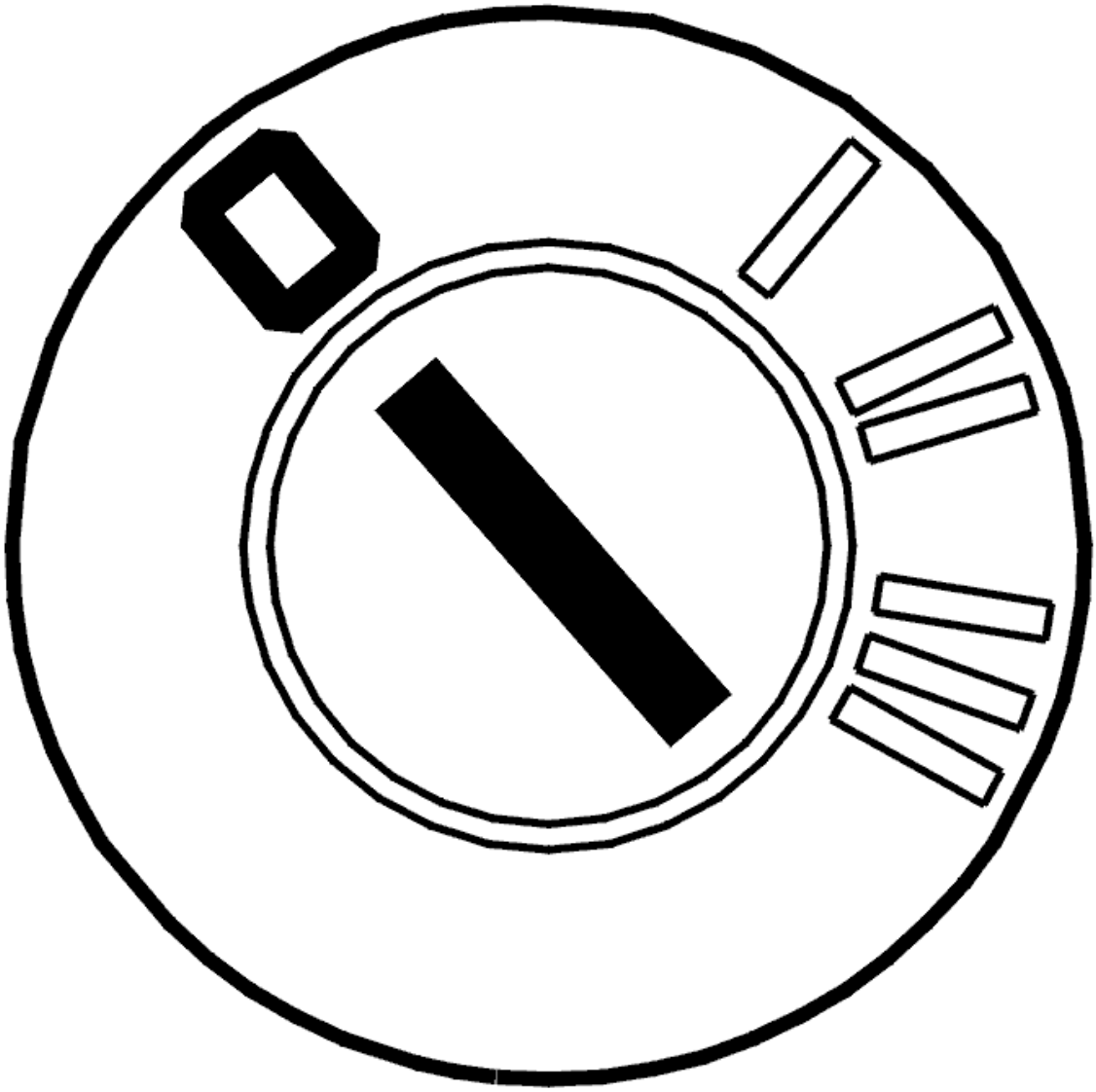


Fig. 454: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission connector (transmission side) terminal #B (#A2) and solenoid S2 terminals #1 and #E (#A5) and solenoid S2 terminal #2. Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

  HINT: Check solenoid S2 by measuring the solenoid resistance between terminals 1 and 2. The resistance must be between 18 and 25 ohms.

  Remedy as necessary.

  Other information:

- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid S2, see **SOLENOID SHIFTING 2-3, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION** .

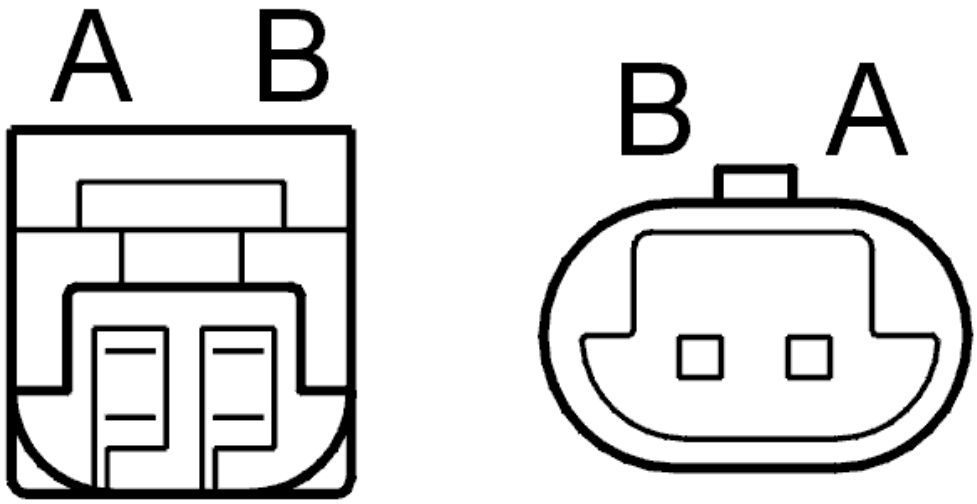


Fig. 455: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

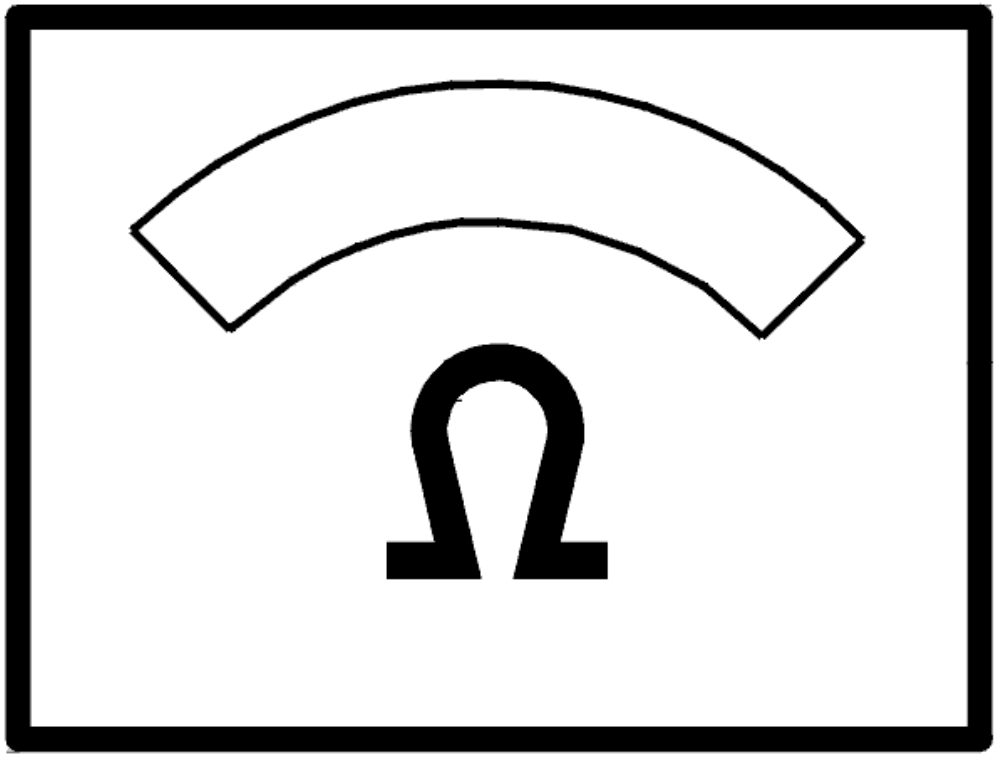


Fig. 456: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

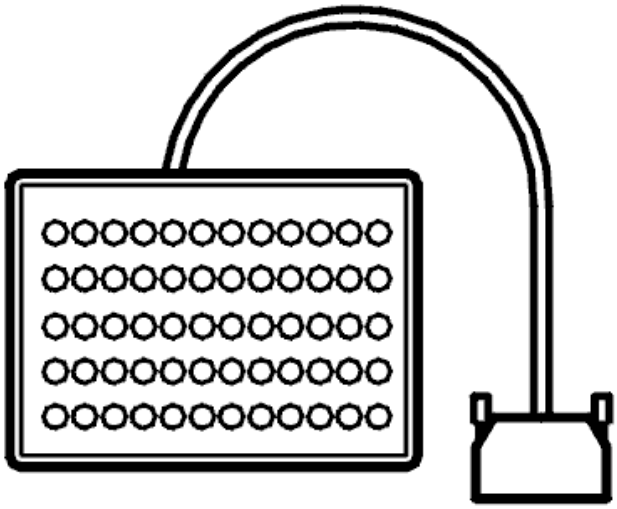


Fig. 457: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the cable between control module terminal #A68 (#B8) and transmission connector terminal #2 (#A2) (control module side). Check for an intermittent short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** . Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between control module terminal #A53 and transmission connector terminal #5 (#A5) (control module side). Check for an intermittent short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** . Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid S2, see **SOLENOID SHIFTING 2-3, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION** .

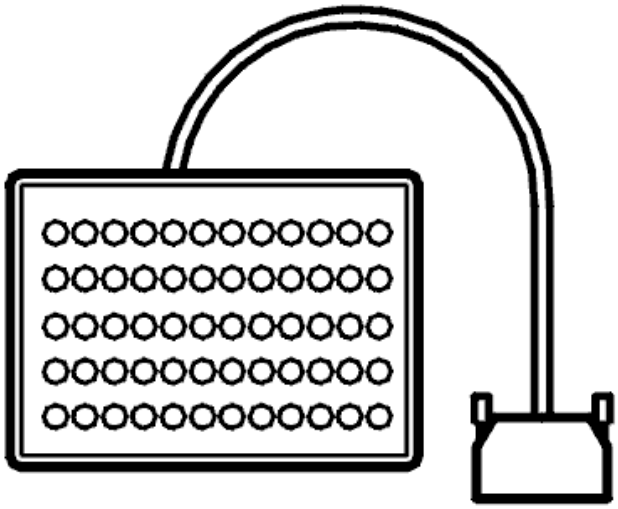


Fig. 458: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

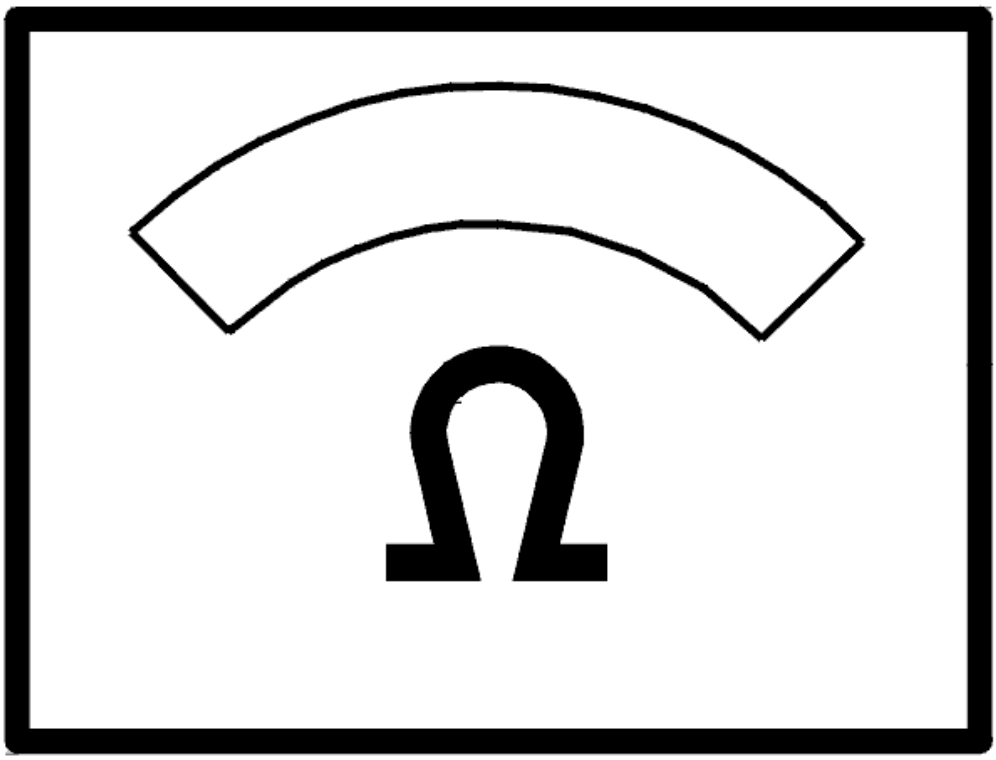


Fig. 459: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

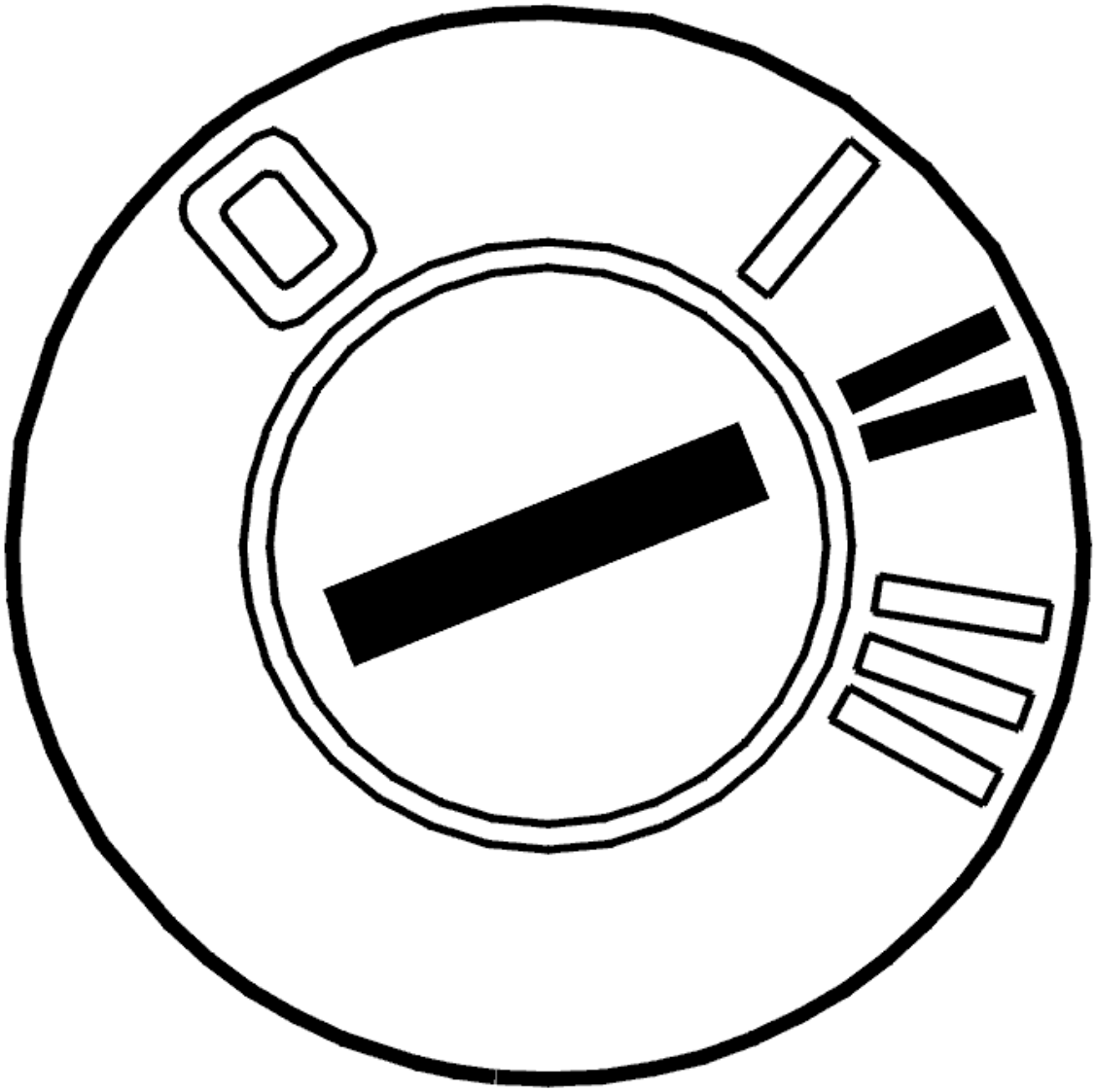


Fig. 460: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

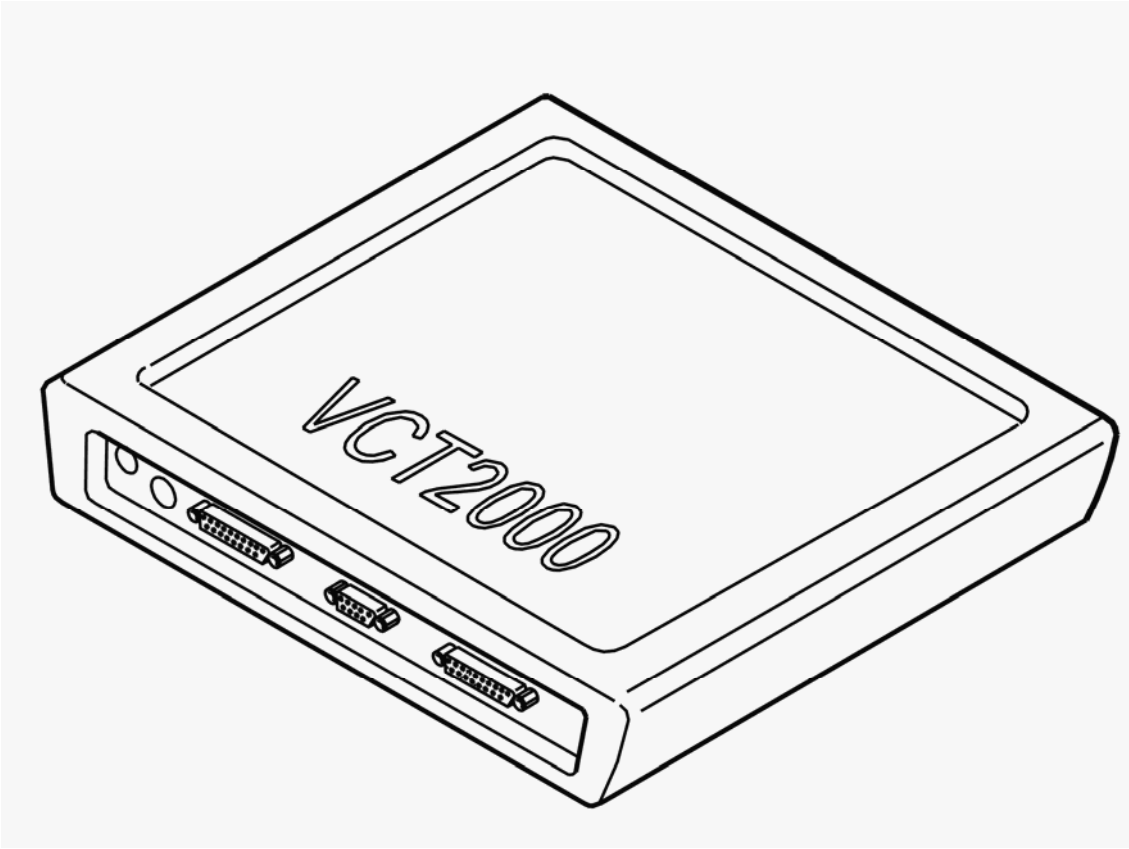


Fig. 461: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

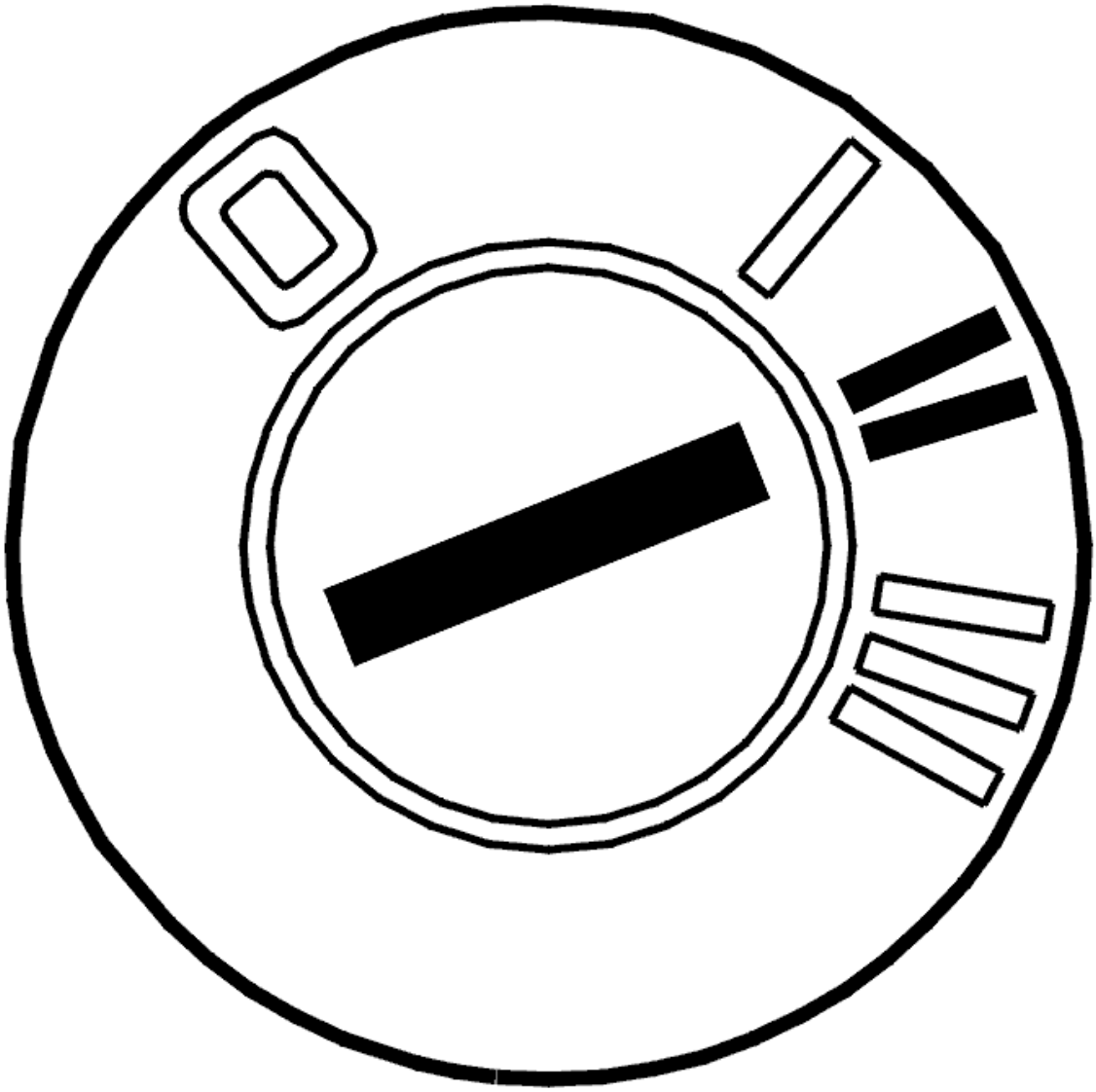


Fig. 462: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

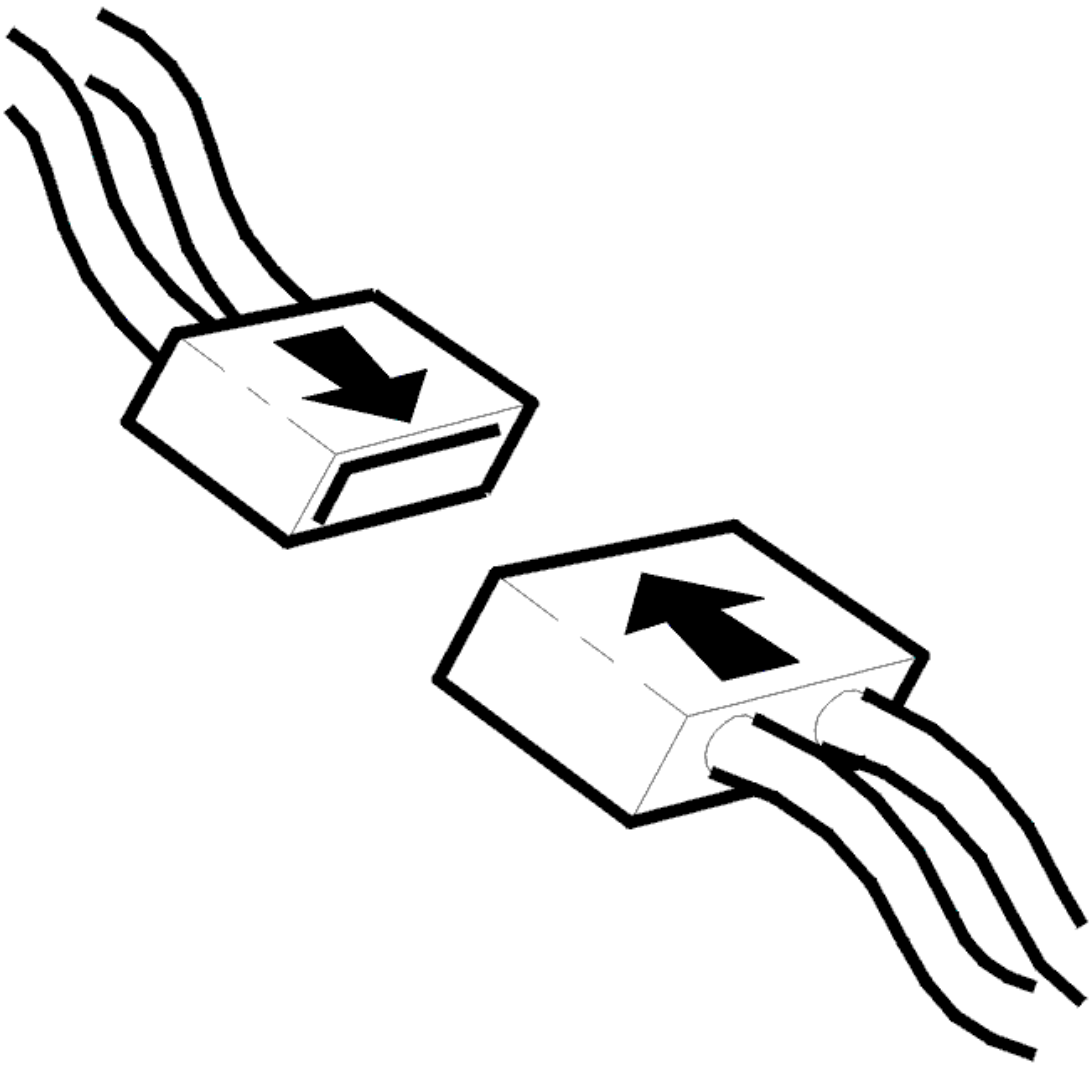


Fig. 463: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Wait at least 90 seconds.
- Reconnect the connectors, reinstall components etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S2.

  The value should change between OFF and ON.

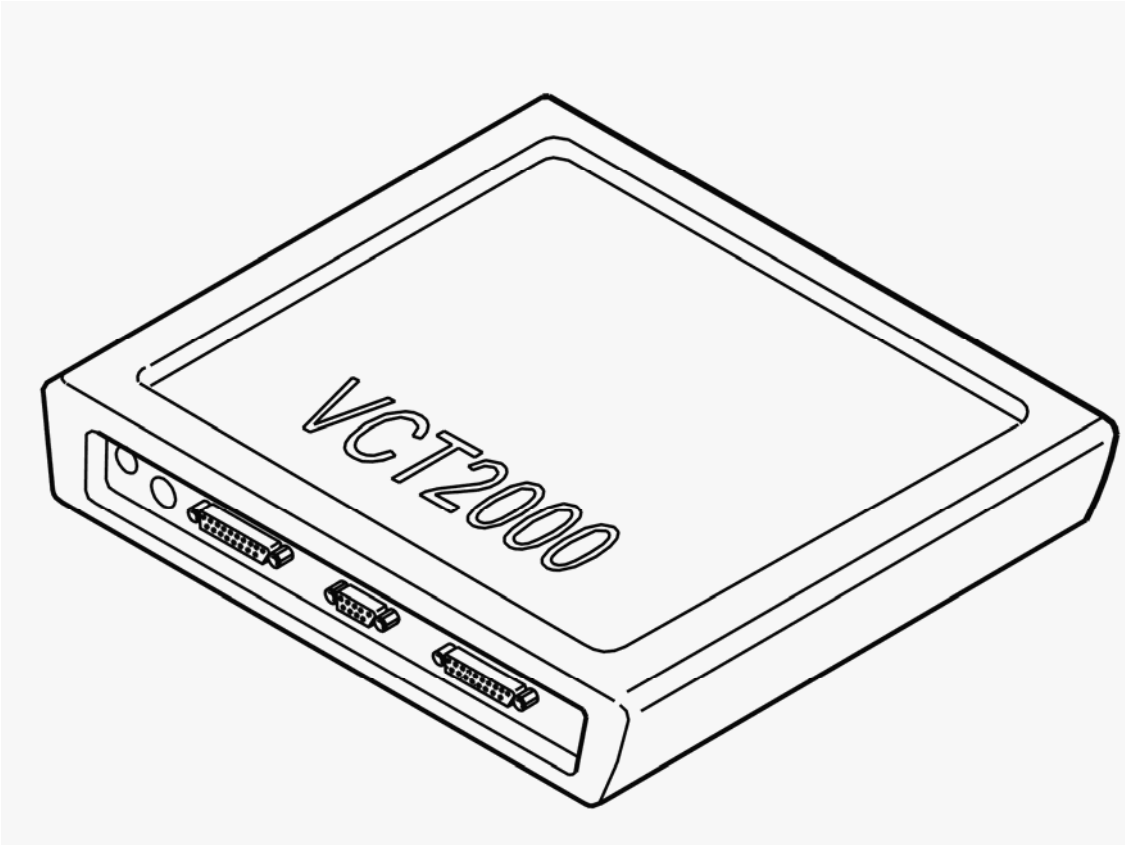


Fig. 464: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

SIGNAL TOO HIGH

CHECKING THE FUNCTION OF THE OIL TEMPERATURE SENSOR

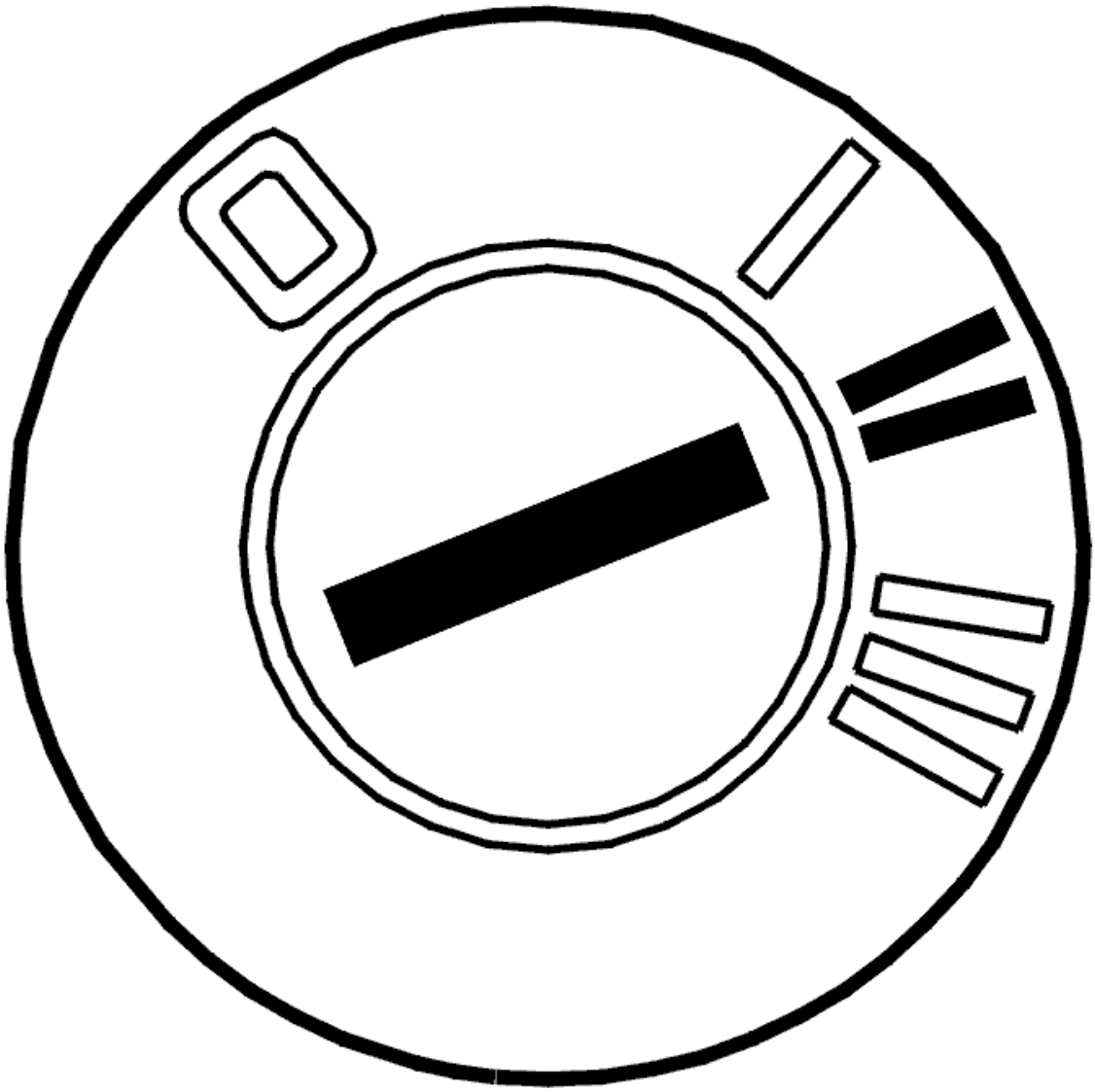


Fig. 465: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

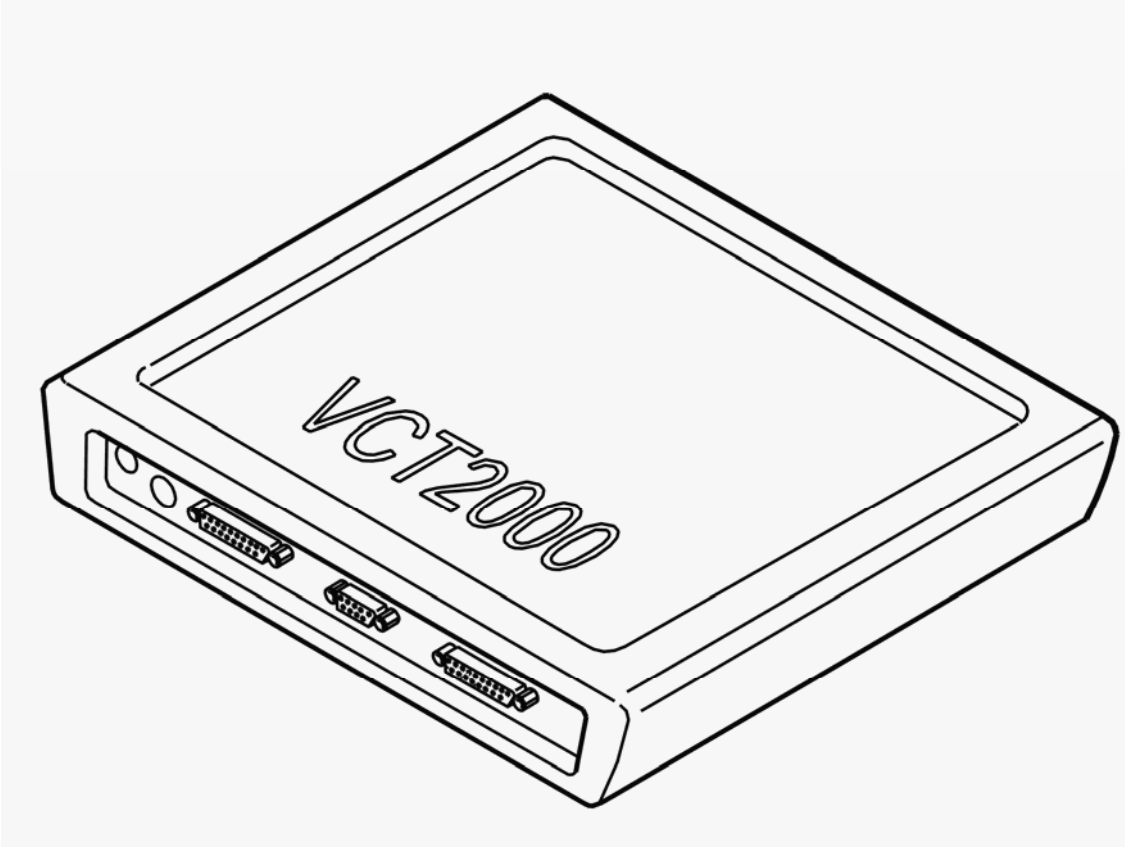


Fig. 466: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

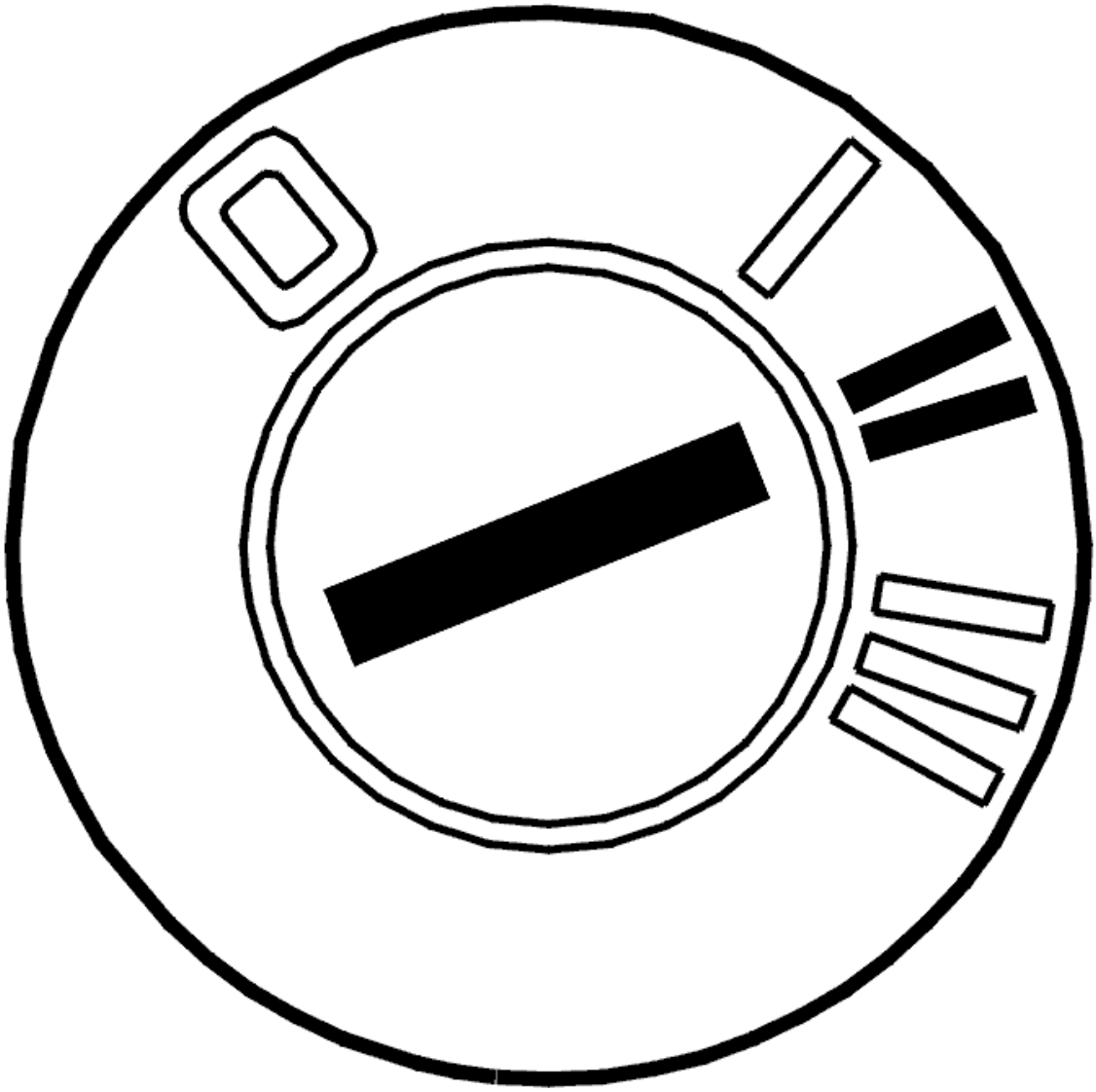


Fig. 467: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

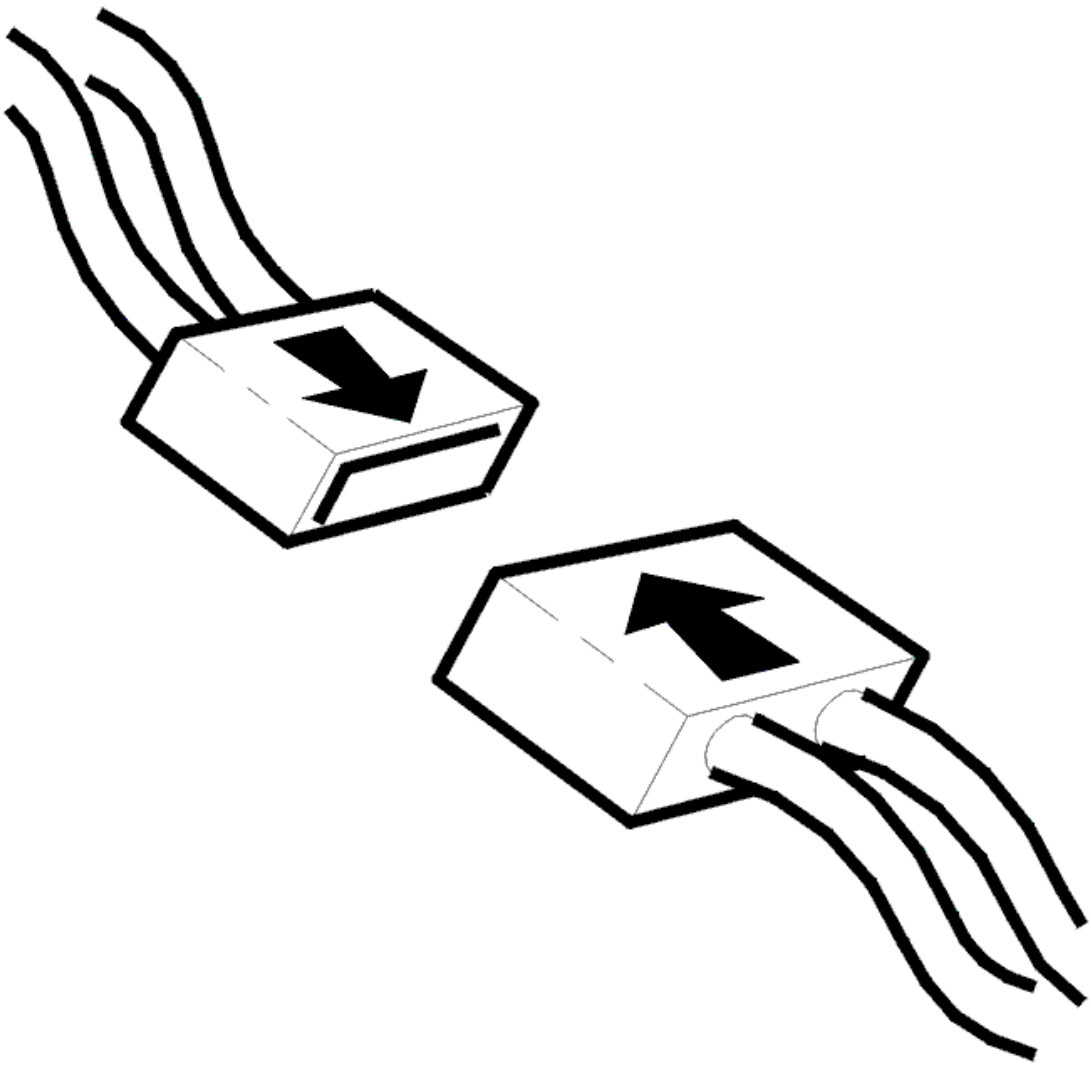


Fig. 468: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and transmission connectors. Check for contact resistance and oxidation
- Reconnect the control module and transmission connectors
- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

  If the transmission temperature is within its permitted range, the cause of the fault was contact resistance or oxidation in the control module or transmission connector.

Other information

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- see **CHECKING WIRING AND TERMINALS**

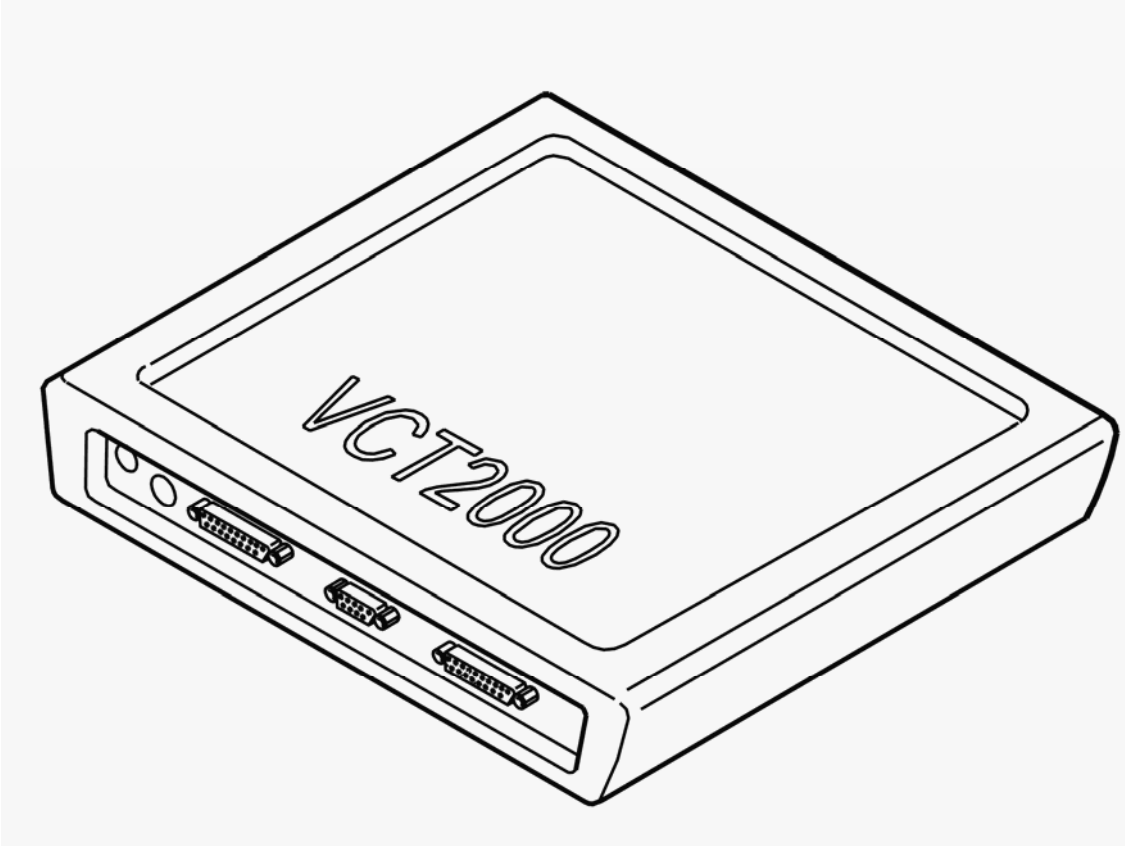


Fig. 469: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING THE TEMPERATURE SENSOR**

CHECKING THE TEMPERATURE SENSOR

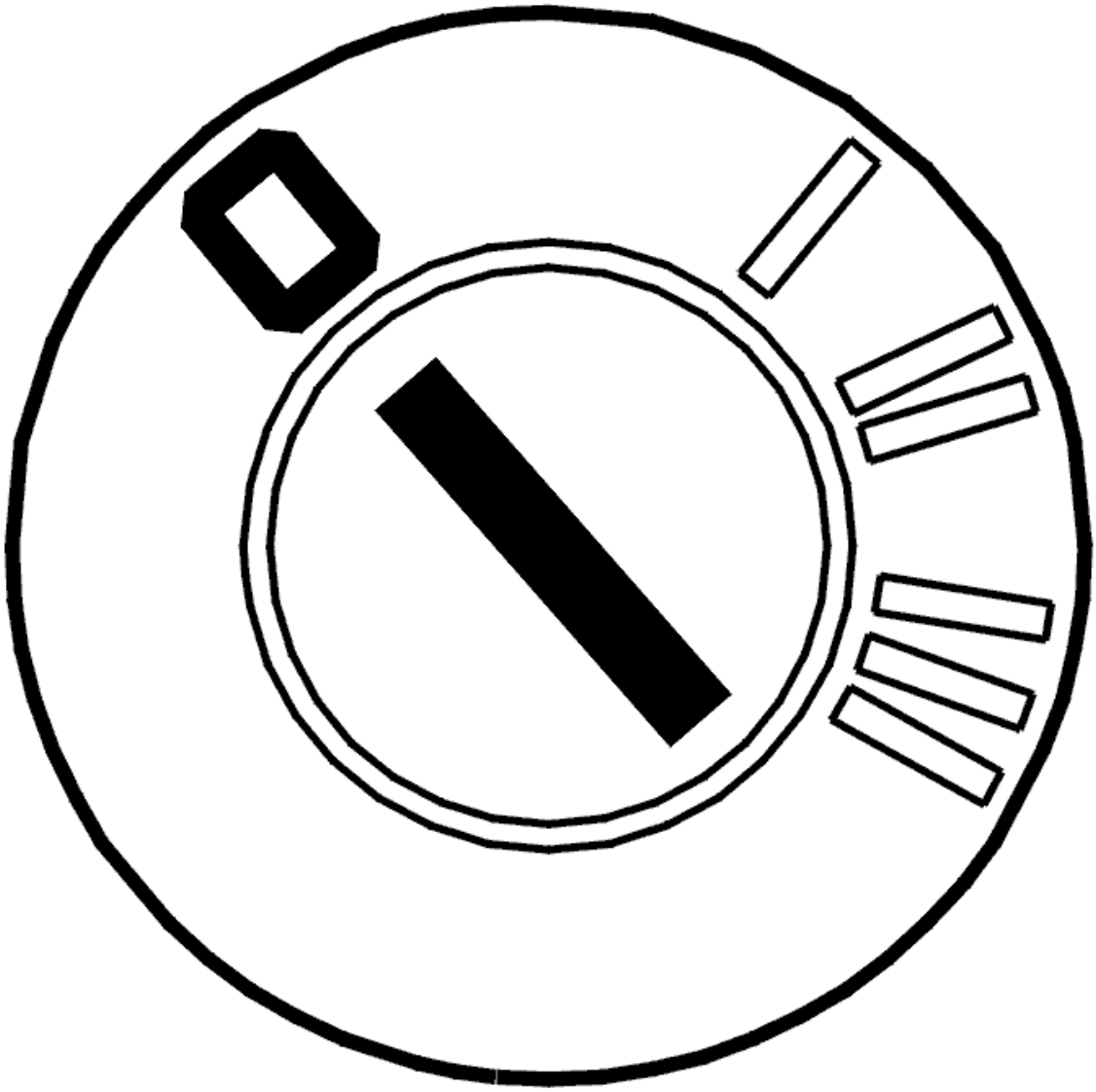


Fig. 470: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector
- Connect adapter see **9511505** and see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals #L (terminal #A11) and #M (terminal #A12).

  The resistance must be 3.4-3.6 kohms at 20 °C.

  Other information

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - For information about signals, see **SIGNAL SPECIFICATION**

- For information about the resistance values, see **COMPONENT RESISTANCE VALUES**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES** .

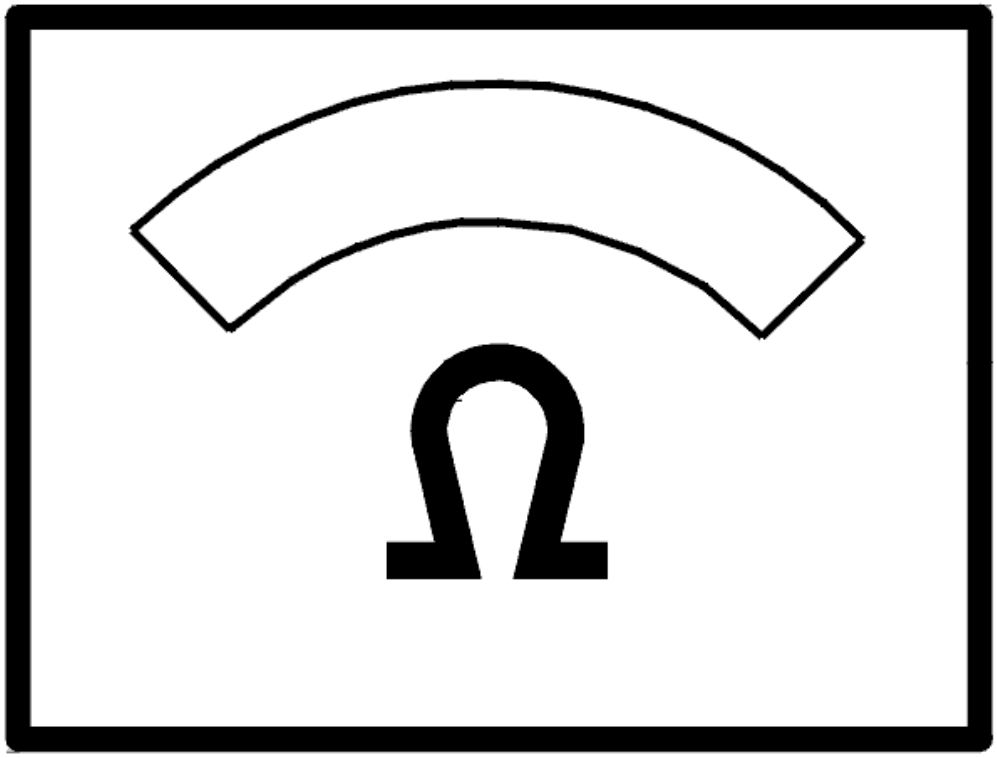


Fig. 471: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

- Breakout box connected to the control module
- Breakout box connected to the transmission connector.

Check the cable between control module terminal #37 (#A37) and transmission connector (control module side) terminal #L (#A11). Check for an open-circuit. Check for a short-circuit to supply voltage.

Check the cable between control module terminal #55 (#A55) and transmission connector (control module side) terminal #M (#A12). Check for an open-circuit. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

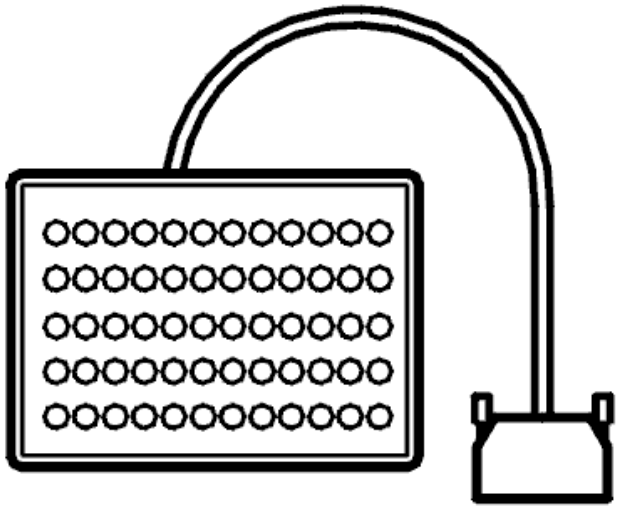


Fig. 472: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

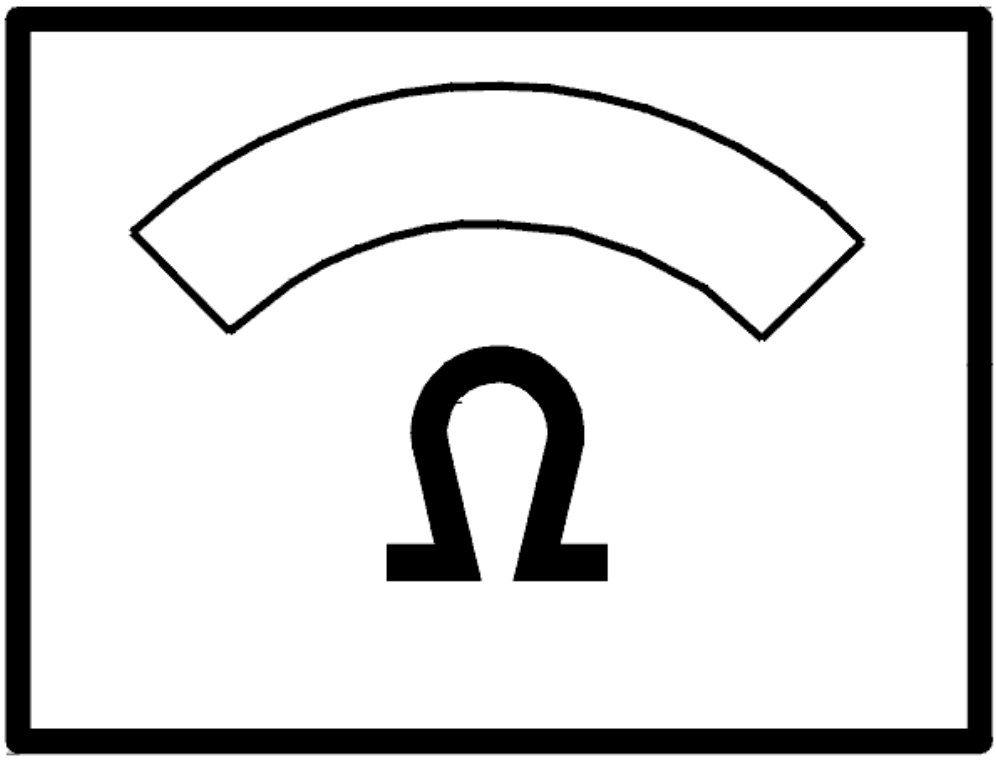


Fig. 473: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

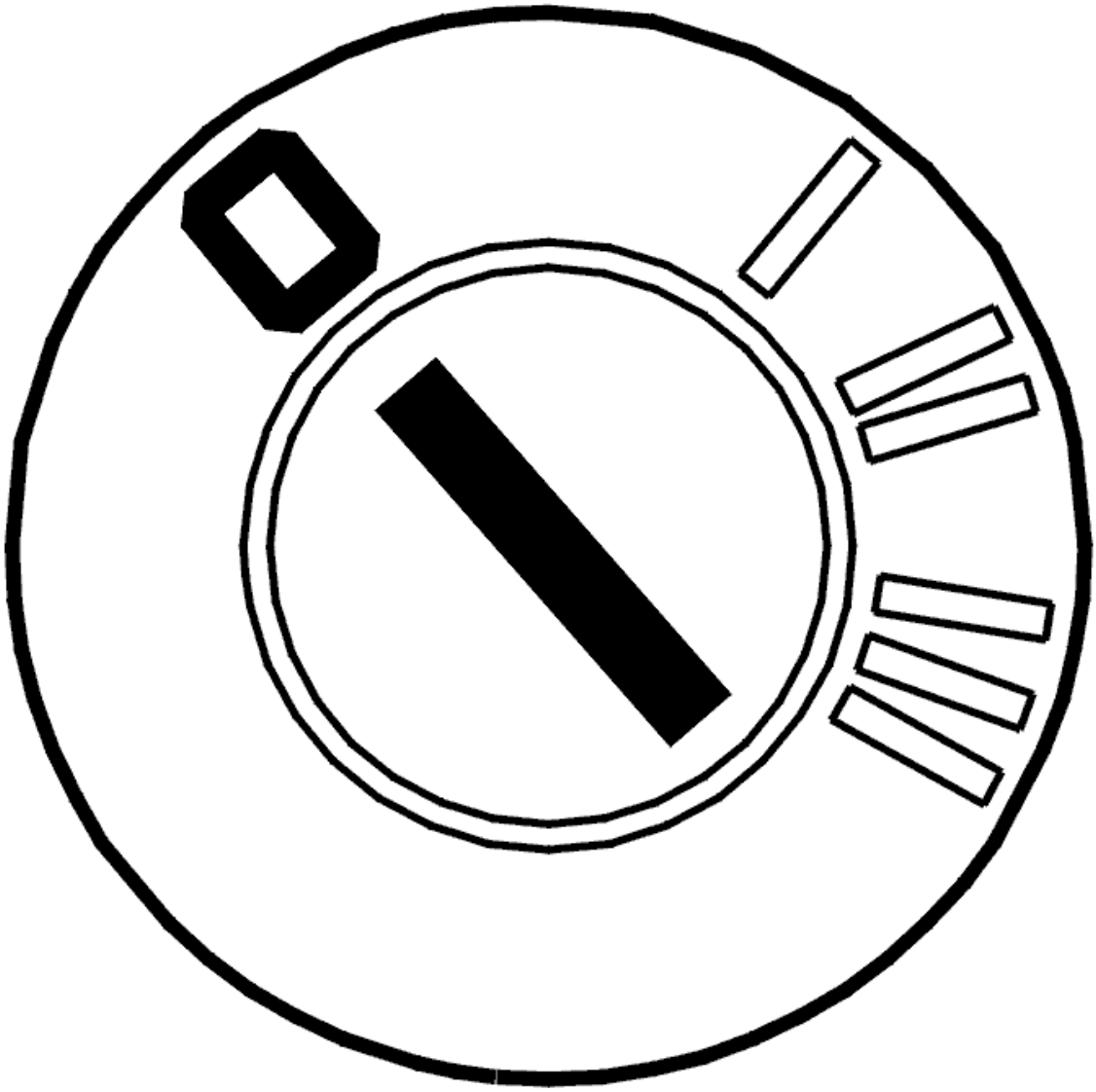


Fig. 474: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission terminal #L (#A11) and temperature sensor terminal #A. Check for an open-circuit. Check for a short-circuit to supply voltage.

  Check the cable between transmission terminal #M (#A12) and temperature sensor terminal #B. Check for an open-circuit. Check for a short-circuit to supply voltage.

  HINT: Check the temperature sensor by measuring the resistance between temperature sensor connector terminals #A and #B. The resistance must be between 3.5-3.6 kohms at 20° C.

  Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- To replace the temperature sensor, see **TEMPERATURE SENSOR FLUID TRANSMISSION, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES**
- see **CHECKING WIRING AND TERMINALS**

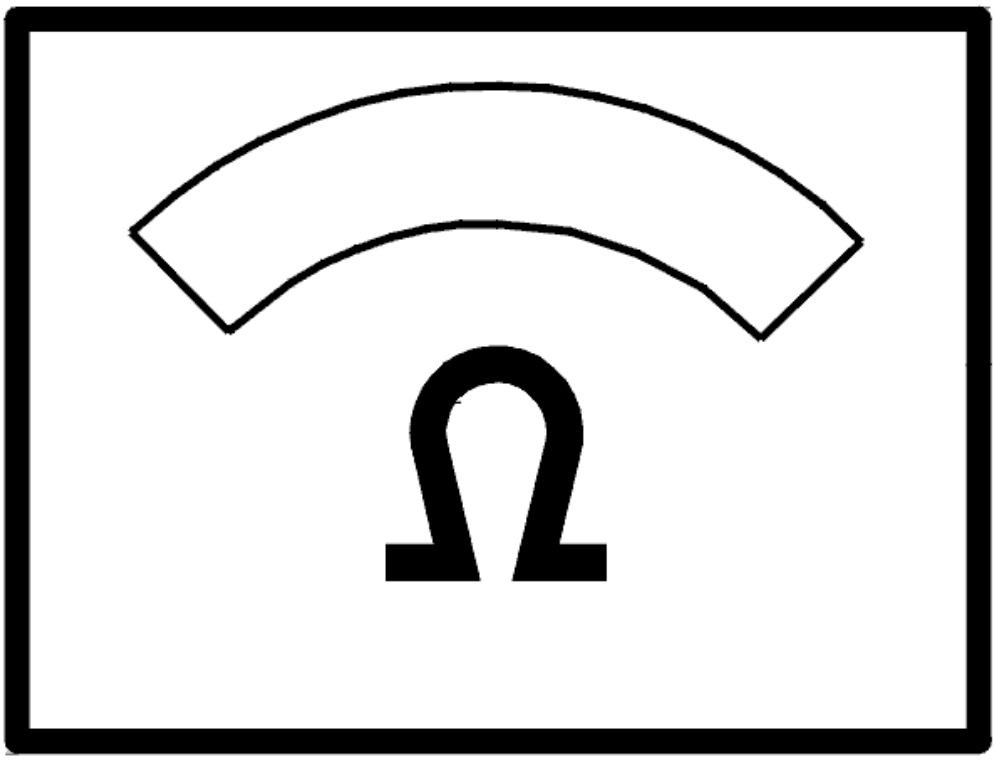


Fig. 475: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the control module and automatic transmission connector. Check for contact resistance and oxidation. Remedy if necessary.

Check the cable between control module terminal #A37 (#A37) and transmission connector (control module side) terminal #11. Check for an intermittent open-circuit. Check for an intermittent short-circuit to supply voltage.

Check the cable between control module terminal #A55 (#A55) and transmission connector (control module side) terminal #12. Check for an intermittent open-circuit. Check for an intermittent short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

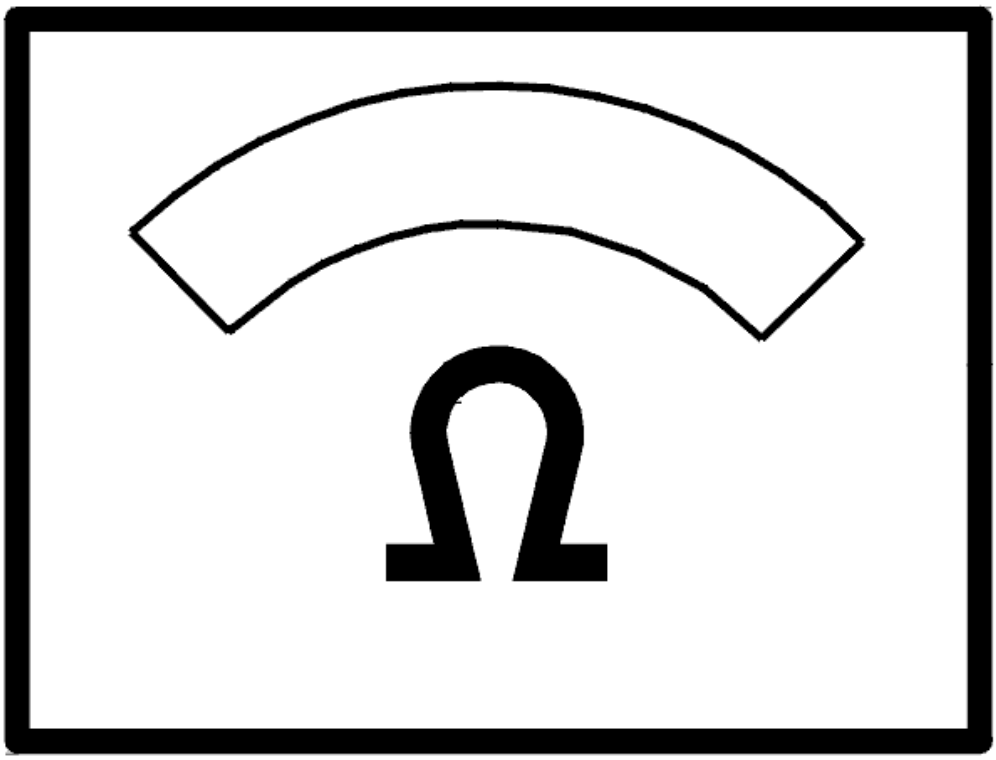


Fig. 476: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

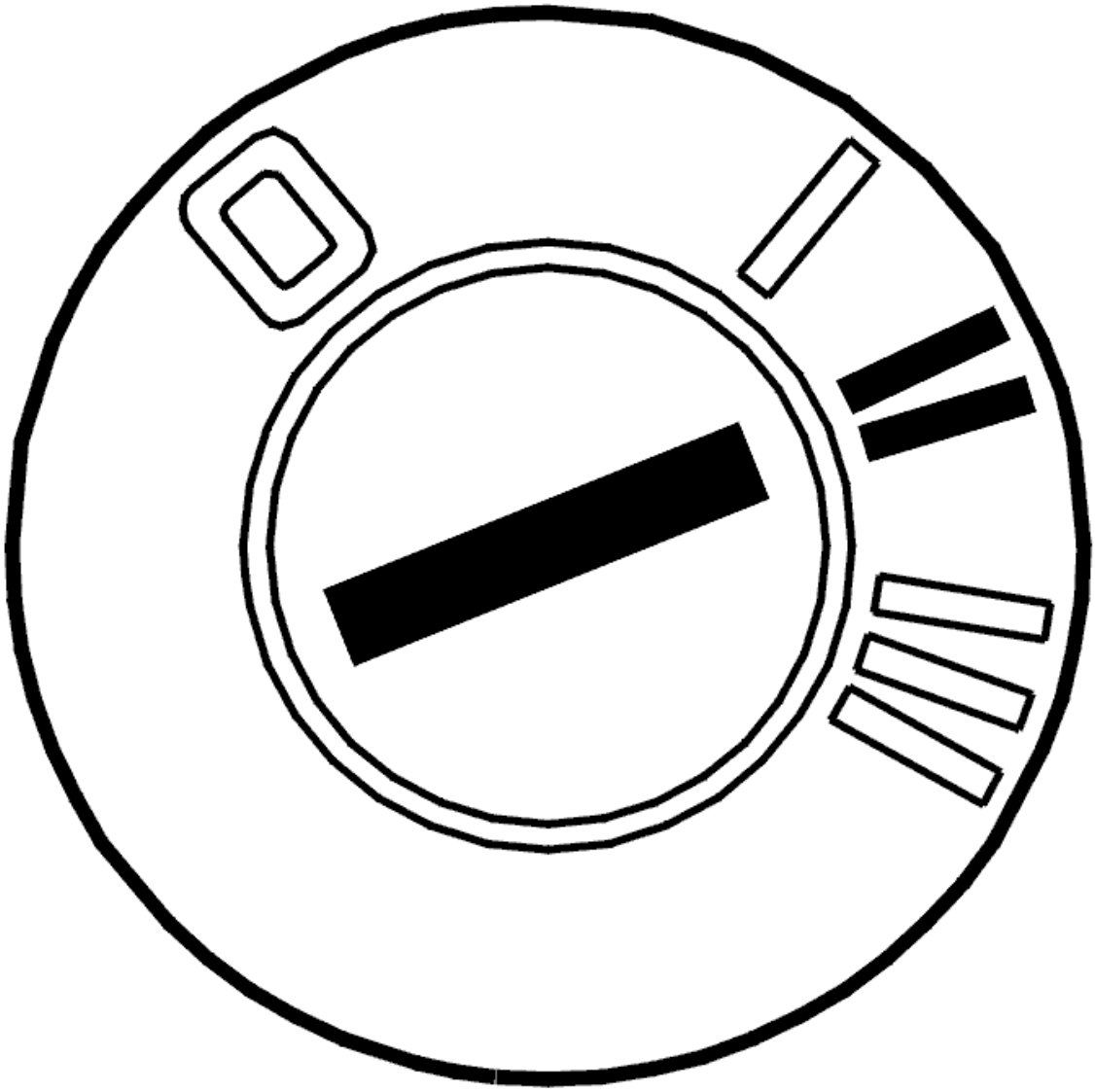


Fig. 477: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

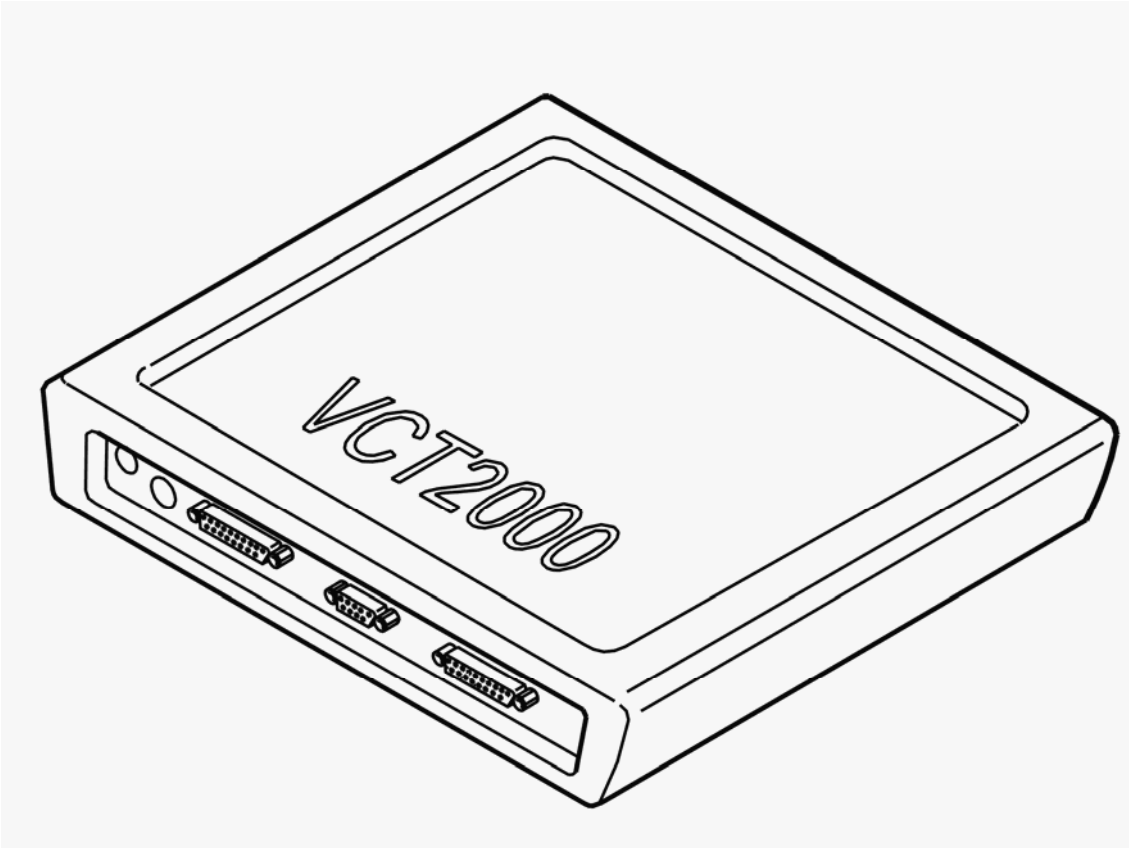


Fig. 478: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair check that the fault has been remedied.

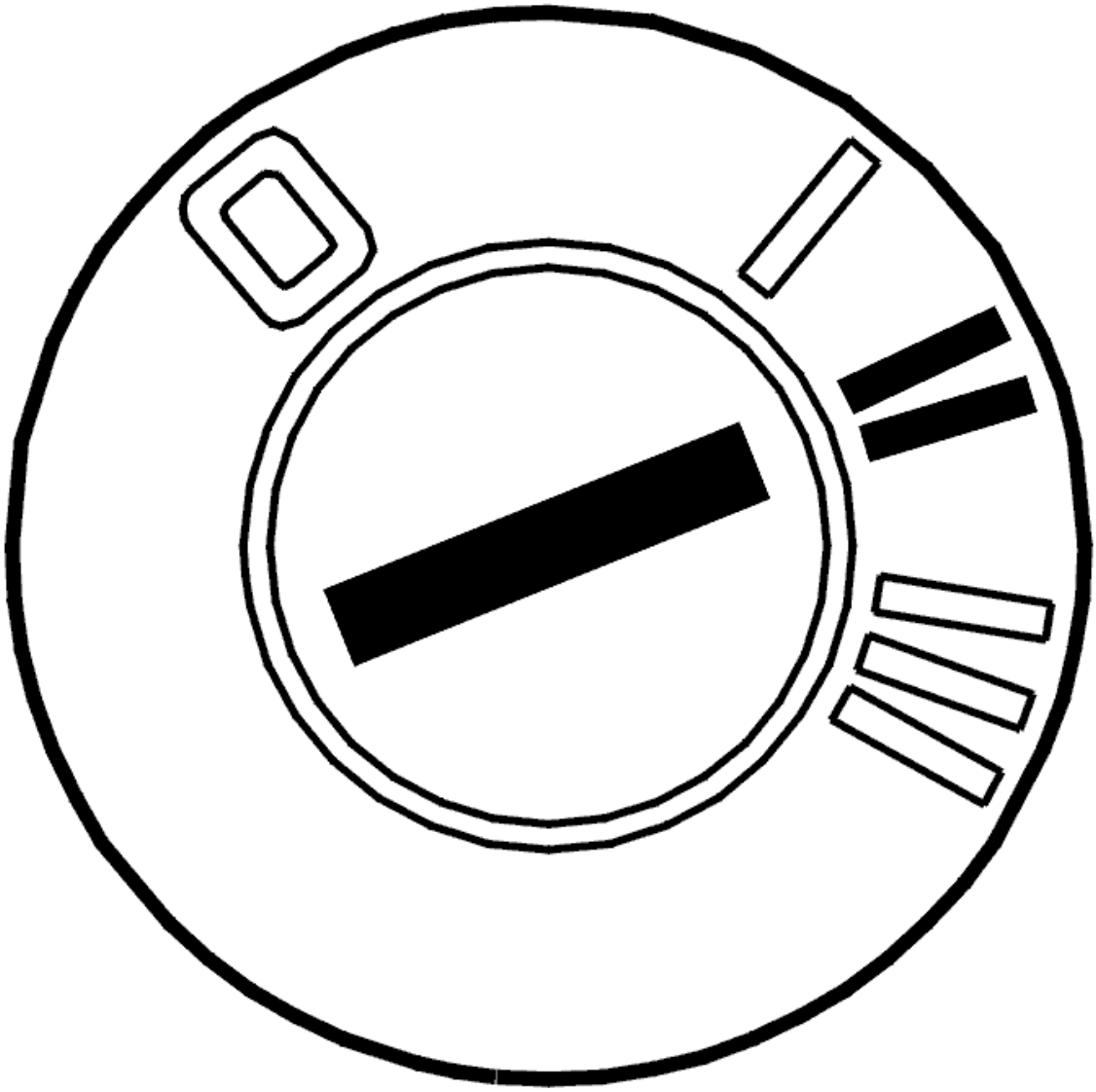


Fig. 479: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

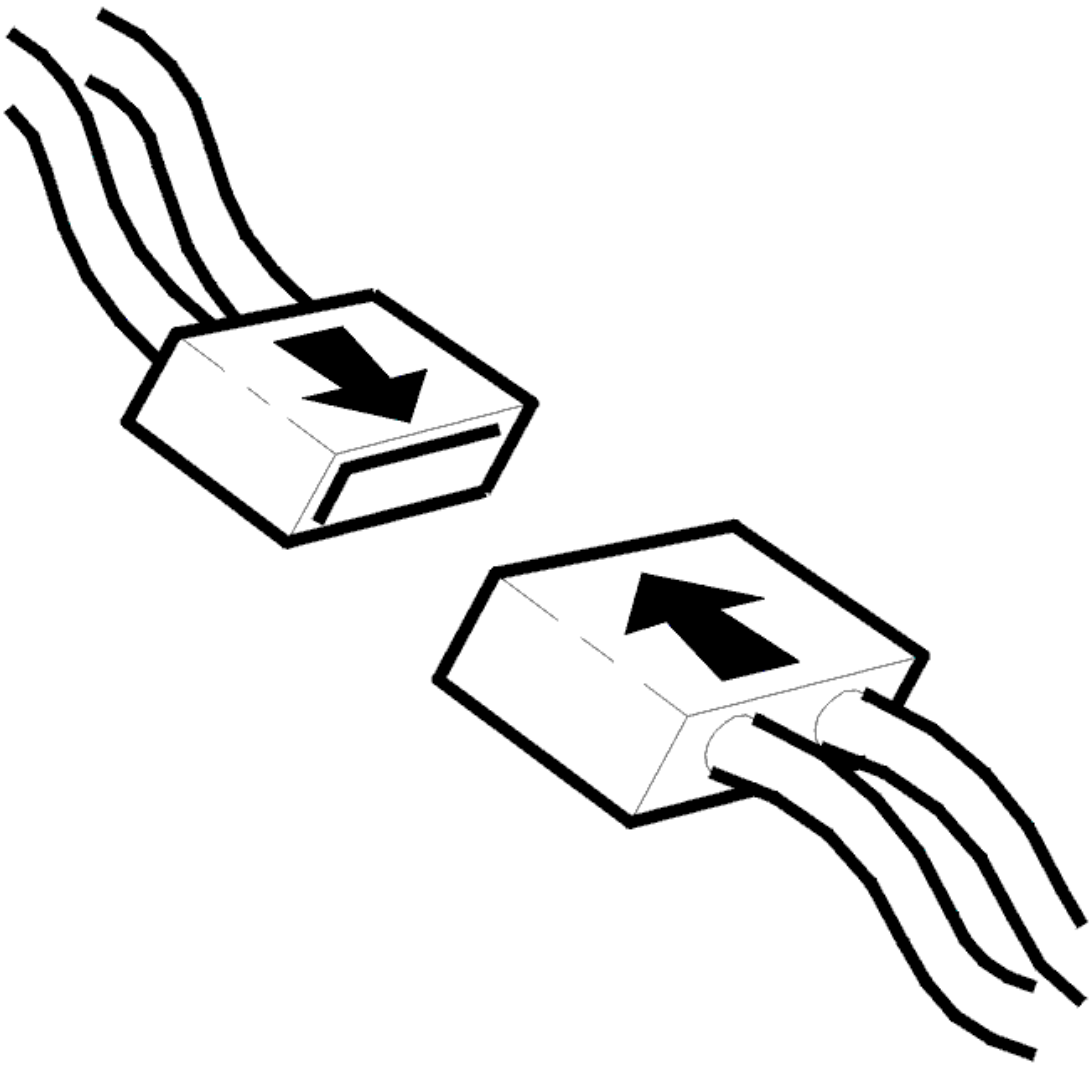


Fig. 480: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.
- Read off oil temperature.

  Check that the transmission oil temperature is within its permitted range. Compare with the transmission temperature.

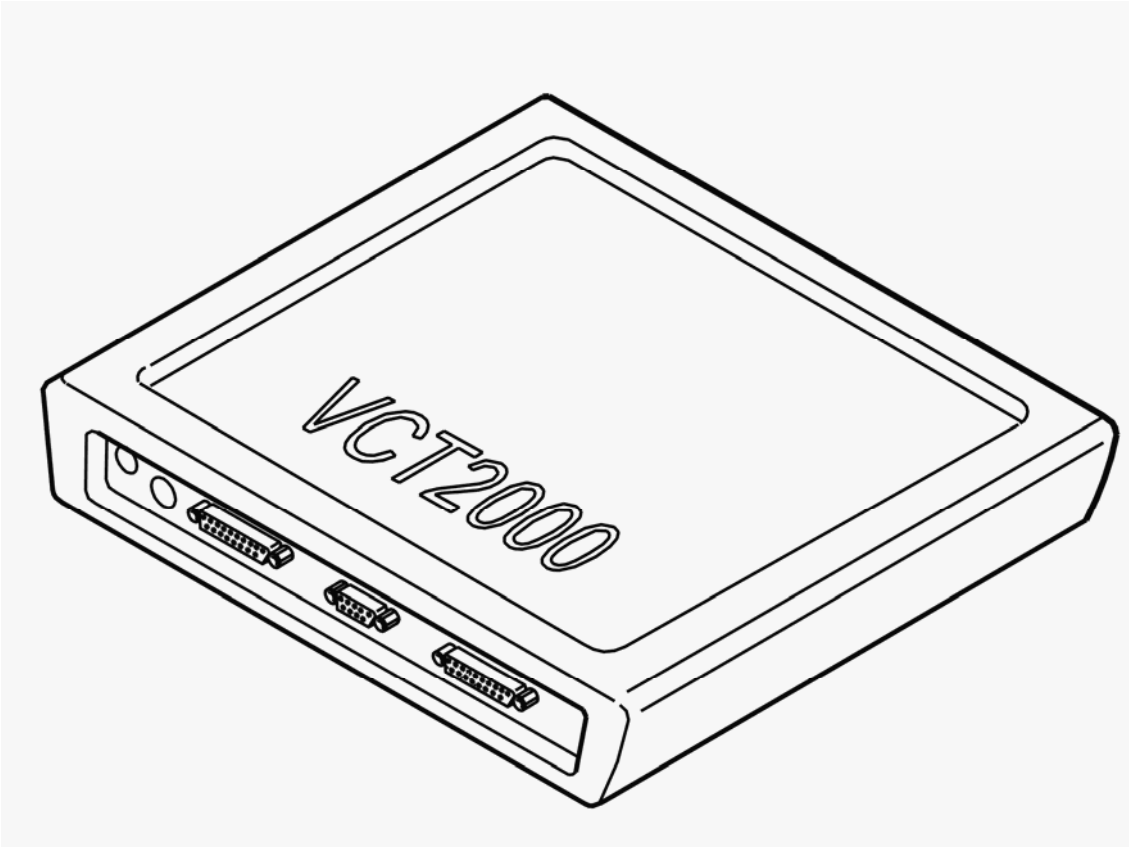


Fig. 481: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-0009: SHIFT SOLENOID S2. SIGNAL TOO LOW (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL TOO LOW

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

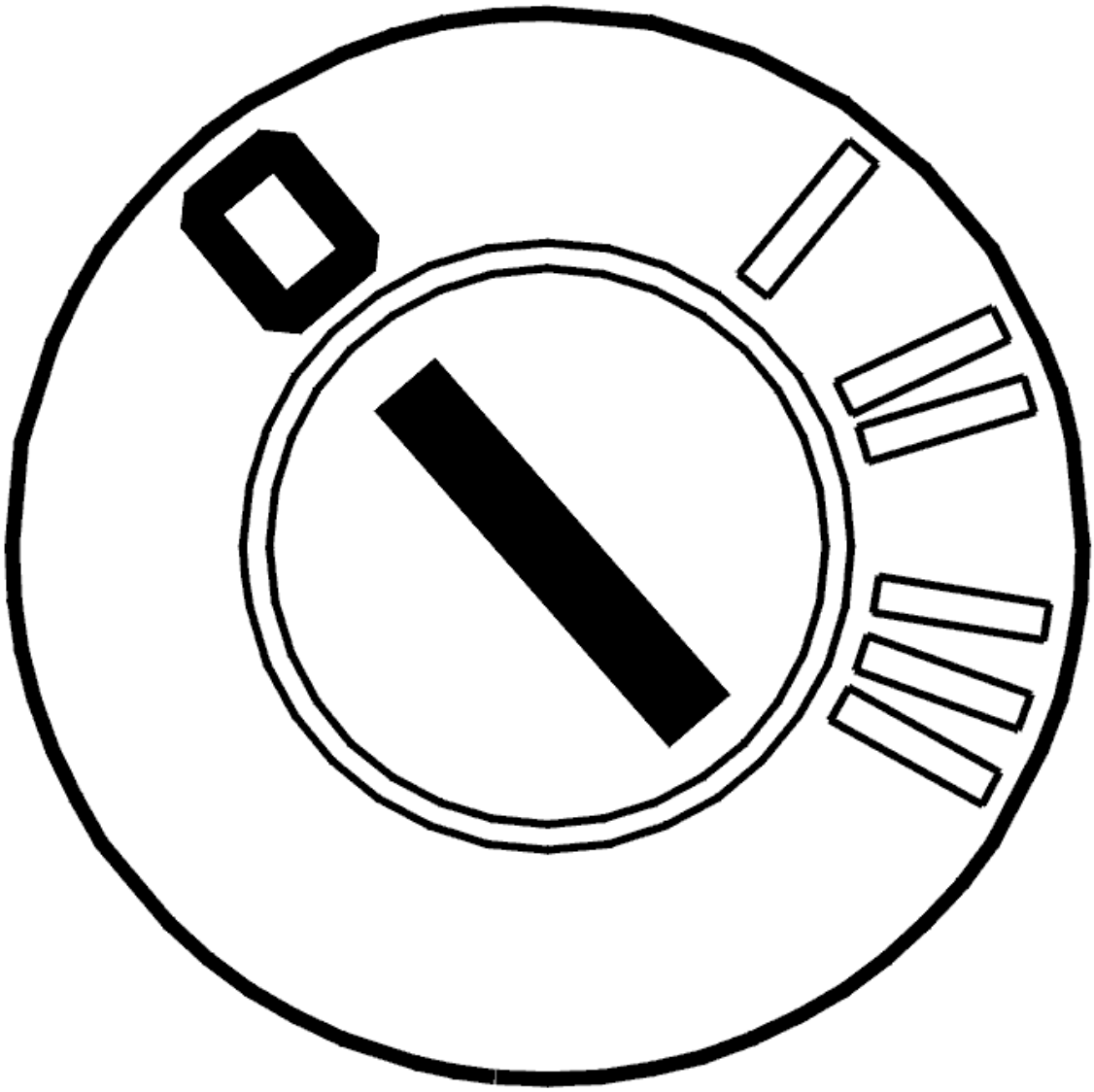


Fig. 482: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

  HINT: If the temperature is outside its permitted range, fault-trace the temperature sensor.

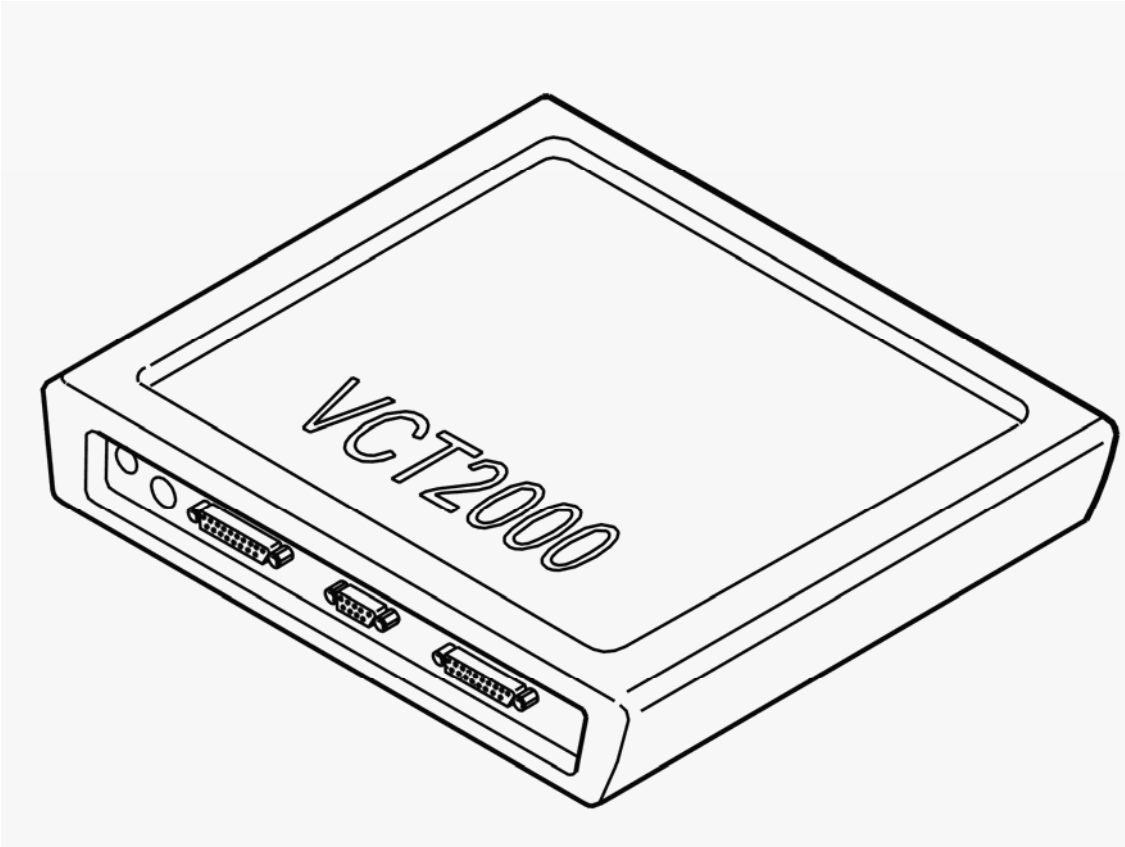


Fig. 483: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S2**

- **NO**

  Refer to **FAULTY SIGNAL**

CHECKING SHIFT SOLENOID S2

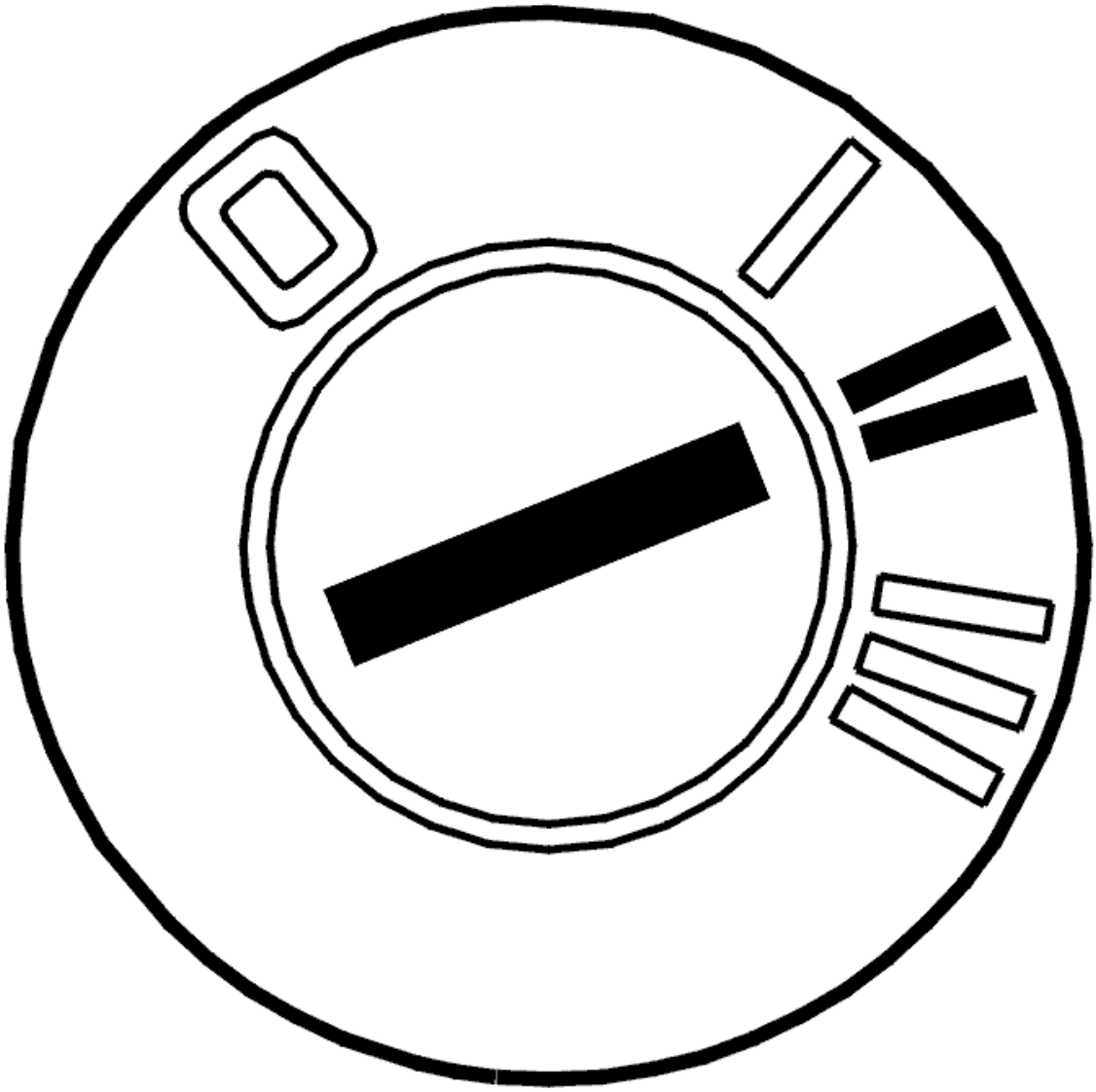


Fig. 484: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S2.

  The value must change between OFF and ON.

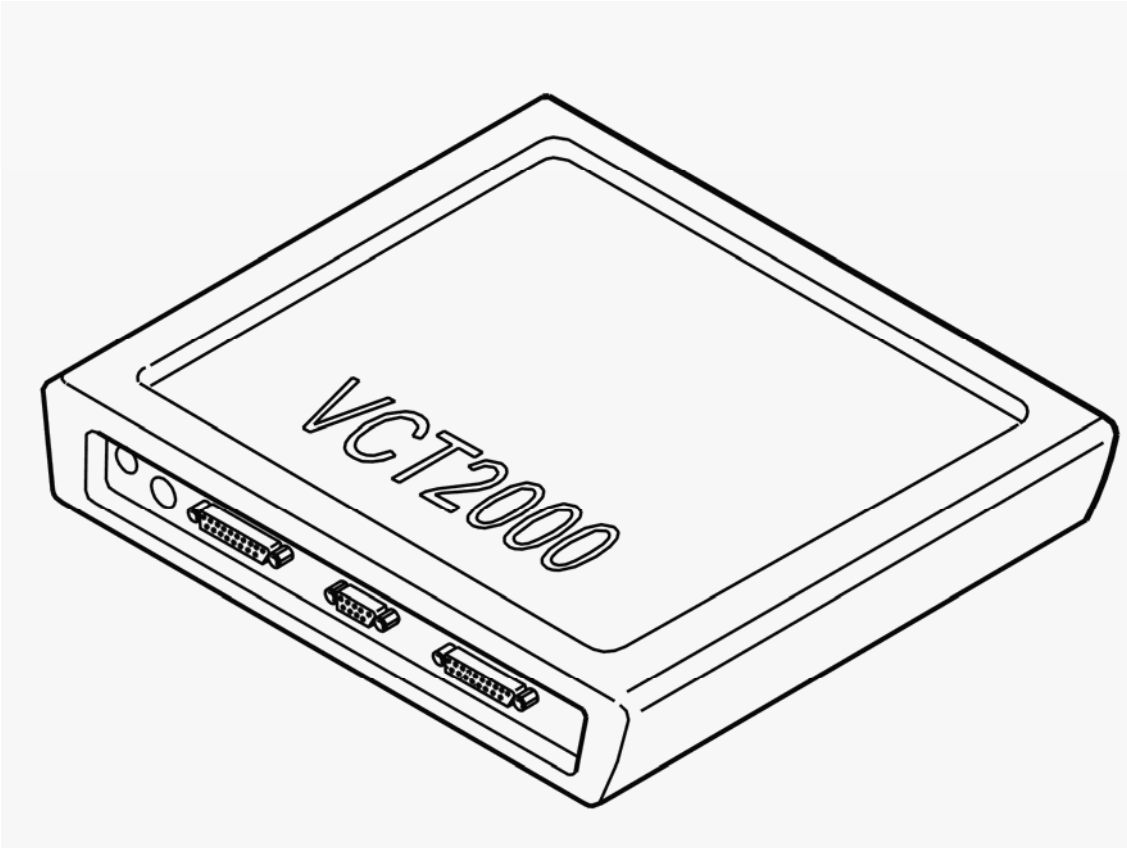


Fig. 485: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING RESISTANCE**

CHECKING RESISTANCE

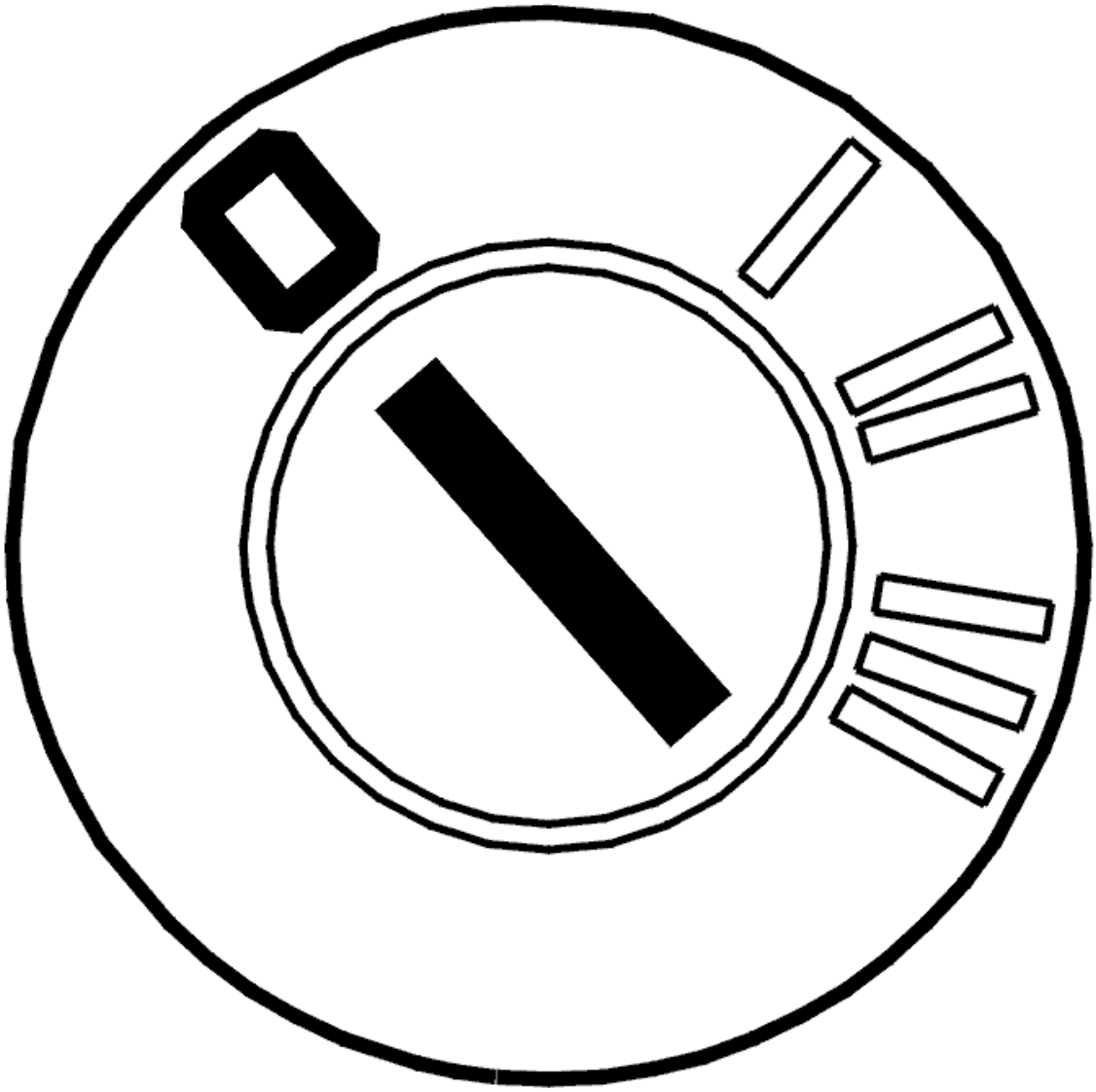


Fig. 486: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

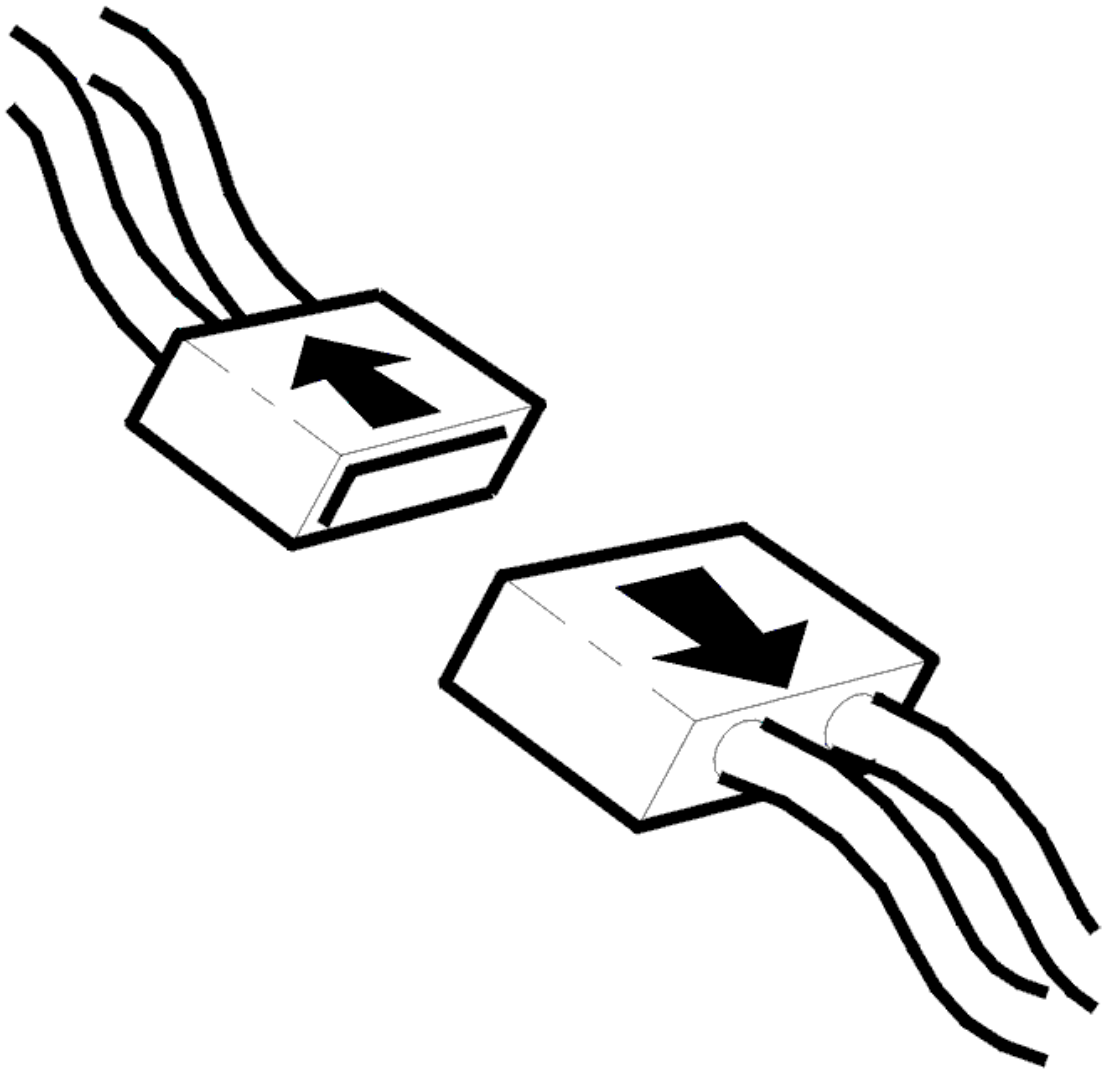


Fig. 487: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect transmission connector C.

Check solenoid S2. Measure the resistance between transmission connector terminal #C2 and the transmission housing. The resistance must be 11-15 ohms.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

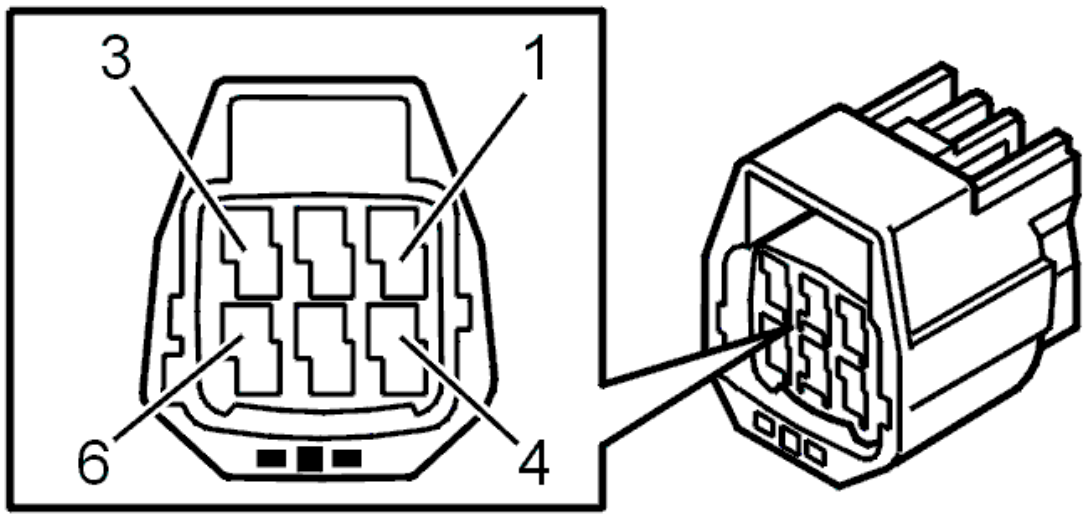


Fig. 488: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

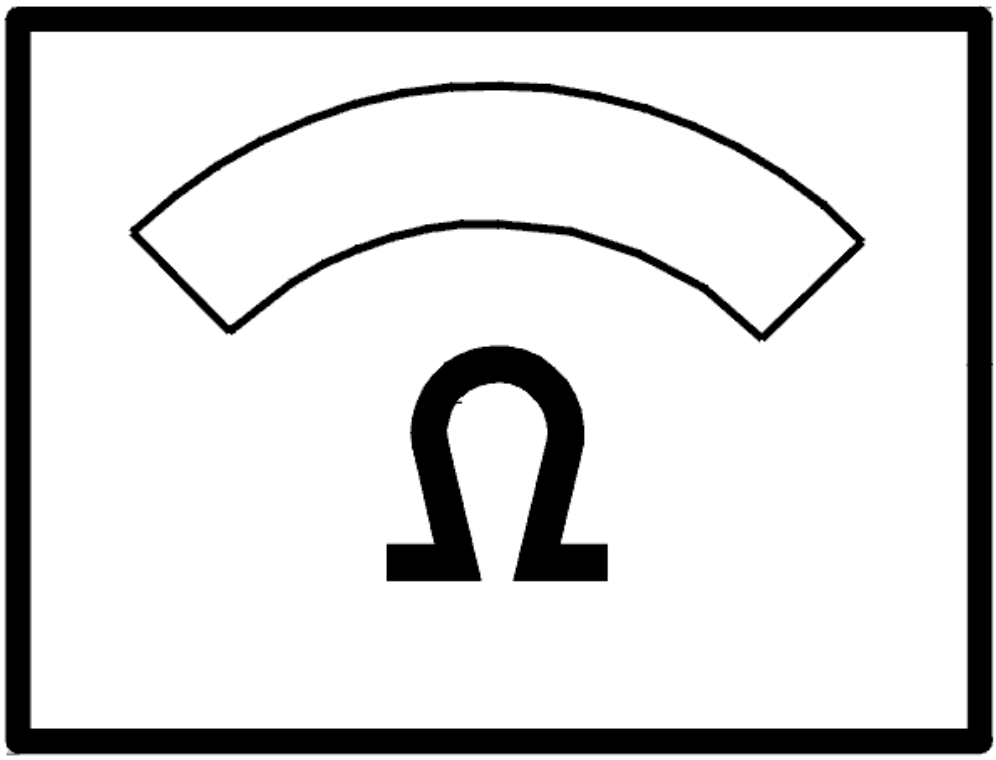


Fig. 489: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

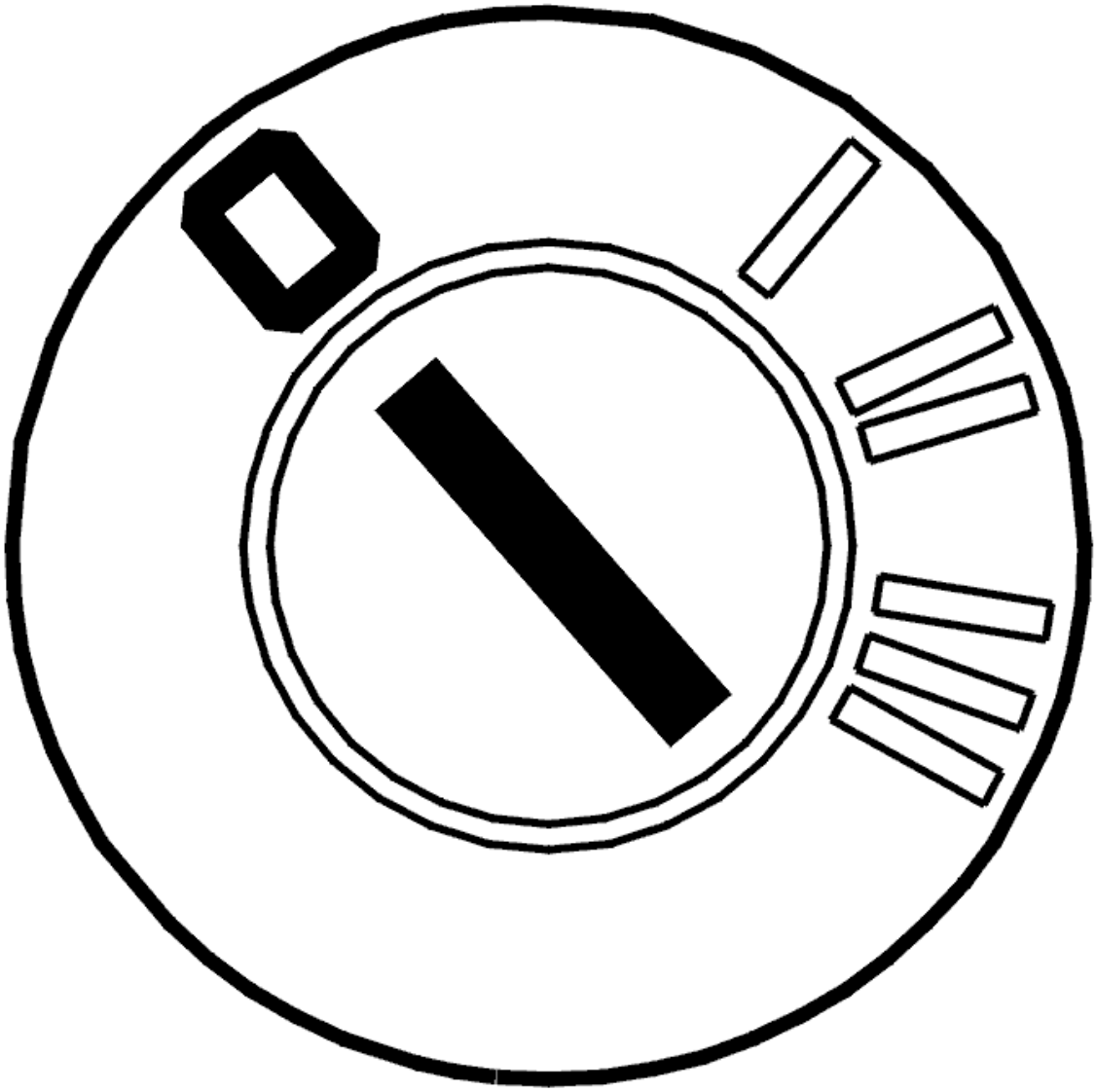


Fig. 490: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the cable between control module terminal #B8 (#A68) and transmission connector terminal #C2 (control module side). Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

  Remedy as necessary.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - To disconnect the transmission connector, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**

- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

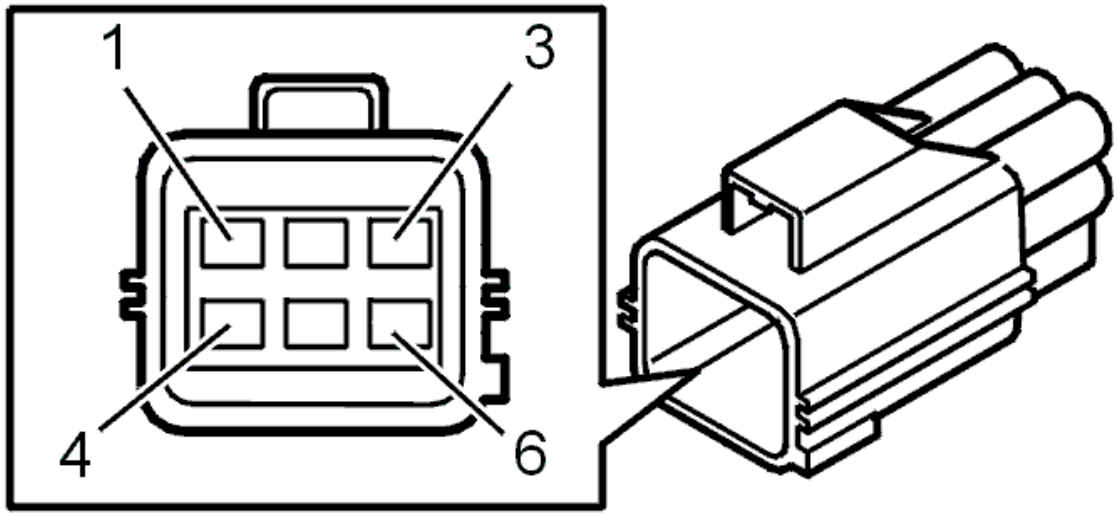


Fig. 491: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

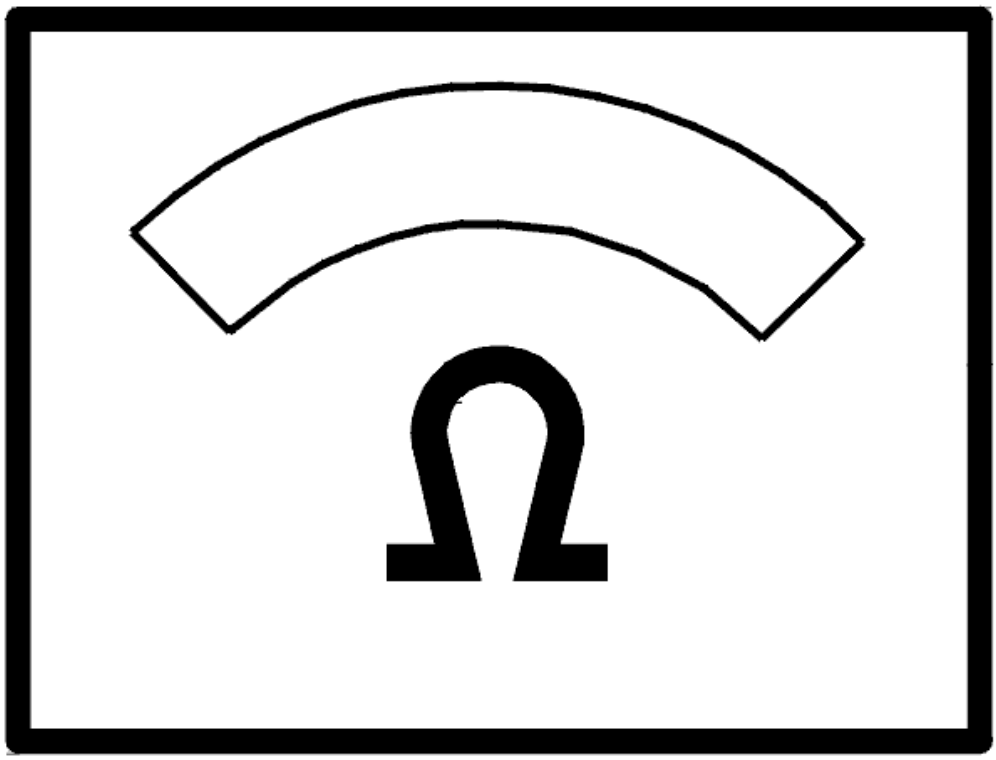


Fig. 492: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

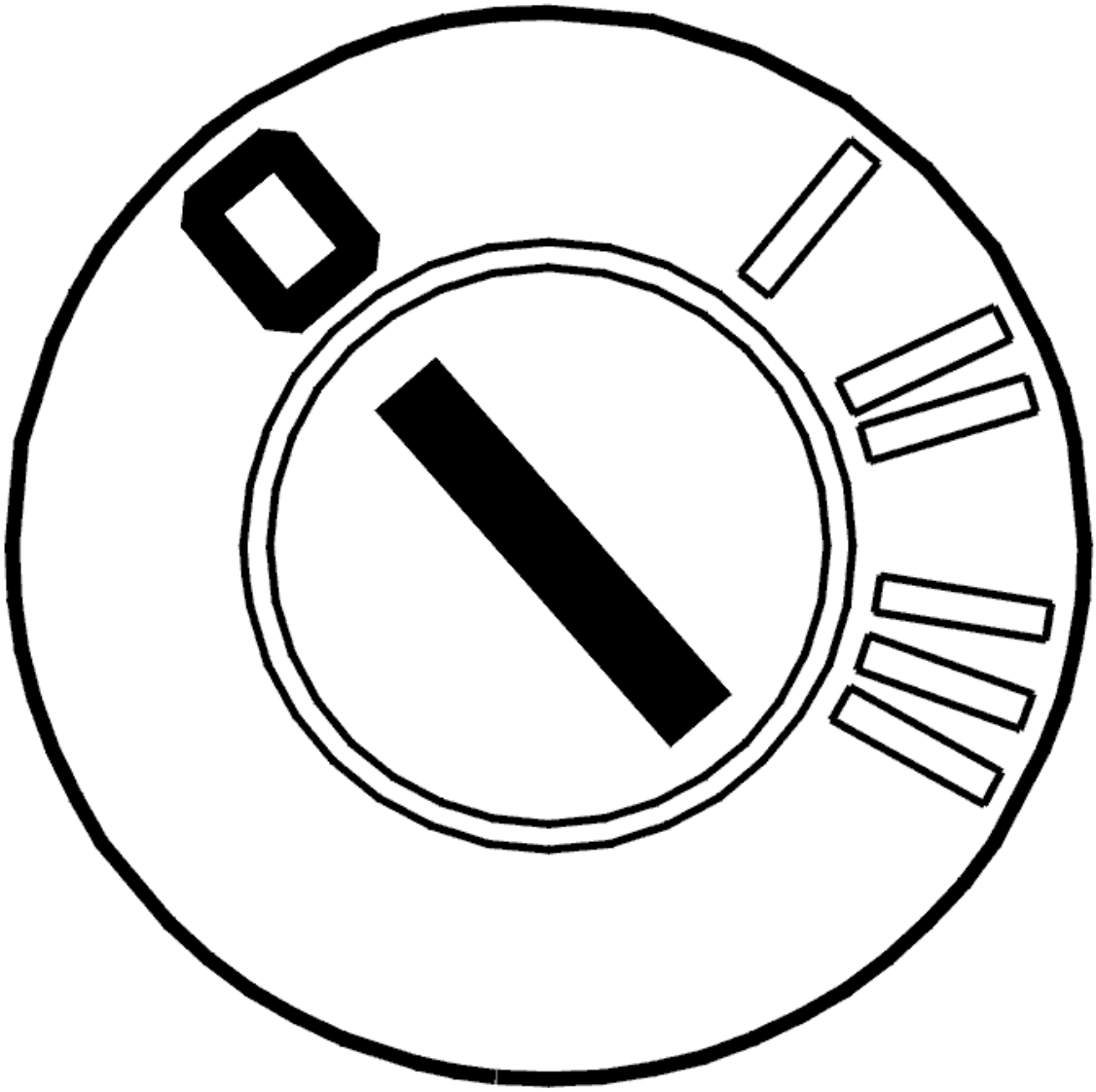


Fig. 493: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

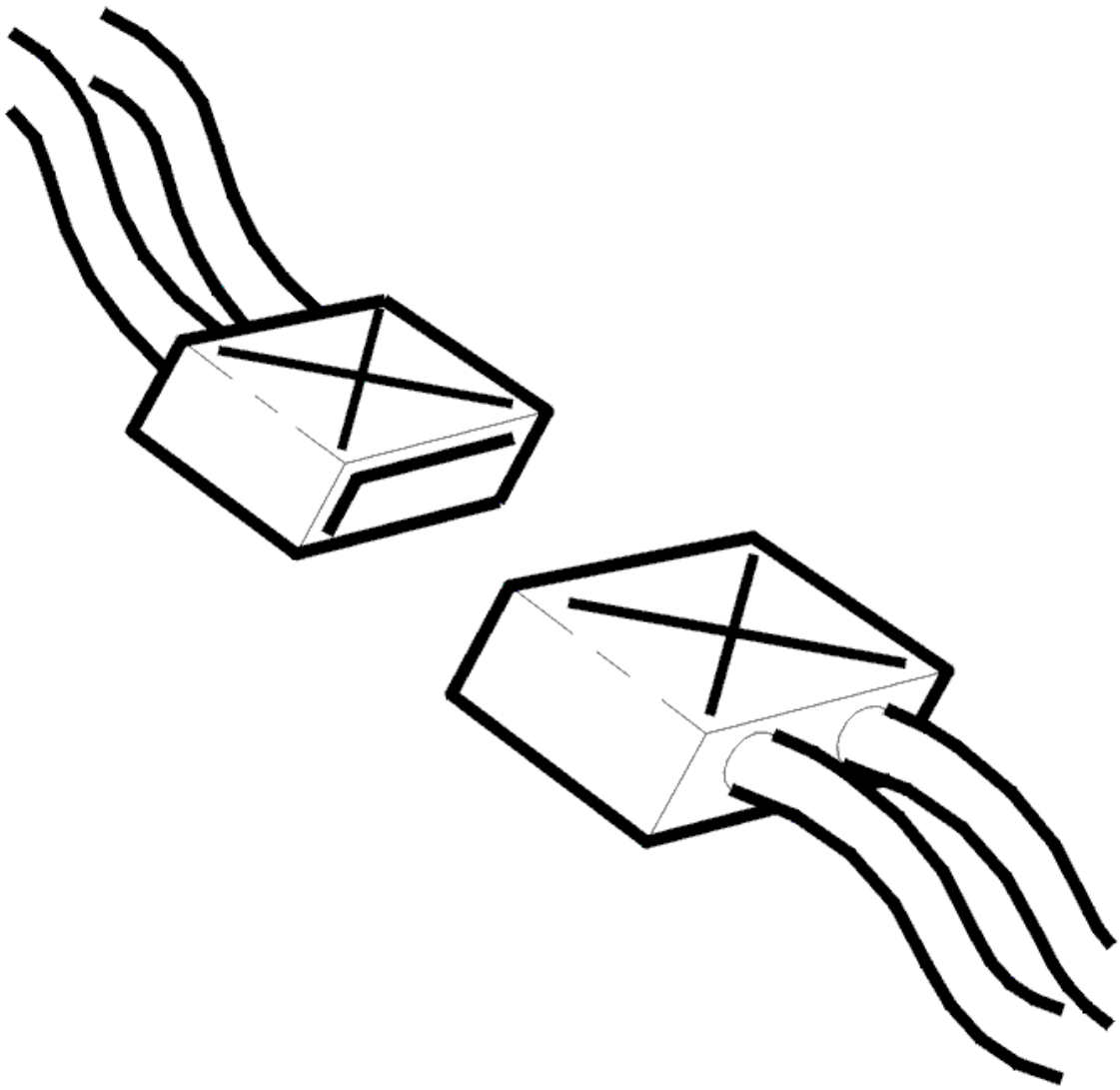


Fig. 494: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

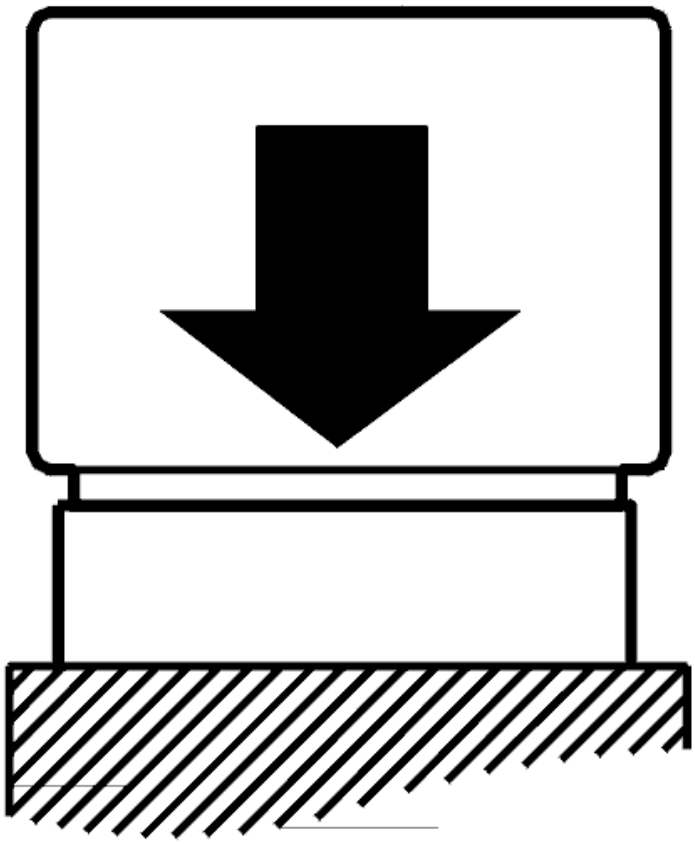


Fig. 495: Identifying Connecting Control Module
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector disconnected
- Gear selector in position P.

Check the transmission control module (TCM) by measuring the resistance between terminals #B8 (#A68) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

NOTE: When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

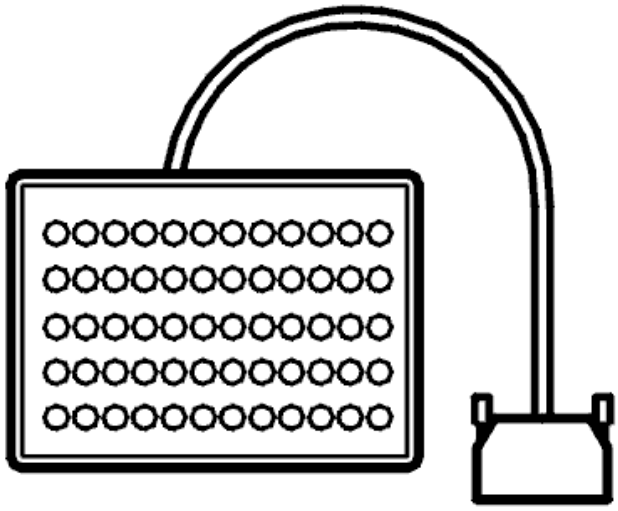


Fig. 496: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

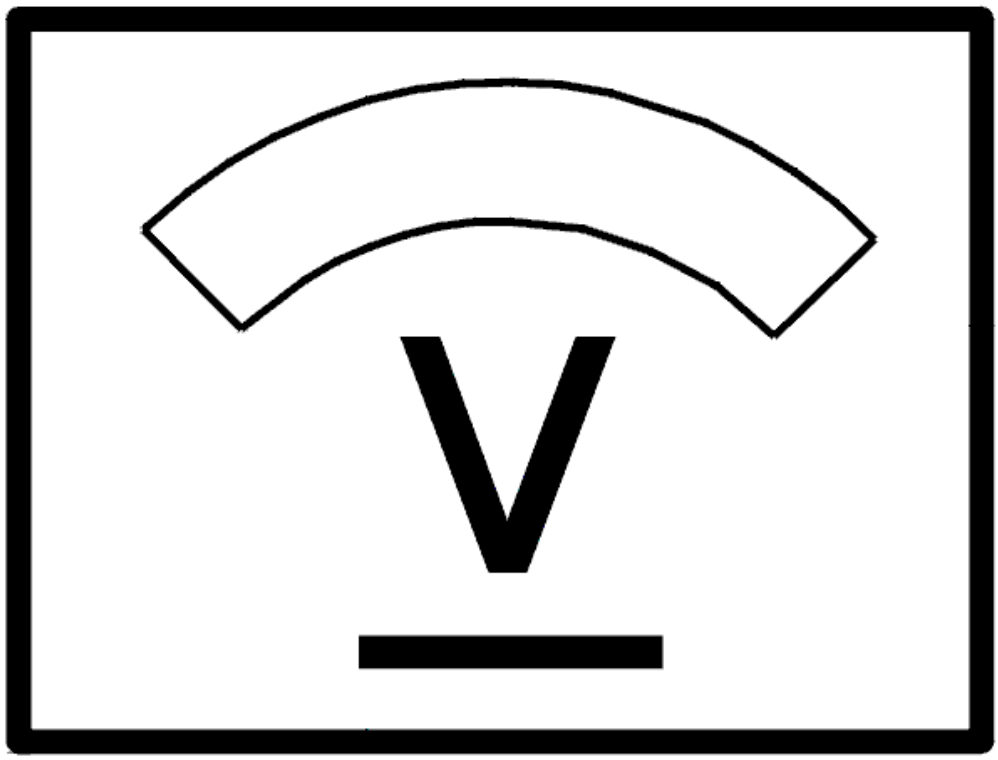


Fig. 497: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

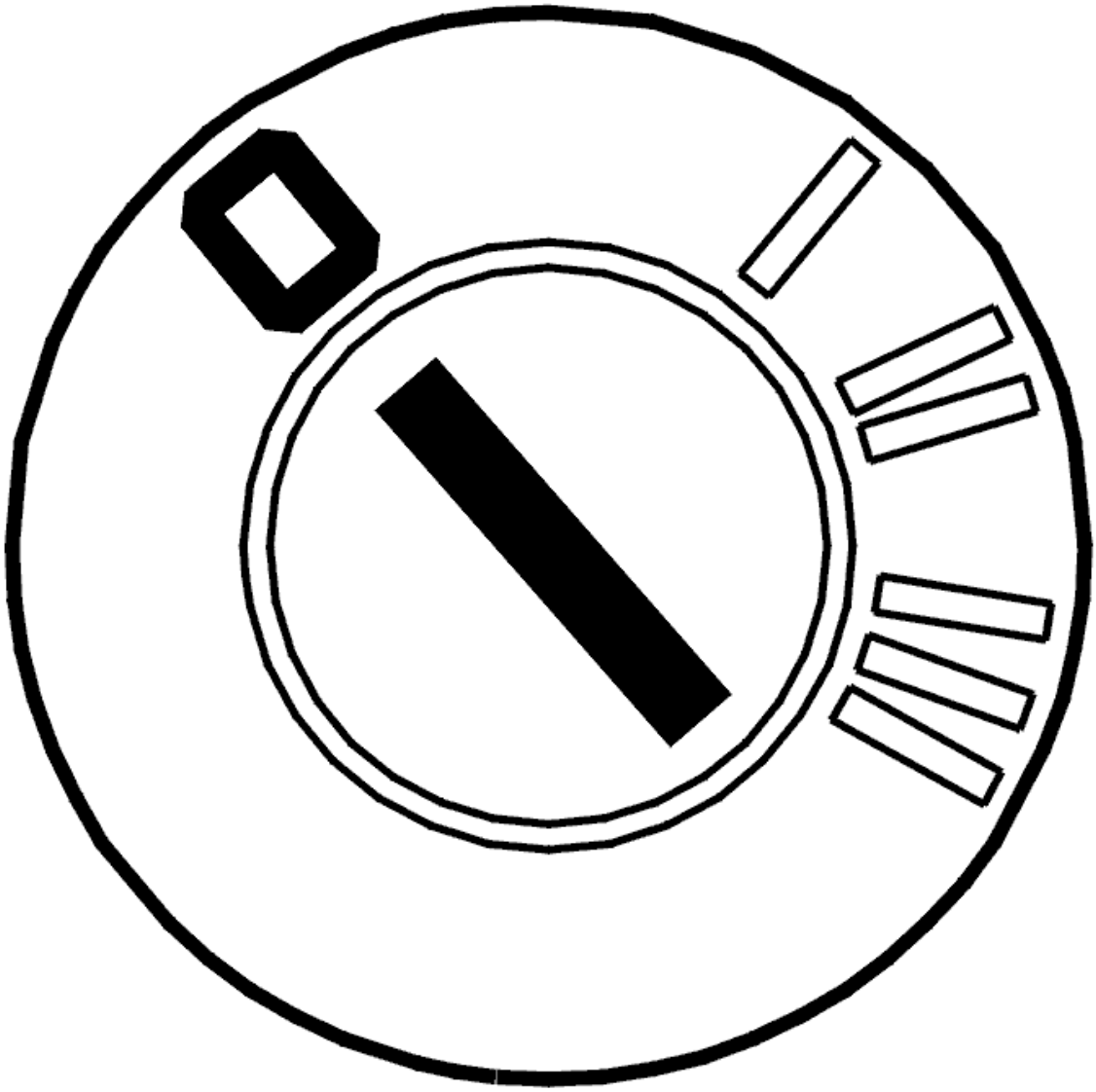


Fig. 498: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C2 (transmission side) and the connector for solenoid S2. Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Check solenoid S2 by measuring the resistance between the terminal pin on solenoid S2 and the transmission housing. The resistance should be 11-15 ohms at 20°C.

Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the control system and to check or replace solenoid S2, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

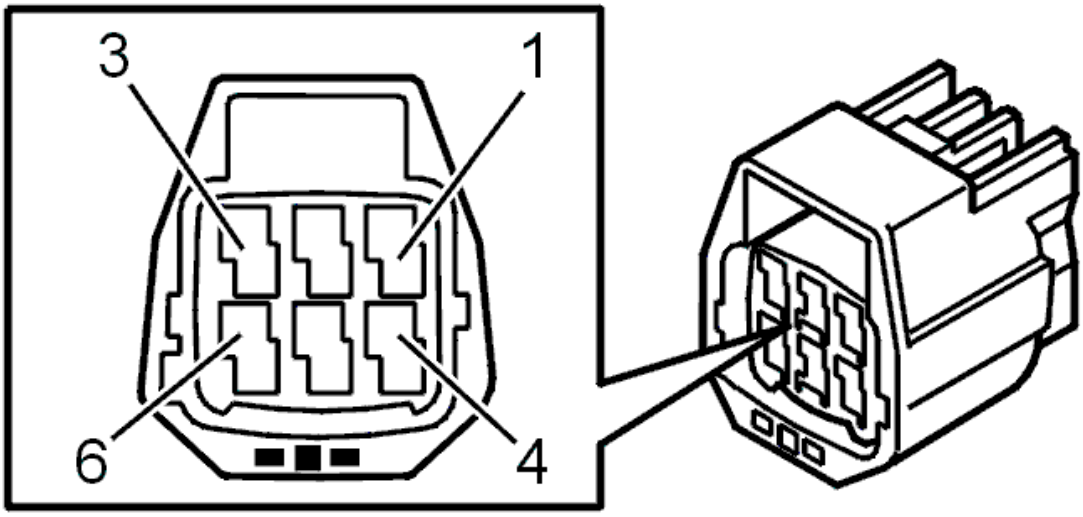


Fig. 499: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

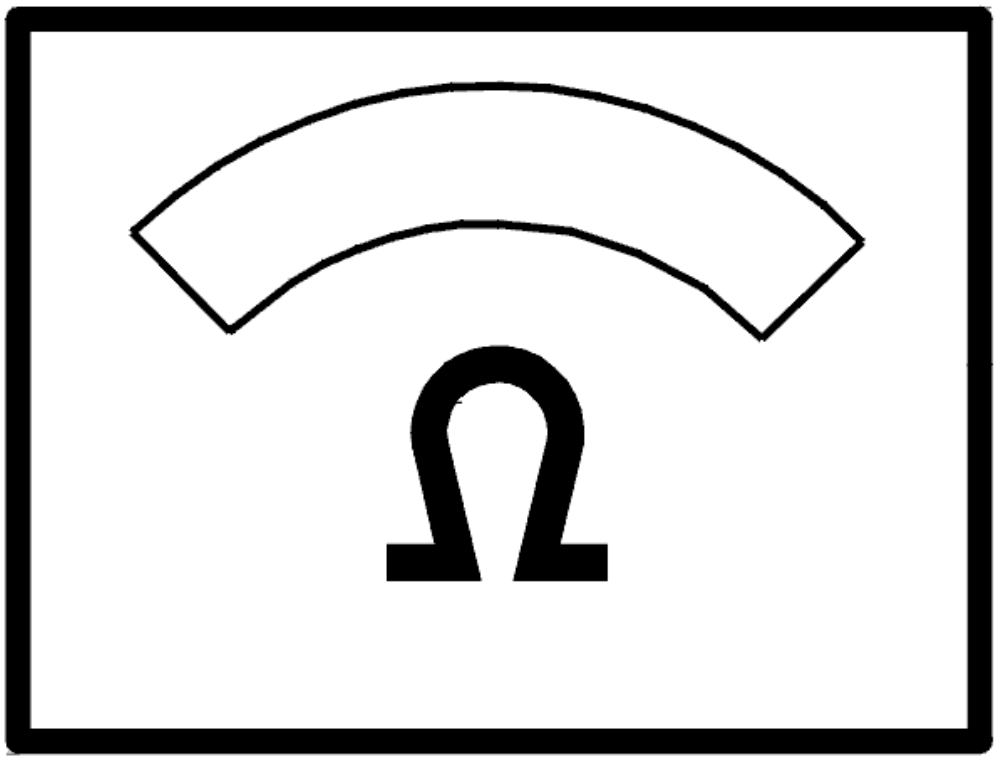


Fig. 500: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the control module and transmission connectors. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between control module terminal #B8 (#A68) and transmission connector terminal #C2. Check for an intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS**

- Check the circuit for solenoid S2. Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #B8 (#A68) and #A53 (#A53) on the breakout box. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For other values, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

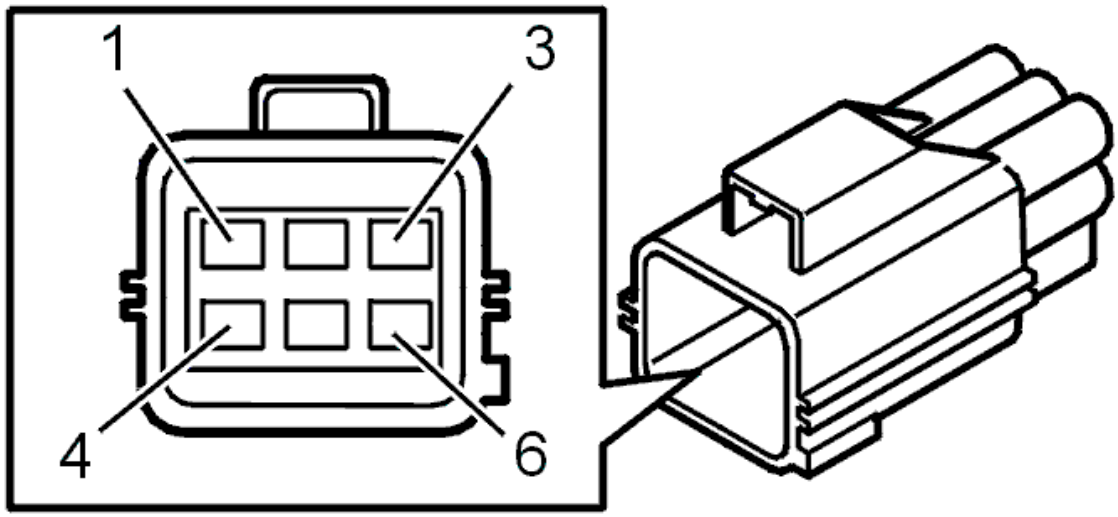


Fig. 501: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

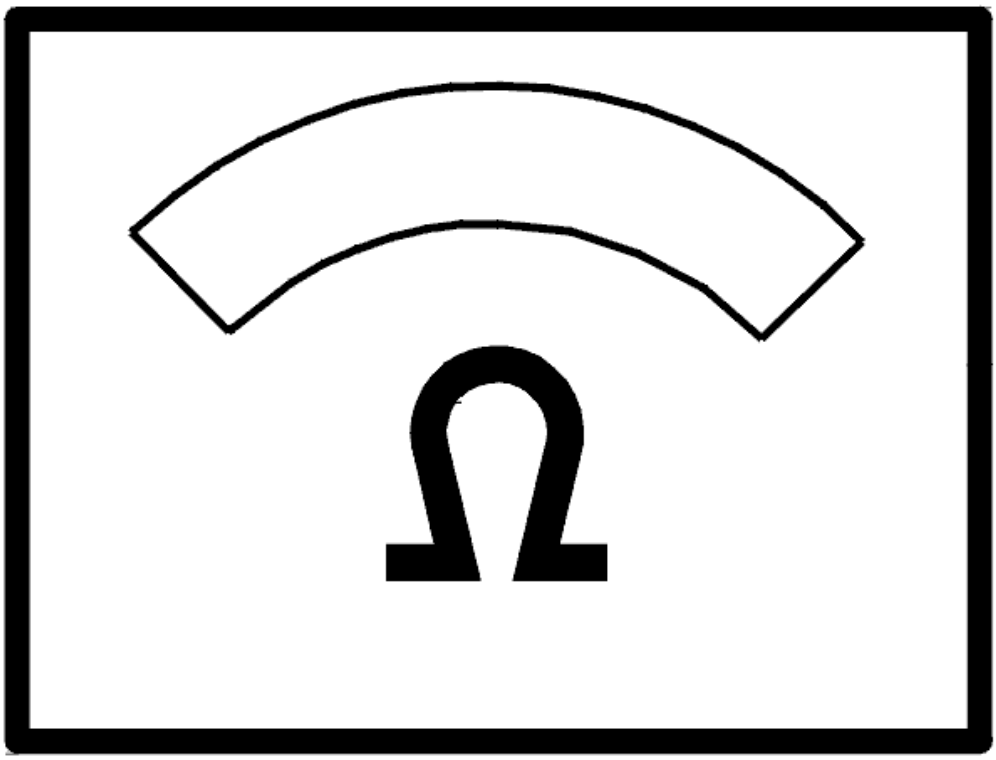


Fig. 502: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

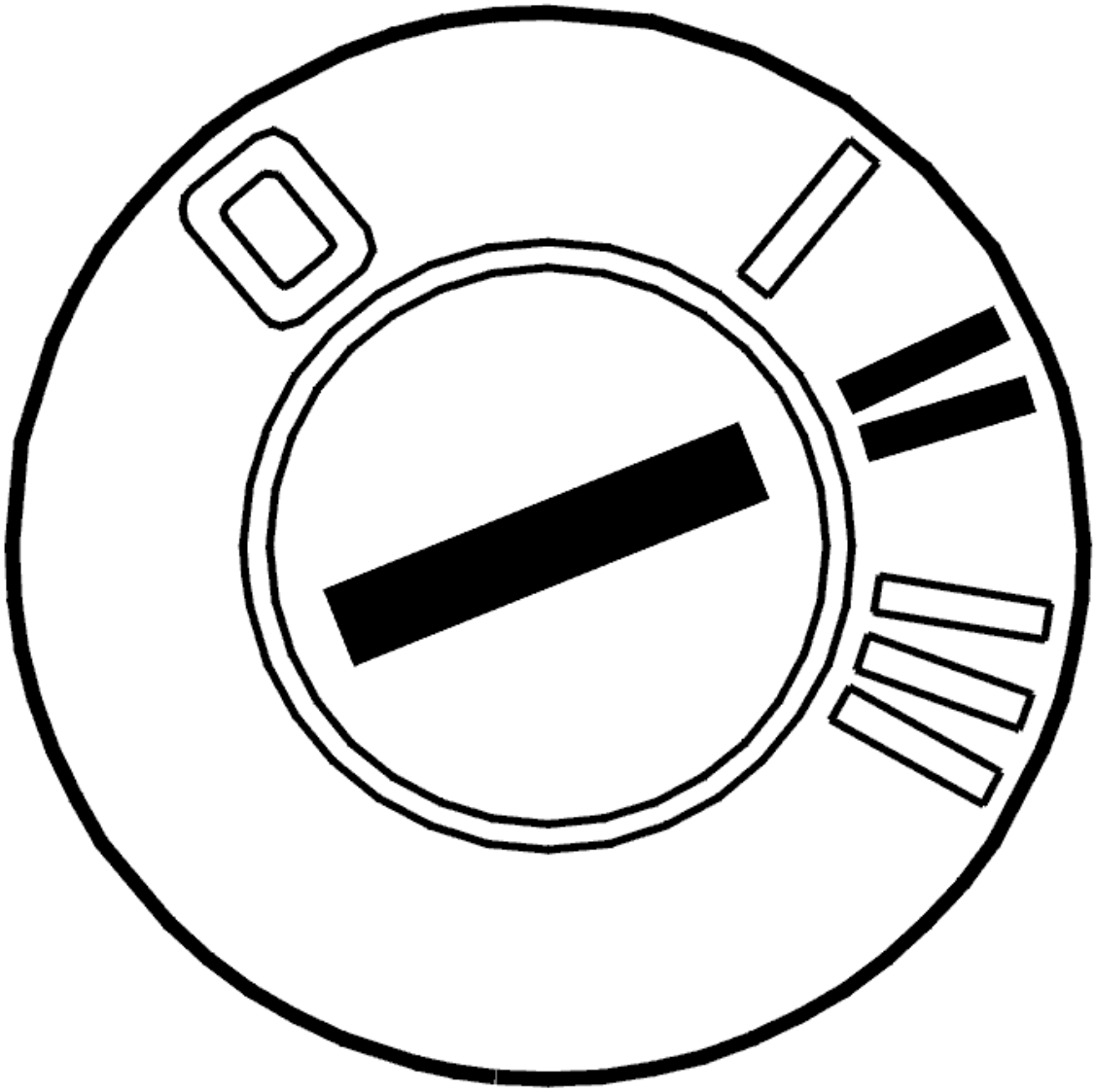


Fig. 503: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

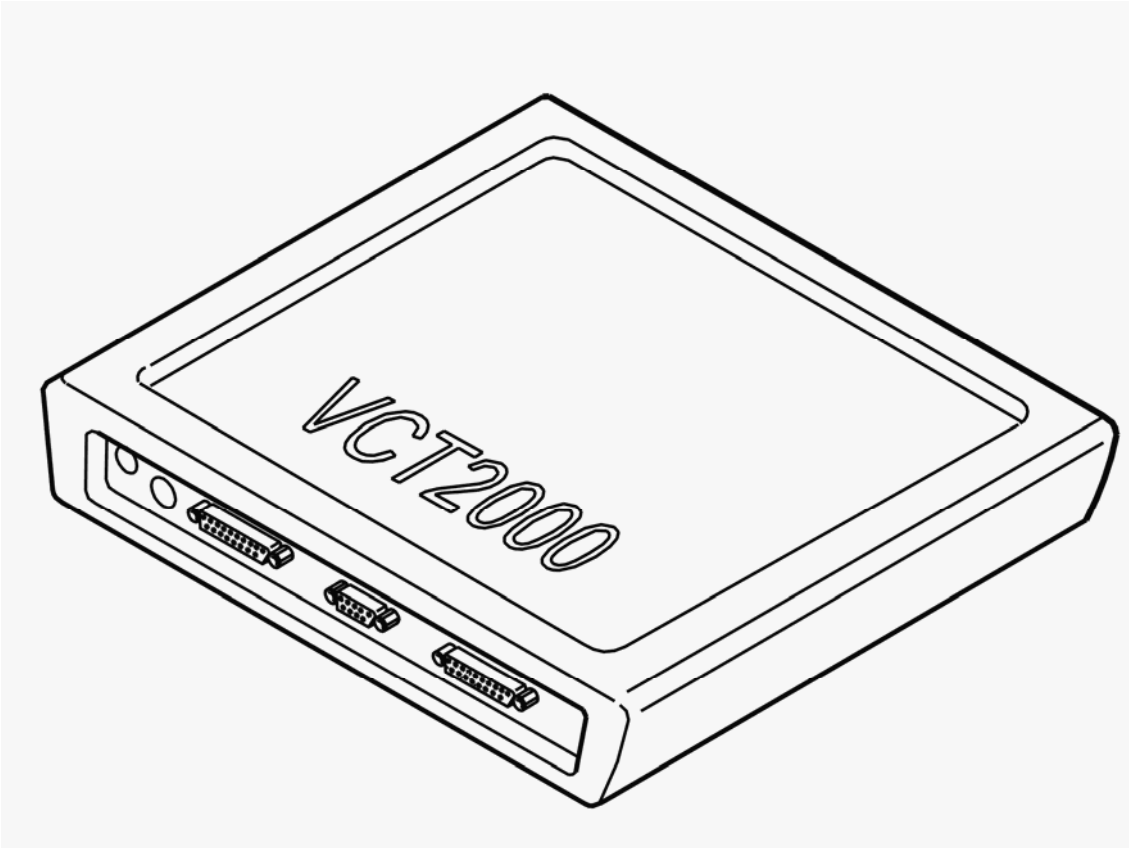


Fig. 504: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

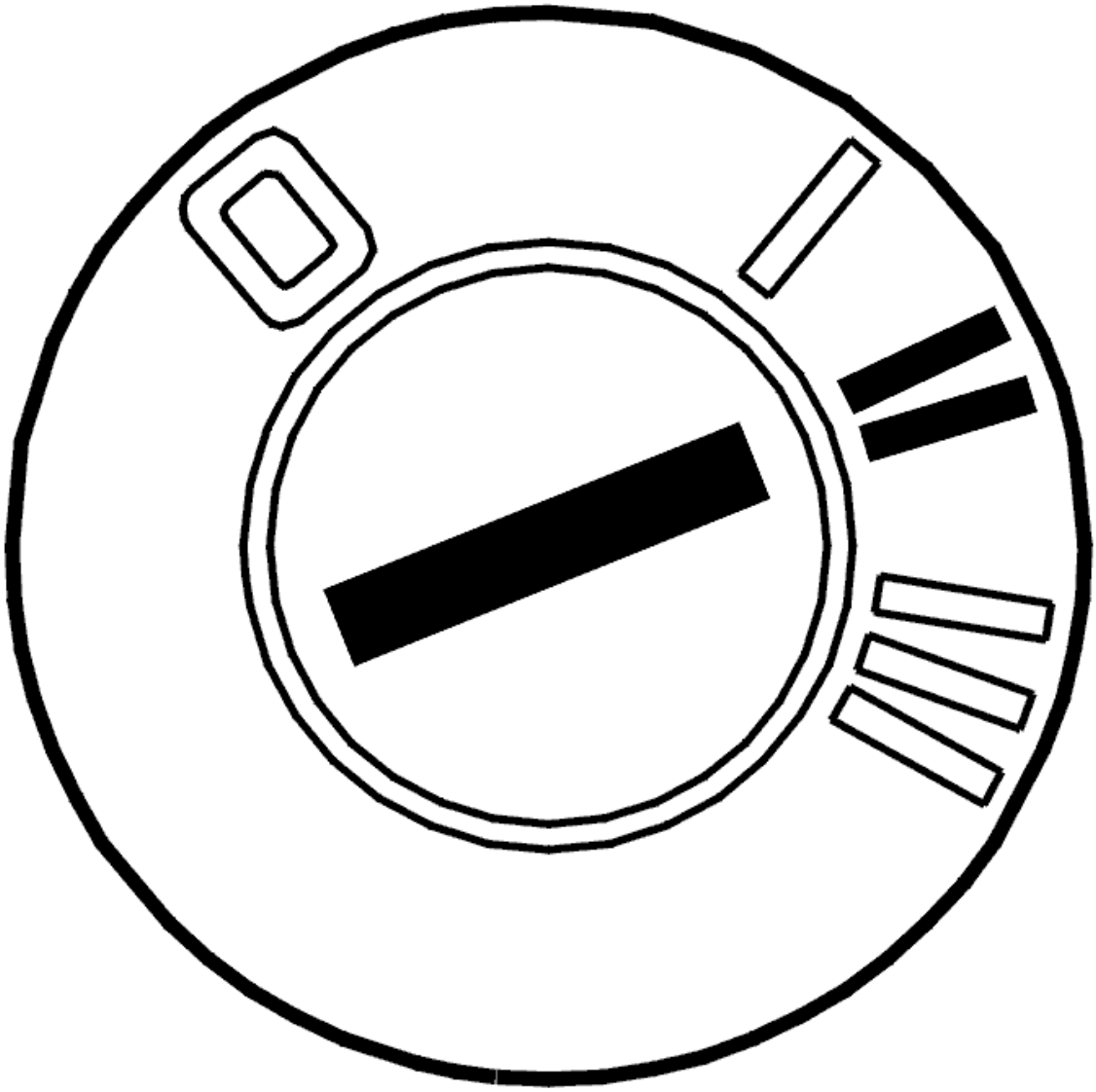


Fig. 505: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

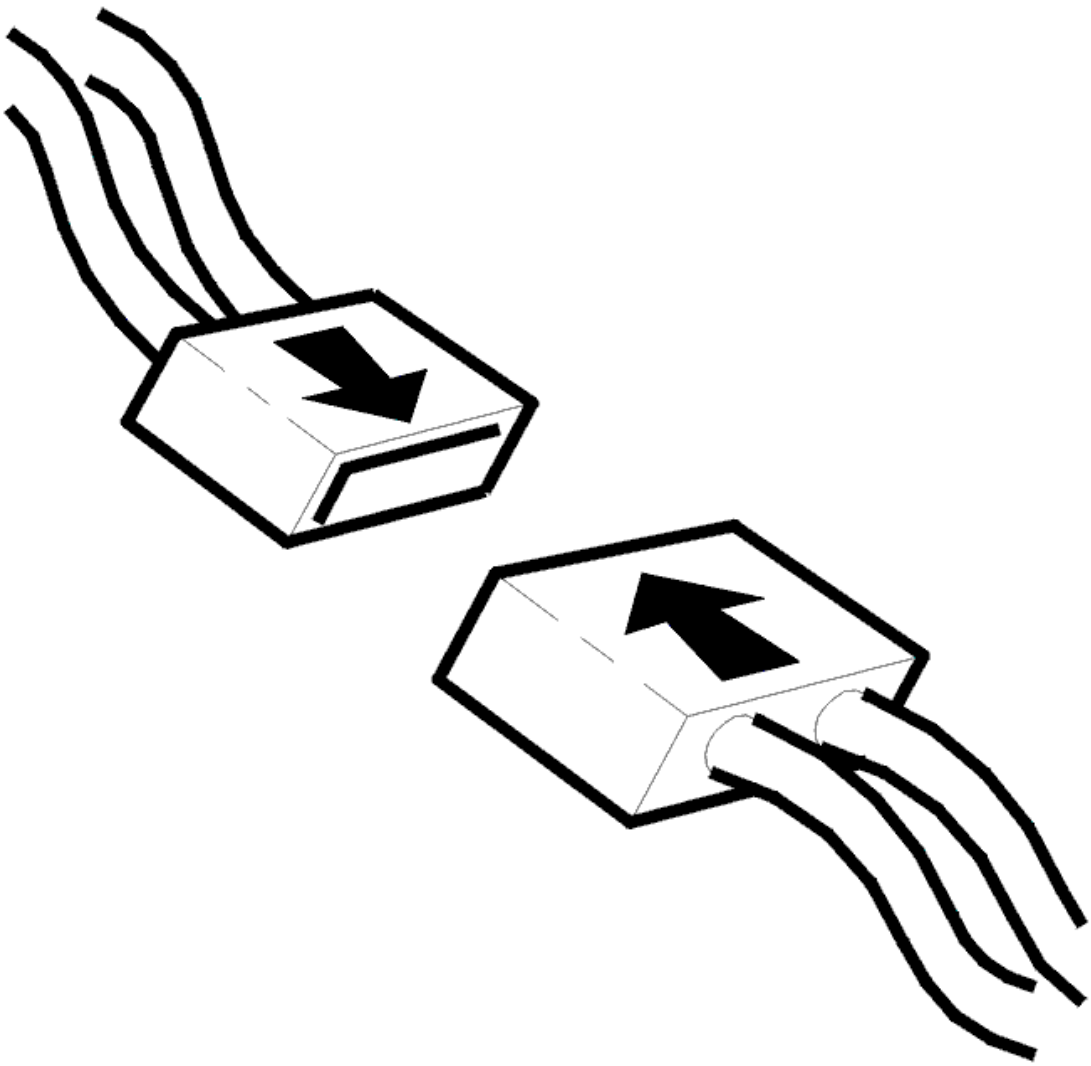


Fig. 506: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S2.

The value should change between OFF and ON.

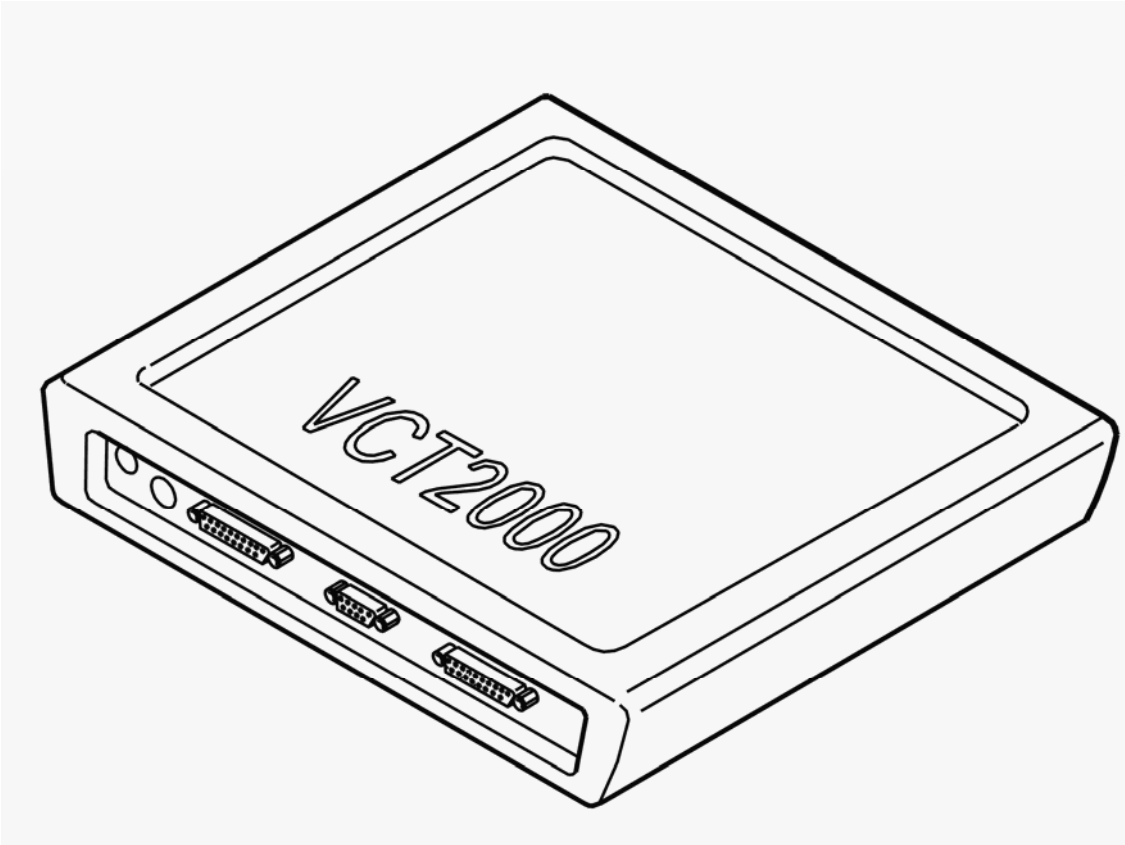


Fig. 507: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change between OFF and ON?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

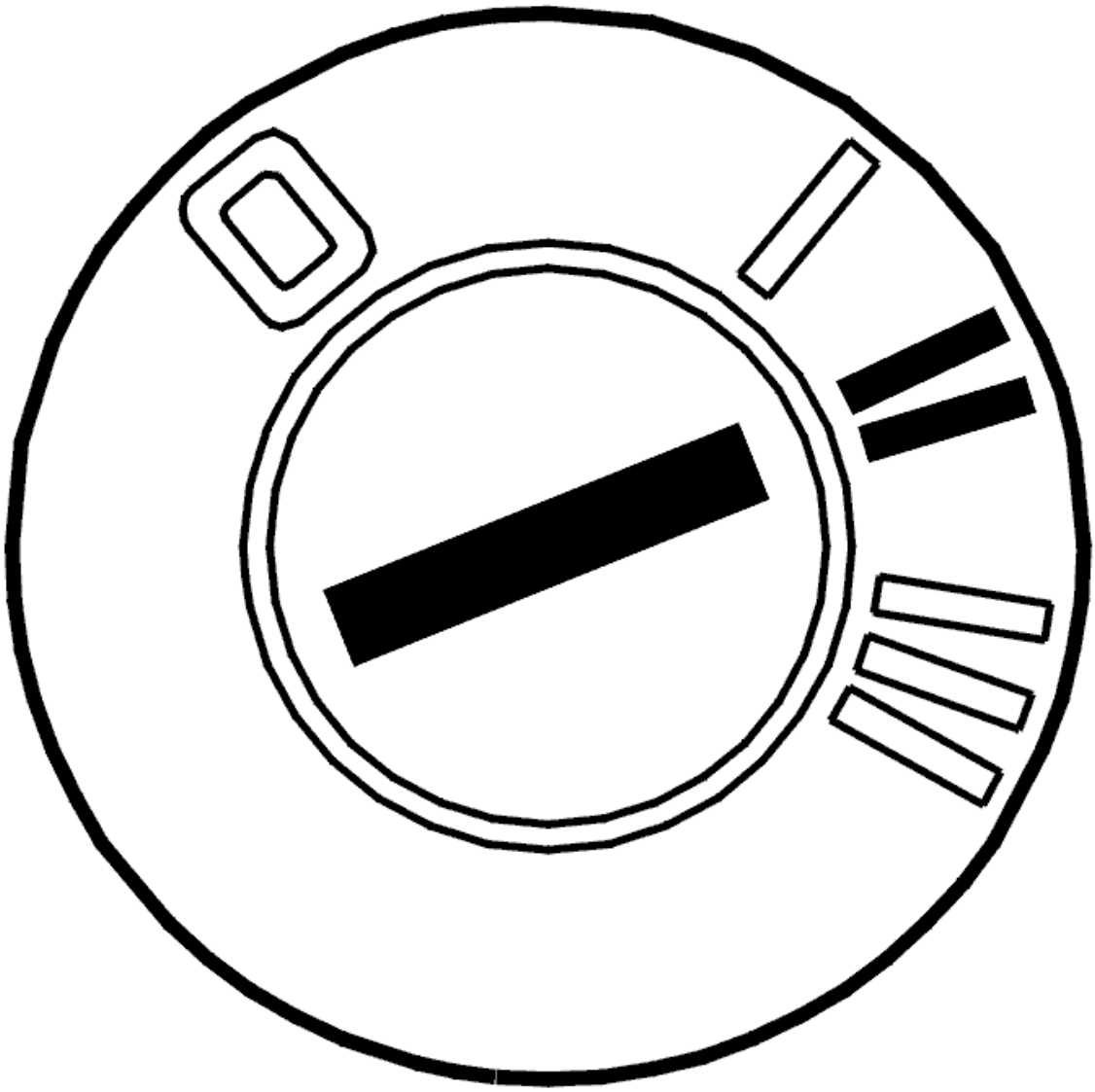


Fig. 508: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

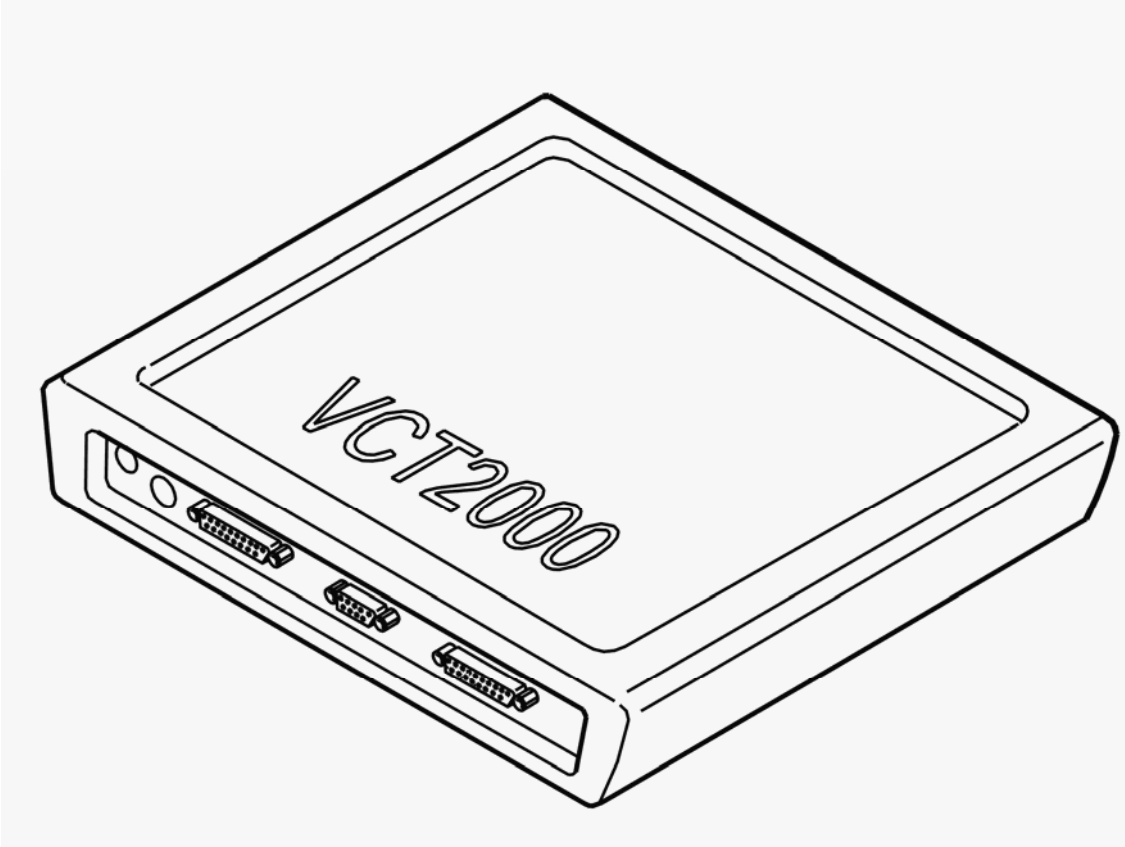


Fig. 509: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

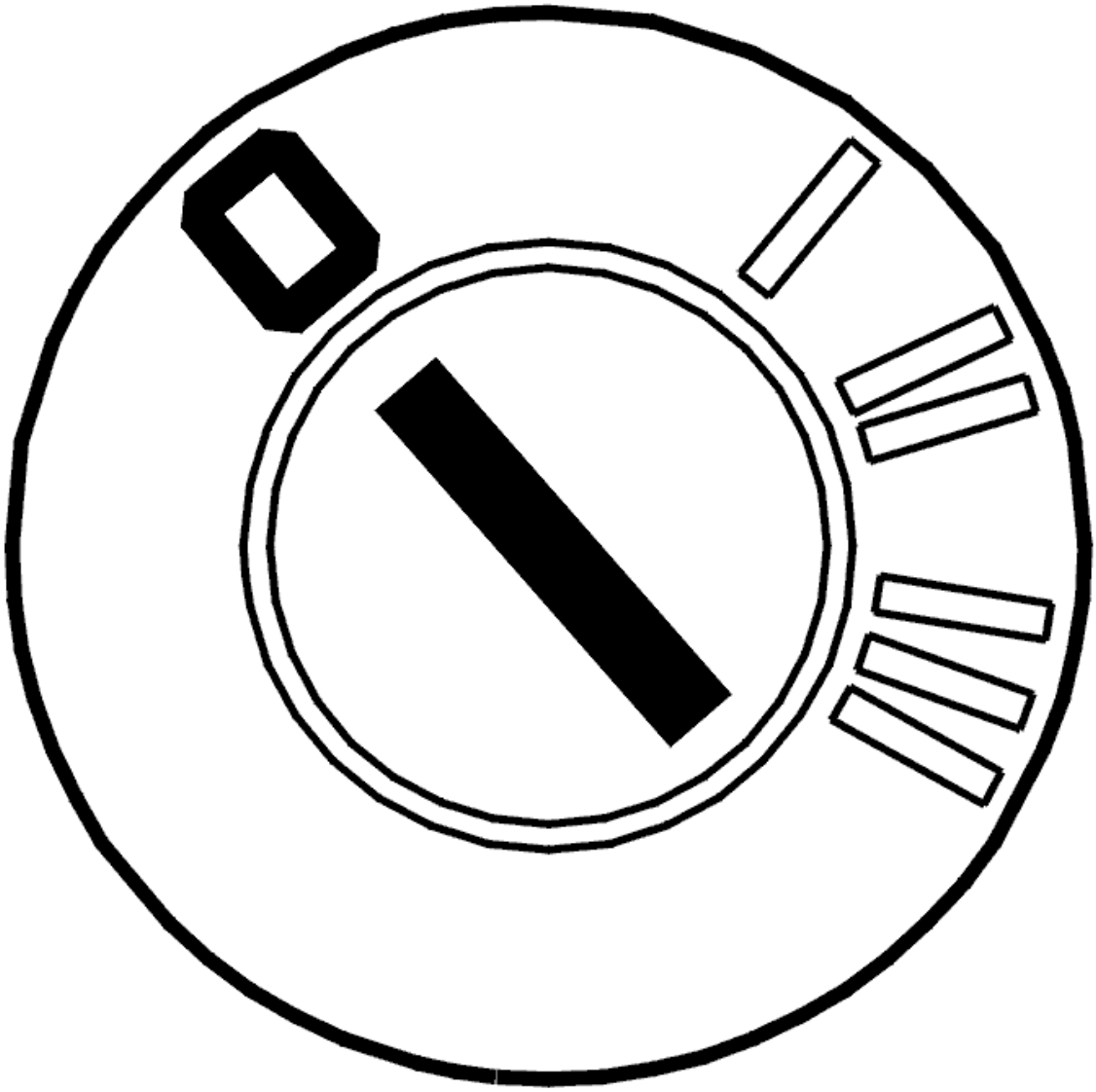


Fig. 510: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

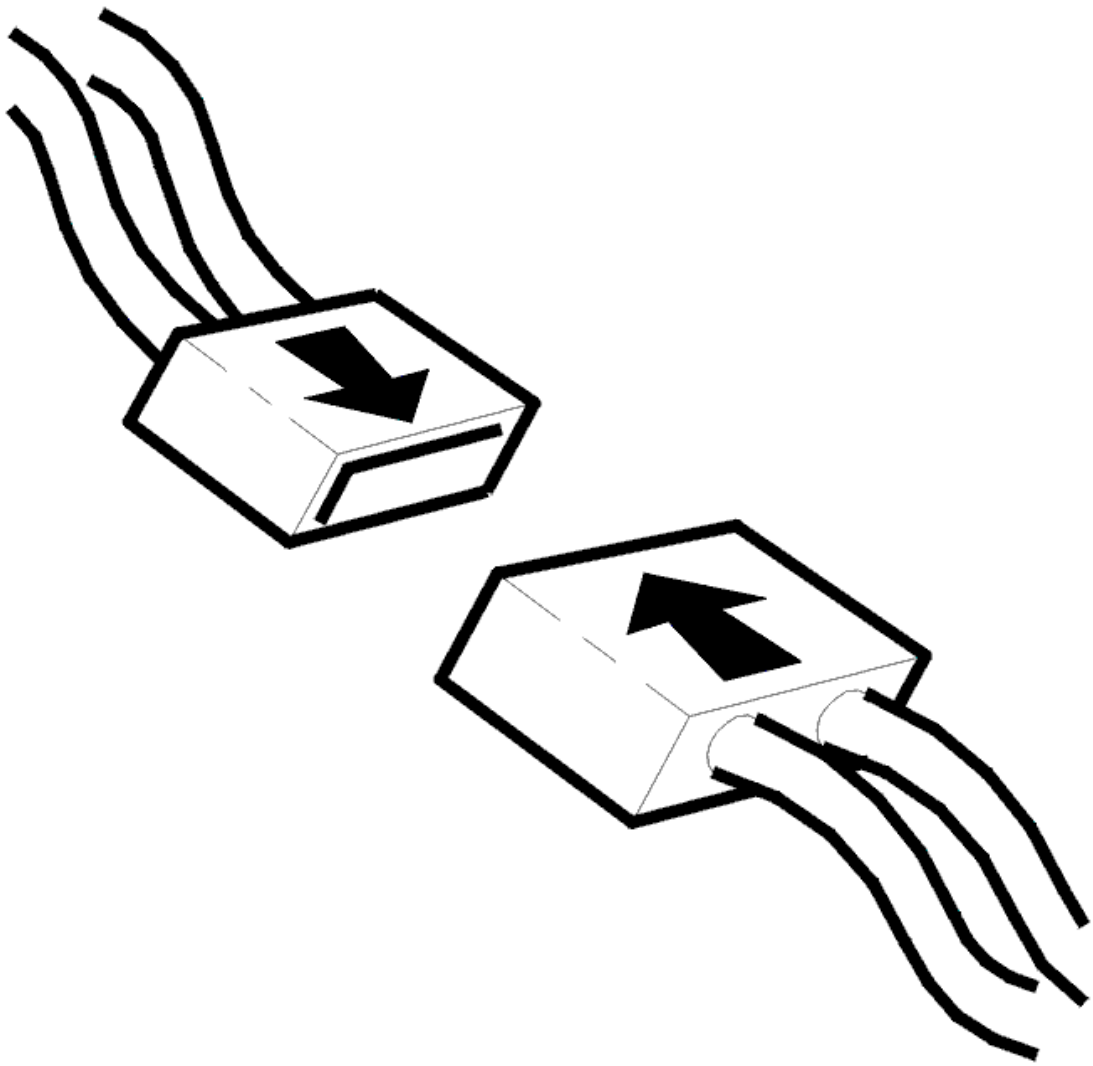


Fig. 511: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

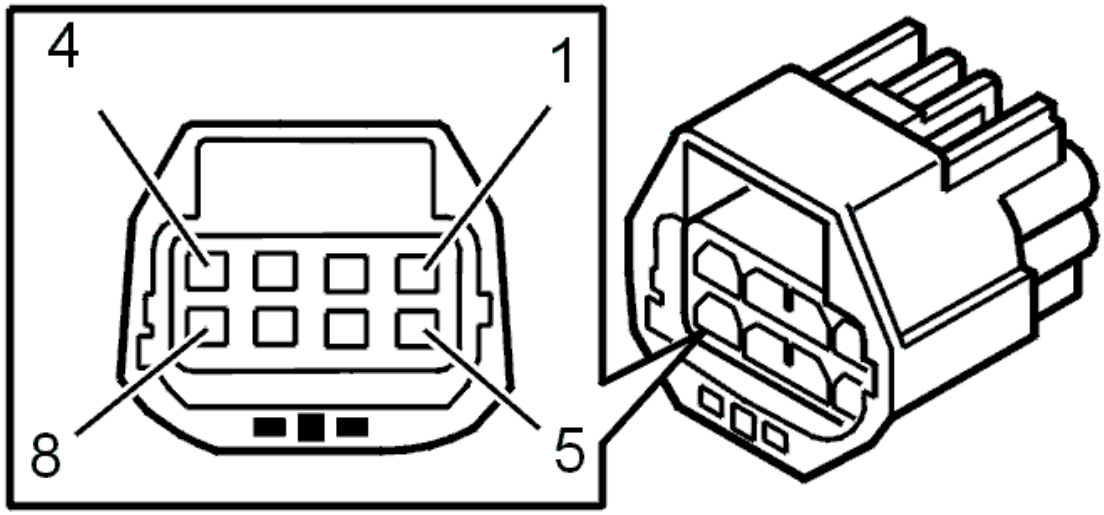


Fig. 512: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

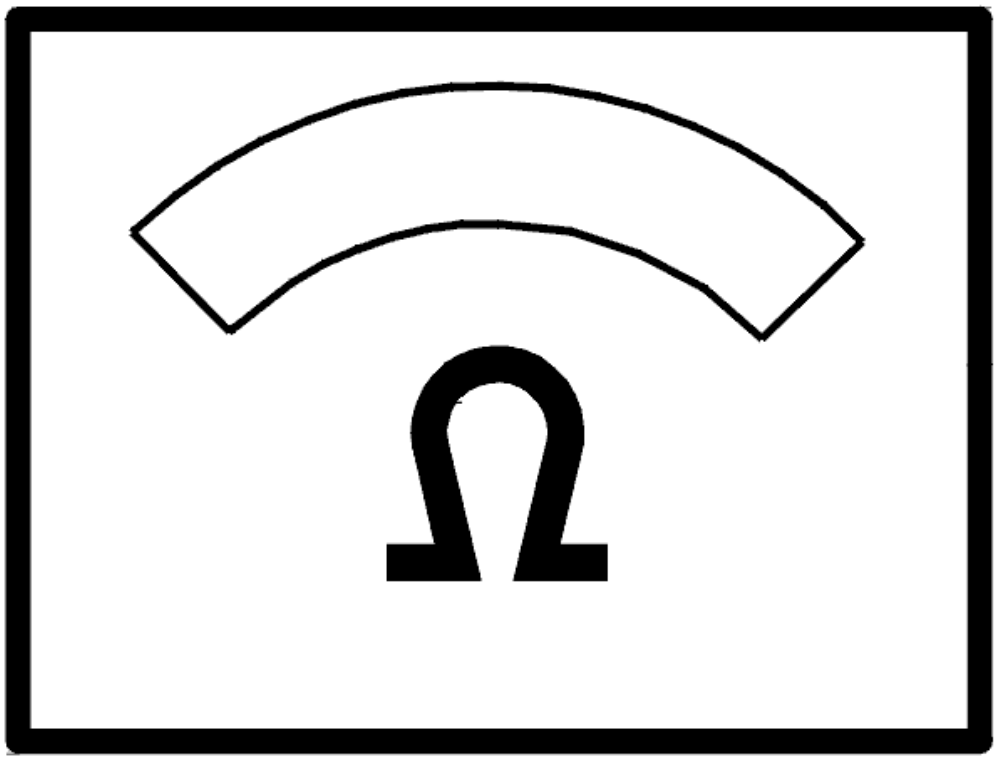


Fig. 513: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

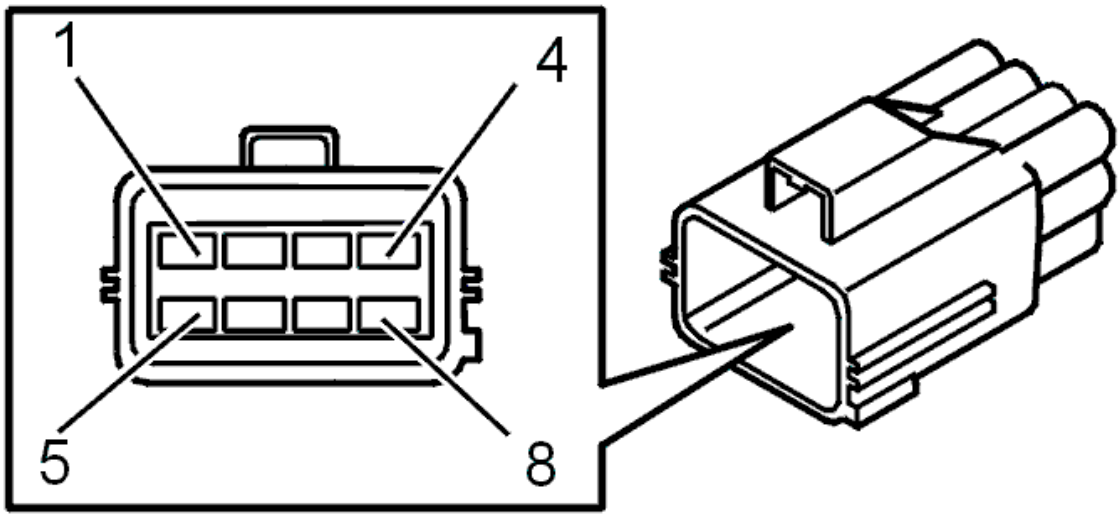


Fig. 514: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

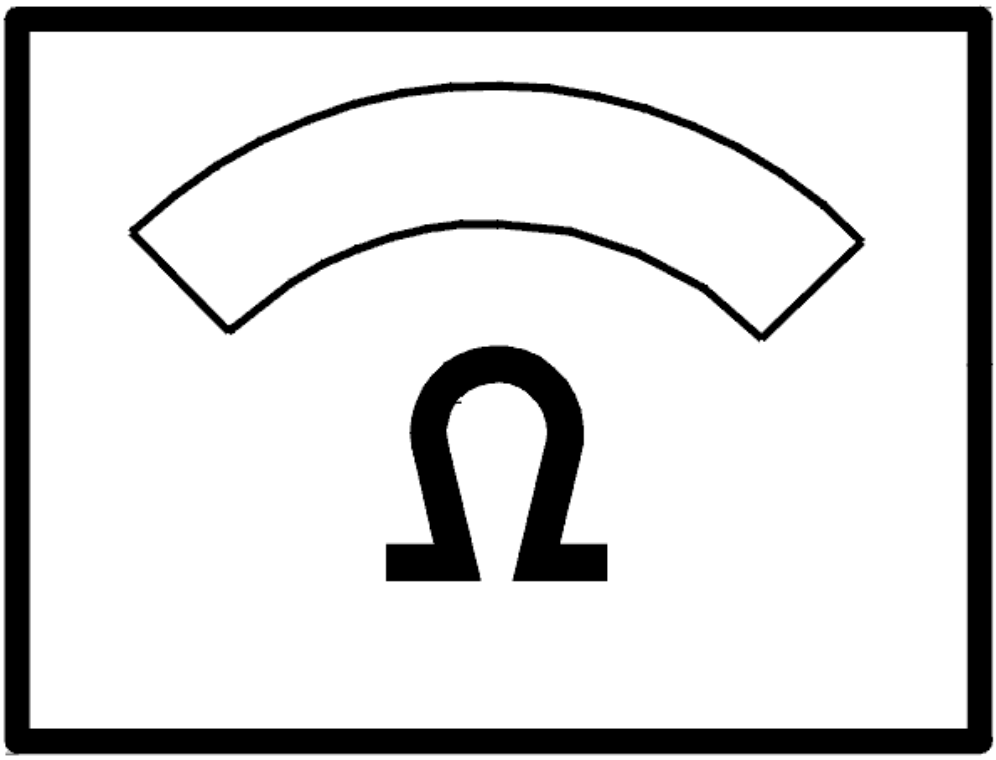


Fig. 515: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

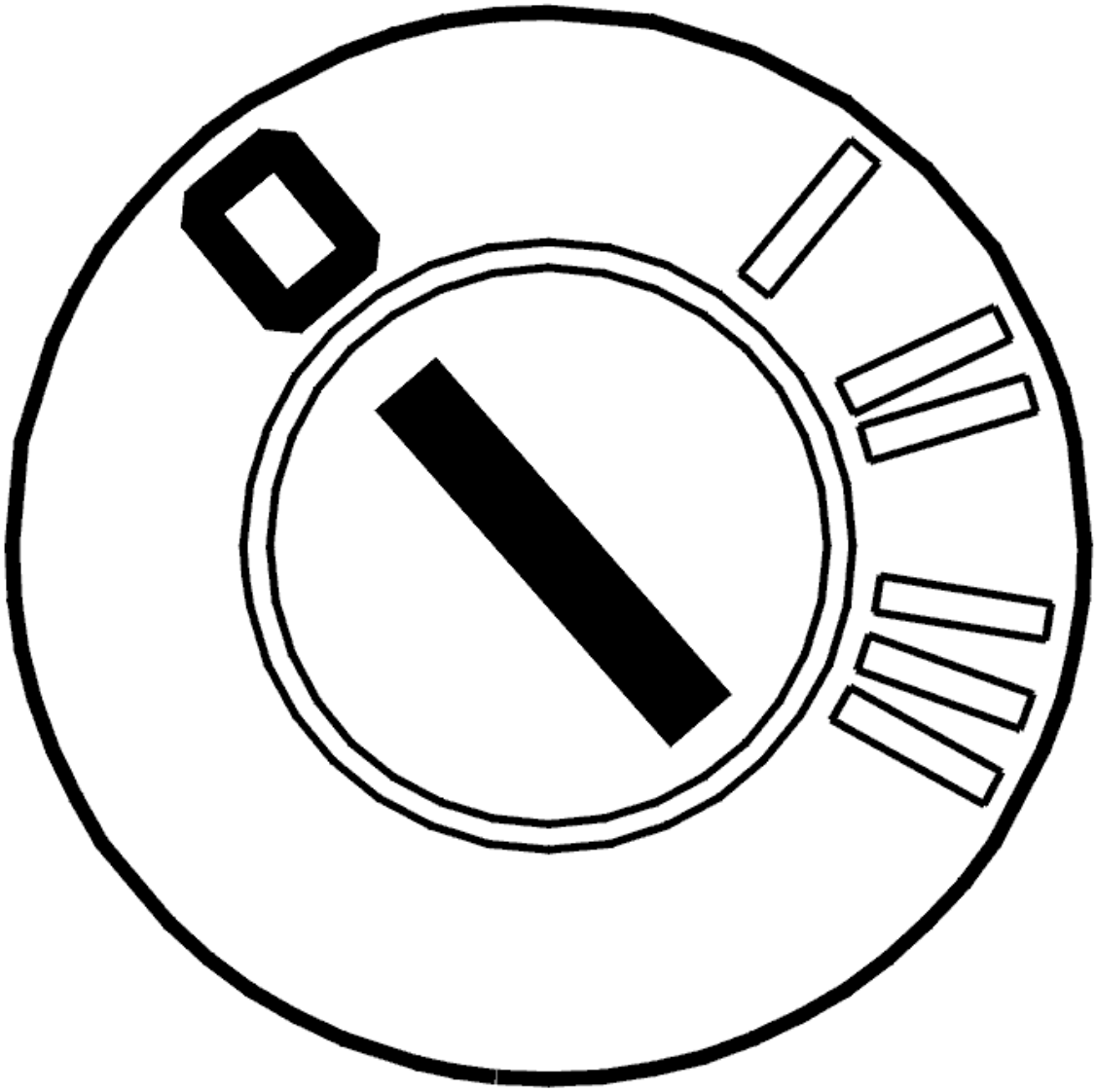


Fig. 516: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

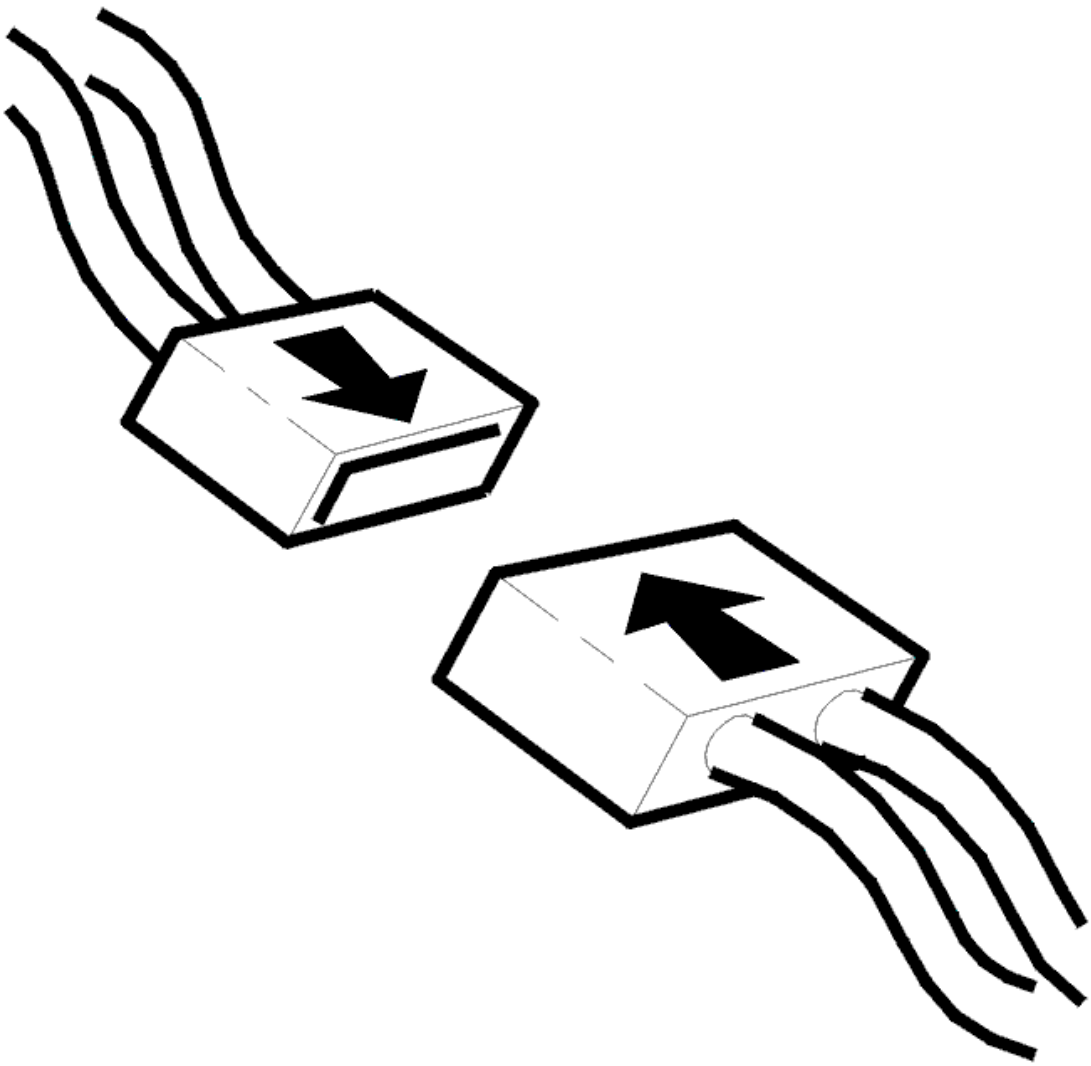


Fig. 517: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

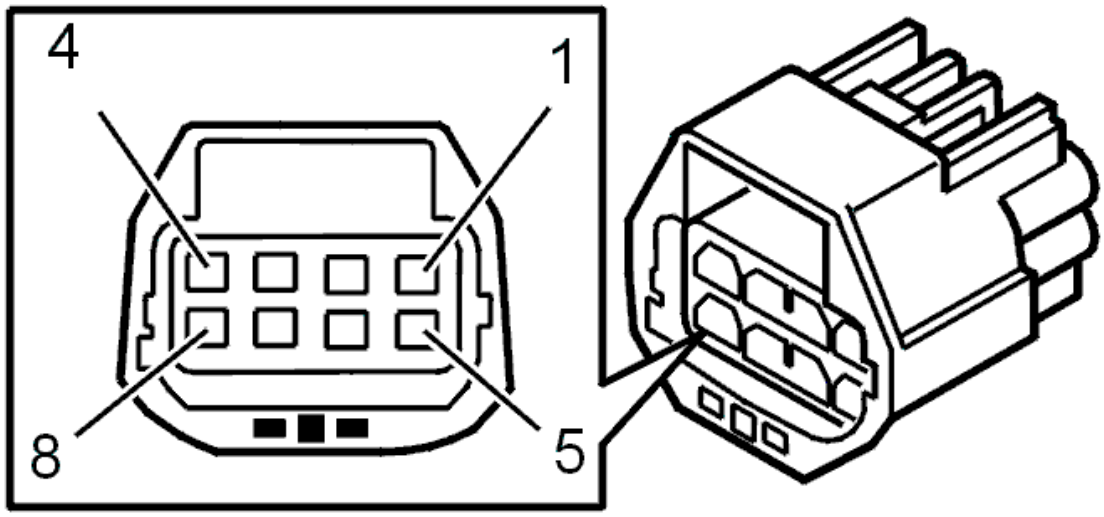


Fig. 518: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

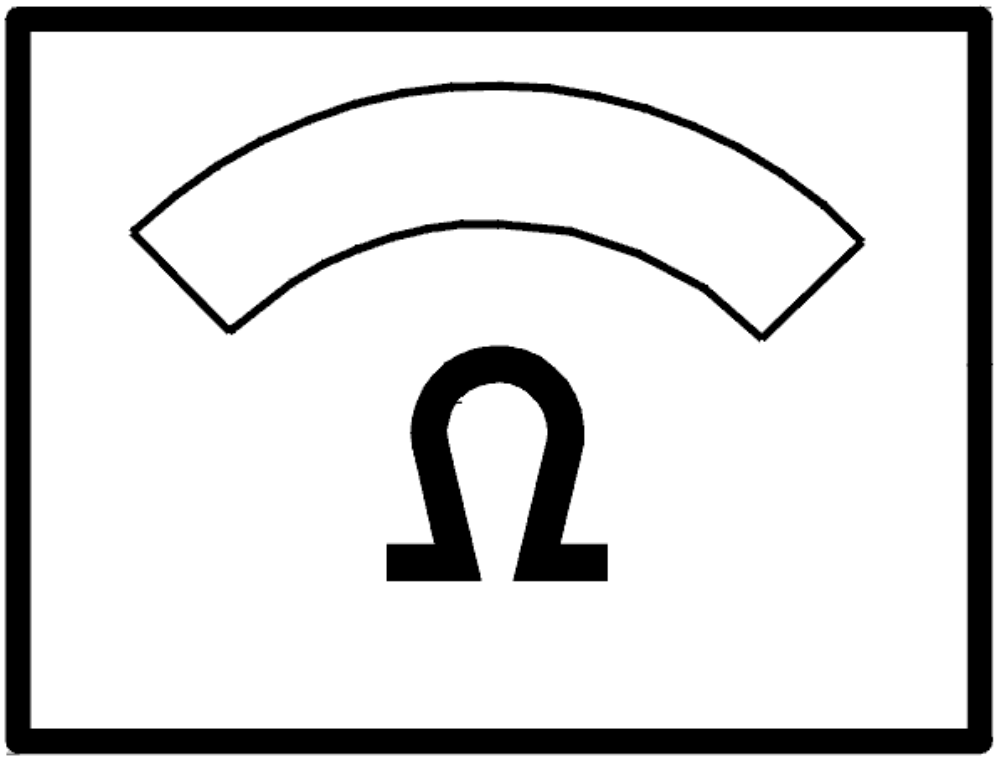


Fig. 519: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

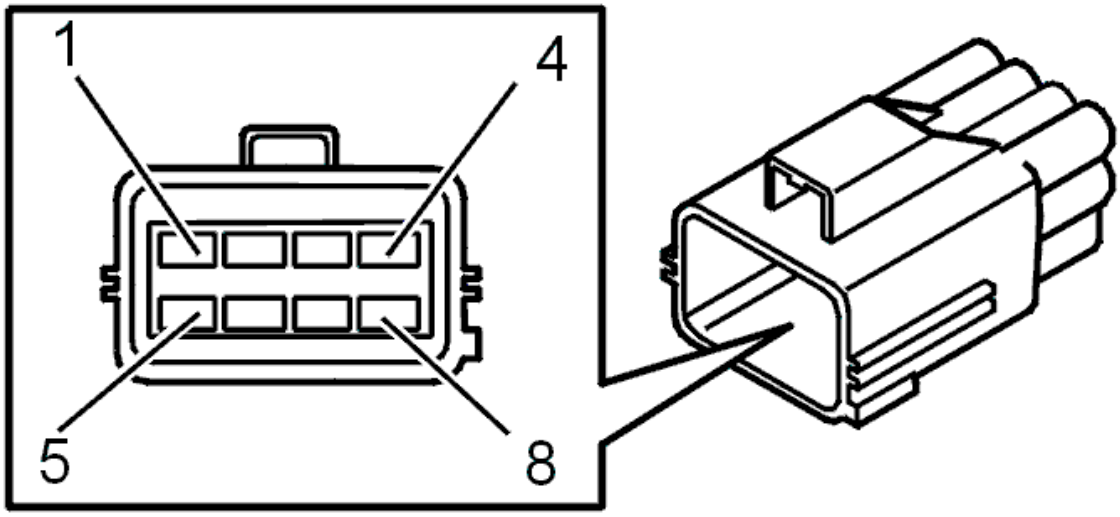


Fig. 520: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

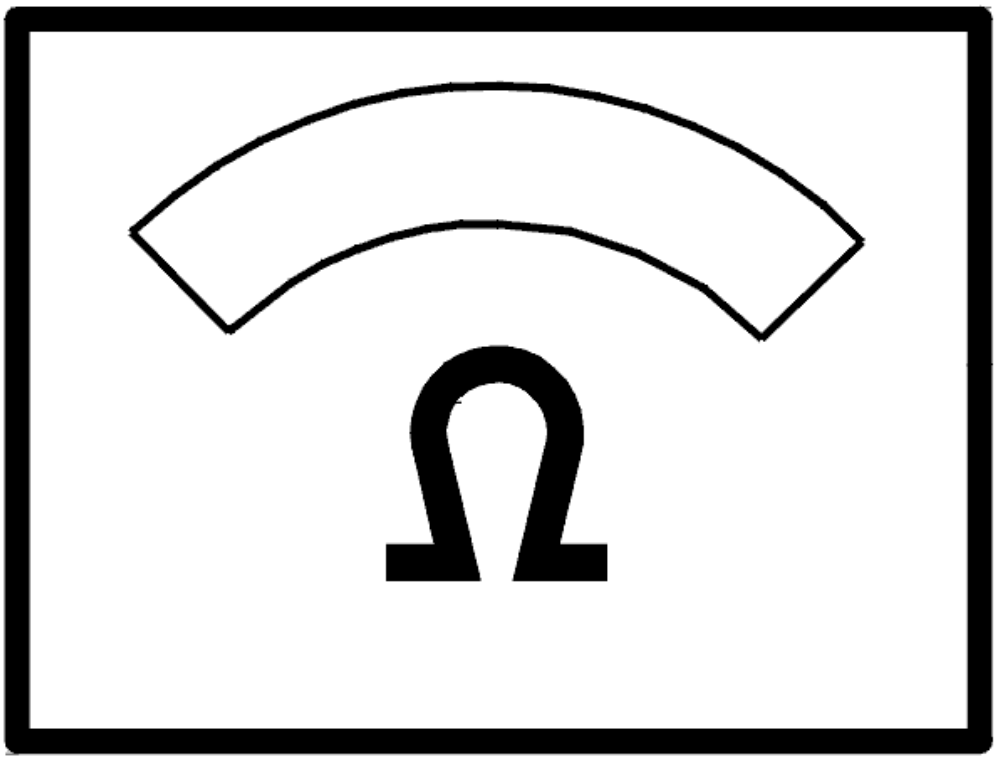


Fig. 521: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

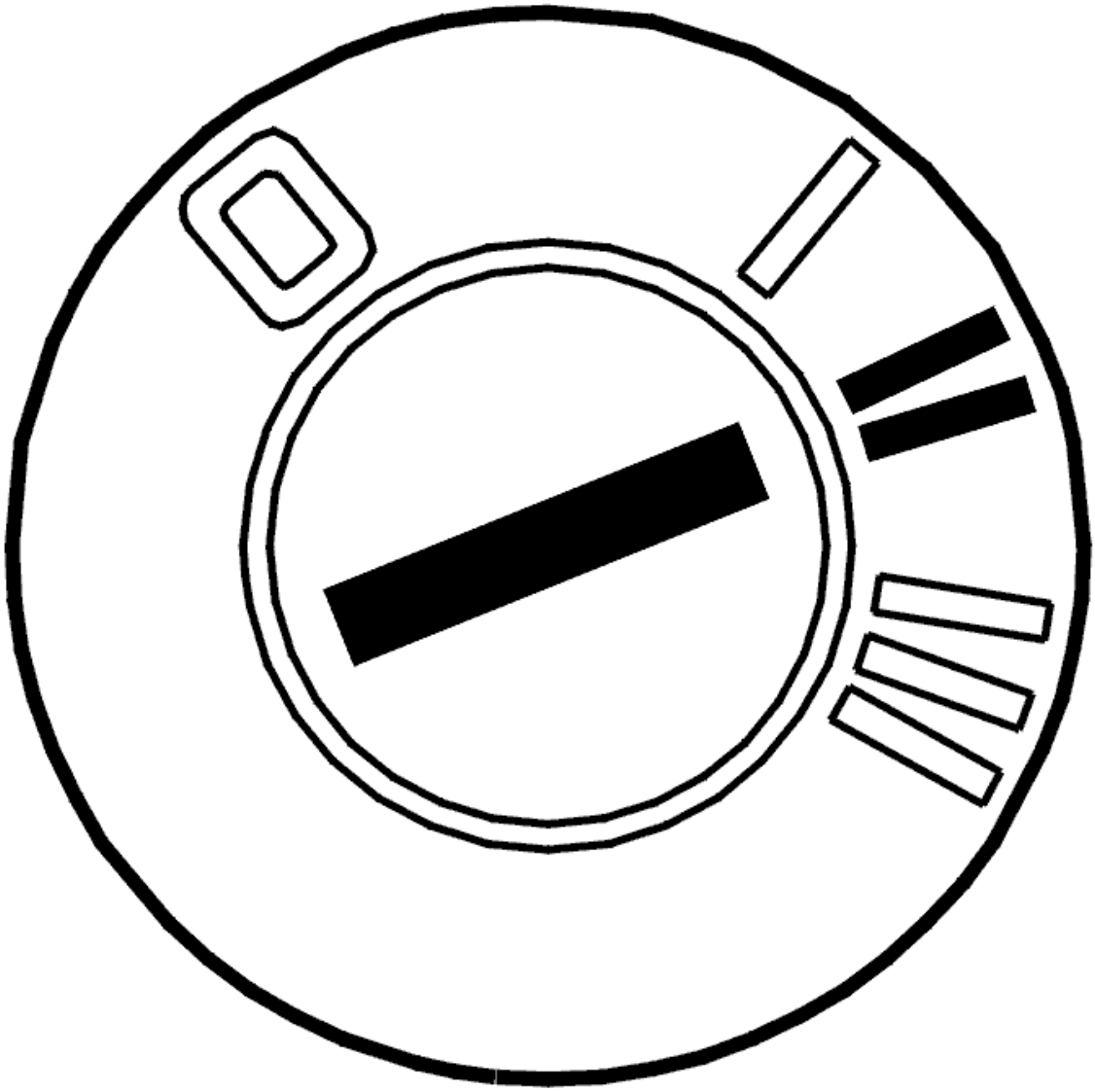


Fig. 522: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

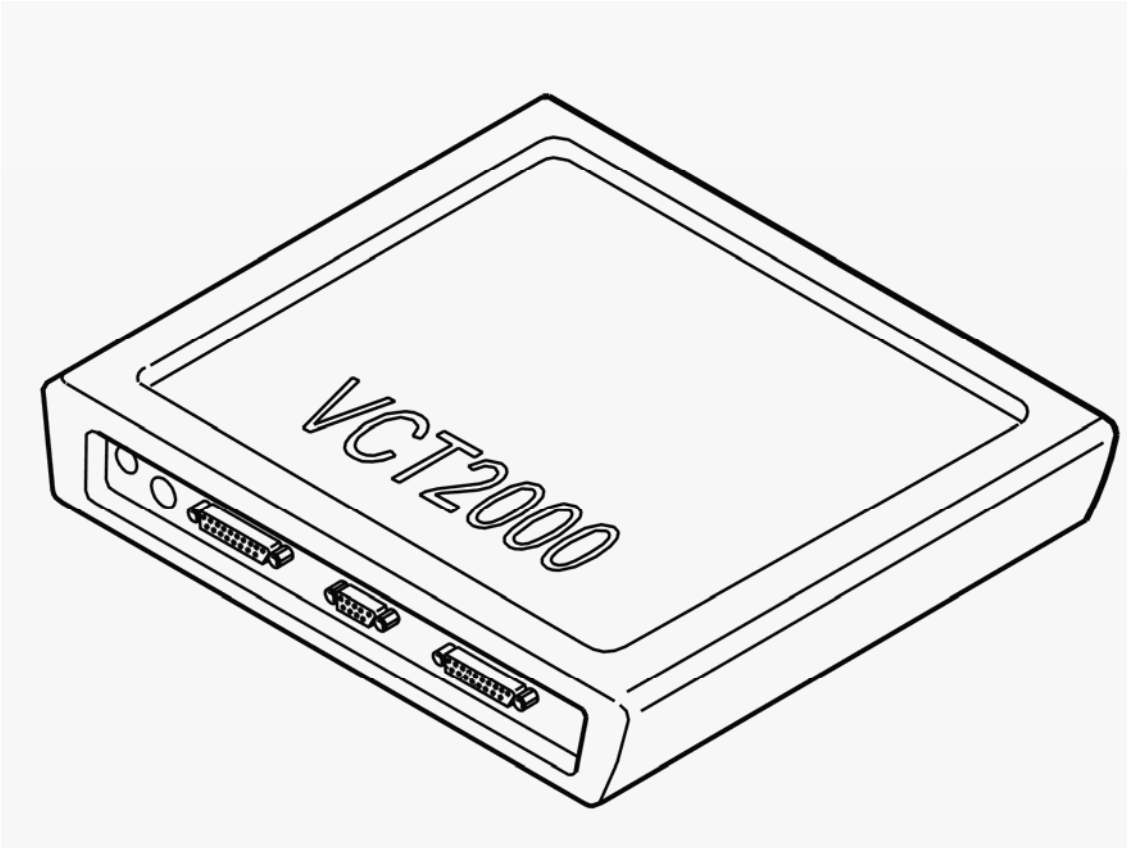


Fig. 523: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

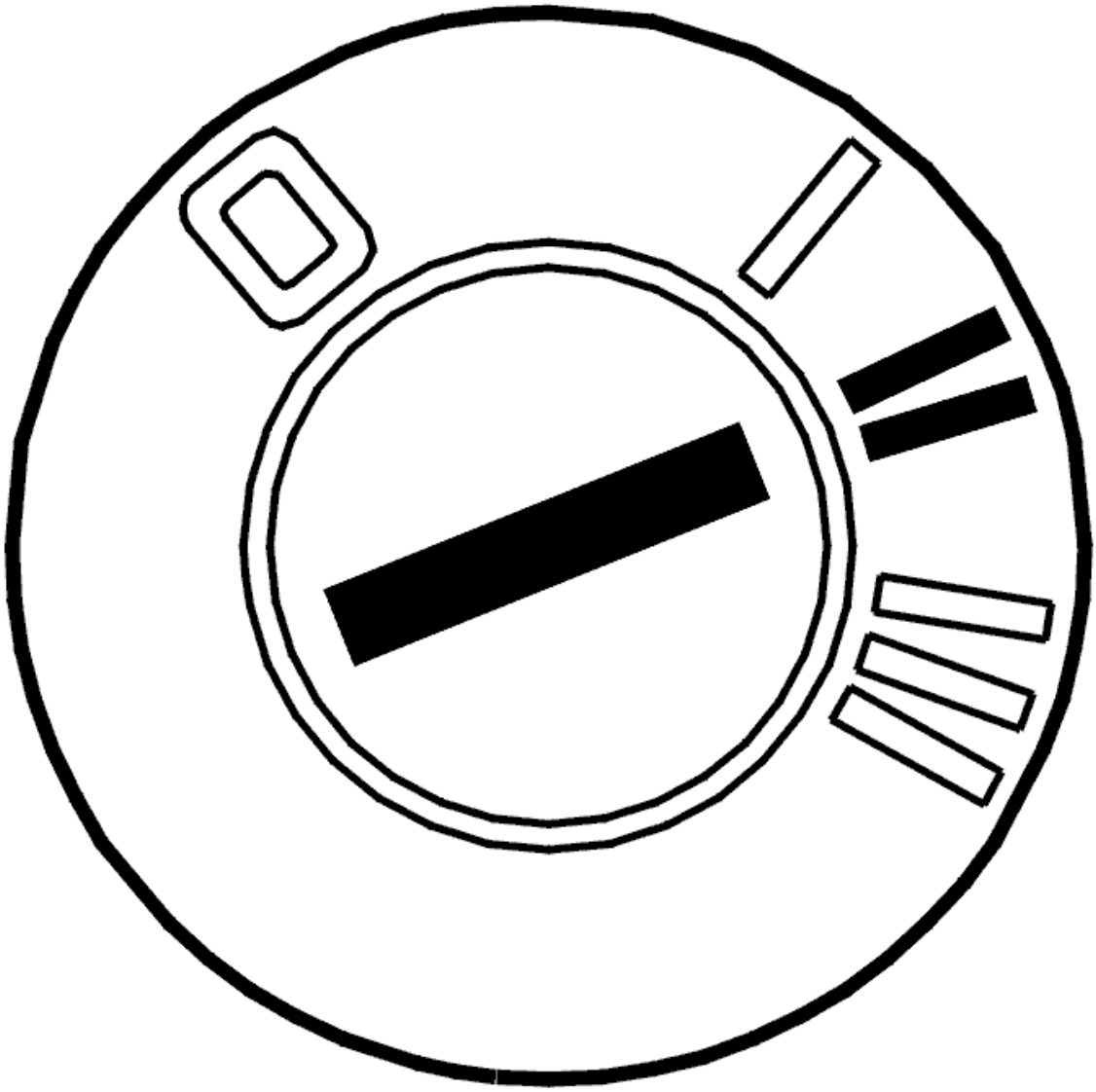


Fig. 524: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

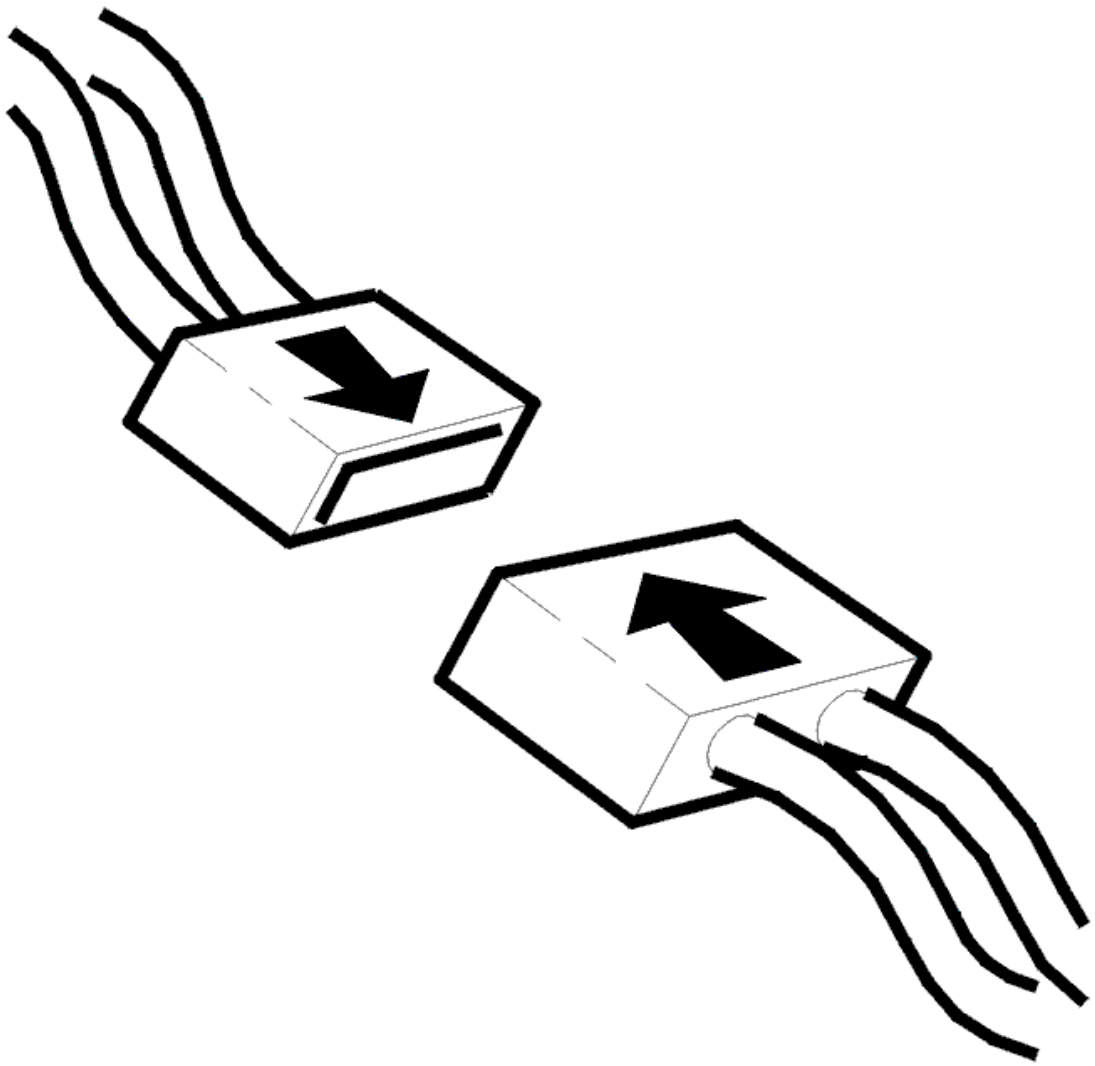


Fig. 525: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

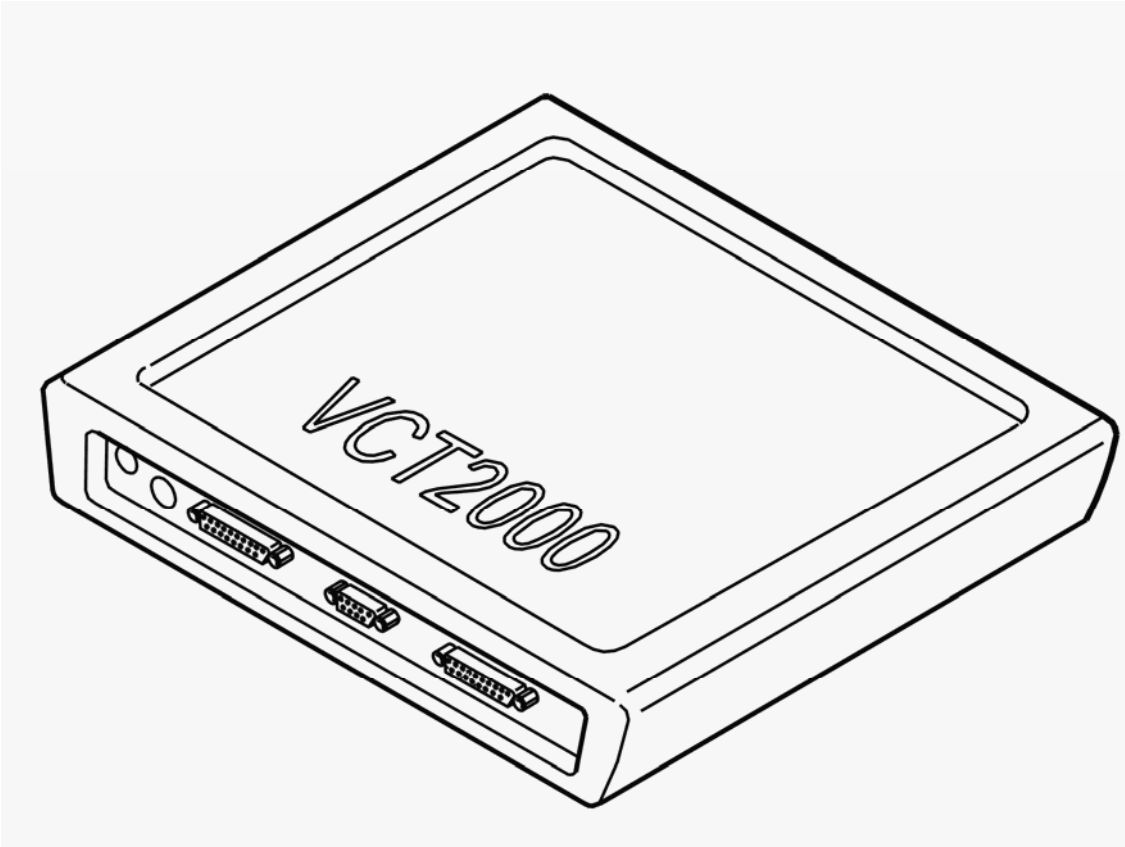


Fig. 526: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-000B: SHIFT SOLENOID S1. HYDRAULIC FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

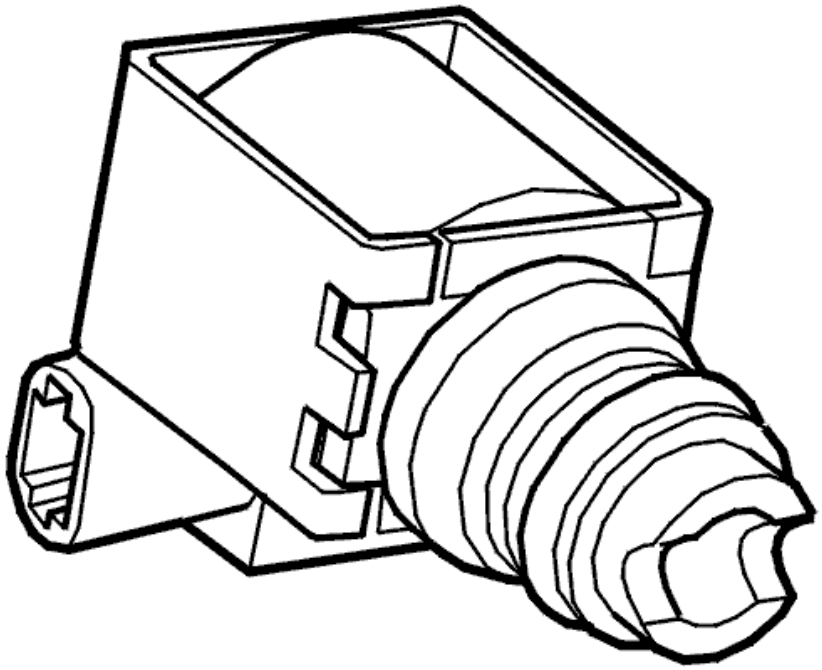


Fig. 527: Identifying Shift Solenoid S1 And S2
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) compares the speed signal from the brake control module (BCM) with the speed signal from the transmission. The control module also checks which gear is selected and compares it with the calculated gear. The speed signal from the brake control module (BCM) and the transmission speed signals should be almost identical, the transmission speed signal should be greater or lower than the brake control module (BCM) speed signal (vehicle speed must be above 30 km/h, engine speed (RPM) above 1400 rpm and transmission oil temperature over 20 °C).

Diagnostic trouble code (DTC) TCM-000B is stored if the control module detects that the vehicle speed and engine speed (RPM) signals do not correspond with the programmed values and that an "incorrect" gear is being used in relation to the calculated gear. This is because a solenoid fault has occurred in the hydraulic circuit for gears 1-2 or 3-4.

Substitute Value

- The control module "Limp-home" mode is engaged and only gear positions 3 and R are available. When the ignition is switched off, the control module switches to normal function and all four forward shift positions can be used.

Possible Source

- Glycol in the transmission fluid.

- The hydraulic valve for solenoid S1 has stuck in the open or closed position
- Defective control system (the solenoid binds or is stuck)
- Internal leakage in the transmission
- Warn or damaged clutch driven plates in the transmission.

Fault symptom[s]

- General orange warning lamp lit
- Malfunction indicator lamp (MIL) lit
- No shifting (may be intermittent)
- No lock-up function.

HINT: When the transmission control module (TCM) detects disrupted function, "Limp-home" mode is activated and only shift positions 3 and R are available. Lock-up function is also unavailable.

HYDRAULIC FAULT

CHECKS

CHECKING SOFTWARE

HINT: This may be due to old software in Engine control module (ECM). The fault can be rectified by updating the software in the Transmission Control Module (TCM).

Fig. 528: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

It is possible to download new software to the Transmission Control Module (TCM). When ordering software, the vehicle's software and hardware are compared with Volvo's central database. If the comparison corresponds, the software is downloaded to the control module.

Check and download the latest software for the Transmission Control Module (TCM) if available and resume this fault tracing.

- **Continue**

  Refer to **CHECKING FOR COOLANT IN OIL**

CHECKING SHIFTING SOLENOIDS AND SHIFTING VALVES.

NOTE: **If the car has STC or DSTC, these functions must be disengaged. Press in the STC/DSTC button on the center console. Hold the button in for at least 2 seconds. The LED on the button must go out.**

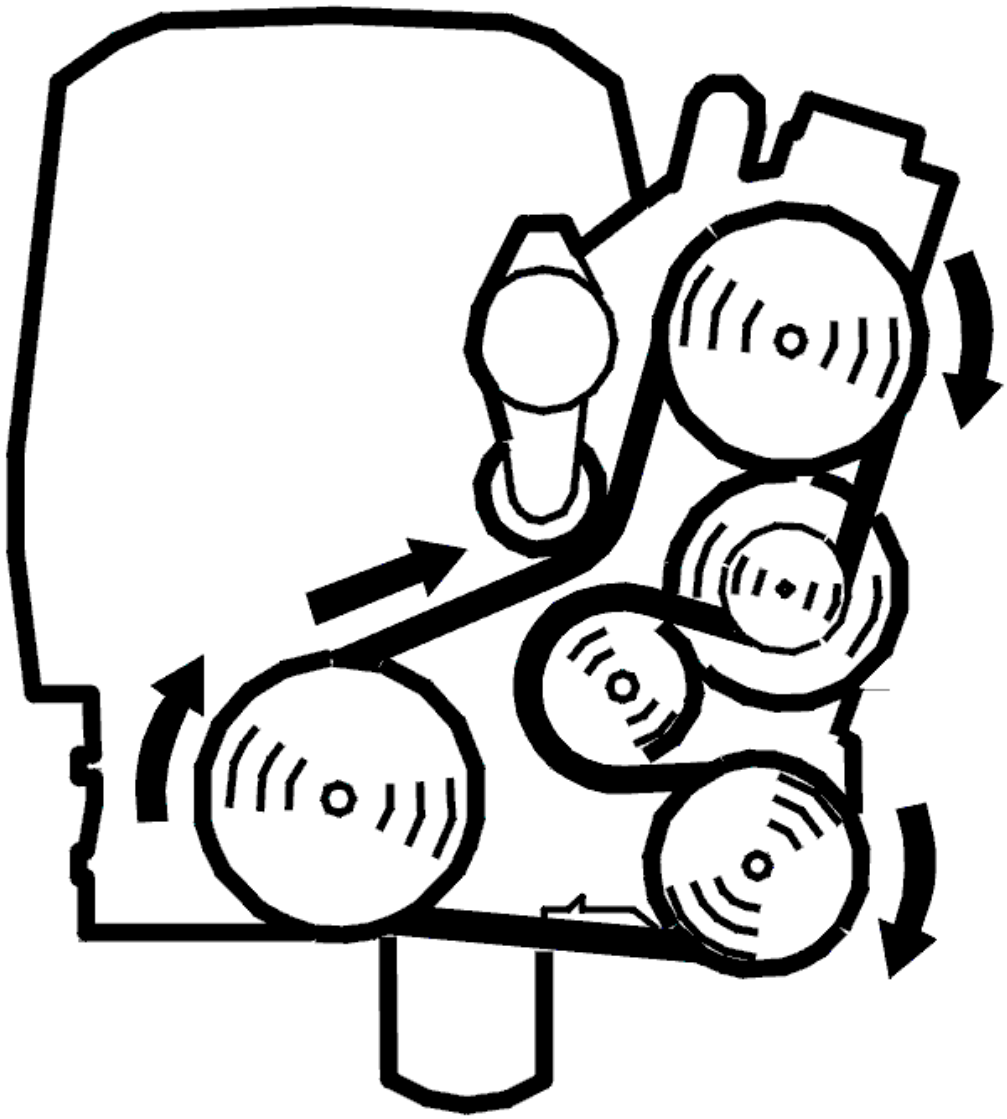


Fig. 529: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Raise the car so that the drive wheels are clear of the ground.

WARNING: **Ensure that the car is safely raised.**

WARNING: **Check that there are no objects caught in the front tire treads.**

- Start the engine
- Deactivate STC/DSTC.
- Click the symbol for VCT2000 in order to start the test sequence.

NOTE: The instructions in the test sequence must be followed carefully to obtain a correct result.

NOTE: Diagnostic trouble codes (DTCs) may be stored in the ABS system when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

Other information:

- To replace the control system:
  - For removal, see **CONTROL SYSTEM/VALVE HOUSING, REMOVING**
  - To install, see **CONTROL SYSTEM / VALVE HOUSING, INSTALLING** .
- see **TABLES - RATIOS AND SHIFT PATTERNS.**

Select alternative according to relevant test results:

1. Replacing the control system

   Refer to **RESETTING THE ADAPTATION**

2. Replacing the transmission

   Refer to **REPLACING THE TRANSMISSION**

3. Checking engine braking

   Refer to **CHECKING ENGINE BRAKING**

4. There is no incorrect shift pattern.

   Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

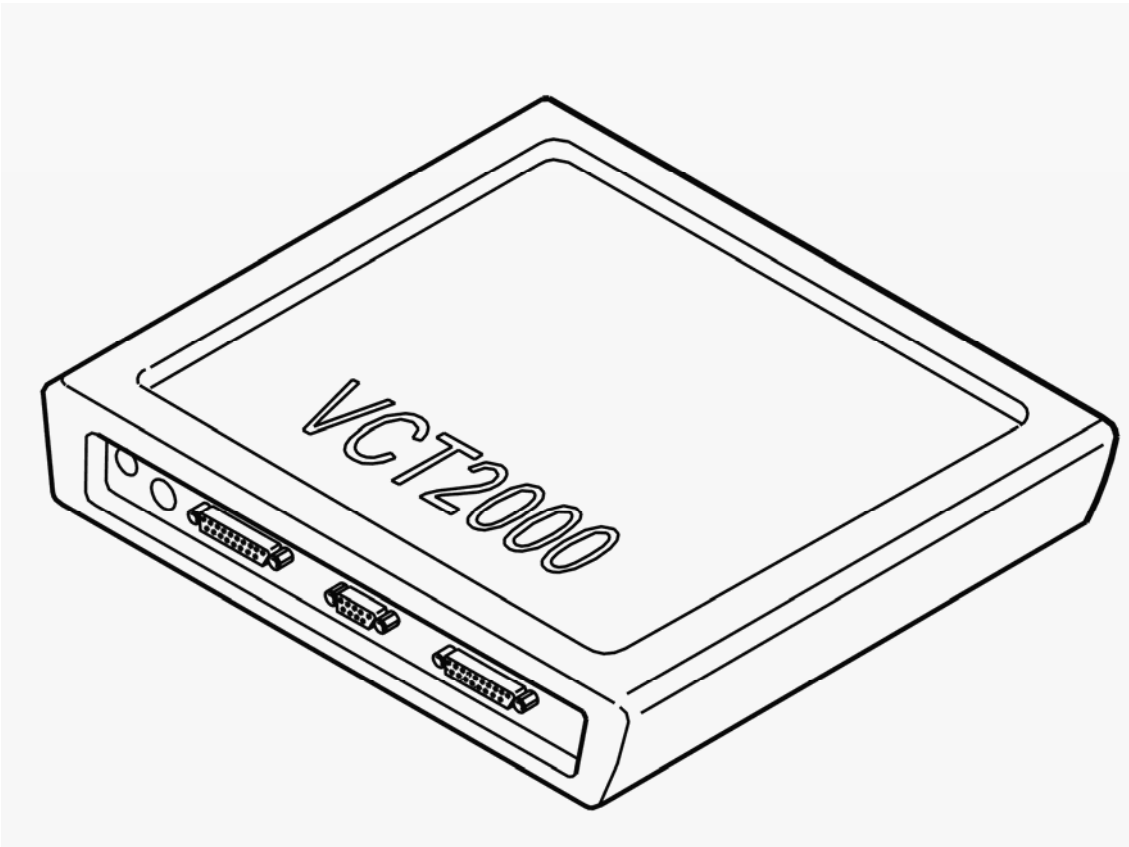


Fig. 530: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING ENGINE BRAKING

HINT: Test drive the car to determine whether the fault is in the transmission or in the transmission control system. Test drive as follows:

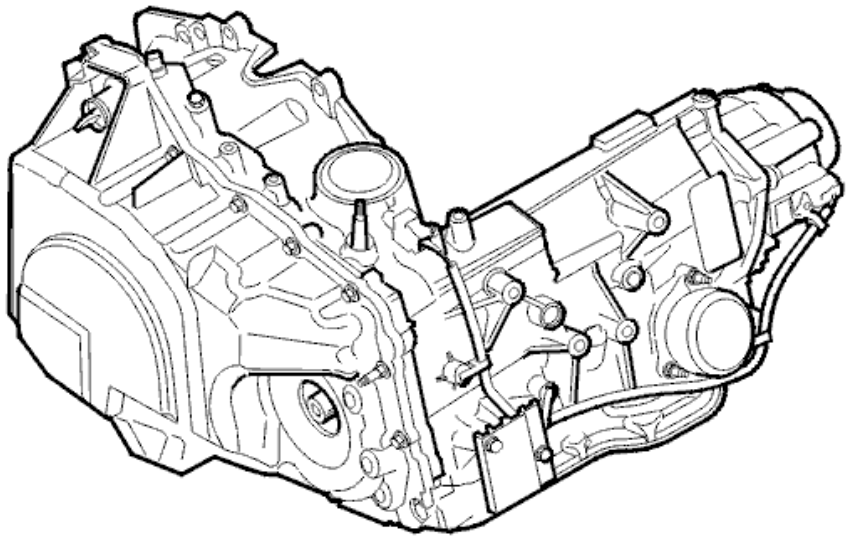
- Start the engine and move the gear selector to position 1 (Geartronic 1)
- Accelerate up to 4500-6000 rpm and release the accelerator pedal (AP).

If there is **no** engine breaking, there is an internal fault in the transmission. Replace the transmission.

If there is engine breaking, there is an internal fault in the transmission control system. Replace the control system

Other information:

- To remove the transmission, see **TRANSMISSION, REMOVING**
- To install the transmission, see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)**
- To replace the control system, For removal, see **CONTROL SYSTEM/VALVE HOUSING, REMOVING** and To install, see **CONTROL SYSTEM / VALVE HOUSING, INSTALLING** .



P2X

4301721D ©VOLVO

Fig. 531: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

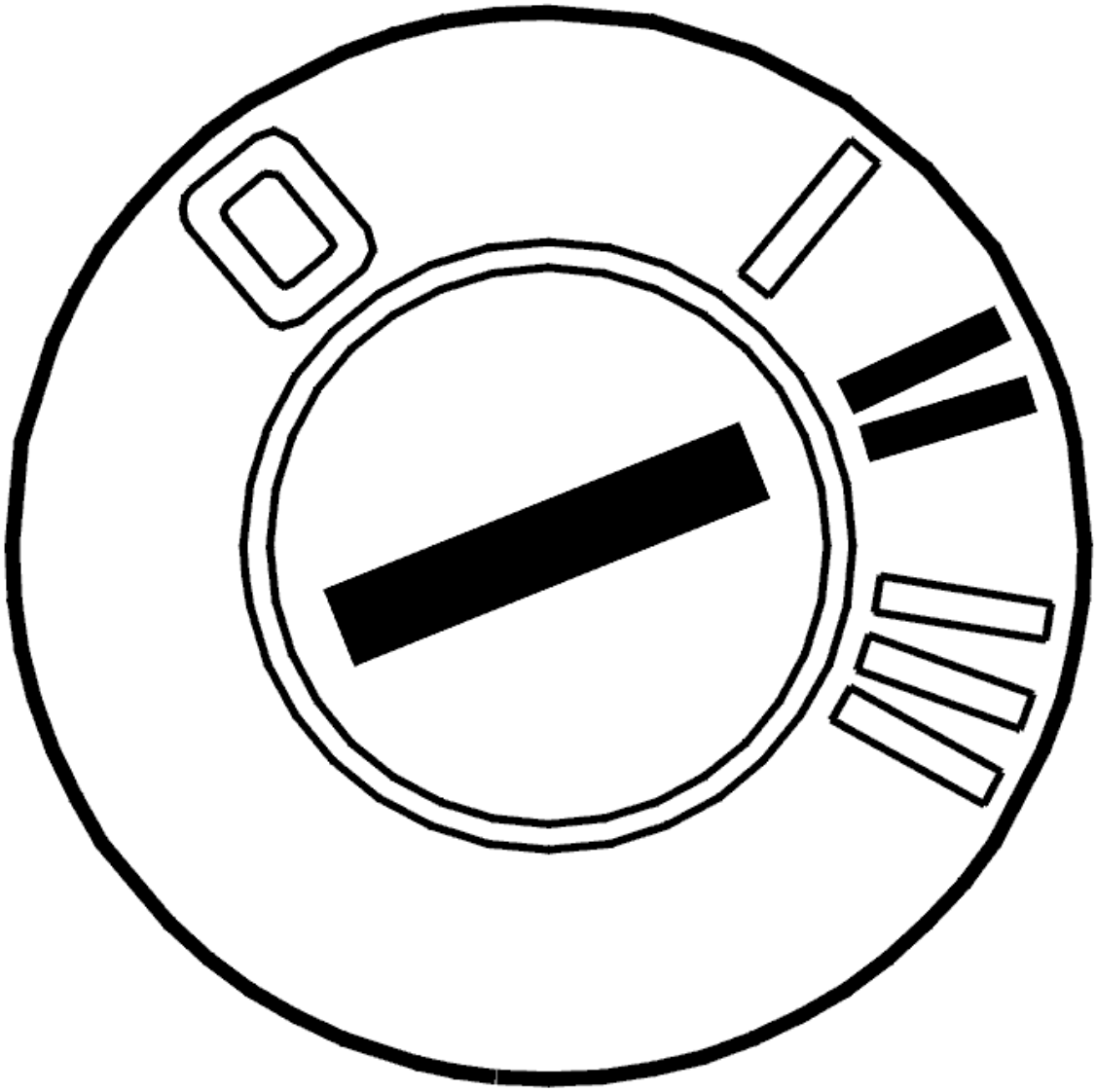


Fig. 532: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-000B or TCM-000C are stored, these must be fault-traced and remedied after this fault-tracing is completed.

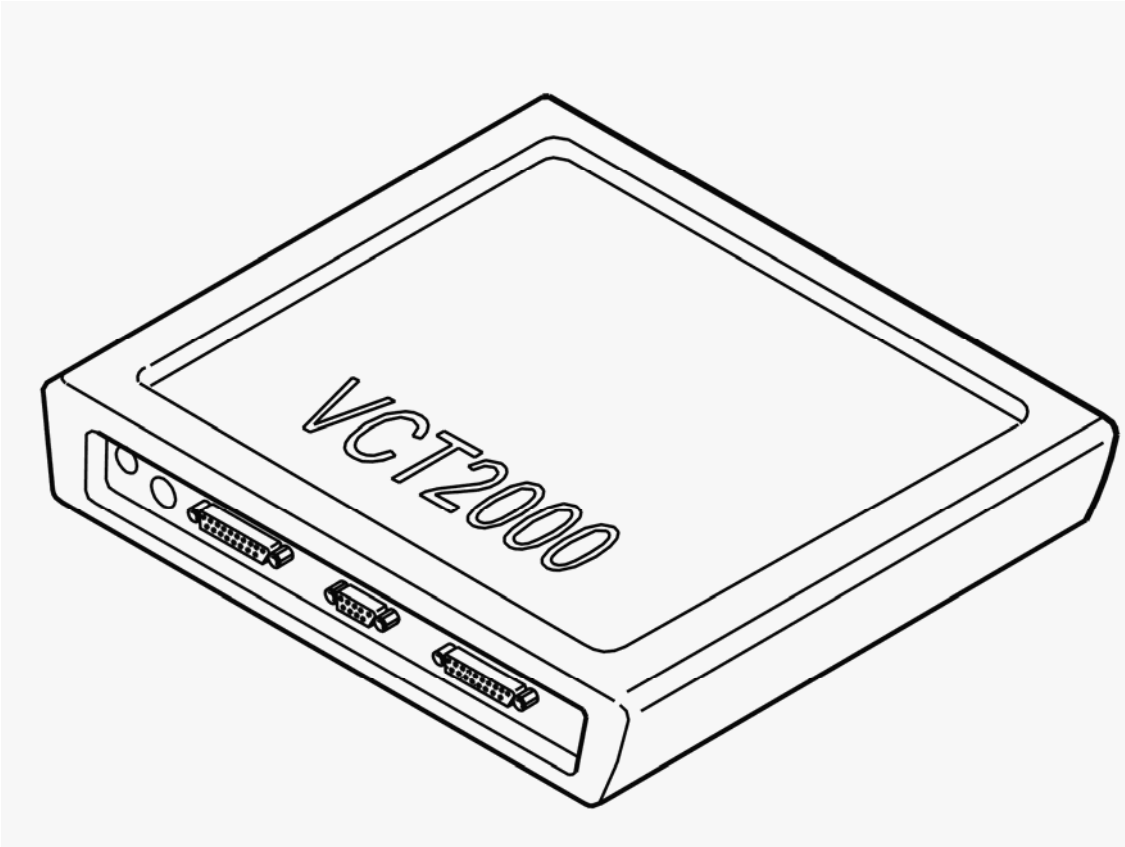


Fig. 533: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

REPLACING THE TRANSMISSION

Fault-tracing indicates a mechanical fault in the transmission. Replace the transmission.

Other information:

- To remove the transmission, see **TRANSMISSION, REMOVING**
- To install the transmission, see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .

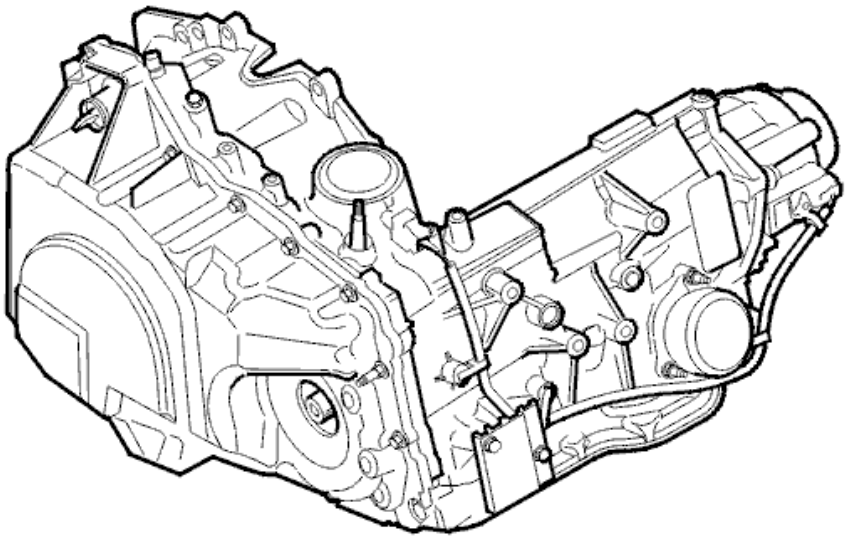


Fig. 534: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

FAULT-TRACING INFORMATION

The fault-tracing indicates that the control module has previously detected a fault but that the fault is no longer active.

- **Continue**

  FAULT NOT FOUND: Troubleshooting has been completed.

CHECKING FOR COOLANT IN OIL

This fault may be due to coolant that has leaked into the transaxle.

Inspect according to:**CHECKING FOR COOLANT IN THE OIL**

If coolant is detected in the transaxle oil, the transaxle, radiator and hoses between the radiator and transaxle

must be replaced.

When replacing the transmission, the cooler unit, including the additional cooler must be replaced if applicable.

Other information:

- see **TRANSMISSION, REMOVING**
- see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)**

Was a fault detected?

- **YES**

  Refer to **RESETTING THE ADAPTATION**

- **NO**

  Refer to **CHECKING THE OIL LEVEL IN THE TRANSMISSION**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

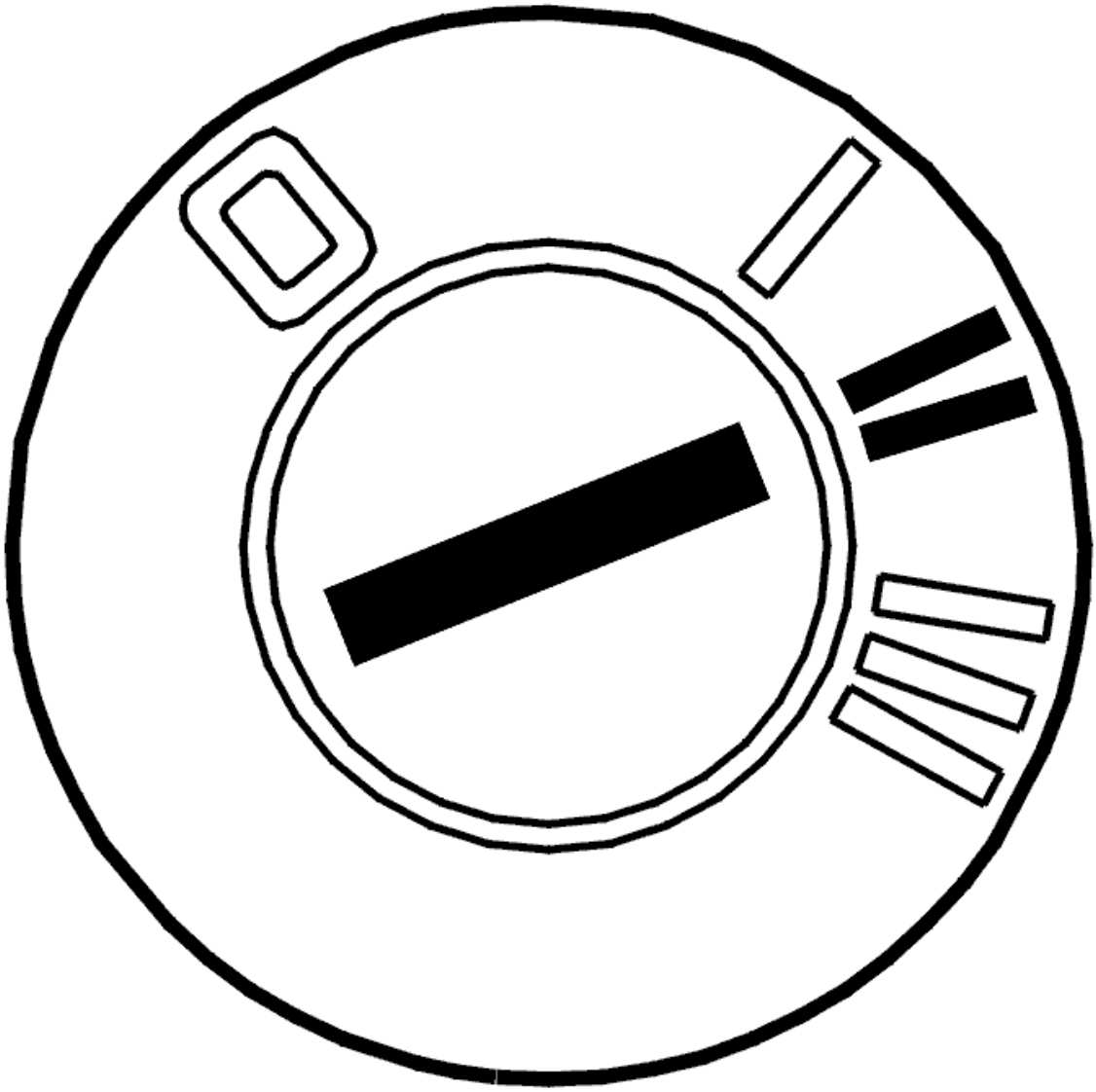


Fig. 535: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

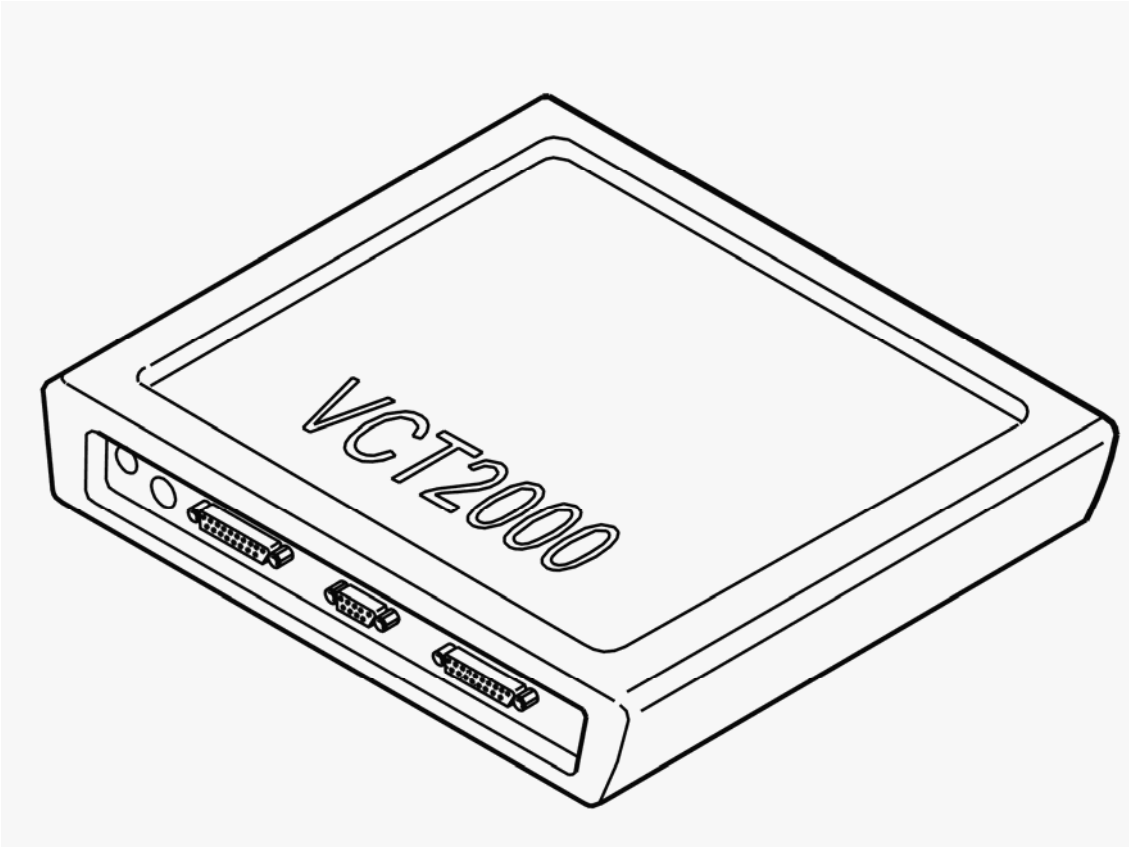


Fig. 536: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

TEST DRIVING

NOTE: Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

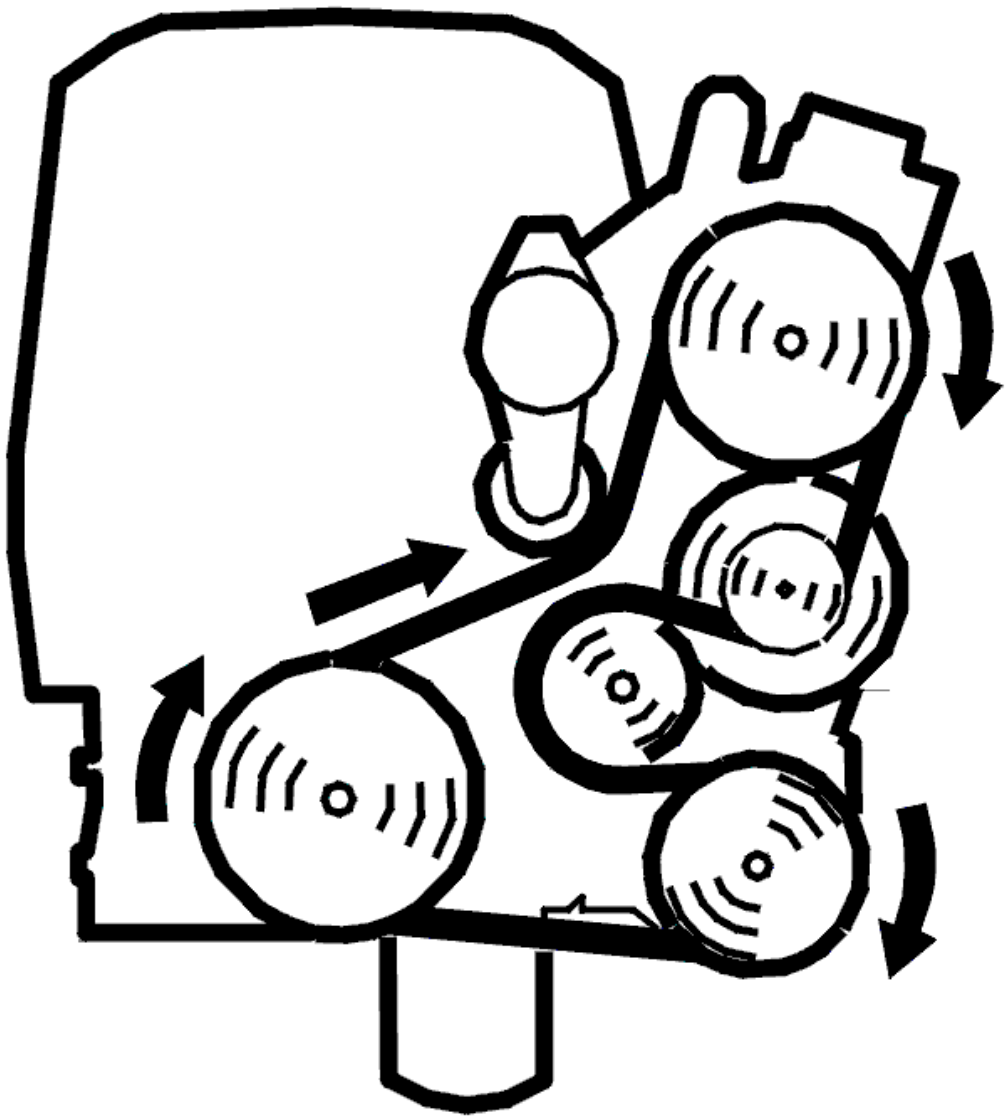


Fig. 537: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect the VIDA station. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission should be at operating temperature,

approximately 80-90°C.

Move the gear selector to Geartronic position. Accelerate carefully until the speed is between 35-65 km/h.

Maintain a constant speed.

Shift up to second, third and fourth gears. Maintain a steady speed for approximately 15 seconds between shifts.

Criteria for diagnostic trouble code (DTC):

- The gear selector is in the desired gear position for at least 15 seconds
- Speed above 30 km/h
- Positive engine torque (no engine braking)
- Engine speed (RPM) above 2000 rpm.

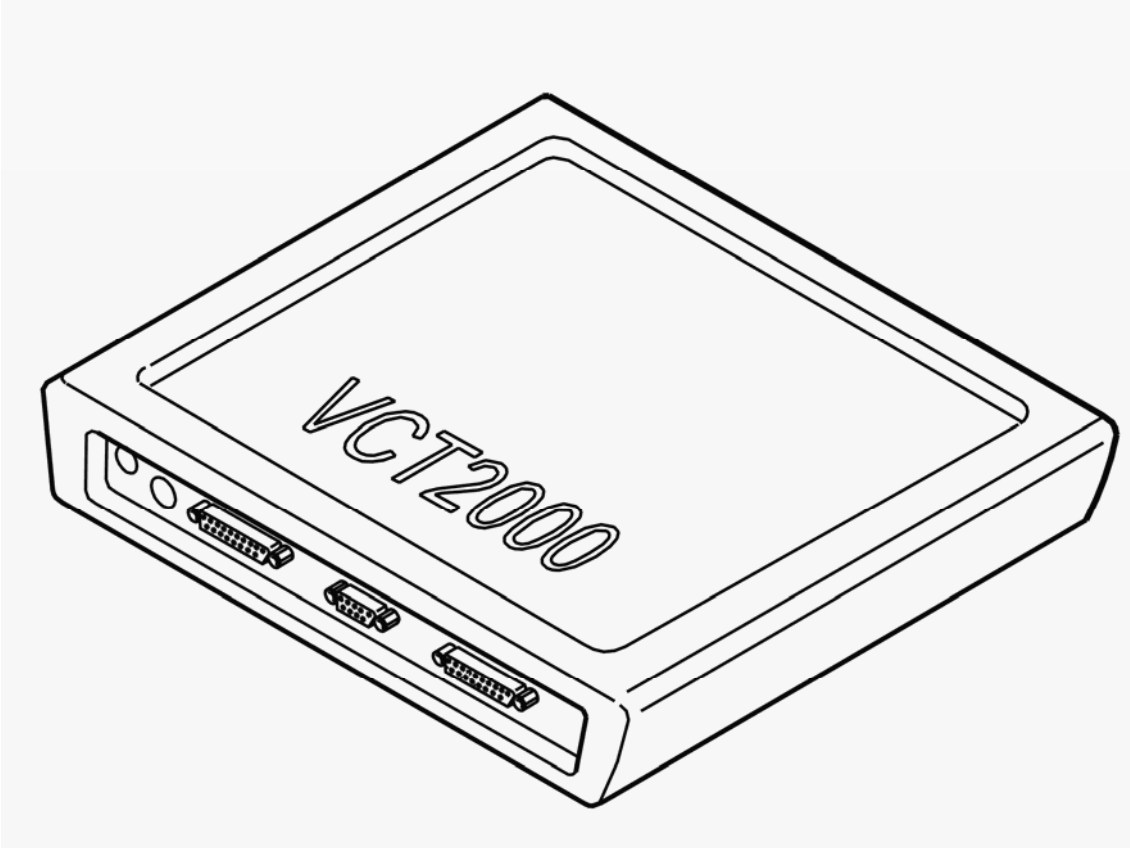


Fig. 538: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

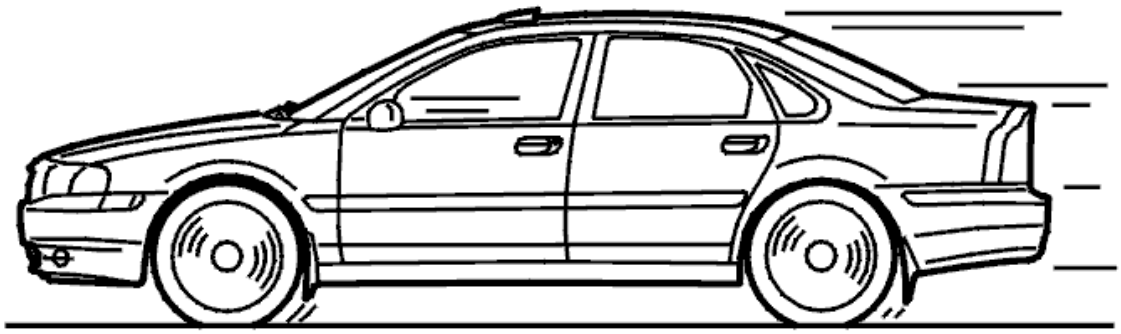


Fig. 539: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

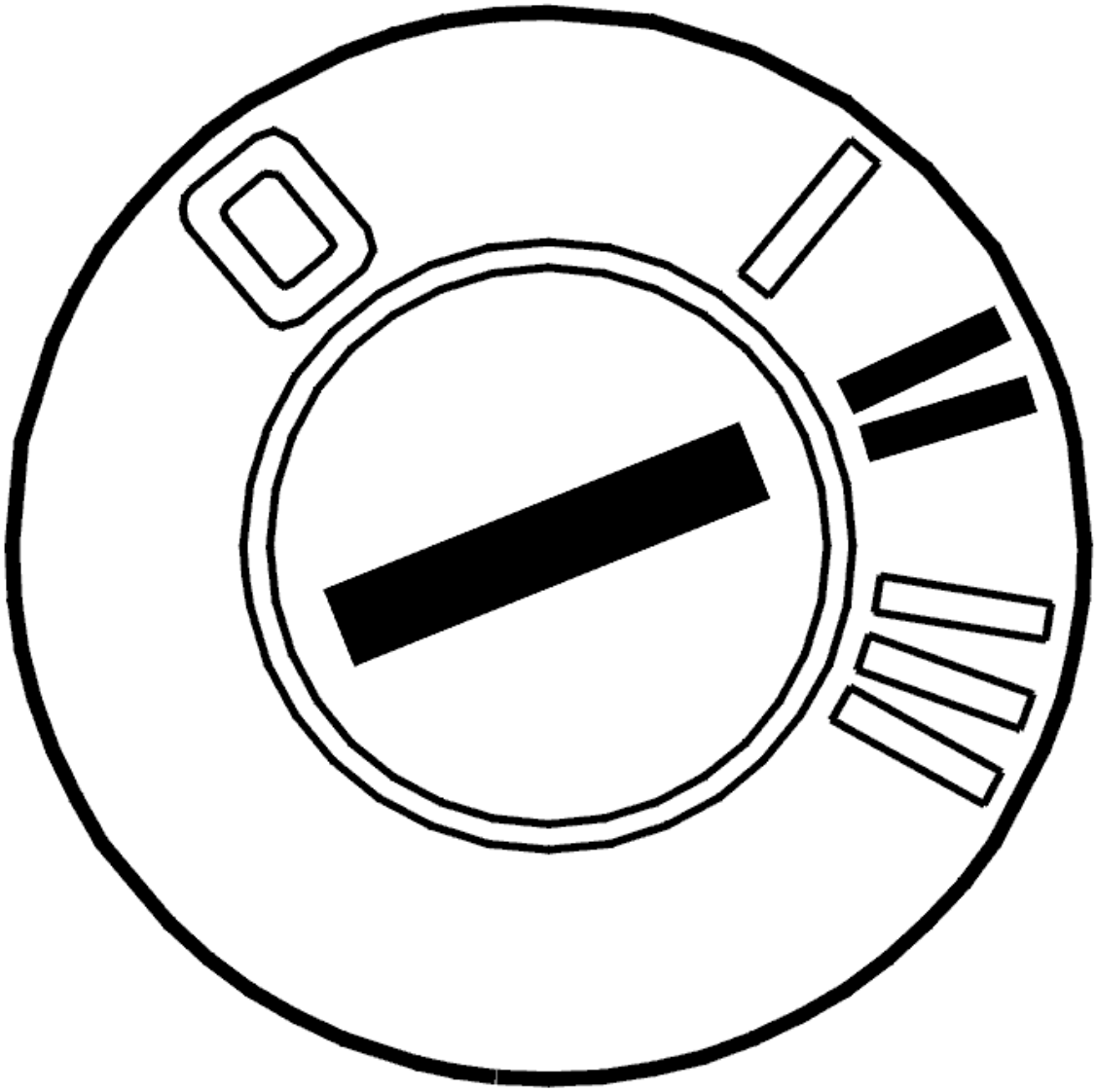


Fig. 540: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

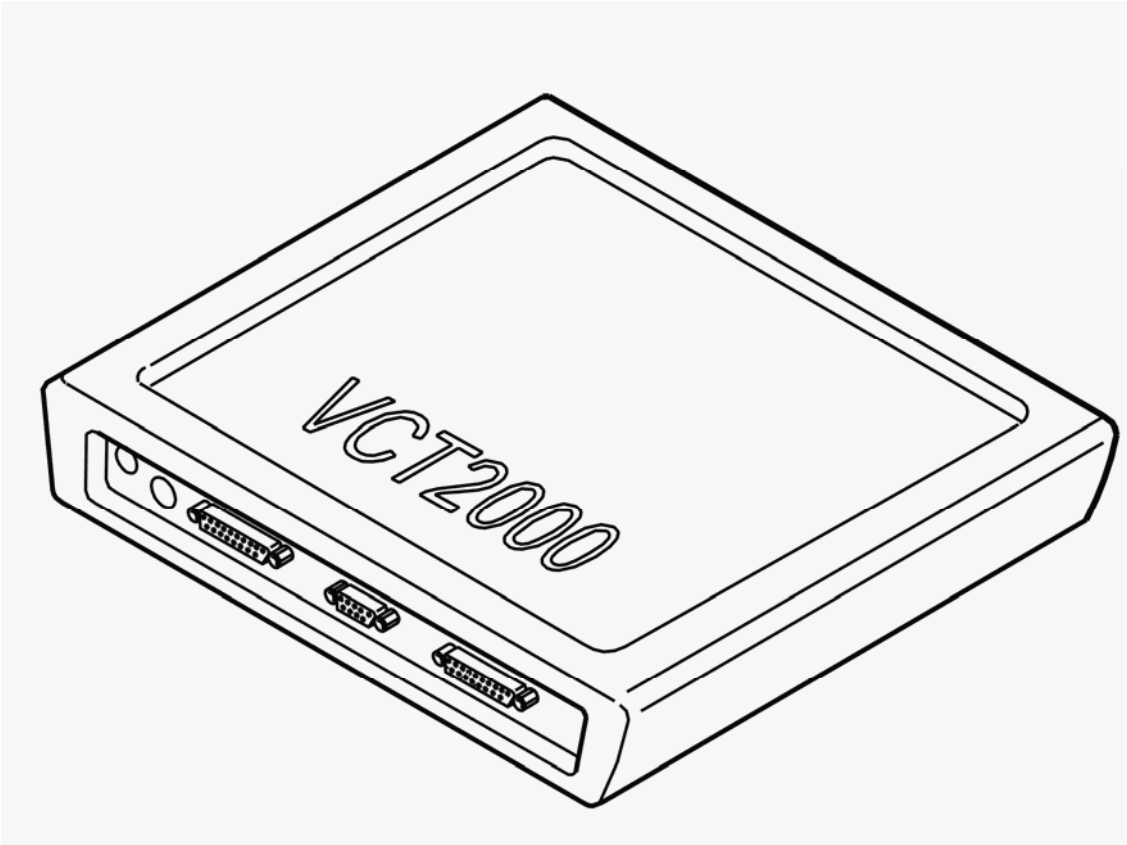


Fig. 541: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is diagnostic trouble code (DTC) TCM 000B or TCM-000C stored?

- **YES**

  Refer to **REPLACING THE TRANSMISSION**

- **NO**

  Refer to **FAULT-TRACING INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect

circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

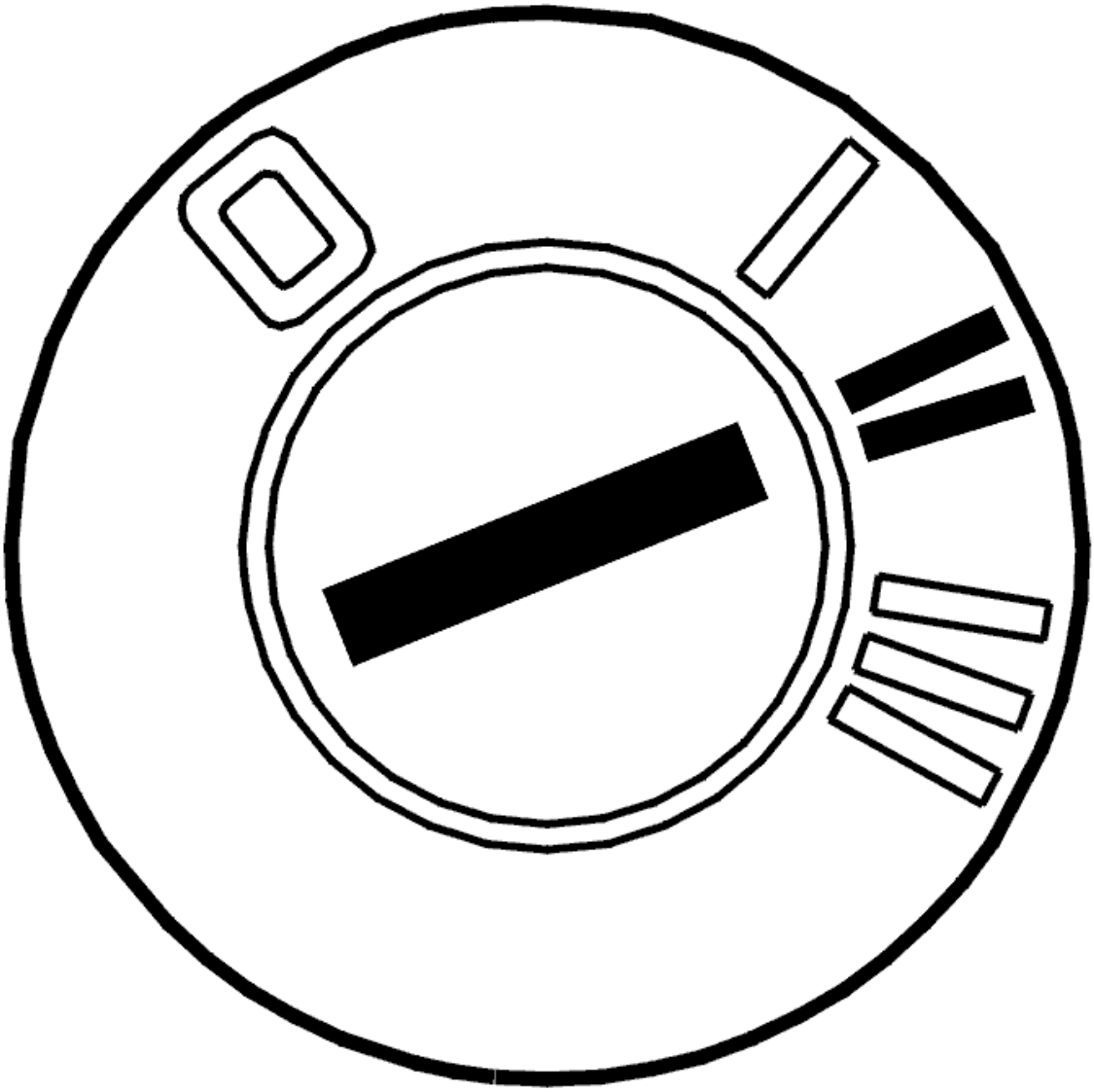


Fig. 542: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

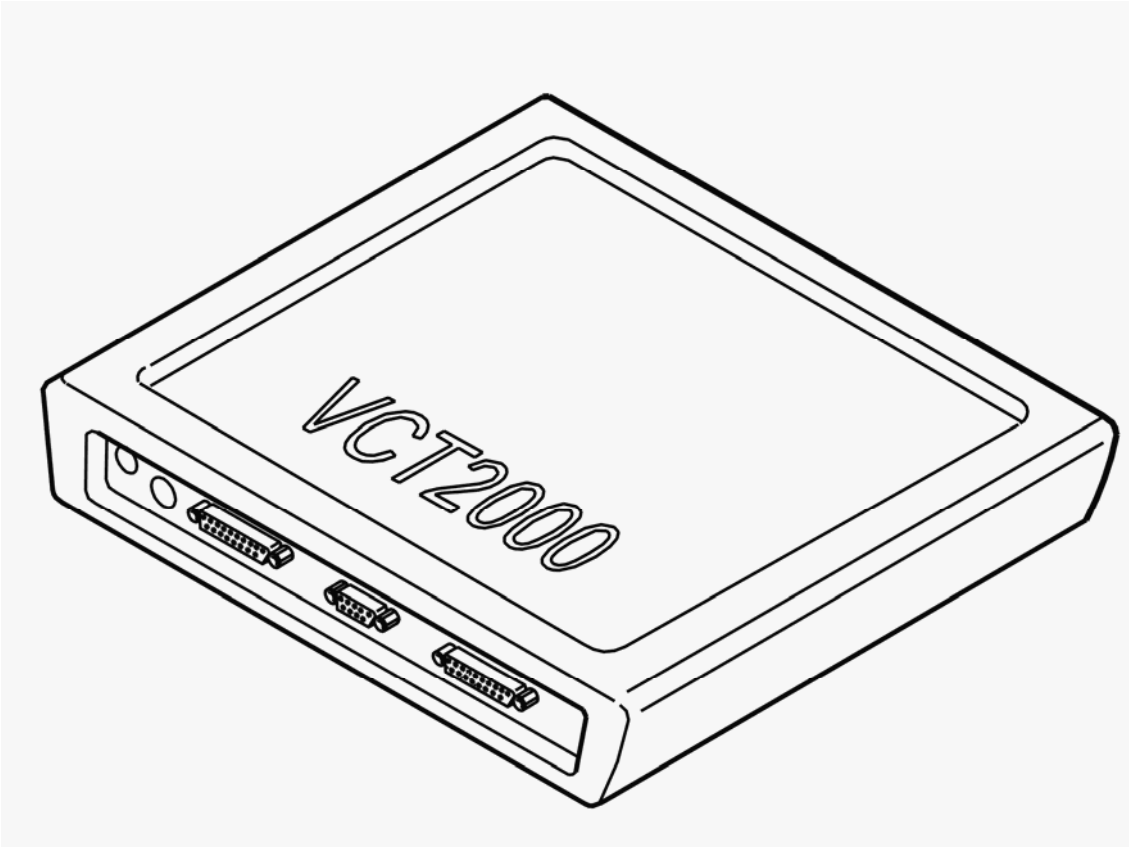


Fig. 543: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

CHECKING THE OIL LEVEL IN THE TRANSMISSION

CHECK THE TRANSMISSION OIL LEVEL

NOTE: The transmission fluid level is extremely important for transmission function. Therefore it is imperative that it is correct. In addition the oil level is dependent on oil temperature.

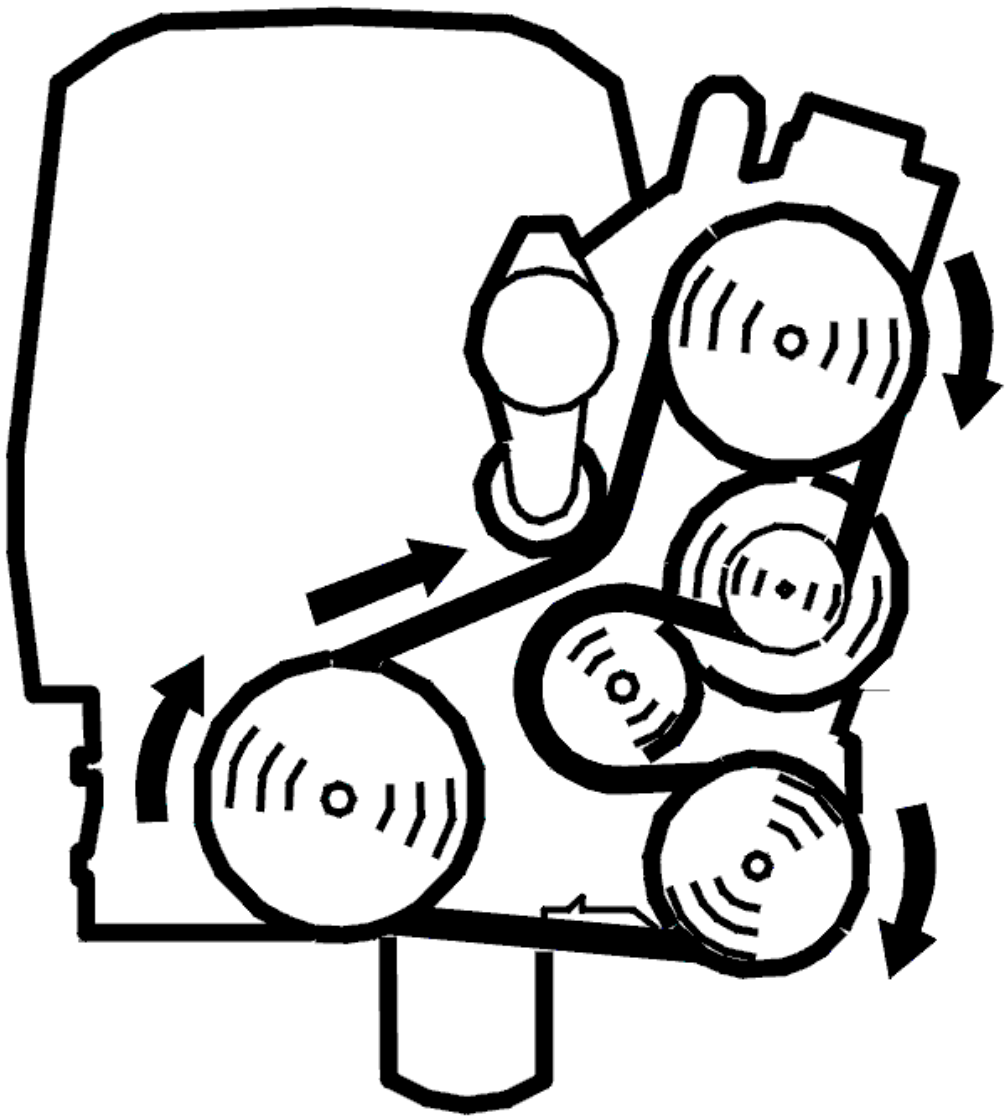


Fig. 544: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the car
- Read off the oil temperature.

When checking the gearbox oil level the oil temperature **must** be **80 °C - 90 °C** .

At the correct temperature, the oil level should be between "Min hot" and "Max hot".

Oil level

Too high: Drain the transmission fluid to the correct level
Too low: Check the transmission for leakage.

Remedy as necessary.

Other information:

- To check and adjust the oil level, see **OIL LEVEL, CHECKING** .

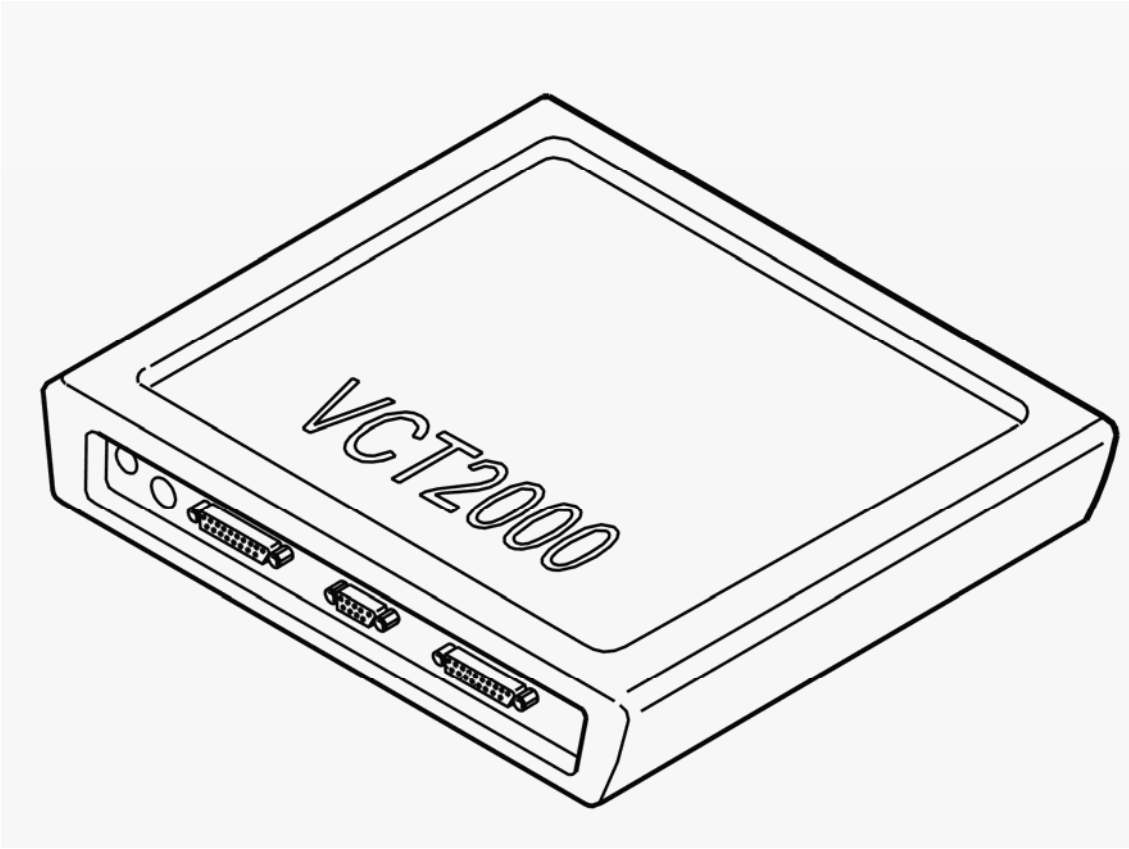


Fig. 545: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

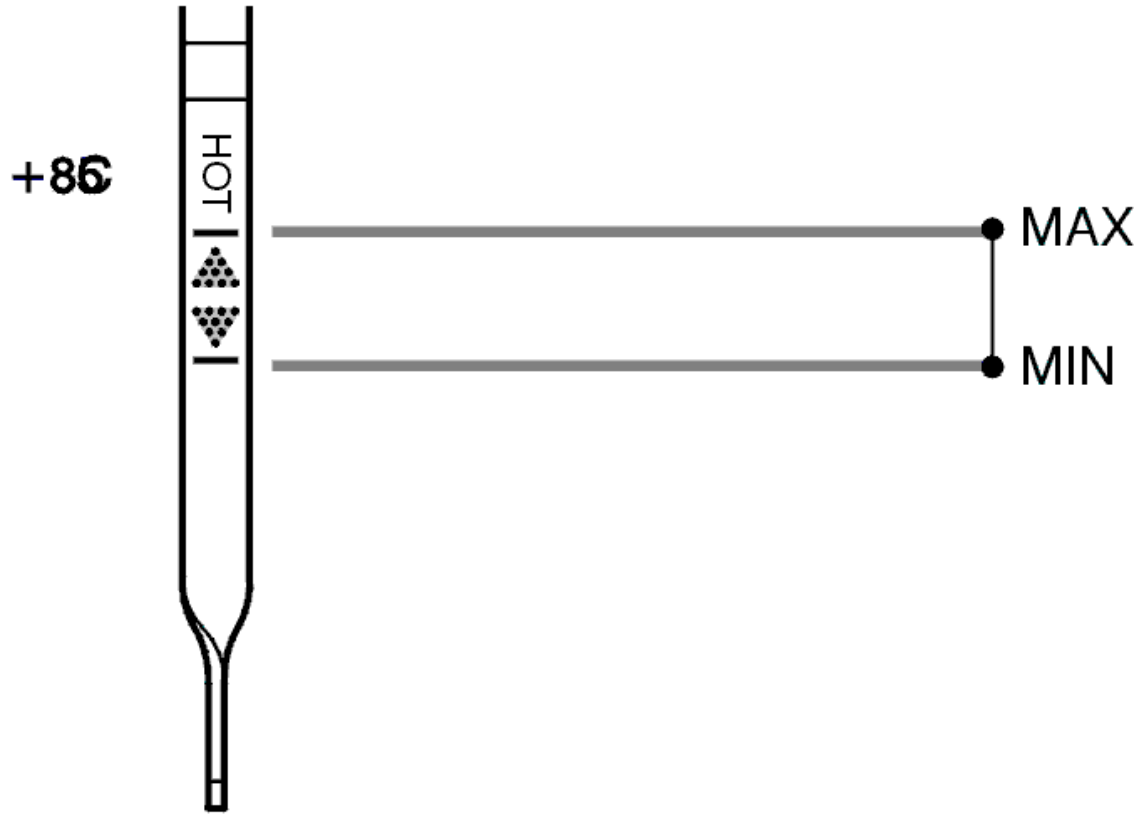


Fig. 546: Identifying Oil Level / Temperature
Courtesy of VOLVO CARS CORPORATION

Was the transmission fluid level correct?

- **YES**

  Refer to **CHECKING SHIFTING SOLENOIDS AND SHIFTING VALVES.**

- **NO**

  NOT OK

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

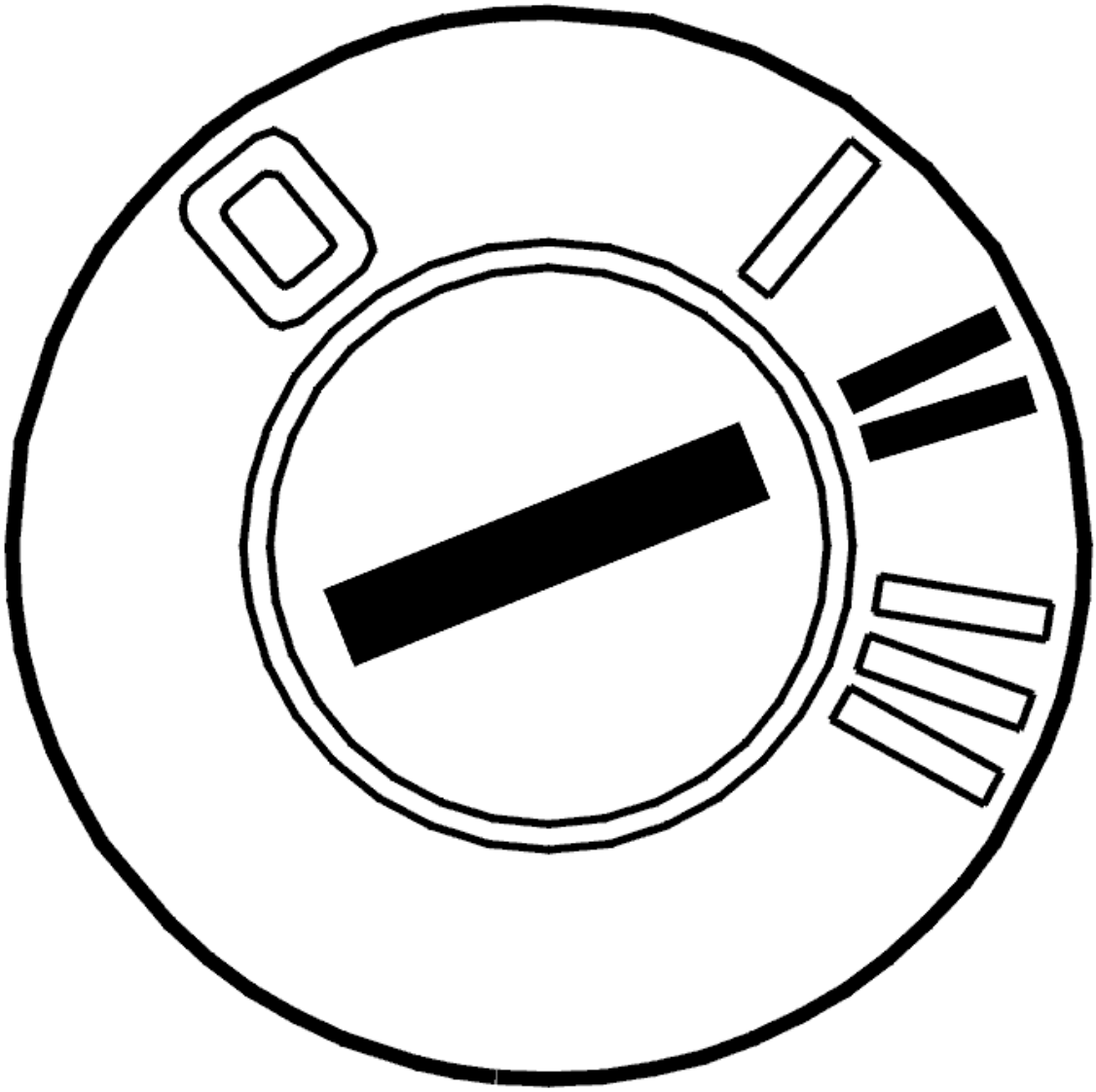


Fig. 547: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

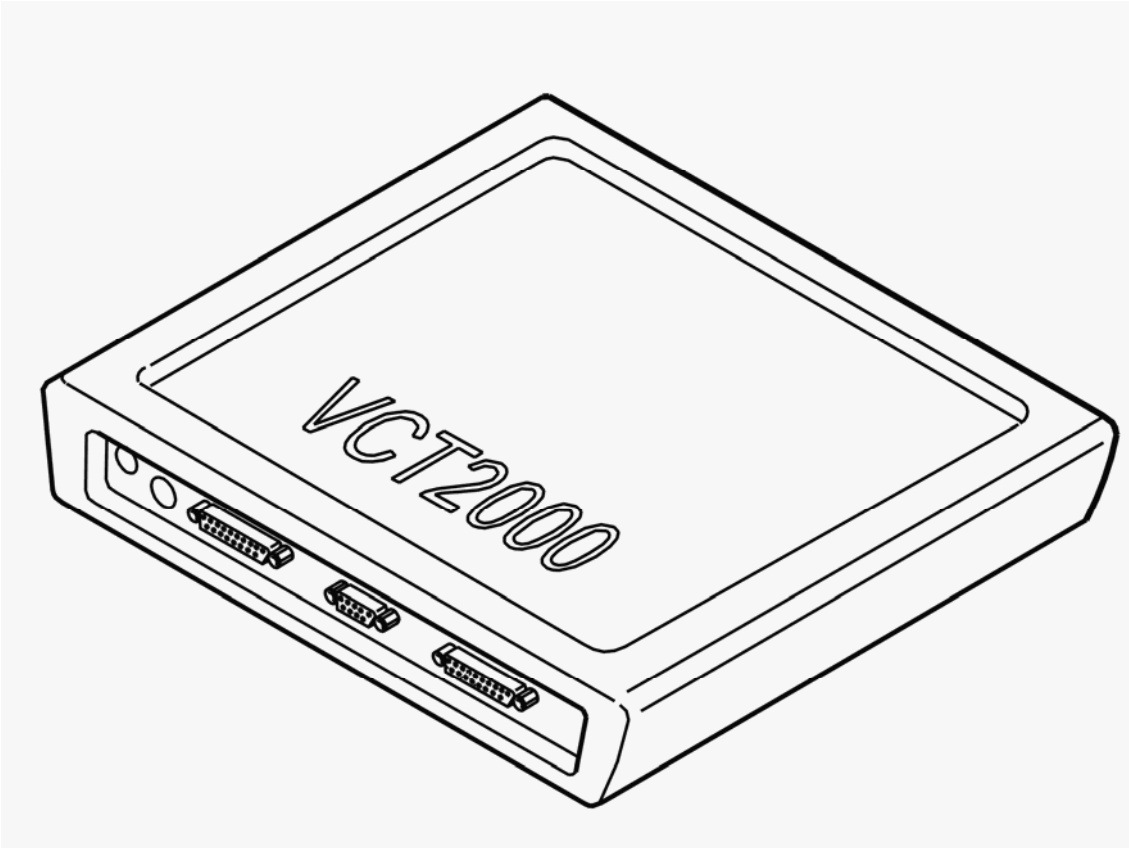


Fig. 548: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

TEST DRIVING

NOTE: Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

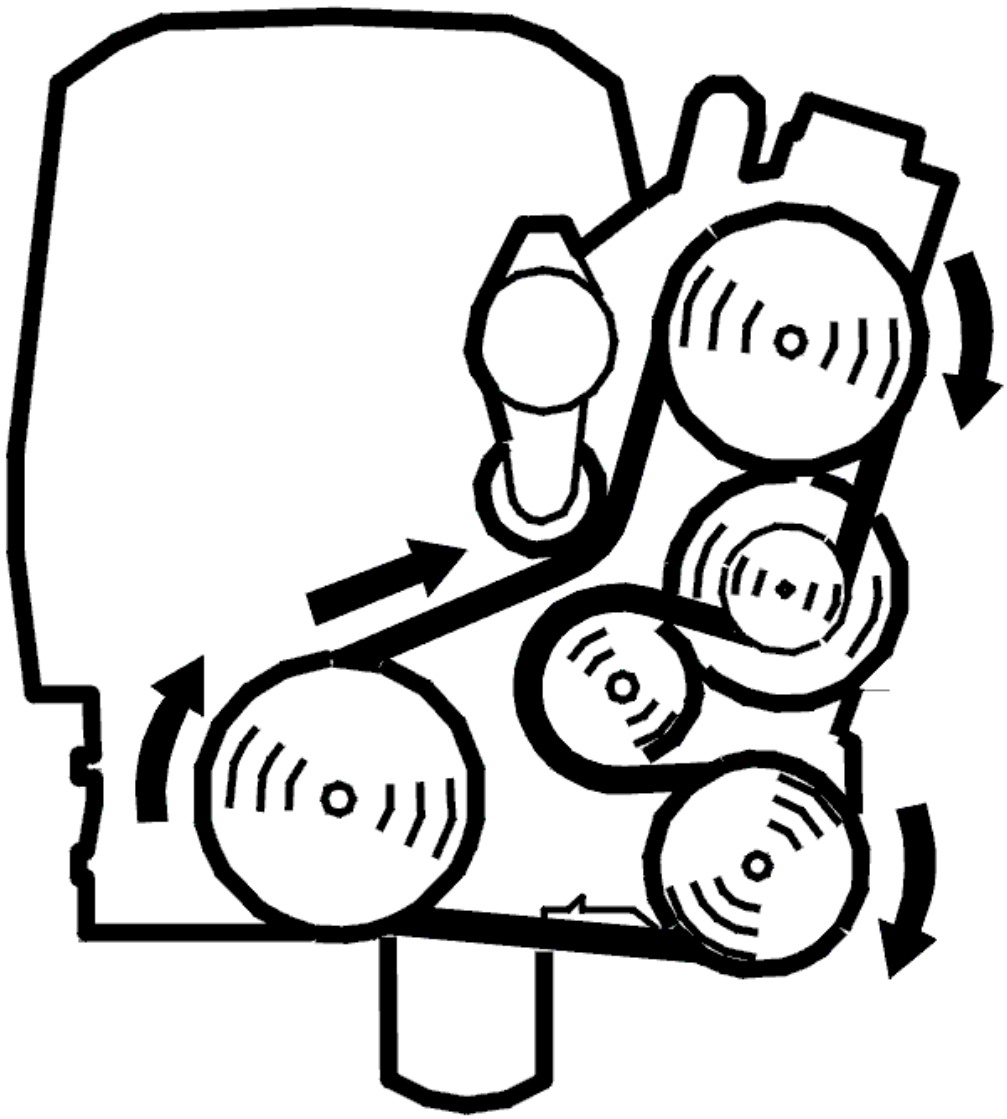


Fig. 549: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect the VIDA station. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission should be at operating temperature,

approximately 80-90°C.

Move the gear selector to Geartronic position. Accelerate carefully until the speed is between 35-65 km/h.

Maintain a constant speed.

Shift up to second, third and fourth gears. Maintain a steady speed for approximately 15 seconds between shifts.

Criteria for diagnostic trouble code (DTC):

- The gear selector is in the desired gear position for at least 15 seconds
- Speed above 30 km/h
- Positive engine torque (no engine braking)
- Engine speed (RPM) above 2000 rpm.

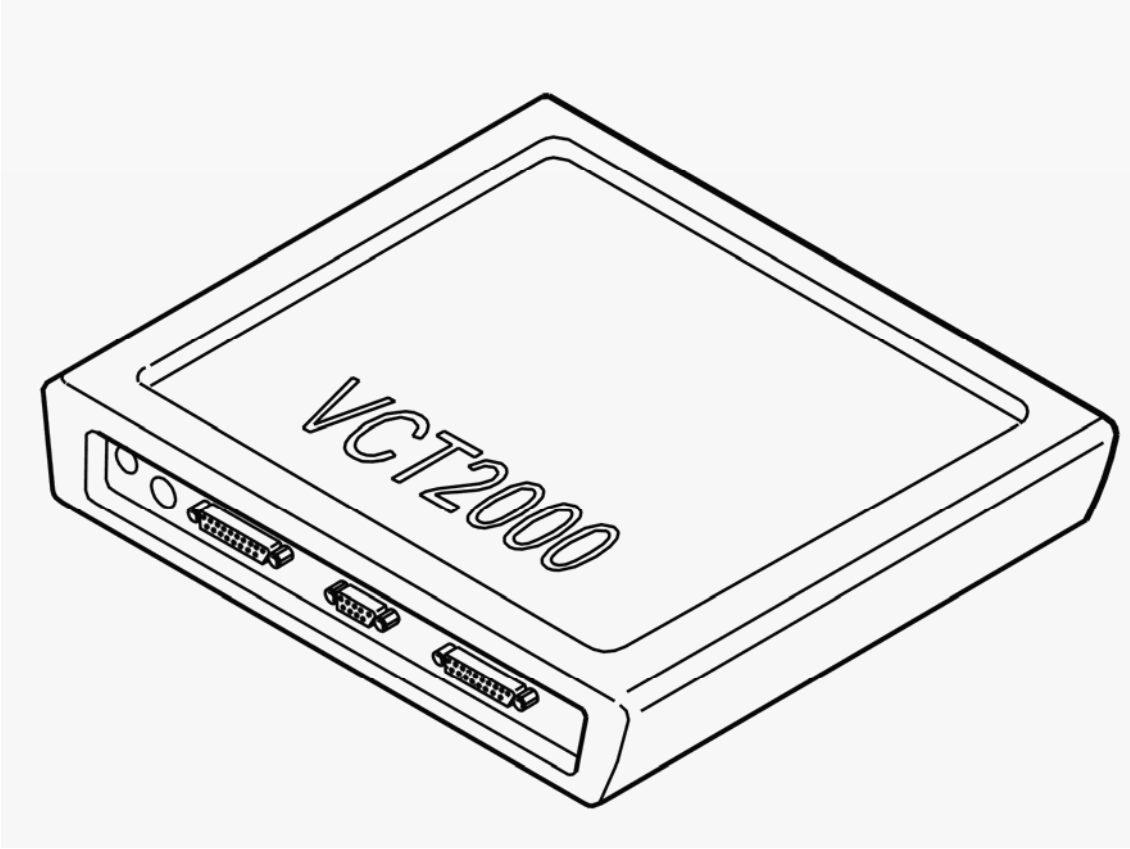


Fig. 550: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

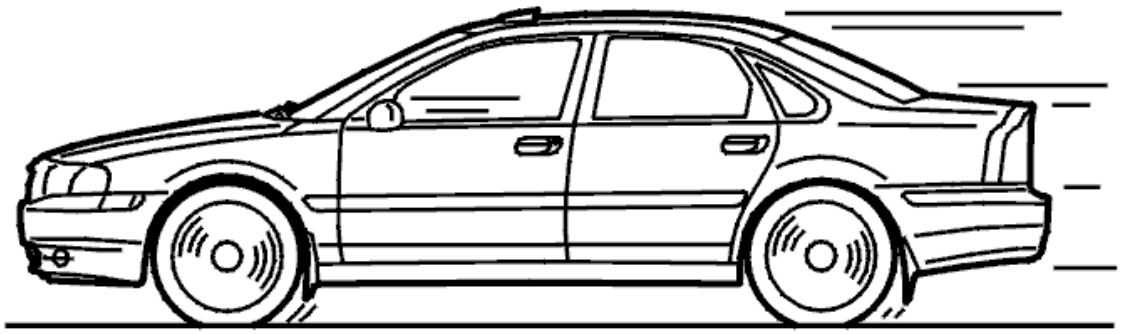


Fig. 551: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

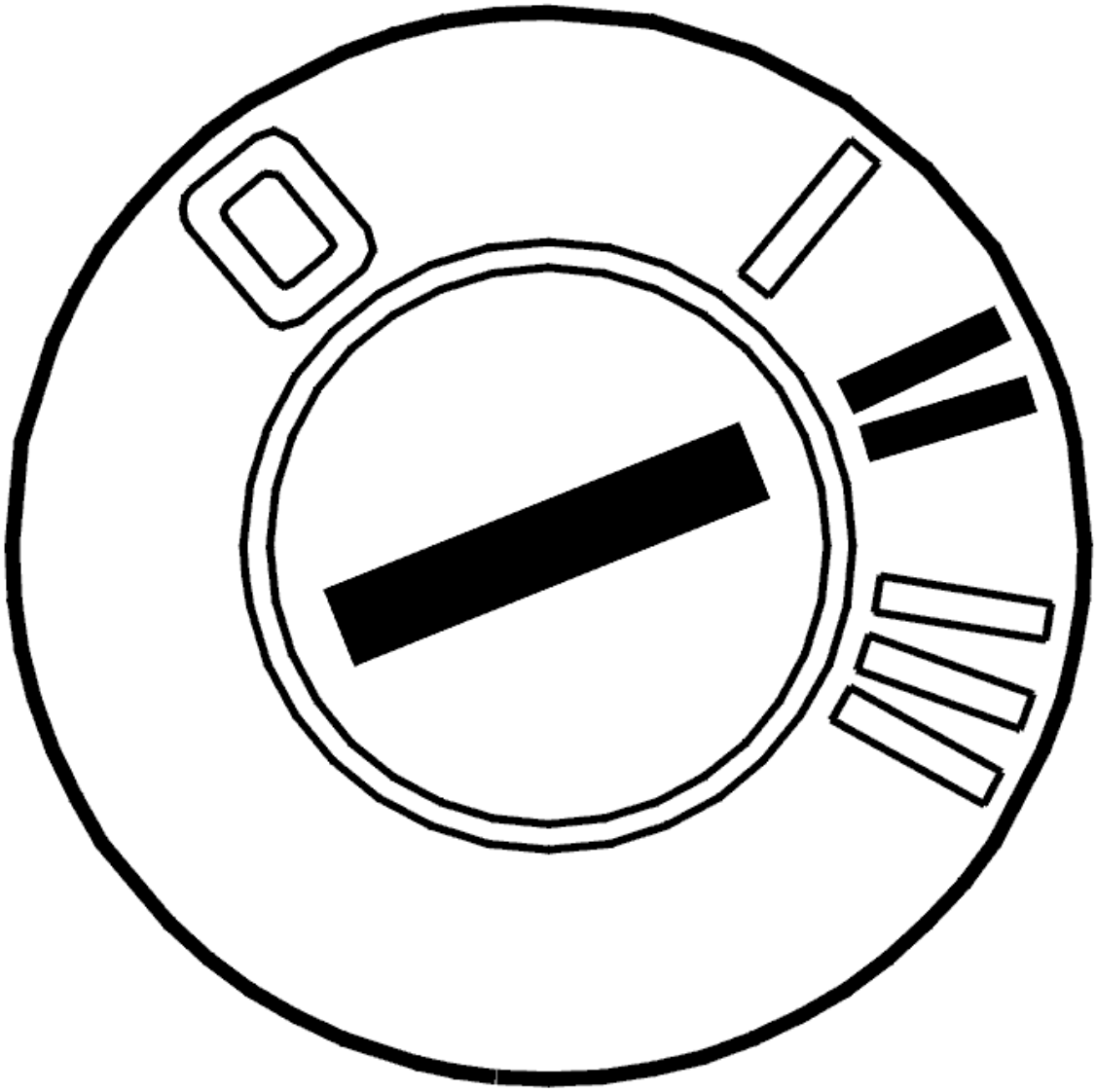


Fig. 552: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

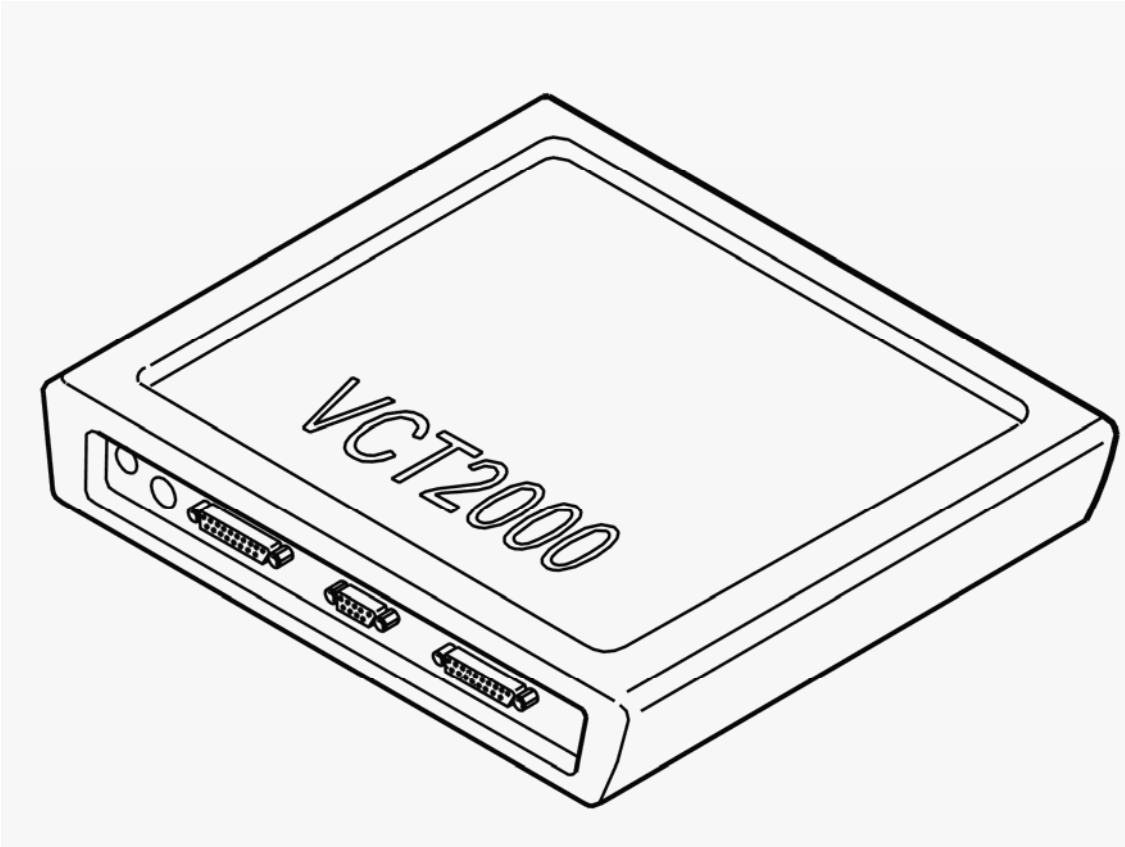


Fig. 553: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is diagnostic trouble code (DTC) TCM 000B or TCM-000C stored?

- **YES**

  Refer to **INFORMATION**

- **NO**

  NO DTC

TCM-000C: SHIFT SOLENOID S2. HYDRAULIC FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

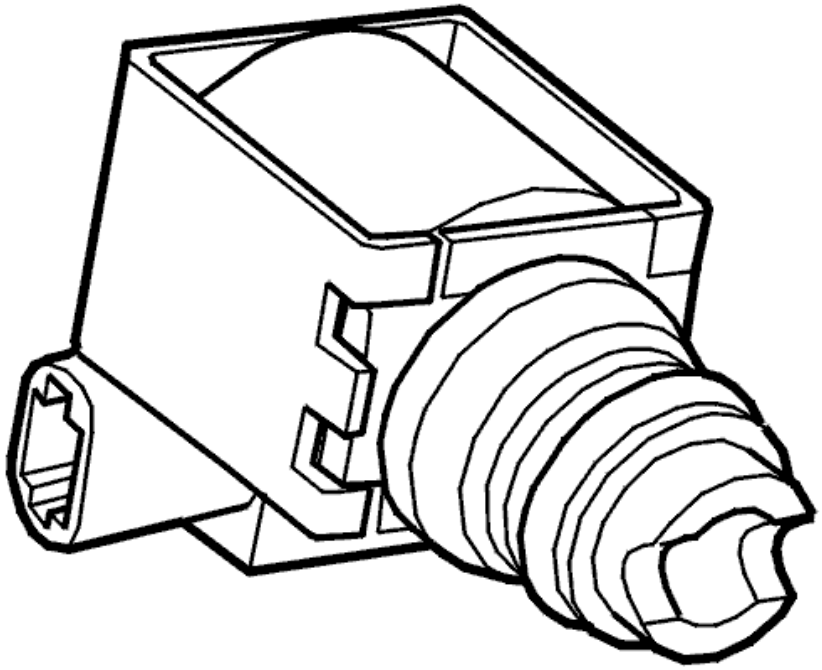


Fig. 1: Identifying Shift Solenoid S1 And S2
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) compares the speed signal from the brake control module (BCM) with the speed signal from the transmission. The control module also checks which gear is selected and compares it with the calculated gear. The speed signal from the brake control module (BCM) and the transmission speed signals should be almost identical, the transmission speed signal should be greater or lower than the brake control module (BCM) speed signal (vehicle speed must be above 30 km/h, engine speed (RPM) above 1400 RPM and transmission oil temperature over 20 °C).

Diagnostic trouble code (DTC) TCM-000C is stored if the control module detects that the vehicle speed and engine speed (RPM) signals do not correspond with the programmed values and that an "incorrect" gear has been selected. This is because a solenoid fault has occurred in the hydraulic circuit for gears 1-2 or 3-4.

Substitute Value

- The control module "Limp-home" mode is engaged and only gear positions 3 and R are available. When the ignition is switched off the control module switches to normal function and all four forward shift positions can be used.

Possible Source

- Glycol in the transmission fluid.
- The hydraulic valve for solenoid S2 has stuck in the open or closed position
- Defective control system (the solenoid binds or is stuck)
- Internal leakage in the transmission
- Warn or damaged clutch driven plates in the transmission.

Fault symptom[s]

- General orange warning lamp lit
- Malfunction indicator lamp (MIL) lit
- No shifting
- Harsh gear shifting
- No lock-up function.

HINT: When the transmission control module (TCM) detects disrupted function, "Limp-home" mode is activated and only shift positions 3 and R are available. Lock-up function is also unavailable.

HINT: Harsh shifting - due to disabled line pressure solenoid STH control. This results in constant maximum line pressure and leads to harsher shifting and gear engagement.

HYDRAULIC FAULT

see **HYDRAULIC FAULT**

TCM-000D: LINE PRESSURE SOLENOID STH. SIGNAL TOO HIGH. INTERMITTENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

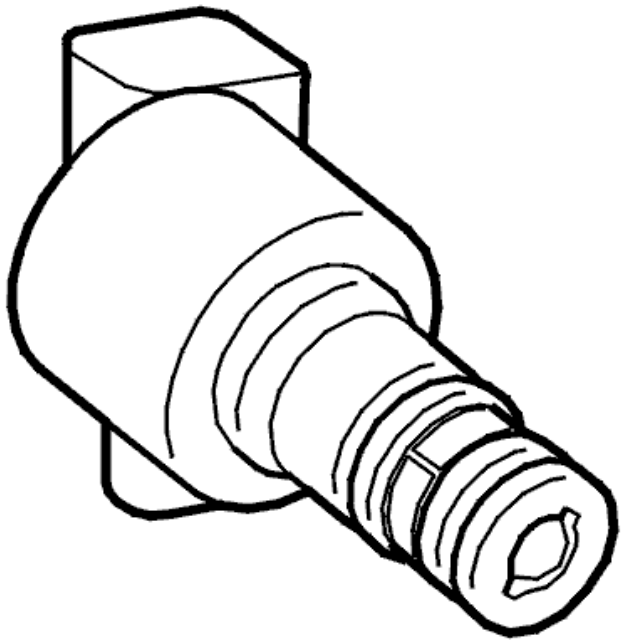


Fig. 2: Identifying Line Pressure Solenoid, STH
Courtesy of VOLVO CARS CORPORATION

Line pressure solenoid STH regulates line pressure in the transmission. The solenoid is controlled by an amplifier in the transmission control module (TCM) output. The transmission control module (TCM) uses the amplifier to control the current to the solenoid. A low amperage gives a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. Amperage is primarily affected by throttle position. Diagnostic trouble code (DTC) TCM-000D is stored if the control module registers that the current is too high through the circuit. Solenoid STH is unable to control the system pressure.

Substitute Value

- The control module "Limp Home" program initiated.

Possible Source

- Short-circuit to supply voltage in the control signal wiring or signal wiring.
- Short-circuit between control signal cable and signal cable.
- Defective solenoid STH.

Fault symptom[s]

- General orange warning lamp lit.

- Malfunction indicator lamp (MIL) lit.
- No shifting.
- No lock-up function.

HINT: No shifting - because the transmission control module (TCM) prevents activation of the solenoids. This stops gear-shifting.

CAUTION: There is a danger that this fault will cause line pressure in the transmission to be too low, which will result in wear.

SIGNAL TOO HIGH. INTERMITTENT FAULT

INTERMITTENT FAULT

Check the wiring between control module terminal A52 and automatic transmission connector terminal C (#A3). Check the wiring between control module terminal A70 (#B10) and automatic transmission connector terminal D (#A4) for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To disconnect control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS** .
- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX** .
- For information about signals, see **SIGNAL SPECIFICATION** .

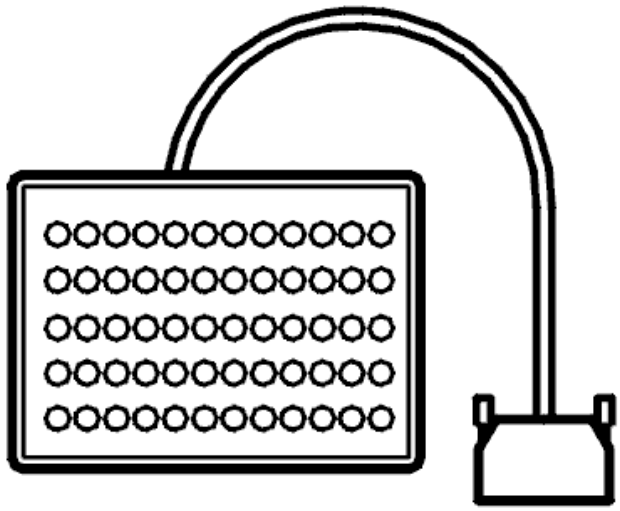


Fig. 3: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

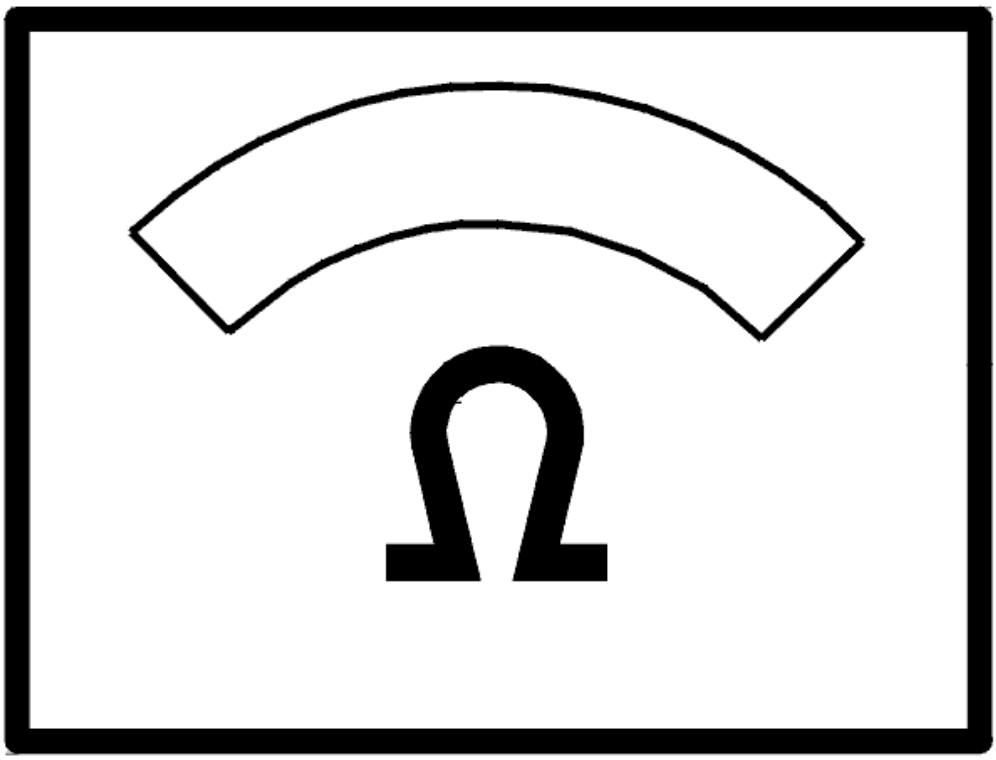


Fig. 4: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-000D: LINE PRESSURE SOLENOID STH. SIGNAL TOO HIGH.

PERMANENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL TOO HIGH. PERMANENT FAULT

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

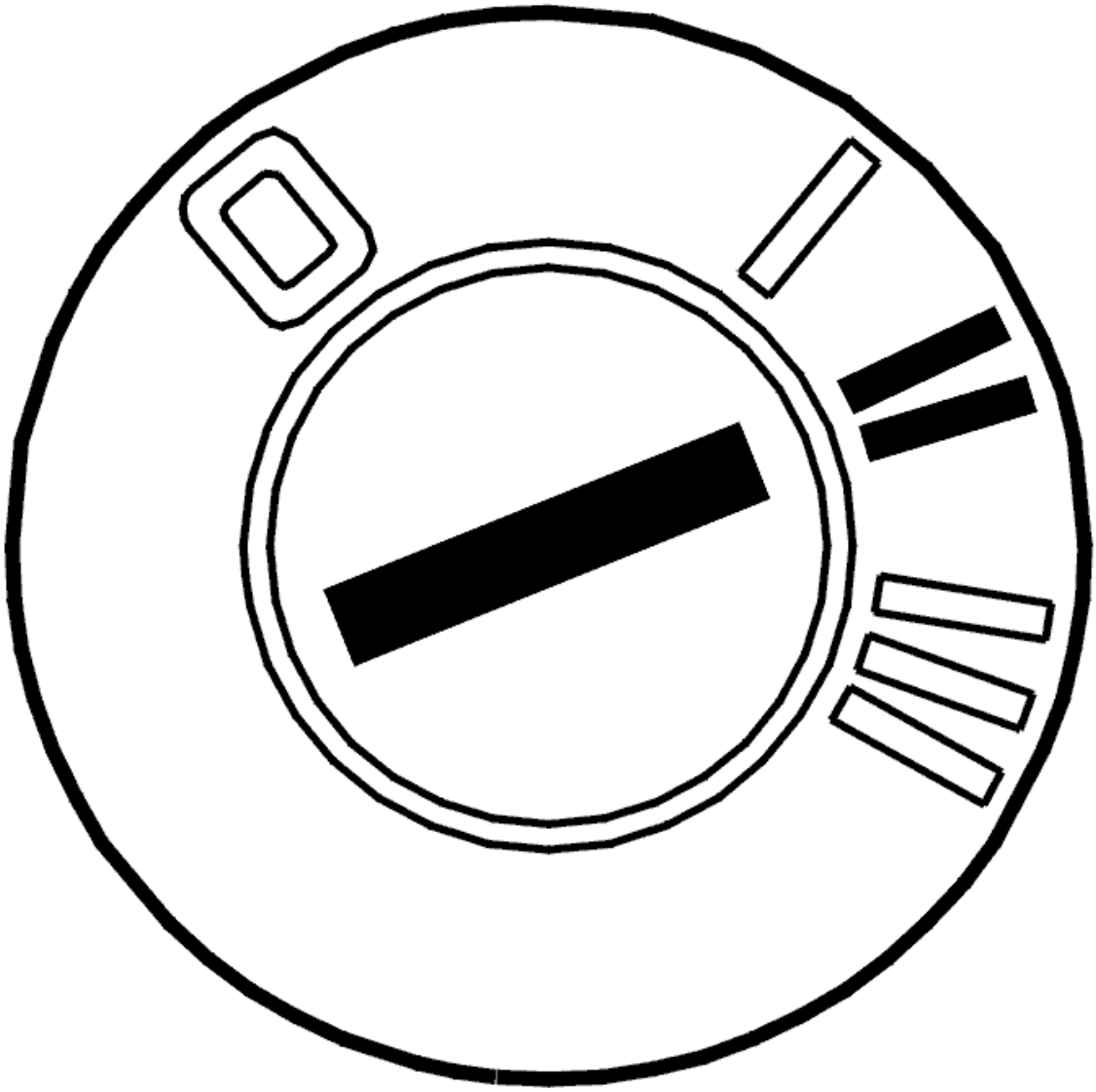


Fig. 5: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

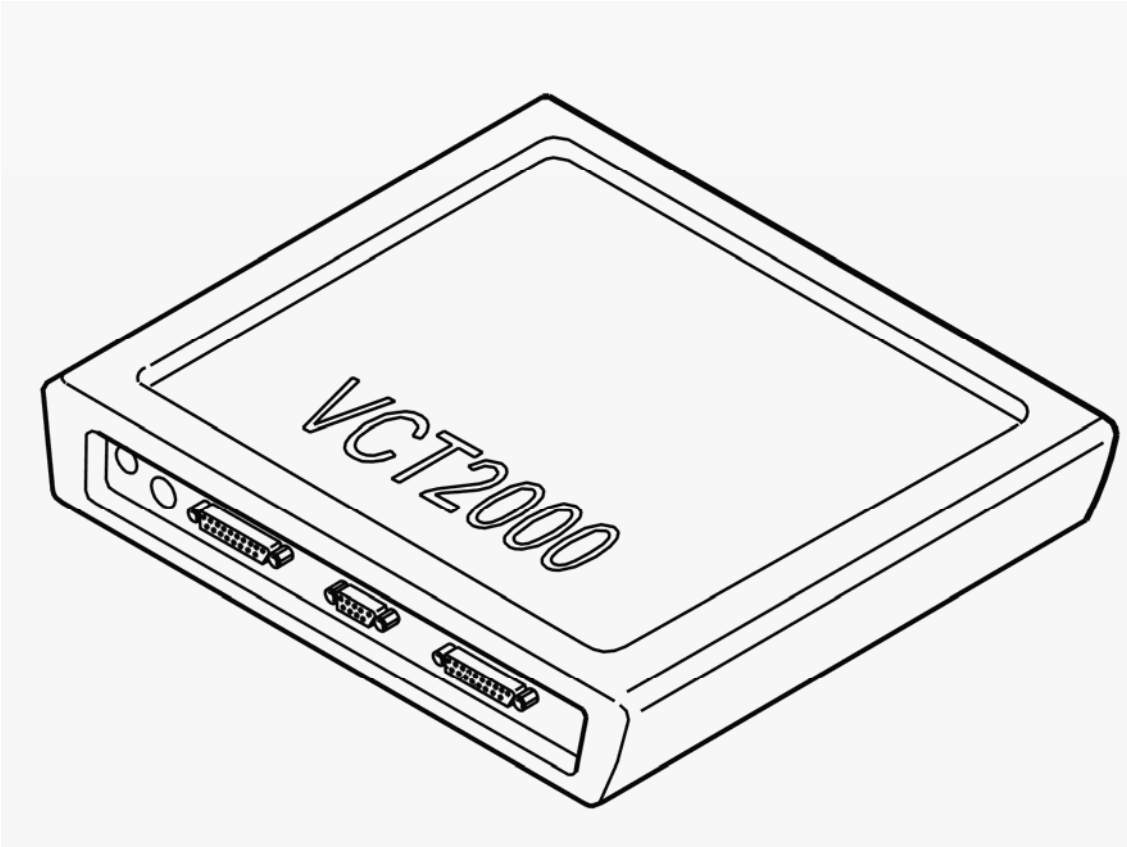


Fig. 6: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

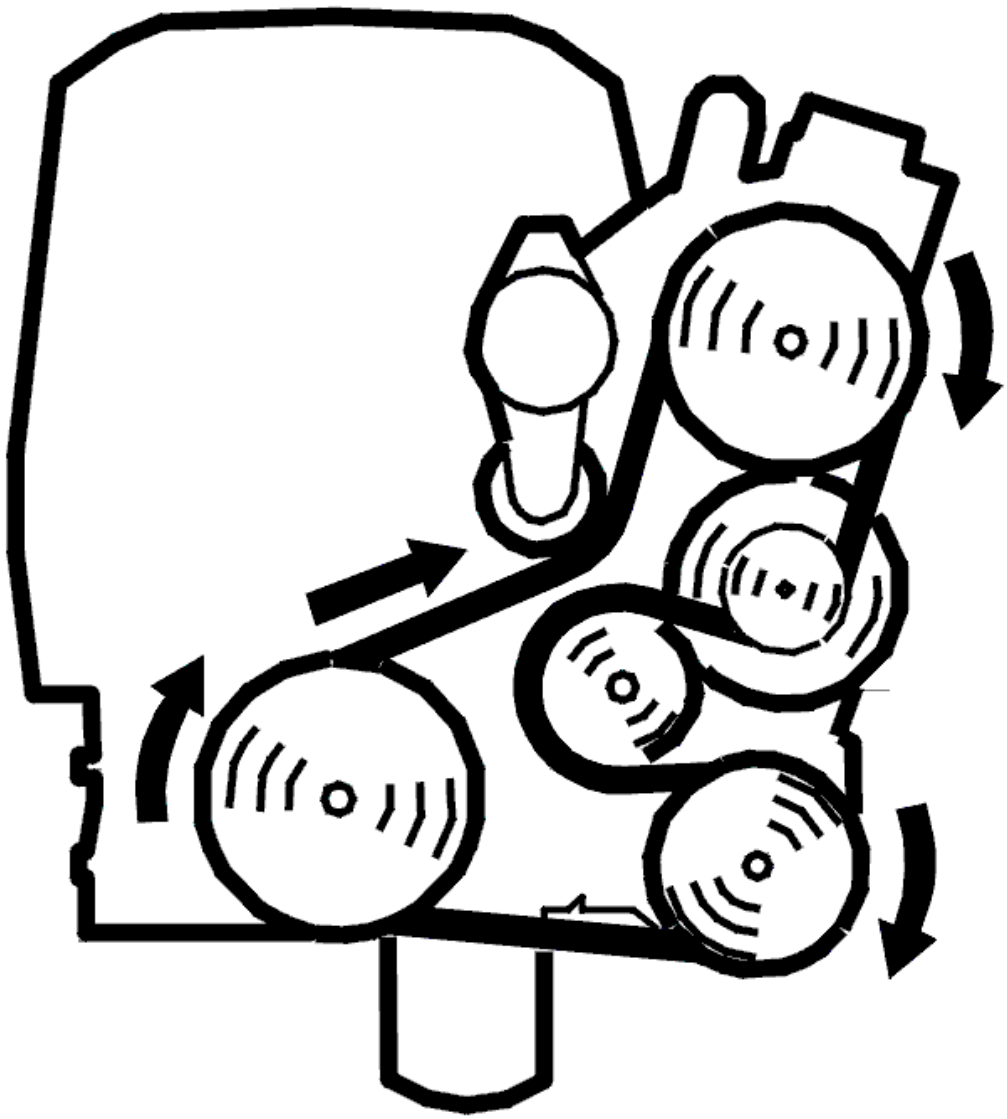


Fig. 7: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

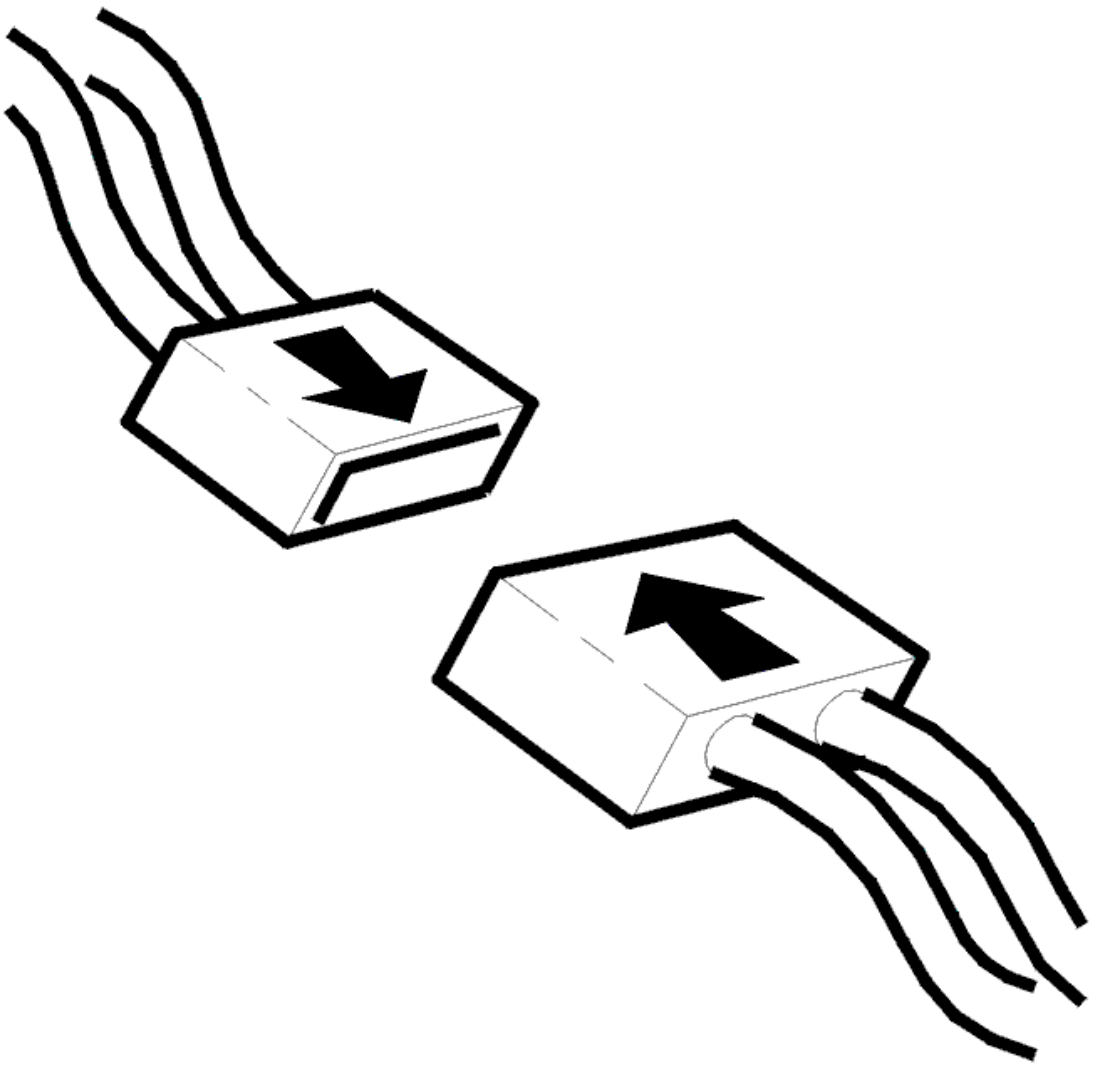


Fig. 8: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reconnect the connectors, reinstall components etc.
- Raise the car so that the drive wheels are unimpeded.
- Start the car.
- Read off the current through the solenoid circuit.
- Lock the wheels with the brakes. Shift the gear selector to position D.
- Depress the accelerator pedal (AP) slowly.

The current should decrease as the accelerator pedal (AP) is depressed.

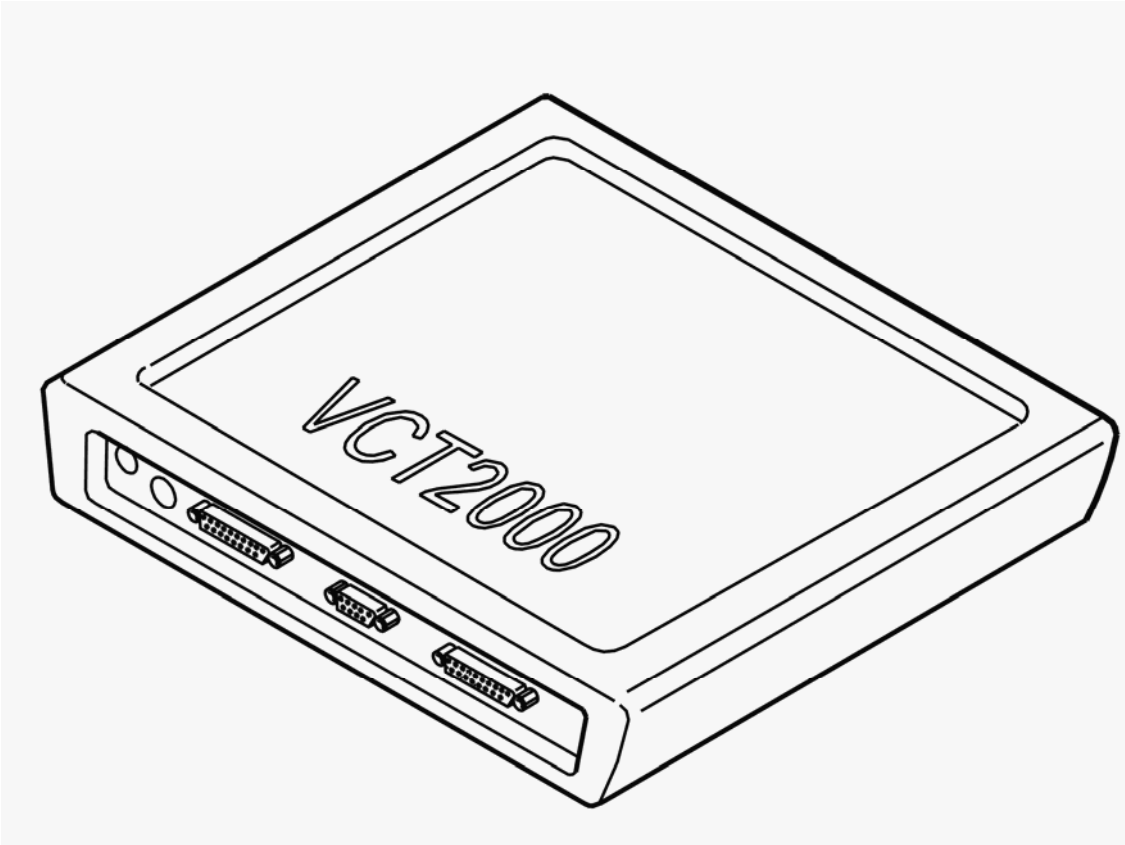


Fig. 9: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current decrease?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-000F: LINE PRESSURE SOLENOID STH. SIGNAL MISSING. INTERMITTENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

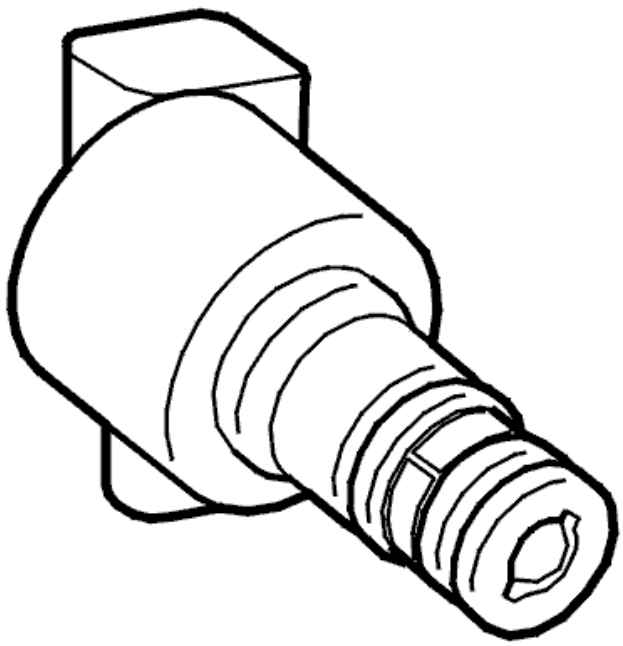


Fig. 10: Identifying Line Pressure Solenoid, STH
Courtesy of VOLVO CARS CORPORATION

Line pressure solenoid STH regulates the line pressure in the transmission. The solenoid is controlled by a power stage in the control module output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-000F is stored if the control module registers that there is no current in the circuit for solenoid STH. Solenoid STH cannot then control the line pressure.

Substitute Value

- The control module "Limp Home" program has been initiated.

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the control signal cable or the signal cable.
- Defective solenoid STH.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No torque limiting request to engine control module (ECM) when shifting.
- No line pressure solenoid STH control. This results in constant maximum line pressure.

SIGNAL MISSING. INTERMITTENT FAULT

INTERMITTENT FAULT

Check the control module and transmission connectors for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION**

Check the wiring between control module terminal A52 and transmission connector terminal C (#A3). Check the wiring between control module terminal A70 (#B10) and transmission connector terminal D (#A4) for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

HINT: With the ignition off, the transmission connector disconnected, and the breakout box connected, the resistance between terminals 3 and 4 should be approximately 3.5 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX** .
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS** .
- For information about signals, see **SIGNAL SPECIFICATION** .

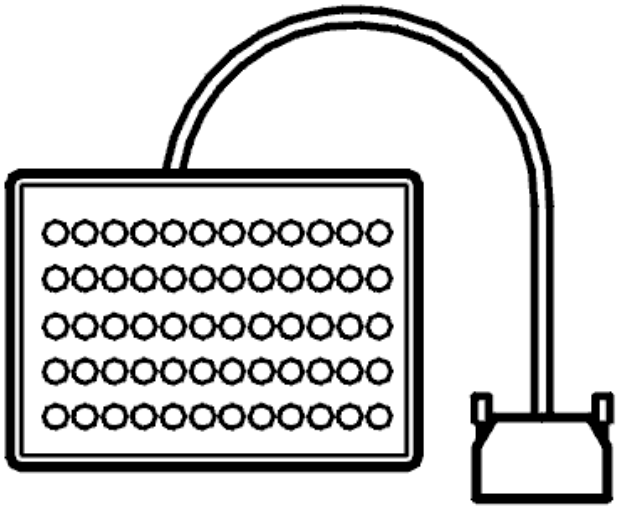


Fig. 11: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

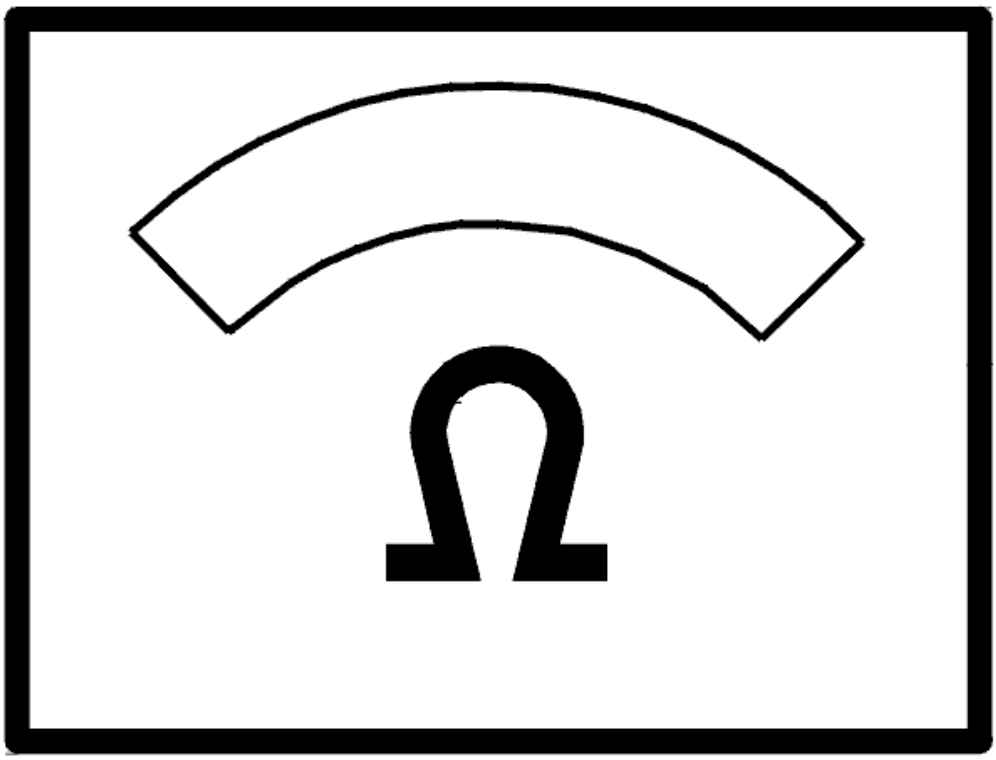


Fig. 12: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-000F: LINE PRESSURE SOLENOID STH. SIGNAL MISSING.

PERMANENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL MISSING. PERMANENT FAULT

CHECKS

CHECKING LINE PRESSURE SOLENOID STH

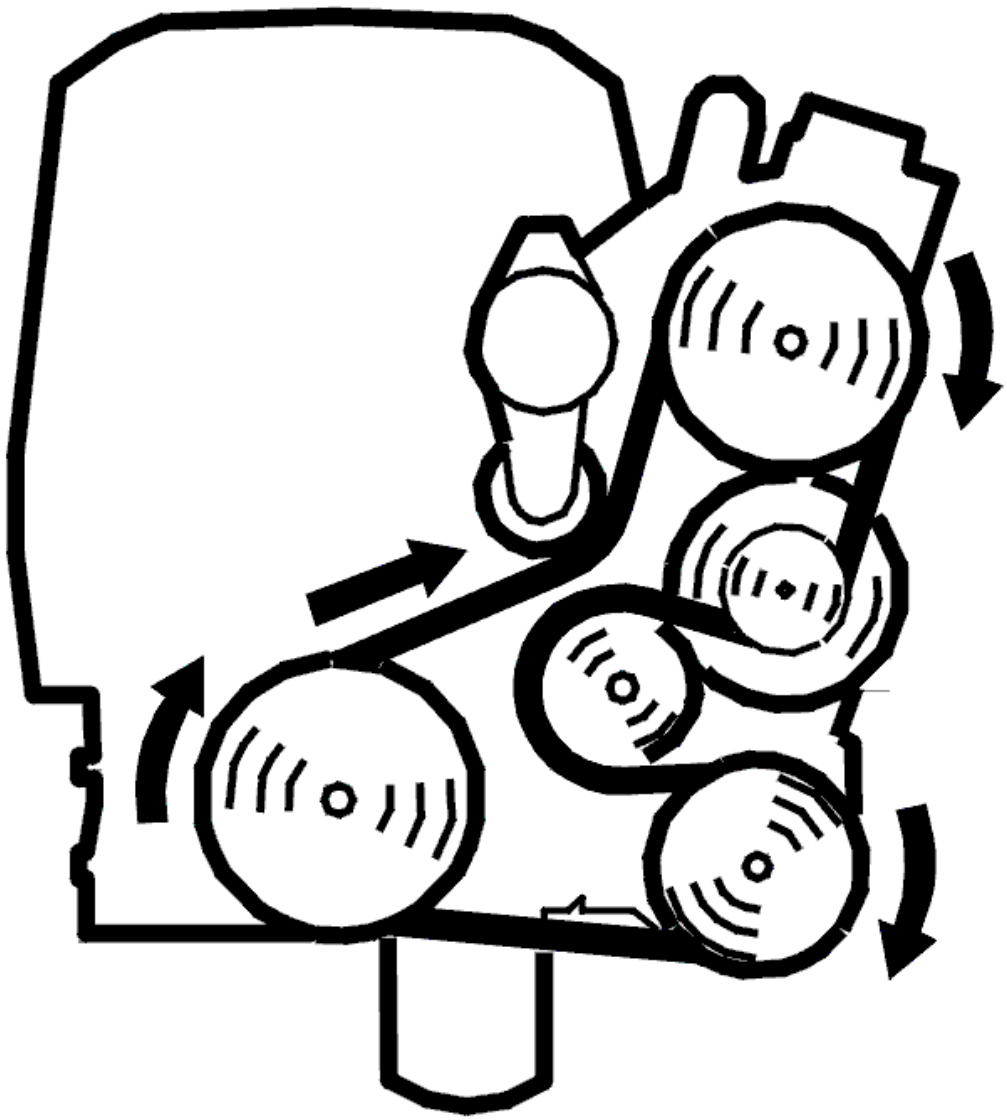


Fig. 13: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

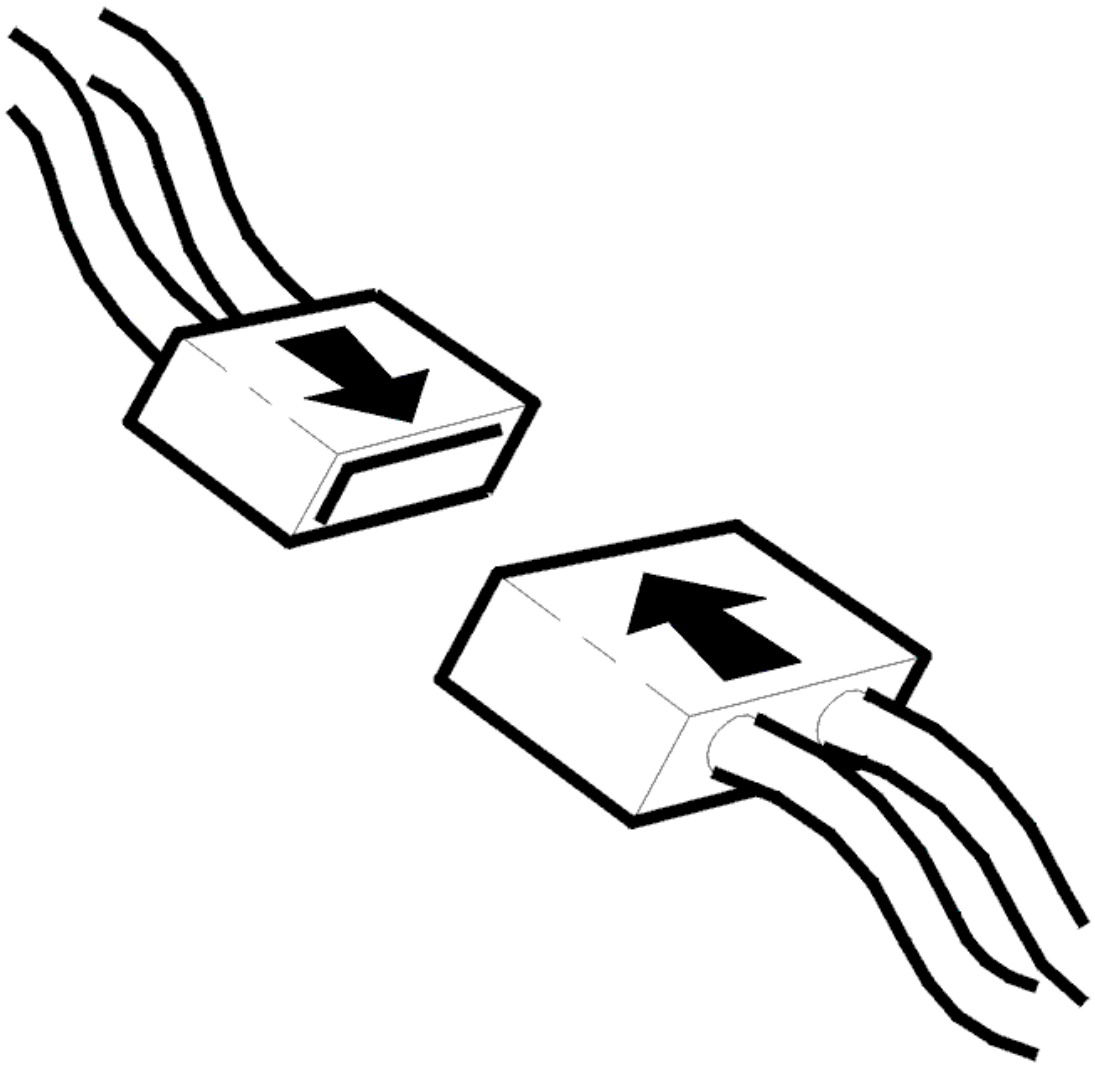


Fig. 14: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the automatic transmission and control module connectors
- Remedy contact resistance and oxidation in the control module and automatic transmission connectors. See **CONTACT RESISTANCE AND OXIDATION**
- Reinstall the components, reconnect the connectors etc.
- Raise the car so that the front wheels are off the ground
- Start the car
- Move the gear selector to position D
- Read off the current through the solenoid circuit
- Depress the accelerator pedal (AP) slowly.

The current should decrease as the accelerator pedal (AP) is depressed. If the current reduces as the accelerator pedal (AP) is depressed, the cause of the fault was contact resistance and oxidation.

Other information:

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION** .

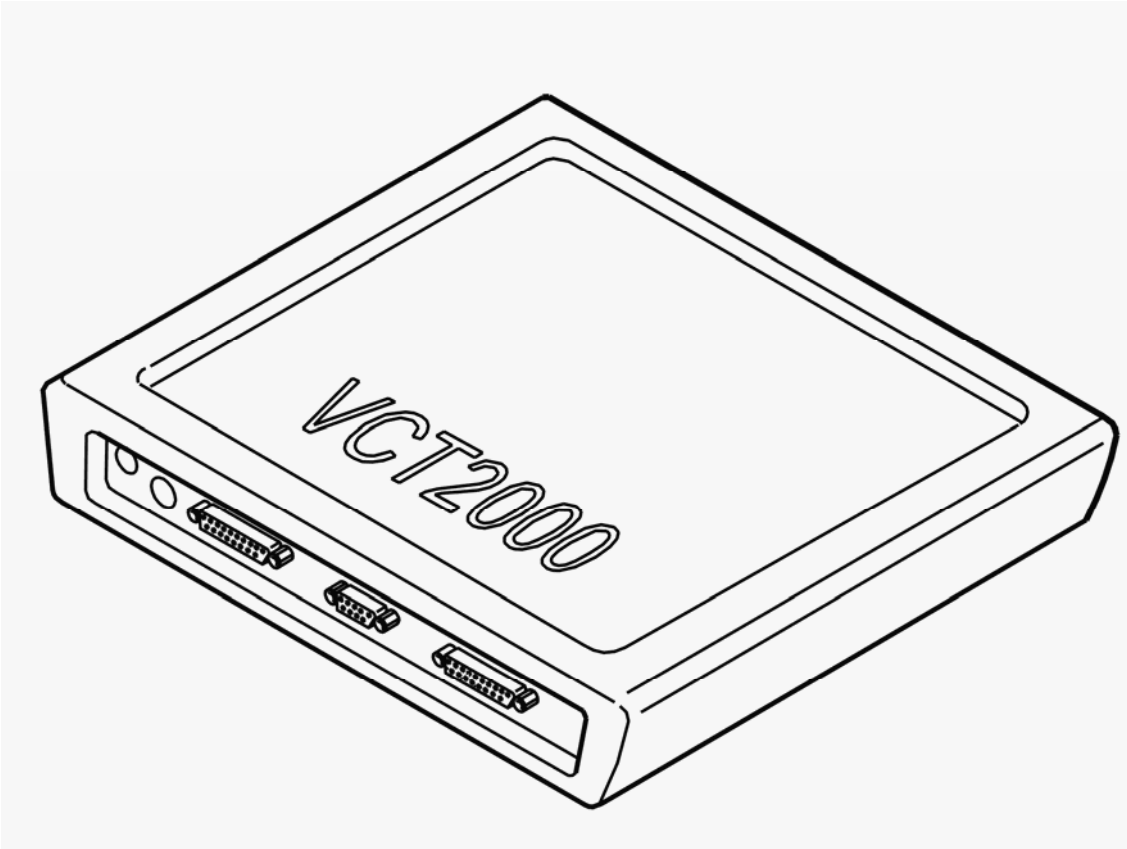


Fig. 15: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current reduce when the accelerator pedal (AP) is depressed?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING SOLENOID STH**

CHECKING SOLENOID STH

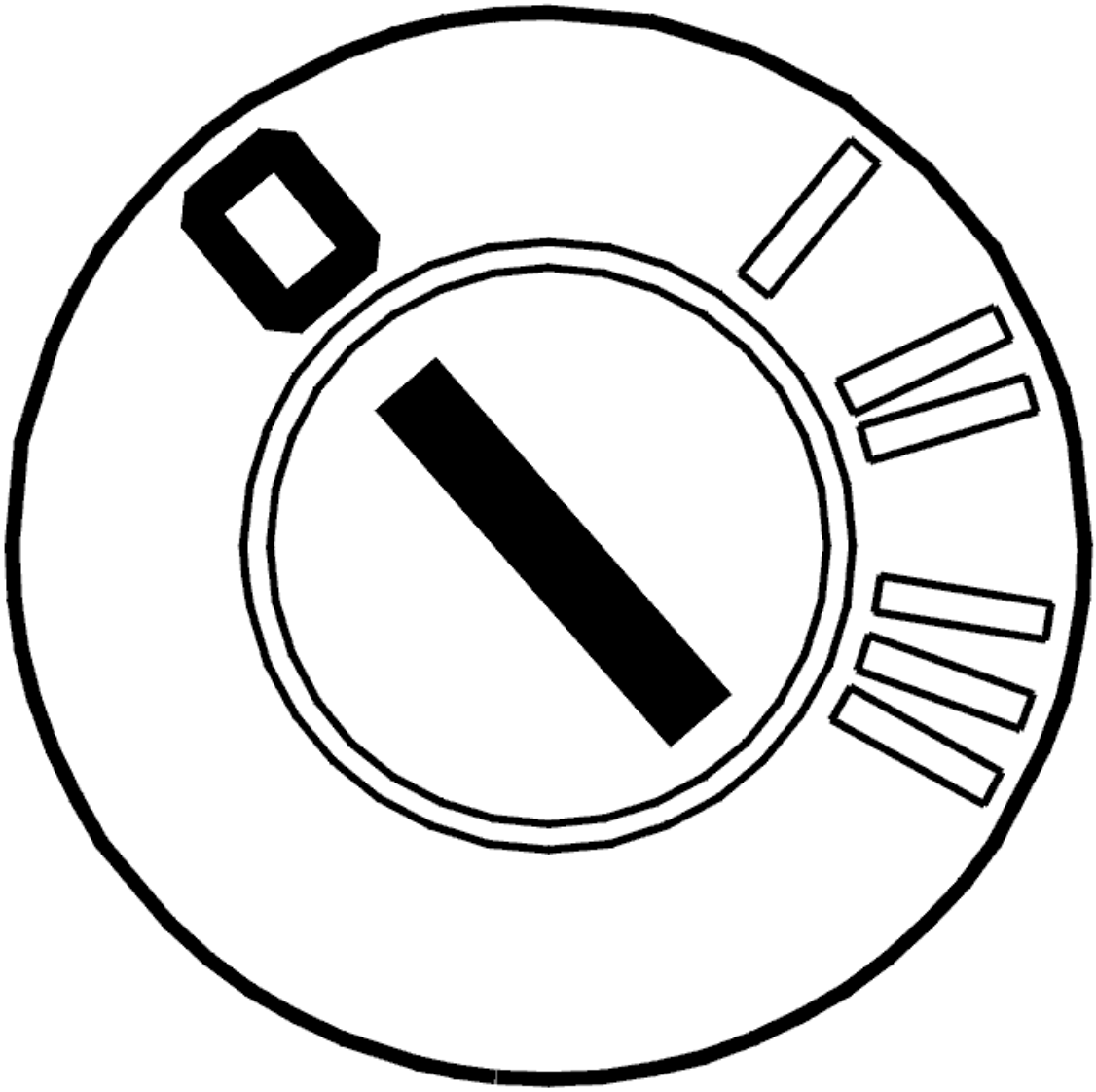


Fig. 16: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

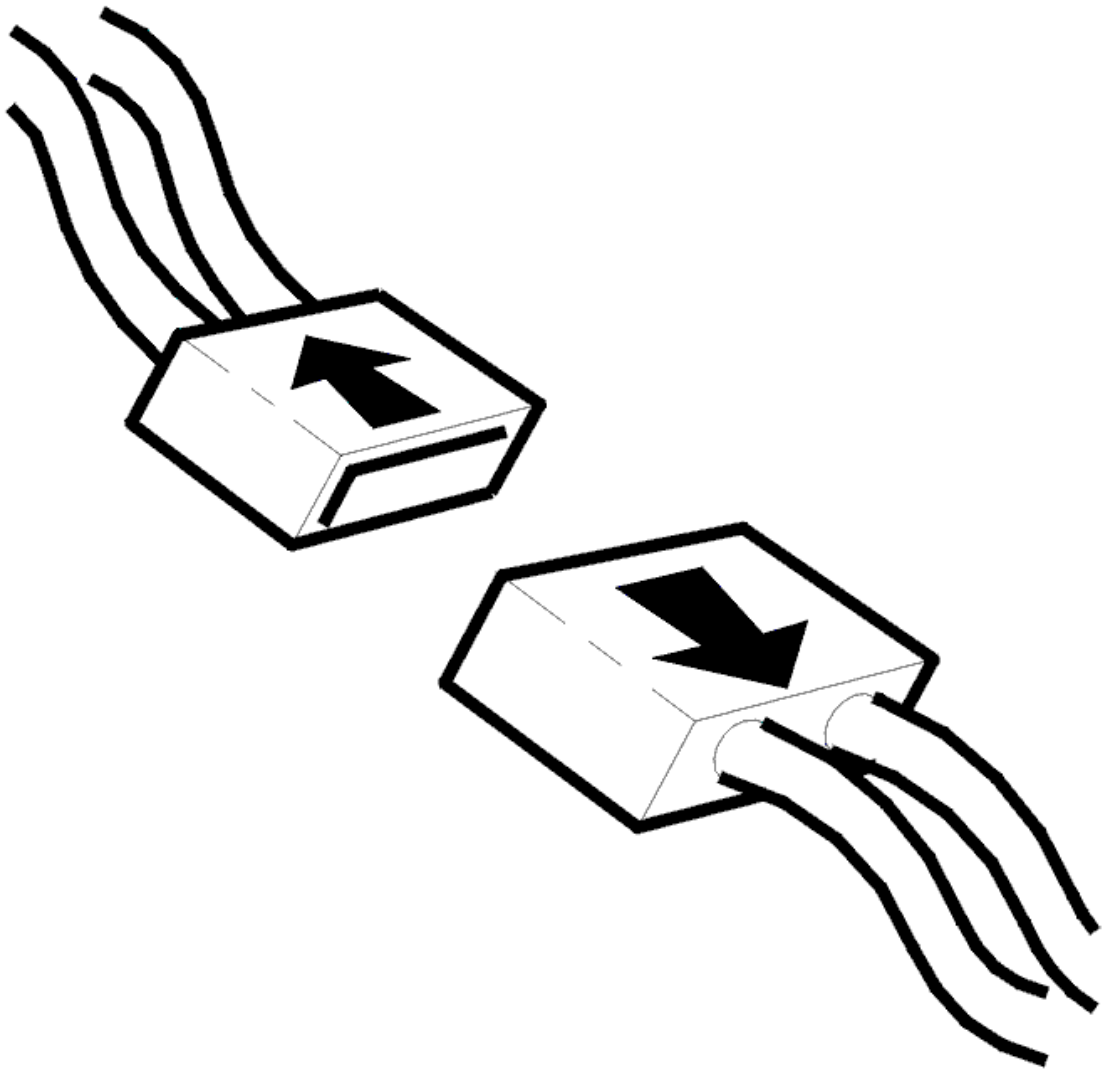


Fig. 17: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals #C (#A3) and #D (#A4) on the breakout box.

  The solenoid STH resistance must be between 3 and 5 ohms.

  Other information:

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**

- For information about signals, see **SIGNAL SPECIFICATION** .

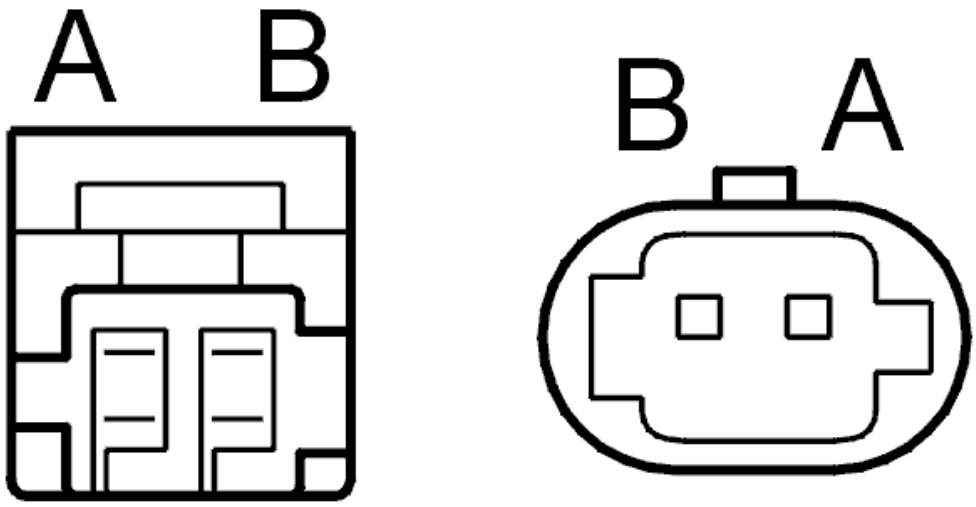


Fig. 18: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

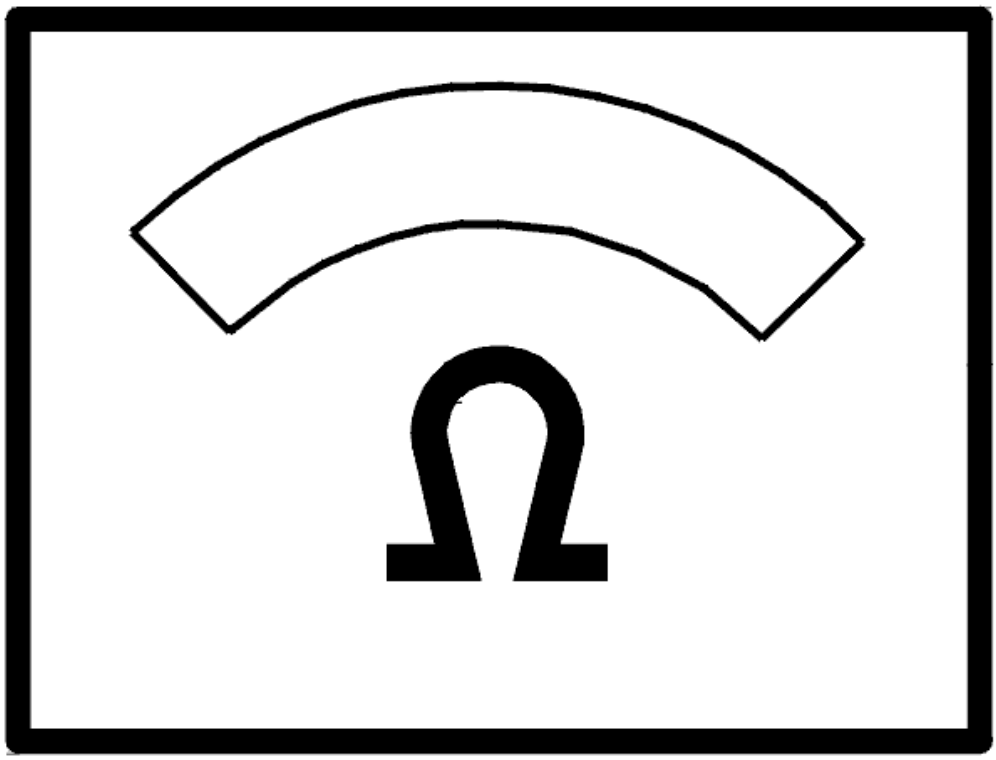


Fig. 19: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

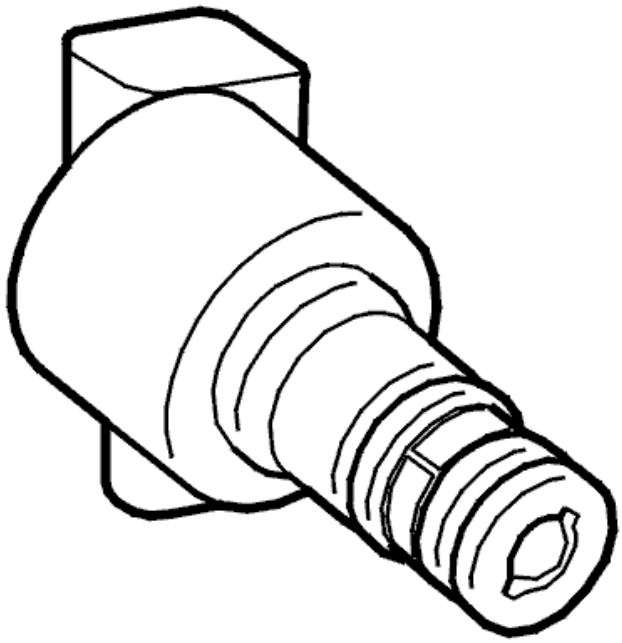


Fig. 20: Identifying Line Pressure Solenoid, STH
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE CABLES IN THE CIRCUIT FOR SOLENOID STH**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE CABLES IN THE CIRCUIT FOR SOLENOID STH

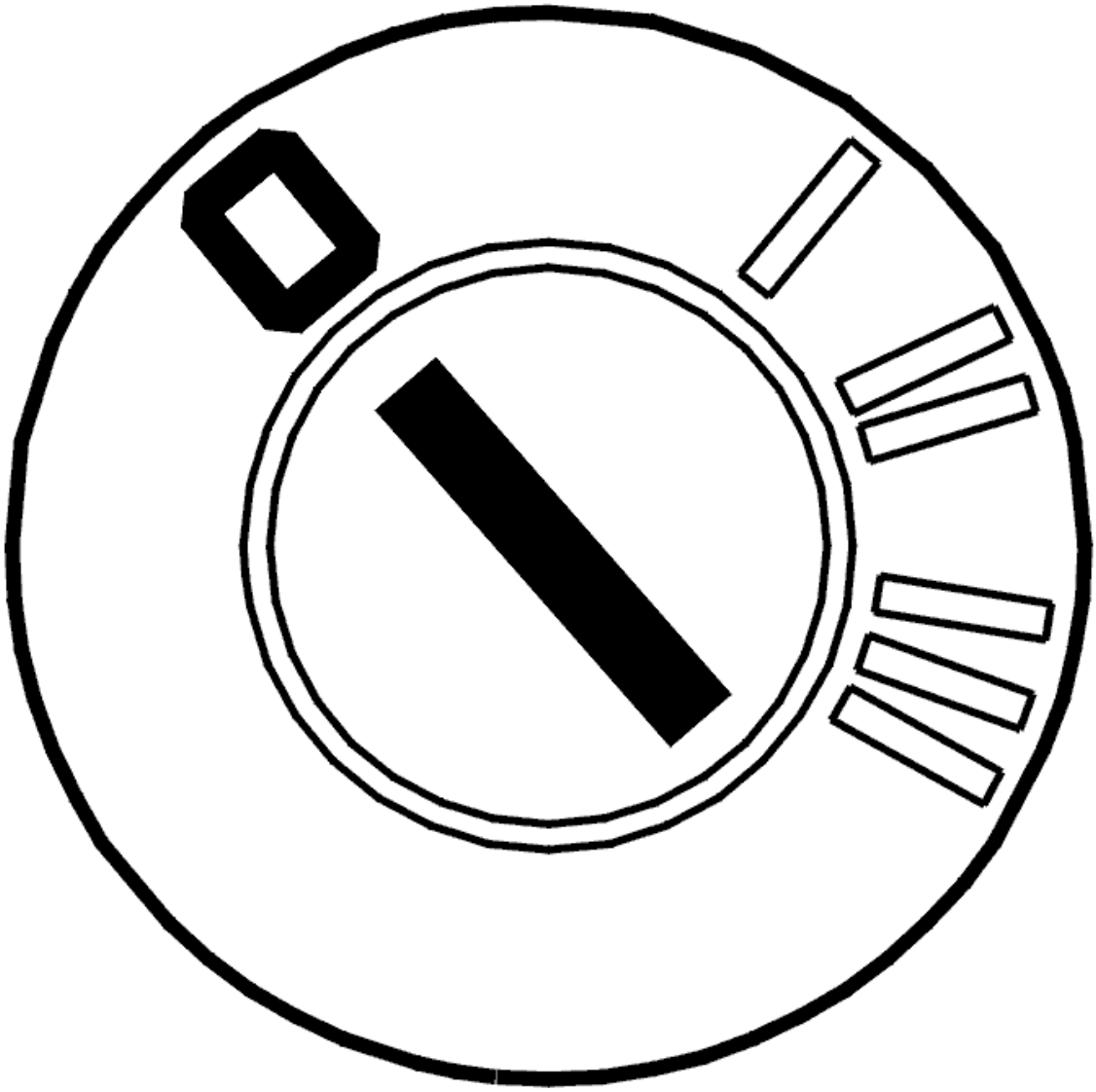


Fig. 21: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

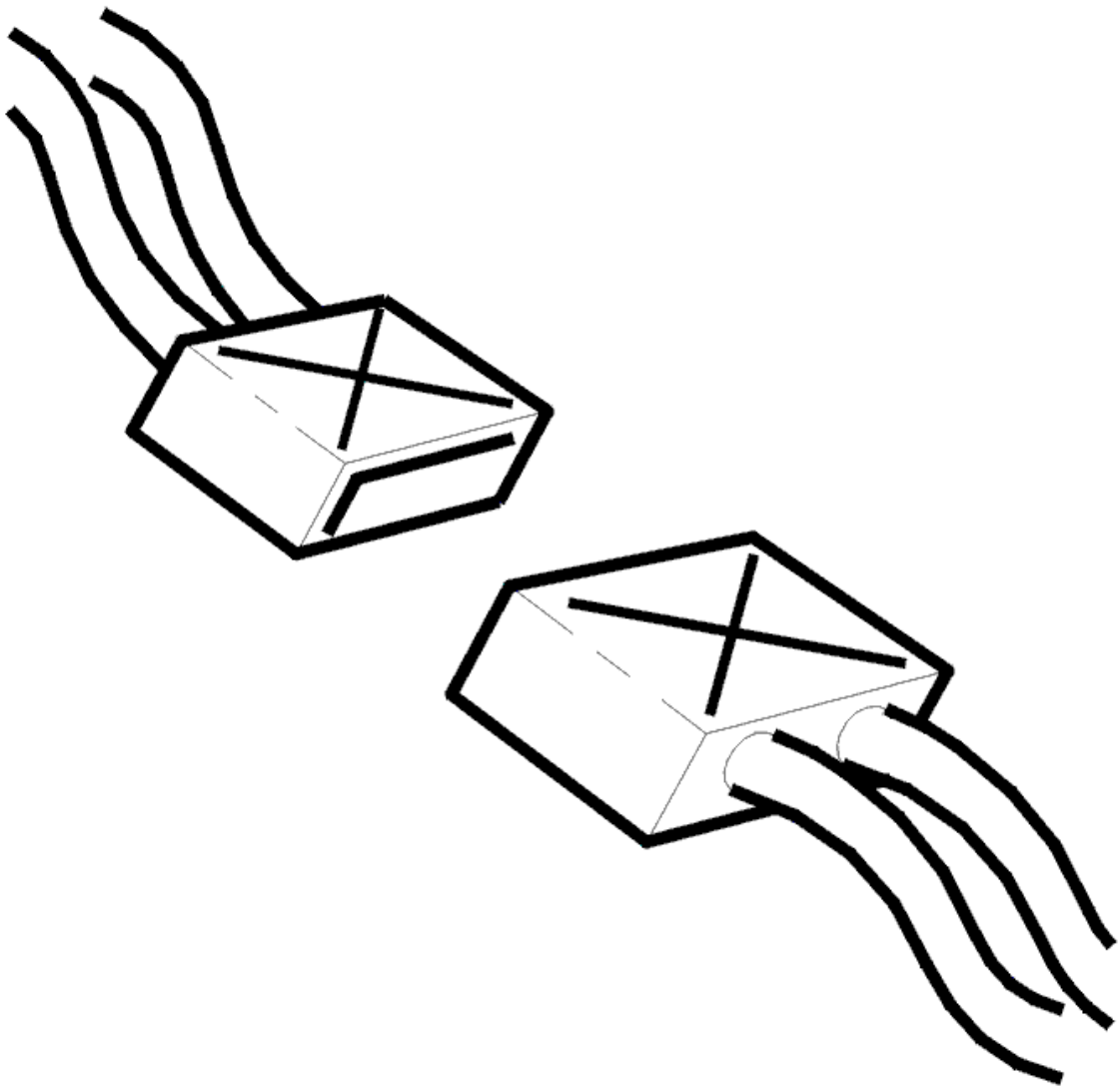


Fig. 22: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

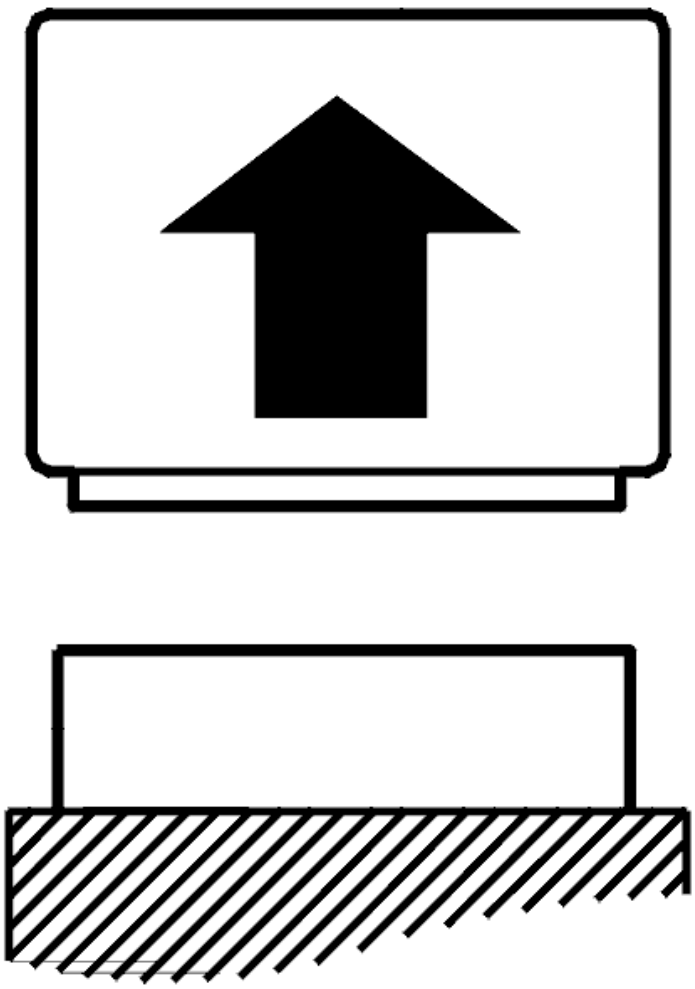


Fig. 23: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the transmission
- Disconnect the control module.
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (control module side).

  Check the cable between control module terminal #A52 and transmission connector terminal #C (#A3). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

  Check the cable between control module terminal #A70 (#B10) and transmission connector terminal #D (#A4). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

Other information:

- To connect the breakout box to the control module, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

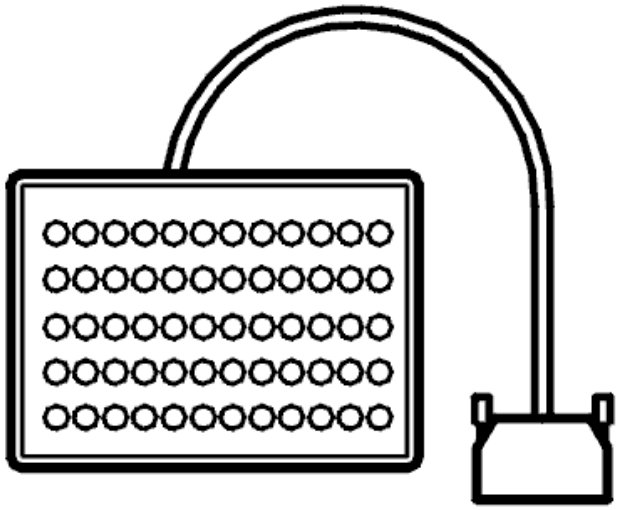


Fig. 24: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

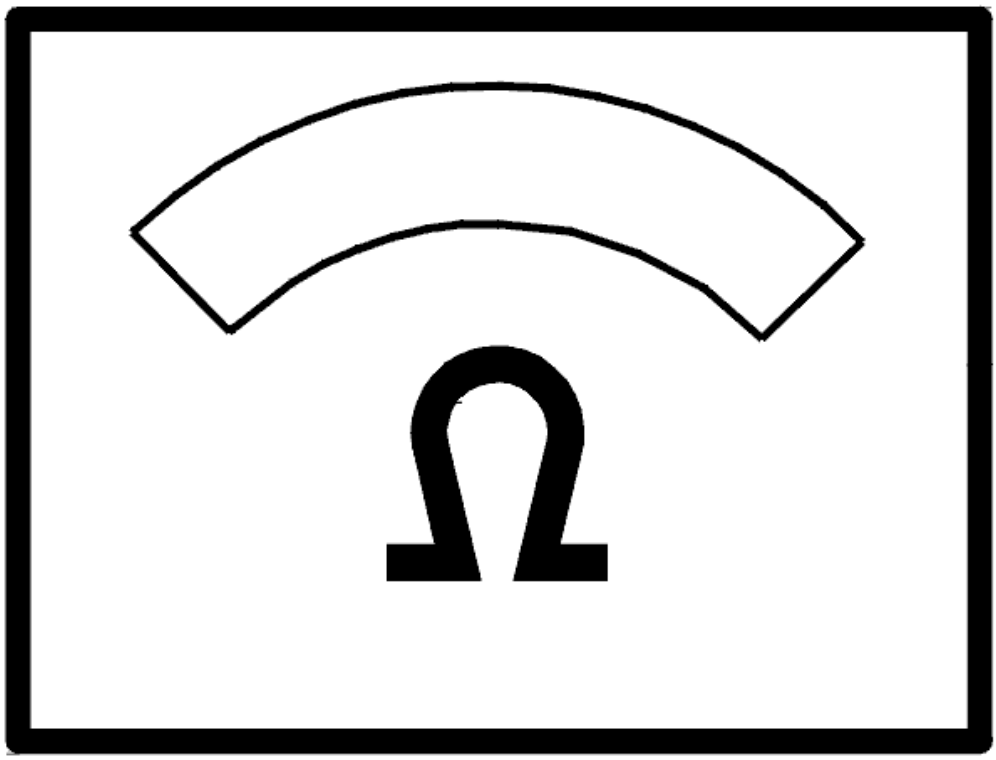


Fig. 25: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the wiring OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

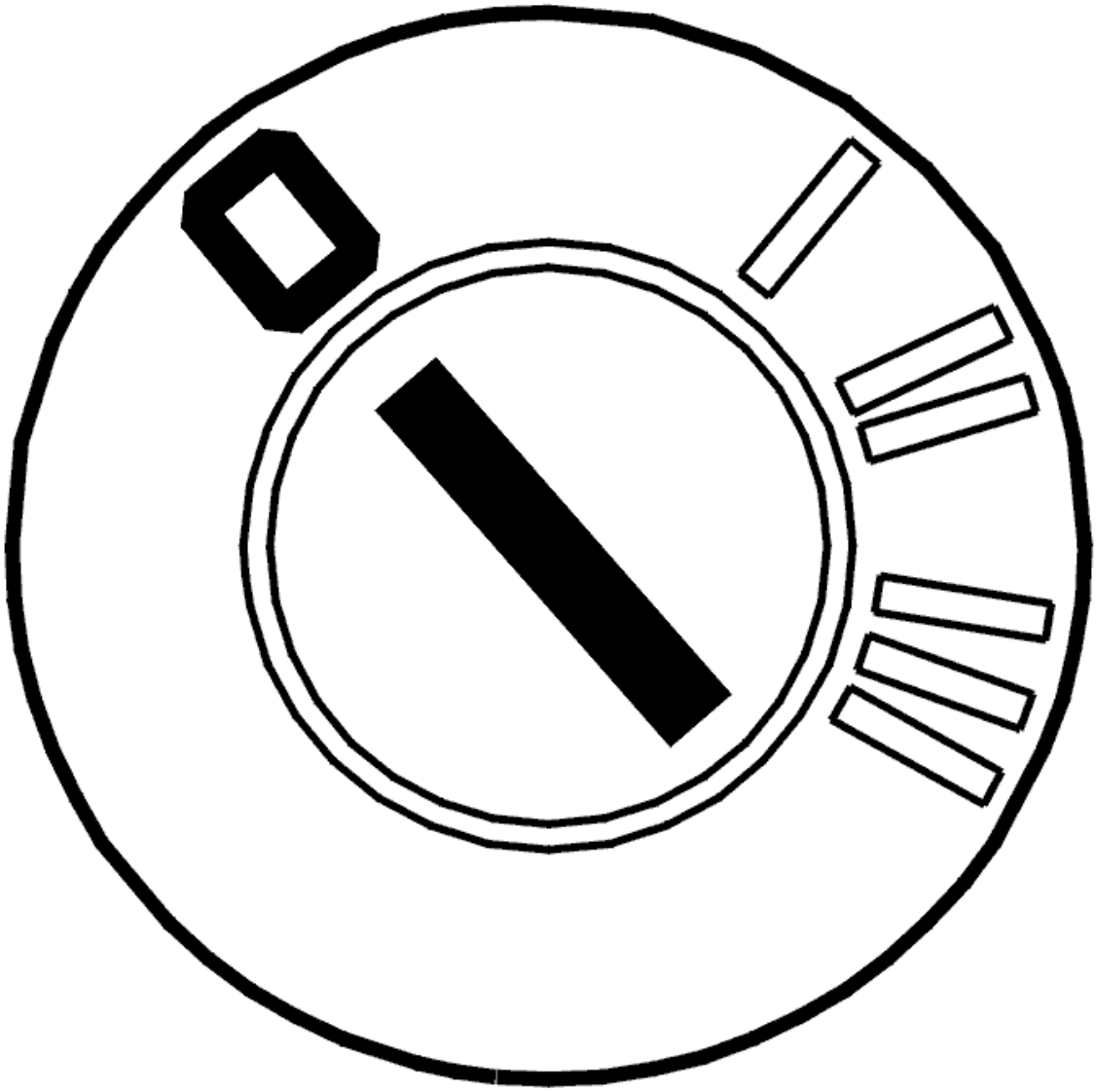


Fig. 26: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission terminal #C (#A3) and solenoid STH terminals #A. and #D (#A4) and solenoid STH terminal #B. Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

  HINT: Check solenoid STH by measuring the solenoid STH resistance between terminals A and B. The resistance must be between 3 and 5 ohms.

  Remedy as necessary

  Other information:

- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** . To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid STH, see **SOLENOID LINE PRESSURE, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION** .

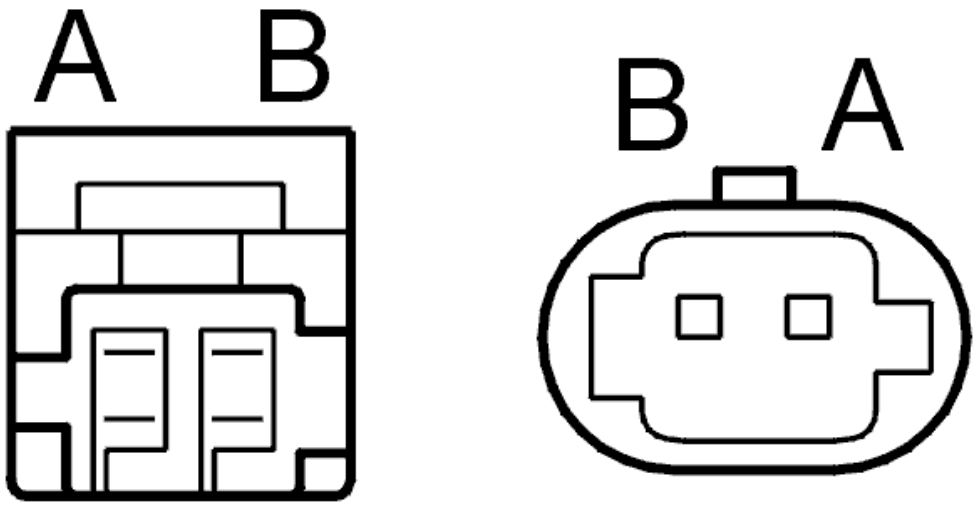


Fig. 27: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

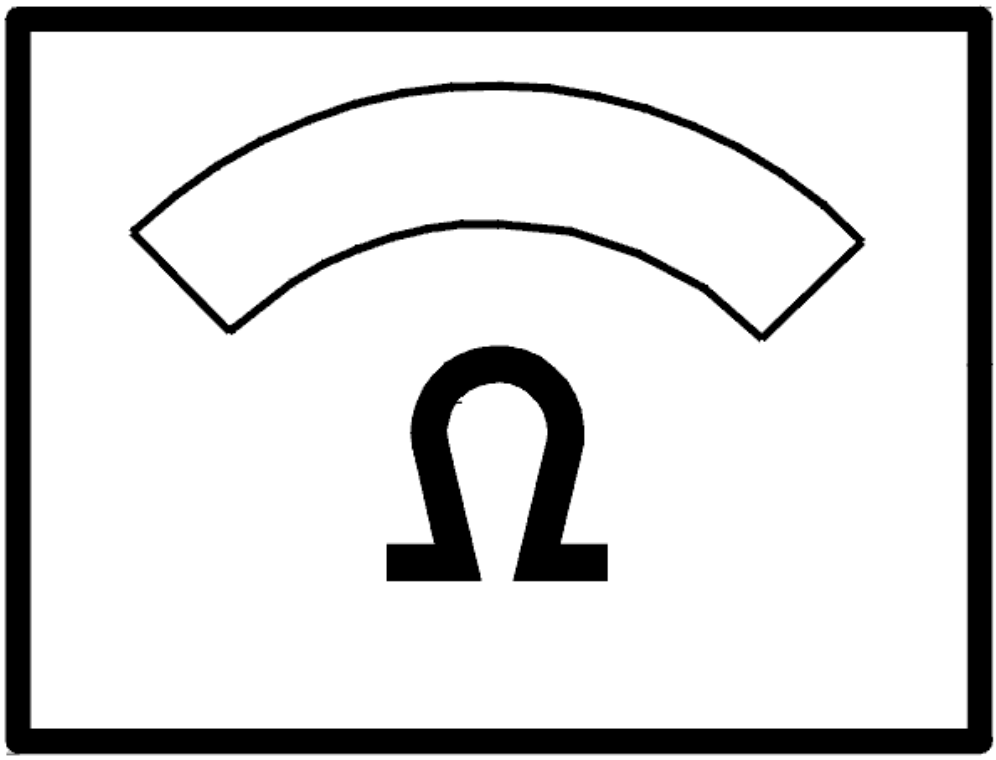


Fig. 28: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

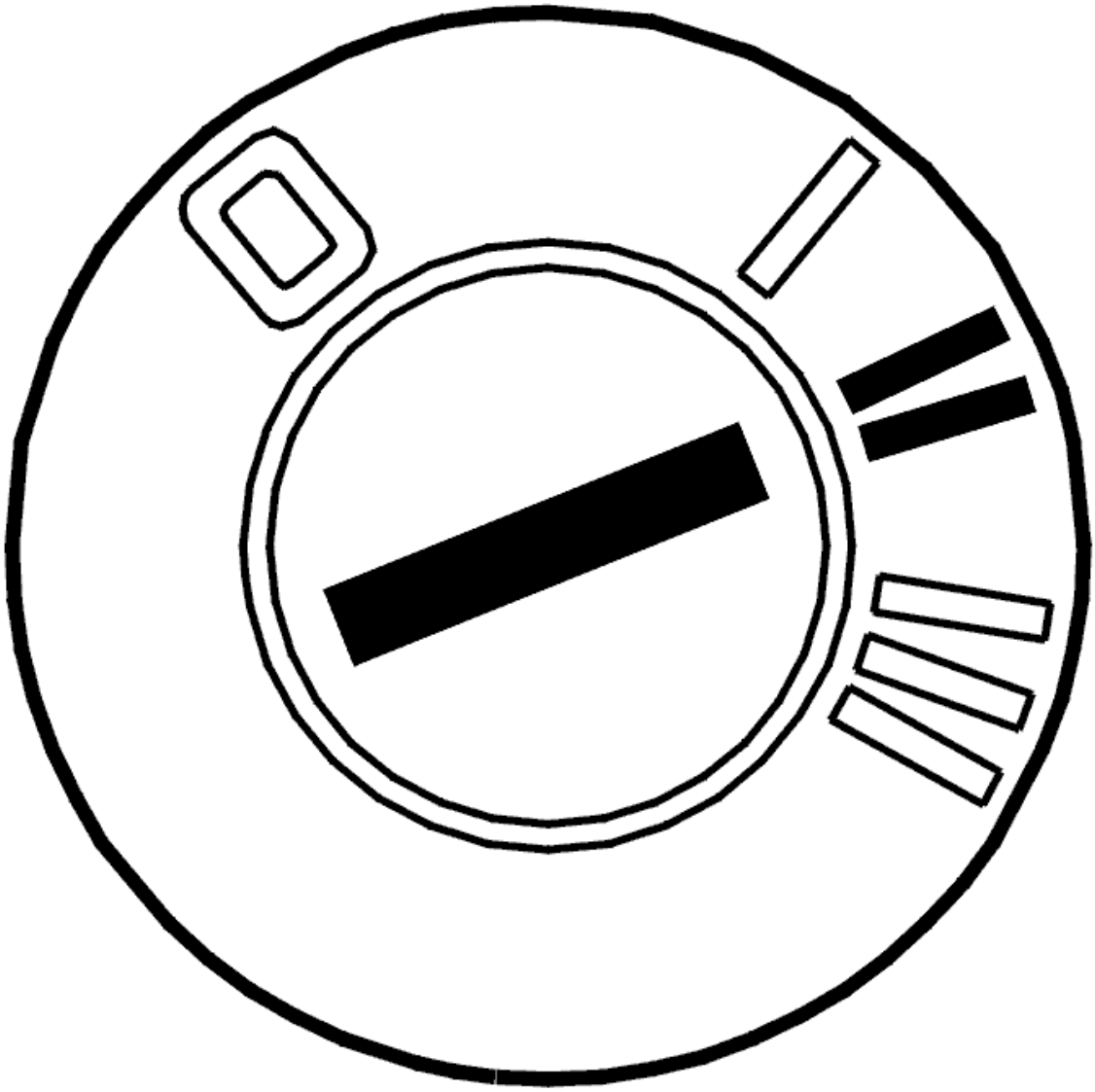


Fig. 29: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

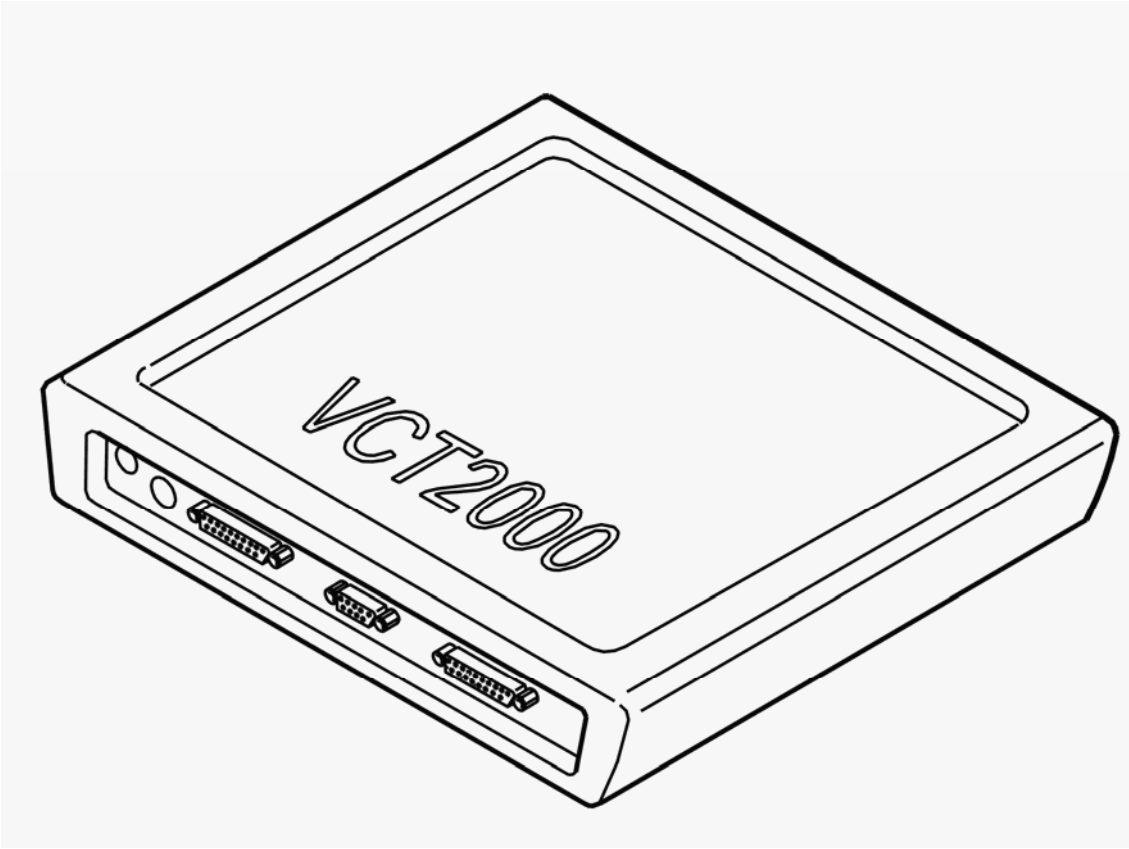


Fig. 30: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

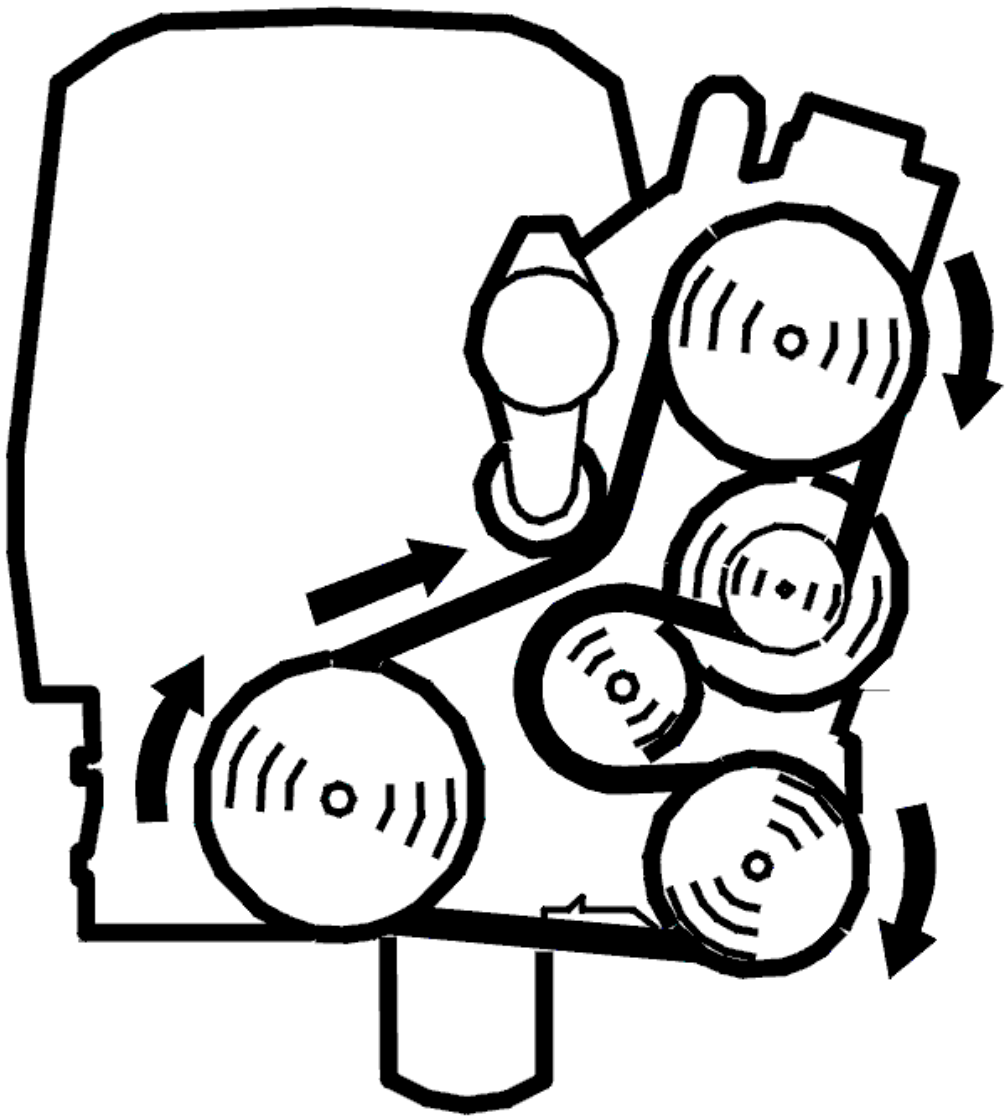


Fig. 31: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

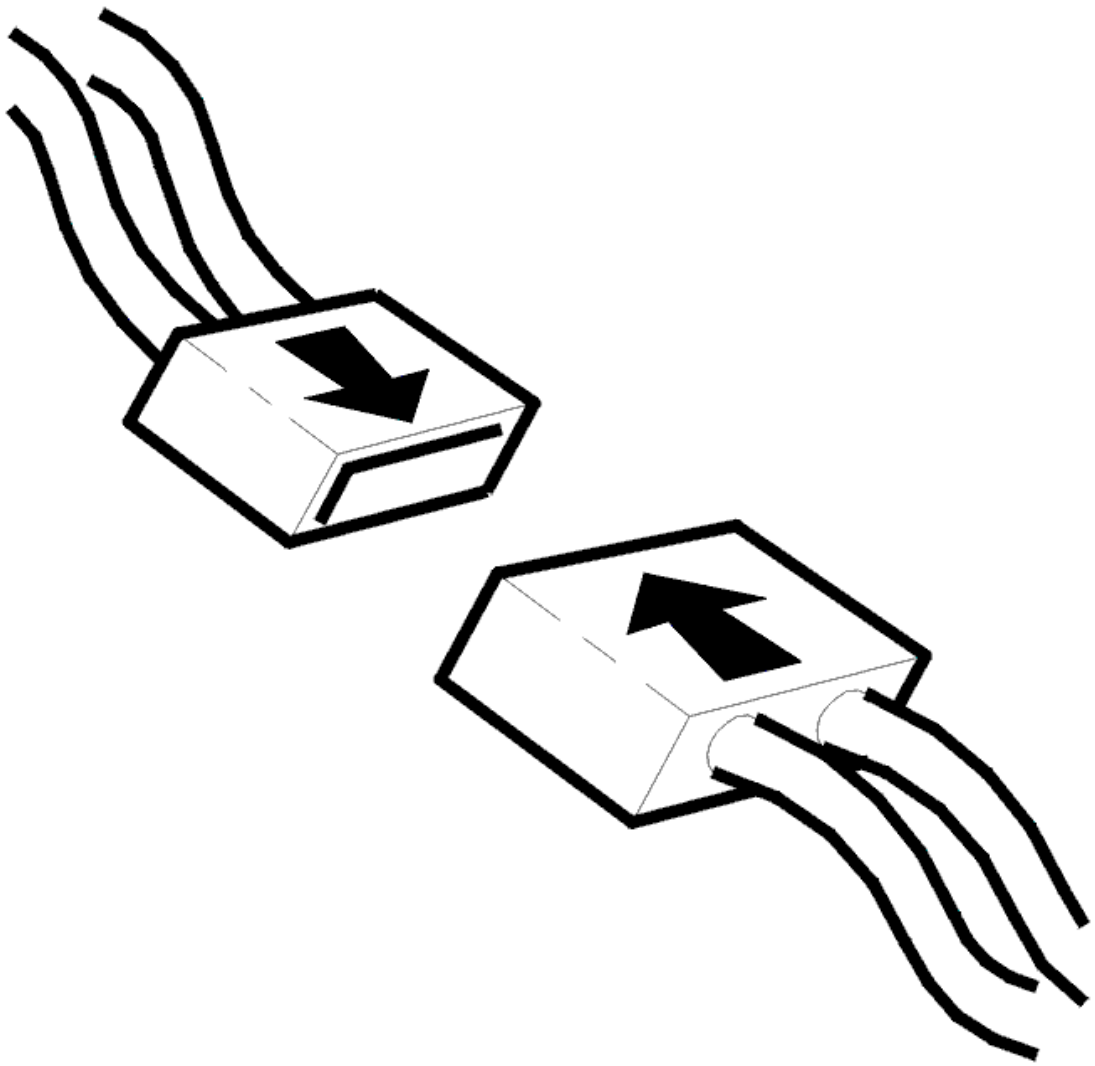


Fig. 32: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reconnect the connectors, reinstall components etc.
- Raise the car so that the drive wheels are unimpeded.
- Start the car.
- Read off the current through the solenoid circuit.
- Lock the wheels with the brakes. Shift the gear selector to position D.
- Depress the accelerator pedal (AP) slowly.

The current should decrease as the accelerator pedal (AP) is depressed.

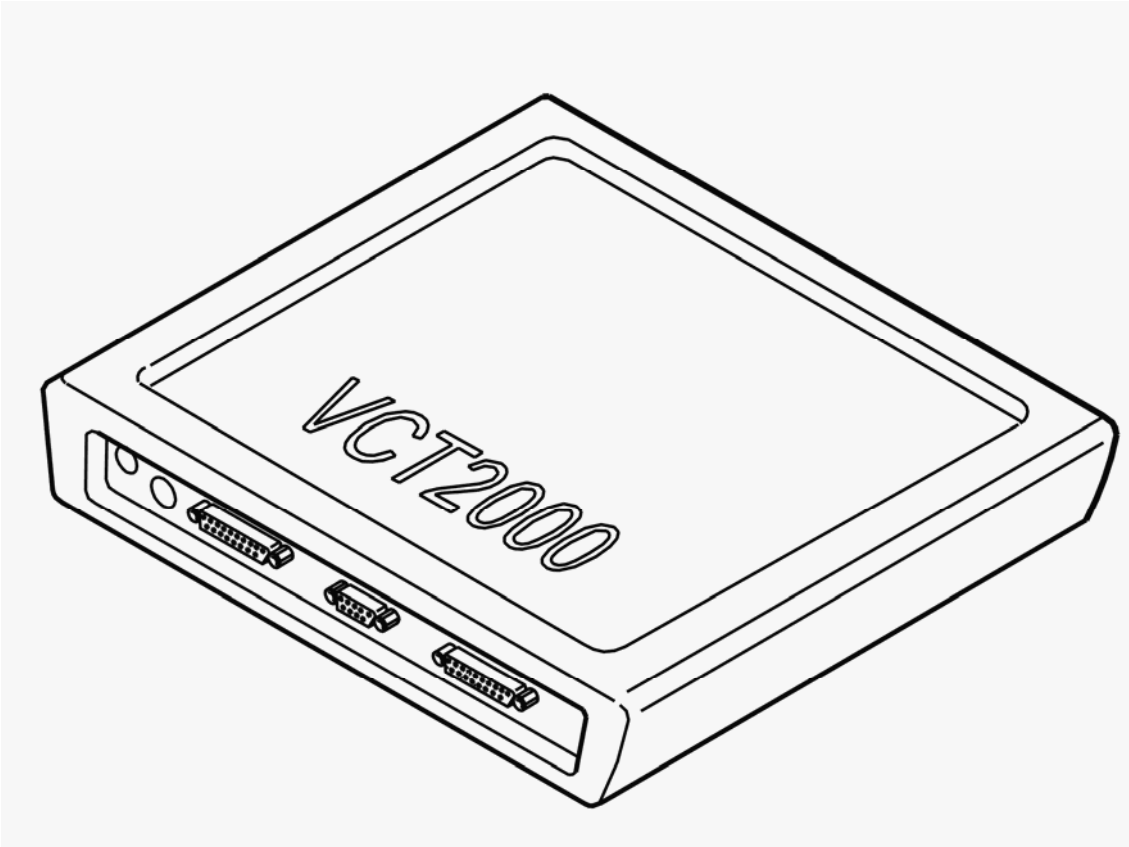


Fig. 33: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current decrease?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0010: LINE PRESSURE SOLENOID STH. SIGNAL TOO LOW. INTERMITTENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

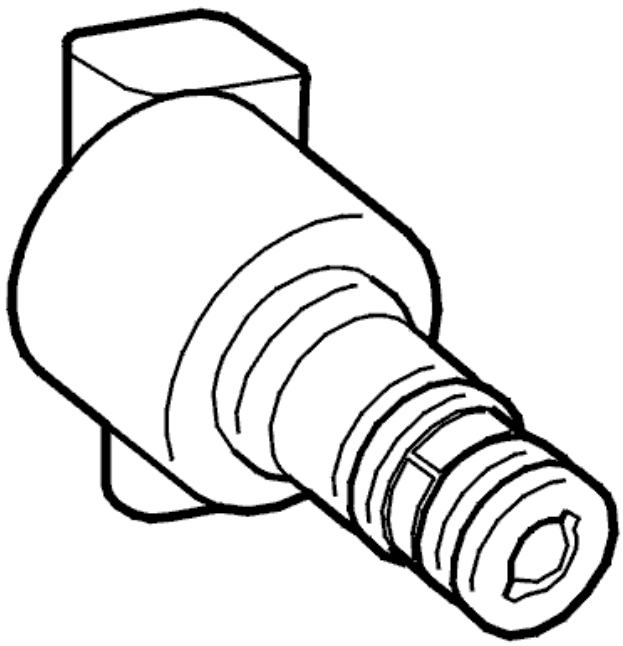


Fig. 34: Identifying Line Pressure Solenoid, STH
Courtesy of VOLVO CARS CORPORATION

Line pressure solenoid STH regulates line pressure in the transmission. The solenoid is controlled by an amplifier in the transmission control module (TCM) output. The transmission control module (TCM) uses the amplifier to control the current to the solenoid. A low amperage gives a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. Amperage is primarily affected by throttle position. Diagnostic trouble code (DTC) TCM-0010 is stored if the control module registers that there is no current in the solenoid STH circuit. Solenoid STH cannot then control line pressure.

Substitute Value

- The control module "Limp Home" program initiated.

Possible Source

- Short-circuit to ground in the control signal cable or signal cable.
- Defective solenoid STH.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No adaptation of the gear slippage times at high altitude (High Altitude Compensation).
- No torque limiting request to engine control module (ECM) when shifting.
- No line pressure solenoid STH control. Results in constant maximum line pressure.

SIGNAL TOO LOW. INTERMITTENT FAULT

INTERMITTENT FAULT

Check control module and transmission connectors for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION**

Check the wiring between control module terminal A52 and transmission connector terminal C (#A3). Check the wiring between control module terminal A70 (#B10) and transmission connector terminal D (#A4) for an intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** .

HINT: With the ignition off, the transmission connector disconnected, and the breakout box connected, the resistance between terminals 3 and 4 should be approximately 3.5 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX** .
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS** .
- For information about signals, see **SIGNAL SPECIFICATION** .

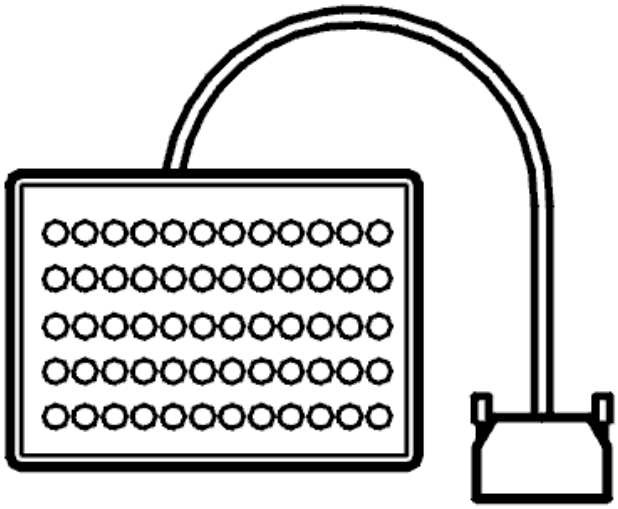


Fig. 35: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

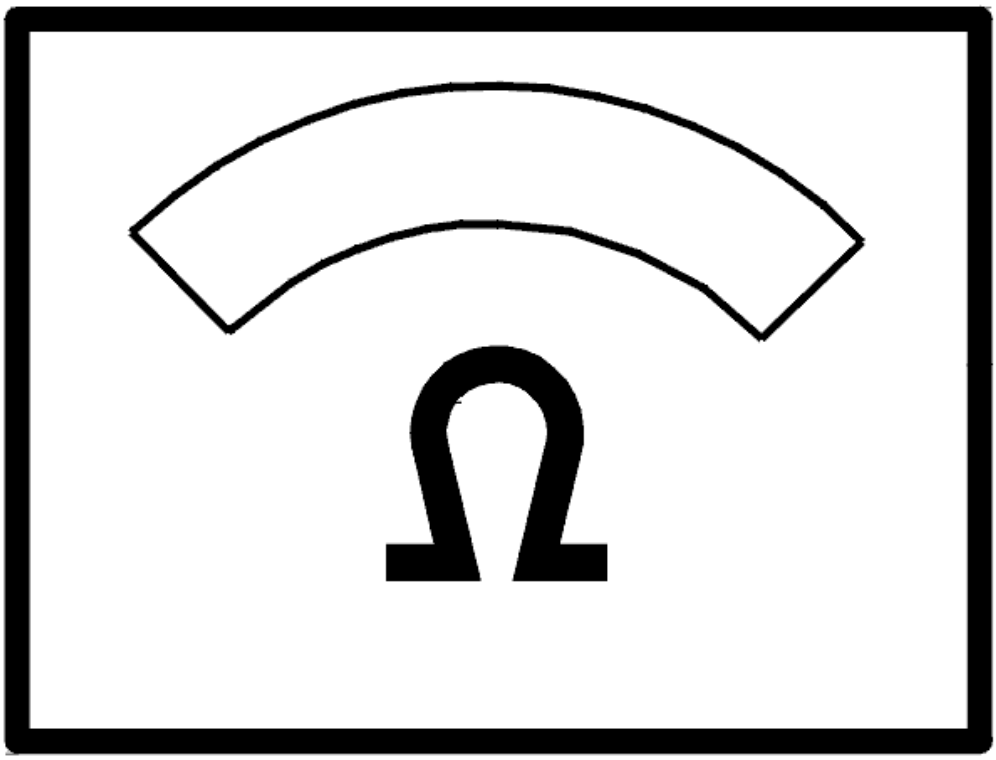


Fig. 36: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0010: LINE PRESSURE SOLENOID STH. SIGNAL TOO LOW.

PERMANENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL TOO LOW. PERMANENT FAULT

CHECKS

CHECKING SOLENOID STH

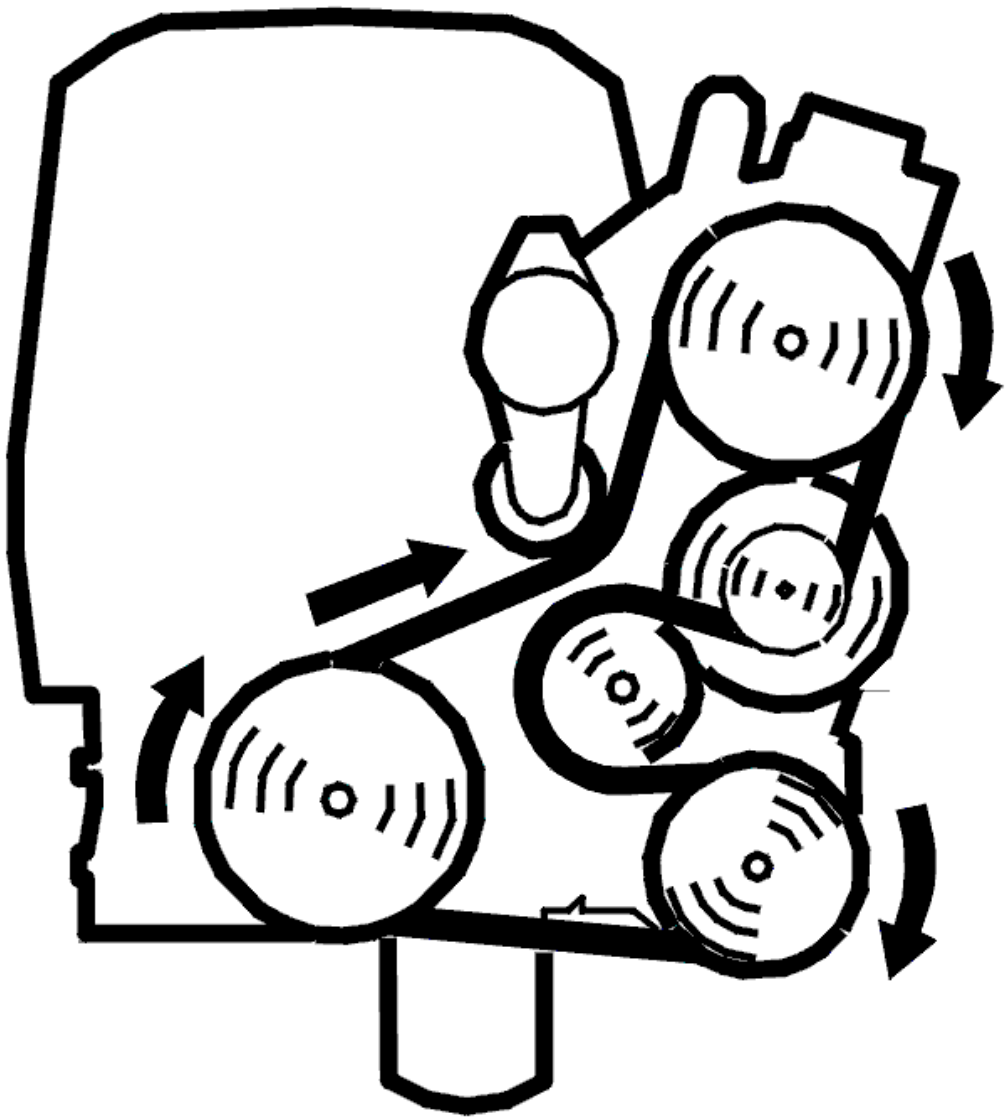


Fig. 37: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off

- Disconnect the automatic transmission and control module connectors
- Check the control module and automatic transmission connectors for contact resistance and oxidation. Remedy if necessary
- Reconnect the control module and automatic transmission connectors
- Start the car
- Gear selector in position P
- Read off the current through the solenoid circuit
- Depress the accelerator pedal (AP) slowly.

The current should decrease as the accelerator pedal (AP) is depressed. The cause of the fault was contact resistance or oxidation if the current reduces as the accelerator pedal (AP) is depressed.

Other information

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

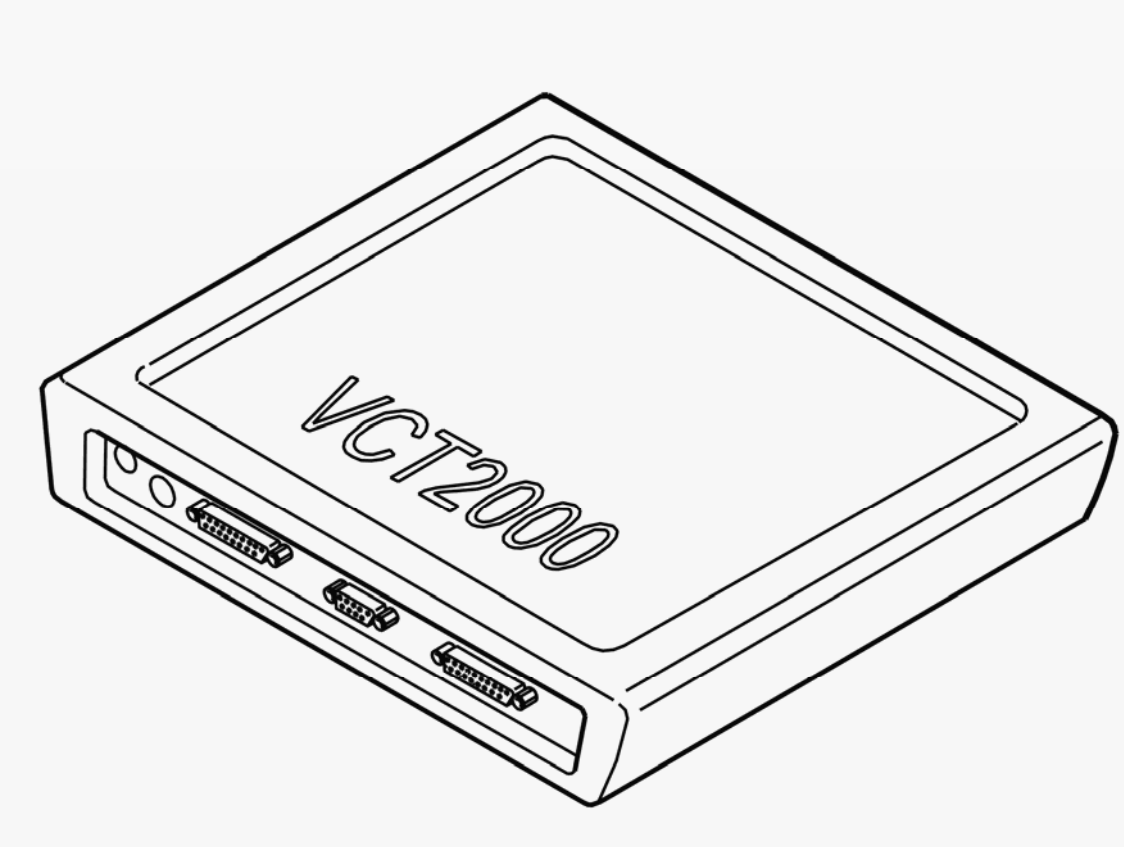


Fig. 38: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current reduce when the accelerator pedal (AP) is depressed?

- **YES**

  Refer to **CHECK THE QUALITY OF THE TRANSMISSION OIL**

- **NO**

  Refer to **CHECKING SOLENOID STH**

CHECKING SOLENOID STH

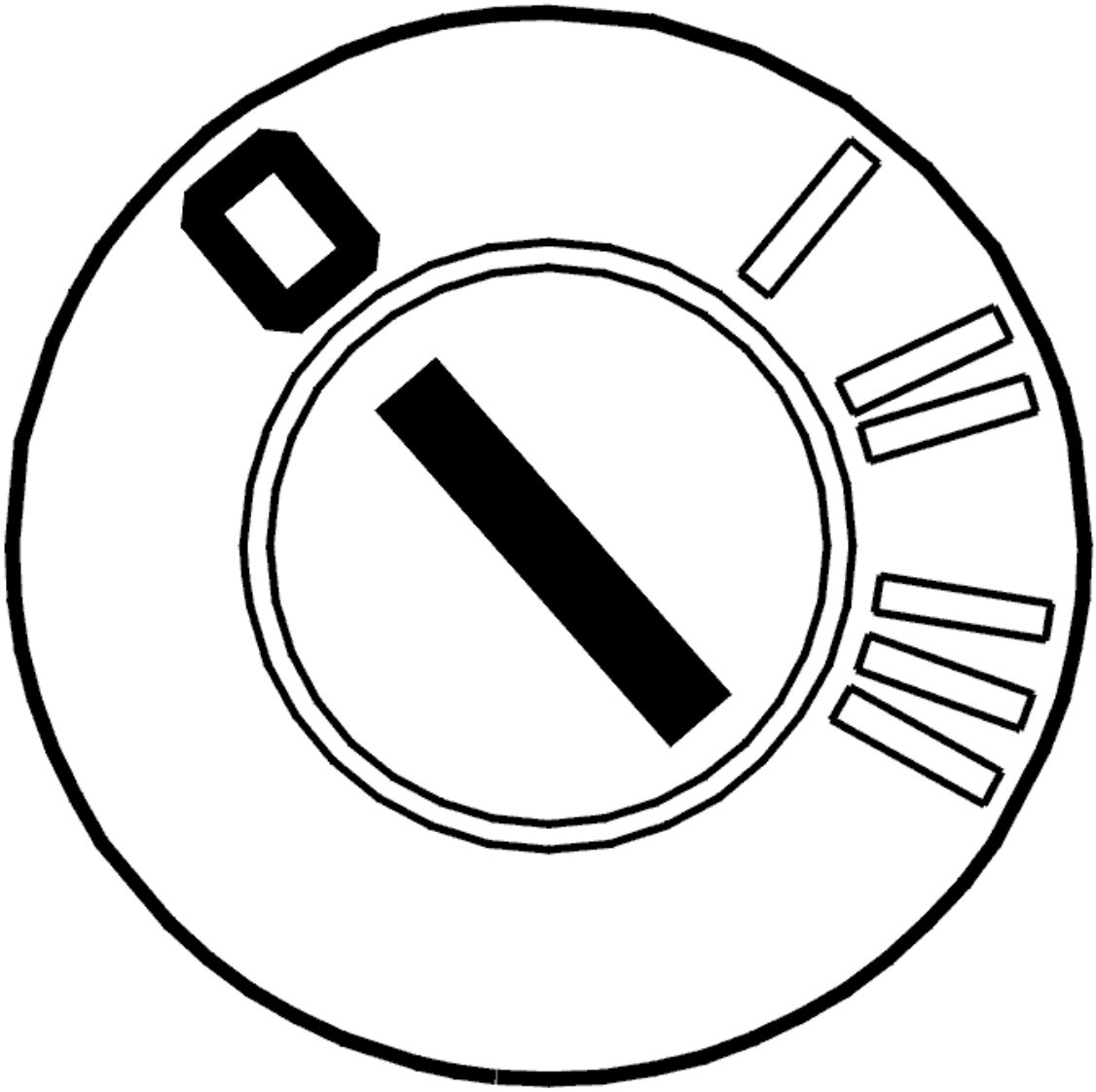


Fig. 39: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

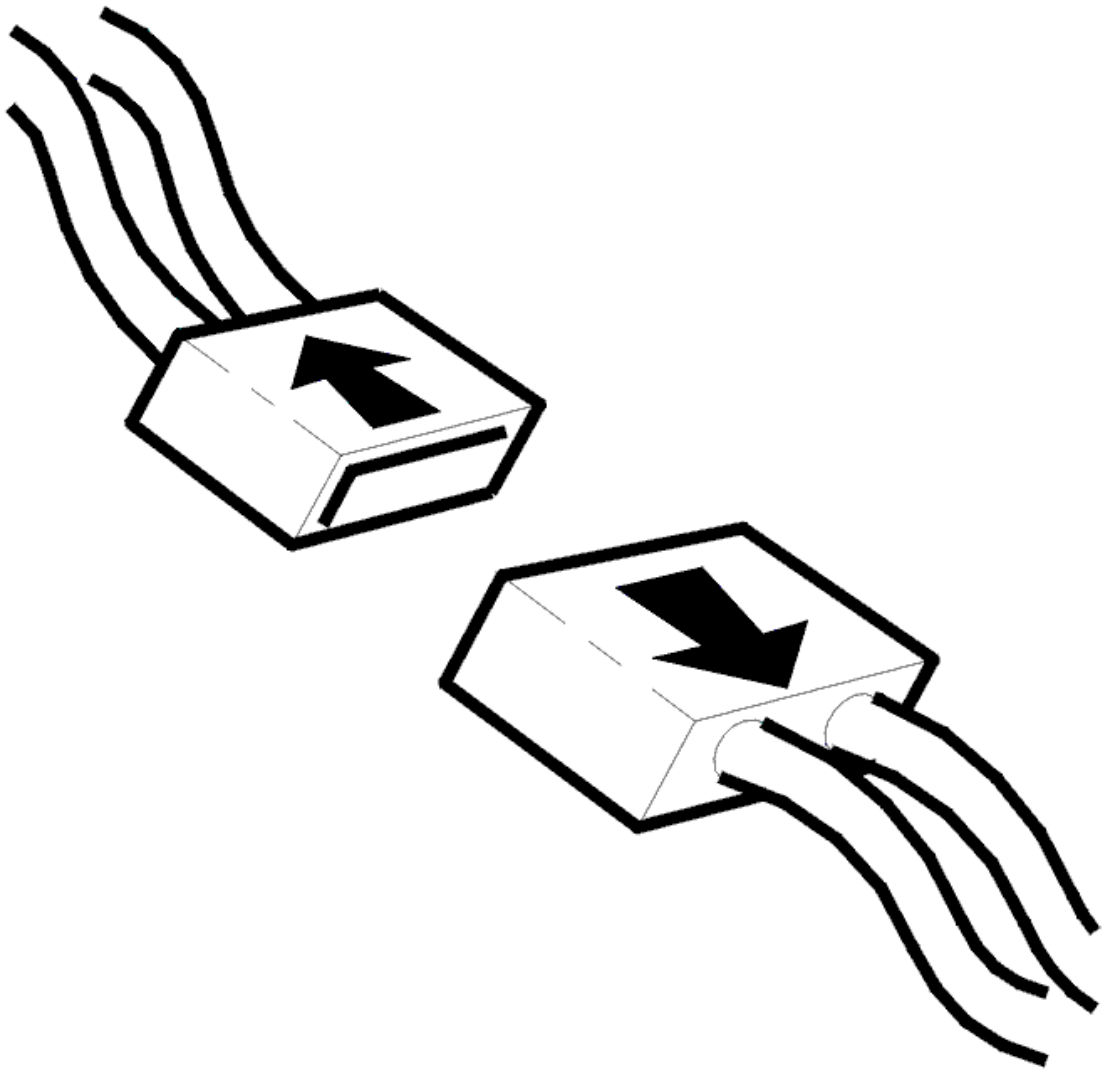


Fig. 40: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals #C (#A3) and #D (#A4) on the breakout box.

  The solenoid STH resistance must be between 3 and 5 ohms at 20°C.

  Other information:

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**

- For information about signals, see **SIGNAL SPECIFICATION** .

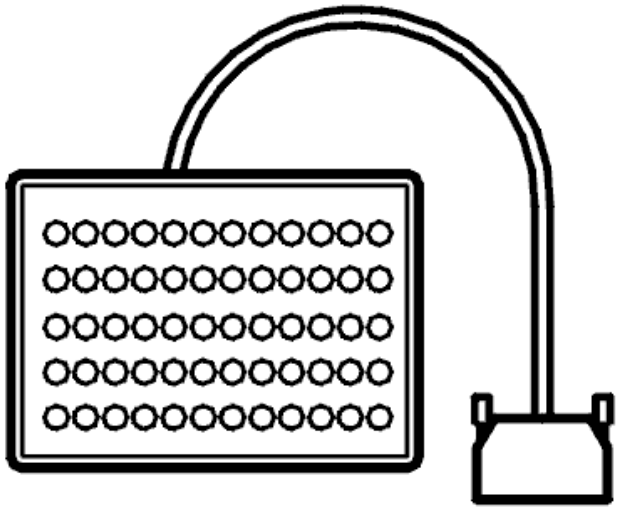


Fig. 41: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

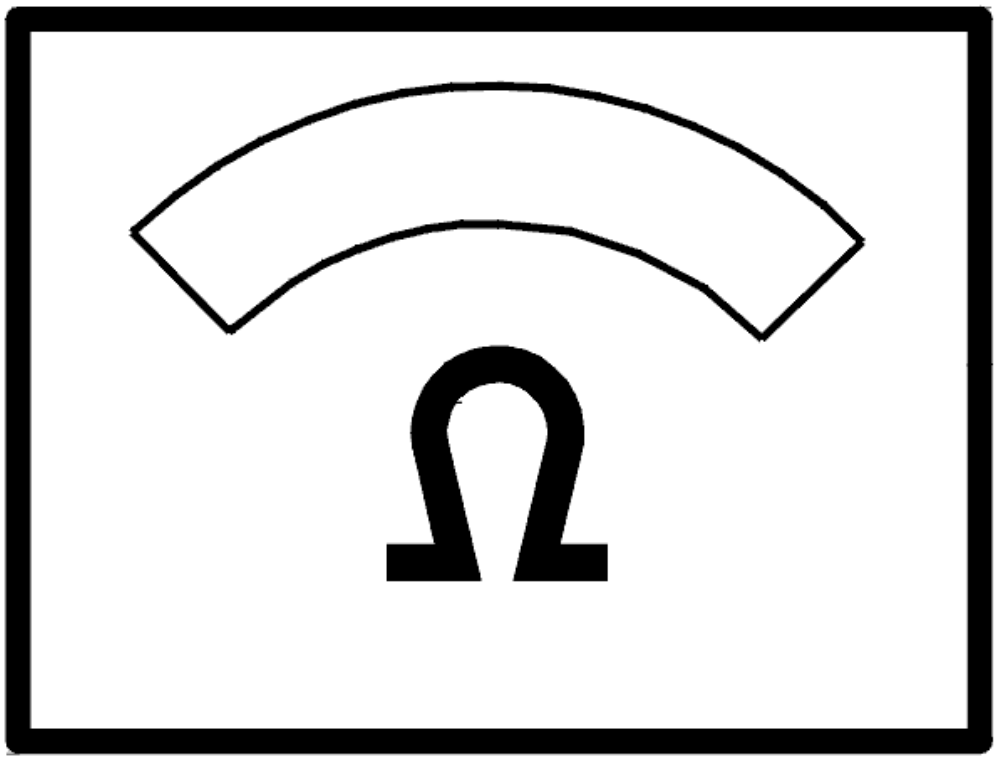


Fig. 42: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

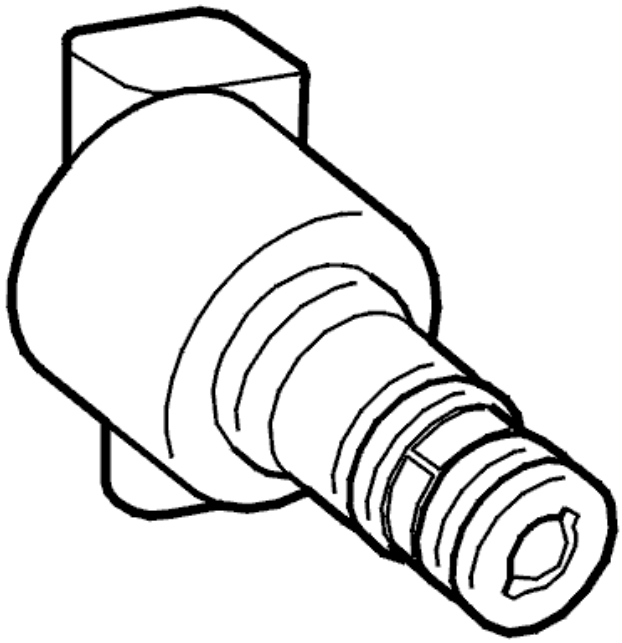


Fig. 43: Identifying Line Pressure Solenoid, STH
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE CABLES IN THE CIRCUIT FOR SOLENOID STH**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE CABLES IN THE CIRCUIT FOR SOLENOID STH

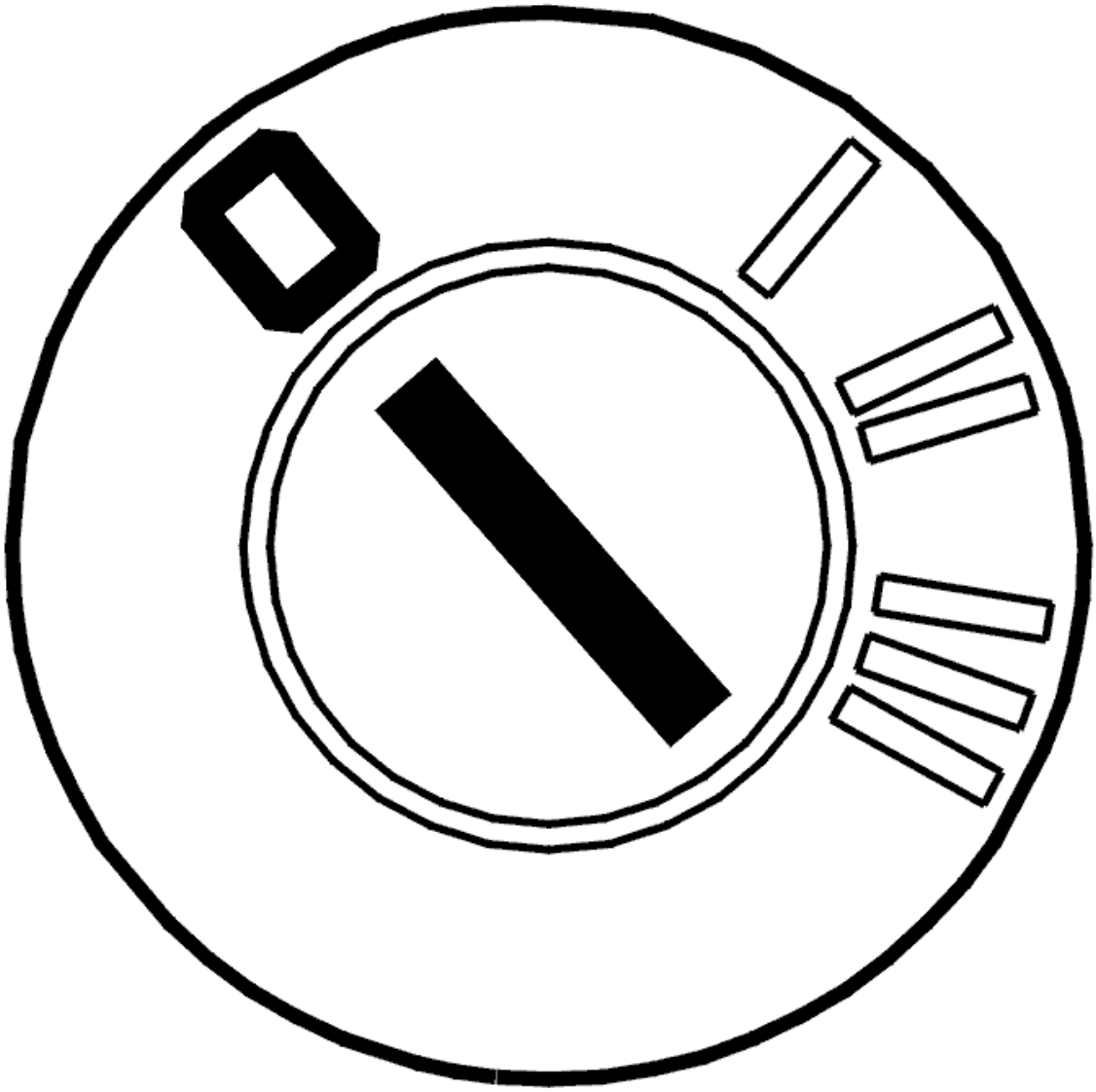


Fig. 44: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

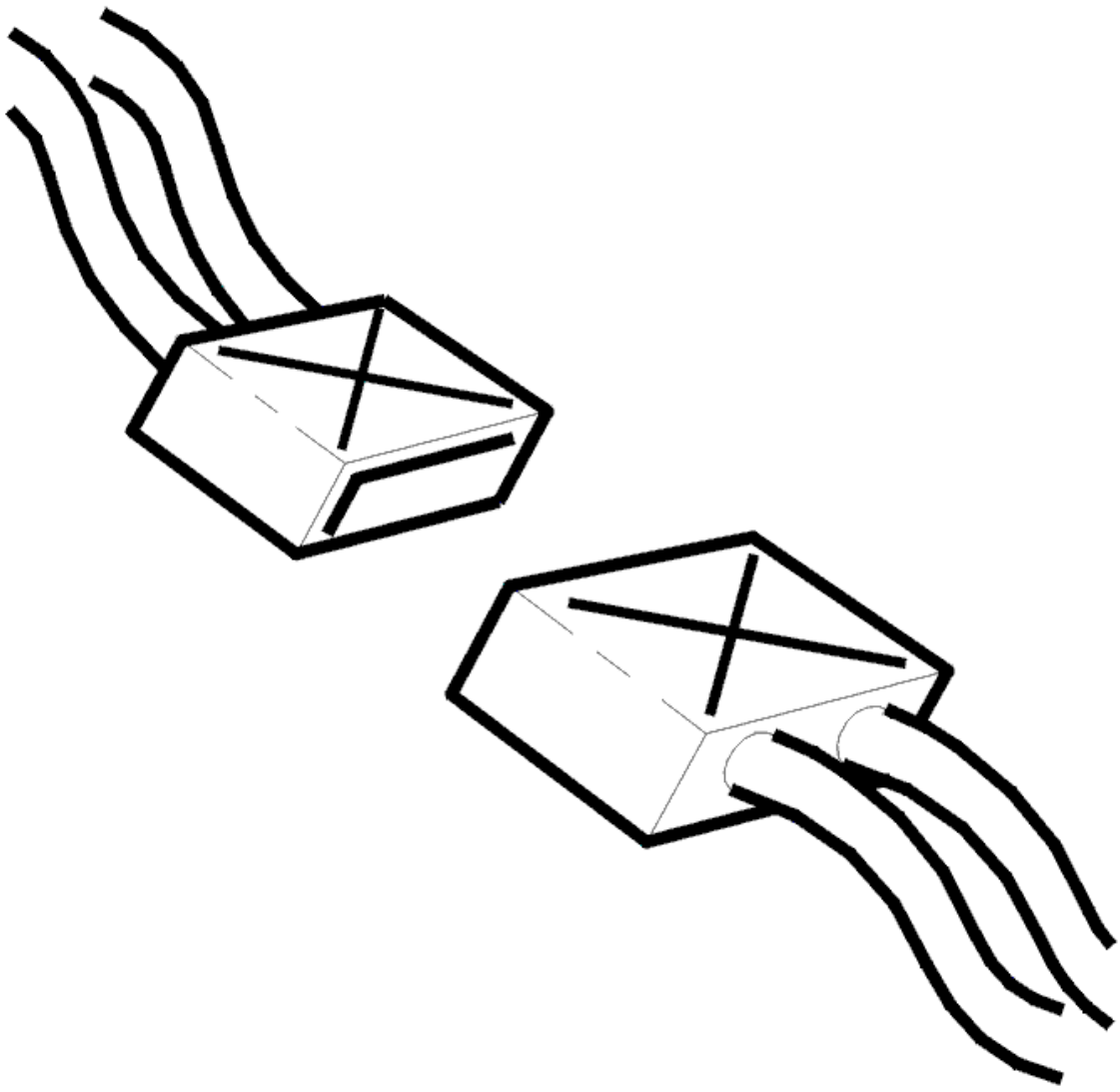


Fig. 45: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

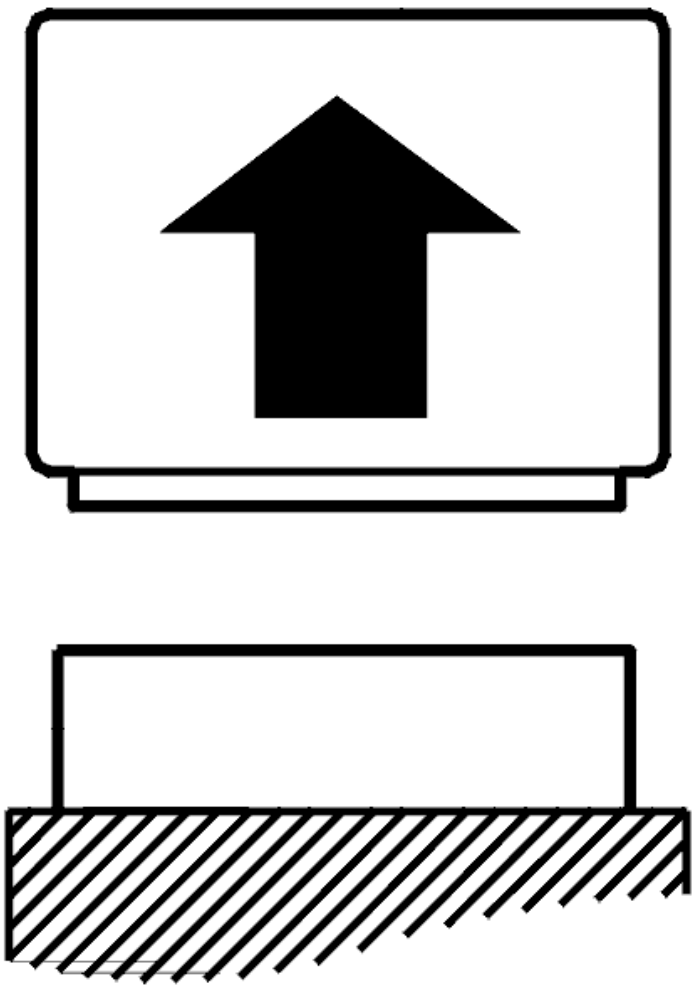


Fig. 46: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the transmission
- Disconnect the control module.
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (control module side).

  Check the cable between control module terminal #A52 and transmission connector terminal #C (#A3) for a short-circuit to ground.

  Check the cable between control module terminal #A70 (#B10) and transmission connector terminal #D (#A4) for a short-circuit to ground.

Other information:

- To connect the breakout box to the control module, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

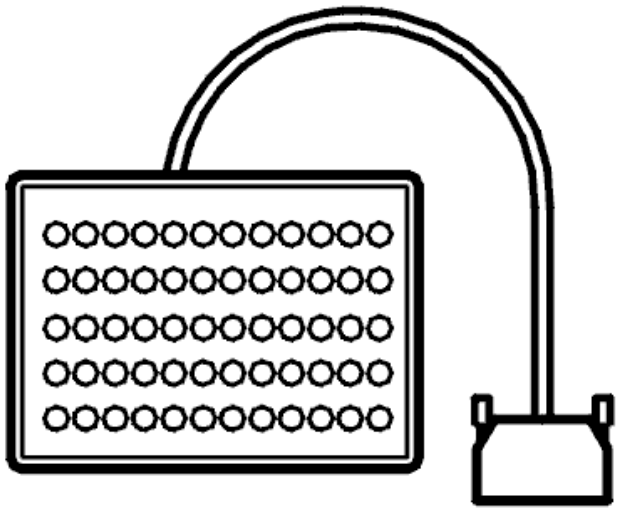


Fig. 47: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

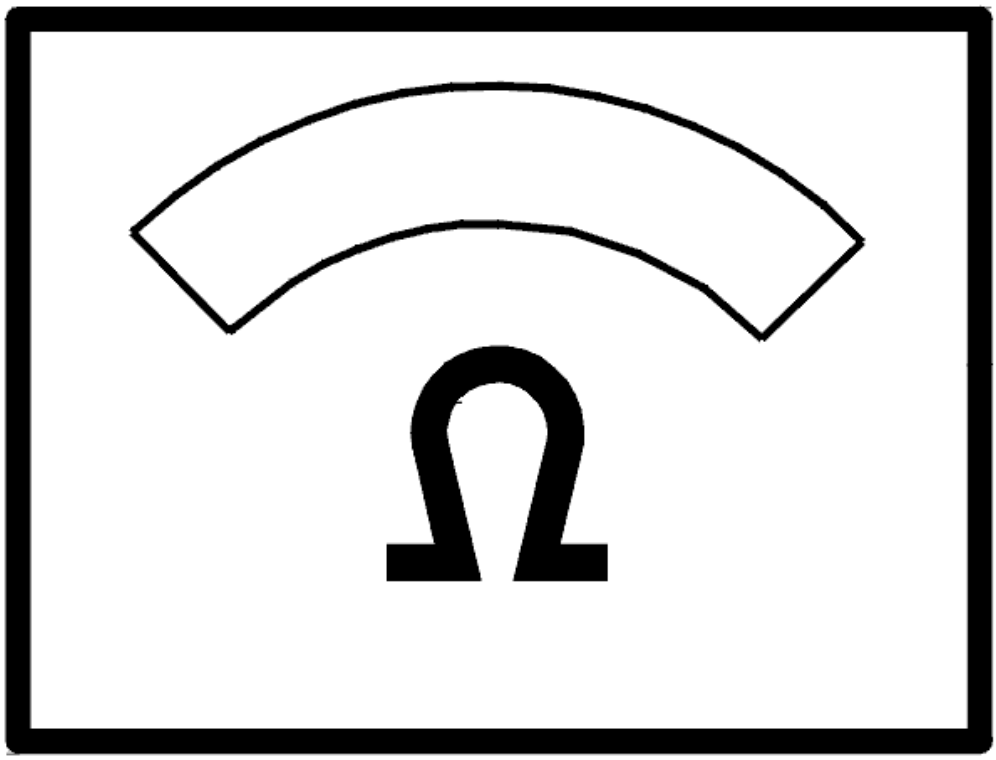


Fig. 48: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the wiring OK?

- **YES**

  Refer to **CHECKING THE WIRING AND COMPONENT**

- **NO**

  Refer to **ERASING DIAGNOSTIC TROUBLE CODE (DTC)**

CHECKING THE WIRING AND COMPONENT

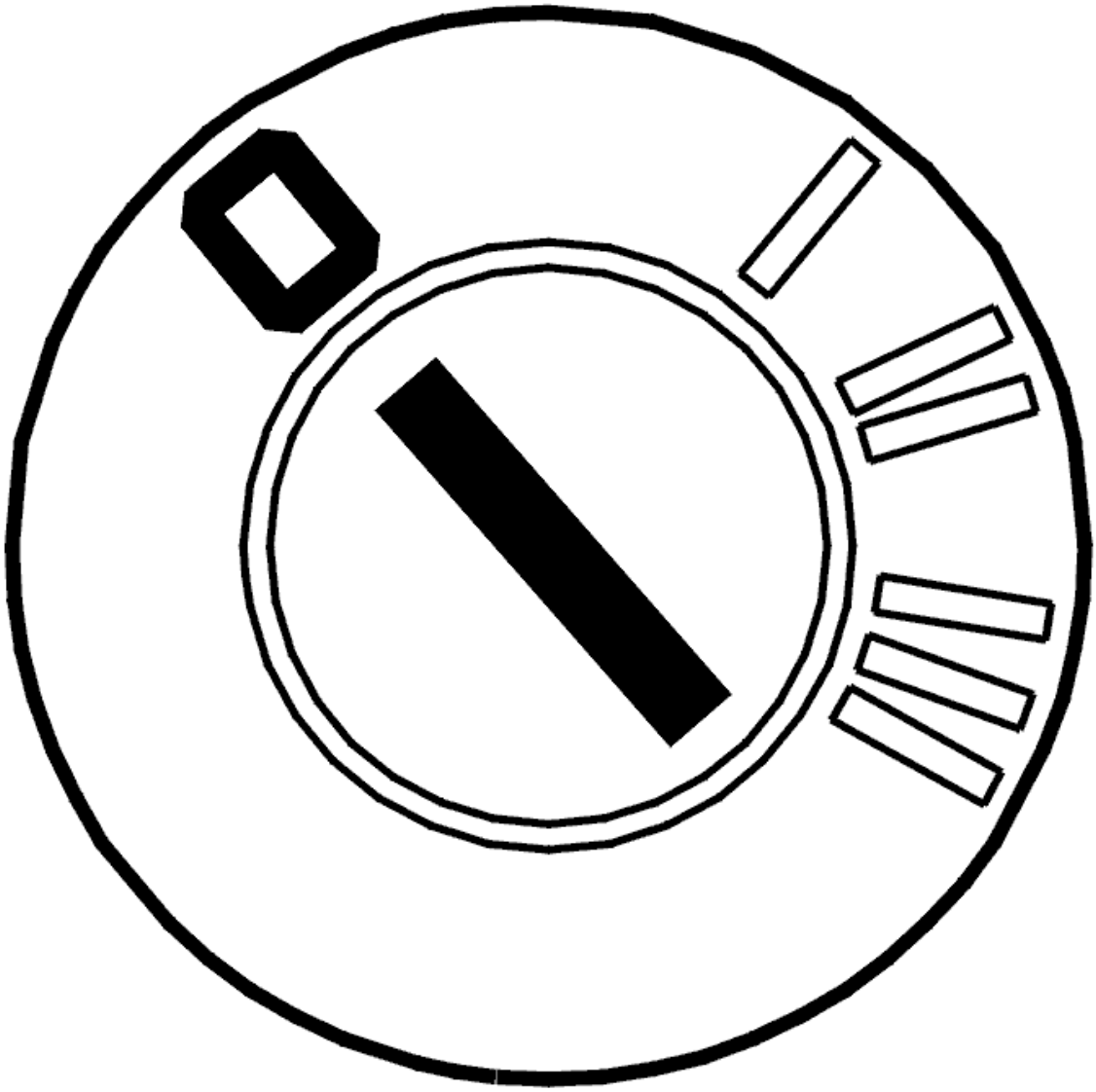


Fig. 49: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission terminal #C (#A3) and solenoid STH terminal #A. Check the cable between transmission terminal #D (#A4) and solenoid STH terminal #B. Check these cables for a short-circuit to ground.

  HINT: Check solenoid STH. Measure the solenoid STH resistance between terminals A and B. The resistance should be between 3-5 ohms.

  Replace the cable harness if no fault is found in the solenoid or the terminals.

  Other information:

- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** . To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid STH, see **SOLENOID LINE PRESSURE, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

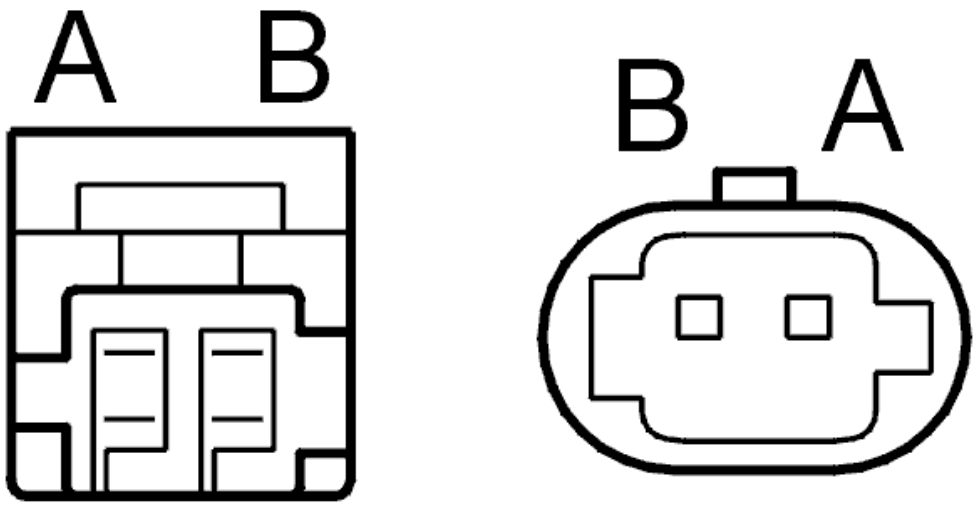


Fig. 50: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

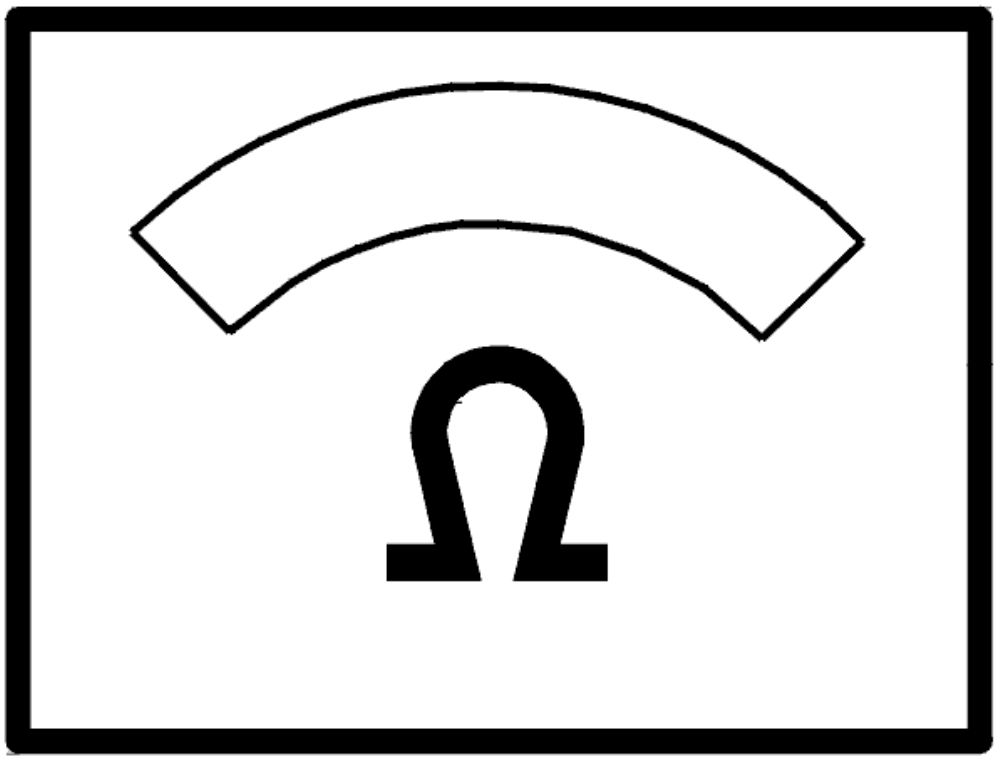


Fig. 51: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

REPLACING THE TRANSMISSION

Fault-tracing indicates a mechanical fault in the transmission. Replace the transmission according to **TRANSMISSION, REMOVING** .

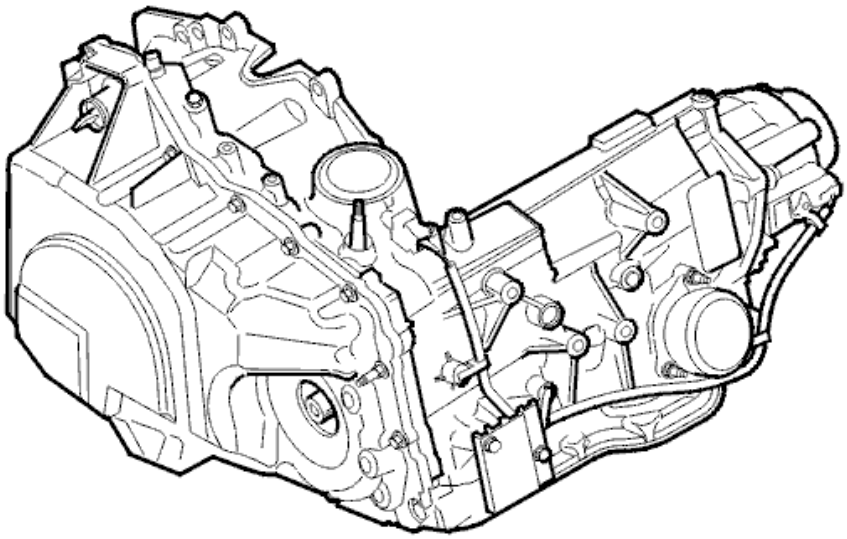


Fig. 52: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

ERASING DIAGNOSTIC TROUBLE CODE (DTC)

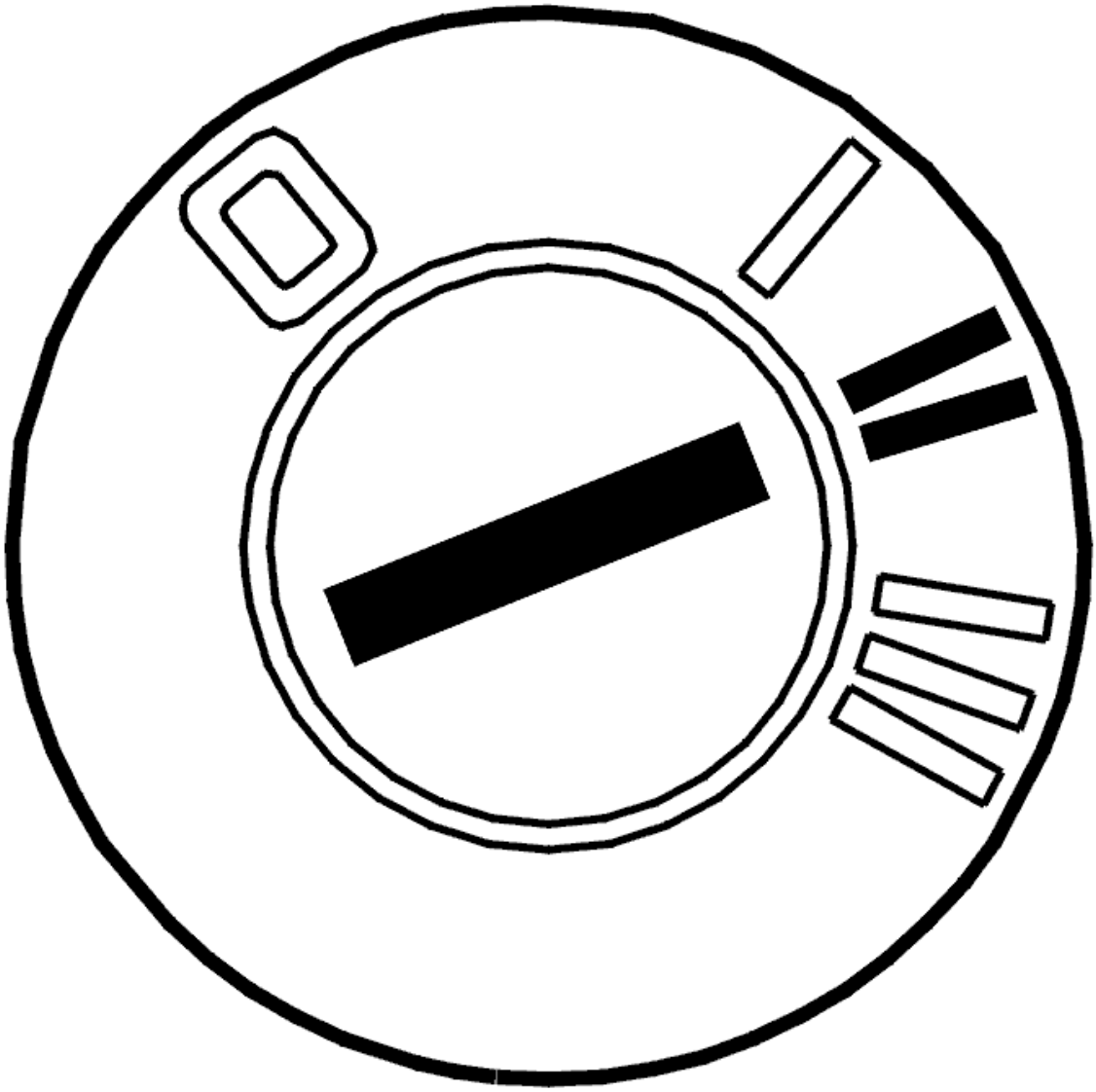


Fig. 53: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Erase diagnostic trouble codes (DTCs)
- Test drive the car. See **TEST DRIVE FORM, DESCRIPTION** .

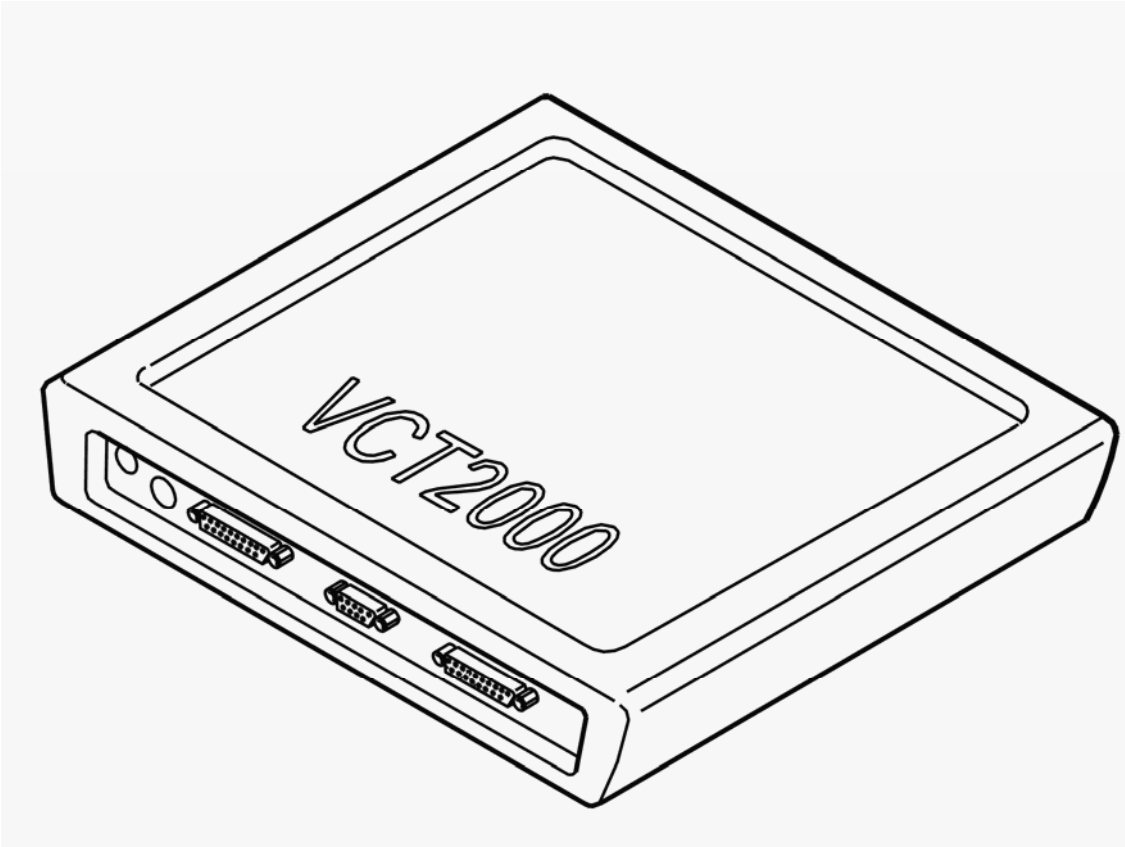


Fig. 54: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

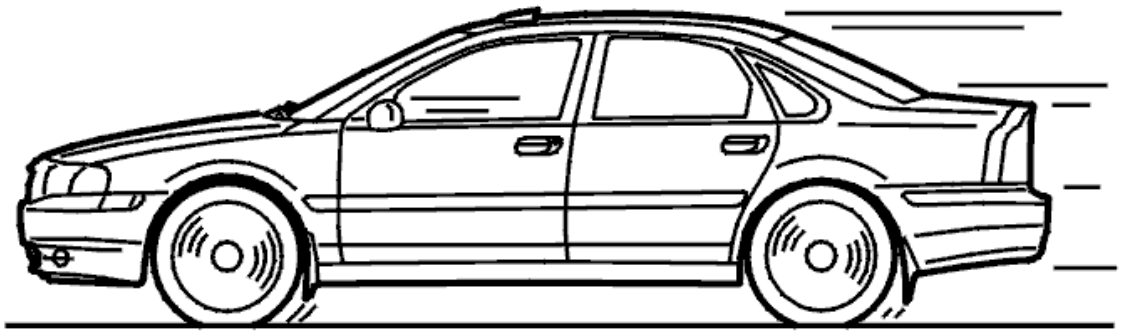


Fig. 55: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **READING OFF DIAGNOSTIC TROUBLE CODES (DTC)**

READING OFF DIAGNOSTIC TROUBLE CODES (DTC)

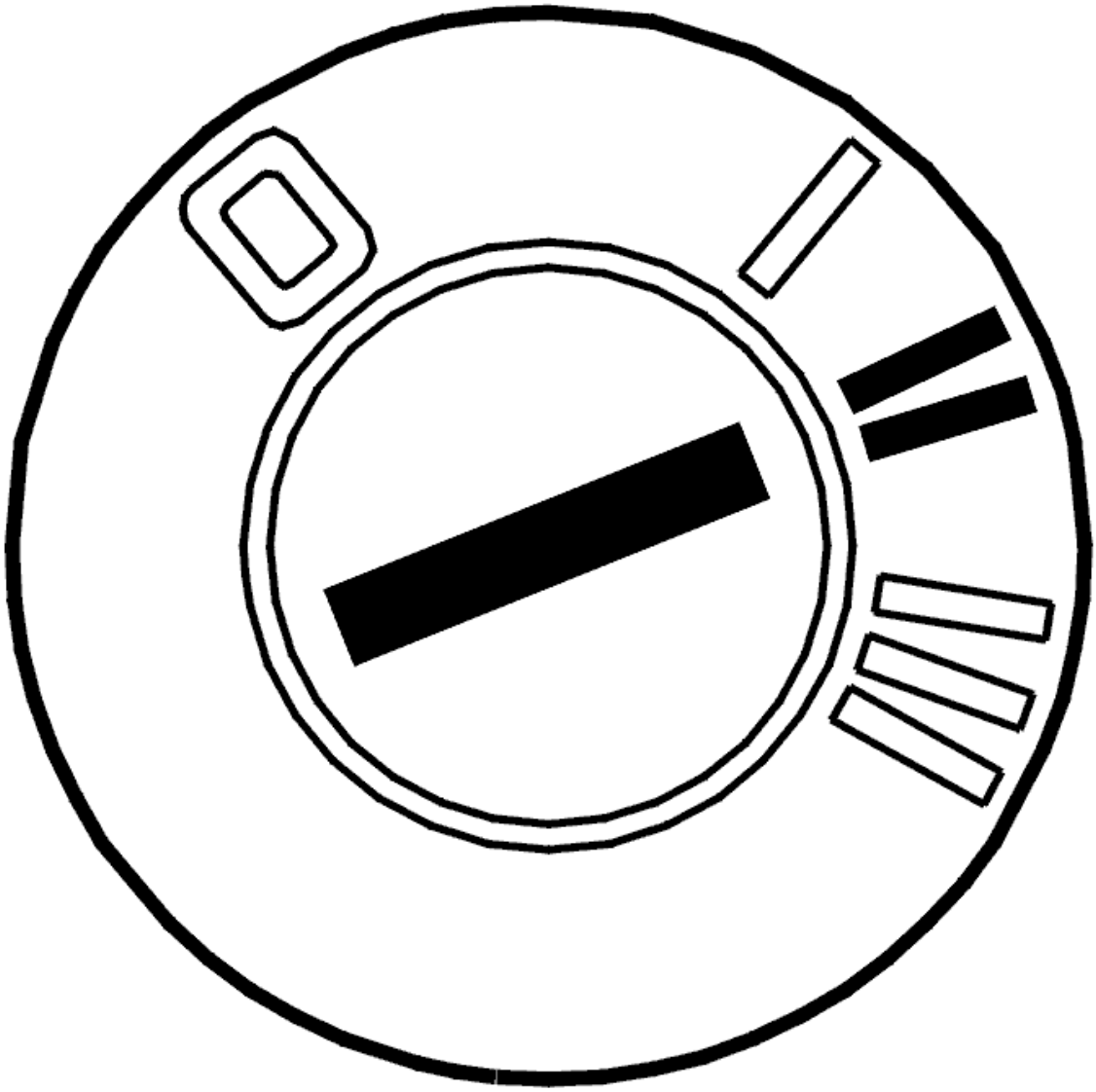


Fig. 56: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

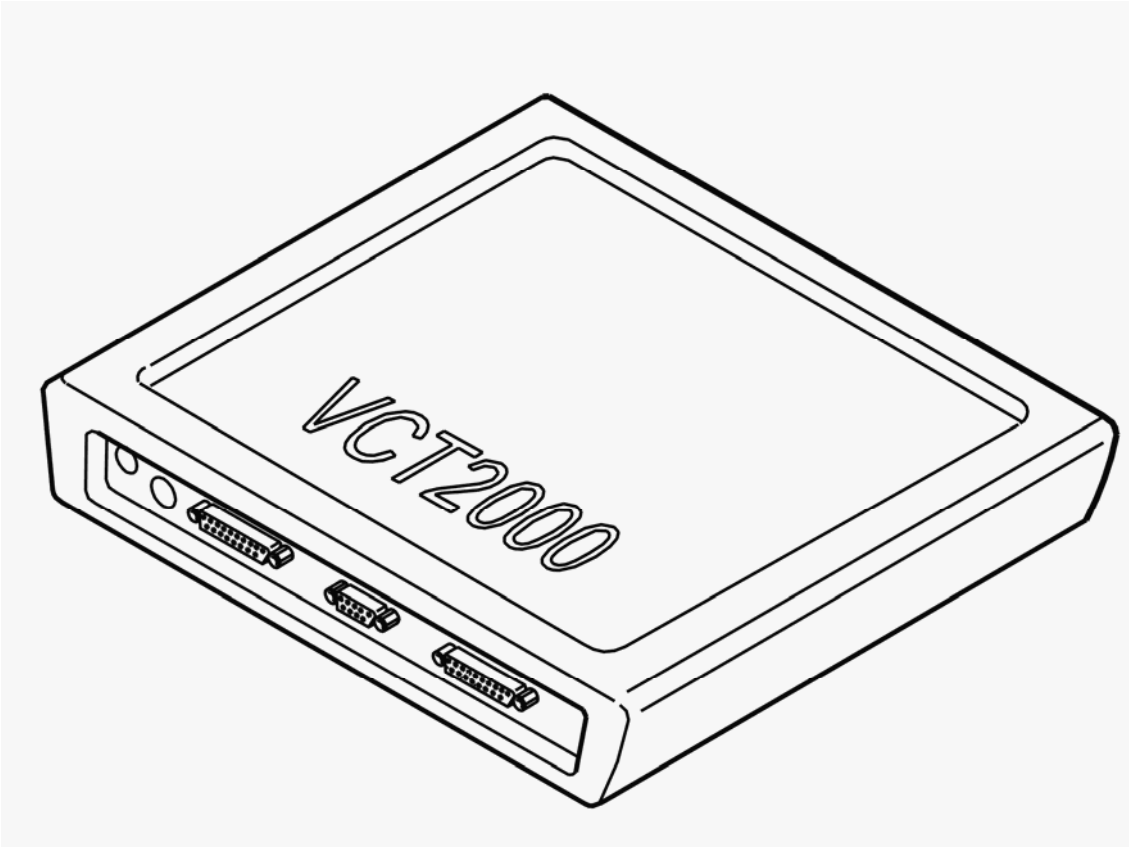


Fig. 57: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does diagnostic trouble code (DTC) TCM-0010 recur?

- **YES**

  Refer to **INFORMATION**

- **NO**

  OKAY: Troubleshooting has been completed.

CHECK THE QUALITY OF THE TRANSMISSION OIL

CHECK THE QUALITY OF THE TRANSMISSION OIL

NOTE: The transmission fluid quality is extremely important for transmission function. Therefore it is imperative that this is correct.

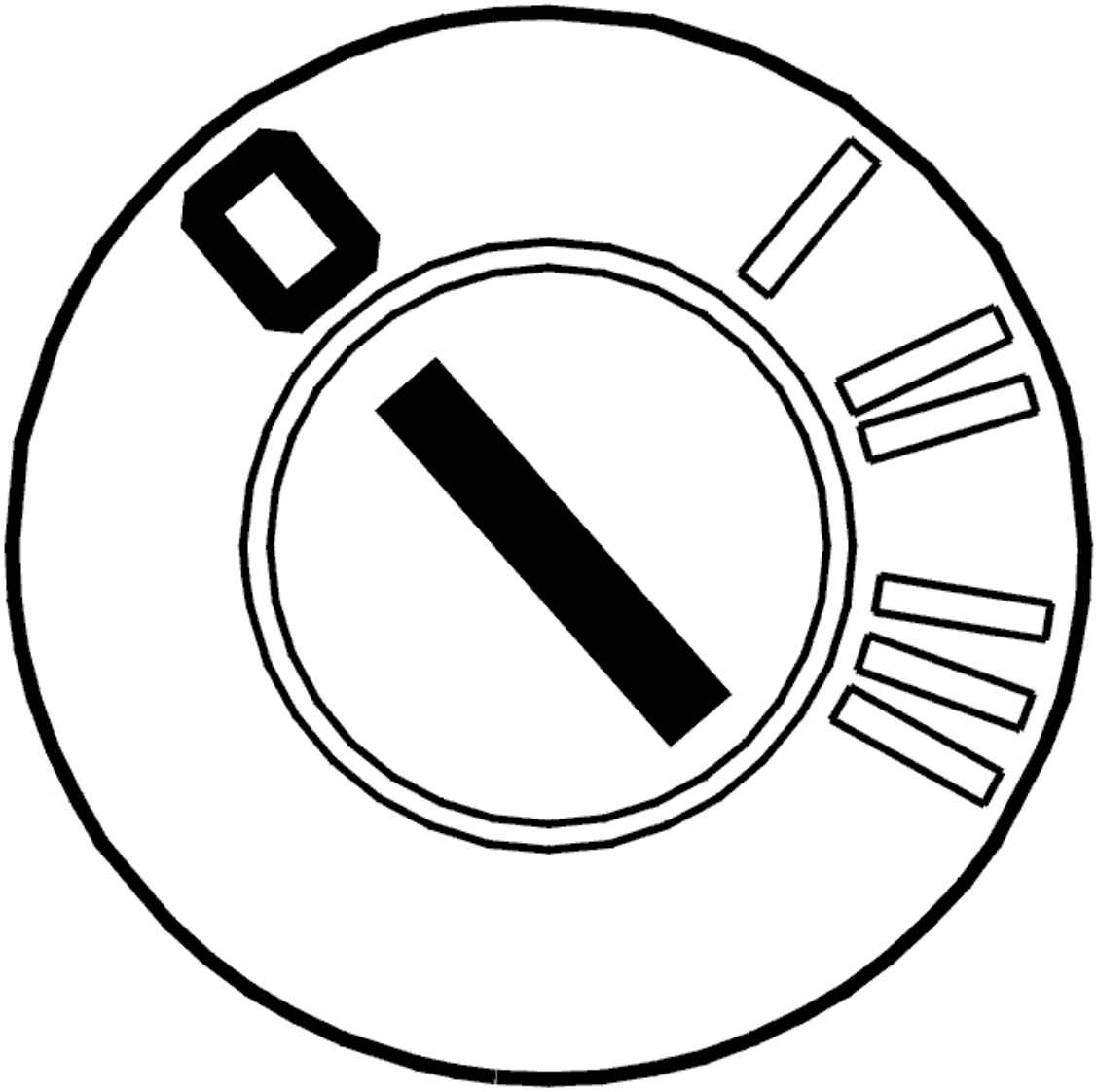


Fig. 58: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission oil quality. Take a sample using the dip stick.

  - Replace the transmission fluid if it smells burnt
  - Replace the fluid and filter if the transmission fluid contains particles
  - Check if there is oil or an oil film in the expansion tank. Oil in the expansion tank indicates leakage from the transmission oil cooler which is positioned in the cooler unit.

  NOTE: The transmission oil is red and must not be confused with black engine oil.

- If the transmission fluid is cloudy or pink, it is contaminated with coolant. In such cases the transmission must be replaced. For checking coolant in transmission oil, see **CHECKING FOR COOLANT IN THE OIL**

  When replacing the transmission, the cooler unit, including the additional cooler must be replaced if installed. Replace the hoses between the cooler and the transmission.

Other information:

- To replace the transmission fluid and filter, see **TRANSMISSION OIL / OIL FILTER, REPLACING** .

Select an option:

1. The fluid contains water

   Refer to **REPLACING THE TRANSMISSION**

2. The fluid smells burnt or contains particles

   Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

3. No fault detected.

   Refer to **CHECKING THE OIL LEVEL IN THE TRANSMISSION**

CHECKING THE OIL LEVEL IN THE TRANSMISSION

CHECK THE TRANSMISSION OIL LEVEL

NOTE: The transmission fluid level is extremely important for transmission function. Therefore it is imperative that it is correct. In addition the oil level is dependent on oil temperature.

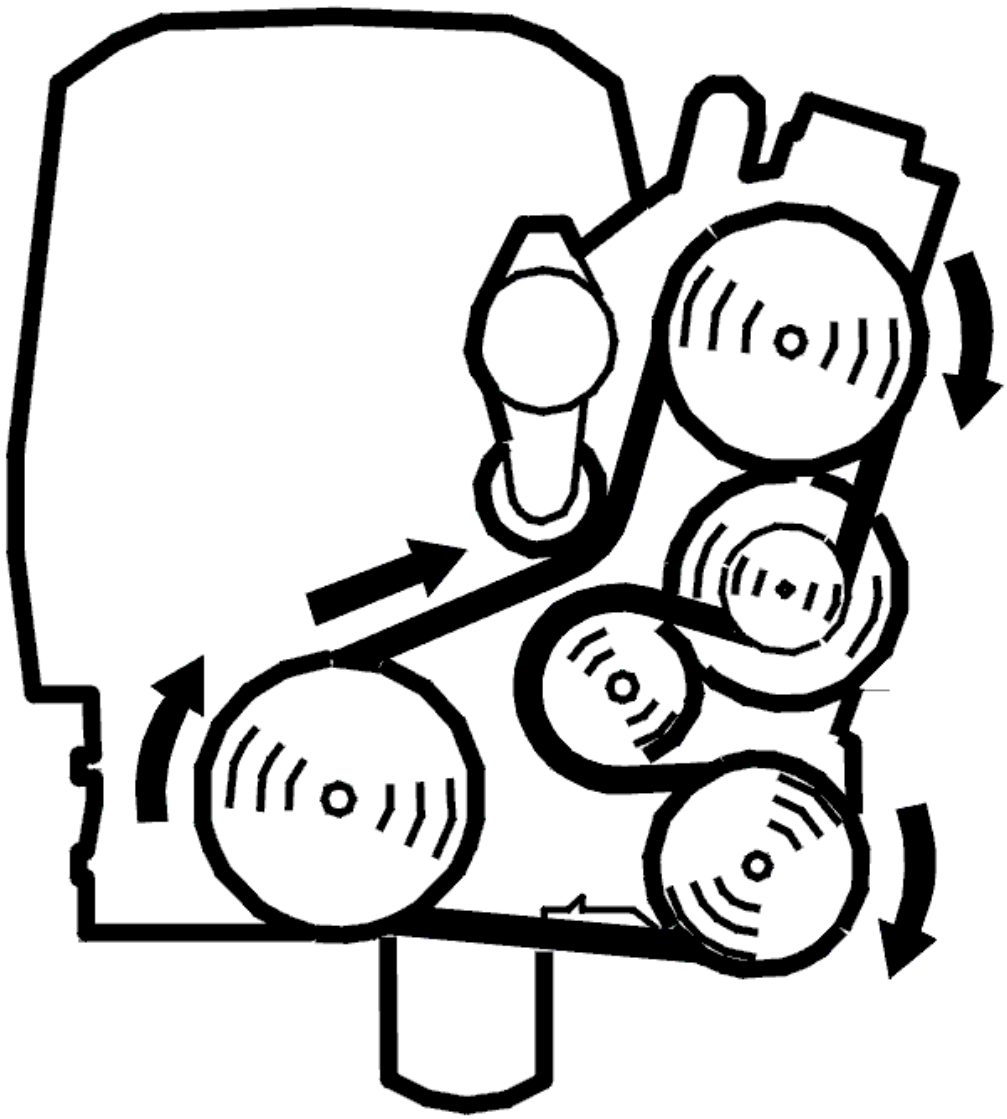


Fig. 59: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the car
- Read off the oil temperature.

When checking the gearbox oil level the oil temperature **must** be **80 °C - 90 °C** .

At the correct temperature, the oil level should be between "Min hot" and "Max hot".

Oil level

Too high: Drain the transmission fluid to the correct level
Too low: Check the transmission for leakage.

Remedy as necessary.

Other information:

- To check and adjust the oil level, see **OIL LEVEL, CHECKING** .

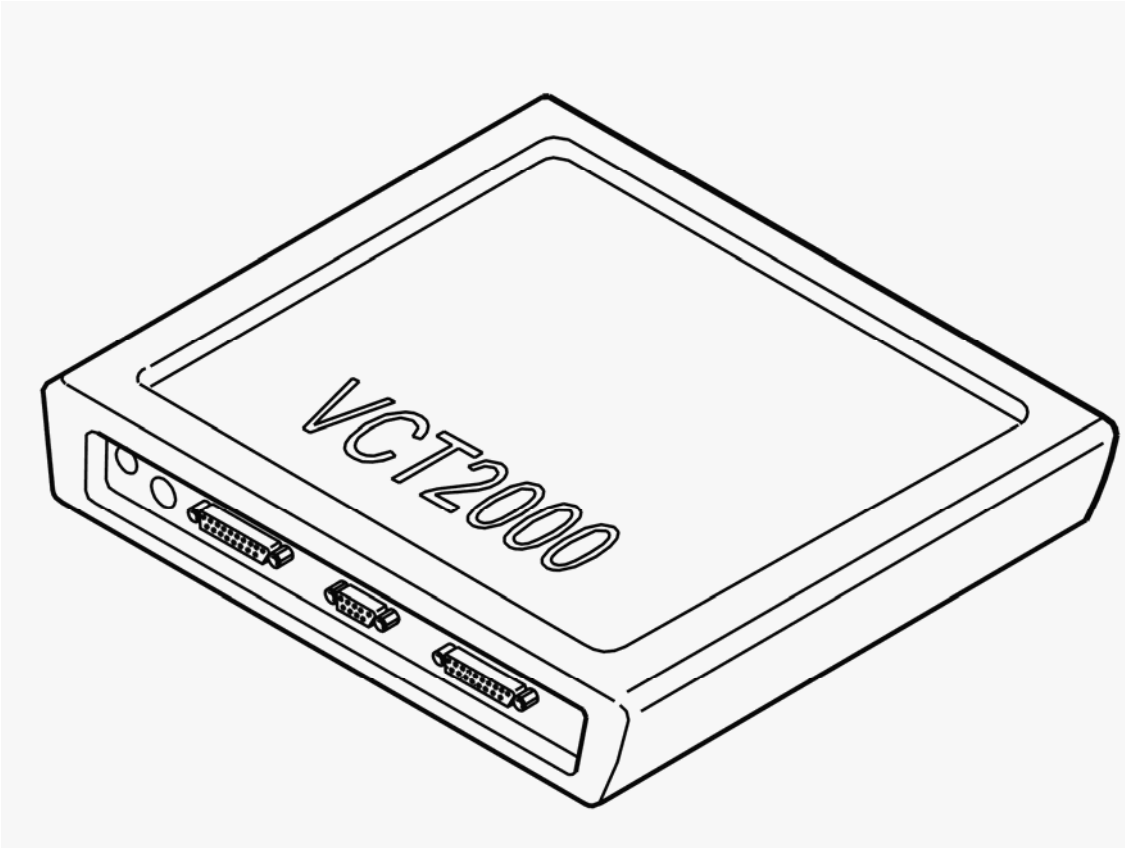


Fig. 60: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

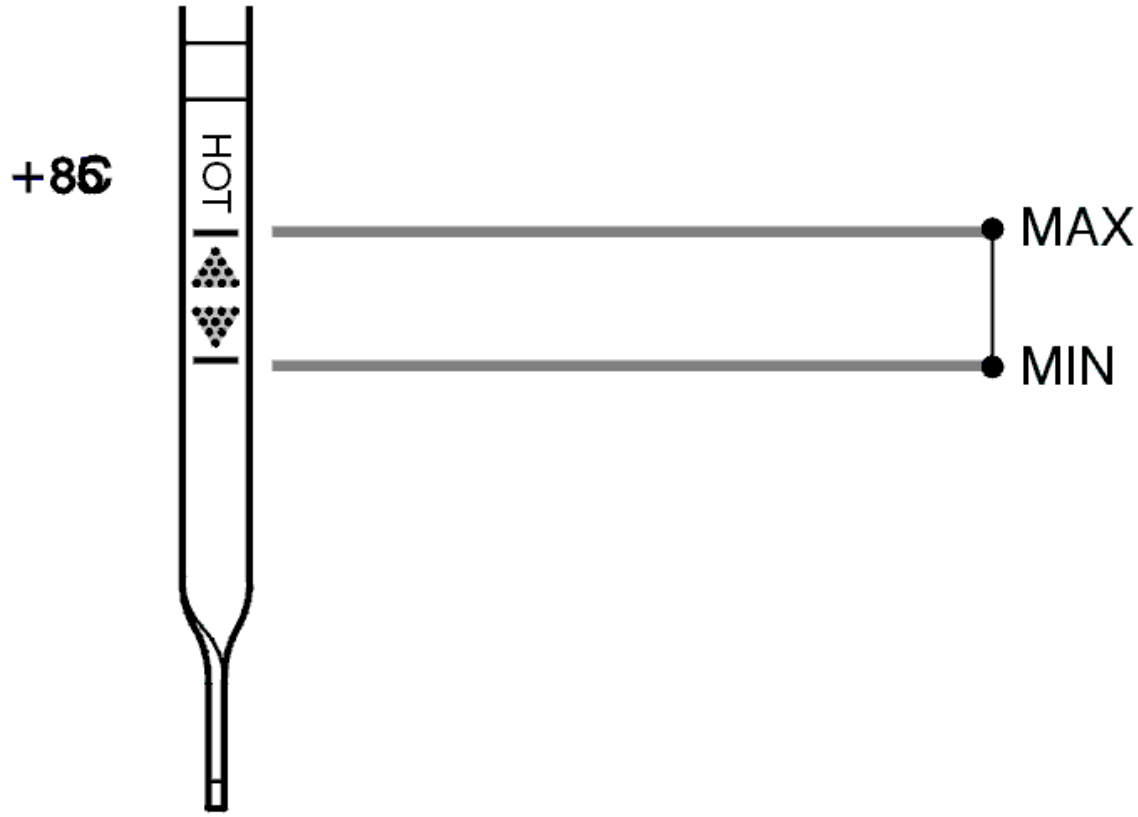


Fig. 61: Identifying Oil Level / Temperature
Courtesy of VOLVO CARS CORPORATION

Was the transmission fluid level correct?

- **YES**

  Refer to **CHECKING SOLENOID STH**

- **NO**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect

circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

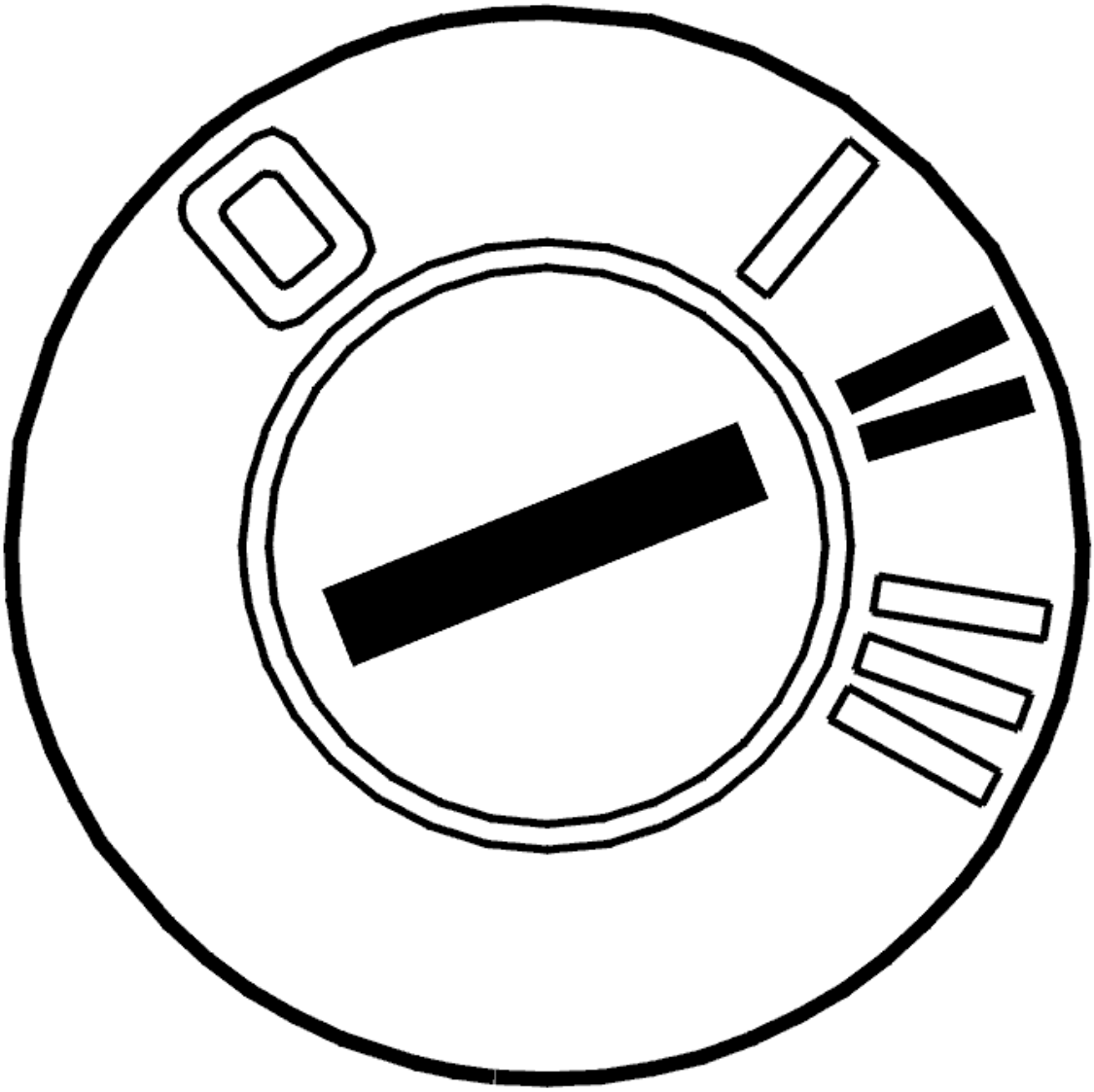


Fig. 62: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

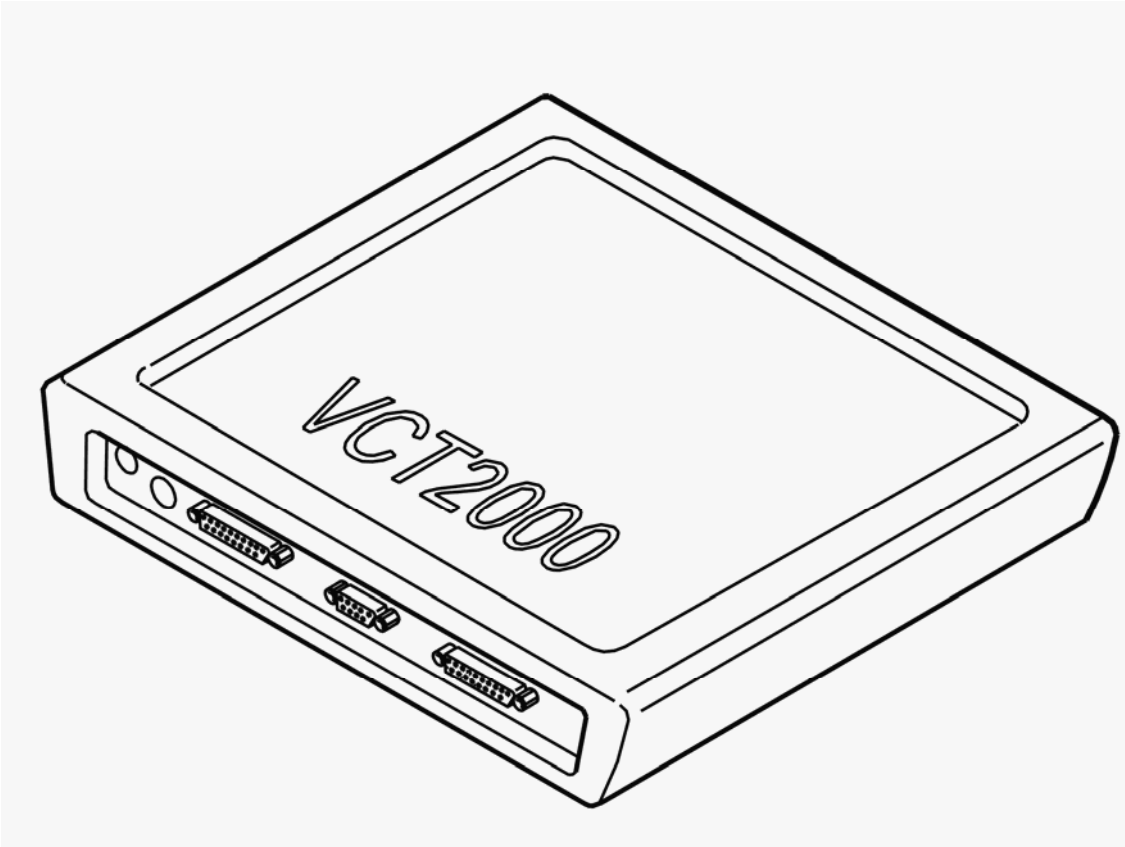


Fig. 63: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.

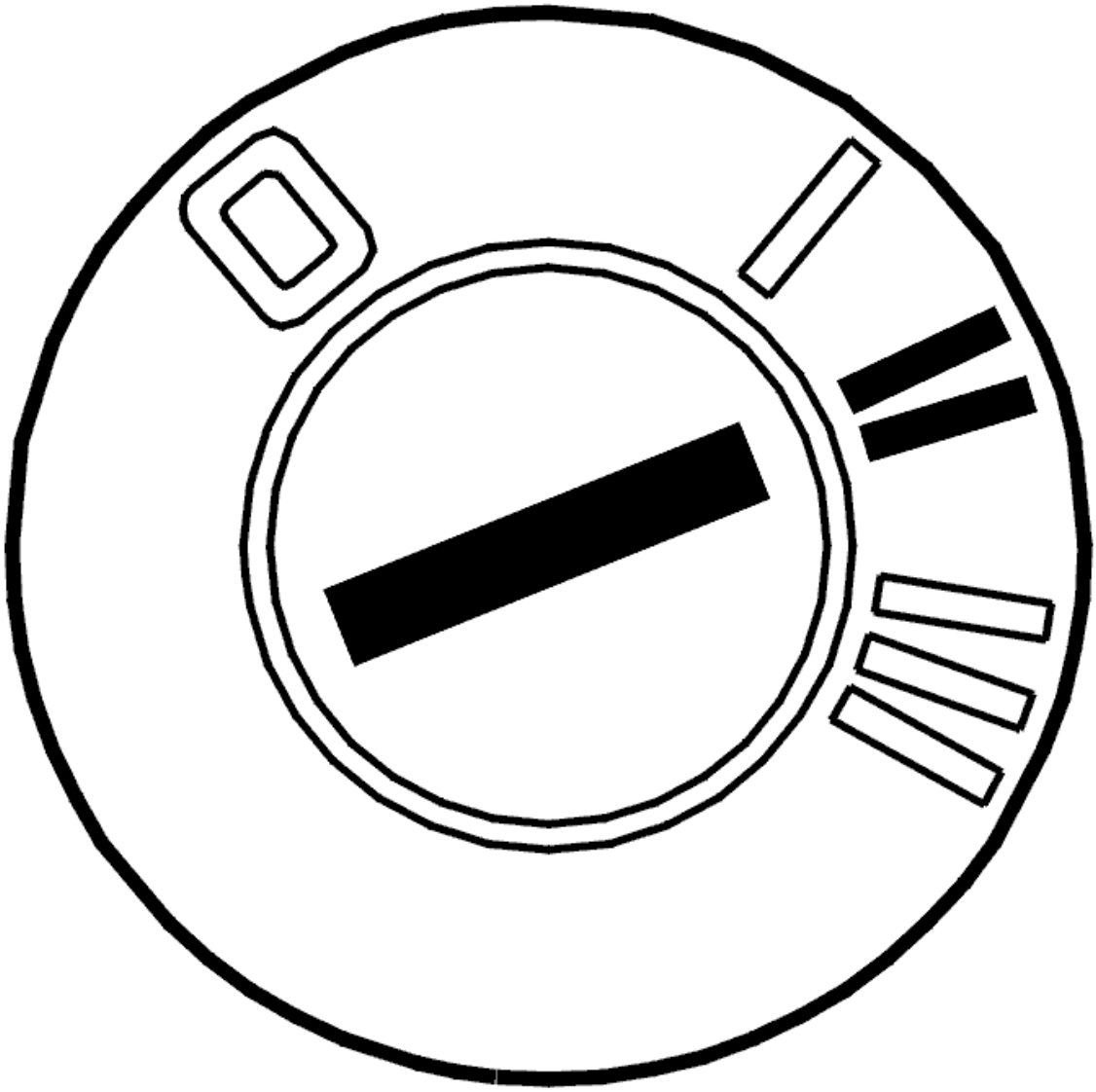


Fig. 64: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

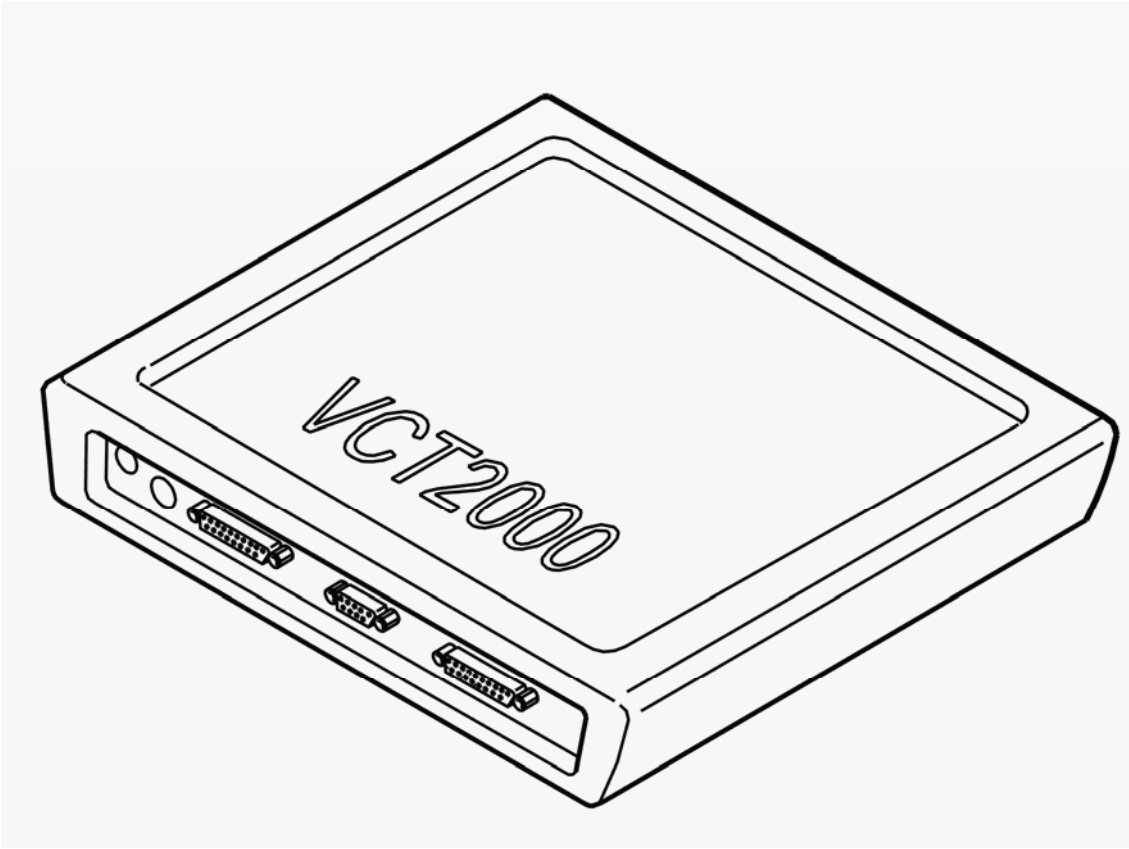


Fig. 65: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

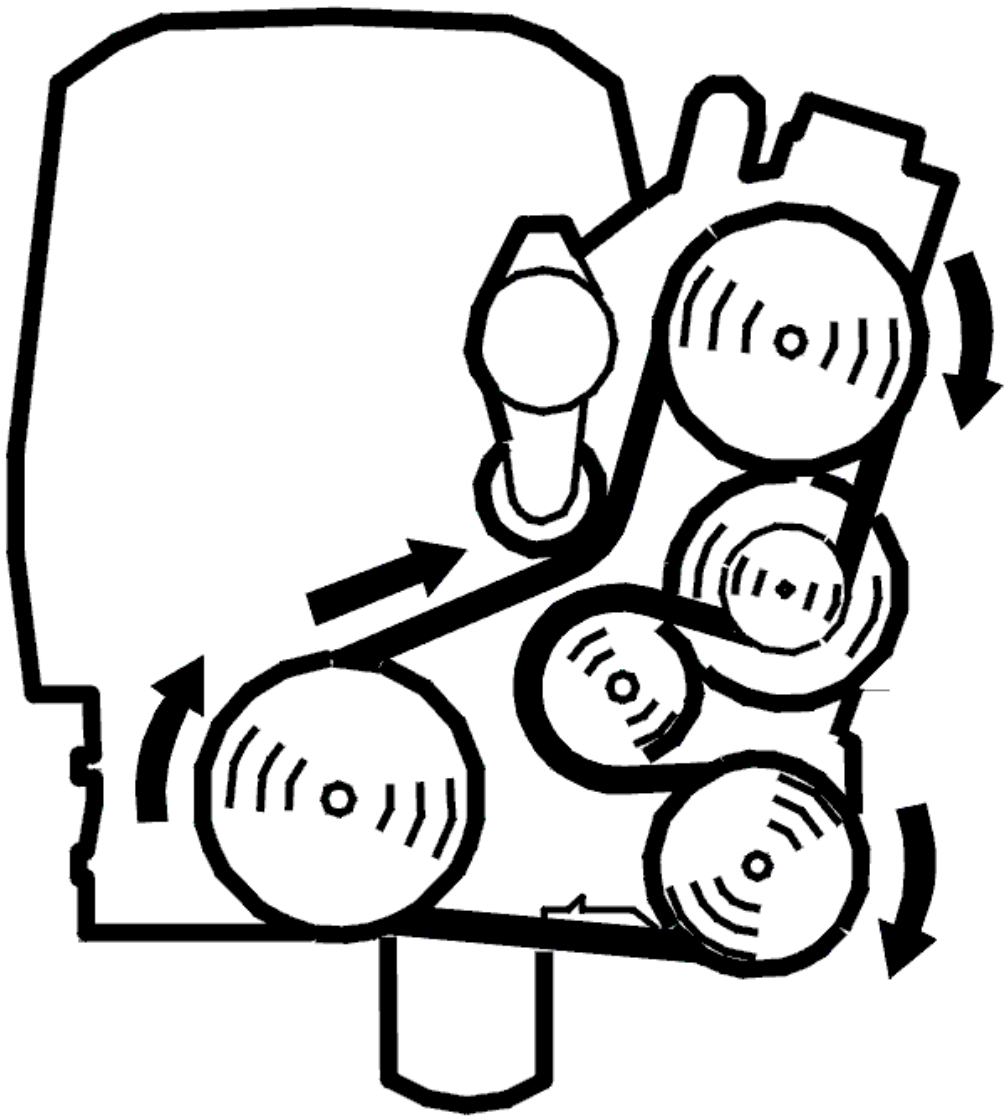


Fig. 66: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

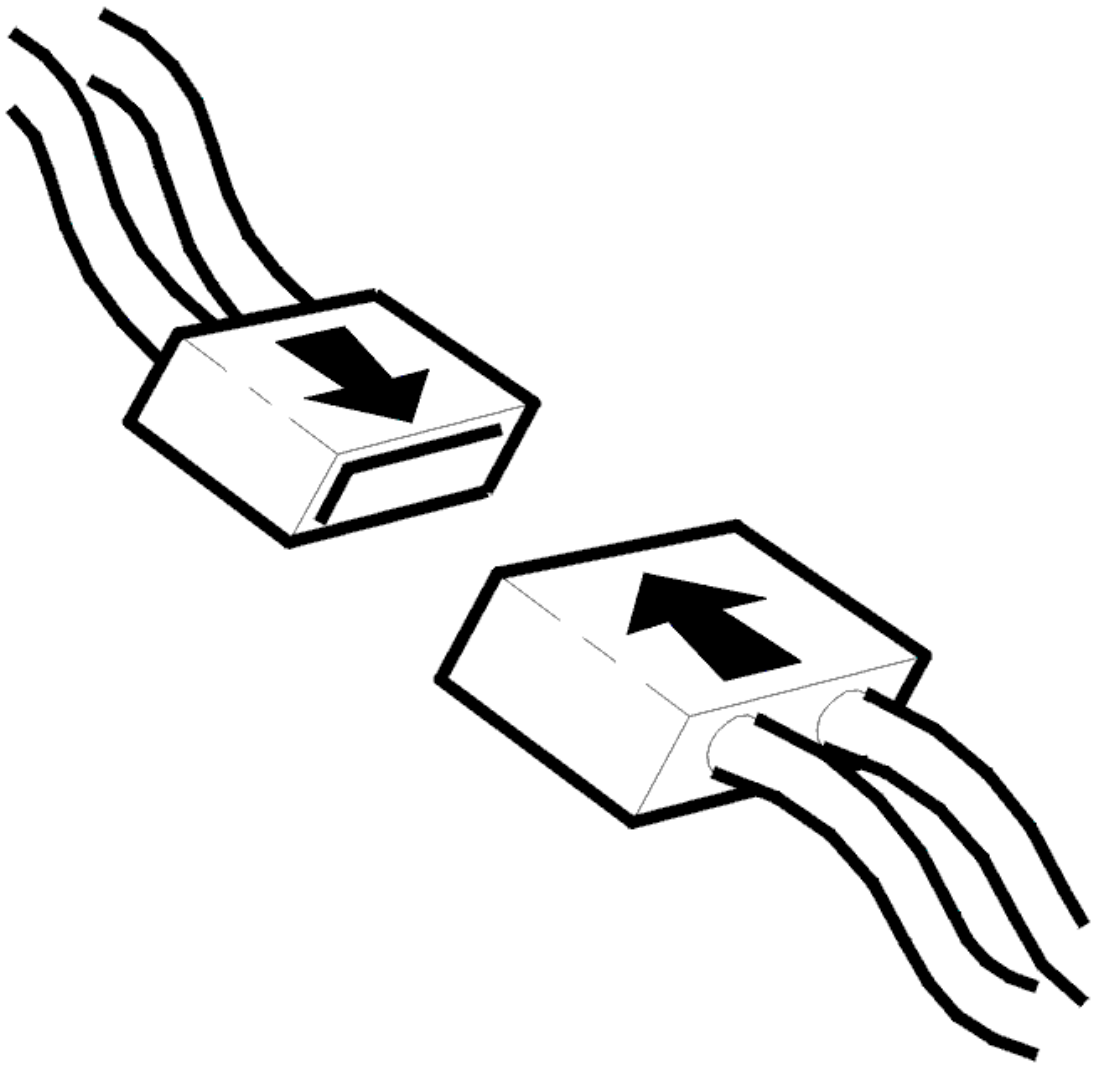


Fig. 67: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reconnect the connectors, reinstall components etc.
- Raise the car so that the drive wheels are unimpeded.
- Start the car.
- Read off the current through the solenoid circuit.
- Lock the wheels with the brakes. Shift the gear selector to position D.
- Depress the accelerator pedal (AP) slowly.

The current should decrease as the accelerator pedal (AP) is depressed.

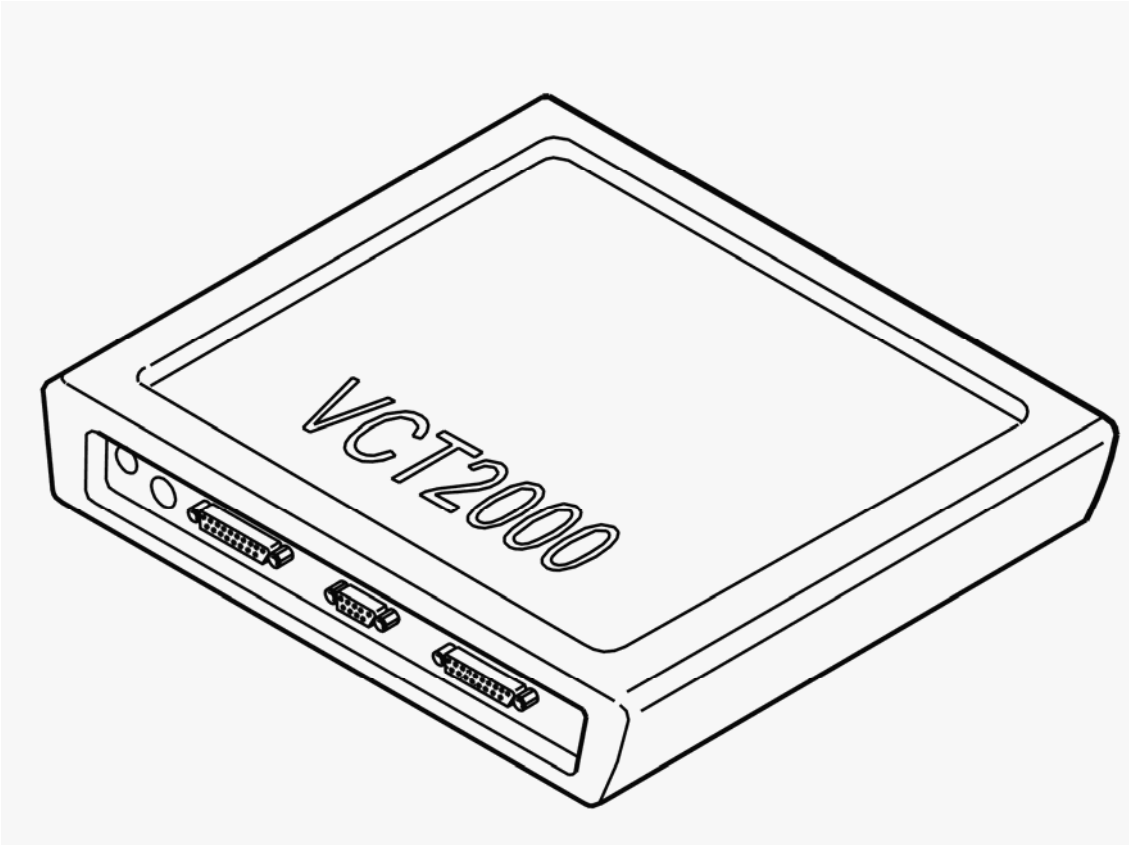


Fig. 68: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current decrease?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0012: LOCK-UP SOLENOID SL. SIGNAL TOO HIGH. INTERMITTENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

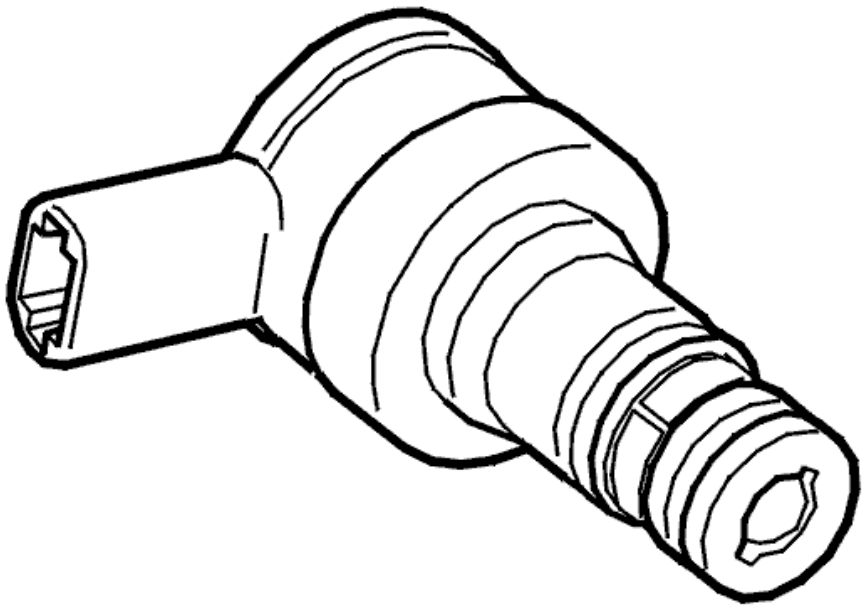


Fig. 69: Identifying Lock-Up Solenoid, SL
Courtesy of VOLVO CARS CORPORATION

Lock-up solenoid SL controls the transmission lock-up function. Solenoid SL operates when it receives voltage from the transmission control module (TCM) and is activated under different driving conditions depending on road speed, throttle position and the driving mode selected. Diagnostic trouble code (DTC) TCM-0012 is stored if the control module registers that the signal is too high in the circuit for solenoid SL when the solenoid should not be activated. Solenoid SL is then probably permanently activated.

Substitute Value

- The control module does not activate the lock-up solenoid.

Possible Source

- Short-circuit to supply voltage in the signal cable.

Fault symptom[s]

- General orange warning lamp lit.

- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- Irregular shifting.

HINT: Harsh shifting - because the solenoid is permanently activated, the lock-up function is permanently engaged in 2nd, 3rd and 4th gears. Harsh shifting and engine braking function in 2nd, 3rd and 4th gears.

SIGNAL TOO HIGH. INTERMITTENT FAULT

INTERMITTENT FAULT

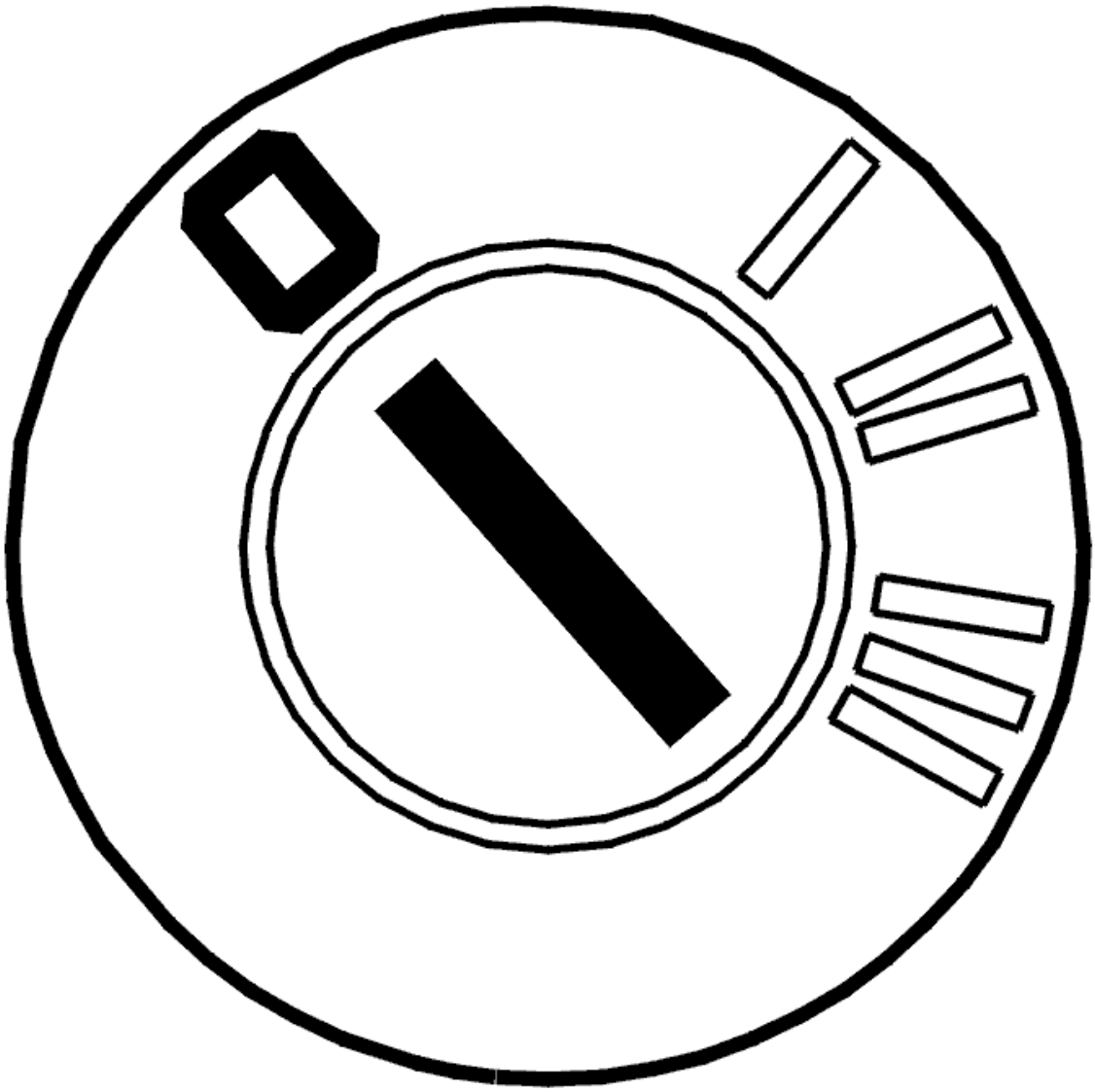


Fig. 70: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the wiring between control module terminal A51 and transmission connector terminal T (#A17) for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

  Check the wiring between control module terminal A53 and transmission connector #E (#A5) for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

  Remedy as necessary.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX** .
  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS** .
  - For information about signals, see **SIGNAL SPECIFICATION** .

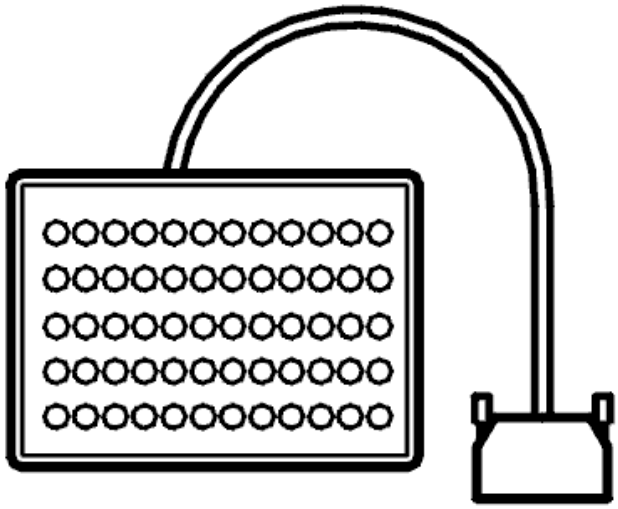


Fig. 71: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

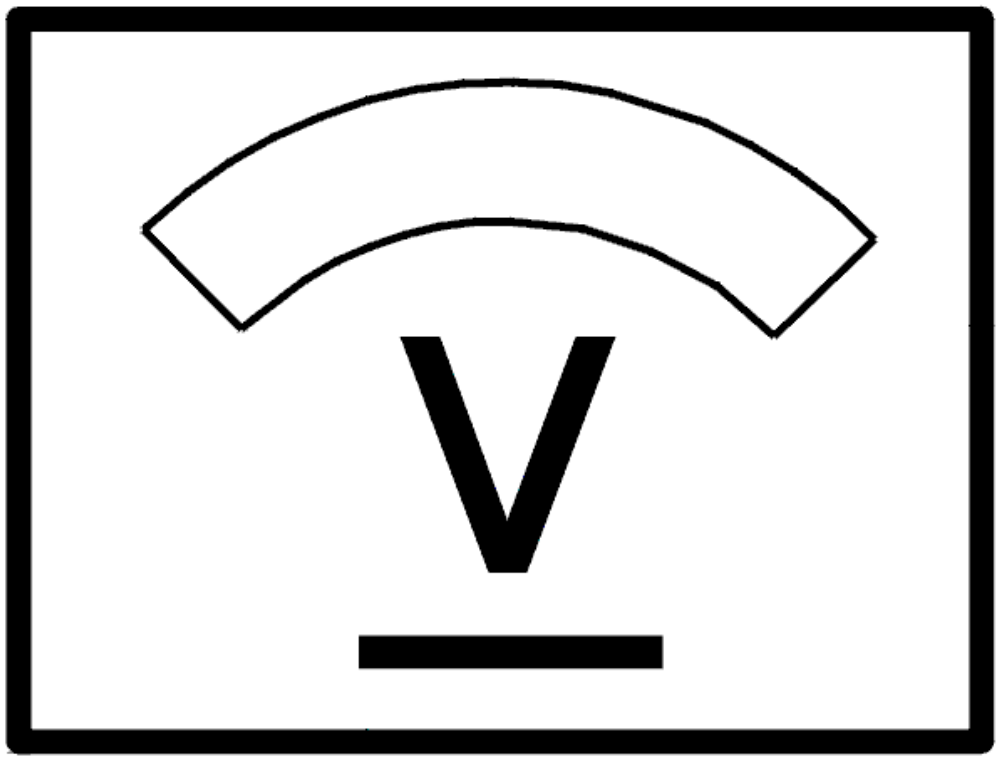


Fig. 72: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0012: LOCK-UP SOLENOID SL. SIGNAL TOO HIGH. PERMANENT

FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL TOO HIGH. PERMANENT FAULT

CHECKS

CHECKING LOCK-UP SOLENOID SL

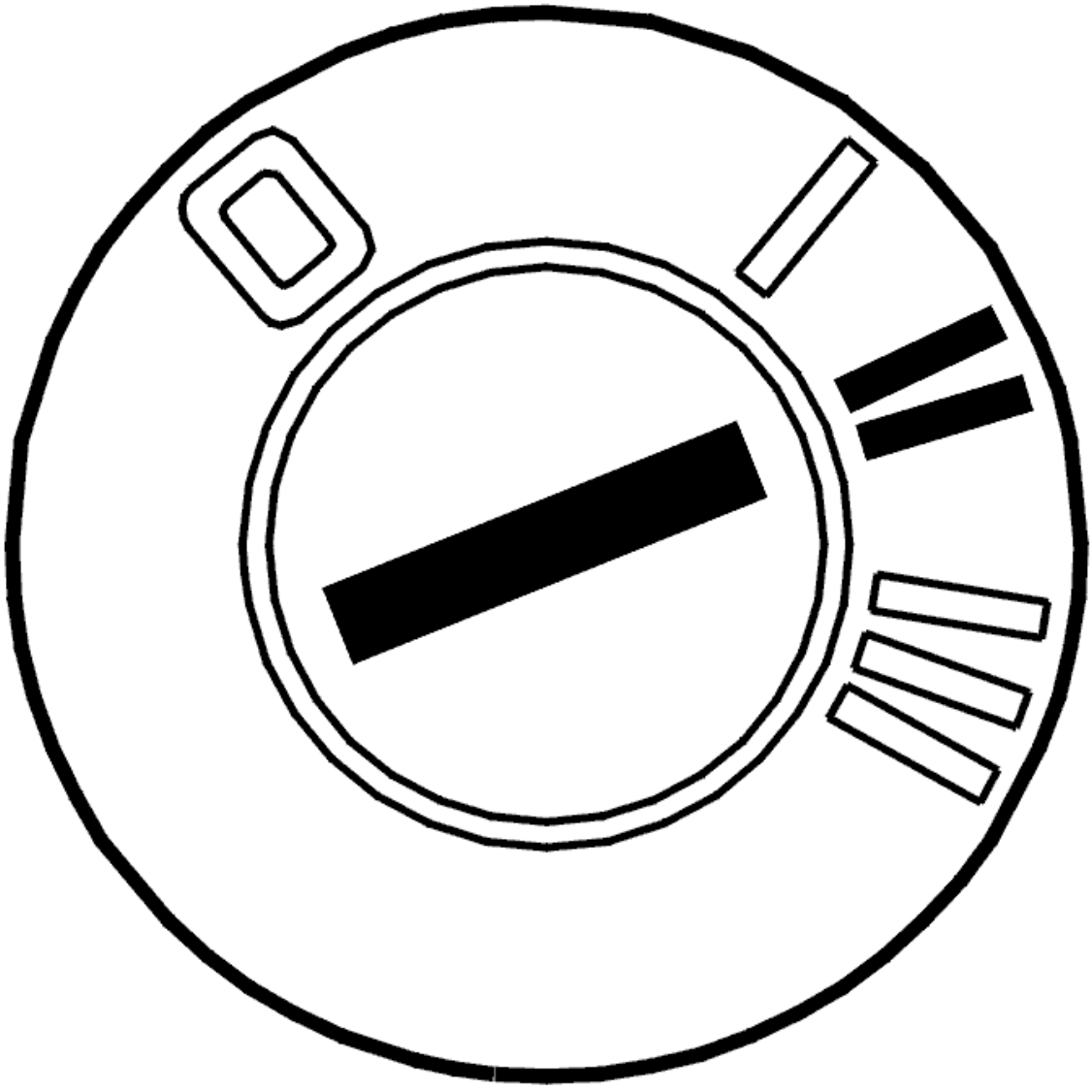


Fig. 73: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

- Gear selector in position P
- Activate the lock-up solenoid SL.

  The value must change between OFF and ON.

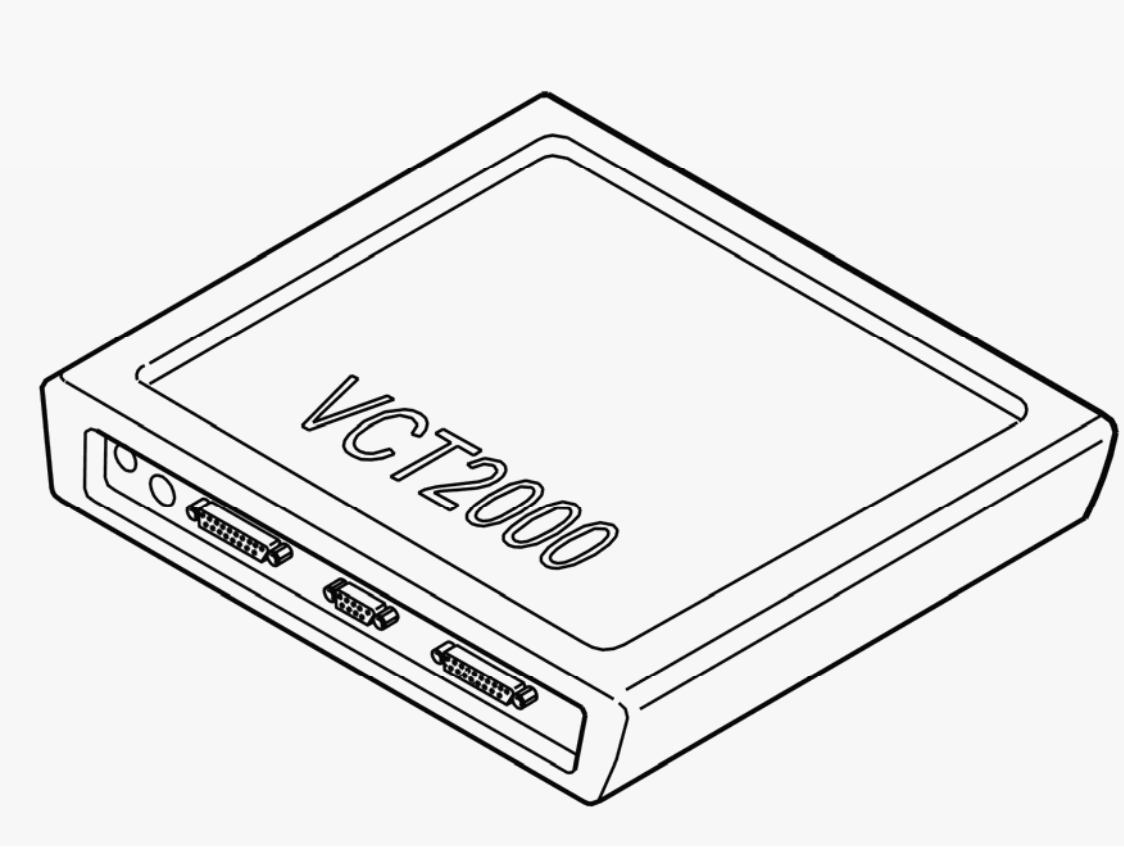


Fig. 74: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

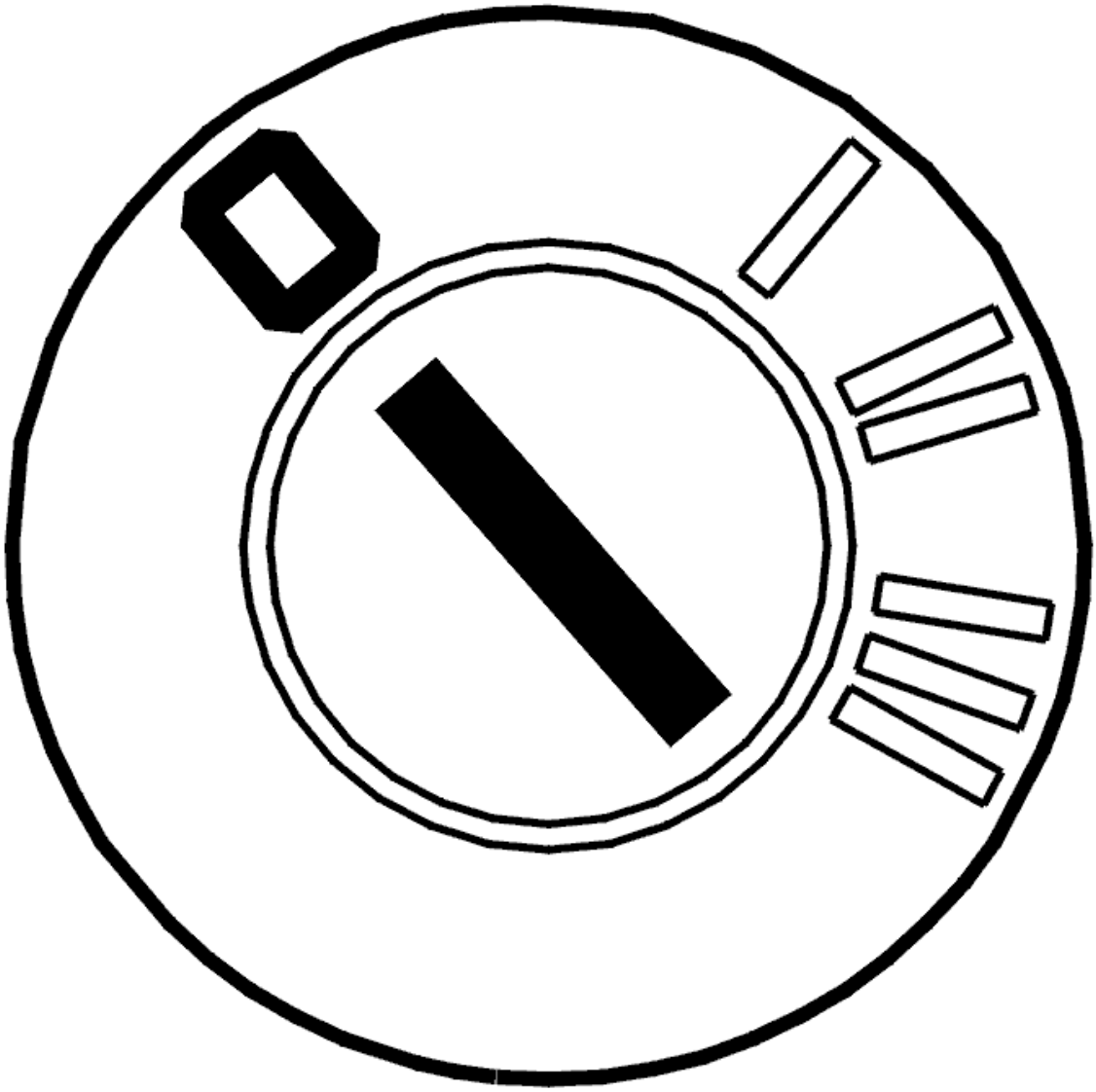


Fig. 75: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

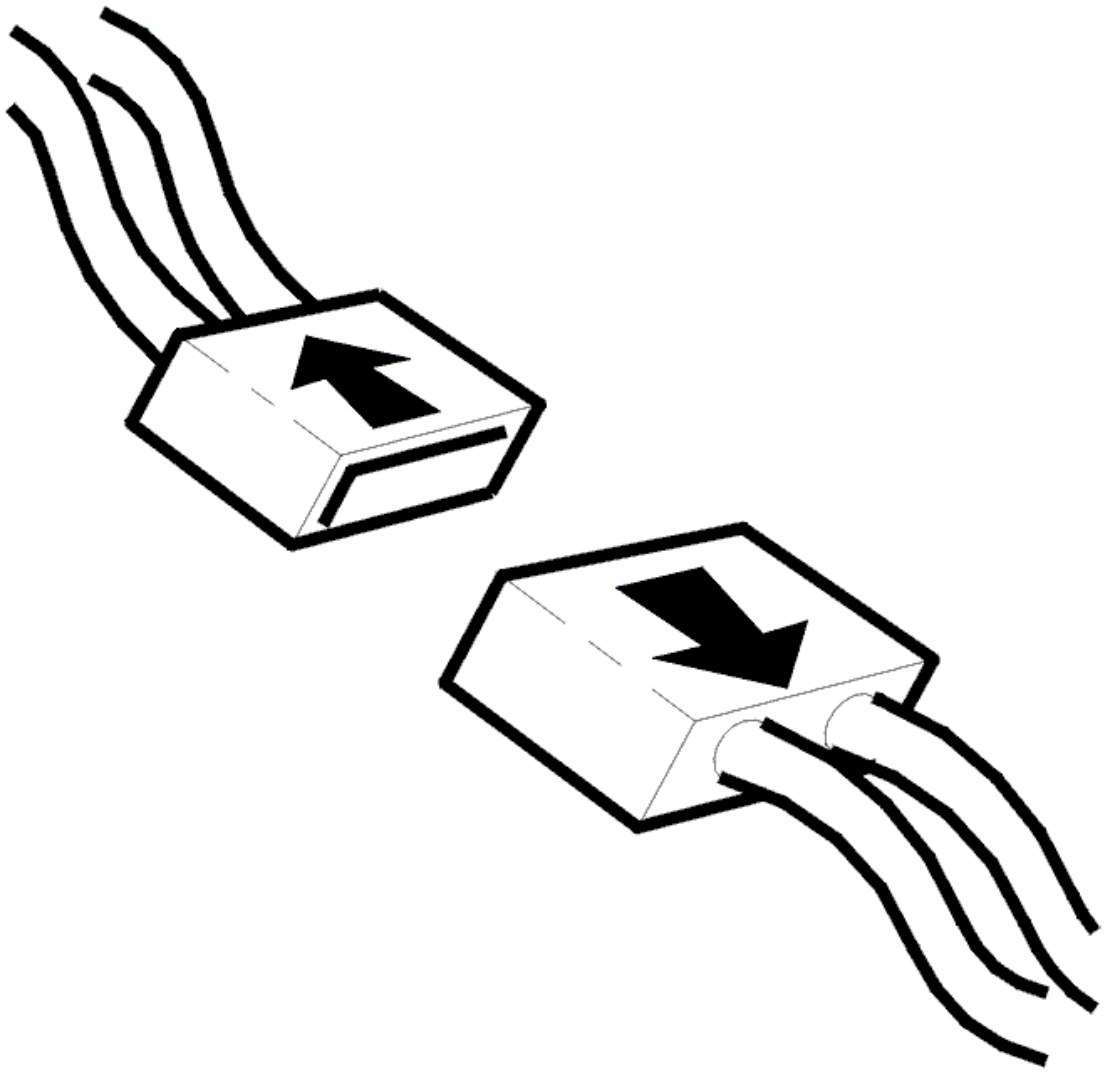


Fig. 76: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

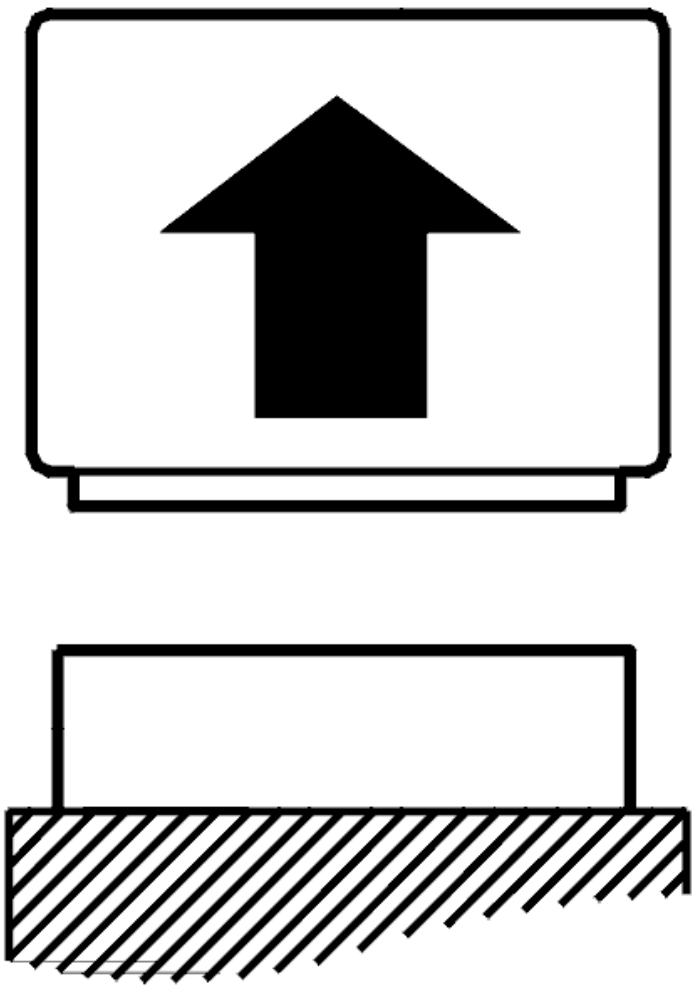


Fig. 77: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box
- Disconnect the control module.
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side).

  Check the cable between control module terminal #51 (#A51) and transmission connector (control module side) terminal #T (#A17) for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

  Check the cable between control module terminal #53 (#A53) and transmission connector terminal #E

(#A5) (control module side). Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

HINT: Also check all the other power supply cables in the circuit.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

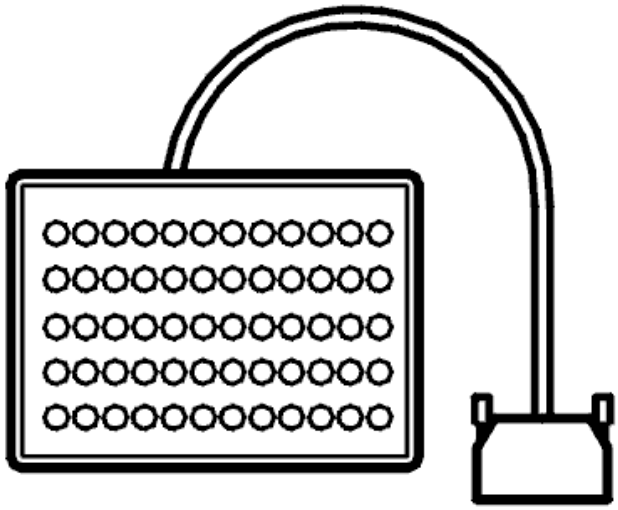


Fig. 78: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

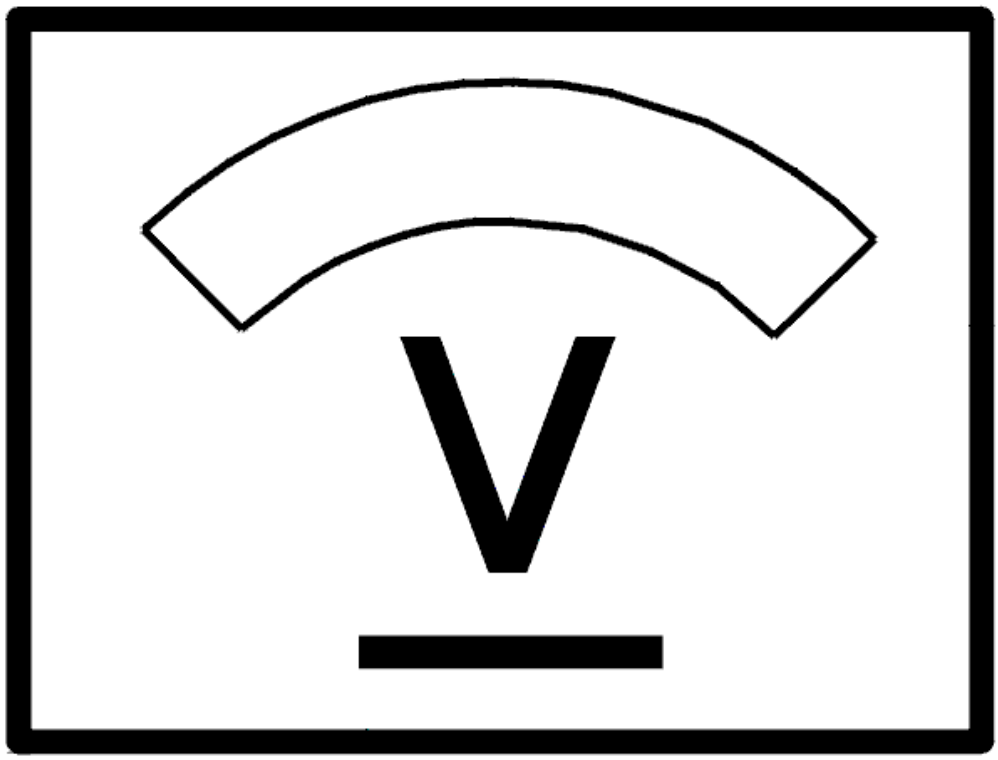


Fig. 79: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

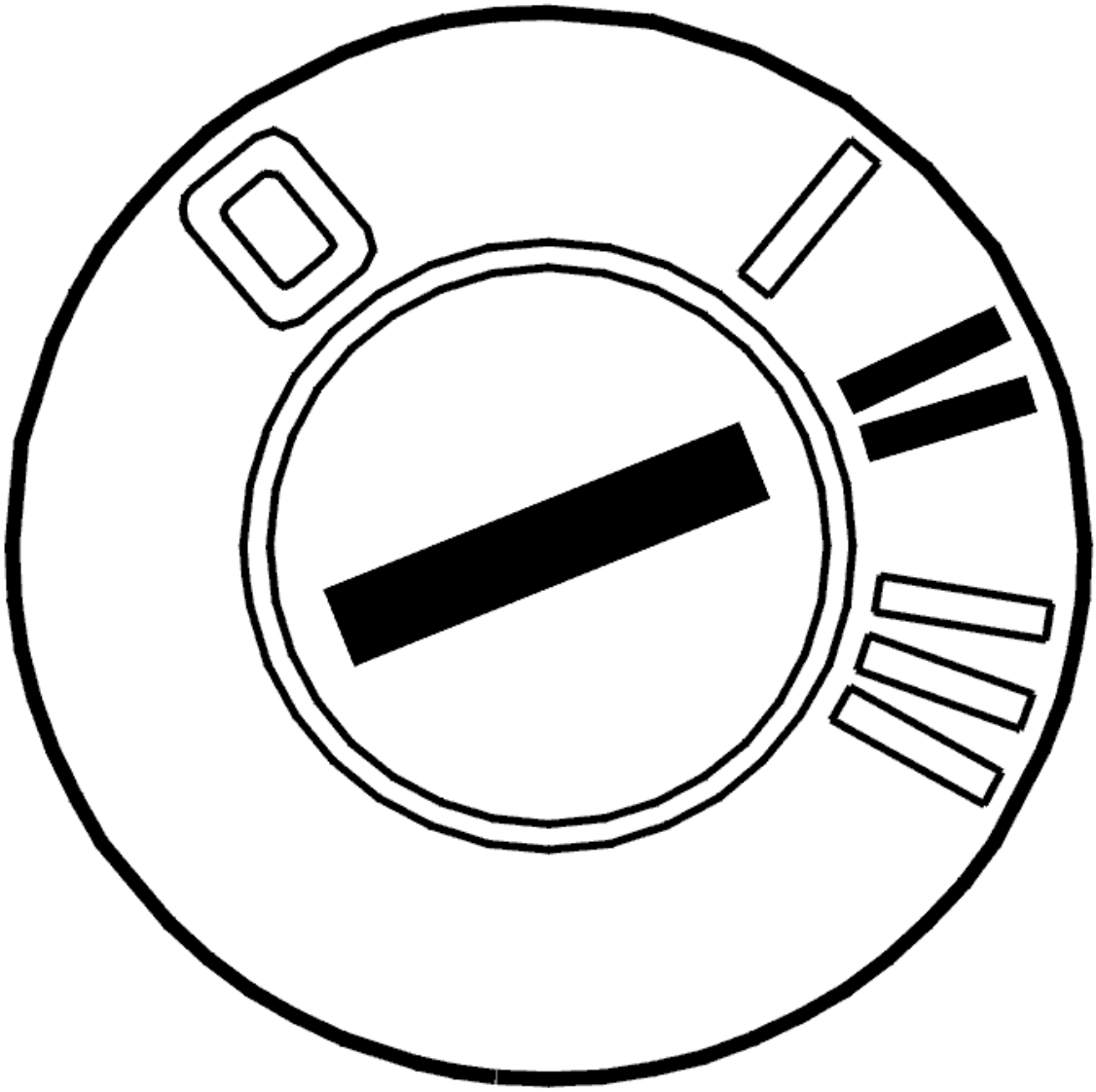


Fig. 80: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

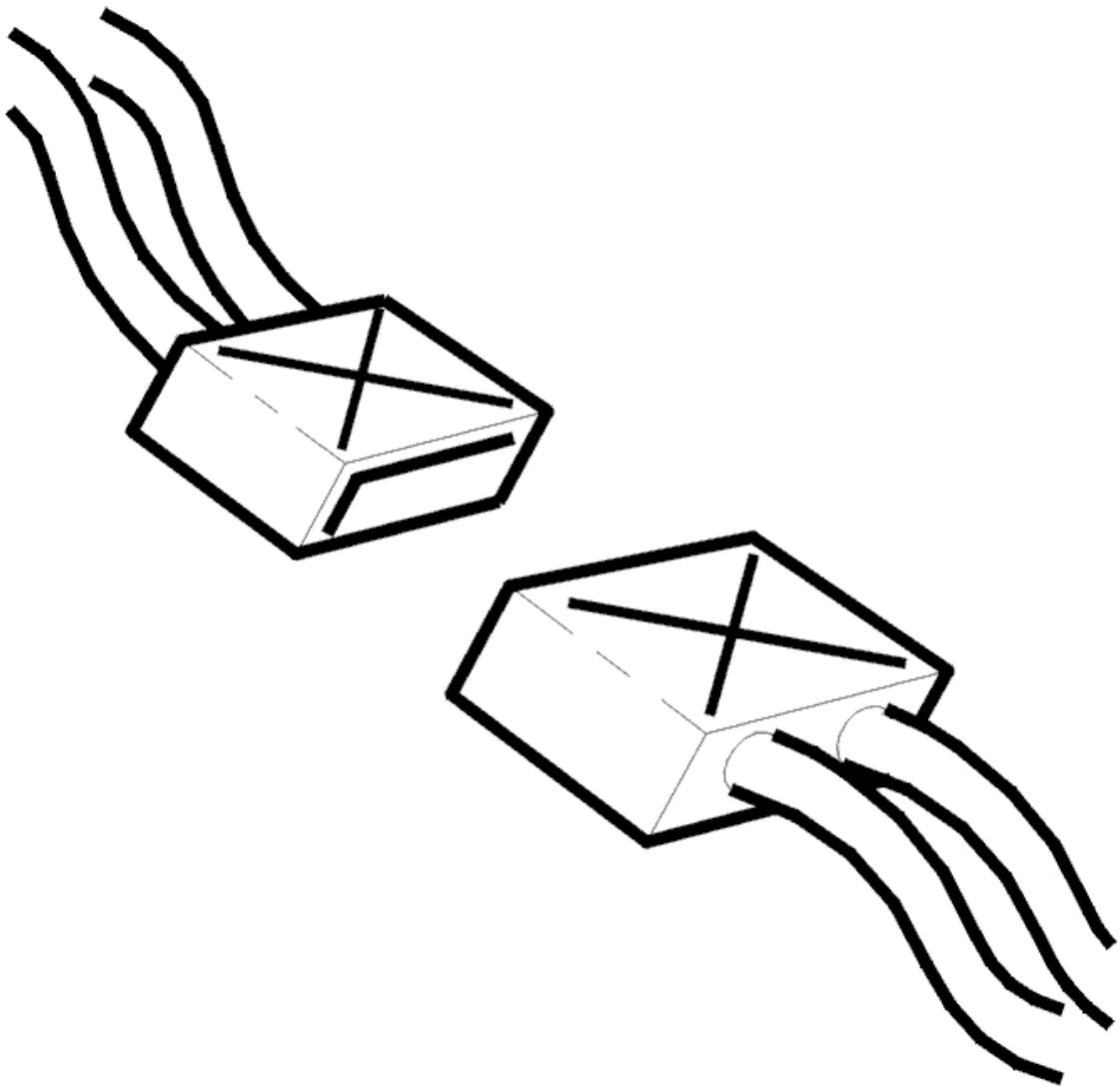


Fig. 81: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

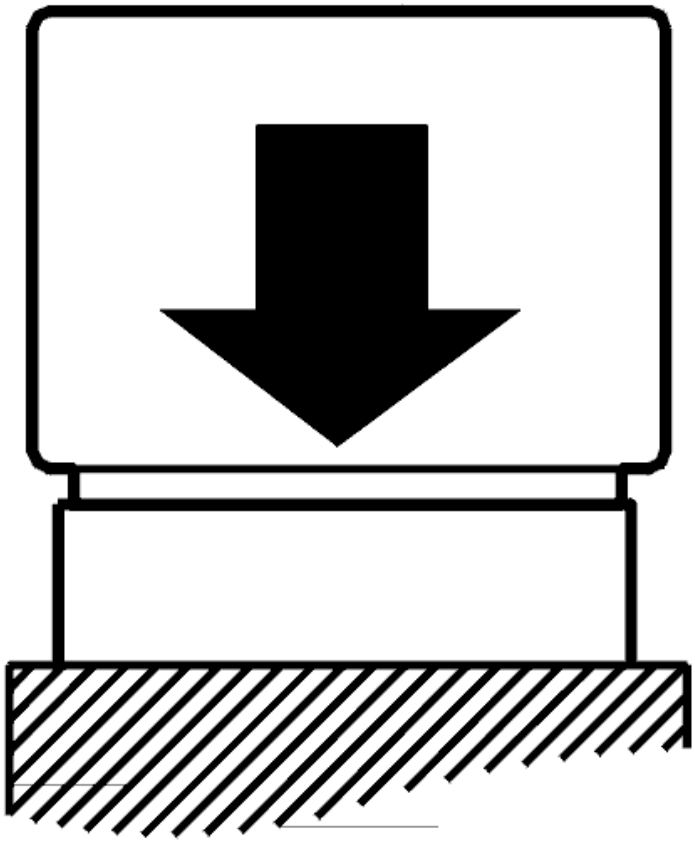


Fig. 82: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector disconnected
- Ignition on
- Gear selector in position P.

Check the transmission control module (TCM). Measure the voltage between terminal #51 (#A51) and terminal #53 (#A53) on the breakout box. The voltage must be approximately 0 V.

Try a new control module if the voltage exceeds 1 V.

NOTE: When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids and the temperature sensor.

Other information:

- To disconnect the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION** .

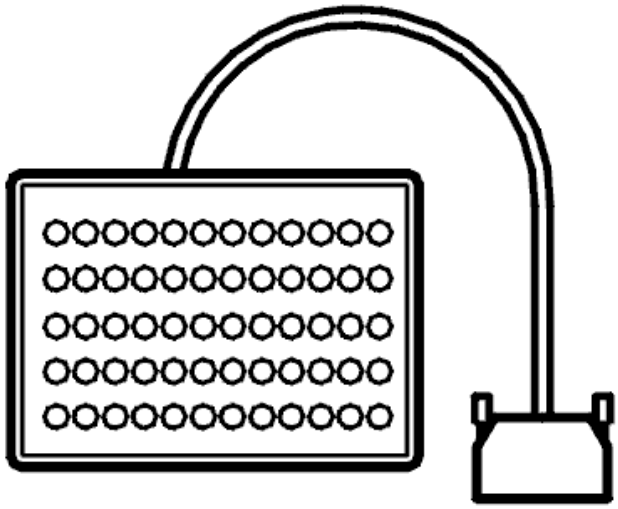


Fig. 83: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

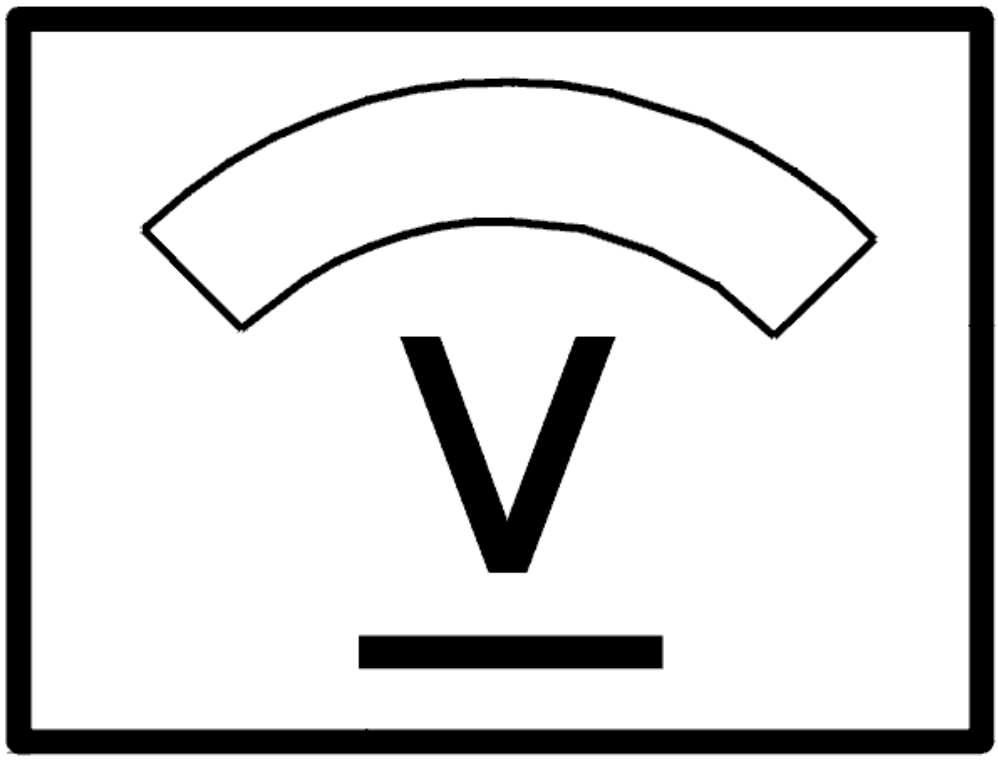


Fig. 84: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was the voltage above 1 V?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECK THE CIRCUIT FOR THE SOLENOID SL**

CHECK THE CIRCUIT FOR THE SOLENOID SL

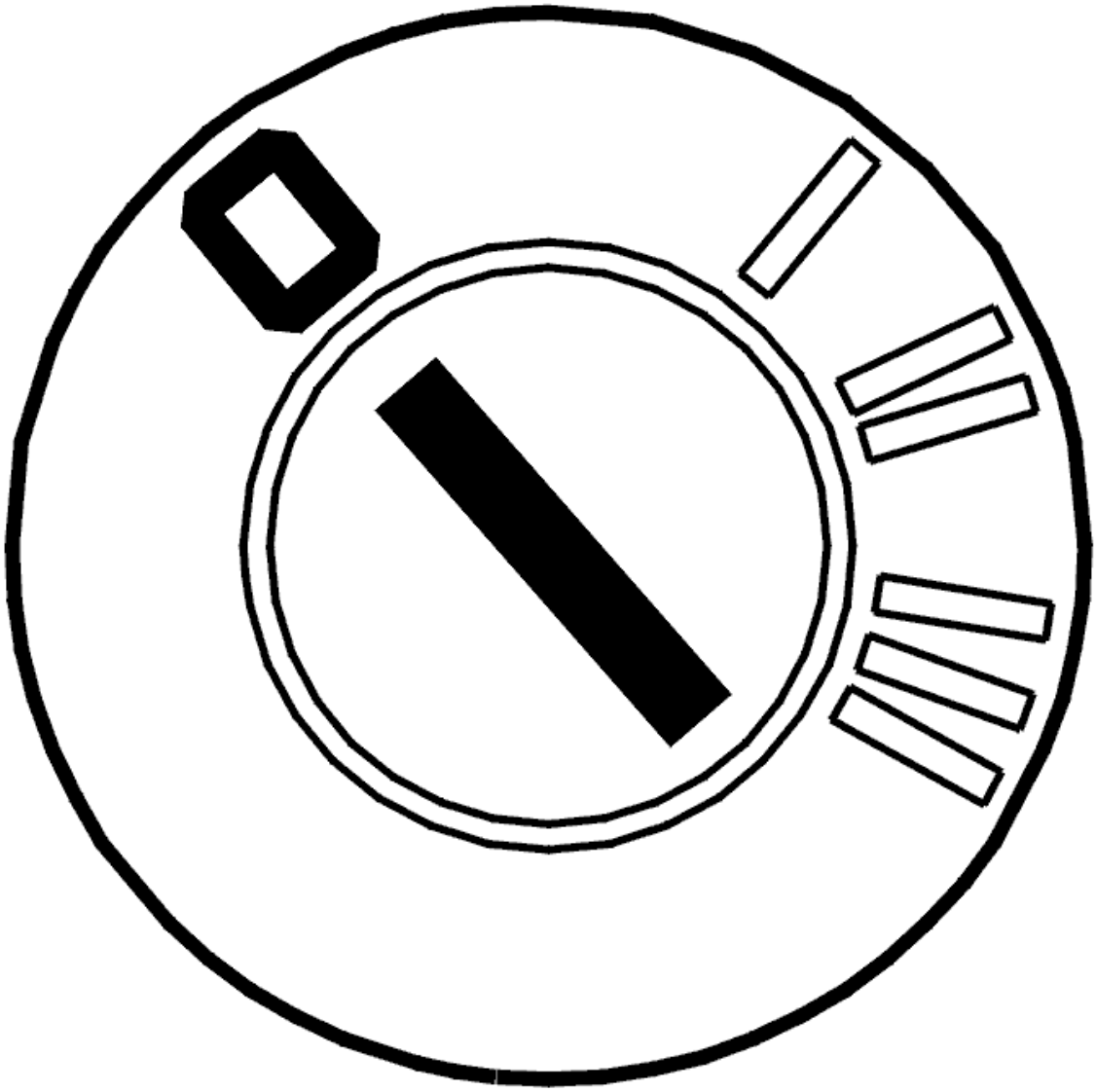


Fig. 85: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #T (#A17) and solenoid SL terminal #A. Check the cable between transmission connector terminal #E (#A5) and solenoid SL terminal #B. Check these cables for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Check all the cables in the wiring harness from the transmission connector to the transmission components. Check for a short-circuit to each other.

HINT: Check solenoid SL. Measure the solenoid resistance between terminals #A and #B. The resistance must be between 10 and 15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** . To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To replace solenoid SL, see **SOLENOID LOCK-UP FUNCTION, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION** .

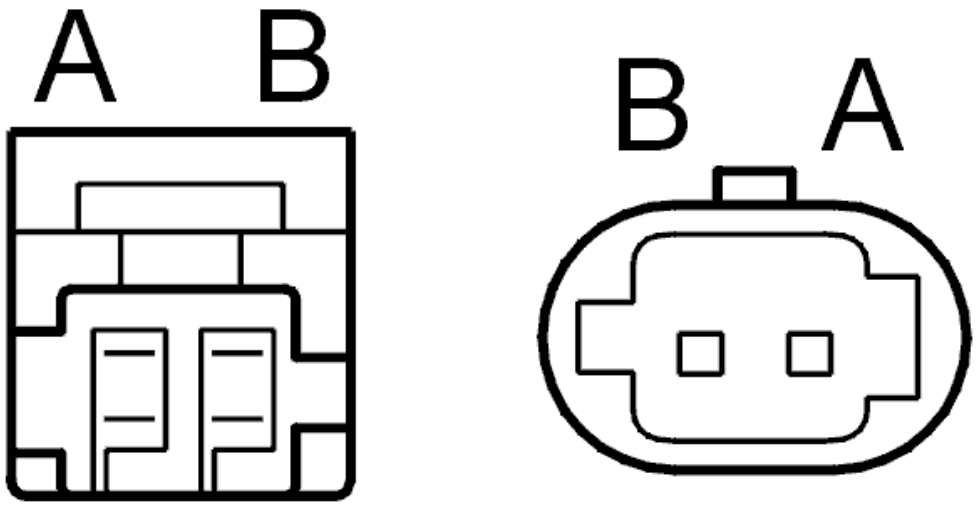


Fig. 86: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

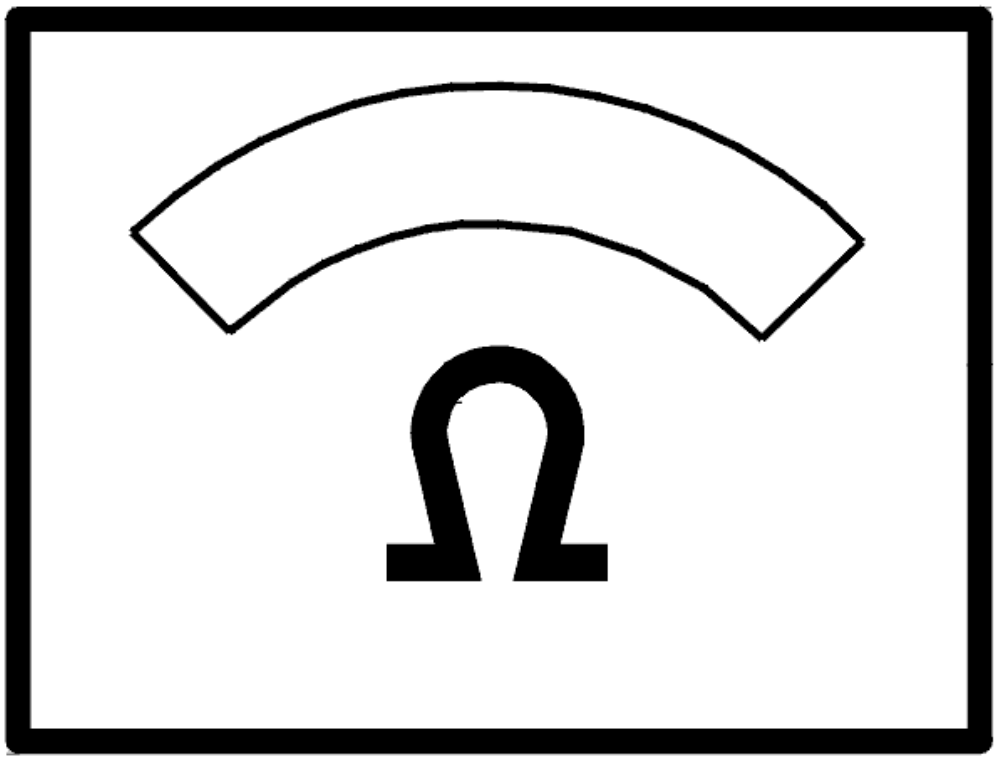


Fig. 87: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

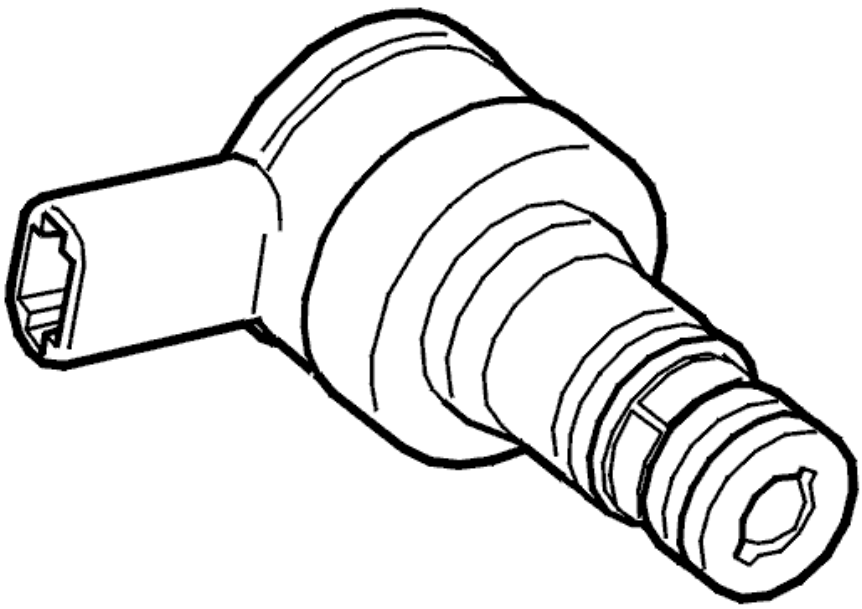


Fig. 88: Identifying Lock-Up Solenoid, SL
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

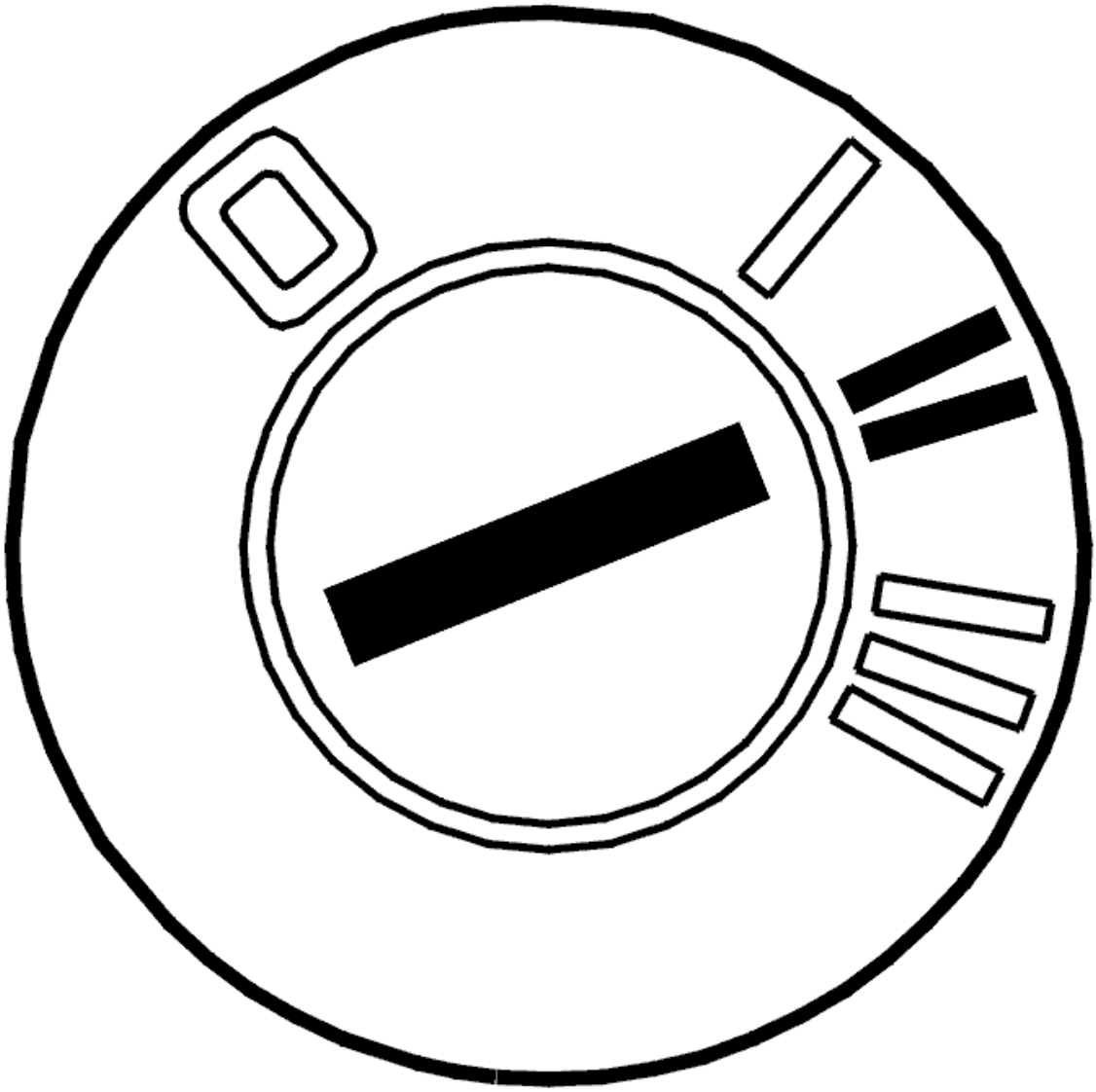


Fig. 89: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

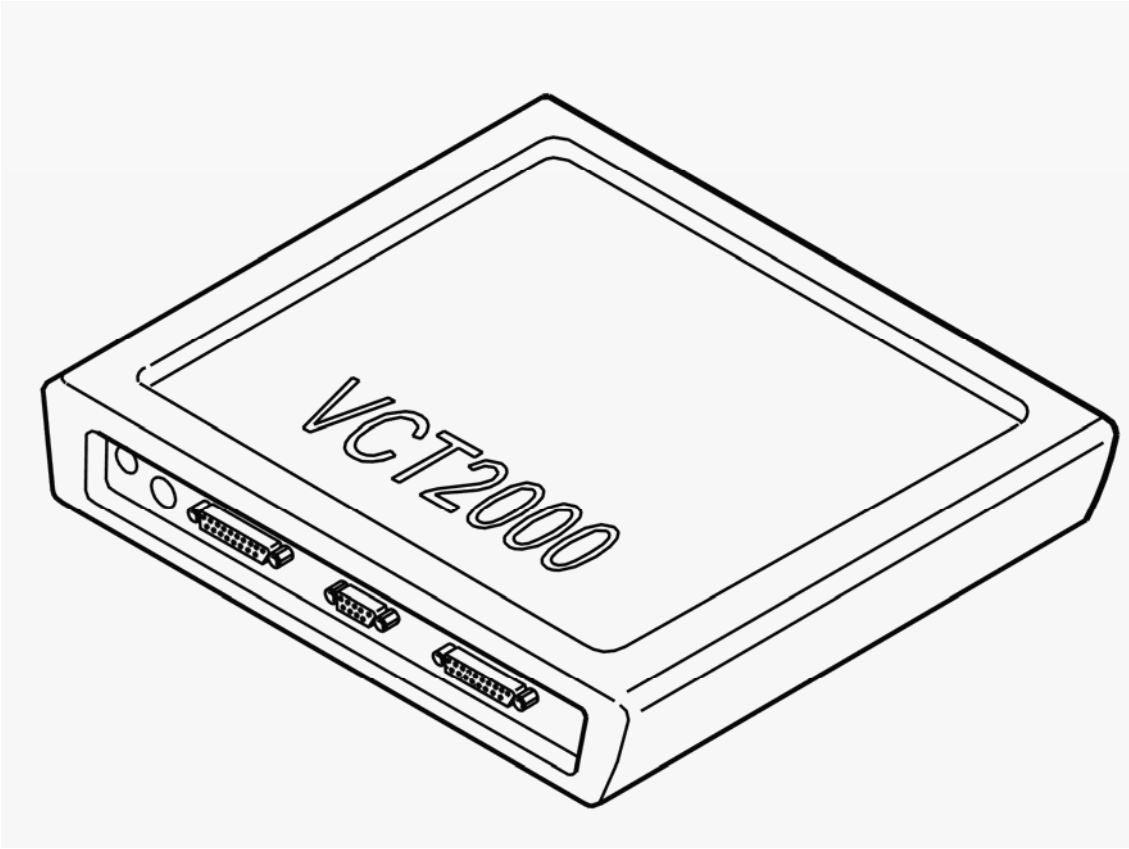


Fig. 90: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

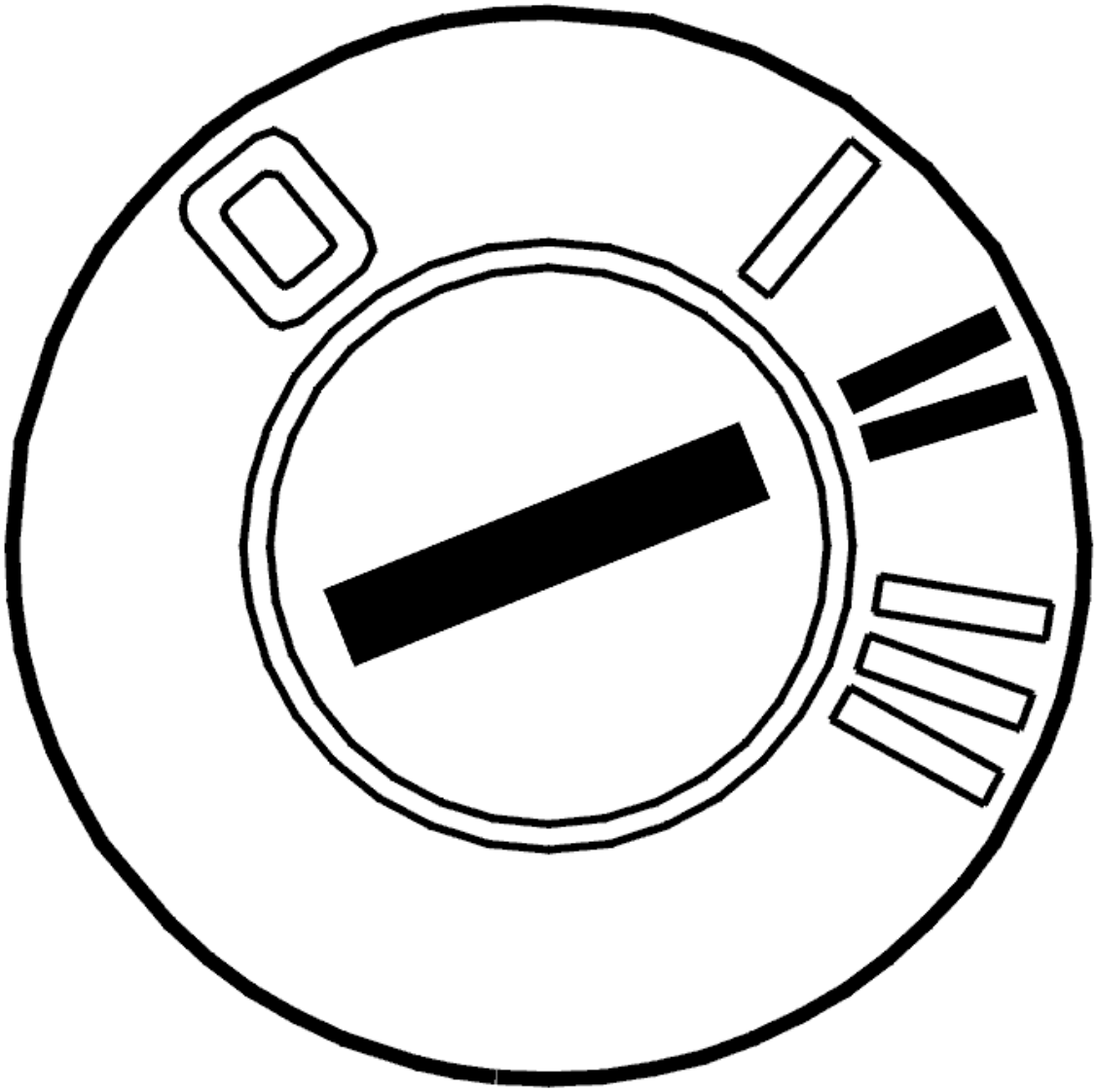


Fig. 91: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

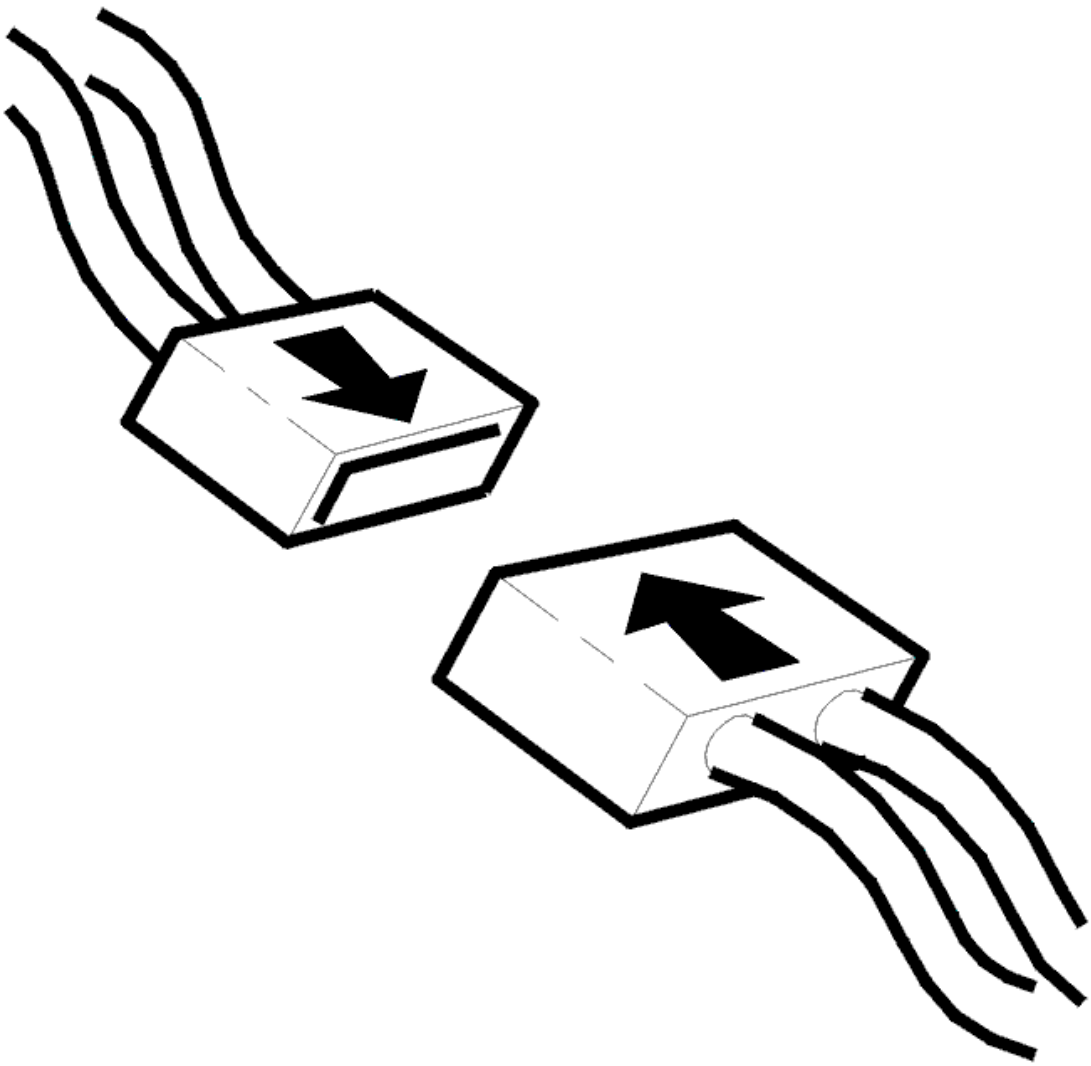


Fig. 92: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Wait at least 90 seconds.
- Reconnect the connectors, reinstall components etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid SL.

The value should change between OFF and ON.

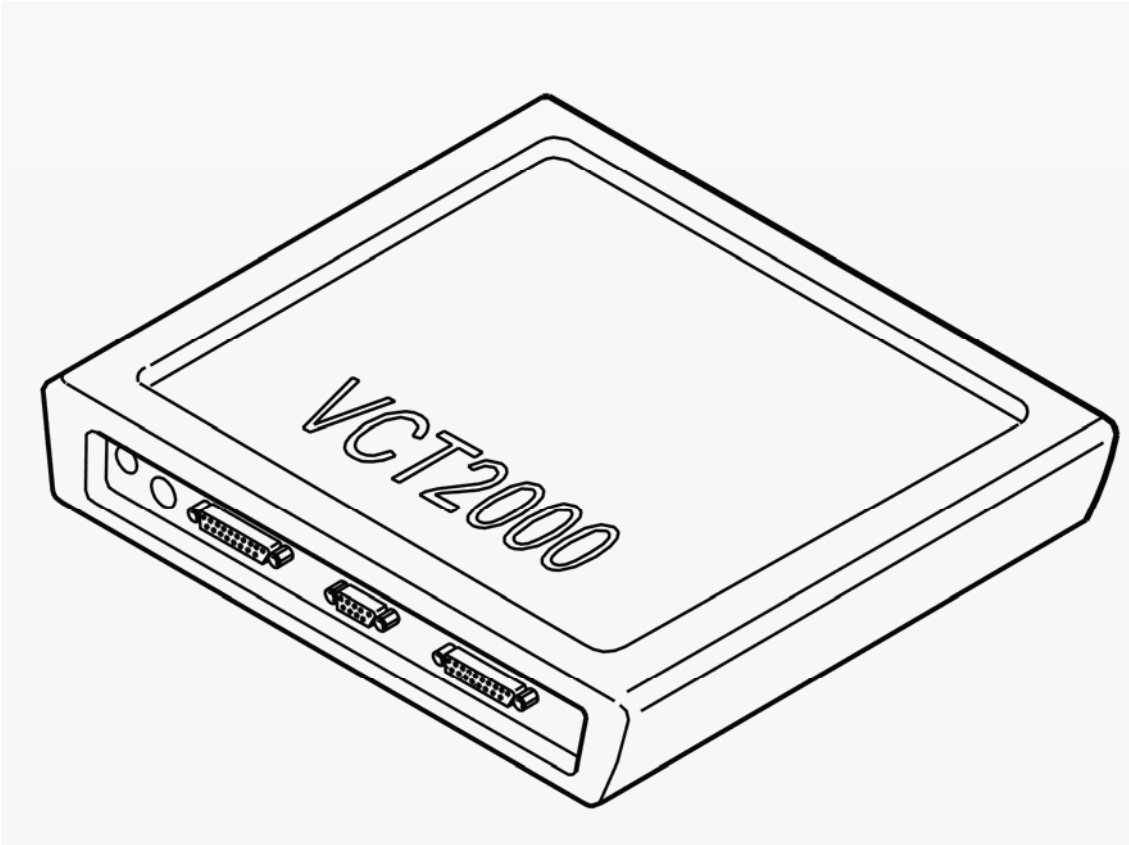


Fig. 93: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0013: LOCK-UP SOLENOID SL. SIGNAL MISSING. INTERMITTENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

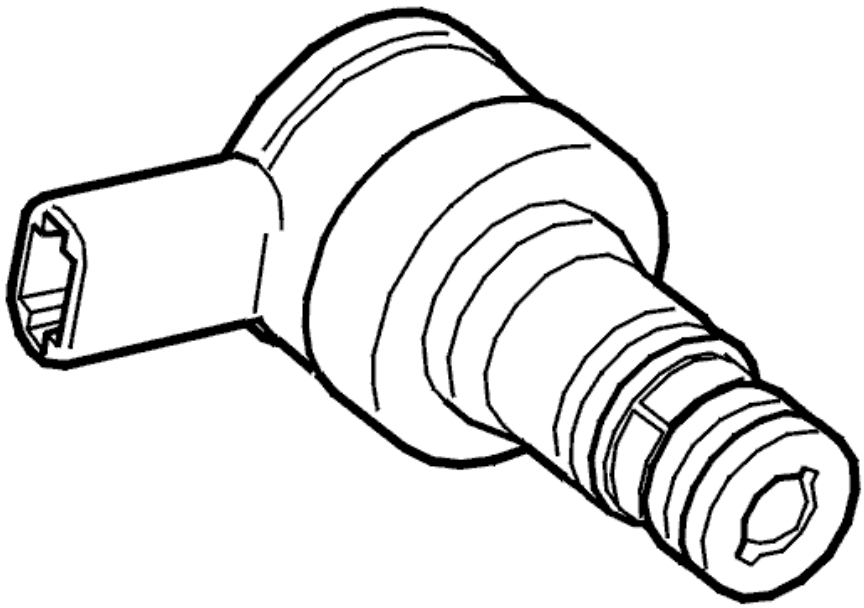


Fig. 94: Identifying Lock-Up Solenoid, SL
Courtesy of VOLVO CARS CORPORATION

The lock-up solenoid SL controls the transmission lock-up function. Solenoid SL operates when it receives voltage from the control module and is activated under different driving conditions depending on road speed, throttle position and the driving mode selected. Diagnostic trouble code (DTC) TCM-0013 is stored if the control module registers that the signal in the solenoid SL circuit is missing when the solenoid should be activated. Solenoid SL cannot then be activated.

Substitute Value

- The control module does not activate the lock-up solenoid.

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the signal cable.
- Defective solenoid.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

SIGNAL MISSING. INTERMITTENT FAULT

INTERMITTENT FAULT

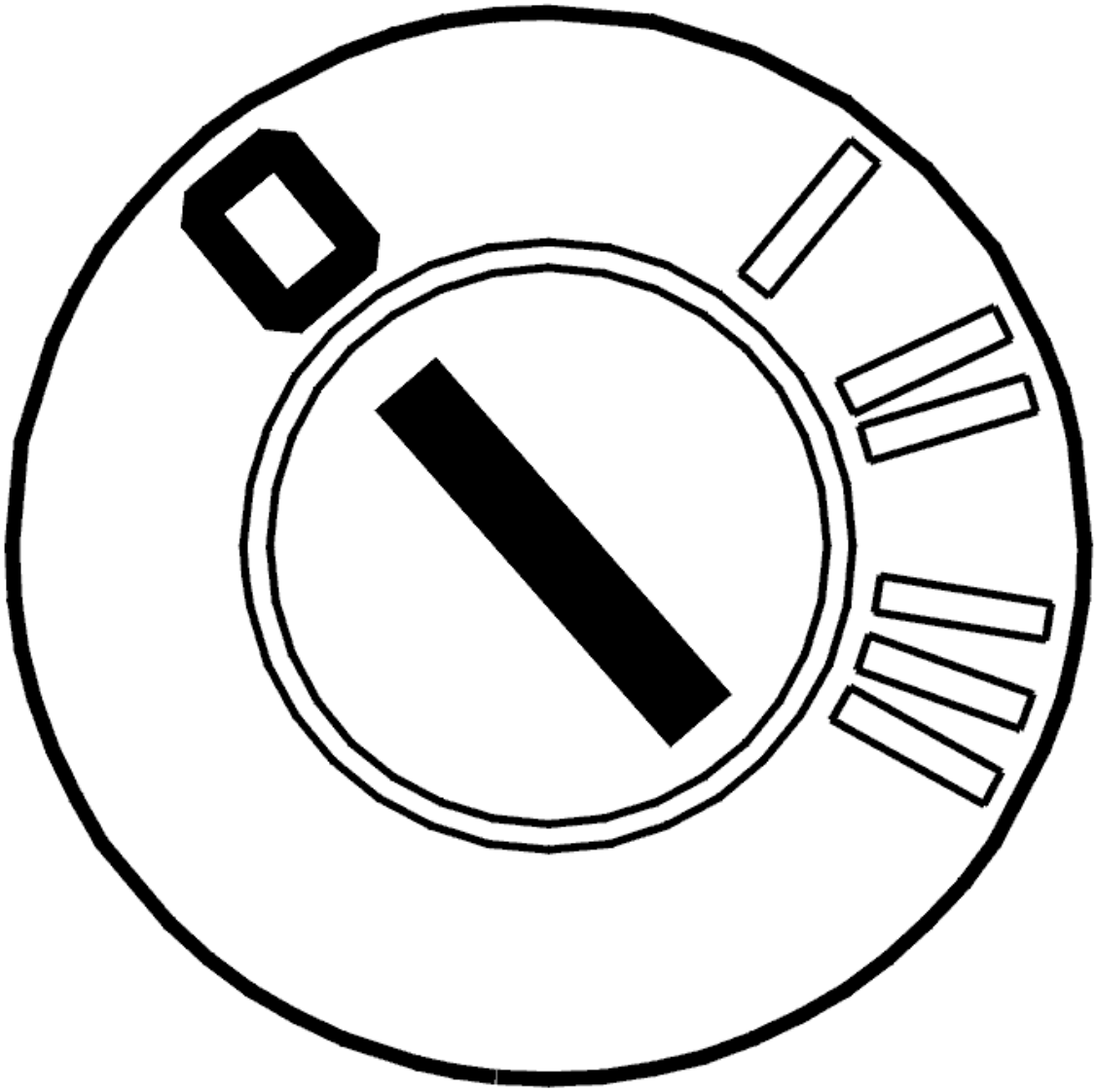


Fig. 95: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

Check the cable between control module terminal 51 (#A51) and transmission connector (control module side) terminal T #A17 for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the wiring between control module terminal 53 (#A53) and transmission connector #E (#A5) for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX** .
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS** .
- For information about signals, see **SIGNAL SPECIFICATION** .

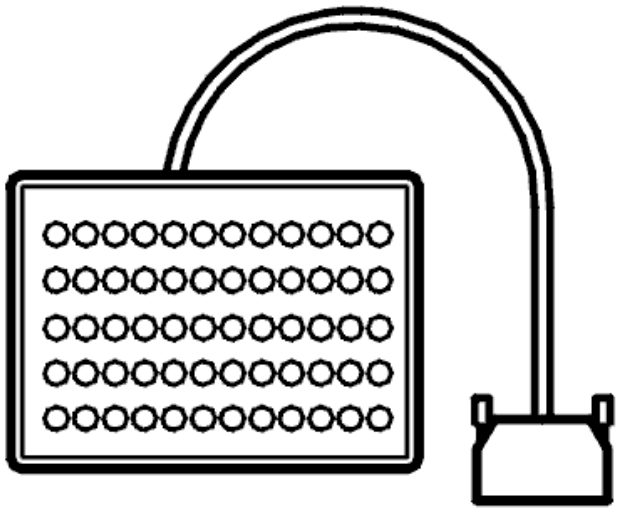


Fig. 96: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

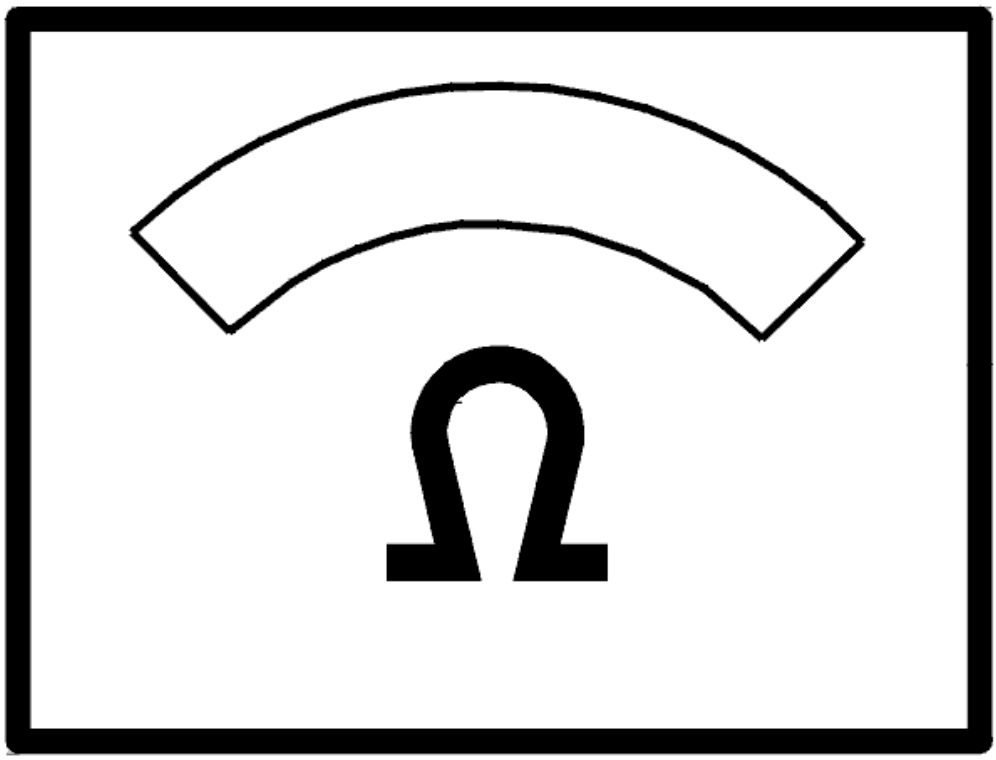


Fig. 97: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0013: LOCK-UP SOLENOID SL. SIGNAL MISSING. PERMANENT

FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL MISSING. PERMANENT FAULT

CHECKS

CHECKING LOCK-UP SOLENOID SL

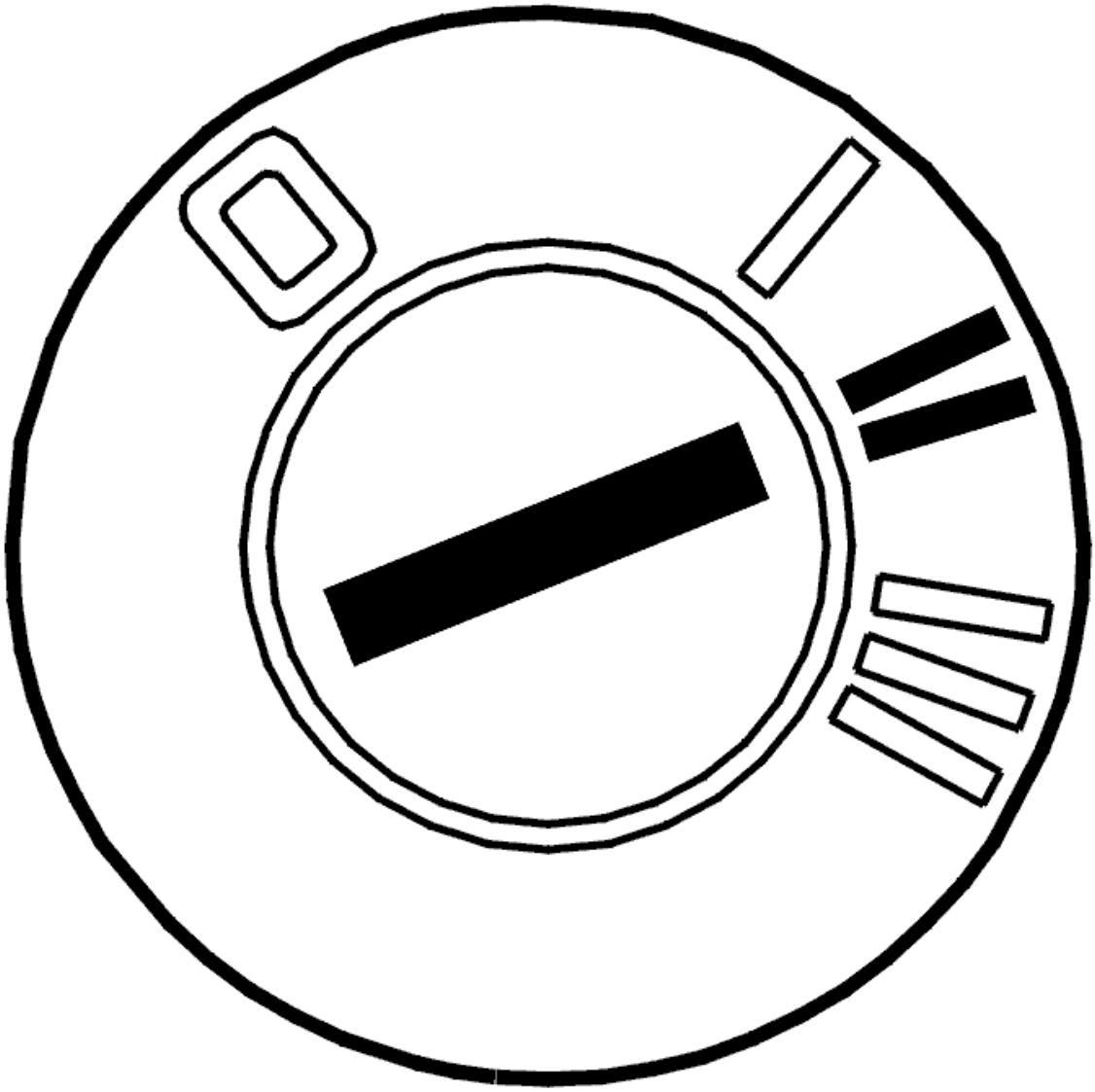


Fig. 98: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

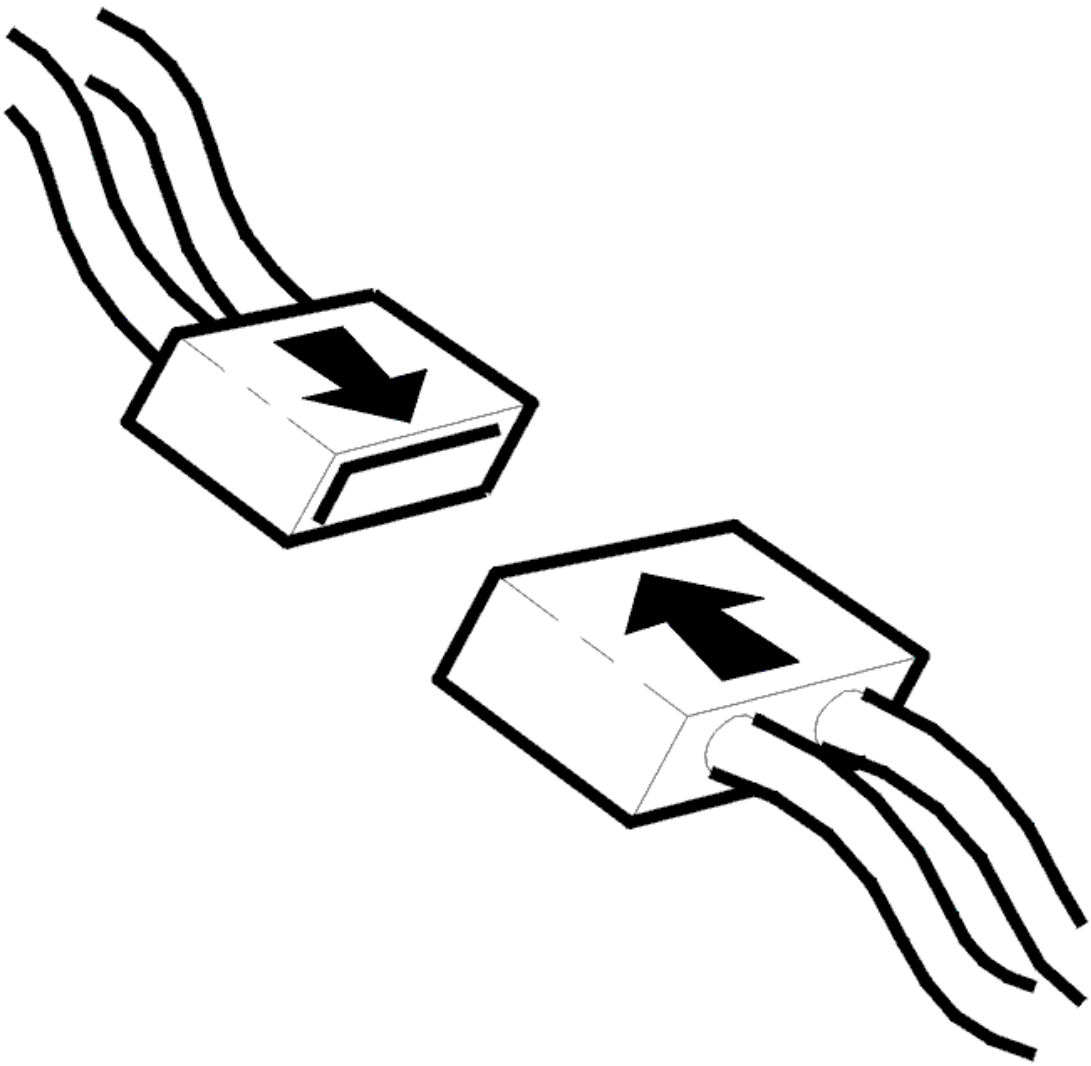


Fig. 99: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and automatic transmission connectors for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Gear selector in position P
- Activate the lock-up solenoid SL.

  The current must oscillate between approximately 0 and 1 A.

  If the current oscillates, the problem was caused by contact resistance and oxidation.

Other information:

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

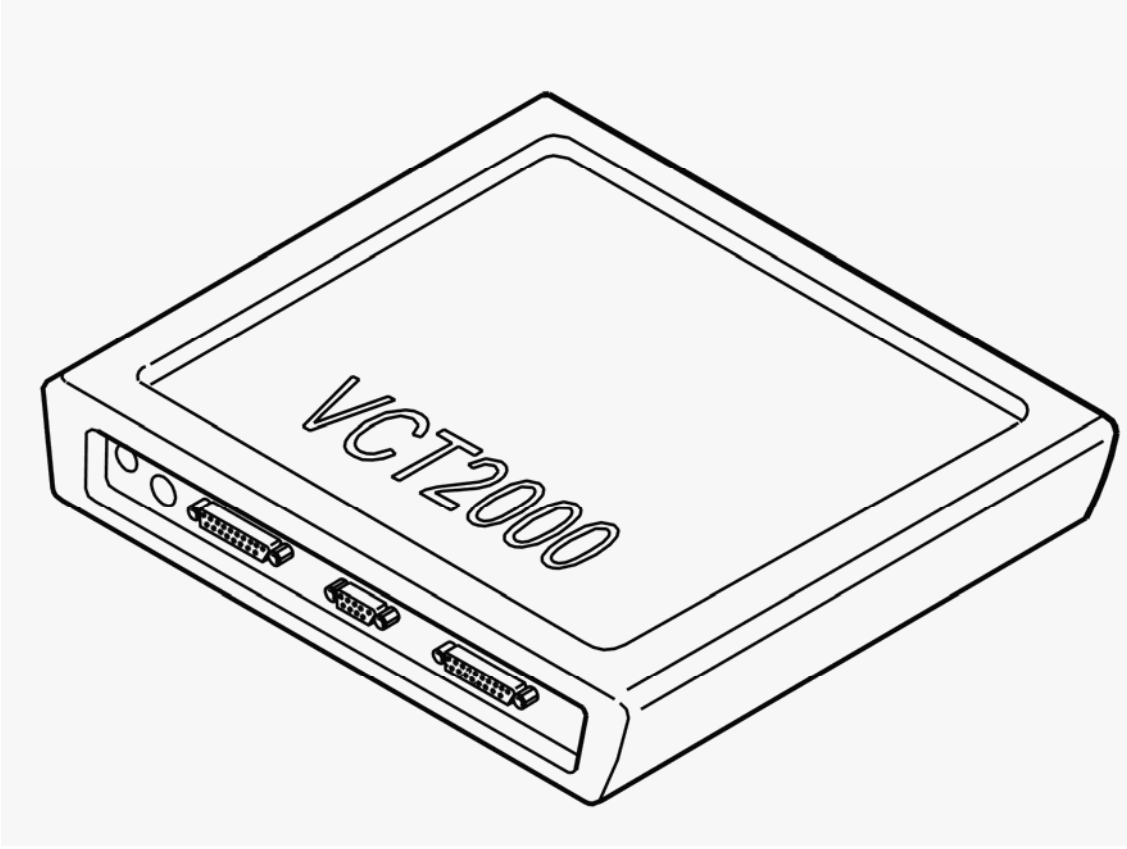


Fig. 100: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING SOLENOID SL**

CHECKING SOLENOID SL

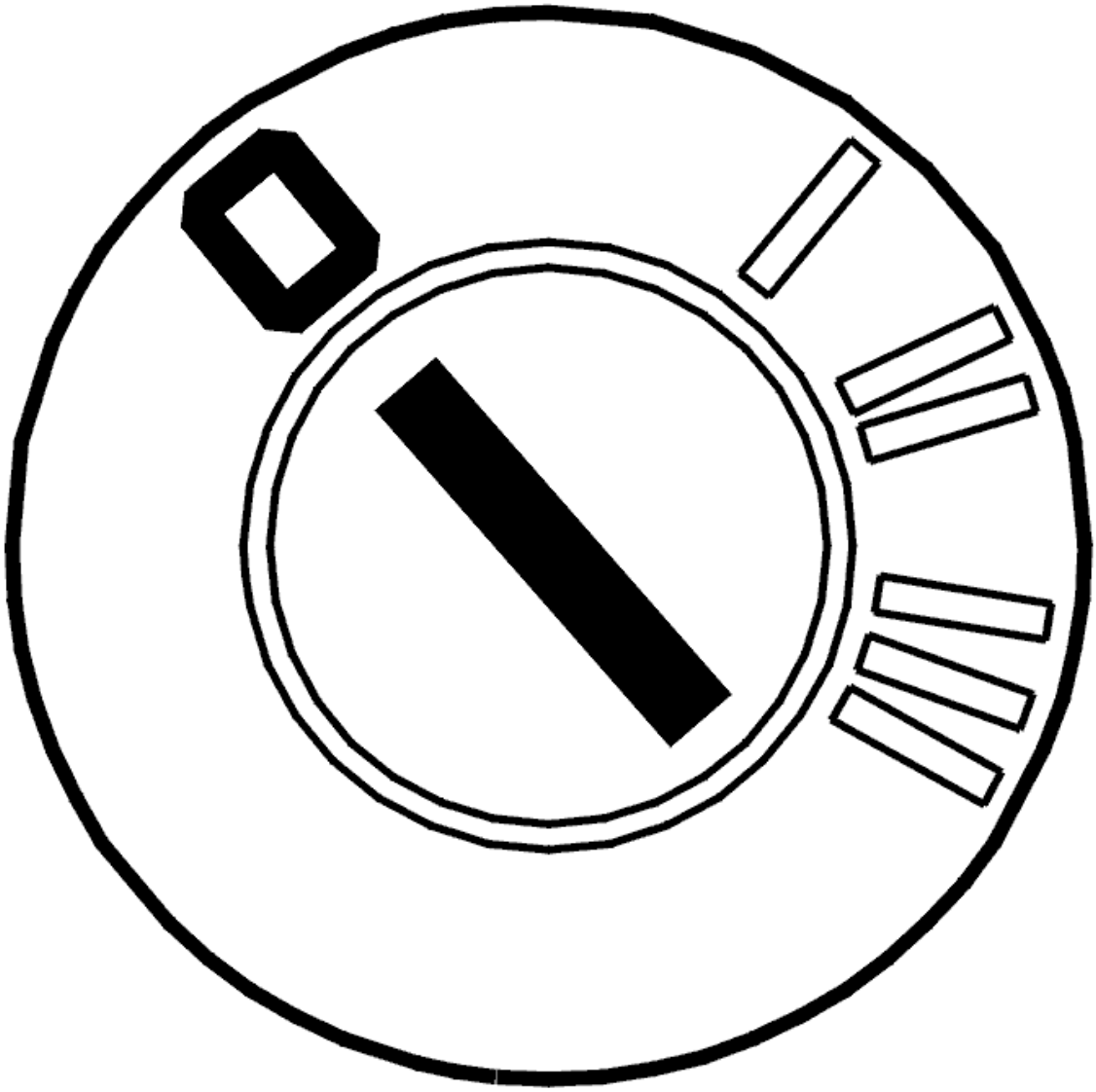


Fig. 101: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

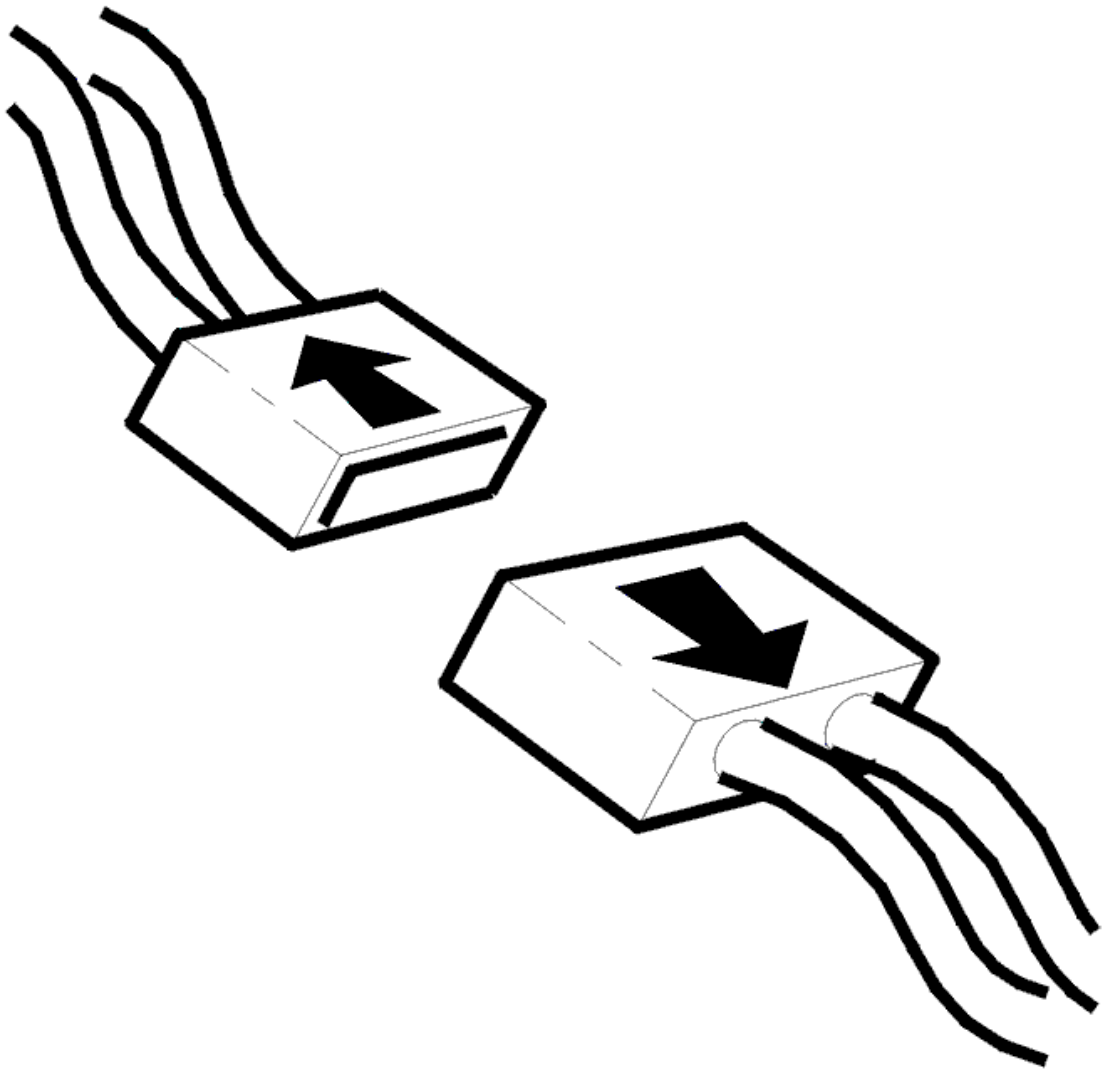


Fig. 102: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the automatic transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals E (#A5) and T (#A17).

  The solenoid SL resistance must be between 10 and 15 ohms.

  Other information:

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**

- For information about signals, see **SIGNAL SPECIFICATION** .

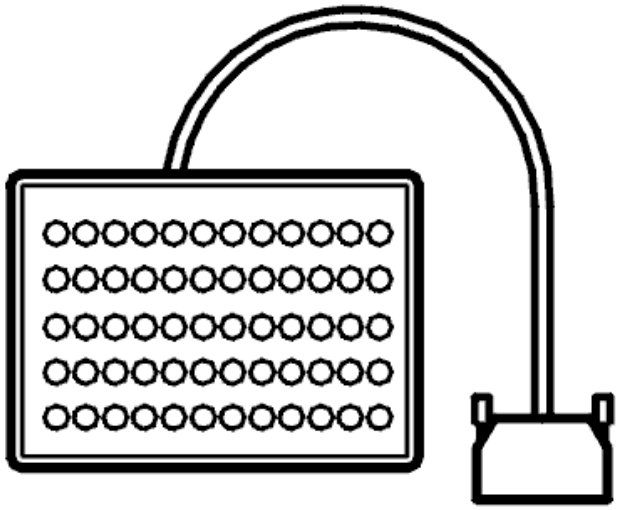


Fig. 103: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

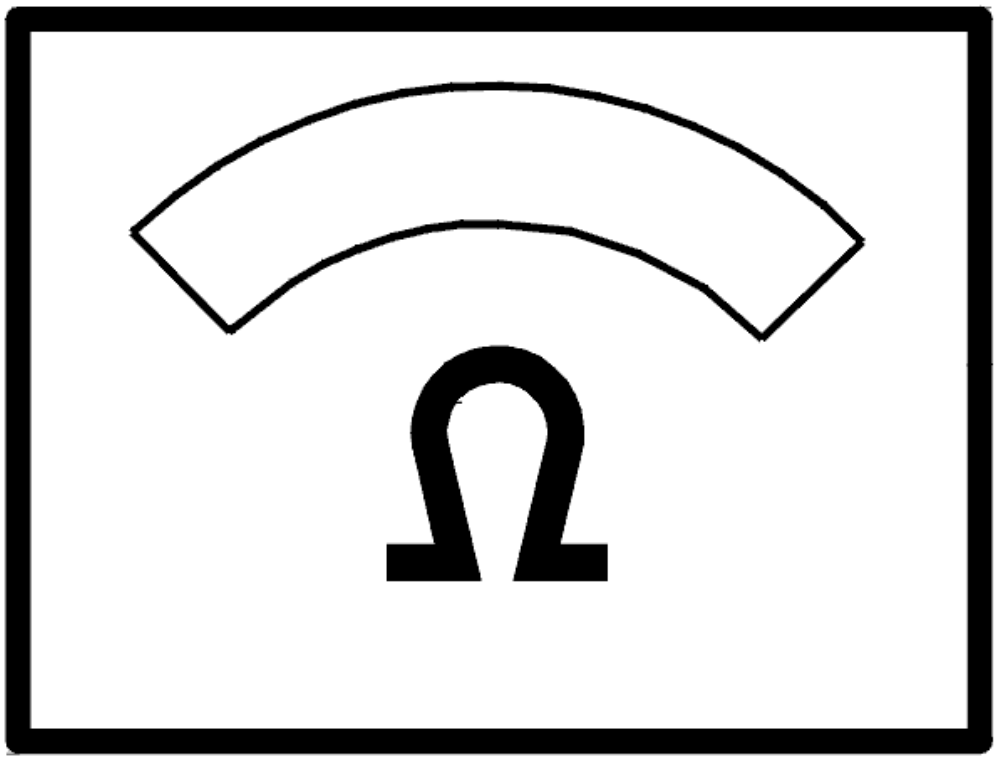


Fig. 104: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

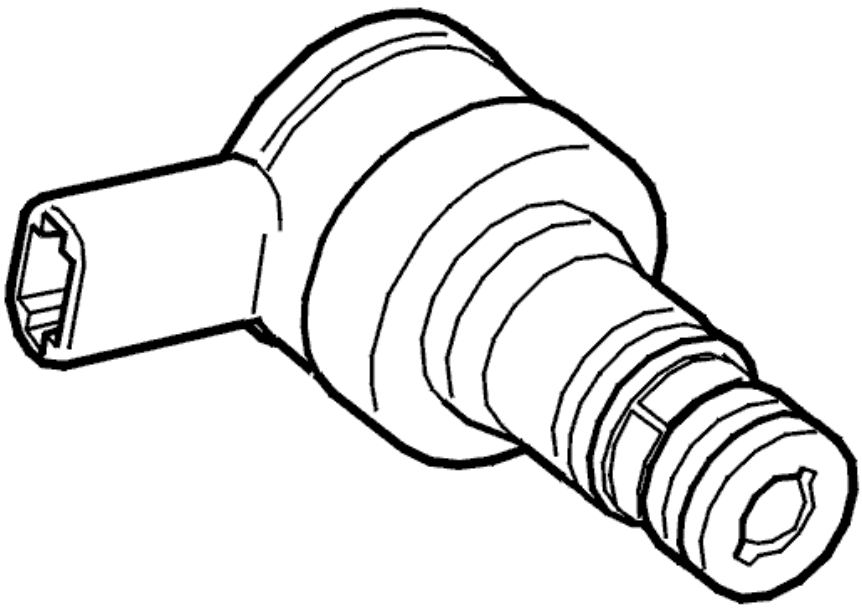


Fig. 105: Identifying Lock-Up Solenoid, SL
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE CONTROL MODULE

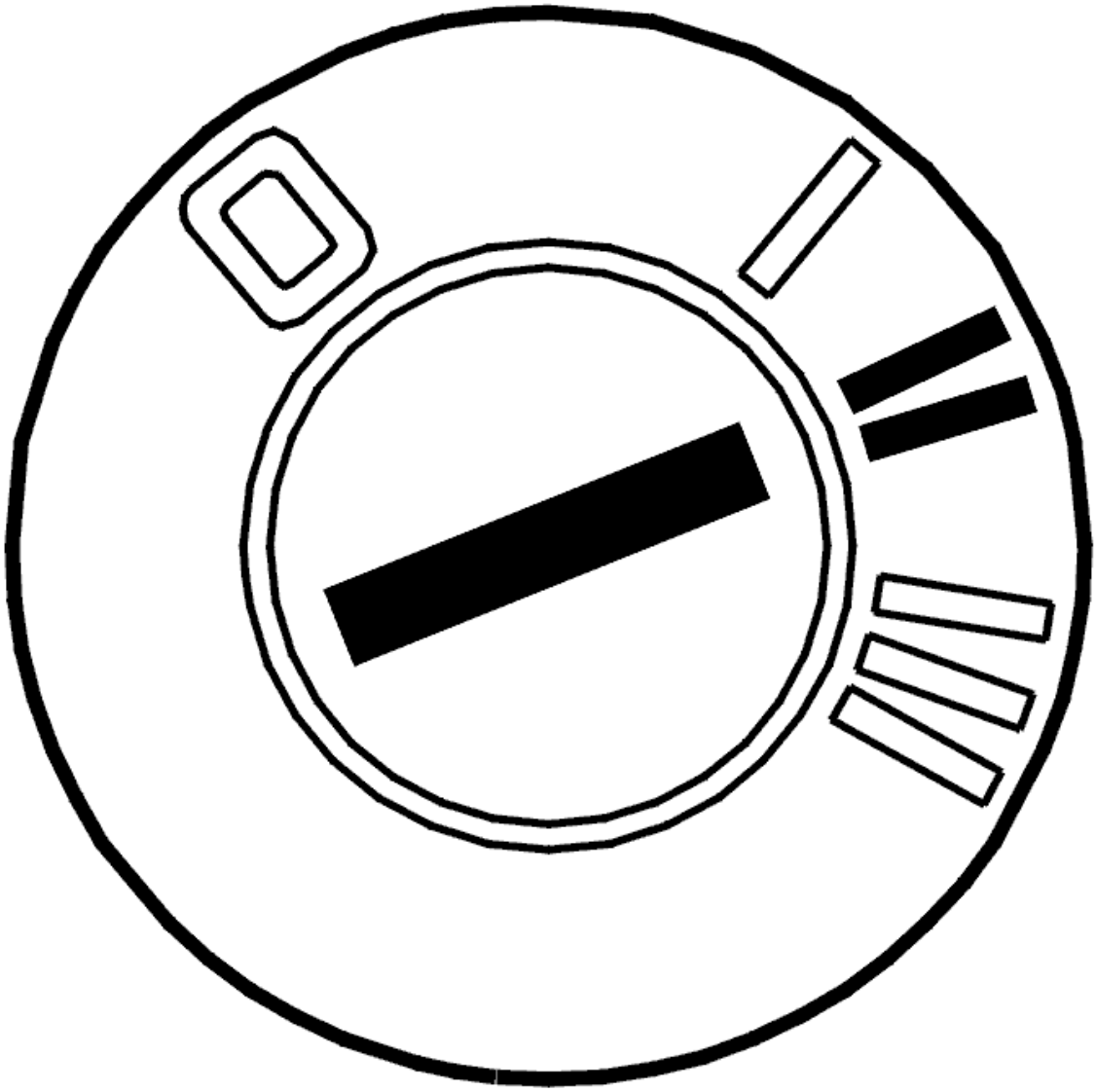


Fig. 106: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

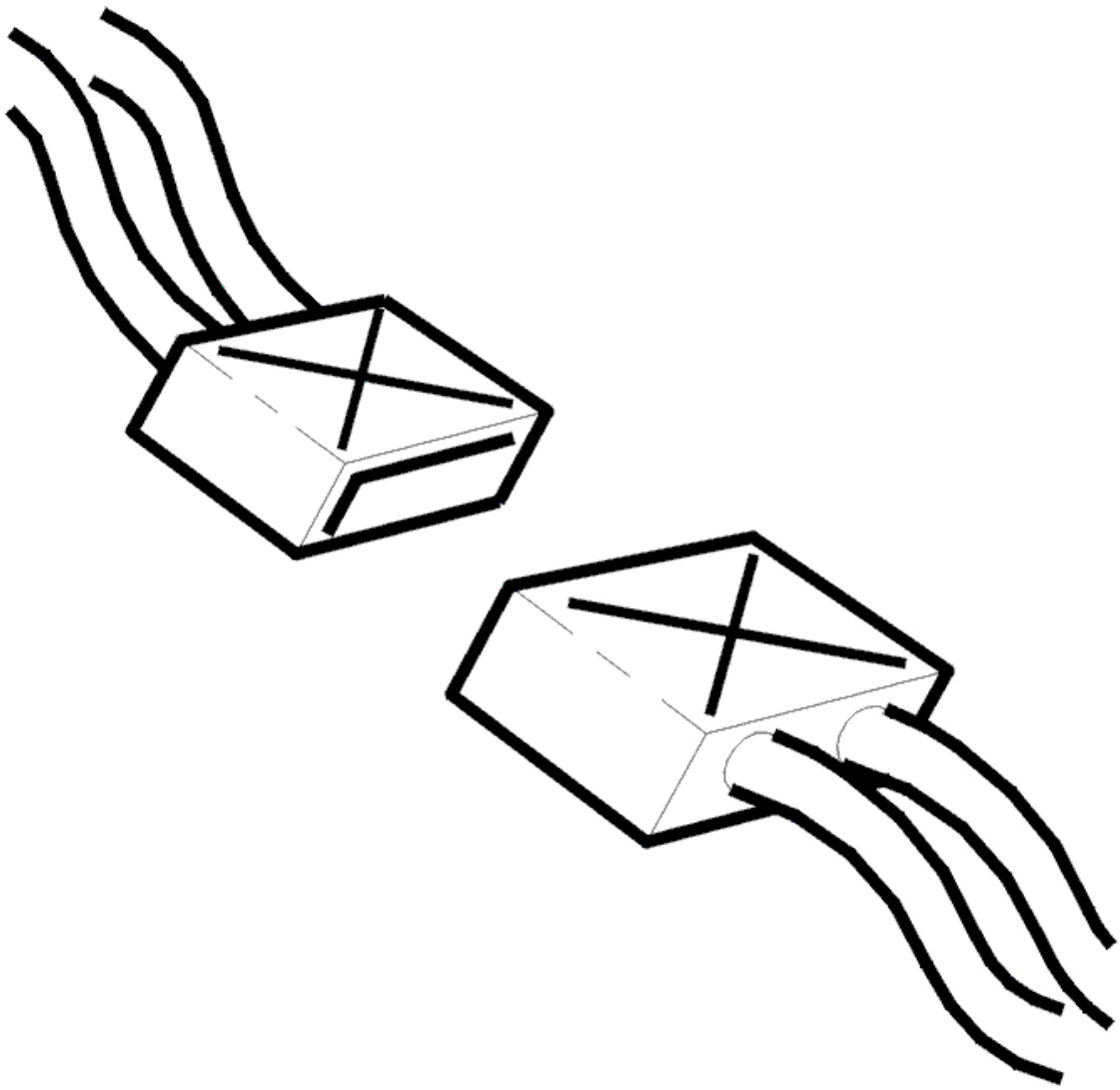


Fig. 107: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the control module without connecting the breakout box connector to the transmission
- Transmission connector disconnected
- Ignition on
- Gear selector in position P
- Connect a voltmeter between terminals #51 (#A51) and #53 (#A53) on the breakout box
- Activate solenoid SL.

  The voltage must oscillate between approximately 0 and 12 V. If the voltage does not oscillate, replace the control module.

NOTE: When disconnecting the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids and temperature sensor etc.

Other information:

- To disconnect the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION** .

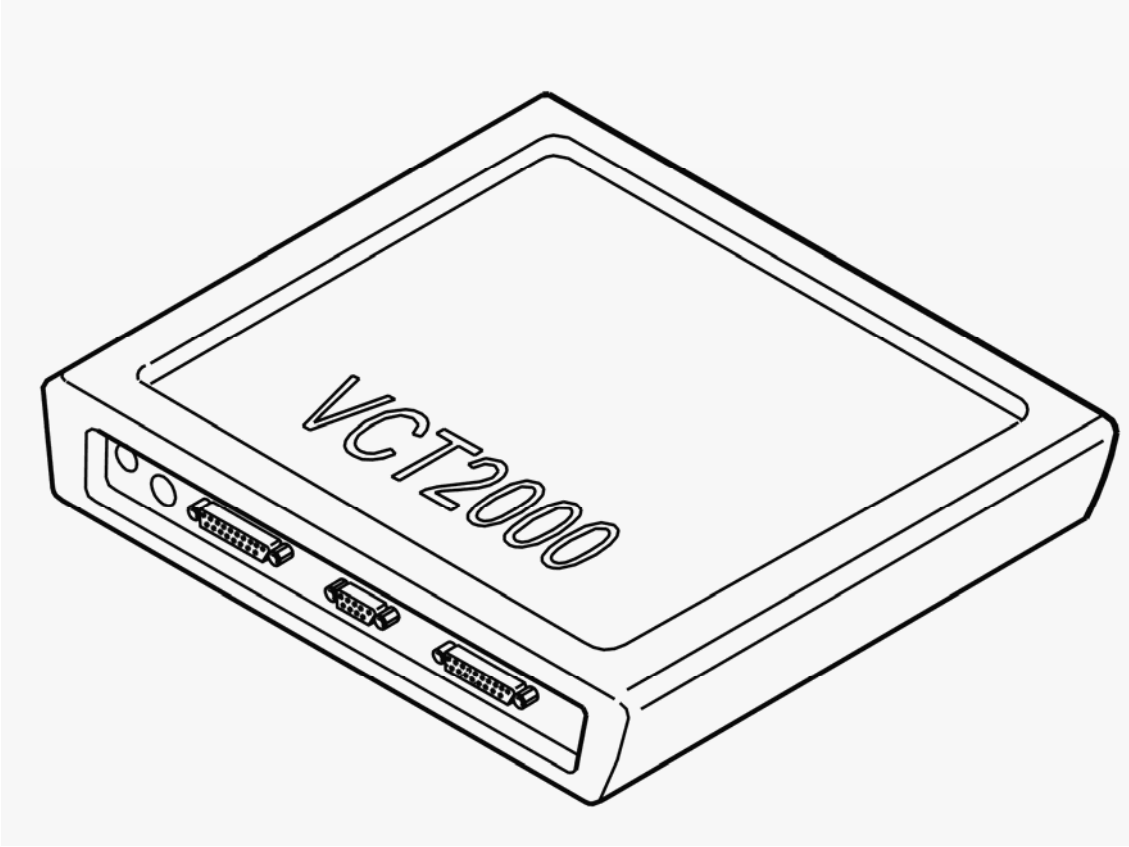


Fig. 108: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the voltage oscillate?

- **YES**

  Refer to **VERIFICATION**

- **NO**

FAULT NOT FOUND: Troubleshooting has been completed.

CHECKING THE WIRING

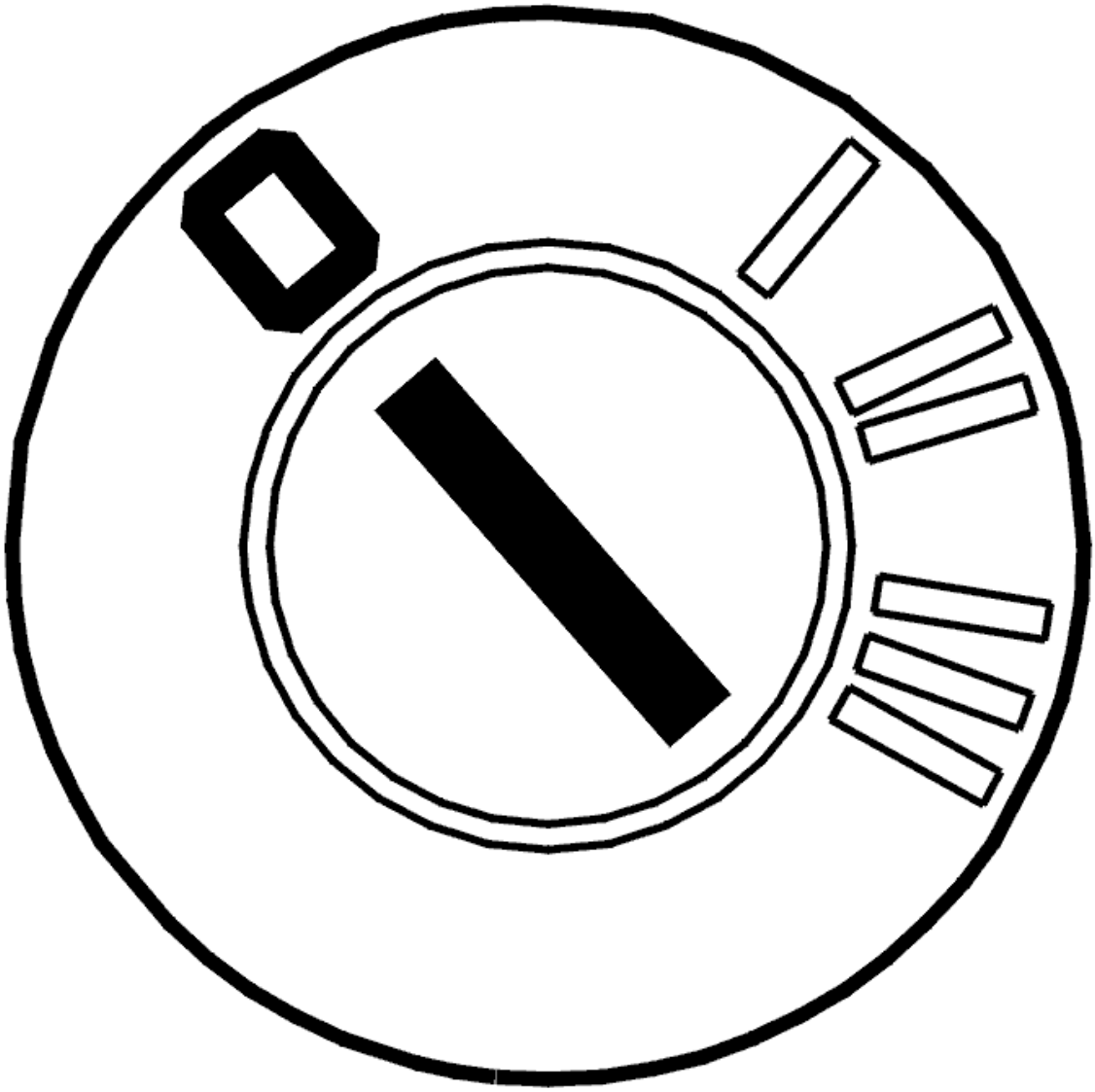


Fig. 109: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

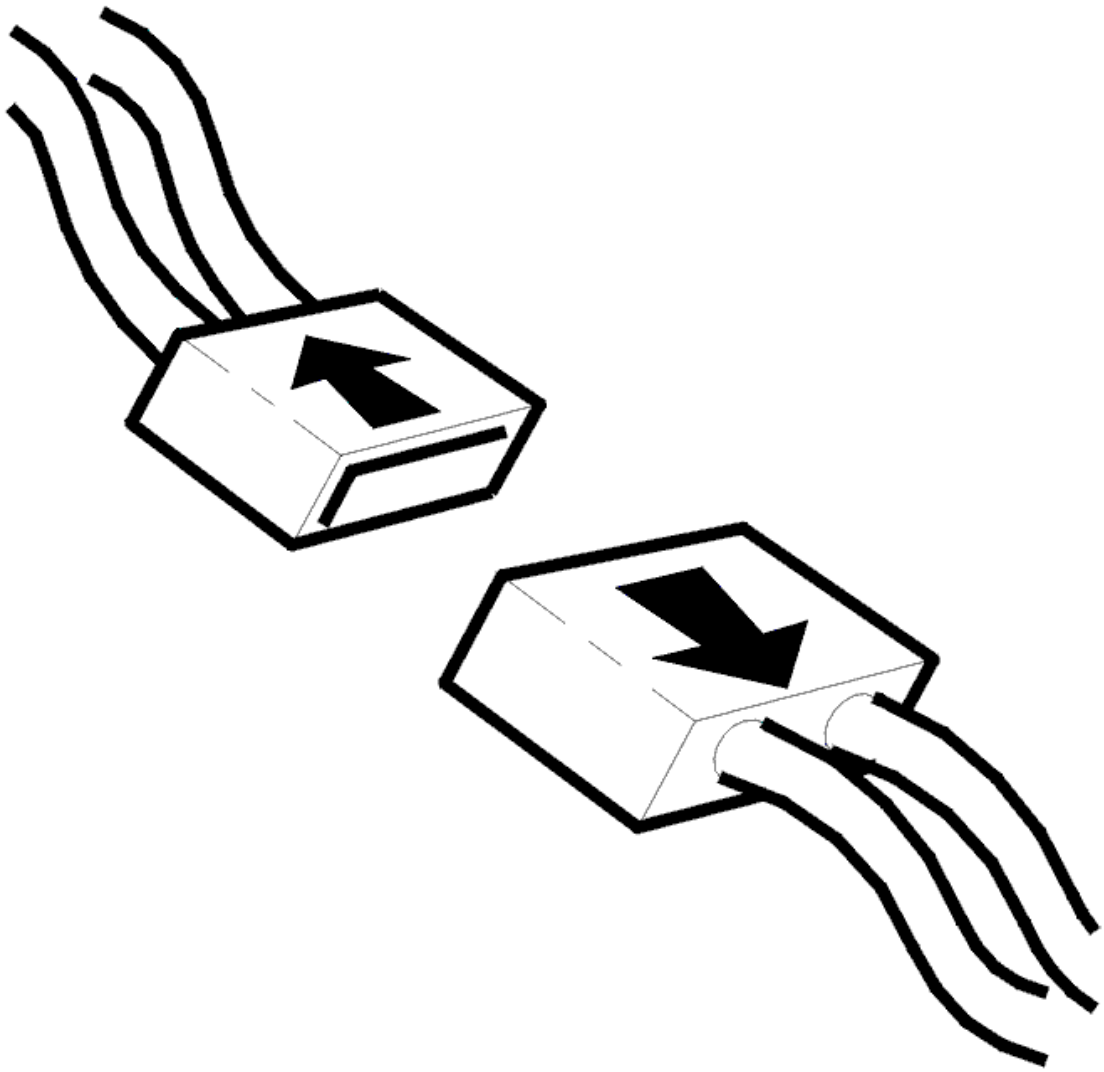


Fig. 110: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

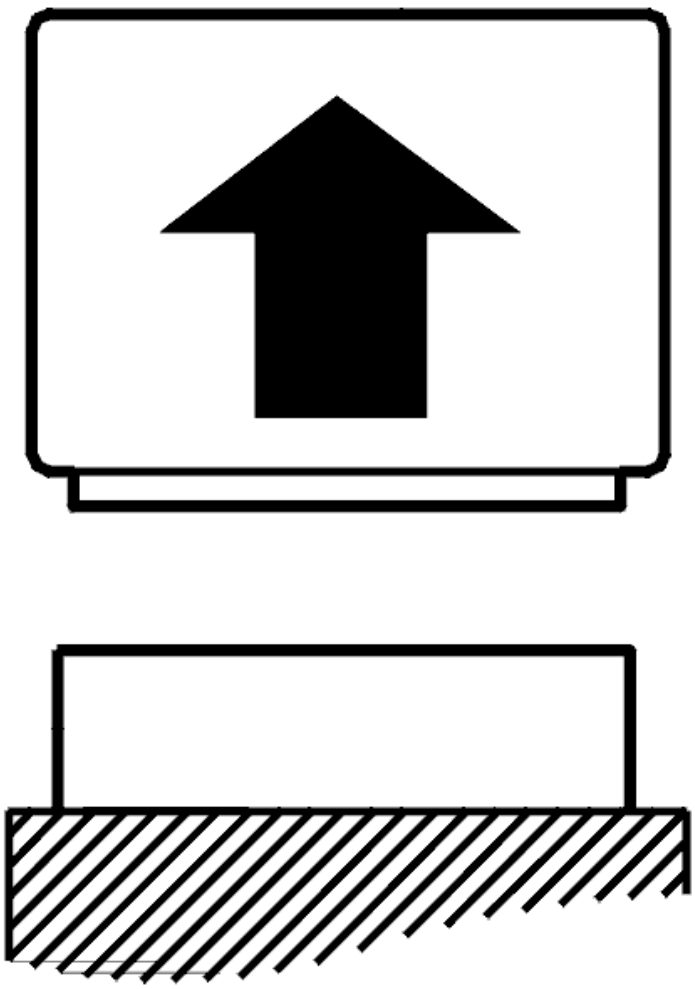


Fig. 111: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the control module
- Disconnect the control module.
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (control module side).

  Check the cable between control module terminal #51 (#A51) and transmission connector terminal #T (#A17). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

  Check the cable between control module terminal #53 (#A53) and transmission connector terminal #E (#A5). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

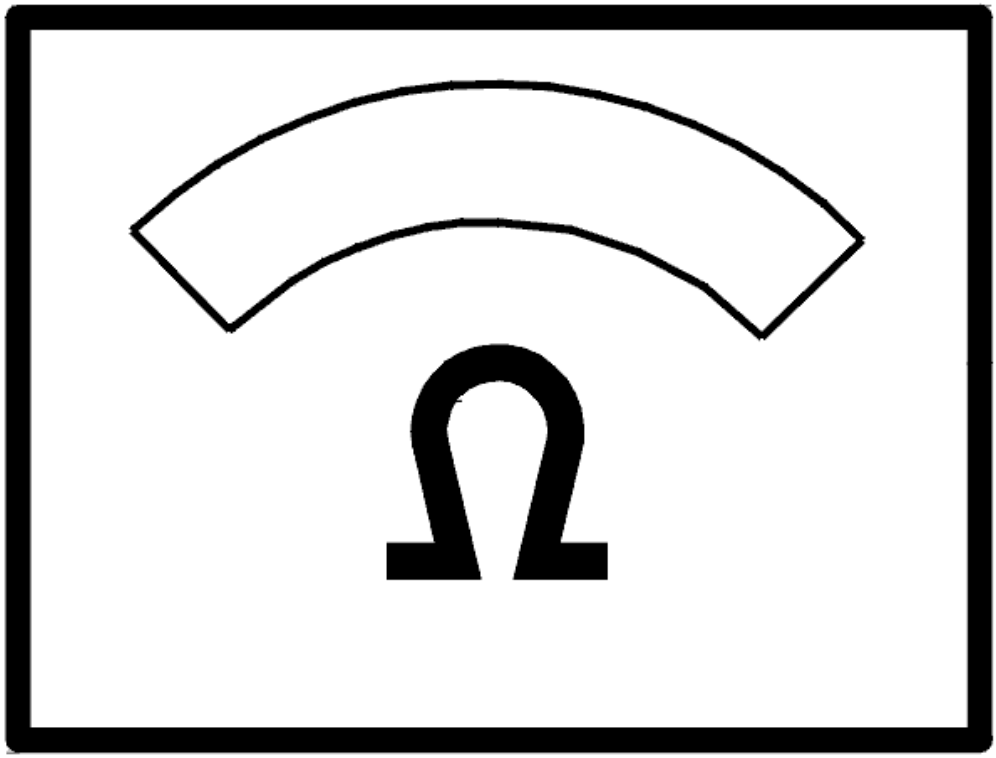


Fig. 112: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE WIRING AND COMPONENT

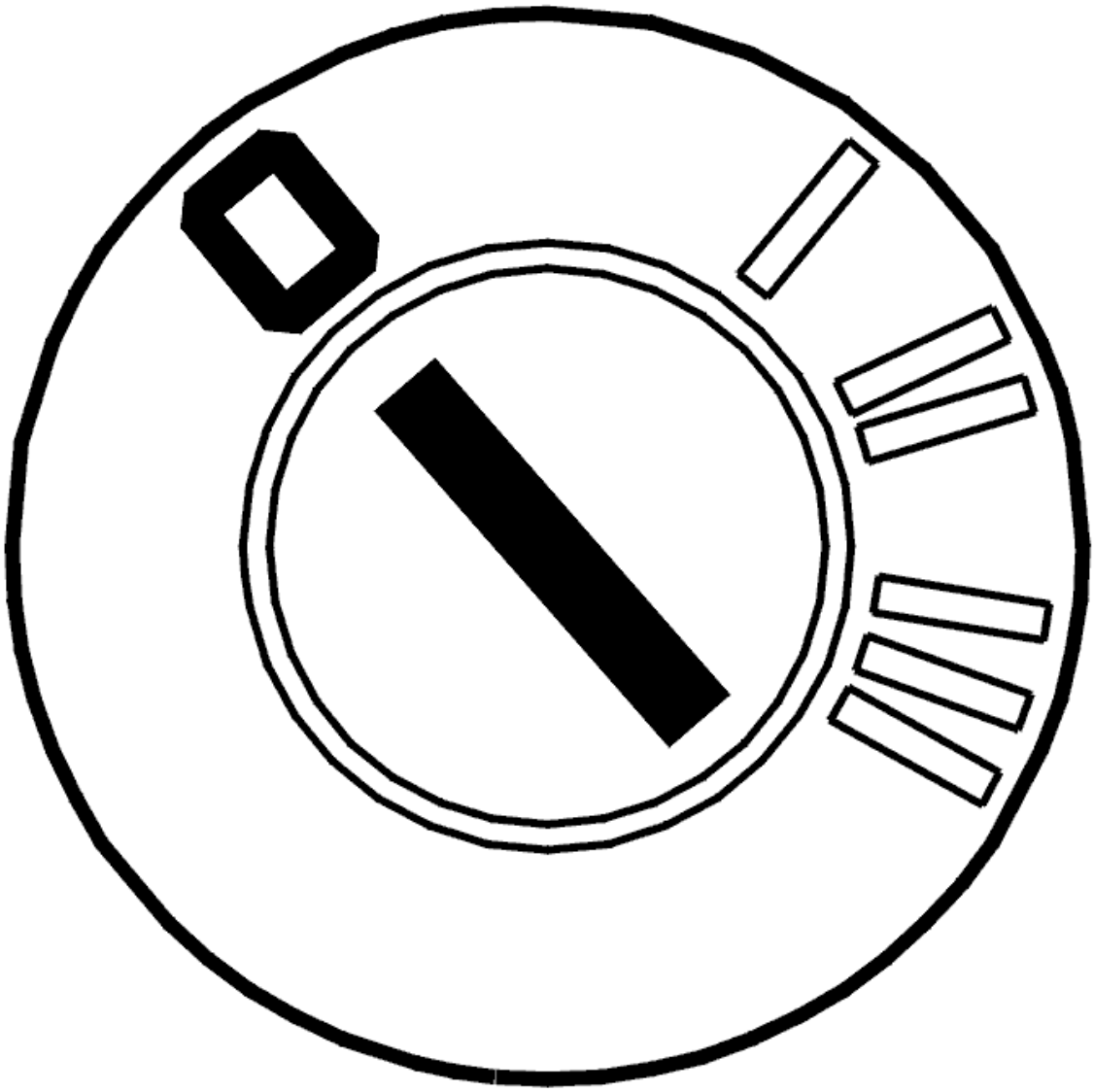


Fig. 113: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission connector terminal #T (#A17) and solenoid SL terminal #A and E (#A5) and solenoid SL terminal #B. Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT**

FAULTS .

HINT: Check solenoid SL by measuring the solenoid SL resistance between terminals #A and #B. The resistance must be between 10 and 15 ohms.

Remedy as necessary.

Other information:

- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** . To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid SL, see **SOLENOID LOCK-UP FUNCTION, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION** .

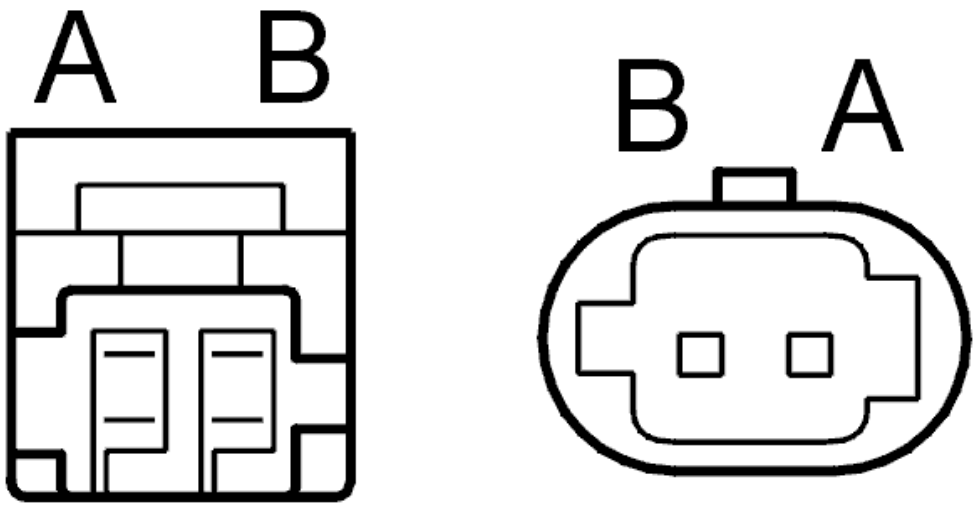


Fig. 114: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

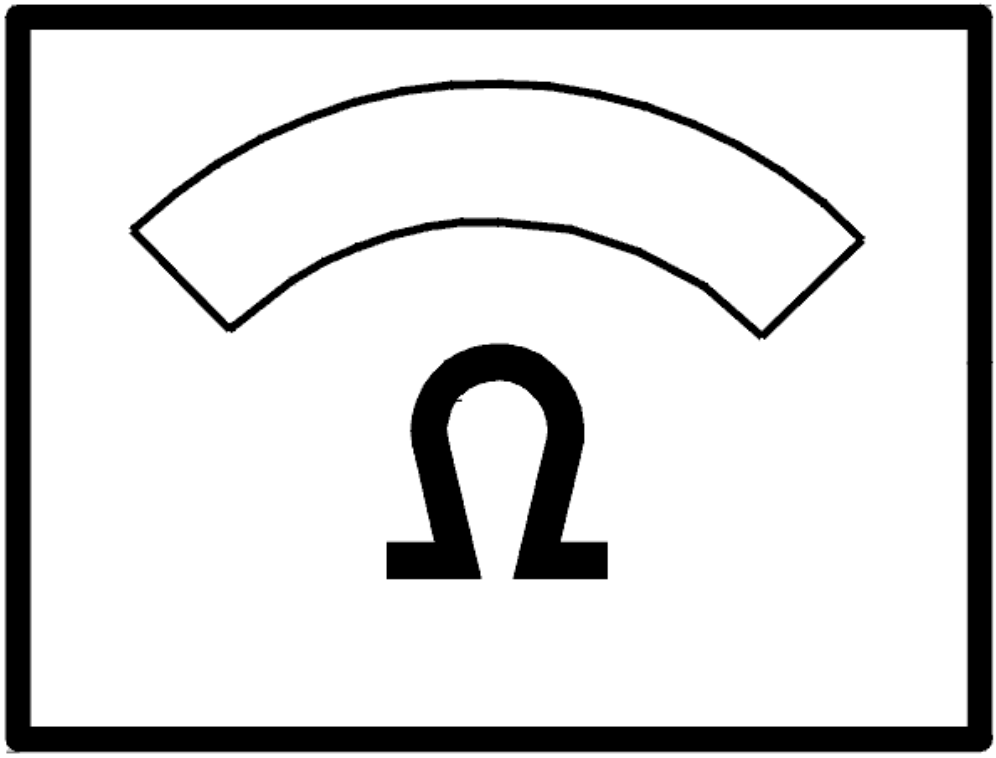


Fig. 115: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

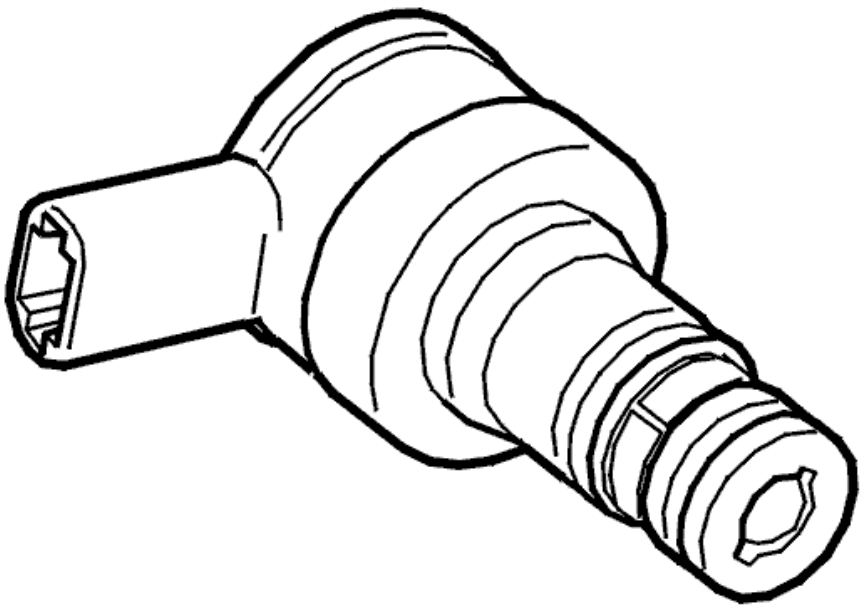


Fig. 116: Identifying Lock-Up Solenoid, SL
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

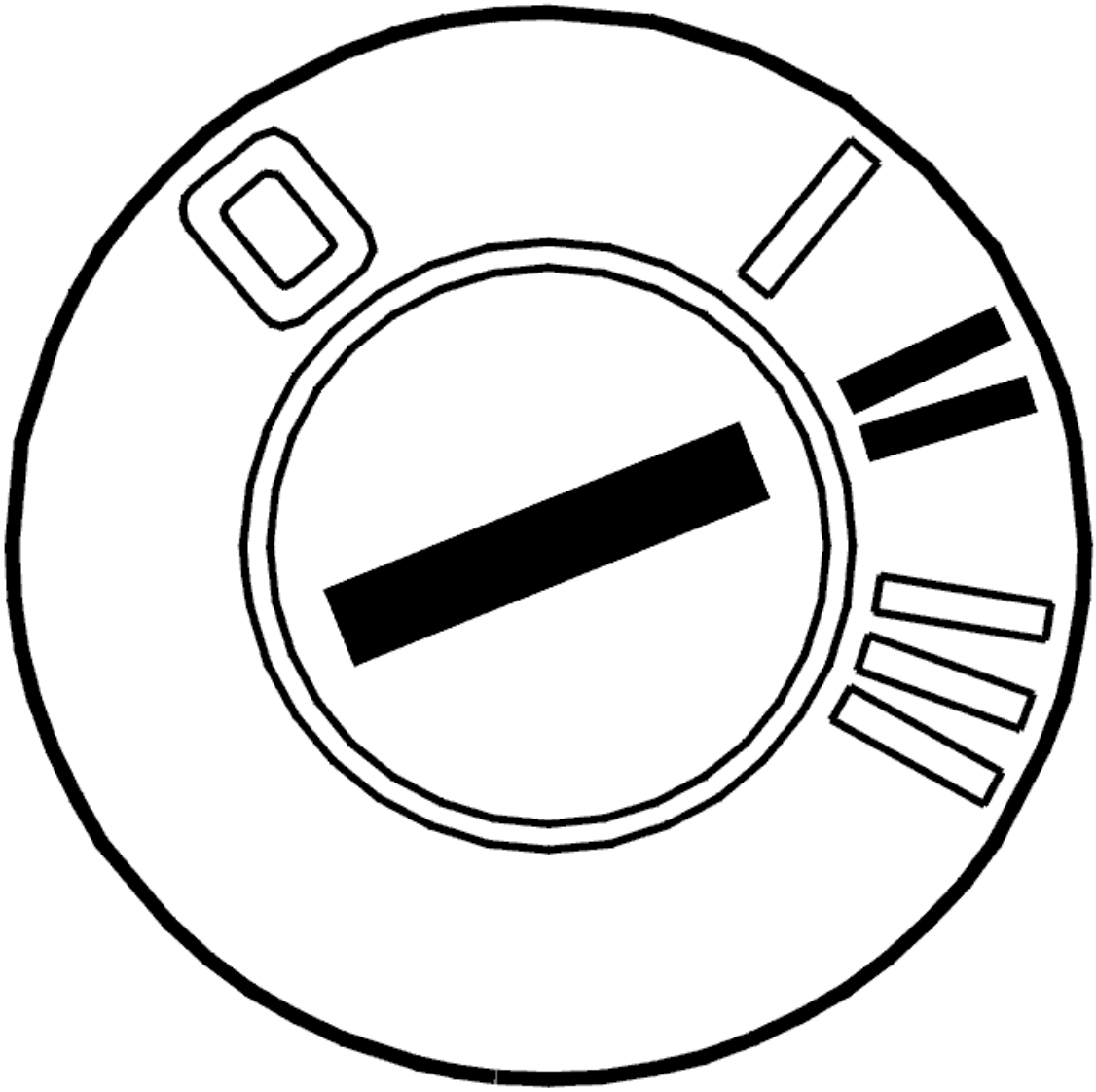


Fig. 117: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

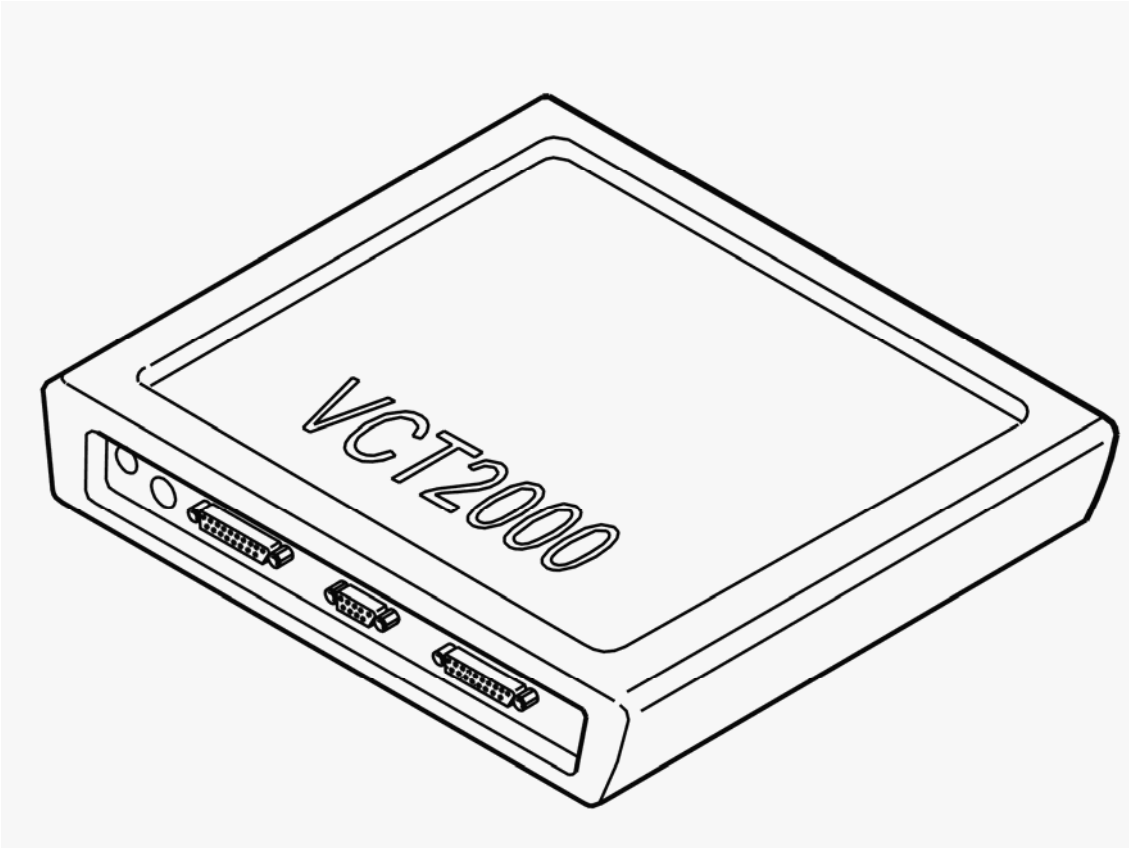


Fig. 118: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

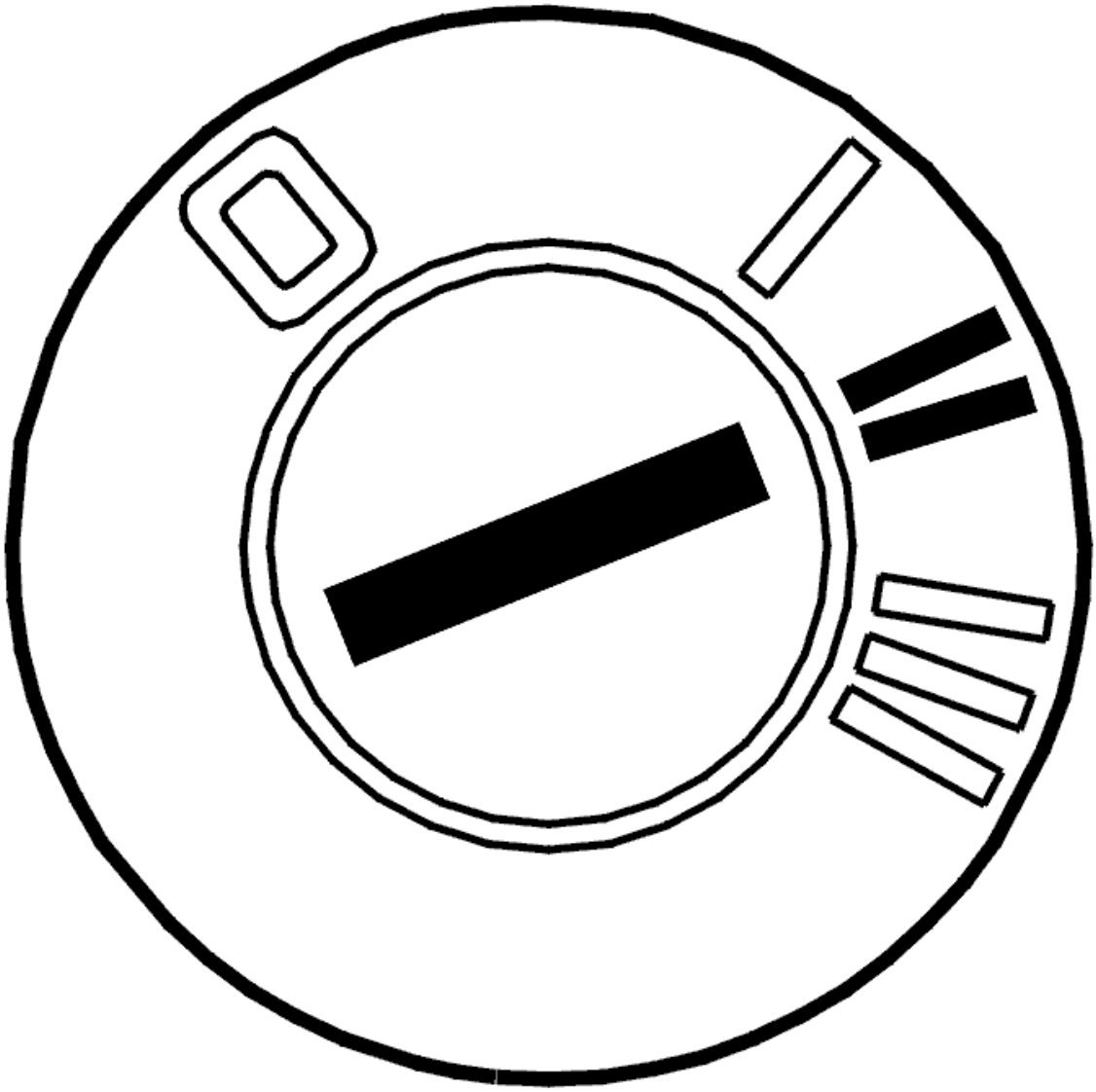


Fig. 119: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

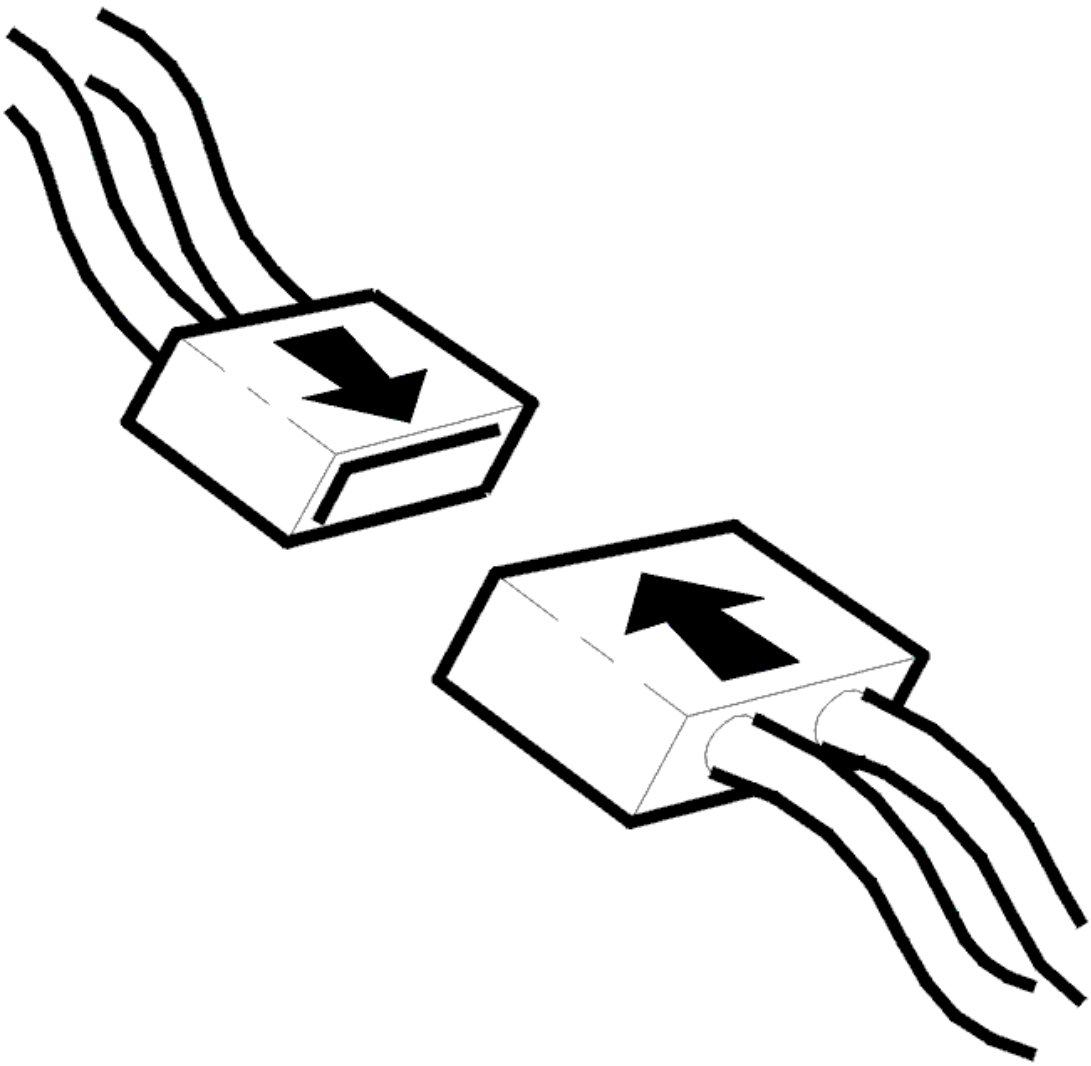


Fig. 120: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate the lock-up solenoid SL.

  The current should oscillate between approximately 0 and 1 A

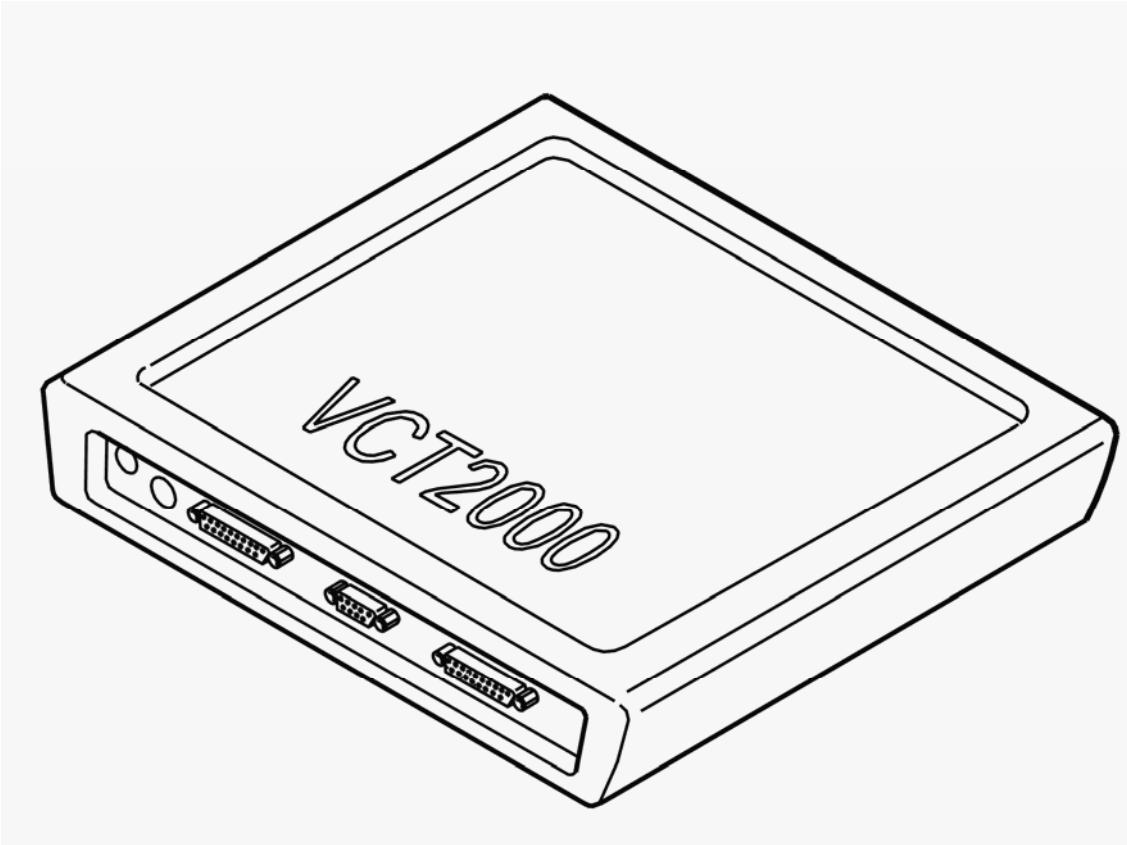


Fig. 121: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0014: LOCK-UP SOLENOID SL. SIGNAL TOO LOW. INTERMITTENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

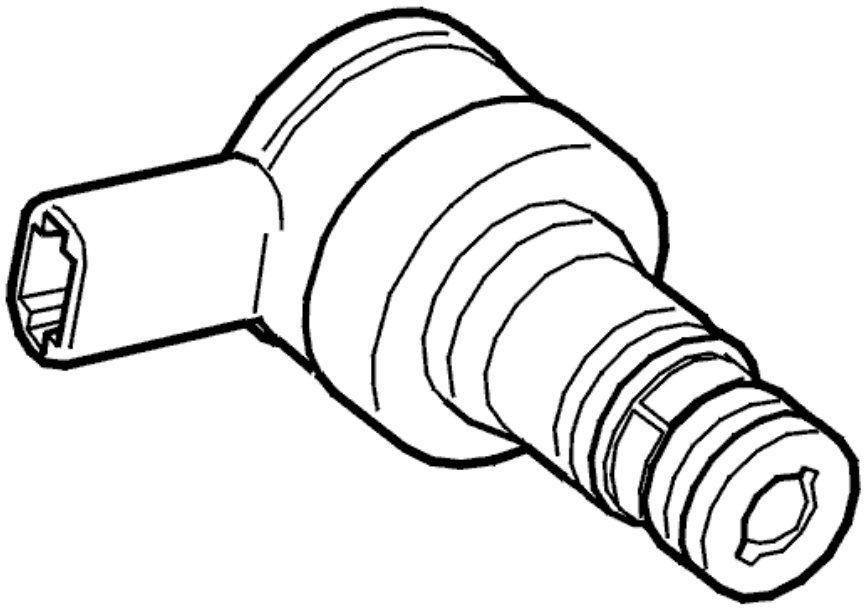


Fig. 122: Identifying Lock-Up Solenoid, SL
Courtesy of VOLVO CARS CORPORATION

The lock-up solenoid SL controls the transmission lock-up function. Solenoid SL operates when it receives voltage from the control module and is activated under different driving conditions depending on road speed, throttle position and the driving mode selected. Diagnostic trouble code (DTC) TCM-0014 is stored if the control module registers a too low signal in the solenoid SL circuit when the solenoid should be activated. Solenoid SL cannot then be activated.

Substitute Value

- The control module does not activate the lock-up solenoid.

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the signal cable.
- Defective solenoid.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

SIGNAL TOO LOW. INTERMITTENT FAULT

INTERMITTENT FAULT

Check the cable between control module terminal #51 (#A51) and transmission connector #T (#A17) for an intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** .

Check the wiring between control module terminal 53 (#A53) and transmission connector #E (#A5) for an intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** .

HINT: With the ignition off and the control module disconnected, the resistance between control module terminal 51 (#A51) and ground (breakout box #53) should be 11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX** .
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS** .
- For information about signals, see **SIGNAL SPECIFICATION** .

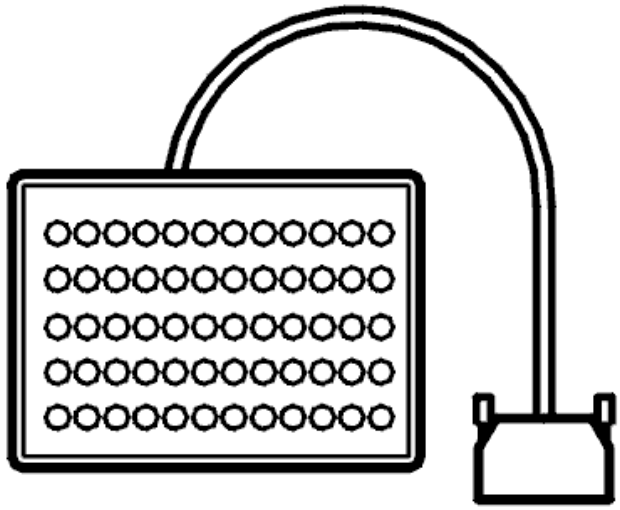


Fig. 123: Identifying Breakout Box

Courtesy of VOLVO CARS CORPORATION

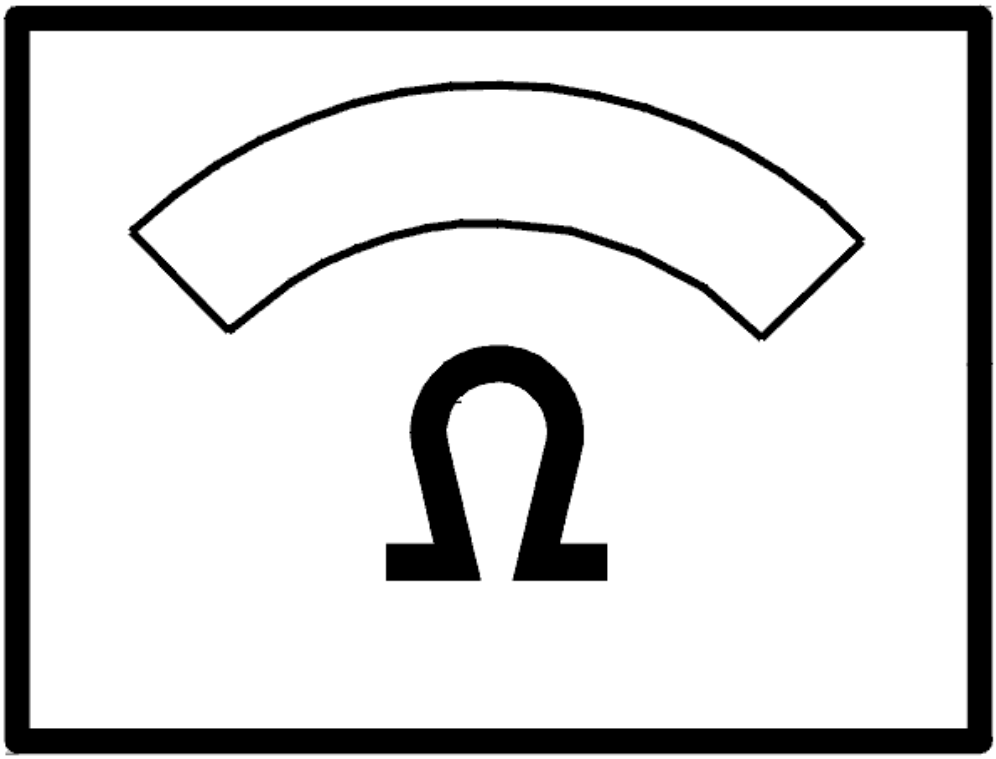


Fig. 124: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0014: LOCK-UP SOLENOID SL. SIGNAL TOO LOW. PERMANENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL TOO LOW. PERMANENT FAULT

CHECKS

CHECKING LOCK-UP SOLENOID SL

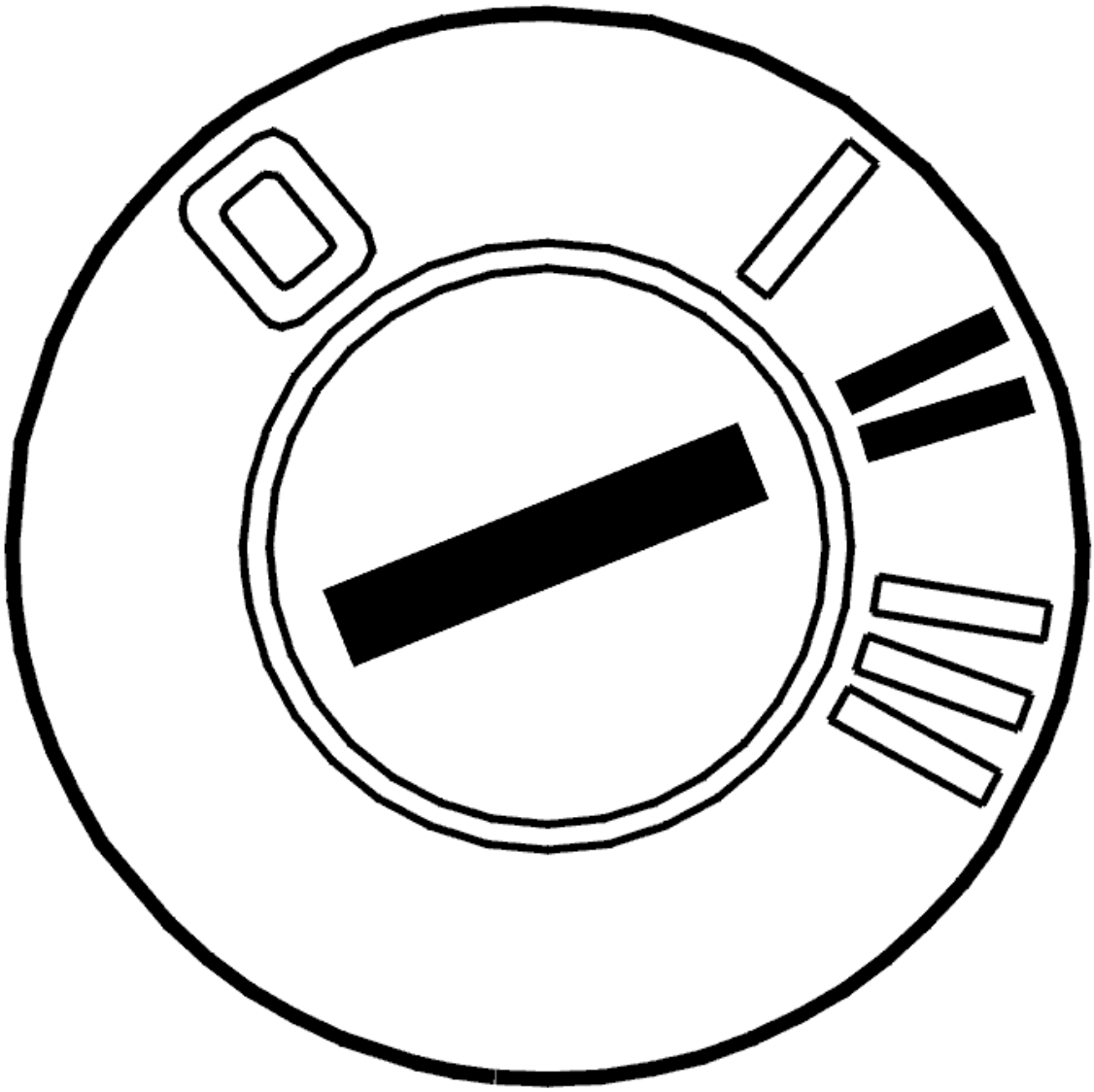


Fig. 125: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

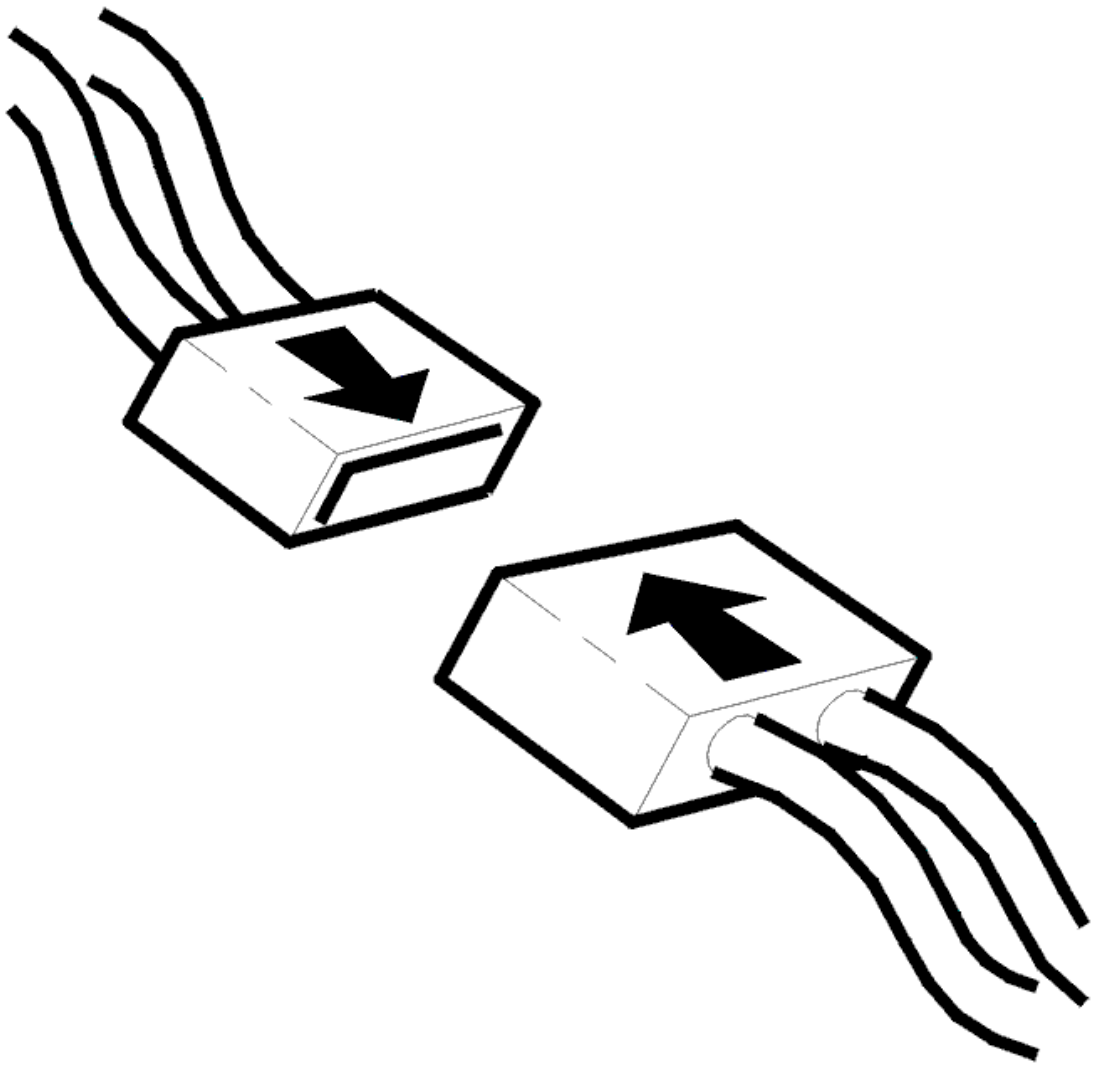


Fig. 126: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the control module and automatic transmission connectors for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary

- Ignition on
- Reinstall the components, reconnect the connectors etc.
- Gear selector in position P
- Activate the lock-up solenoid SL.

  The value must change between OFF and ON.

Other information:

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

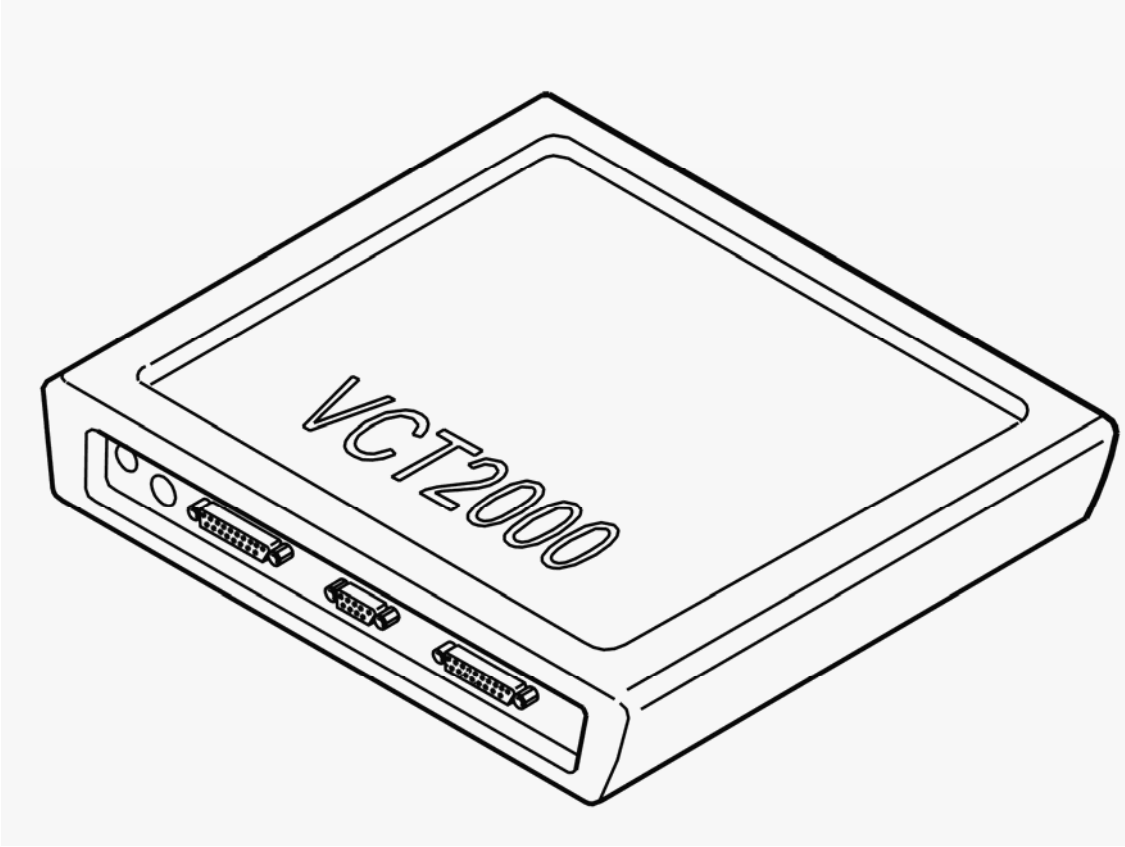


Fig. 127: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING SOLENOID SL**

CHECKING THE WIRING

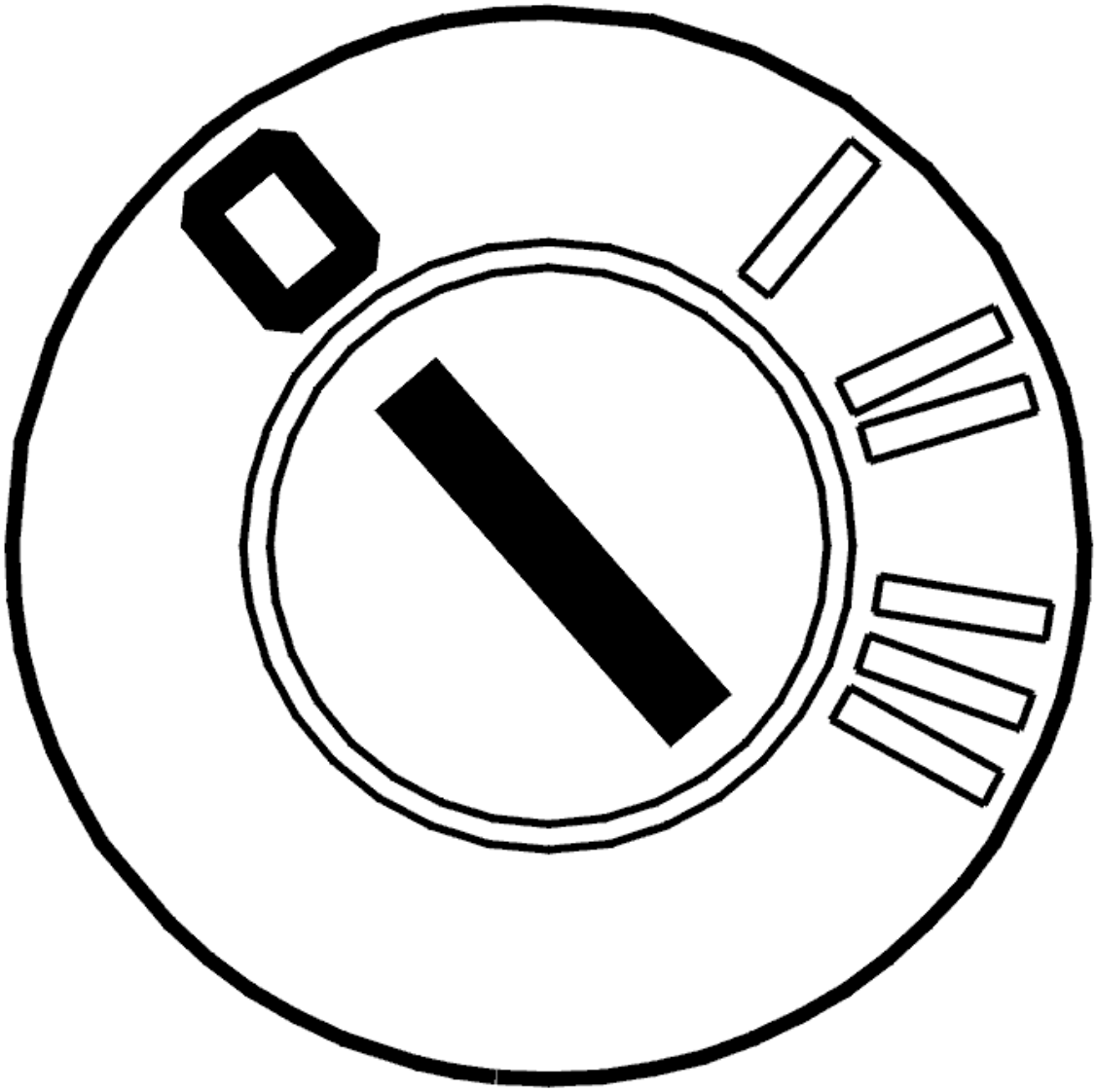


Fig. 128: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

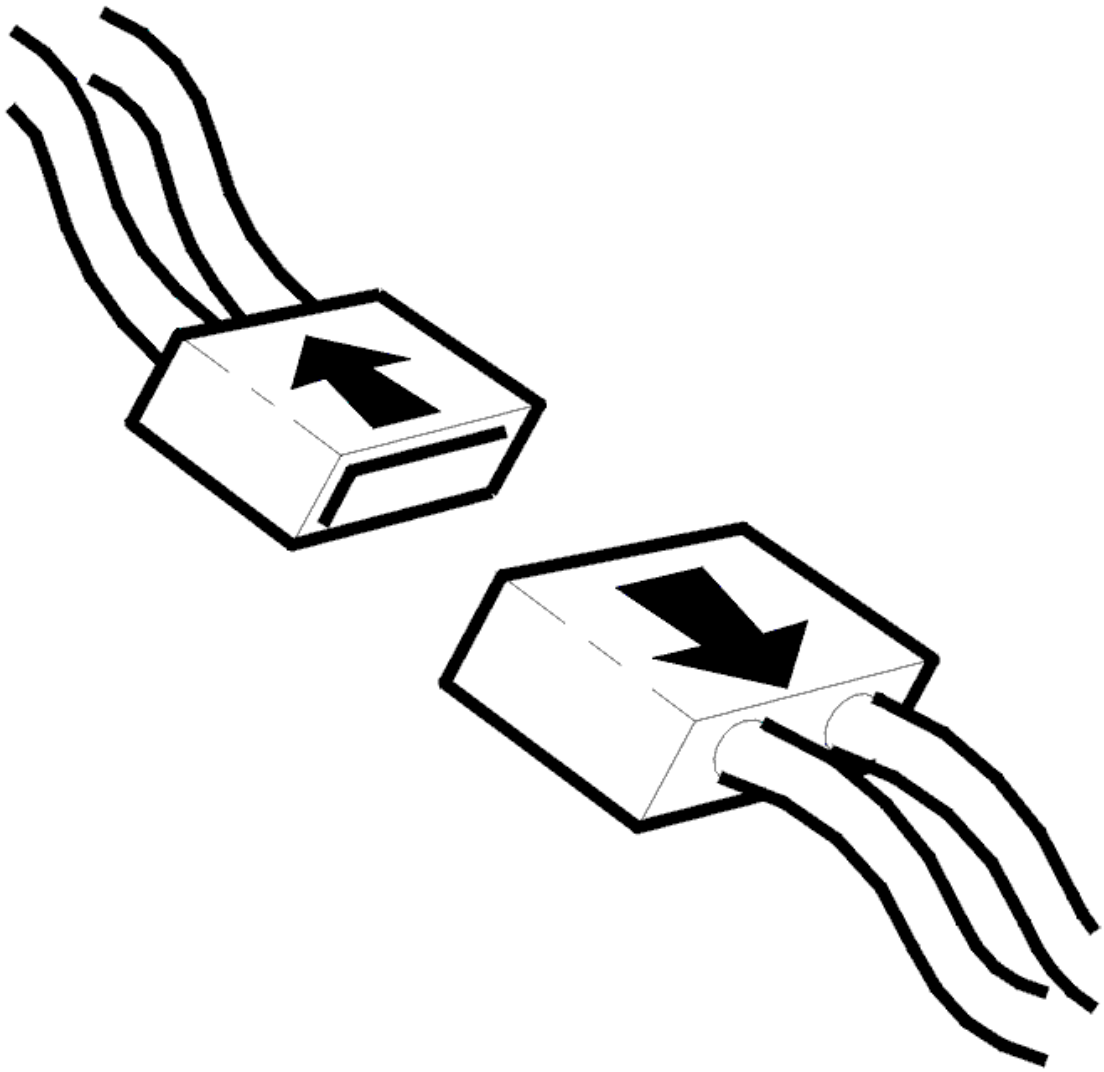


Fig. 129: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The transmission connector disconnected.

Check the cable between control module terminal #51 (#A51) and transmission connector (control module side) terminal #T (#A17). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Check the cable between control module terminal #A53 and transmission connector (control module side) terminal #E (#A5). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

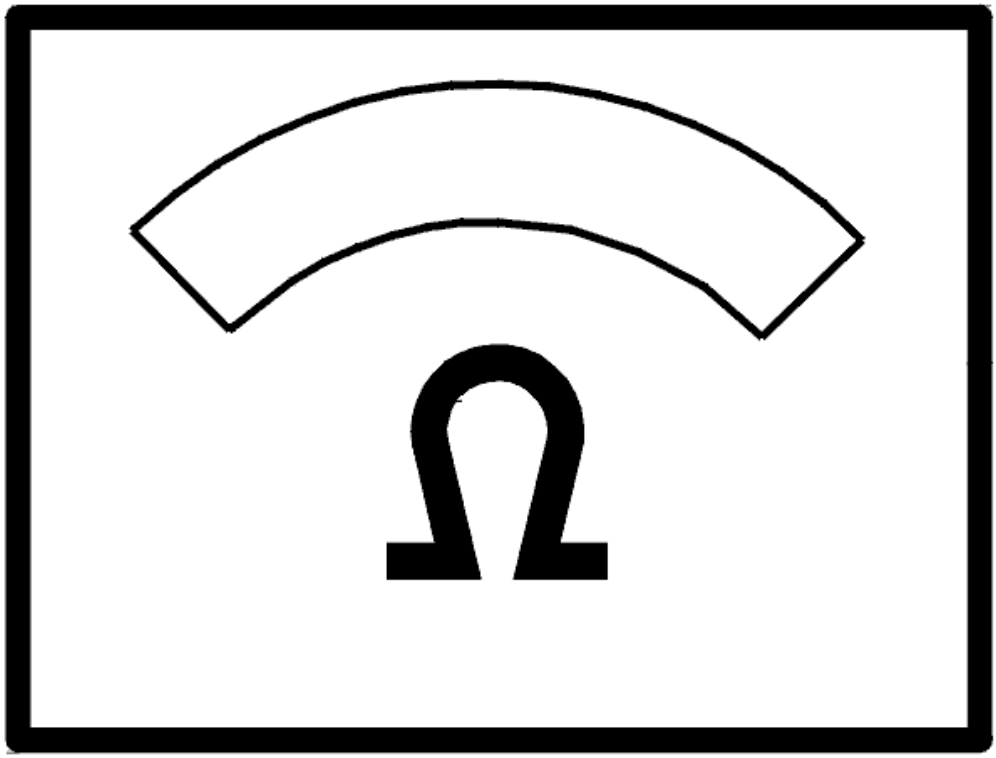


Fig. 130: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING SOLENOID SL

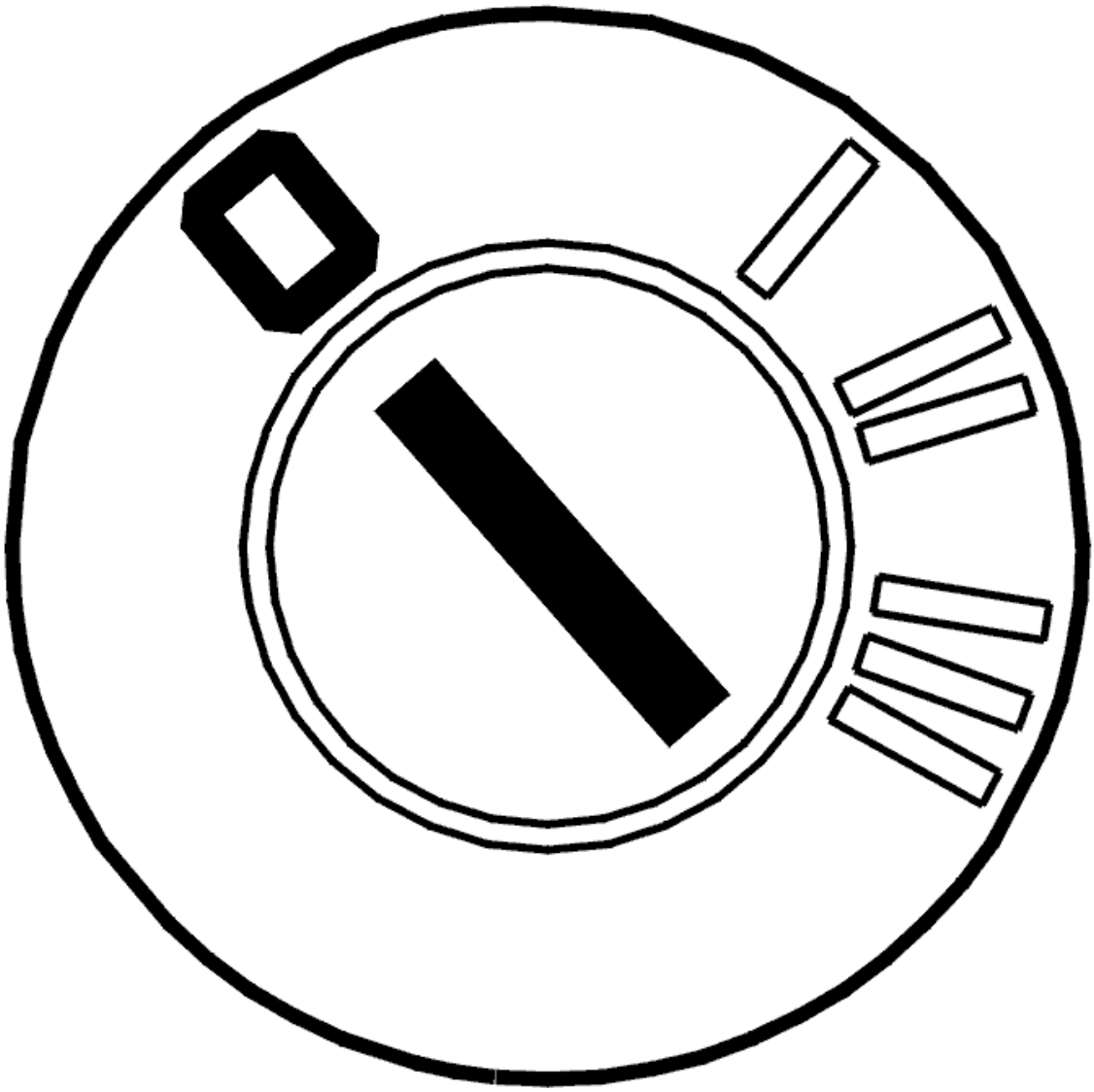


Fig. 131: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

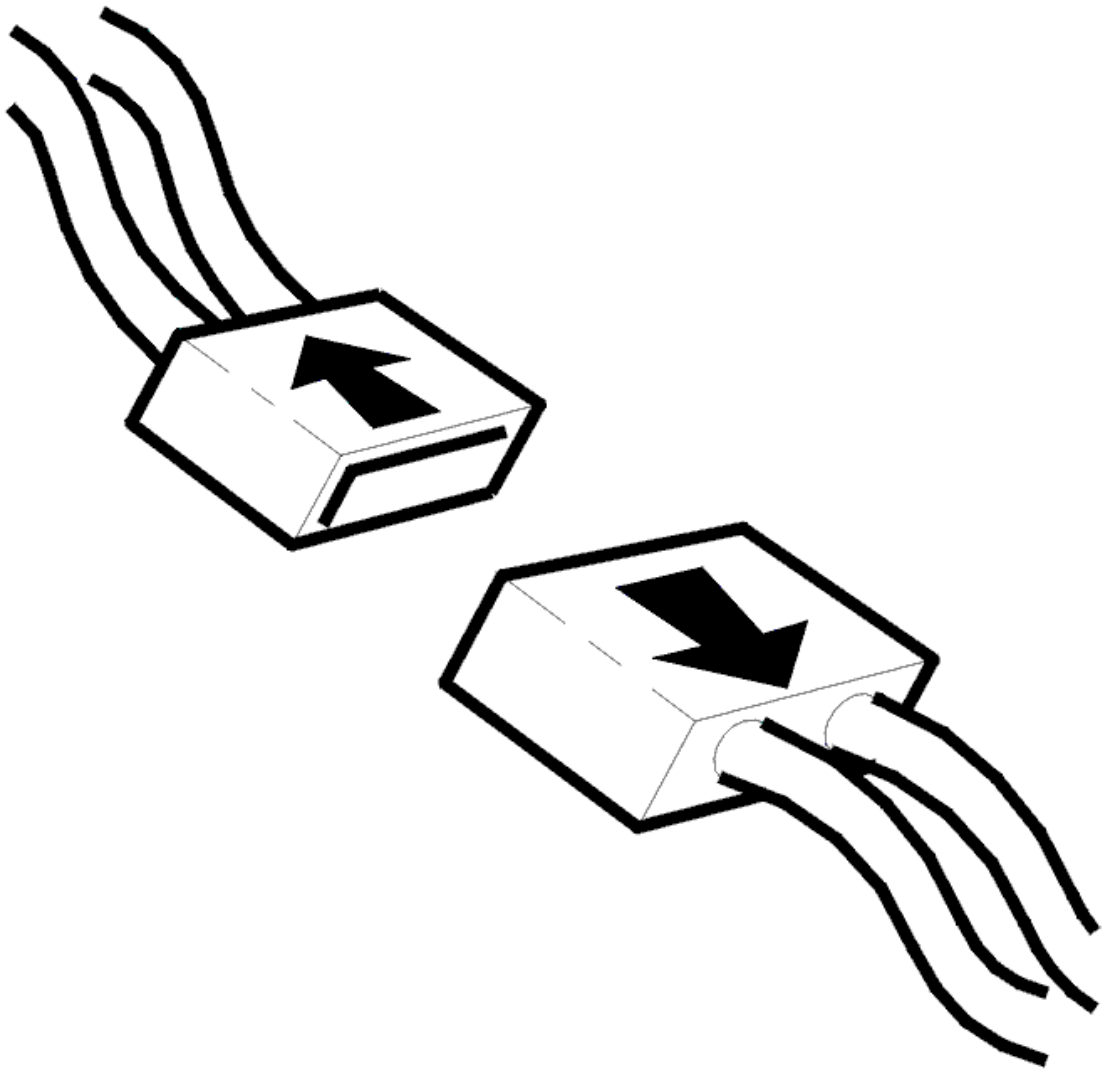


Fig. 132: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the automatic transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side).

  Connect an ohmmeter between terminals E (#A5) and T (#A17).

  The solenoid SL resistance must be between 11 and 15 ohms.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**

- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

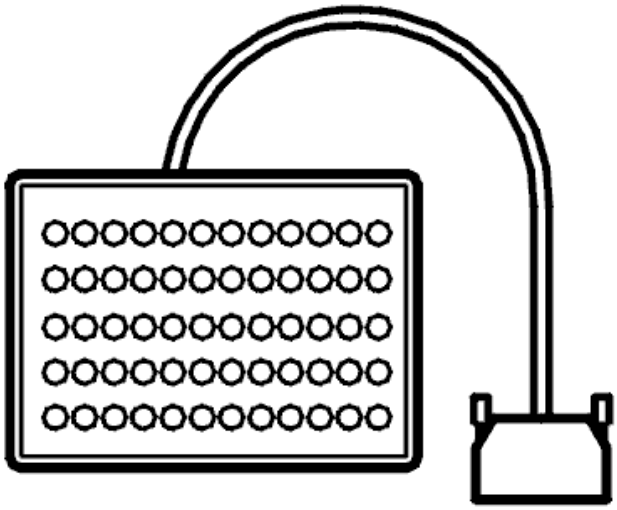


Fig. 133: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

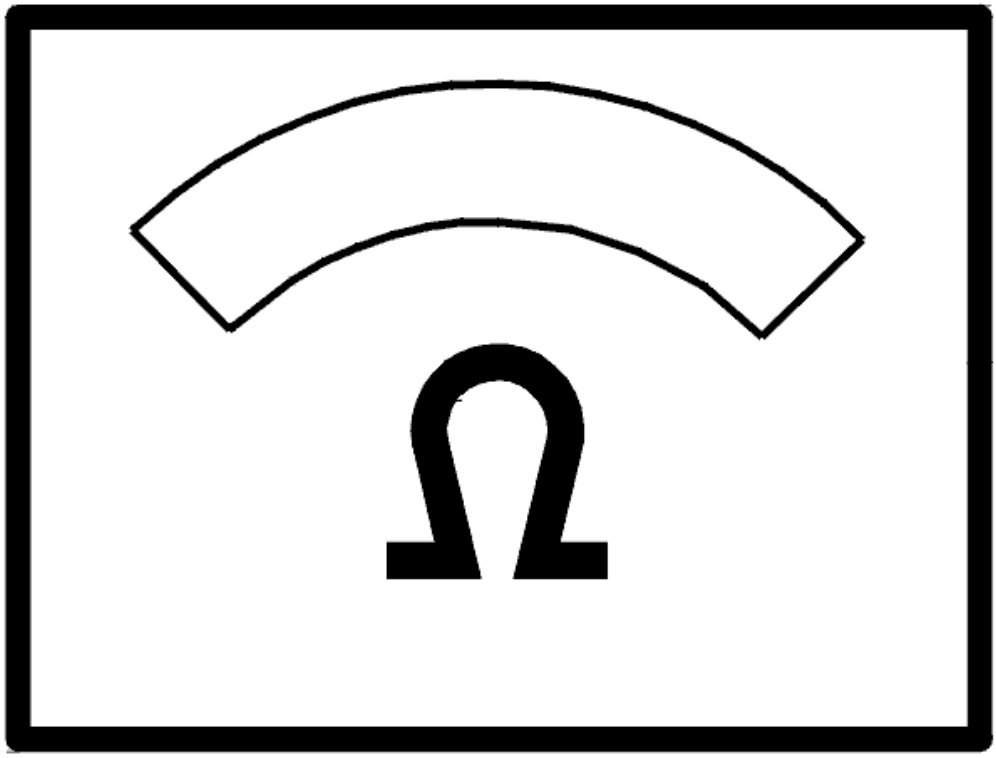


Fig. 134: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

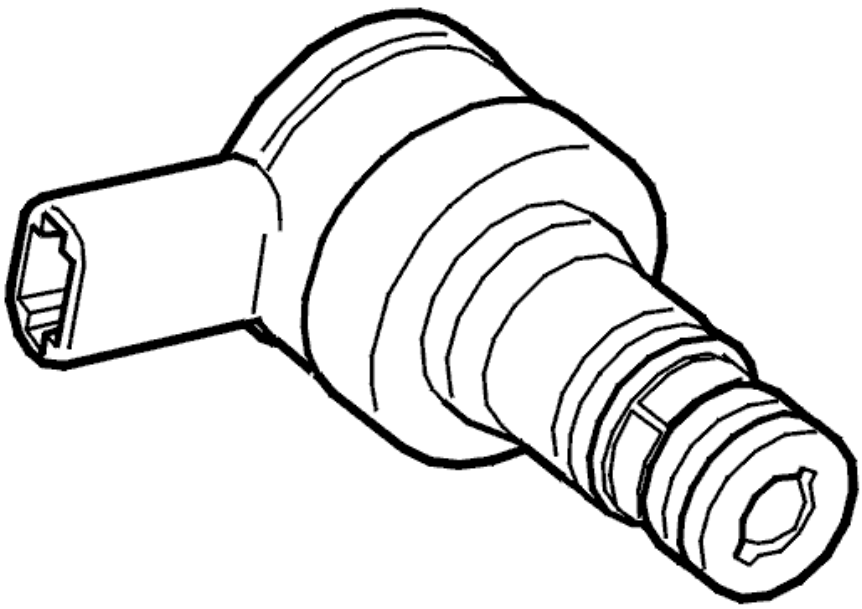


Fig. 135: Identifying Lock-Up Solenoid, SL
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING COMPONENTS AND WIRING**

CHECKING THE CONTROL MODULE

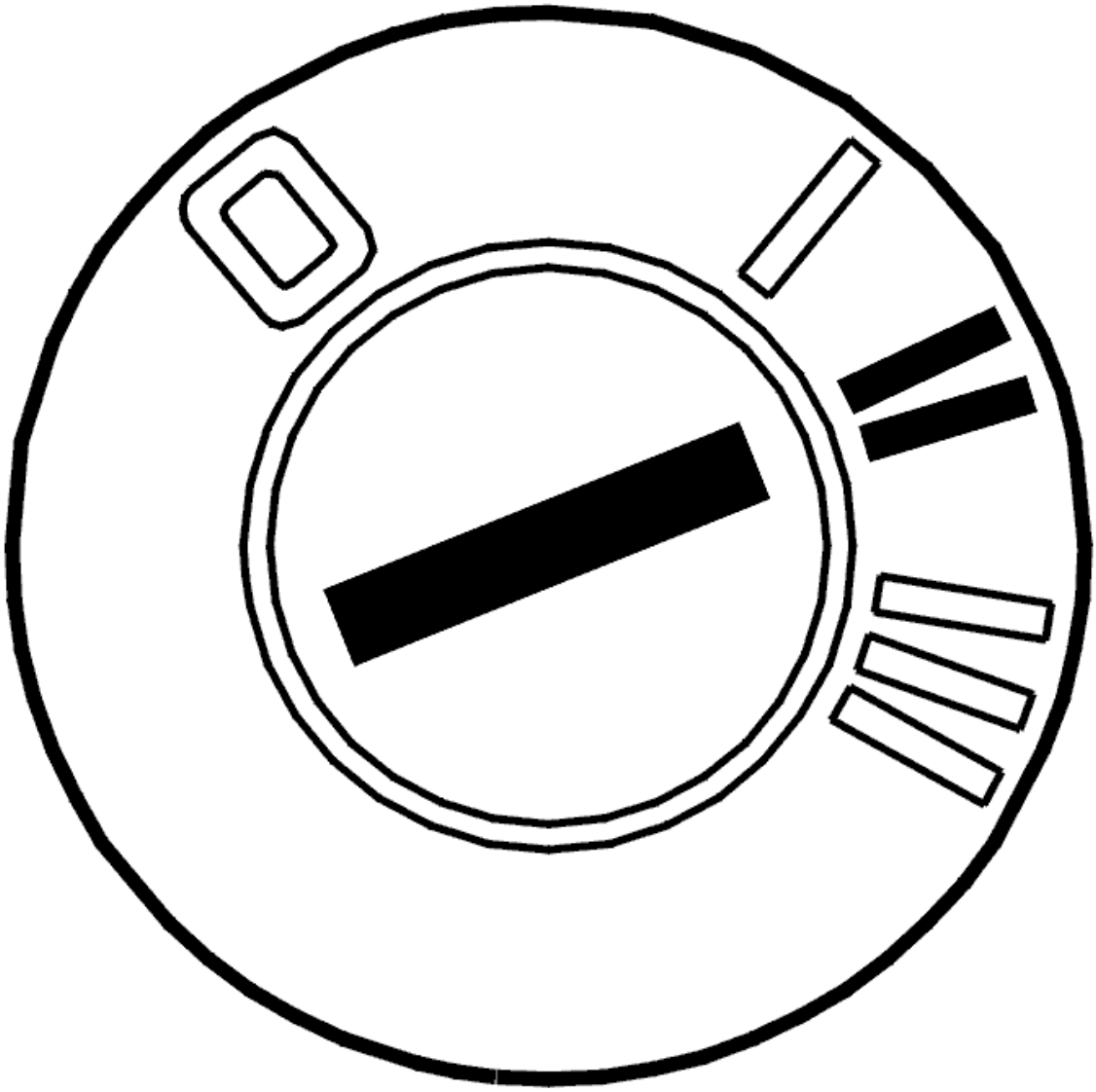


Fig. 136: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

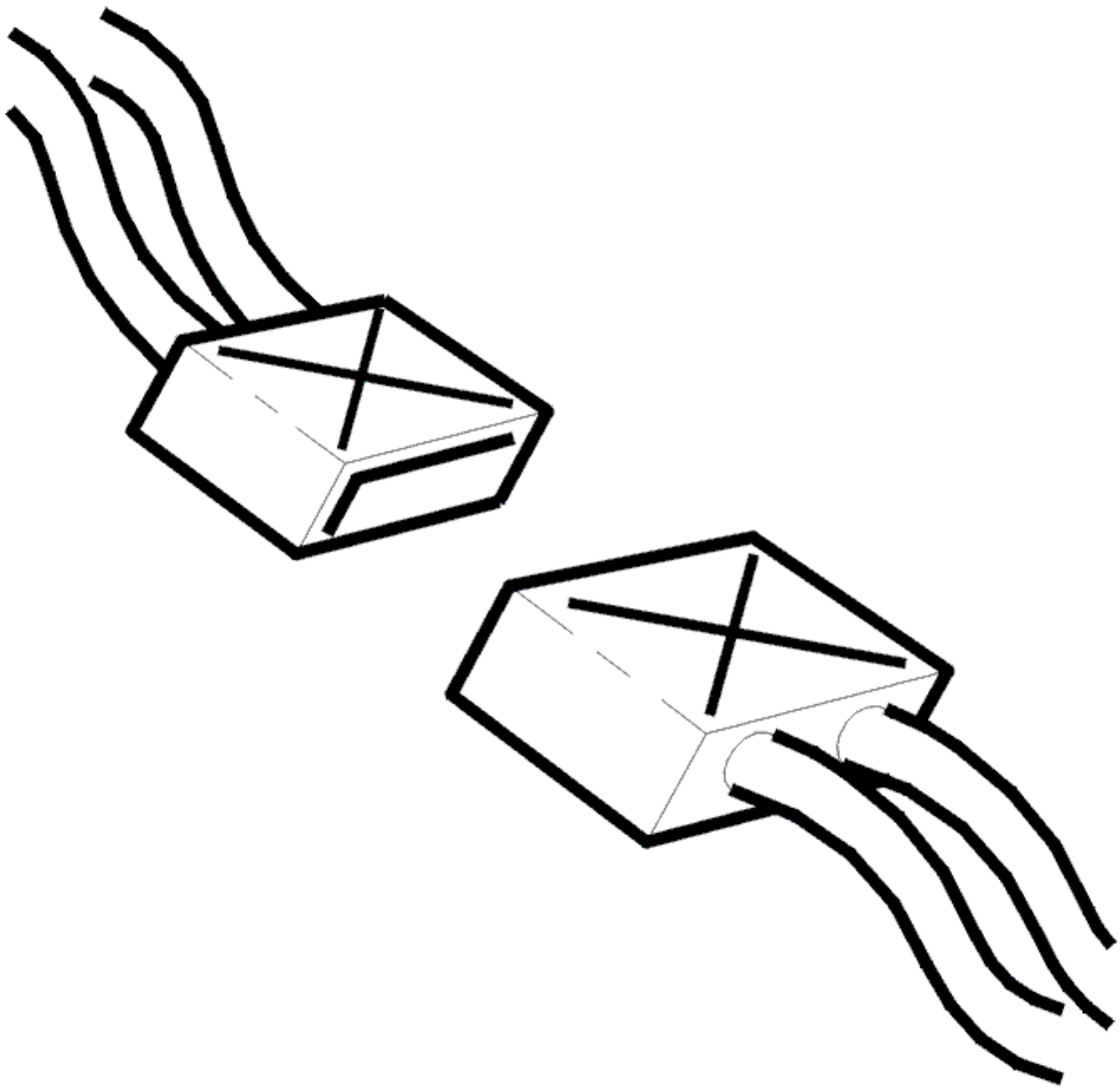


Fig. 137: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

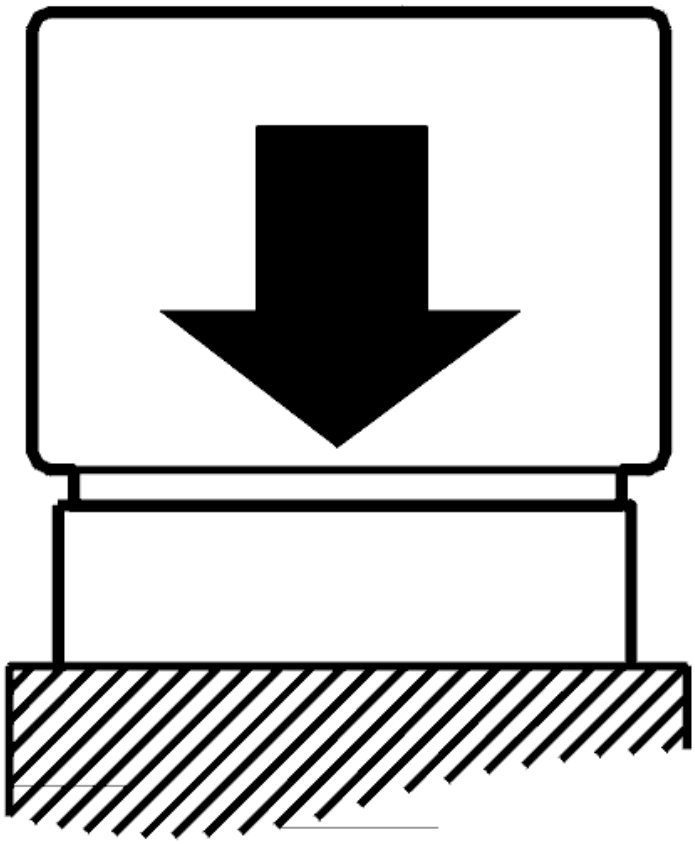


Fig. 138: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector disconnected
- Connect the control module.
- The breakout box connected
- Ignition on
- Gear selector in position P.

Check the transmission control module (TCM). Measure the voltage between terminal #51 (#A51) and terminal #53 (#A53) on the breakout box. The voltage must be approximately 0 V.

NOTE: When removing the transmission connector, the control module may store

diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids and the temperature sensor etc.

Try a new control module if the voltage exceeds 1 V.

Other information:

- To disconnect the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION** .

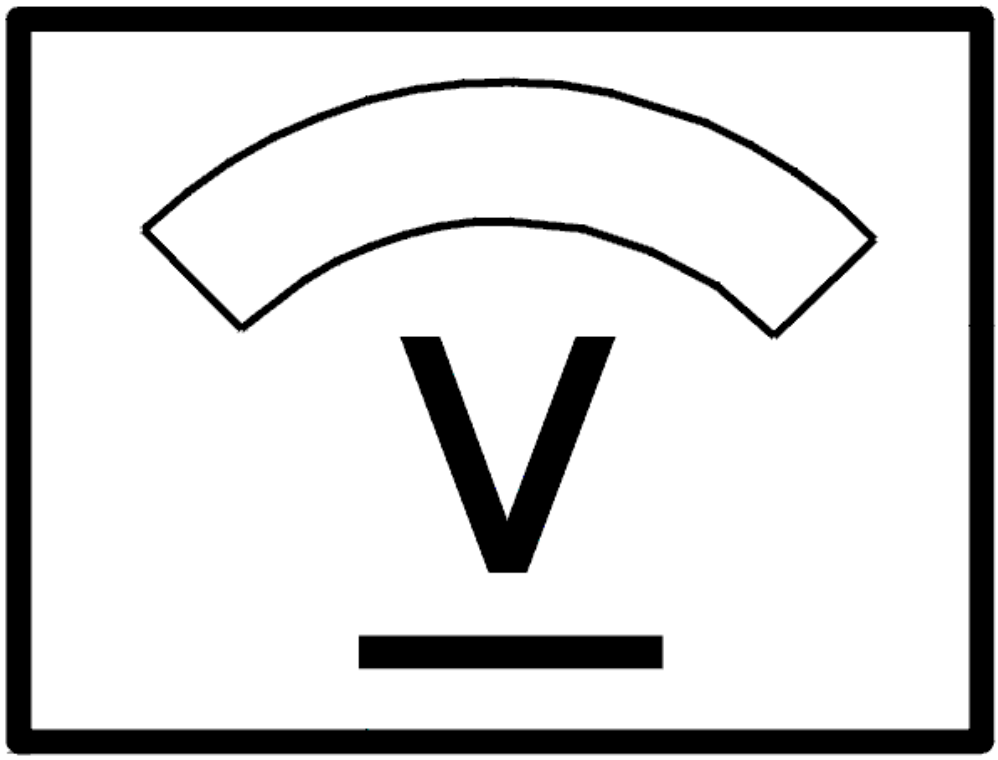


Fig. 139: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was the voltage above 1 V?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

CHECKING COMPONENTS AND WIRING

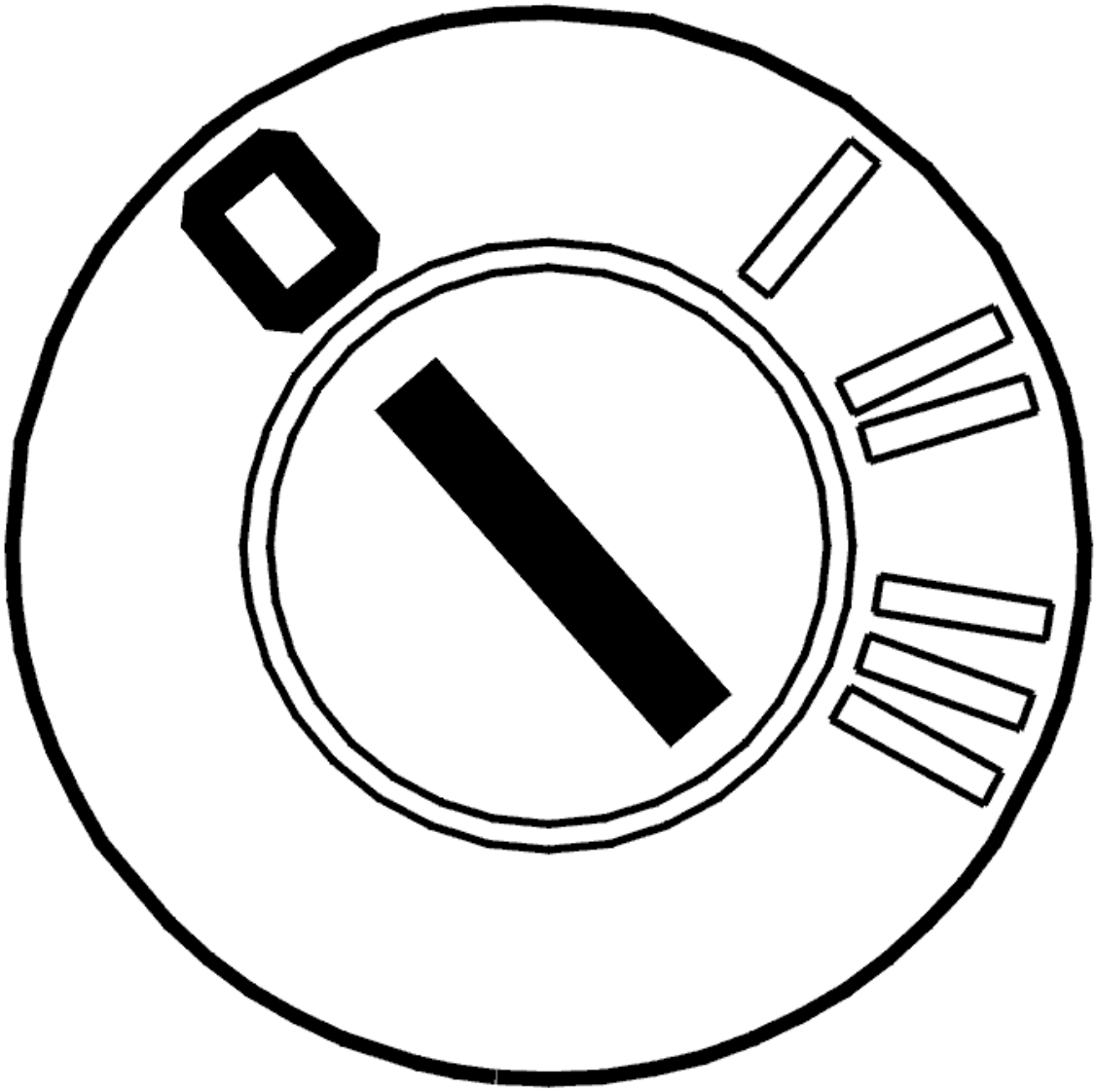


Fig. 140: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off

- Open the transmission control system.

  Check the cable between transmission connector (transmission side) terminal #C (#A3) and solenoid SL terminal #A. Check the cable between transmission connector terminal #E (#A5) and solenoid SL terminal #B. Check these cables for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check all the cables in the wiring harness from the transmission connector to the transmission components. Check for short-circuits to each other.

  HINT: Check solenoid SL. Measure the solenoid resistance between terminals 1 and 2. The resistance must be between 3 and 5 ohms.

  Remedy as necessary.

  Other information:

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** . To install, see **SIDE COVER TRANSMISSION, INSTALLING**
  - To replace solenoid S2, see **SOLENOID SHIFTING 2-3, REPLACING**
  - To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
  - For information about signals, see **SIGNAL SPECIFICATION** .

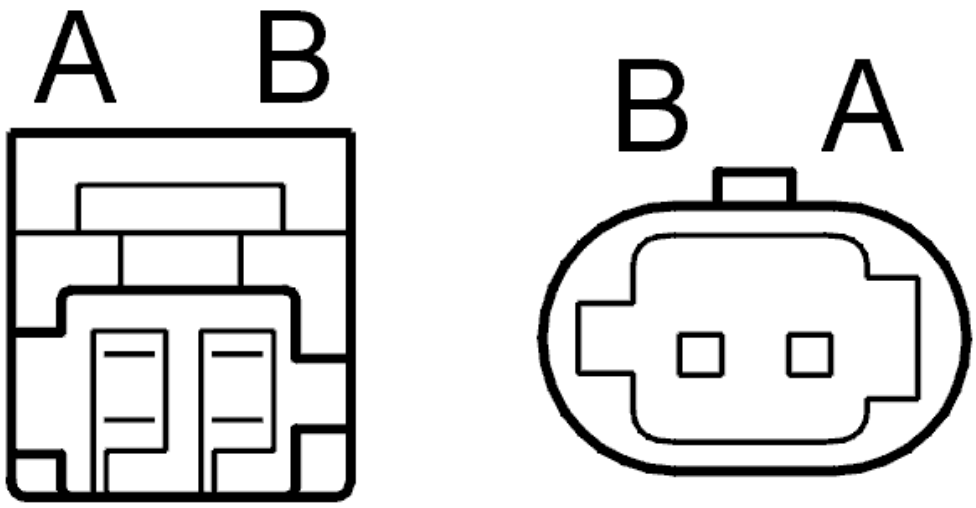


Fig. 141: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

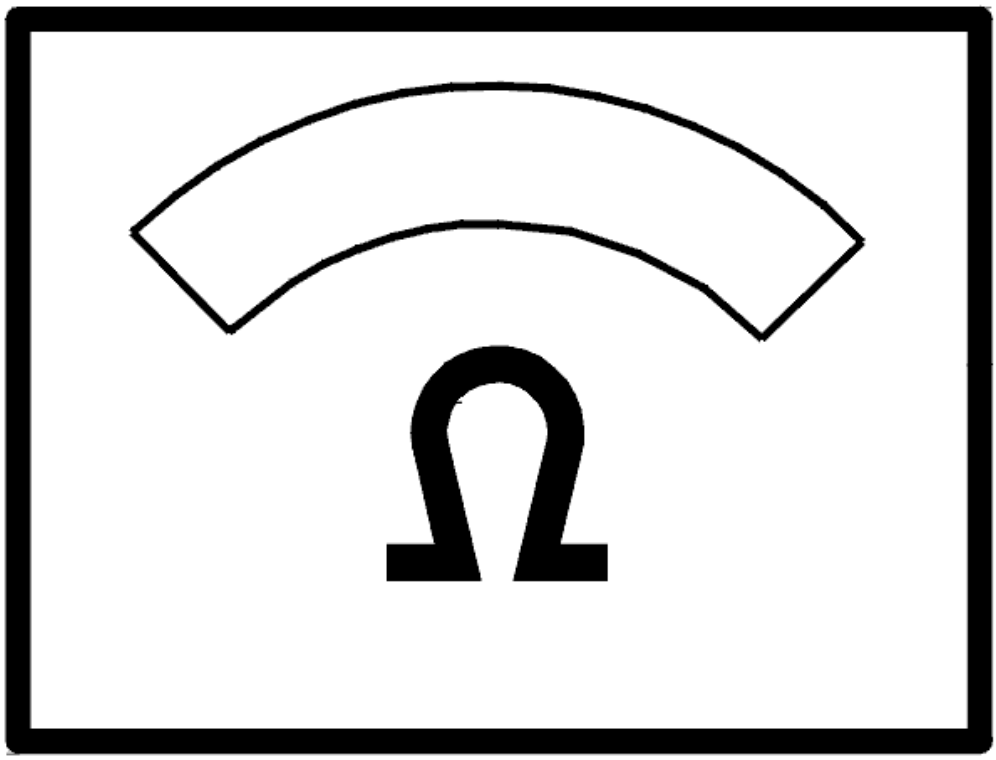


Fig. 142: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

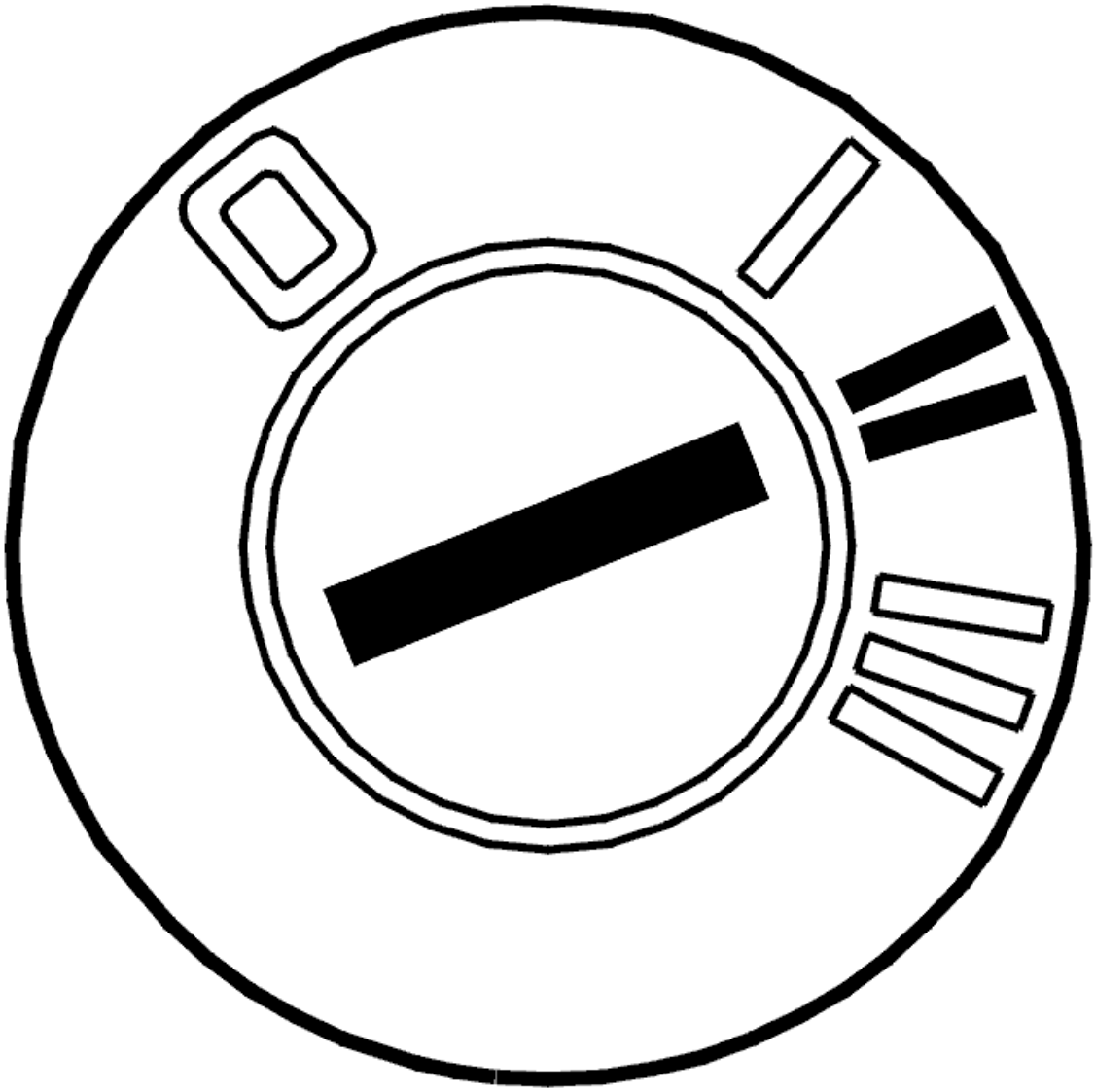


Fig. 143: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

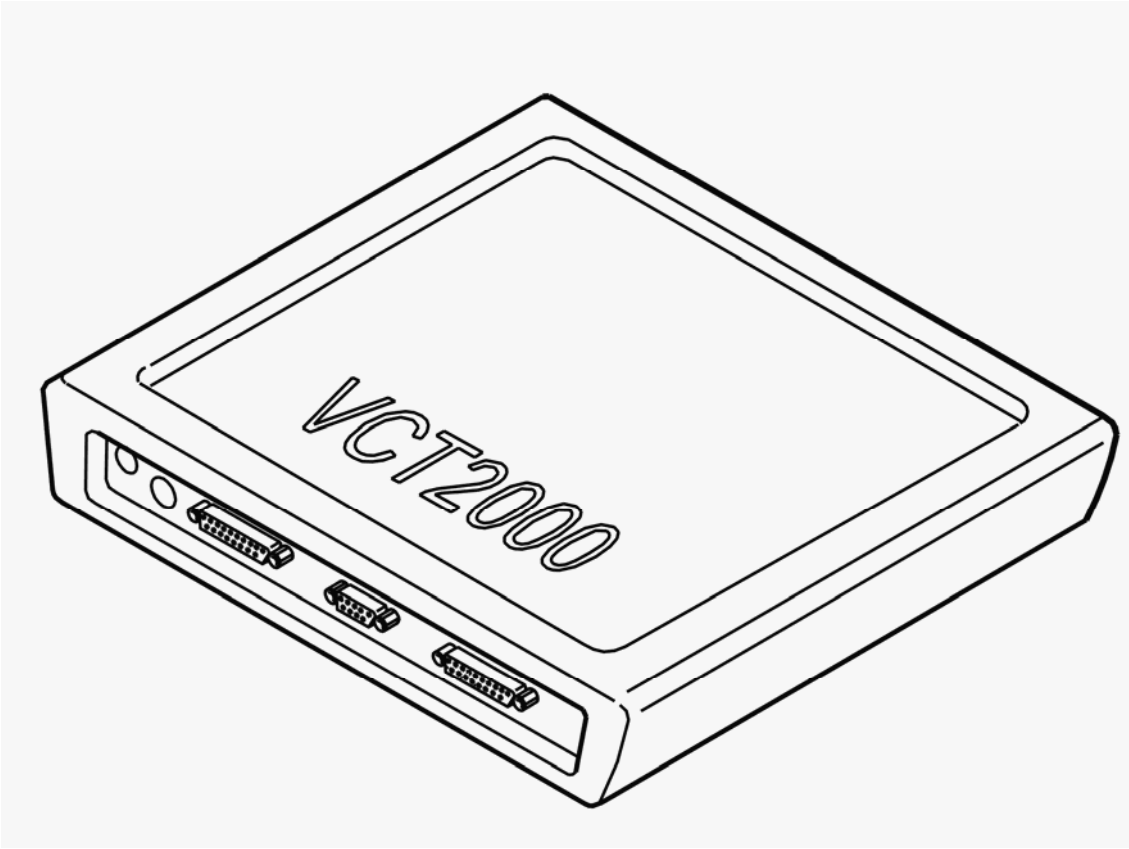


Fig. 144: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

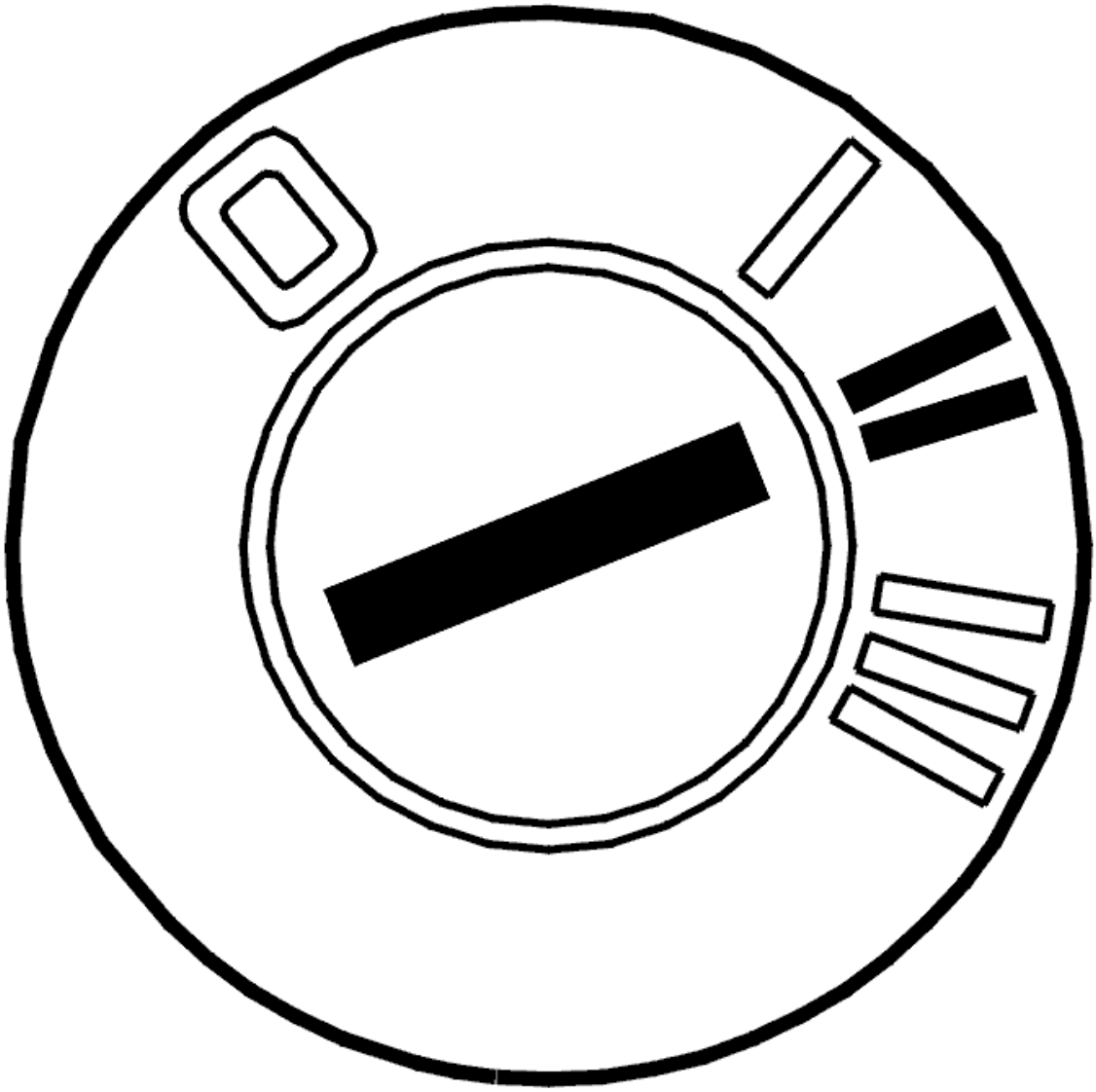


Fig. 145: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

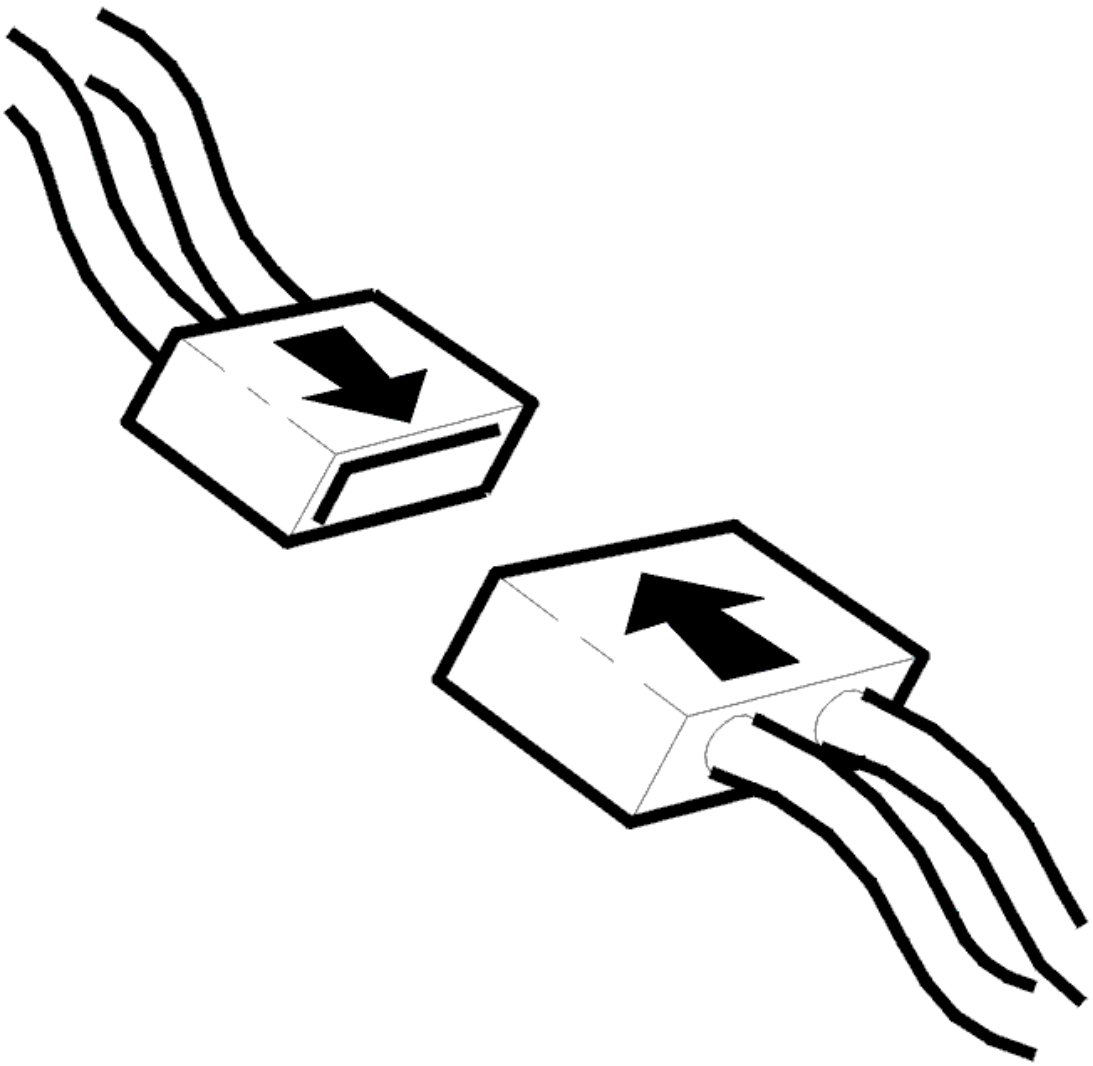


Fig. 146: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Wait at least 90 seconds.
- Reconnect the connectors, reinstall components etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid SL.

The value should change between OFF and ON.

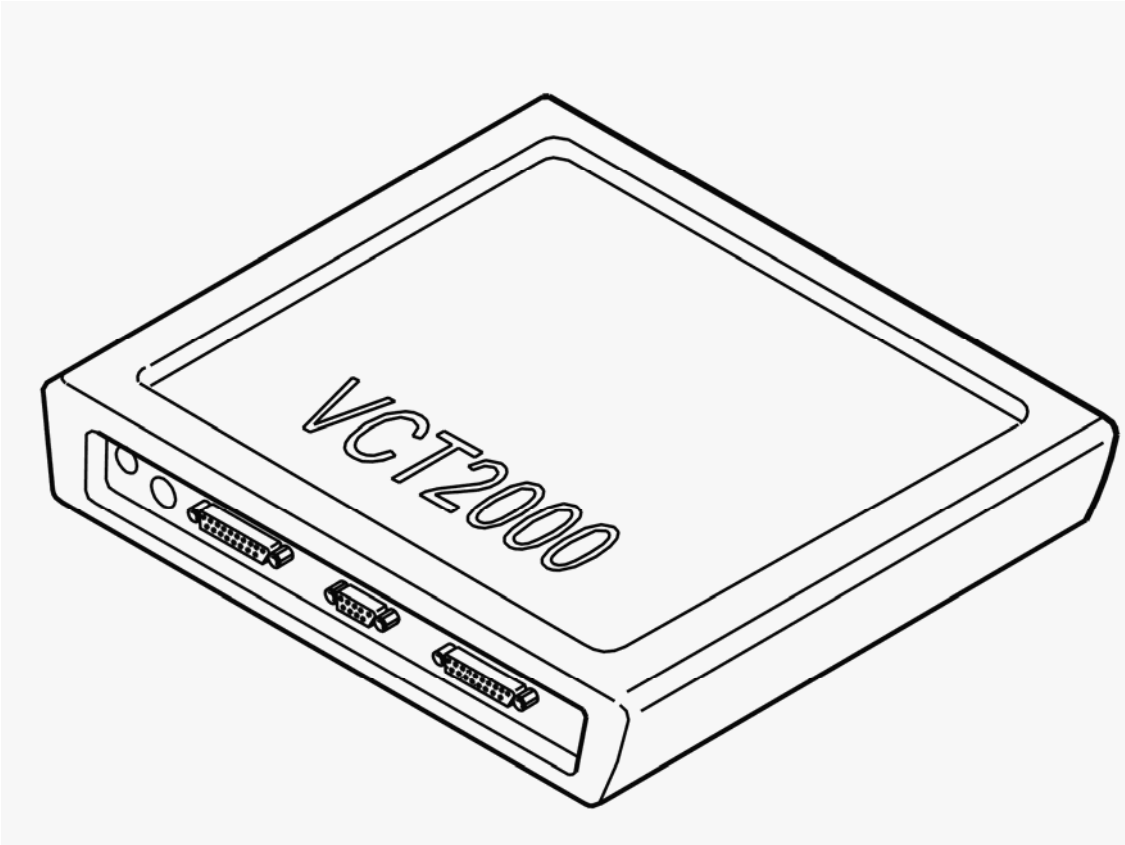


Fig. 147: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0015: LOCK-UP SOLENOID SL. HYDRAULIC FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

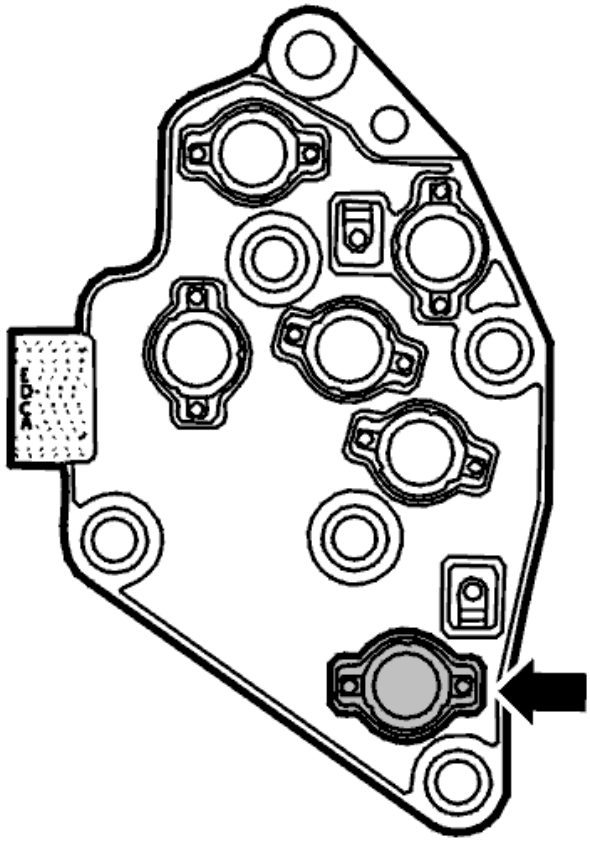


Fig. 148: Identifying Lock-Up Pressure Switch
Courtesy of VOLVO CARS CORPORATION

Lock-up solenoid SL controls the transmission lock-up function. Solenoid SL operates when it receives voltage from the transmission control module (TCM) and is activated under different driving conditions depending on road speed, throttle position and the driving mode selected. The control module checks if lock-up solenoid SL is stuck in open or closed position by comparing the signals from solenoid SL and lock-up pressure sensor PS4. Pressure sensor PS4 detects whether solenoid SL is activated or not. Diagnostic trouble code (DTC) TCM-0015 is stored if the signals do not correspond with each other for 10 seconds.

Substitute Value

- The control module does not activate the lock-up solenoid.

Possible Source

- Lock-up solenoid SL has stuck in open or shut position.
- Defective solenoid SL.

Fault symptom[s]

- Automatic transmission warning lamp flashes.
- No lock-up function.
- Malfunction indicator lamp (MIL) lit.

HYDRAULIC FAULT

CHECKS

CHECKING THE TRANSMISSION FLUID

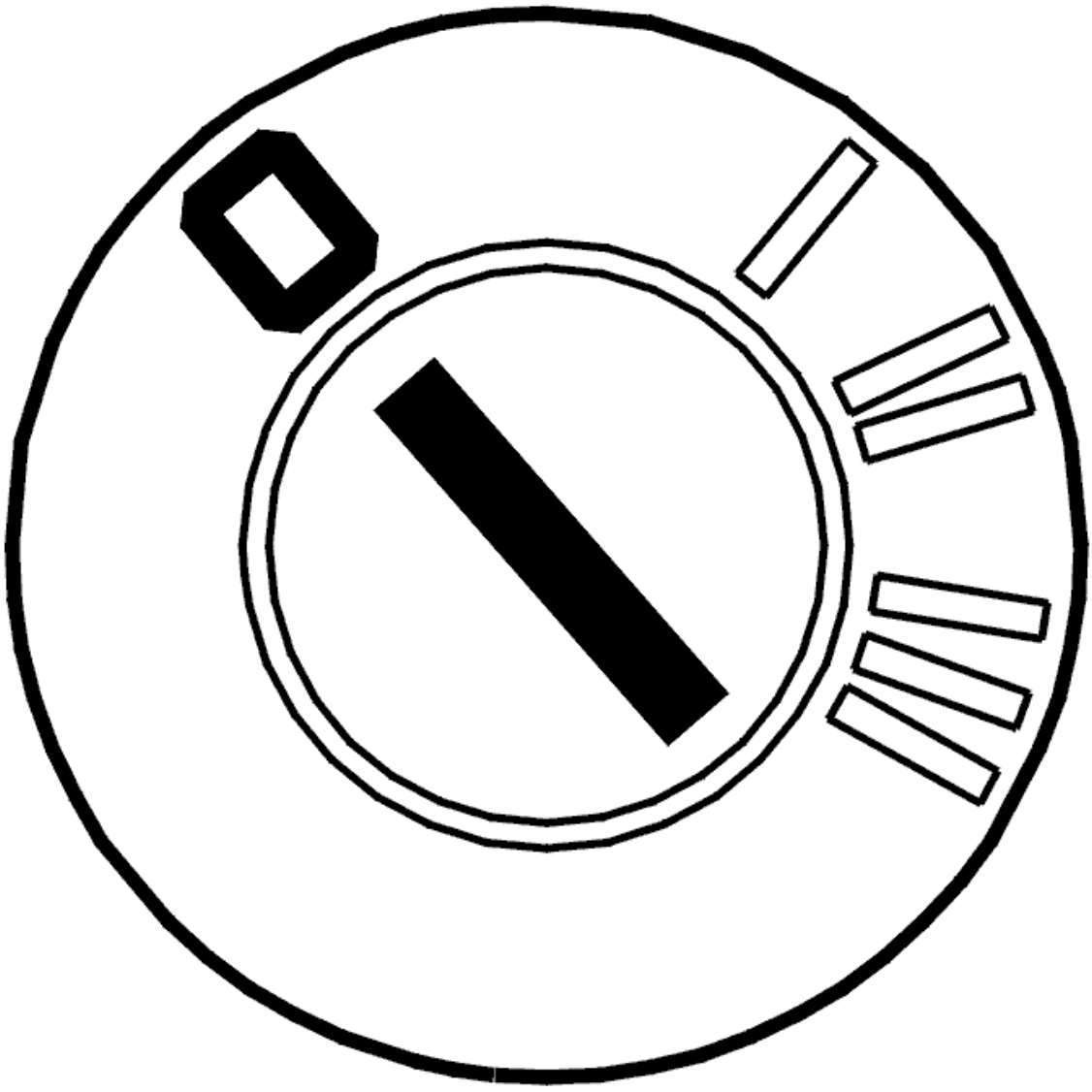


Fig. 149: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

Check that there is no metal shavings in the transmission fluid.

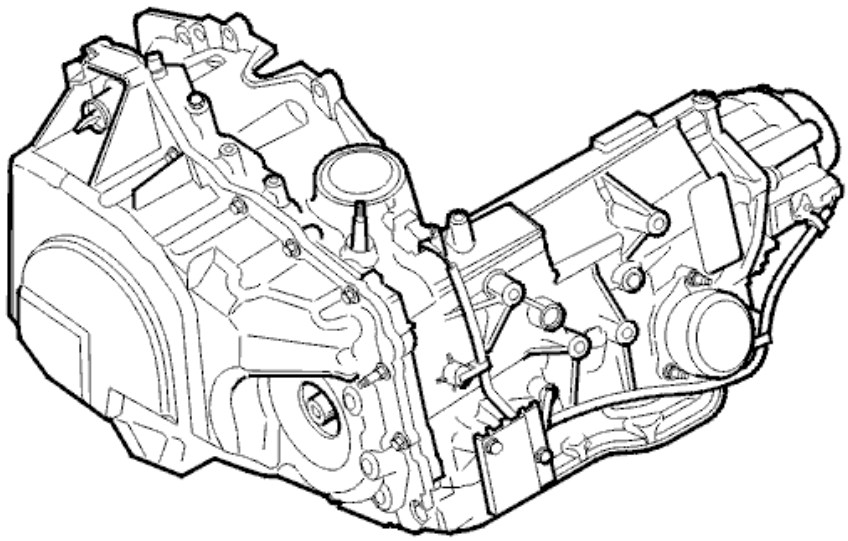


Fig. 150: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Was the transmission fluid OK?

- **OK**

  Refer to **CHECKING LOCK-UP SOLENOID SL**

- **NOT OK**

  Refer to **REPLACING THE TRANSMISSION**

CHECKING LOCK-UP SOLENOID SL

NOTE: The transmission must not be colder than room temperature when activated.

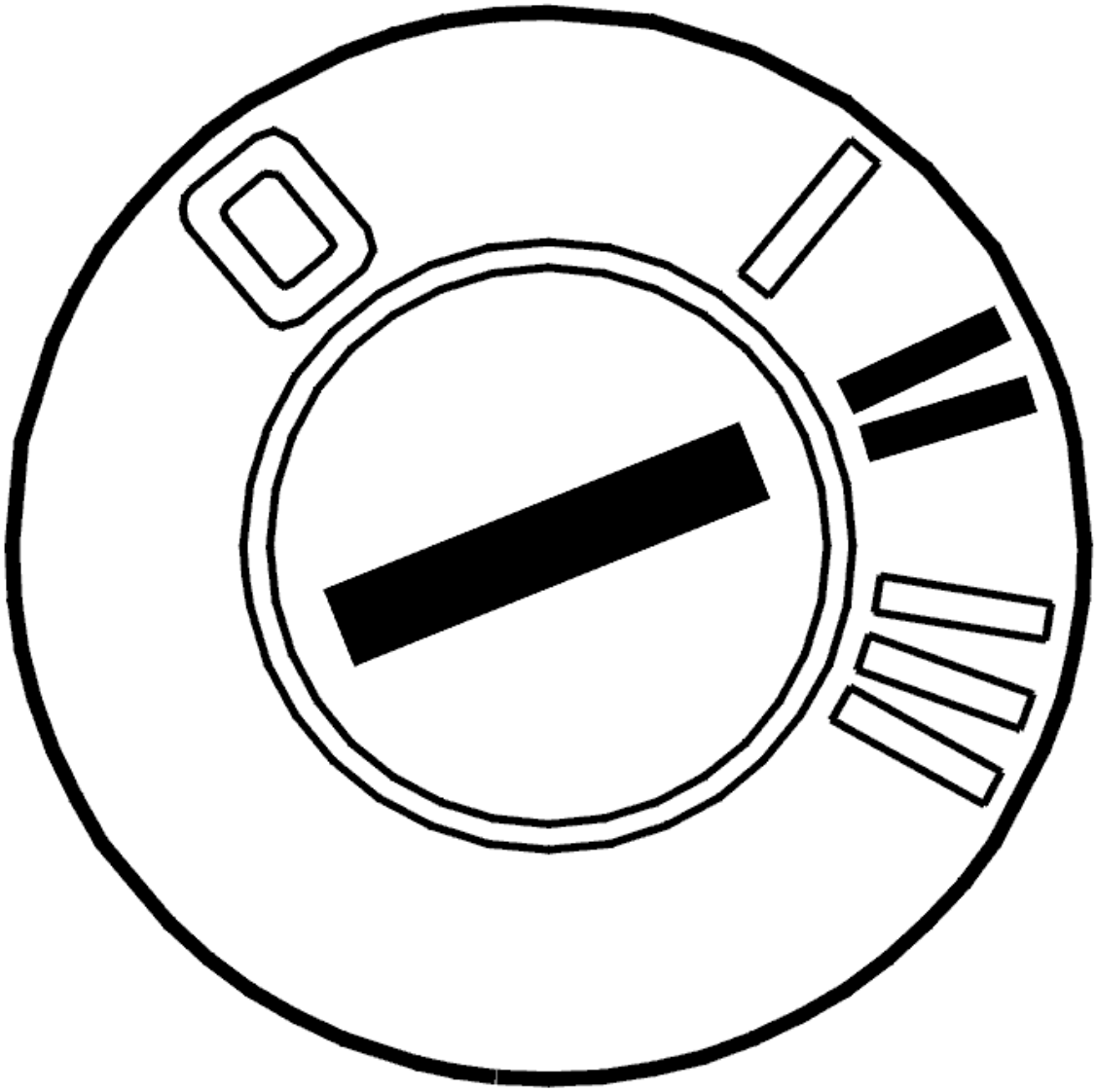


Fig. 151: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate the lock-up solenoid SL.

  A "click" should be heard when the solenoid is activated. Use a stethoscope to hear the click more clearly.

  There is a mechanical fault if the solenoid does not click. Try a new lock-up solenoid SL.

  Other information

  - To replace solenoid SL, see **SOLENOID LOCK-UP FUNCTION, REPLACING** .

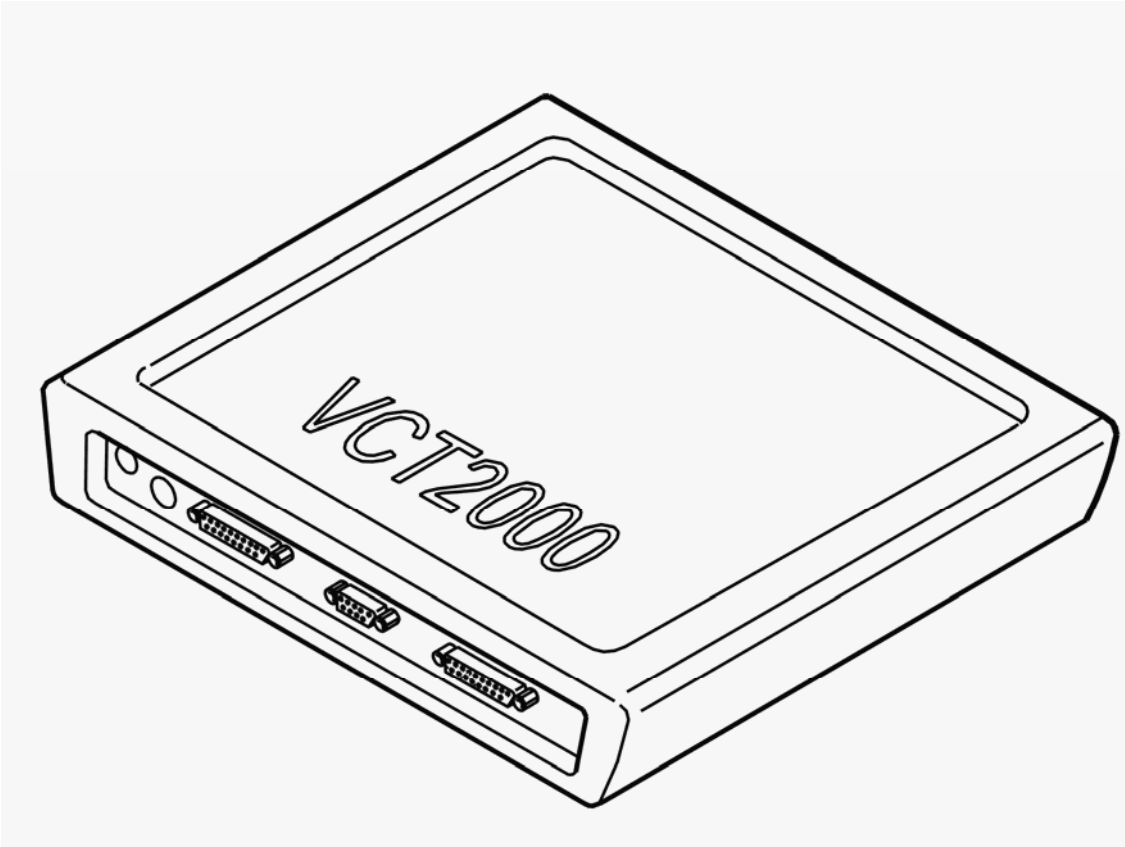


Fig. 152: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

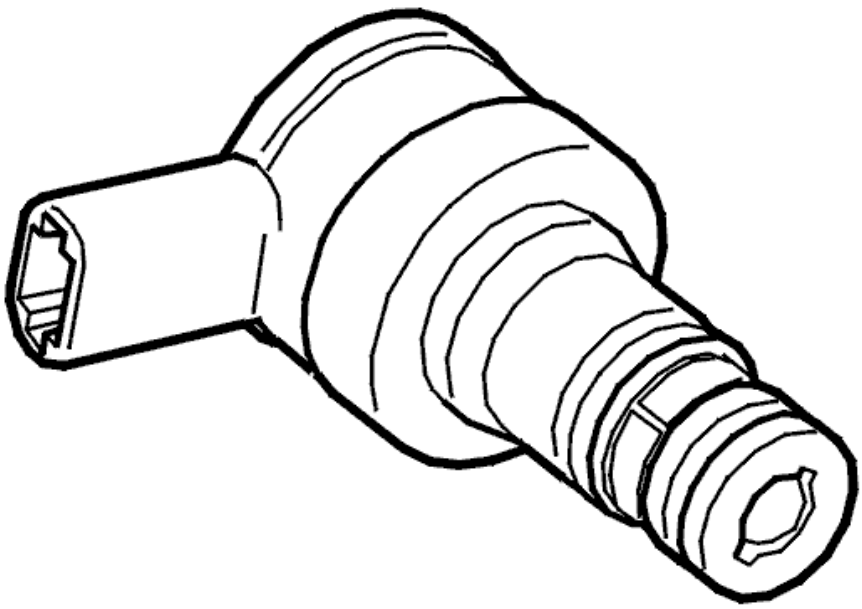


Fig. 153: Identifying Lock-Up Solenoid, SL
Courtesy of VOLVO CARS CORPORATION

Does the lock-up solenoid SL click?

- **YES**

  Refer to **CHECKING FOR CONTACT RESISTANCE AND OXIDATION**

- **NO**

  Refer to **RESETTING THE ADAPTATION**

TEST DRIVING

- Test drive the car. See **TEST DRIVE FORM, DESCRIPTION** .

  Check for any clearly audible noises from the transmission. Check for malfunctions.

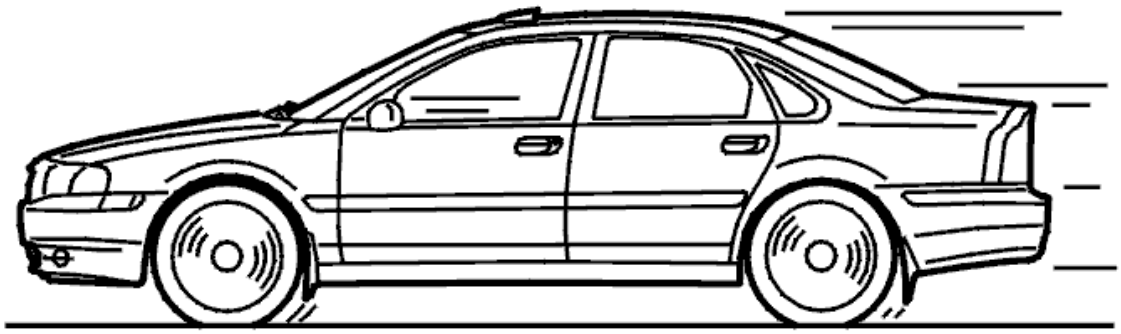


Fig. 154: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the function of the transmission OK?

- **OK**

  OKAY: Troubleshooting has been completed.

- **NOT OK**

  Refer to **REPLACING THE TRANSMISSION**

CHECKING FOR CONTACT RESISTANCE AND OXIDATION

Check the transmission and control module connectors for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Other information:

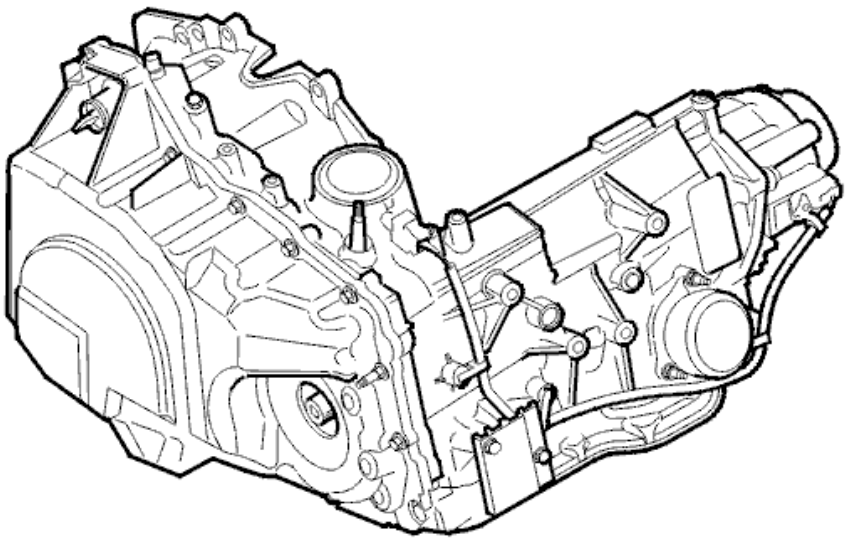
- To access the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To access the control module connector, see **CONNECTING THE BREAKOUT BOX** .

- **Continue**

  Refer to **TEST DRIVING**

REPLACING THE TRANSMISSION

Fault-tracing indicates a mechanical fault in the transmission. Replace the transmission. See **TRANSMISSION, REMOVING** and **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .



P2X 43017210 ©VOLVO

Fig. 155: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each

gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

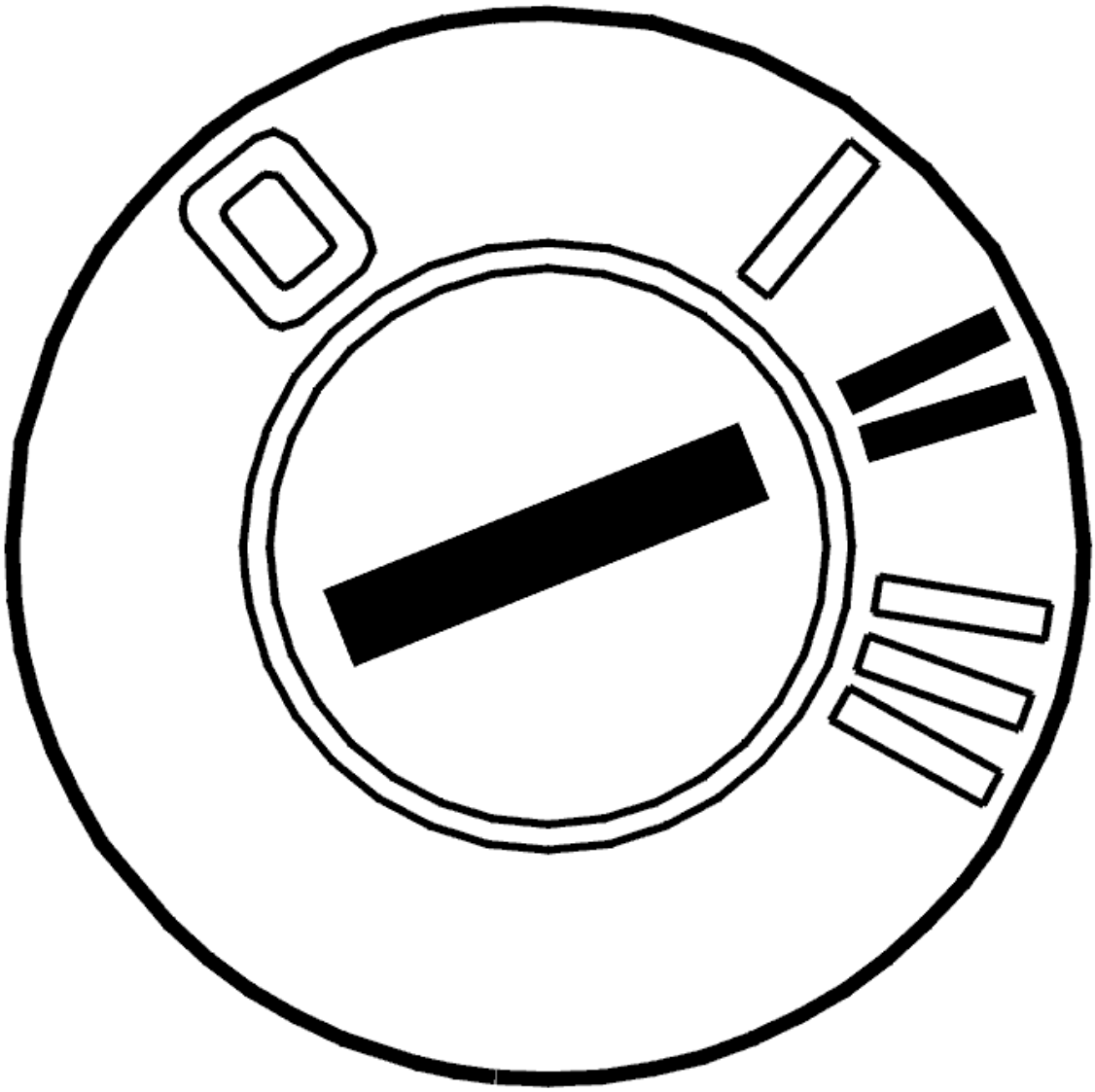


Fig. 156: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

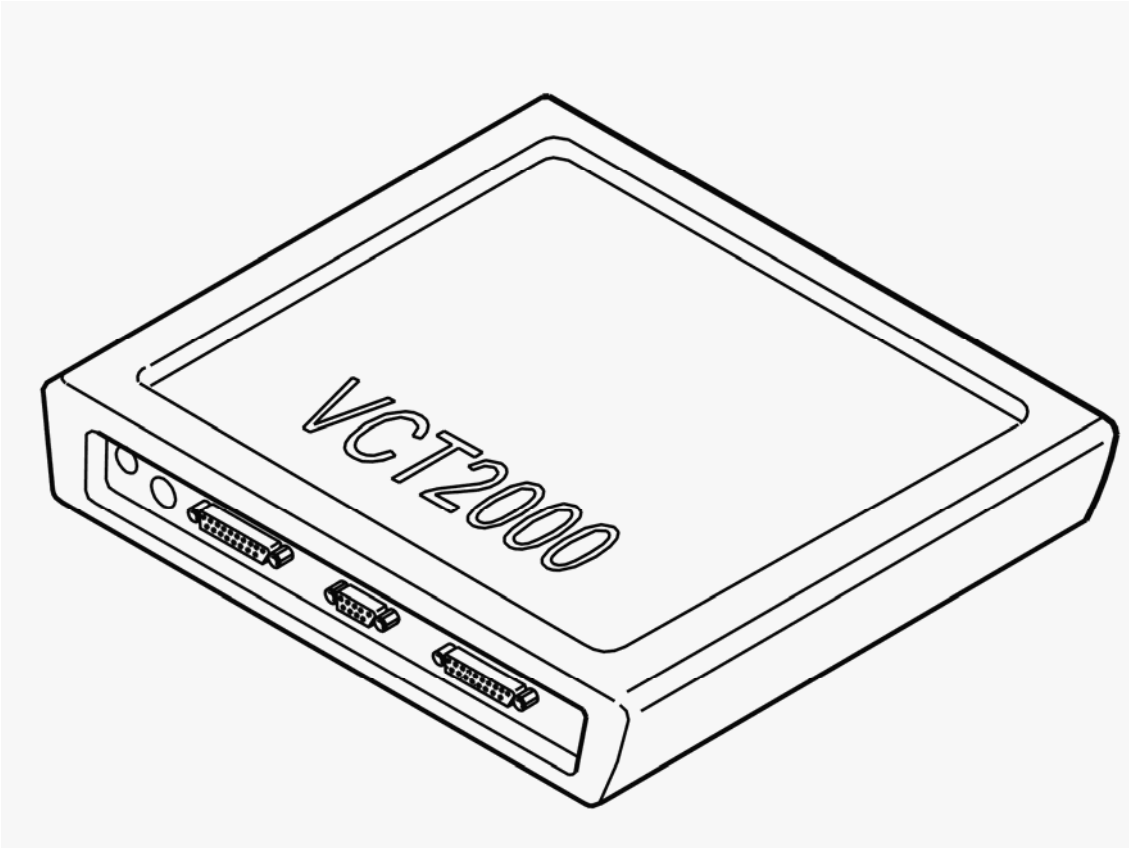


Fig. 157: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

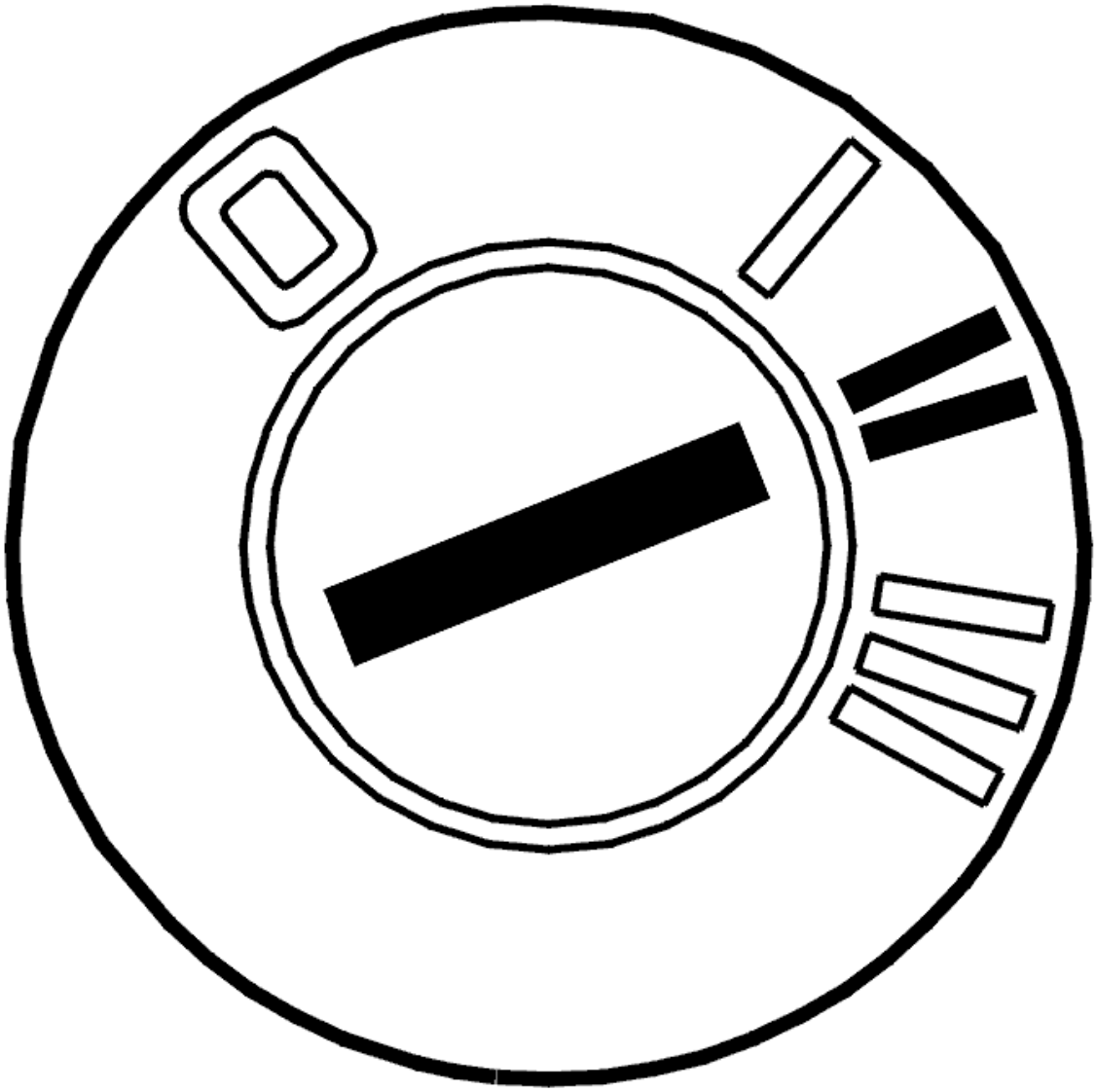


Fig. 158: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

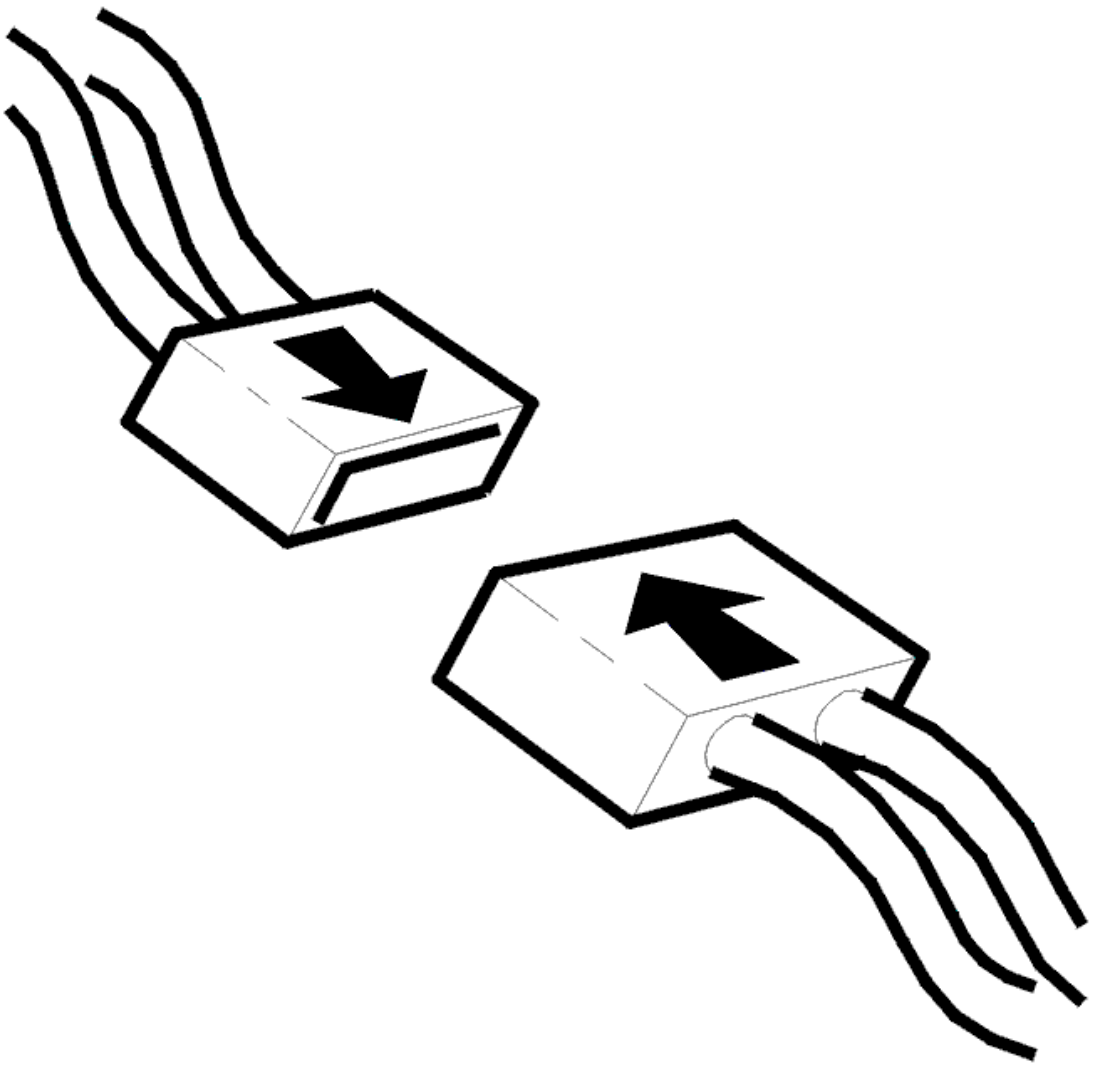


Fig. 159: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Wait at least 90 seconds.
- Reconnect the connectors, reinstall components etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid SL.

The value should change between OFF and ON.

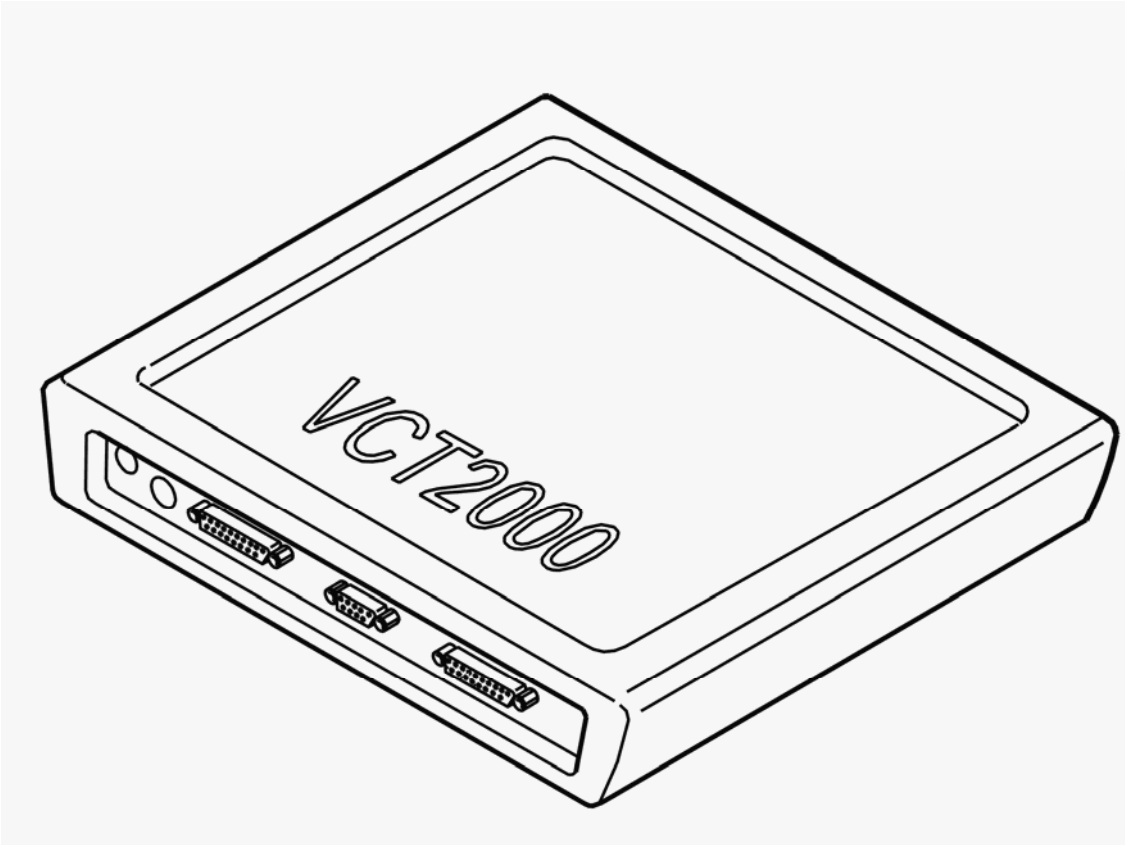


Fig. 160: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0016: CONTROL MODULE. INTERNAL FAULT. INTERMITTENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

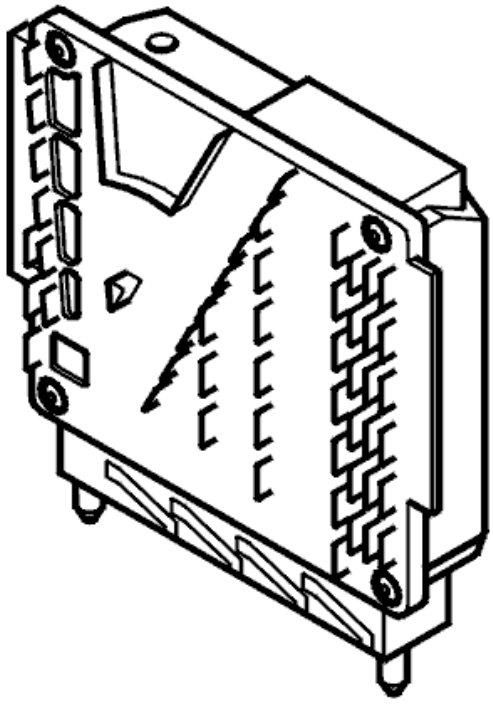


Fig. 161: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The solenoids are controlled by amplifiers in the transmission control module (TCM). The transmission control module (TCM) opens the amplifiers to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble code (DTC) TCM-0016 is stored if the control module registers an internal fault in one of the amplifier circuits.

Substitute Value

- The control module "Limp Home" program initiated.

Possible Source

- Defective control module.

Fault symptom[s]

- General orange warning lamp lit.

- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

HINT: Harsh gear shifting can be caused by:

- No adaptation of the gear slippage times at high altitude (High Altitude Compensation).
- No reduction of line pressure when shifting.
- No torque limiting request to engine control module (ECM) when shifting.

HINT: No shifting - because the transmission control module (TCM) prevents activation of the solenoids. This stops gear-shifting.

CAUTION: There is a danger that this fault will cause line pressure in the transmission to be too low, which will result in wear.

INTERNAL FAULT. INTERMITTENT FAULT

INTERMITTENT FAULT

Control module previously registered a fault. The fault is now no longer present.

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0016: CONTROL MODULE. INTERNAL FAULT. PERMANENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

INTERNAL FAULT. PERMANENT FAULT

CHECKING SHIFT SOLENOIDS S1 AND S2

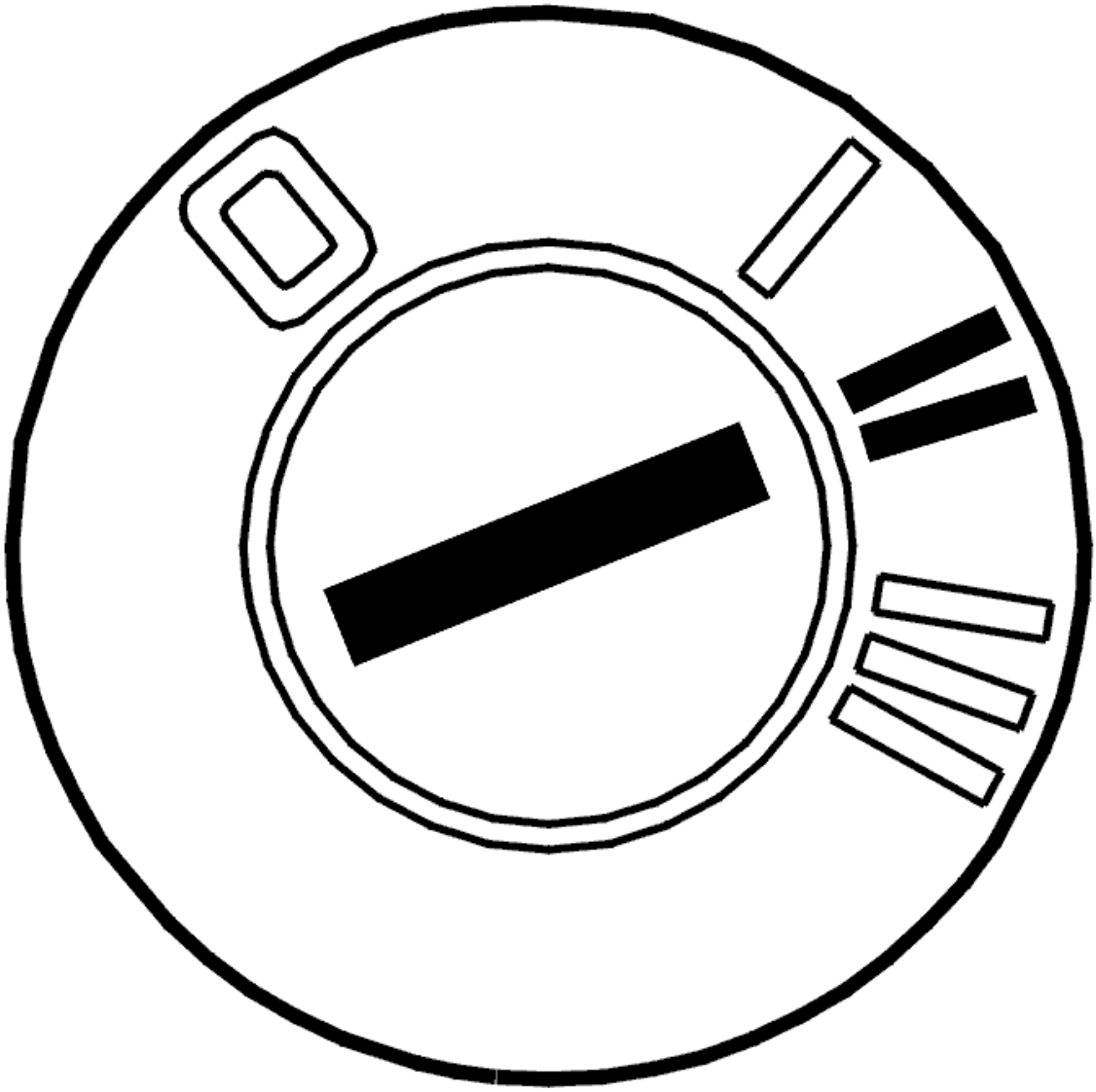


Fig. 162: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Gear selector in position P.
- Activate solenoids S1 and S2 individually.

  The values should change between OFF and ON.

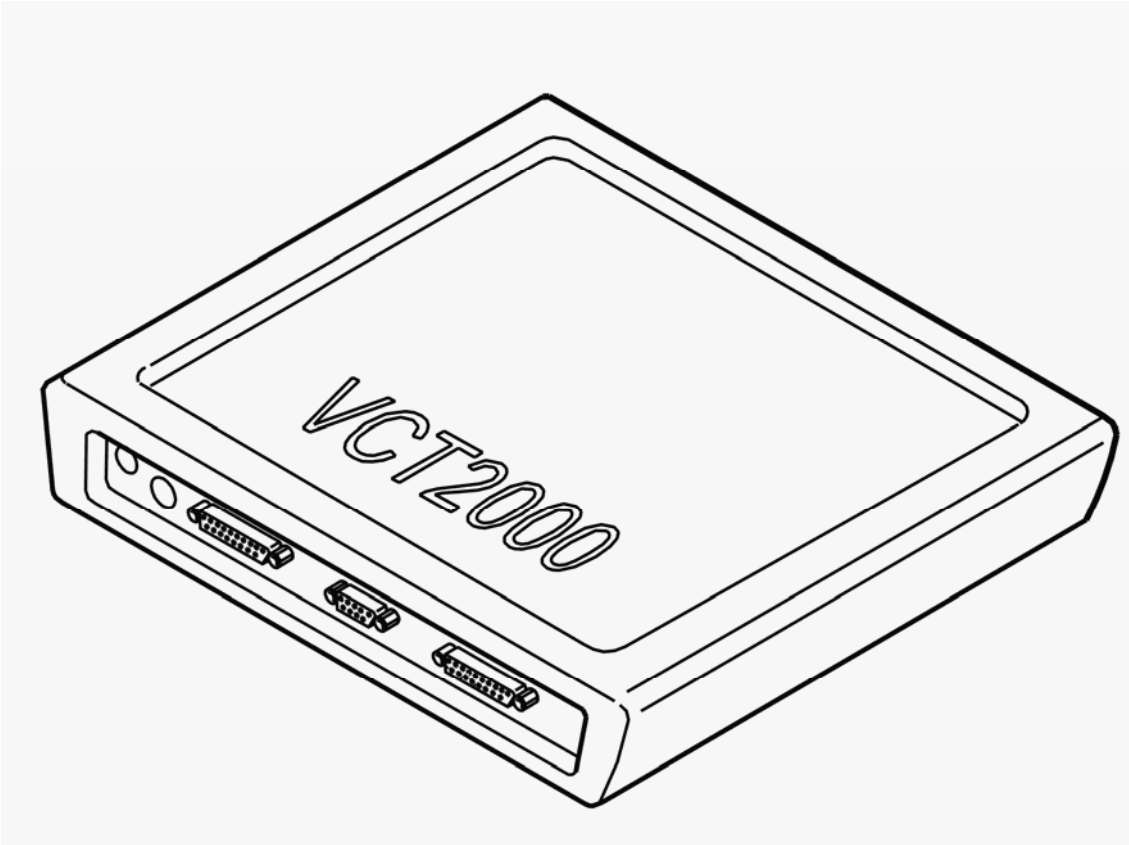


Fig. 163: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Do the values change?

- **YES**

  FAULT TRACING FAILED: The fault should have been detected and remedied. As this is not the case fault-tracing has failed. Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

- **NO**

  Refer to **REPLACING THE CONTROL MODULE AND PROGRAMMING**

REPLACING THE CONTROL MODULE AND PROGRAMMING

CAUTION: A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

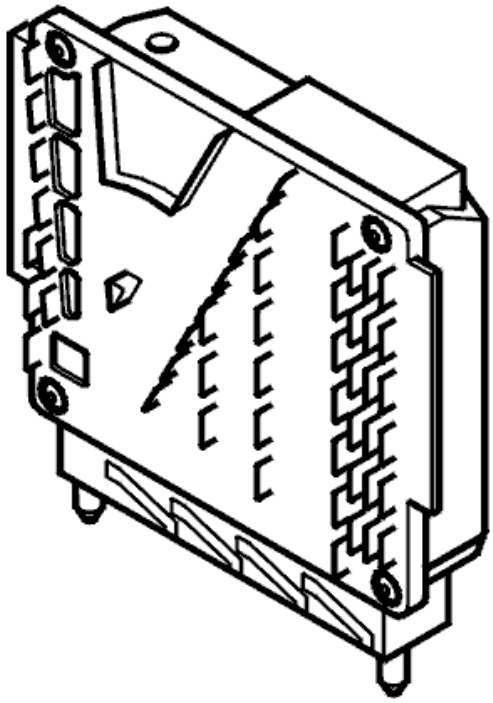


Fig. 164: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

TCM-001F: VEHICLE SPEED SENSOR (VSS). SIGNAL MISSING. INTERMITTENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

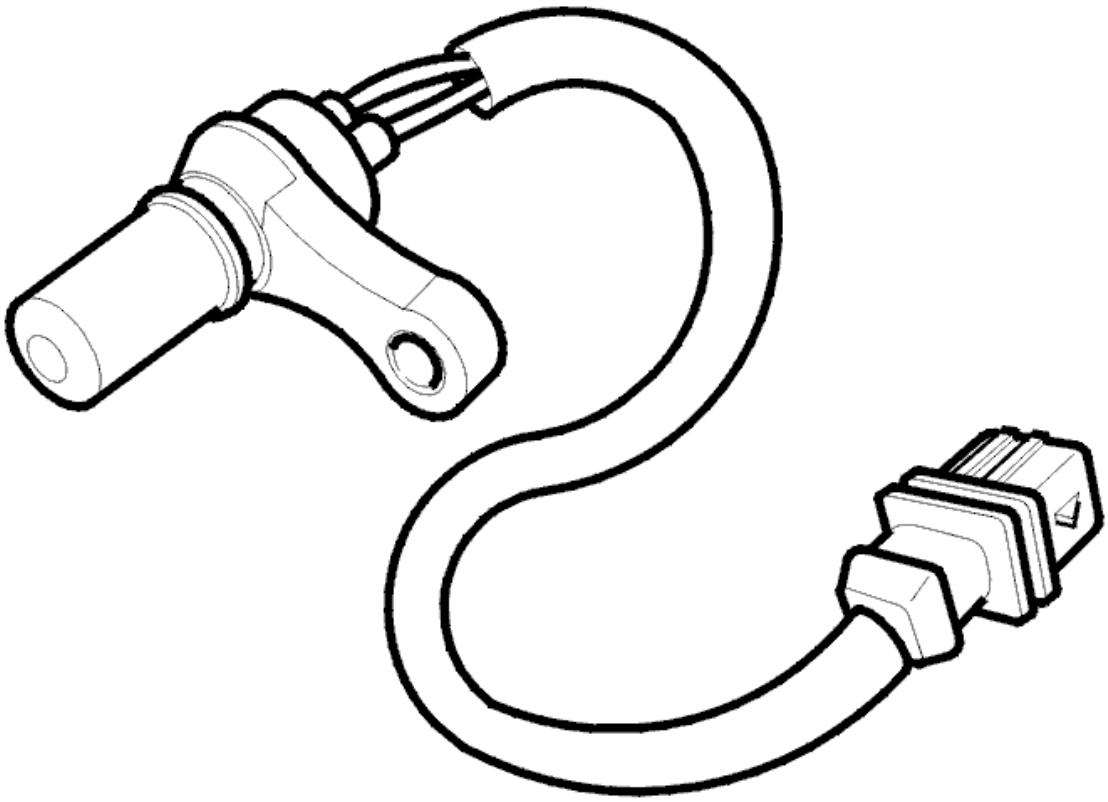


Fig. 165: Identifying Automatic Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Diagnostic trouble code (DTC) TCM-001F is stored if the control module registers that the signal from the speed sensor is missing.

Substitute Value

- None.

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the power supply.
- Open-circuit in the signal cable.
- Defective speed sensor.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.

- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of the line pressure when shifting.
- No reduction of the line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No request for torque limiting to the engine control module (ECM) when shifting.

SIGNAL MISSING. INTERMITTENT FAULT

INTERMITTENT FAULT

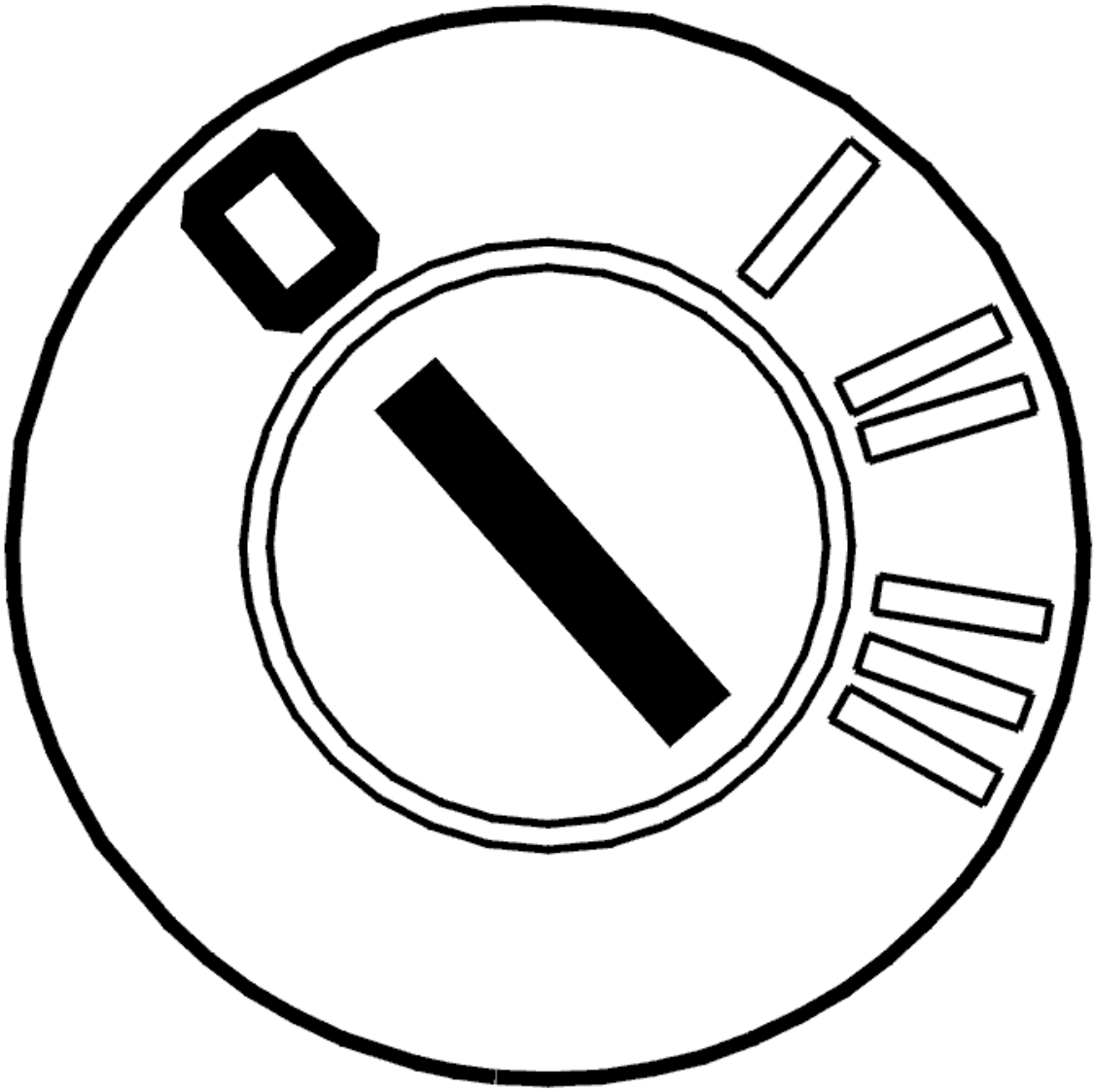


Fig. 166: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the control module and transmission output speed sensor connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

  Check the power supply cable between transmission control module (TCM) terminal #57 (#A57) and transmission output speed sensor connector terminal #A4. Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

  Check the signal cable between transmission control module (TCM) terminal #39 (#A39) and transmission output speed sensor connector terminal #A3. Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

  Remedy as necessary.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
  - To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
  - To check and replace the transmission output speed sensor, see **INPUT SPEED SENSOR/OUTPUT SPEED SENSOR, REPLACING**
  - For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

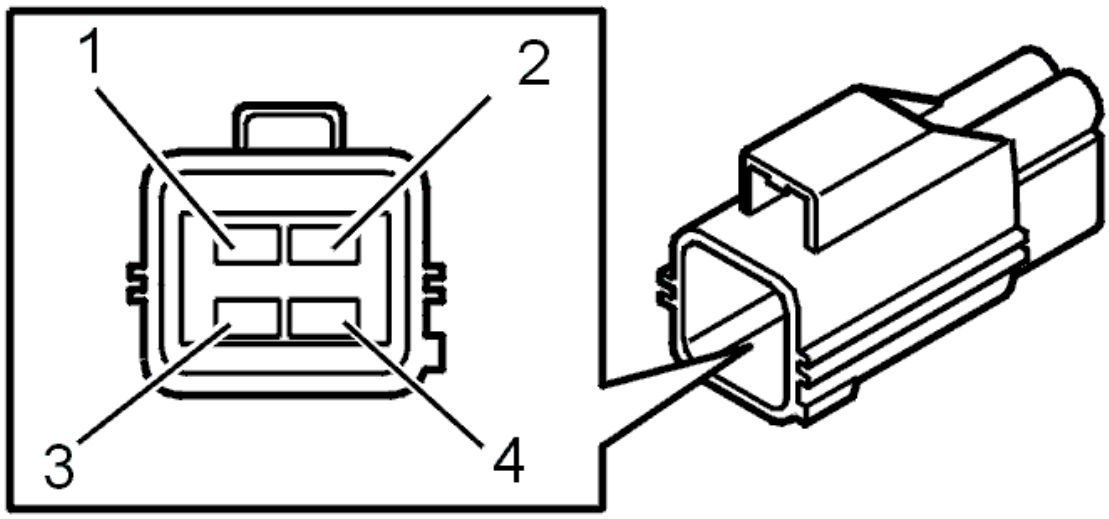


Fig. 167: Identifying Transmission Output Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

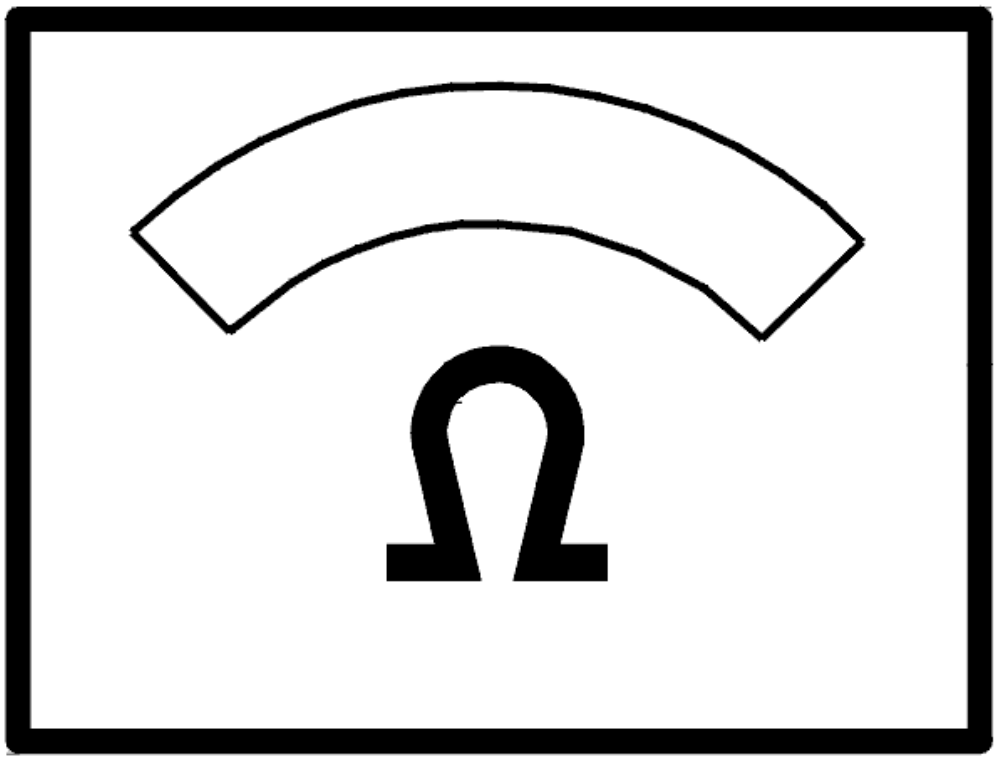


Fig. 168: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-001F: VEHICLE SPEED SENSOR (VSS). SIGNAL MISSING.

PERMANENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL MISSING. PERMANENT FAULT

CHECKS

CHECKING THE VEHICLE SPEED SENSOR (VSS) SIGNAL

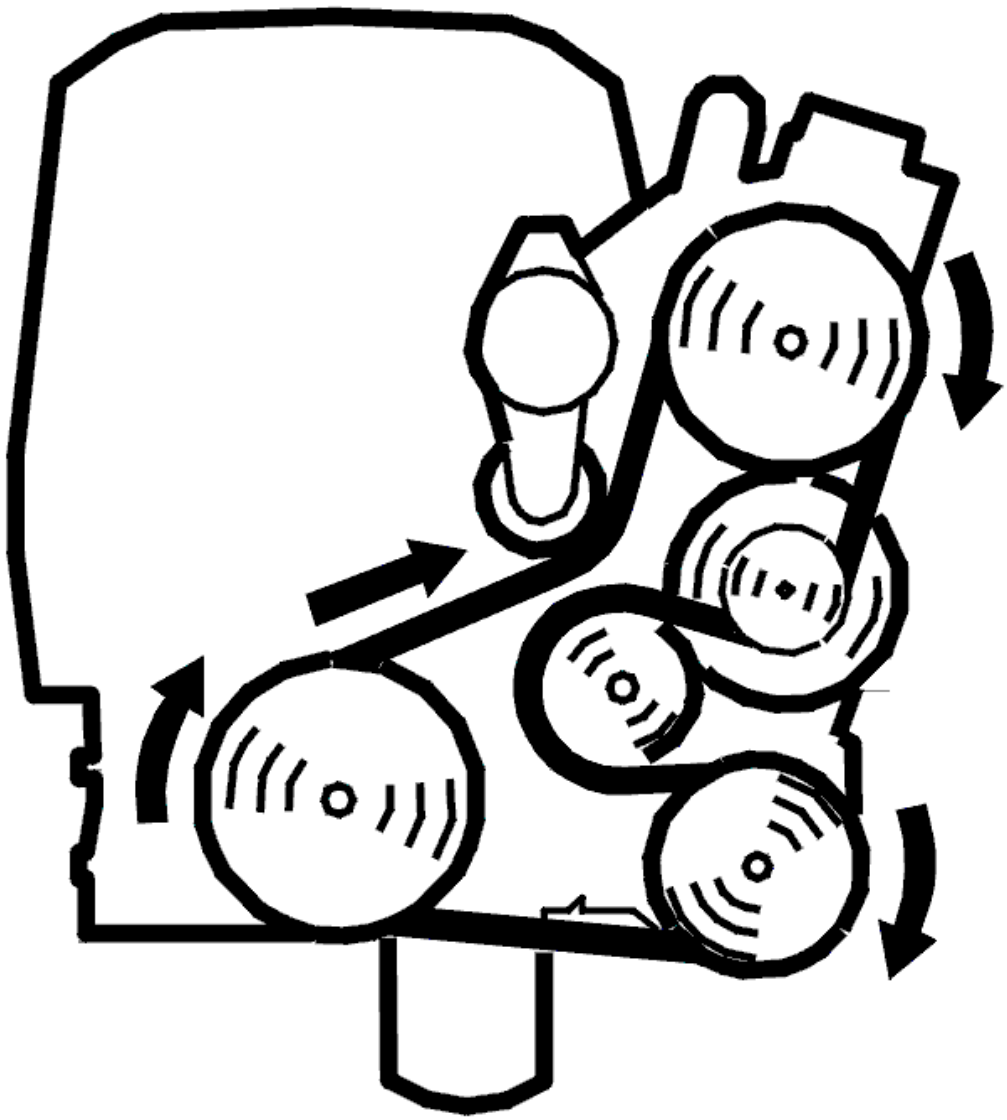


Fig. 169: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off

- Check the transmission control module (TCM) and speed sensor connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary
- Raise the car so that the drive wheels are clear of the ground
- Start the engine. Allow the engine to idle
- Move the gear selector to position D so that the drive wheels begin to rotate
- Read off the transmission speed.

Depress the accelerator pedal (AP) and check that the speed is updated.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

NOTE: Diagnostic trouble codes (DTCs) may be stored in the ABS system when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

If the speed is updated, the cause of the fault was probably contact resistance or oxidation in the control module or vehicle speed sensor (VSS) connectors.

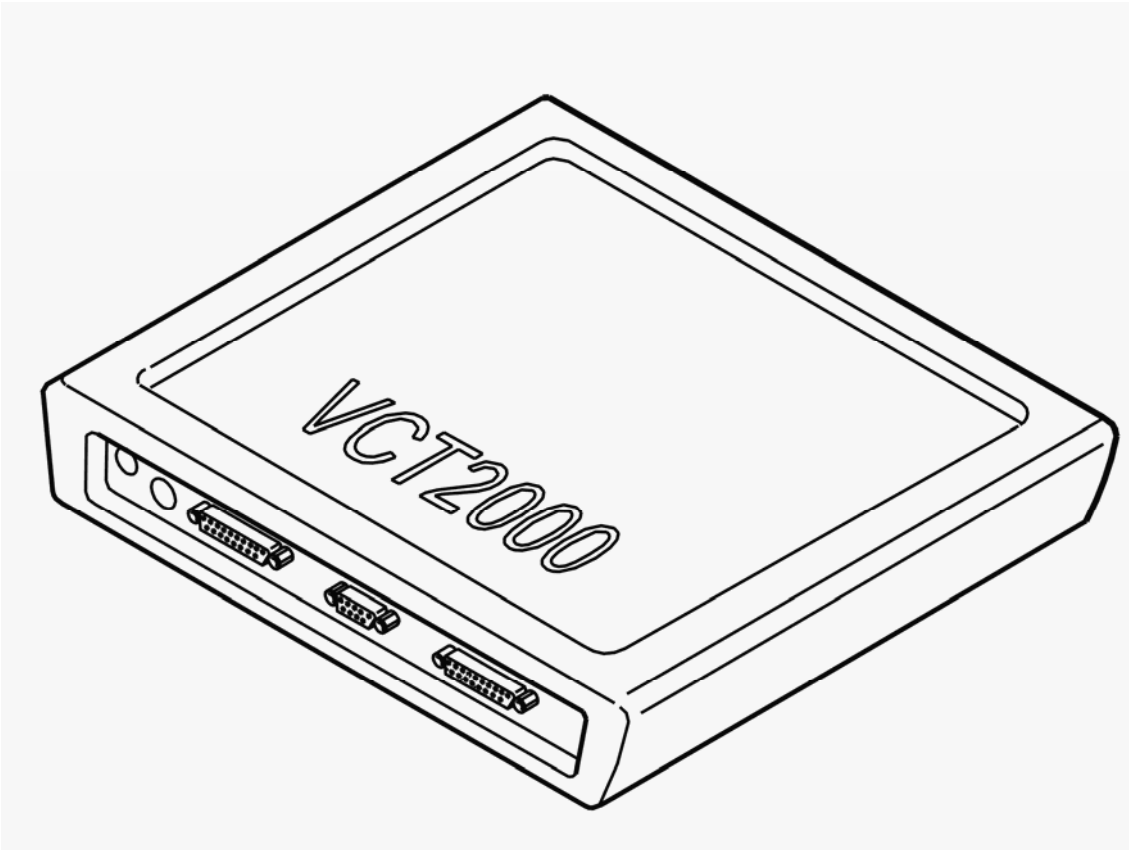


Fig. 170: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the speed updated?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

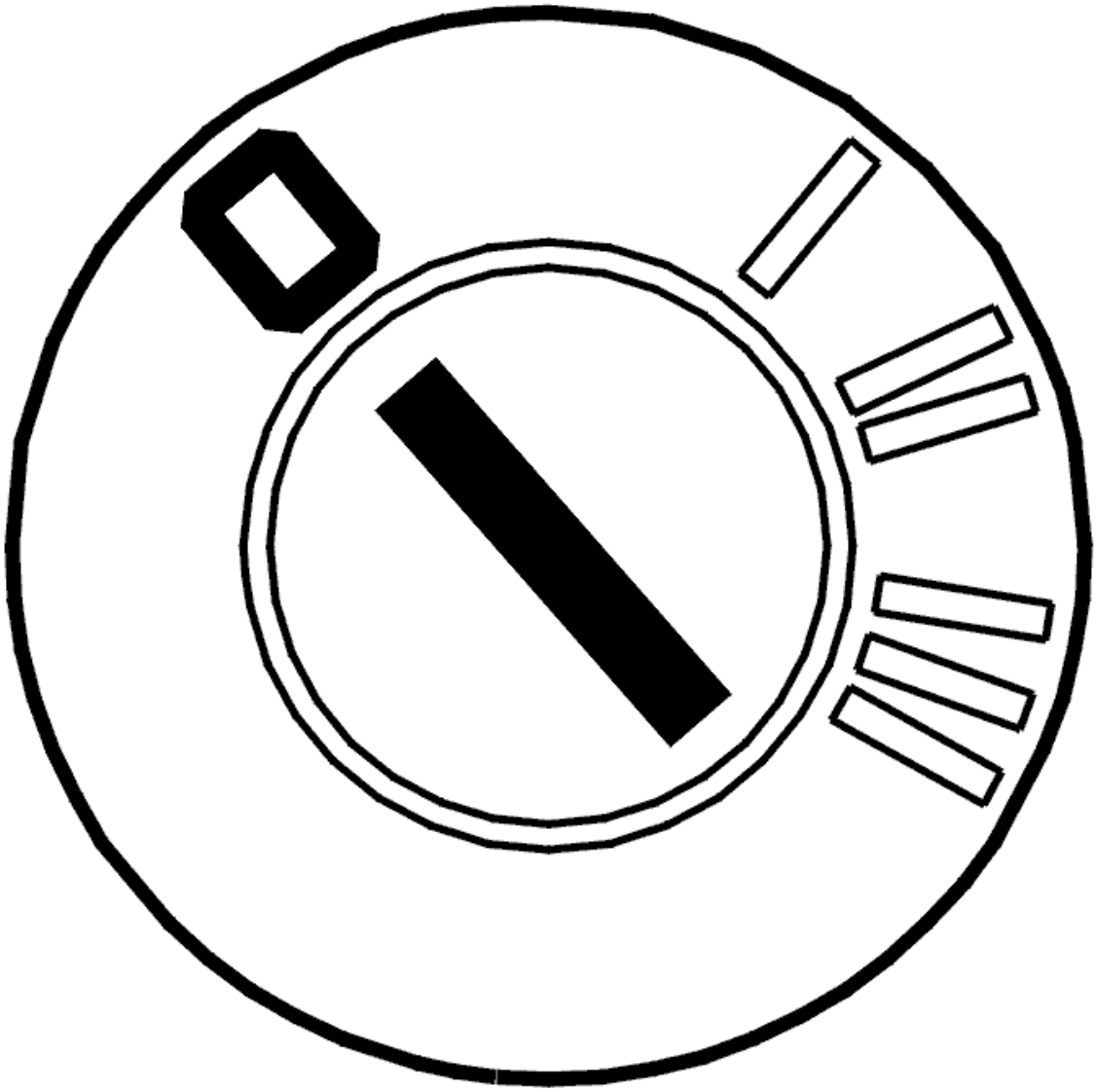


Fig. 171: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off

- Connect the breakout box.

  Check the power supply cable between transmission control module (TCM) terminal #A57 (#A57) and transmission output speed sensor connector terminal #A4. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

  Check the signal cable between transmission control module (TCM) terminal #A39 (#A39) and transmission output speed sensor connector terminal #A3. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

  HINT: With the control module connected, the ignition on and a voltmeter connected between transmission output speed sensor connector terminals #A3 and #A4 (control module side), the voltage must be approximately 1-3 V below Ubat.

  Remedy as necessary.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
  - To check or replace the transmission output speed sensor, see **INPUT SPEED SENSOR/OUTPUT SPEED SENSOR, REPLACING**
  - For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

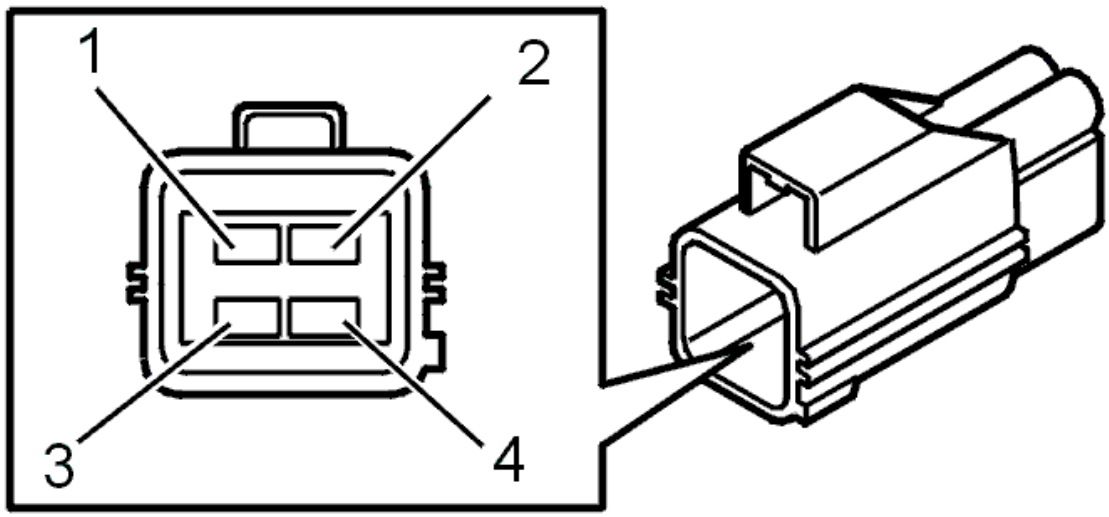


Fig. 172: Identifying Transmission Output Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

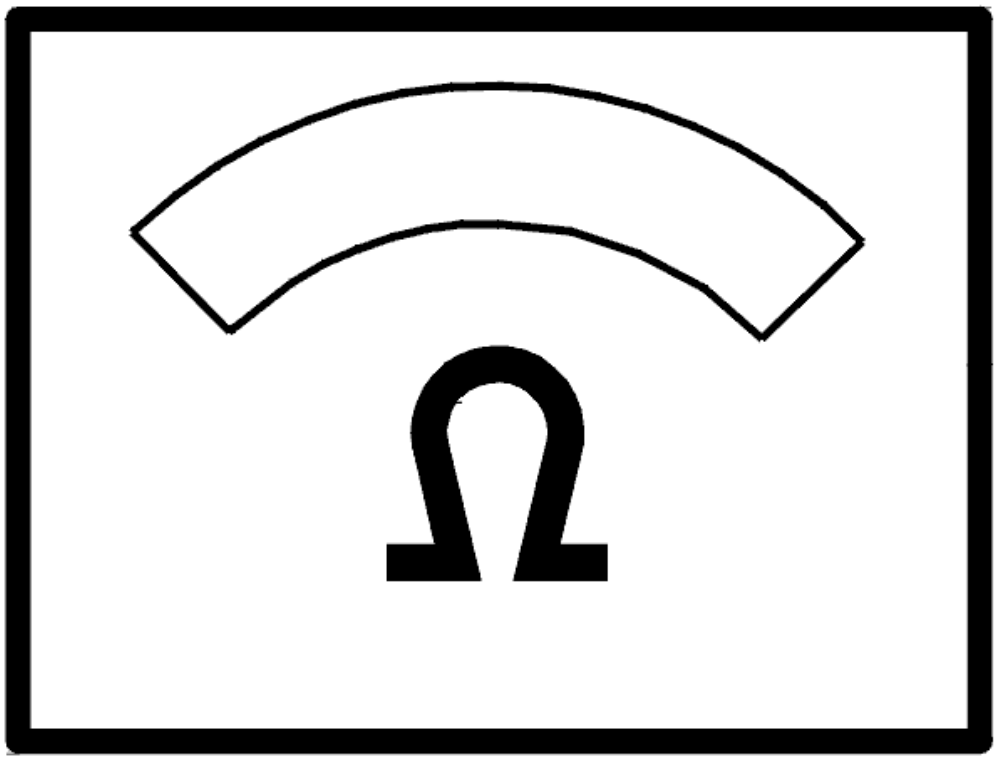


Fig. 173: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

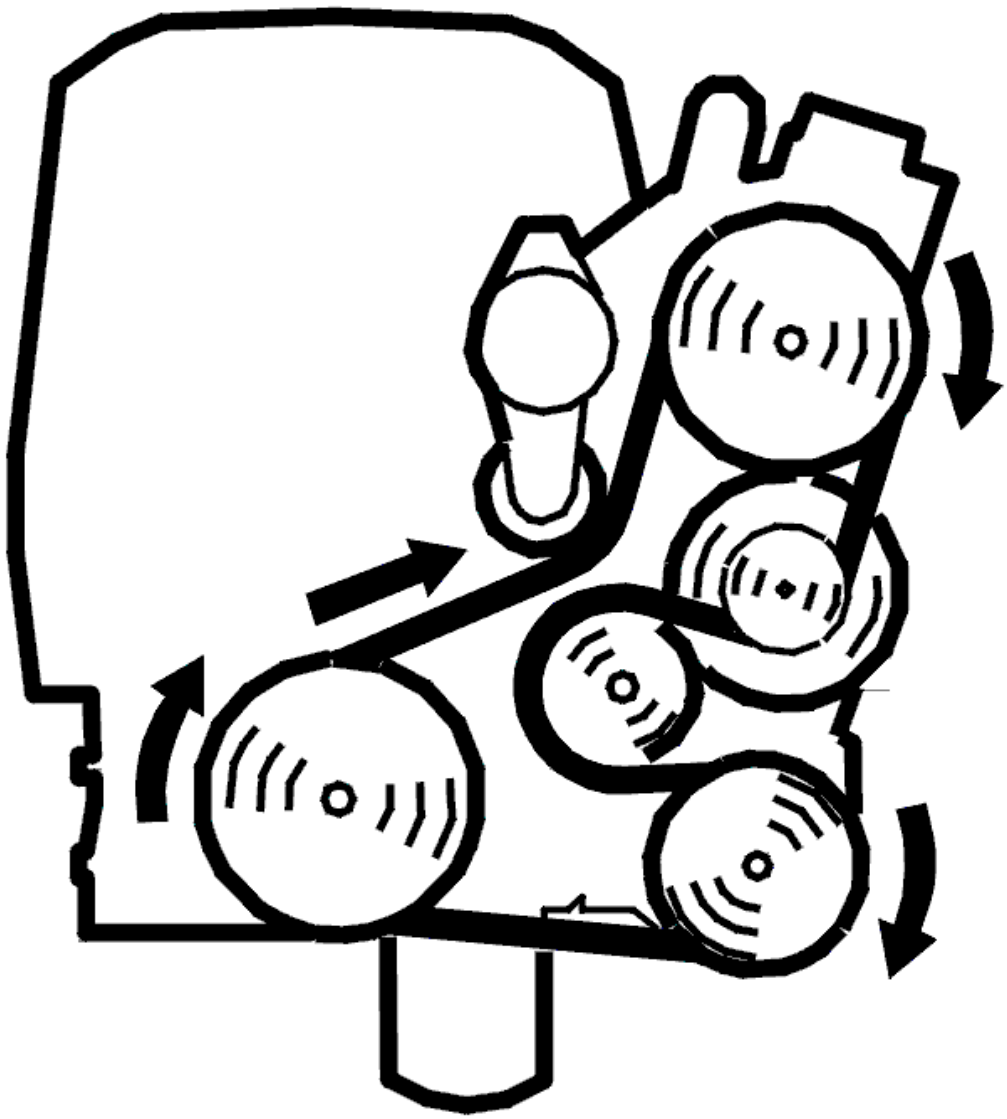


Fig. 174: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

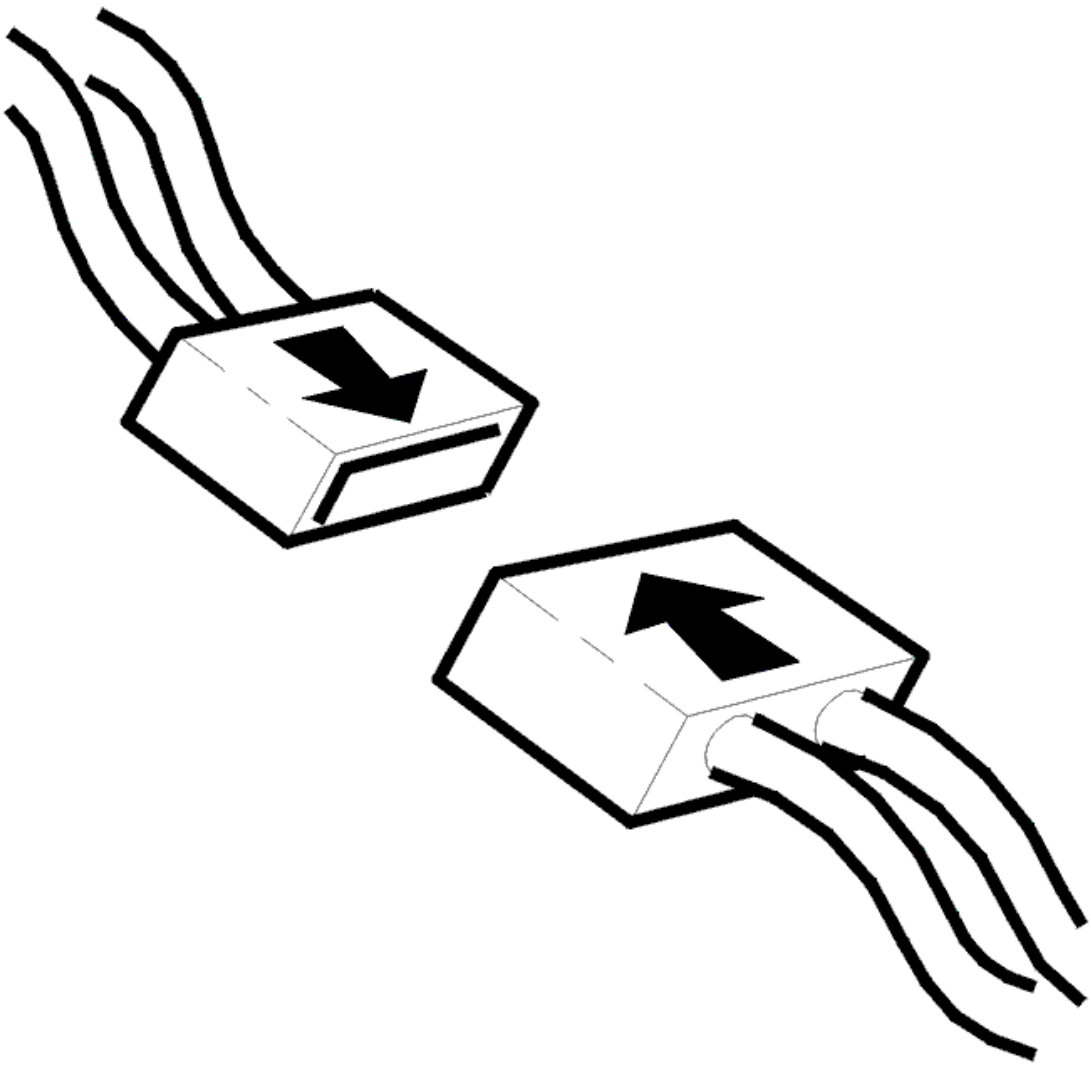


Fig. 175: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Raise car so that drive wheels are unimpeded.
- Start the engine and let it idle.
- Shift gear selector to position D so that the drive wheels begin to rotate.
- Read off the transmission speed.

Check that speed is updated

NOTE: When the rear wheels are stationary and the front wheels rotate, diagnostic trouble codes (DTCs) can be stored in the ABS system. Erase

any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

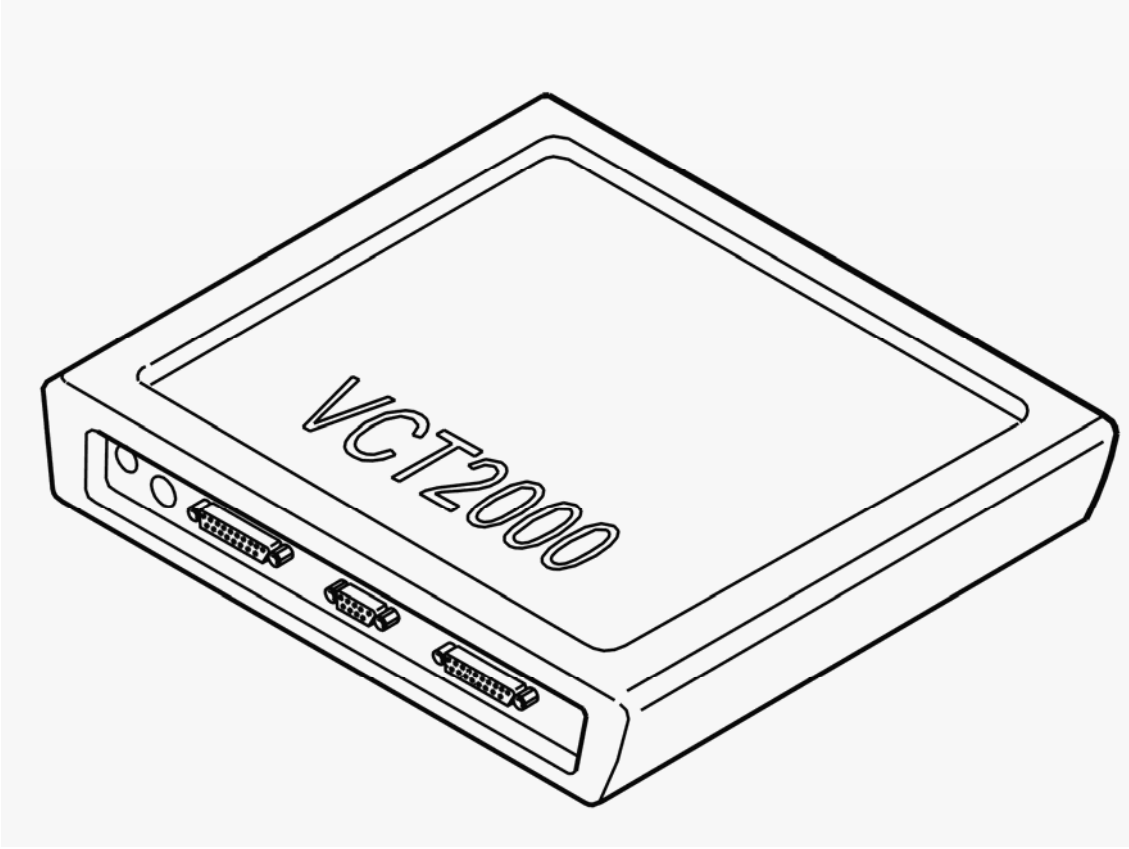


Fig. 176: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-001F: VEHICLE SPEED SENSOR. SIGNAL MISSING. INTERMITTENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

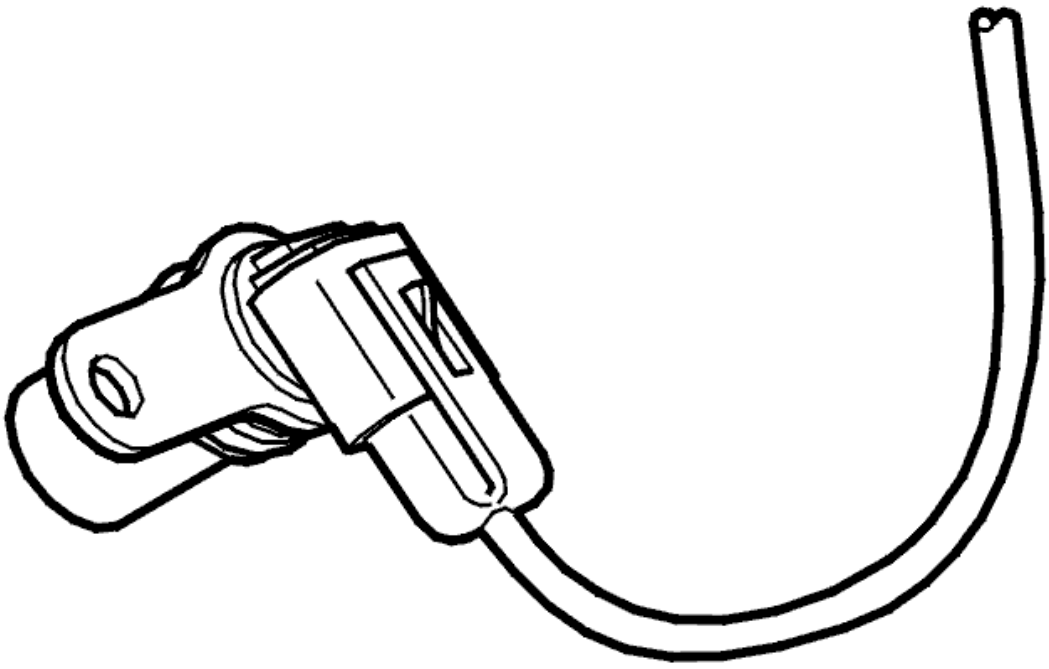


Fig. 177: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The automatic transmission control module (TCM) receives speed signals from the ABS control module and from the transmission speed sensor on the transmission. The transmission control module (TCM) uses the signals to select the correct gear. The control module derives and compares the speed signal from the ABS system with the transmission speed and the engine speed (RPM) at the transmission. Diagnostic trouble code (DTC) TCM-001F is stored if the control module registers that the signal from the speed sensor is missing.

Substitute Value

- None.

Possible Source

- Contact resistance in the terminals.
- Open-circuit on power supply.
- Open-circuit in the signal cable.
- Defective transmission speed sensor.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

SIGNAL MISSING. INTERMITTENT FAULT

INTERMITTENT FAULT

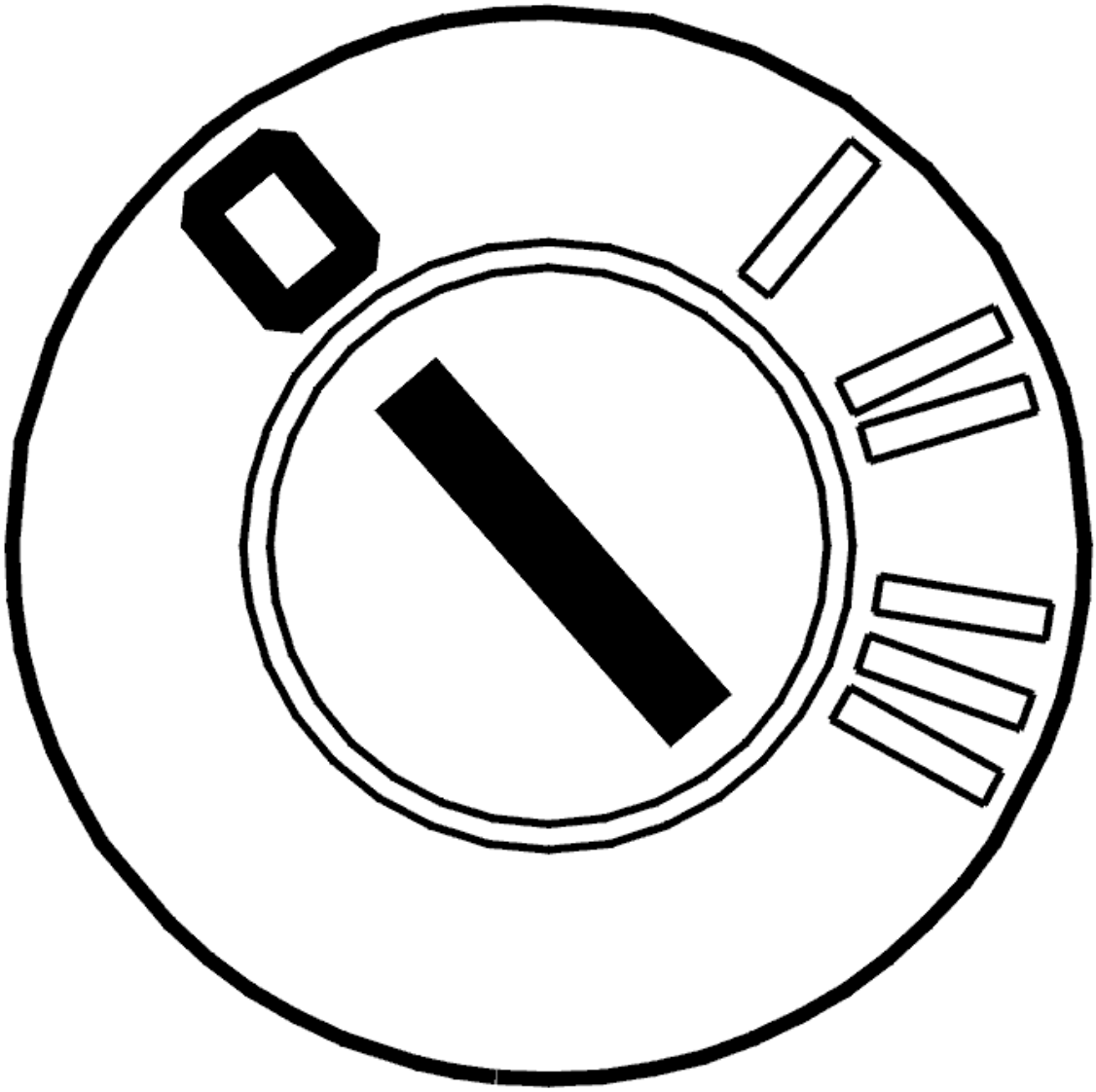


Fig. 178: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the speed sensor and control module connectors for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

  Check the power supply cable between transmission control module (TCM) terminal 57A and speed sensor connector terminal 1 for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

  Check the signal cable between transmission control module (TCM) terminal 39A and speed sensor connector terminal 2 for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX** .
- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .
- For information about signals, see **SIGNAL SPECIFICATION** .

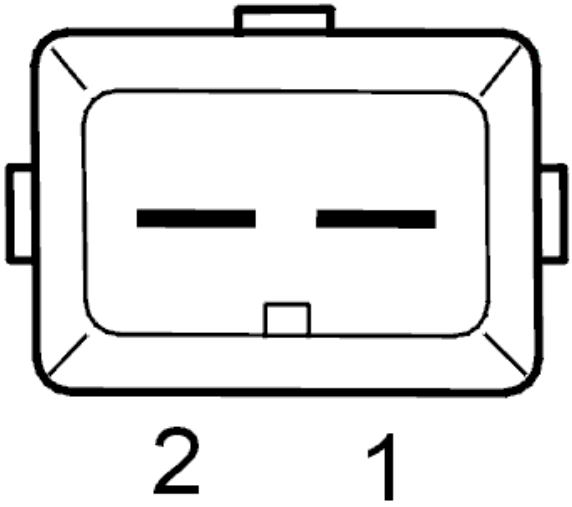


Fig. 179: Identifying Vehicle Speed Sensor (VSS) Connector Terminals
Courtesy of VOLVO CARS CORPORATION

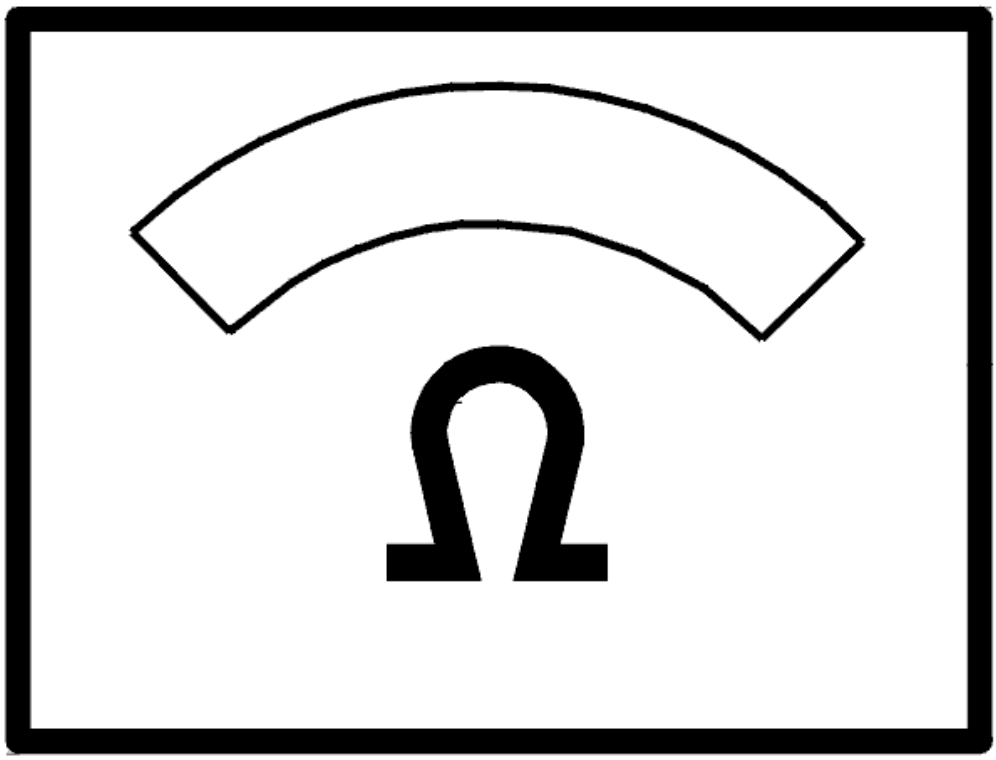


Fig. 180: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

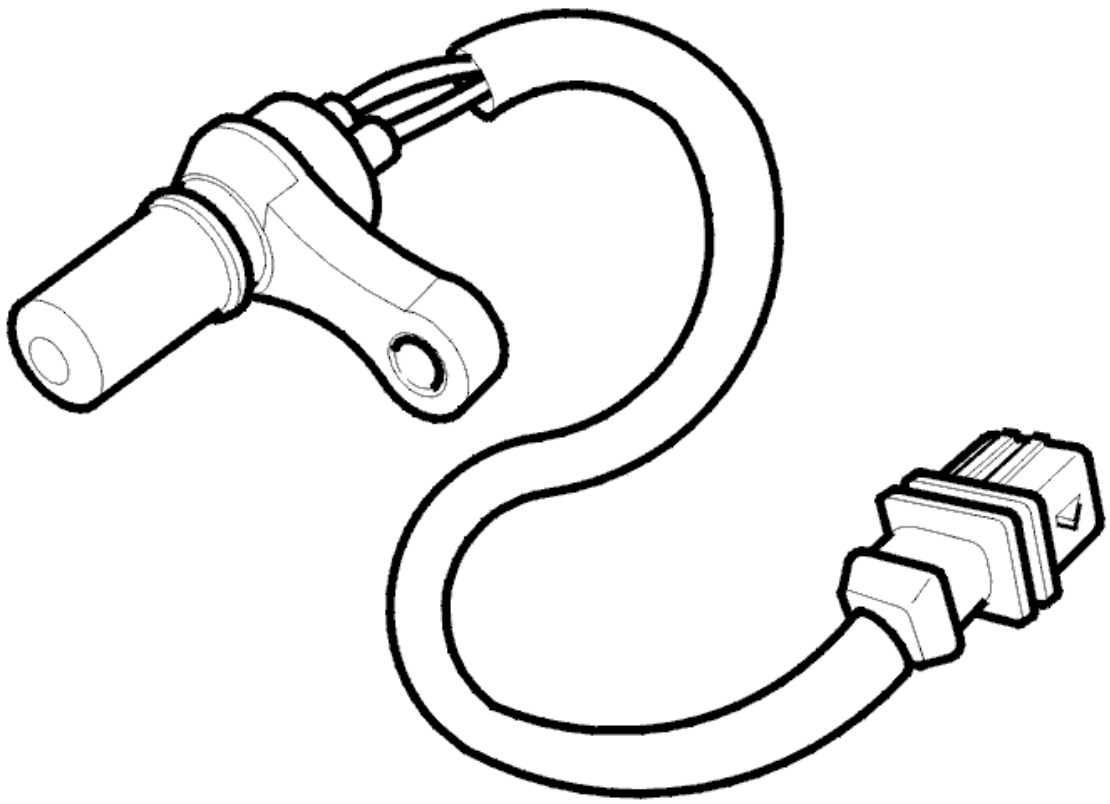


Fig. 181: Identifying Automatic Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-001F: VEHICLE SPEED SENSOR. SIGNAL MISSING. PERMANENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL MISSING. PERMANENT FAULT

CHECKS

CHECKING THE TRANSMISSION OUTPUT SPEED SENSOR SIGNAL

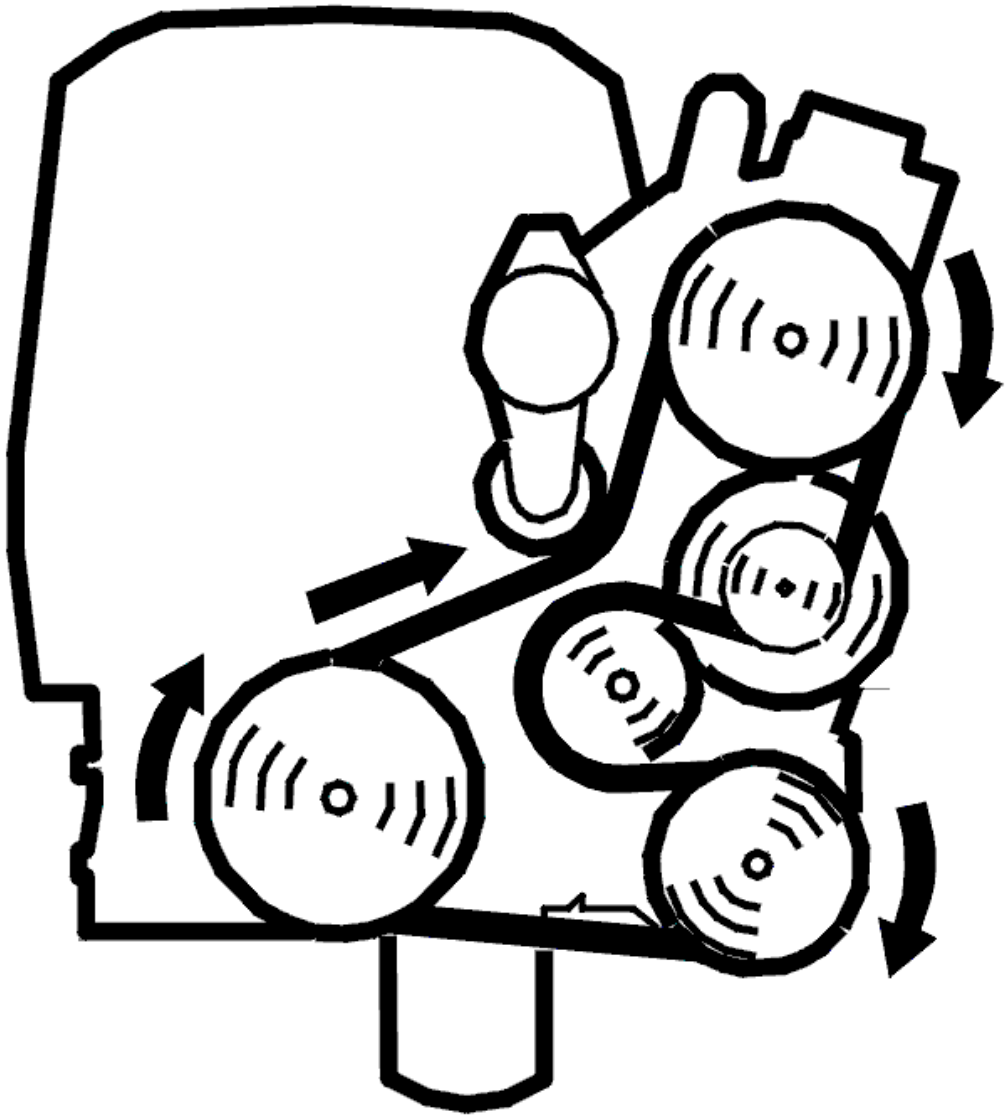


Fig. 182: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Take care of the control module's and the speed sensor's connector with regards to contact resistance and oxidation according to:**CHECKING WIRING AND TERMINALS. PERMANENT FAULT**
- Raise the car so that the drive wheels are clear of the ground
- Start the engine. Allow the engine to idle
- Shift the gear selector to position D so that the drive wheels begin to rotate
- Read off the transmission speed.

Depress the accelerator pedal (AP) and check that the speed is updated.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

NOTE: Diagnostic trouble codes (DTCs) may be stored in the ABS system when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

Other information:

- To access the control module connector, see **CONNECTING THE BREAKOUT BOX**
- To access the transmission output speed sensor connector, see **OUTPUT SPEED SENSOR TRANSMISSION, REPLACING** .

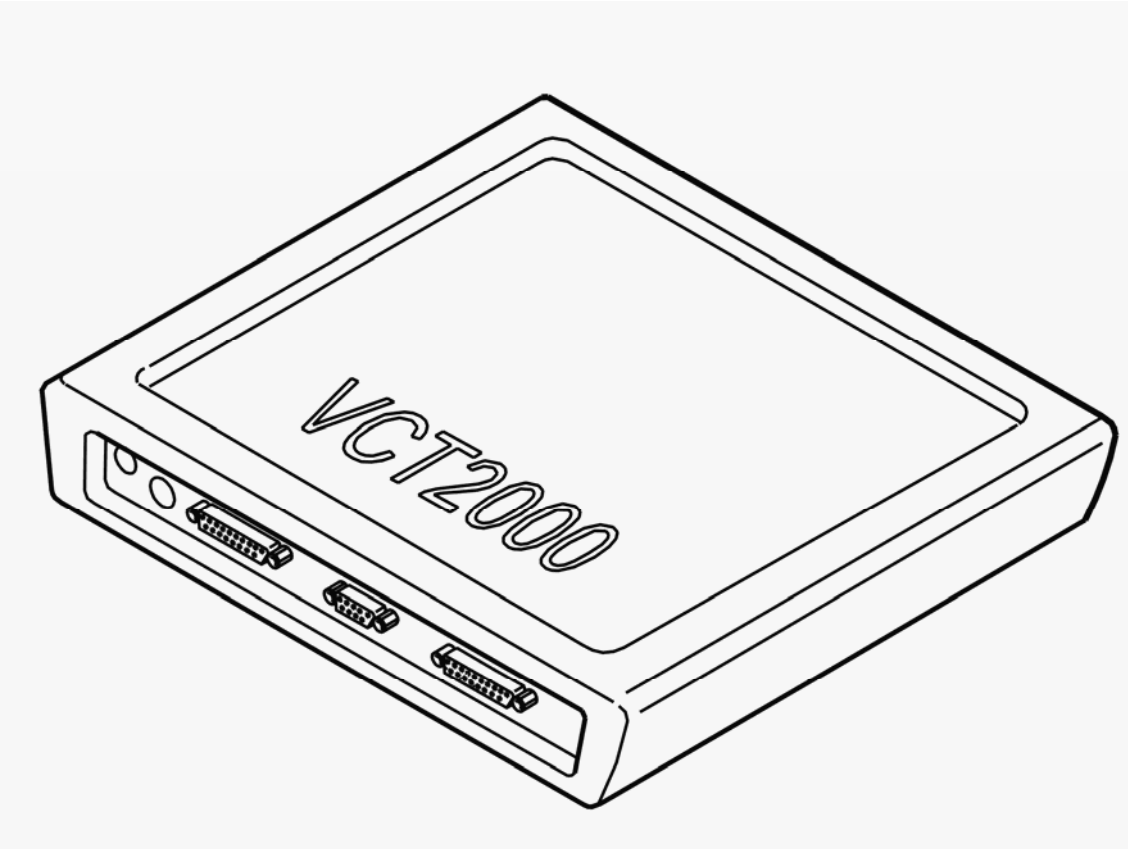


Fig. 183: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the speed updated?

- **YES**

OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

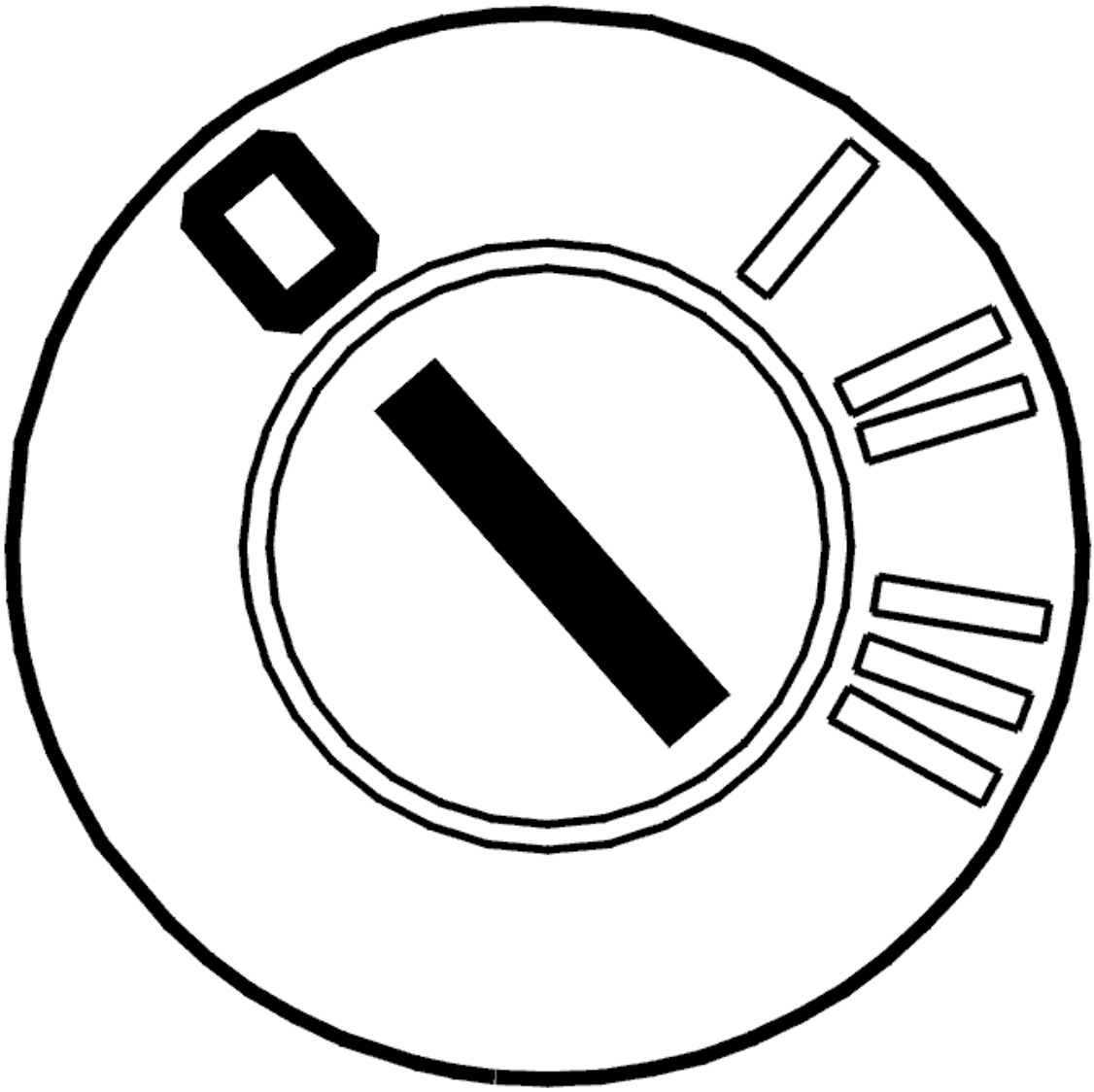


Fig. 184: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the voltage supply cable between the transmission control module (TCM) #A57 (#A57) and the speed sensor's connector #1 for open circuit. See **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

  Check the signal cable between the transmission control module (TCM) #39 (#A39) and the speed

sensor's connector #2 for open circuit. See **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

HINT: With the control module connected, the ignition on and a voltmeter connected between transmission output speed sensor connector terminals #1 and #2 (control module side), the voltage must be approximately 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To check or replace the transmission output speed sensor, see **OUTPUT SPEED SENSOR TRANSMISSION, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION** .

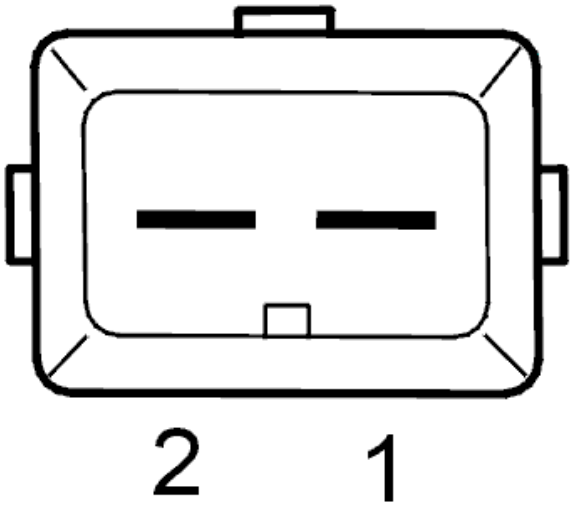


Fig. 185: Identifying Vehicle Speed Sensor (VSS) Connector Terminals
Courtesy of VOLVO CARS CORPORATION

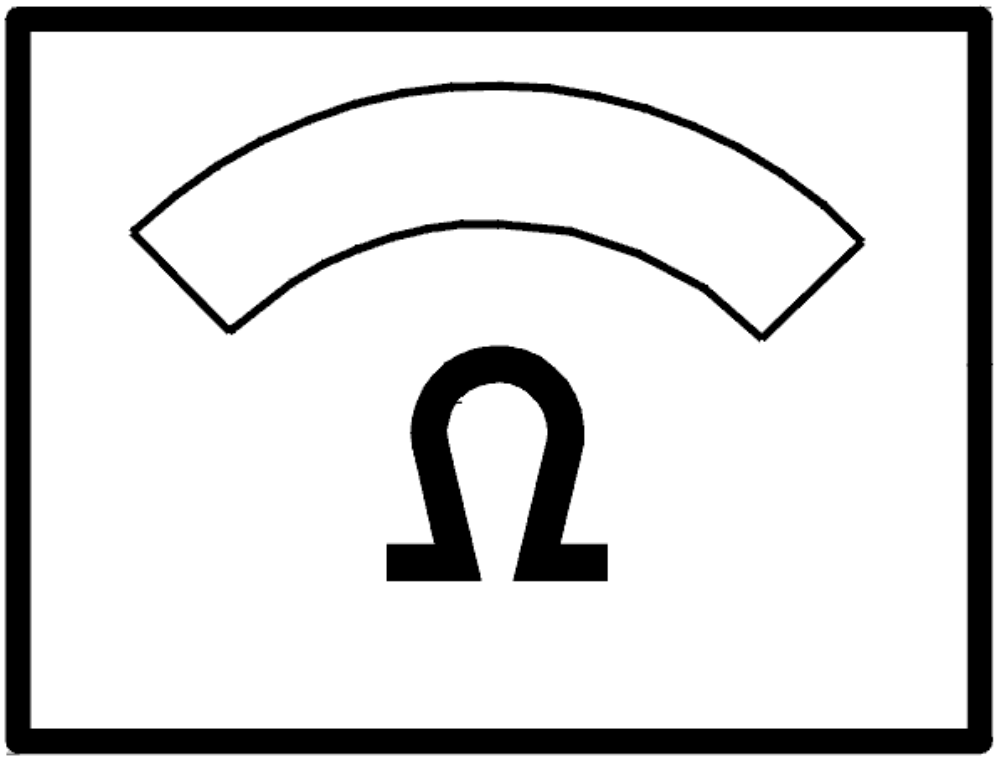


Fig. 186: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

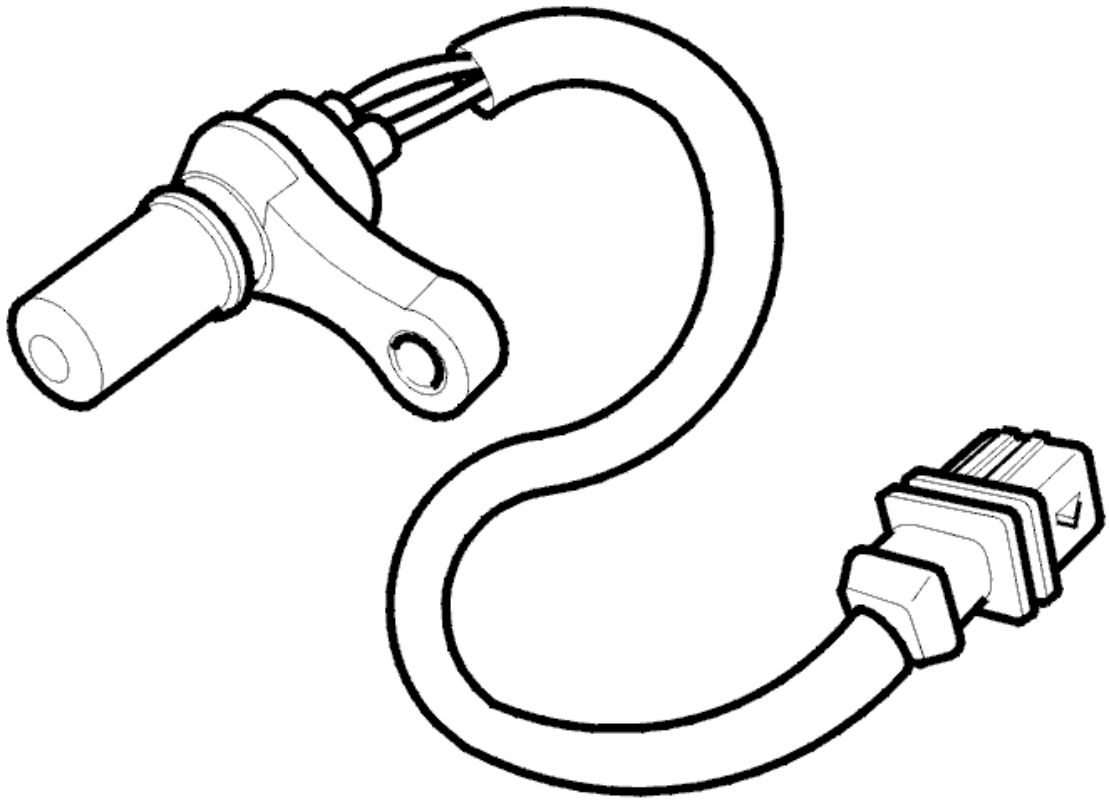


Fig. 187: Identifying Automatic Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

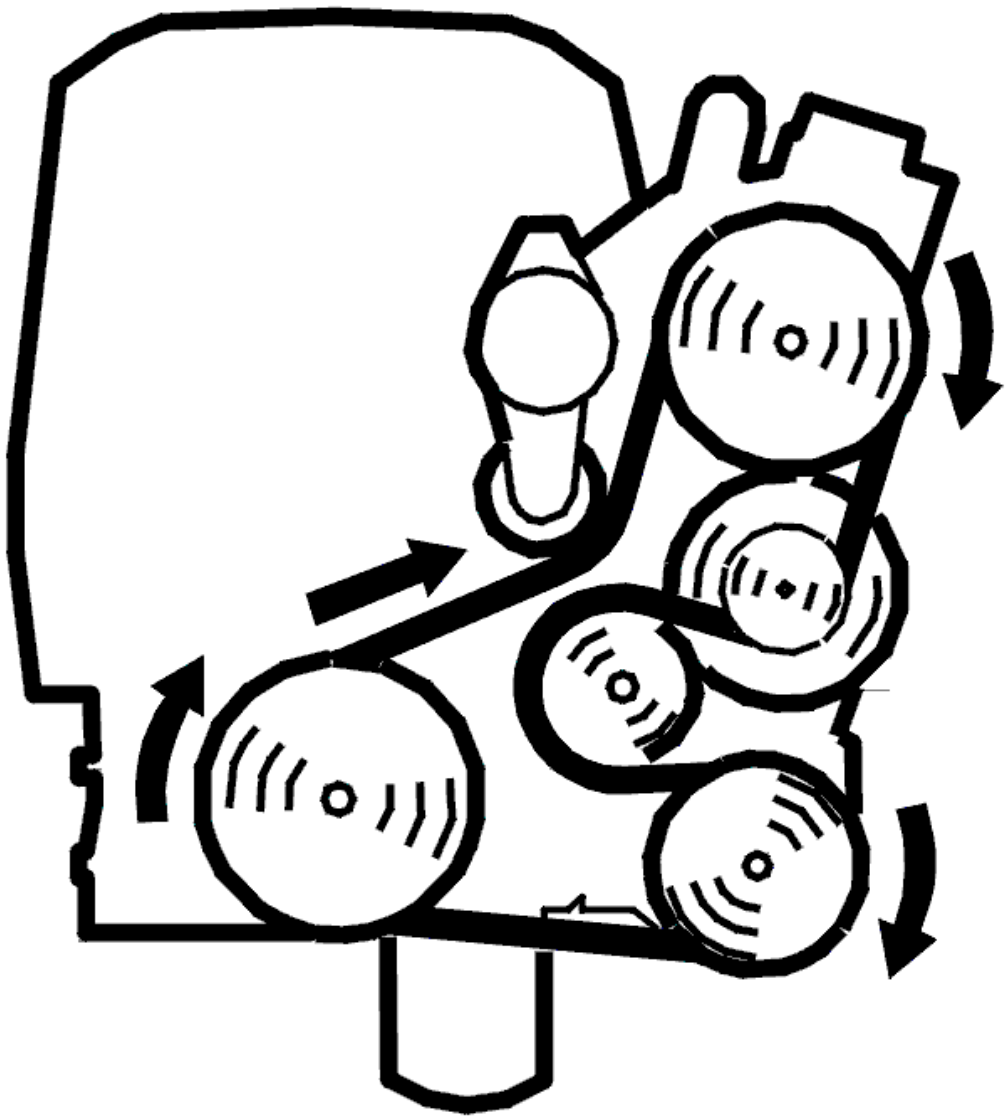


Fig. 188: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

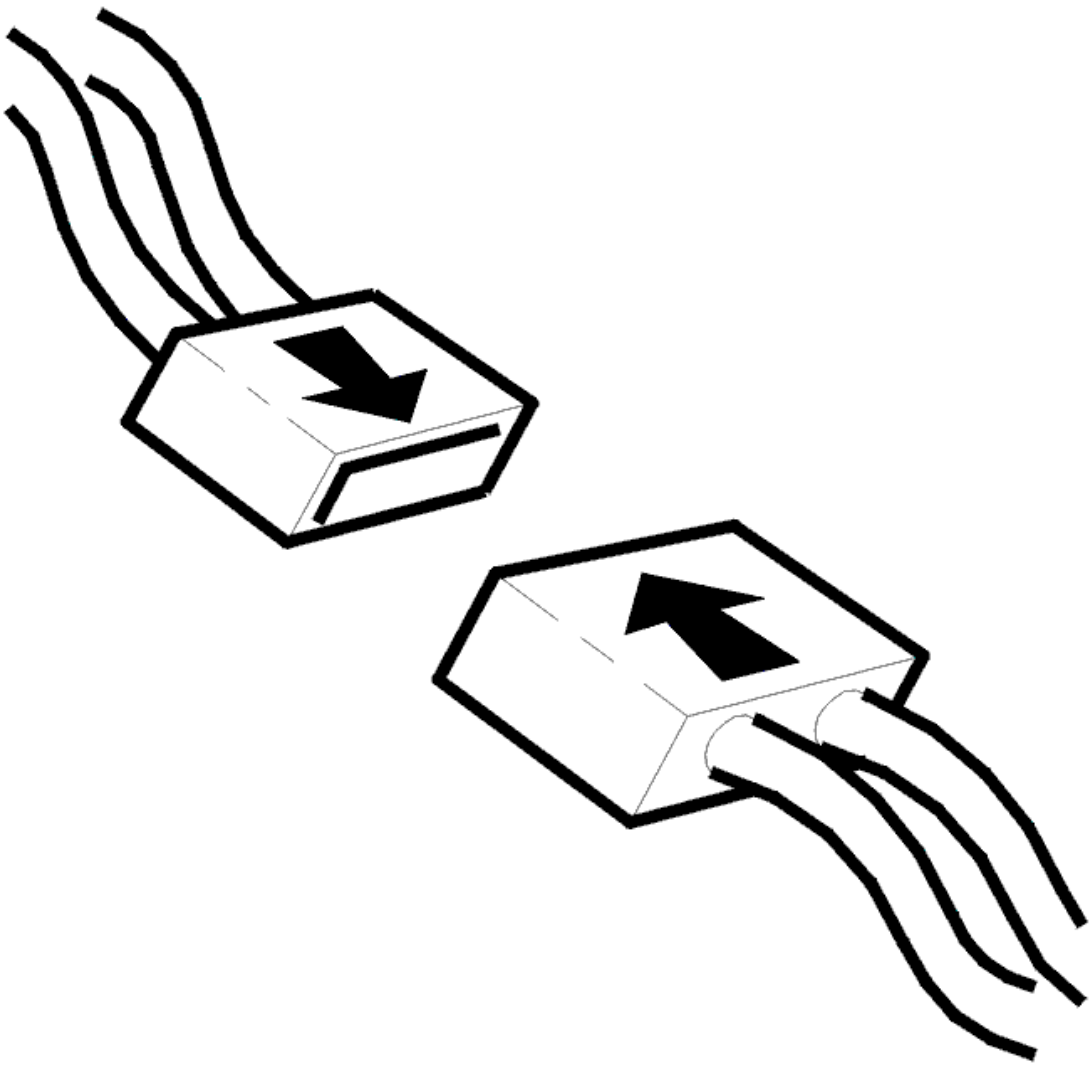


Fig. 189: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Raise car so that drive wheels are unimpeded.
- Start the engine and let it idle.
- Shift gear selector to position D so that the drive wheels begin to rotate.
- Read off the transmission speed.

Check that speed is updated

NOTE: When the rear wheels are stationary and the front wheels rotate, diagnostic trouble codes (DTCs) can be stored in the ABS system. Erase

any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

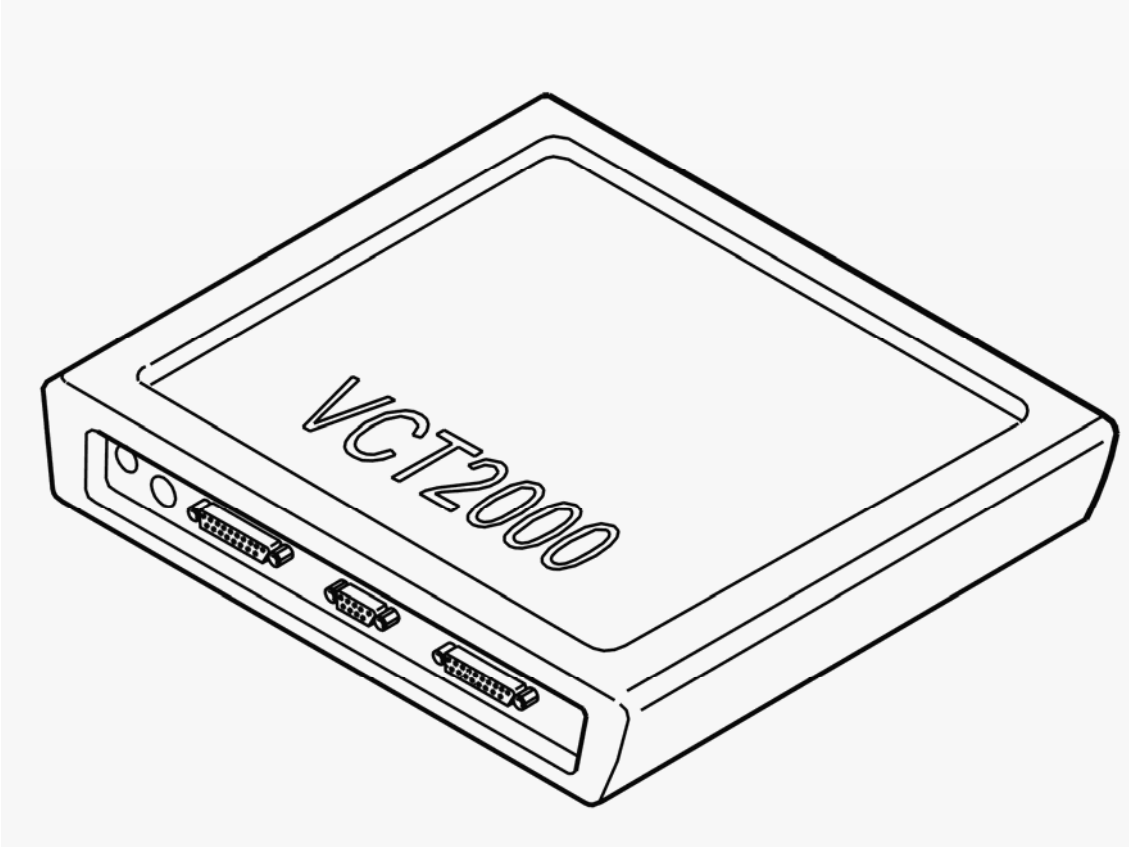


Fig. 190: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0020: TRANSMISSION OUTPUT SPEED SENSOR. FAULTY SIGNAL. INTERMITTENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

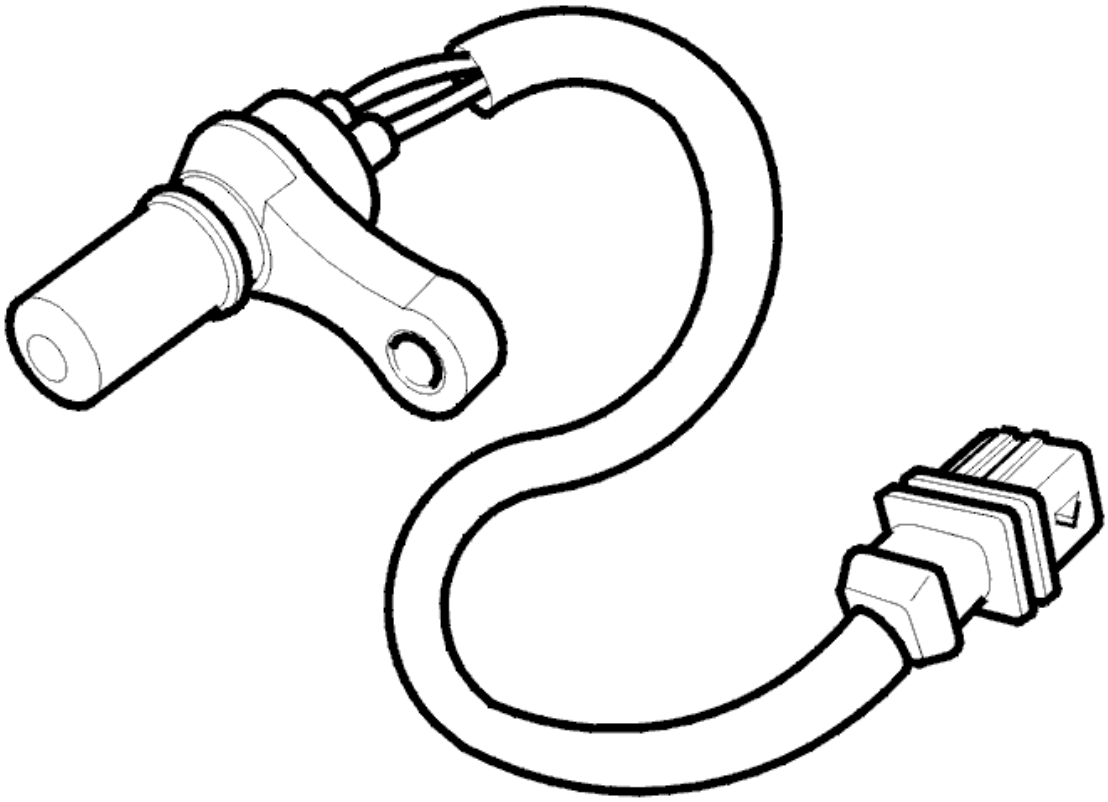


Fig. 191: Identifying Automatic Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The automatic transmission control module (TCM) receives speed signals from the ABS control module and from the speed sensor on the transmission. The transmission control module (TCM) uses the signals to select the correct gear. The control module derives and compares the speed signal from the ABS system with the transmission speed and the engine speed (RPM) at the transmission. Diagnostic trouble code (DTC) TCM-0020 is stored if the control module registers that the speed signal from the ABS system does not correspond with the transmission speed or the engine speed (RPM).

Substitute Value

- None.

Possible Source

- Contact resistance in the terminals.
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the power supply.
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the signal cable.
- Defective speed sensor.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of the line pressure when shifting.
- No reduction of the line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No request for torque limiting to the engine control module (ECM) when shifting.

FAULTY SIGNAL. INTERMITTENT FAULT

INTERMITTENT FAULT

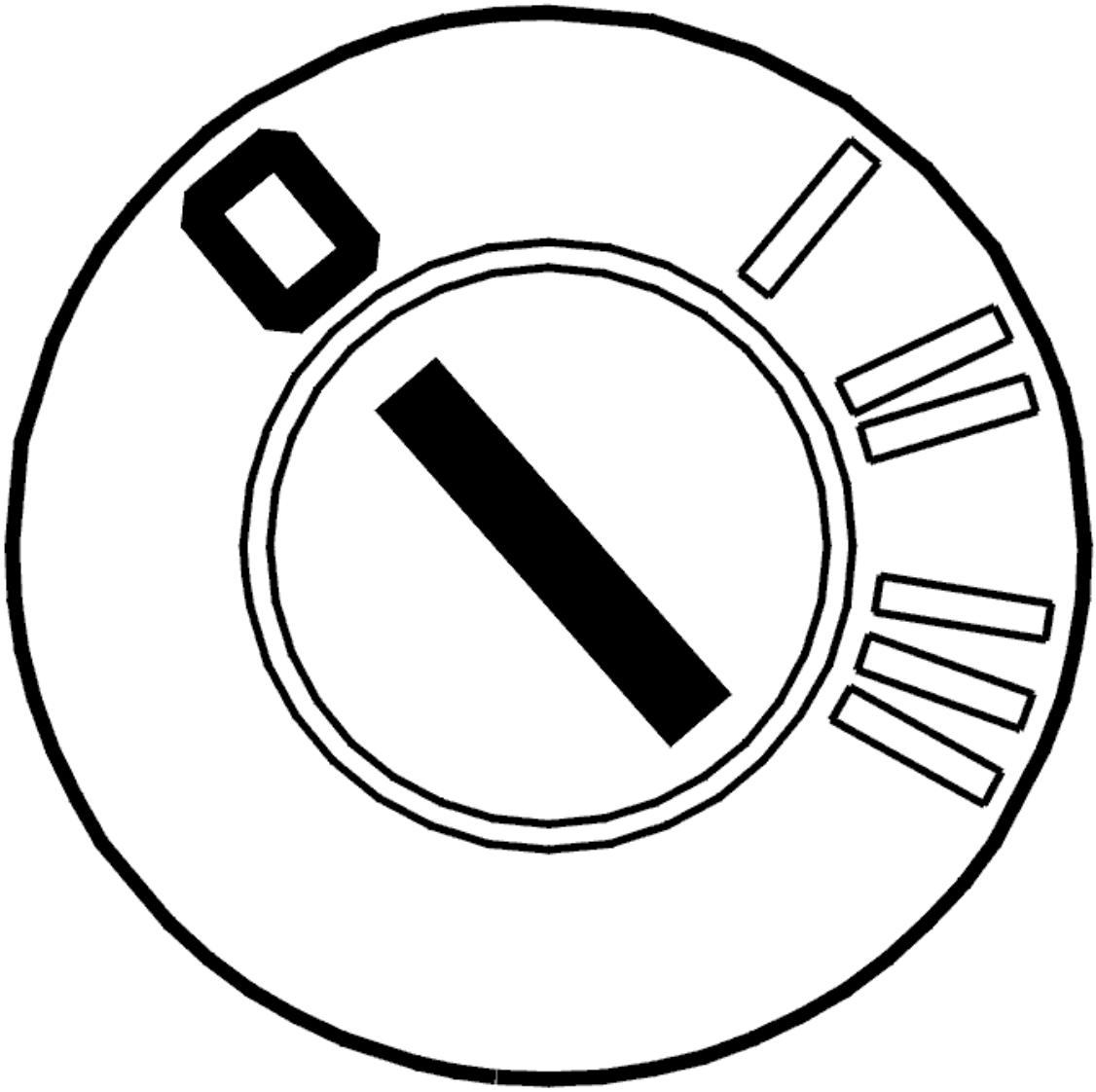


Fig. 192: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the control module and transmission output speed sensor connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

  Check the wiring between control module terminal #A57 (#A57) and transmission output speed sensor connector terminal #A4. Check the wiring between control module terminal #A39 (#A39) and transmission output speed sensor connector terminal #A3. Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** . Check for an intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** . Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To check or replace the transmission output speed sensor, see **INPUT SPEED SENSOR/OUTPUT SPEED SENSOR, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

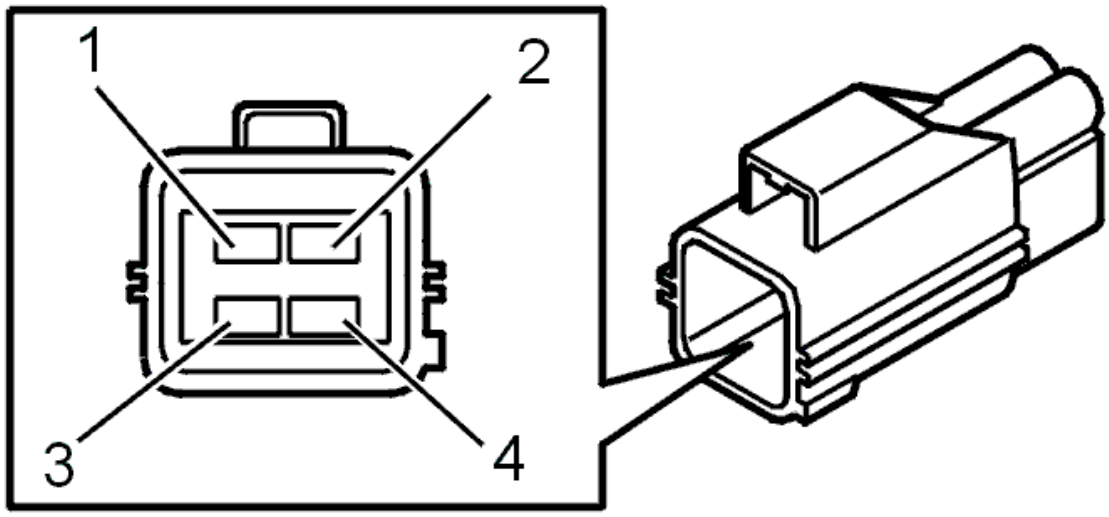


Fig. 193: Identifying Transmission Output Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

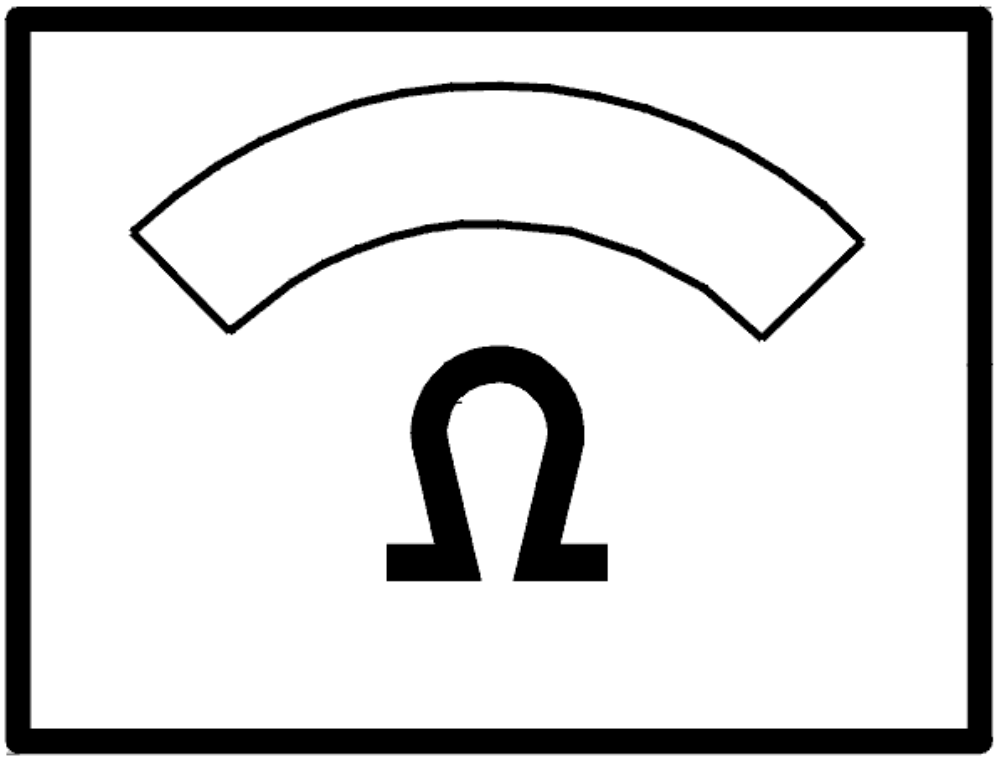


Fig. 194: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0020: TRANSMISSION OUTPUT SPEED SENSOR. FAULTY SIGNAL.

PERMANENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULTY SIGNAL. PERMANENT FAULT

CHECKS

CHECKING THE TRANSMISSION OUTPUT SPEED SENSOR SIGNAL

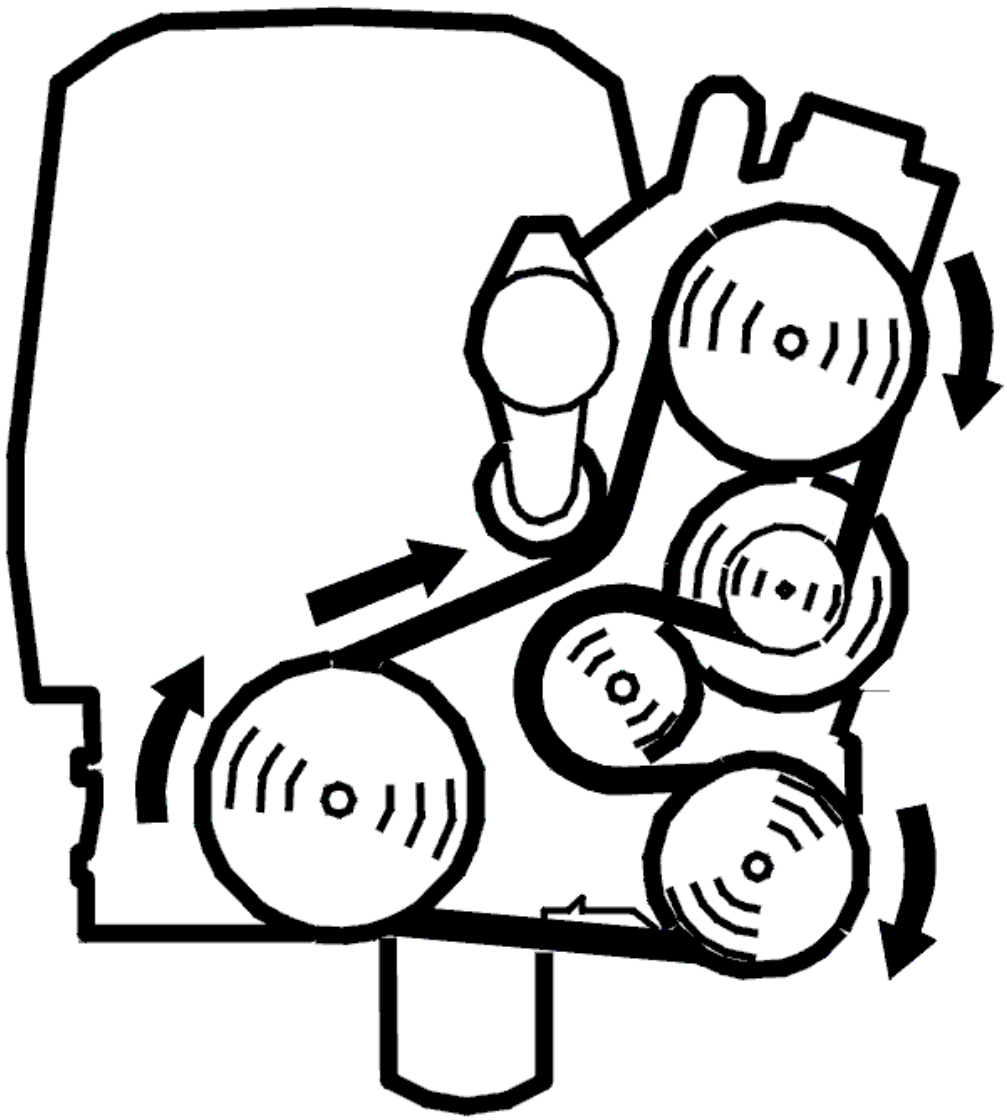


Fig. 195: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

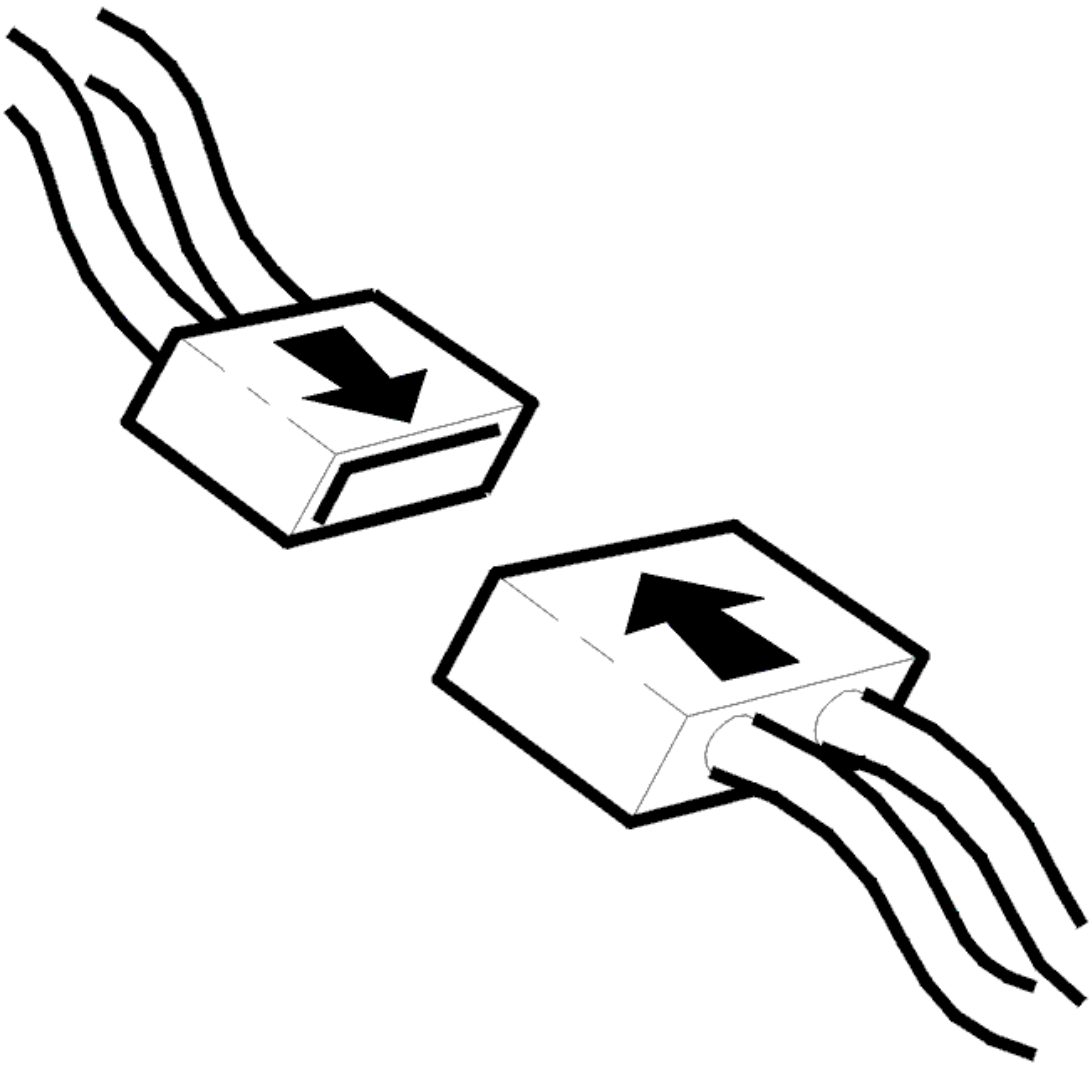


Fig. 196: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and transmission output speed sensor connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION**
- Reinstall the components, reconnect the connectors etc.
- Raise the car so that the drive wheels can rotate freely
- Engine idling
- Gear selector in position D
- Read off the transmission output speed signal.

  Check that the speed increases with engine speed (RPM). If the speed is updated, the cause of the fault was loose connections in the control module or vehicle speed sensor (VSS) connectors.

NOTE: **A diagnostic trouble code (DTC) may be stored in the ABS system when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) in the ABS system after completing fault-tracing.**

Other information:

- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

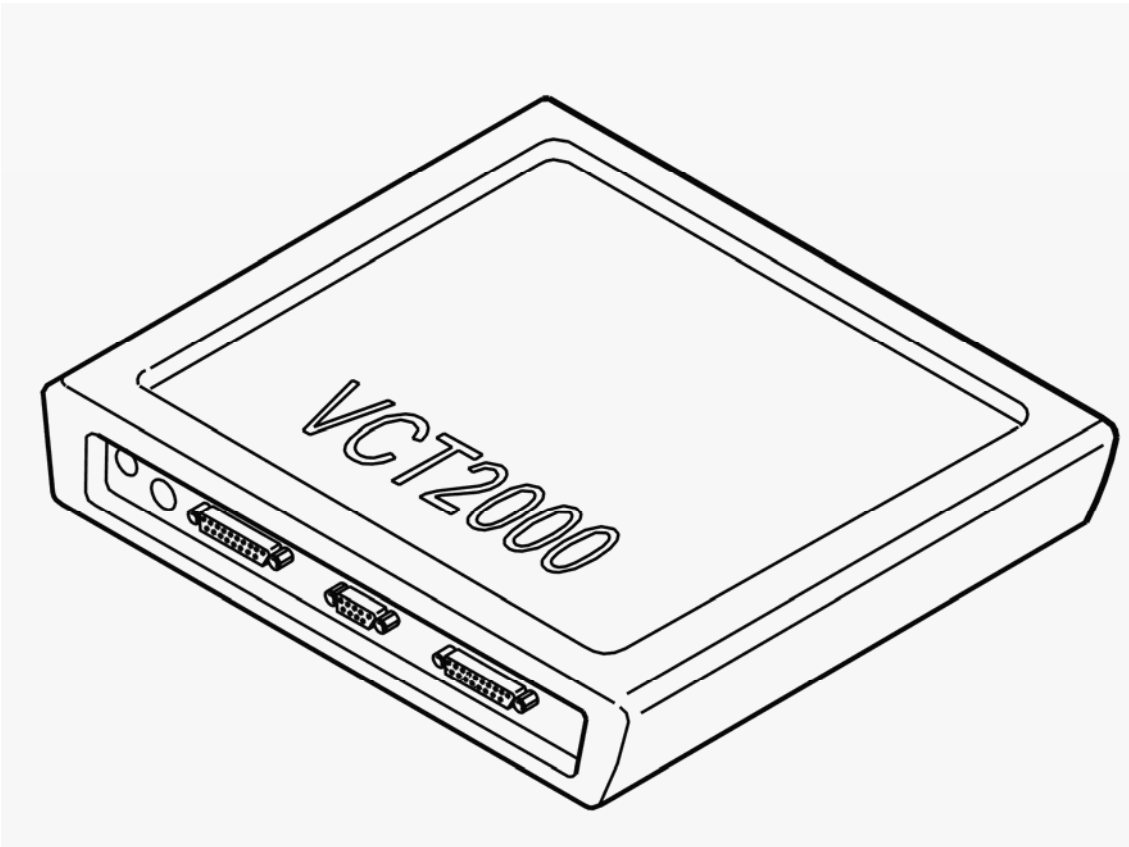


Fig. 197: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the speed increase with engine speed (RPM)?

- **YES**

OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

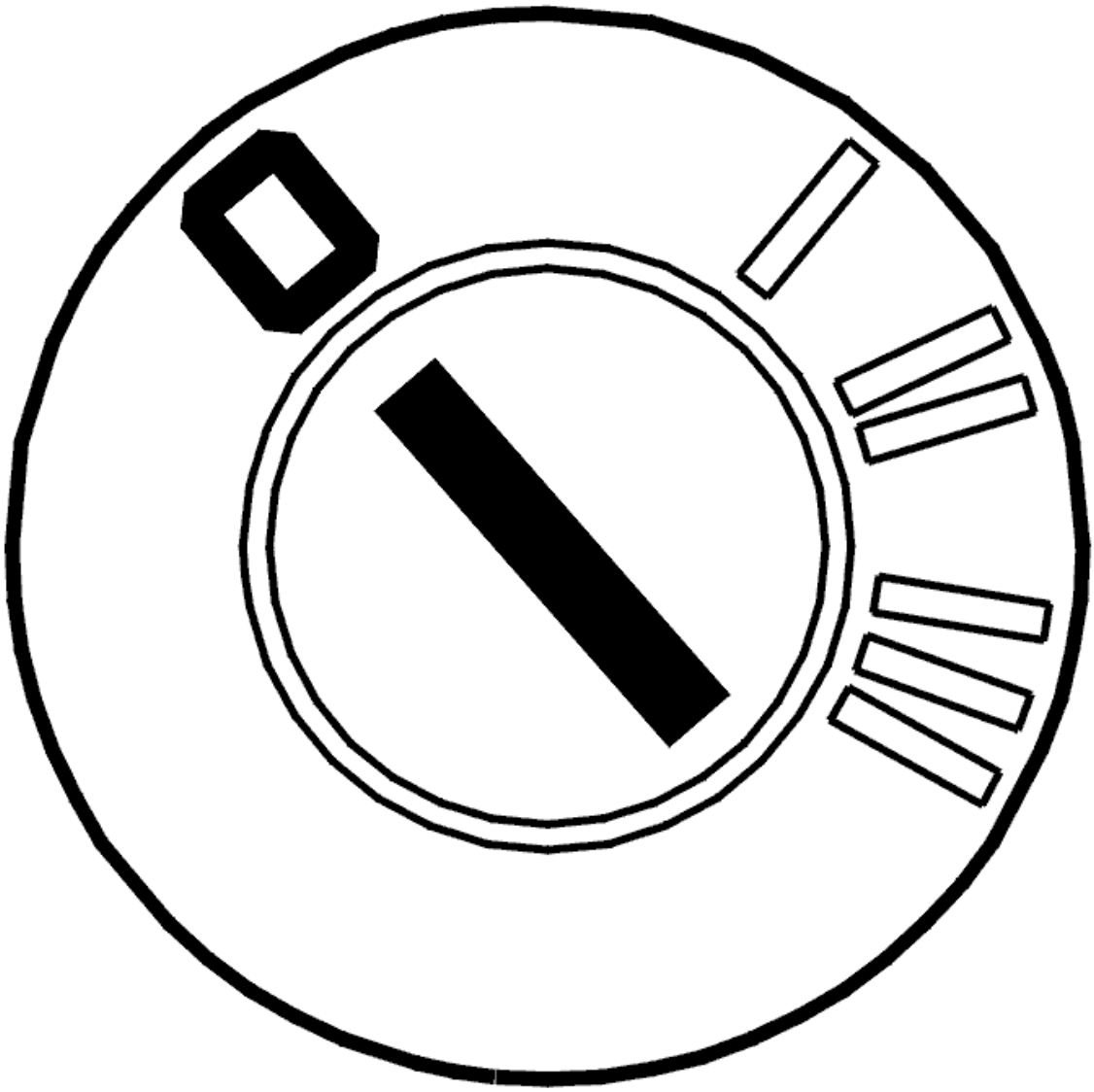


Fig. 198: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box.

  Check the power supply cable between transmission output speed sensor connector terminal #A4 (control module side) and control module terminal #57 (#A57). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage

according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Check the signal cable between transmission output speed sensor connector terminal #A3 (control module side) and control module terminal #39 (#A39). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

HINT: With the control module connected, the transmission output speed sensor disconnected and the ignition on, the voltage between transmission output speed sensor connector terminals #A3 and #A4 must be approximately 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To check or replace the transmission output speed sensor, see **INPUT SPEED SENSOR/OUTPUT SPEED SENSOR, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

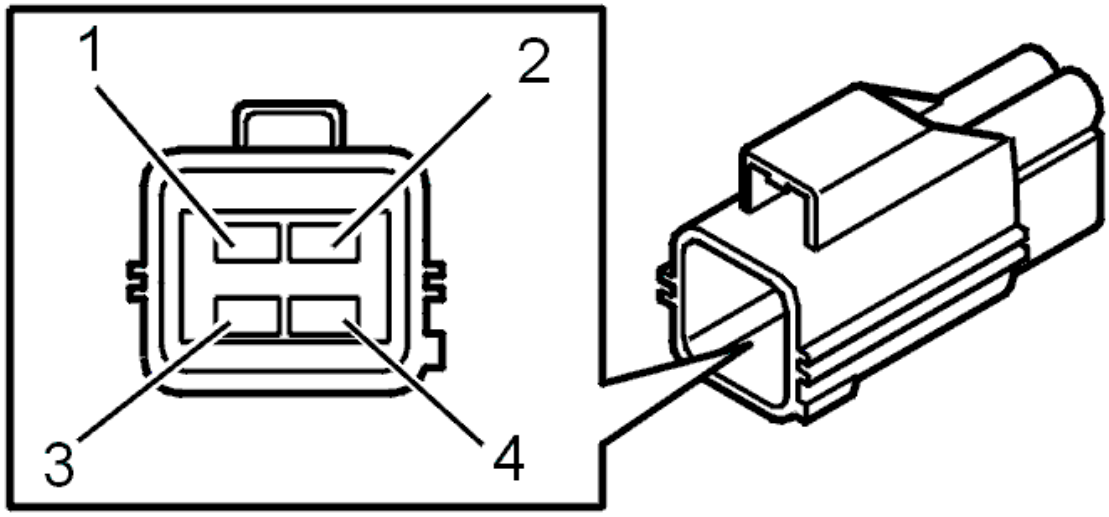


Fig. 199: Identifying Transmission Output Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

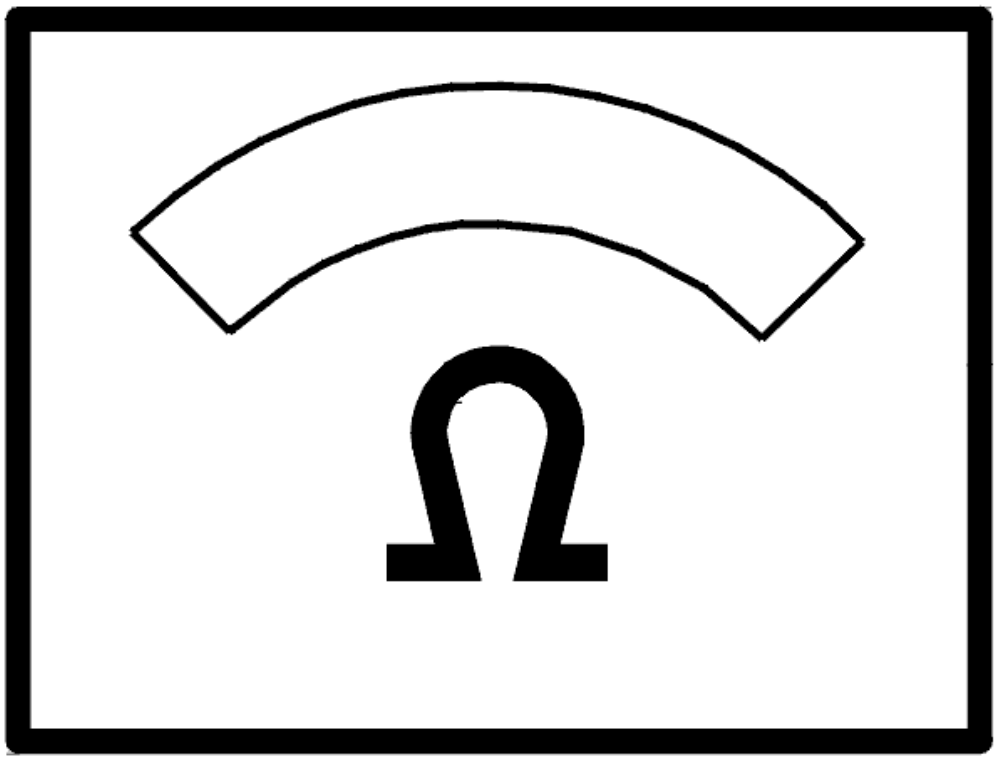


Fig. 200: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

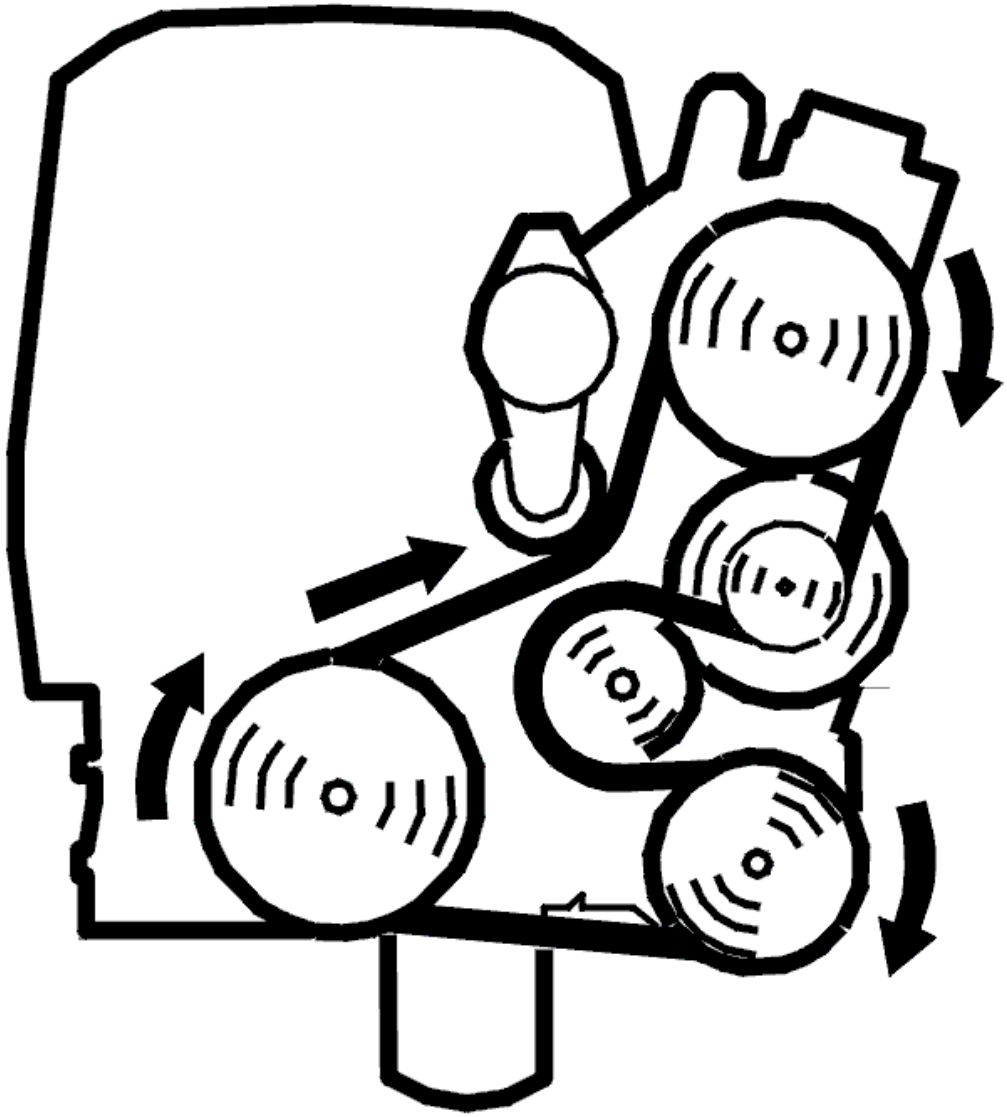


Fig. 201: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

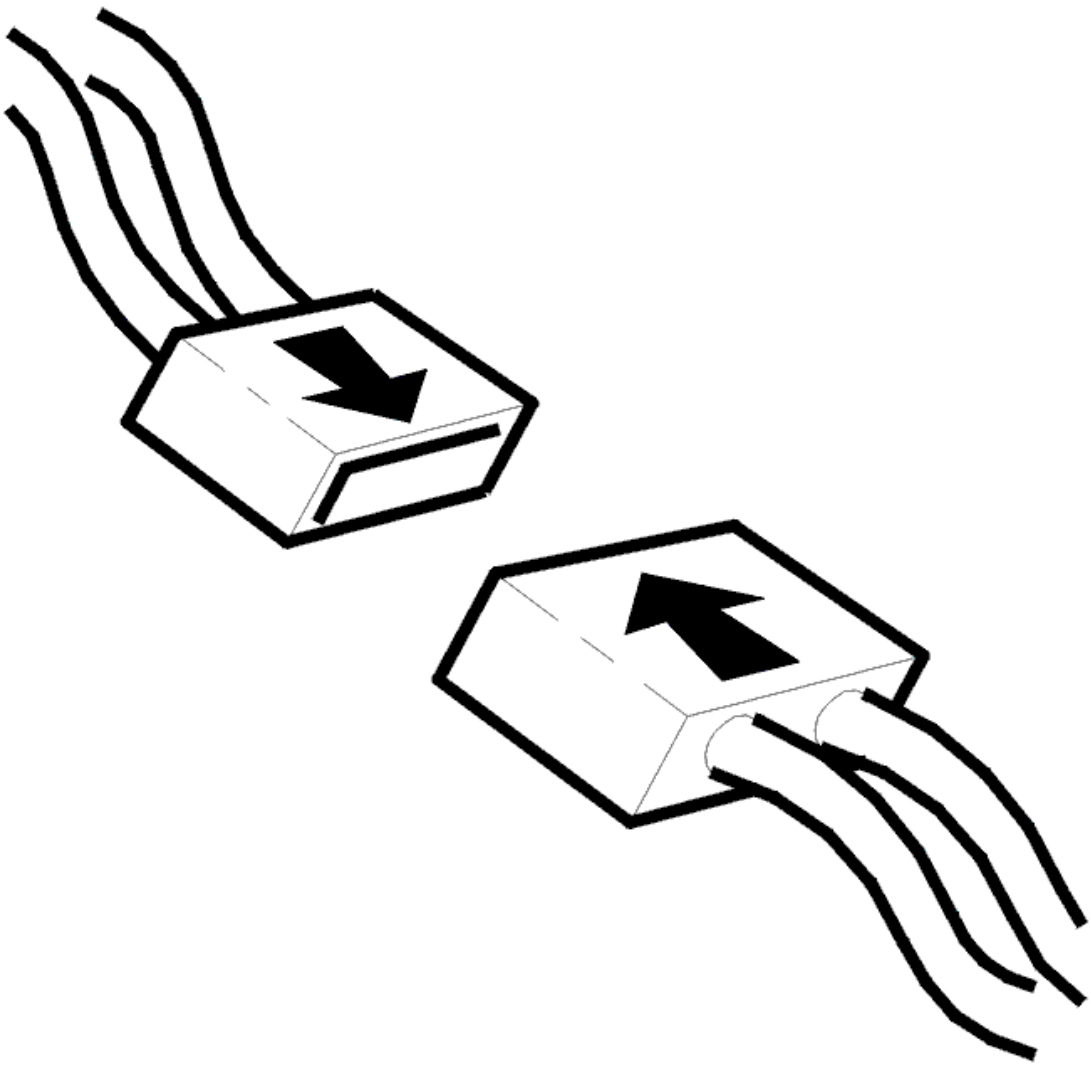


Fig. 202: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Raise car so that drive wheels are unimpeded.
- Start the engine and let it idle.
- Shift gear selector to position D so that the drive wheels begin to rotate.
- Read off the transmission speed.

Check that speed is updated

NOTE: When the rear wheels are stationary and the front wheels rotate, diagnostic trouble codes (DTCs) can be stored in the ABS system. Erase

any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

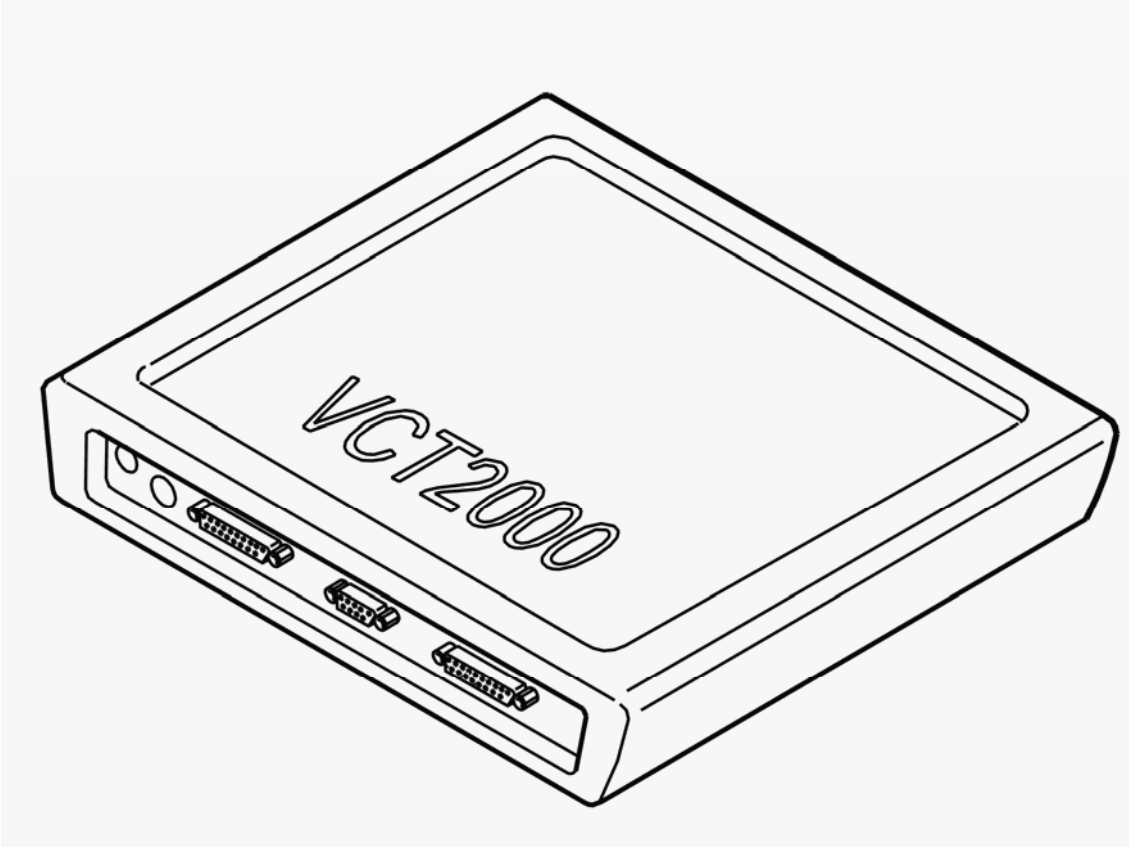


Fig. 203: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0020: VEHICLE SPEED SENSOR. FAULTY SIGNAL. INTERMITTENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

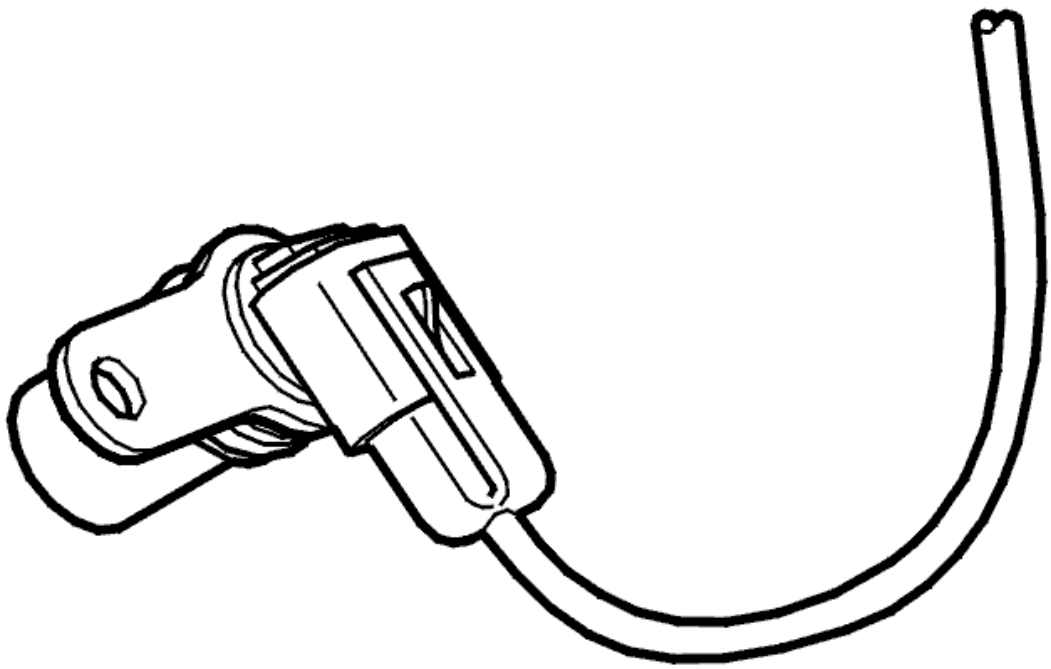


Fig. 204: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The automatic transmission control module (TCM) receives speed signals from the ABS control module and from the transmission speed sensor on the transmission. The transmission control module (TCM) uses the signals to select the correct gear. The control module derives and compares the speed signal from the ABS system with the transmission speed and the engine speed (RPM) at the transmission. Diagnostic trouble code (DTC) TCM- 0020 is stored if the control module registers that the speed signal from the ABS system does not correspond with the transmission speed or the engine speed (RPM).

Substitute Value

- None.

Possible Source

- Contact resistance in the terminals.
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the power supply.
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the signal cable.
- Defective transmission speed sensor.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

FAULTY SIGNAL. INTERMITTENT FAULT

INTERMITTENT FAULT

Check the control module and vehicle speed sensor (VSS) connectors for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the wiring between control module terminal #59 (#A59) and transmission connector terminal #S (#A16). Check for an intermittent open-circuit. See **OPEN-CIRCUIT, INTERMITTENT FAULTS** . Check for an intermittent short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** . Check for an intermittent short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** . Also check the wiring between control module terminal #41 (#A41) and transmission connector terminal #V (#A17). Check for an intermittent open-circuit. See **OPEN-CIRCUIT, INTERMITTENT FAULTS** . Check for an intermittent short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** . Check for an intermittent short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To check or replace the transmission output speed sensor, see **OUTPUT SPEED SENSOR TRANSMISSION, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION** .

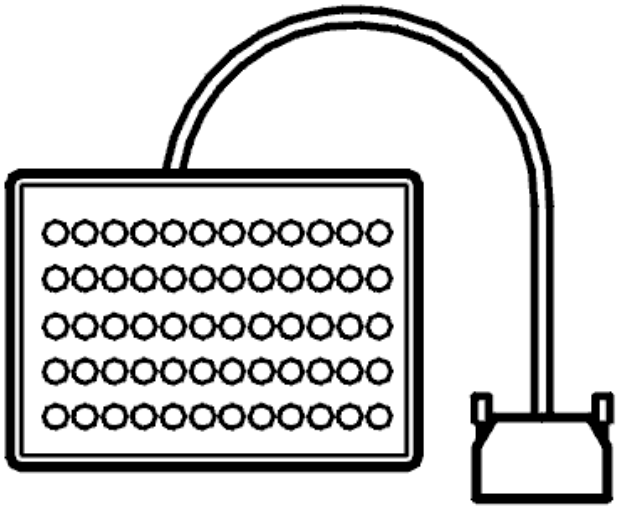


Fig. 205: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

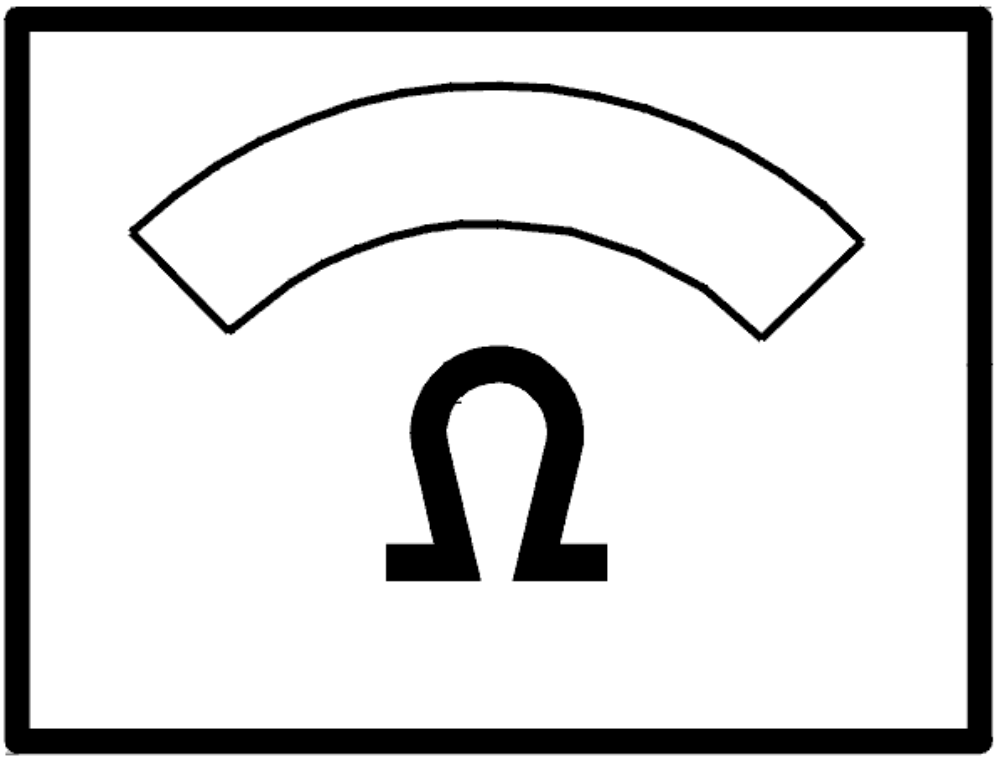


Fig. 206: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0020: VEHICLE SPEED SENSOR. FAULTY SIGNAL. PERMANENT

FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULTY SIGNAL. PERMANENT FAULT

CHECKS

CHECKING THE TRANSMISSION OUTPUT SPEED SENSOR SIGNAL

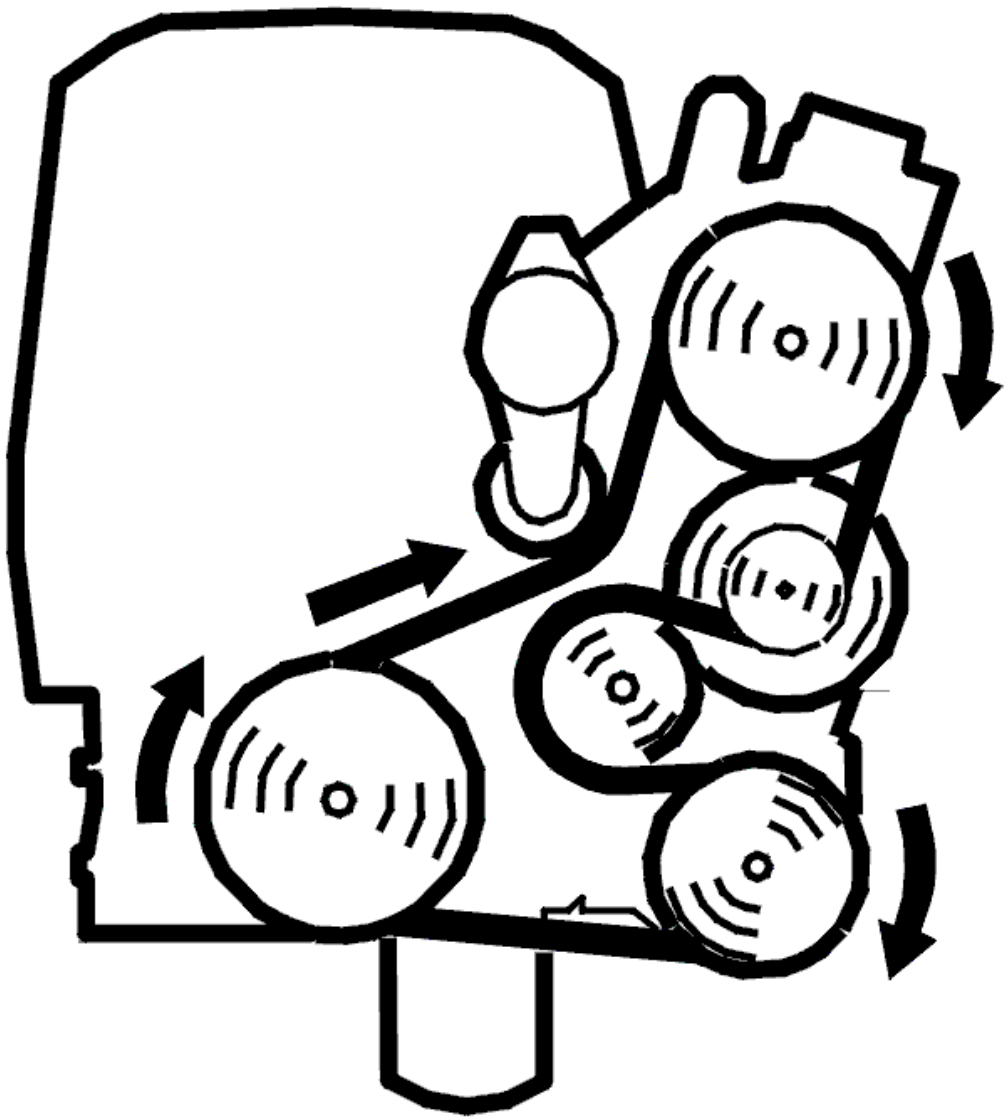


Fig. 207: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

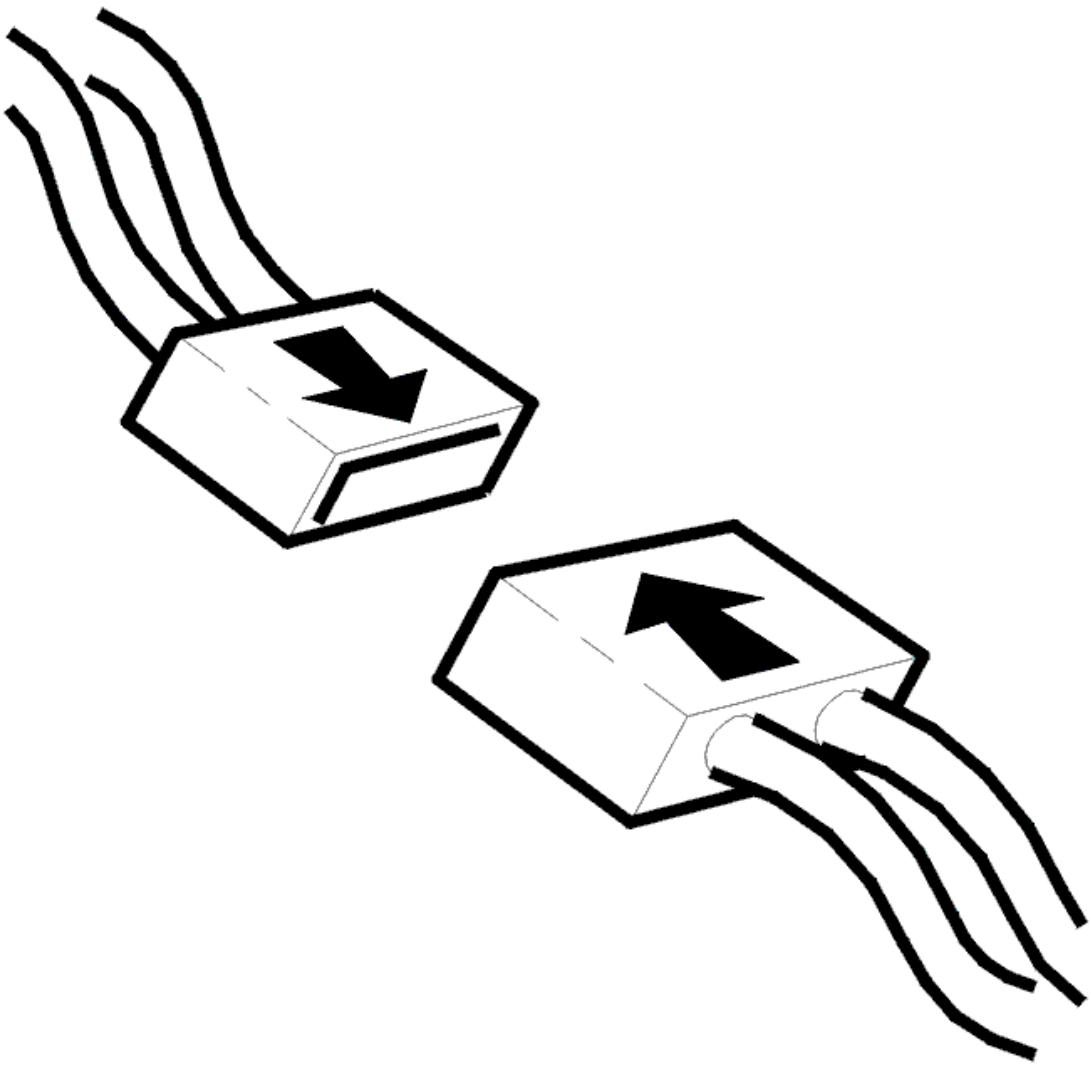


Fig. 208: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and transmission output speed sensor connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION**
- Reinstall the components, reconnect the connectors etc.
- Raise the car so that the drive wheels can rotate freely
- Engine idling
- Gear selector in position D
- Read off the transmission output speed signal.

  Check that the speed increases with engine speed (RPM). If the speed is updated, the cause of the fault was loose connections in the control module or vehicle speed sensor (VSS) connectors.

NOTE: A diagnostic trouble code (DTC) may be stored in the ABS system when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) in the ABS system after completing fault-tracing.

Other information:

- To access the control module connector, see **CONNECTING THE BREAKOUT BOX**
- To access the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS** .

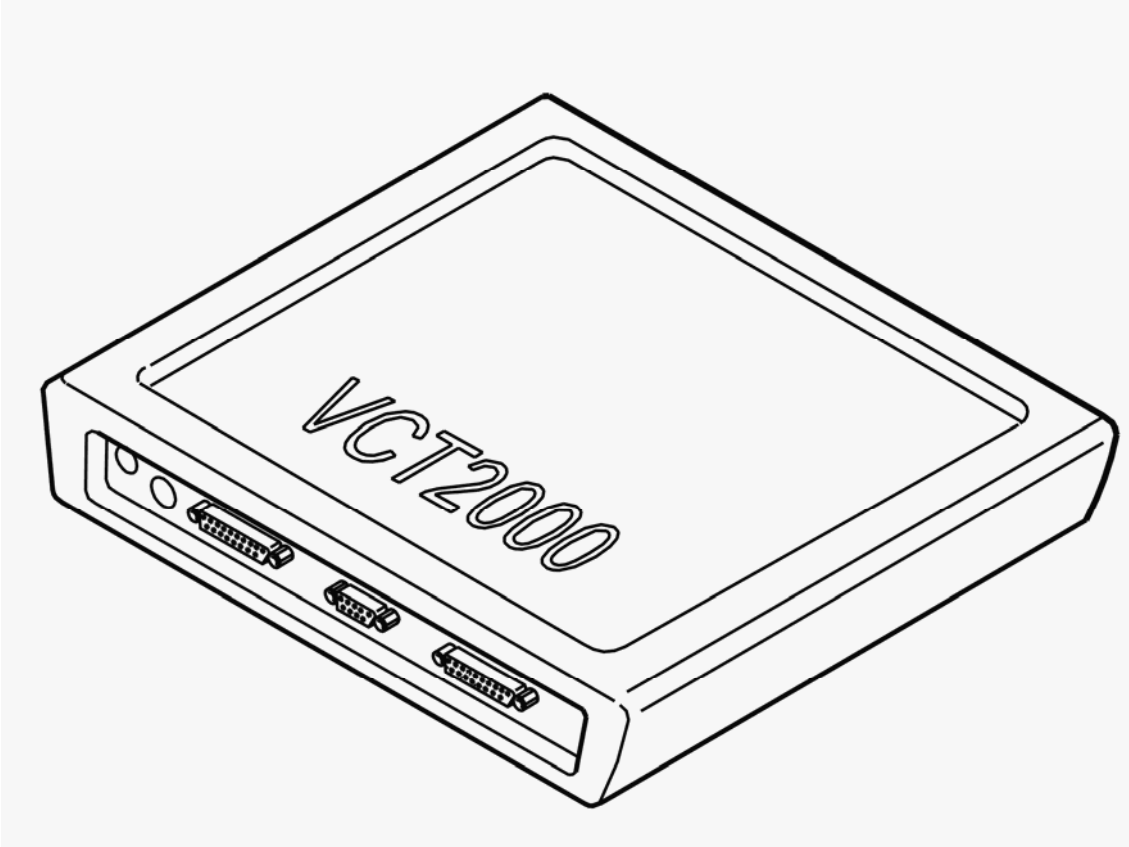


Fig. 209: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the speed increase with engine speed (RPM)?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

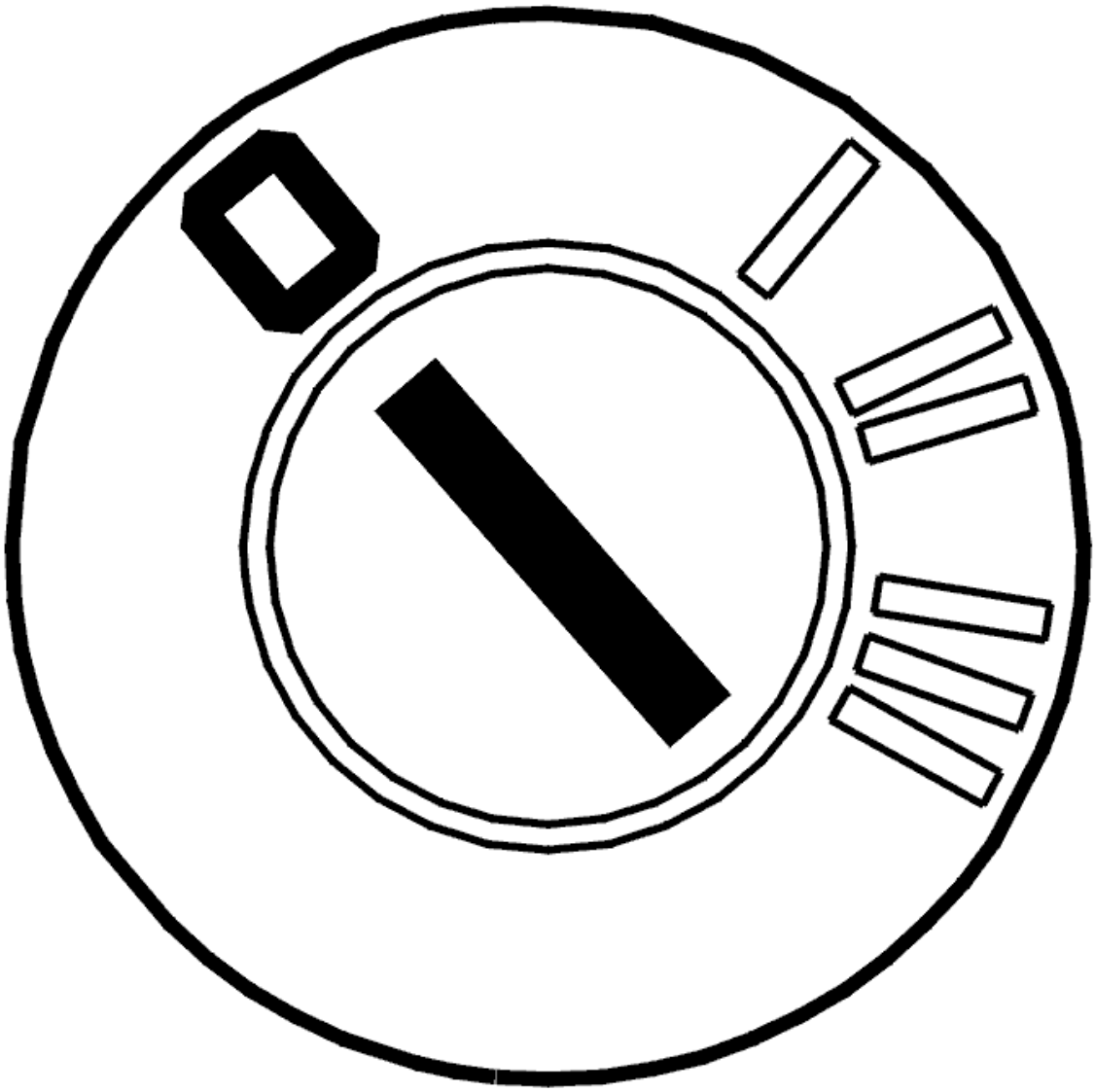


Fig. 210: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the power supply cable between vehicle speed sensor (VSS) connector terminal #1 (control module side) and control module terminal #57 (#A57). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

  HINT: With the control module connected and the ignition on, the voltage between speed sensor connector terminal #1 and ground (breakout box terminal #53) must be approximately 1-3 V below Ubat.

Check the signal cable between speed sensor connector terminal #2 (control module side) and control module terminal #39 (#A39). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To replace the vehicle speed sensor (VSS), see **OUTPUT SPEED SENSOR TRANSMISSION, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION** .

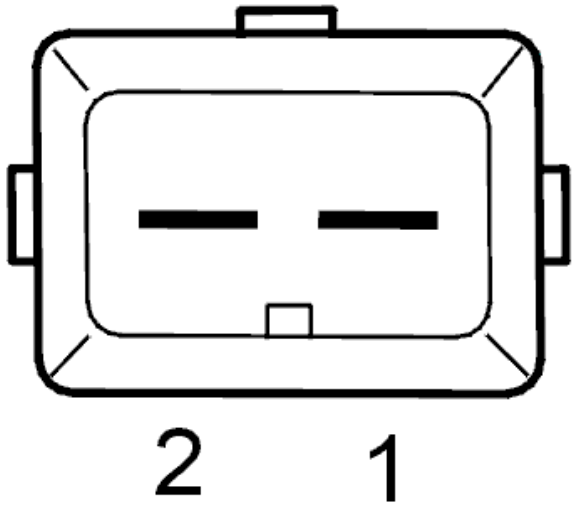


Fig. 211: Identifying Vehicle Speed Sensor (VSS) Connector Terminals
Courtesy of VOLVO CARS CORPORATION

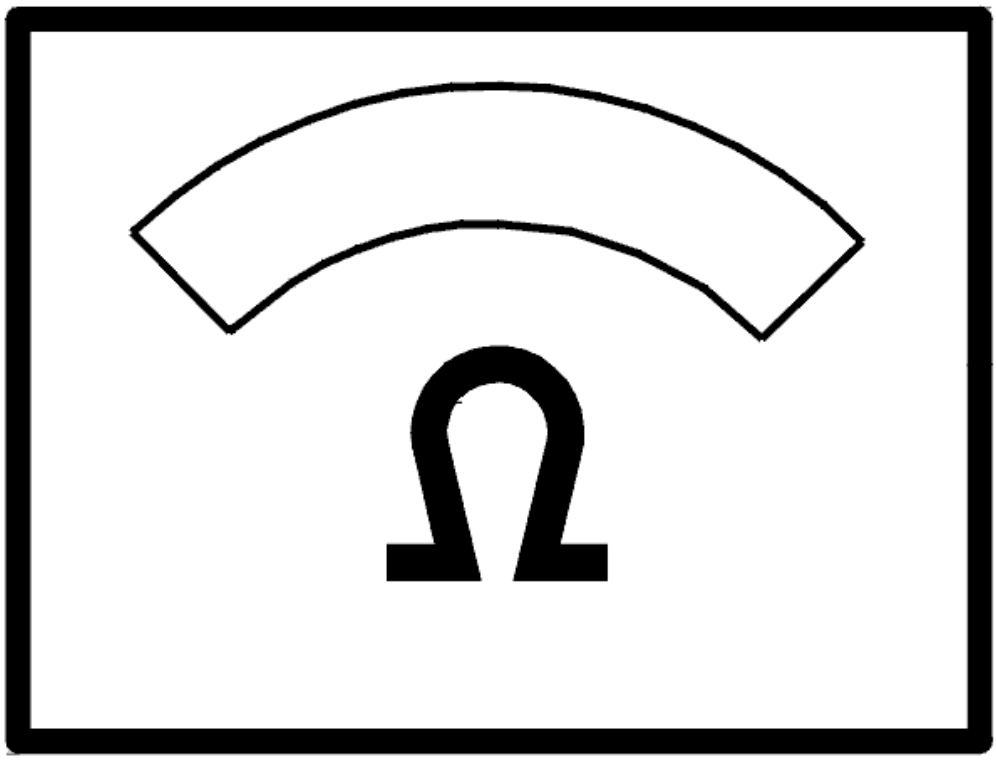


Fig. 212: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

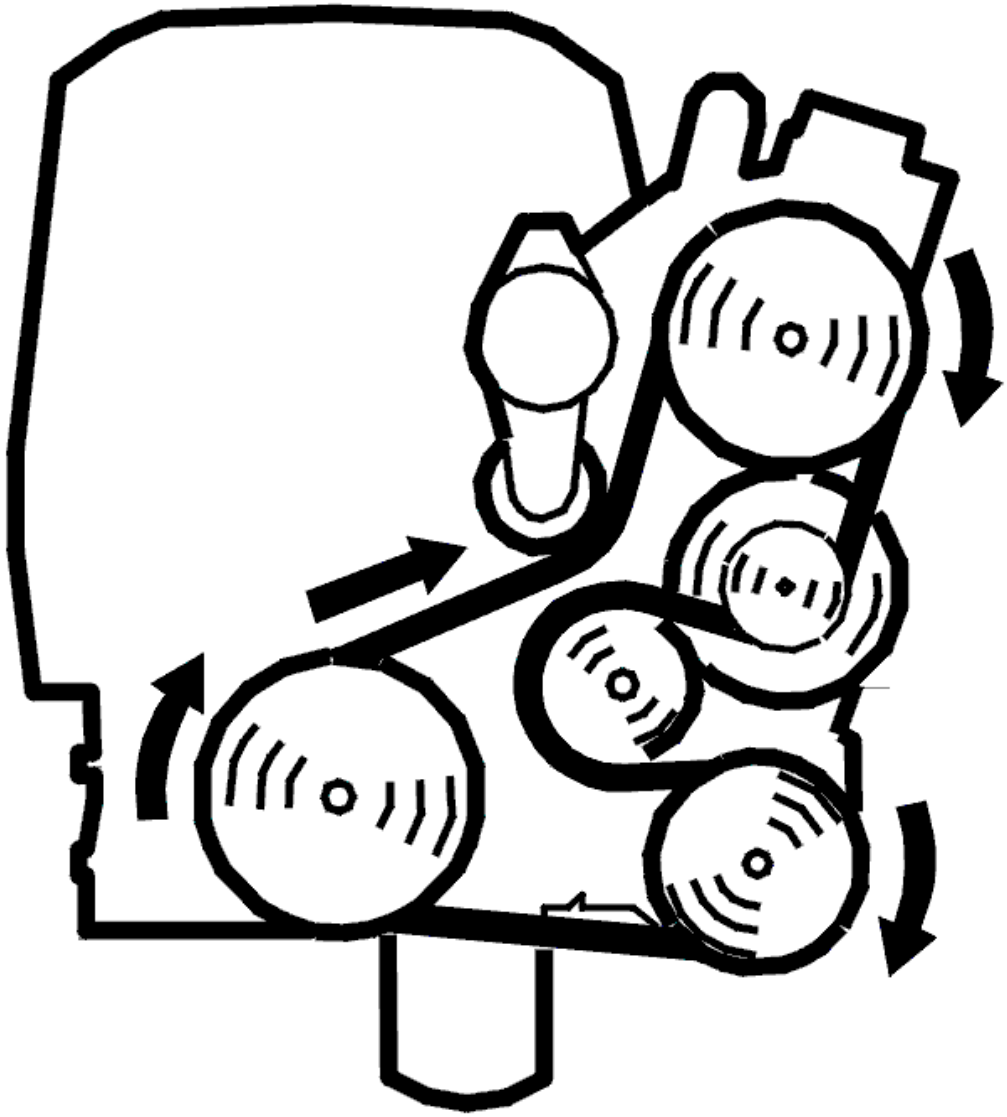


Fig. 213: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

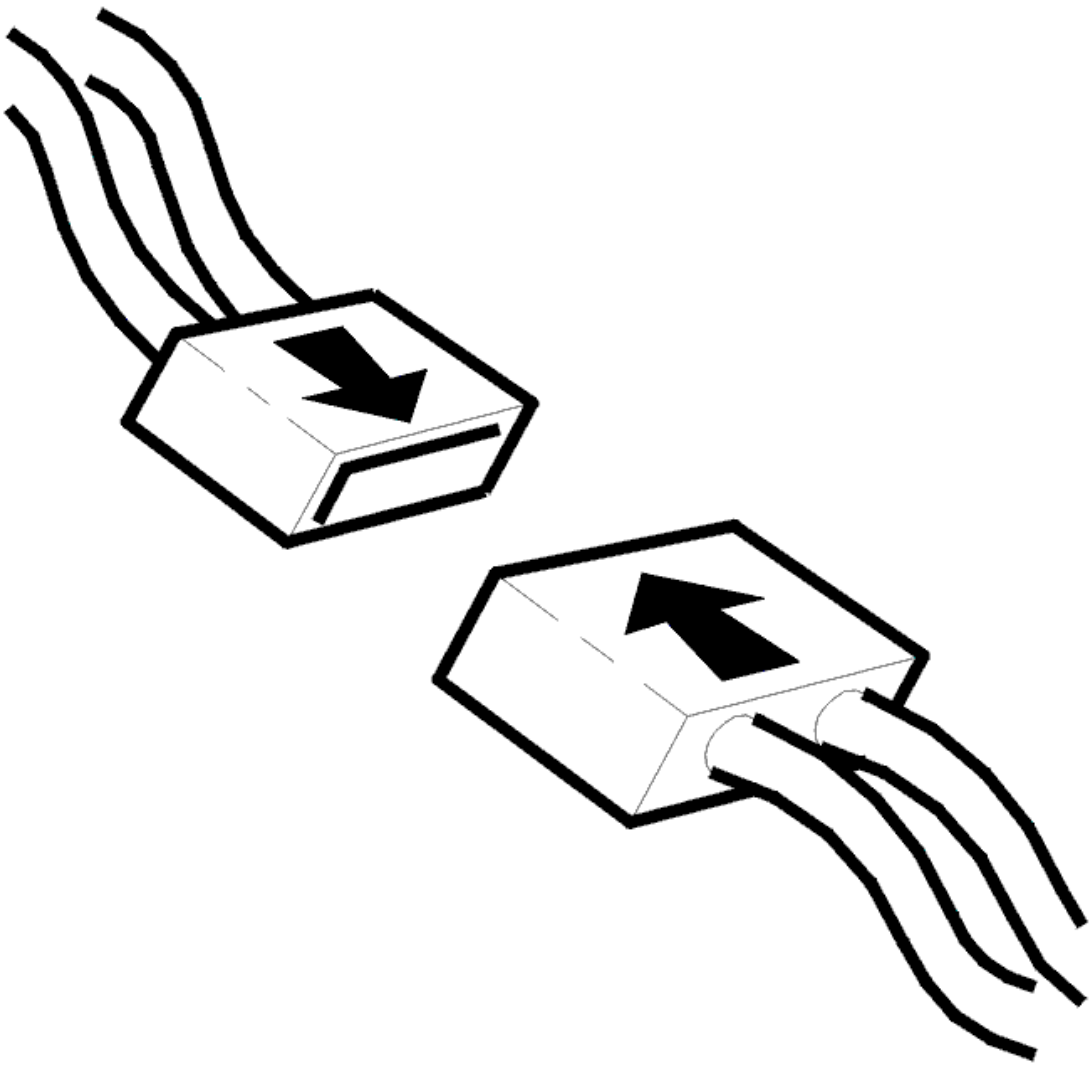


Fig. 214: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Raise car so that drive wheels are unimpeded.
- Start the engine and let it idle.
- Shift gear selector to position D so that the drive wheels begin to rotate.
- Read off the transmission speed.

Check that speed is updated

NOTE: When the rear wheels are stationary and the front wheels rotate, diagnostic trouble codes (DTCs) can be stored in the ABS system. Erase

any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

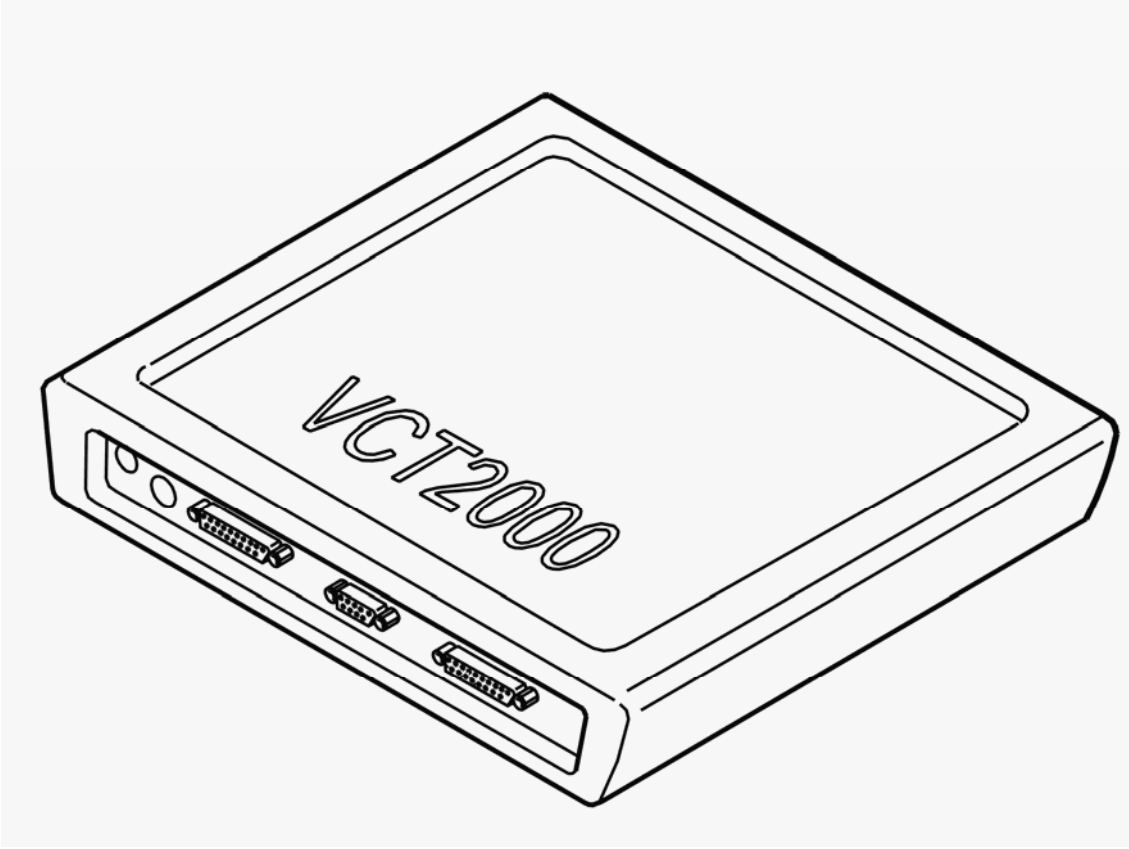


Fig. 215: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0023: INPUT SPEED SENSOR. SIGNAL MISSING. INTERMITTENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

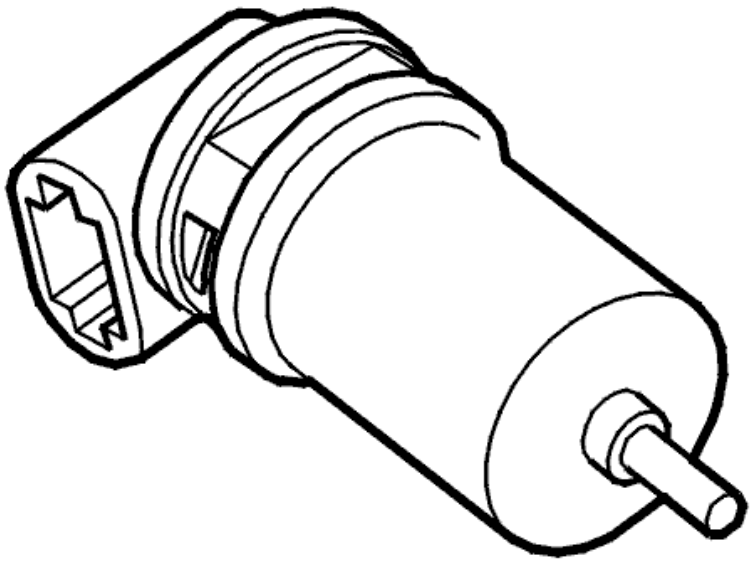


Fig. 216: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The transmission speed signal is transmitted by a sensor on the transmission. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare the transmission speed and vehicle speed. The transmission control module (TCM) uses this comparison to calculate gear-shift timing. Engine speed (RPM) and vehicle speed data affects the adjustment of system pressure, lock-up function control and engine torque reduction. The result is smooth gear-shifting. The control module calculates and compares the transmission speed, engine speed (RPM) and speed at the transmission. Diagnostic trouble code (DTC) TCM-0023 is stored if the control module registers that the engine speed (RPM) signal is missing.

Substitute Value

- No torque reduction
- No lock-up

Possible Source

- Contact resistance in the terminals.
- Open-circuit on power supply.
- Open-circuit in the signal cable.
- Defective input speed sensor.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

SIGNAL MISSING. INTERMITTENT FAULT

INTERMITTENT FAULT

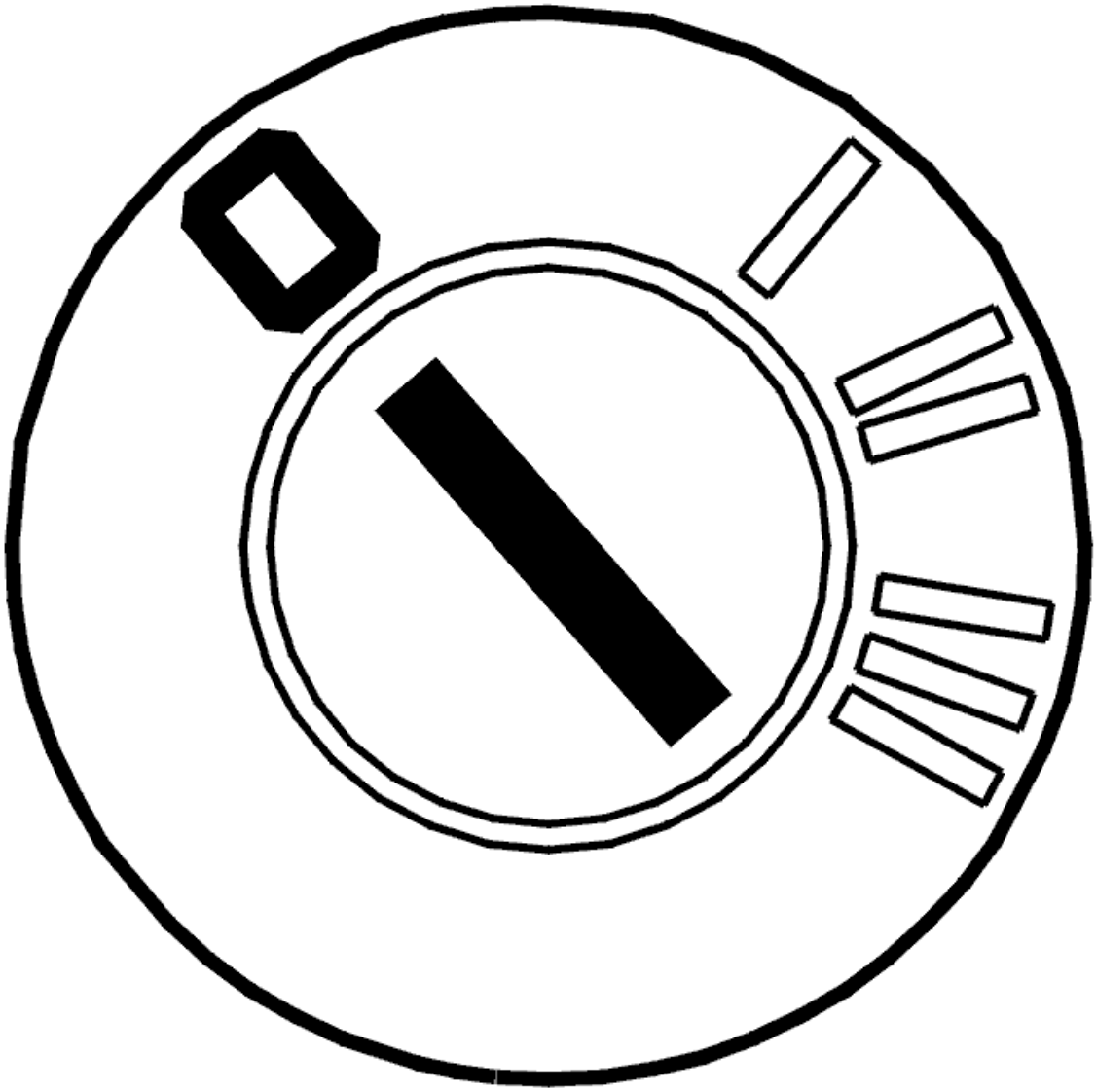


Fig. 217: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission control module (TCM) and speed sensor connectors for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

  Check the power supply cable between transmission control module (TCM) terminal A59 and transmission connector terminal 16 for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

  Check the signal cable between transmission control module (TCM) terminal A41 and transmission connector terminal 19 for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX** .
- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .
- To disconnect transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS** .
- For information about signals, see **SIGNAL SPECIFICATION** .
- For information about signals to the transmission connector, see **SIGNAL DESCRIPTION. CONNECTOR 4T65 EV/EV-GT** .

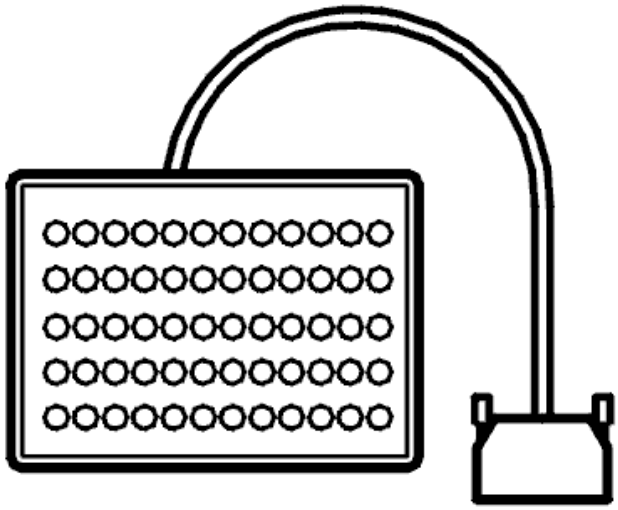


Fig. 218: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

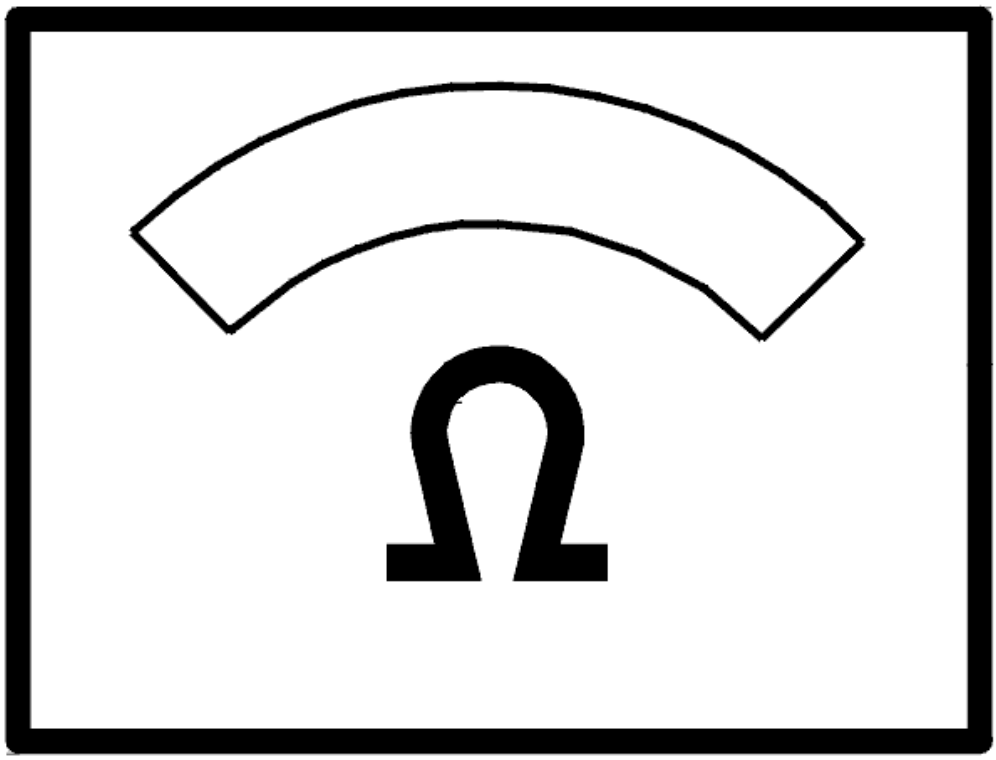


Fig. 219: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

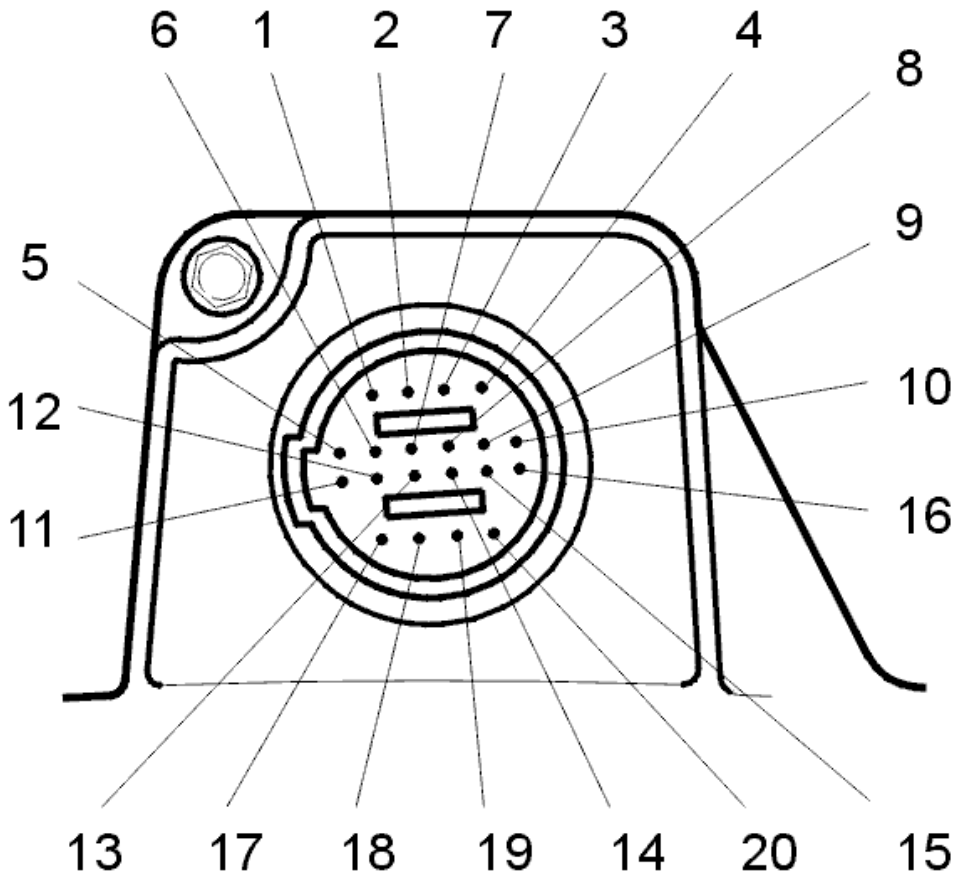


Fig. 220: Identifying Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0023: INPUT SPEED SENSOR. SIGNAL MISSING. PERMANENT FAULT

(4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL MISSING. PERMANENT FAULT

CHECKS

CHECKING THE TRANSMISSION INPUT SPEED SENSOR SIGNAL

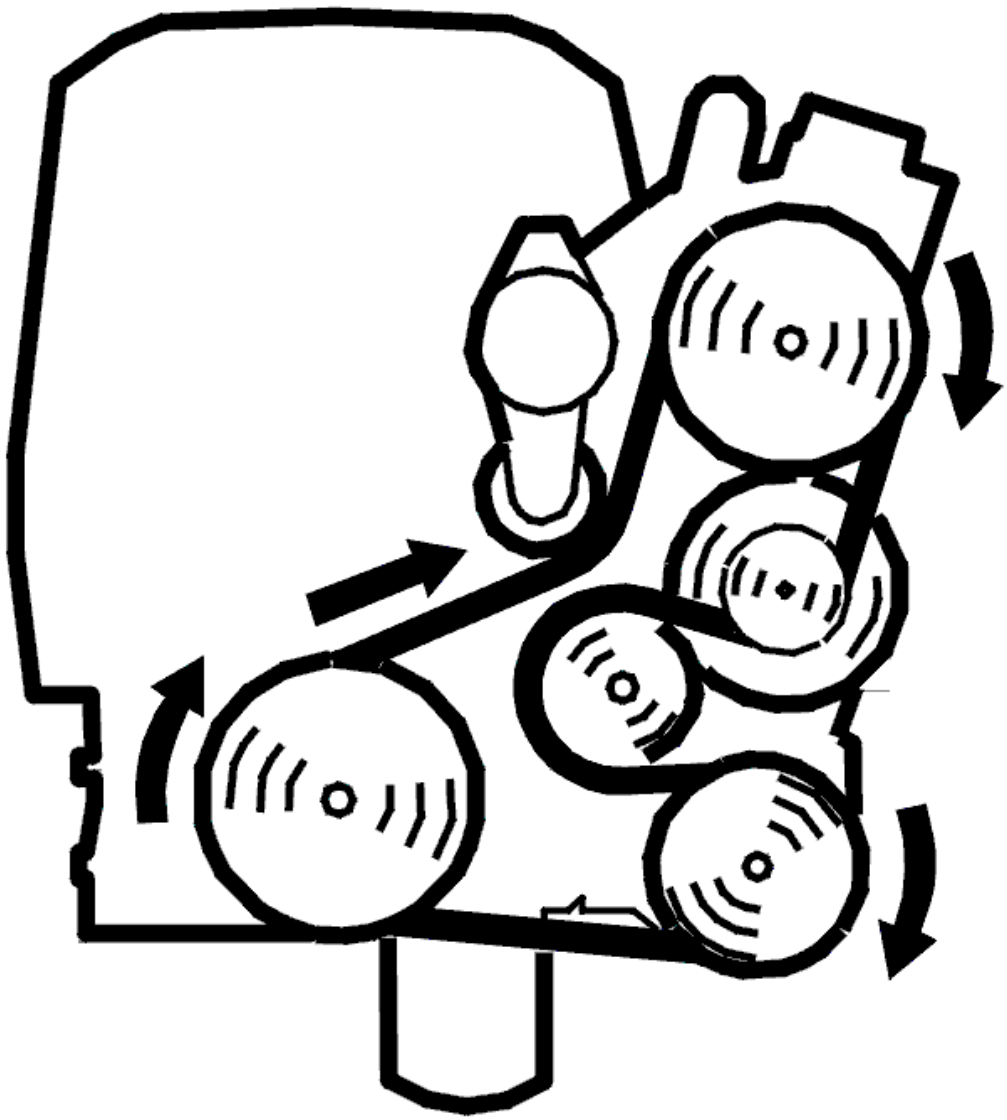


Fig. 221: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off

- Check the control module and transmission output speed sensor connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION**
- Start the engine. Allow the engine to idle
- Read off the transmission input speed.

  Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated. Compare with the engine speed (RPM).

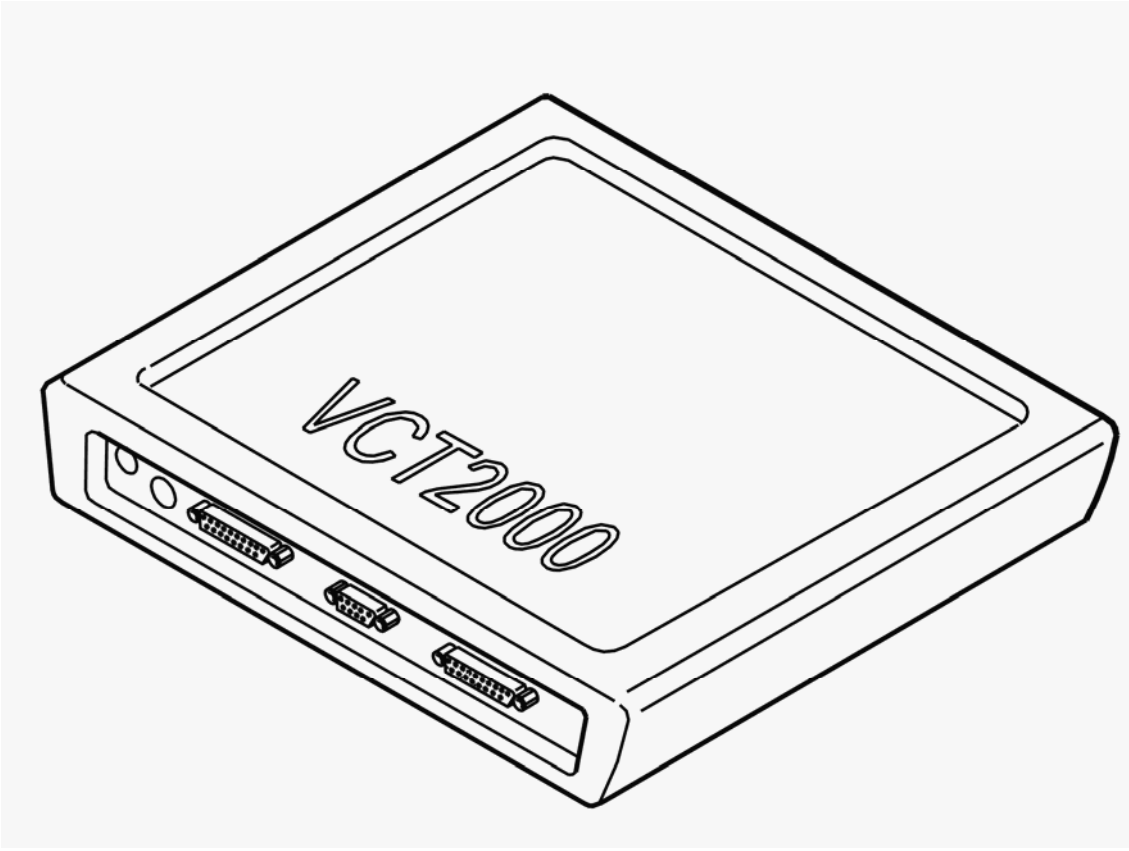


Fig. 222: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

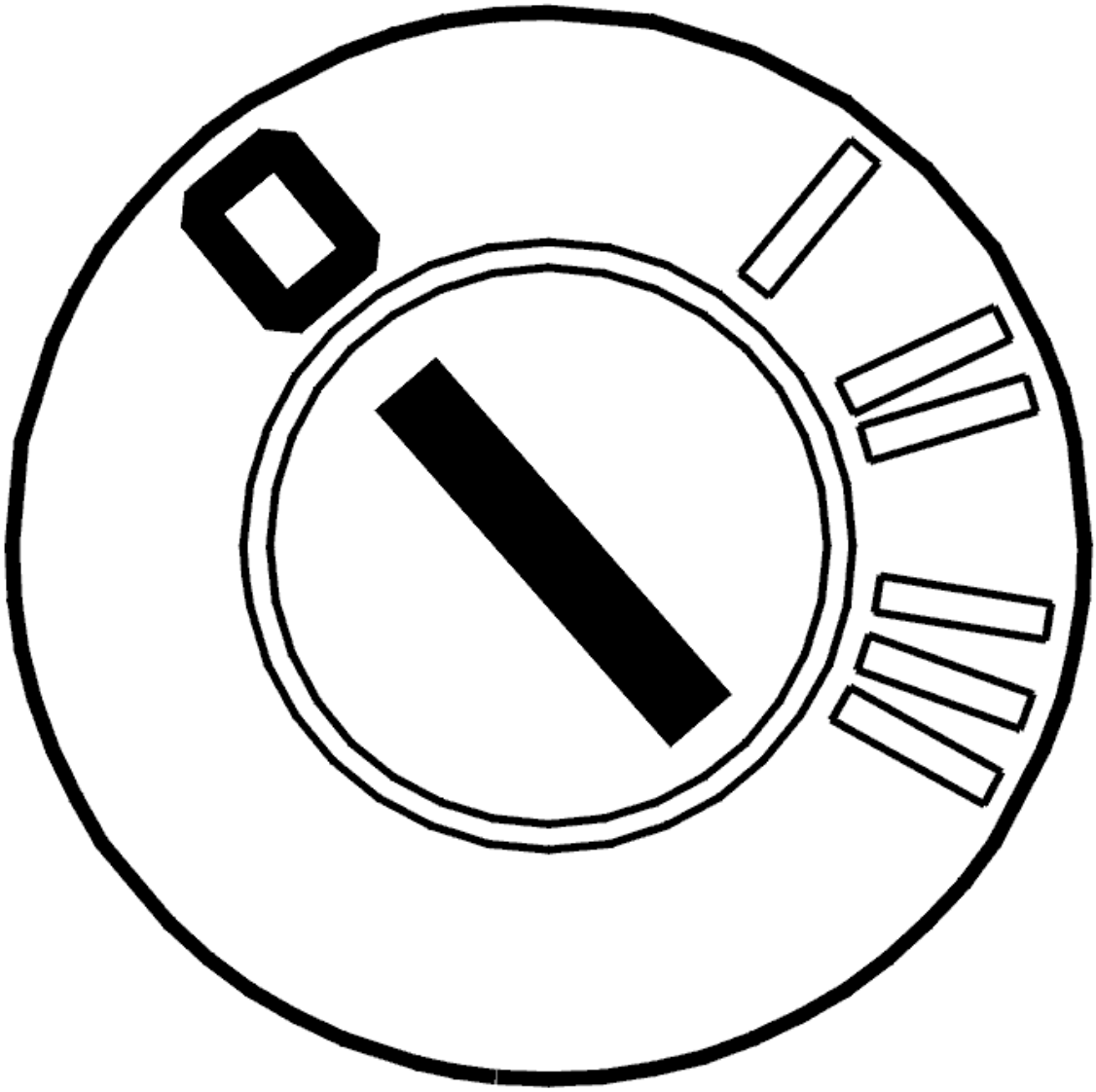


Fig. 223: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

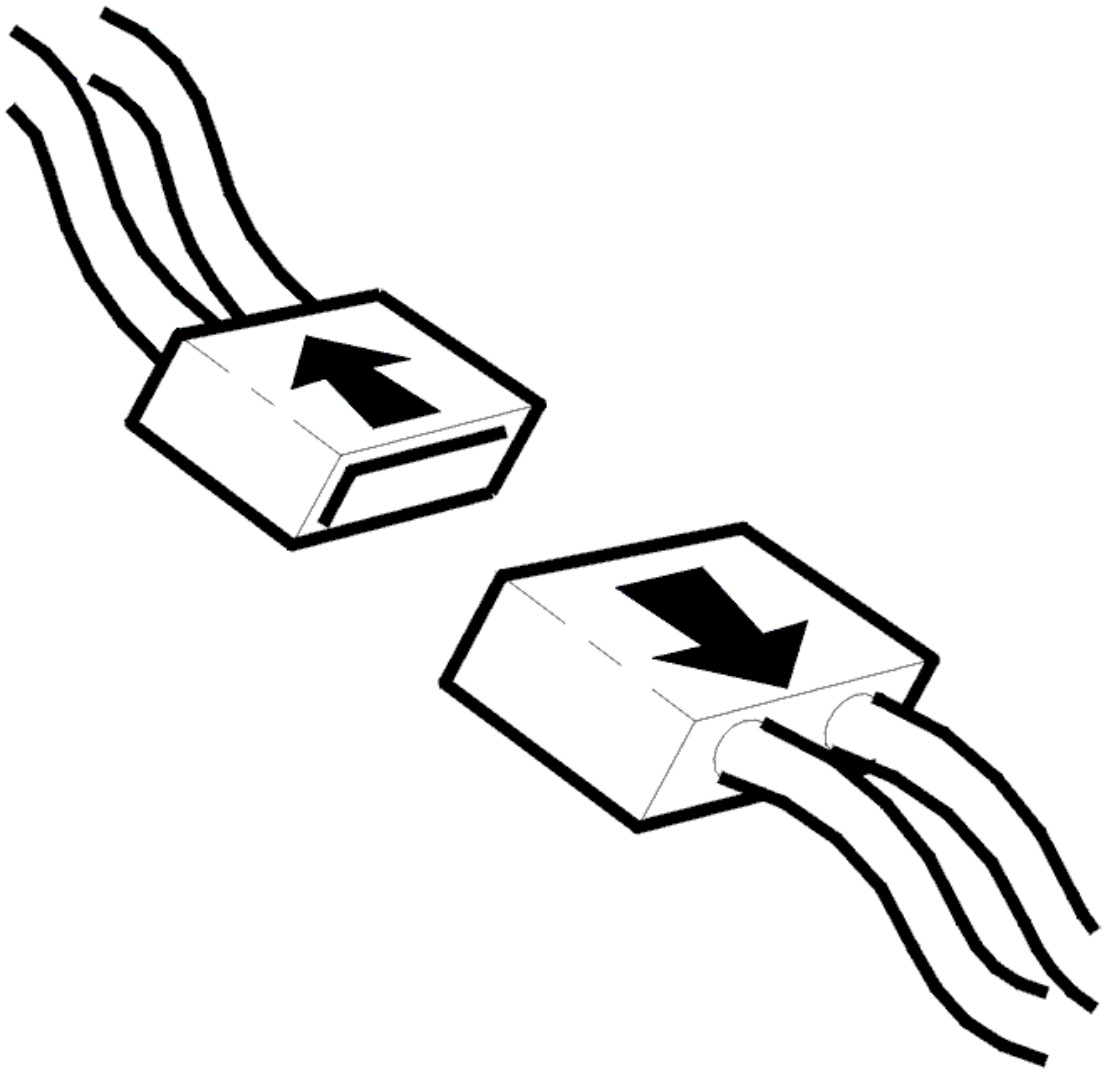


Fig. 224: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

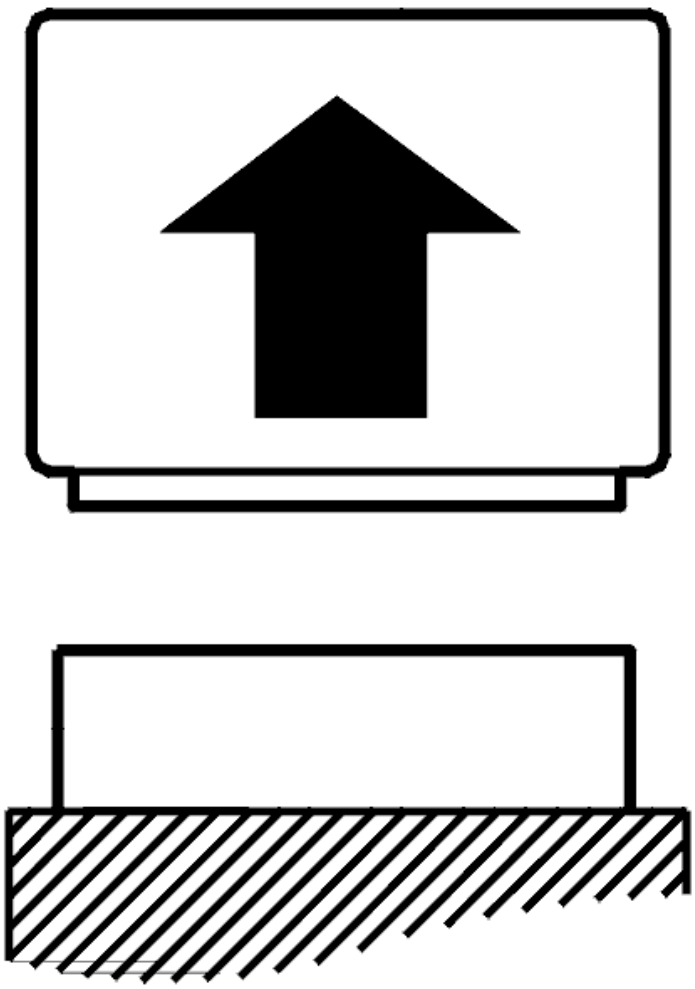


Fig. 225: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the transmission
- Disconnect the control module.
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (control module side).

  Check the power supply cable between transmission control module (TCM) terminal #59 (#A59) and transmission connector terminal #S (#A16). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

  Check the signal cable between transmission control module (TCM) terminal #41 (#A41) and

transmission connector terminal #V (#A19). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

HINT: With the transmission control module (TCM) connected, the ignition on and a voltmeter connected between transmission connector terminals #S (#A16) and #V (#A19) (control module side), the voltage must be approximately 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- For information about signals to the transmission connector, see **SIGNAL DESCRIPTION. CONNECTOR 4T65 EV/EV-GT** .

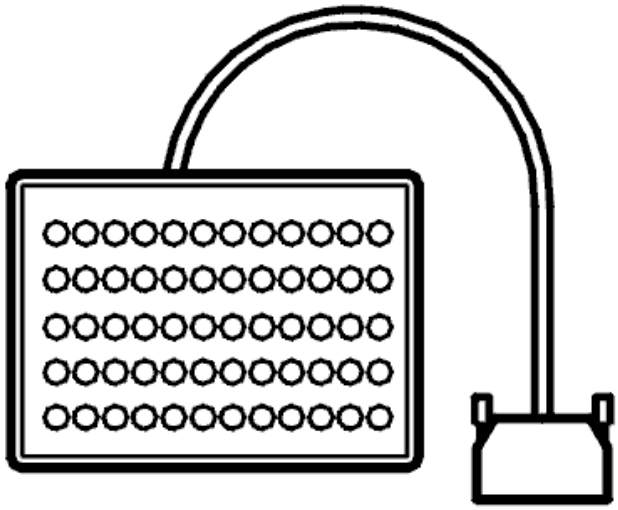


Fig. 226: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

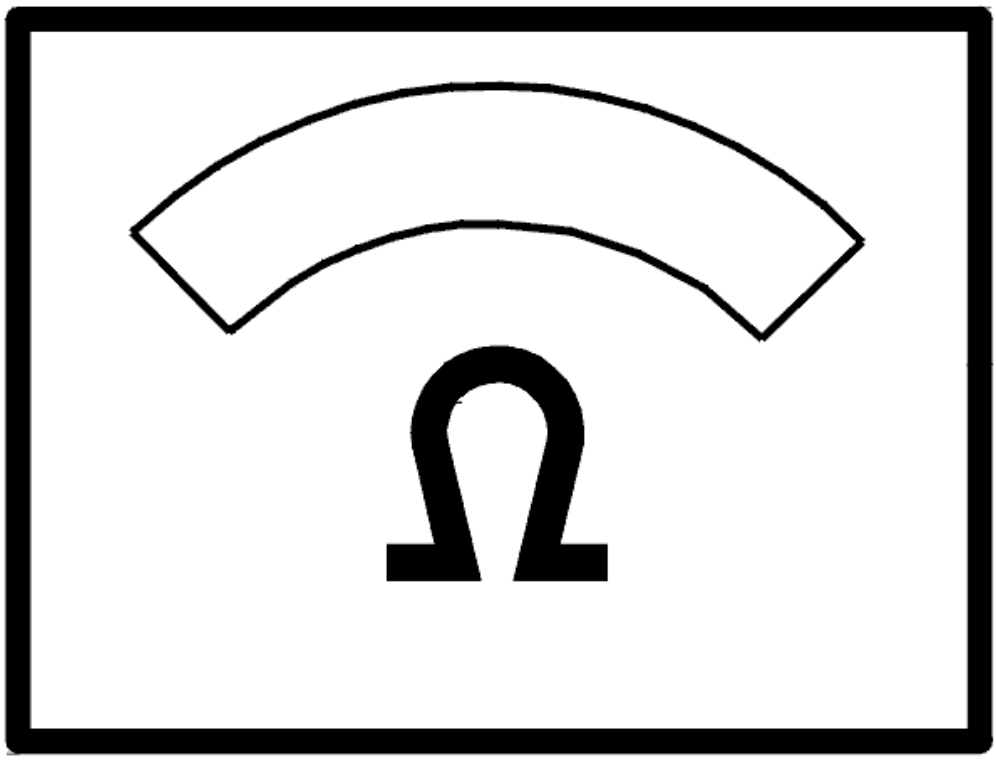


Fig. 227: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

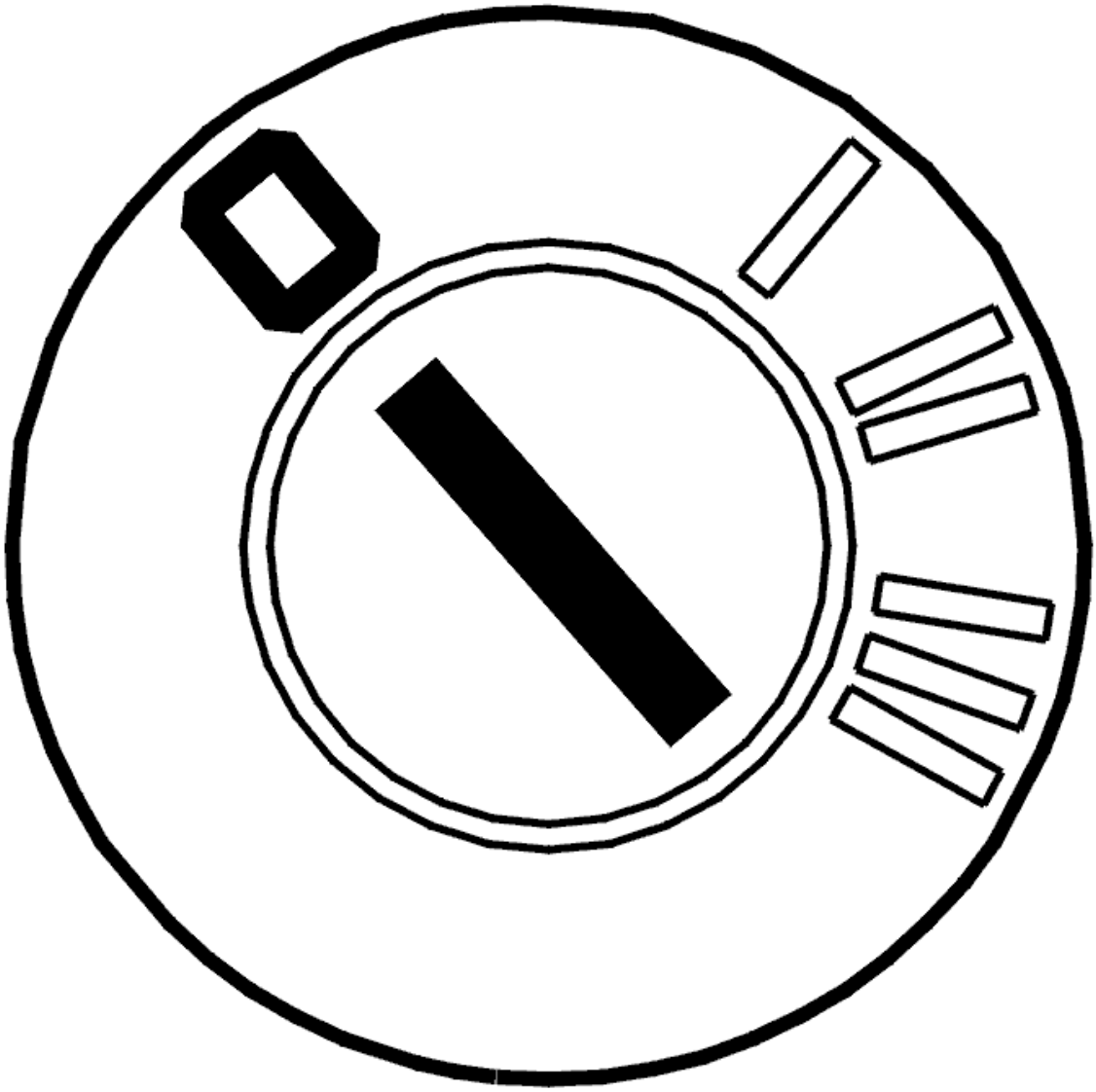


Fig. 228: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable for power supply between transmission connector terminal #S (#A16) and transmission input speed sensor connector terminal #A. Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the signal cable between transmission connector terminal #V (#A19) and transmission input speed sensor connector terminal #B. Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** . To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the transmission speed sensor, see **INPUT SPEED SENSOR TRANSMISSION, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION** .

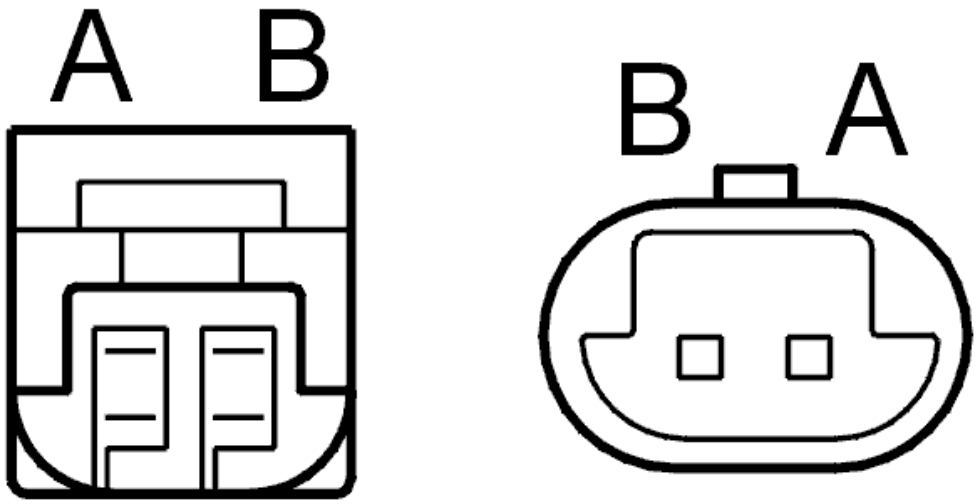


Fig. 229: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

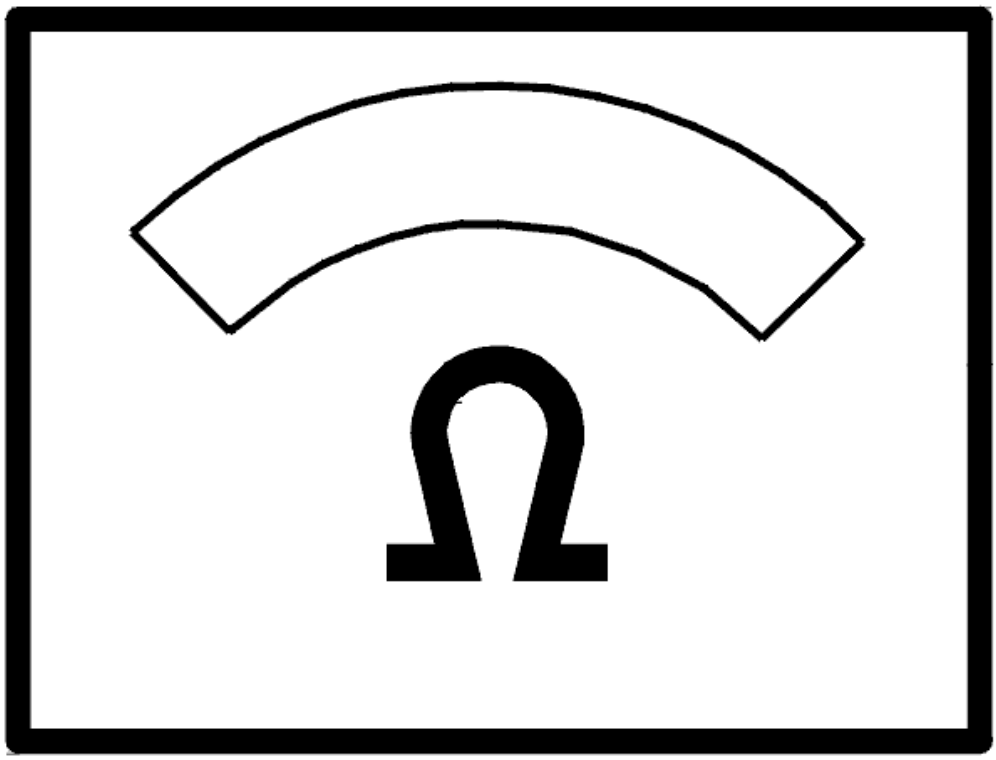


Fig. 230: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

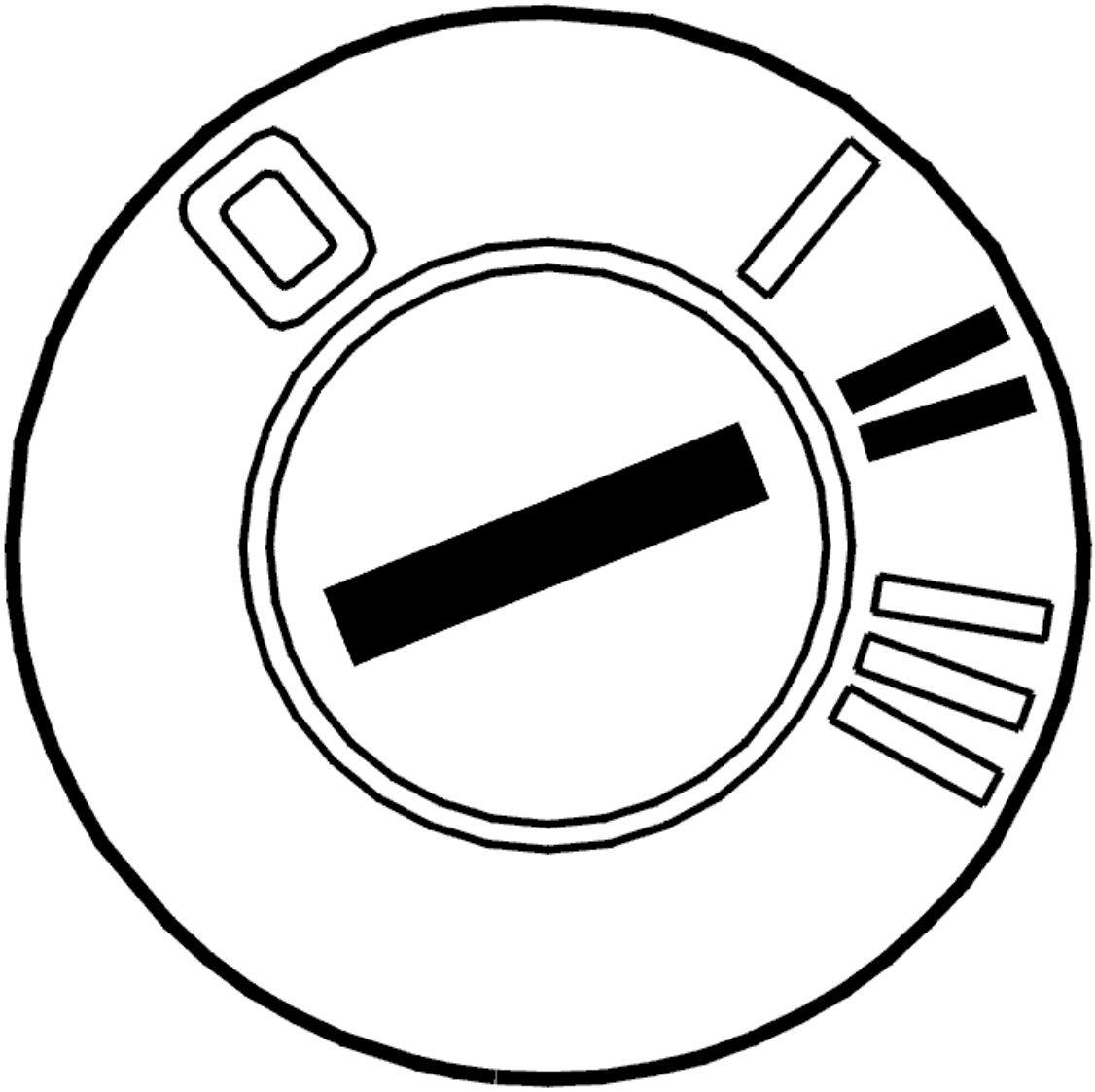


Fig. 231: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

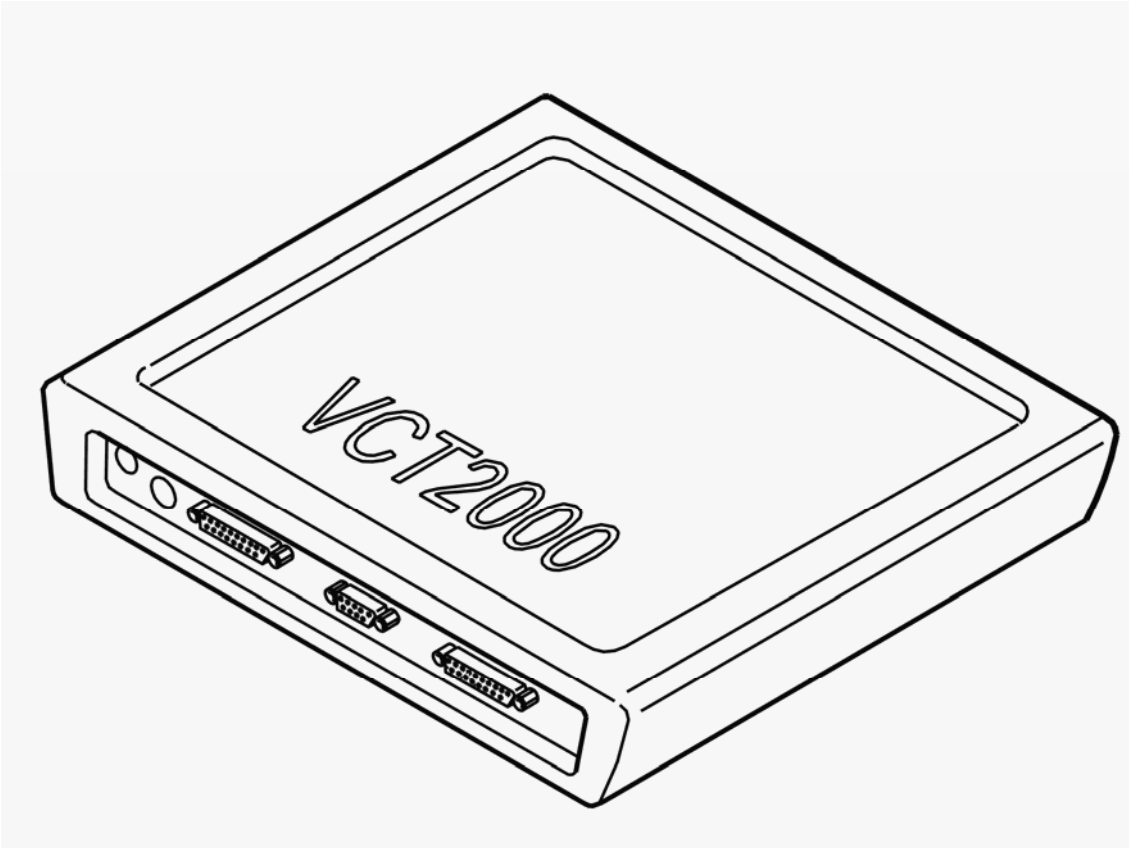


Fig. 232: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

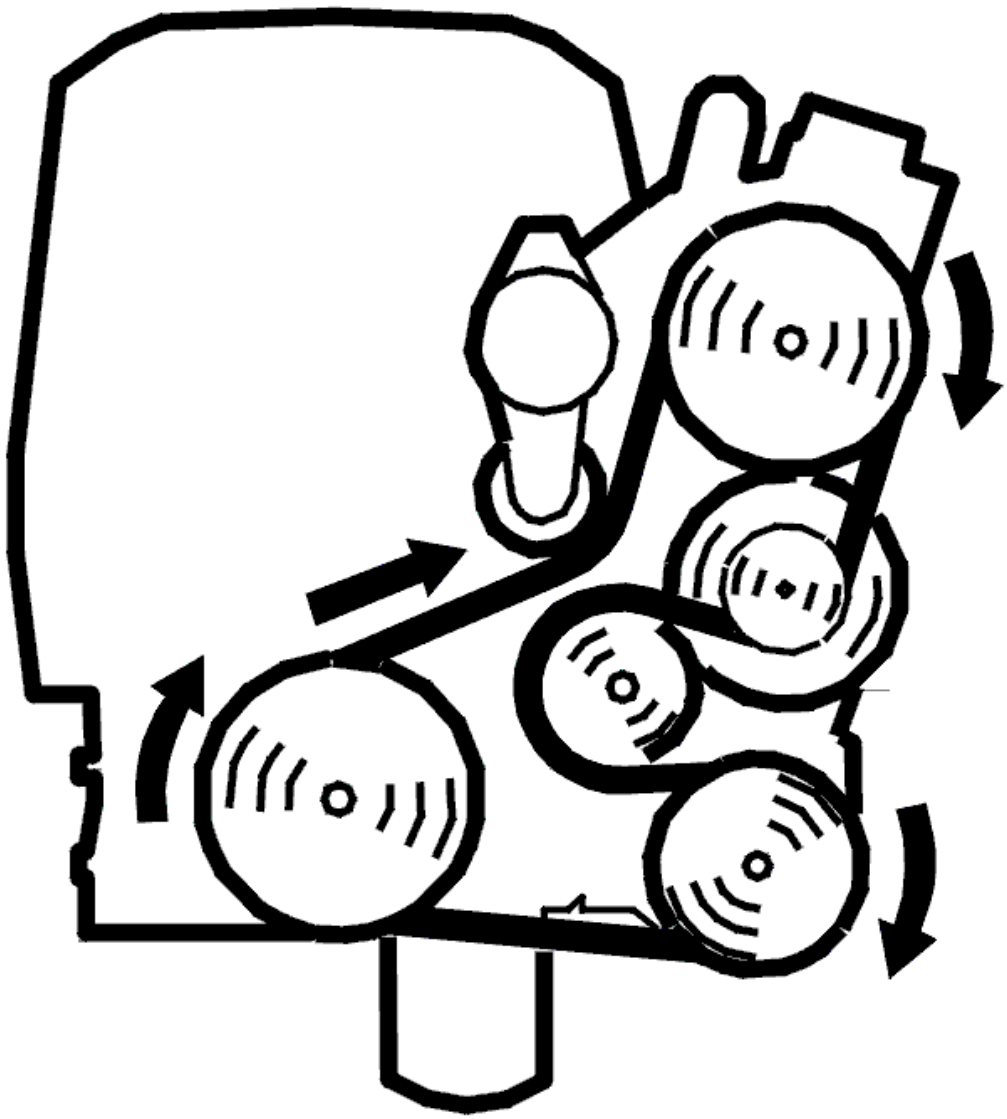


Fig. 233: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

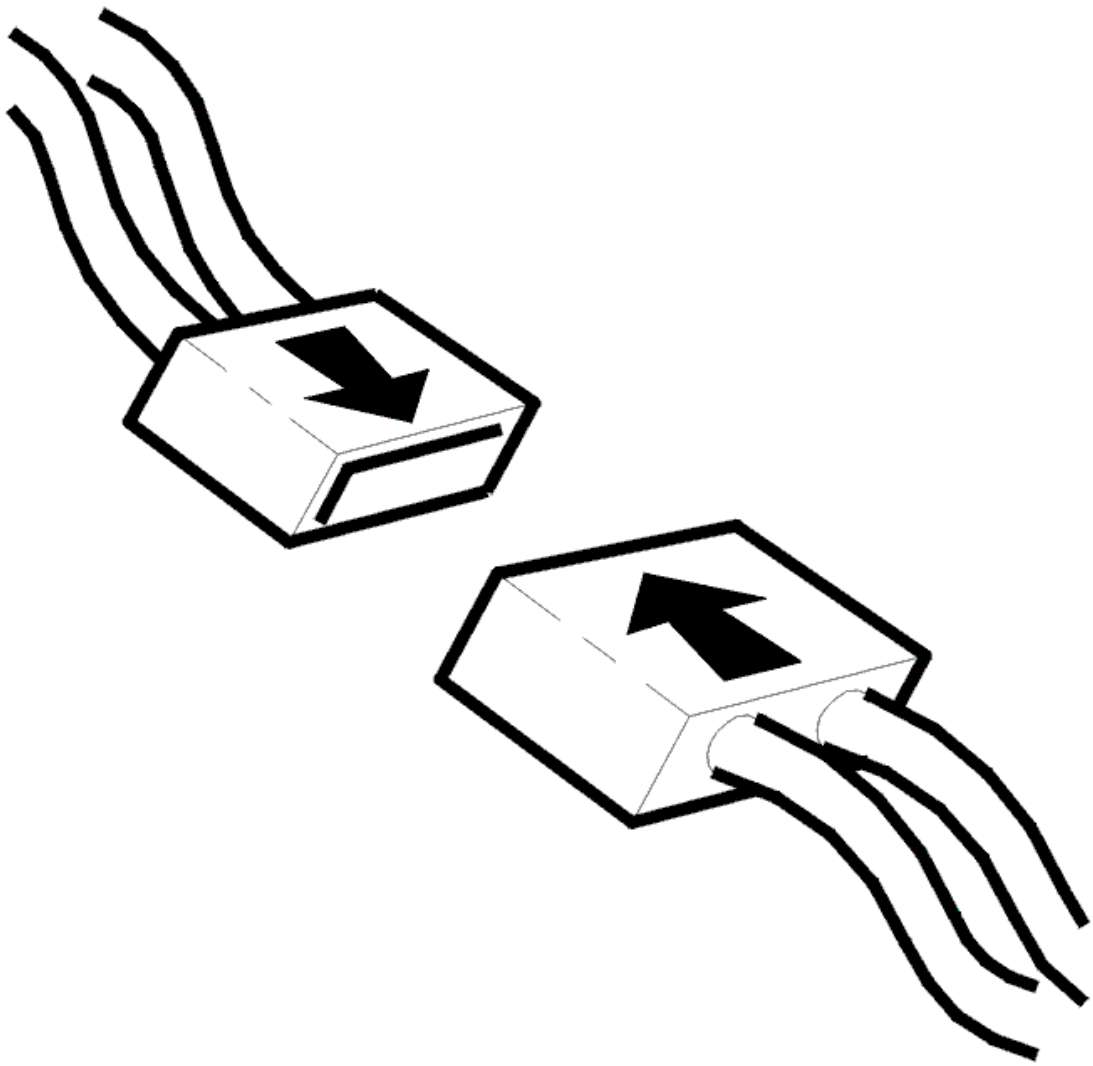


Fig. 234: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Start the engine and let it idle.
- Read off the transmission speed.

  Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated. Compare with the engine speed (RPM).

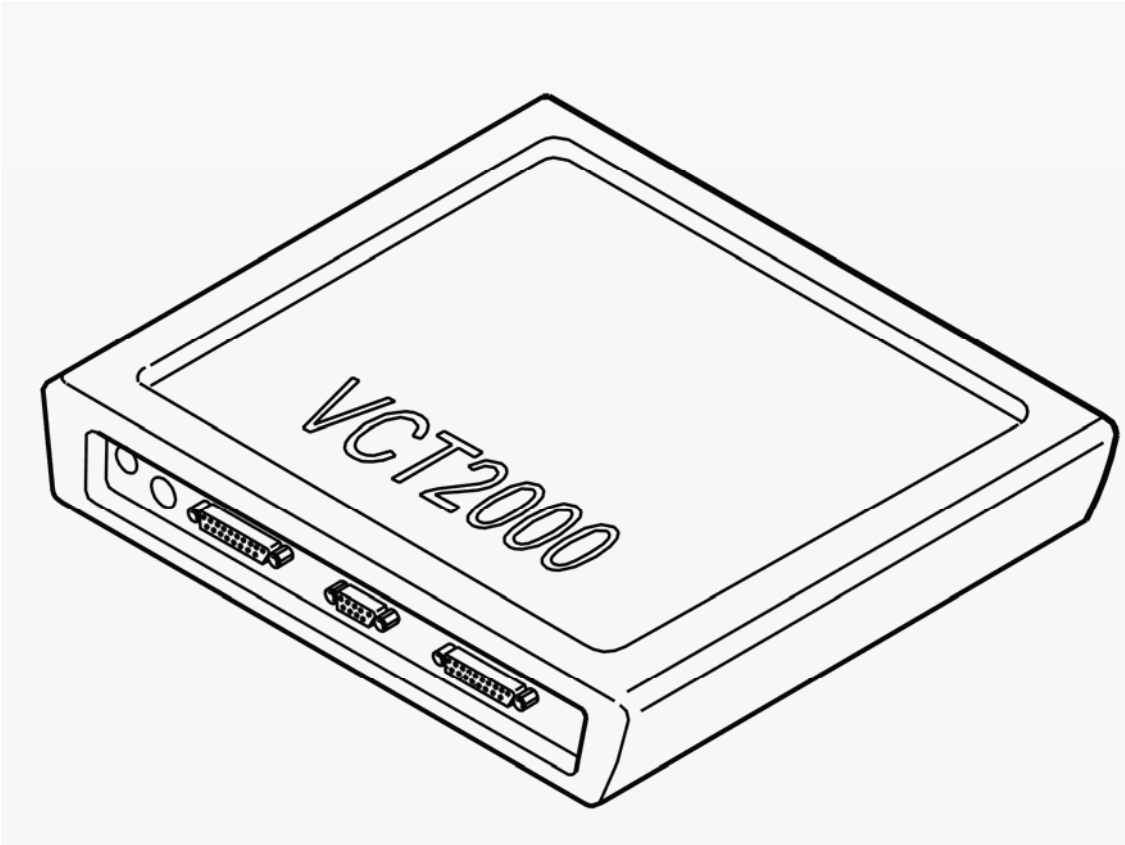


Fig. 235: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0023: TRANSMISSION INPUT SPEED SENSOR. SIGNAL MISSING. INTERMITTENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

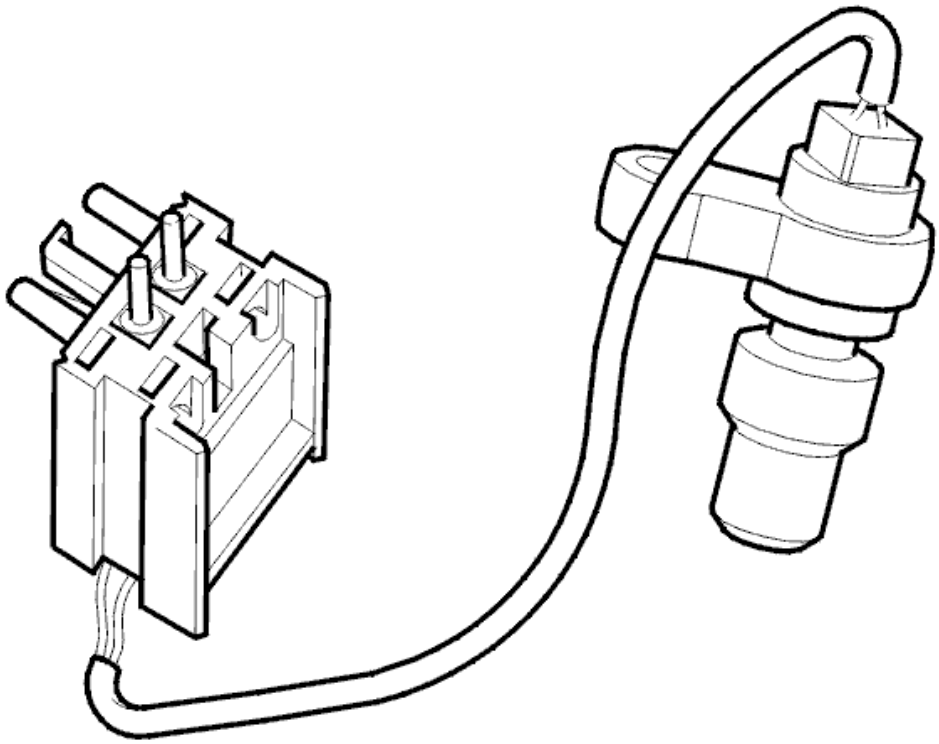


Fig. 236: Identifying Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The transmission speed signal is transmitted by a sensor on the transmission. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare the transmission speed and vehicle speed. The transmission control module (TCM) uses this comparison to calculate gear-shift timing. Engine speed (RPM) and vehicle speed data affects the adjustment of system pressure, lock-up function control and engine torque reduction. The result is smooth gear-shifting. The control module calculates and compares the transmission speed, engine speed (RPM) and speed at the transmission. Diagnostic trouble code (DTC) TCM-0023 is stored if the control module registers that the speed (RPM) signal is missing.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Contact resistance in the terminals.
- Open-circuit on power supply.

- Open-circuit in signal cable.
- Defective input speed sensor.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

SIGNAL MISSING. INTERMITTENT FAULT

INTERMITTENT FAULT

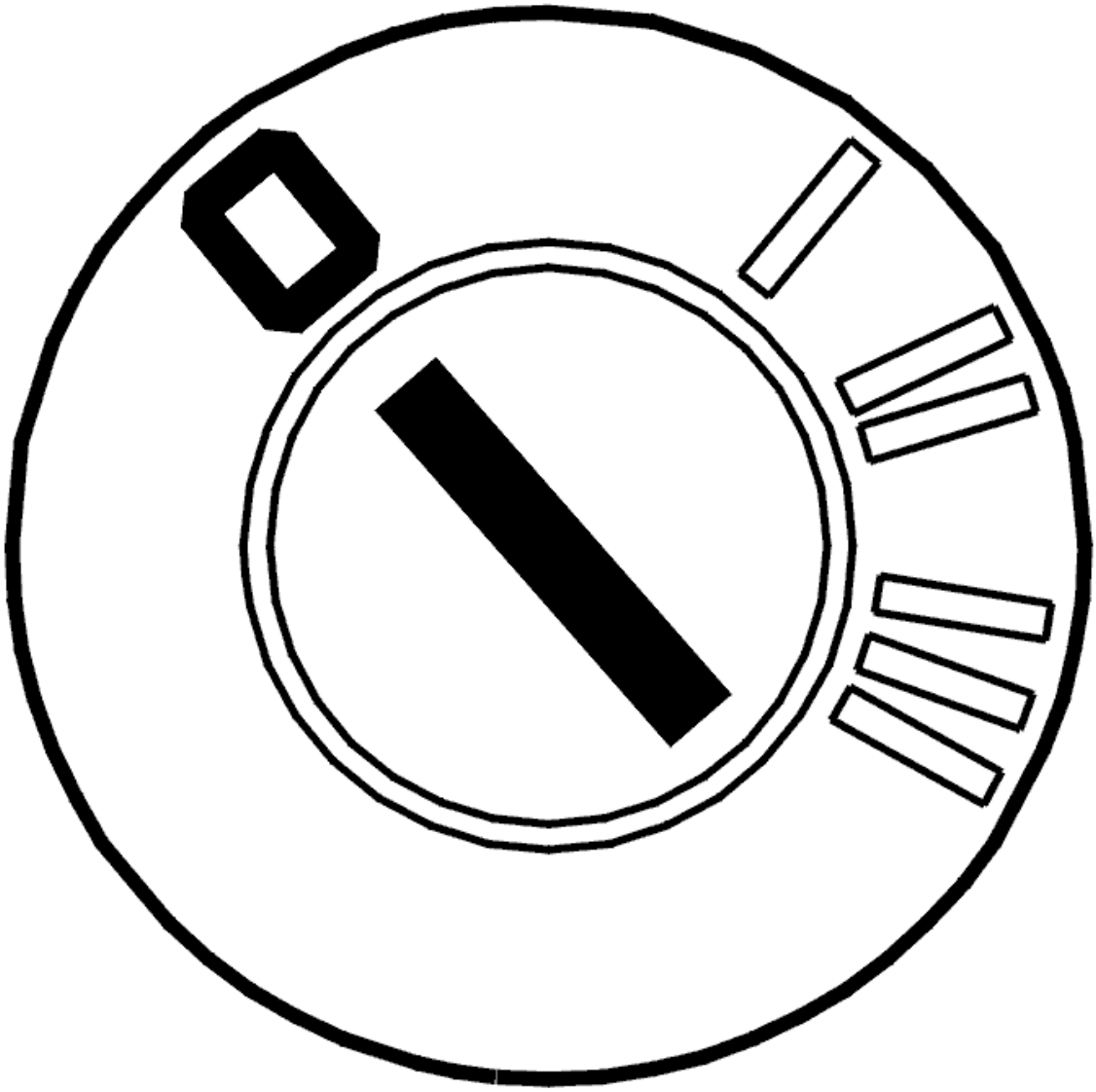


Fig. 237: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission connector. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

  Check the power supply cable between transmission control module (TCM) terminal #A59 (#A59) and transmission connector terminal #A2. Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

  Check the signal cable between transmission control module (TCM) terminal #A41 (#A41) and transmission connector terminal #A1. Check for an open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

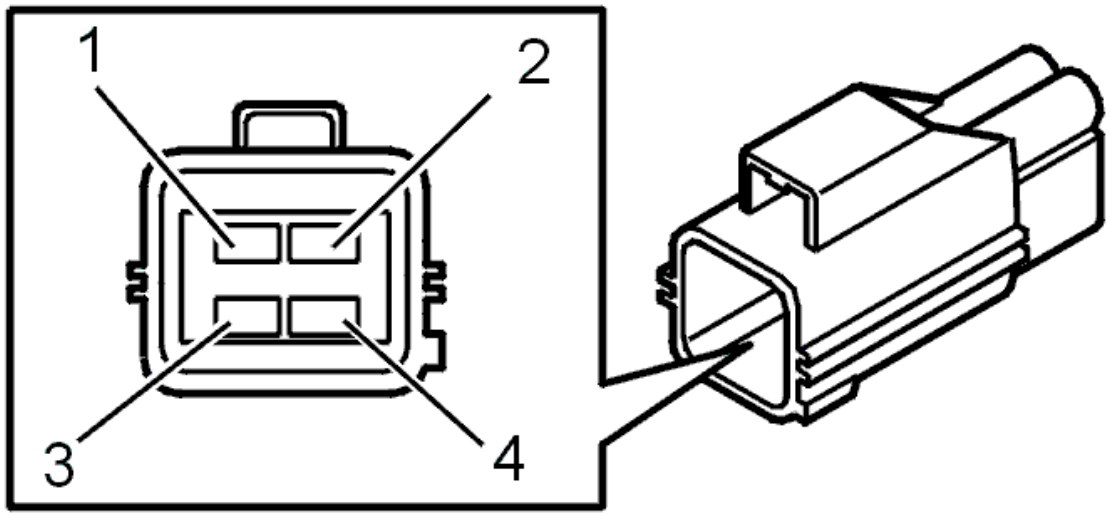


Fig. 238: Identifying Transmission Output Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

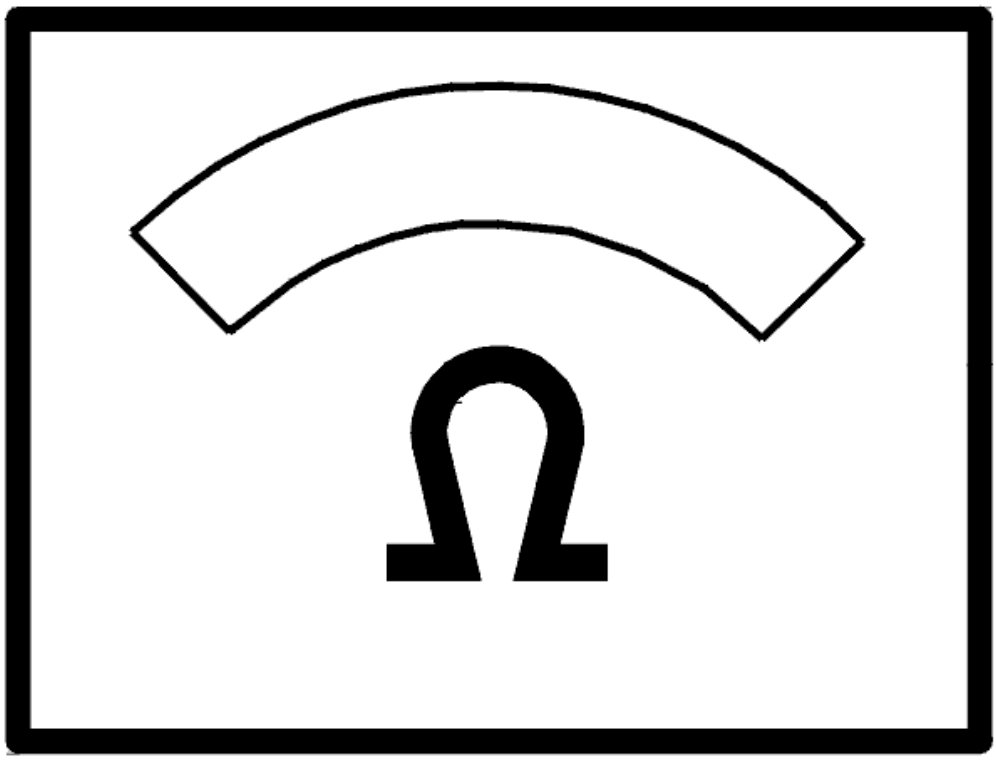


Fig. 239: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0023: TRANSMISSION INPUT SPEED SENSOR. SIGNAL MISSING.

PERMANENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL MISSING. PERMANENT FAULT

CHECKS

CHECKING THE TRANSMISSION INPUT SPEED SENSOR SIGNAL

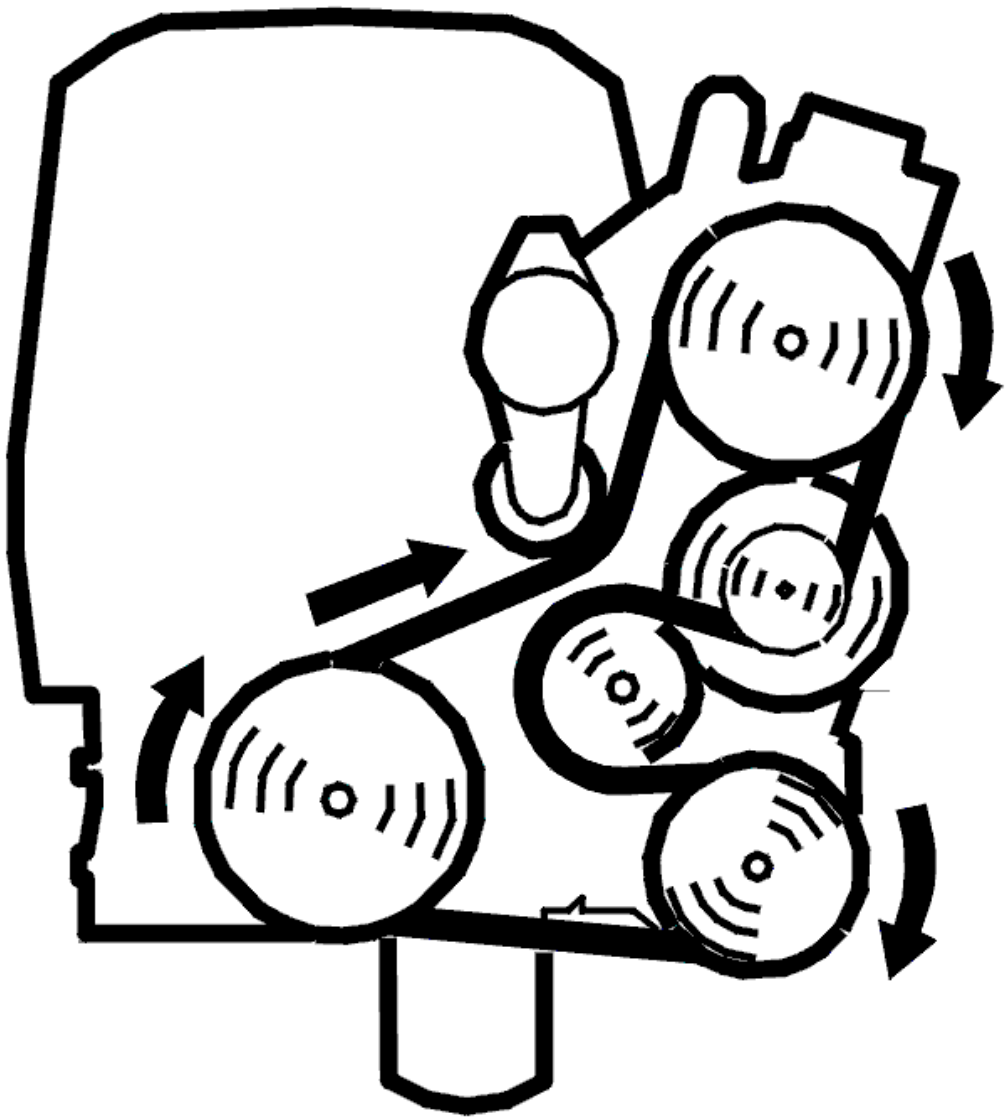


Fig. 240: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Gear selector in position P

- Start the engine. Allow the engine to idle
- Read off the transmission input speed.

  Check that the transmission speed is updated.

  Compare with the engine speed (RPM).

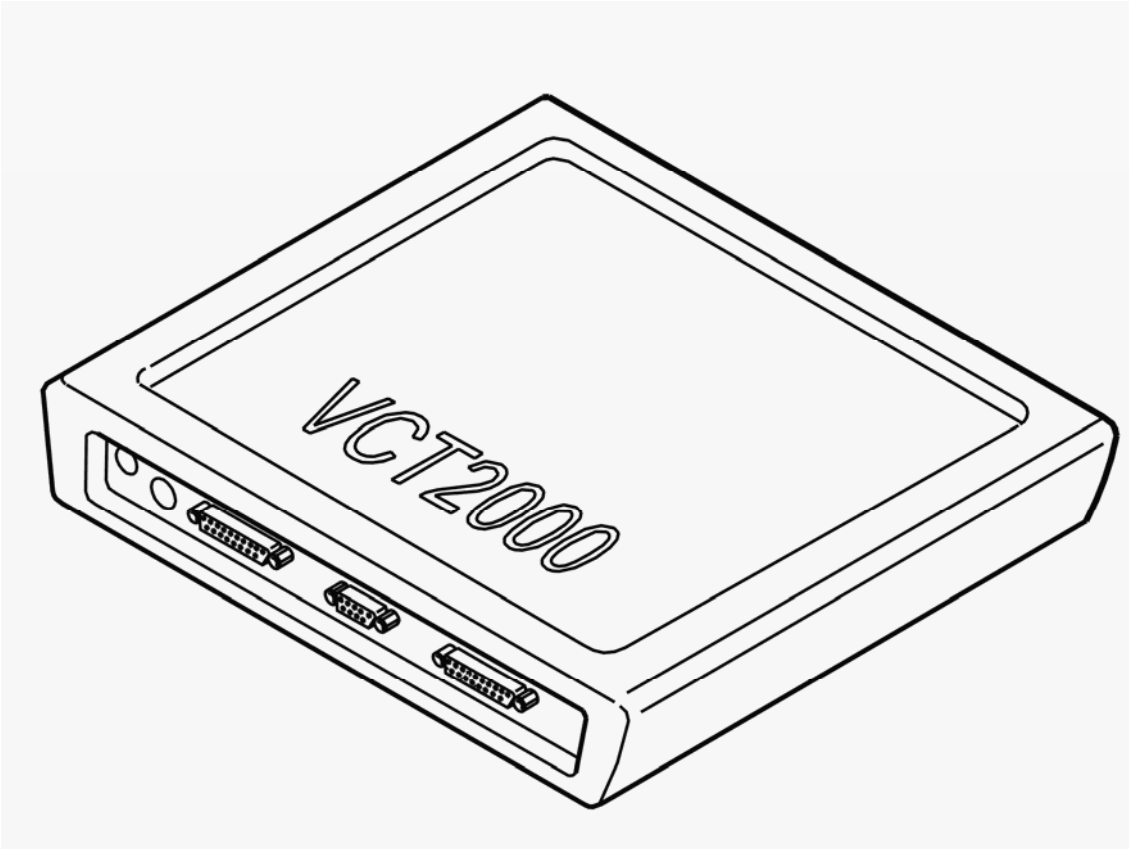


Fig. 241: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

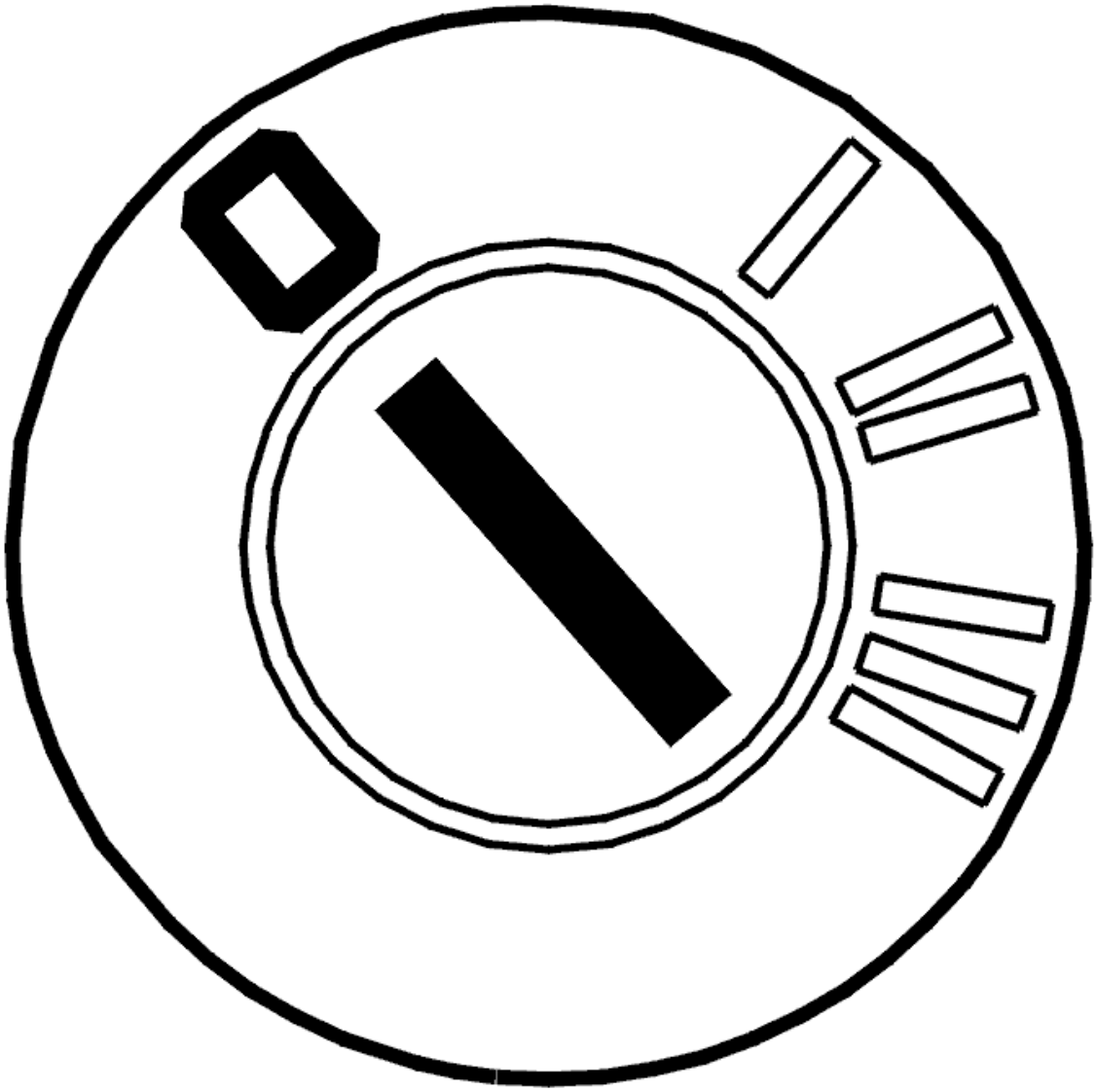


Fig. 242: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission connector. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

  Check the power supply cable between transmission control module (TCM) terminal #A59 (#A59) and transmission connector terminal #A2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

  Check the signal cable between transmission control module (TCM) terminal #A41 (#A41) and transmission connector terminal #A1. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

HINT: With the control module connected, the ignition on and a voltmeter connected between transmission connector terminals #A1 and #A2 (control module side), the voltage must be 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the transmission speed sensor, see **INPUT SPEED SENSOR/OUTPUT SPEED SENSOR, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

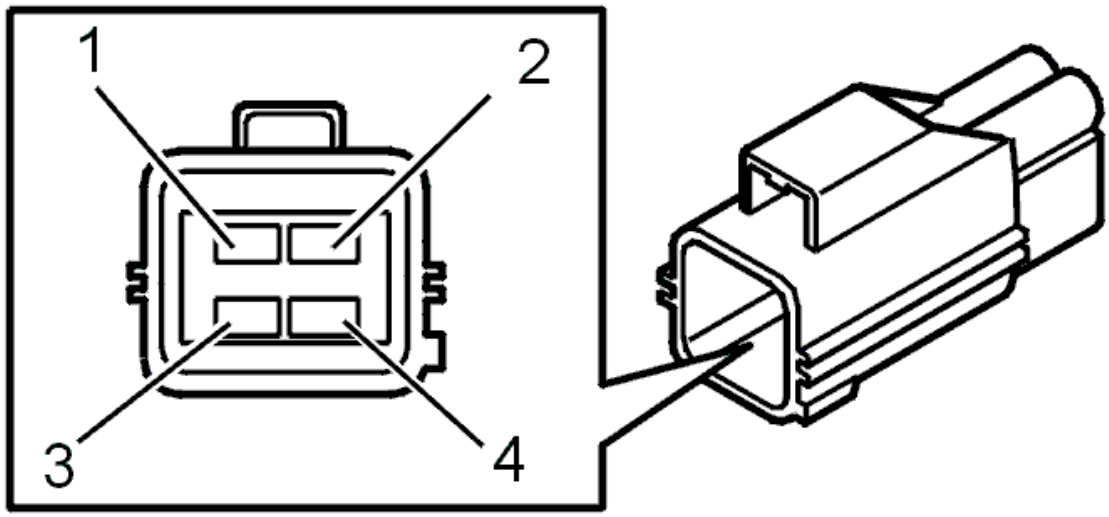


Fig. 243: Identifying Transmission Output Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

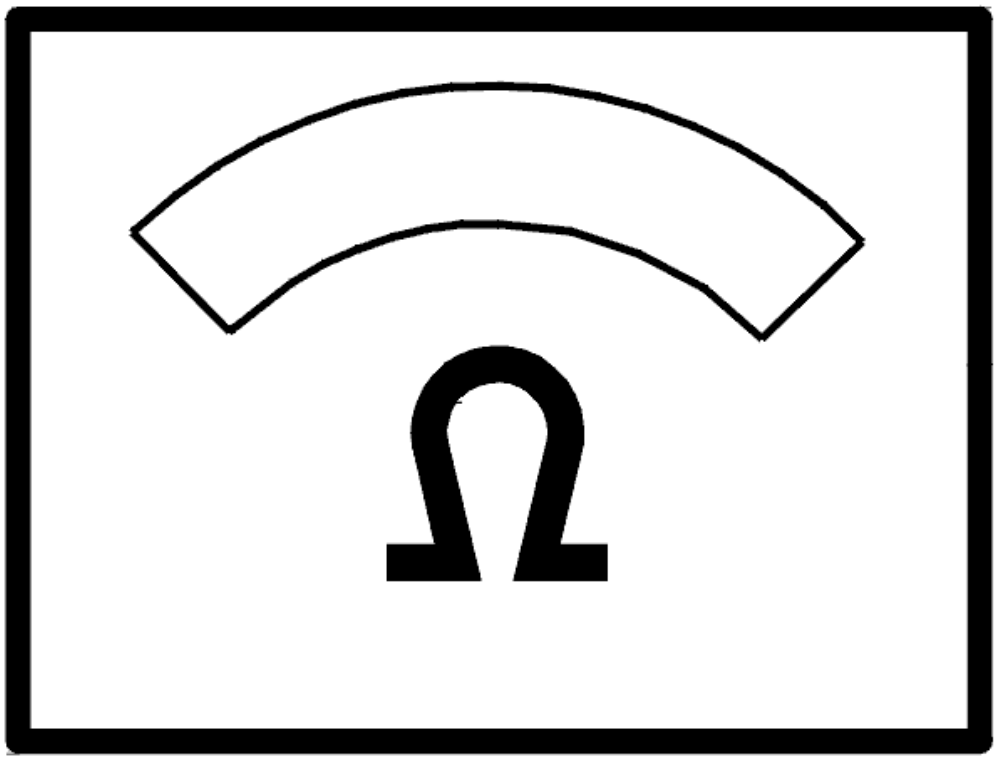


Fig. 244: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

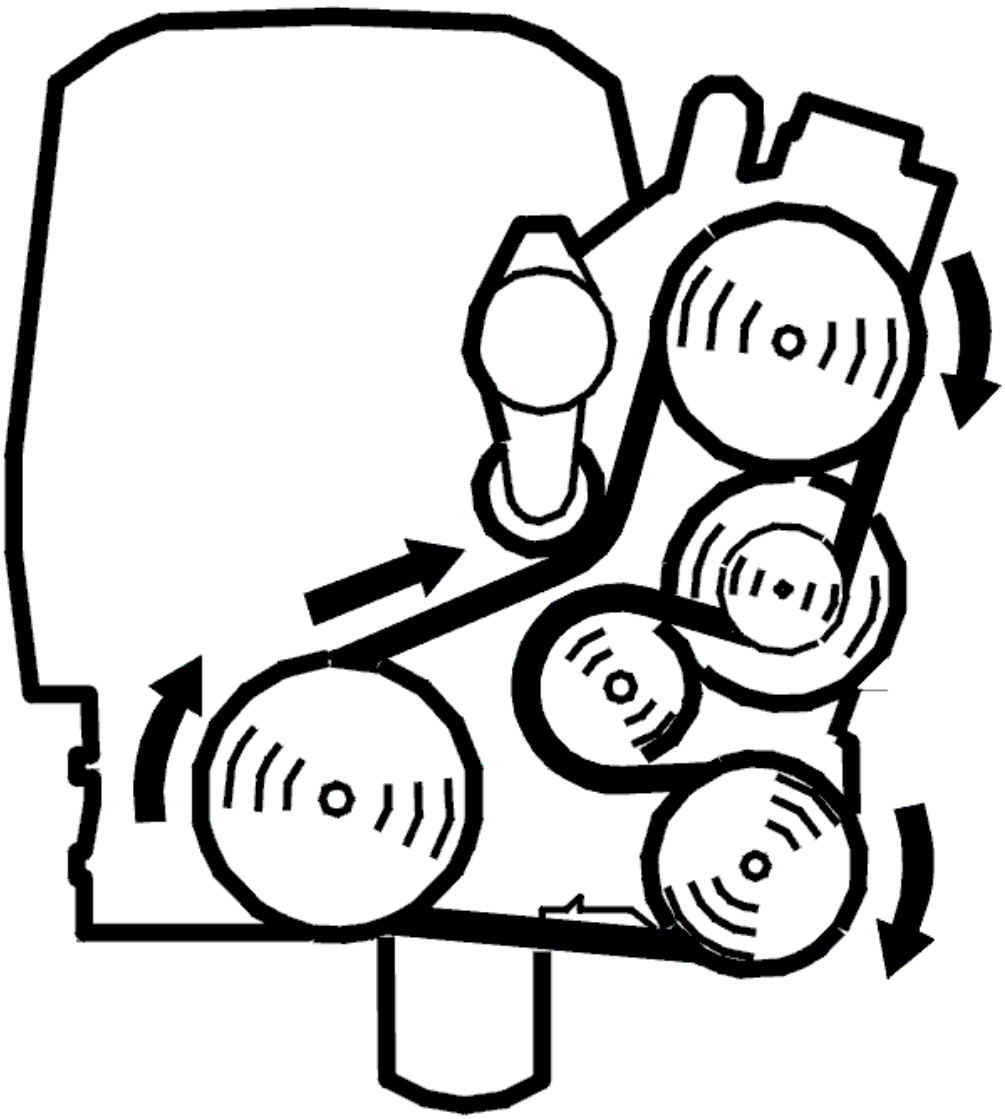


Fig. 245: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

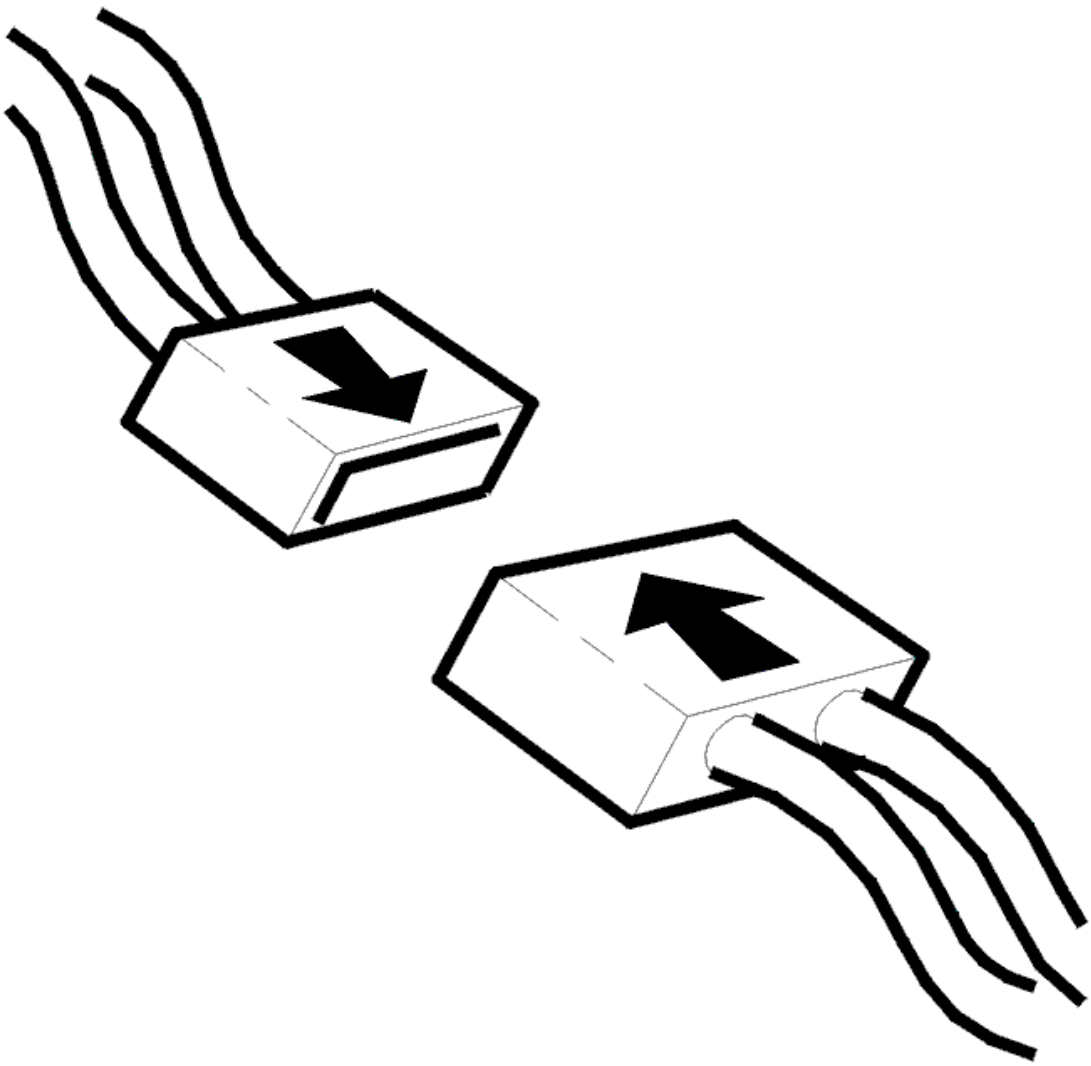


Fig. 246: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Start the engine and let it idle.
- Gear selector in position P.
- Read off the transmission speed.

  Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated.

  Compare with the engine speed (RPM).

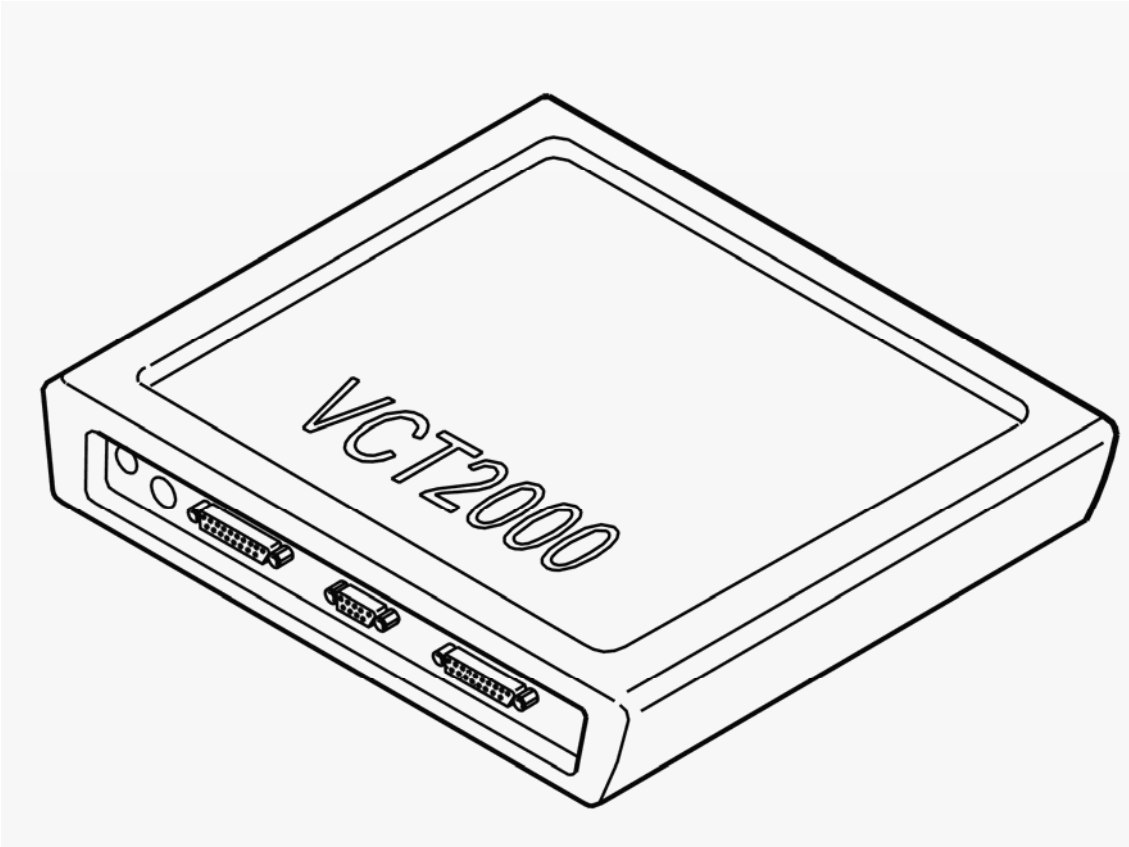


Fig. 247: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0024: INPUT SPEED SENSOR. FAULTY SIGNAL. INTERMITTENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

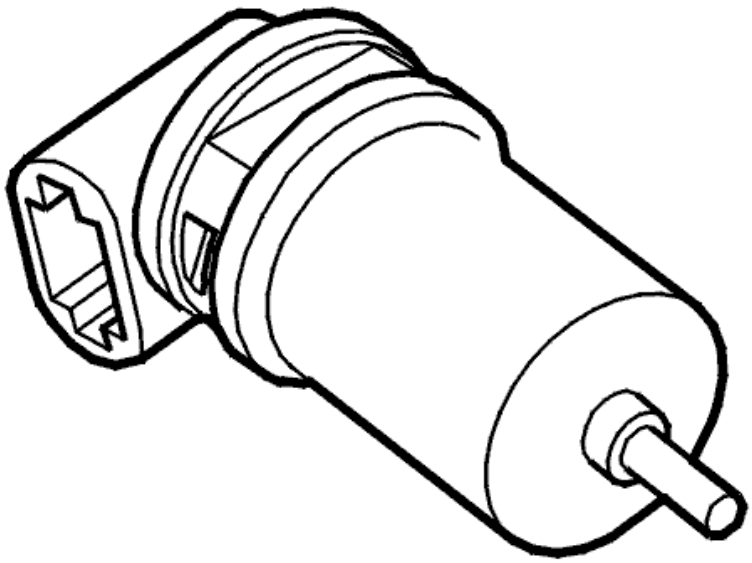


Fig. 248: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The transmission speed signal is transmitted by a sensor on the transmission. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare the transmission speed and the vehicle speed. The transmission control module (TCM) uses this comparison to calculate the gear-shift timing. Engine speed (RPM) and vehicle speed data affects the adjustment of the system pressure, lock-up function control and engine torque reduction. The result is smooth gear-shifting. The control module calculates and compares the transmission speed, the engine speed (RPM) and the speed at the transmission. Diagnostic trouble code (DTC) TCM-0024 is stored if the control module registers that the signal is faulty when vehicle speed is above approximately 25 km/h.

Substitute Value

- No torque reduction
- No lock-up.

Possible Source

- Contact resistance in the terminals

- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the power supply
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the signal cable
- Defective transmission input speed sensor
- Incorrect transmission installed if the transmission has been replaced.

Fault symptom[s]

- General orange warning lamp lit
- Malfunction indicator lamp (MIL) lit
- No lock-up function
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of the line pressure when shifting
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D
- No request for torque limiting to the engine control module (ECM) when shifting.

FAULTY SIGNAL. INTERMITTENT FAULT

INTERMITTENT FAULT

Check the wiring between control module terminal A59 (#A59) and transmission connector #S (#A16) for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** , an intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** , and an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** and contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Also check the wiring between control module terminal 41 (#A41) and transmission connector #V (#A17) for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** , an intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** , and an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** and contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX** .
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS** .
- For information about signals, see **SIGNAL SPECIFICATION** .

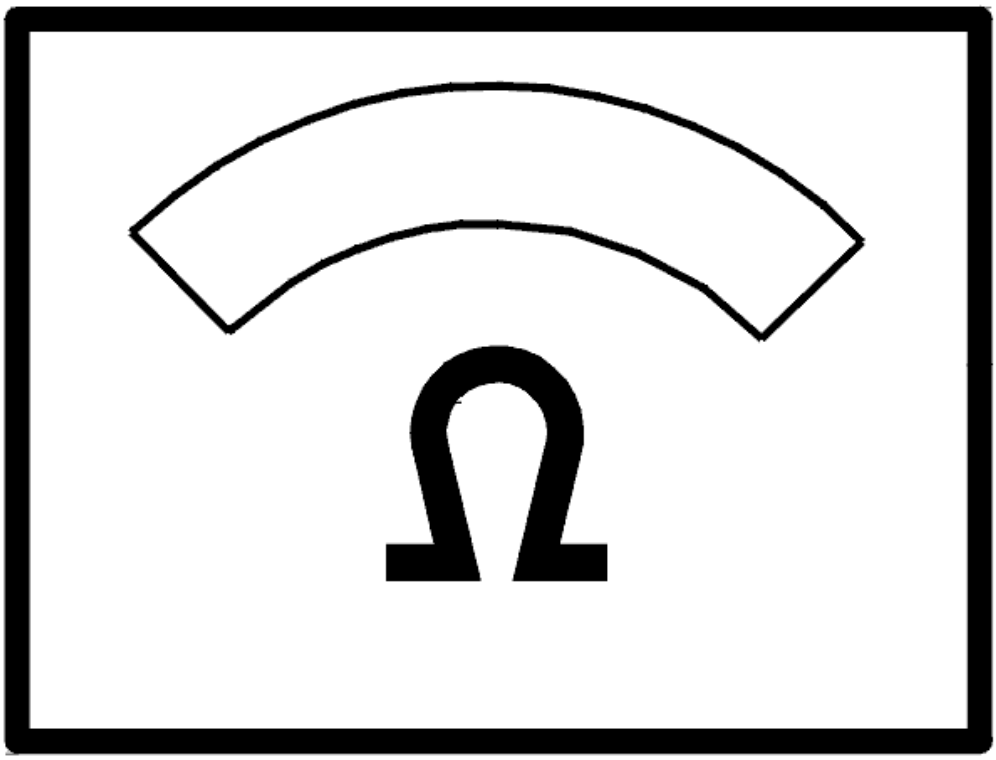


Fig. 249: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0024: INPUT SPEED SENSOR. FAULTY SIGNAL. PERMANENT FAULT

(4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULTY SIGNAL. PERMANENT FAULT

CHECKS

CHECKING THE TRANSMISSION INPUT SPEED SENSOR SIGNAL

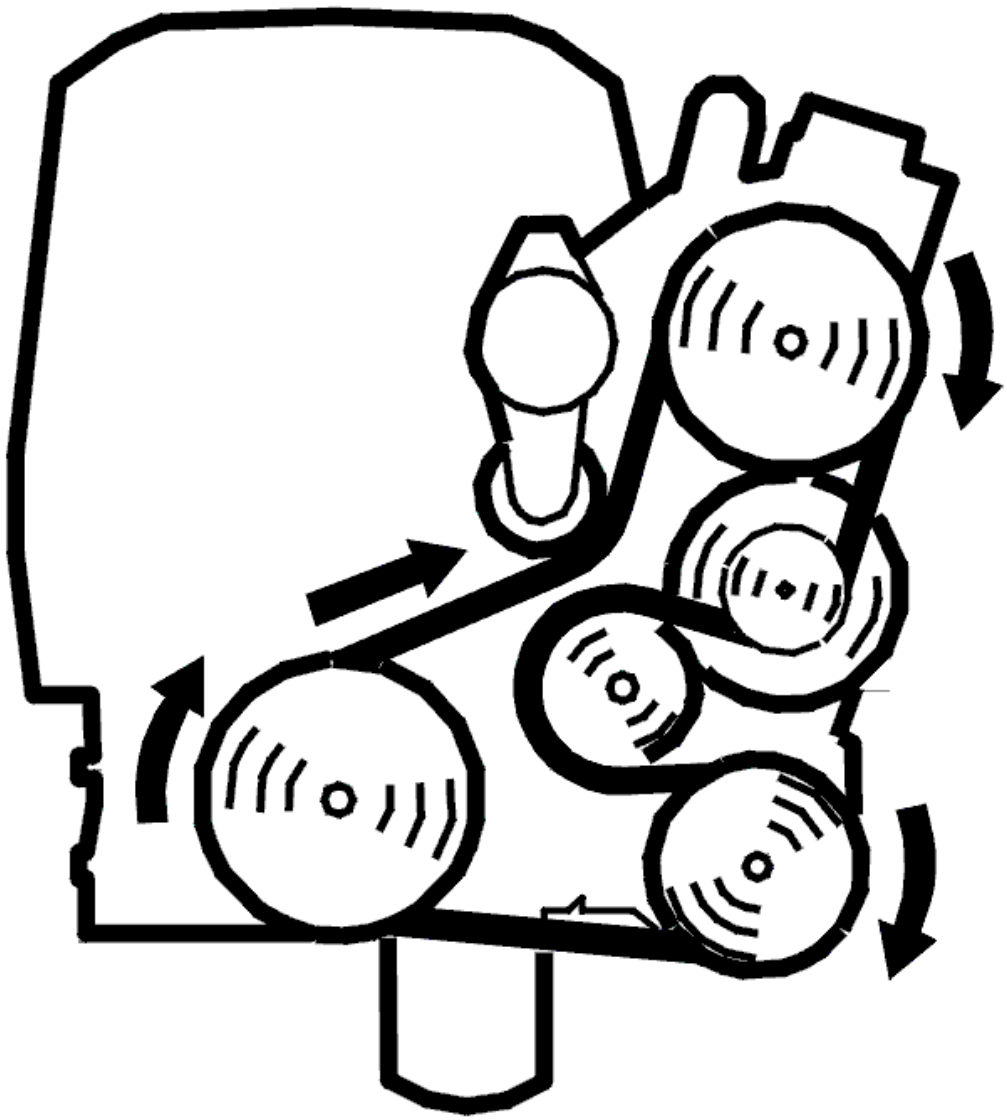


Fig. 250: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

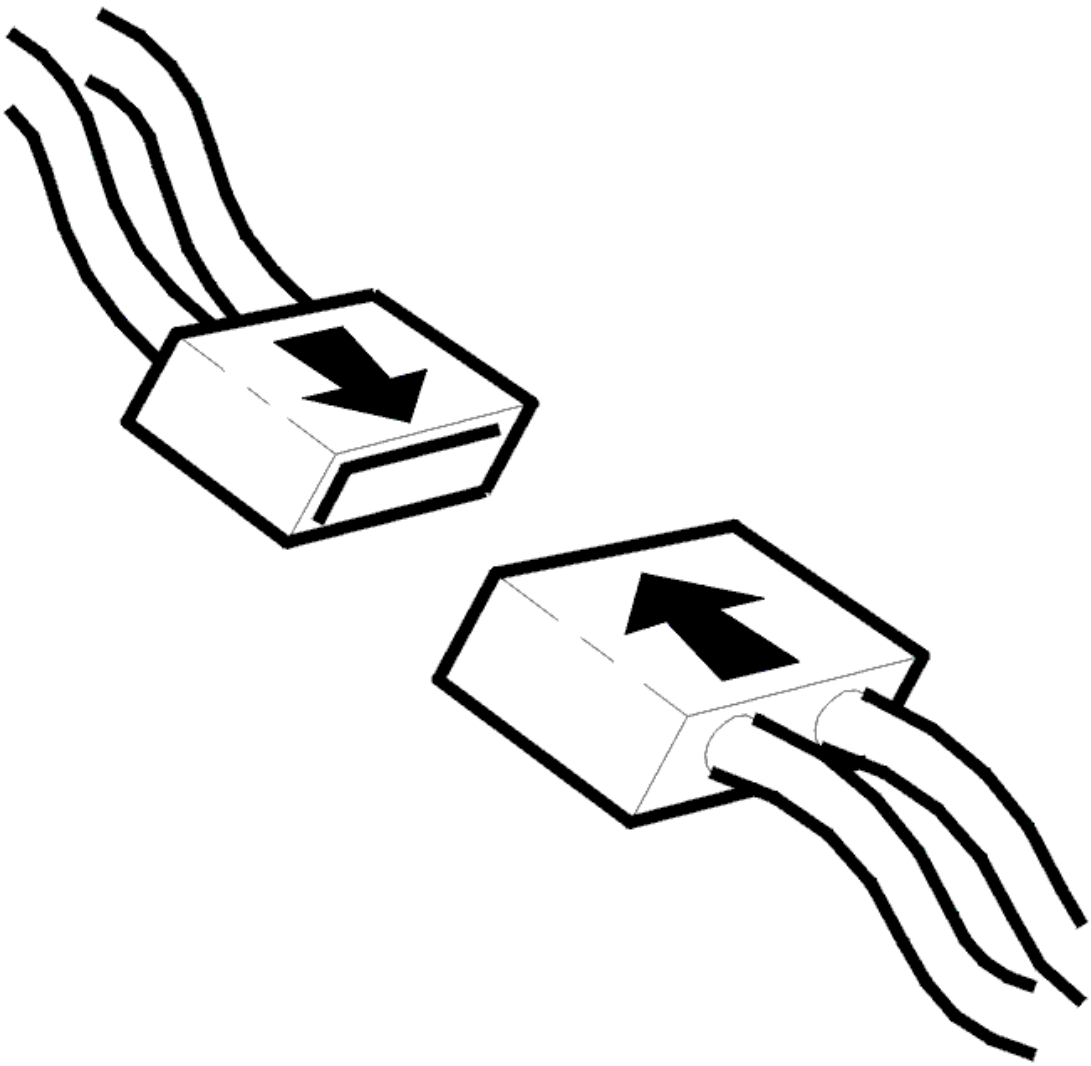


Fig. 251: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and transmission input speed sensor connectors. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Start the engine
- Read off the transmission input speed.

  Depress the accelerator pedal (AP). Check that the transmission speed increases with engine speed (RPM).

  Other information:

- To access the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To access the control module connector, see **CONNECTING THE BREAKOUT BOX** .

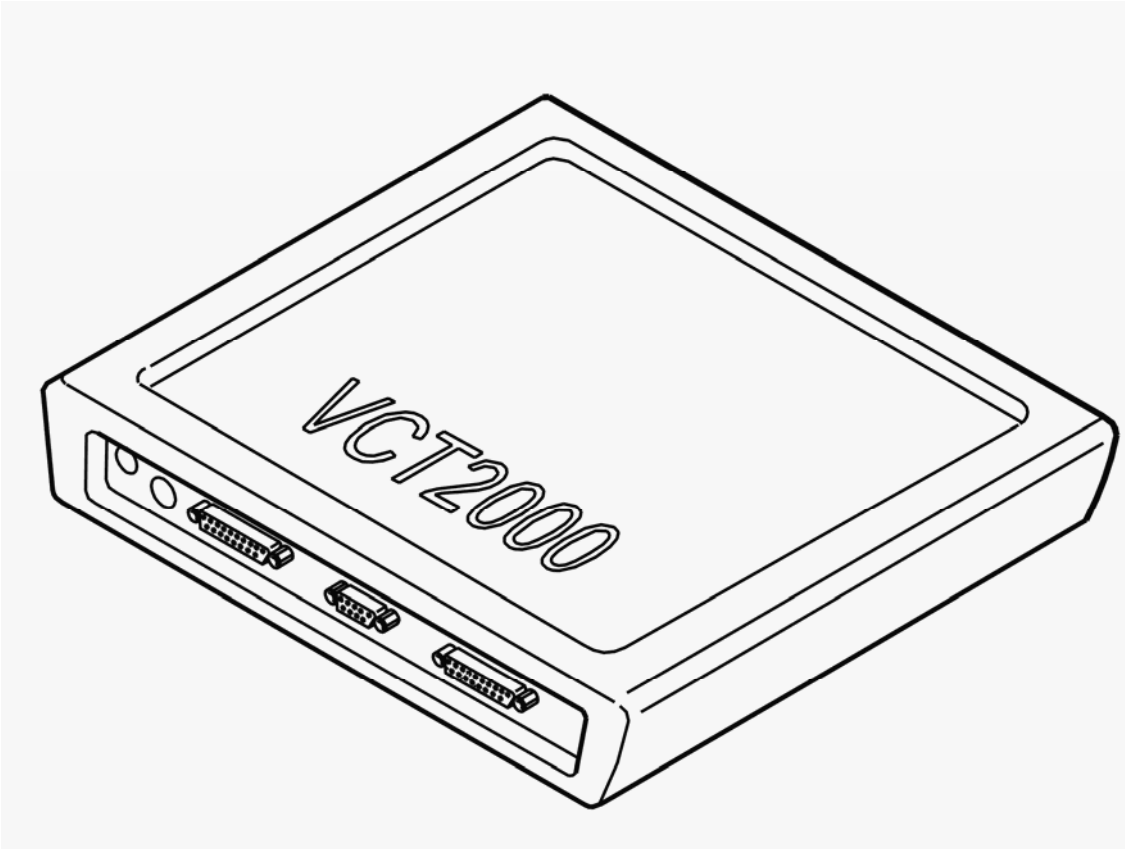


Fig. 252: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the transmission input speed increase with engine speed (RPM)?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

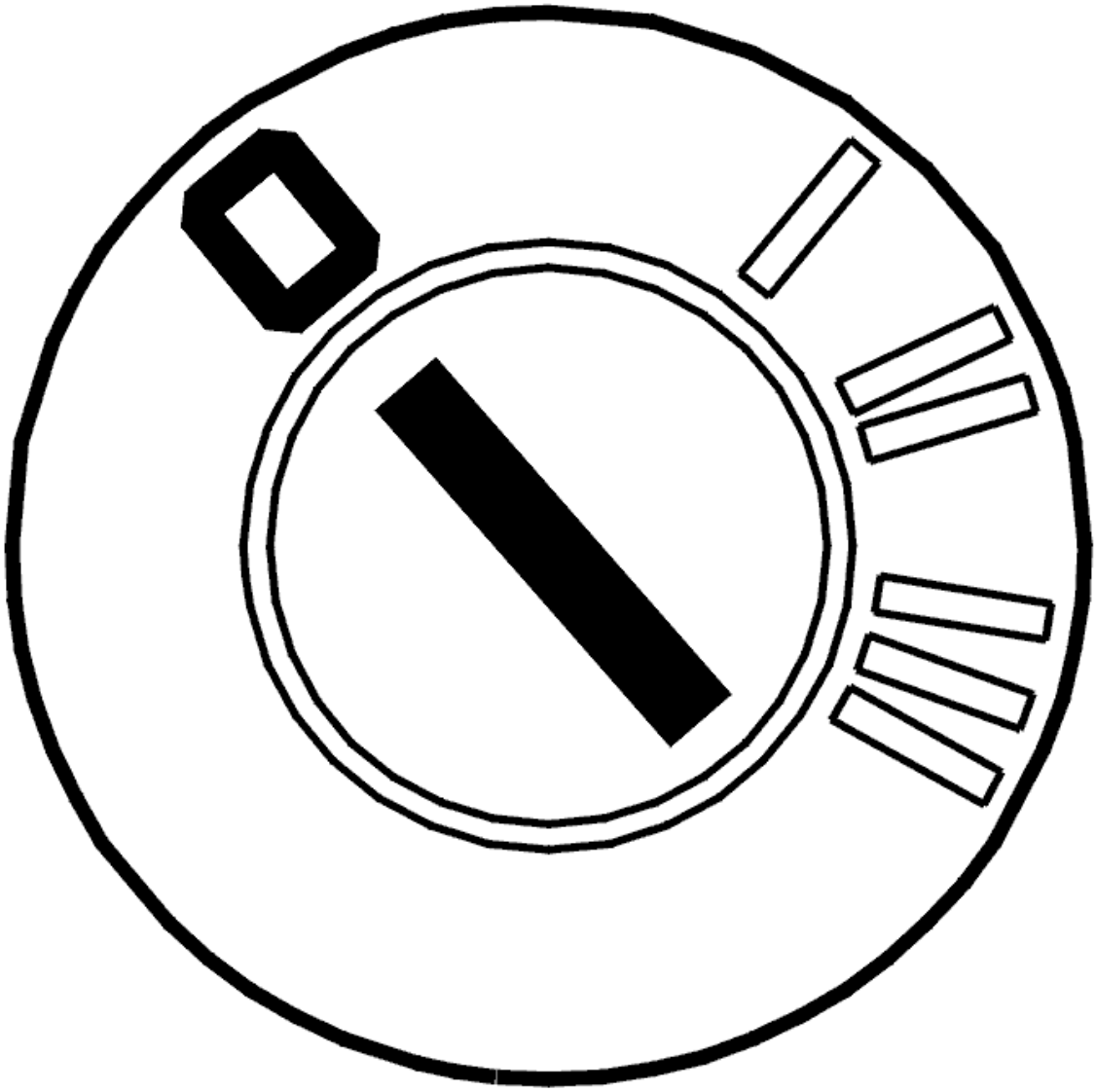


Fig. 253: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

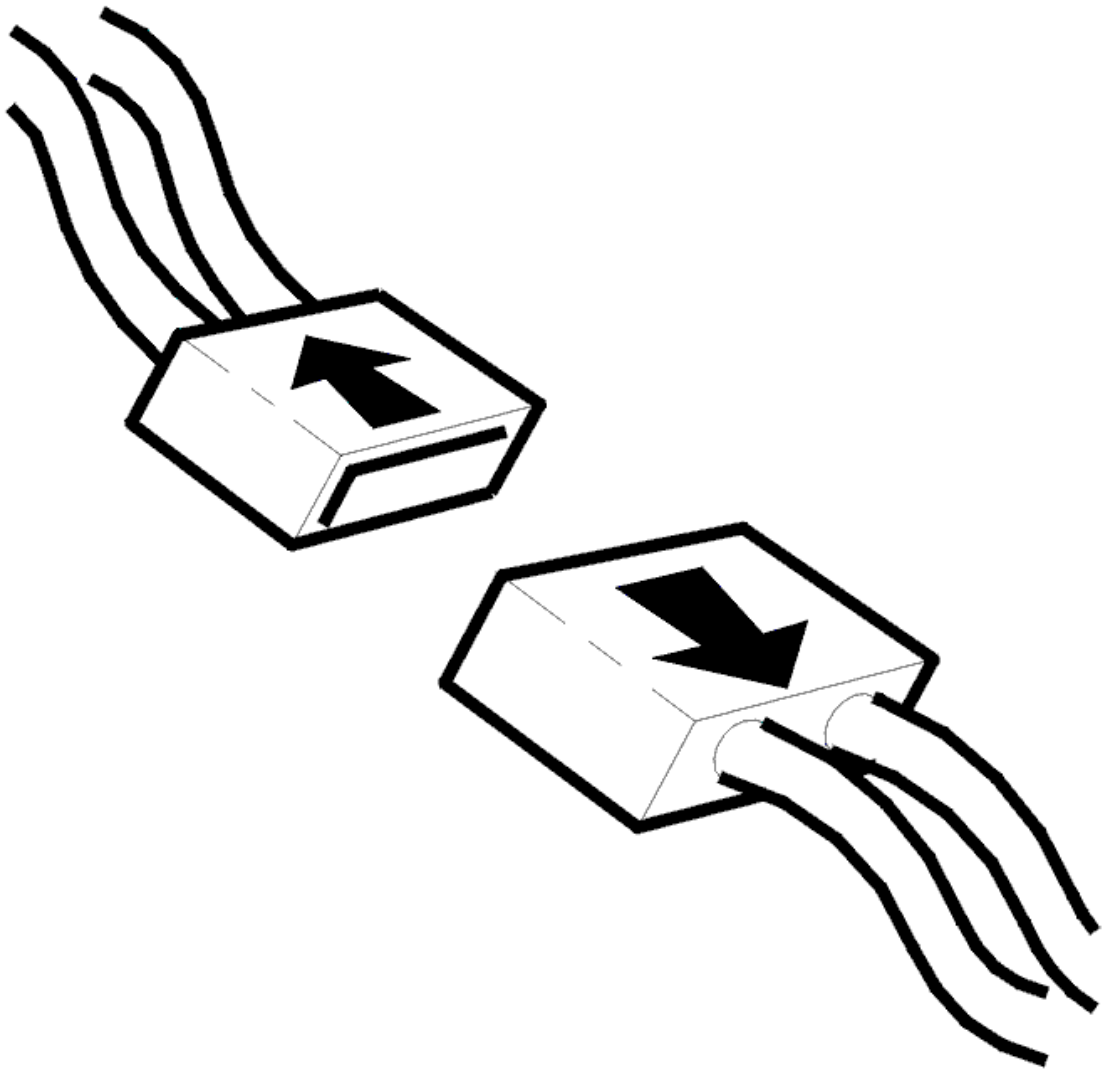


Fig. 254: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

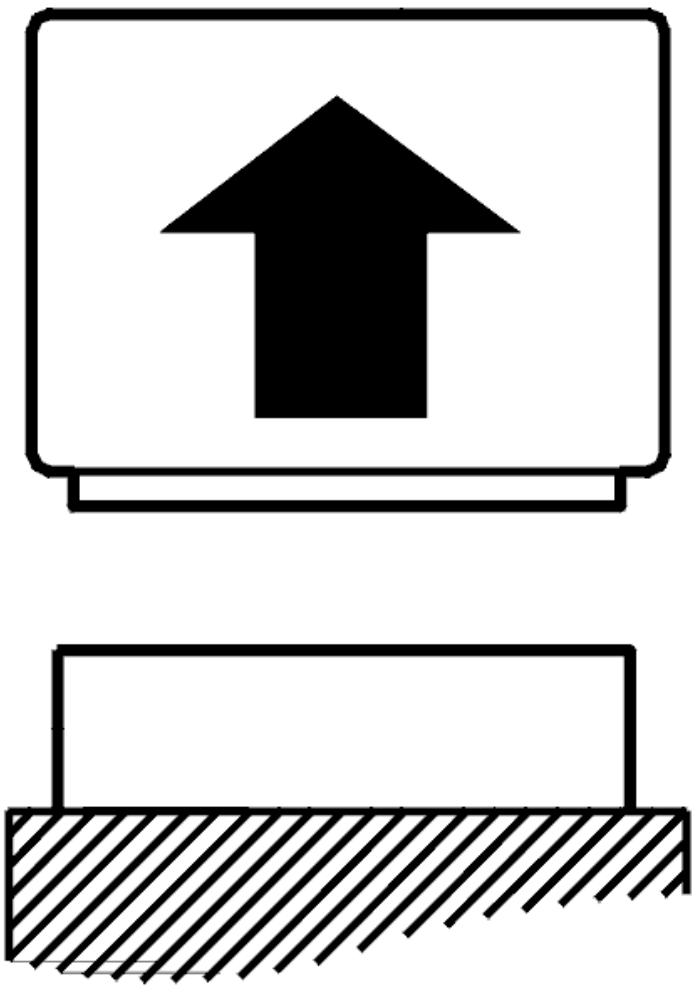


Fig. 255: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector
- Connect the breakout box to the transmission connector (control module side)
- Disconnect the control module.
- Connect the breakout box to the control module connector (transmission side).

Check the transmission input speed sensor cable for power supply between control module terminal #59 (#A59) and transmission connector terminal #S (#A16). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Check the signal cable between control module terminal #41 (#A41) and transmission connector terminal #V (#A19). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Remedy as necessary.

HINT: With the control module connected and the ignition on, the voltage between transmission connector terminal #16 and ground (breakout box terminal #53) must be approximately 1-3 V below Ubat.

Other information:

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

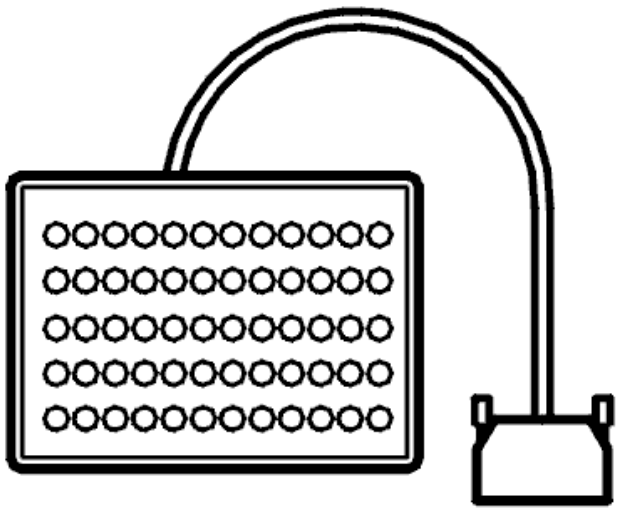


Fig. 256: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

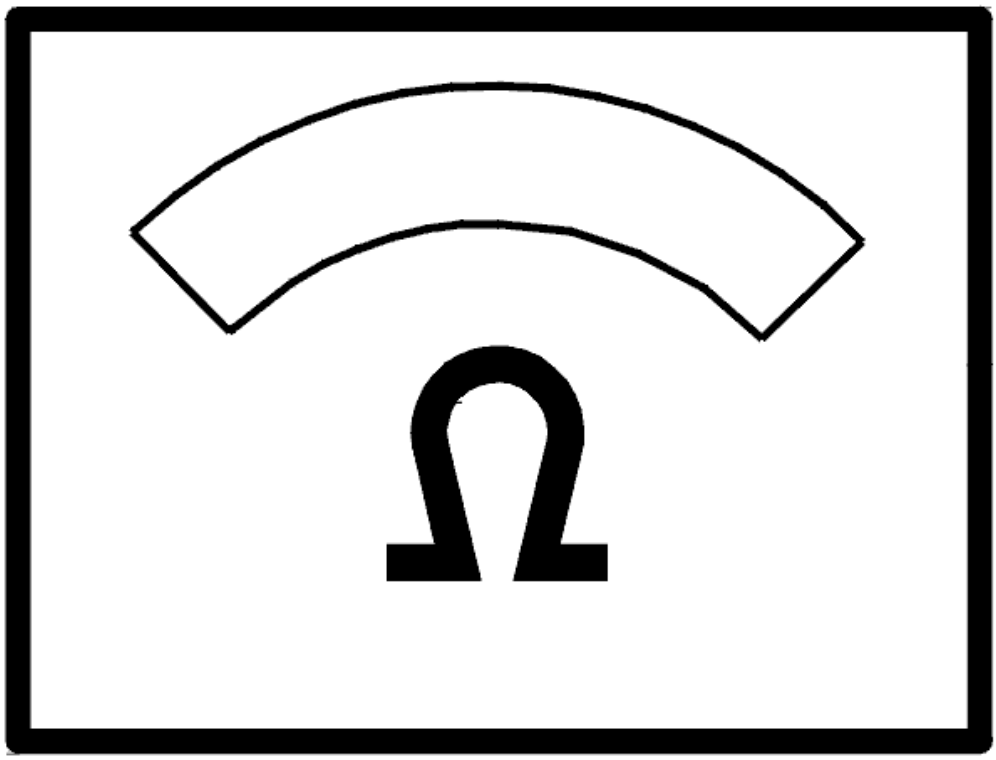


Fig. 257: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

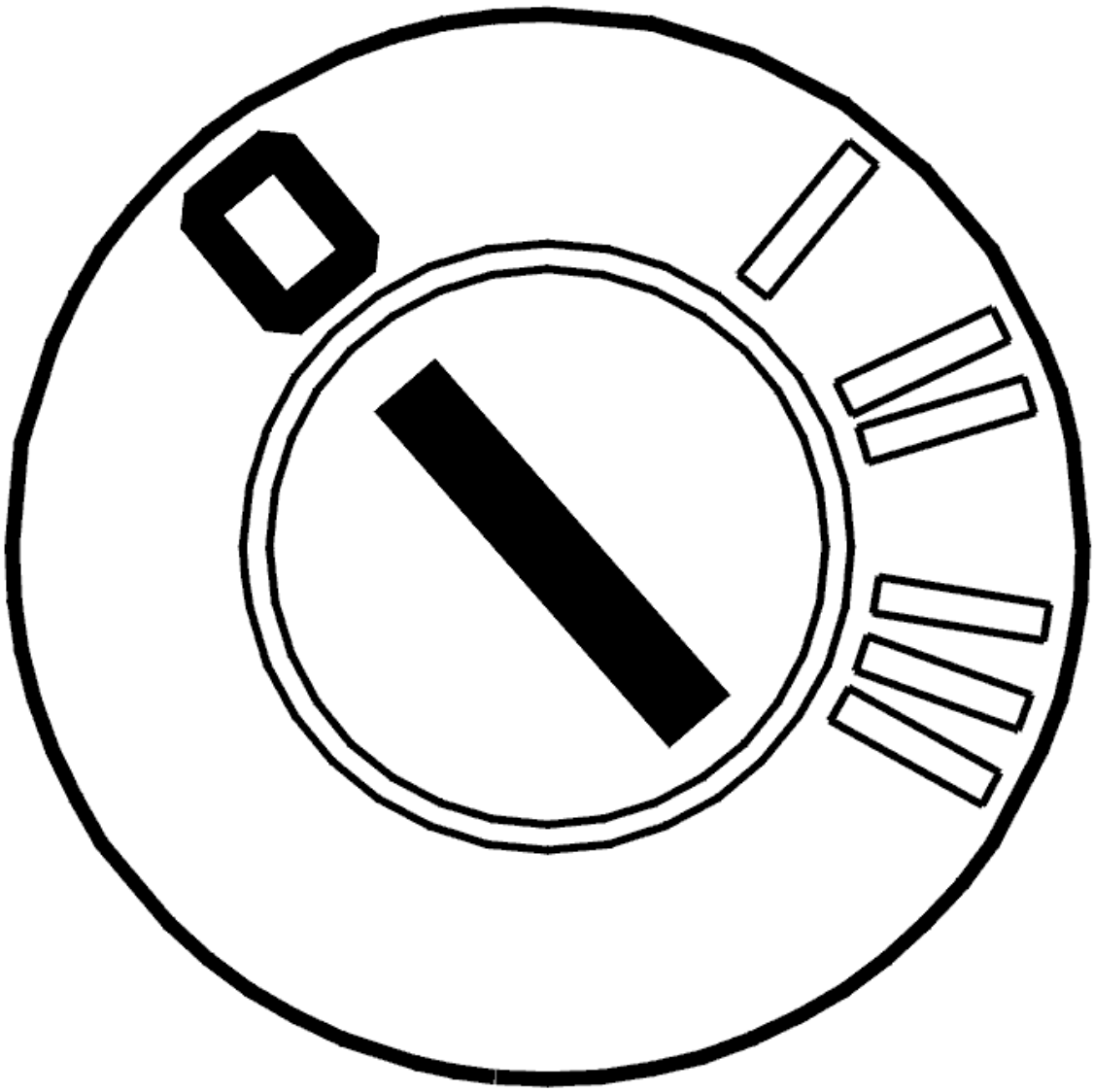


Fig. 258: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable for power supply between transmission connector terminal #S (#A16) and transmission input speed sensor connector terminal #A. Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Check the signal cable between transmission connector terminal #V (#A19) and transmission input speed sensor connector terminal #B. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT**

TO SUPPLY VOLTAGE. PERMANENT FAULTS .

Remedy as necessary.

Other information:

- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the transmission speed sensor, see **INPUT SPEED SENSOR TRANSMISSION, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION** .

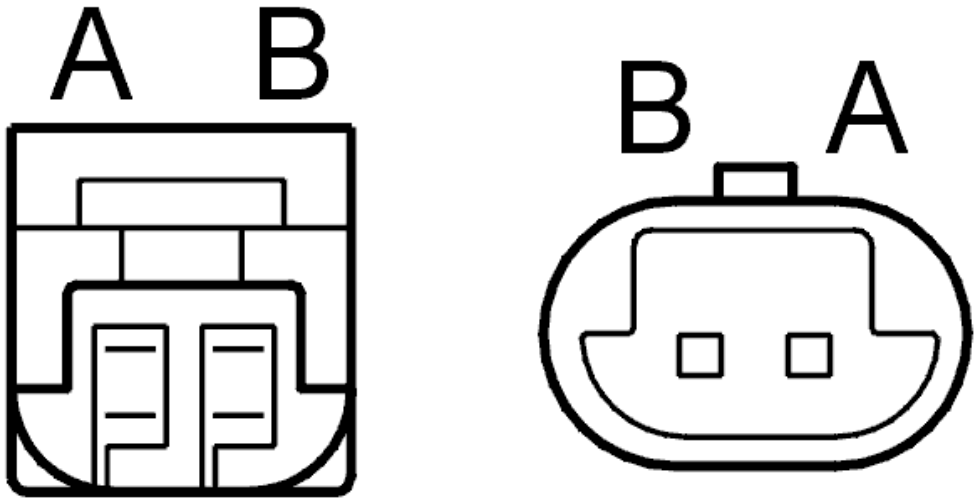


Fig. 259: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

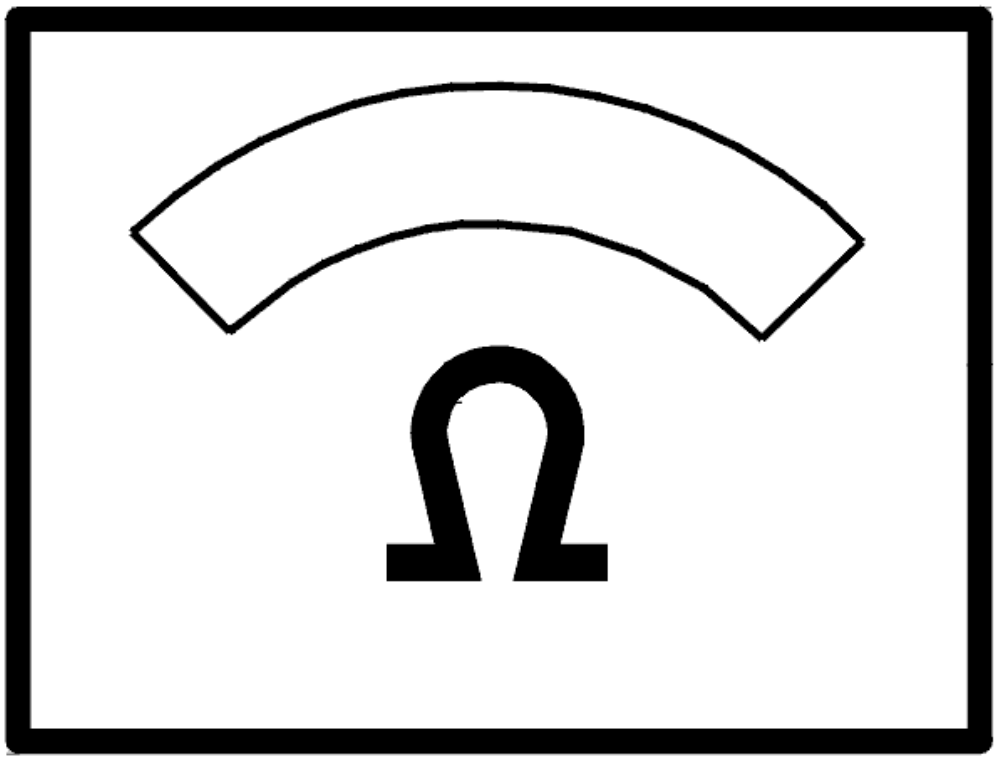


Fig. 260: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

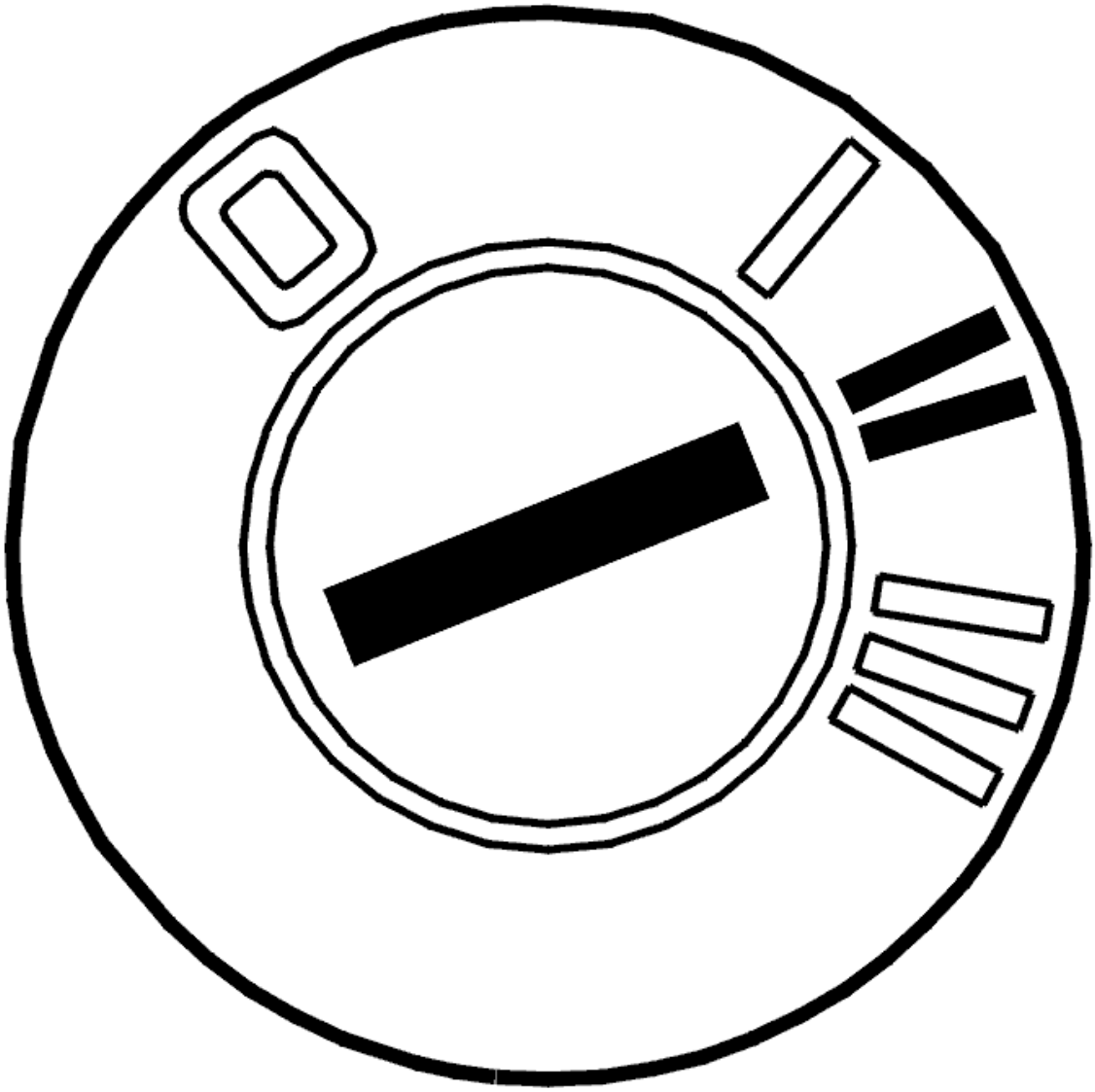


Fig. 261: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

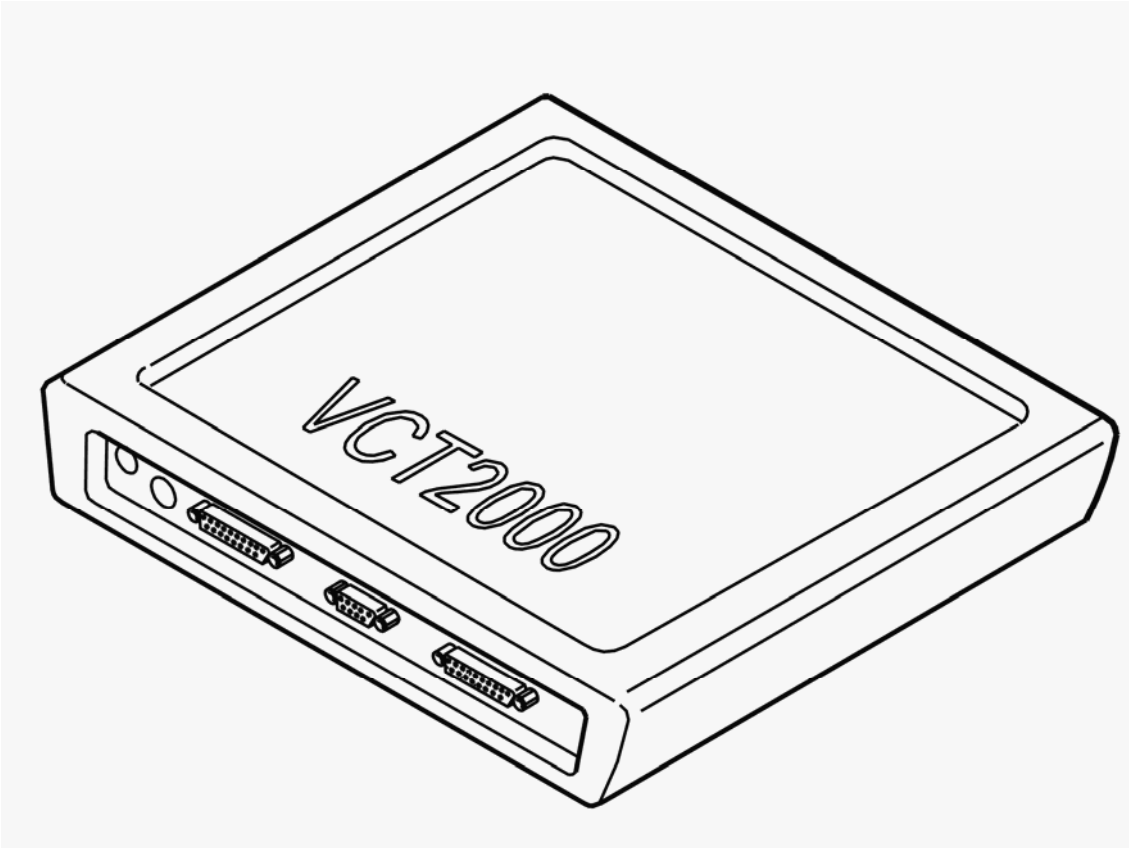


Fig. 262: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

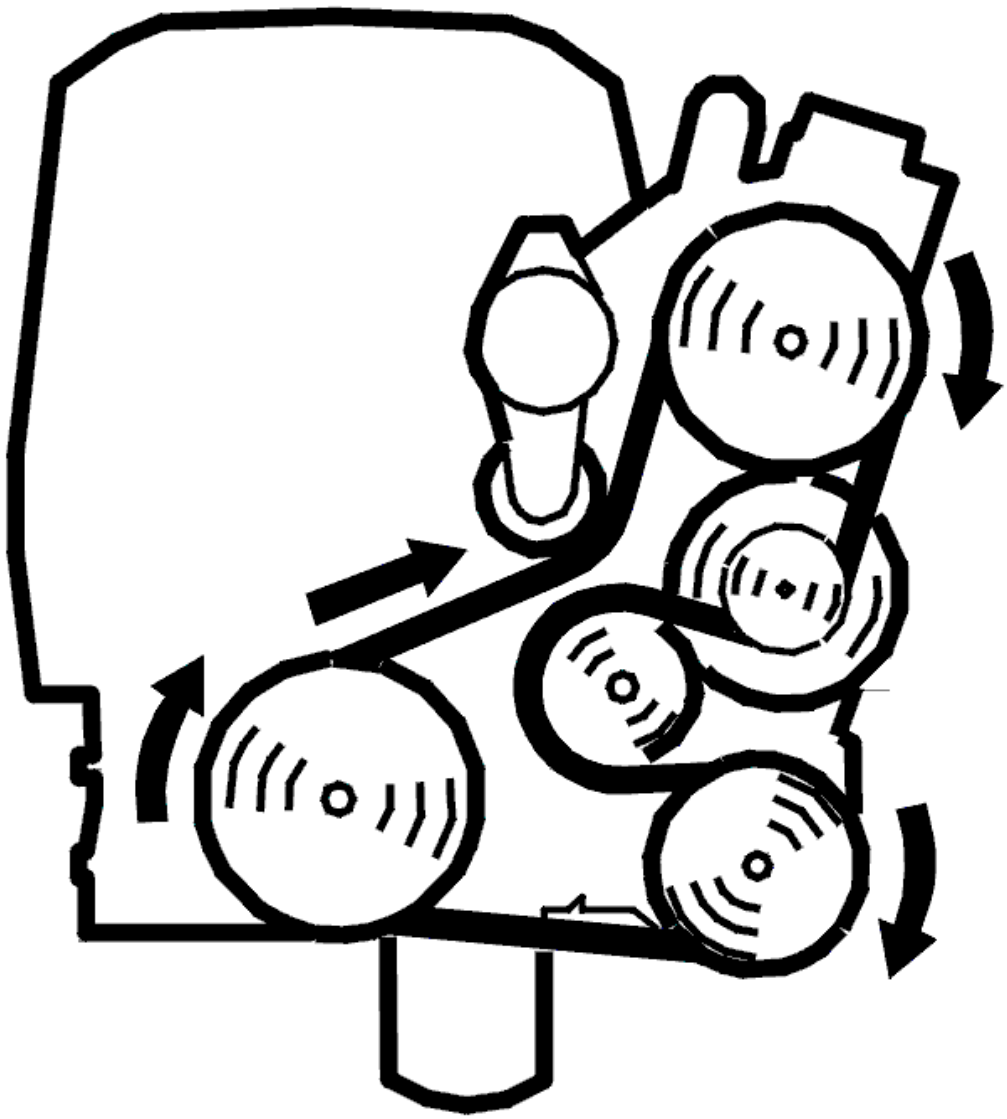


Fig. 263: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

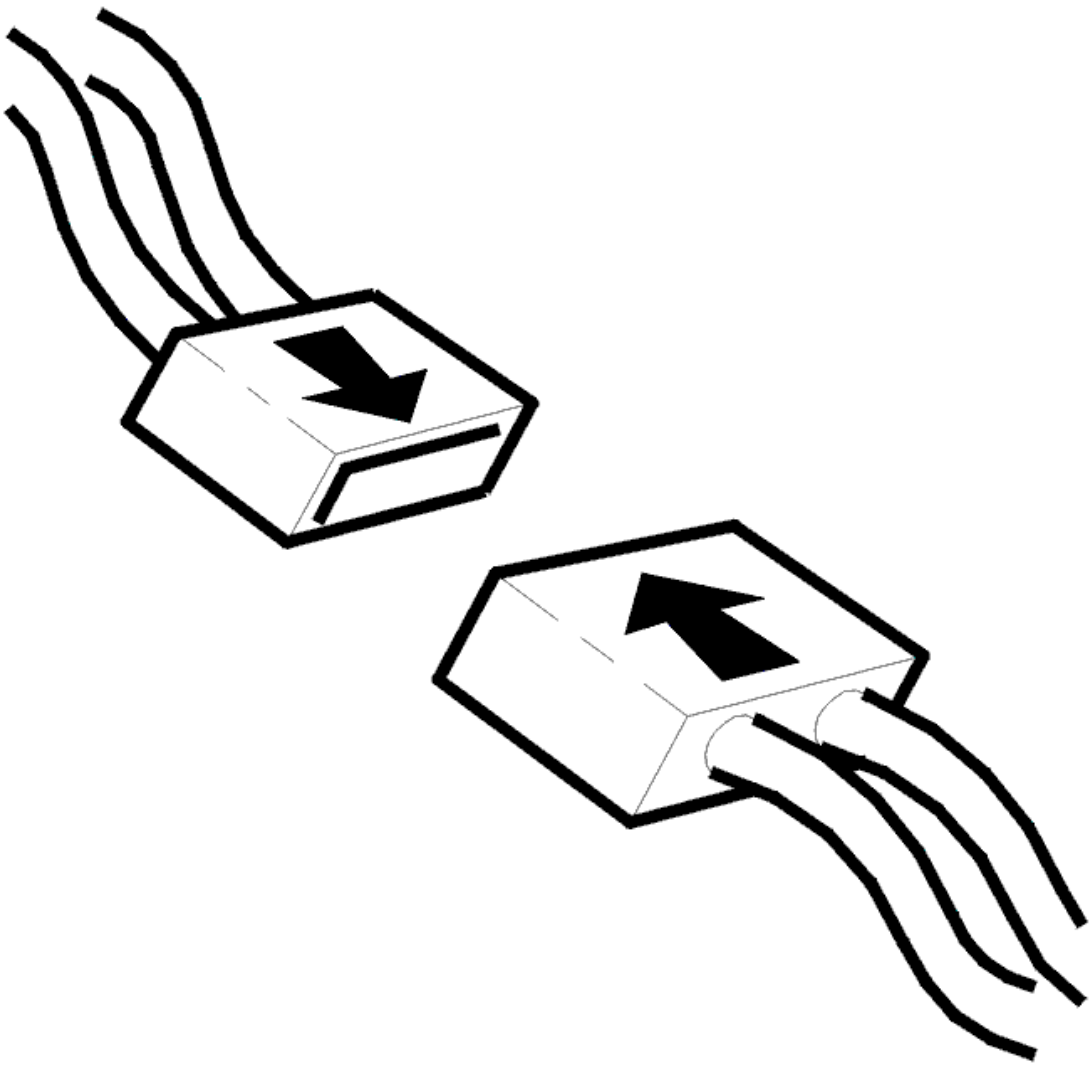


Fig. 264: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Start the engine and let it idle.
- Read off the transmission speed.

  Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated. Compare with the engine speed (RPM).

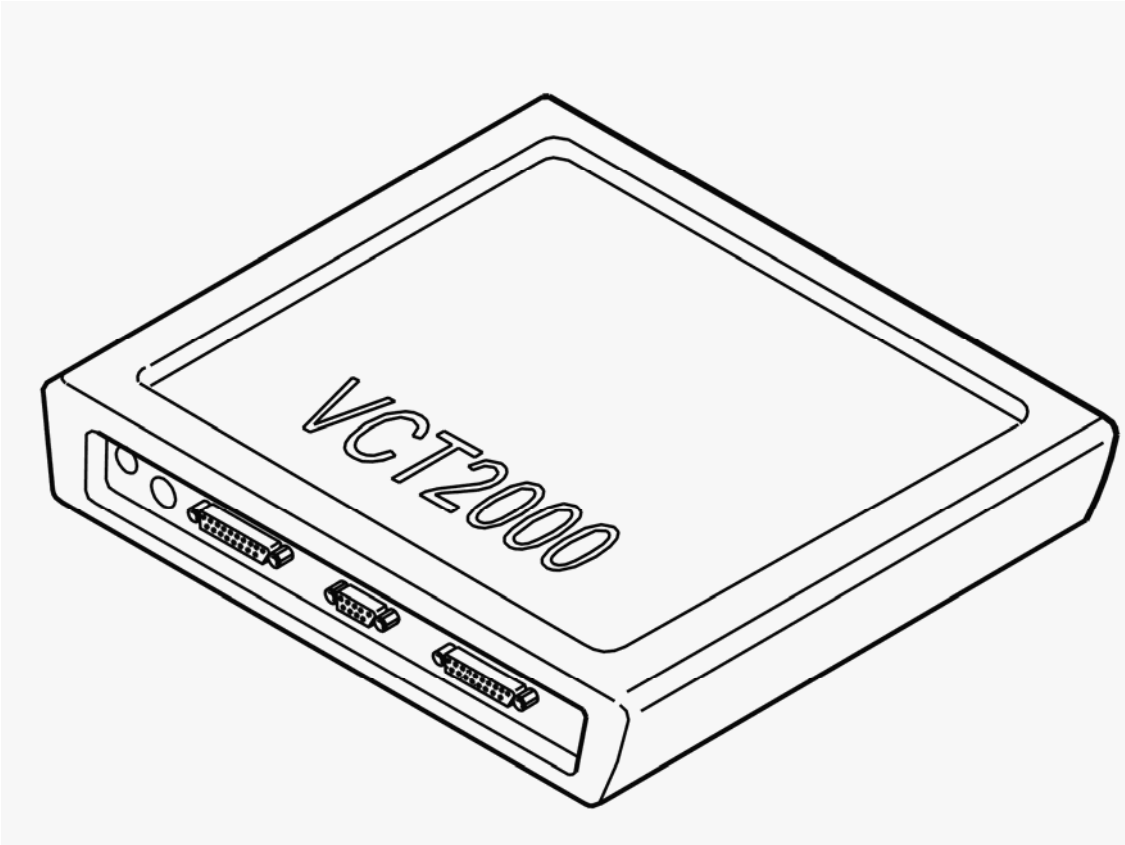


Fig. 265: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0024: TRANSMISSION INPUT SPEED SENSOR. FAULTY SIGNAL. INTERMITTENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

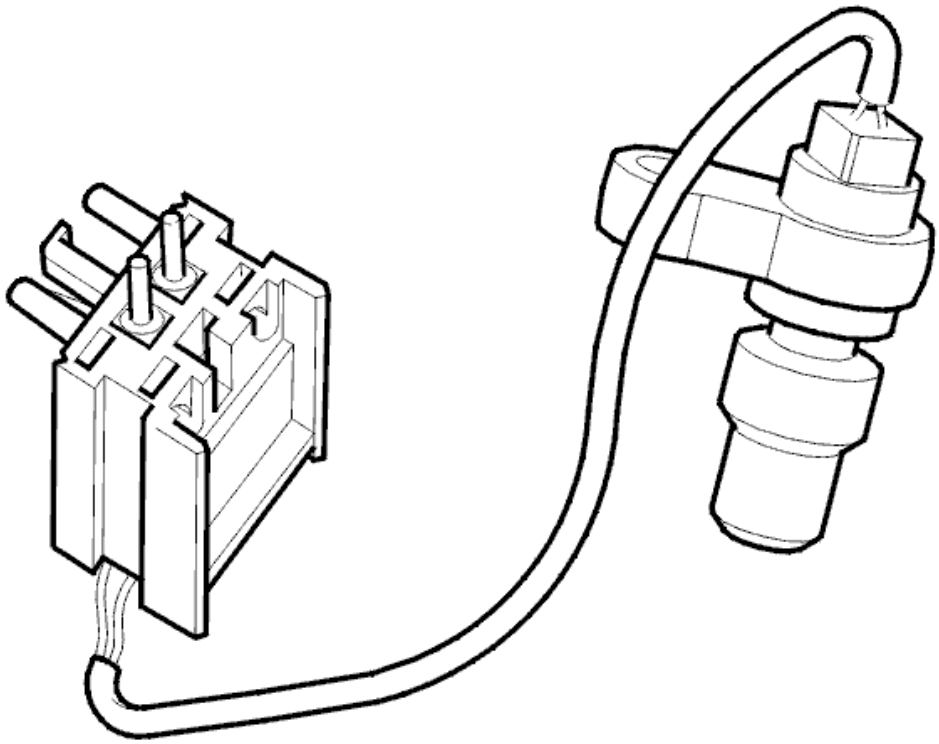


Fig. 266: Identifying Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The transmission speed signal is transmitted by a sensor on the transmission. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare the transmission speed and the vehicle speed. The transmission control module (TCM) uses this comparison to calculate the gear-shift timing. Engine speed (RPM) and vehicle speed data affects the adjustment of the system pressure, lock-up function control and engine torque reduction. The result is smooth gear-shifting. The control module calculates and compares the transmission speed, the engine speed (RPM) and the speed at the transmission. Diagnostic trouble code (DTC) TCM-0024 is stored if the control module registers a faulty signal when vehicle speed is above approximately 25 km/h.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Contact resistance in the terminals.
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the power supply.

- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the signal cable.
- Defective engine speed (RPM) sensor.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of the line pressure when shifting.
- No reduction of the line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No request for torque limiting to the engine control module (ECM) when shifting.

FAULTY SIGNAL. INTERMITTENT FAULT

INTERMITTENT FAULT

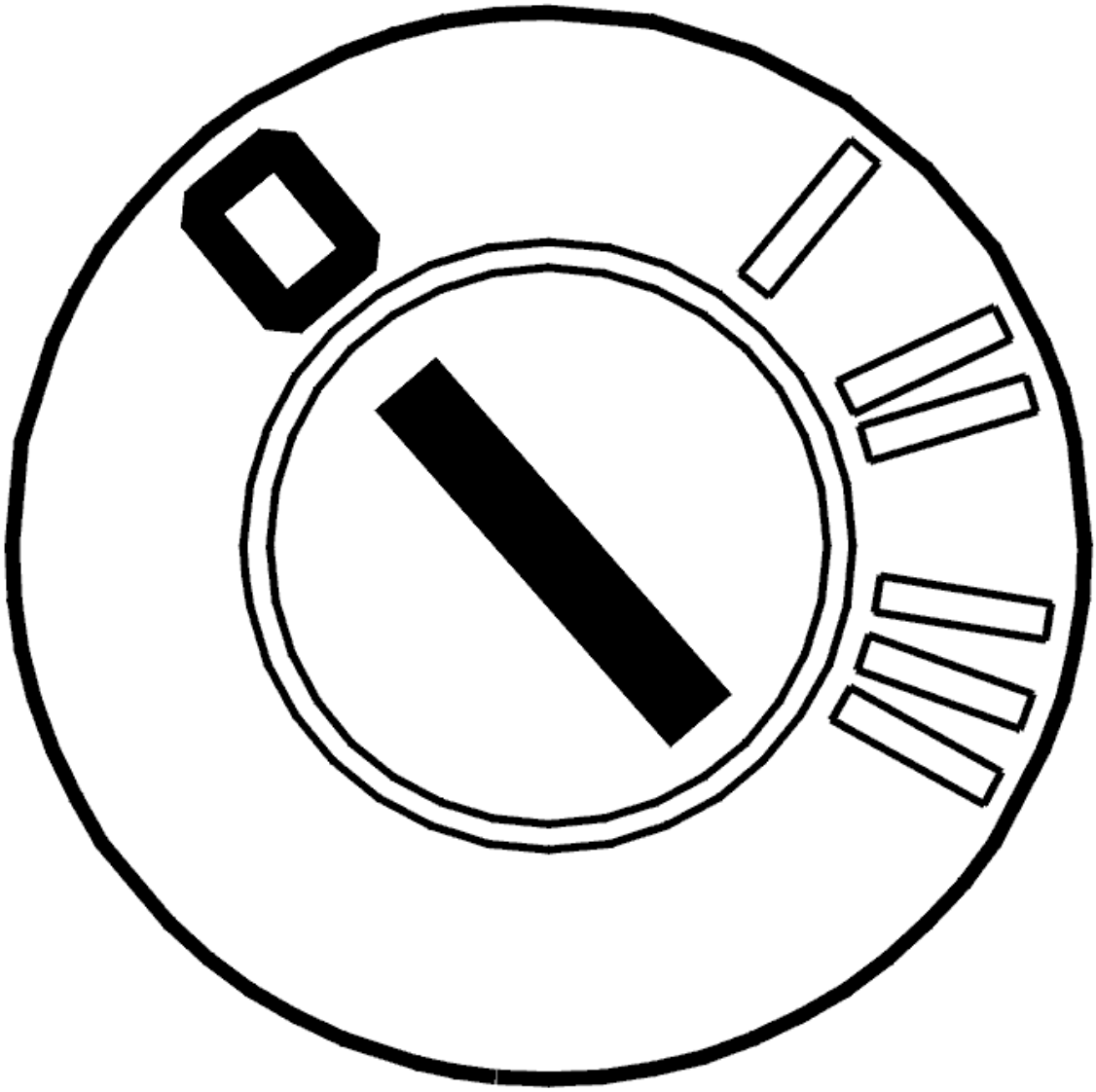


Fig. 267: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

  Check the wiring between transmission control module (TCM) terminal #A41 (#A41) and transmission connector terminal #A1. Check the wiring between control module terminal #A59 (#A59) and transmission connector terminal #A2. Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** . Check for an intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** . Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the automatic transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To check or replace the transmission speed sensor, see **INPUT SPEED SENSOR/OUTPUT SPEED SENSOR, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

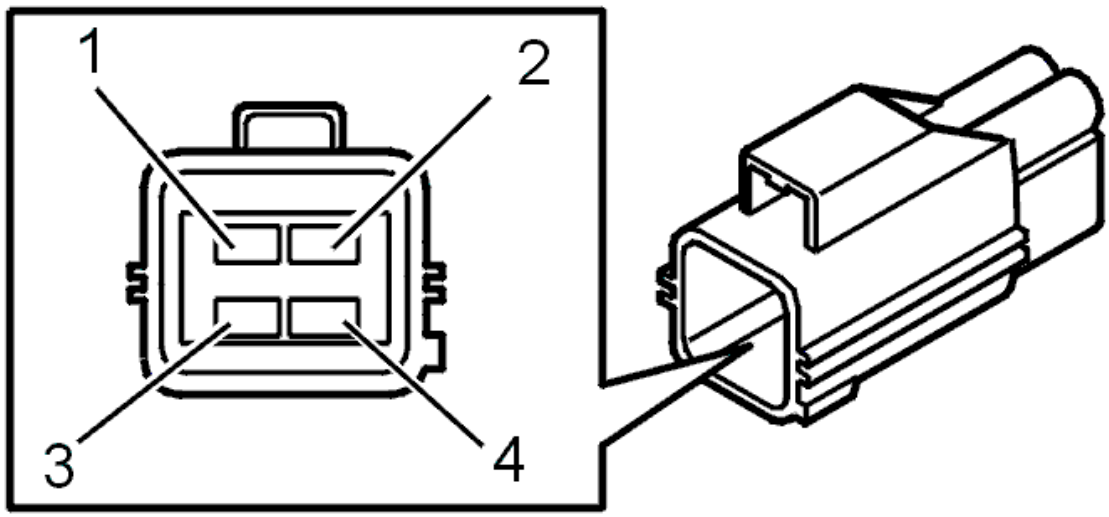


Fig. 268: Identifying Transmission Output Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

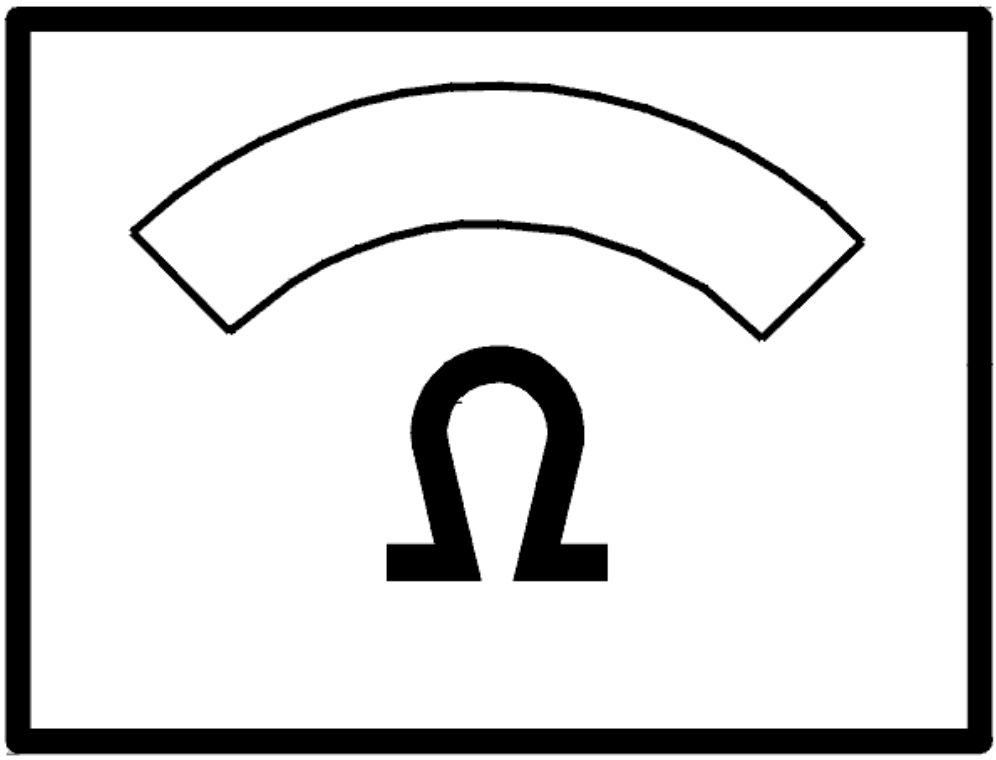


Fig. 269: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0024: TRANSMISSION INPUT SPEED SENSOR. FAULTY SIGNAL.

PERMANENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULTY SIGNAL. PERMANENT FAULT

CHECKS

CHECKING THE TRANSMISSION INPUT SPEED SENSOR SIGNAL

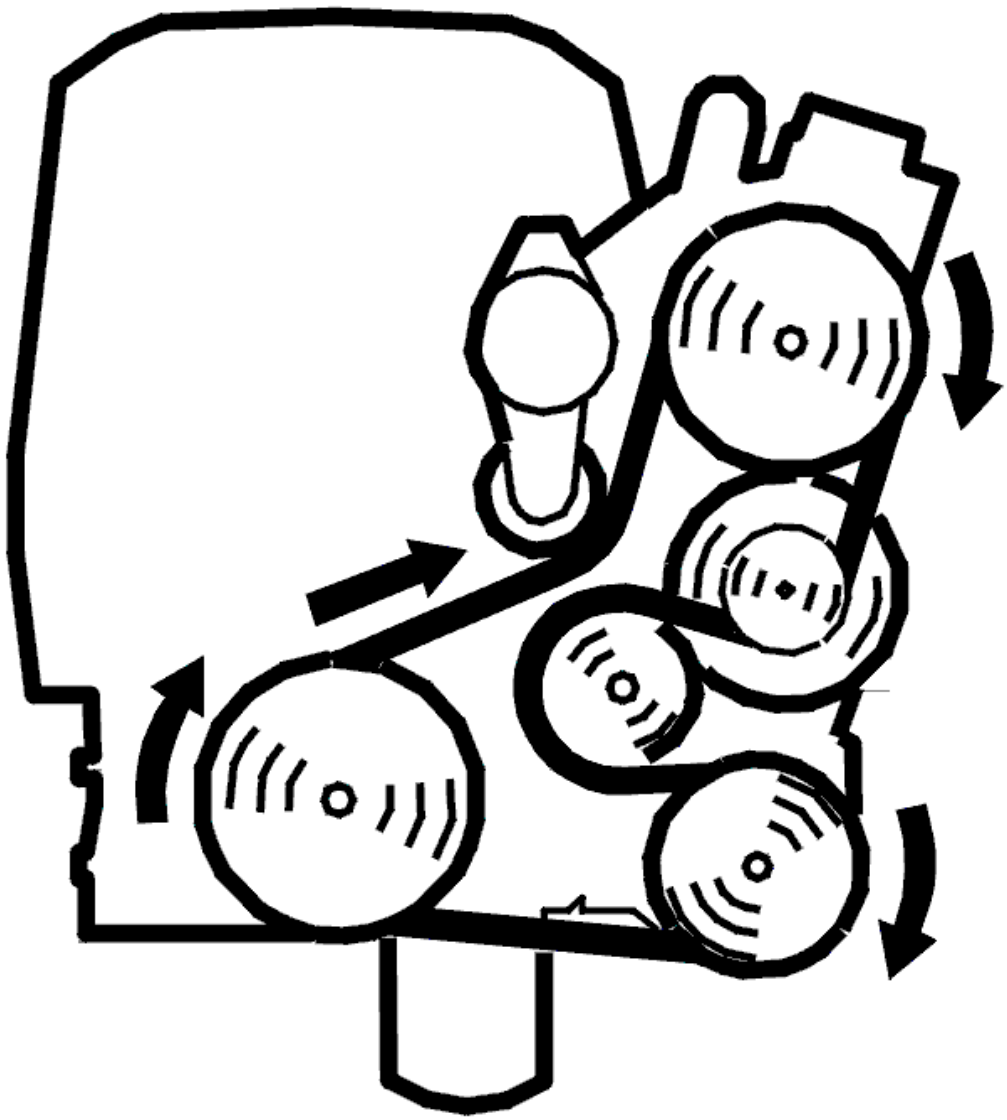


Fig. 270: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

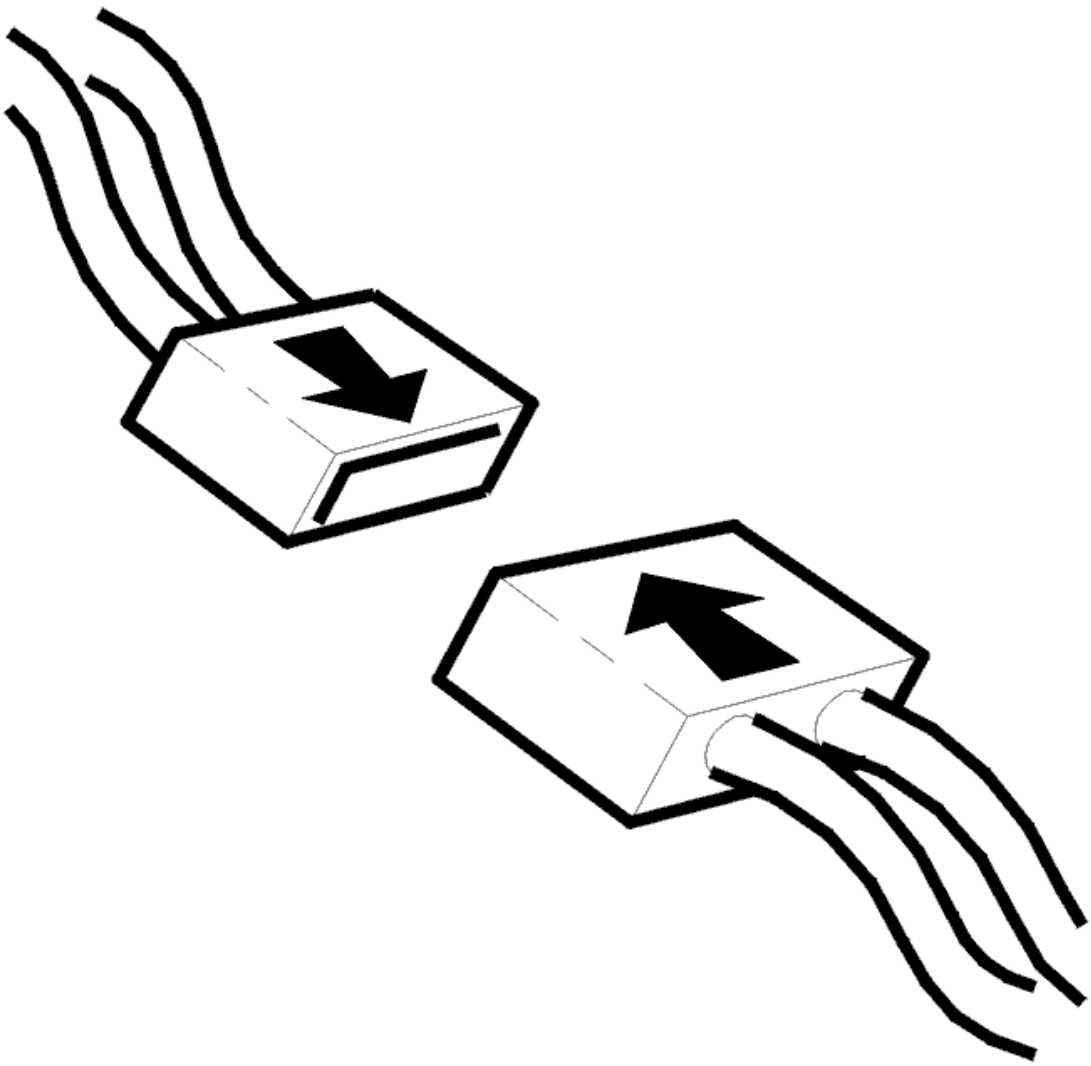


Fig. 271: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Gear selector in position P
- Start the engine. Allow the engine to idle
- Read off the transmission input speed.

  Check that the transmission input speed is updated.

  Compare with the engine speed (RPM).

If the transmission speed increases, the cause of the fault was loose connections in the control module or transmission speed sensor connectors.

Other information:

- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the automatic transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

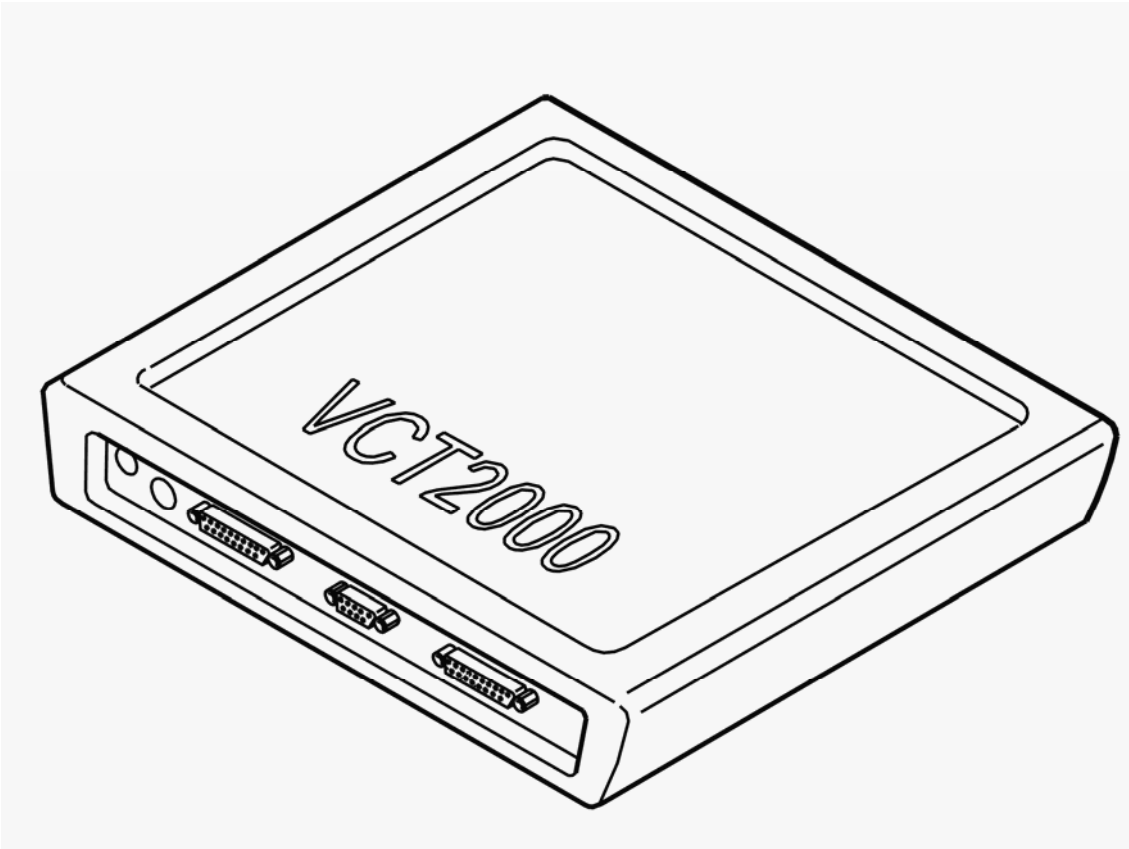


Fig. 272: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the transmission input speed increase with engine speed (RPM)?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

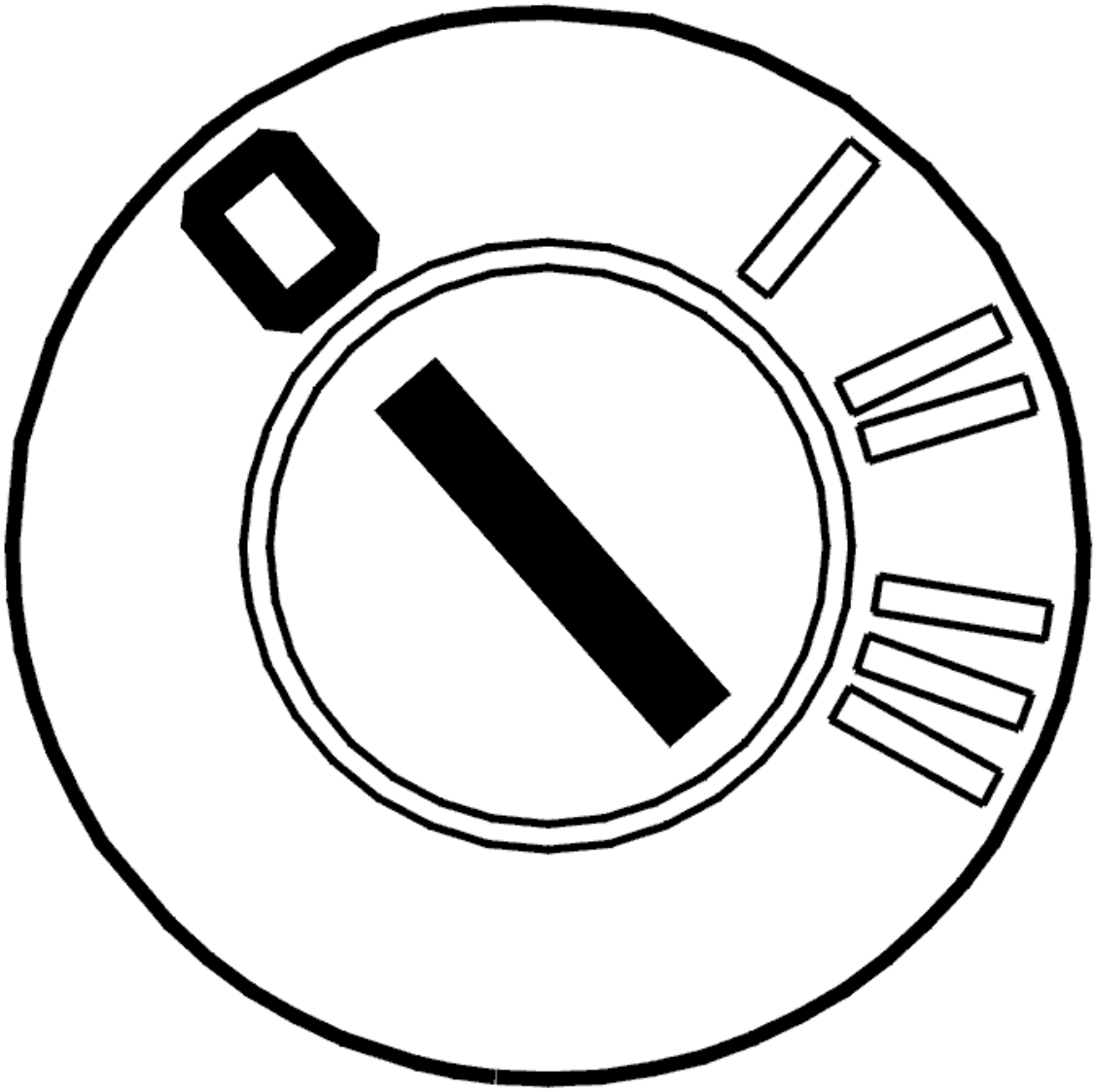


Fig. 273: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box.

Check the power supply cable for the transmission input speed sensor between control module terminal #A59 (#A59) and transmission connector terminal #A2. Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Check the signal cable between control module terminal #A41 (#A41) and transmission connector terminal #A1. Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

HINT: With the control module connected and the ignition on, the voltage between transmission output speed sensor connector terminals #A1 and #A2 must be approximately 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the automatic transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the transmission input speed sensor, see **INPUT SPEED SENSOR/OUTPUT SPEED SENSOR, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

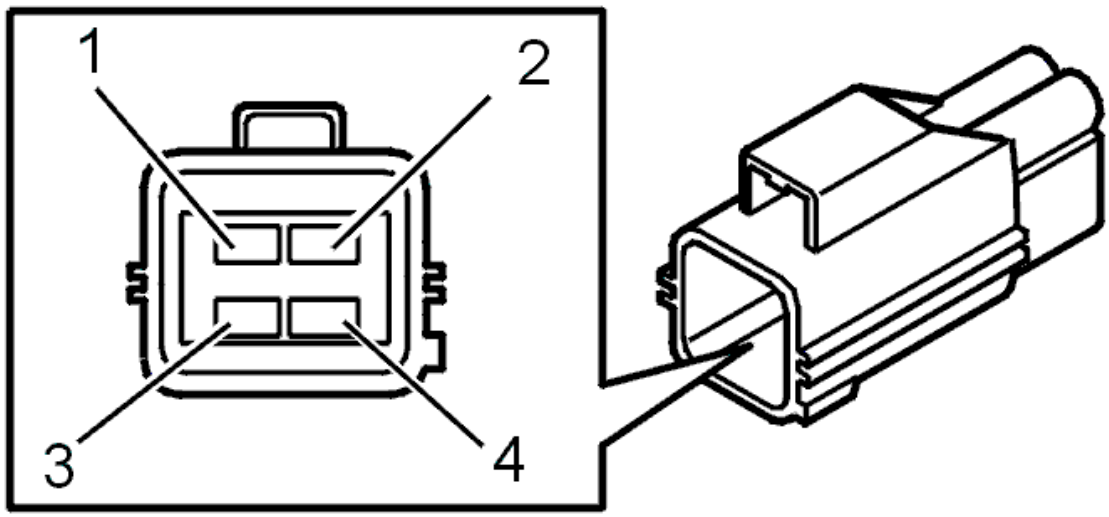


Fig. 274: Identifying Transmission Output Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

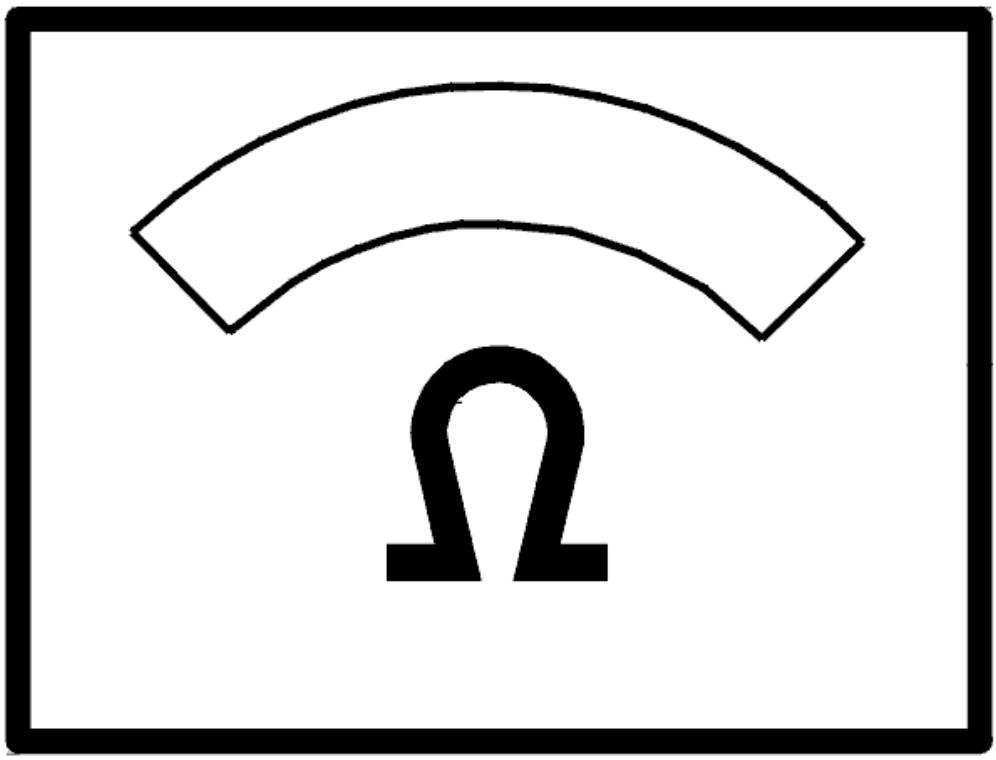


Fig. 275: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

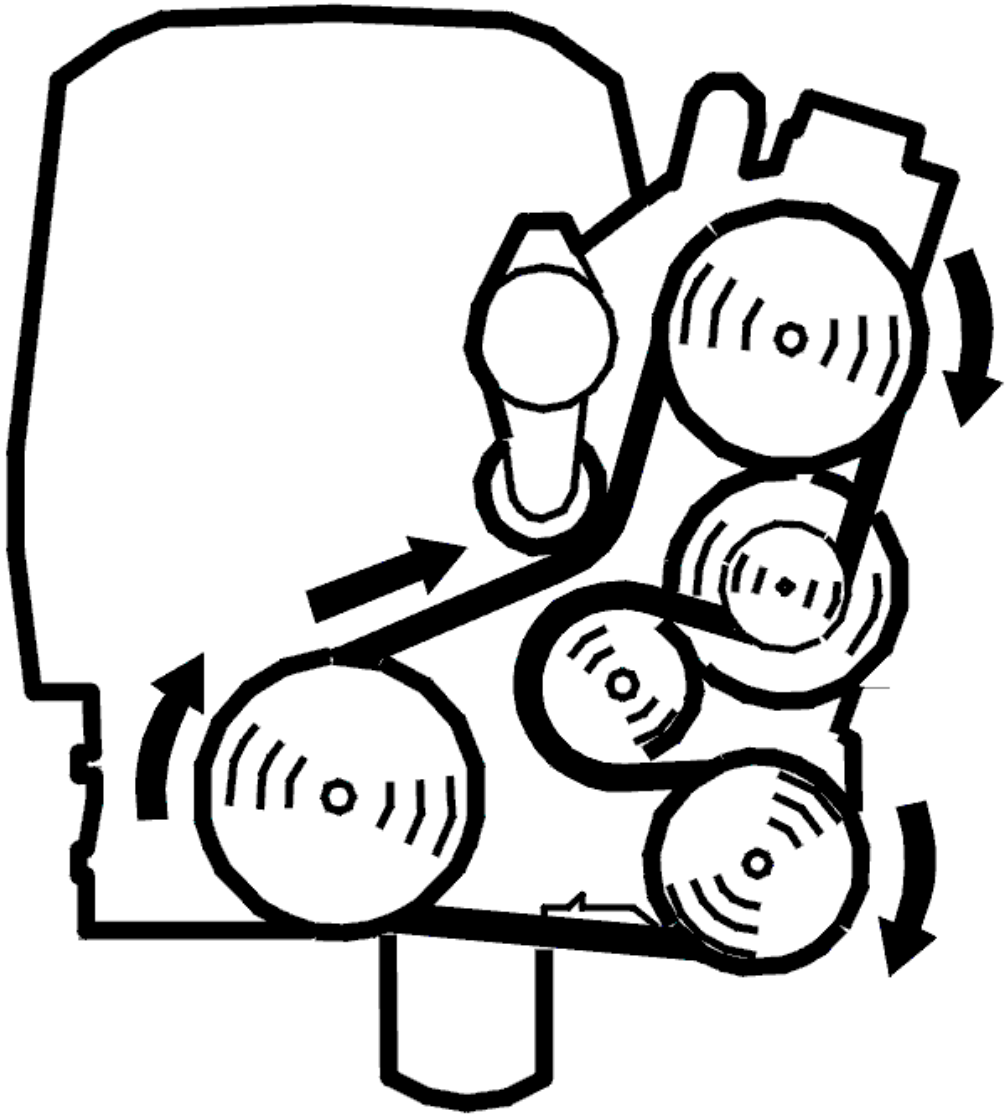


Fig. 276: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

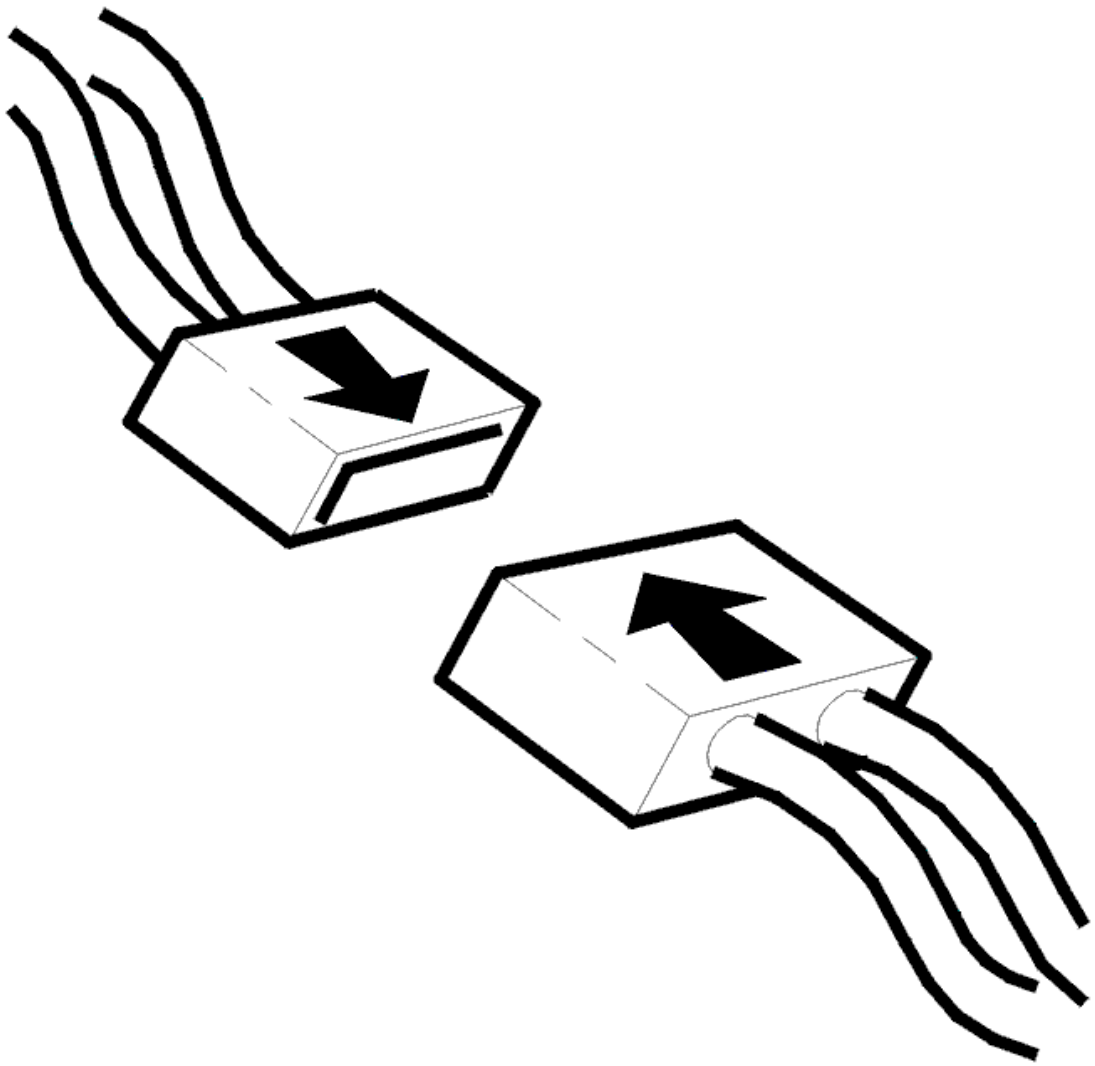


Fig. 277: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Start the engine and let it idle.
- Gear selector in position P.
- Read off the transmission speed.

  Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated.

  Compare with the engine speed (RPM).

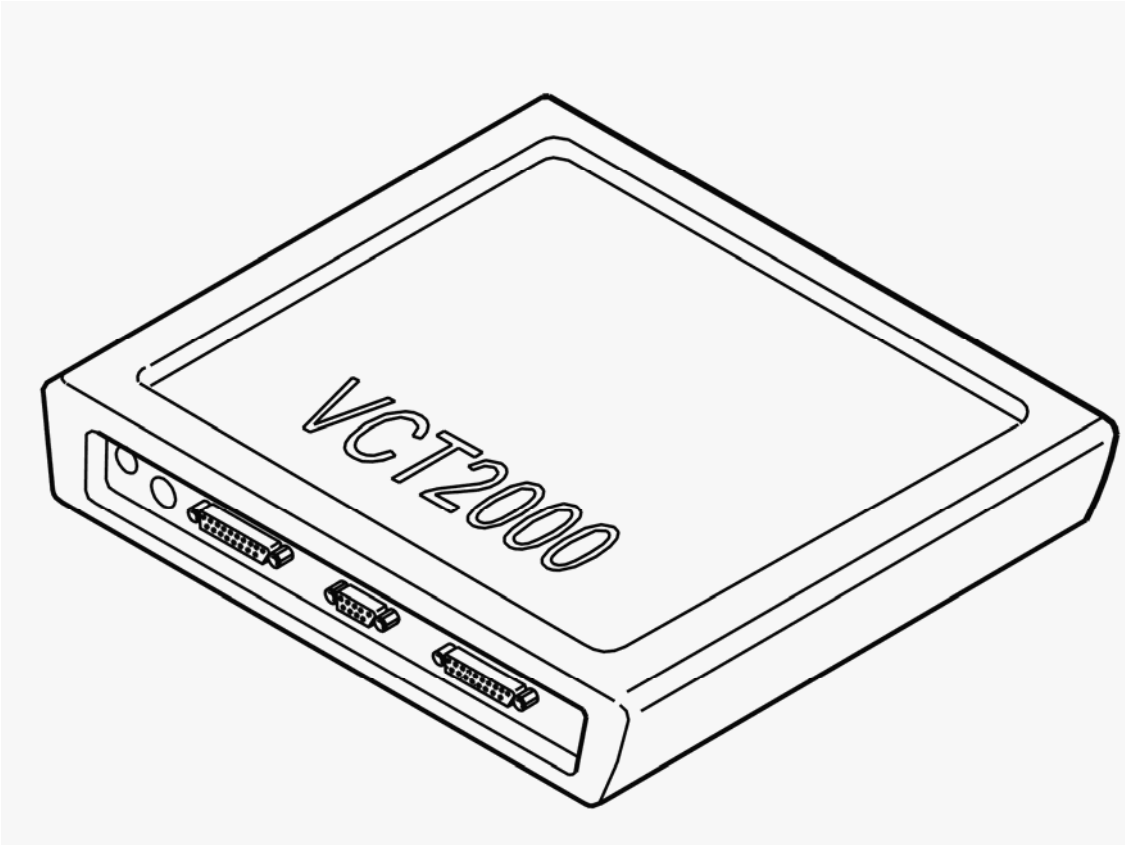


Fig. 278: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0027: BACK-UP (REVERSE) GEAR. INCORRECT GEAR RATIO (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

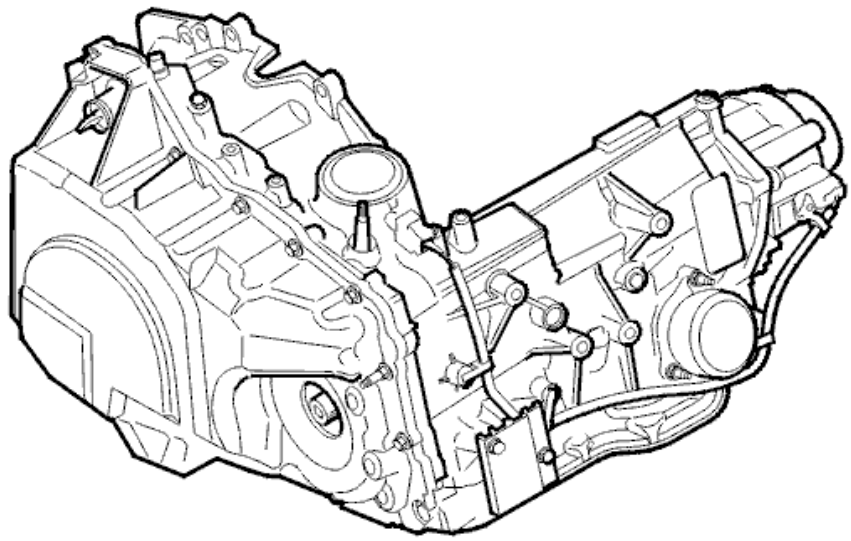


Fig. 279: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) calculates the ratio between the transmission input speed and the vehicle speed. There is a specific ratio for each gear. Diagnostic trouble code (DTC) TCM-0027 is stored if the control module registers that the ratio deviates by more than 10% when oil temperature is above +20°C and throttle opening exceeds 3%.

Substitute Value

- The control module "Limp Home" program initiated.

Possible Source

- Contact resistance in the Solenoid S1 and S2 circuits.
- Interference with or faulty transmission speed sensor signal.
- Interference with or faulty speed signal from transmission speed sensor.
- Gear-shift position sensor incorrectly adjusted.

- Transmission oil level too low.
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.
- Defective power ground.
- Short-circuited to ground in transmission speed sensor signal cable.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- No shifting.
- Harsh gear shifting.

HINT: Harsh shifting - due to disabled line pressure solenoid STH control. This results in constant maximum line pressure.

HINT: No shifting - because the transmission control module (TCM) prevents activation of the solenoids. This stops gear-shifting.

INCORRECT GEAR RATIO

CHECKS

CHECKING SOFTWARE

HINT: This may be due to old software in Engine control module (ECM). The fault can be rectified by updating the software in the Transmission Control Module (TCM).

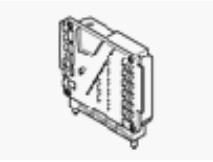


Fig. 280: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

It is possible to download new software to the Transmission Control Module (TCM). When ordering software, the vehicle's software and hardware are compared with Volvo's central database. If the comparison corresponds, the software is downloaded to the control module.

Check and download the latest software for the Transmission Control Module (TCM) if available and resume this fault tracing.

- **Continue**

  Refer to **CHECK THE QUALITY OF THE TRANSMISSION OIL**

CHECK THE QUALITY OF THE TRANSMISSION OIL

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct.

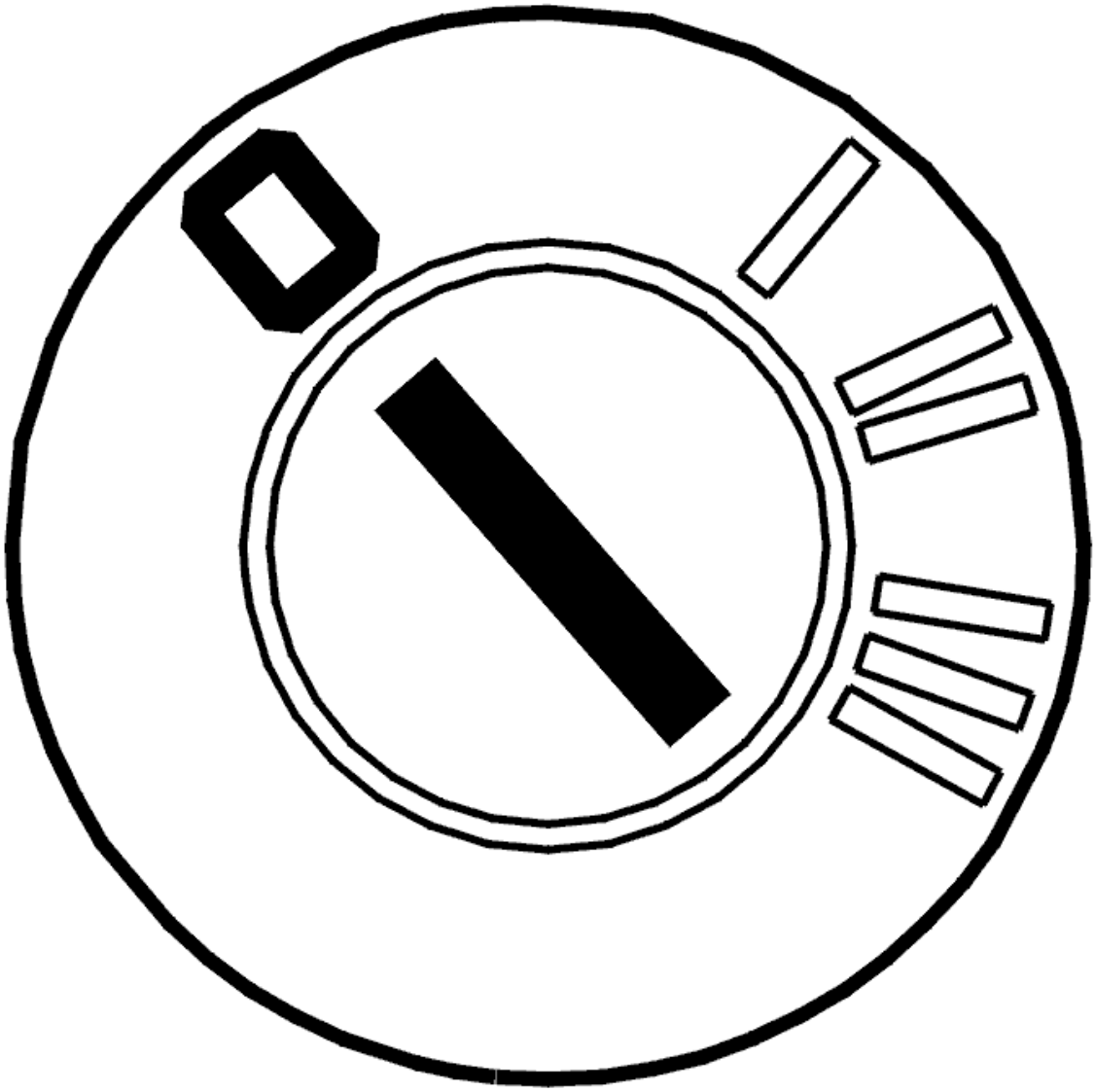


Fig. 281: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission oil quality. Take a sample using the dip stick. See **CHECKING FOR**

COOLANT IN THE OIL

Select an alternative

1. Glycol in the transmission fluid.

   Refer to **REPLACING THE TRANSMISSION**

2. No fault detected.

   Refer to **CHECKING THE OIL LEVEL IN THE TRANSMISSION**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

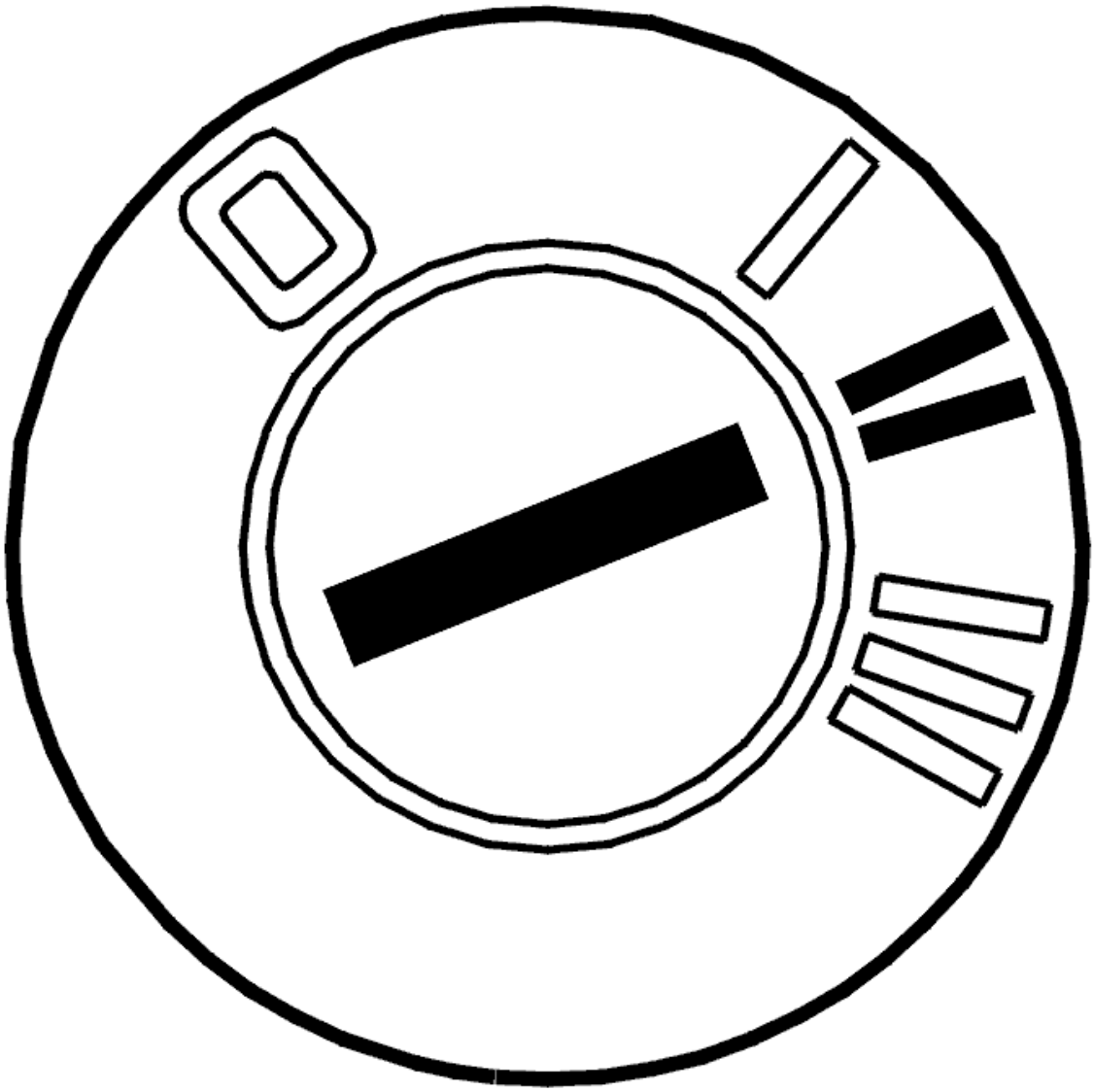


Fig. 282: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-0027, TCM-0028, TCM-0029, TCM-002A or TCM-002B are stored, these must be fault-traced after this fault-tracing is completed.

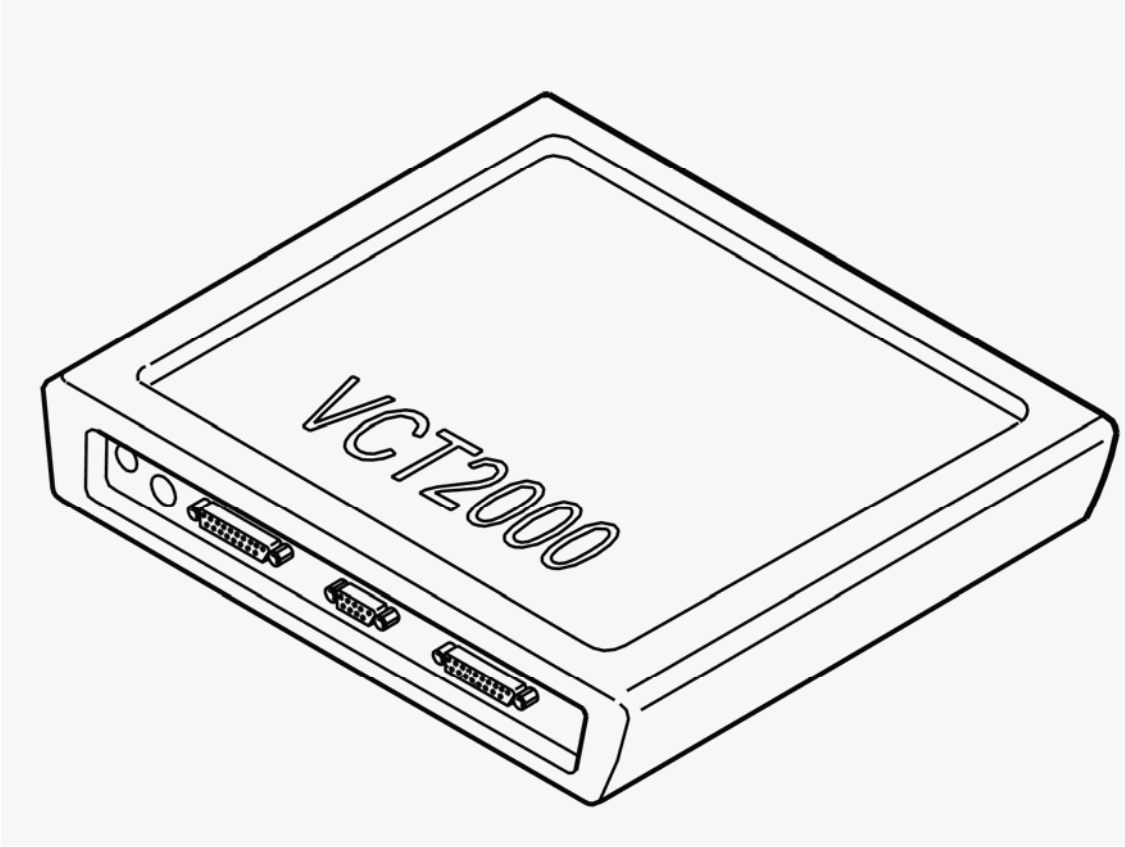


Fig. 283: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING SENSORS AND RATIOS**

CHECKING THE WIRING AND COMPONENT

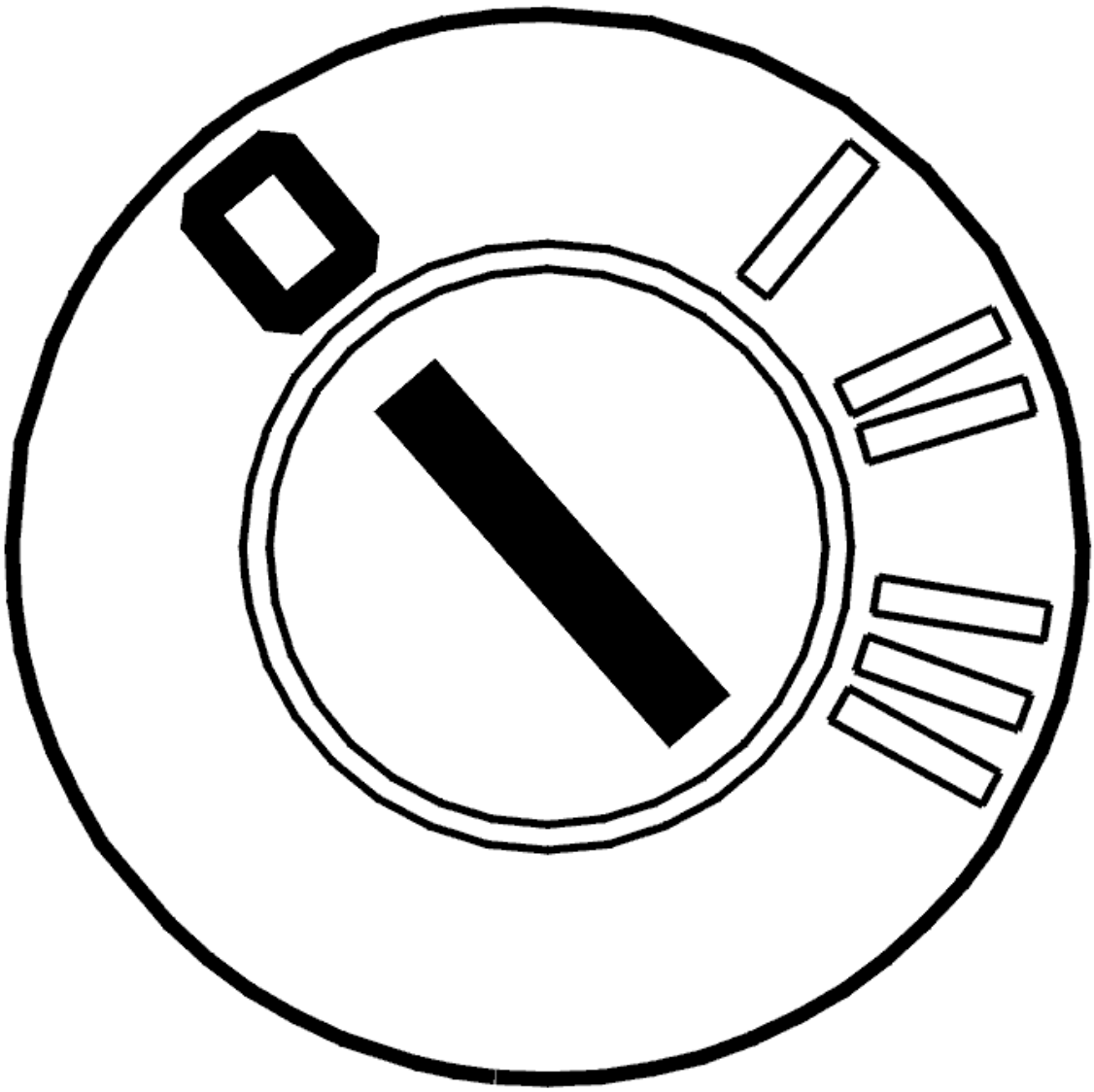


Fig. 284: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the power supply cable between the transmission control module (TCM) terminal #A57 (#A57) and transmission output speed sensor terminal #1. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

  Check the signal cable transmission control module (TCM) terminal #A39 (#A39) and transmission output speed sensor terminal #2. Check for an open-circuit, a short-circuit to ground and for a short-circuit to supply voltage.

  HINT: With the control module connected, the ignition on and a voltmeter connected between

transmission output speed sensor terminals #1 and #2 (control module side), the voltage must be approximately 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To check or replace the transmission output speed sensor, see **OUTPUT SPEED SENSOR TRANSMISSION, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

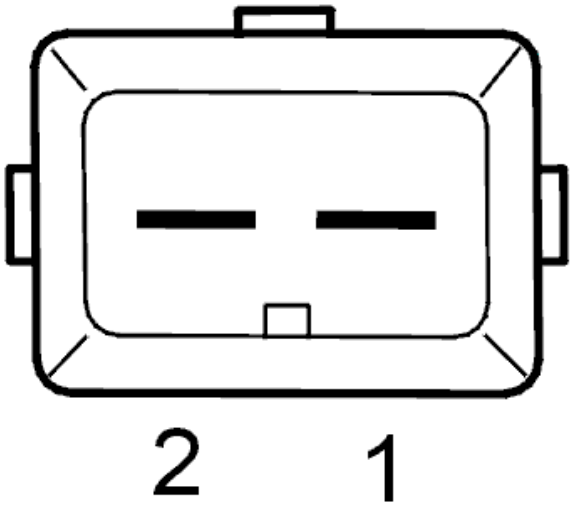


Fig. 285: Identifying Vehicle Speed Sensor (VSS) Connector Terminals
Courtesy of VOLVO CARS CORPORATION

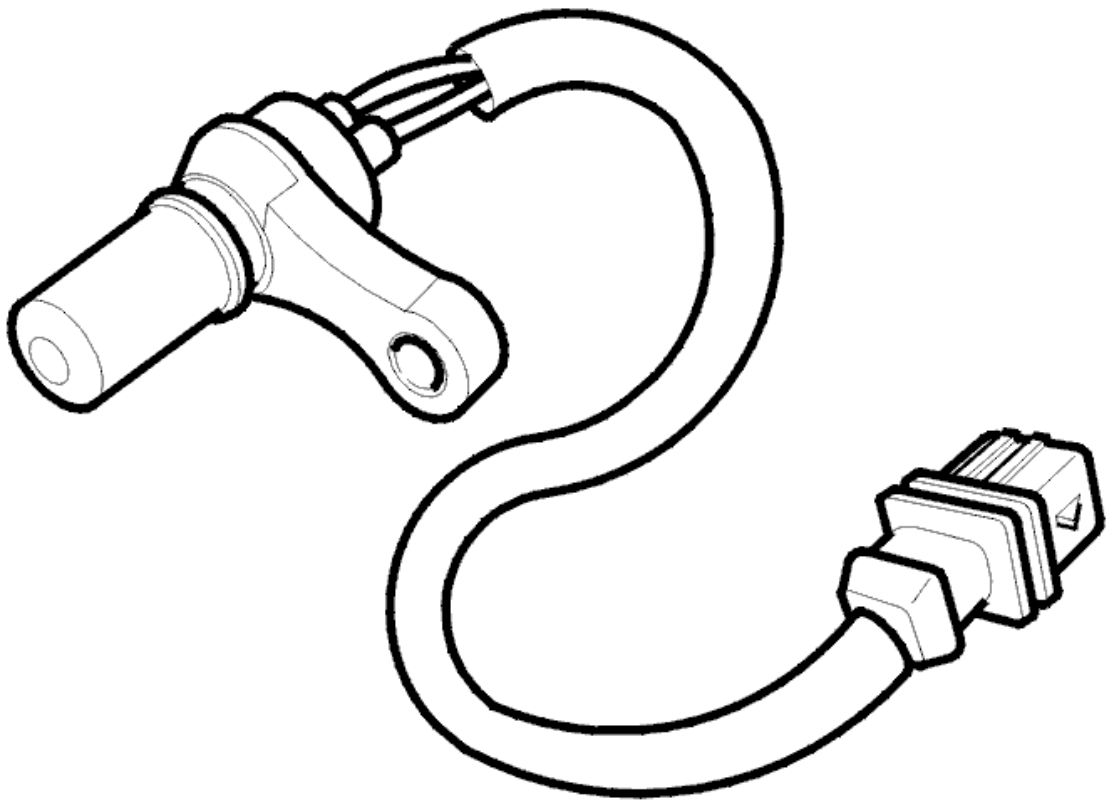


Fig. 286: Identifying Automatic Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING WIRING AND SENSORS

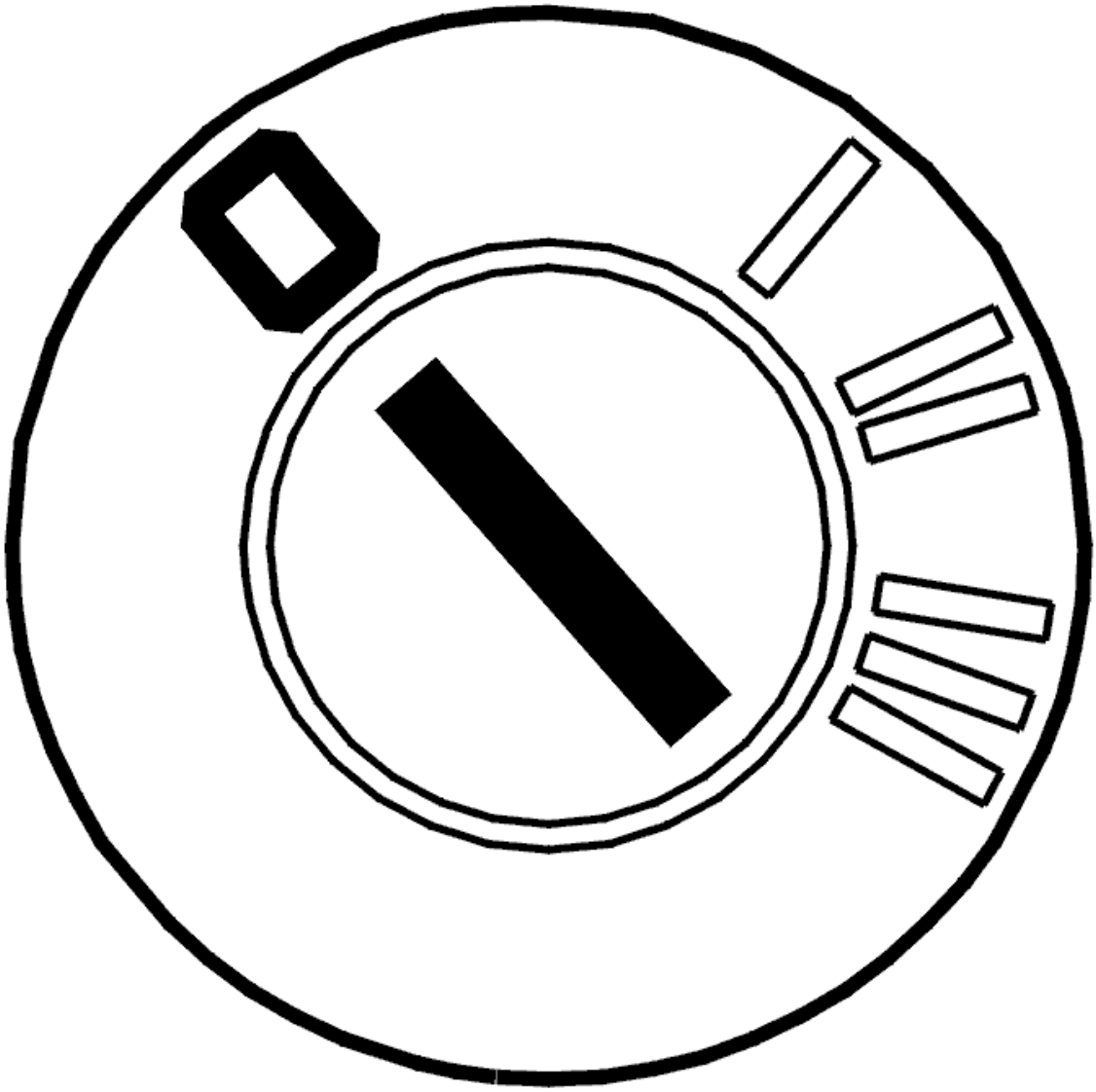


Fig. 287: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

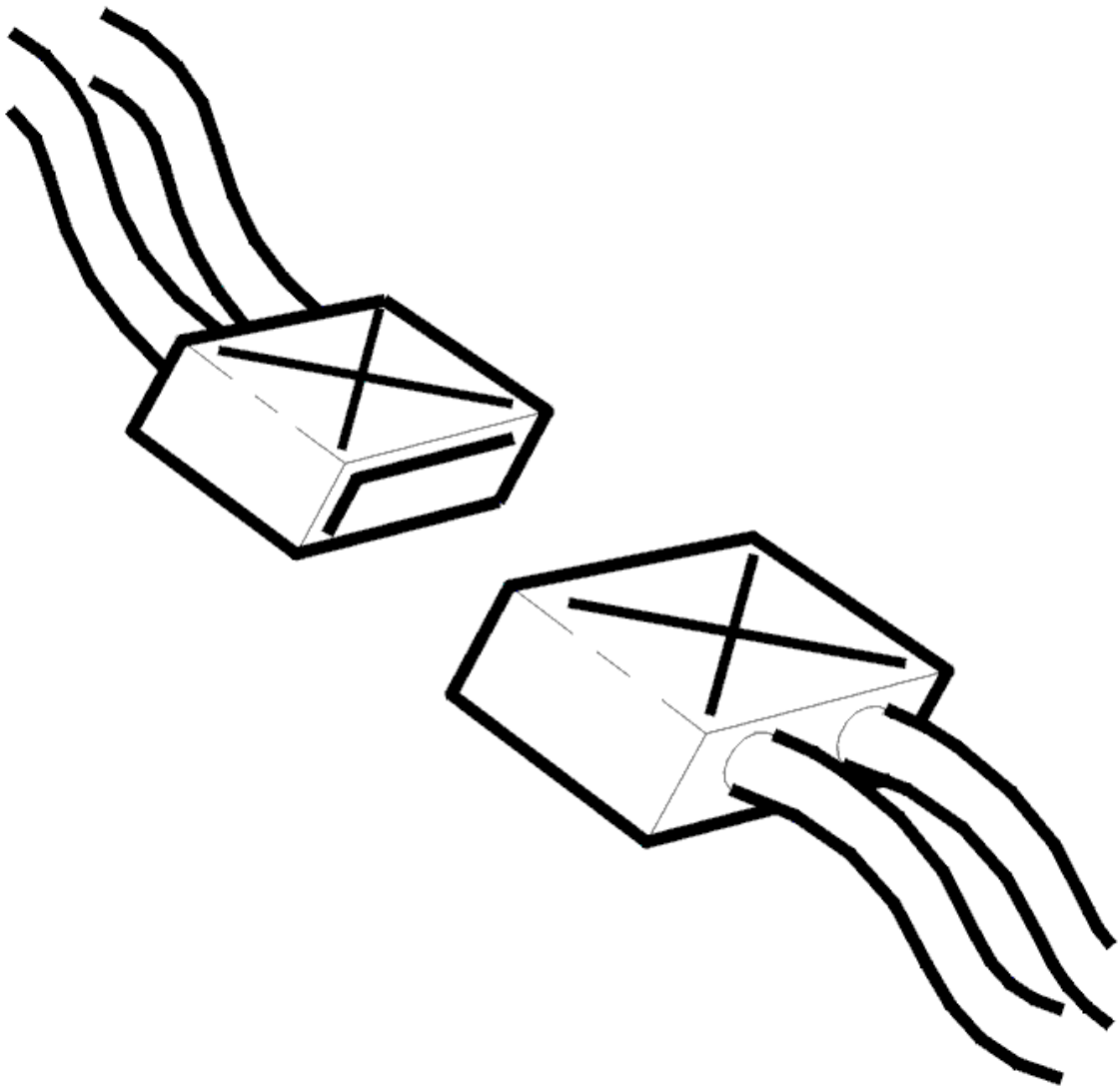


Fig. 288: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

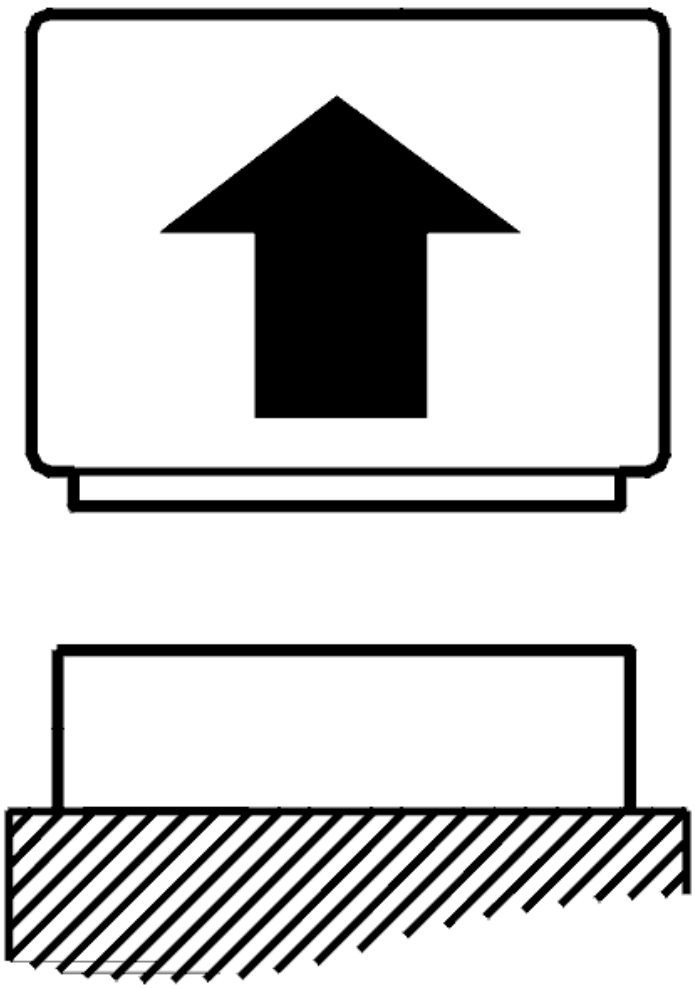


Fig. 289: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the transmission
- Disconnect the control module
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9511428** to the transmission connector (control module side).

  Check the power supply cable between the transmission control module (TCM) terminal #A59 (#A59) and transmission connector terminal #S (#A16). Check for an open-circuit, a short-circuit to ground and for a short-circuit to supply voltage.

  Check the signal cable between transmission control module (TCM) terminal #A41 (#A41) and

transmission connector terminal #V (#A19). Check for an open-circuit, a short-circuit to ground and for a short-circuit to supply voltage.

HINT: With the transmission control module (TCM) connected, the ignition on and a voltmeter connected between transmission connector terminals #S (#A16) and #V (#A19) (control module side), the voltage must be approximately 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- For information about signals to the transmission connector, see **SIGNAL DESCRIPTION. CONNECTOR 4T65 EV/EV-GT**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

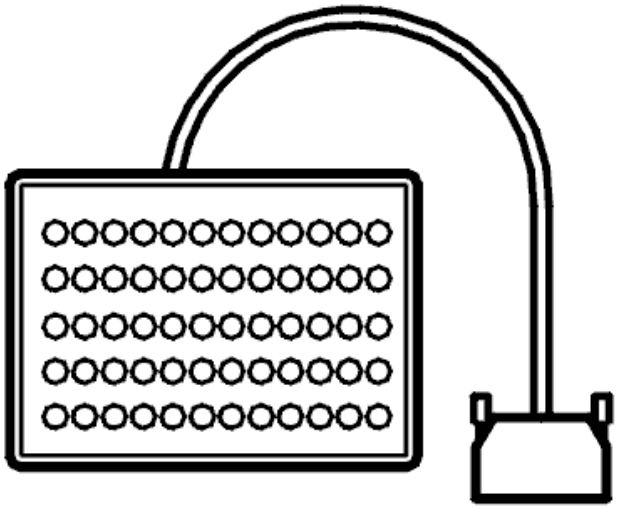


Fig. 290: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

- **NO**

Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

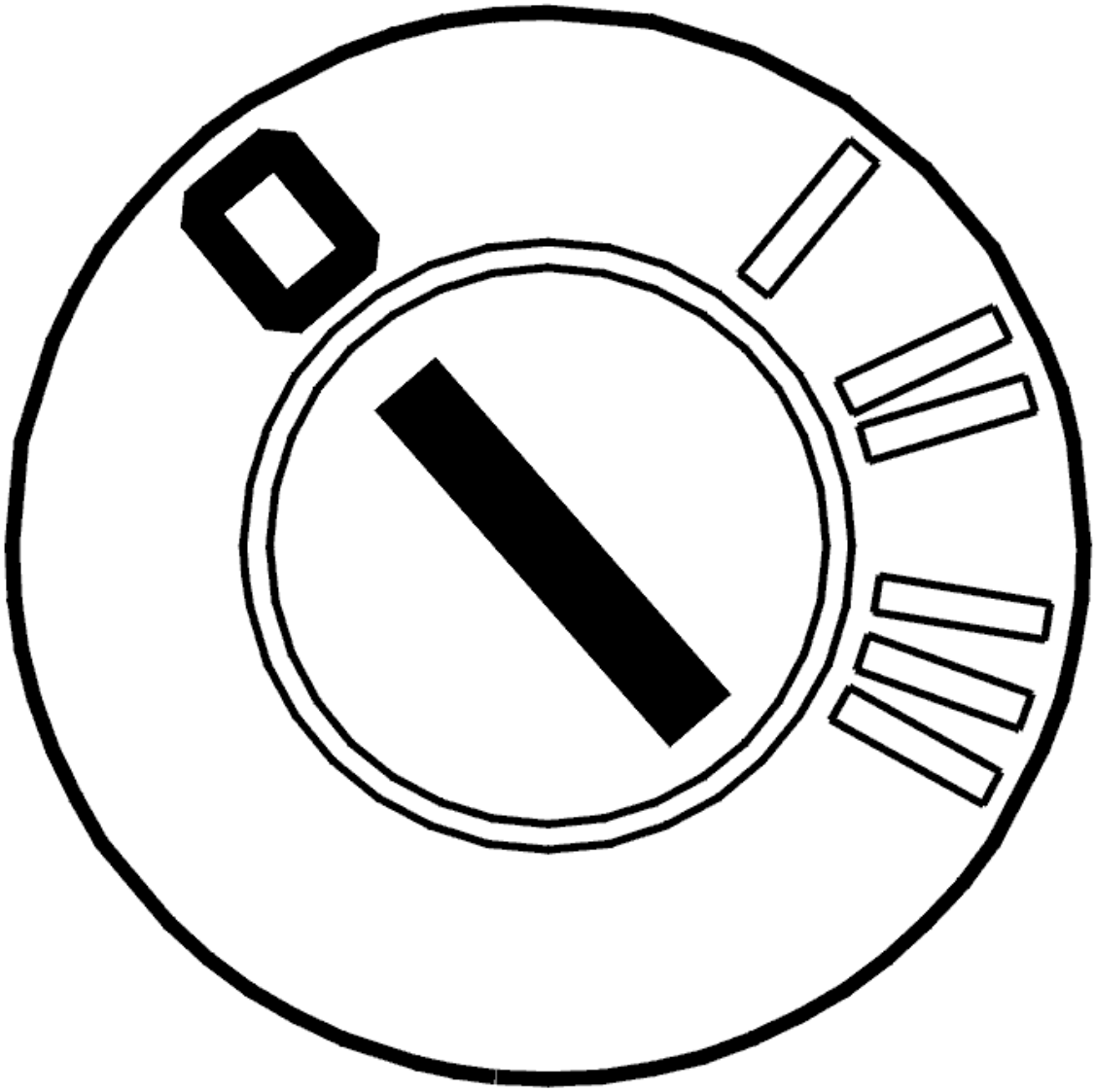


Fig. 291: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable for power supply between transmission connector terminal #S (#A16) and transmission input speed sensor connector terminal #A. Check for an open-circuit, a short-circuit to ground and for a short-circuit to supply voltage.

Check the signal cable between transmission connector terminal #V (terminal #A19) and transmission input speed sensor connector terminal #B. Check for an open-circuit, a short-circuit to ground and a short-

circuit to supply voltage.

Remedy as necessary.

Other information:

- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** . To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the transmission speed sensor, see **INPUT SPEED SENSOR TRANSMISSION, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

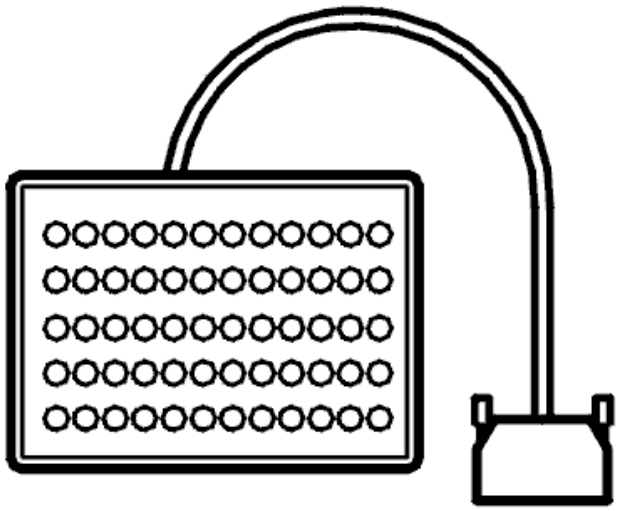


Fig. 292: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **RESETTING THE ADAPTATION**

- **NO**

  Refer to **FAULT-TRACING INFORMATION**

REPLACING THE TRANSMISSION

Fault-tracing indicates a fault in the transmission. Replace the transmission.

If coolant is detected in the transaxle oil, the transaxle, radiator and hoses between the radiator and transaxle must be replaced.

When replacing the transmission, the cooler unit, including the additional cooler must be replaced if applicable.

Other information:

- To remove the transmission, see **TRANSMISSION, REMOVING** and
- To install the transmission, see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .

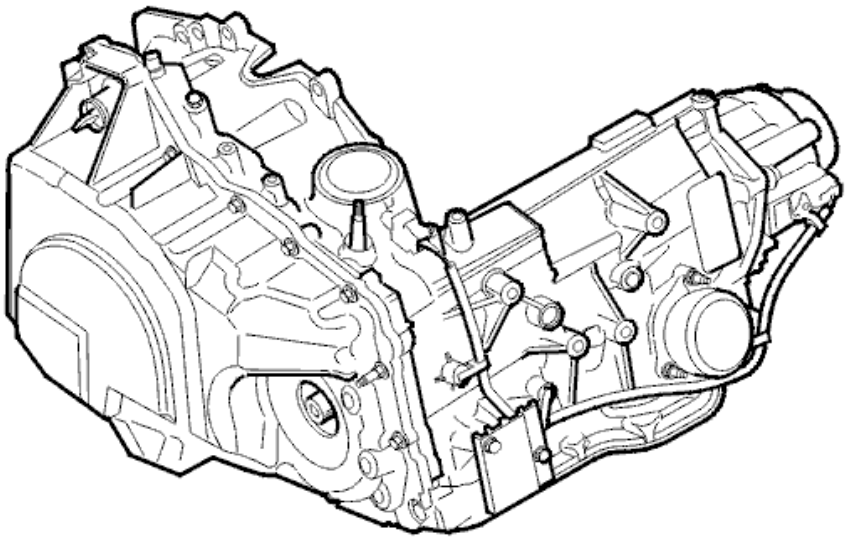


Fig. 293: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

FAULT-TRACING INFORMATION

The fault-tracing indicates that the control module has previously detected a fault but that the fault is no longer active.

CHECKING SENSORS AND RATIOS

- Ignition off.
- Check the control module and transmission input speed sensor connectors. Check for contact resistance and oxidation. Remedy if necessary
- Check the control module and speed sensor connectors. Check for contact resistance and oxidation. Remedy if necessary
- Raise the car so that the drive wheels are clear of the ground
- Start the engine. Allow the engine to idle
- If the car has STC or DSTC, these functions must be disengaged. Press in the STC/DSTC button on the center console. Hold the button in for at least two seconds
- Click the symbol for VCT2000 in order to start the test sequence.

NOTE: Diagnostic trouble codes (DTCs) may be stored in the ABS system when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

- To access the control module connector, see **CONNECTING THE BREAKOUT BOX**
- To access the speed sensor connector, see **OUTPUT SPEED SENSOR TRANSMISSION, REPLACING**
- To access the engine speed sensor connector, see **INPUT SPEED SENSOR TRANSMISSION, REPLACING**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**
- see **TABLES - RATIOS AND SHIFT PATTERNS.**

Select one of the following options

1. One of the engine speed sensors has not been updated.

   Refer to **CHECKING WIRING AND SENSORS**

2. Previously stored DTCs have been detected.

   Refer to **REPLACING THE TRANSMISSION**

3. No fault detected.

   Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

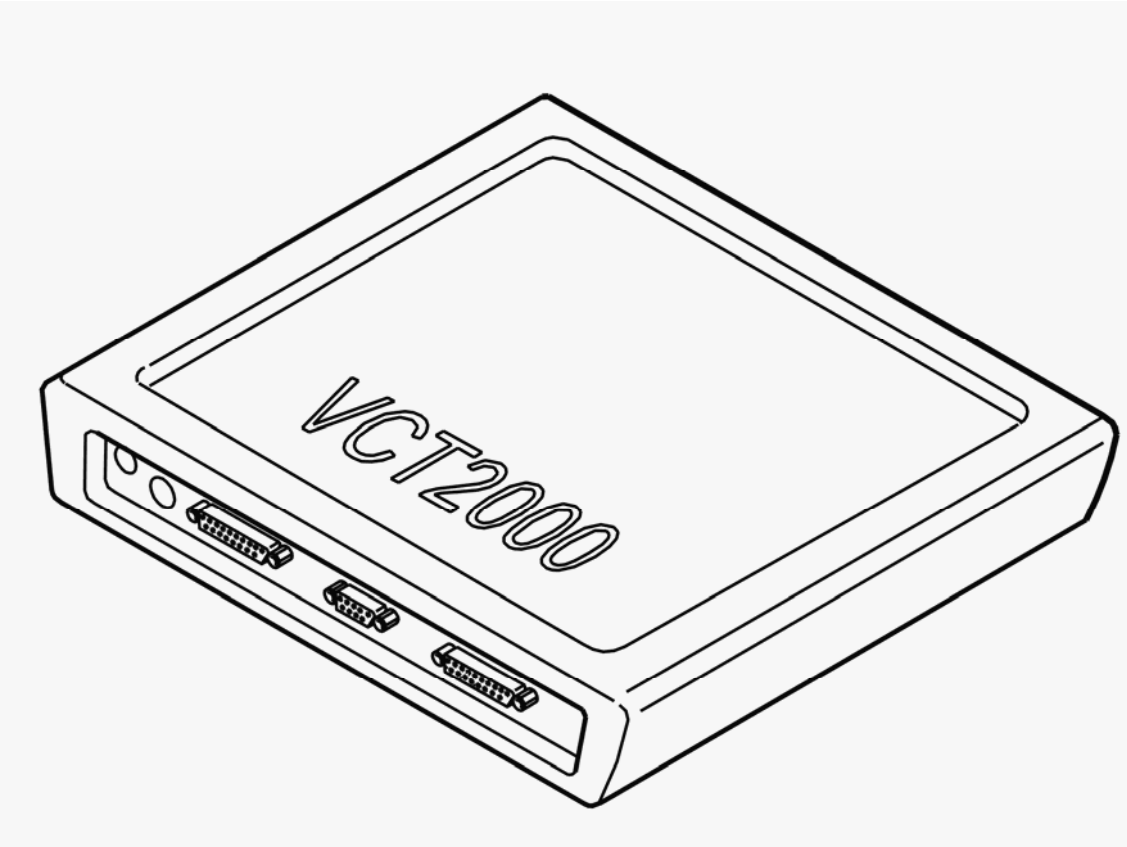


Fig. 294: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

FAULT-TRACING INFORMATION

The fault must now be detected and remedied. As this is not the case, the fault-tracing has failed.

This fault can also be caused by an internal fault in the Transmission Control Module (TCM) or its component parts. Fault trace the Transmission Control Module (TCM) and rectify as necessary.

CHECKING THE OIL LEVEL IN THE TRANSMISSION

CHECK THE TRANSMISSION OIL LEVEL

NOTE: The transmission fluid level is extremely important for transmission function. Therefore it is imperative that it is correct. In addition the oil level is dependent on oil temperature.

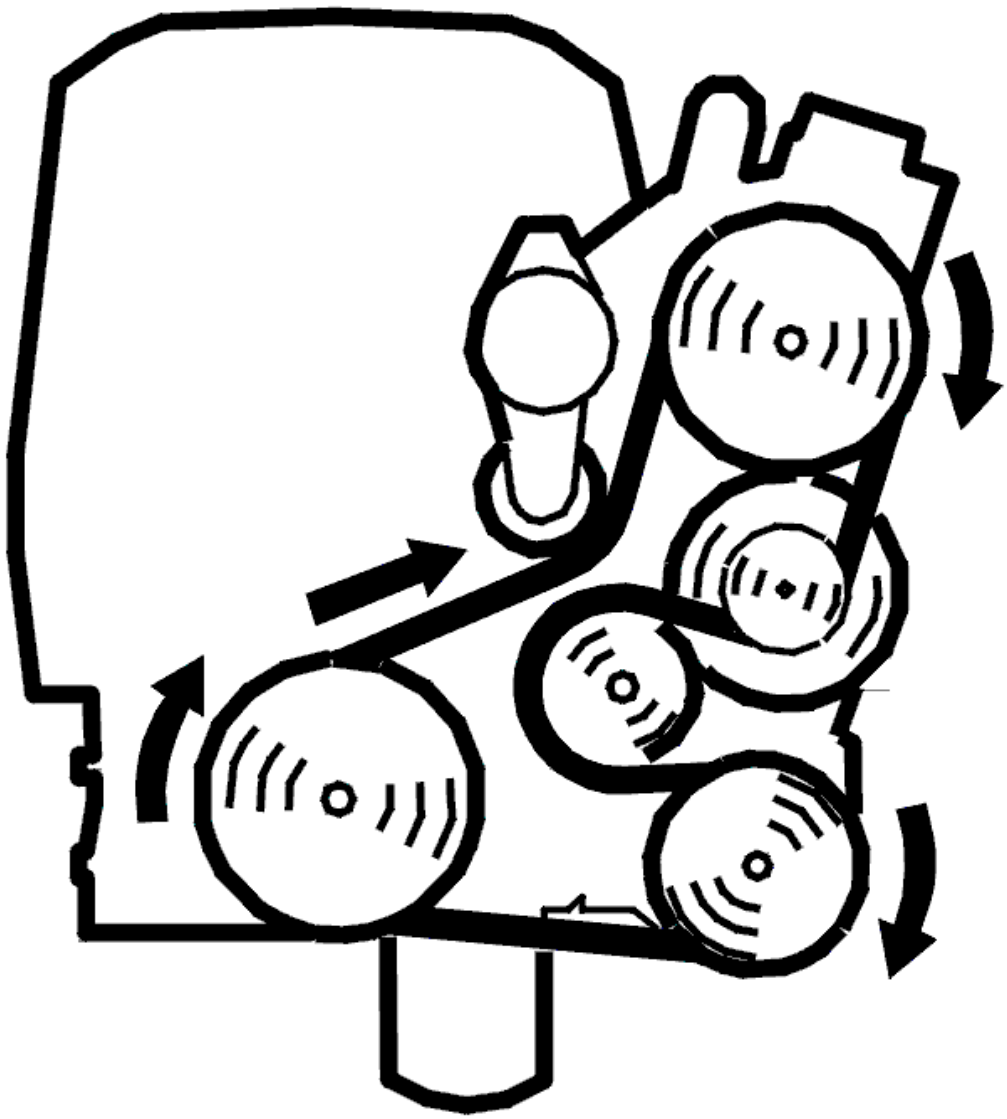


Fig. 295: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the car
- Read off the oil temperature.

When checking the gearbox oil level the oil temperature **must** be **80 °C - 90 °C** .

At the correct temperature, the oil level should be between "Min hot" and "Max hot".

Oil level

Too high: Drain the transmission fluid to the correct level
Too low: Check the transmission for leakage.

Remedy as necessary.

Other information:

- To check and adjust the oil level, see **OIL LEVEL, CHECKING** .

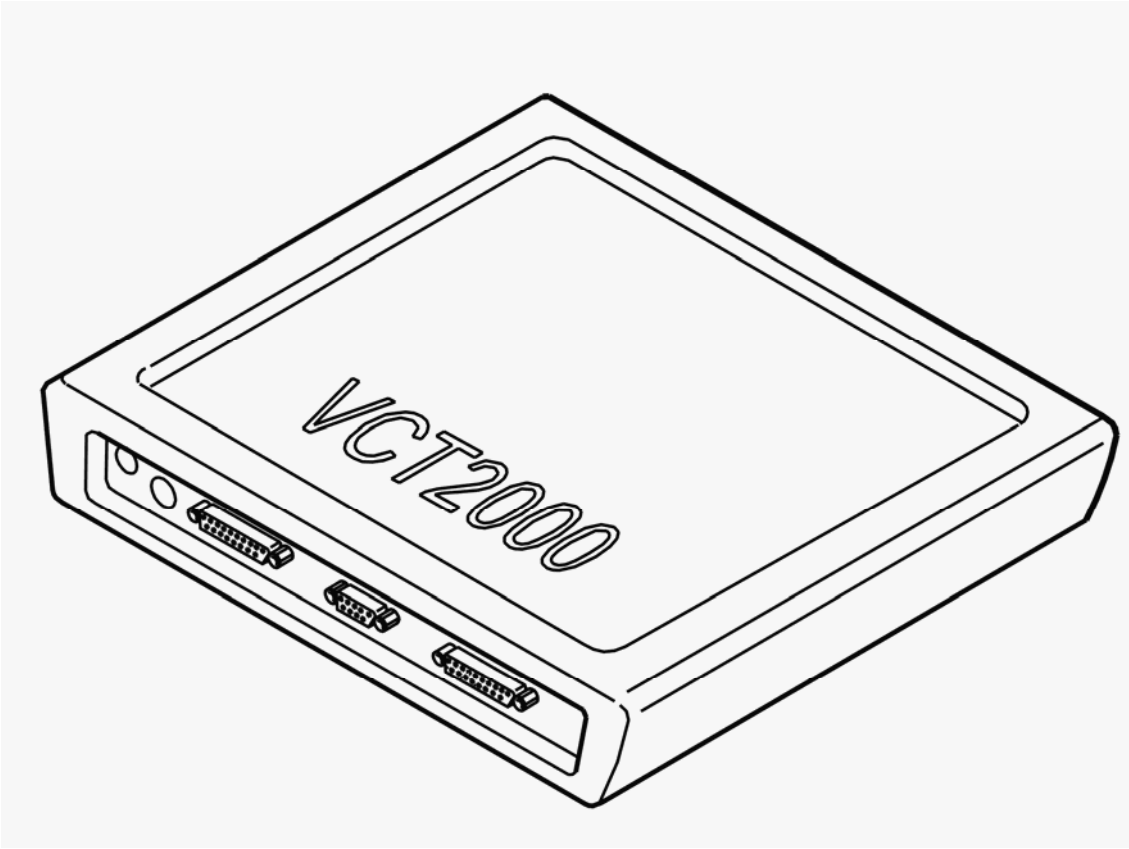


Fig. 296: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

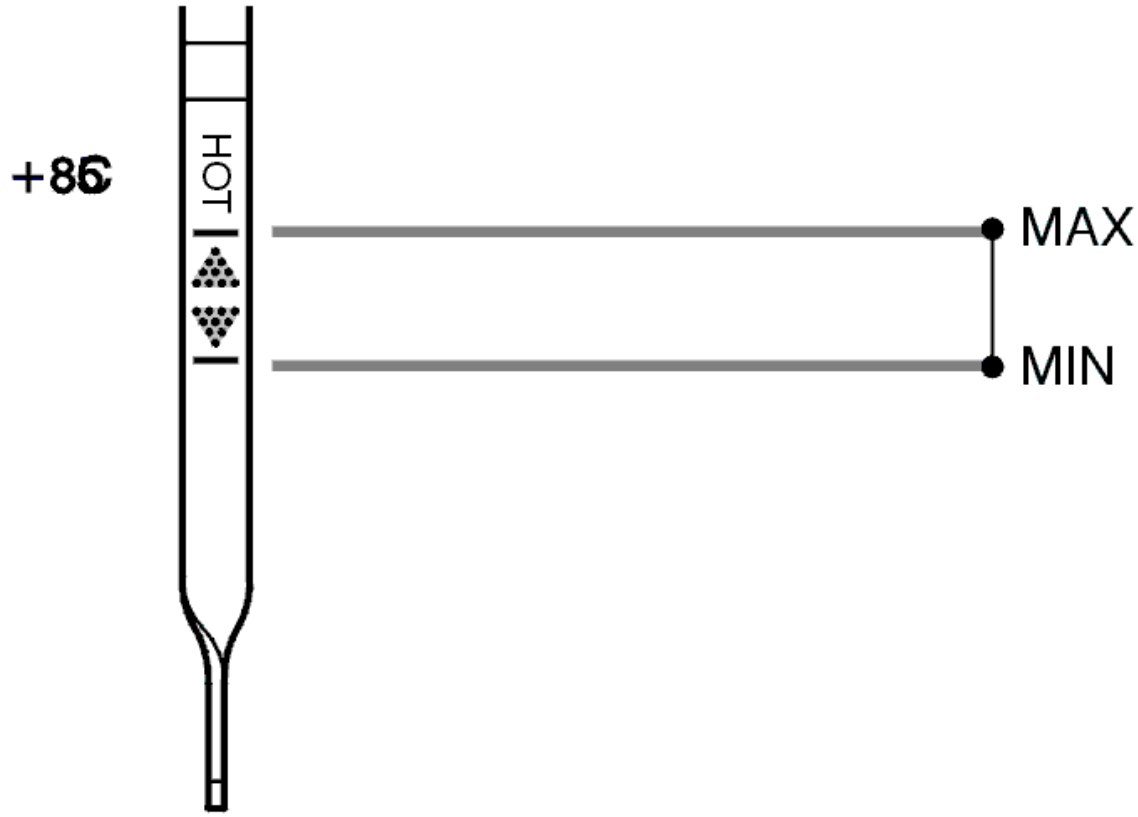


Fig. 297: Identifying Oil Level / Temperature
Courtesy of VOLVO CARS CORPORATION

Was the transmission fluid level correct?

- **YES**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

- **NO**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect

circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

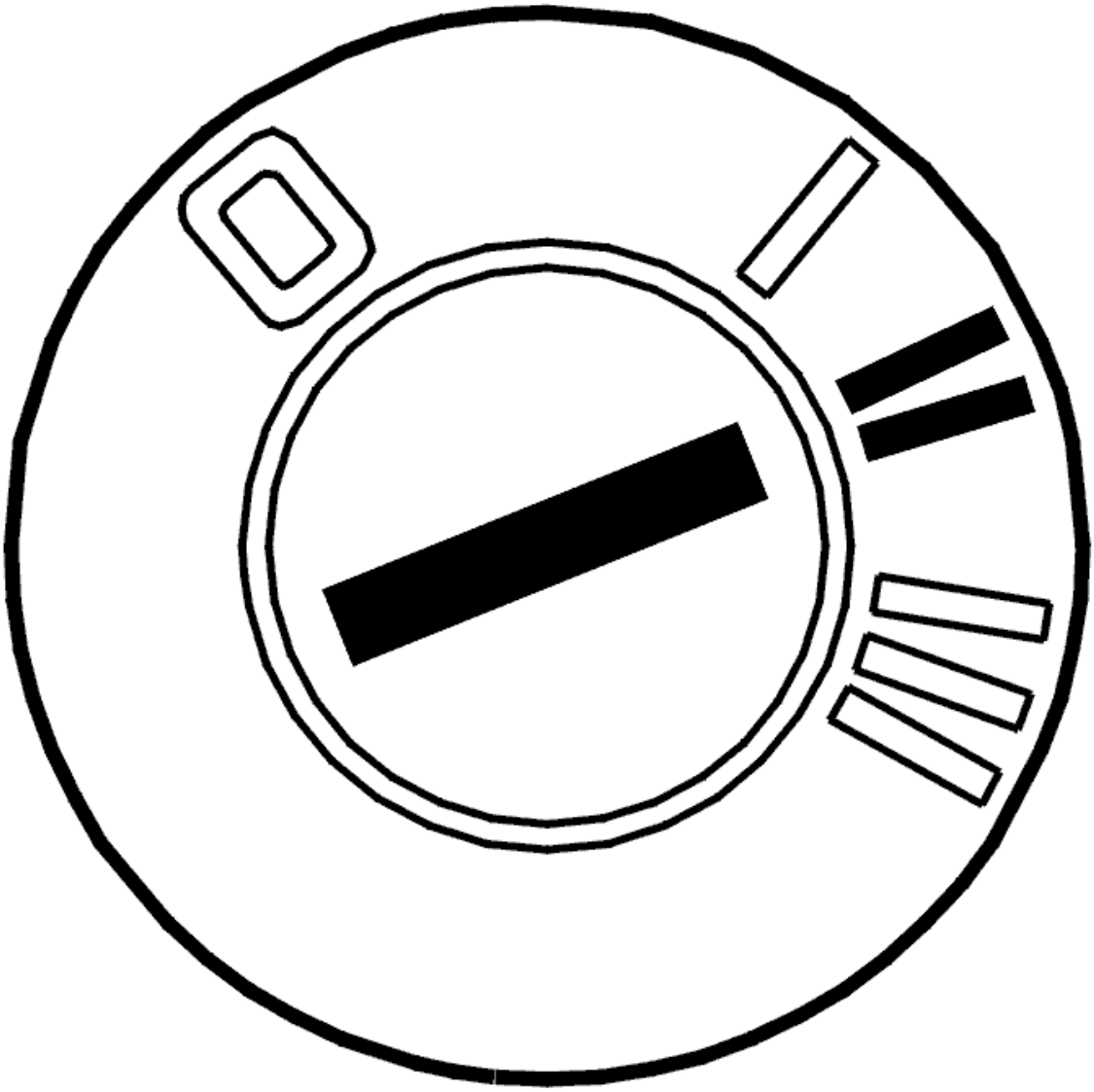


Fig. 298: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

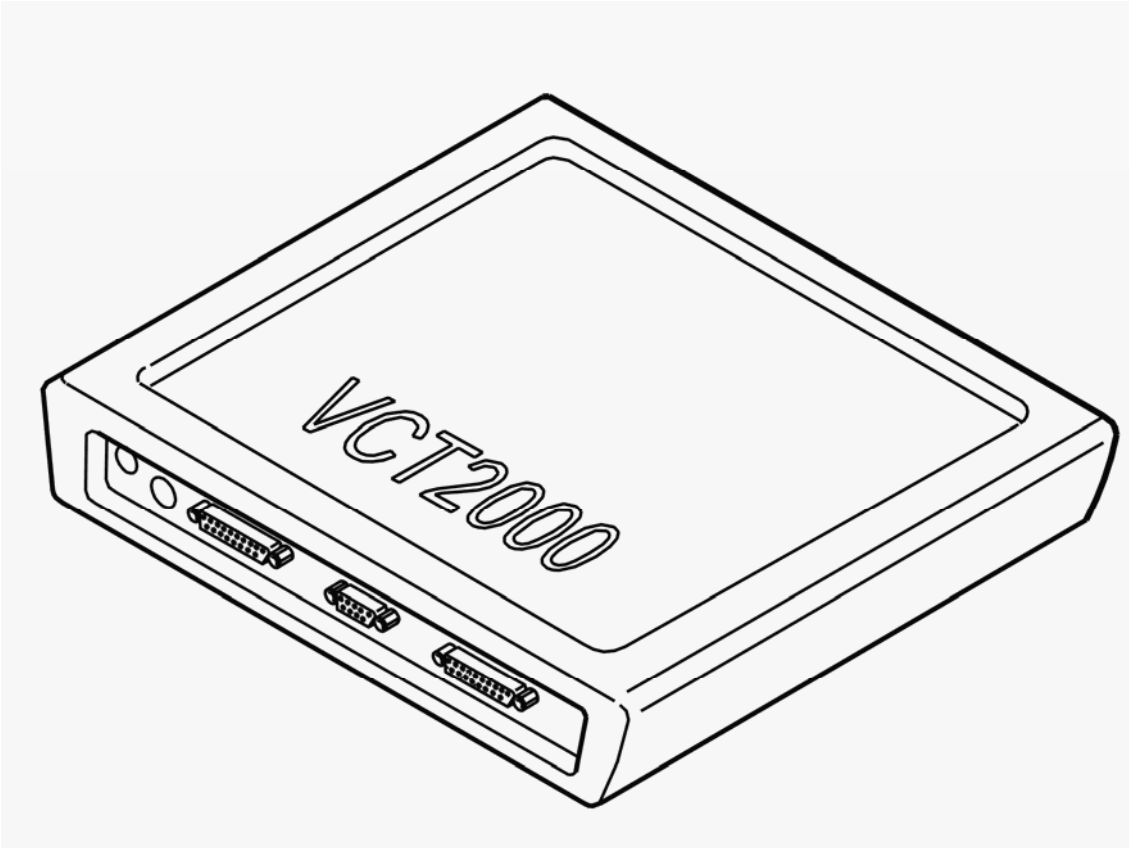


Fig. 299: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

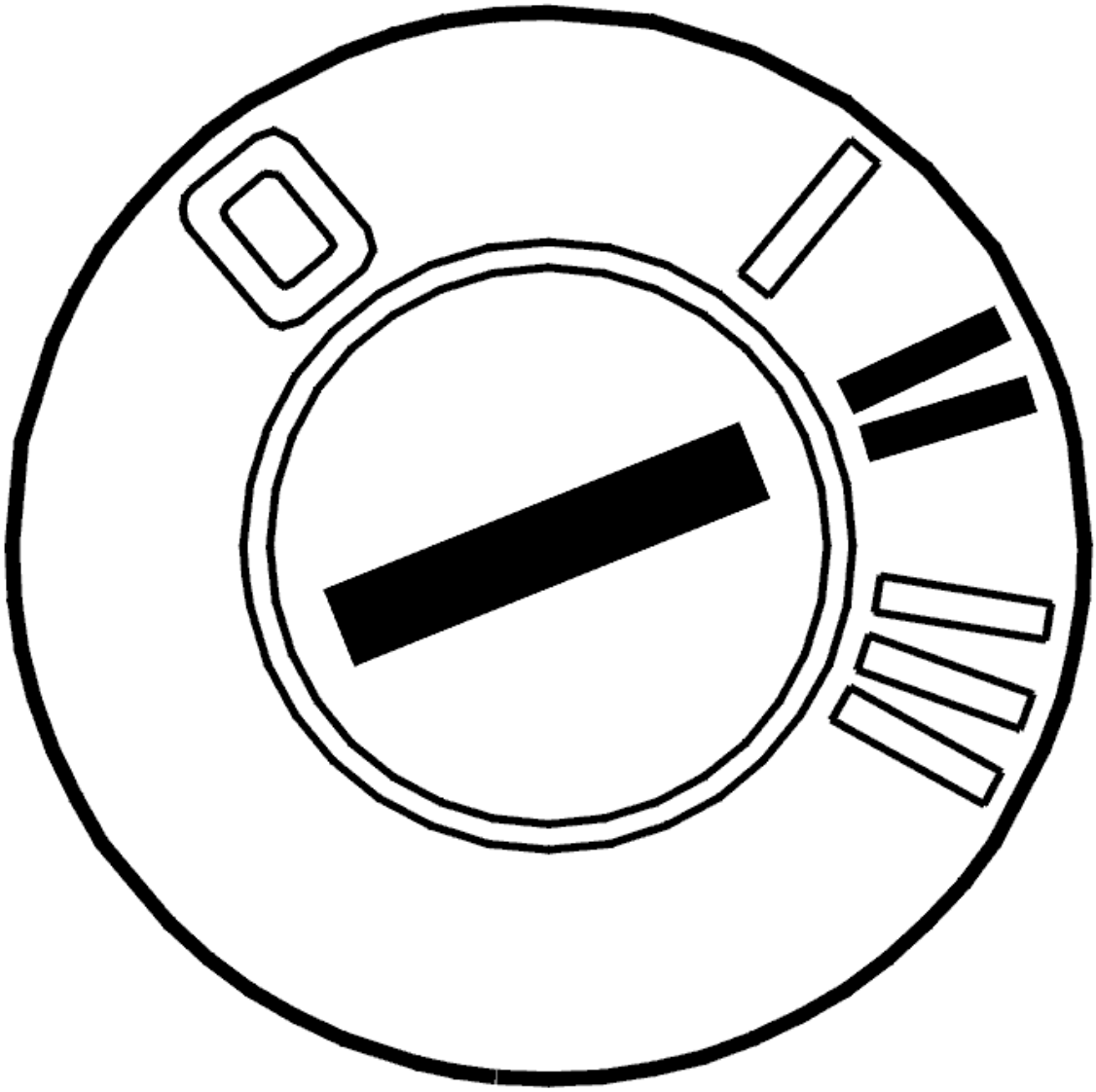


Fig. 300: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

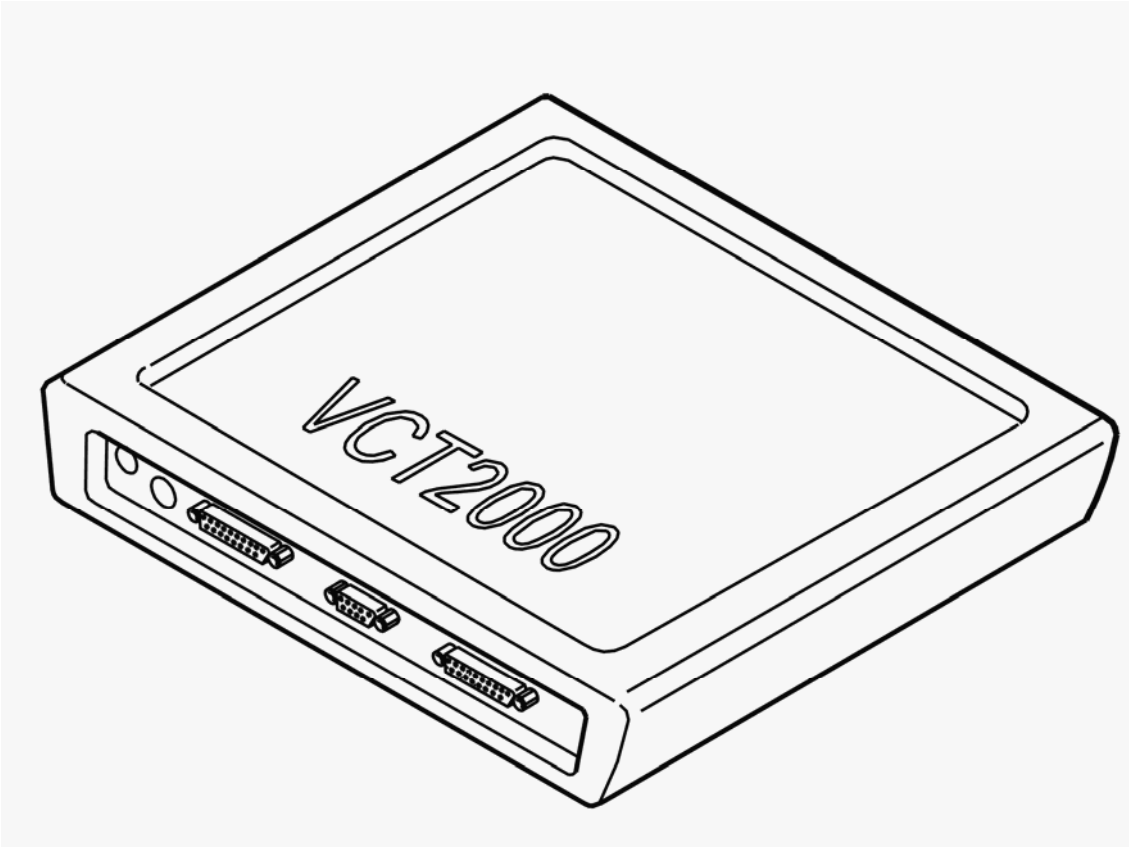


Fig. 301: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

TEST DRIVING

NOTE: Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

- Engine running.
- Activate TEST MODE
- Test drive the car according to the driving schedule below.

HINT: Test drive the car and try to regenerate the fault.

Move the gear selector during the test drive to the gear position indicated in the table for each diagnostic trouble code (DTC) and transmission. Follow the criteria below.

Diagnostic Trouble Code (DTC)	Gear shift position	
	4T65EV	4T65EV-GT
TCM-0027	R	R
TCM-0028	1	1
TCM-0029	2	2
TCM-002A	3	3
TCM-002B	D	4

Criteria for diagnostic trouble code (DTC):

- No shifting (automatic or manual) must take place for approximately 20 seconds
- The gear selector must not be moved out of position
- Speed must be in excess of 30 km/h
- Positive engine torque (no engine braking)
- Transmission fluid temperature above than 20°C.

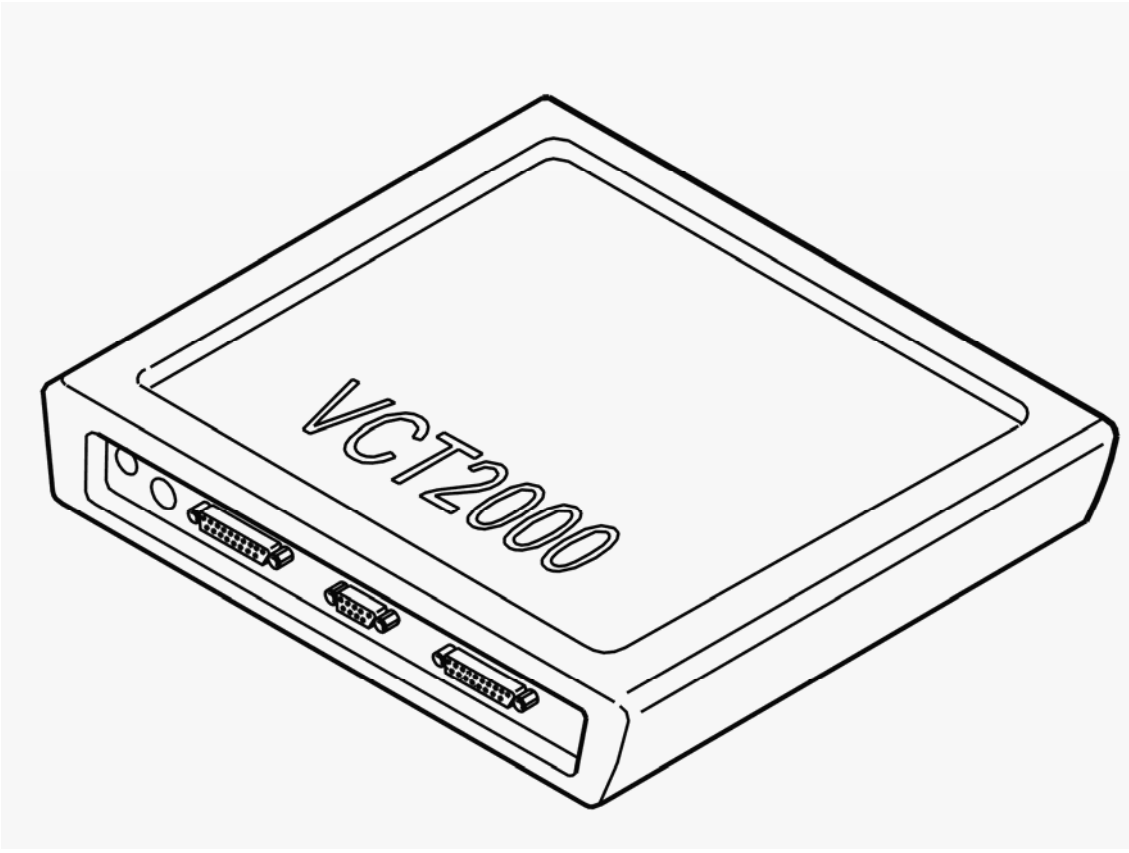


Fig. 302: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

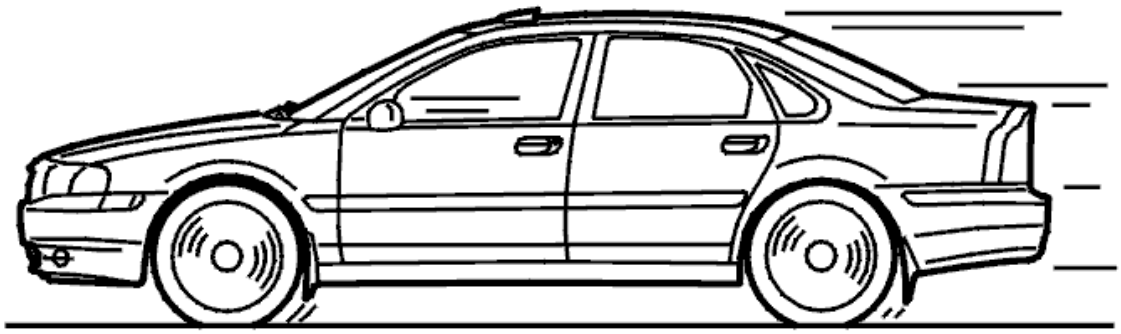


Fig. 303: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

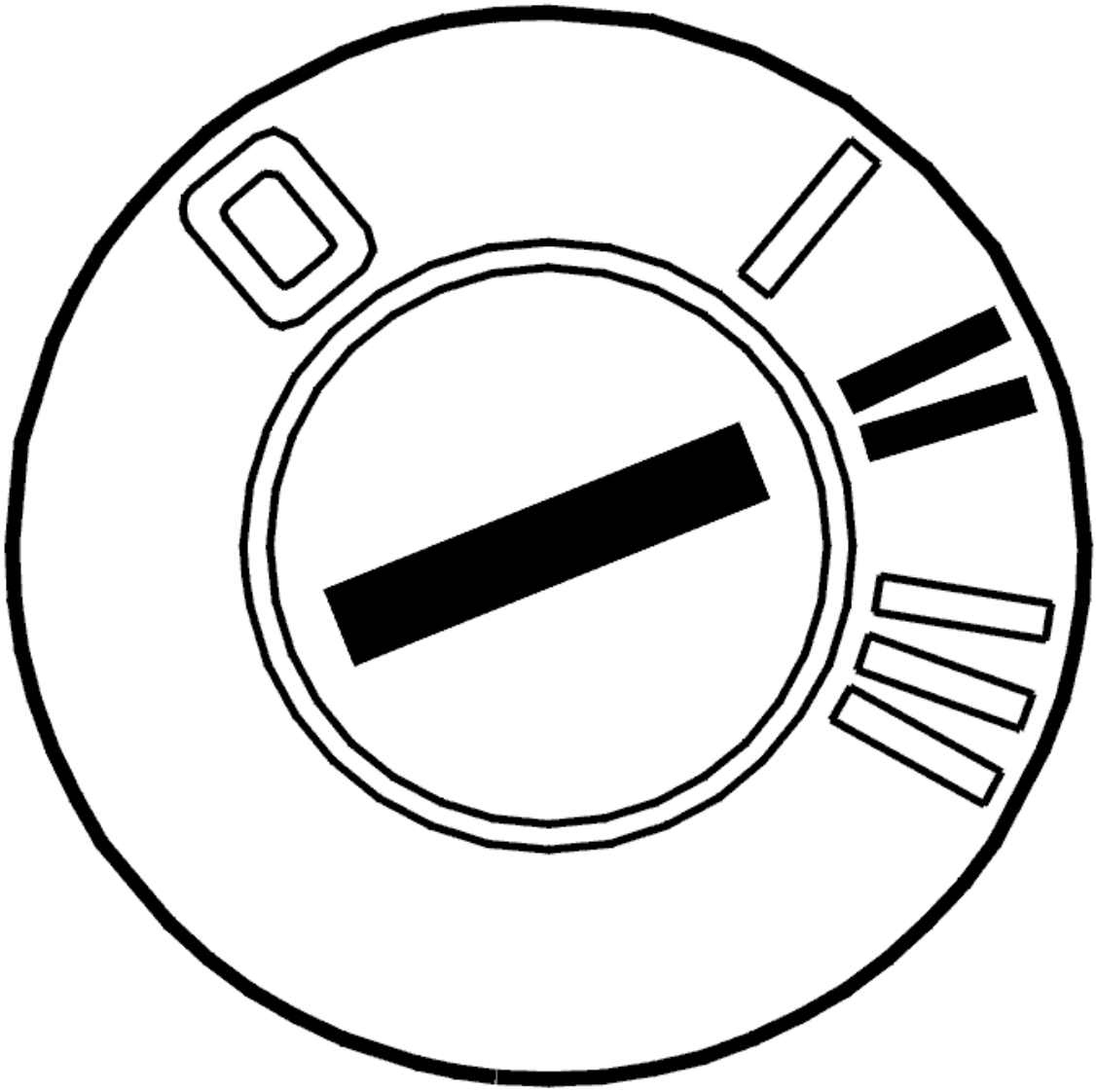


Fig. 304: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

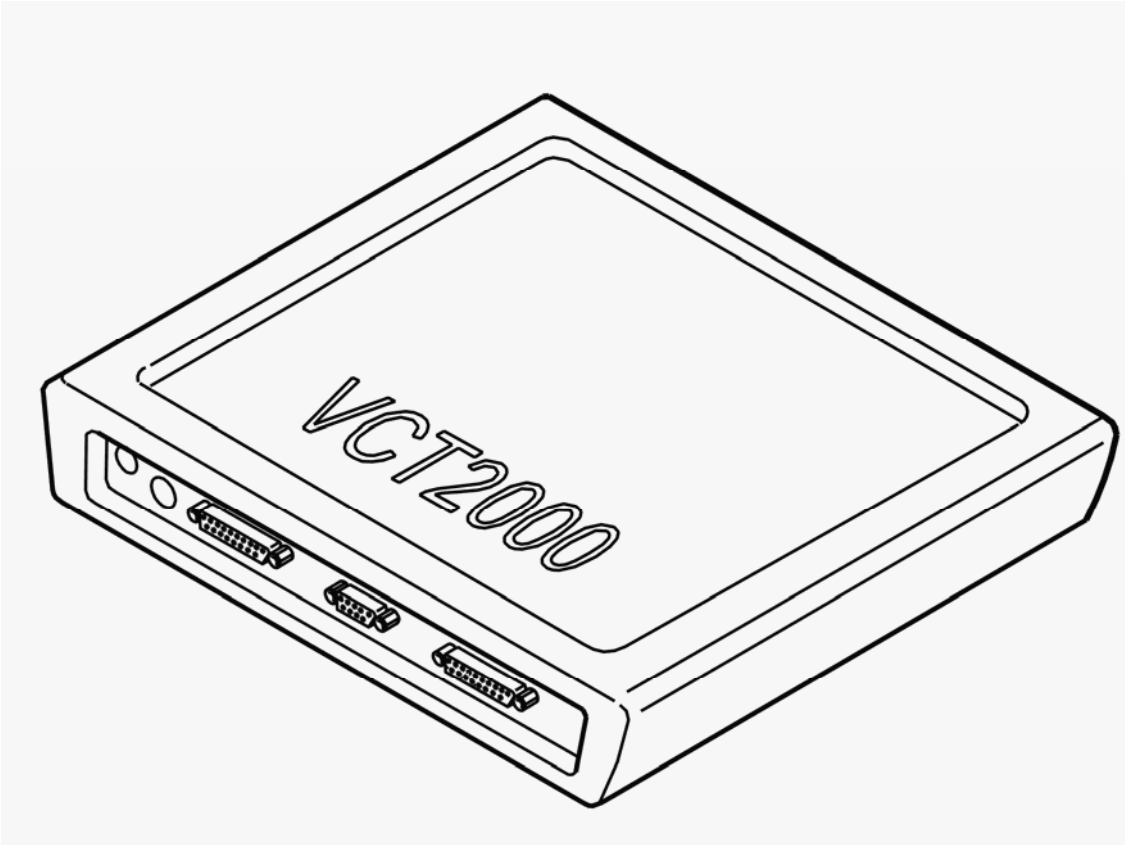


Fig. 305: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Were any of the diagnostic trouble codes (DTCs) TCM-0027, 0028, 0029, 002A, 002B stored?

- **YES**

  Refer to **INFORMATION**

- **NO**

  NO DTC

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

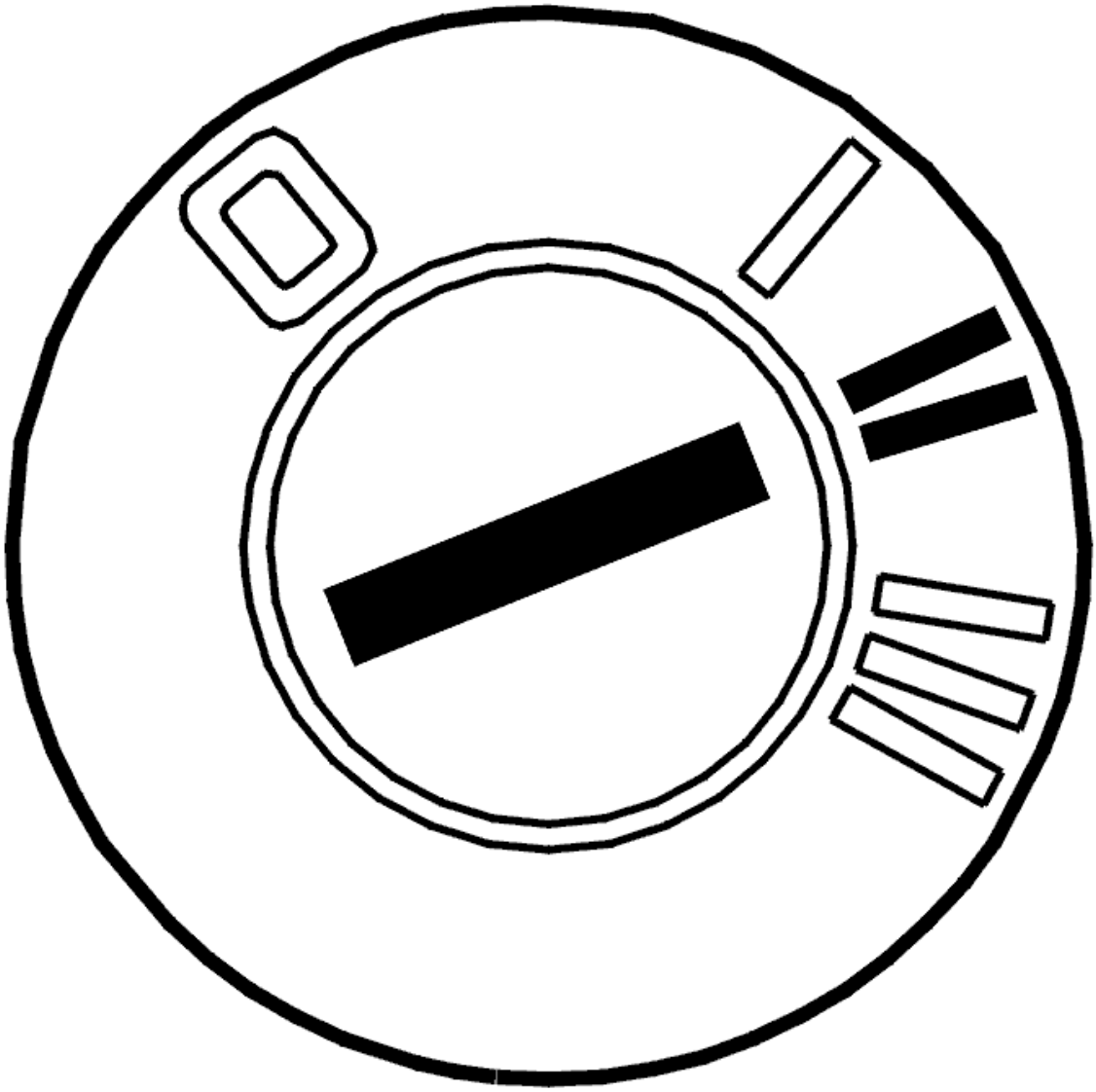


Fig. 306: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

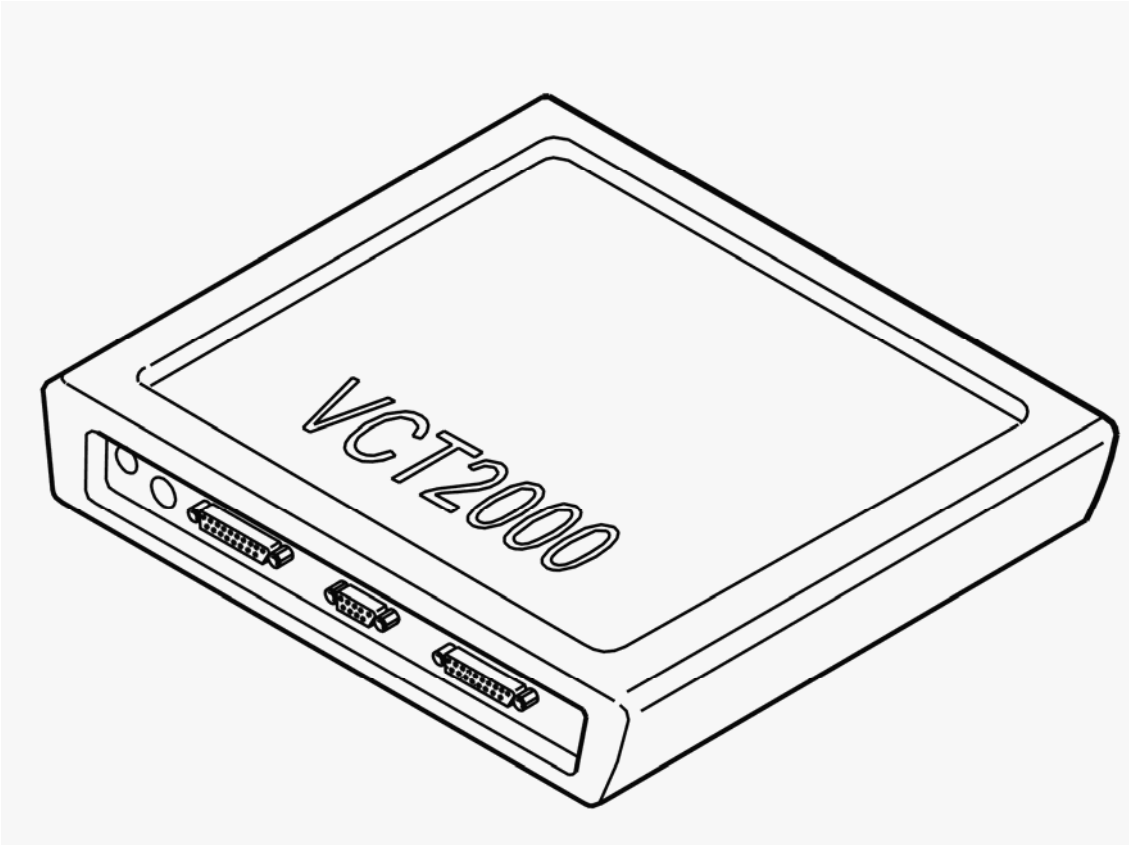


Fig. 307: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

TEST DRIVING

NOTE: Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

- Engine running.
- Activate TEST MODE
- Test drive the car according to the driving schedule below.

HINT: Test drive the car and try to regenerate the fault.

Move the gear selector during the test drive to the gear position indicated in the table for each diagnostic trouble code (DTC) and transmission. Follow the criteria below.

Diagnostic Trouble Code (DTC)	Gear shift position	
	4T65EV	4T65EV-GT
TCM-0027	R	R
TCM-0028	1	1
TCM-0029	2	2
TCM-002A	3	3
TCM-002B	D	4

Criteria for diagnostic trouble code (DTC):

- No shifting (automatic or manual) must take place for approximately 20 seconds
- The gear selector must not be moved out of position
- Speed must be in excess of 30 km/h
- Positive engine torque (no engine braking)
- Transmission fluid temperature above than 20°C.

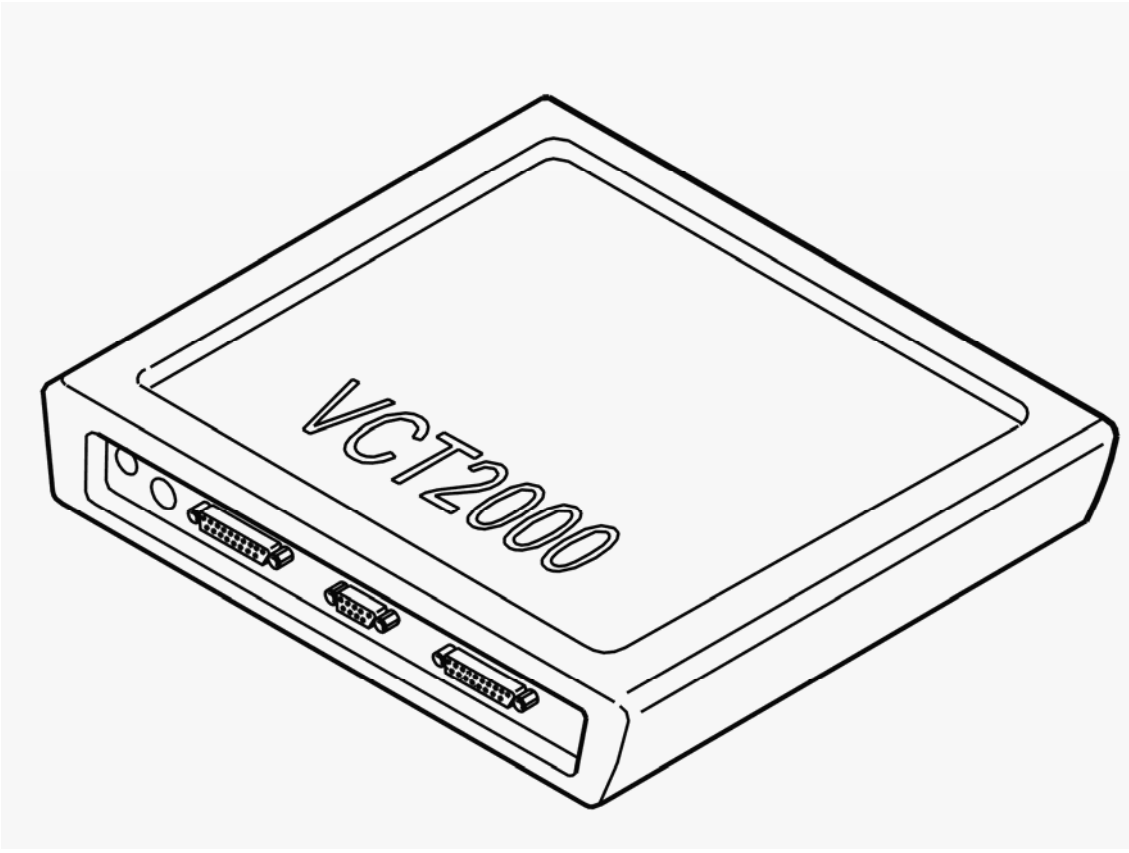


Fig. 308: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

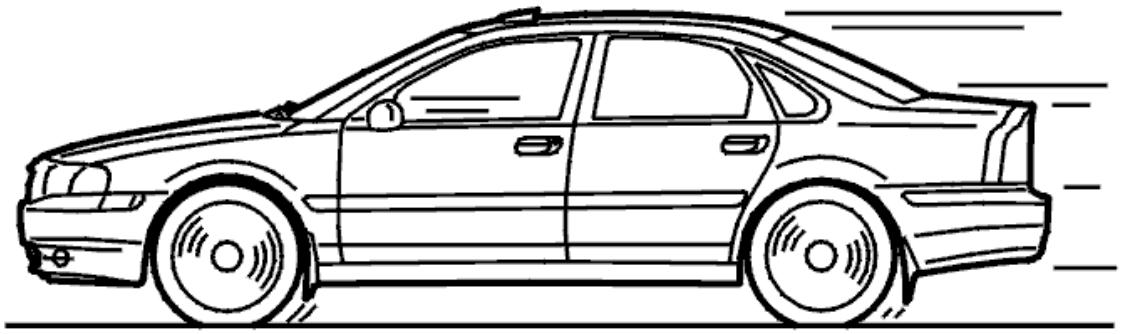


Fig. 309: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

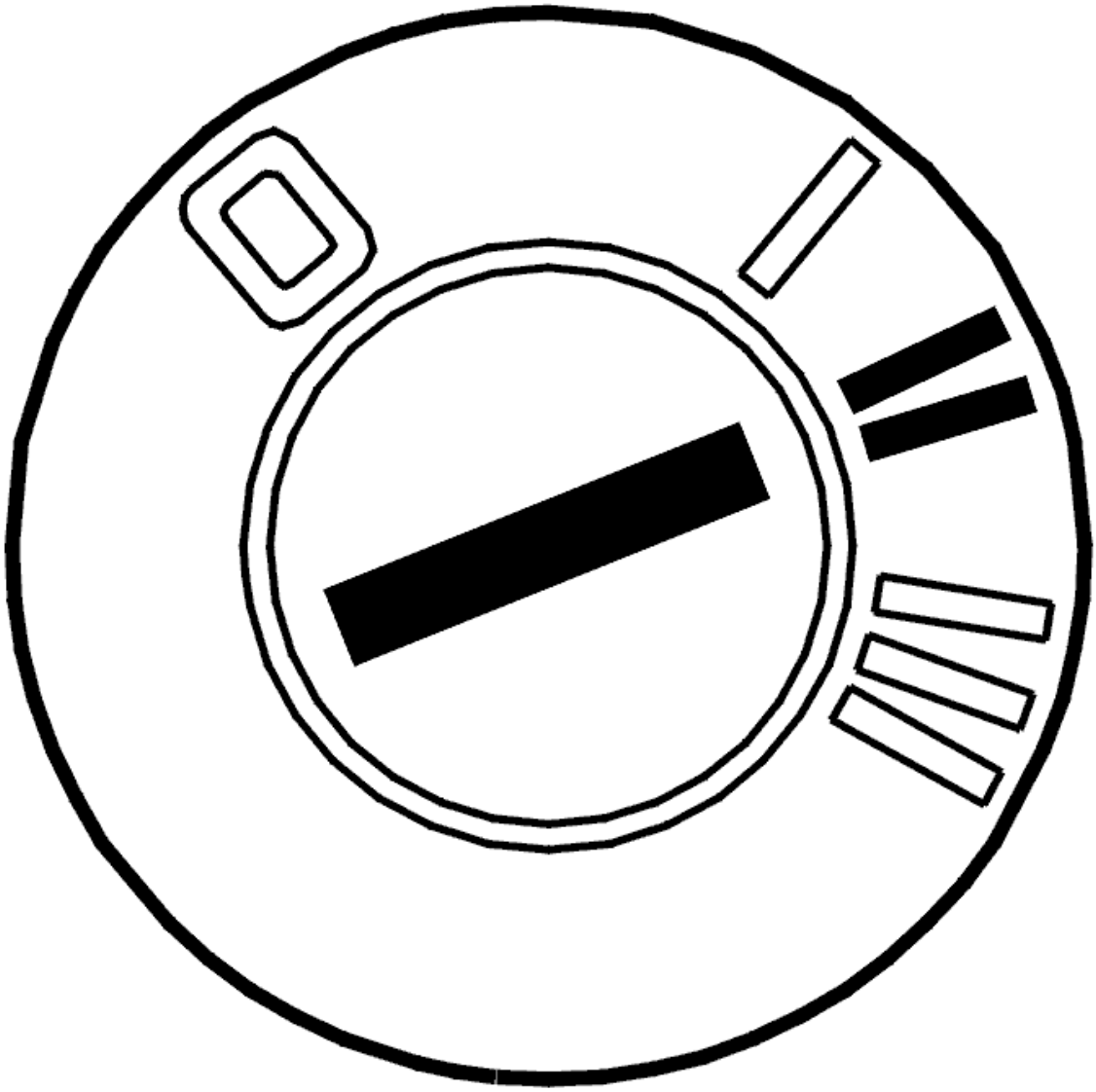


Fig. 310: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

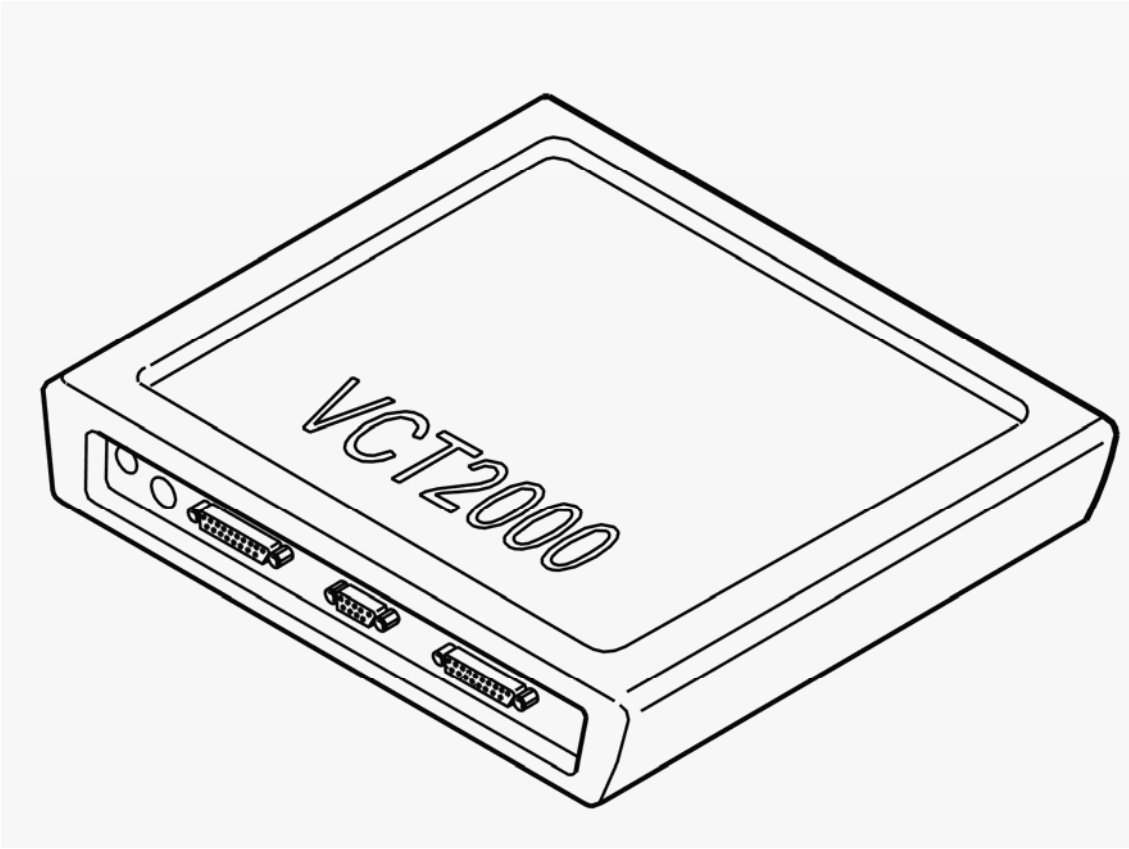


Fig. 311: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Were any of the diagnostic trouble codes (DTCs) TCM-0027, 0028, 0029, 002A, 002B stored?

- **YES**

  Refer to **INFORMATION**

- **NO**

  Refer to **FAULT-TRACING INFORMATION**

TCM-0027: BACK-UP (REVERSE) GEAR. INCORRECT GEAR RATIO (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

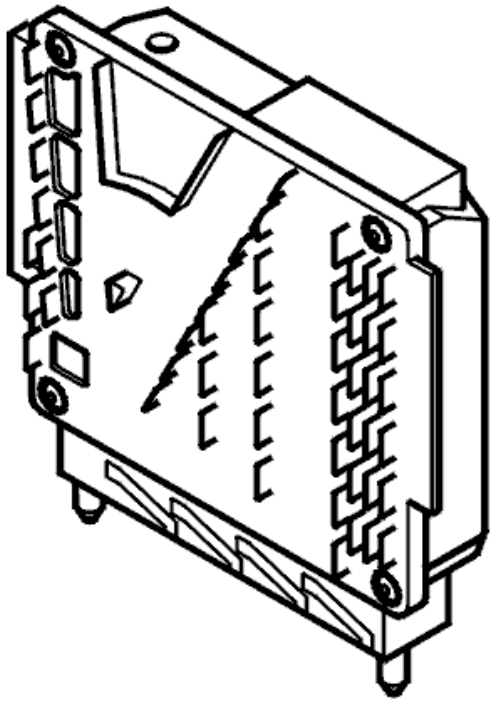


Fig. 312: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) calculates the ratio between the transmission input speed and the vehicle speed. There is a specific ratio for each gear. Diagnostic trouble code (DTC) TCM-0027 is stored if the control module registers that the ratio deviates by more than 10 % when the oil temperature is above +20°C and throttle opening exceeds 3 %.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Contact resistance in the circuit for solenoids S1, S2, S3, S4, S5 and SLS.
- Solenoid S4 has jammed in the ON position.
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.

- No lock-up function.
- No shifting.
- Harsh gear shifting.

INCORRECT GEAR RATIO

CHECKS

CHECKING FOR CONTACT RESISTANCE AND OXIDATION

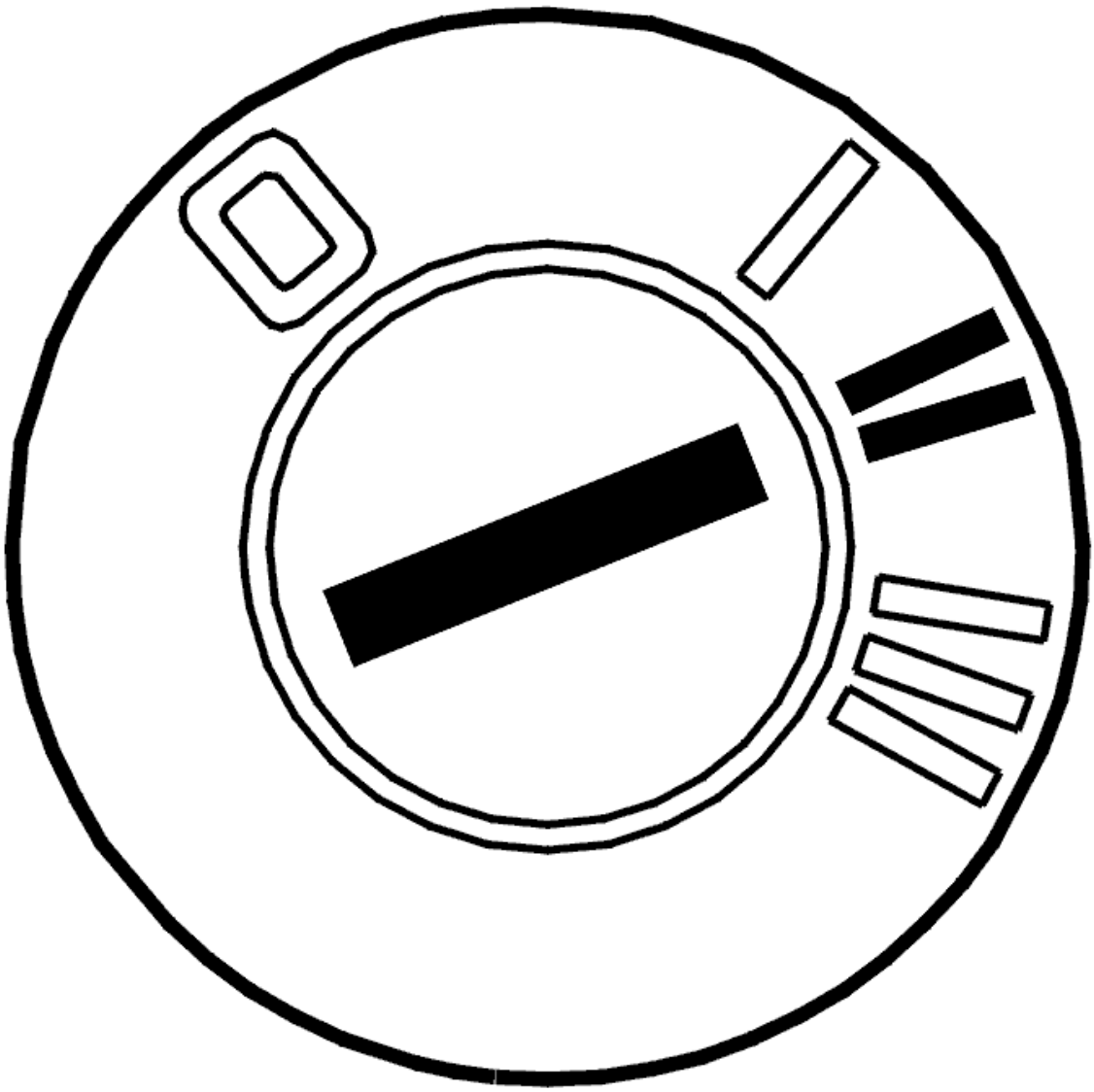


Fig. 313: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the transmission control module (TCM), transmission output speed sensor and transmission

connectors. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

Test drive the car. See **TEST DRIVE SCHEDULE, DESCRIPTION** .

When test driving, the oil temperature must be above 20°C. Check for transmission malfunction. Listen for mechanical noise from the transmission.

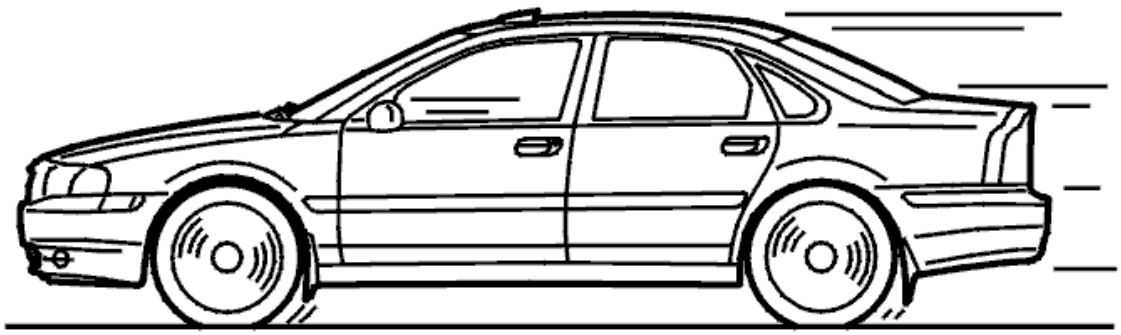


Fig. 314: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the function of the transmission OK?

- **YES**

  Refer to **CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION**

- **NO**

  Refer to **REPLACING THE TRANSMISSION**

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: **Transmission fluid quality and level are extremely important for transmission function. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.**

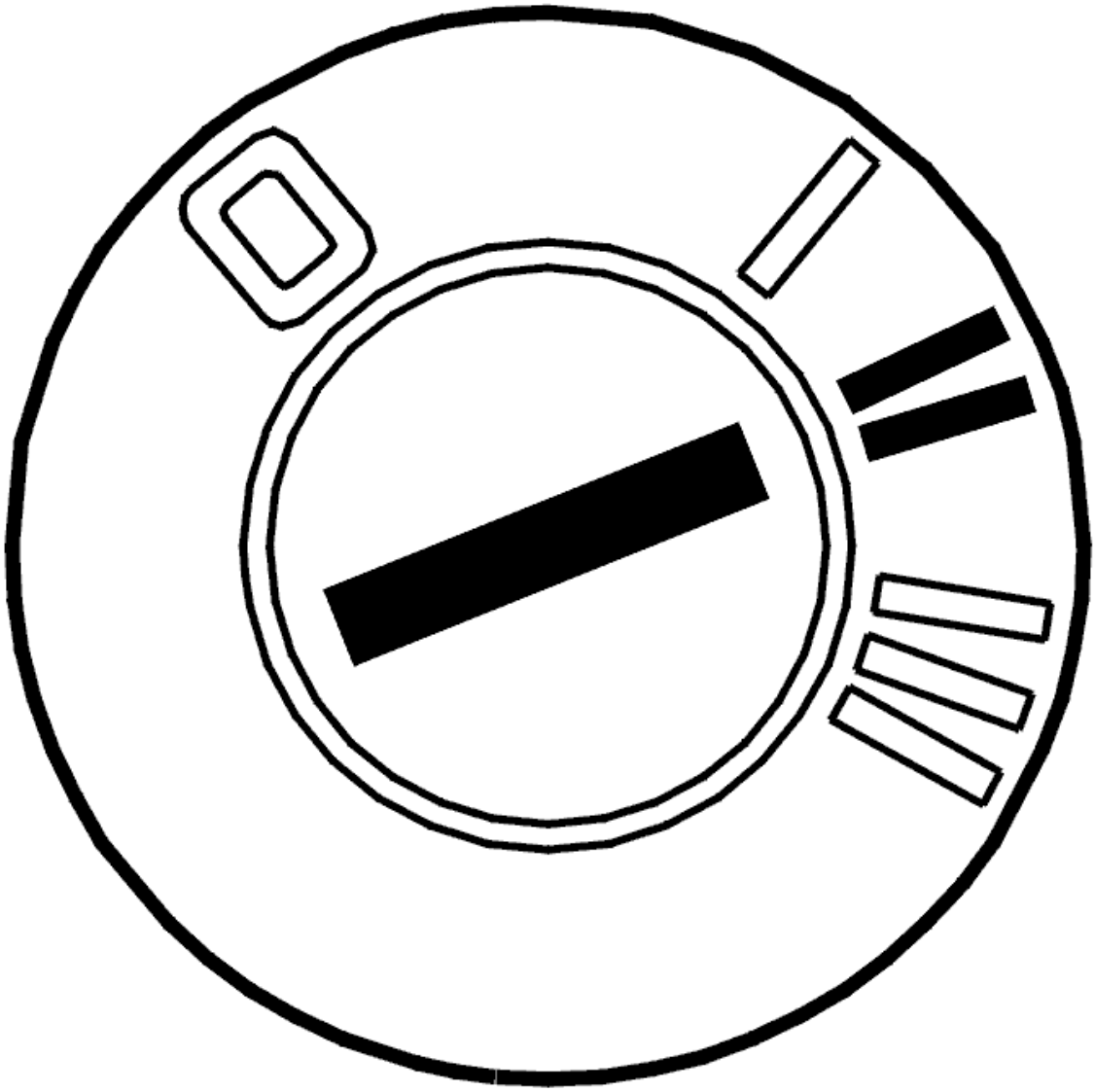


Fig. 315: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

Check the oil level. If the oil level is low check for leakage. Top up with oil.

Check the quality of the oil.

Replace the transmission fluid if the fluid smells burnt.

Check the transmission fluid for metal shavings. Take a sample using the dip stick.

Replace the transmission if the transmission fluid contains metal shavings.

Other information:

- To replace the transmission fluid, see **TRANSMISSION FLUID, REPLACING**
- To check the level, see **OIL LEVEL, CHECKING**
- To check the quality of the transmission fluid, see **OIL GRADE, CHECKING** .

Select an alternative below:

1. No fault detected

   Refer to **CHECKING THE ADJUSTMENT OF THE GEAR-SHIFT POSITION SENSOR**

2. Transmission fluid replaced, the level was low or quality was poor

   Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

3. The transmission fluid contains metal shavings.

   Refer to **REPLACING THE TRANSMISSION**

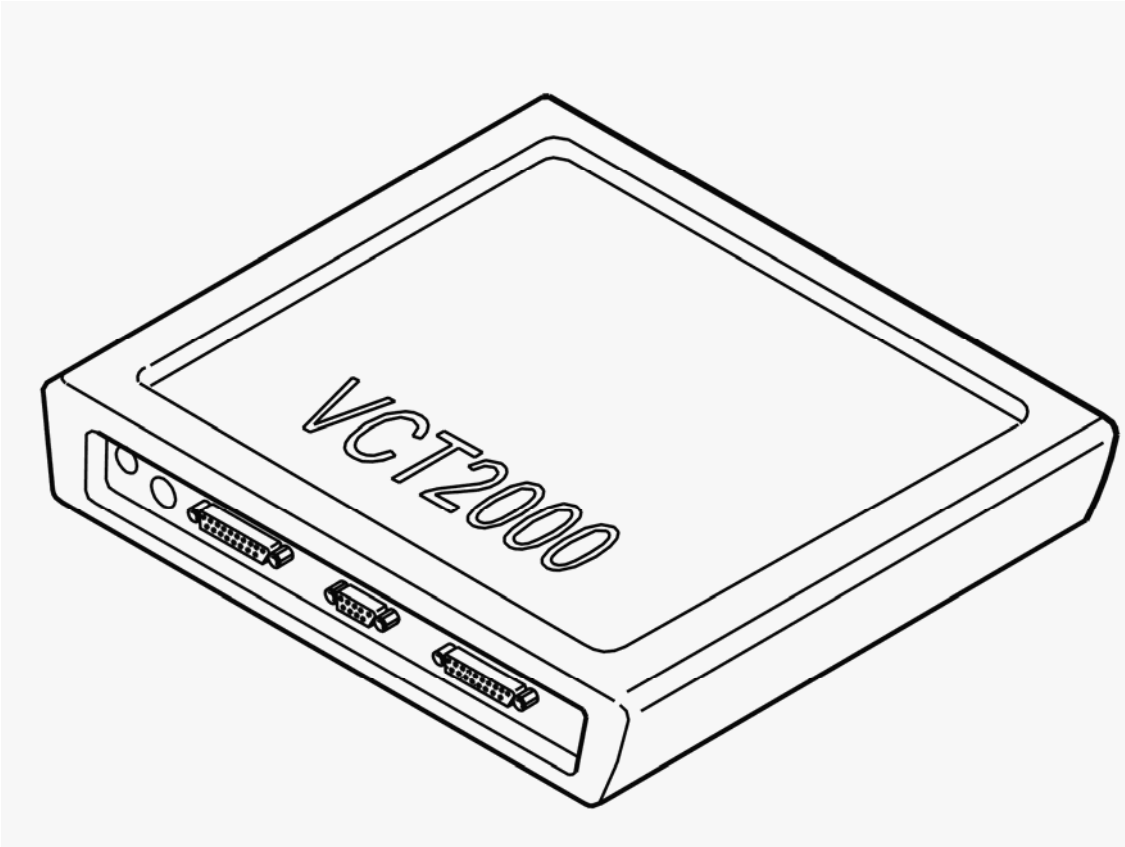


Fig. 316: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING THE ADJUSTMENT OF THE GEAR-SHIFT POSITION SENSOR

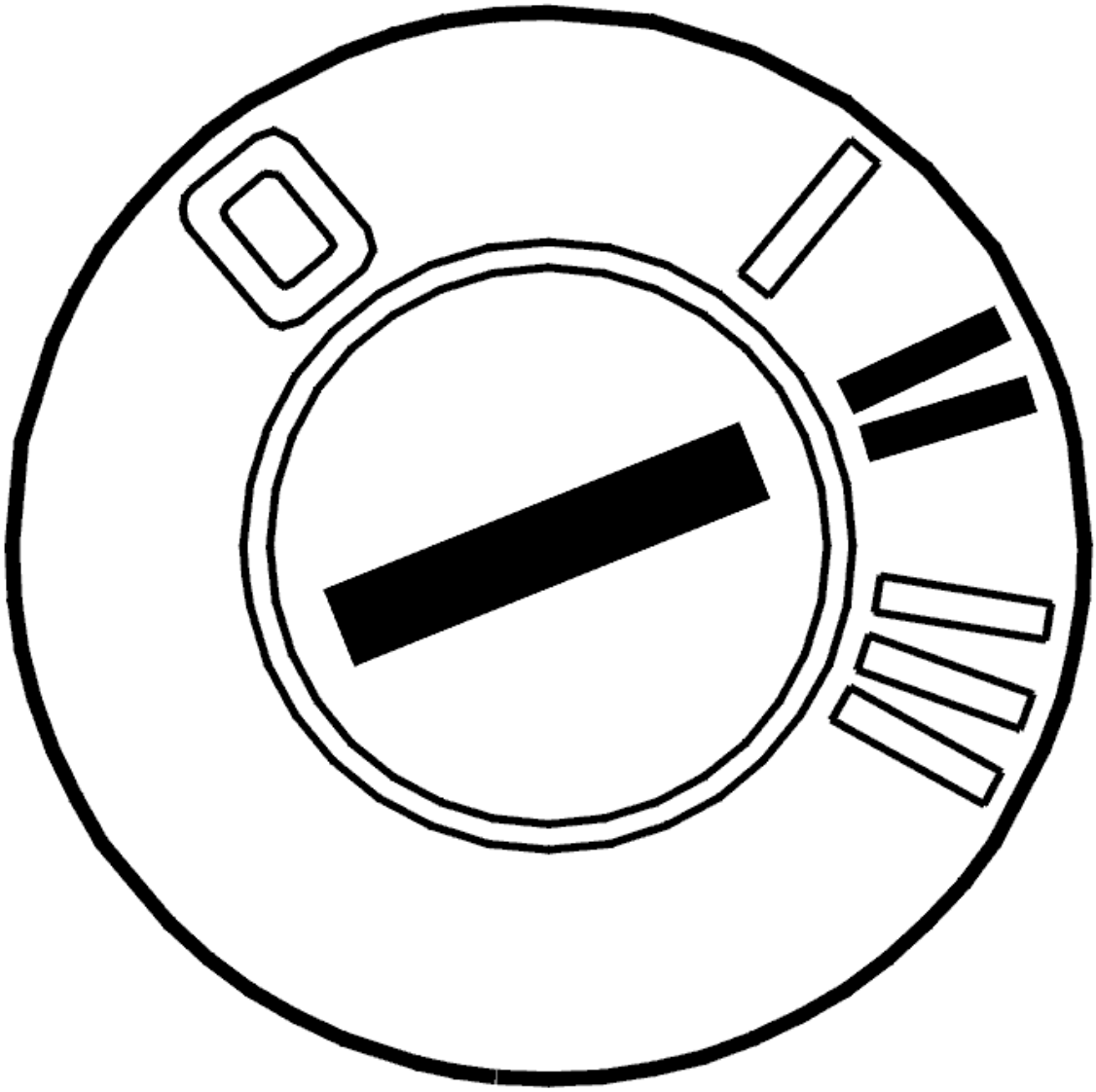


Fig. 317: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the position of the gear-shift position sensor.

  Move the gear selector around the different gear positions a number of times. Check that the gear position is updated. The selected position must be the same as that displayed in VIDA (Volvo scan tool). If the display shows an undefined position (OR for example) the transmission cable needs adjusting.

  NOTE: An undefined position may be displayed between the fixed gear positions. This is not a fault.

  Remedy as necessary.

Other information

- To adjust the mechanical transmission cable, see **GEAR-SHIFT POSITION SENSOR, CHECKING/ADJUSTING** .

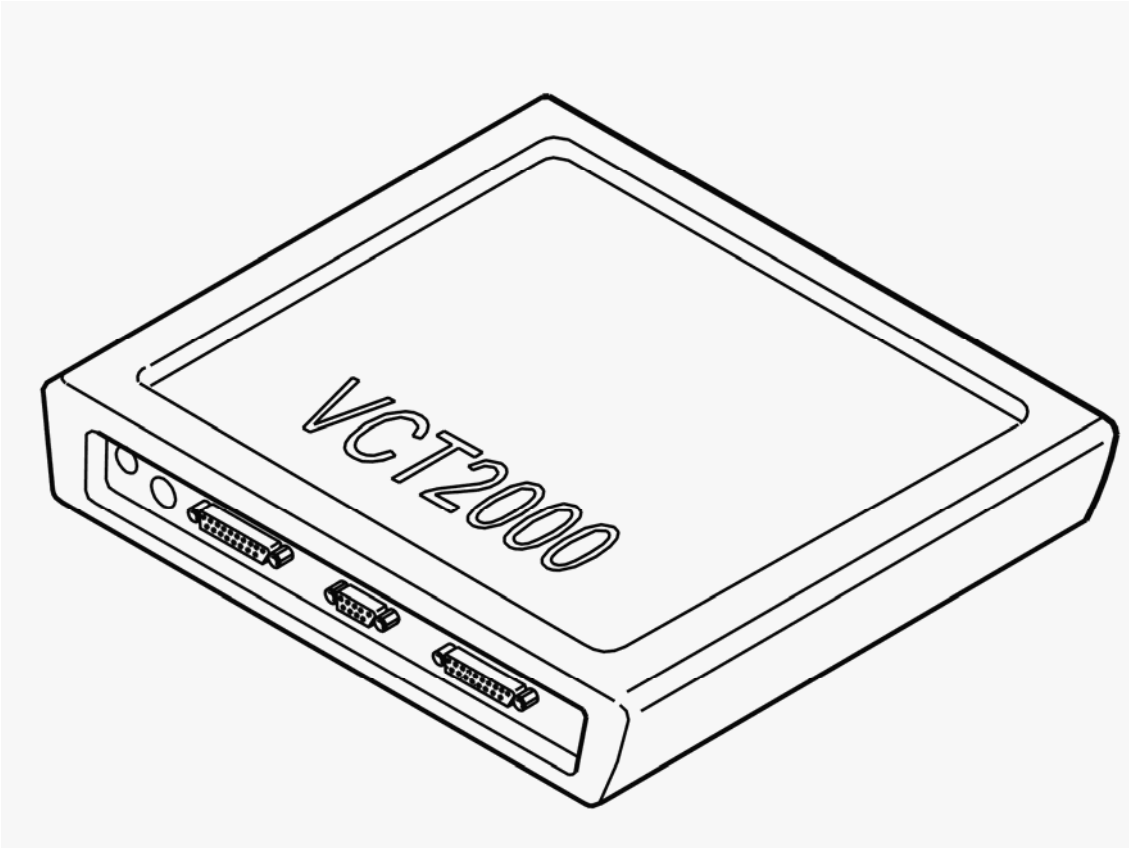


Fig. 318: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

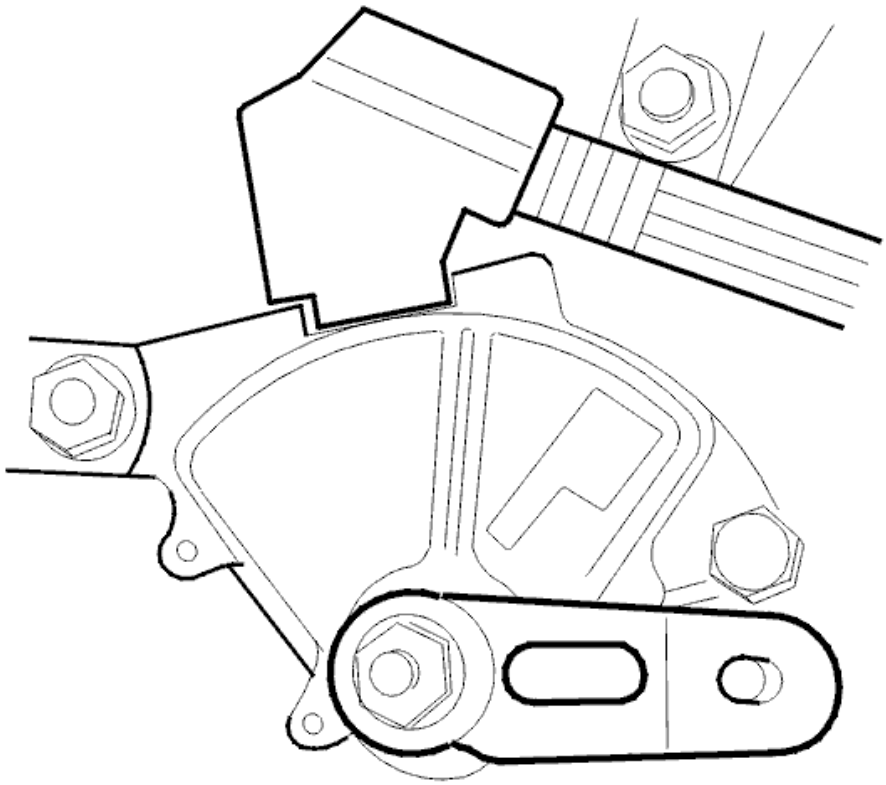


Fig. 319: Identifying Gear-Shift Position Sensor
Courtesy of VOLVO CARS CORPORATION

Is the gear-shift position sensor incorrectly adjusted?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE TRANSMISSION OUTPUT SPEED SENSOR SIGNAL**

CHECKING THE TRANSMISSION OUTPUT SPEED SENSOR SIGNAL

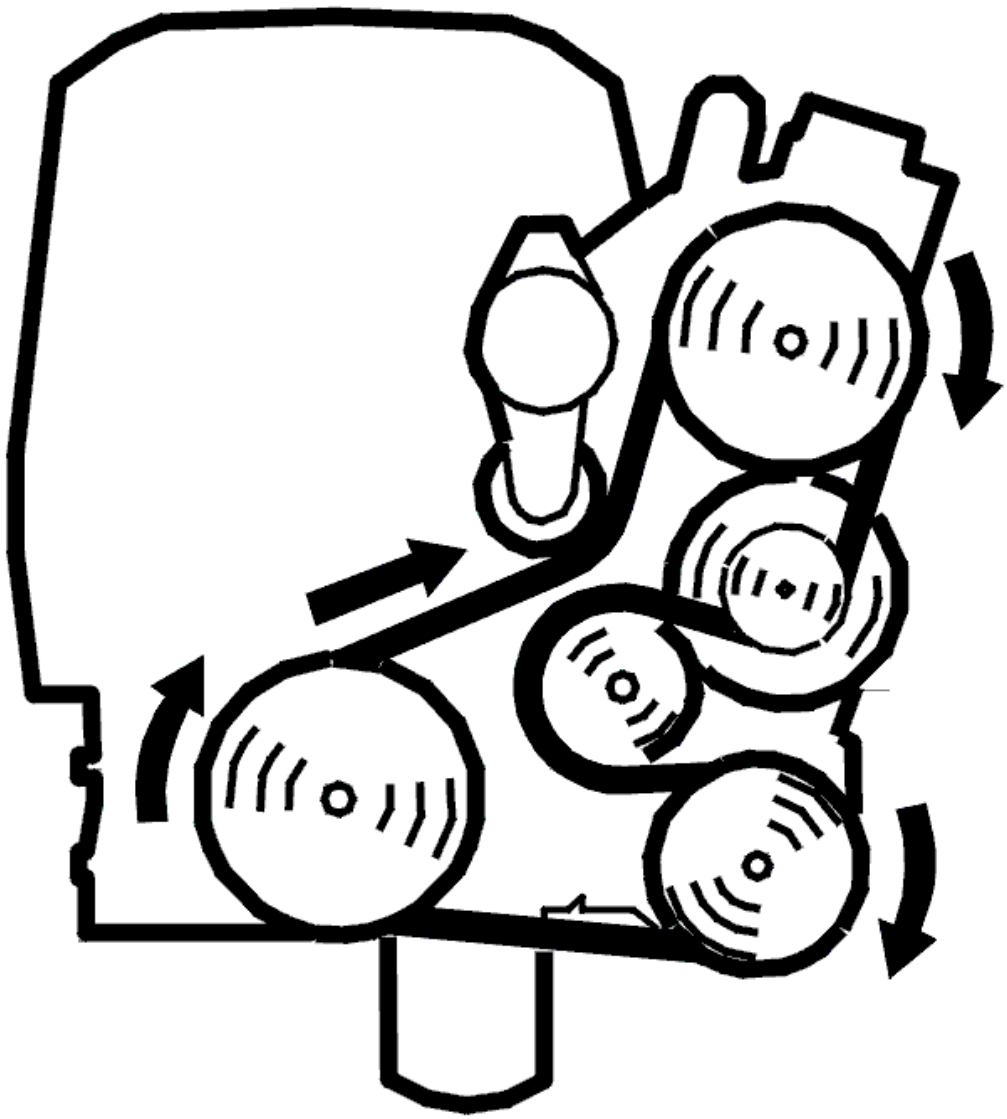


Fig. 320: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Raise the car so that the drive wheels can rotate freely
- Start the engine and let it run at idle speed
- Gear selector in position D
- Read off the transmission output speed signal.

Check that the speed increases with engine speed (RPM).

NOTE: A diagnostic trouble code (DTC) may be stored in the ABS system when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) in the ABS system after completing fault-tracing.

Other information:

- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

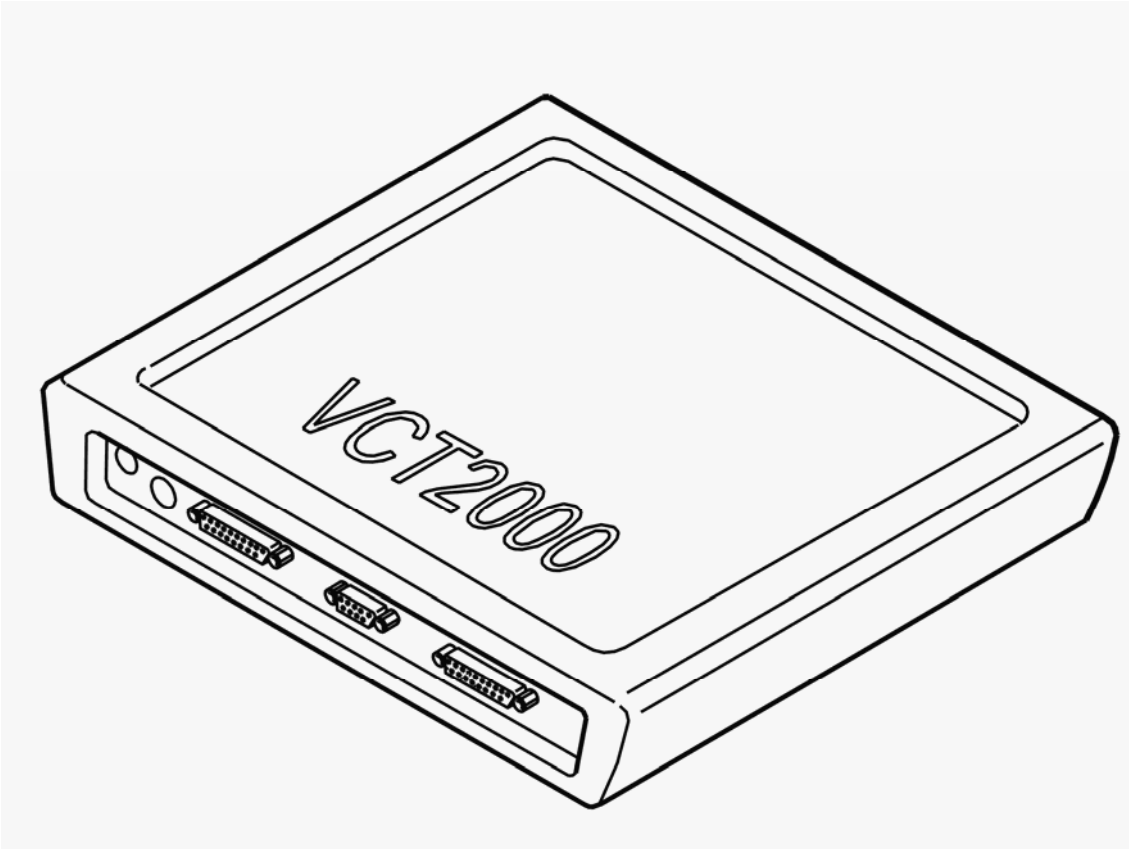


Fig. 321: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the speed increase with engine speed (RPM)?

- **YES**

  Refer to **CHECKING THE TRANSMISSION INPUT SPEED SENSOR SIGNAL**

- **NO**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

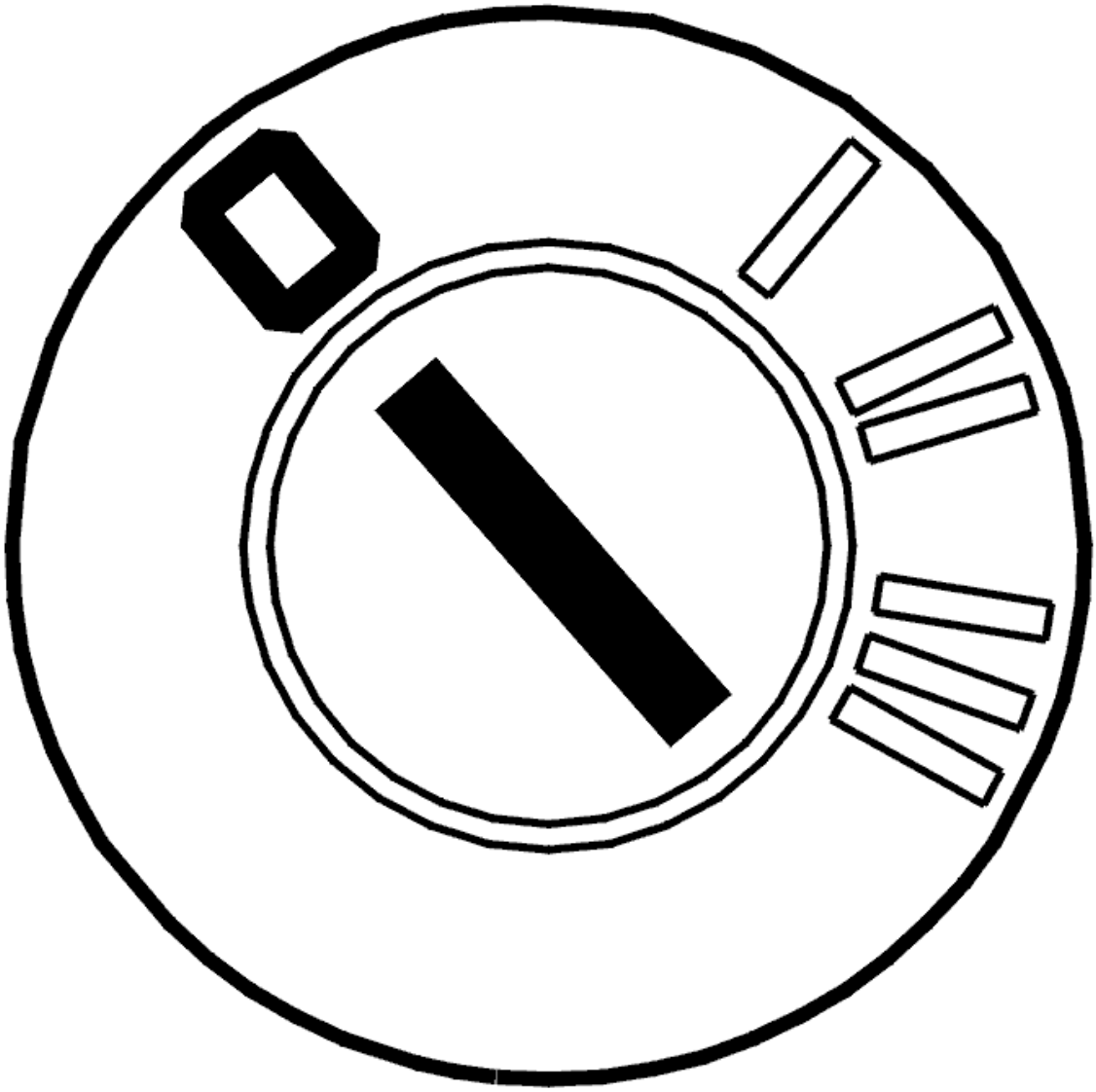


Fig. 322: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box.

Check the power supply cable between transmission output speed sensor connector terminal #A4 (control module side) and control module terminal #A57 (#A57). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Check the signal cable between transmission output speed sensor connector terminal #A3 (control module side) and control module terminal #A39 (#A39). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO**

SUPPLY VOLTAGE. PERMANENT FAULTS .

HINT: With the control module connected, the transmission output speed sensor disconnected and the ignition on, the voltage between transmission output speed sensor connector terminals #A3 and #A4 must be approximately 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To check or replace the transmission output speed sensor, see **REPLACING THE TRANSMISSION INPUT SPEED SENSOR AND THE TRANSMISSION OUTPUT SPEED SENSOR**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

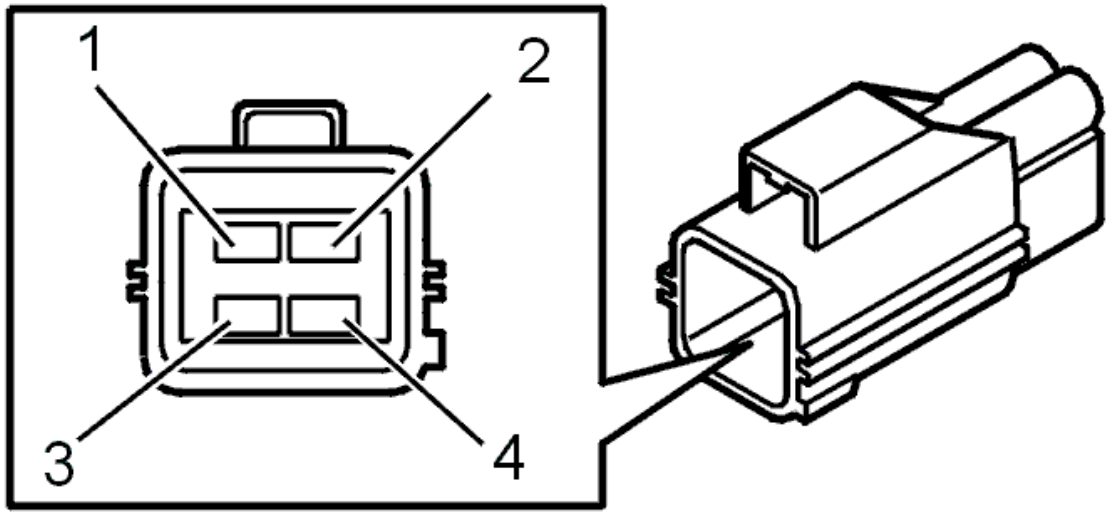


Fig. 323: Identifying Transmission Output Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

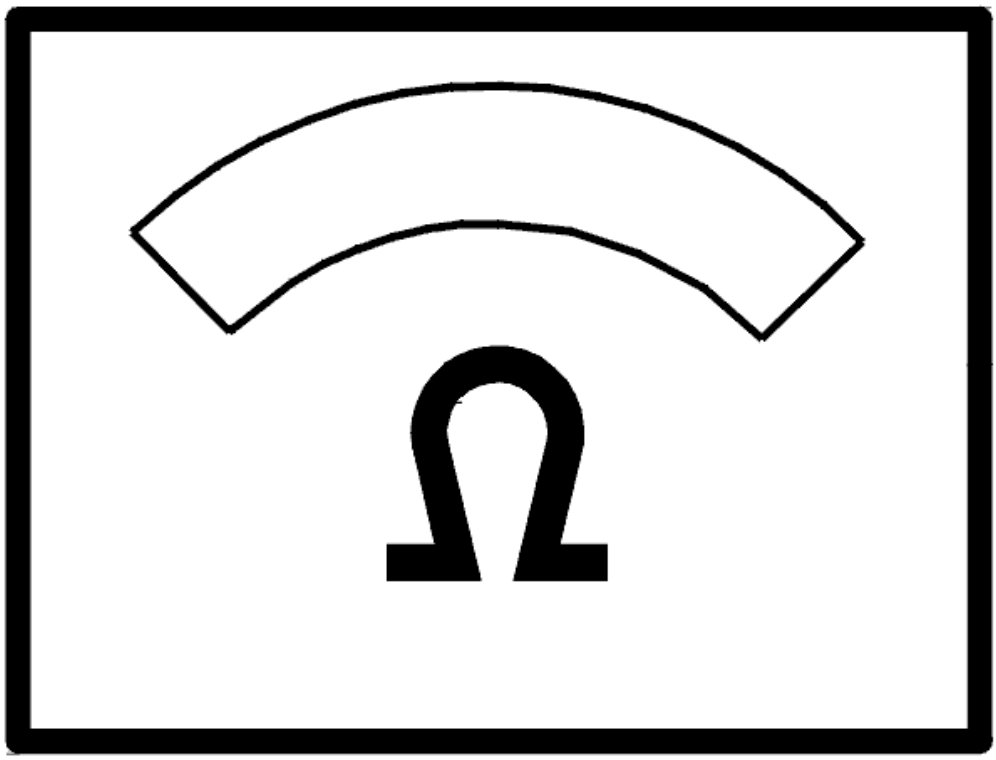


Fig. 324: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

CHECKING THE TRANSMISSION INPUT SPEED SENSOR SIGNAL

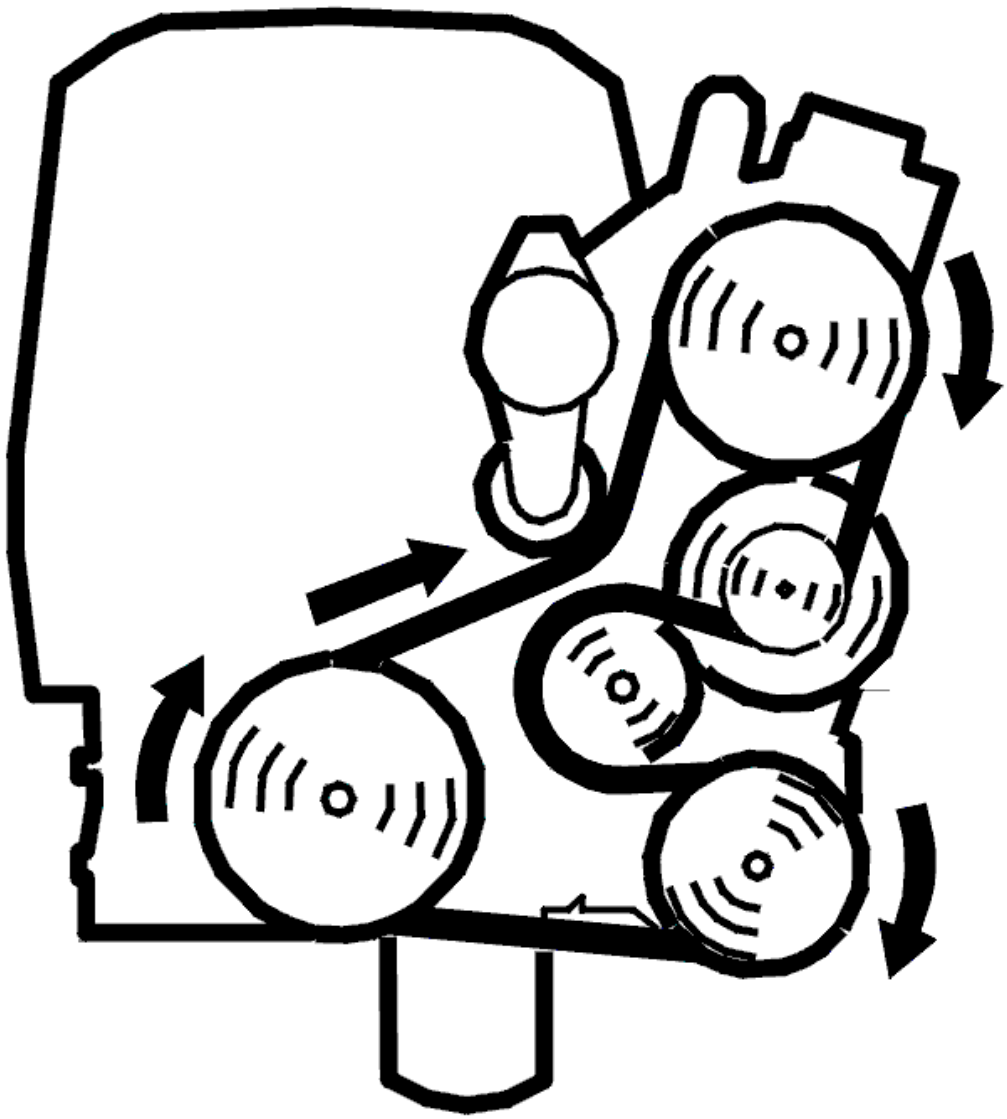


Fig. 325: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Gear selector in position P
- Start the engine and let it run at idle speed
- Read off the transmission input speed.

  Check that the transmission input speed is updated.

  Compare with the engine speed (RPM).

  Other information:

  - To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL**

MODULE (TCM), REPLACING

- To disconnect the automatic transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

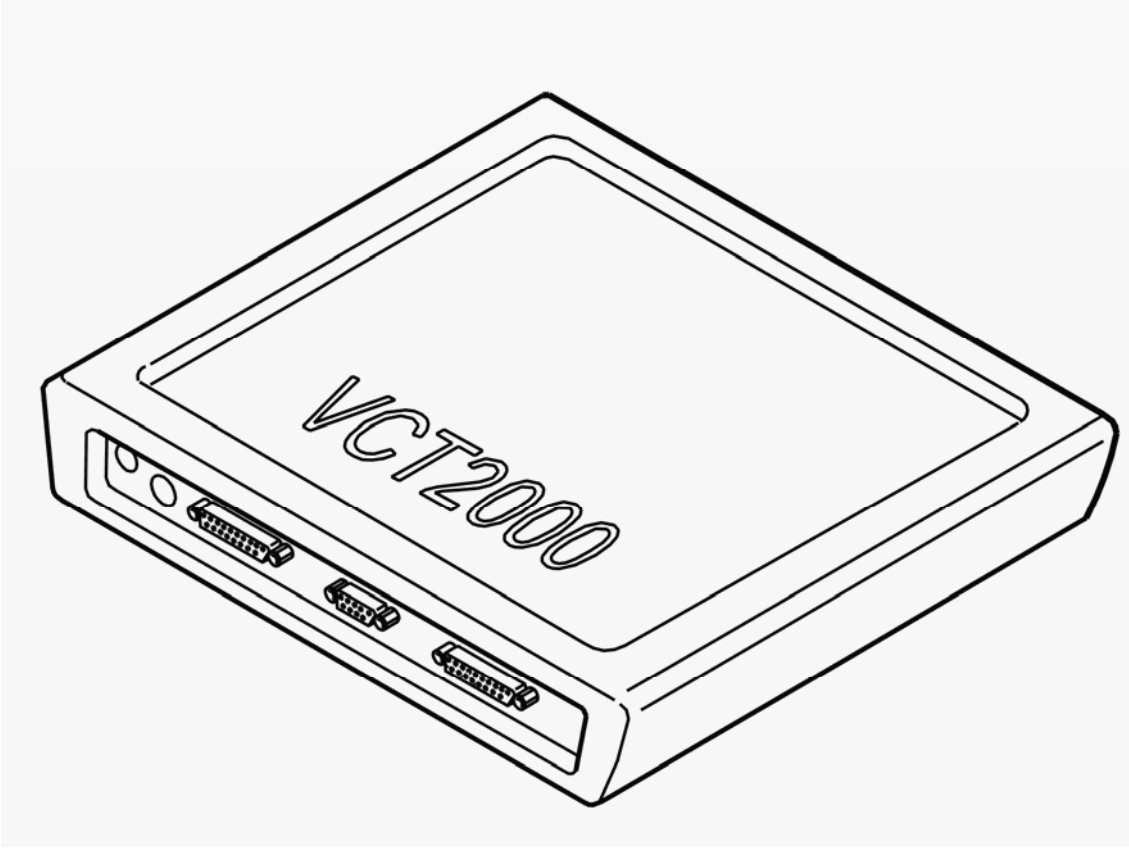


Fig. 326: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the transmission input speed increase with engine speed (RPM)?

- **YES**

  Refer to **TEST DRIVING THE TRANSMISSION**

- **NO**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

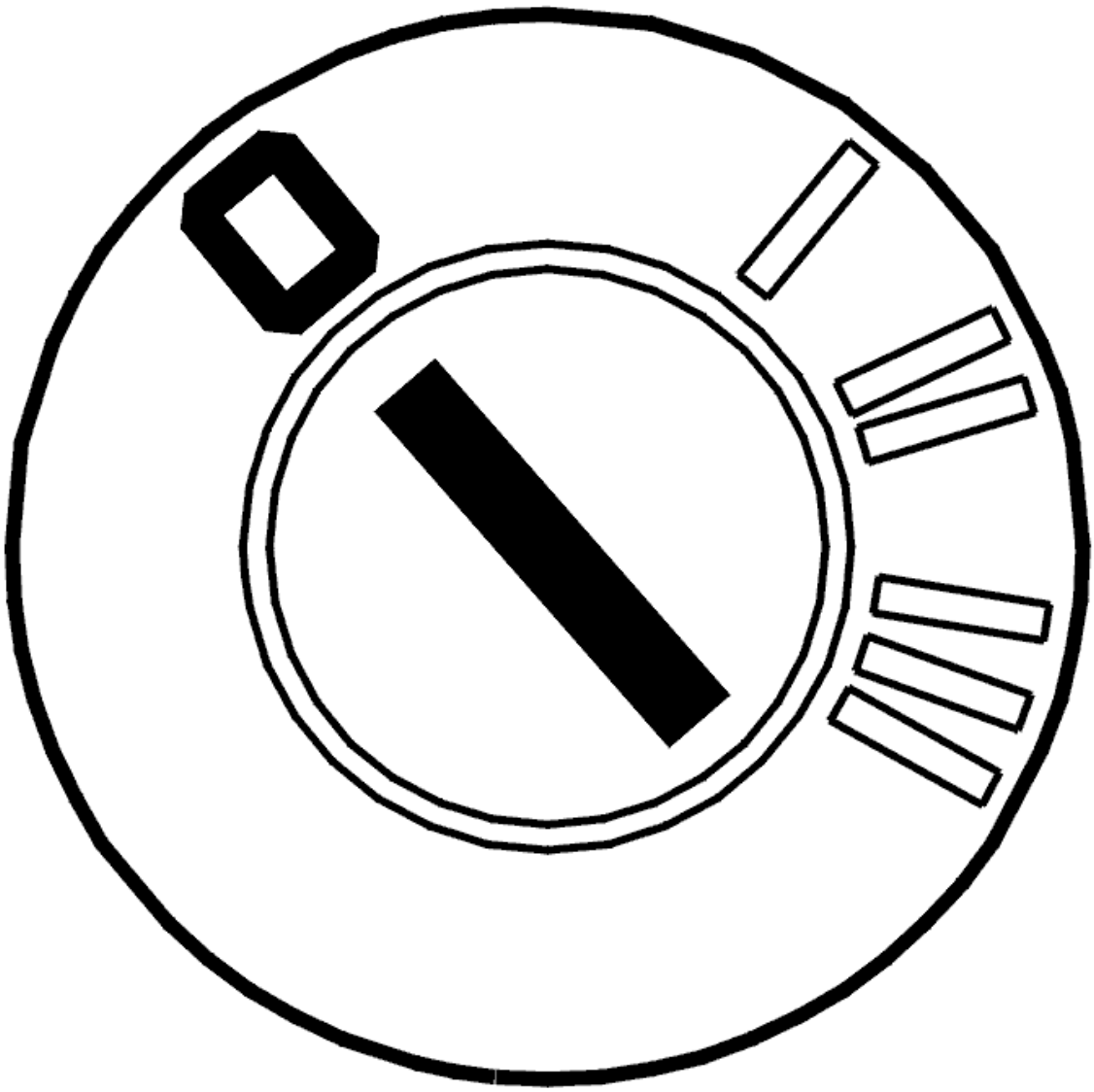


Fig. 327: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box.

Check the power supply cable for the transmission input speed sensor between control module terminal #A59 (#A59) and transmission connector terminal #A2. Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Check the signal cable between control module terminal #A41 (#A41) and transmission connector terminal #A1. Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT**

FAULTS .

HINT: With the control module connected and the ignition on, the voltage between transmission output speed sensor connector terminals #A1 and #A2 must be between 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the automatic transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the transmission input speed sensor, see **REPLACING THE TRANSMISSION INPUT SPEED SENSOR AND THE TRANSMISSION OUTPUT SPEED SENSOR**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

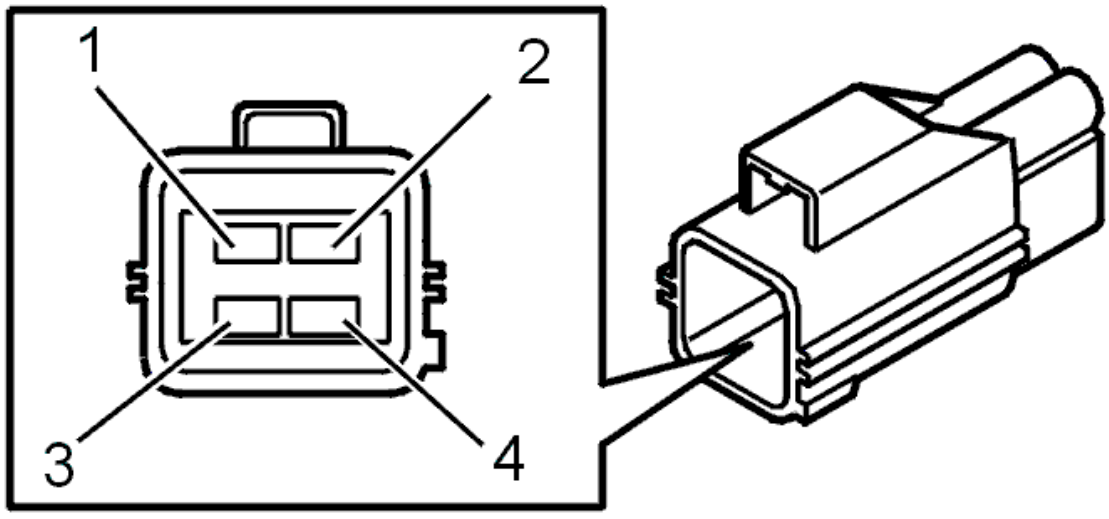


Fig. 328: Identifying Transmission Output Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

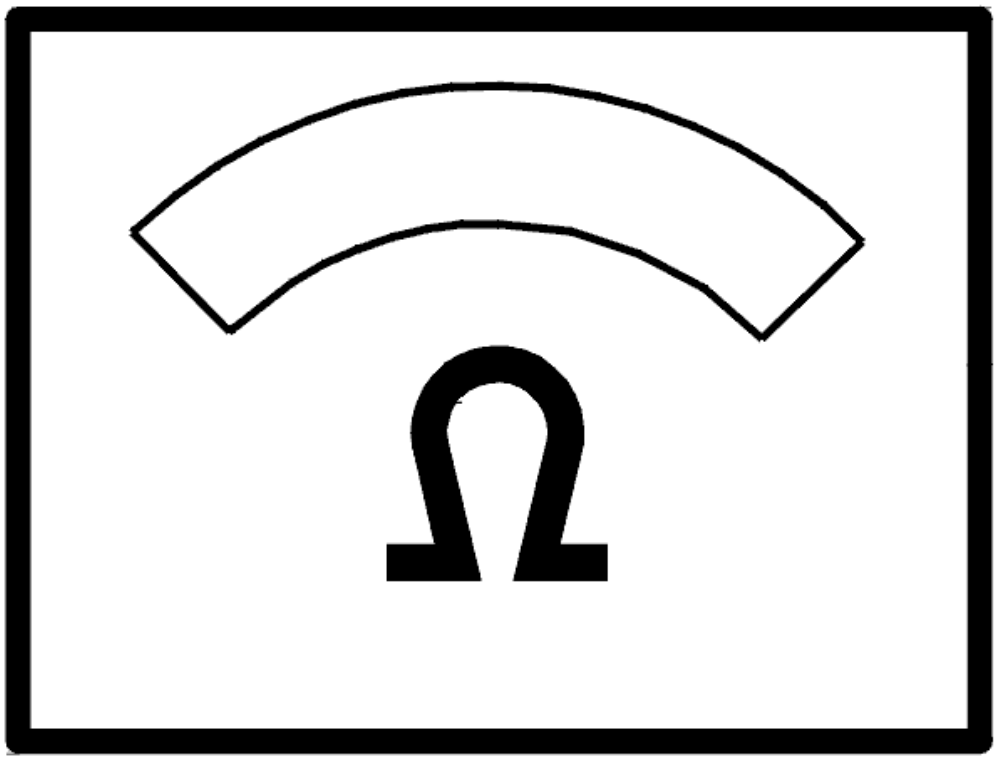


Fig. 329: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

REPLACING THE TRANSMISSION

- Fault-tracing indicates an internal fault in the transmission. Replace the transmission. See **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

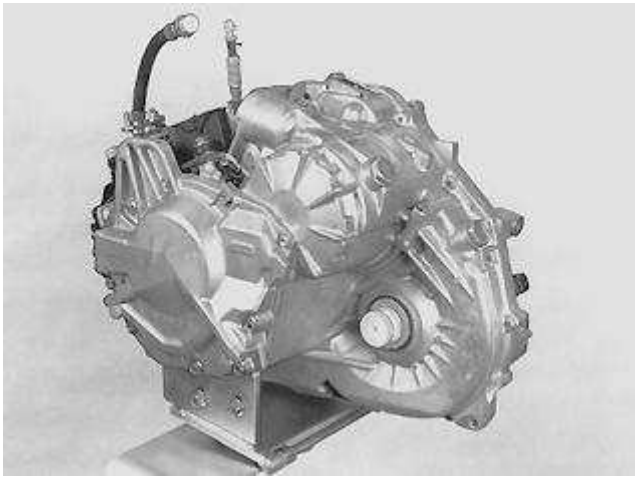


Fig. 330: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TEST DRIVING THE TRANSMISSION

Test drive the car. See **TEST DRIVE SCHEDULE, DESCRIPTION** . When test driving, the oil temperature must be above 20°C.

Look out for any transmission malfunction.

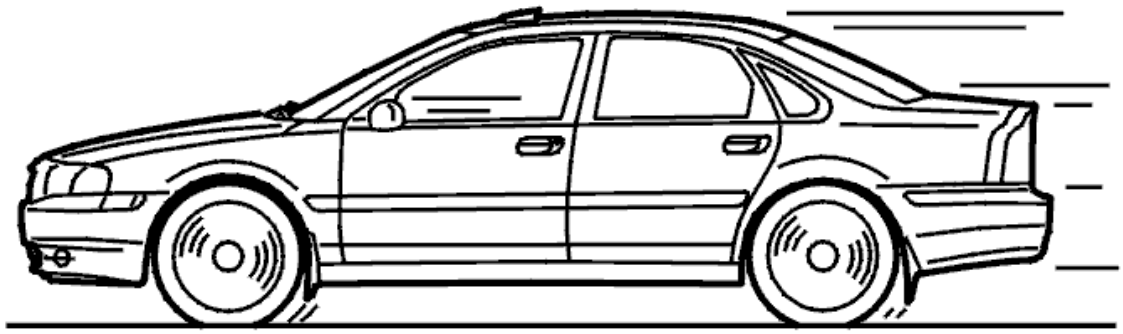


Fig. 331: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the transmission operating correctly?

- **YES**

  Refer to **FAULT-TRACING INFORMATION**

- **NO**

  Refer to **REPLACING THE TRANSMISSION CONTROL SYSTEM**

REPLACING THE TRANSMISSION CONTROL SYSTEM

The previous tests indicate that there is a fault in the transmission control system.

Try a new control system. See **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

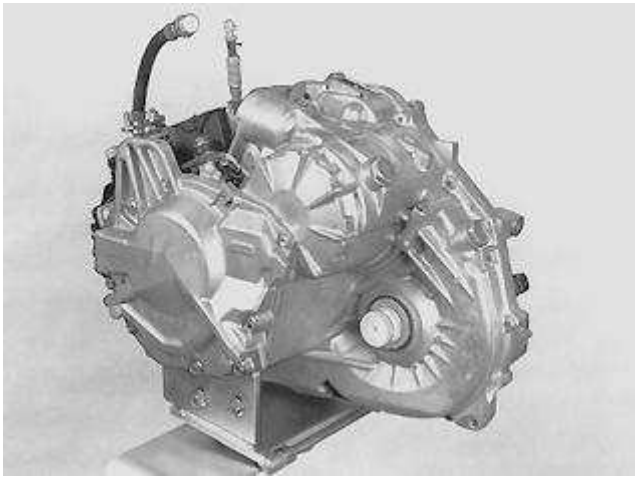


Fig. 332: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

FAULT-TRACING INFORMATION

The control module has previously registered a fault. The fault is now no longer present. A test of the transmission function indicates that everything is now OK.

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.

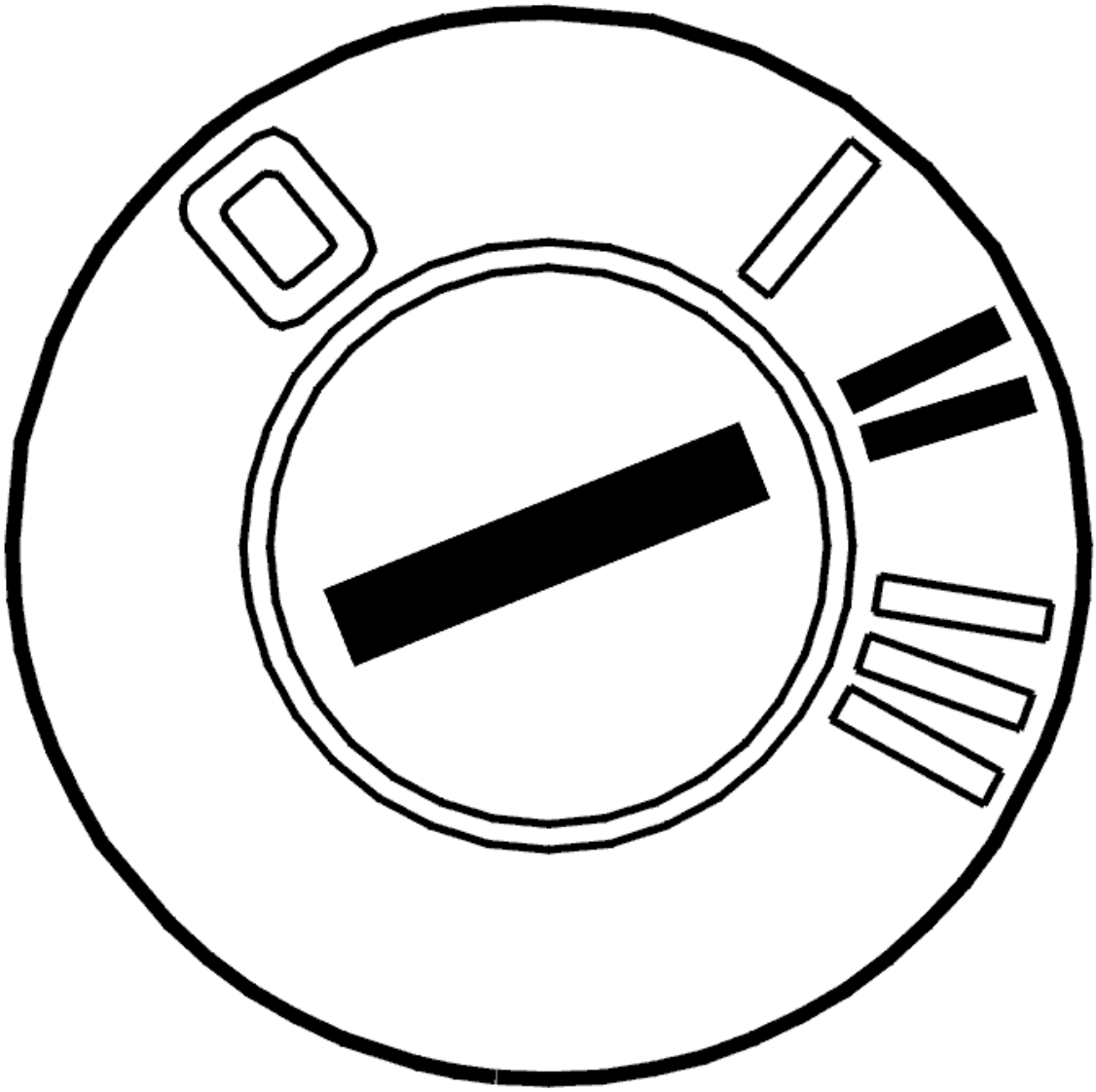


Fig. 333: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

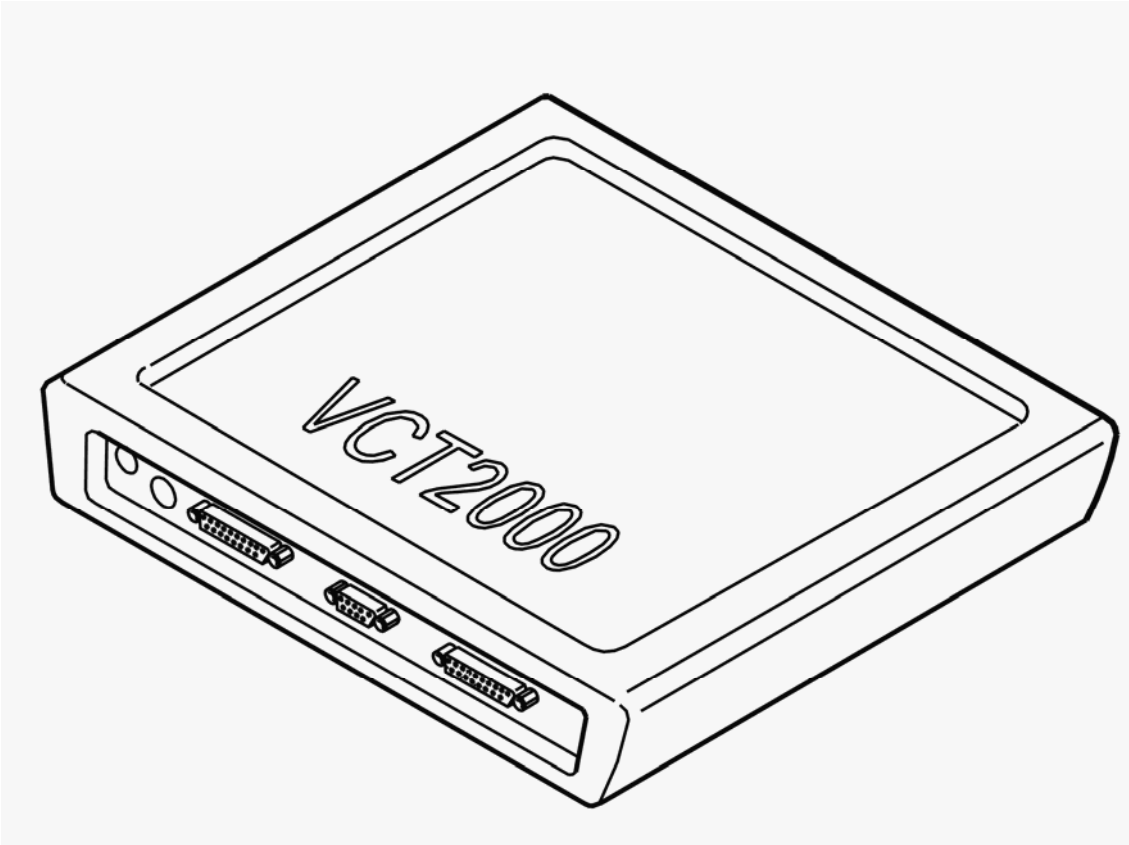


Fig. 334: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

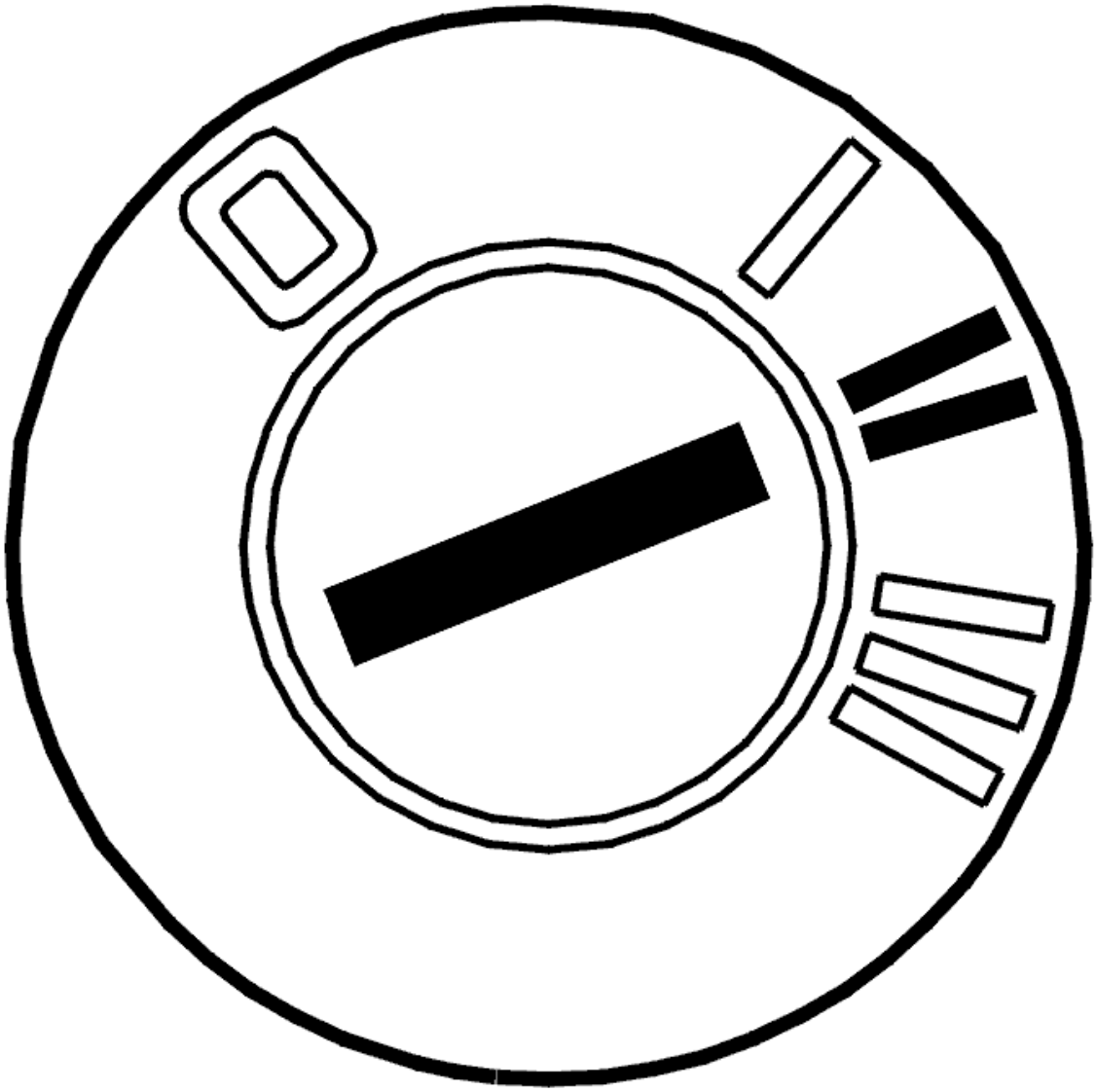


Fig. 335: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

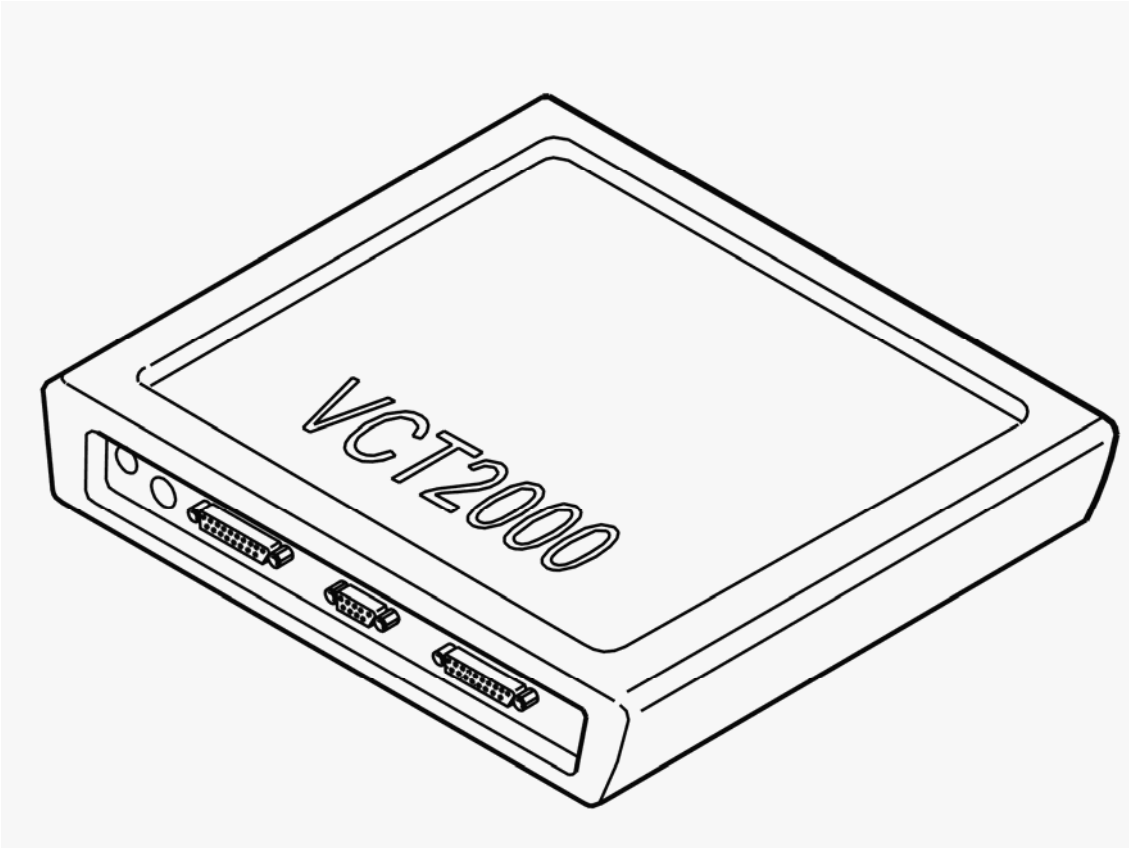


Fig. 336: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

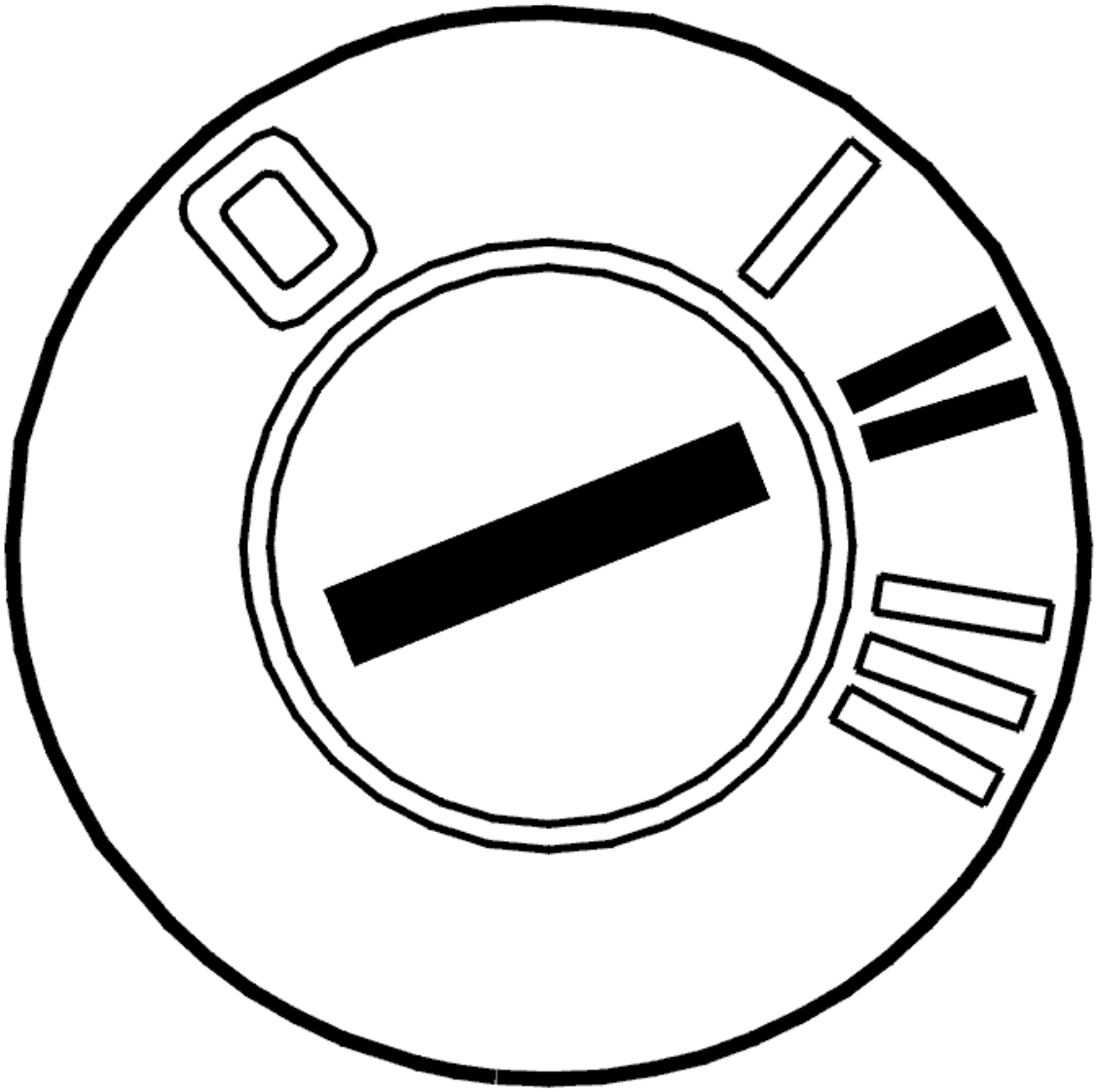


Fig. 337: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

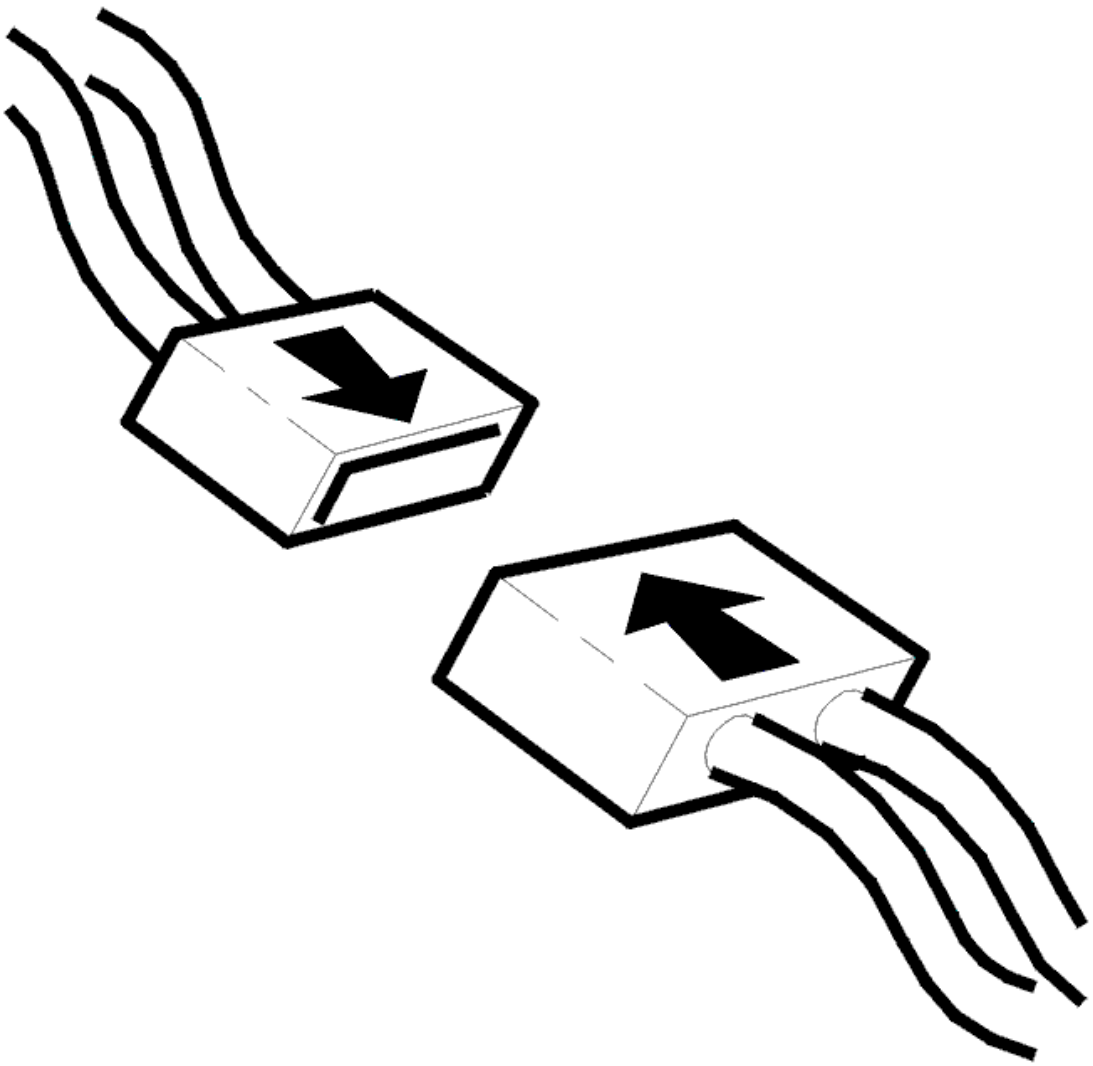


Fig. 338: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

During the test drive, oil temperature should be over 20 °C.

Note any deviations in transmission function.

Does the transmission function flawlessly?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  VERIFICATION FAILED: The fault should have been detected and remedied. As this is not the case fault-tracing has failed. Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

REPLACING THE TRANSMISSION INPUT SPEED SENSOR AND THE TRANSMISSION OUTPUT SPEED SENSOR

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

REMOVAL

PREPARATIONS

Switch off the ignition.

REMOVING THE AIR CLEANER (ACL) HOUSING

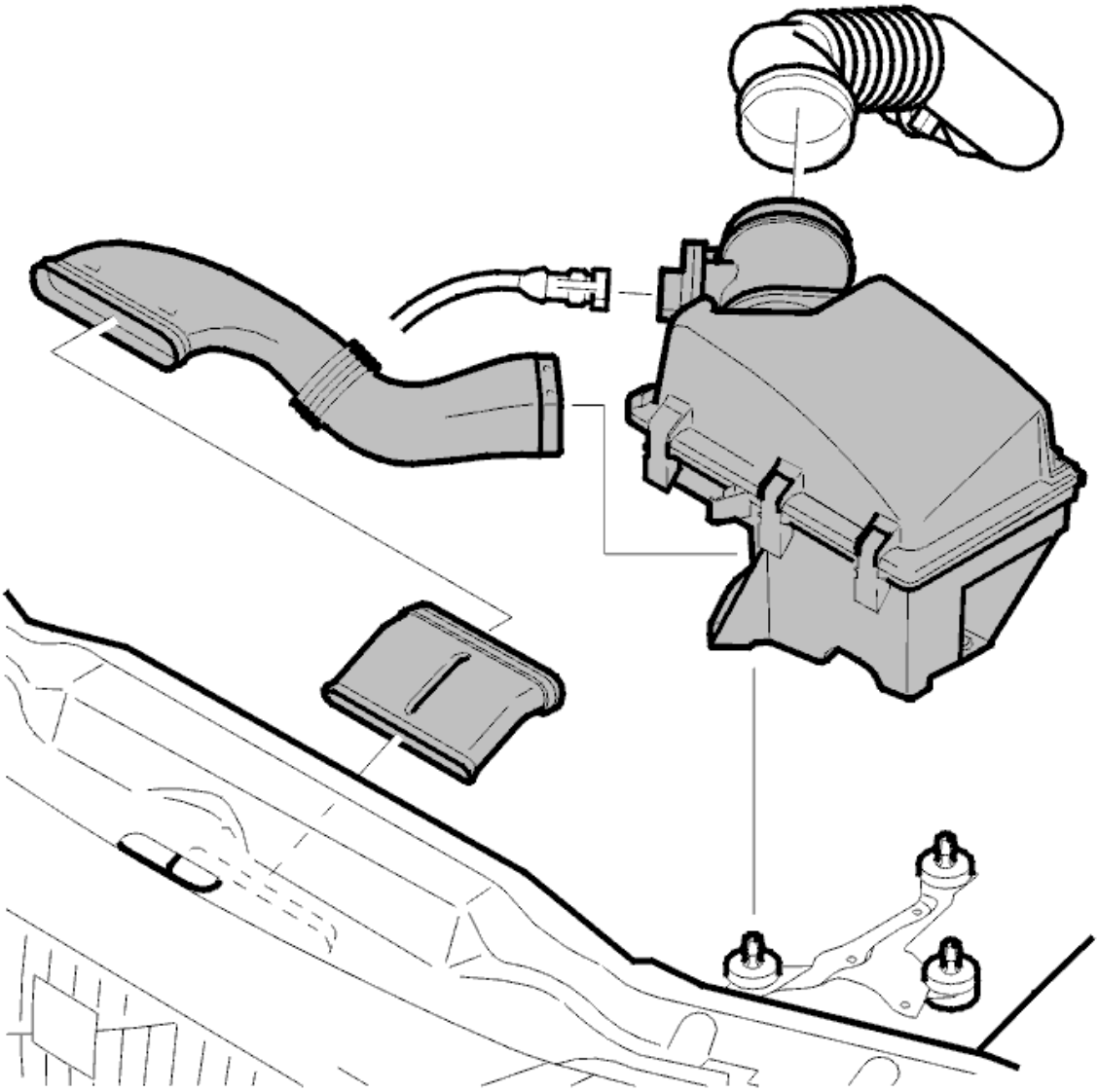


Fig. 339: Identifying Air Cleaner Housing Assembly And Intake Pipe
Courtesy of VOLVO CARS CORPORATION

The air cleaner housing ACL assembly with the intake pipe.

REMOVING THE CABLE HARNESS

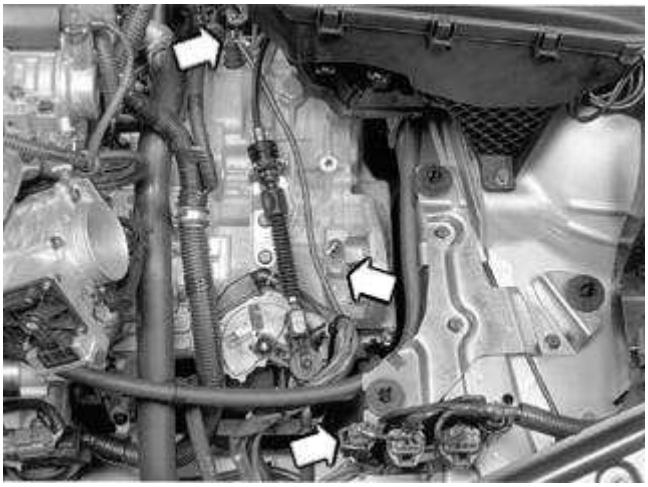


Fig. 340: Identifying Air Cleaner (ACL) Housing Cable Harness
Courtesy of VOLVO CARS CORPORATION

Remove the mounting for the cable harness from the cover for the control system.

Unhook the mounting with the connectors for the cable harness from the bracket for the air cleaner (ACL) housing.

Remove the tie straps from the cable harness.

Separate the connectors for the transmission output speed sensor and the transmission input speed sensor.

Unhook the connectors from the mounting.

Clean thoroughly around the sensors.

Remove the sensors and the cable harness.

INSTALLATION

INSTALLING THE SENSOR

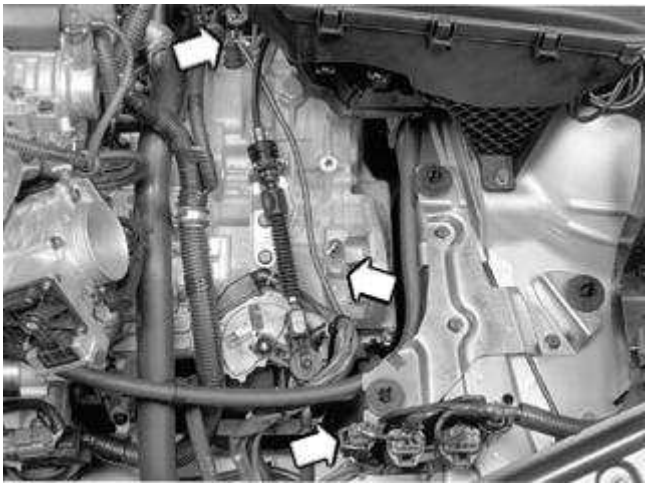


Fig. 341: Identifying Air Cleaner (ACL) Housing Cable Harness
Courtesy of VOLVO CARS CORPORATION

Install the new sensors.

Apply a little petroleum jelly to the O-rings for the sensors. Tighten to **5.5 Nm** .

- Install the connectors for the sensors on the mounting. Assemble the connectors
- Install the tie straps for the cable harness
- Hook the mounting for the connectors on to the bracket for the air cleaner (ACL) housing
- Secure the cable harness mounting in the control system cover.

INSTALLING THE AIR CLEANER (ACL) HOUSING

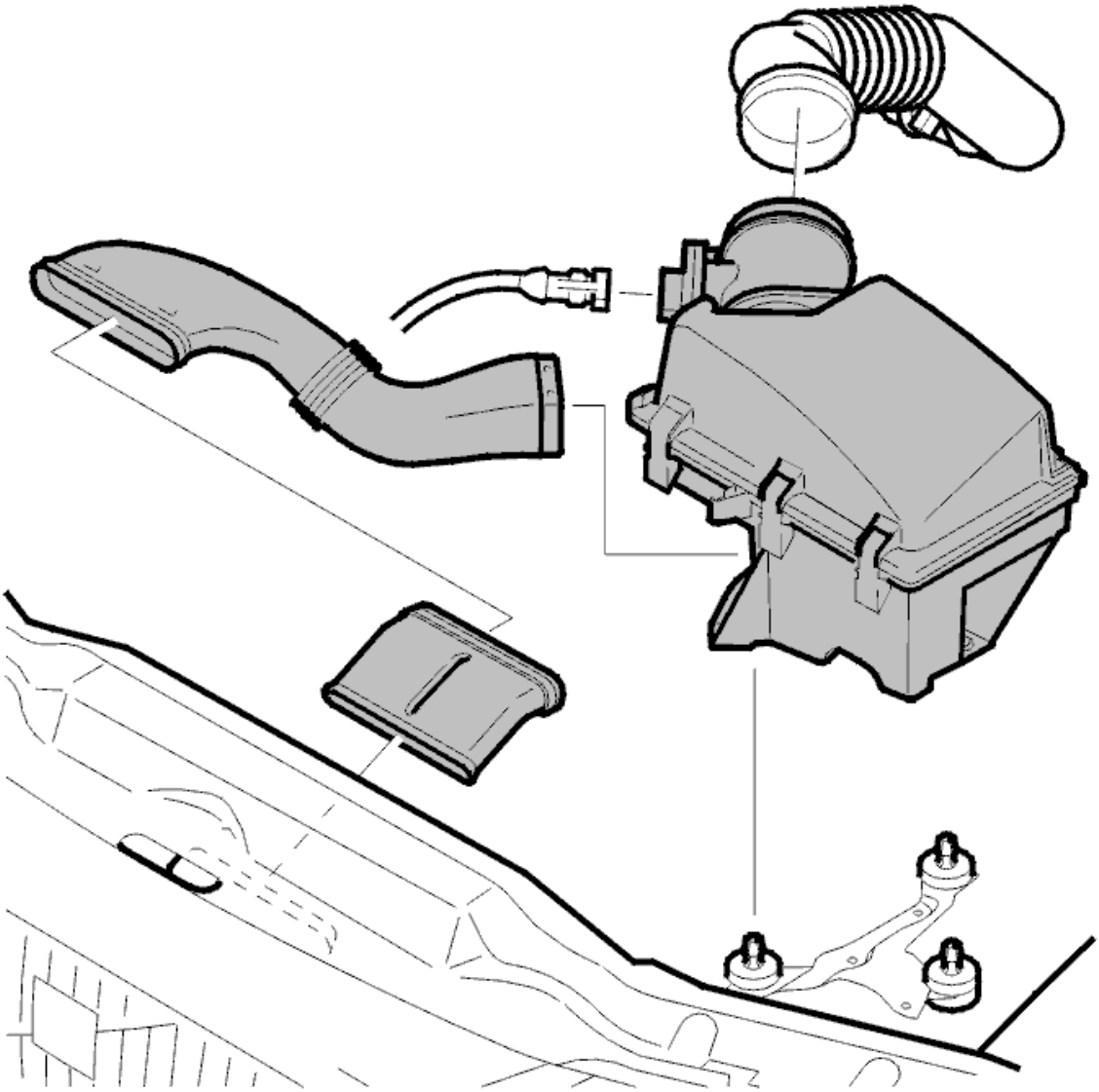


Fig. 342: Identifying Air Cleaner Housing Assembly And Intake Pipe
Courtesy of VOLVO CARS CORPORATION

Install the air cleaner housing (ACL) assembly with the intake pipe and connector.

Check and erase any diagnostic trouble codes (DTCs).

TCM-0028: 1ST GEAR. INCORRECT GEAR RATIO (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

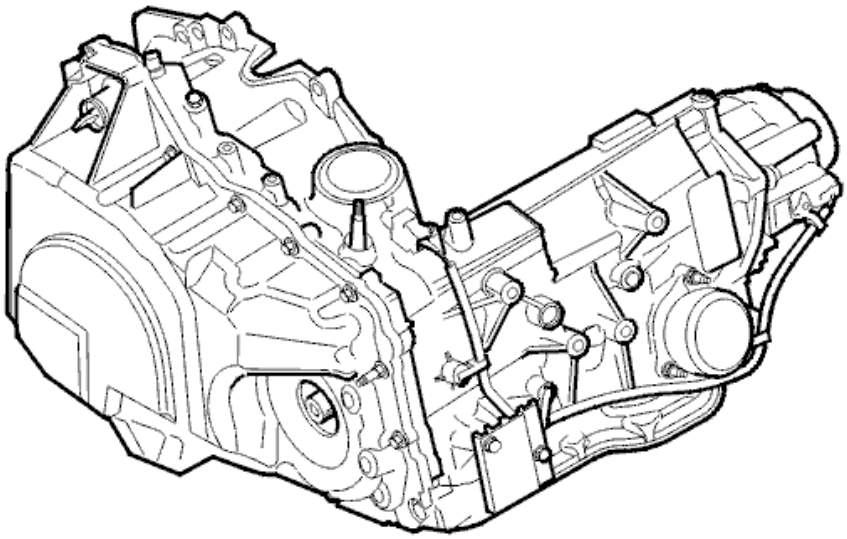


Fig. 343: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) calculates the ratio between the transmission input speed and the vehicle speed. There is a specific ratio for each gear. Diagnostic trouble codes (DTC) TCM-0028, TCM-0029, TCM-002A or TCM-002B are stored (depending on the gear selected) if the control module, when the oil temperature is above +20°C and throttle opening exceeds 3%, registers that the ratio deviates by more than 10%.

Substitute Value

- The control module "Limp Home" program has been initiated.

Possible Source

- Glycol in the transmission fluid.
- Contact resistance in the solenoid S1 and S2 circuits.
- Interference with or faulty transmission speed sensor signal.
- Interference with or faulty speed signal from the transmission speed sensor.
- Short-circuit to ground in the engine speed (RPM) sensor signal cable (-).
- Incorrectly adjusted gear-shift position sensor.

- The transmission oil level is too low.
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.
- Defective power ground.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

HINT: Harsh shifting -may be due to no line pressure solenoid STH control. This results in constant maximum line pressure.

HINT: No shifting -because the transmission control module (TCM) prevents activation of the solenoids. This stops gear-shifting. The transmission only operates in 3rd gear in positions 1 and 2, in 4th gear in positions D and 3, and in reverse gear in position R. Shifting can only be carried out manually between 3rd, 4th and reverse gears.

INCORRECT GEAR RATIO

see **INCORRECT GEAR RATIO**

TCM-0028: 1ST GEAR. INCORRECT GEAR RATIO (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

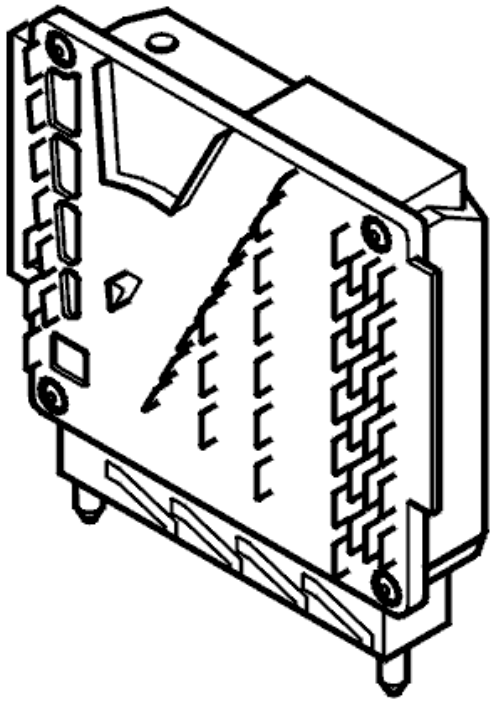


Fig. 344: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) calculates the ratio between the transmission input speed and the vehicle speed. There is a specific ratio for each gear. Diagnostic trouble code (DTC) TCM-0028 is stored if the control module registers that the ratio deviates by more than 10 % when the oil temperature is above +20°C (68 °F) and throttle opening exceeds 3 %.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Contact resistance in the circuit for solenoids S1, S2, S3, S4, S5 and SLS.
- Solenoid S1 has jammed in the OFF position.
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.

- No lock-up function.
- Harsh gear shifting.
- No shifting.

INCORRECT GEAR RATIO

CHECKS

CHECKING THE ADJUSTMENT OF THE GEAR-SHIFT POSITION SENSOR

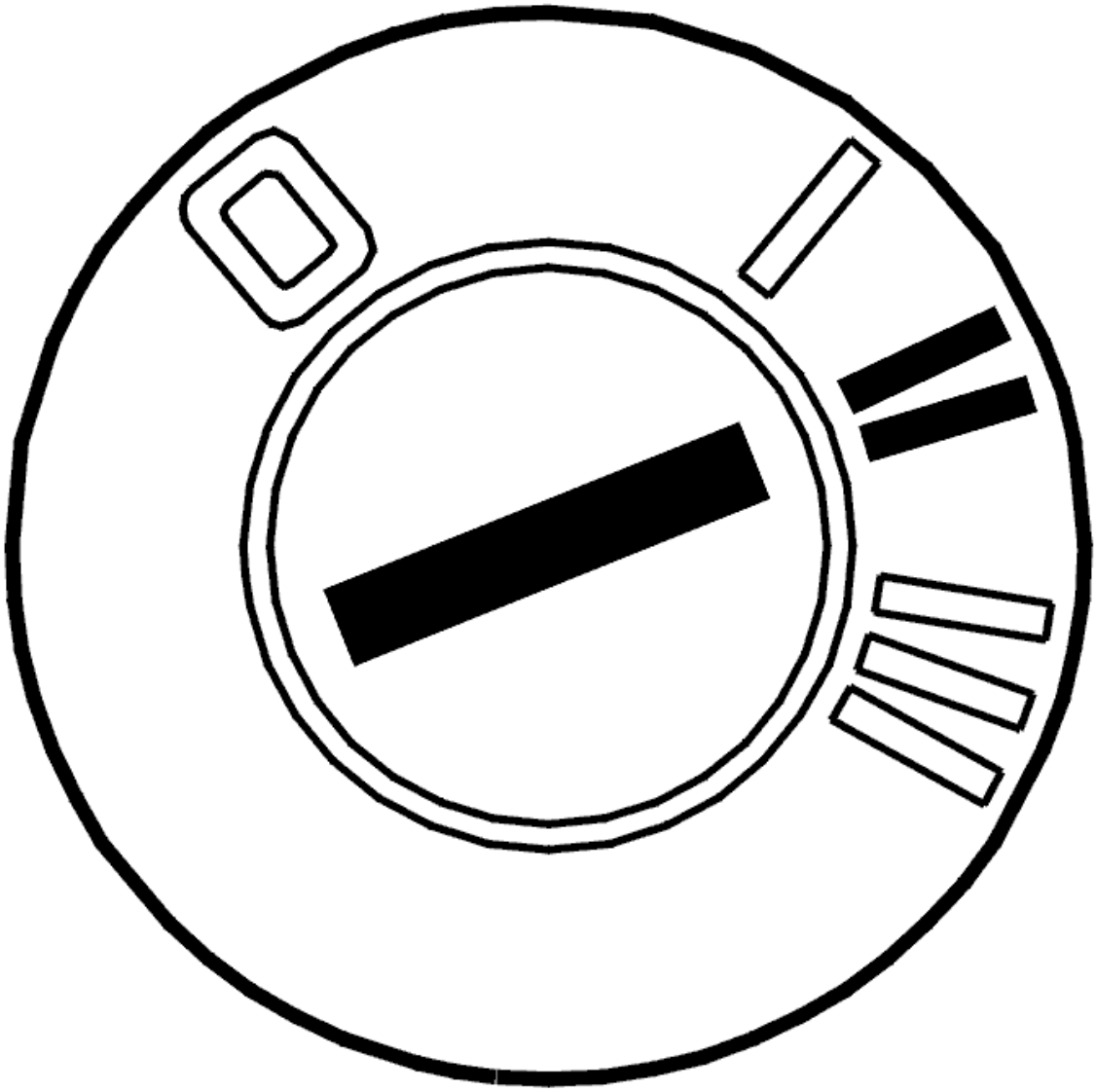


Fig. 345: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the position of the gear selector.

Move the gear selector into all positions. Check that the gear-shift positions are updated.

NOTE: Select the correct gear lever carrier from the list.

HINT: If the display shows an undefined position (O2 for example) the gear position sensor is incorrectly adjusted.

Remedy as necessary

Other information:

- see **GEAR-SHIFT POSITION SENSOR, CHECKING/ADJUSTING**

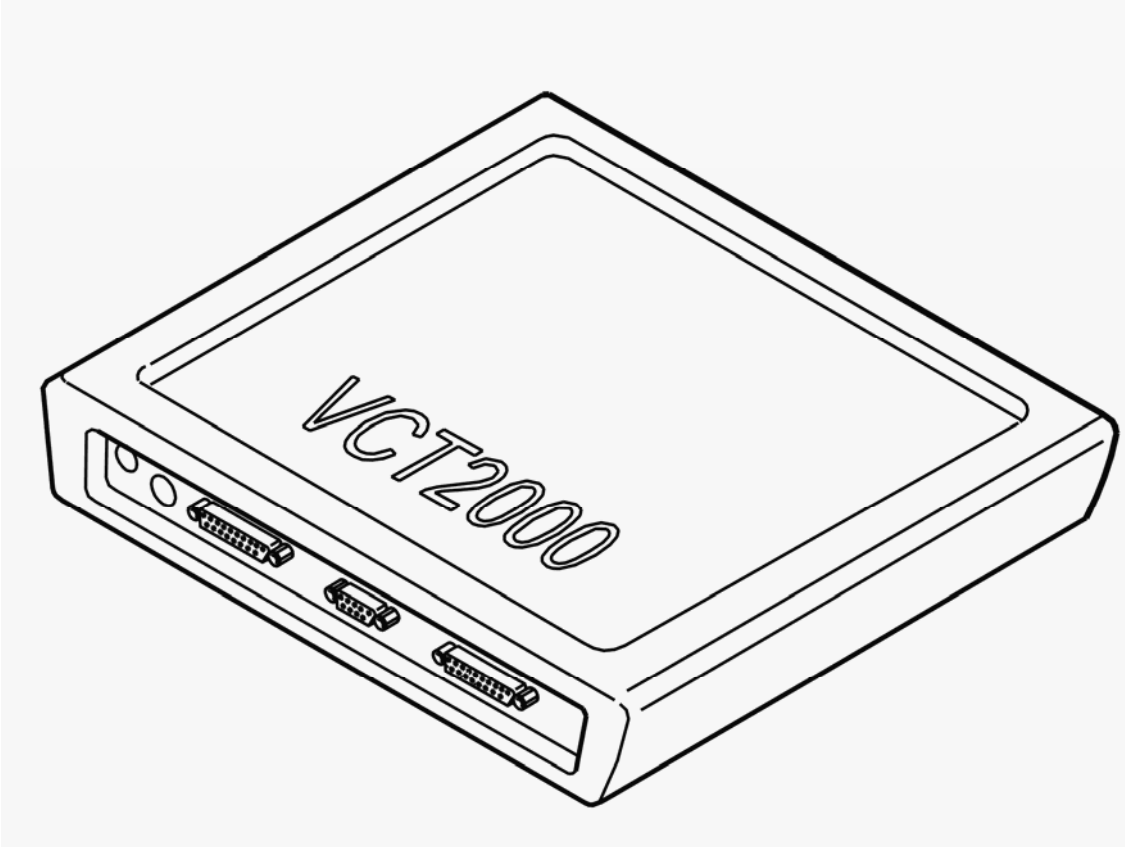


Fig. 346: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

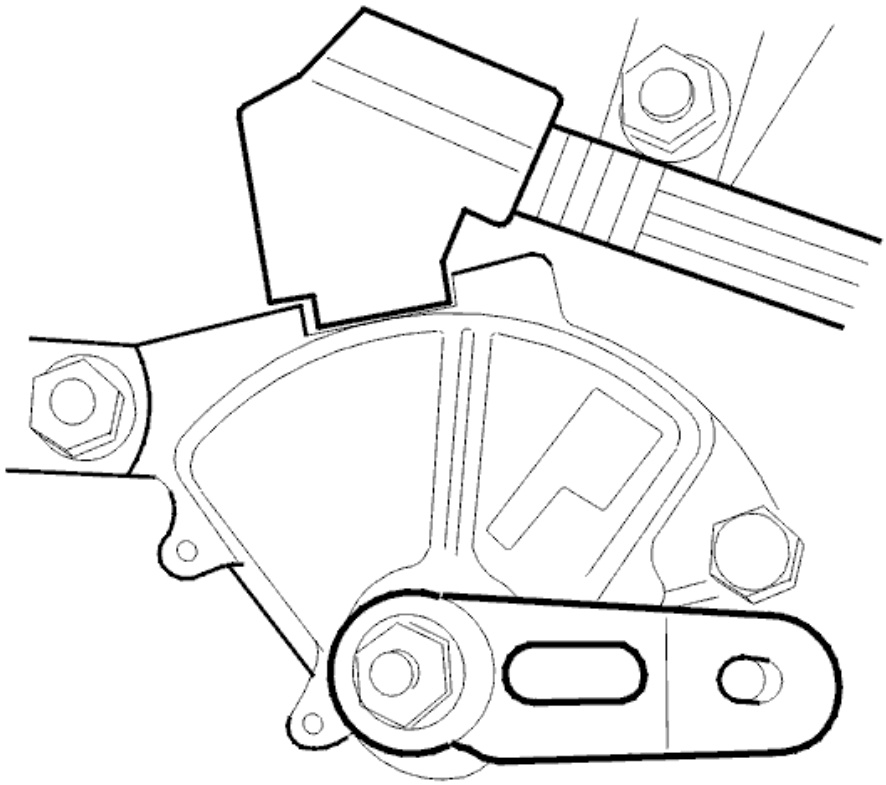


Fig. 347: Identifying Gear-Shift Position Sensor
Courtesy of VOLVO CARS CORPORATION

Is the gear-shift position sensor incorrectly adjusted?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE QUALITY AND LEVEL OF TRANSMISSION FLUID**

CHECKING THE QUALITY AND LEVEL OF TRANSMISSION FLUID

NOTE: The quality and level of transmission fluid is vital to transmission function. It is therefore important that these are correct. Fluid level is also affected by its temperature.

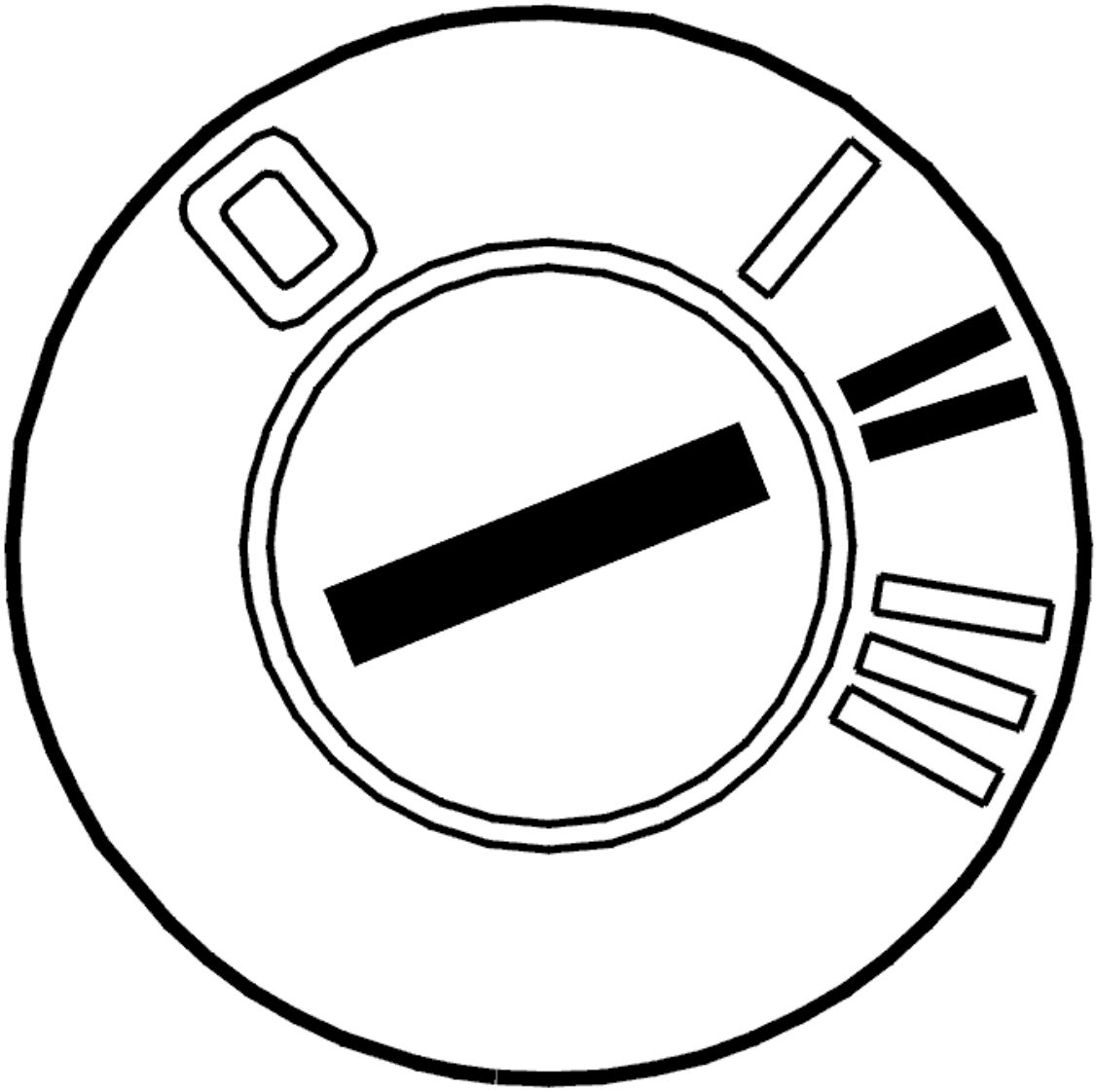


Fig. 348: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read the fluid temperature.

  Check the transmission fluid level. If it is low, check the transmission for leaks and then top off the fluid.

  Check the fluid quality.

  If the fluid smells burnt, change the transmission fluid.

  In addition, check the transmission fluid for an **abnormal** amount of particles by taking a sample with the dipstick.

  If the transmission fluid contains an **abnormal** amount of particles, replace the transmission.

Other information

- see **OIL LEVEL, CHECKING**
- see **OIL GRADE, CHECKING**
- see **TRANSMISSION OIL / OIL FILTER, REPLACING**

Select an alternative below

1. No fault found.

   Refer to **CHECKING FOR CONTACT RESISTANCE AND OXIDATION**

2. Transmission fluid changed, level low or quality poor.

   Refer to **RESETTING THE ADAPTATION**

3. The transmission fluid contains an **abnormal** amount of particles.

   Refer to **REPLACING THE GEARBOX**

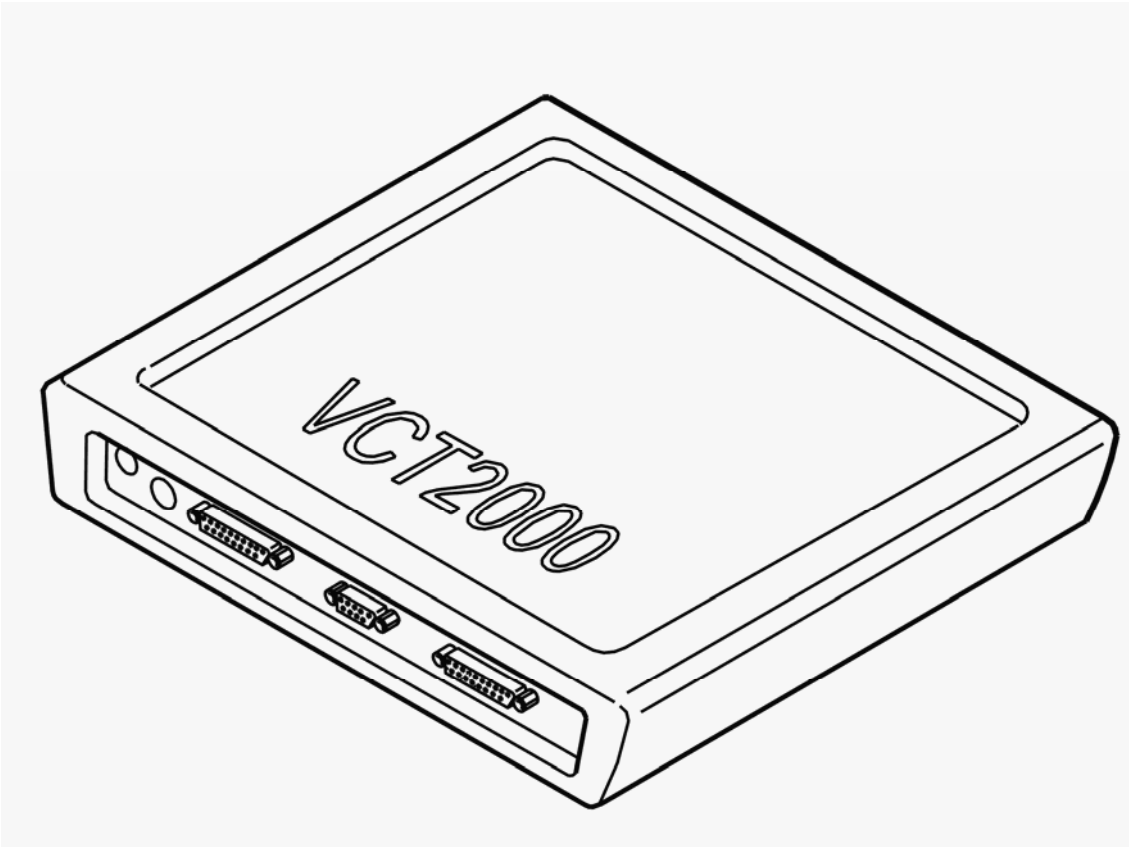


Fig. 349: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

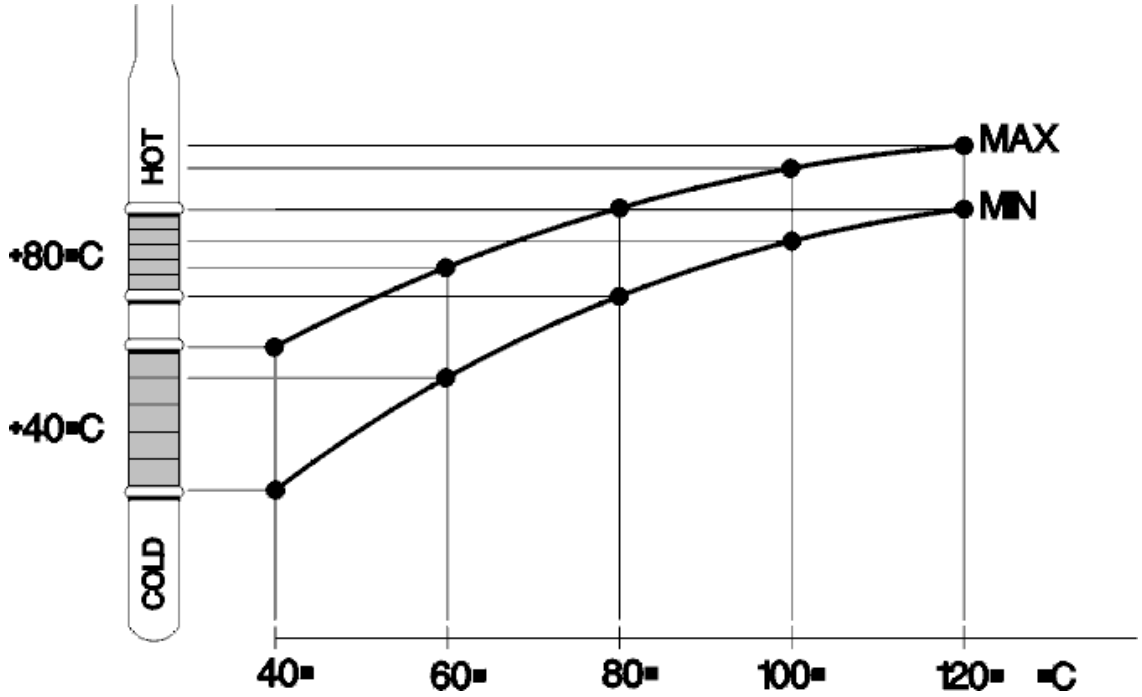


Fig. 350: Identifying Oil Level Temperature Graph
Courtesy of VOLVO CARS CORPORATION

CHECKING FOR CONTACT RESISTANCE AND OXIDATION

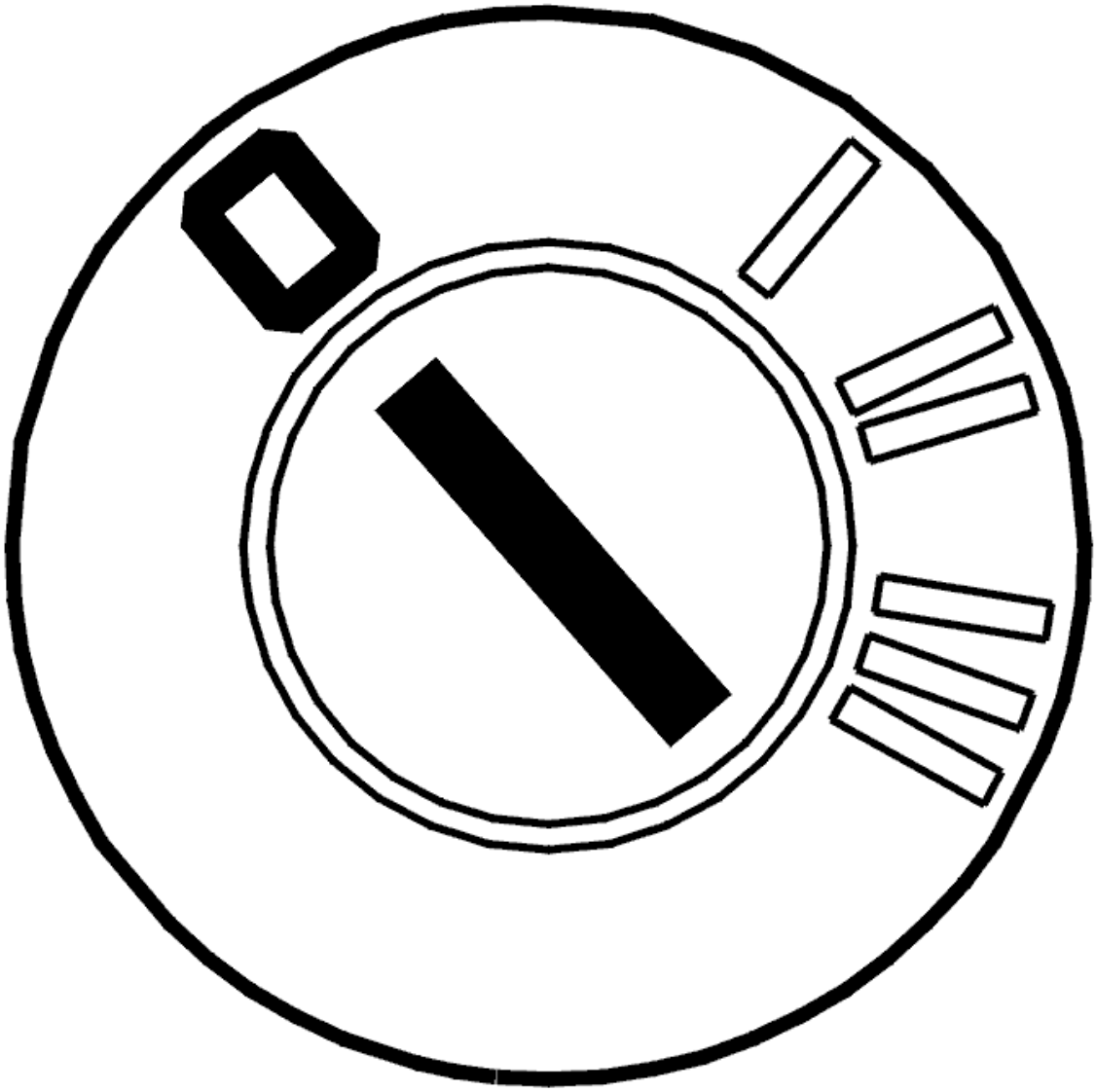


Fig. 351: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off

  Check the transmission connectors and the control module connector for contact resistance and oxidation.

  Other information:

  - To access transmission connectors: **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
  - see **CONTACT RESISTANCE AND OXIDATION**

- **Continue**

  Refer to **CHECKING NOISE IN THE GEARBOX**

CHECKING NOISE IN THE GEARBOX

- Test drive the vehicle following: **TEST DRIVE SCHEDULE, DESCRIPTION**
- Check for any clearly audible noises from the gearbox. Check for malfunctions.

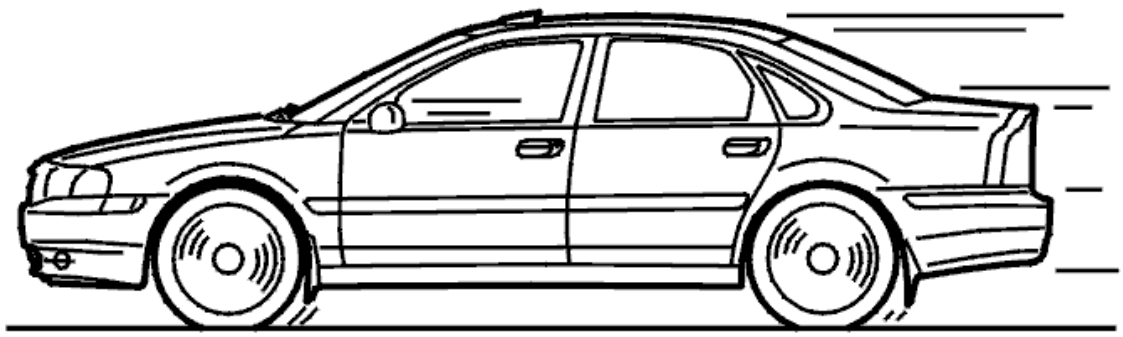


Fig. 352: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Does the transmission exhibit any noises or function problems?

- **YES**

  Refer to **REPLACING THE GEARBOX**

- **NO**

  Refer to **REPLACING THE CONTROL SYSTEM/TRANSMISSION**

REPLACING THE CONTROL SYSTEM/TRANSMISSION

Test with a new control system following: **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

If this does not help, Replace the transmission. For AW50AWD 2003- see **TRANSMISSION, REMOVING**

or for AW55-50 2004- see **TRANSMISSION, REMOVING** and for AW50AWD 2003- see **TRANSMISSION, INSTALLING** or for AW55-50 2004- see **TRANSMISSION, INSTALLING** .

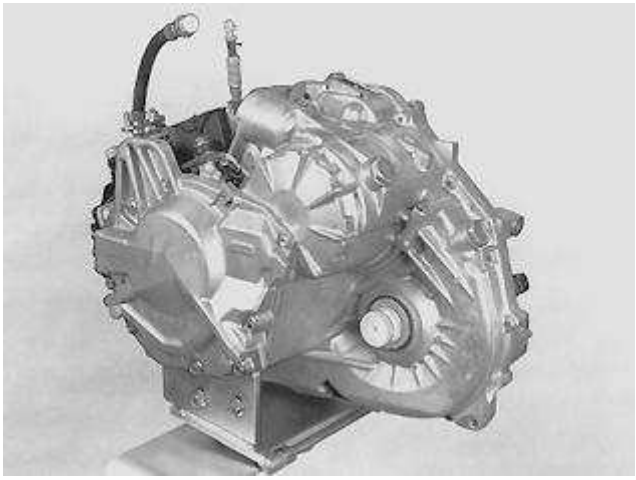


Fig. 353: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

REPLACING THE GEARBOX

Replace the transmission. For AW50AWD 2003- see **TRANSMISSION, REMOVING** or For AW55-50 2004- see **TRANSMISSION, REMOVING** and For AW50AWD 2003- see **TRANSMISSION, INSTALLING** or For AW55-50 2004- see **TRANSMISSION, INSTALLING** .

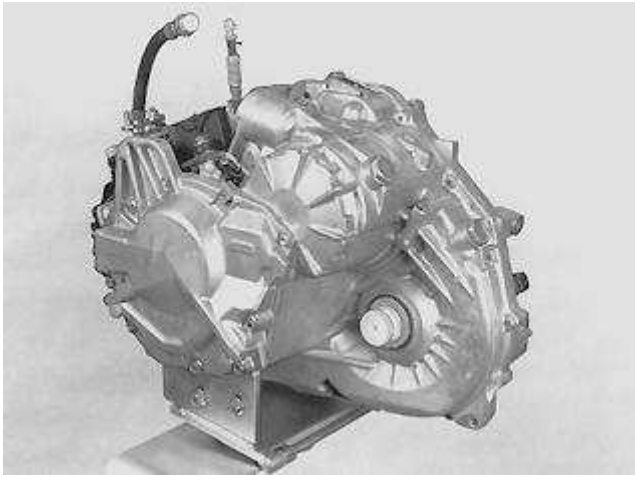


Fig. 354: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

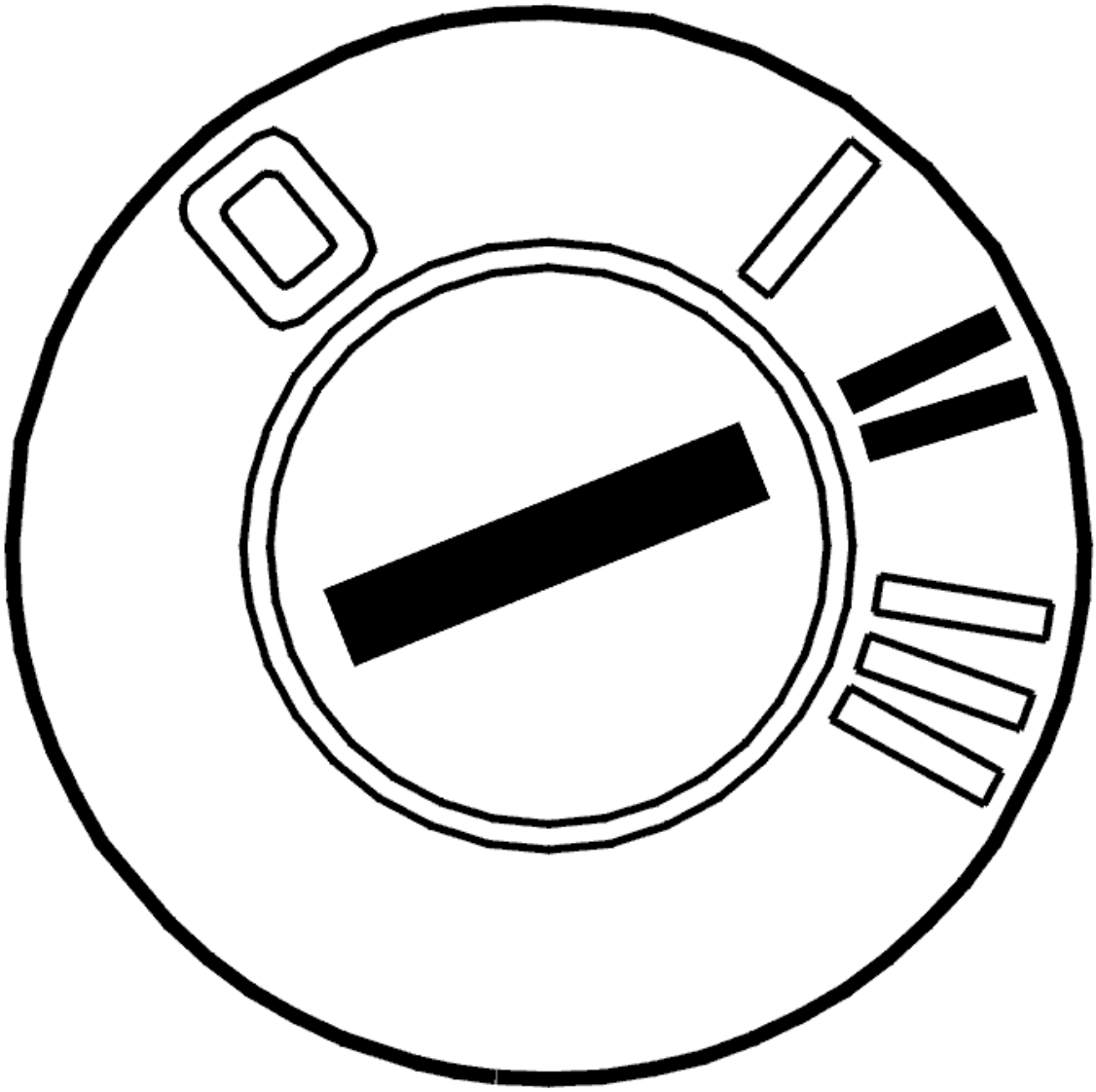


Fig. 355: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

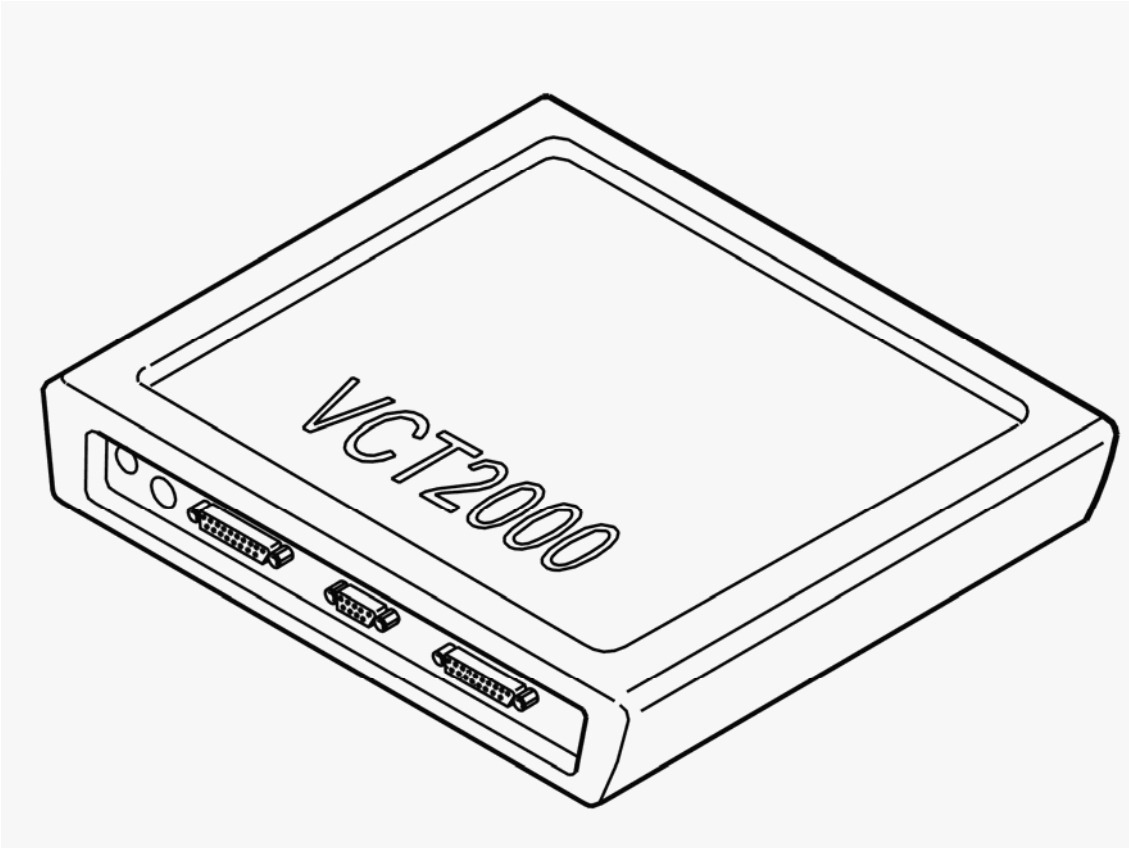


Fig. 356: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

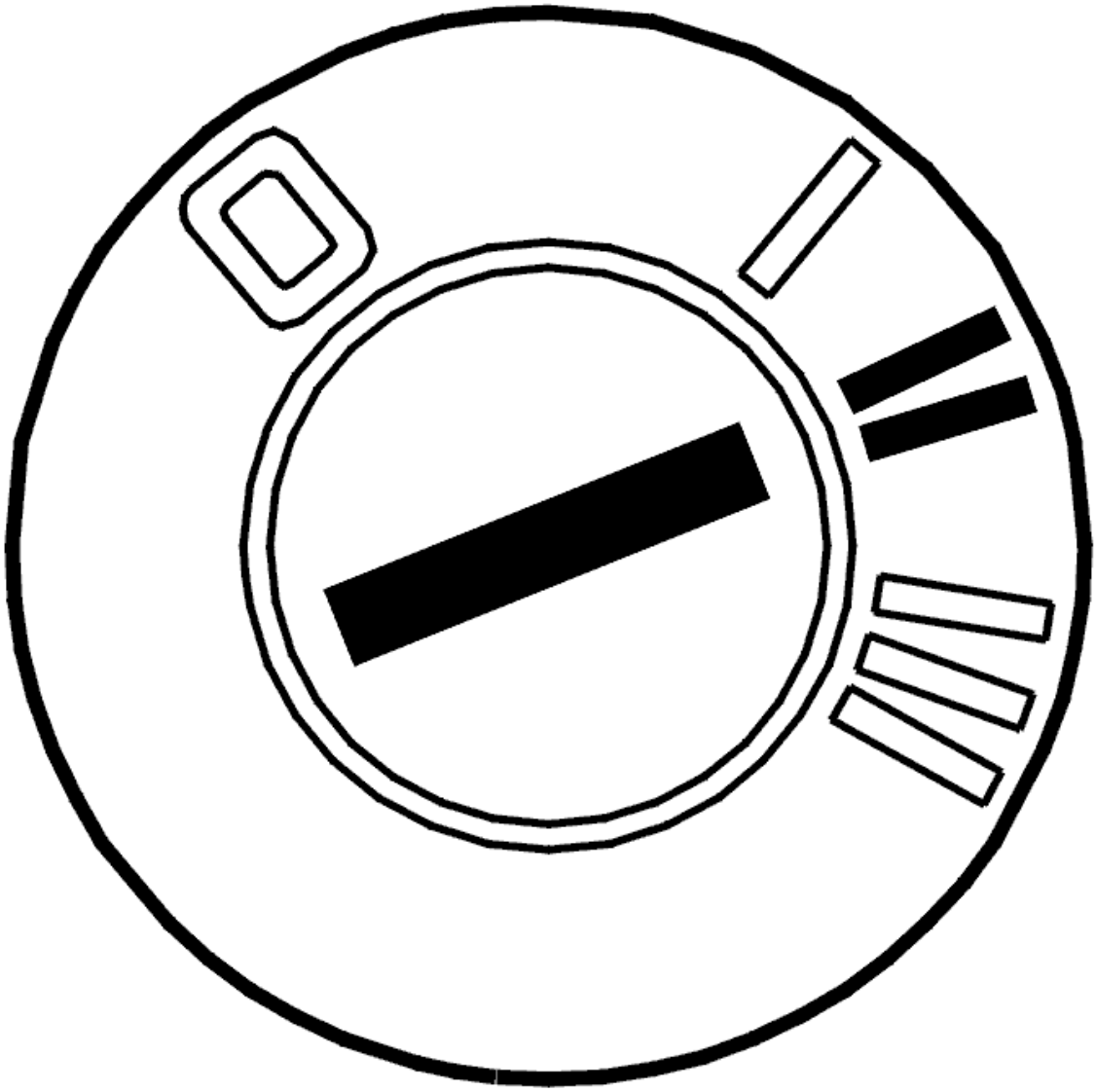


Fig. 357: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

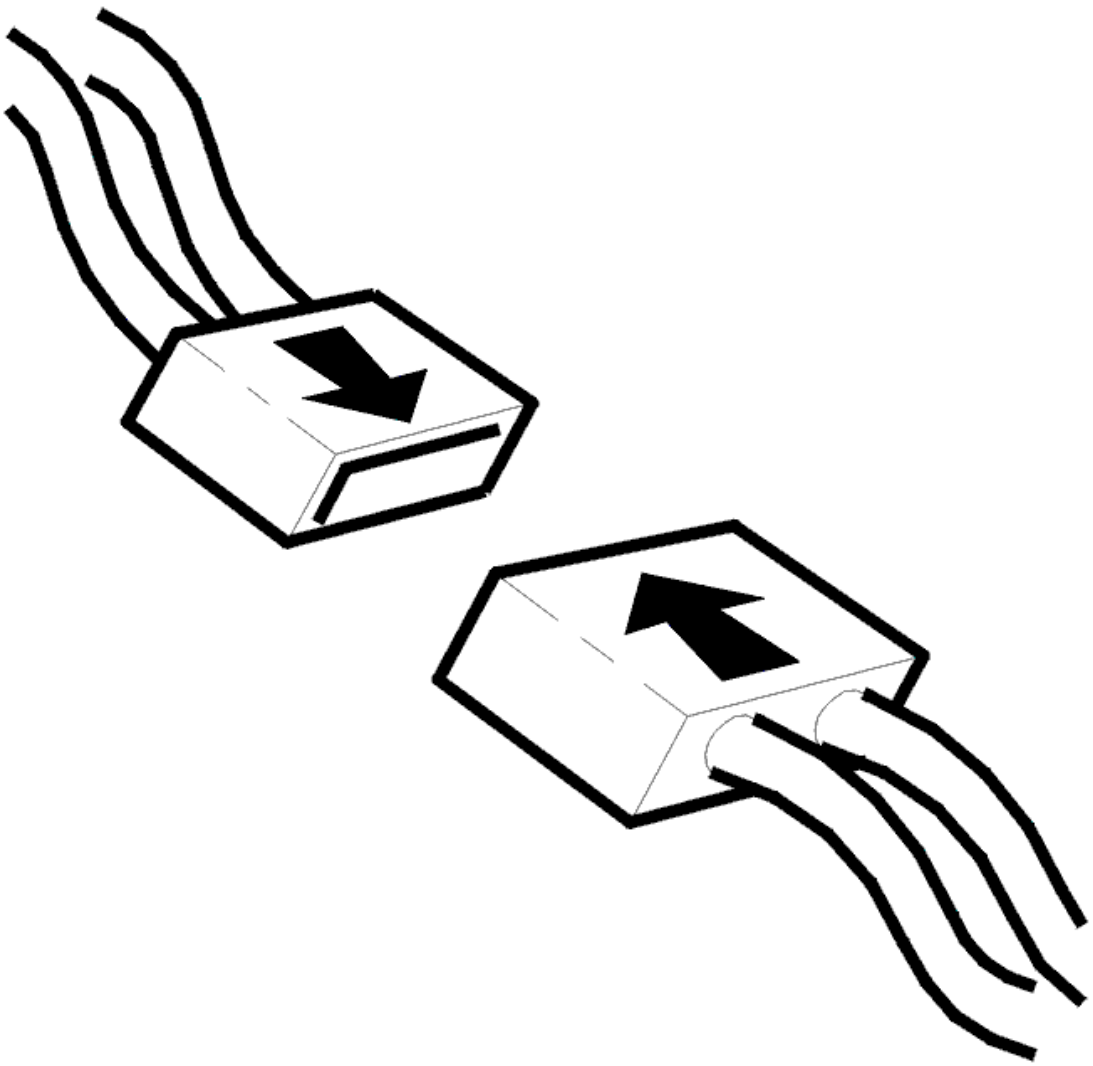


Fig. 358: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

During the test drive, oil temperature should be over 20 °C.

Note any deviations in transmission function.

Does the transmission function flawlessly?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TEST DRIVE FORM, DESCRIPTION

This schedule is intended to provide guidelines for test driving a car to evaluate complaints about the 4T65EV, 4T65EV-GT and 4T65AWD automatic transmissions.

Please observe speed limits .

Before the test drive

- Check the oil level in the transmission **before** test driving. See **OIL LEVEL, CHECKING**
- Check that the gear selector cannot be moved with the ignition **off**
- Check that the gear selector cannot be moved with the ignition **on** and the brake pedal unaffected.

Check the operation of the park / neutral position (PNP) switch

Check that the car can be started with the gear selector in positions **N** and **P** .

It must not be possible to start the car with the gear selector in any other position than **P** and **N** .

Check the gear selector positions

Check that the selector engages in each position, and that it does not try to " jump" out of the selected position.

Check that the gear selector cannot be moved to position **P** or **N** at a speed above 12 km/h.

Check the back-up gear

Back up the car in the normal way. Check that the back-up light comes on.

Check the engagement of back-up (reverse) gear. The gear should normally engage within 1.5 seconds. The engagement must be soft.

Look out for delayed or notchy engagements. If the conditions are abnormal, check if these symptoms disappear when the transmission is hot or cold.

Test driving

Warm up the transmission by driving at variable speeds for 10 to 20 minutes. Start and stop the engine a few times to warm up the engine more quickly.

NOTE: Never warm up the transmission by braking the transmission. This may cause localized overheating and uneven temperature distribution.

Listen for mechanical noises

Start the car with the gear selector in position **D** . Drive the car so that the transmission shifts up and down. Listen for abnormal noises from the transmission. If any abnormal noises are audible at normal speeds, during engine braking, in different gear selector positions, at different oil temperatures, different accelerator pedal (AP) positions or different speeds, stop the test drive and return to the workshop.

Fault-trace the relevant symptoms in the symptom manager.

Check the function of the transmission while driving

Economy program (E) Sports program (S)

The software for the transmission is intended to provide the best combination of comfort, performance and economy.

The software will gradually adapt the shift pressure to ensure optimal smooth gear shifts.

If the transmission has Geartronic, slightly harsher shifting will be noticeable in Geartronic mode.

The transmission control module (TCM) also receives information about acceleration and speed. The control module will adapt the shift points for better performance (Sports mode (S) if the driver has an aggressive driving style. The shifting points are affected by the speed at which the driver depresses the accelerator pedal (AP). When the accelerator pedal (AP) is released, the software in the transmission will return to the standard economy (E) mode. The gear shifts must be smooth, irrespective of the shifting conditions.

Start the car with the gear selector in position **D** . Check the shifting speeds using the lowest possible acceleration. Note any tendency to stick or slip during shifting.

Checking the kickdown function

The transmission receives a signal for activation from the accelerator pedal (AP). The kickdown function is activated when the accelerator pedal (AP) is pressed approximately 85%. The kickdown function is blocked in Geartronic mode.

Start the car with the gear selector in position **D** . Check the kickdown function by driving at variable speeds

and fully depressing the accelerator pedal (AP) to the kickdown position (100% throttle opening). After the shift from 1st to 2nd, reduce the throttle opening to just below the kickdown threshold (85% throttle opening). Note whether the shifts slip or are harsh.

Check the kickdown function by driving at variable speeds (60 - 90 km/h) and fully pressing the accelerator pedal (AP) to the kickdown position. At lower speeds, the transmission will shift down when the kickdown function is engaged. The function is OK if the transmission downshifts on activation.

Start the car with the gear selector in position **D** . Depress the accelerator pedal (AP) to the kickdown position at different speeds. Check the **HIGHEST** speed at which the kickdown downshift occurs.

Keep the car stationary on a flat road with the gear selector in **N position** . Release the brake and accelerate a little. Does the car move forward?

Start in position 3. Drive until 3rd gear engages. Release the accelerator pedal. Check that there is engine braking in 1st gear. Select **L** position at high speed. Let the car slow down.

Check the shifting points as the car slows.

Start in position **L** . Increase speed. Check that there is engine braking.

Stop the car on a slope. Shift the gear selector to position **P** . Release the brake. Does the car move?

Winter (W)

Start the car with the gear selector in position **D** . Press the button for winter mode (W). The transmission should start in 2nd gear and give a smooth take-up from standstill.

Checking the lock-up function

Start by driving the car for 5-10 minutes. This is to get the oil temperature to operating temperature.

Then move the gear selector to 3rd gear. Drive the car for at least 2 minutes at an engine speed (RPM) of approximately 2500 RPM or higher. Move the gear selector to position **D** .

Drive the car for 3-4 minutes at speed in excess of 70 km/h.

Accelerate until the lock-up function is activated (at approximately 80 km/h). If the brake pedal is pressed when the engine speed (RPM) is below 2000 RPM, the lock-up function will be disengaged.

Adapting the shift pressure

If the transmission control module (TCM) has been replaced or if the adaptation has been erased, the shift patterns and lock-up mode will revert to default.

The following driving schedule must be followed in order to adapt the pressure to a correct level:

- Before beginning adaptation, the transmission must be at normal operating temperature (approximately 70°C)
- To adapt the shift pressure, start by accelerating 5 to 10 times with the accelerator pedal (AP) in each position, 25, 50, 75 and 100%. Hold the accelerator pedal (AP) in a set position during each acceleration and through shifts 1-2, 2-3 and 3-4
- Drive at 90 km/h for approximately 3 minutes to adapt the pressure.

TCM-0029: 2ND GEAR. INCORRECT GEAR RATIO (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

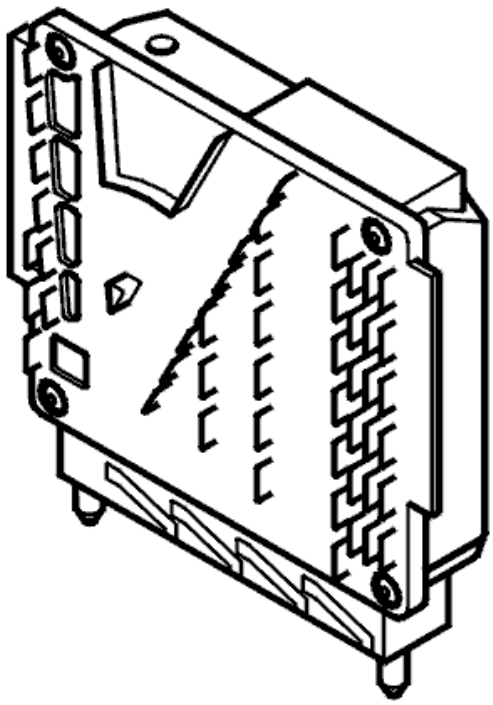


Fig. 359: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) calculates the ratio between the transmission input speed and the vehicle speed. There is a specific ratio for each gear. Diagnostic trouble code (DTC) TCM-0029 is stored if the control module registers that the ratio deviates by more than 10% when the oil temperature is above +20°C (68 °F) and throttle opening exceeds 3%.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Contact resistance in the circuit for solenoids S1, S2, S3, S4, S5 and SLS.
- Solenoid S2 has jammed in the ON position.
- Solenoid S3 has jammed in the OFF position.
- Solenoid S4 has jammed in the ON position.
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

INCORRECT GEAR RATIO

CHECKS

CHECKING THE ADJUSTMENT OF THE GEAR-SHIFT POSITION SENSOR

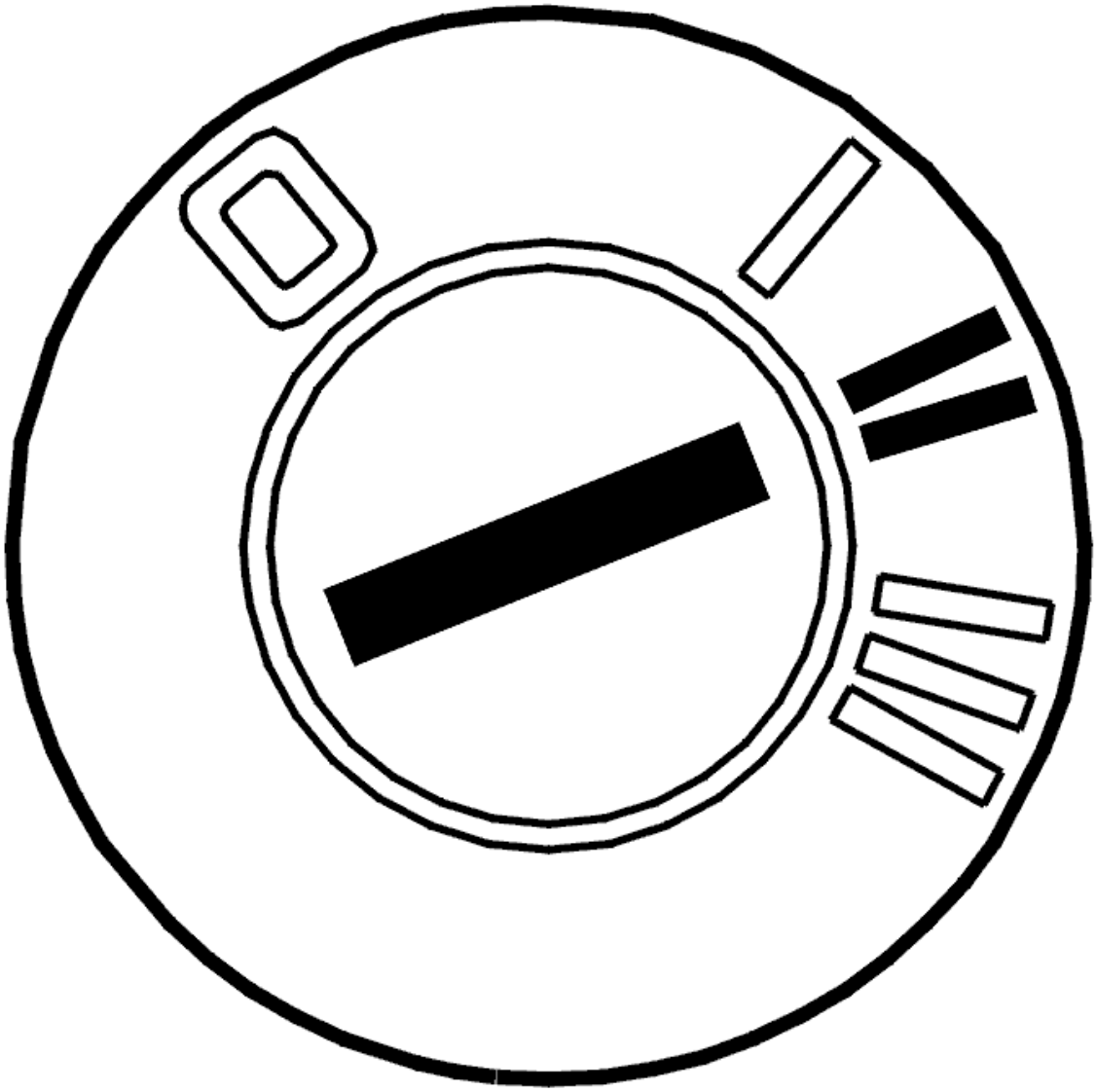


Fig. 360: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the position of the gear selector.

  Move the gear selector into all positions. Check that the gear-shift positions are updated.

  HINT: If the display shows an undefined position (O2 for example) the gear position sensor is incorrectly adjusted.

  Remedy as necessary

  Other information:

  - To adjust the gear-shift position sensor, see **GEAR-SHIFT POSITION SENSOR,**

CHECKING/ADJUSTING .

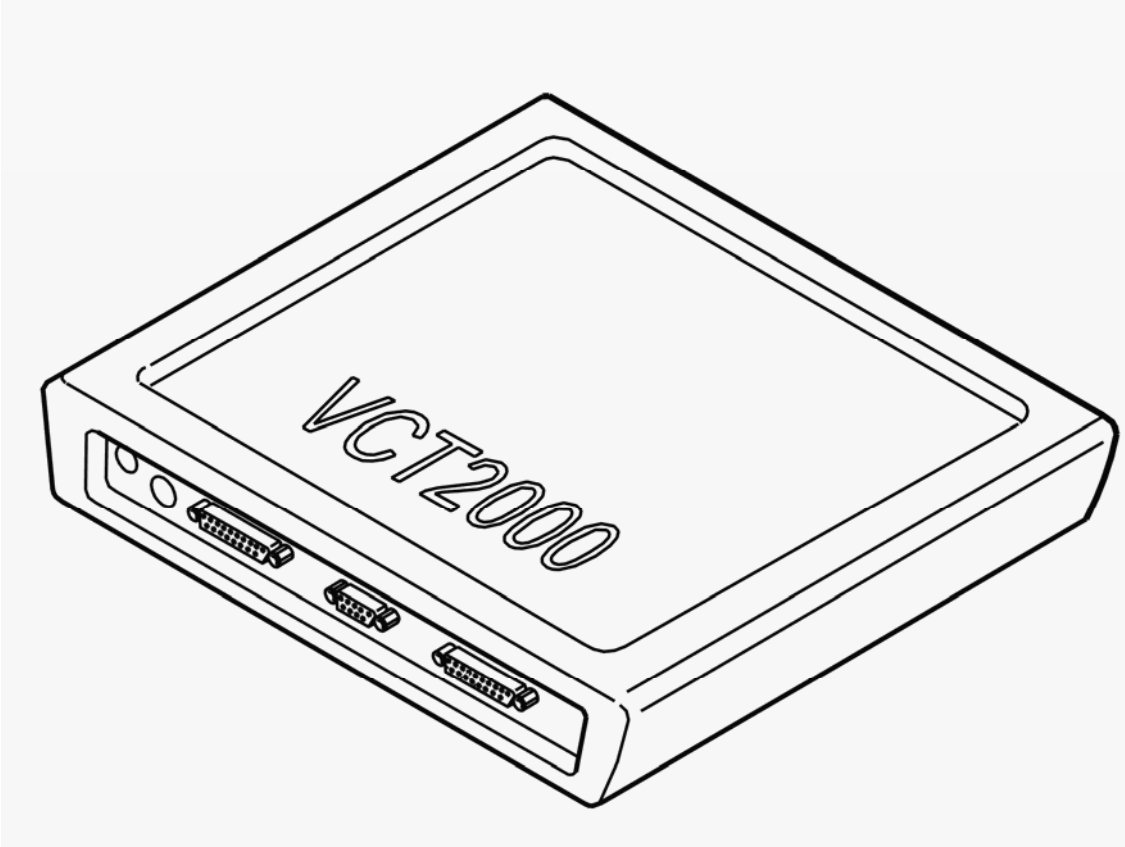


Fig. 361: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

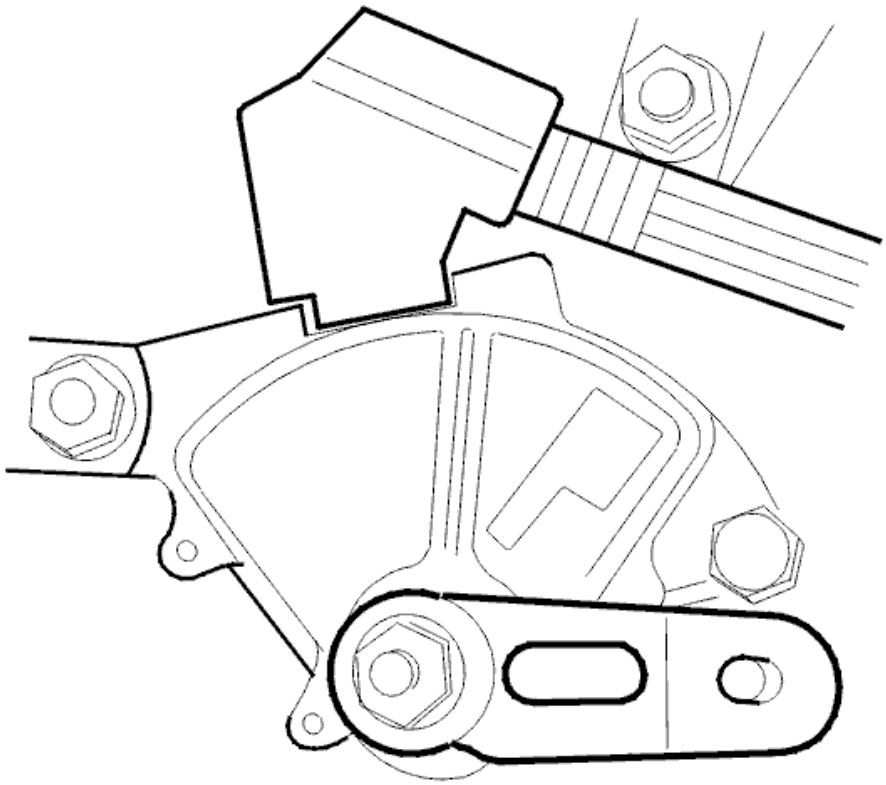


Fig. 362: Identifying Gear-Shift Position Sensor
Courtesy of VOLVO CARS CORPORATION

Is the gear-shift position sensor incorrectly adjusted?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING FOR CONTACT RESISTANCE AND OXIDATION**

CHECKING NOISE IN THE TRANSMISSION

- Test drive the car. See **TEST DRIVE FORM, DESCRIPTION**
- Check for any clearly audible noises from the transmission. Check for malfunctions.

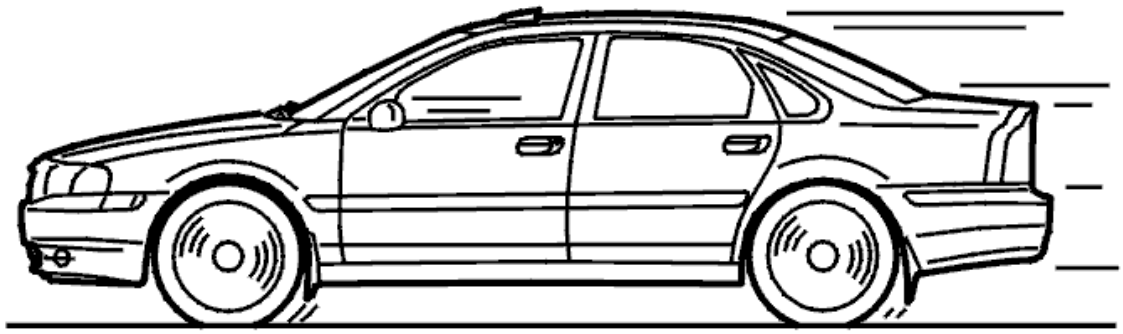


Fig. 363: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the transmission making a noise?

- **YES**

  Refer to **REPLACING THE TRANSMISSION**

- **NO**

  OKAY: Troubleshooting has been completed.

CHECKING FOR CONTACT RESISTANCE AND OXIDATION

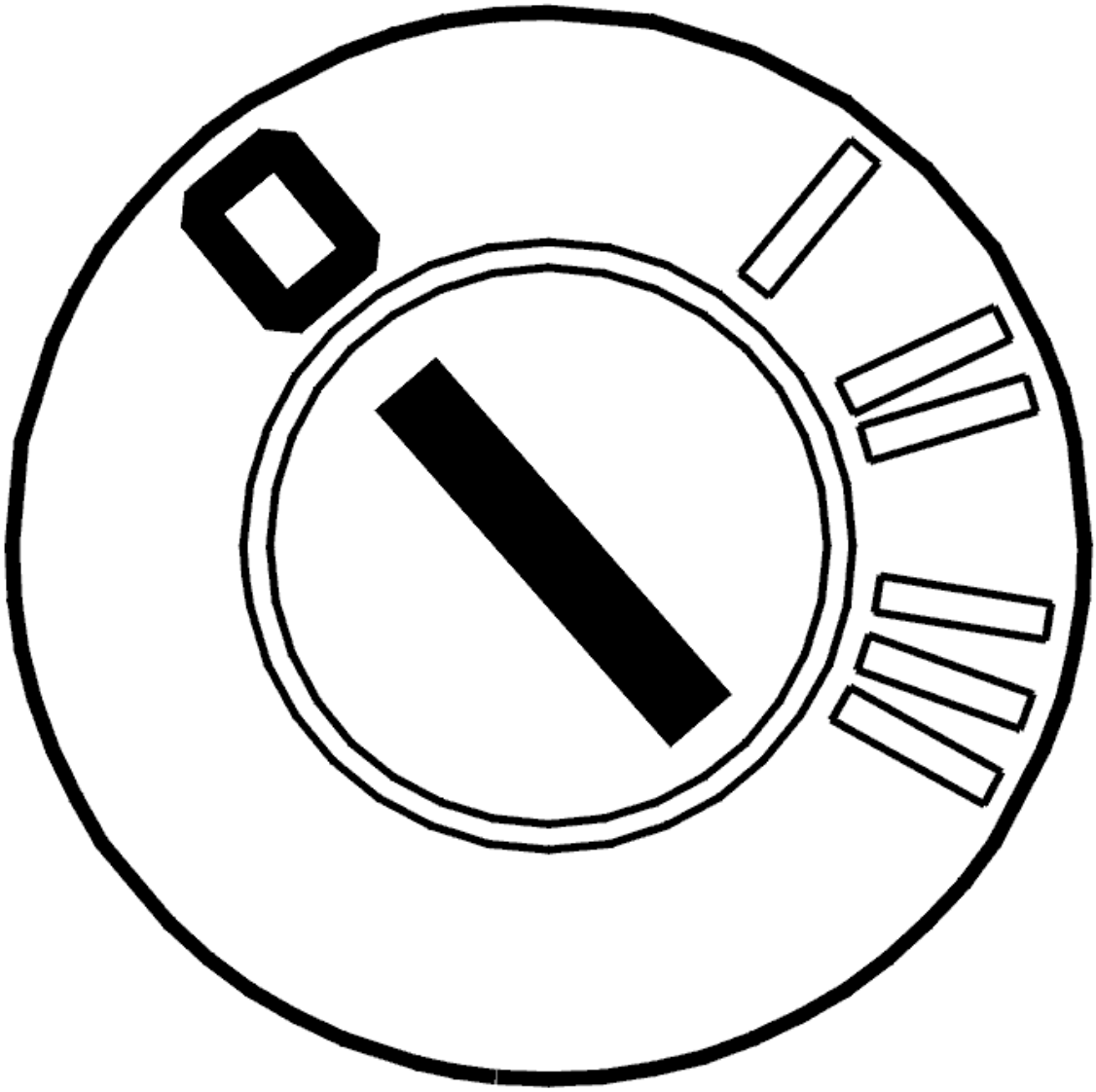


Fig. 364: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission connectors and the control module connector. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION**

  Other information:

  - To access the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING** .

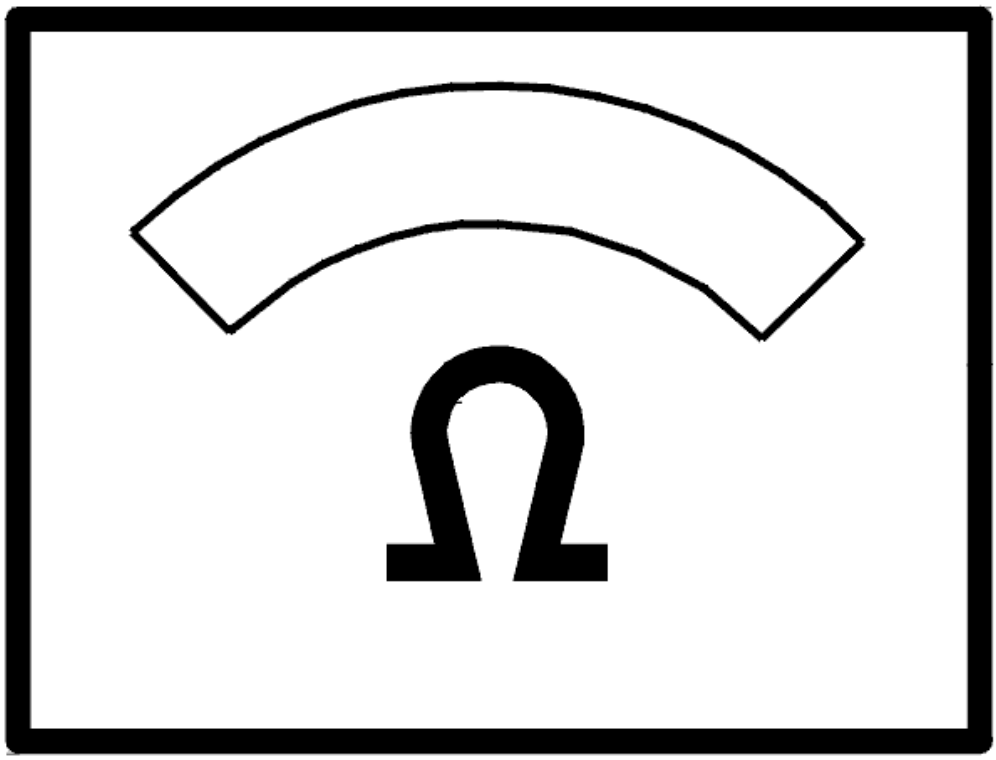


Fig. 365: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING NOISE IN THE TRANSMISSION**

REPLACING THE TRANSMISSION

NOTE: In the event of faults during the first year on the market, replace transmission AW55-50SN.

Replace the transmission. For AW50AWD 2003- see **TRANSMISSION, REMOVING** or For AW55-50 2004- see **TRANSMISSION, REMOVING** and For AW50AWD 2003- see **TRANSMISSION, INSTALLING** or For AW55-50 2004- see **TRANSMISSION, INSTALLING** .

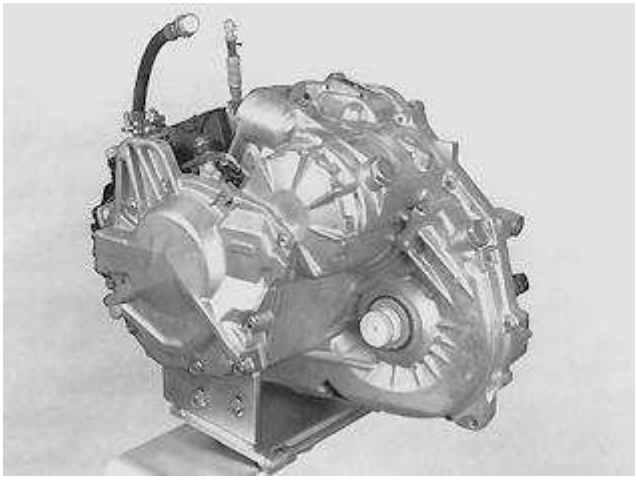


Fig. 366: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

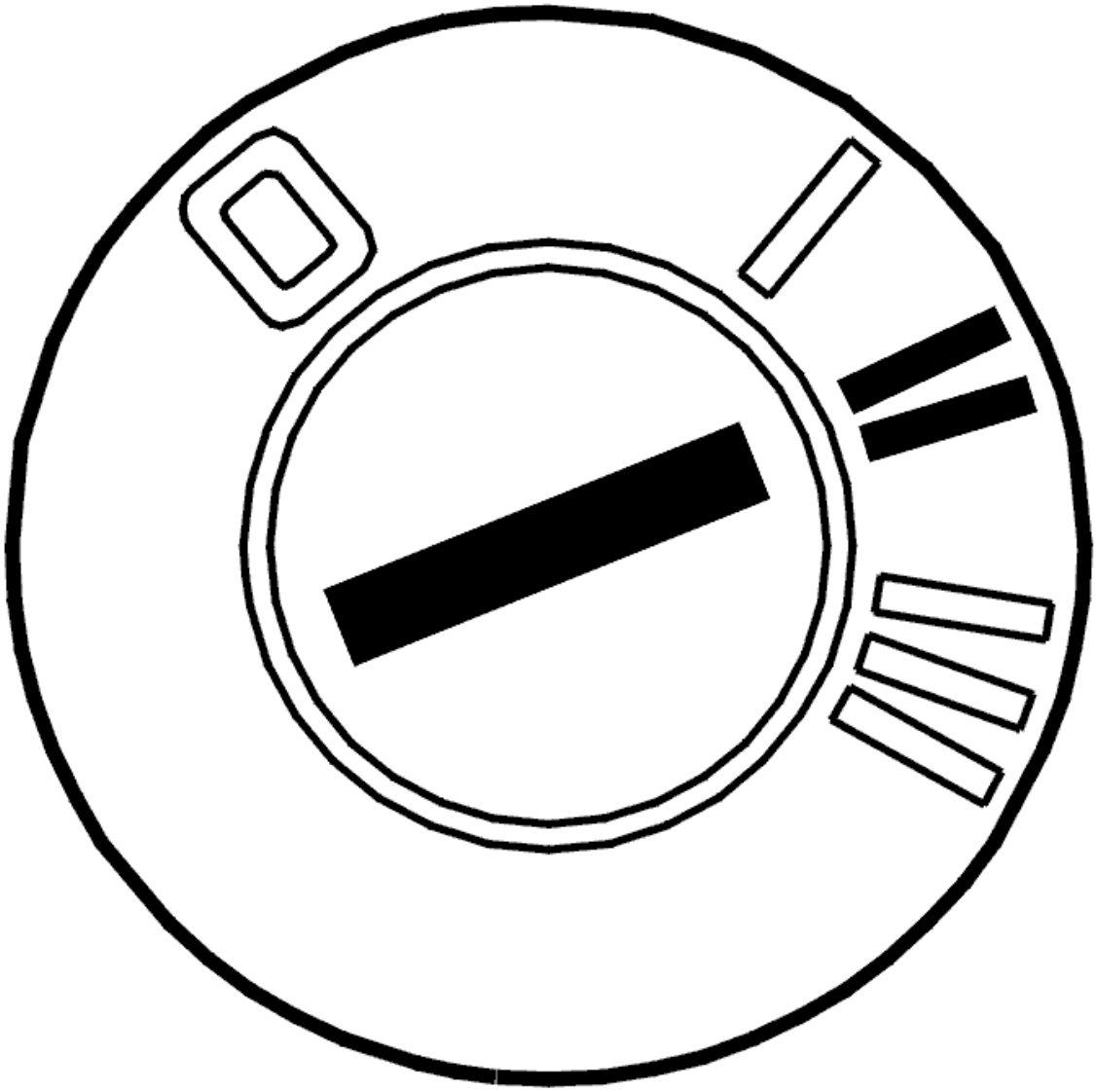


Fig. 367: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

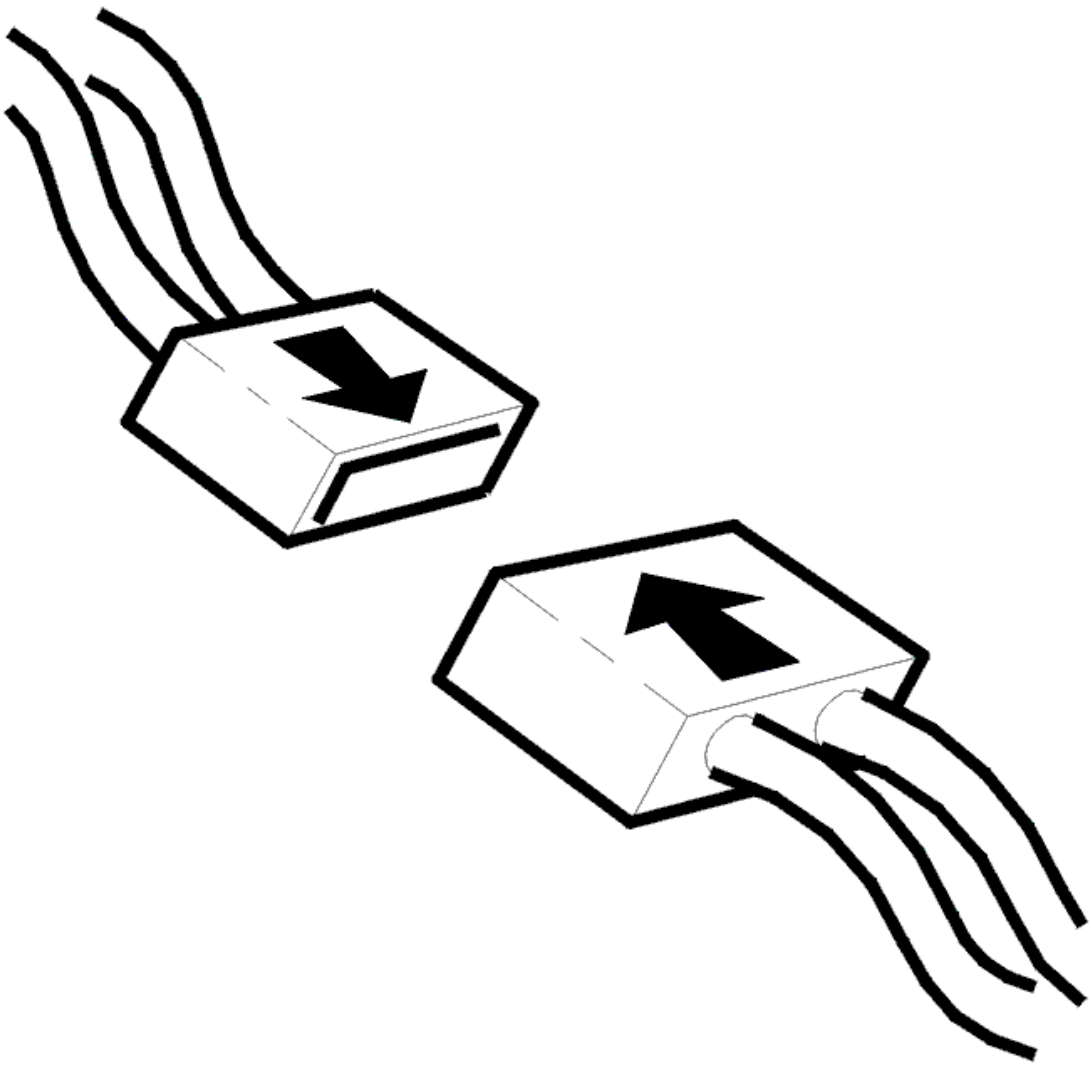


Fig. 368: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following: **TEST DRIVE FORM, DESCRIPTION**

During the test drive, oil temperature should be over 20 °C.

Note any deviations in transmission function.

Does the transmission function flawlessly?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-002A: 3RD GEAR. INCORRECT GEAR RATIO (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

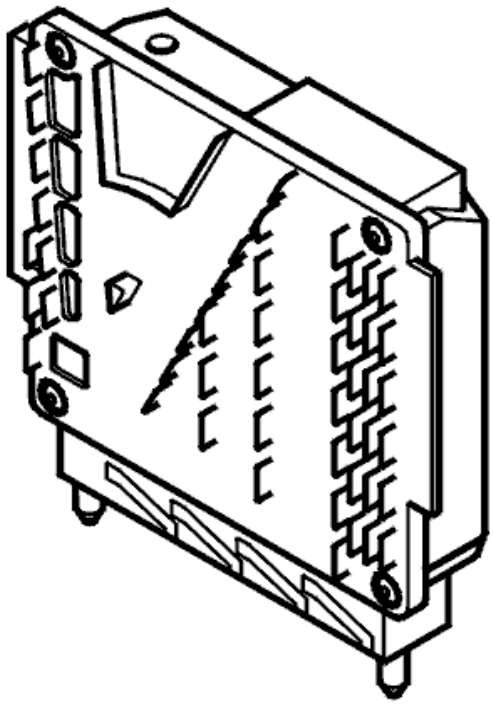


Fig. 369: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) calculates the ratio between the transmission input speed and the vehicle speed. There is a specific ratio for each gear. Diagnostic trouble code (DTC) TCM-002A is stored if the control module registers that the ratio deviates by more than 10% when the oil temperature is above +20°C (68 °F) and throttle opening exceeds 3%.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Contact resistance in the circuit for solenoids S1, S2, S3, S4, S5 and SLS.
- Solenoid S1 jammed in the ON position.
- Solenoid S2 has jammed in the ON position.
- Solenoid S3 has jammed in the OFF position.
- Solenoid S4 has jammed in the OFF position.
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

INCORRECT GEAR RATIO

CHECKS

CHECKING THE ADJUSTMENT OF THE GEAR-SHIFT POSITION SENSOR

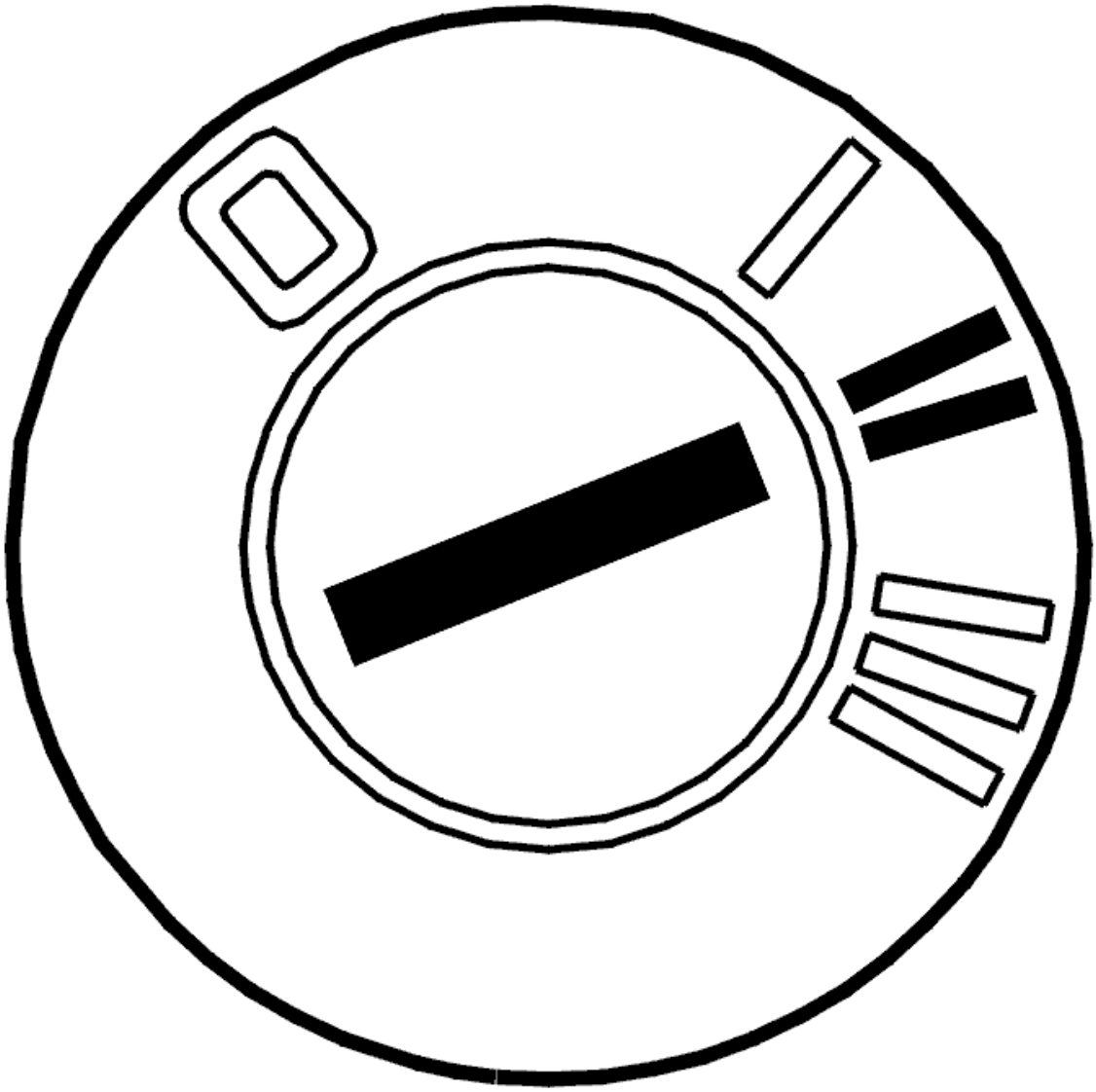


Fig. 370: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the position of the gear selector.

  Move the gear selector into all positions. Check that the gear-shift positions are updated.

  HINT: If the display shows an undefined position (O2 for example) the gear position sensor is incorrectly adjusted.

  Remedy as necessary

  Other information:

  - To adjust the gear-shift position sensor, see **GEAR-SHIFT POSITION SENSOR,**

CHECKING/ADJUSTING .

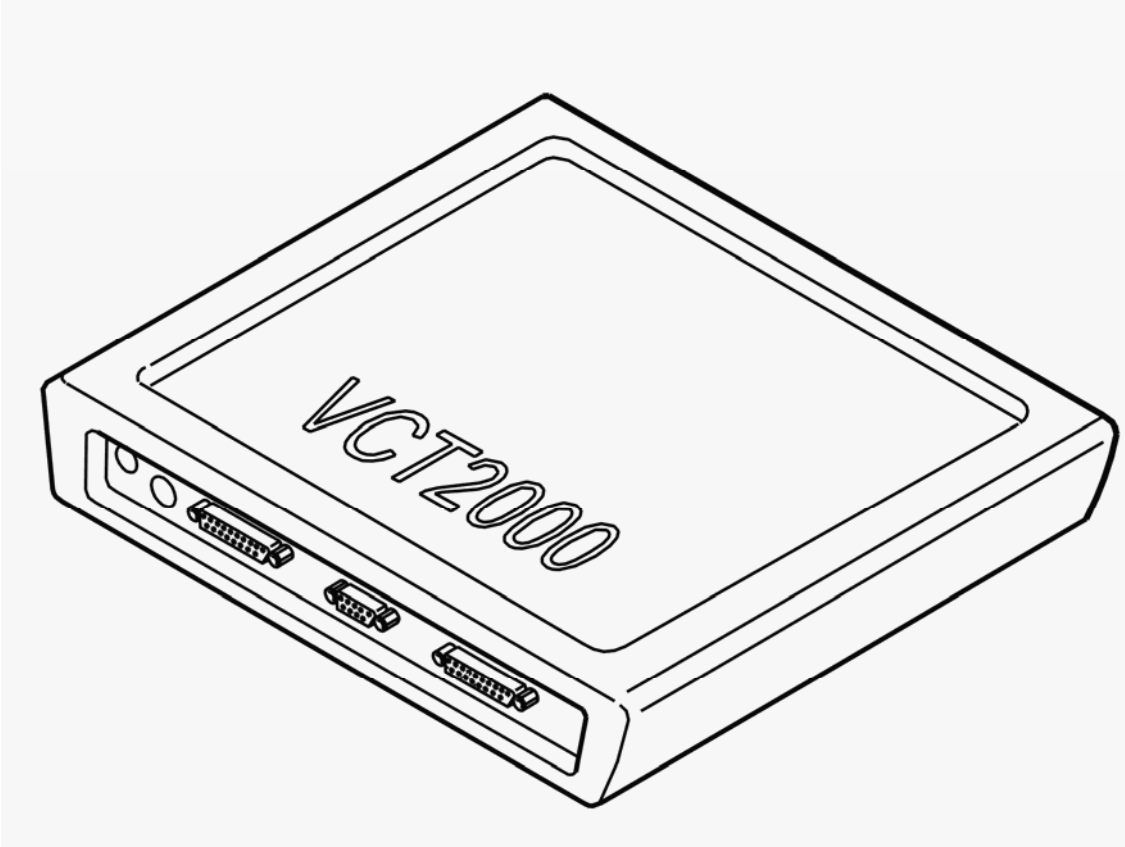


Fig. 371: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

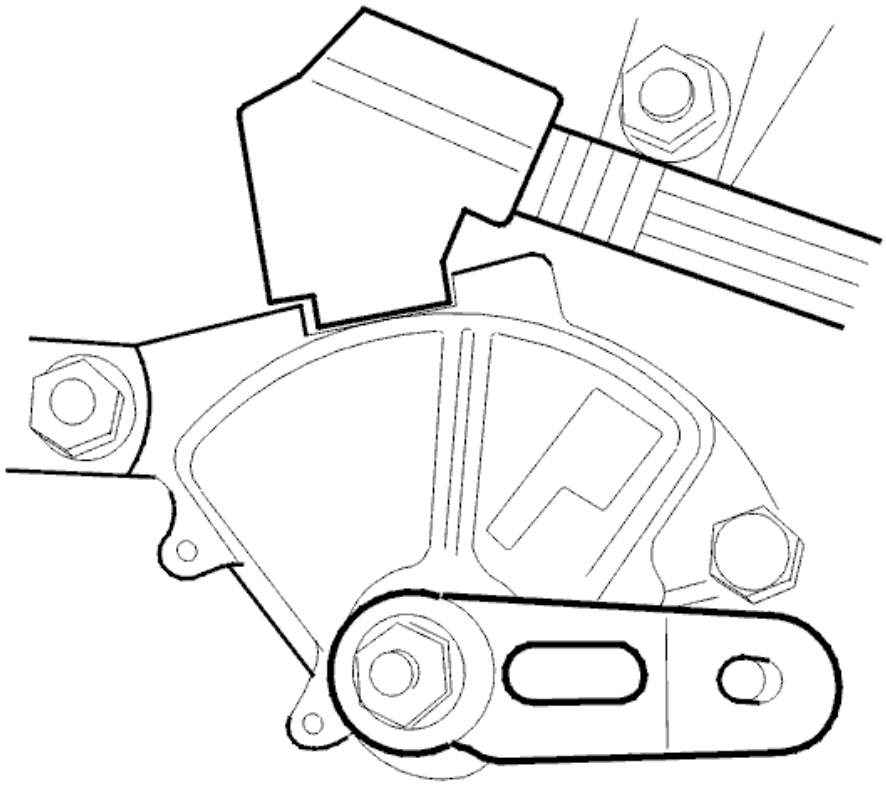


Fig. 372: Identifying Gear-Shift Position Sensor
Courtesy of VOLVO CARS CORPORATION

Is the gear-shift position sensor incorrectly adjusted?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING FOR CONTACT RESISTANCE AND OXIDATION**

CHECKING NOISE IN THE TRANSMISSION

- Test drive the car. See **TEST DRIVE FORM, DESCRIPTION**
- Check for any clearly audible noises from the transmission. Check for malfunctions.

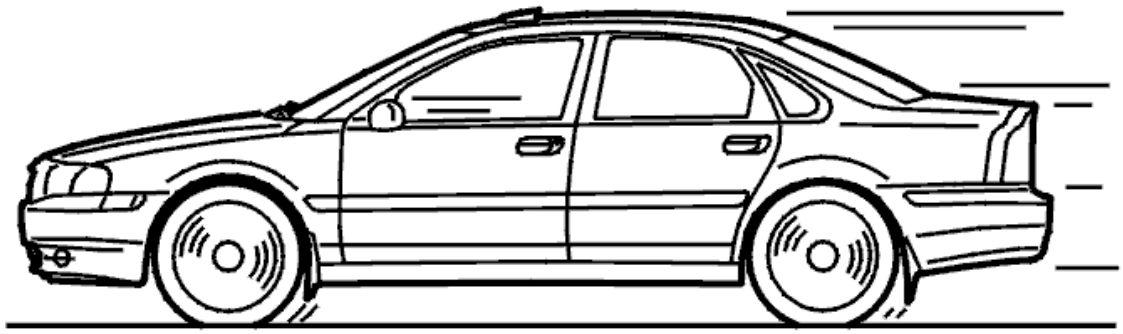


Fig. 373: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the transmission making a noise?

- **YES**

  Refer to **REPLACING THE TRANSMISSION**

- **NO**

  OKAY: Troubleshooting has been completed.

CHECKING FOR CONTACT RESISTANCE AND OXIDATION

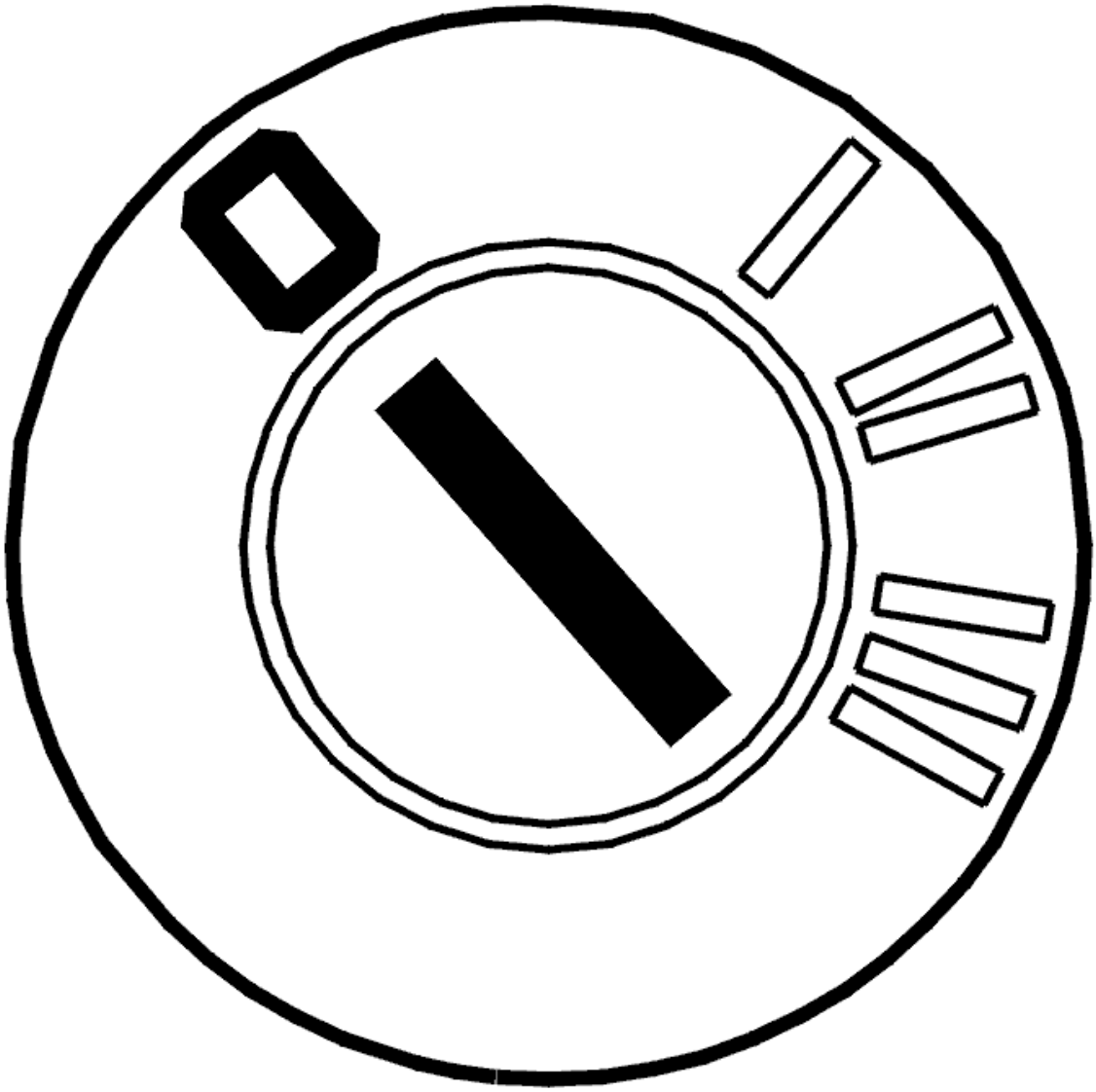


Fig. 374: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission connectors and the control module connector. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION**

  Other information:

  - To access the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING** .

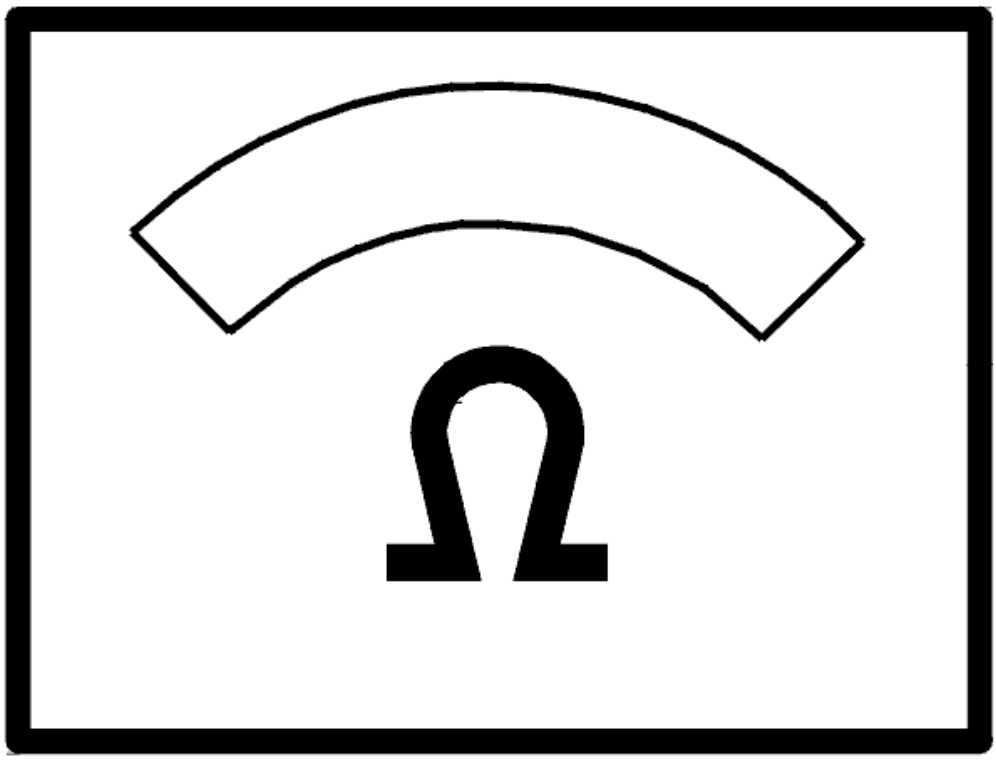


Fig. 375: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING NOISE IN THE TRANSMISSION**

REPLACING THE TRANSMISSION

NOTE: In the event of faults during the first year on the market, replace transmission AW55-50SN.

Replace the transmission. For AW50AWD 2003- see **TRANSMISSION, REMOVING** or For AW55-50 2004- see **TRANSMISSION, REMOVING** and For AW50AWD 2003- see **TRANSMISSION, INSTALLING** or For AW55-50 2004- see **TRANSMISSION, INSTALLING** .

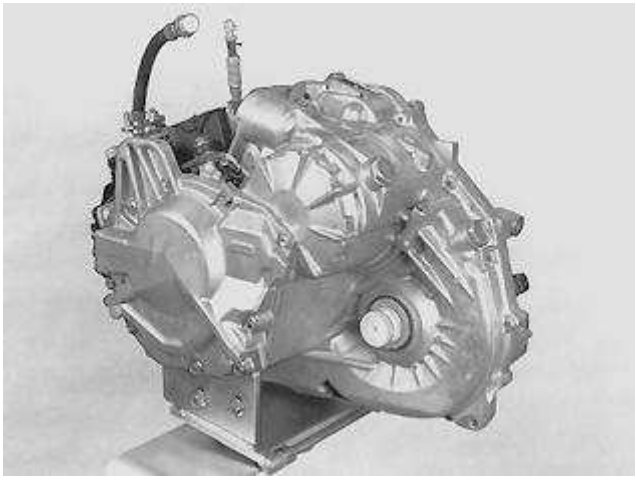


Fig. 376: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

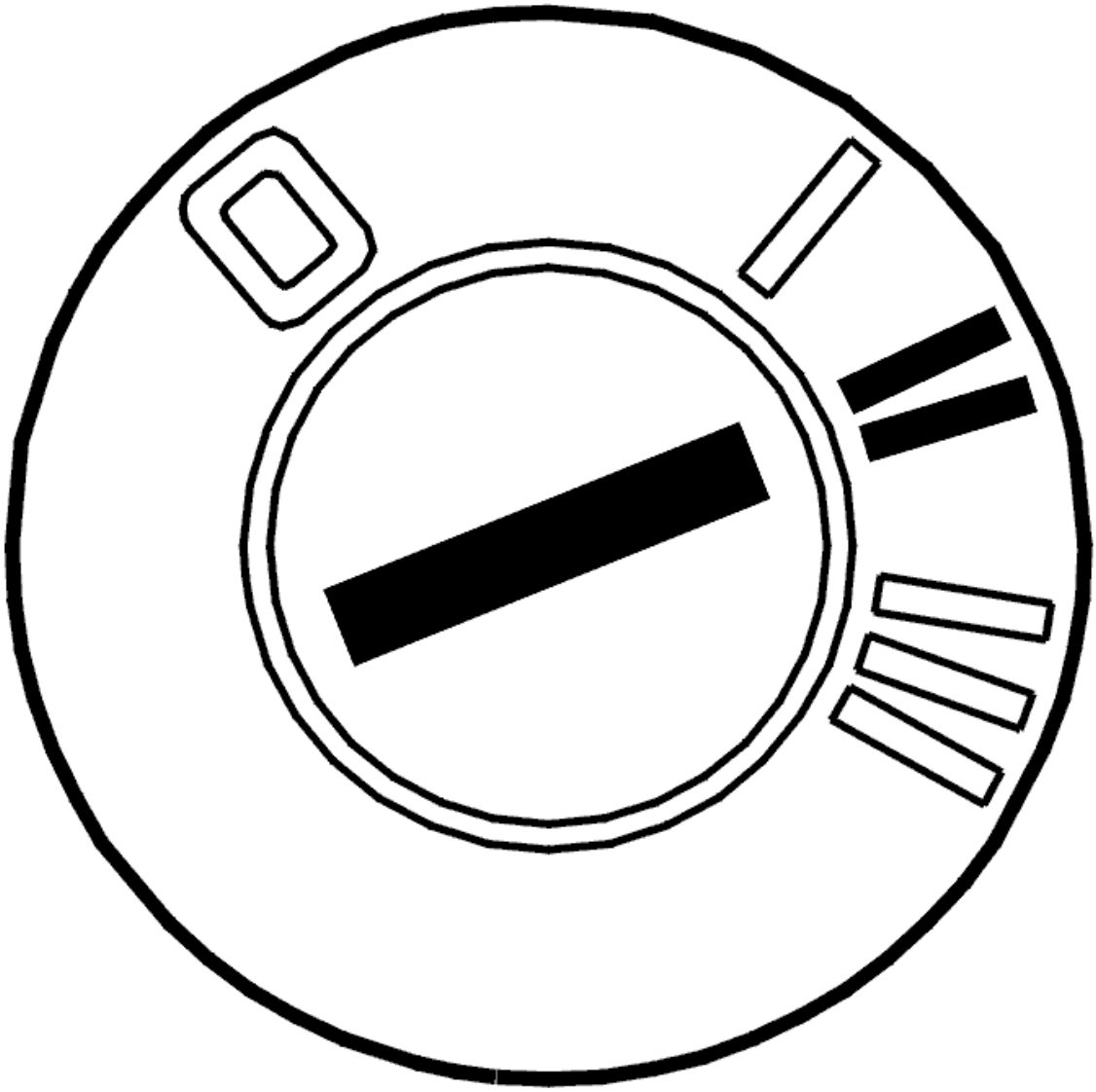


Fig. 377: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

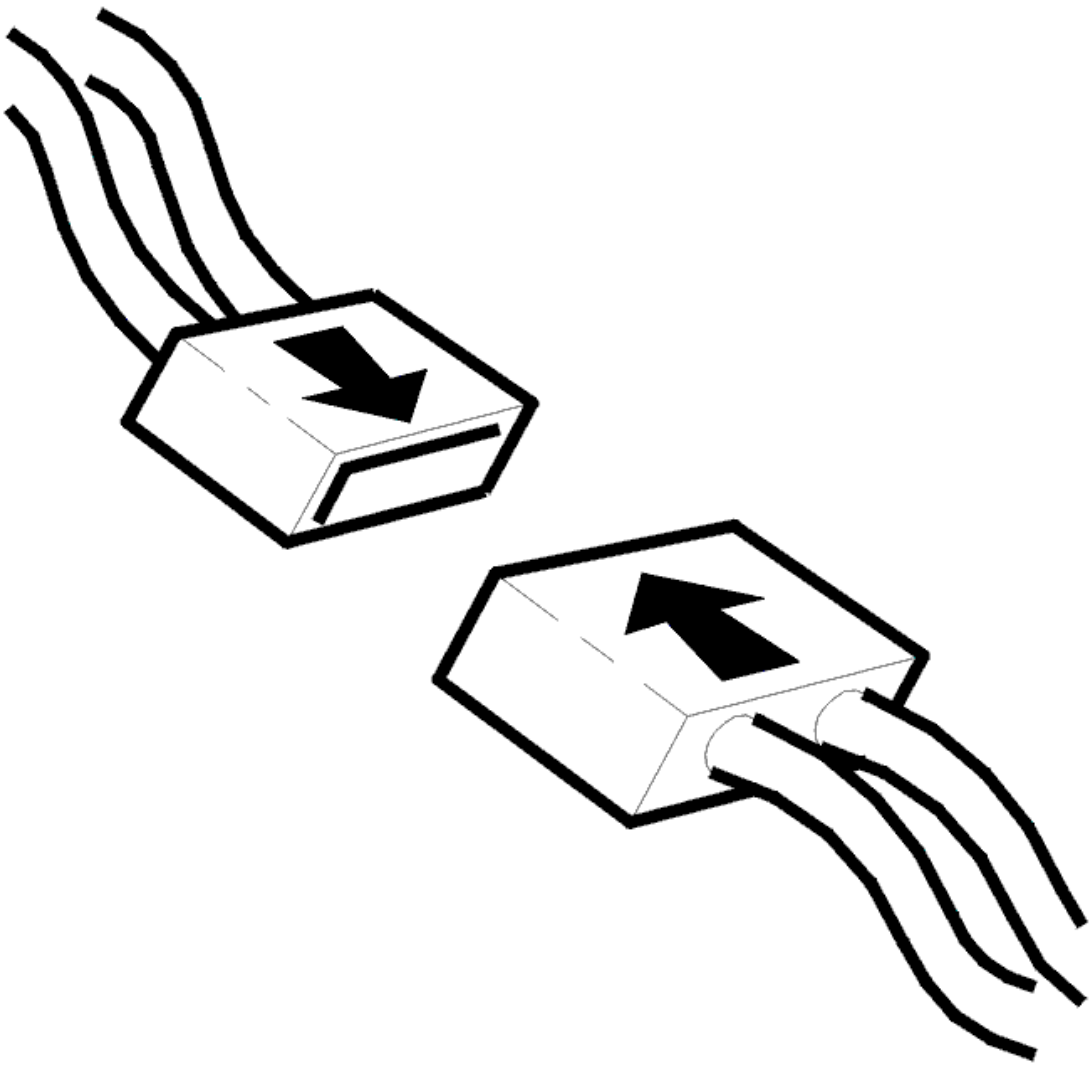


Fig. 378: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following: **TEST DRIVE FORM, DESCRIPTION**

During the test drive, oil temperature should be over 20 °C.

Note any deviations in transmission function.

Does the transmission function flawlessly?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-002B: 4TH GEAR. INCORRECT GEAR RATIO (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

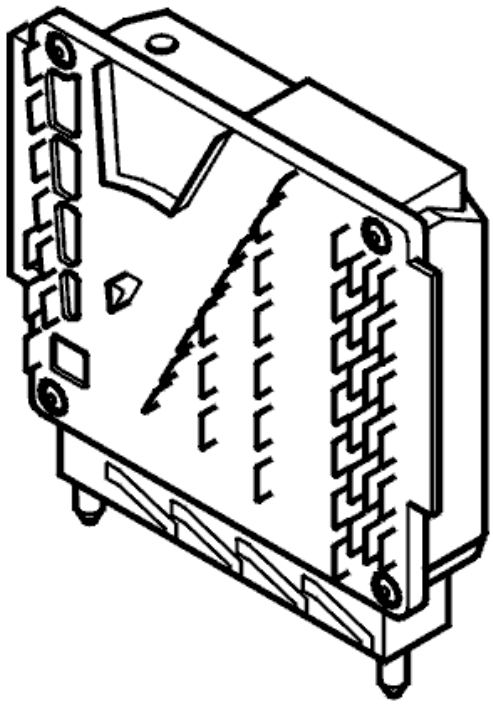


Fig. 379: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) calculates the ratio between the transmission input speed and the vehicle speed. There is a specific ratio for each gear. Diagnostic trouble code (DTC) TCM-002B is stored if the control module registers that the ratio deviates by more than 10 % when the oil temperature is above +20°C (68 °F) and throttle opening exceeds 3 %.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Contact resistance in the circuit for solenoids S1, S2, S3, S4, S5 and SLS.
- Solenoid S2 has jammed in the ON position.
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

INCORRECT GEAR RATIO

CHECKS

CHECKING THE ADJUSTMENT OF THE GEAR-SHIFT POSITION SENSOR

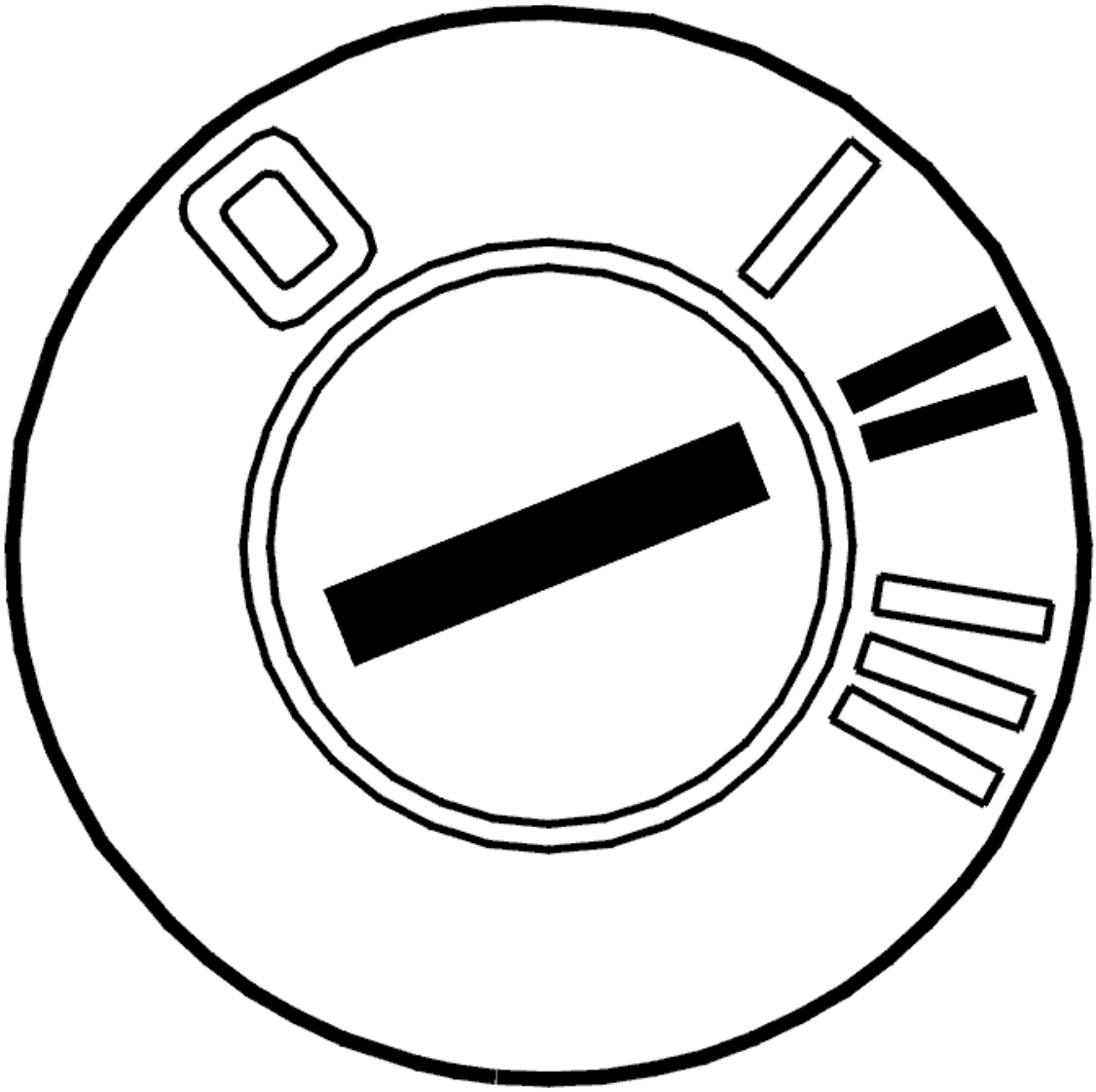


Fig. 380: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the position of the gear selector.

  Move the gear selector into all positions. Check that the gear-shift positions are updated.

  HINT: If the display shows an undefined position (O2 for example) the gear position sensor is incorrectly adjusted.

  Remedy as necessary

  Other information:

  - To adjust the gear-shift position sensor, see **GEAR-SHIFT POSITION SENSOR,**

CHECKING/ADJUSTING .

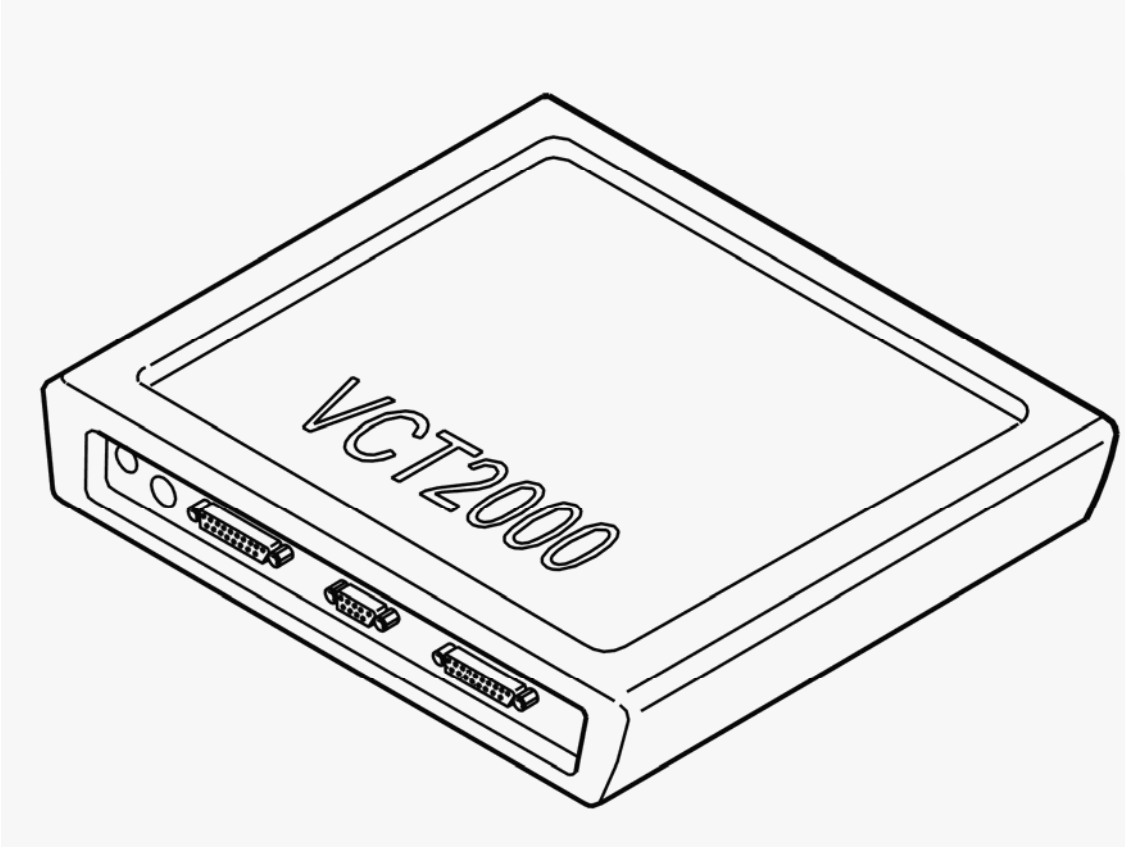


Fig. 381: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

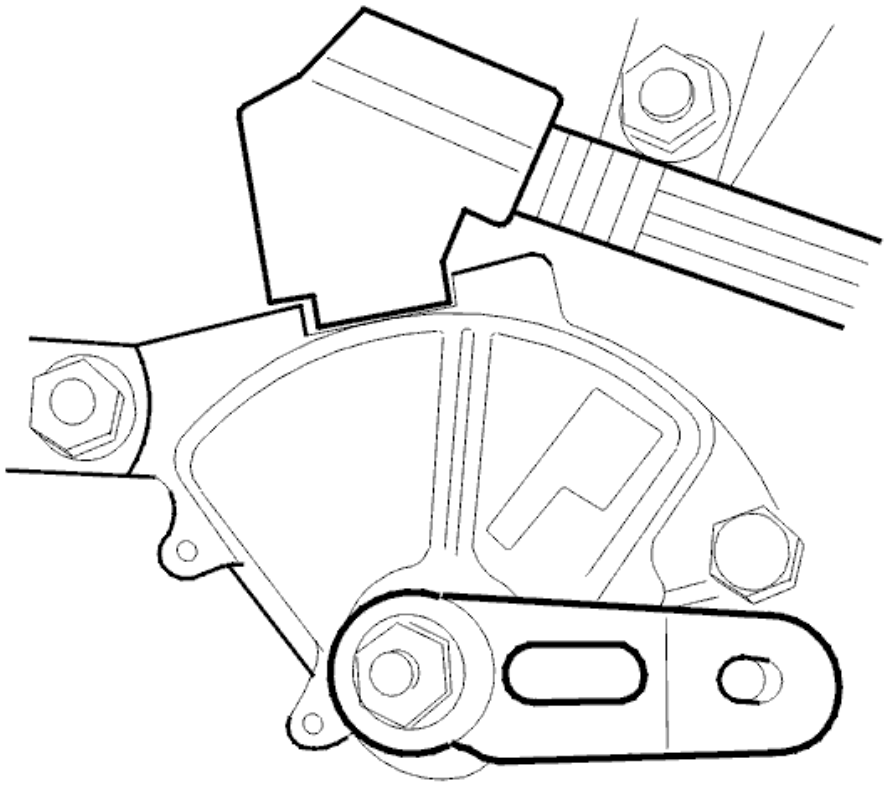


Fig. 382: Identifying Gear-Shift Position Sensor
Courtesy of VOLVO CARS CORPORATION

Is the gear-shift position sensor incorrectly adjusted?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING FOR CONTACT RESISTANCE AND OXIDATION**

CHECKING NOISE IN THE TRANSMISSION

- Test drive the car. See **TEST DRIVE FORM, DESCRIPTION**
- Check for any clearly audible noises from the transmission. Check for malfunctions.

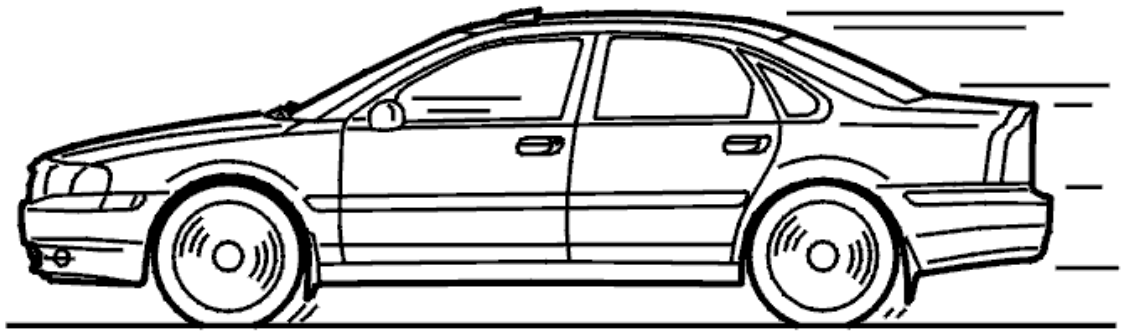


Fig. 383: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the transmission making a noise?

- **YES**

  Refer to **REPLACING THE TRANSMISSION**

- **NO**

  OKAY: Troubleshooting has been completed.

CHECKING FOR CONTACT RESISTANCE AND OXIDATION

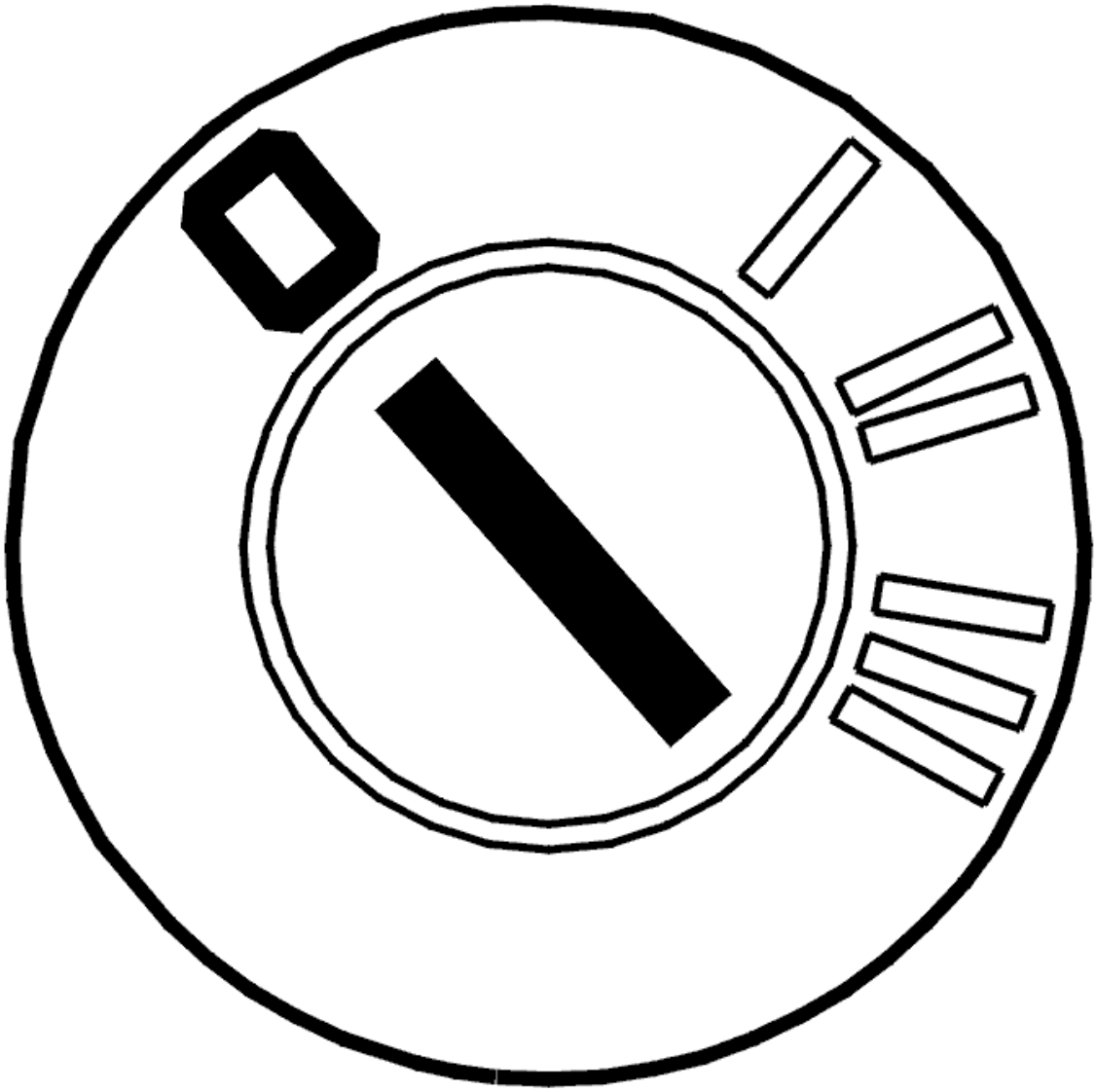


Fig. 384: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission connectors and the control module connector. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION**

  Other information:

  - To access the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING** .

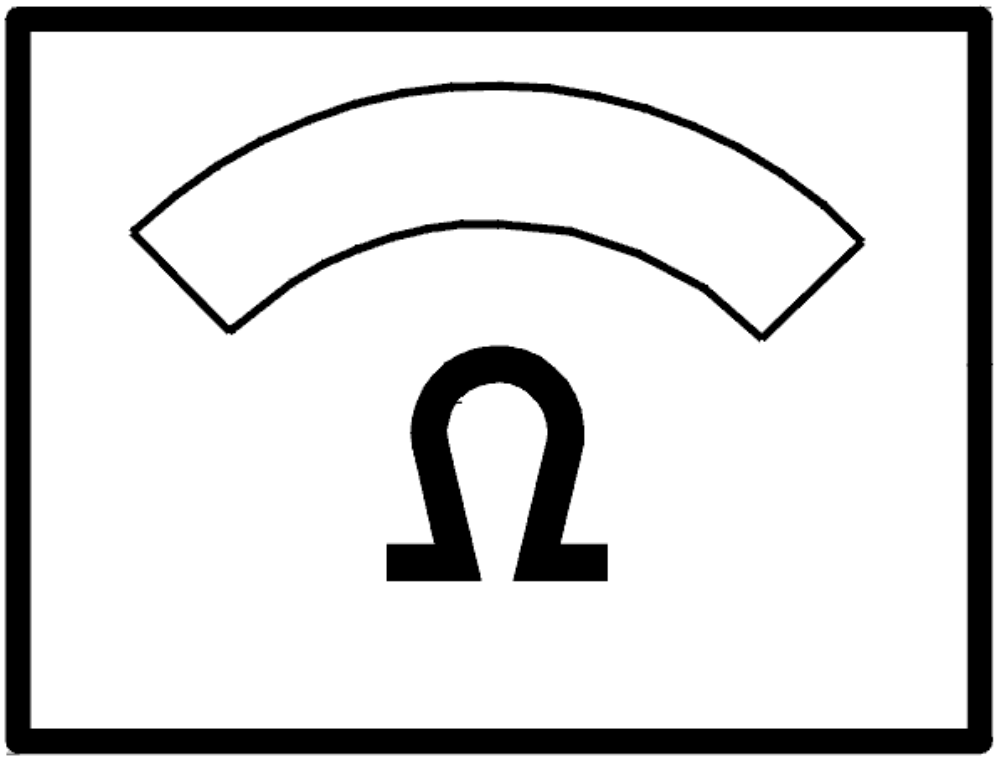


Fig. 385: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING NOISE IN THE TRANSMISSION**

REPLACING THE TRANSMISSION

NOTE: In the event of faults during the first year on the market, replace transmission AW55-50SN.

Replace the transmission. For AW50AWD 2003- see **TRANSMISSION, REMOVING** or For AW55-50 2004- see **TRANSMISSION, REMOVING** and For AW50AWD 2003- see **TRANSMISSION, INSTALLING** or For AW55-50 2004- see **TRANSMISSION, INSTALLING** .

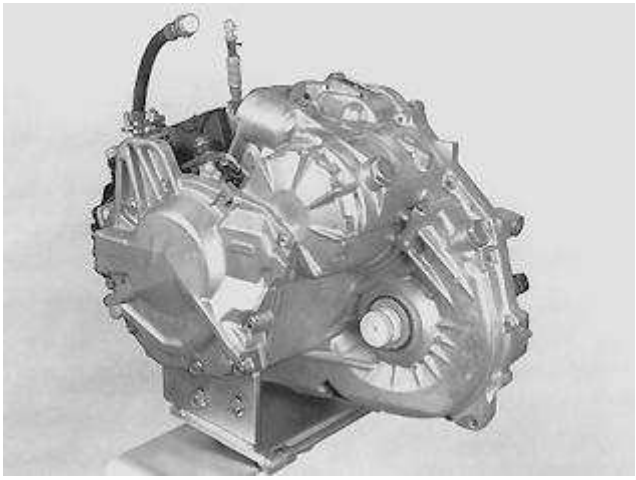


Fig. 386: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

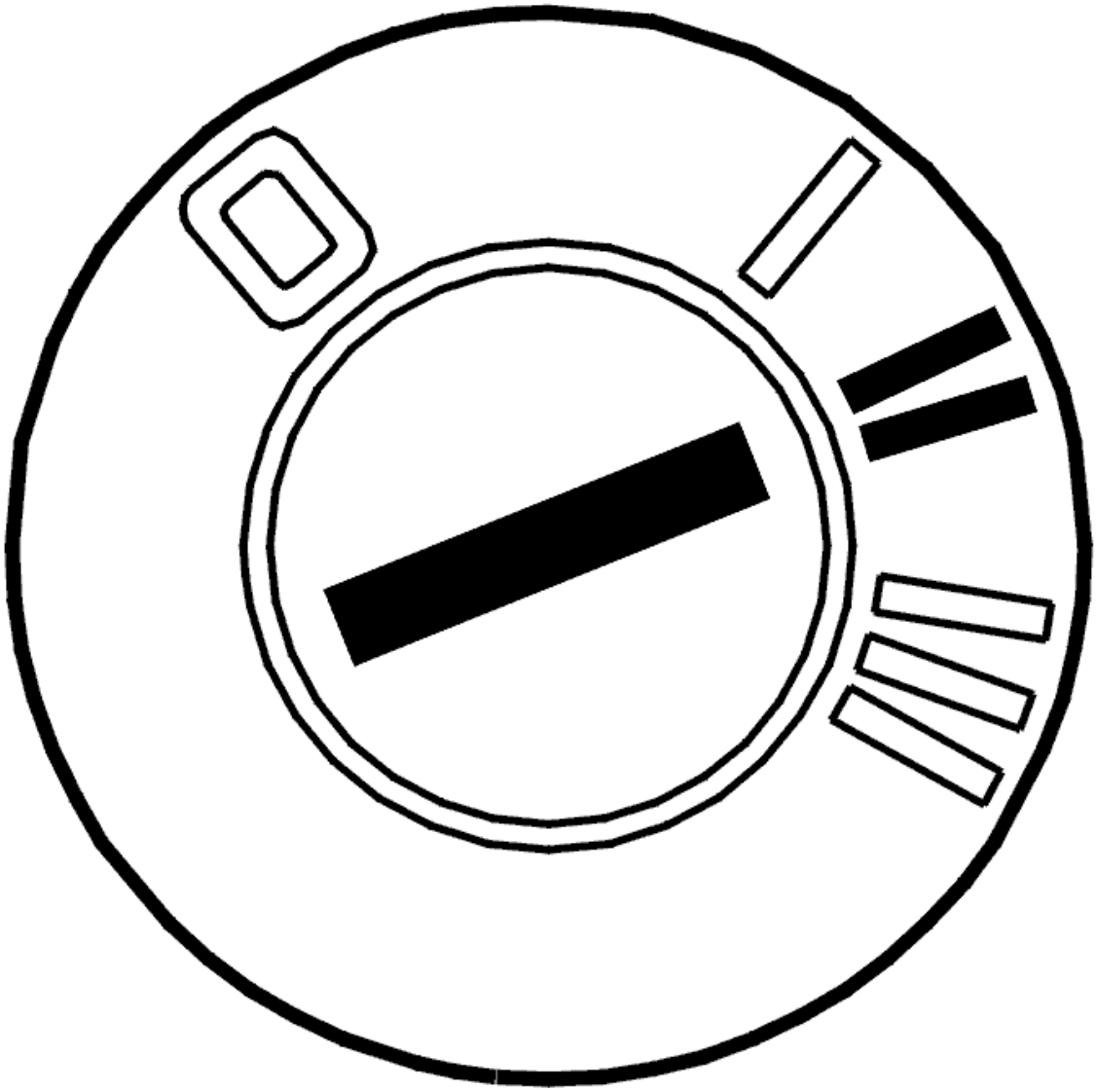


Fig. 387: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

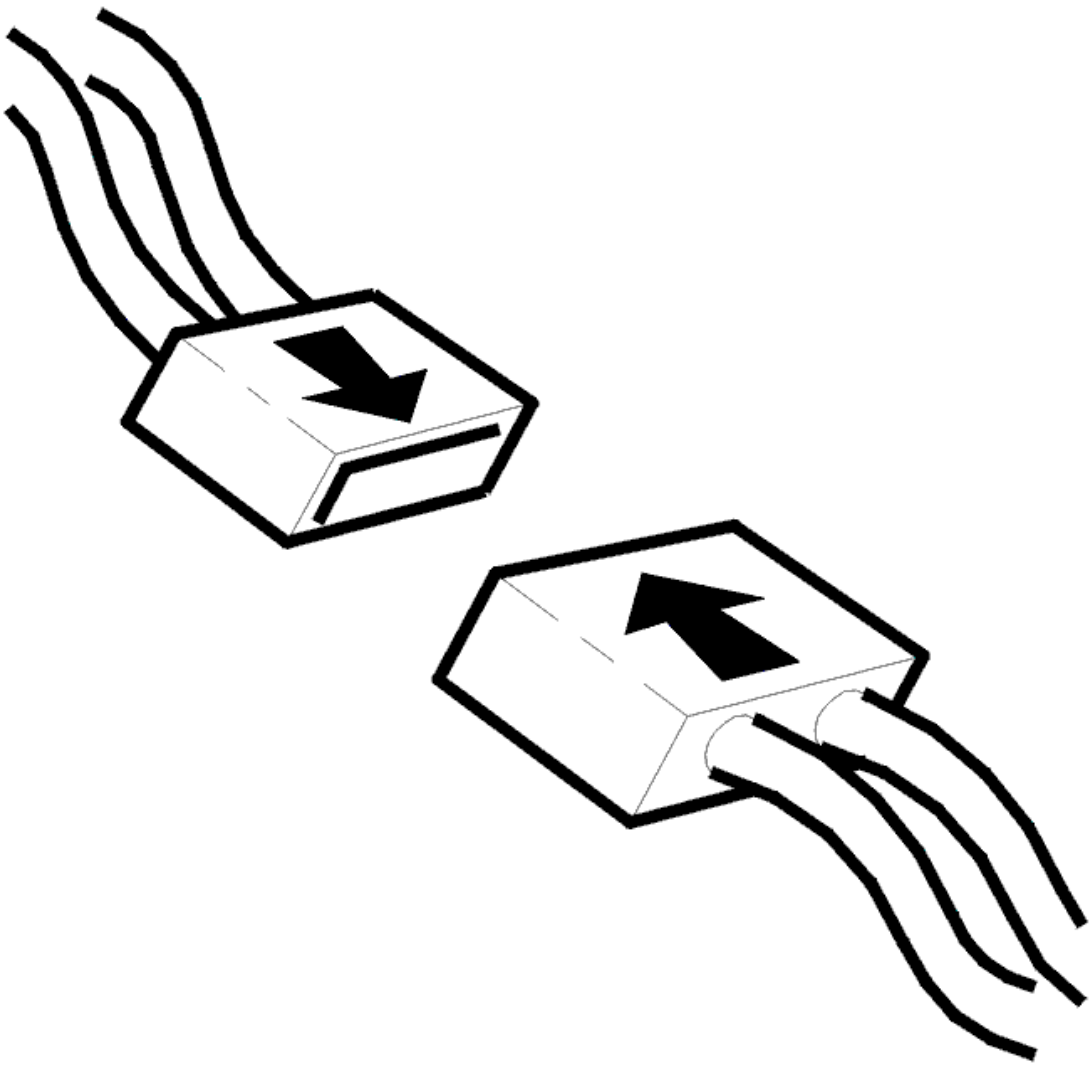


Fig. 388: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following: **TEST DRIVE FORM, DESCRIPTION**

During the test drive, oil temperature should be over 20 °C.

Note any deviations in transmission function.

Does the transmission function flawlessly?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-002C: 5TH GEAR. INCORRECT GEAR RATIO (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

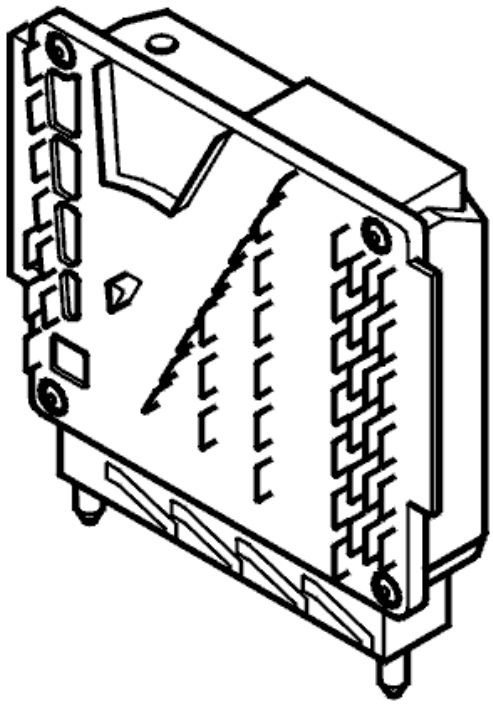


Fig. 389: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) calculates the ratio between the transmission input speed and the vehicle speed. There is a specific ratio for each gear. Diagnostic trouble code (DTC) TCM-002C is stored, depending on the gear, if the control module registers that the ratio deviates by more than 10 % when the oil temperature is above +20°C (68 °F) and throttle opening exceeds 3 %.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Contact resistance in the circuit for solenoids S1, S2, S3, S4, S5 and SLS.
- Solenoid S2 has jammed in the OFF position.
- Solenoid S3 has jammed in the ON position.
- Solenoid SLS jammed in the ON position.
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

INCORRECT GEAR RATIO

CHECKS

CHECKING THE ADJUSTMENT OF THE GEAR-SHIFT POSITION SENSOR

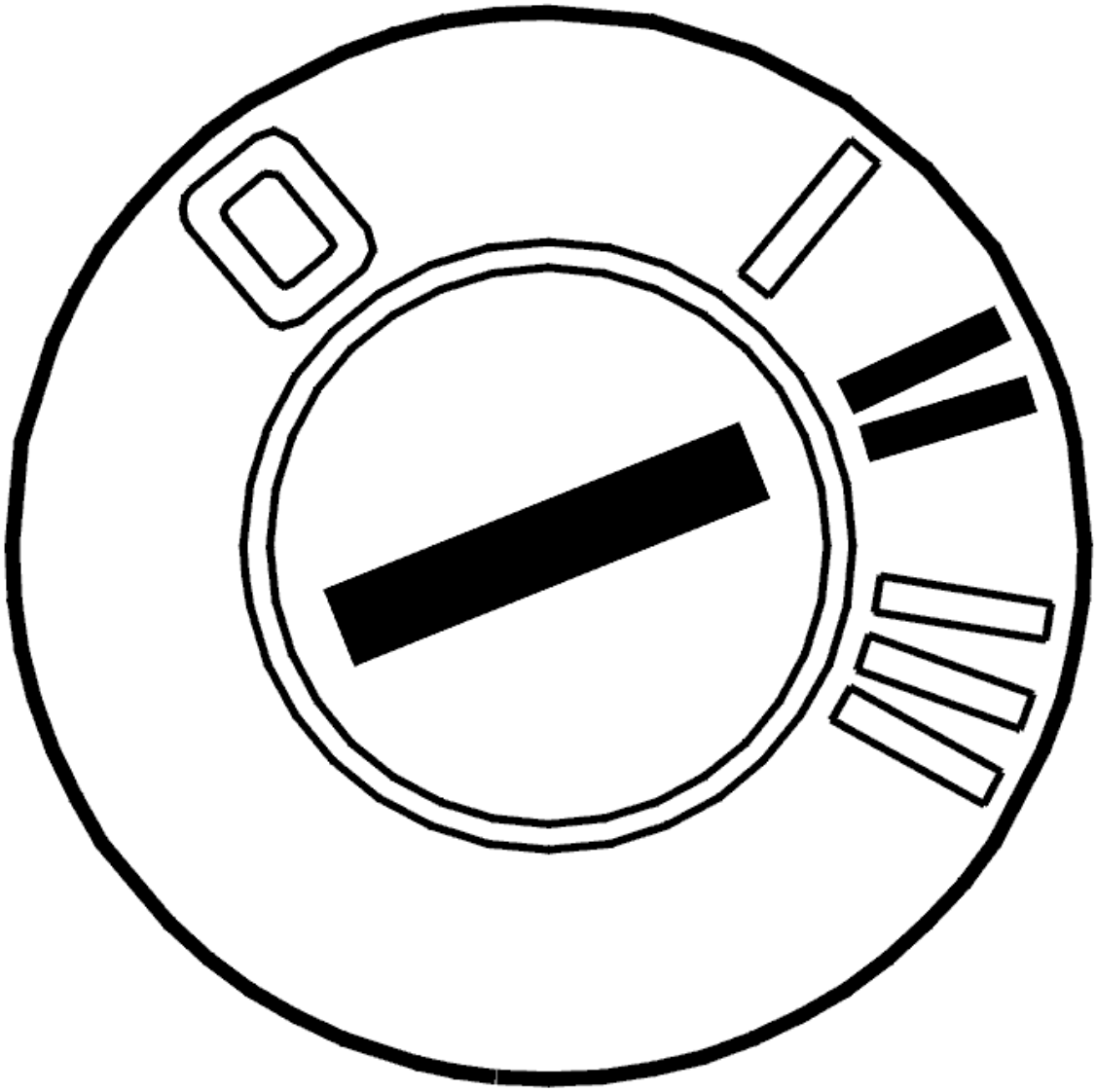


Fig. 390: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the position of the gear selector.

  Move the gear selector into all positions. Check that the gear-shift positions are updated.

  HINT: If the display shows an undefined position (O2 for example) the gear position sensor is incorrectly adjusted.

  Remedy as necessary

  Other information:

  - To adjust the gear-shift position sensor, see **GEAR-SHIFT POSITION SENSOR,**

CHECKING/ADJUSTING .

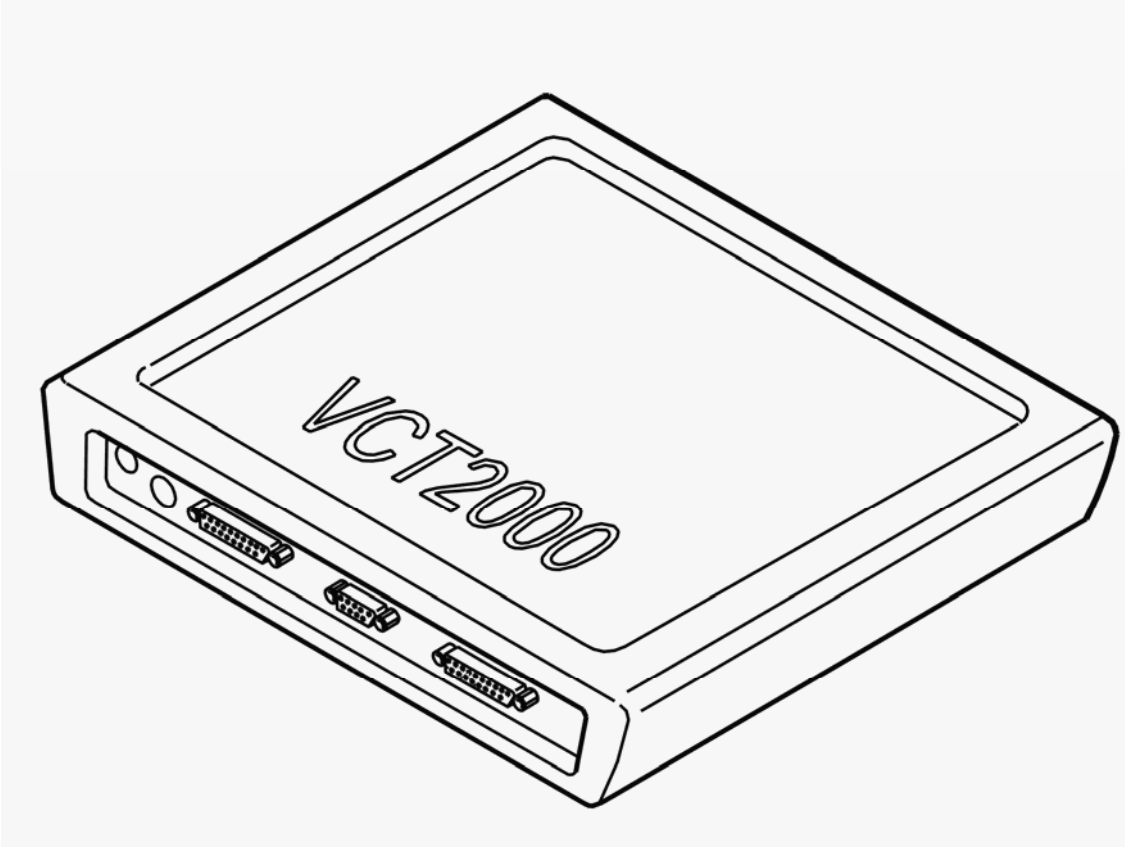


Fig. 391: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

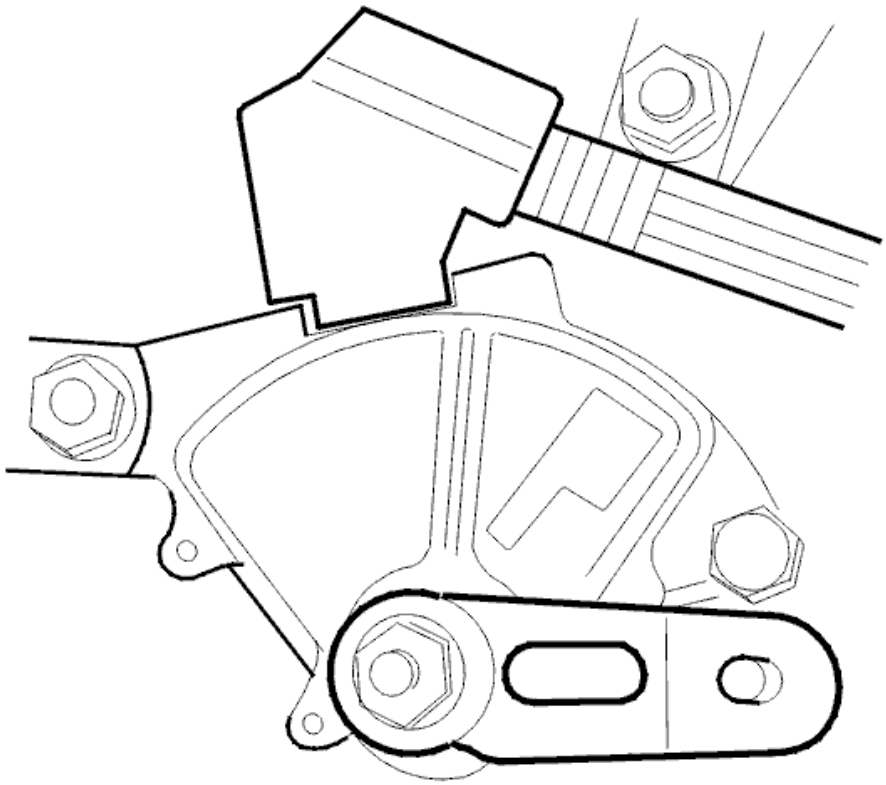


Fig. 392: Identifying Gear-Shift Position Sensor
Courtesy of VOLVO CARS CORPORATION

Is the gear-shift position sensor incorrectly adjusted?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING FOR CONTACT RESISTANCE AND OXIDATION**

CHECKING NOISE IN THE TRANSMISSION

- Test drive the car. See **TEST DRIVE FORM, DESCRIPTION**
- Check for any clearly audible noises from the transmission. Check for malfunctions.

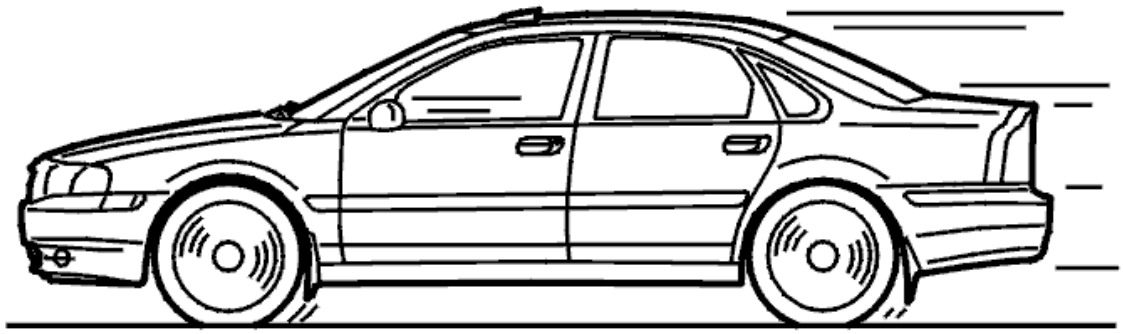


Fig. 393: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the transmission making a noise?

- **YES**

  Refer to **REPLACING THE TRANSMISSION**

- **NO**

  OKAY: Troubleshooting has been completed.

CHECKING FOR CONTACT RESISTANCE AND OXIDATION

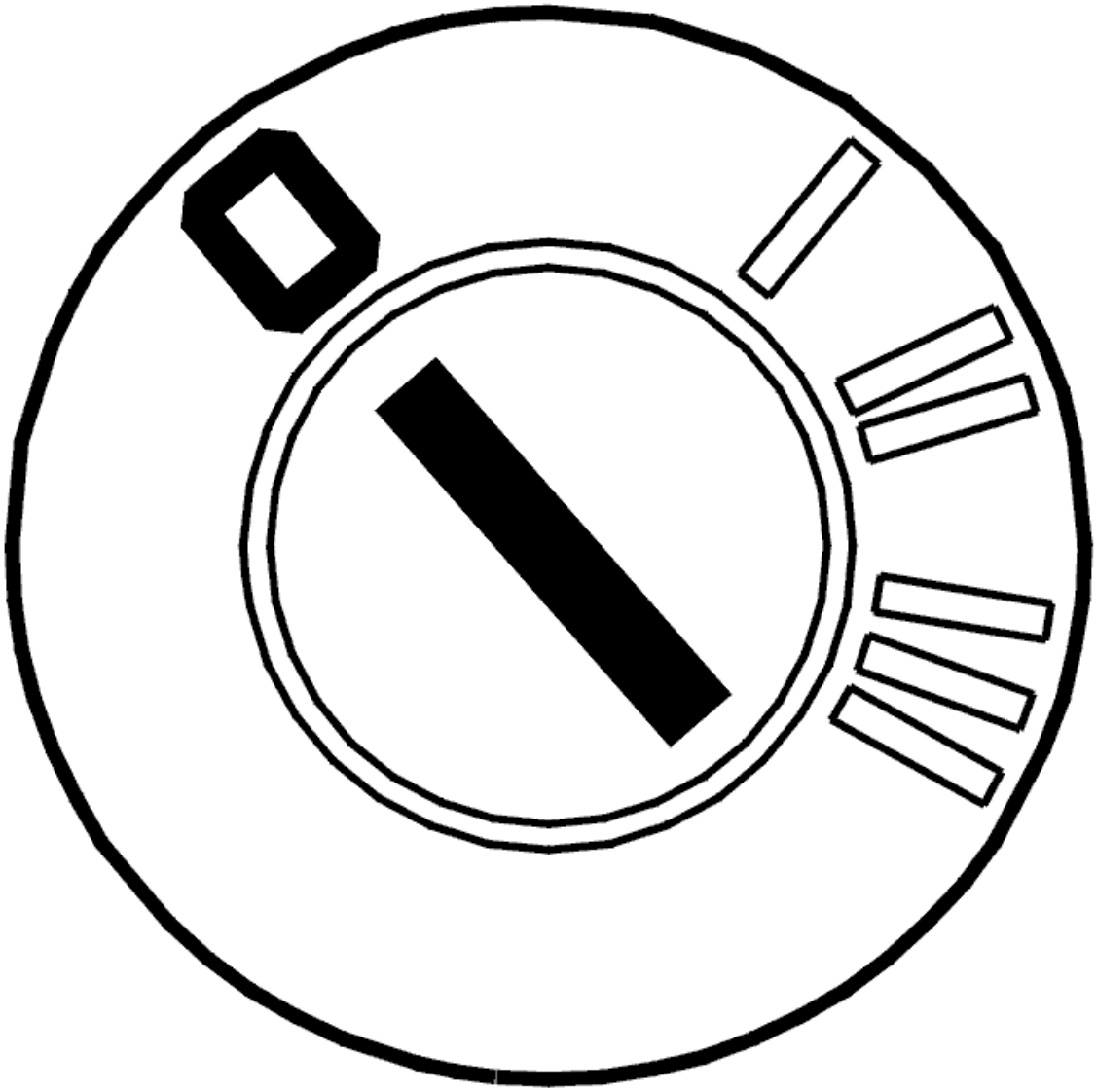


Fig. 394: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission connectors and the control module connector. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION**

  Other information:

  - To access the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING** .

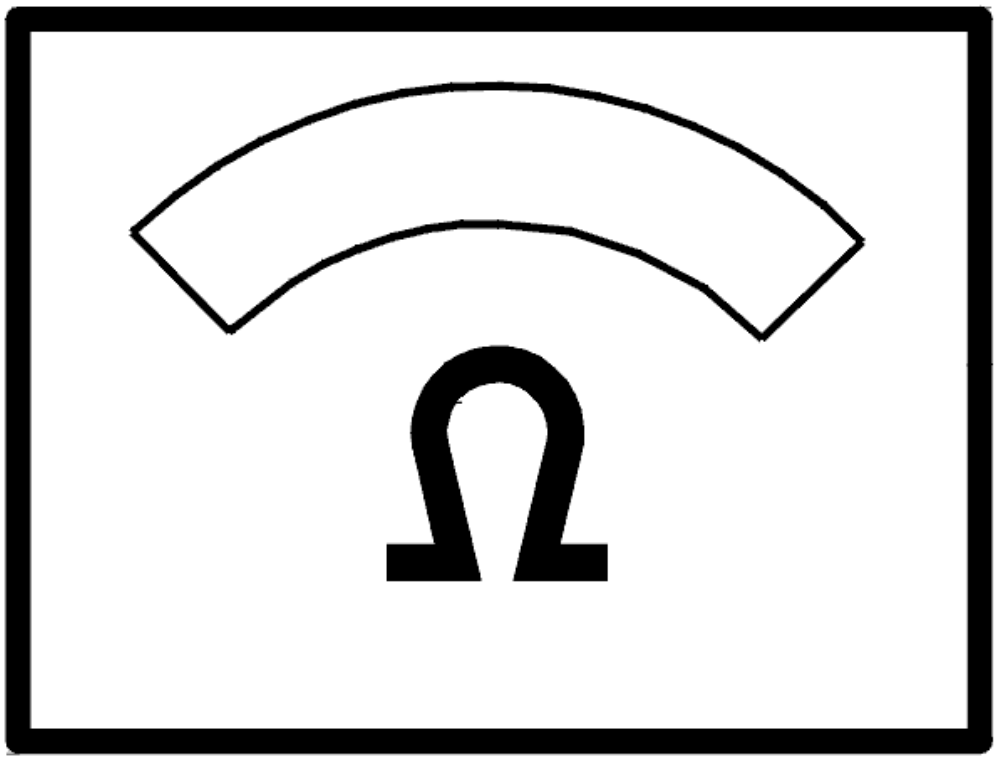


Fig. 395: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING NOISE IN THE TRANSMISSION**

REPLACING THE TRANSMISSION

NOTE: In the event of faults during the first year on the market, replace transmission AW55-50SN.

Replace the transmission. For AW50AWD 2003- see **TRANSMISSION, REMOVING** or For AW55-50 2004- see **TRANSMISSION, REMOVING** and For AW50AWD 2003- see **TRANSMISSION, INSTALLING** or For AW55-50 2004- see **TRANSMISSION, INSTALLING** .

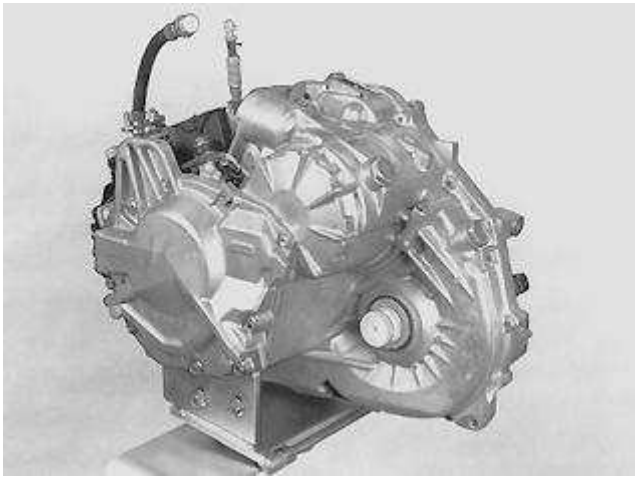


Fig. 396: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

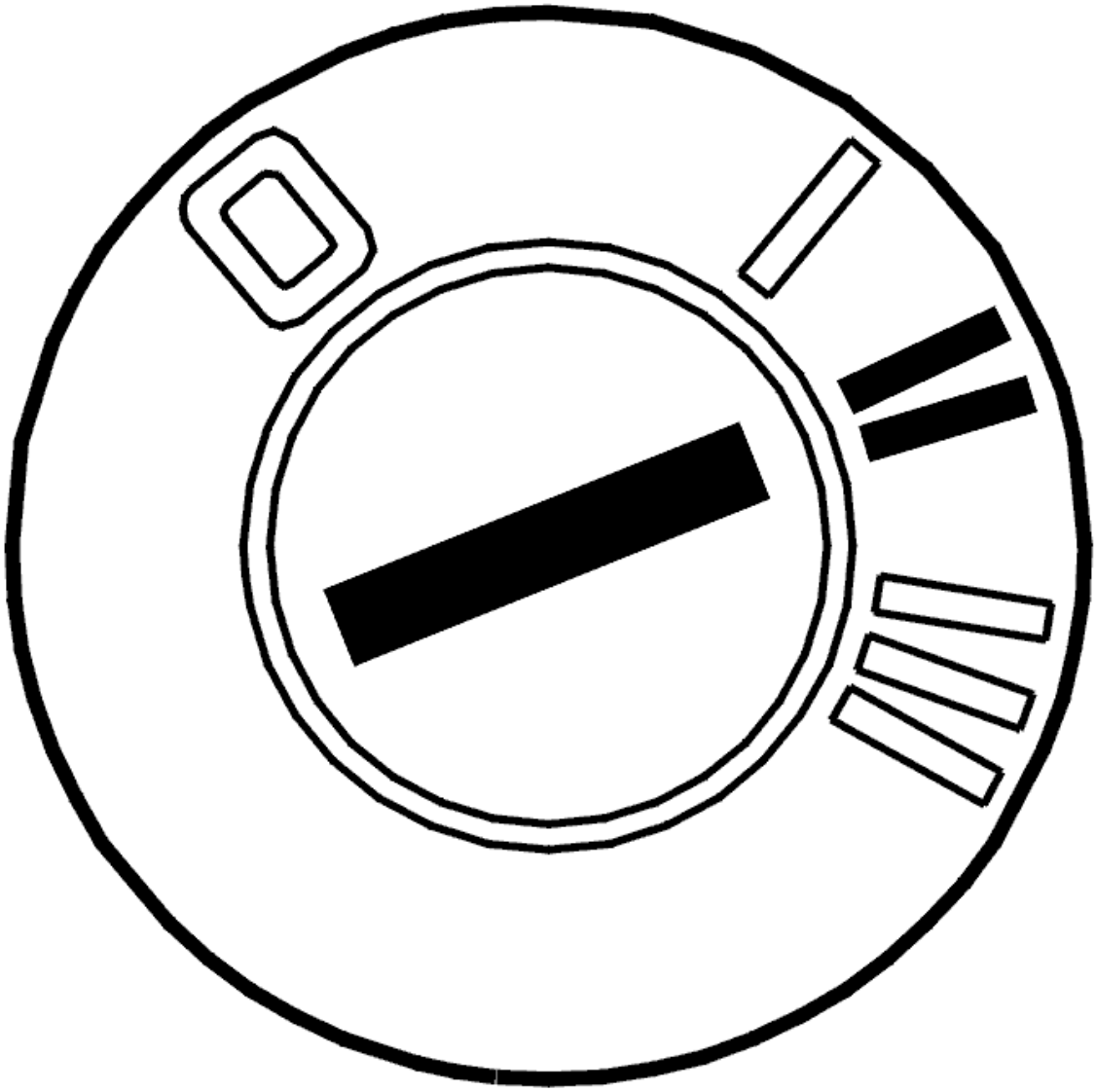


Fig. 397: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

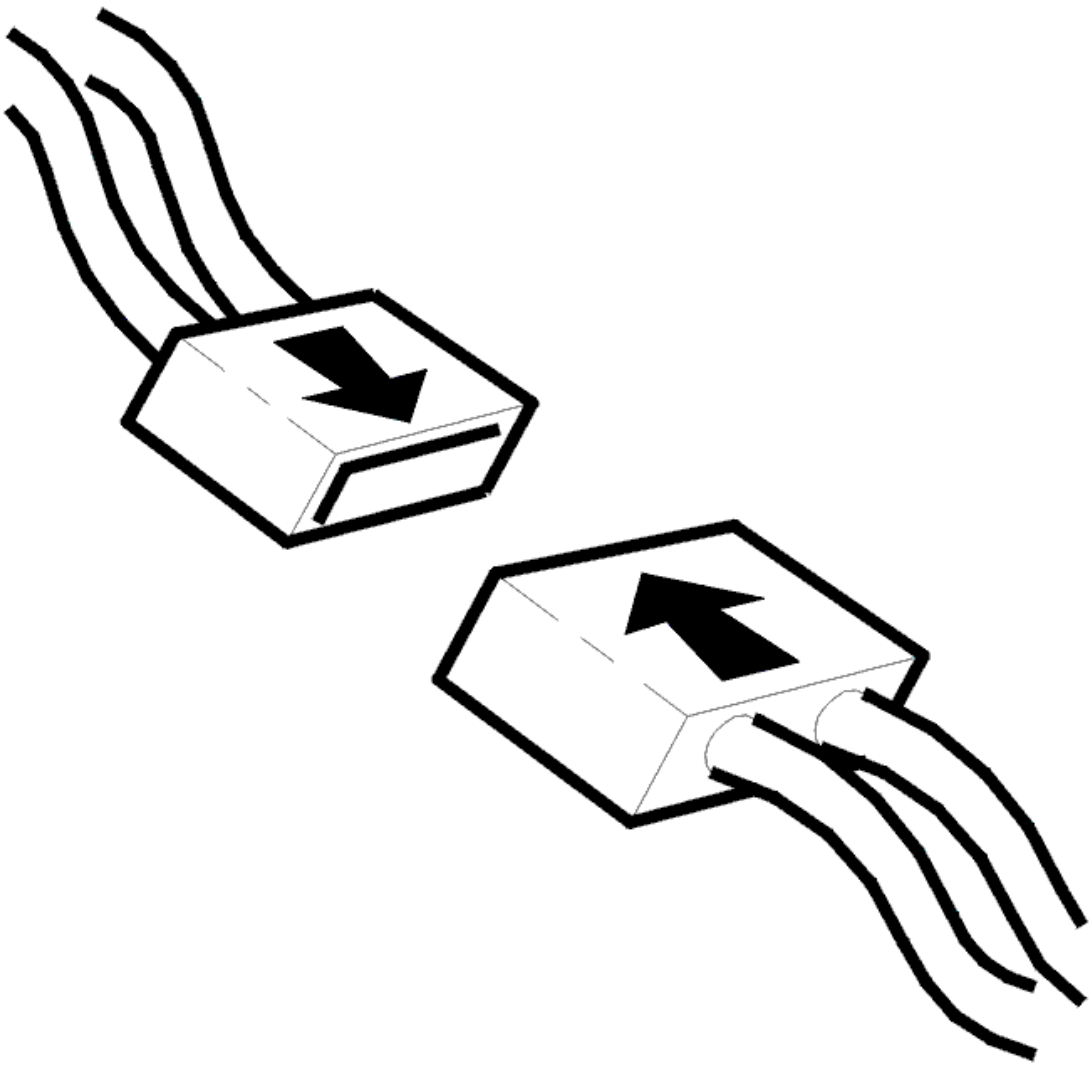


Fig. 398: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following:**TEST DRIVE FORM, DESCRIPTION**

During the test drive, oil temperature should be over 20 °C.

Note any deviations in transmission function.

Does the transmission function flawlessly?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-002E: LOCK-UP. THE TRANSMISSION JERKS WHEN LOCK-UP ENGAGES (AW50/51 AWD; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

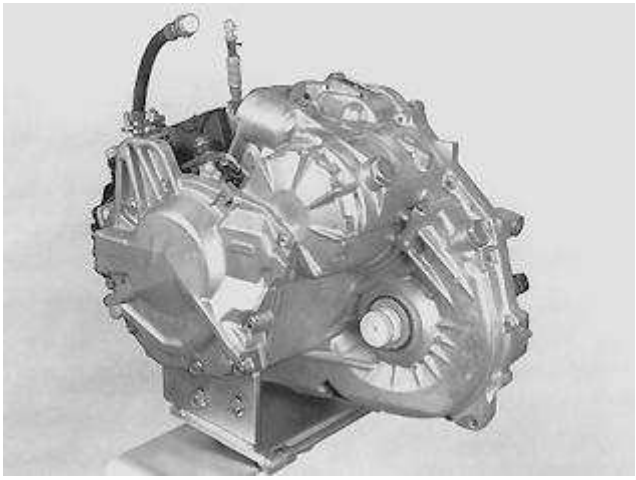


Fig. 399: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

The diagnostic trouble code (DTC) is stored if the control module repeatedly registers vibrations from slipping lock-up during a number of cycles.

Substitute Value

- Slipping lock-up shuts off temporarily.

Possible Source

- Poor quality transmission fluid.
- Glycol in the transmission fluid.
- Worn torque converter.
- Mechanical fault in the transmission.

Fault symptom[s]

- Cooling fluid consumption; High
- Vibrations
- Rough gear shift

THE-GEARBOX: JERKS WHEN LOCK-UP ENGAGES

CHECKS

CHECKING FOR THE FAULT

Has the customer complained of vibrations?

- **YES**

  Refer to **CHECKING OIL QUALITY AND OIL LEVEL IN TRANSMISSION**

- **NO**

  Refer to **FAULT-TRACING WITHOUT RESULT**

CHECKING OIL QUALITY AND OIL LEVEL IN TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

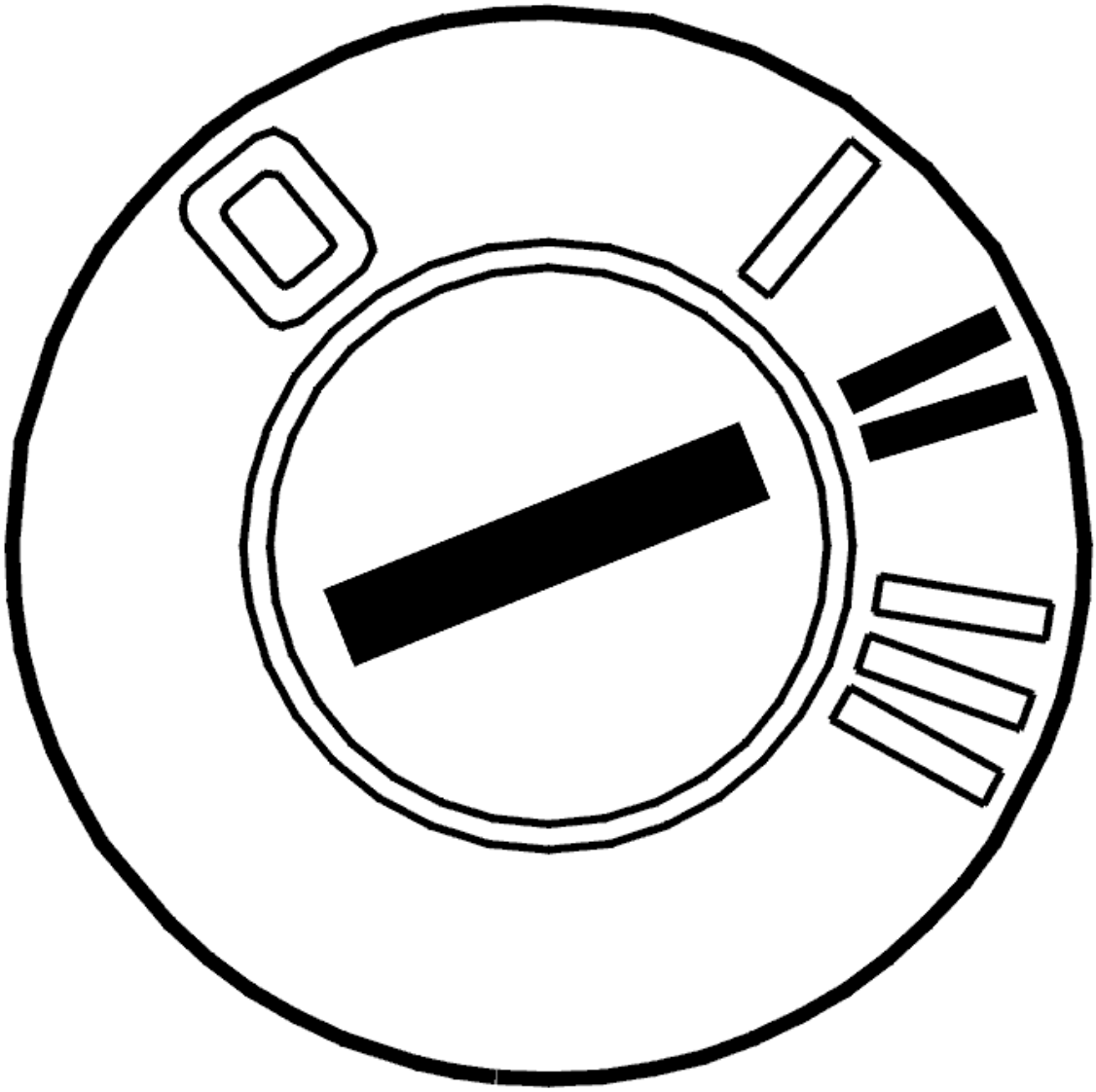


Fig. 400: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check the oil level. If the oil level is low, check the transmission for leakage, then top up with oil.

  Check the oil's quality.

  If the oil smells burnt, change transmission oil.

  Check the transmission fluid for metal shavings. Take a sample using the dip stick.

  Replace the transmission if the transmission fluid contains metal shavings.

Other information:

- see **TRANSMISSION OIL / OIL FILTER, REPLACING**
- see **OIL LEVEL, CHECKING**
- see **OIL GRADE, CHECKING**

Select an alternative below:

1. No defect found.

   Refer to **CHECKING THE COOLING SYSTEM**

2. Transmission oil changed, level low or quality poor.

   Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

3. The transmission fluid contains metal shavings.

   Refer to **REPLACING THE GEARBOX**

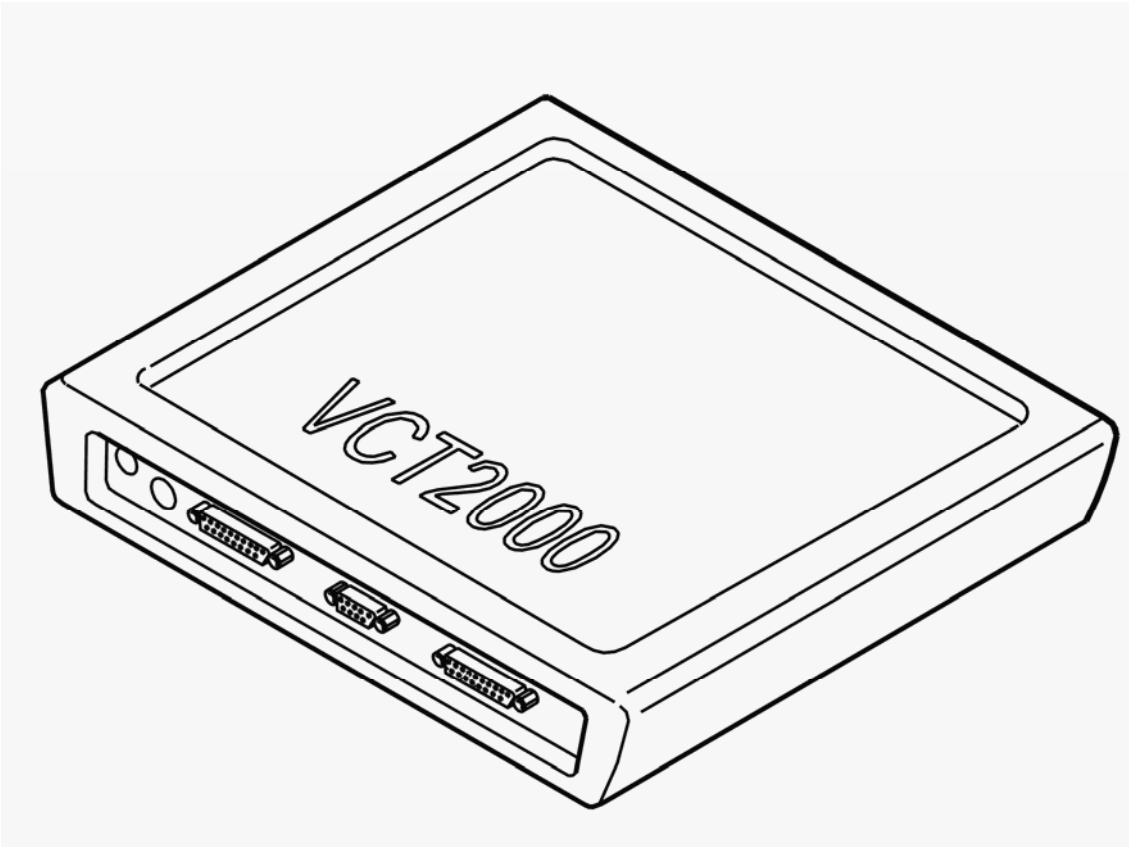


Fig. 401: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

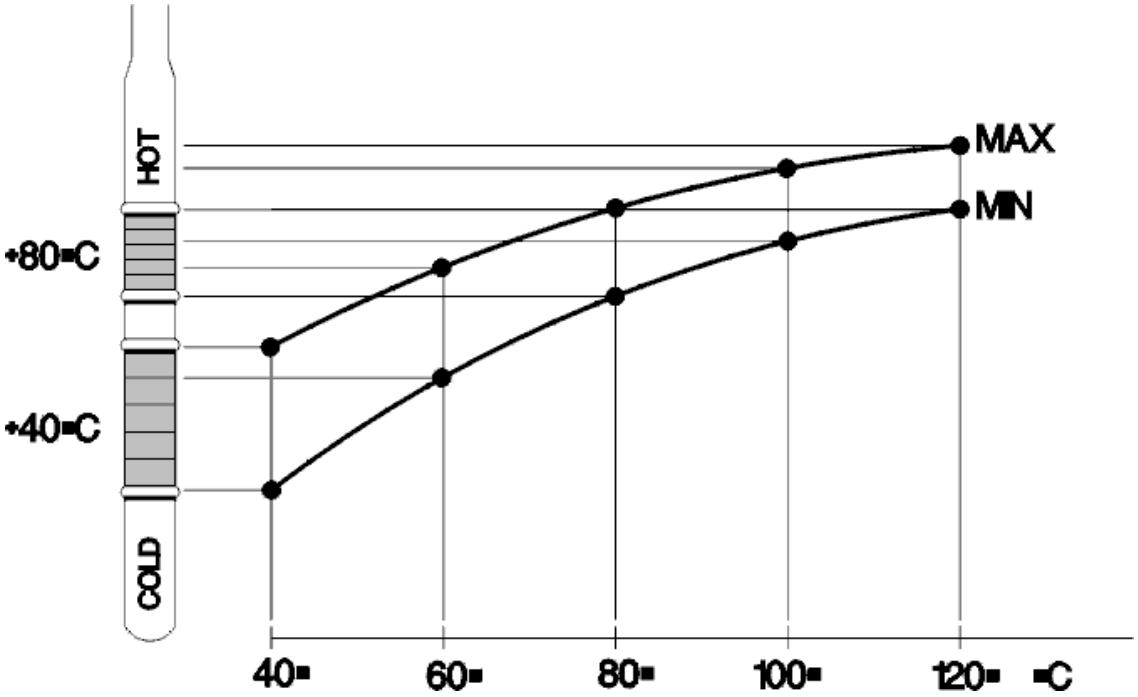


Fig. 402: Identifying Oil Level Temperature Graph
Courtesy of VOLVO CARS CORPORATION

CHECKING THE COOLING SYSTEM

- Perform the following check.

  see **TEST PRESSURIZATION**

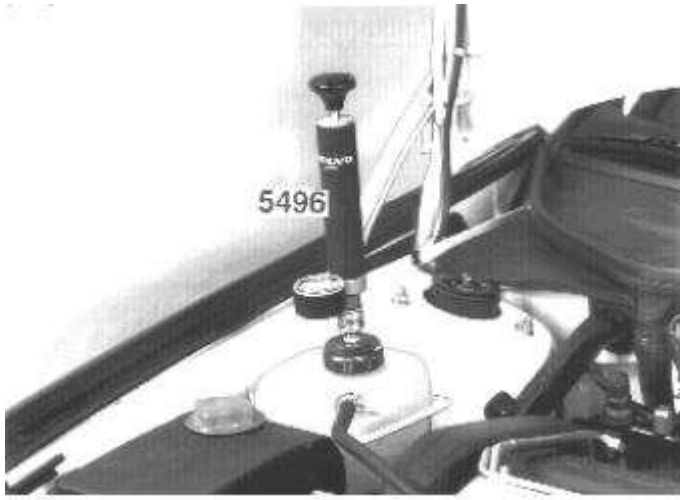


Fig. 403: Identifying Engine Coolant System Pressure Tester
Courtesy of VOLVO CARS CORPORATION

Does the pressure drop?

- **YES**

  Refer to **CHECKING THE COOLING SYSTEM**

- **NO**

  Refer to **CHECKING SOFTWARE**

REPLACING THE GEARBOX

Earlier tests indicate that there is a fault in the transmission.

Replace the transmission. For AW50AWD 2003- see **TRANSMISSION, REMOVING** or For AW55-50 2004- see **TRANSMISSION, REMOVING** and For AW50AWD 2003- see **TRANSMISSION, INSTALLING** or For AW55-50 2004- see **TRANSMISSION, INSTALLING** .

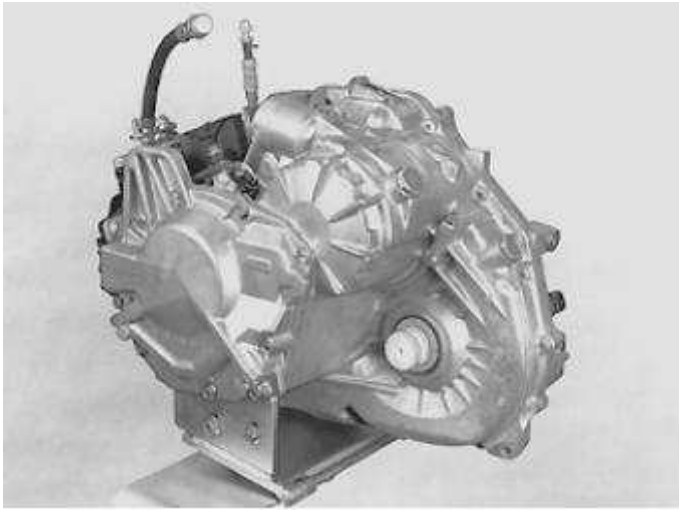


Fig. 404: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

CHECKING SOFTWARE

Check that the control module has the latest version of the relevant software.

- If new software is available, download to the control module and then select Continue.
- If the control module already has the latest software select Continue.

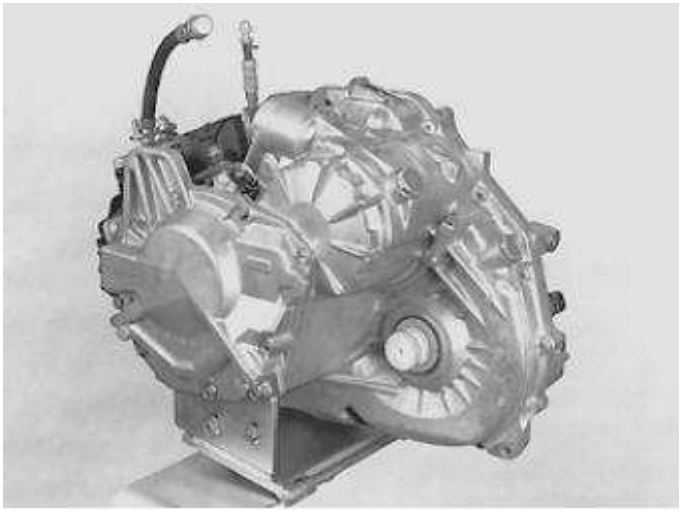


Fig. 405: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING THE TRANSMISSION**

FAULT-TRACING WITHOUT RESULT

The diagnostic trouble code (DTC) indicates that a fault occurred previously but that the fault is no longer present.

No further corrective action is required if the diagnostic trouble code (DTC) is intermittent and does not recur.

CHECKING THE COOLING SYSTEM

Ensure that the leak is the cause of the coolant coming in contact with the transmission oil by checking the quality of the oil.

If the quality of the transmission fluid had deteriorated due to leakage from the cooling system, replace the transmission, radiator, hoses and expansion tank as below.

Other information:

- see **OIL GRADE, CHECKING (AW50/51 AWD; AW55-50/51SN)**
- see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
- see **RADIATOR / CHARGE AIR COOLER (CAC), REPLACEMENT**

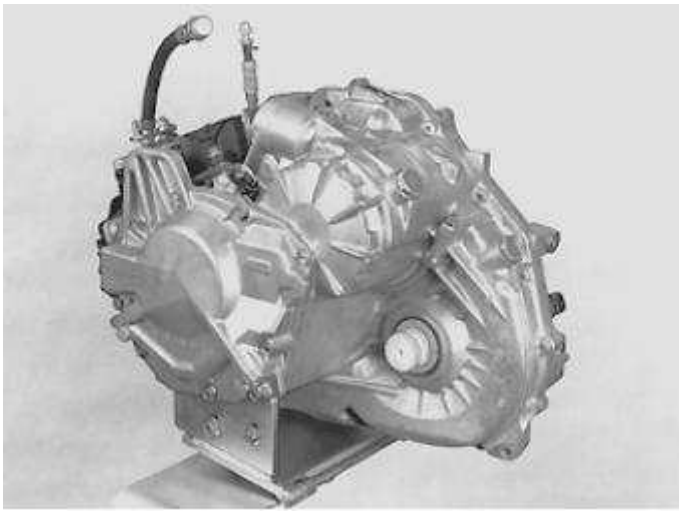


Fig. 406: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

REPLACING THE TORQUE CONVERTER

- Ignition off.

  Replace the torque converter.

  Remedy as necessary.

  Other information

  - see **REPLACING THE SEALING RING FOR THE OIL PUMP**

TEST DRIVING THE TRANSMISSION

see **TEST DRIVE SCHEDULE, DESCRIPTION**

Was any corrective action taken?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **REPLACING THE TORQUE CONVERTER**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.

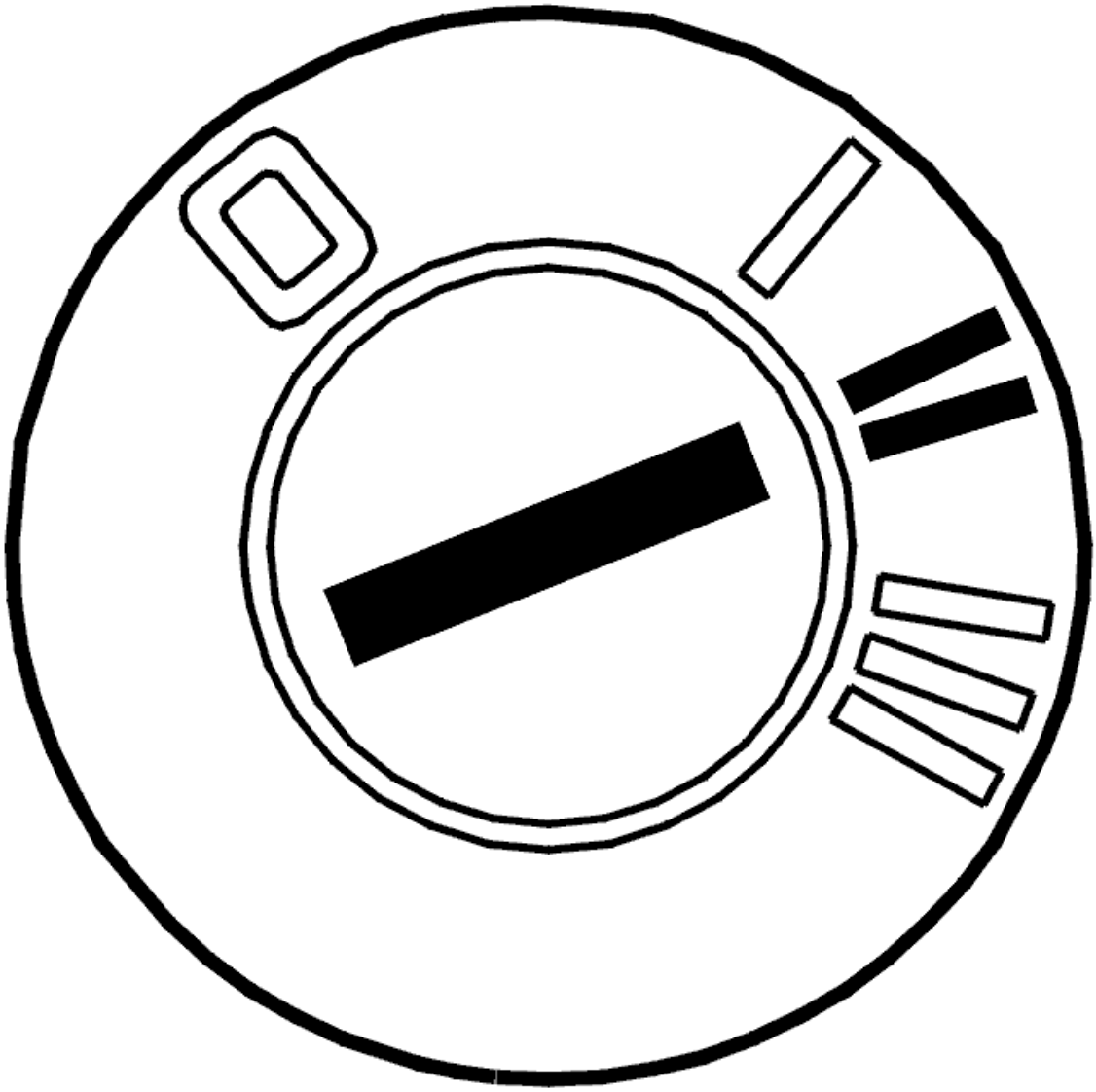


Fig. 407: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

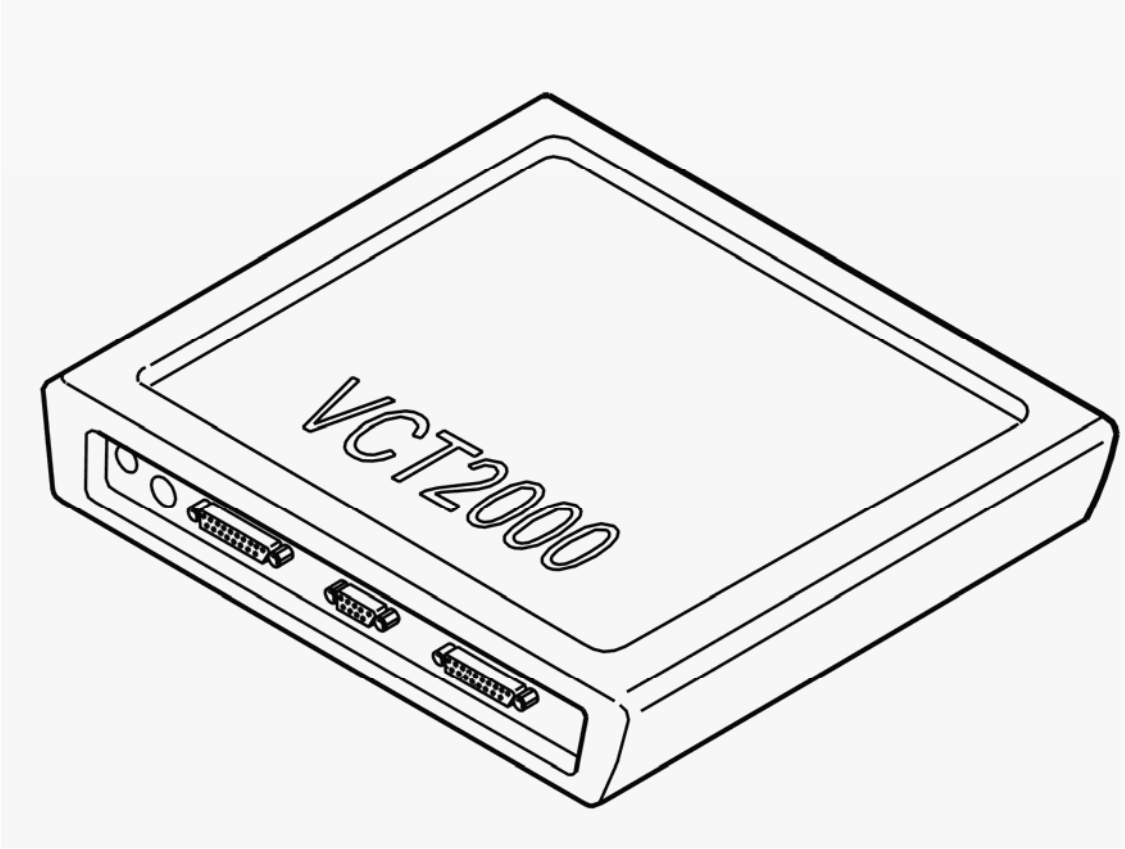


Fig. 408: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

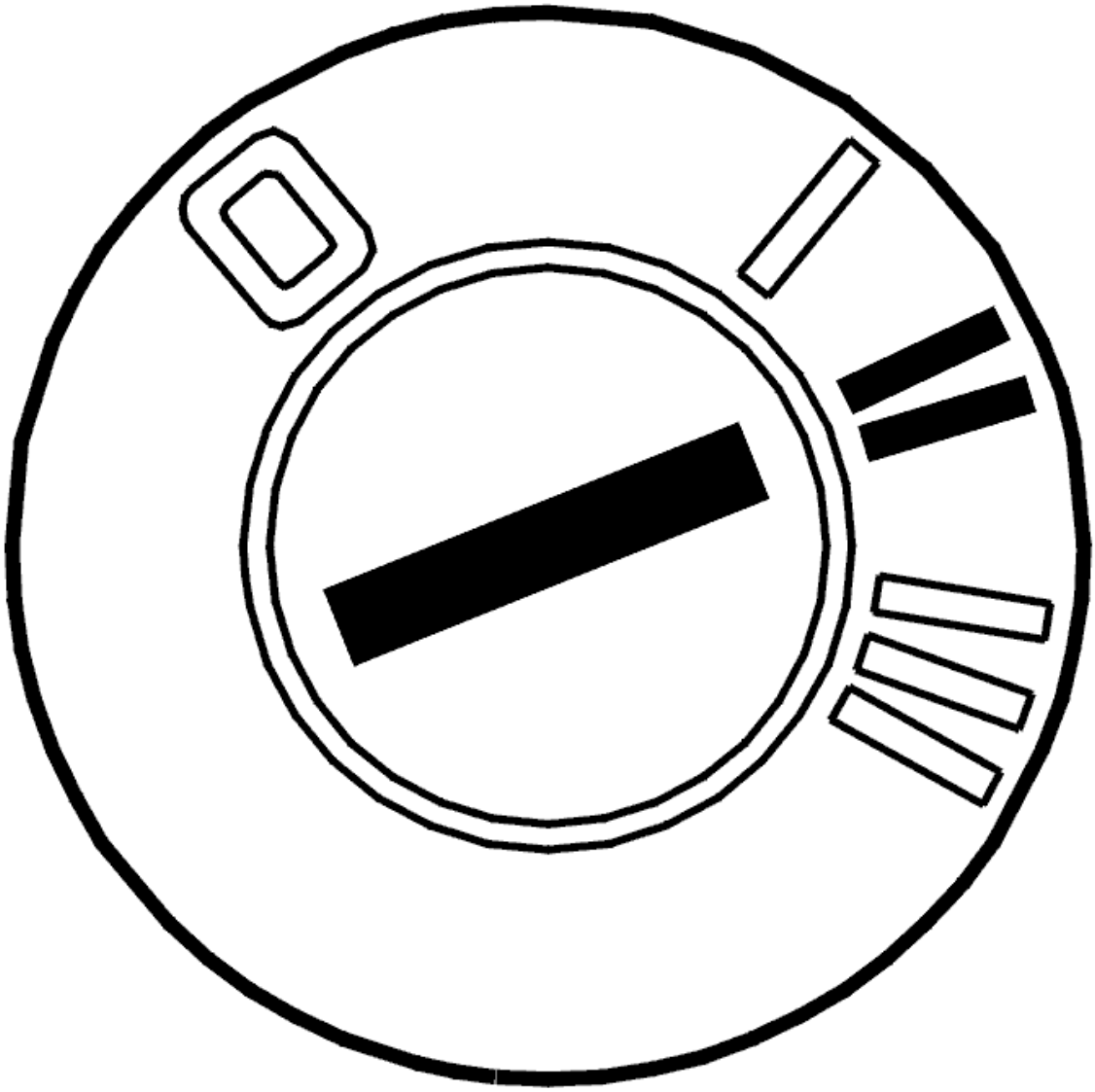


Fig. 409: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

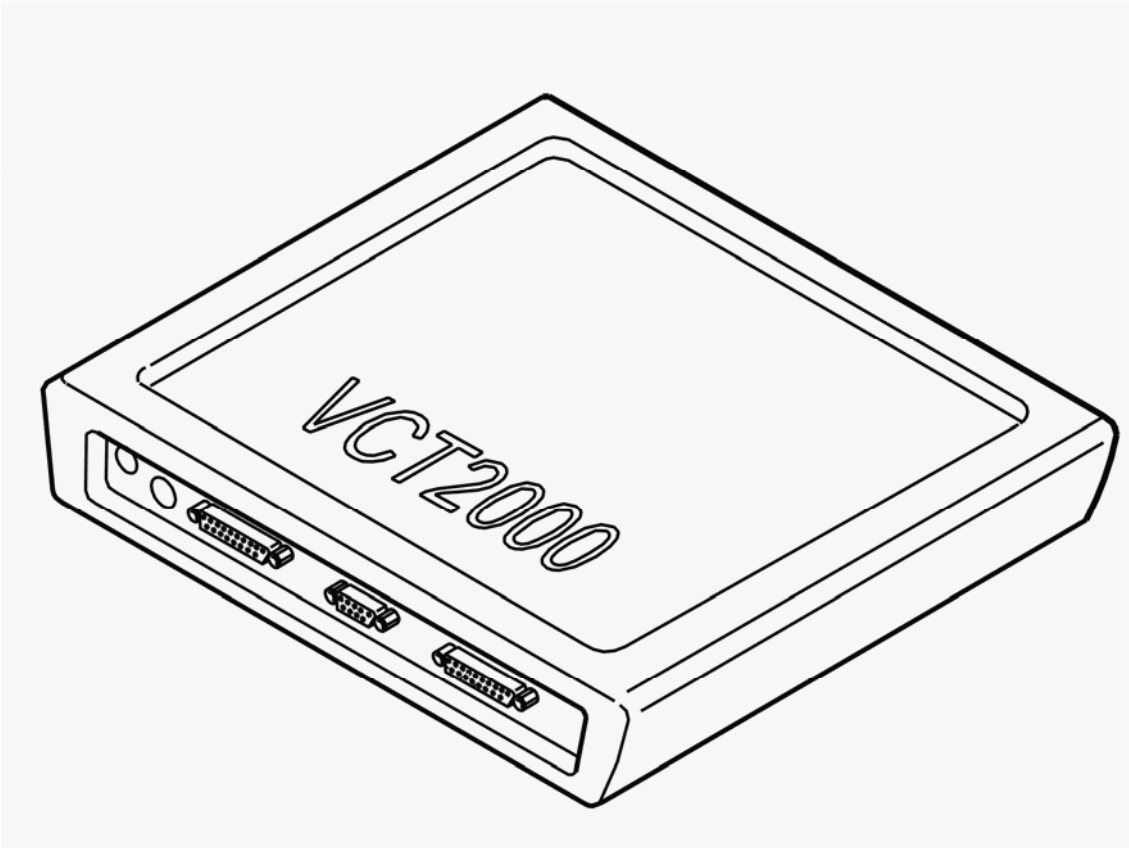


Fig. 410: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

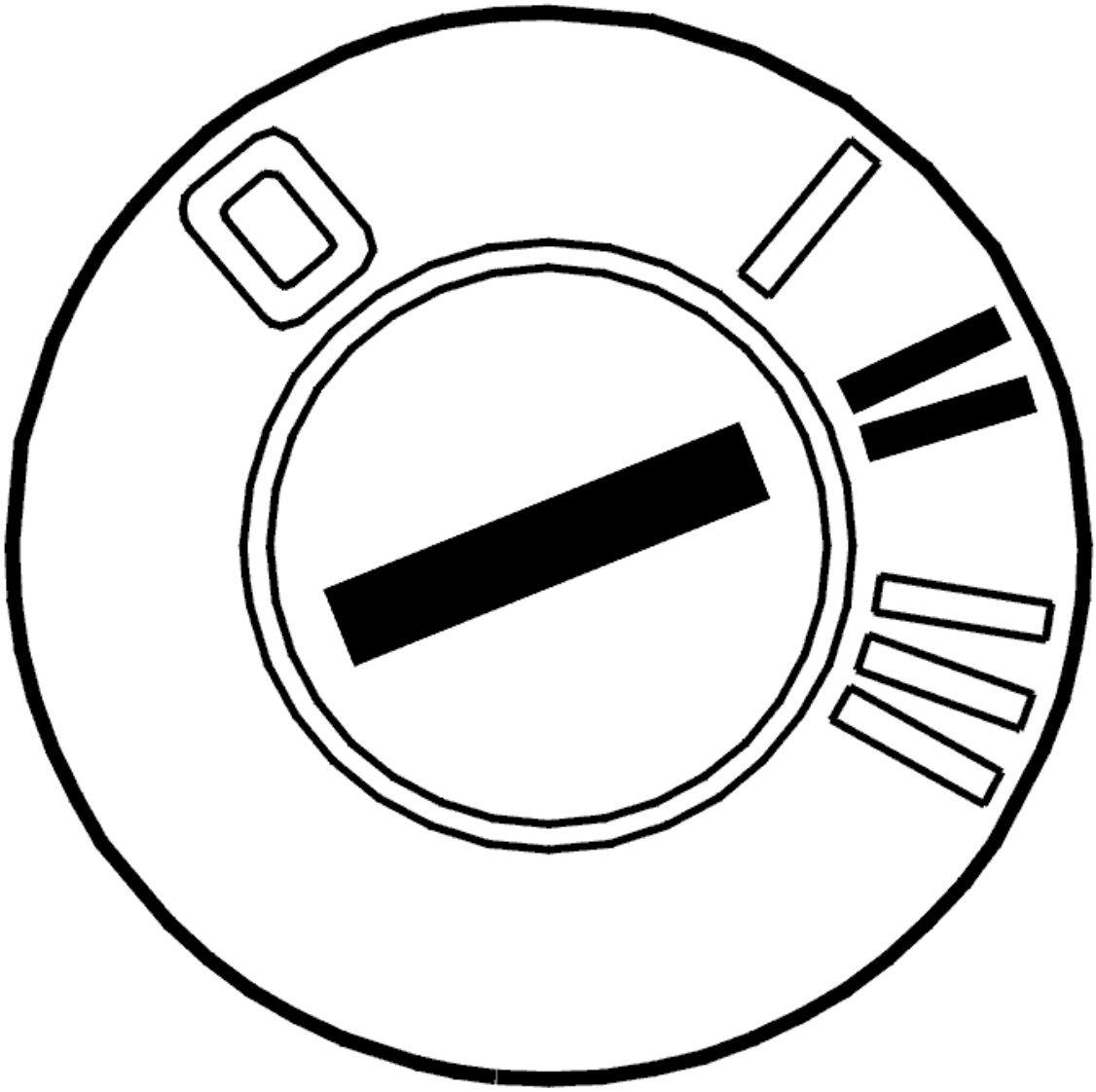


Fig. 411: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

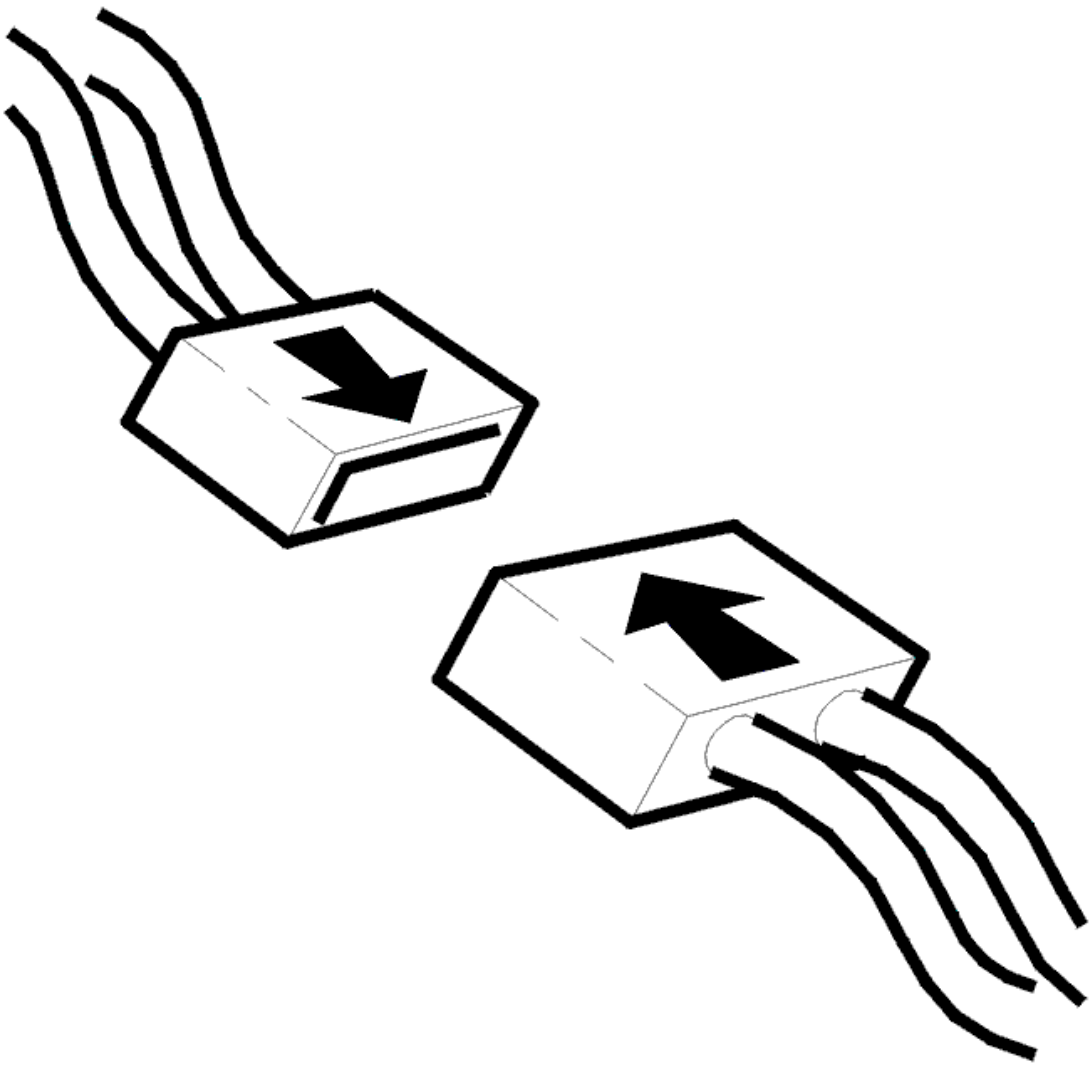


Fig. 412: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reconnect the connectors, reinstall components etc.
- Ignition on.

Test drive the vehicle following:

see **TEST-DRIVE SCHEDULE TCM-002E AW55-50/51SN**

During the test drive the oil temperature must be above 20°C.

Look out for any irregularities in the function of the transmission.

Is the transmission operating correctly?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-002E: LOCK-UP. THE TRANSMISSION JERKS WHEN LOCK-UP ENGAGES (AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

THE-GEARBOX: JERKS WHEN LOCK-UP ENGAGES

see **THE GEARBOX JERKS WHEN LOCK-UP ENGAGES**

TCM-002F: LOCK-UP FUNCTION. SLIPPING OR NOT ENGAGED (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

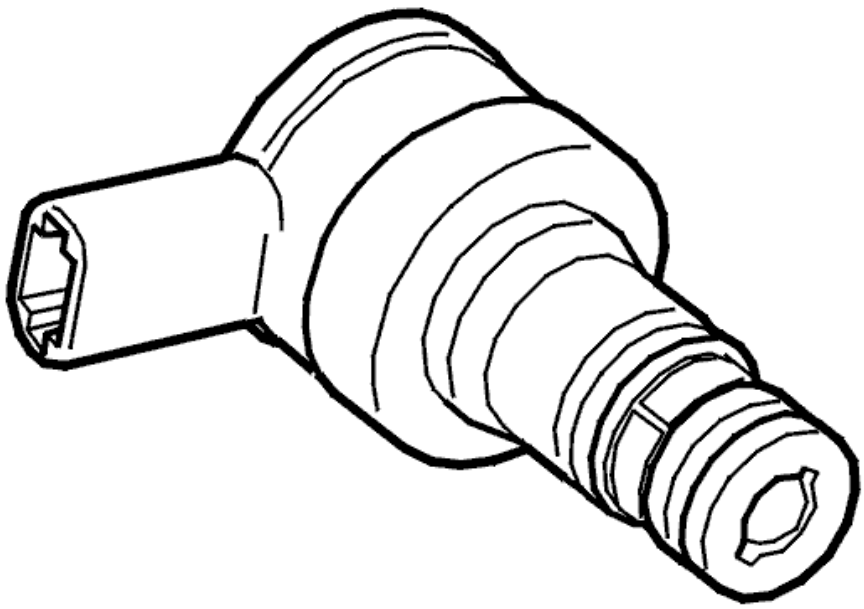


Fig. 413: Identifying Lock-Up Solenoid, SL
Courtesy of VOLVO CARS CORPORATION

The automatic transmission checks whether the lock-up solenoid is disengaged or slipping by comparing the speed signal from the transmission output speed sensor with the actual transmission speed (RPM) at the transmission. The signals should "show"the same calculated speed (RPM). The control module also compares the transmission speed signal with the engine speed (RPM). The speed should then be greater or less than the transmission speed depending on the gear selected. Diagnostic trouble code (DTC) TCM-002F is stored if the control module detects that vehicle speed and transmission speed signals do not correspond with the estimated values. This means that the lock-up solenoid SL is slipping or is not engaged.

Substitute Value

- The transmission control module (TCM) "Emergency mode I"program has been initiated.

Possible Source

- Glycol in the transmission fluid.
- Contact resistance in the terminals
- Mechanical fault in the transmission control system
- Electrical fault in lock-up solenoid SL
- Mechanical fault in the transmission.

Fault symptom[s]

- General orange warning lamp lit
- Malfunction indicator lamp (MIL) lit
- No lock-up function
- Harsh gear shifting.

SLIPPING OR NOT ENGAGED

CHECKS

CHECKING THE DIAGNOSTIC TROUBLE CODES (DTCS)

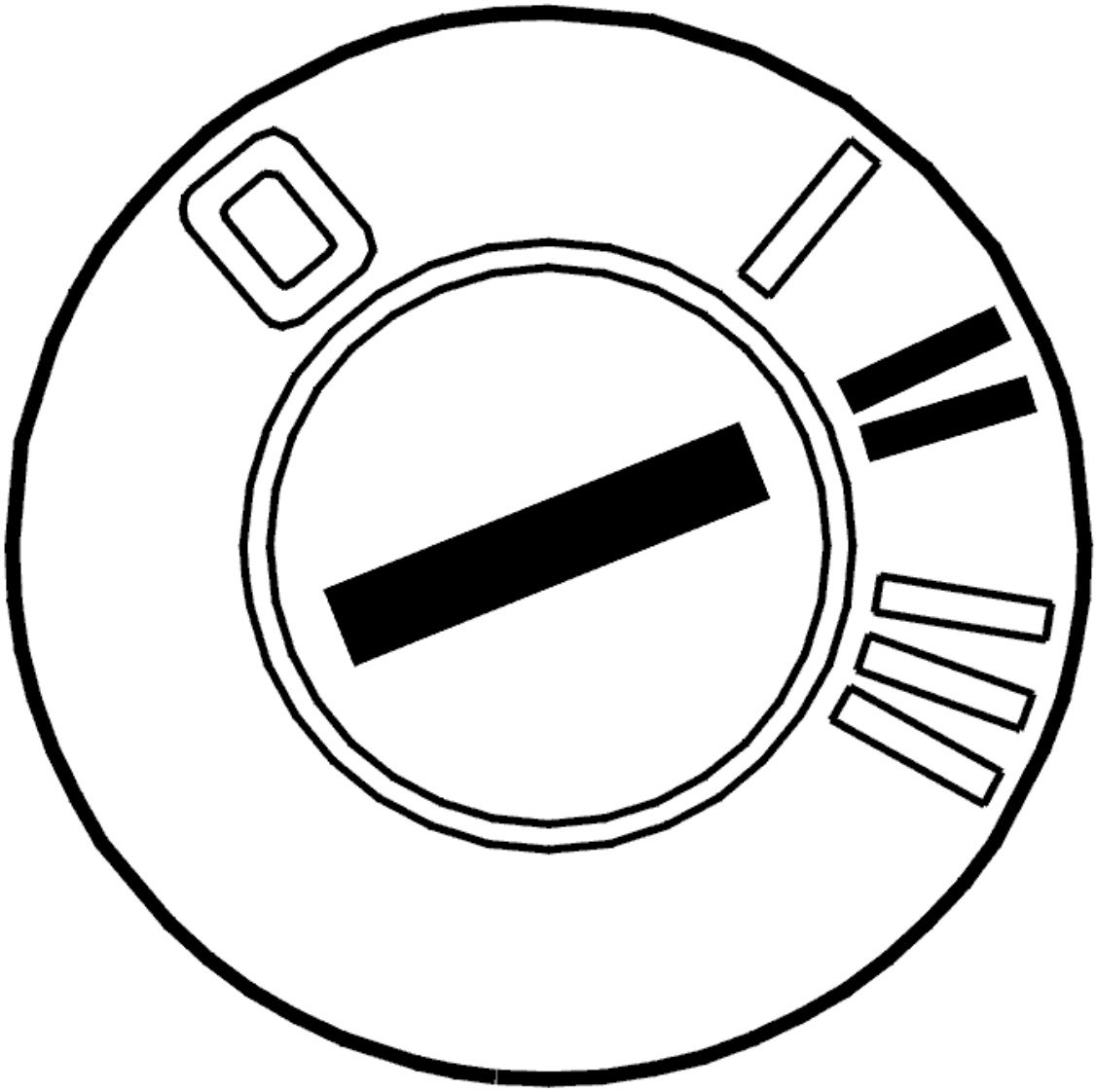


Fig. 414: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-002F are stored, these must be fault-traced and remedied after this fault-tracing is completed.

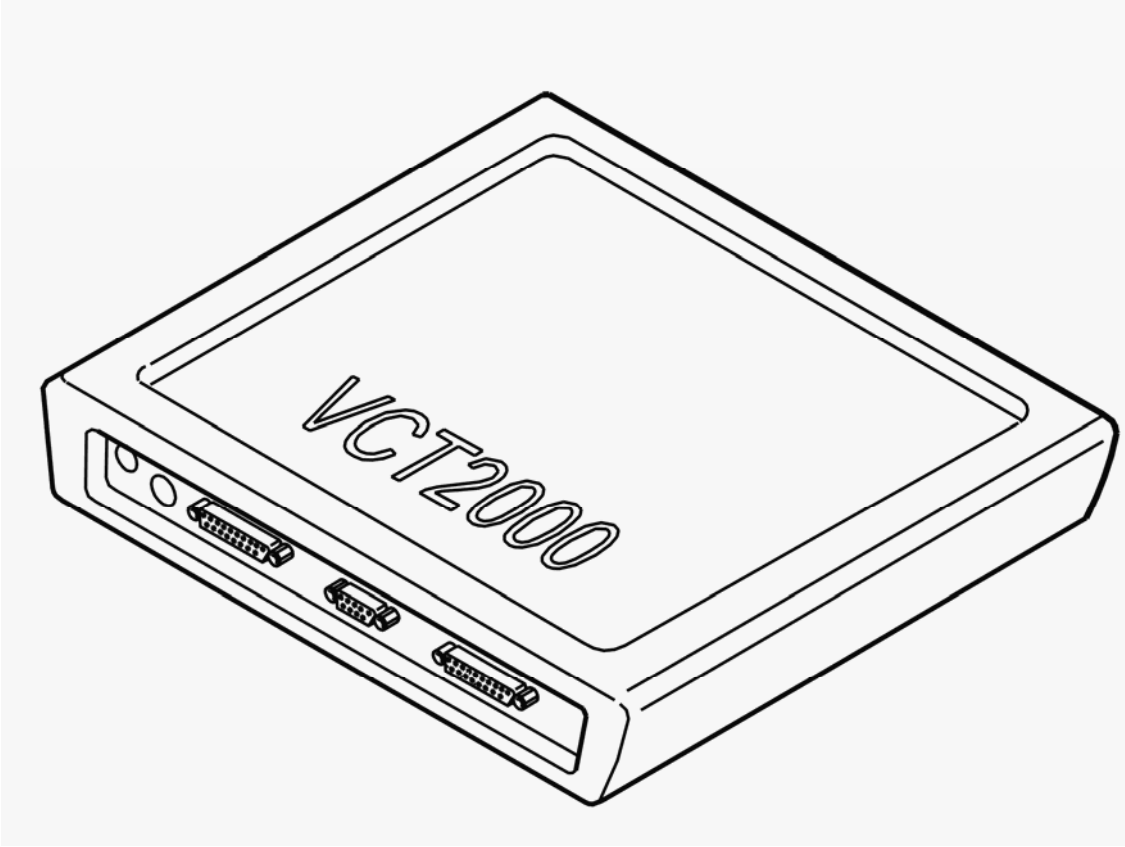


Fig. 415: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECK THE QUALITY OF THE TRANSMISSION OIL**

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

HINT: When diagnostic trouble codes (DTCs) are erased, the information stored at the same time as the DTC is also erased. Therefore it is suggested that the extended diagnostic trouble code (DTC) information (frozen values) is read off before the DTCs are erased. To read off extended fault-tracing information: save a bookmark, select cancel and go to VIDA vehicle communication.

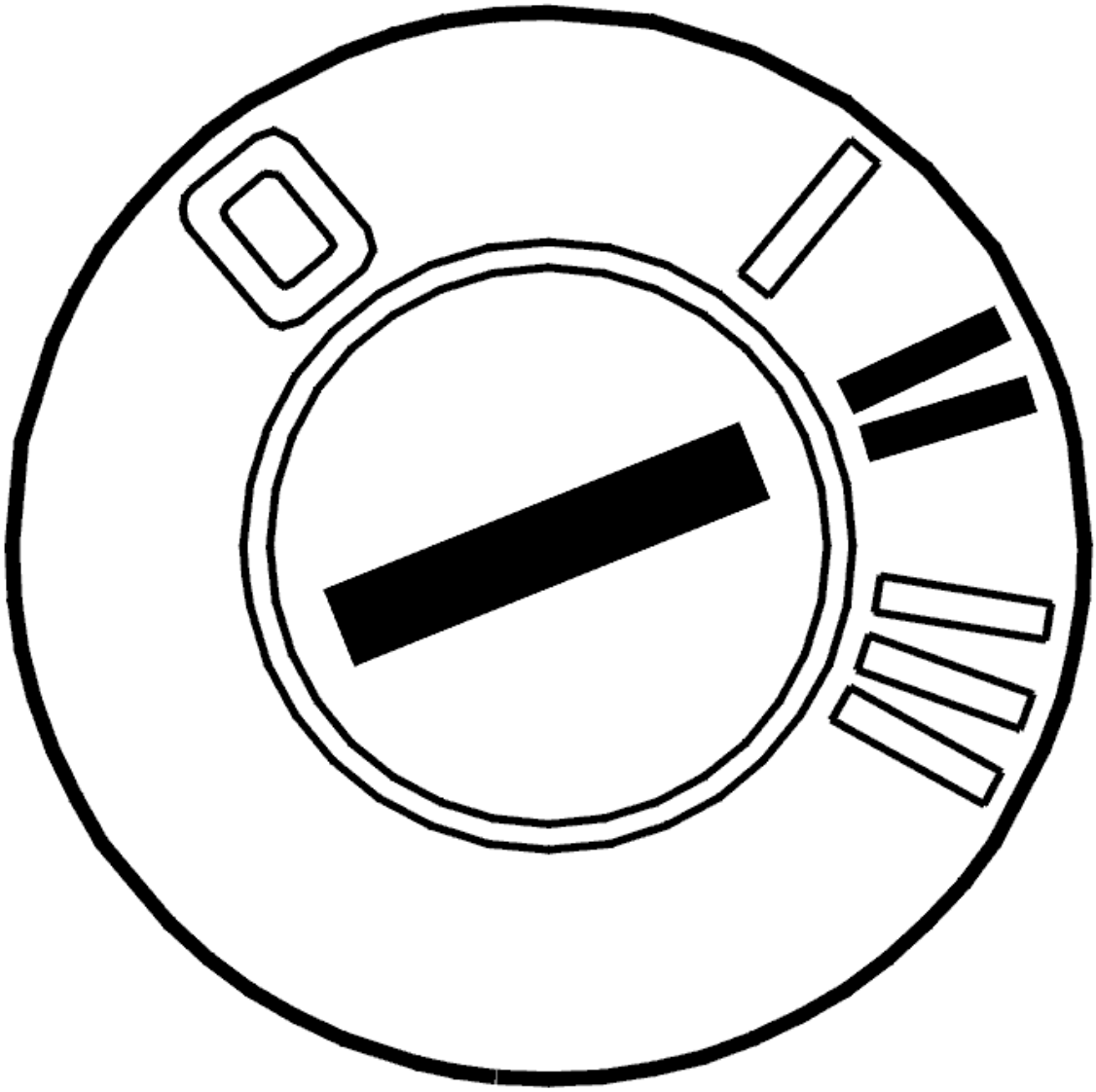


Fig. 416: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

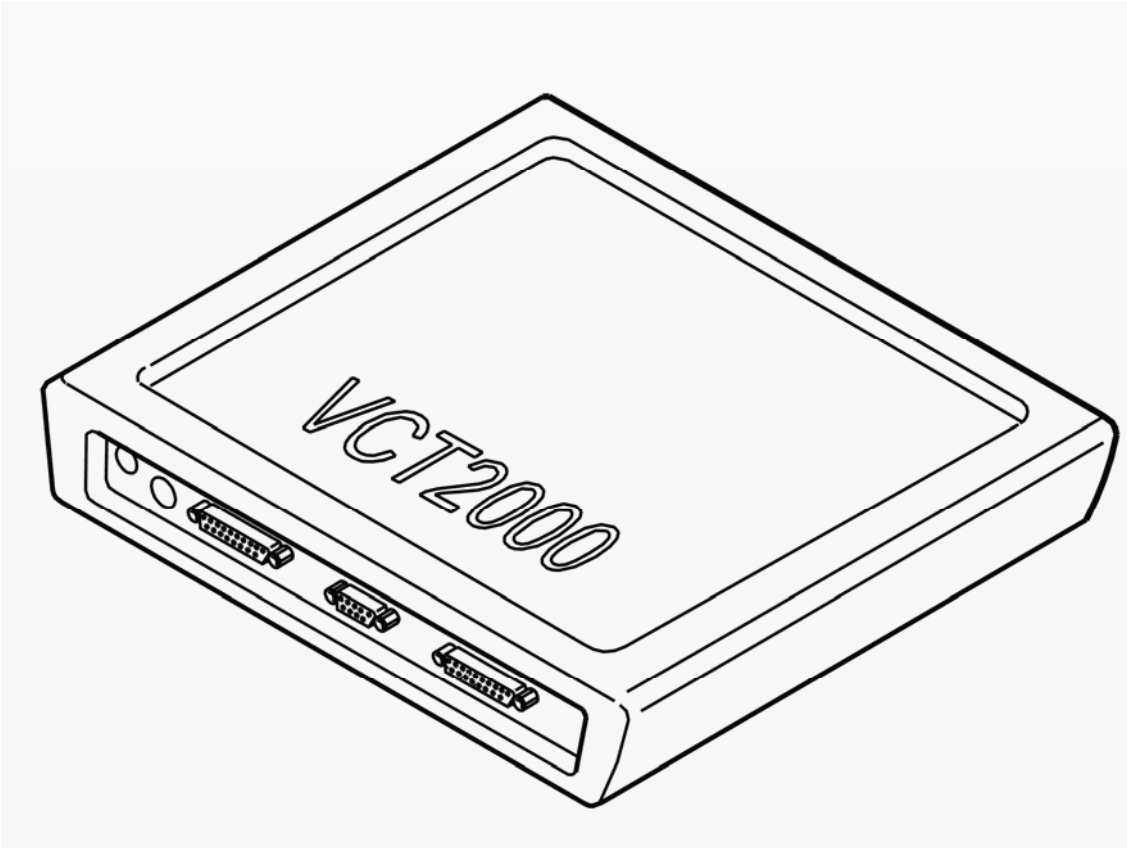


Fig. 417: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE SOFTWARE**

CONNECTING THE T PIPE

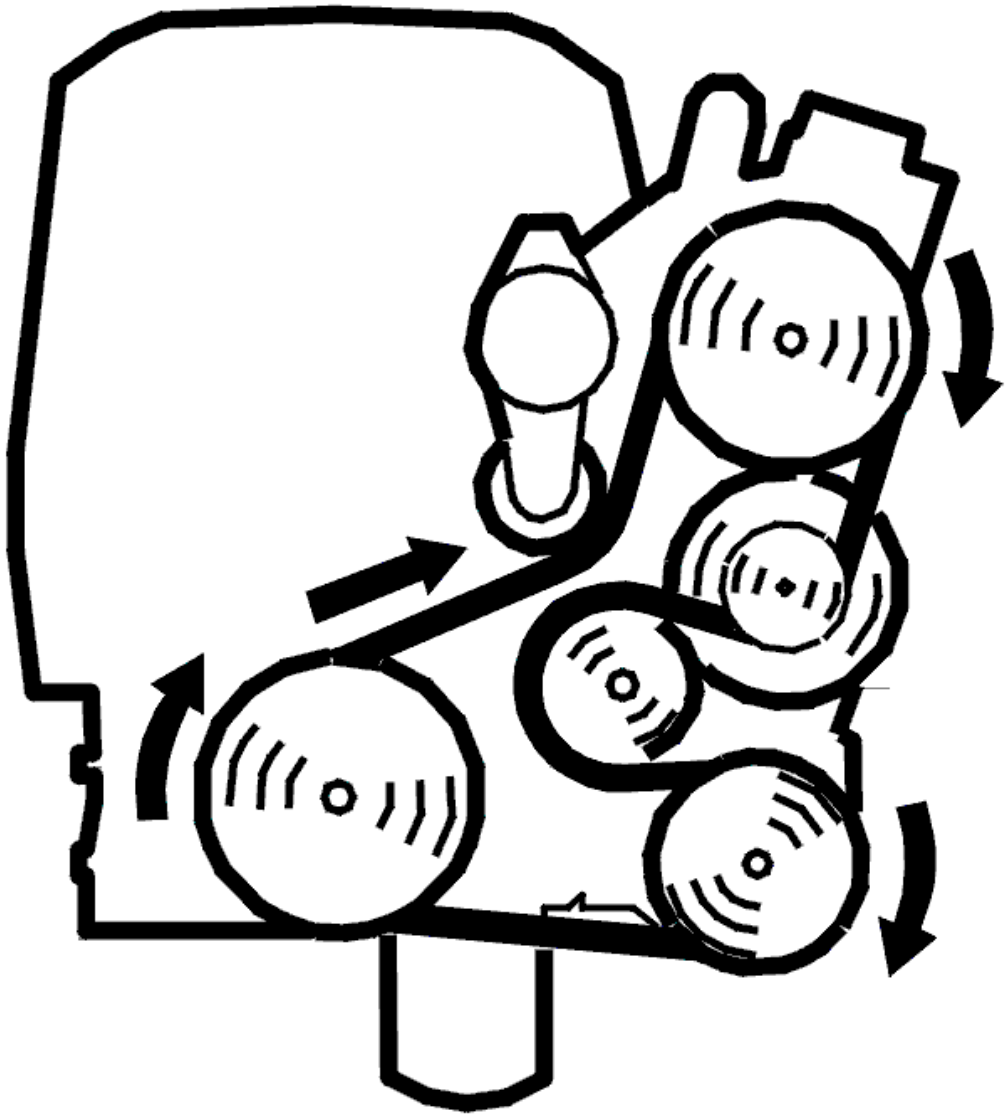


Fig. 418: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Deactivate the function for STC/DSTC by pressing the button for STC/DSTC for approximately 2 seconds
- Ignition off
- Connect T-pipe see **9997002** with oil pressure gauge see **9995114** to the coolant hose from the transmission for the oil cooler
- Raise the car so that the drive wheels are clear of the ground.

WARNING: Ensure that the car safely raised. Ensure that there are no objects caught in the front wheels.

- Start the engine

- Gear selector in position P
- Activate the function "Block automatic shifting".

Other information

- To connect the T-pipe to the oil cooler for the transmission. See **T-PIPE, CONNECTING TO OIL COOLER**.

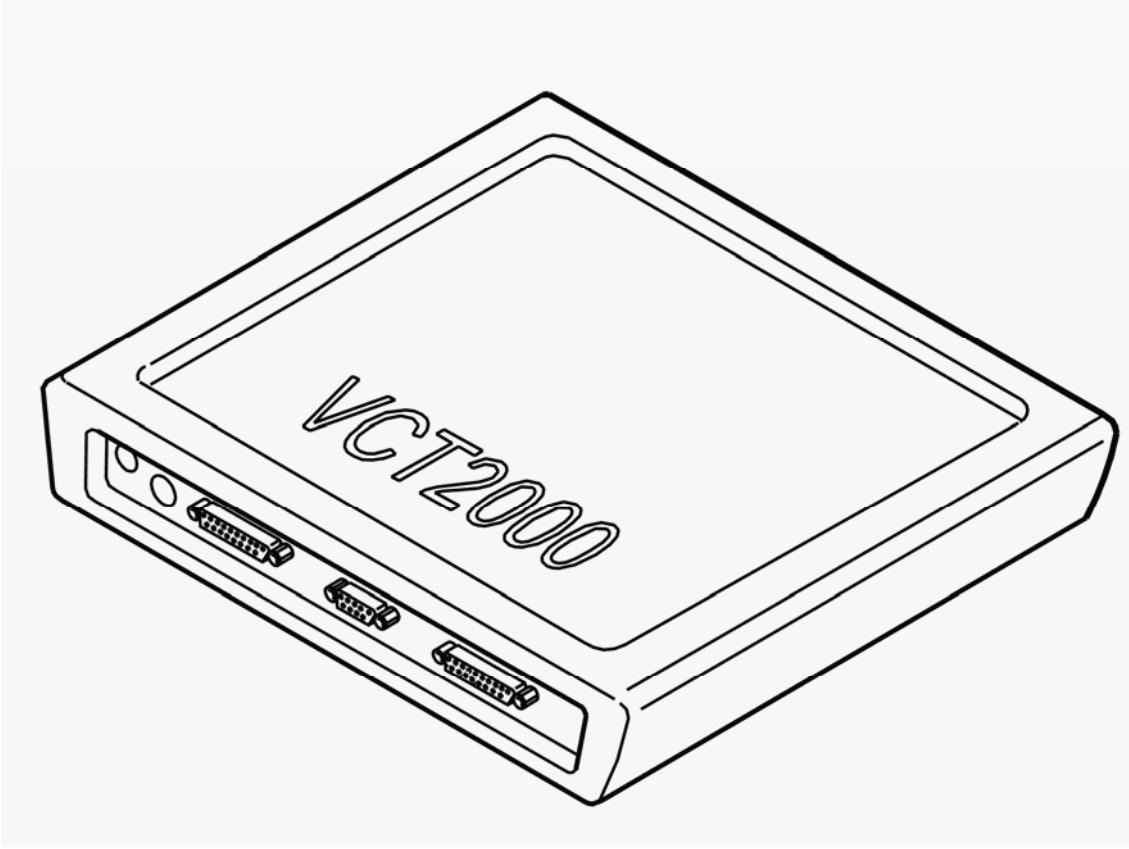


Fig. 419: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Allow the engine to run.

- **Continue**

Refer to **CHECKING LOCK-UP SOLENOID SL**

CHECKING LOCK-UP SOLENOID SL

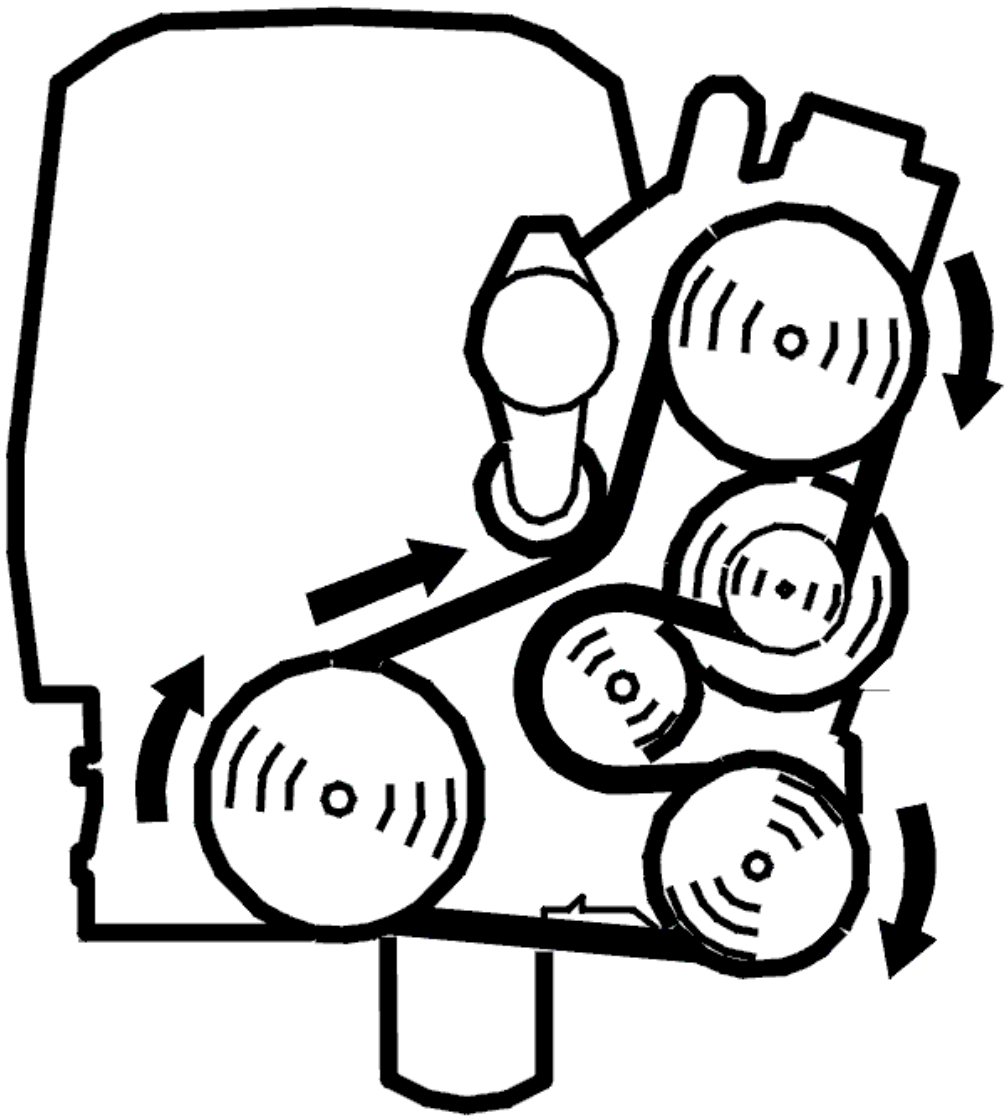


Fig. 420: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Engine running
- Move the gear selector to position D
- Activate the solenoid for gear 2 and then the lock-up function
- Check the pressure change on the oil pressure gauge. A considerable change in pressure should be observed
- Deactivate the lock-up function. Check the pressure change.

  Repeat the activation and deactivation of the lock-up function a few times to ensure accurate results.

  HINT: Unchanged pressure means that the control system is defective.

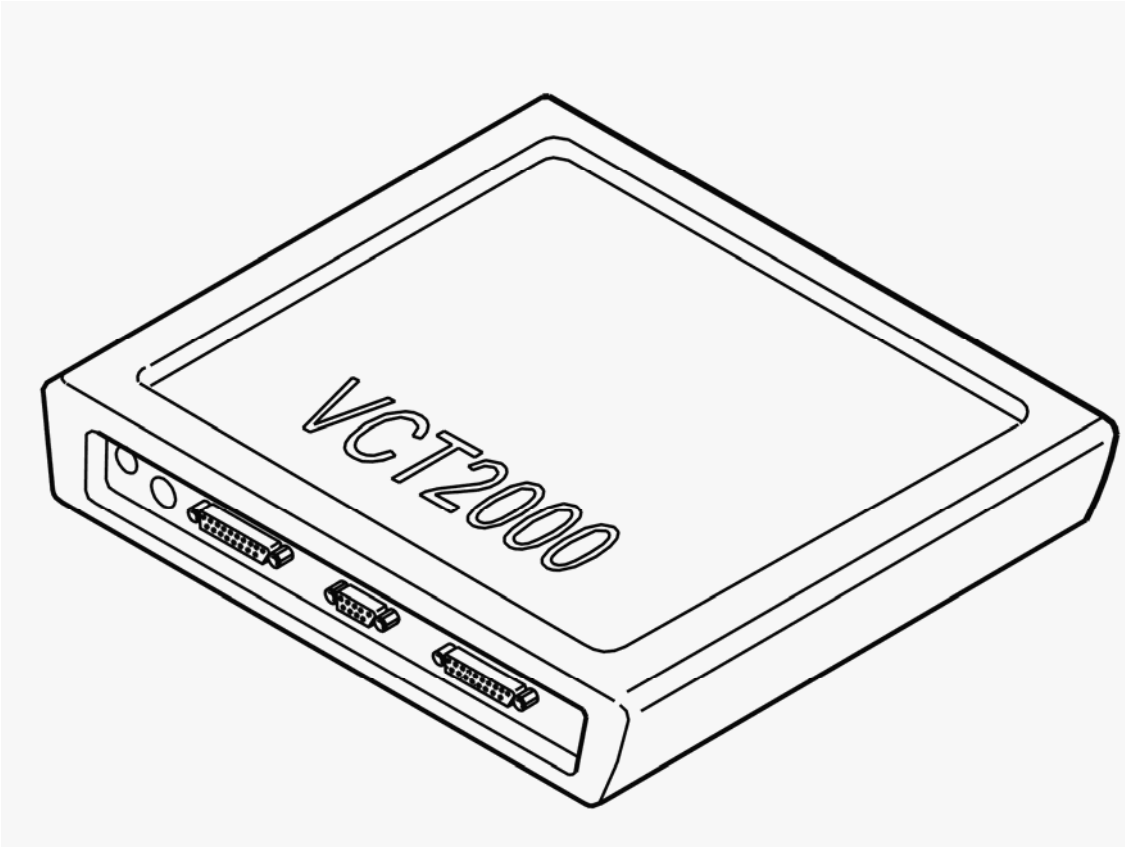


Fig. 421: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Did the pressure change?

- **YES**

  Refer to **CHECKING THE LOCK-UP FUNCTION**

- **NO**

  Refer to **REPLACING TRANSMISSION CONTROL SYSTEM**

CHECKING THE LOCK-UP FUNCTION

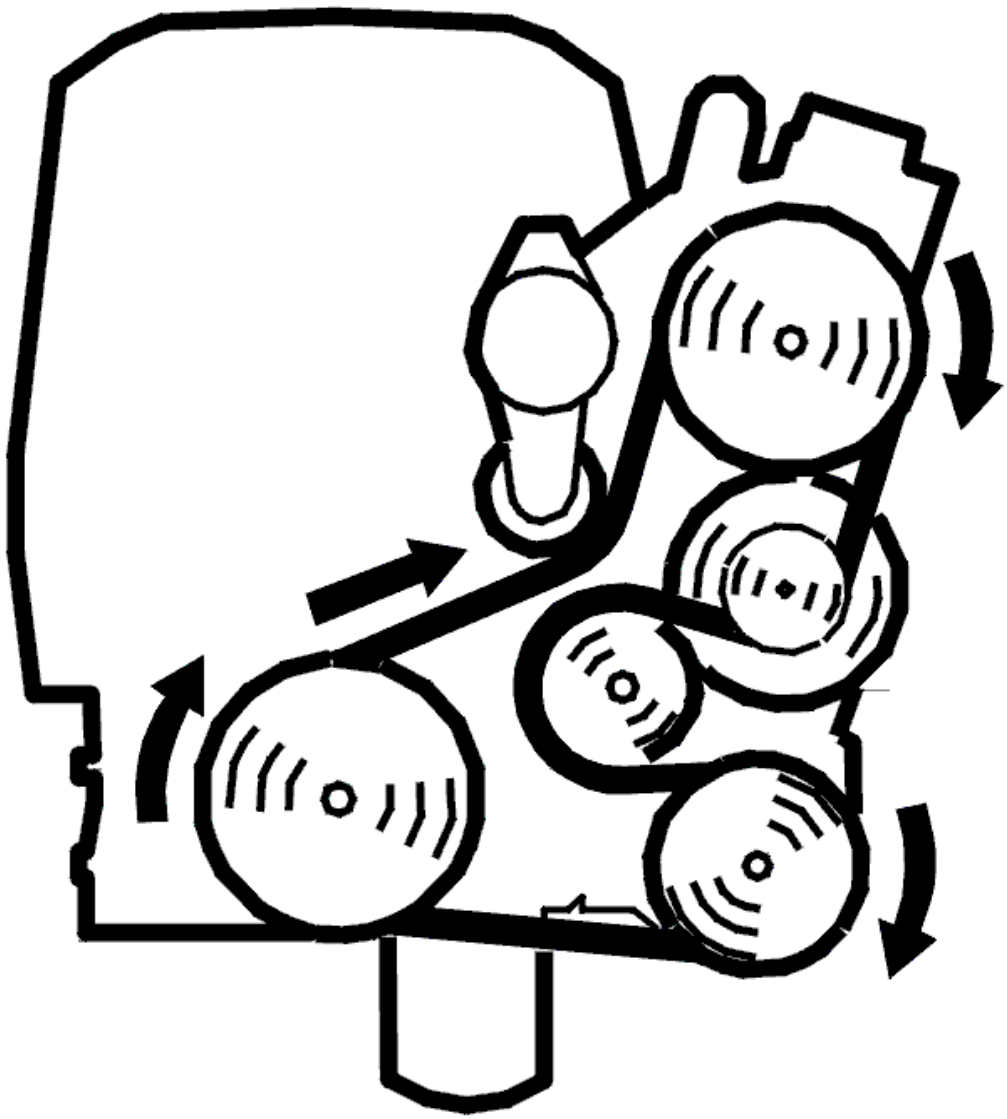


Fig. 422: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Engine running
- Raise the car so that the wheels can rotate freely
- Move the gear selector to position D
- Rev the engine to 2000 RPM
- Activate the solenoid for gear 2 and then the lock-up function
- Read off the input transmission speed and the engine speed.

  Press the accelerator pedal (AP). Check the lock-up function by comparing the input speed of the transmission and the engine speed (RPM). The speeds should follow each other and be approximately the same. If the difference in speed is greater than 100 RPM the lock-up function is not functioning.

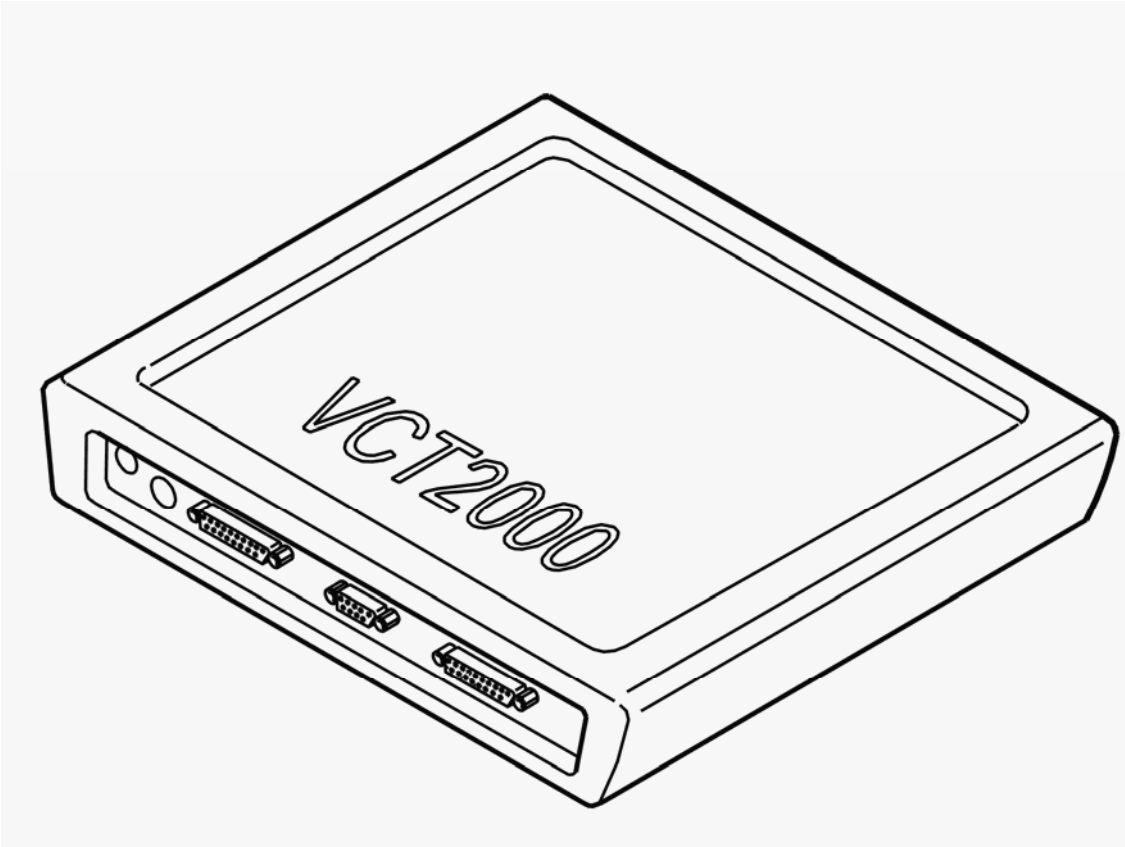


Fig. 423: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the difference in speed (RPM) greater than 100 RPM?

- **YES**

  Refer to **REPLACING A FAULTY TRANSMISSION**

- **NO**

  Refer to **CHECKING THE RESISTANCE OF SOLENOID SL**

CHECKING THE RESISTANCE OF SOLENOID SL

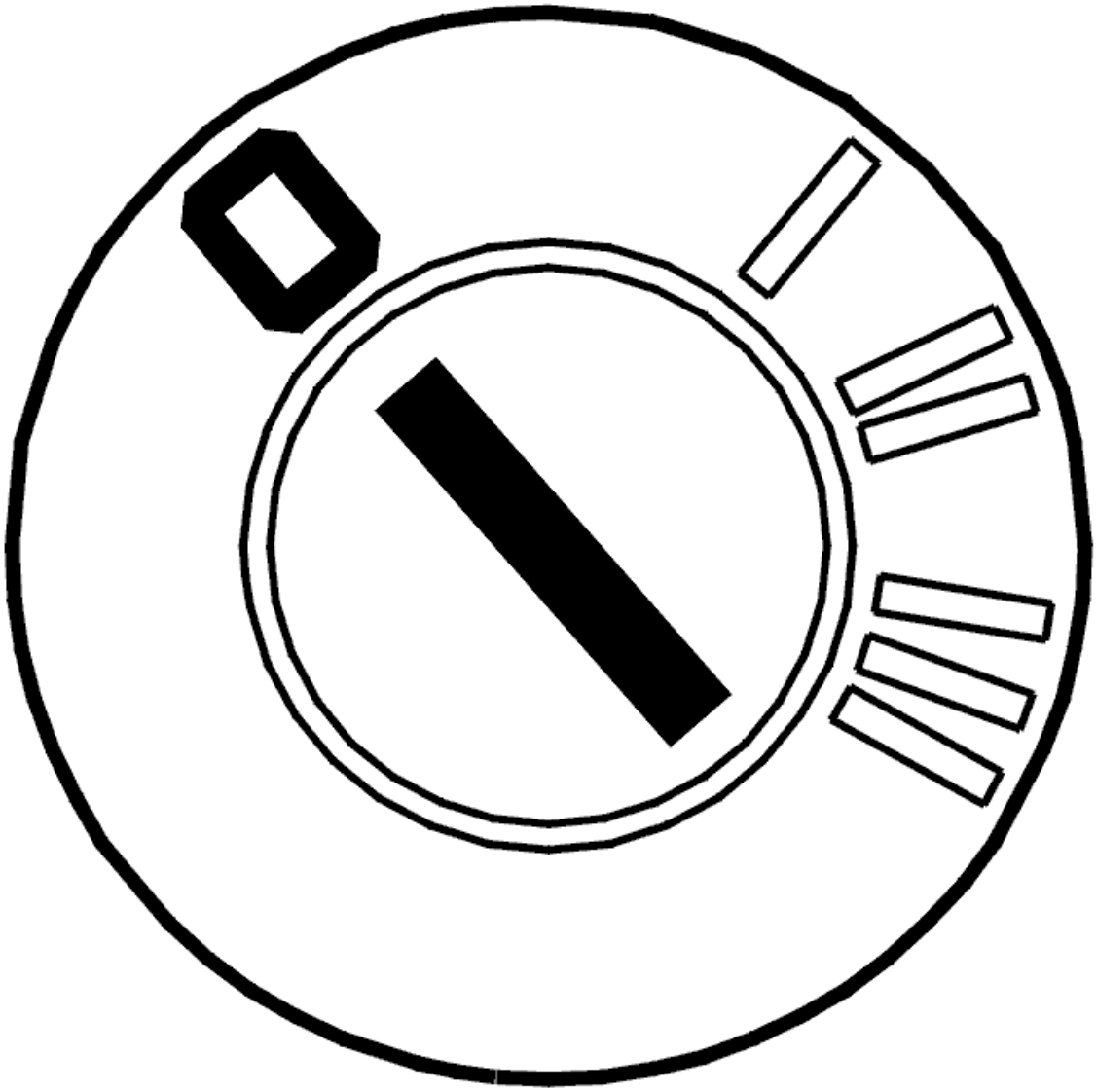


Fig. 424: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

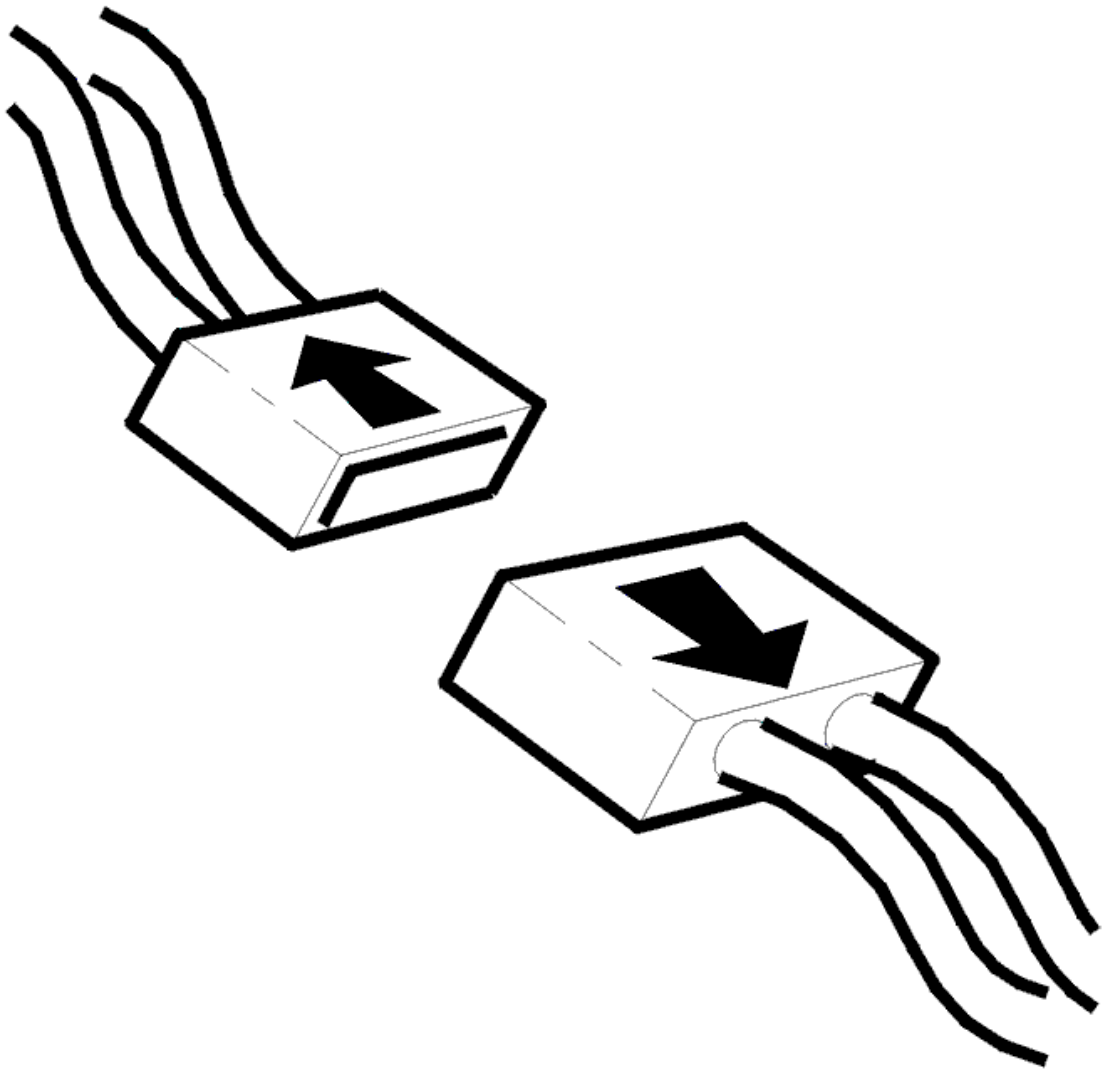


Fig. 425: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side).

  Connect an ohmmeter between terminals E (#A5) and T (#A17).

  The solenoid SL resistance must be between 11 and 15 ohms.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**

- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

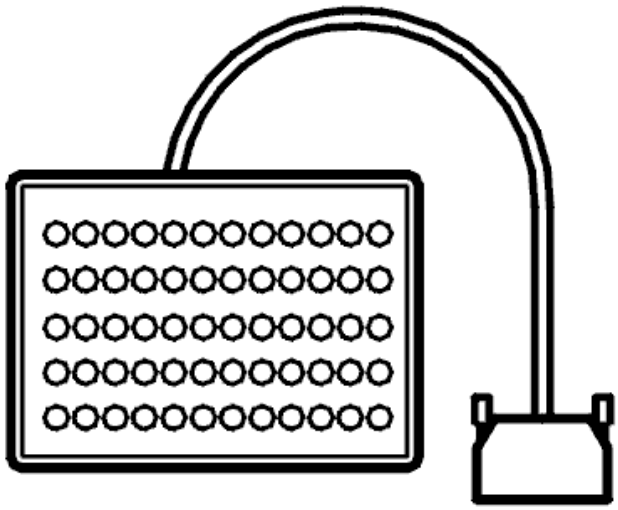


Fig. 426: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

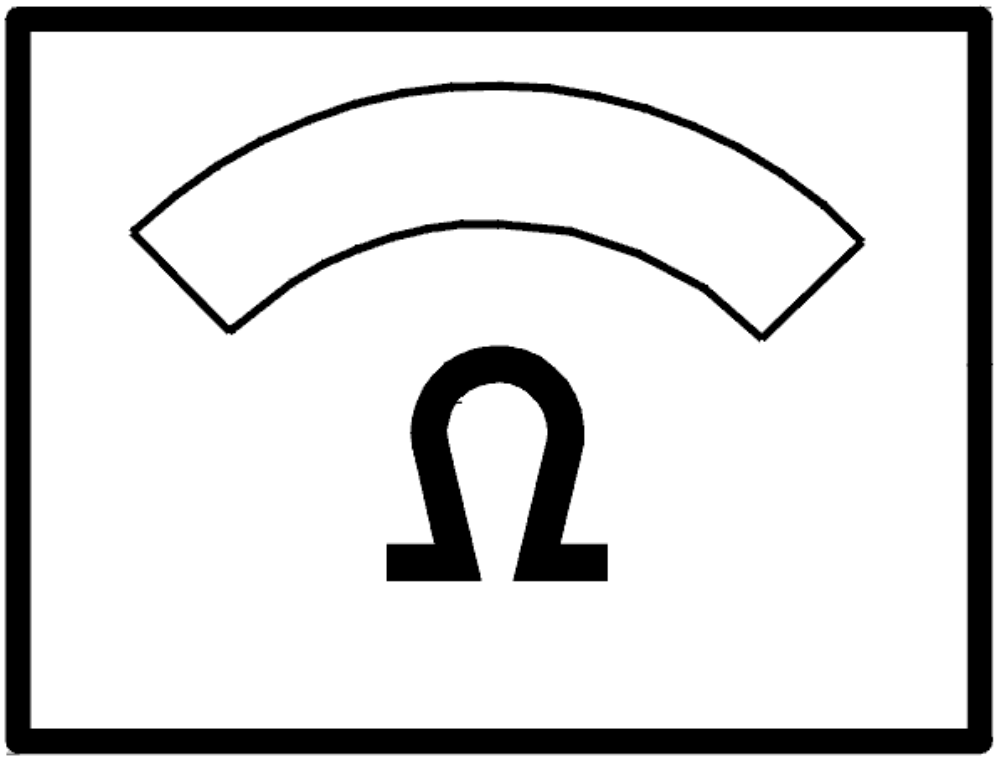


Fig. 427: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **TEST DRIVING**

- **NO**

  Refer to **CHECKING THE WIRING**

TEST DRIVING

NOTE: Test drive the car according to the driving schedule below to check whether the

fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

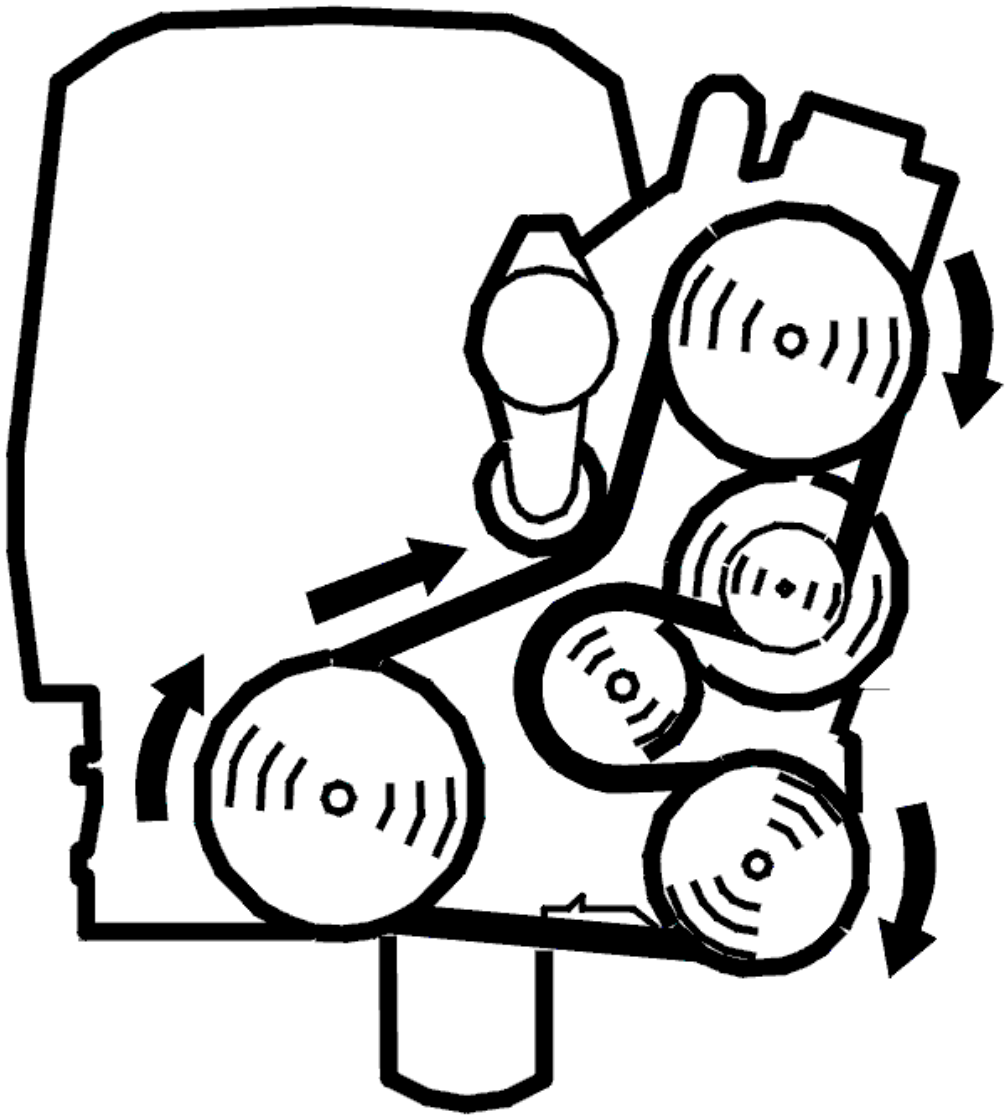


Fig. 428: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect the VIDA station. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission should be at operating temperature, approximately 80-90 °C.

Shift the gear selector to position 3 (third gear with Geartronic). Carefully accelerate to 85 km/h. Maintain the same speed for a few seconds. Carefully accelerate for approximately 30 seconds to increase the engine torque.

HINT: The car must be driven at an engine speed where the lock-up function is normally fully activated and not slipping. The following gear positions and speeds are also possible:

- 120 km/h gear position D
- 85 km/h gear position 3.

Criteria for diagnostic trouble code (DTC):

- The transmission fluid temperature must exceed 30 °C
- No shifting during the evaluation period
- Positive engine torque (no engine braking)
- Gear selector in position D, 3 or 2 (4T65EV).

  Gear selector in Geartronic position and gears 4, 3 or 2 (4T65EV-GT)

- Speed 85 km/h for at least 30 seconds.

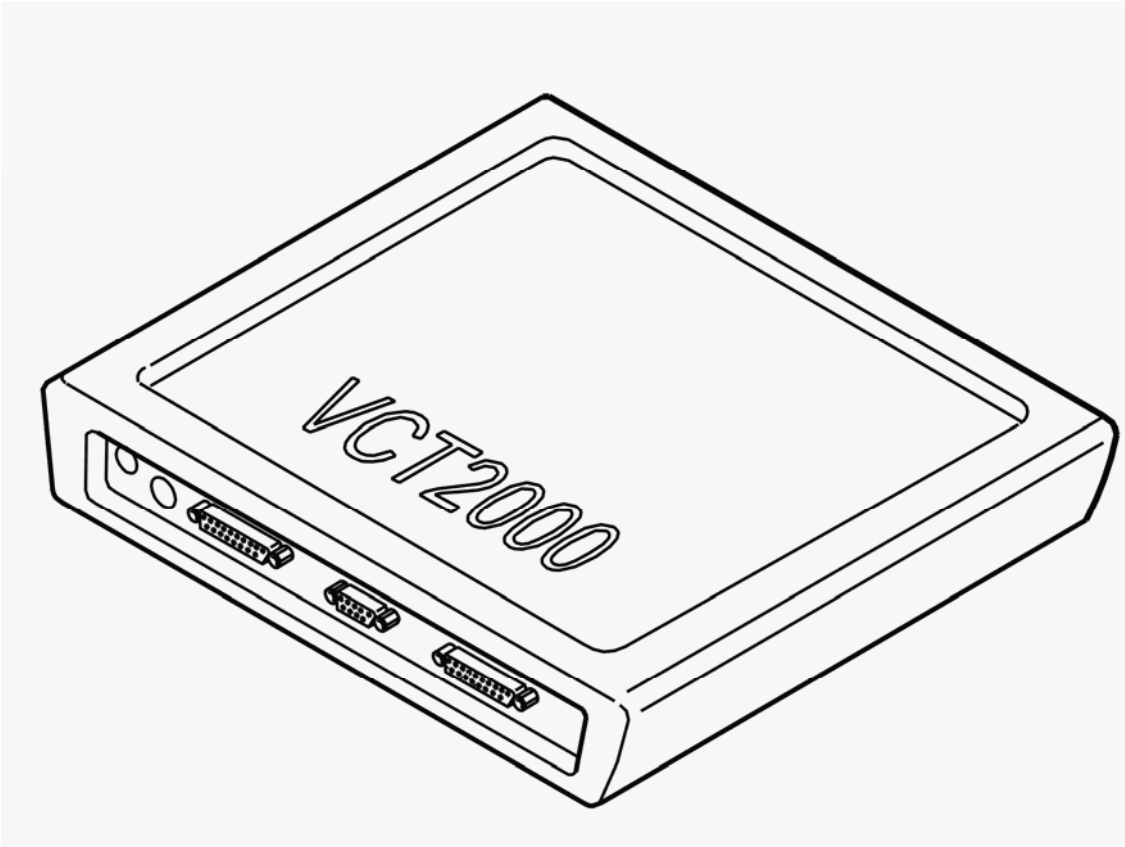


Fig. 429: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

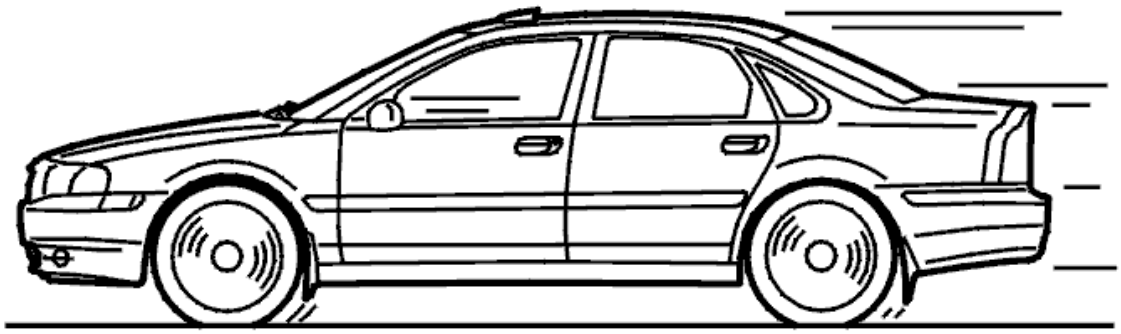


Fig. 430: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING THE DIAGNOSTIC TROUBLE CODES (DTCS)

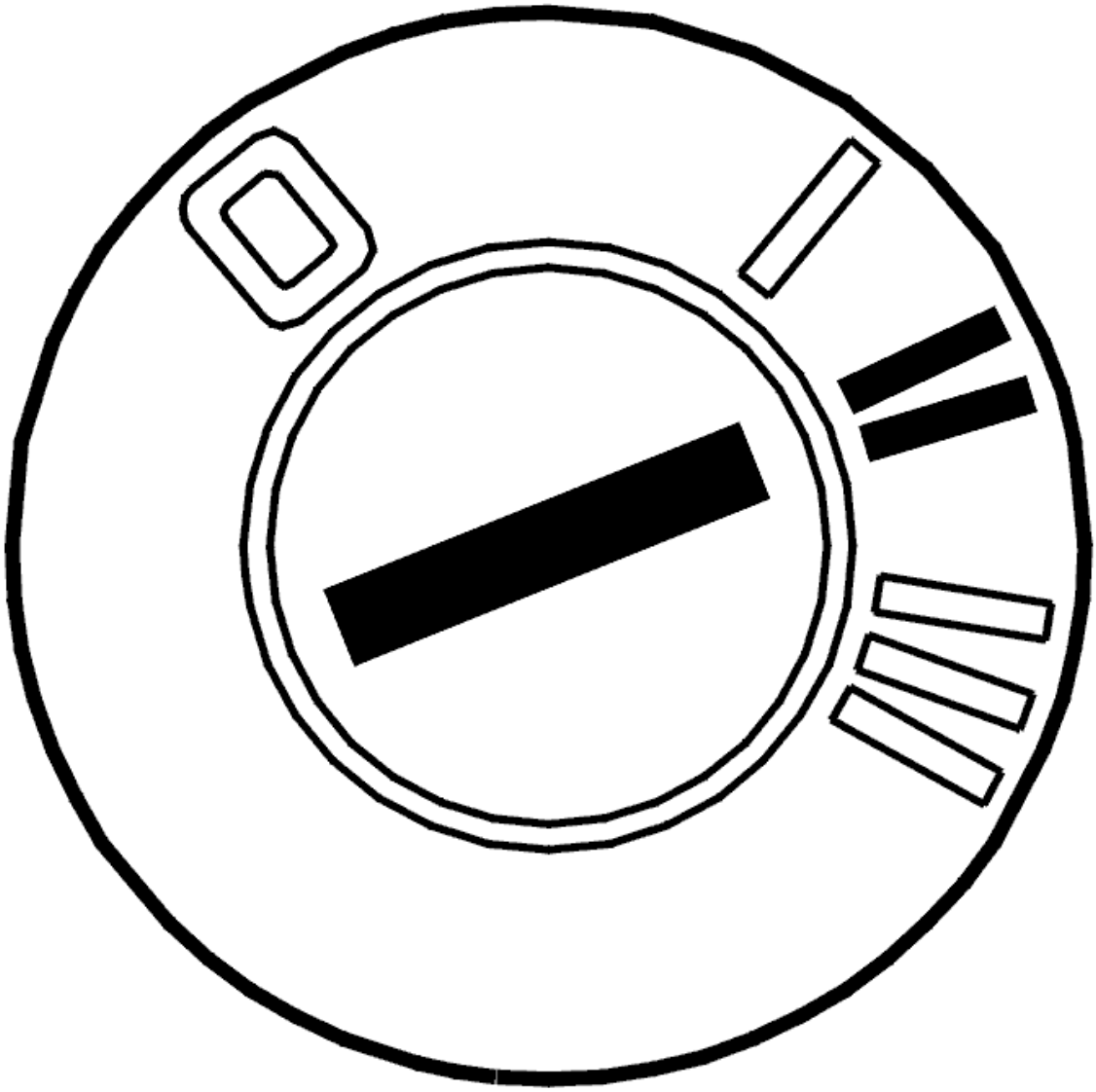


Fig. 431: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-002F are stored, these must be fault-traced and remedied after this fault-tracing is completed.

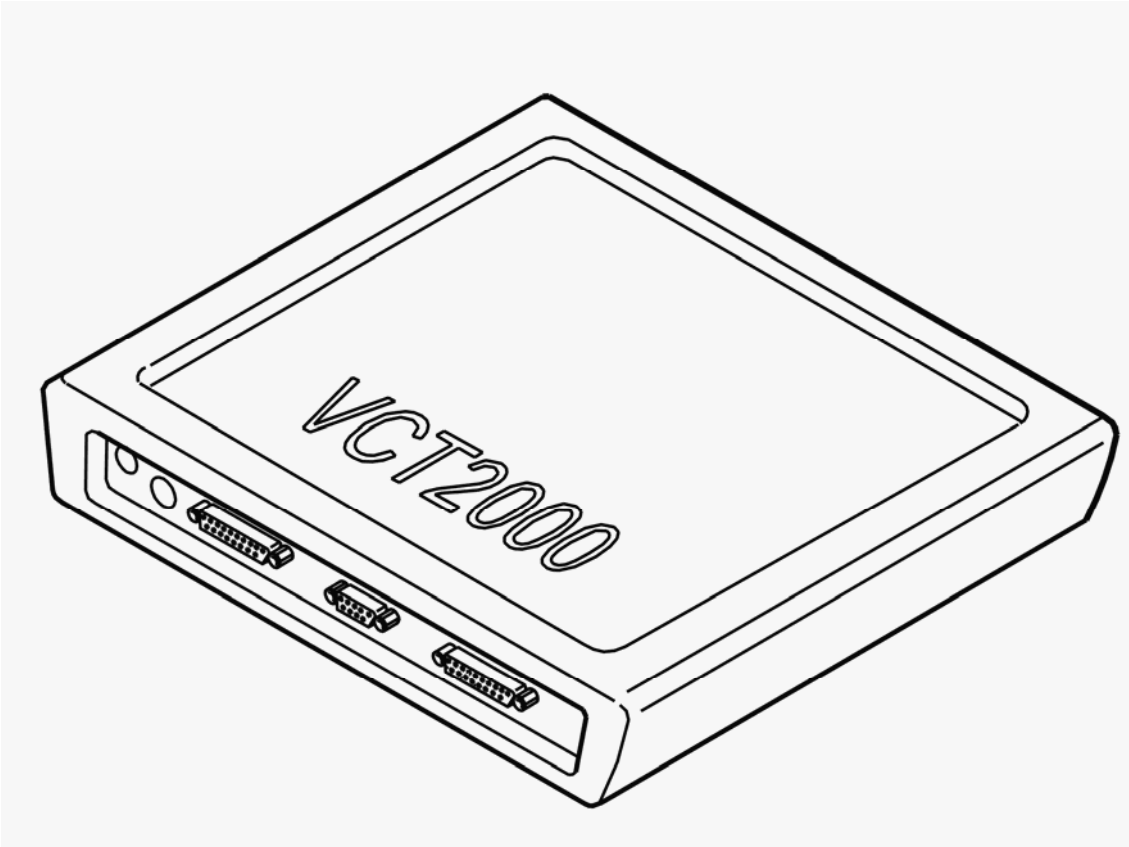


Fig. 432: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was diagnostic trouble code (DTC) TCM-002F stored?

- **YES**

  Refer to **REPLACING A FAULTY TRANSMISSION**

- **NO**

  OKAY: Troubleshooting has been completed.

REPLACING TRANSMISSION CONTROL SYSTEM

Replace the transmission control system:

- For removal, see **CONTROL SYSTEM/VALVE HOUSING, REMOVING**
- To install, see **CONTROL SYSTEM / VALVE HOUSING, INSTALLING** .

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

CHECKING THE WIRING

HINT: 2 breakout boxes can be used to make fault-tracing easier.

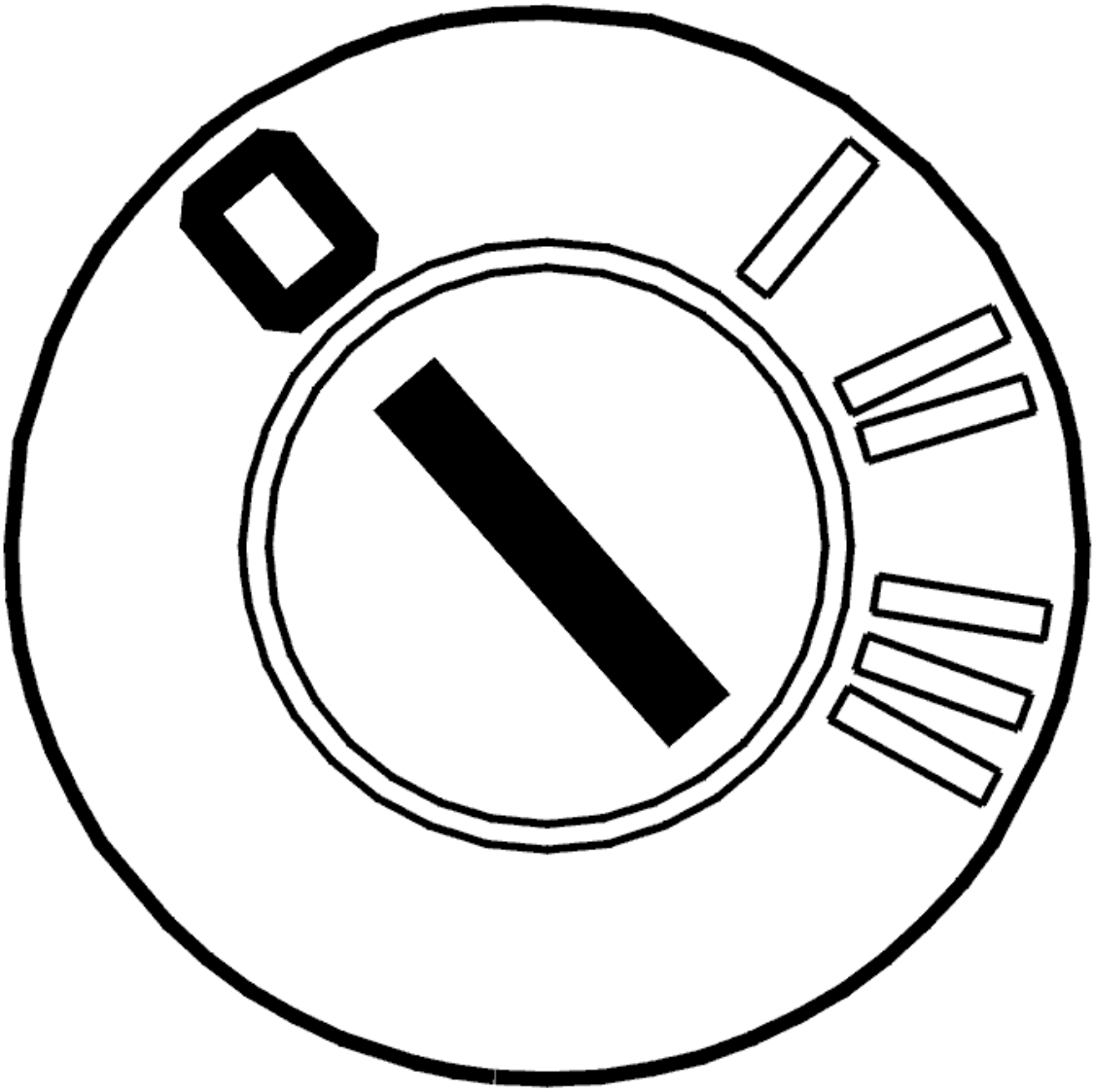


Fig. 433: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

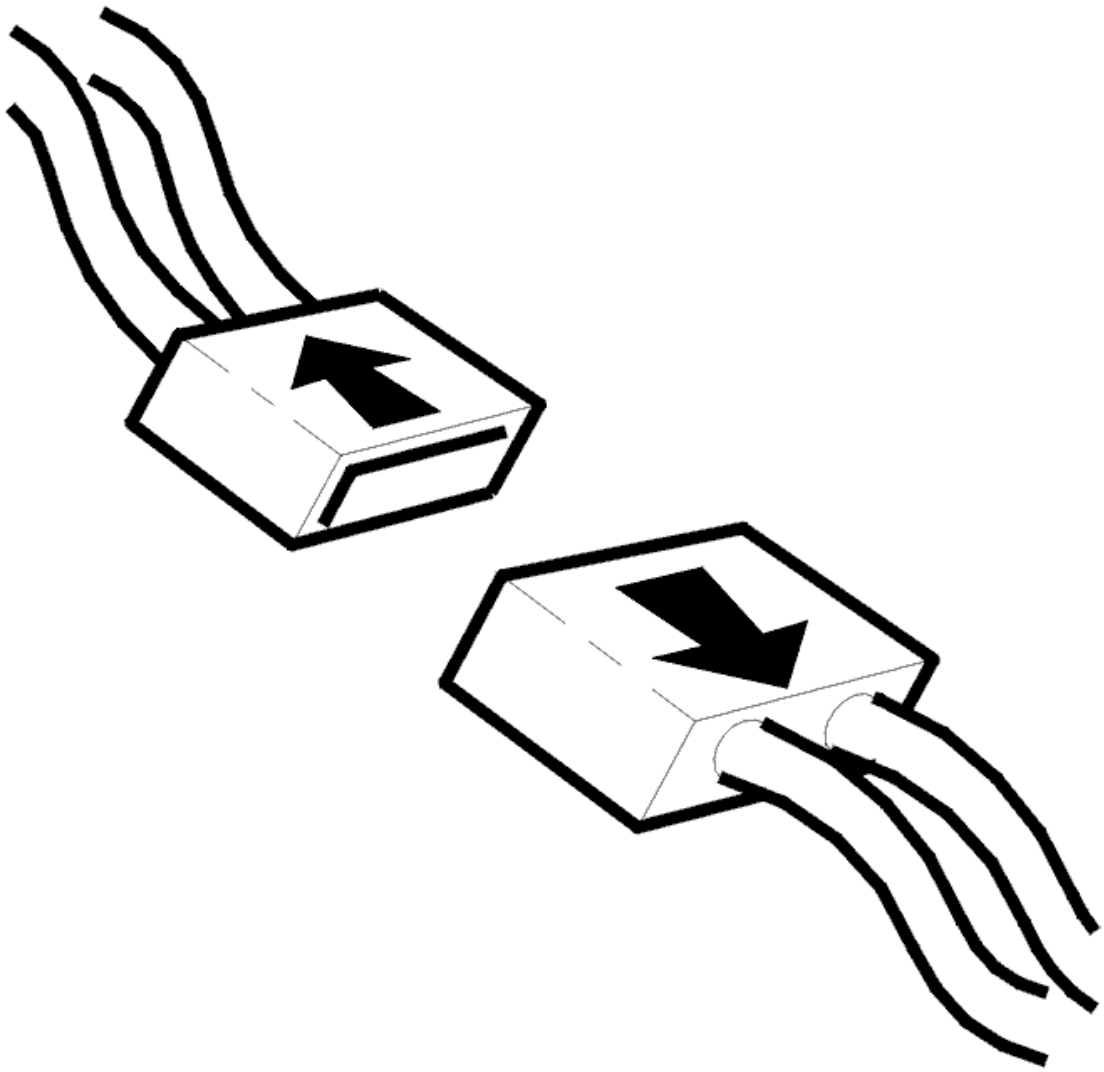


Fig. 434: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

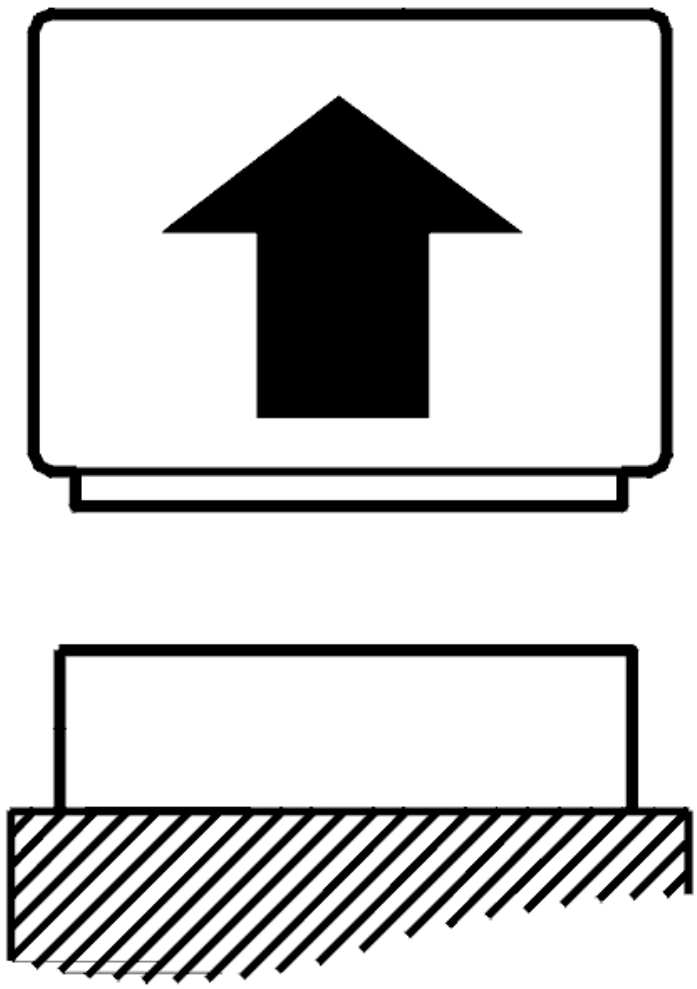


Fig. 435: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box
- Disconnect the control module.
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side).

  Check the cable between control module terminal #51 (#A51) and transmission connector (control module side) terminal #T (#A17). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

  Check the cable between control module terminal #53 (#A53) and transmission connector (control

module side) terminal #E (#A5). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

HINT: Also check all the other power supply cables in the circuit.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

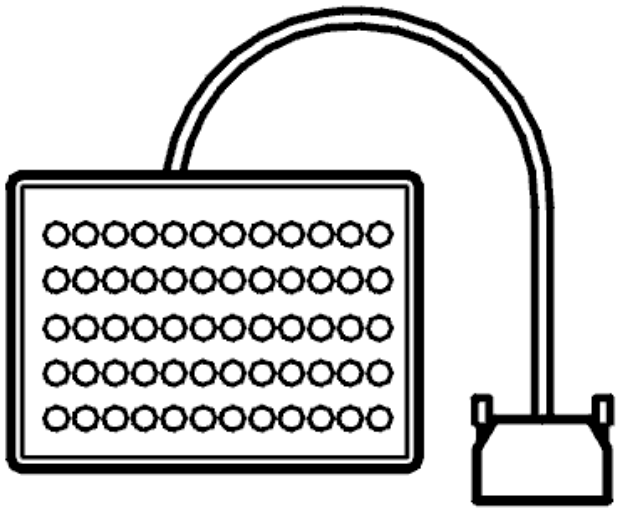


Fig. 436: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

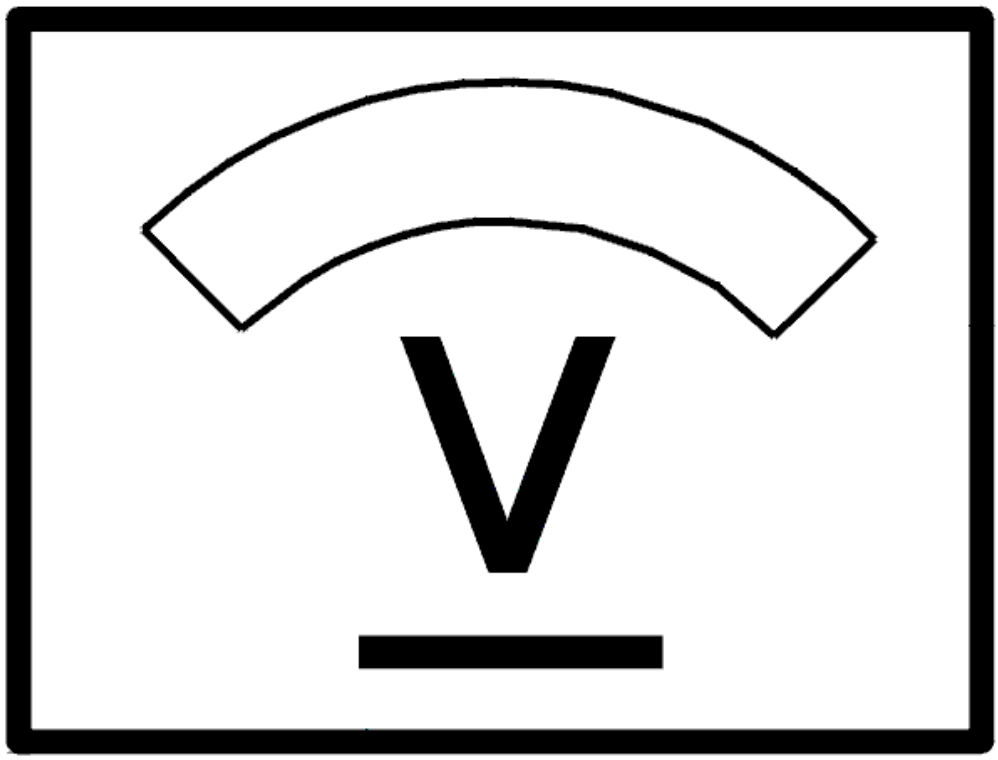


Fig. 437: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

- **NO**

  Refer to **CHECKING THE CIRCUIT FOR SOLENOID SL**

CHECKING THE CIRCUIT FOR SOLENOID SL

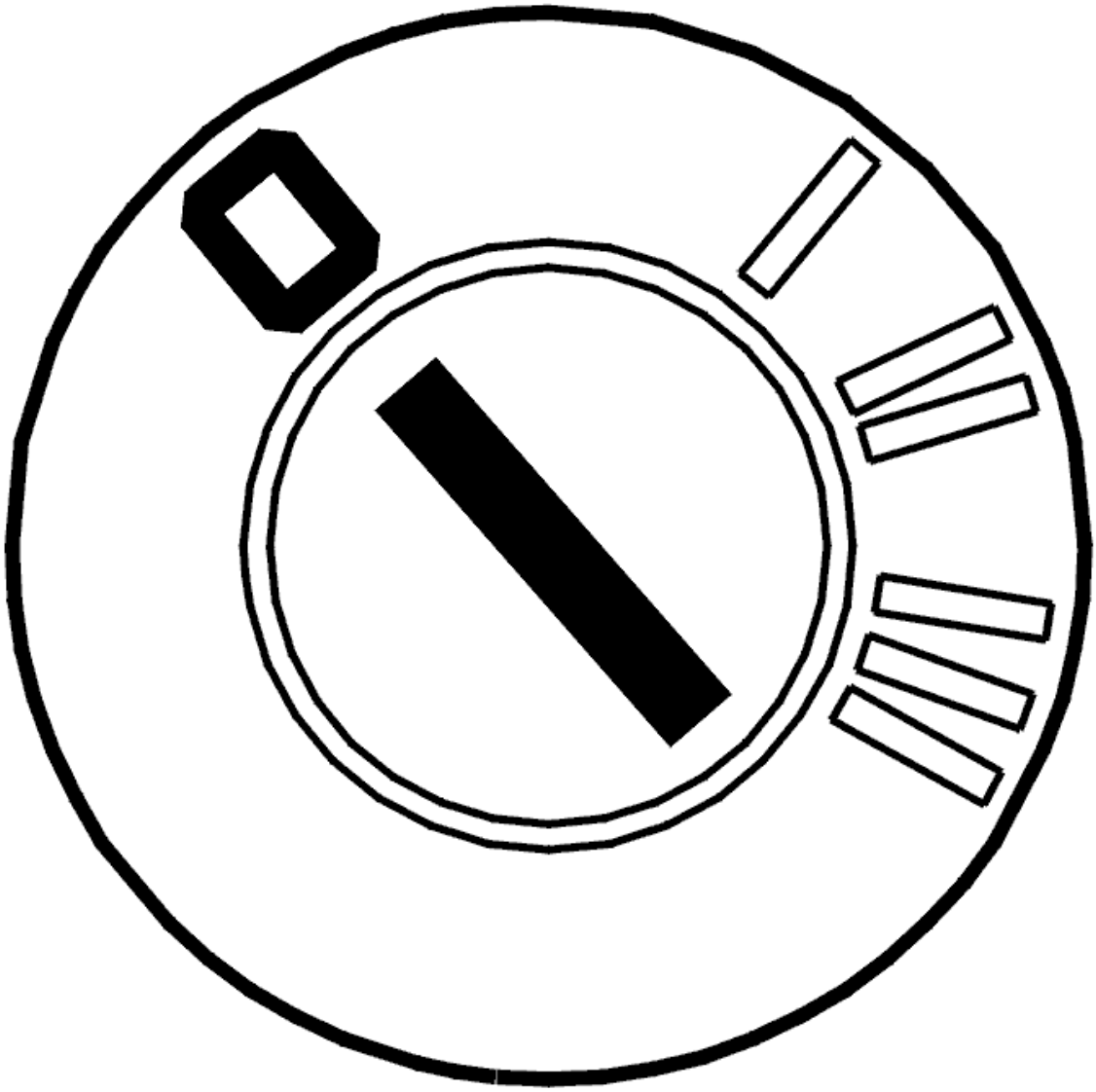


Fig. 438: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission connector terminal #T (#A17) and solenoid SL terminals #A and #E (#A5) and solenoid SL terminal #B. Check for a short-circuit to supply voltage.

  Check all the cables in the wiring harness from the transmission connector to the transmission components. Check for a short-circuit to each other.

  HINT: Check solenoid SL. Measure the solenoid resistance between terminals #A and #B. The resistance must be between 10 and 15 ohms.

  Remedy as necessary.

Other information:

- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** . To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To replace solenoid SL, see **SOLENOID LOCK-UP FUNCTION, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

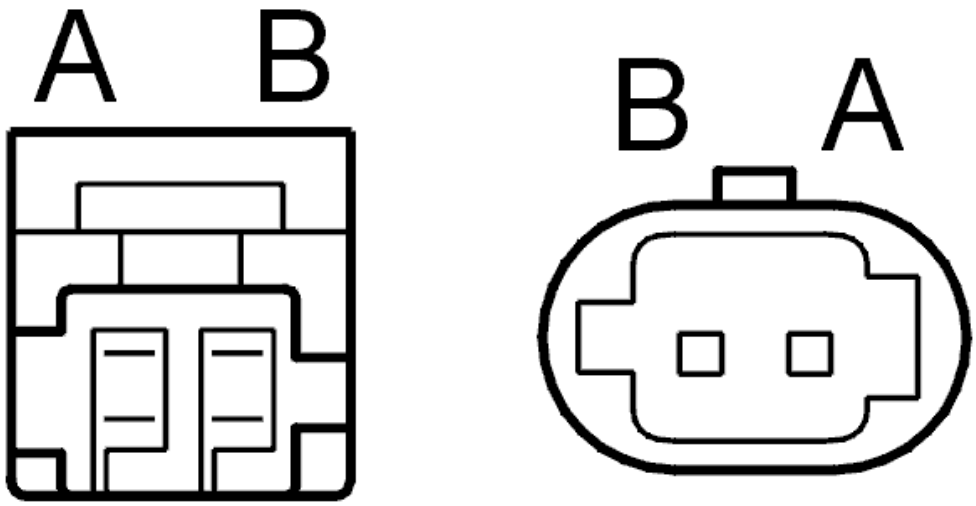


Fig. 439: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

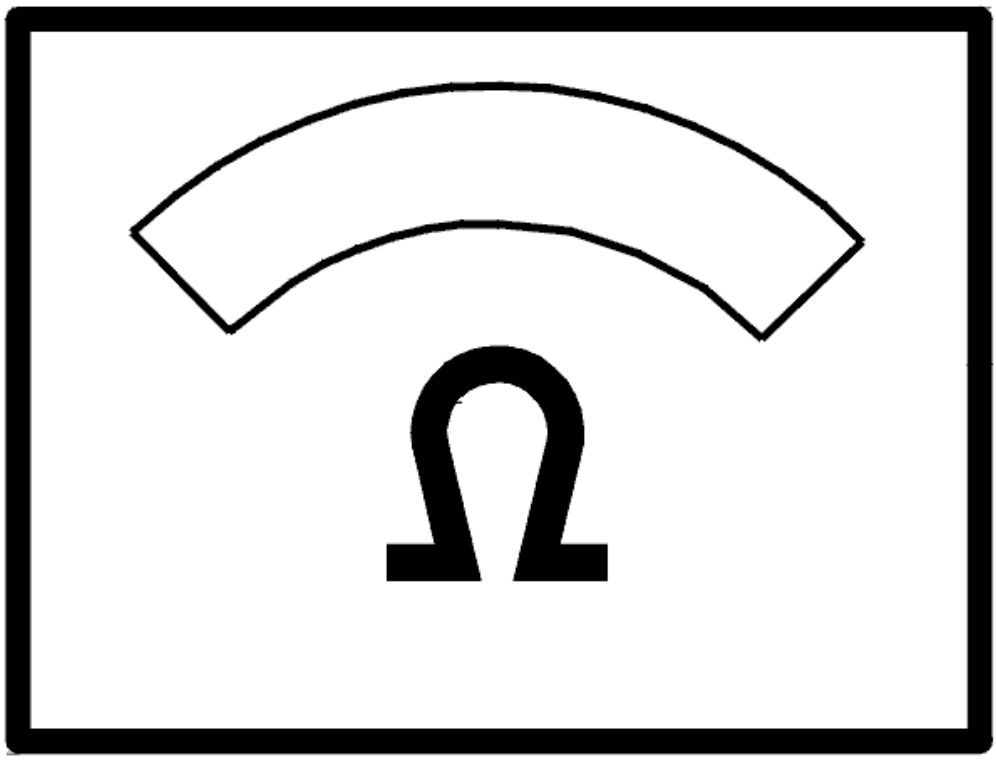


Fig. 440: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

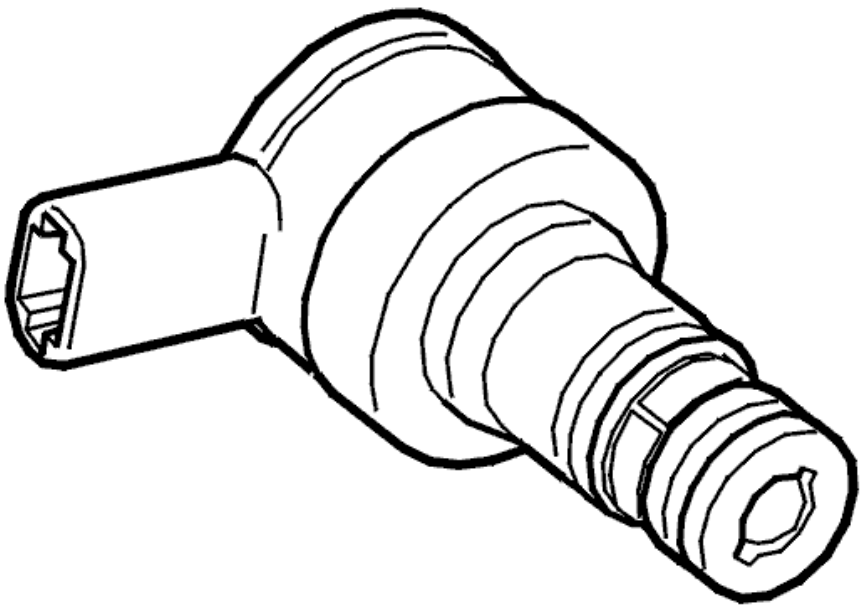


Fig. 441: Identifying Lock-Up Solenoid, SL
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

CHECK THE QUALITY OF THE TRANSMISSION OIL

CHECK THE QUALITY OF THE TRANSMISSION OIL

NOTE: **The transmission fluid quality is extremely important for transmission function. Therefore it is imperative that this is correct.**

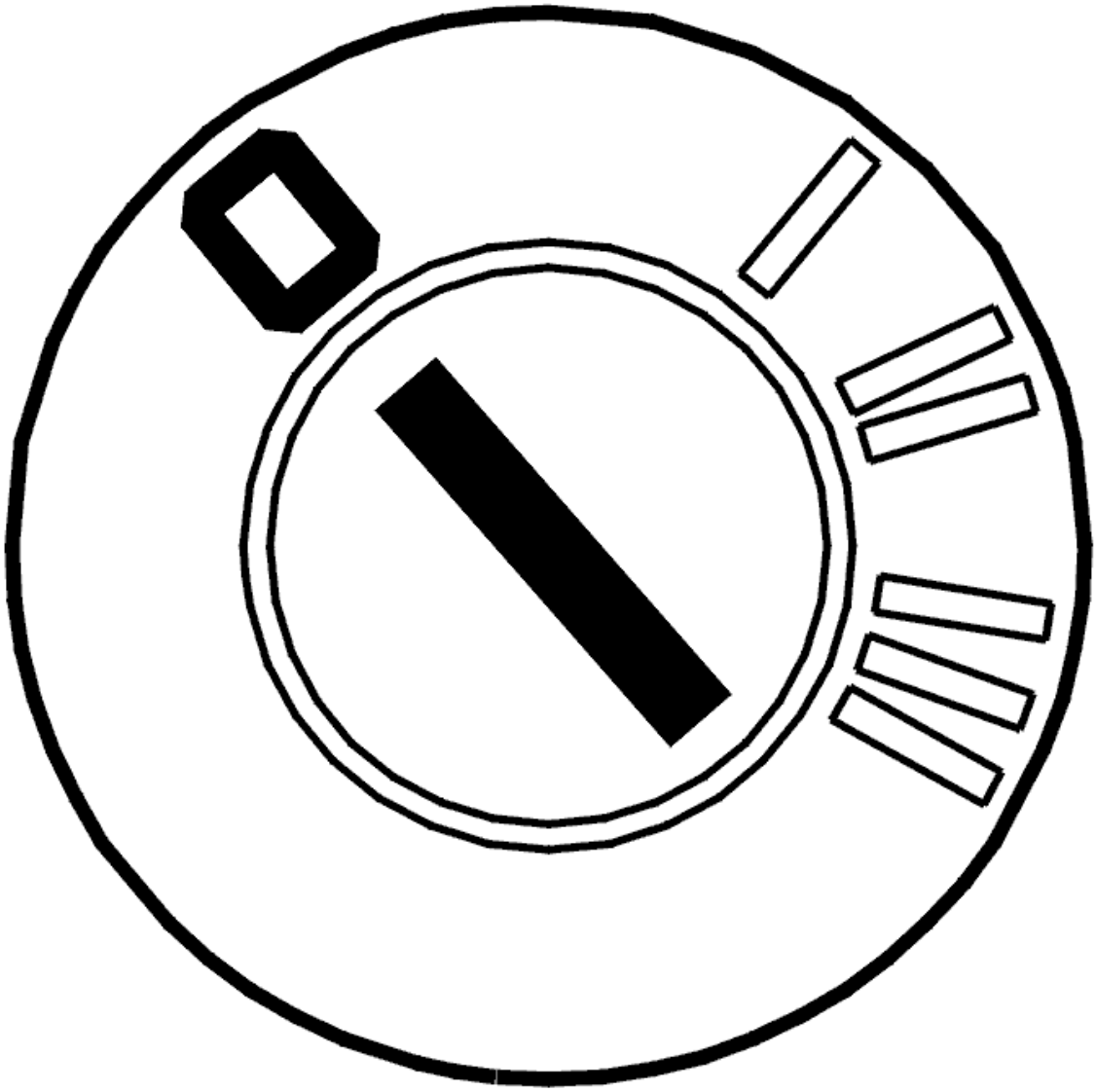


Fig. 442: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission oil quality. Take a sample using the dip stick.

  - Replace the transmission fluid if it smells burnt
  - Replace the fluid and filter if the transmission fluid contains particles
  - Check if there is oil or an oil film in the expansion tank. Oil in the expansion tank indicates leakage from the transmission oil cooler which is positioned in the cooler unit.

  NOTE: The transmission oil is red and must not be confused with black engine oil.

- If the transmission fluid is cloudy or pink, it is contaminated with coolant. In such cases the transmission must be replaced. For checking coolant in transmission oil, see **CHECKING FOR COOLANT IN THE OIL**

  When replacing the transmission, the cooler unit, including the additional cooler must be replaced if installed. Replace the hoses between the cooler and the transmission.

Other information:

- To replace the transmission fluid and filter, see **TRANSMISSION OIL / OIL FILTER, REPLACING** .

Select an option:

1. The fluid contains water

   Refer to **REPLACING A FAULTY TRANSMISSION**

2. The fluid smells burnt or contains particles

   Refer to **REPLACING A FAULTY TRANSMISSION**

3. No fault detected.

   Refer to **CHECKING THE OIL LEVEL IN THE TRANSMISSION**

CHECKING THE OIL LEVEL IN THE TRANSMISSION

CHECK THE TRANSMISSION OIL LEVEL

NOTE: The transmission fluid level is extremely important for transmission function. Therefore it is imperative that it is correct. In addition the oil level is dependent on oil temperature.

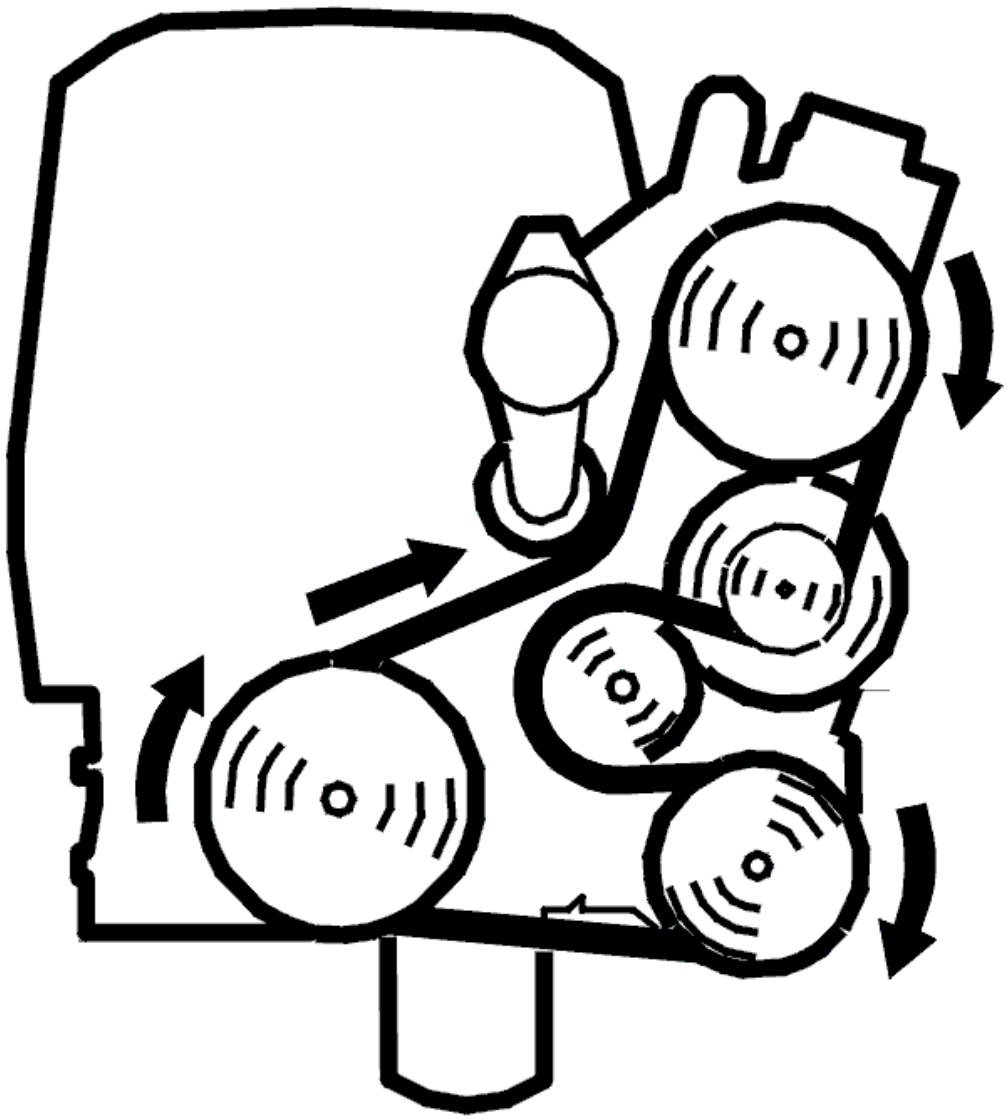


Fig. 443: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the car
- Read off the oil temperature.

When checking the gearbox oil level the oil temperature **must** be **80 °C - 90 °C** .

At the correct temperature, the oil level should be between "Min hot" and "Max hot".

Oil level

Too high: Drain the transmission fluid to the correct level
Too low: Check the transmission for leakage.

Remedy as necessary.

Other information:

- To check and adjust the oil level, see **OIL LEVEL, CHECKING** .

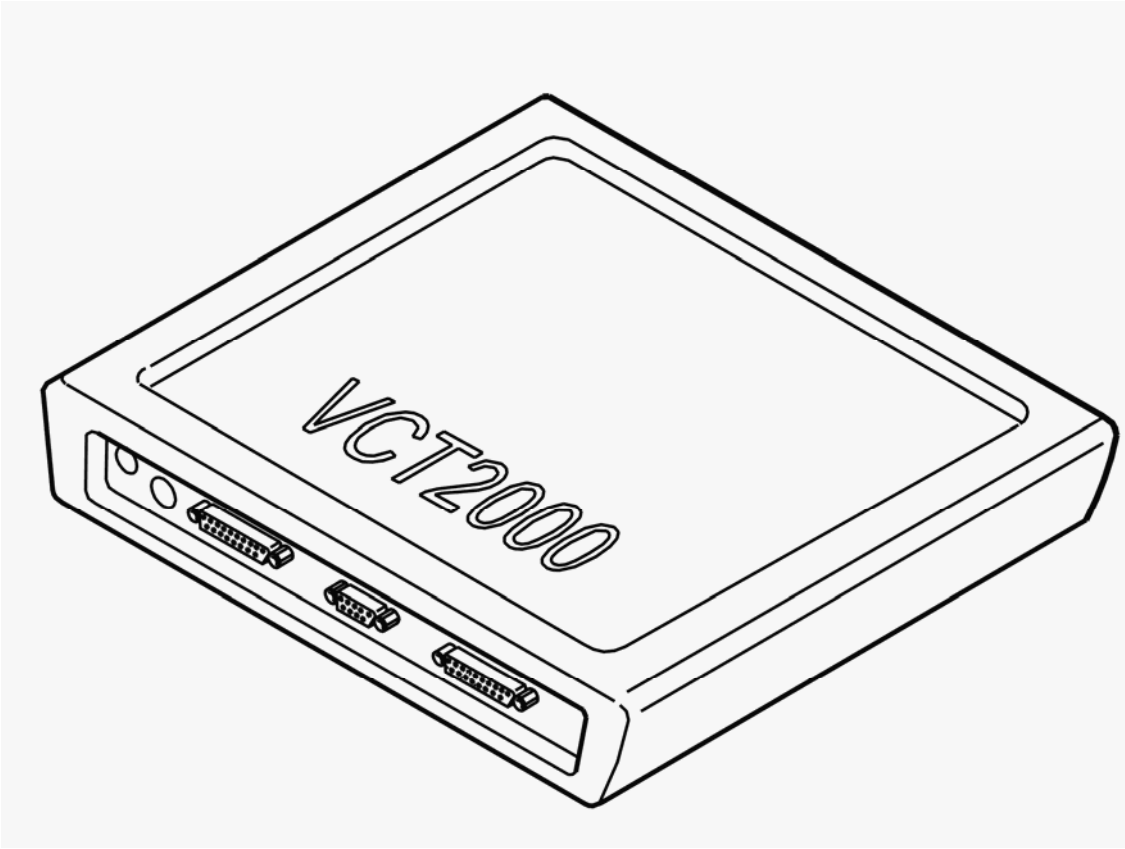


Fig. 444: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

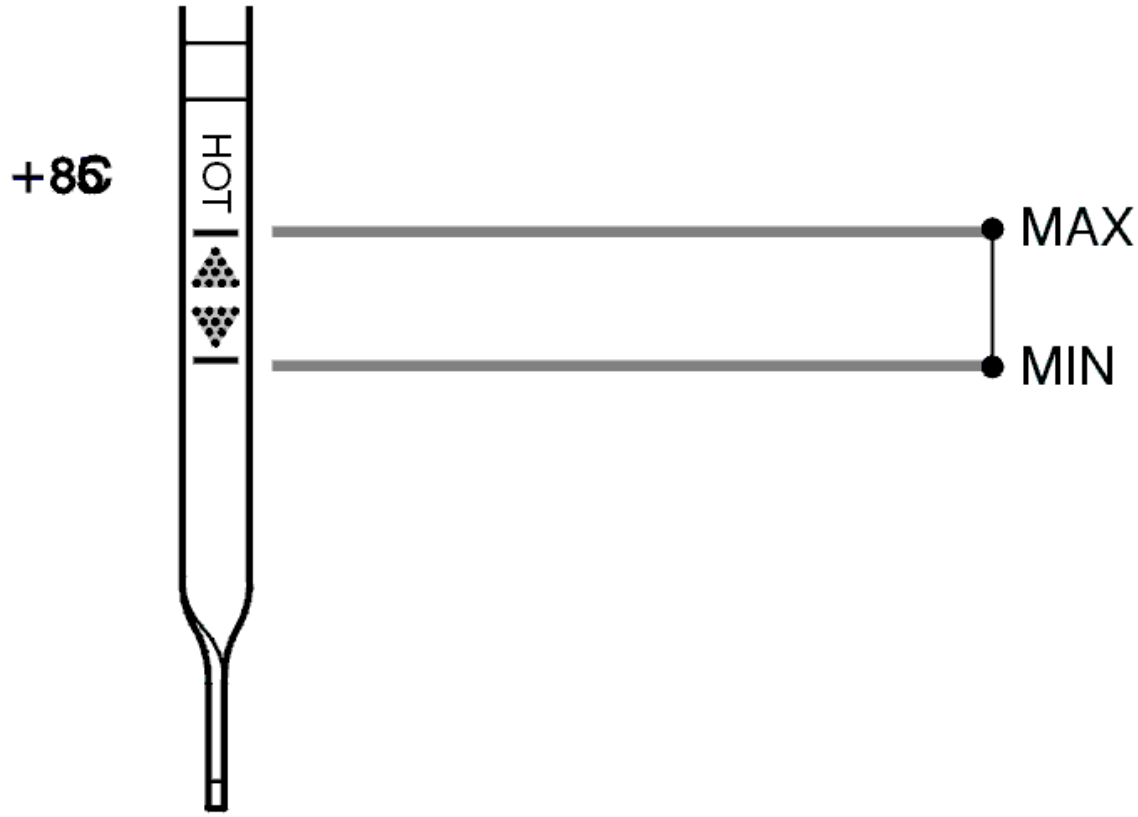


Fig. 445: Identifying Oil Level / Temperature
Courtesy of VOLVO CARS CORPORATION

Was the transmission fluid level correct?

- **YES**

  Refer to **ERASING DIAGNOSTIC TROUBLE CODES (DTCS)**

- **NO**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is

changed when repairs are carried out to the transmission temperature sensor.

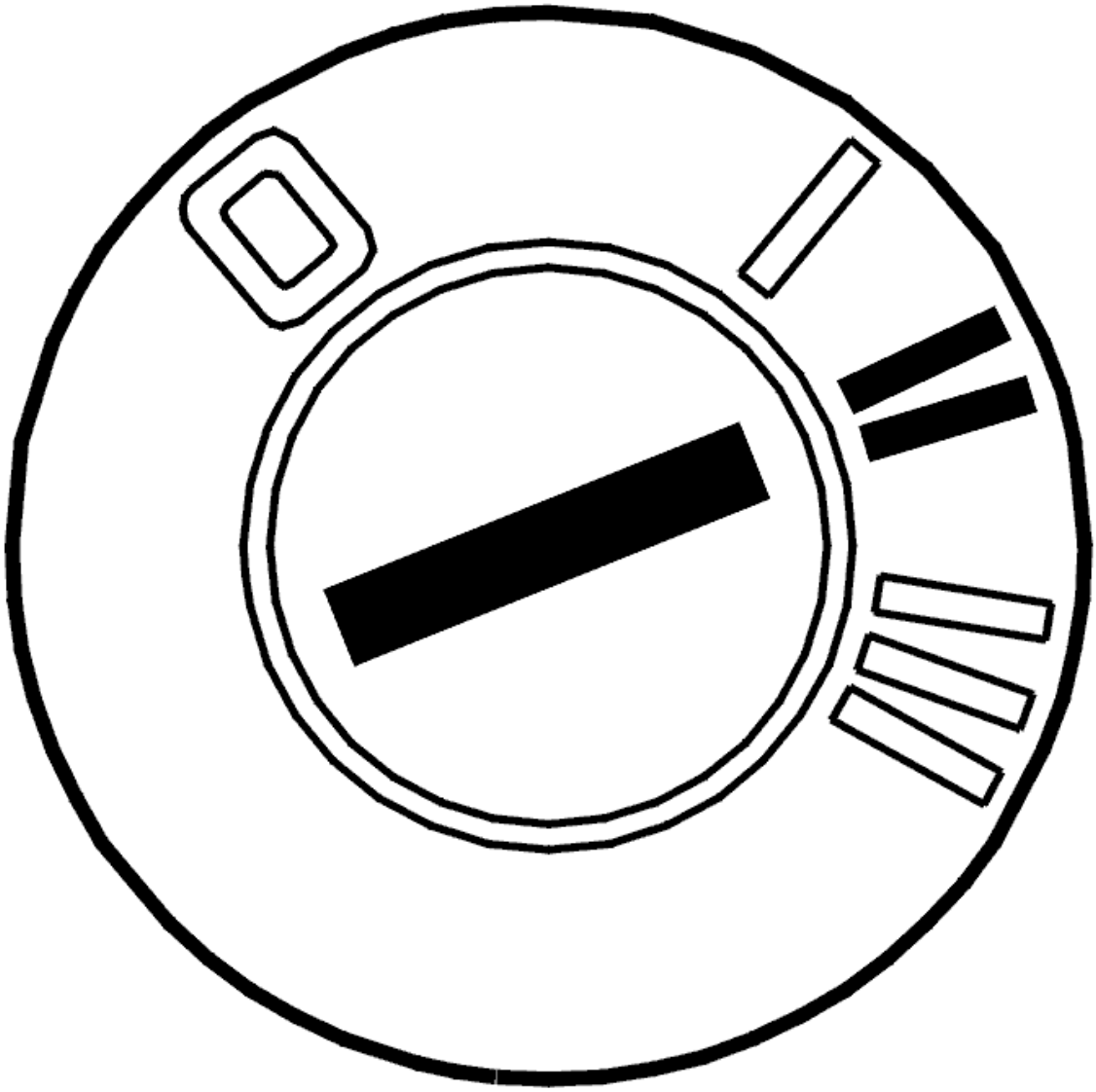


Fig. 446: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

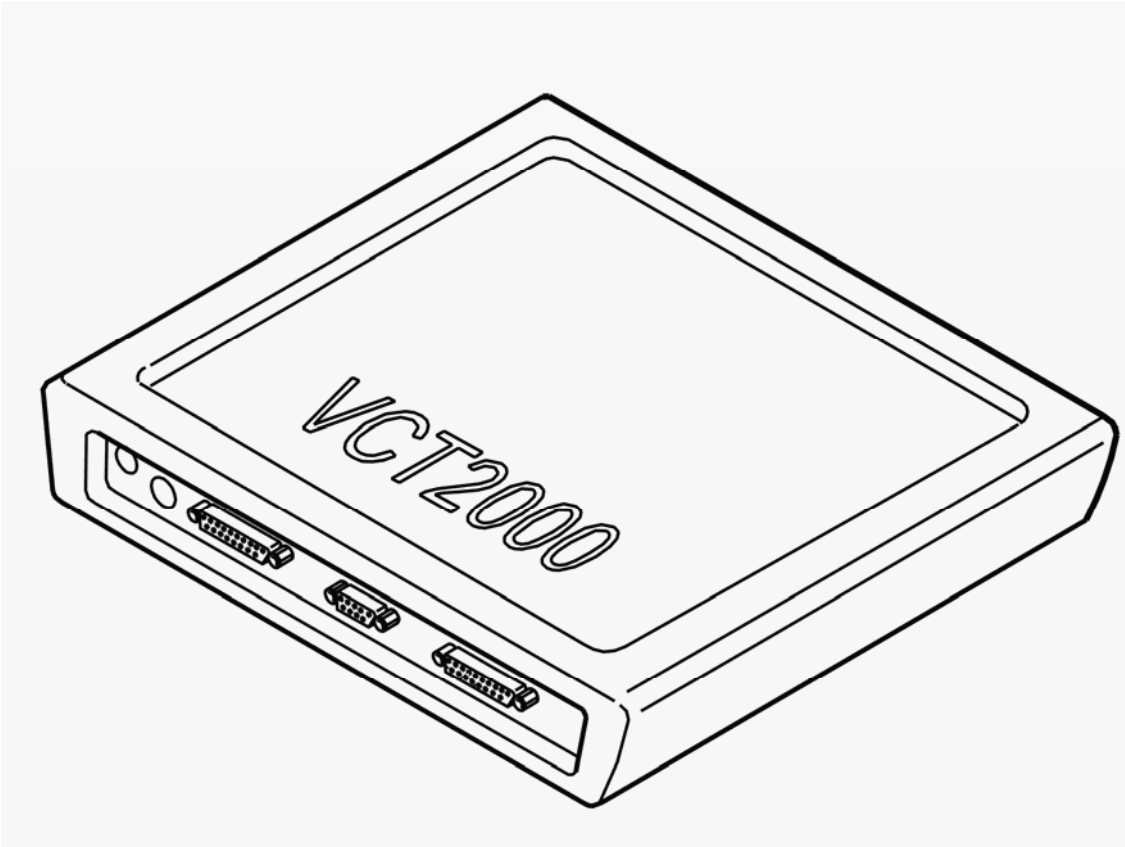


Fig. 447: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **ERASING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING THE SOFTWARE

CHECKING THE SOFTWARE

NOTE: To carry out fault-tracing, the transmission control module (TCM) must be programmed with specific software.

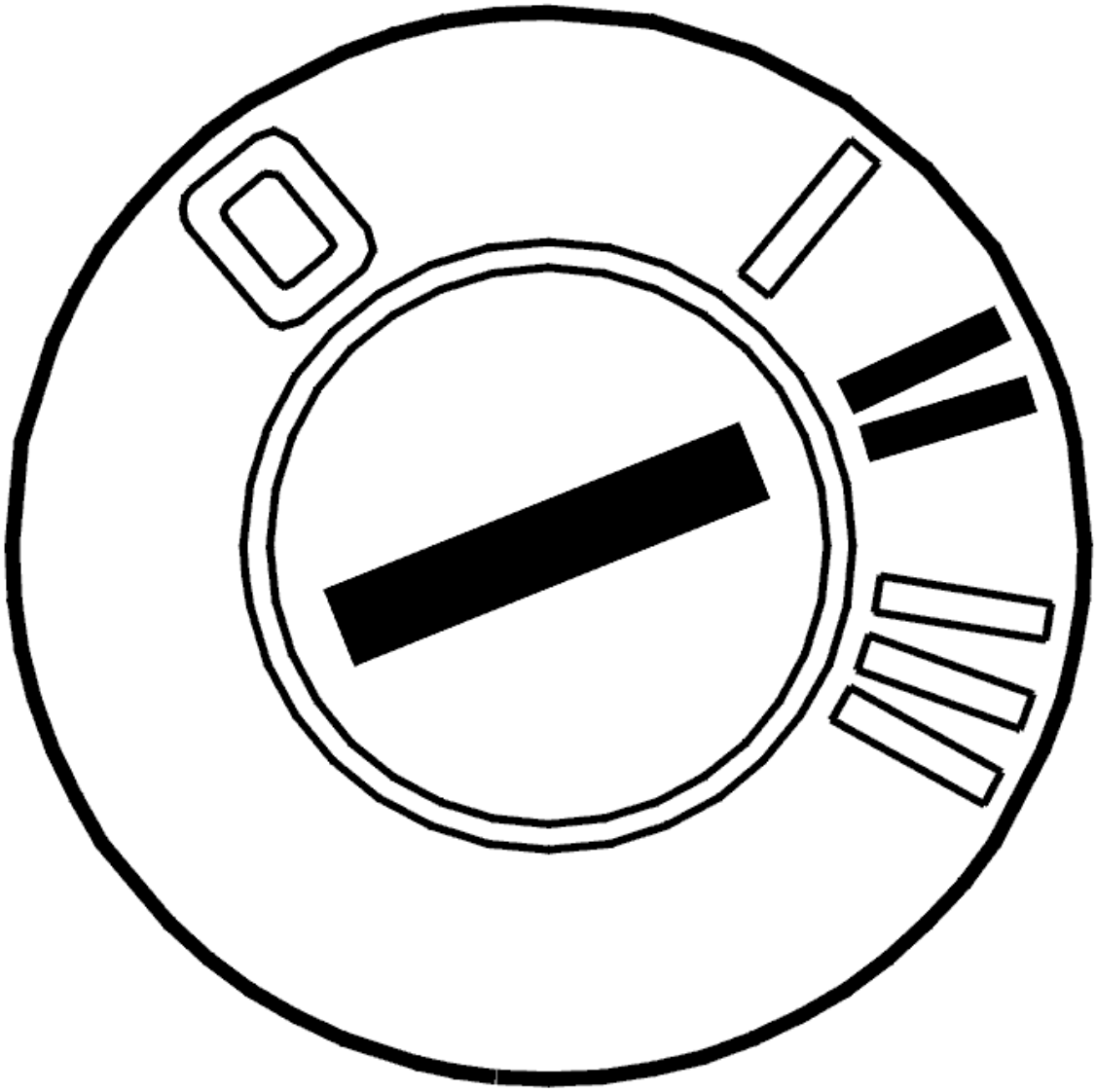


Fig. 448: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the control module diagnostic number.

  Check the read off diagnostic number against the diagnostic numbers given in the center table.

  If the diagnostic number is included in the table, the control module must be programmed with the latest software.

  See the technical journal for information about the most recent software.

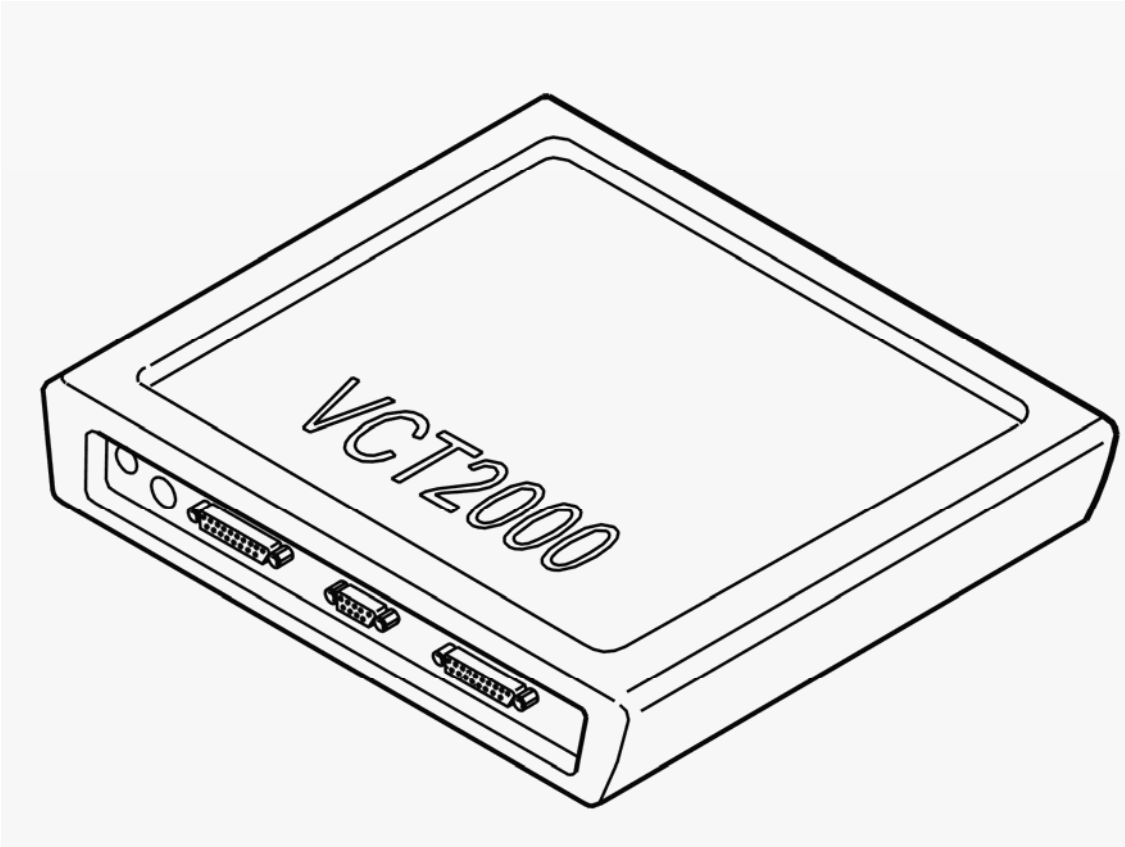


Fig. 449: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

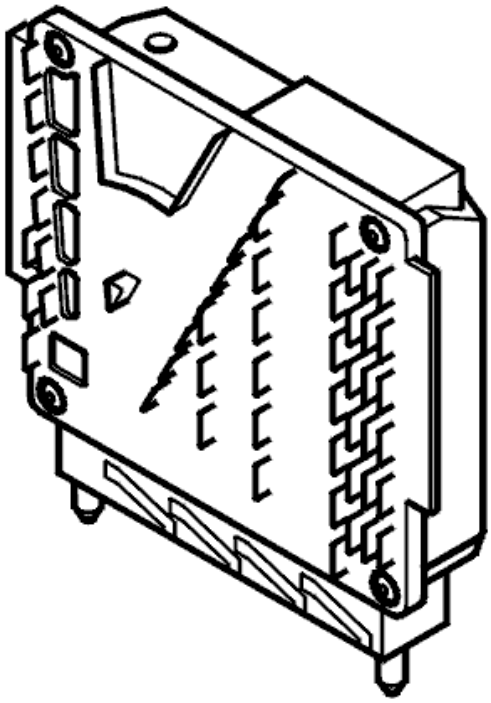


Fig. 450: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

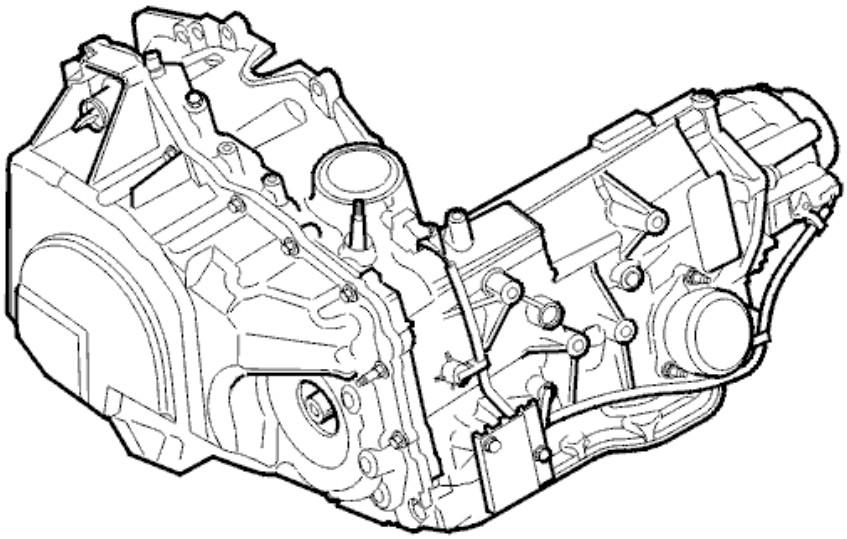
- **Continue**

  Refer to **CONNECTING THE T PIPE**

REPLACING A FAULTY TRANSMISSION

REPLACING A FAULTY TRANSMISSION

Replace the transmission. For AW50AWD 2003- see **TRANSMISSION, REMOVING** or For AW55-50 2004- see **TRANSMISSION, REMOVING** and For AW50AWD 2003- see **TRANSMISSION, INSTALLING** or For AW55-50 2004- see **TRANSMISSION, INSTALLING** .



P2X

43017210 ©VOLVO

Fig. 451: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

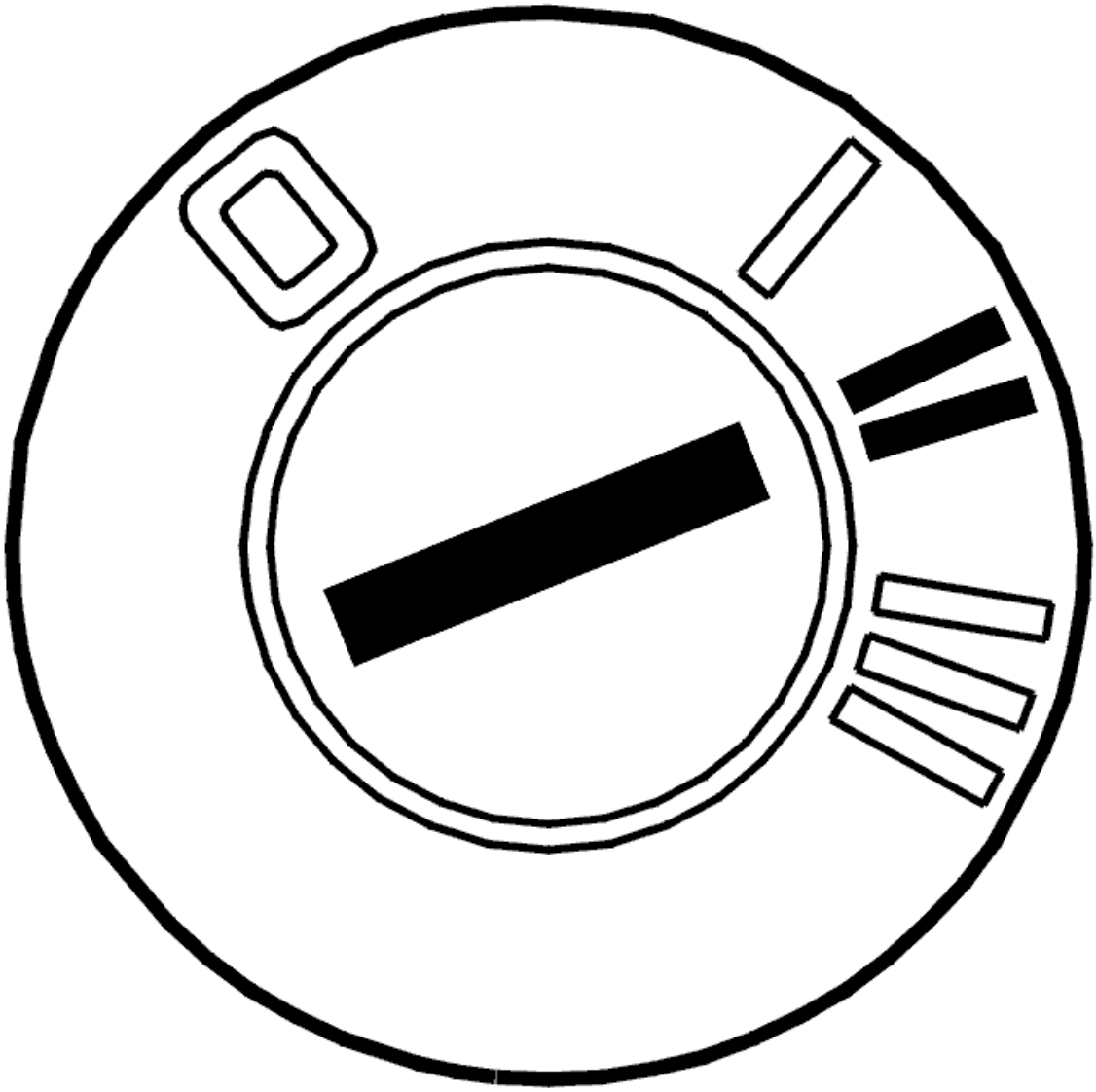


Fig. 452: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

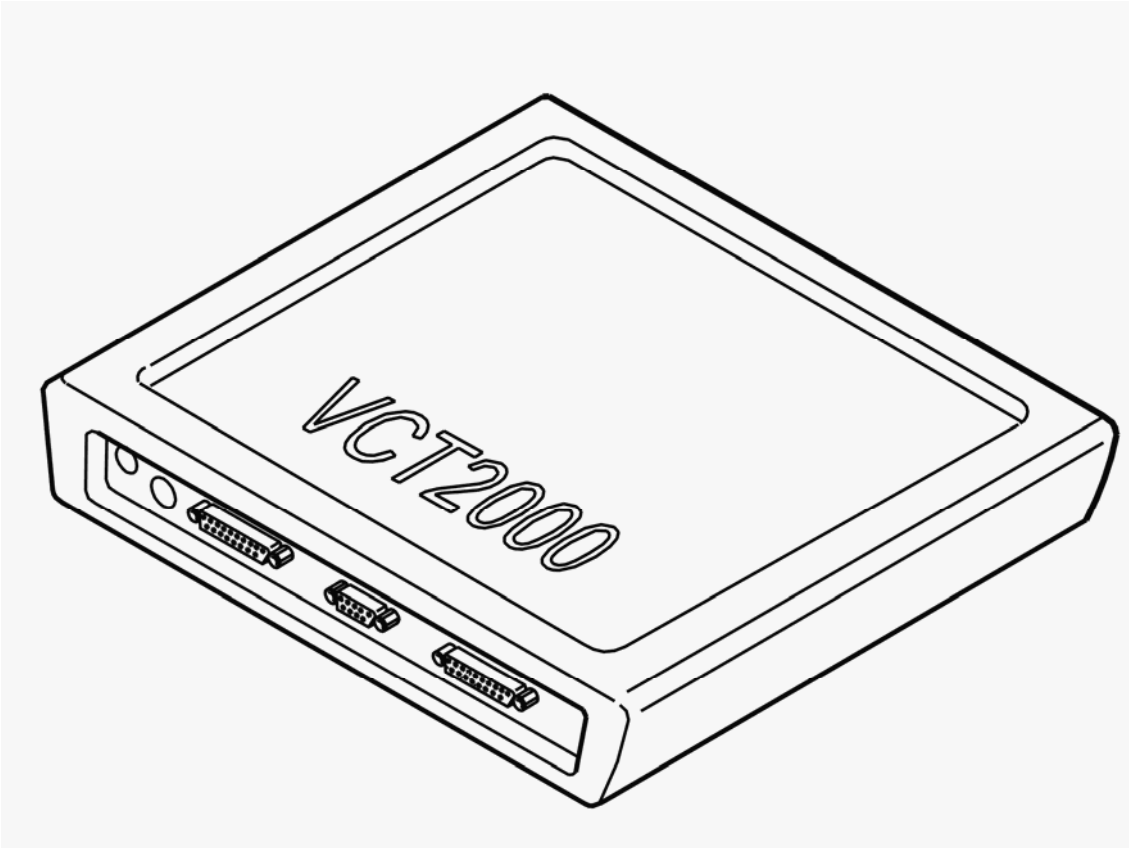


Fig. 453: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

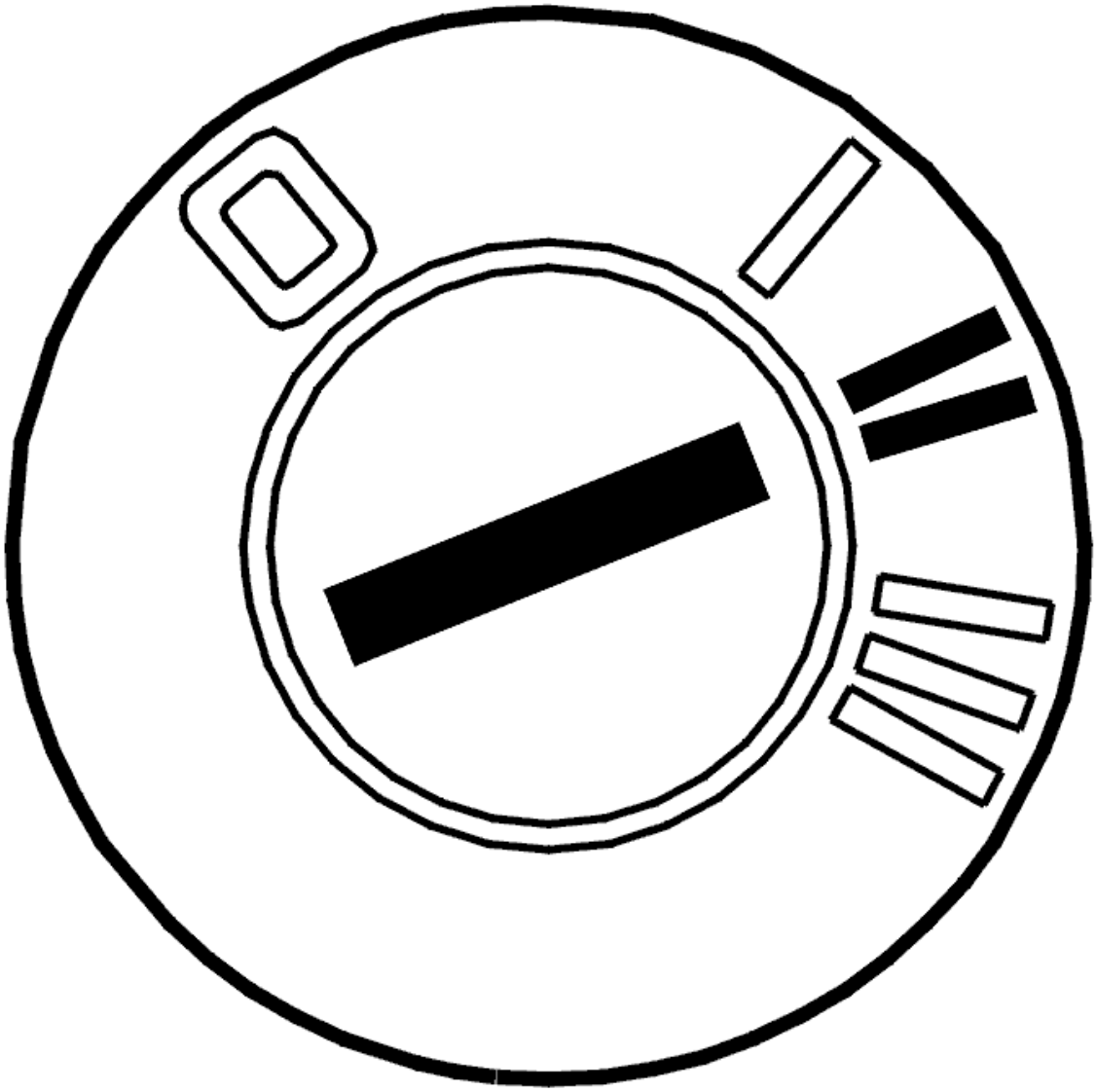


Fig. 454: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-002F are stored, these must be fault-traced and remedied after this fault-tracing is completed.

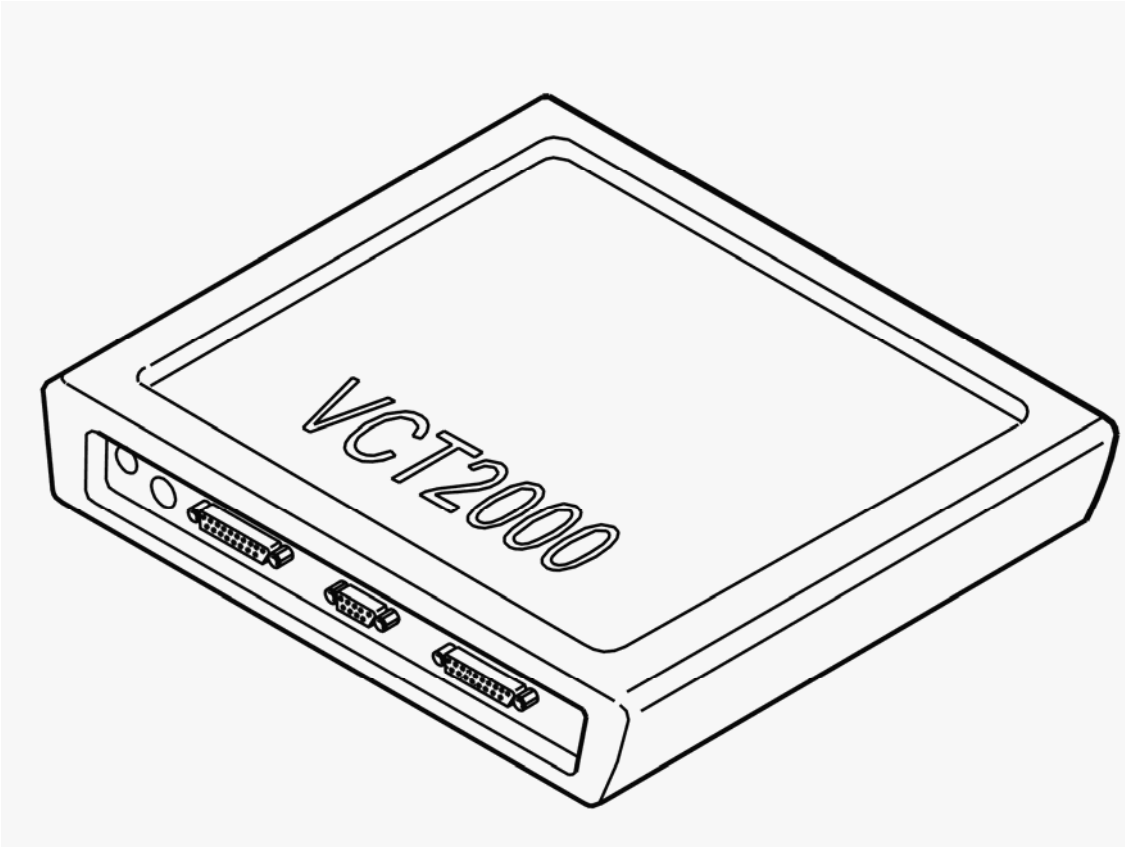


Fig. 455: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **ERASING DIAGNOSTIC TROUBLE CODES (DTCS)**

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

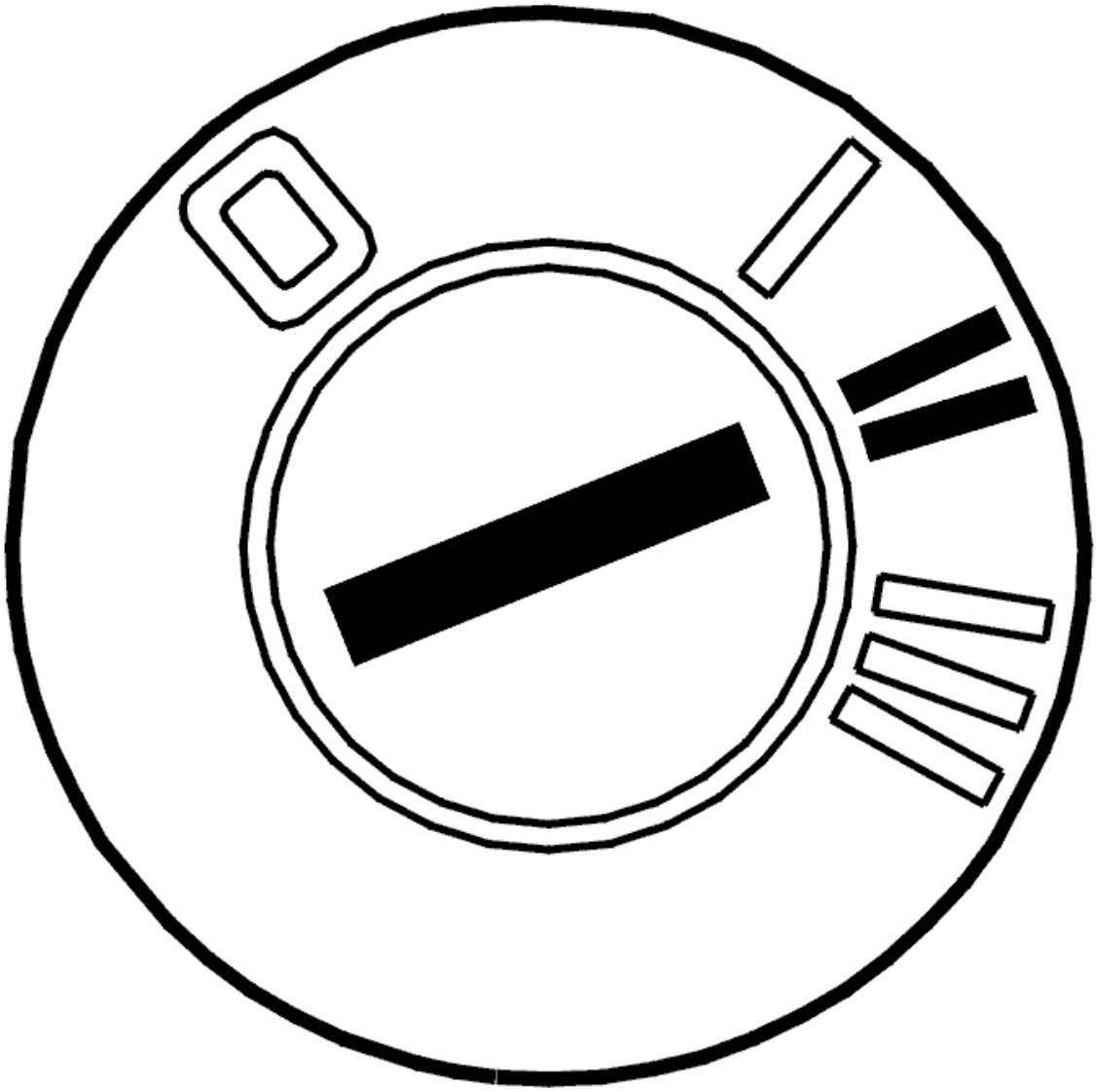


Fig. 456: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

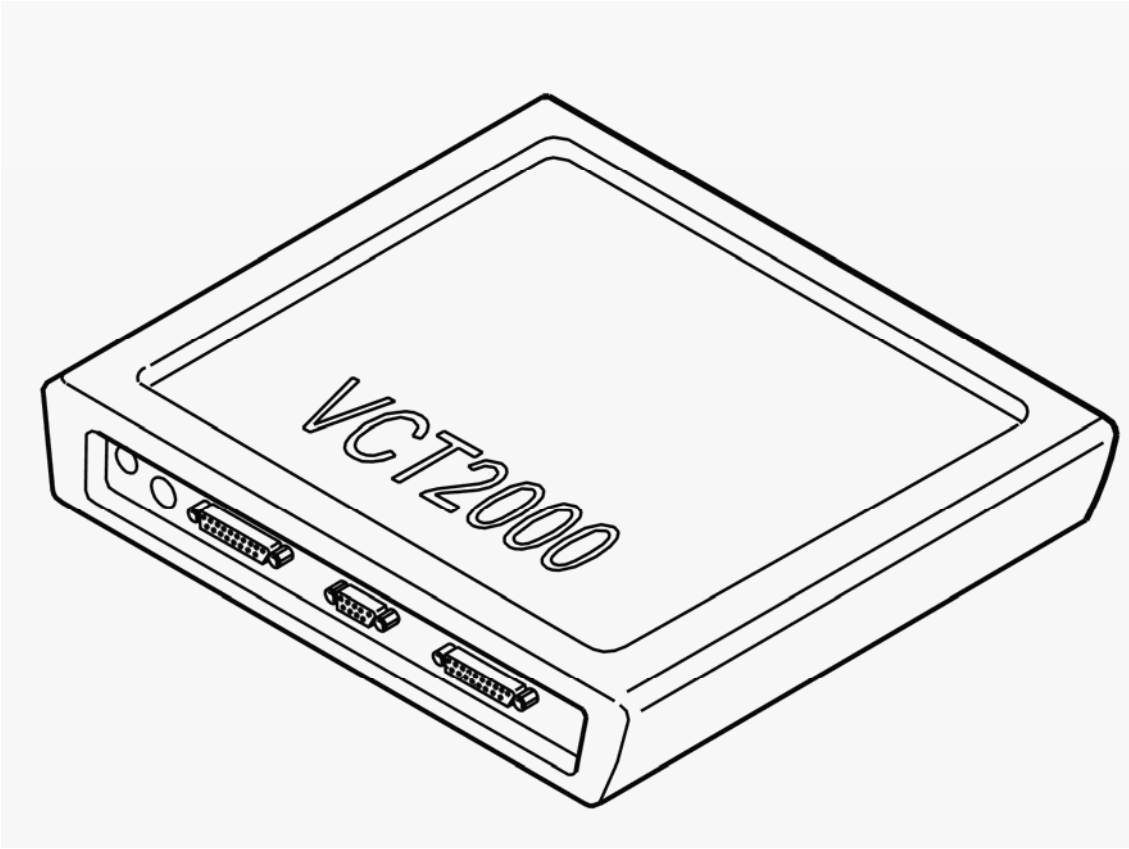


Fig. 457: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE SOFTWARE**

TEST DRIVING

NOTE: **Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.**

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

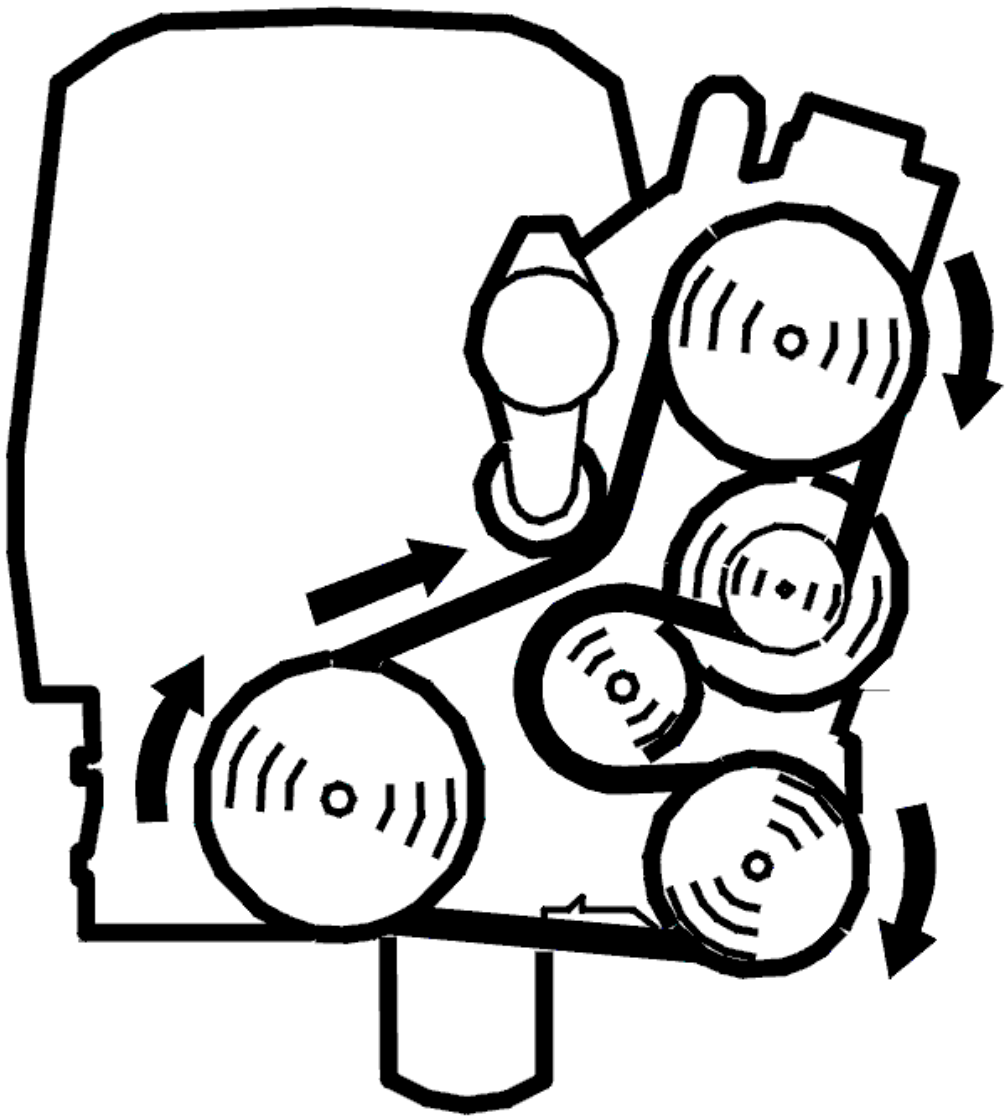


Fig. 458: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect the VIDA station. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission should be at operating temperature,

approximately 80-90°C.

Shift the gear selector to position 3 (third gear with geartronic). Carefully accelerate to 85 km/h. Maintain the same speed for a few seconds. Carefully accelerate for approximately 30 seconds to increase the engine torque.

HINT: The car must be driven at an engine speed where the lock-up function is normally fully activated and not slipping. The following gear positions and speeds are also possible:

- 120 km/h gear position D
- 85 km/h gear position 3.

Criteria for diagnostic trouble code (DTC):

- The transmission fluid temperature must exceed 30°C
- No shifting during the evaluation period
- Positive engine torque (no engine braking)
- Gear selector in position D, 3 or 2 (4T65EV).

  Gear selector in Geartronic position and gears 4, 3 or 2 (4T65EV-GT)

- Speed 85 km/h for at least 30 seconds.

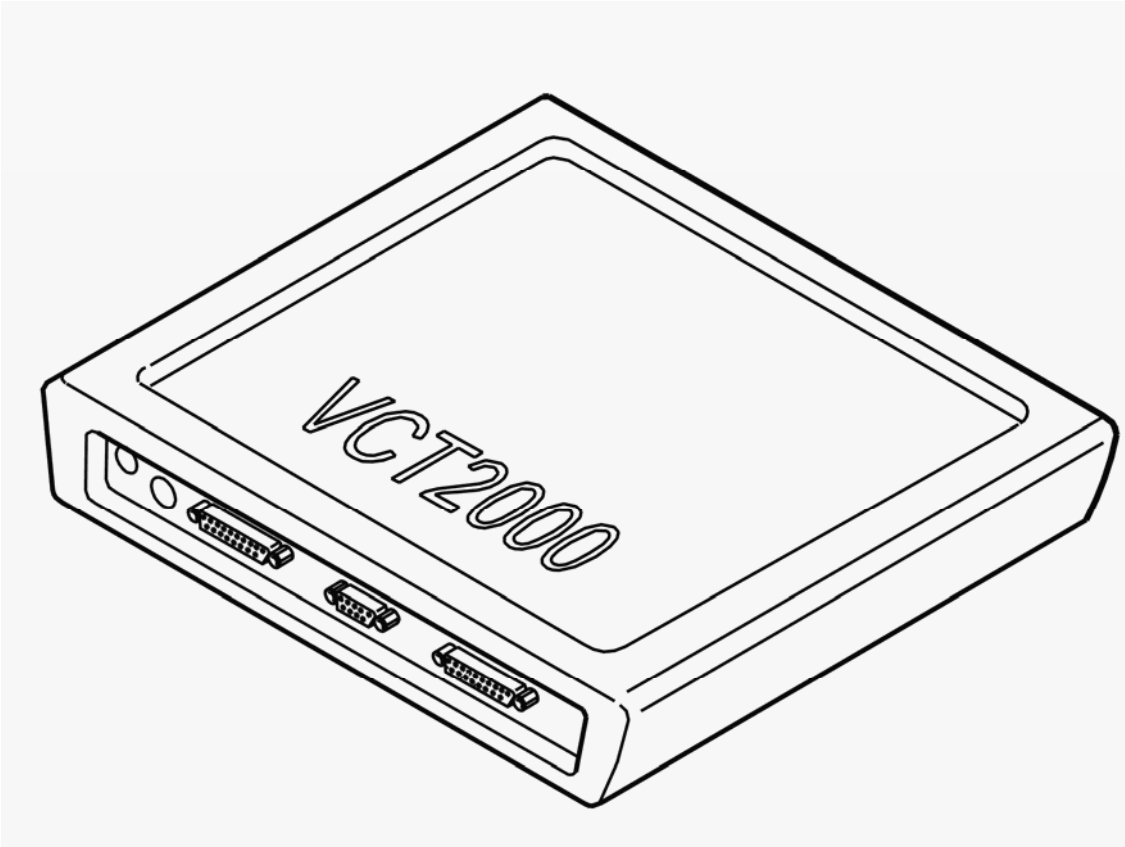


Fig. 459: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

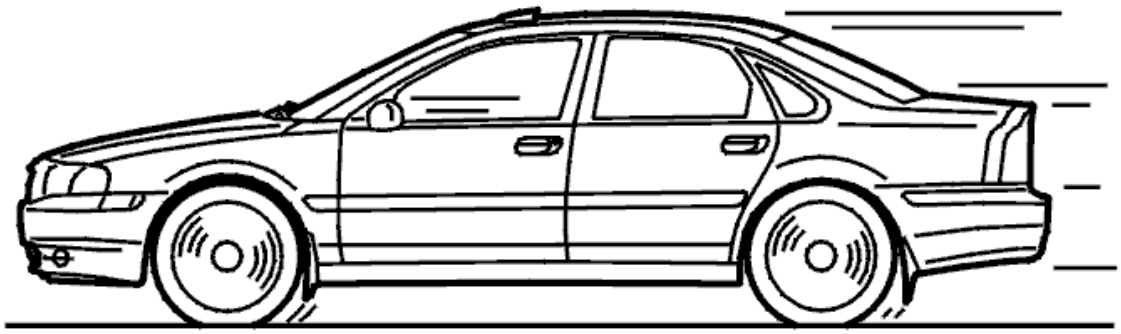


Fig. 460: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

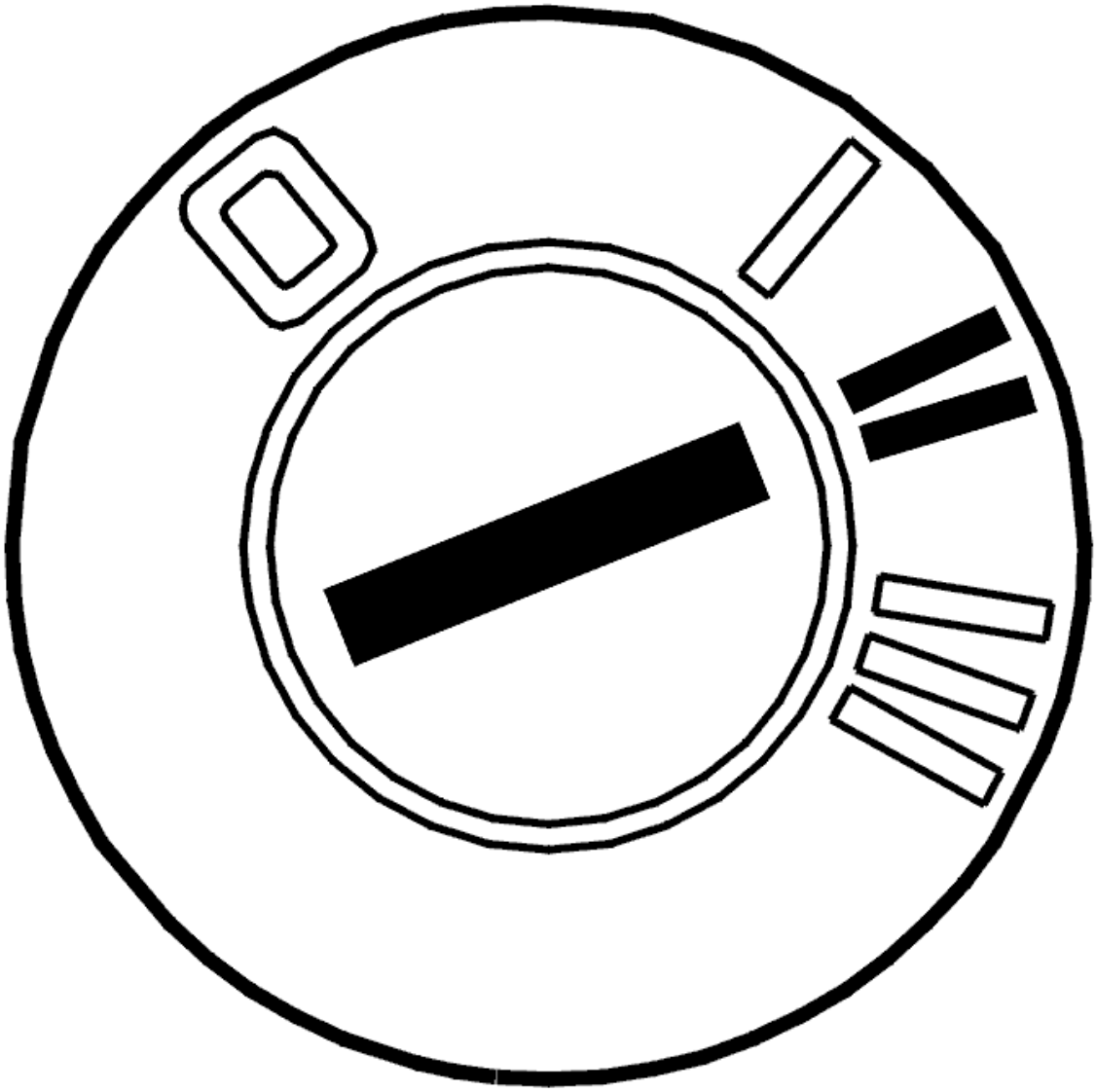


Fig. 461: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-002F are stored, these must be fault-traced and remedied after this fault-tracing is completed.

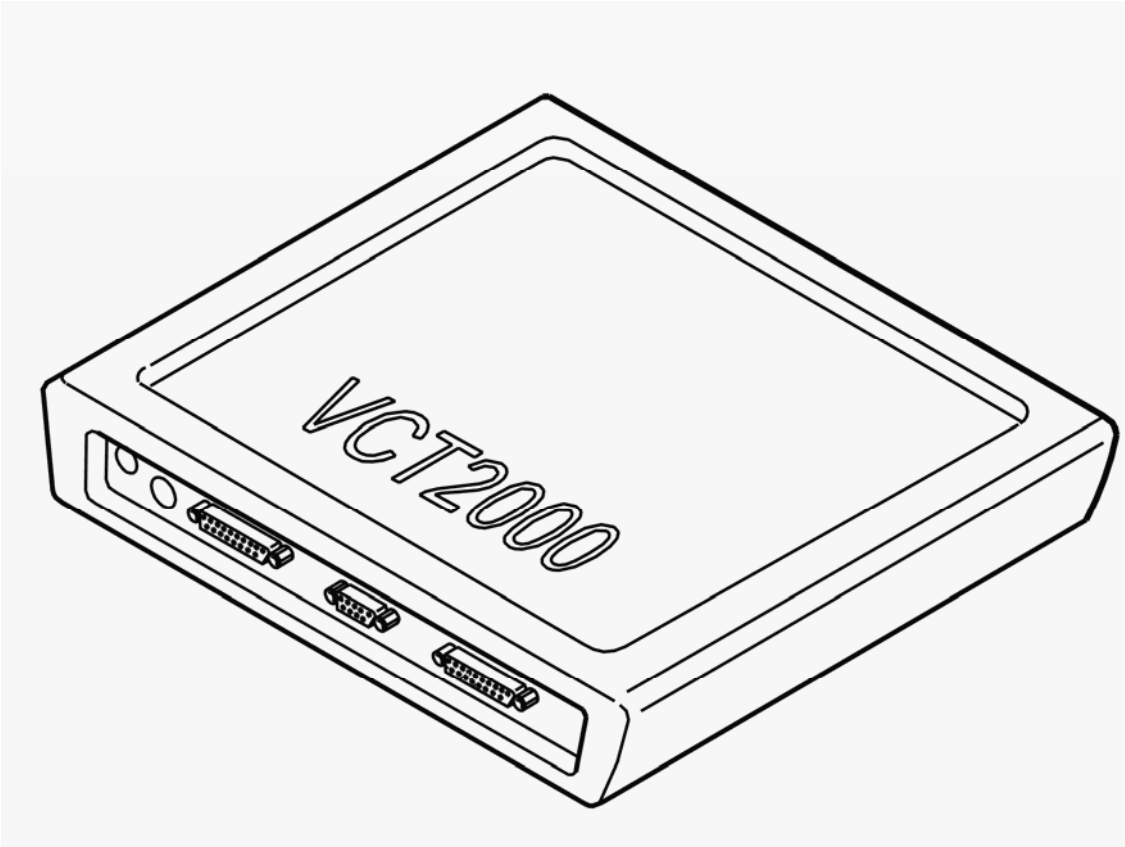


Fig. 462: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was diagnostic trouble code (DTC) TCM-002F stored?

- **YES**

  Refer to **INFORMATION**

- **NO**

  NO DTC

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

CHECKING THE SOFTWARE

CHECKING THE SOFTWARE

NOTE: To carry out fault-tracing, the transmission control module (TCM) must be programmed with specific software.

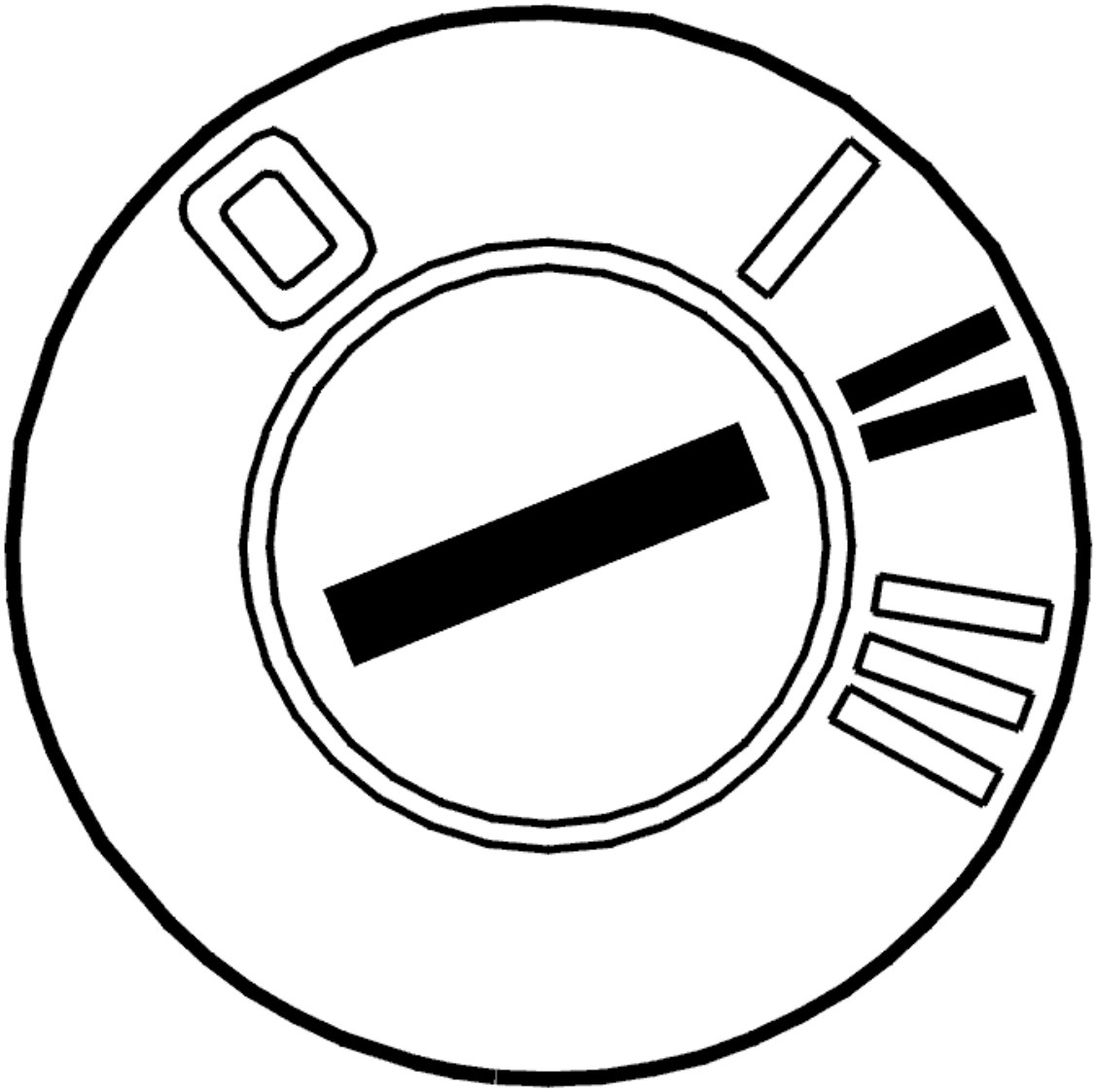


Fig. 463: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the control module diagnostic number.

  Check the read off diagnostic number against the diagnostic numbers given in the center table.

  If the diagnostic number is included in the table, the control module must be programmed with the latest software.

  See the technical journal for information about the most recent software.

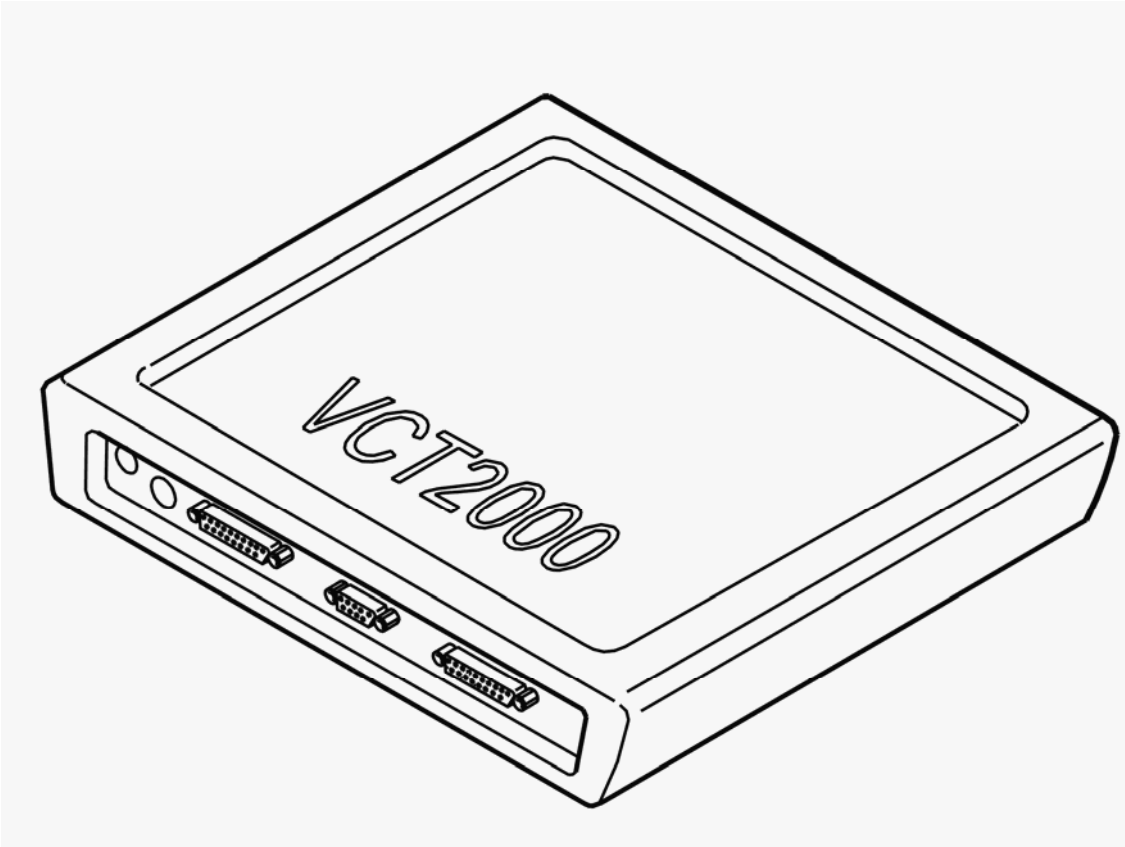


Fig. 464: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

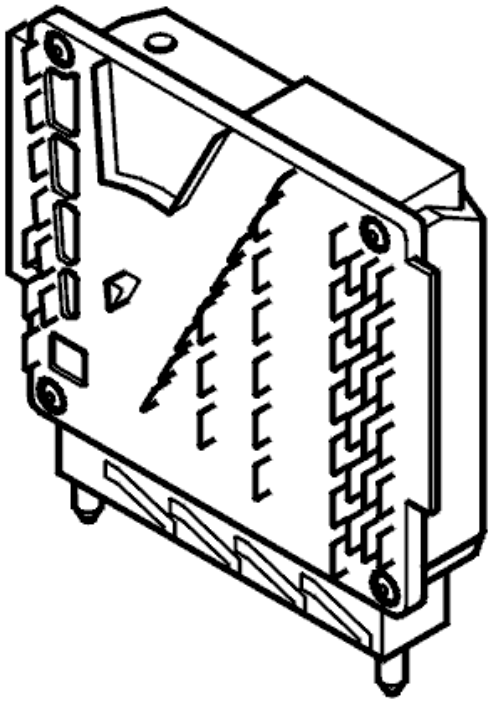


Fig. 465: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

T-PIPE, CONNECTING TO OIL COOLER

Special tools:

see **9992531**

see **9997002**

DIAGNOSTIC TESTING OF THE LOCK-UP FUNCTION IN THE CONTROL SYSTEM

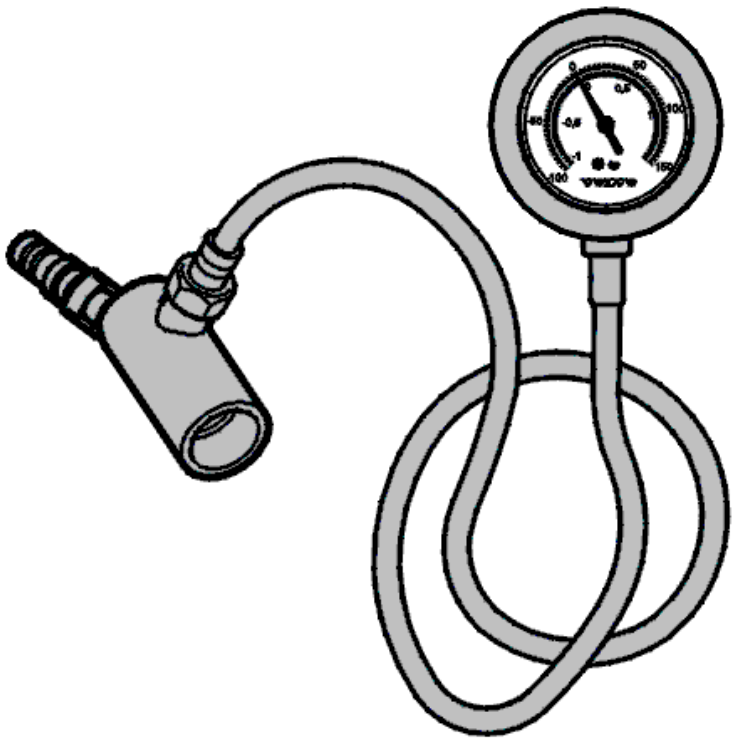


Fig. 466: Identifying T Piece Between Oil Cooler And Return Hose
Courtesy of VOLVO CARS CORPORATION

Measure the pressure by connecting the T piece between the oil cooler and the return hose.

Tools:

Oil pressure gauge see **9992531**

T pipe (adapter) see **9997002**

Preparations

For transmission temperature, see VIDA vehicle communication.

Connect the pressure gauge hose to the T piece.

Tighten the screw. Tighten to 25 Nm.

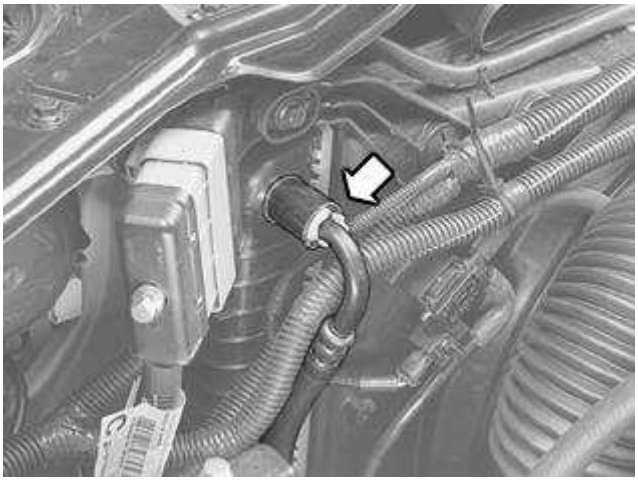


Fig. 467: Identifying Oil Cooler Upper Hose Connector
Courtesy of VOLVO CARS CORPORATION

Disconnect the oil pipe from the oil cooler.

Collect any oil that flows out.

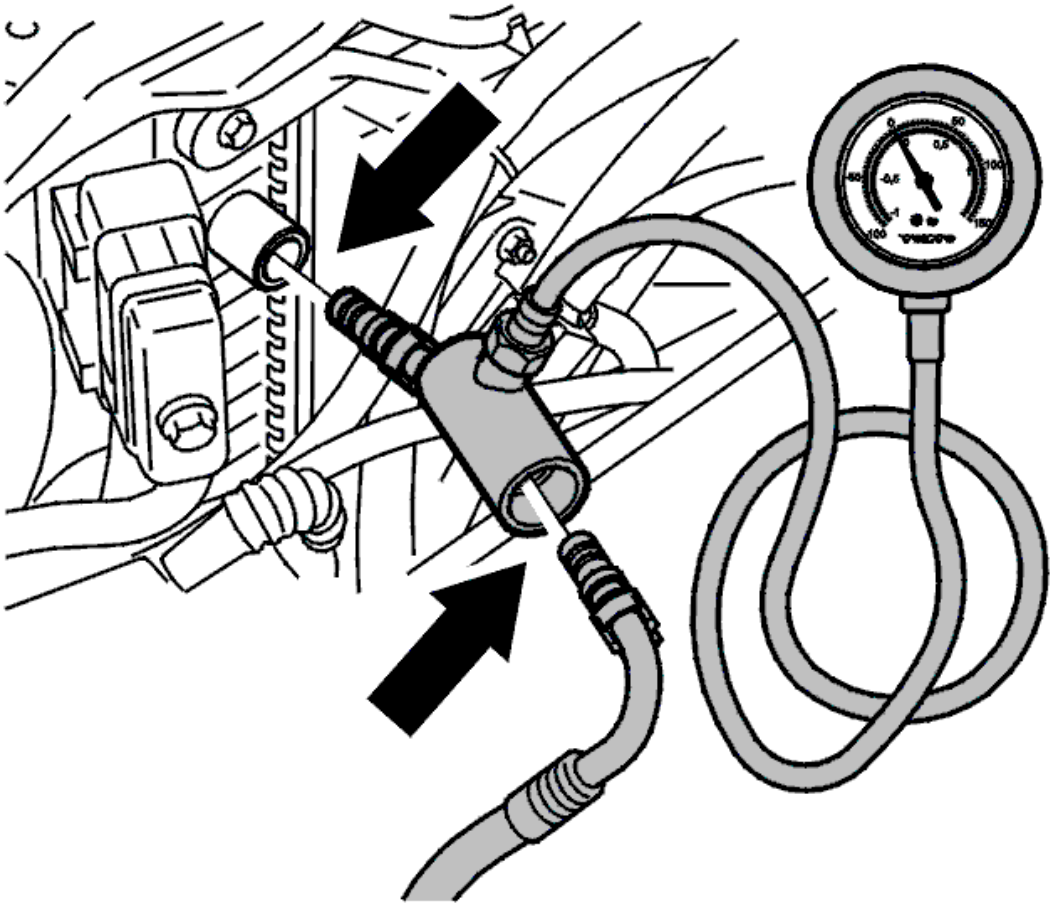


Fig. 468: Identifying Connecting T Piece To Oil Cooler And Oil Hose

Courtesy of VOLVO CARS CORPORATION

Connect the T piece to the oil cooler (push it into place).

Connect the oil hose to the T piece.

TCM-002F: LOCK-UP FUNCTION. SLIPPING OR NOT ENGAGED (AW50/51 AWD; 2003-2007)

DIAGNOSTIC TROUBLE CODE INFORMATION

Condition

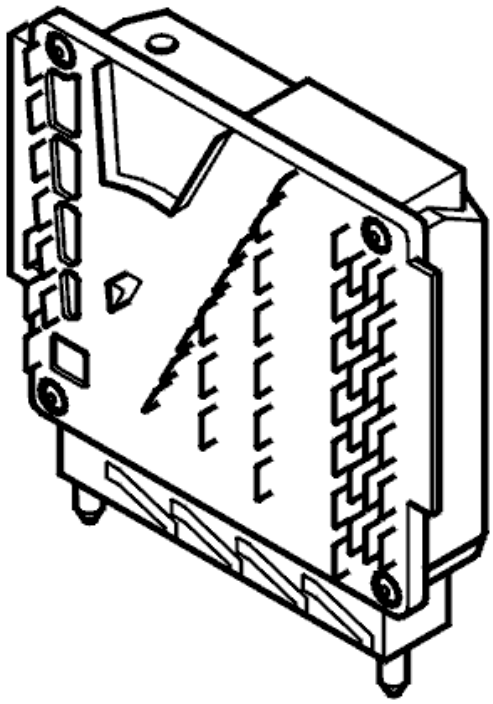


Fig. 1: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The automatic transmission checks that lock-up is not engaged or slips by comparing the rpm signal from the transmission speed (rpm) sensor to the engine speed. The signals must then show the same calculated speed (rpm). If the control module detects that the engine speed (RPM) signals do not correspond with the programmed values, it means that lock-up is slipping or does not engage in the locked position. The diagnostic trouble code (DTC) is stored.

Substitute Value

- Control unit help program "Emergency mode I" has started to work.

Possible Source

- Poor quality transmission fluid.

- Water in the oil.
- Contact resistance in the connectors.
- Gear shift solenoid S4 is jammed in OFF position.
- Gear shift solenoid SLU is jammed in OFF position.
- Mechanical fault in the gearbox.

Fault symptom[s]

- Orange general warning lamp is on.
- Malfunction indicator light (MIL) is on.
- No lock up function.
- Rough gear shifts.

SLIPPING OR NOT ENGAGED

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for transmission function. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

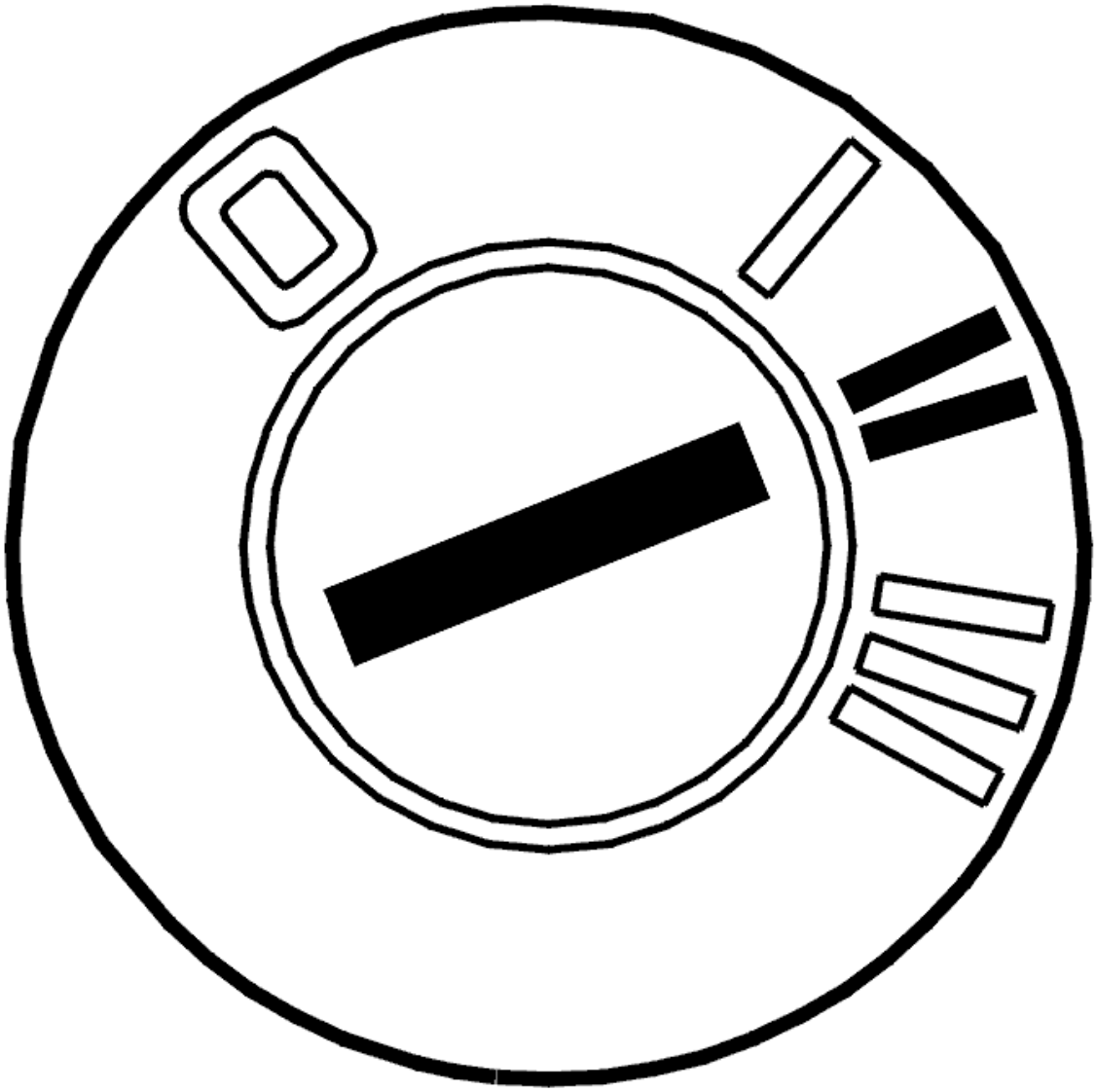


Fig. 2: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check the oil level. Check the transmission for leakage if the fluid level is low. Then top up with oil.

  Check the quality of the oil.

  Check the transmission fluid for metal shavings. Take a sample using the dip stick.

  - Replace the transmission if the transmission fluid contains metal shavings
  - Replace the transmission fluid if the fluid smells burnt.

Other information:

- see **TRANSMISSION FLUID, REPLACING**
- see **OIL LEVEL, CHECKING**
- see **OIL GRADE, CHECKING**

Select an alternative below:

1. No fault detected

   Refer to **REPLACING THE TRANSMISSION CONTROL SYSTEM**

2. Transmission fluid replaced, the level was low or quality was poor

   Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

3. The transmission fluid contains metal shavings.

   Refer to **REPLACING THE TRANSMISSION**

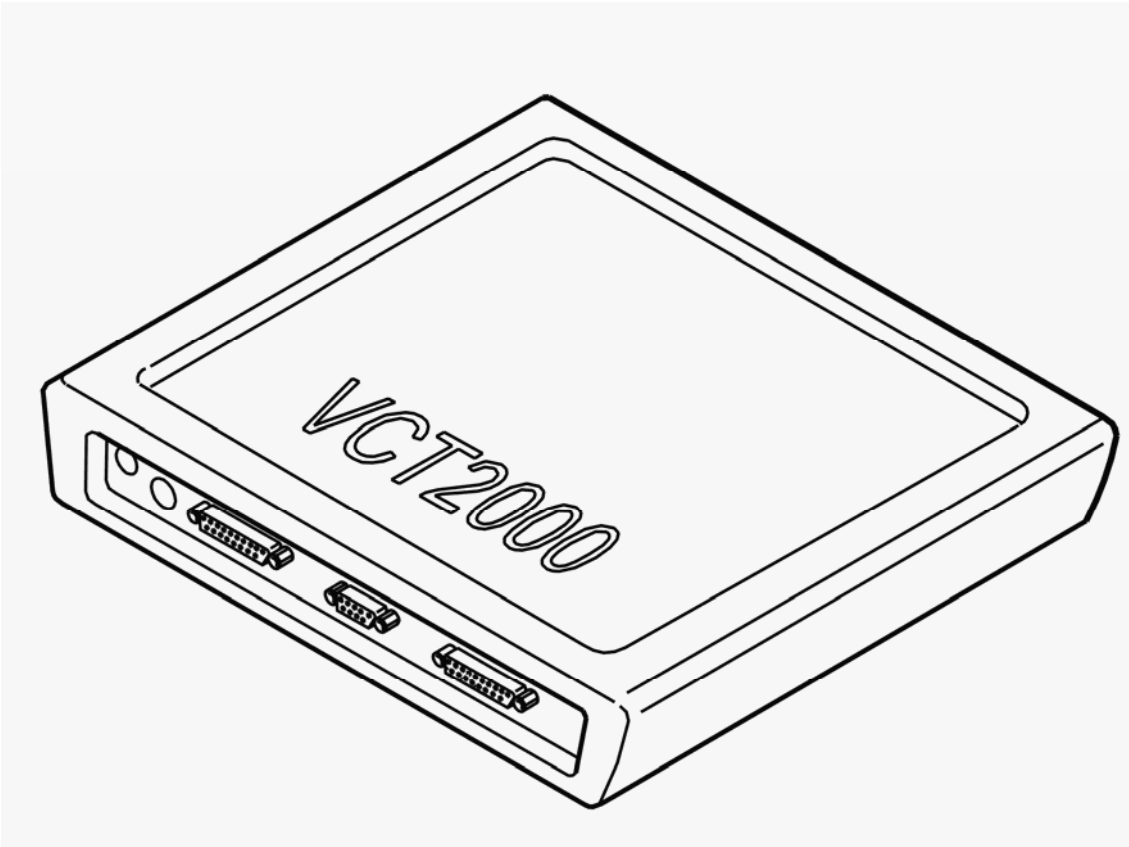


Fig. 3: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

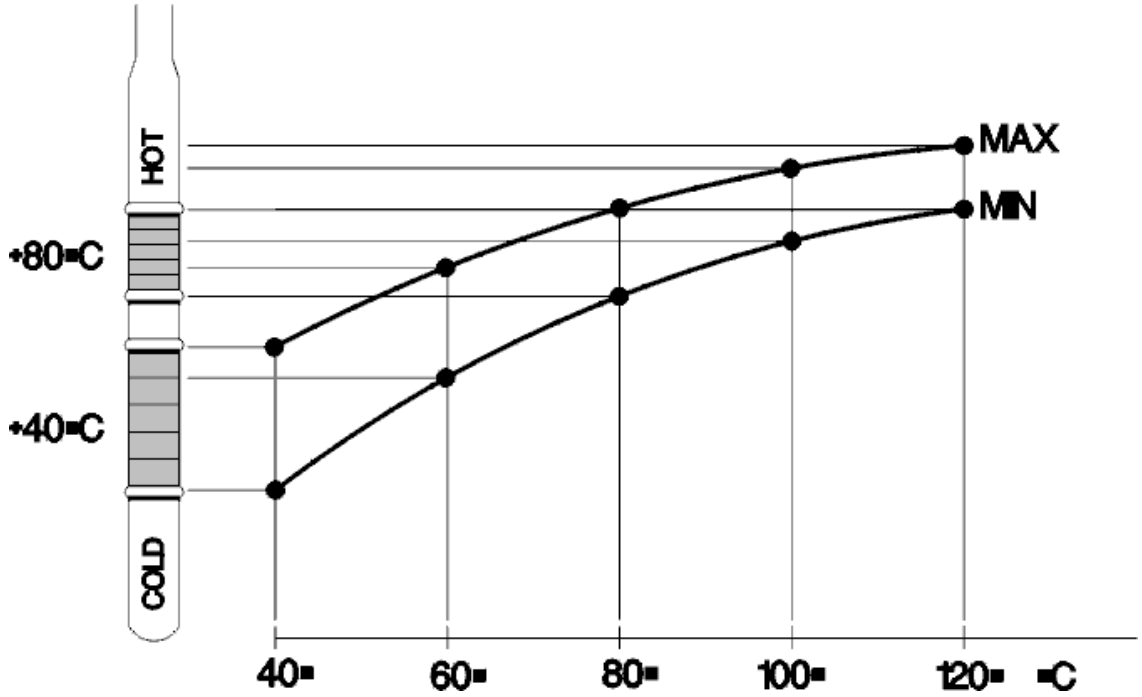


Fig. 4: Identifying Oil Level Temperature Graph
Courtesy of VOLVO CARS CORPORATION

CHECKING FOR CONTACT RESISTANCE AND OXIDATION

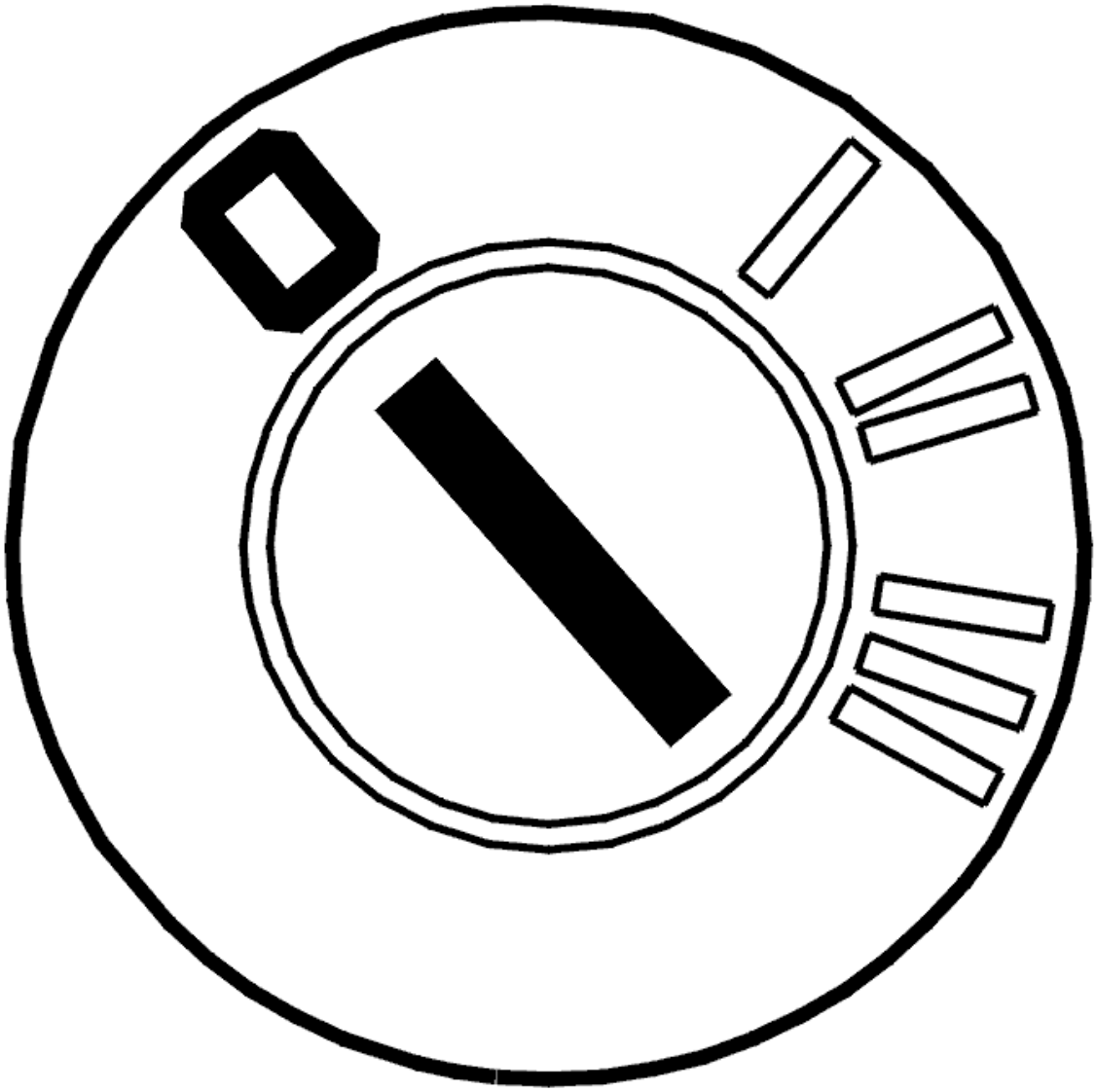


Fig. 5: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

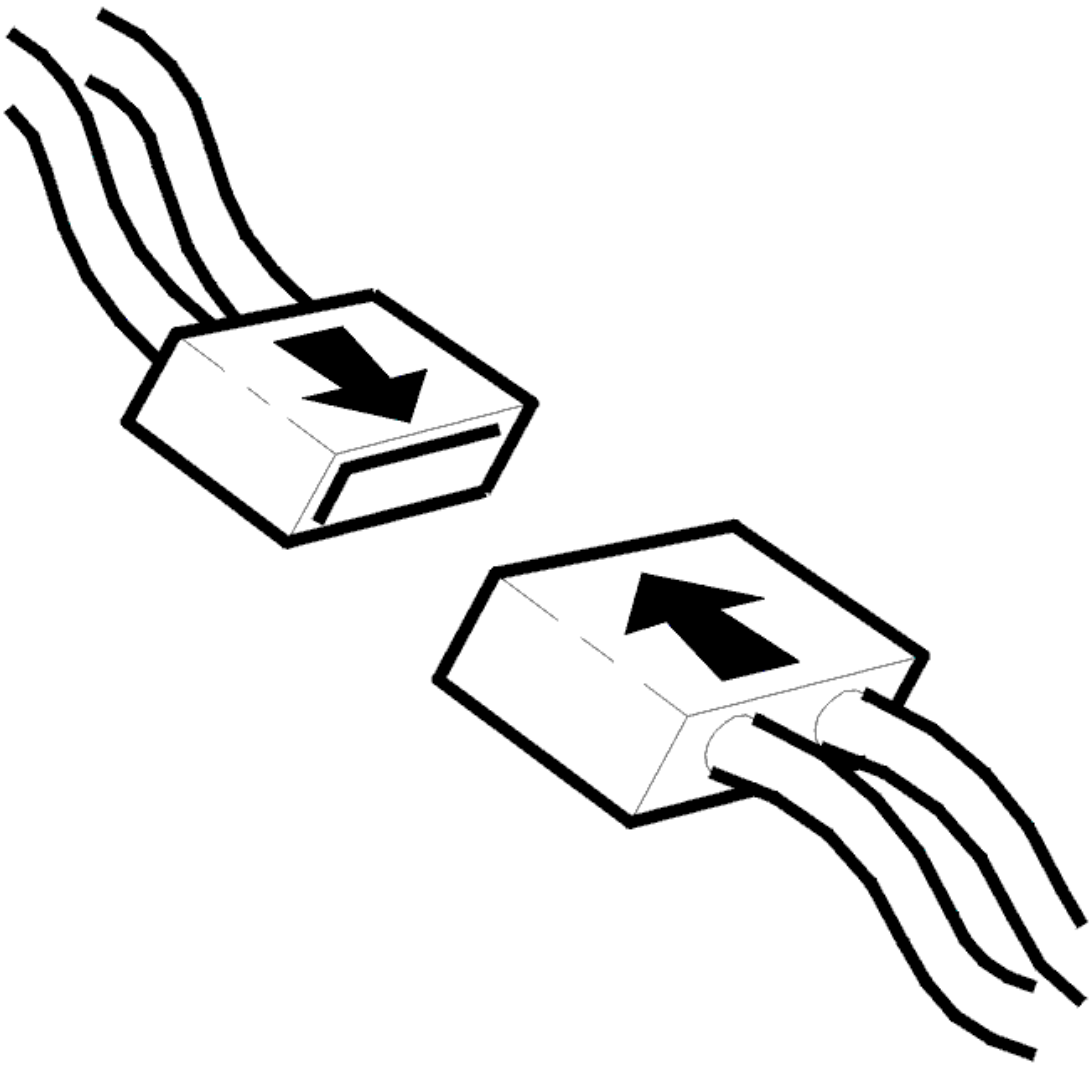


Fig. 6: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check connectors and connections for contact resistance or oxidation.

  Measure the resistance on the terminals for solenoid SLU. Check for an open-circuit. Check for a short-circuit to ground.

  Remedy as necessary.

  Other information

  - see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**
  - To access transmission connectors,

see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**

- To access the control module connector,

  see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**

- see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

- **Continue**

  Refer to **TEST DRIVING THE TRANSMISSION**

REPLACING THE TRANSMISSION

The previous tests indicate an internal fault in the transmission.

Replace the transmission.

Other information:

- see **TRANSMISSION, REMOVING**
- see **TRANSMISSION, INSTALLING**

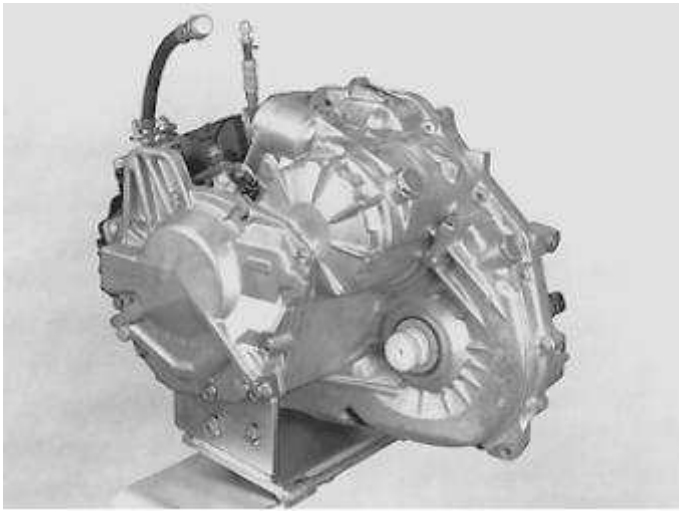


Fig. 7: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

REPLACING THE TRANSMISSION CONTROL SYSTEM

- Perform the following check.

see **TEST PRESSURIZATION**

- Check the cooling system's pipes and connections to the automatic transmission. Check for leakage.

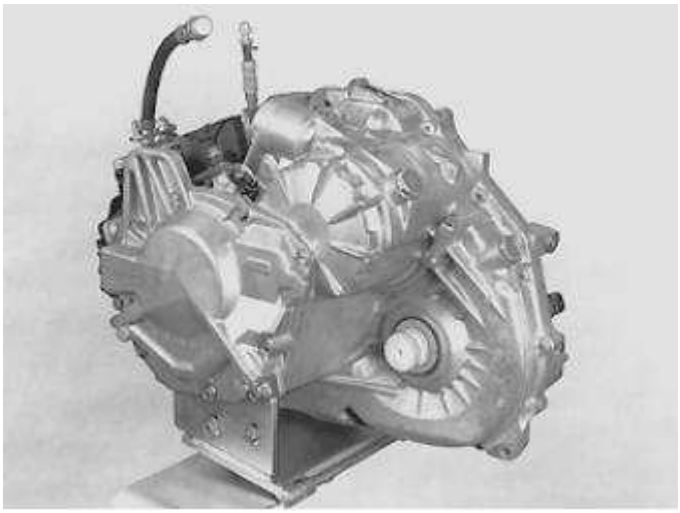


Fig. 8: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Does the pressure drop?

- **YES**

  Refer to **CHECKING THE COOLING SYSTEM**

- **NO**

  Refer to **CHECKING SOFTWARE**

CHECKING THE COOLING SYSTEM

Ensure that the leak is the cause of the coolant coming in contact with the transmission oil by checking the quality of the oil.

If the quality of the transmission fluid had deteriorated due to leakage from the cooling system, replace the transmission, radiator, hoses and expansion tank as below.

Other information:

- see **OIL GRADE, CHECKING (AW50/51 AWD; AW55-50/51SN)**
- see **TRANSMISSION, REMOVING**
- see **TRANSMISSION, INSTALLING**
- see **RADIATOR / CHARGE AIR COOLER (CAC), REPLACEMENT**

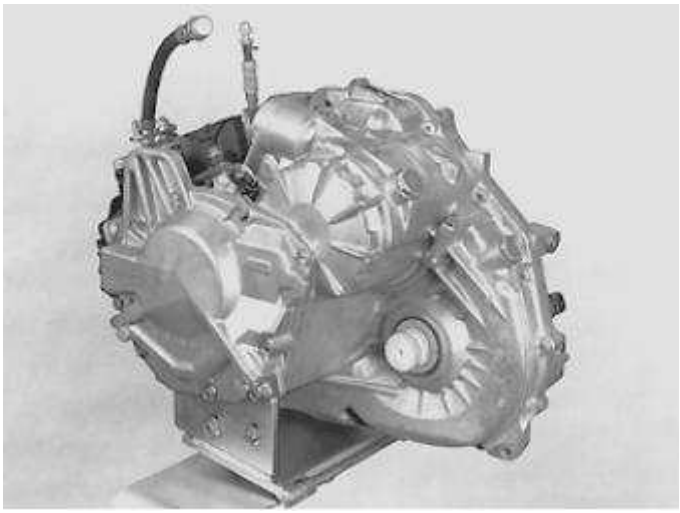


Fig. 9: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

CHECKING SOFTWARE

- Check that the control module has the latest version of the relevant software.

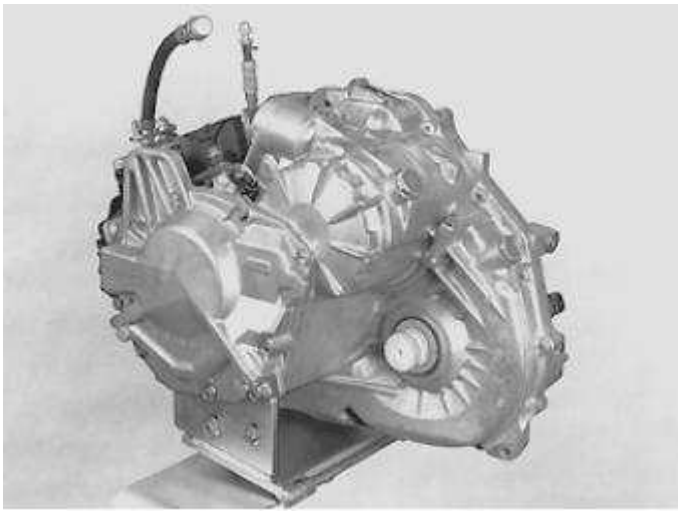


Fig. 10: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING THE TRANSMISSION**

REPLACING AUTOMATIC TRANSMISSIONS

Replace the transmission.

Other information:

- see **TRANSMISSION, REMOVING**
- see **TRANSMISSION, INSTALLING**

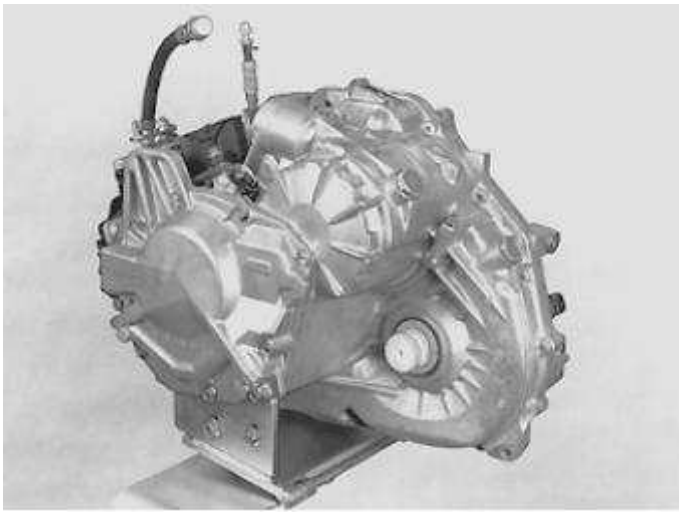


Fig. 11: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  REPAIRED

TEST DRIVING THE TRANSMISSION

- Perform the following check.

  Other information:

  - see **TEST DRIVE SCHEDULE, DESCRIPTION**

Does the problem persist?

- **YES**

  Refer to **CHECKING FOR CONTACT RESISTANCE AND OXIDATION**

- **NO**

  OKAY: Troubleshooting has been completed.

TEST DRIVING THE TRANSMISSION

- Perform the following check.

  Other information:

  - see **TEST DRIVE SCHEDULE, DESCRIPTION**

Does the problem persist?

- **YES**

  Refer to **REPLACING AUTOMATIC TRANSMISSIONS**

- **NO**

  OKAY: Troubleshooting has been completed.

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.

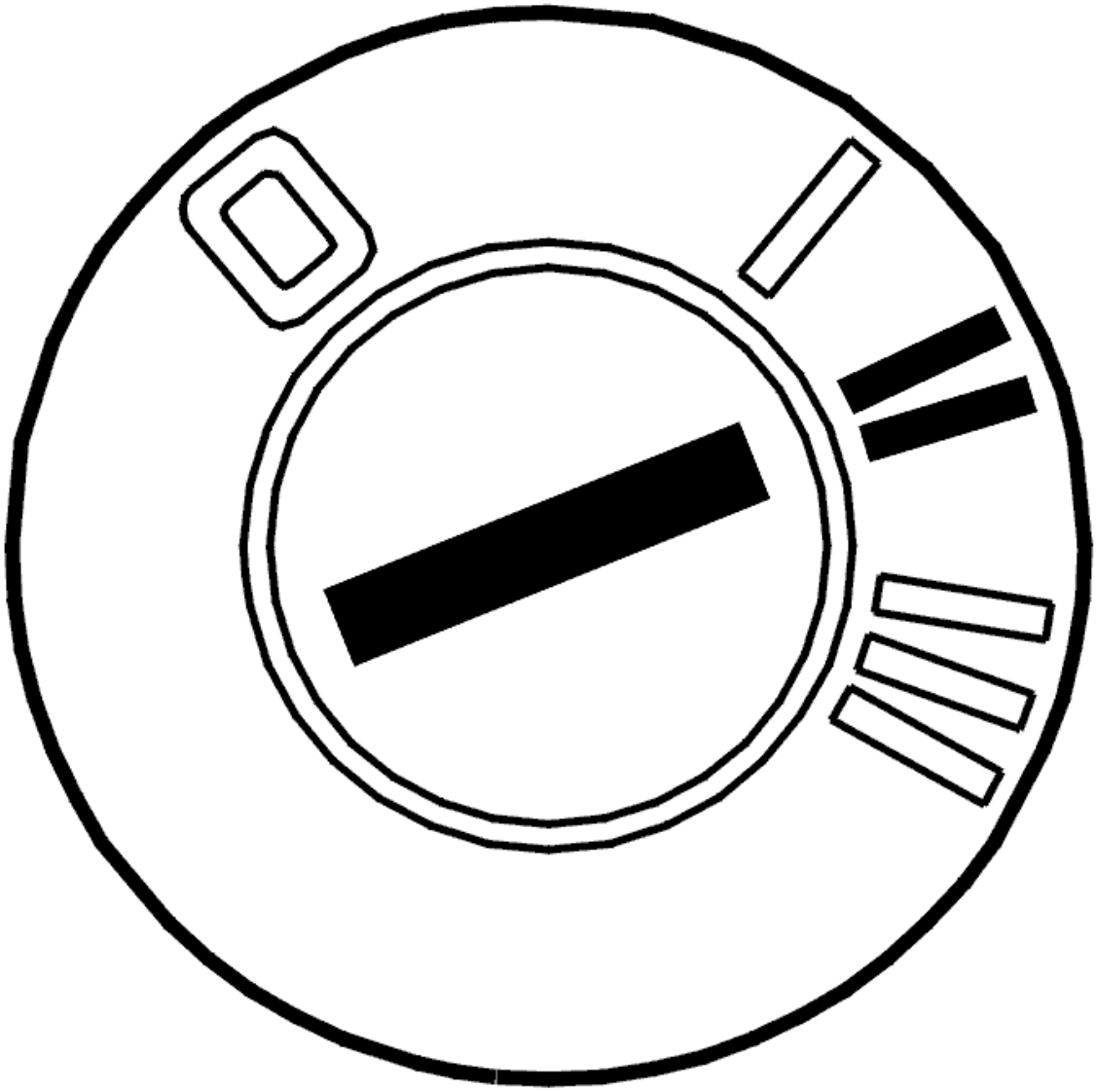


Fig. 12: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

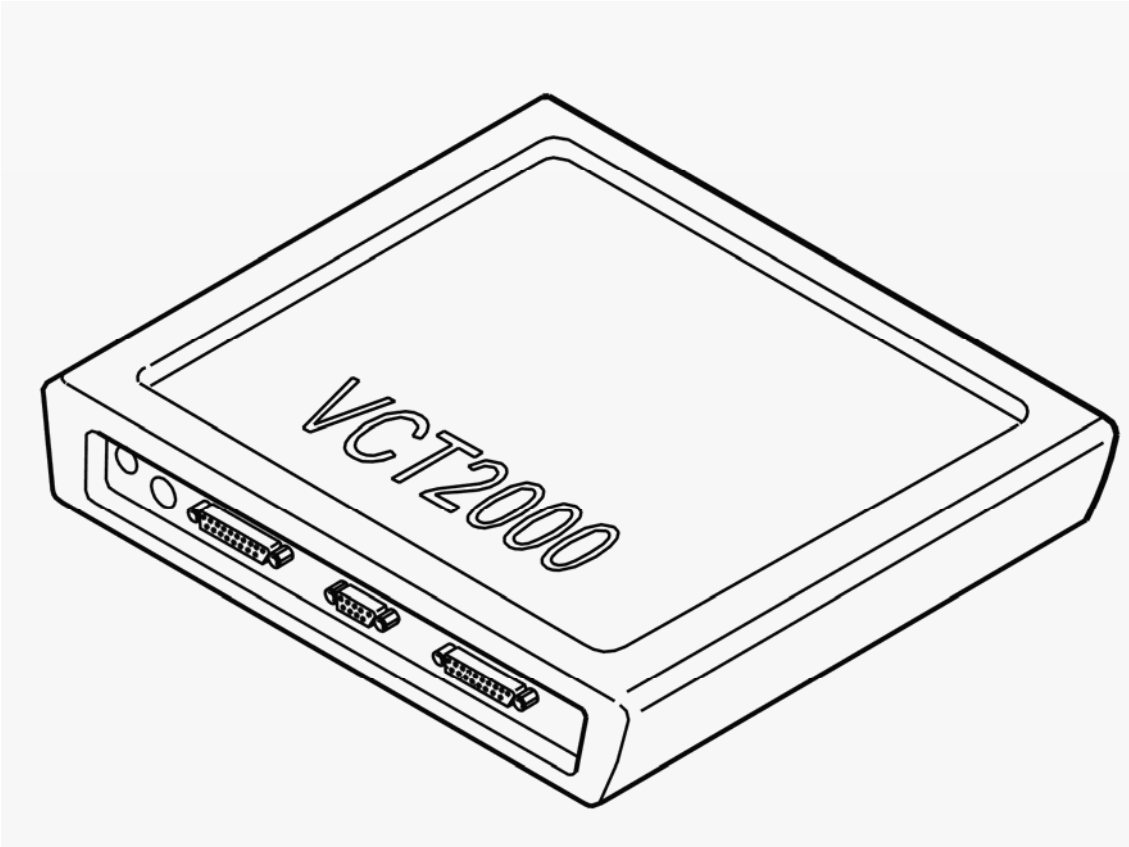


Fig. 13: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

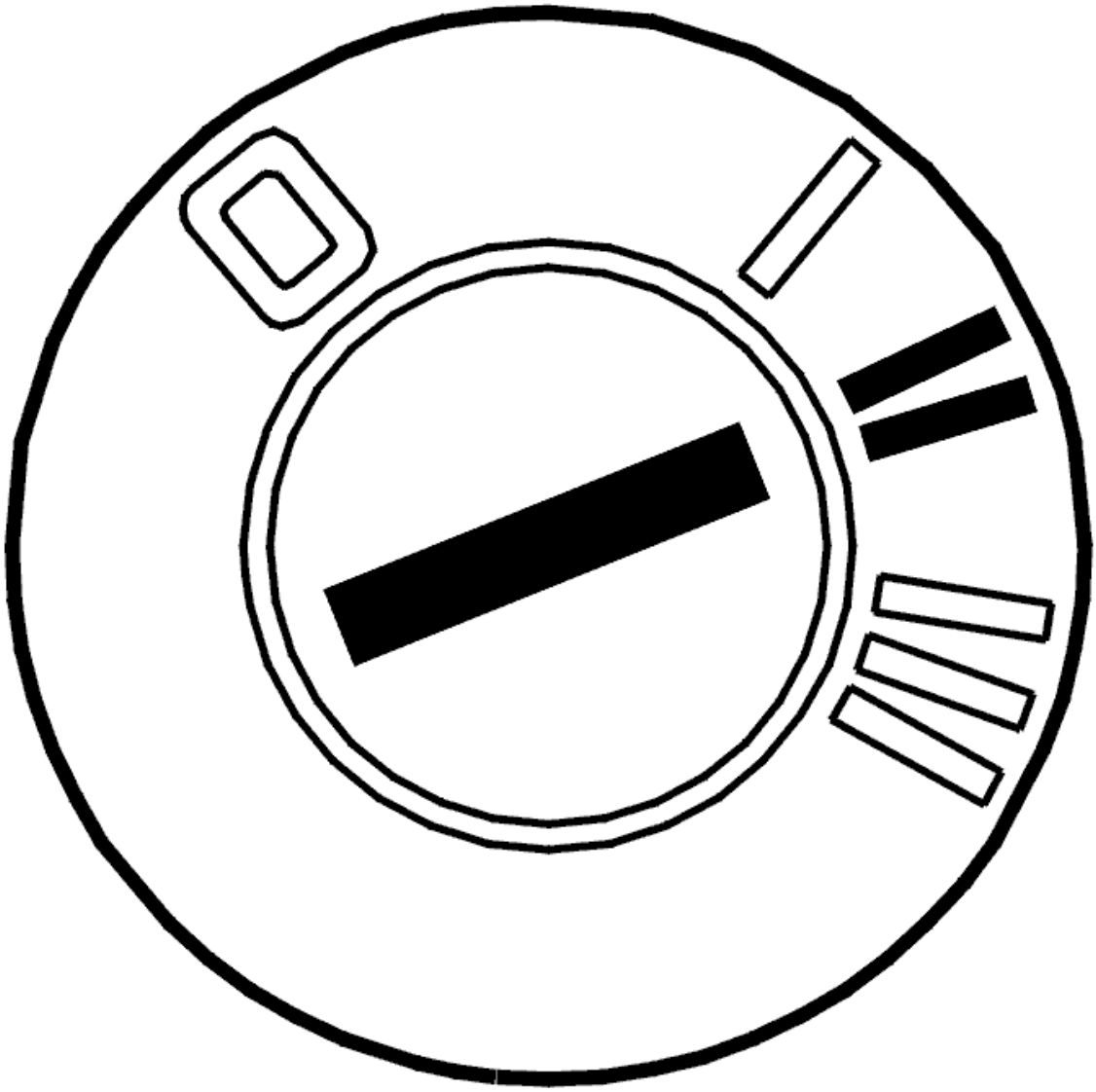


Fig. 14: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

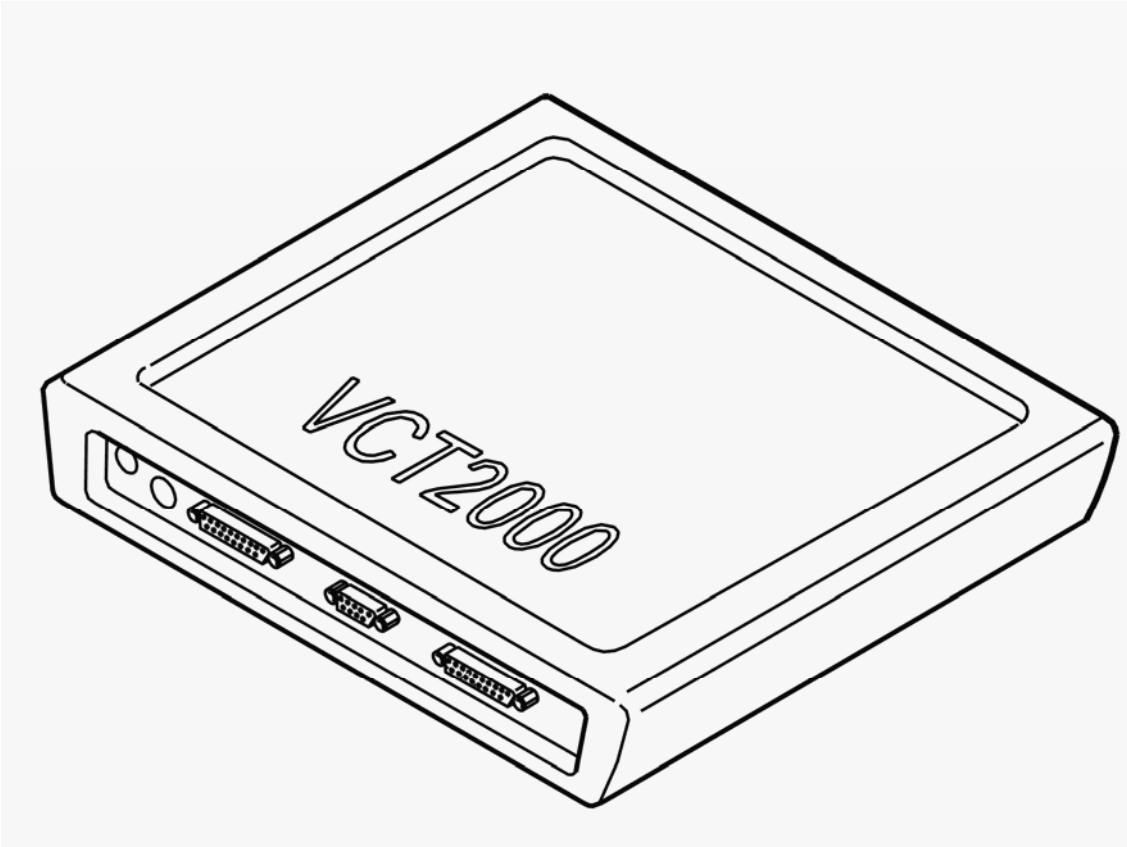


Fig. 15: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

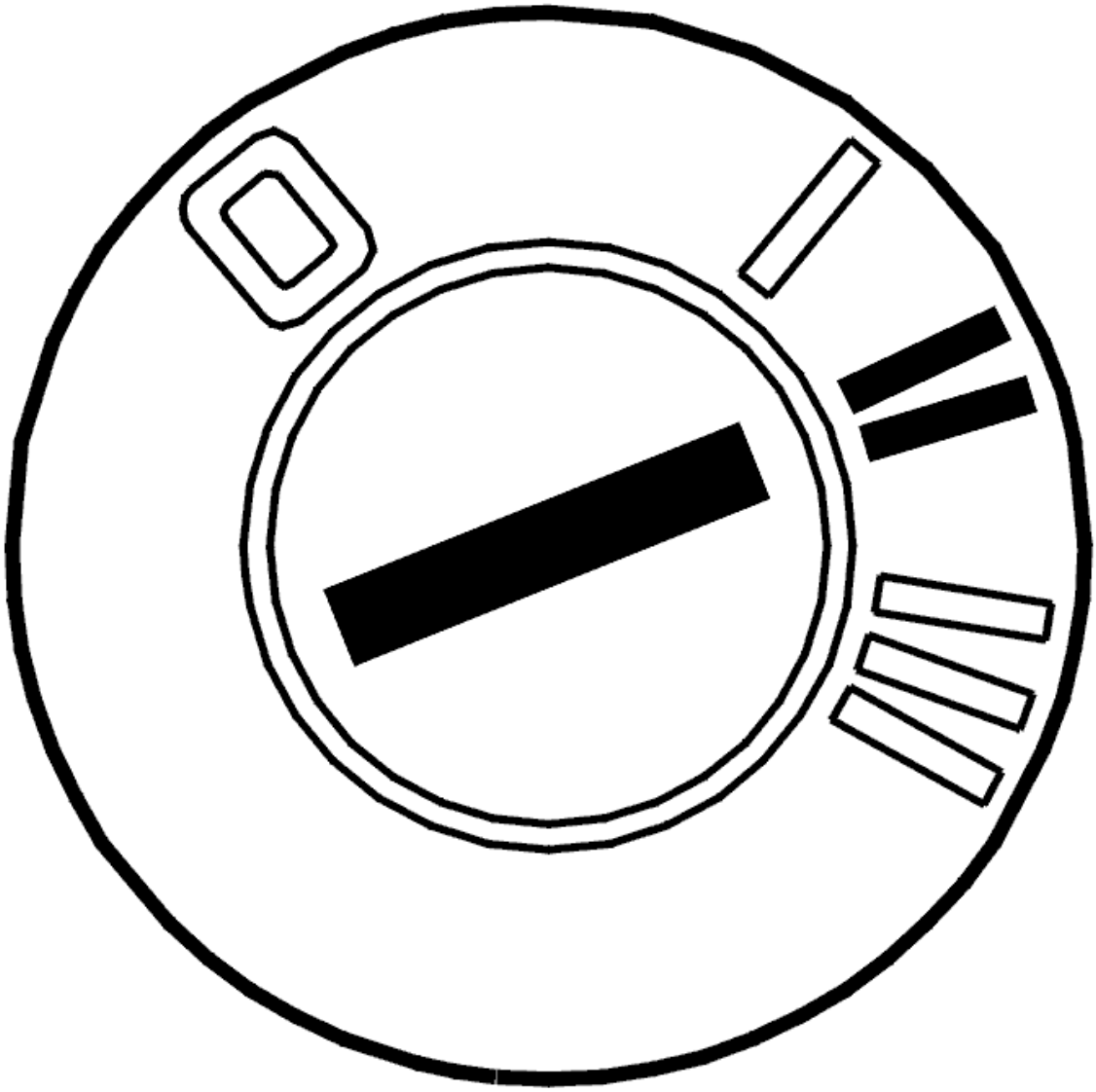


Fig. 16: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

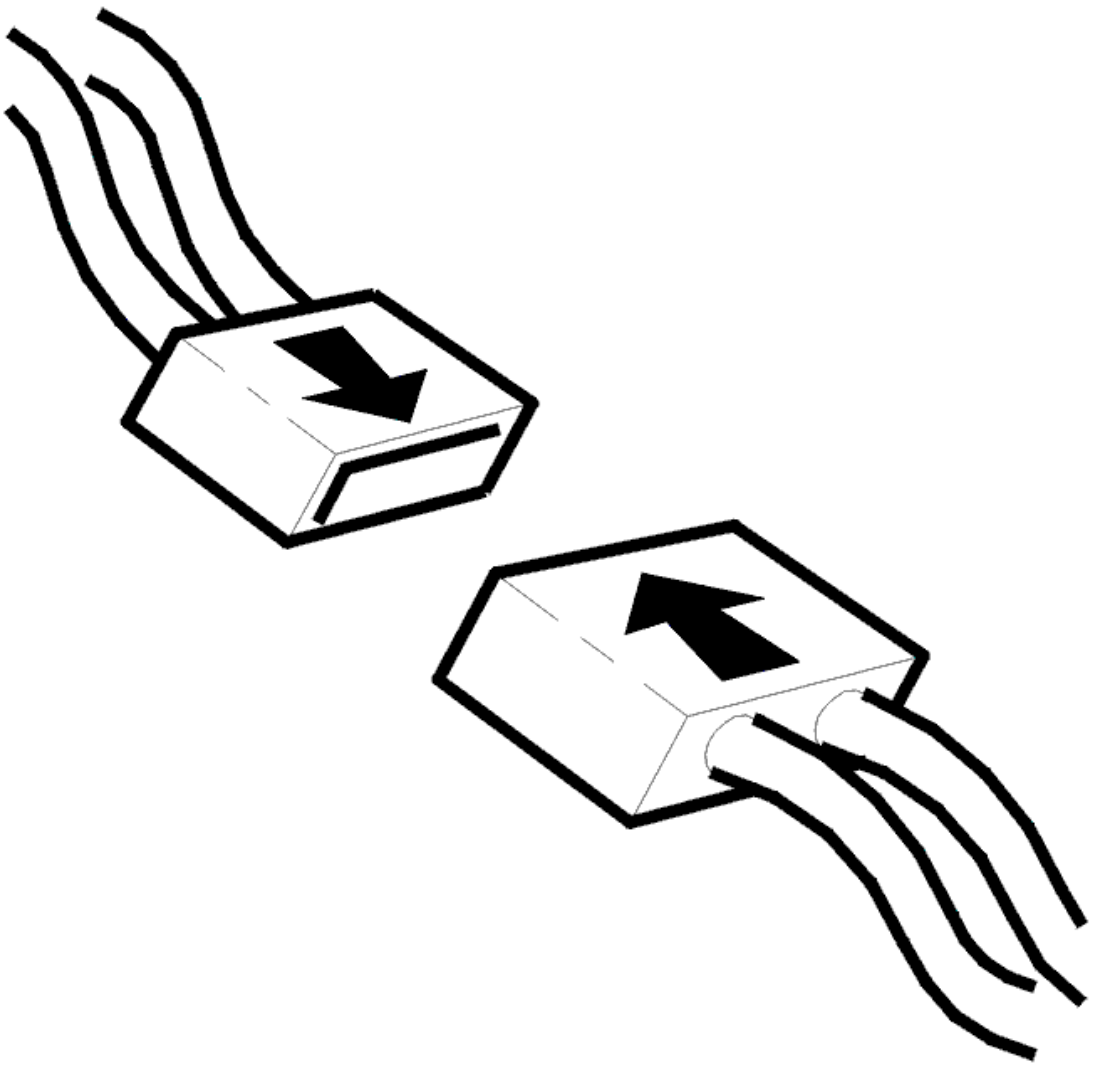


Fig. 17: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

During the test drive, oil temperature should be over 20 °C.

Note any deviations in transmission function.

Does the transmission function flawlessly?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-002F: LOCK-UP FUNCTION. SLIPPING OR NOT ENGAGED (AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE INFORMATION

see **DIAGNOSTIC TROUBLE CODE INFORMATION**

SLIPPING OR NOT ENGAGED

see **SLIPPING OR NOT ENGAGED**

SLIPPING OR NOT ENGAGED (2004, 2005)

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for transmission function. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

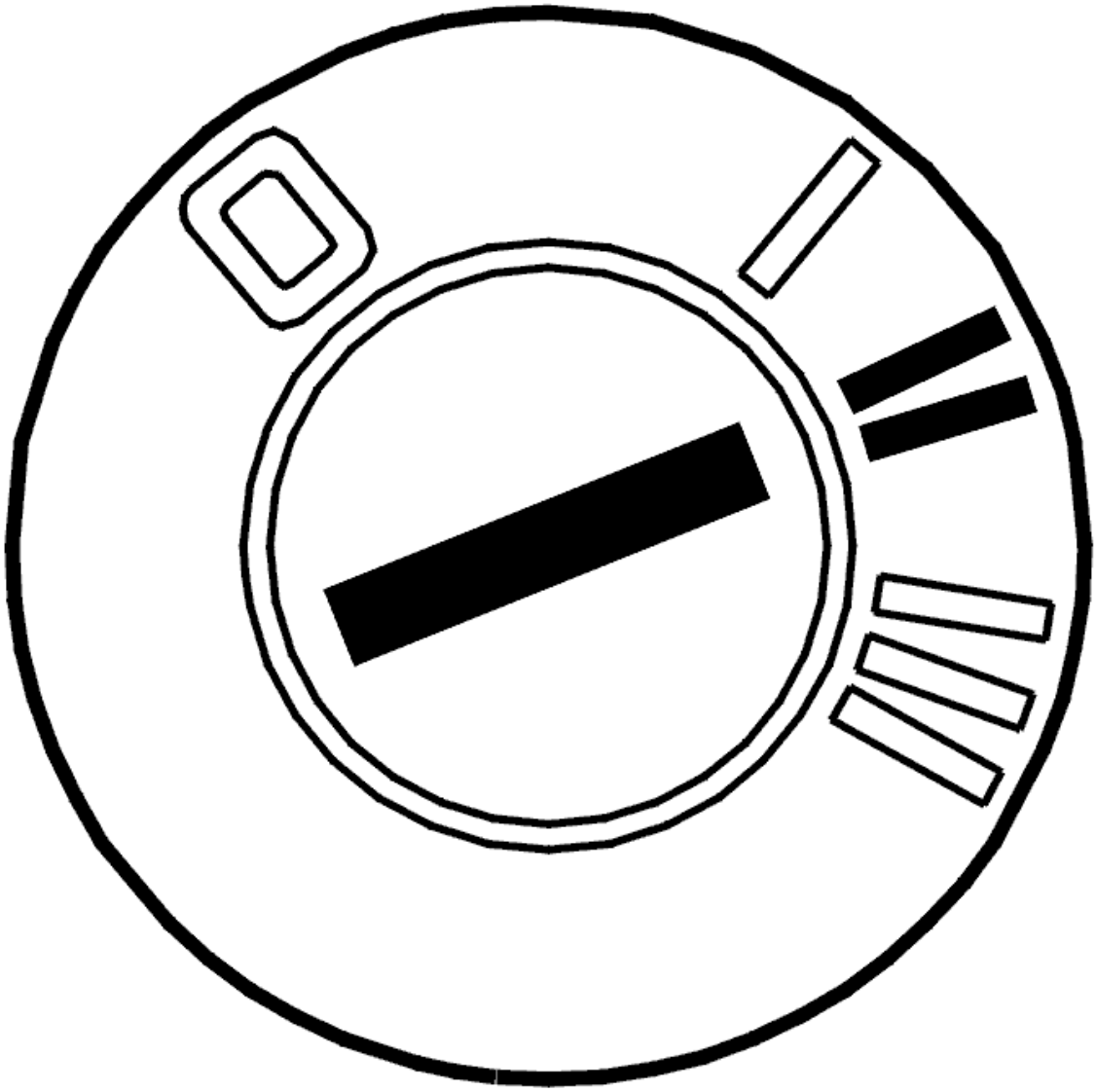


Fig. 18: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check the oil level. Check the transmission for leakage if the fluid level is low. Then top up with oil.

  Check the quality of the oil.

  Check the transmission fluid for metal shavings. Take a sample using the dip stick.

  - Replace the transmission if the transmission fluid contains metal shavings
  - Replace the transmission fluid if the fluid smells burnt.

Other information:

- see **TRANSMISSION FLUID, REPLACING**
- see **OIL LEVEL, CHECKING**
- see **OIL GRADE, CHECKING**

Select an alternative below:

1. No fault detected

   Refer to **REPLACING THE TRANSMISSION CONTROL SYSTEM**

2. Transmission fluid replaced, the level was low or quality was poor

   Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

3. The transmission fluid contains metal shavings.

   Refer to **REPLACING THE TRANSMISSION**

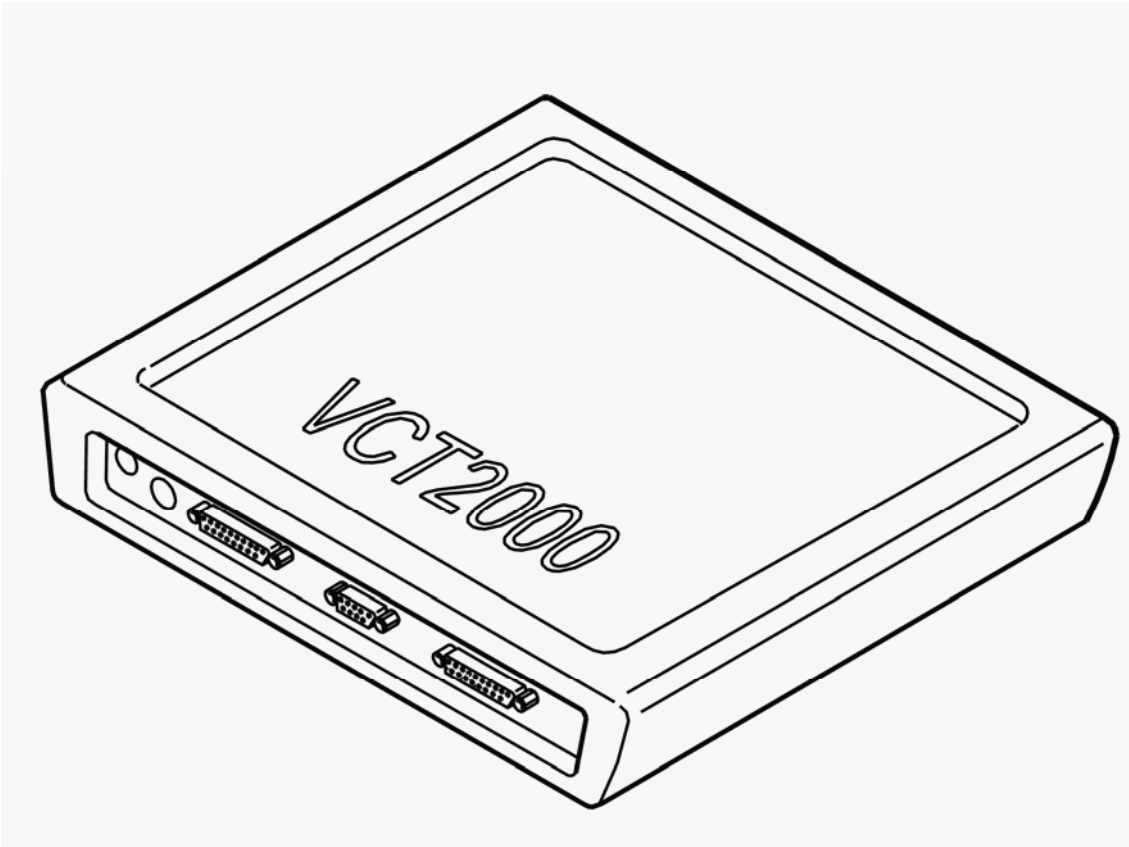


Fig. 19: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

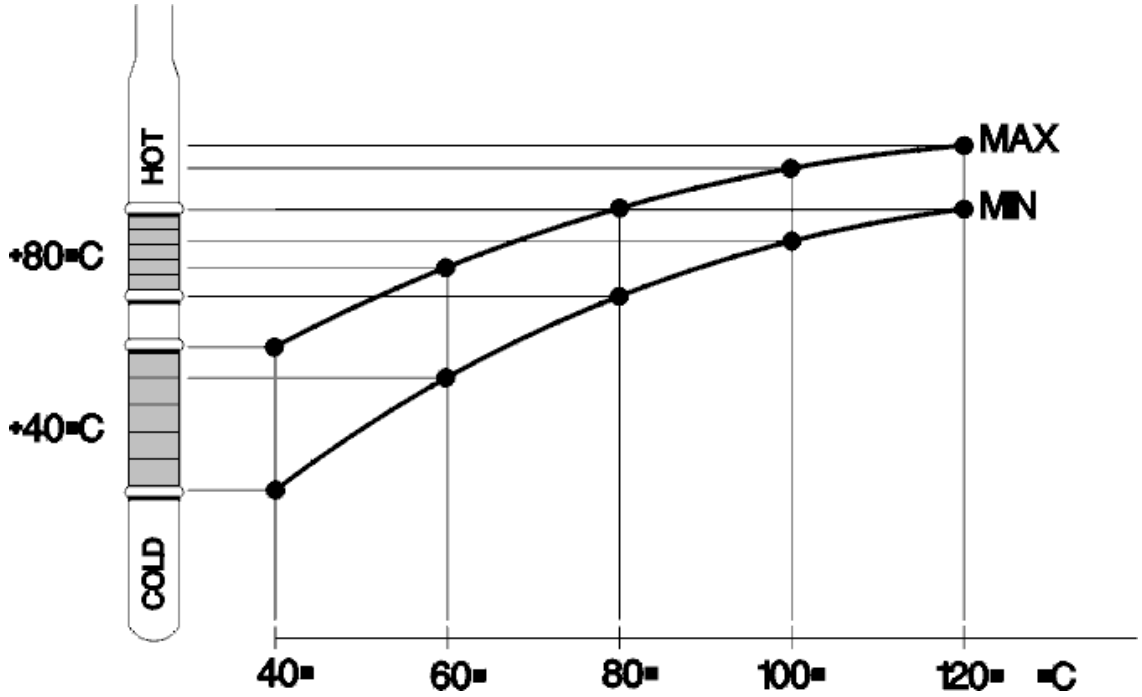


Fig. 20: Identifying Oil Level Temperature Graph
Courtesy of VOLVO CARS CORPORATION

CHECKING FOR CONTACT RESISTANCE AND OXIDATION

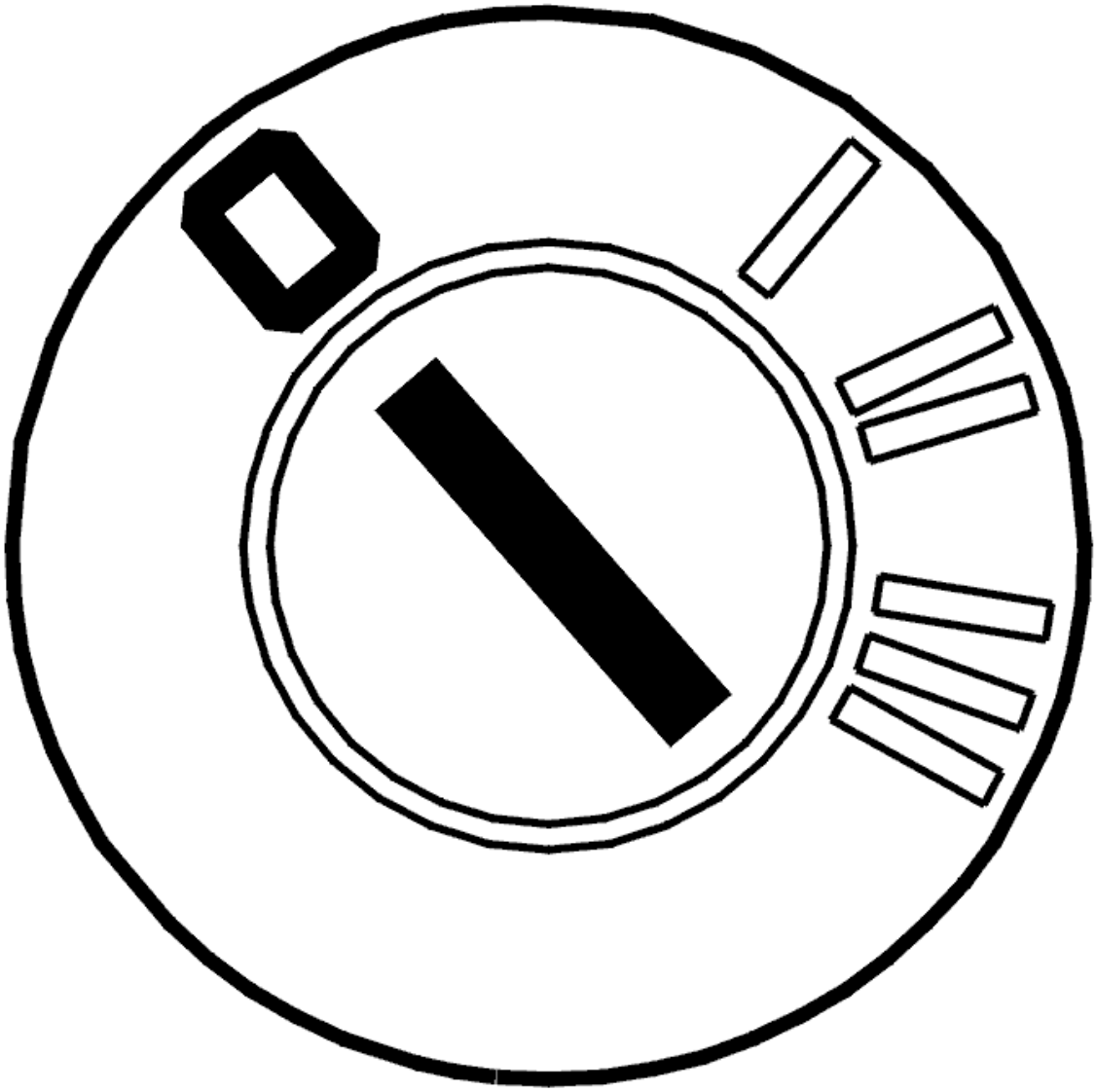


Fig. 21: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

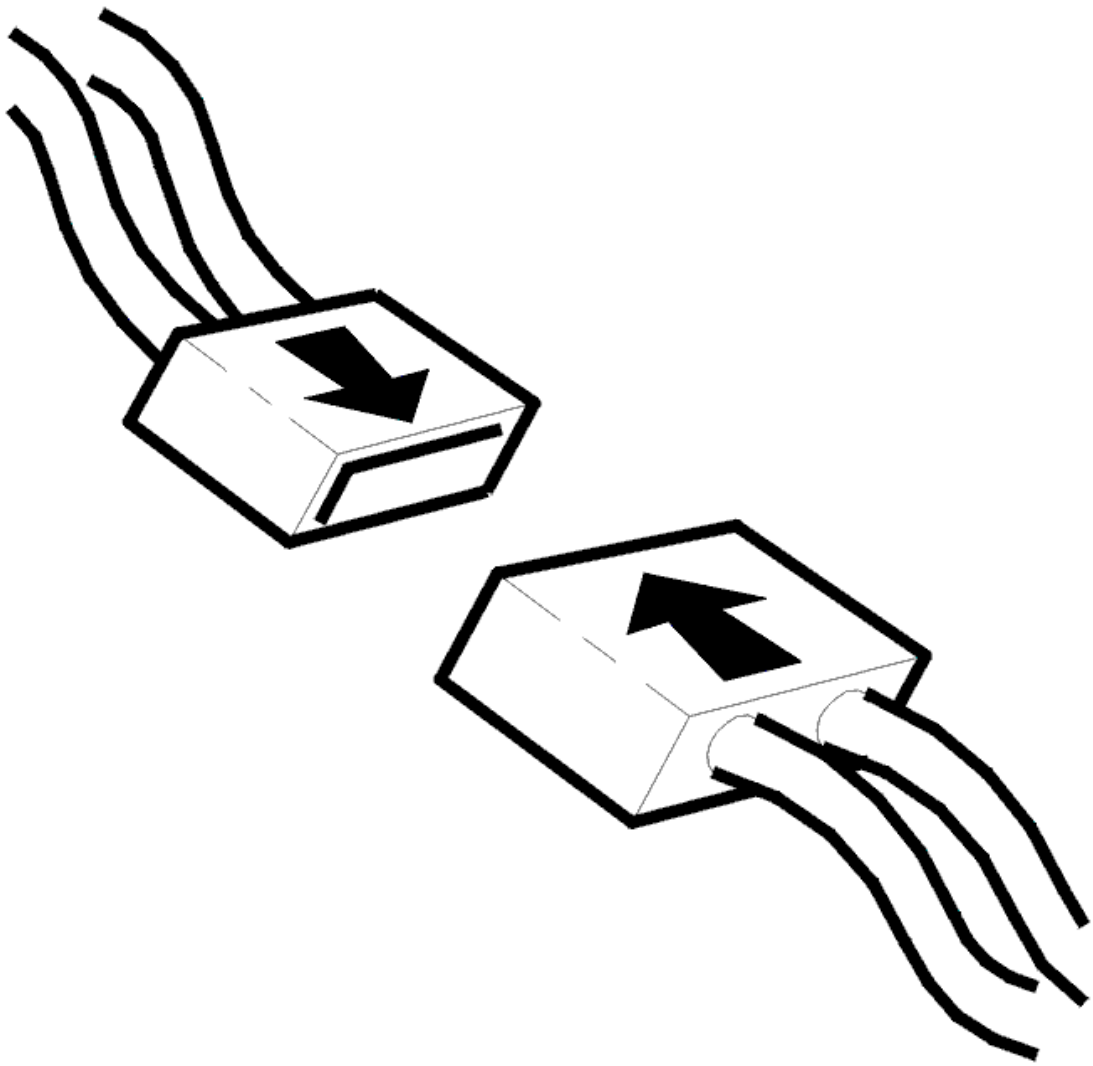


Fig. 22: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check connectors and connections for contact resistance or oxidation.

  Measure the resistance on the terminals for solenoid SLU. Check for an open-circuit. Check for a short-circuit to ground.

  Remedy as necessary.

  Other information

  - see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**
  - To access transmission connectors, see

see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**

- To access the control module connector, see

  see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**

- see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

- **Continue**

  Refer to **TEST DRIVING THE TRANSMISSION**

REPLACING THE TRANSMISSION

The previous tests indicate an internal fault in the transmission.

Replace the transmission.

Other information:

- see **TRANSMISSION, REMOVING**
- see **TRANSMISSION, INSTALLING**

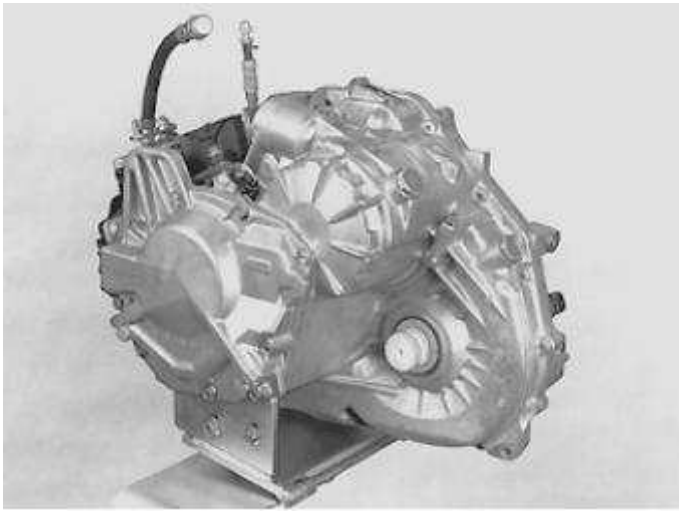


Fig. 23: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

REPLACING THE TRANSMISSION CONTROL SYSTEM

- Perform the following check.

see **TEST PRESSURIZATION**

- Check the cooling system's pipes and connections to the automatic transmission. Check for leakage.

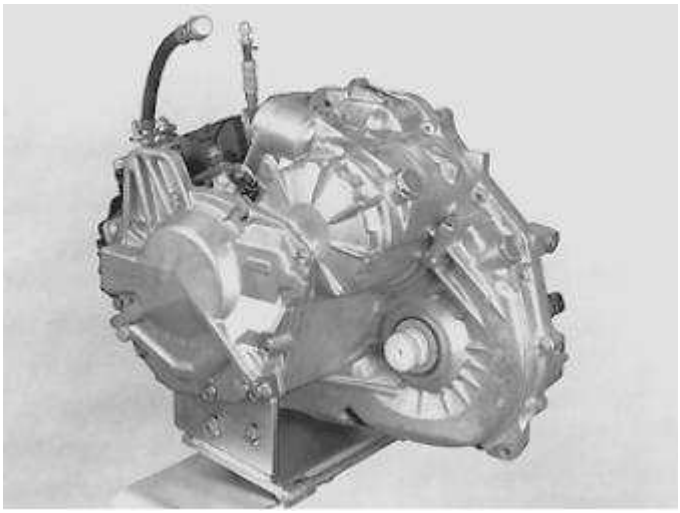


Fig. 24: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Does the pressure drop?

- **YES**

  Refer to **CHECKING THE COOLING SYSTEM**

- **NO**

  Refer to **CHECKING SOFTWARE**

CHECKING THE COOLING SYSTEM

Ensure that the leak is the cause of the coolant coming in contact with the transmission oil by checking the quality of the oil.

If the quality of the transmission fluid had deteriorated due to leakage from the cooling system, replace the transmission, radiator, hoses and expansion tank as below.

Other information:

- see **OIL GRADE, CHECKING (AW50/51 AWD; AW55-50/51SN)**
- see **TRANSMISSION, REMOVING**
- see **TRANSMISSION, INSTALLING**
- see **RADIATOR / CHARGE AIR COOLER (CAC), REPLACEMENT**

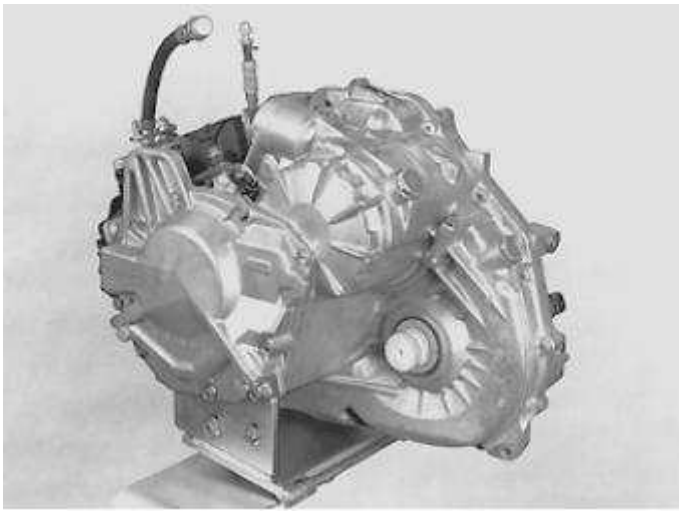


Fig. 25: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

CHECKING SOFTWARE

- Check that the control module has the latest version of the relevant software.

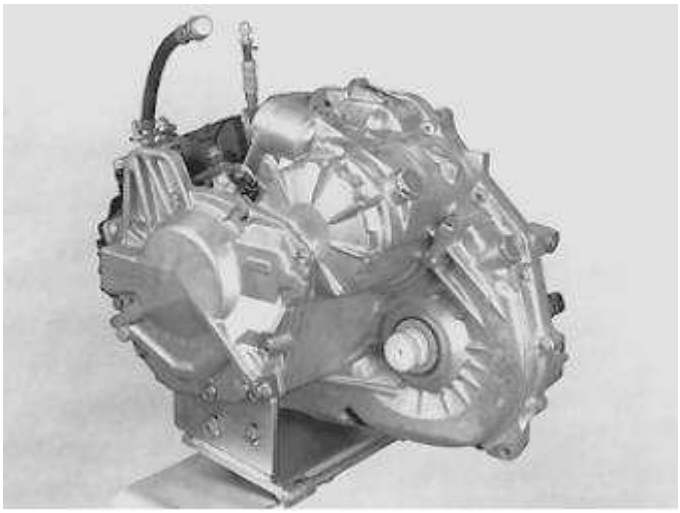


Fig. 26: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING THE TRANSMISSION**

REPLACING AUTOMATIC TRANSMISSIONS

Replace the transmission.

Other information:

- see **TRANSMISSION, REMOVING**
- see **TRANSMISSION, INSTALLING**

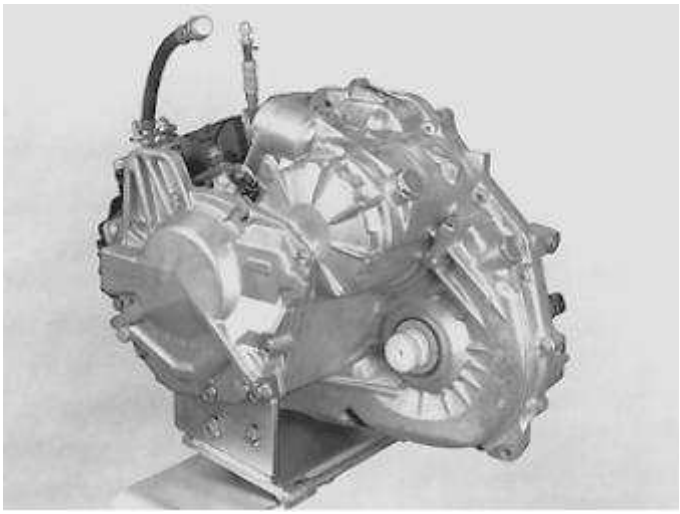


Fig. 27: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  REPAIRED

TEST DRIVING THE TRANSMISSION

- Perform the following check.

  Other information:

  - see **TEST DRIVE SCHEDULE, DESCRIPTION**

Does the problem persist?

- **YES**

  Refer to **CHECKING FOR CONTACT RESISTANCE AND OXIDATION**

- **NO**

  OKAY: Troubleshooting has been completed.

TEST DRIVING THE TRANSMISSION

- Perform the following check.

  Other information:

  - see **TEST-DRIVE SCHEDULE TCM-002F AW55-50/51SN**

Does the problem persist?

- **YES**

  Refer to **REPLACING AUTOMATIC TRANSMISSIONS**

- **NO**

  OKAY: Troubleshooting has been completed.

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.

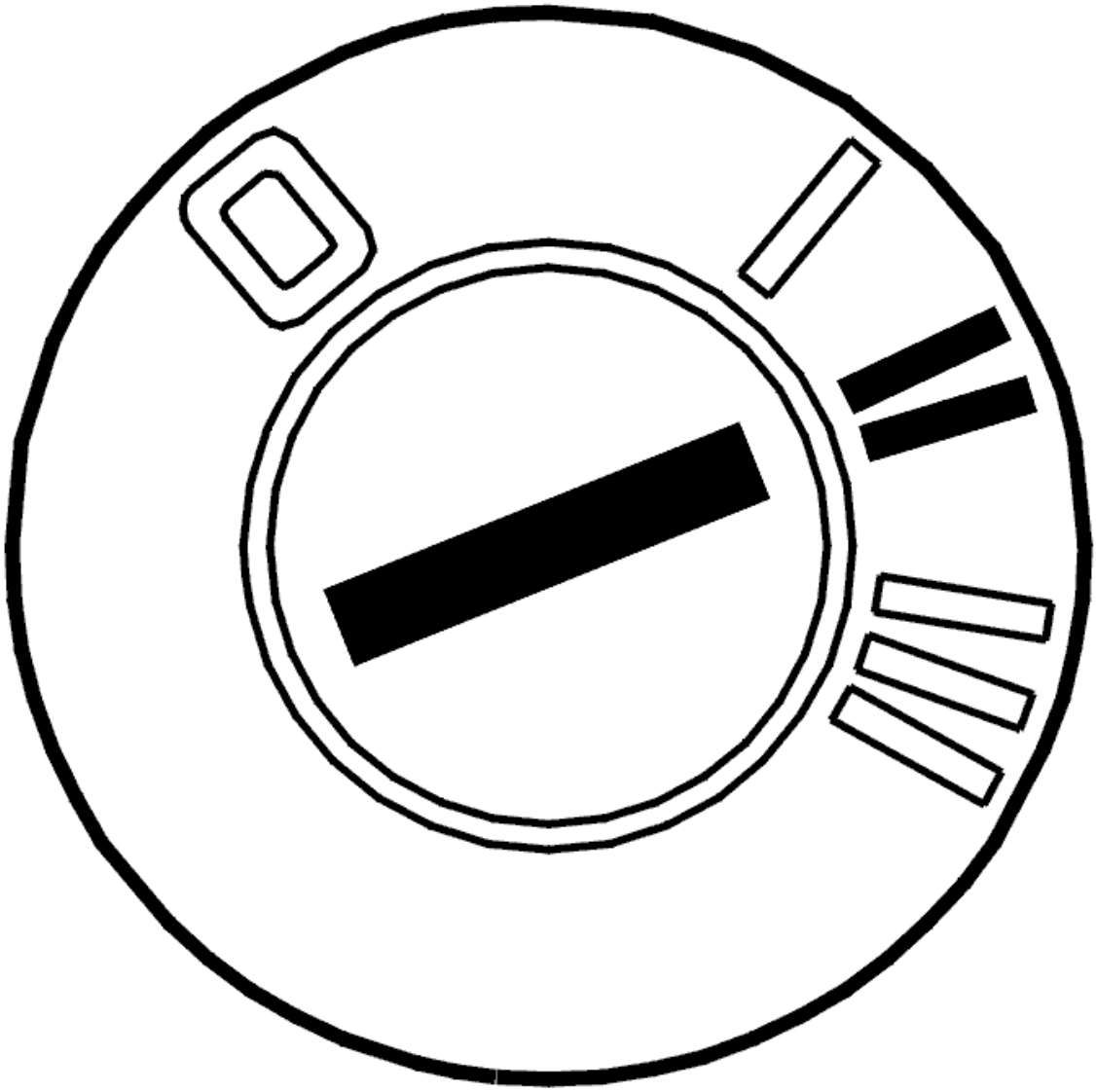


Fig. 28: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

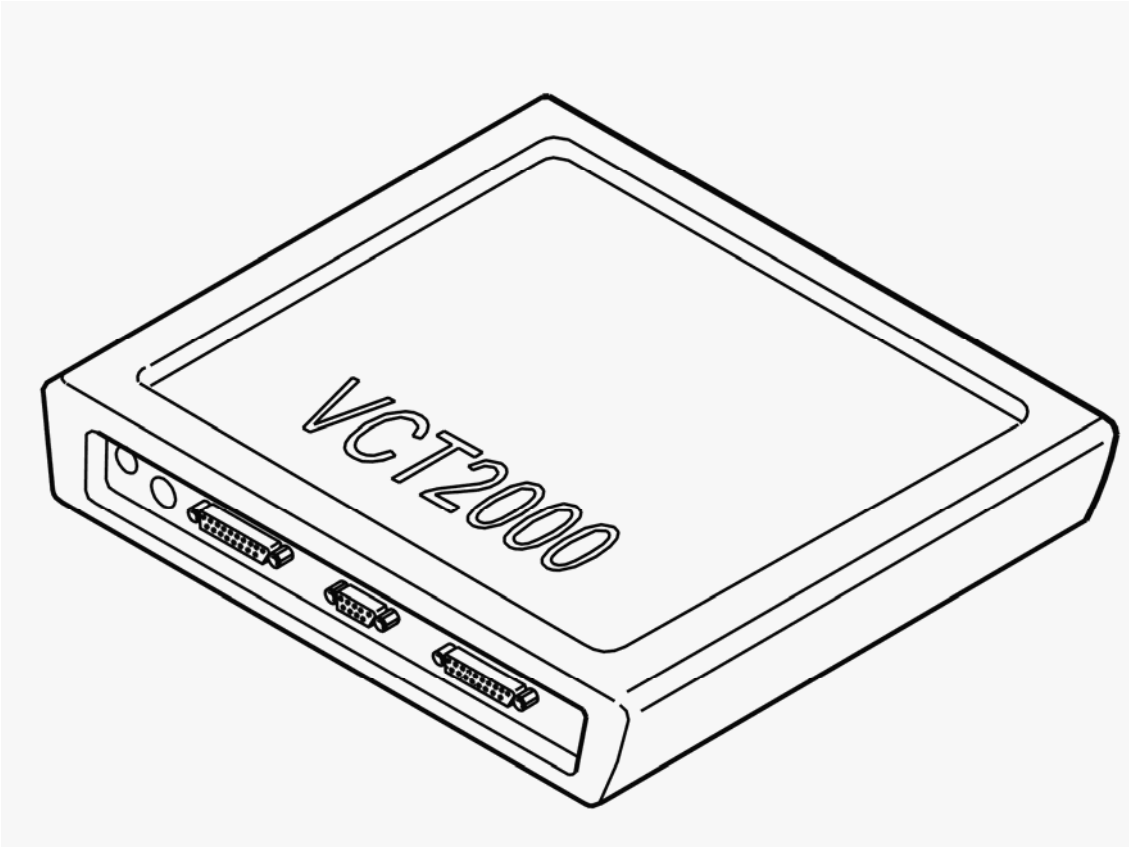


Fig. 29: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

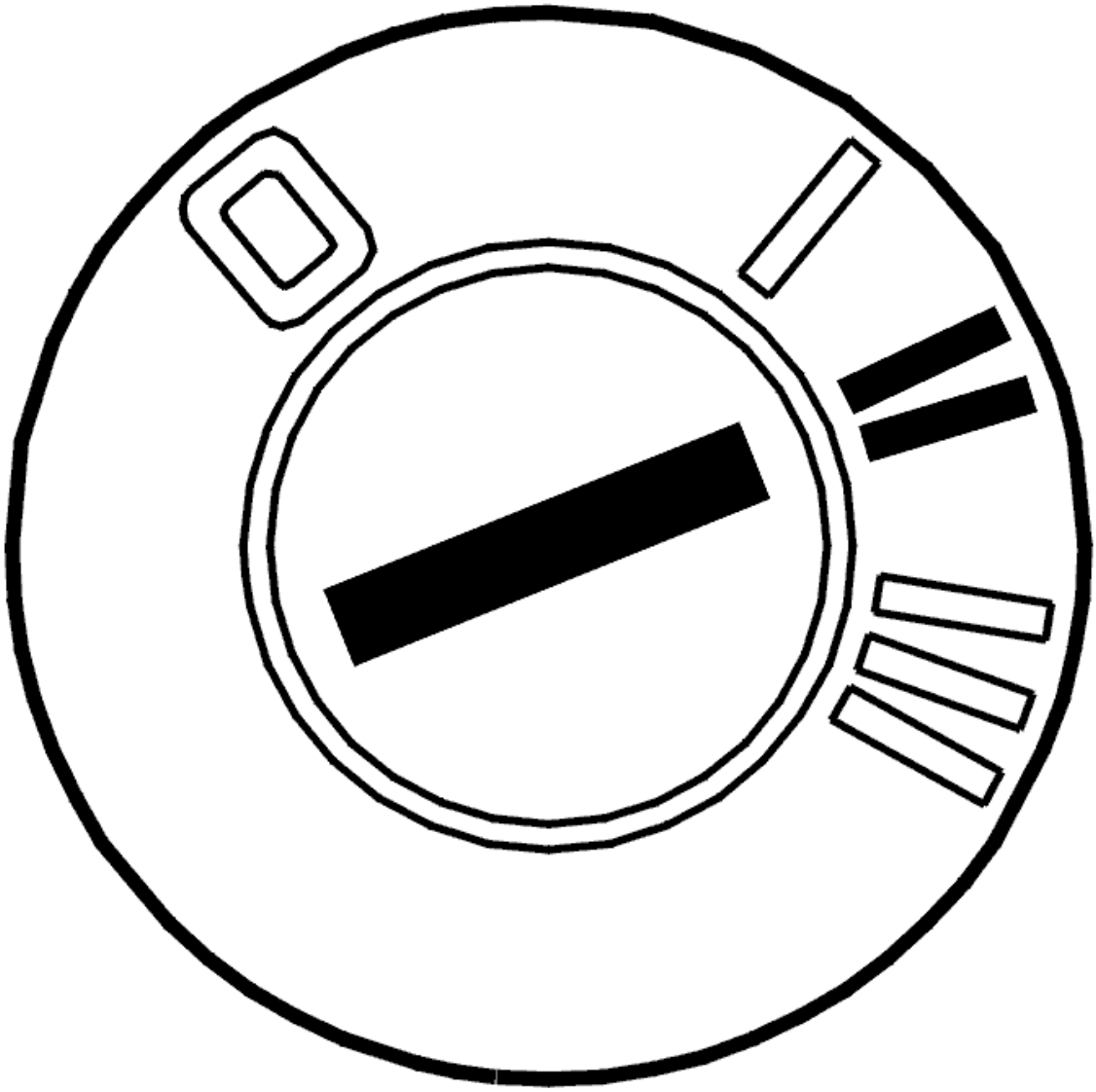


Fig. 30: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

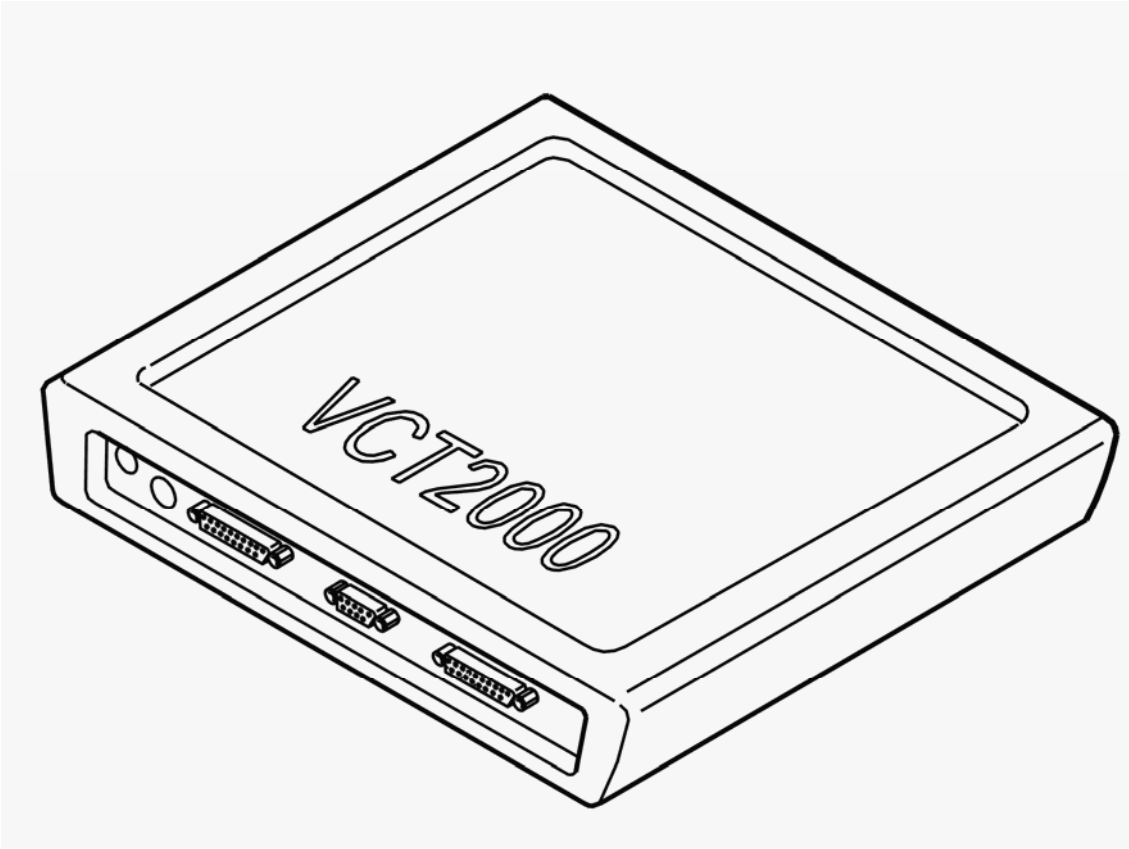


Fig. 31: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

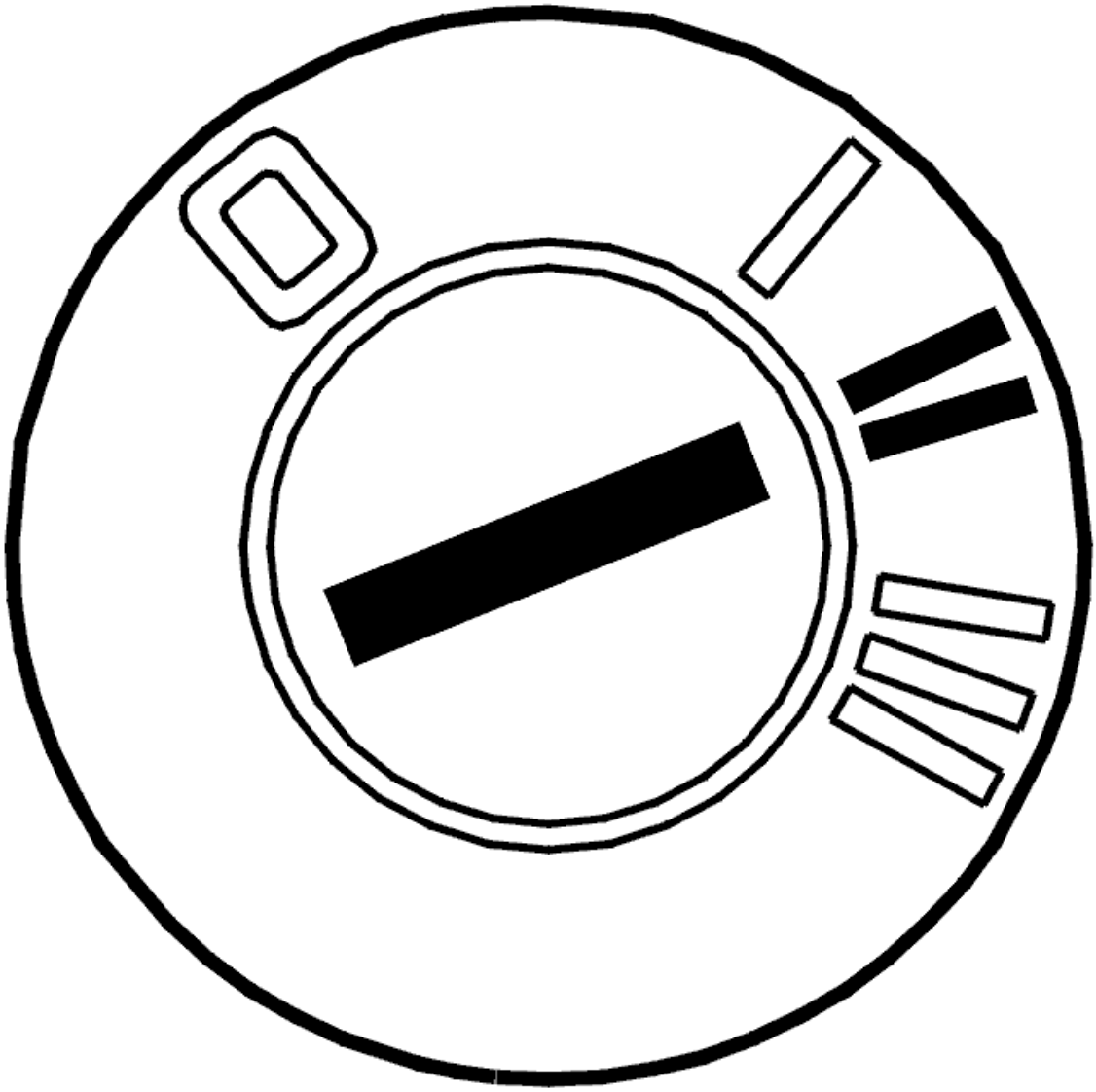


Fig. 32: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

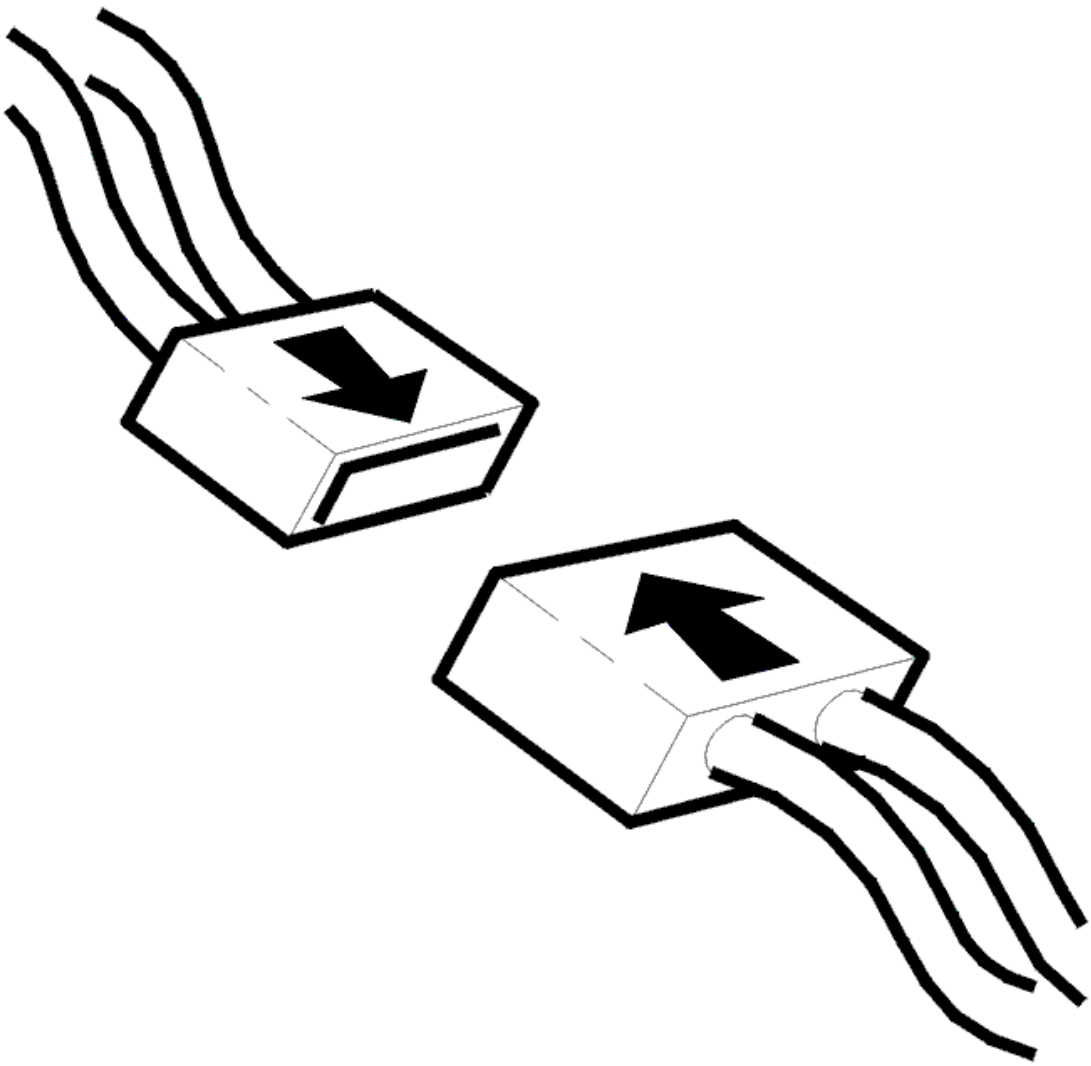


Fig. 33: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

During the test drive, oil temperature should be over 20 °C.

Note any deviations in transmission function.

Does the transmission function flawlessly?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TEST-DRIVE SCHEDULE TCM-002F AW55-50/51SN

NOTE: Read through the whole test-drive schedule before starting to test-drive.

1. Check the oil temperature in the transmission. Suitable temperature range is approx. 40-100 °C.
2. Start Activation of gear indication.

   NOTE: The function is only active during the driving cycle in question.

3. Activate tools to measure the rpm difference between the transmission's rpm sensor and the engine speed.
4. Drive the vehicle at approx. 60 km/h (37 mph) with the gear selector in lever position 3, alternatively manually selected position 3 if the vehicle is equipped with lever carrier with GearTronic. Check that the lock-up locks (indicated by steady glow from IND-light).
5. Press down the accelerator pedal and check if the difference in rpm between engine and transmission is greater than 100 rpm.
6. Perform the above check at other speeds and with other lever positions.

NOTE: Diagnostic trouble code is stored after approx. 20 sec. with an rpm difference that is greater than 100 rpm.

TCM-0039: GEAR-SHIFT POSITION SENSOR. FAULTY SIGNAL (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

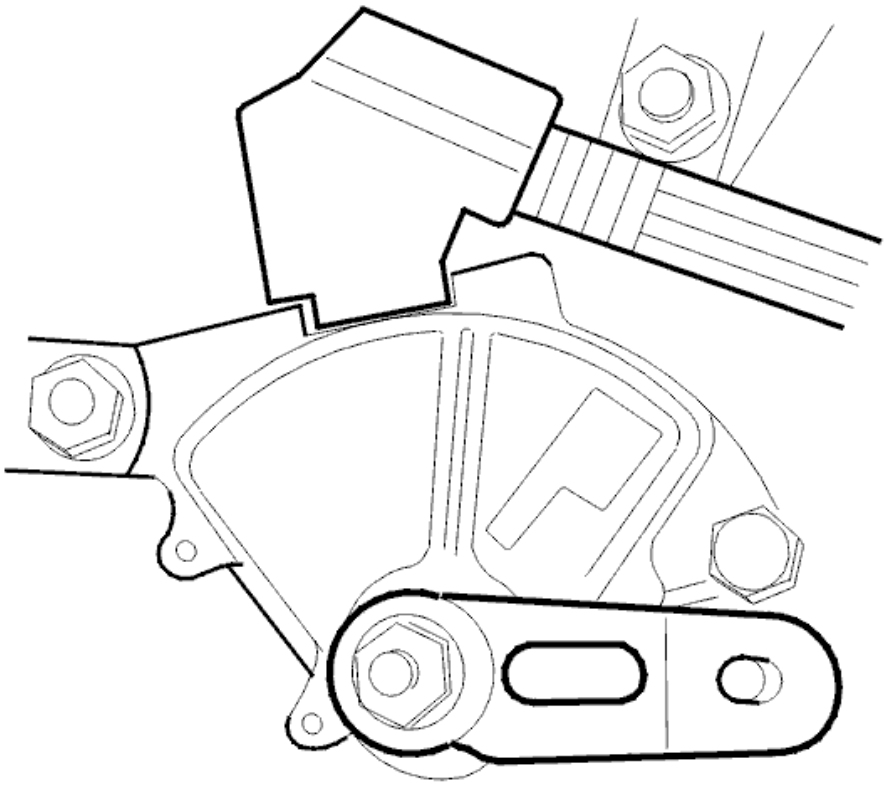


Fig. 34: Identifying Gear-Shift Position Sensor
Courtesy of VOLVO CARS CORPORATION

The gear-shift position sensor signals provide the transmission control module (TCM) with data on the gear selector position. This is done by grounding a combination of signals A, B, C and PA inside the gear position sensor. Diagnostic trouble code (DTC) TCM-0039 is stored if the control module registers an unacceptable combination of A, B, C and PA for a period of approximately 10 seconds as shown below (depending on the transmission).

AW 6 position gear selector assembly				
A	**B**	**C**	**PA**	
o	o	o	•	Diagnostic Trouble Code (DTC)
o	o	•	o	Diagnostic Trouble Code (DTC)
o	o	•	•	Diagnostic Trouble Code (DTC)
•	o	o	o	Diagnostic Trouble Code (DTC)
•	•	•	o	Diagnostic Trouble Code (DTC)
AW 7 position gear selector assembly				

A	B	C	PA	
o	o	o	•	Diagnostic Trouble Code (DTC)
o	o	•	o	Diagnostic Trouble Code (DTC)
•	•	•	•	Diagnostic Trouble Code (DTC)
•	o	o	o	Diagnostic Trouble Code (DTC)
GM4T65GT Geartronic				
A	**B**	**C**	**PA**	
o	o	o	•	Diagnostic Trouble Code (DTC)
o	o	•	o	Diagnostic Trouble Code (DTC)
o	o	•	•	Diagnostic Trouble Code (DTC)
•	o	o	o	Diagnostic Trouble Code (DTC)
•	o	•	o	Diagnostic Trouble Code (DTC)
•	•	•	o	Diagnostic Trouble Code (DTC)
•	o	•	•	Diagnostic Trouble Code (DTC)
GM4T65GT 7 position gear selector assembly				
A	**B**	**C**	**PA**	
o	o	o	•	Diagnostic Trouble Code (DTC)
•	o	o	o	Diagnostic Trouble Code (DTC)

• = 0-2 V below battery voltage

o = ground

Substitute Value

- The control module "Limp Home" program has been initiated.

Possible Source

- Contact resistance in the terminals.
- Short-circuit to supply voltage or ground in the signal cable.

- Open-circuit in the signal cable.
- Incorrectly adjusted gear-shift position sensor.
- Defective gear-shift position sensor.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

CAUTION: The gear-shift position sensor will malfunction if there is a short-circuit to supply voltage.

HINT: Harsh shifting - due to disabled line pressure solenoid STH control. This results in constant maximum line pressure and leads to harsher shifting and gear engagement.

HINT: No shifting -because the transmission control module (TCM) prevents activation of the solenoids. This stops gear-shifting.

FAULTY SIGNAL

CHECKING THE GEAR-SHIFT POSITION SENSOR

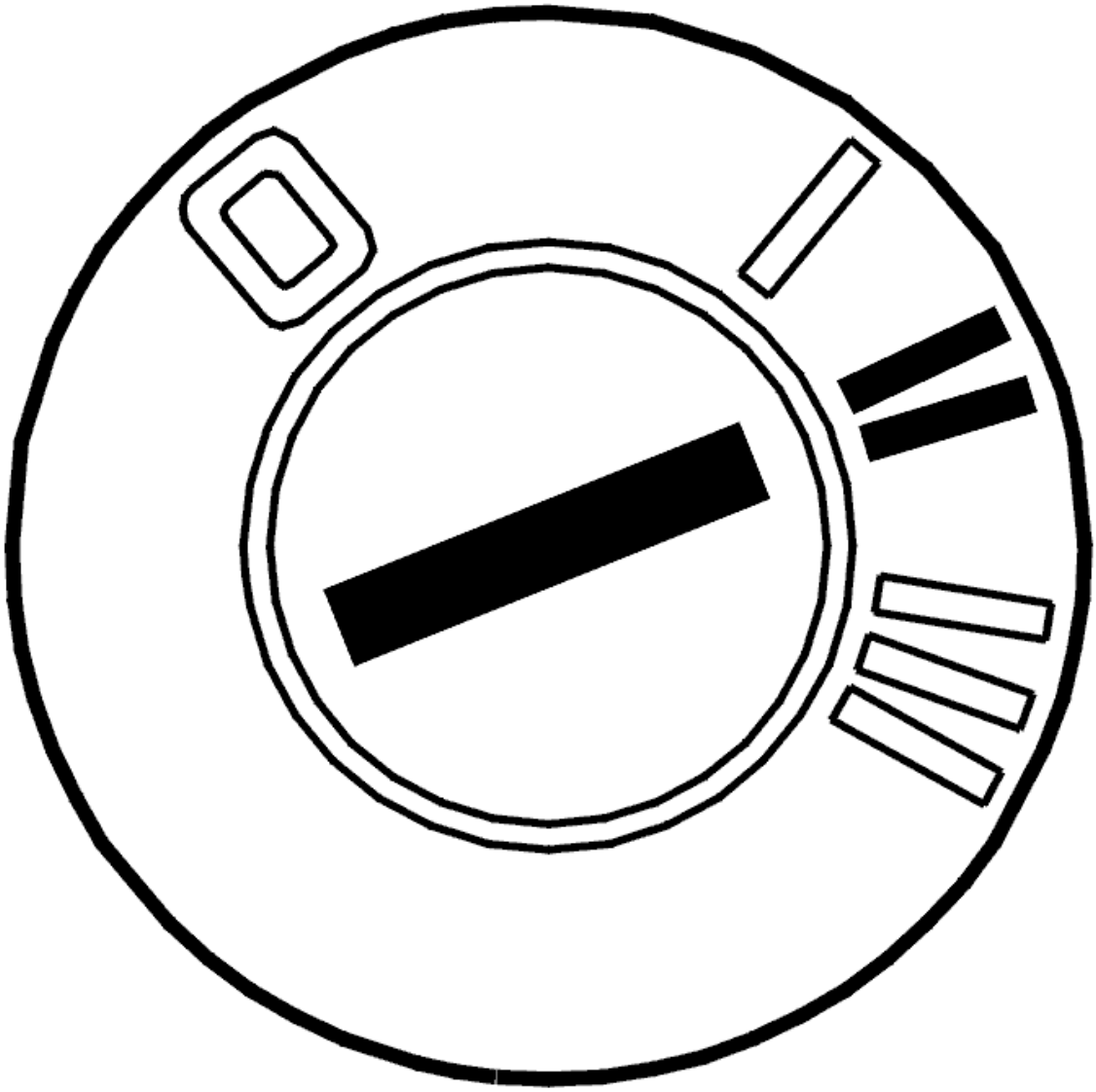


Fig. 35: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Select the correct type of gear selector assembly. Read off the position of the gear-shift position sensor.

  Shift the gear selector to all gear positions several times. Check that the gear positions are updated. The gear position sensor is incorrectly adjusted if the display shows an undefined position (OR for example).

  Adjust the gear-shift position sensor if necessary. Then re-check the gear-shift position sensor.

  Other information:

  - To adjust the gear-shift position sensor, For B5xx4T2, see **GEAR SELECTOR CABLES, ADJUSTING** or For B6xx4T, see **GEAR SELECTOR CABLE, ADJUSTING**

- To access the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To access the control module connector, see **CONNECTING THE BREAKOUT BOX** .

Select an option:

1. The gear positions are updated correctly

   Refer to **INTERMITTENT FAULT**

2. The gear positions are not updated correctly

   Refer to **CHECKING THE WIRING**

3. The gear-shift position sensor has been adjusted.

   Refer to **VERIFICATION**

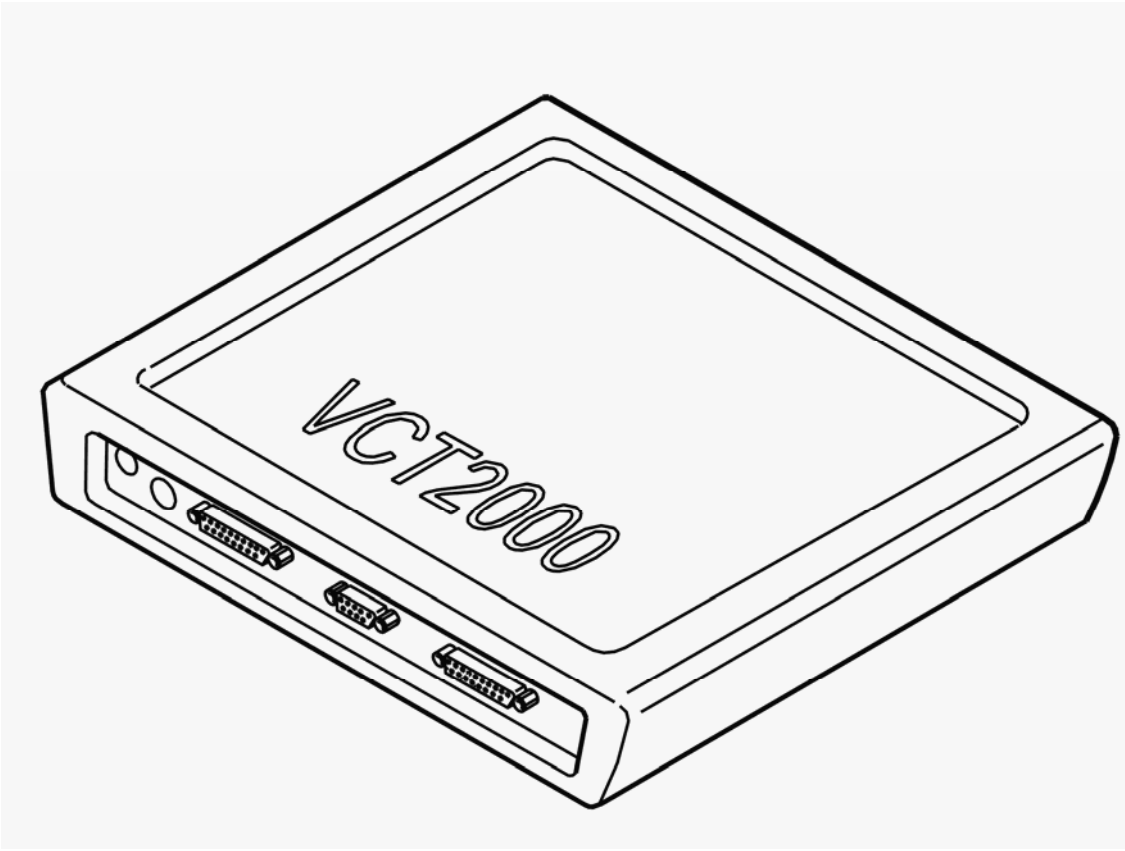


Fig. 36: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING THE WIRING

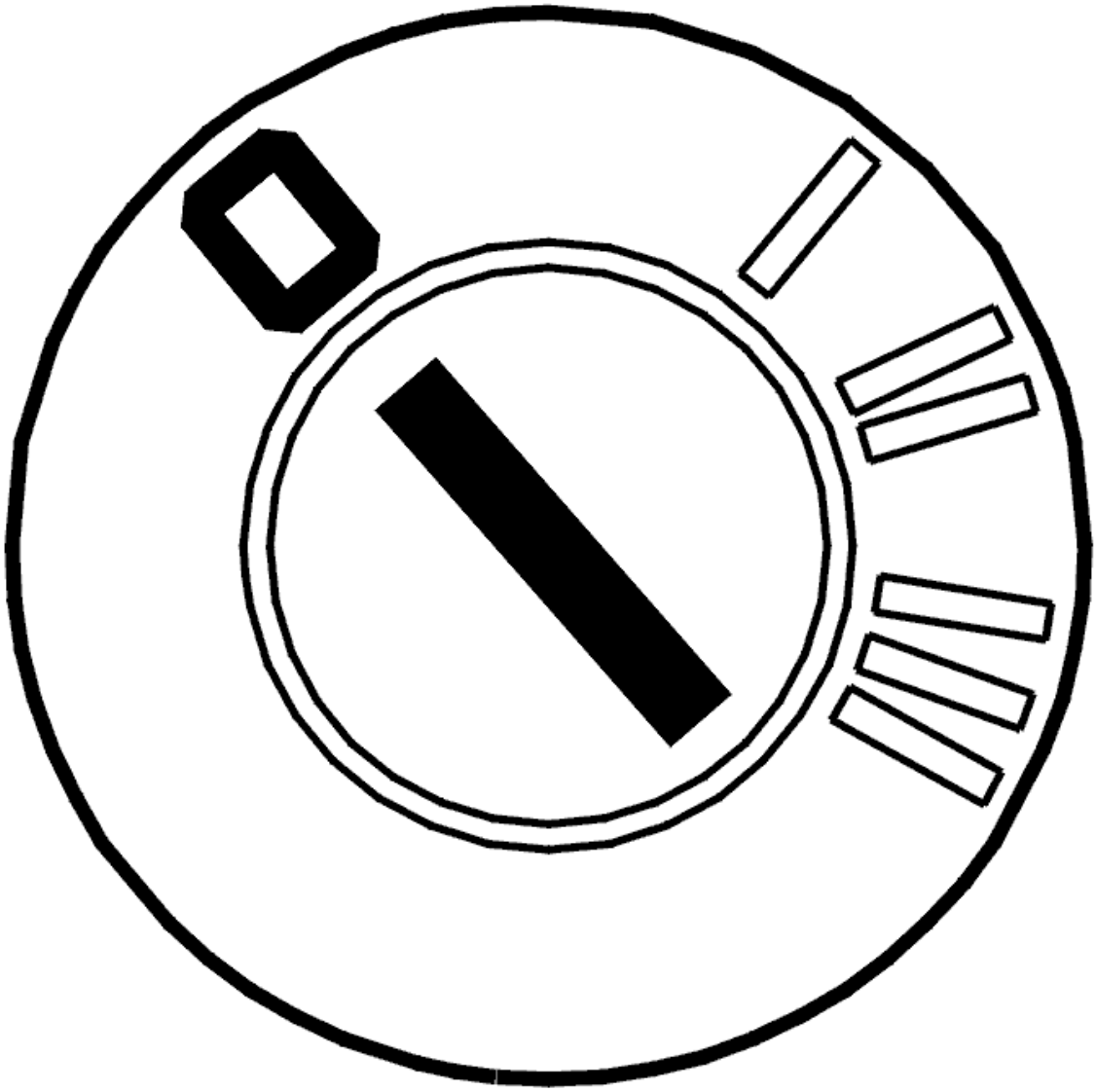


Fig. 37: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

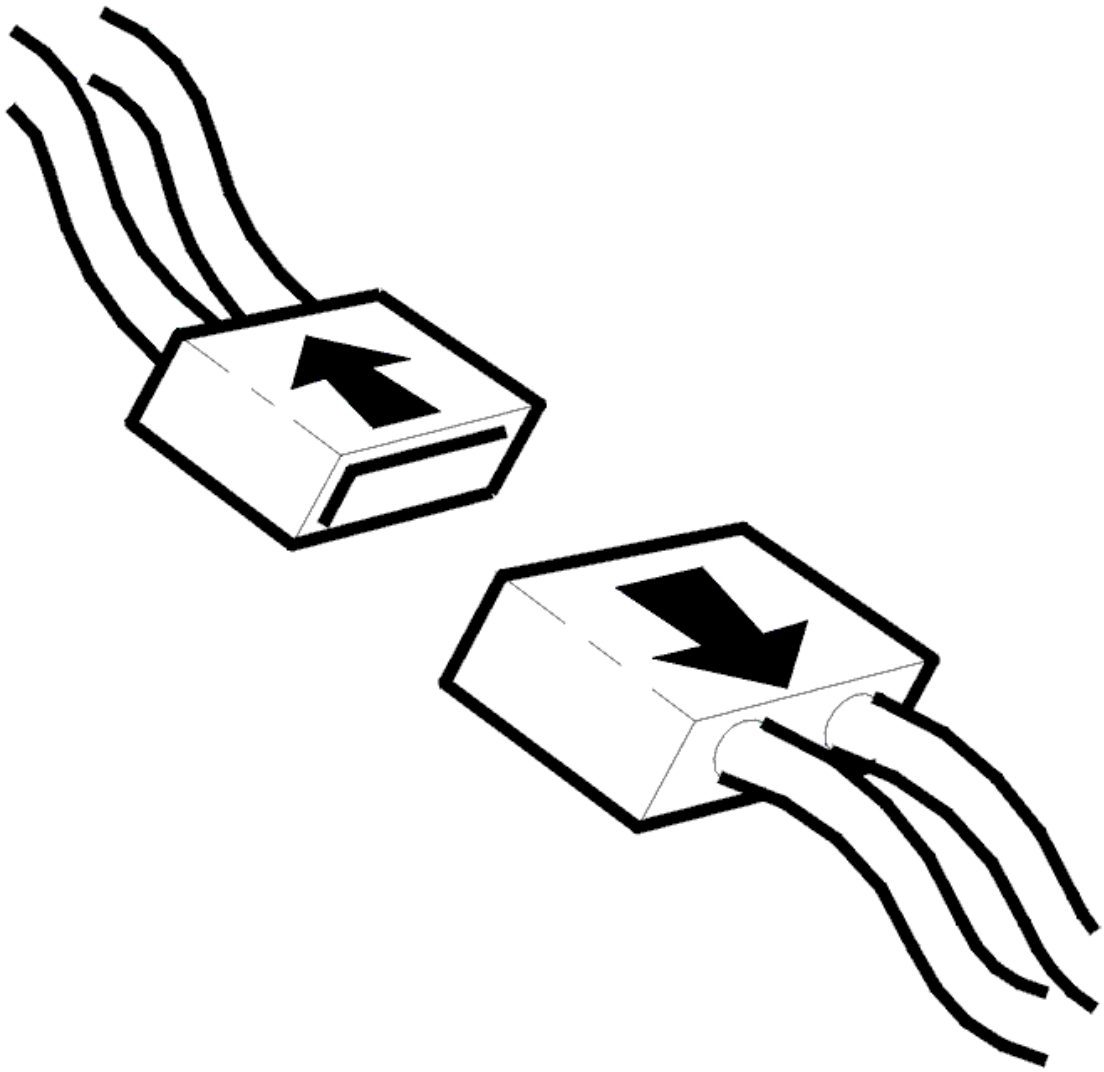


Fig. 38: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (control module side).

  Check the wiring between the transmission connector (control module side) :

  - terminal #F (#A6) and control module terminal #A46 (#A46) "A"
  - terminal #G (#A7) and control module terminal #A64 (#B4) "B"
  - terminal #H (#A8) and control module terminal #A45 (#A45) "C"

- terminal #J (#A9) and control module terminal #A63 (#B3) "PA".

check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Other information:

- To connect the breakout box to the control module, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

Select an option:

1. No fault detected

   Refer to **CHECKING THE CONTROL MODULE**

2. Open-circuit in the wiring or a short-circuit to ground

   Refer to **VERIFICATION**

3. Short-circuit to supply voltage in the wiring.

   Refer to **CHECKING THE GEAR-SHIFT POSITION SENSOR**

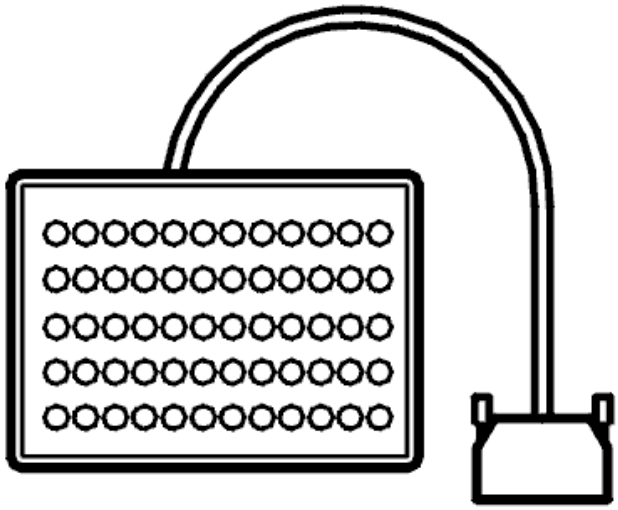


Fig. 39: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

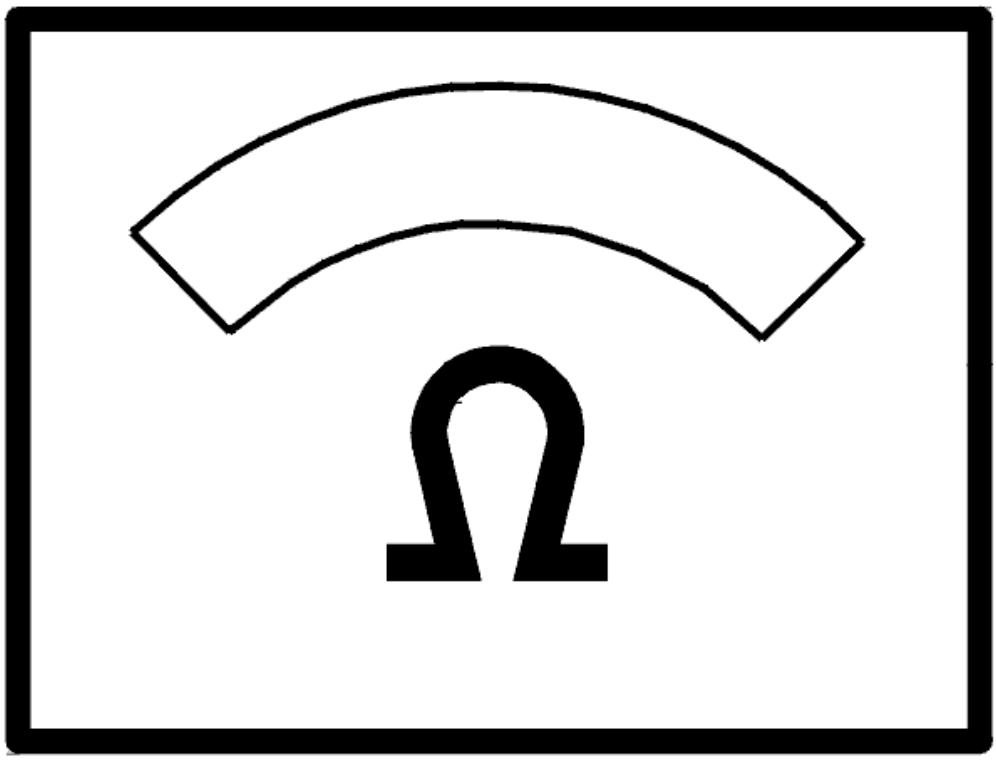


Fig. 40: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

CHECKING THE CONTROL MODULE

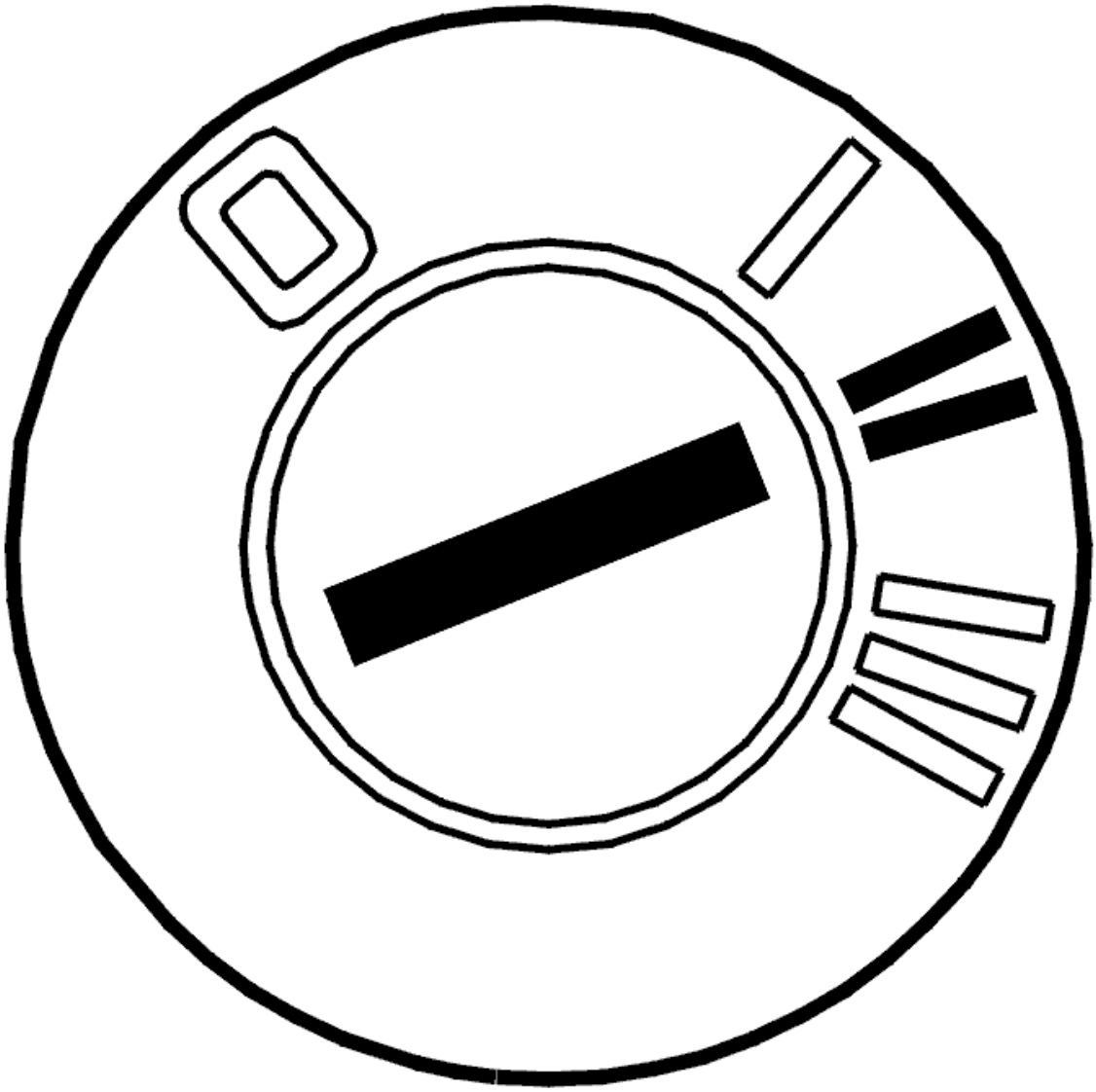


Fig. 41: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

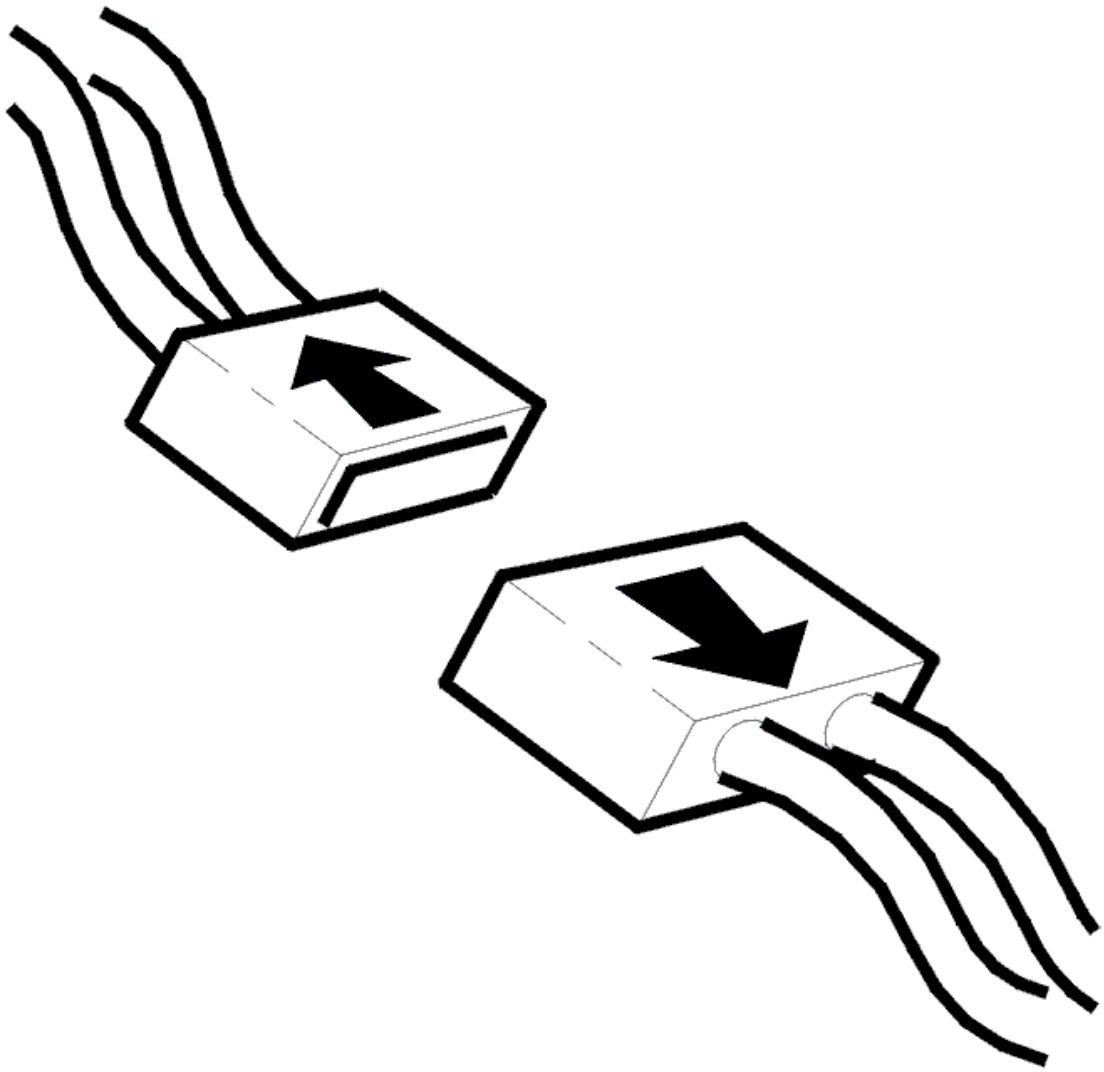


Fig. 42: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Breakout box connected to the control module
- Transmission connector disconnected
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side)
- Ignition on
- Read off the status for the inputs to the gear-shift position sensor (A, B, C, PA).

  Check that the status is HIGH for all inputs to the gear-shift position sensor (A, B, C, PA).

  Ignition off.

Temporarily connect a cable between the connector for the transmission (transmission side) terminal #A53 (#A53) and the transmission connector (control module side), see terminals according to the table.

Input	Control module connection
A	#A46 (#A46)
B	#A64 (#B4)
C	#A45 (#A45)
PA	#A63 (#B3)

CAUTION: Carefully check that the correct terminals are connected.

Also check that there is no risk of short-circuits.

Ignition on.

Check that the status of the inputs for the gear-shift position sensor change to LOW when reading off the status.

Read off the status after every new connection.

The control module is defective if the status does not change. If this is the case replace the control module.

Other information

- To connect the breakout box to the control module, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- To access or replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

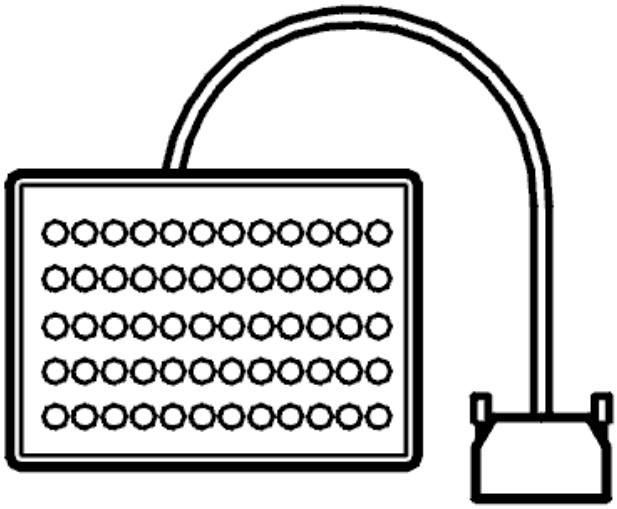


Fig. 43: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

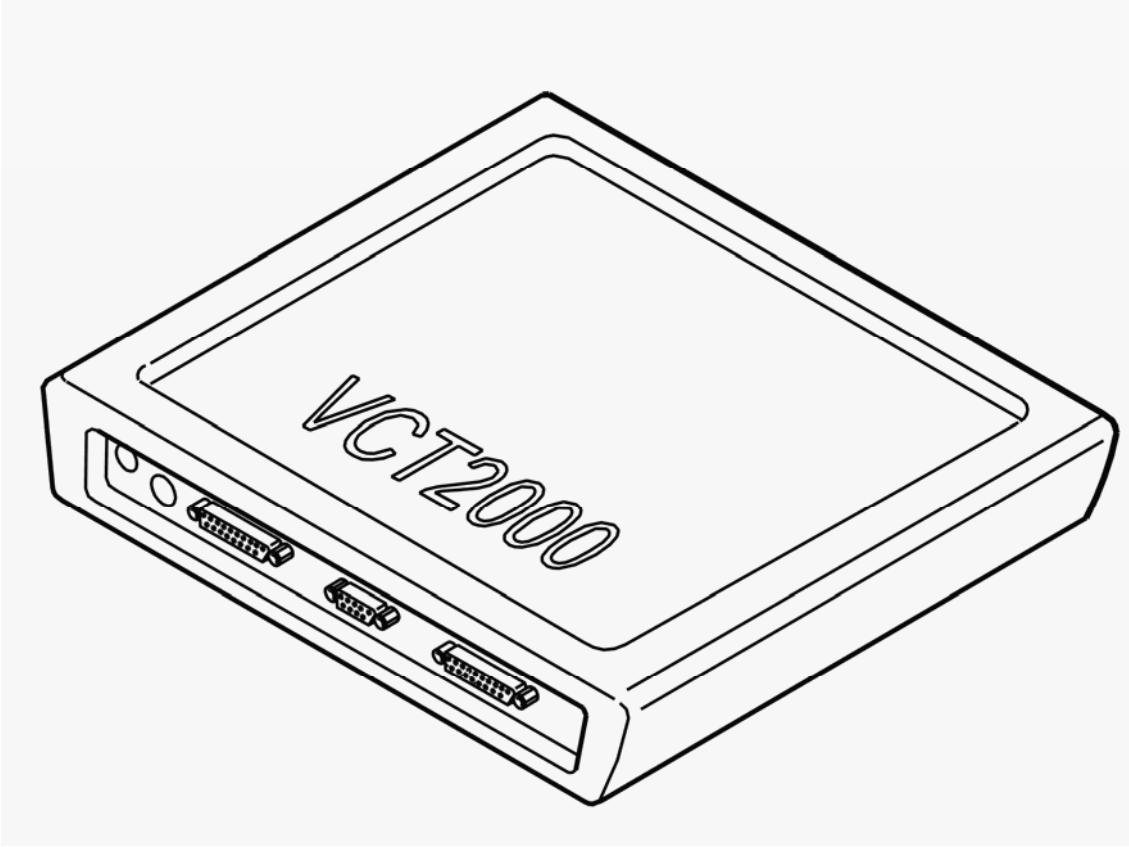


Fig. 44: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the control module defective?

- **YES**

Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

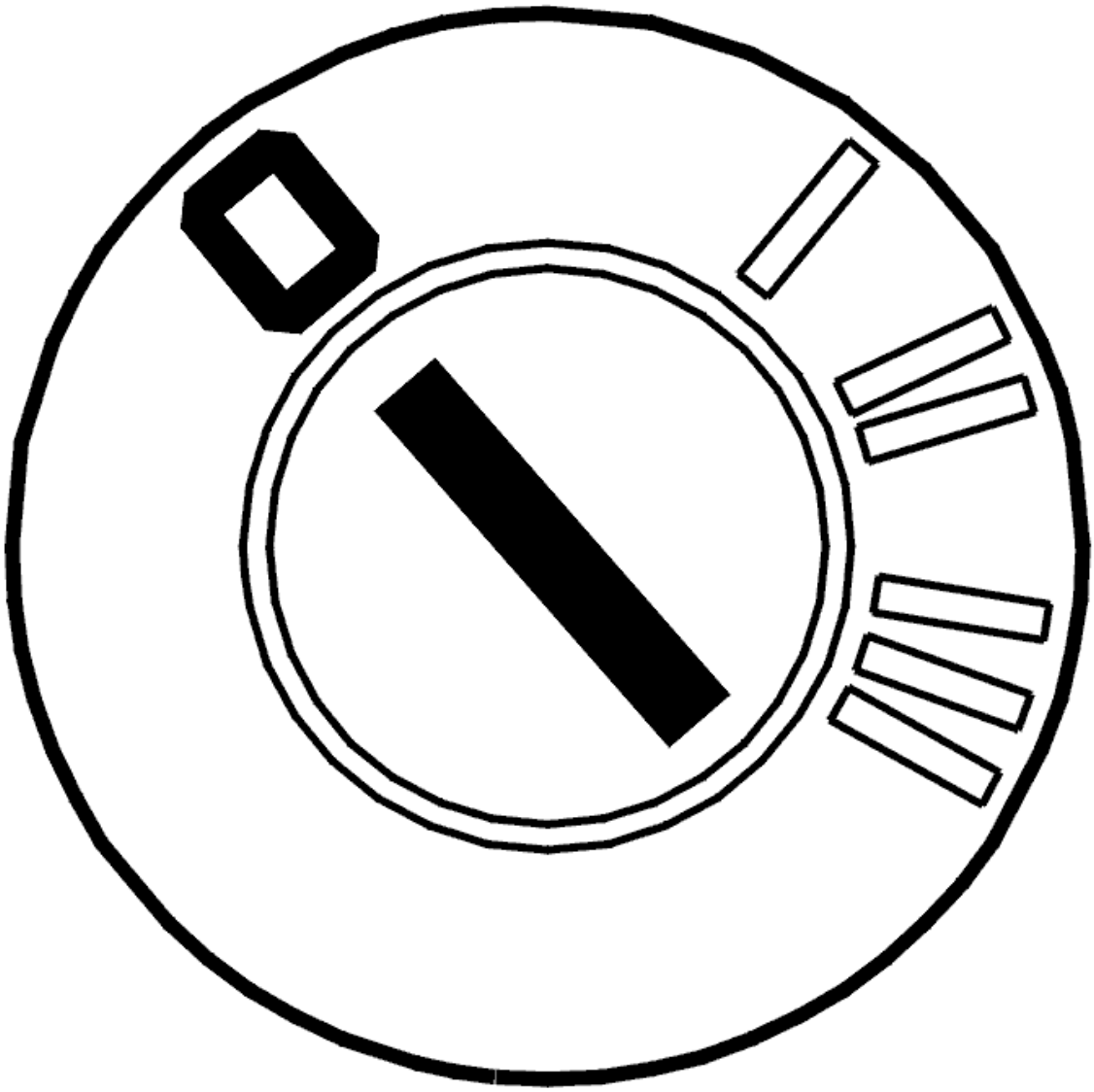


Fig. 45: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

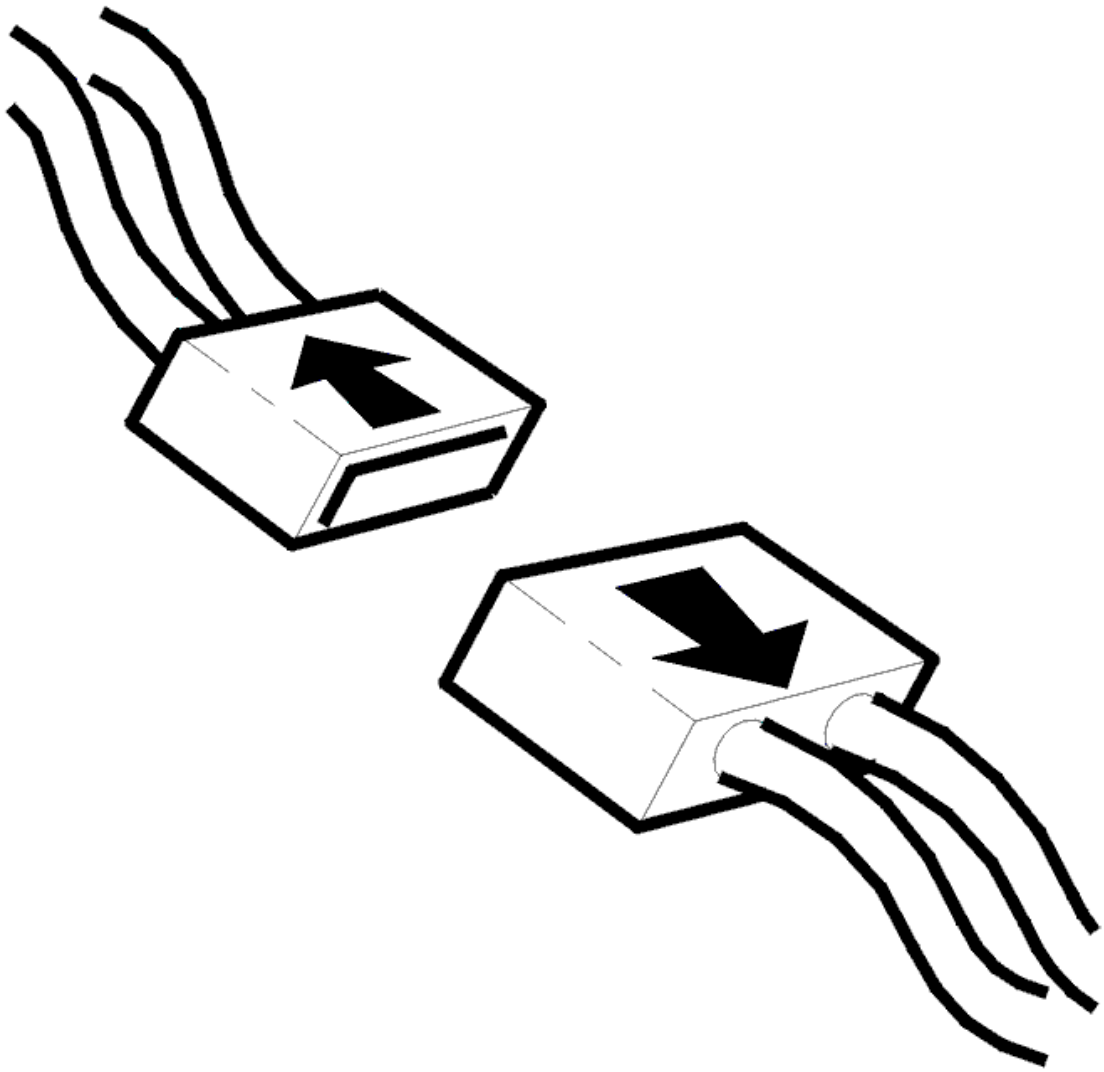


Fig. 46: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Breakout box connected to the control module
- Open the transmission control system
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (transmission side).

  Check the wiring between the transmission connector and:

  - terminal #F (#A6) and gear-shift position sensor terminal #E
  - terminal #G (#A7) and gear-shift position sensor terminal #D
  - terminal #H (#A8) and gear-shift position sensor terminal #C

- terminal #J (#A9) and gear-shift position sensor terminal #B
- terminal #K (#A10) and gear-shift position sensor terminal #F.

check for an open-circuit, a short-circuit to ground and a short-circuit to supply voltage.

Other information:

- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** and To install, see **SIDE COVER TRANSMISSION, INSTALLING** .
- To connect the breakout box to the control module, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

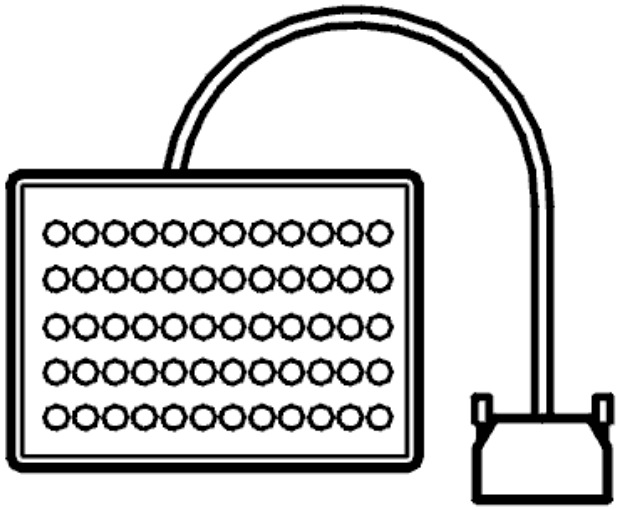


Fig. 47: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

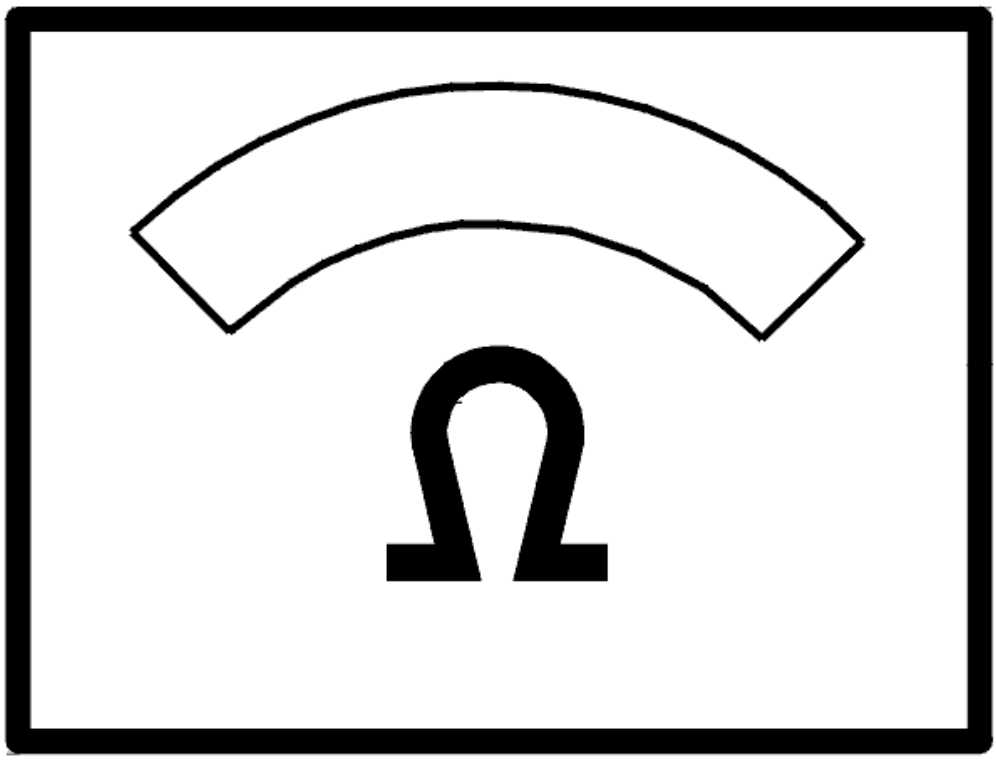


Fig. 48: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Were any faults found in the cable?

- **YES**

  Refer to **RESETTING THE ADAPTATION**

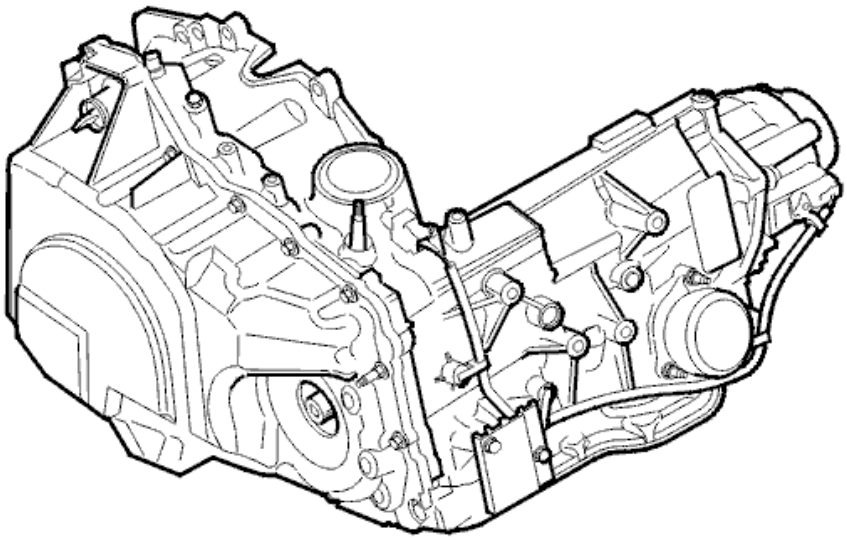
- **NO**

  Refer to **REPLACING THE COMPONENT**

REPLACING THE COMPONENT

The gear-shift position sensor is not available a replacement component. Replace the transmission. See

TRANSMISSION, REMOVING and **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)**



P2X

4301721D ©VOLVO

Fig. 49: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

CHECKING THE GEAR-SHIFT POSITION SENSOR

HINT: The gear-shift position sensor may malfunction if there has been a short-circuit to supply voltage in the signal cable. Check the gear-shift position sensor as follows:

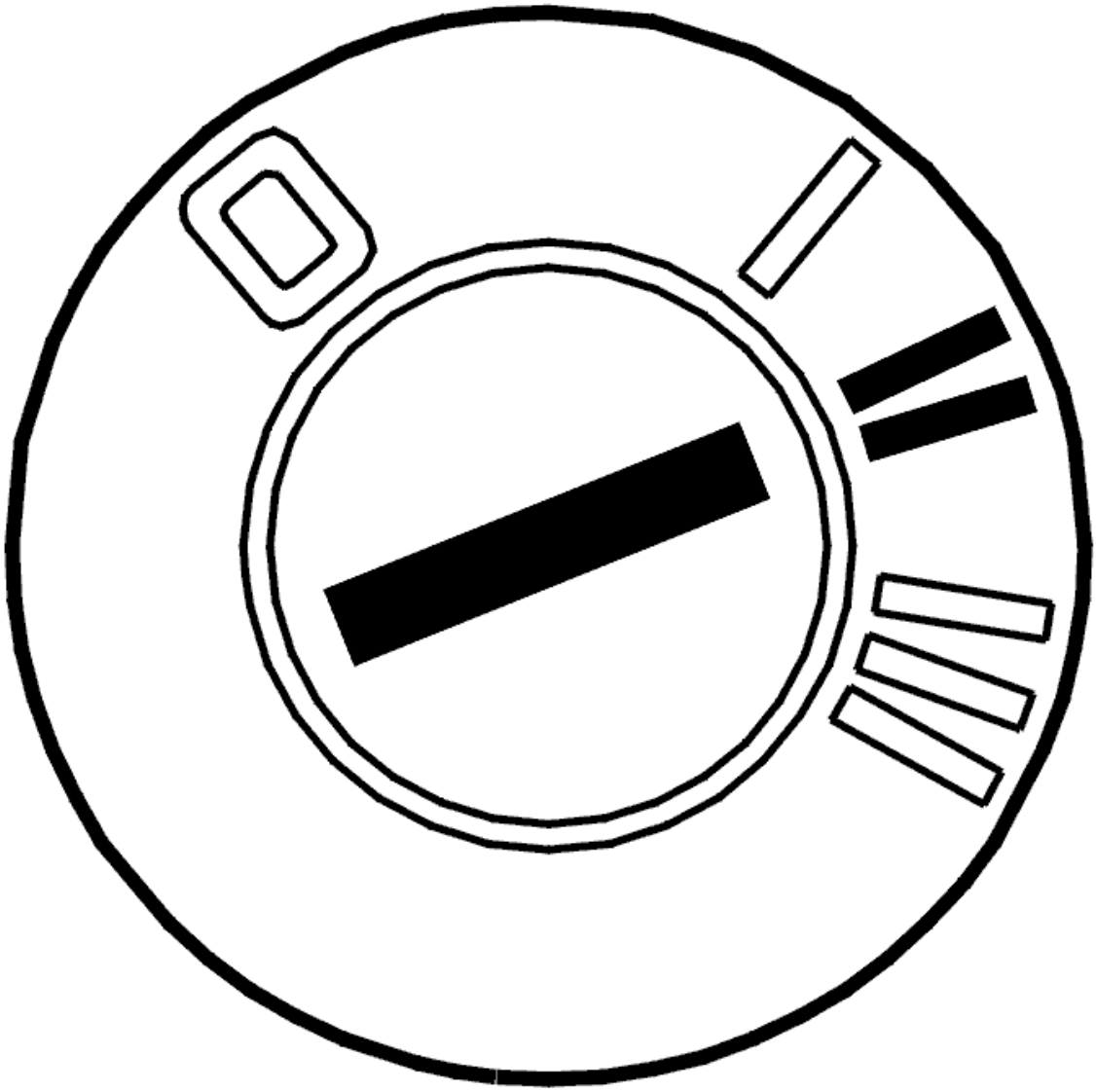


Fig. 50: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

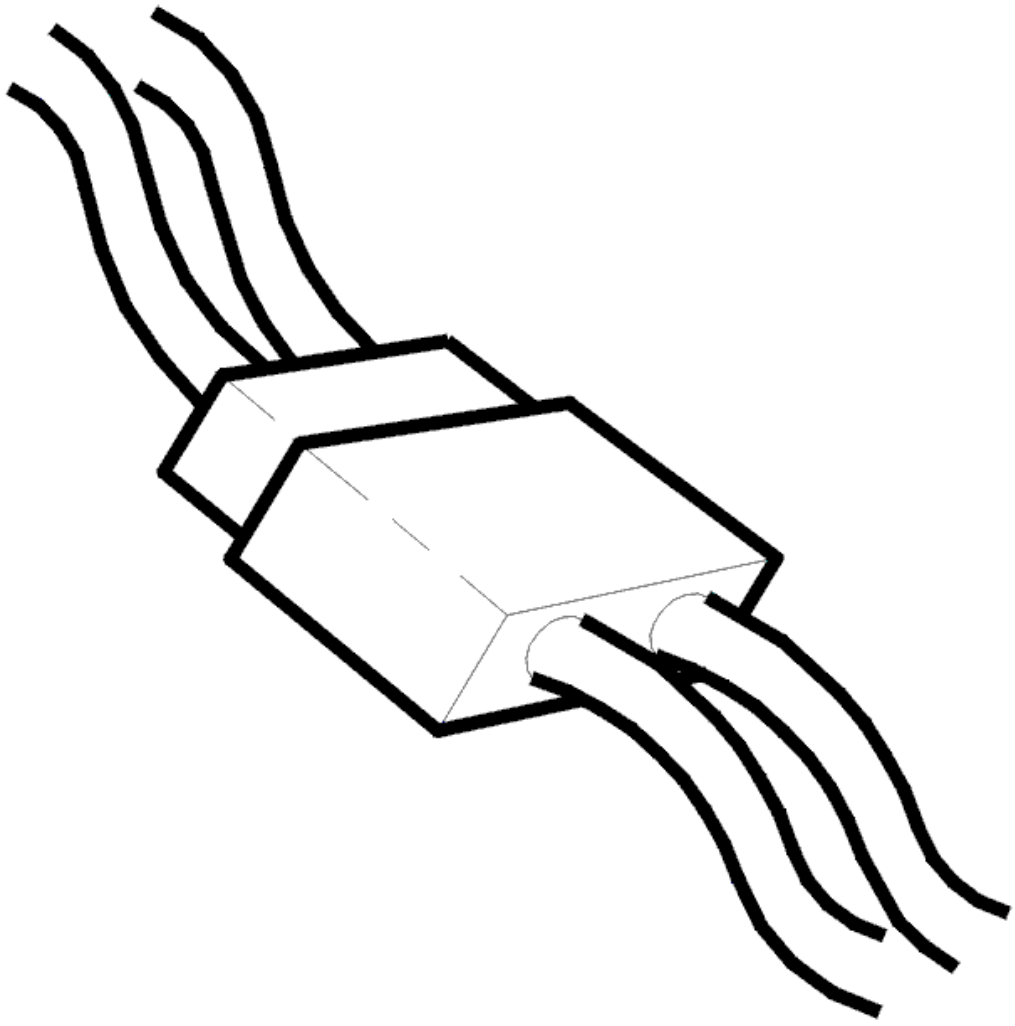


Fig. 51: Identifying Connector
Courtesy of VOLVO CARS CORPORATION

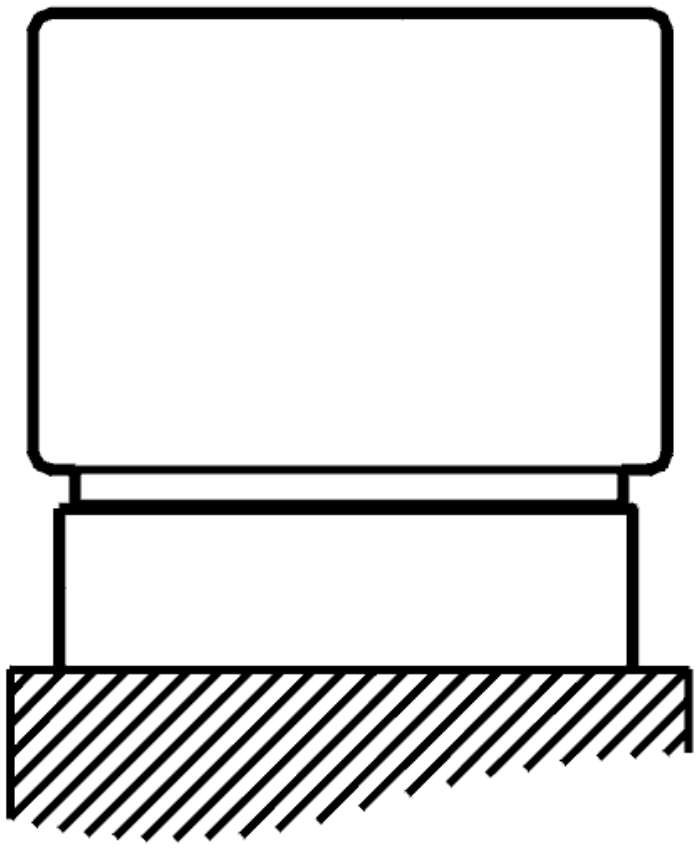


Fig. 52: Identifying Control Unit Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector connected
- Control module connected.
- Ignition on
- Select the correct type of gear selector assembly. Read off the position of the gear-shift position sensor.

  Move the gear selector to all shift positions a number of times. Repeatedly select the same position to check the operation of the gear-shift position sensor.

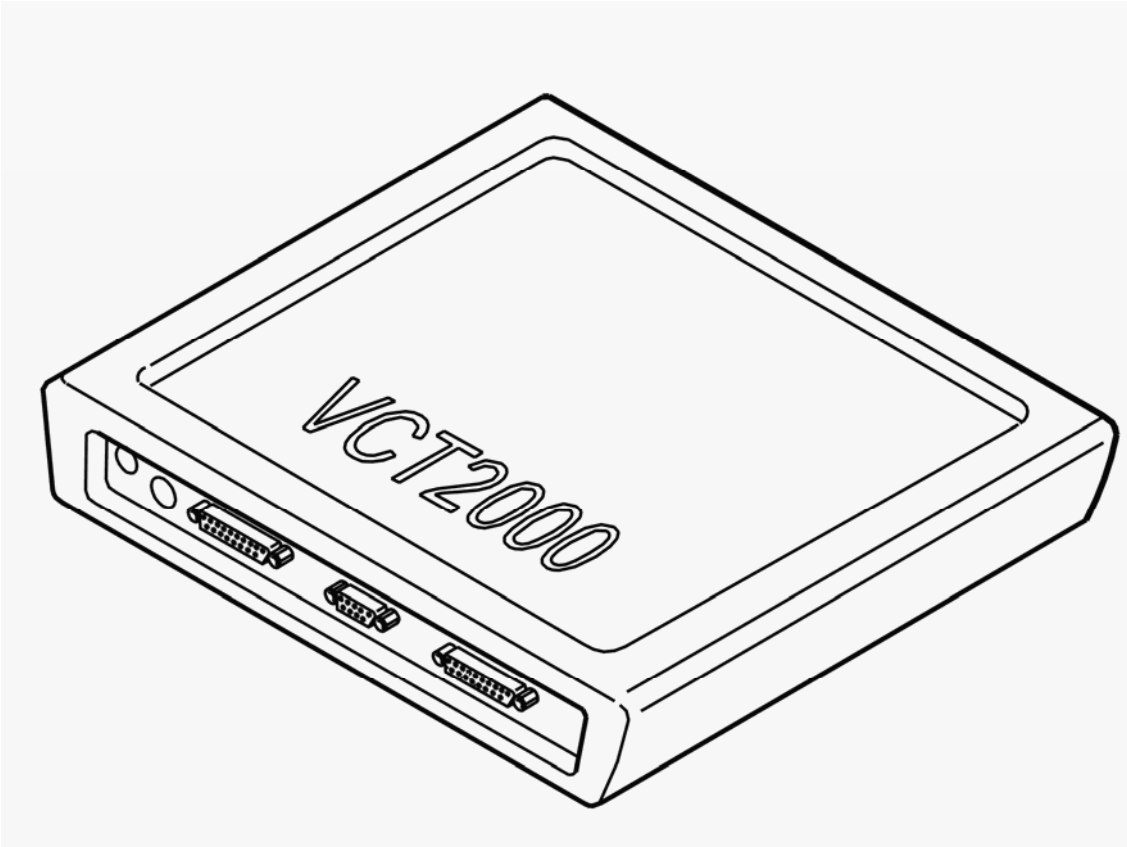


Fig. 53: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Are all positions OK?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **REPLACING THE COMPONENT**

INTERMITTENT FAULT

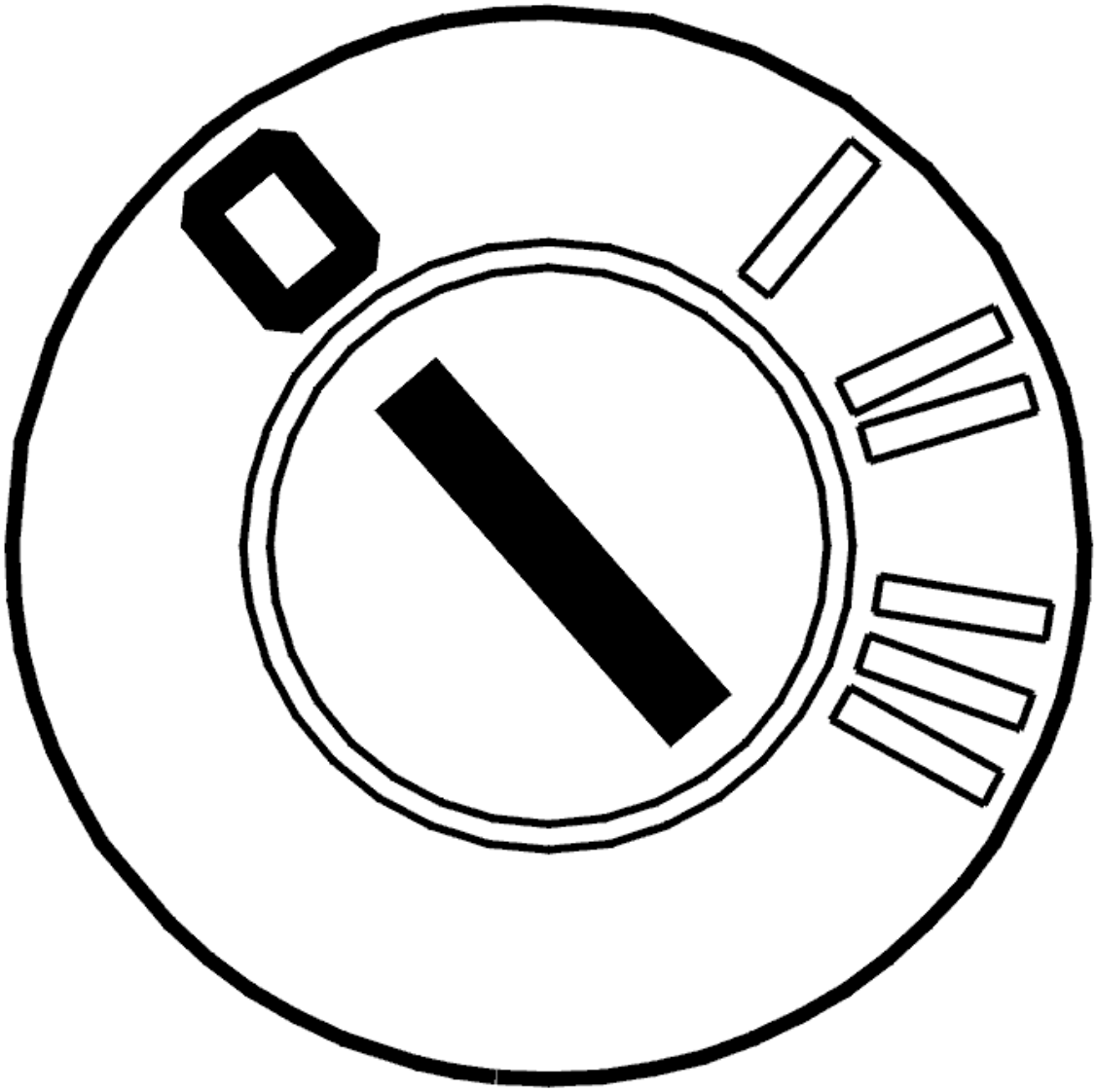


Fig. 54: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the control module and transmission connectors. Check the ground terminal for the gear position sensor. Check for intermittent loose connections (terminals). Check for contact resistance and oxidation.

  Check the wiring between the transmission connector (control module side):

  - terminal #F (#A6) and control module terminal #A46 (#A46) "A"
  - terminal #G (#A7) and control module terminal #A64 (#B4) "B"
  - terminal #H (#A8) and control module terminal #A45 (#A45) "C"
  - terminal #J (#A9) and control module terminal #A63 (#B3) "PA".

check for an intermittent open-circuit. Check for an intermittent short-circuit to ground. Check for an intermittent short-circuit to supply voltage.

Remedy as necessary.

Other information:

- To connect the breakout box to the control module, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

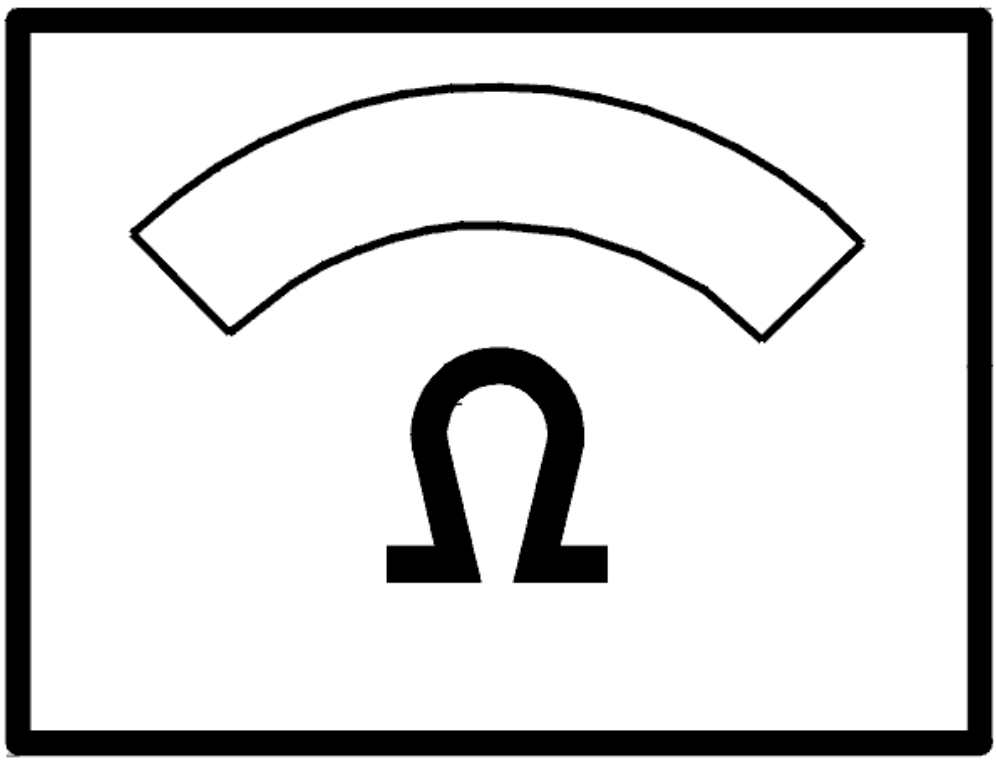


Fig. 55: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

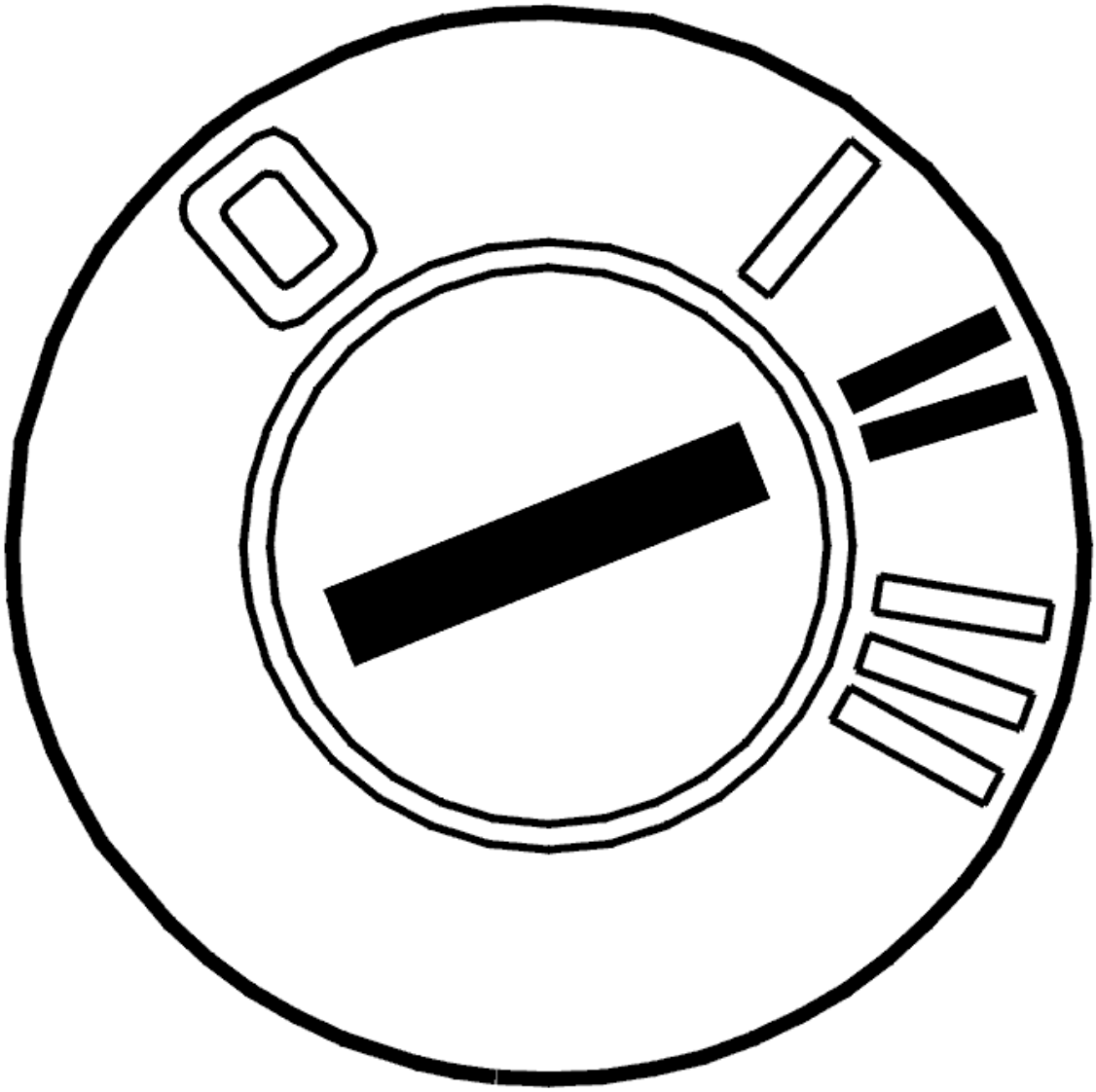


Fig. 56: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

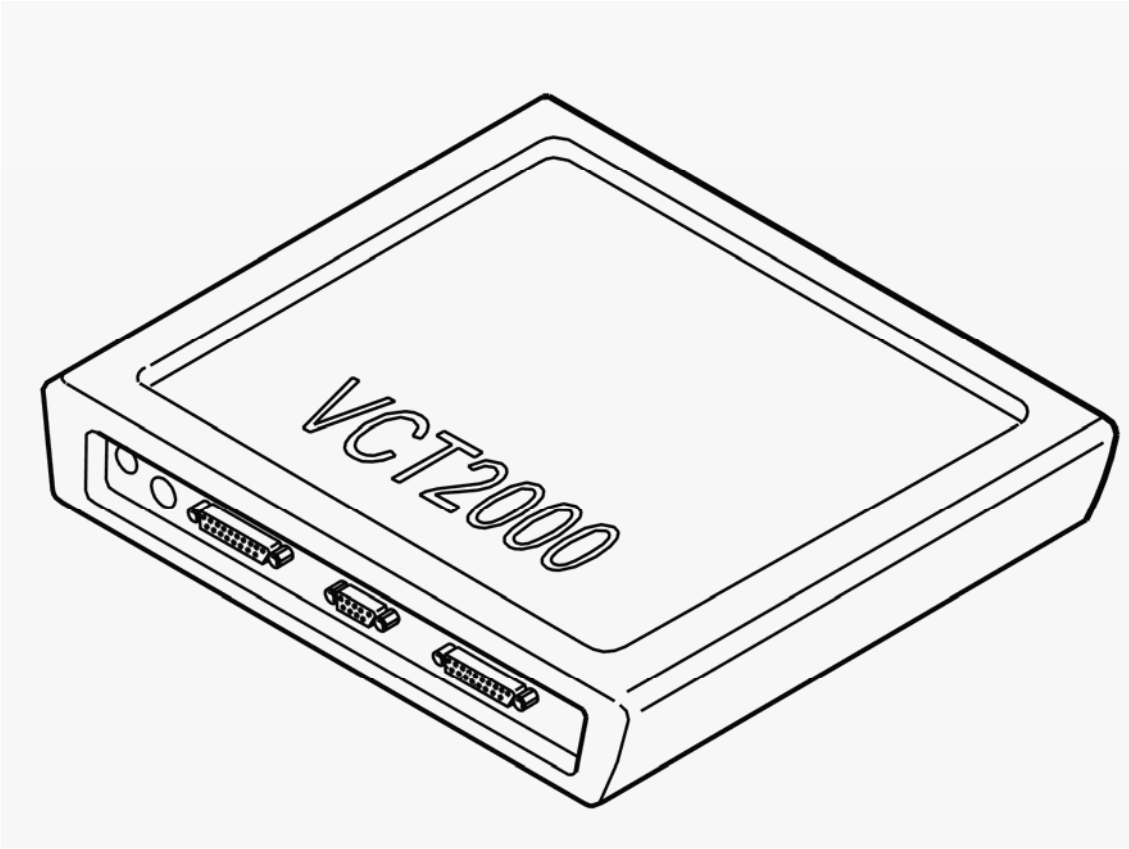


Fig. 57: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair check that the fault has been remedied.

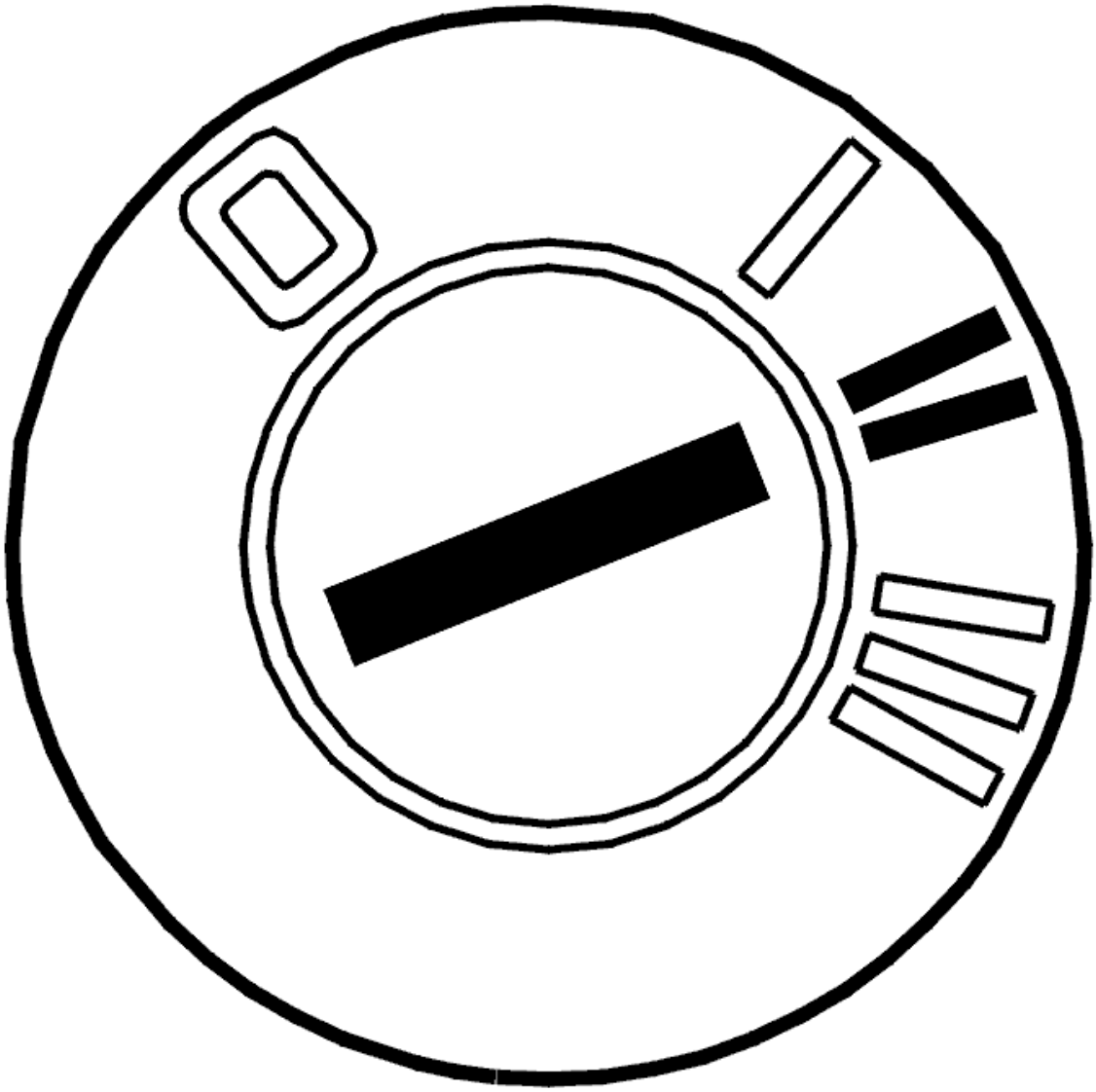


Fig. 58: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

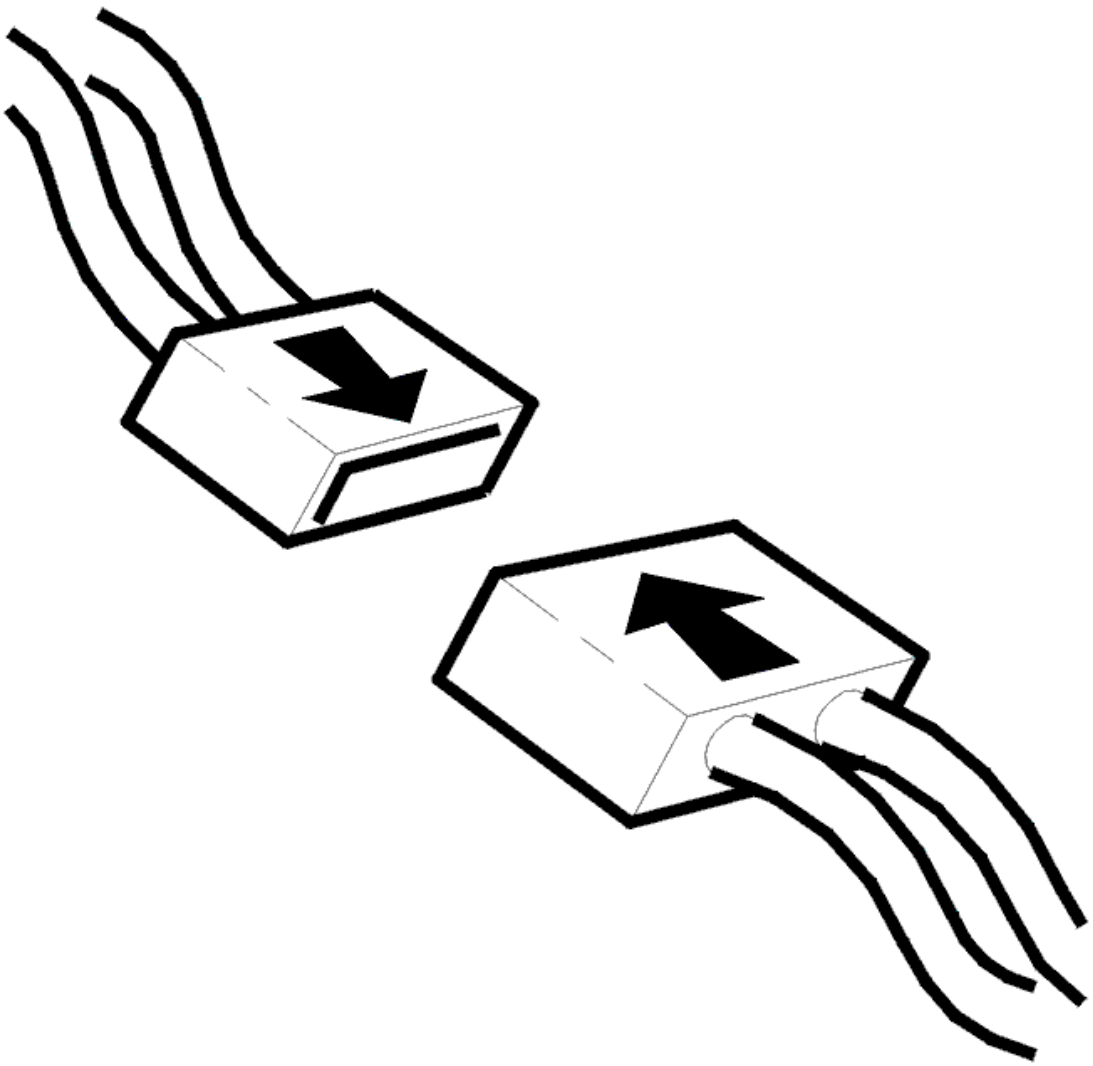


Fig. 59: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reconnect components, connectors etc.
- Ignition on.
- Read off gear-shift position sensor position.

  Move the gear selector to all shift positions a number of times, and repeatedly select the same position to check the operation of the gear-shift position sensor. If the gear-shift position sensor function is OK the cause of the fault was contact resistance or oxidation.

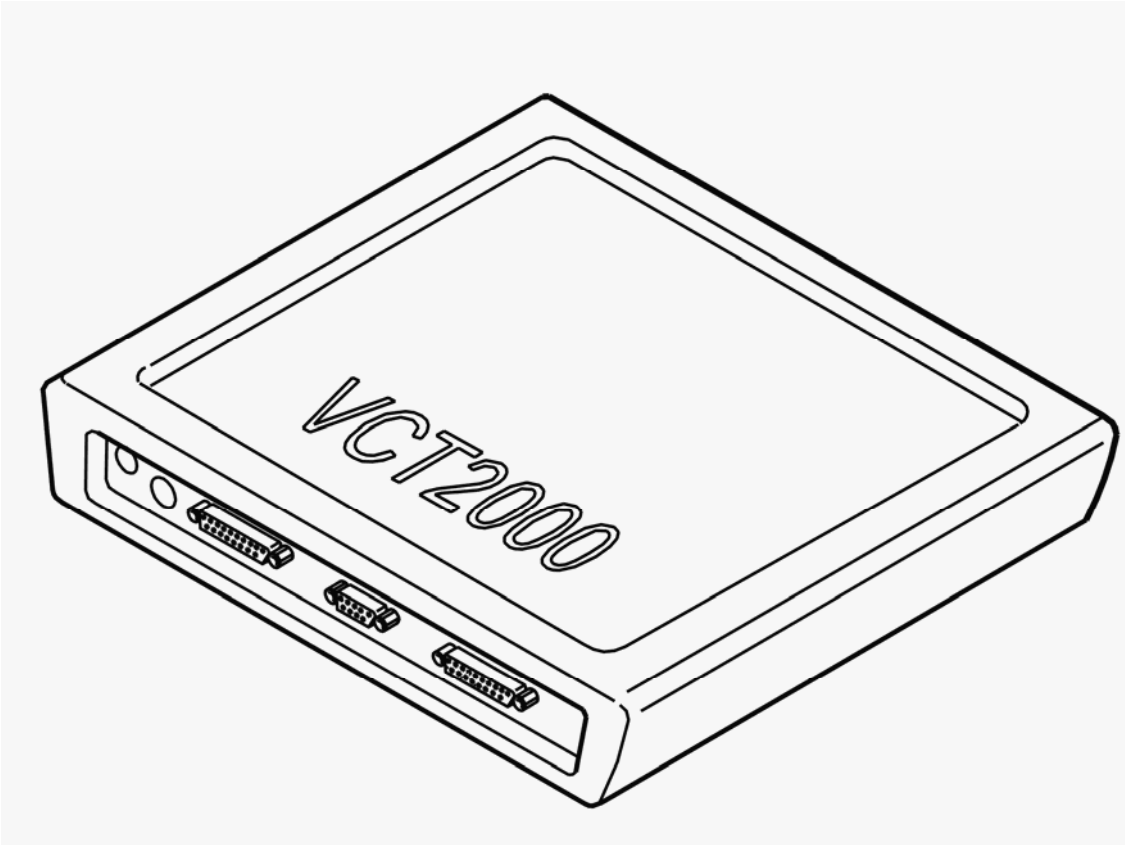


Fig. 60: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Are all values OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

In case of this defect, troubleshooting is not followed by verification.

The information can be displayed again or the fault-tracing for this fault can be interrupted.

TCM-0039: GEAR-SHIFT POSITION SENSOR. FAULTY SIGNAL (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

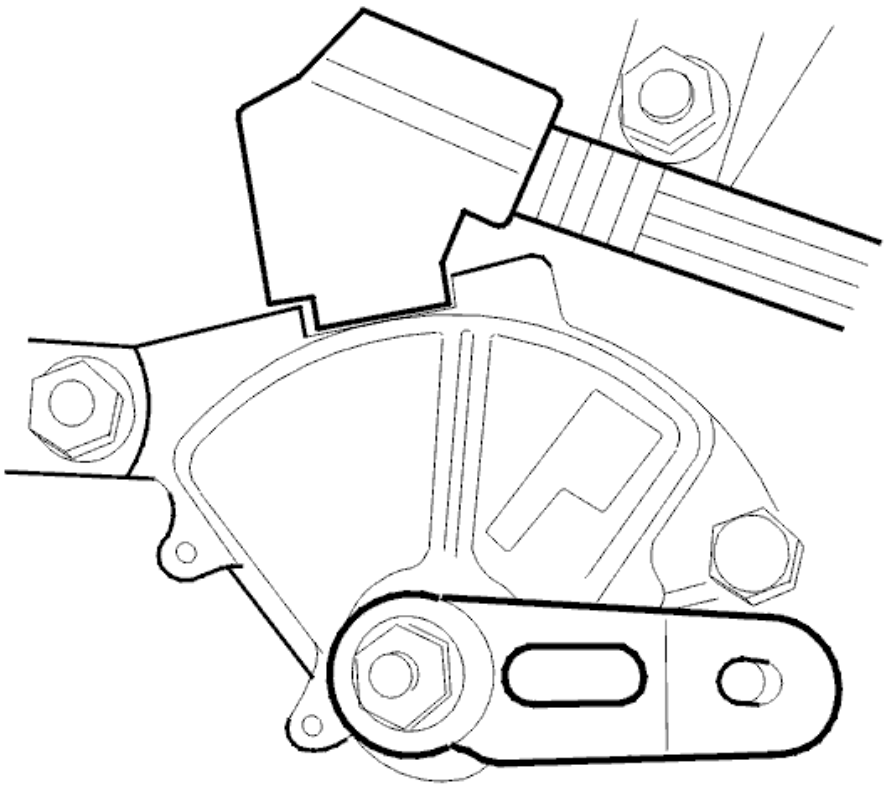


Fig. 61: Identifying Gear-Shift Position Sensor
Courtesy of VOLVO CARS CORPORATION

The gear-shift position sensor signals provide the transmission control module (TCM) with data on the gear selector position. This is done by grounding a combination of signals A, B, C and PA inside the gear position sensor. Diagnostic trouble code (DTC) TCM-0039 is stored if the transmission control module (TCM) registers an unacceptable combination of A, B, C and PA for a period of 10 seconds as shown below.

A	B	C	PA	
•	•	o	o	Diagnostic Trouble Code (DTC)
•	•	•	•	Diagnostic Trouble Code

				(DTC)
•	•	•	o	Diagnostic Trouble Code (DTC)
o	•	•	•	Diagnostic Trouble Code (DTC)
•	•	o	•	Diagnostic Trouble Code (DTC)
o	o	o	•	Diagnostic Trouble Code (DTC)

• = 0-2 V below battery voltage

o = ground

Substitute Value

- The control module "Limp Home" program has been initiated.

Possible Source

- Contact resistance in terminals.
- Short-circuit to supply voltage or ground in the signal cable.
- Open-circuit in the signal cable.
- Incorrectly adjusted gear-shift position sensor.
- Defective gear-shift position sensor.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

CAUTION: The gear-shift position sensor will malfunction if there is a short-circuit to supply voltage.

FAULTY SIGNAL

CHECKING THE ADJUSTMENT OF THE GEAR-SHIFT POSITION SENSOR

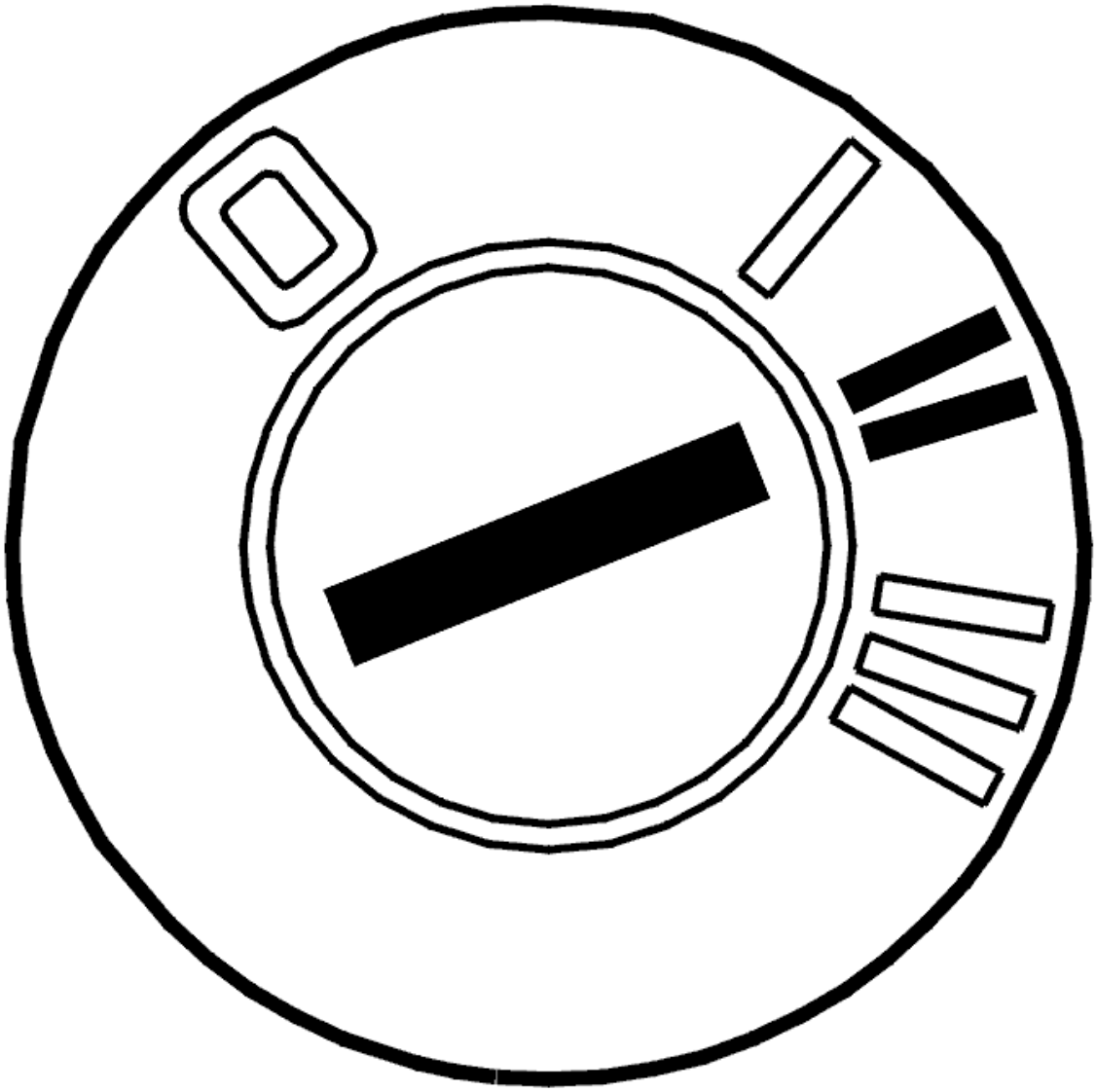


Fig. 62: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the position of the gear selector.

NOTE: Select the correct gear selector assembly from the list.

Shift the gear selector to all gear positions several times. This is to check the function of the gear selector sensor.

The selected position must be the same as that displayed in VIDA (Volvo scan tool). If the display shows an undefined position (OR for example) when a specific gear is selected, the transmission cable needs adjusting.

NOTE: An undefined position may be displayed between the fixed gear positions. This is not a fault.

Adjust the gear-shift position sensor if necessary according to **GEAR-SHIFT POSITION SENSOR, CHECKING/ADJUSTING** .

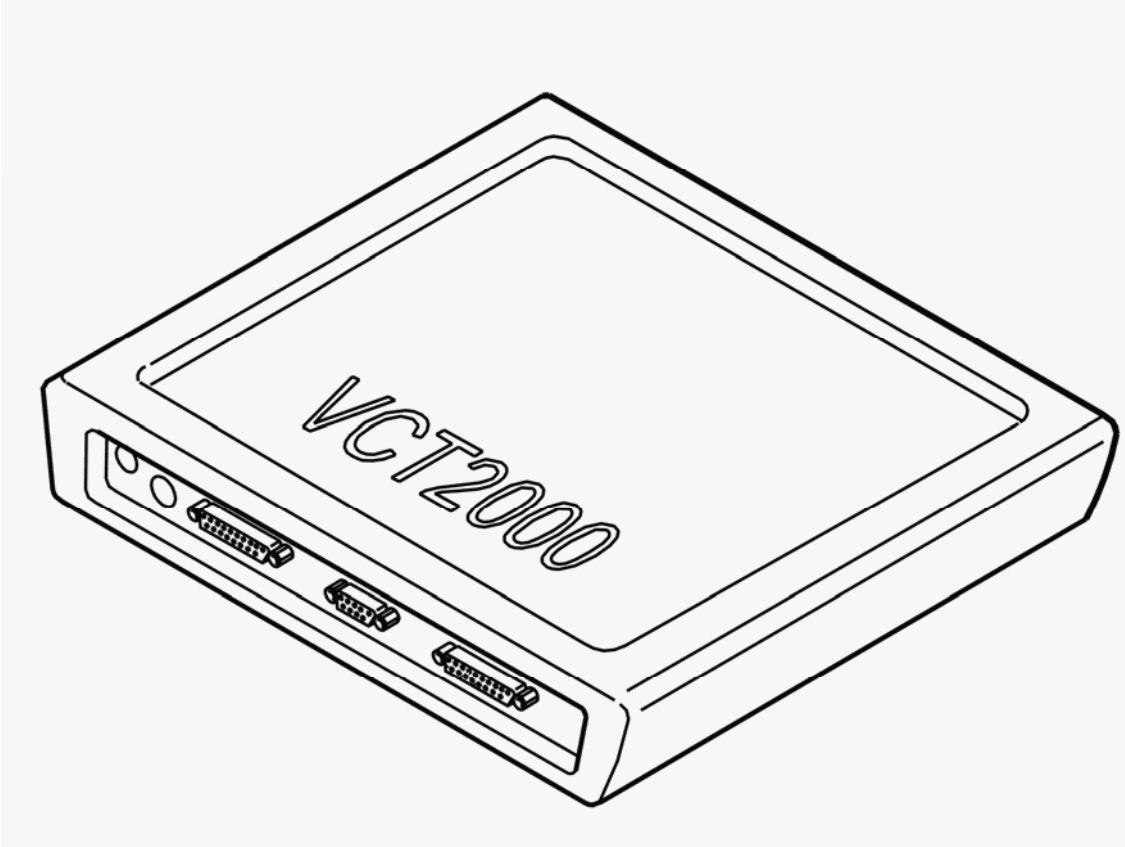


Fig. 63: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

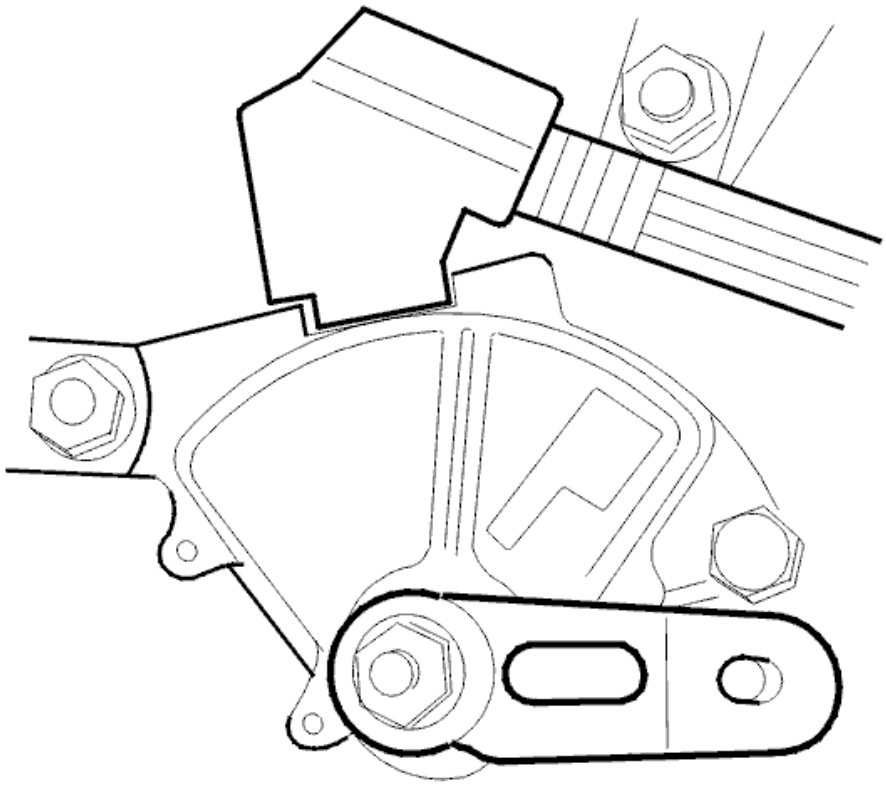


Fig. 64: Identifying Gear-Shift Position Sensor
Courtesy of VOLVO CARS CORPORATION

Is the gear-shift position sensor incorrectly adjusted?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

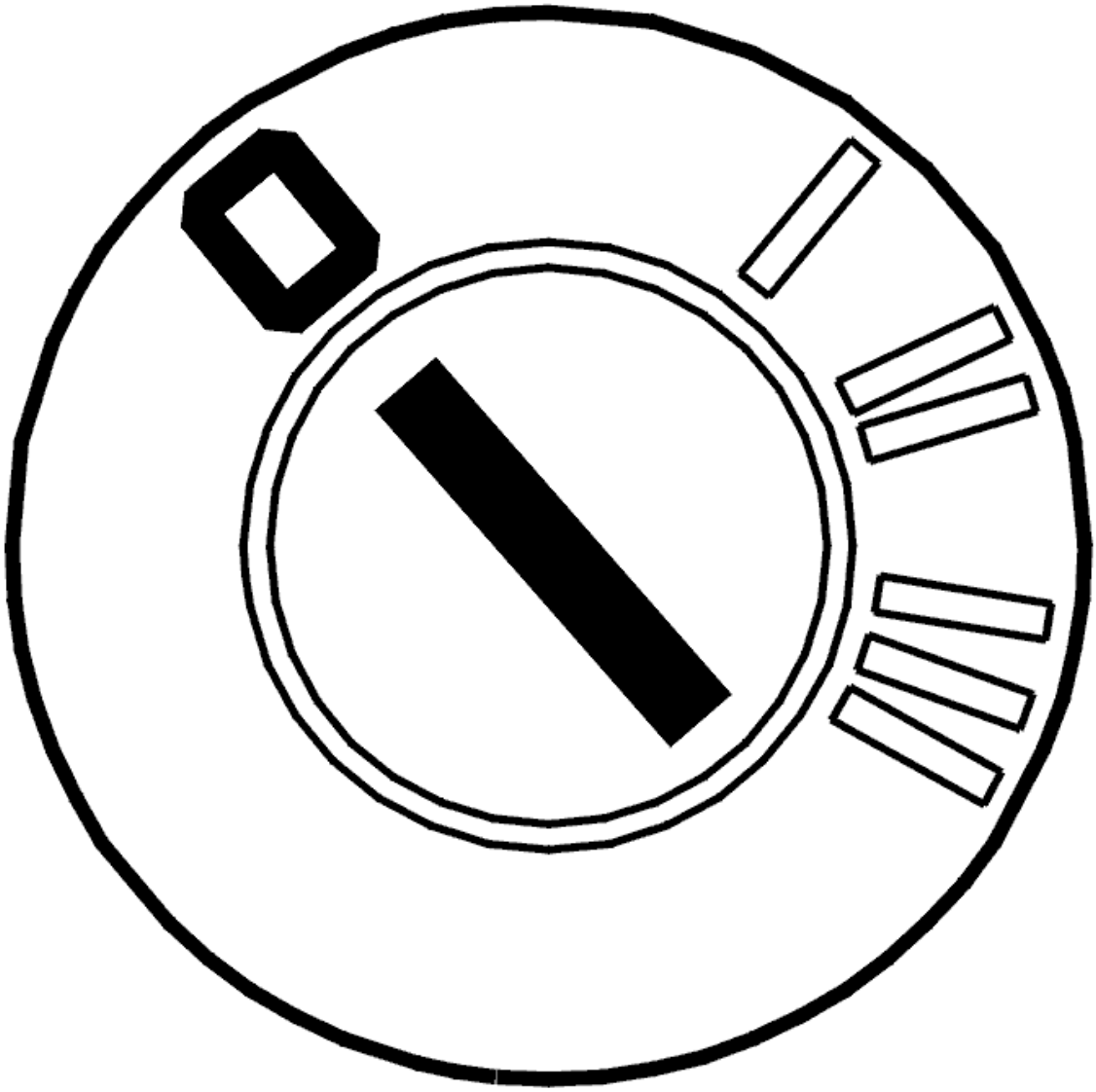


Fig. 65: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

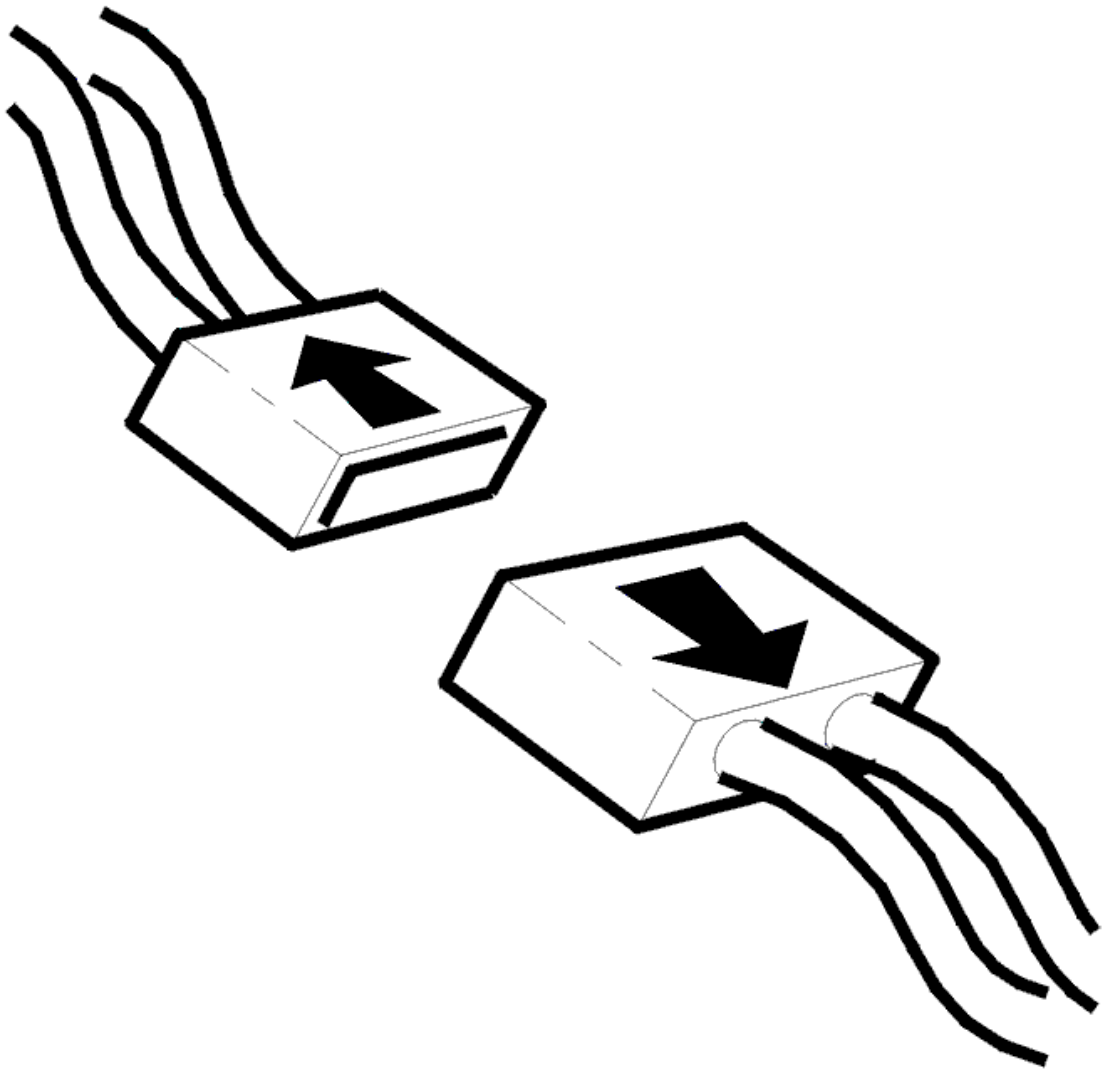


Fig. 66: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector
- Connect the breakout box.

Check the wiring between the transmission connector (control module side):

- terminal #B5 and control module terminal #A46 (#A46) "A"
- terminal #B6 and control module terminal #B4 (#A64) "B"
- terminal #B7 and control module terminal #A45 (#A45) "C"
- terminal #B8 and control module terminal #B3 (#A63) "PA".

check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-

circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

Was a fault detected? Select an option according to the following:

1. No fault detected

   Refer to **REPLACING THE COMPONENT**

2. Open-circuit in the wiring or a short-circuit to ground

   Refer to **VERIFICATION**

3. Short-circuit to supply voltage in the wiring.

   Refer to **CHECKING THE GEAR-SHIFT POSITION SENSOR**

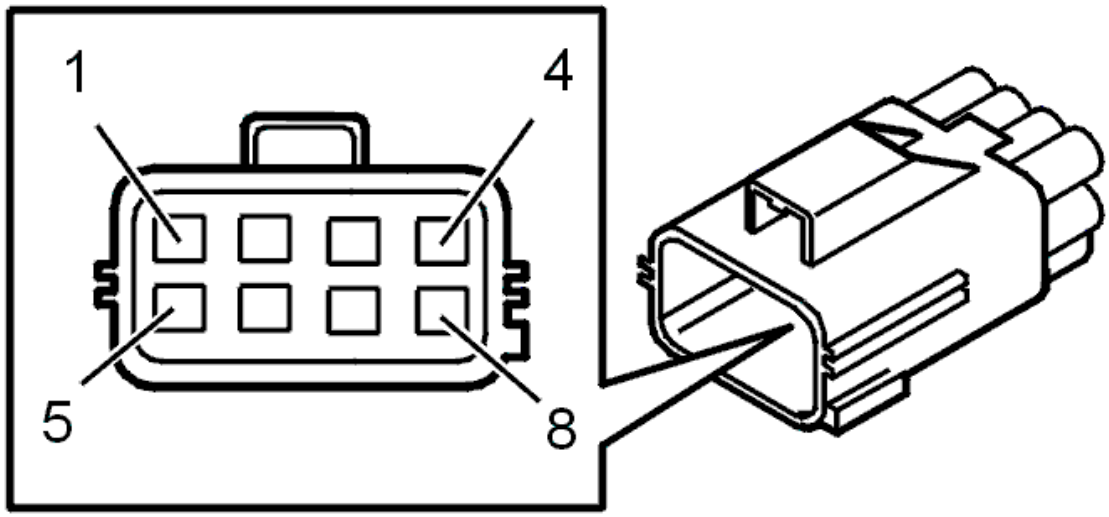


Fig. 67: Identifying Transmission Connector (Control Module Side) Terminals
Courtesy of VOLVO CARS CORPORATION

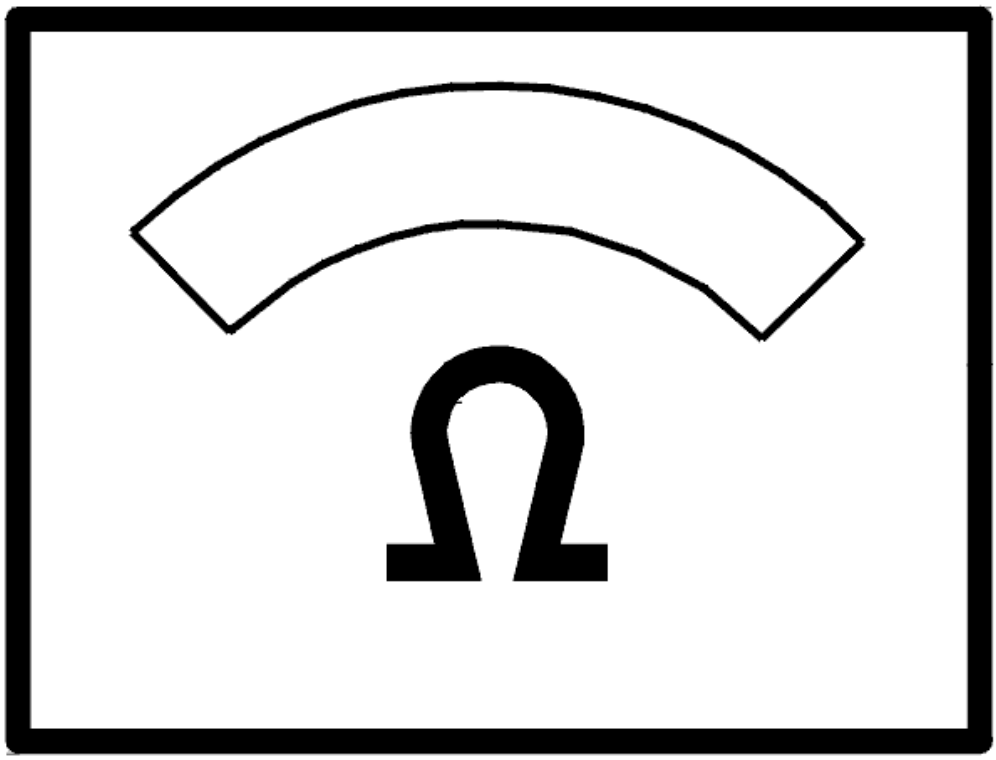


Fig. 68: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

REPLACING THE COMPONENT

Try a new gear-shift position sensor according to **GEAR-SHIFT POSITION SENSOR, POSITION** .

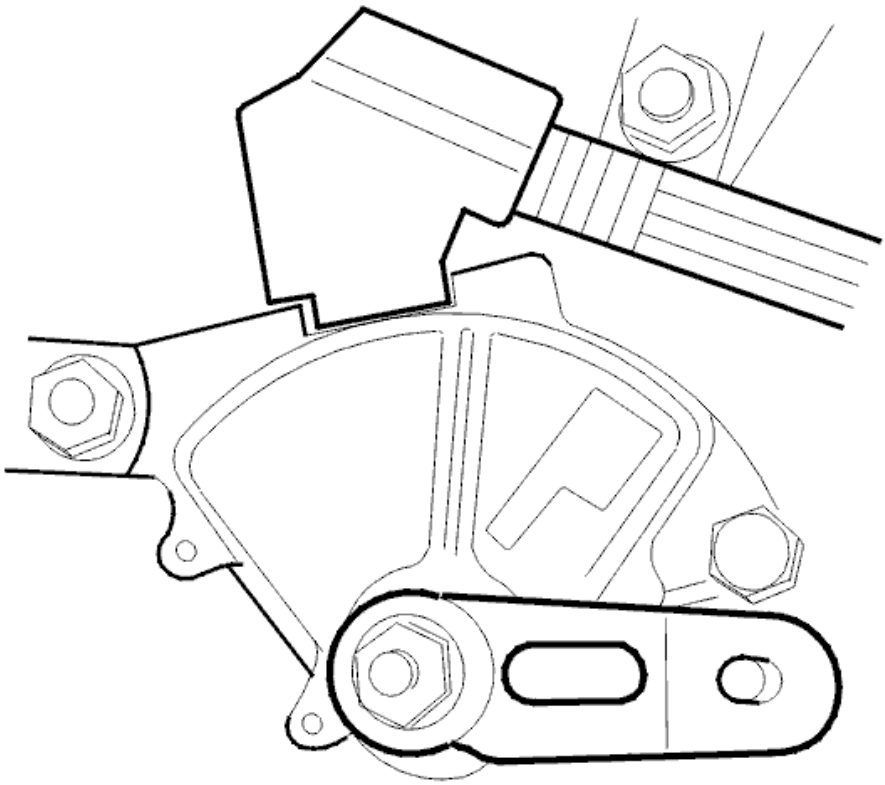


Fig. 69: Identifying Gear-Shift Position Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

CHECKING THE GEAR-SHIFT POSITION SENSOR

HINT: The gear-shift position sensor may malfunction if there has been a short-circuit to supply voltage in the signal cable. Check the gear-shift position sensor as follows:

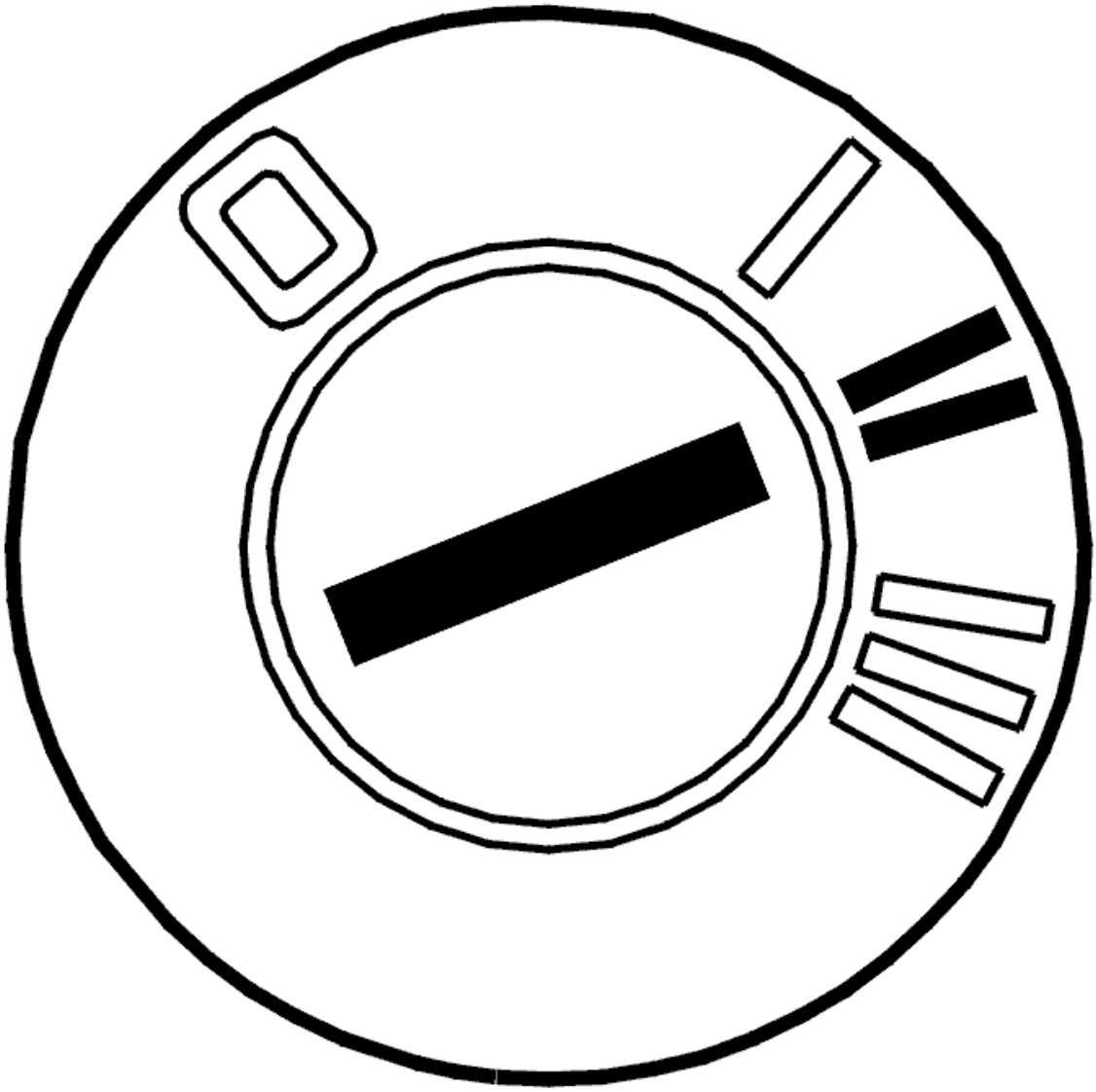


Fig. 70: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

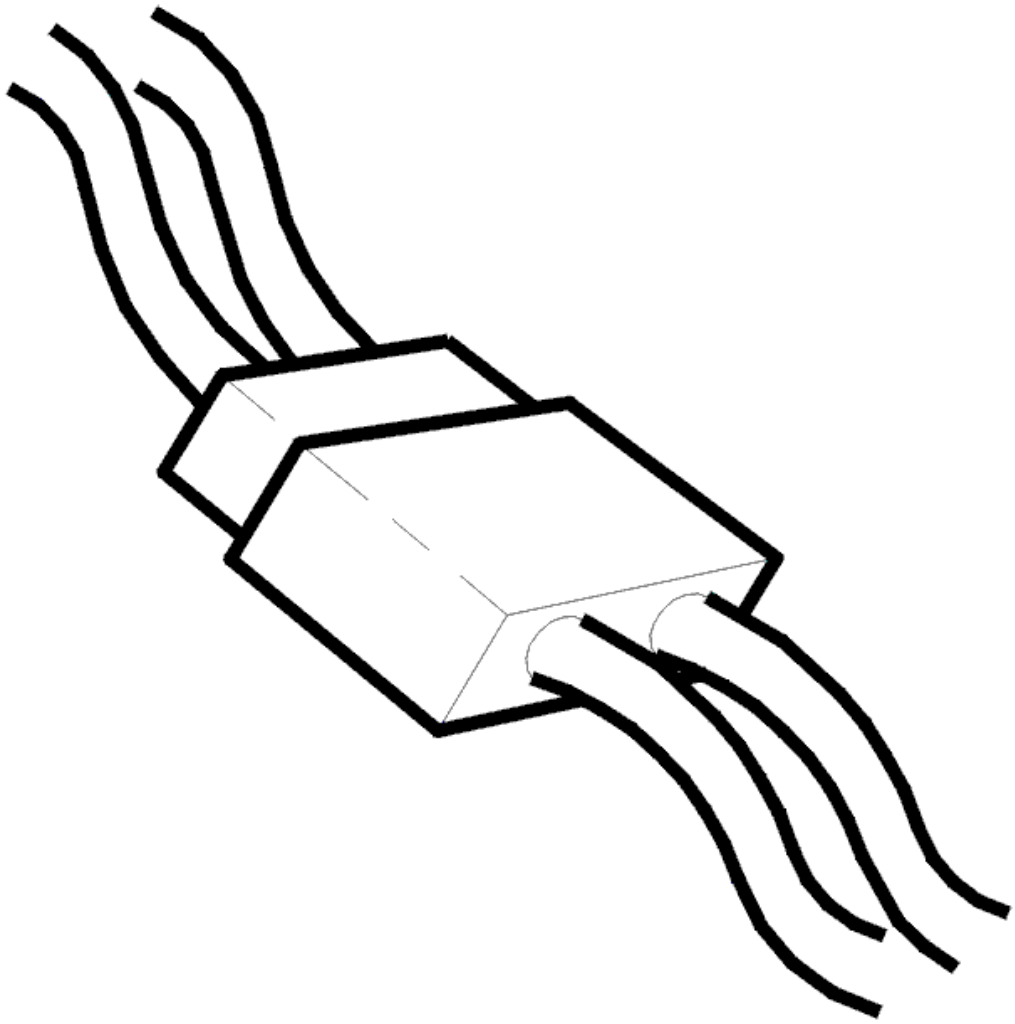


Fig. 71: Identifying Connector
Courtesy of VOLVO CARS CORPORATION

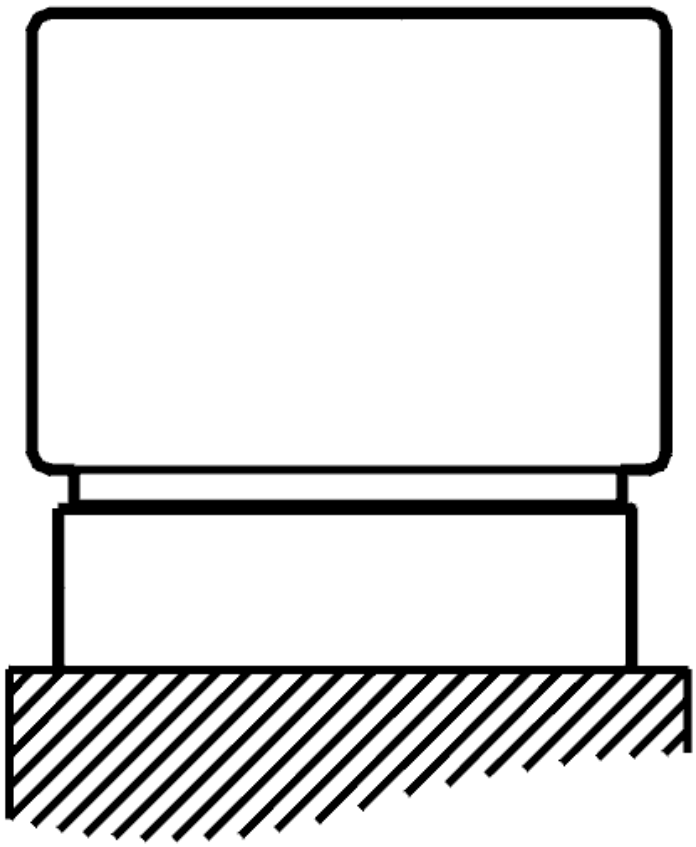


Fig. 72: Identifying Control Unit Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector connected
- Control module connected.
- Ignition on
- Read off the position of the gear-shift position sensor

NOTE: Select the correct gear selector assembly from the list.

NOTE: An undefined position may be displayed between the fixed gear positions. This is not a fault.

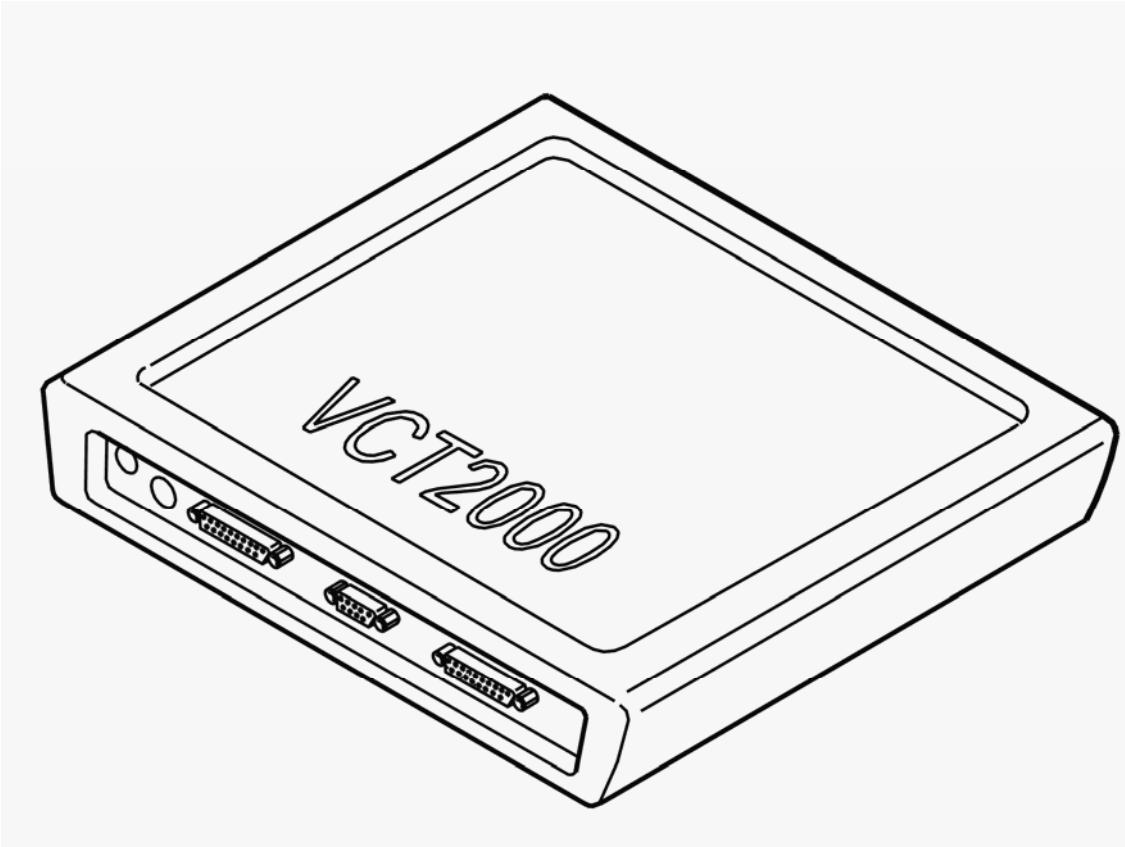


Fig. 73: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

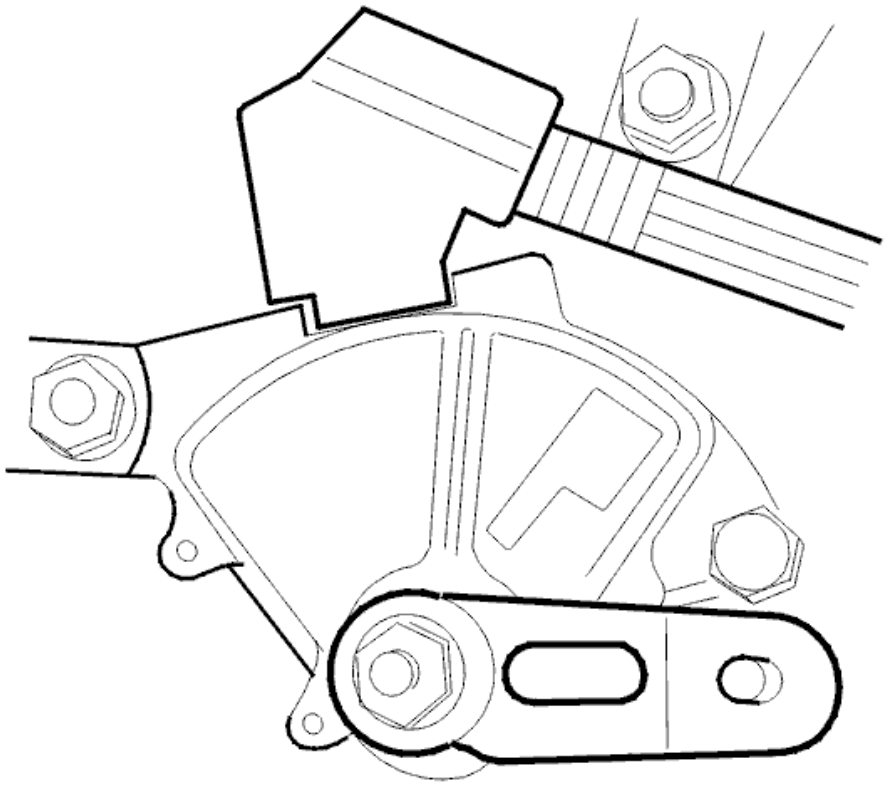


Fig. 74: Identifying Gear-Shift Position Sensor
Courtesy of VOLVO CARS CORPORATION

- Move the gear selector to the different gear positions a number of times. Check the gear-shift position sensor function. If the gear-shift position sensor function is OK the cause of the fault was contact resistance and oxidation.

Are all positions OK?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **REPLACING THE COMPONENT**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair check that the fault has been remedied.

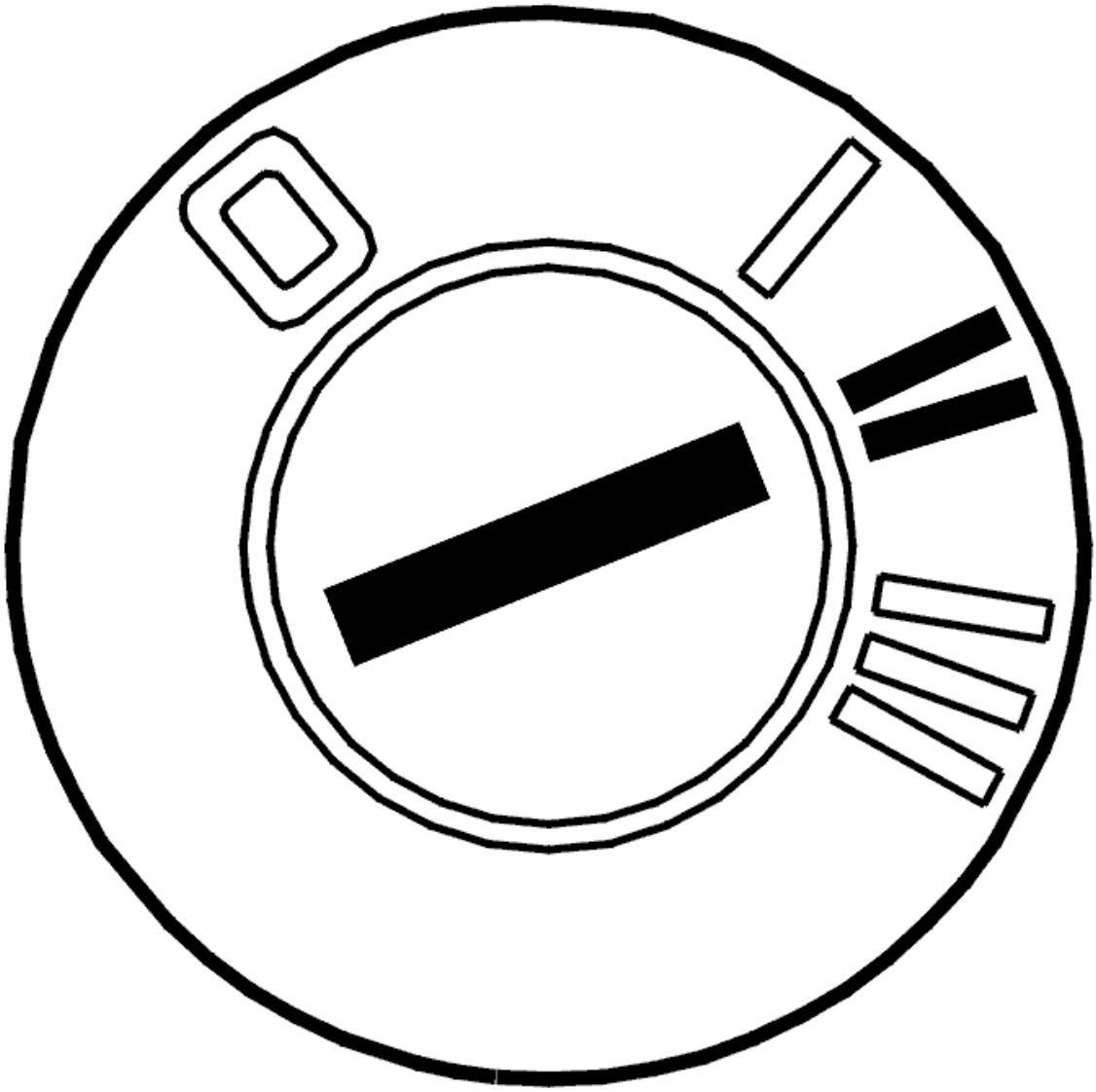


Fig. 75: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

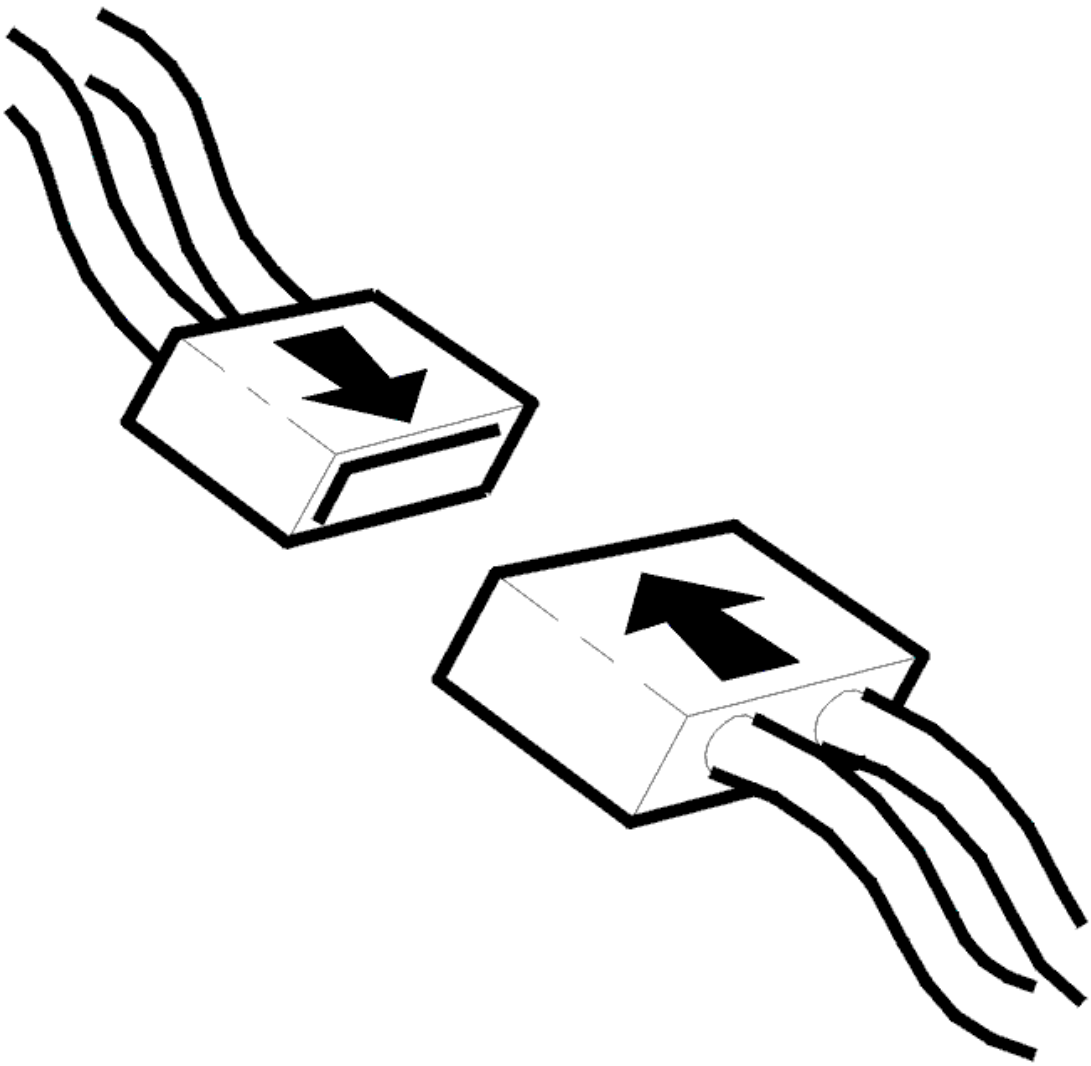


Fig. 76: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reconnect components, connectors etc.
- Ignition on.
- Read off gear-shift position sensor position.

  Move the gear selector to all shift positions a number of times, and repeatedly select the same position to check the operation of the gear-shift position sensor.

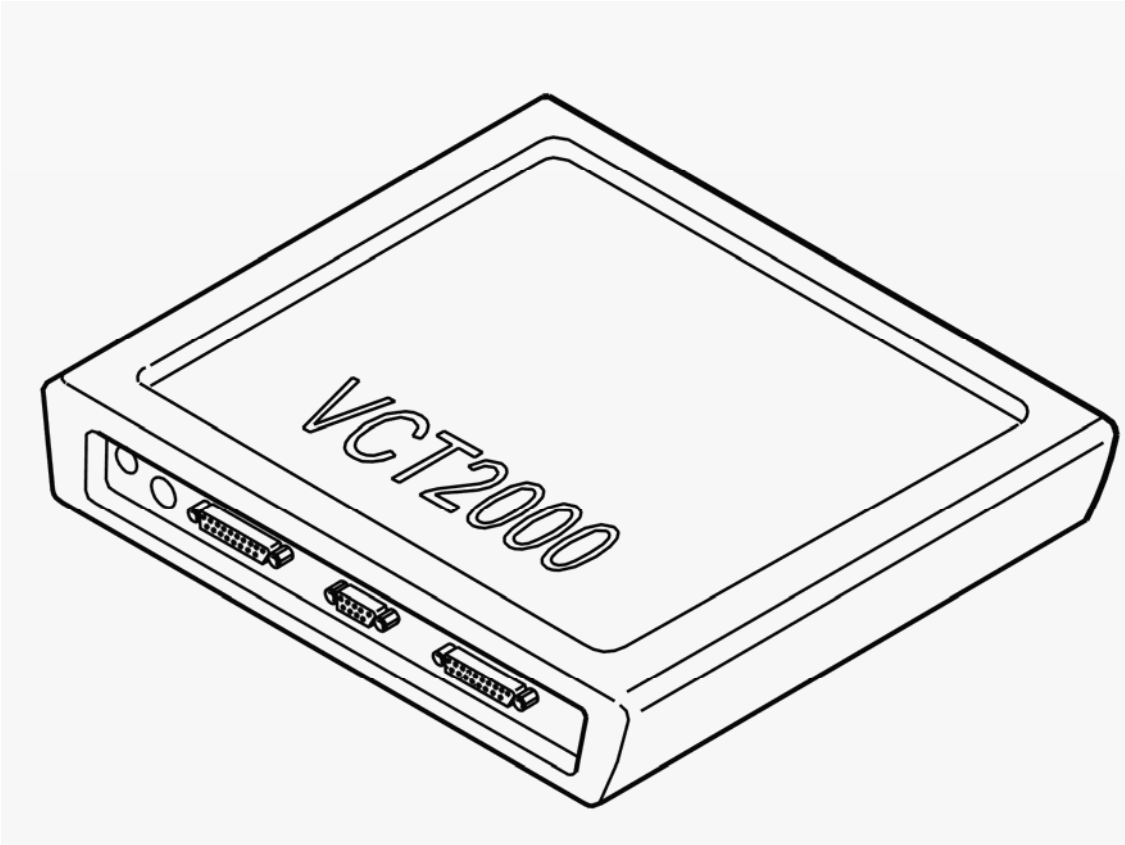


Fig. 77: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Are all values OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

In case of this defect, troubleshooting is not followed by verification.

The information can be displayed again or the fault-tracing for this fault can be interrupted.

TCM-0042: OIL TEMPERATURE. TEMPERATURE TOO HIGH (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

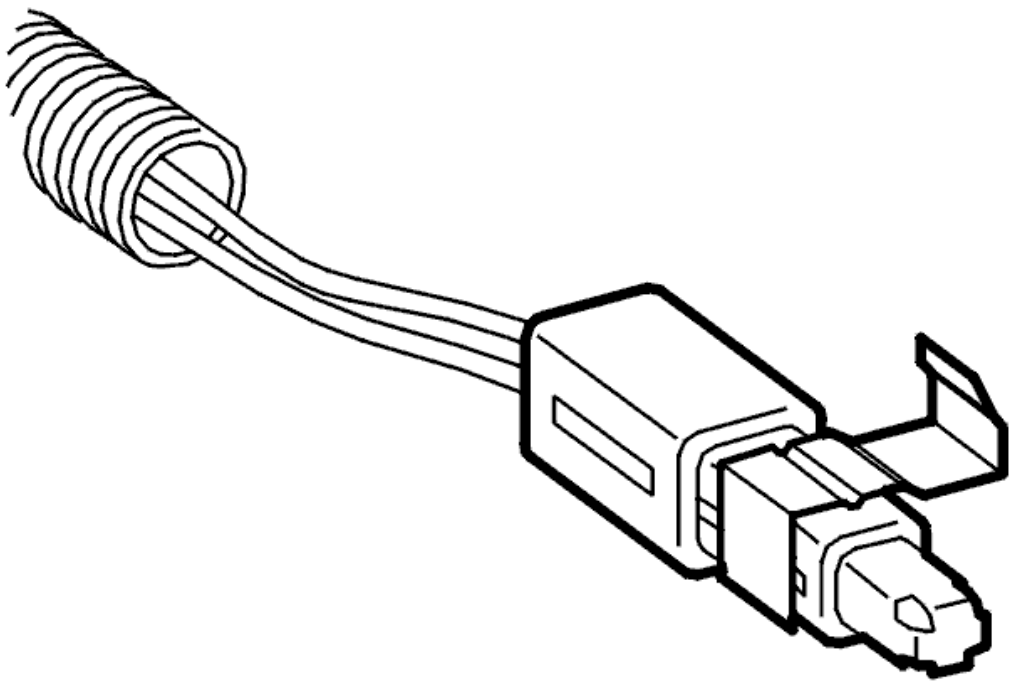


Fig. 78: Identifying Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

The function of the transmission is dependent on the quality of the transmission oil. The quality of the oil diminishes if the transmission fluid is excessively hot over a long period of time. The oil temperature controls the time it takes before TCM-0042 is stored.

Temperature area / time before the diagnostic trouble code (DTC) is stored

- 100-110°C for 9600 hours
- 110-120°C for 4800 hours
- 120-130°C for 1067 hours

- 130-140°C for 480 hours
- 140-150°C for 240 hours
- more than 150°C for 120 hours.

Substitute Value

- No substitute values.

Possible Source

- Contact resistance in the terminals
- Short-circuit to ground in the signal cable
- Defective oil temperature sensor
- Mechanical fault in the transmission
- The transmission has been exposed to extreme load and high ambient temperature.

Fault symptom[s]

- General orange warning lamp lit.

TEMPERATURE TOO HIGH

CHECKING THE WIRING AND COMPONENT

The diagnostic trouble code (DTC) was caused by the transmission being subjected to high loads and high temperatures. It is therefore important to change transmission fluid and to check the function of the transmission.

Replace the oil according to **TRANSMISSION OIL / OIL FILTER, REPLACING** .

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

TEST DRIVING

Test drive the car according to **TEST DRIVE FORM, DESCRIPTION** . Check the transmission for mechanical faults or noise.

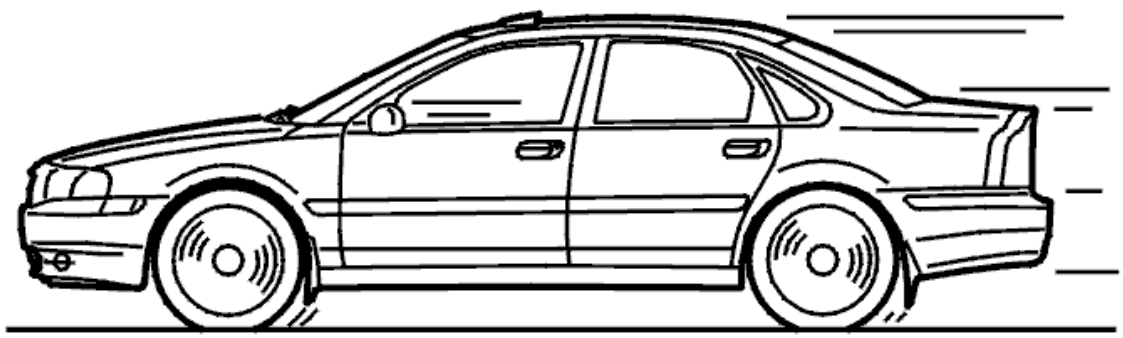


Fig. 79: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the transmission exhibiting any mechanical malfunctions or making a noise?

- **YES**

  Refer to **FAULT-TRACING INFORMATION**

- **NO**

  OKAY: Troubleshooting has been completed.

FAULT-TRACING INFORMATION

Exit the current fault-tracing. Add mechanical symptoms to the symptoms list. Fault-trace the symptoms.

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be

stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.

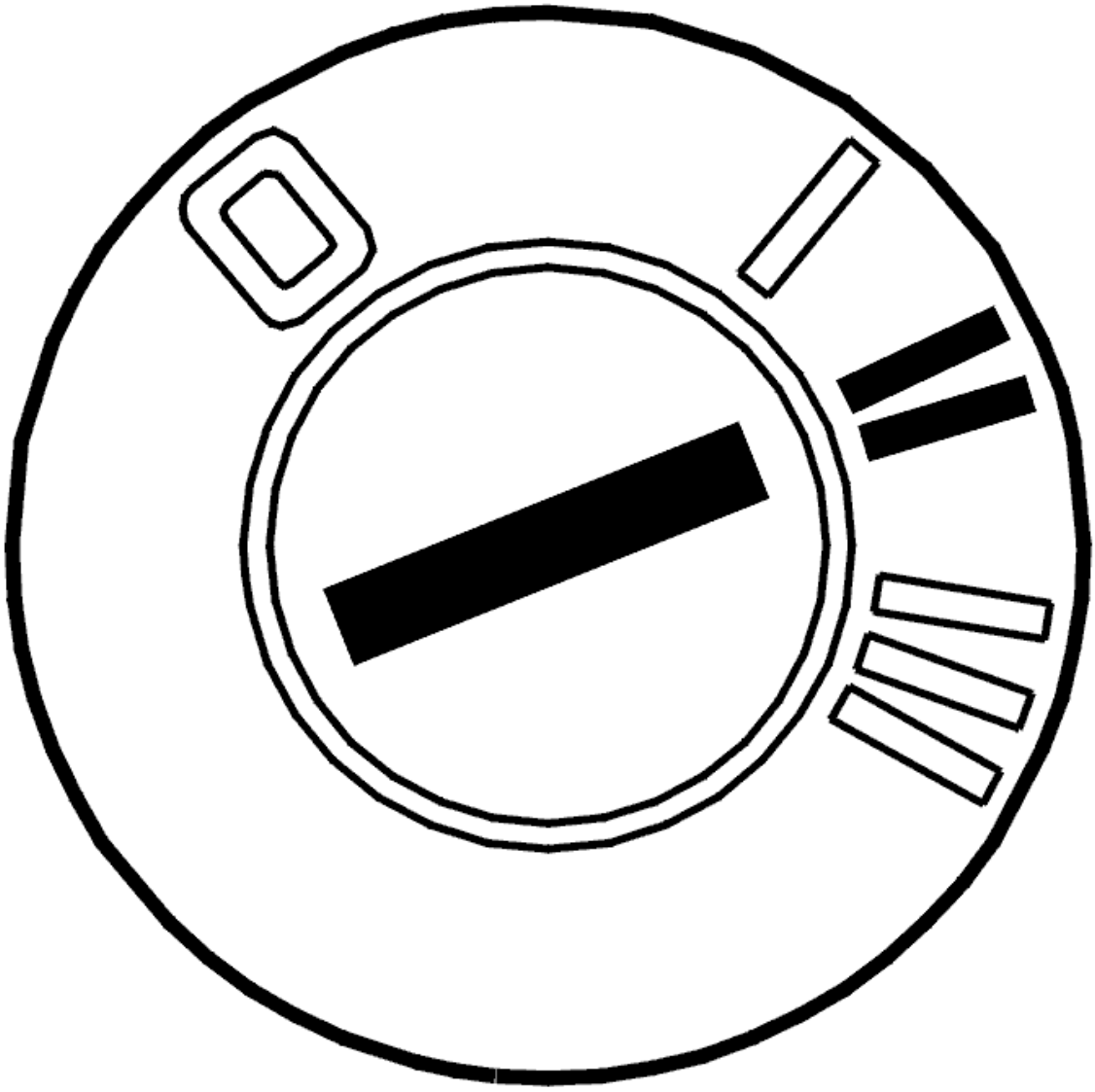


Fig. 80: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

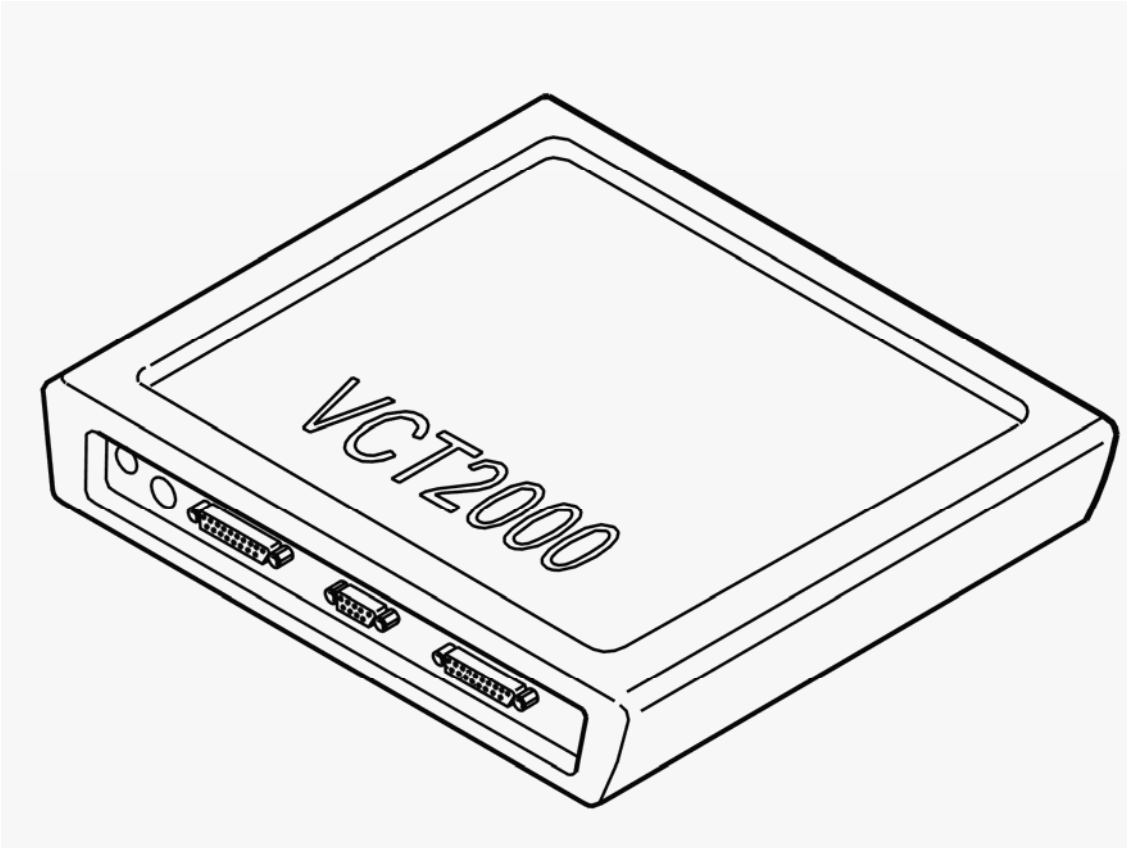


Fig. 81: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

TCM-0042: OIL TEMPERATURE. TEMPERATURE TOO HIGH (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

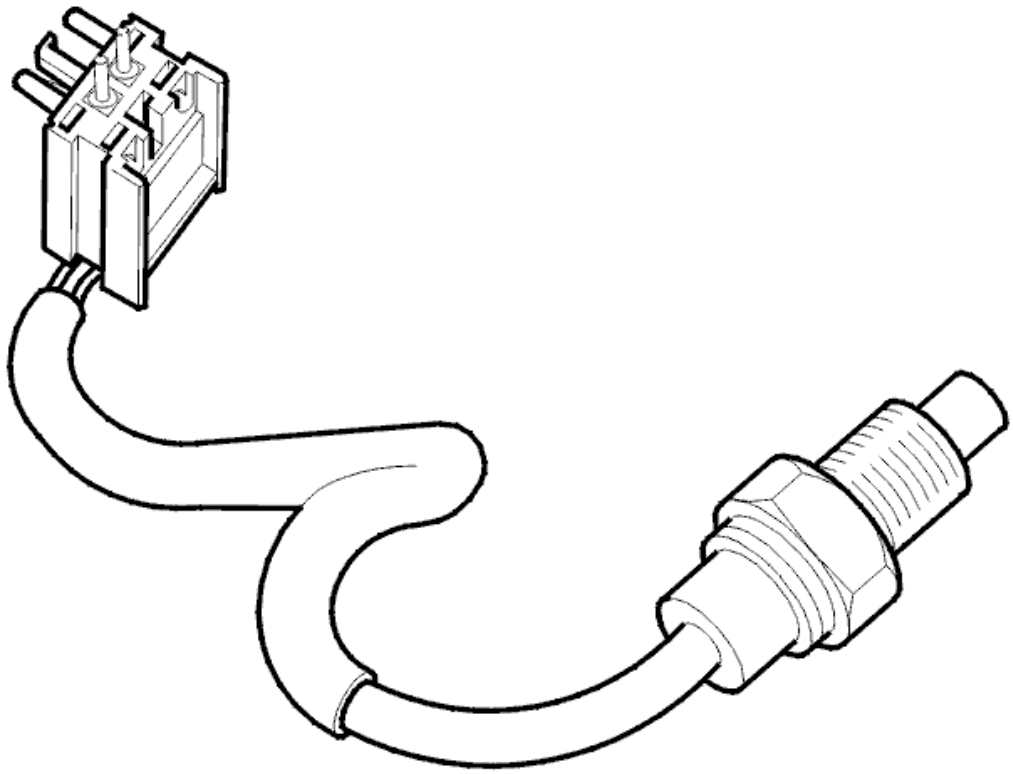


Fig. 82: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

The oil temperature sensor sends a signal to the transmission control module (TCM) which is used for functions such as temperature controlled lockup and initiating high-temperature programs. The sensor has an NTC (negative temperature coefficient) resistor. The signal (voltage) decreases with increasing oil temperature. Diagnostic trouble code (DTC) TCM-0042 is stored if the transmission control module (TCM) receives a signal from the oil temperature sensor corresponding to a temperature above approximately +150°C for approximately 2 minutes.

Substitute Value

- No substitute values.

Possible Source

- Contact resistance in terminals.
- Short-circuit to ground in signal cable.
- Defective oil temperature sensor.
- Mechanical fault in the transmission.
- The transmission has been exposed to extreme load and high ambient temperature.

Fault symptom[s]

- General orange warning lamp lit.

TEMPERATURE TOO HIGH

CHECKING THE WIRING AND COMPONENT

The diagnostic trouble code (DTC) was caused by the transmission being subjected to high loads and high temperatures. It is therefore important to change transmission fluid and to check the function of the transmission.

Replace the oil according to **TRANSMISSION OIL / OIL FILTER, REPLACING** .

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

TEST DRIVING

Test drive the car. See **TEST DRIVE SCHEDULE, DESCRIPTION** .

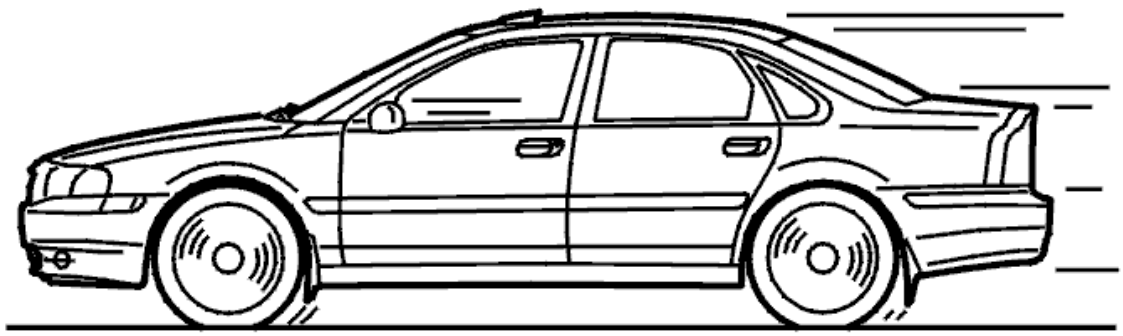


Fig. 83: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Does the transmission have any mechanical faults?

- **YES**

  Refer to **FAULT-TRACING INFORMATION**

- **NO**

  OKAY: Troubleshooting has been completed.

FAULT-TRACING INFORMATION

Exit the current fault-tracing. Add mechanical symptoms to the symptoms list. Fault-trace the symptoms.

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.

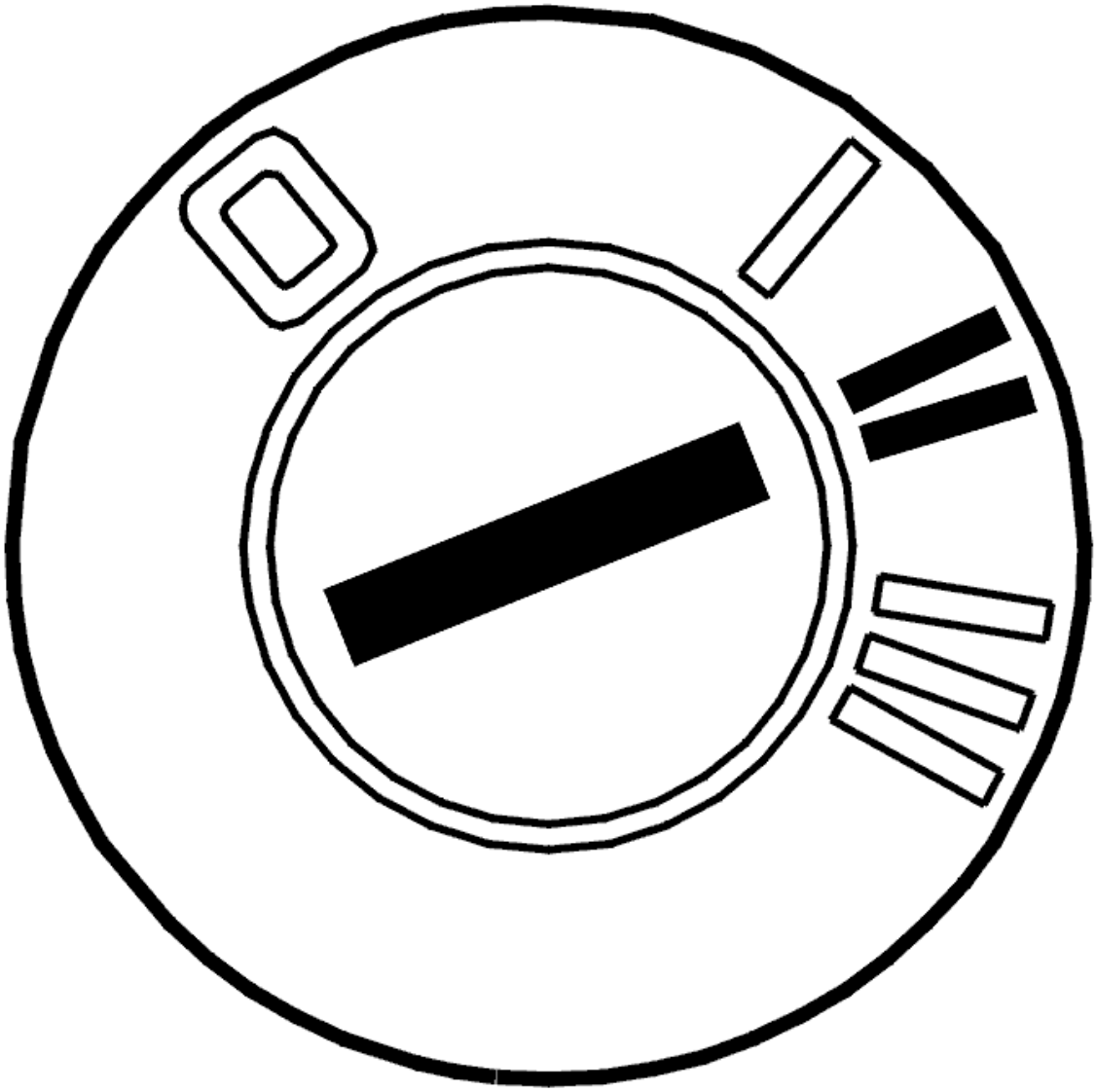


Fig. 84: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

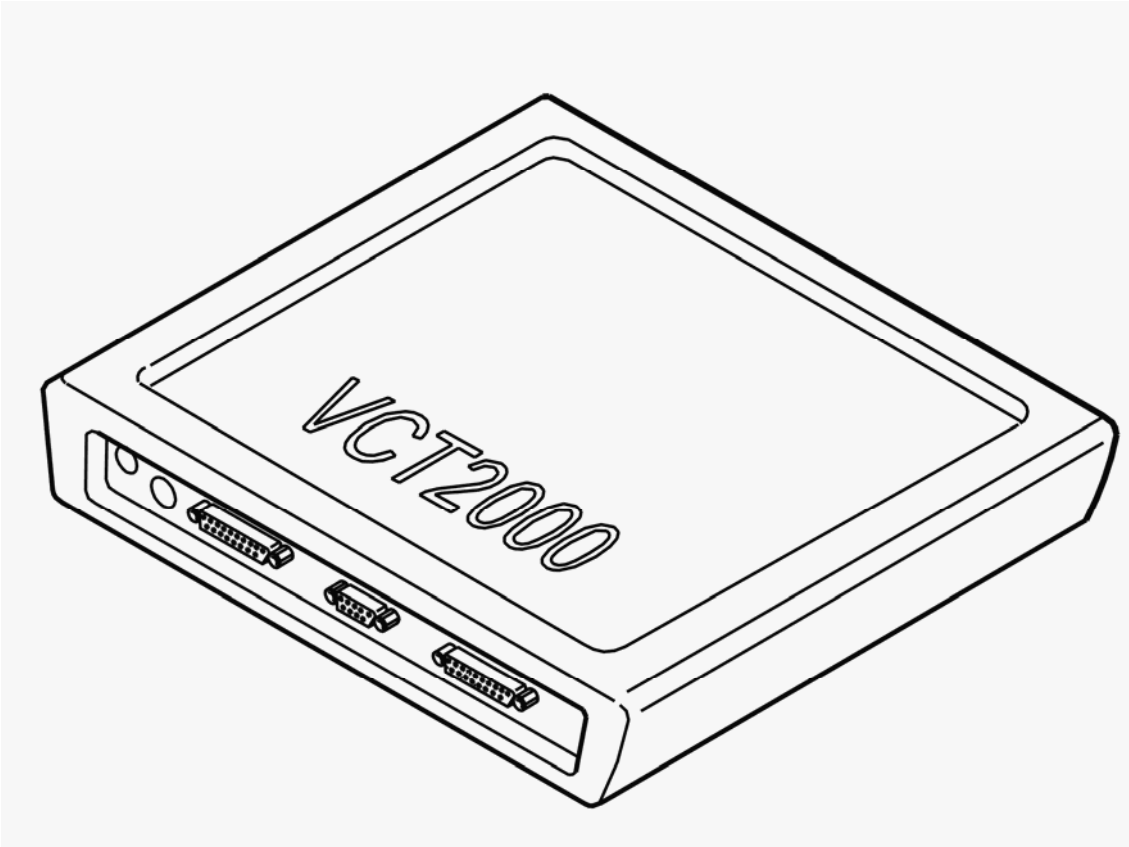


Fig. 85: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

TCM-0043: OIL TEMPERATURE SENSOR. SIGNAL TOO LOW (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

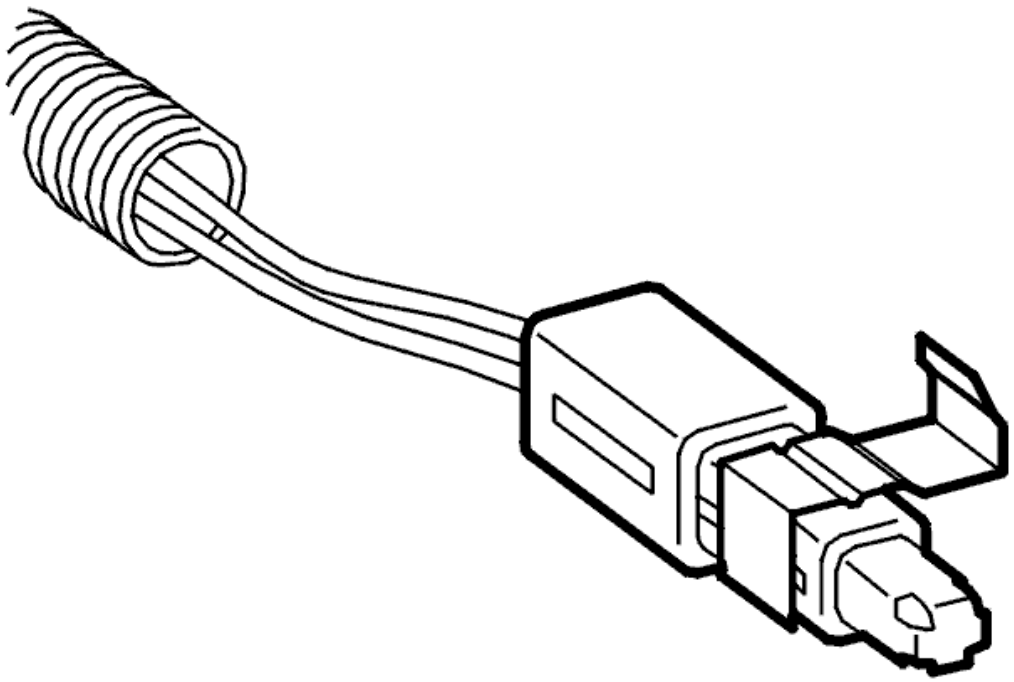


Fig. 86: Identifying Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

The oil temperature sensor transmits a signal to the control module. This signal is used for functions such as temperature controlled lock-up and the engagement of high-temperature programs. The sensor has an NTC (negative temperature coefficient) resistor. The signal (voltage) decreases with increasing oil temperature. Diagnostic trouble code (DTC) TCM-0043 is stored if the control module receives too low a signal from the oil temperature sensor for approximately 20 seconds.

Substitute Value

- No substitute values.

Possible Source

- The power supply and signal cables are short-circuited to each other.
- Short-circuit to ground in the signal cable.
- Defective oil temperature sensor.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.

- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

SIGNAL TOO LOW

CHECKING THE FUNCTION OF THE OIL TEMPERATURE SENSOR

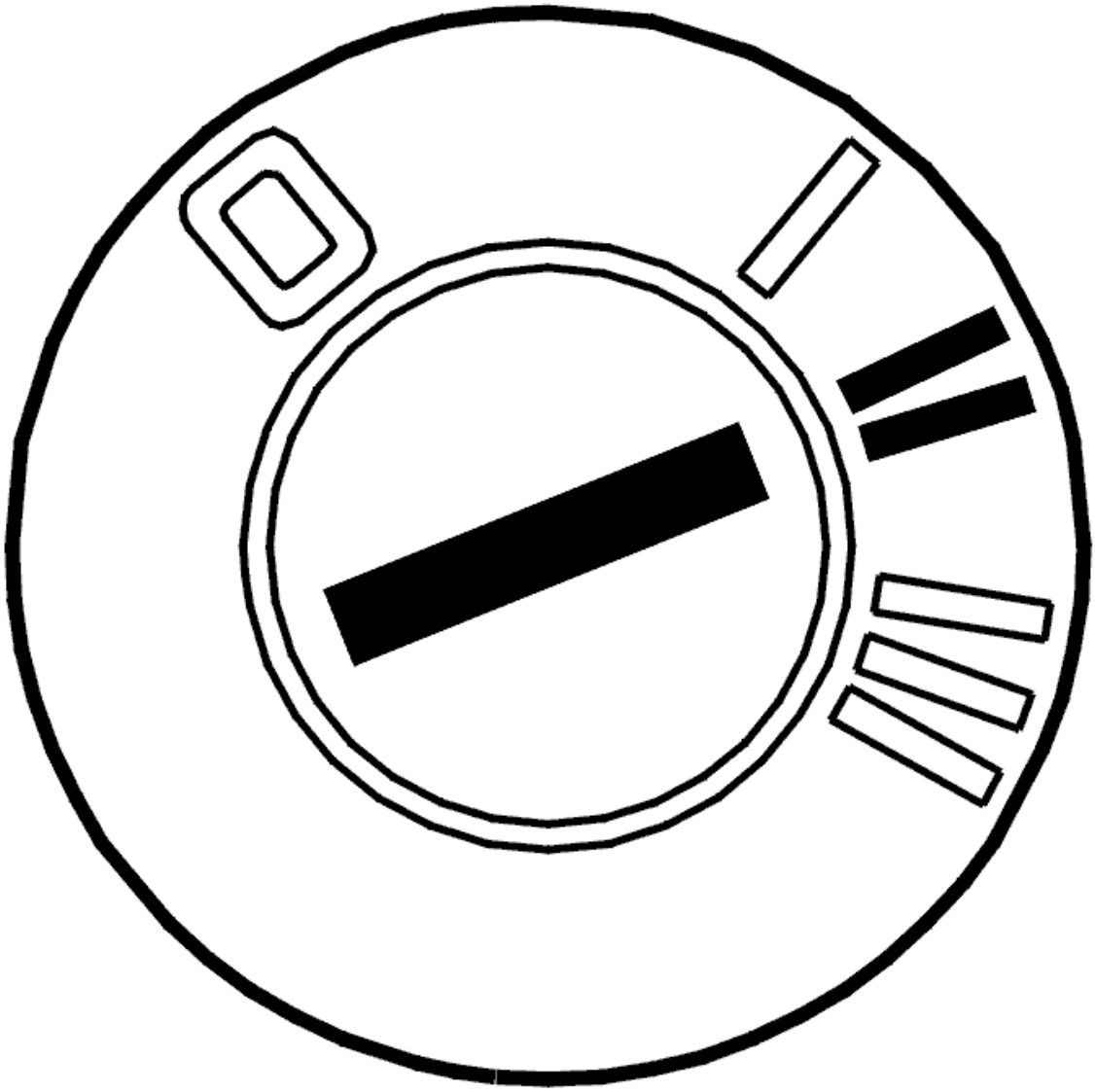


Fig. 87: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

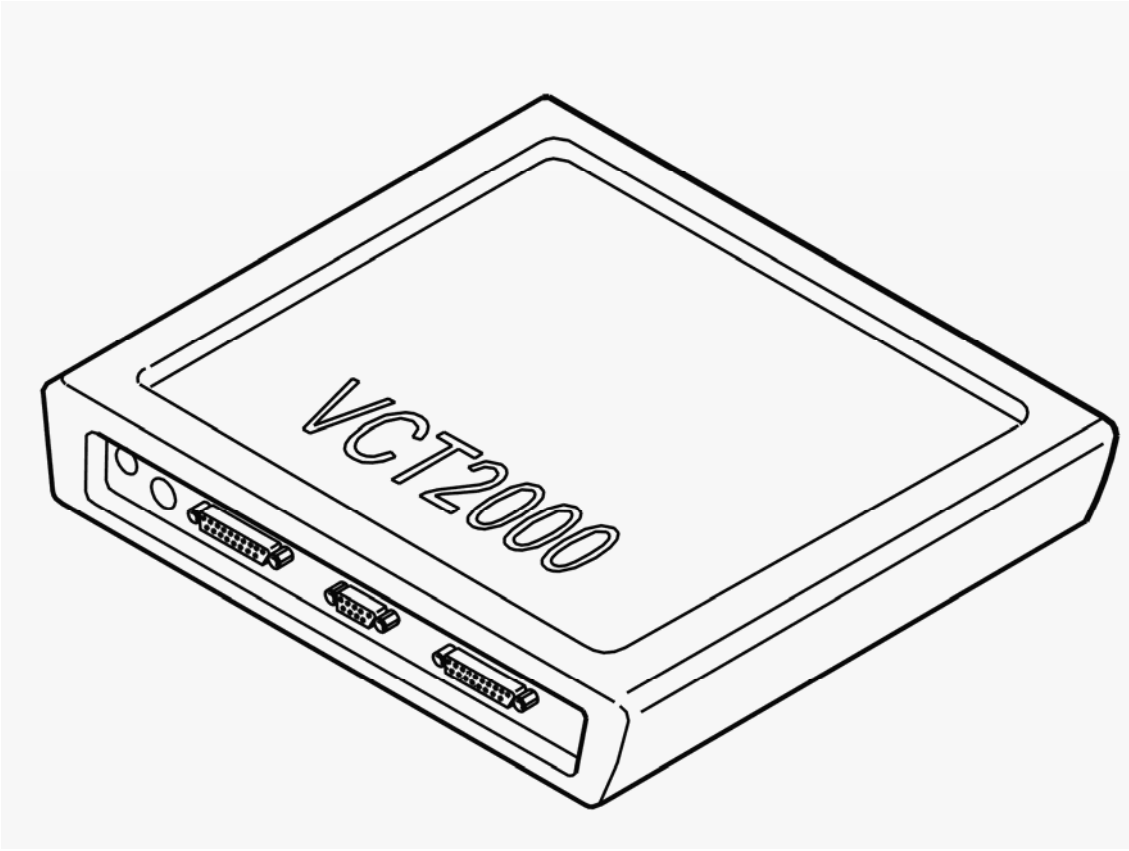


Fig. 88: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

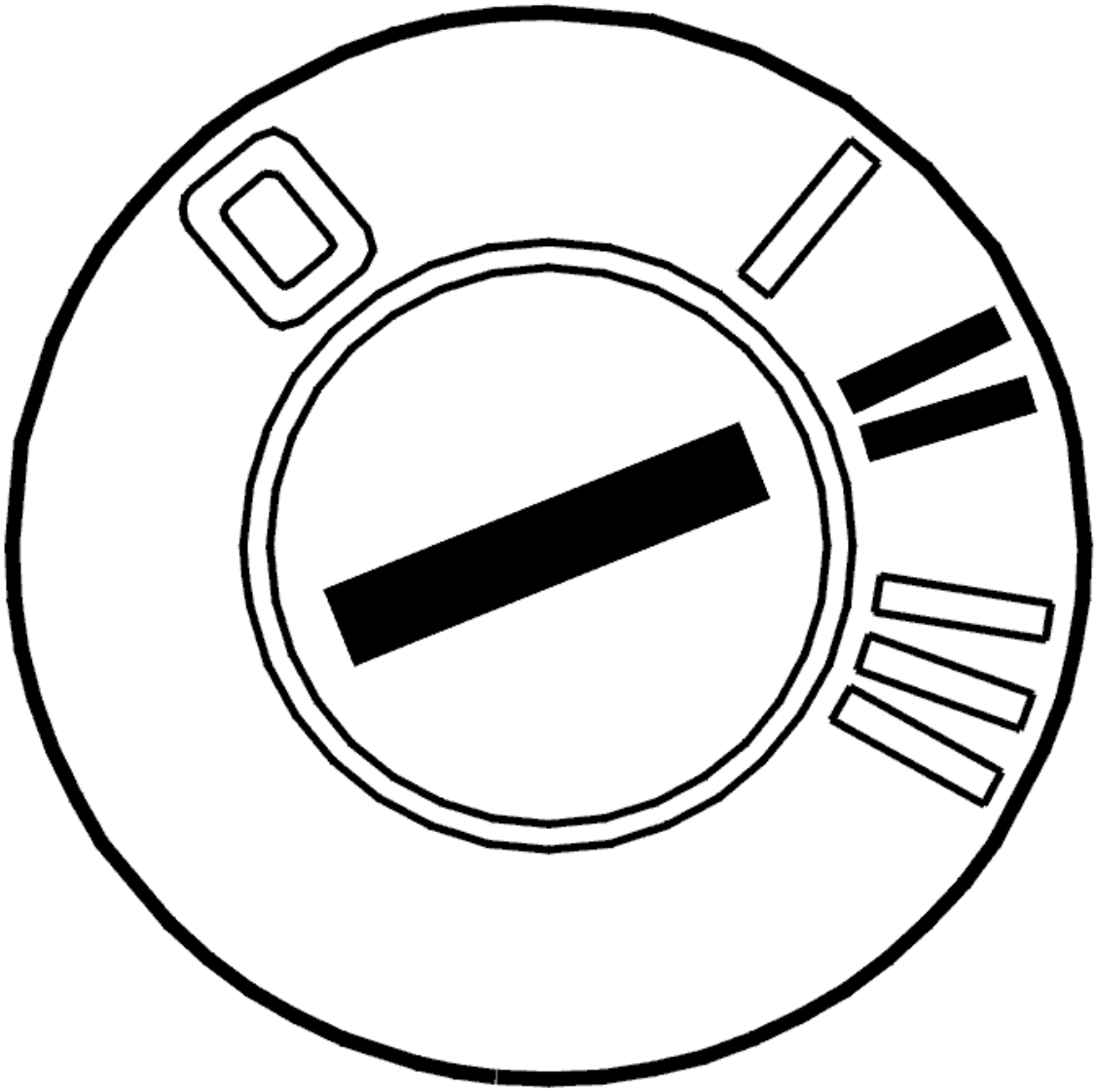


Fig. 89: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

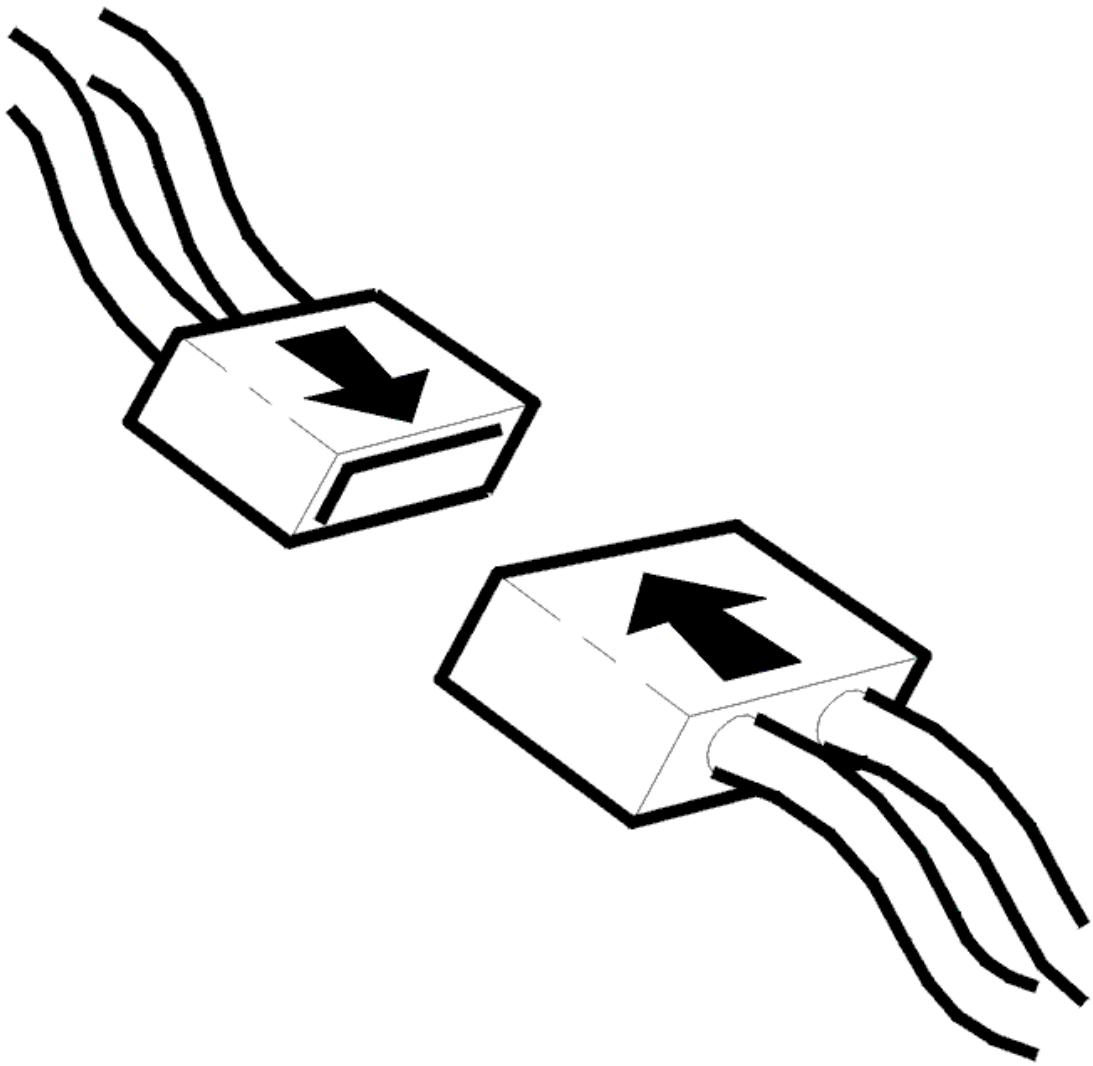


Fig. 90: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and transmission connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary
- Reconnect the control module and transmission connectors
- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

  If the transmission temperature is within its permitted range, the cause of the fault was contact resistance

or oxidation in the control module or transmission connector.

Other information:

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES** .

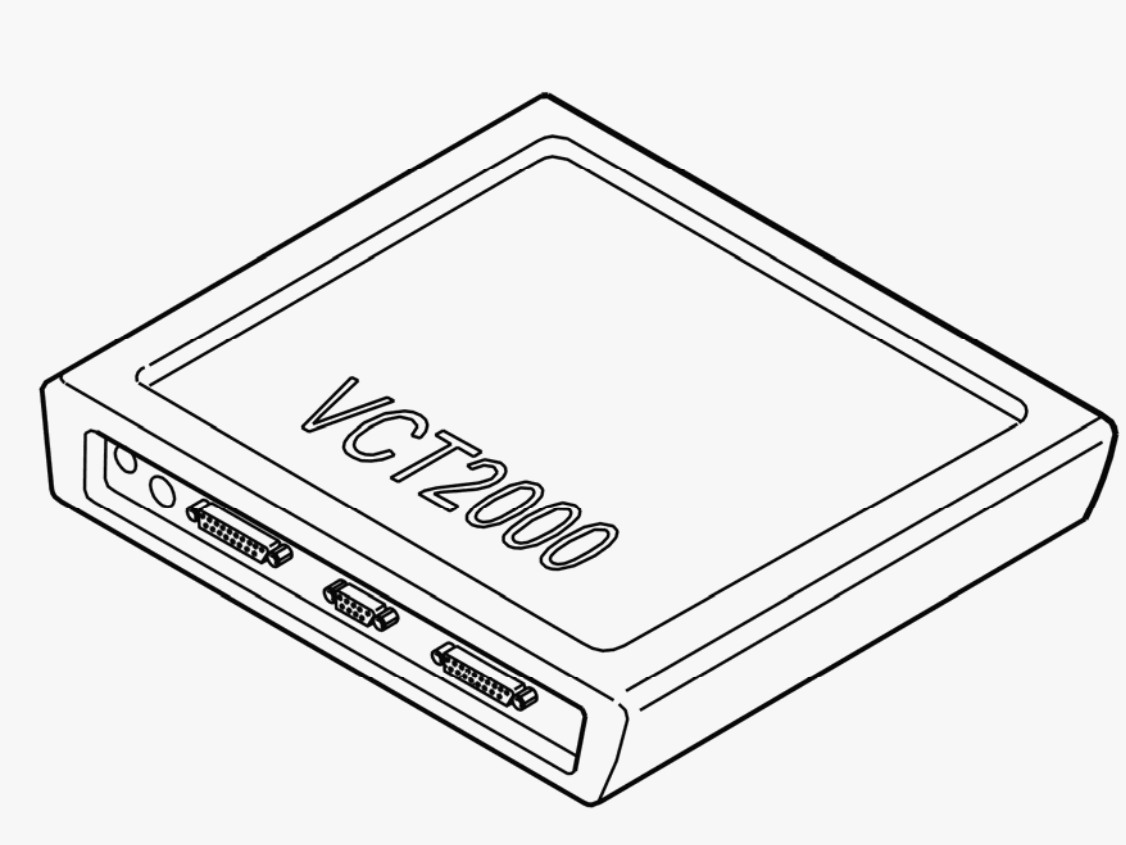


Fig. 91: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING THE TEMPERATURE SENSOR**

CHECKING THE TEMPERATURE SENSOR

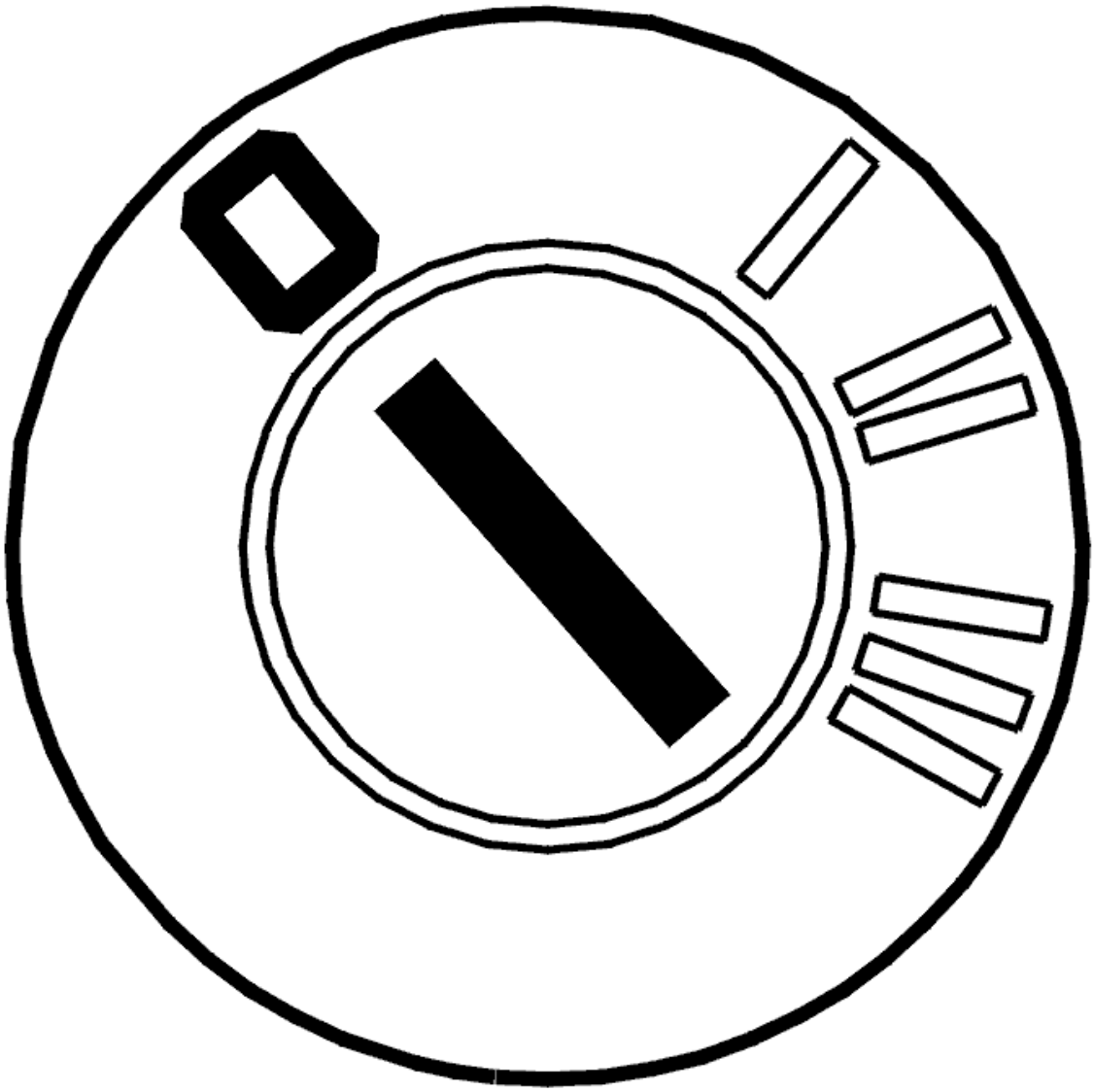


Fig. 92: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

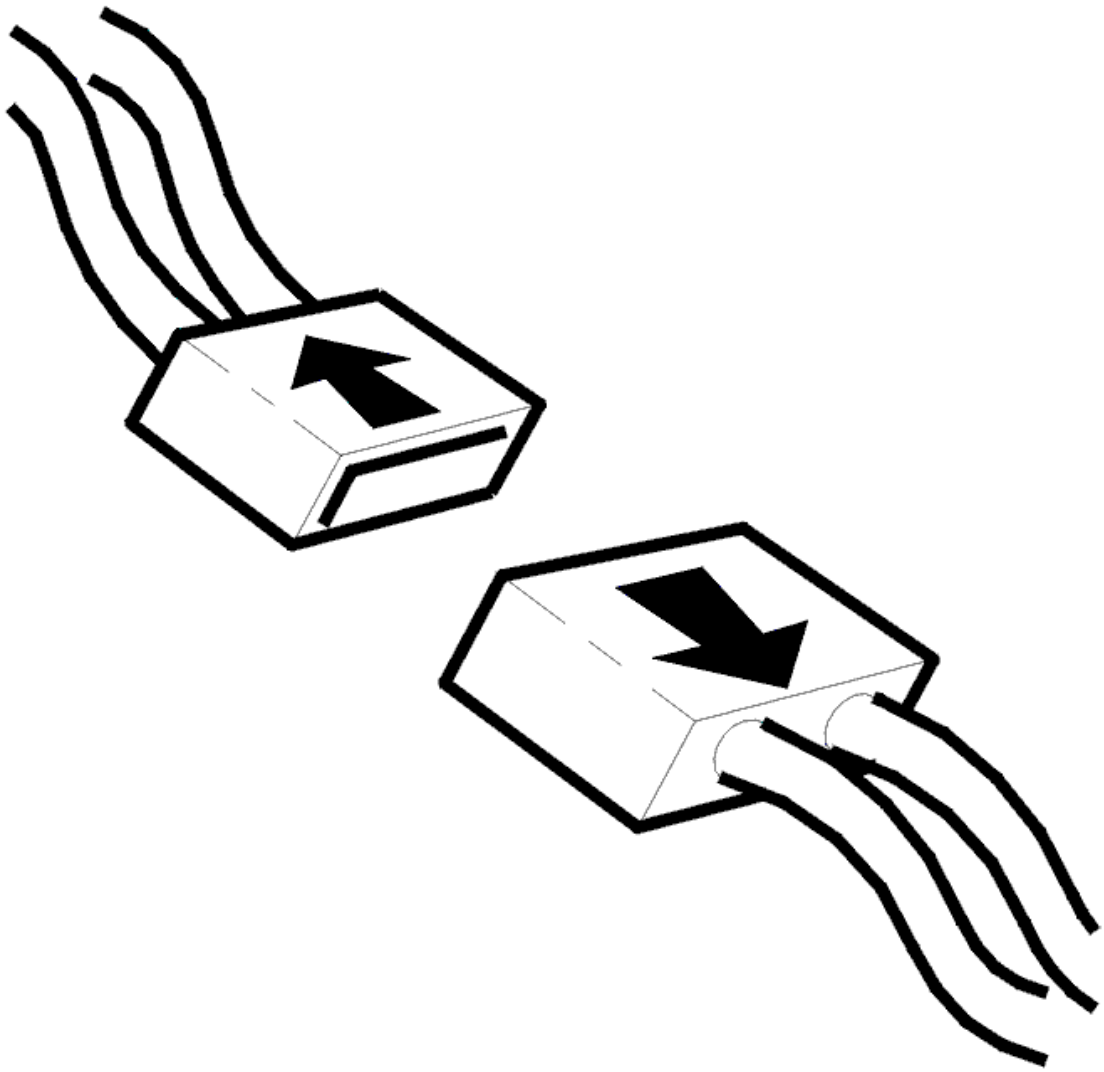


Fig. 93: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector
- Connect adapter see **9511505** and see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals #L (terminal #A11) and #M (terminal #A12).

  The resistance must be 3.5-3.6 kohms at 20° C.

  Remedy as necessary.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**

- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

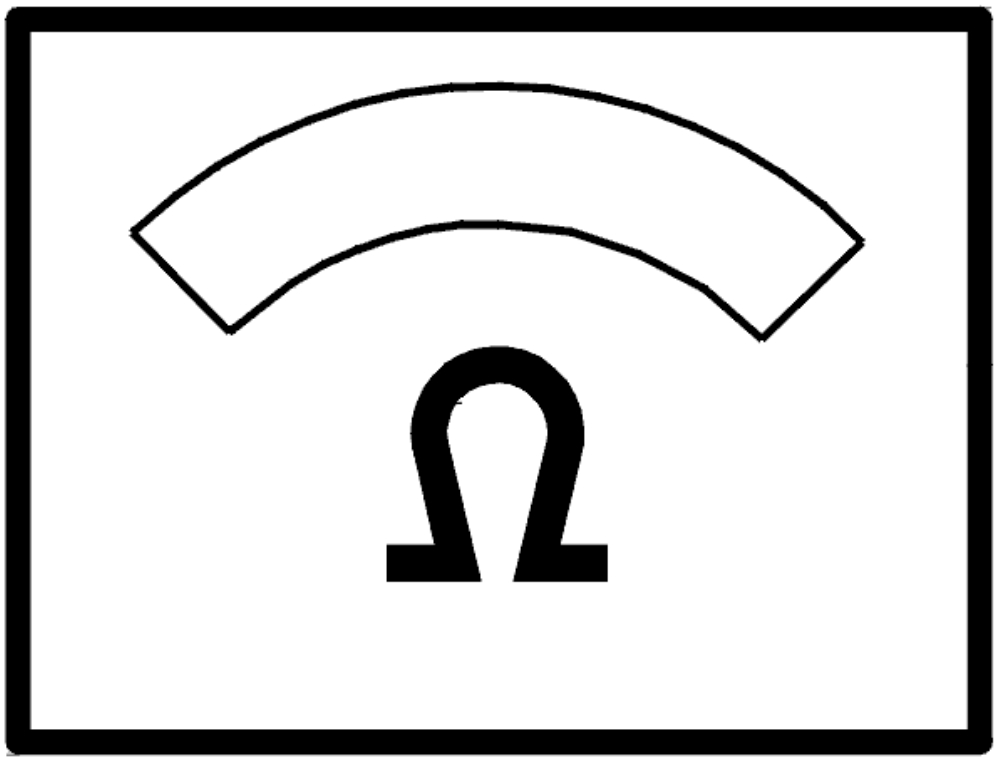


Fig. 94: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **OK**

  Refer to **CHECKING THE WIRING**

- **NOT OK**

Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

- Breakout box connected to the control module
- Breakout box connected to the transmission connector.

Check the cable between control module terminal #37 (#A37) and transmission connector (control module side) terminal #L (terminal #A11). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Check the cable between control module terminal #55 (#A55) and transmission connector (control module side) terminal #M (#A12). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

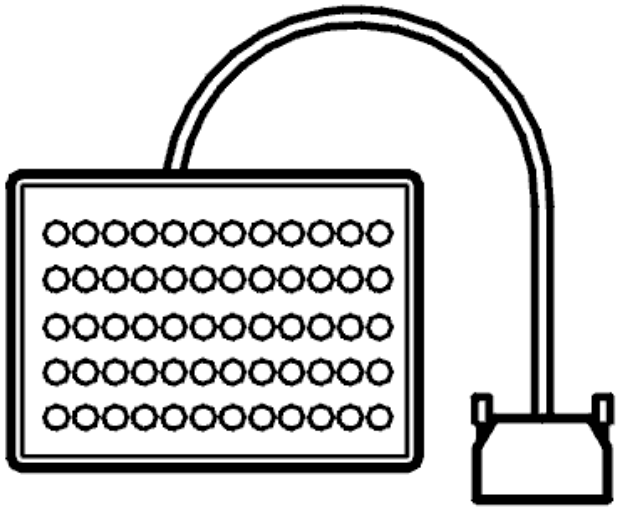


Fig. 95: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

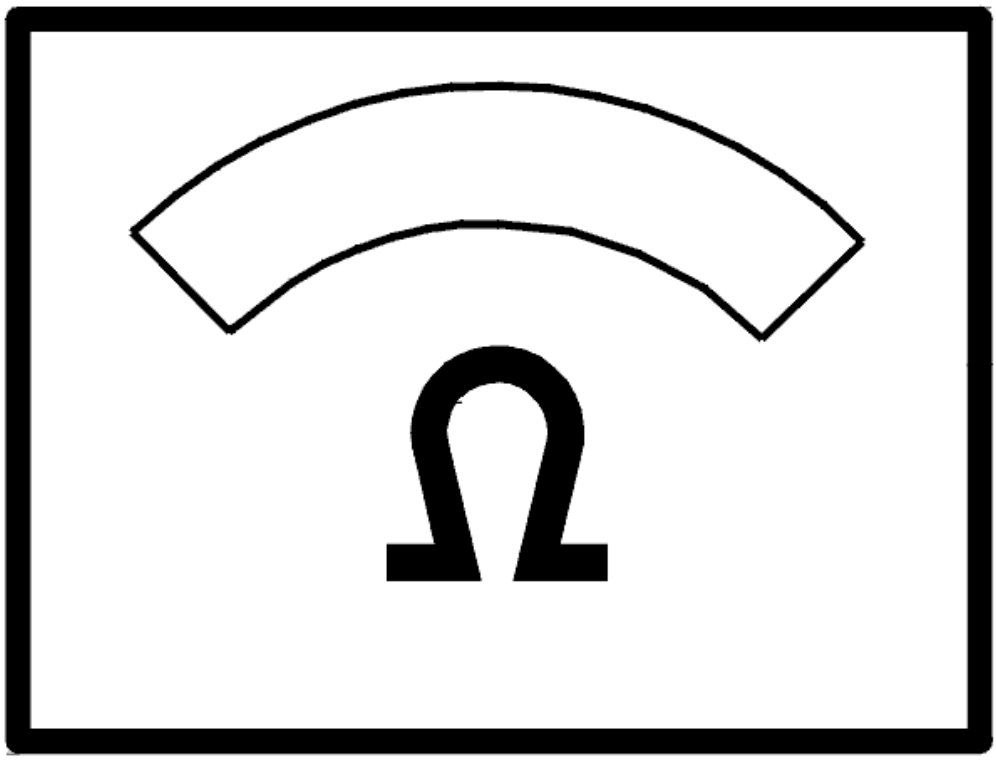


Fig. 96: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

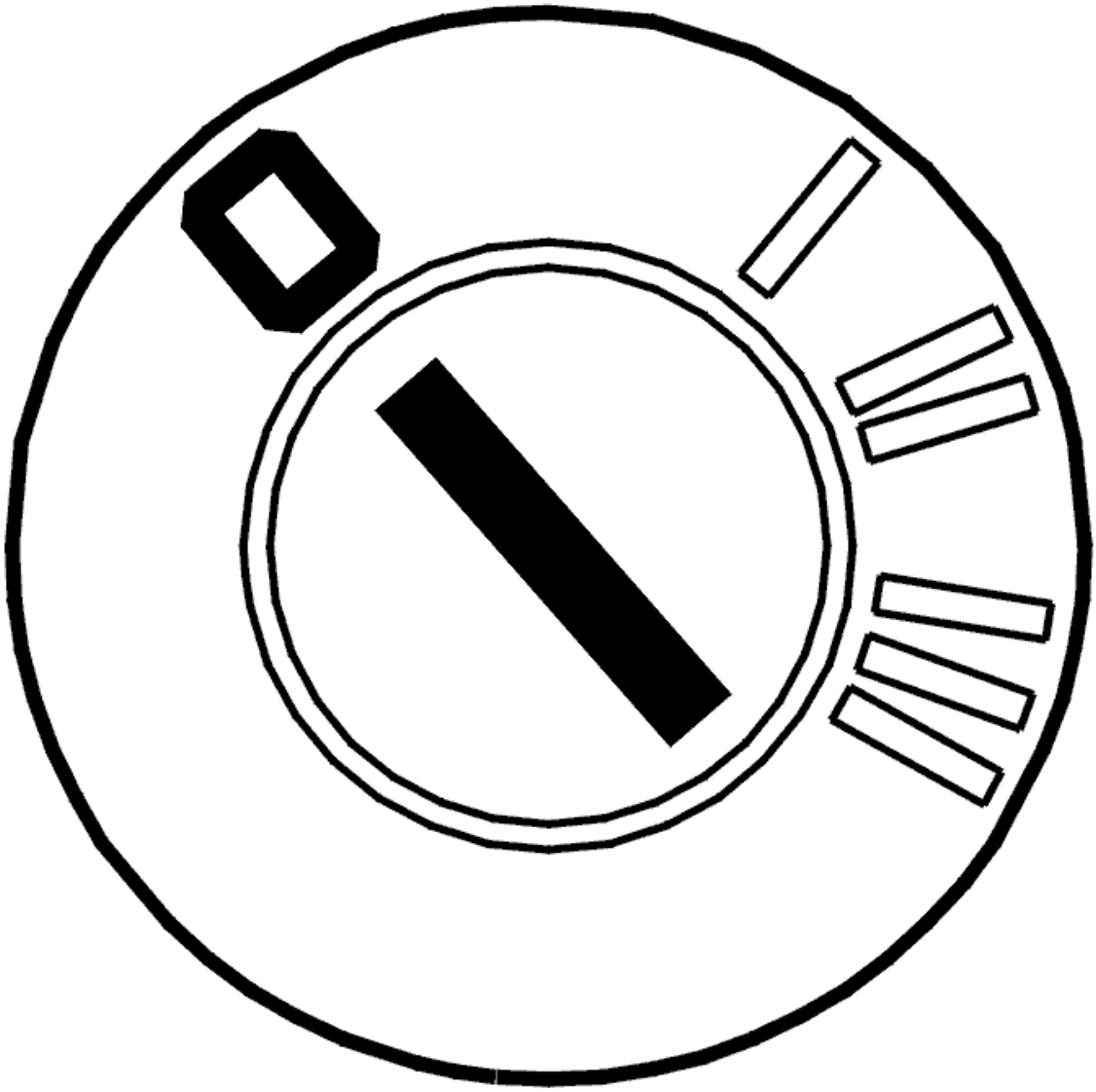


Fig. 97: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission terminal #L (#A11) and temperature sensor terminal #A. Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Check the cable between transmission terminal #M (#A12) and temperature sensor terminal #B. Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

HINT: Check the temperature sensor by measuring the resistance between temperature sensor connector terminals #A and #B. The resistance must be 3.5-3.6 kohms at 20° C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- To replace the temperature sensor, see **TEMPERATURE SENSOR FLUID TRANSMISSION, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES** .

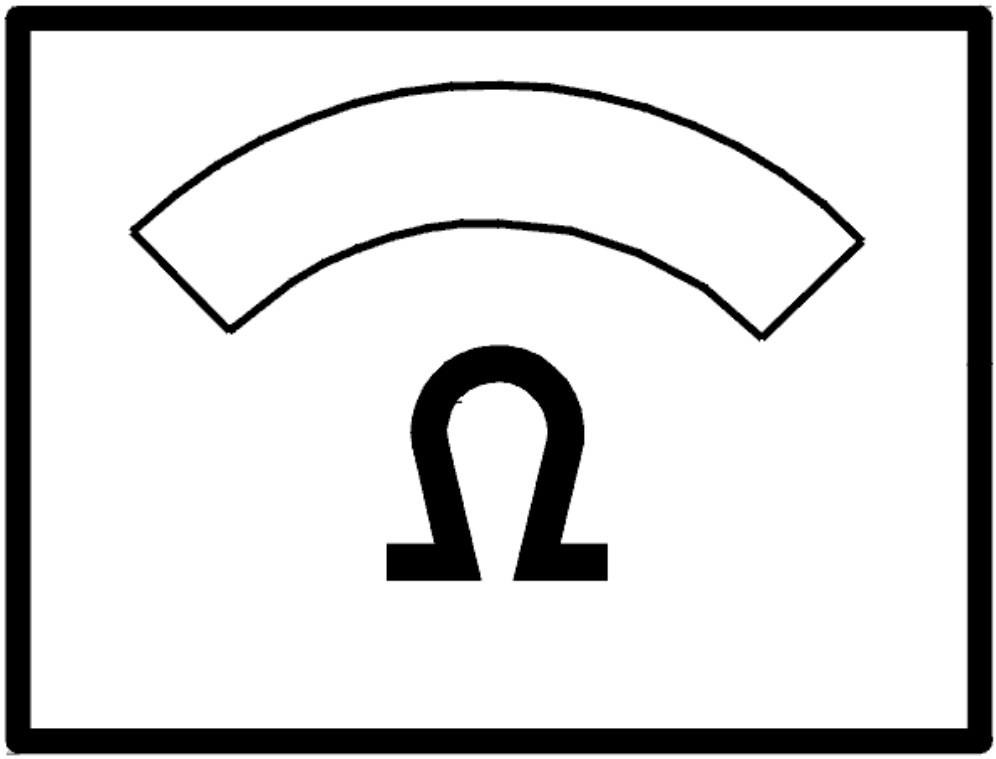


Fig. 98: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

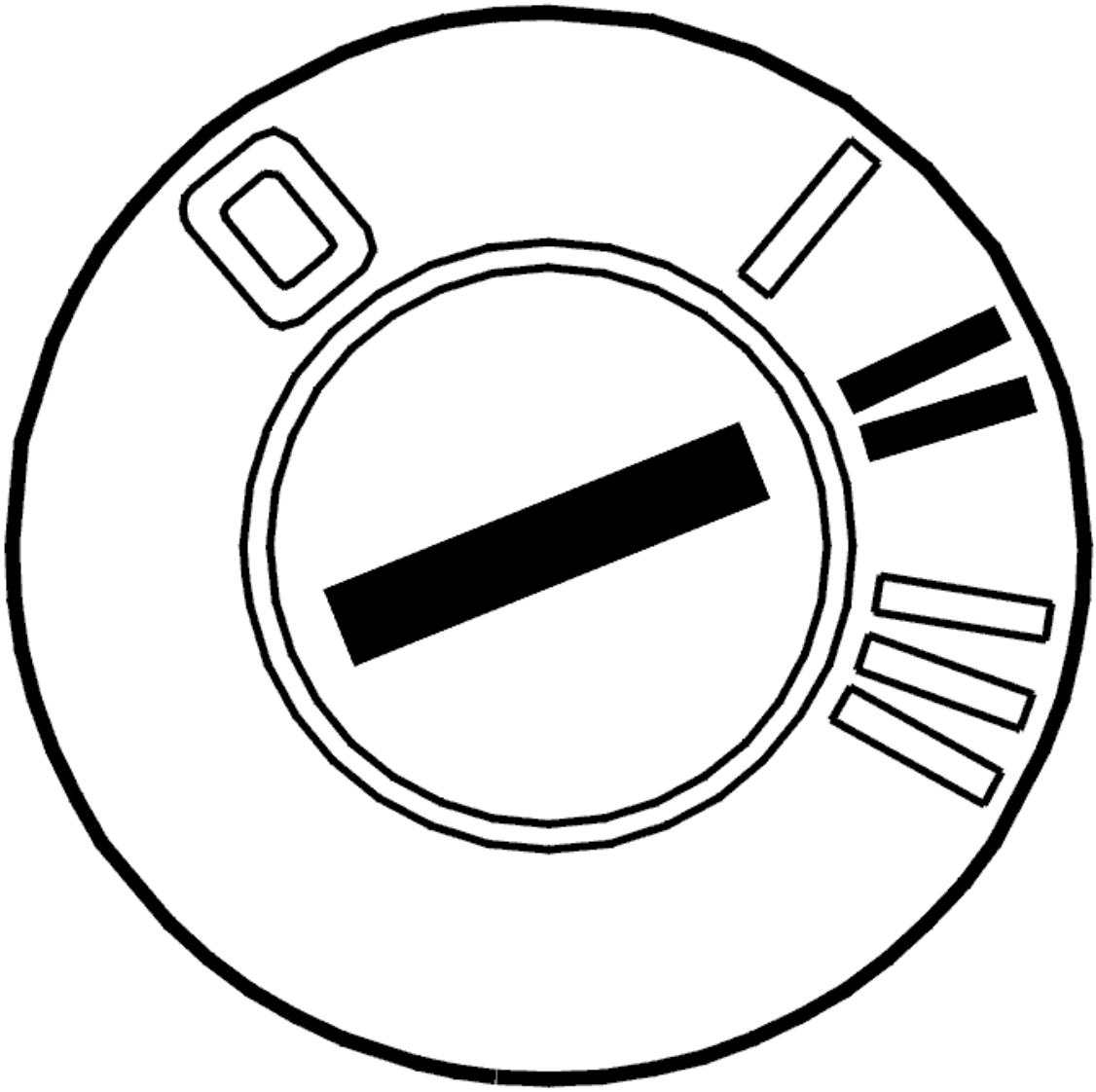


Fig. 99: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

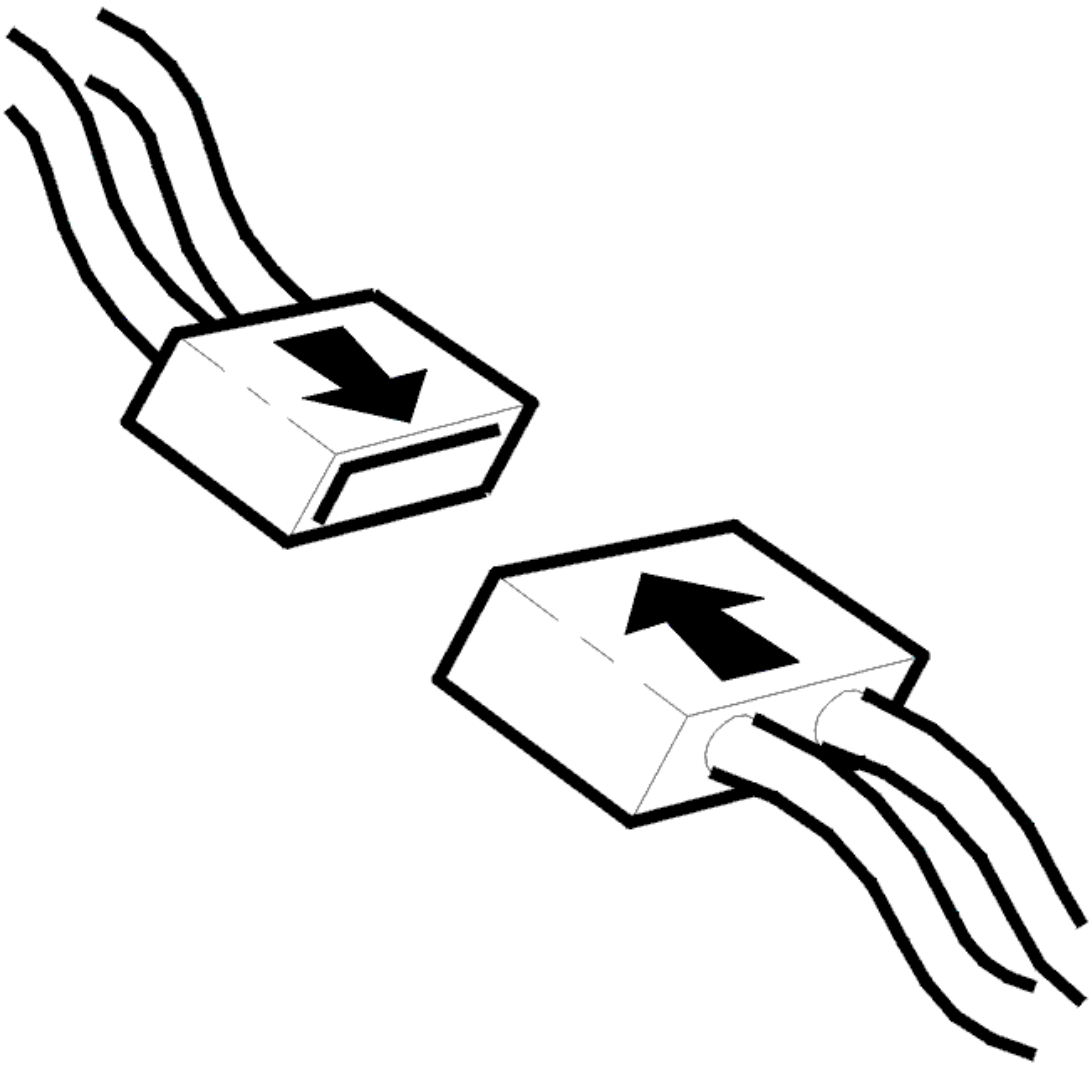


Fig. 100: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

Remedy contact resistance and oxidation in the control module and automatic transmission connectors. See **CONTACT RESISTANCE AND OXIDATION**

Check the cable between control module terminal #37 (#A37) and transmission connector (control module side) terminal #L (#A11). Check for an intermittent short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** .

Check the cable between control module terminal #55 (#A55) and transmission connector (control module side) terminal #M (#A12). Check for an intermittent short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

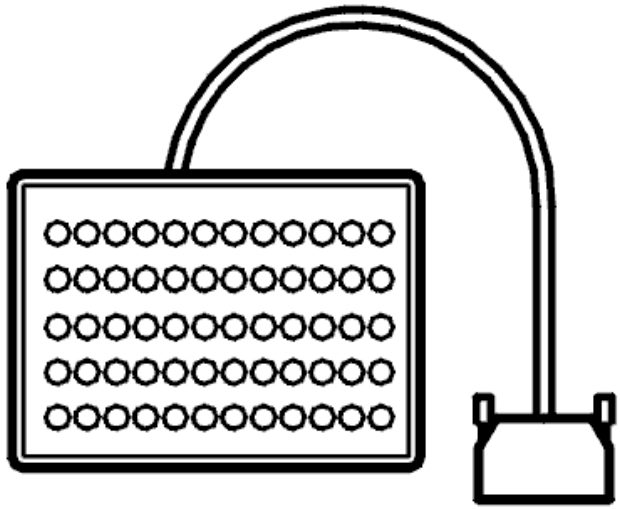


Fig. 101: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

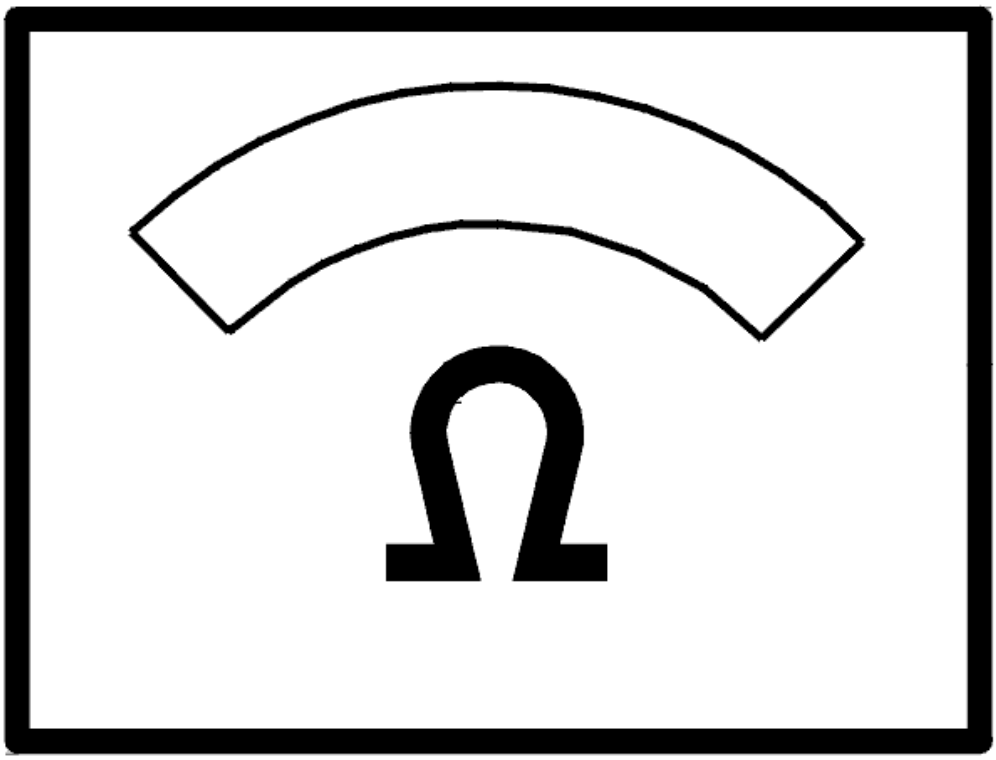


Fig. 102: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

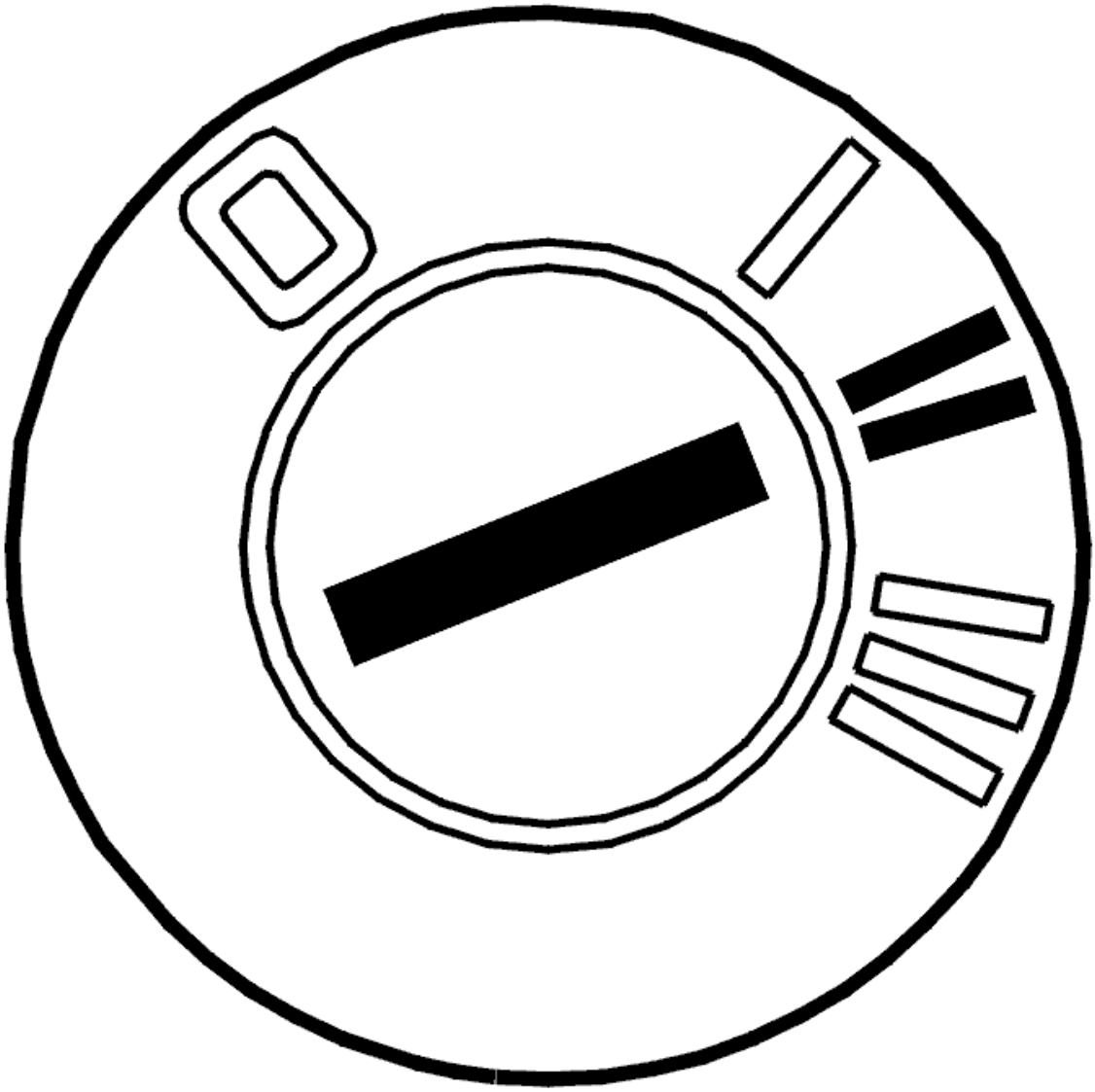


Fig. 103: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

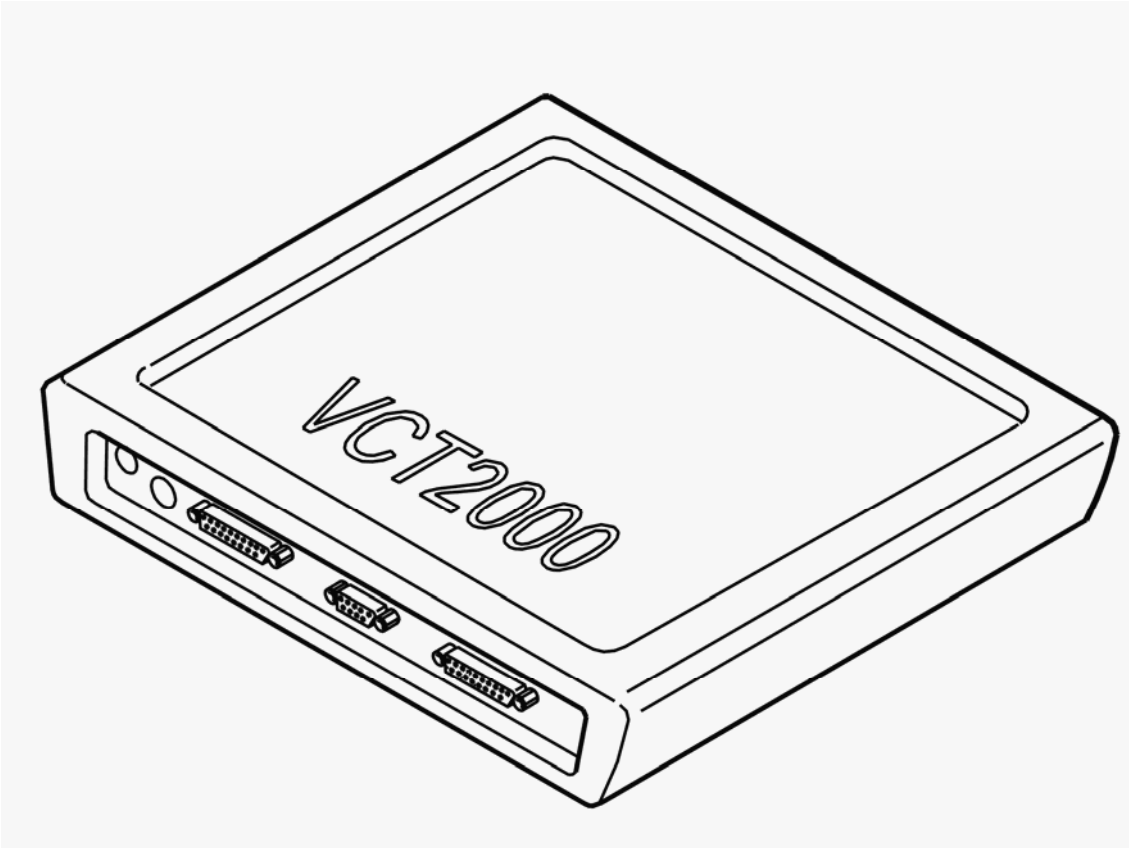


Fig. 104: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair check that the fault has been remedied.

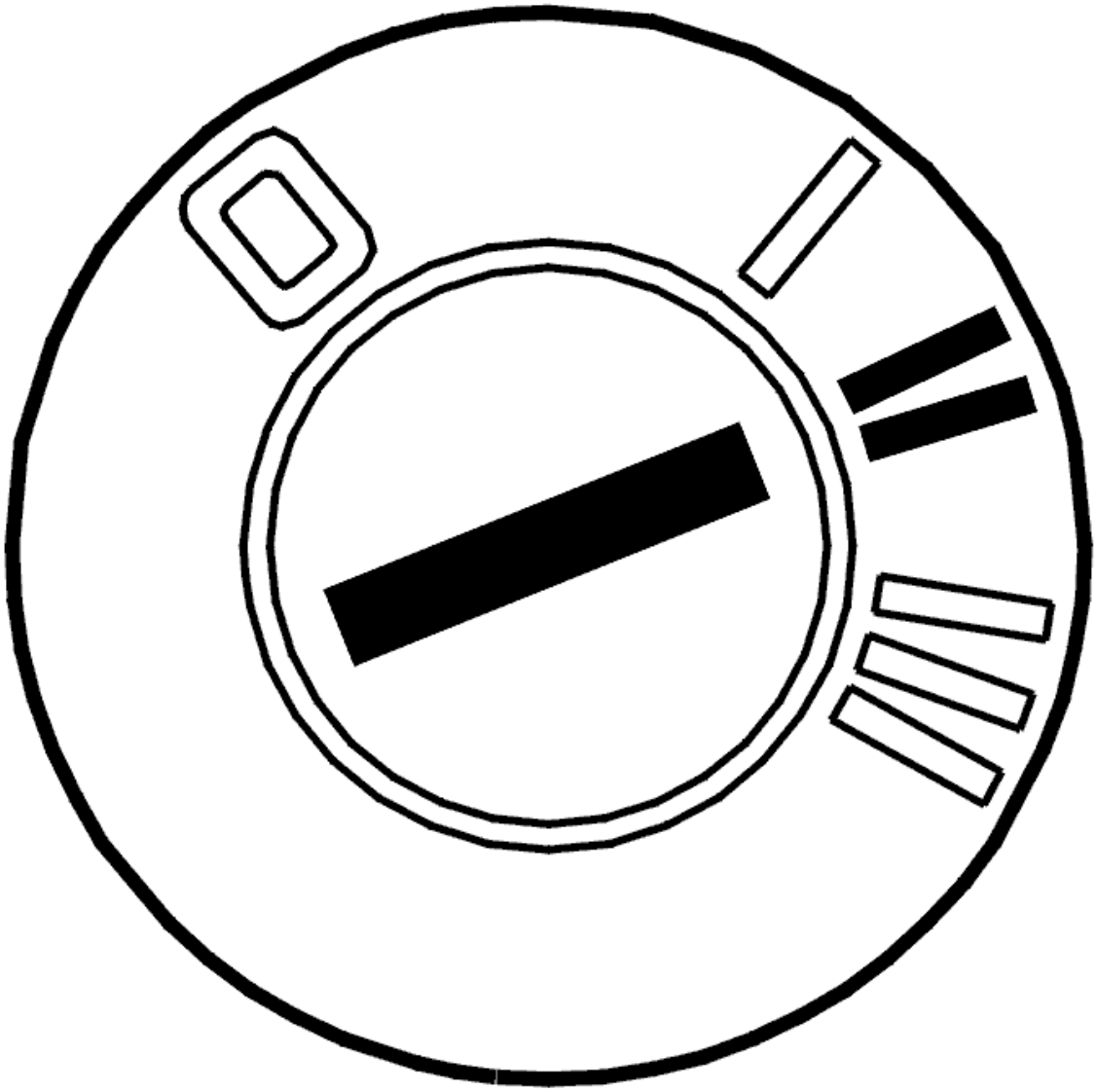


Fig. 105: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

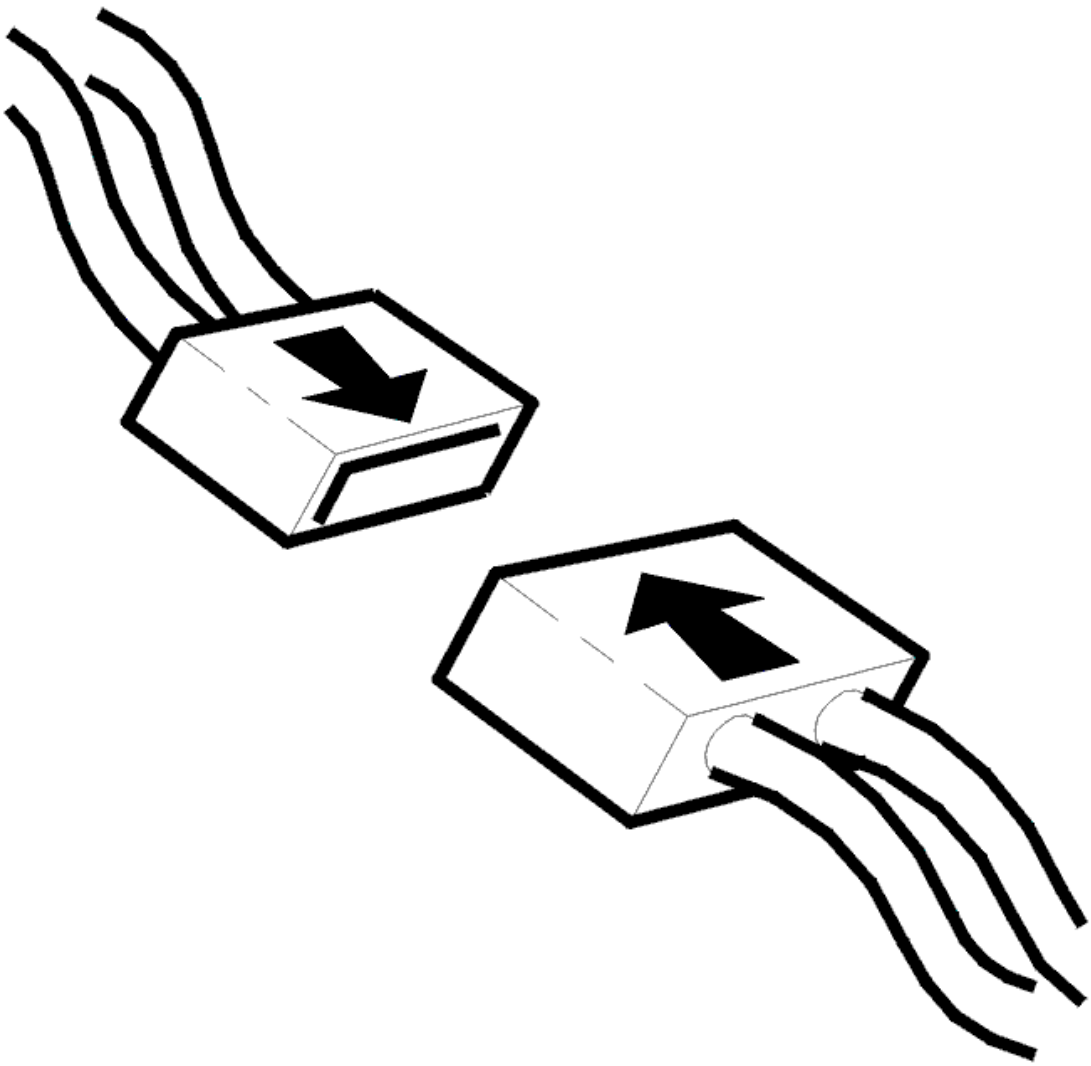


Fig. 106: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.
- Read off oil temperature.

  Check that the transmission oil temperature is within its permitted range. Compare with the transmission temperature.

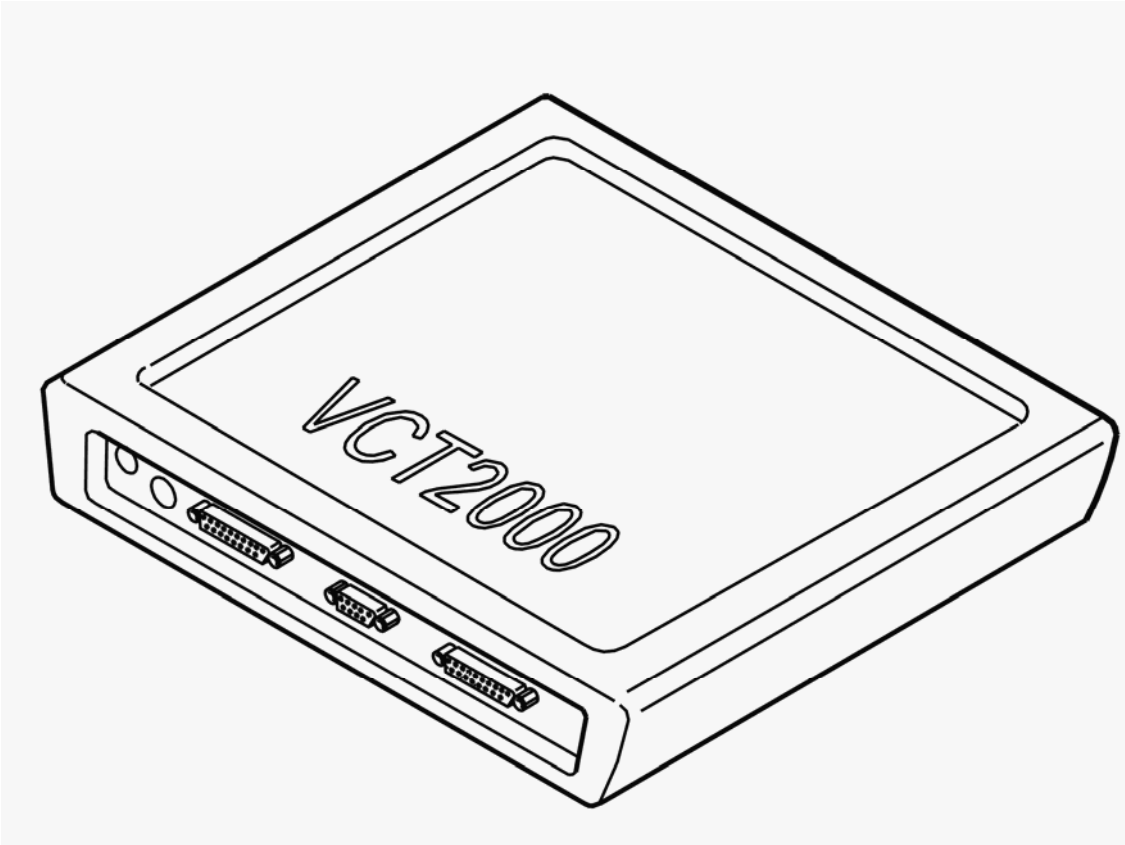


Fig. 107: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0043: OIL TEMPERATURE SENSOR. SIGNAL TOO LOW (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

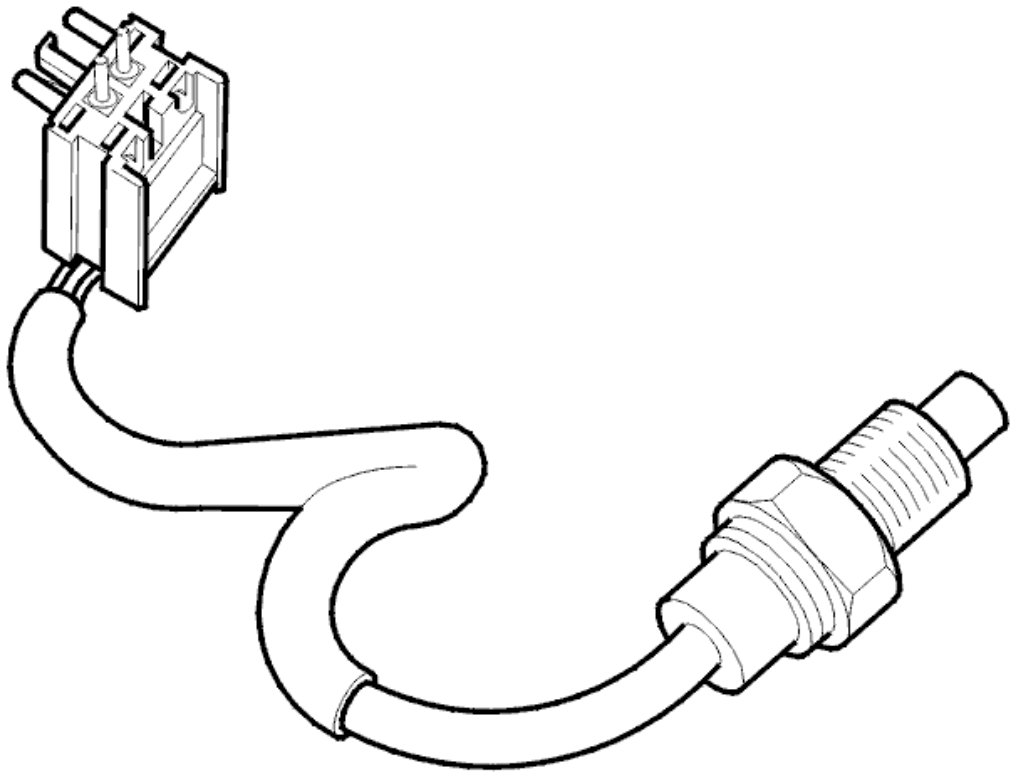


Fig. 108: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

The oil temperature sensor transmits a signal to the control module. This signal is used for functions such as temperature controlled lock-up and the engagement of high-temperature programs. The sensor has an NTC (negative temperature coefficient) resistor. The signal (voltage) decreases with increasing oil temperature. Diagnostic trouble code (DTC) TCM-0043 is stored if the control module receives too low a signal from the oil temperature sensor for approximately 20 seconds.

Substitute Value

- No substitute values.

Possible Source

- The power supply and signal cables are short-circuited to each other.
- Short-circuit to ground in the signal cable.
- Defective oil temperature sensor.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of the line pressure when shifting.
- No reduction of the line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No request for torque limiting to the engine control module (ECM) when shifting.

SIGNAL TOO LOW

CHECKING THE FUNCTION OF THE OIL TEMPERATURE SENSOR

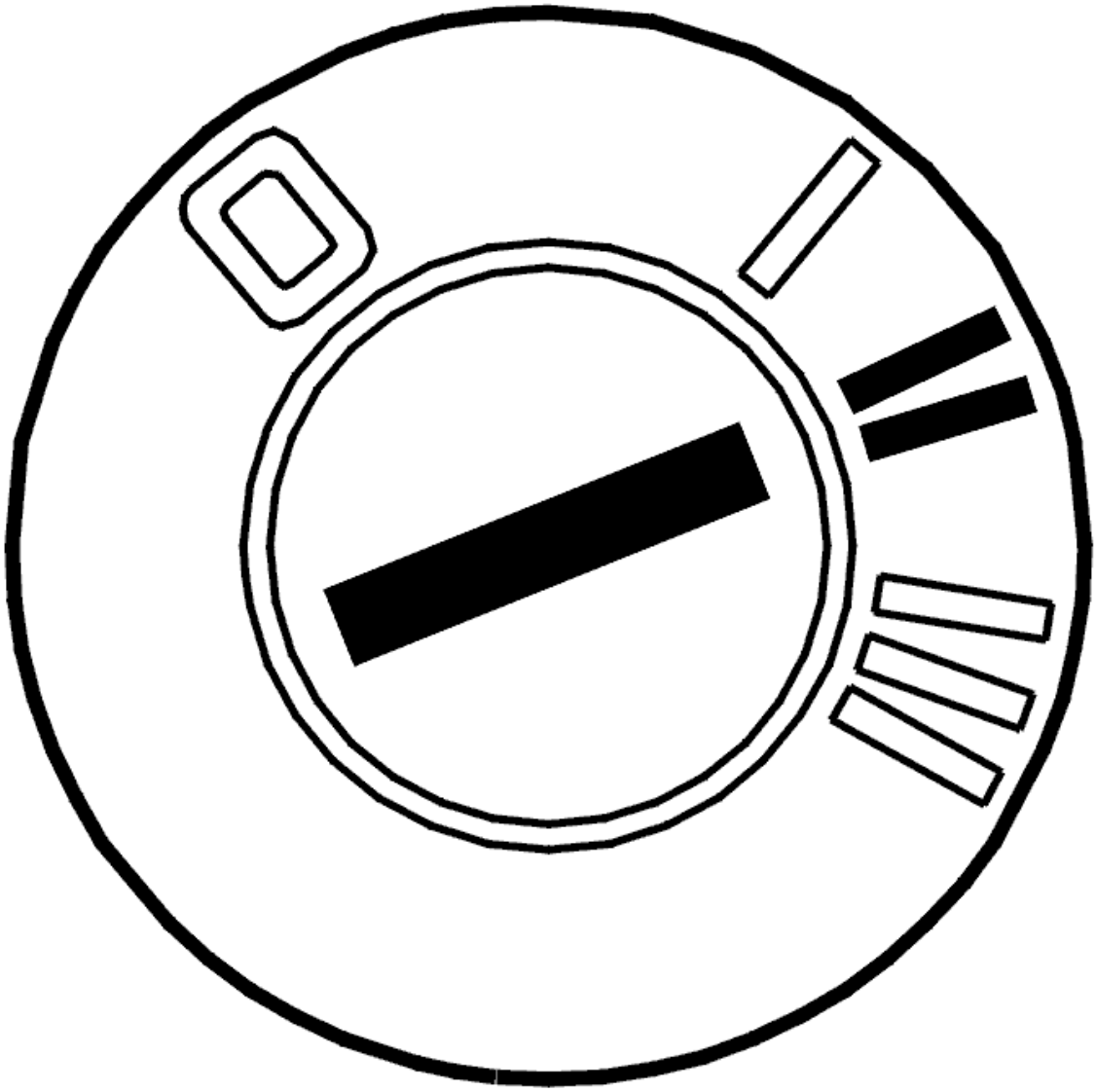


Fig. 109: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control system and may be affected by the heat given off by the solenoids.

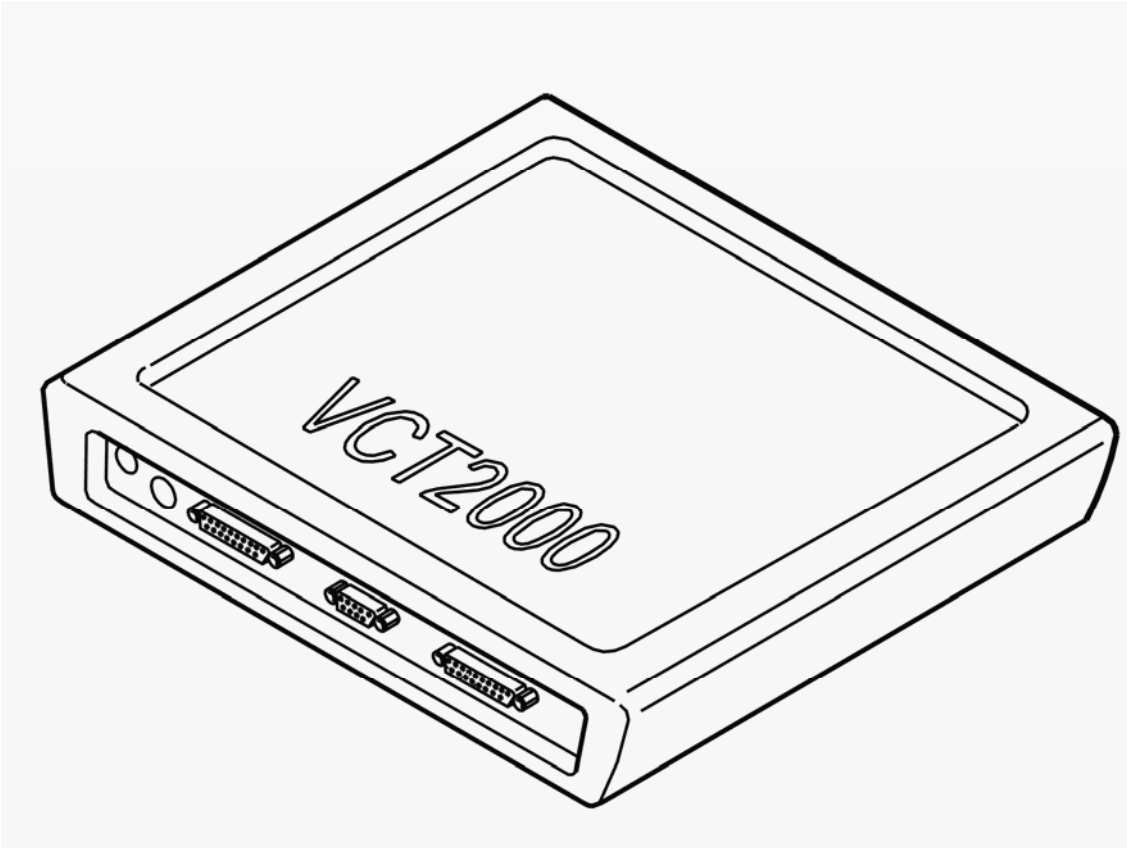


Fig. 110: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

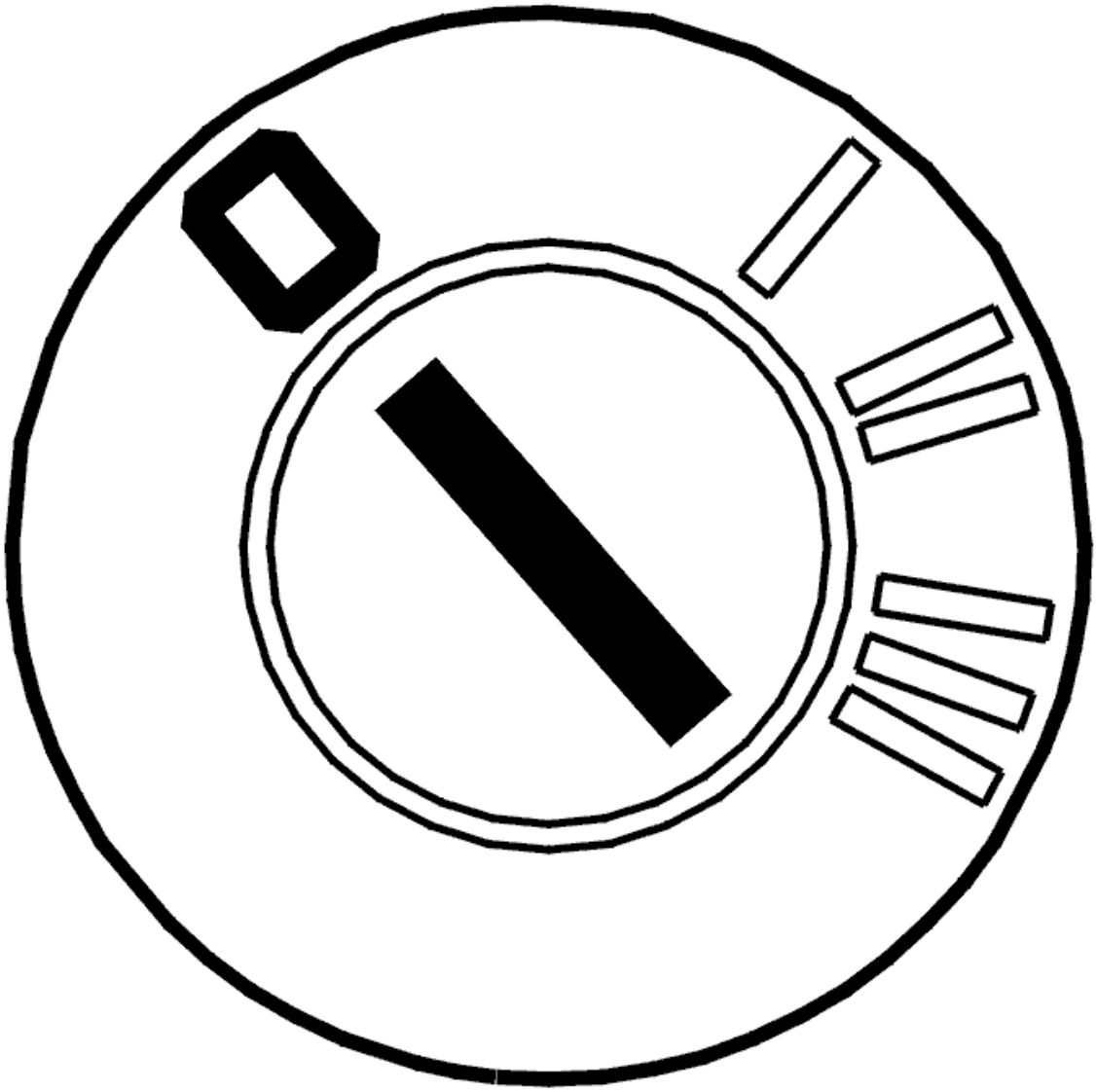


Fig. 111: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

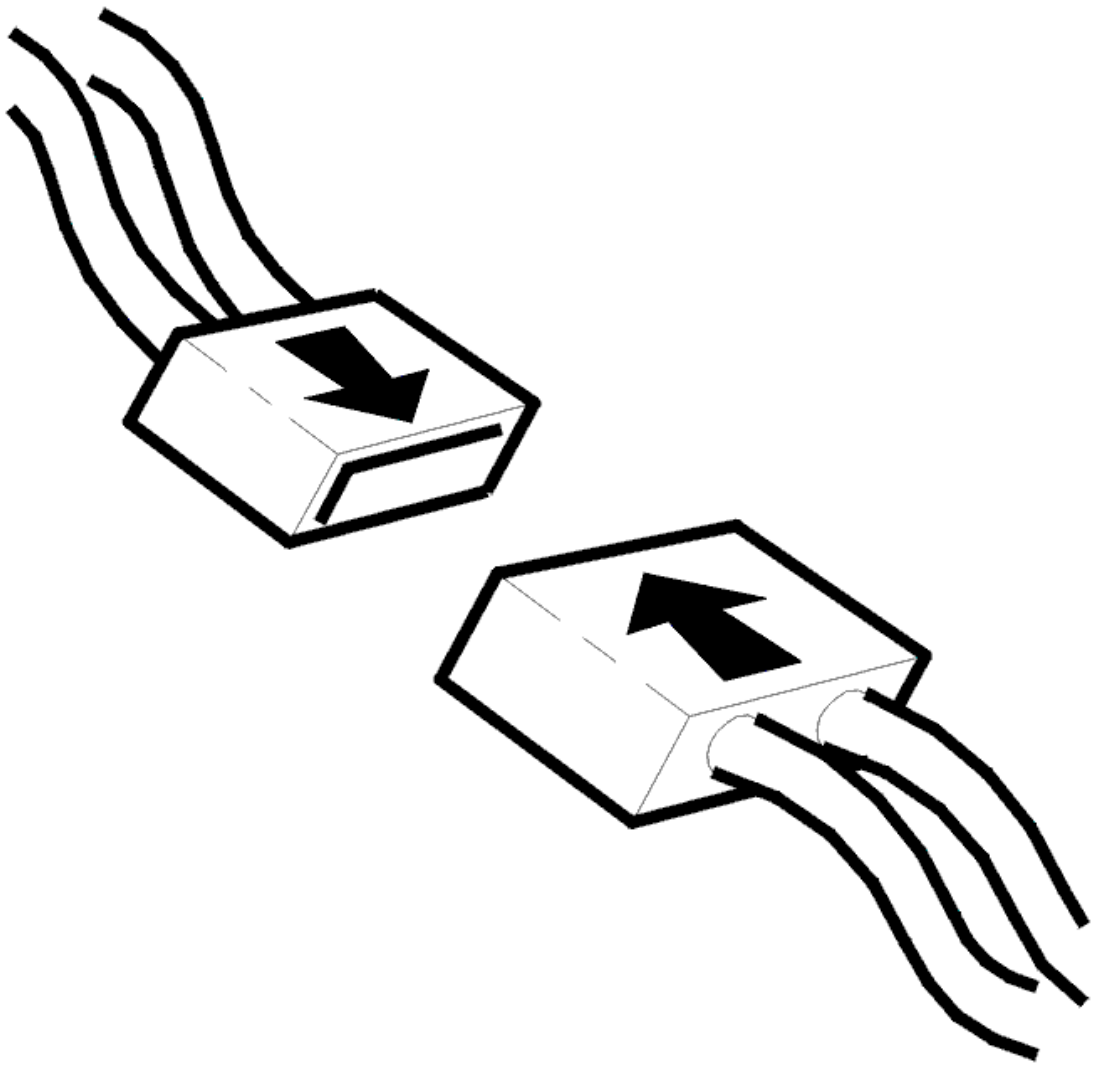


Fig. 112: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

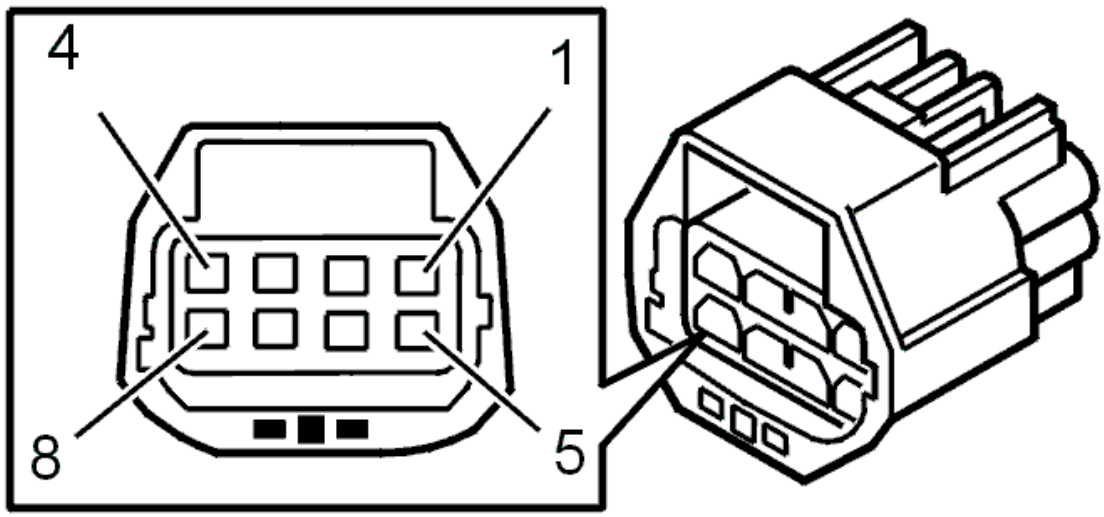


Fig. 113: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING AND COMPONENT**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

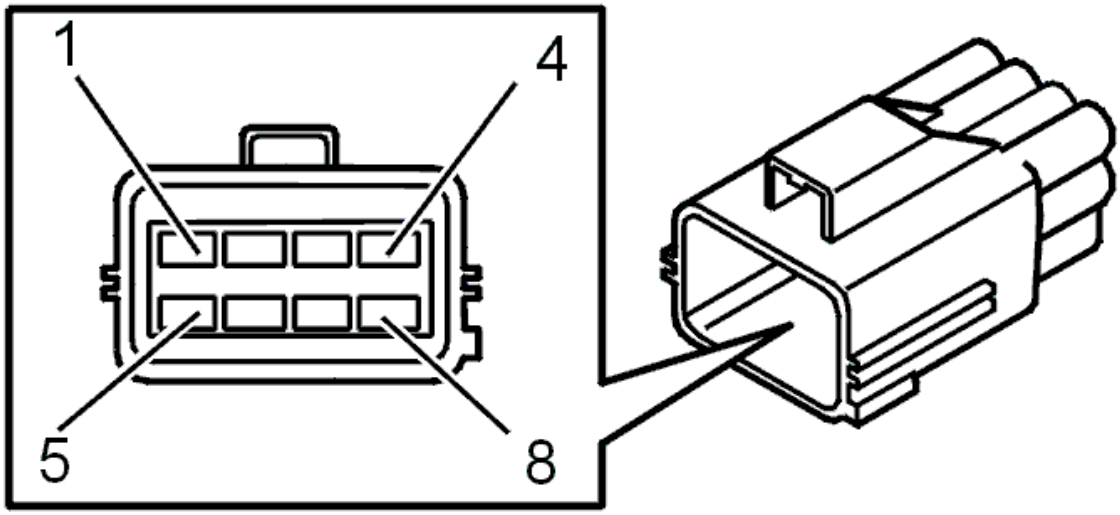


Fig. 114: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

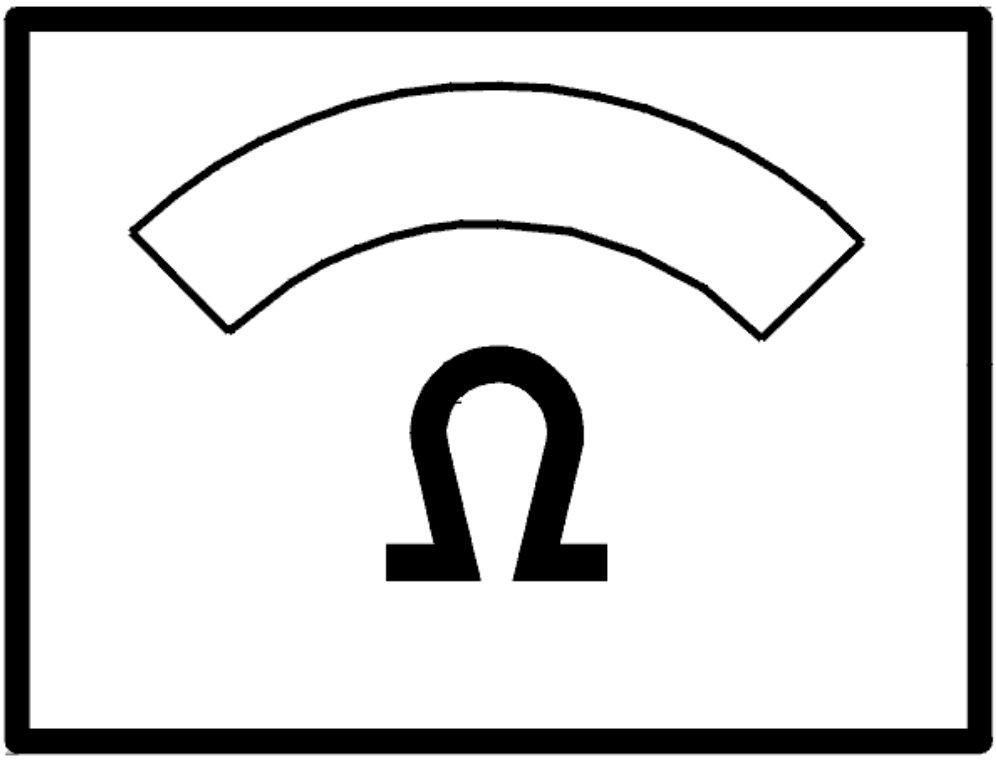


Fig. 115: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

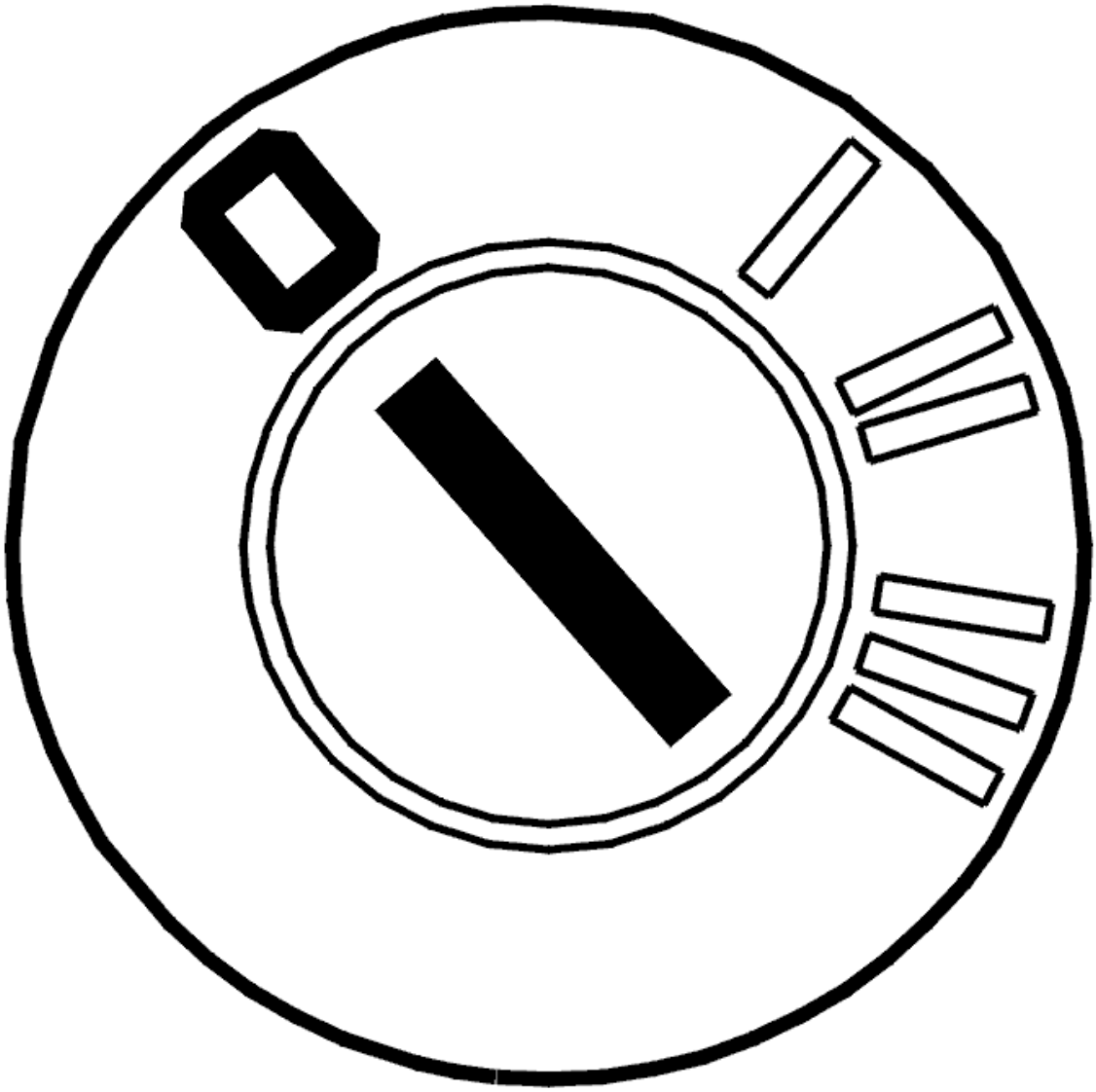


Fig. 116: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

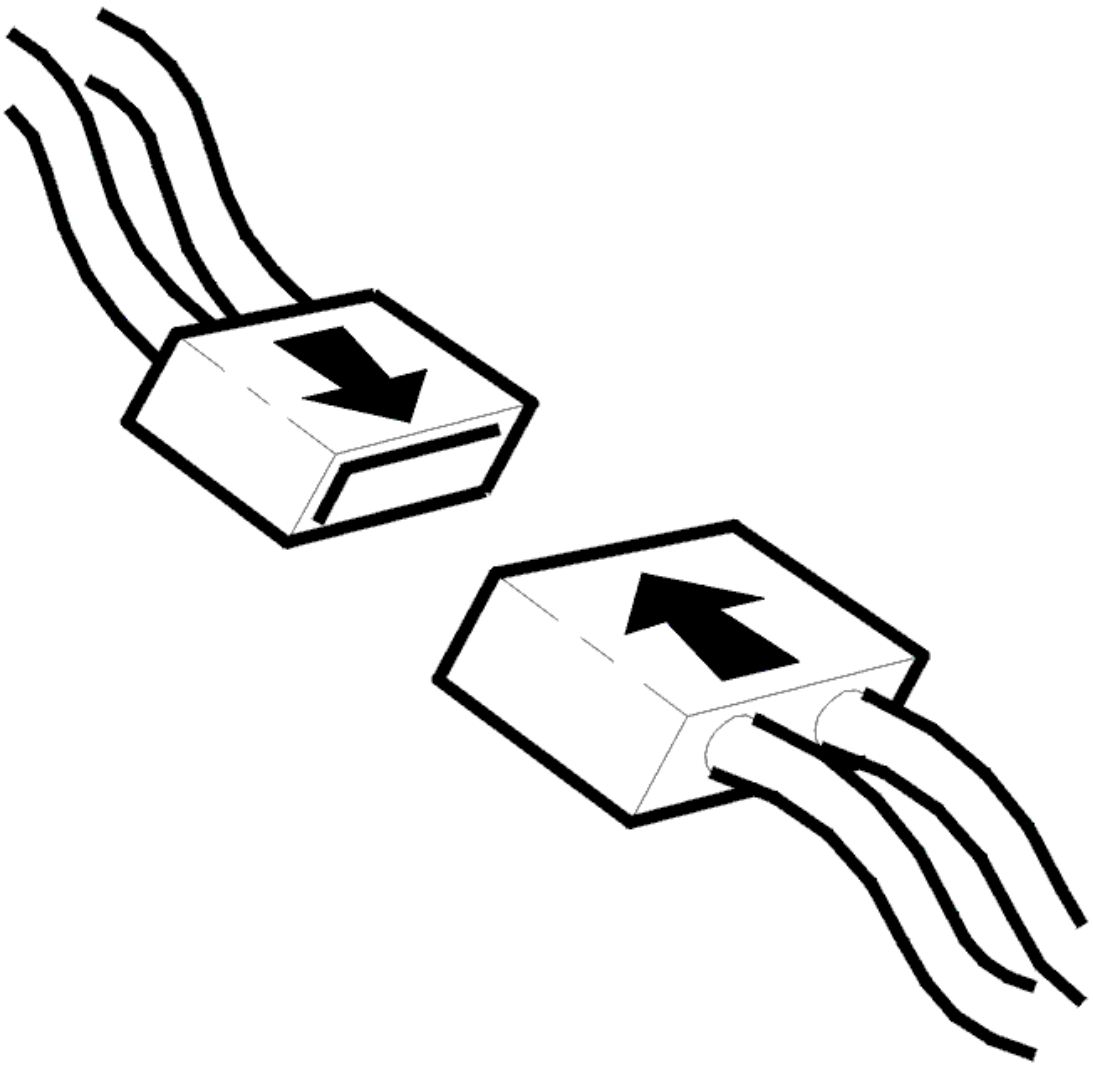


Fig. 117: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector terminal #D8 and temperature sensor terminal #2. Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20°C.

Remedy as necessary

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To check and replace the temperature sensor, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

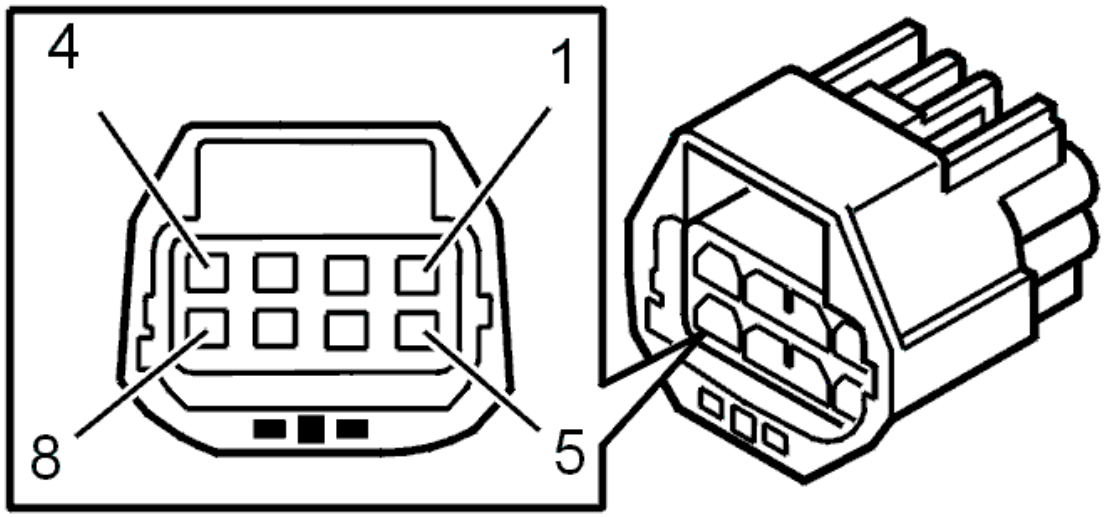


Fig. 118: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** . Also check the cables for a short-circuit to each other.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

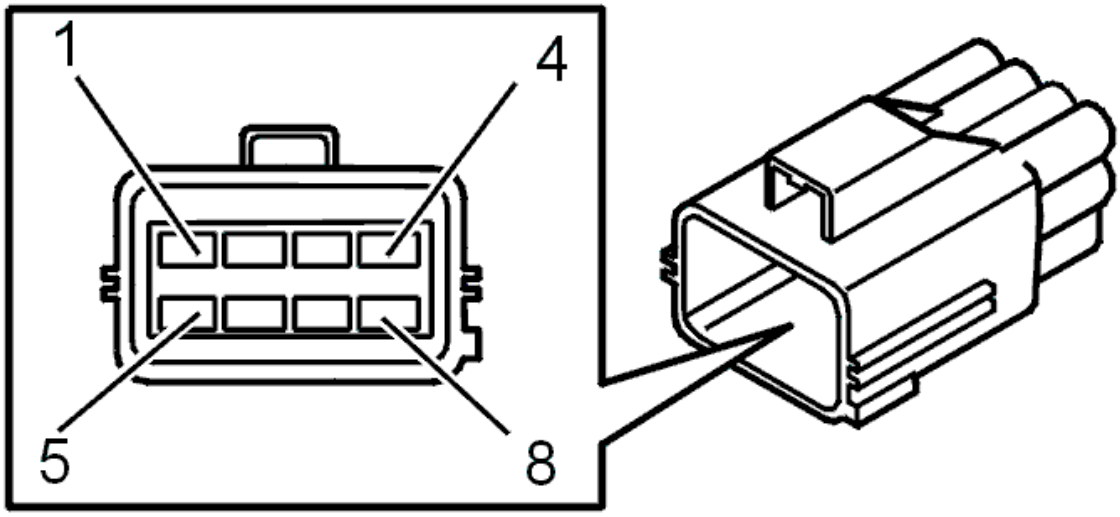


Fig. 119: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

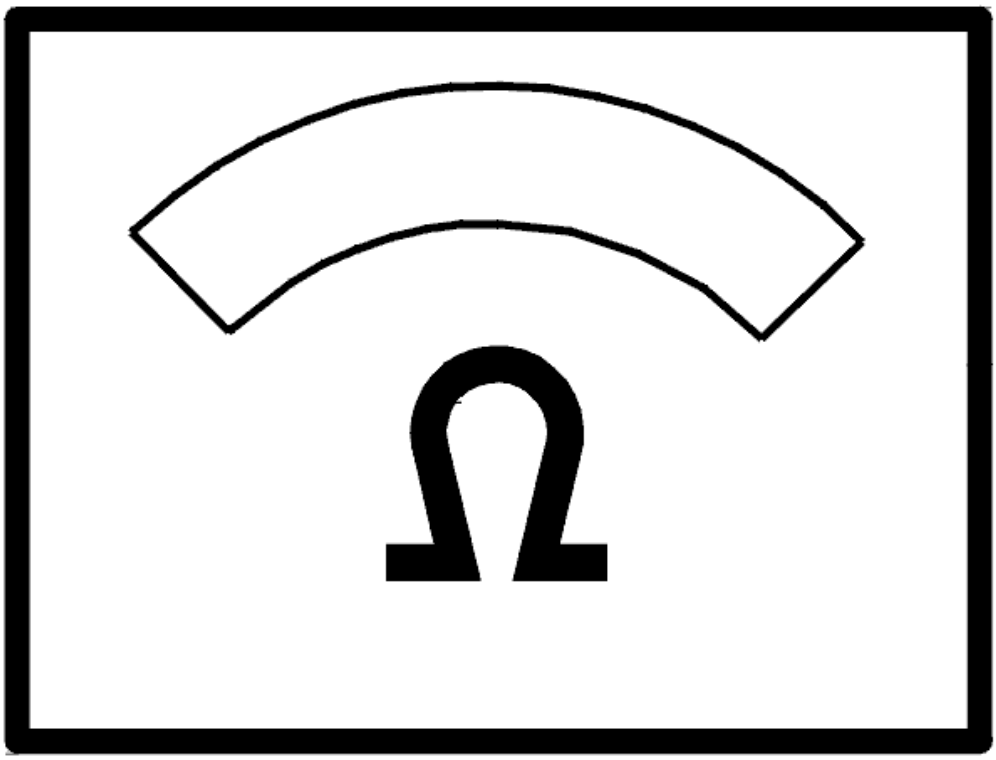


Fig. 120: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

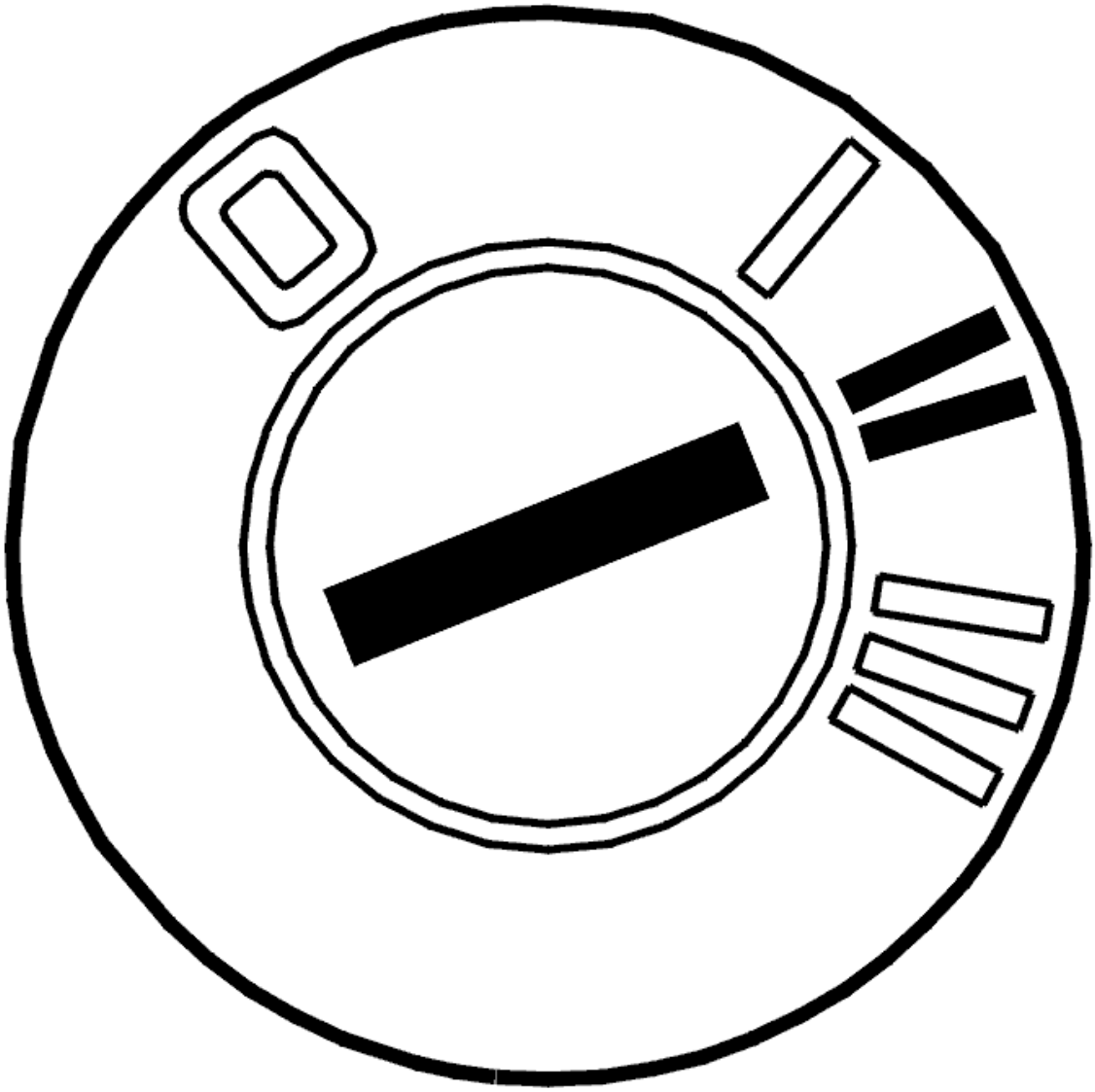


Fig. 121: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

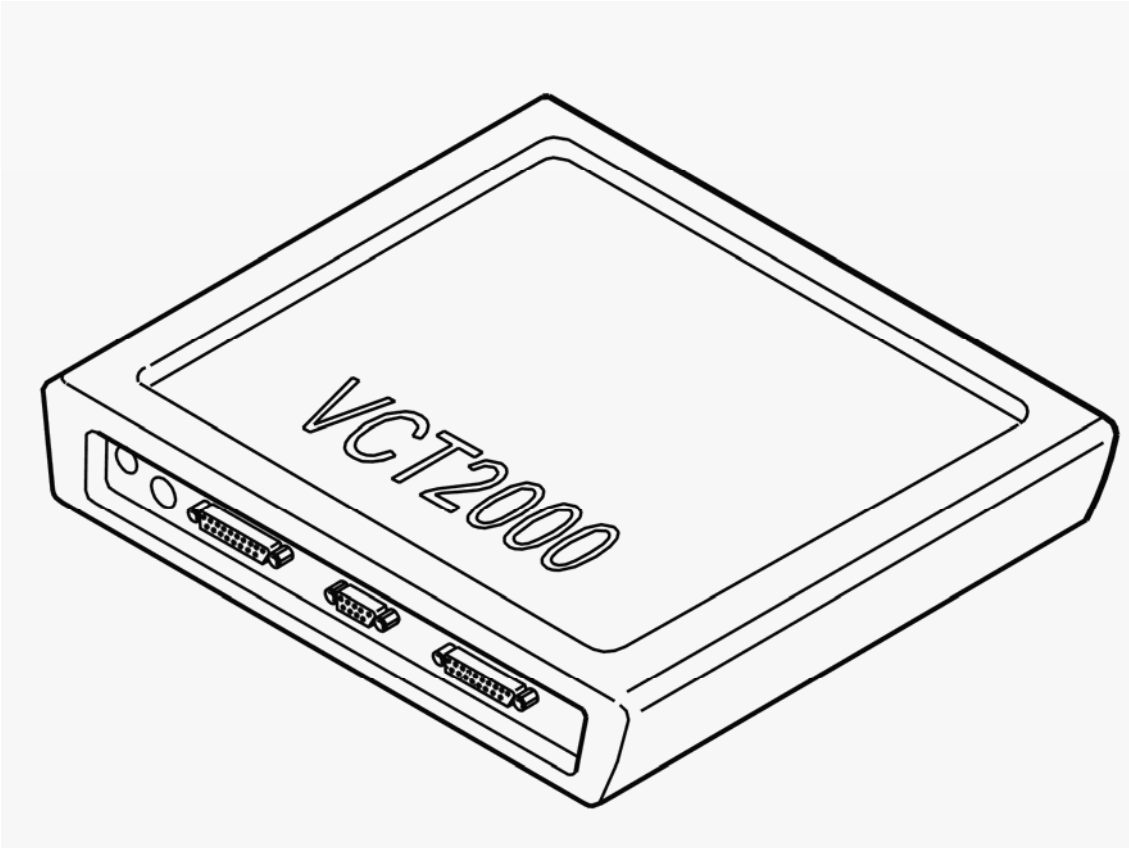


Fig. 122: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

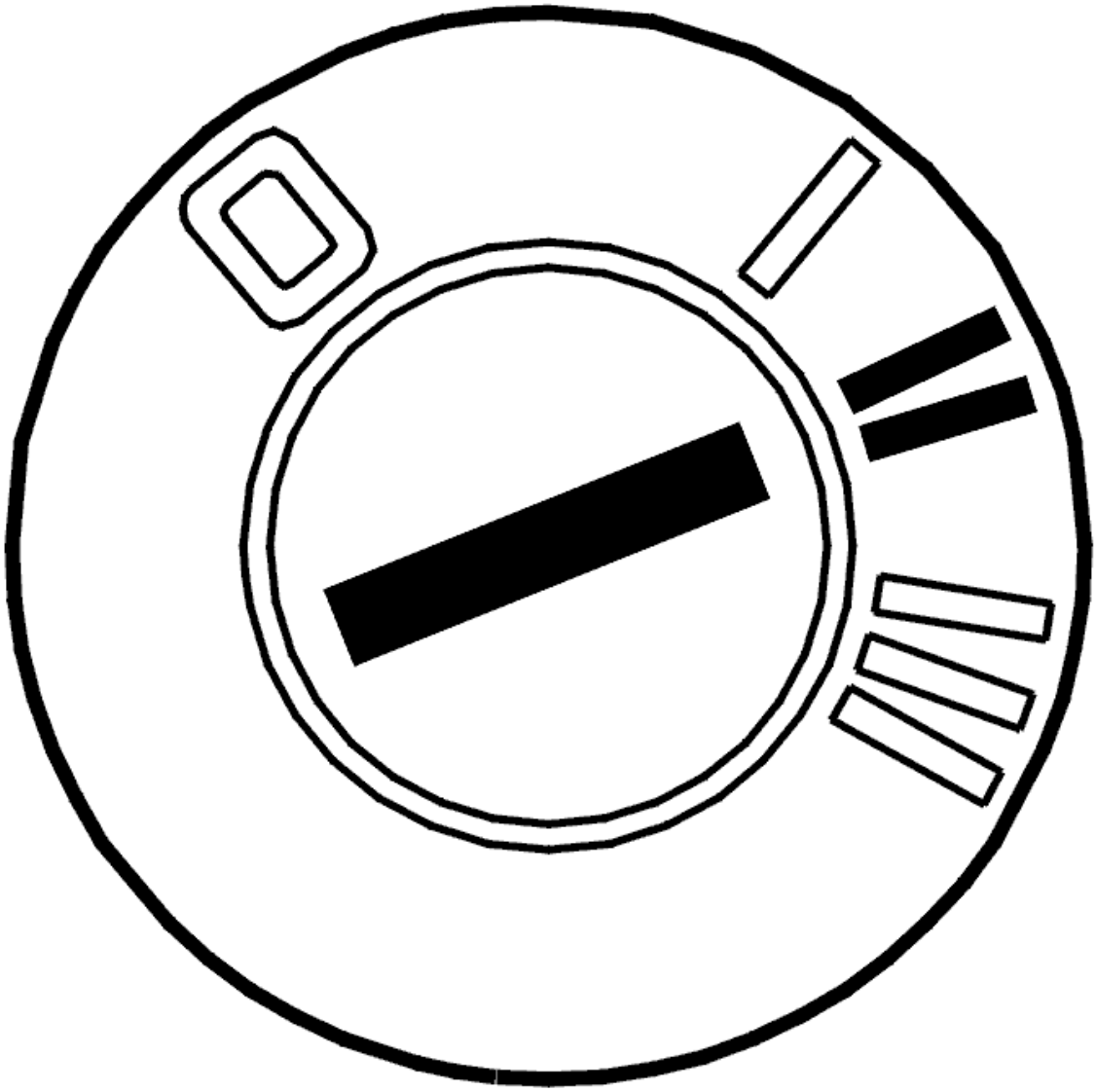


Fig. 123: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

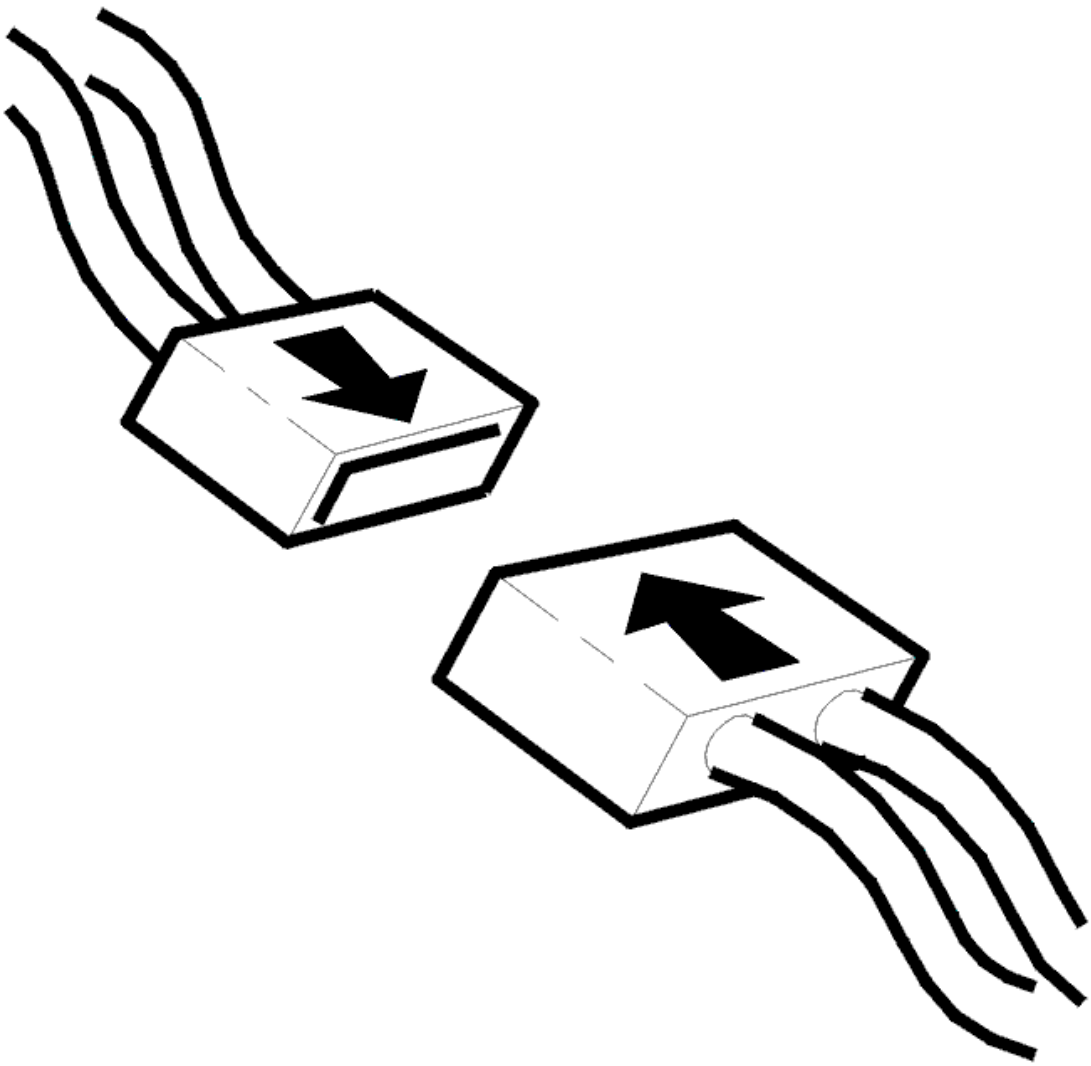


Fig. 124: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

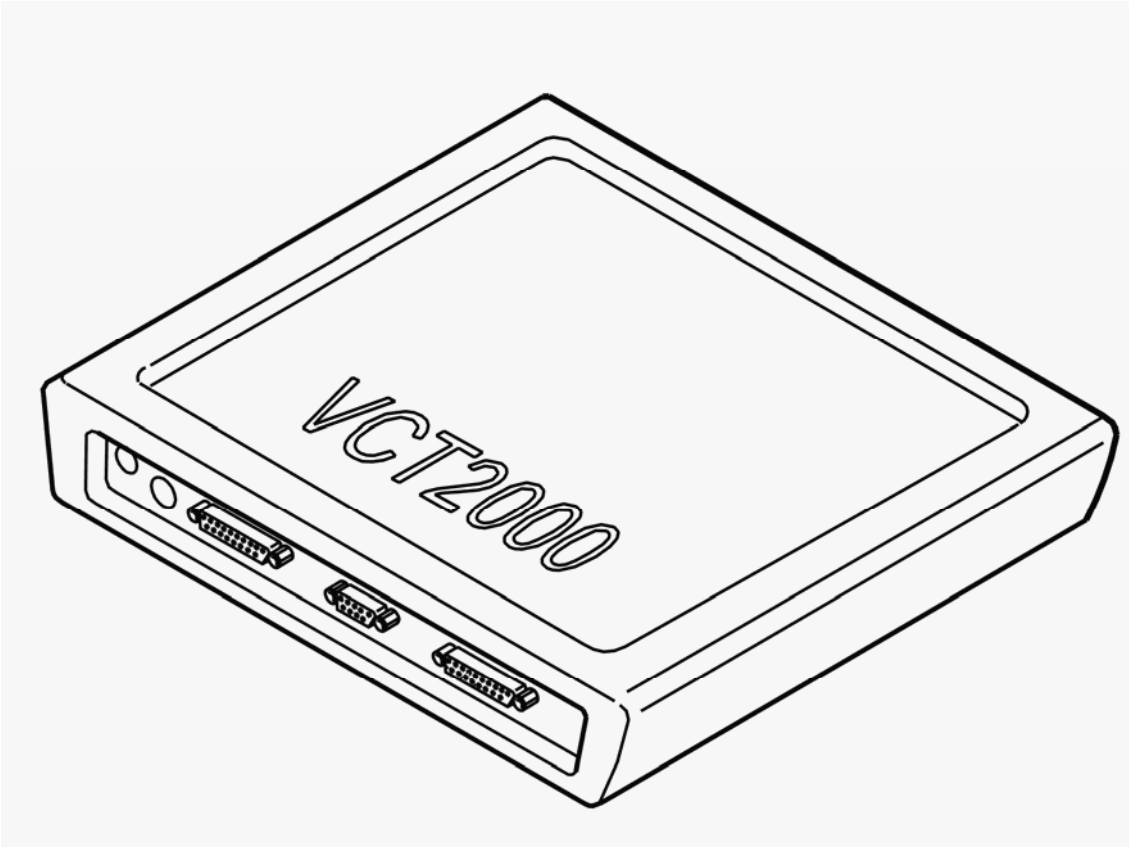


Fig. 125: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0044: OIL TEMPERATURE SENSOR. SIGNAL TOO HIGH (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

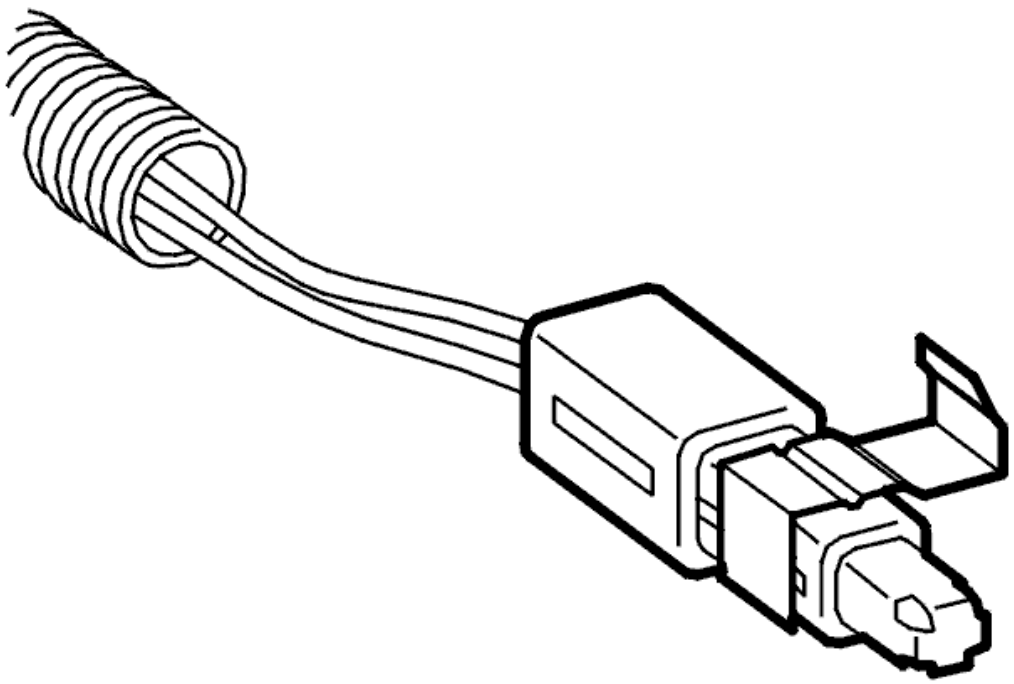


Fig. 126: Identifying Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

The oil temperature sensor transmits a signal to the control module. This signal is used for functions such as temperature controlled lock-up and the engagement of high-temperature programs. The sensor has an NTC (negative temperature coefficient) resistor. The signal (voltage) decreases with increasing oil temperature. Diagnostic trouble code (DTC) TCM-0044 is stored if the control module receives a signal from the oil temperature sensor corresponding to a temperature below approximately -10°C when the engine is started, and the signal has not changed after the engine has been running for approximately 10 seconds.

Substitute Value

- No substitute values.

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the signal cable or in the ground lead.
- Short-circuit to supply voltage in the signal cable.
- Defective oil temperature sensor.

Fault symptom[s]

- General orange warning lamp lit.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

SIGNAL TOO HIGH

CHECKING THE FUNCTION OF THE OIL TEMPERATURE SENSOR

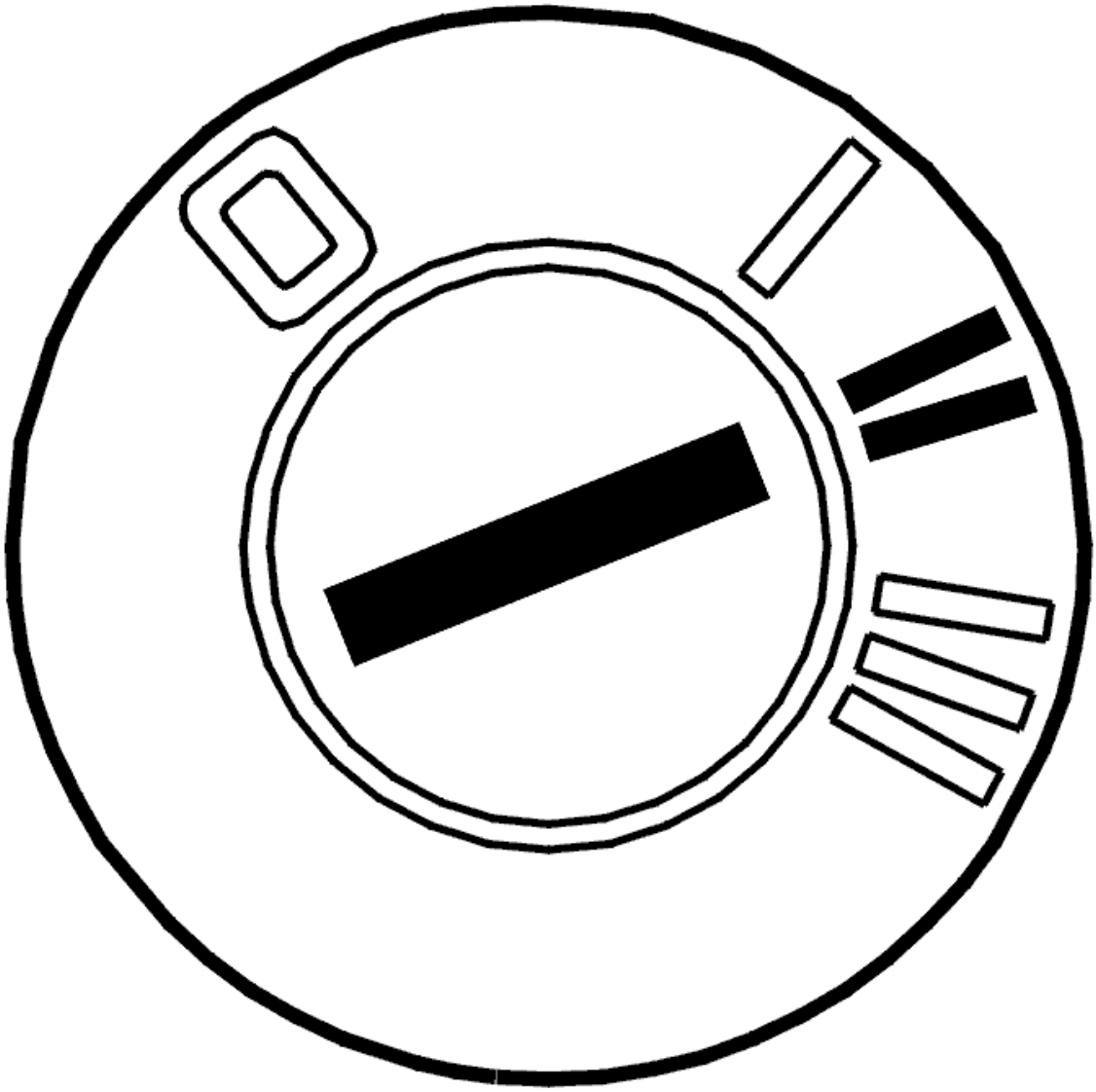


Fig. 127: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

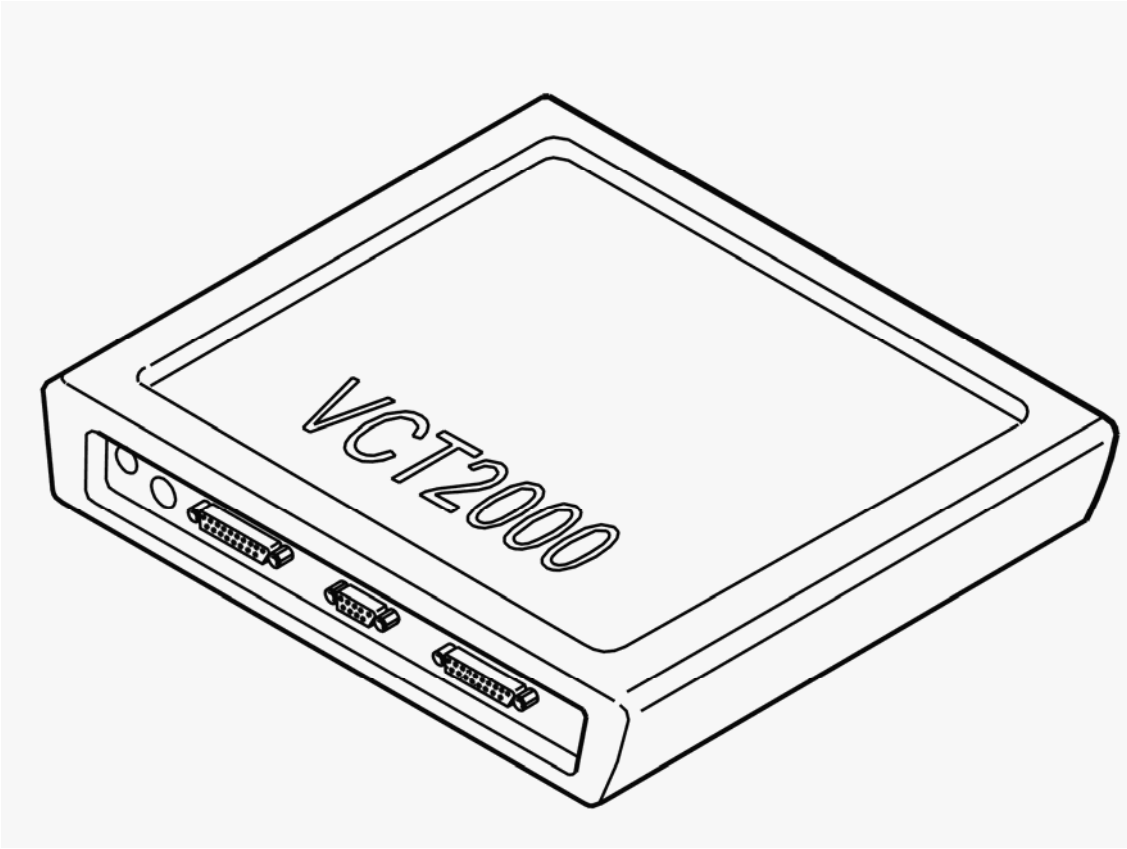


Fig. 128: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

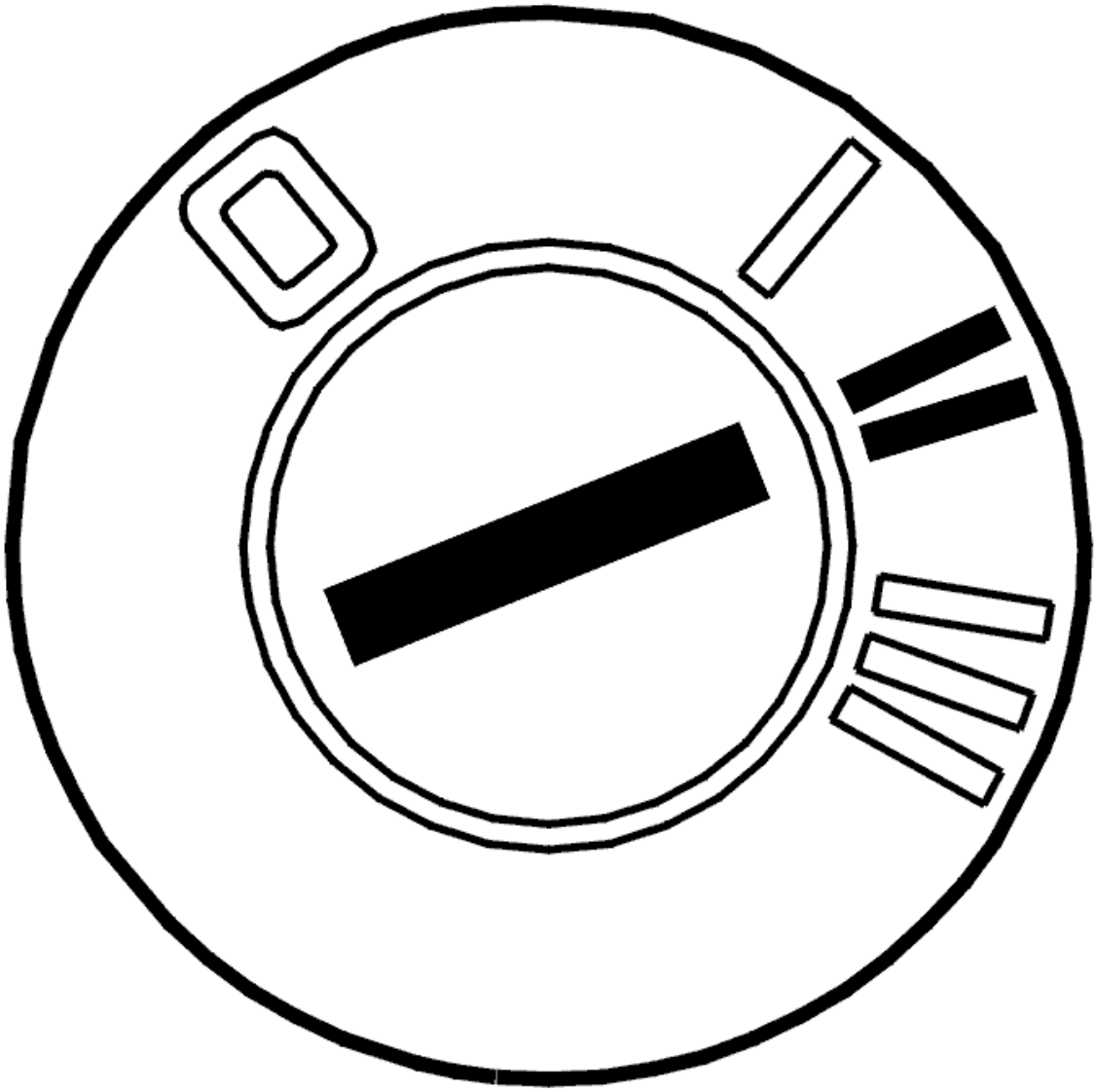


Fig. 129: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

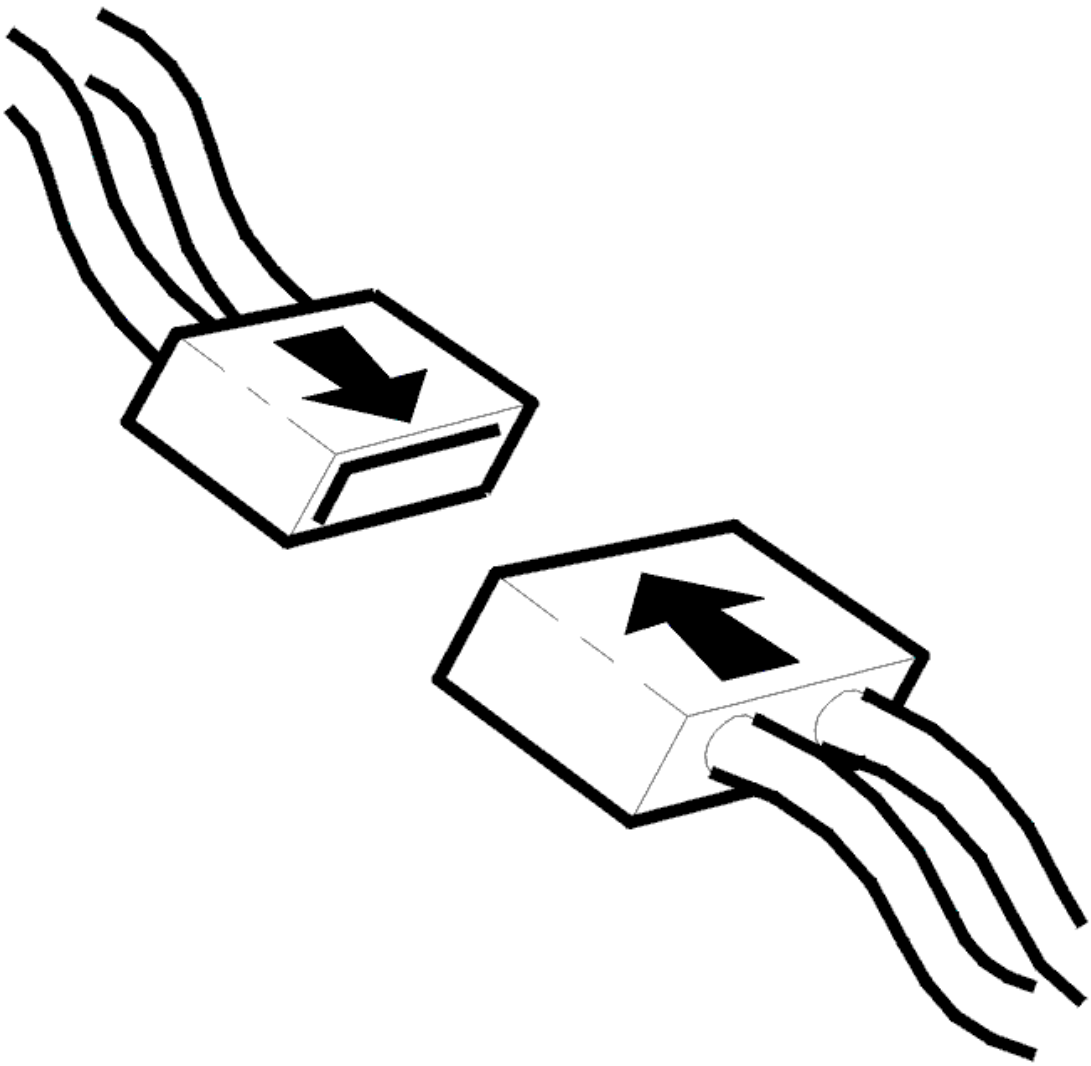


Fig. 130: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and transmission connectors. Check for contact resistance and oxidation
- Reconnect the control module and transmission connectors
- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

  If the transmission temperature is within its permitted range, the cause of the fault was contact resistance or oxidation in the control module or transmission connector.

Other information

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- see **CHECKING WIRING AND TERMINALS**

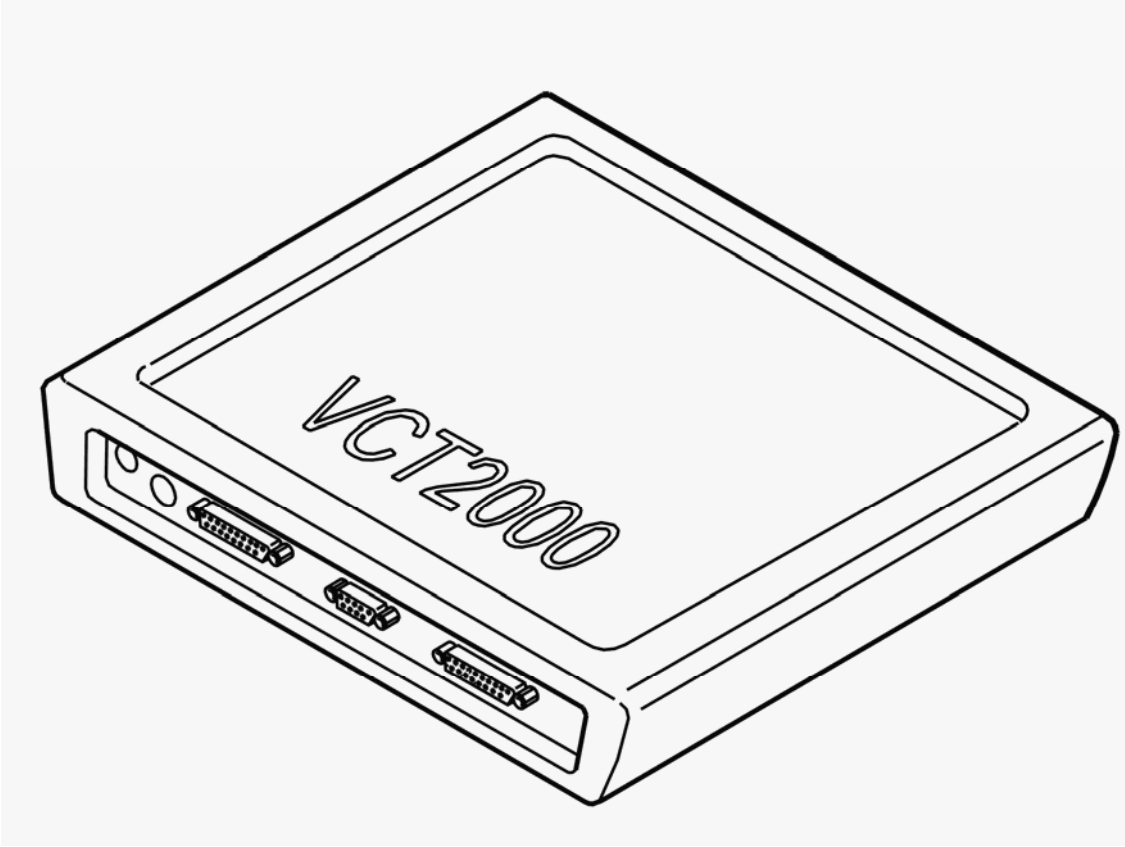


Fig. 131: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING THE TEMPERATURE SENSOR**

CHECKING THE TEMPERATURE SENSOR

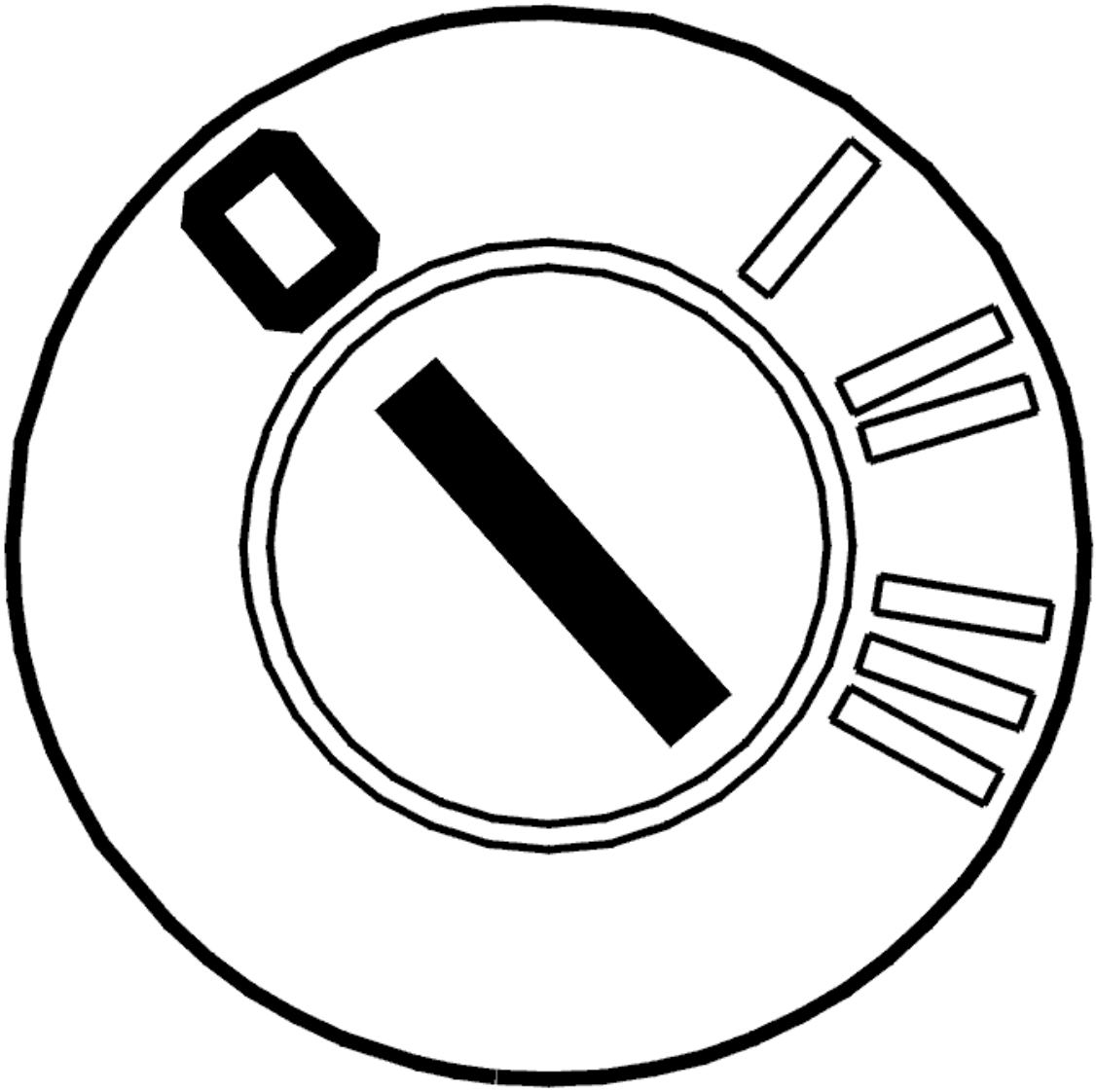


Fig. 132: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector
- Connect adapter see **9511505** and see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals #L (terminal #A11) and #M (terminal #A12).

  The resistance must be 3.4-3.6 kohms at 20 °C.

  Other information

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - For information about signals, see **SIGNAL SPECIFICATION**

- For information about the resistance values, see **COMPONENT RESISTANCE VALUES**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES** .

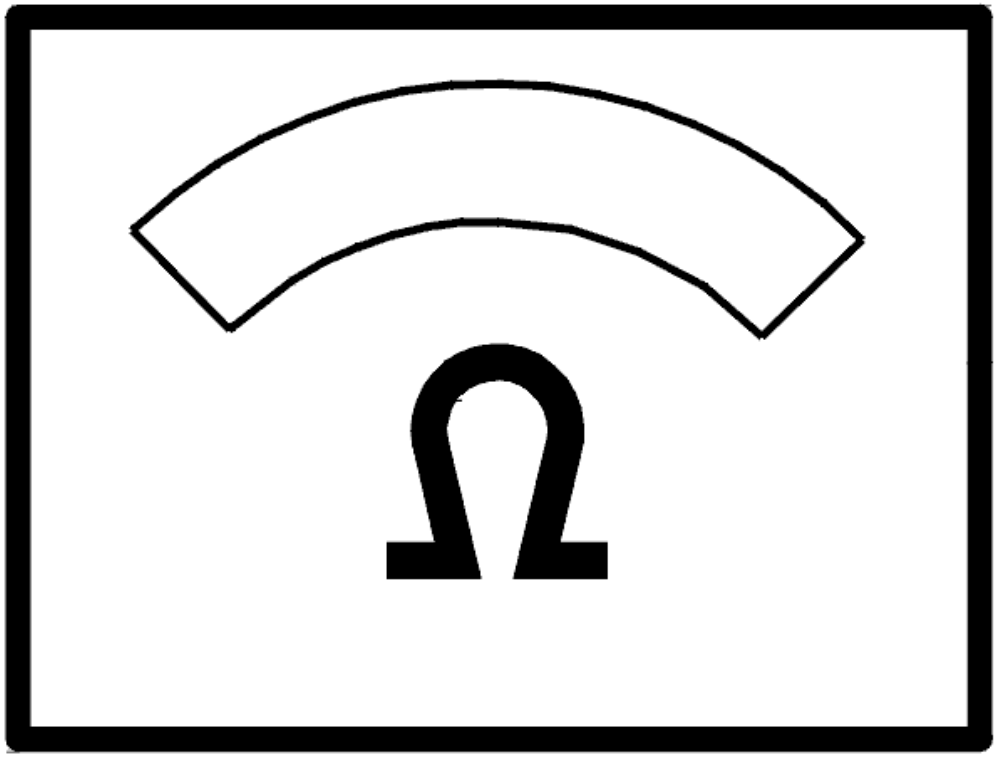


Fig. 133: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

- Breakout box connected to the control module
- Breakout box connected to the transmission connector.

Check the cable between control module terminal #37 (#A37) and transmission connector (control module side) terminal #L (#A11). Check for an open-circuit. Check for a short-circuit to supply voltage.

Check the cable between control module terminal #55 (#A55) and transmission connector (control module side) terminal #M (#A12). Check for an open-circuit. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

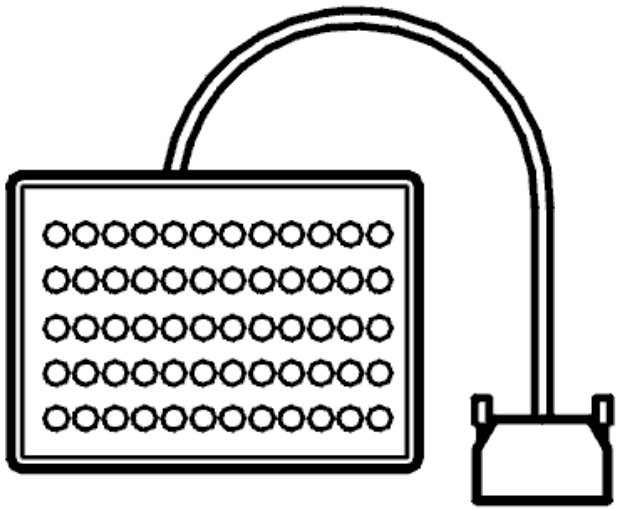


Fig. 134: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

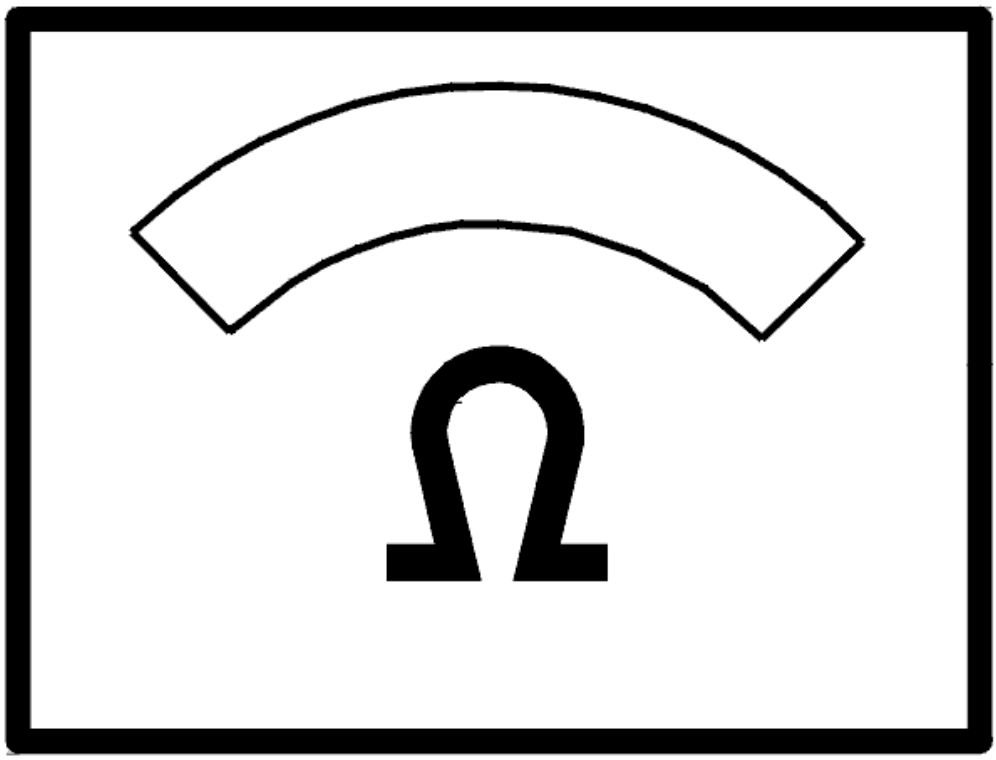


Fig. 135: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

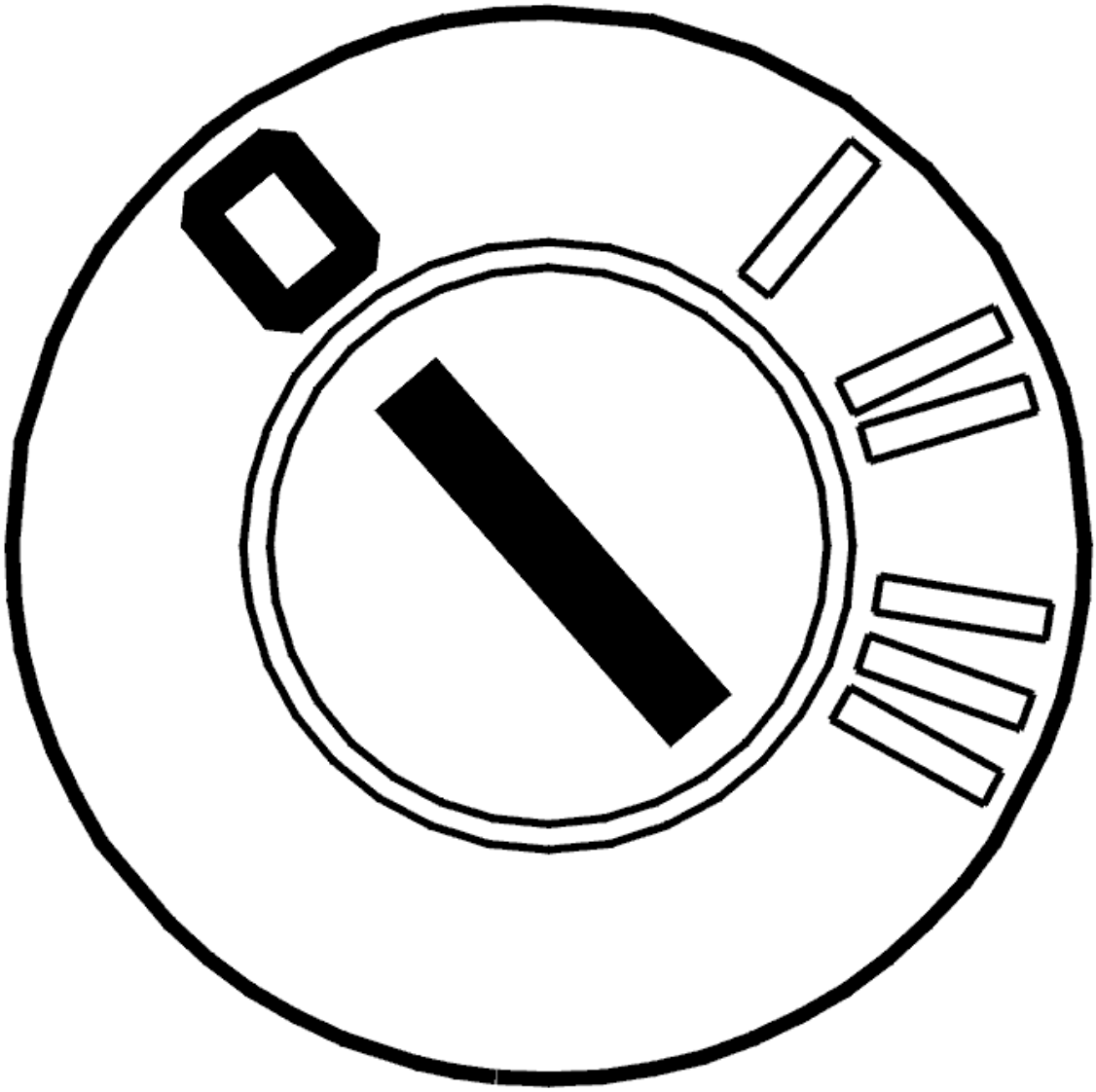


Fig. 136: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission terminal #L (#A11) and temperature sensor terminal #A. Check for an open-circuit. Check for a short-circuit to supply voltage.

  Check the cable between transmission terminal #M (#A12) and temperature sensor terminal #B. Check for an open-circuit. Check for a short-circuit to supply voltage.

  HINT: Check the temperature sensor by measuring the resistance between temperature sensor connector terminals #A and #B. The resistance must be between 3.5-3.6 kohms at 20° C.

  Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- To replace the temperature sensor, see **TEMPERATURE SENSOR FLUID TRANSMISSION, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES**
- see **CHECKING WIRING AND TERMINALS**

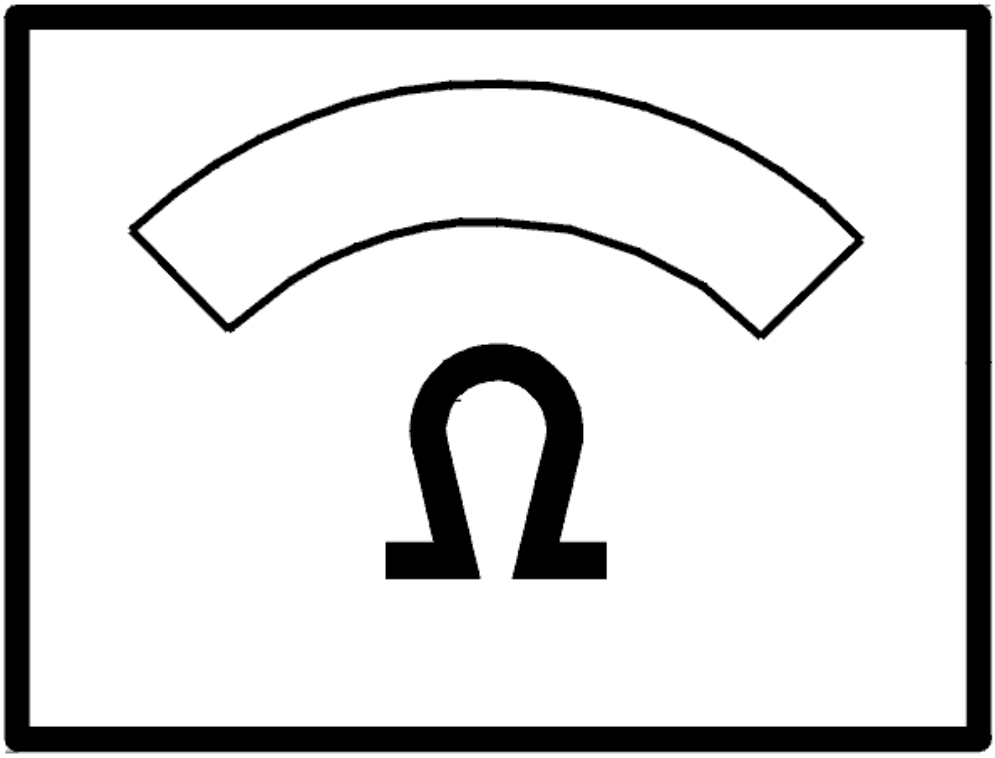


Fig. 137: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the control module and automatic transmission connector. Check for contact resistance and oxidation. Remedy if necessary.

Check the cable between control module terminal #A37 (#A37) and transmission connector (control module side) terminal #11. Check for an intermittent open-circuit. Check for an intermittent short-circuit to supply voltage.

Check the cable between control module terminal #A55 (#A55) and transmission connector (control module side) terminal #12. Check for an intermittent open-circuit. Check for an intermittent short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

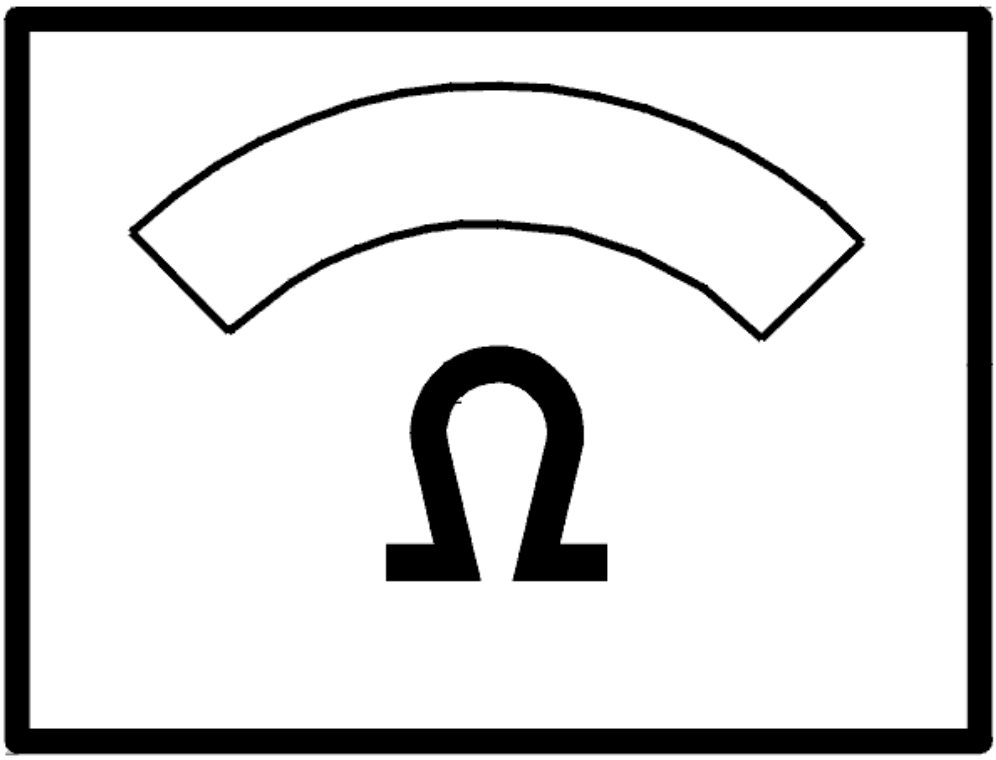


Fig. 138: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

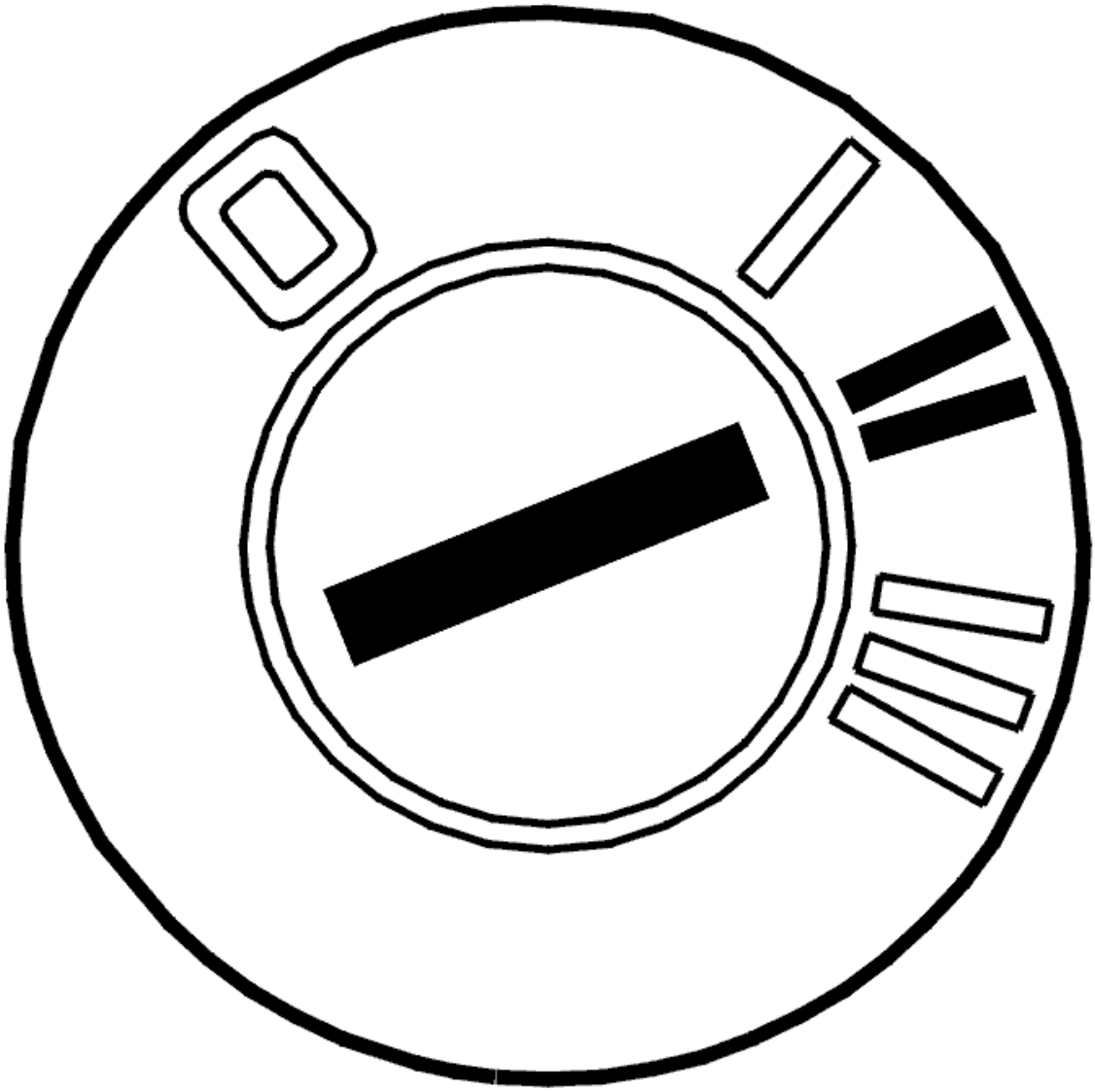


Fig. 139: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

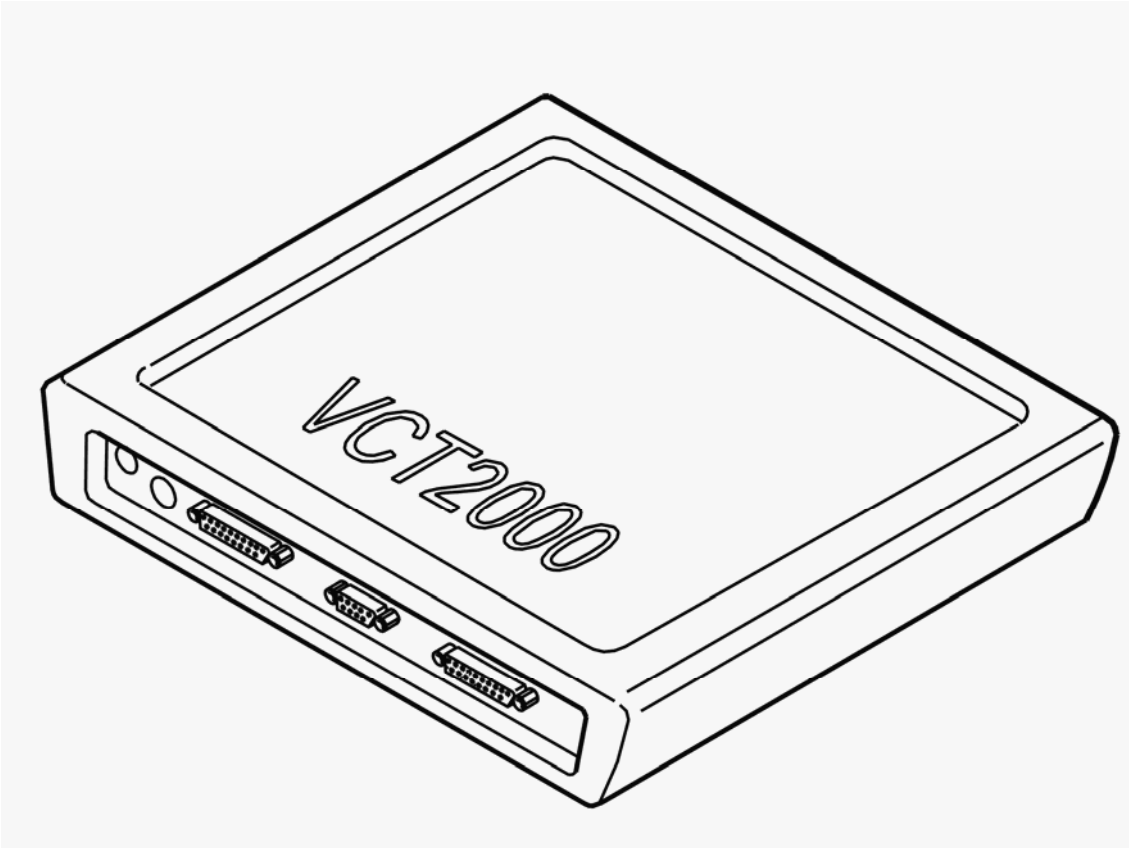


Fig. 140: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair check that the fault has been remedied.

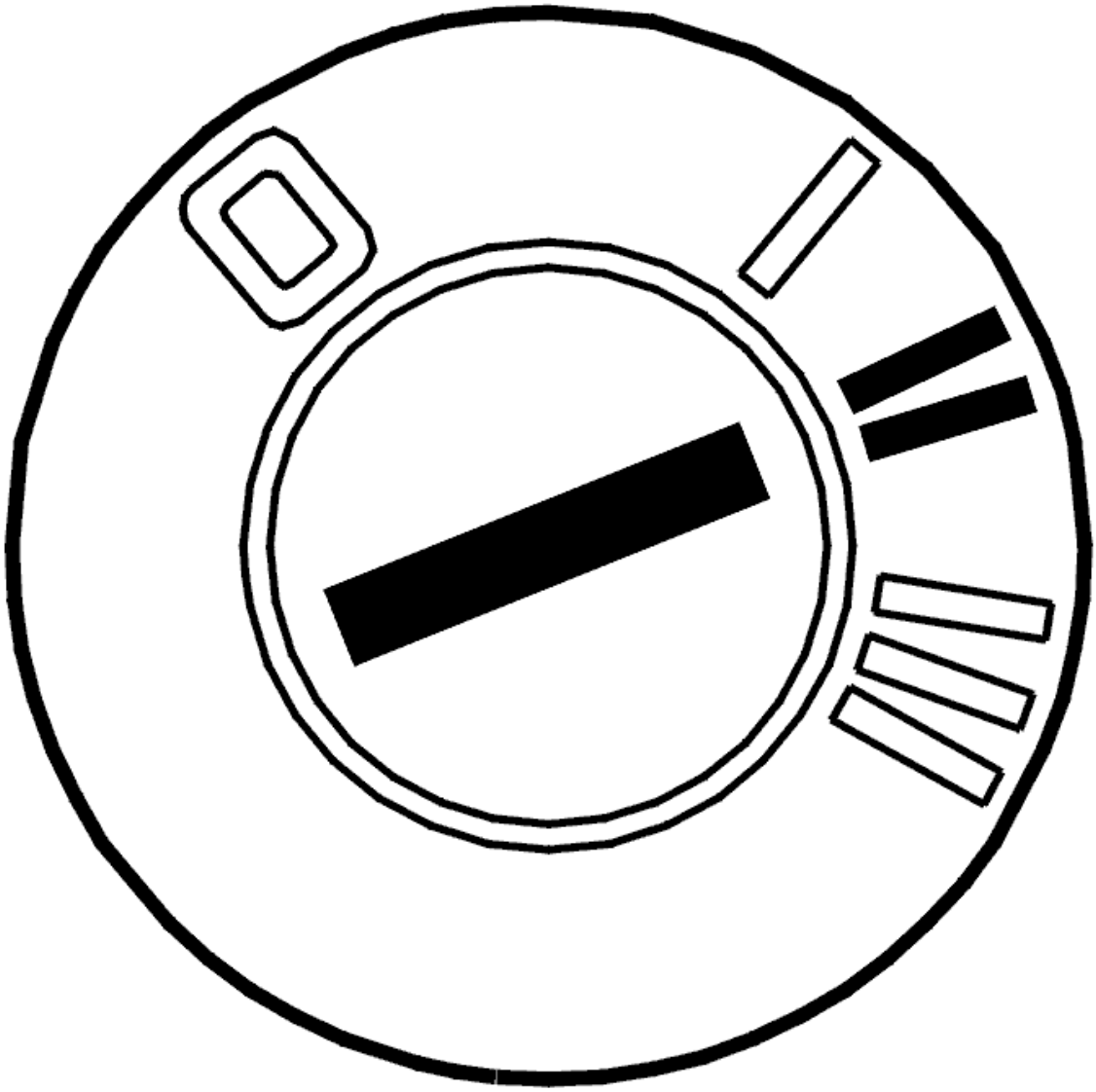


Fig. 141: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

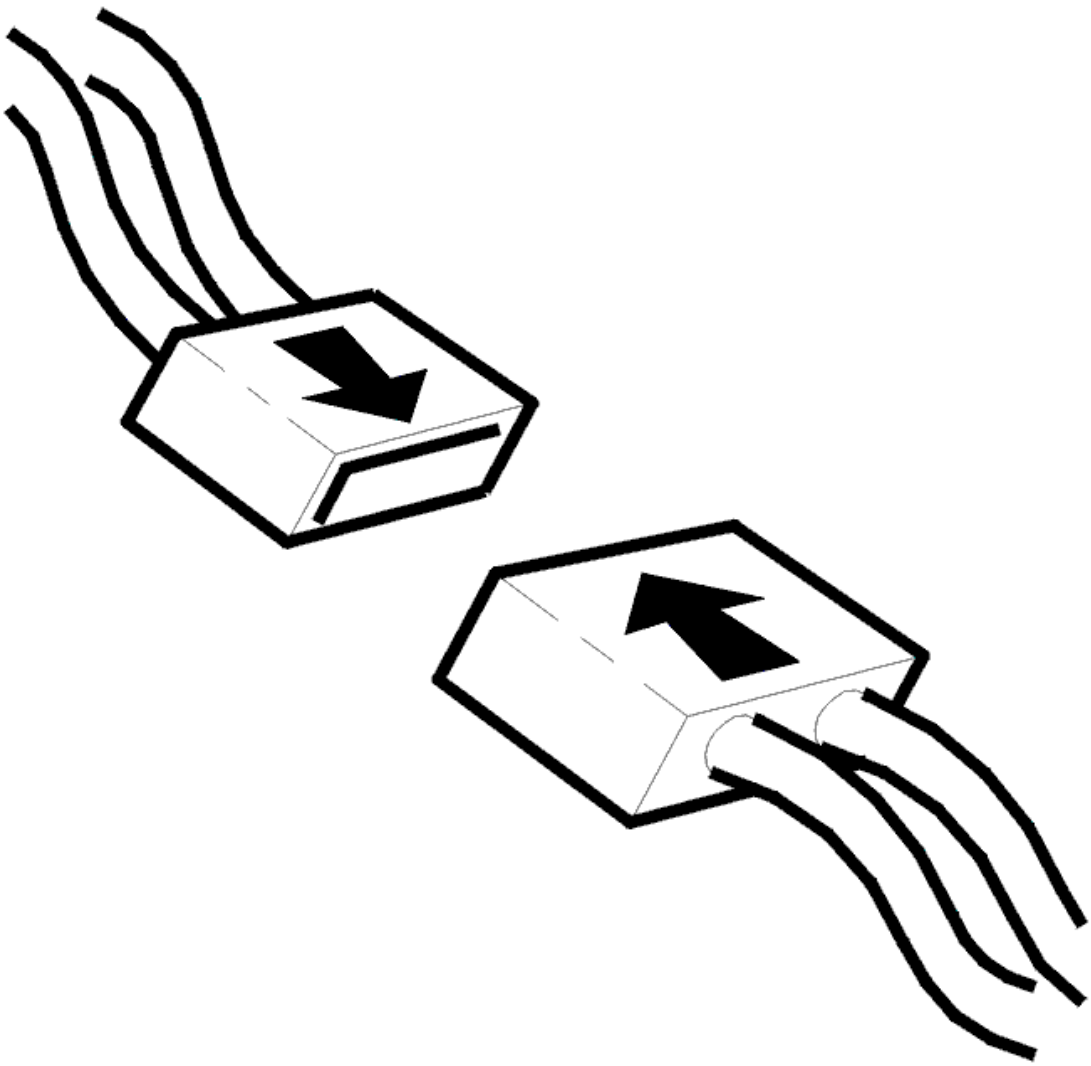


Fig. 142: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.
- Read off oil temperature.

  Check that the transmission oil temperature is within its permitted range. Compare with the transmission temperature.

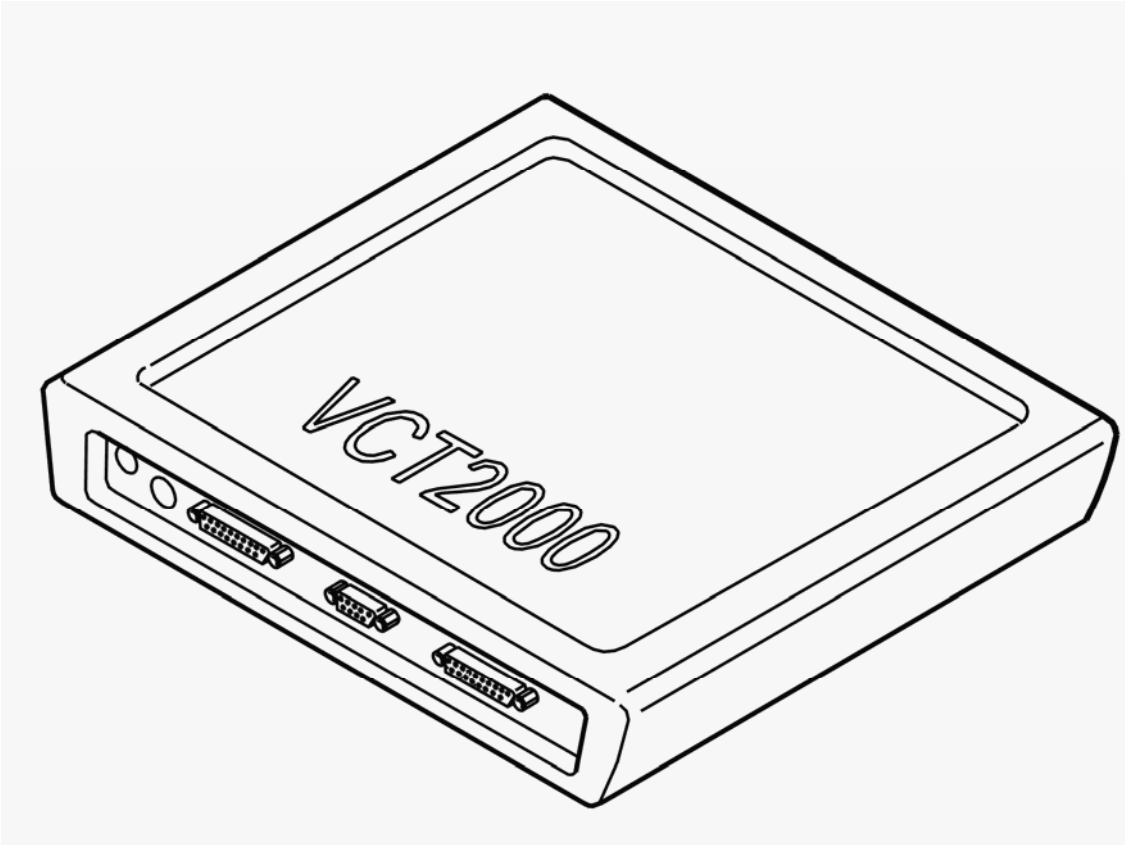


Fig. 143: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0044: OIL TEMPERATURE SENSOR. SIGNAL TOO HIGH (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

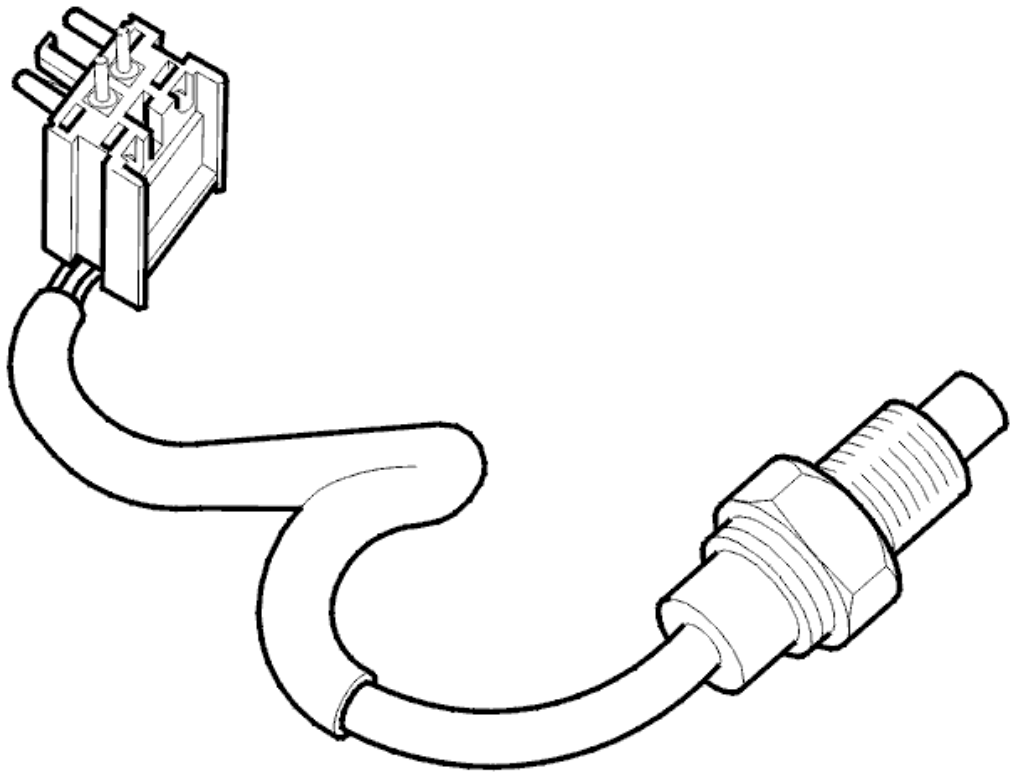


Fig. 144: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

The oil temperature sensor transmits a signal to the control module. This signal is used for functions such as temperature controlled lock-up and the engagement of high-temperature programs. The sensor has an NTC (negative temperature coefficient) resistor. The signal (voltage) decreases with increasing oil temperature. Diagnostic trouble code (DTC) TCM-0044 is stored if the control module receives a signal from the oil temperature sensor corresponding to a temperature below approximately -10°C when the engine is started, and the signal has not changed after the engine has been running for approximately 10 minutes.

Substitute Value

- No substitute values.

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the signal cable or in the ground lead.
- Short-circuit to supply voltage in the signal cable.
- Defective oil temperature sensor.

Fault symptom[s]

- General orange warning lamp lit.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of the line pressure when shifting.
- No reduction of the line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No request for torque limiting to the engine control module (ECM) when shifting.

SIGNAL TOO HIGH

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

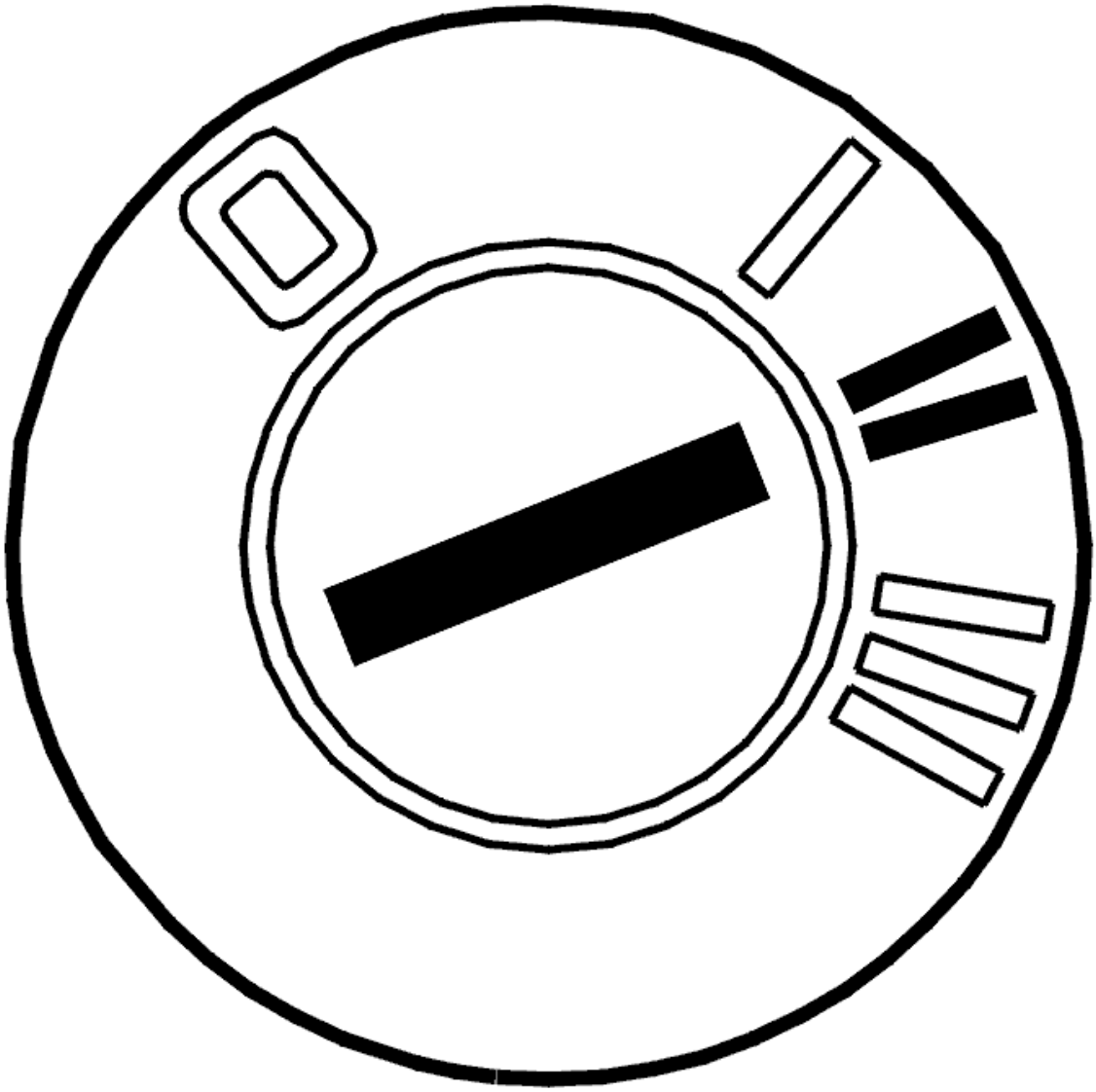


Fig. 145: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module connector and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary
- Reconnect the control module and transmission connectors
- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

  If the transmission temperature is within its permitted range, the cause of the fault was contact resistance

or oxidation in the control module or transmission connector.

Other information:

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING** .

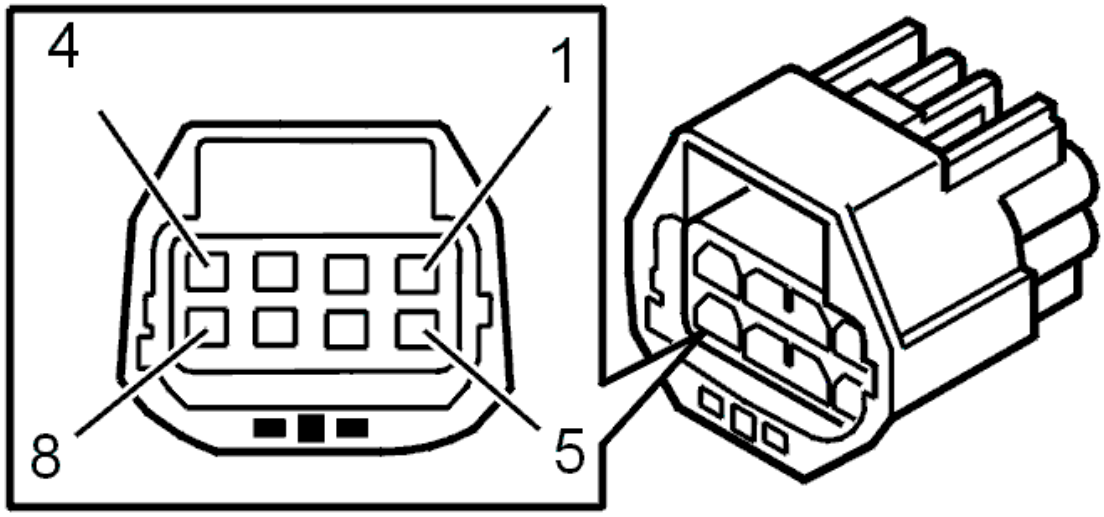


Fig. 146: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

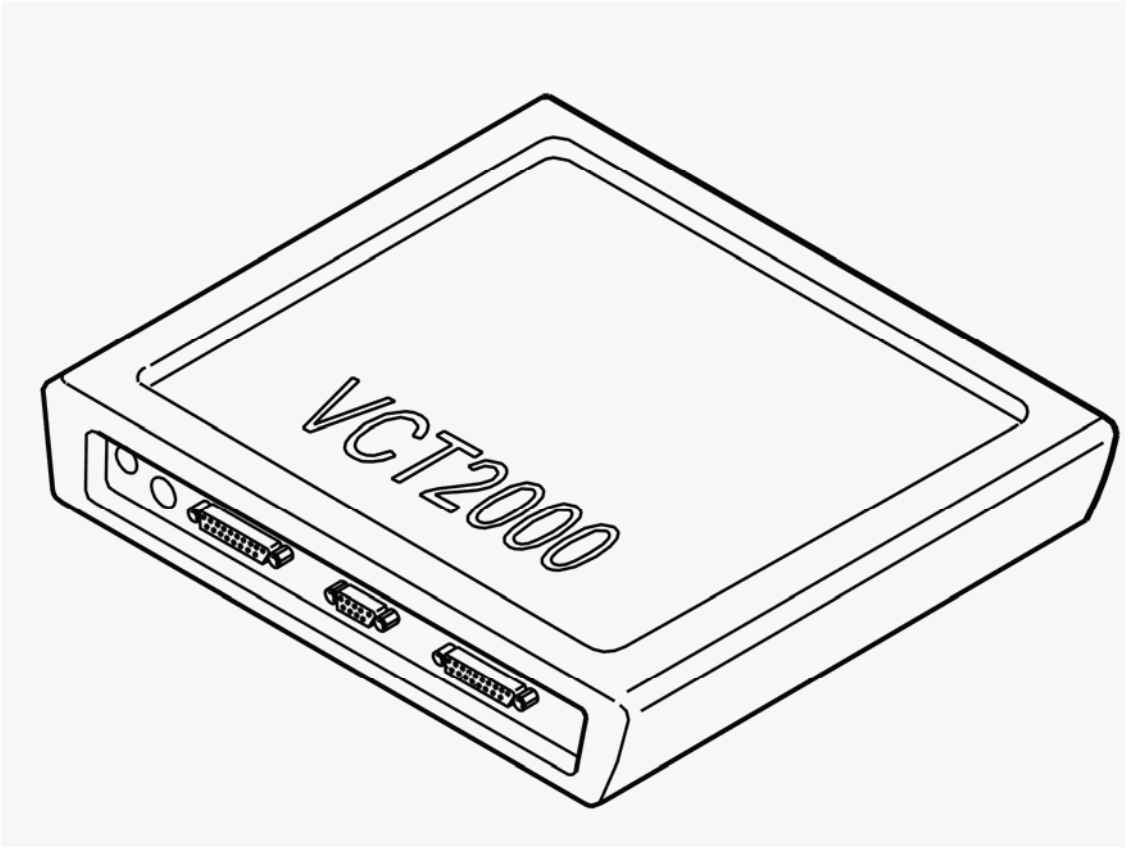


Fig. 147: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

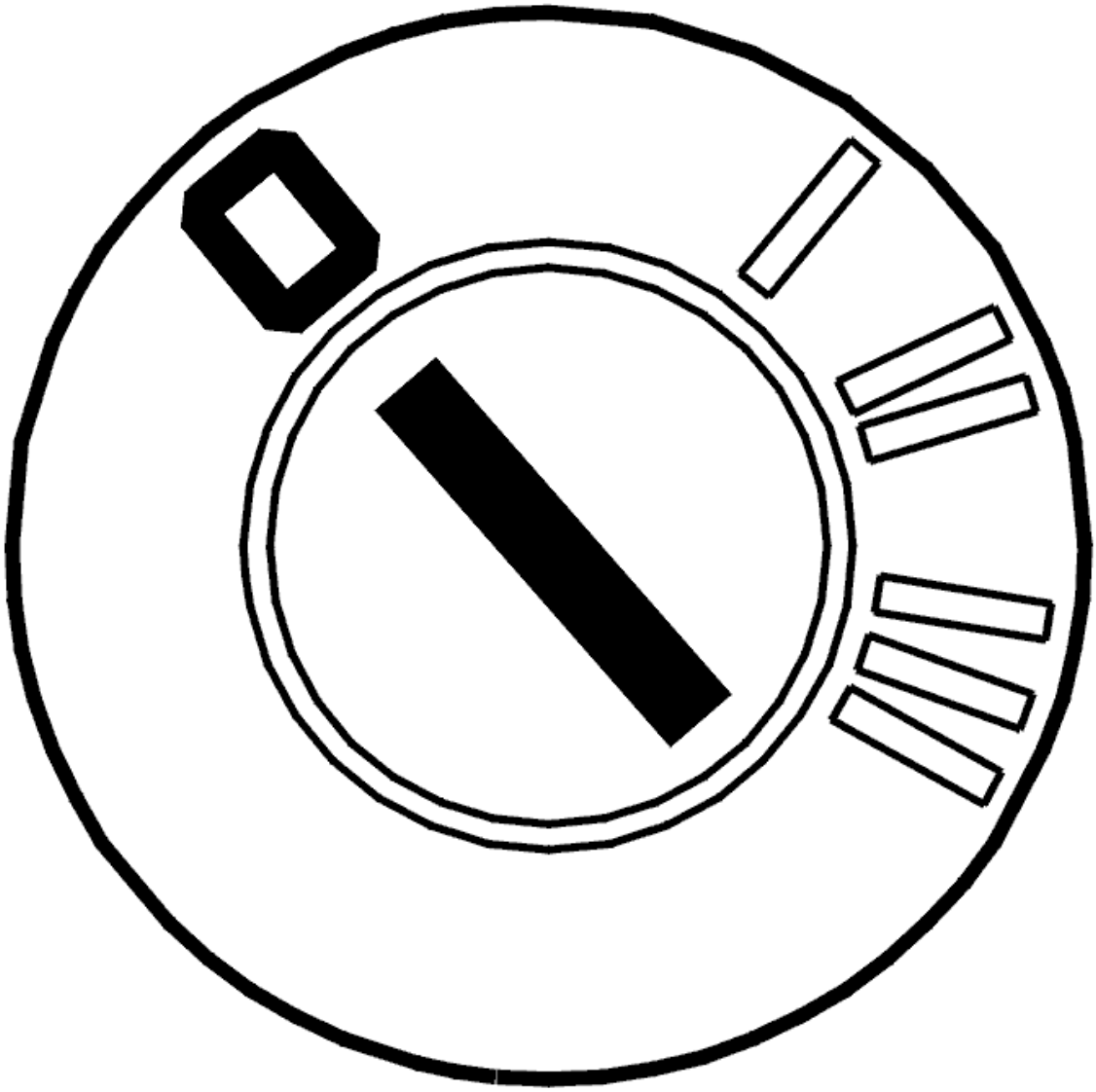


Fig. 148: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

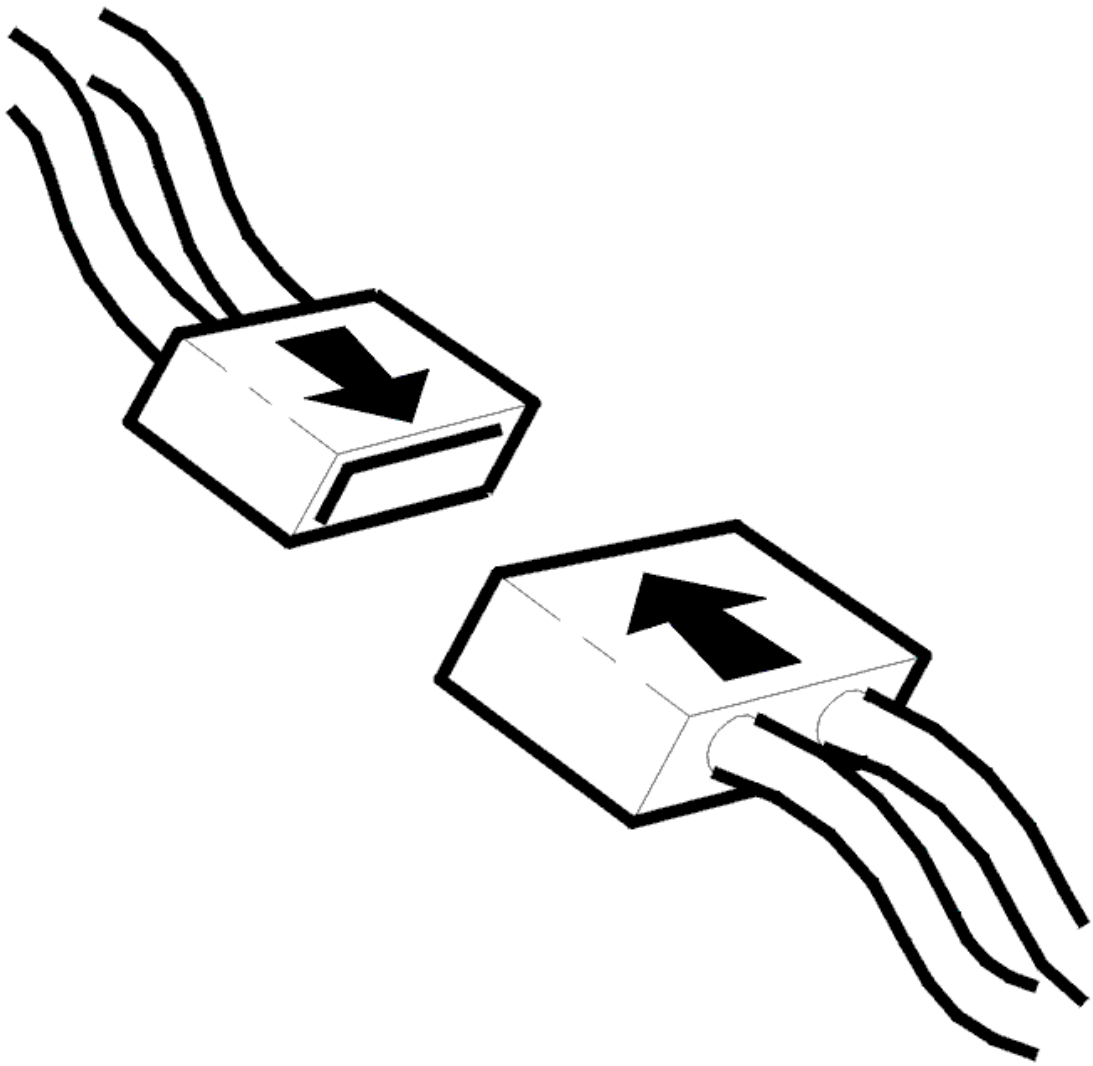


Fig. 149: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

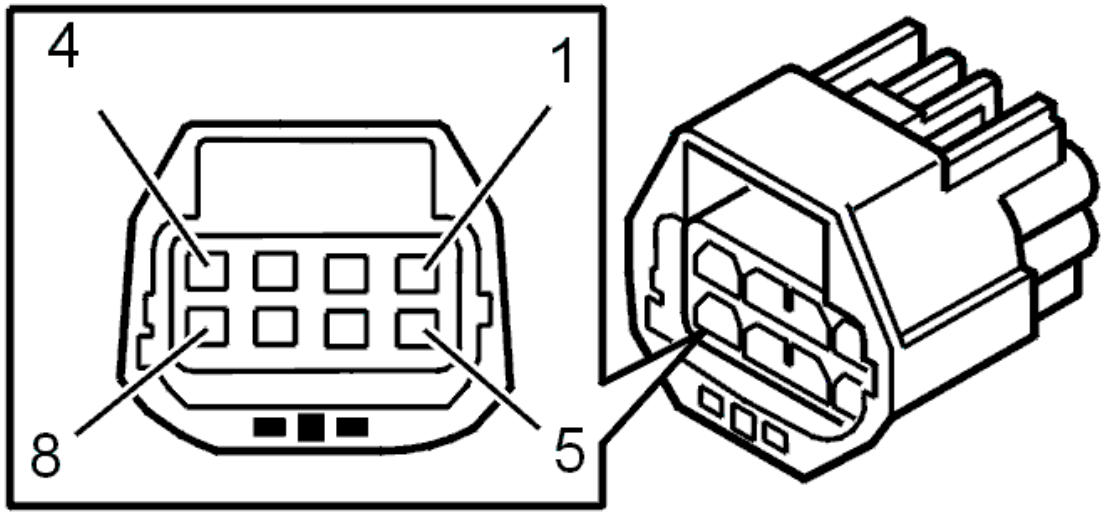


Fig. 150: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

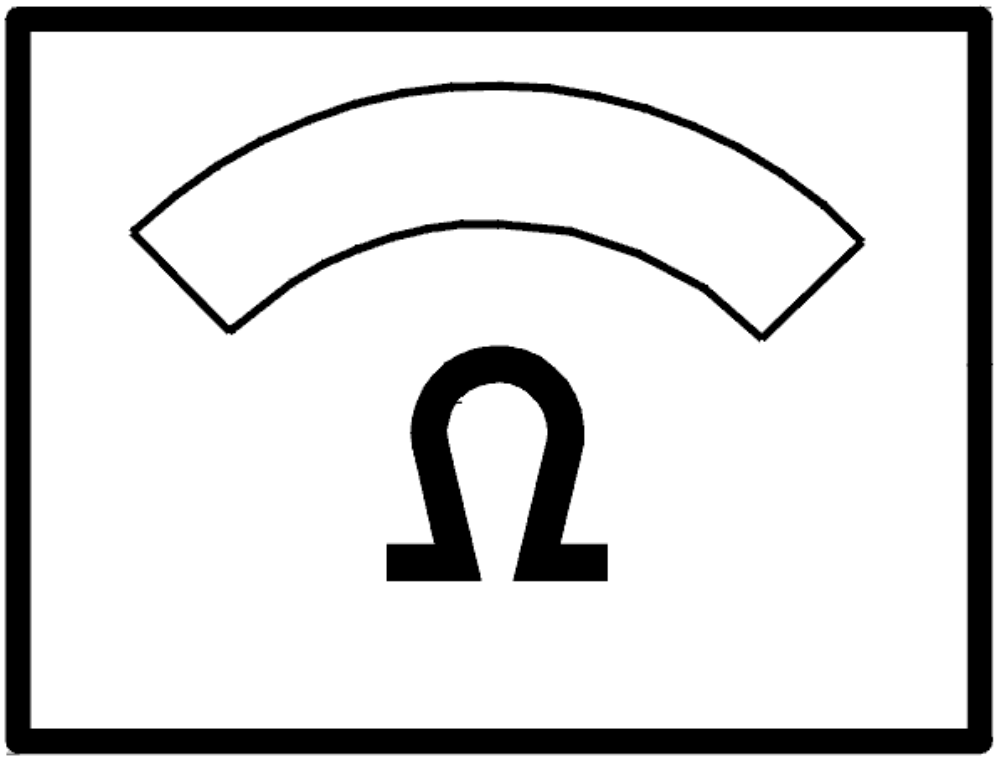


Fig. 151: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING AND COMPONENT**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55) and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

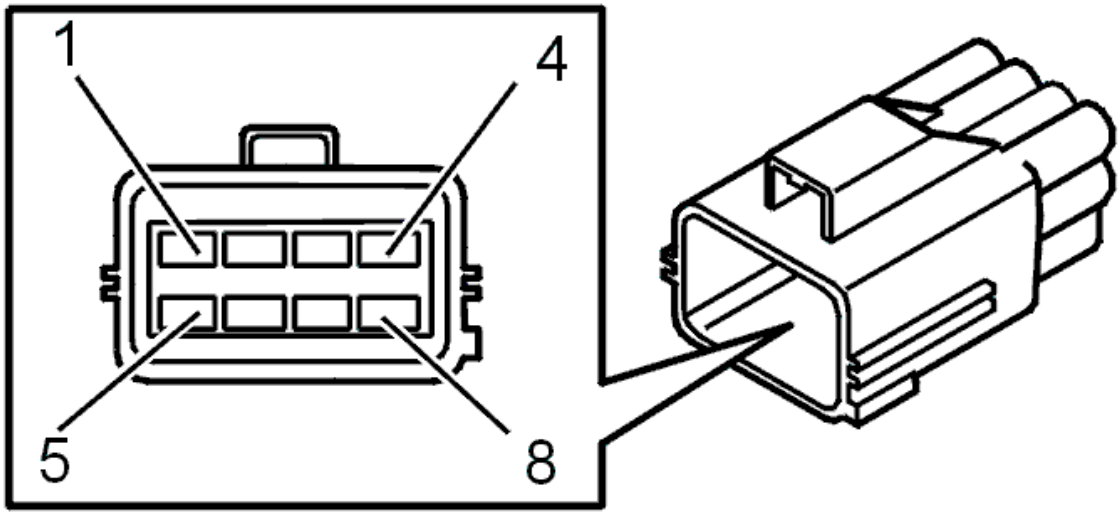


Fig. 152: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

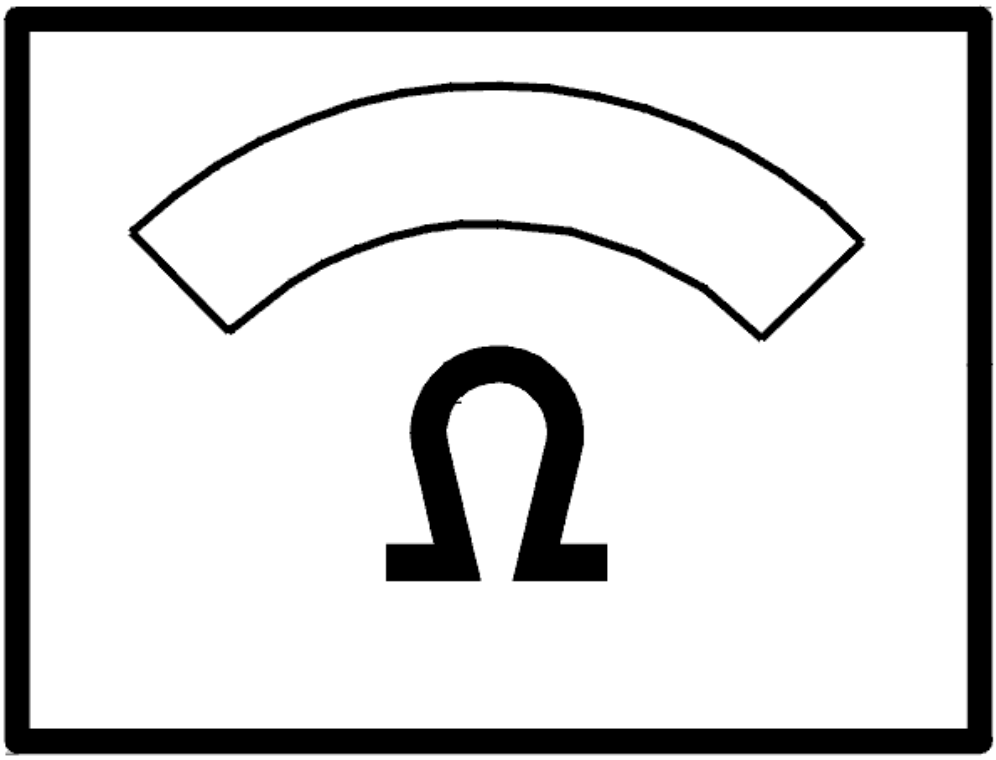


Fig. 153: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

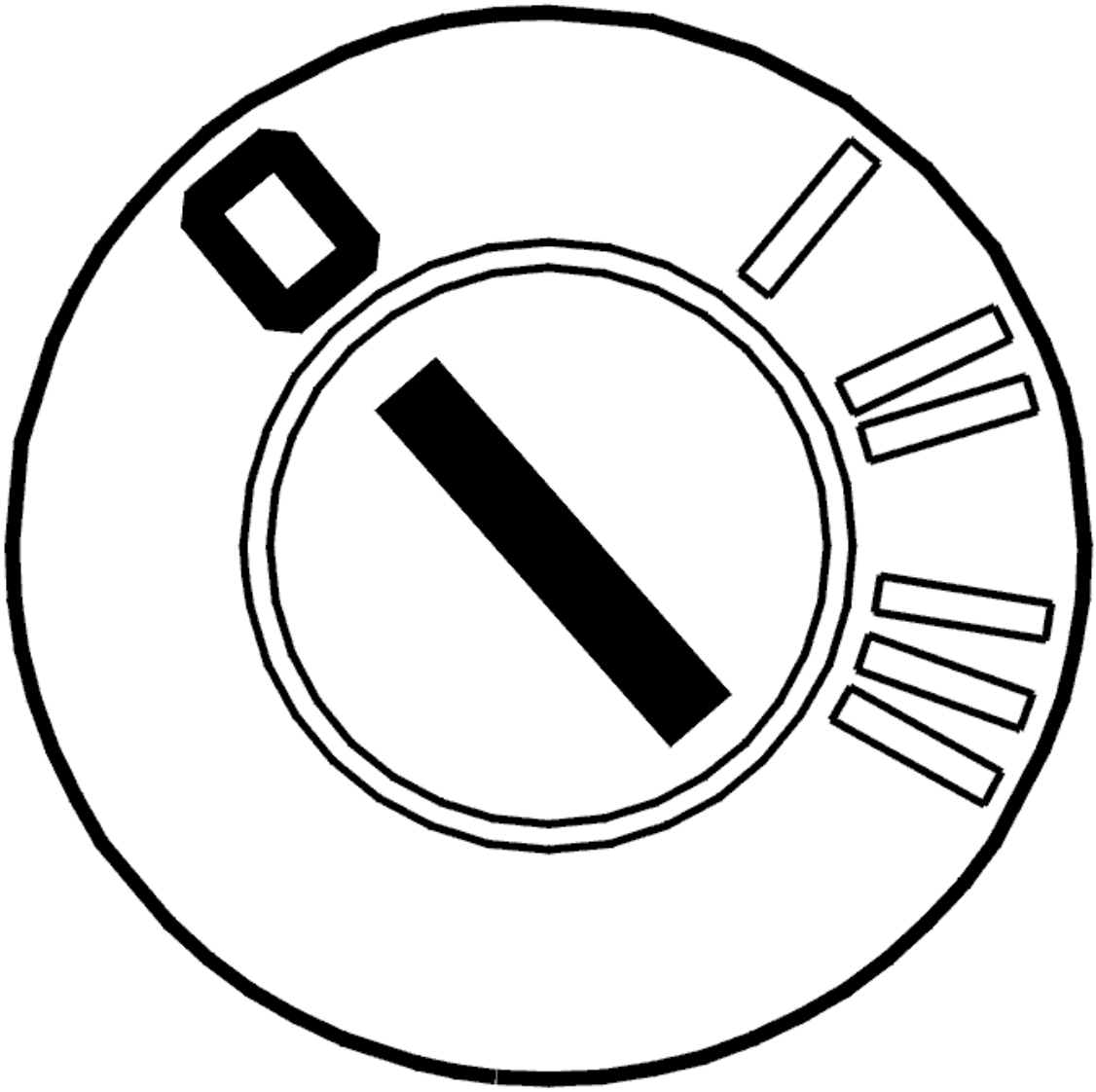


Fig. 154: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

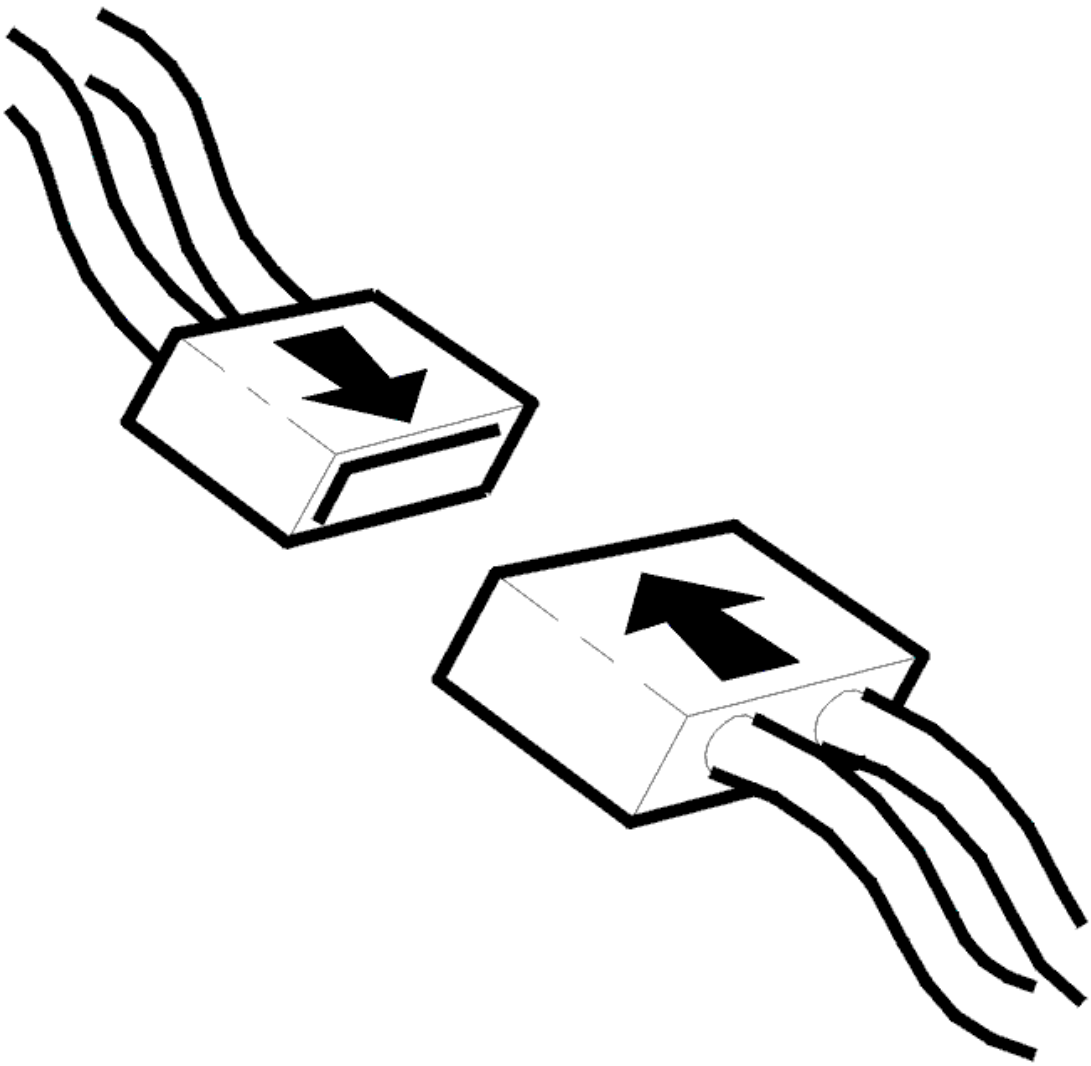


Fig. 155: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** . Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20°C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

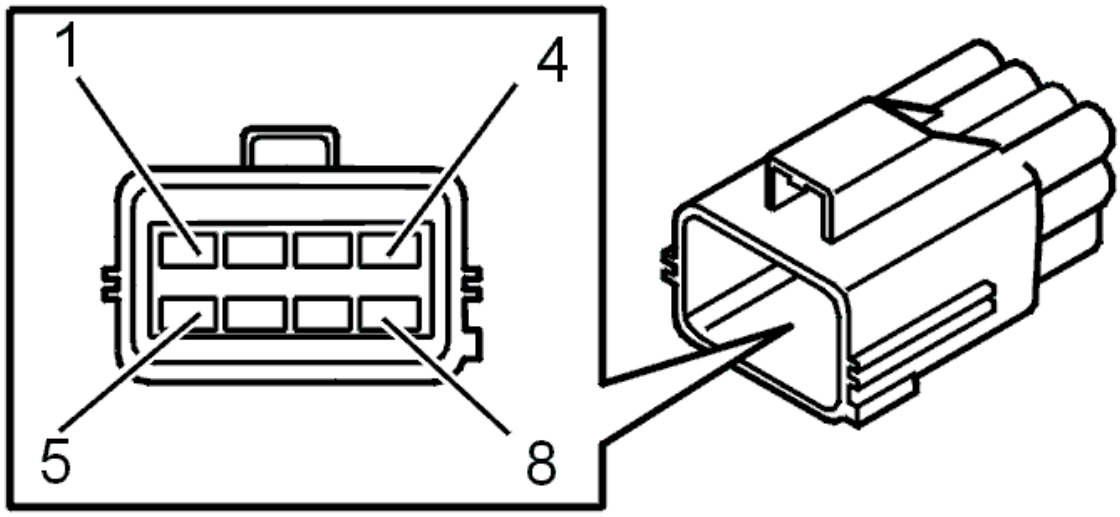


Fig. 156: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

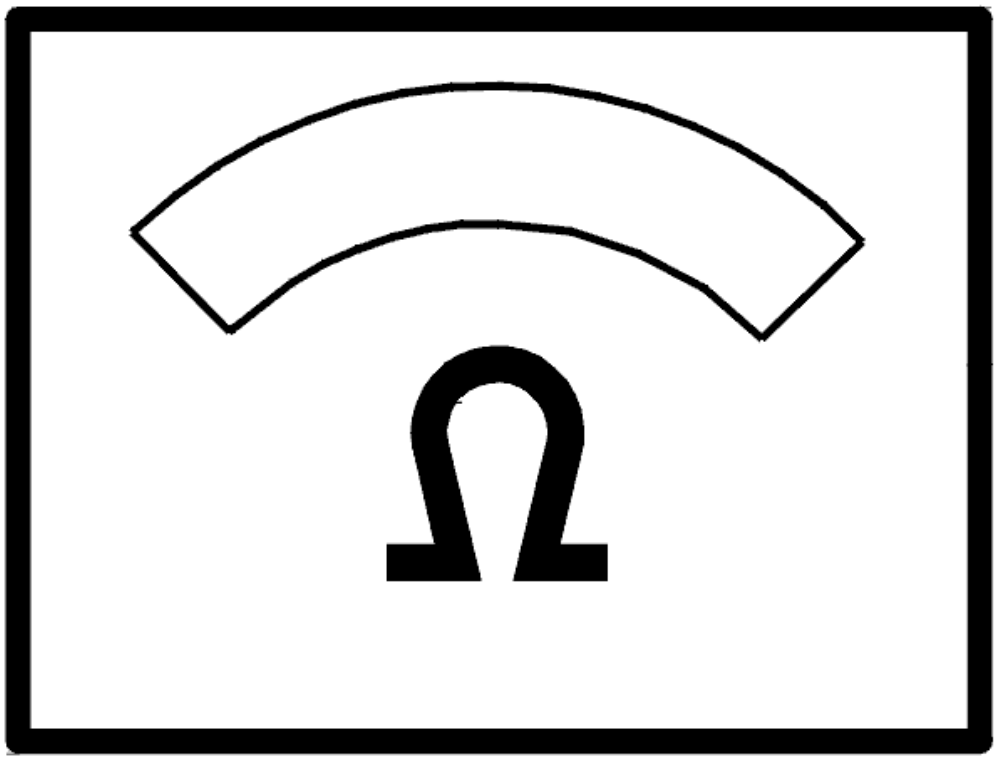


Fig. 157: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the wiring between transmission control module (TCM) terminals #A37 (#A37) and #A55 (#A55) and transmission connector terminals #D7 and #D8. Check for an intermittent short-circuit to each other.

Check the cables between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55) and transmission connector terminal #D8 (control module side). Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

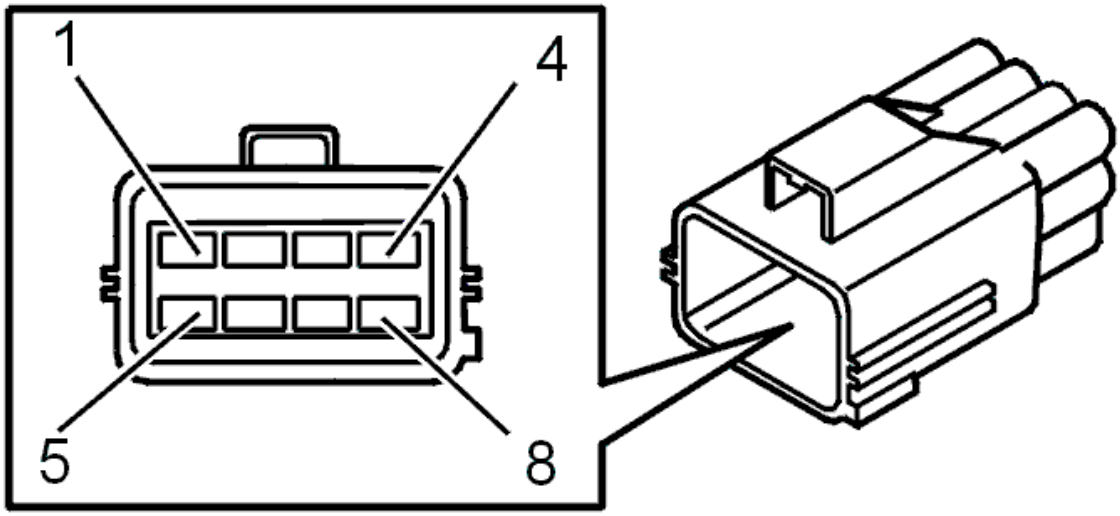


Fig. 158: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

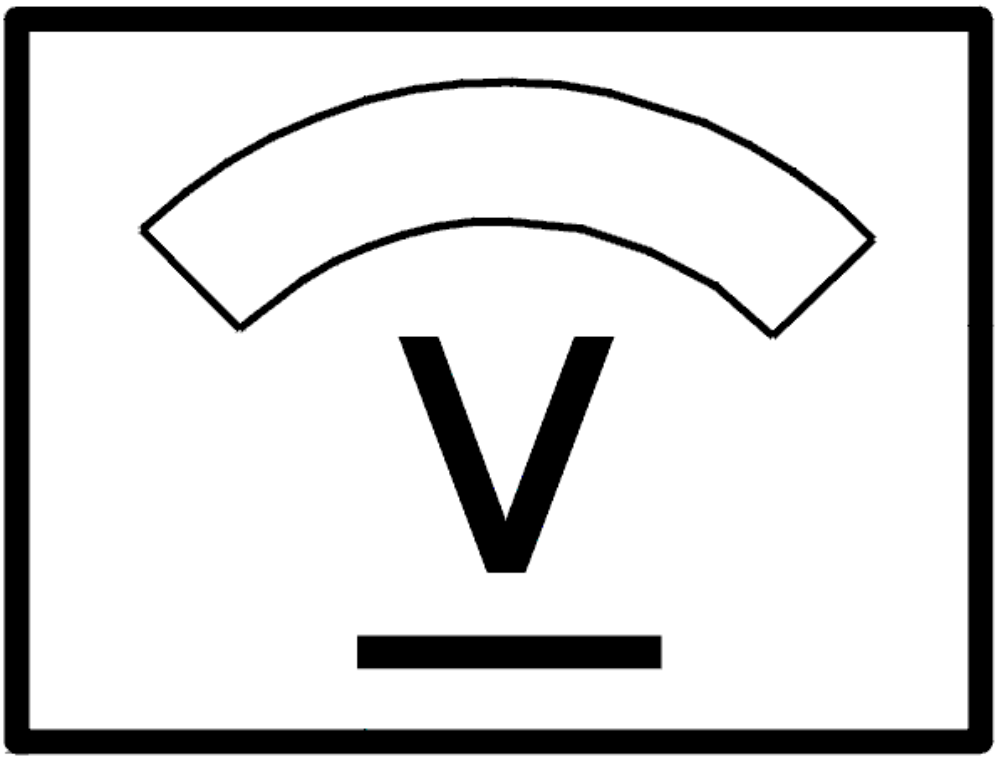


Fig. 159: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

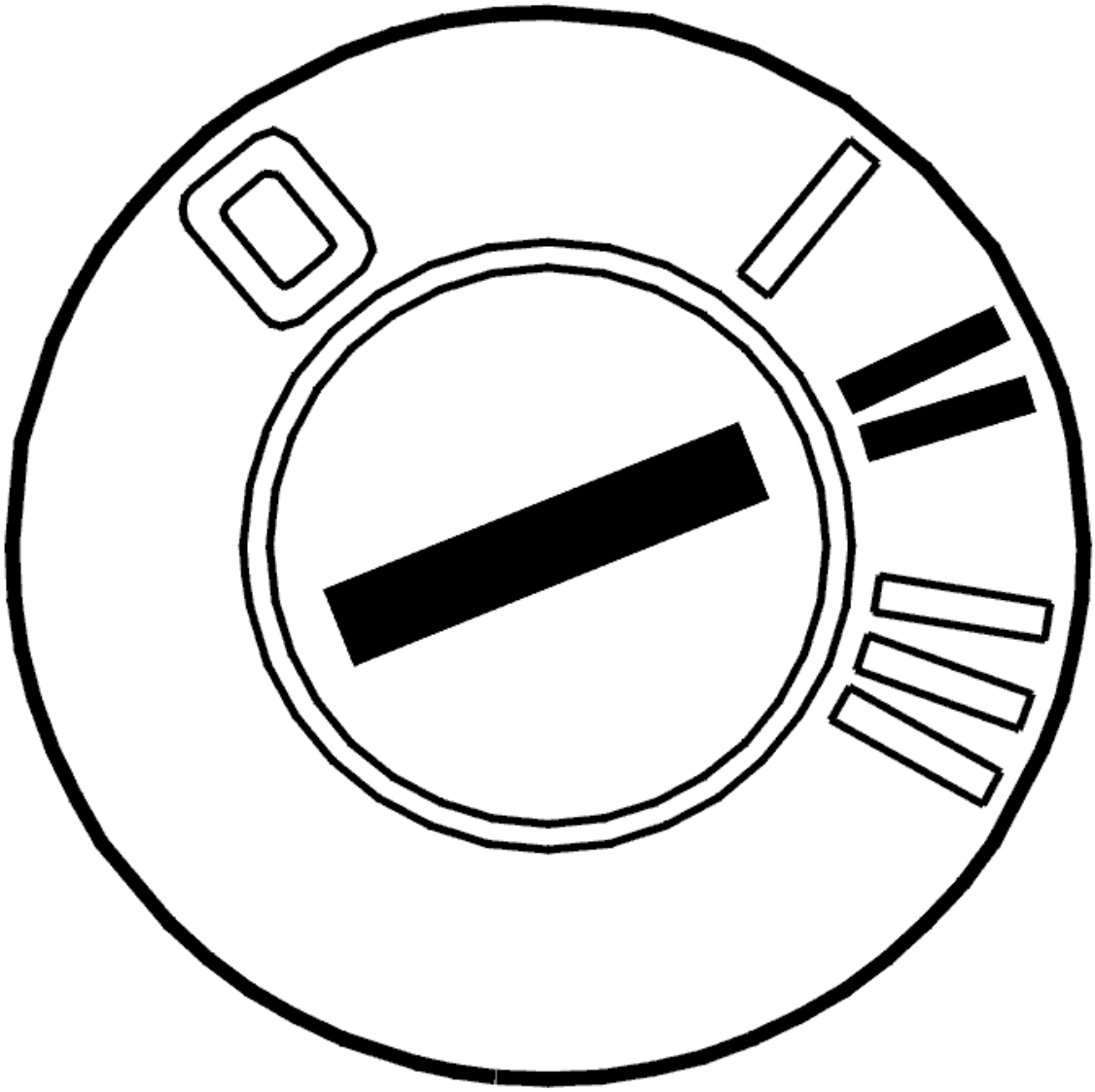


Fig. 160: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

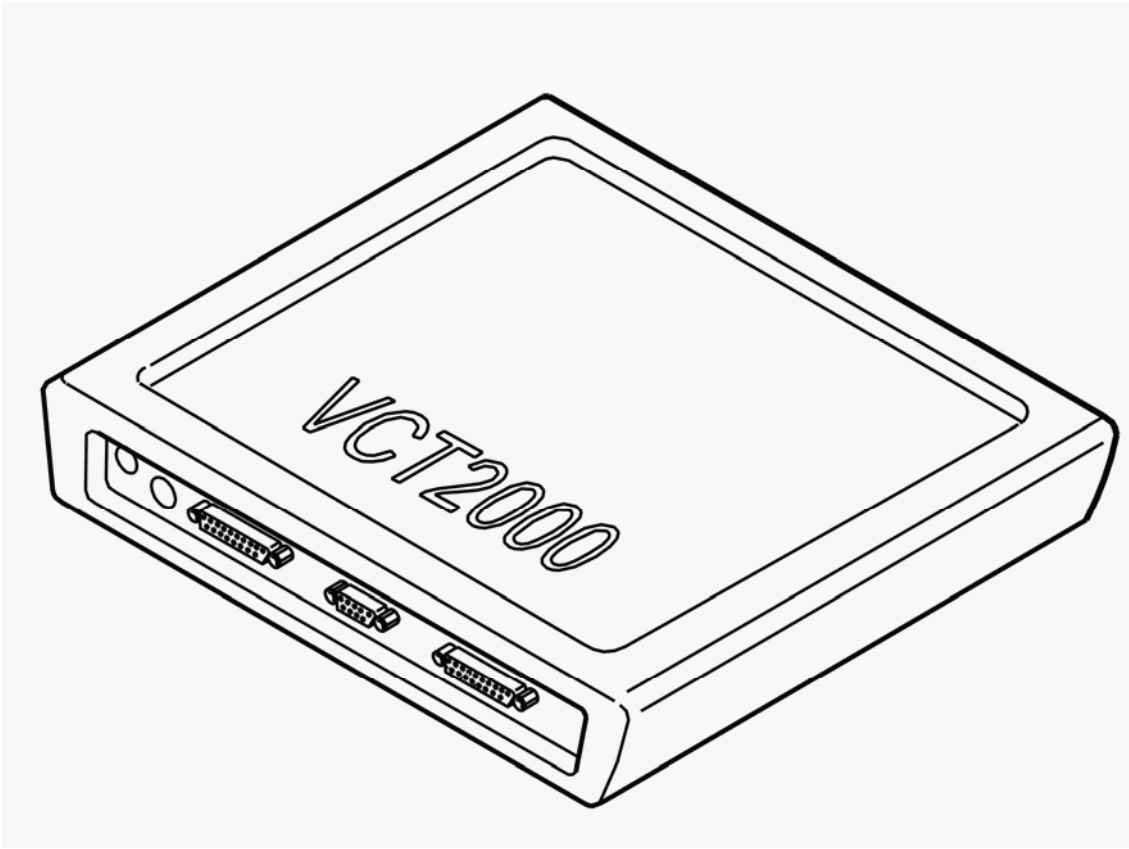


Fig. 161: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

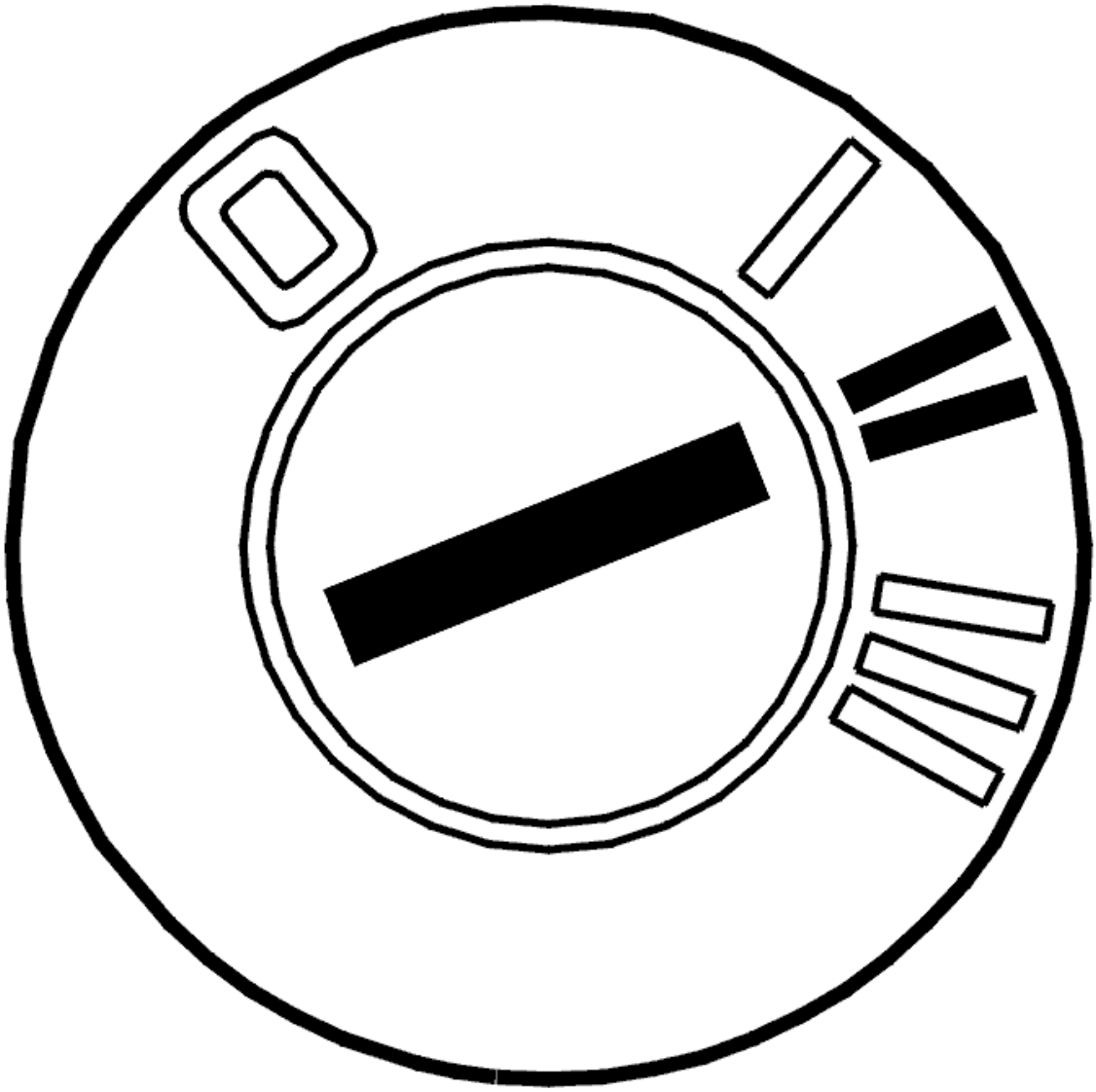


Fig. 162: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

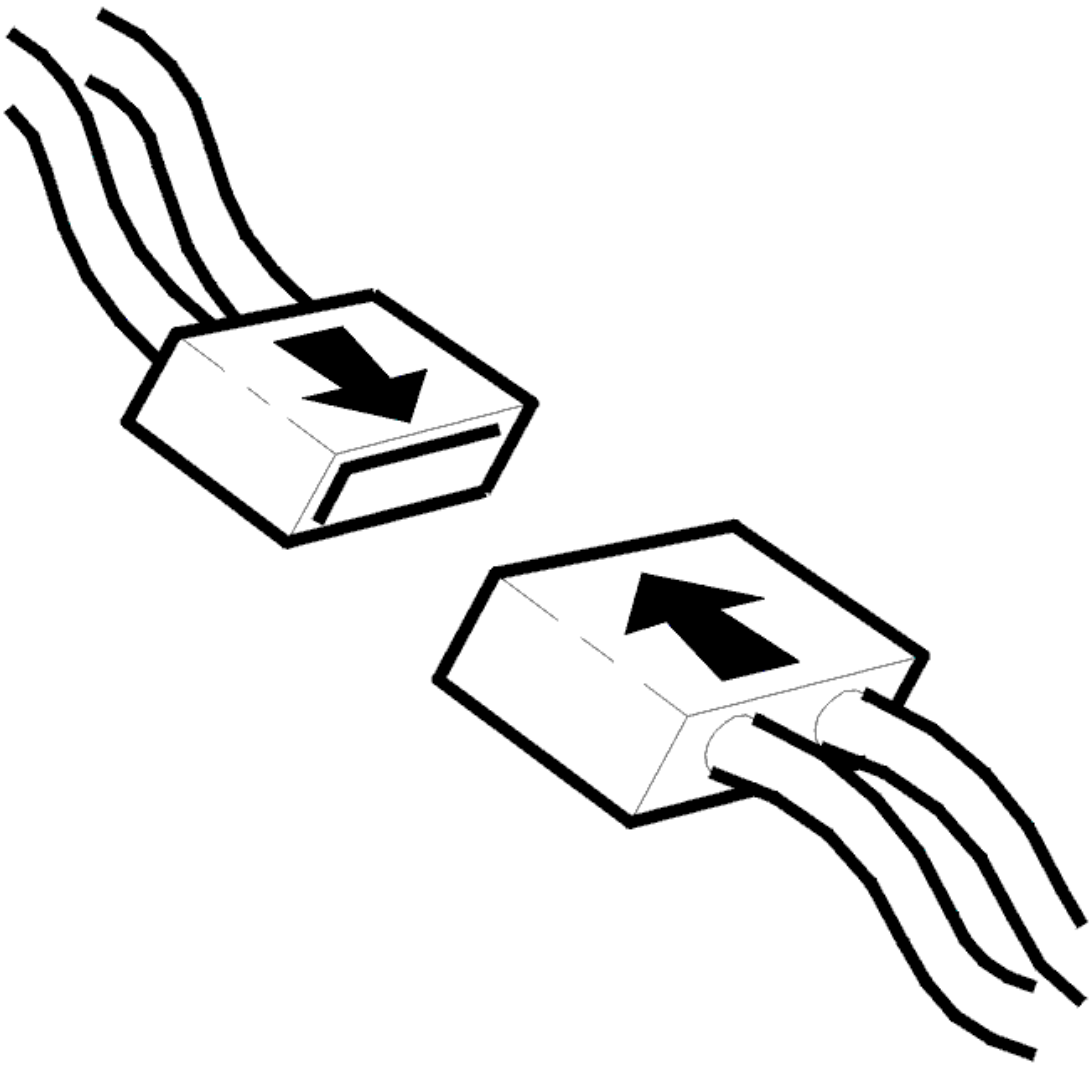


Fig. 163: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

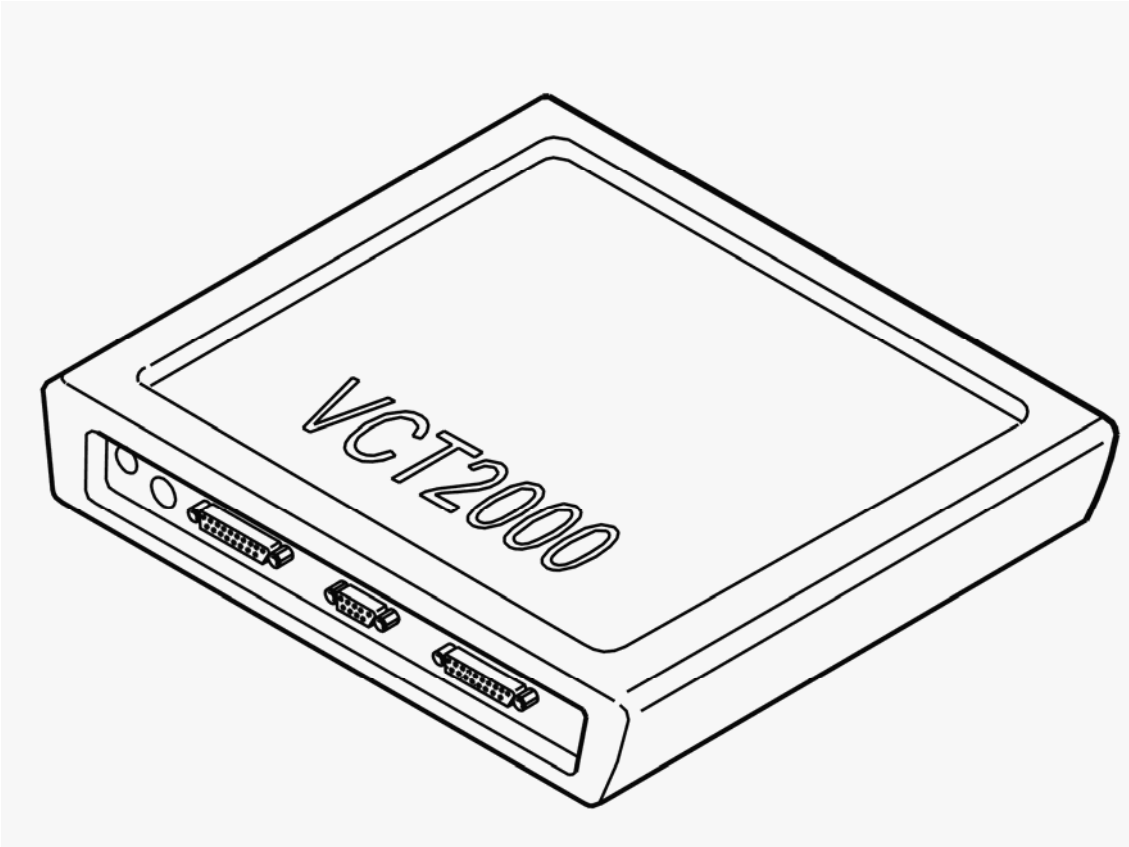


Fig. 164: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0045: OIL TEMPERATURE SENSOR. FAULTY SIGNAL (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

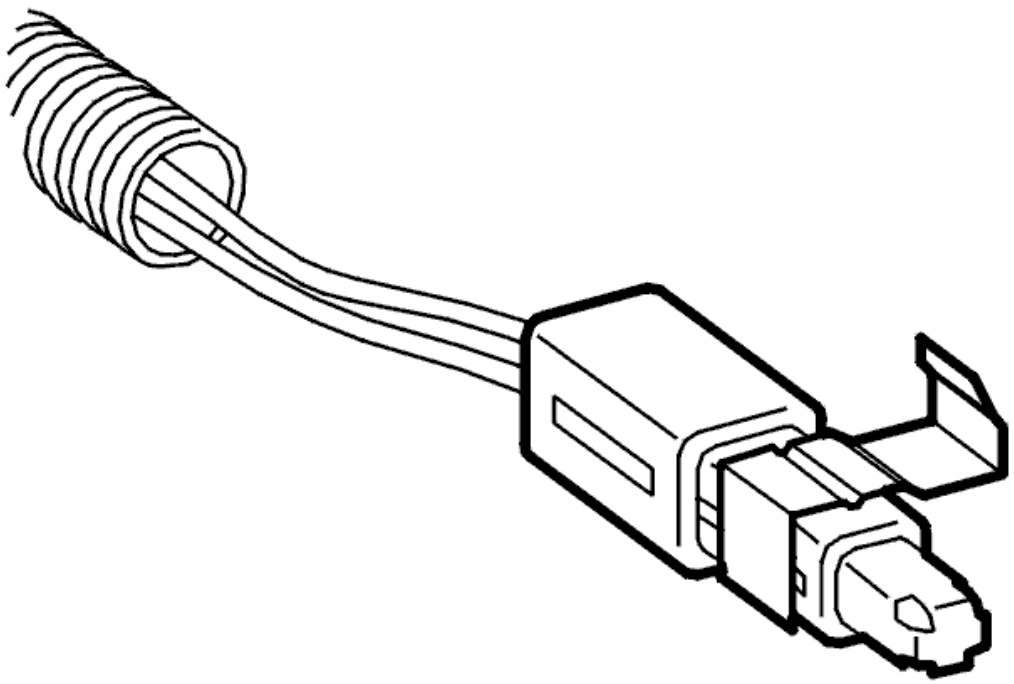


Fig. 165: Identifying Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

The oil temperature sensor sends a signal to the transmission control module (TCM) which is used for functions such as temperature controlled lockup and initiating high-temperature programs. The sensor has an NTC (negative temperature coefficient) resistor. The signal (voltage) decreases with increasing oil temperature. Diagnostic trouble code (DTC) TCM-0045 is stored if the transmission control module (TCM) receives a signal from the oil temperature sensor which has not changed after the engine has run for 10 minutes.

Substitute Value

- No substitute values.

Possible Source

- Contact resistance in terminals.
- Open-circuit in signal cable or ground lead.
- Short-circuit to supply voltage in the signal cable.
- Defective oil temperature sensor.

Fault symptom[s]

- General orange warning lamp lit.

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

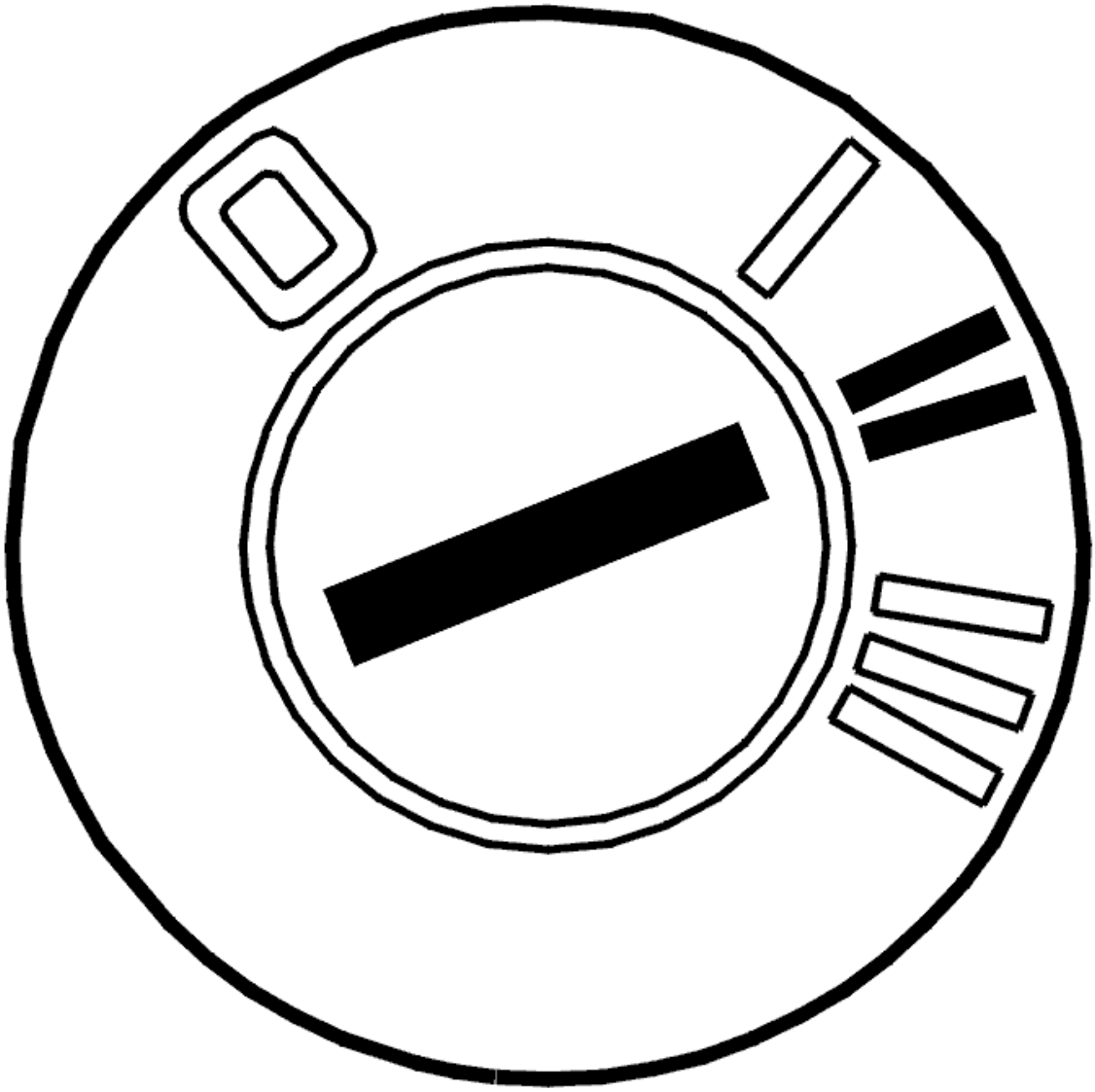


Fig. 166: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

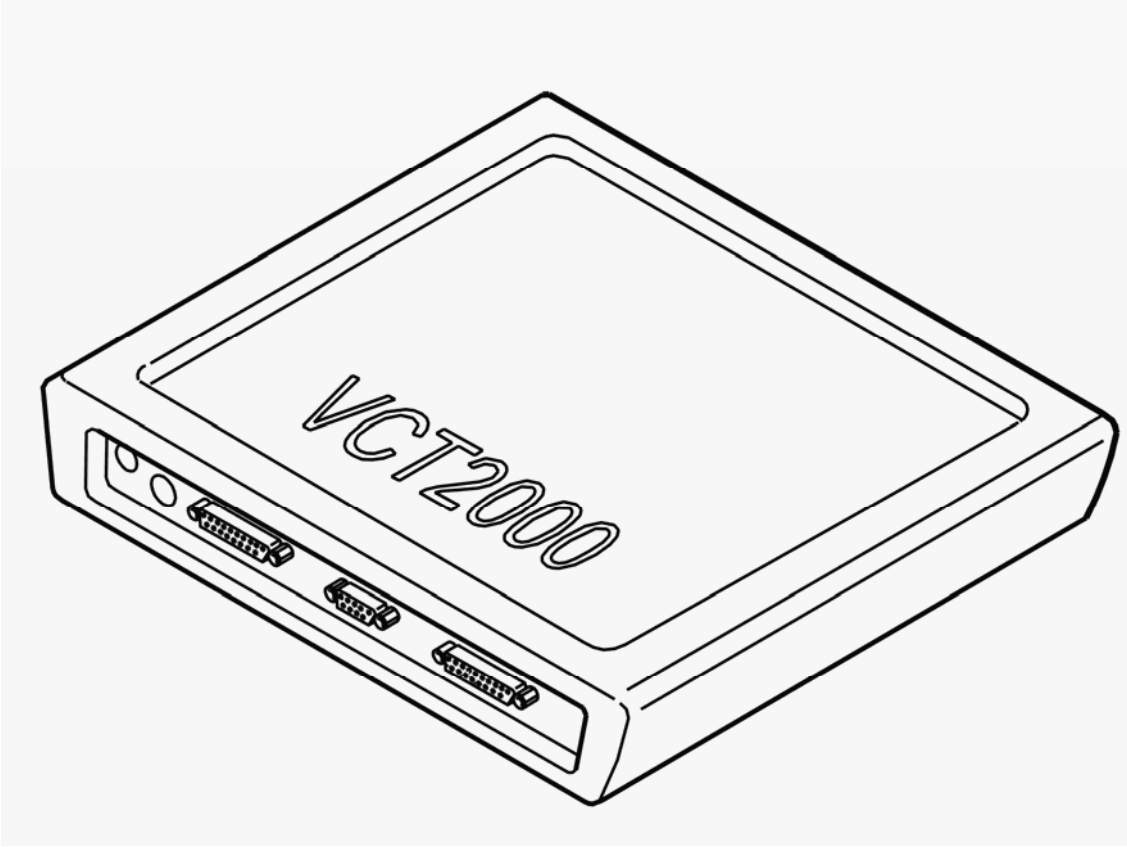


Fig. 167: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

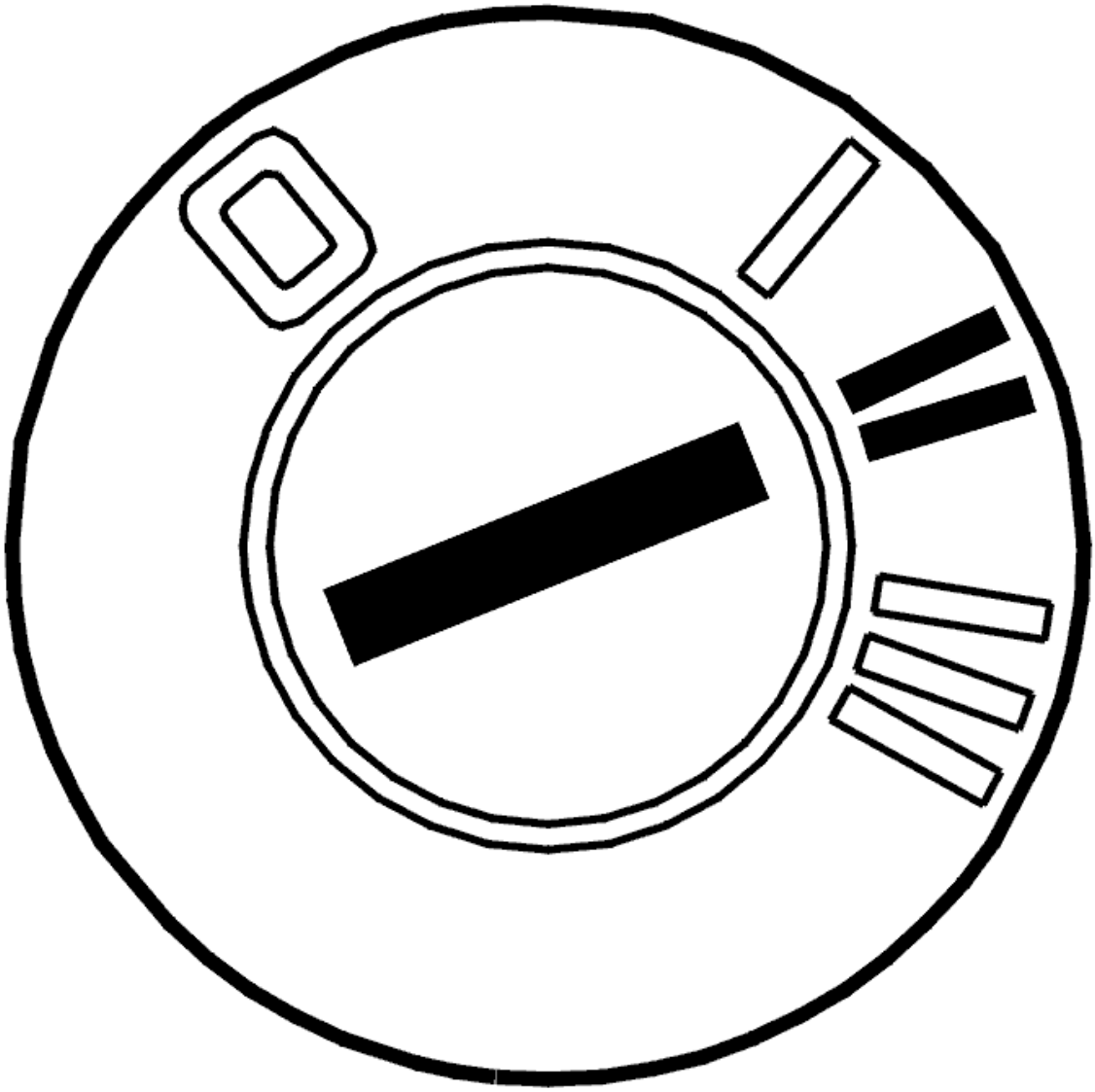


Fig. 168: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

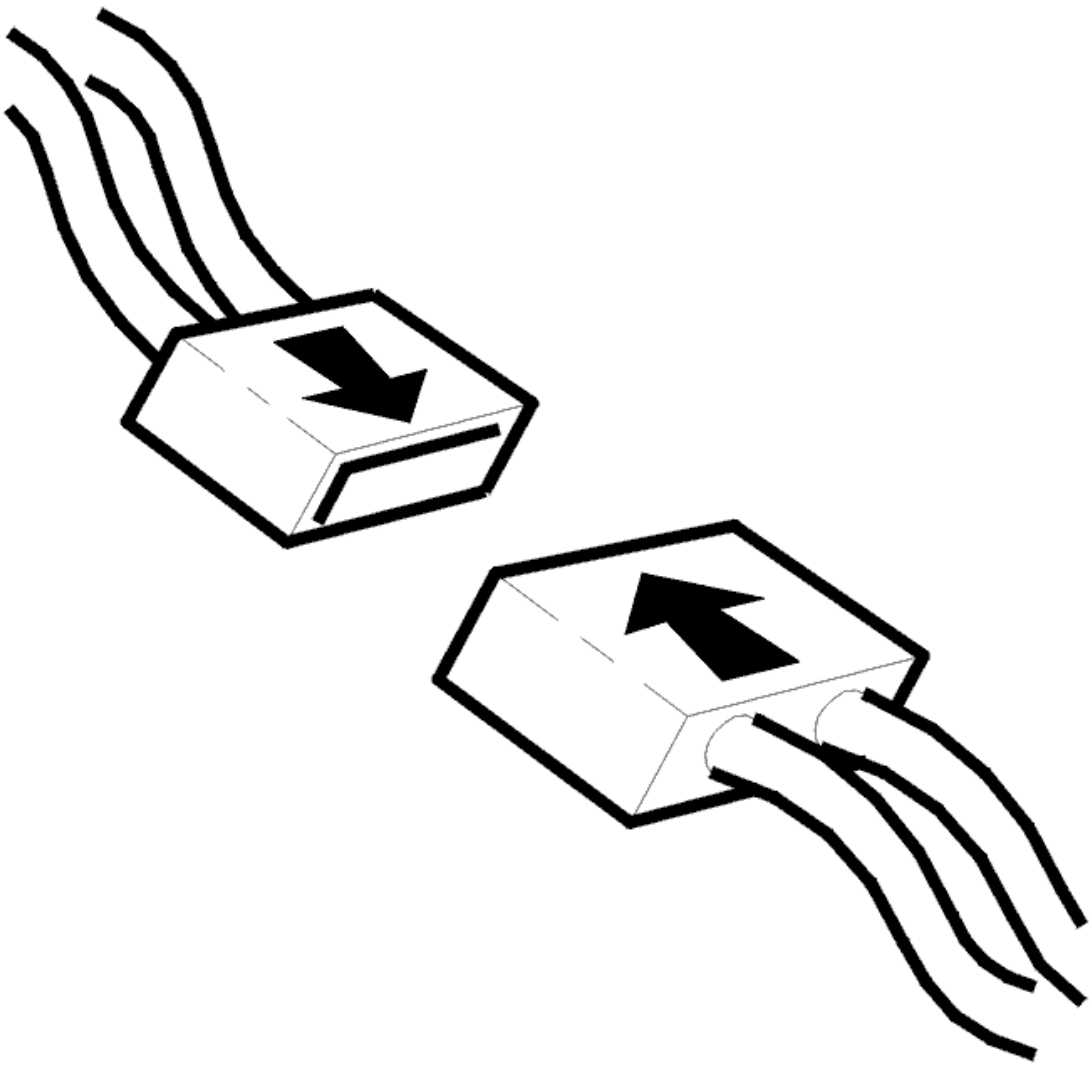


Fig. 169: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and transmission connectors. Check for contact resistance and oxidation
- Reconnect control module and transmission connector
- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

  If the transmission temperature is within its permitted range, the cause of the diagnostic trouble code (DTC) was contact resistance or oxidation in the control module or transmission connector.

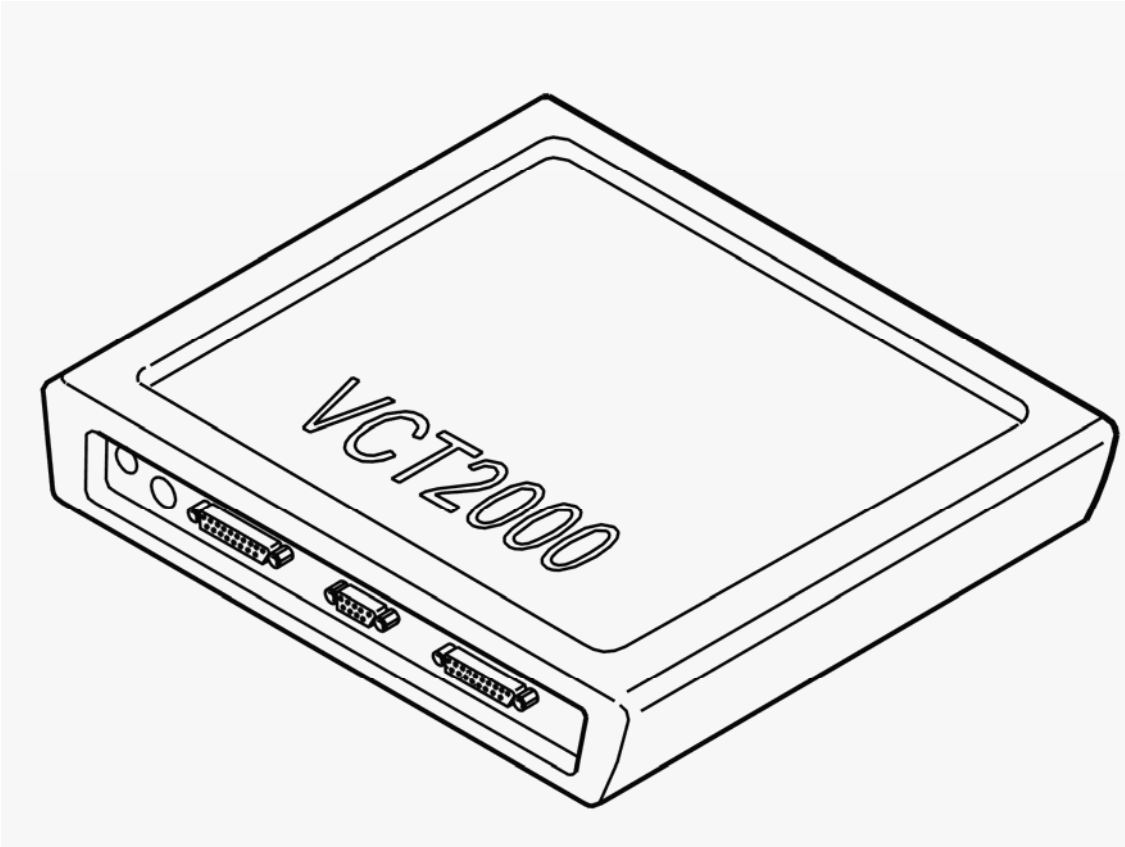


Fig. 170: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING THE TEMPERATURE SENSOR**

CHECKING THE TEMPERATURE SENSOR

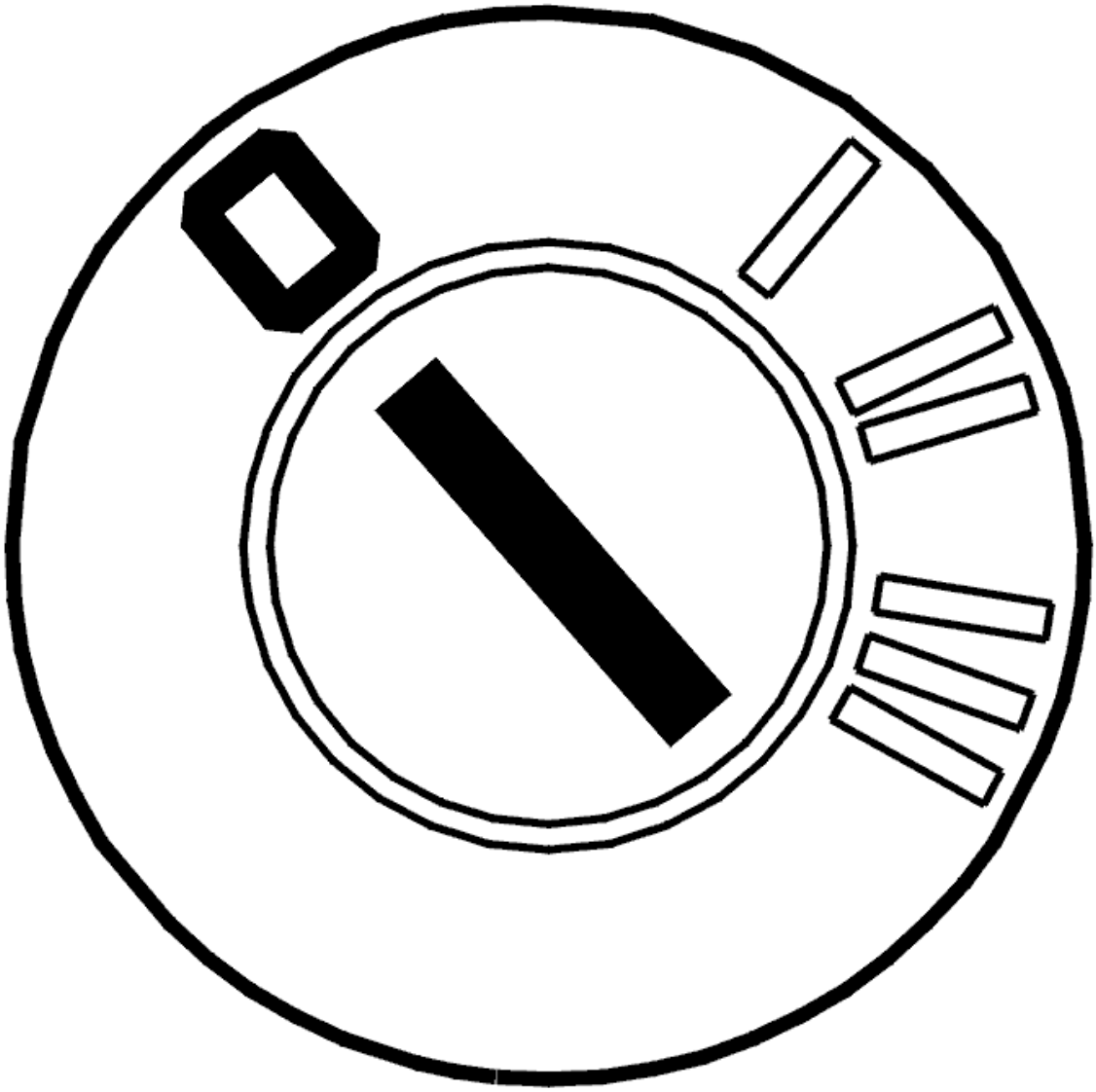


Fig. 171: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector
- Connect adapter see **9511505** and see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals #L (terminal #A11) and #M (terminal #A12).

  The resistance must be 3.5-3.6 kohms at 20 °C.

  Other information

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - For information about signals, see **SIGNAL SPECIFICATION**

- For information about the resistance values, see **COMPONENT RESISTANCE VALUES** .

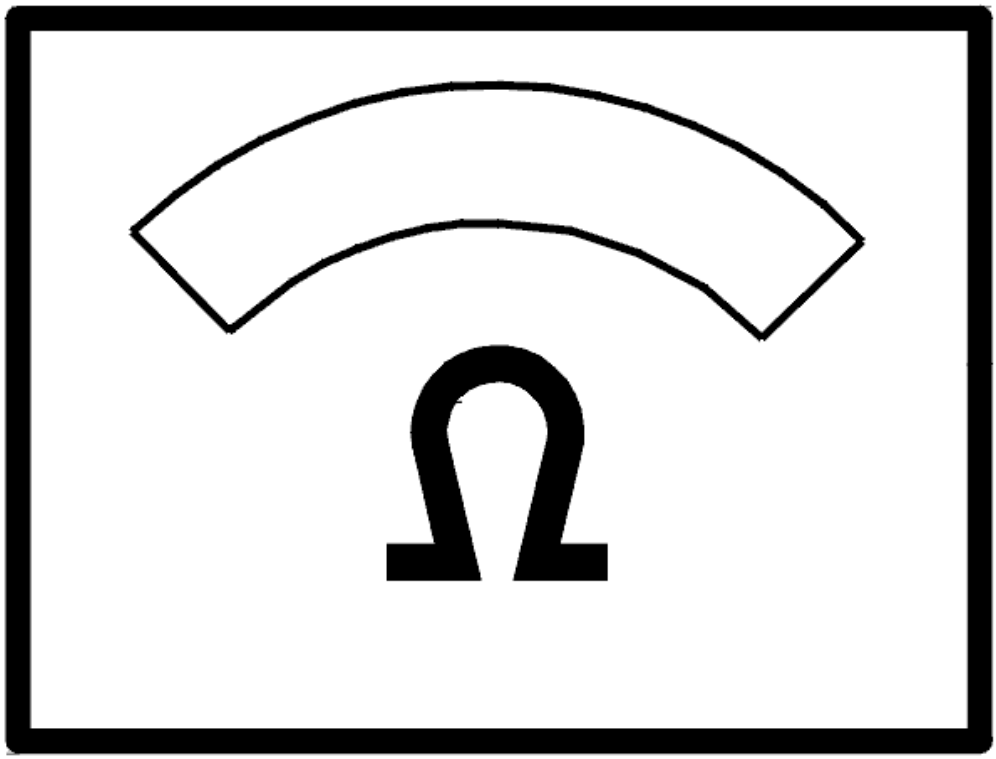


Fig. 172: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE SIGNAL CABLE**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE SIGNAL CABLE

Check the cable between control module terminal #37 (#A37) and transmission connector (control module side) terminal #L (#11). Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

HINT: With the ignition on, the transmission connector disconnected and a voltmeter connected between terminal #L (#A11) and the ground terminal, the voltage must be 5 V.

NOTE: Diagnostic trouble codes (DTCs) for the gear-shift position sensor and the solenoids may be stored when disconnecting the transmission connector.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

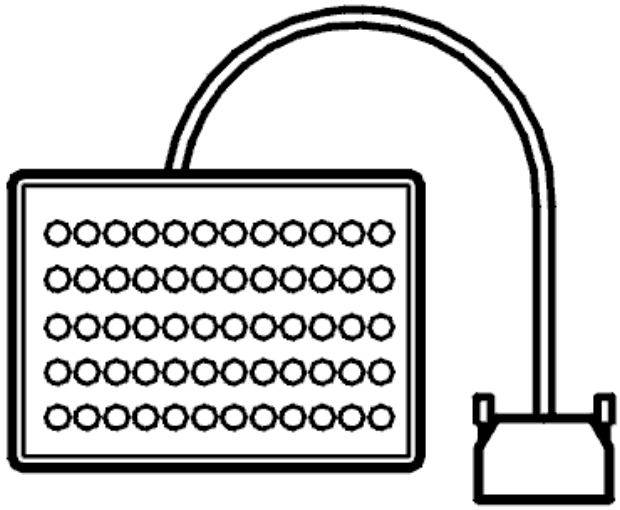


Fig. 173: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

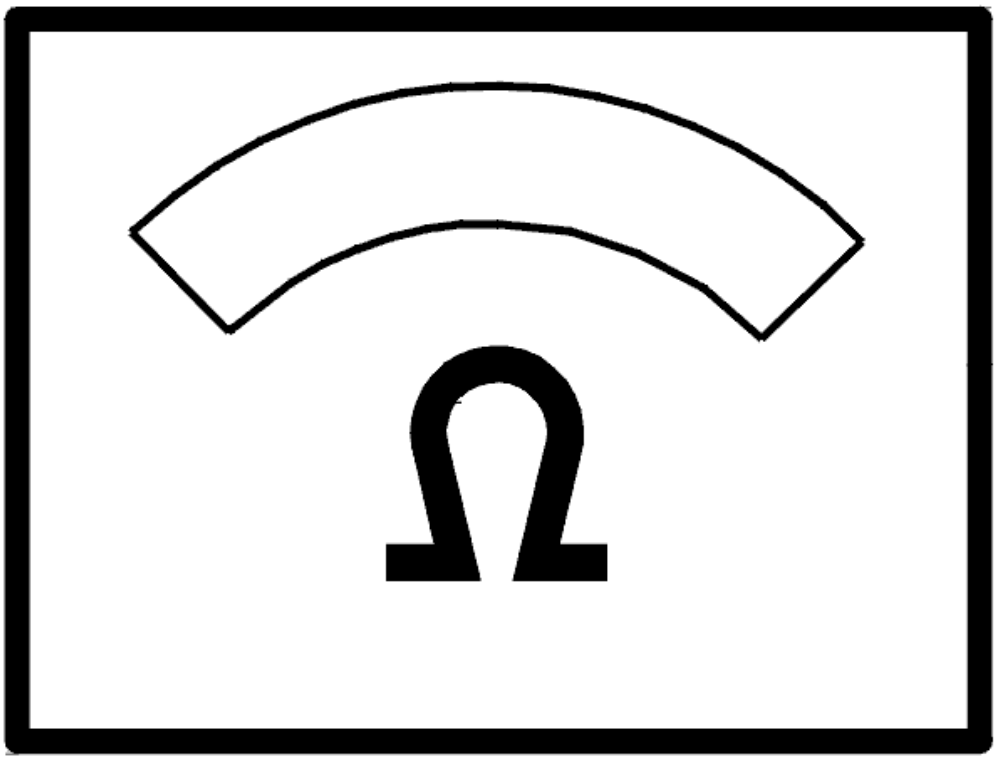


Fig. 174: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

- Ignition off

- Open the transmission control system.

  Check the cable between transmission terminal #L (#A11) and temperature sensor terminal #A. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

  HINT: Check the temperature sensor: Measure the resistance between temperature sensor connector terminals #A and #B. The resistance should be between 3.5-3.6 kohms at 20 °C.

  Remedy as necessary.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
  - To replace the temperature sensor, see **TEMPERATURE SENSOR FLUID TRANSMISSION, REPLACING**
  - For information about signals, see **SIGNAL SPECIFICATION**
  - For information about the resistance values, see **COMPONENT RESISTANCE VALUES**
  - see **CHECKING WIRING AND TERMINALS**

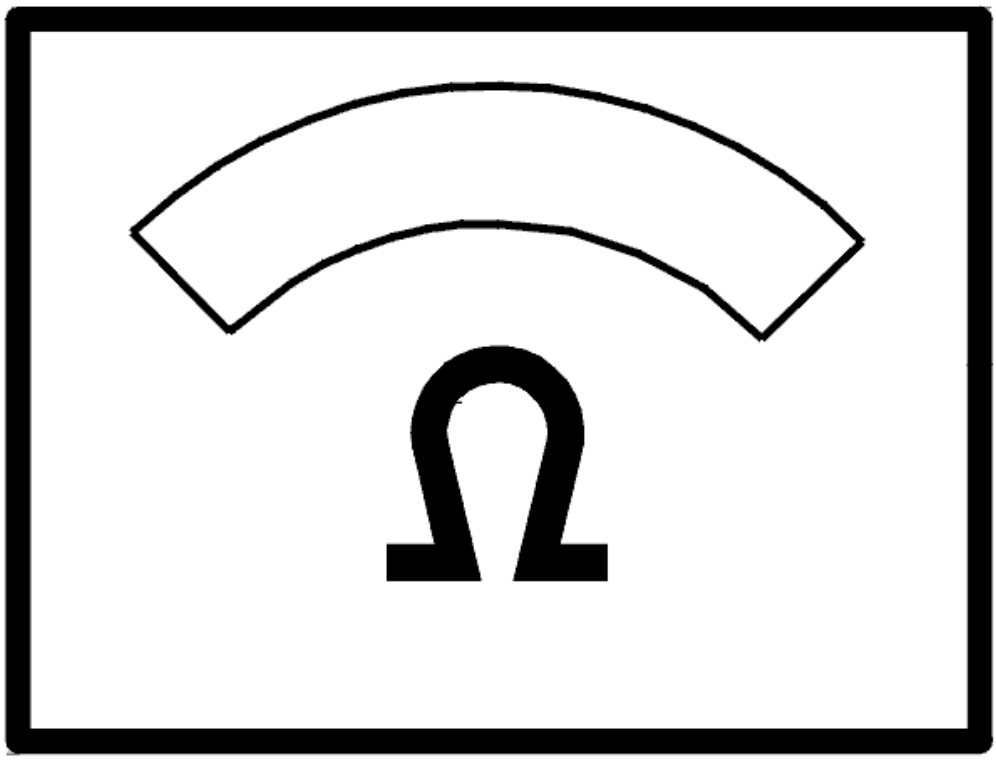


Fig. 175: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the control module and transmission connectors. Check for contact resistance and oxidation.

Check the cable between control module terminal #37 (#A37) and transmission connector (control module side) terminal #11. Check for an intermittent short-circuit to ground. Check for a short-circuit to supply voltage.

Check the cable between control module terminal #55 (#A55) and transmission connector (control module side) terminal #12. Check for an intermittent short-circuit to ground. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES**
- see **CHECKING WIRING AND TERMINALS**

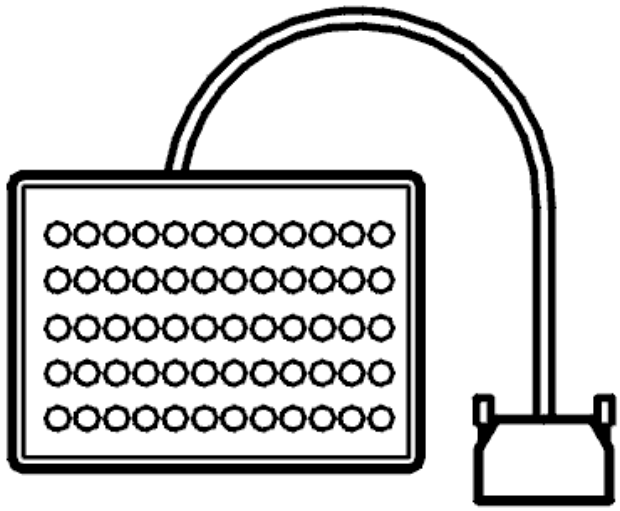


Fig. 176: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

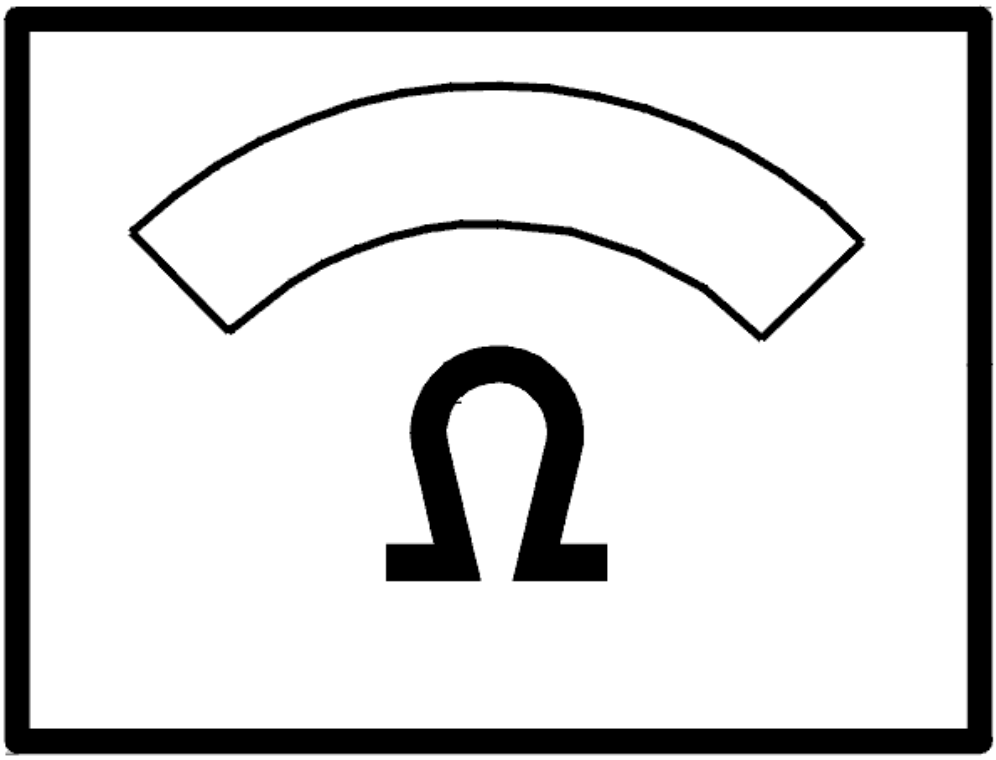


Fig. 177: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

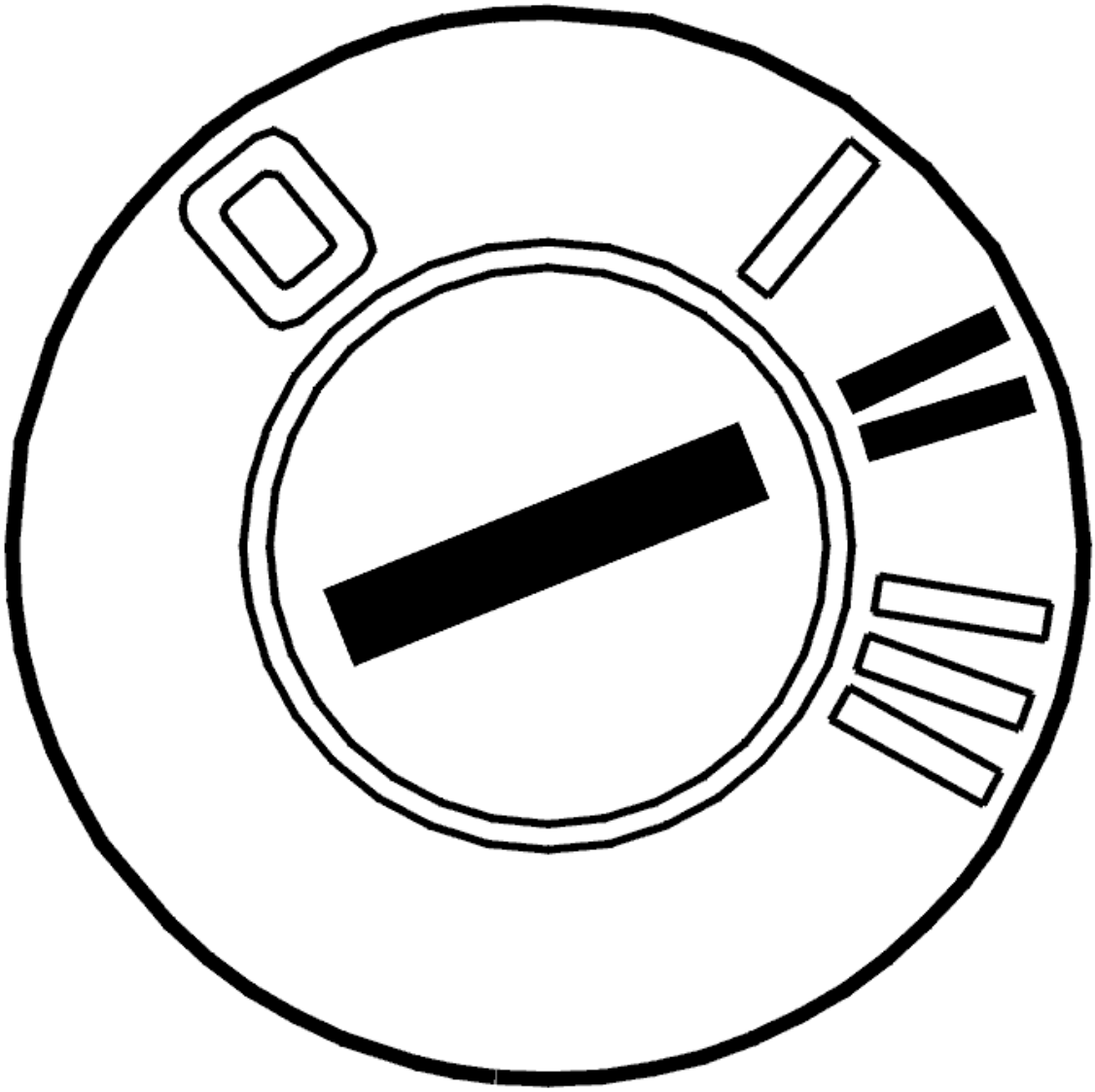


Fig. 178: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

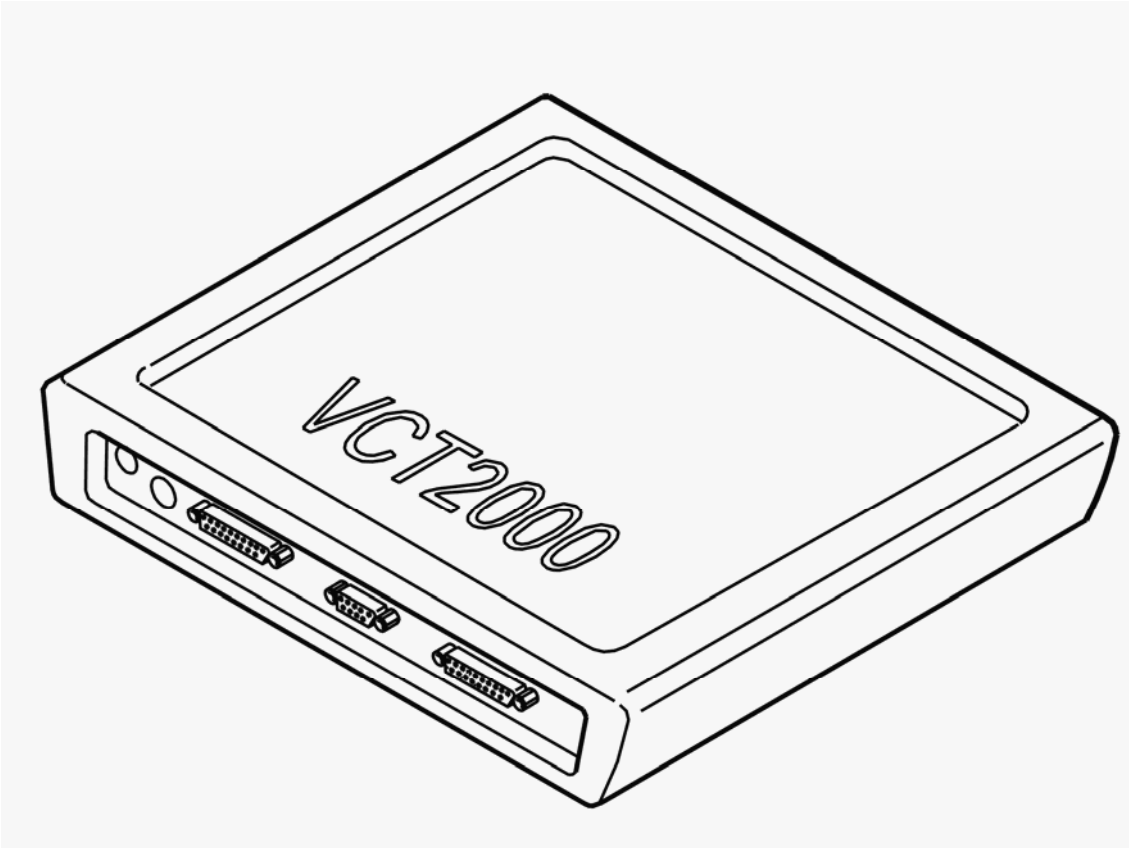


Fig. 179: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair check that the fault has been remedied.

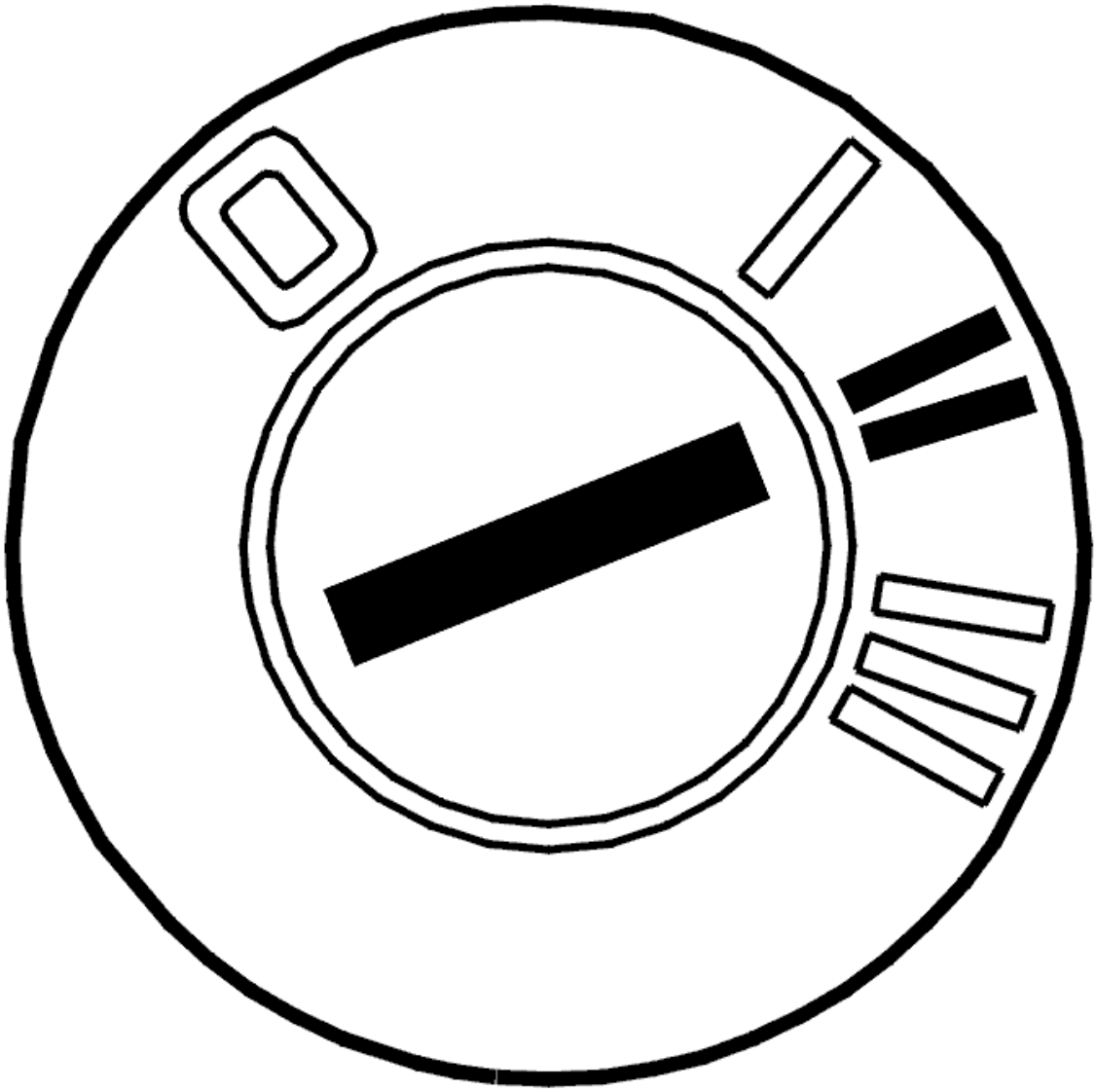


Fig. 180: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

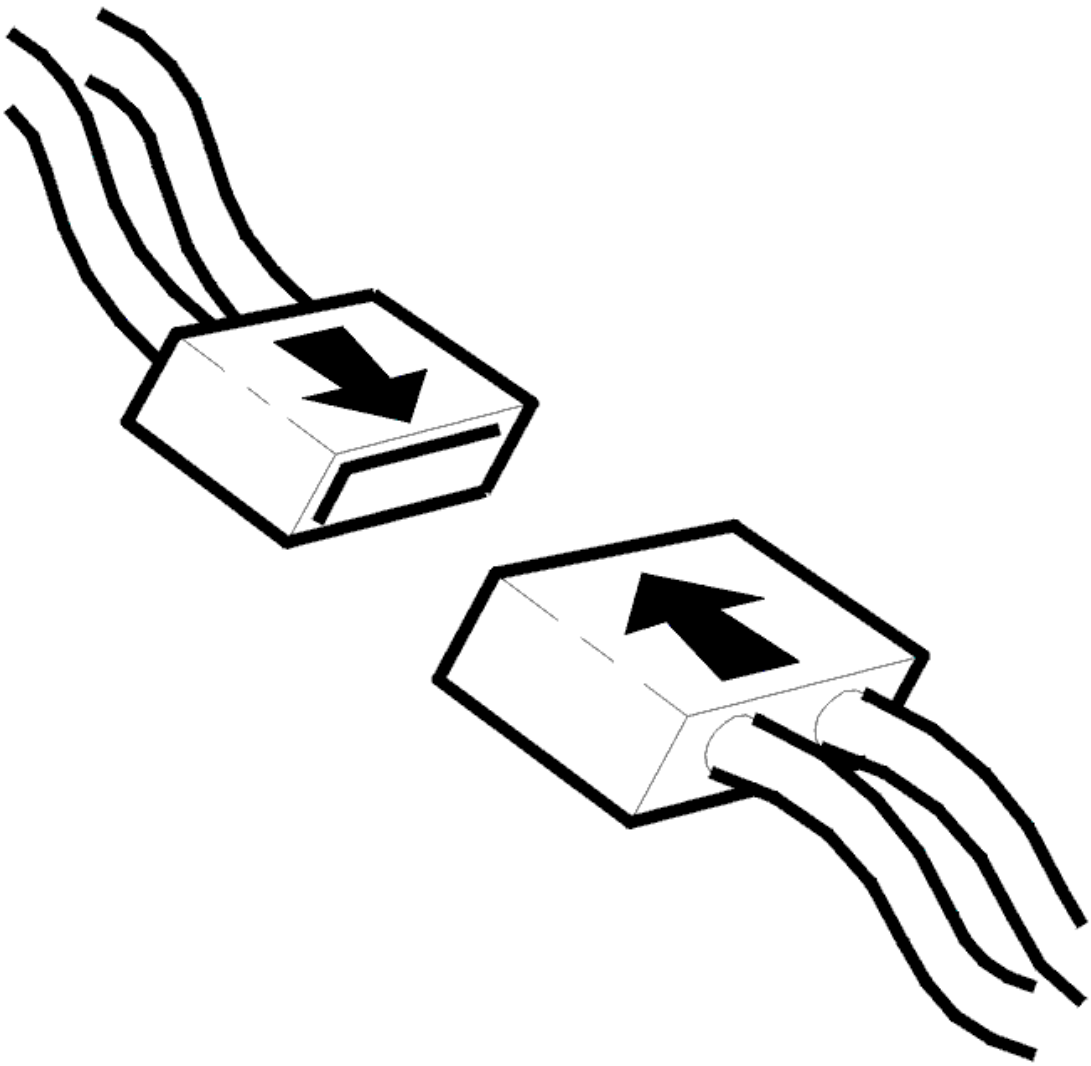


Fig. 181: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.
- Read off oil temperature.

  Check that the transmission oil temperature is within its permitted range. Compare with the transmission temperature.

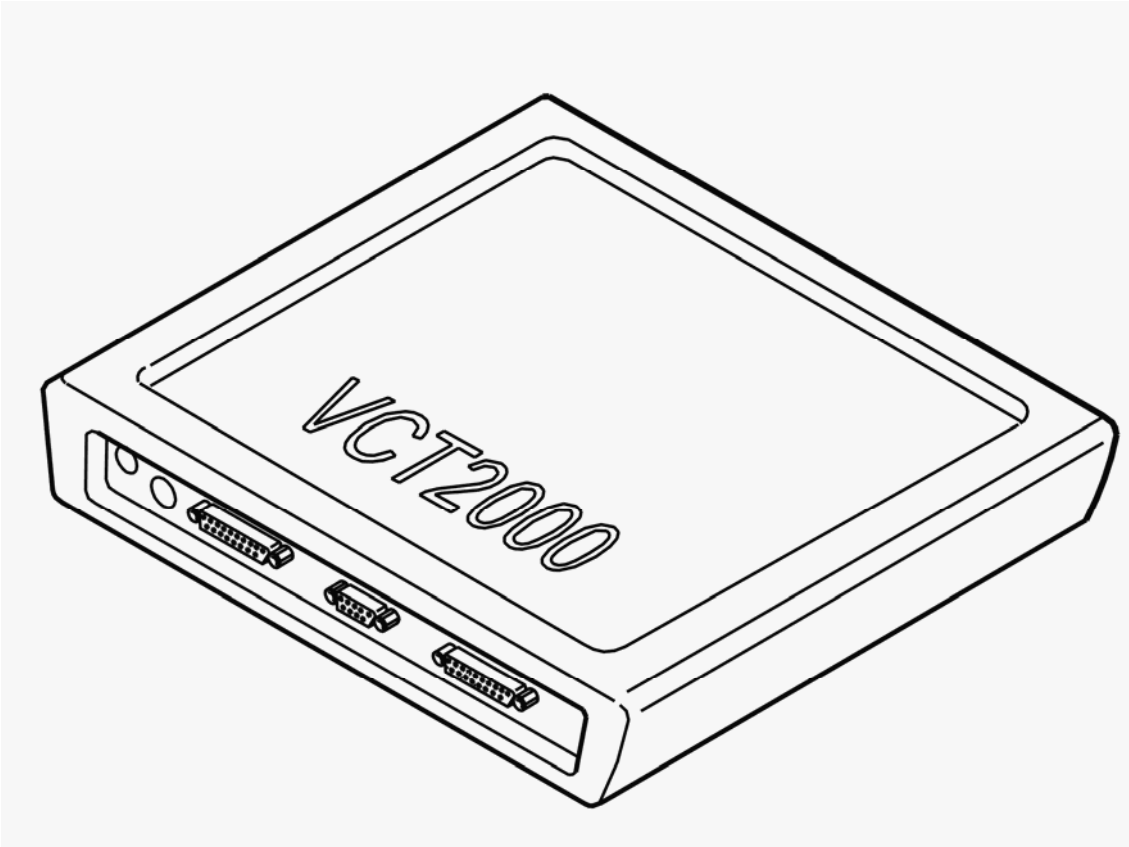


Fig. 182: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0045: OIL TEMPERATURE SENSOR. FAULTY SIGNAL (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

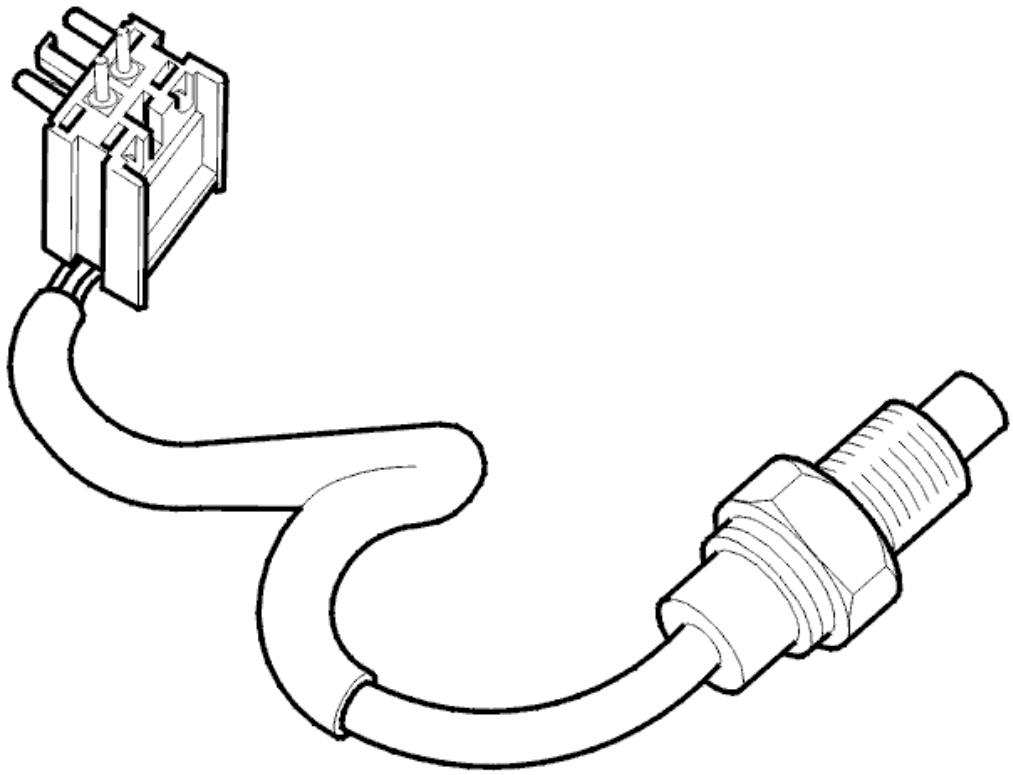


Fig. 183: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

The oil temperature sensor sends a signal to the transmission control module (TCM) which is used for functions such as temperature controlled lockup and initiating high-temperature programs. The sensor has an NTC (negative temperature coefficient) resistor. The signal (voltage) decreases with increasing oil temperature. Diagnostic trouble code (DTC) TCM-0045 is stored if the transmission control module (TCM) receives a signal from the oil temperature sensor which has not changed after the engine has run for 10 minutes.

Substitute Value

- No substitute values.

Possible Source

- Contact resistance in terminals.
- Open-circuit in signal cable or ground lead.
- Short-circuit to supply voltage in the signal cable.
- Defective oil temperature sensor.

Fault symptom[s]

- General orange warning lamp lit.

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

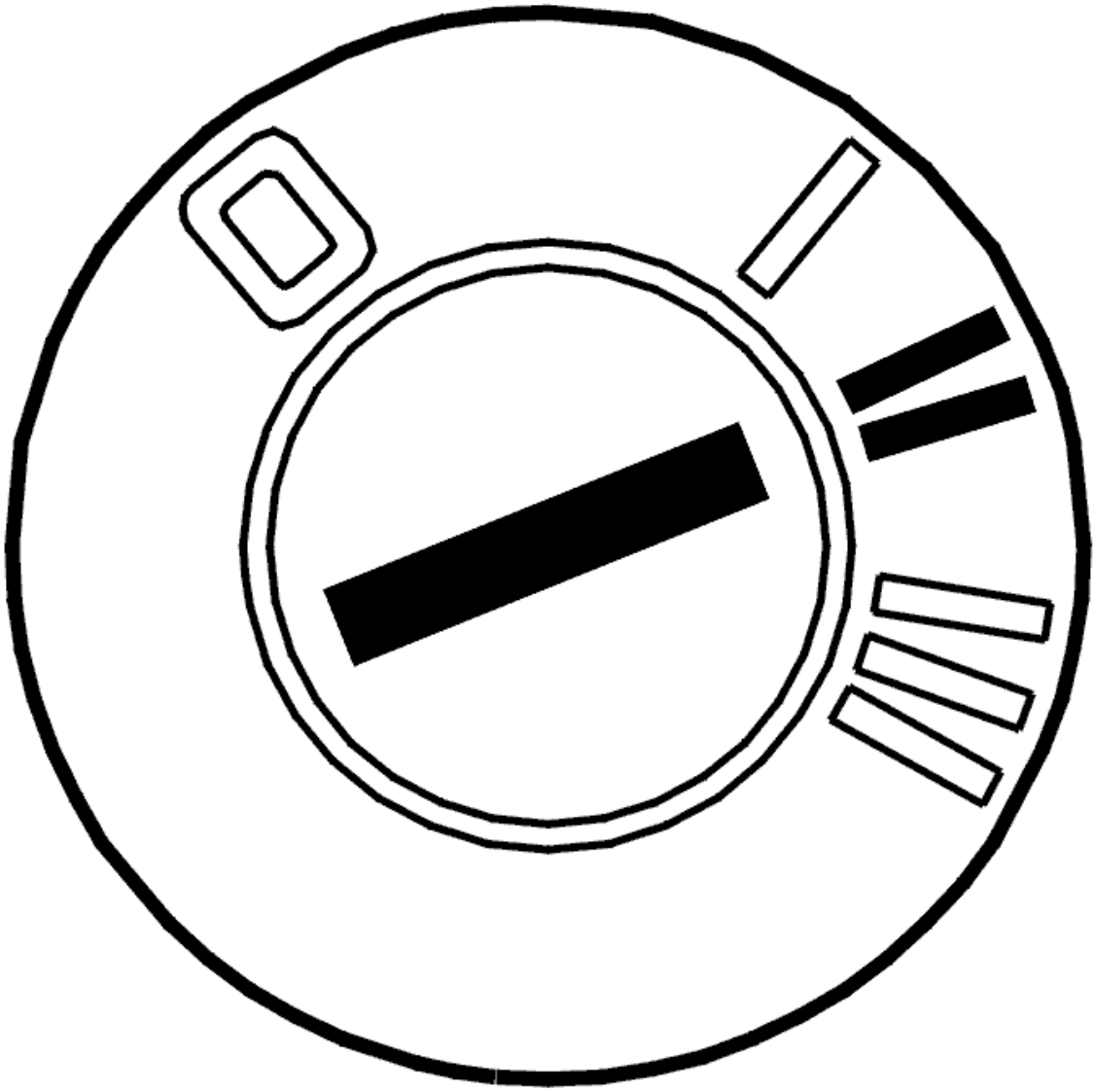


Fig. 184: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

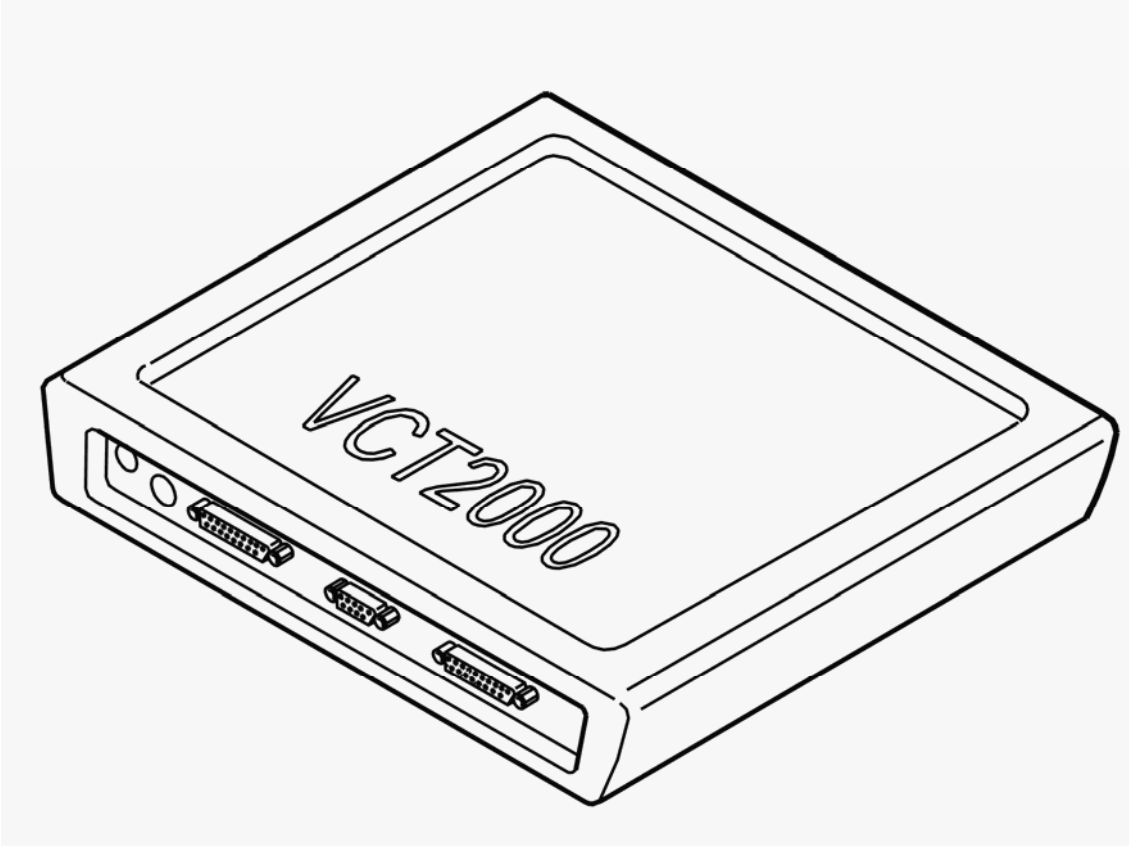


Fig. 185: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

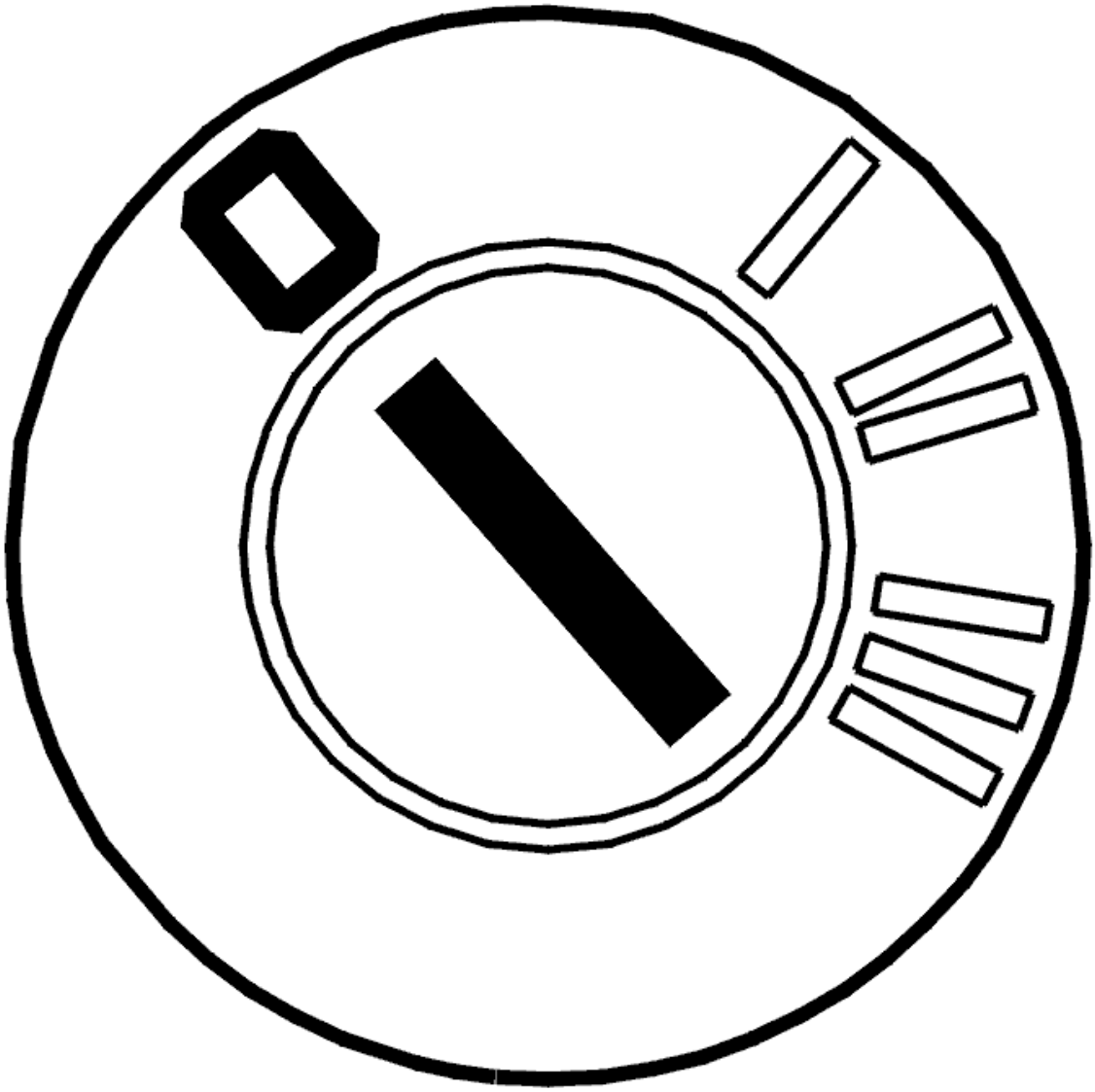


Fig. 186: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

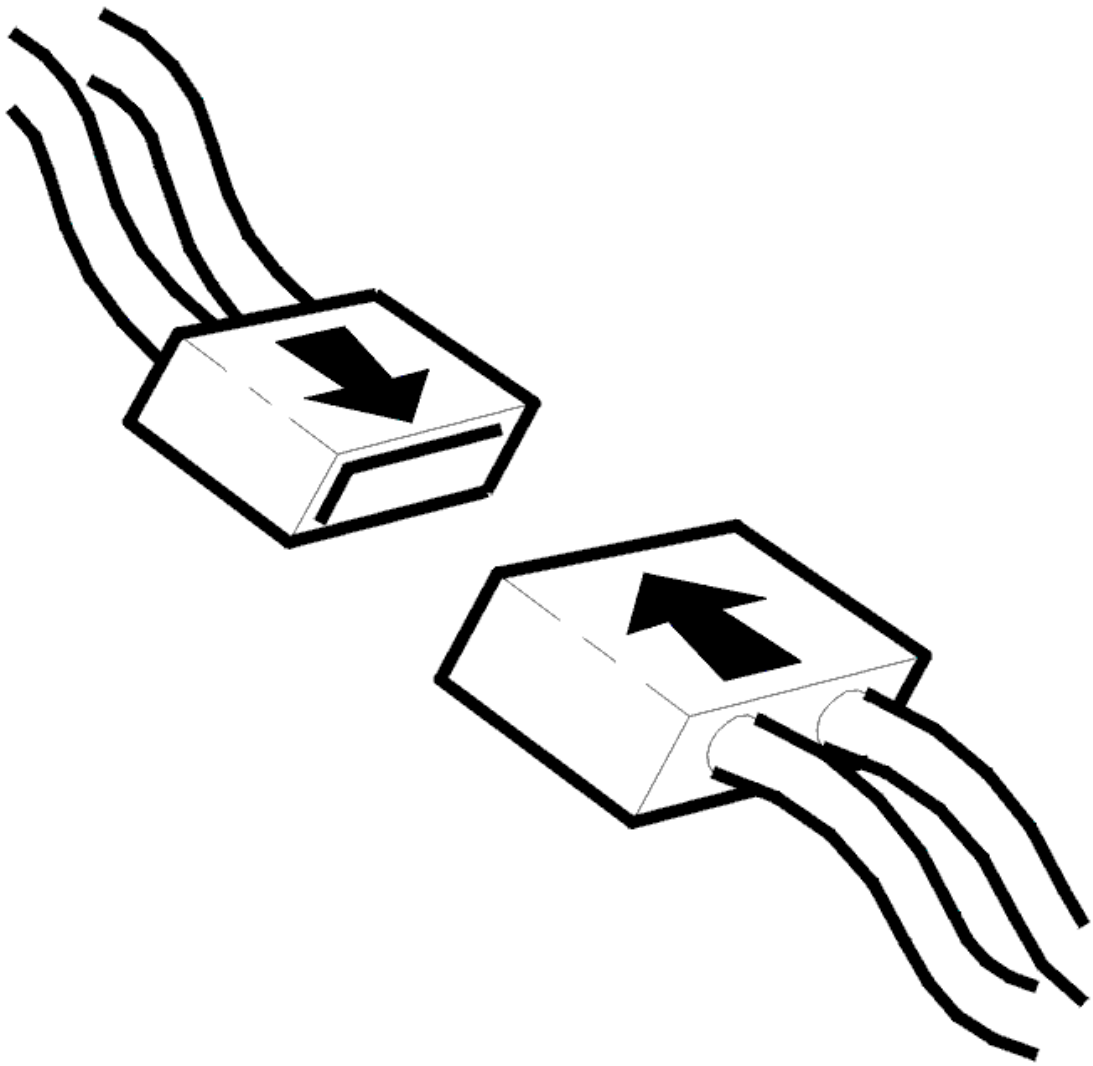


Fig. 187: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

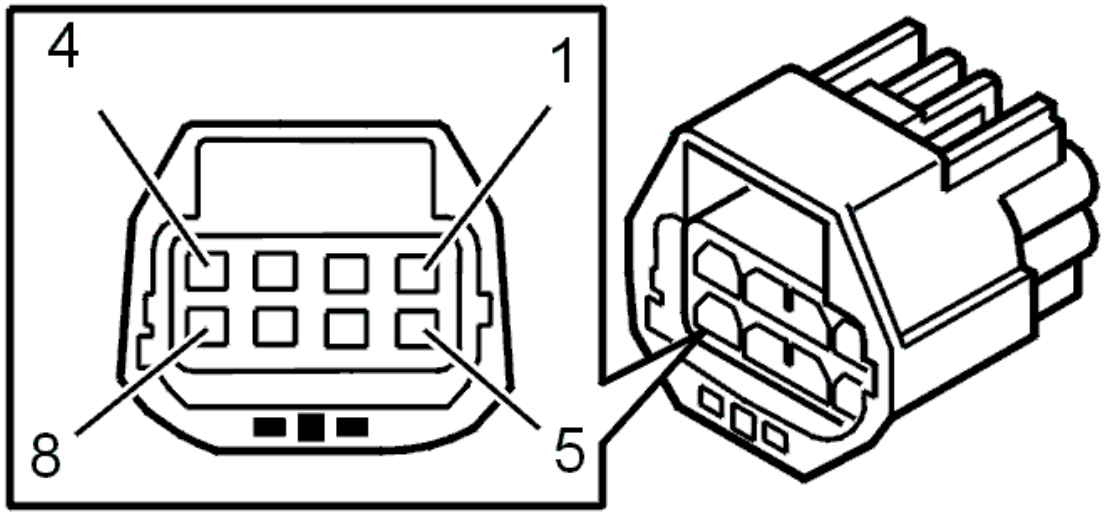


Fig. 188: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

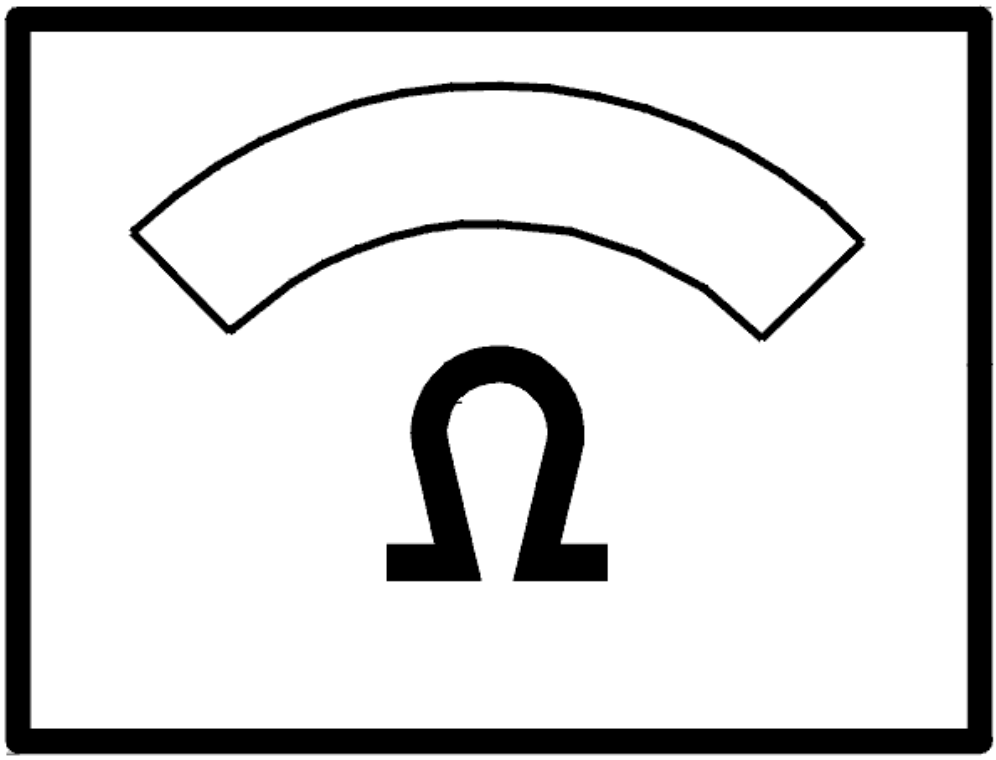


Fig. 189: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

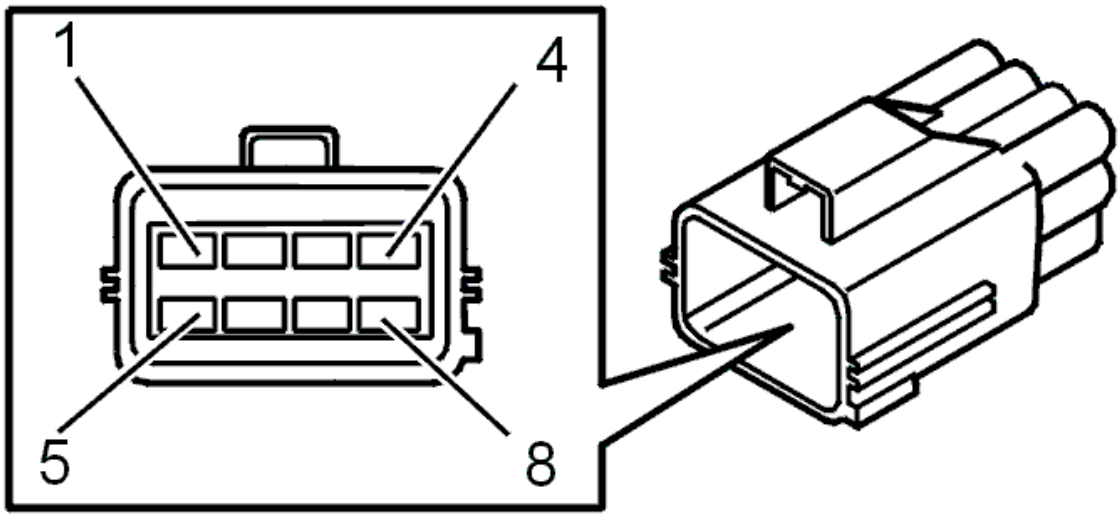


Fig. 190: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

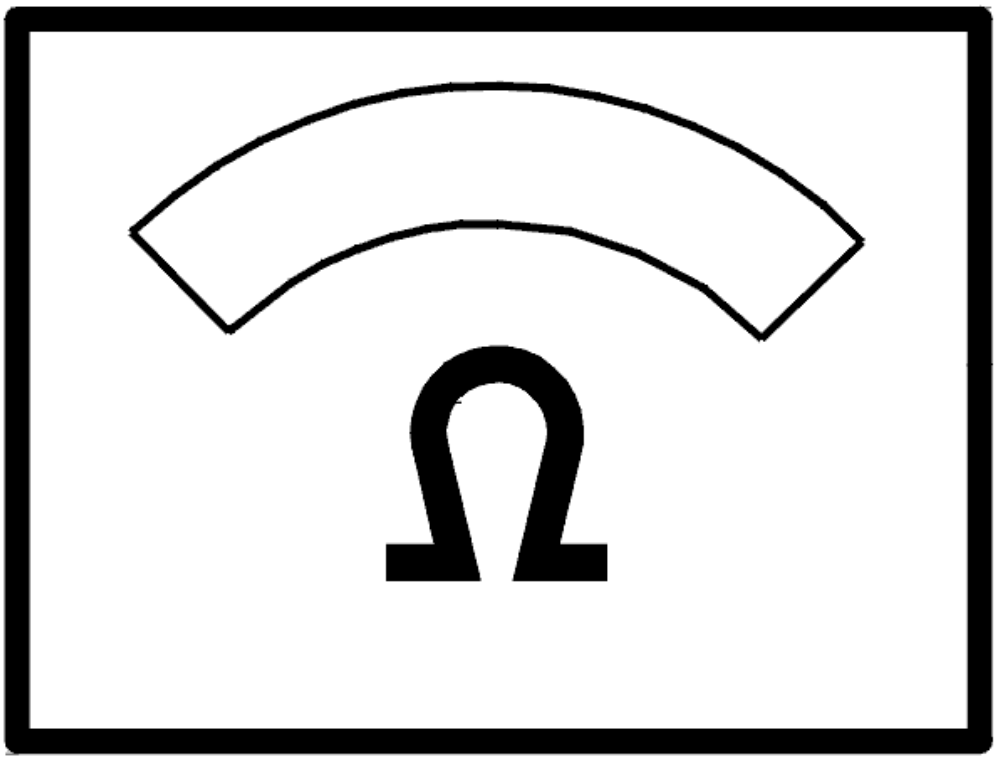


Fig. 191: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

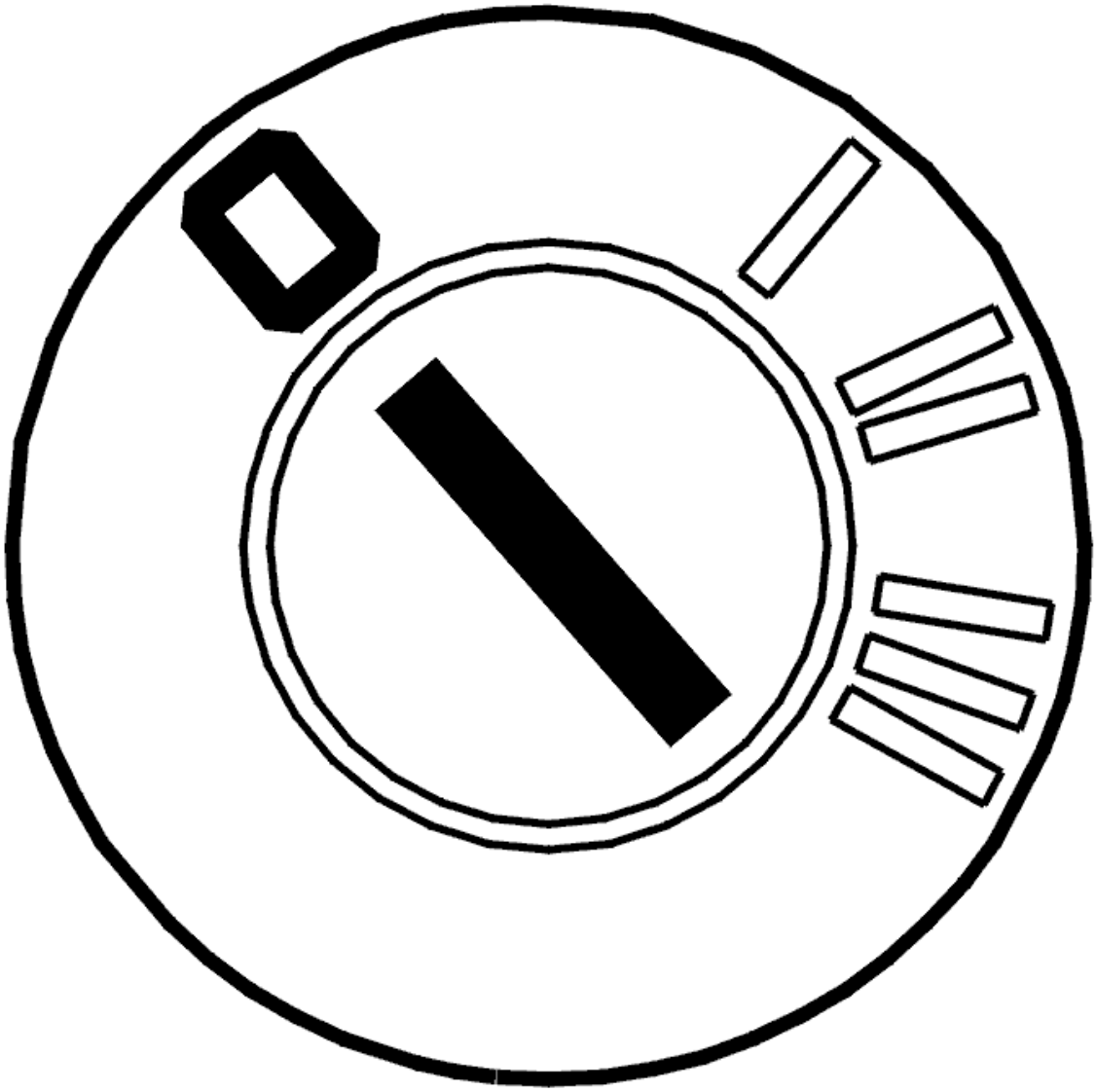


Fig. 192: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

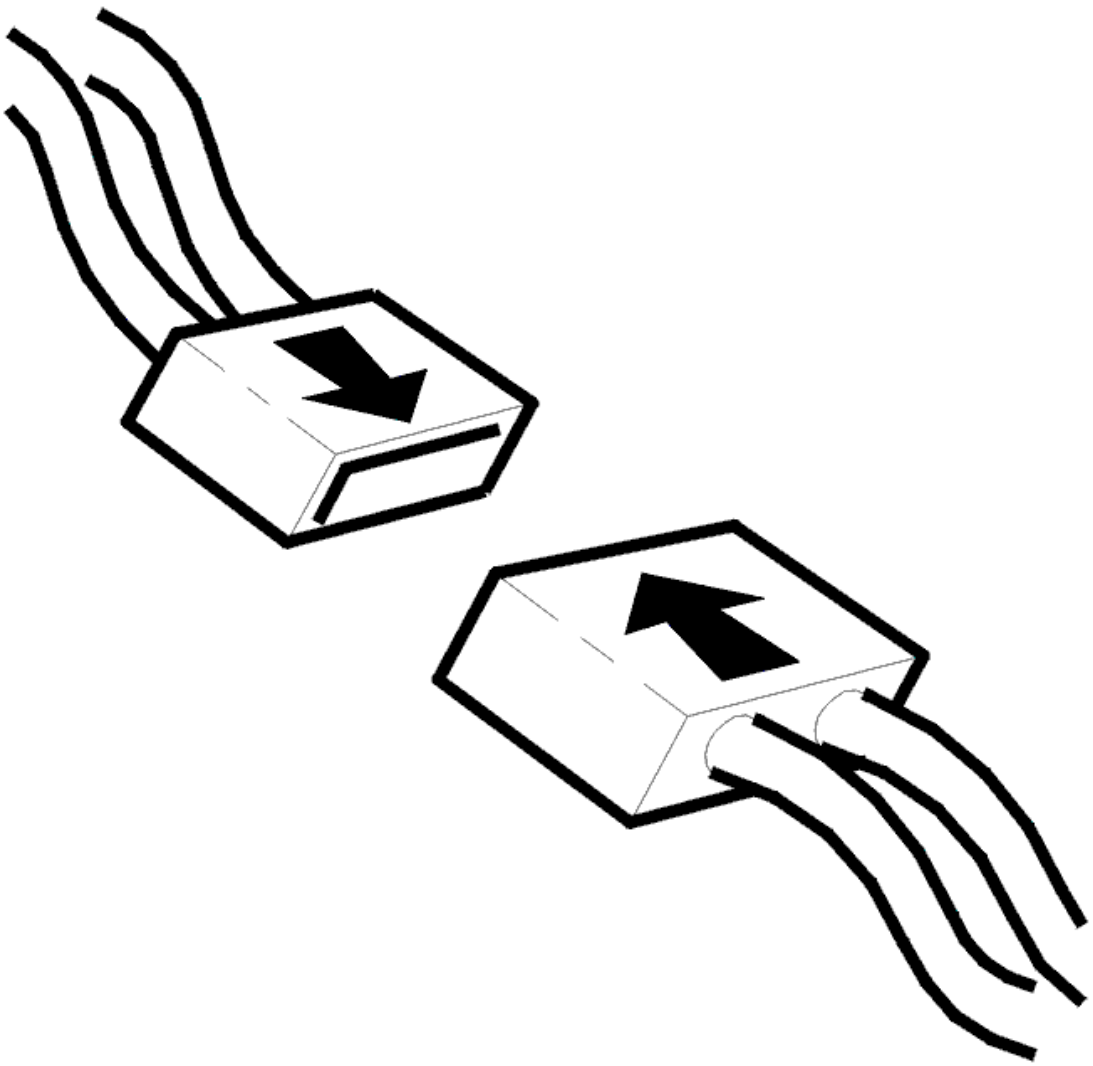


Fig. 193: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

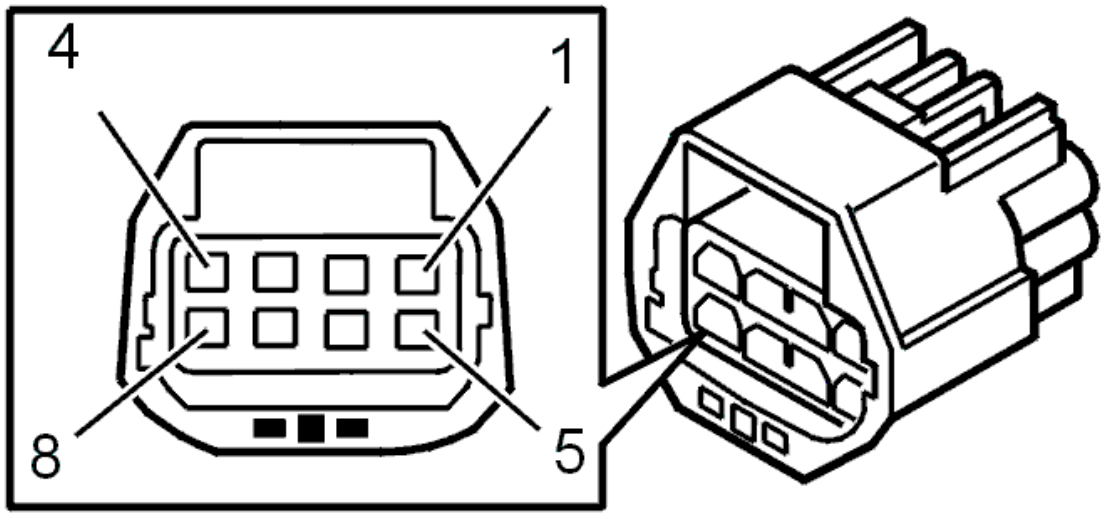


Fig. 194: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

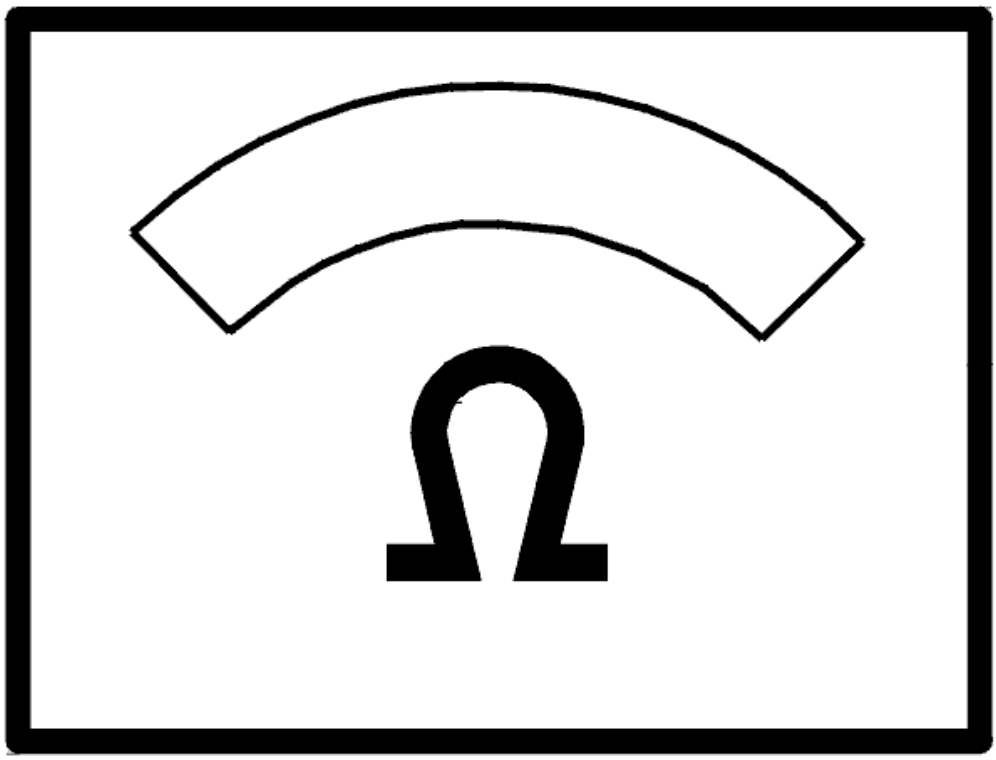


Fig. 195: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

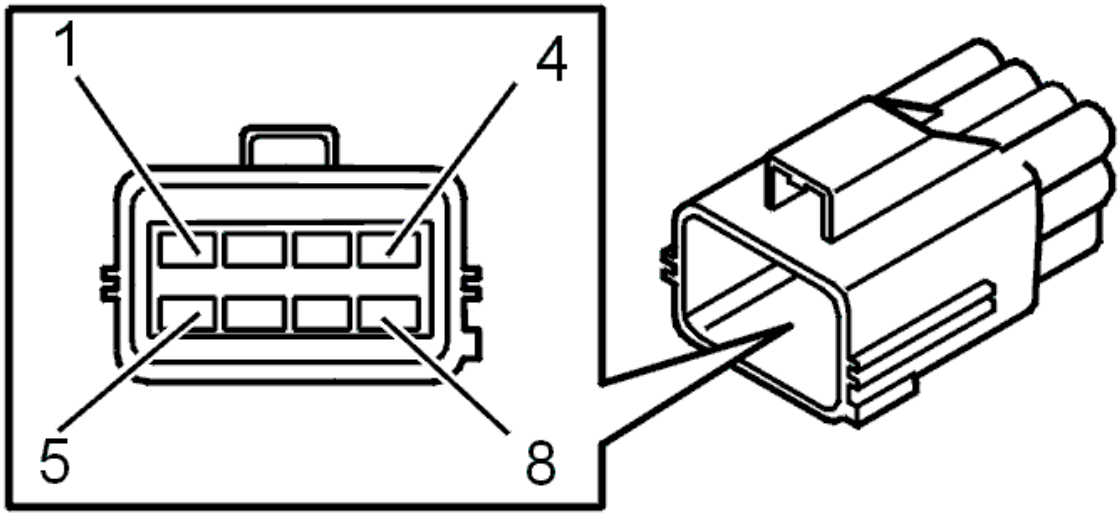


Fig. 196: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

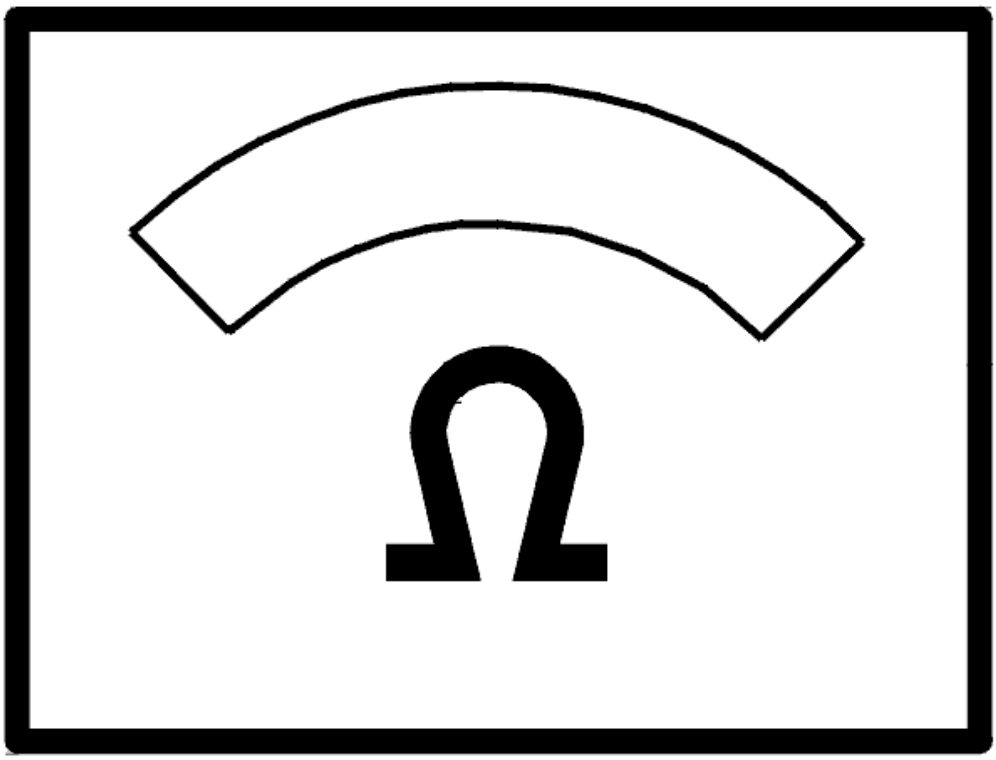


Fig. 197: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

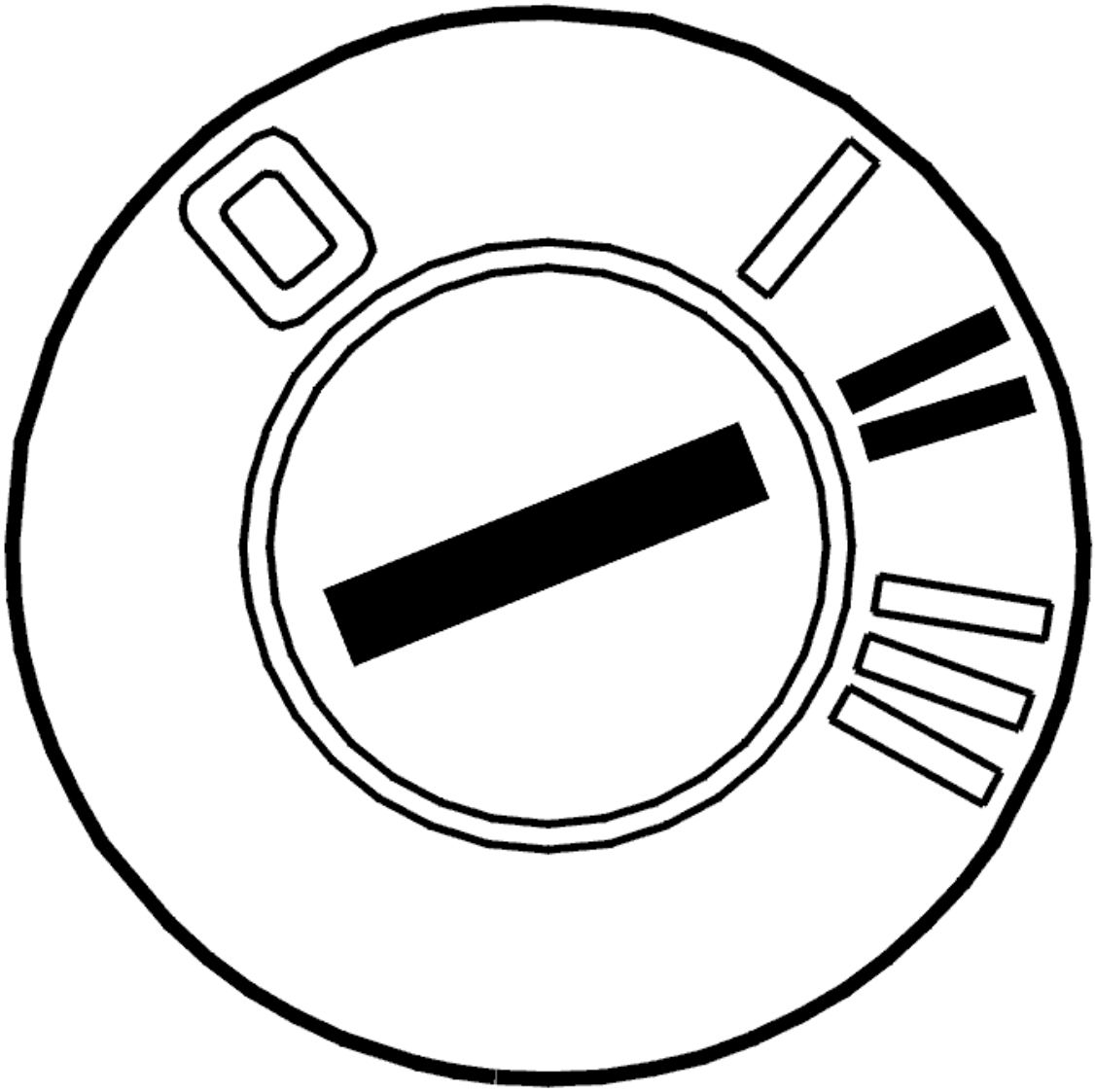


Fig. 198: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

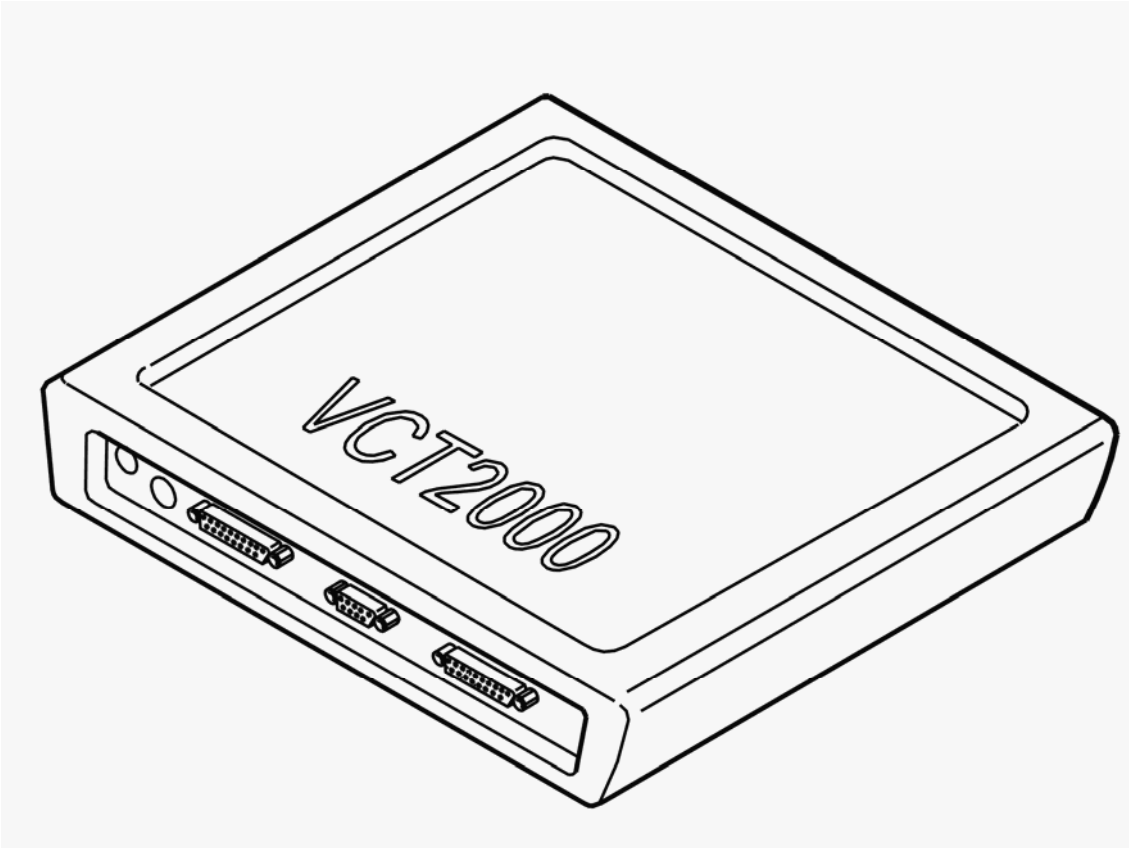


Fig. 199: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

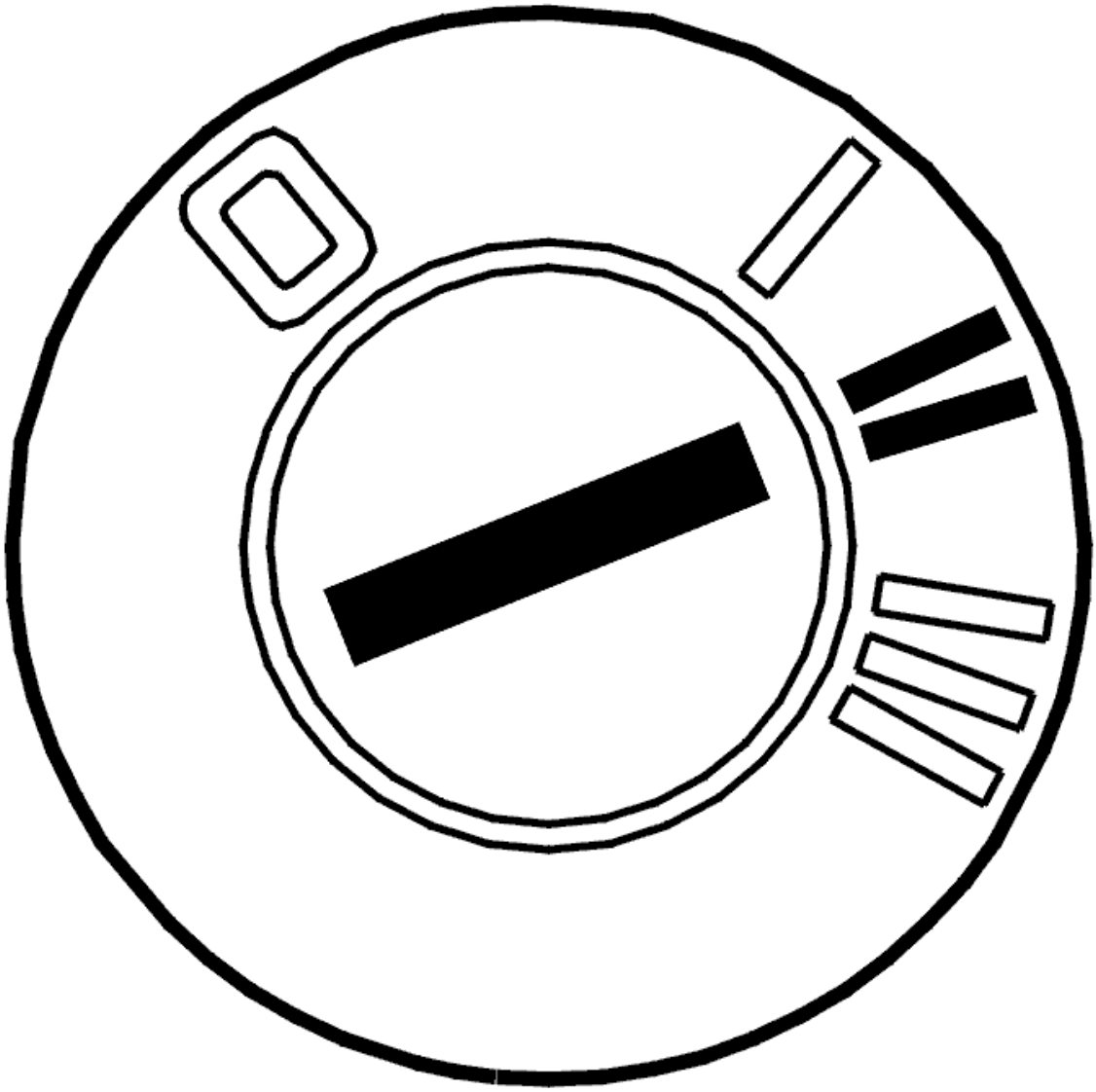


Fig. 200: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

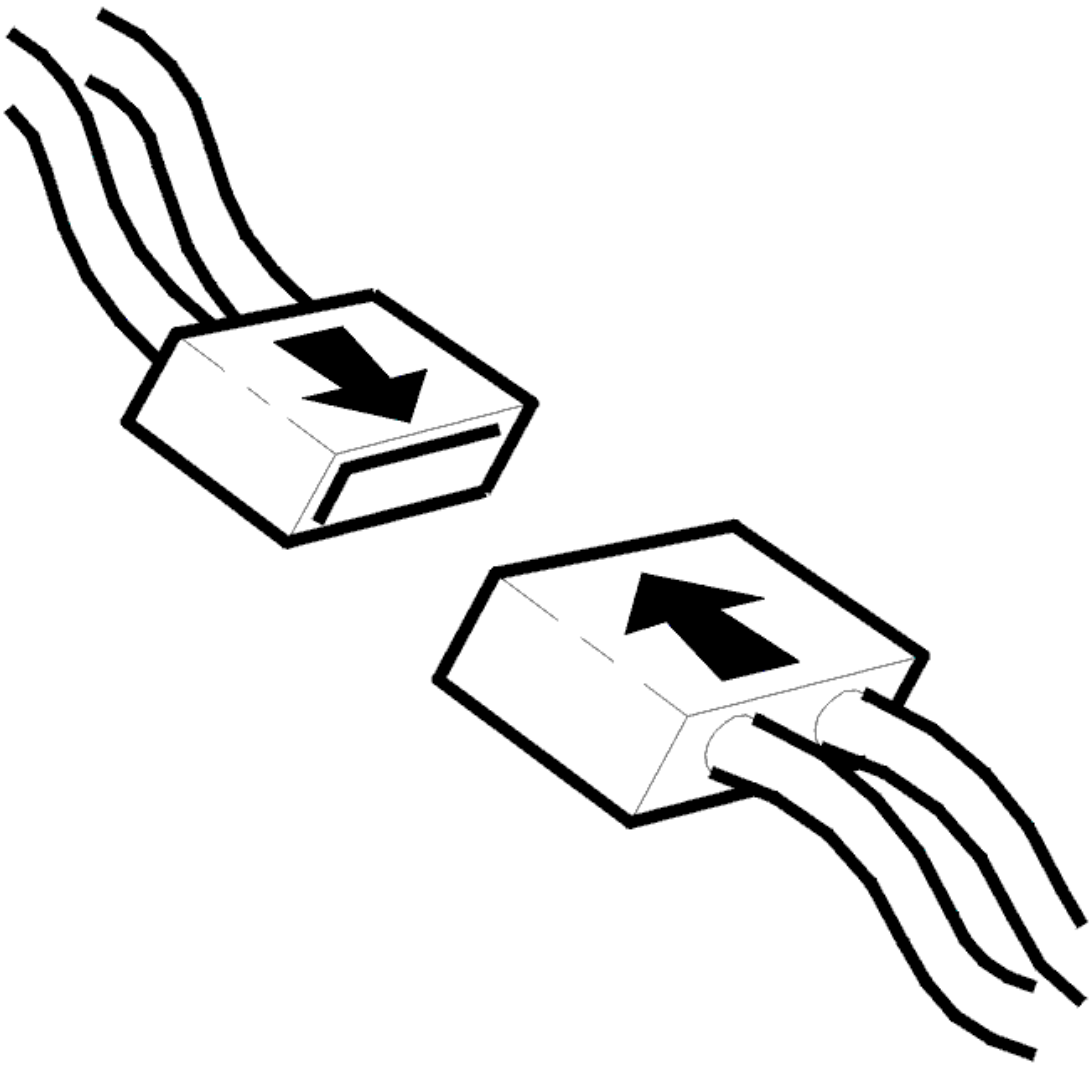


Fig. 201: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

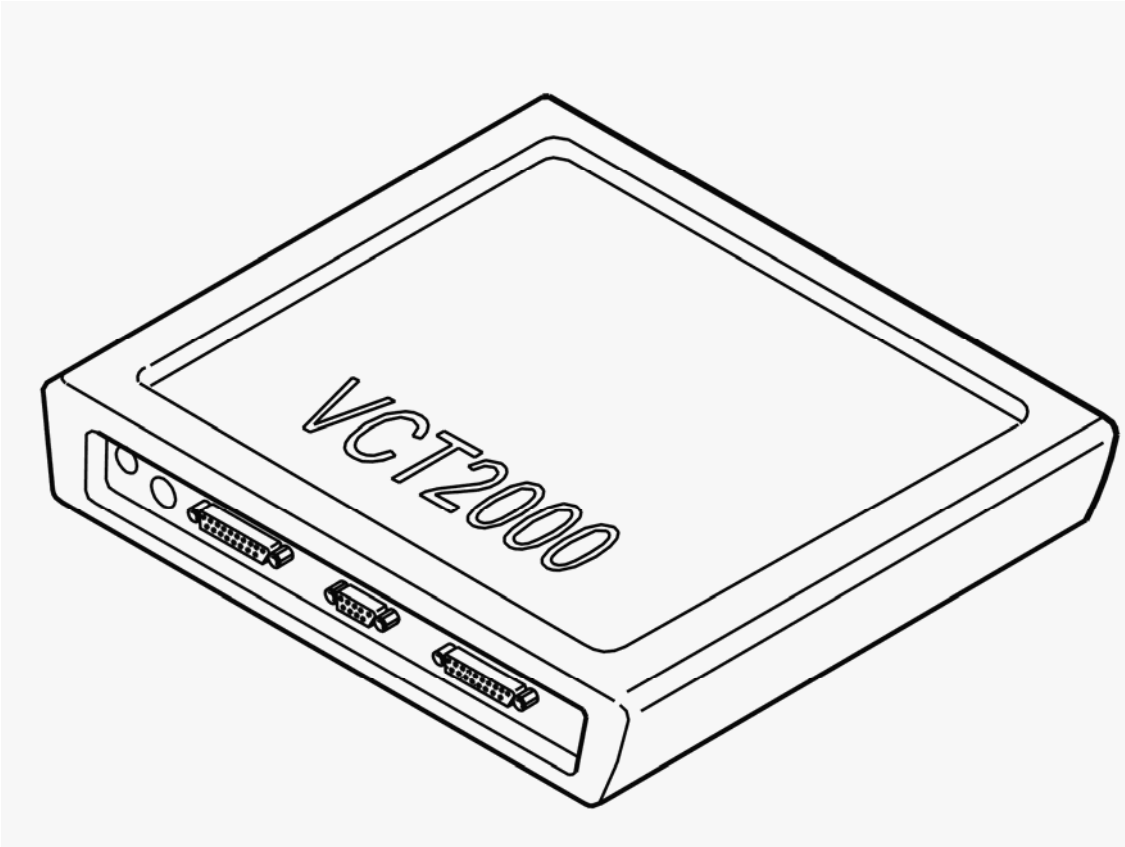


Fig. 202: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0046: OIL TEMPERATURE. OIL TEMPERATURE TOO HIGH (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

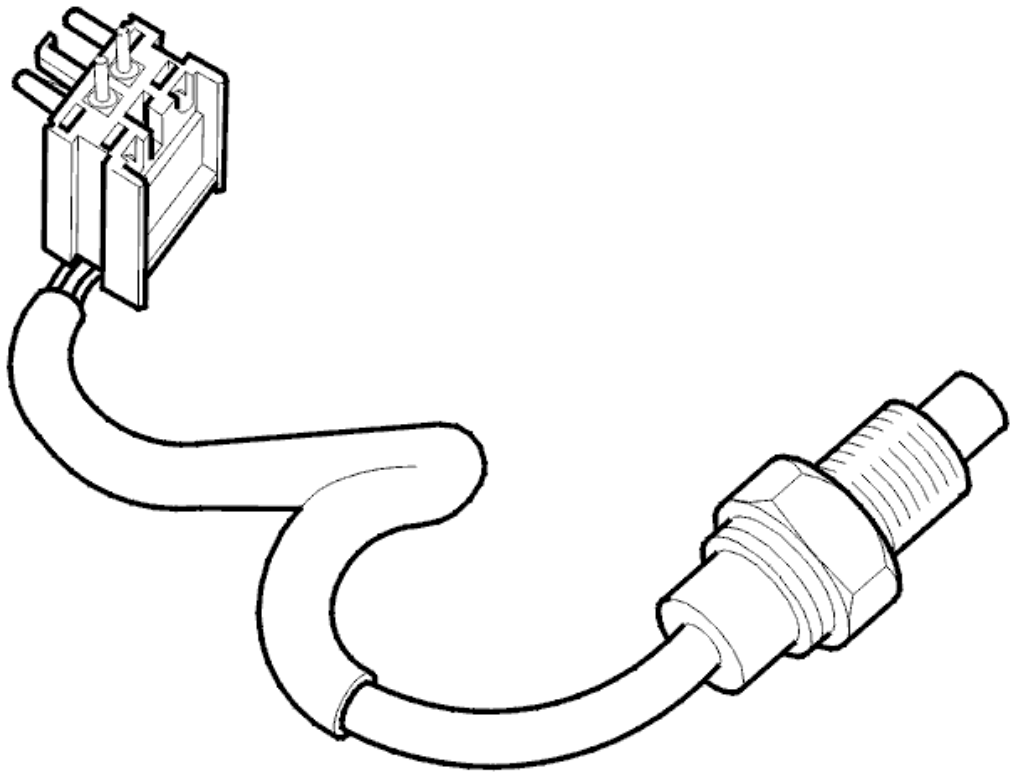


Fig. 203: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

The oil temperature sensor sends a signal to the control module which is used for functions such as temperature controlled lock-up and the engagement of high-temperature programs. The sensor has an NTC (negative temperature coefficient) resistor. The signal (voltage) decreases with increasing oil temperature. Diagnostic trouble code (DTC) TCM-0046 is stored if the control module receives a signal from the oil temperature sensor corresponding to a temperature above approximately +150°C for approximately 2 minutes

Substitute Value

- None.

Possible Source

- Poor oil cooling.
- Mechanical fault in the transmission.
- The transmission has been exposed to extreme load and high ambient temperature.

Fault symptom[s]

- General orange warning lamp lit.

TEMPERATURE TOO HIGH

CHECKING THE OIL COOLER AND HOSES

The cause of the diagnostic trouble code (DTC) was insufficient oil cooling in the transmission. Check the oil cooler and hoses for signs of damage and blockage. Then replace the oil.

Other information:

- To replace the oil, see **TRANSMISSION OIL / OIL FILTER, REPLACING** .
- **Continue**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

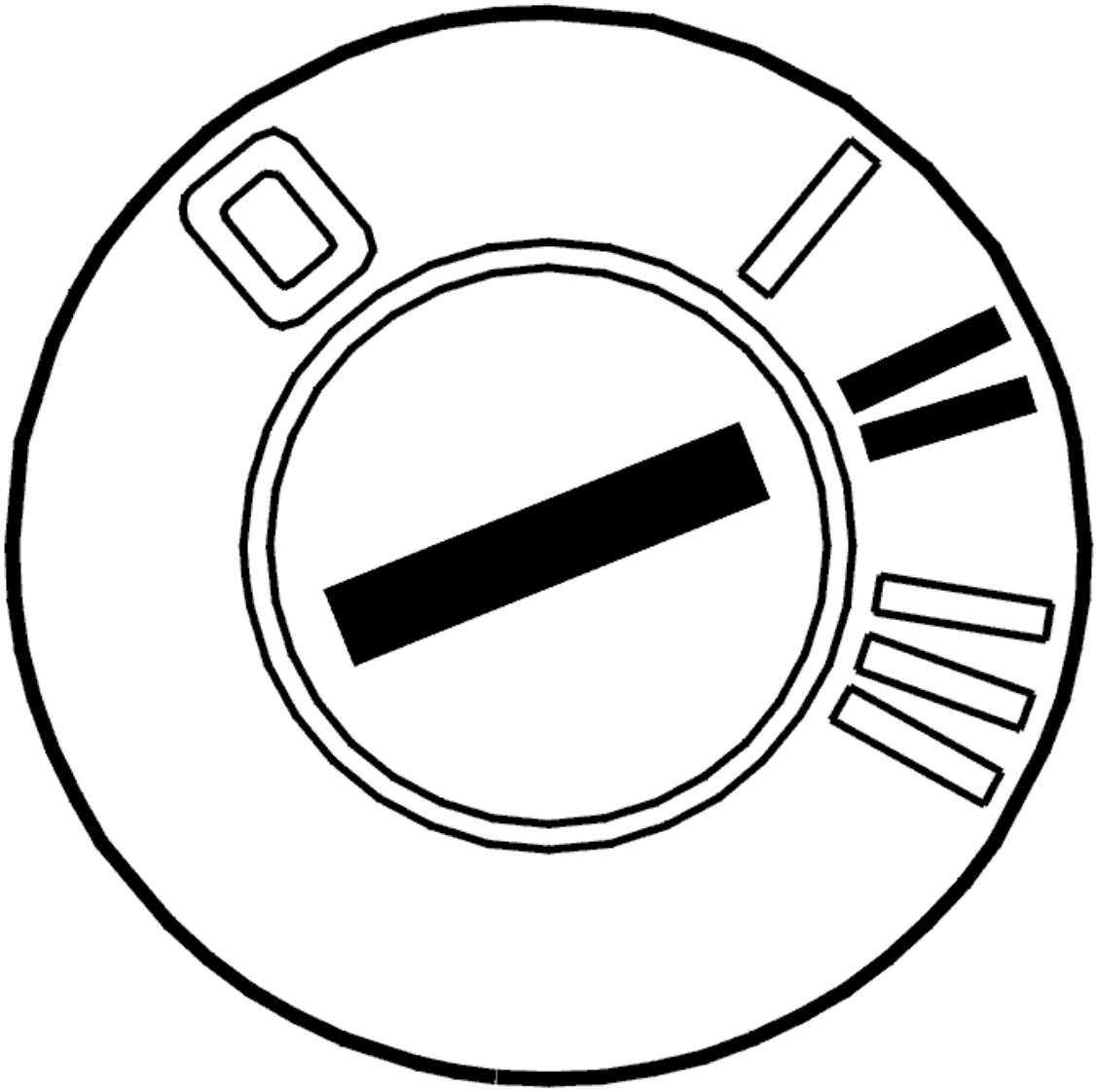


Fig. 204: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

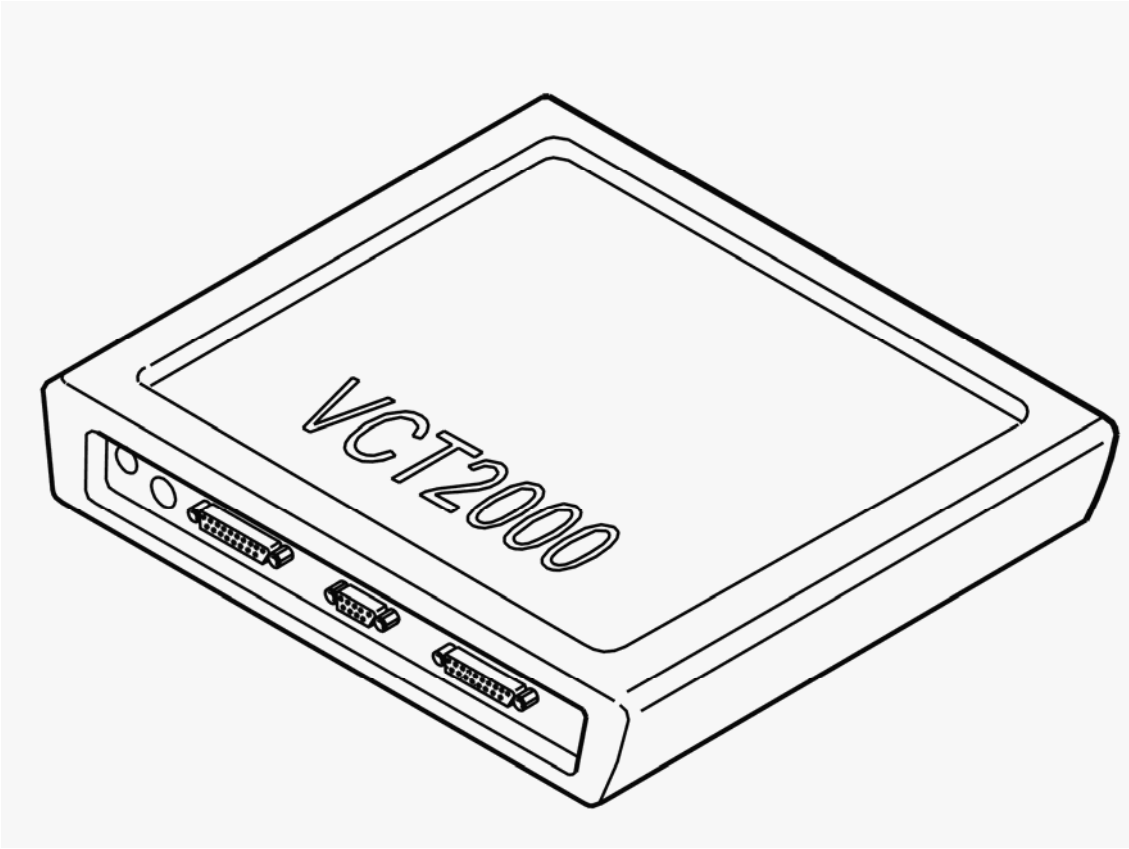


Fig. 205: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

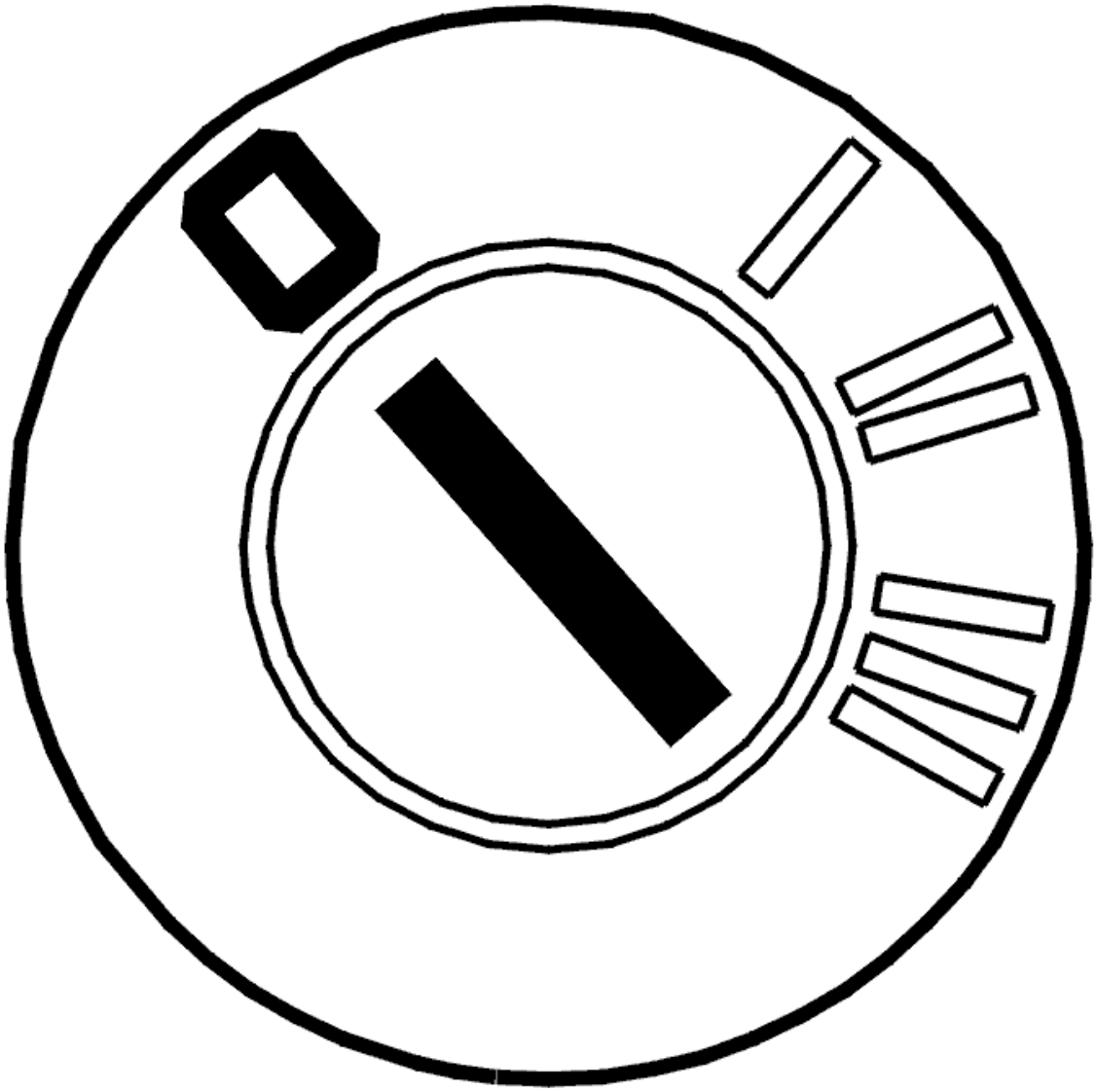


Fig. 206: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

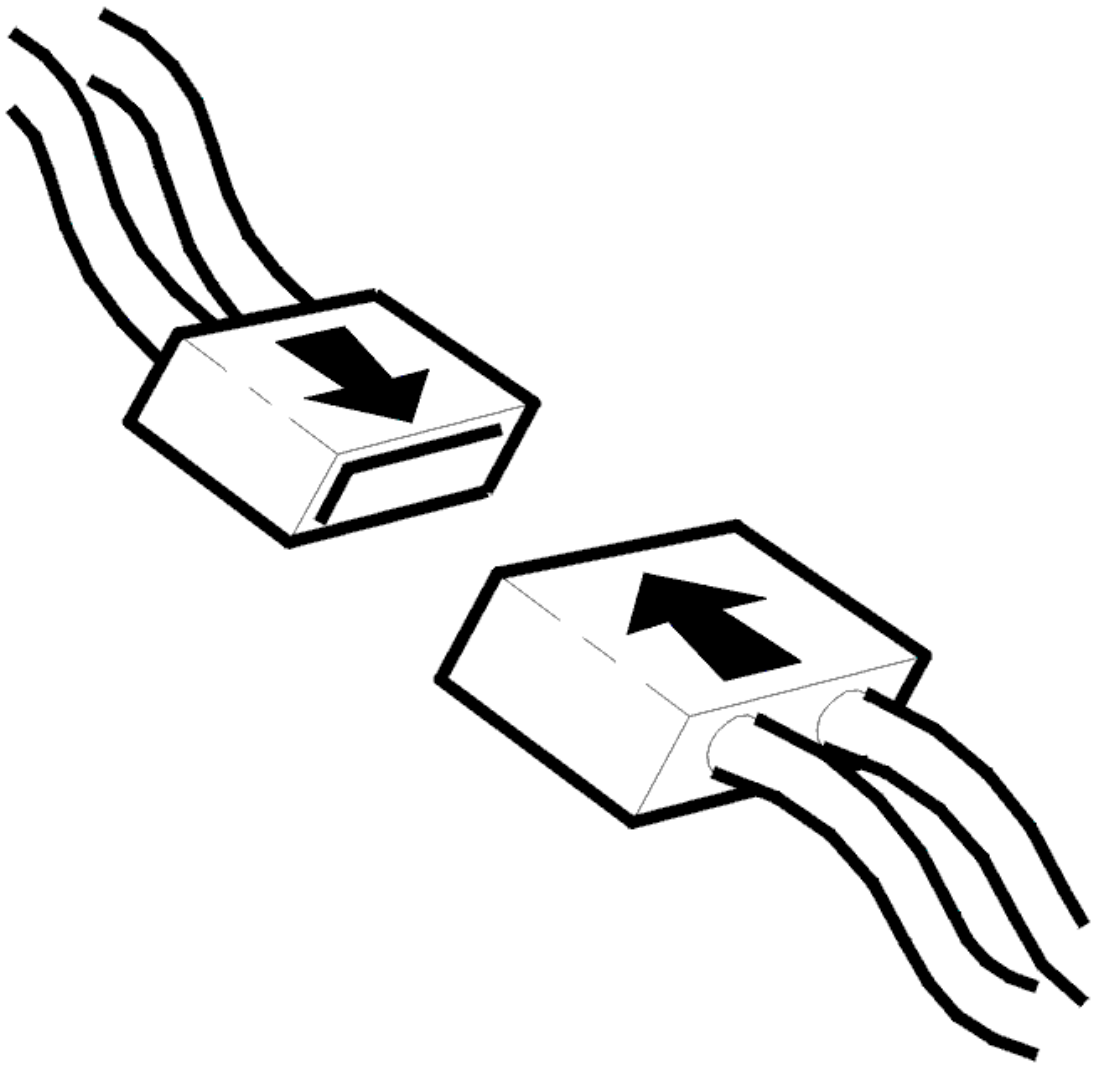


Fig. 207: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reconnect the connectors. Reinstall the components.
- Test drive the car according to **TEST DRIVE SCHEDULE, DESCRIPTION** .

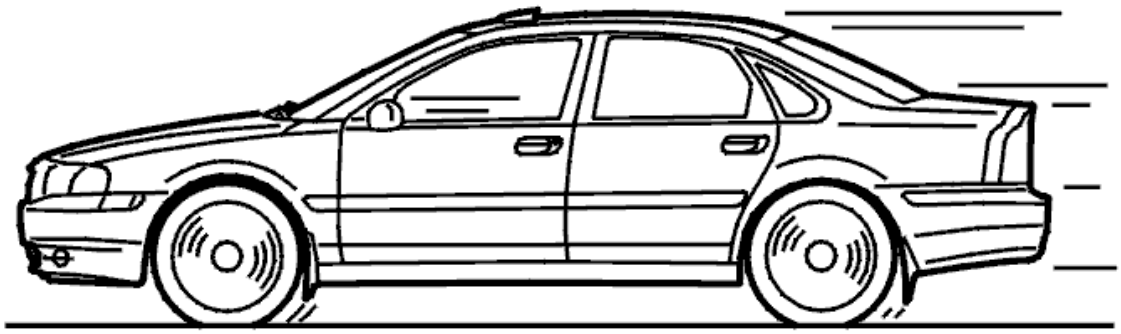


Fig. 208: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the function of the transmission OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0046: OIL TEMPERATURE. OIL TEMPERATURE TOO HIGH (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

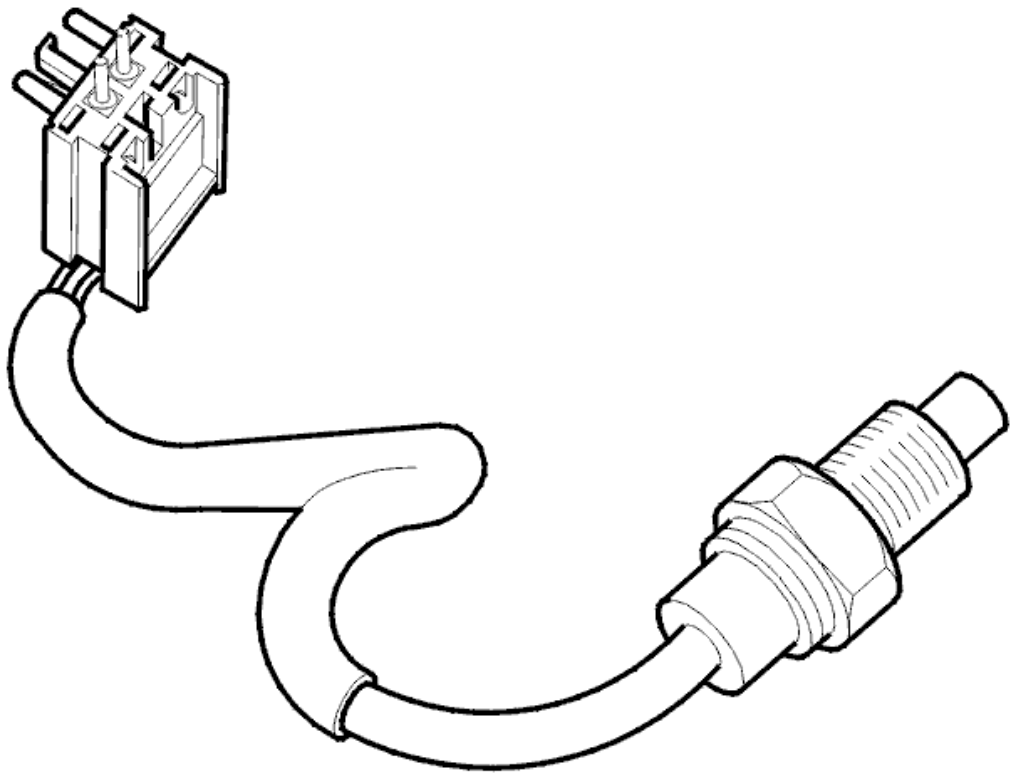


Fig. 209: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

The oil temperature sensor sends a signal to the control module which is used for functions such as temperature controlled lock-up and the engagement of high-temperature programs. The sensor has an NTC (negative temperature coefficient) resistor. The signal (voltage) decreases with increasing oil temperature. Diagnostic trouble code (DTC) TCM-0046 is stored if the control module receives a signal from the oil temperature sensor corresponding to a temperature above approximately +160°C (320 °F) for approximately 2 minutes.

Substitute Value

- None.

Possible Source

- Poor oil cooling.
- Mechanical fault in the transmission.
- The transmission has been exposed to extreme load and high ambient temperature.

Fault symptom[s]

- General orange warning lamp lit.

TEMPERATURE TOO HIGH

CHECKING THE OIL COOLER AND HOSES

The cause of the diagnostic trouble code (DTC) was insufficient oil cooling in the transmission. Check the oil cooler and hoses for signs of damage and blockage. Then replace the oil.

Other information:

- To replace the oil, see **TRANSMISSION FLUID, REPLACING** .
- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.

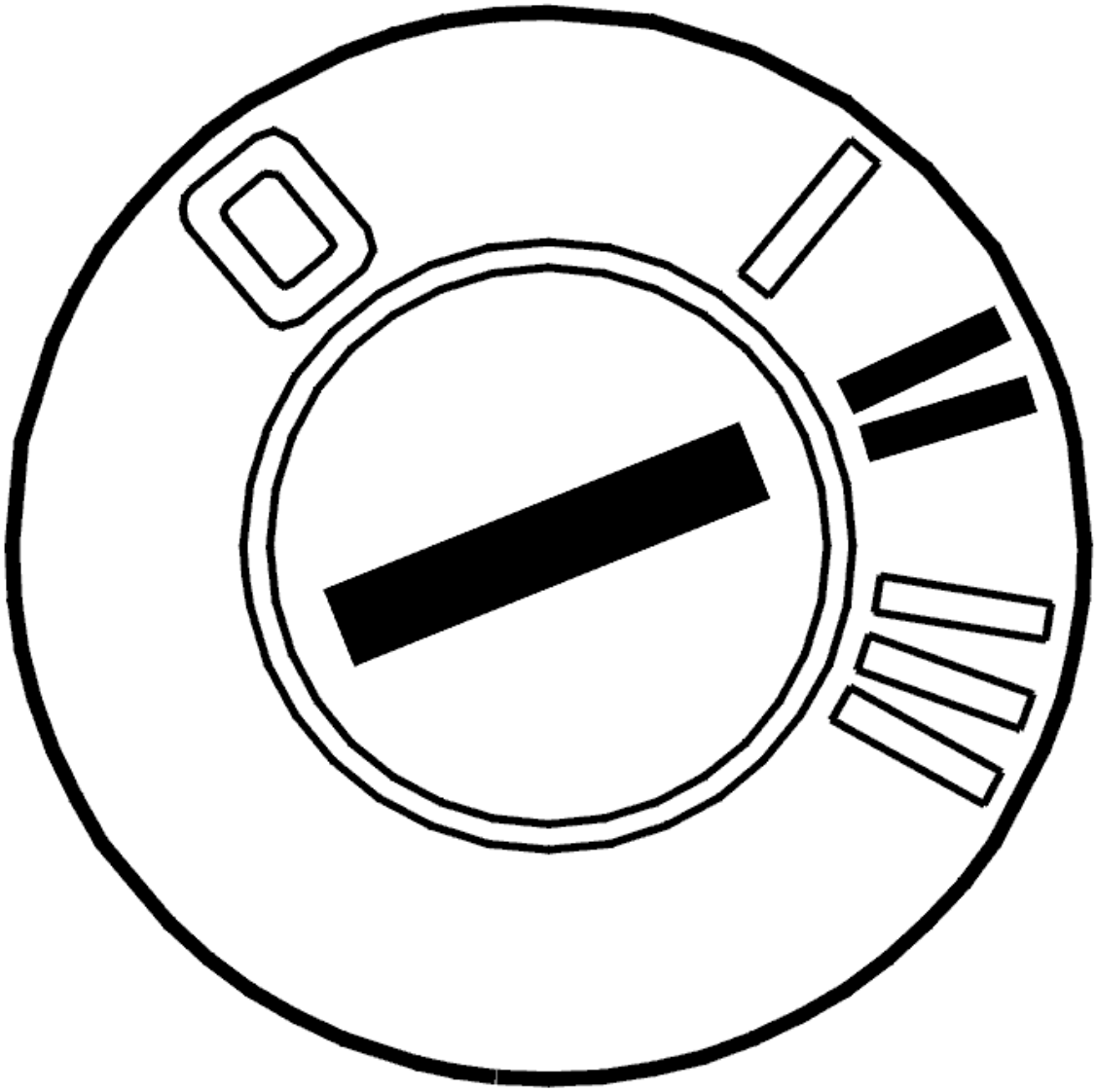


Fig. 210: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

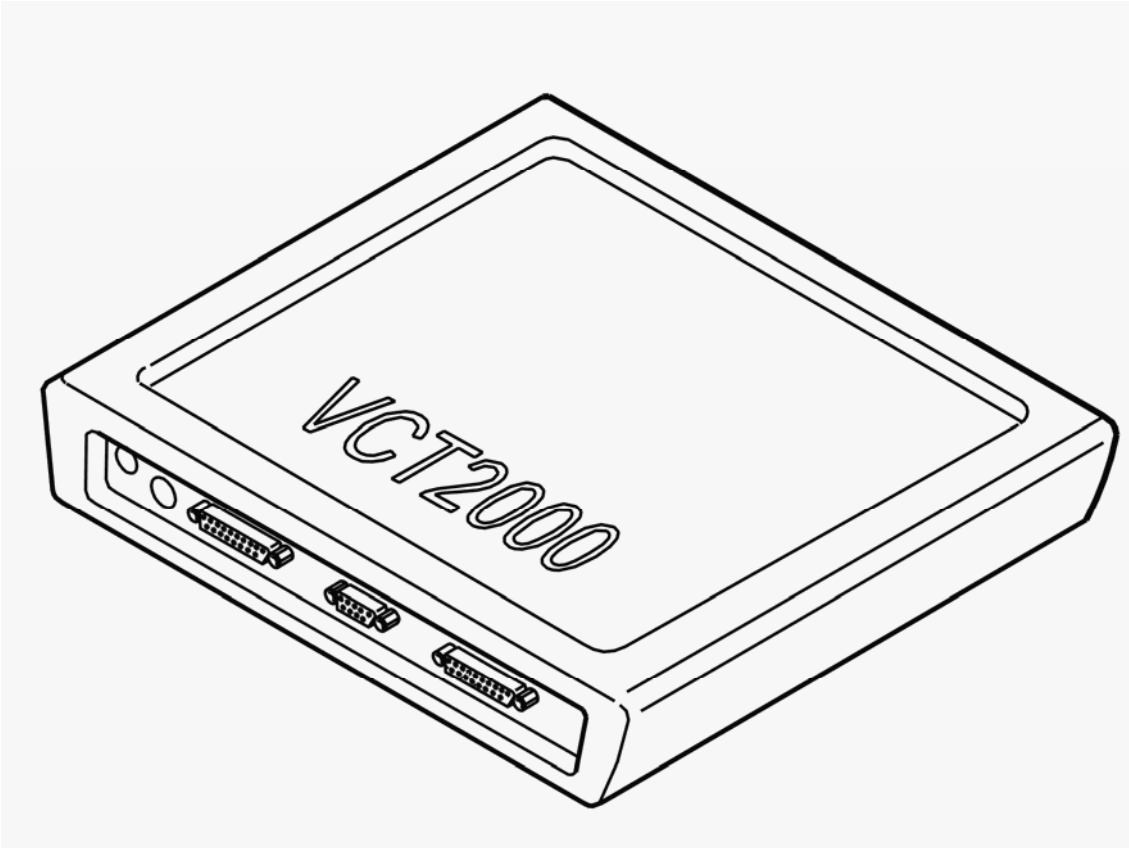


Fig. 211: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

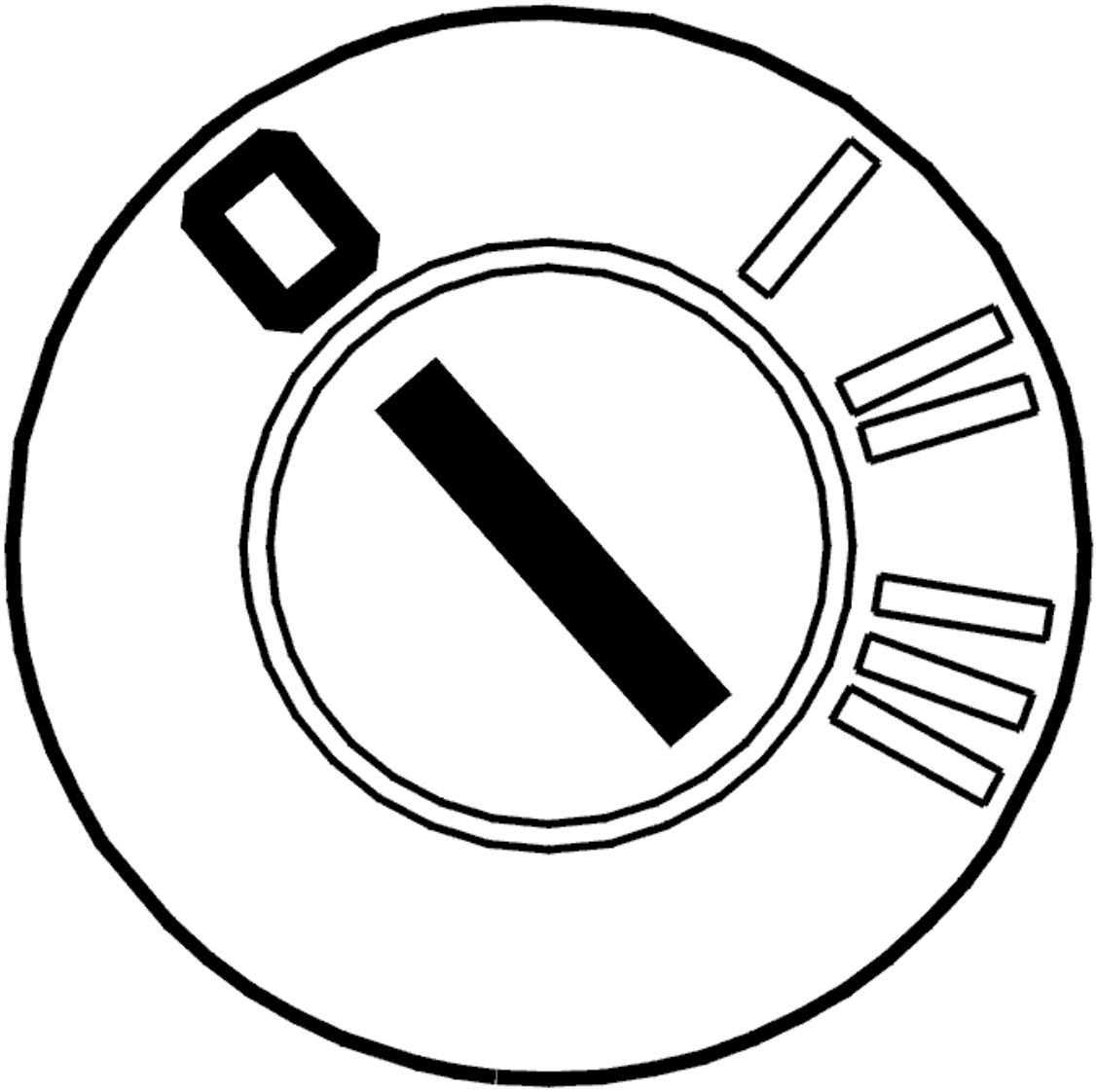


Fig. 212: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

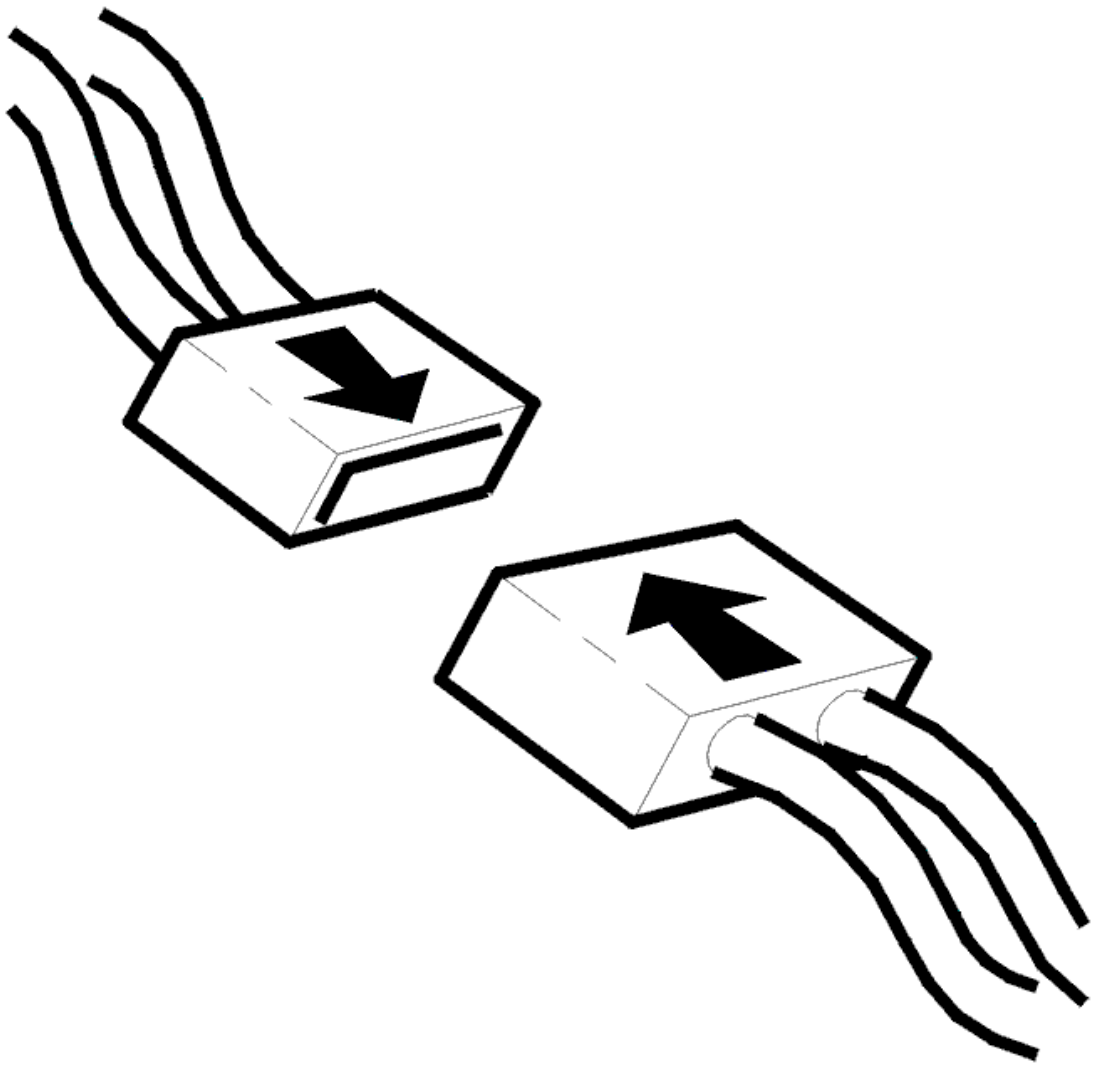


Fig. 213: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reconnect the connectors. Reinstall the components.
- Test drive the car according to **TEST DRIVE SCHEDULE, DESCRIPTION** .

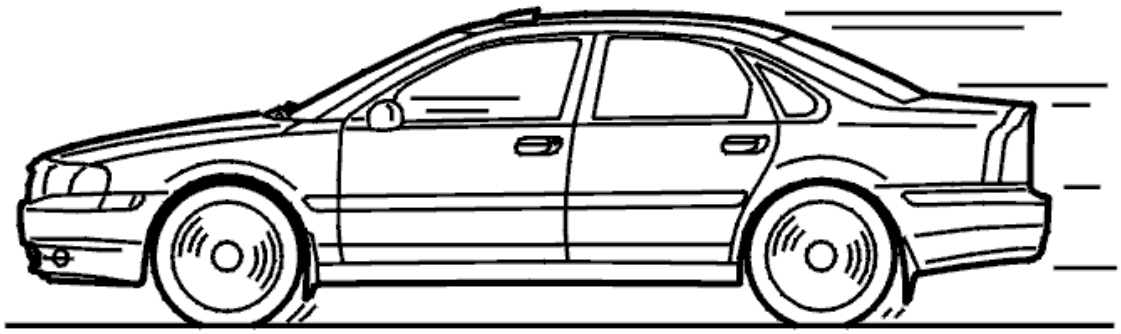


Fig. 214: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the function of the transmission OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0048: CONTROL MODULE. FAULTY SOFTWARE (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

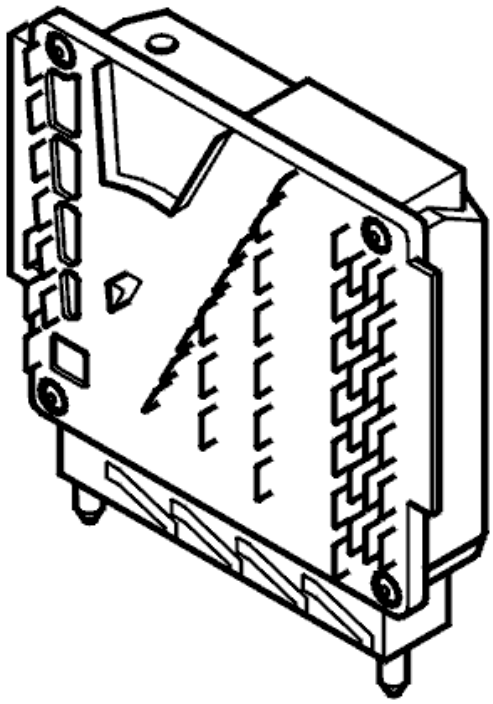


Fig. 215: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The control module software is adapted to the engine and transmission of the car. The control module must contain the correct software version in order for the transmission to function satisfactorily. Diagnostic trouble code (DTC) TCM-0048 is stored if the control module registers that the engine, transmission and software are not compatible.

Substitute Value

- The control module "Limp Home" program has been initiated.

Possible Source

- Faulty software in the transmission control module (TCM).
- Faulty transmission (installed when the transmission was replaced for example).

Fault symptom[s]

- General orange warning lamp lit.
- The malfunction indicator lamp (MIL) flashes.

FAULTY SOFTWARE

ORDERING SOFTWARE

The control module has registered an internal fault in the software. The control module can be programmed with new software. The software must be replaced to remedy the fault.

Order software according to the table below.

XC90	9438291

- **Continue**

  Refer to **PROGRAMMING THE CONTROL MODULE**

PROGRAMMING THE CONTROL MODULE

Programming can be carried out when the software has been delivered.

Program the control module according to the table below.

XC90	8691289

TCM-0048: CONTROL MODULE. FAULTY SOFTWARE (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULTY SOFTWARE

see **FAULTY SOFTWARE**

TCM-0049: CONTROL MODULE. INTERNAL FAULT. INTERMITTENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

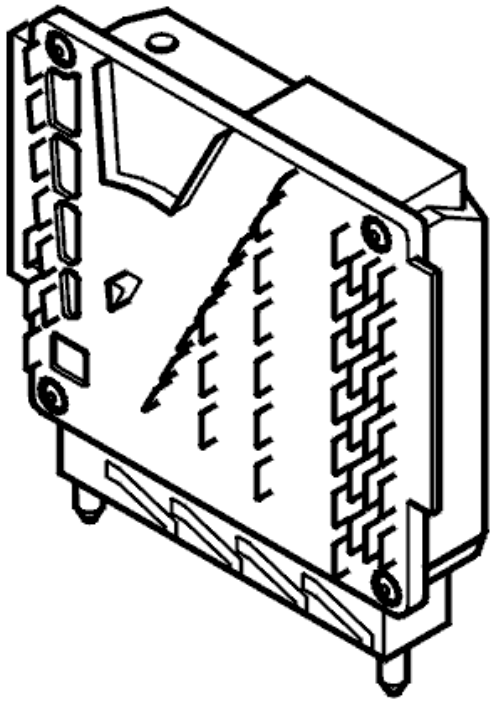


Fig. 216: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Diagnostic trouble code (DTC) TCM-0049 is stored if the control module detects a fault in the control module EEPROM memory.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Faulty software in control module.
- Internal fault in control module.

Fault symptom[s]

- No fault symptoms.

INTERNAL FAULT. INTERMITTENT FAULT

INFORMATION

The control module previously registered a fault. The fault is now no longer present.

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0049: CONTROL MODULE. INTERNAL FAULT. INTERMITTENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

INTERNAL FAULT. INTERMITTENT FAULT

see **INTERNAL FAULT. INTERMITTENT FAULT**

TCM-0049: CONTROL MODULE. INTERNAL FAULT. PERMANENT FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

INTERNAL FAULT. PERMANENT FAULT

REPLACING THE CONTROL MODULE AND PROGRAMMING

The control module has registered an internal fault.

CAUTION: A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

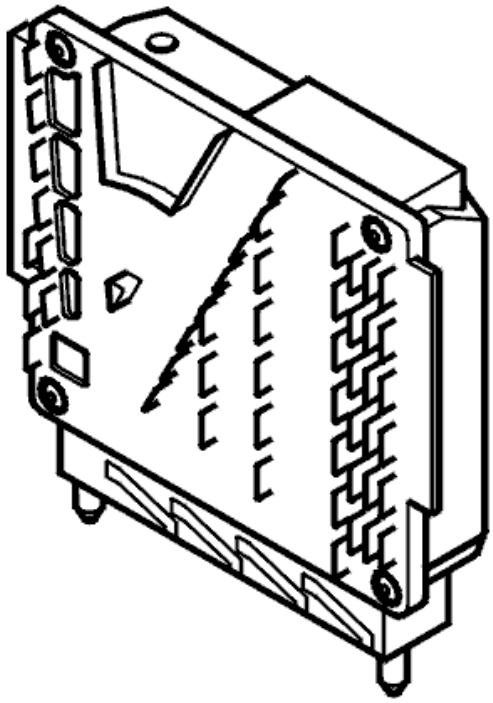


Fig. 217: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

CHECKING THE CONTROL MODULE

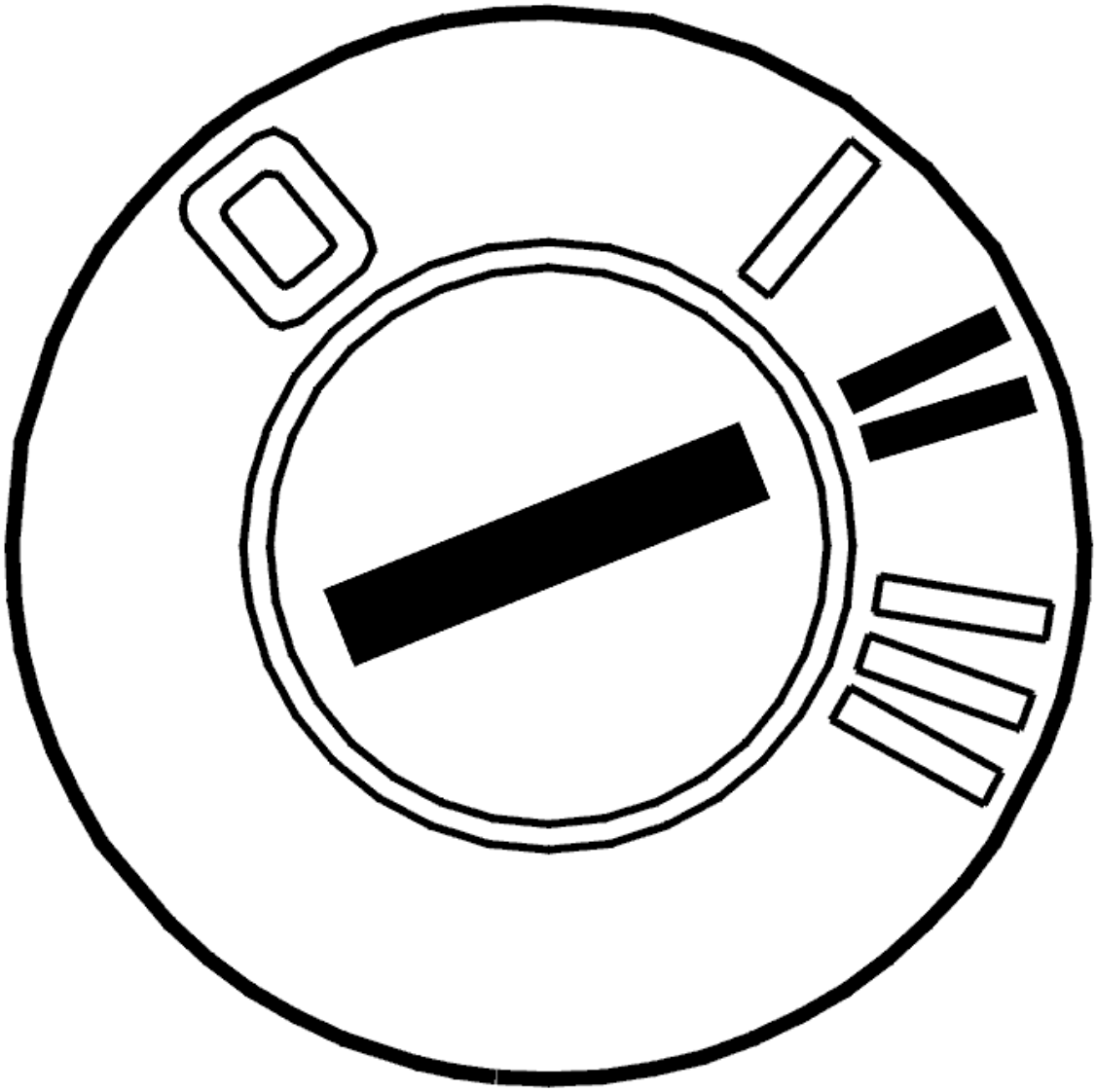


Fig. 218: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the check sum and calculated check sum.

  Check that the check sums correspond.

  If they do not correspond this indicates an internal fault in the control module.

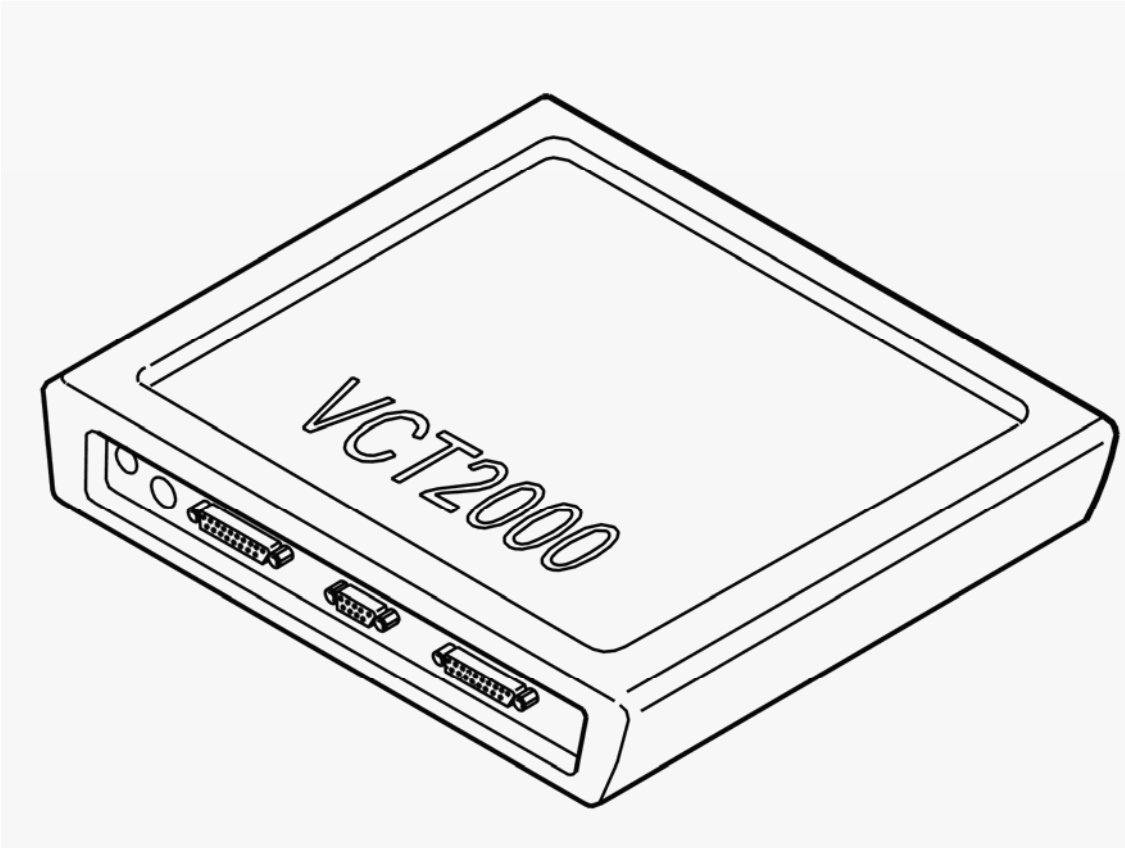


Fig. 219: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

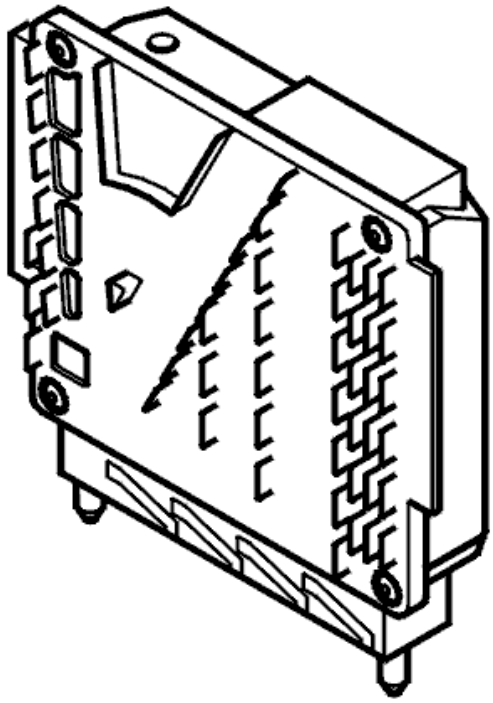


Fig. 220: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Are the values correct?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **REPLACING THE CONTROL MODULE AND PROGRAMMING**

TCM-0049: CONTROL MODULE. INTERNAL FAULT. PERMANENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

INTERNAL FAULT. PERMANENT FAULT

see **INTERNAL FAULT. PERMANENT FAULT**

TCM-0050: SOLENOID SL. JAMMED (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

The control module checks if lock-up solenoid SL is stuck in the open or closed position by comparing the signals from solenoid SL and lock-up pressure sensor PS4. Pressure sensor PS4 detects whether solenoid SL is activated or not. Diagnostic trouble code (DTC) TCM-0050 is stored if the control module registers that solenoid SL has jammed in the open position.

Substitute Value

- The control module does not activate the lock-up solenoid.

Possible Source

- Lock-up solenoid SL has stuck in the open position
- Mechanical fault in the transmission control system
- Defective solenoid SL.

Fault symptom[s]

- General orange warning lamp lit
- No lock-up function.

STUCK

CHECKING THE FUNCTION OF THE TRANSMISSION

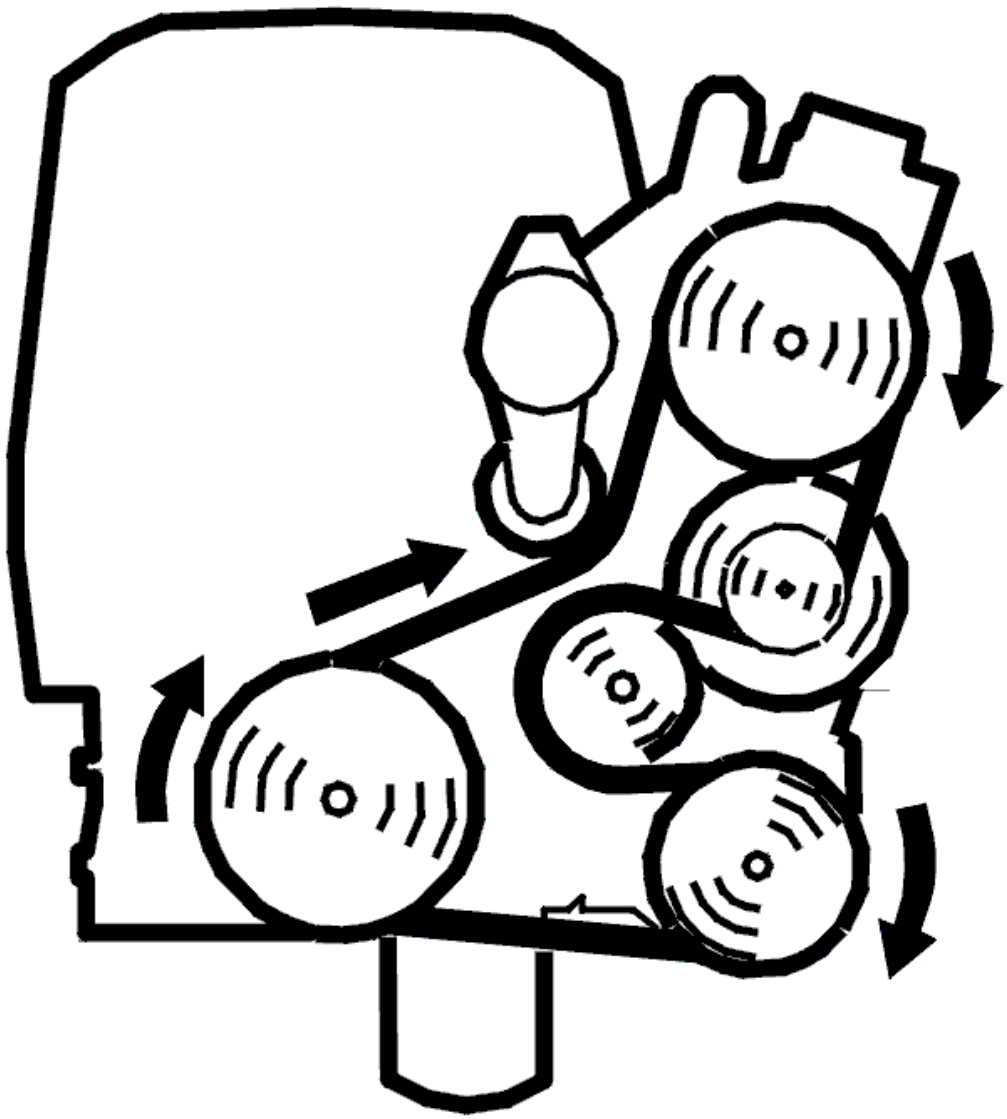


Fig. 221: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Ensure that the car is fully braked
- Move the gear selector to position D
- Press the "Winter" mode button.

HINT: The "Winter" mode activates second gear.

Check that the engine speed (RPM) drops considerably when "Winter" mode is engaged.

HINT: If the engine speed (RPM) drops considerably, the lock-up function is engaged.

Did the engine speed (RPM) drop dramatically?

- **YES**

  Refer to **REPLACING THE CONTROL SYSTEM**

- **NO**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING SOLENOID SL

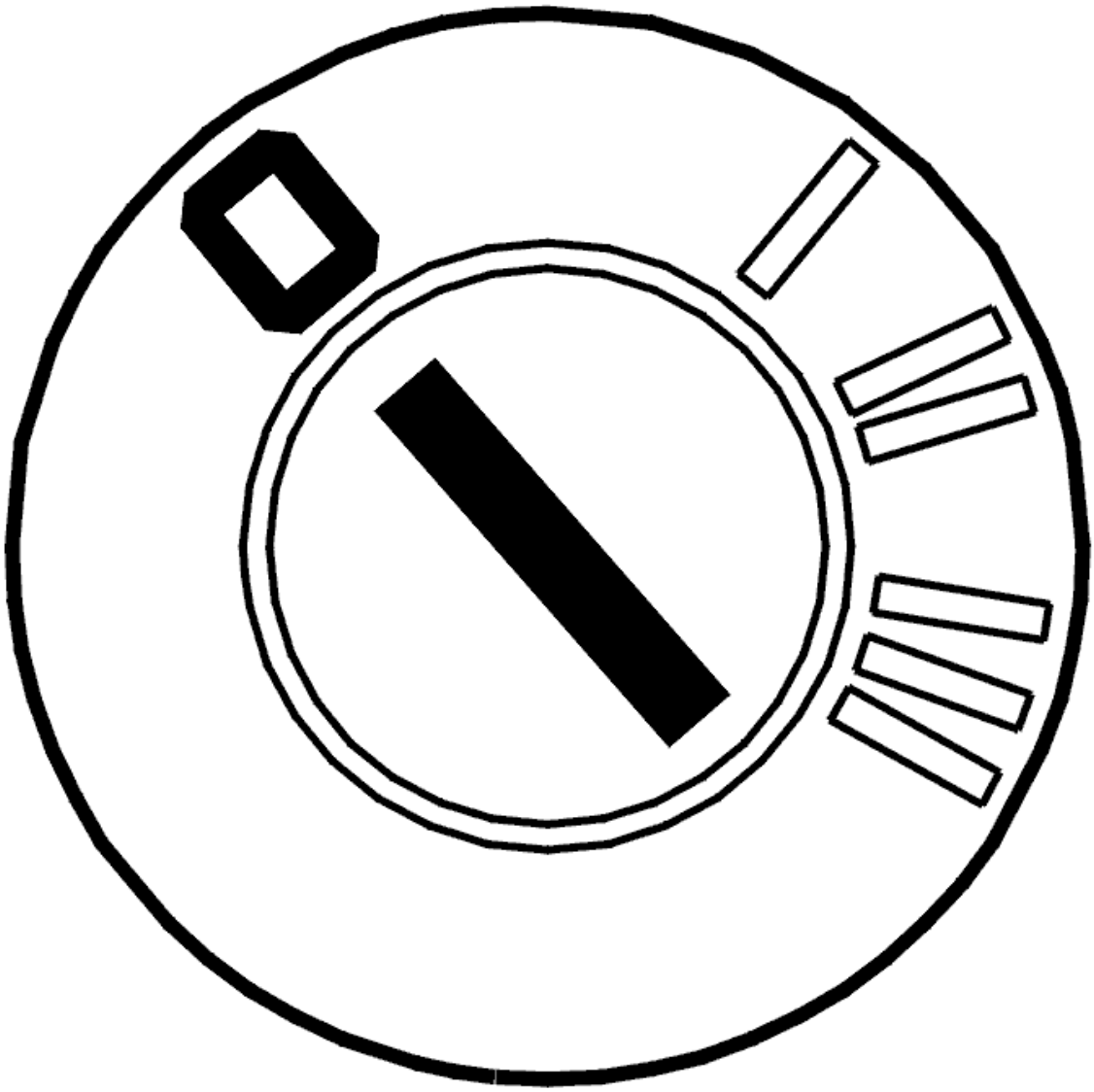


Fig. 222: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the control module connector (transmission side).

Check solenoid SL by measuring the resistance between terminals #A51 (#A51) and #A53 (#A53).

When the transmission is cold (20°C), the resistance must be 10-11 ohms. When the transmission is at operating temperature (150°C), the resistance must not exceed 16 ohms.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- For information about signals, see **SIGNAL SPECIFICATION** .

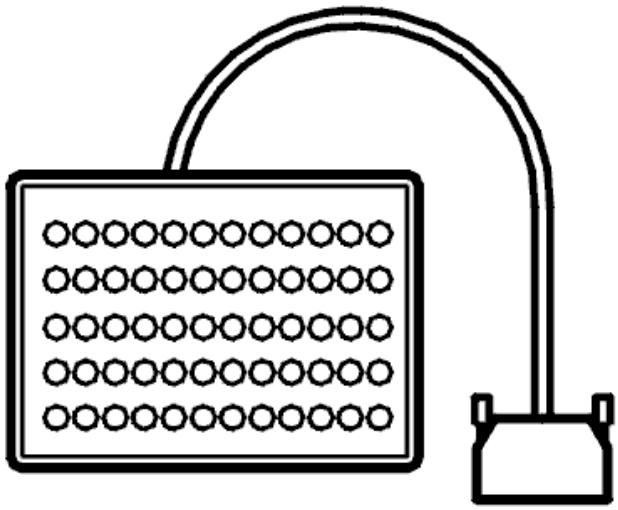


Fig. 223: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

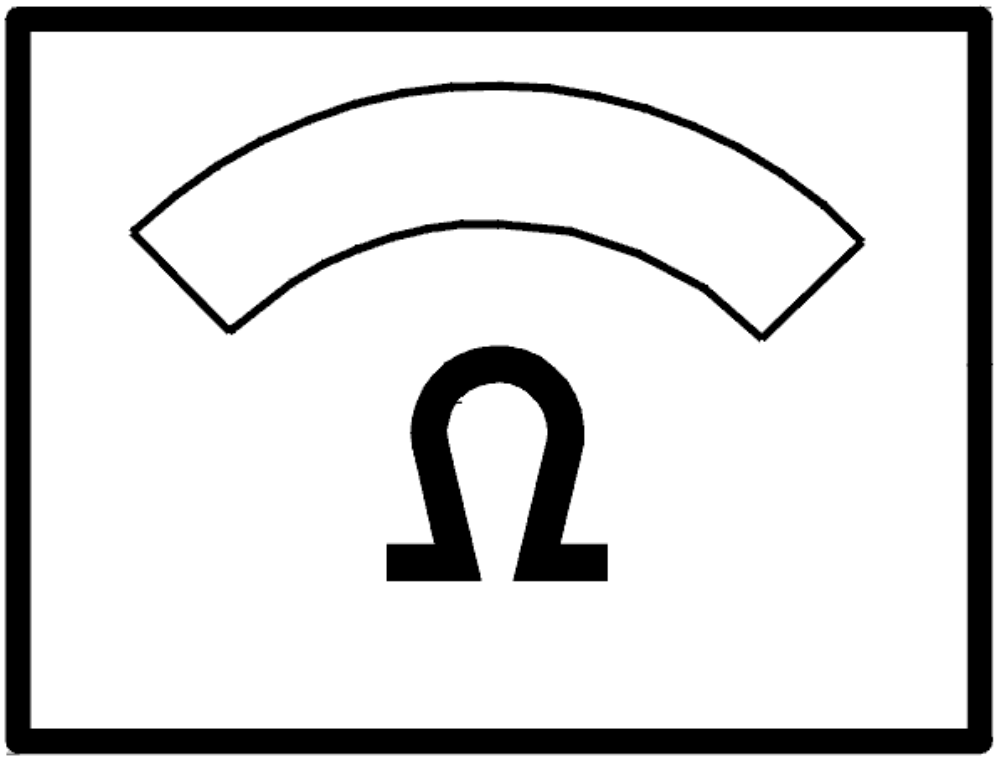


Fig. 224: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

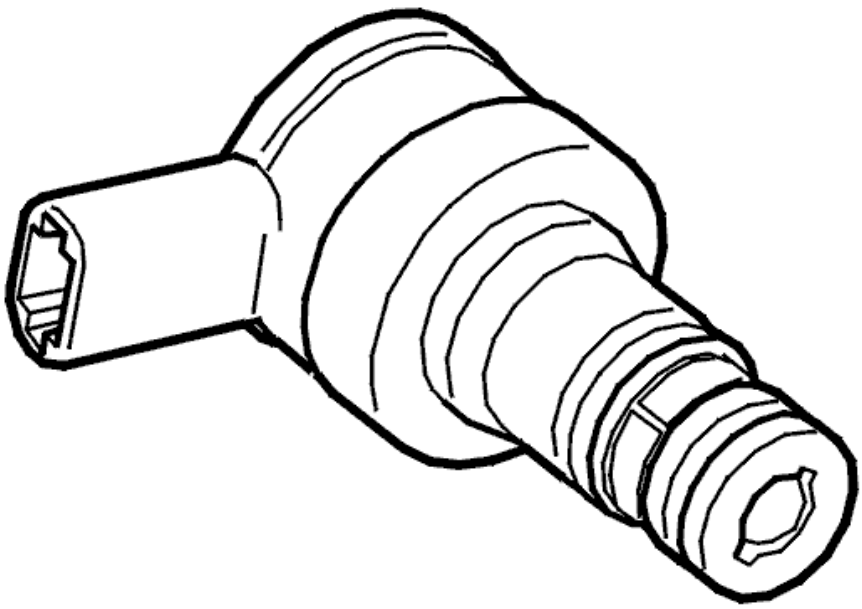


Fig. 225: Identifying Lock-Up Solenoid, SL
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE TRANSMISSION FLUID**

- **NO**

  Refer to **CHECKING THE WIRING**

CHECKING THE TRANSMISSION FLUID

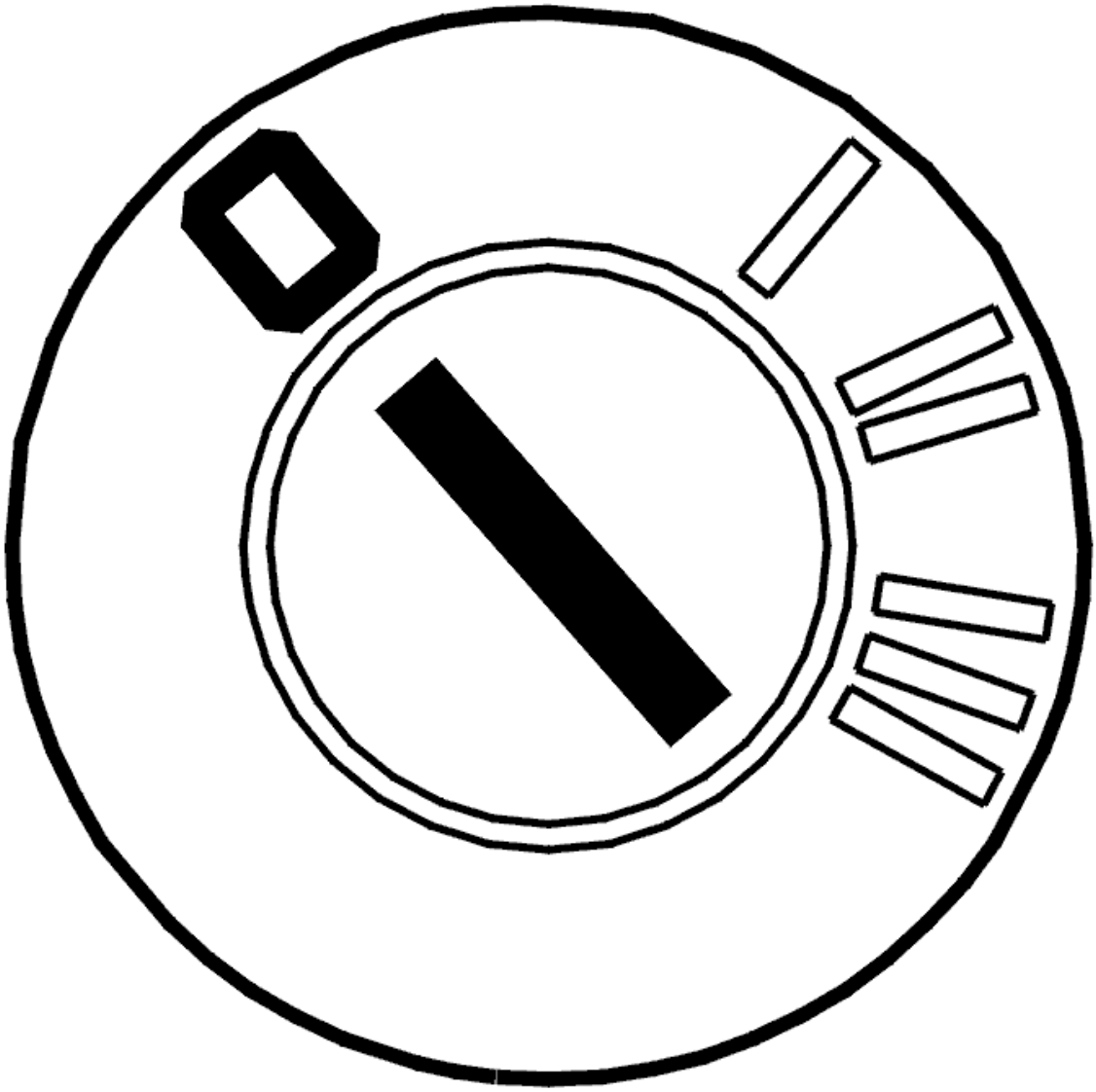


Fig. 226: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Remove the transmission oil trough according to **TRANSMISSION OIL / OIL FILTER, REPLACING** . Check the transmission oil and filter. Check for **abnormal** amounts of particles in the oil.

  Large amounts of particles in the oil trough and filter indicate that there is an internal fault in the transmission and that the transmission must be replaced. If there are small amounts of particles in the oil trough and filter, the transmission control system should be replaced.

  Select an alternative

  1. Large amounts particles in the oil trough and filter

Refer to **REPLACING THE TRANSMISSION**

2. Small amounts particles in the oil trough and filter.

   Refer to **REPLACING THE CONTROL SYSTEM**

CHECKING THE WIRING

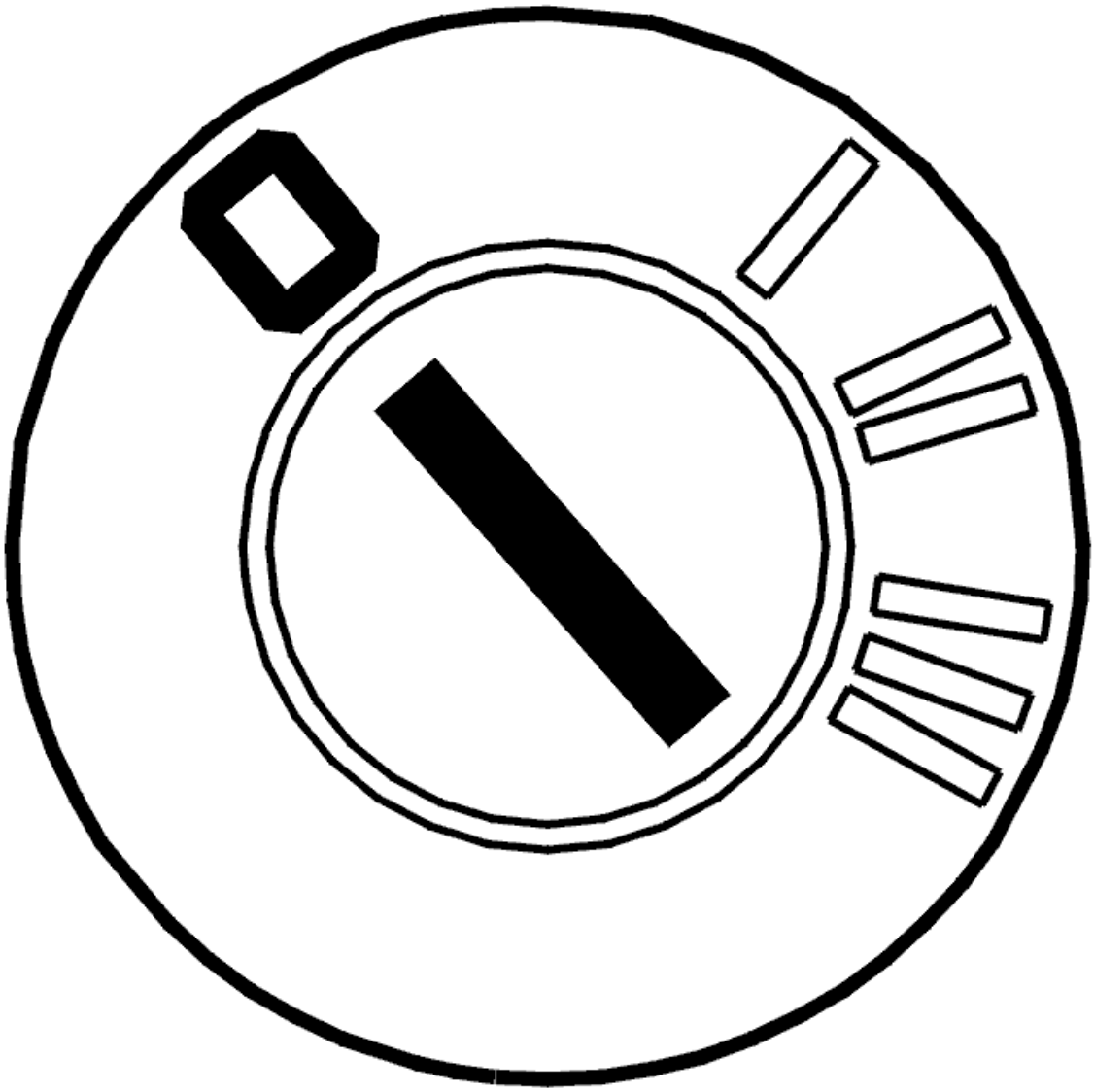


Fig. 227: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

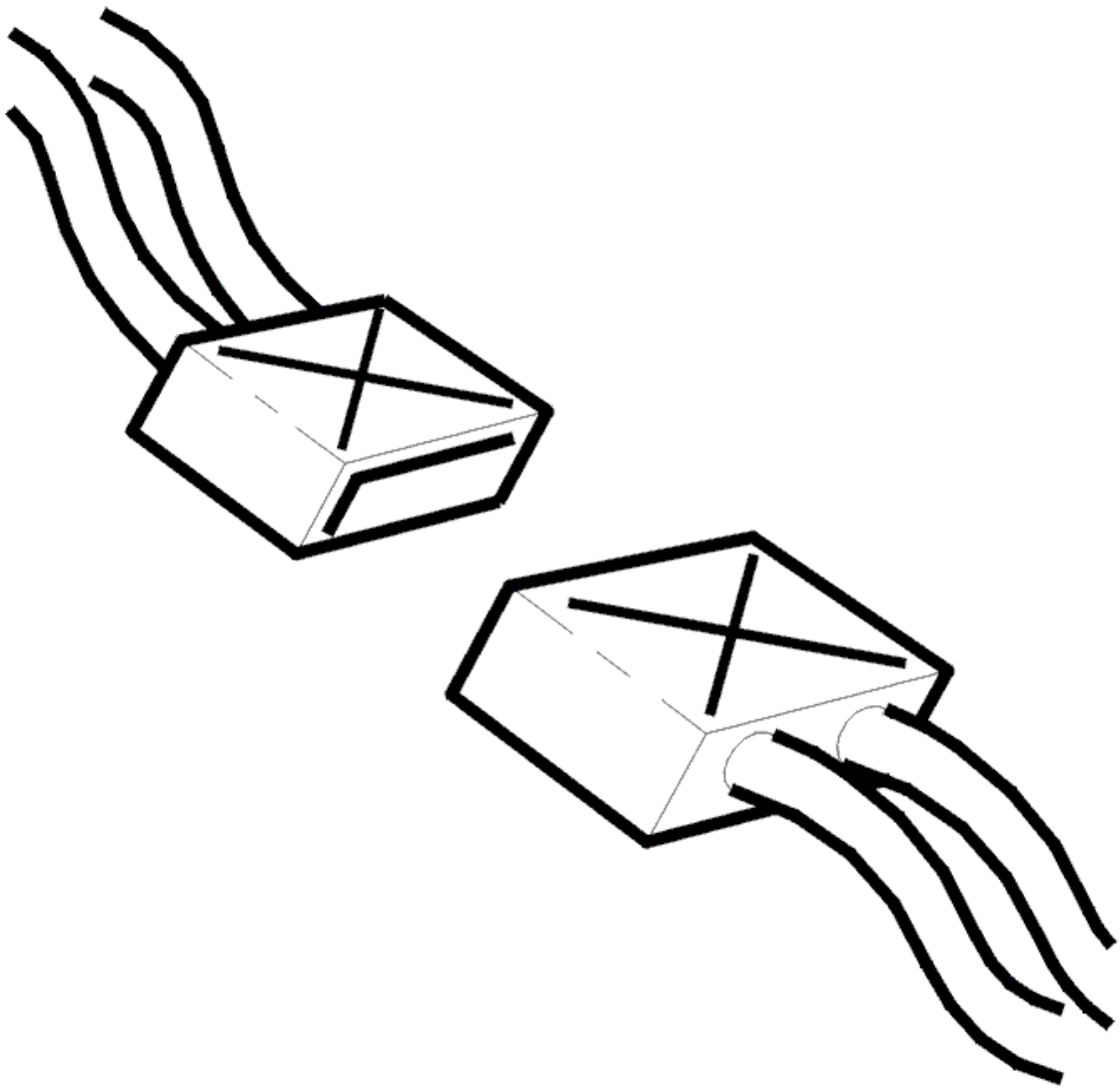


Fig. 228: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

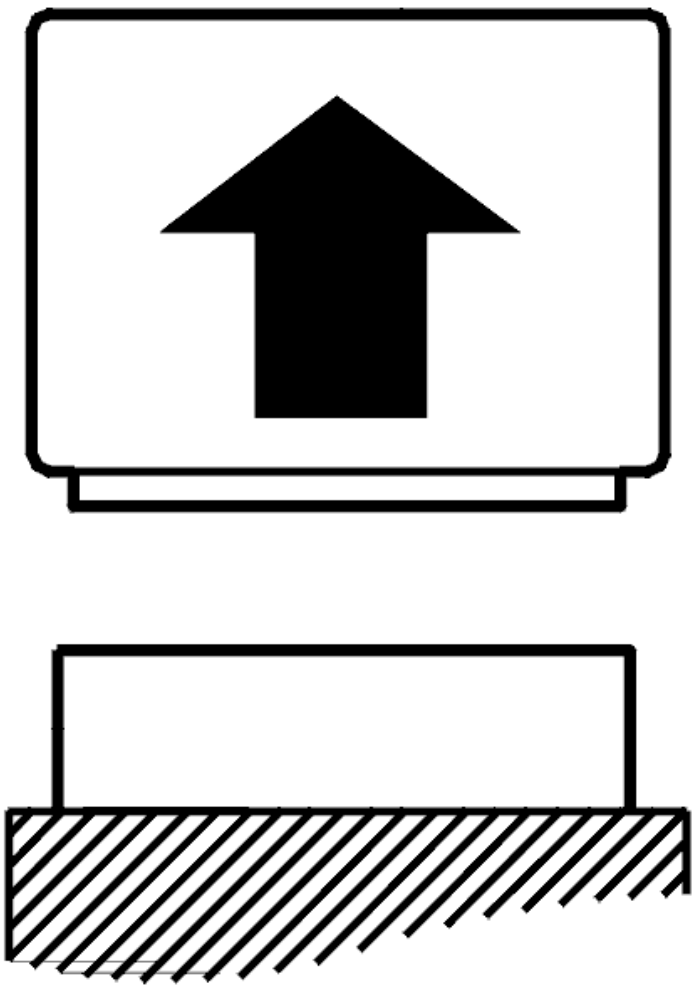


Fig. 229: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Control module disconnected
- Connect the breakout box to the control module connector (transmission side)
- Disconnect the transmission connector
- Adapter see **9511505** and breakout box see **9511428** connected to the transmission connector (control module side).

  Check the wiring between control module terminal #A51 (#A51) and transmission connector terminal #T (#A17). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

  Check the wiring between control module terminal #A53 (#A53) and transmission connector terminal #E

(#A5). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

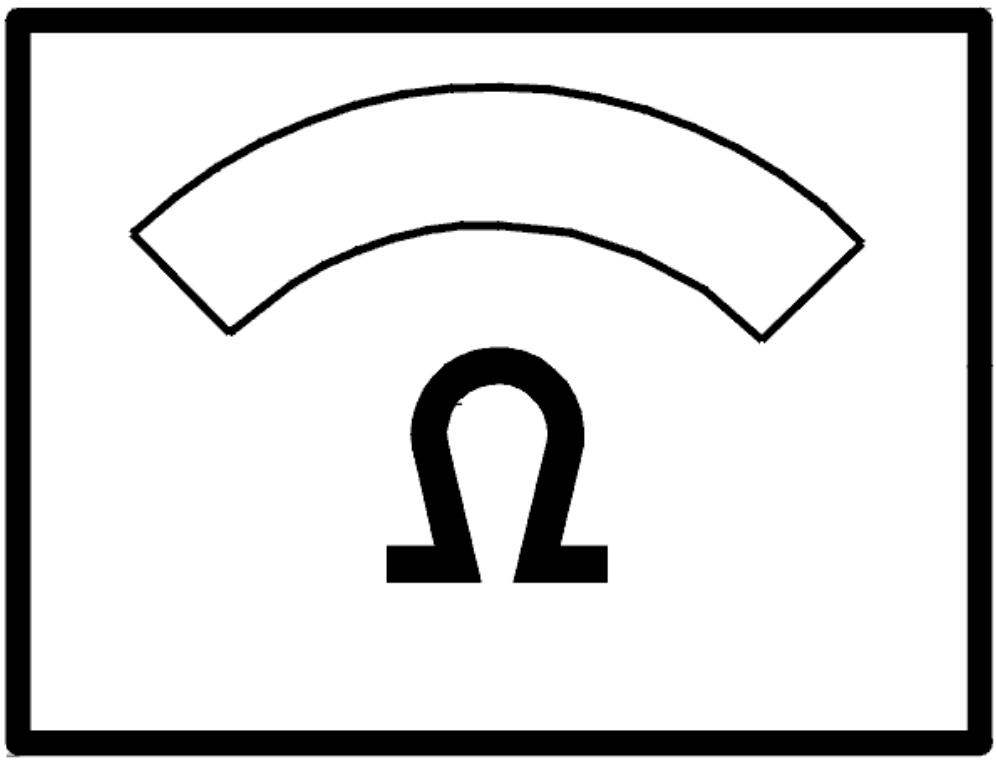


Fig. 230: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

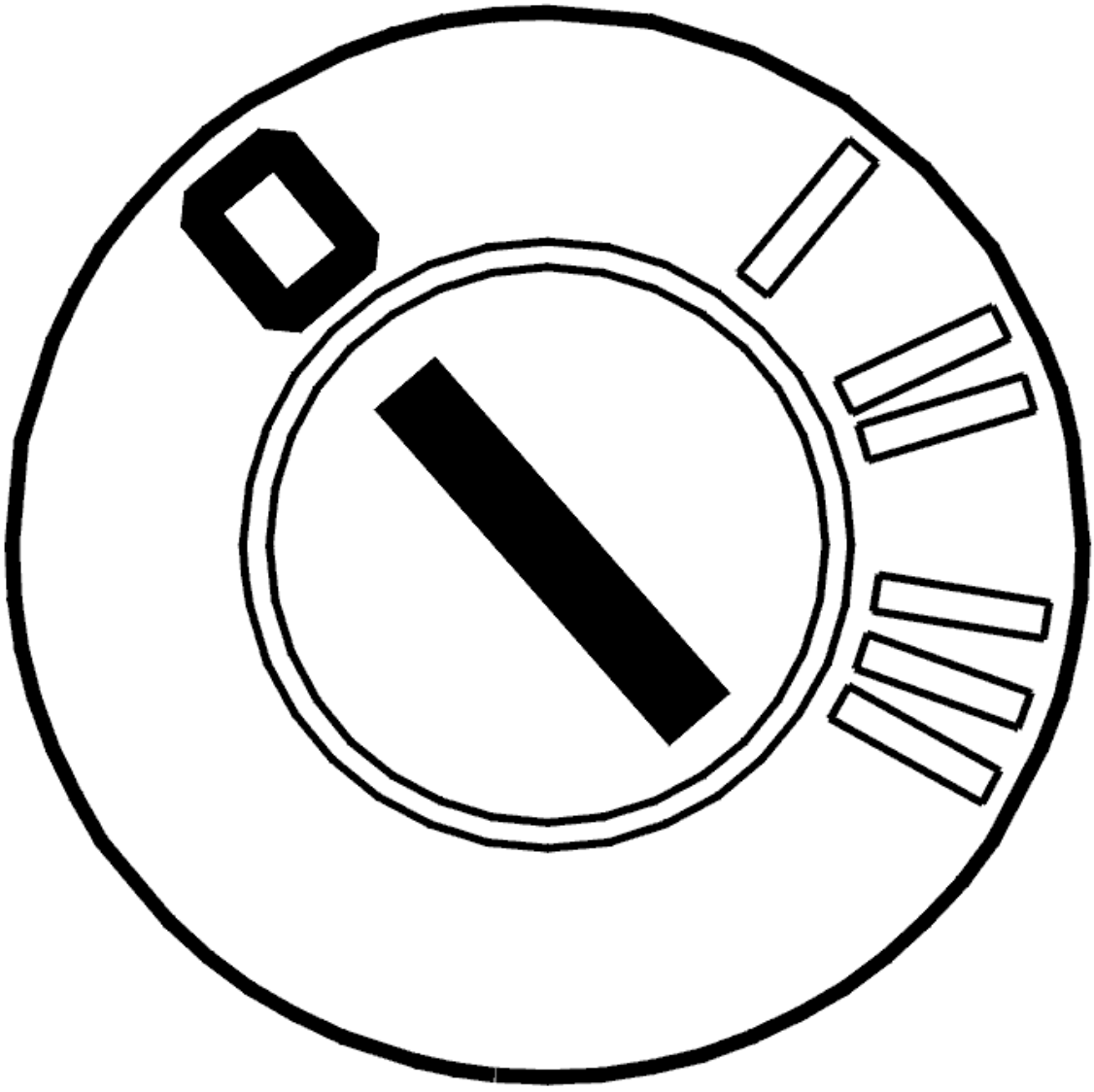


Fig. 231: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off

- Open the transmission control system
- Connect adapter see **9511505** and breakout box see **9511428** to the transmission connector (transmission side).

Check the cable between transmission connector terminal #T (#A17) and solenoid SL terminal #A. Check the cable between transmission connector terminal #E (#A5) and solenoid SL terminal #B. Check these cables for an open-circuit.

HINT: Check solenoid SL by measuring the resistance between solenoid SL terminals #A and #B. When the transmission is cold (approximately 20°C), the resistance must be 10-11 ohms.

Remedy as necessary.

Other information:

- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** or To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid SL, see **SOLENOID LOCK-UP FUNCTION, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

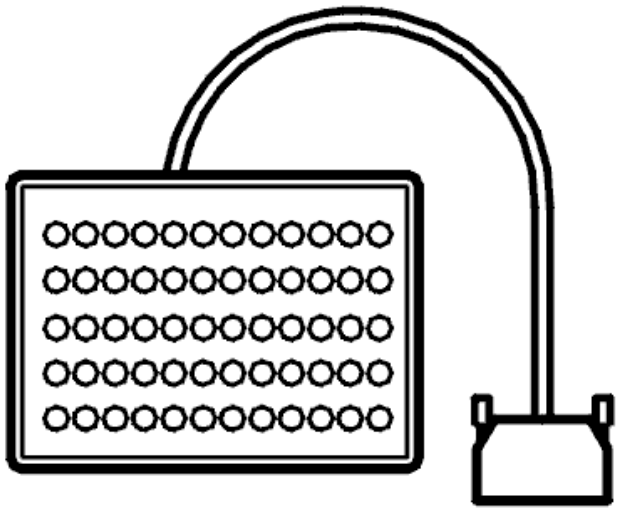


Fig. 232: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

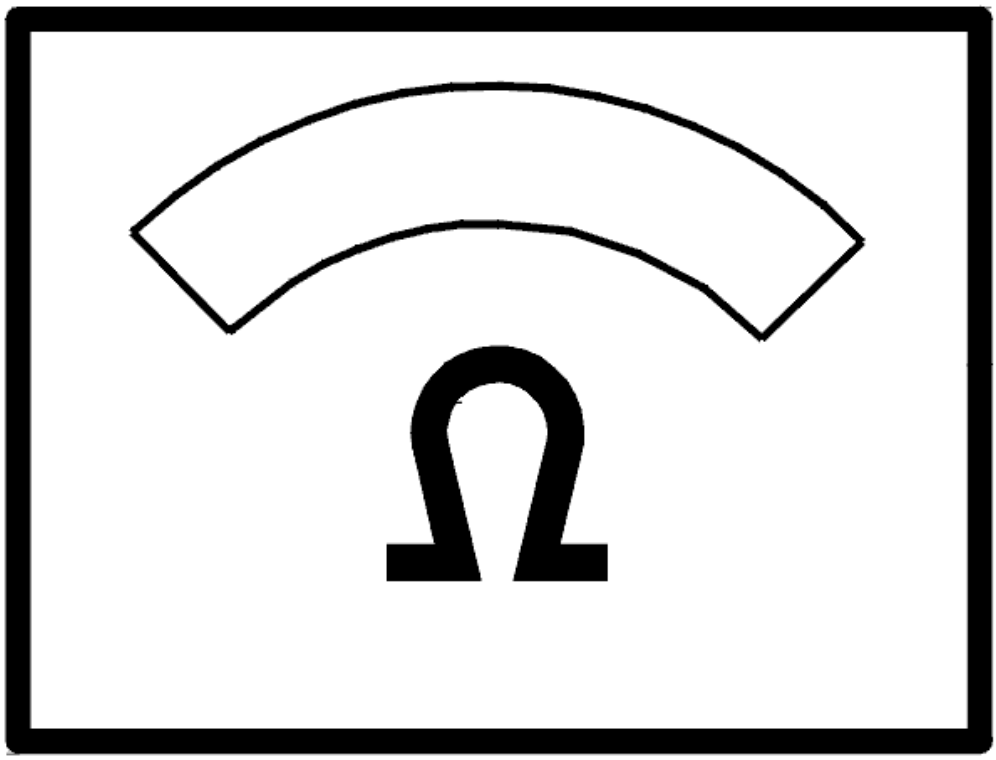


Fig. 233: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

REPLACING THE TRANSMISSION

Fault-tracing indicates a fault in the transmission. Replace the transmission.

Other information:

- To remove the transmission, see **TRANSMISSION, REMOVING**
- To install the transmission, see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .

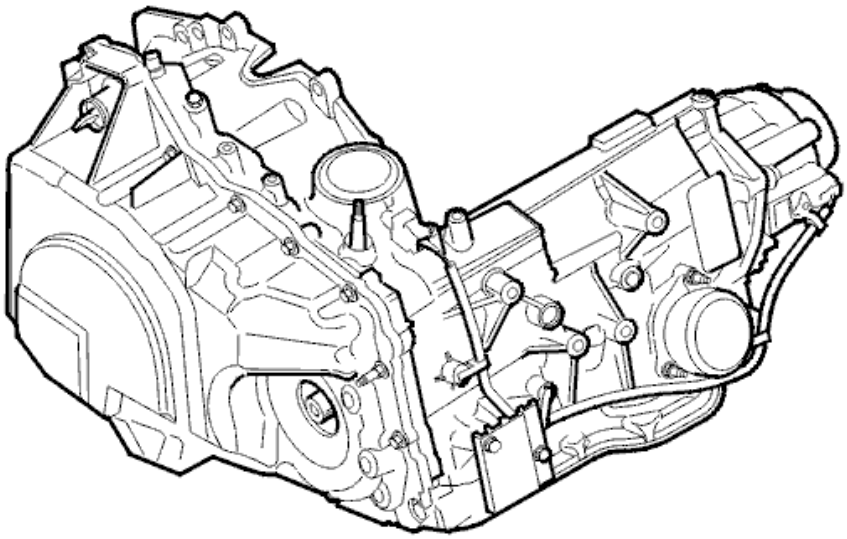


Fig. 234: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

FAULT-TRACING INFORMATION

The fault-tracing indicates that the control module has previously detected a fault but that the fault is no longer active.

REPLACING THE CONTROL SYSTEM

Fault-tracing indicates a fault in the transmission control system. Replace the control system.

Other information:

- To replace the control system, For removal, see **CONTROL SYSTEM/VALVE HOUSING, REMOVING** and To install, see **CONTROL SYSTEM / VALVE HOUSING, INSTALLING** .

- **Continue**

Refer to **RESETTING THE ADAPTATION**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

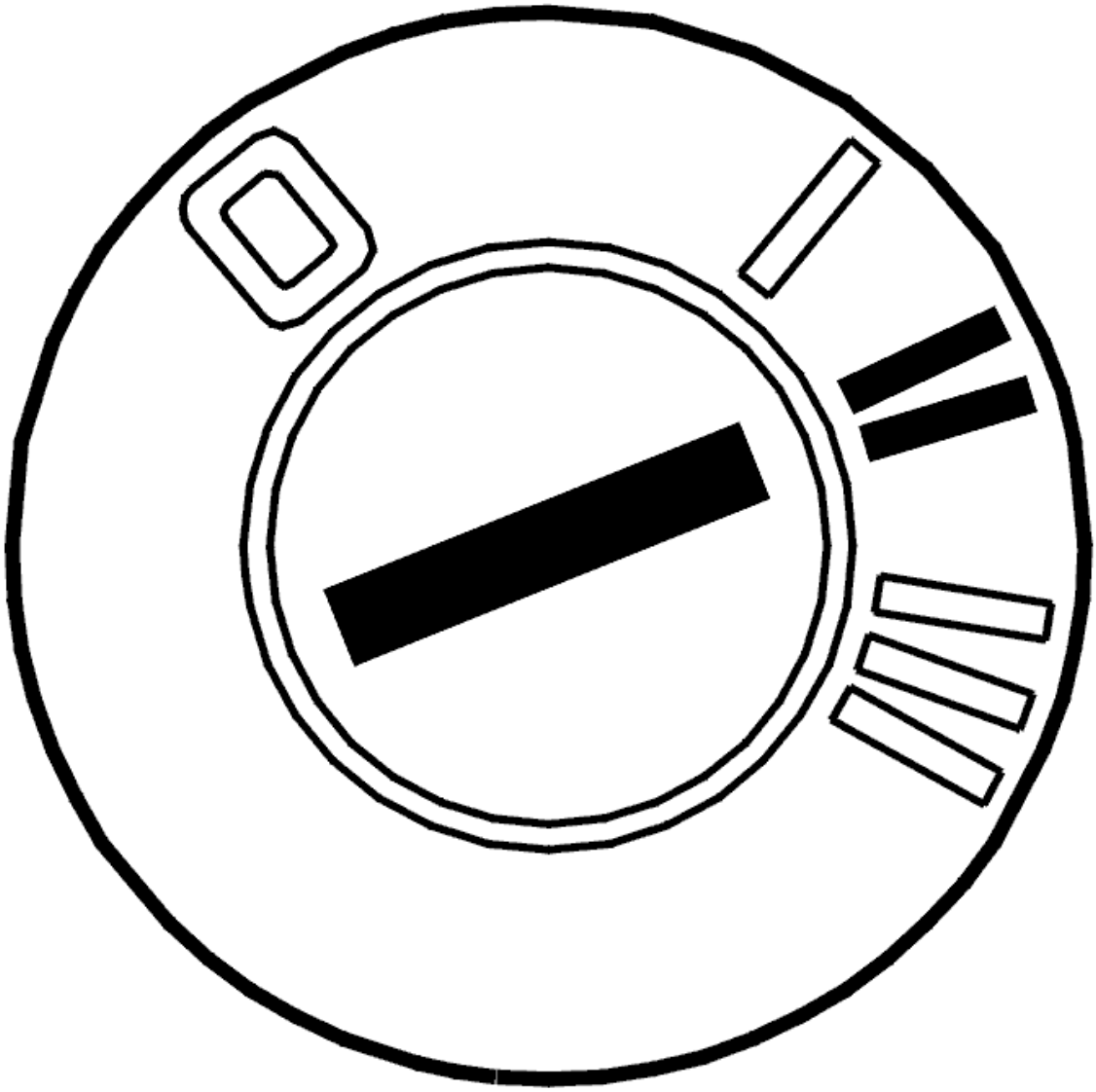


Fig. 235: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-0050 are stored, these must be fault-traced and remedied after this fault-tracing is completed.

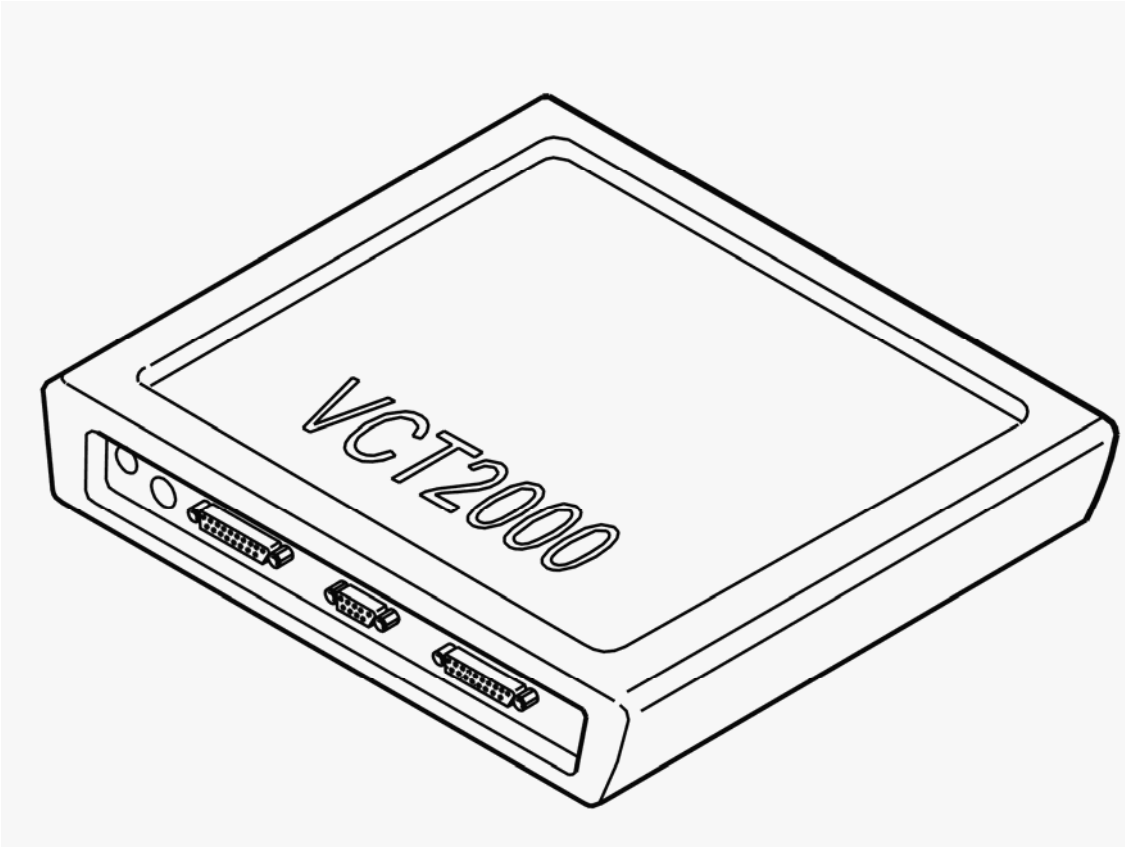


Fig. 236: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **ERASING DIAGNOSTIC TROUBLE CODES (DTCS)**

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

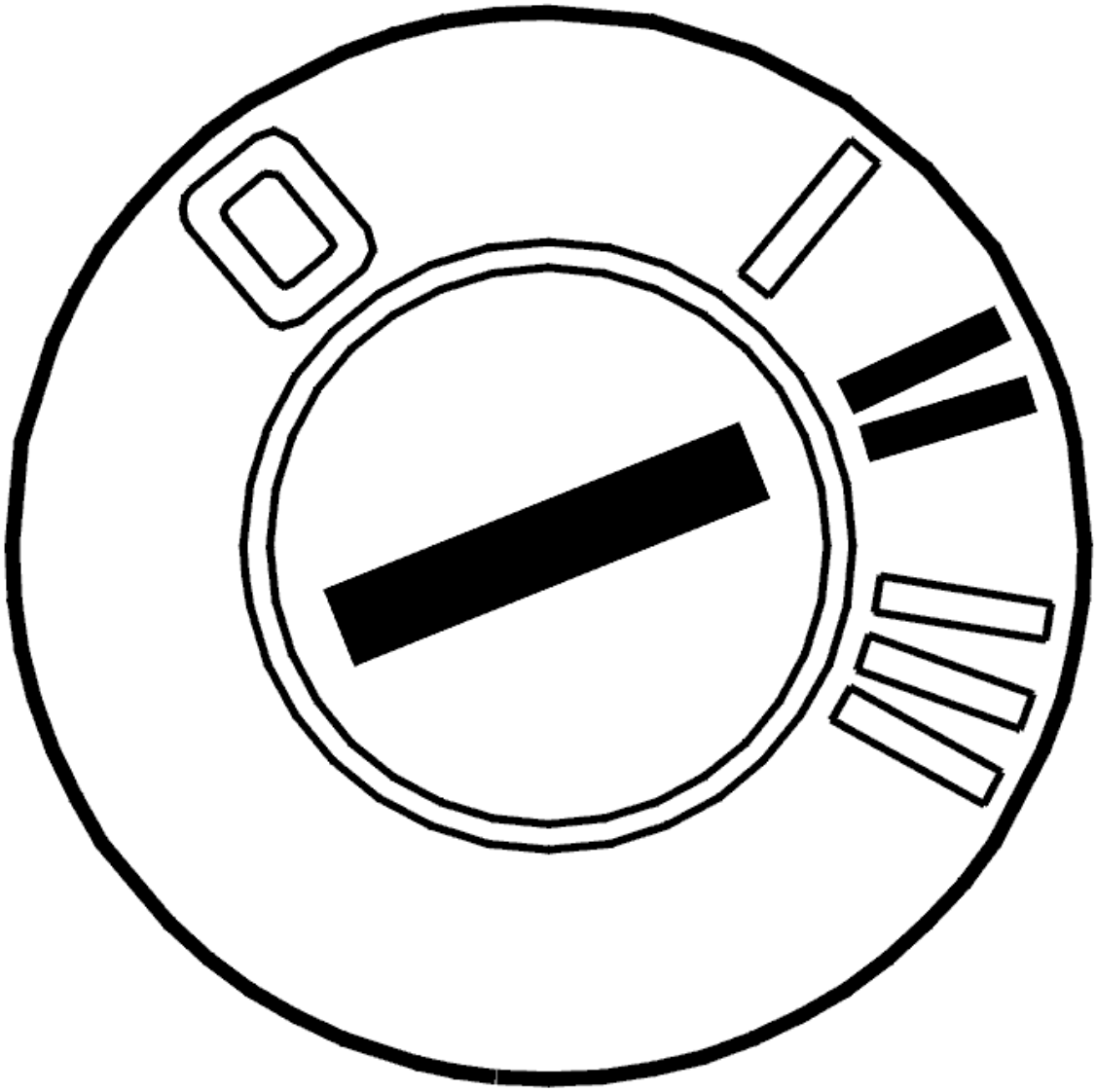


Fig. 237: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

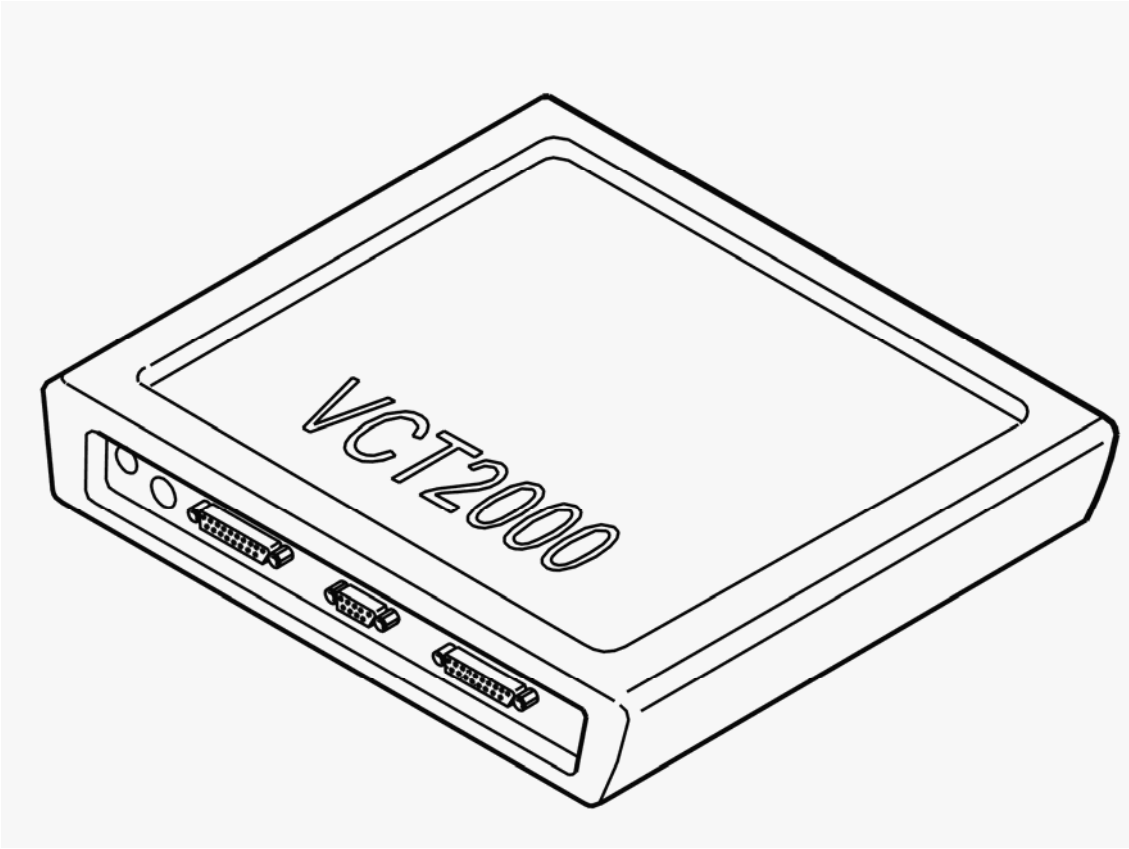


Fig. 238: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE SOFTWARE**

TEST DRIVING

NOTE: **Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.**

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

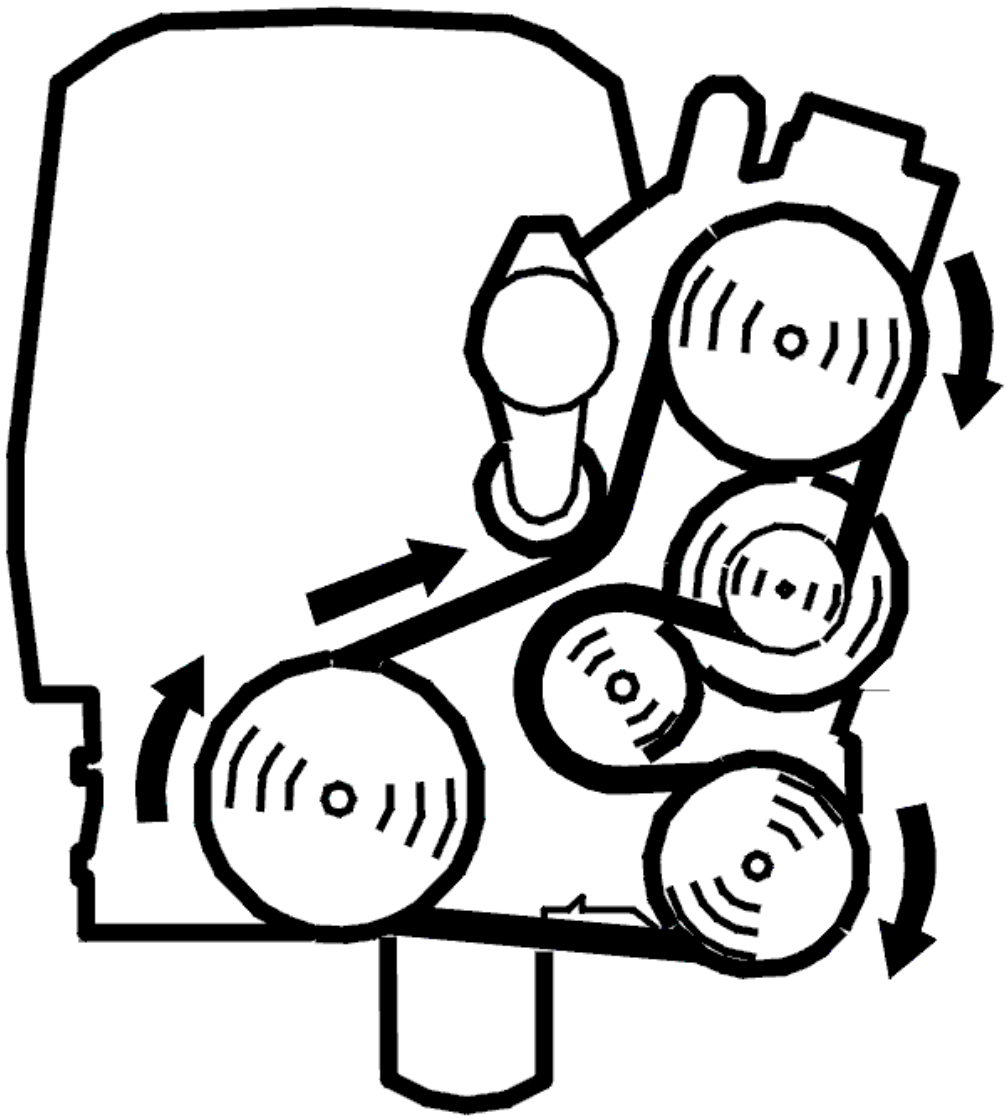


Fig. 239: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect the VIDA station. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission fluid should be at operating

temperature, approximately 80-90°C.

Shift the gear selector to position D. Carefully accelerate to 50-65 km/h. Maintain the same speed for more than 20 seconds.

Criteria for diagnostic trouble code (DTC):

- The transmission fluid temperature must exceed 30°C
- The engine must be running for at least 20 seconds
- Gear selector in position D, 3 or 2 (4T65EV).

  Gear selector in Geartronic position and gears 4, 3 or 2 (4T65EV-GT)

- Speed 50-65 km/h for at least 5 seconds.

  HINT: The car must be driven at an engine speed where the lock-up function is not normally activated.

- At least 5 seconds since the last gear shift
- Positive engine torque (no engine braking).

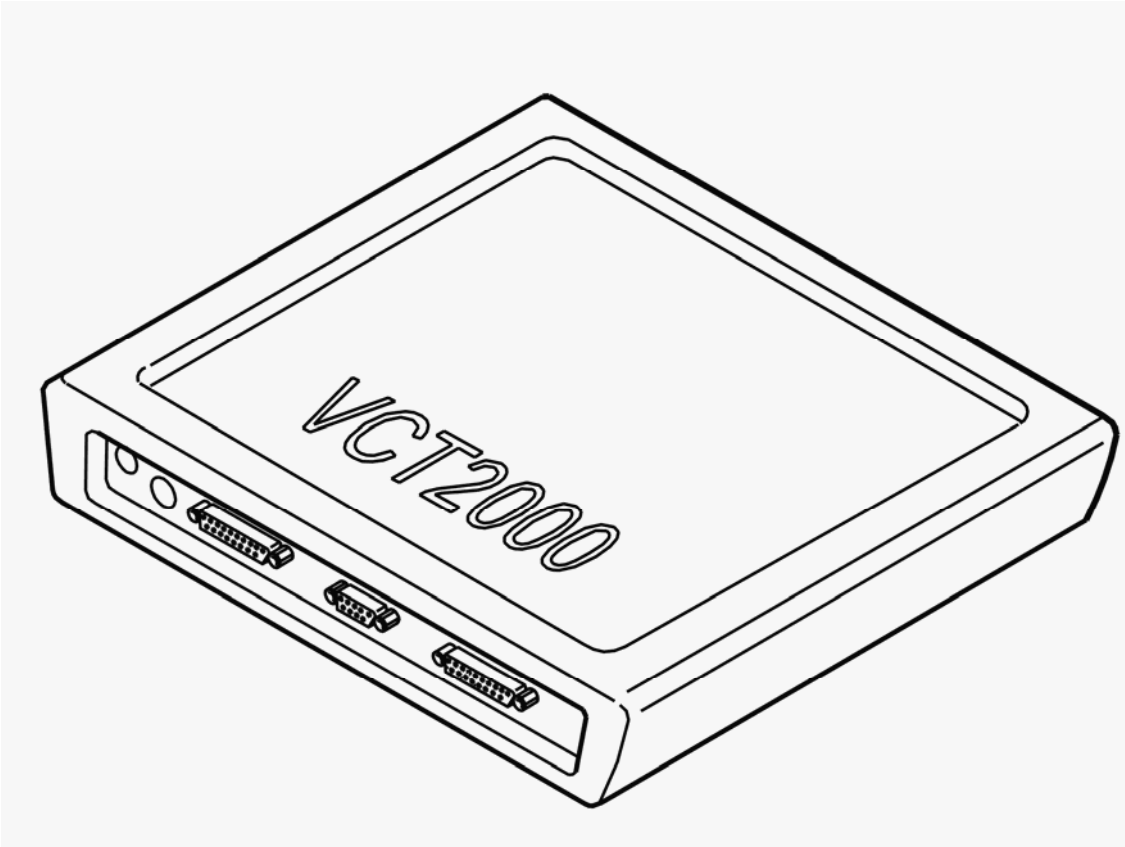


Fig. 240: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

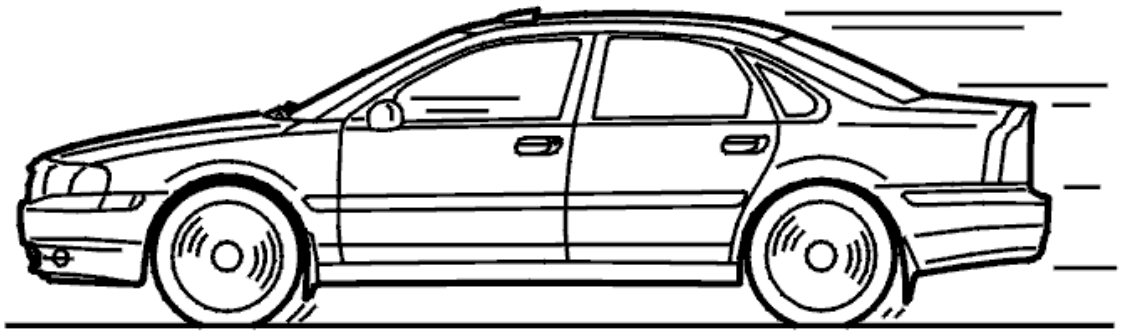


Fig. 241: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

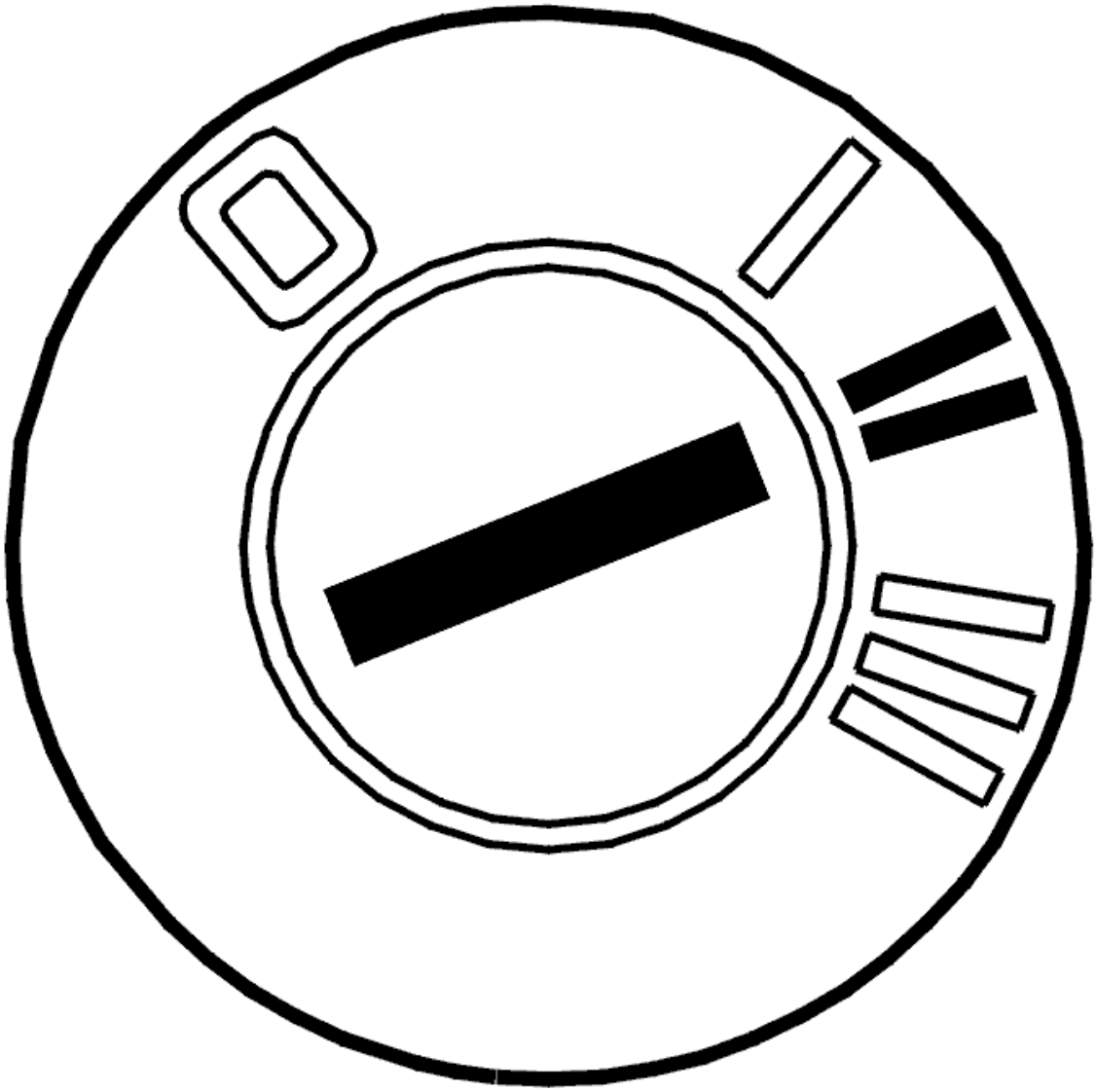


Fig. 242: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-0050 are stored, these must be fault-traced and remedied after this fault-tracing is completed.

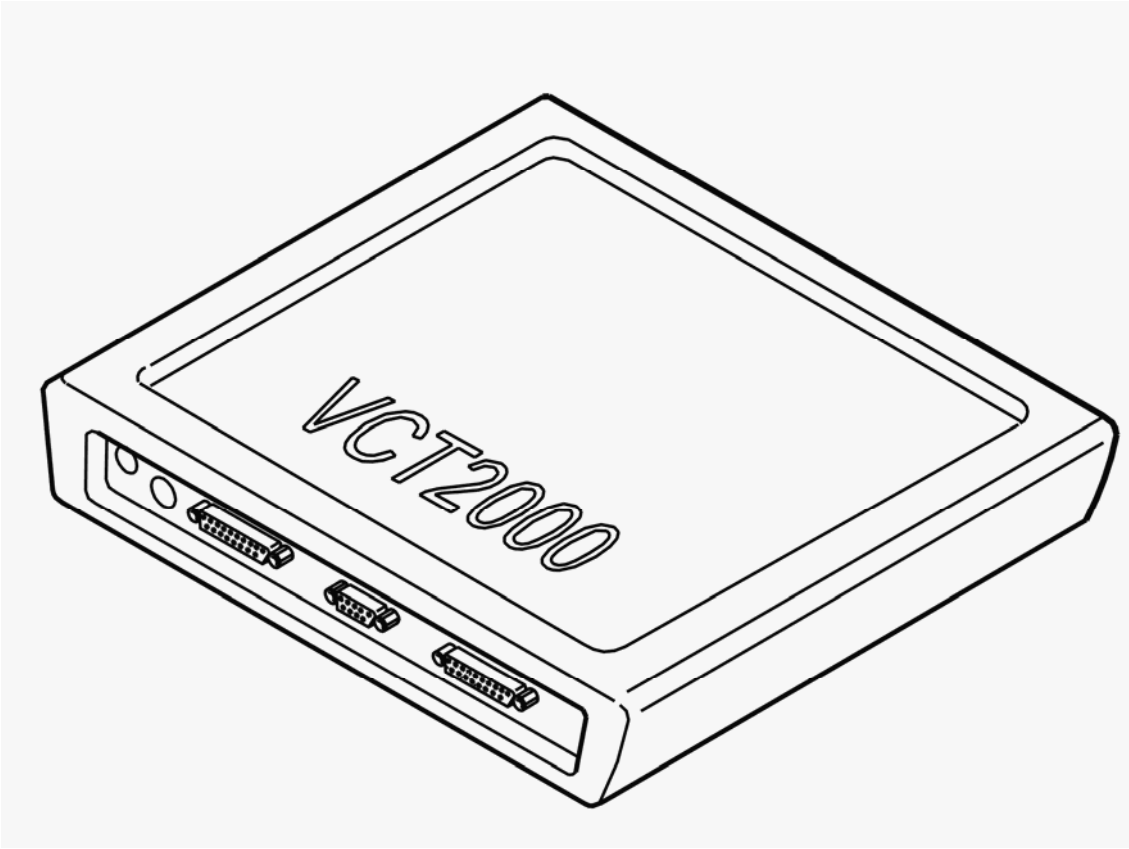


Fig. 243: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was diagnostic trouble code (DTC) TCM-0050 stored?

- **YES**

  Refer to **CHECKING SOLENOID SL**

- **NO**

  Refer to **FAULT-TRACING INFORMATION**

CHECKING THE SOFTWARE

CHECKING THE SOFTWARE

NOTE: To carry out fault-tracing, the transmission control module (TCM) must be programmed with specific software.

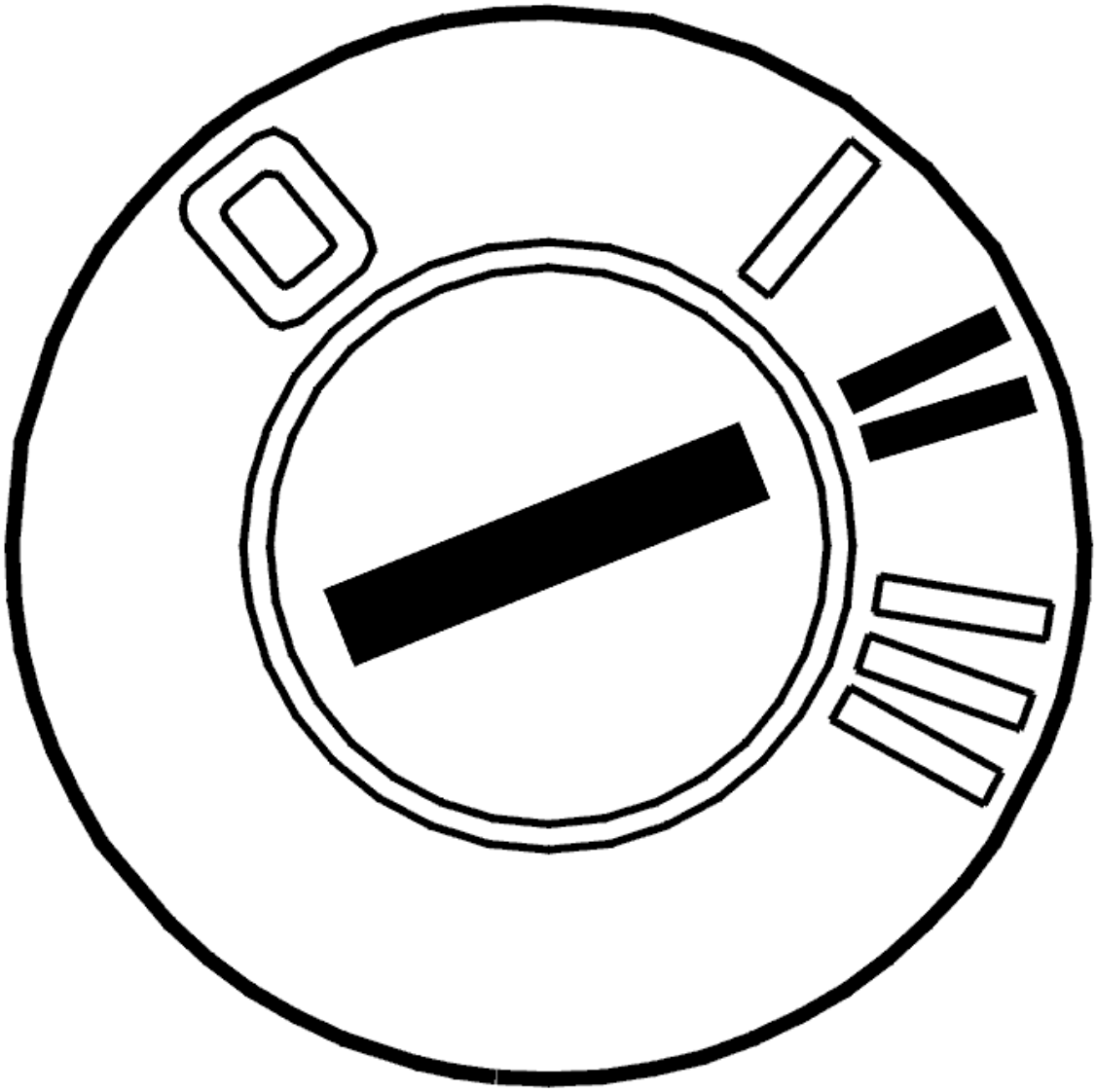


Fig. 244: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the control module diagnostic number.

  Check the read off diagnostic number against the diagnostic numbers given in the center table.

  If the diagnostic number is included in the table, the control module must be programmed with the latest software.

  See the technical journal for information about the most recent software.

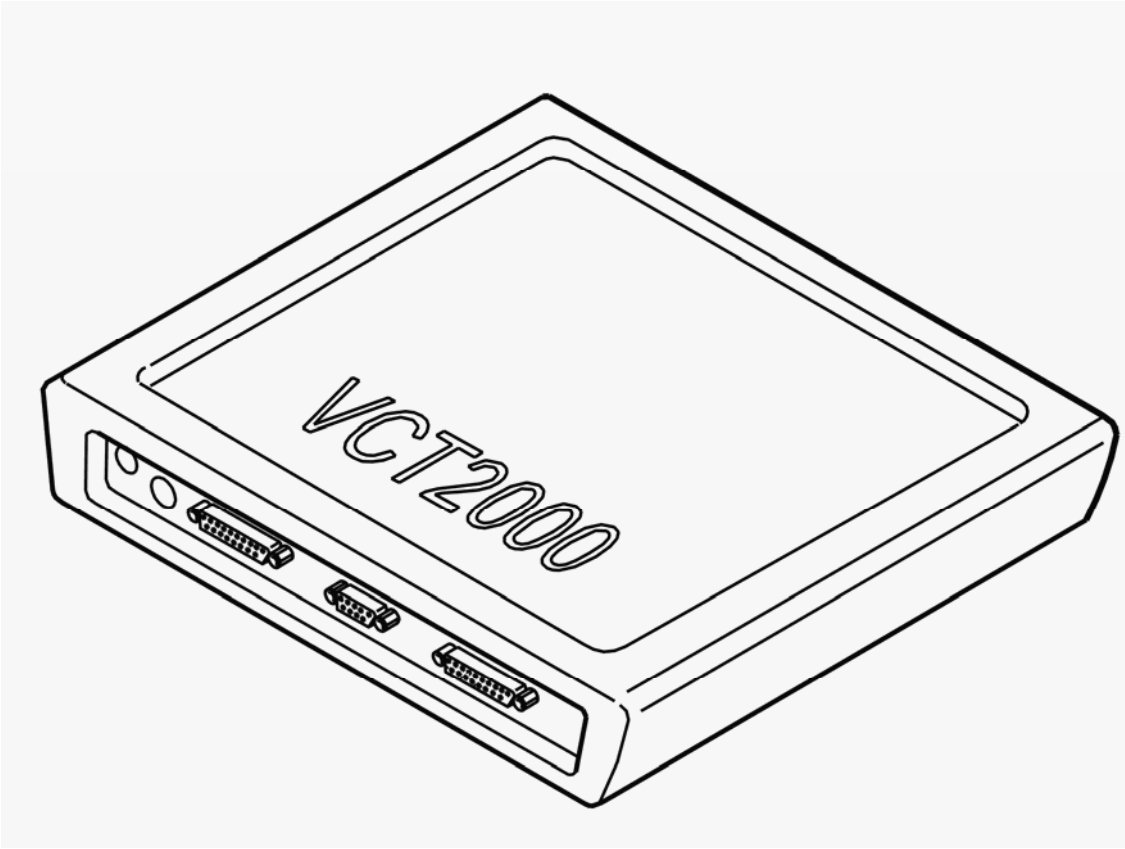


Fig. 245: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

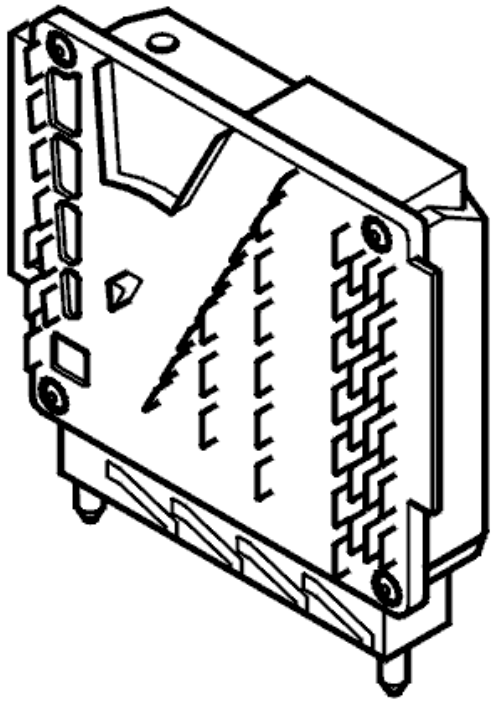


Fig. 246: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

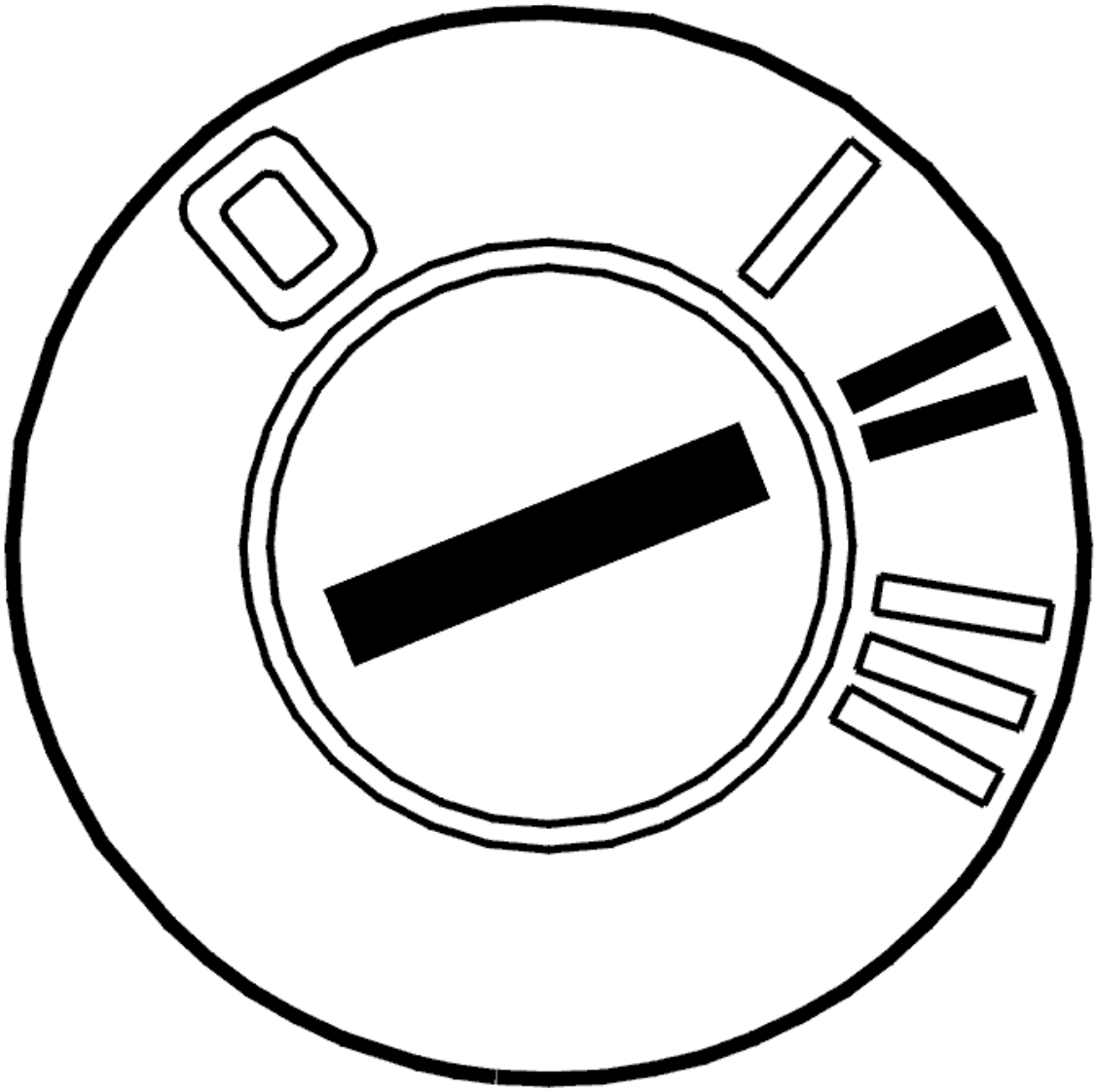


Fig. 247: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

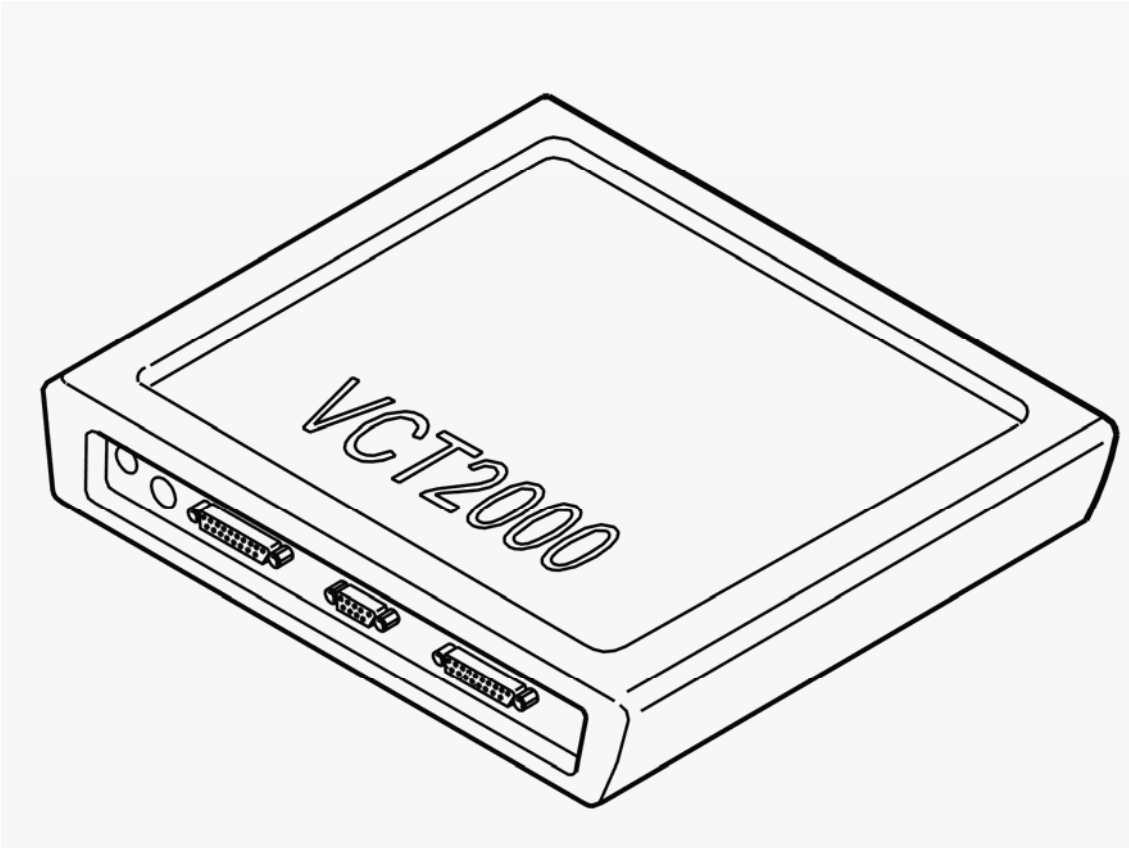


Fig. 248: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

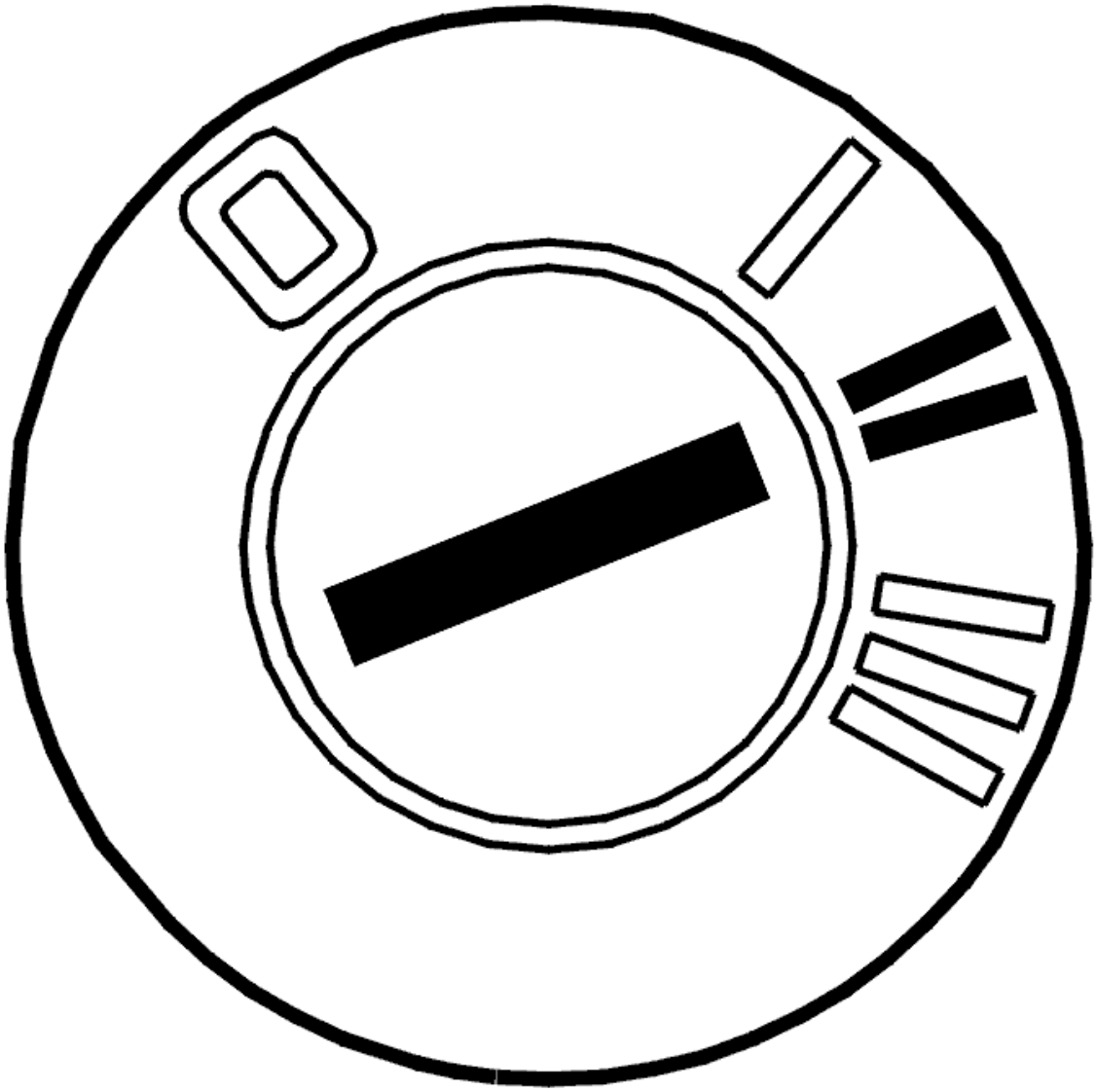


Fig. 249: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-0050 are stored, these must be fault-traced and remedied after this fault-tracing is completed.

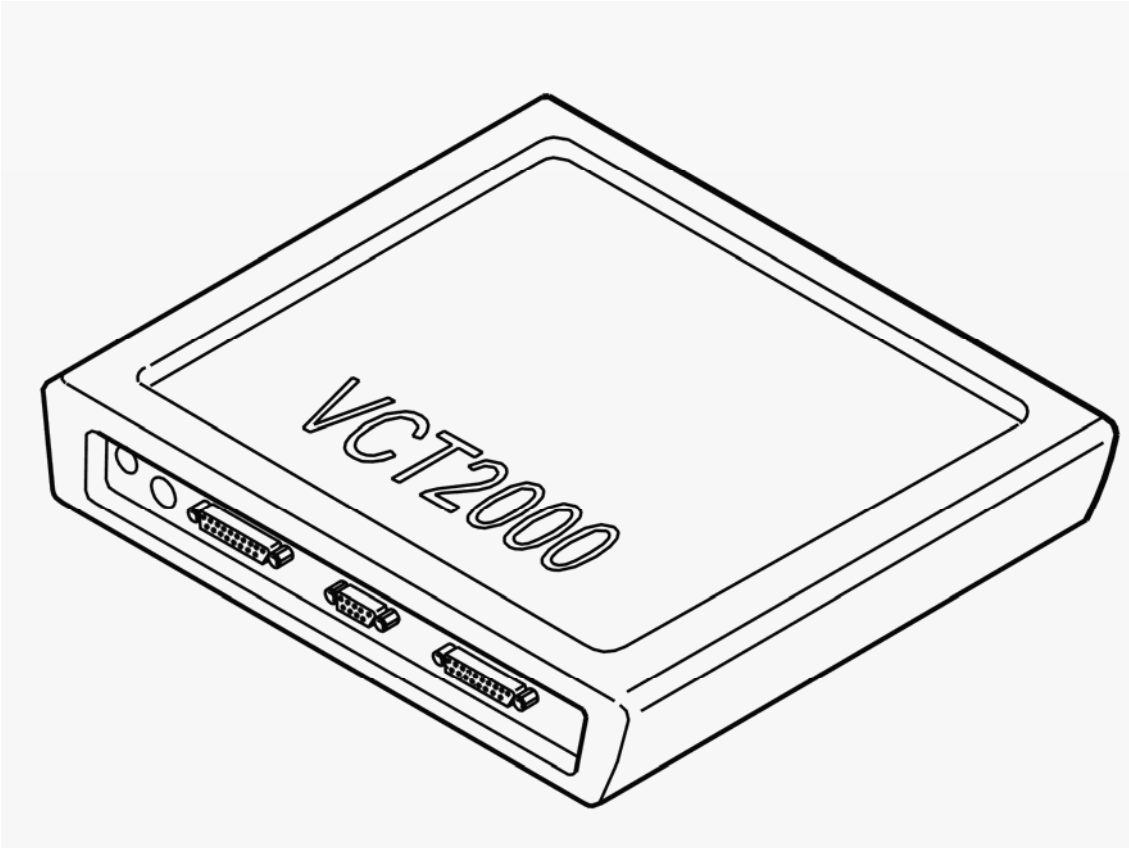


Fig. 250: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **ERASING DIAGNOSTIC TROUBLE CODES (DTCS)**

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

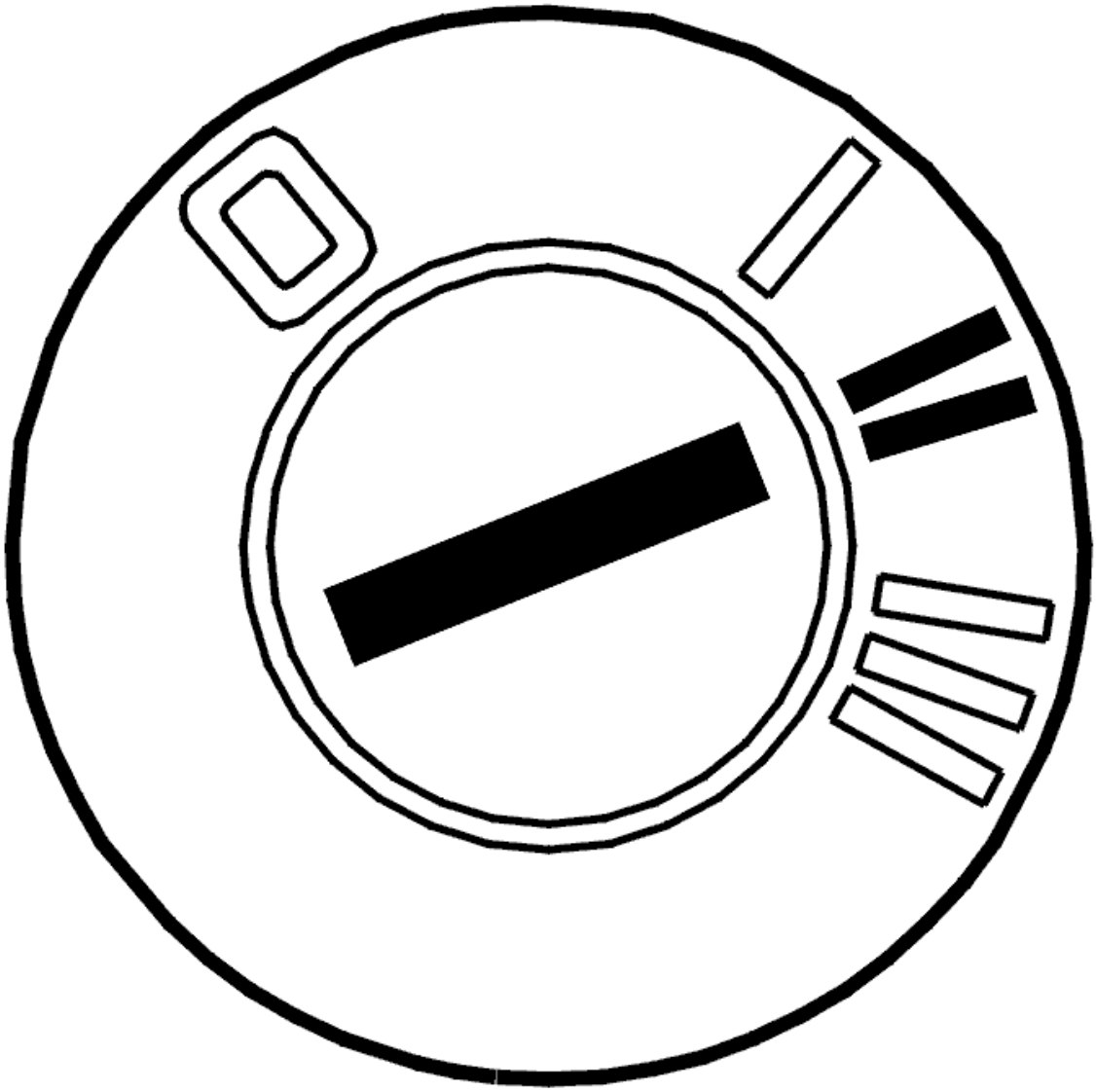


Fig. 251: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

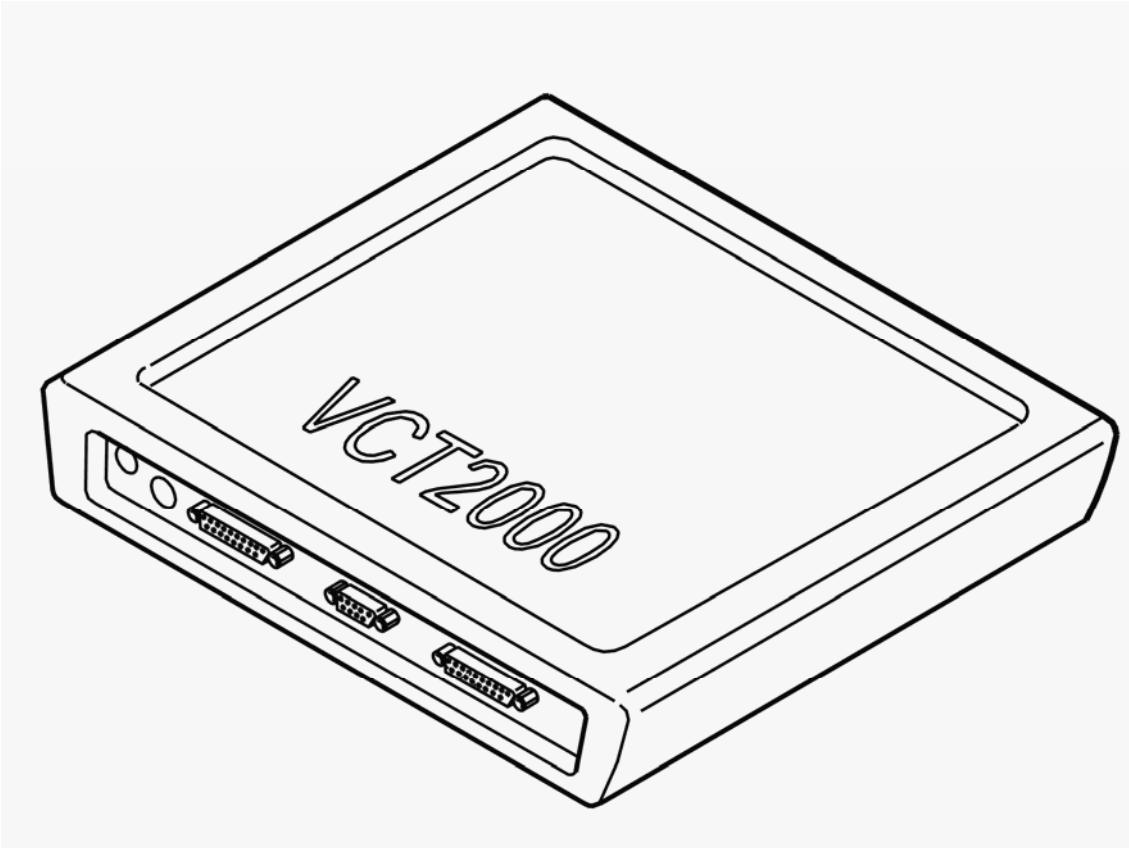


Fig. 252: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE SOFTWARE**

TEST DRIVING

NOTE: Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

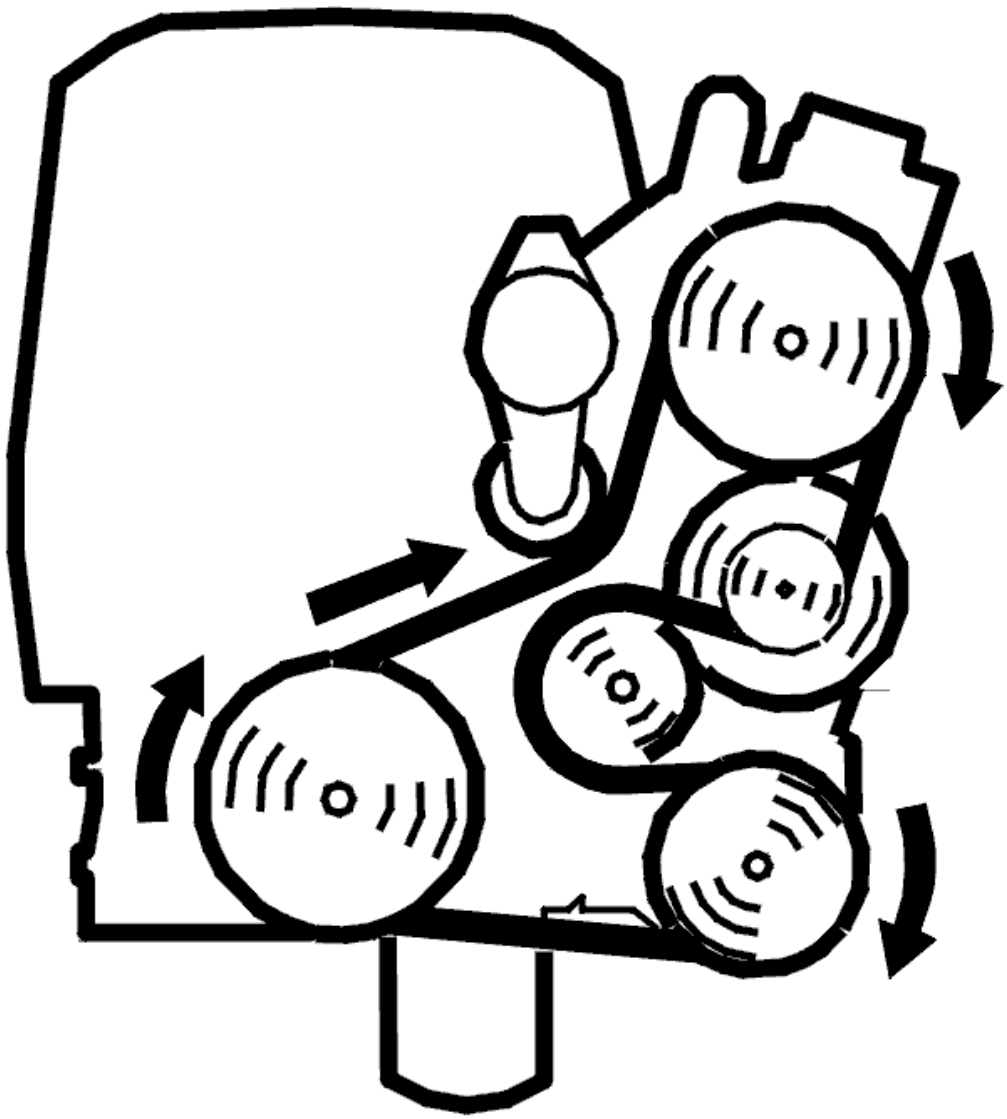


Fig. 253: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect the VIDA station. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission fluid should be at operating

temperature, approximately 80-90°C.

Shift the gear selector to position D. Carefully accelerate to 50-65 km/h. Maintain the same speed for more than 20 seconds.

Criteria for diagnostic trouble code (DTC):

- The transmission fluid temperature must exceed 30°C
- The engine must be running for at least 20 seconds
- Gear selector in position D, 3 or 2 (4T65EV).

  Gear selector in Geartronic position and gears 4, 3 or 2 (4T65EV-GT)

- Speed 50-65 km/h for at least 5 seconds.

  HINT: The car must be driven at an engine speed where the lock-up function is not normally activated.

- At least 5 seconds since the last gear shift
- Positive engine torque (no engine braking).

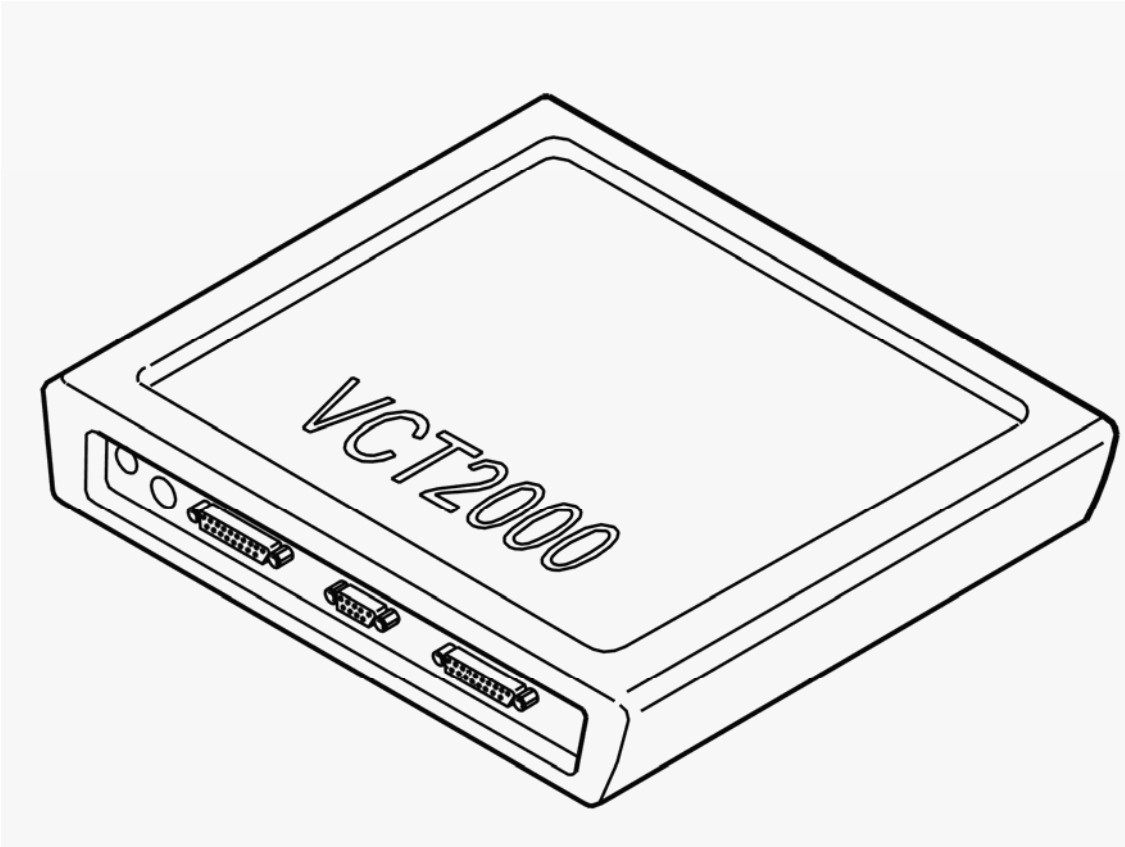


Fig. 254: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

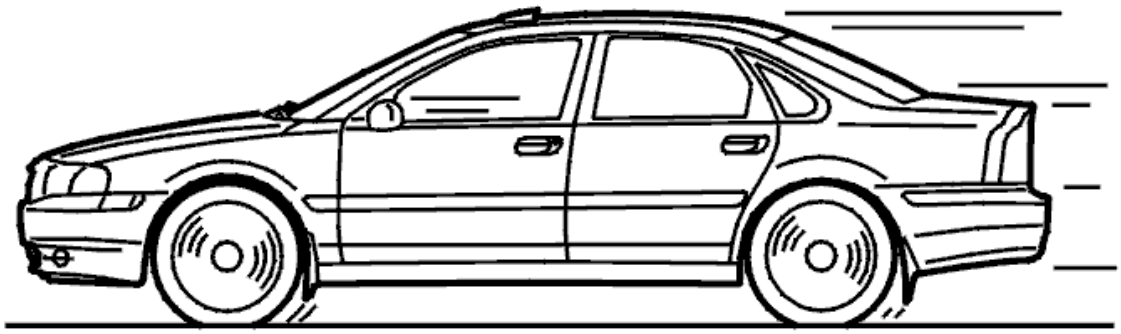


Fig. 255: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

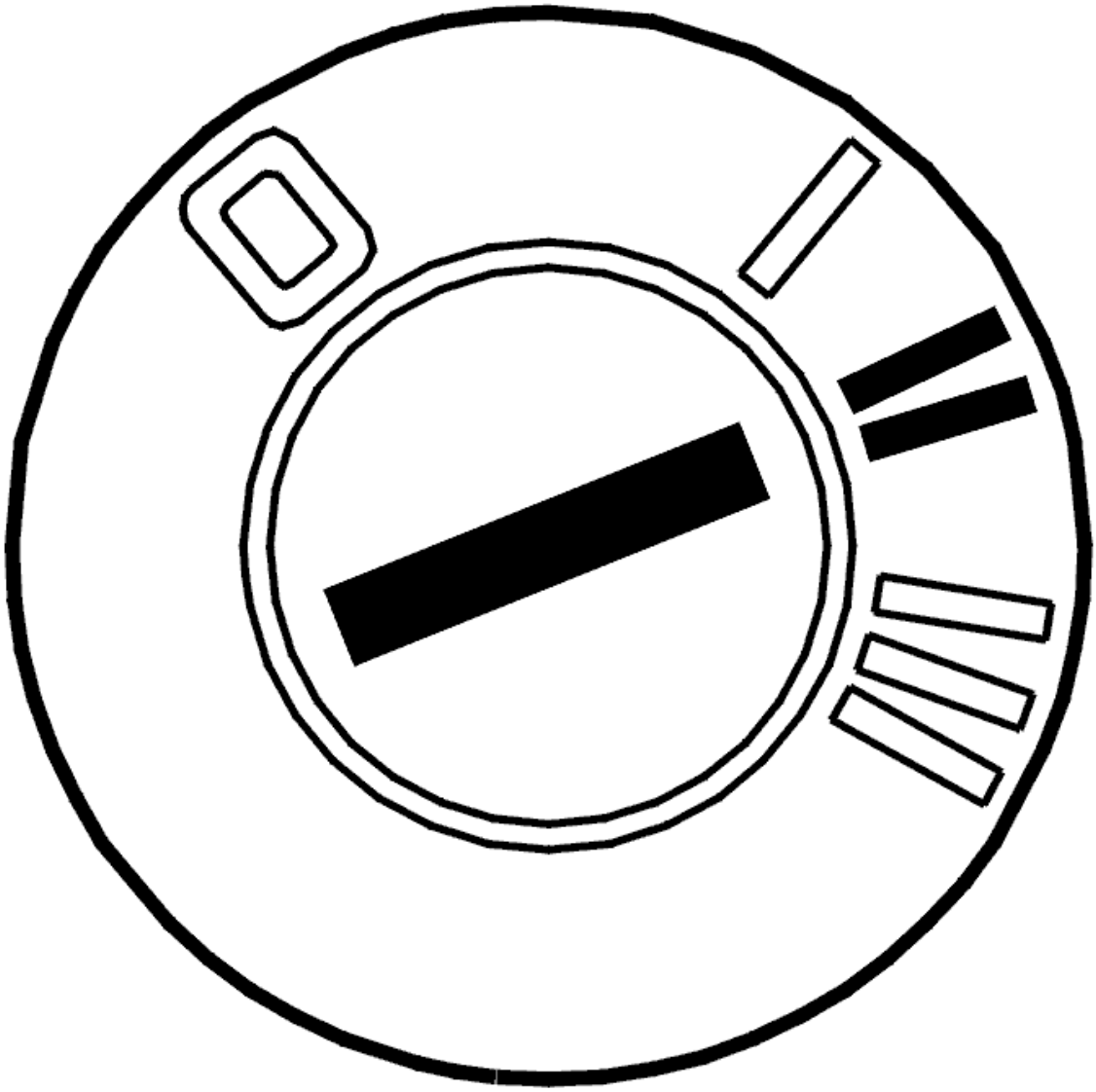


Fig. 256: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-0050 are stored, these must be fault-traced and remedied after this fault-tracing is completed.

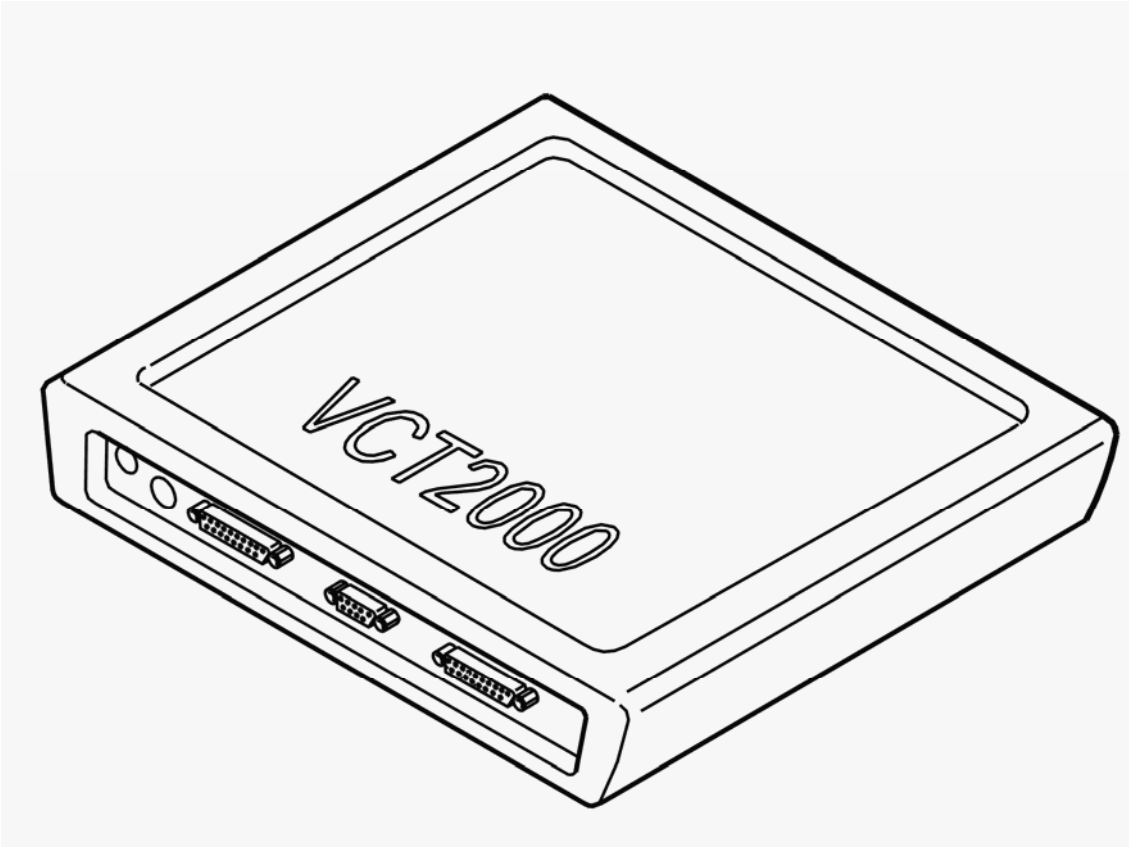


Fig. 257: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was diagnostic trouble code (DTC) TCM-0050 stored?

- **YES**

  Refer to **INFORMATION**

- **NO**

  NO DTC

CHECKING THE SOFTWARE

CHECKING THE SOFTWARE

NOTE: To carry out fault-tracing, the transmission control module (TCM) must be programmed with specific software.

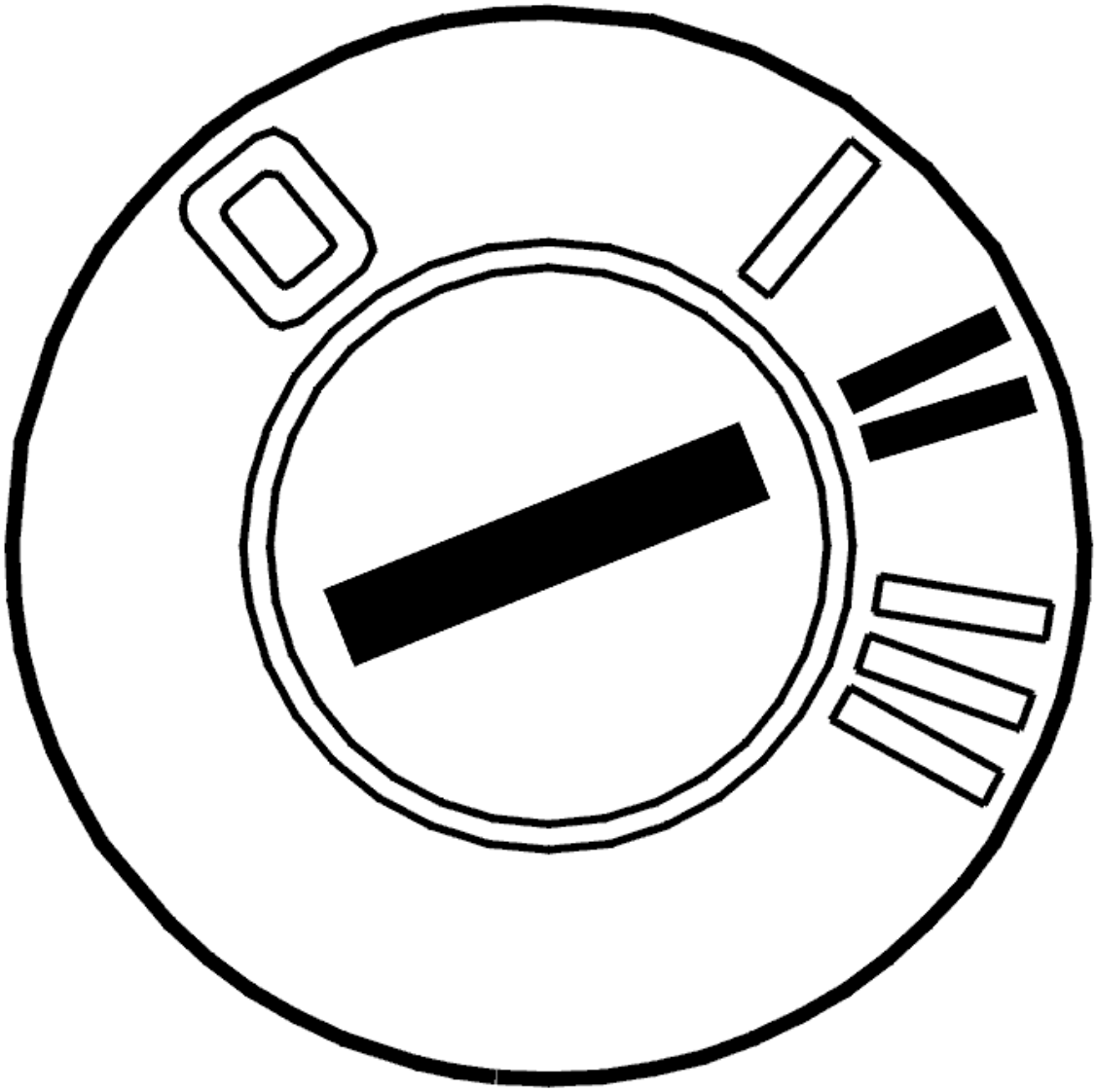


Fig. 258: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the control module diagnostic number.

  Check the read off diagnostic number against the diagnostic numbers given in the center table.

  If the diagnostic number is included in the table, the control module must be programmed with the latest software.

  See the technical journal for information about the most recent software.

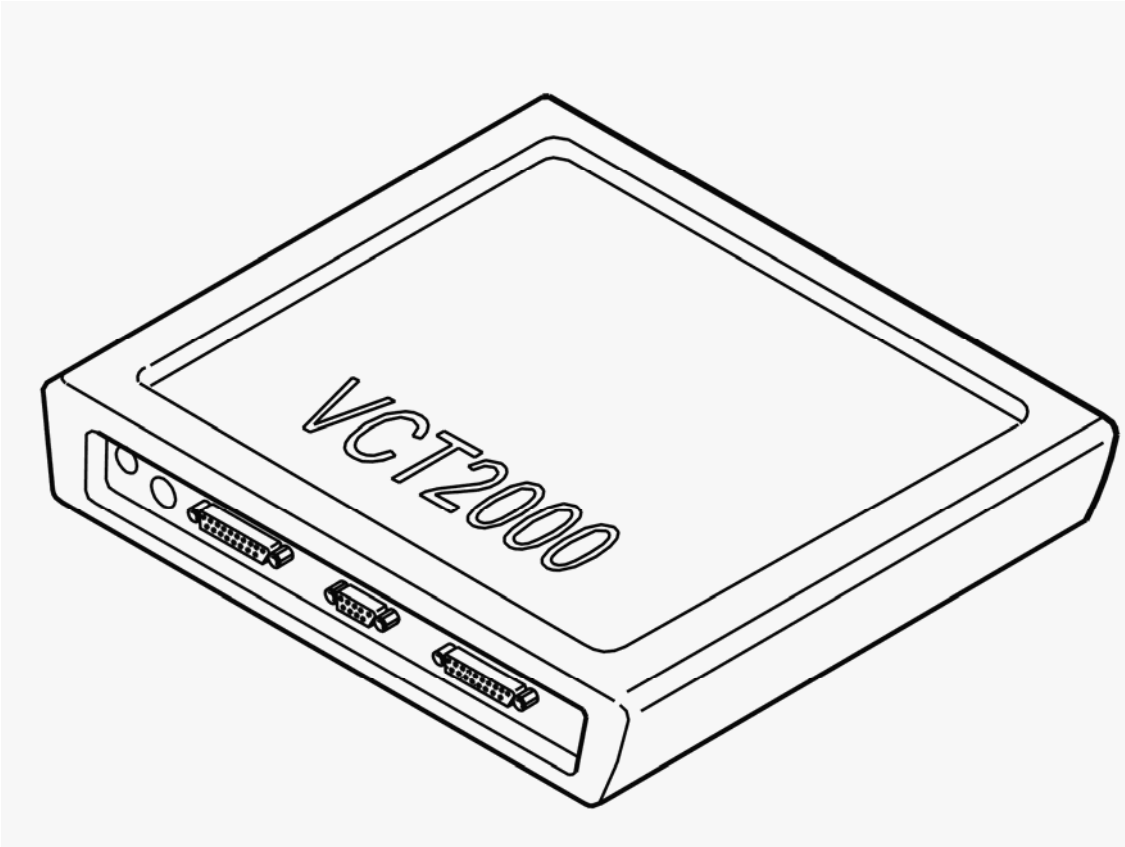


Fig. 259: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

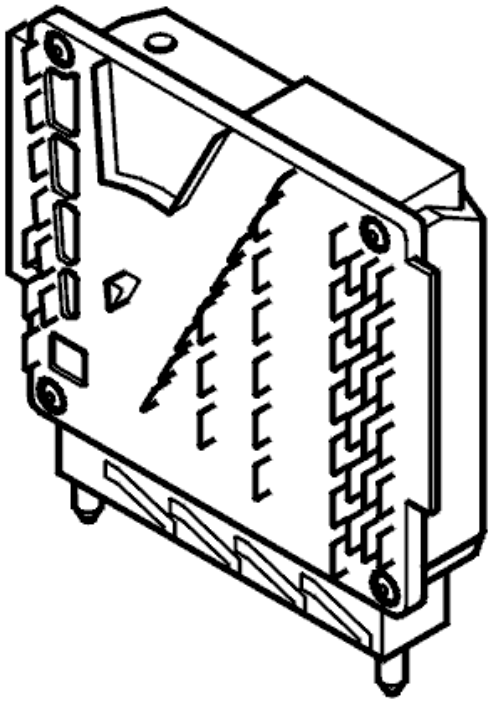


Fig. 260: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

TCM-0051: SOLENOID SL. STUCK (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

The control module checks if lock-up solenoid SL is stuck in the open or closed position by comparing the signals from solenoid SL and lock-up pressure sensor PS4. Pressure sensor PS4 detects whether solenoid SL is activated or not. Diagnostic trouble code (DTC) TCM-0051 is stored if the control module registers that solenoid SL has jammed in the open position.

Substitute Value

- The control module does not activate the lock-up solenoid.

Possible Source

- Lock-up solenoid SL has jammed in the closed position
- Mechanical fault in the transmission control system
- Defective solenoid SL.

Fault symptom[s]

- General orange warning lamp lit
- No lock-up function.

STUCK

CHECKING THE SOFTWARE

CHECKING THE SOFTWARE

NOTE: To carry out fault-tracing, the transmission control module (TCM) must be programmed with specific software.

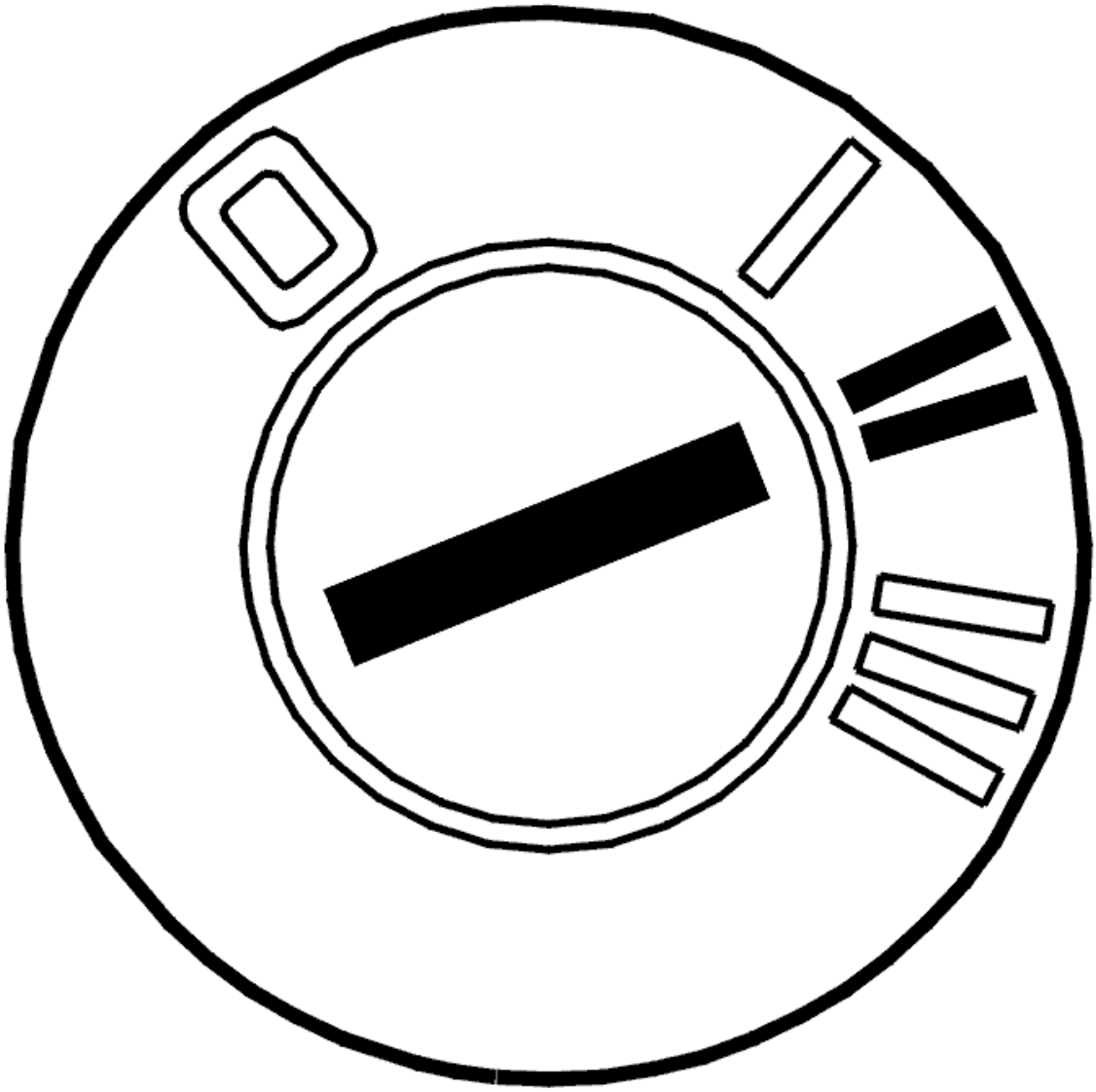


Fig. 261: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the control module diagnostic number.

  Check the read off diagnostic number against the diagnostic numbers given in the center table.

  If the diagnostic number is included in the table, the control module must be programmed with the latest software.

  See the technical journal for information about the most recent software.

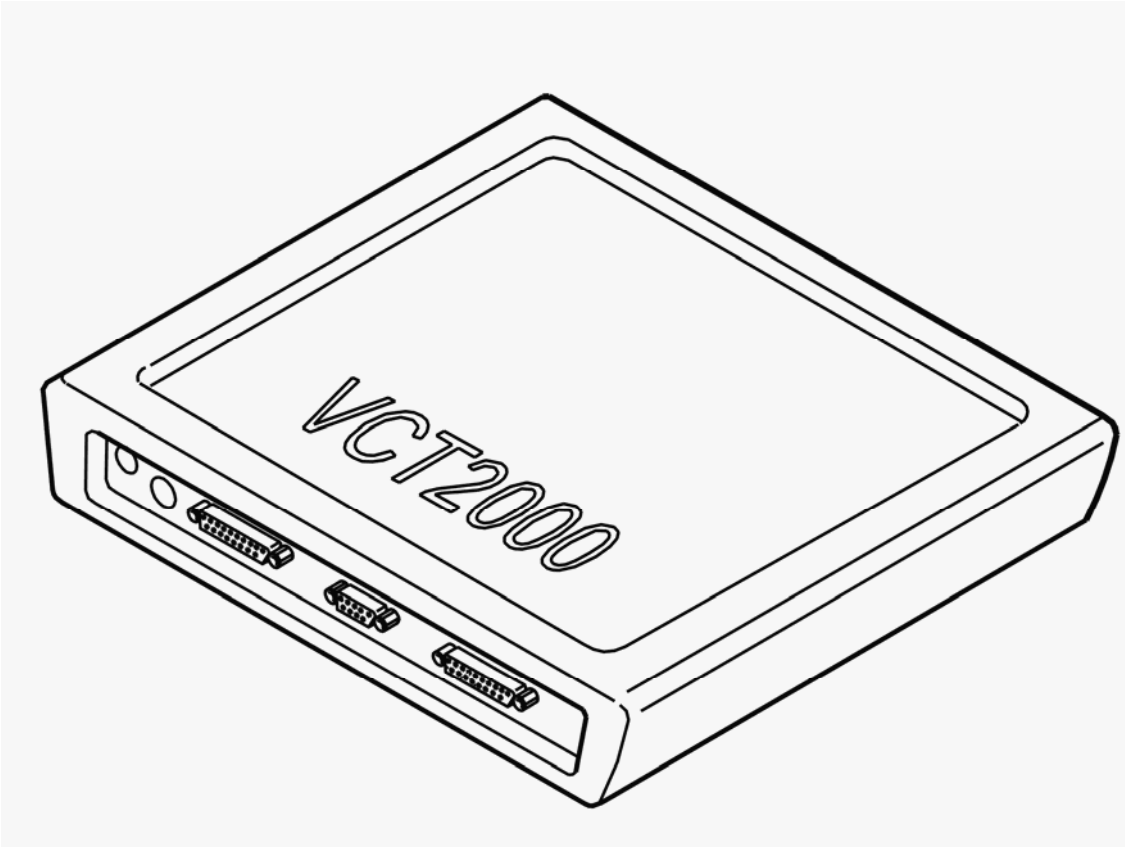


Fig. 262: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

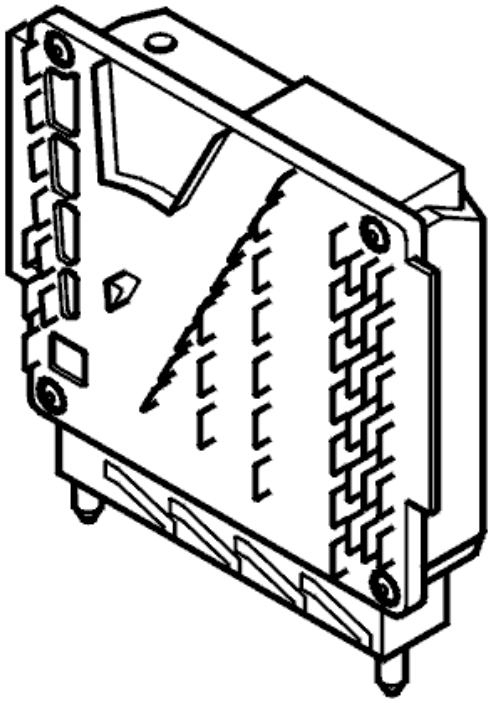


Fig. 263: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING SOLENOID SL

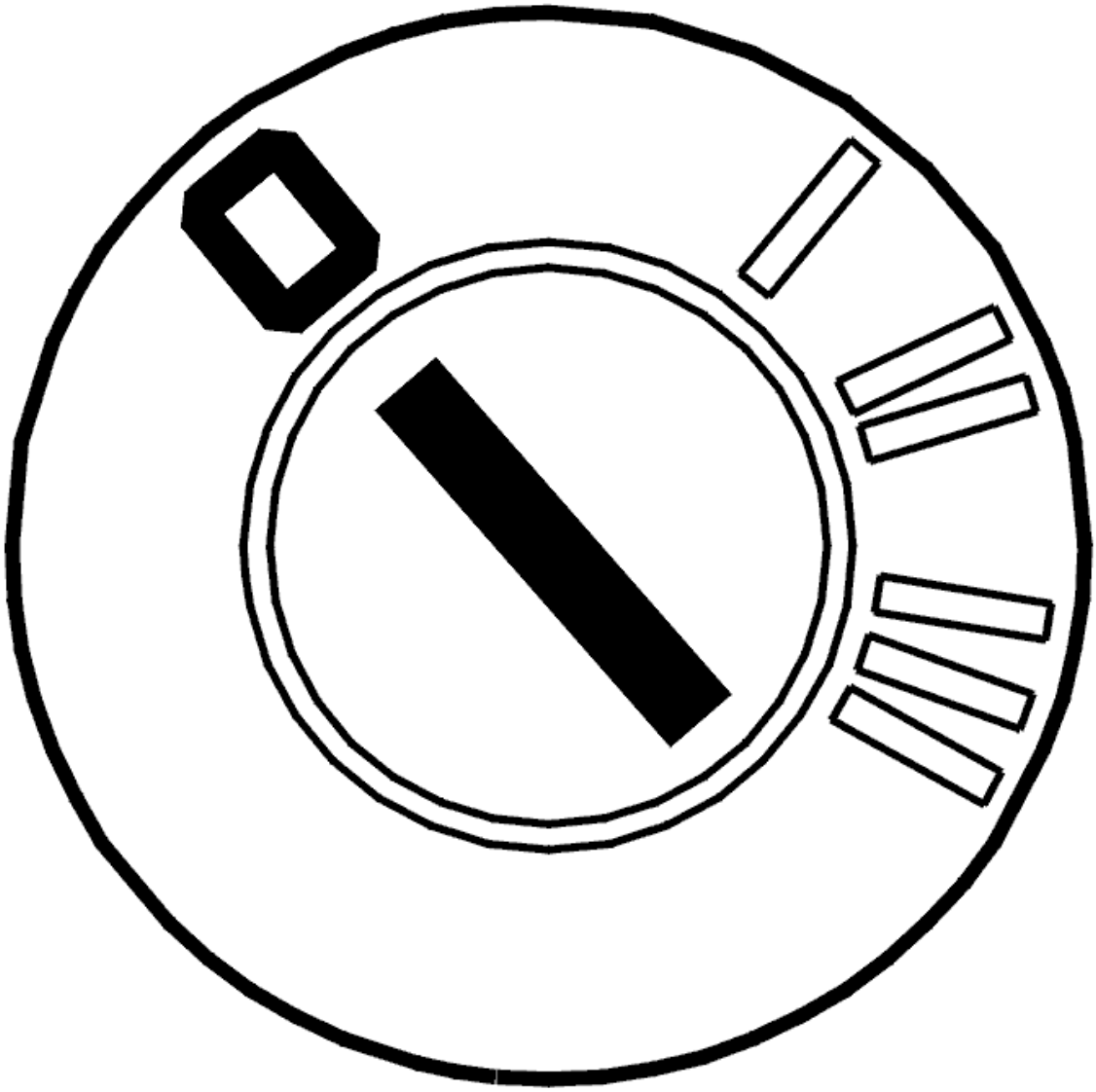


Fig. 264: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the control module connector (transmission side).

  Check solenoid SL by measuring the resistance between terminals #A51 (#A51) and #A53 (#A53).

  When the transmission is cold (20°C), the resistance must be 10-11 ohms. When the transmission is at operating temperature (150°C), the resistance must not exceed 16 ohms.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - For information about signals, see **SIGNAL SPECIFICATION** .

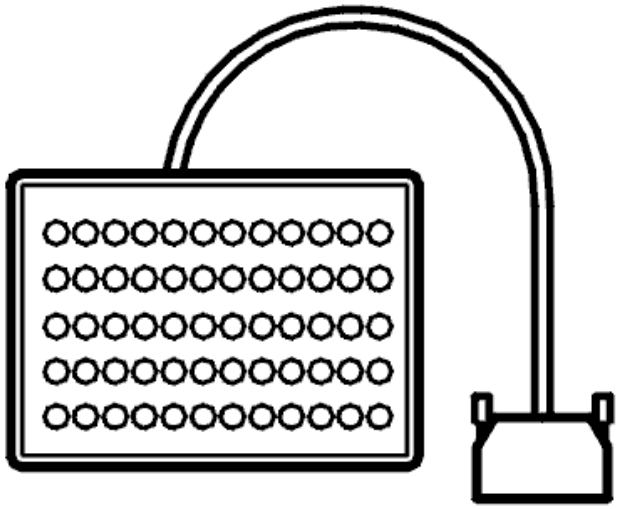


Fig. 265: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

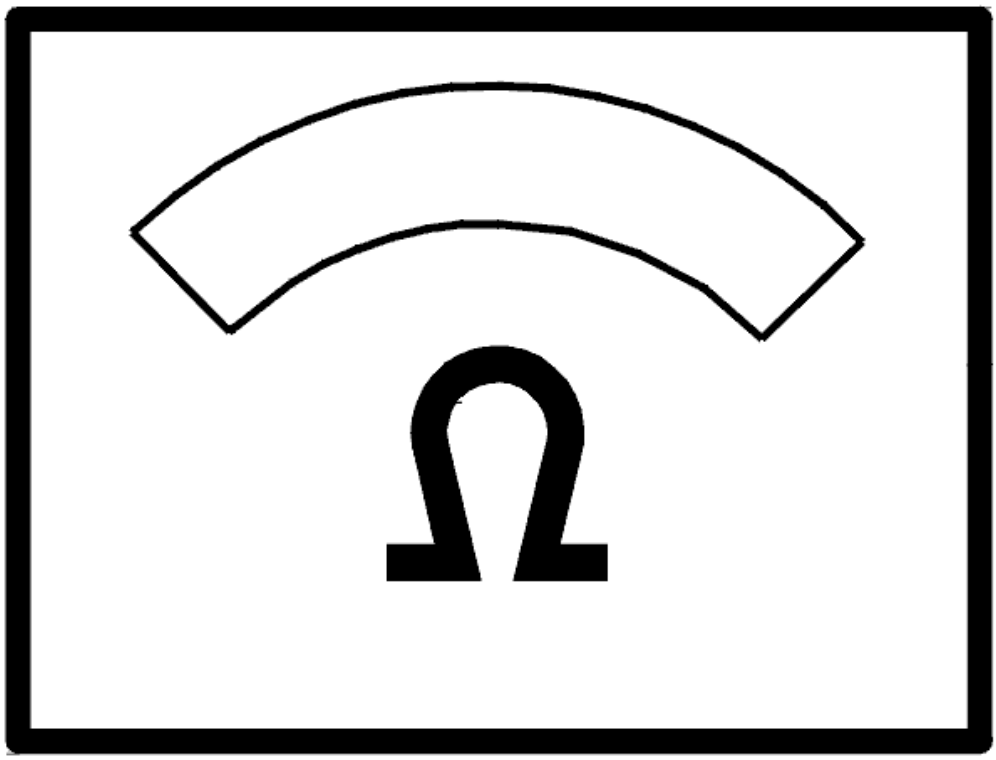


Fig. 266: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

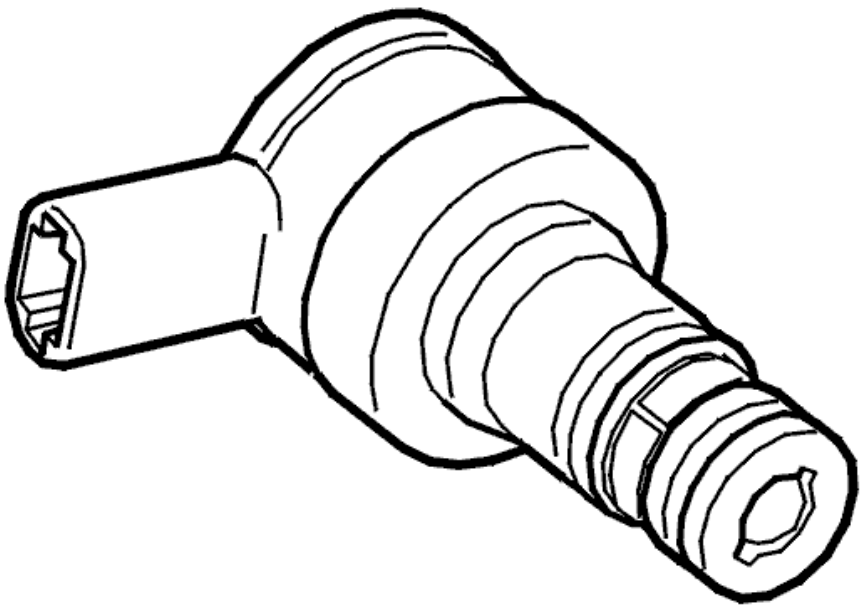


Fig. 267: Identifying Lock-Up Solenoid, SL
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CONNECTING THE T PIPE**

- **NO**

  Refer to **CHECKING THE WIRING**

CONNECTING THE T PIPE

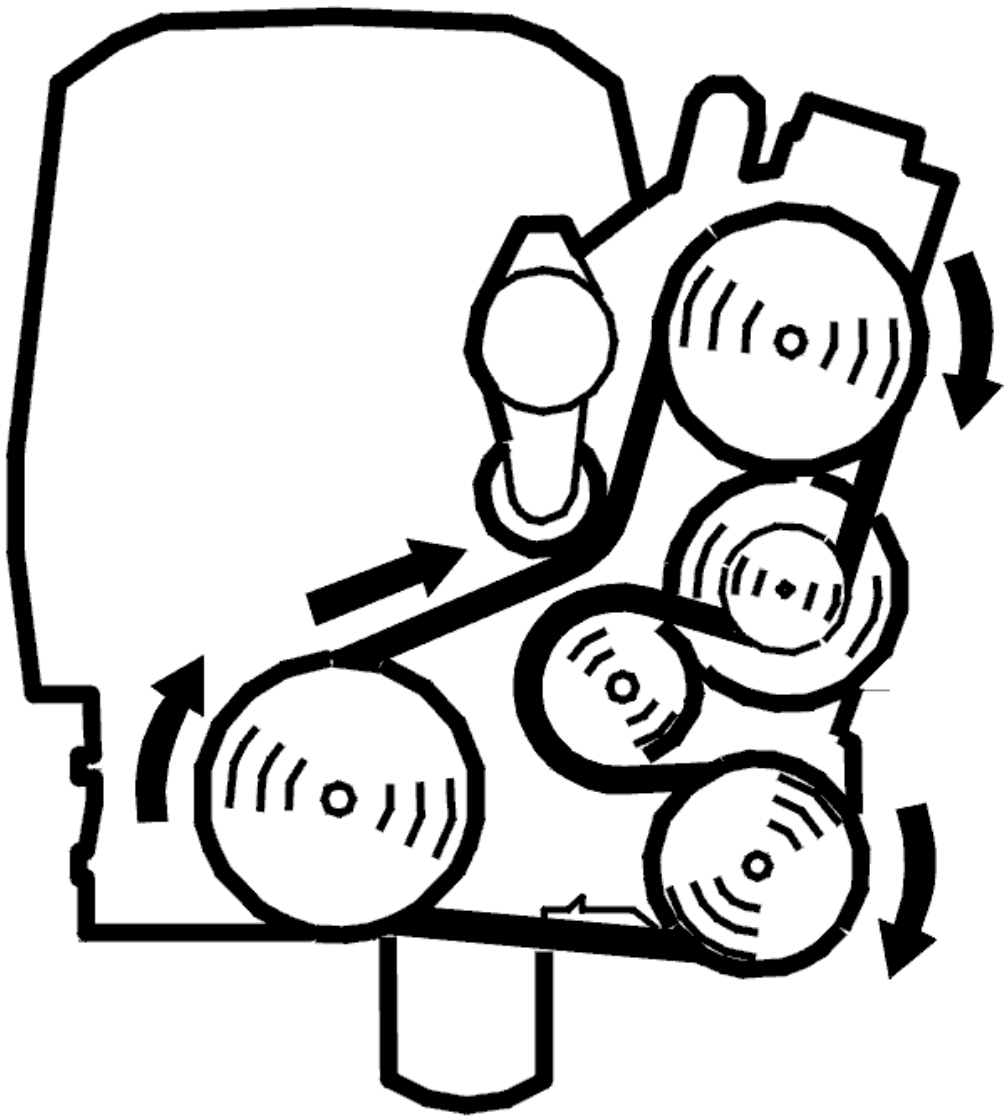


Fig. 268: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Deactivate the function for STC/DSTC by pressing in the button for STC/DSTC for approximately 2 seconds
- Ignition off
- Connect T-pipe see **9997002** with oil pressure gauge see **9995114** to the coolant hose from the transmission for the oil cooler
- Raise the car so that the drive wheels are clear of the ground.

WARNING: Ensure that the car safely raised. Ensure that there are no objects caught in the front wheels.

- Start the engine

- Gear selector in position P
- Activate the function "Block automatic shifting".

Other information

- To connect the T-pipe to the oil cooler for the transmission. See **T-PIPE, CONNECTION TO OIL COOLER** .

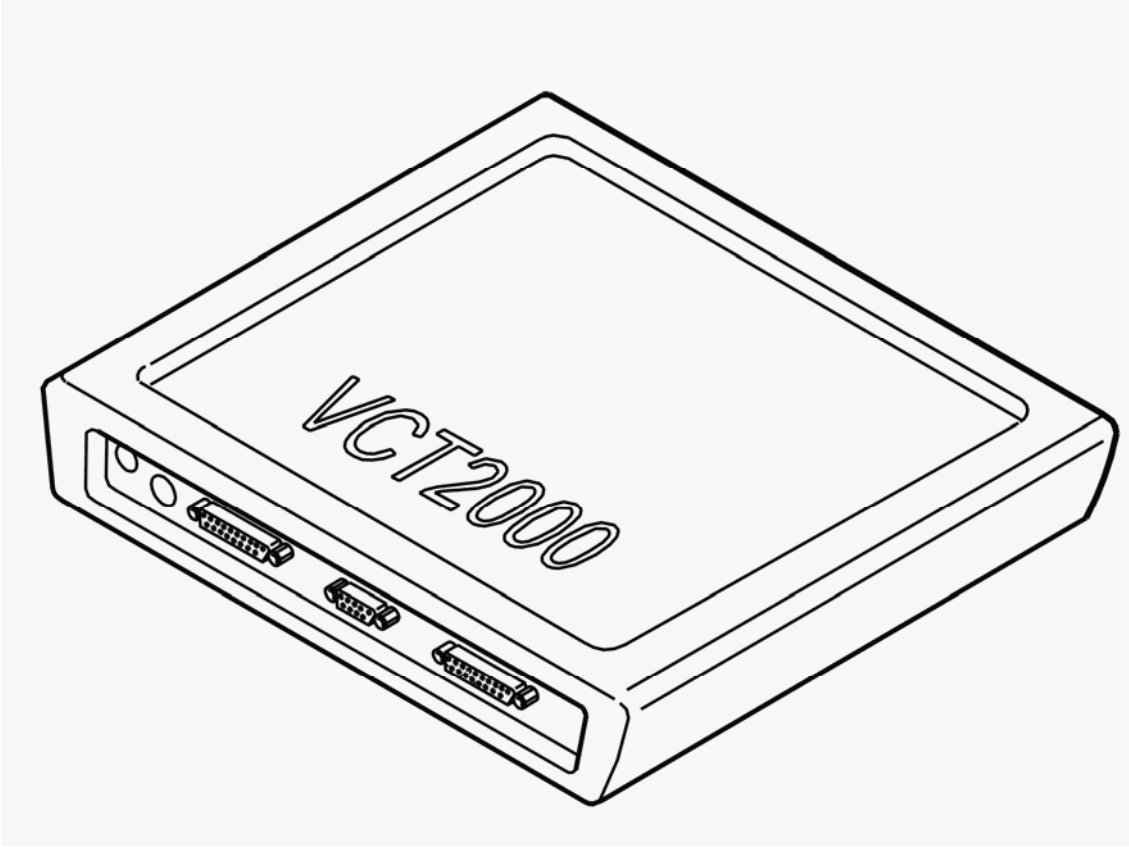


Fig. 269: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Allow the engine to run.

- **Continue**

Refer to **CHECKING SOLENOID SL**

CHECKING SOLENOID SL

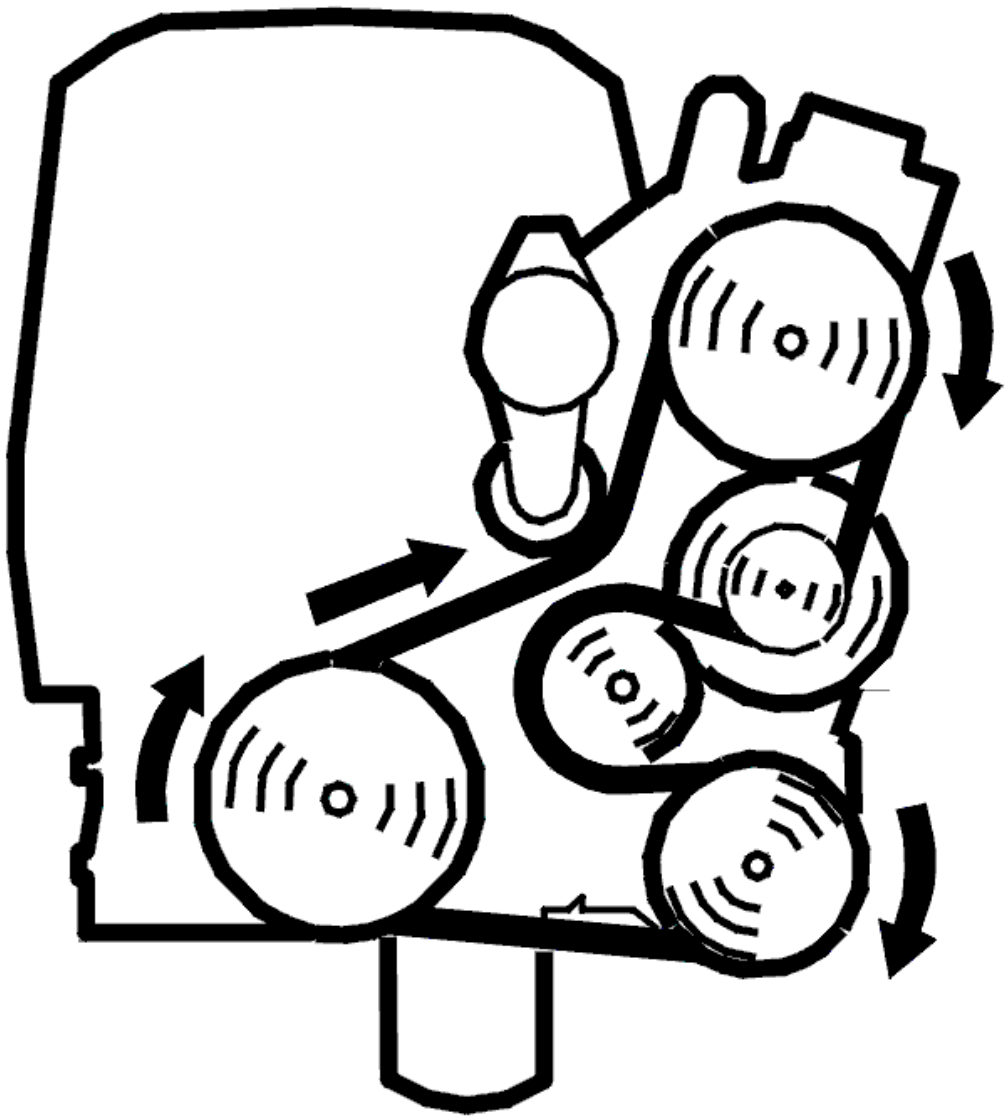


Fig. 270: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Engine running
- Move the gear selector to position D
- Activate the solenoid for gear 2 and then the lock-up function
- Check the pressure change on the oil pressure gauge. A considerable change in pressure should be observed
- Deactivate the lock-up function. Check the pressure change.

  Repeat the activation and deactivation of the lock-up function a few times to ensure accurate results.

  HINT: Unchanged pressure means that the control system is defective.

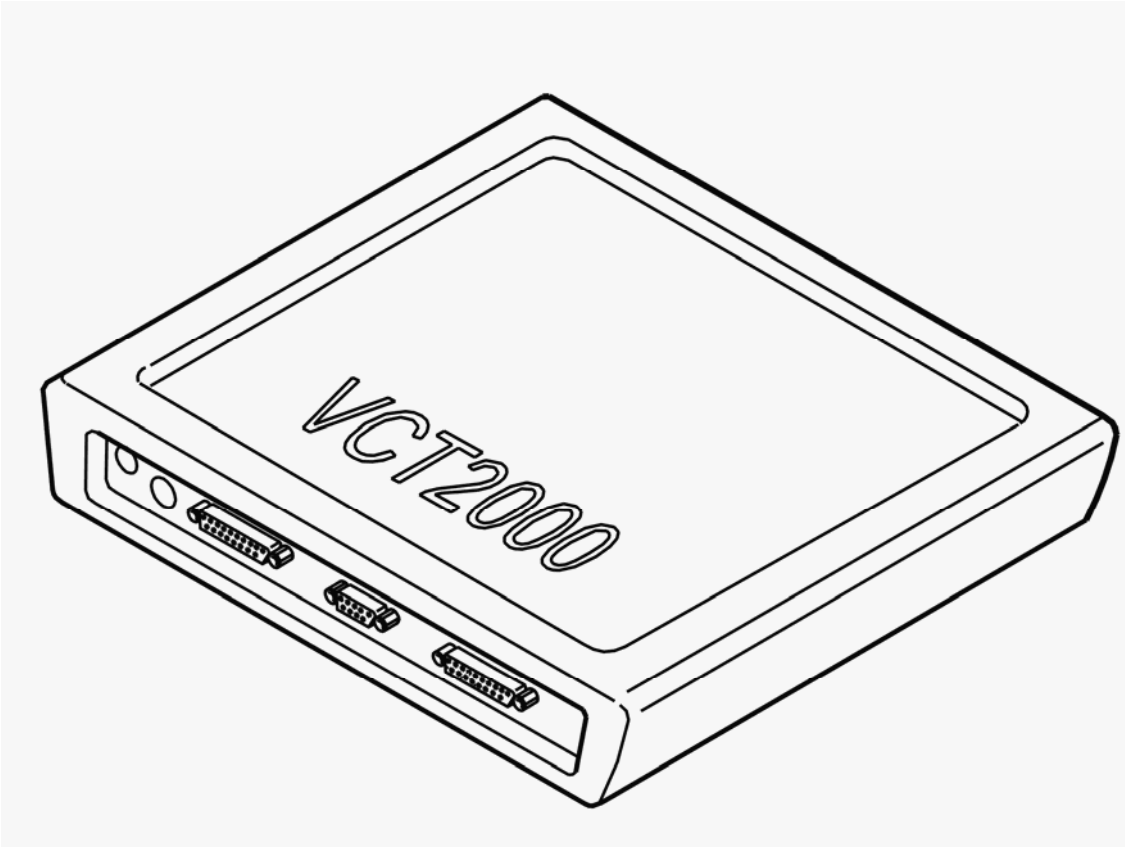


Fig. 271: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Did the pressure change?

- **YES**

  Refer to **REPLACING THE TRANSMISSION**

- **NO**

  Refer to **REPLACING THE CONTROL SYSTEM**

REPLACING THE CONTROL SYSTEM

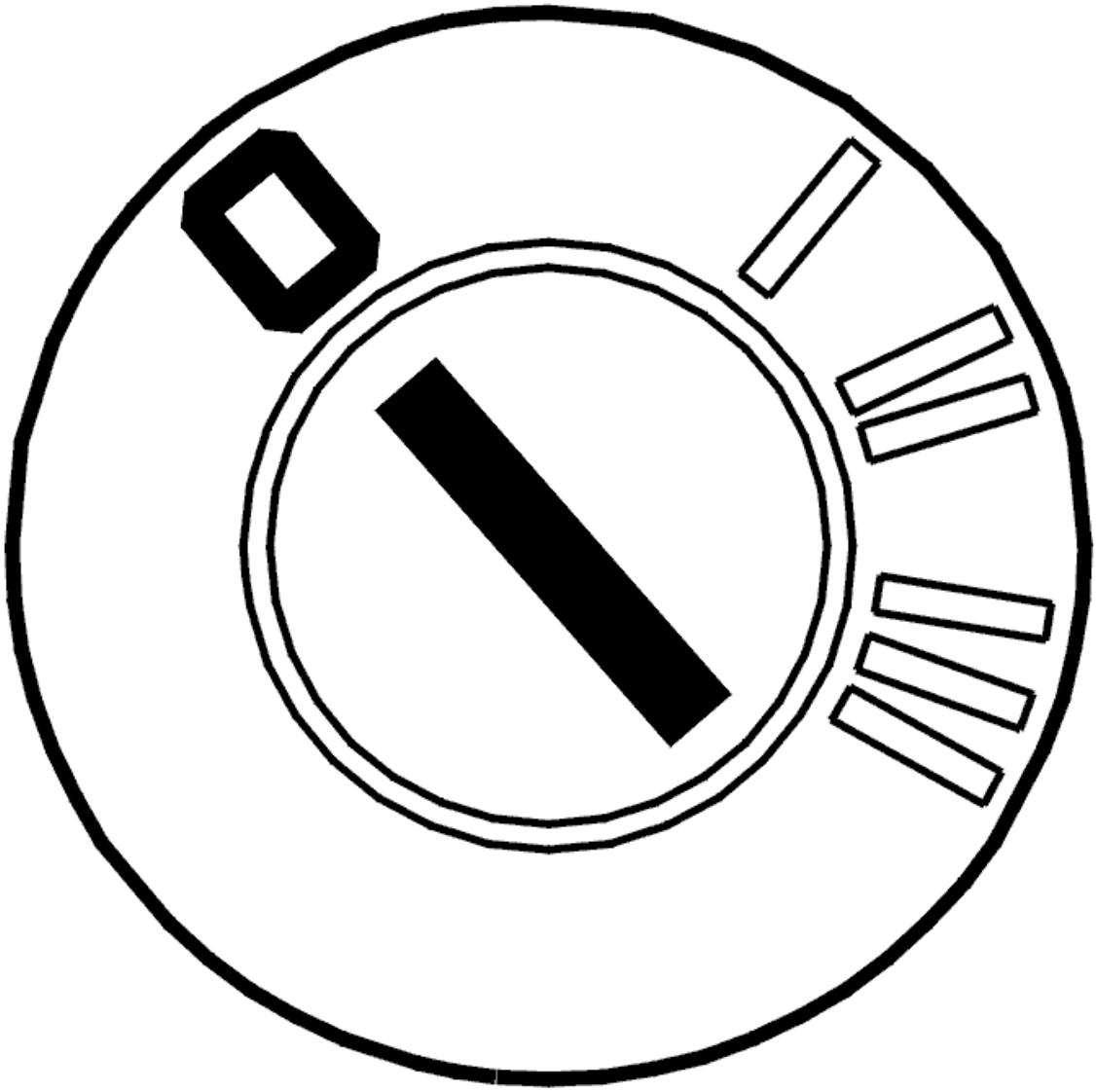


Fig. 272: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Fault-tracing indicates a fault in the transmission control system. Replace the control system.

  Other information

  - To replace the control system, For removal, see **CONTROL SYSTEM/VALVE HOUSING, REMOVING** and To install, see **CONTROL SYSTEM / VALVE HOUSING, INSTALLING** .

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

CHECKING THE WIRING

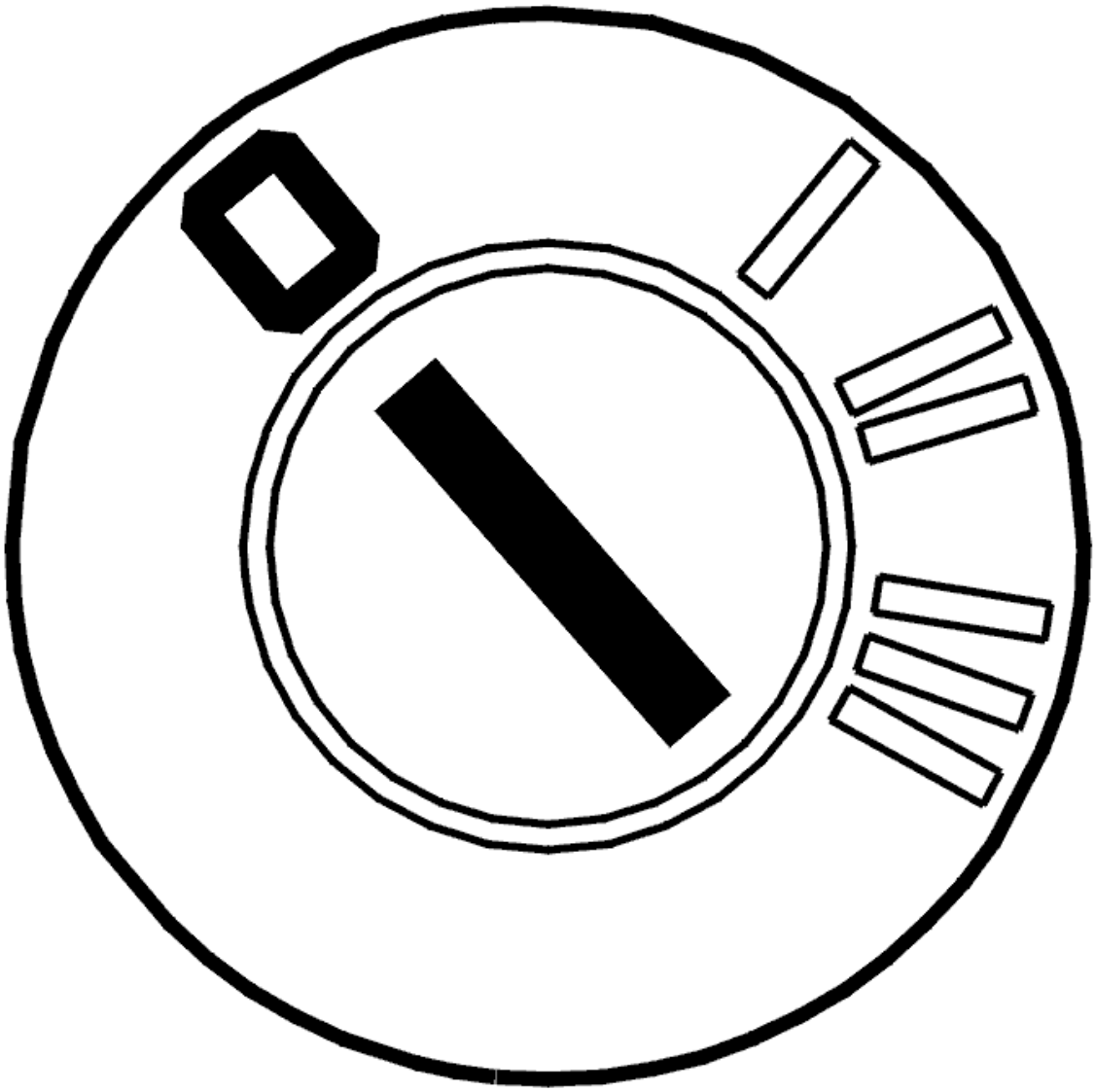


Fig. 273: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

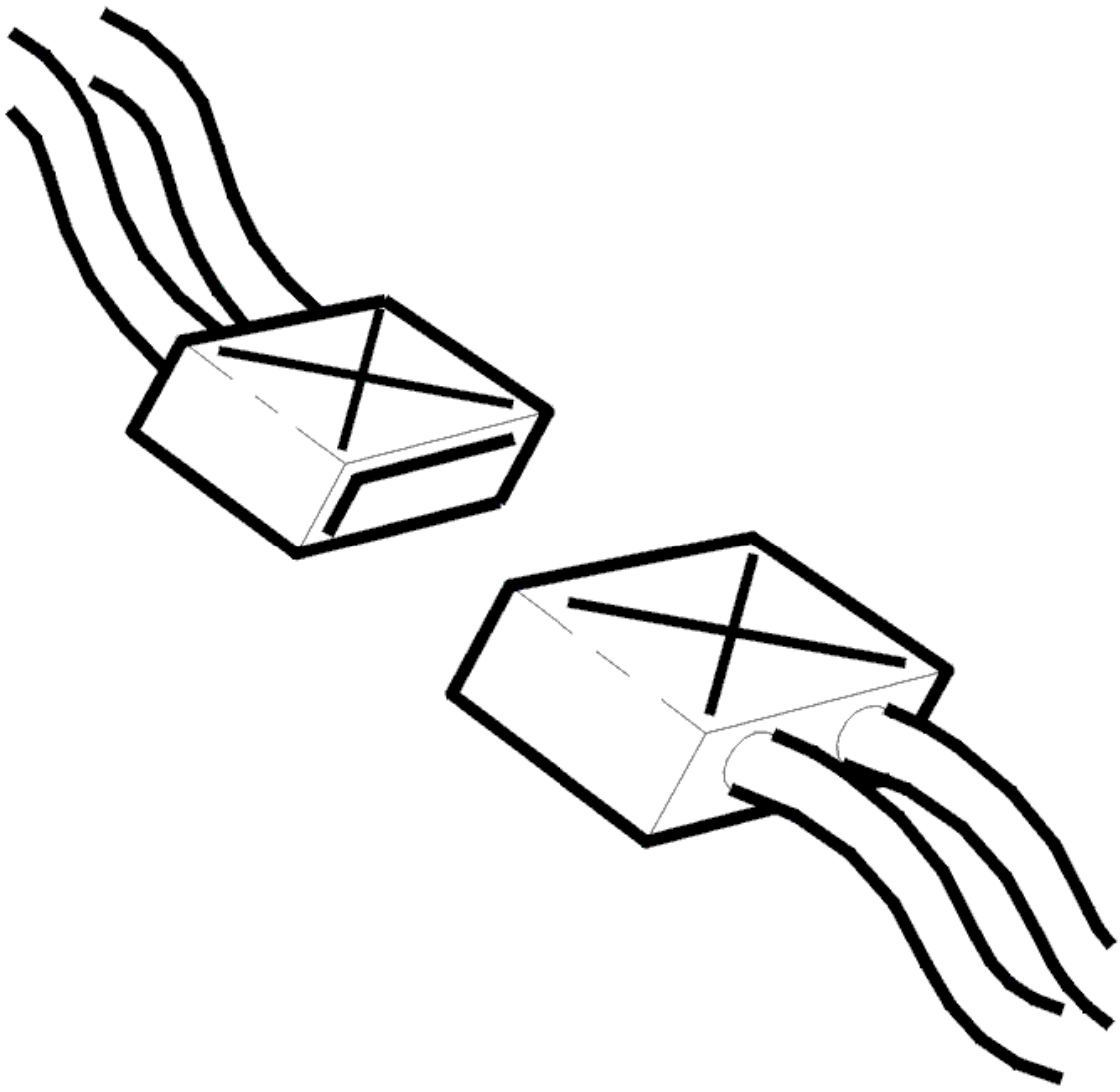


Fig. 274: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

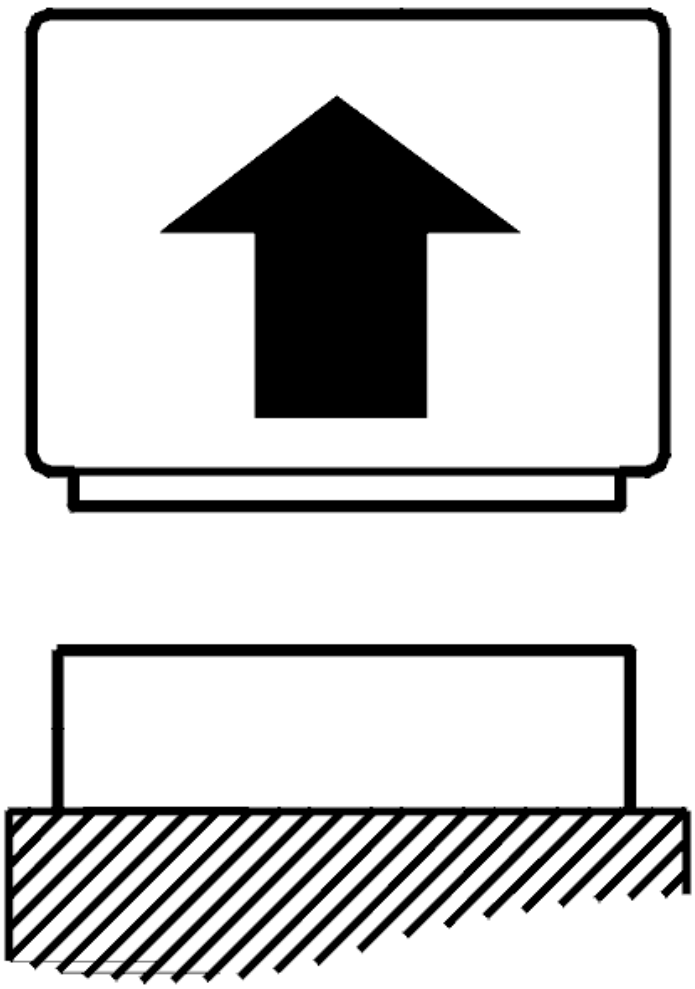


Fig. 275: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Control module disconnected
- Connect the breakout box to the control module connector (transmission side)
- Disconnect the transmission connector
- Adapter see **9511505** and breakout box see **9511428** connected to the transmission connector (control module side).

  Check the wiring between control module terminal #A51 (#A51) and transmission connector terminal #T (#A17). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

  Check the wiring between control module terminal #A53 (#A53) and transmission connector terminal #E

(#A5). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

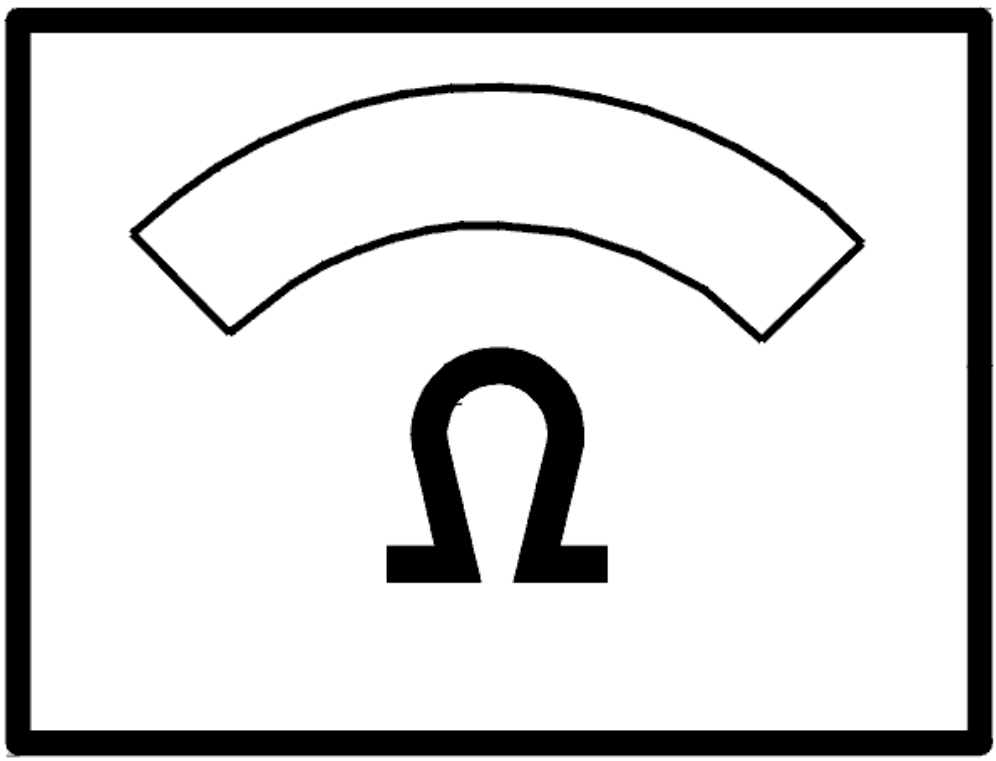


Fig. 276: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

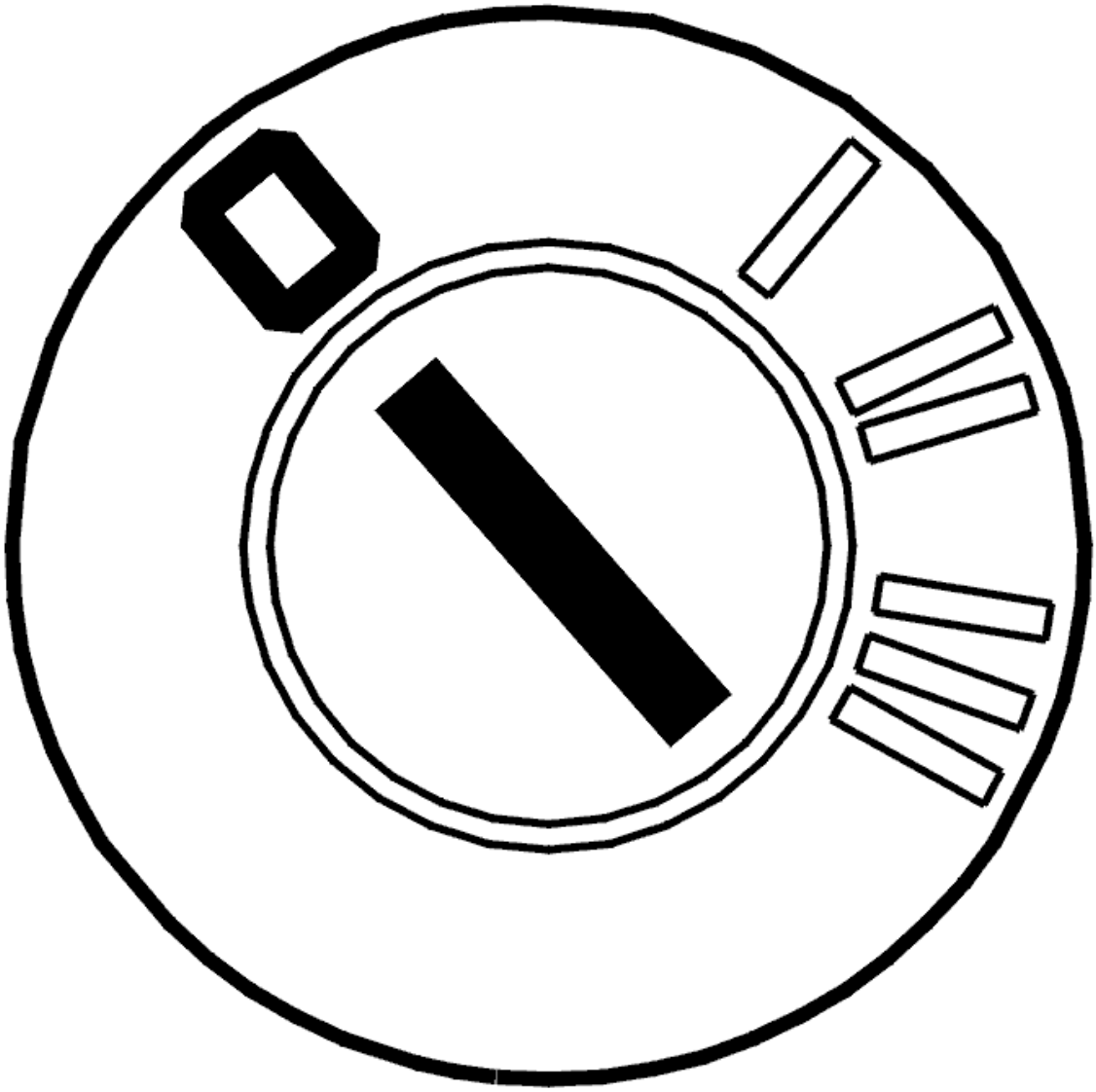


Fig. 277: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off

- Open the transmission control system
- Connect adapter see **9511505** and breakout box see **9511428** to the transmission connector (transmission side).

Check the cable between transmission connector terminal #T (#A17) and solenoid SL terminal #A. Check the cable between transmission connector terminal #E (#A5) and solenoid SL terminal #B. Check these cables for an open-circuit.

HINT: Check solenoid SL by measuring the resistance between solenoid SL terminals #A and #B. When the transmission is cold (approximately 20°C), the resistance must be 10-11 ohms.

Remedy as necessary.

Other information:

- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** or To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid SL, see **SOLENOID LOCK-UP FUNCTION, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

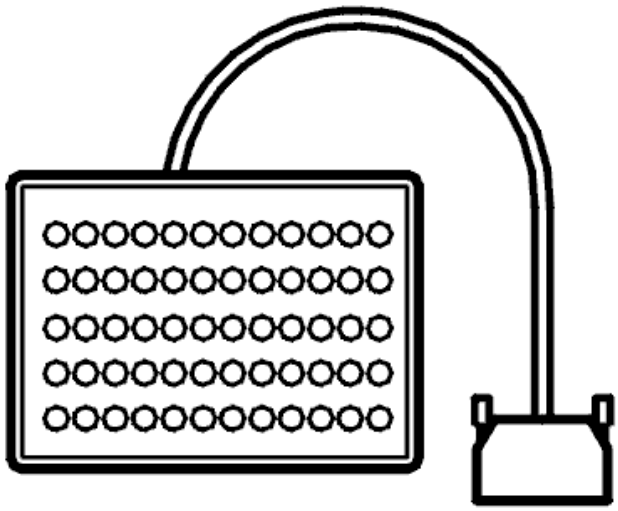


Fig. 278: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

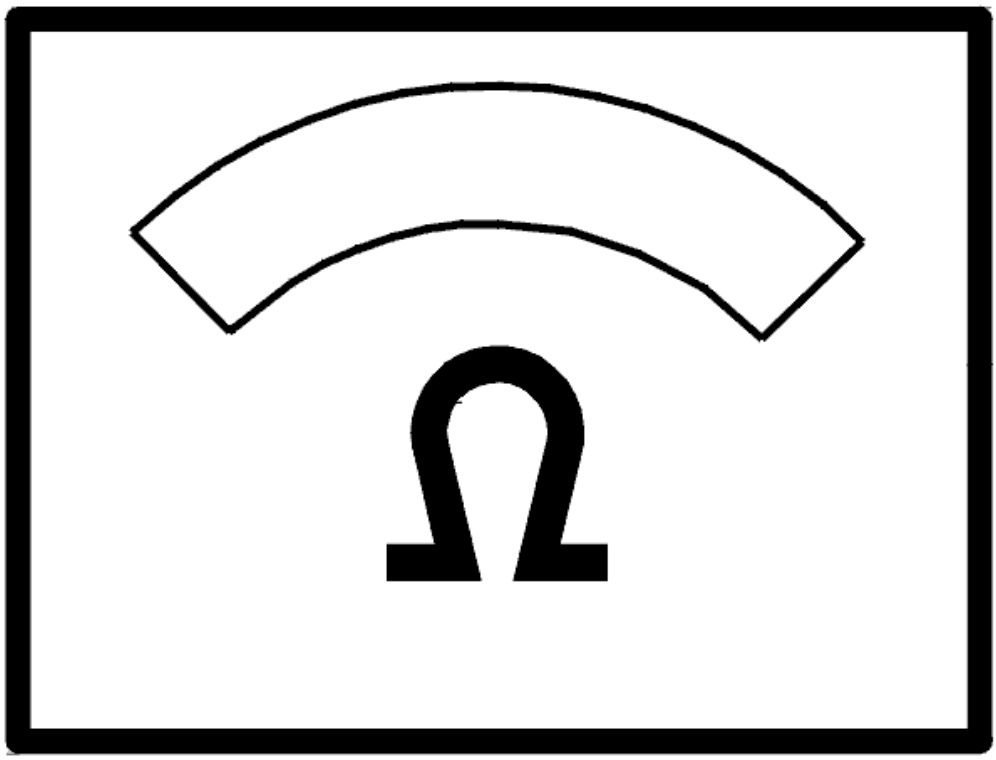


Fig. 279: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

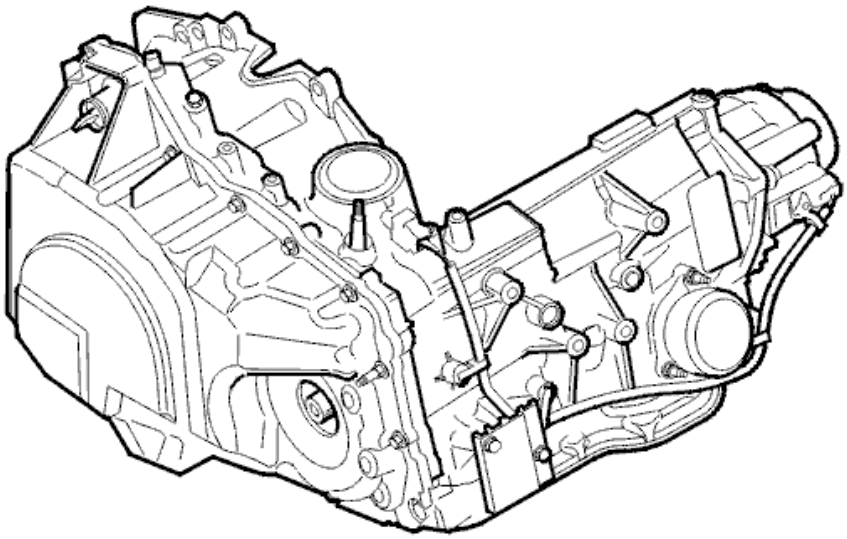
  Refer to **RESETTING THE ADAPTATION**

REPLACING THE TRANSMISSION

Fault-tracing indicates a fault in the transmission. Replace the transmission.

Other information:

- To remove the transmission, see **TRANSMISSION, REMOVING**
- To install the transmission, see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .



P2X

4301721D ©VOLVO

Fig. 280: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

FAULT-TRACING INFORMATION

The fault-tracing indicates that the control module has previously detected a fault but that the fault is no longer active.

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

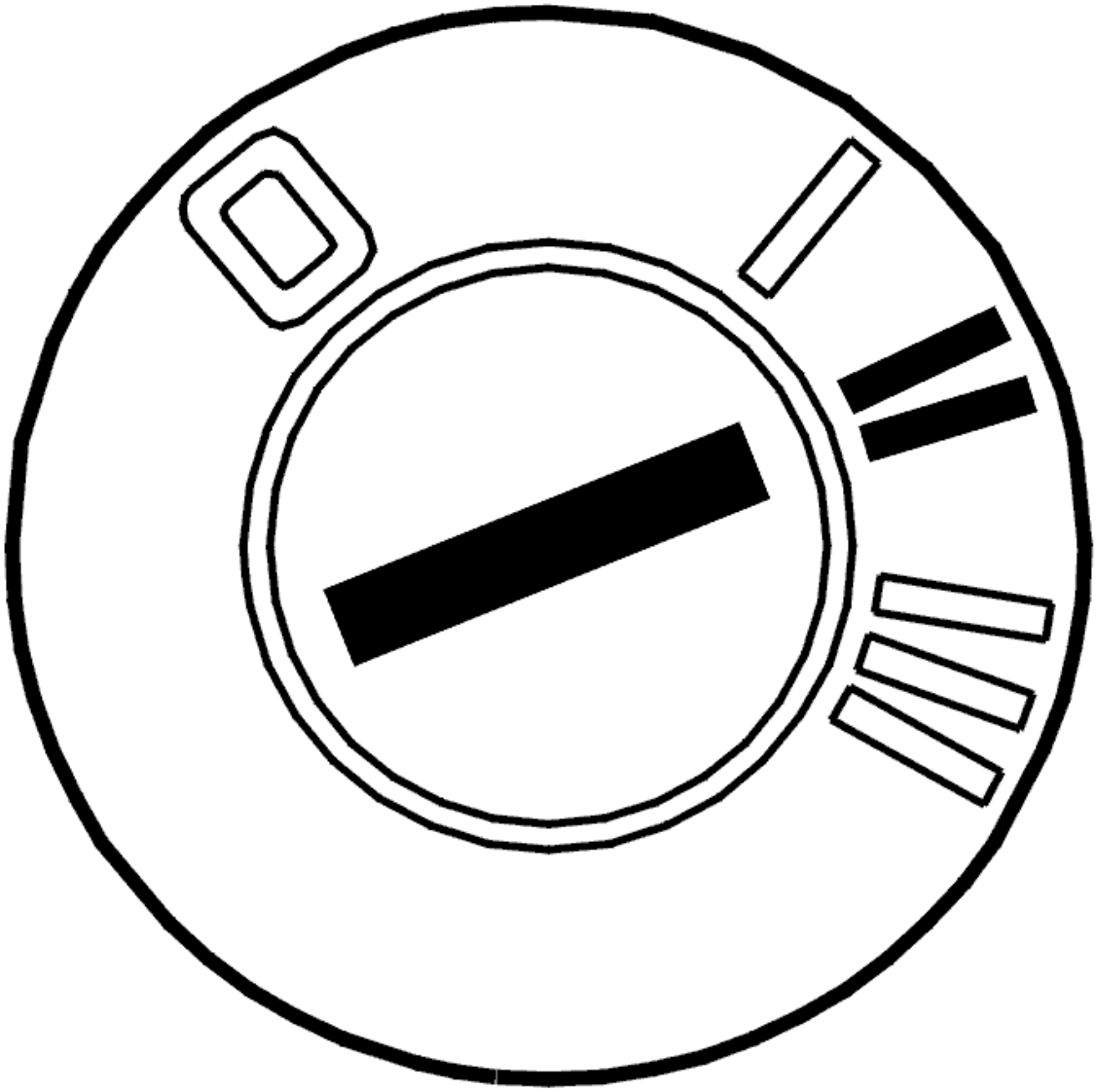


Fig. 281: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-0051 are stored, these must be fault-traced and remedied after this fault-tracing is completed.

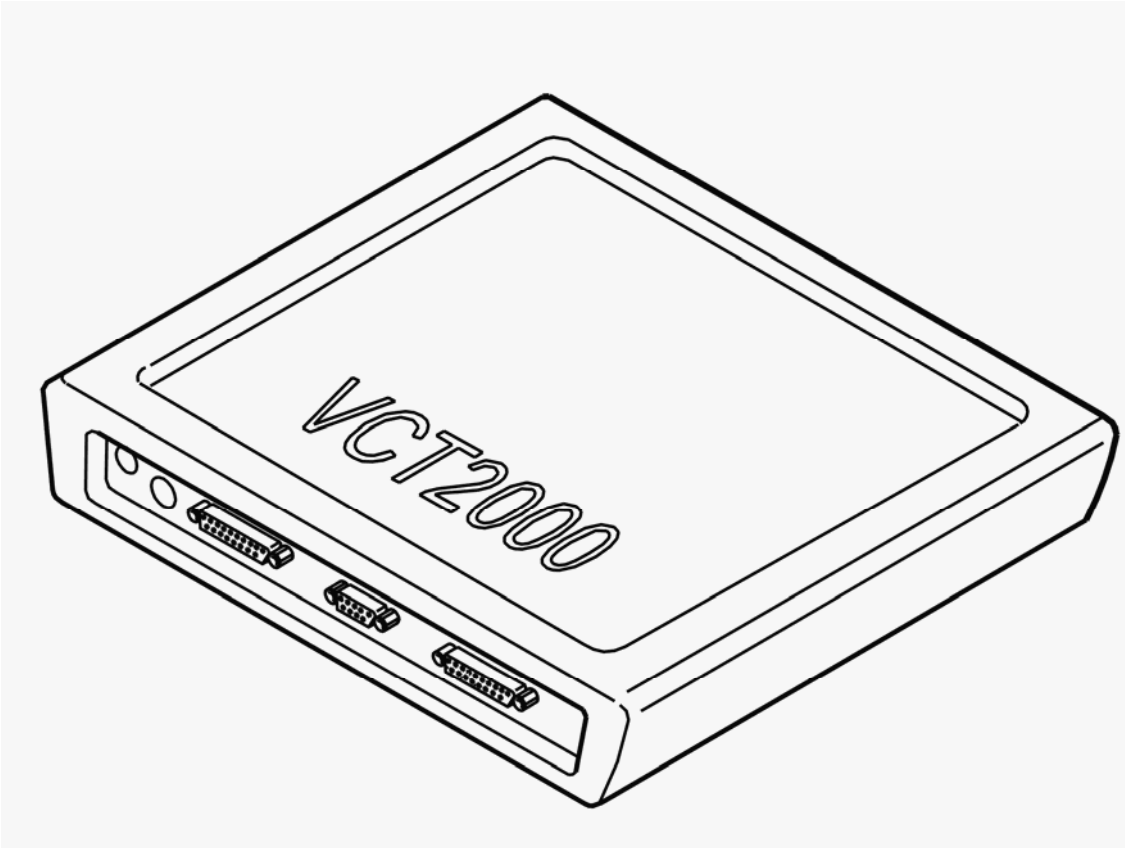


Fig. 282: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **ERASING DIAGNOSTIC TROUBLE CODES (DTCS)**

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

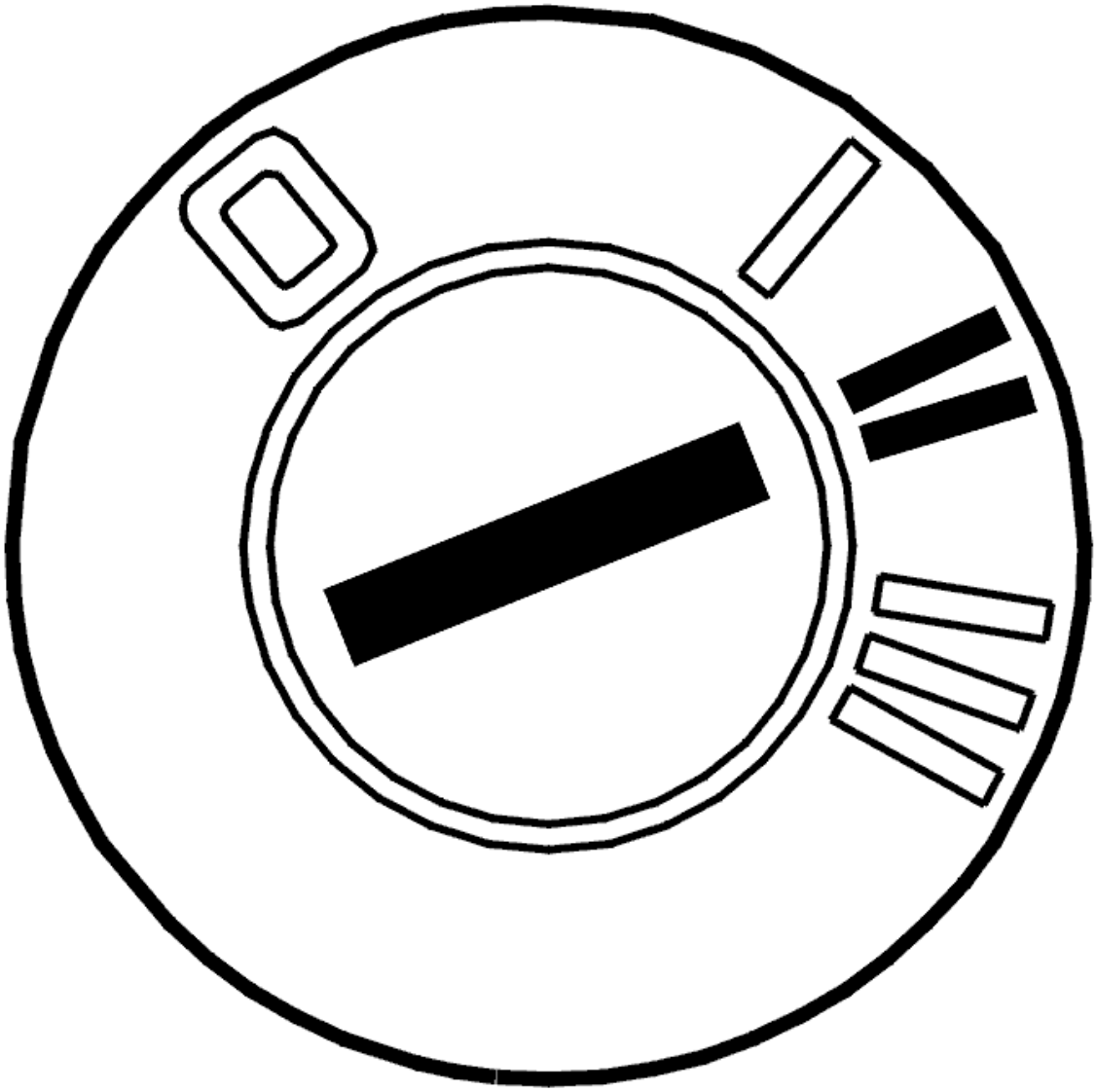


Fig. 283: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

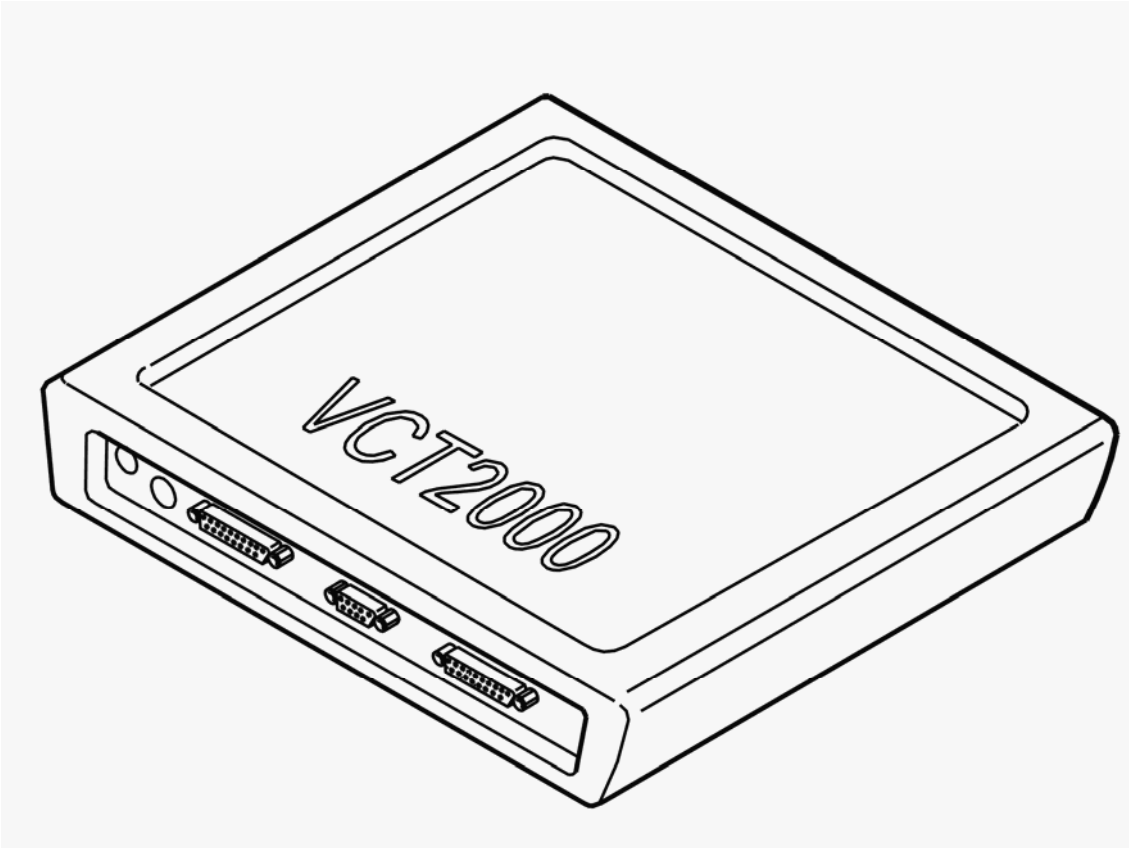


Fig. 284: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

TEST DRIVING

NOTE: Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

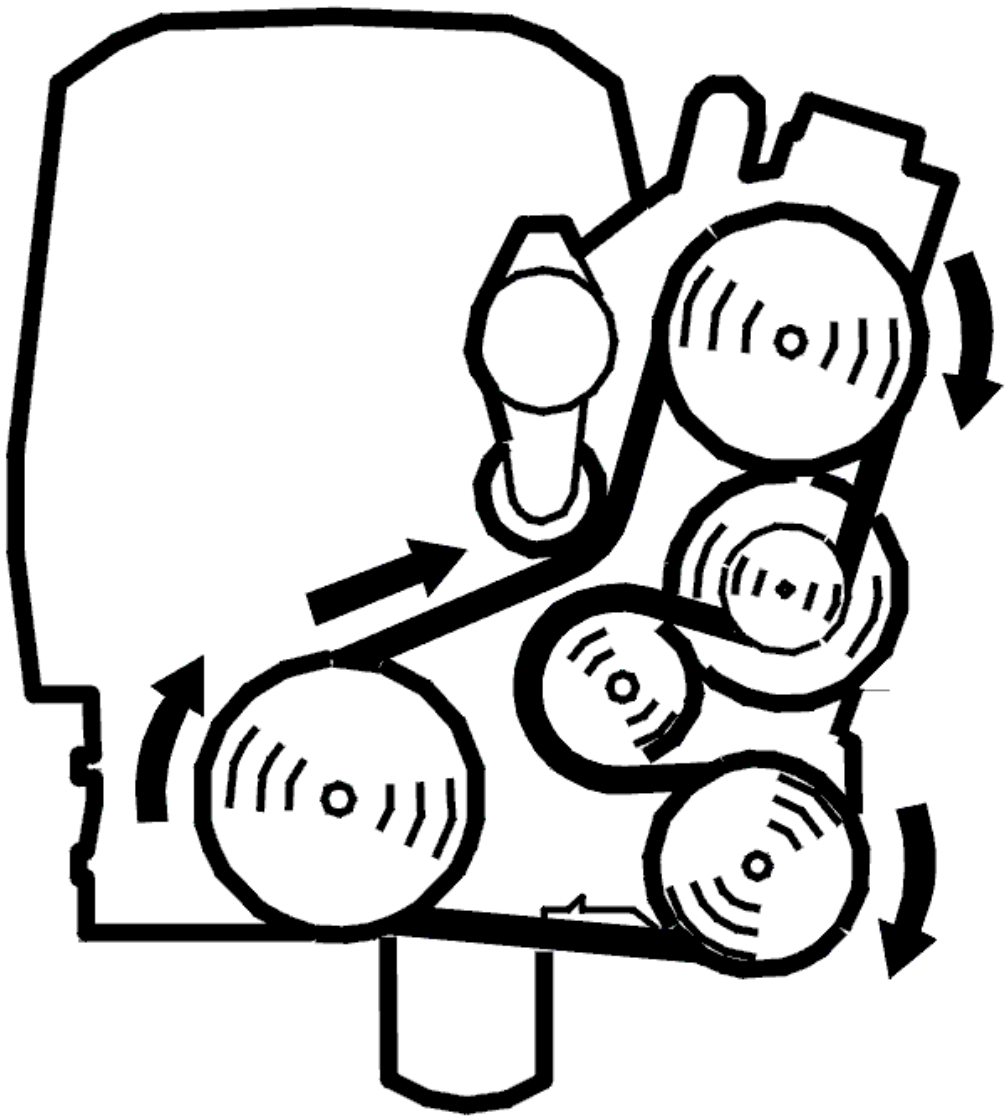


Fig. 285: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect the VIDA station. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission fluid should be at operating

temperature, approximately 80-90°C.

Shift the gear selector to position D (fourth gear for geartronic). Carefully accelerate to 80 km/h. Maintain the same speed for at least 60 seconds.

Criteria for diagnostic trouble code (DTC):

- The transmission fluid temperature must exceed 30°C
- The engine must be running for at least 20 seconds
- Gear selector in position D, 3 or 2 (4T65EV).

  Gear selector in Geartronic position and gears 4, 3 or 2 (4T65EV-GT)

- Speed 80 km/h for at least 20 seconds.

  HINT: The car must be driven at an engine speed where the lock-up function is normally activated.

- At least 5 seconds since the last gear shift
- Positive engine torque (no engine braking).

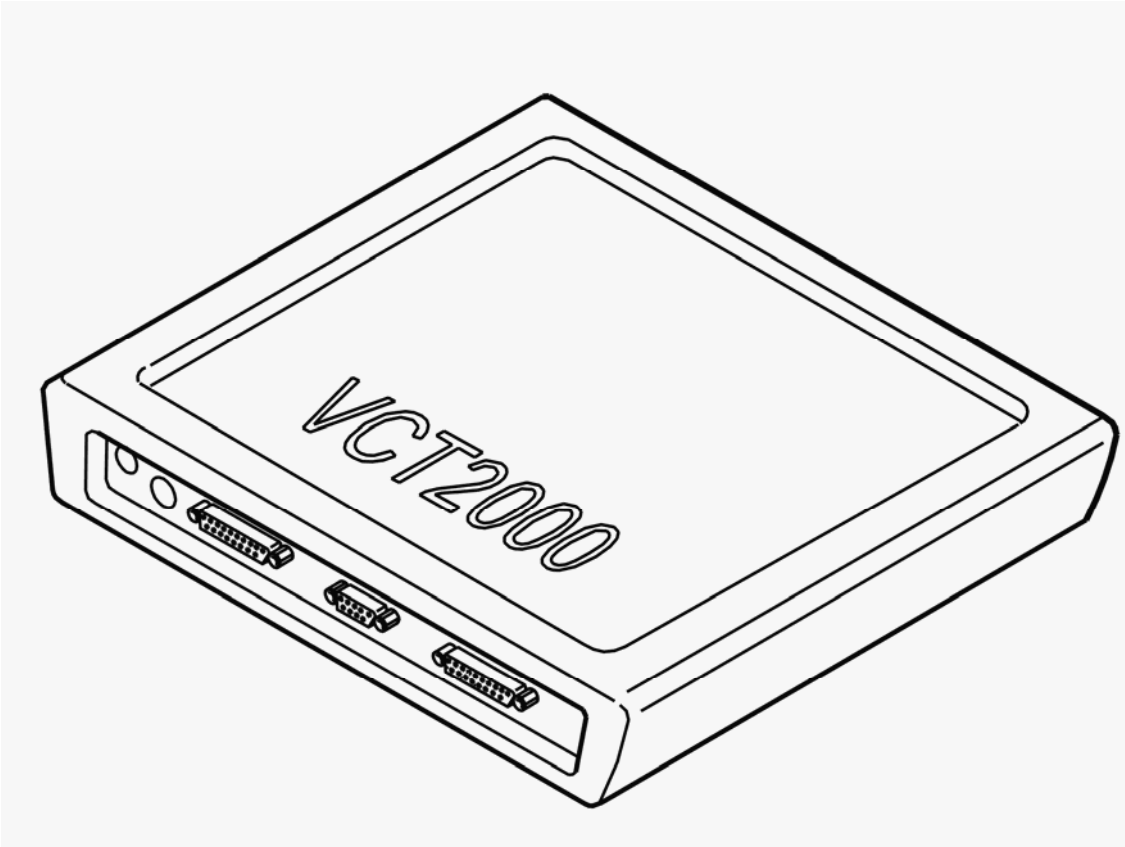


Fig. 286: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

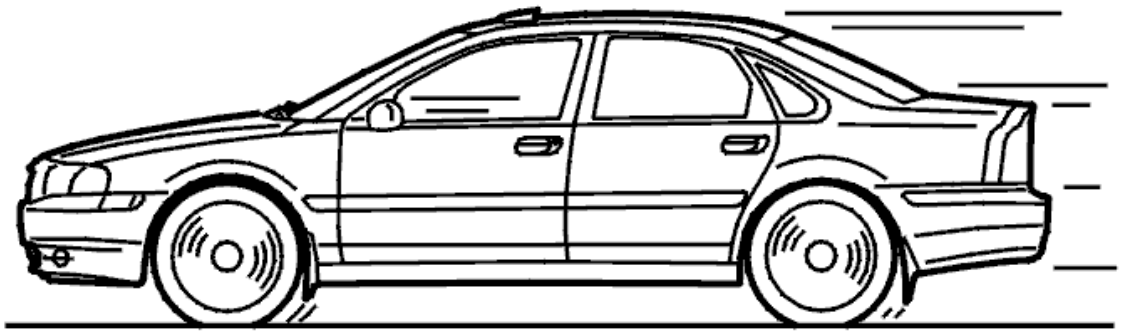


Fig. 287: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

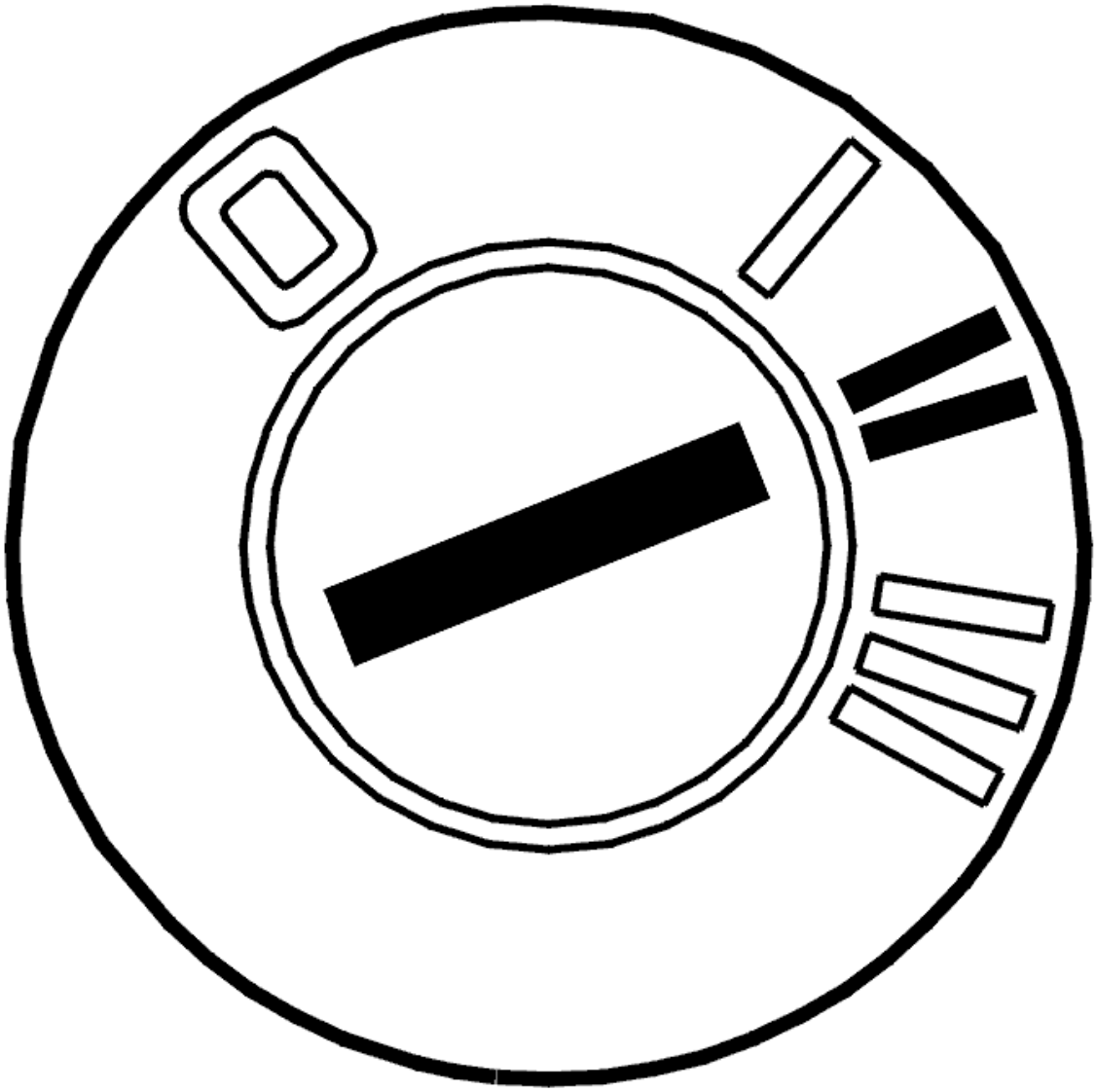


Fig. 288: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-0051 are stored, these must be fault-traced and remedied after this fault-tracing is completed.

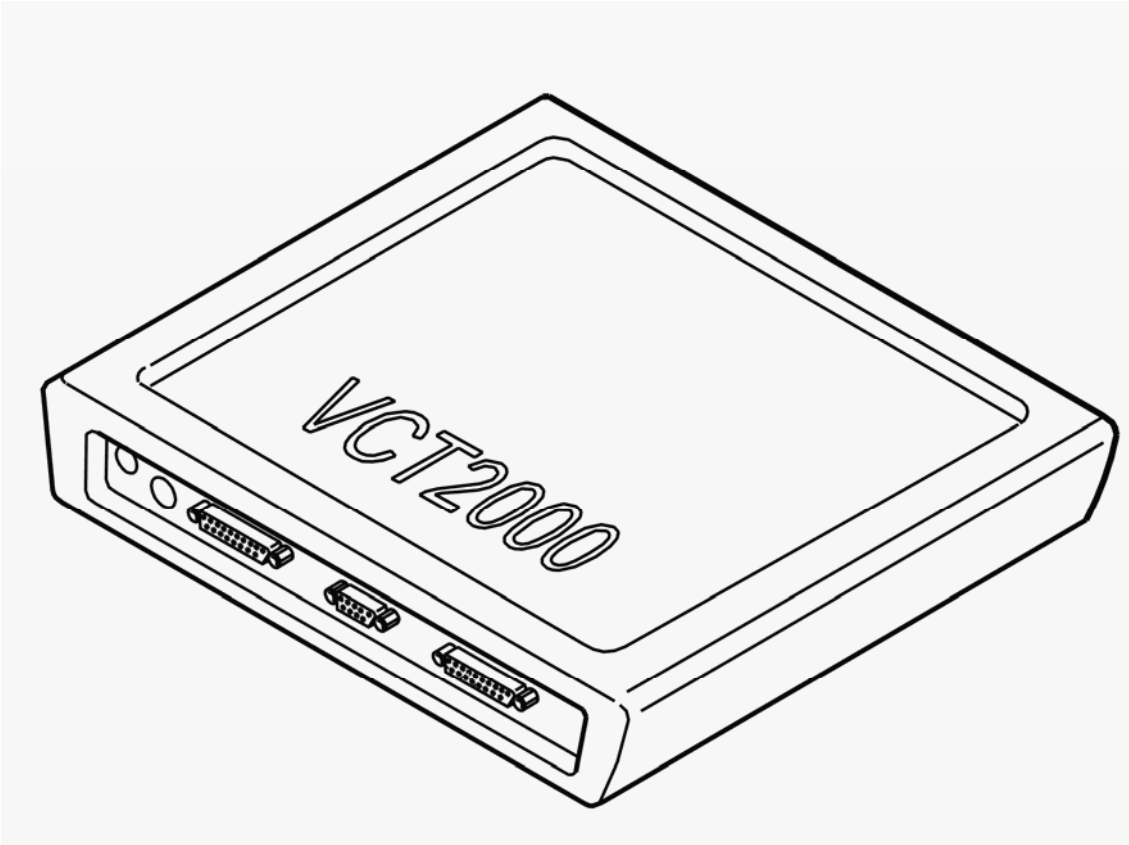


Fig. 289: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was diagnostic trouble code (DTC) TCM-0051 stored?

- **YES**

  Refer to **CHECKING SOLENOID SL**

- **NO**

  Refer to **FAULT-TRACING INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect

circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

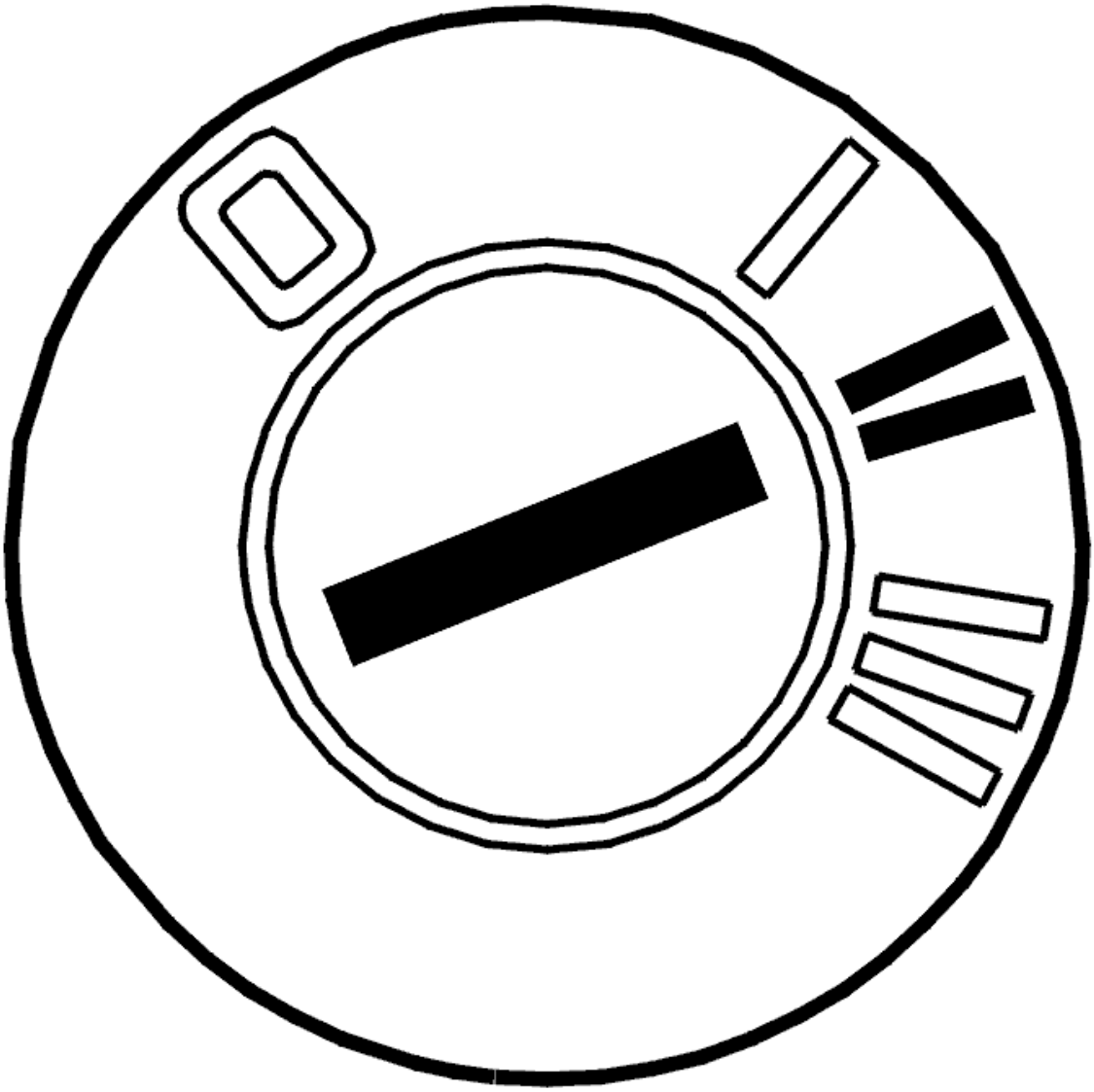


Fig. 290: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

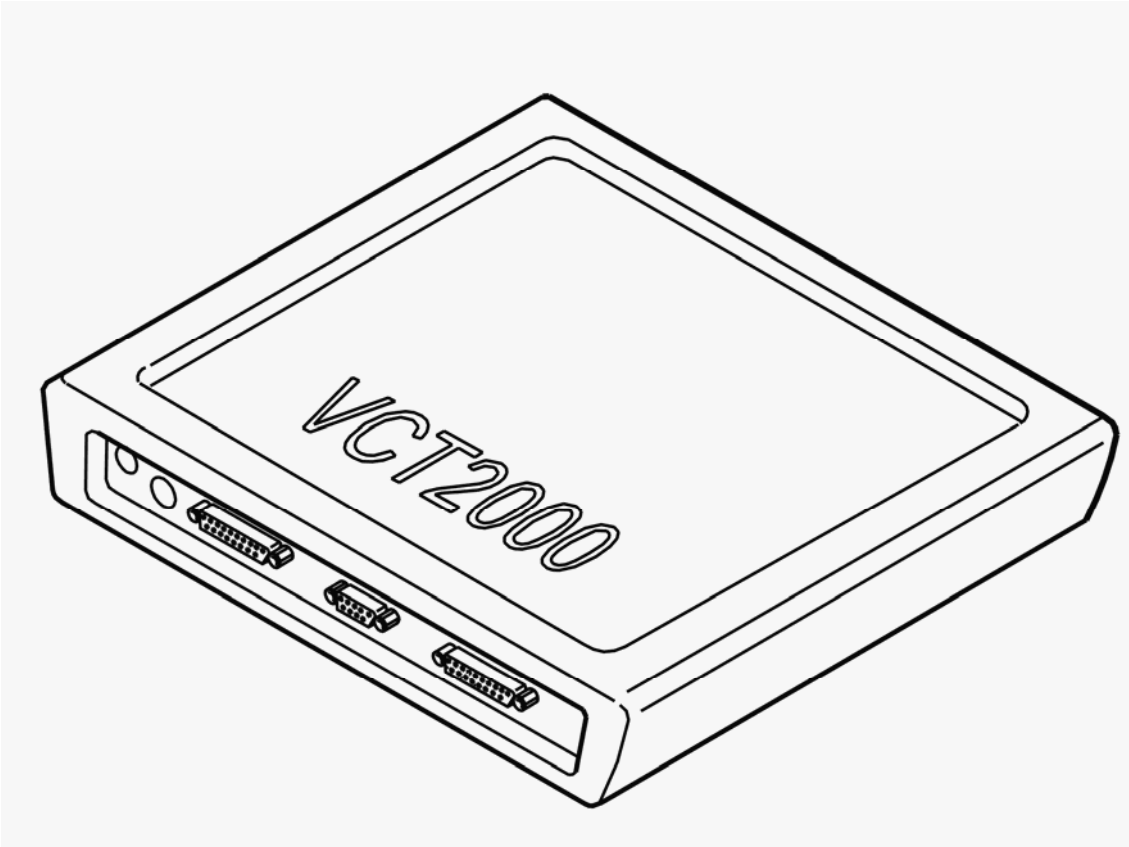


Fig. 291: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

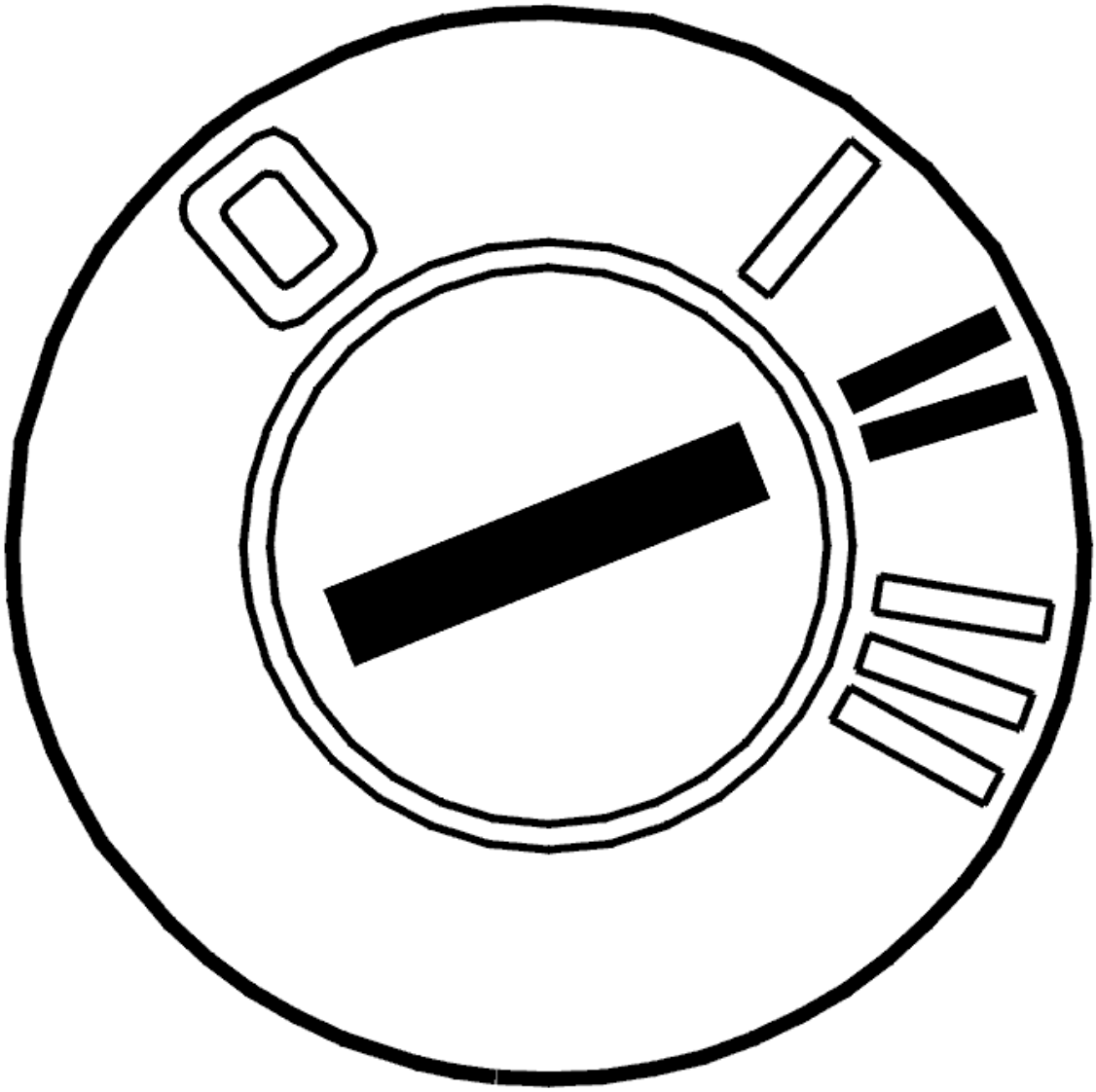


Fig. 292: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-0051 are stored, these must be fault-traced and remedied after this fault-tracing is completed.

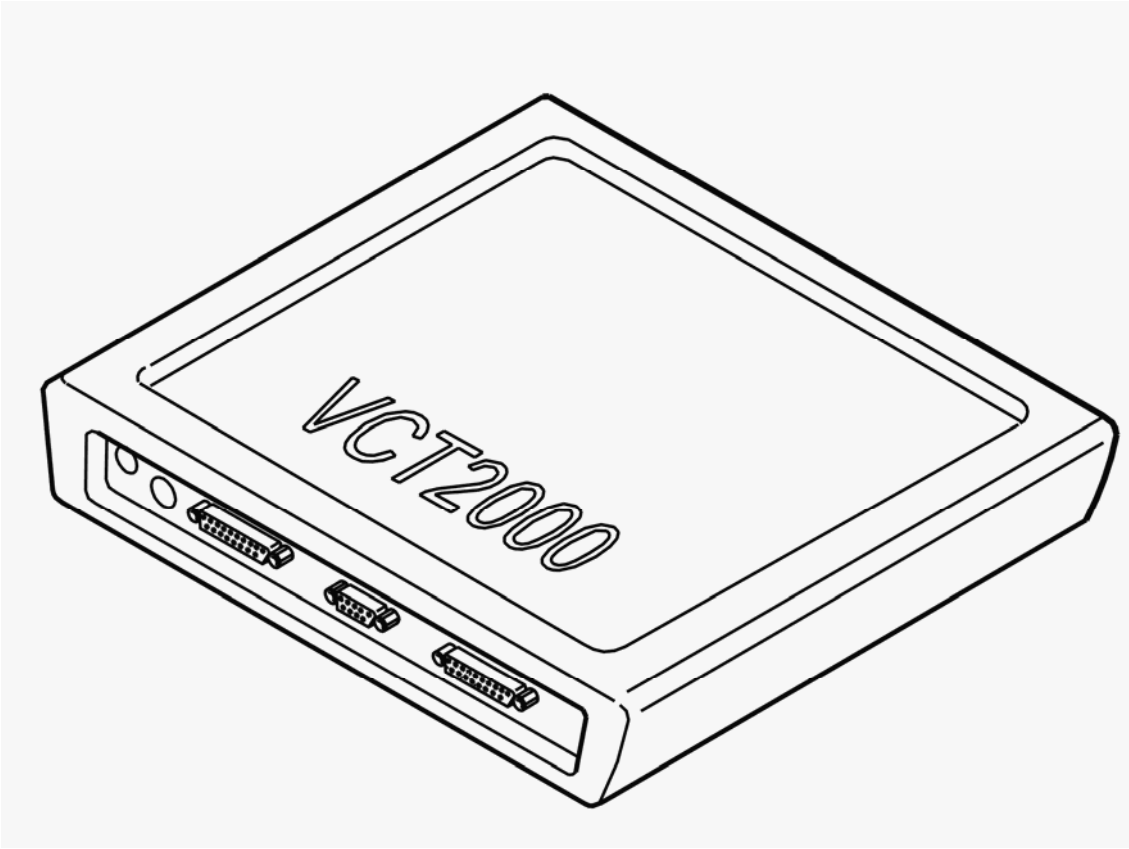


Fig. 293: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **ERASING DIAGNOSTIC TROUBLE CODES (DTCS)**

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

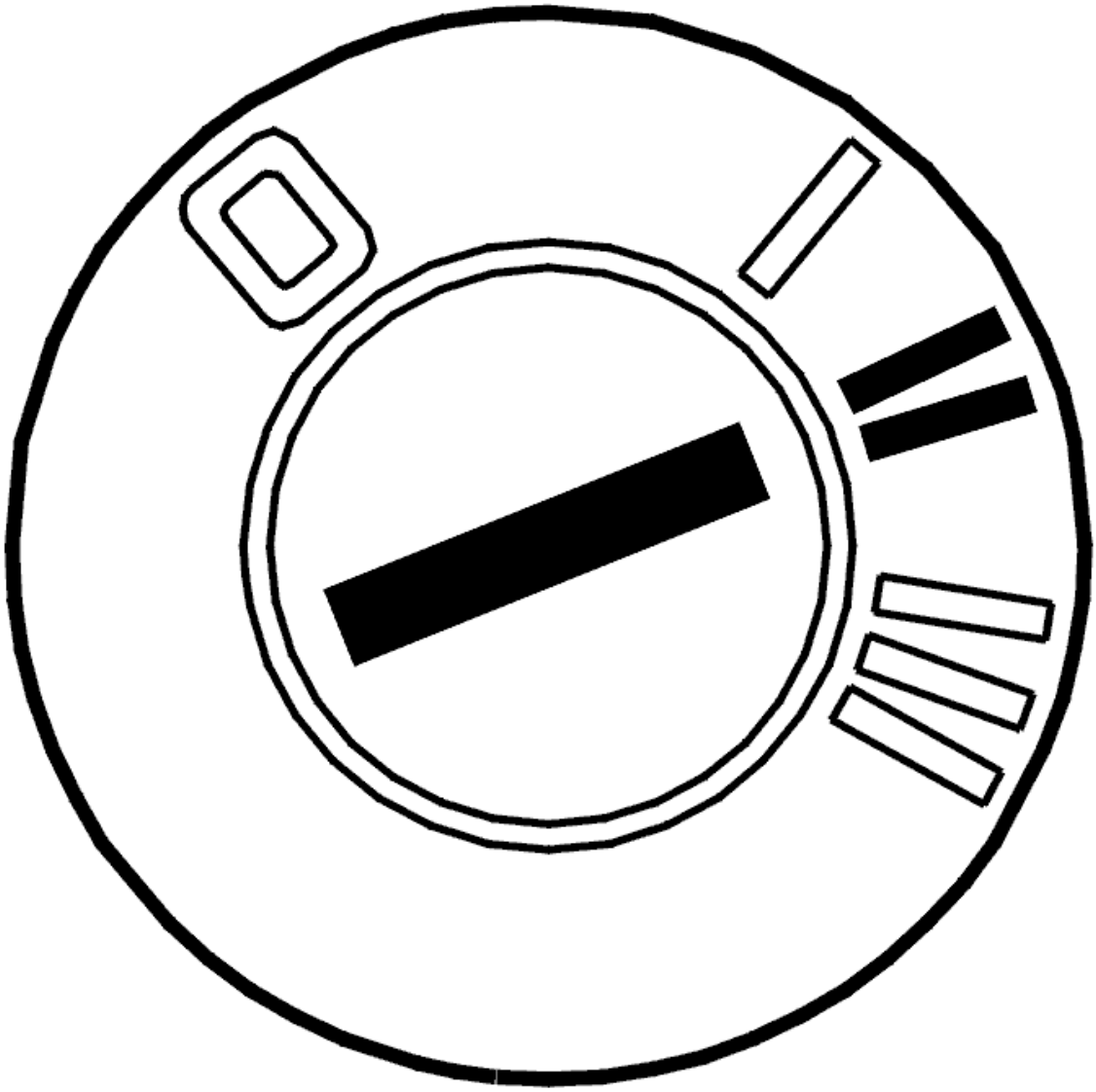


Fig. 294: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

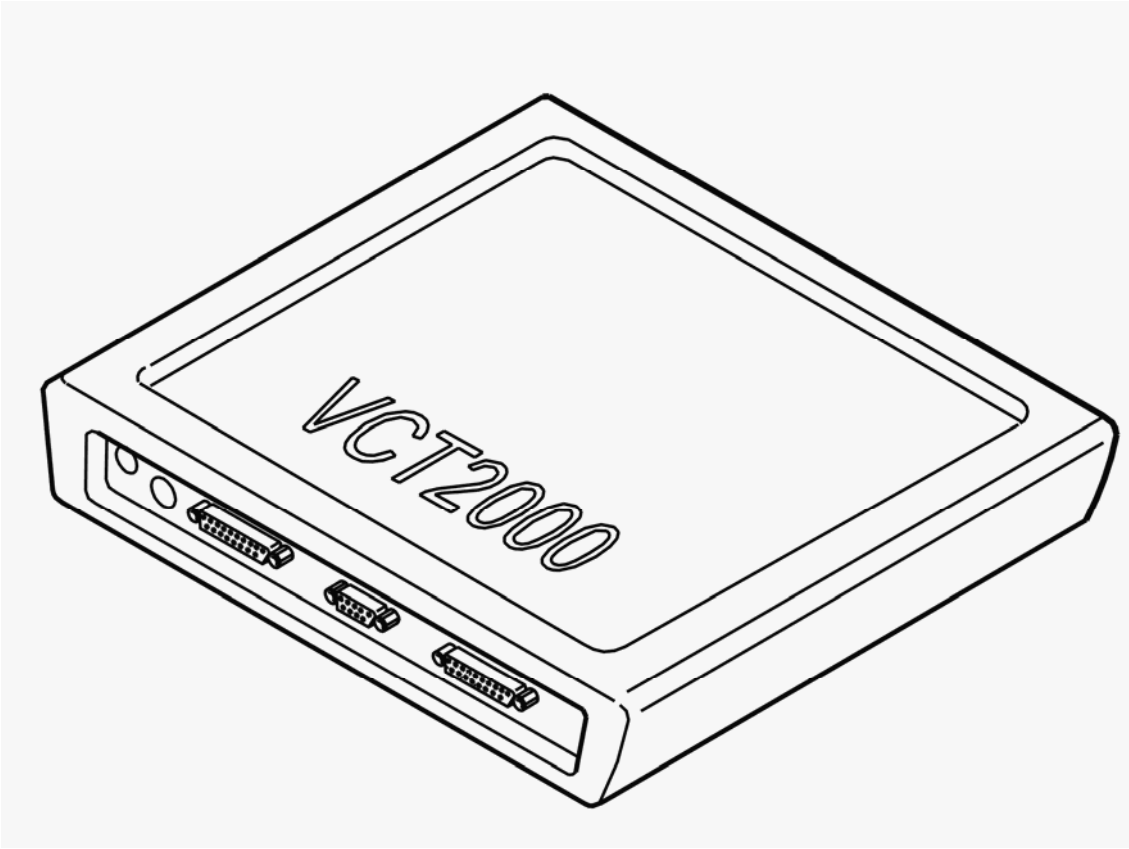


Fig. 295: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

TEST DRIVING

NOTE: **Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.**

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

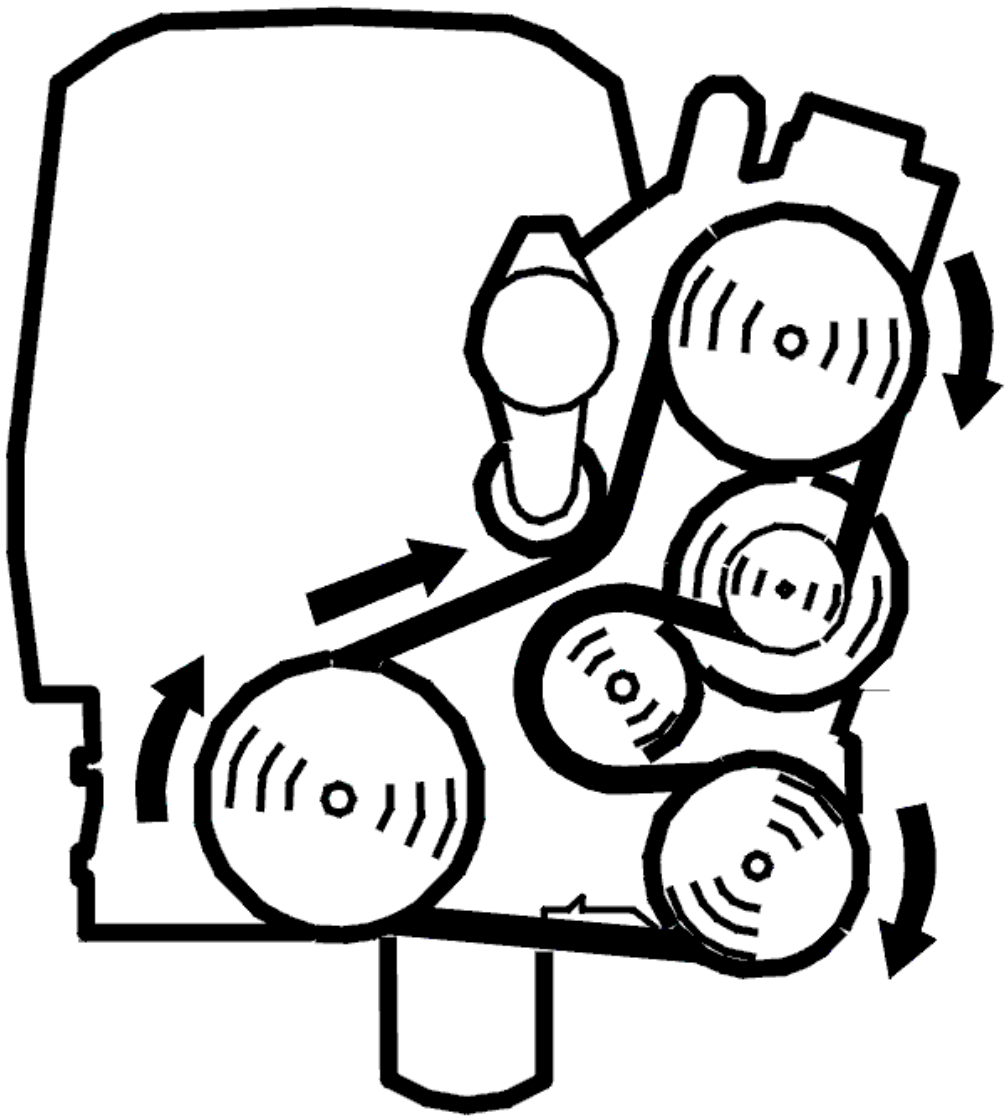


Fig. 296: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect the VIDA station. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission fluid should be at operating

temperature, approximately 80-90°C.

Shift the gear selector to position D (fourth gear for geartronic). Carefully accelerate to 80 km/h. Maintain the same speed for at least 60 seconds.

Criteria for diagnostic trouble code (DTC):

- The transmission fluid temperature must exceed 30°C
- The engine must be running for at least 20 seconds
- Gear selector in position D, 3 or 2 (4T65EV).

  Gear selector in Geartronic position and gears 4, 3 or 2 (4T65EV-GT)

- Speed 80 km/h for at least 20 seconds.

  HINT: The car must be driven at an engine speed where the lock-up function is normally activated.

- At least 5 seconds since the last gear shift
- Positive engine torque (no engine braking).

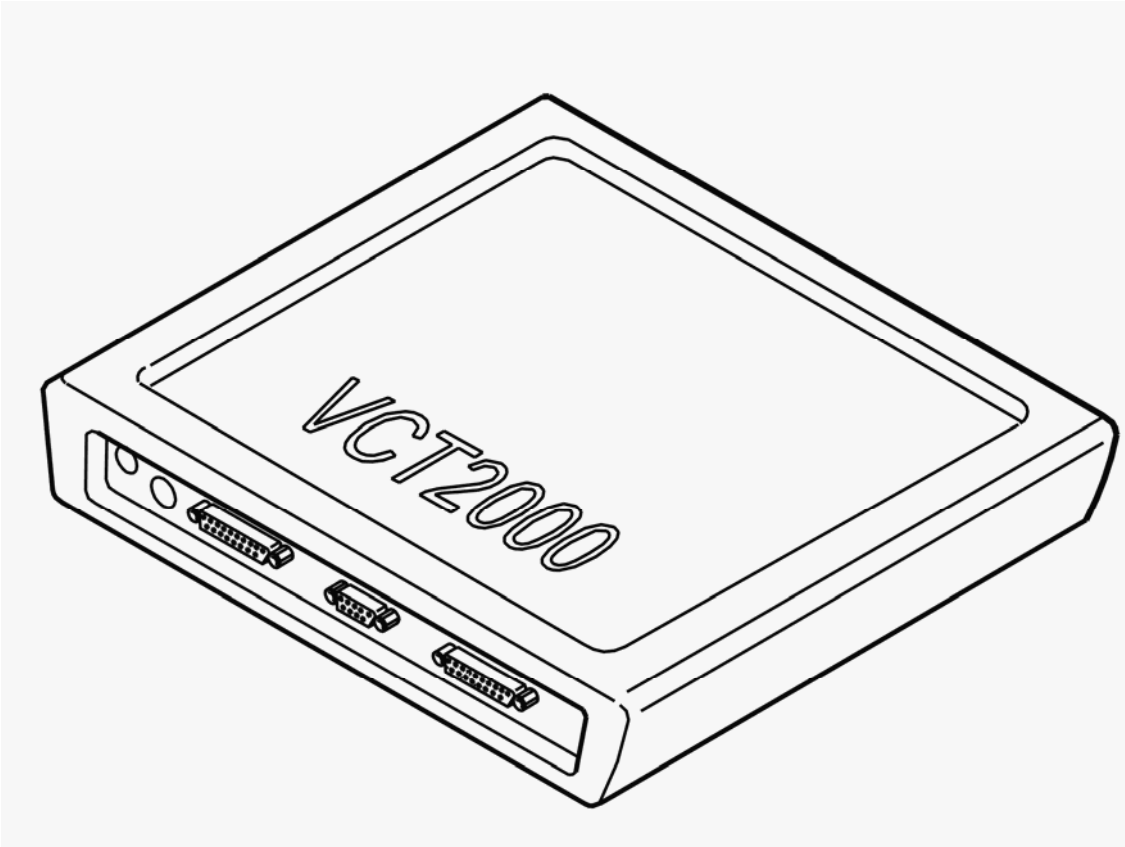


Fig. 297: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

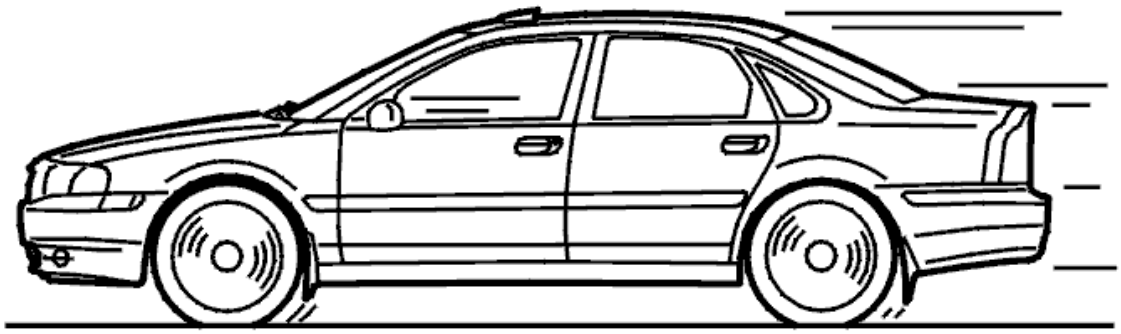


Fig. 298: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

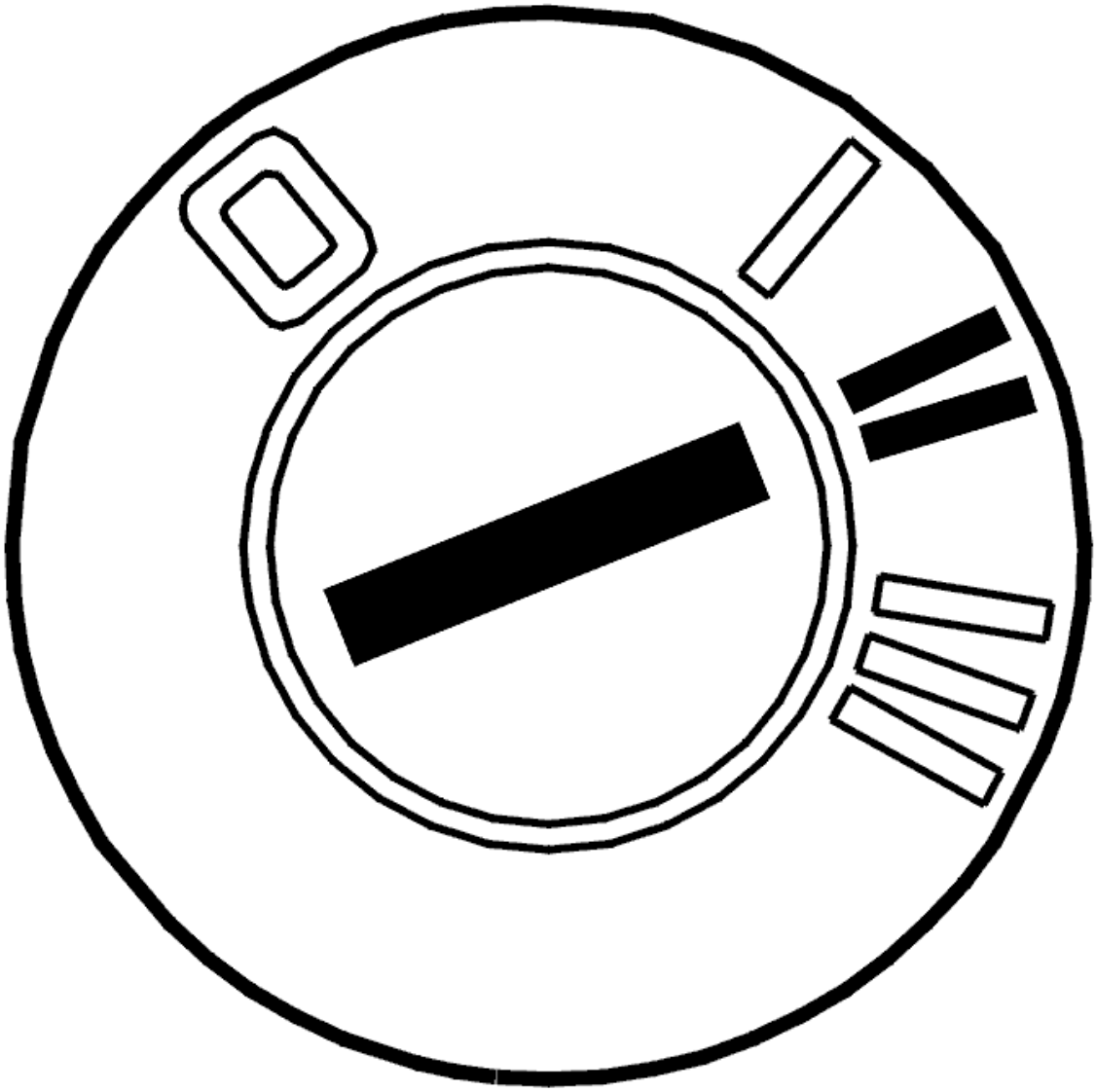


Fig. 299: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-0051 are stored, these must be fault-traced and remedied after this fault-tracing is completed.

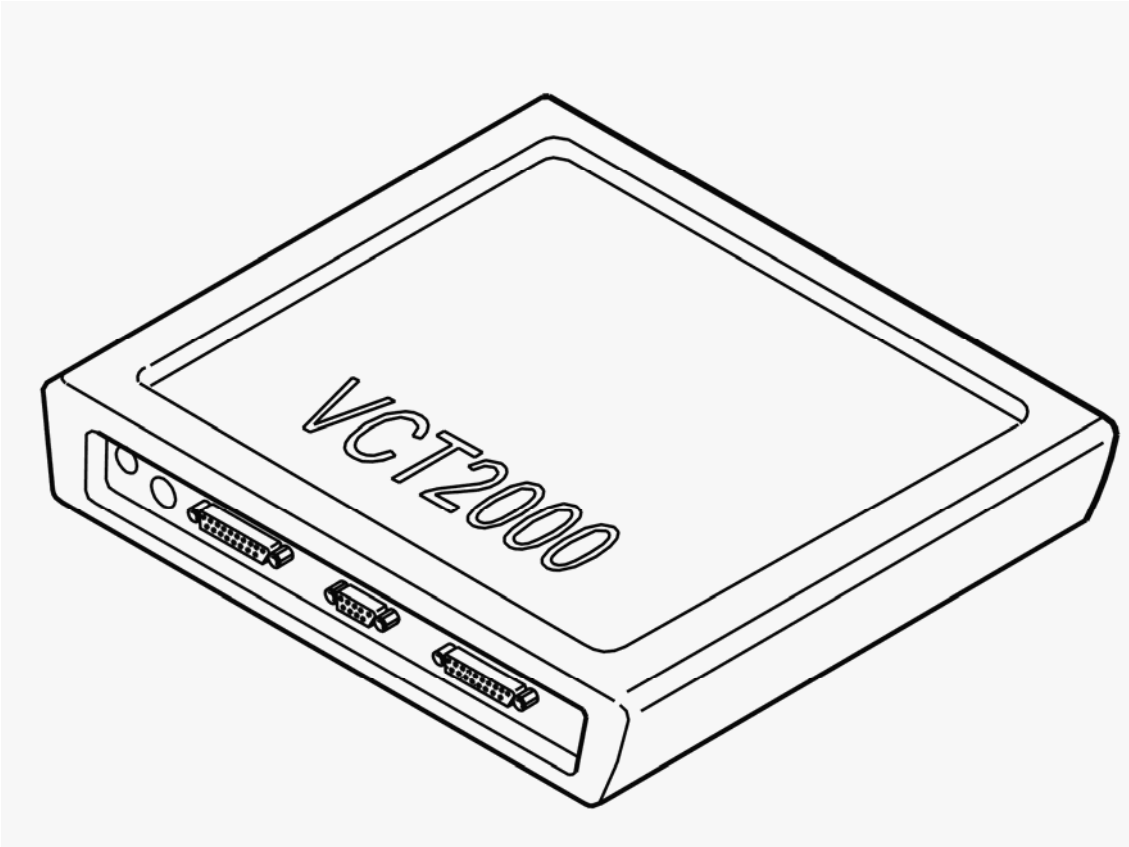


Fig. 300: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was diagnostic trouble code (DTC) TCM-0051 stored?

- **YES**

  Refer to **INFORMATION**

- **NO**

  NO DTC

TCM-0052: SOLENOID SL. STUCK (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

The control module checks if lock-up solenoid SL is stuck in the open or closed position by comparing the signals from solenoid SL and lock-up pressure sensor PS4. Pressure sensor PS4 detects whether solenoid SL is activated or not. Diagnostic trouble code (DTC) TCM-0052 is stored if the control module registers that solenoid SL has jammed between the open and closed positions.

Substitute Value

- The control module does not activate the lock-up solenoid.

Possible Source

- Lock-up solenoid SL has jammed
- Mechanical fault in the transmission control system
- Defective solenoid SL.

Fault symptom[s]

- General orange warning lamp lit
- No lock-up function.

STUCK

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

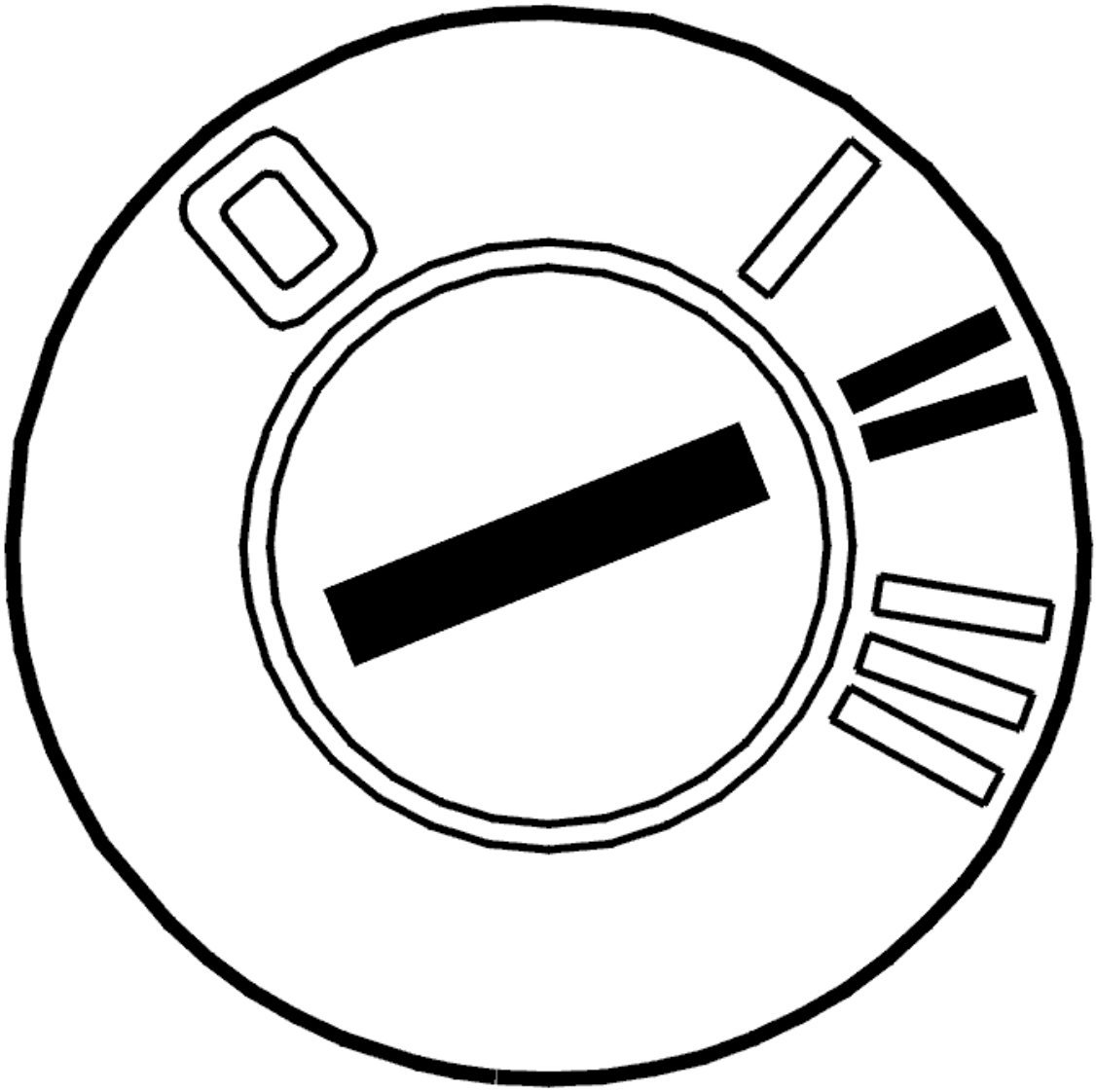


Fig. 301: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  Any diagnostic trouble codes (DTCs) other than TCM-0050, TCM-0051 and TCM-0052 that are stored must be fault-traced after this fault-tracing is completed.

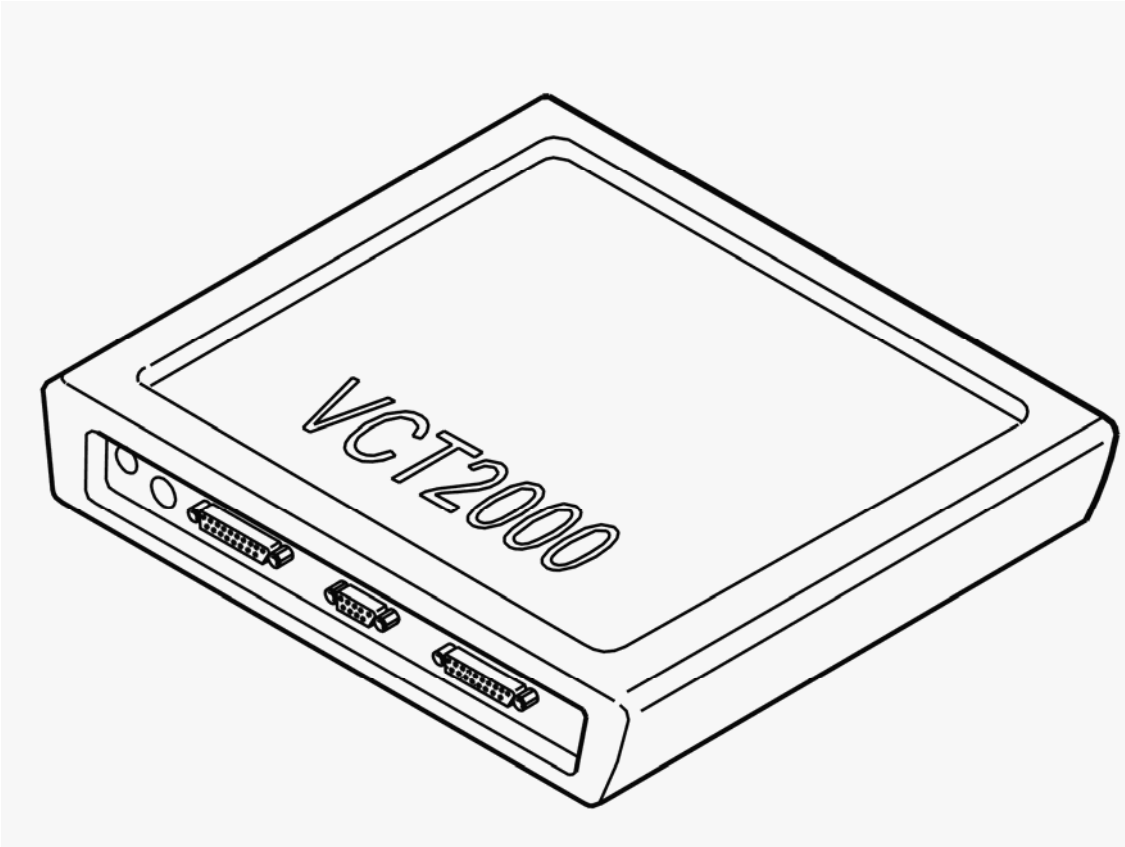


Fig. 302: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **ERASING DIAGNOSTIC TROUBLE CODES (DTCS)**

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

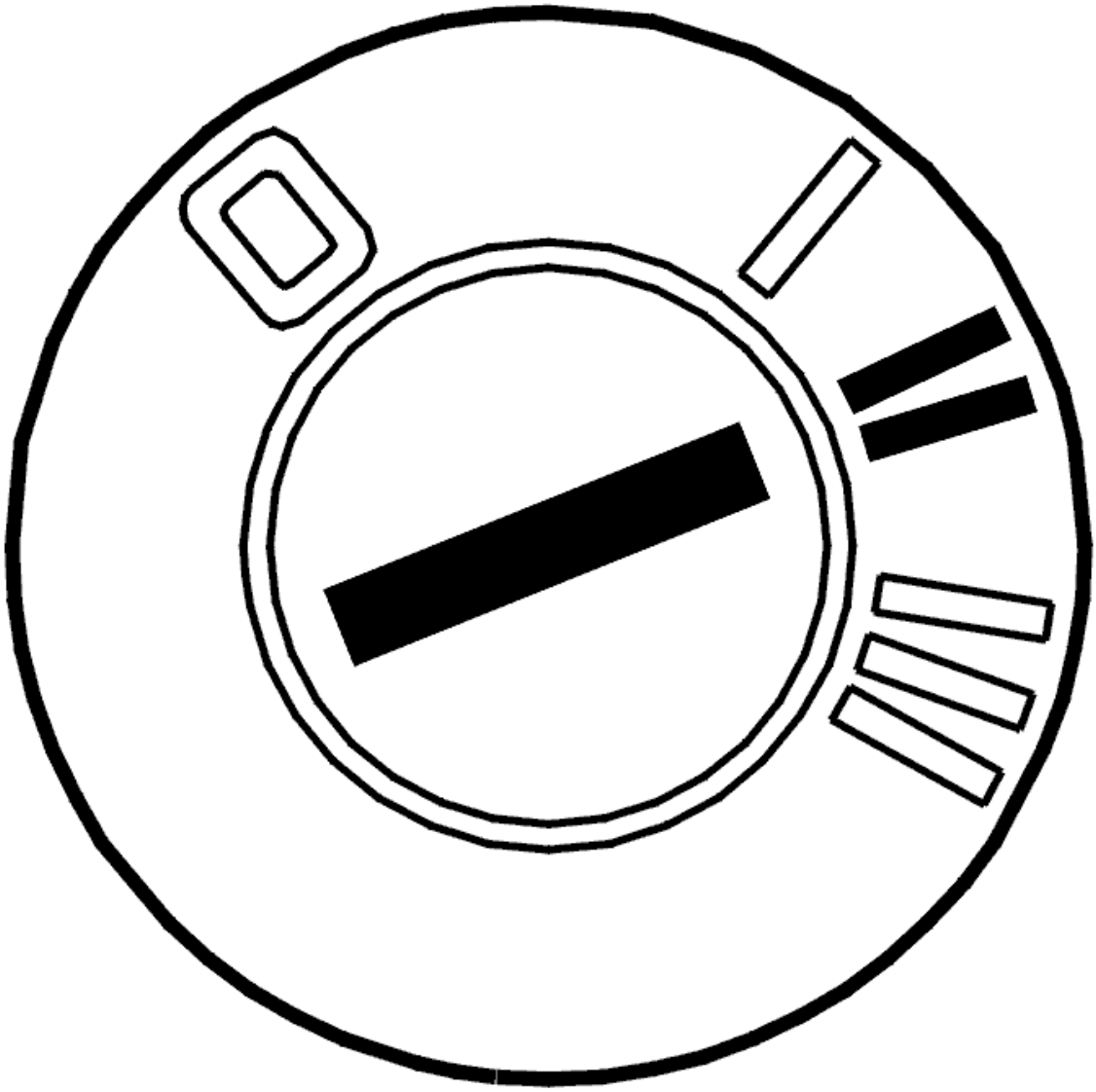


Fig. 303: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

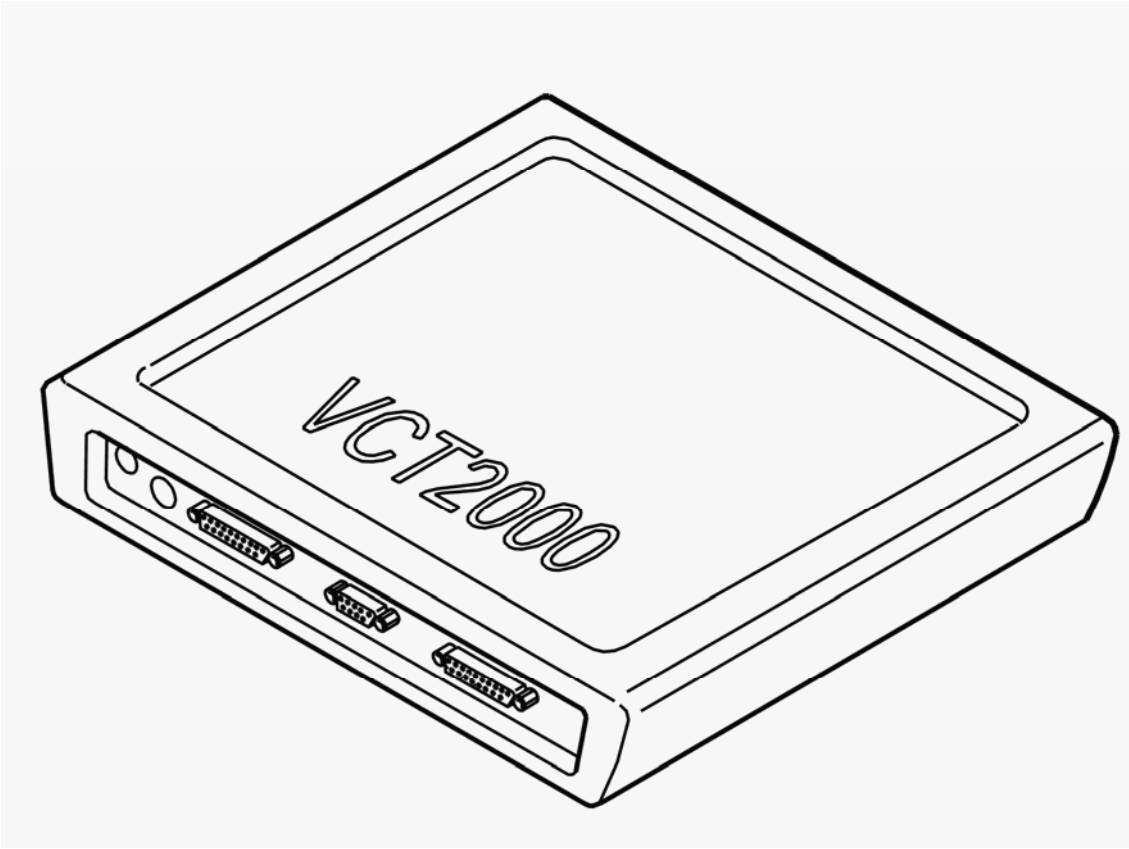


Fig. 304: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE SOFTWARE**

TEST DRIVING

NOTE: **Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.**

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

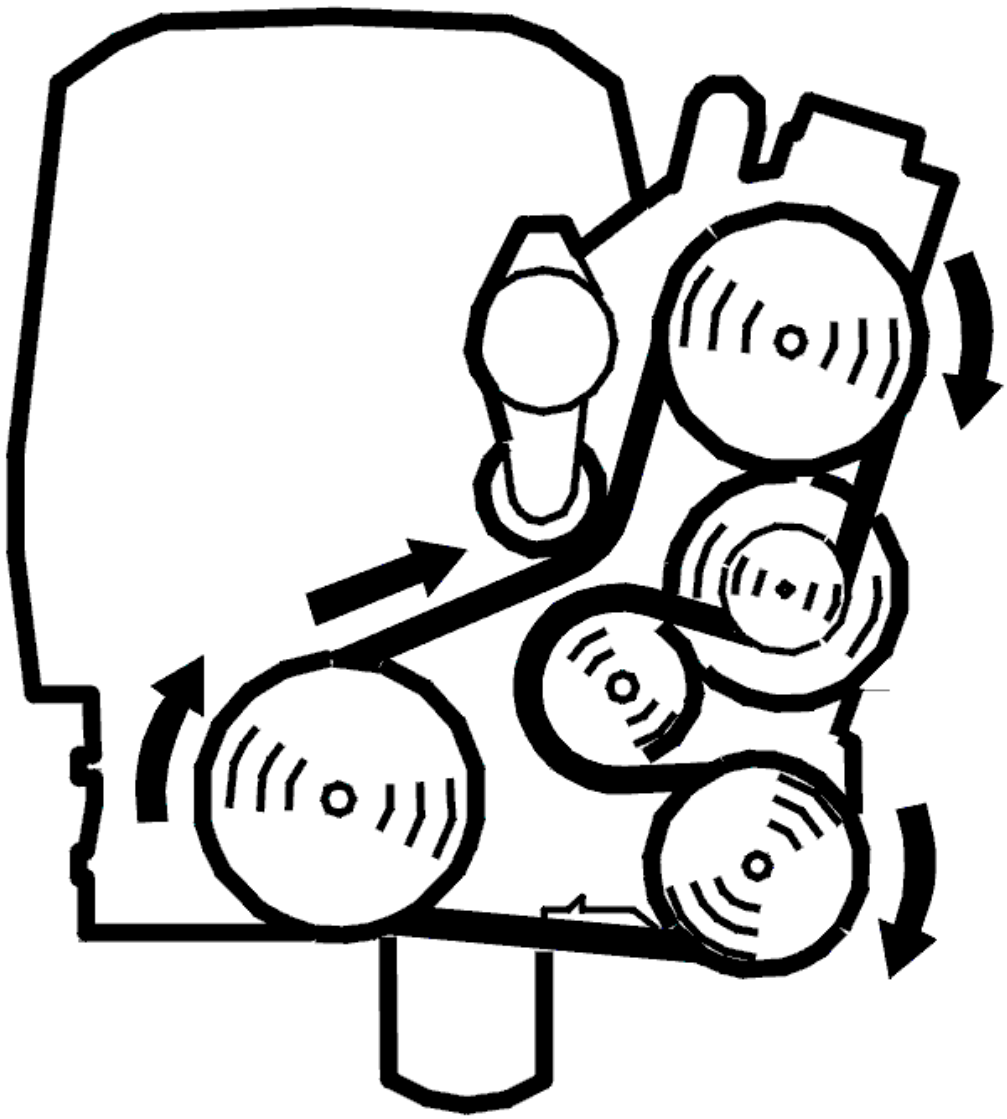


Fig. 305: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect the VIDA station. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission fluid should be at operating

temperature, approximately 80-90°C.

Shift the gear selector to position D (fourth gear with geartronic). Carefully accelerate to 80 km/h (65 km/h for geartronic). Maintain the same speed for at least 20 seconds.

Accelerate further for approximately 20 seconds to increase the torque.

Criteria for diagnostic trouble code (DTC):

- The transmission fluid temperature must exceed 30°C
- The engine must be running for at least 20 seconds
- Gear selector in position D, 3 or 2 (4T65EV).

  Gear selector in Geartronic position and gears 4, 3 or 2 (4T65EV-GT)

- Speed 80 km/h for at least 5 seconds.

  HINT: The car must be driven at an engine speed where the lock-up function is normally activated.

- At least 5 seconds since the last gear shift
- Positive engine torque (no engine braking).

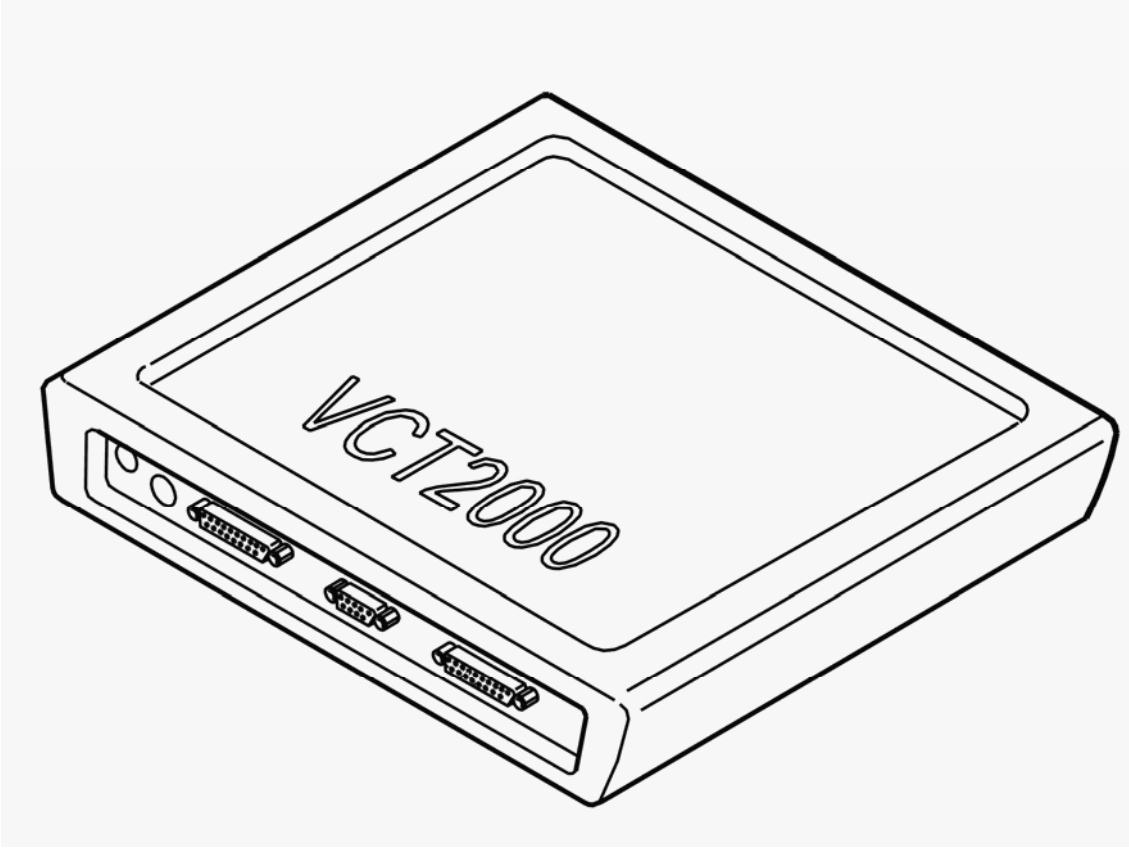


Fig. 306: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

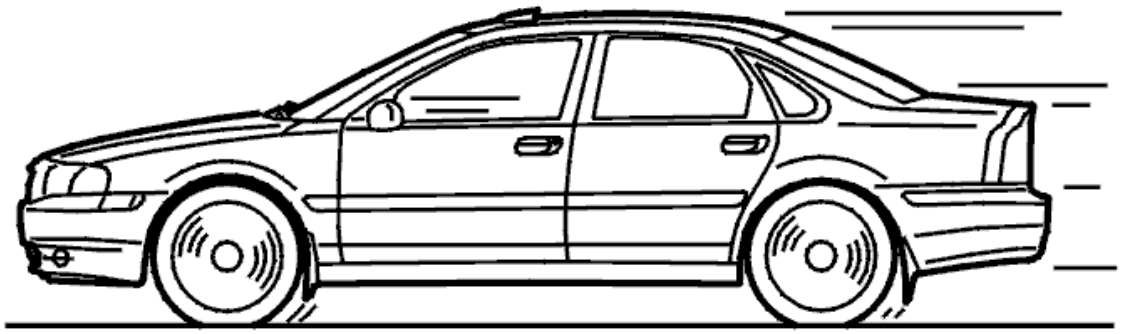


Fig. 307: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

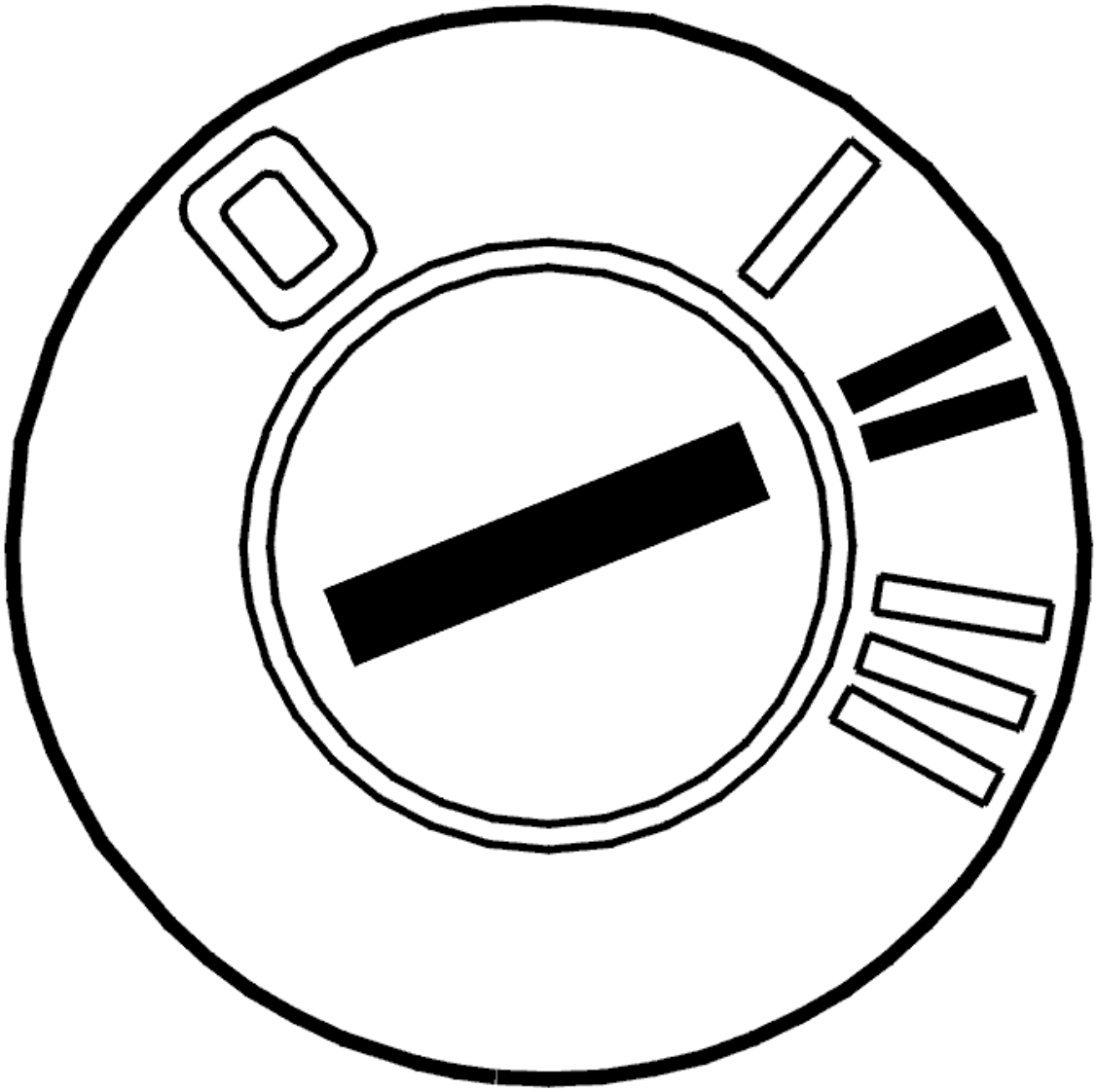


Fig. 308: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  Any diagnostic trouble codes (DTCs) other than TCM-0050, TCM-0051 and TCM-0052 that are stored must be fault-traced after this fault-tracing is completed.

  Select an option:

  1. Diagnostic trouble codes (DTCs) TCM-0050 and TCM-0052 were stored

     Refer to **REPLACING THE CONTROL SYSTEM**

  2. Only TCM-0052 or both TCM-0051 and TCM-0052 were stored

Refer to **CHECK THE QUALITY OF THE TRANSMISSION OIL**

3. No diagnostic trouble codes (DTCs) other than TCM-0050, TCM-0051 or TCM-0052 were stored.

   Refer to **FAULT-TRACING INFORMATION**

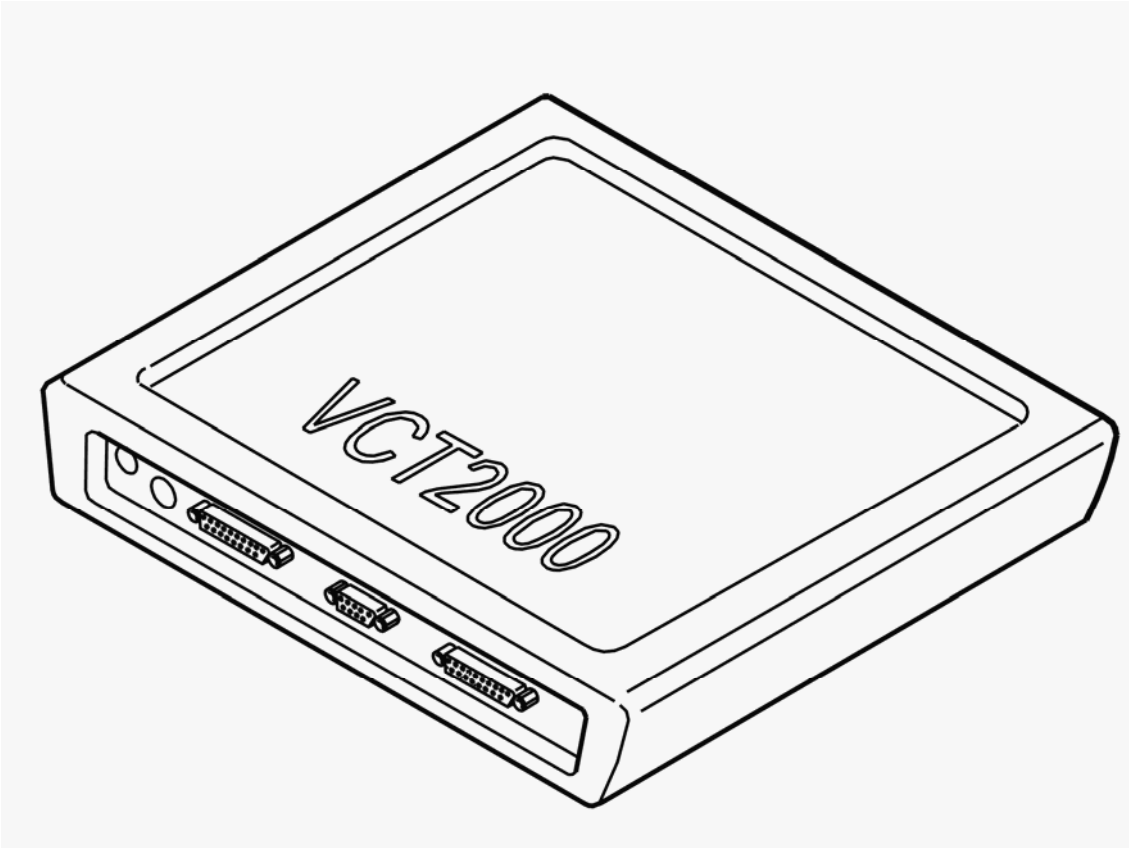


Fig. 309: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING SOLENOID SL

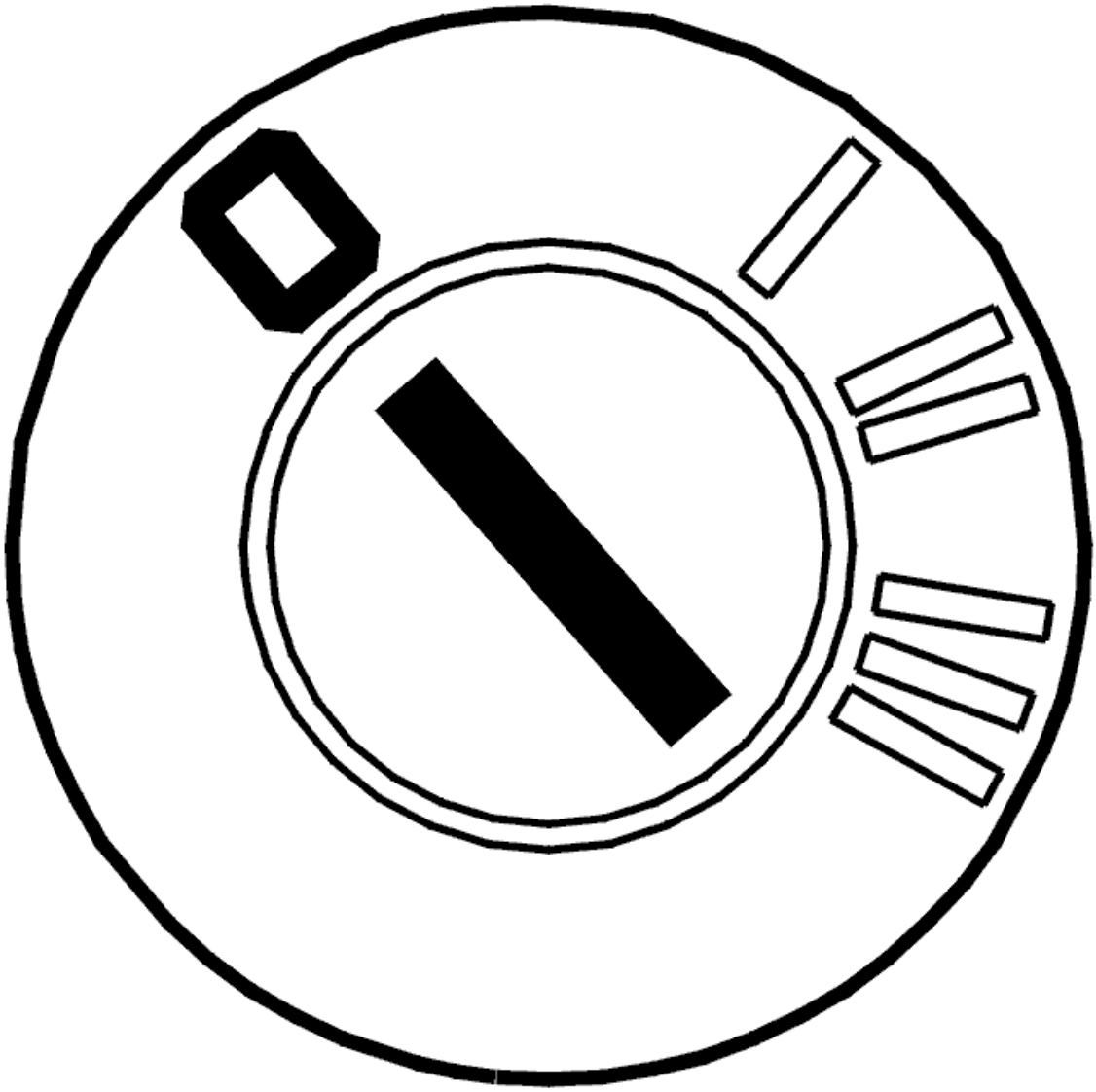


Fig. 310: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the control module connector (transmission side).

  Check solenoid SL by measuring the resistance between terminals #A51 (#A51) and #A53 (#A53).

  When the transmission is cold (20°C), the resistance must be 10-11 ohms. When the transmission is at operating temperature (150°C), the resistance must not exceed 16 ohms.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - For information about signals, see **SIGNAL SPECIFICATION** .

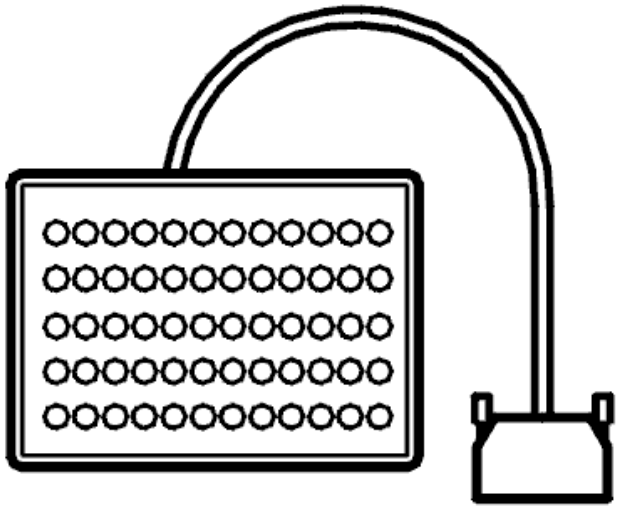


Fig. 311: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

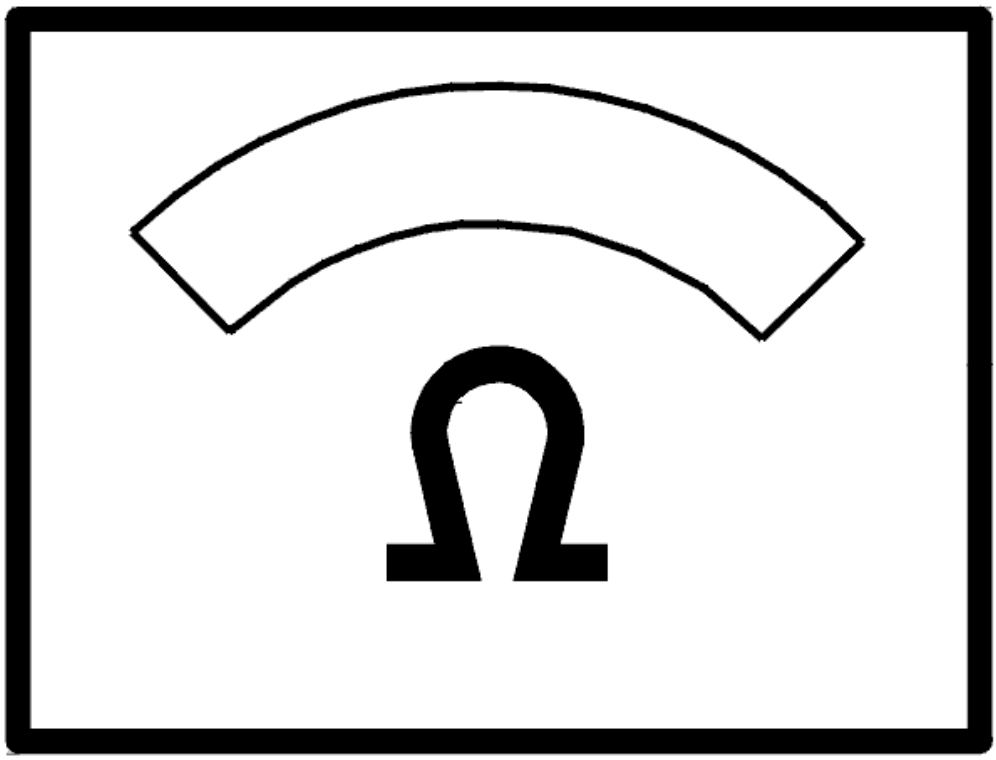


Fig. 312: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

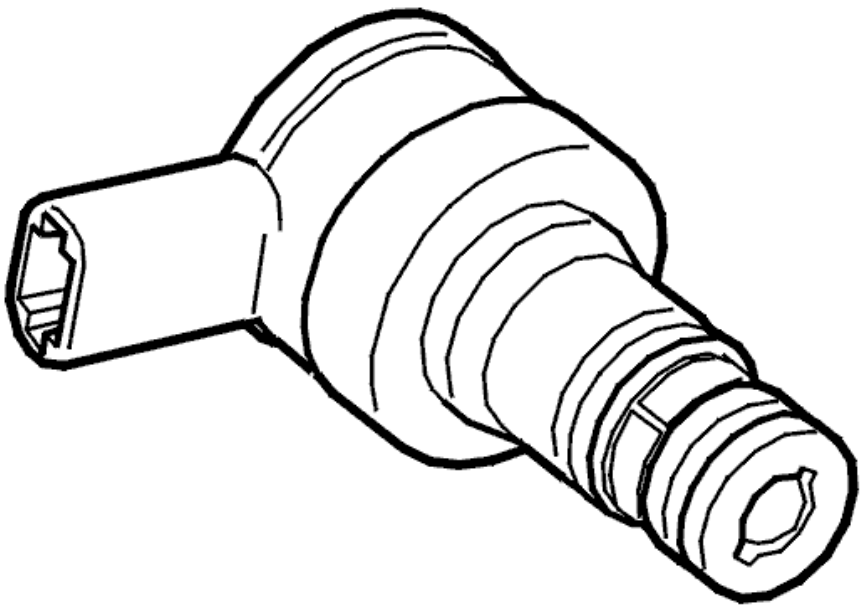


Fig. 313: Identifying Lock-Up Solenoid, SL
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

- **NO**

  Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

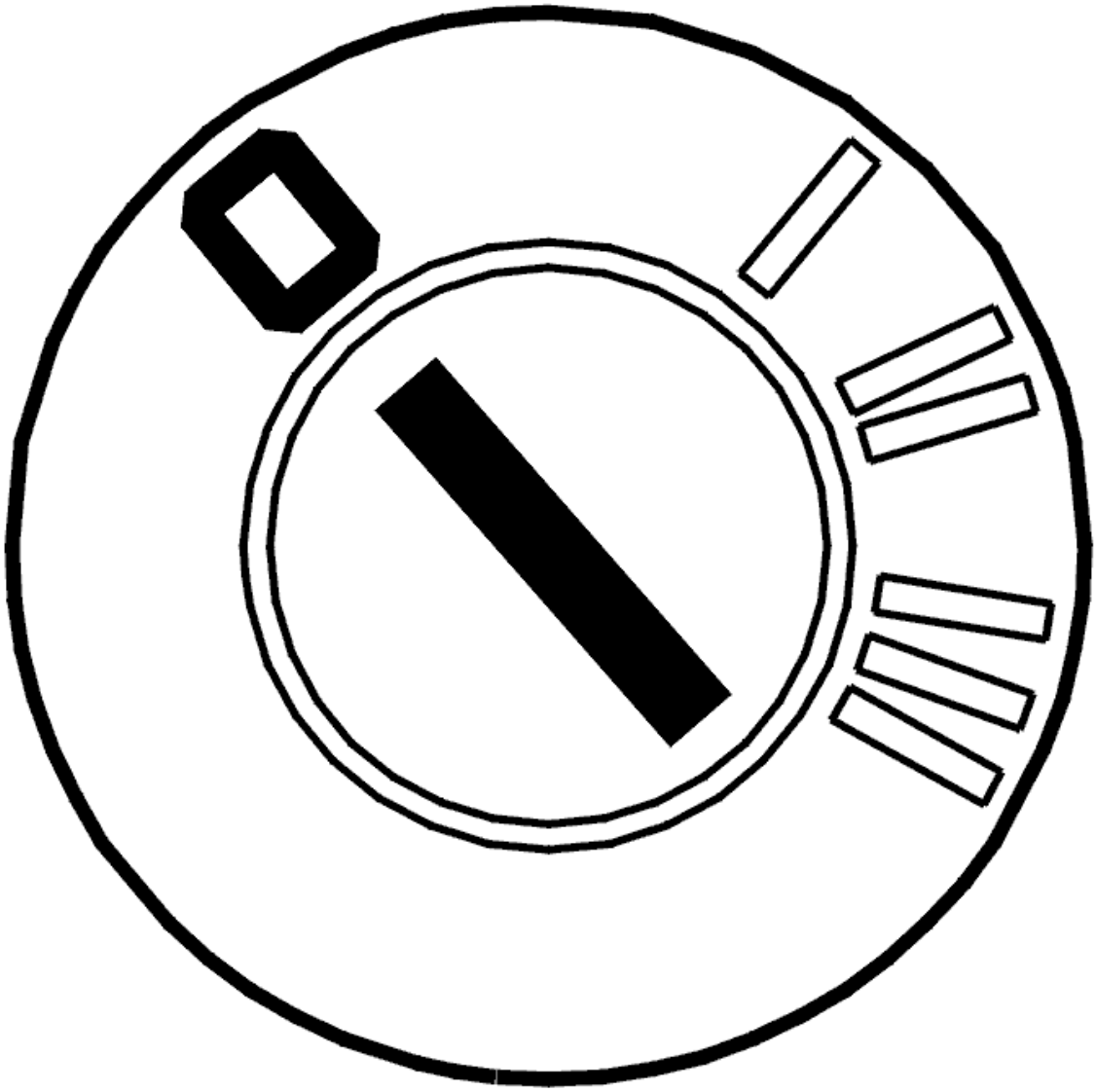


Fig. 314: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

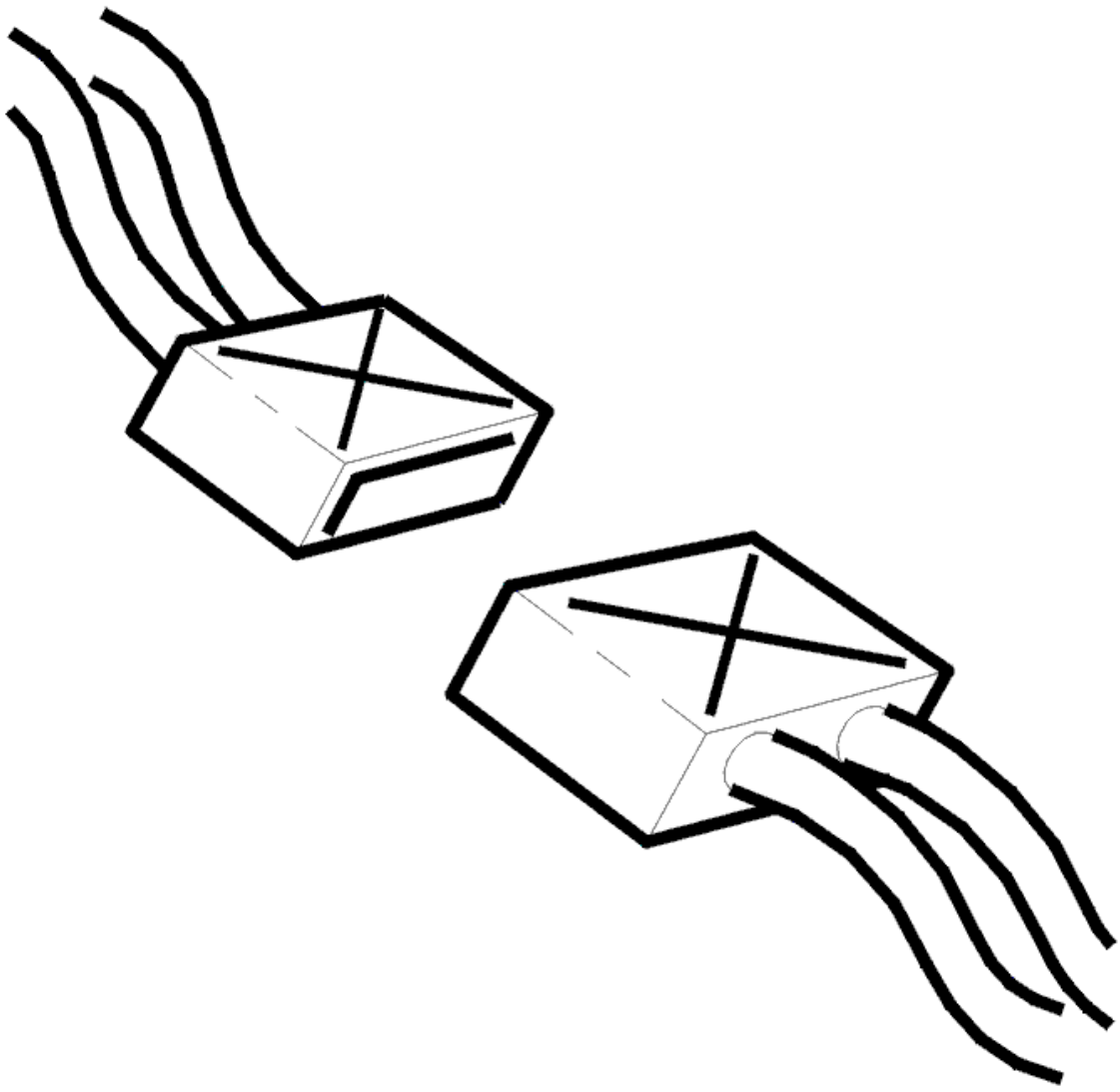


Fig. 315: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

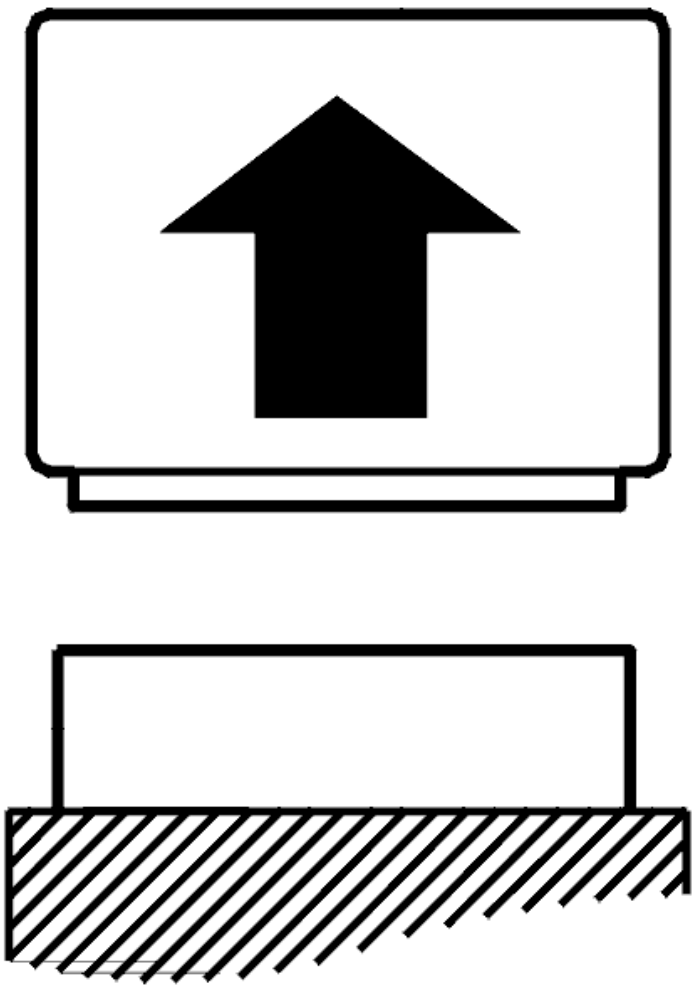


Fig. 316: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Control module disconnected
- Connect the breakout box to the control module connector (transmission side)
- Disconnect the transmission connector
- Adapter see **9511505** and breakout box see **9511428** connected to the transmission connector (control module side).

  Check the wiring between control module terminal #A51 (#A51) and transmission connector terminal #T (#A17). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

  Check the wiring between control module terminal #A53 (#A53) and transmission connector terminal #E

(#A5). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

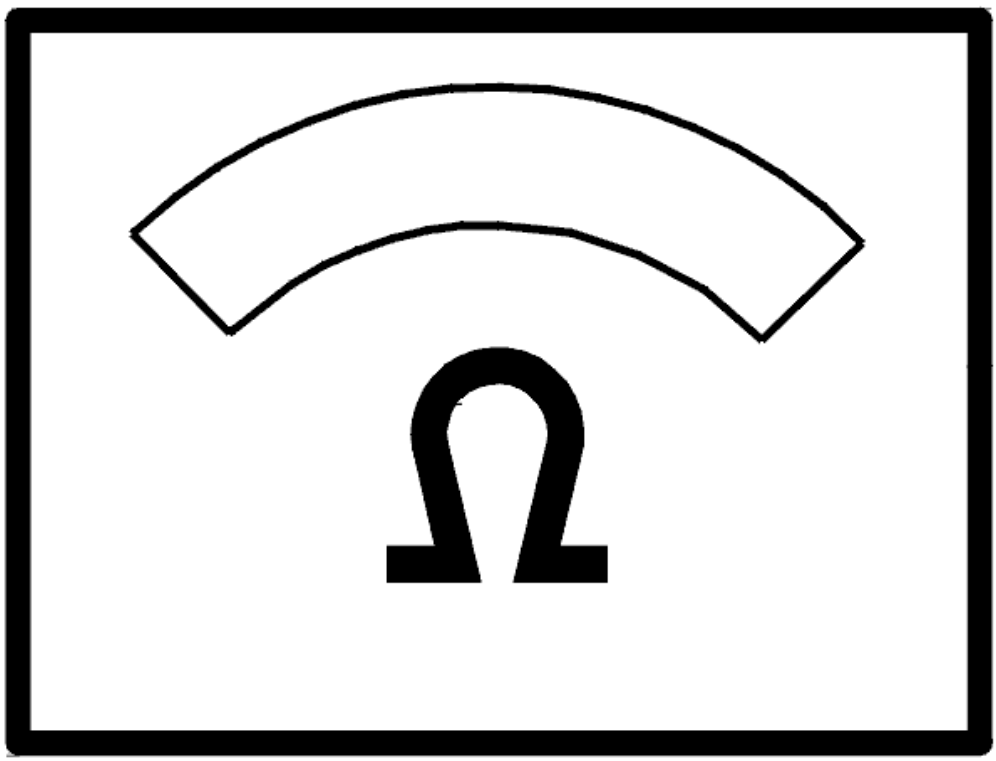


Fig. 317: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

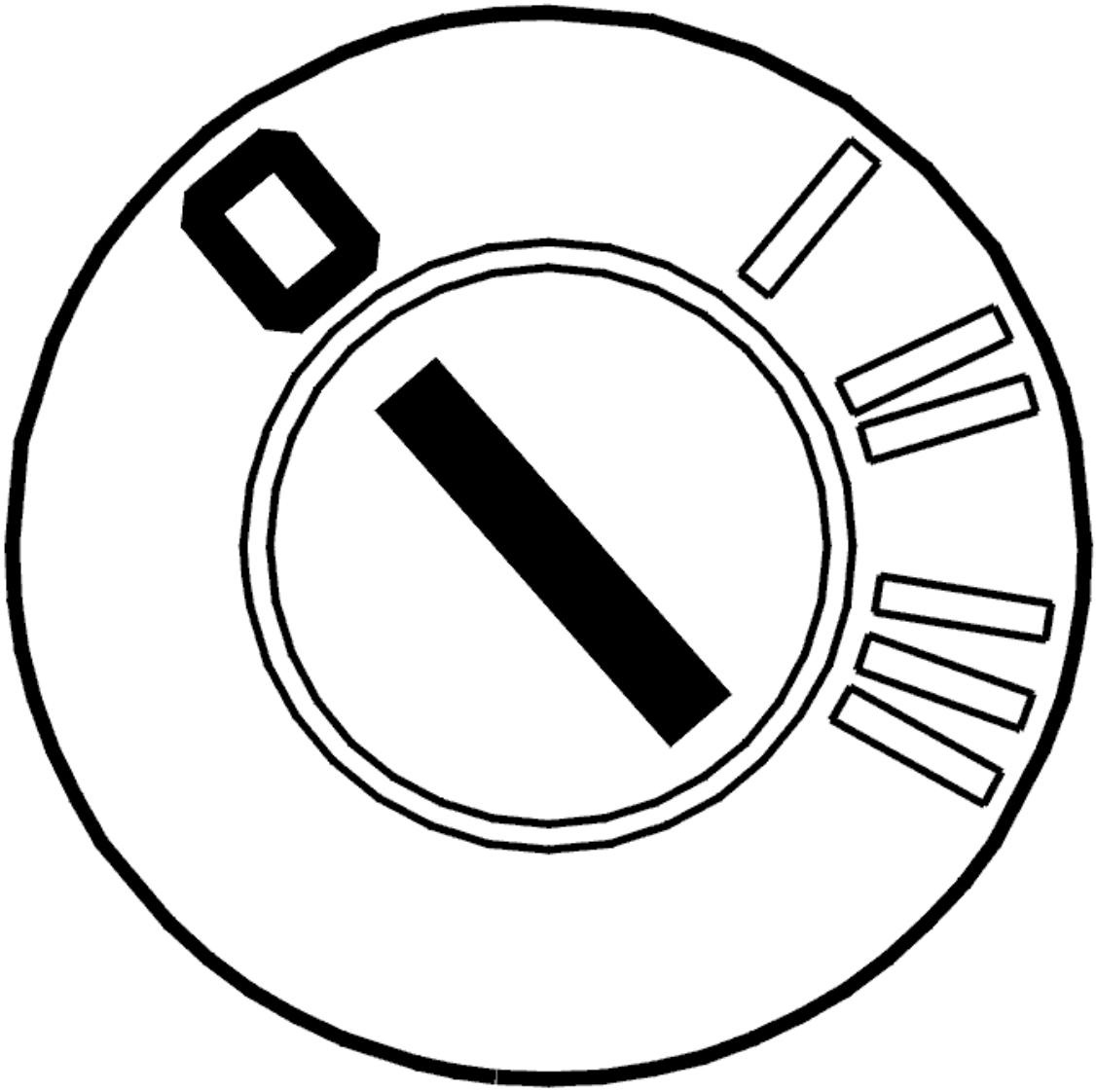


Fig. 318: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off

- Open the transmission control system
- Connect adapter see **9511505** and breakout box see **9511428** to the transmission connector (transmission side).

Check the cable between transmission connector terminal #T (#A17) and solenoid SL terminal #A. Check the cable between transmission connector terminal #E (#A5) and solenoid SL terminal #B. Check these cables for an open-circuit.

HINT: Check solenoid SL by measuring the resistance between solenoid SL terminals #A and #B. When the transmission is cold (approximately 20°C), the resistance must be 10-11 ohms.

Remedy as necessary.

Other information:

- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** or To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid SL, see **SOLENOID LOCK-UP FUNCTION, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

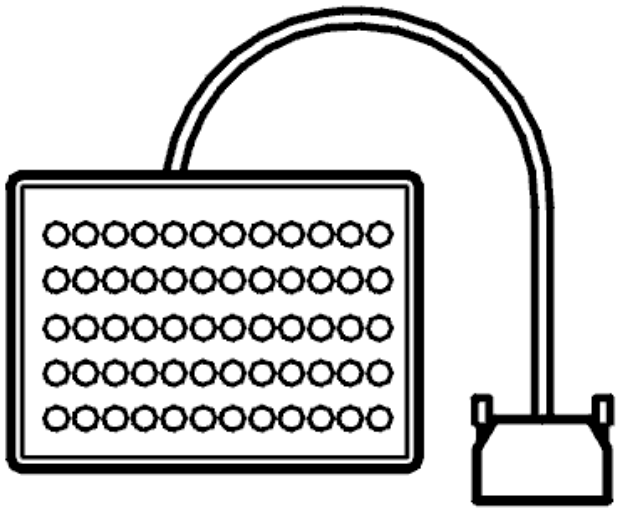


Fig. 319: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

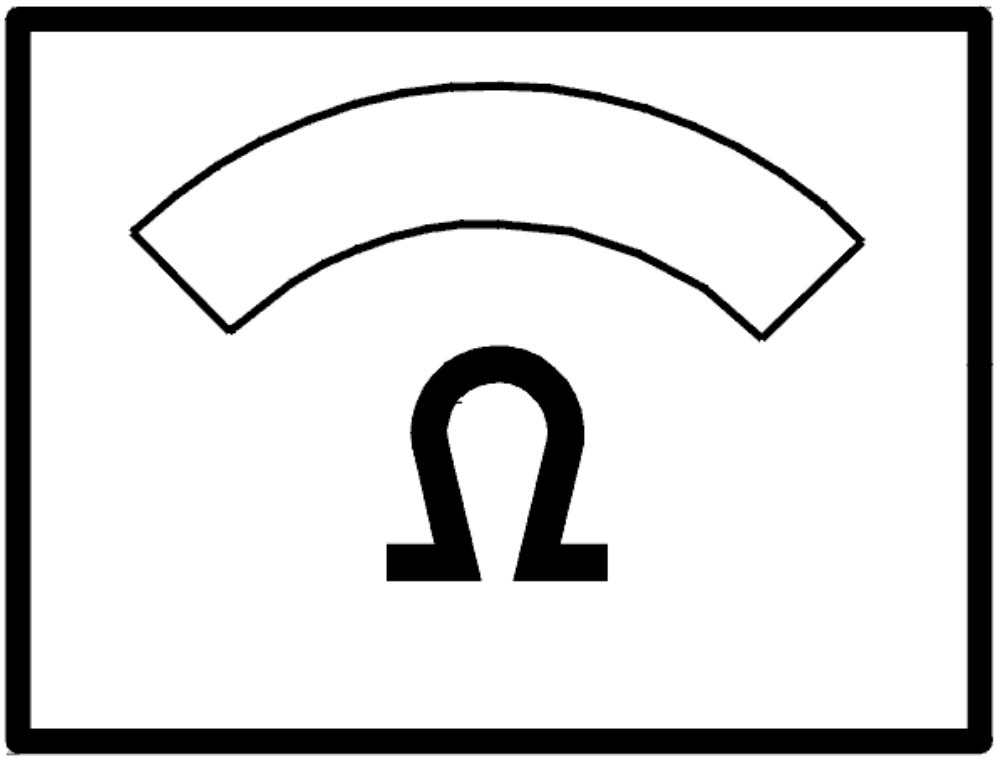


Fig. 320: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

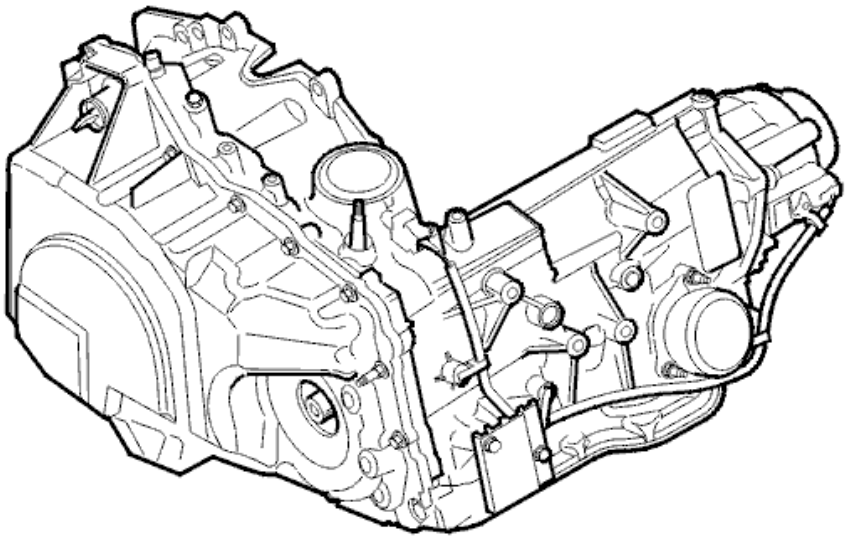
  Refer to **RESETTING THE ADAPTATION**

REPLACING THE CONTROL SYSTEM

Fault-tracing indicates a fault in the transmission control system. Replace the control system.

Other information

- To replace the control system, For removal, see **CONTROL SYSTEM/VALVE HOUSING, REMOVING** and To install, see **CONTROL SYSTEM / VALVE HOUSING, INSTALLING** .



P2X

4301721D ©VOLVO

Fig. 321: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

REPLACING THE TRANSMISSION

Fault-tracing indicates a fault in the transmission. Replace the transmission.

NOTE: If there is water in the transmission fluid, the oil cooler unit, including the additional cooler, must be replaced if installed. Replace the hoses between the cooler and the transmission.

Other information:

- To remove the transmission, see **TRANSMISSION, REMOVING**
- To install the transmission, see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .

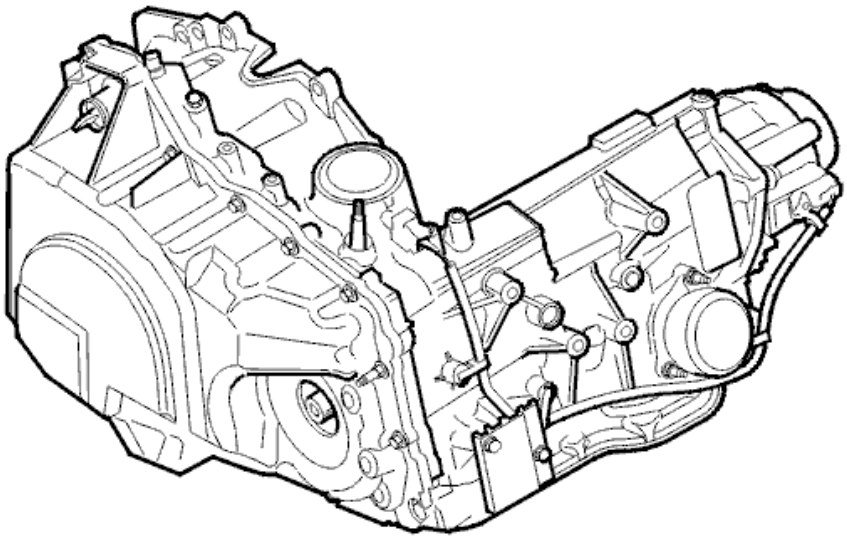


Fig. 322: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

FAULT-TRACING INFORMATION

The fault-tracing indicates that the control module has previously detected a fault but that the fault is no longer active.

CHECKING THE SOFTWARE

CHECKING THE SOFTWARE

NOTE: To carry out fault-tracing, the transmission control module (TCM) must be programmed with specific software.

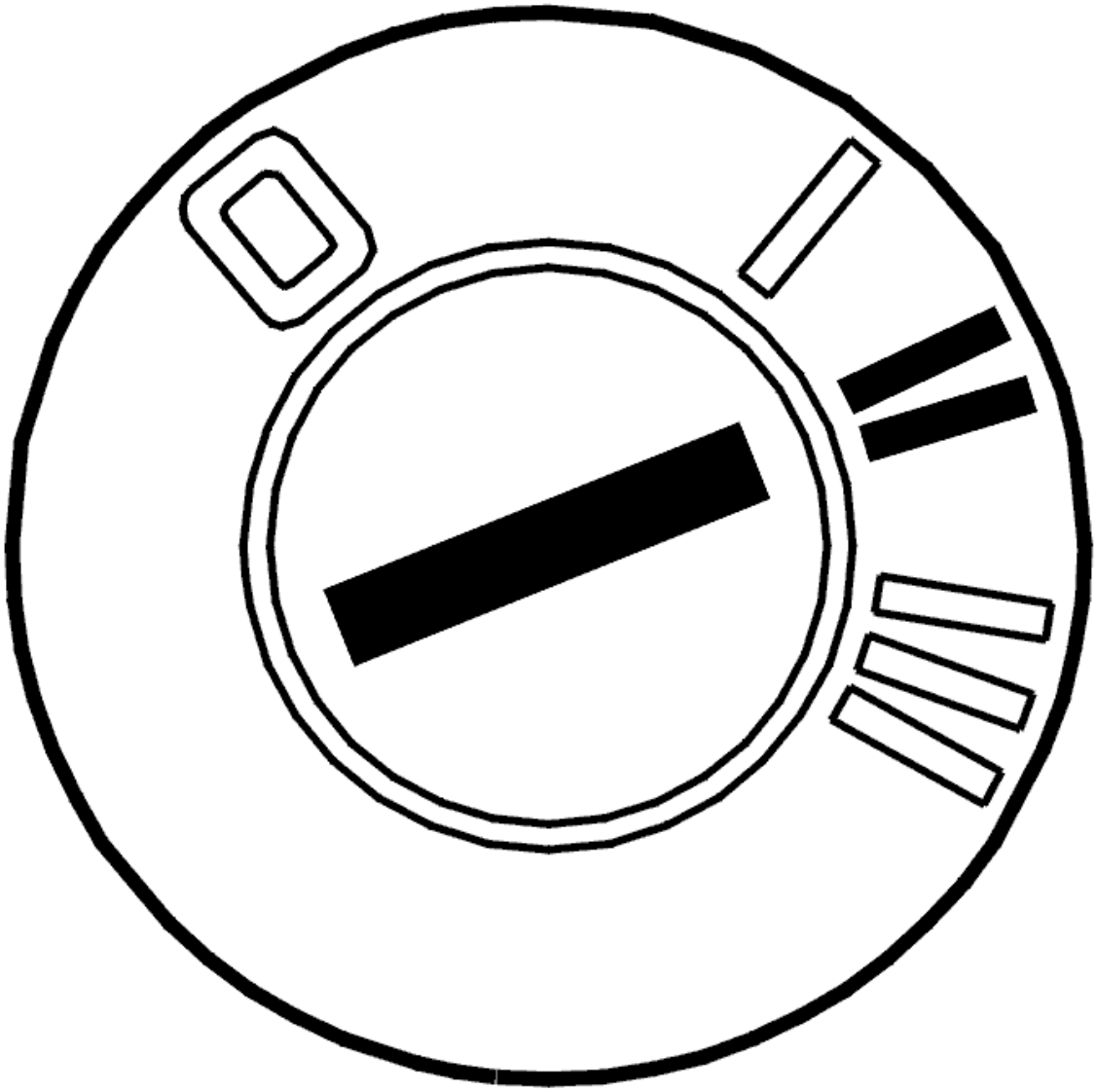


Fig. 323: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the control module diagnostic number.

  Check the read off diagnostic number against the diagnostic numbers given in the center table.

  If the diagnostic number is included in the table, the control module must be programmed with the latest software.

  See the technical journal for information about the most recent software.

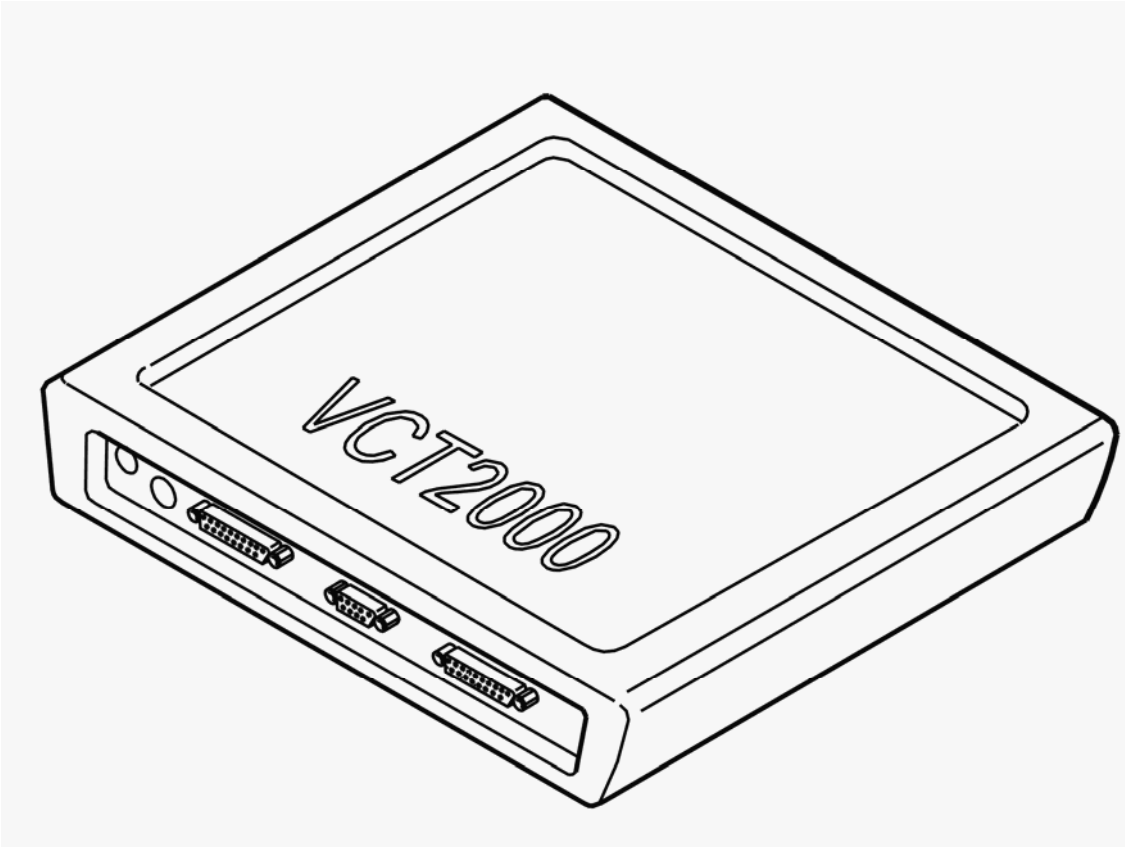


Fig. 324: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

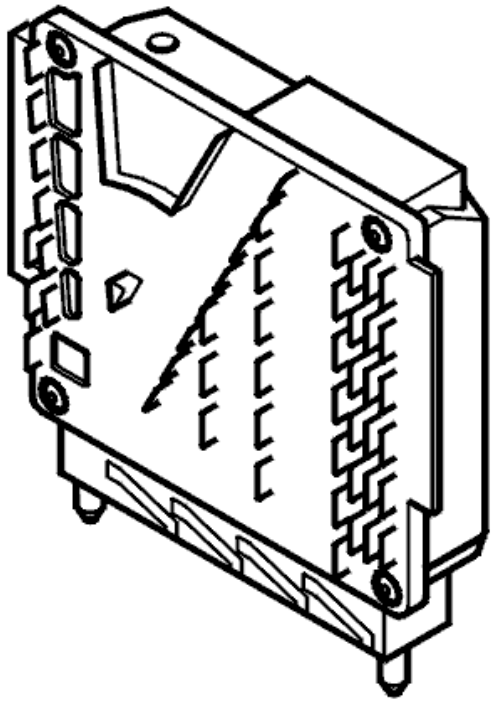


Fig. 325: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

CHECK THE QUALITY OF THE TRANSMISSION OIL

CHECK THE QUALITY OF THE TRANSMISSION OIL

NOTE: The transmission fluid quality is extremely important for transmission function. Therefore it is imperative that this is correct.

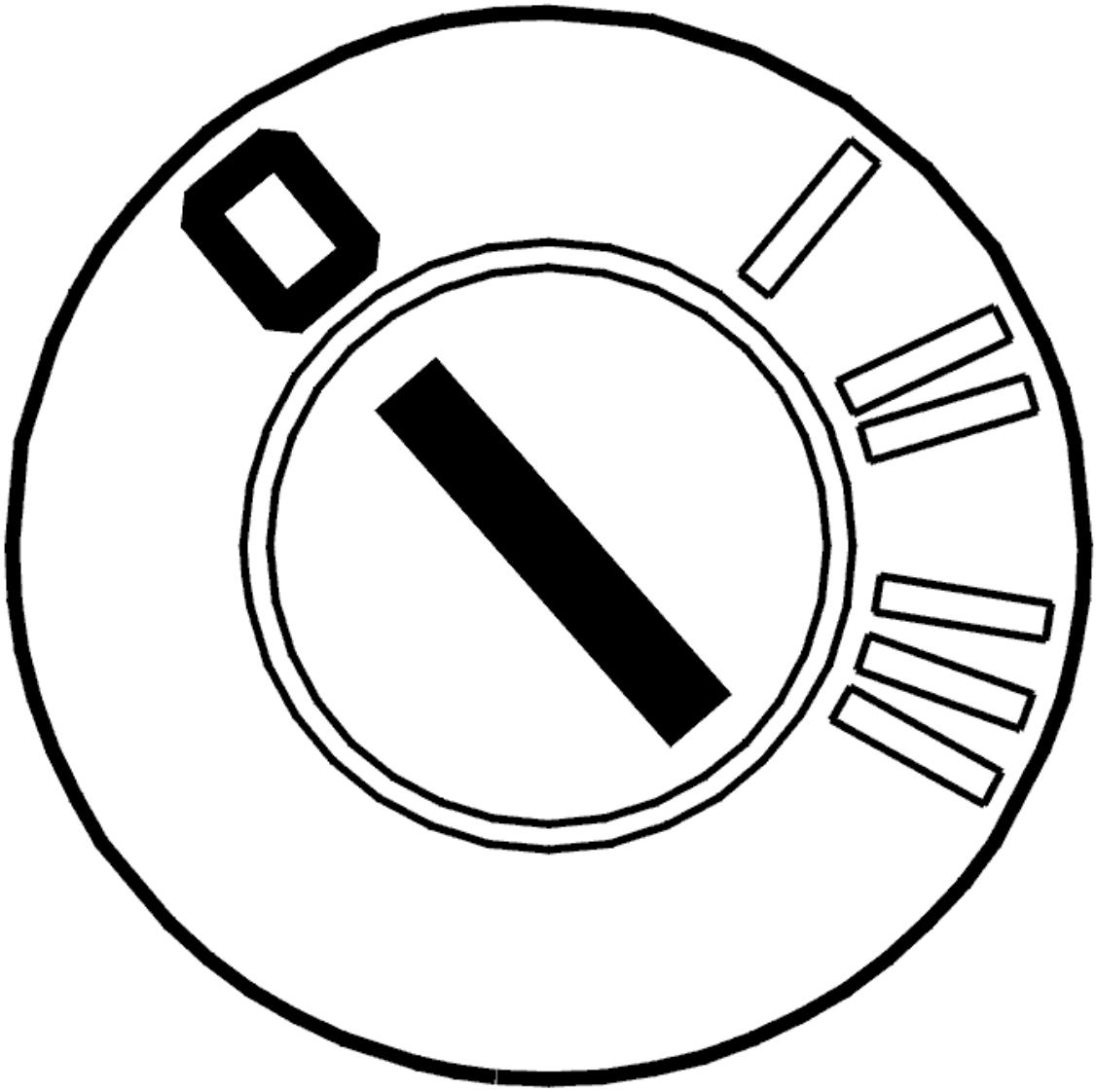


Fig. 326: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission oil quality. Take a sample using the dip stick.

  - Replace the transmission fluid if it smells burnt
  - Replace the fluid and filter if the transmission fluid contains particles
  - Check if there is oil or an oil film in the expansion tank. Oil in the expansion tank indicates leakage from the transmission oil cooler which is positioned in the cooler unit.

  NOTE: The transmission oil is red and must not be confused with black engine oil.

- If the transmission fluid is cloudy or pink, it is contaminated with coolant. In such cases the transmission must be replaced. For checking coolant in transmission oil, see **CHECKING FOR COOLANT IN THE OIL**

  When replacing the transmission, the cooler unit, including the additional cooler must be replaced if installed. Replace the hoses between the cooler and the transmission.

Other information:

- To replace the transmission fluid and filter, see **TRANSMISSION OIL / OIL FILTER, REPLACING** .

Select an option:

1. The fluid contains water

   Refer to **REPLACING THE TRANSMISSION**

2. The fluid smells burnt or contains particles

   Refer to **CHECKING SOLENOID SL**

3. No fault detected.

   Refer to **CHECKING THE OIL LEVEL IN THE TRANSMISSION**

CHECKING THE OIL LEVEL IN THE TRANSMISSION

CHECK THE TRANSMISSION OIL LEVEL

NOTE: The transmission fluid level is extremely important for transmission function. Therefore it is imperative that it is correct. In addition the oil level is dependent on oil temperature.

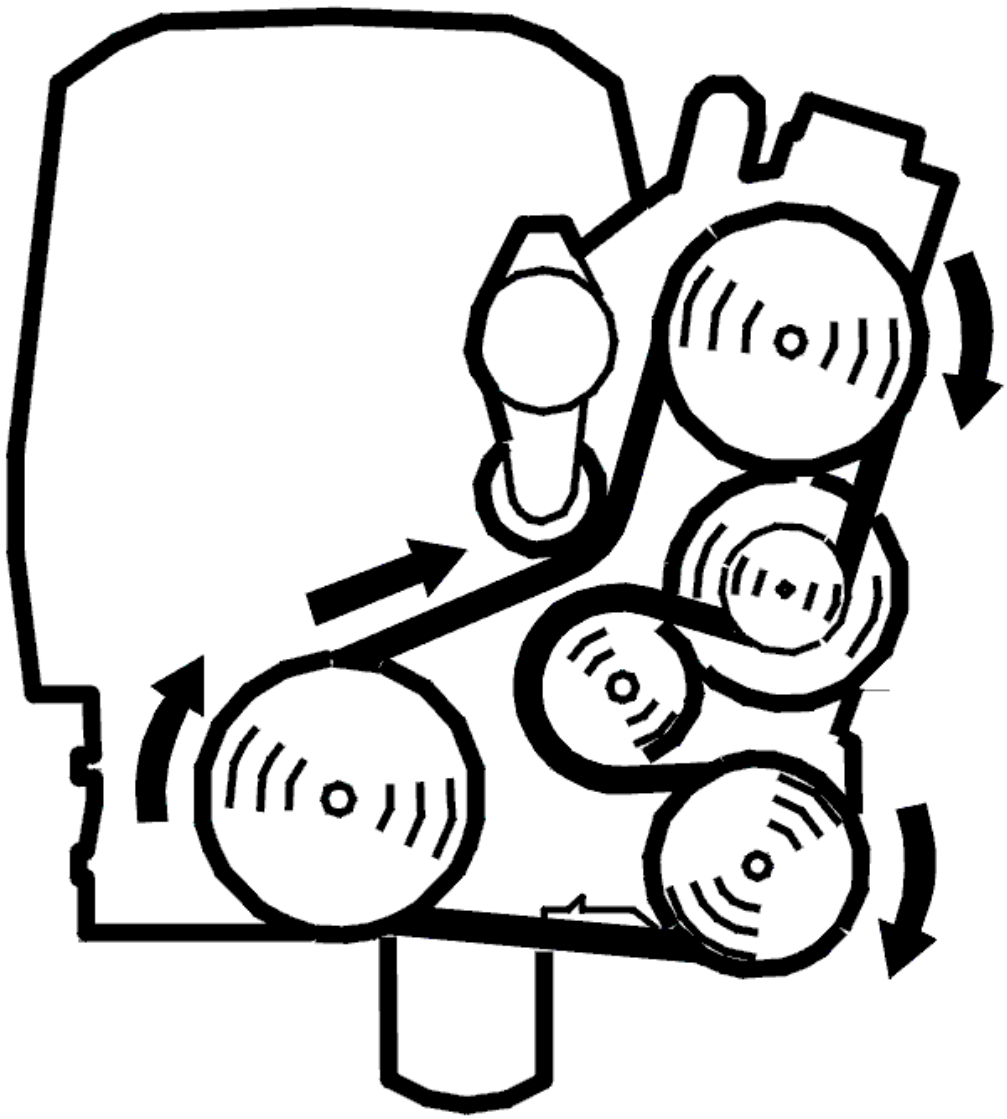


Fig. 327: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the car
- Read off the oil temperature.

When checking the gearbox oil level the oil temperature **must** be **80 °C - 90 °C** .

At the correct temperature, the oil level should be between "Min hot" and "Max hot".

Oil level

Too high: Drain the transmission fluid to the correct level
Too low: Check the transmission for leakage.

Remedy as necessary.

Other information:

- To check and adjust the oil level, see **OIL LEVEL, CHECKING** .

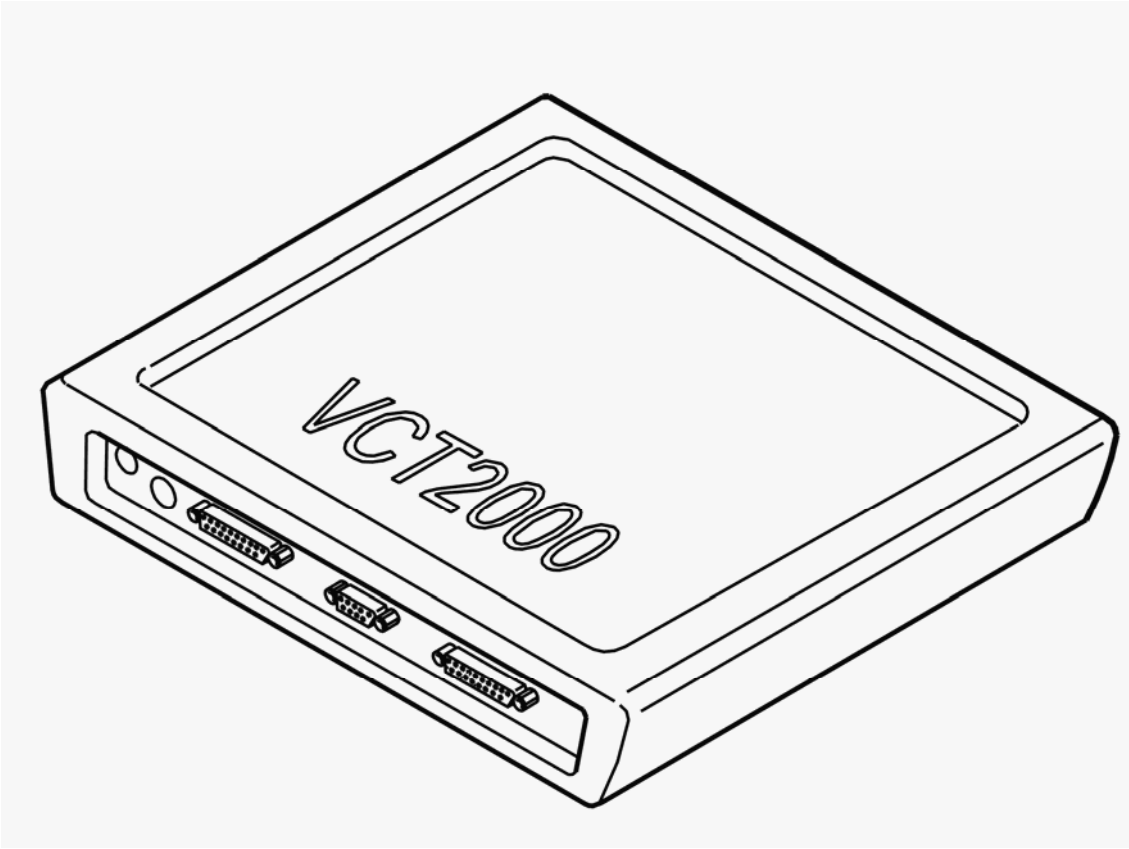


Fig. 328: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

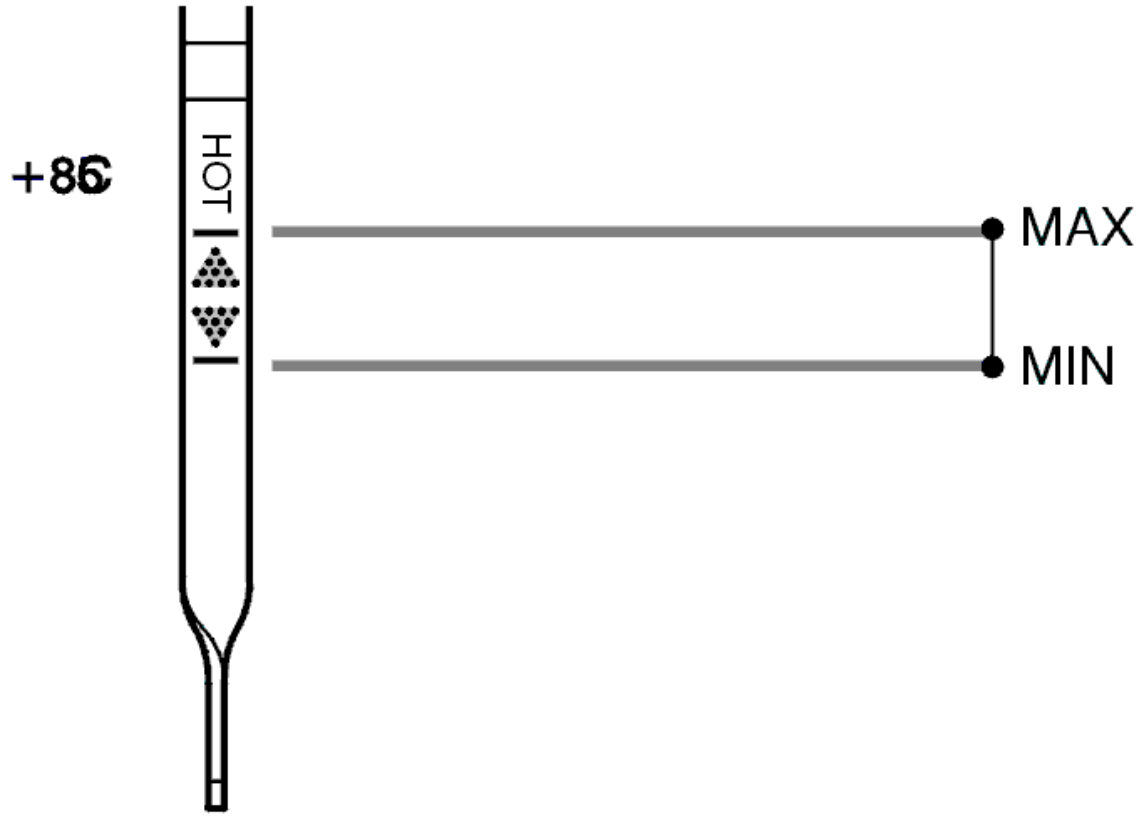


Fig. 329: Identifying Oil Level / Temperature
Courtesy of VOLVO CARS CORPORATION

Was the transmission fluid level correct?

- **YES**

  Refer to **CHECKING SOLENOID SL**

- **NO**

  Refer to **CHECKING SOLENOID SL**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect

circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

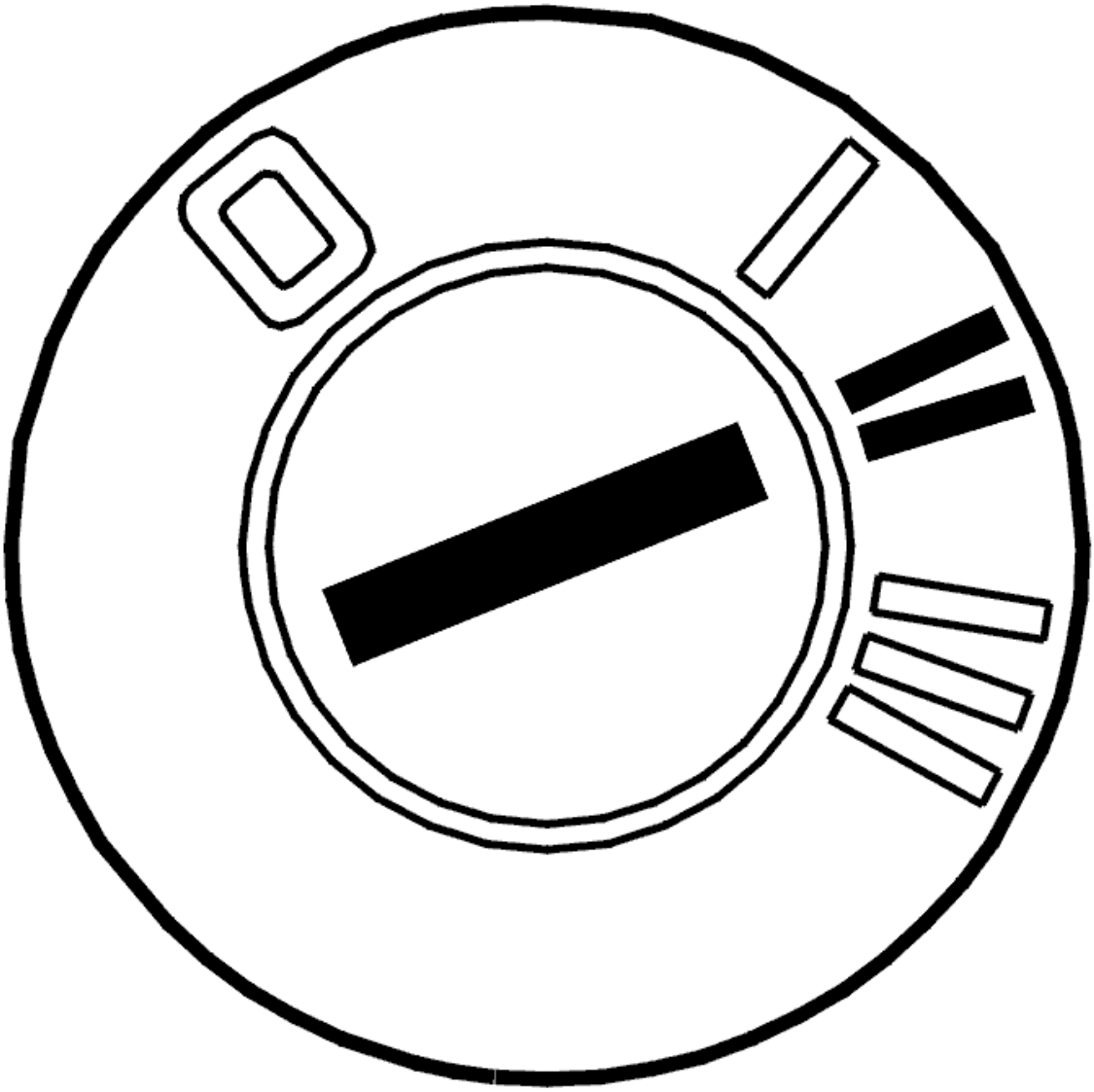


Fig. 330: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

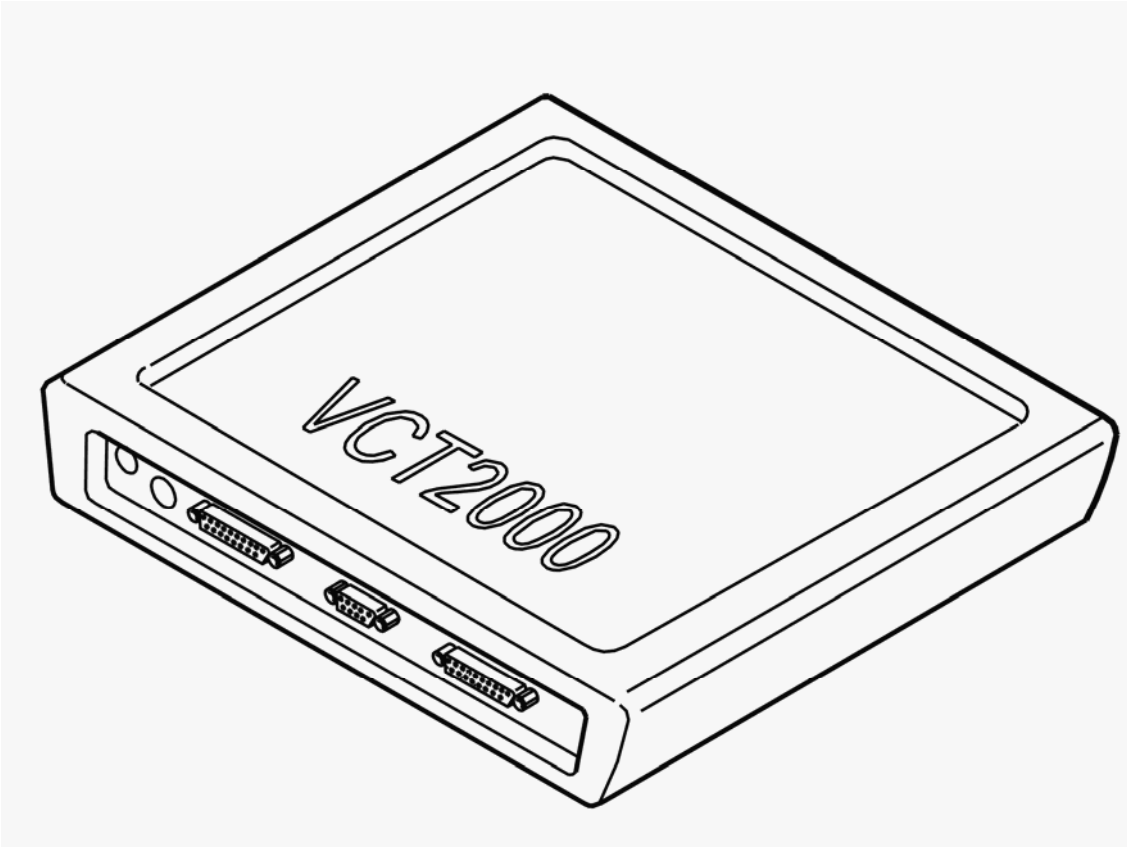


Fig. 331: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

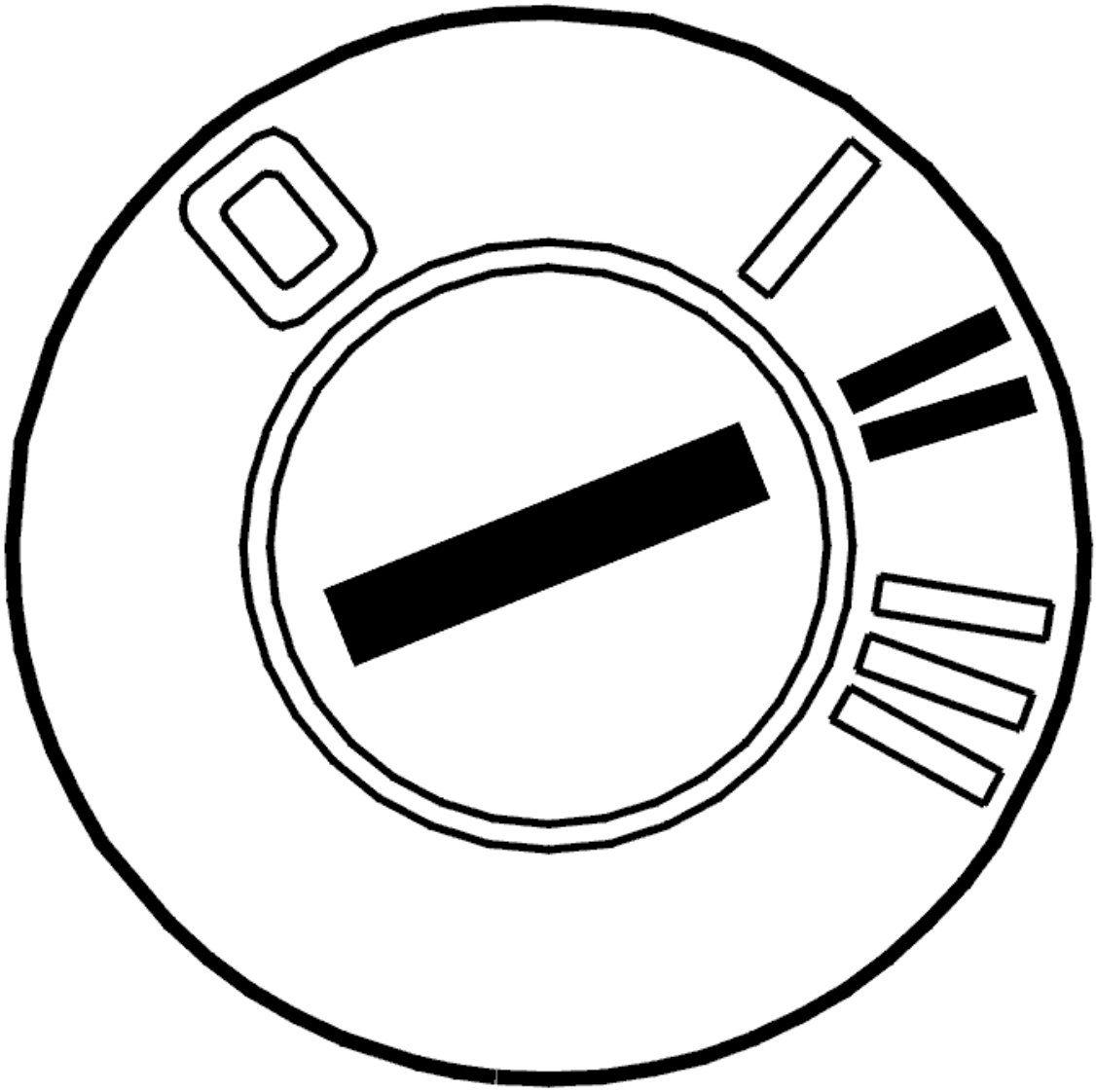


Fig. 332: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  Any diagnostic trouble codes (DTCs) other than TCM-0050, TCM-0051 and TCM-0052 that are stored must be fault-traced after this fault-tracing is completed.

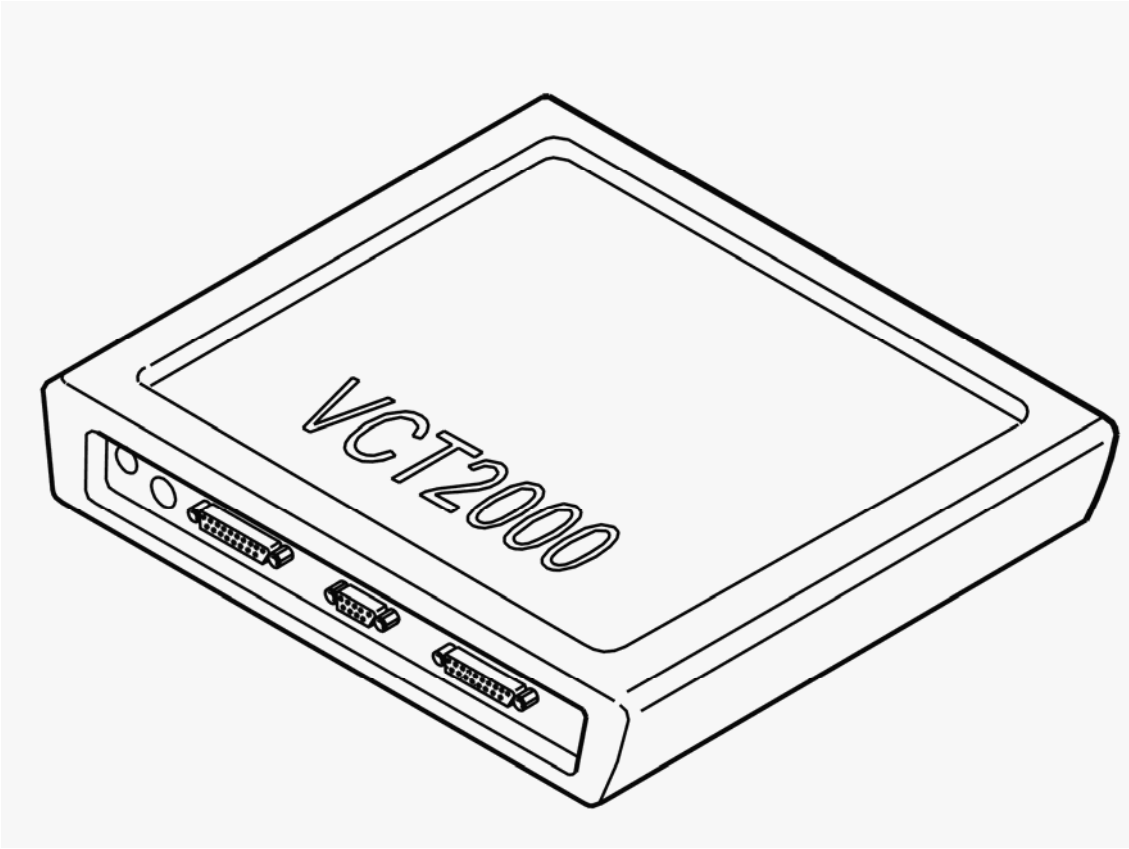


Fig. 333: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **ERASING DIAGNOSTIC TROUBLE CODES (DTCS)**

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

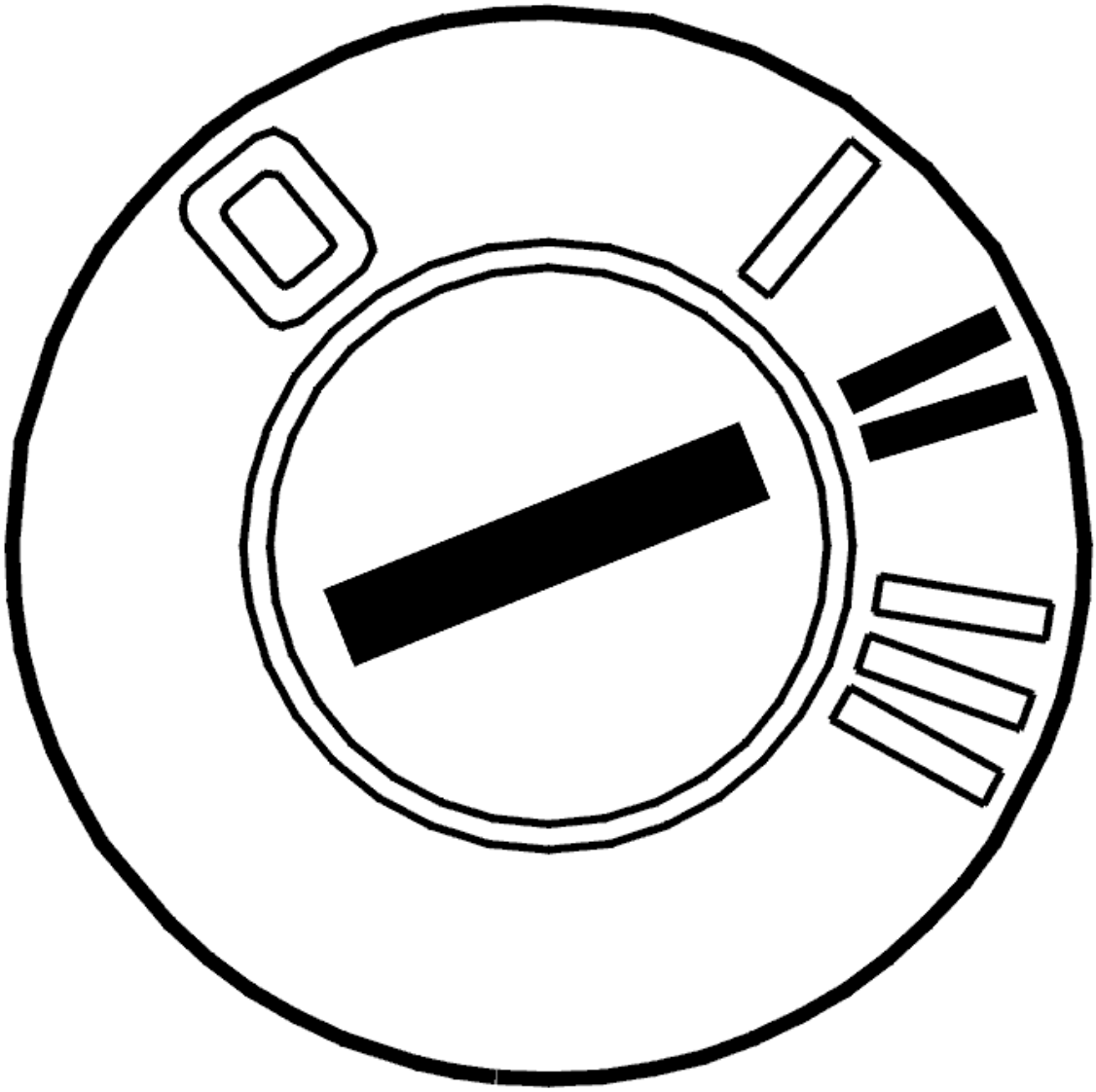


Fig. 334: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

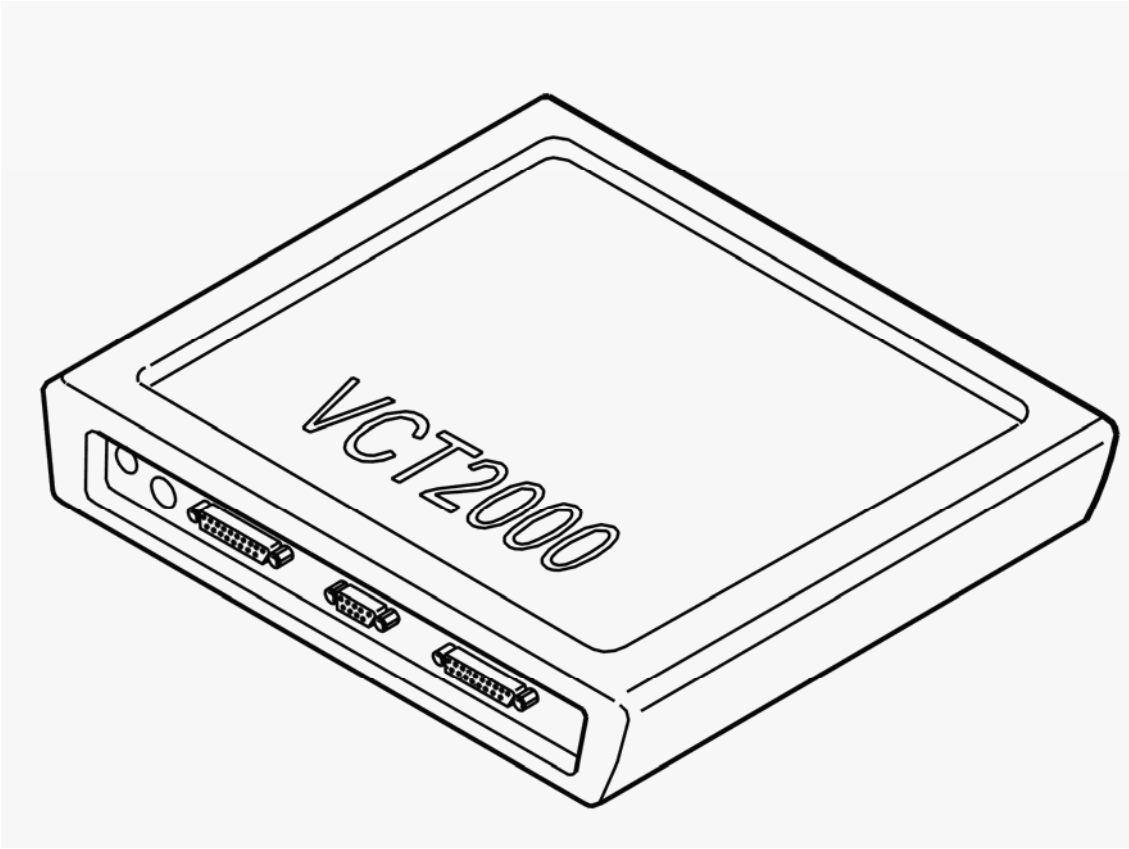


Fig. 335: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE SOFTWARE**

TEST DRIVING

NOTE: **Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.**

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

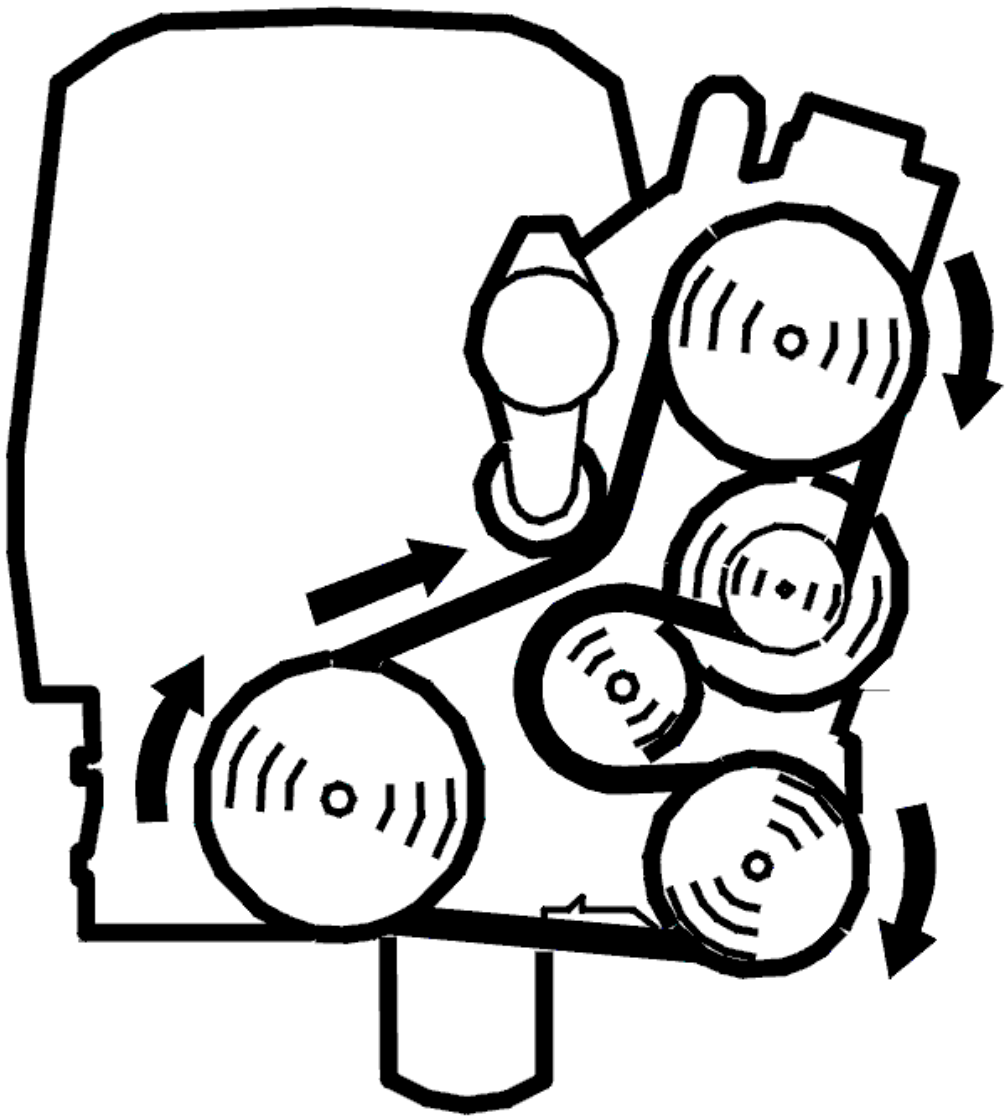


Fig. 336: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect the VIDA station. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission fluid should be at operating

temperature, approximately 80-90°C.

Shift the gear selector to position D (fourth gear with geartronic). Carefully accelerate to 80 km/h (65 km/h for geartronic). Maintain the same speed for at least 20 seconds.

Accelerate further for approximately 20 seconds to increase the torque.

Criteria for diagnostic trouble code (DTC):

- The transmission fluid temperature must exceed 30°C
- The engine must be running for at least 20 seconds
- Gear selector in position D, 3 or 2 (4T65EV).

  Gear selector in Geartronic position and gears 4, 3 or 2 (4T65EV-GT)

- Speed 80 km/h for at least 5 seconds.

  HINT: The car must be driven at an engine speed where the lock-up function is normally activated.

- At least 5 seconds since the last gear shift
- Positive engine torque (no engine braking).

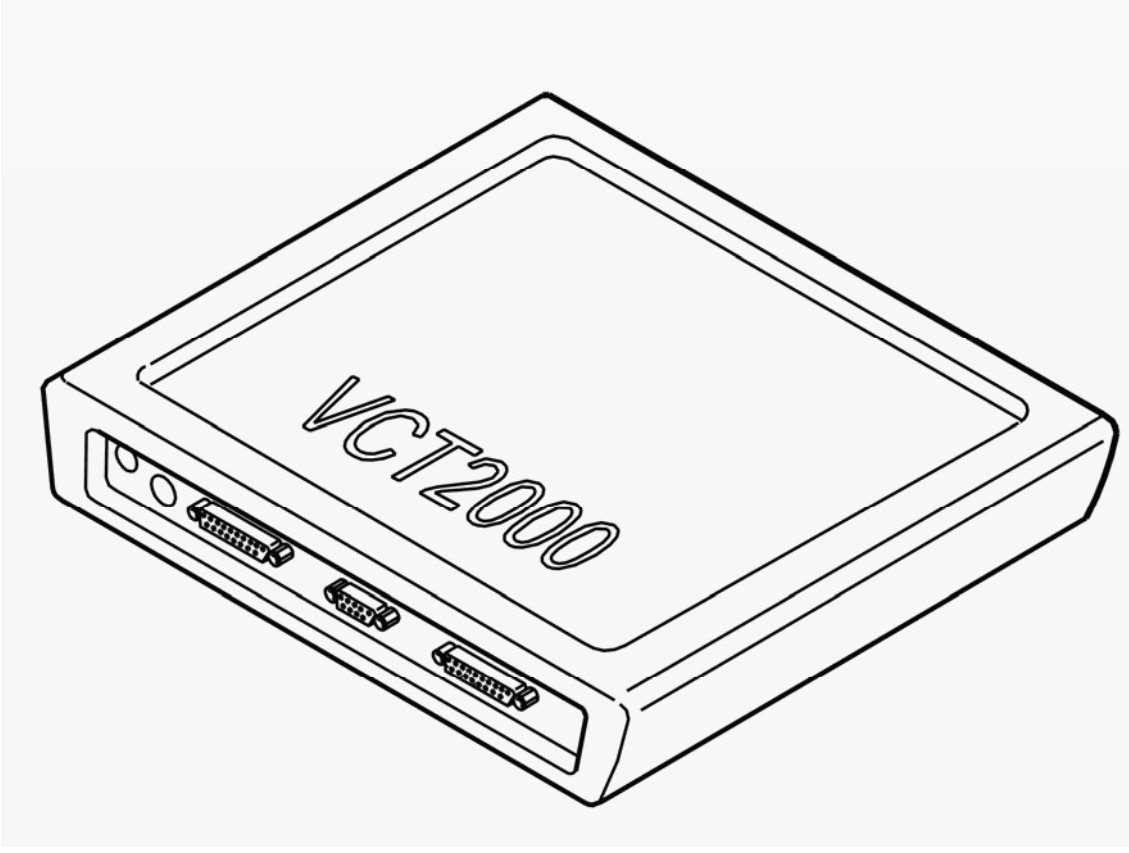


Fig. 337: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

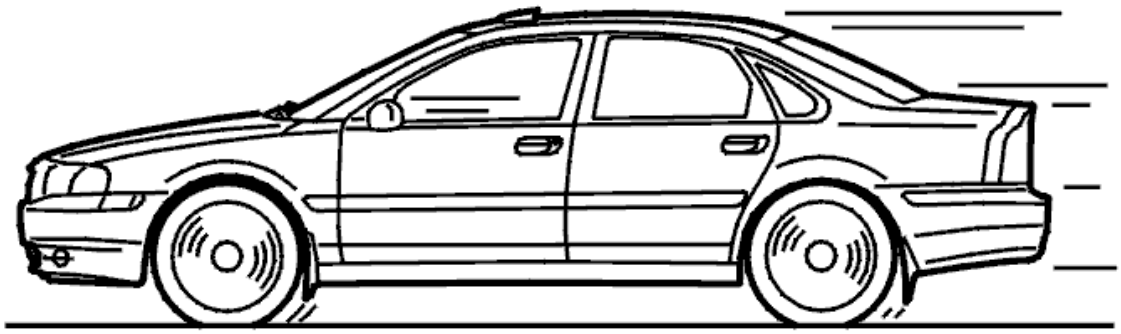


Fig. 338: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

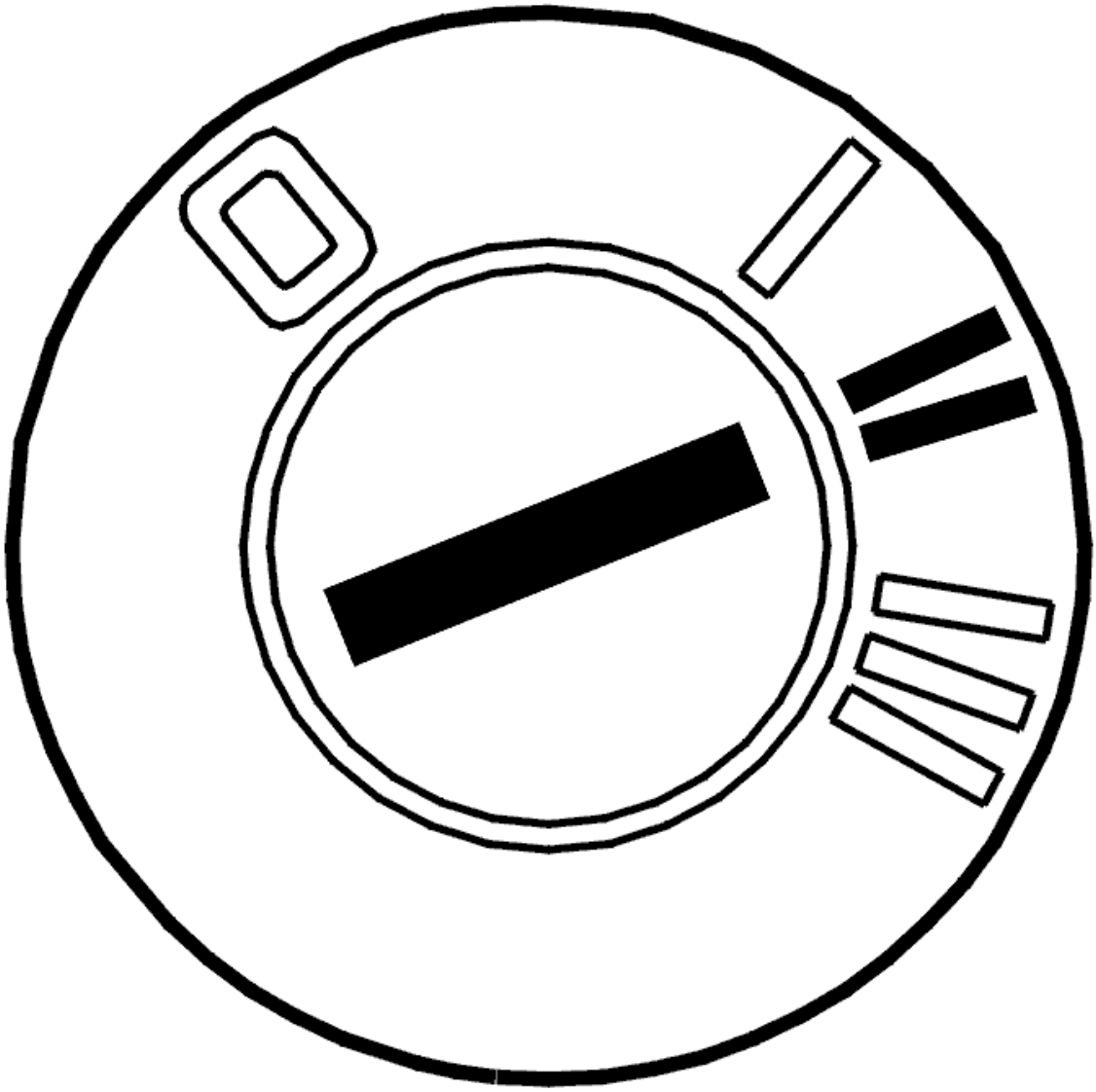


Fig. 339: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  Any diagnostic trouble codes (DTCs) other than TCM-0050, TCM-0051 and TCM-0052 that are stored must be fault-traced after this fault-tracing is completed.

  Select an option:

  1. Diagnostic trouble codes (DTCs) TCM-0050 and TCM-0052 were stored

     Refer to **REPLACING THE CONTROL SYSTEM**

  2. Only TCM-0052 or both TCM-0051 and TCM-0052 were stored

Refer to **REPLACING THE CONTROL SYSTEM**

3. No diagnostic trouble codes (DTCs) other than TCM-0050, TCM-0051 or TCM-0052 were stored.

   NO DTC

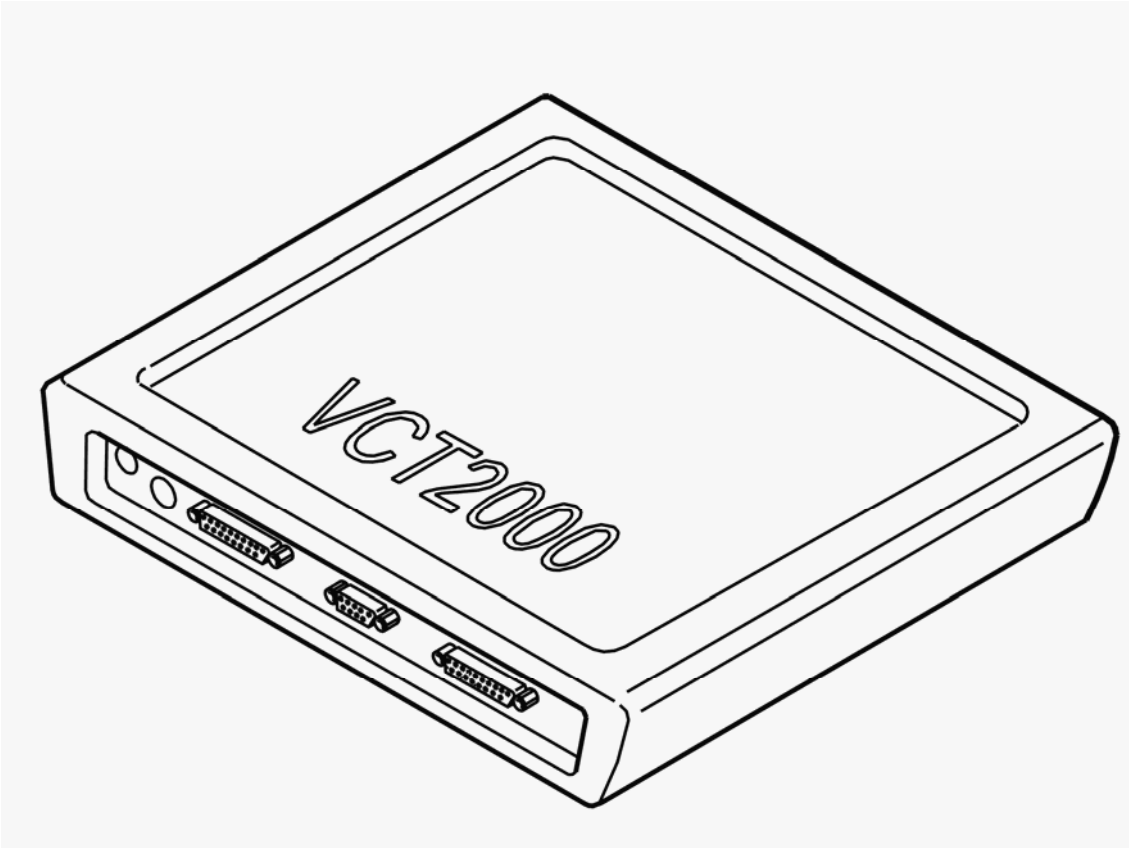


Fig. 340: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING THE SOFTWARE

CHECKING THE SOFTWARE

NOTE: To carry out fault-tracing, the transmission control module (TCM) must be programmed with specific software.

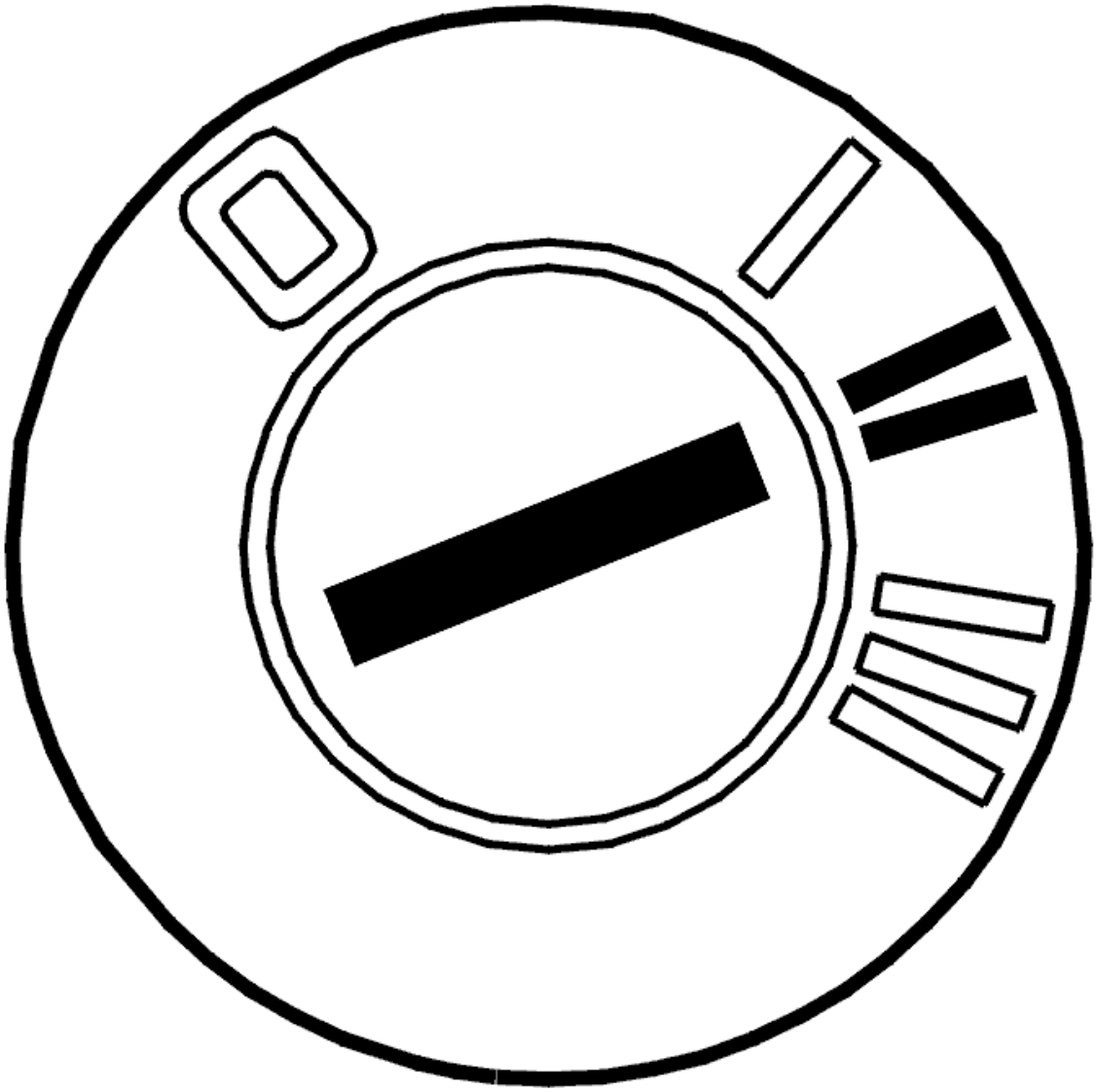


Fig. 341: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the control module diagnostic number.

  Check the read off diagnostic number against the diagnostic numbers given in the center table.

  If the diagnostic number is included in the table, the control module must be programmed with the latest software.

  See the technical journal for information about the most recent software.

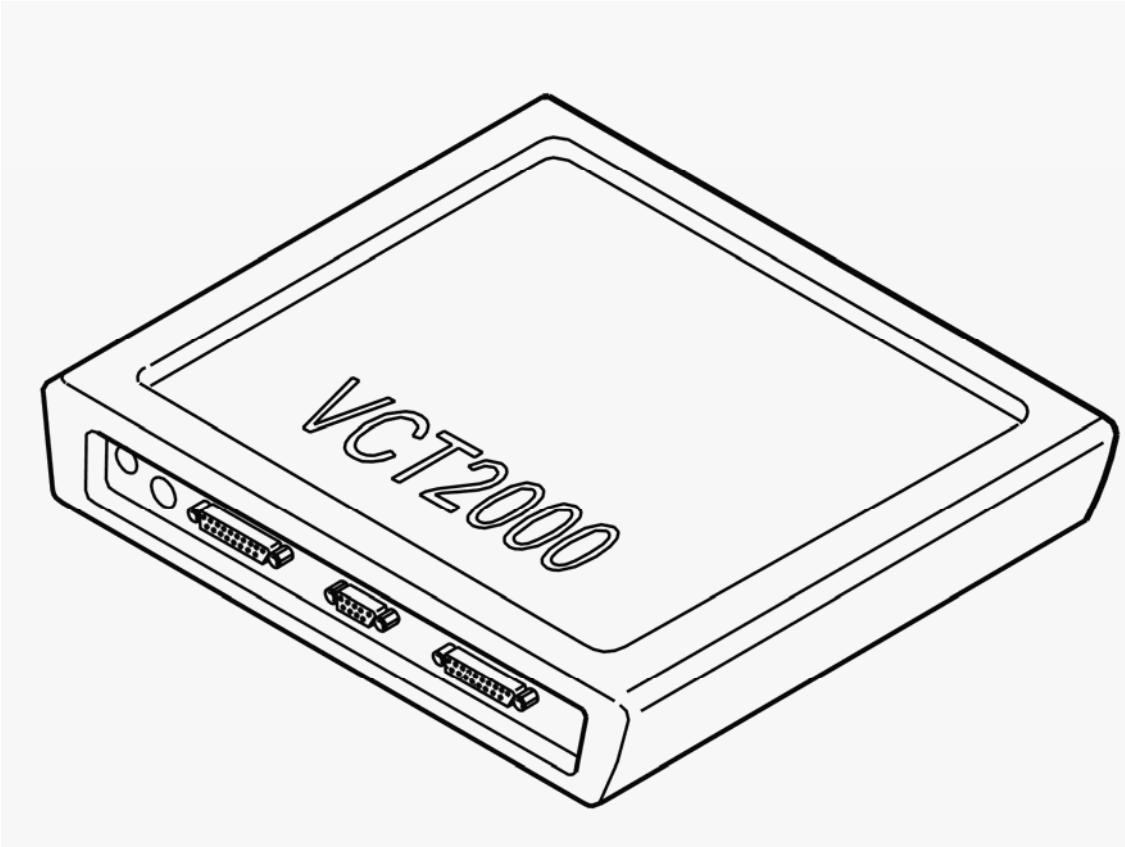


Fig. 342: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

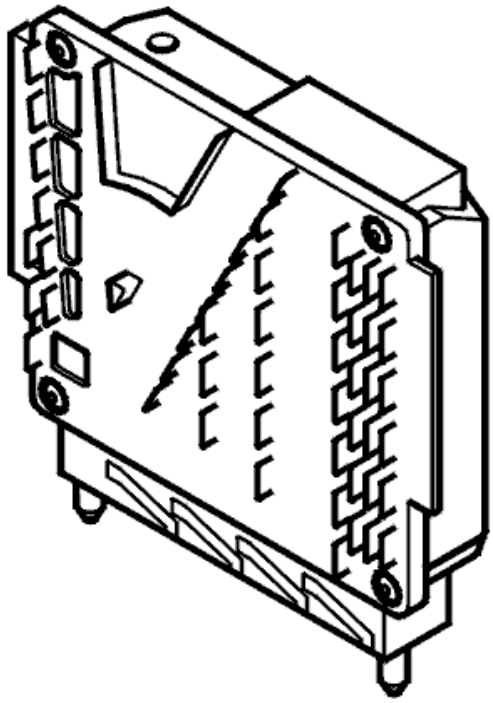


Fig. 343: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

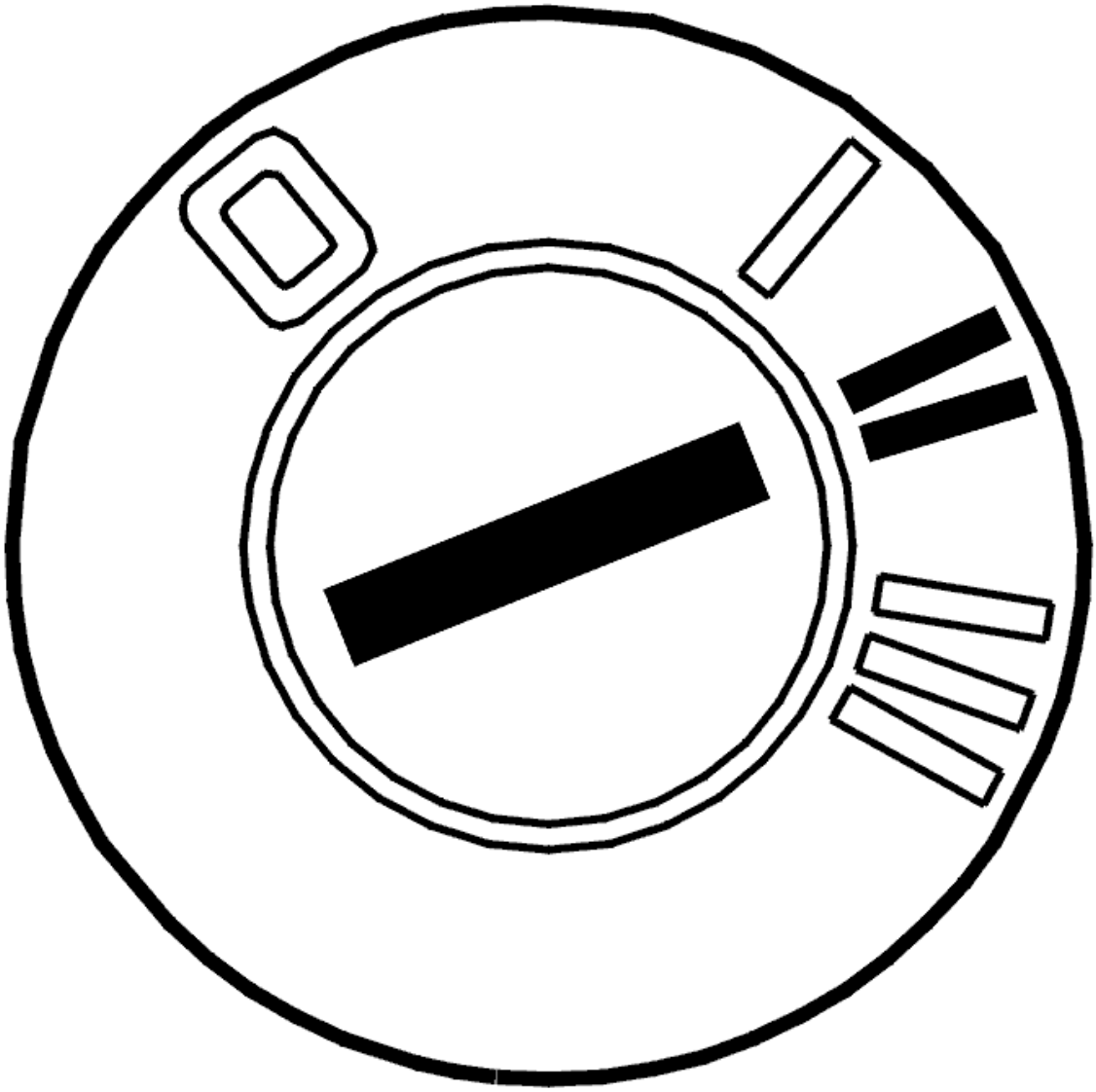


Fig. 344: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  Any diagnostic trouble codes (DTCs) other than TCM-0050, TCM-0051 and TCM-0052 that are stored must be fault-traced after this fault-tracing is completed.

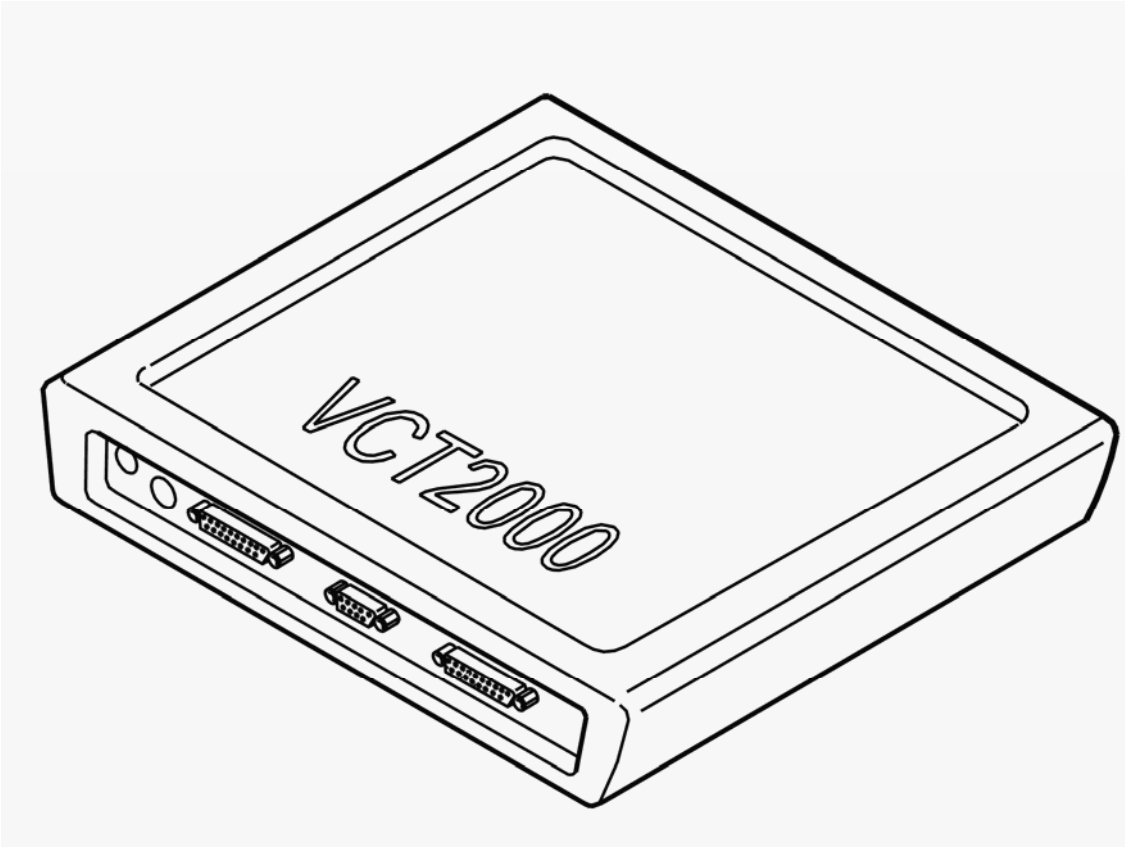


Fig. 345: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **ERASING DIAGNOSTIC TROUBLE CODES (DTCS)**

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

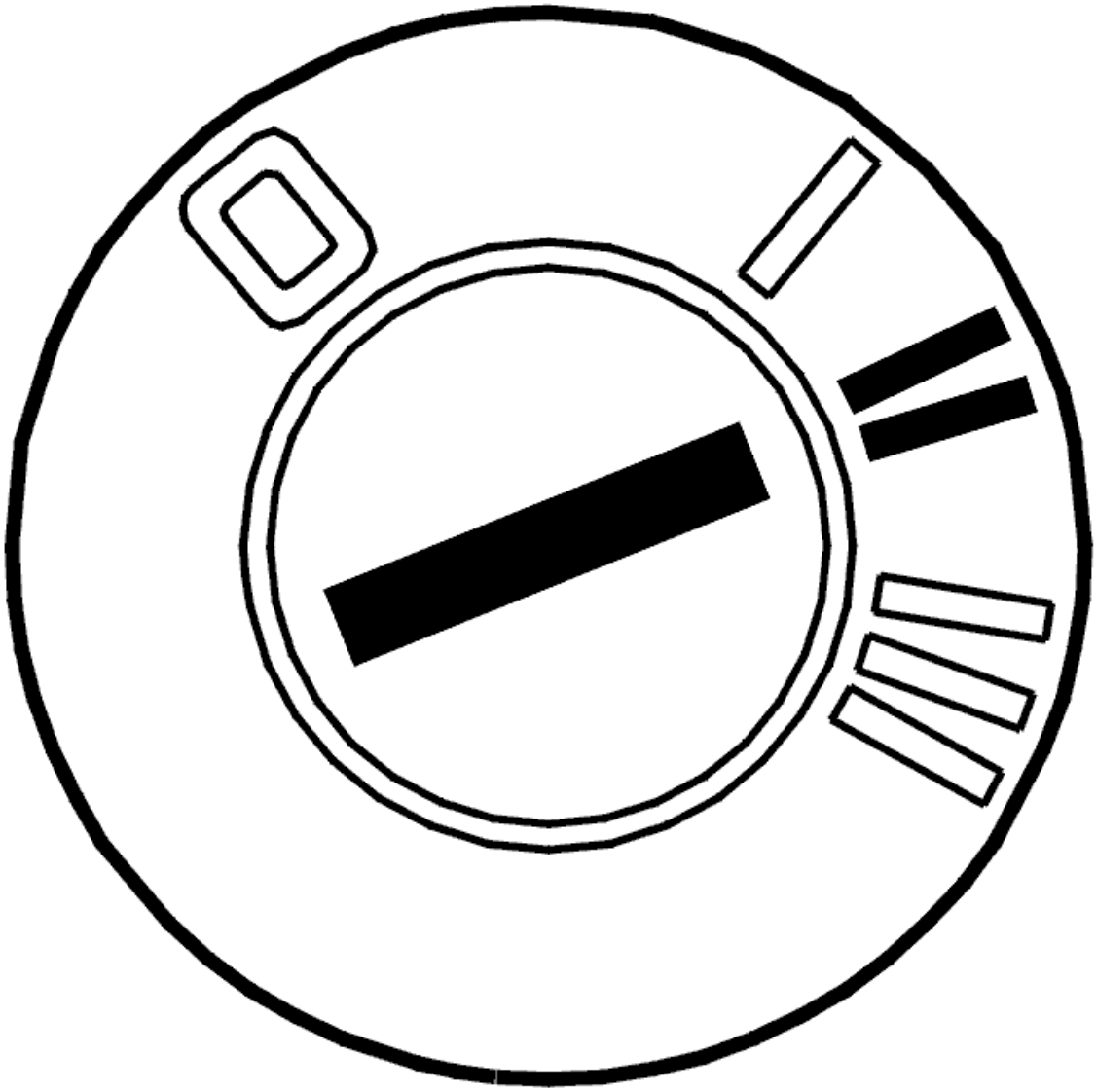


Fig. 346: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

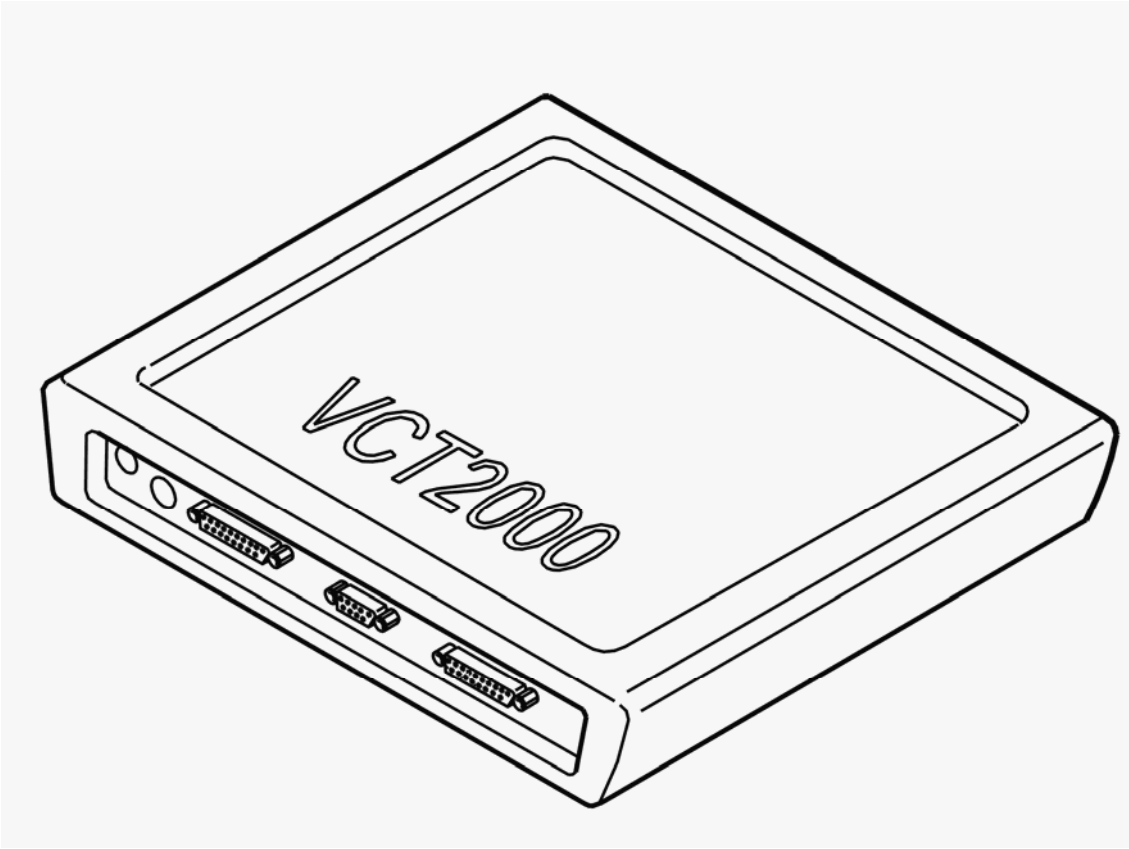


Fig. 347: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE SOFTWARE**

TEST DRIVING

NOTE: **Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.**

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

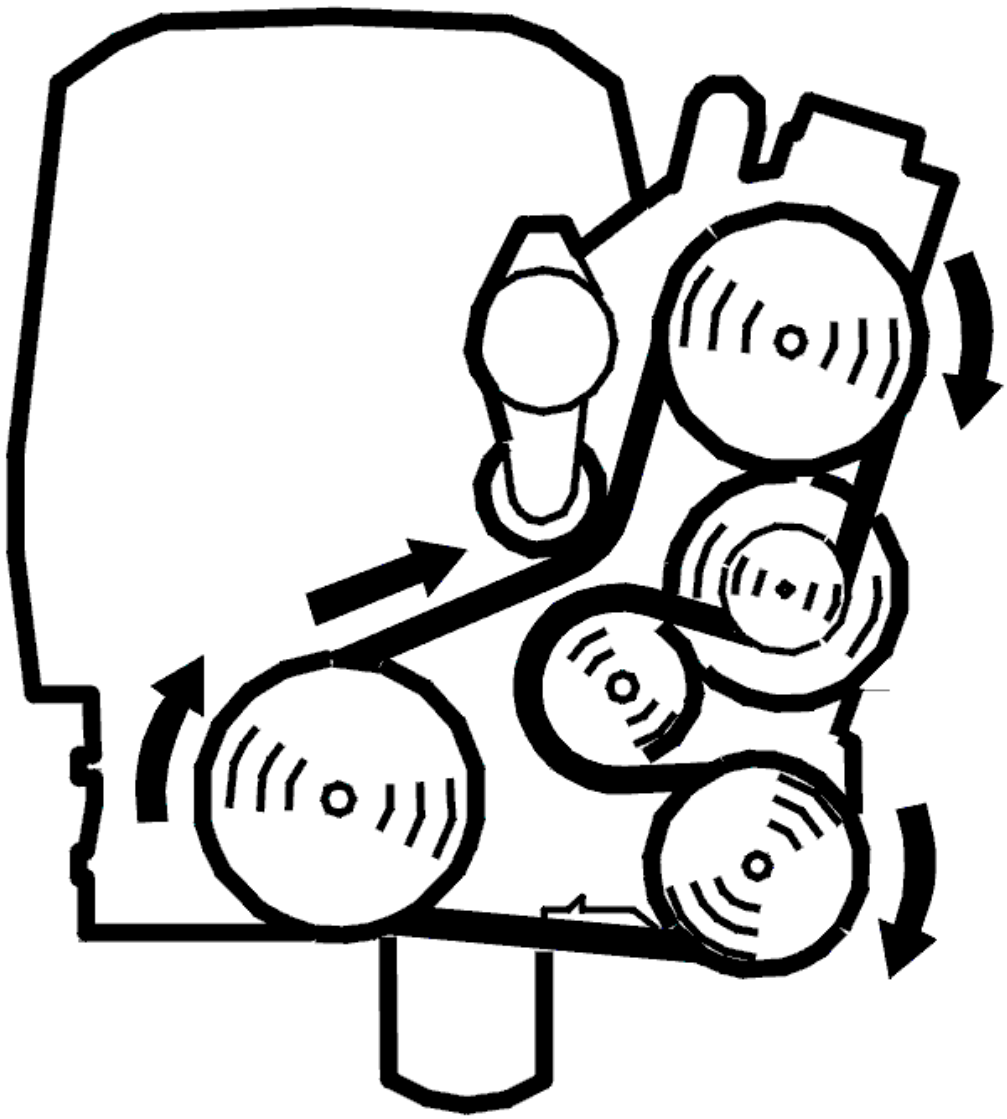


Fig. 348: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect the VIDA station. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission fluid should be at operating

temperature, approximately 80-90°C.

Shift the gear selector to position D (fourth gear with geartronic). Carefully accelerate to 80 km/h (65 km/h for geartronic). Maintain the same speed for at least 20 seconds.

Accelerate further for approximately 20 seconds to increase the torque.

Criteria for diagnostic trouble code (DTC):

- The transmission fluid temperature must exceed 30°C
- The engine must be running for at least 20 seconds
- Gear selector in position D, 3 or 2 (4T65EV).

  Gear selector in Geartronic position and gears 4, 3 or 2 (4T65EV-GT)

- Speed 80 km/h for at least 5 seconds.

  HINT: The car must be driven at an engine speed where the lock-up function is normally activated.

- At least 5 seconds since the last gear shift
- Positive engine torque (no engine braking).

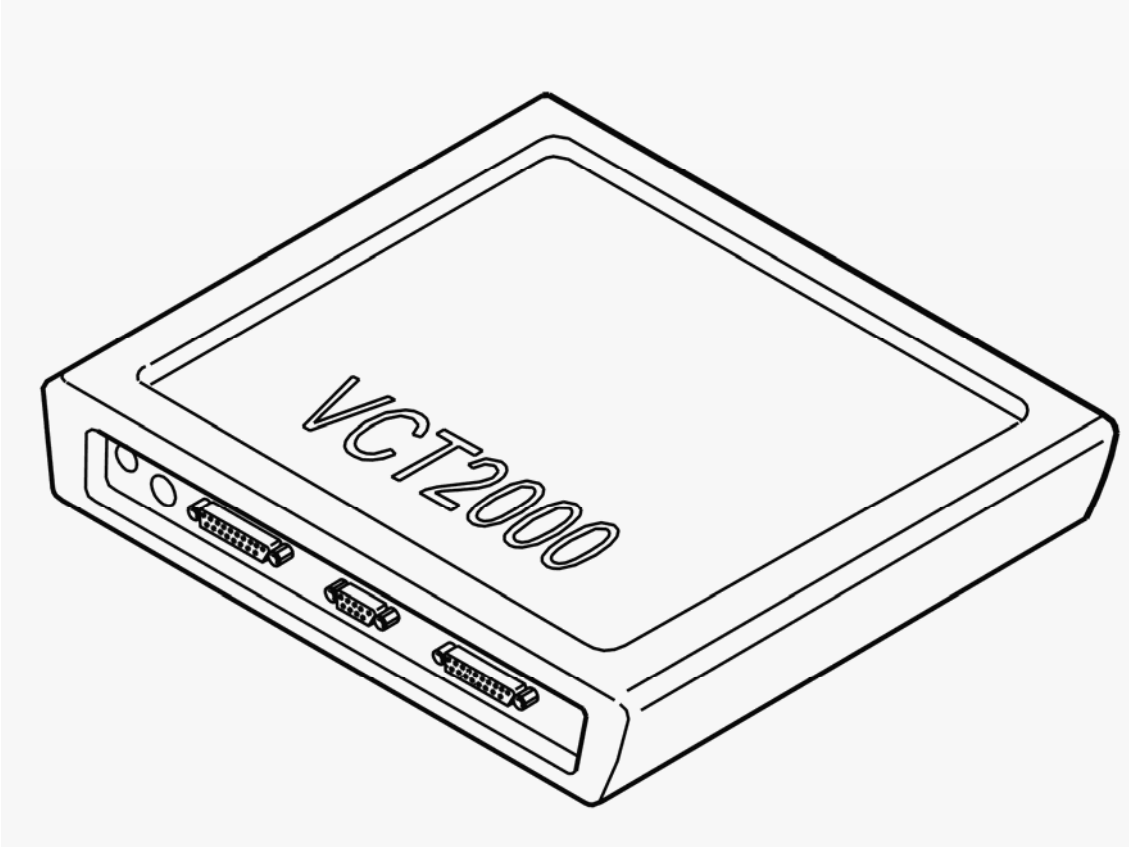


Fig. 349: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

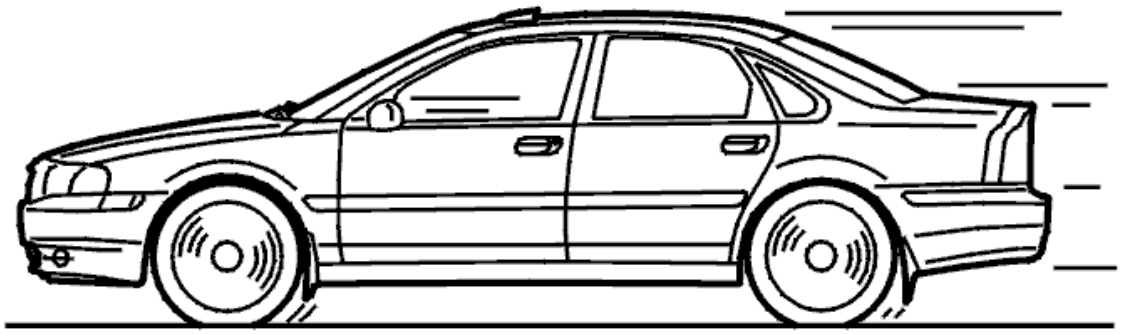


Fig. 350: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

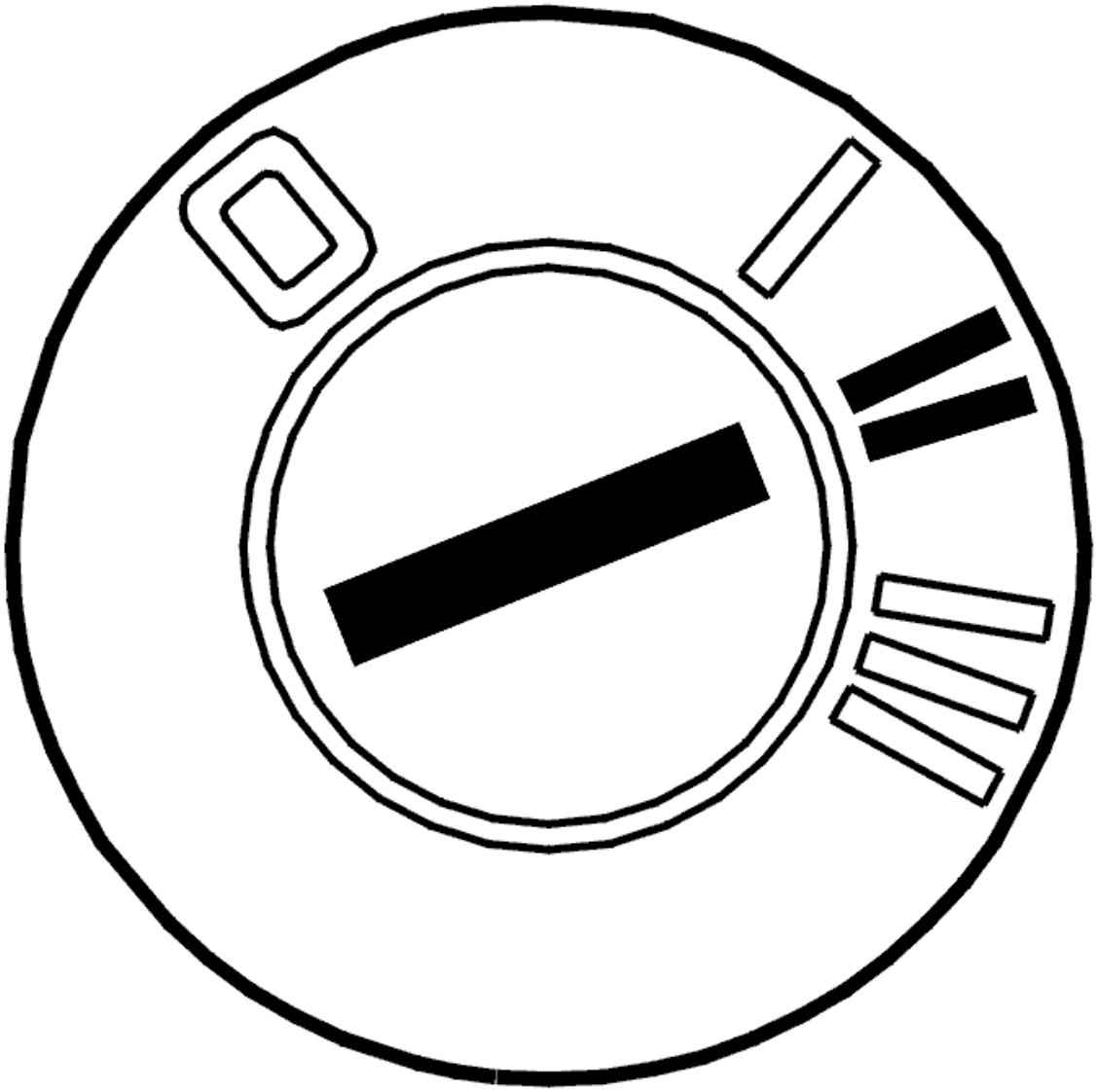


Fig. 351: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  Any diagnostic trouble codes (DTCs) other than TCM-0050, TCM-0051 and TCM-0052 that are stored must be fault-traced after this fault-tracing is completed.

  Select an option:

  1. Diagnostic trouble codes (DTCs) TCM-0050 and TCM-0052 were stored

     Refer to **INFORMATION**

  2. Only TCM-0052 or both TCM-0051 and TCM-0052 were stored

Refer to **INFORMATION**

3. No diagnostic trouble codes (DTCs) other than TCM-0050, TCM-0051 or TCM-0052 were stored.

   NO DTC

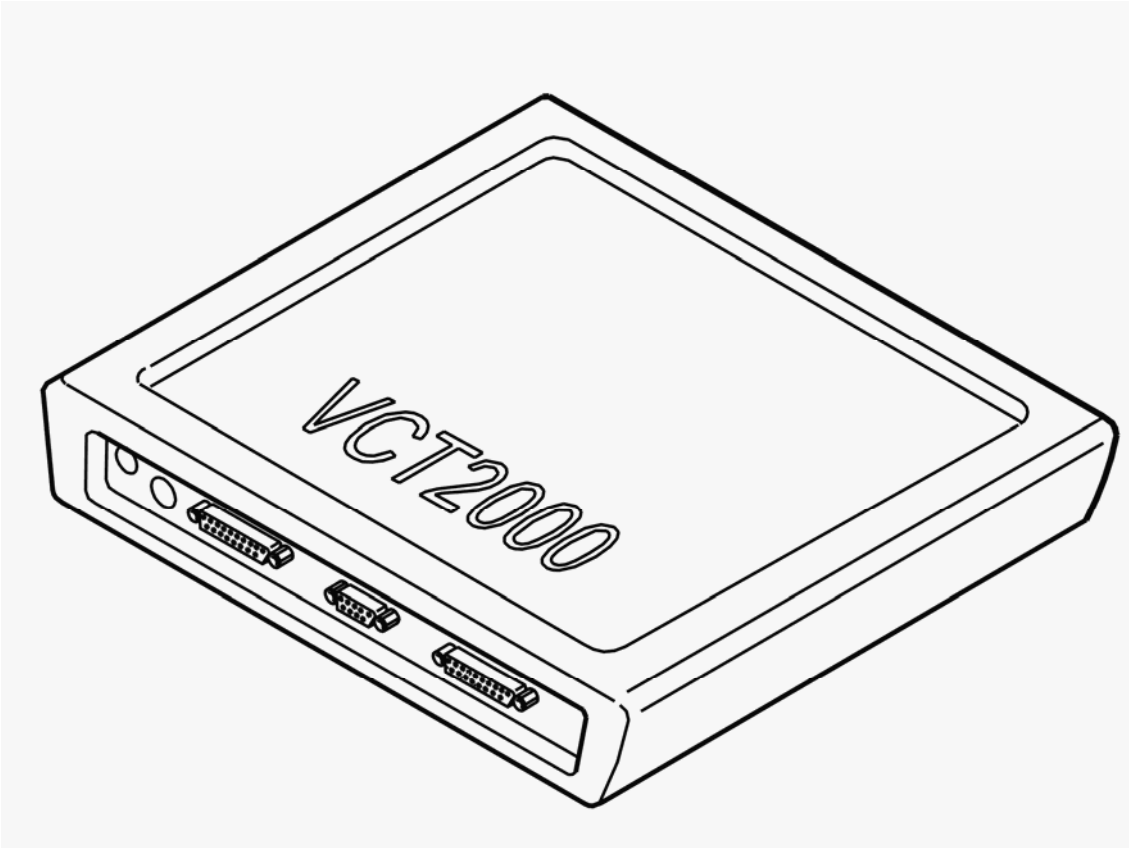


Fig. 352: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING THE SOFTWARE

CHECKING THE SOFTWARE

NOTE: To carry out fault-tracing, the transmission control module (TCM) must be programmed with specific software.

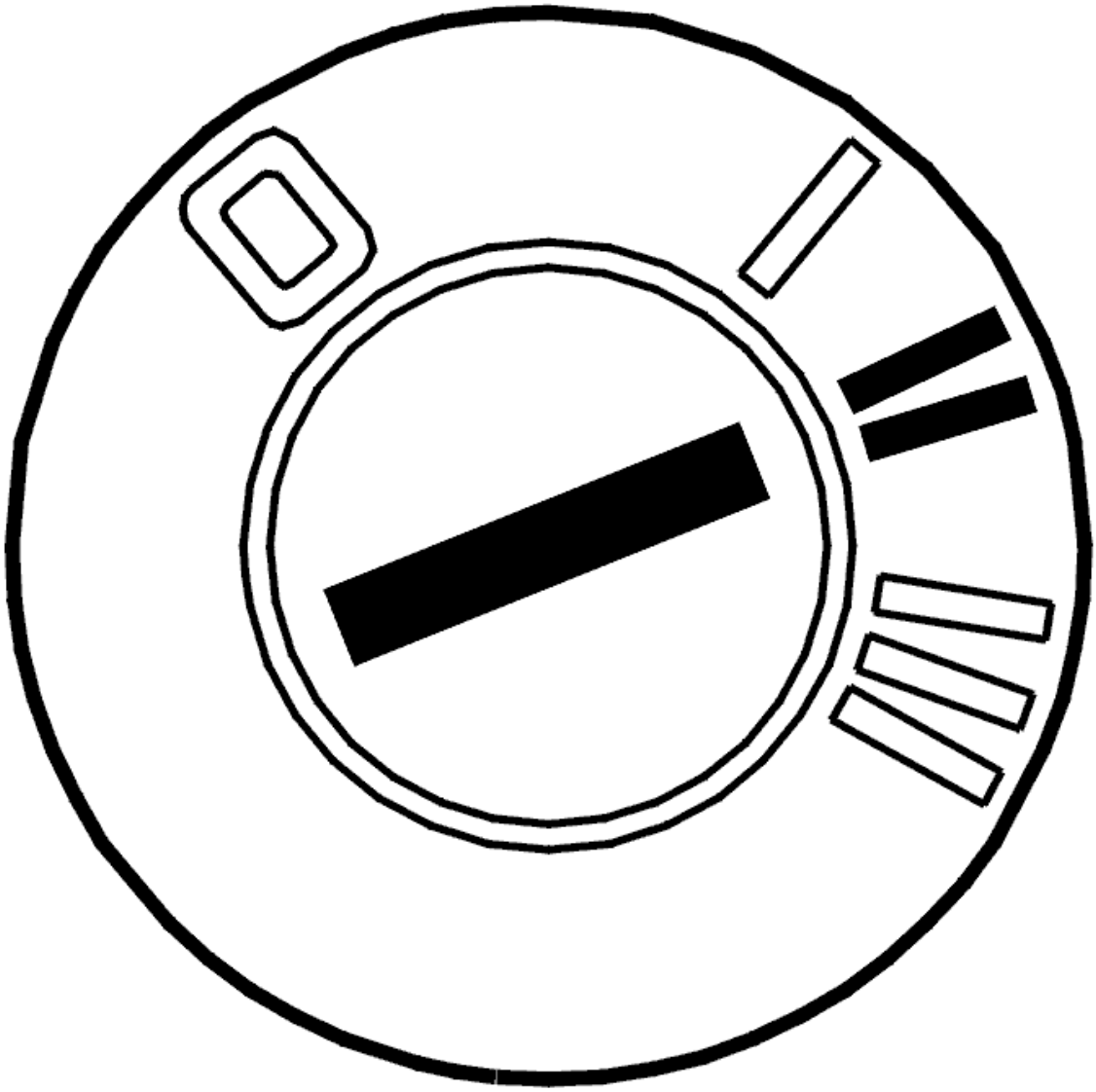


Fig. 353: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the control module diagnostic number.

  Check the read off diagnostic number against the diagnostic numbers given in the center table.

  If the diagnostic number is included in the table, the control module must be programmed with the latest software.

  See the technical journal for information about the most recent software.

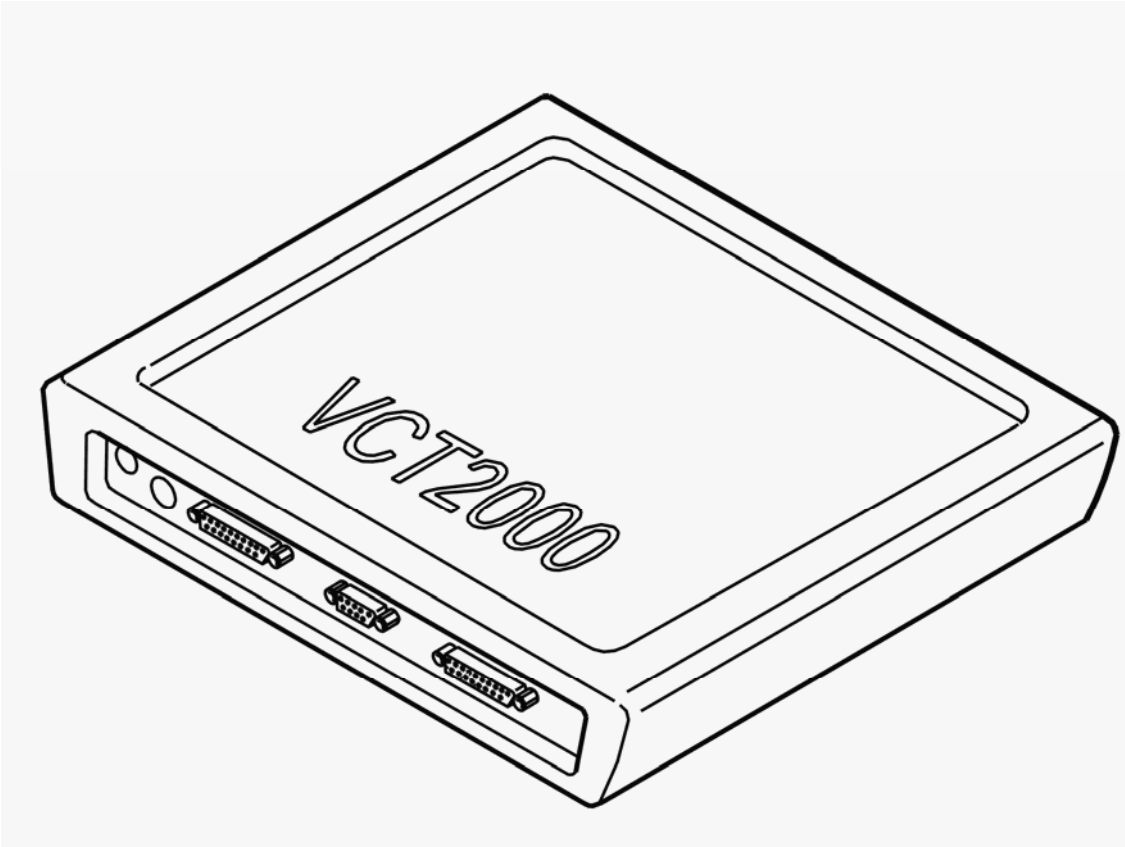


Fig. 354: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

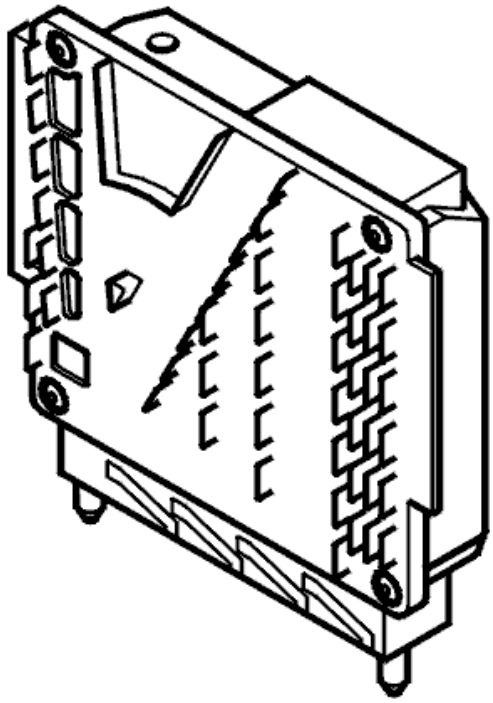


Fig. 355: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

TCM-0053: LOCK-UP PRESSURE SWITCH. JAMMED (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

The automatic transmission control module (TCM) receives a signal from the pressure switch for lock-up PS4 to check the lock-up valve position. Diagnostic trouble code (DTC) TCM-0053 is stored if the lock-up solenoid has stuck in the open position.

Substitute Value

- The control module (TCM) "Emergency mode II" program has been initiated.

Possible Source

- The pressure switch for lock-up is jammed
- Contact resistance in the terminals
- The transmission oil level is too high
- Mechanical fault in the transmission control system
- There is an electrical fault in the pressure sensor circuit.

Fault symptom[s]

- General orange warning lamp lit
- No lock-up function
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- no reduction of line pressure when shifting
- no reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D
- no torque limiting request to the engine control module (ECM) when shifting.

STUCK

CHECKING THE SOFTWARE

CHECKING THE SOFTWARE

NOTE: To carry out fault-tracing, the transmission control module (TCM) must be programmed with specific software.

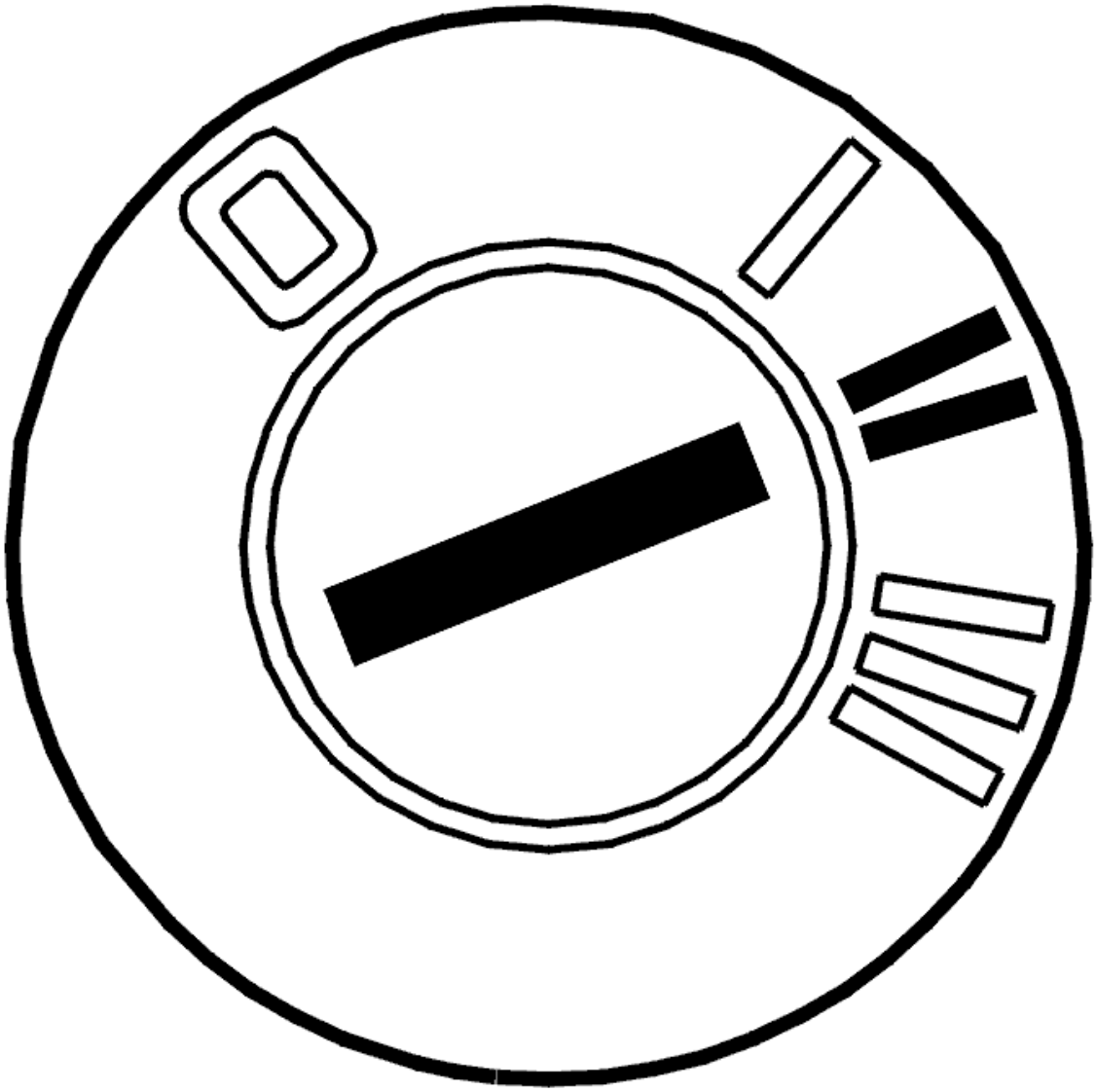


Fig. 356: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the control module diagnostic number.

  Check the read off diagnostic number against the diagnostic numbers given in the center table.

  If the diagnostic number is included in the table, the control module must be programmed with the latest software.

  See the technical journal for information about the most recent software.

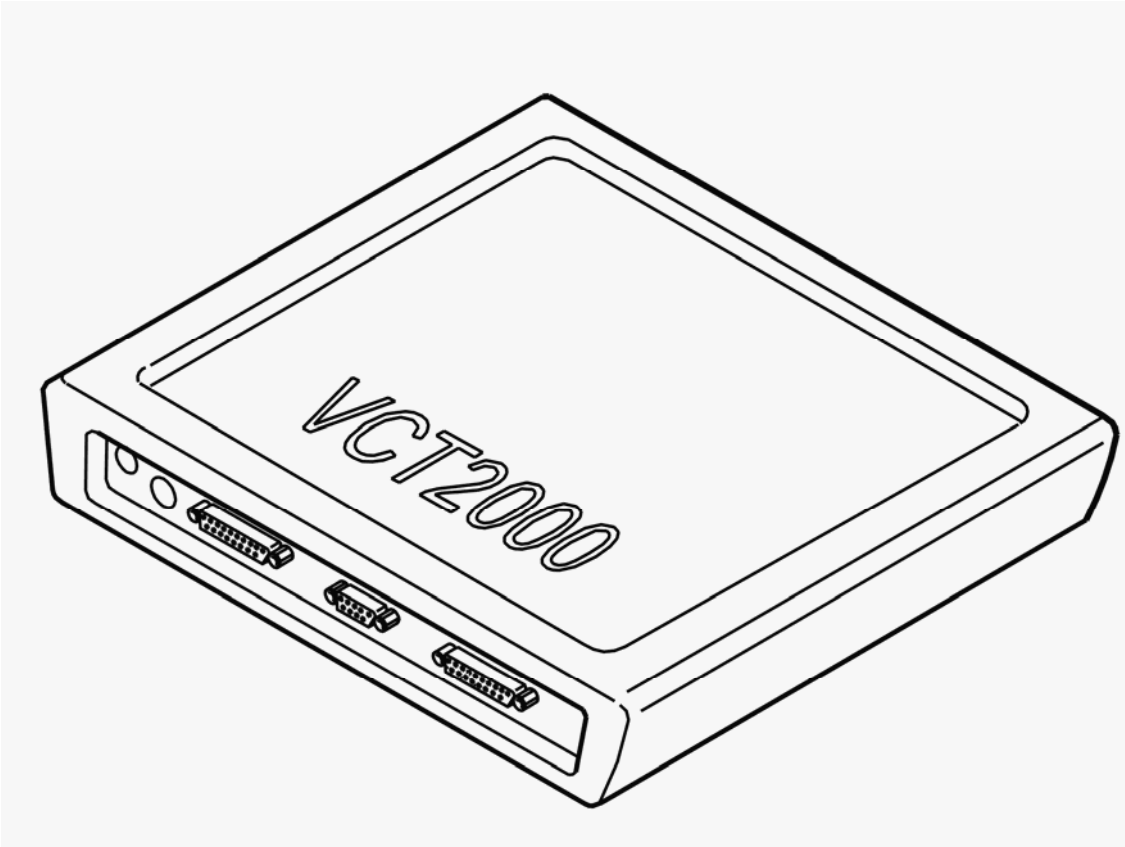


Fig. 357: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

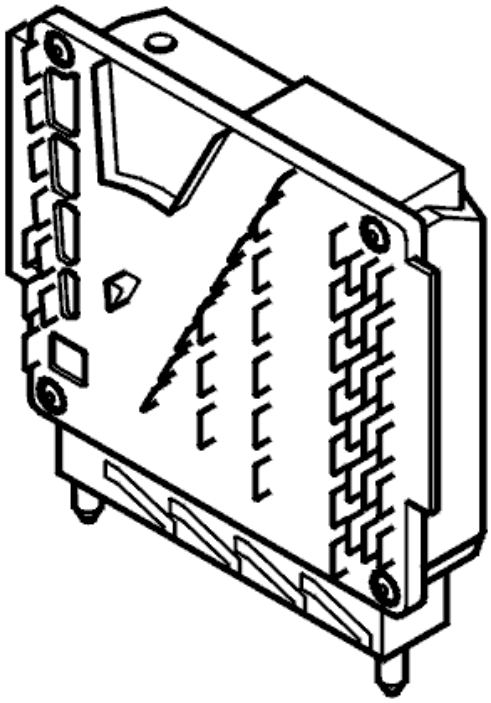


Fig. 358: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING THE DIAGNOSTIC TROUBLE CODES (DTCS)

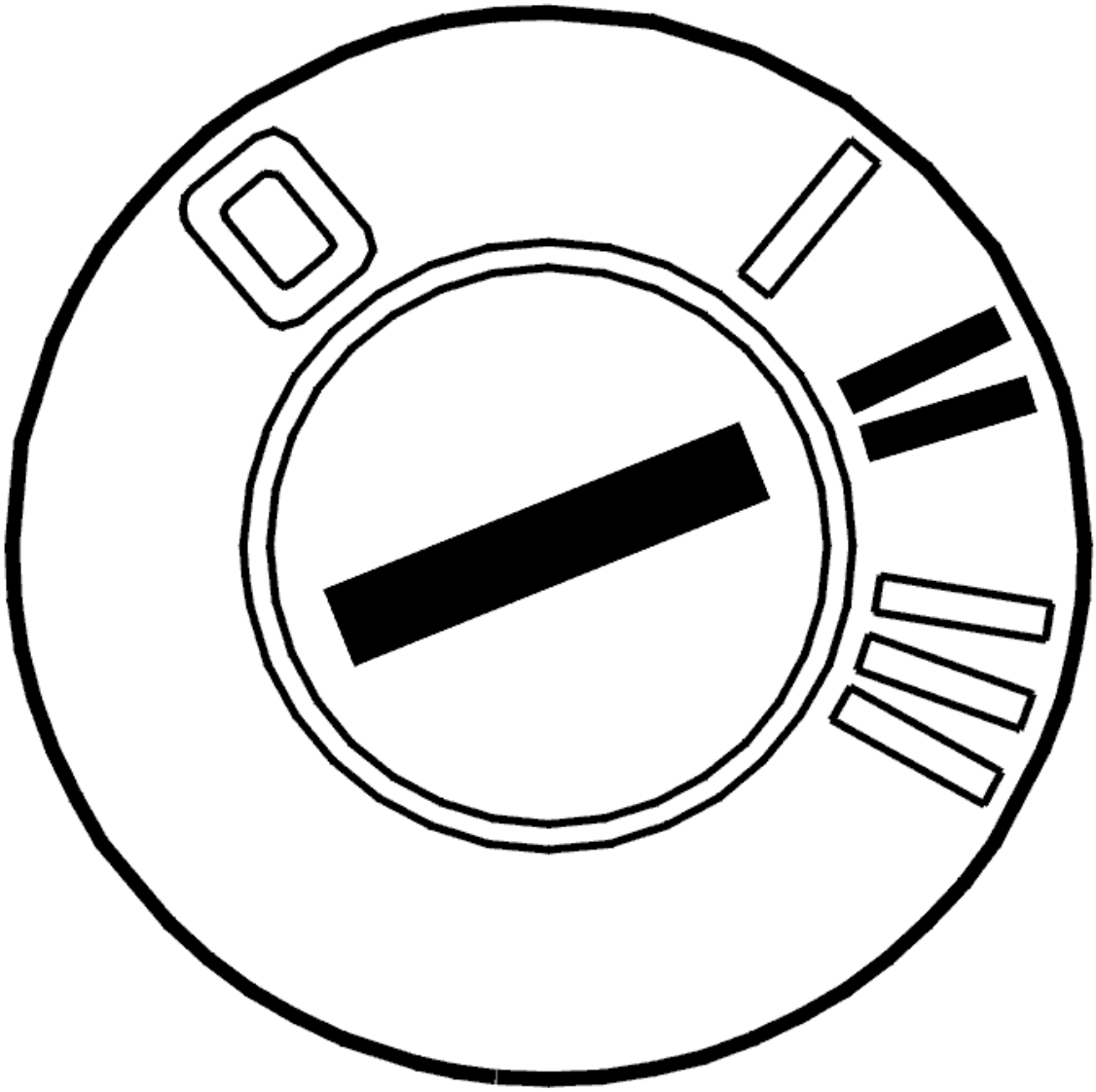


Fig. 359: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-0053 are stored, these must be fault-traced and remedied after this fault-tracing is completed.

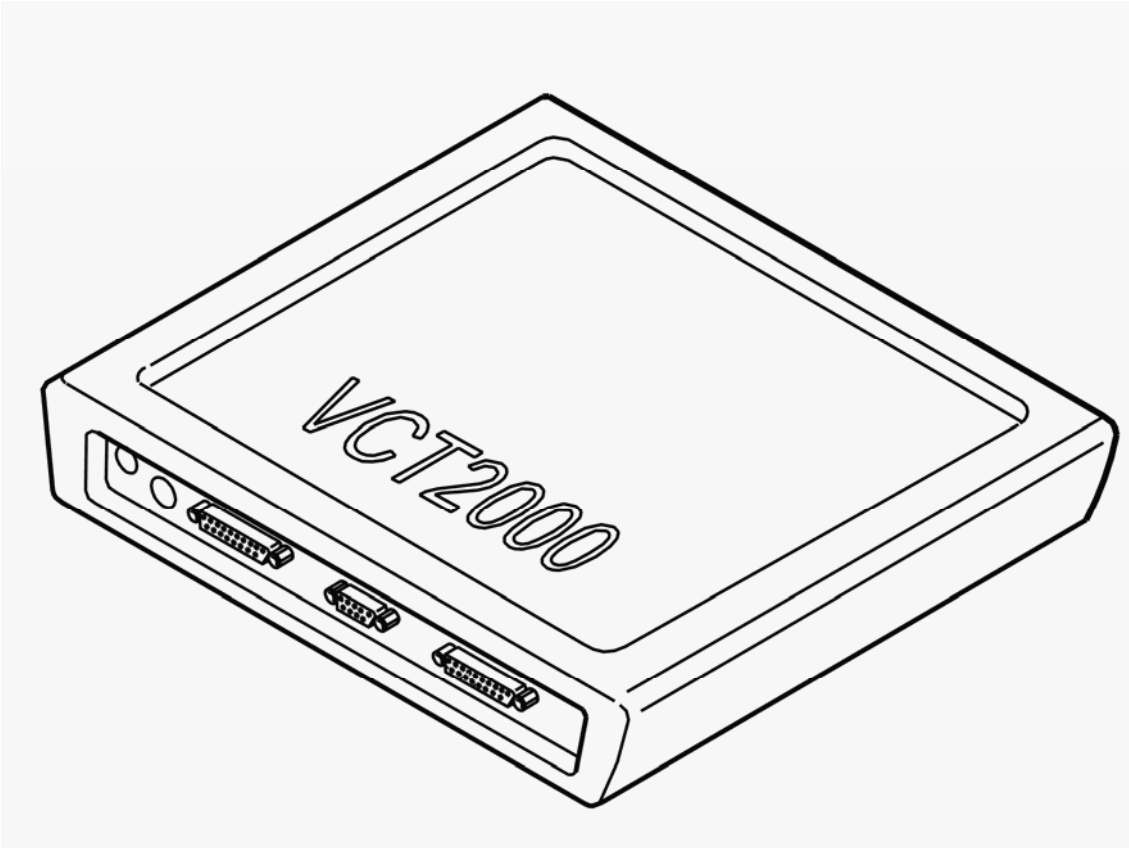


Fig. 360: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING THE WIRING

HINT: This step requires 2 breakout boxes.

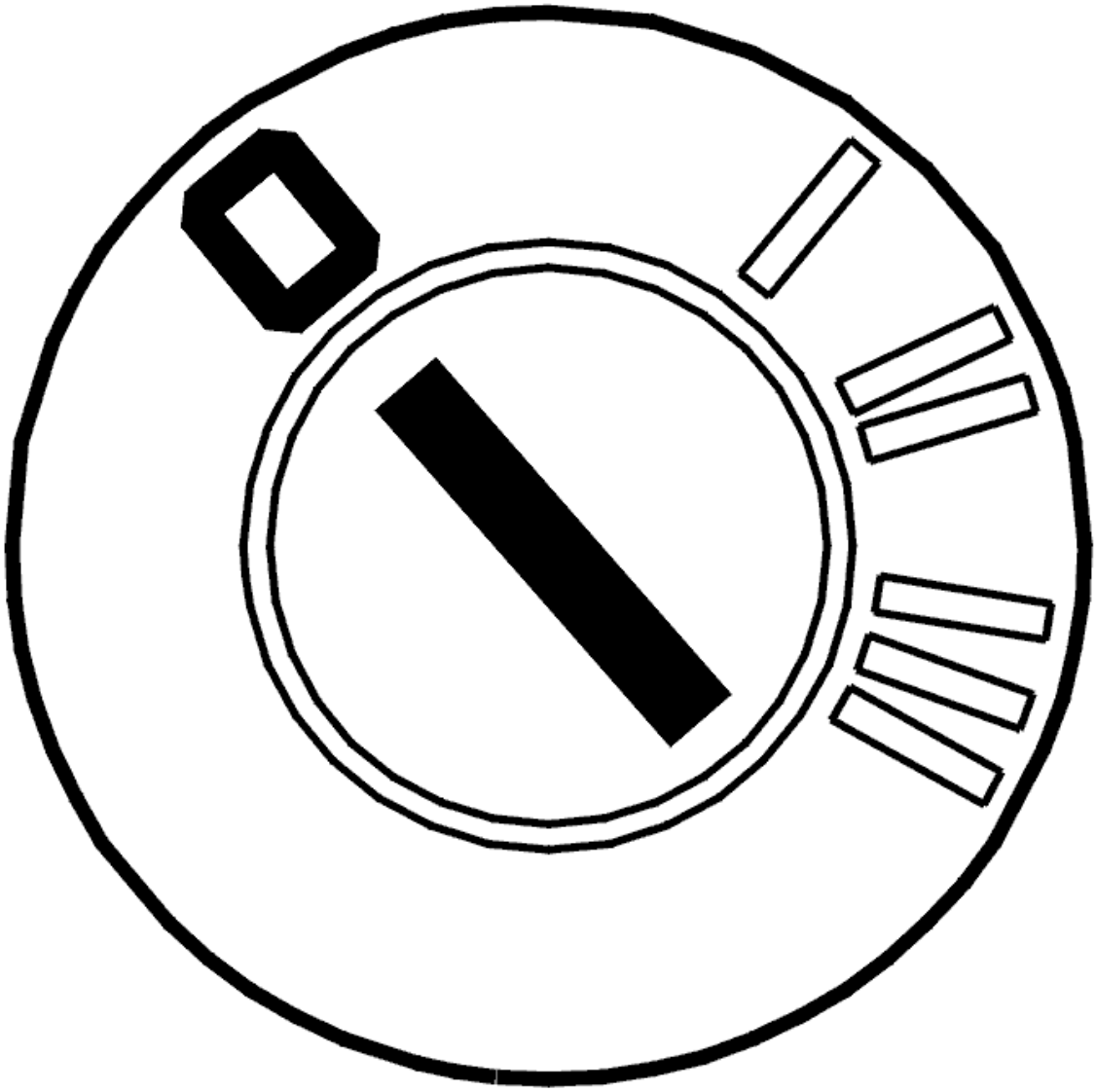


Fig. 361: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

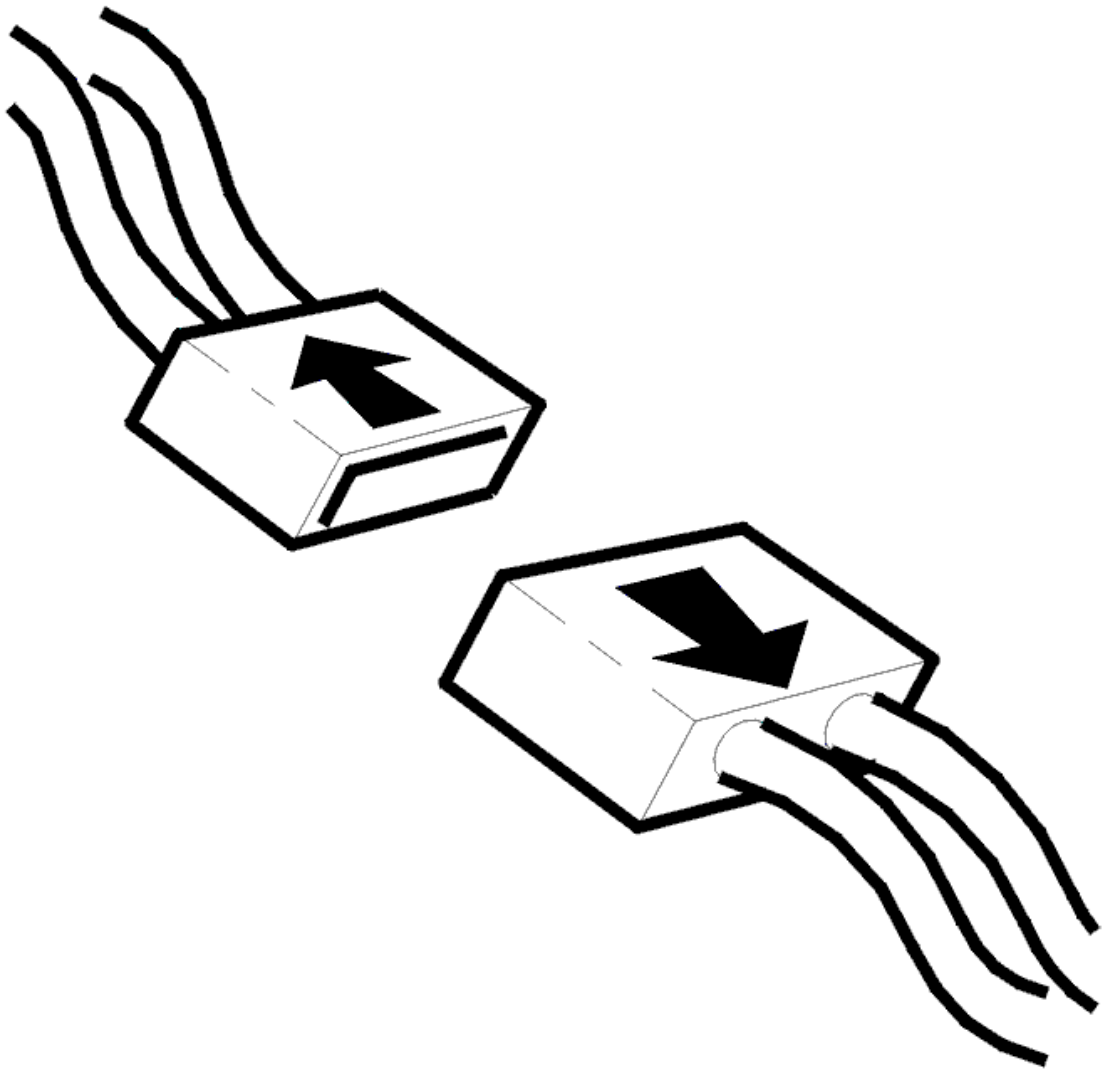


Fig. 362: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission control module (TCM).
- Connect adapter see **9511505** and breakout box see **9511428** to the transmission control module (TCM) connector (transmission side).
- Disconnect the gearbox connector
- Connect adapter see **9511505** and breakout box see **9511428** to the transmission connector (transmission control module (TCM) side).
- Connector to the transmission unplugged.

  Check the cable between transmission control module (TCM) #A51 (#A51) and transmission #U (#A18) for open-circuit and short-circuit to either voltage or ground.

Check the cable between transmission control module (TCM) #A53 (#A53) and transmission #E (#A5) for open-circuit and short-circuit to supply voltage or ground.

Other information:

- Connecting a breakout box to the transmission control module (TCM): **CONNECTING THE BREAKOUT BOX**
- see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- see **SIGNAL DESCRIPTION. CONNECTOR 4T65 EV/EV-GT**
- For information on signals on the transmission control module (TCM): **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

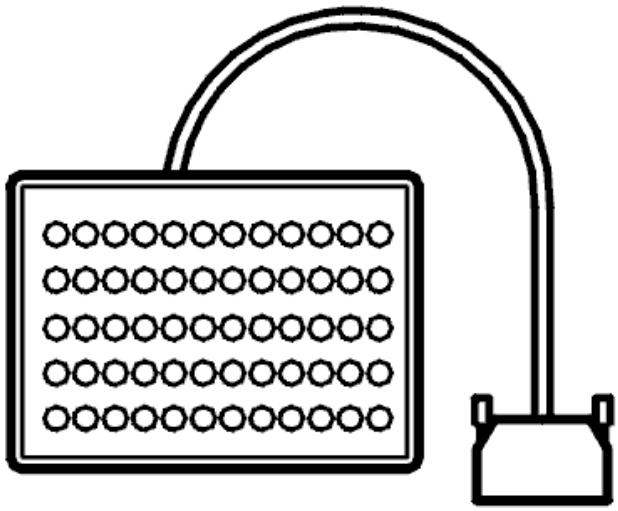


Fig. 363: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

- **NO**

  Refer to **CHECKING THE COMPONENT**

CHECKING THE COMPONENT

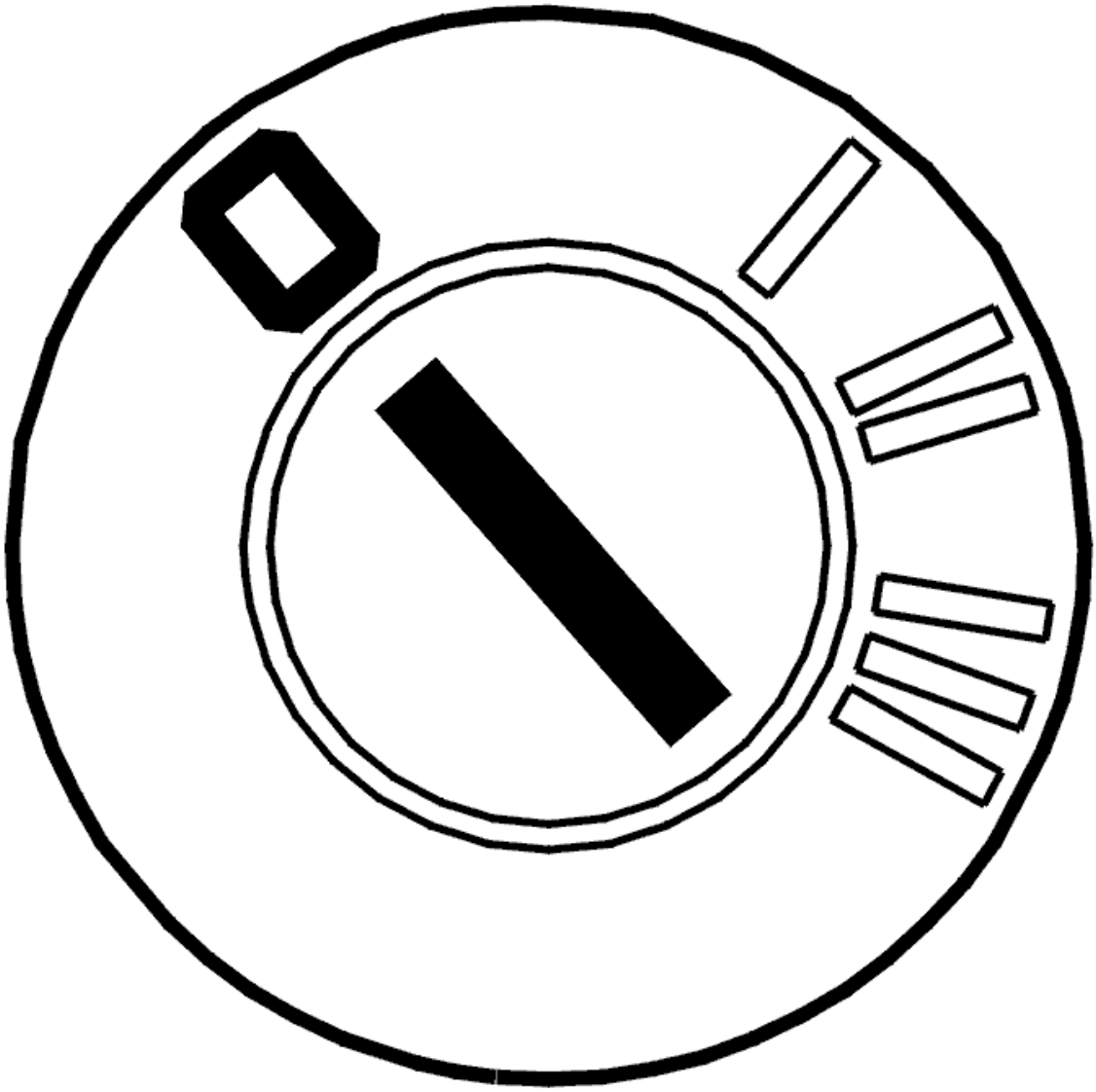


Fig. 364: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

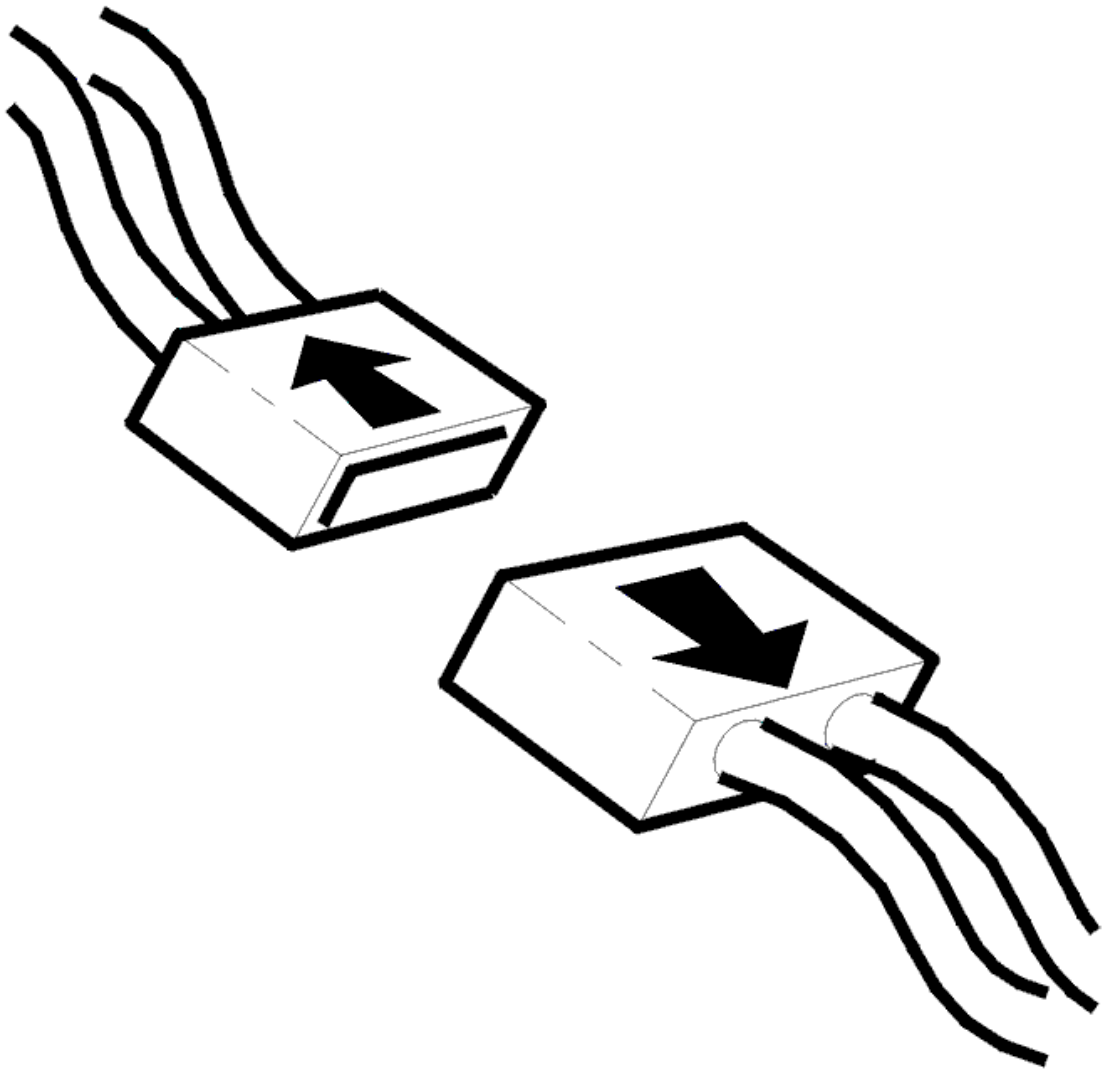


Fig. 365: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the gearbox connector
- Connect adapter see **9511505** and breakout box see **9511428** to the gearbox connector (gearbox side)
- Unplug the transmission connector (transmission control module (TCM) side).

  Check that the resistance between the gearbox housing and the gearbox connector terminal #U (#A18) is 0-50 ohms.

  Other information:

  - see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - see **SIGNAL DESCRIPTION. CONNECTOR 4T65 EV/EV-GT**

- For information on signals on the transmission control module (TCM): **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

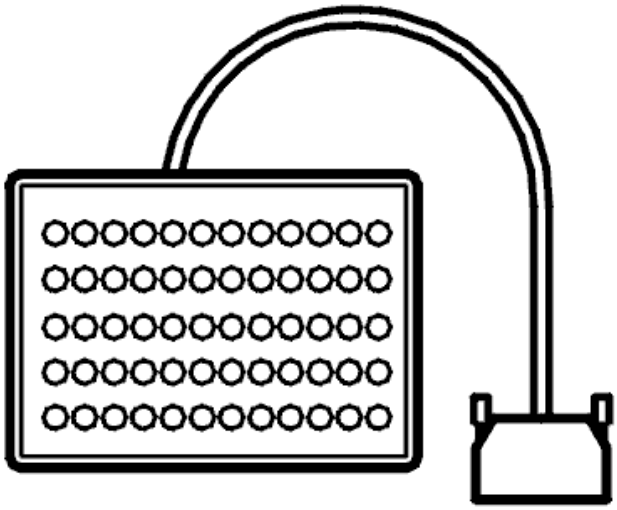


Fig. 366: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE COMPONENT**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE COMPONENT

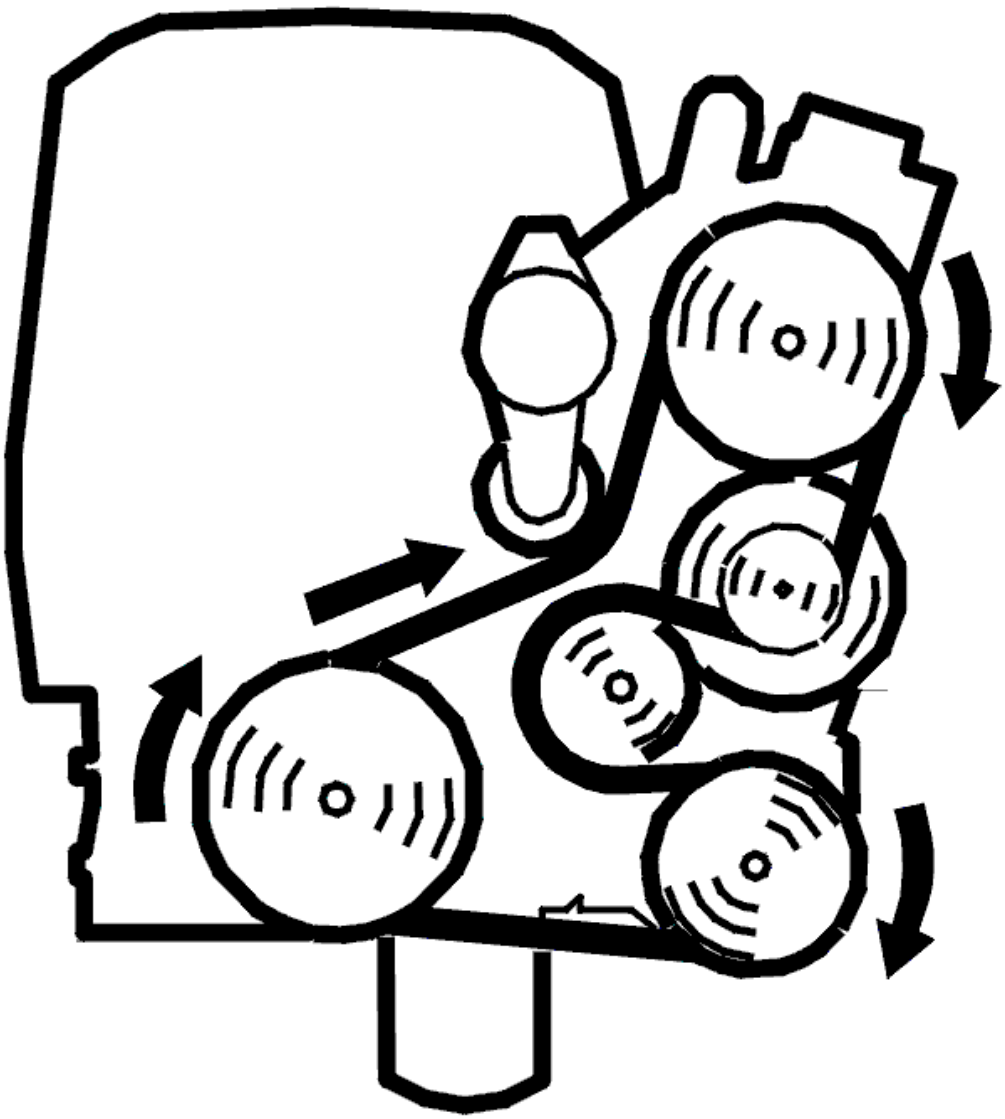


Fig. 367: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

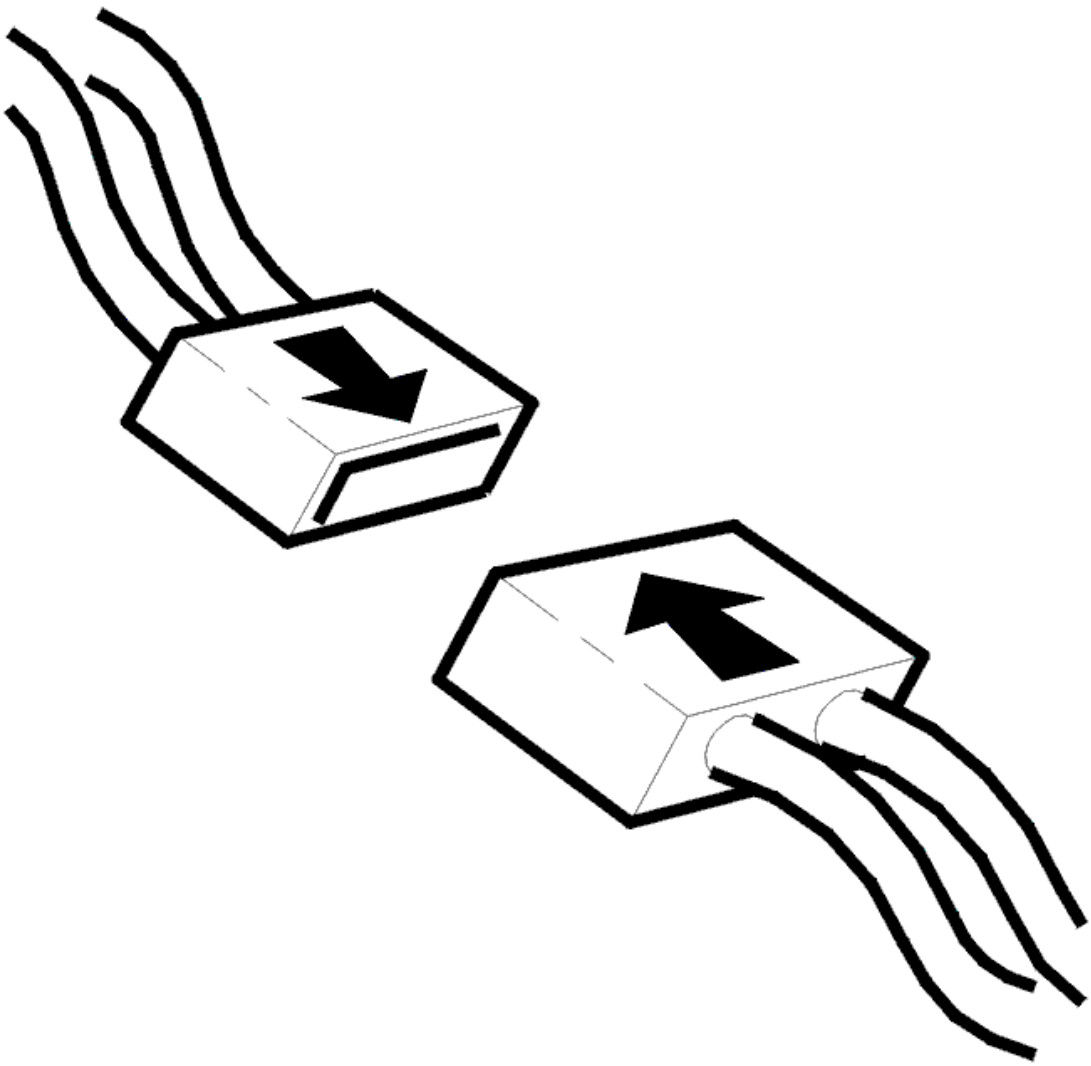


Fig. 368: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Adapter see **9511505** and breakout box see **9511428** connected to the gearbox connector (transmission control module (TCM) side and transmission side).
- Start the engine.

  Check that the voltage between the gearbox housing and the gearbox connector terminal #U (#A18) is battery voltage.

  Other information:

  - see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - see **SIGNAL DESCRIPTION. CONNECTOR 4T65 EV/EV-GT**

- For information on signals on the transmission control module (TCM): **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

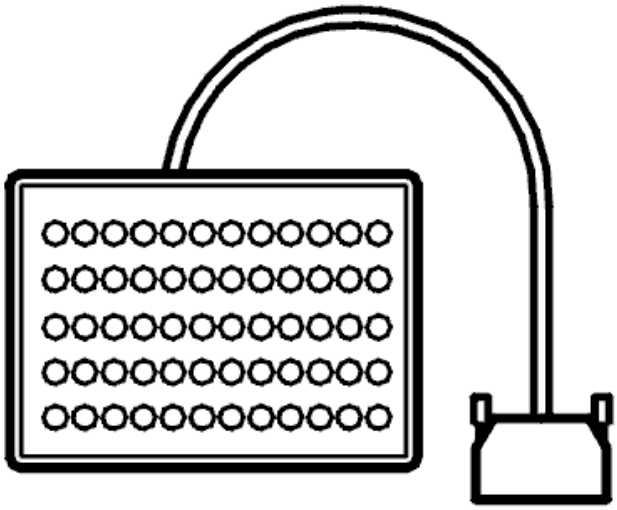


Fig. 369: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

Was the voltage OK?

- **YES**

  Refer to **CHECKING SOLENOID SL**

- **NO**

  Refer to **CHECKING THE COMPONENT**

CHECKING THE COMPONENT

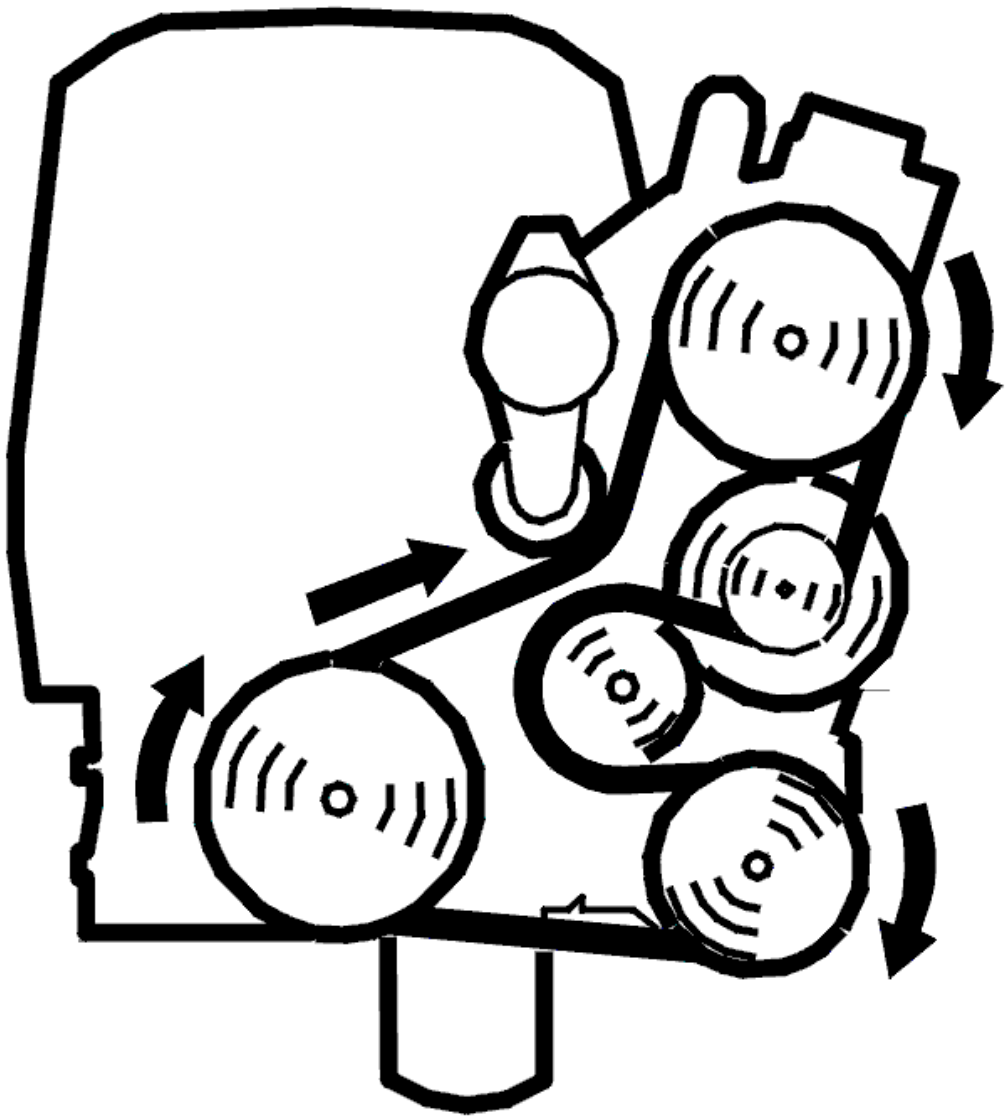


Fig. 370: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

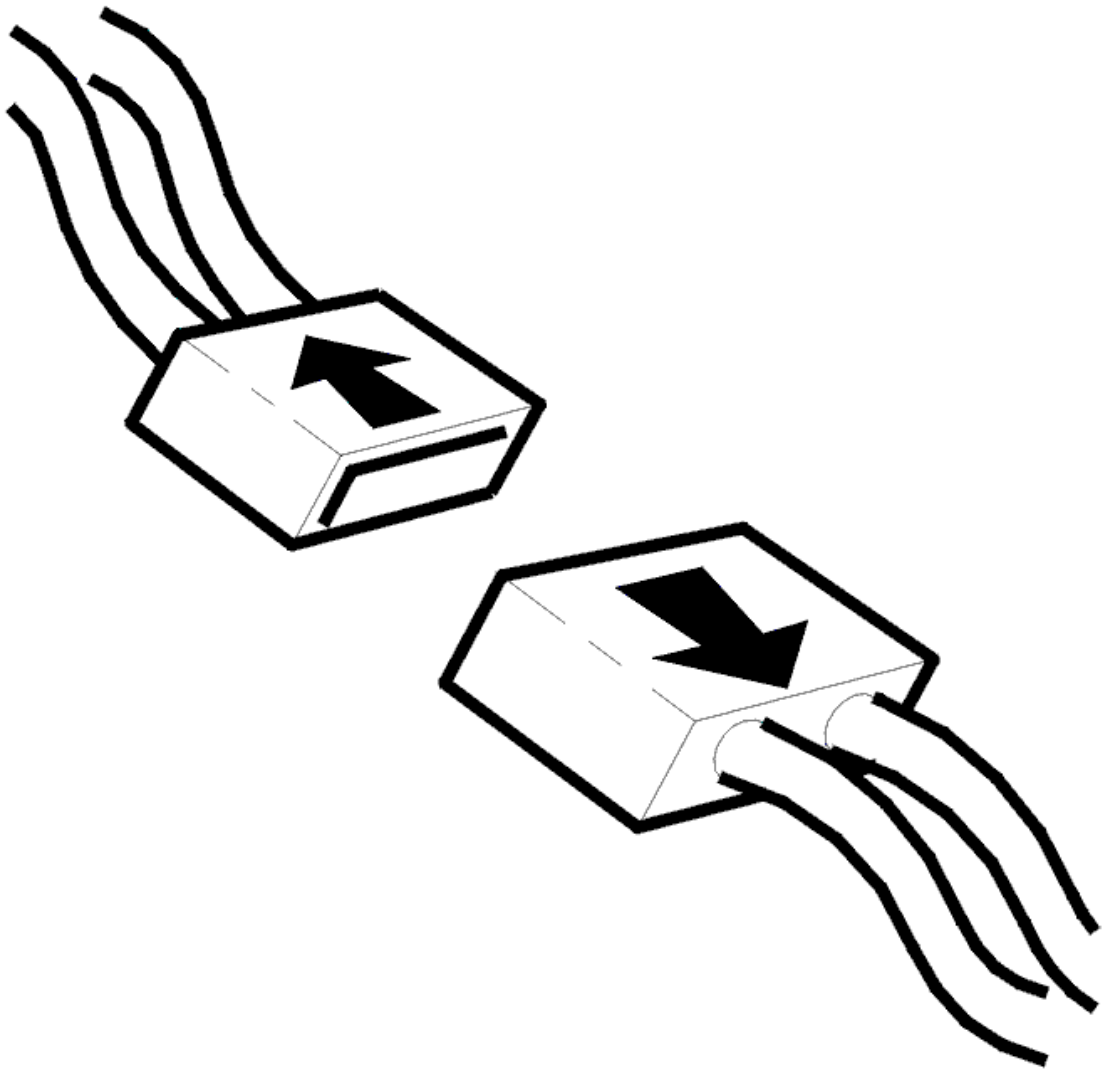


Fig. 371: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Engine idling
- Adapter see **9511505** and breakout box see **9511428** connected to the transmission connector (transmission control module (TCM) side).
- Gearbox connector disconnected.

NOTE: When the transmission connector is unplugged, the transmission control module (TCM) will generate diagnostic trouble codes (DTCs) for solenoids and the gear shift position sensor. These do not require fault tracing after completion of this fault tracing.

Check that the voltage between any ground terminal and terminal #U (#A18) is battery voltage.

Other information:

- see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information on signals on the transmission control module (TCM): **SIGNAL SPECIFICATION**

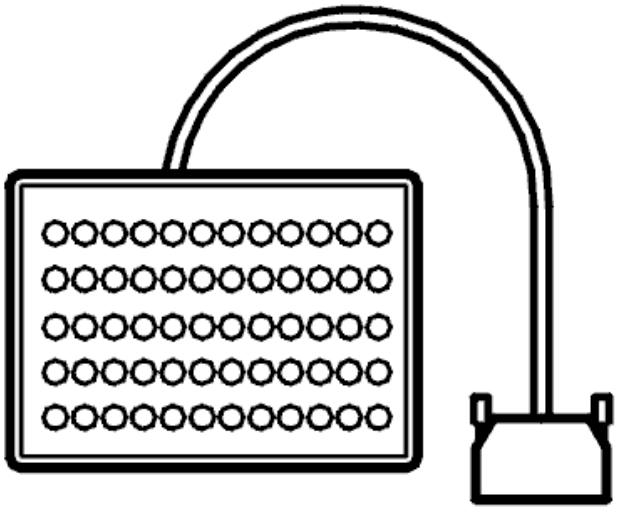


Fig. 372: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

Was the voltage OK?

- **YES**

  Refer to **CHECKING THE WIRING AND COMPONENT**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

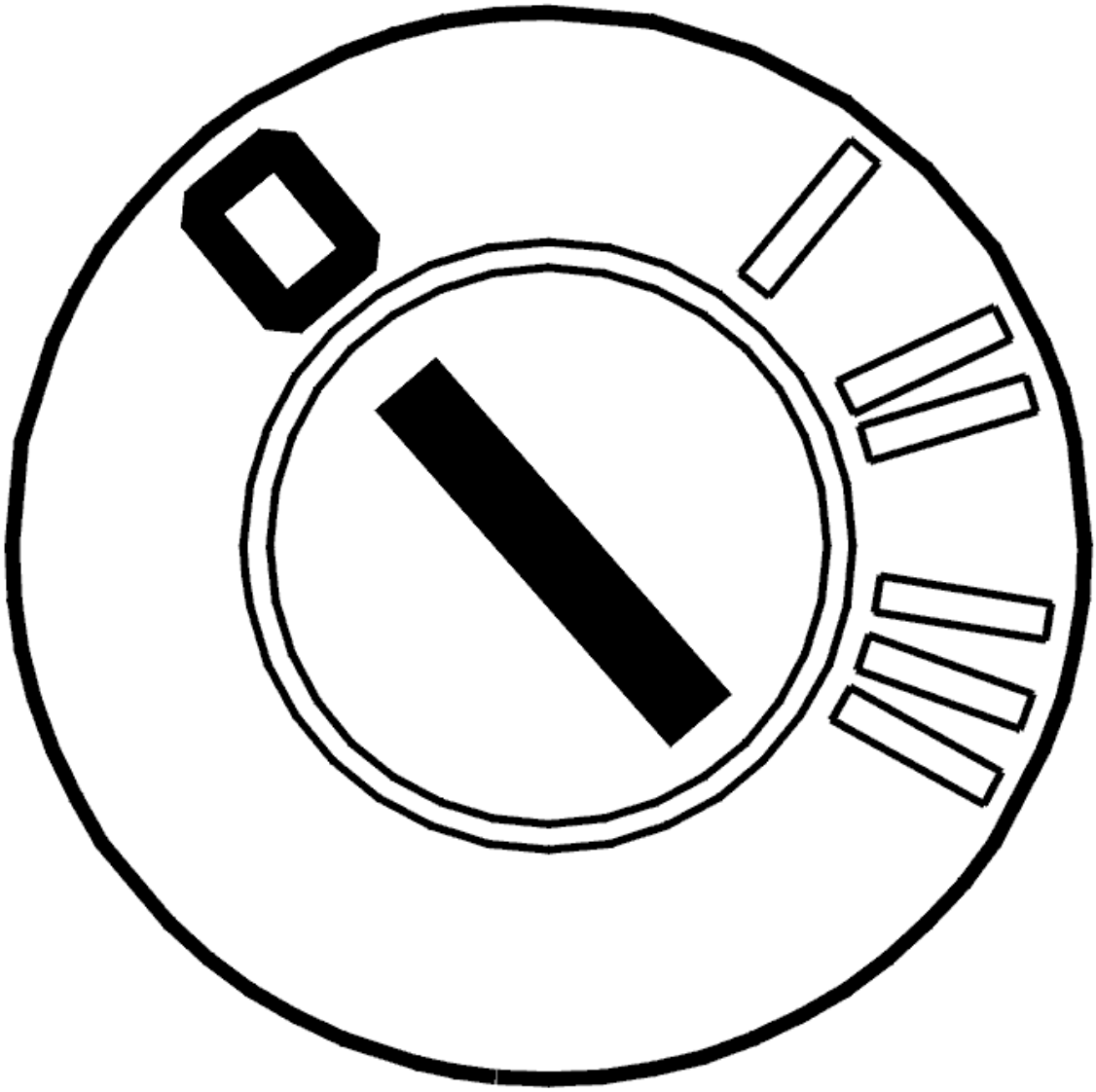


Fig. 373: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

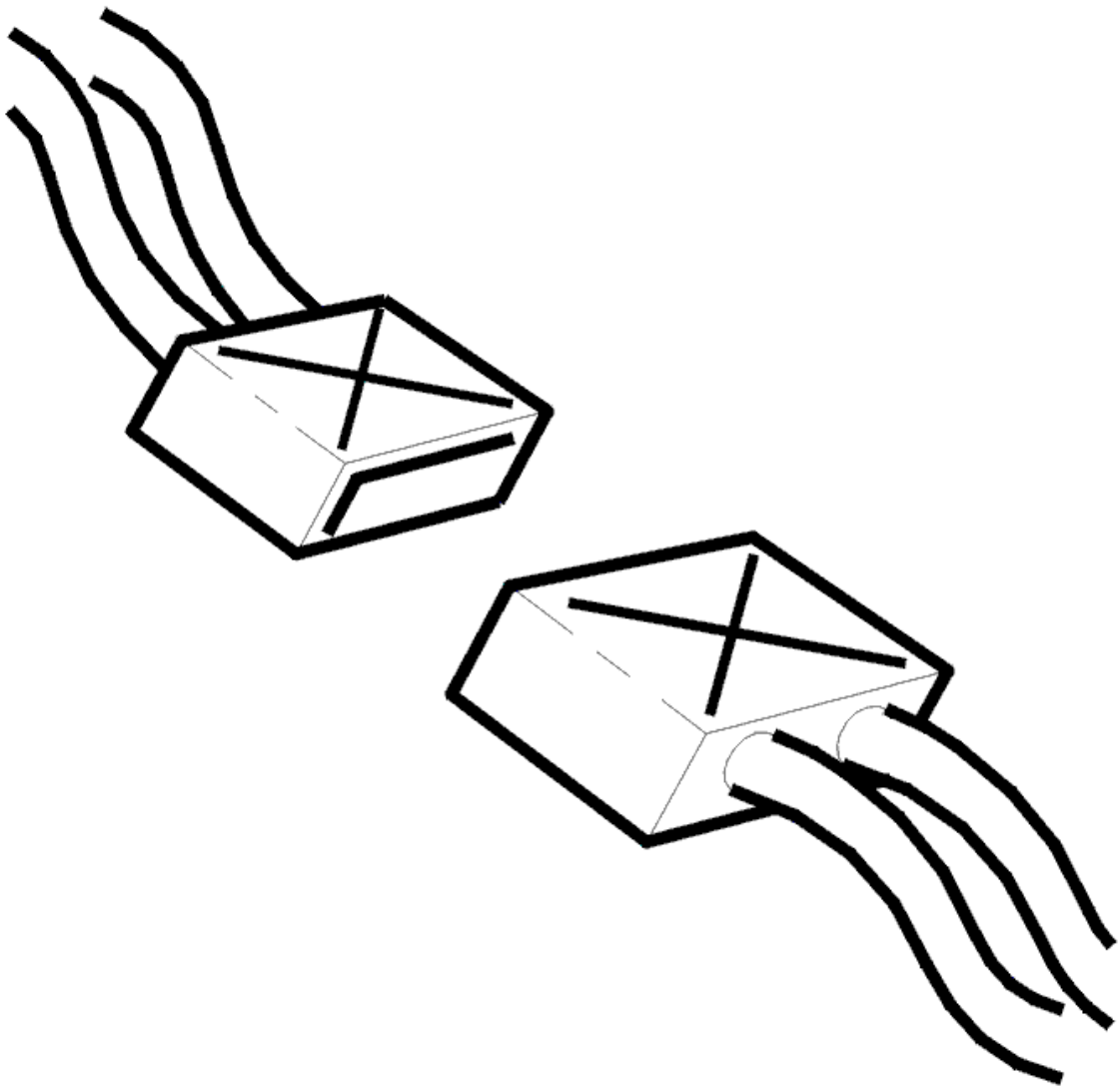


Fig. 374: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

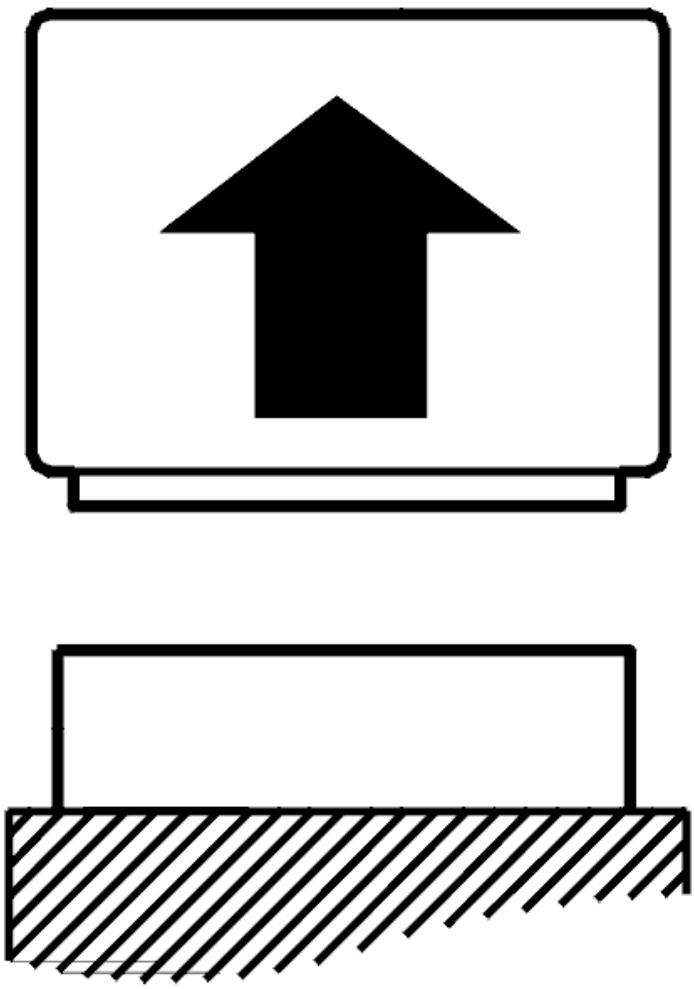


Fig. 375: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission control module (TCM).
- Connect a breakout box to the transmission control module (TCM) connector (transmission side).
- Connect adapter see **9511505** and breakout box see **9511428** to the transmission connector (transmission control module (TCM) side).
- Disconnect the gearbox connector

  Check the connectors of the transmission control module (TCM) and the transmission for contact resistance and oxidation.

  Check the cable between transmission control module (TCM) terminal #A65 (#B5) and gearbox connector terminal #U (#A18) (control module side). Check for an open-circuit. Check for a short-circuit

to ground. Check for a short-circuit to supply voltage.

Replace the transmission control module (TCM) if no fault was detected in the wiring or terminals.

Other information:

- Connecting a breakout box to the transmission control module (TCM): **CONNECTING THE BREAKOUT BOX**
- see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information on signals on the transmission control module (TCM): **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

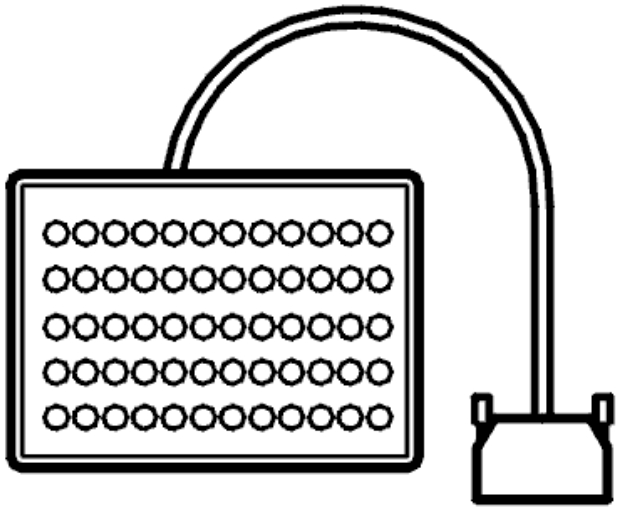


Fig. 376: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

Was a fault detected in the cables or terminals?

- **YES**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

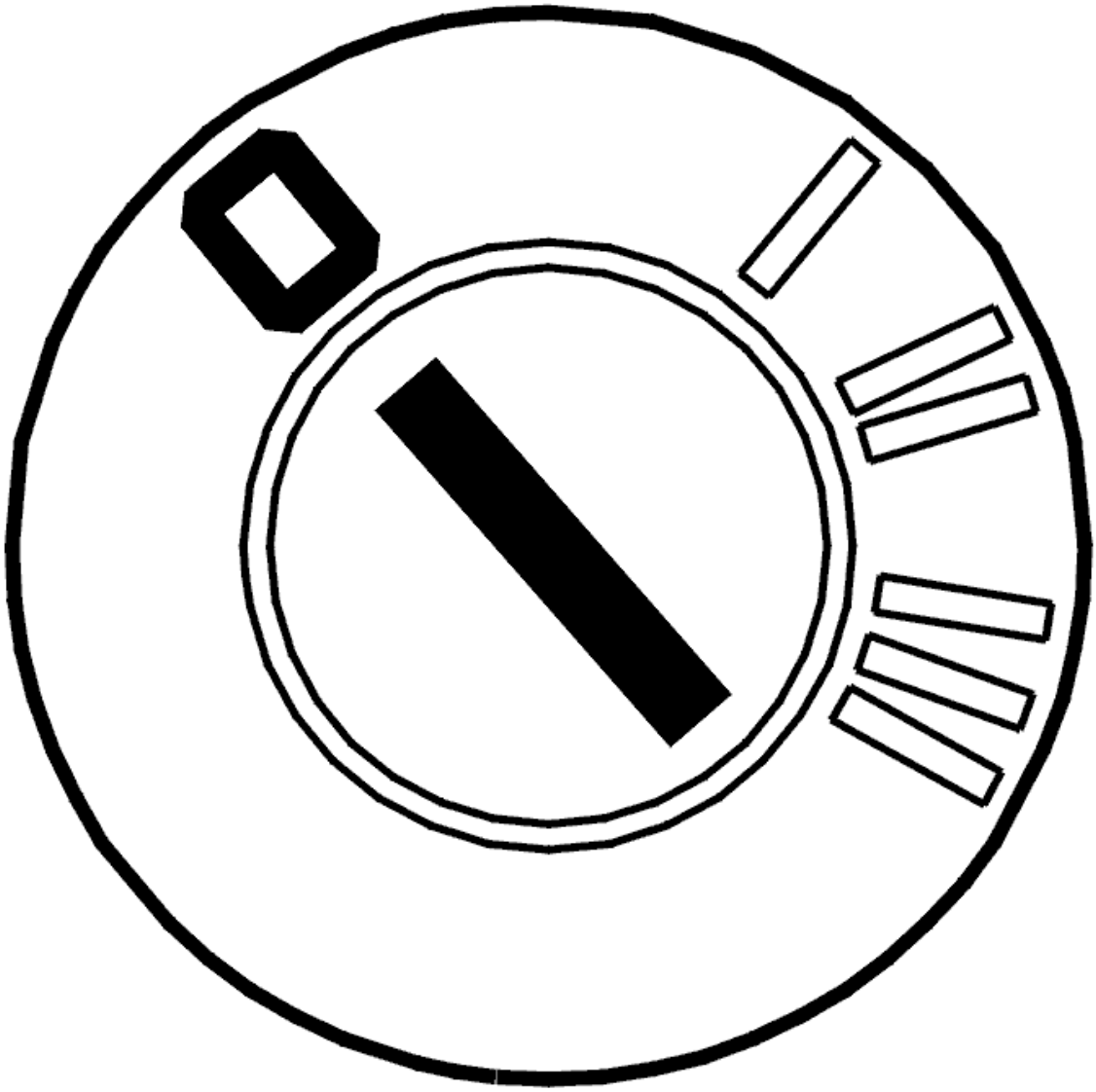


Fig. 377: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system
- Connect adapter see **9511505** and breakout box see **9511428** to the gearbox connector (gearbox side).

  Check the gearbox and pressure switch module connectors. Check for contact resistance and oxidation.

  Check the cable between control module terminal #U (terminal #A18) and pressure switch module connector terminal #B. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

  Check the gearbox oil filter. Check for **abnormal** amounts of particles in the oil.

Replace the oil filter if necessary.

Replace the pressure switch module if no particles were found in the oil filter or there was no fault in the wiring.

Other information:

- Connecting a breakout box to the control module: **CONNECTING THE BREAKOUT BOX**
- see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- Opening the transmission control system: **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information on signals on the transmission control module (TCM): **SIGNAL SPECIFICATION**
- see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- Replacing the oil filter: **TRANSMISSION OIL / OIL FILTER, REPLACING**
- Replacing the pressure switch module: **PRESSURE SENSOR, REPLACING**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

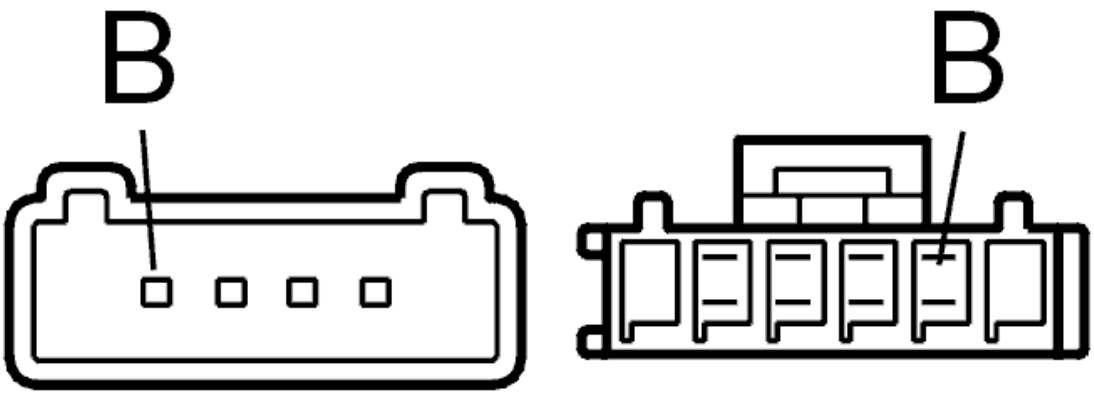


Fig. 378: Identifying Pressure Switch Module Connector Terminal #B
Courtesy of VOLVO CARS CORPORATION

Was an abnormal quantity of particles found in the gearbox oil trough and oil filter?

- **YES**

  Refer to **REPLACING THE GEARBOX**

- **NO**

  Refer to **RESETTING THE ADAPTATION**

CHECKING SOLENOID SL

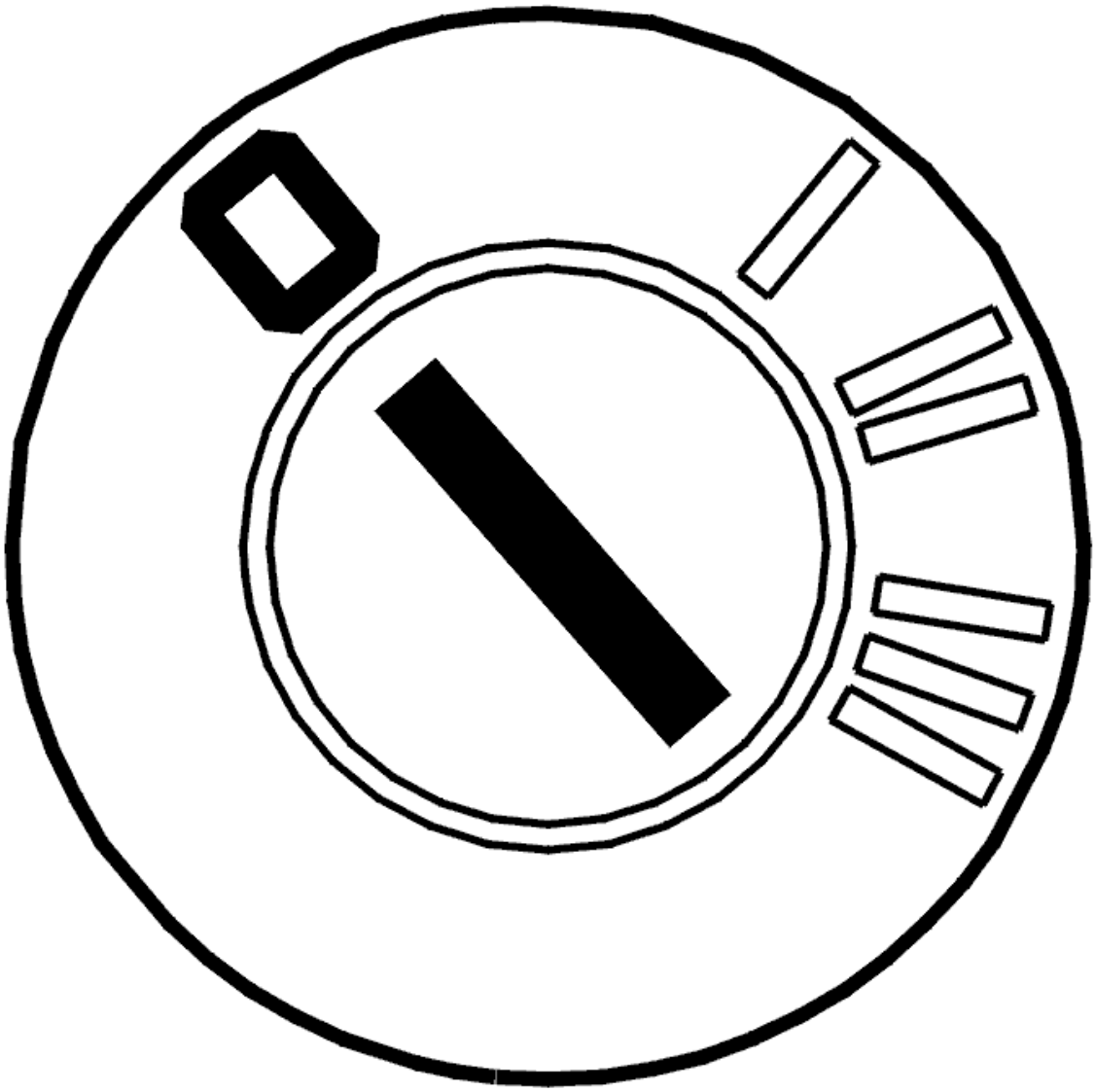


Fig. 379: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Breakout box connected to the transmission control module (TCM) connector (transmission side).

Check solenoid SL by measuring the resistance between transmission control module (TCM) #A51 (#A51) and #A53 (#A53).

When the gearbox is cold (20°C), the resistance must be 10-11 ohms. When the gearbox is at operating temperature (150°C), the resistance must not exceed 16 ohms.

Other information:

- Connecting a breakout box to the transmission control module (TCM): **CONNECTING THE BREAKOUT BOX**
- For information on signals on the transmission control module (TCM): **SIGNAL SPECIFICATION**

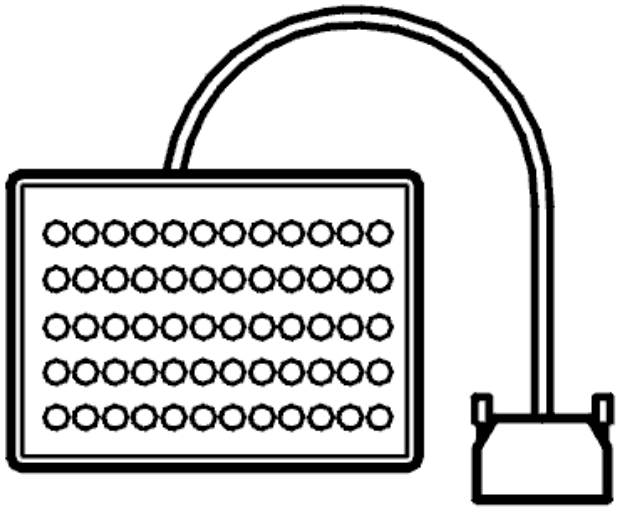


Fig. 380: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CONNECTING THE T PIPE**

- **NO**

  Refer to **CHECKING THE WIRING**

CONNECTING THE T PIPE

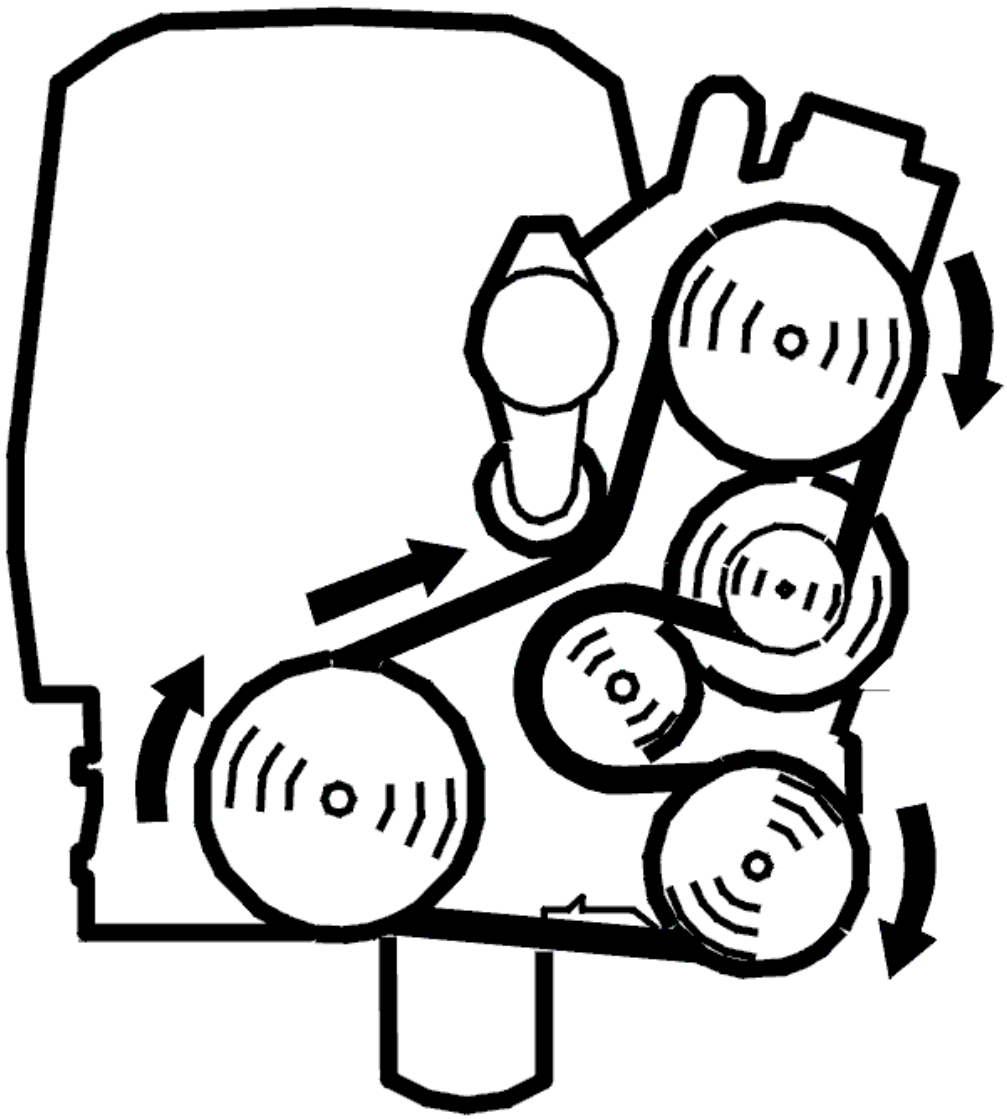


Fig. 381: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Deactivate the function for STC/DSTC by pressing in the button for STC/DSTC for approximately 2 seconds
- Ignition off
- Connect T-pipe see **9997002** with oil pressure gauge see **9995114** to the coolant hose from the gearbox for the oil cooler
- Raise the vehicle so that the drive wheels hang freely.

WARNING: Ensure that the vehicle is safely raised and that there are no objects caught in the front wheels.

- Start the engine.

- Gear selector in position P
- Activate the function "Block automatic shifting".

Other information

- see **T-PIPE, CONNECTION TO OIL COOLER**

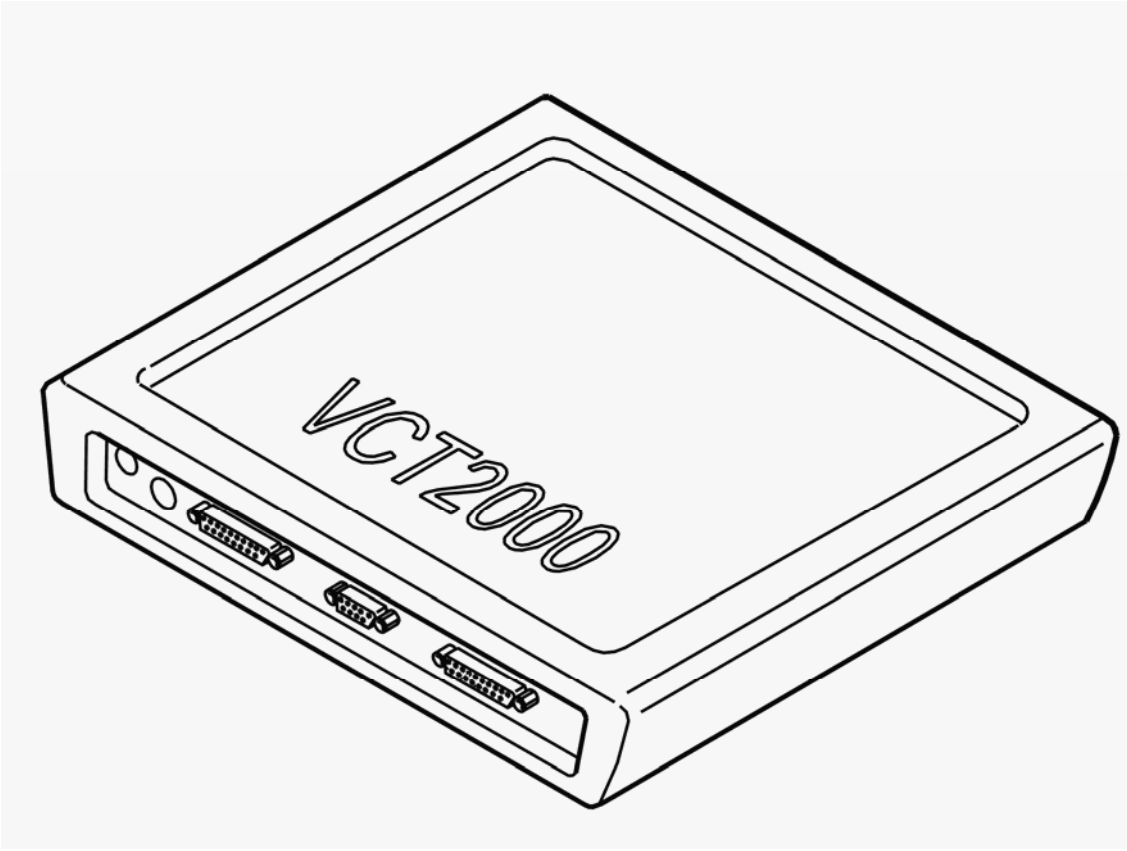


Fig. 382: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Allow the engine to run

- **Continue**

Refer to **CHECKING SOLENOID SL**

CHECKING SOLENOID SL

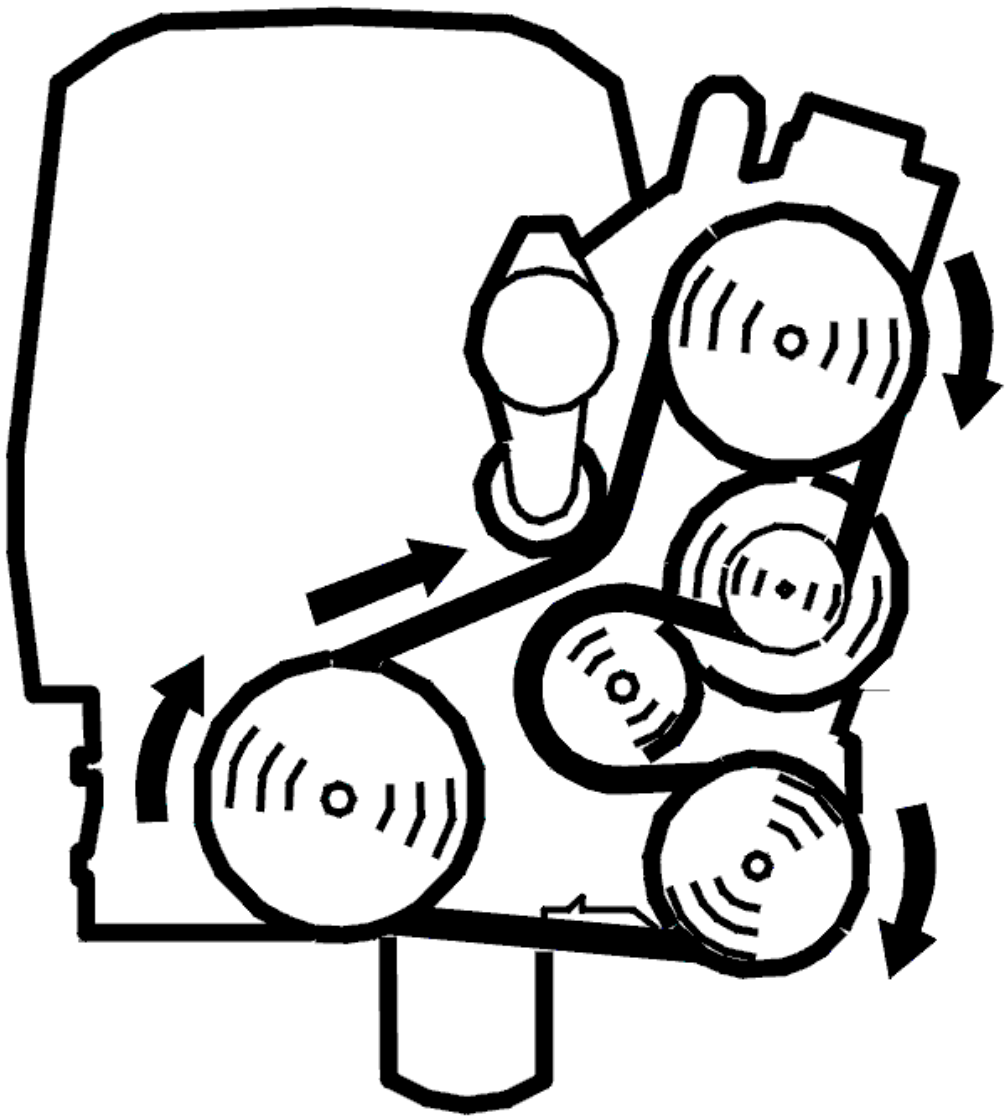


Fig. 383: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Engine running
- Move the gear selector to position D
- Activate the solenoid for gear 2 and then the lock-up function
- Check the pressure change on the oil pressure gauge. A considerable change in pressure should be observed
- Deactivate the lock-up function. Check the pressure change.

  Repeat the activation and deactivation of the lock-up function a few times to ensure accurate results.

  HINT: Unchanged pressure indicates that the control system is damaged.

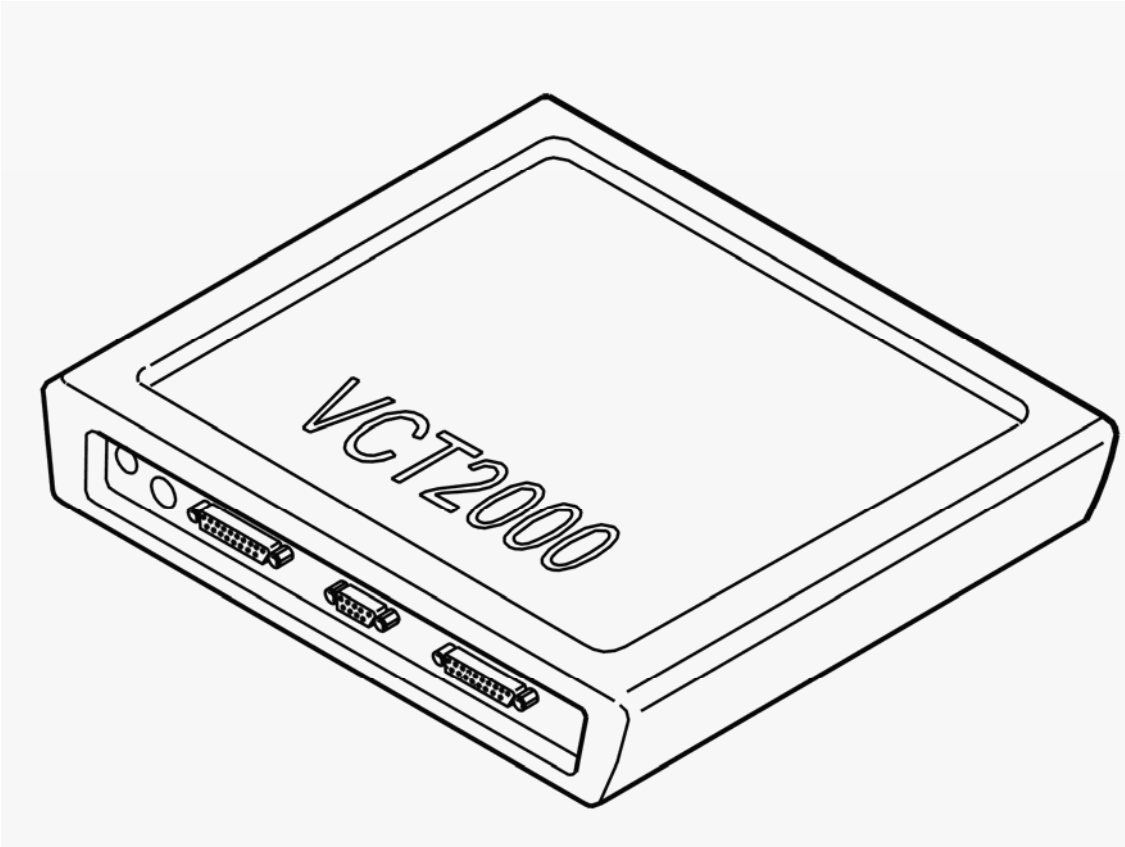


Fig. 384: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Did the pressure change?

- **YES**

  Refer to **REPLACING THE GEARBOX**

- **NO**

  Refer to **REPLACING THE CONTROL SYSTEM**

REPLACING THE CONTROL SYSTEM

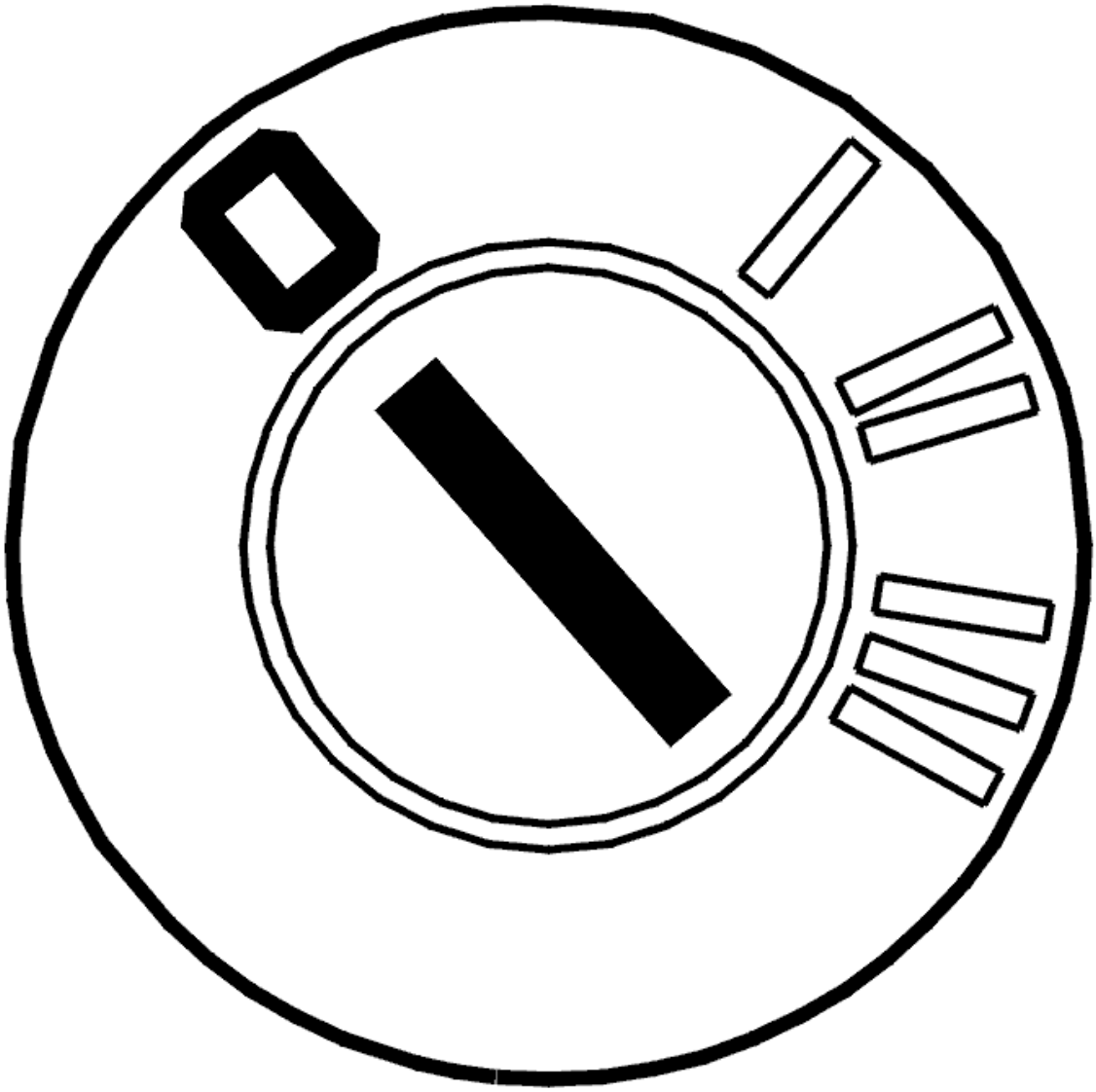


Fig. 385: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off

  Fault-tracing indicates a fault in the gearbox control system. Replace the control system.

  Other information

  - To replace the control system, For removal, see **CONTROL SYSTEM/VALVE HOUSING, REMOVING** and To install, see **CONTROL SYSTEM / VALVE HOUSING, INSTALLING** .

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

CHECKING THE WIRING

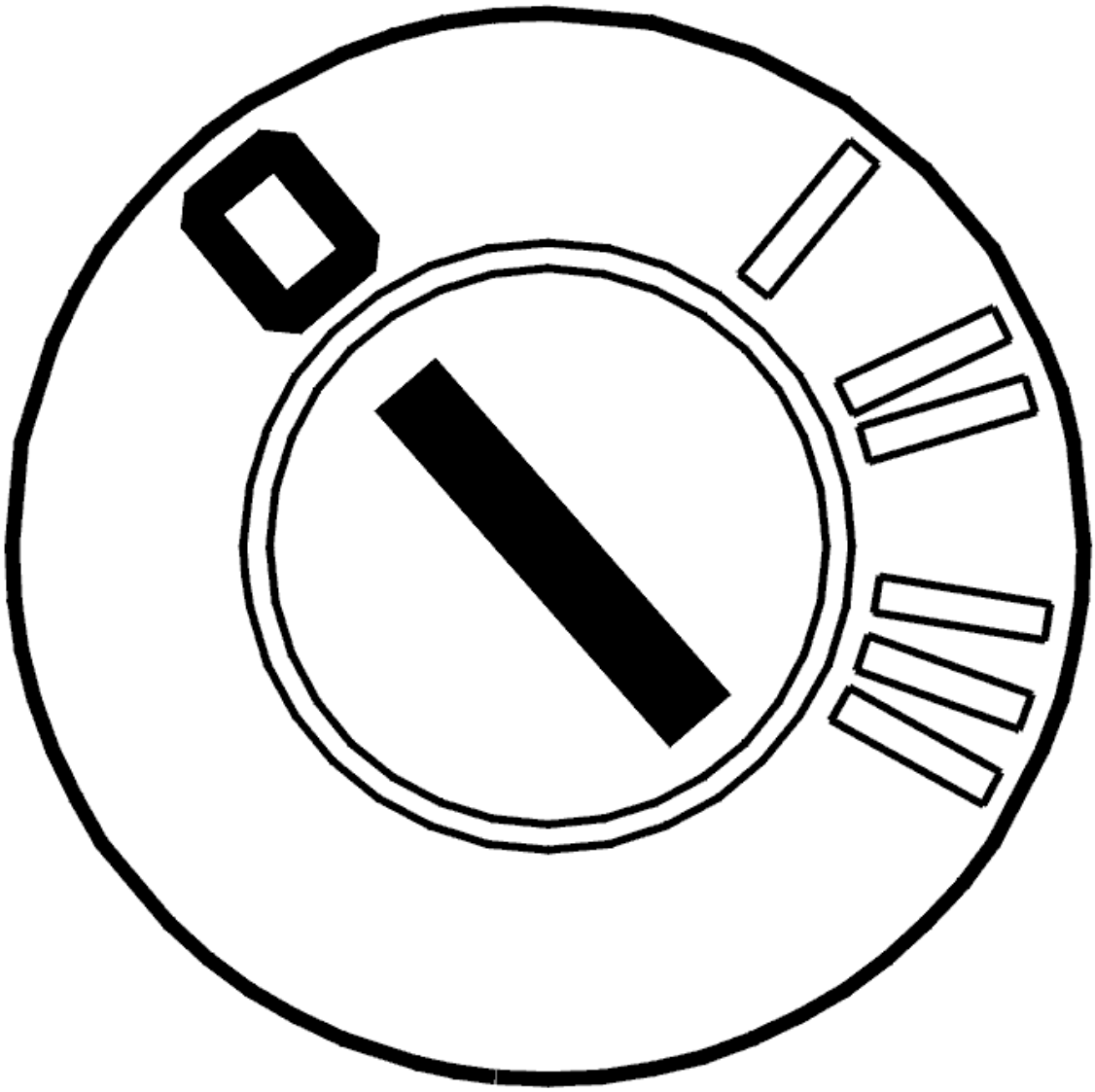


Fig. 386: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

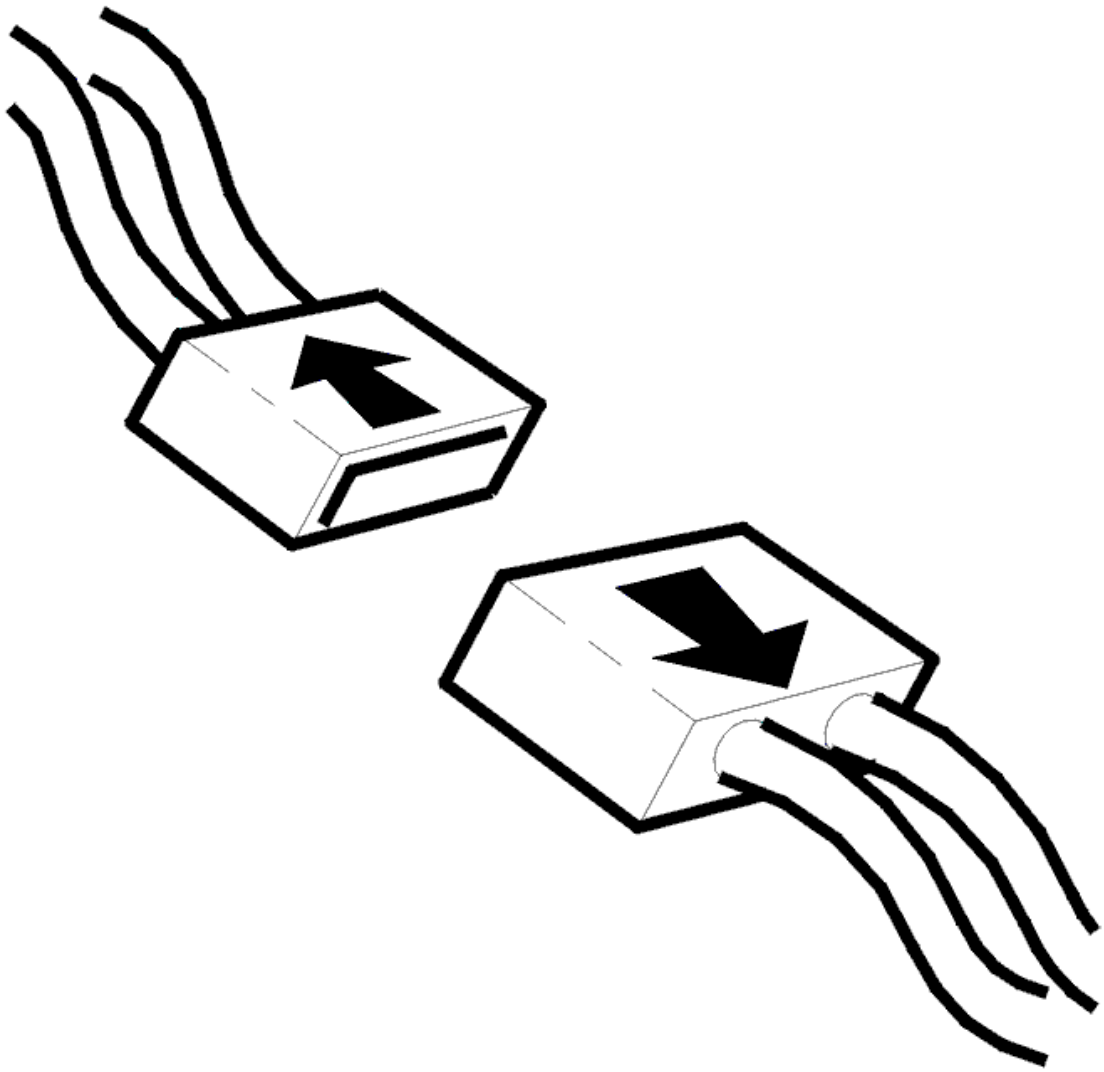


Fig. 387: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

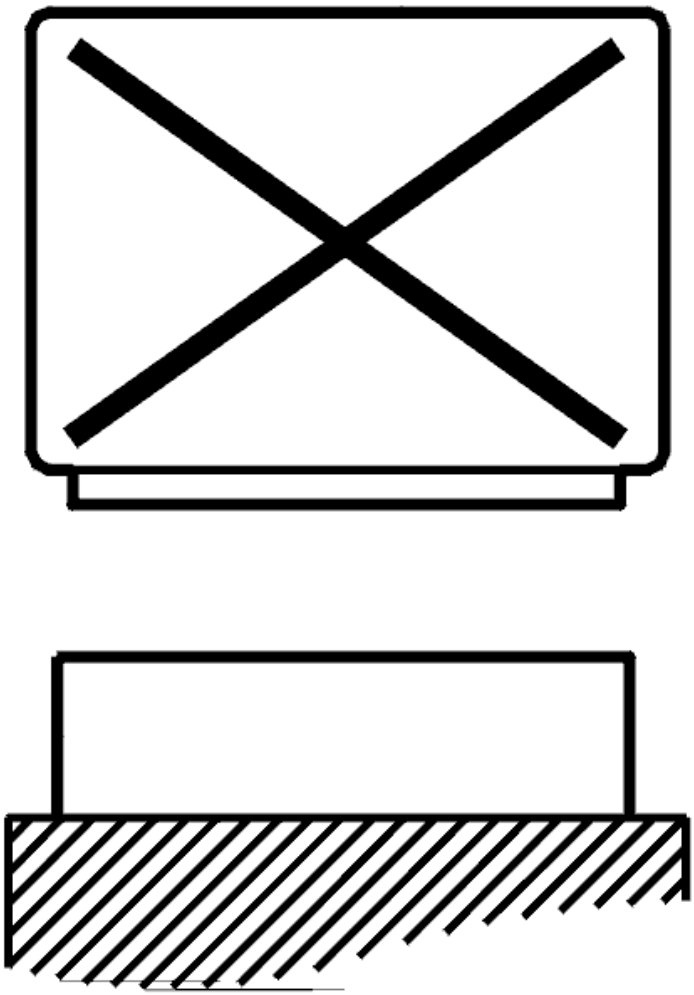


Fig. 388: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission control module (TCM) disconnected.
- Breakout box connected to the transmission control module (TCM) connector (transmission side).
- Disconnect the gearbox connector
- Adapter see **9511505** and breakout box see **9511428** connected to the transmission connector (transmission control module (TCM) side).

  Check the cable between transmission control module (TCM) #A51 (#A51) and transmission connector #T (#A17) for open-circuit and short-circuit to ground or voltage.

  Check the wiring between control module terminal #A53 (#A53) and gearbox connector terminal #E (#A5). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply

voltage.

Remedy as necessary.

Other information:

- Connecting a breakout box to the transmission control module (TCM): **CONNECTING THE BREAKOUT BOX**
- see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information on signals on the transmission control module (TCM): **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

Was a fault detected?

- **YES**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

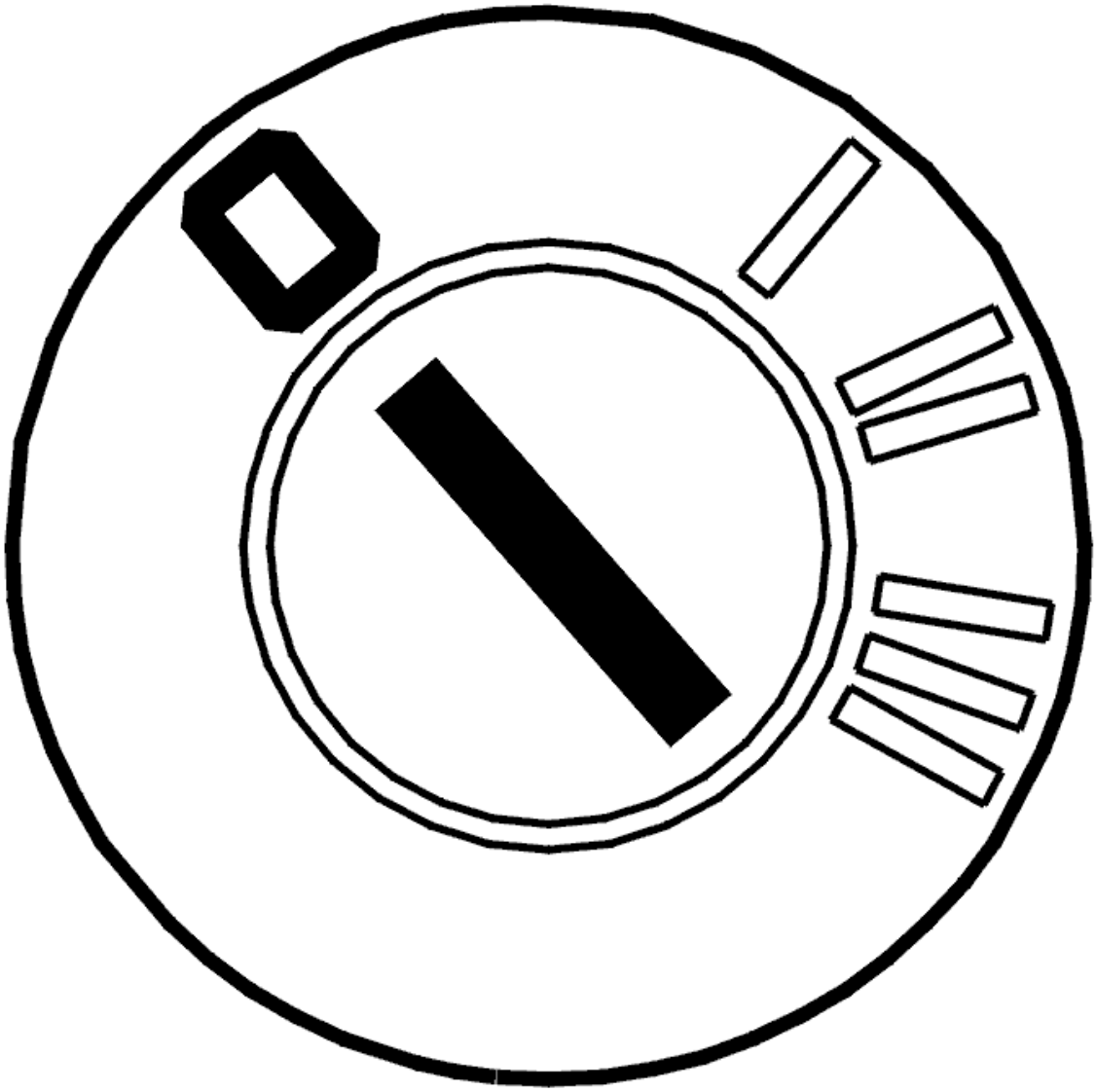


Fig. 389: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system
- Connect adapter see **9511505** and breakout box see **9511428** to the gearbox connector (gearbox side).

  Check the cable between gearbox connector terminal #T (#A17) and solenoid SL terminal #A. Check the cable between gearbox connector terminal #E (#A5) and solenoid SL terminal #B. Check these cables for an open-circuit.

  HINT: Check solenoid SL by measuring the resistance between solenoid SL terminals #A and #B. When the gearbox is cold (approximately 20°C), the resistance must be 10-11 ohms.

  Remedy as necessary.

Other information:

- see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information on signals on the transmission control module (TCM): **SIGNAL SPECIFICATION**
- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** or To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- see **SOLENOID LOCK-UP FUNCTION, REPLACING**
- see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

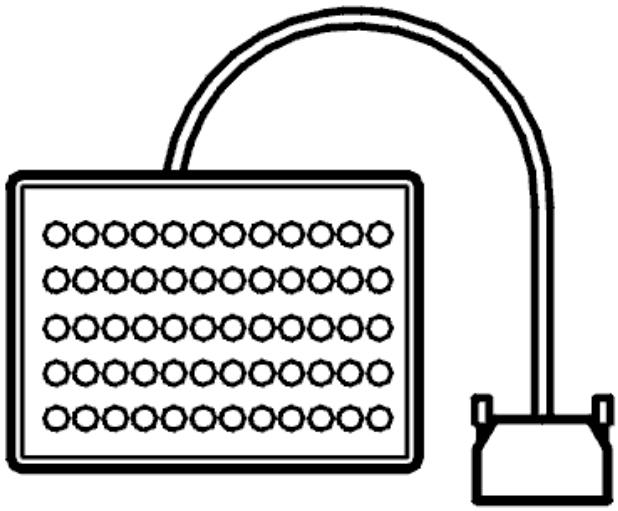


Fig. 390: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

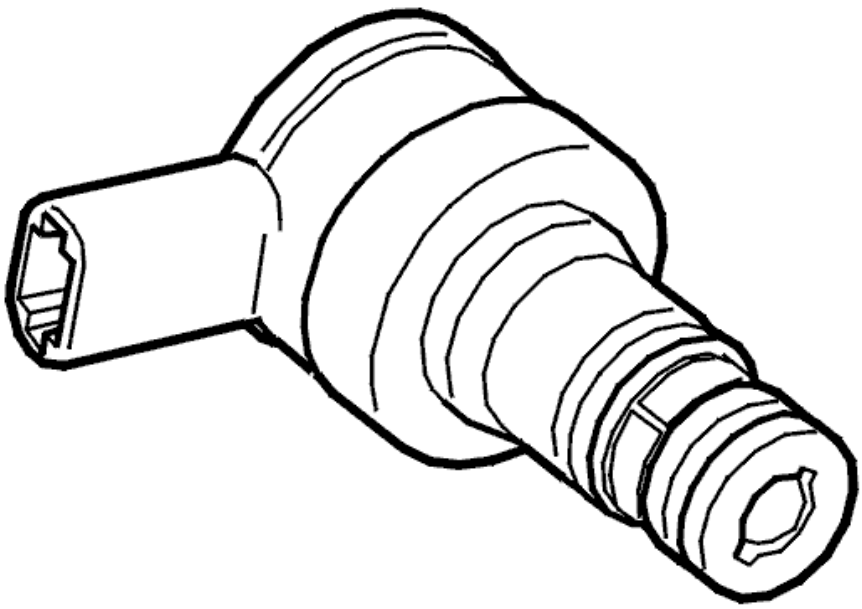


Fig. 391: Identifying Lock-Up Solenoid, SL
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

REPLACING THE GEARBOX

Fault-tracing indicates a fault in the gearbox. Replace the gearbox.

Other information:

- see **TRANSMISSION, REMOVING**
- see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)**

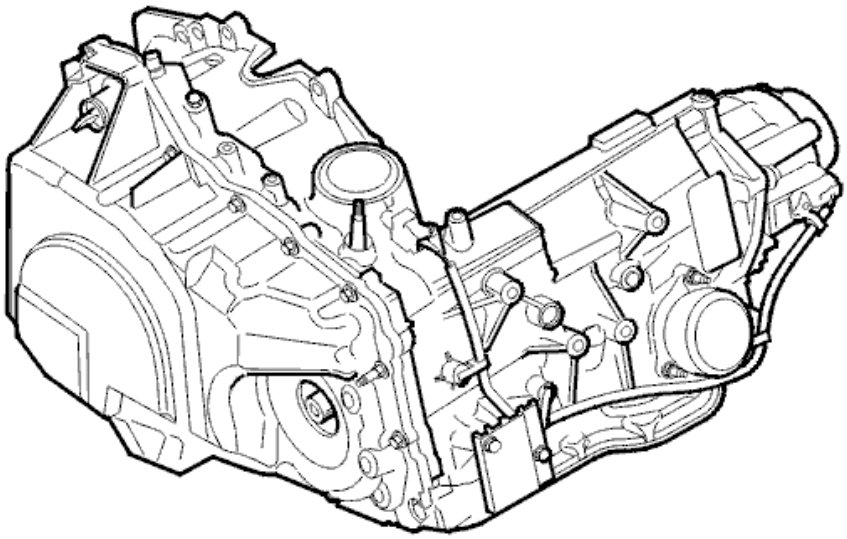


Fig. 392: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

FAULT-TRACING INFORMATION

If the transmission control module (TCM) has been programmed with new software, the fault is probably remedied.

If new software has not been loaded, fault tracing indicates that the transmission control module (TCM) detected a fault earlier, but it is no longer active.

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

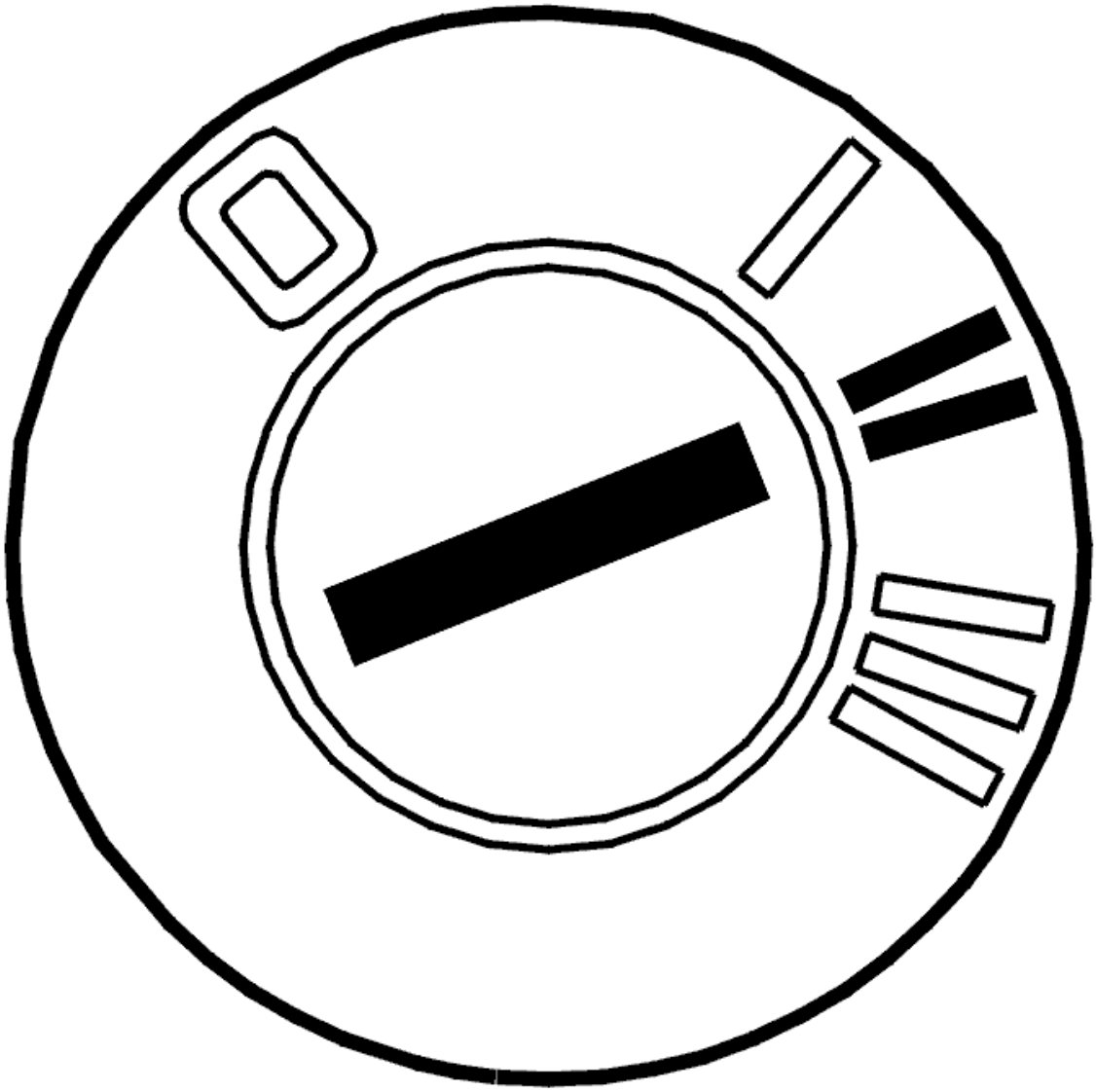


Fig. 393: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

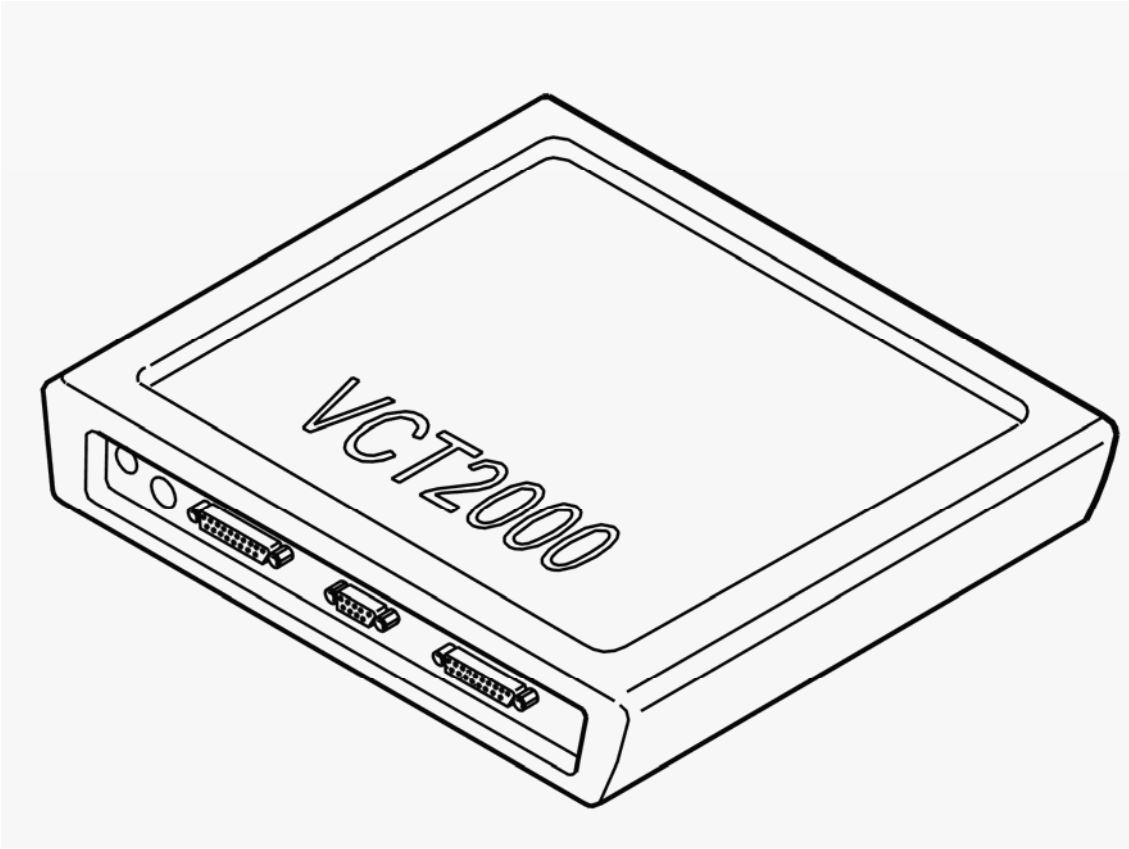


Fig. 394: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

TEST DRIVING

NOTE: Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

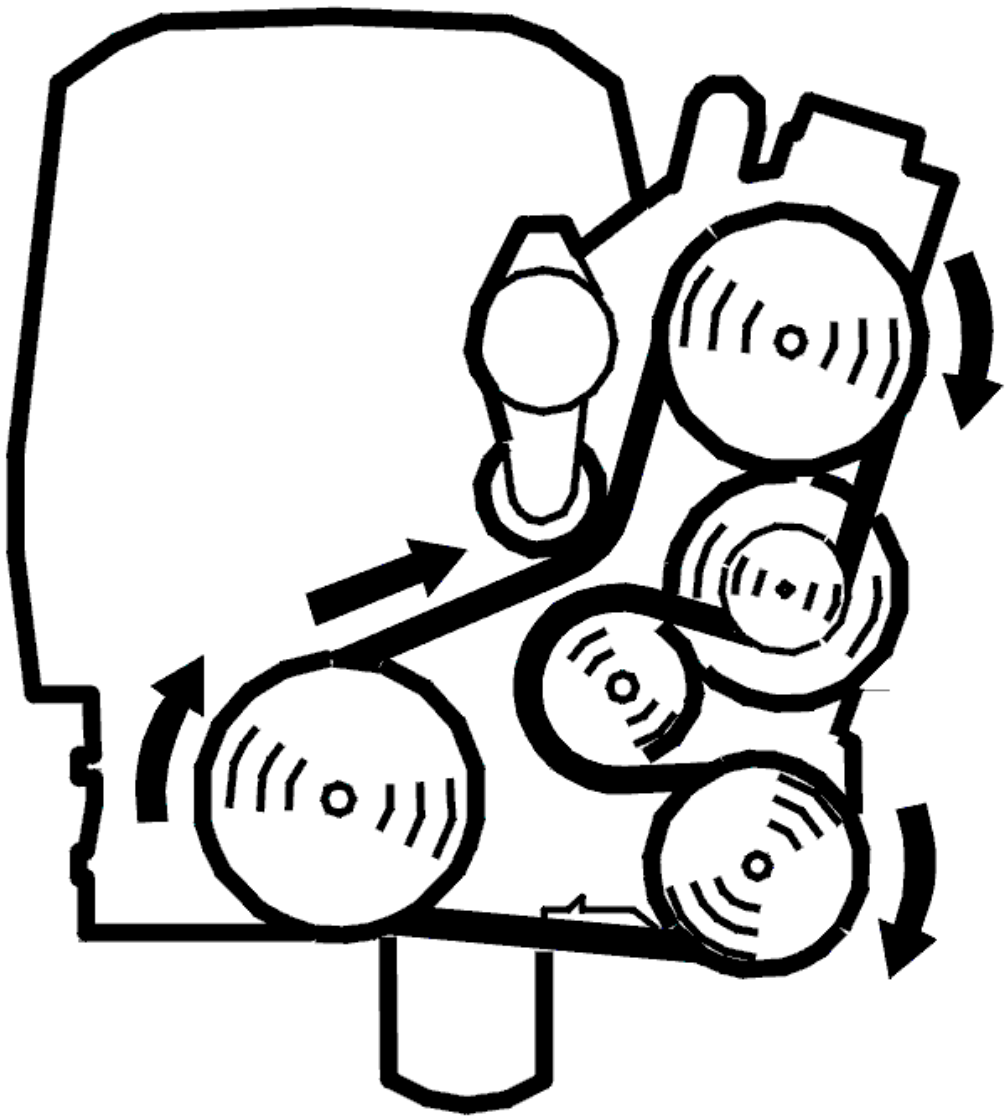


Fig. 395: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect the VIDA station. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission should be at operating temperature,

approximately 80-90°C.

Shift the gear selector to position D (third gear with geartronic). Carefully accelerate to 50-65 km/h. Maintain the same speed for at least 20 seconds.

HINT: The car must be driven at an engine speed where the lock-up function is not normally activated.

Criteria for diagnostic trouble code (DTC):

- The transmission fluid temperature must exceed 30°C
- The engine must be running for at least 20 seconds
- Gear selector in position D, 3 or 2 (4T65EV).

  Gear selector in Geartronic position and gears 4, 3 or 2 (4T65EV-GT)

- Speed 50-65 km/h for at least 5 seconds
- At least 5 seconds since the last gear shift
- Positive engine torque (no engine braking).

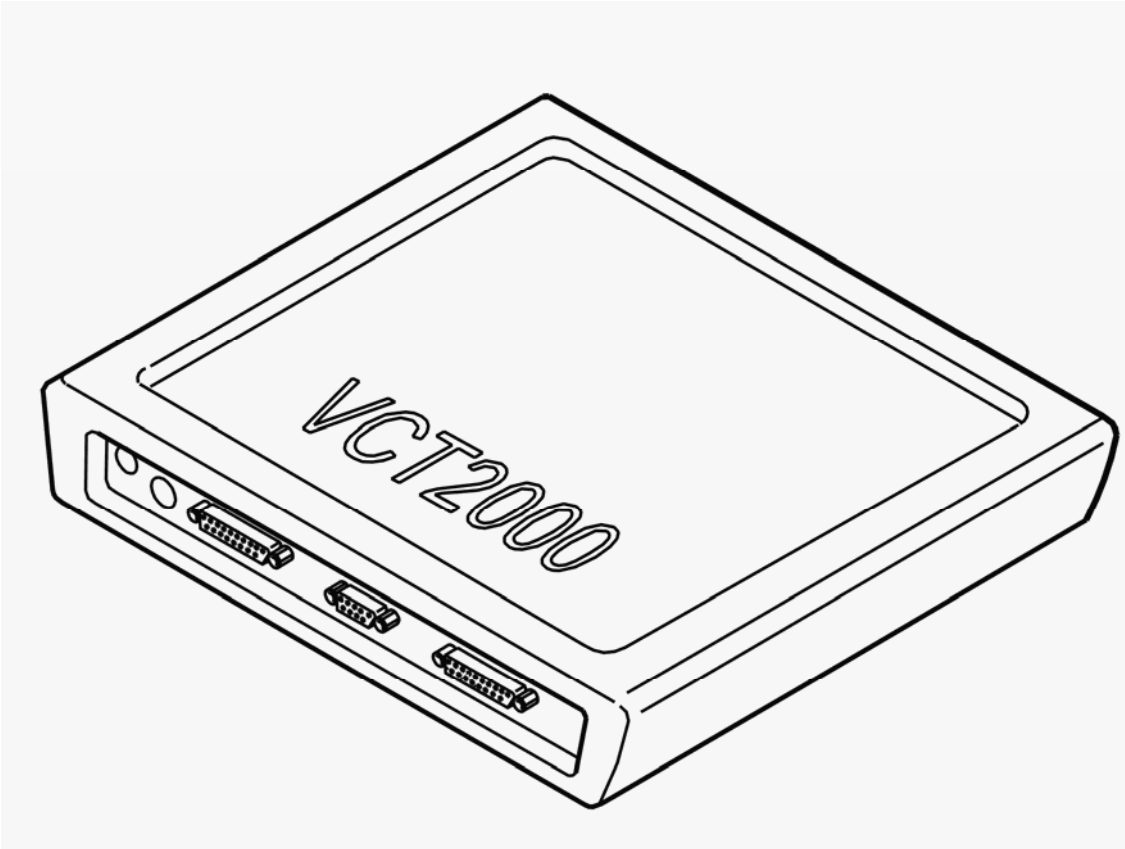


Fig. 396: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

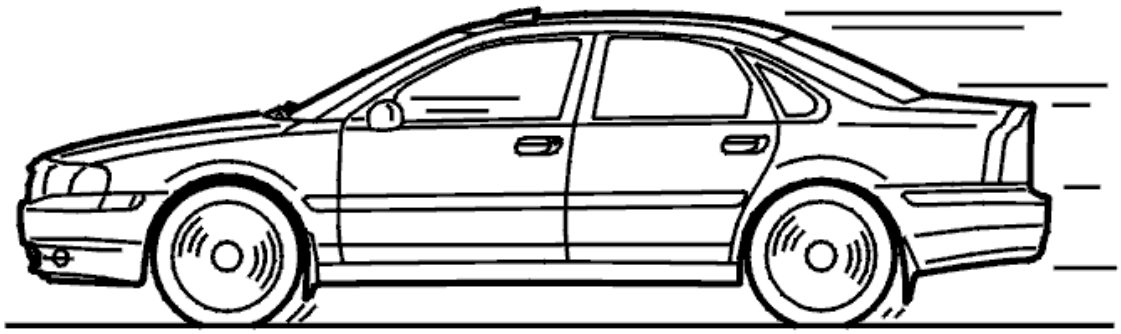


Fig. 397: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

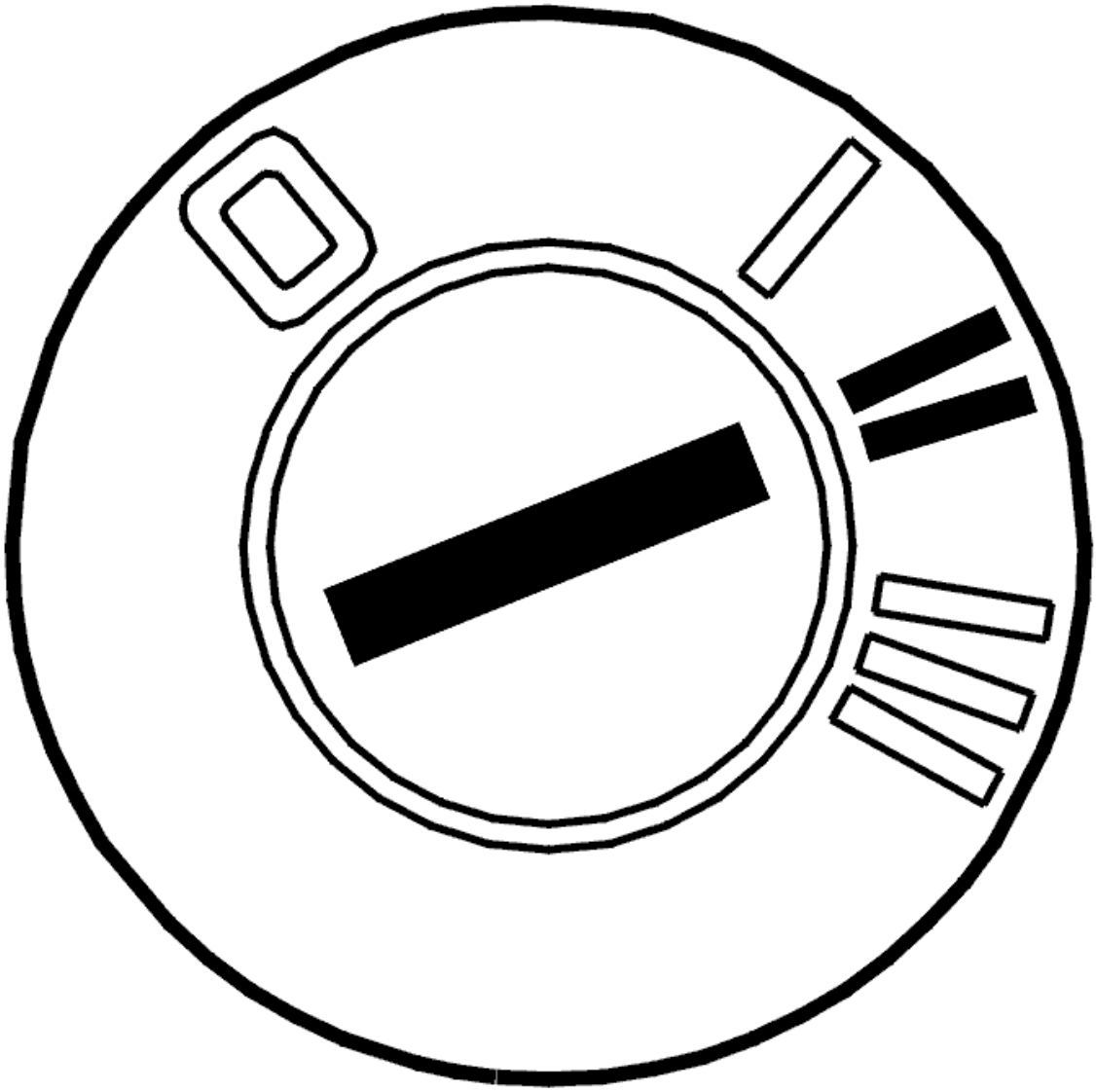


Fig. 398: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-0053 are stored, these must be fault-traced and remedied after this fault-tracing is completed.

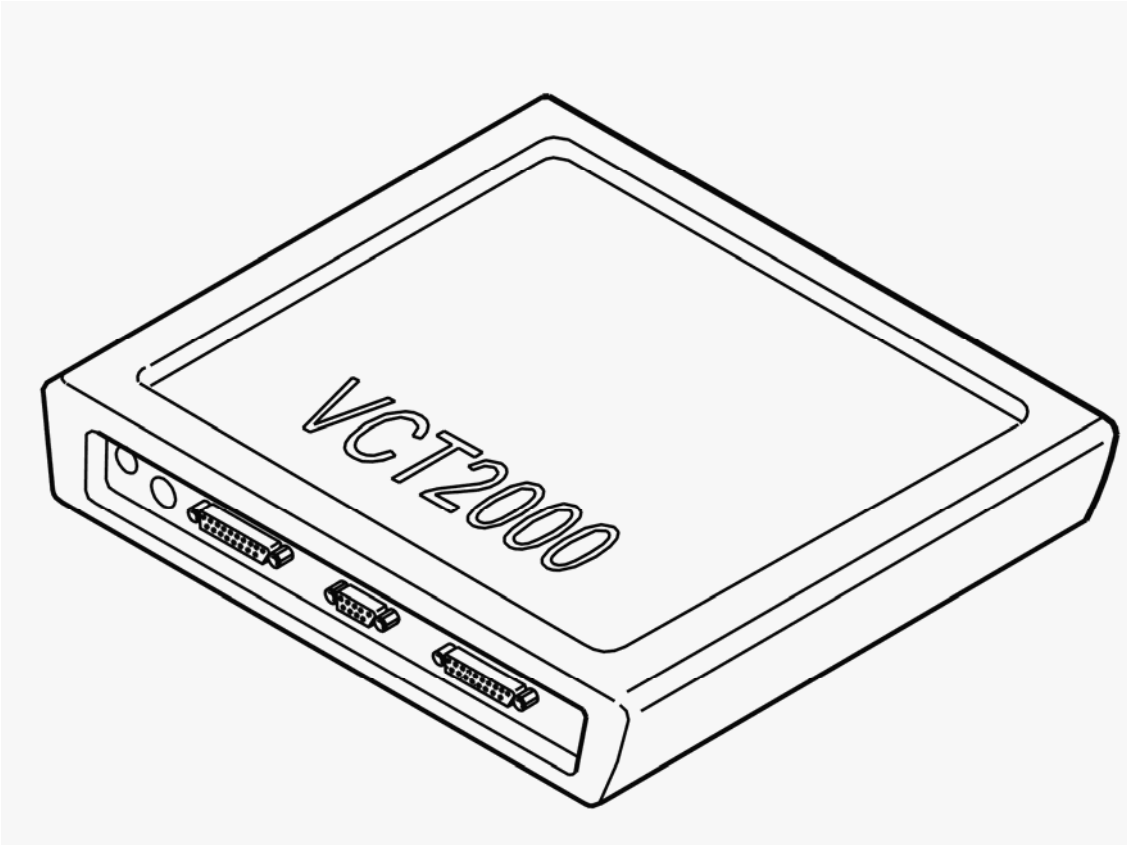


Fig. 399: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was diagnostic trouble code (DTC) TCM-0053 stored?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **FAULT-TRACING INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect

circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

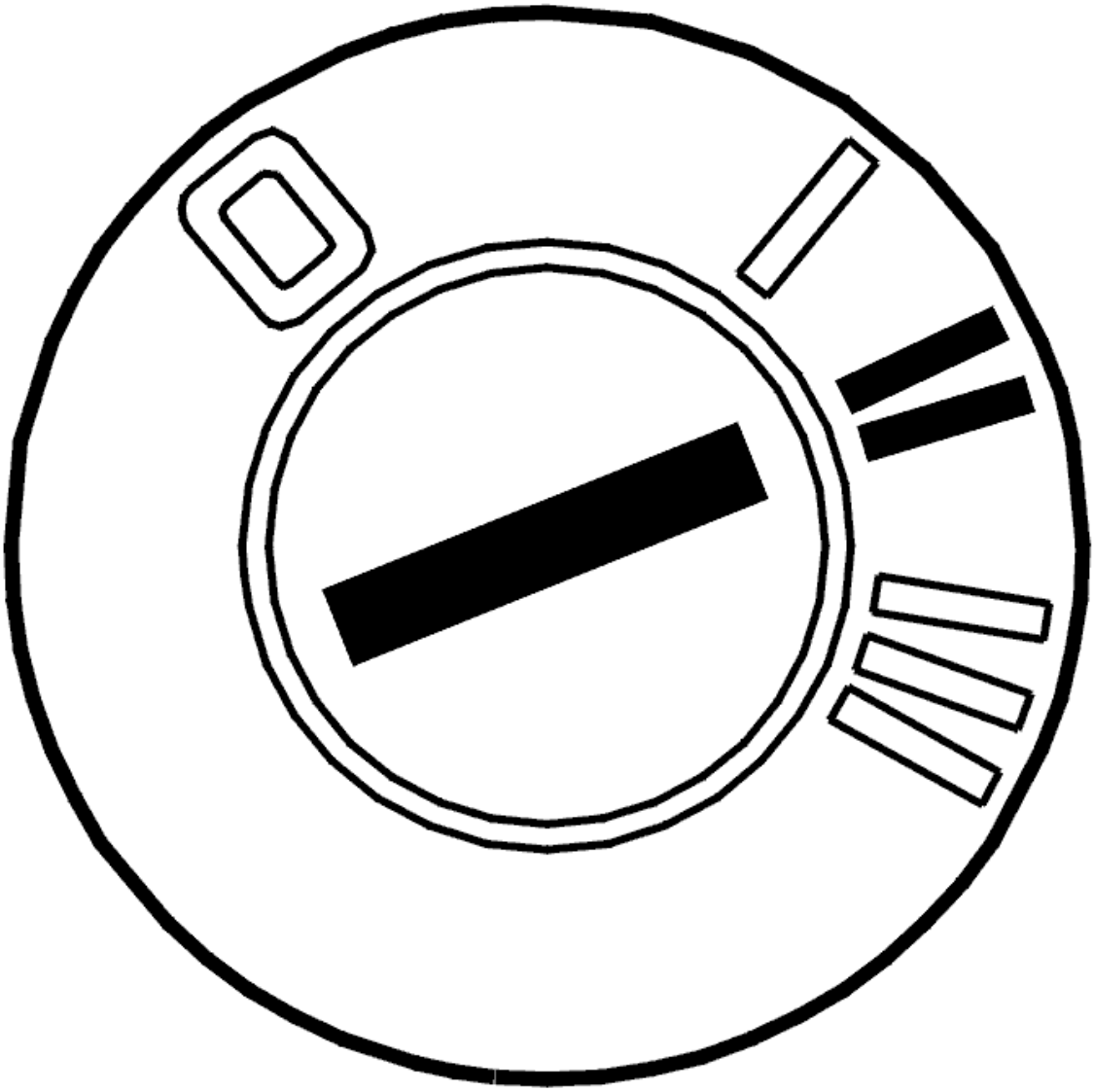


Fig. 400: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

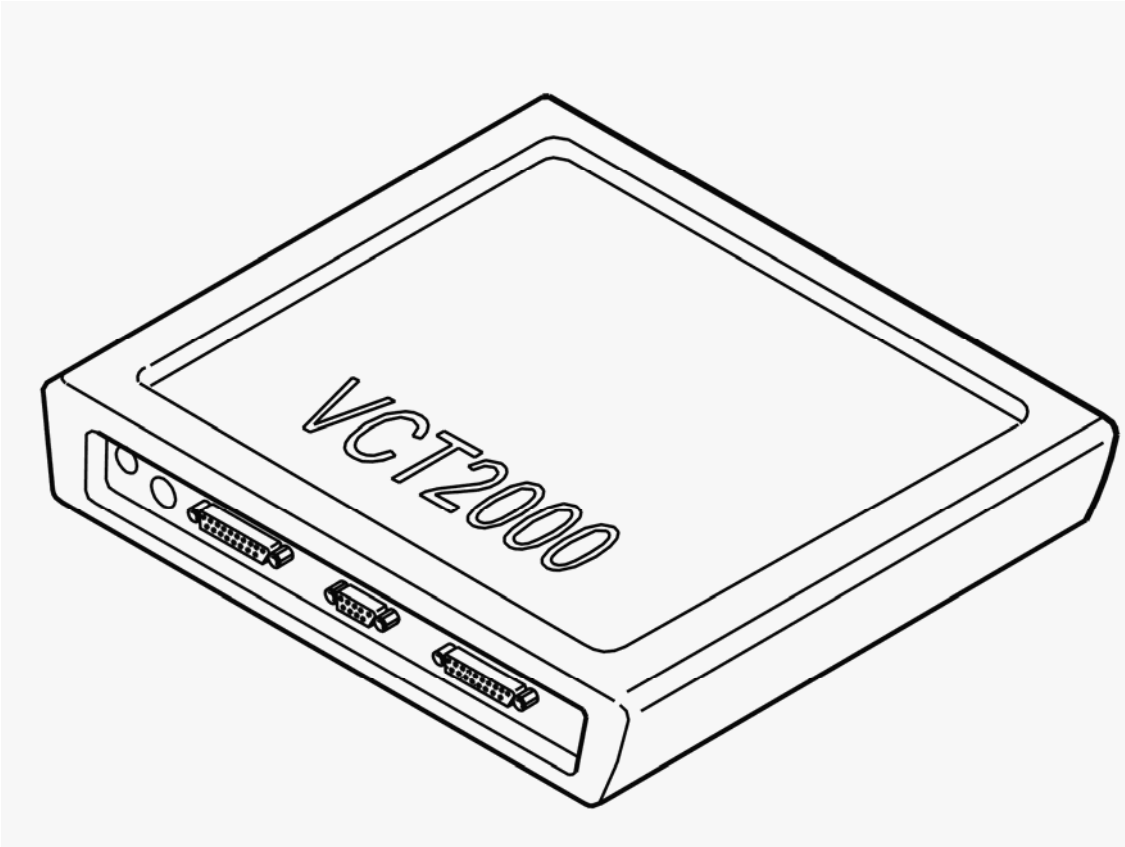


Fig. 401: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

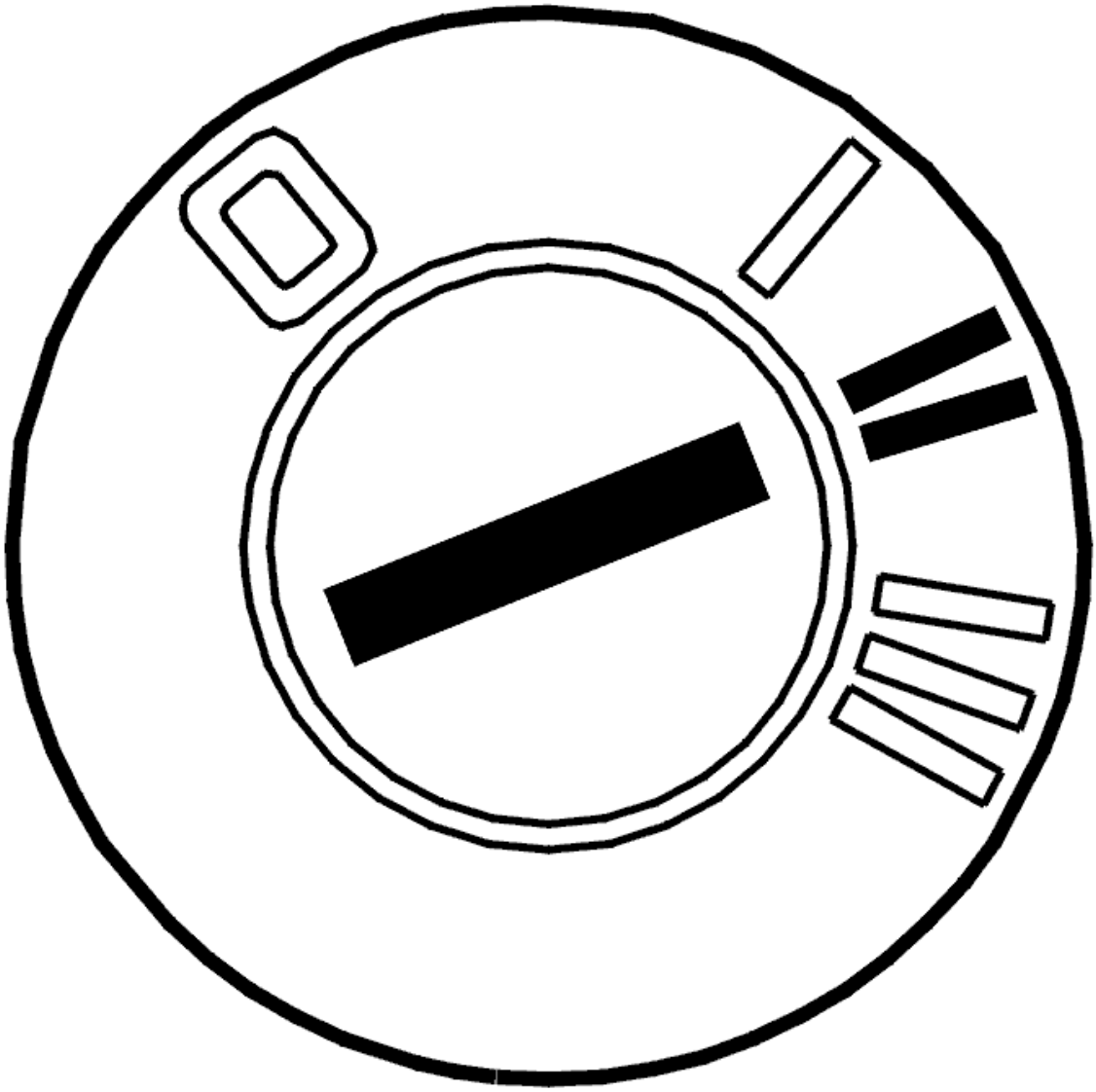


Fig. 402: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

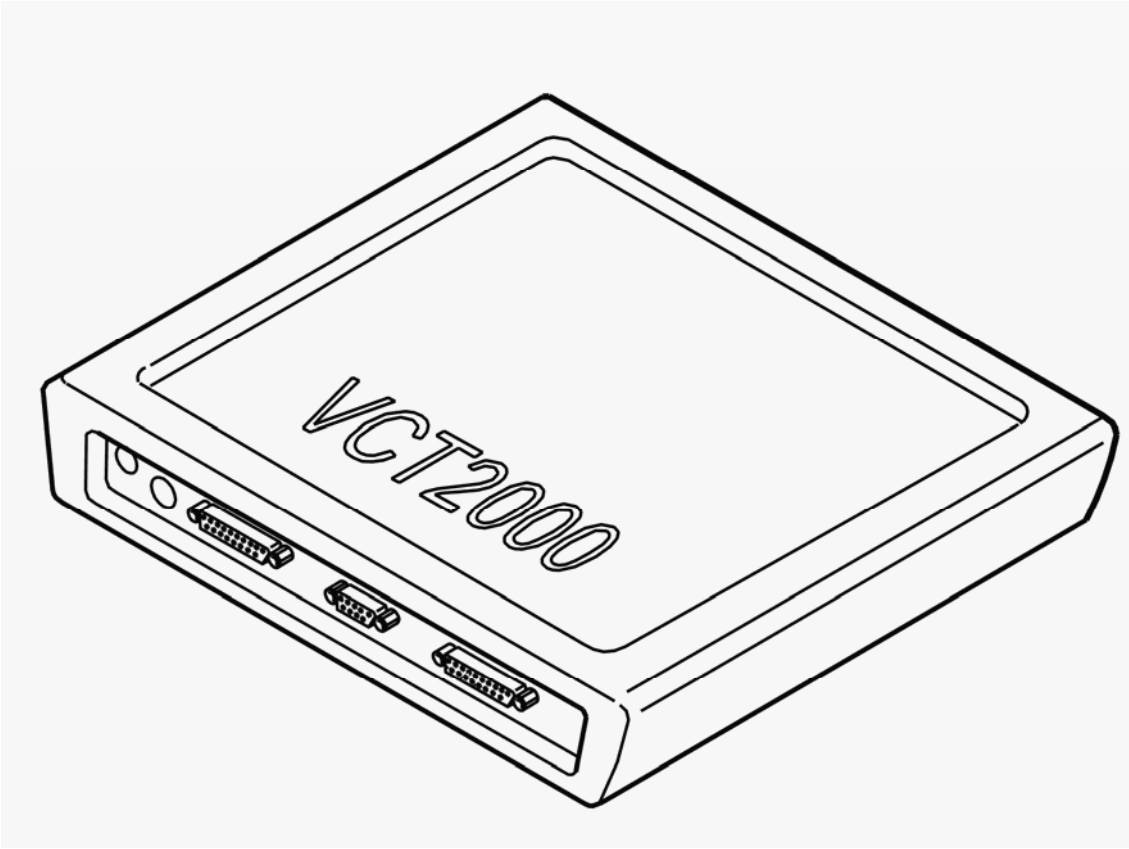


Fig. 403: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

TEST DRIVING

NOTE: **Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.**

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

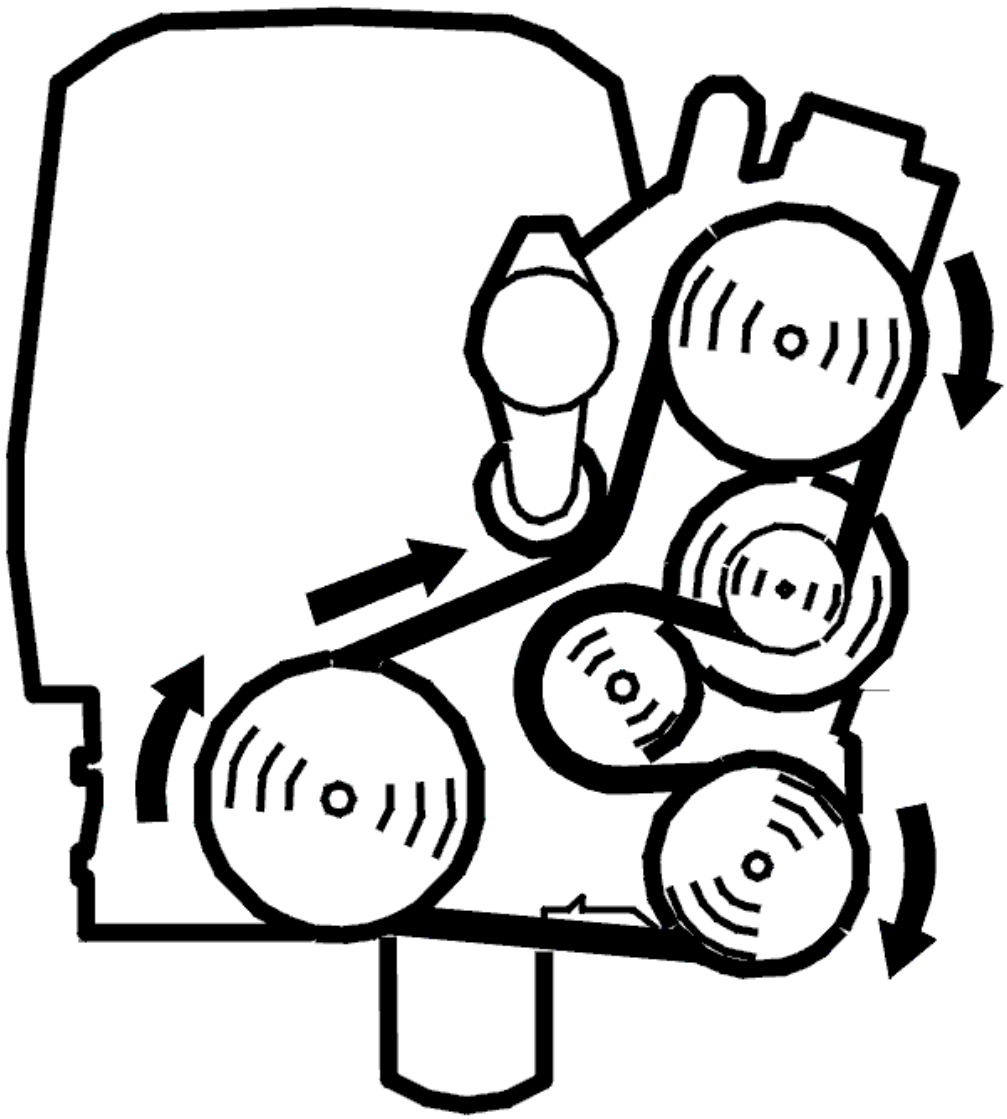


Fig. 404: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect the VIDA station. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission should be at operating temperature,

approximately 80-90°C.

Shift the gear selector to position D (third gear with geartronic). Carefully accelerate to 50-65 km/h. Maintain the same speed for at least 20 seconds.

HINT: The car must be driven at an engine speed where the lock-up function is not normally activated.

Criteria for diagnostic trouble code (DTC):

- The transmission fluid temperature must exceed 30°C
- The engine must be running for at least 20 seconds
- Gear selector in position D, 3 or 2 (4T65EV).

  Gear selector in Geartronic position and gears 4, 3 or 2 (4T65EV-GT)

- Speed 50-65 km/h for at least 5 seconds
- At least 5 seconds since the last gear shift
- Positive engine torque (no engine braking).

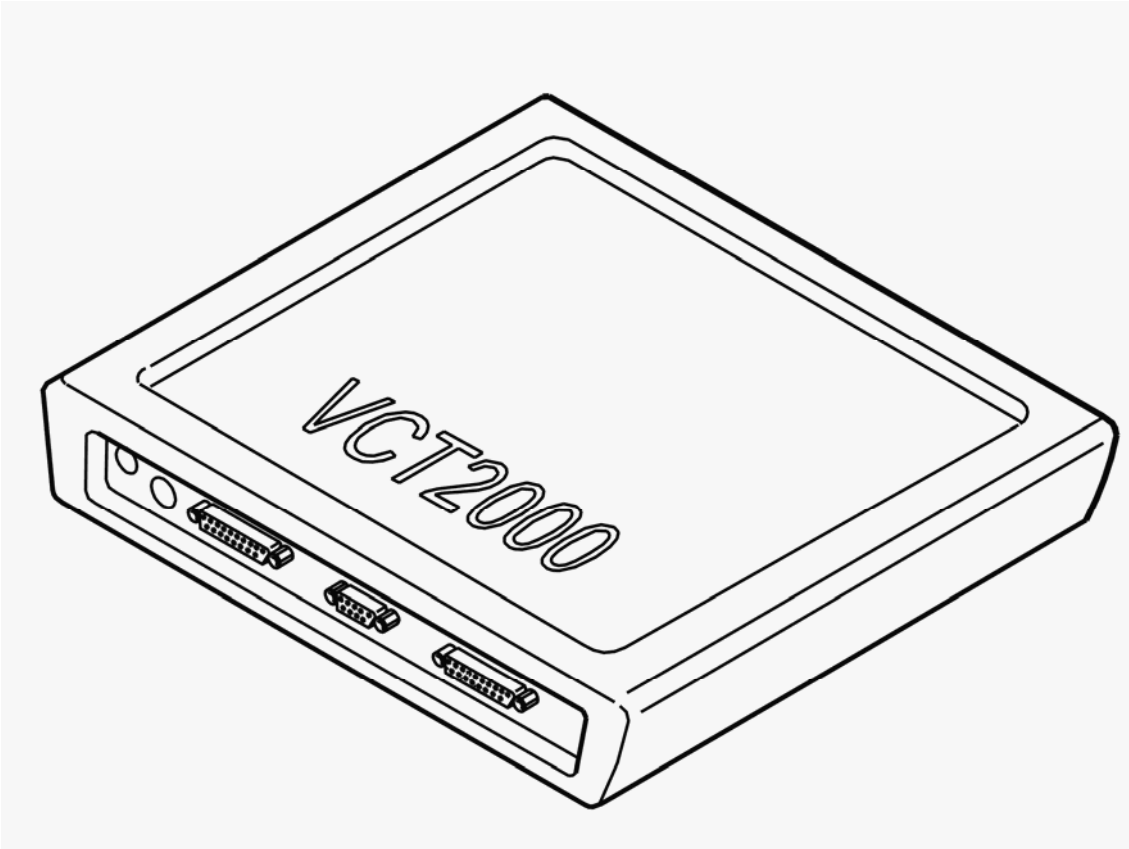


Fig. 405: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

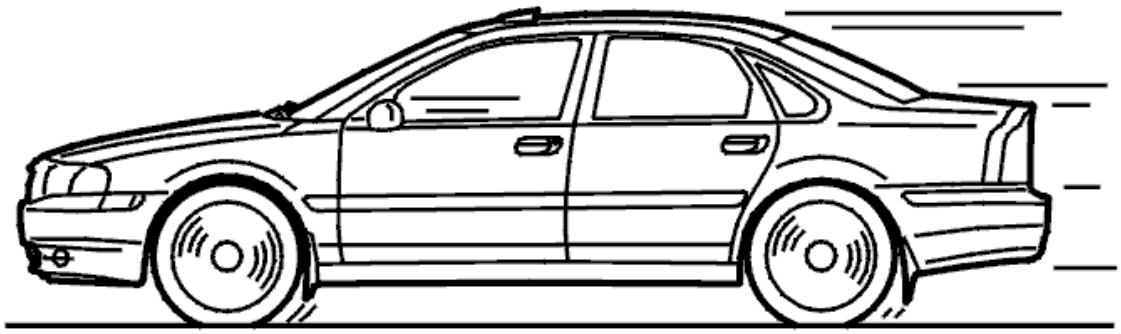


Fig. 406: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

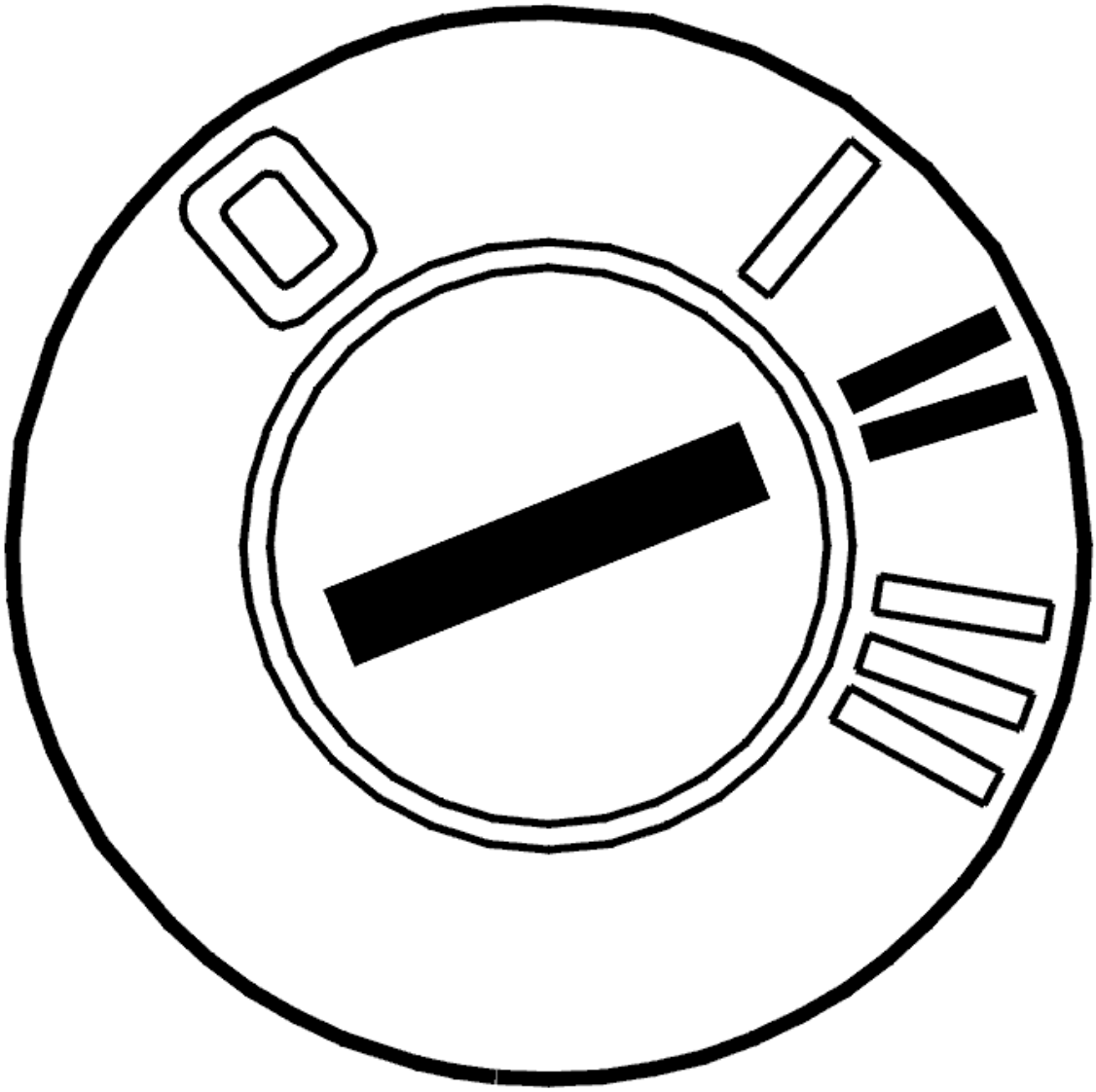


Fig. 407: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-0053 are stored, these must be fault-traced and remedied after this fault-tracing is completed.

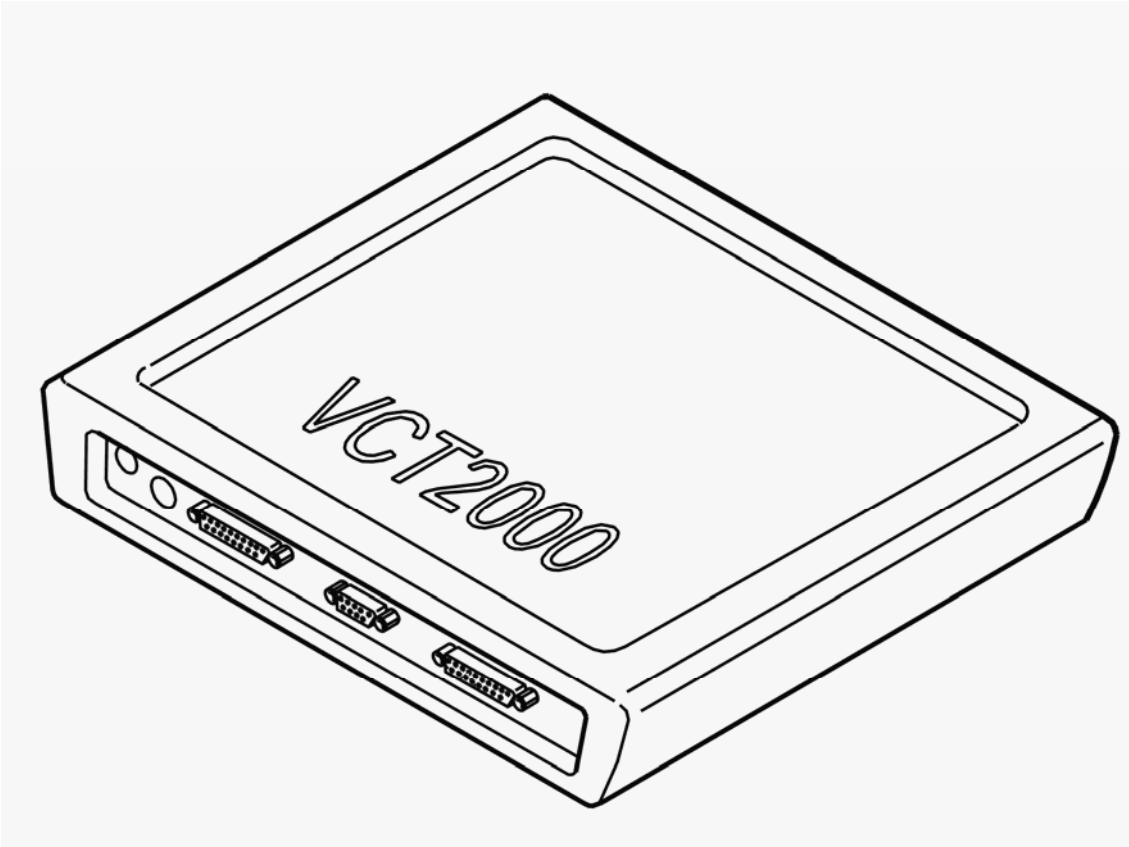


Fig. 408: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was diagnostic trouble code (DTC) TCM-0053 stored?

- **YES**

  Refer to **INFORMATION**

- **NO**

  NO DTC

TCM-0054: LOCK-UP PRESSURE SWITCH. STUCK (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

The automatic transmission control module (TCM) receives a signal from the pressure switch for lock-up PS4 to check the lock-up valve position. Diagnostic trouble code (DTC) TCM-0054 is stored if the lock-up solenoid has stuck in the closed position.

Substitute Value

- The control module (TCM) "Emergency mode II" program has been initiated.

Possible Source

- The pressure switch for lock-up is jammed
- Contact resistance in the terminals
- Mechanical fault in the transmission control system
- The transmission oil level is too high.

Fault symptom[s]

- General orange warning lamp lit
- No lock-up function
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- no reduction of line pressure when shifting
- no reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D
- no torque limiting request to the engine control module (ECM) when shifting.

STUCK

CHECKING THE SOFTWARE

CHECKING THE SOFTWARE

NOTE: To carry out fault-tracing, the transmission control module (TCM) must be programmed with specific software.

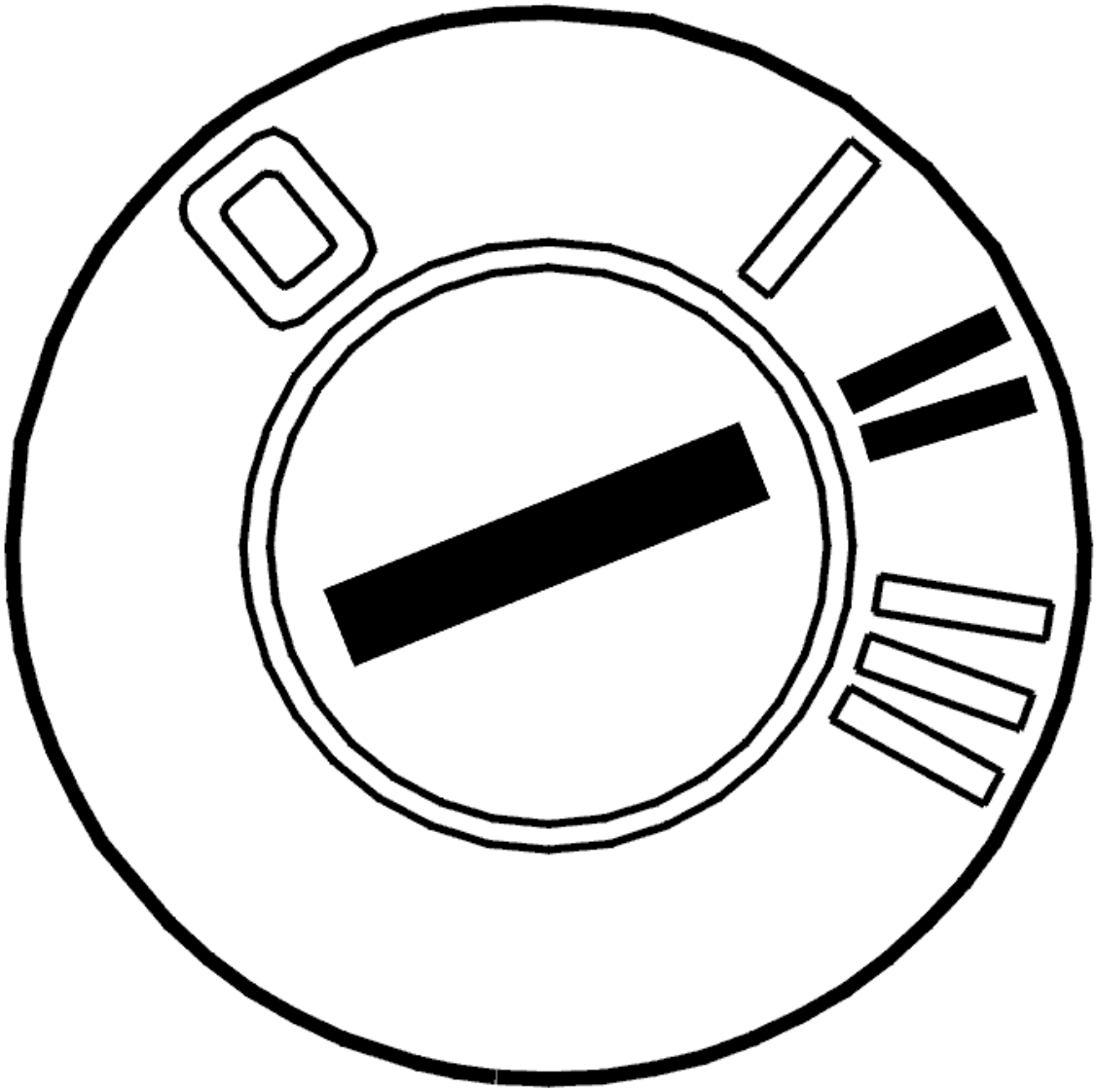


Fig. 409: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the control module diagnostic number.

  Check the read off diagnostic number against the diagnostic numbers given in the center table.

  If the diagnostic number is included in the table, the control module must be programmed with the latest software.

  See the technical journal for information about the most recent software.

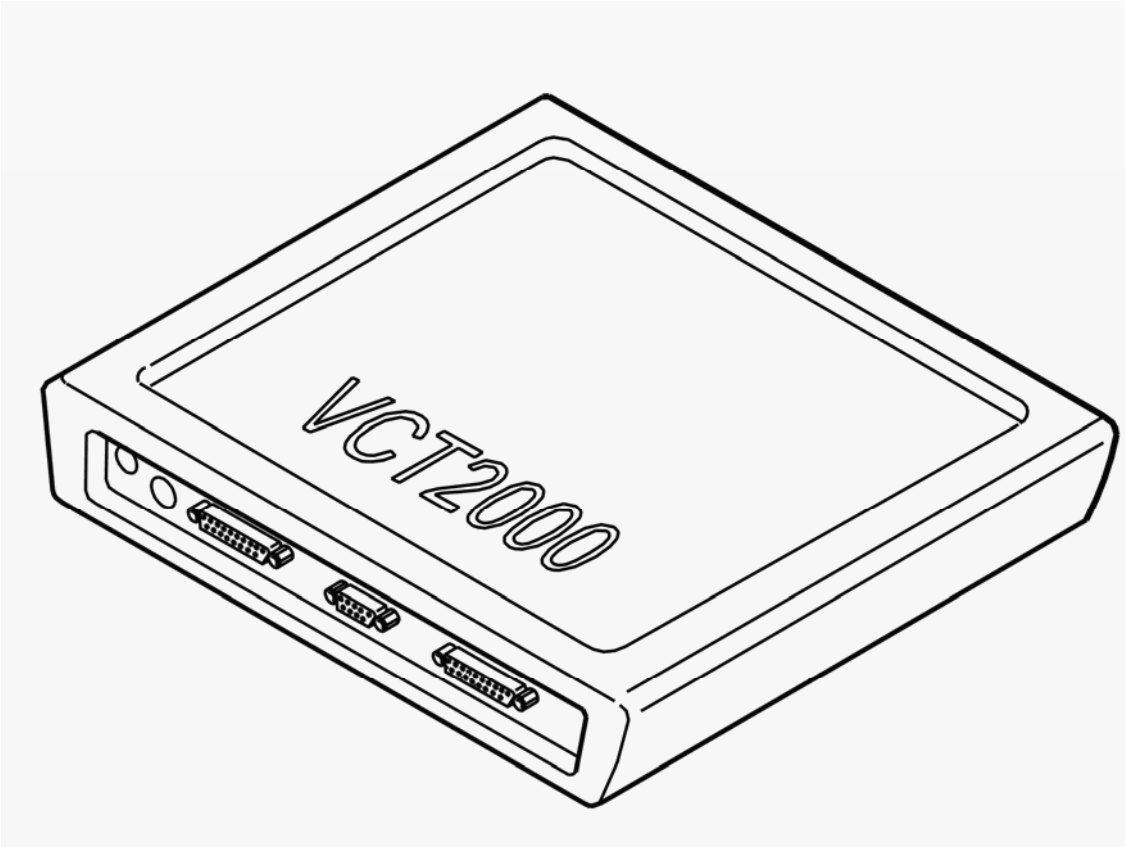


Fig. 410: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

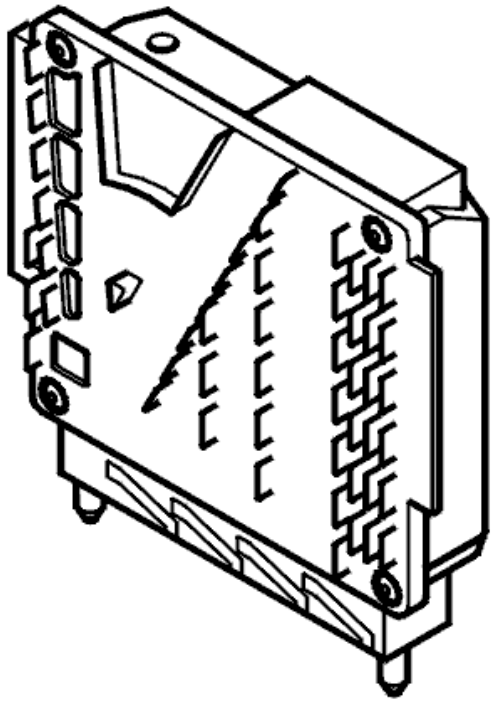


Fig. 411: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

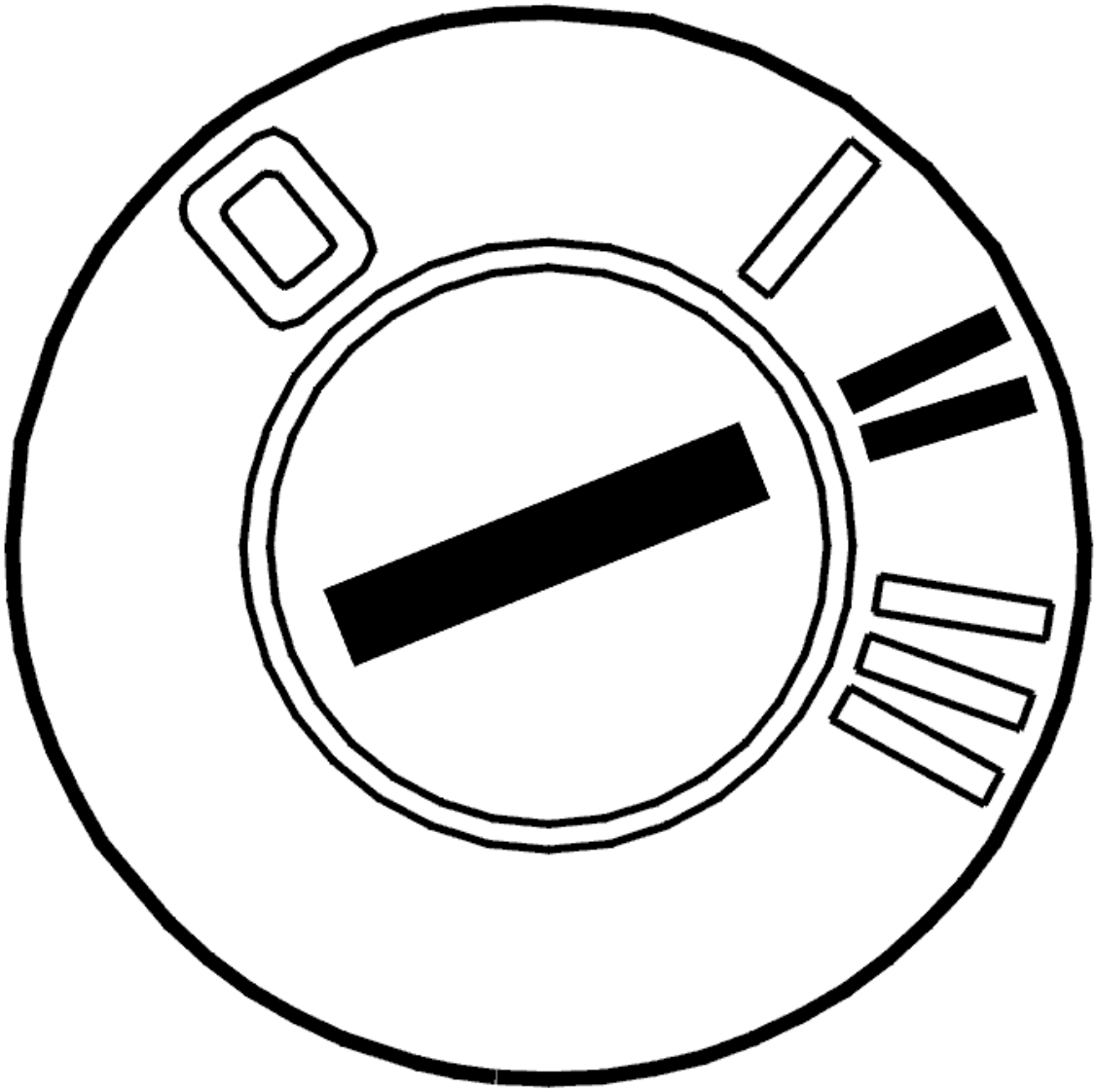


Fig. 412: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-0054 are stored, these must be fault-traced after this fault-tracing is completed.

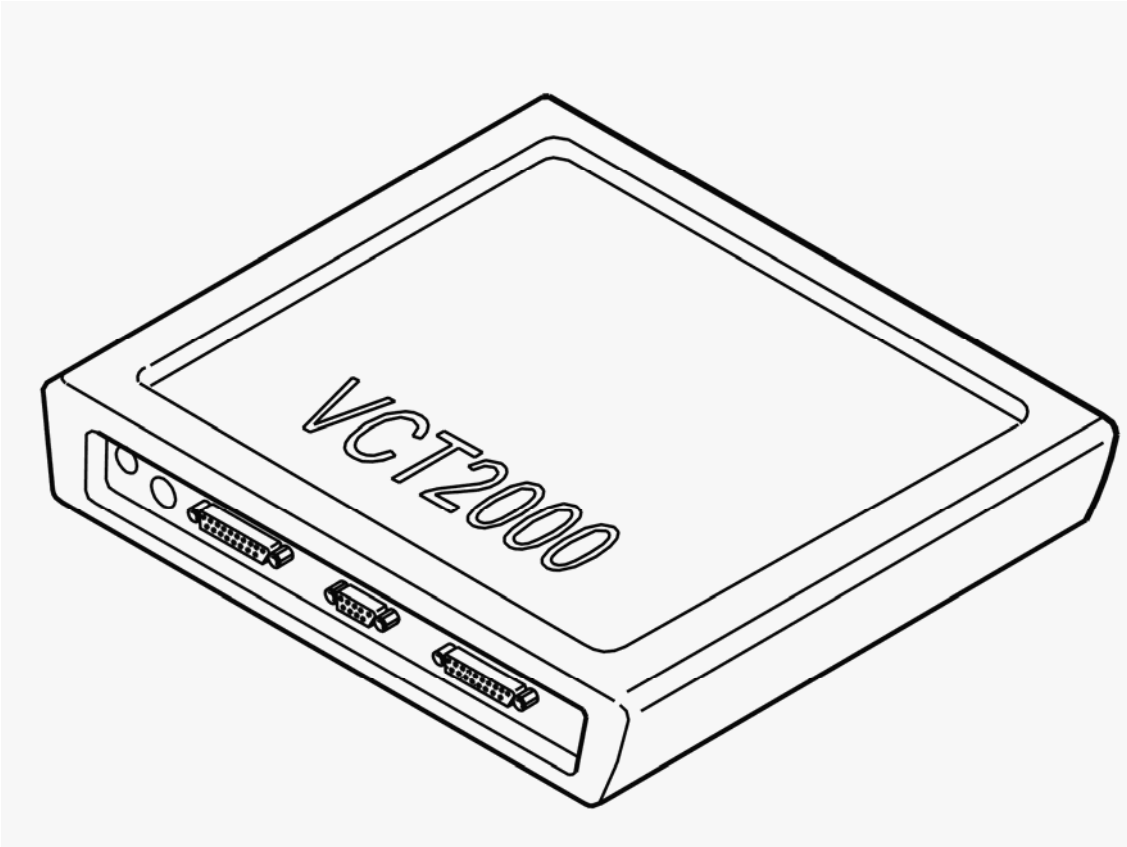


Fig. 413: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING THE COMPONENT

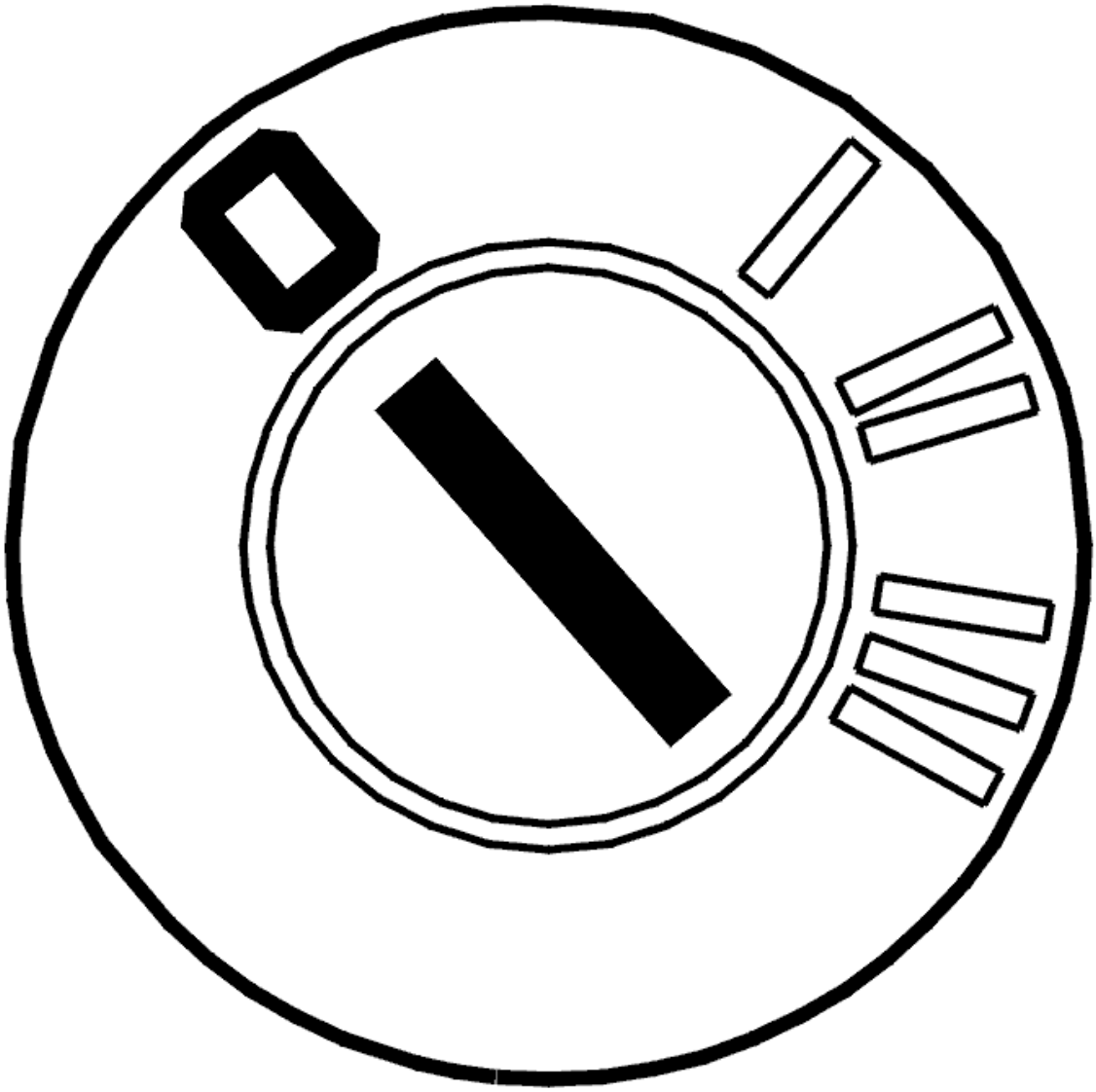


Fig. 414: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

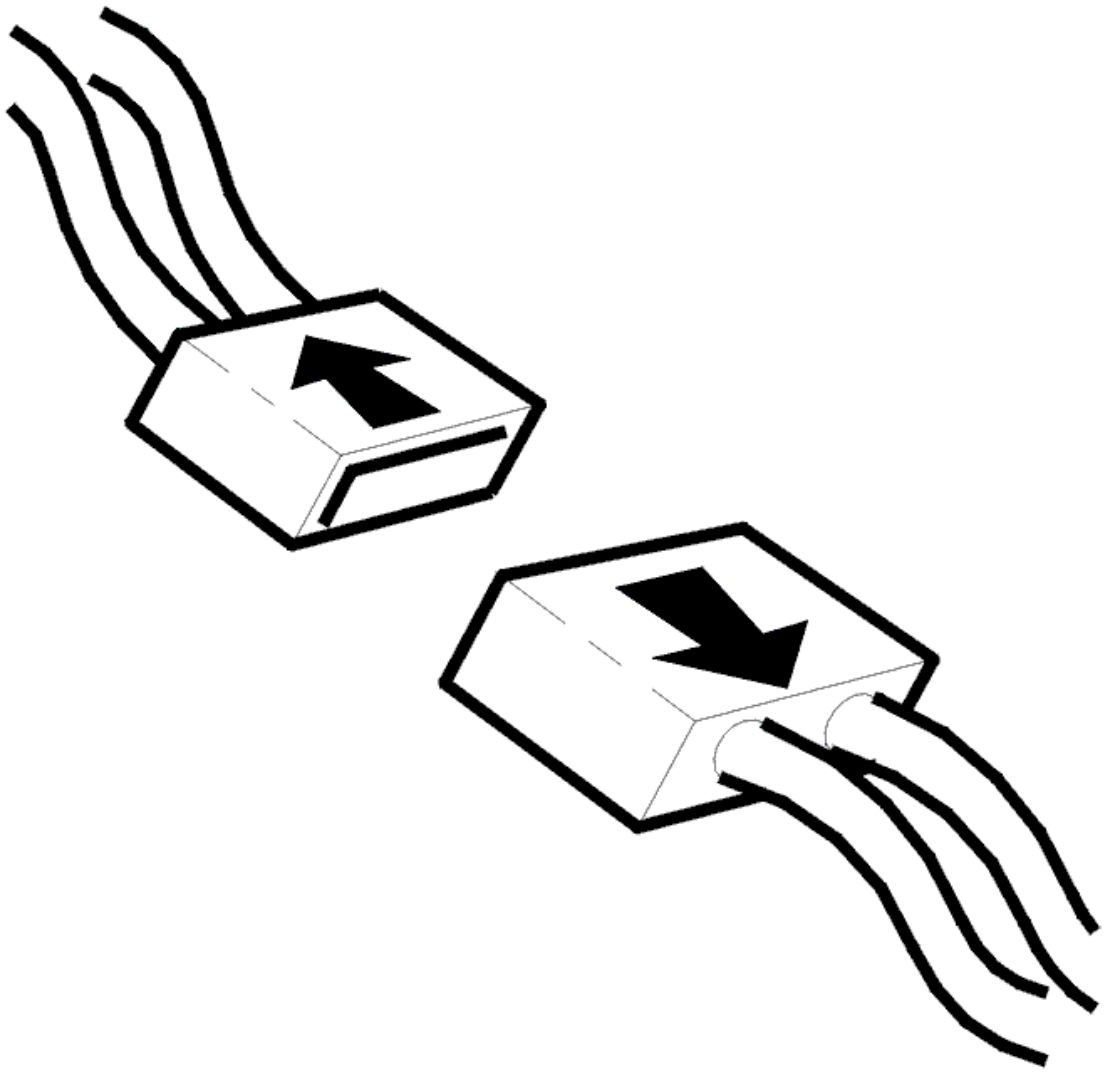


Fig. 415: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9511428** to the transmission connector (transmission side)
- Disconnect the transmission connector (control module side).

  Check that the resistance between the transmission housing and connector terminal #U (#A18) is 0-50 ohms.

  Other information:

  - To connect the breakout box to the transmission connector, see **CONNECTING THE**

BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS

- For information about signals, see **SIGNAL SPECIFICATION** .

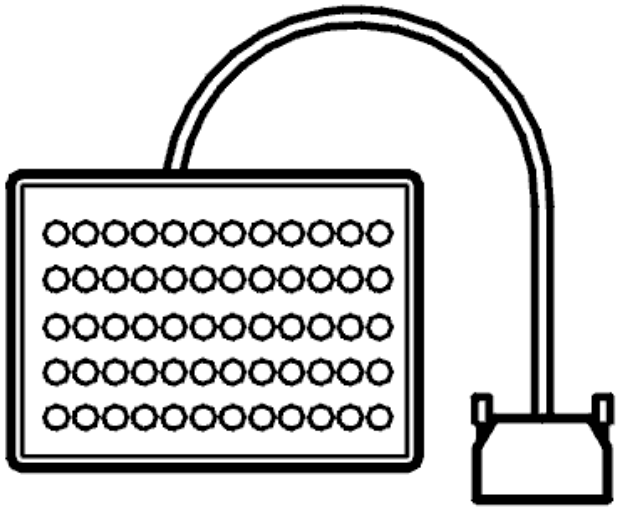


Fig. 416: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

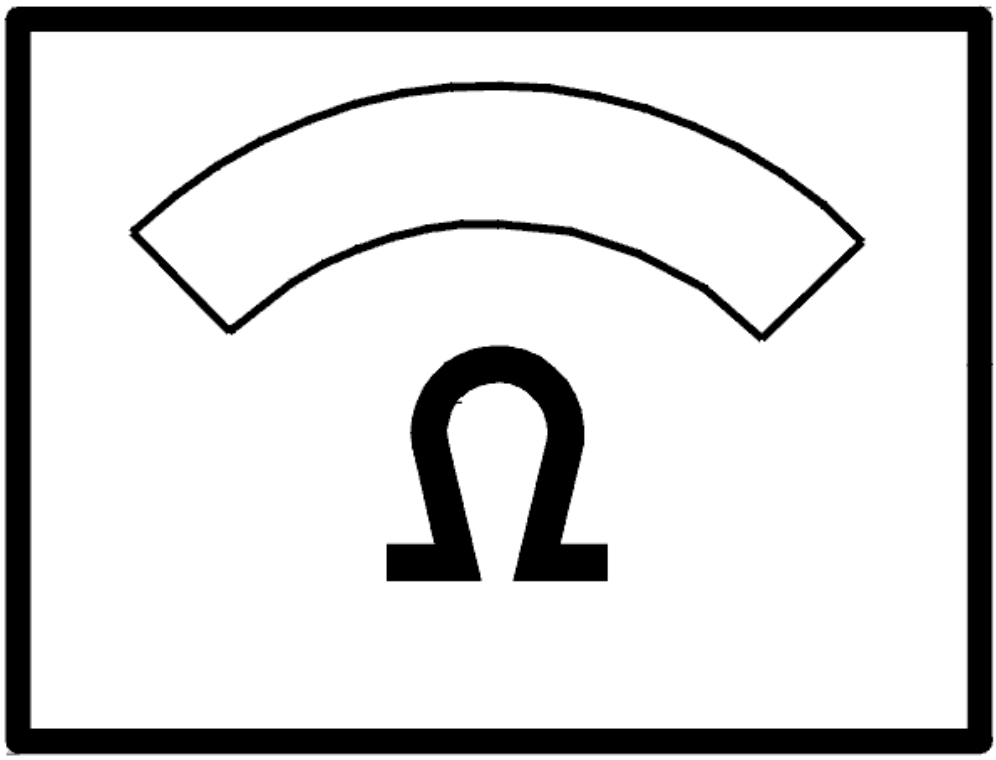


Fig. 417: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE COMPONENT**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE COMPONENT

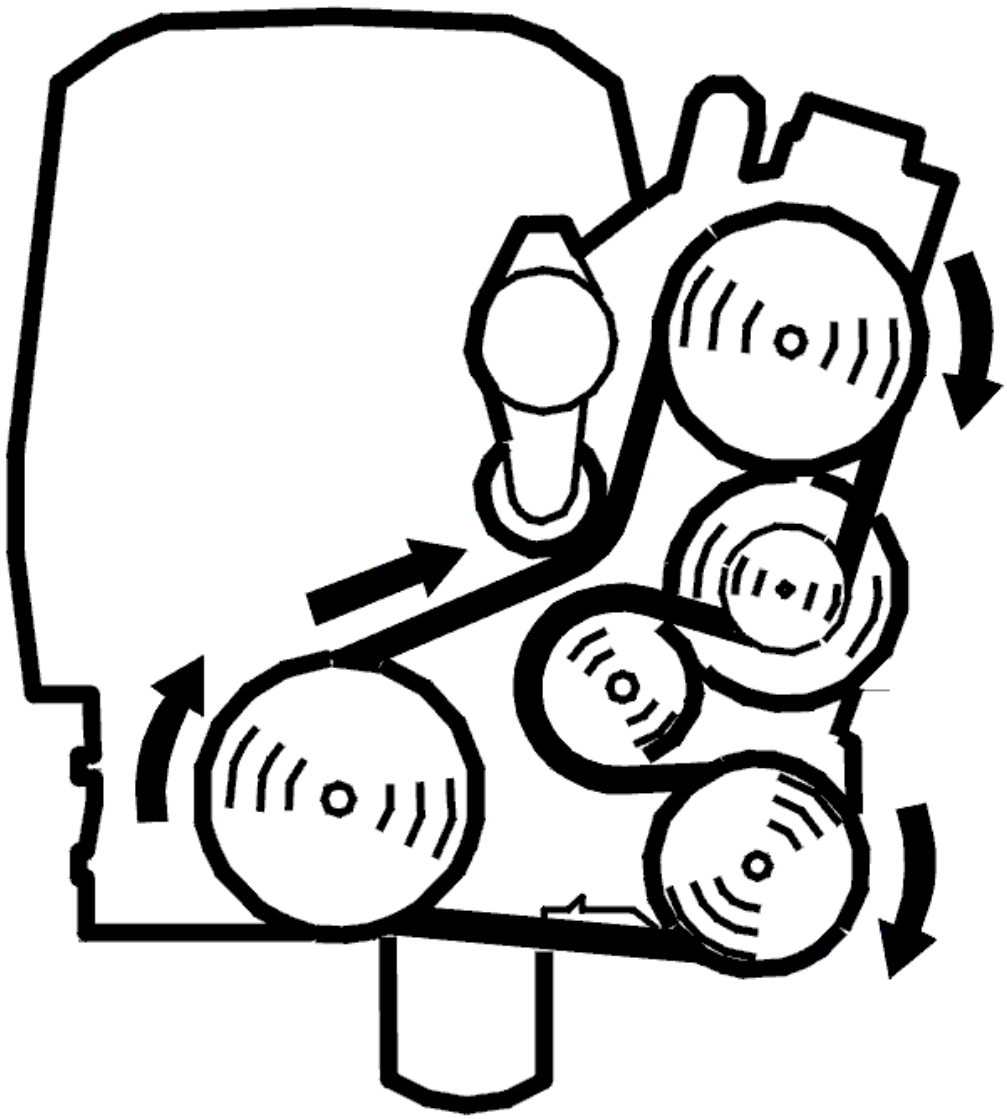


Fig. 418: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

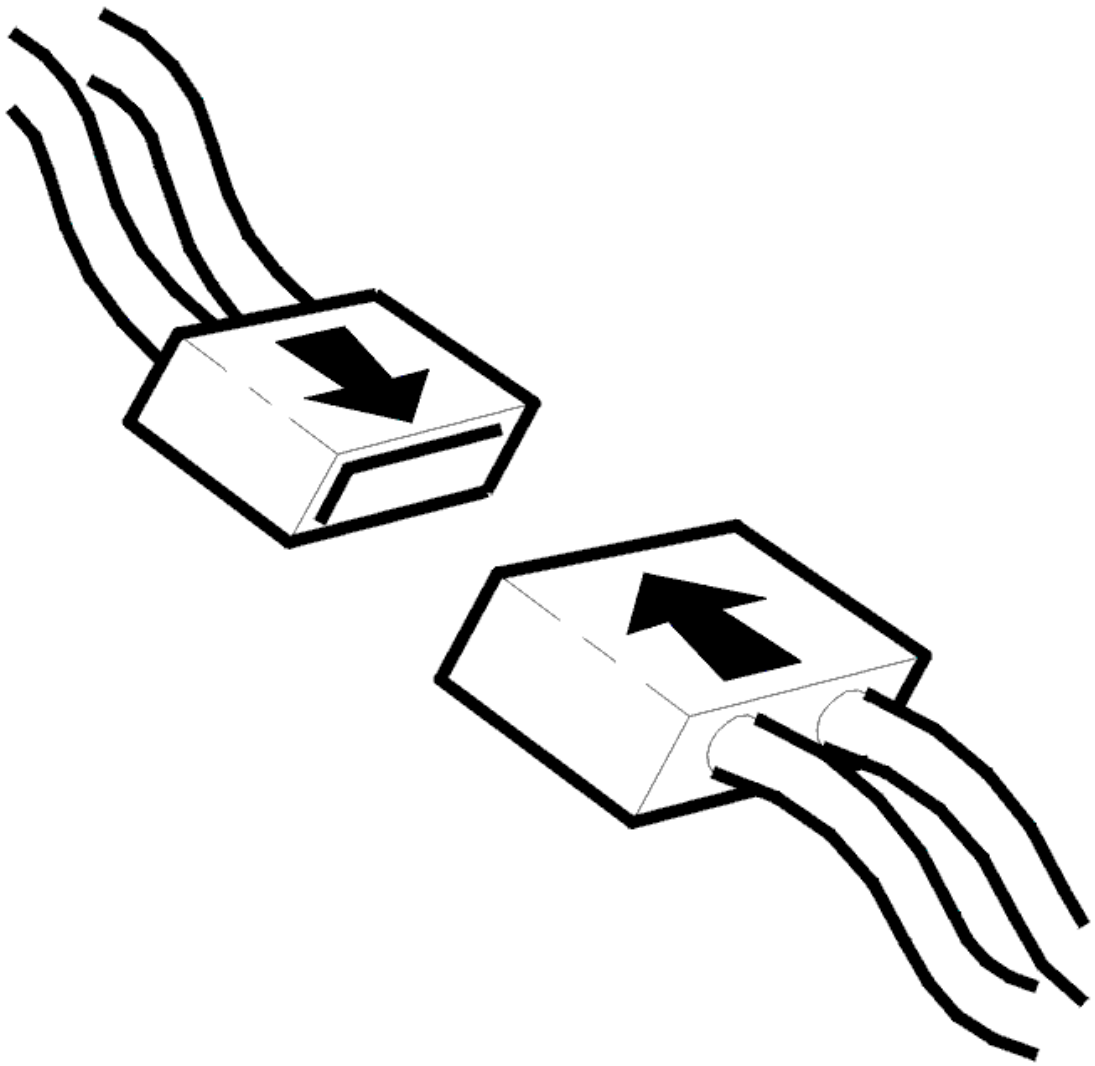


Fig. 419: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect adapter see **9511505** and breakout box see **9511428** to the transmission connector (transmission and control module side)
- Start the engine.

  Check that the voltage between the transmission housing and connector terminal #U (#A18) is battery voltage.

  Other information:

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**

- For information about signals, see **SIGNAL SPECIFICATION** .

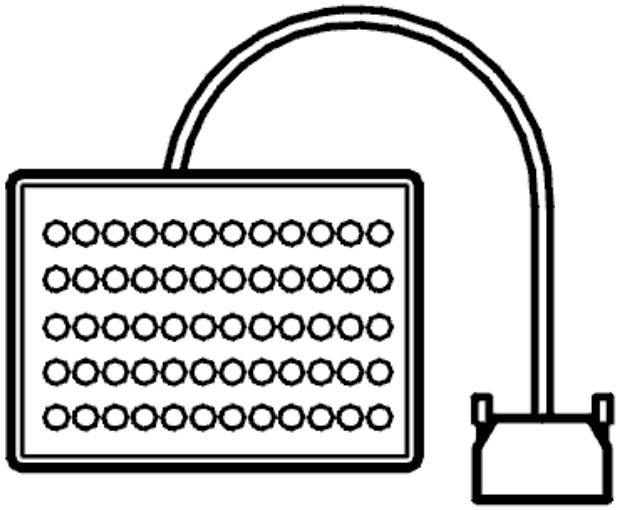


Fig. 420: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

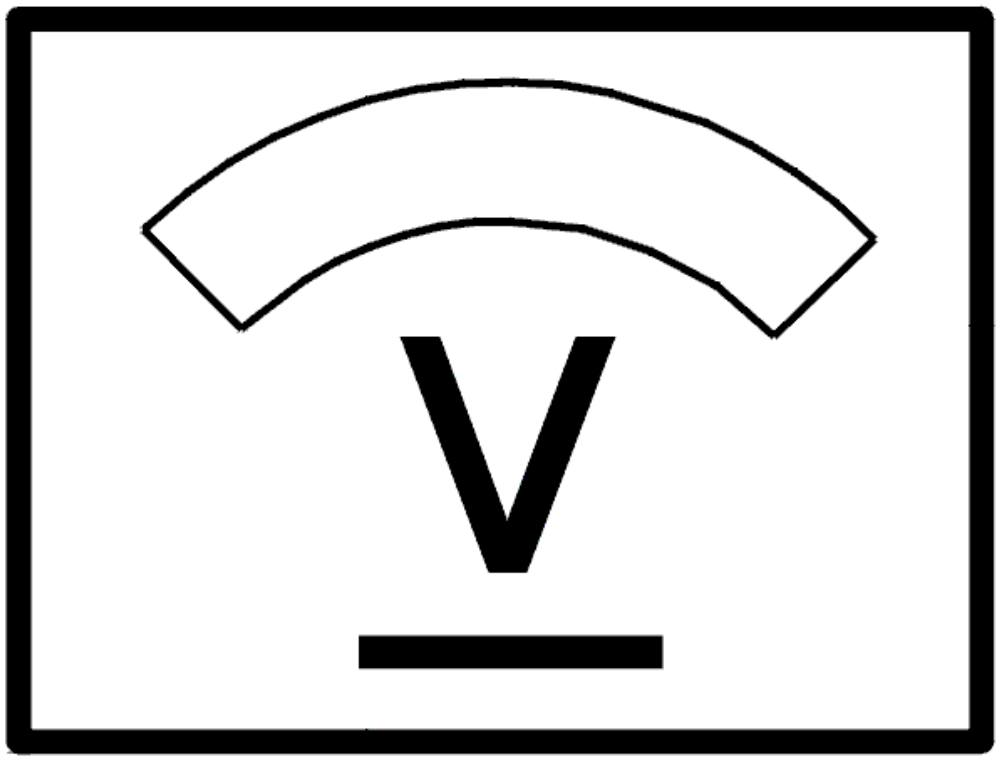


Fig. 421: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Is the voltage OK?

- **YES**

  Refer to **CHECKING SOLENOID SL**

- **NO**

  Refer to **CHECKING THE COMPONENT**

CHECKING THE COMPONENT

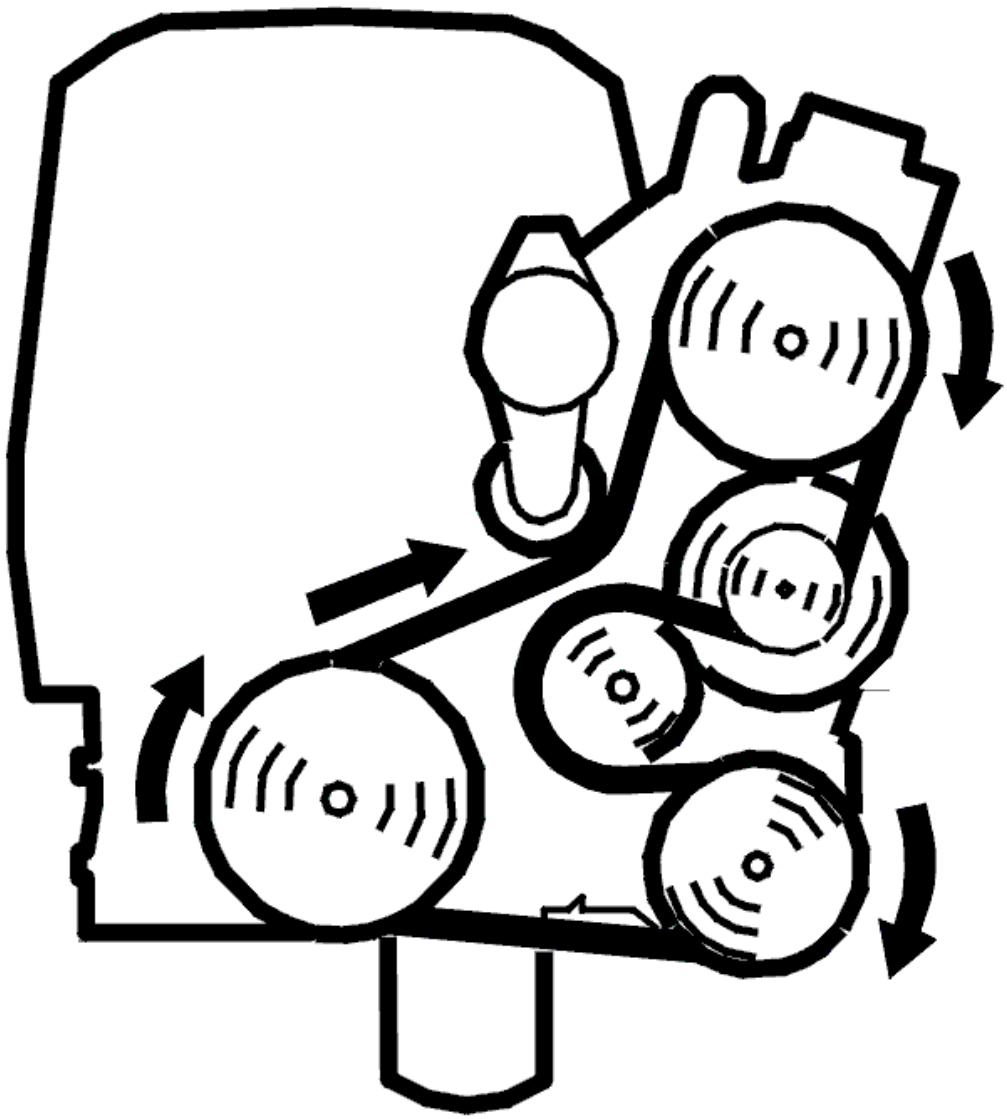


Fig. 422: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

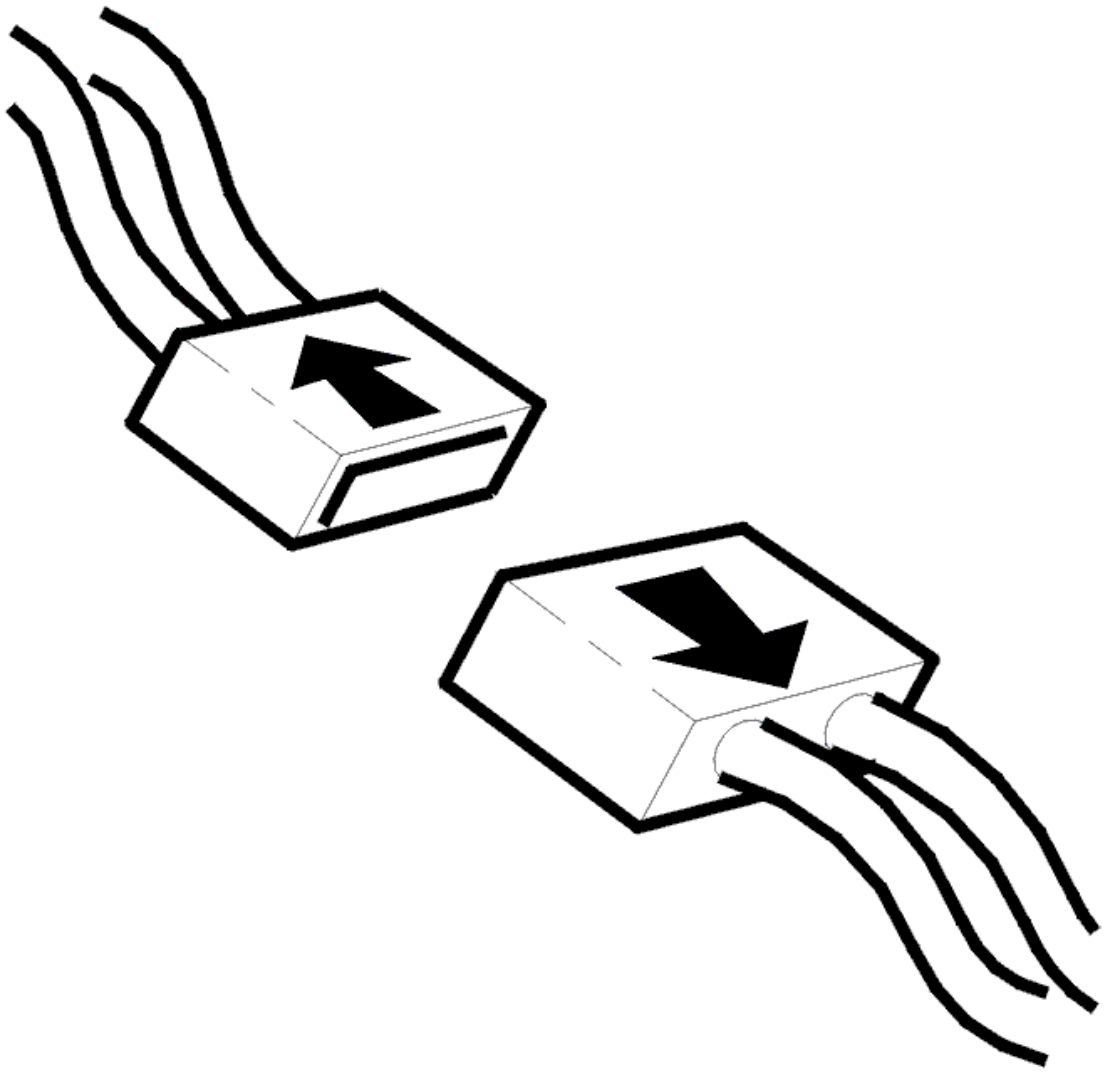


Fig. 423: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Engine idling
- Connect adapter see **9511505** and breakout box see **9511428** to the transmission connector (control module side)
- The transmission connector disconnected.

NOTE: Diagnostic trouble codes (DTCs) for the gear-shift position sensor and the solenoids may be stored in the transmission control module (TCM) when disconnecting the transmission connector. These do not need to be fault traced when this fault tracing is complete.

Check that the voltage between any ground terminal and terminal #A18 (#U) is battery voltage.

Other information:

- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION** .

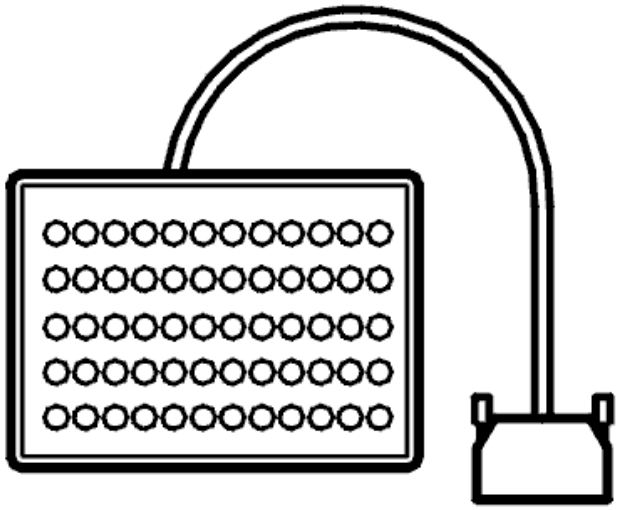


Fig. 424: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

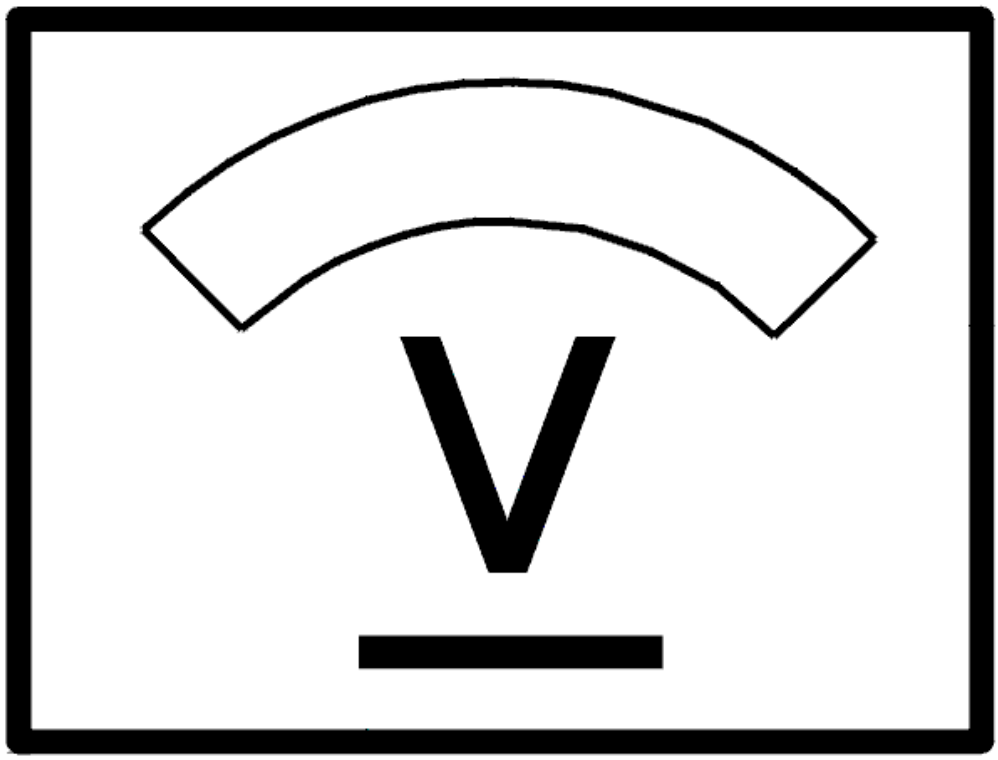


Fig. 425: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was the voltage OK?

- **YES**

  Refer to **CHECKING THE WIRING AND COMPONENT**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

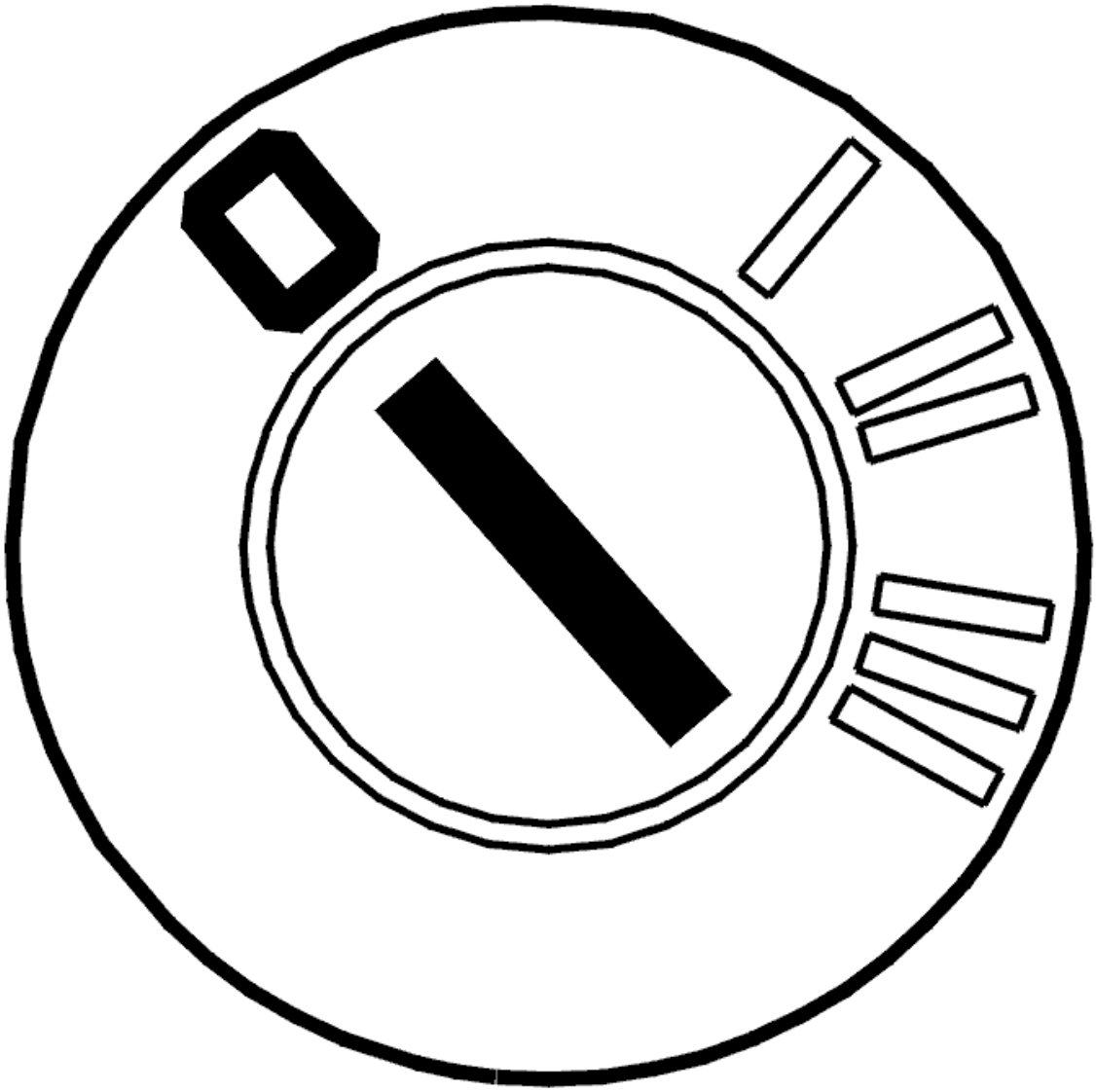


Fig. 426: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

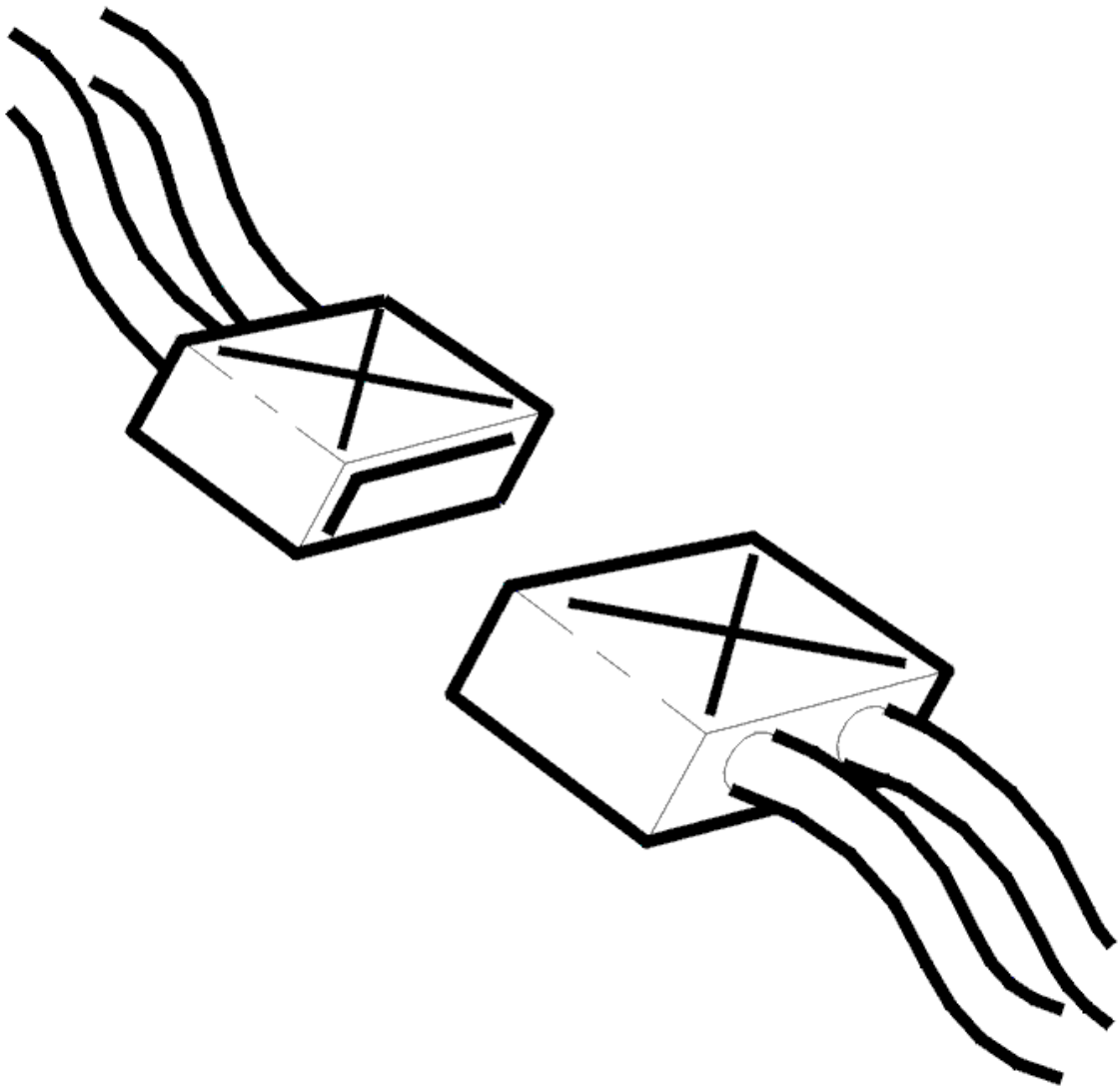


Fig. 427: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

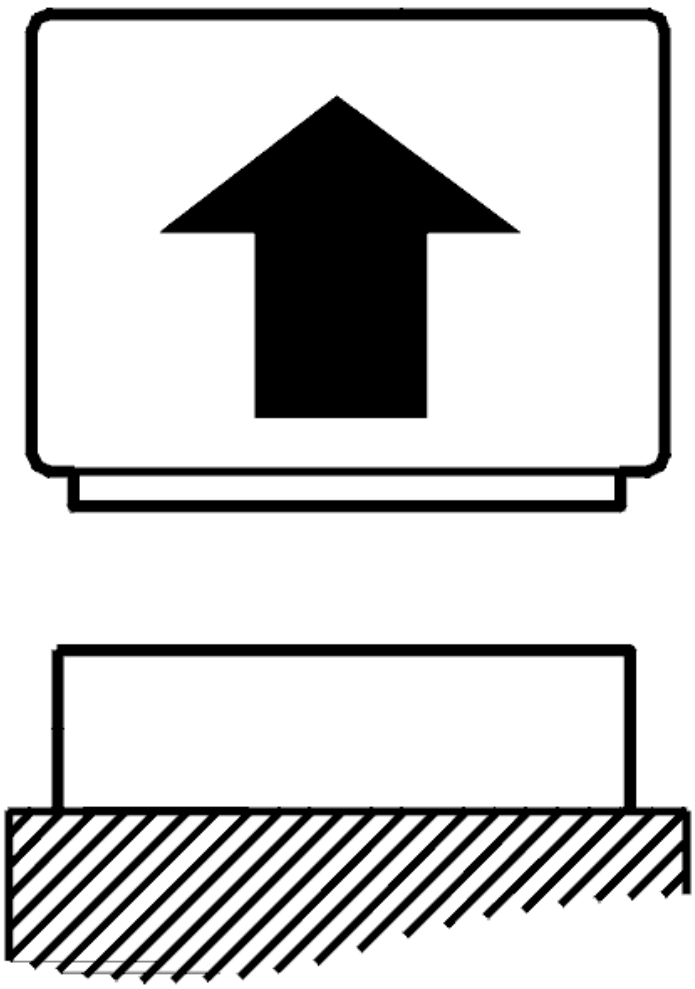


Fig. 428: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the control module.
- Connect the breakout box to the control module connector (transmission side)
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9511428** to the transmission connector (control module side).

  Check the control module and transmission connectors. Check for contact resistance and oxidation.

  Check the cable between control module terminal #A65 (#B5) and transmission connector terminal #U (#A18) (control module side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

If a fault was not detected in the wiring or terminals replace the control module.

Other information:

- To connect the breakout box to the control module, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

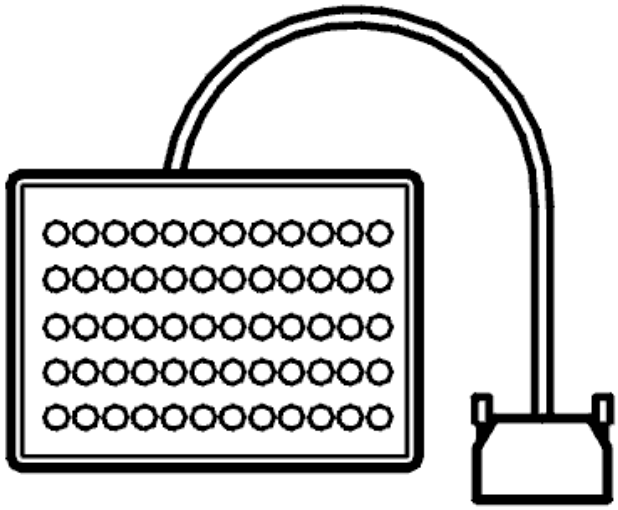


Fig. 429: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

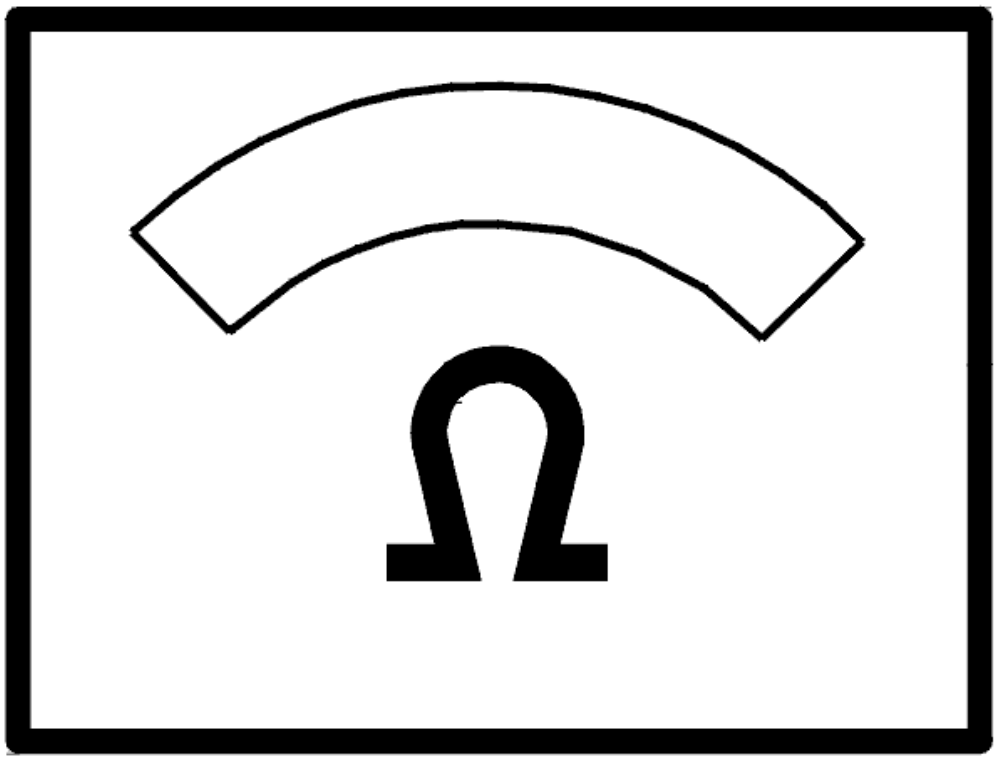


Fig. 430: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected in the cables or terminals?

- **YES**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

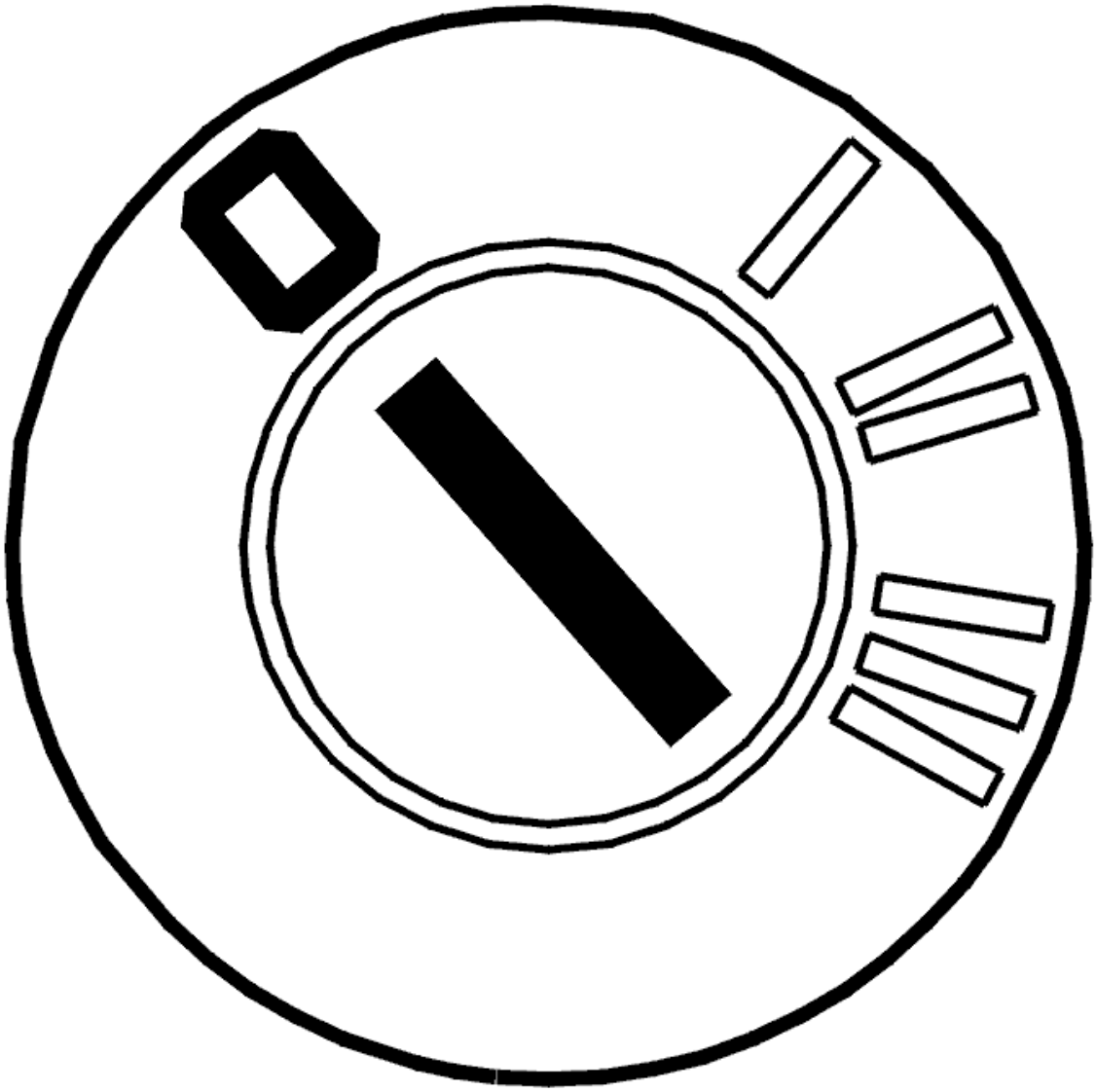


Fig. 431: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system
- Connect adapter see **9511505** and breakout box see **9511428** to the transmission connector (transmission side).

  Check that the pins in the pressure switch module connector are not loose or bent. Check that the connector is correctly connected.

  Check the transmission and pressure switch module connectors. Check for contact resistance and oxidation.

  Check the cable between control module terminal #U (terminal #A18) and pressure switch module

connector terminal #B. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Check the transmission oil filter. Check for **abnormal** amounts of particles in the oil.

Replace the oil filter if necessary.

Replace the pressure switch module if no abnormal amount of particles were found in the oil filter or there was no fault in the wiring.

Other information:

- To open the transmission control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- To connect the breakout box to the control module, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- To replace the oil filter, see **TRANSMISSION OIL / OIL FILTER, REPLACING**
- To replace the pressure switch module, see **PRESSURE SENSOR, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

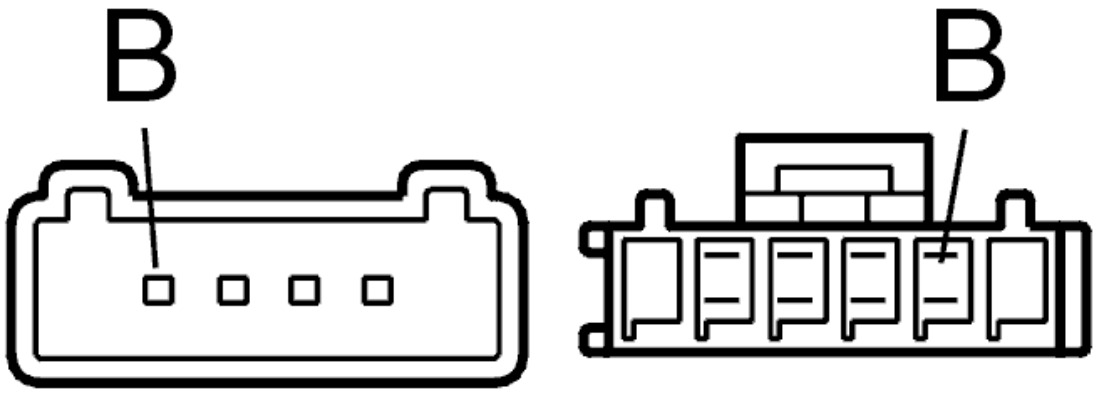


Fig. 432: Identifying Pressure Switch Module Connector Terminal #B
Courtesy of VOLVO CARS CORPORATION

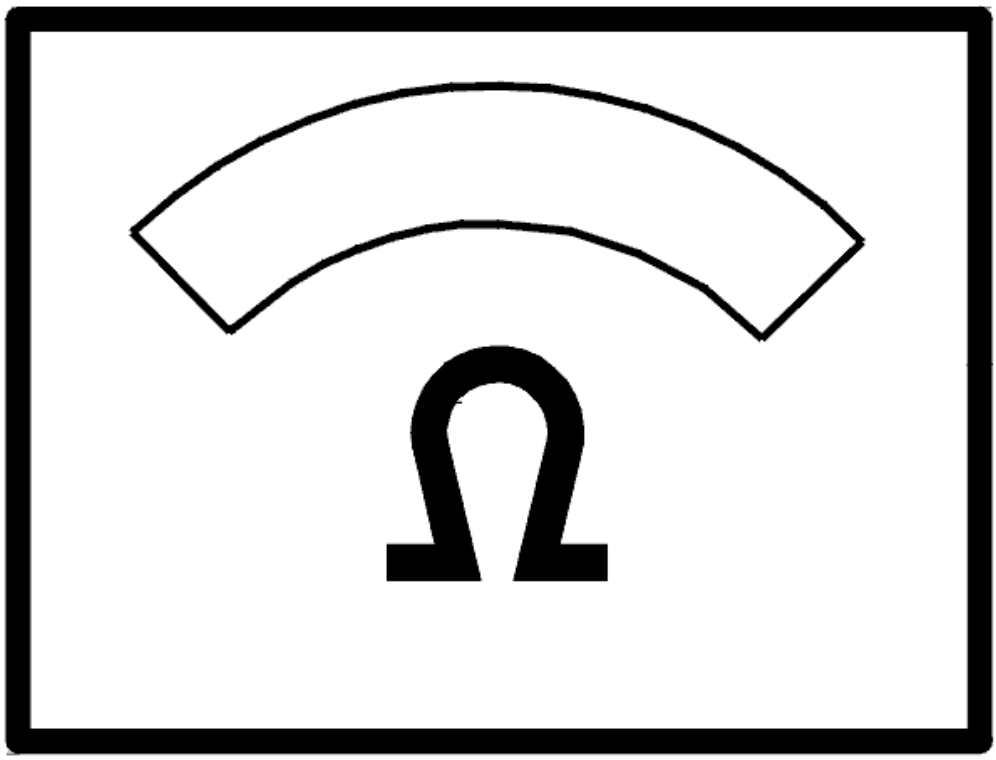


Fig. 433: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

CHECKING SOLENOID SL

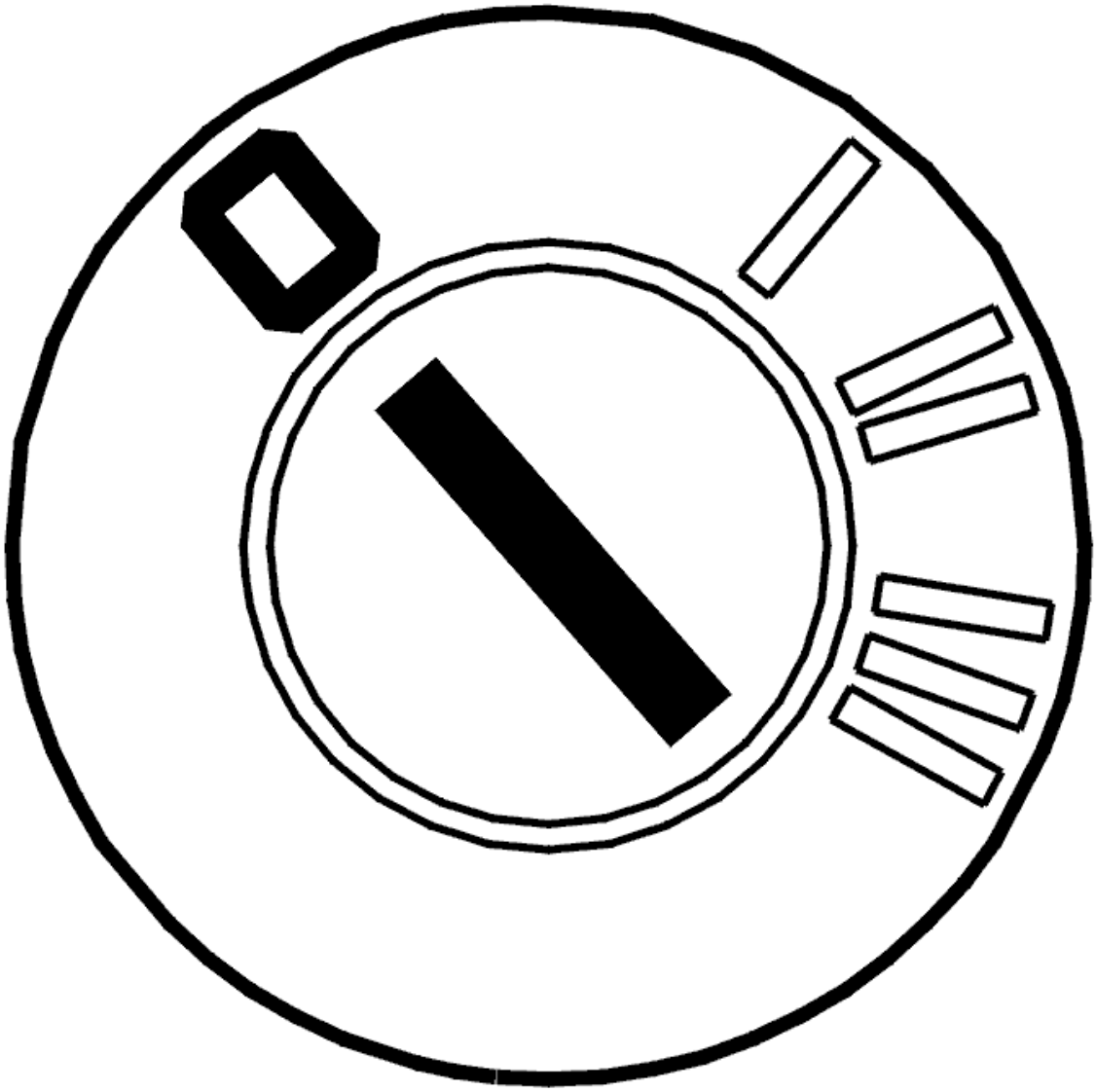


Fig. 434: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the control module connector (transmission side).

  Check solenoid SL by measuring the resistance between terminals #A51 (#A51) and #A53 (#A53).

  When the transmission is cold (20°C), the resistance must be 10-11 ohms. When the transmission is at operating temperature (150°C), the resistance must not exceed 16 ohms.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - For information about signals, see **SIGNAL SPECIFICATION** .

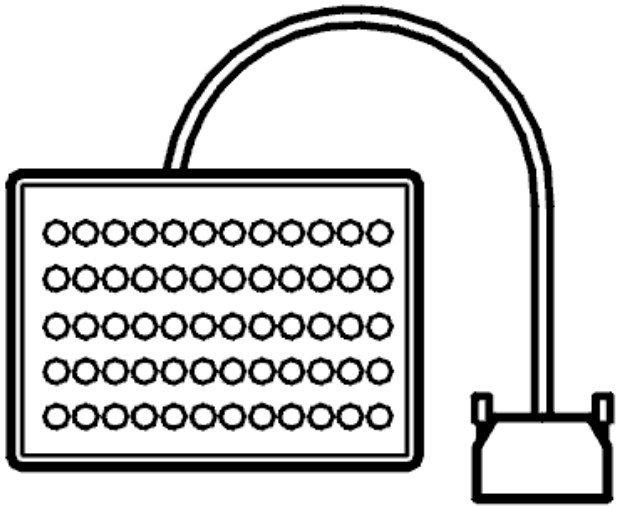


Fig. 435: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

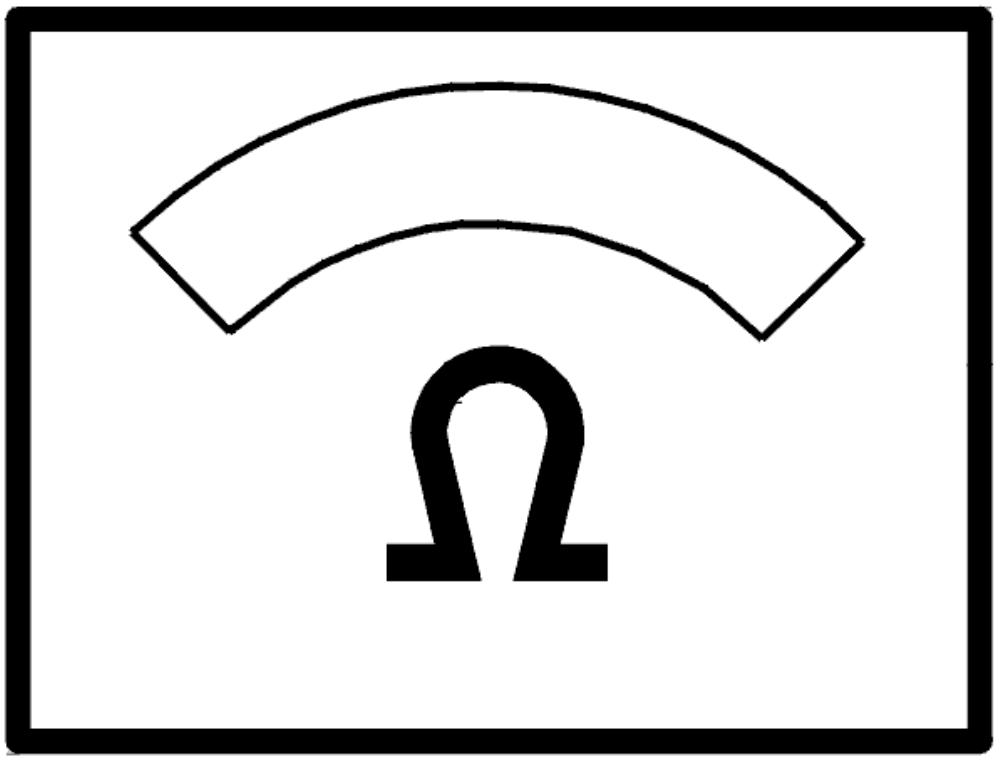


Fig. 436: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CONNECTING THE T PIPE**

- **NO**

  Refer to **CHECKING THE WIRING**

CONNECTING THE T PIPE

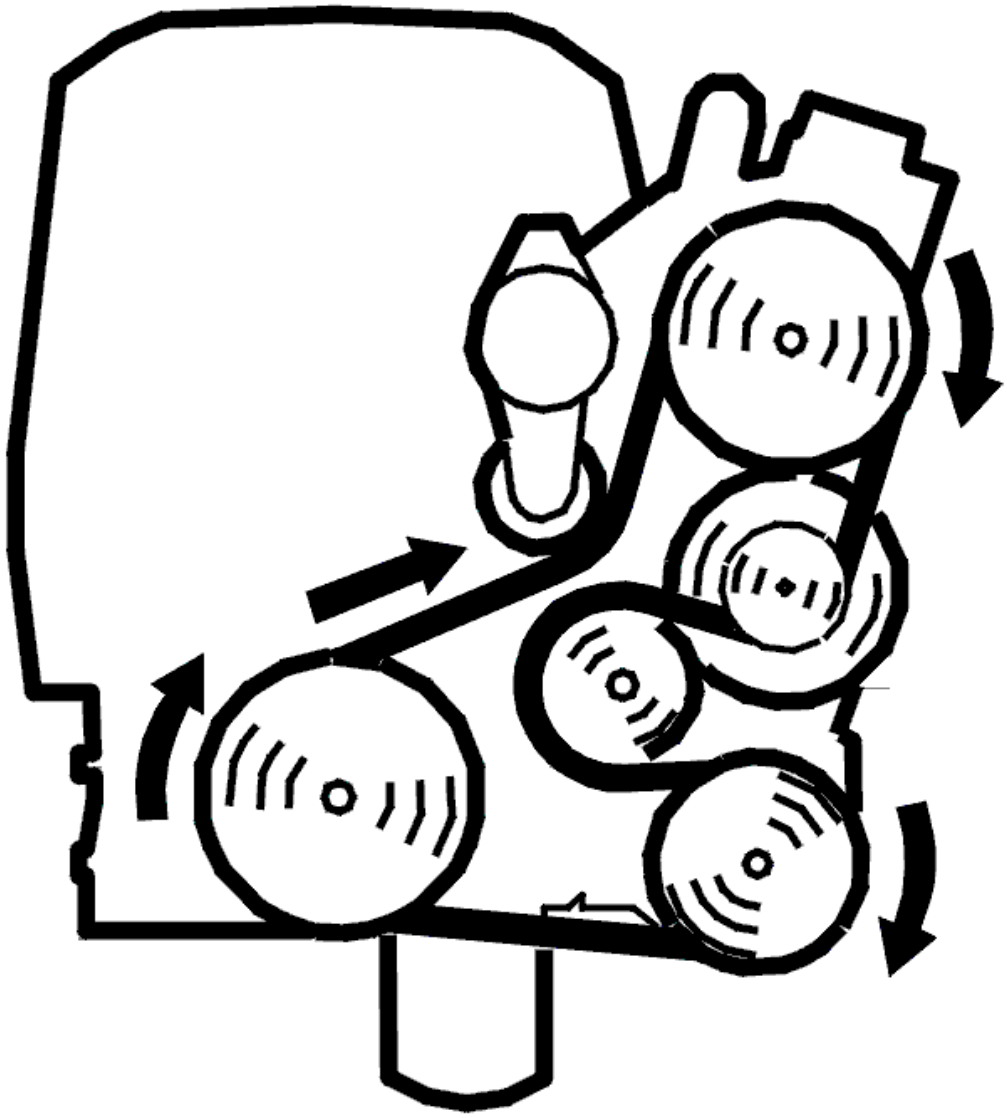


Fig. 437: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Deactivate the function for STC/DSTC by pressing in the button for STC/DSTC for approximately 2 seconds
- Ignition off
- Connect T-pipe see **9997002** with oil pressure gauge see **9995114** to the coolant hose from the transmission for the oil cooler
- Raise the car so that the drive wheels are clear of the ground.

WARNING: Ensure that the car safely raised. Ensure that there are no objects caught in the front wheels.

- Start the engine

- Gear selector in position P
- Activate the function "Block automatic shifting".

Other information

- To connect the T-pipe to the oil cooler for the transmission. See **T-PIPE, CONNECTION TO OIL COOLER** .

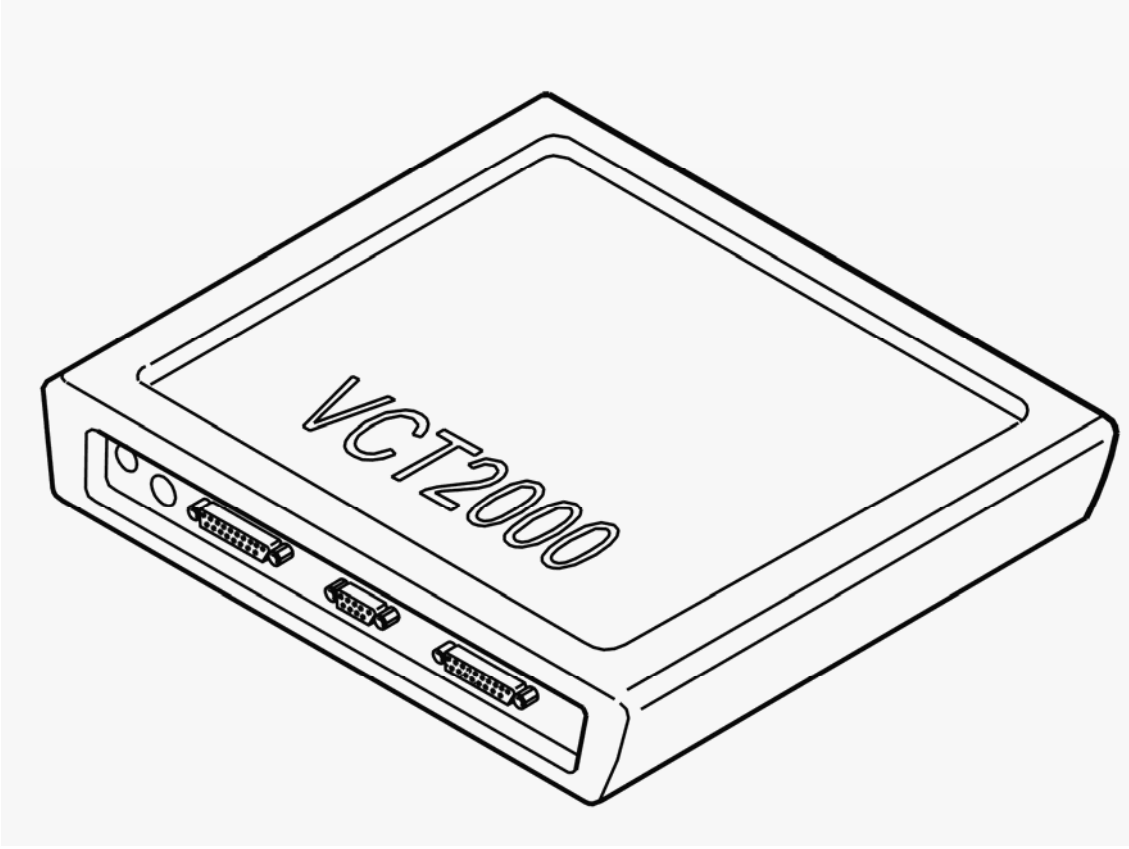


Fig. 438: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Allow the engine to run.

- **Continue**

Refer to **CHECKING SOLENOID SL**

CHECKING SOLENOID SL

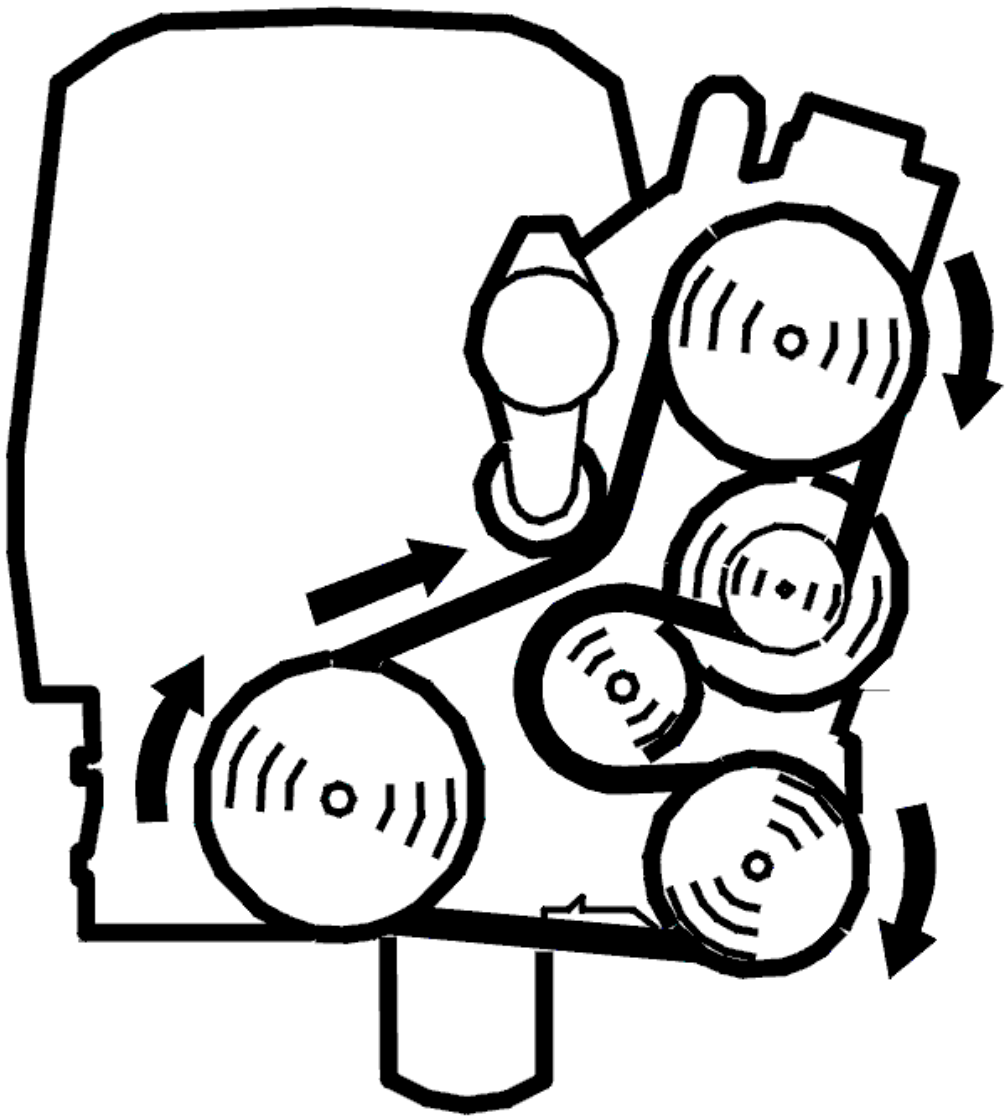


Fig. 439: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Engine running
- Move the gear selector to position D
- Activate the solenoid for gear 2 and then the lock-up function
- Check the pressure change on the oil pressure gauge. A considerable change in pressure should be observed
- Deactivate the lock-up function. Check the pressure change.

  Repeat the activation and deactivation of the lock-up function a few times to ensure accurate results.

  HINT: Unchanged pressure means that the control system is defective.

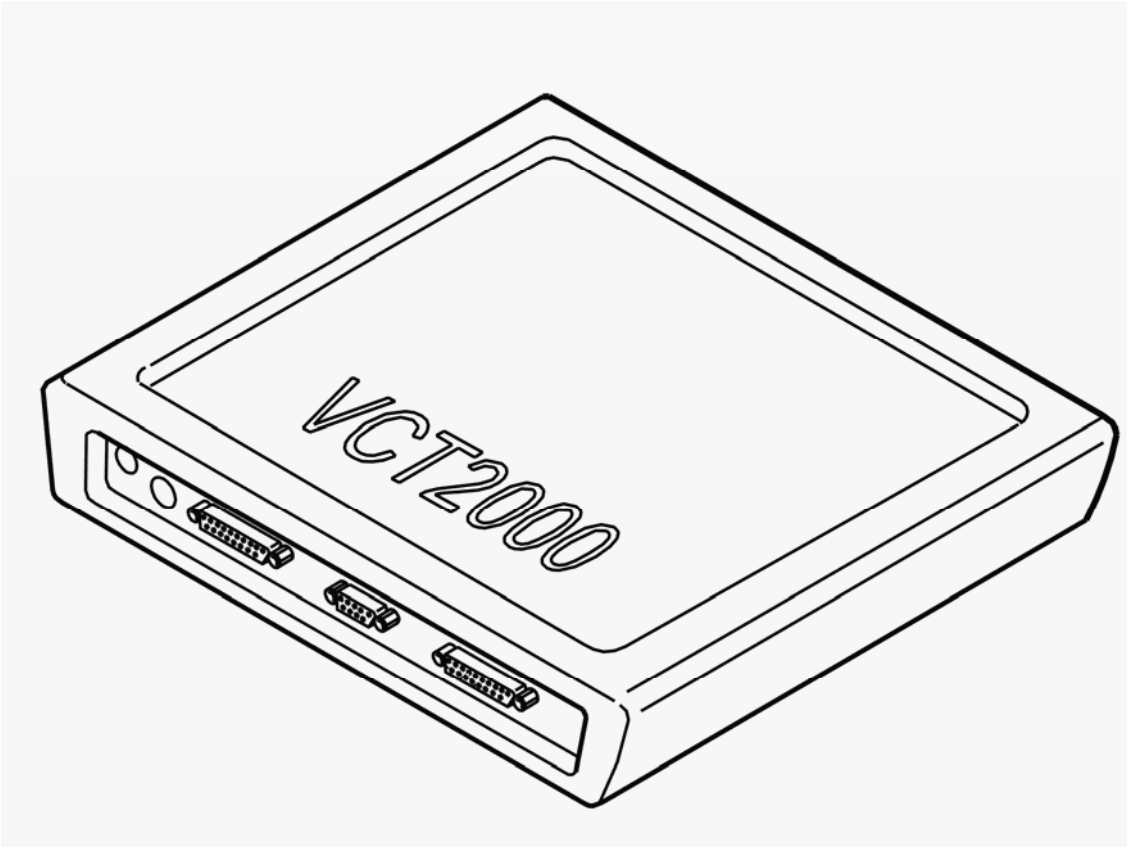


Fig. 440: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Did the pressure change?

- **YES**

  Refer to **REPLACING THE TRANSMISSION**

- **NO**

  Refer to **REPLACING THE CONTROL SYSTEM**

REPLACING THE CONTROL SYSTEM

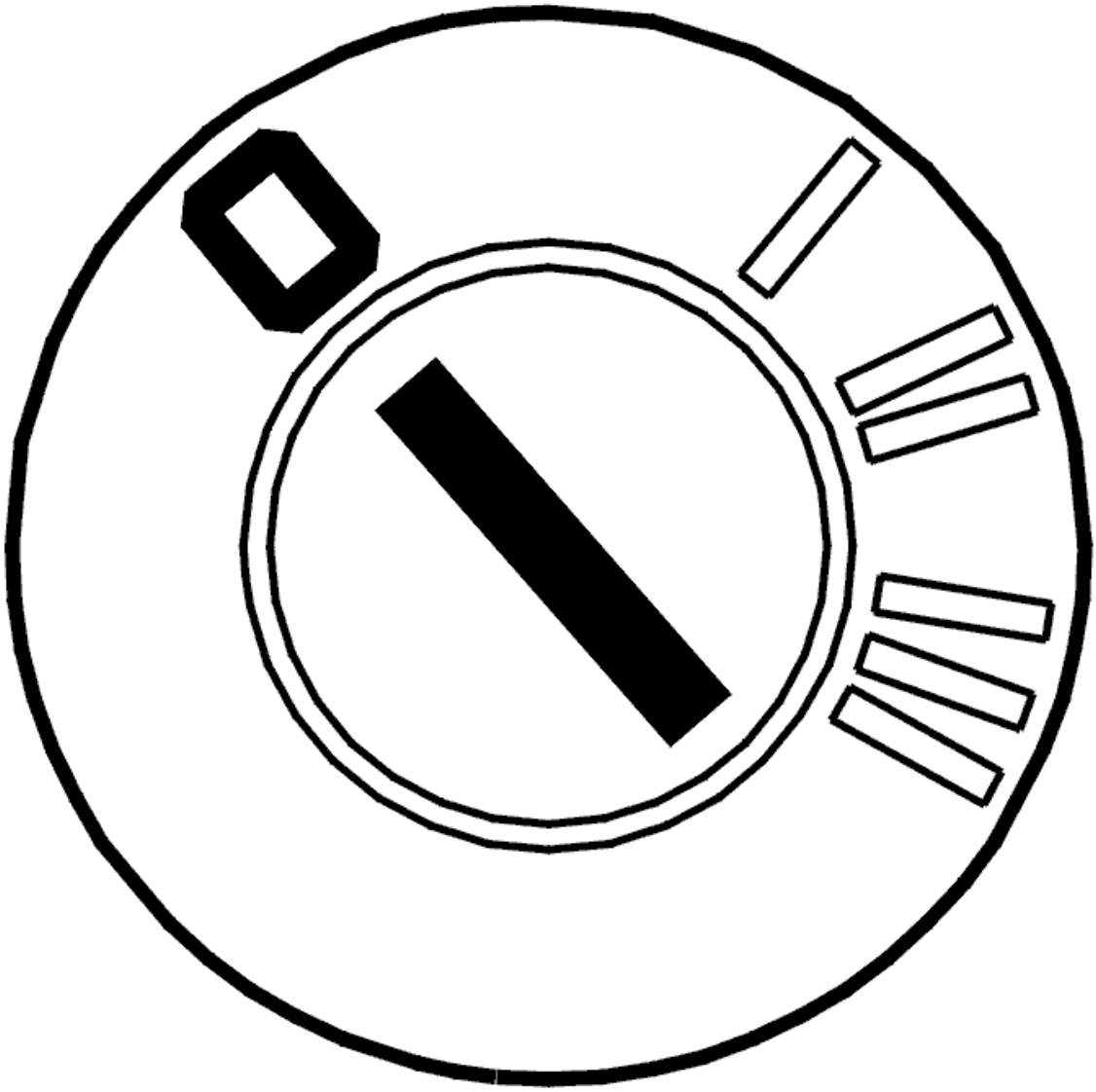


Fig. 441: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Fault-tracing indicates a fault in the transmission control system. Replace the control system.

  Other information

  - To replace the control system, For removal, see **CONTROL SYSTEM/VALVE HOUSING, REMOVING** and To install, see **CONTROL SYSTEM / VALVE HOUSING, INSTALLING** .

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

CHECKING THE WIRING

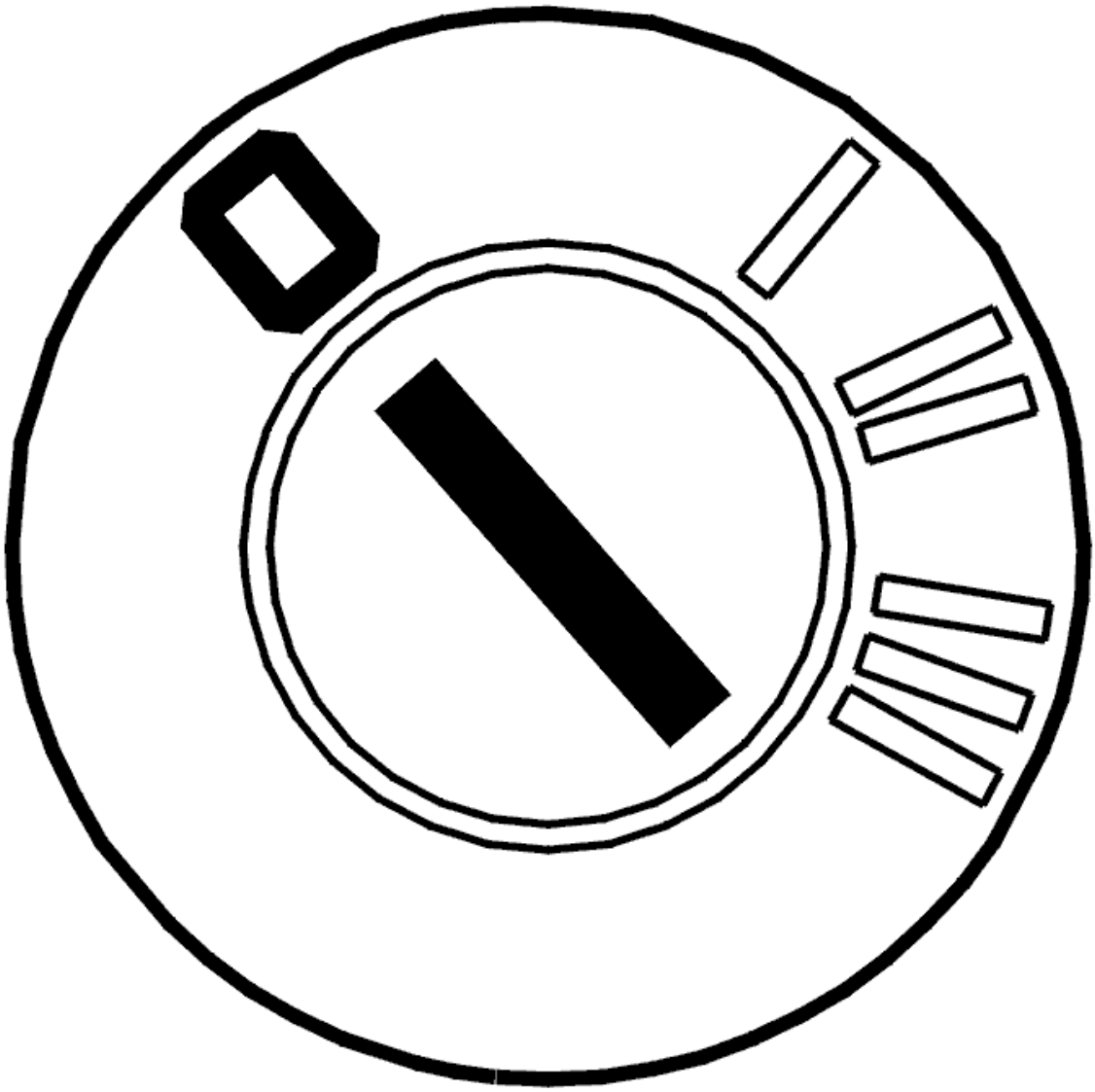


Fig. 442: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

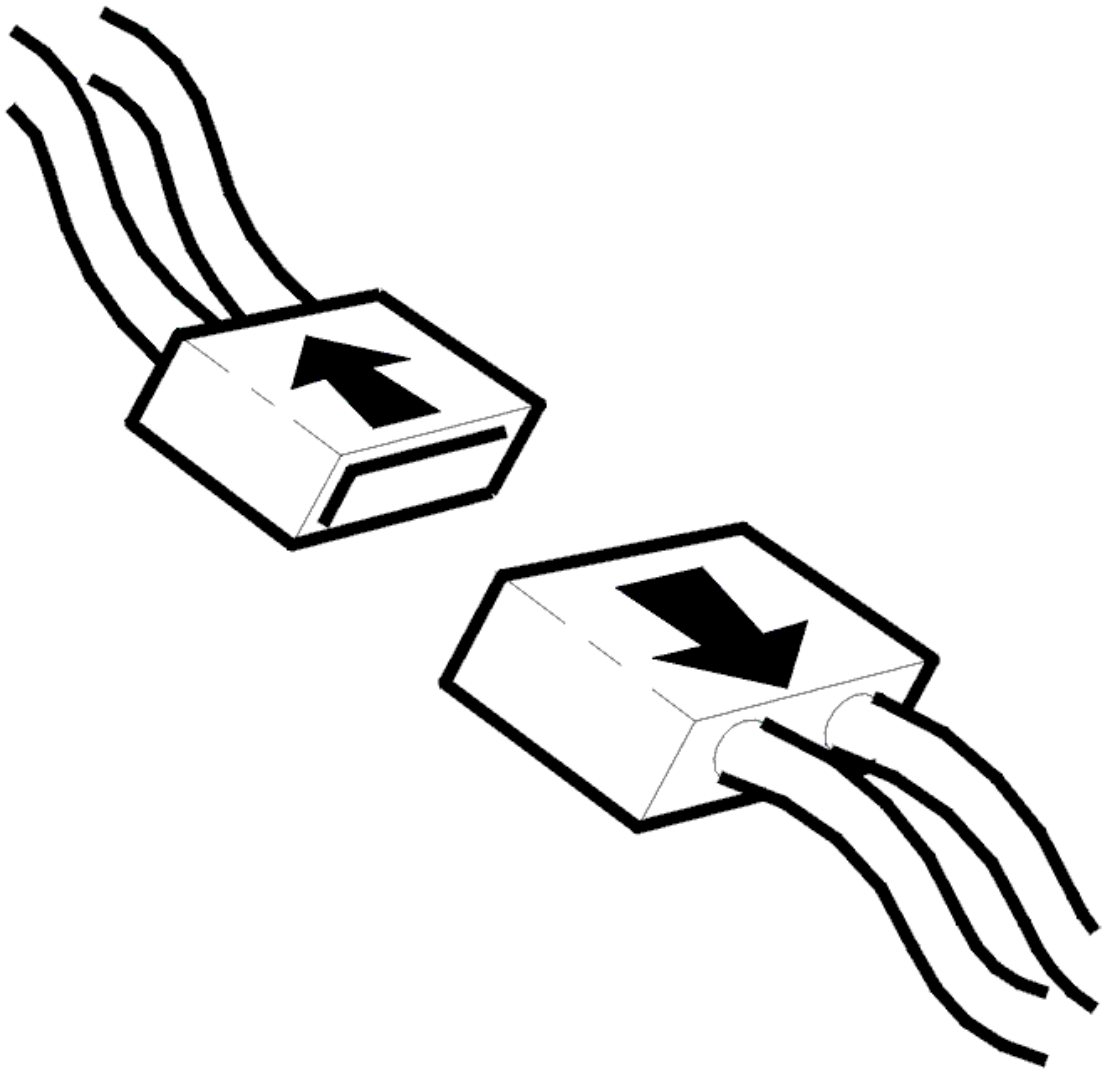


Fig. 443: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

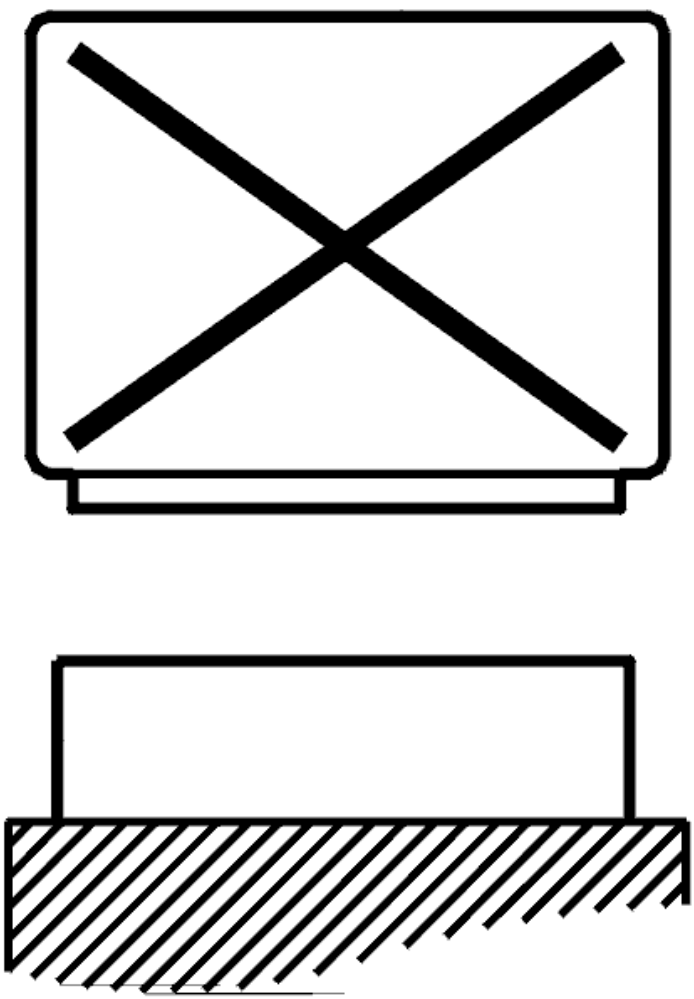


Fig. 444: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Control module disconnected
- Connect the breakout box to the control module connector (transmission side)
- Disconnect the transmission connector
- Adapter see **9511505** and breakout box see **9511428** connected to the transmission connector (control module side).

  Check the wiring between control module terminal #A51 (#A51) and transmission connector terminal #T (#A17). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

  Check the wiring between control module terminal #A53 (#A53) and transmission connector terminal #E

(#A5). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information:

- To connect the breakout box to the control module, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

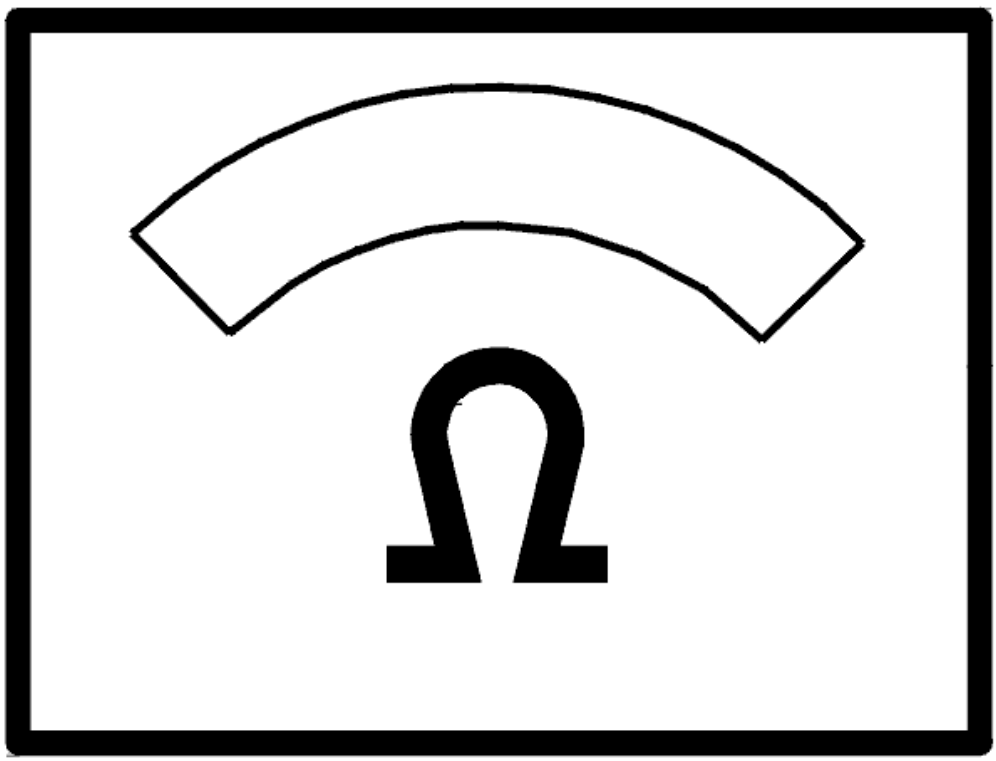


Fig. 445: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

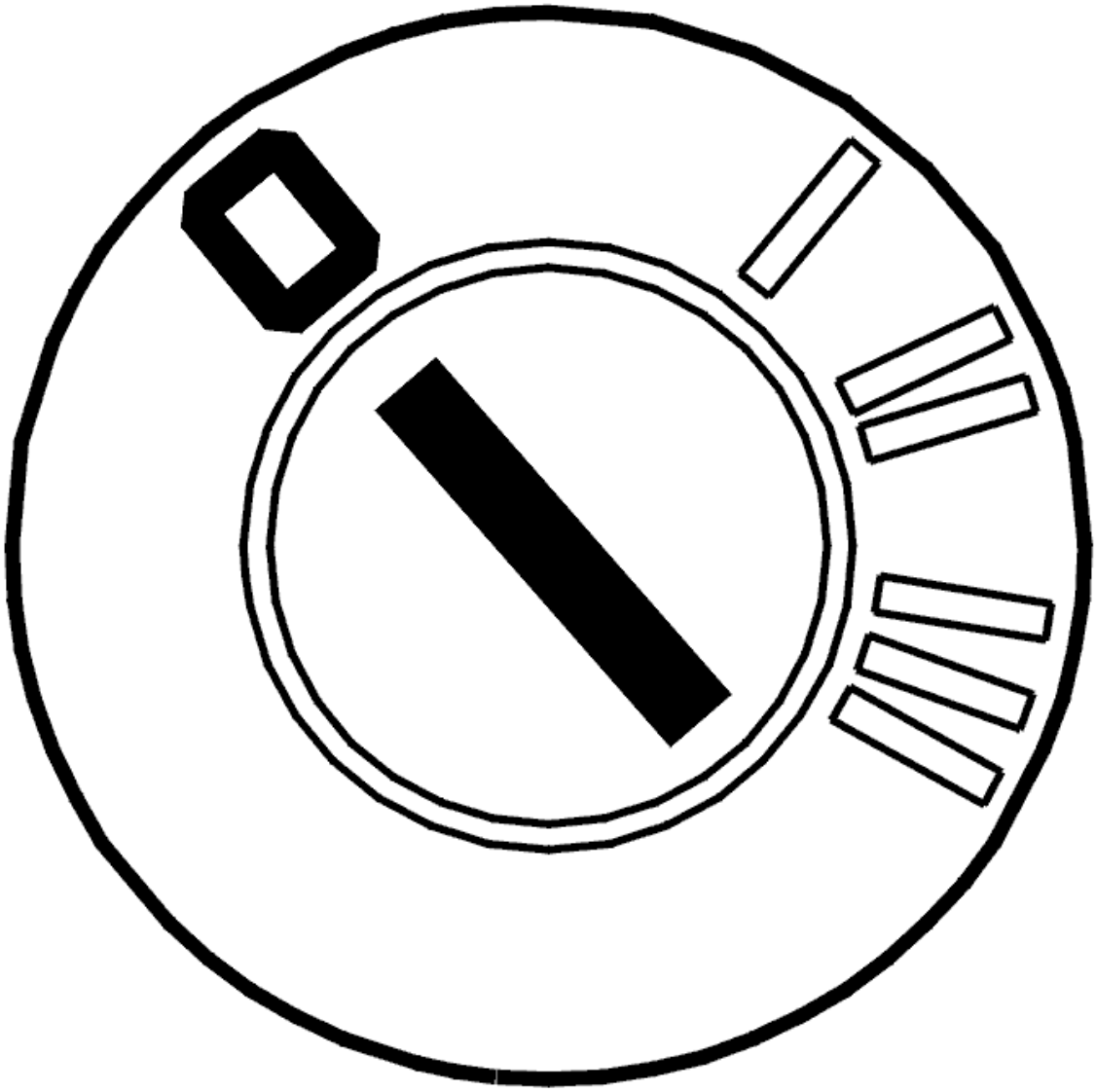


Fig. 446: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off

- Open the transmission control system
- Connect adapter see **9511505** and breakout box see **9511428** to the transmission connector (transmission side).

Check the cable between transmission connector terminal #T (#A17) and solenoid SL terminal #A. Check the cable between transmission connector terminal #E (#A5) and solenoid SL terminal #B. Check these cables for an open-circuit.

HINT: Check solenoid SL by measuring the resistance between solenoid SL terminals #A and #B. When the transmission is cold (approximately 20°C), the resistance must be 10-11 ohms.

Remedy as necessary.

Other information:

- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** or To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid SL, see **SOLENOID LOCK-UP FUNCTION, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS. PERMANENT FAULT**

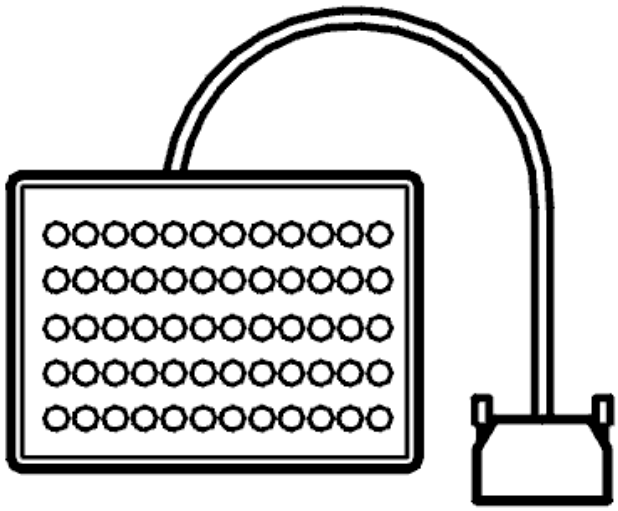


Fig. 447: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

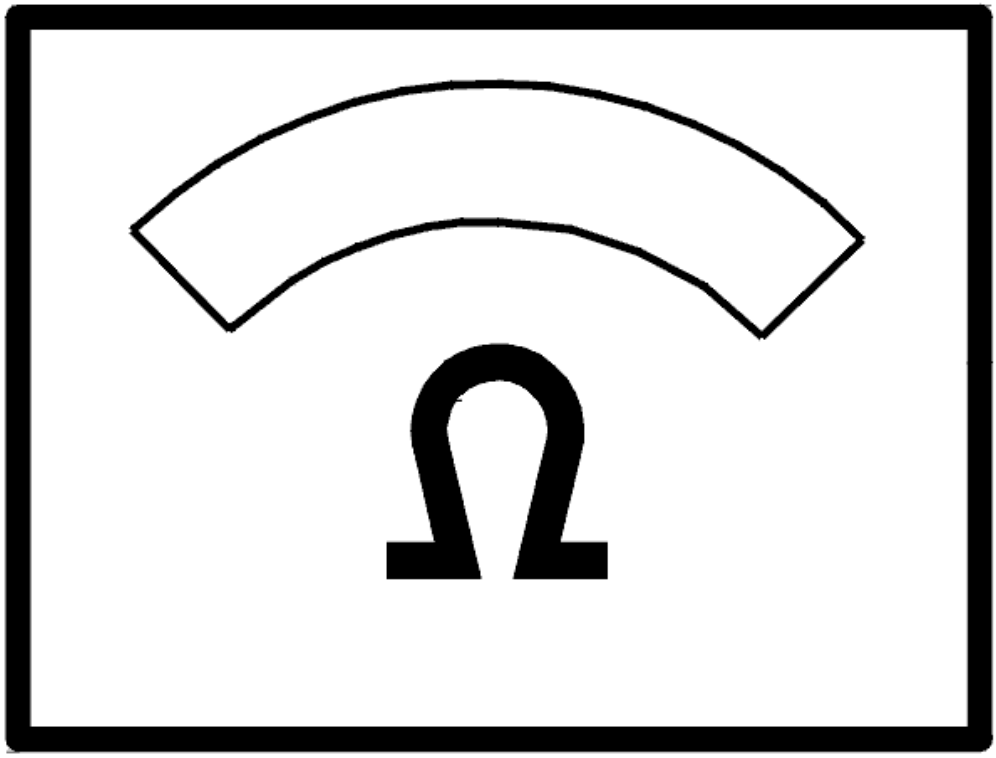


Fig. 448: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

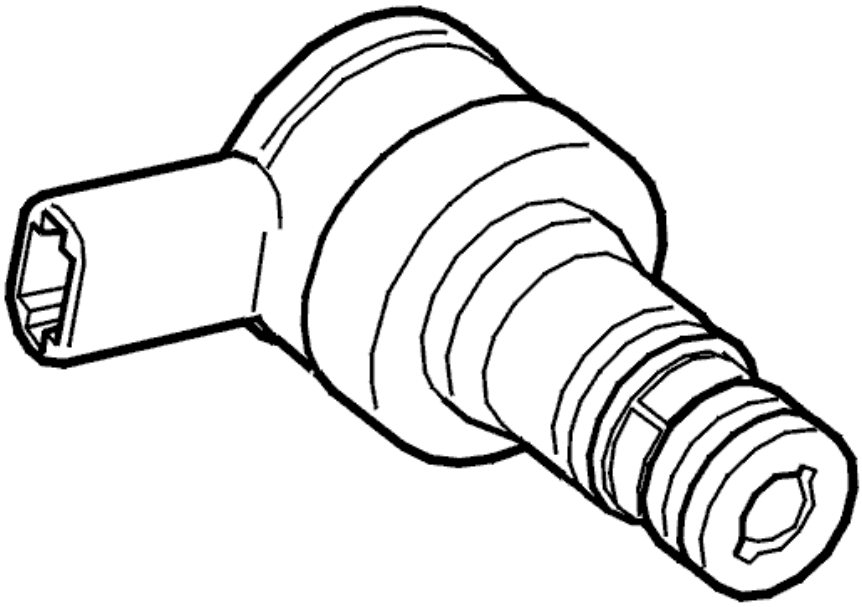


Fig. 449: Identifying Lock-Up Solenoid, SL
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

REPLACING THE TRANSMISSION

Fault-tracing indicates a fault in the transmission. Replace the transmission.

Other information:

- To remove the transmission, see **TRANSMISSION, REMOVING**
- To install the transmission, see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .

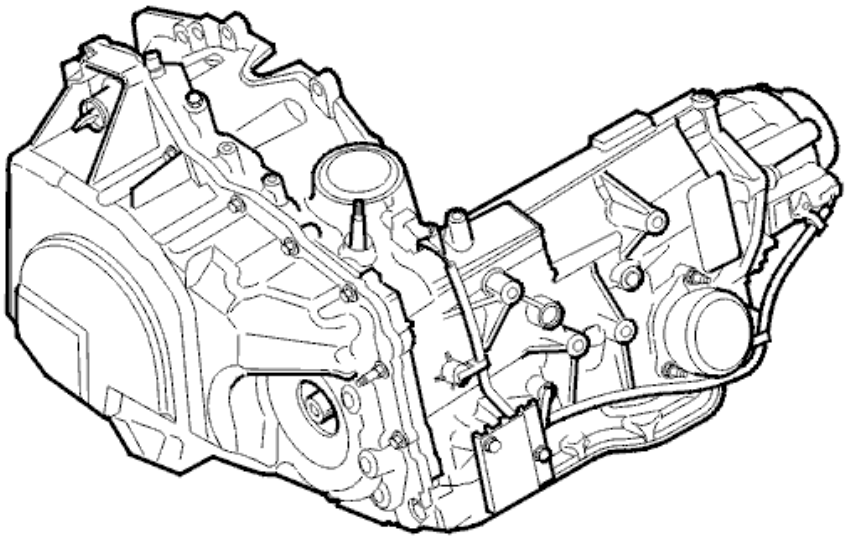


Fig. 450: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

FAULT-TRACING INFORMATION

The fault has probably been remedied if the control module has been programmed with new software.

If new software has not been downloaded, the fault-tracing indicates that the control module has previously detected a fault but the fault is no longer active.

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

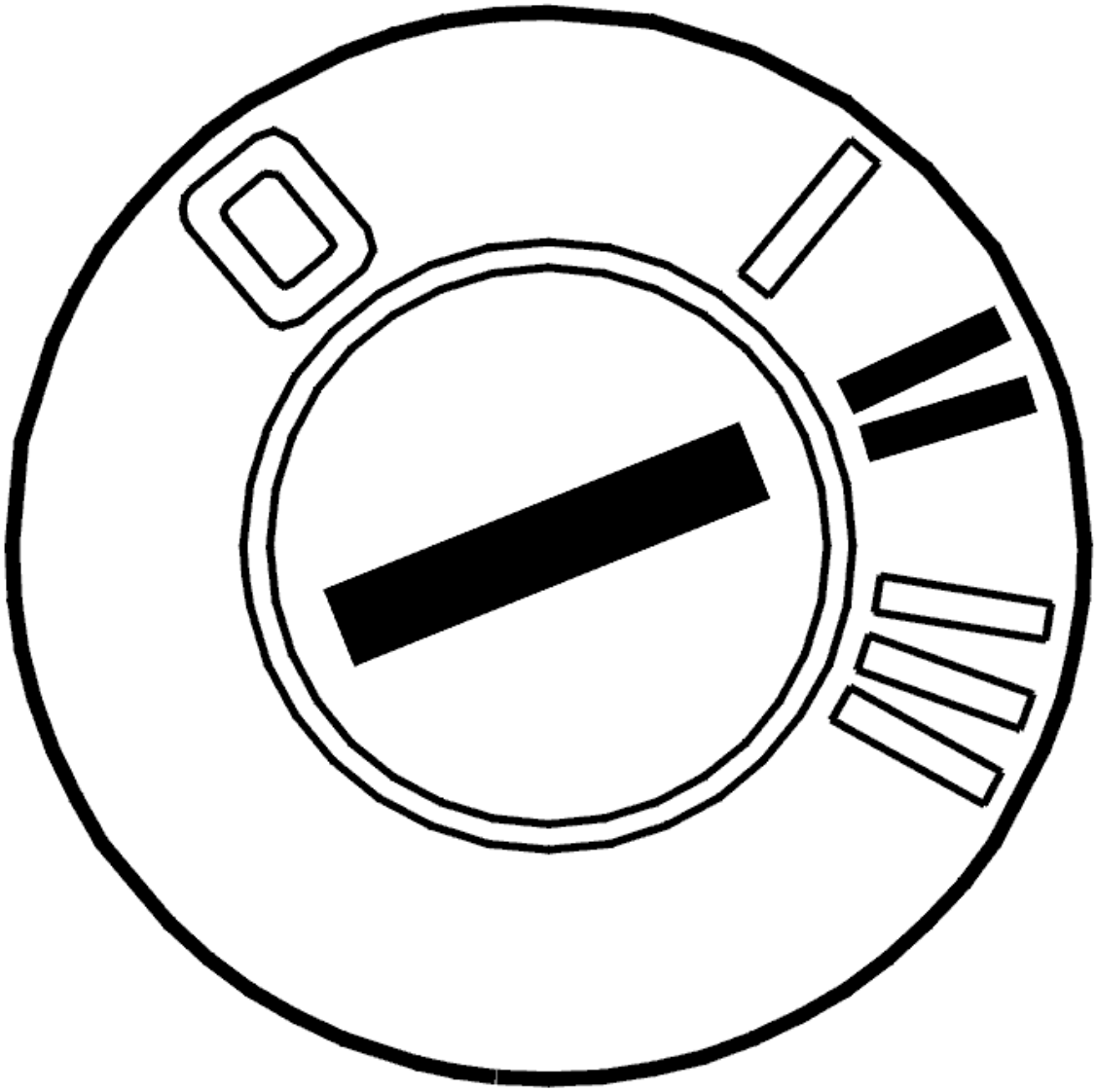


Fig. 451: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

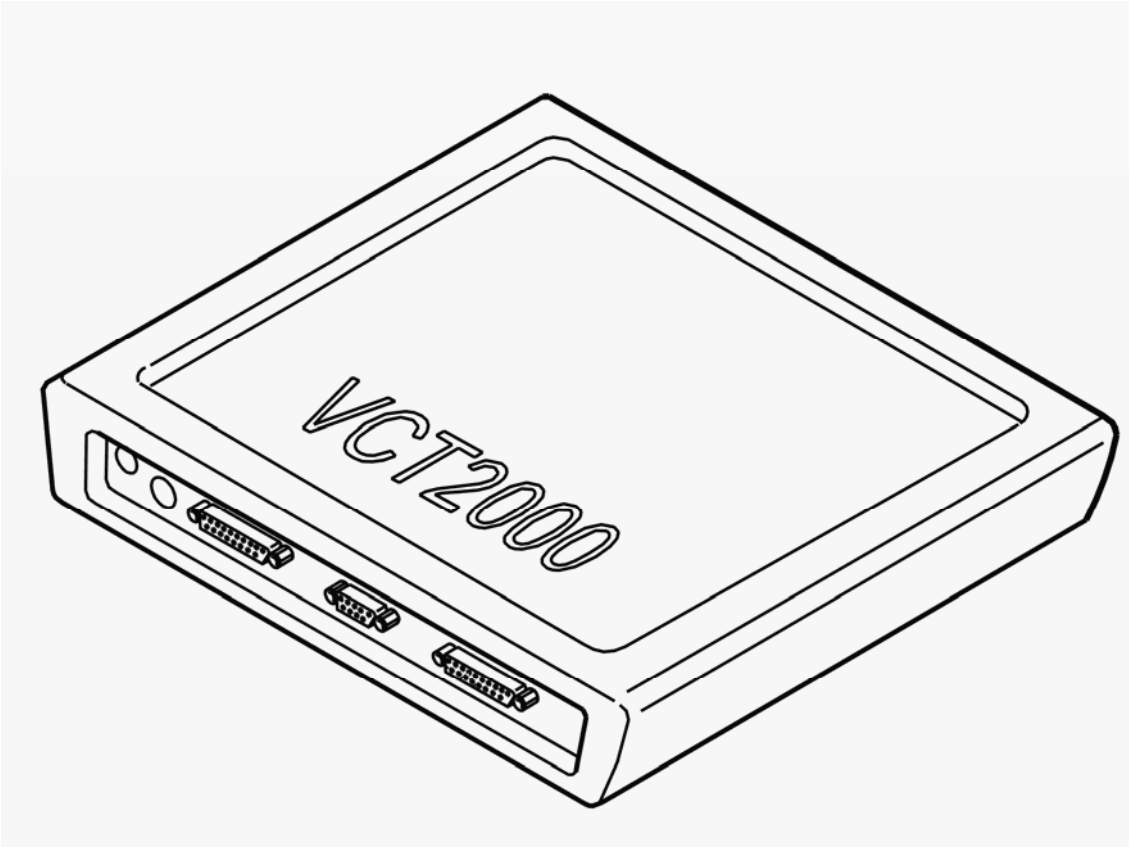


Fig. 452: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

TEST DRIVING

NOTE: **Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.**

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

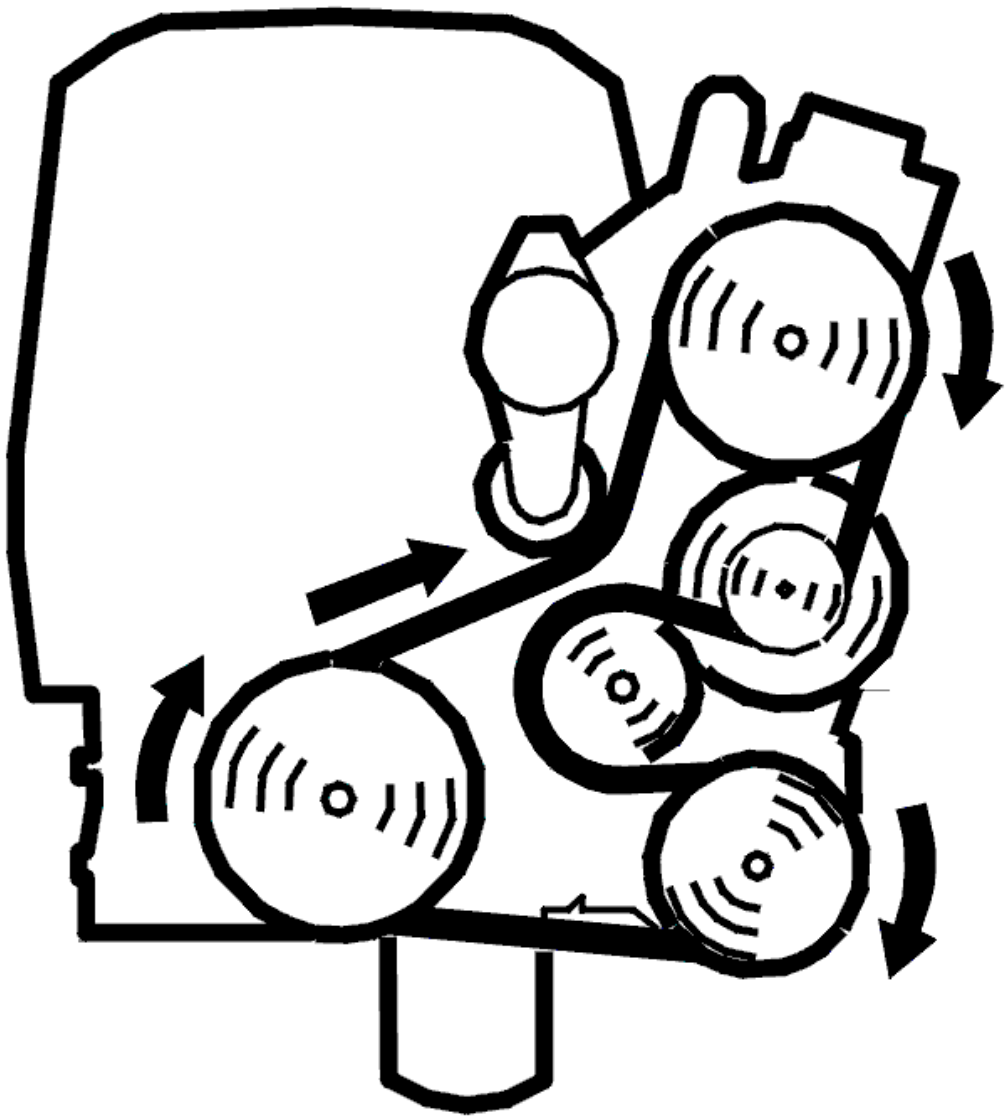


Fig. 453: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect the VIDA station. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission should be at operating temperature,

approximately 80-90°C.

Shift the gear selector to position D (for Geartronic transmissions, shift as usual up to third gear). Carefully accelerate to a speed slightly higher than 75 km/h. Maintain the same speed for at least 30 seconds.

HINT: The car must be driven at an engine speed where the lock-up function is normally activated.

Criteria for diagnostic trouble code (DTC):

- The transmission fluid temperature must exceed 30°C
- The engine must be running for at least 20 seconds
- Gear selector in position D, 3 or 2 (4T65EV).

  Gear selector in Geartronic position and gears 4, 3 or 2 (4T65EV-GT)

- Speed above 75 km/h for at least 5 seconds
- At least 5 seconds since the last gear shift
- Positive engine torque (no engine braking).

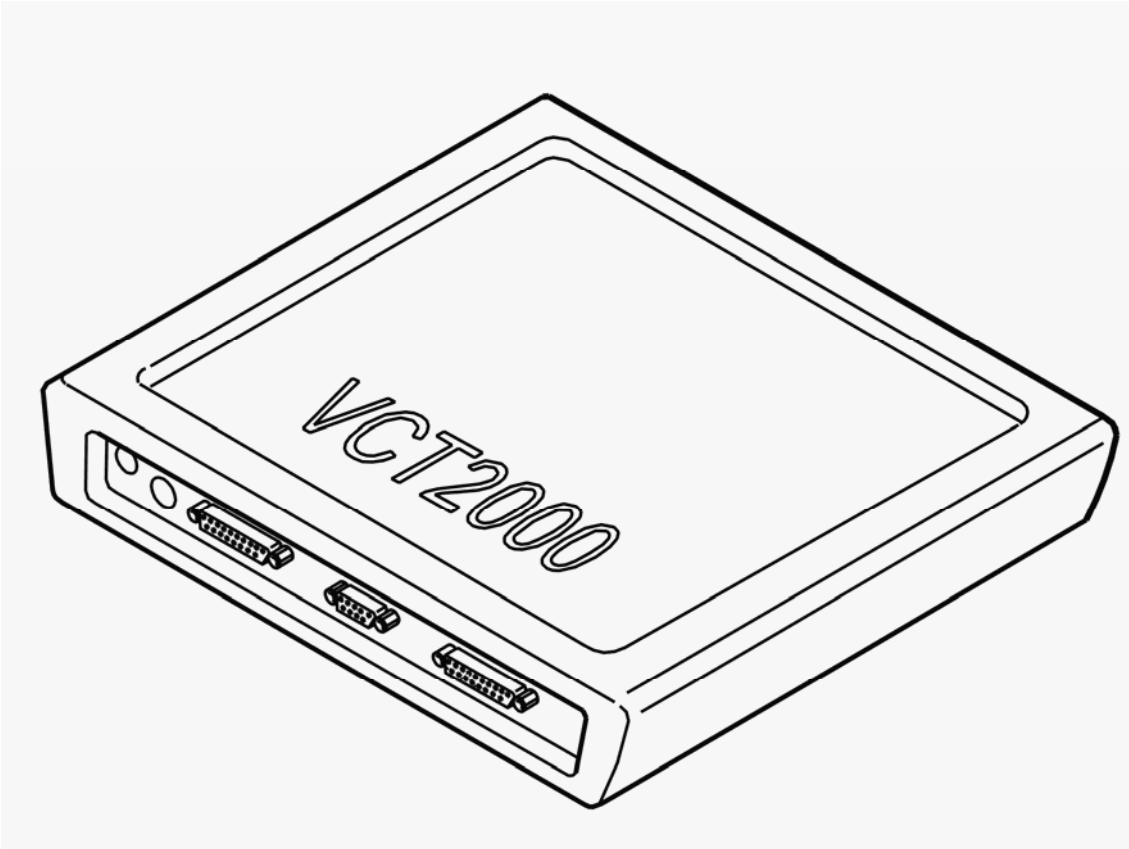


Fig. 454: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

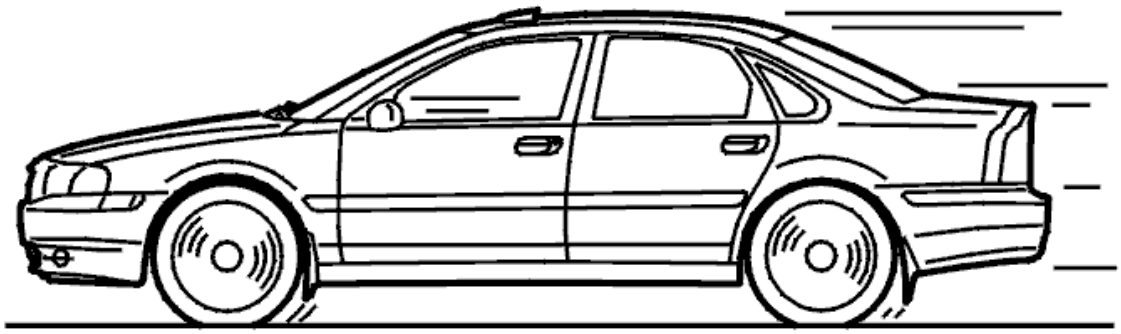


Fig. 455: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

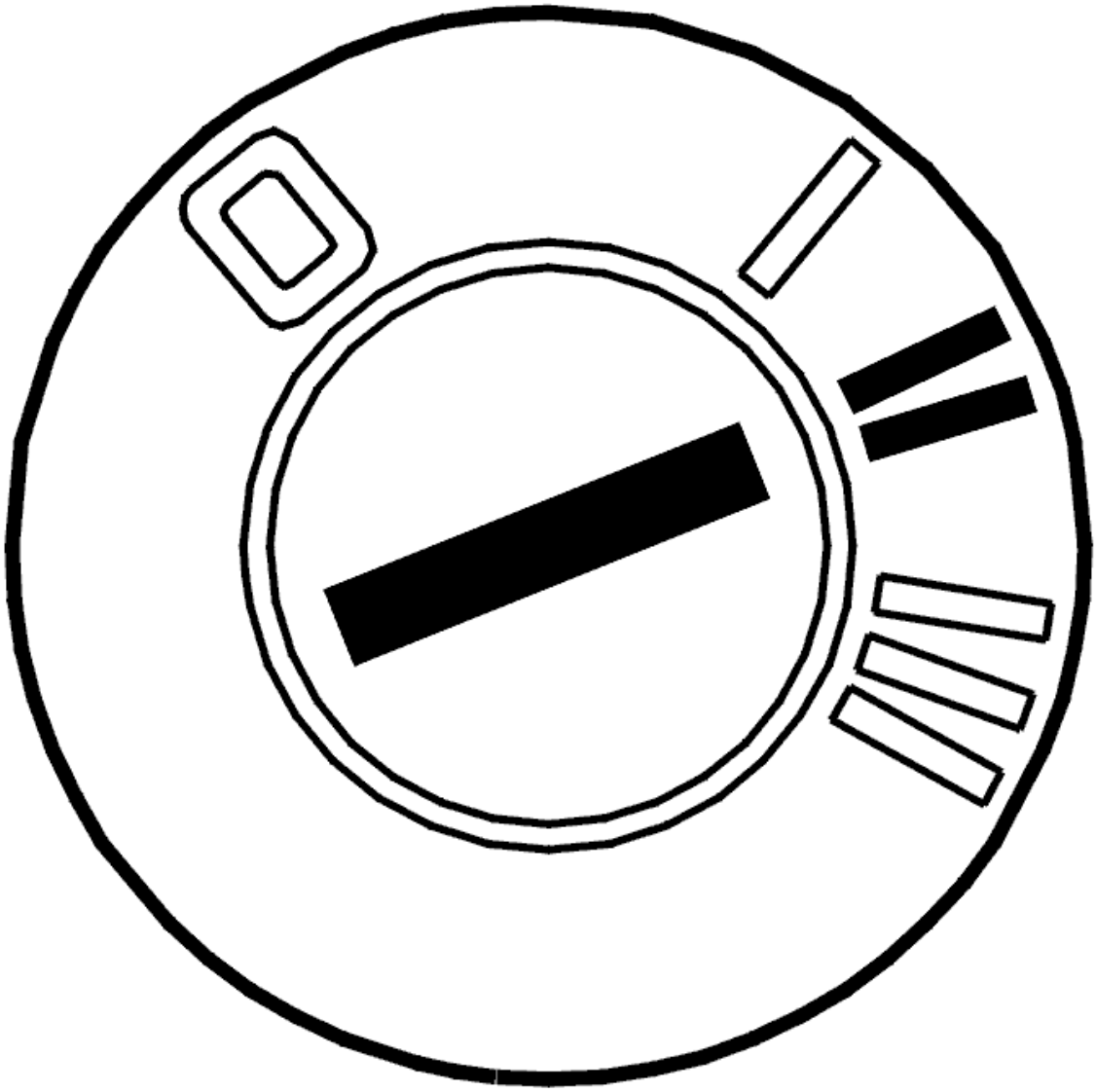


Fig. 456: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-0054 are stored, these must be fault-traced after this fault-tracing is completed.

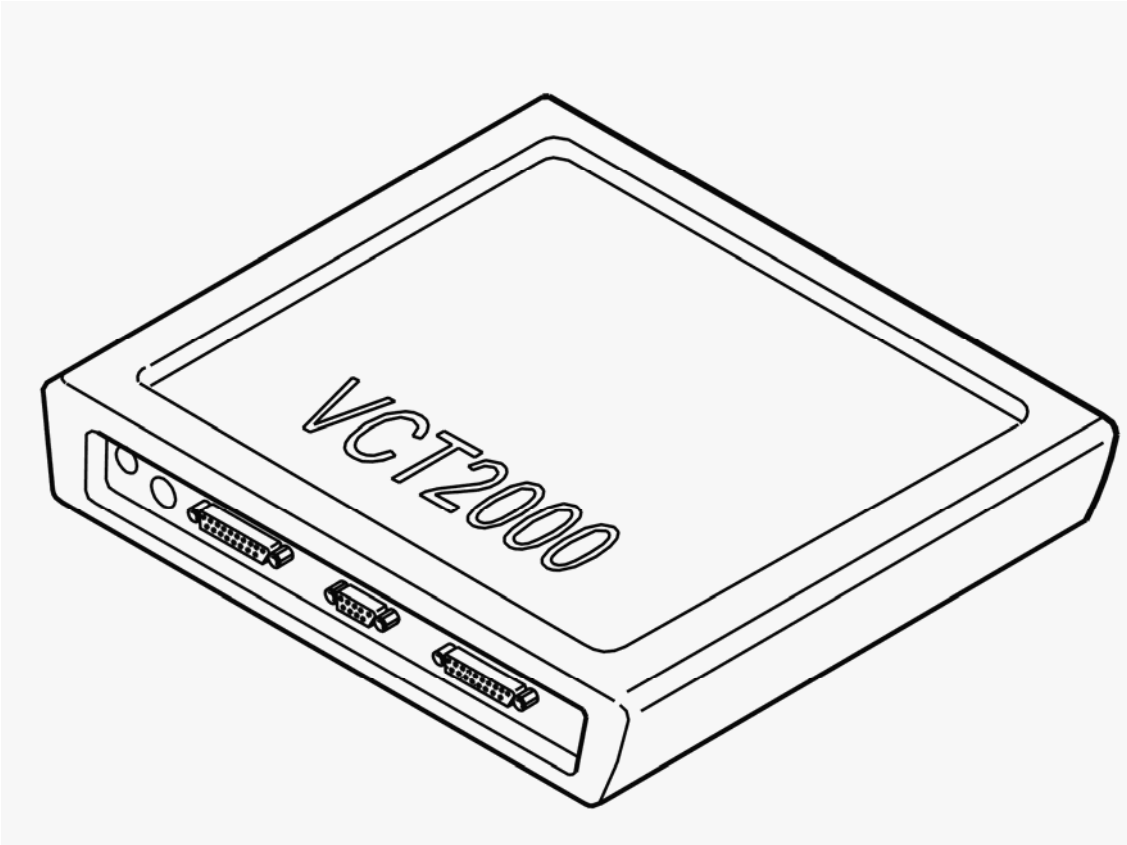


Fig. 457: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was diagnostic trouble code (DTC) TCM-0054 stored?

- **YES**

  Refer to **CHECKING THE COMPONENT**

- **NO**

  Refer to **FAULT-TRACING INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect

circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

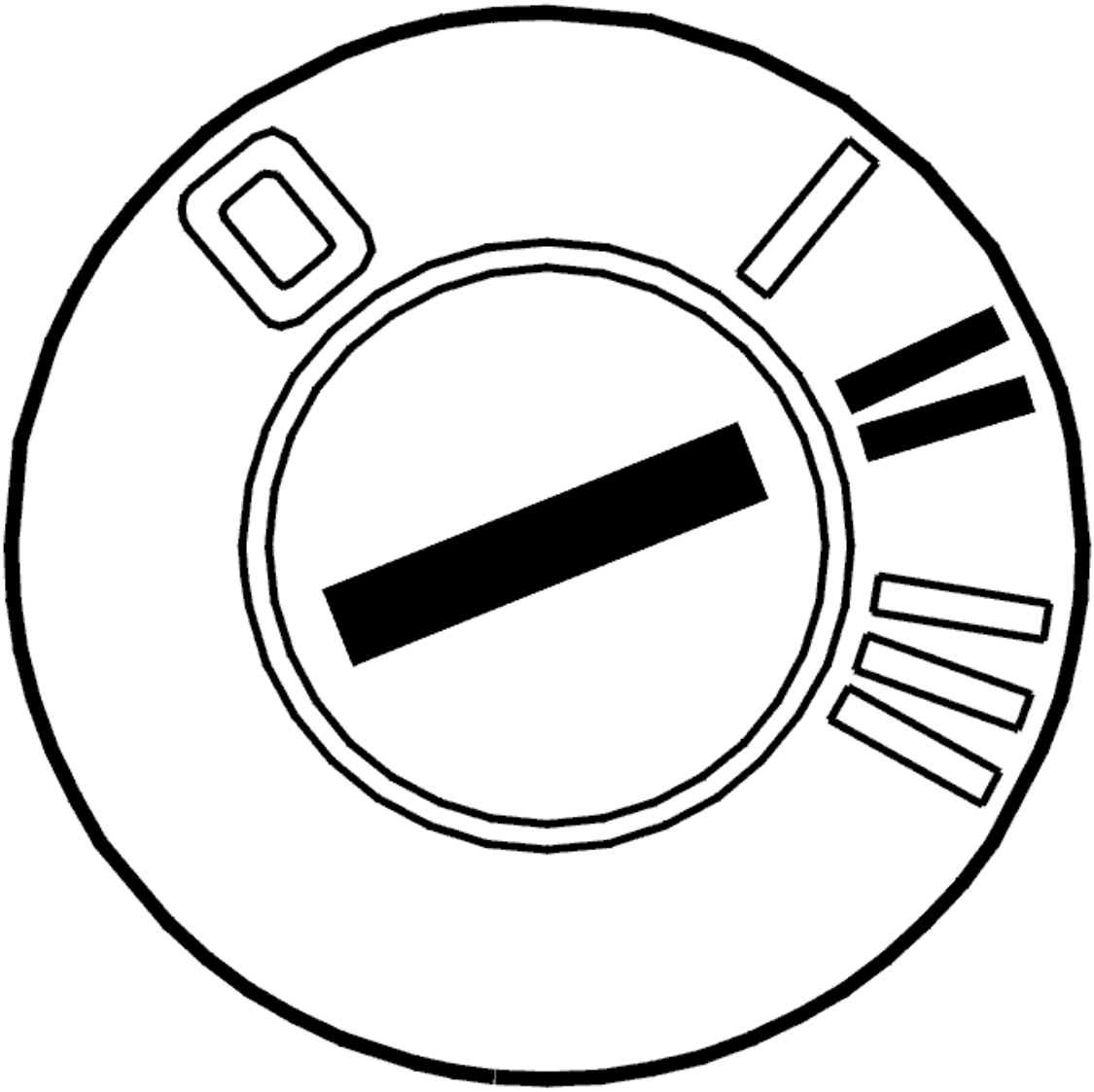


Fig. 458: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

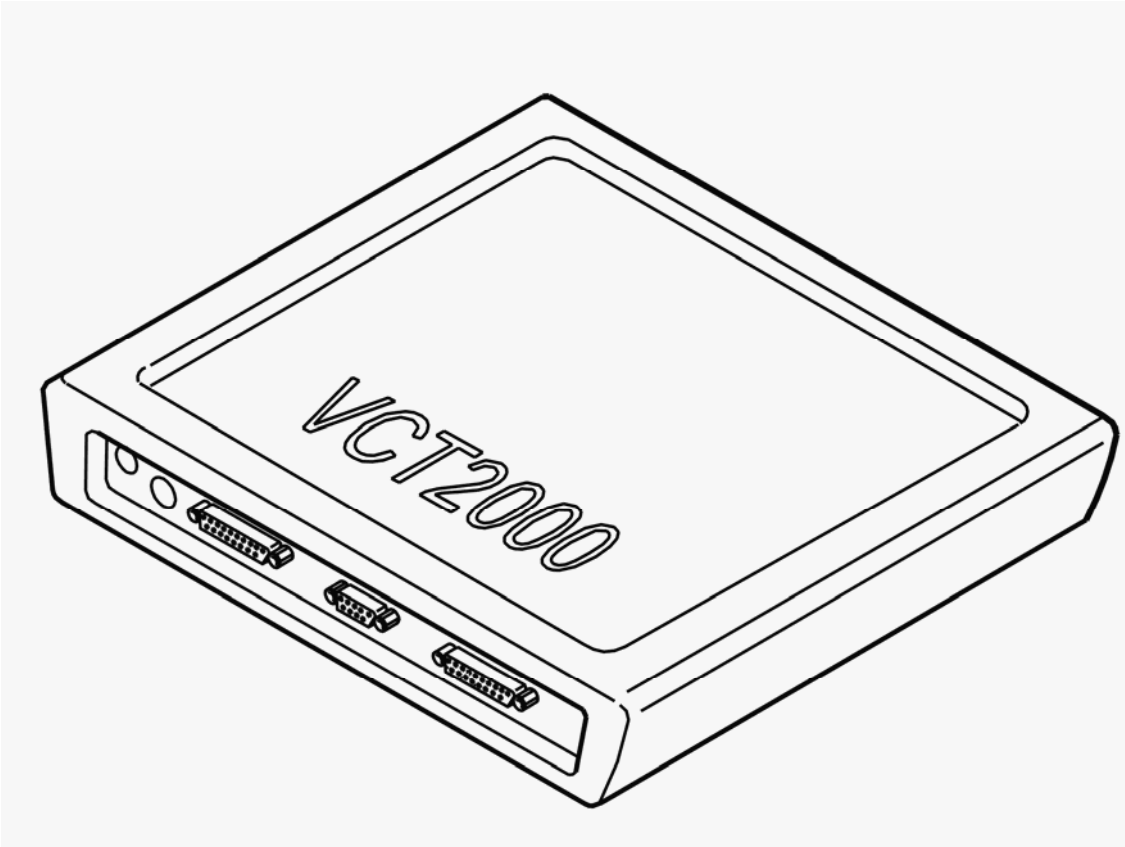


Fig. 459: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

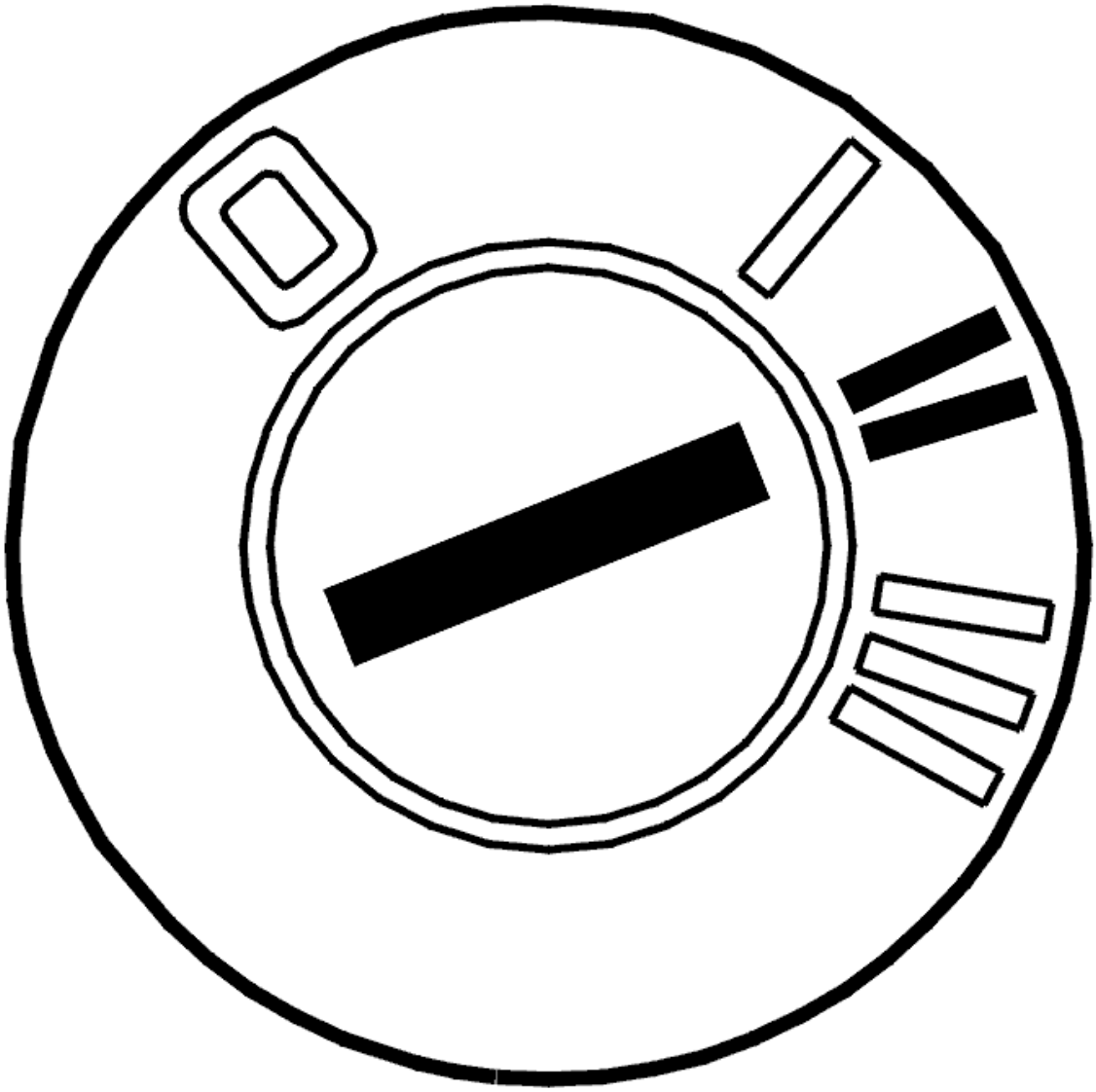


Fig. 460: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes to allow time for the diagnostic trouble codes (DTCs) to be stored in the control module memory
- Ignition on
- Erase diagnostic trouble codes (DTCs).

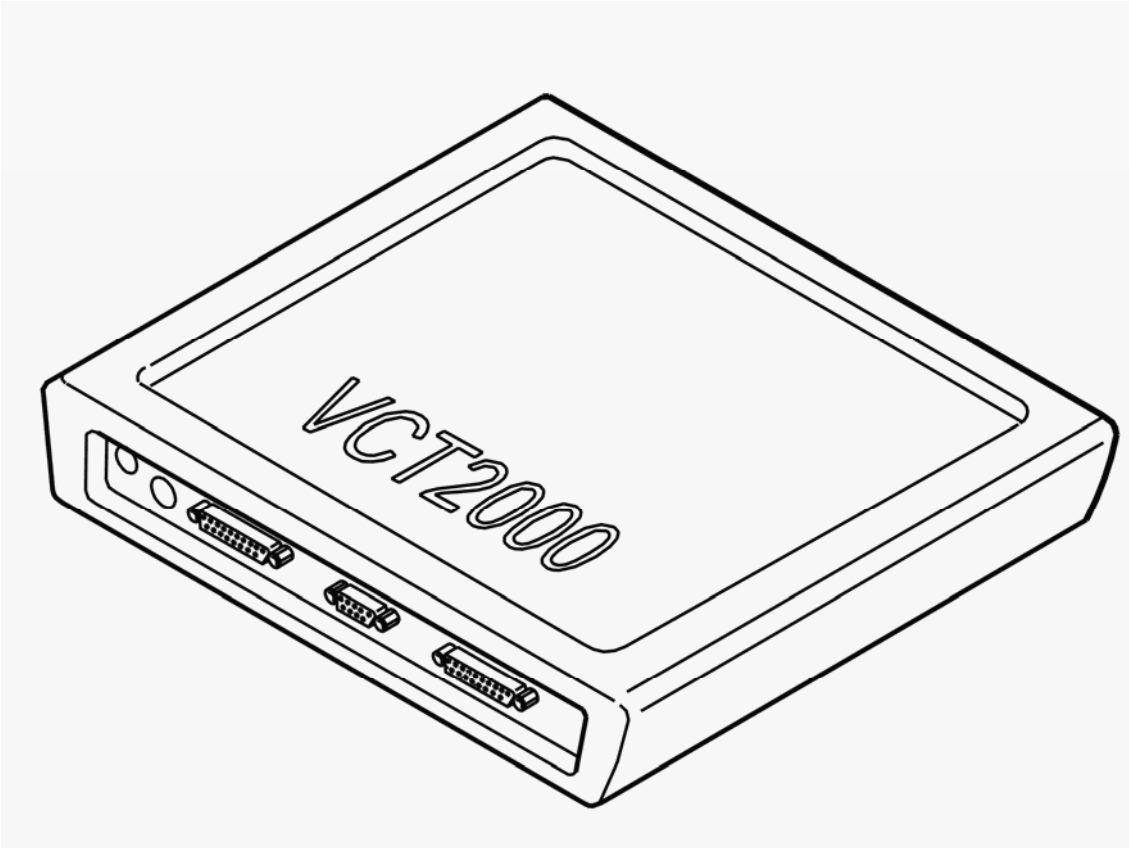


Fig. 461: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

TEST DRIVING

NOTE: **Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.**

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

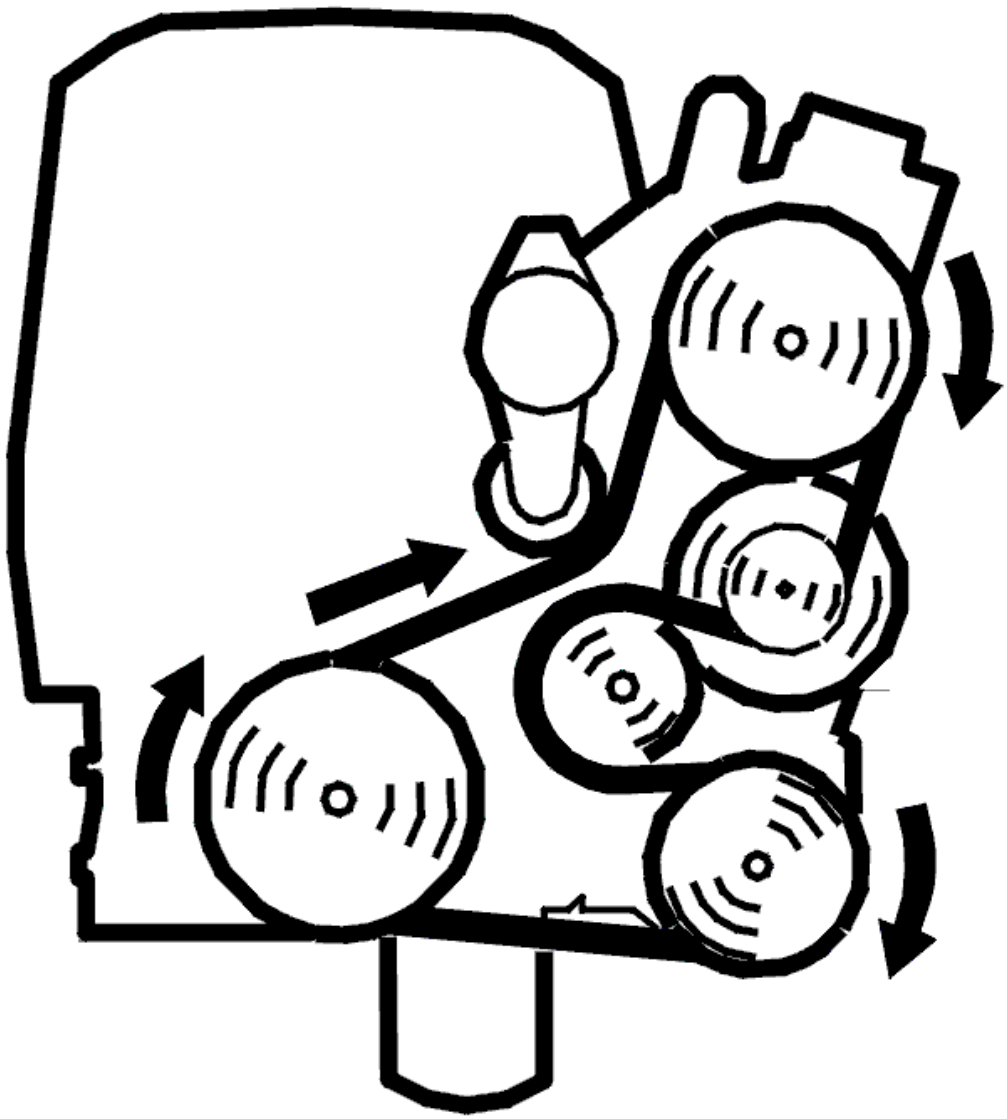


Fig. 462: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect the VIDA station. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission should be at operating temperature,

approximately 80-90°C.

Shift the gear selector to position D (for Geartronic transmissions, shift as usual up to third gear). Carefully accelerate to a speed slightly higher than 75 km/h. Maintain the same speed for at least 30 seconds.

HINT: The car must be driven at an engine speed where the lock-up function is normally activated.

Criteria for diagnostic trouble code (DTC):

- The transmission fluid temperature must exceed 30°C
- The engine must be running for at least 20 seconds
- Gear selector in position D, 3 or 2 (4T65EV).

  Gear selector in Geartronic position and gears 4, 3 or 2 (4T65EV-GT)

- Speed above 75 km/h for at least 5 seconds
- At least 5 seconds since the last gear shift
- Positive engine torque (no engine braking).

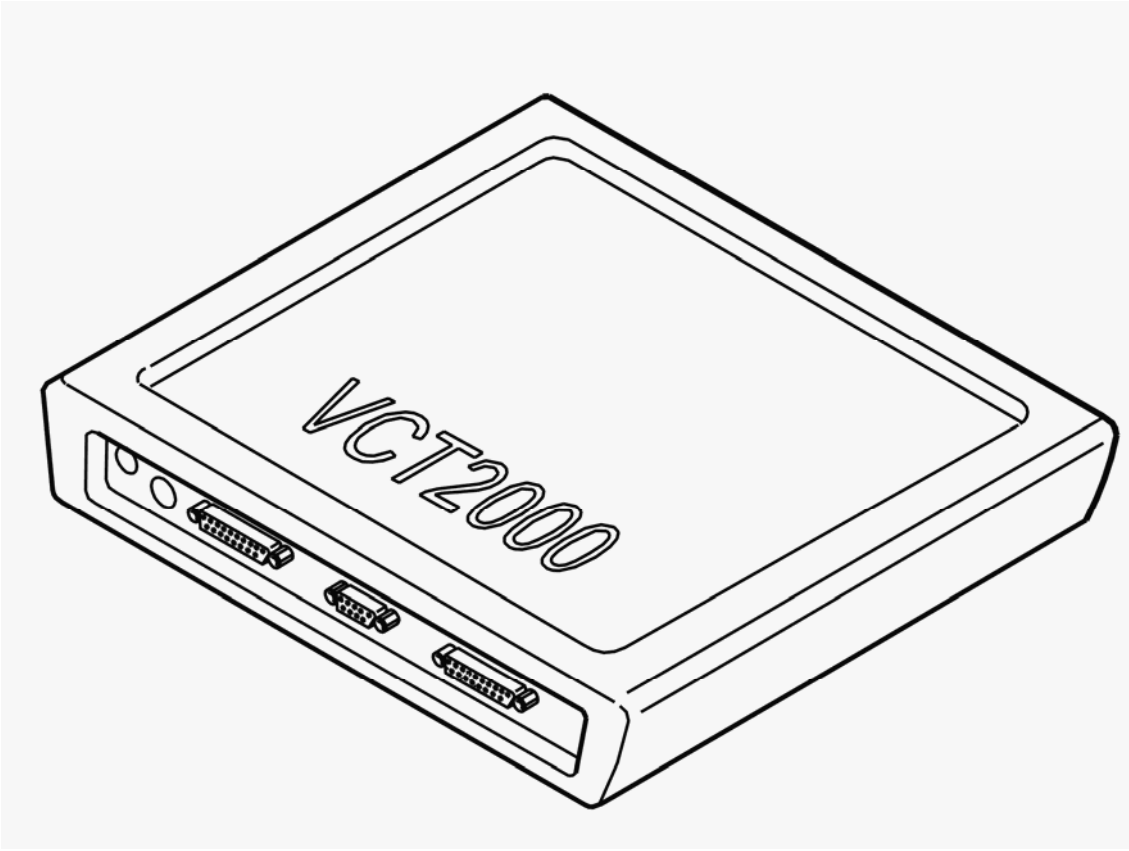


Fig. 463: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

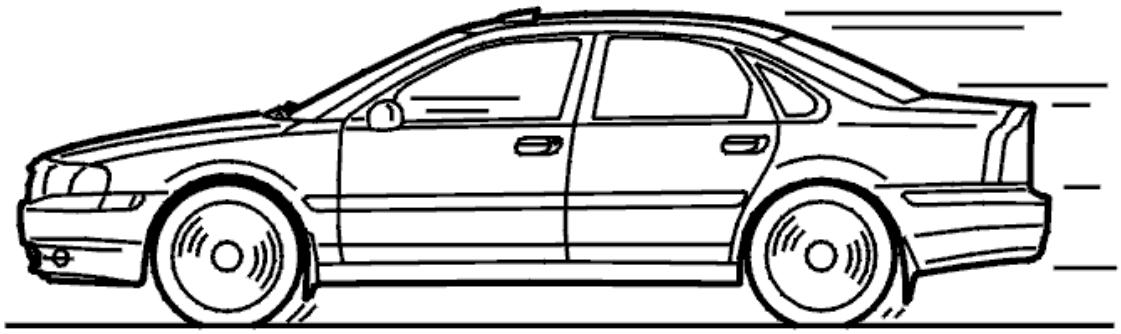


Fig. 464: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

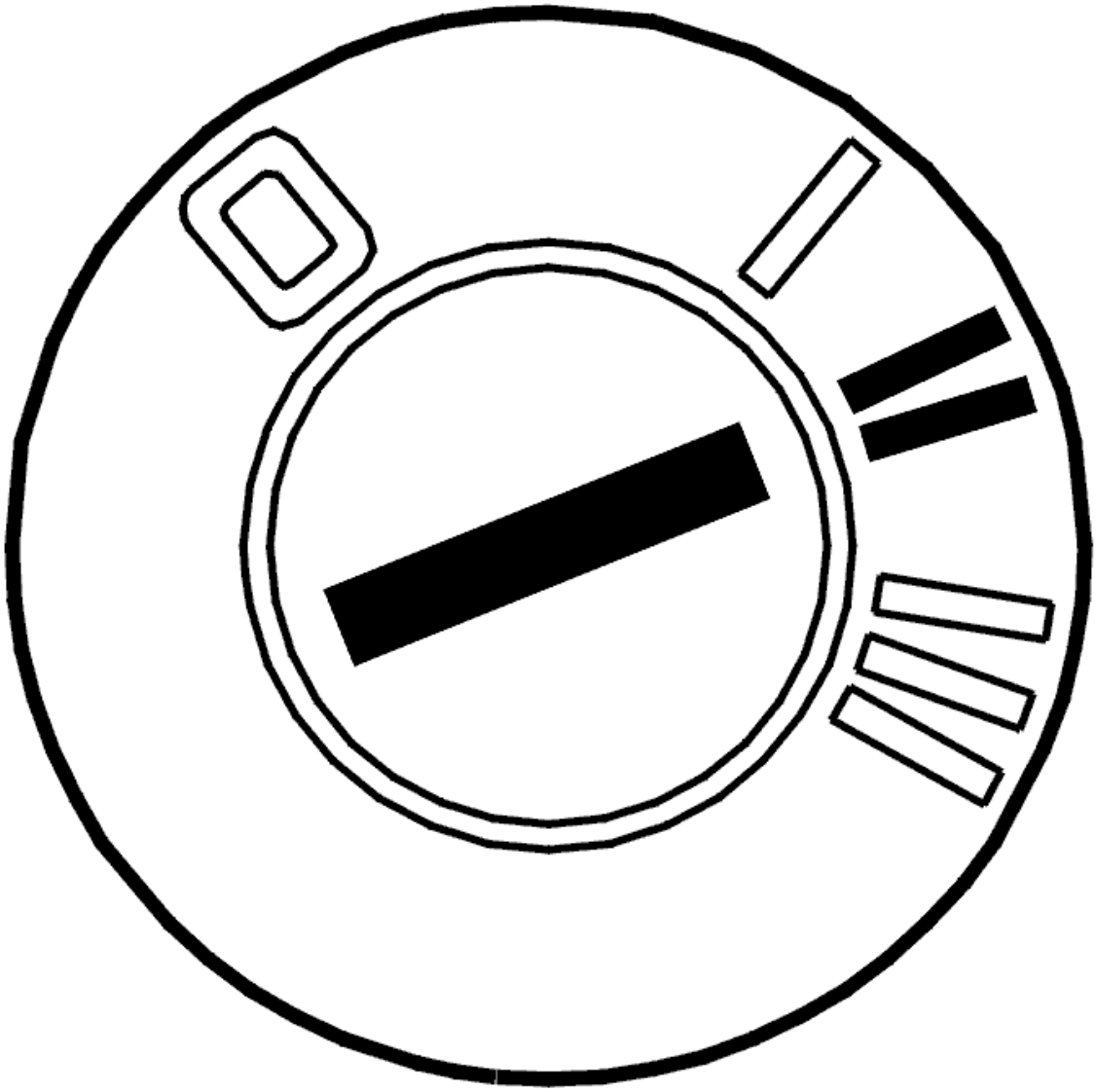


Fig. 465: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If any other diagnostic trouble codes (DTCs) than TCM-0054 are stored, these must be fault-traced after this fault-tracing is completed.

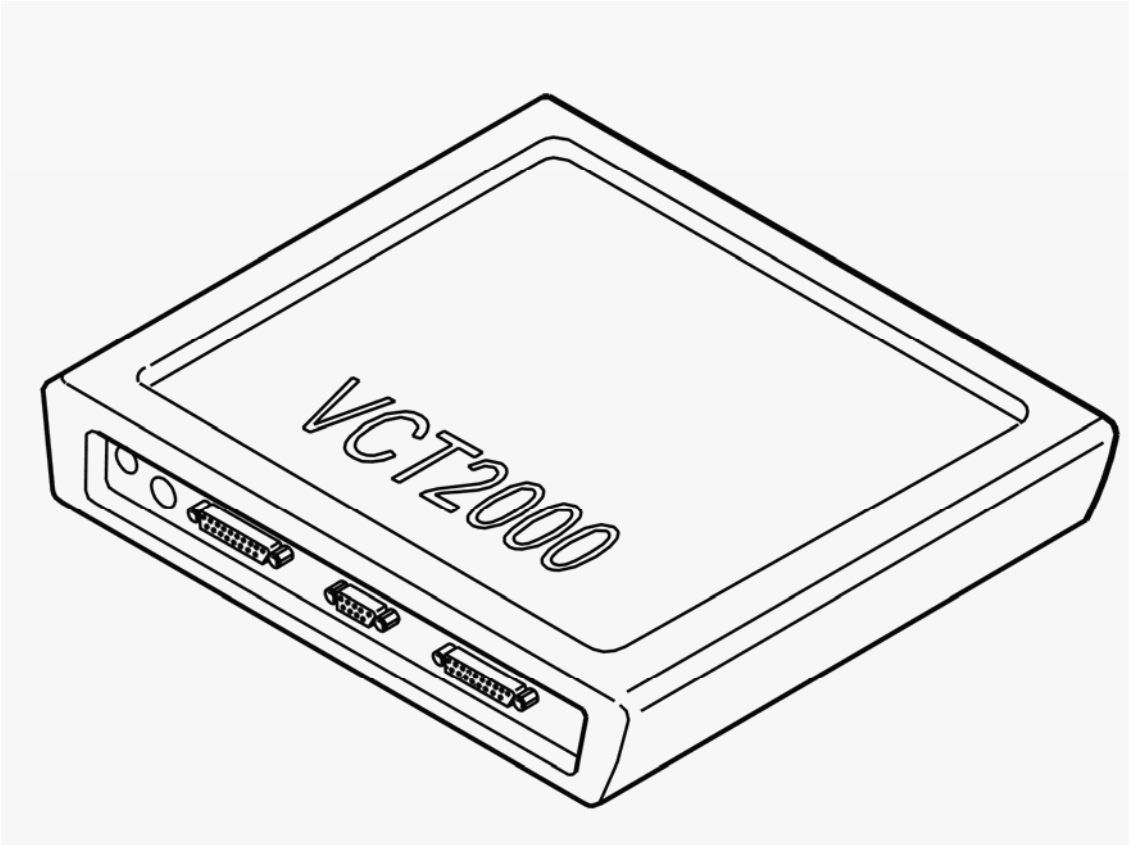


Fig. 466: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was diagnostic trouble code (DTC) TCM-0054 stored?

- **YES**

  Refer to **INFORMATION**

- **NO**

  NO DTC

TCM-0060: CONTROL UNIT. INTERNAL FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble code (DTC) TCM-0060 is stored if the control module registers an internal fault in the power stage circuit for solenoids S1, S2, S3, S4 or S5.

Substitute Value

- The transmission control module (TCM) Emergency mode III program has been initiated.

Possible Source

- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

HINT: Harsh gear shifting can be caused by:

- no reduction of line pressure when shifting
- no reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D
- no torque limiting request to engine control module (ECM) when shifting

HINT:

HINT: No shifting - because the transmission control module (TCM) prevents activation of the solenoids. This stops gear-shifting.

INTERNAL FAULT

CHECKING SHIFT SOLENOIDS

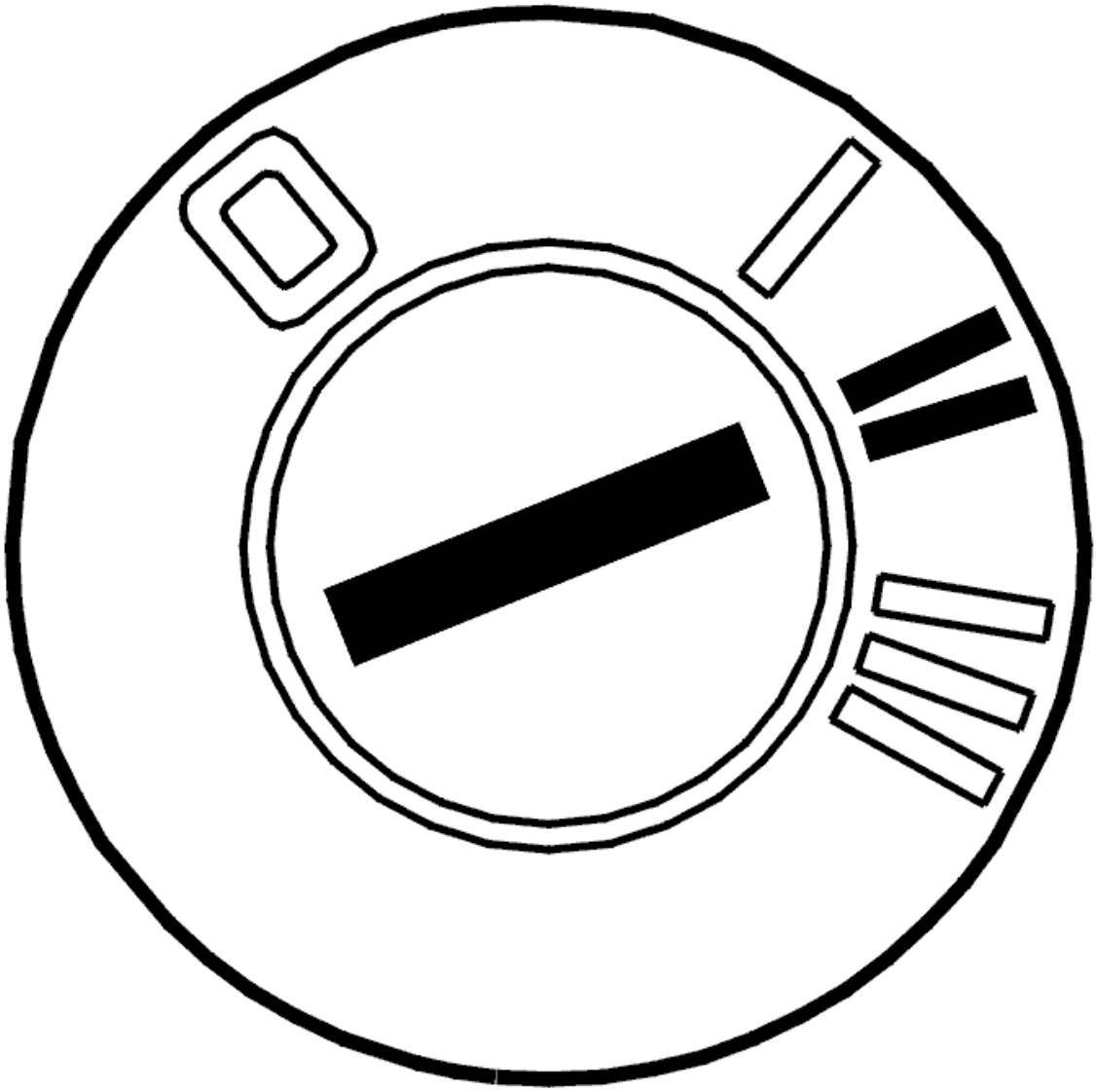


Fig. 467: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P.
- Activate shift solenoids S1 and S2 individually.

  The status should switch between OFF and ON.

  If the status does not change, it indicates that there is an internal fault in the transmission control module (TCM).

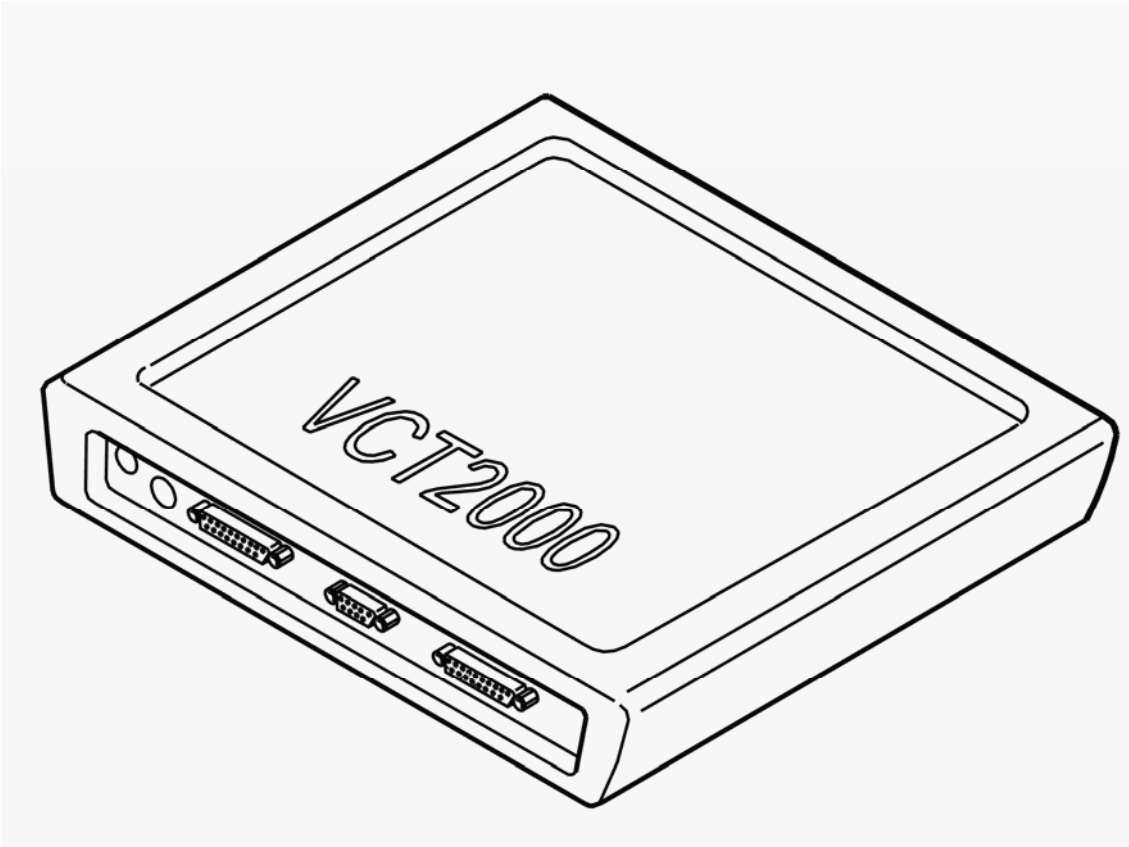


Fig. 468: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does solenoid status switch?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **TRANSMISSION CONTROL MODULE (TCM) REPLACEMENT AND PROGRAMMING**

TRANSMISSION CONTROL MODULE (TCM) REPLACEMENT AND PROGRAMMING

The control module has registered an internal fault.

CAUTION: A new control module is delivered without software. The control module must be programmed in order to function after replacement.

Other information:

- see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**

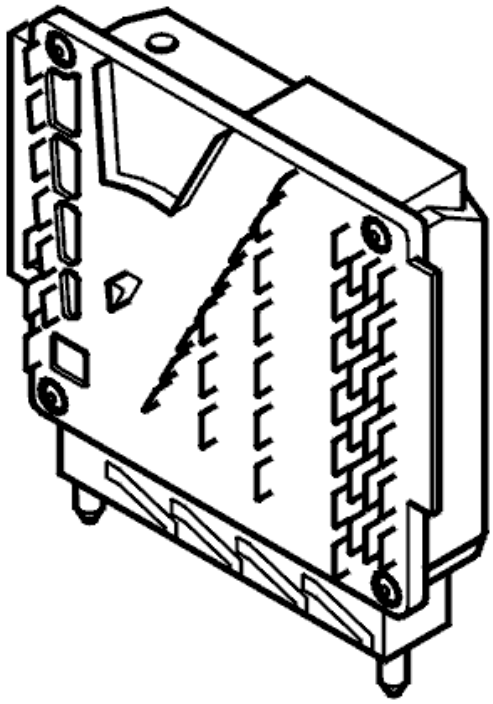


Fig. 469: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

In case of this defect, troubleshooting is not followed by verification.

The information can be displayed again or the fault-tracing for this fault can be interrupted.

TCM-0060: CONTROL UNIT. INTERNAL FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

INTERNAL FAULT

CHECKING SHIFT SOLENOIDS

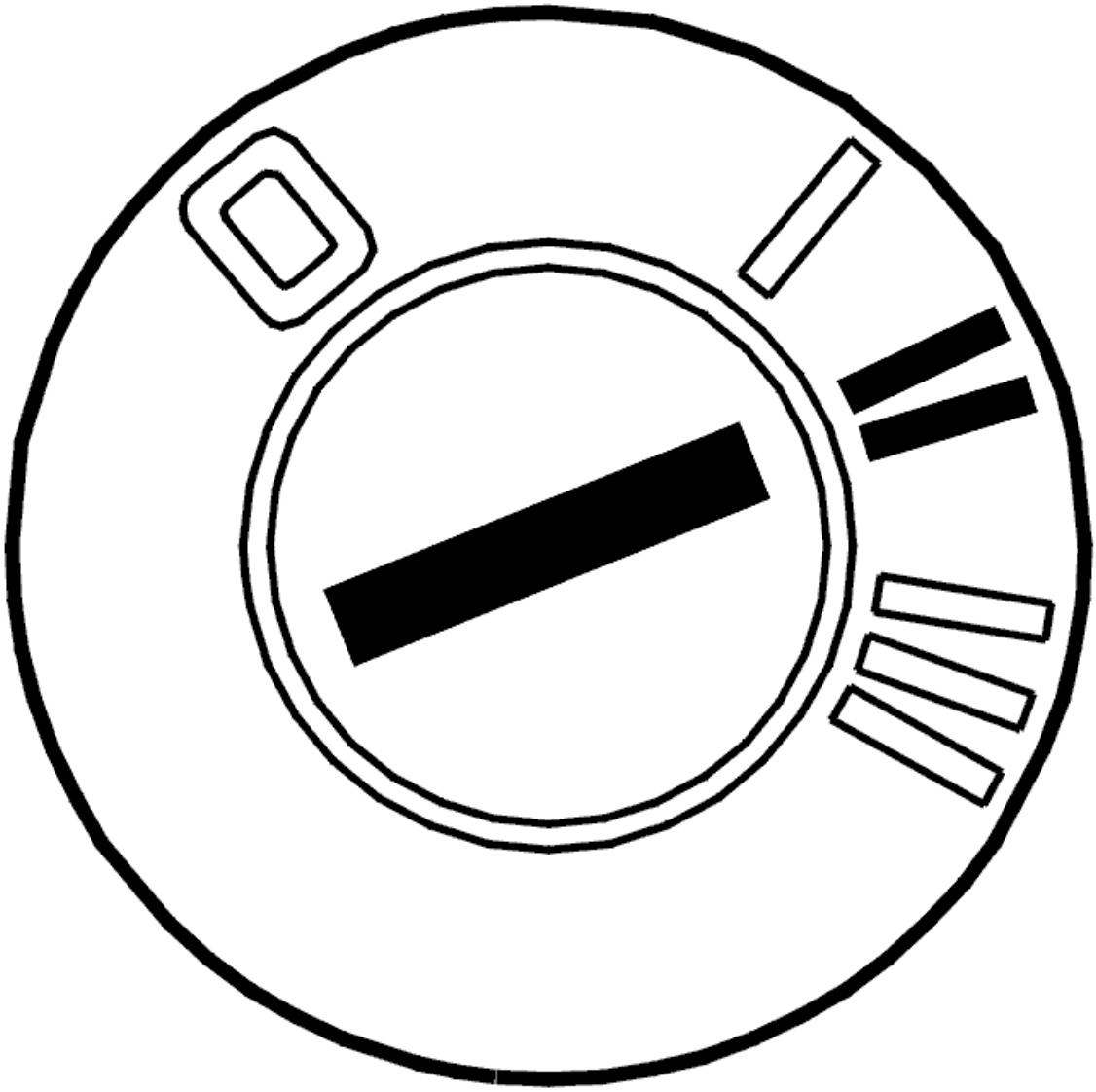


Fig. 470: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P.
- Activate shift solenoids S1, S2, S3, S4 and S5 individually.

  The status should switch between OFF and ON.

  If the status does not change, it indicates that there is an internal fault in the transmission control module (TCM).

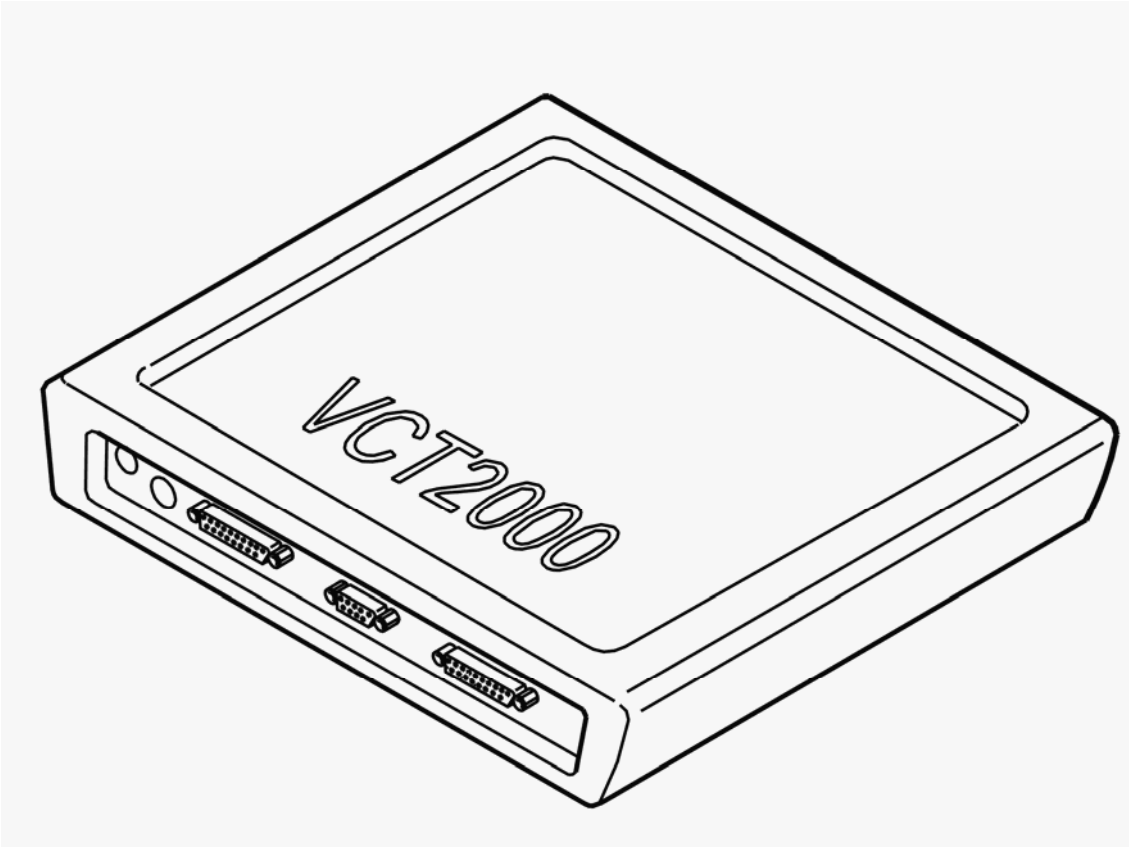


Fig. 471: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does solenoid status switch?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **TRANSMISSION CONTROL MODULE (TCM) REPLACEMENT AND PROGRAMMING**

TRANSMISSION CONTROL MODULE (TCM) REPLACEMENT AND PROGRAMMING

The control module has registered an internal fault.

CAUTION: A new control module is delivered without software. The control module must be programmed in order to function after replacement.

Other information:

- see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**

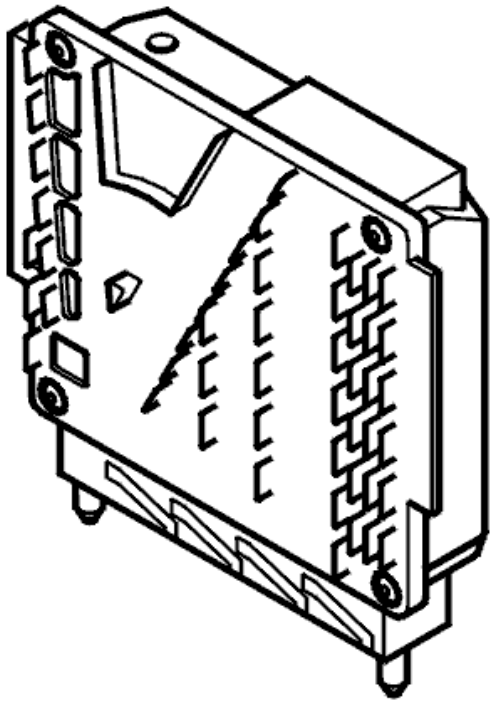


Fig. 472: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

In case of this defect, troubleshooting is not followed by verification.

The information can be displayed again or the fault-tracing for this fault can be interrupted.

TCM-0061: CONTROL UNIT. INTERNAL FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble code (DTC) TCM-0061 is stored if the control module registers an internal fault in the power stage circuit for solenoid STH.

Substitute Value

- Transmission control module (TCM) "Limp Home" program initiated.

Possible Source

- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

HINT: Harsh gear shifting can be caused by:

- no reduction of line pressure when shifting
- no reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D
- no torque limiting request to engine control module (ECM) when shifting

HINT:

HINT: No shifting - because the transmission control module (TCM) prevents activation of the solenoids. This stops gear-shifting.

INTERNAL FAULT

CHECKING SHIFT SOLENOIDS

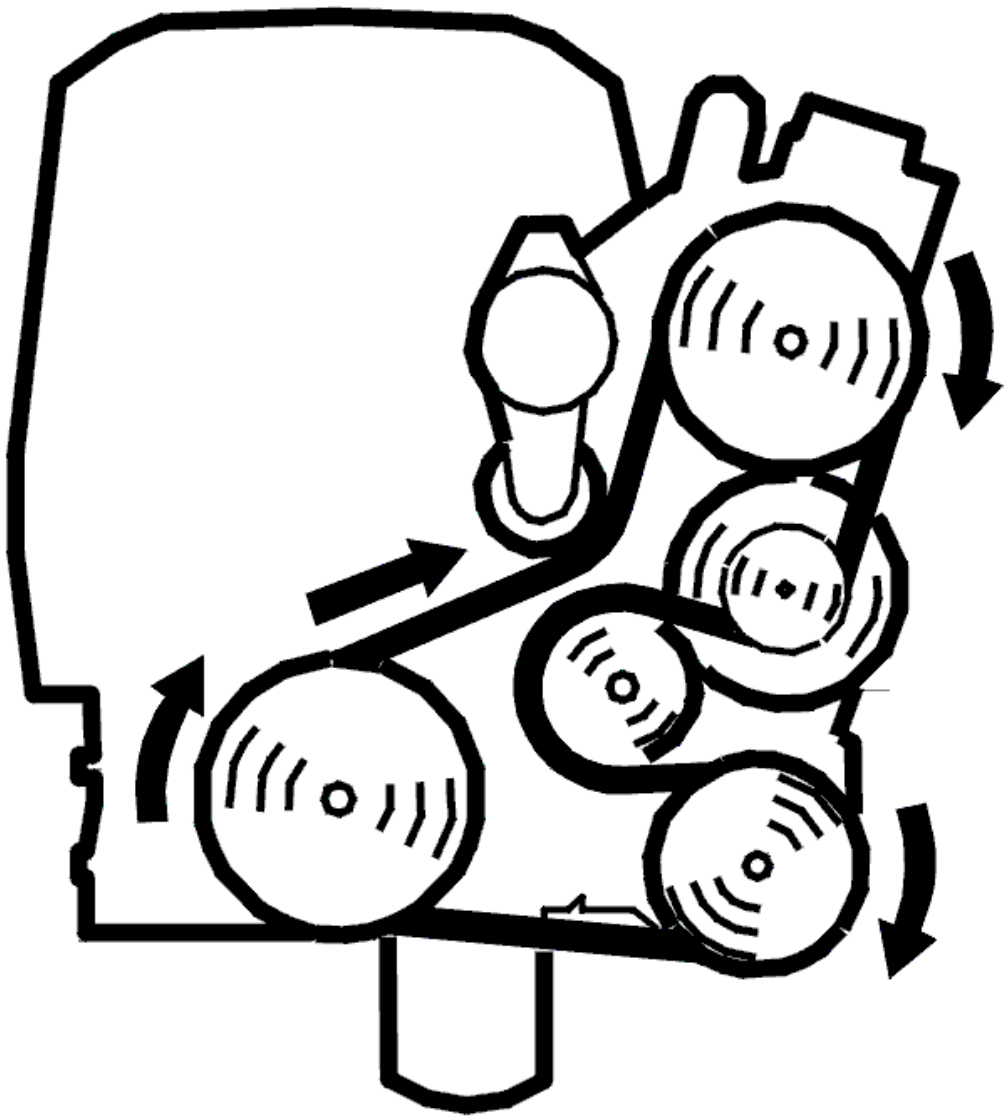


Fig. 473: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine.
- Gear selector in position P.
- Read off the current through the line pressure solenoid STH.
- Depress the accelerator pedal (AP) slowly.

  The current should decrease as the accelerator pedal (AP) is depressed.

  If current does not decrease, it indicates that there is an internal fault in the transmission control module (TCM).

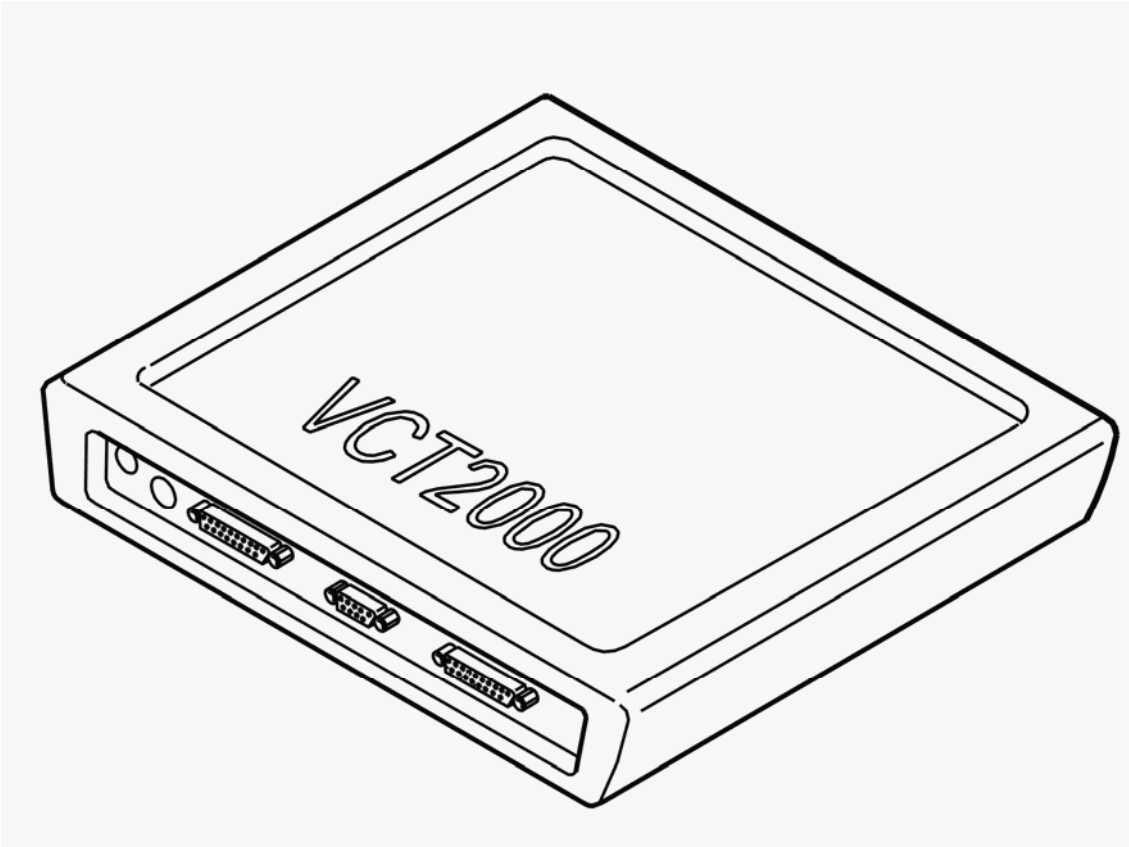


Fig. 474: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current decrease?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **TRANSMISSION CONTROL MODULE (TCM) REPLACEMENT AND PROGRAMMING**

TRANSMISSION CONTROL MODULE (TCM) REPLACEMENT AND PROGRAMMING

The control module has registered an internal fault.

CAUTION: A new control module is delivered without software. The control module must be programmed in order to function after replacement.

Other information:

- see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**

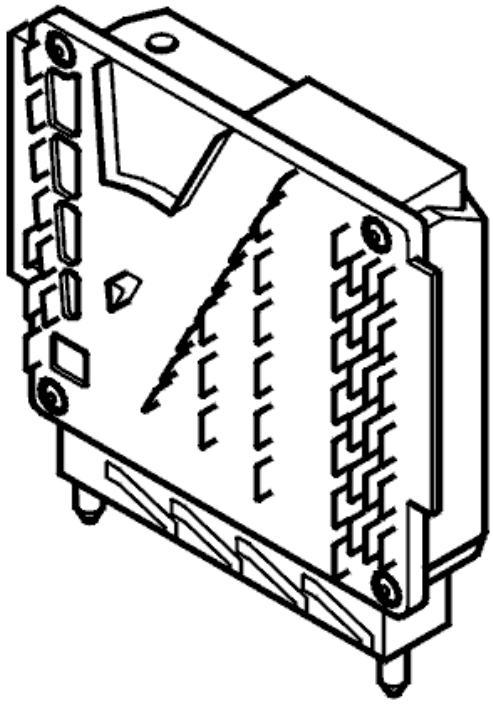


Fig. 475: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

In case of this defect, troubleshooting is not followed by verification.

The information can be displayed again or the fault-tracing for this fault can be interrupted.

TCM-0062: CONTROL UNIT. INTERNAL FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble code (DTC) TCM-0062 is stored if the control module registers an internal fault in the power stage circuit for solenoid SL.

Substitute Value

- Transmission control module (TCM) "Limp Home" program initiated.

Possible Source

- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

HINT: Harsh gear shifting can be caused by:

- no reduction of line pressure when shifting
- no reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D
- no torque limiting request to engine control module (ECM) when shifting

HINT:

HINT: No shifting - because the transmission control module (TCM) prevents activation of the solenoids. This stops gear-shifting.

INTERNAL FAULT

CHECKING LOCK-UP SOLENOID SL

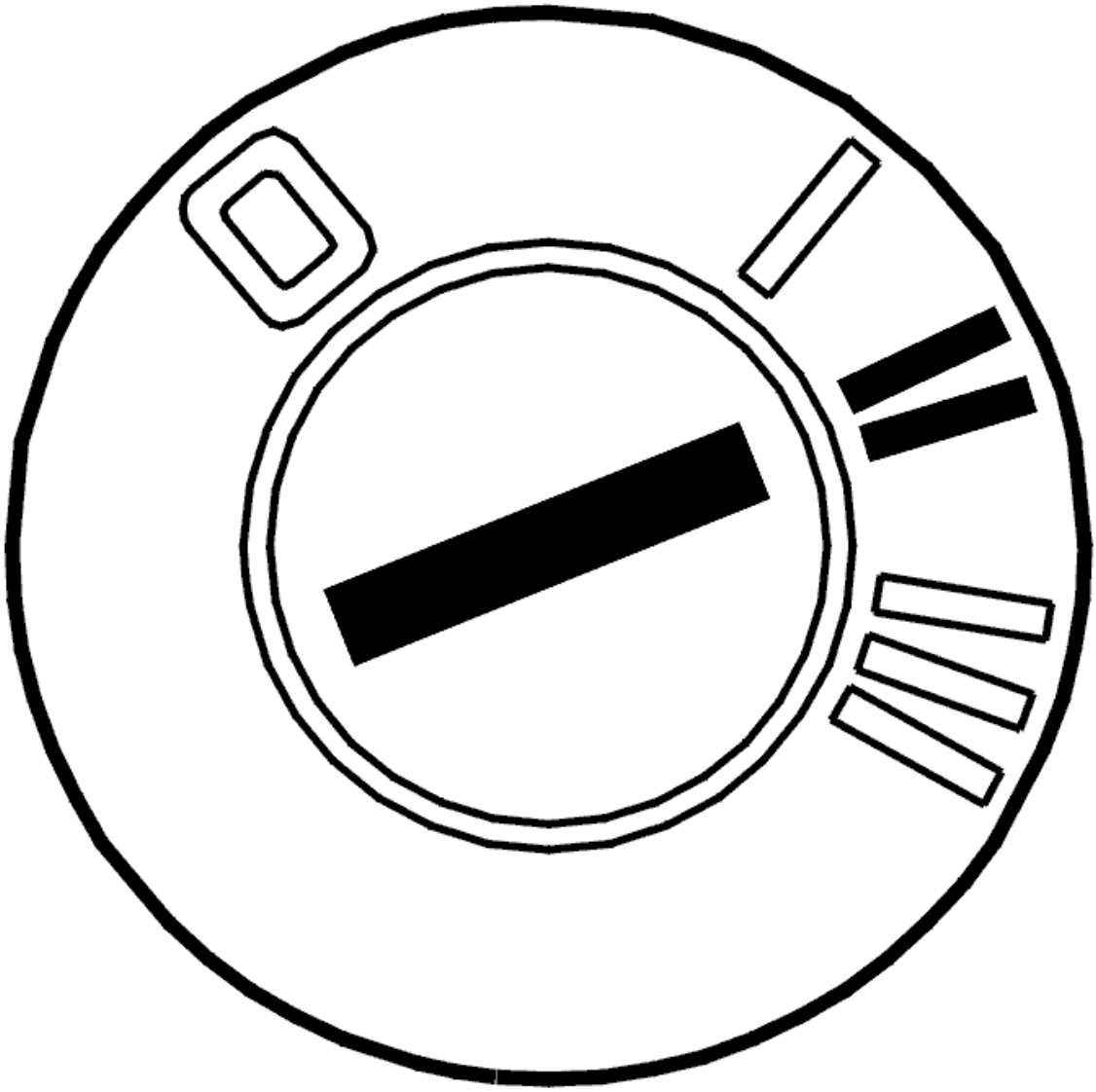


Fig. 476: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P.
- Activate the lock-up solenoid SL.

  The status should switch between OFF and ON.

  If the status does not change, it indicates that there is an internal fault in the transmission control module (TCM).

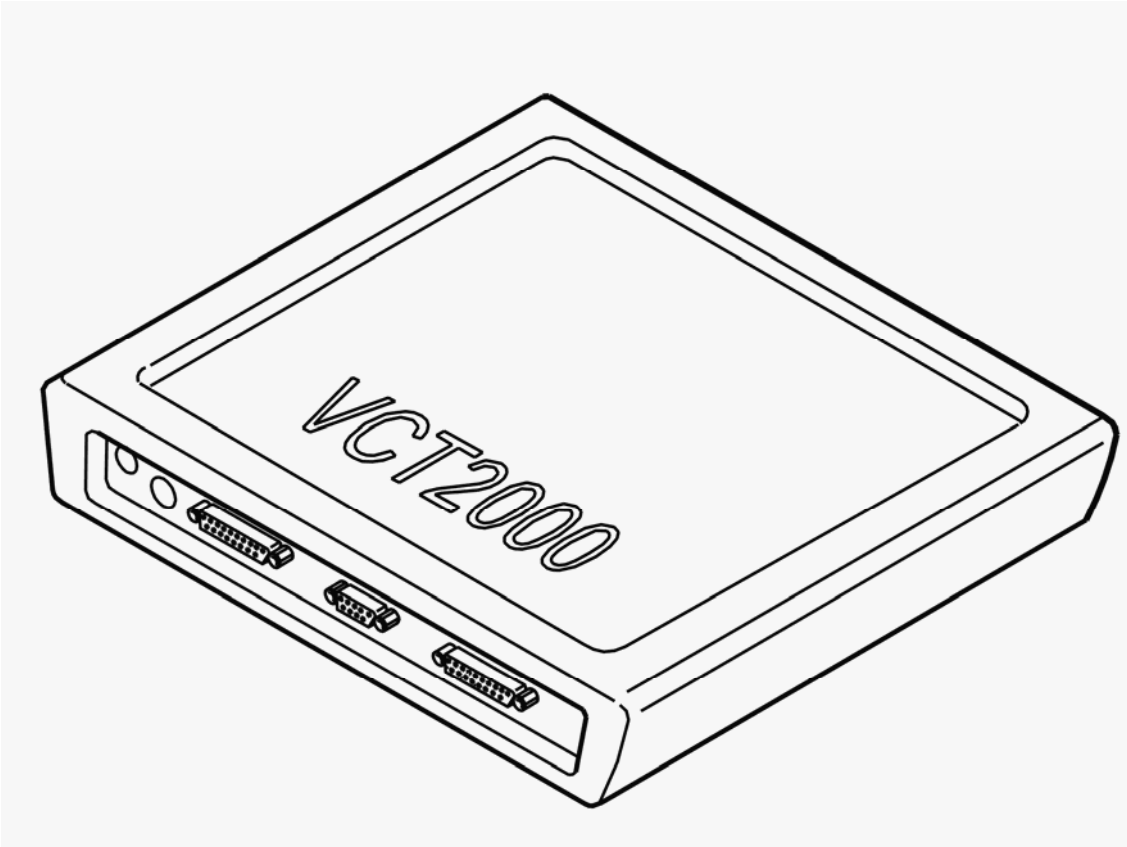


Fig. 477: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the status change?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **TRANSMISSION CONTROL MODULE (TCM) REPLACEMENT AND PROGRAMMING**

TRANSMISSION CONTROL MODULE (TCM) REPLACEMENT AND PROGRAMMING

The control module has registered an internal fault.

CAUTION: A new control module is delivered without software. The control module must be programmed in order to function after replacement.

Other information:

- see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**

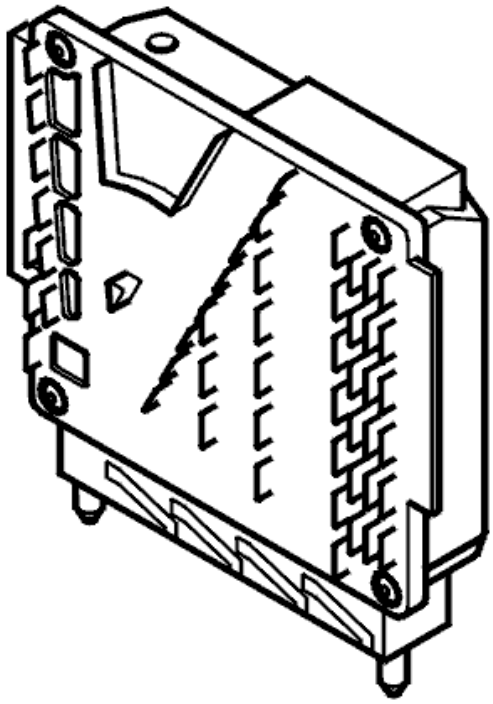


Fig. 478: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

In case of this defect, troubleshooting is not followed by verification.

The information can be displayed again or the fault-tracing for this fault can be interrupted.

TCM-0081: TRANSMISSION OUTPUT SPEED SENSOR. SIGNAL TOO HIGH (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

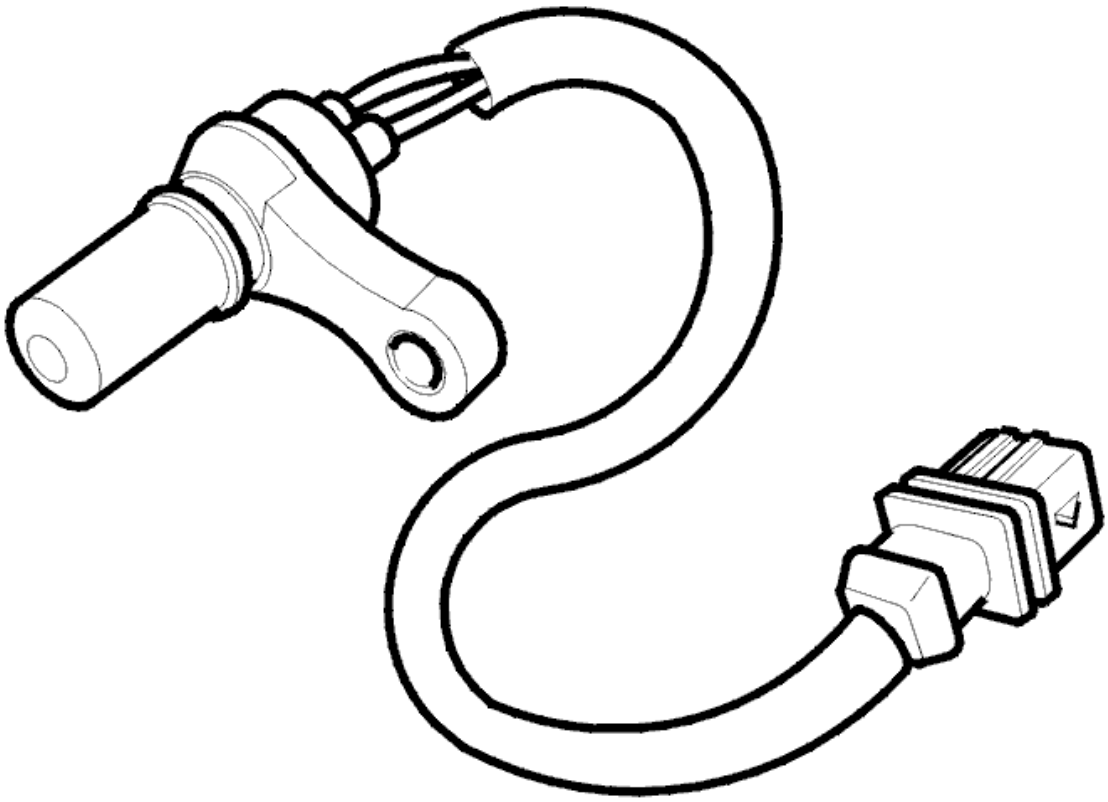


Fig. 479: Identifying Automatic Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The automatic transmission control module (TCM) receives speed signals from the transmission speed sensor on the transmission. The transmission control module (TCM) uses the signals to select the correct gear. The control module derives and compares the transmission speed with engine speed (RPM) at the transmission. Diagnostic trouble code (DTC) TCM-0081 is stored if the control module registers that transmission speed signal is too high.

Substitute Value

- None.

Possible Source

- Short-circuit to supply voltage in the power supply or signal cable.
- Defective transmission speed sensor.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

SIGNAL TOO HIGH

CHECKING THE TRANSMISSION OUTPUT SPEED SENSOR SIGNAL

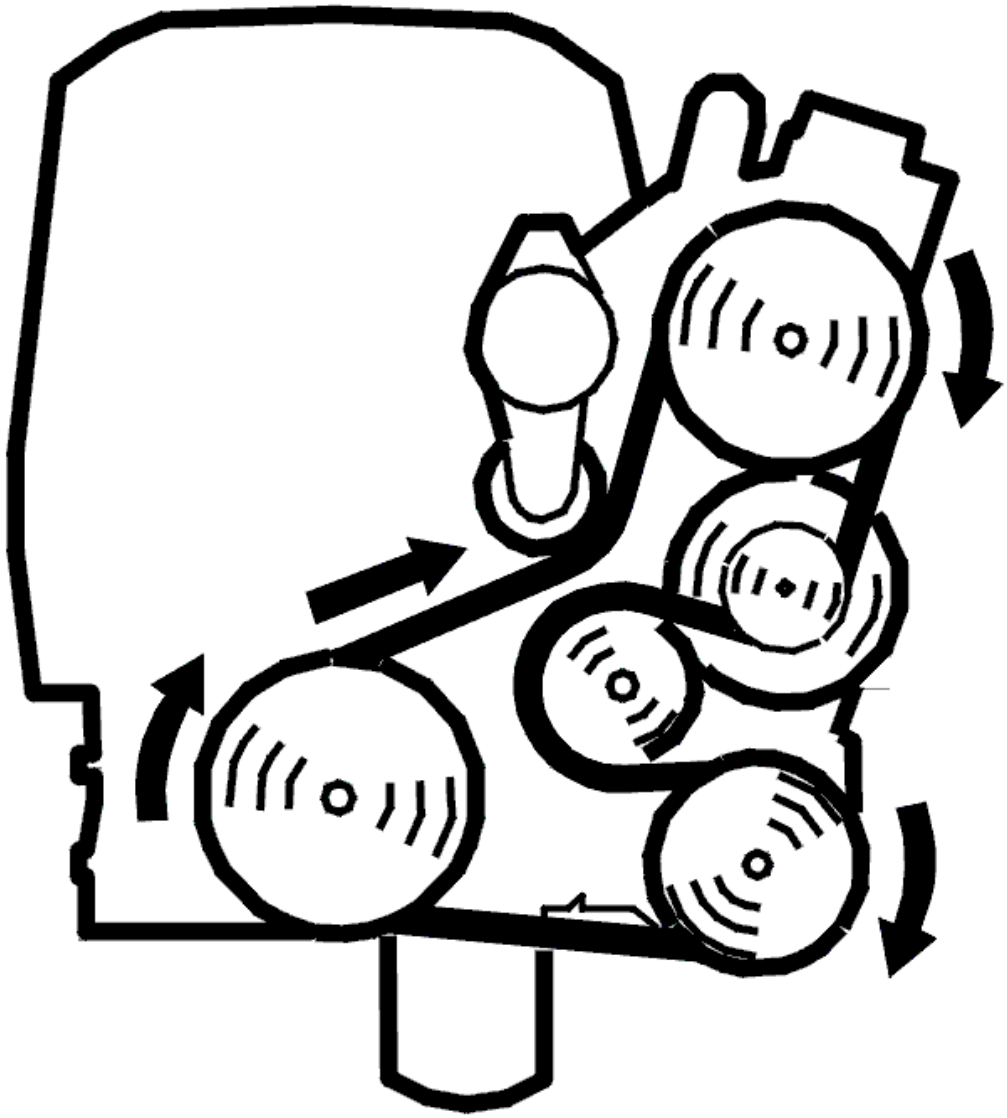


Fig. 480: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Raise the car so that the drive wheels are clear of the ground

- Start the engine. Allow the engine to idle
- Shift gear selector to position D so that the drive wheels begin to rotate
- Read off the transmission speed.

Depress the accelerator pedal (AP) and check that the speed is updated.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

NOTE: Diagnostic trouble codes (DTCs) may be stored in the ABS system when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

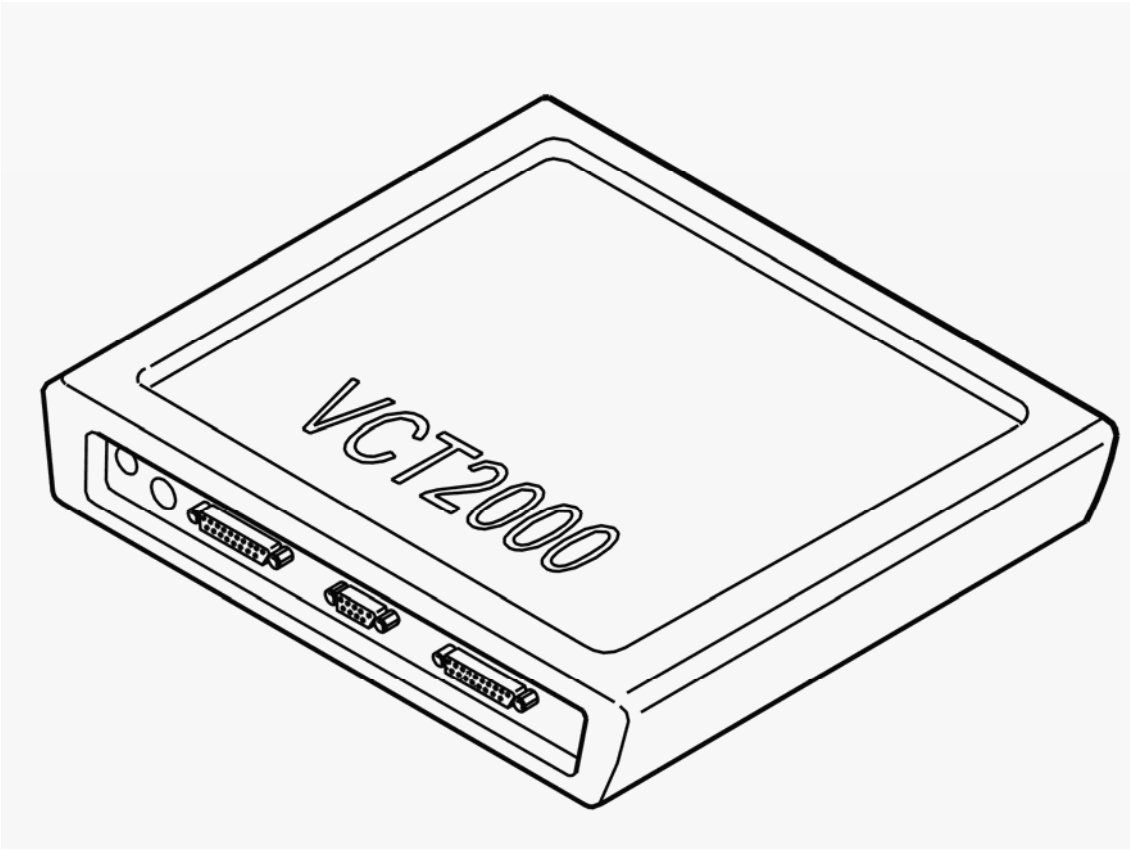


Fig. 481: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the speed updated?

- **YES**

Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

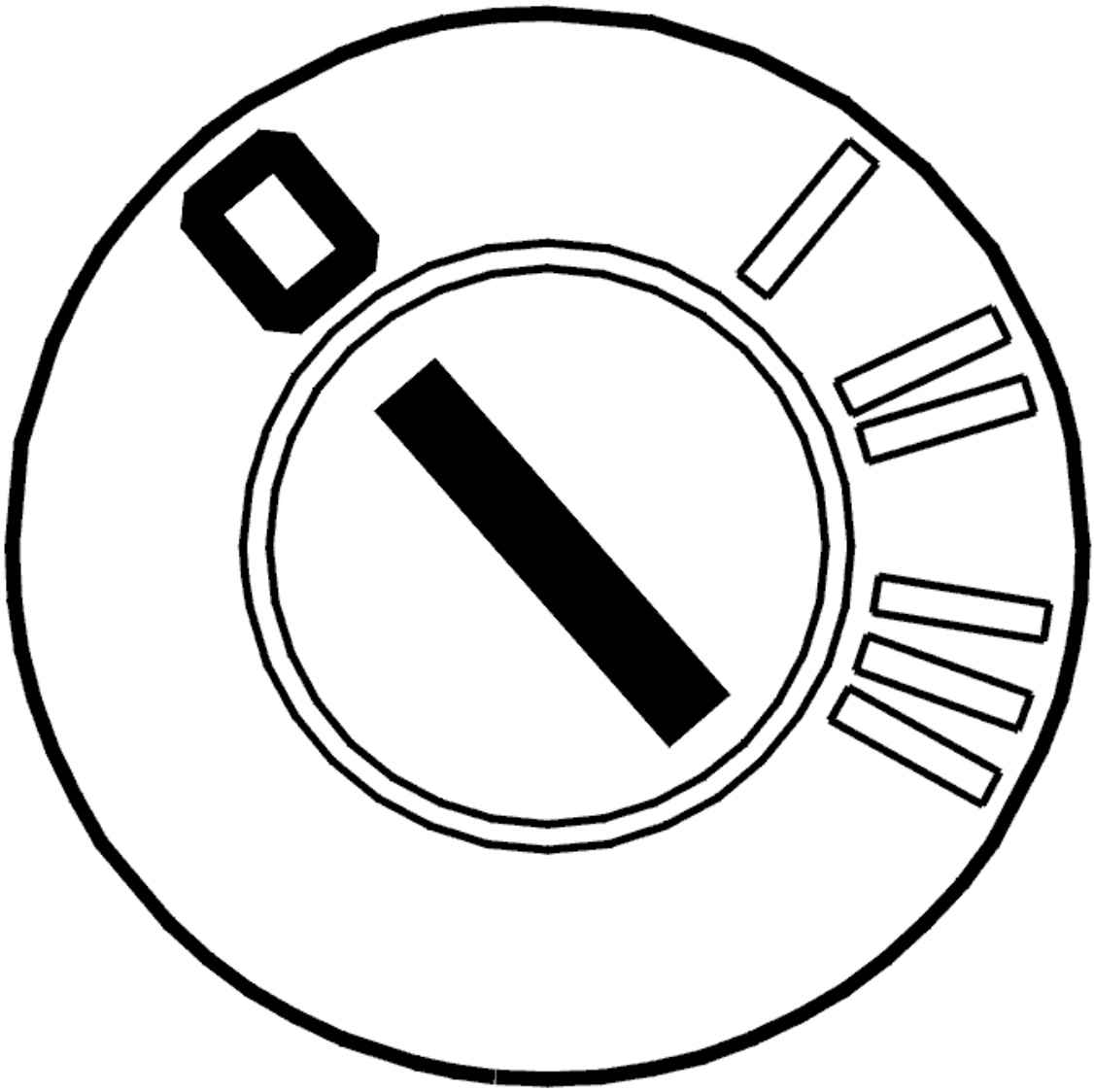


Fig. 482: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box.

  Check the cables between control module terminals #A57 (#A57) and #A39 (#A39) and transmission output speed sensor terminals #A3 and #A4. Check for a short-circuit to each other.

Check the power supply cable between control module terminal #A57 (#A57) and transmission output speed sensor terminal #A4. Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Check the signal cable between control module terminal #A39 (#A39) and transmission output speed sensor terminal #A3. Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

HINT: With the control module connected, the ignition on and a voltmeter connected between transmission connector terminals #A4 and #A3 (control module side), the voltage must be 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To check or replace the transmission output speed sensor, see **INPUT SPEED SENSOR/OUTPUT SPEED SENSOR, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

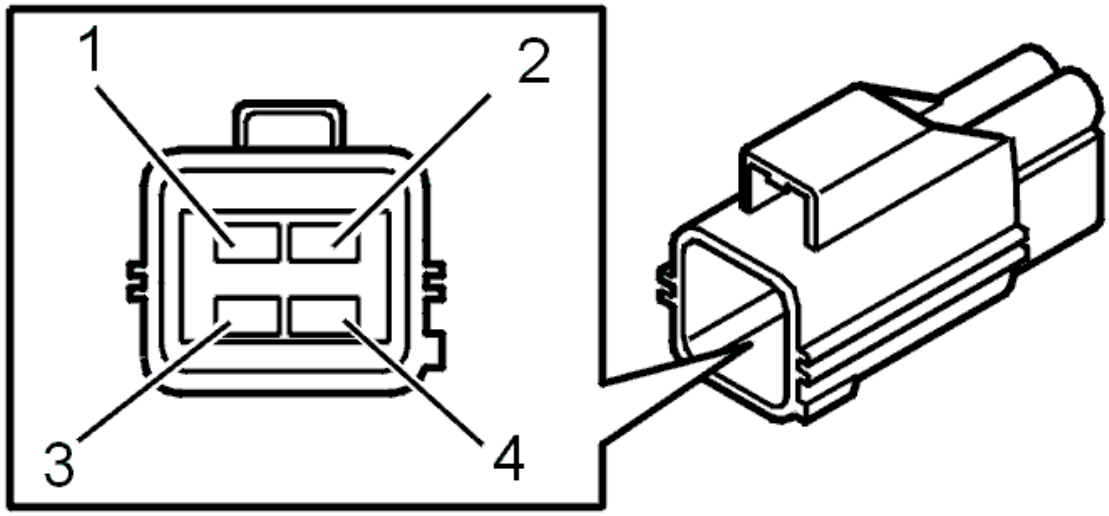


Fig. 483: Identifying Transmission Output Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

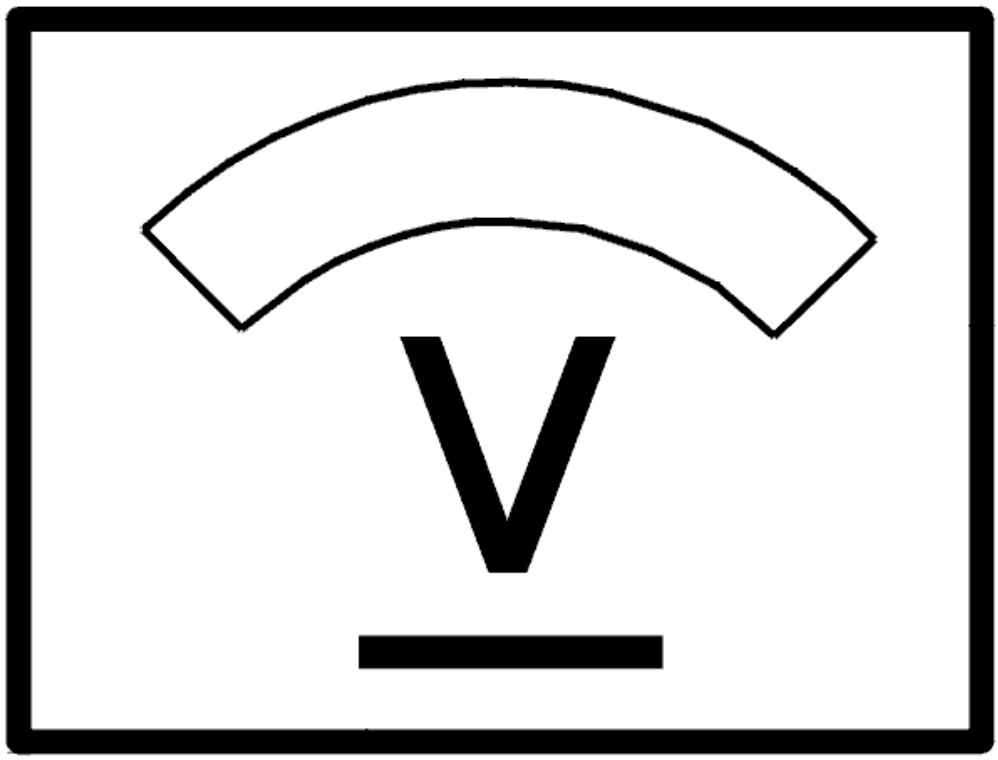


Fig. 484: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INTERMITTENT FAULT

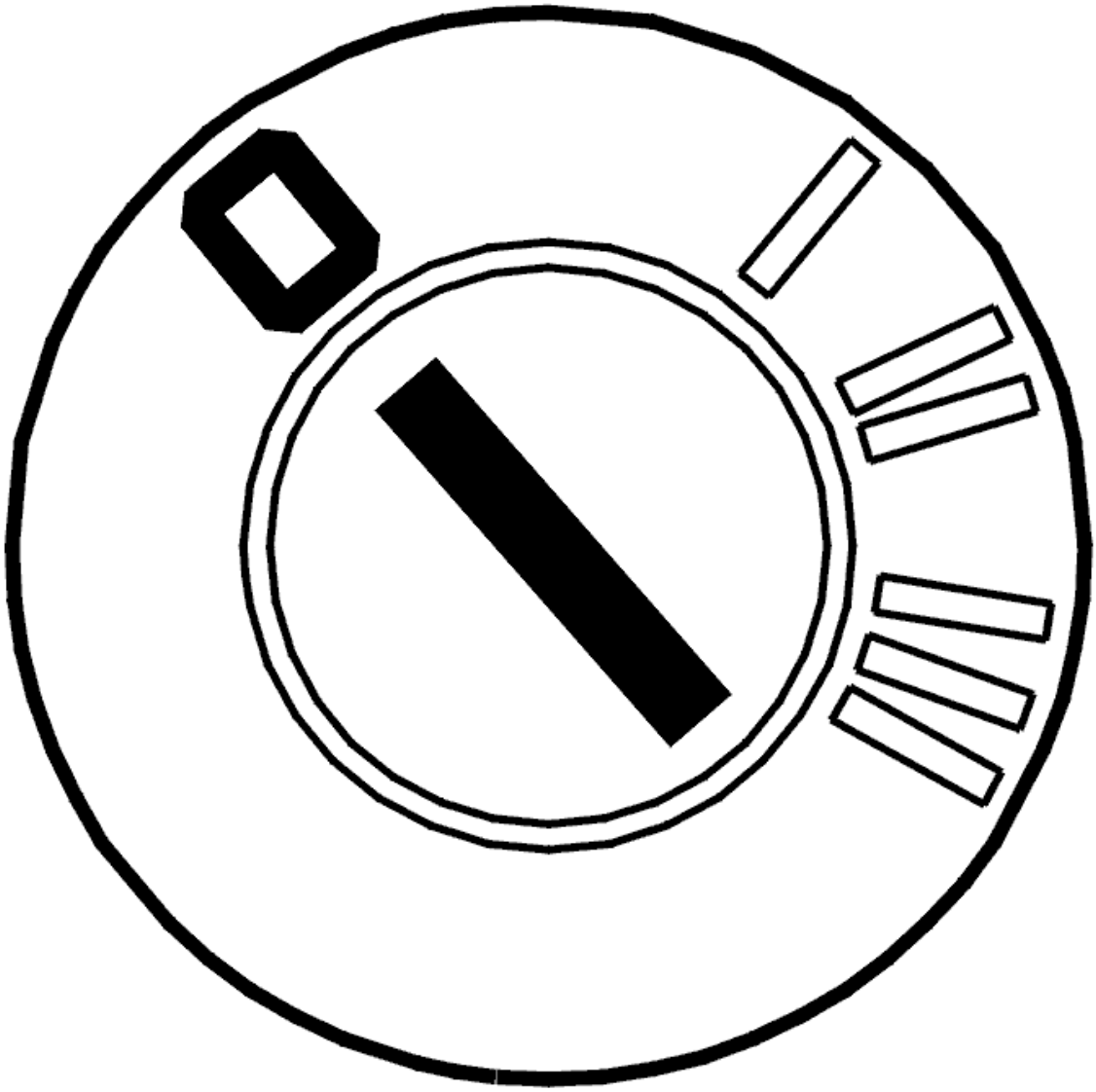


Fig. 485: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the control module and transmission connectors. Check for contact resistance and oxidation and remedy according to **CONTACT RESISTANCE AND OXIDATION** .

  Check the power supply cable between control module terminal #A57 (#A57) and transmission output speed sensor terminal #A4. Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

  Check the signal cable between control module terminal #A39 (#A39) and transmission output speed sensor terminal #A3. Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

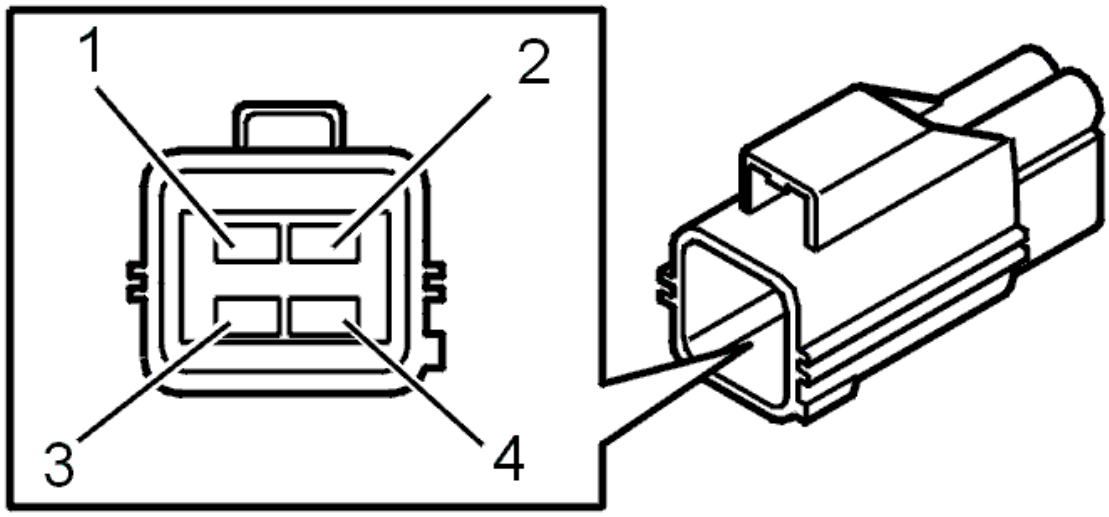


Fig. 486: Identifying Transmission Output Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

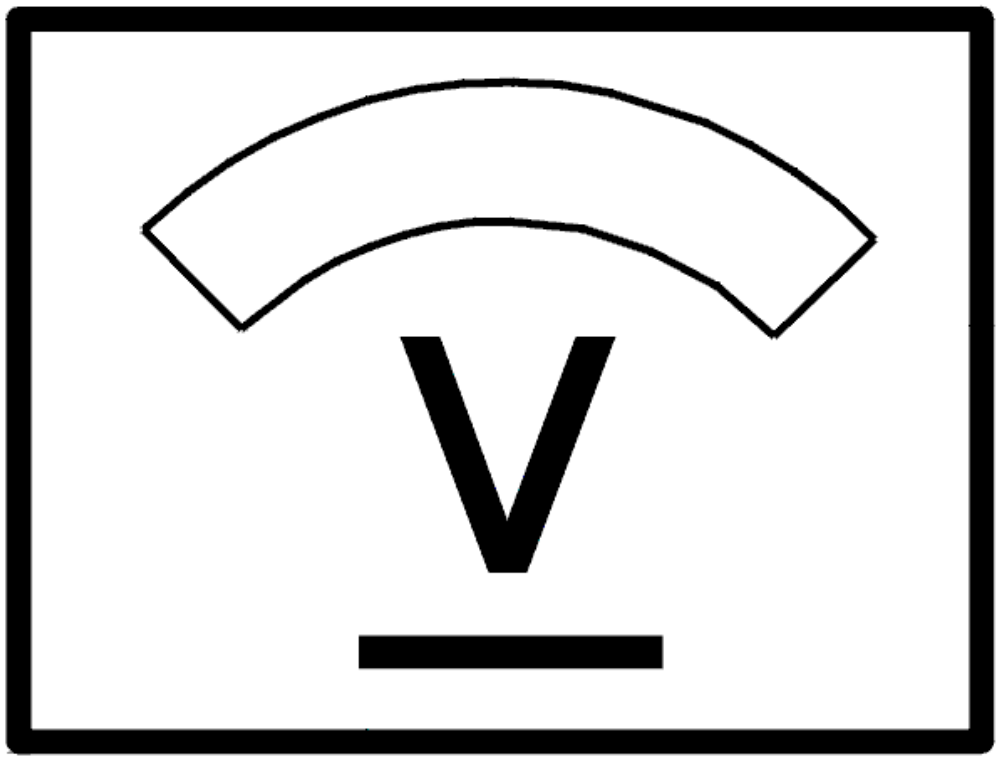


Fig. 487: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

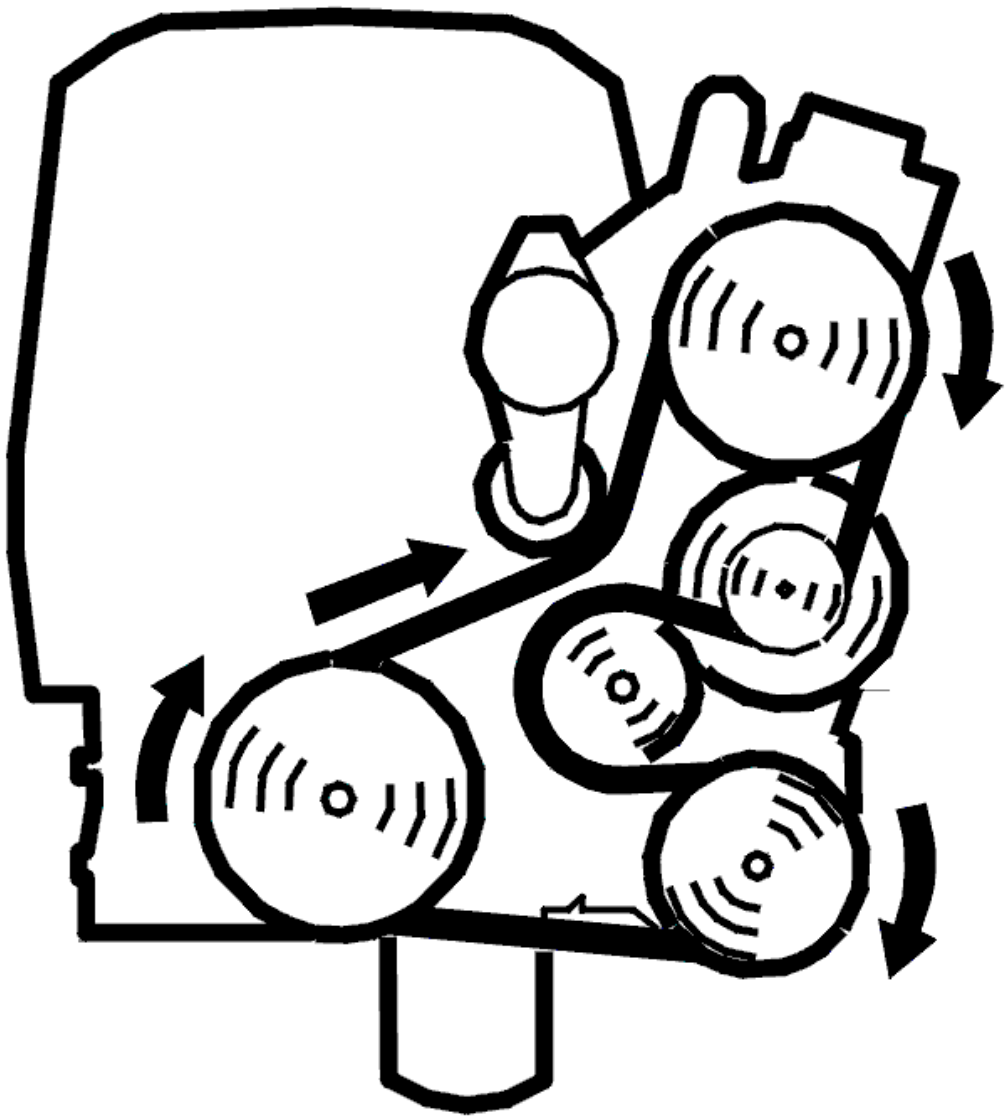


Fig. 488: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

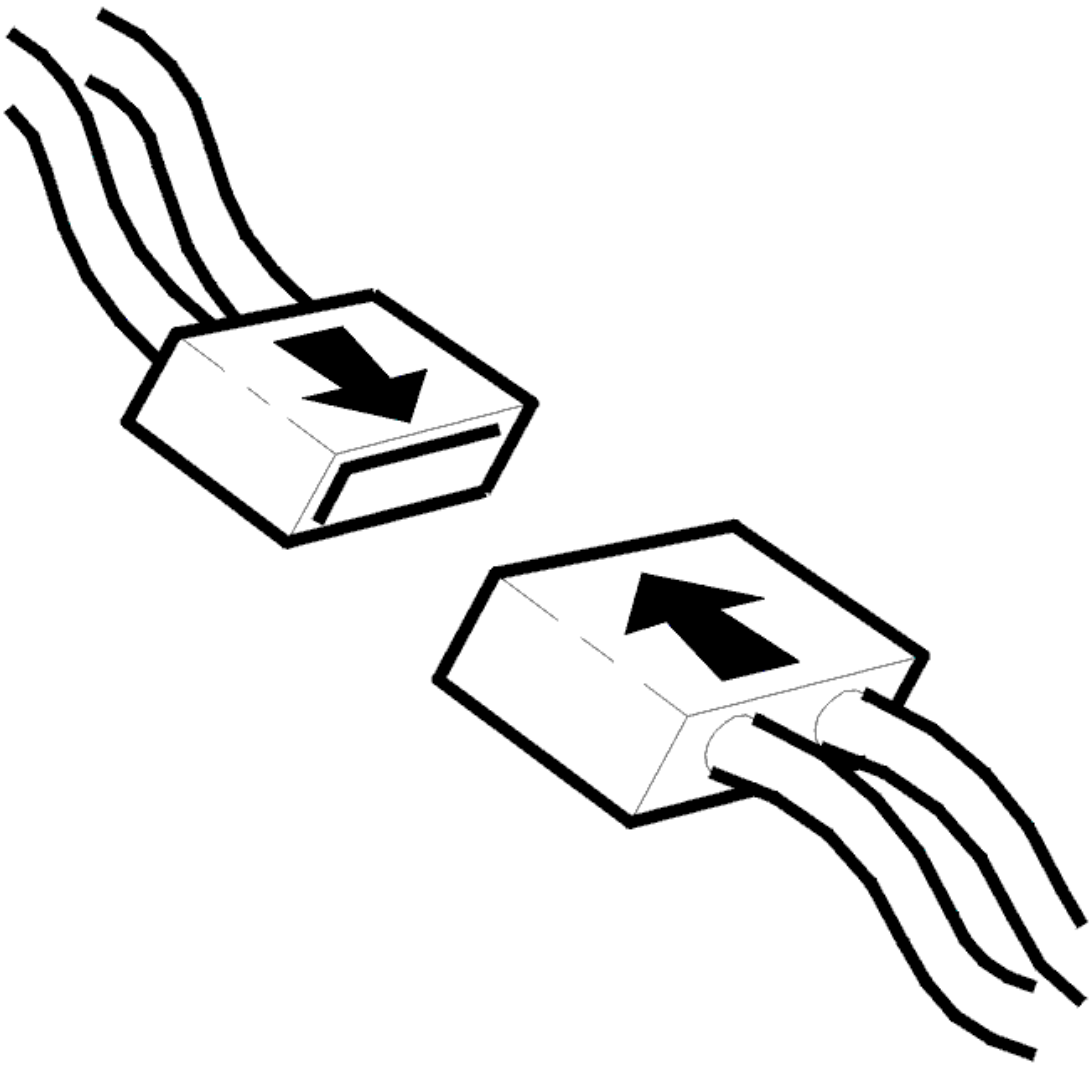


Fig. 489: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Raise car so that drive wheels are unimpeded.
- Start the engine and let it idle.
- Shift gear selector to position D so that the drive wheels begin to rotate.
- Read off the transmission speed.

Check that speed is updated

NOTE: When the rear wheels are stationary and the front wheels rotate, diagnostic trouble codes (DTCs) can be stored in the ABS system. Erase

any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

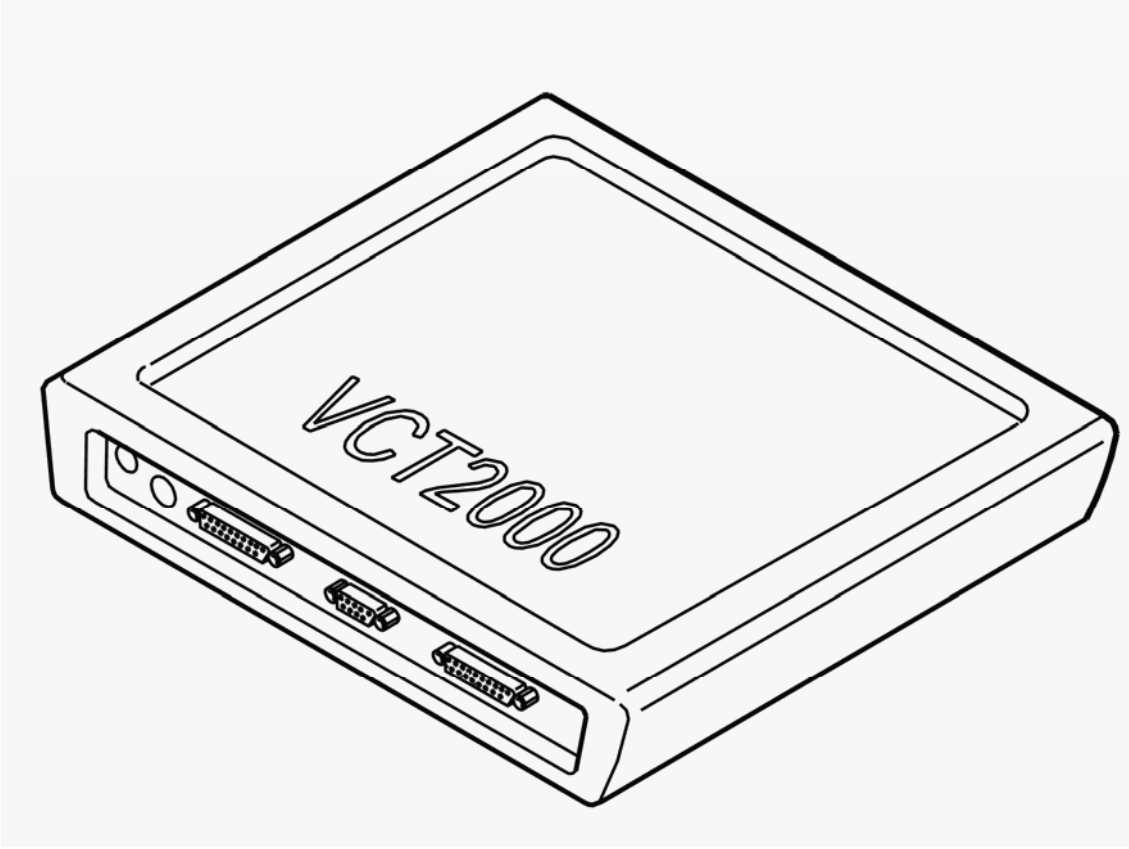


Fig. 490: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0081: VEHICLE SPEED SENSOR. SIGNAL TOO HIGH (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

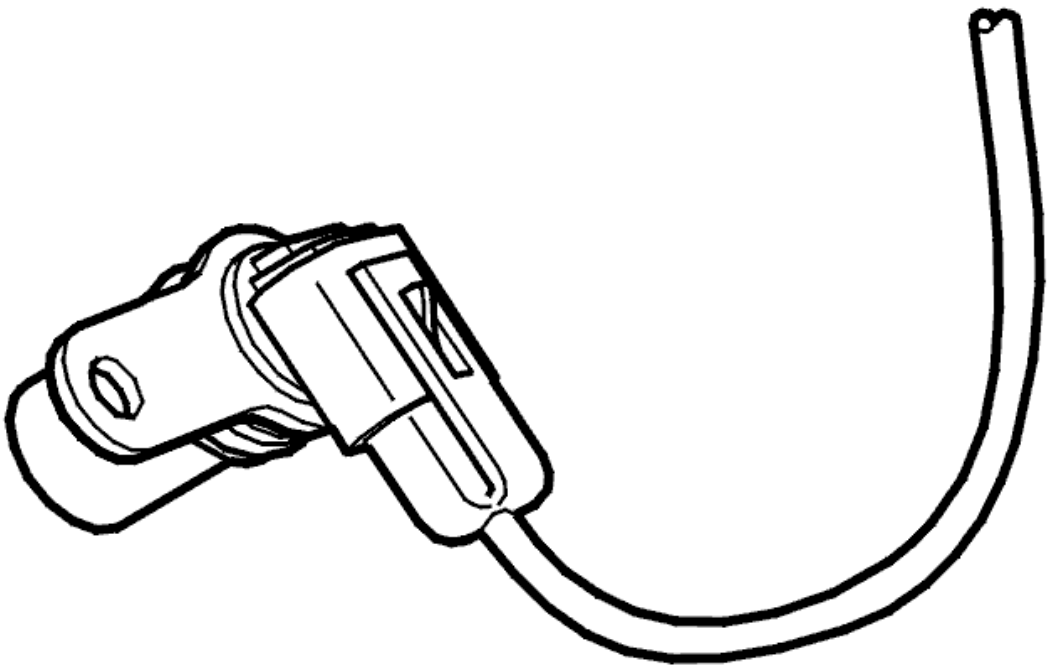


Fig. 1: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The automatic transmission control module (TCM) receives speed signals from the transmission speed sensor on the transmission. The transmission control module (TCM) uses the signals to select the correct gear. The control module derives and compares the transmission speed with engine speed (RPM) at the transmission. Diagnostic trouble code (DTC) TCM-0081 is stored if the control module registers that the transmission speed signal is too high.

Substitute Value

- TBD

Possible Source

- Short-circuit to supply voltage in the power supply or signal cable.

- Defective transmission speed sensor.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

SIGNAL TOO HIGH

CHECKS

CHECKING THE TRANSMISSION OUTPUT SPEED SENSOR SIGNAL

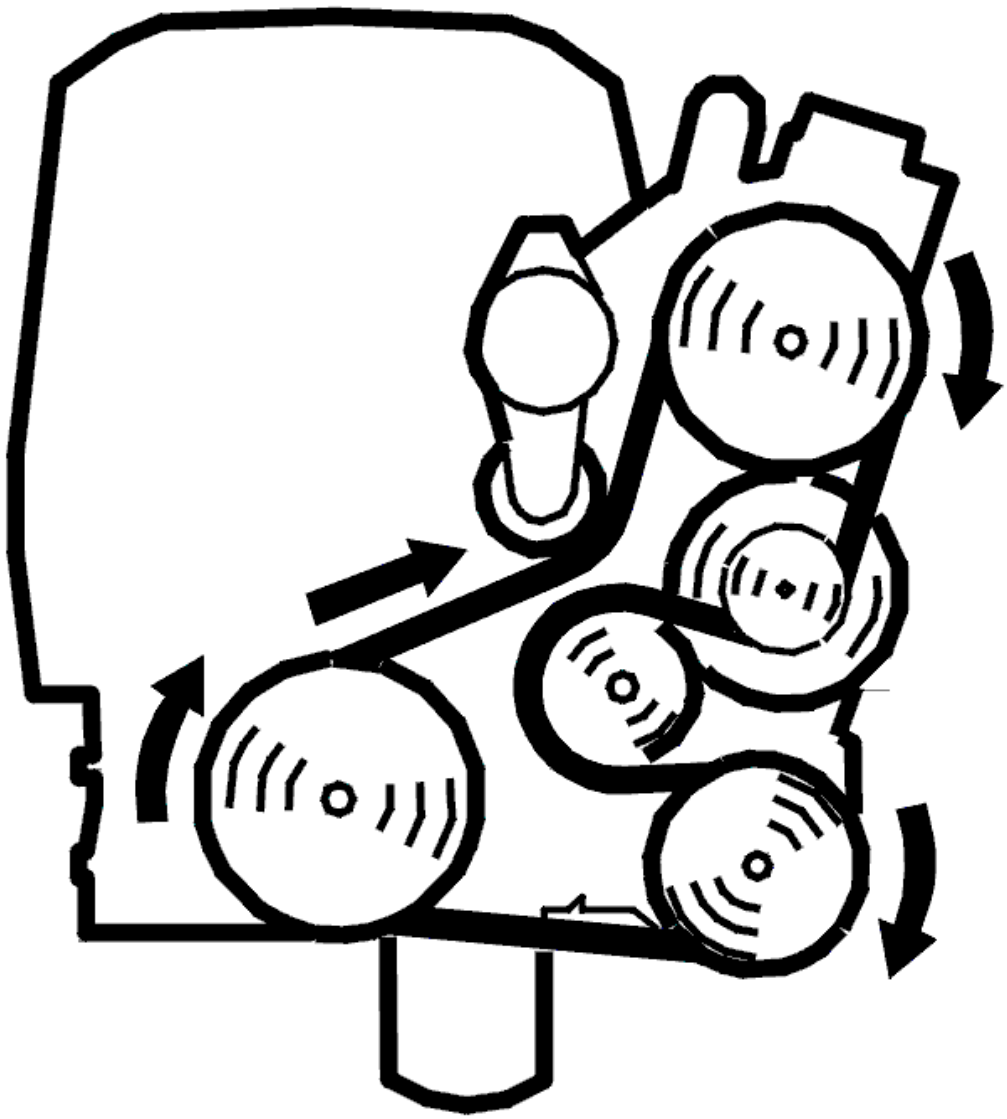


Fig. 2: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Raise the car so that the drive wheels are clear of the ground
- Start the engine. Allow the engine to idle
- Shift gear selector to position D so that the drive wheels begin to rotate
- Read off the transmission speed.

Depress the accelerator pedal (AP) and check that speed is updated

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

NOTE: Diagnostic trouble codes (DTCs) may be stored in the ABS system when

the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

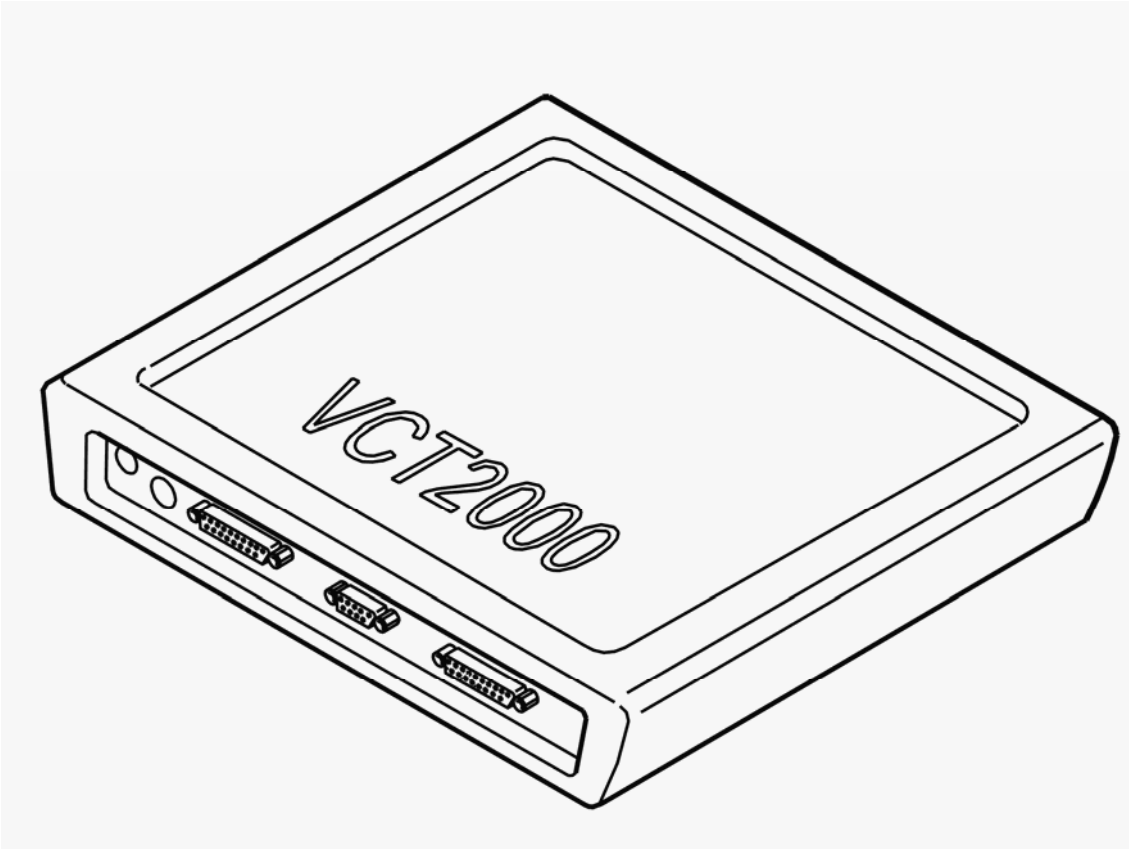


Fig. 3: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the speed updated?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

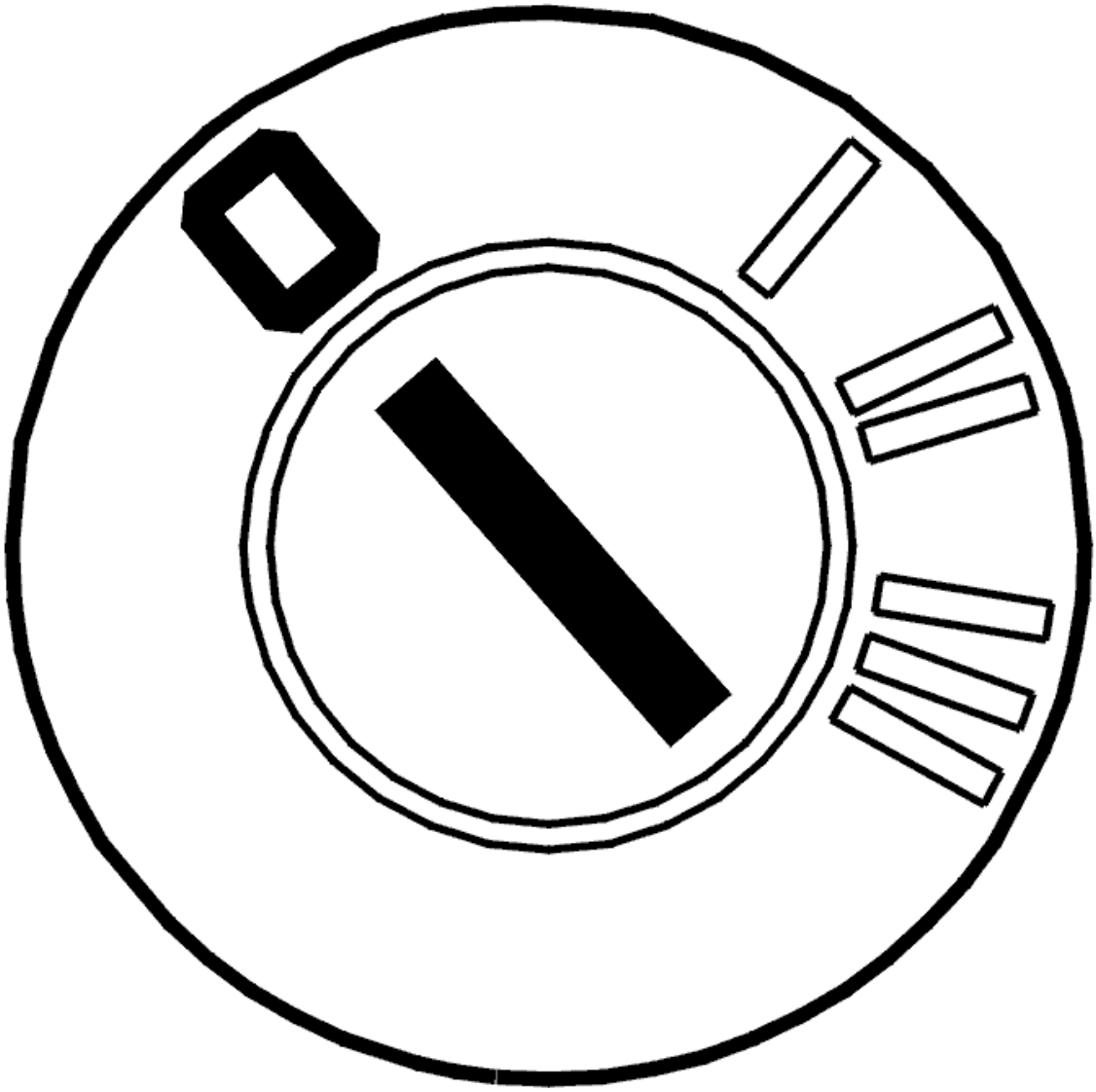


Fig. 4: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the wiring between control module terminals #A57 and #A39 and speed sensor connector terminals #1 and #2. Check for a short-circuit to each other.

  Check the power supply cable between control module terminal #A57 and speed sensor connector terminal #1. Check for a short-circuit to supply voltage.

  Check the signal cable between control module terminal #A39 and speed sensor connector terminal #2. Check for a short-circuit to supply voltage.

  Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To check or replace the transmission output speed sensor, see **OUTPUT SPEED SENSOR TRANSMISSION, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

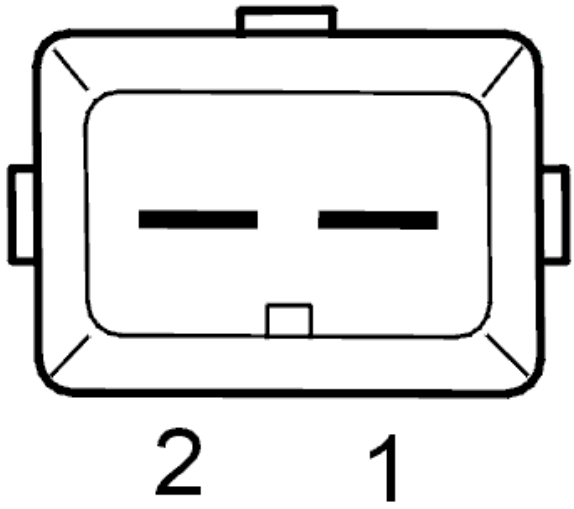


Fig. 5: Identifying Vehicle Speed Sensor (VSS) Connector Terminals
Courtesy of VOLVO CARS CORPORATION

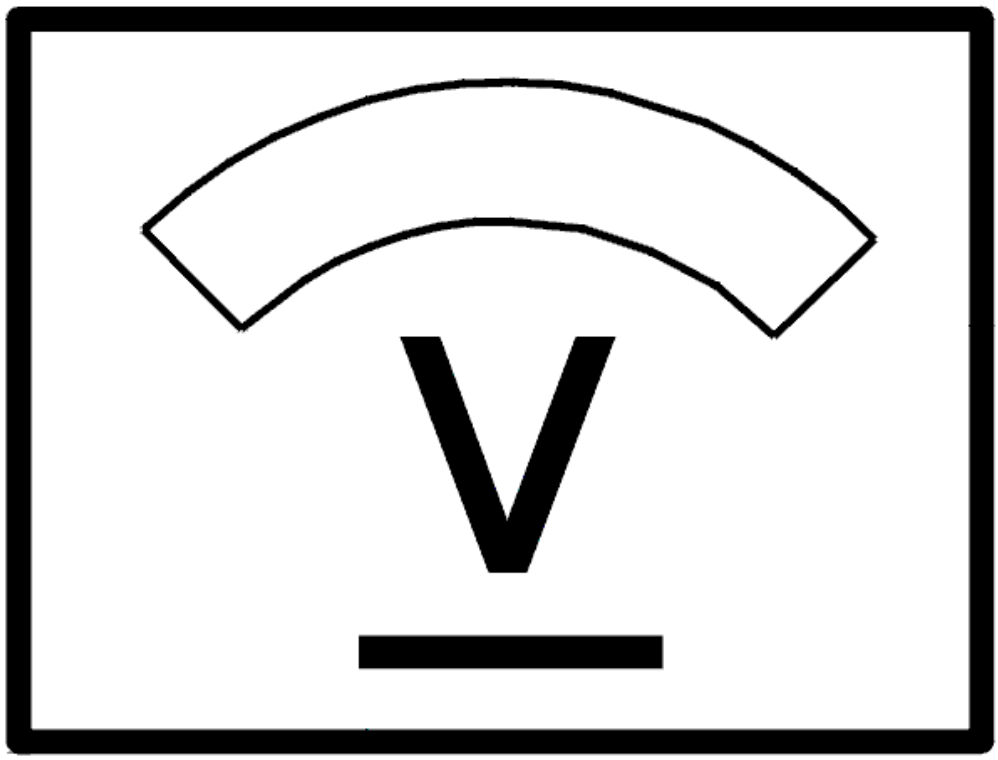


Fig. 6: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

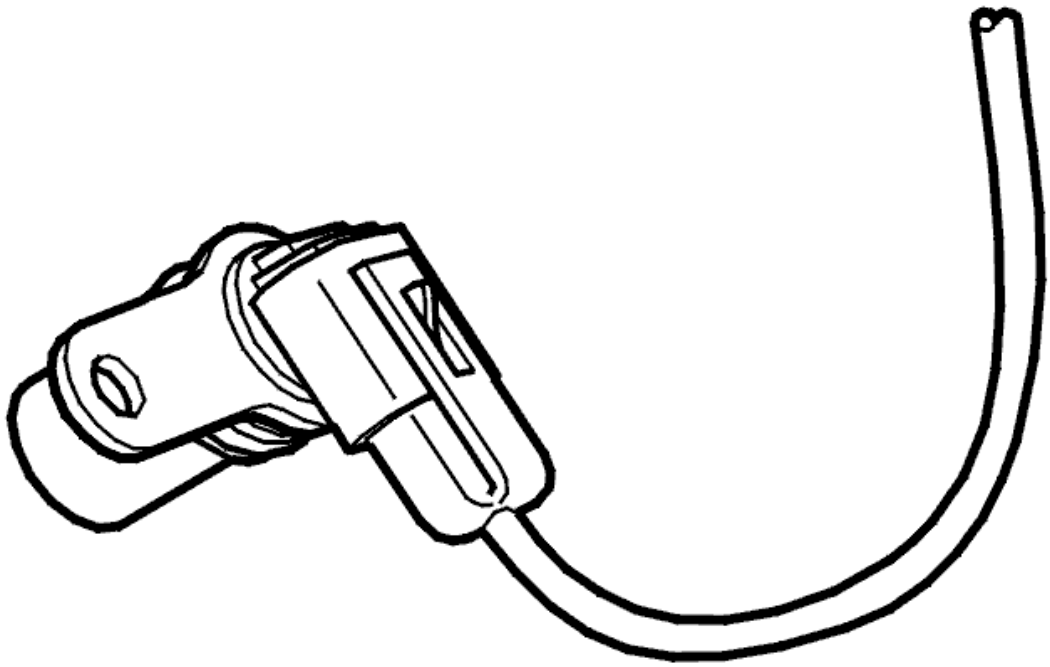


Fig. 7: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

HINT: It is possible to determine whether the control module is faulty by disconnecting the speed sensor connector and connecting a temporary cable and short-circuiting the connections with the control module.

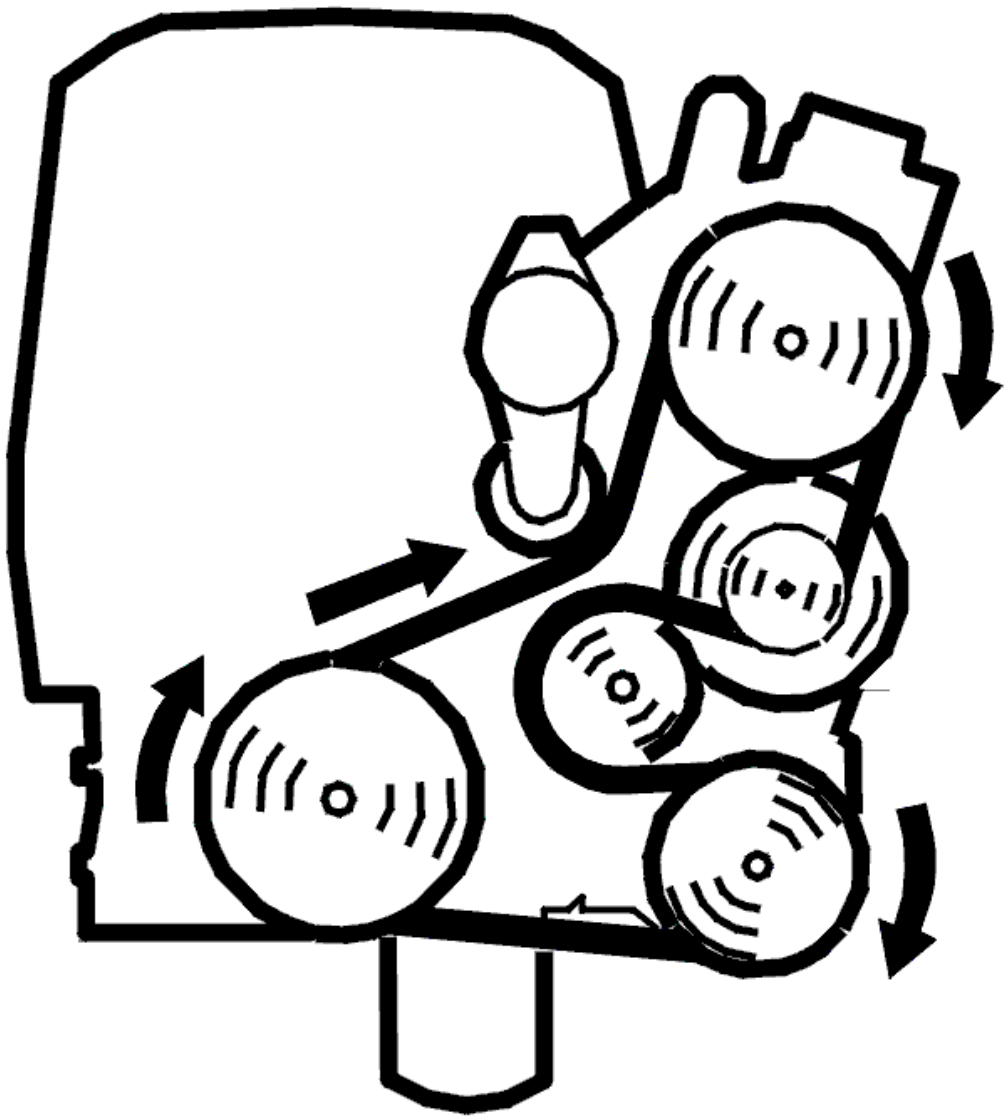


Fig. 8: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

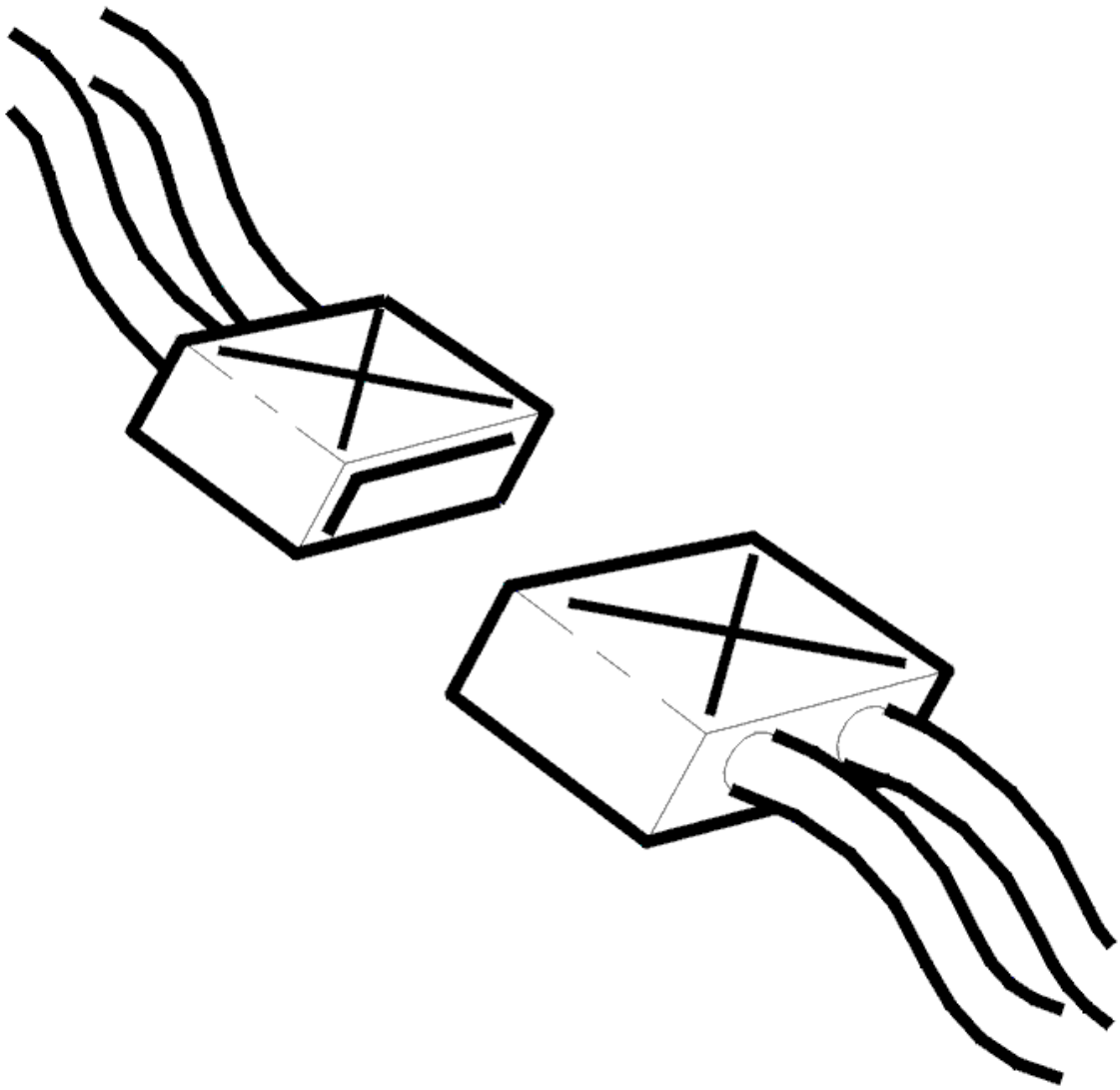


Fig. 9: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

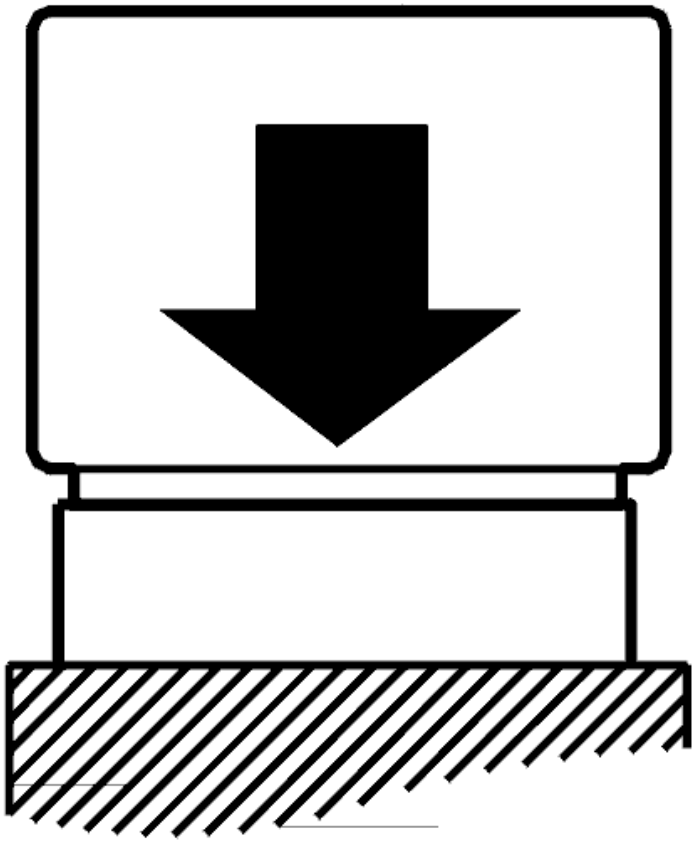


Fig. 10: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission control module (TCM) connected
- The breakout box connected
- Disconnected connector for the transmission speed sensor
- Connect a temporary cable between terminals #A35 and #A57 on the breakout box

CAUTION: Check that the temporary cable is connected to the correct terminals. Also check that there is no risk of unintentional short-circuits.

-
- Ignition on

- Read off the status.

  Check that the status is "1" when the temporary cable is connected to the terminals above.

  Disconnect the cable end that is connected to terminal #A35 and move the cable to terminal #A53.

  NOTE: Leave the cable end connected to terminal #A57 in place.

  Check that the status changes to "0" when the temporary cable has been moved to terminal #A53.

  The transmission speed sensor is defective if the status has changed between "1" and "0" as above and no errors have been detected on the cables or terminals in the preceding checks. Replace the transmission speed sensor if this is the case.

  The transmission control module (TCM) is defective if the status has not changed between "1" and "0" as above and no errors have been detected on the cables or terminals in the preceding checks. If this is the case replace the control module.

  Other information

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - To check or replace the transmission output speed sensor, see **OUTPUT SPEED SENSOR TRANSMISSION, REPLACING**
  - To replace the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
  - For information about signals, see **SIGNAL SPECIFICATION** .

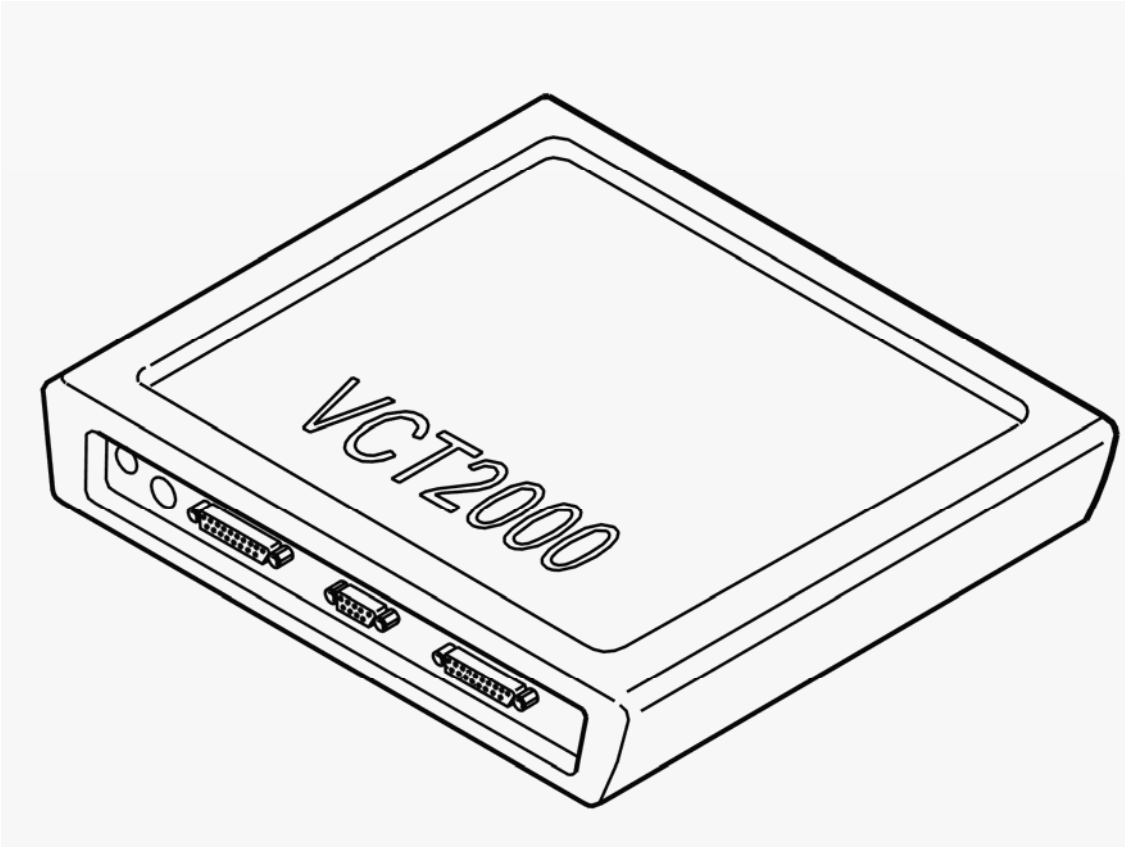


Fig. 11: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INTERMITTENT FAULT

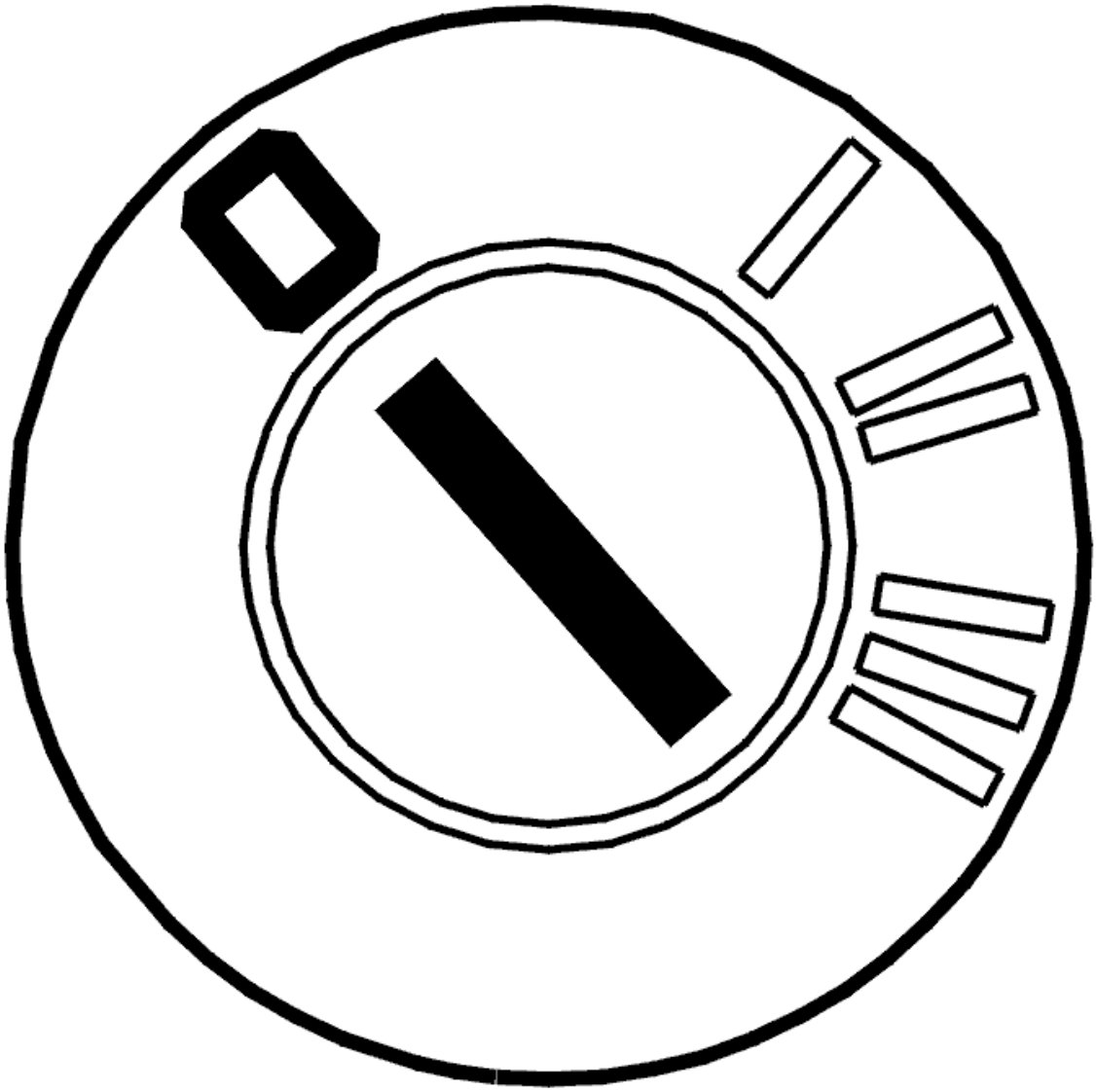


Fig. 12: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the control module and transmission connectors. Check for contact resistance and oxidation.

  Check the power supply cable between control module terminal #A57 and speed sensor connector terminal #1. Check for an intermittent short-circuit to supply voltage.

  Check the signal cable between control module terminal #A39 and speed sensor connector terminal #2. Check for an intermittent short-circuit to supply voltage.

  Remedy as necessary.

  Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

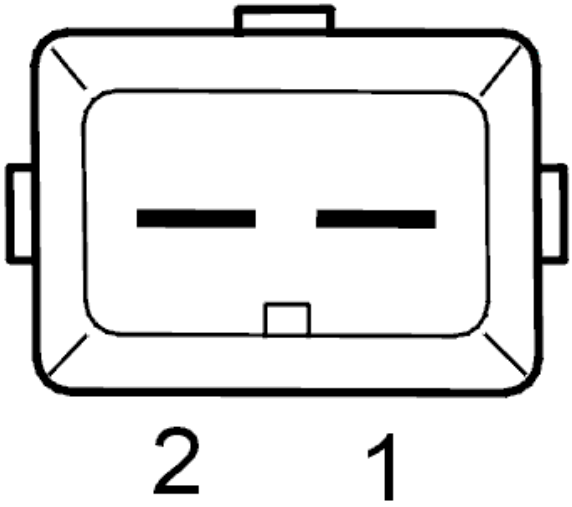


Fig. 13: Identifying Vehicle Speed Sensor (VSS) Connector Terminals
Courtesy of VOLVO CARS CORPORATION

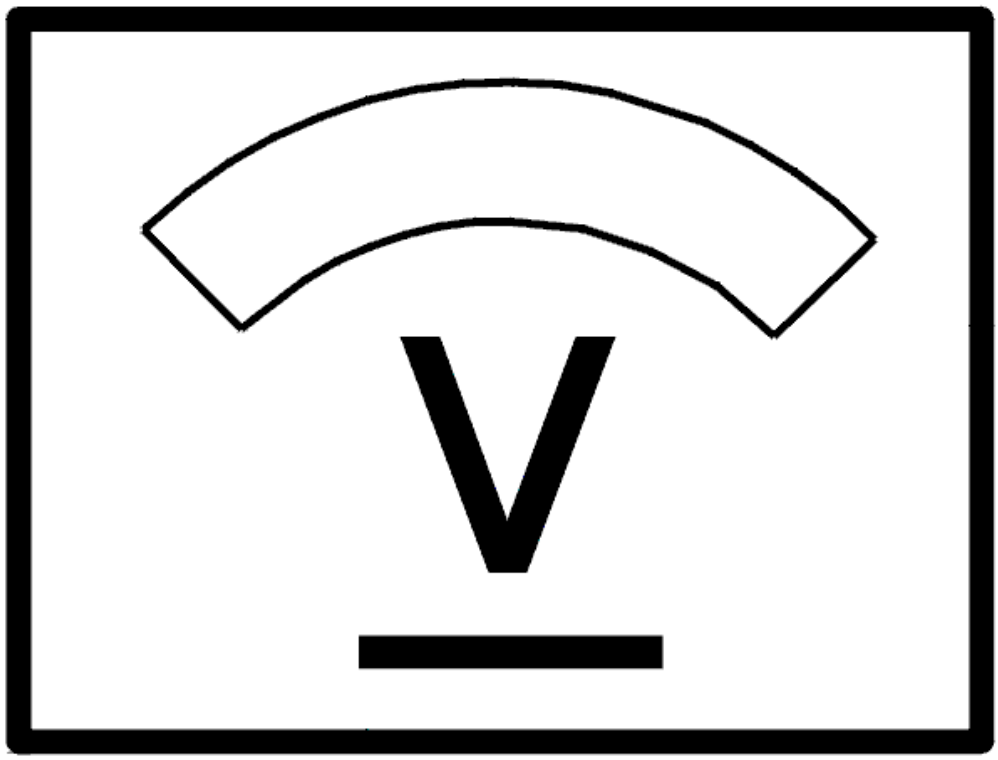


Fig. 14: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

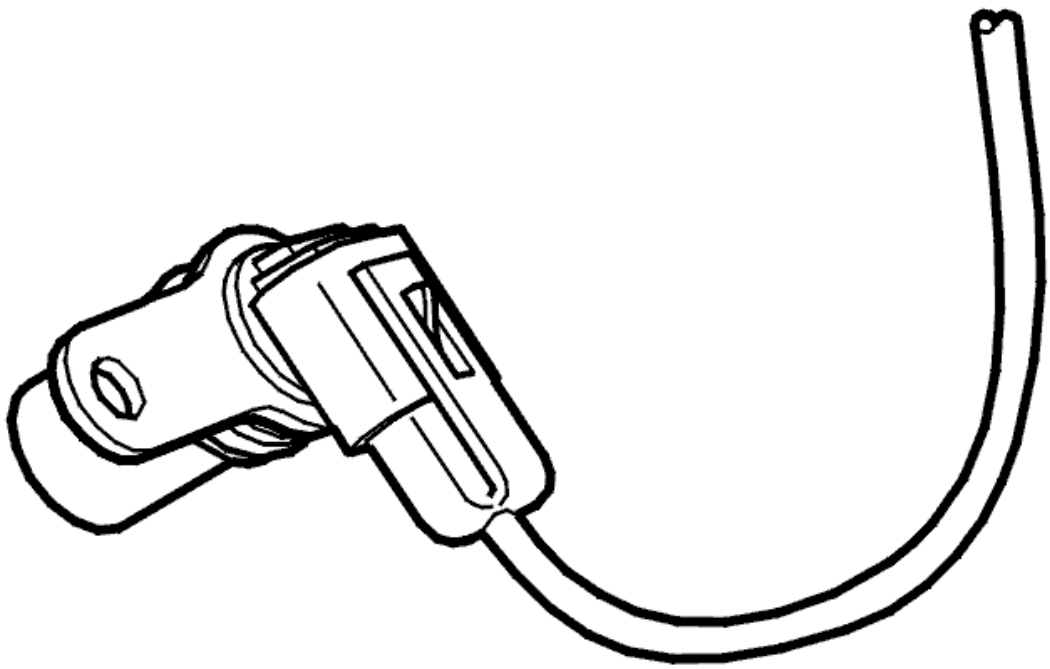


Fig. 15: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

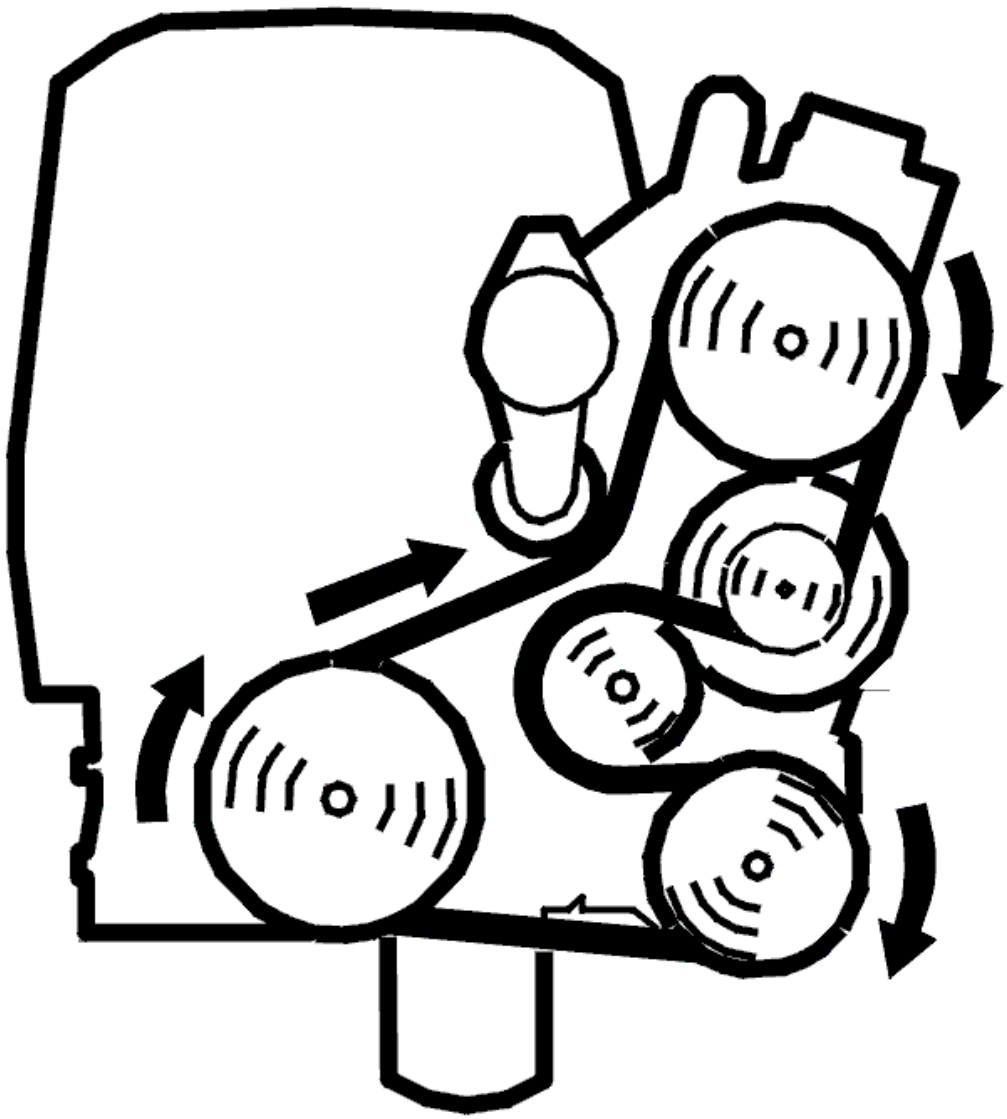


Fig. 16: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

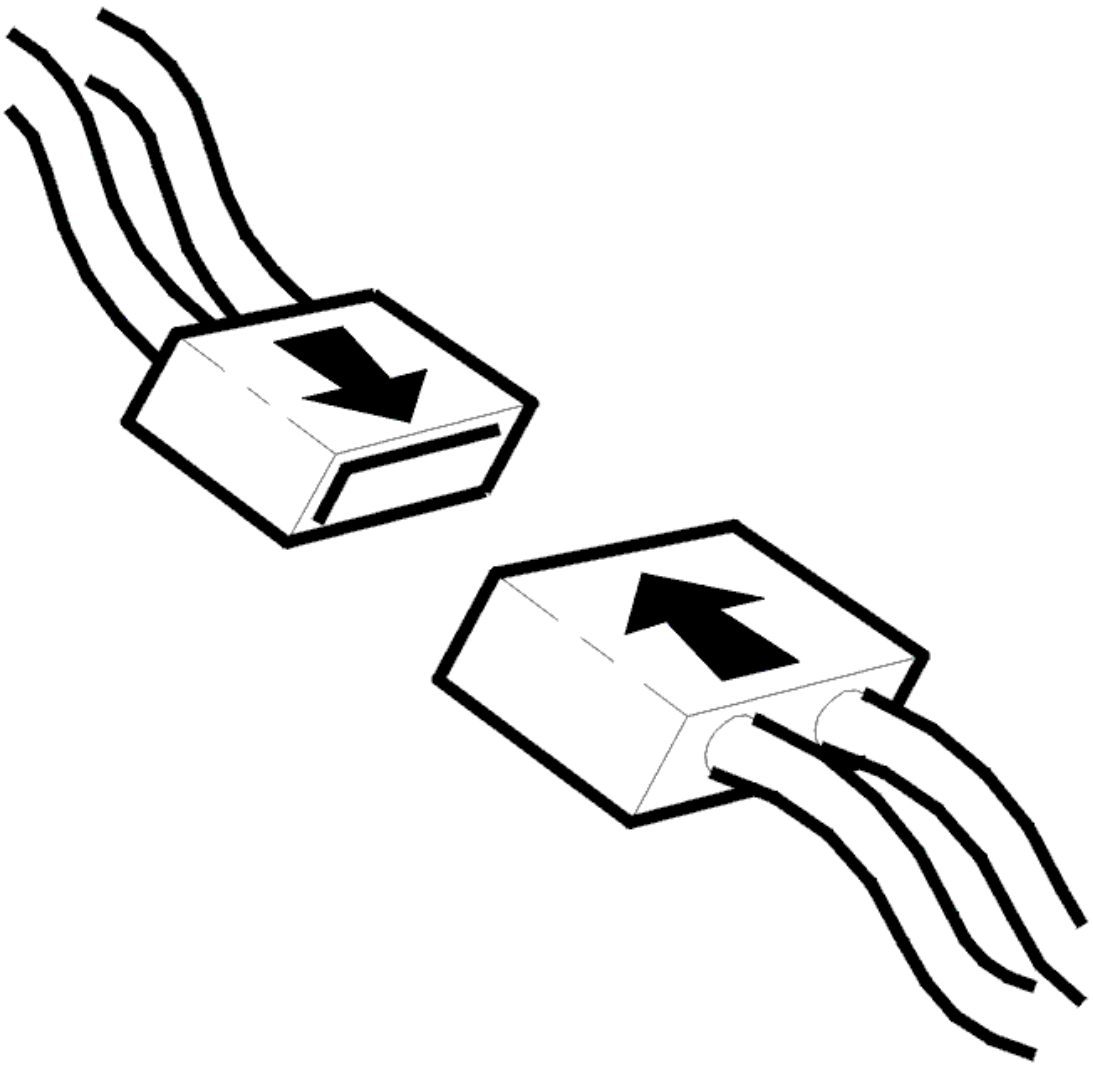


Fig. 17: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Raise car so that drive wheels are unimpeded.
- Start the engine and let it idle.
- Shift gear selector to position D so that the drive wheels begin to rotate.
- Read off the transmission speed.

Check that speed is updated

NOTE: When the rear wheels are stationary and the front wheels rotate, diagnostic trouble codes (DTCs) can be stored in the ABS system. Erase

any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

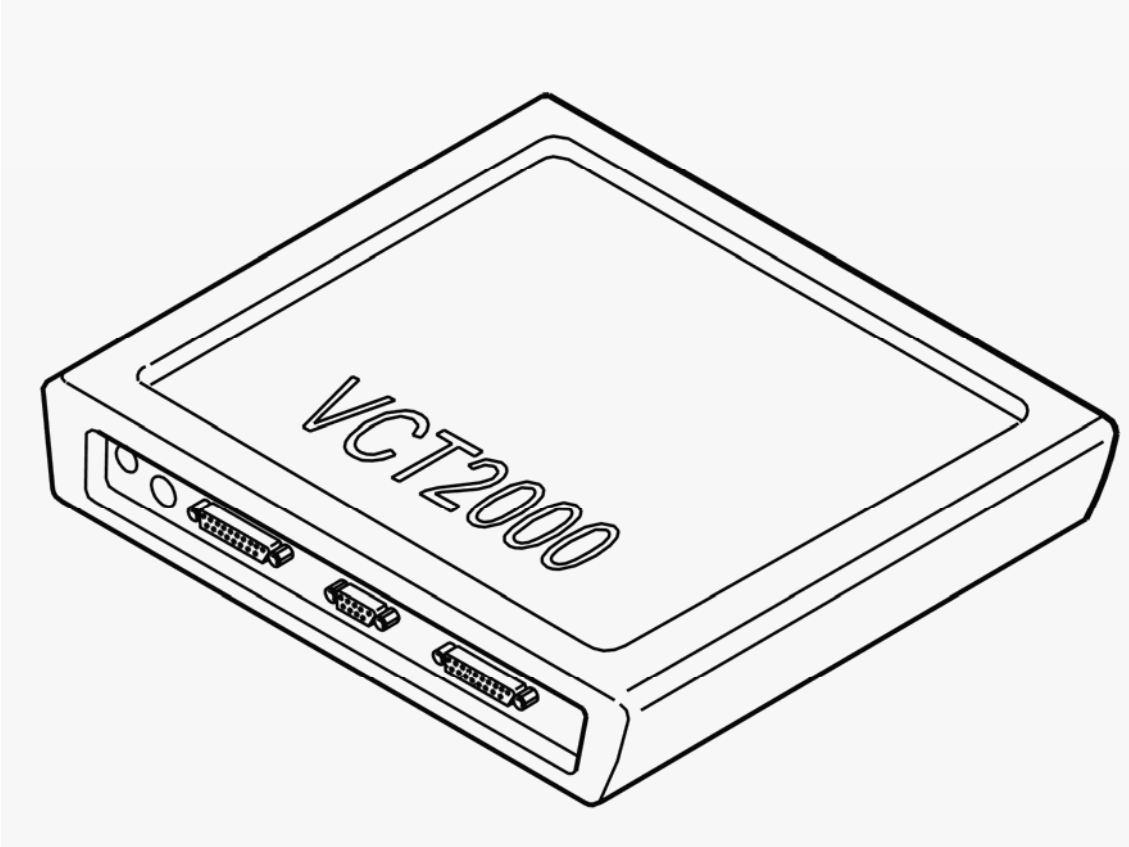


Fig. 18: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0083: TRANSMISSION OUTPUT SPEED SENSOR. SIGNAL TOO LOW (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

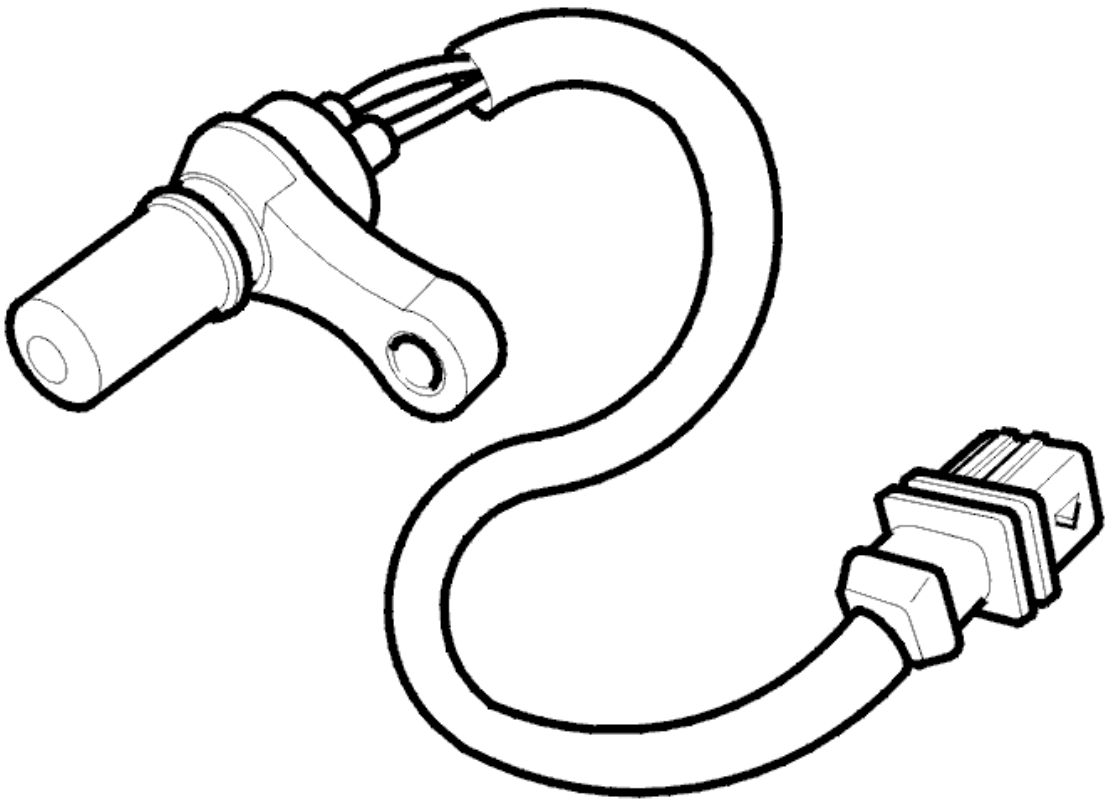


Fig. 19: Identifying Transmission Output Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The speed signal comes from a sensor on the transmission. The transmission control module (TCM) uses the signal to select the correct gear. The control module also uses the engine speed sensor signal to determine the speed. Diagnostic trouble code (DTC) TCM-0083 is stored if the transmission control module (TCM) registers

that the speed signal is to low.

Substitute Value

- None.

Possible Source

- Contact resistance in the terminals.
- Signal cable (+) or signal cable (-) short-circuited to ground, to supply voltage or to each other.
- Defective speed sensor.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of the line pressure when shifting.
- No reduction of the line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No request for torque limiting to the engine control module (ECM) when shifting.

SIGNAL TOO LOW

CHECKS

CHECKING THE TRANSMISSION OUTPUT SPEED SENSOR SIGNAL

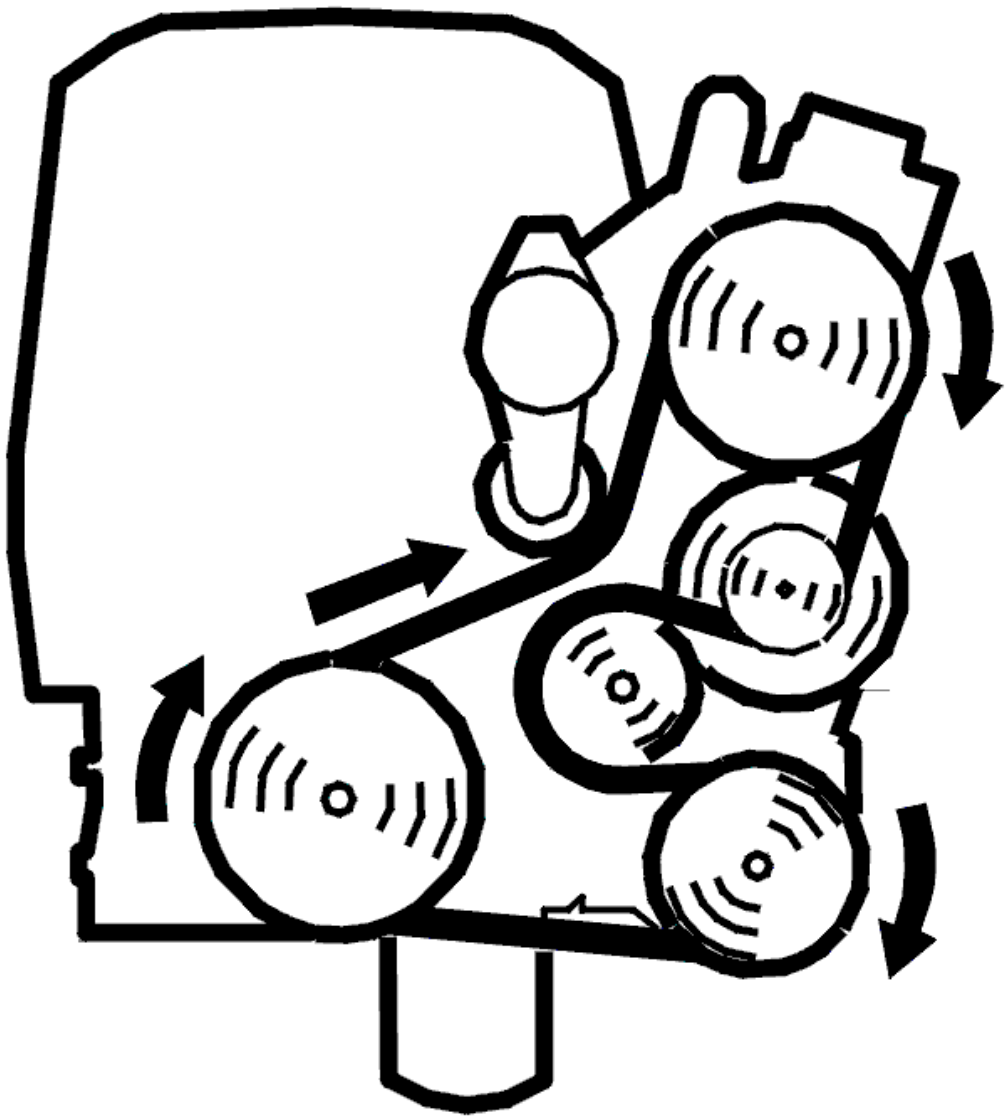


Fig. 20: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Raise the car so that the drive wheels are clear of the ground
- Start the engine. Allow the engine to idle
- Shift gear selector to position D so that the drive wheels begin to rotate
- Read off the transmission speed.

Depress the accelerator pedal (AP) and check that the speed is updated.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

NOTE: Diagnostic trouble codes (DTCs) may be stored in the ABS system when

the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

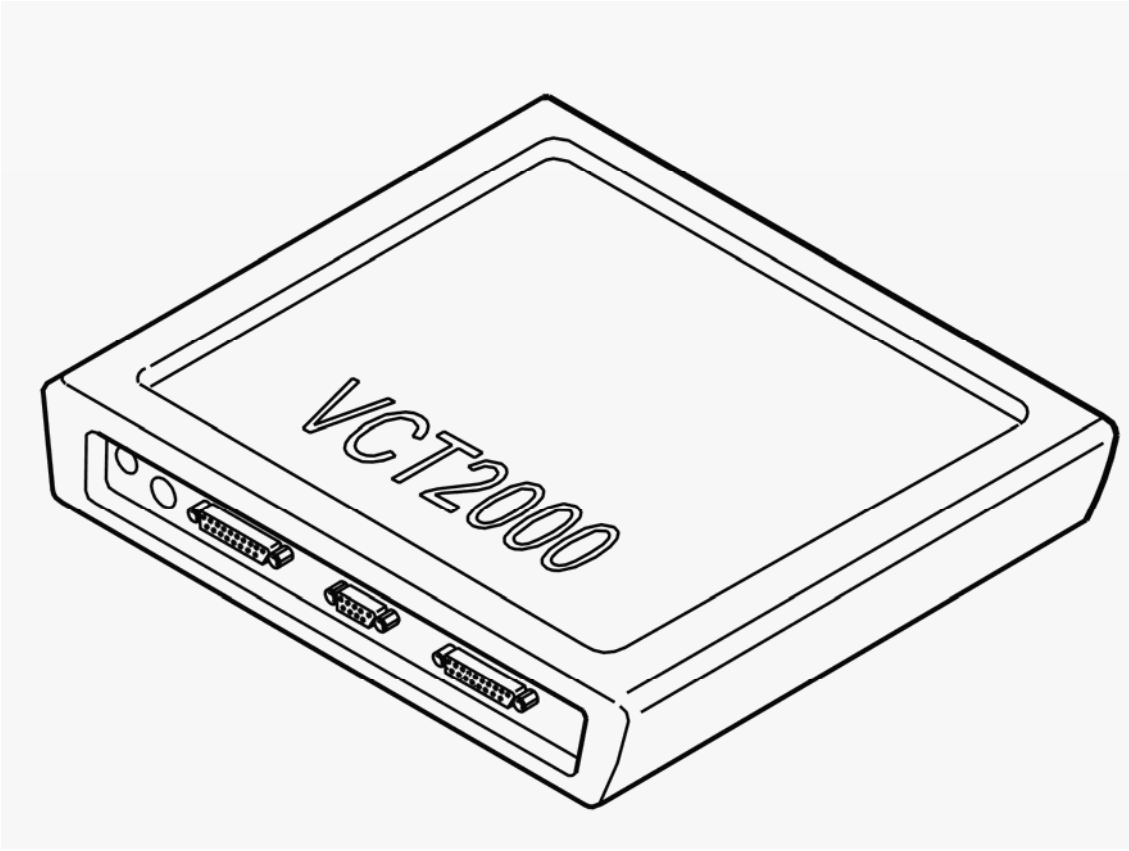


Fig. 21: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the speed updated?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

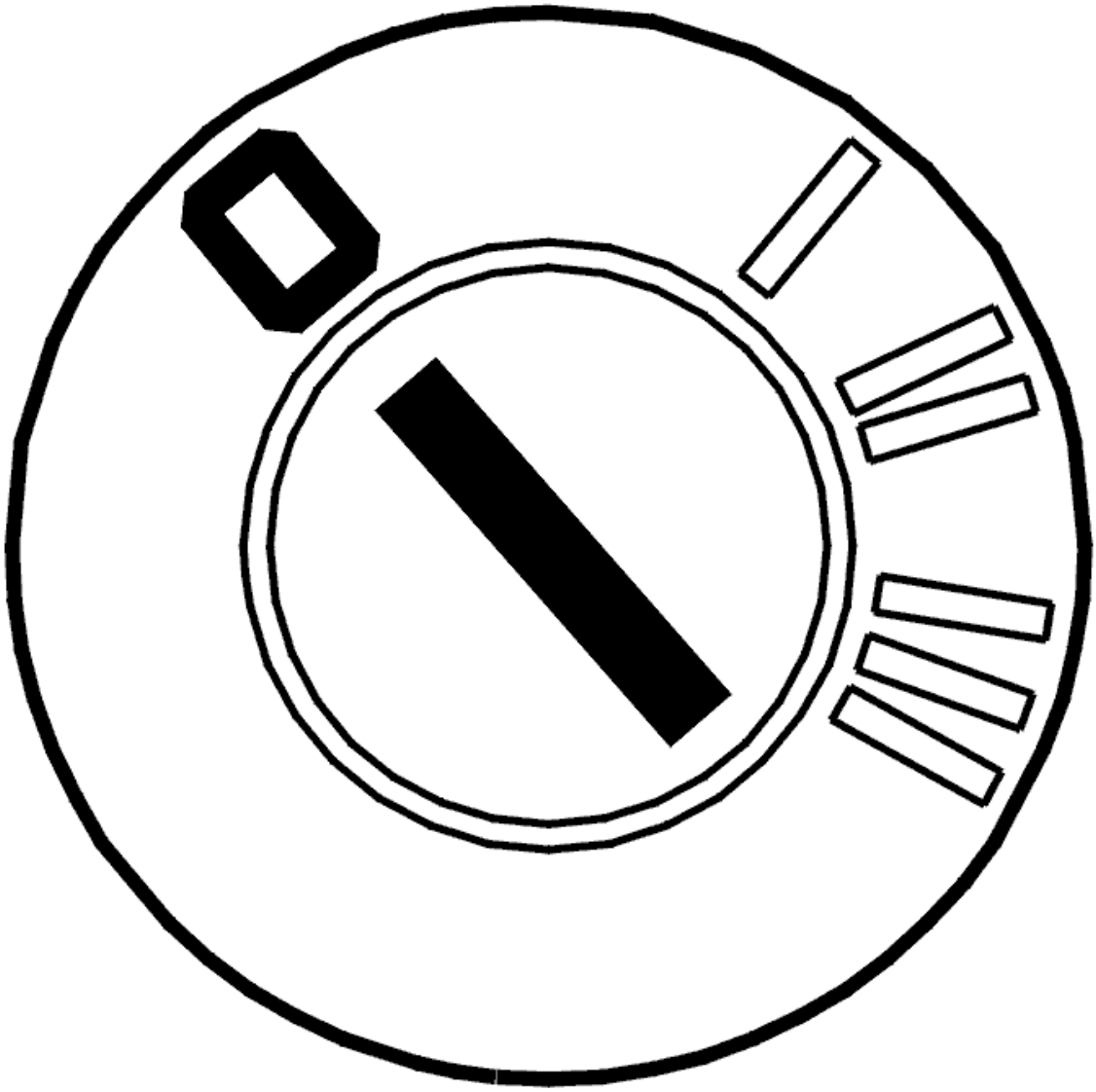


Fig. 22: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box.

Check the power supply cable between transmission control module (TCM) terminal #A57 (#A57) and transmission output speed sensor terminal #A4. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Check the signal cable between control module terminal #A39 (#A39) and transmission output speed sensor terminal #A3. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

HINT: With the control module connected, the ignition on and a voltmeter connected between transmission output speed sensor terminals #A4 and #A3 (control module side), the voltage must be approximately 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To check or replace the transmission output speed sensor, see **INPUT SPEED SENSOR/OUTPUT SPEED SENSOR, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

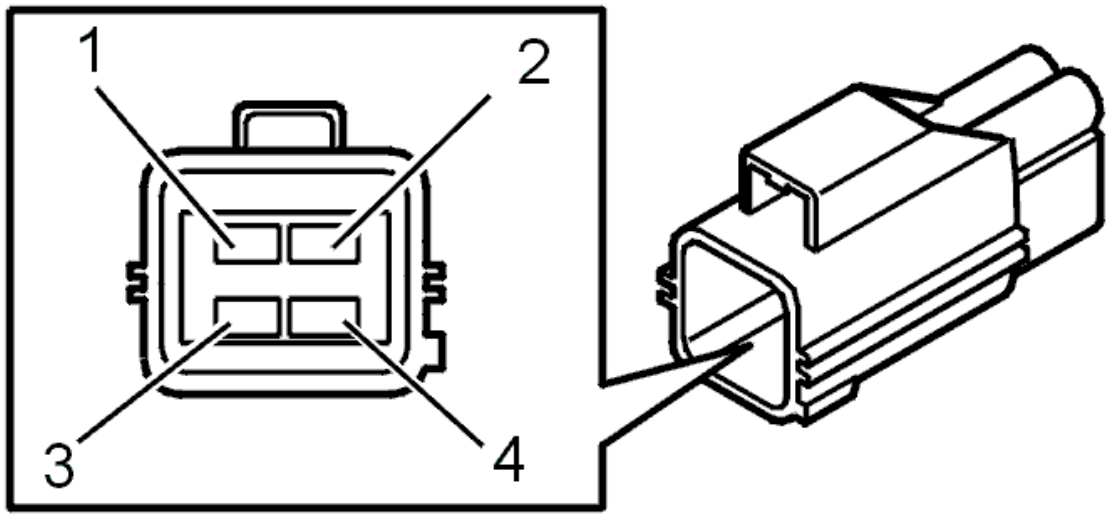


Fig. 23: Identifying Transmission Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

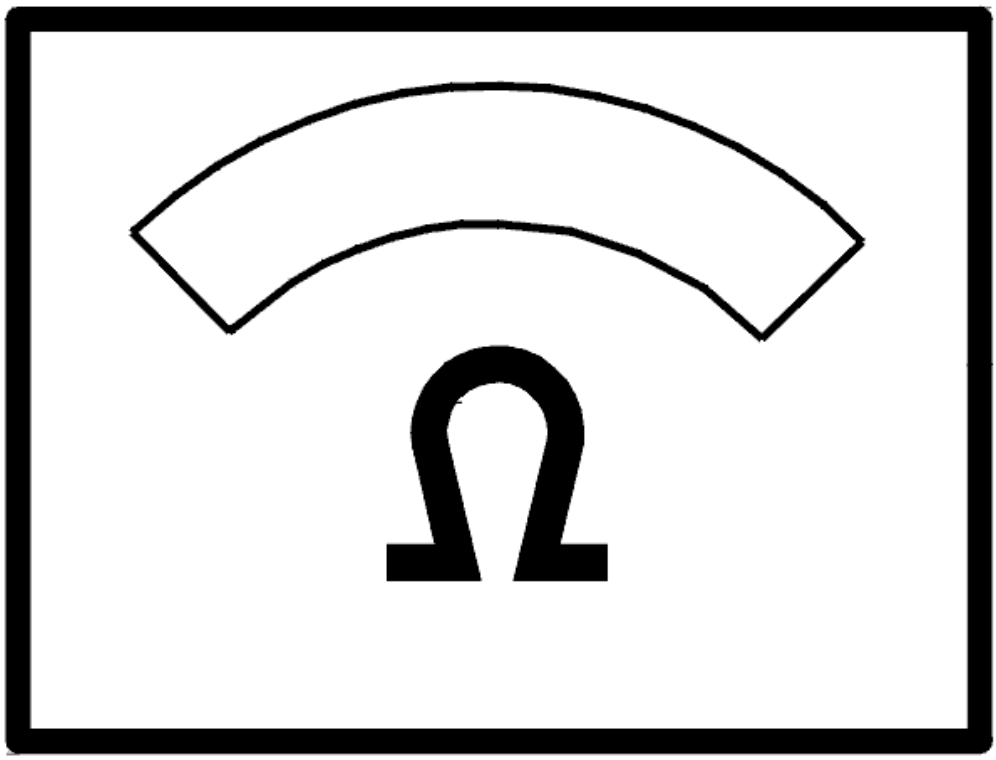


Fig. 24: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INTERMITTENT FAULT

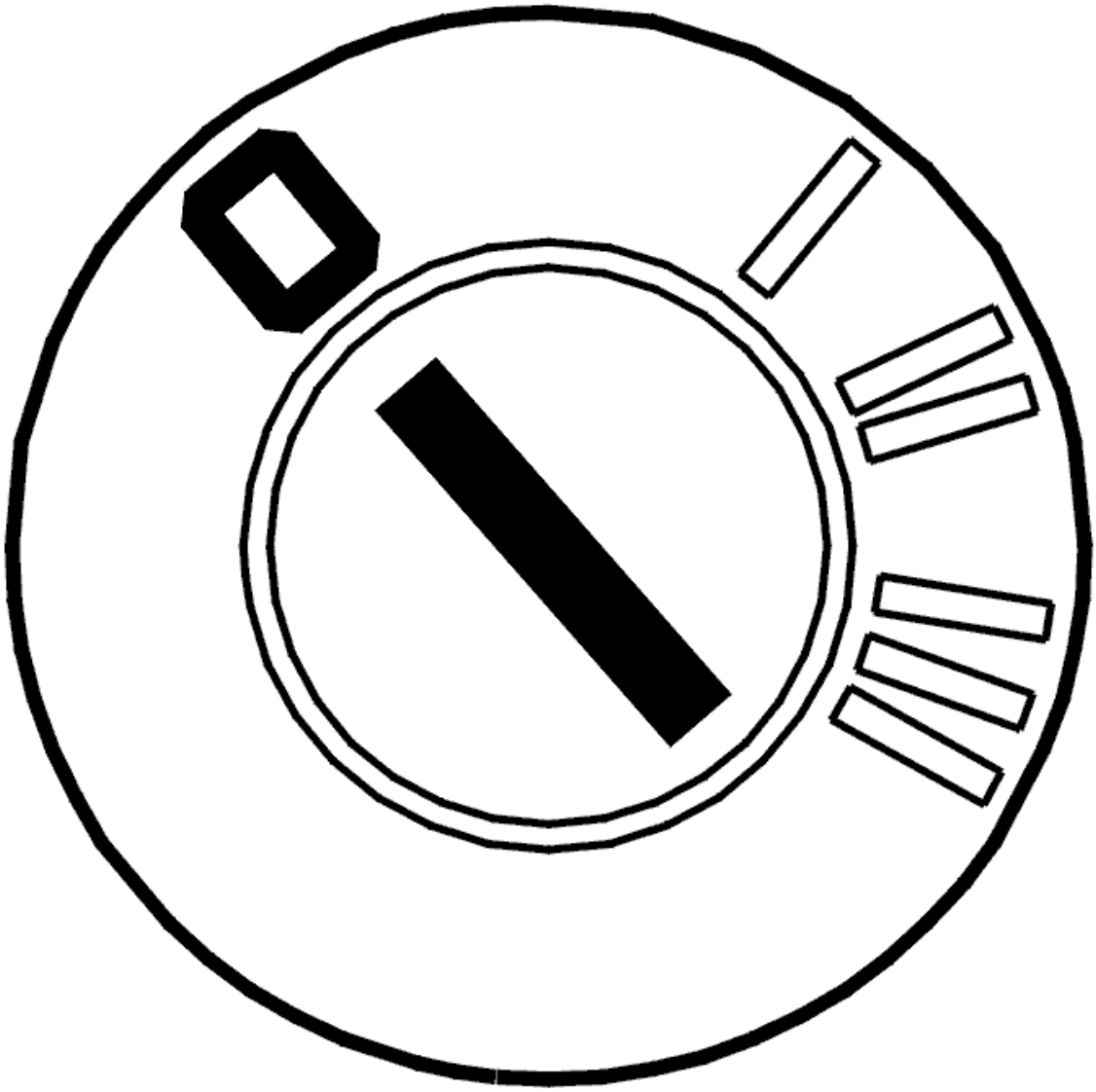


Fig. 25: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the power supply cable between control module terminal #A57 (#A57) and transmission output sensor terminal #A4. Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** . Check for an intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** .

  Check the signal cable between control module terminal #A39 (#A39) and transmission output speed sensor terminal #A3. Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** . Check for an intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** .

  Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

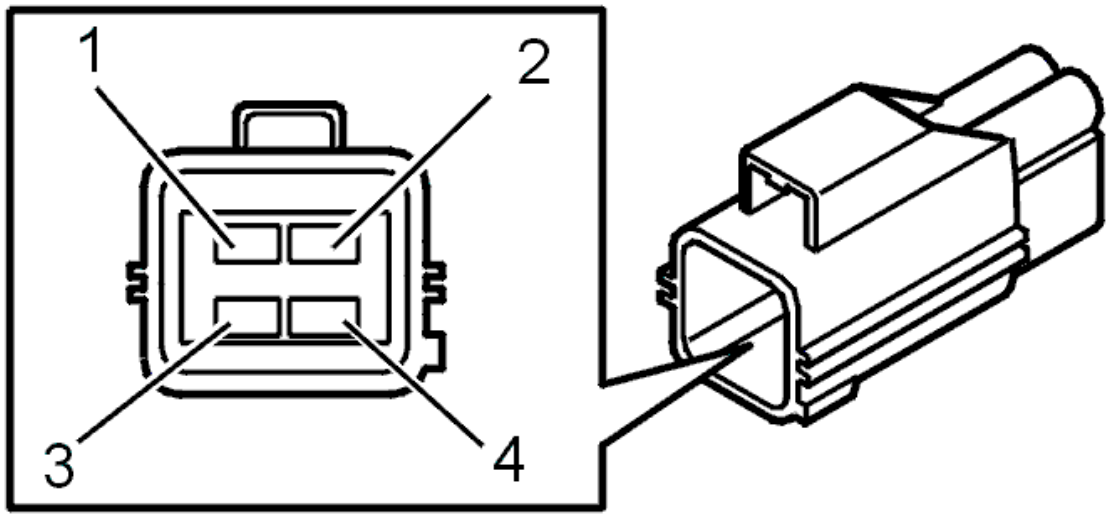


Fig. 26: Identifying Transmission Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

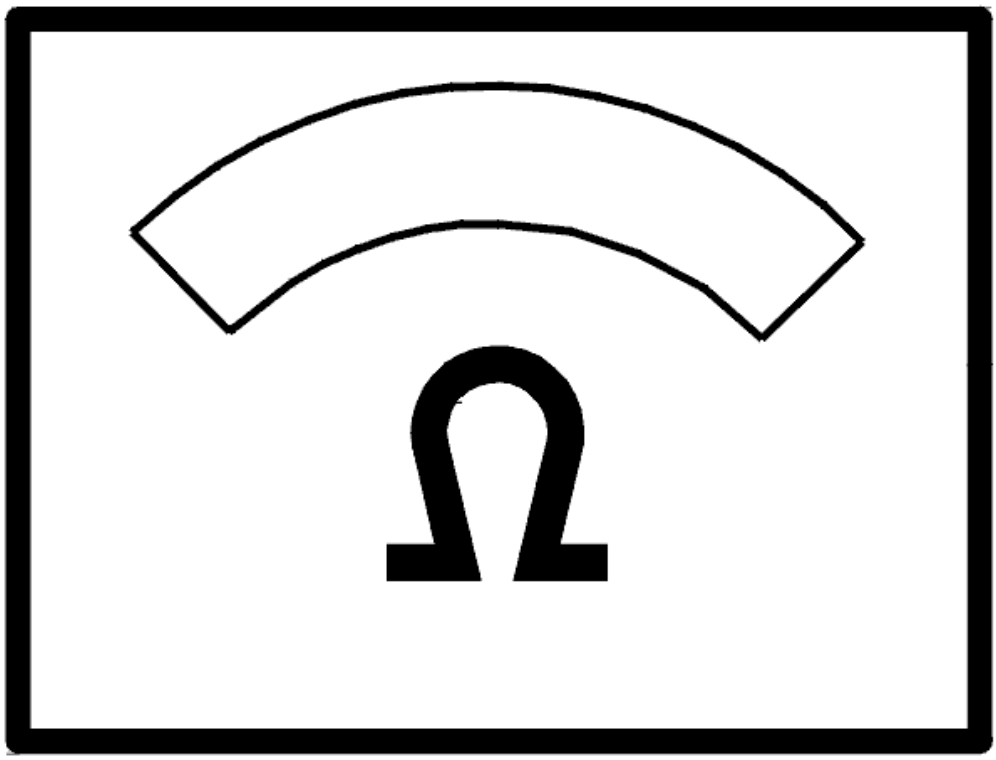


Fig. 27: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

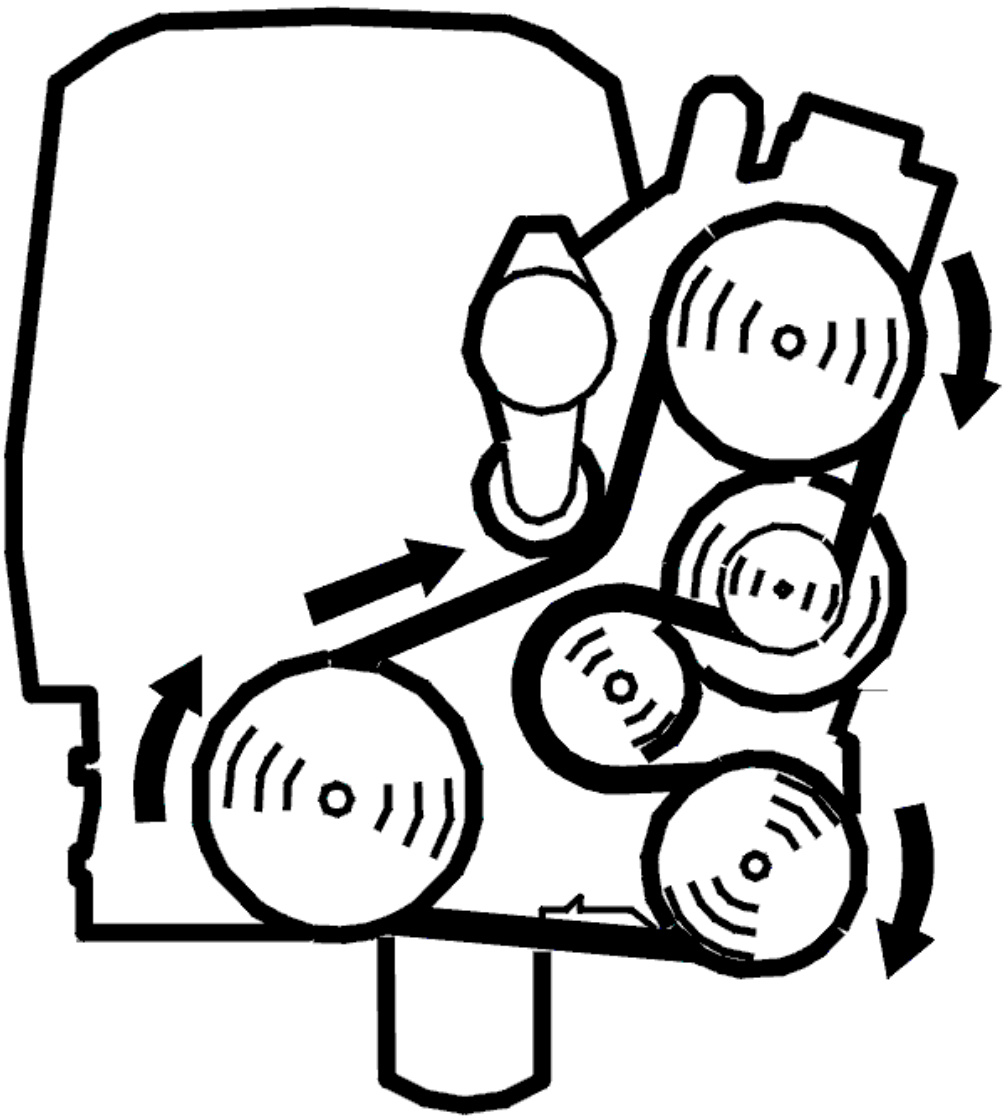


Fig. 28: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

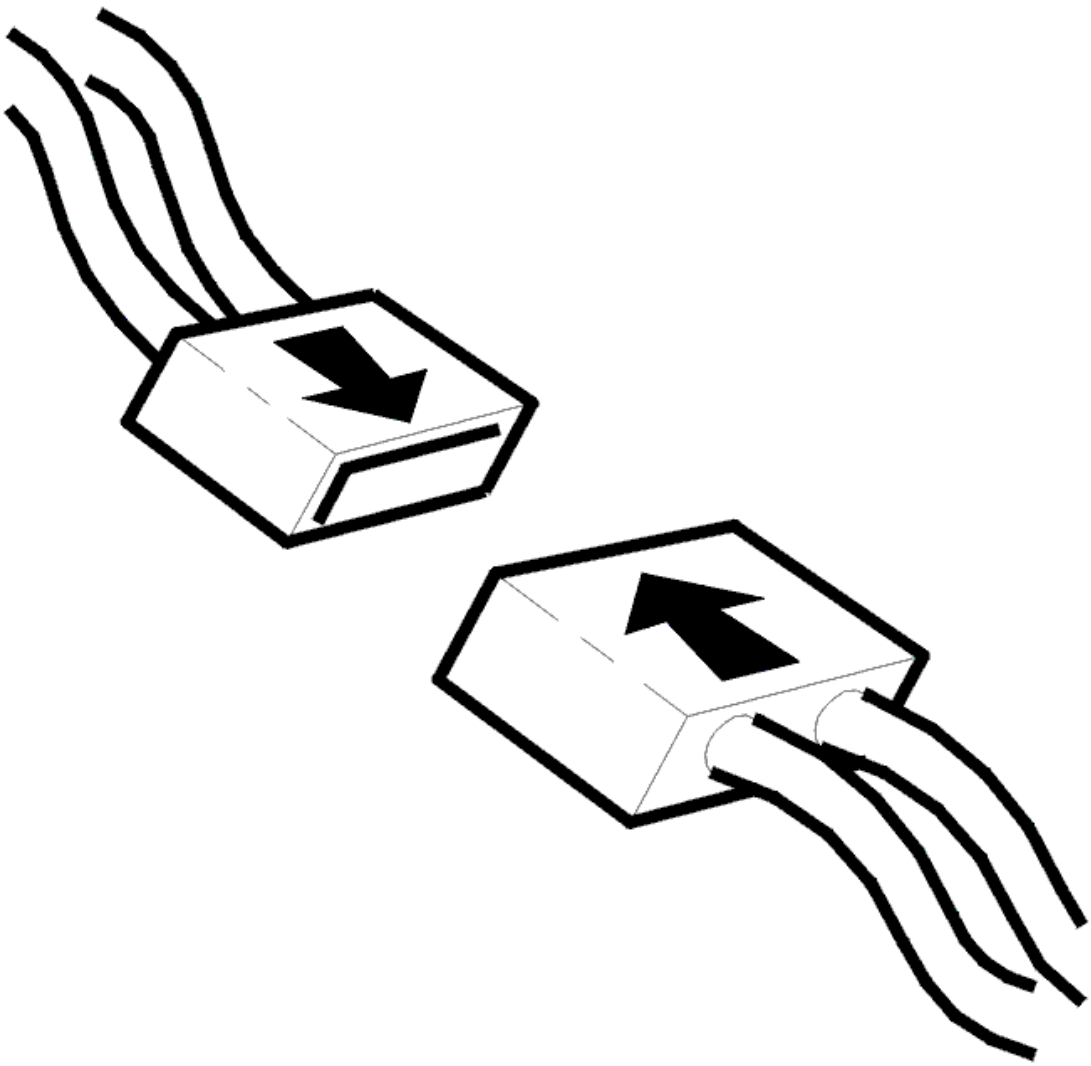


Fig. 29: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Raise car so that drive wheels are unimpeded.
- Start the engine and let it idle.
- Shift gear selector to position D so that the drive wheels begin to rotate.
- Read off the transmission speed.

Check that speed is updated

NOTE: When the rear wheels are stationary and the front wheels rotate, diagnostic trouble codes (DTCs) can be stored in the ABS system. Erase

any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

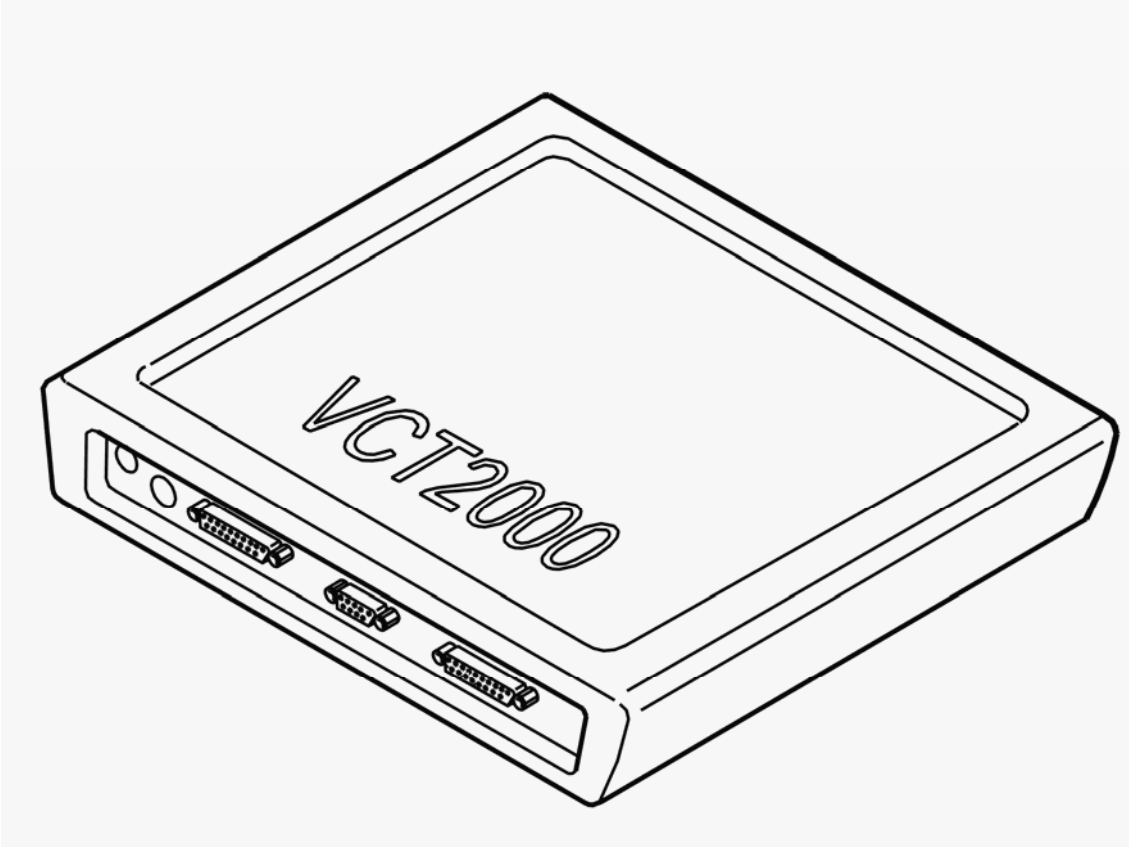


Fig. 30: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0083: VEHICLE SPEED SENSOR. SIGNAL TOO LOW (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

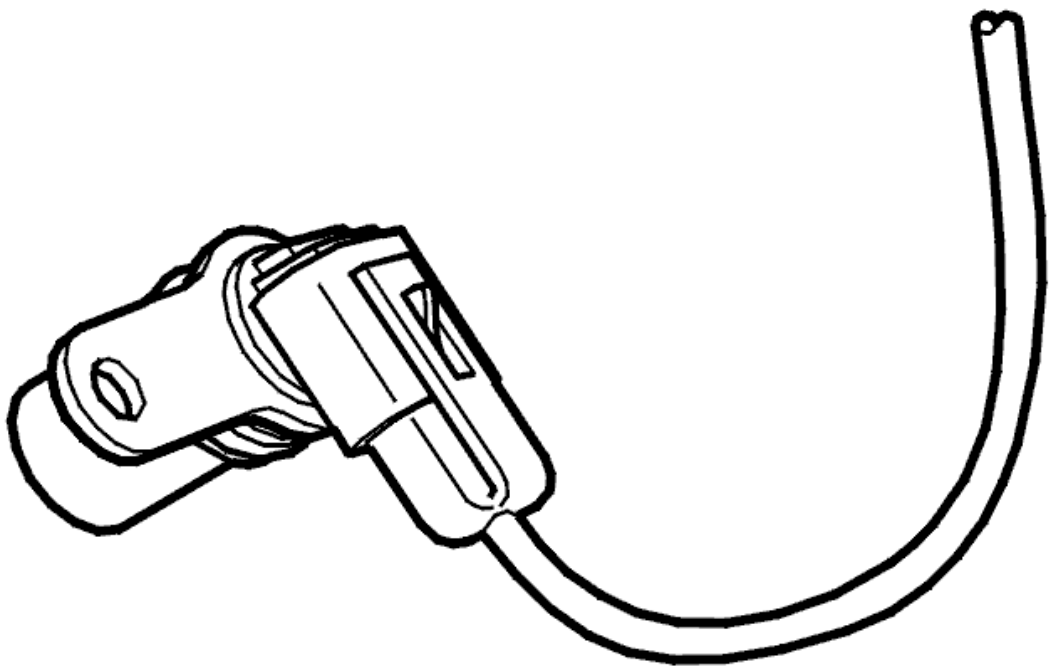


Fig. 31: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The speed signal comes from a sensor on the transmission. The transmission control module (TCM) uses the signal to select the correct gear. The control module also uses the engine speed sensor (RPM) signal to determine the speed. Diagnostic trouble code (DTC) TCM-0083 is stored if the control module registers that the

speed signal is incorrect.

Substitute Value

- TBD

Possible Source

- Contact resistance in the terminals.
- Signal cable (+) or signal cable (-) short-circuited to ground, to supply voltage or to each other.
- Defective transmission speed sensor.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

SIGNAL TOO LOW

CHECKS

CHECKING THE TRANSMISSION OUTPUT SPEED SENSOR SIGNAL

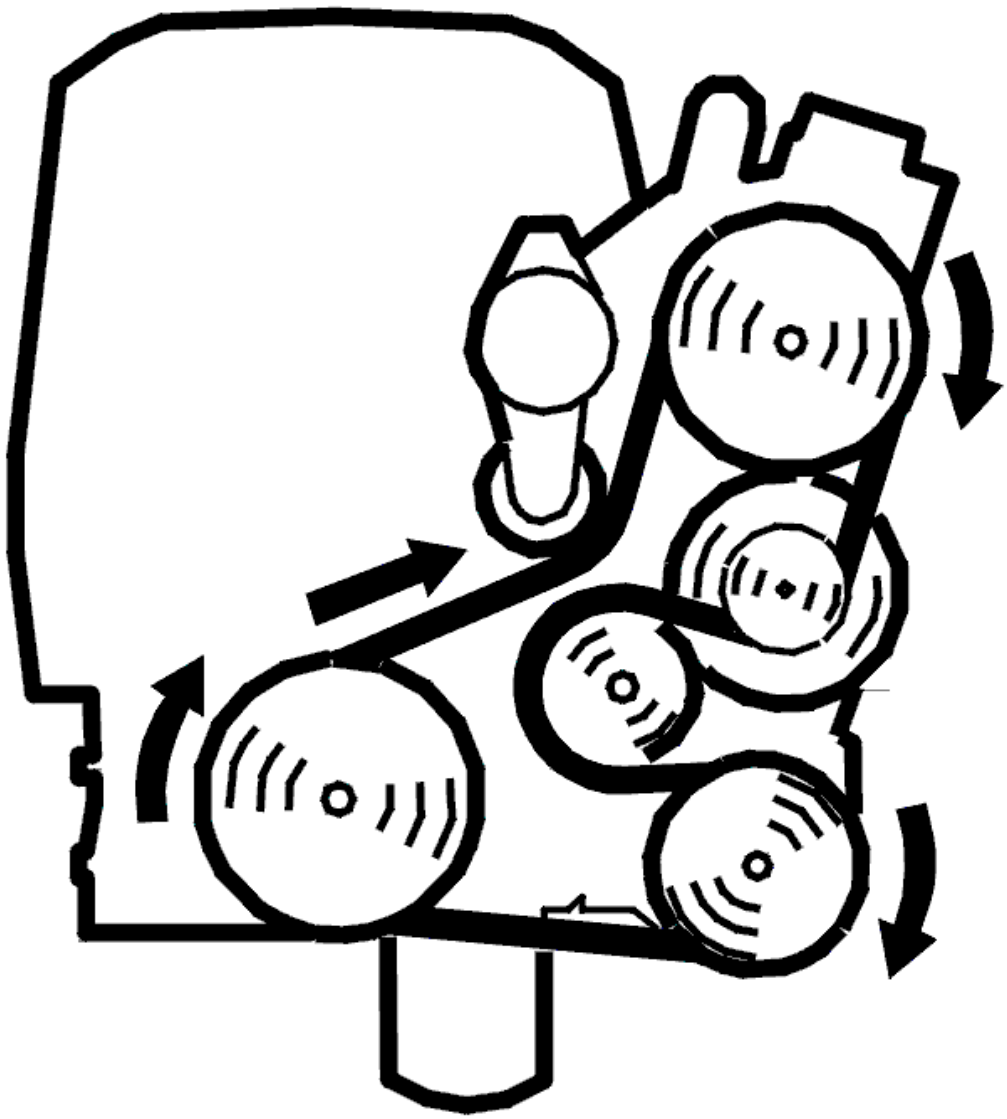


Fig. 32: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Raise the car so that the drive wheels are clear of the ground
- Start the engine. Allow the engine to idle
- Shift gear selector to position D so that the drive wheels begin to rotate
- Read off the transmission speed.

Depress the accelerator pedal (AP) and check that the speed is updated.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

NOTE: Diagnostic trouble codes (DTCs) may be stored in the ABS system when

the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

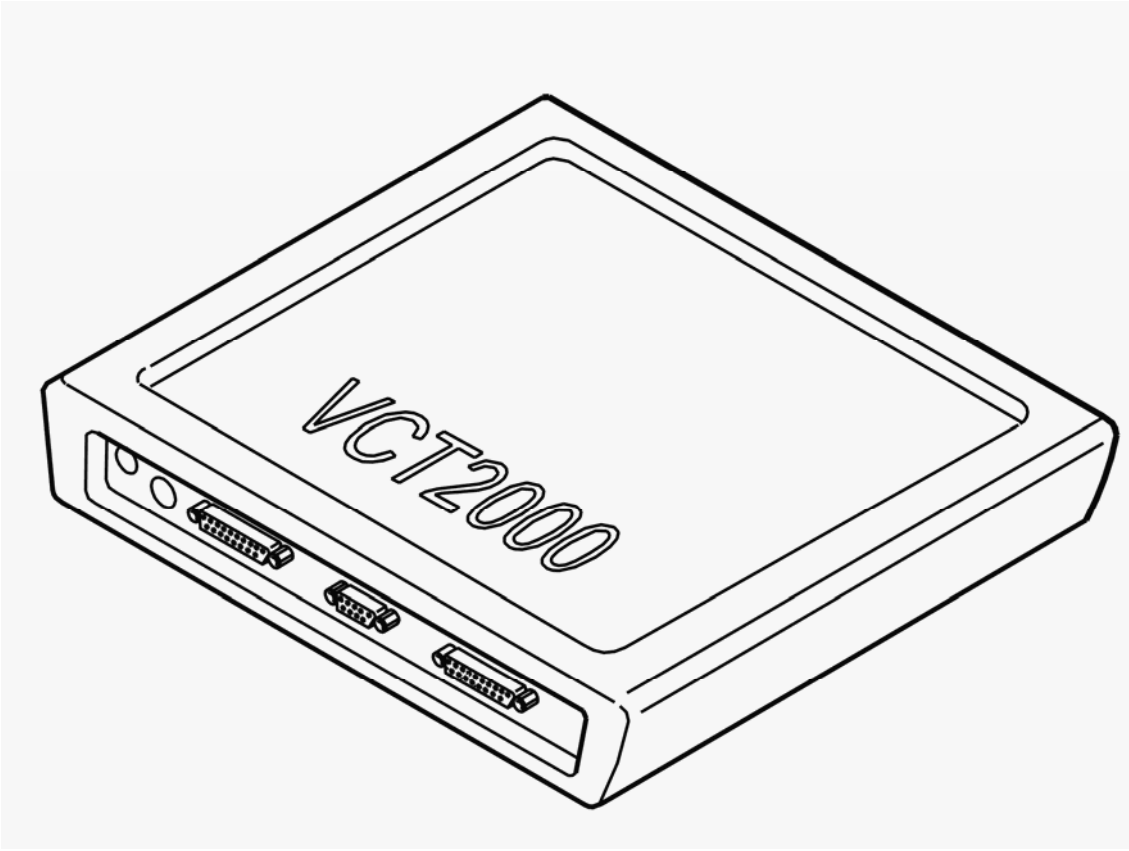


Fig. 33: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the speed updated?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

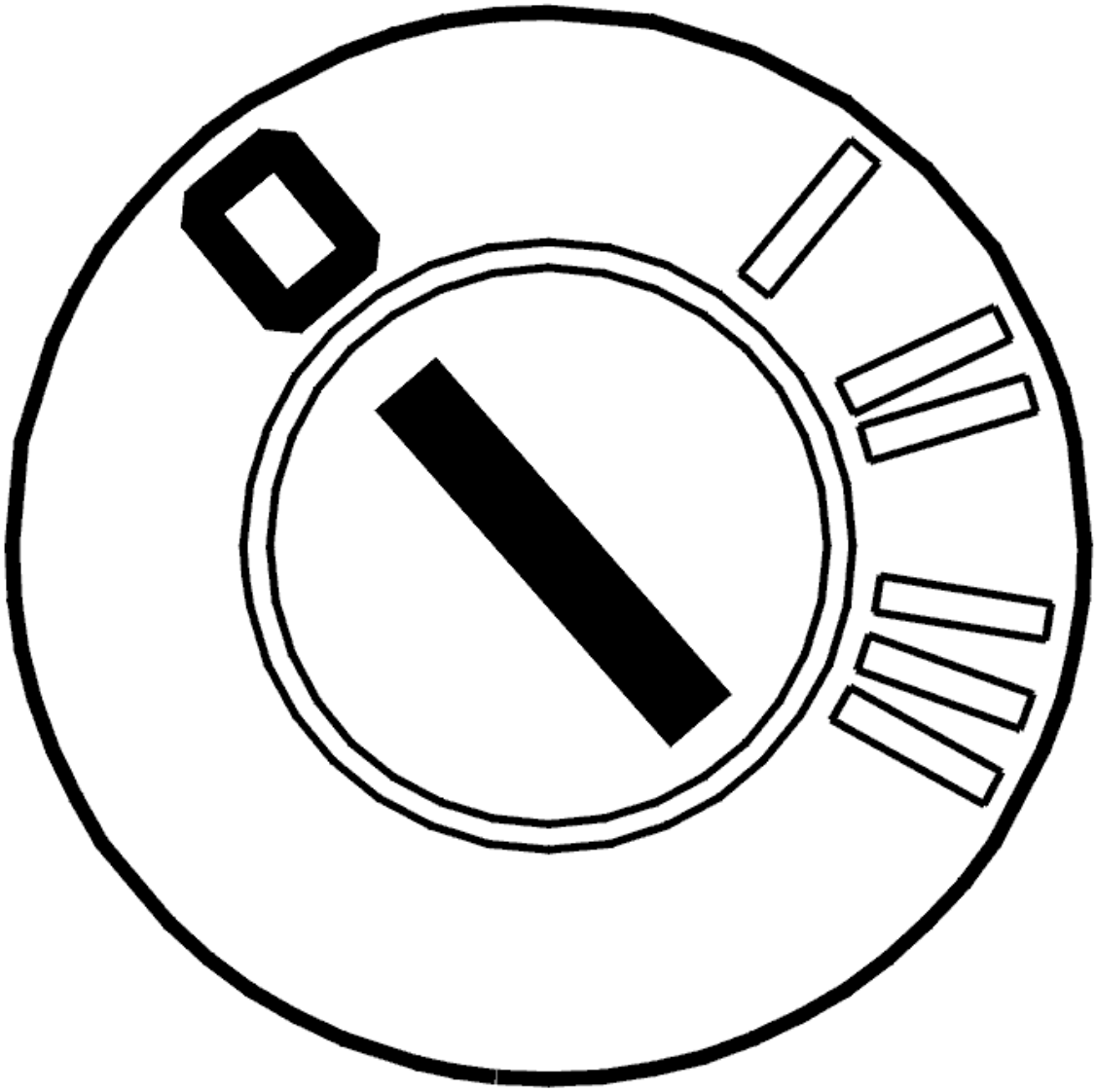


Fig. 34: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the power supply cable between control module terminal #57 (#A57) and speed sensor connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground.

  Check the signal cable between control module terminal #39 (#A39) and speed sensor connector terminal #2. Check for an open-circuit. Check for a short-circuit to ground.

  Remedy as necessary.

  Other information

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**

- To check or replace the transmission output speed sensor, see **OUTPUT SPEED SENSOR TRANSMISSION, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

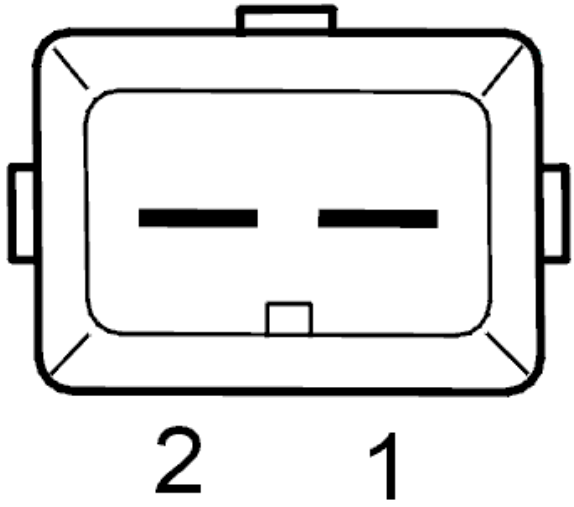


Fig. 35: Identifying Vehicle Speed Sensor (VSS) Connector Terminals
Courtesy of VOLVO CARS CORPORATION

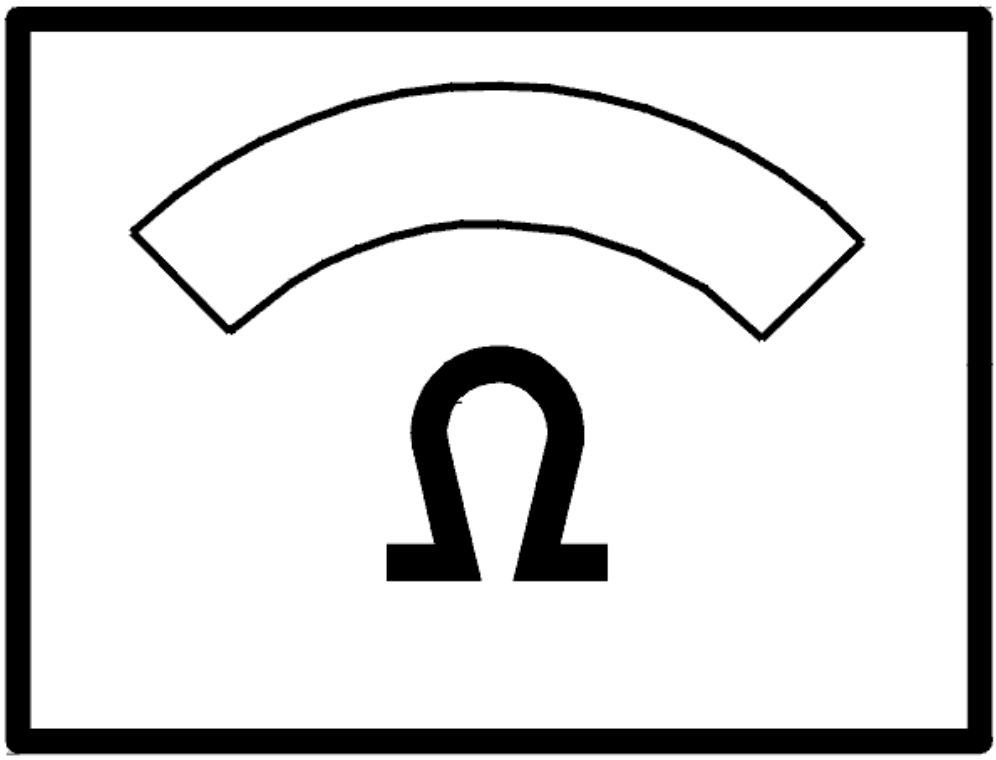


Fig. 36: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

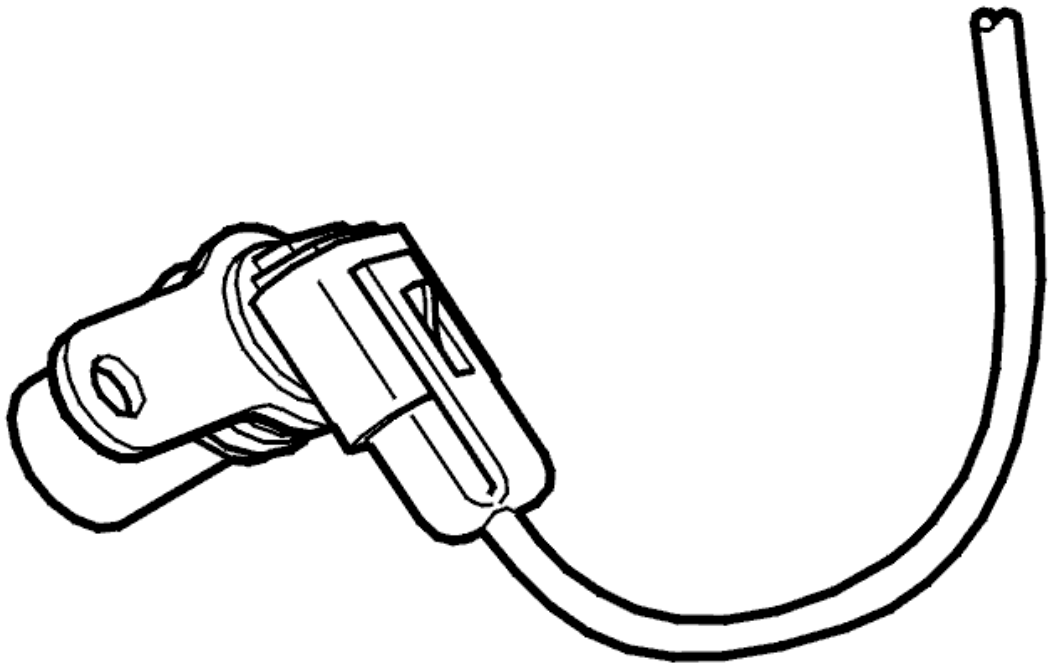


Fig. 37: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

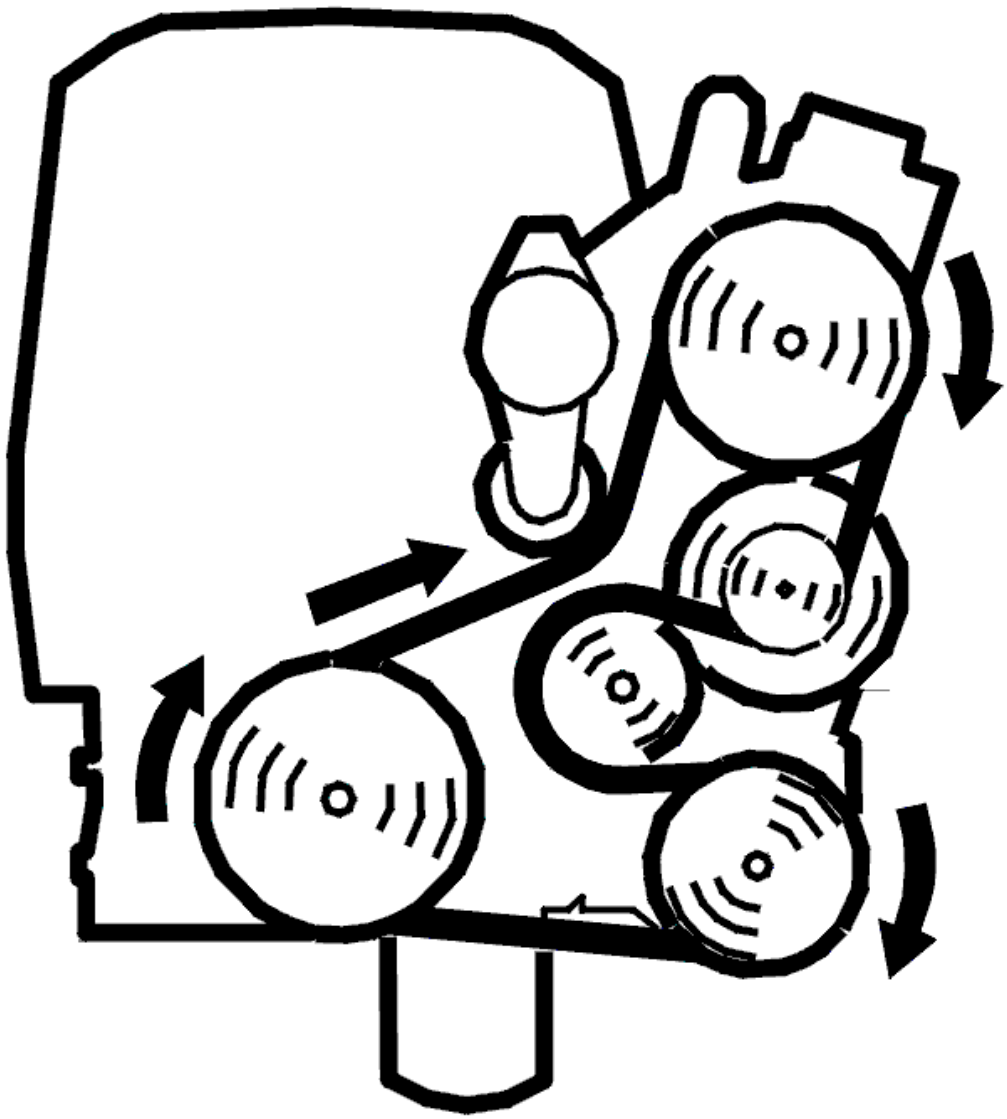


Fig. 38: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the control module
- Disconnect the connector for the speed sensor
- Connect a temporary cable between terminals #A35 and #A57 on the breakout box

CAUTION: Check that the temporary cable is connected to the correct terminals. Also check that there is no risk of unintentional short-circuits.

-
- Ignition on
- Read off the status.

Check that the status is "1" when the temporary cable is connected to the terminals above.

Disconnect the cable end that is connected to terminal #A35 and move the cable to terminal #A53.

NOTE: Leave the cable end connected to terminal #A57 (#A57) in place.

Check that the status changes to "0" when the temporary cable has been moved to terminal #A53.

The transmission speed sensor is defective if the status has changed between "1" and "0" as above and no errors have been detected on the cables or terminals in the preceding checks. Replace the transmission speed sensor if this is the case.

The transmission control module (TCM) is defective if the status has not changed between "1" and "0" as above and no errors have been detected on the cables or terminals in the preceding checks. If this is the case replace the control module.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To check or replace the transmission output speed sensor, see **OUTPUT SPEED SENSOR TRANSMISSION, REPLACING**
- To replace the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION** .

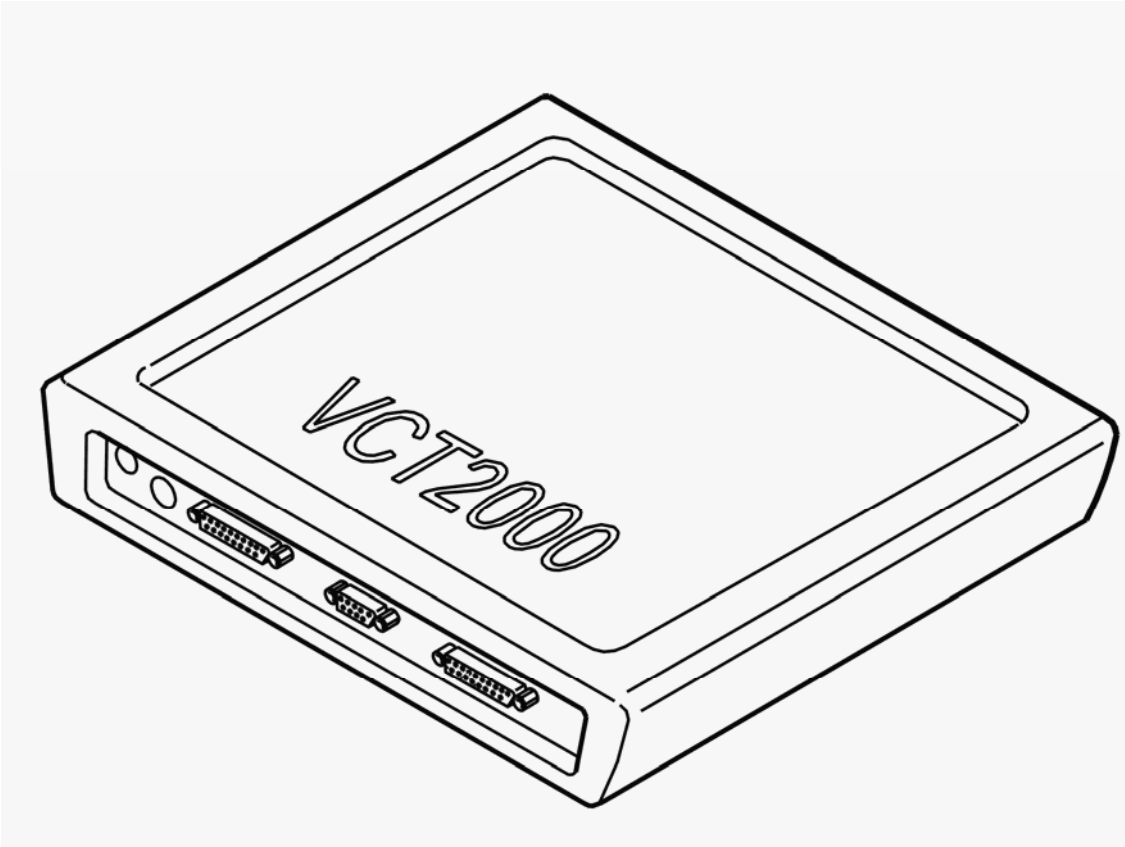


Fig. 39: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INTERMITTENT FAULT

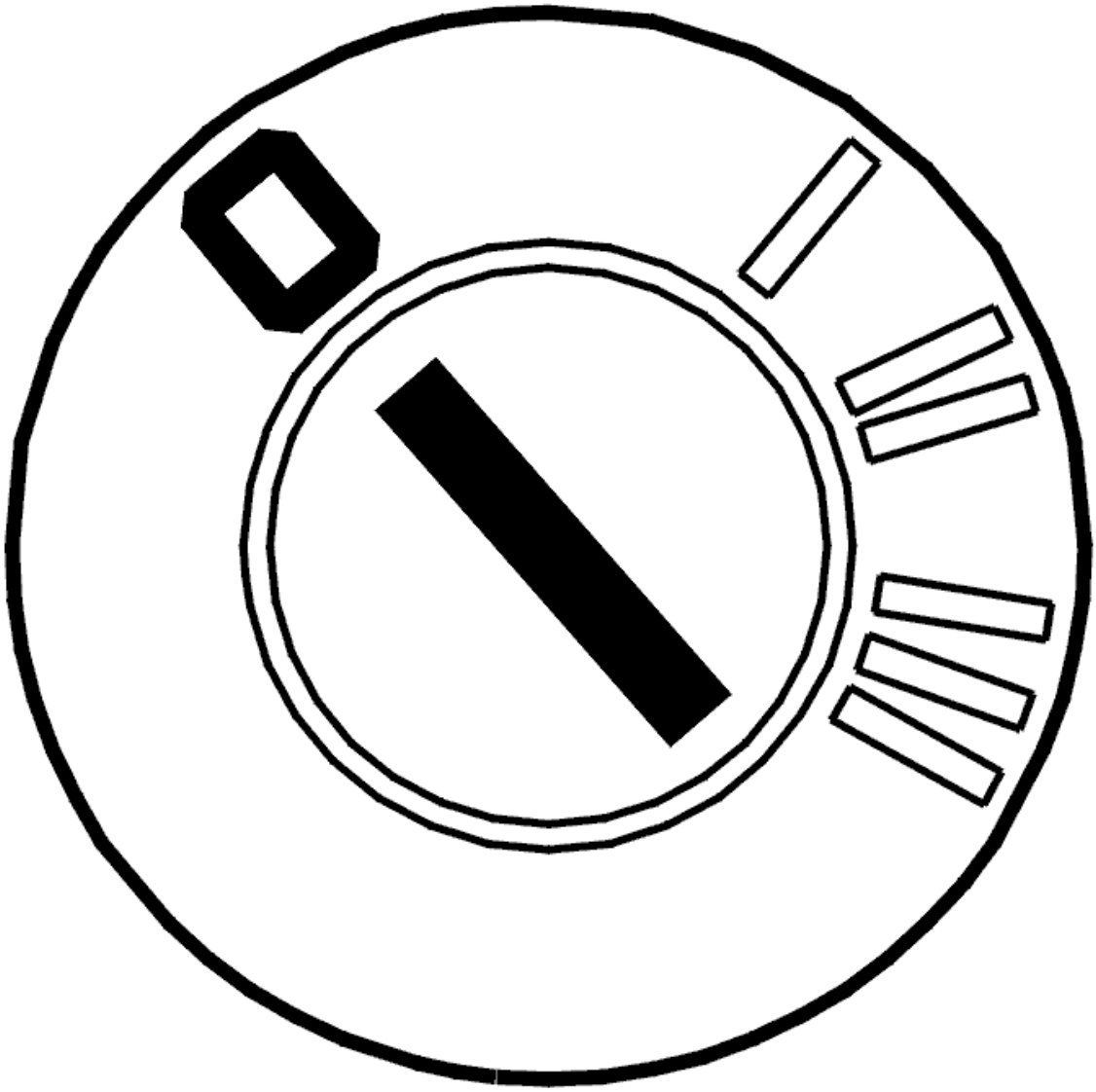


Fig. 40: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the control module and transmission output speed sensor connectors. Check for contact resistance and oxidation.

  Check the power supply cable between control module terminal #57 (terminal #A57) and speed sensor connector terminal #1. Check for an intermittent open-circuit. Check for an intermittent short-circuit to ground.

  Check the signal cable between control module terminal #39 (terminal #A39) and speed sensor connector terminal #2. Check for an intermittent open-circuit. Check for an intermittent short-circuit to ground.

  HINT: With the control module connected, the ignition on and a voltmeter connected between

speed sensor connector terminals #1 and #2 (control module side), the voltage should be approximately 1-3 V below Ubat.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

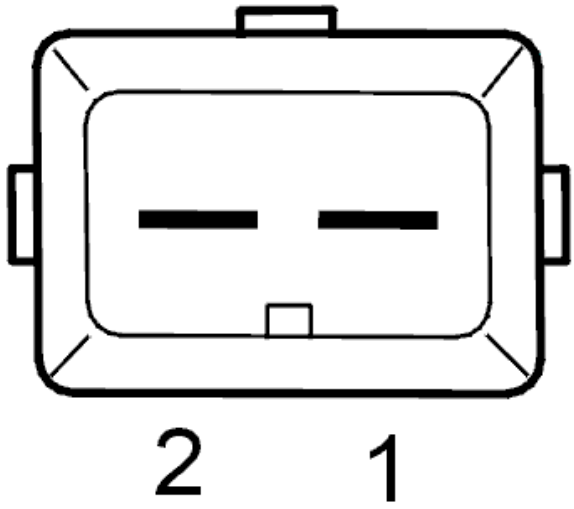


Fig. 41: Identifying Vehicle Speed Sensor (VSS) Connector Terminals
Courtesy of VOLVO CARS CORPORATION

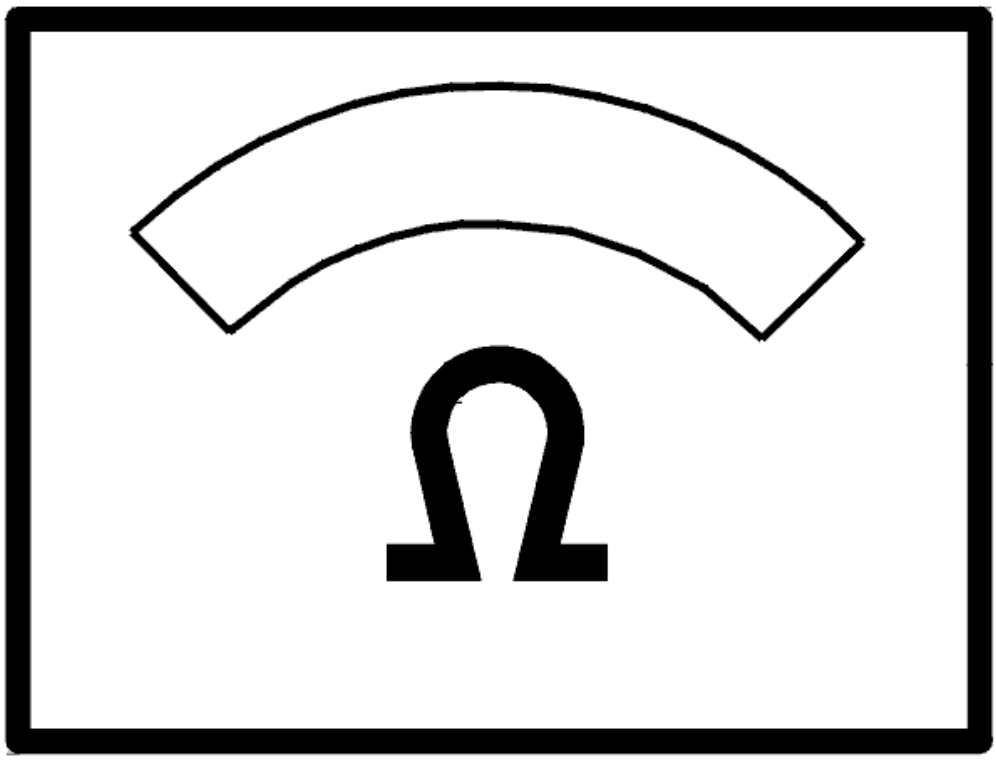


Fig. 42: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

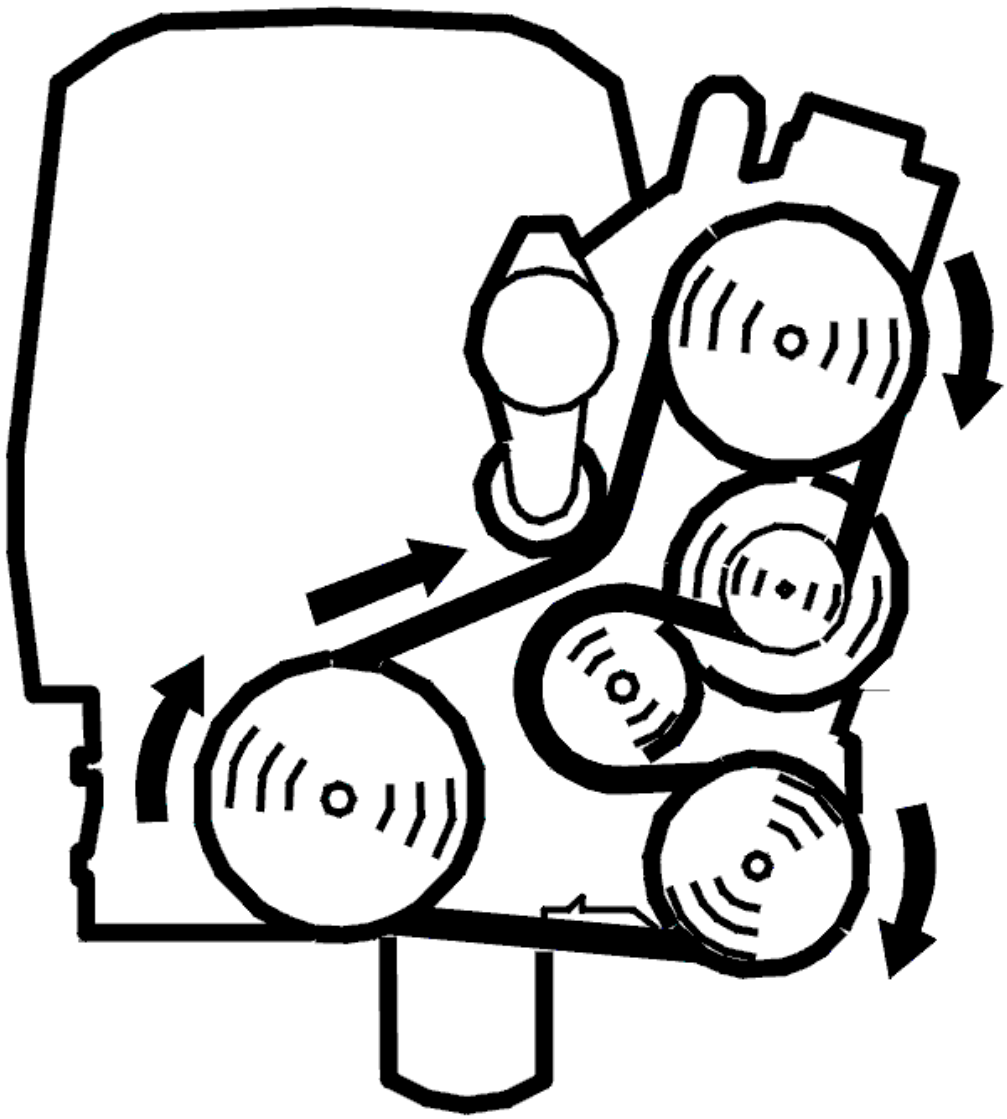


Fig. 43: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

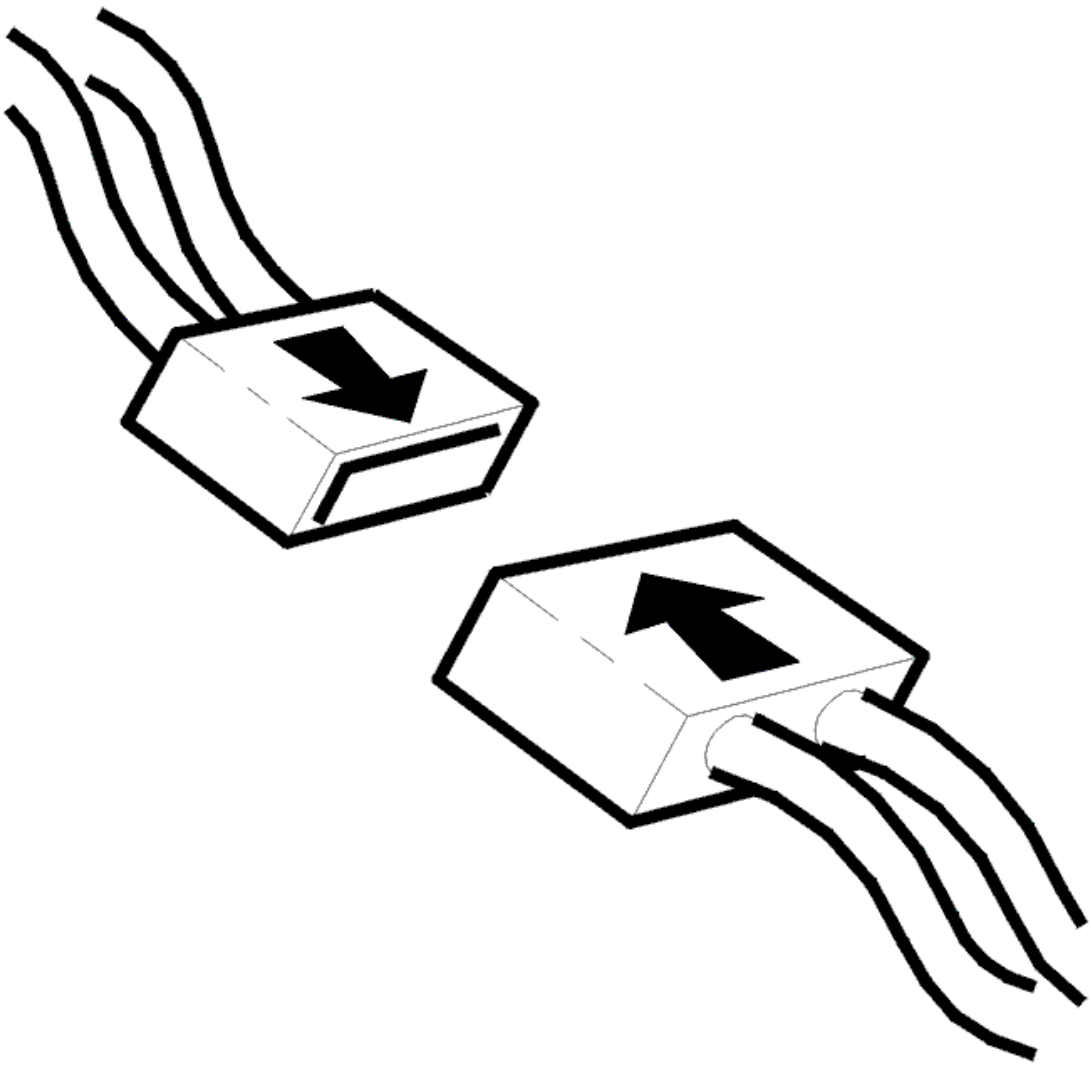


Fig. 44: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Raise car so that drive wheels are unimpeded.
- Start the engine and let it idle.
- Shift gear selector to position D so that the drive wheels begin to rotate.
- Read off the transmission speed.

Check that speed is updated

NOTE: When the rear wheels are stationary and the front wheels rotate, diagnostic trouble codes (DTCs) can be stored in the ABS system. Erase

any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

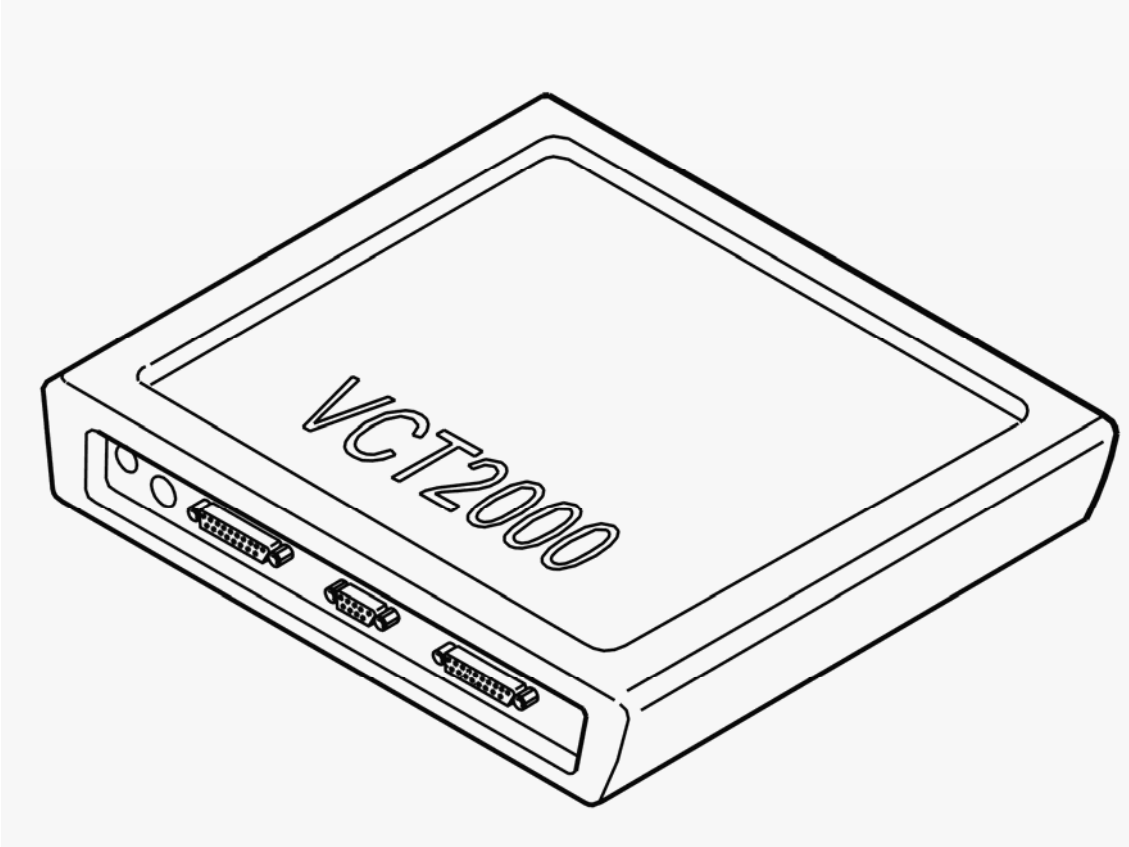


Fig. 45: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0087: INPUT SPEED SENSOR. SIGNAL TOO HIGH (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

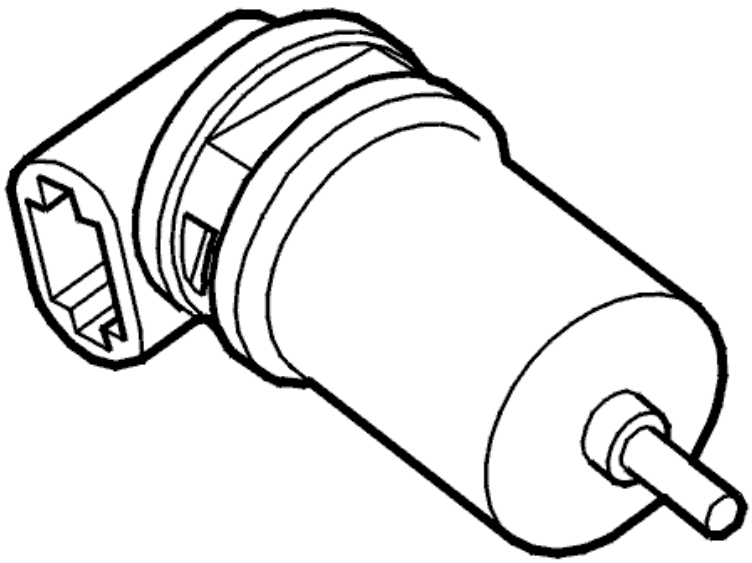


Fig. 46: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The transmission speed signal is transmitted by a sensor on the transmission. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare the transmission speed with vehicle speed. The transmission control module (TCM) uses this

comparison to calculate gear-shift timing. Engine speed (RPM) and vehicle speed data affects the adjustment of system pressure, lock-up function control and engine torque reduction. The result is smooth gear-shifting. Diagnostic trouble code (DTC) TCM-0087 is stored if the control module registers, when comparing with the transmission speed signal, that the engine speed (RPM) signal is too high when the vehicle speed is above approximately 25 km/h.

Substitute Value

- TBD

Possible Source

- Power supply (-) short-circuited to supply voltage.
- Defective input speed sensor.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

SIGNAL TOO HIGH

CHECKS

CHECKING THE TRANSMISSION INPUT SPEED SENSOR SIGNAL

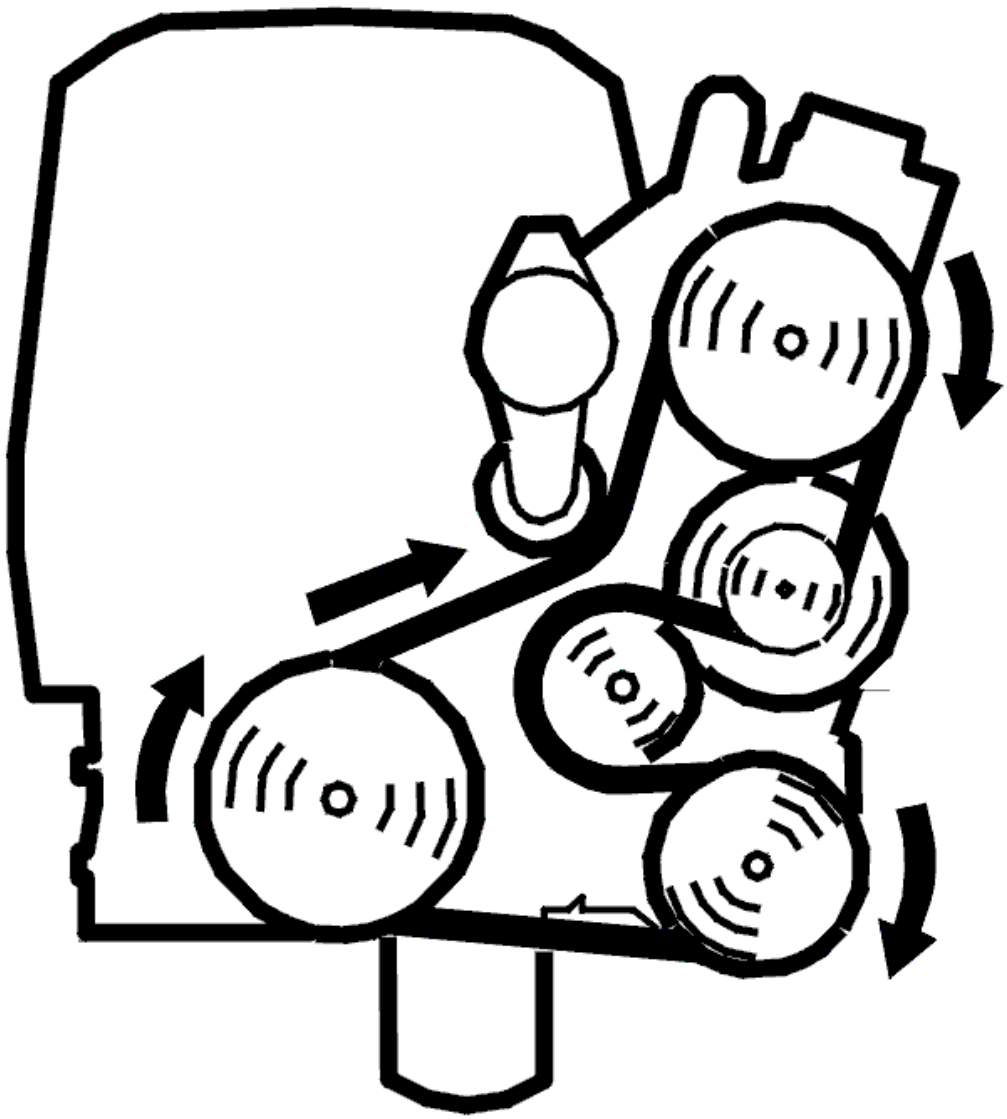


Fig. 47: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

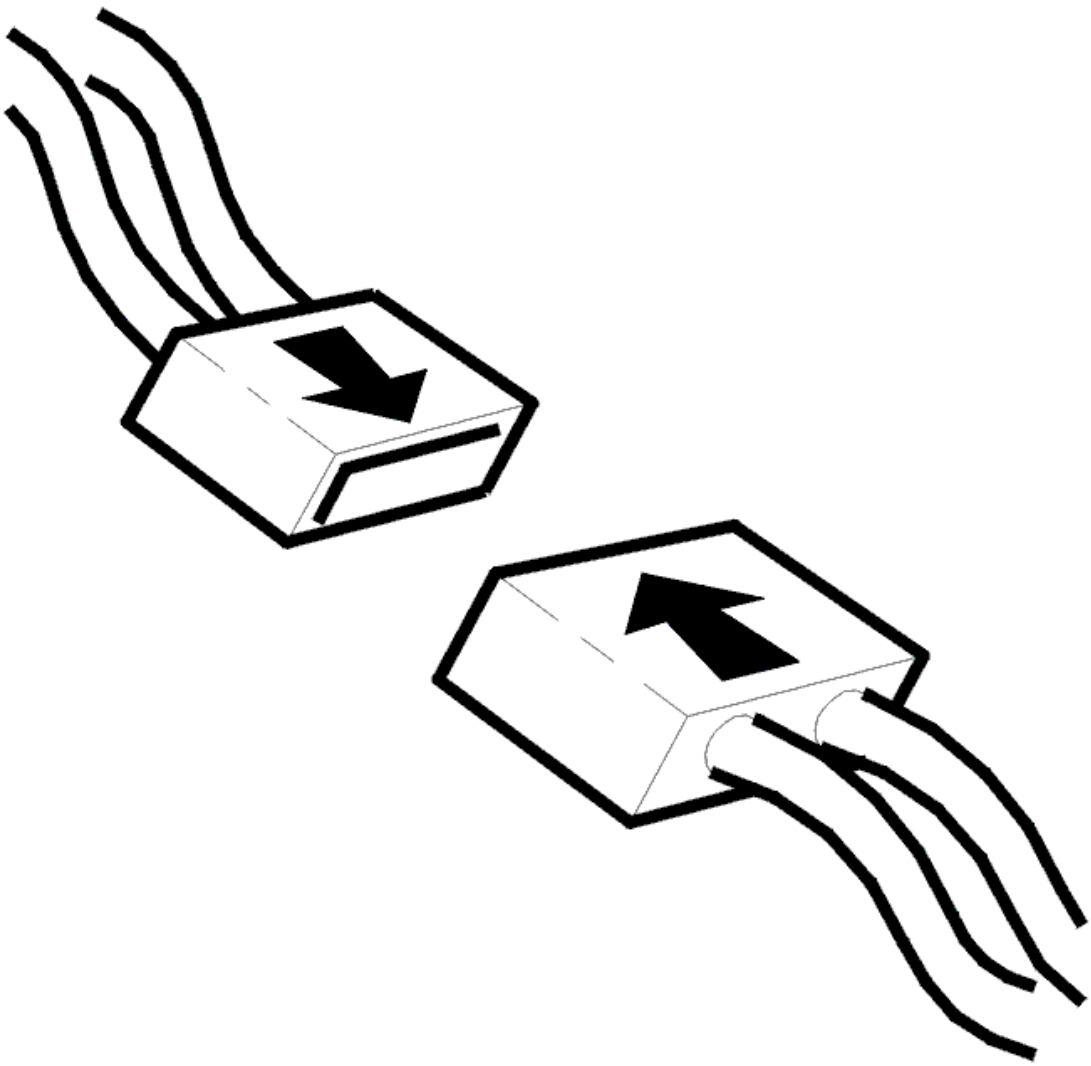


Fig. 48: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Start the engine
- Read off the transmission input speed.

  Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated. Compare with the engine speed (RPM).

  Other information

  - To access the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - To access the control module connector, see **CONNECTING THE BREAKOUT BOX** .

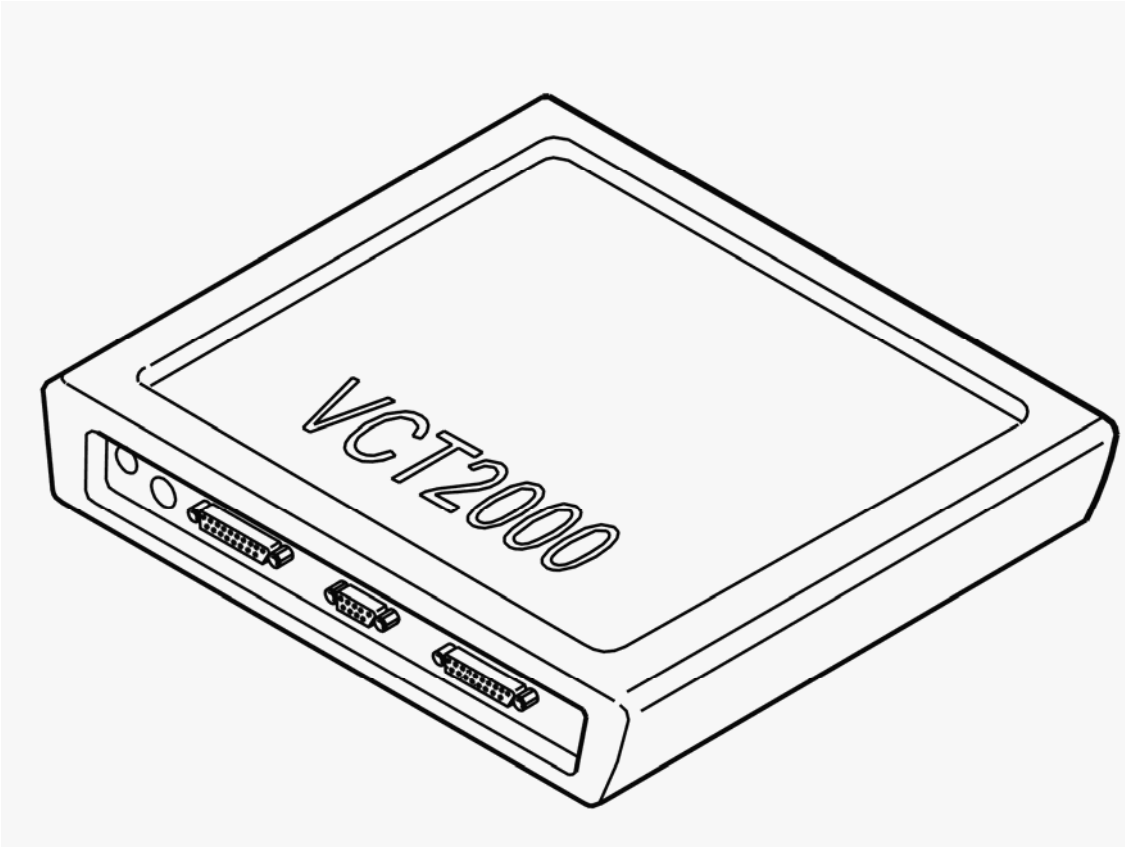


Fig. 49: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

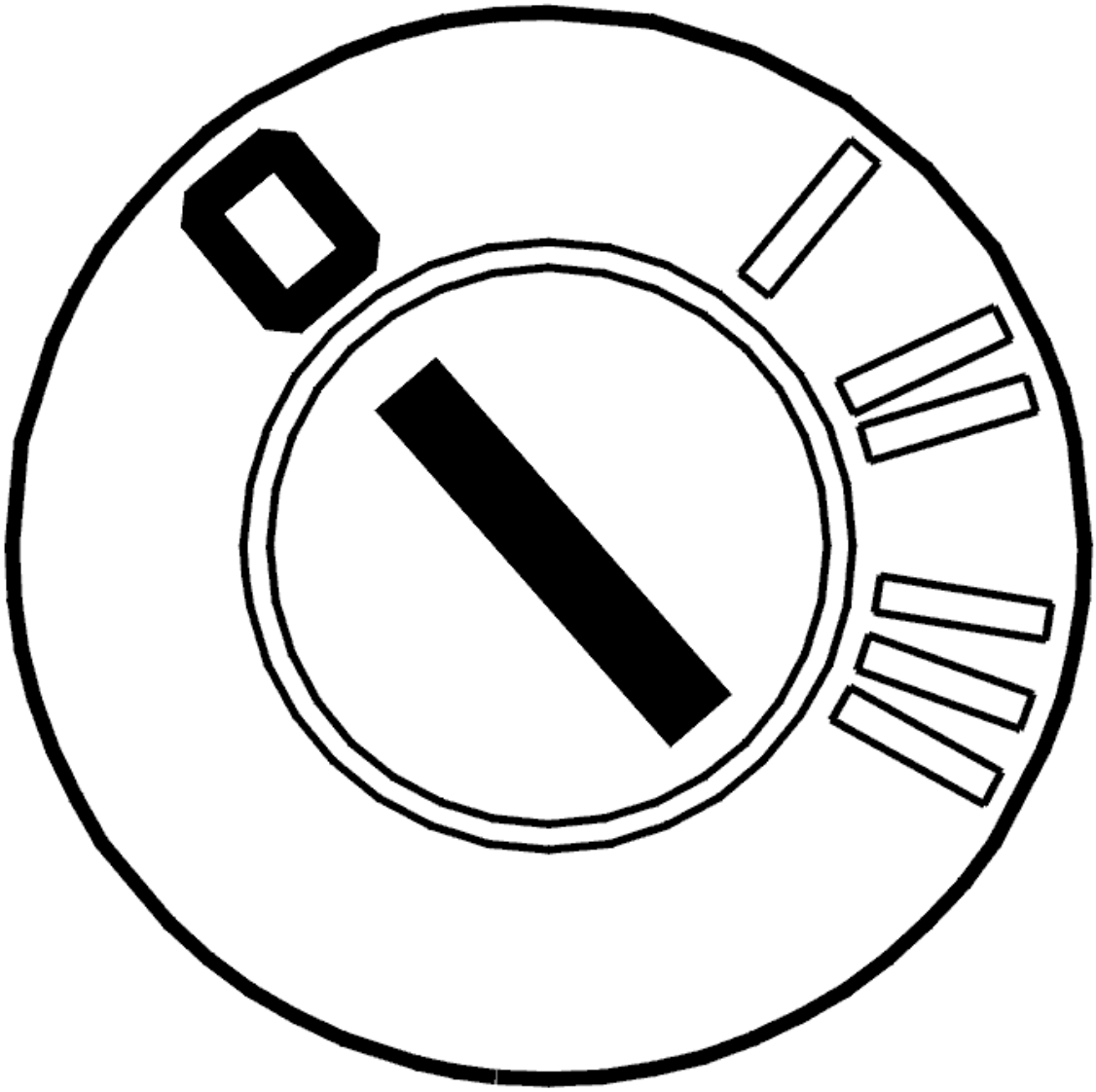


Fig. 50: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

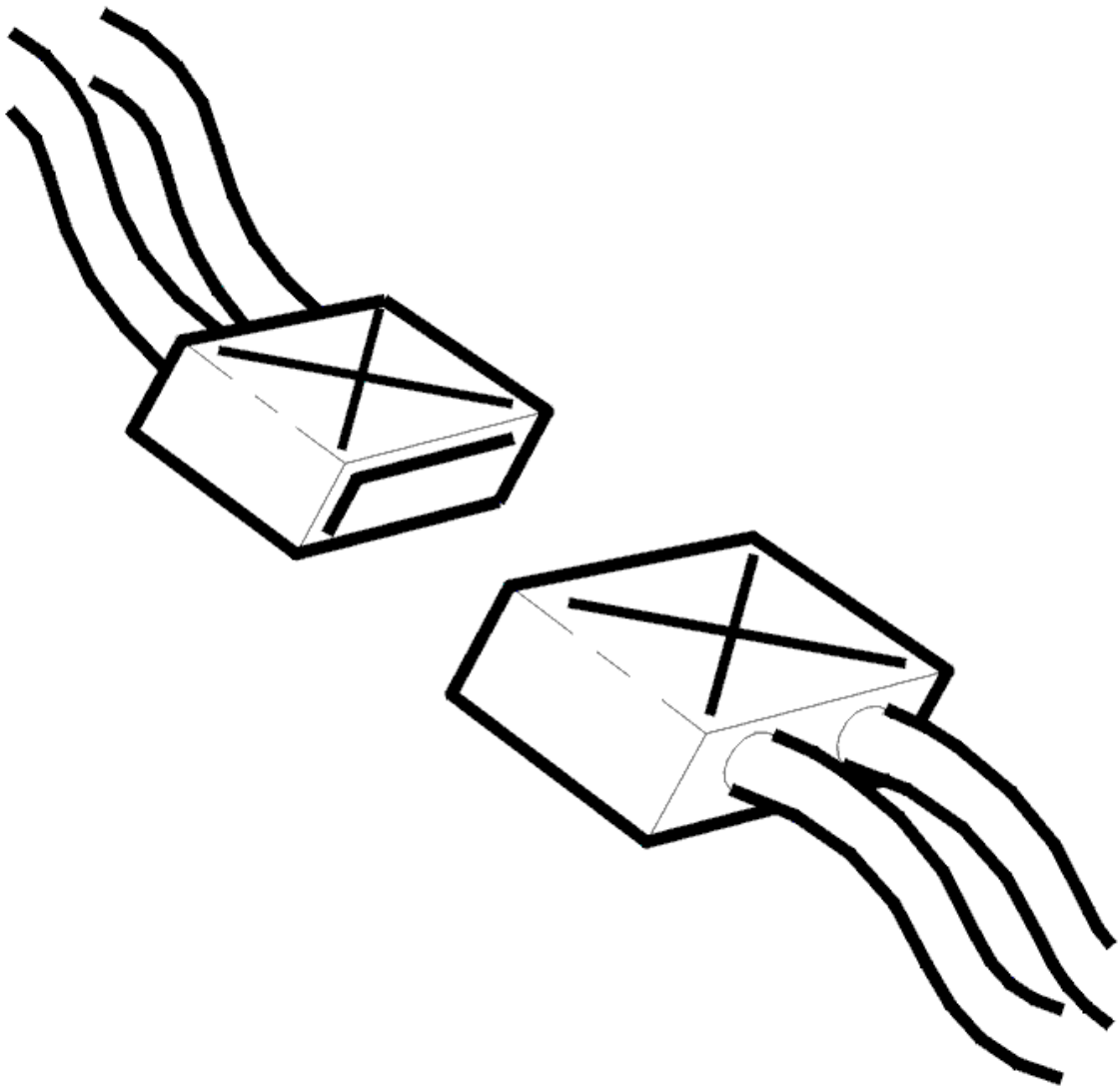


Fig. 51: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

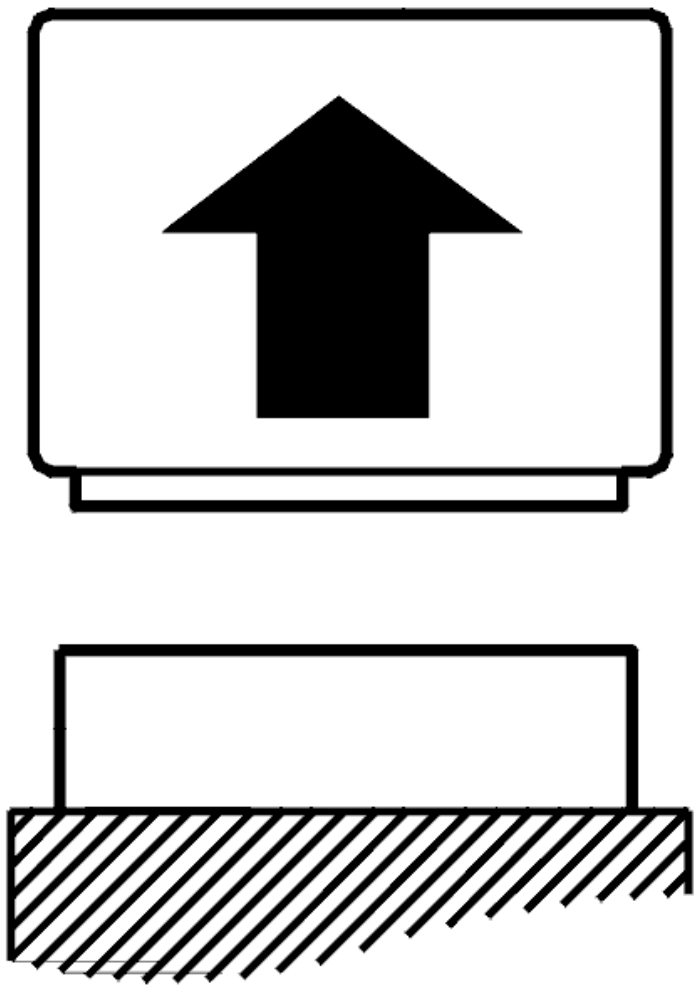


Fig. 52: Disconnecting Connector
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the transmission
- Disconnect the control module
- Disconnect the transmission connector
- Connect adapter see **9511505** and breakout box see **9813190** to the transmission connector (control module side).

  Check the wiring between control module terminals #59 (#A59) and #41 (#A41) and transmission connector terminals #S (#A16) and #V (#A19). Check for a short-circuit to each other.

  Check the power supply cable between control module terminal #59 (#A59) and transmission connector terminal #S (#A16). Check for a short-circuit to supply voltage.

Check the signal cable between control module terminal #41 (#A41) and transmission connector terminal #V (#A19). Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- For information about signals to the transmission connector, see **SIGNAL DESCRIPTION. CONNECTOR 4T65 EV/EV-GT**
- see **CHECKING WIRING AND TERMINALS**

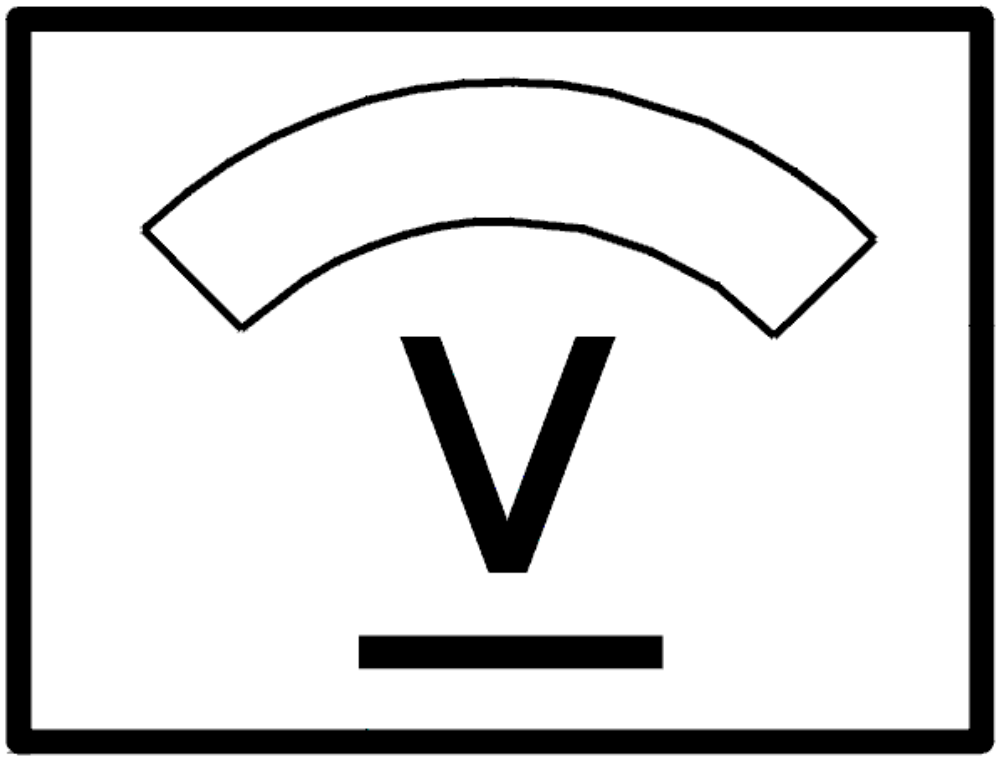


Fig. 53: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

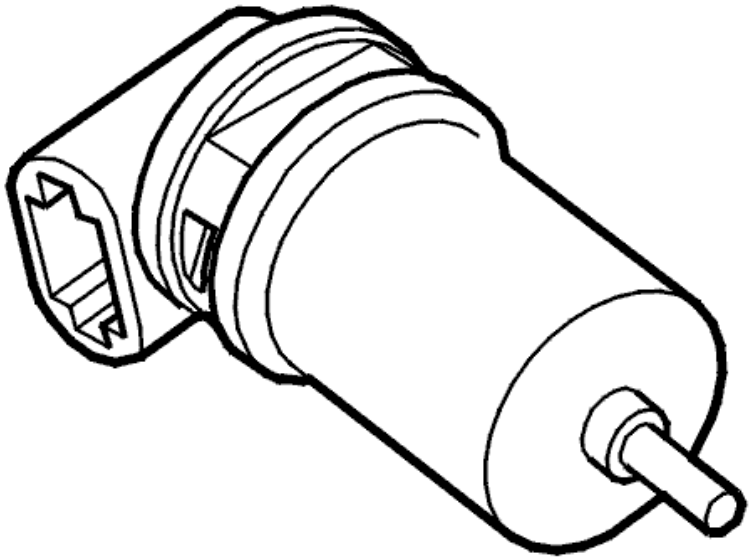


Fig. 54: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

Was a fault detected in the cables or terminals?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

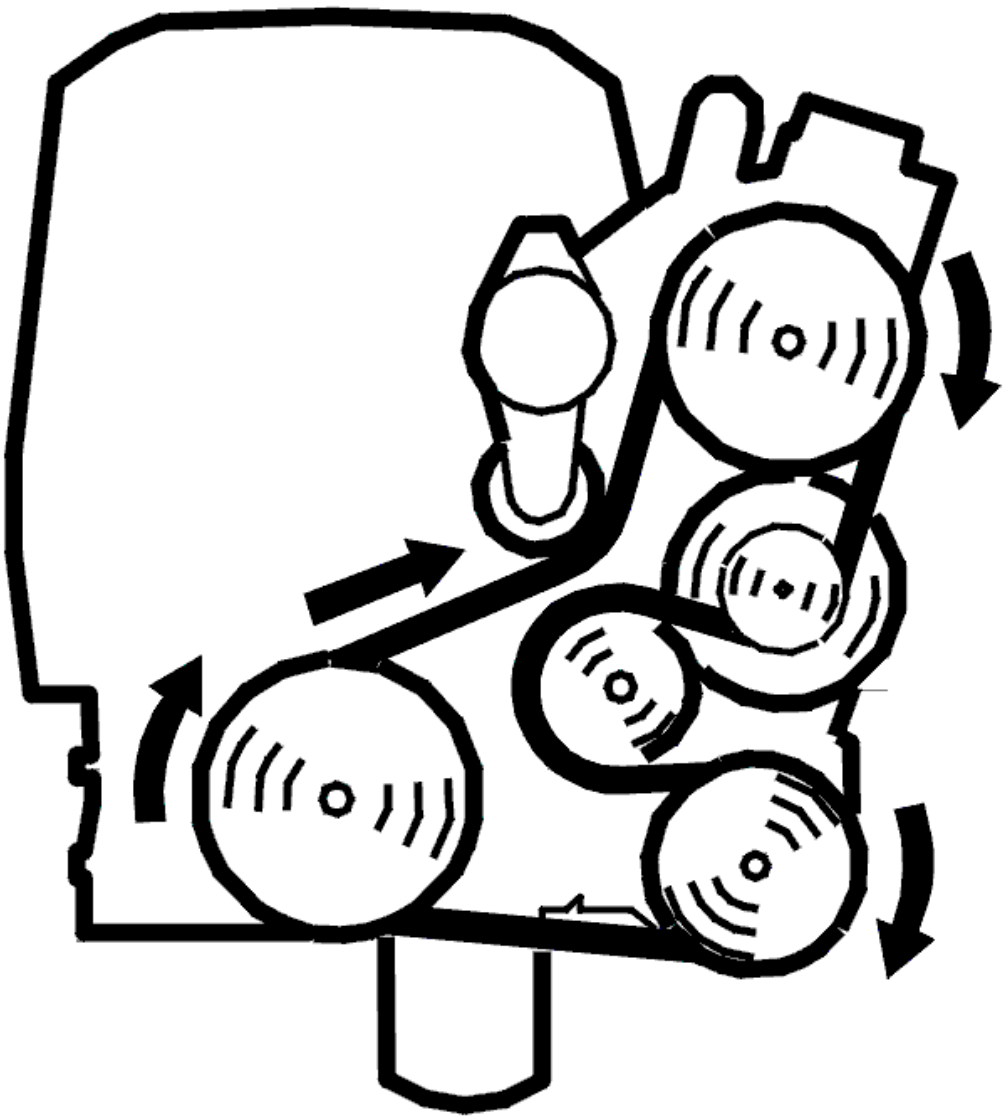


Fig. 55: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

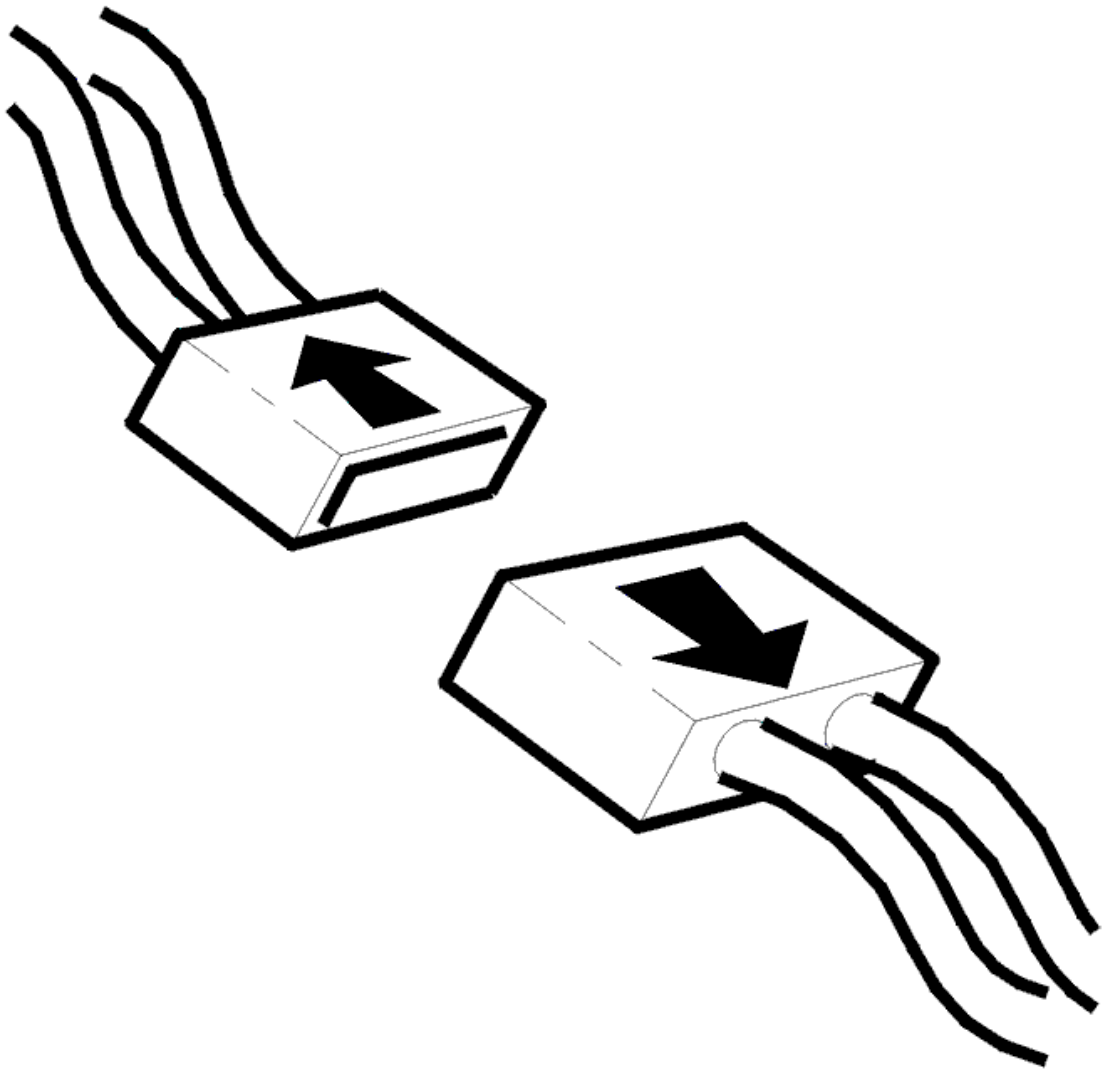


Fig. 56: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

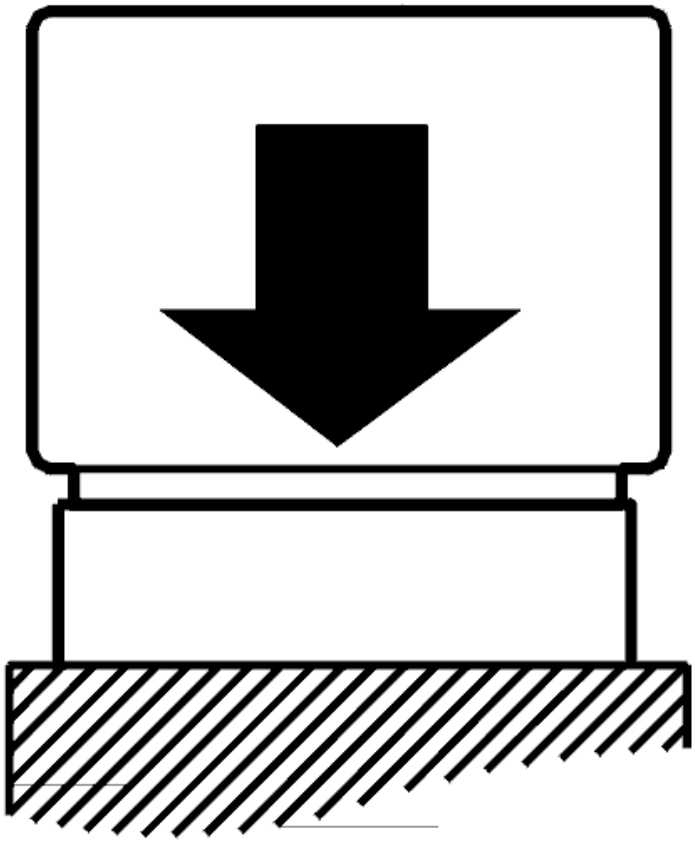


Fig. 57: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission control module (TCM) connected
- The breakout box connected
- Transmission connector disconnected
- Connect a temporary cable between terminals #A35 and #A59 on the breakout box

CAUTION: Check that the temporary cable is connected to the correct terminals. Also check that there is no risk of unintentional short-circuits.

-
- Ignition on

- Read off the status.

  Check that the status is "1" when the temporary cable is connected to the terminals above.

  Disconnect the cable end that is connected to terminal #A35 and move the cable to terminal #A53.

  NOTE: Leave the cable end connected to terminal #A59 in place.

  Check that the status changes to "0" when the temporary cable has been moved to terminal #A53.

  The transmission output speed sensor is defective if the status has changed between "1" and "0" as above and no errors have been detected on the cables or terminals in the preceding checks. Replace the transmission output speed sensor.

  The transmission control module (TCM) is defective if the status has not changed between "1" and "0" as above and no errors have been detected on the cables or terminals in the preceding checks. If this is the case replace the control module.

  Remedy as necessary.

  Other information

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - To disconnect the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - To check or replace the transmission output speed sensor, see **OUTPUT SPEED SENSOR TRANSMISSION, REPLACING**
  - To replace the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
  - For information about signals, see **SIGNAL SPECIFICATION** .

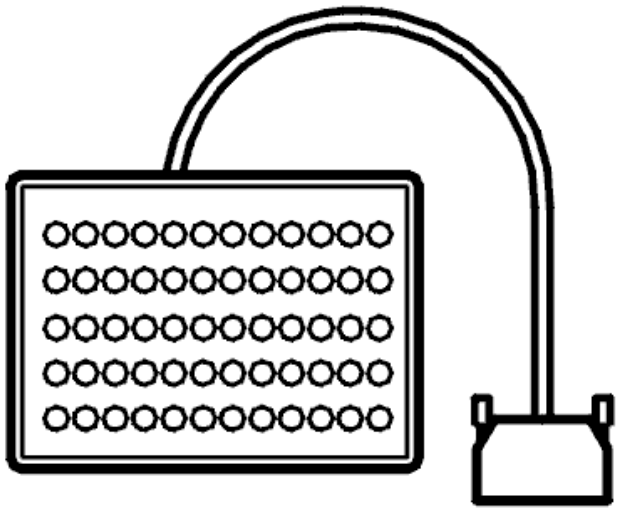


Fig. 58: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

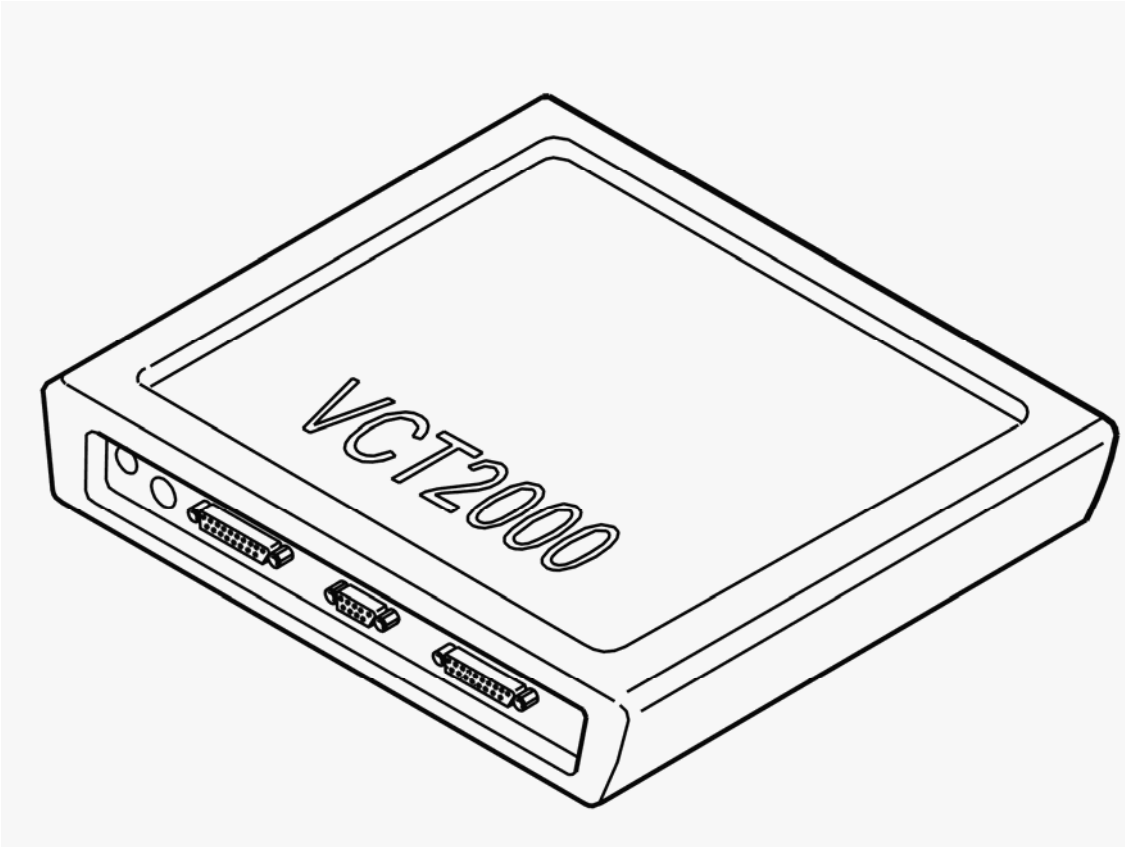


Fig. 59: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

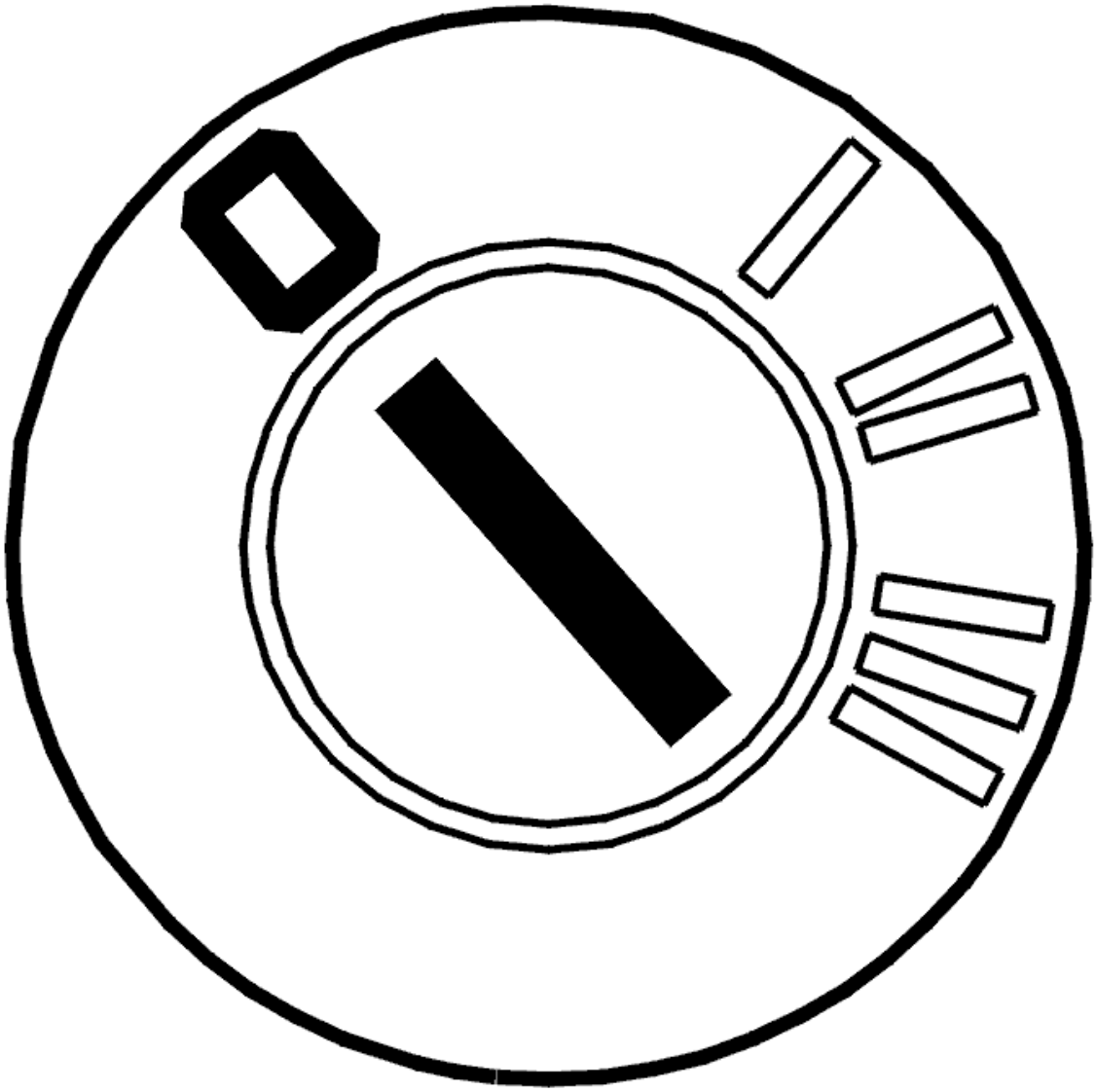


Fig. 60: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable for power supply between transmission connector terminal #S (#A16) and transmission input speed sensor connector terminal #A. Check for a short-circuit to supply voltage.

  Check the signal cable between transmission connector terminal #V (#A19) and transmission input speed sensor connector terminal #B. Check for a short-circuit to supply voltage.

  Remedy as necessary.

  Other information:

- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** and To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the transmission speed sensor, see **INPUT SPEED SENSOR TRANSMISSION, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

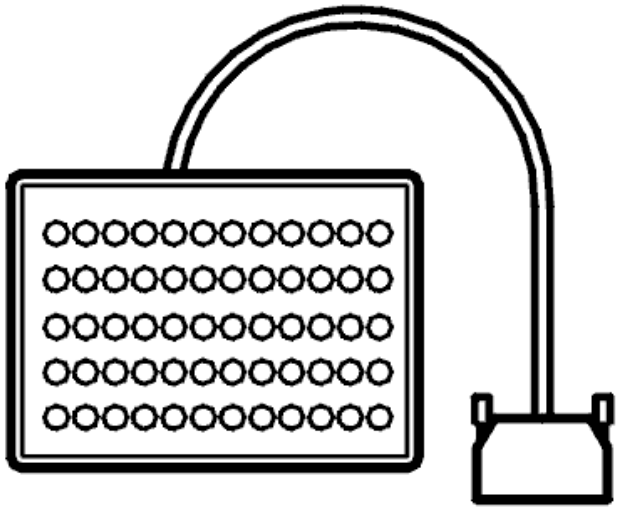


Fig. 61: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

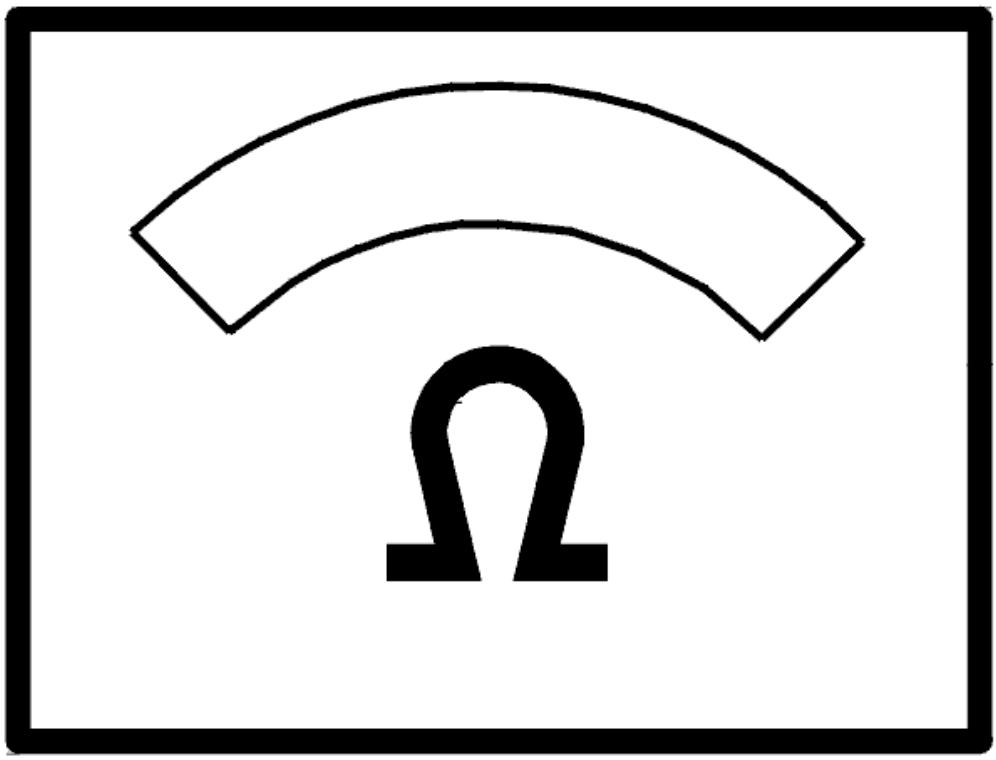


Fig. 62: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

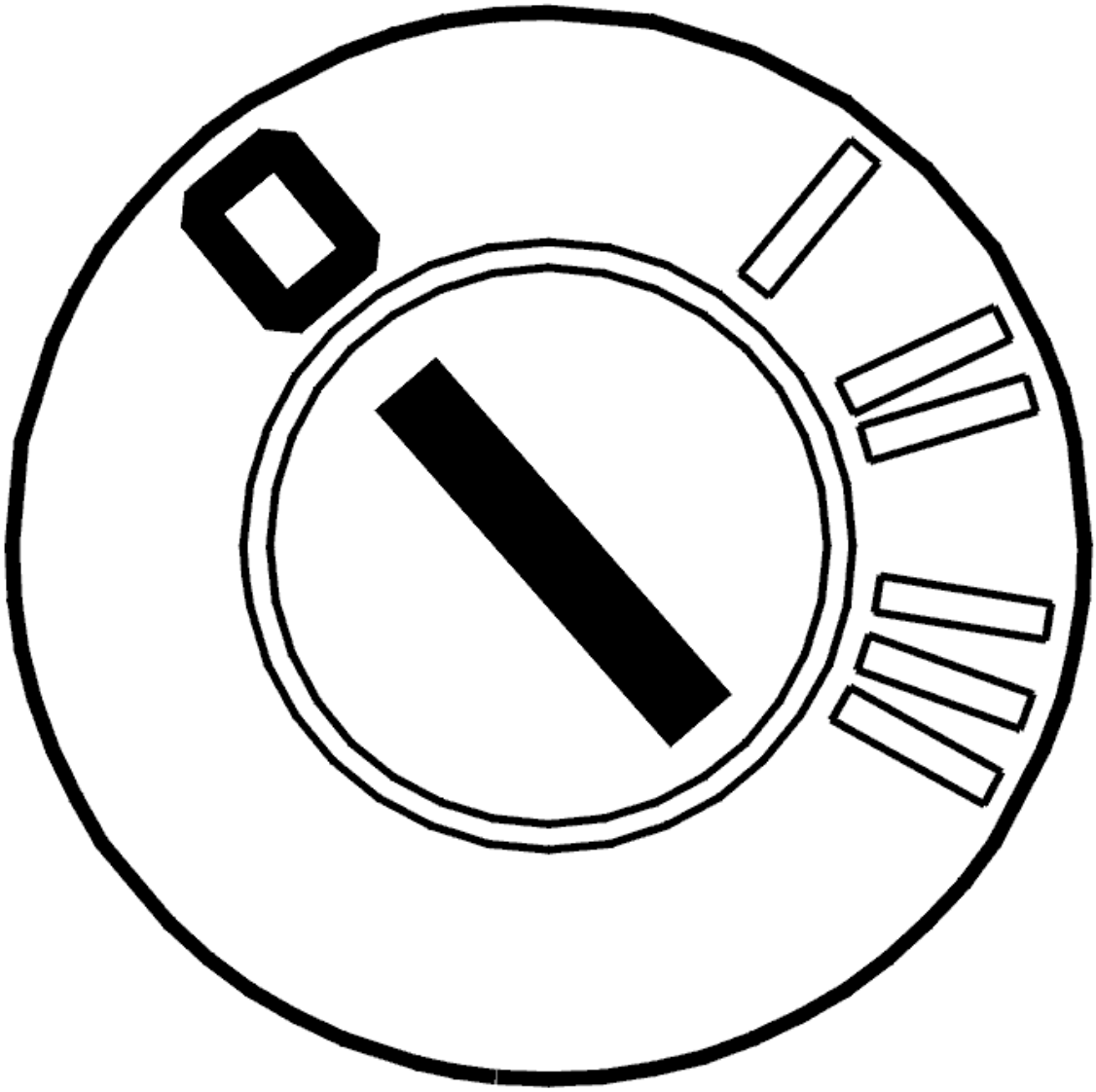


Fig. 63: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the power supply cable between control module terminal #59 (#A59) and transmission connector terminal #S (#A16). Check for an intermittent short-circuit to supply voltage.

  Check the signal cable between control module terminal #41 (#A41) and transmission connector terminal #V (#A19). Check for an intermittent short-circuit to supply voltage.

  Remedy as necessary.

  Other information

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**

- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

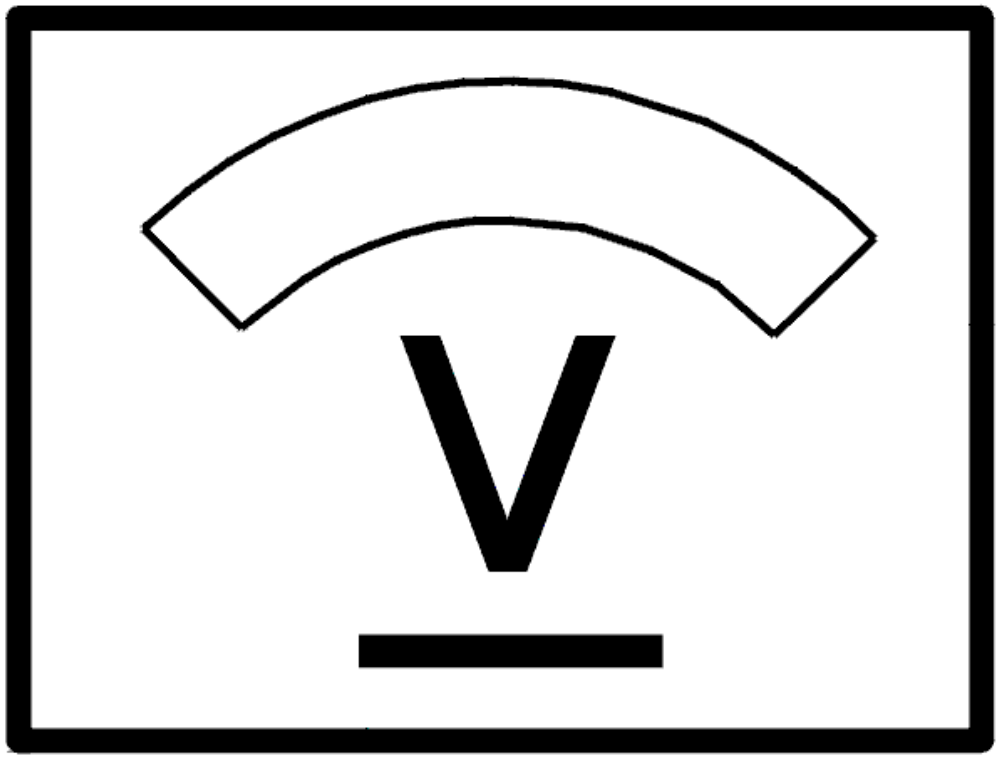


Fig. 64: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

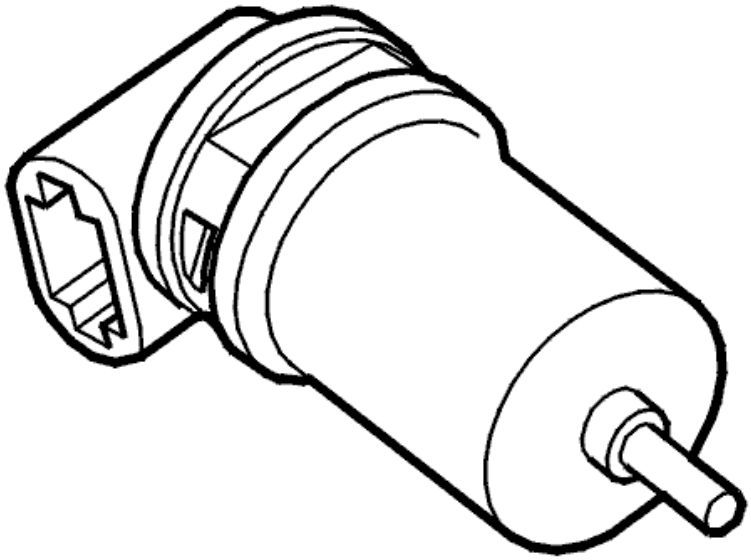


Fig. 65: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

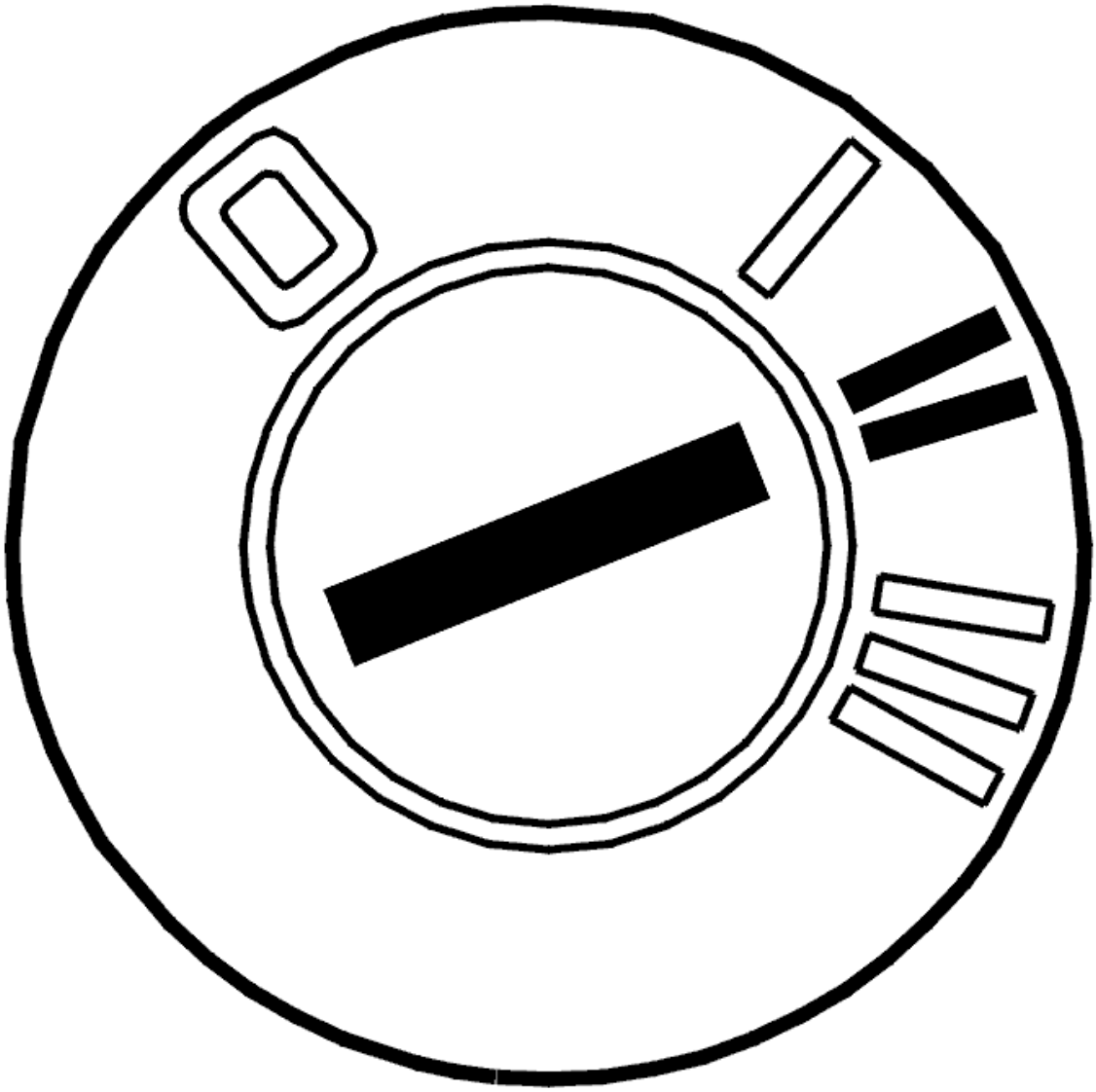


Fig. 66: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Use the VCT2000 (or appropriate scan tool) to reset the adaptation and counter.

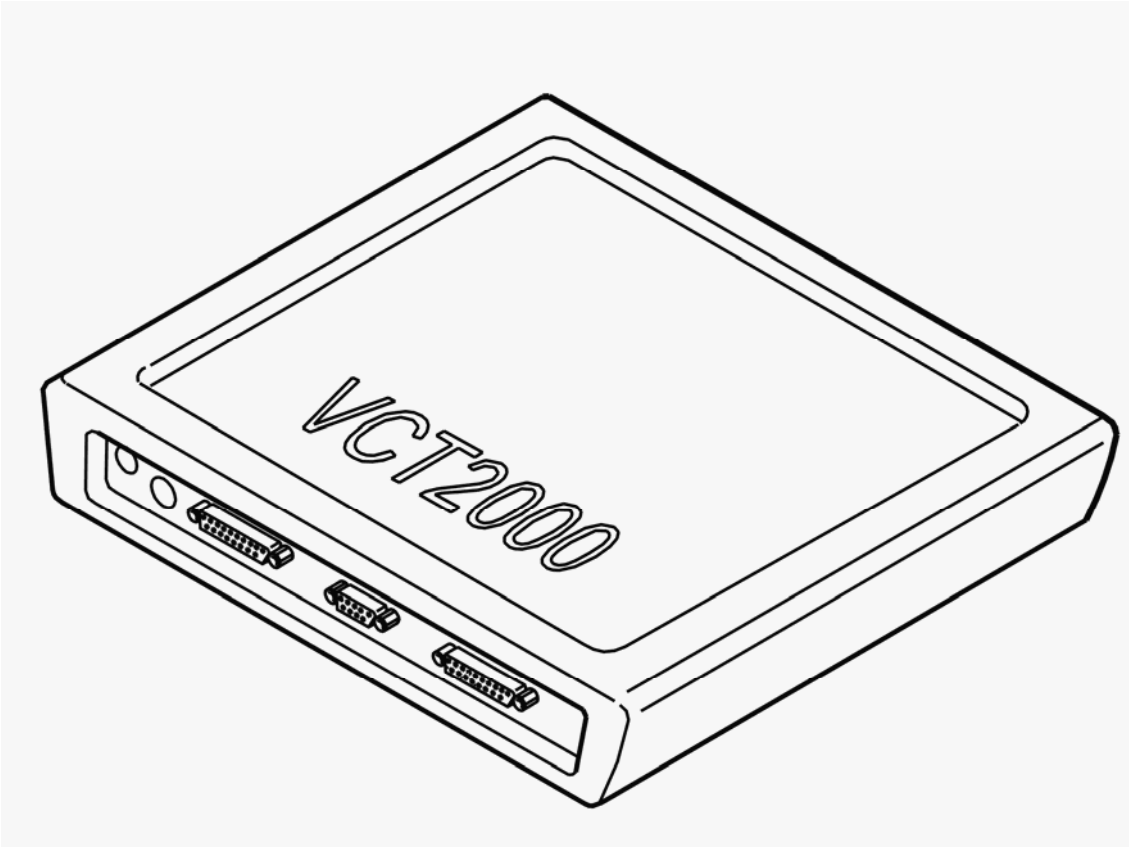


Fig. 67: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

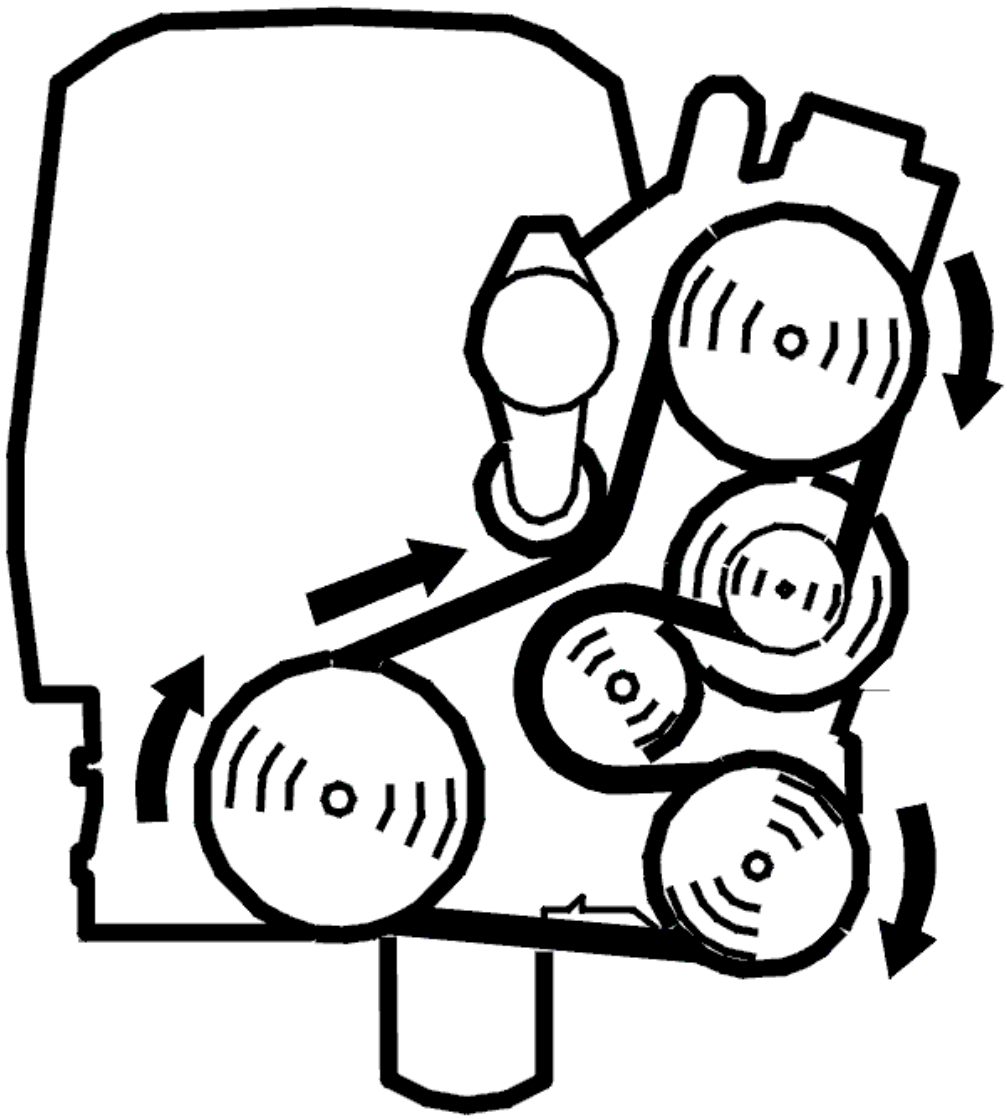


Fig. 68: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

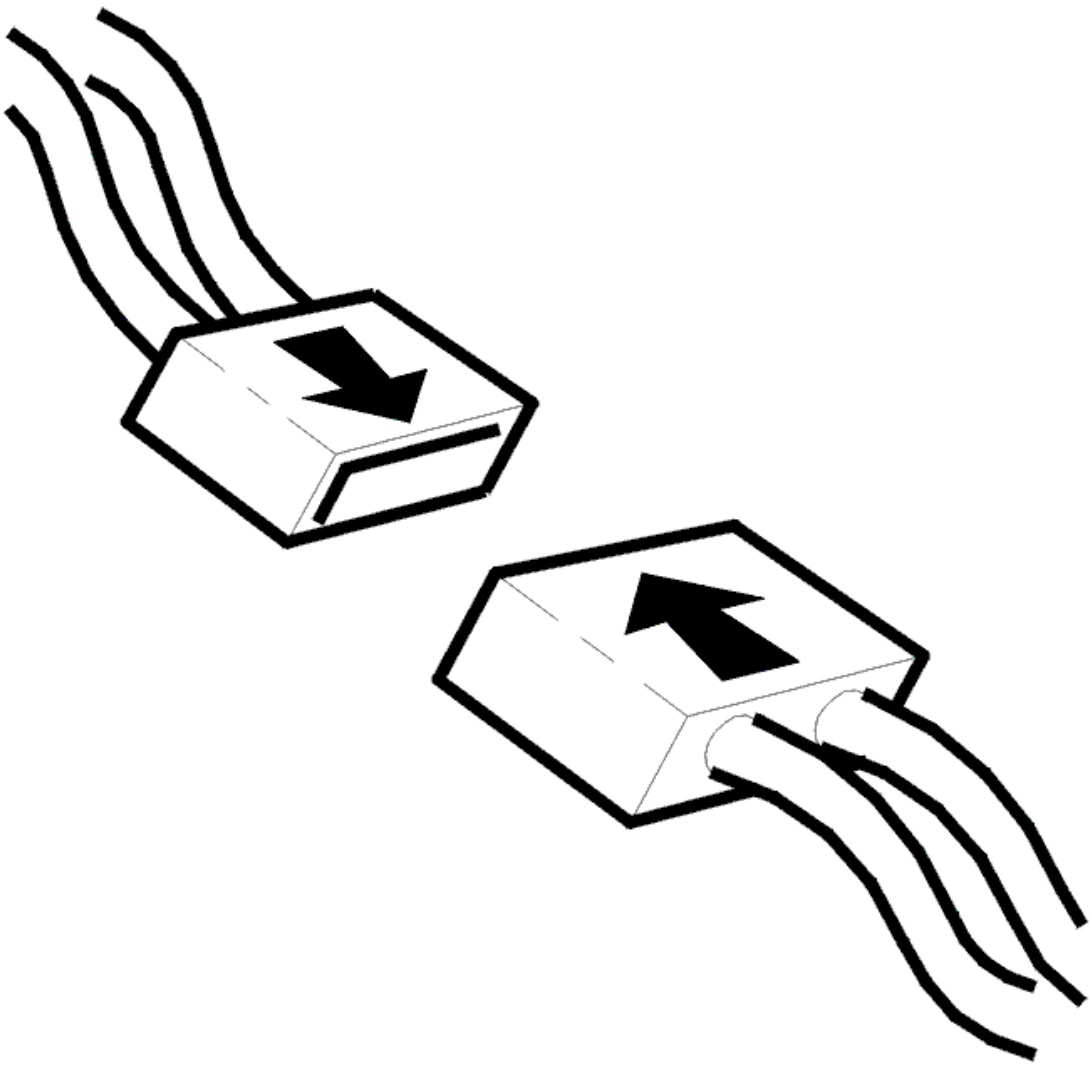


Fig. 69: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Start the engine and let it idle.
- Read off the transmission speed.

  Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated. Compare with the engine speed (RPM).

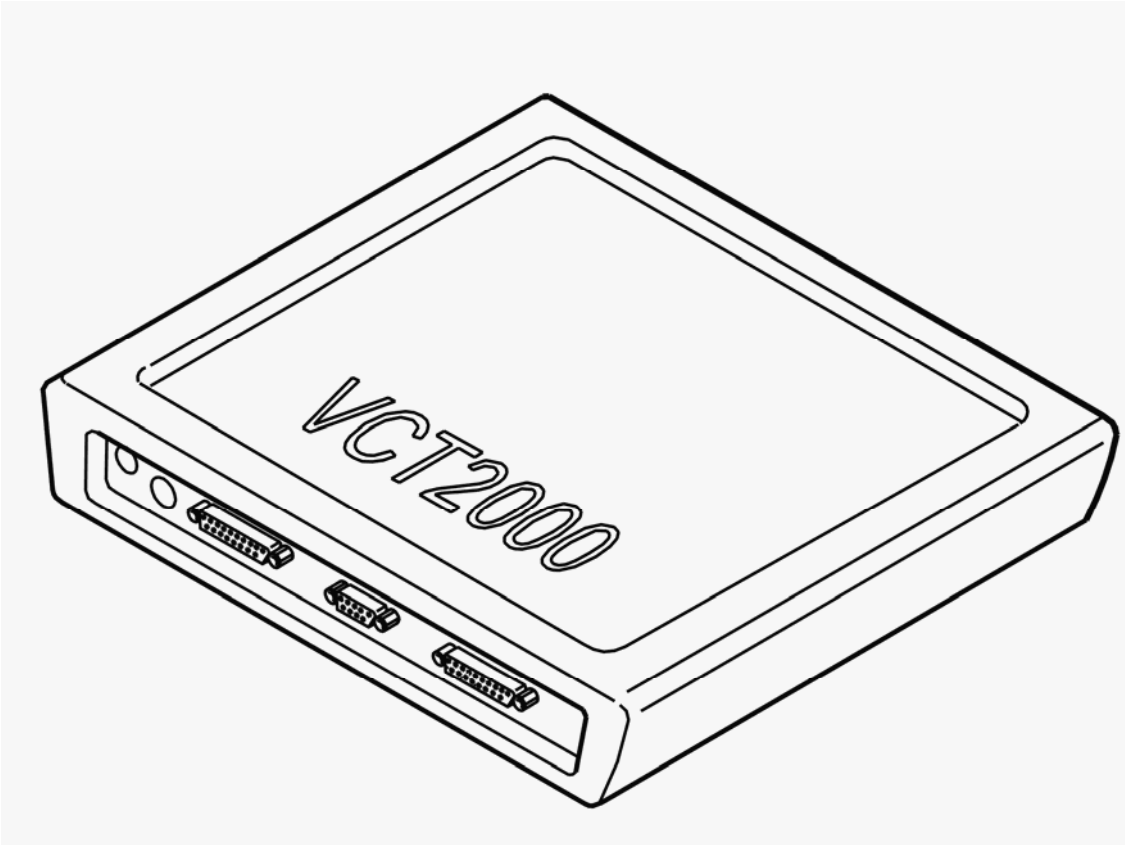


Fig. 70: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0087: TRANSMISSION INPUT SPEED SENSOR. SIGNAL TOO HIGH (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

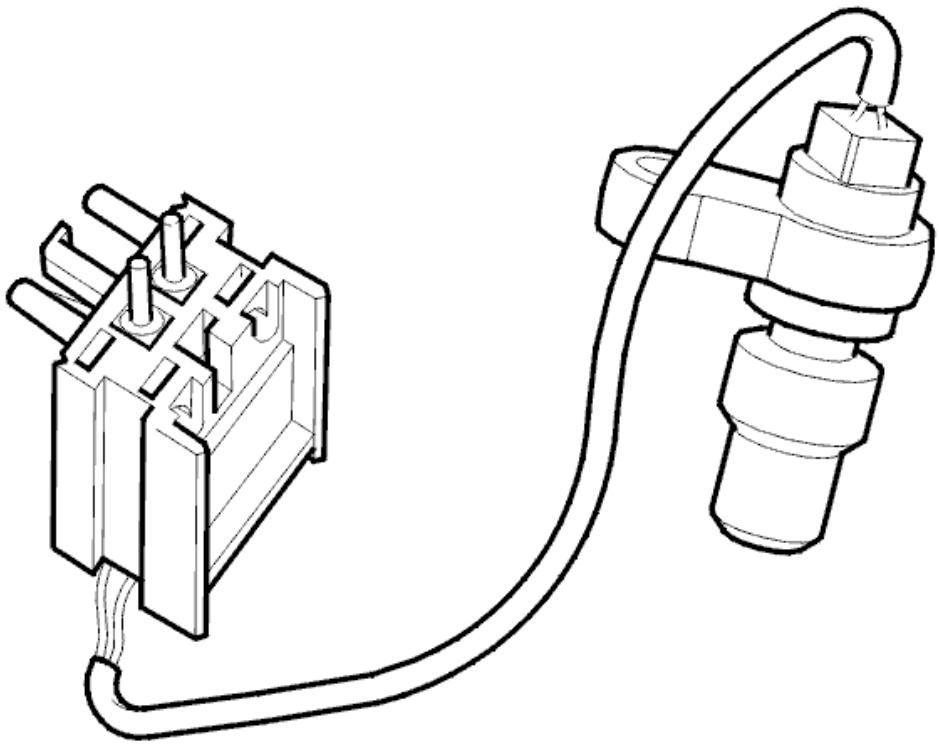


Fig. 71: Identifying Transmission Input Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The transmission speed signal is transmitted by a sensor on the transmission. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare the transmission speed with vehicle speed. The transmission control module (TCM) uses this comparison to calculate the gear-shift timing. Engine speed and vehicle speed data affects the adjustment of the system pressure, lock-up function control and engine torque reduction. The result is smooth gear-shifting. Diagnostic trouble code (DTC) TCM-0087 is stored if the control module registers, when comparing with the transmission speed signal, that the engine speed (RPM) signal is too high when the vehicle speed is above approximately 25 km/h.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Power supply (-) short-circuited to supply voltage.
- Defective engine speed (RPM) sensor.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of the line pressure when shifting.
- No reduction of the line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No request for torque limiting to the engine control module (ECM) when shifting.

SIGNAL TOO HIGH

CHECKS

CHECKING THE TRANSMISSION INPUT SPEED SENSOR SIGNAL

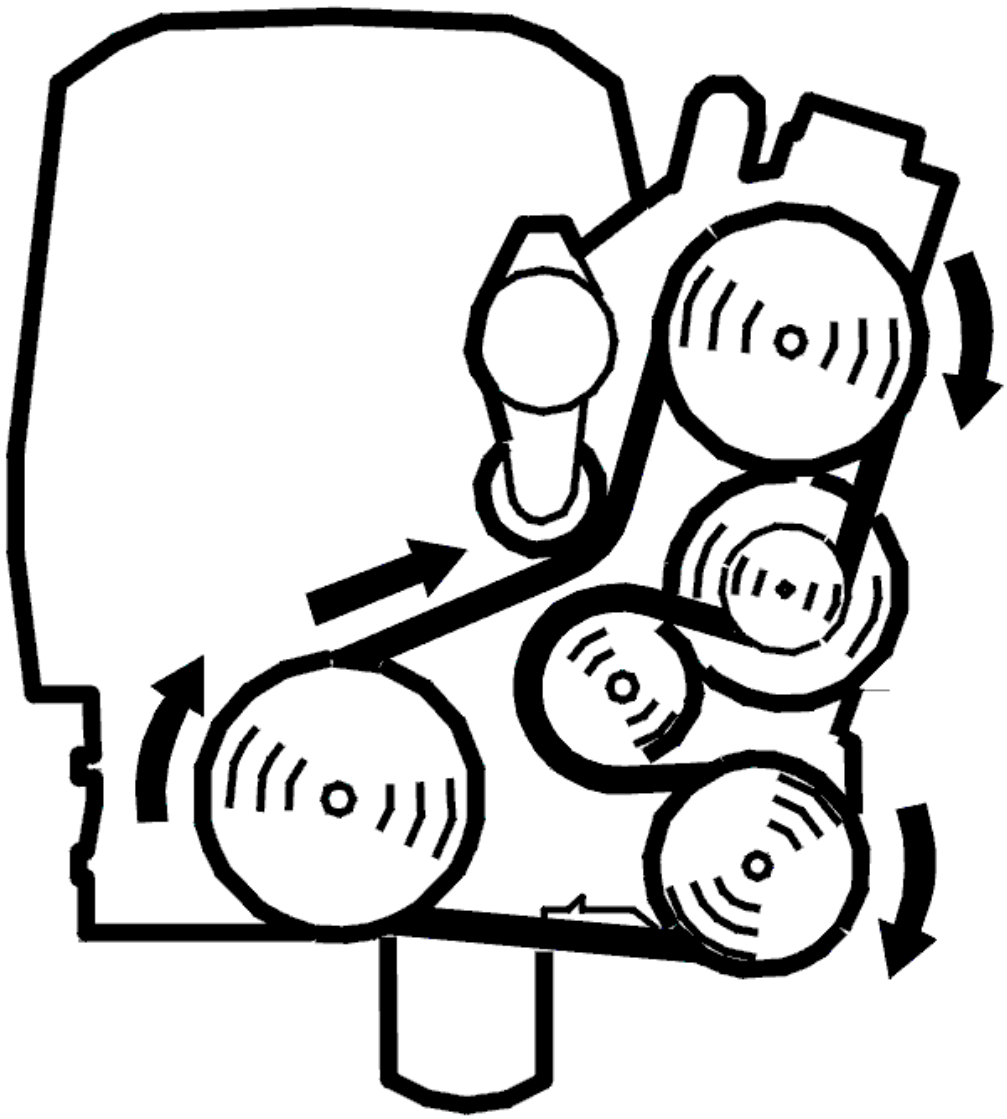


Fig. 72: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Gear selector in position P
- Start the engine. Allow the engine to idle
- Read off the transmission input speed.

Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated.

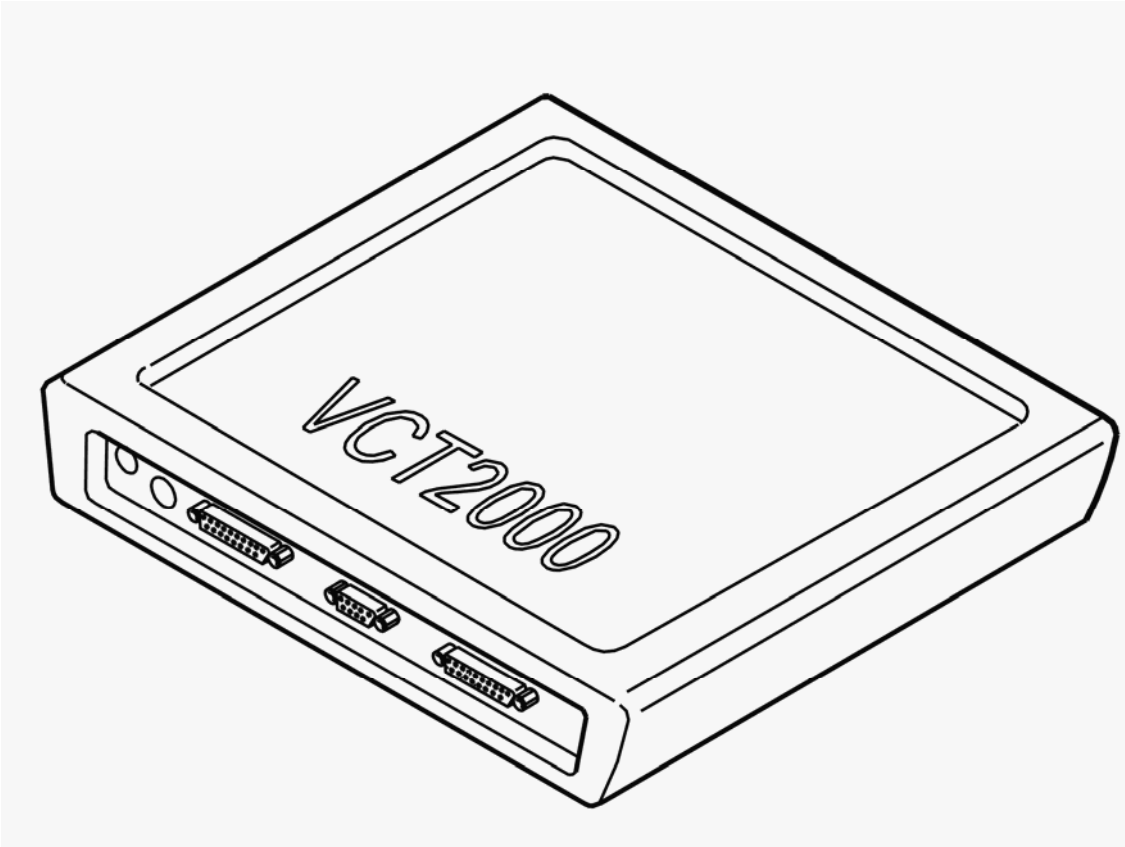


Fig. 73: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

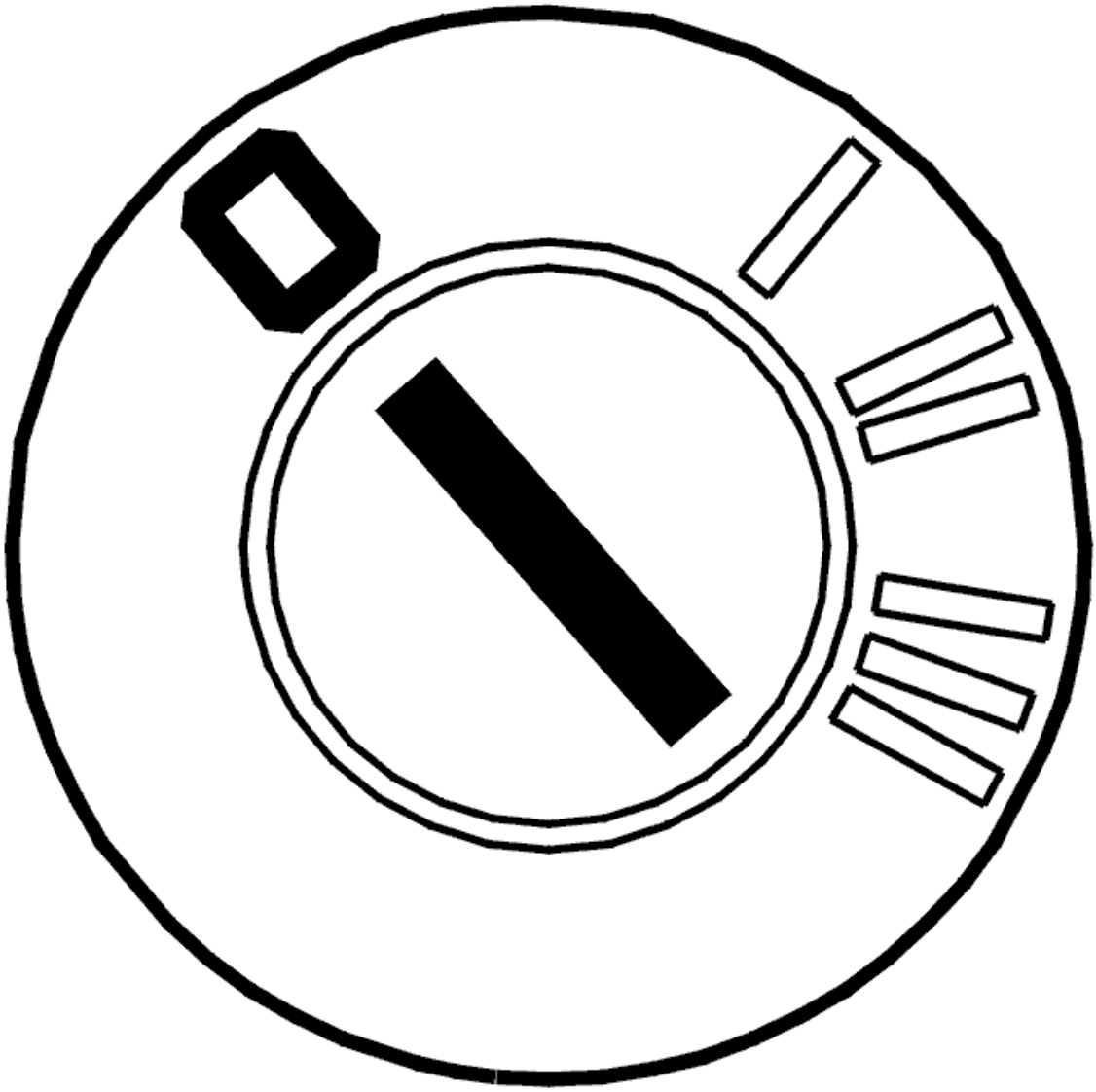


Fig. 74: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the cables between transmission control module (TCM) terminals #A59 (#A59) and #A41 (#A41) and transmission connector terminals #A2 and #A1. Check for a short-circuit to each other.

  Check the power supply cable between control module terminal #A59 (#A59) and transmission connector terminal #A2. Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

  Check the signal cable between control module terminal #A41 (#A41) and transmission connector terminal #A1. Check for an open-circuit or a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

HINT: With the control module connected, the ignition on and a voltmeter connected between transmission connector terminals #A2 and #A1 (control module side), the voltage must be 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To check or replace the transmission speed sensor, see **INPUT SPEED SENSOR/OUTPUT SPEED SENSOR, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

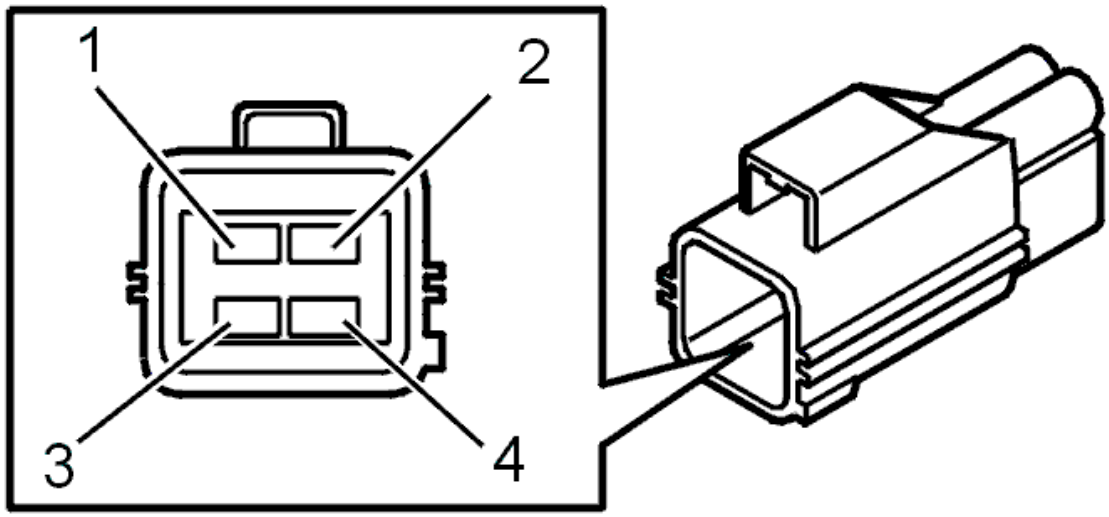


Fig. 75: Identifying Transmission Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

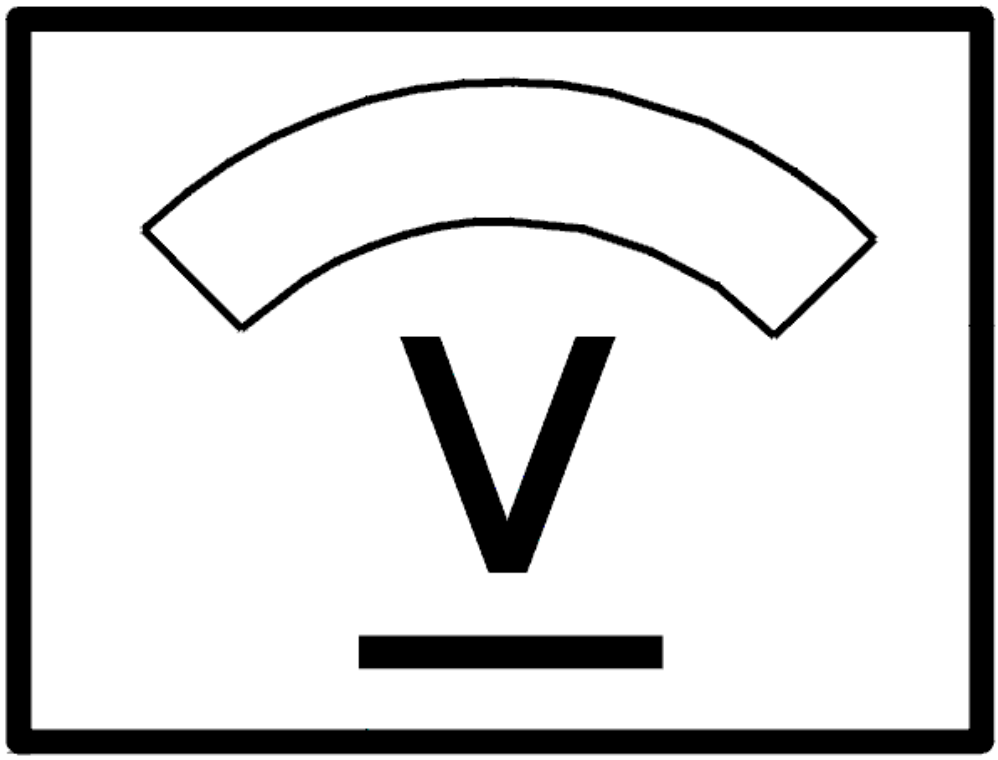


Fig. 76: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INTERMITTENT FAULT

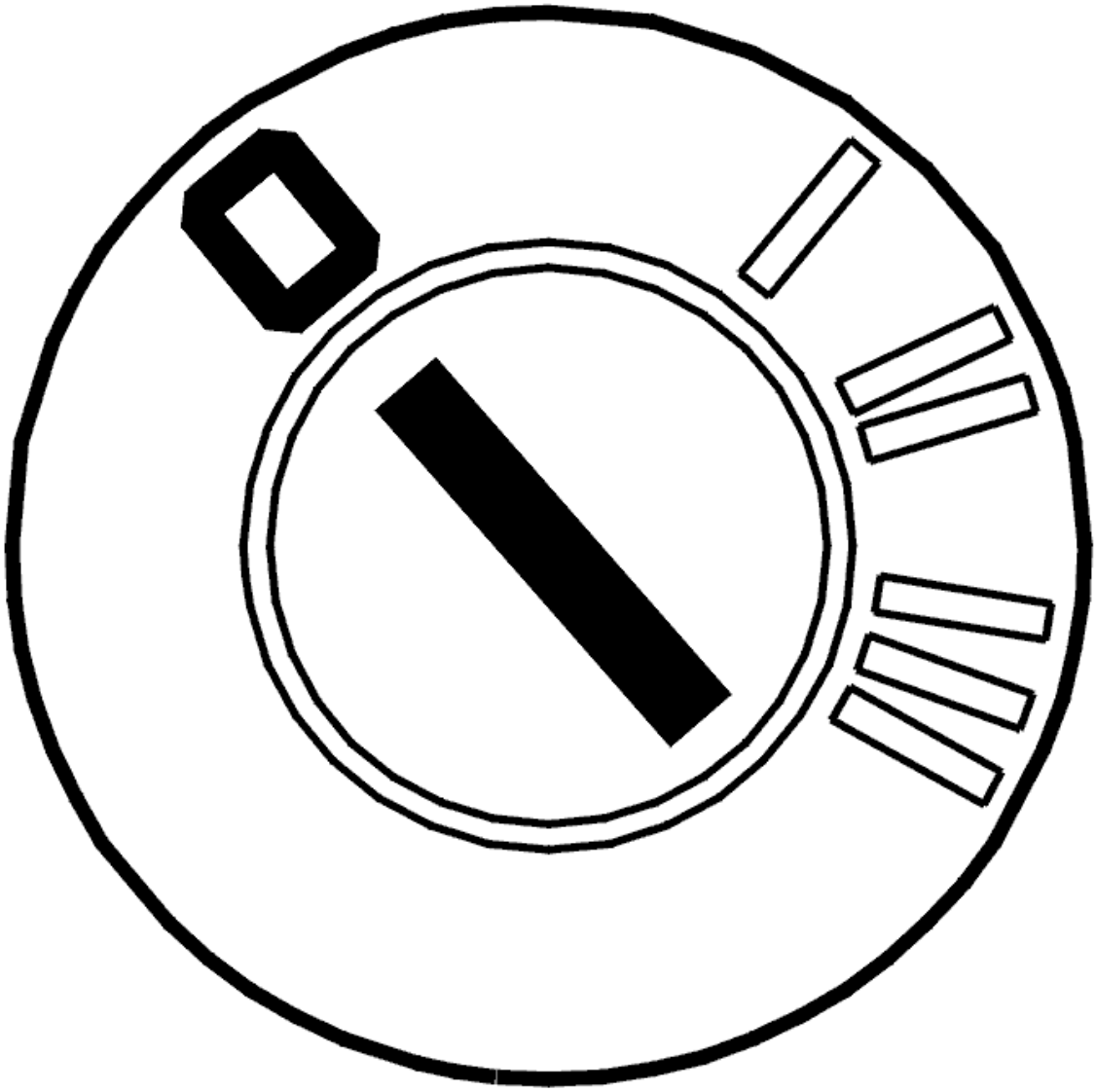


Fig. 77: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

  Check the power supply cable between control module terminal #A59 (#A59) and transmission connector terminal #A2. Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

  Check the signal cable between control module terminal #A41 (#A41) and transmission connector terminal #A1. Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To check or replace the speed sensor, see **INPUT SPEED SENSOR/OUTPUT SPEED SENSOR, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

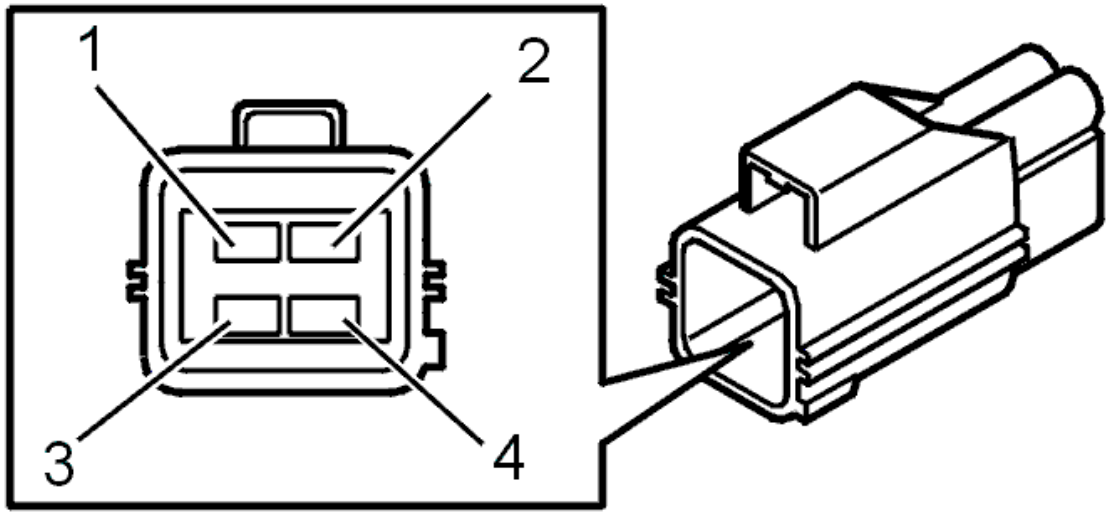


Fig. 78: Identifying Transmission Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

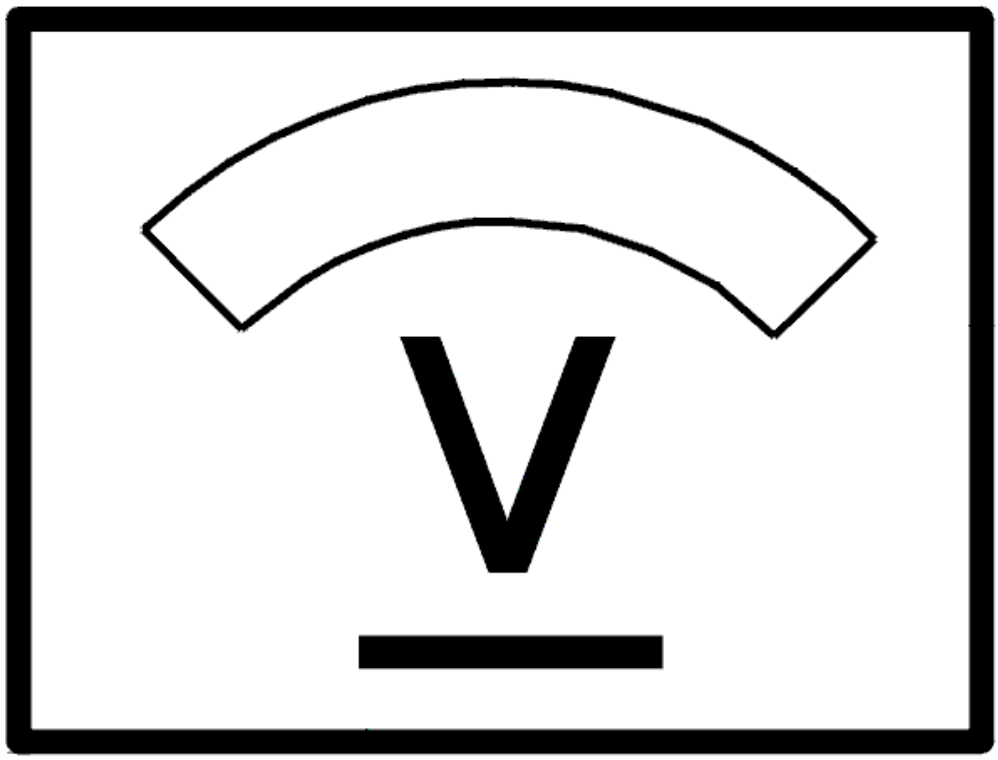


Fig. 79: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

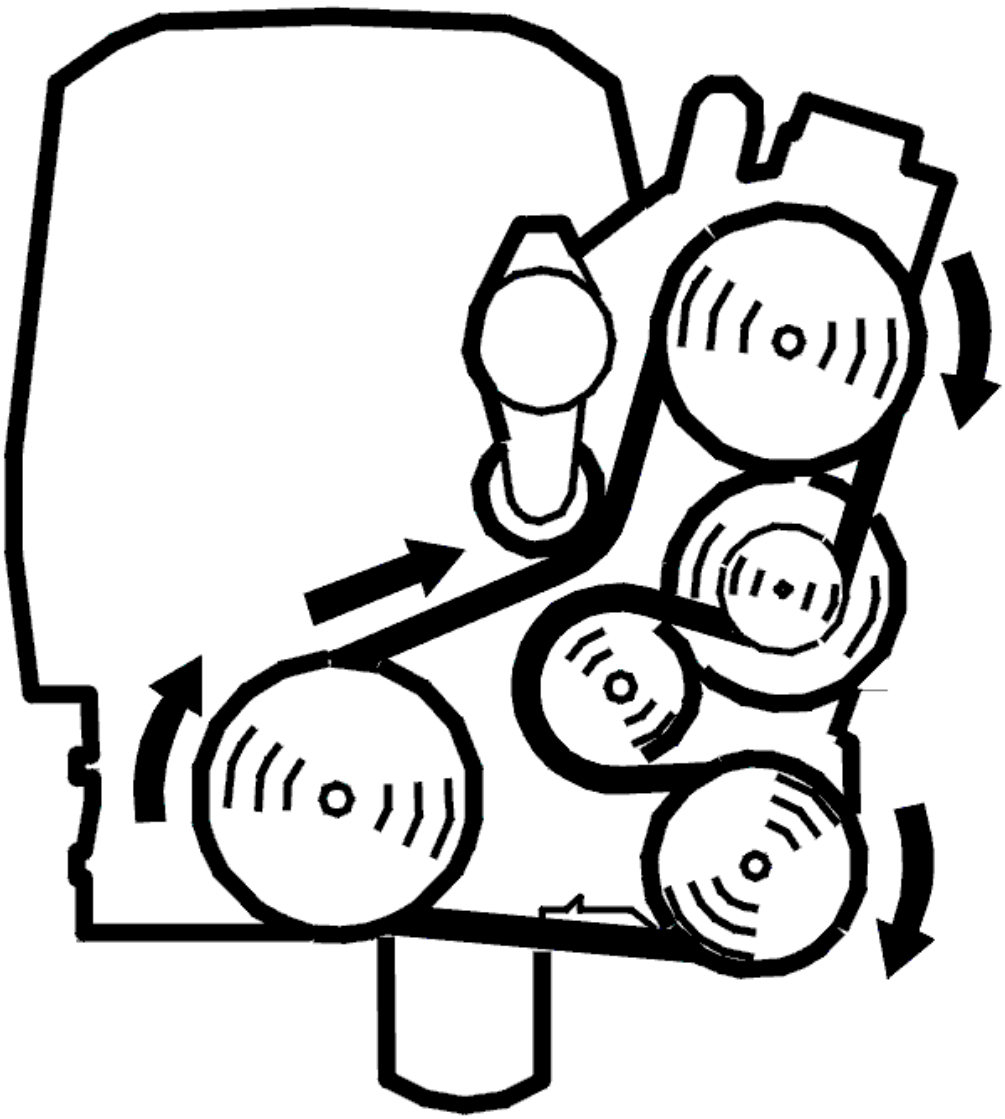


Fig. 80: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

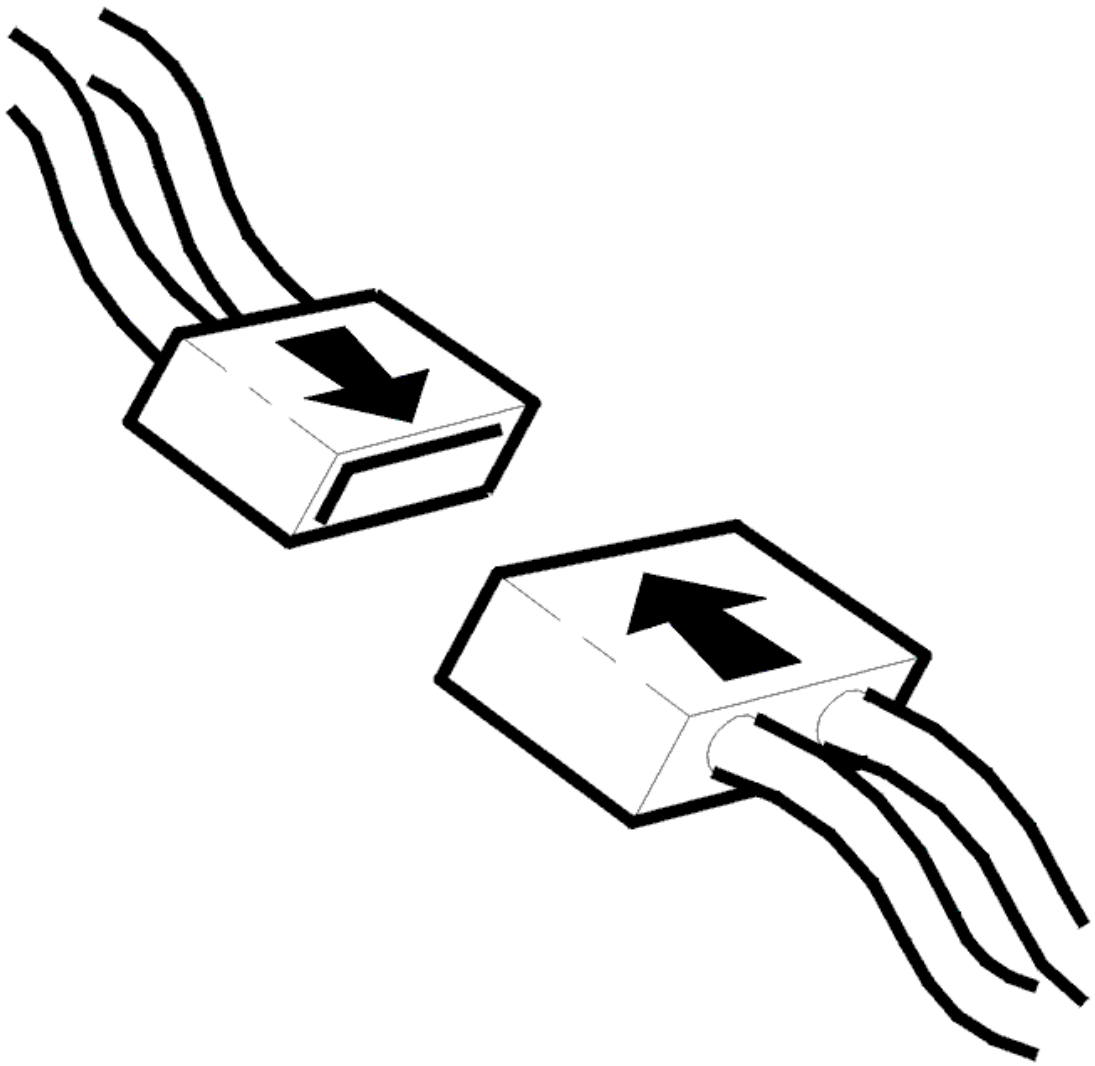


Fig. 81: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Start the engine and let it idle.
- Gear selector in position P.
- Read off the transmission speed.

  Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated.

  Compare with the engine speed (RPM).

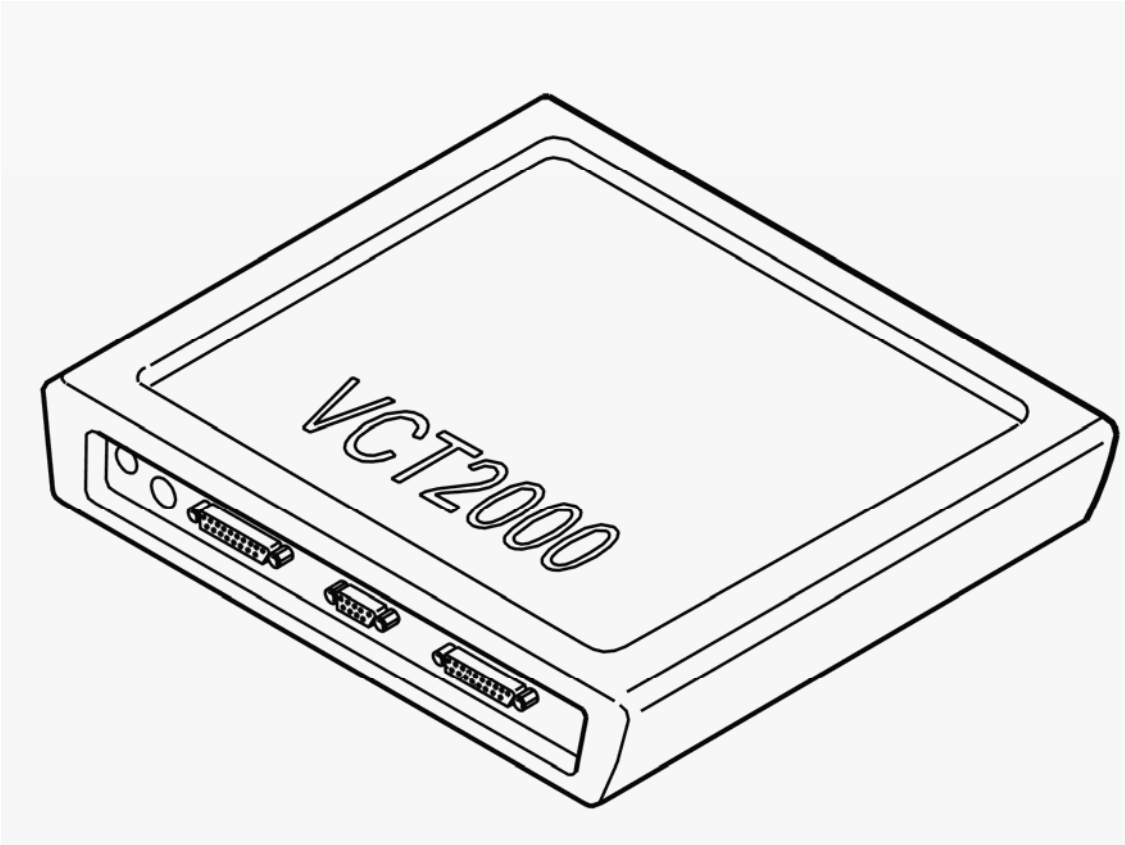


Fig. 82: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0089: INPUT SPEED SENSOR. SIGNAL TOO LOW (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

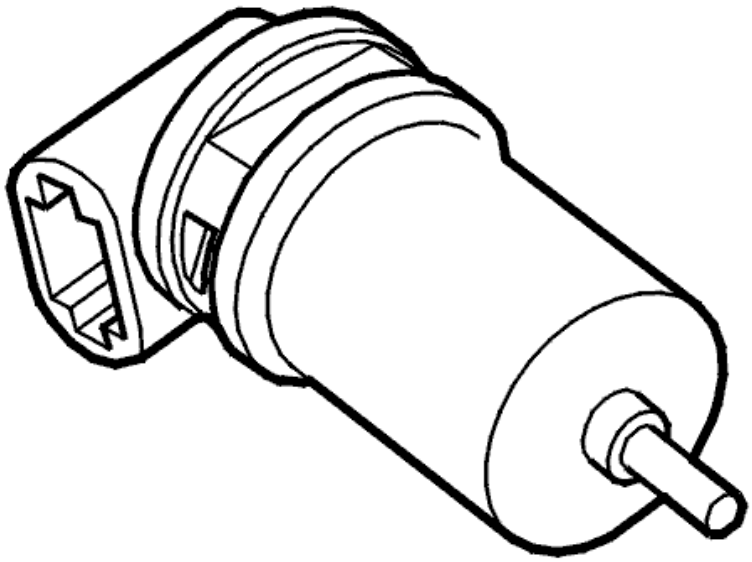


Fig. 83: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The transmission speed signal is transmitted by a sensor on the transmission. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare the transmission speed with vehicle speed. The transmission control module (TCM) uses this comparison to calculate gear-shift timing. Engine speed (RPM) and vehicle speed data affects the adjustment of system pressure, lock-up function control and engine torque reduction. The result is smooth gear-shifting. Diagnostic trouble code (DTC) TCM-0089 is stored if the control module registers that the signal is too low when vehicle speed is above approximately 25 km/h.

Substitute Value

- TBD

Possible Source

- Contact resistance in the terminals.
- Short-circuit to ground in the signal cable.
- Defective input speed sensor.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

SIGNAL TOO LOW

CHECKS

CHECKING THE TRANSMISSION INPUT SPEED SENSOR SIGNAL

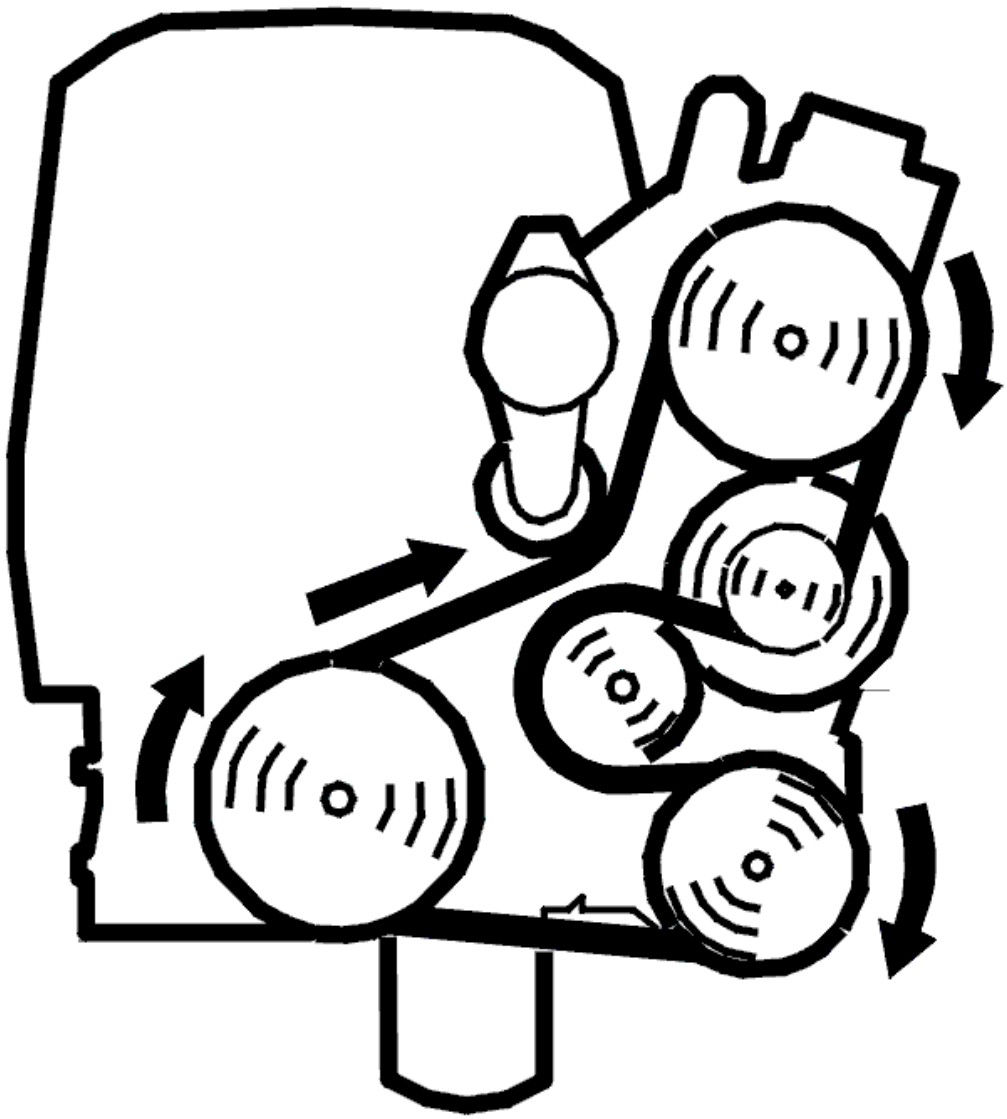


Fig. 84: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

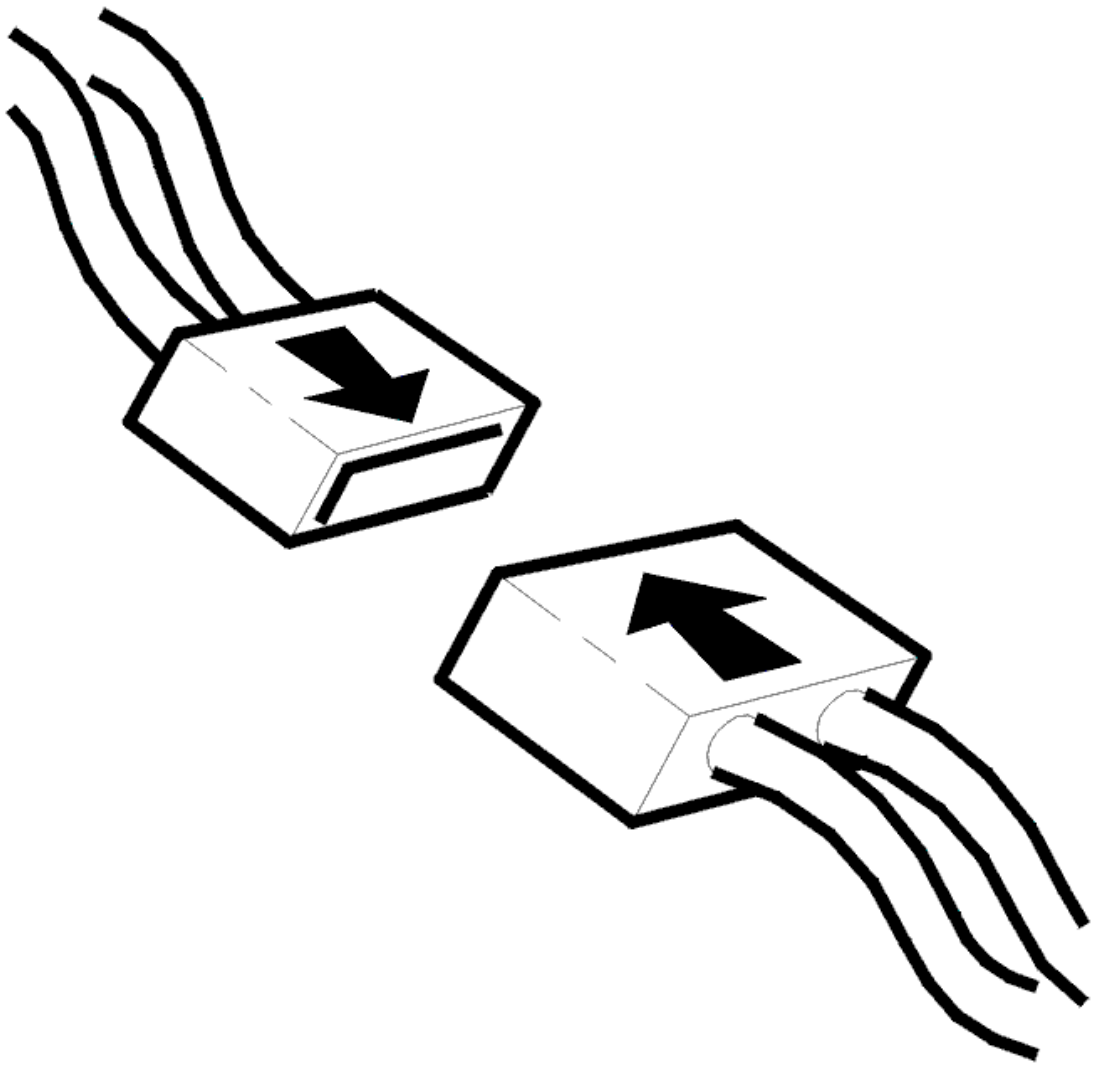


Fig. 85: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module and transmission input speed sensor connectors. Check for contact resistance and oxidation. Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Start the engine
- Read off the transmission input speed.

  Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated. Compare with the engine speed (RPM).

  Other information

- To access the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To access the control module connector, see **CONNECTING THE BREAKOUT BOX**
- see **CHECKING WIRING AND TERMINALS**

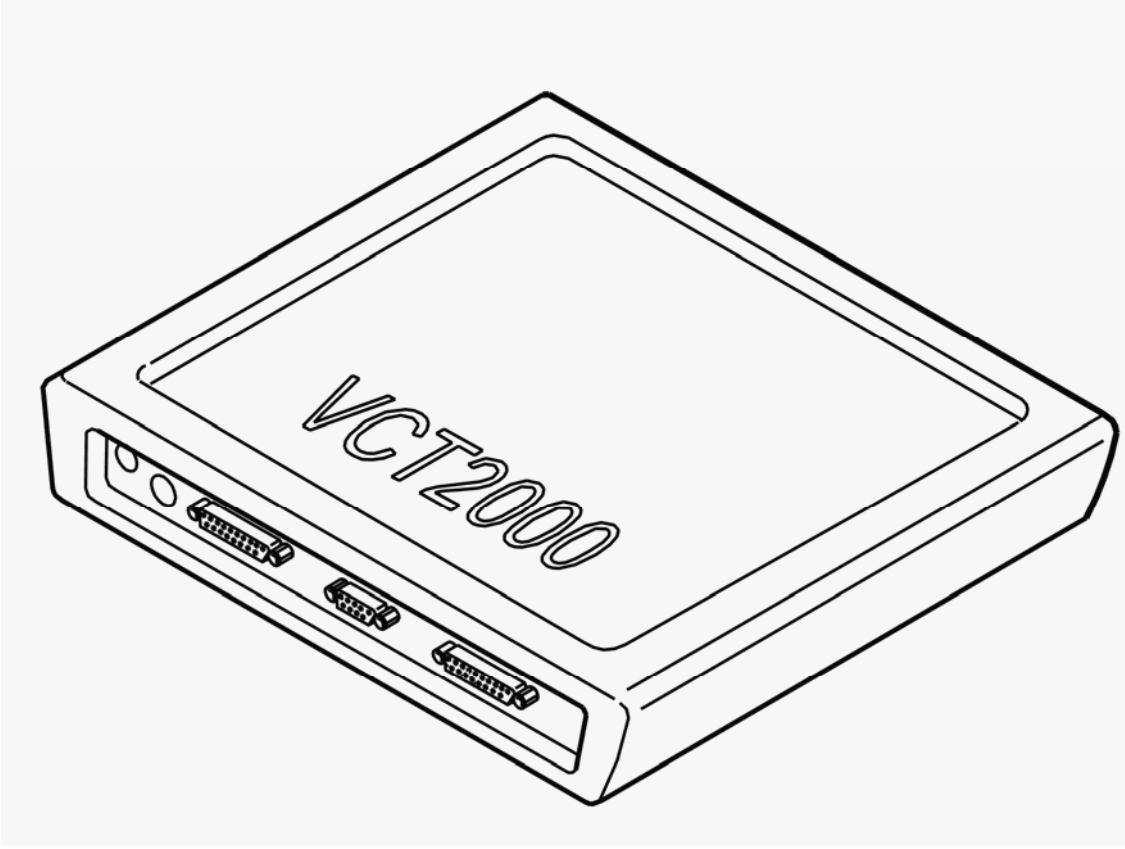


Fig. 86: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

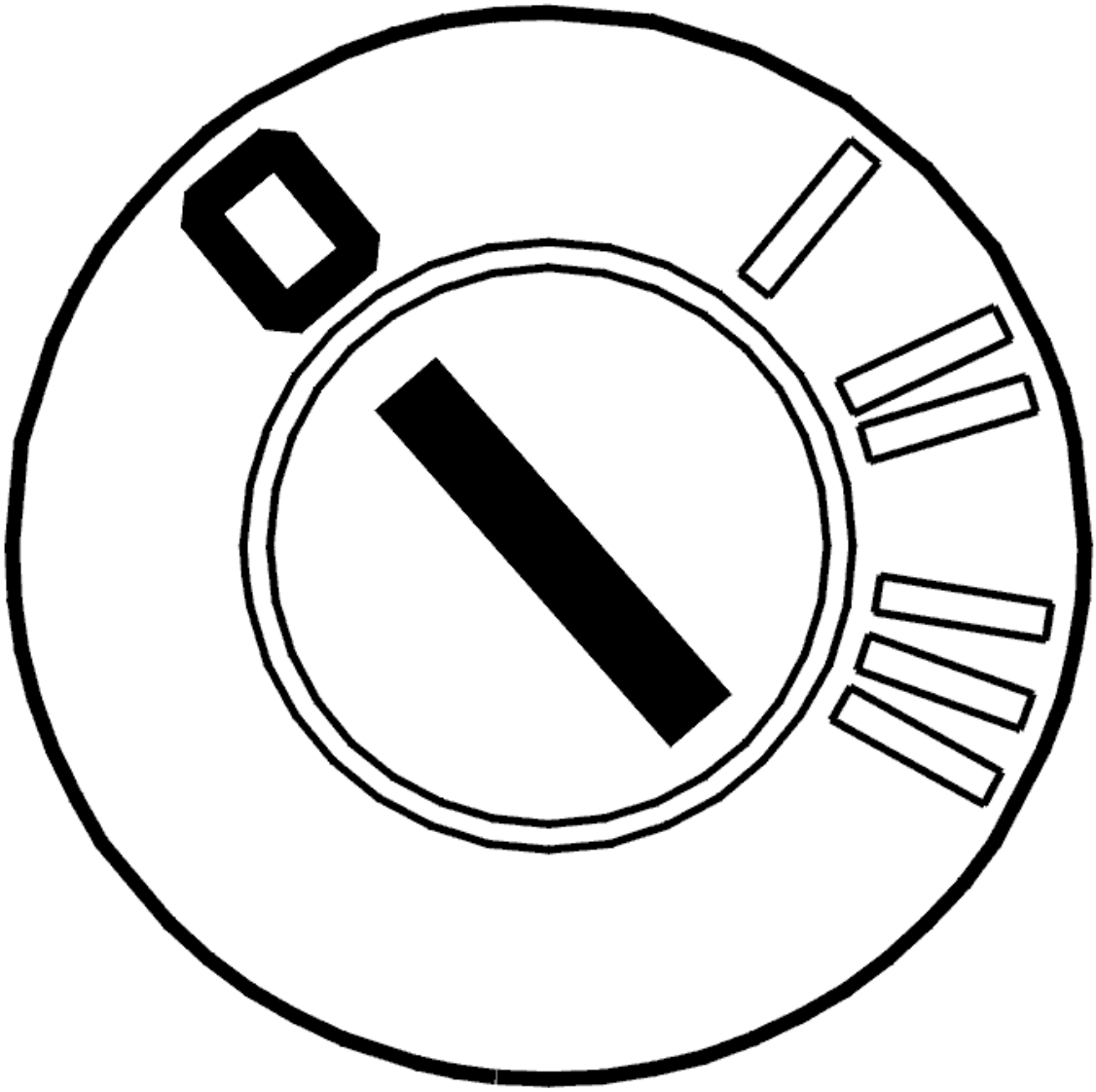


Fig. 87: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the control module and transmission input speed sensor connectors. Check for contact resistance and oxidation.

  Check the power supply cable between control module terminal #59 (#A59) and transmission connector terminal #S (#A16). Check for an open-circuit. Check for a short-circuit to ground.

  Check the signal cable between control module terminal #41 (#A41) and transmission connector terminal #V (#A19). Check for an open-circuit. Check for a short-circuit to ground.

  Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

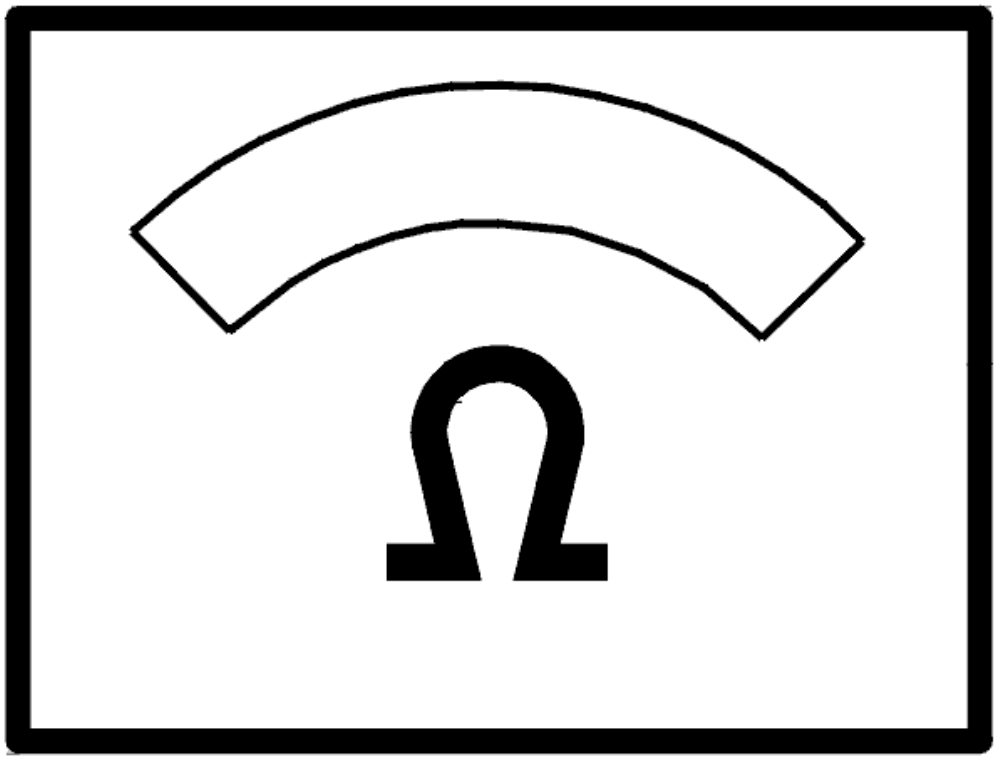


Fig. 88: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

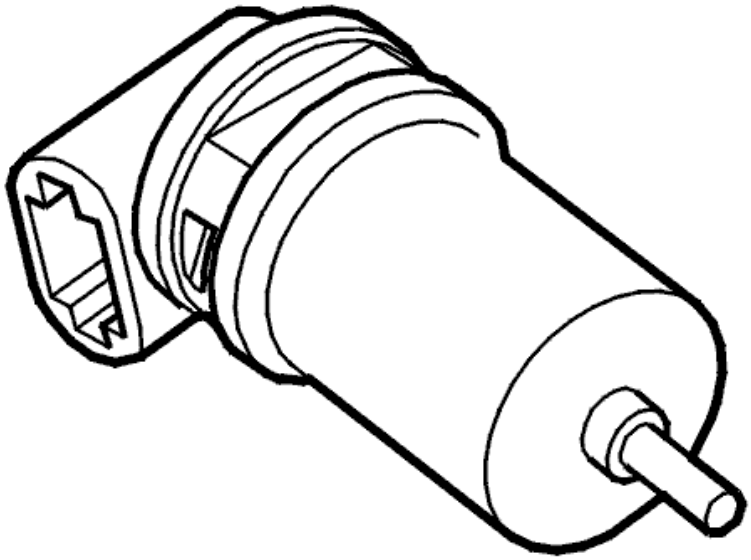


Fig. 89: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

Was a fault detected in the cables or terminals?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

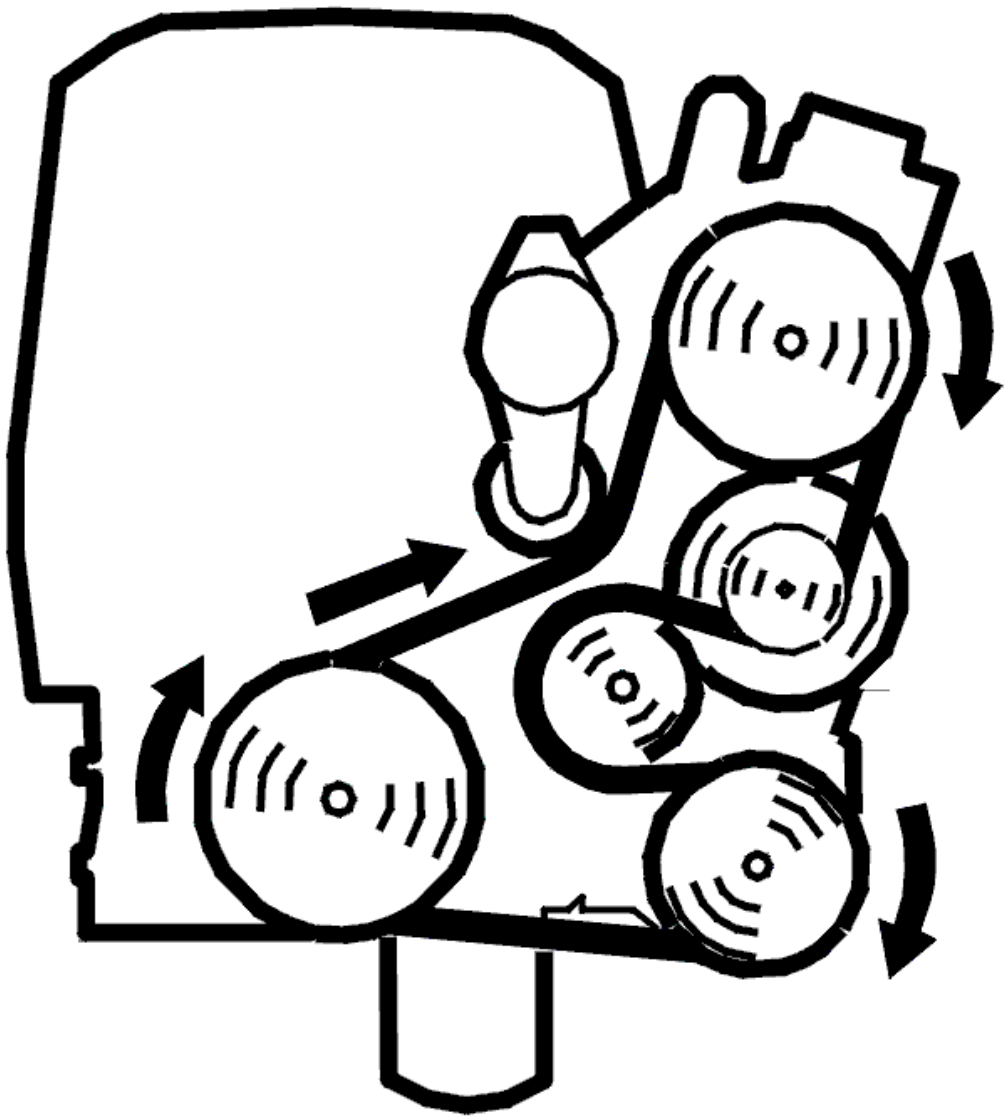


Fig. 90: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

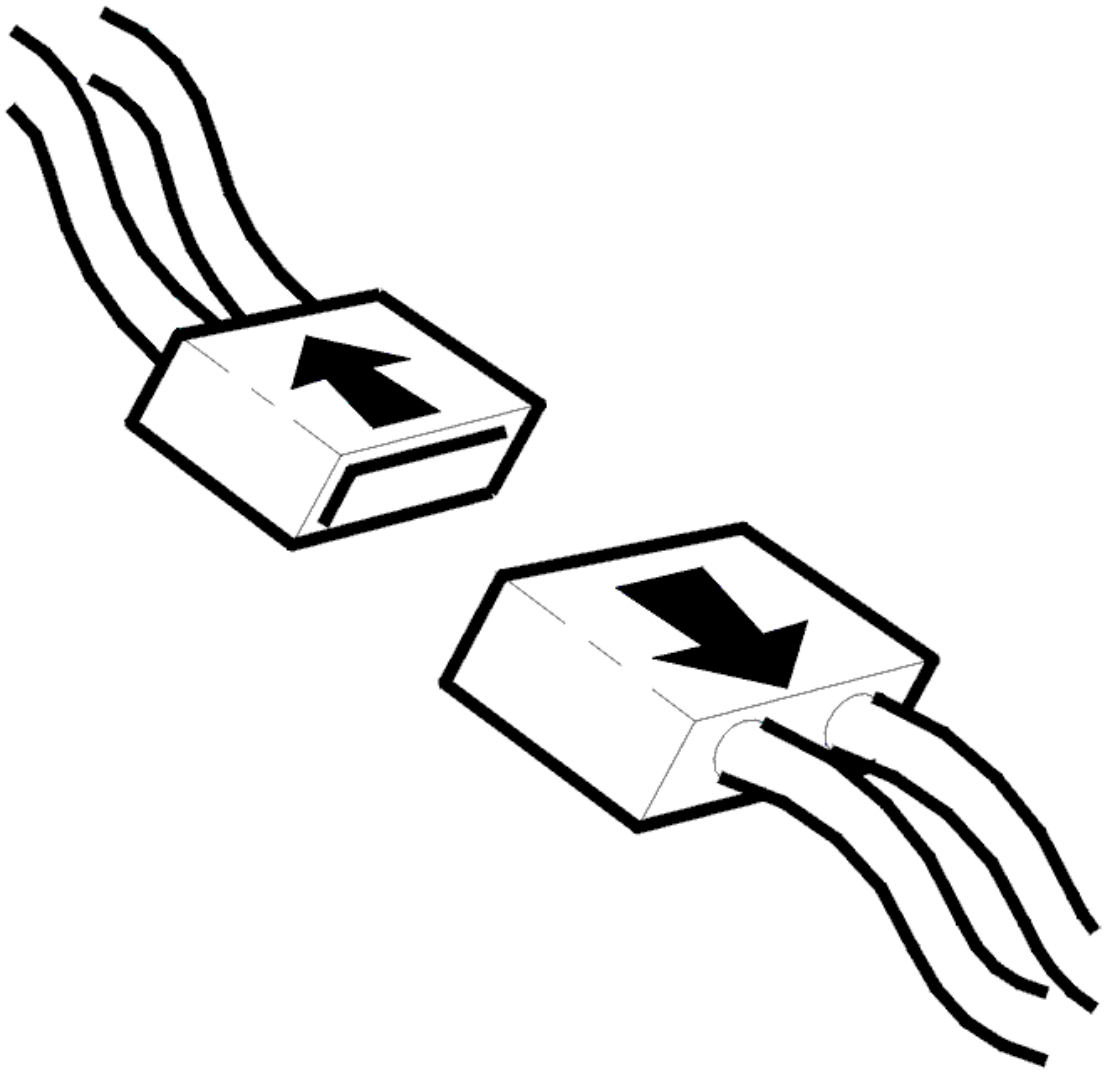


Fig. 91: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

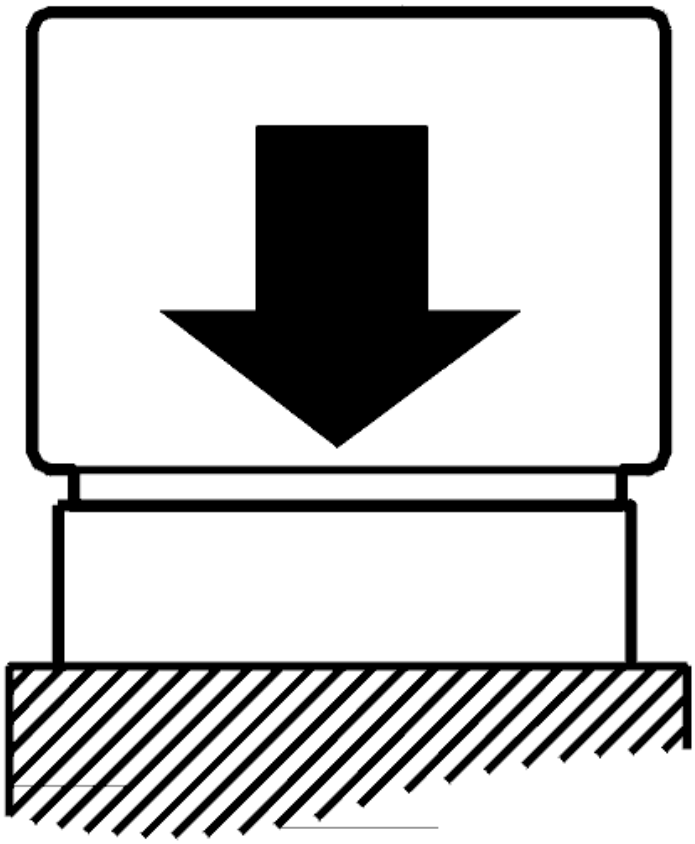


Fig. 92: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission control module (TCM) connected
- The breakout box connected
- Transmission connector disconnected
- Connect a temporary cable between terminals #A35 and #A59 on the breakout box

CAUTION: Check that the temporary cable is connected to the correct terminals. Also check that there is no risk of unintentional short-circuits.

-
- Ignition on

- Read off the status.

  Check that the status is "1" when the temporary cable is connected to the terminals above.

  Disconnect the cable end that is connected to terminal #A35 and move the cable to terminal #A53.

  NOTE: Leave the cable end connected to terminal #A59 in place.

  Check that the status changes to "0" when the temporary cable has been moved to terminal #A53.

  The transmission output speed sensor is defective if the status has changed between "1" and "0" as above and no errors have been detected on the cables or terminals in the preceding checks. Replace the transmission output speed sensor.

  The transmission control module (TCM) is defective if the status has not changed between "1" and "0" as above and no errors have been detected on the cables or terminals in the preceding checks. If this is the case replace the control module.

  Remedy as necessary.

  Other information

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - To disconnect the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - To check or replace the transmission output speed sensor, see **OUTPUT SPEED SENSOR TRANSMISSION, REPLACING**
  - To replace the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
  - For information about signals, see **SIGNAL SPECIFICATION** .

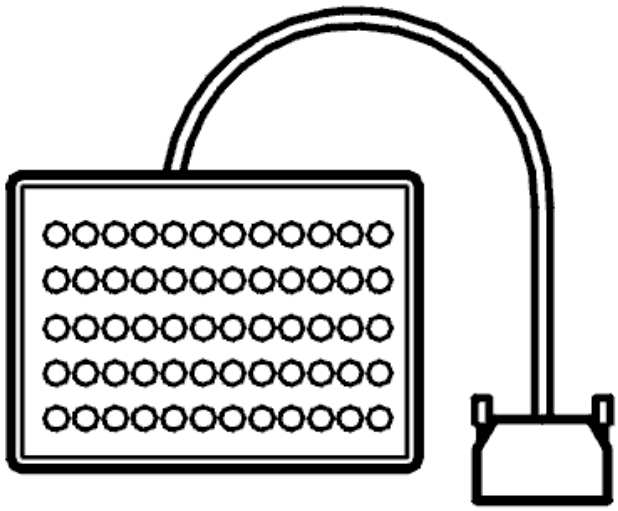


Fig. 93: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

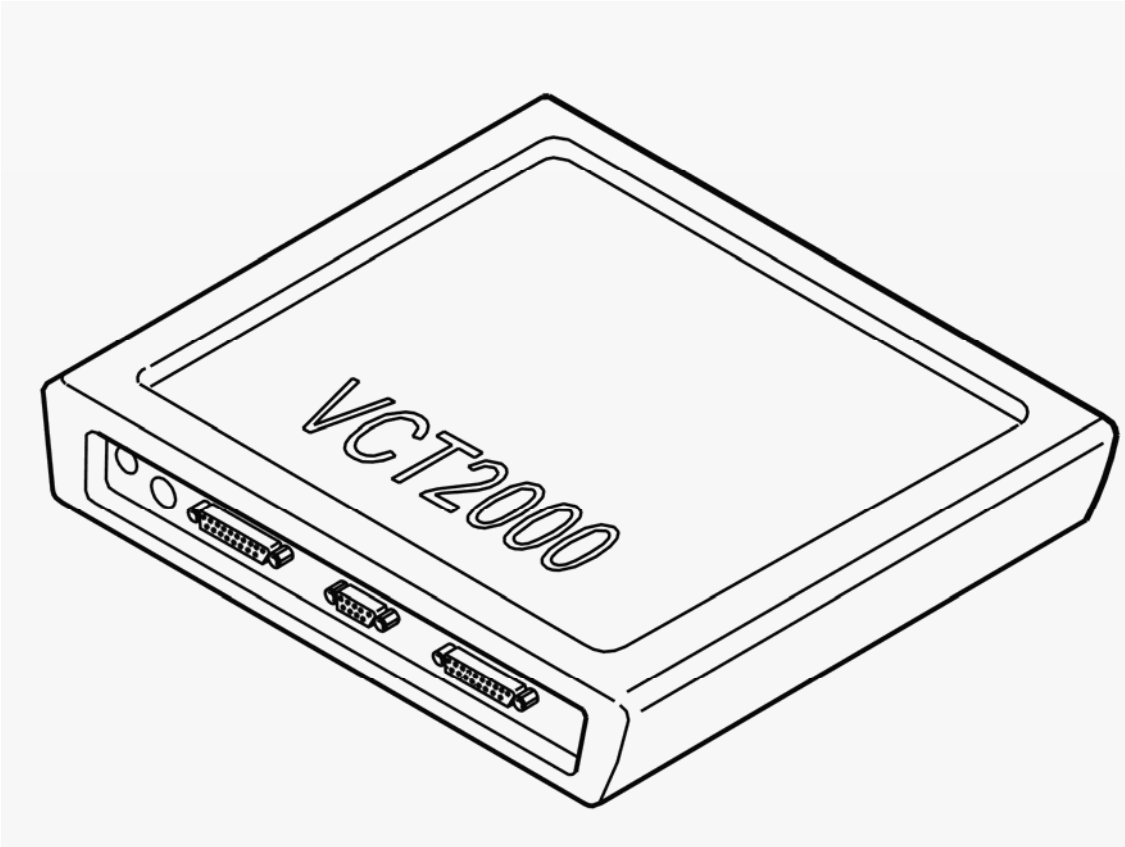


Fig. 94: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

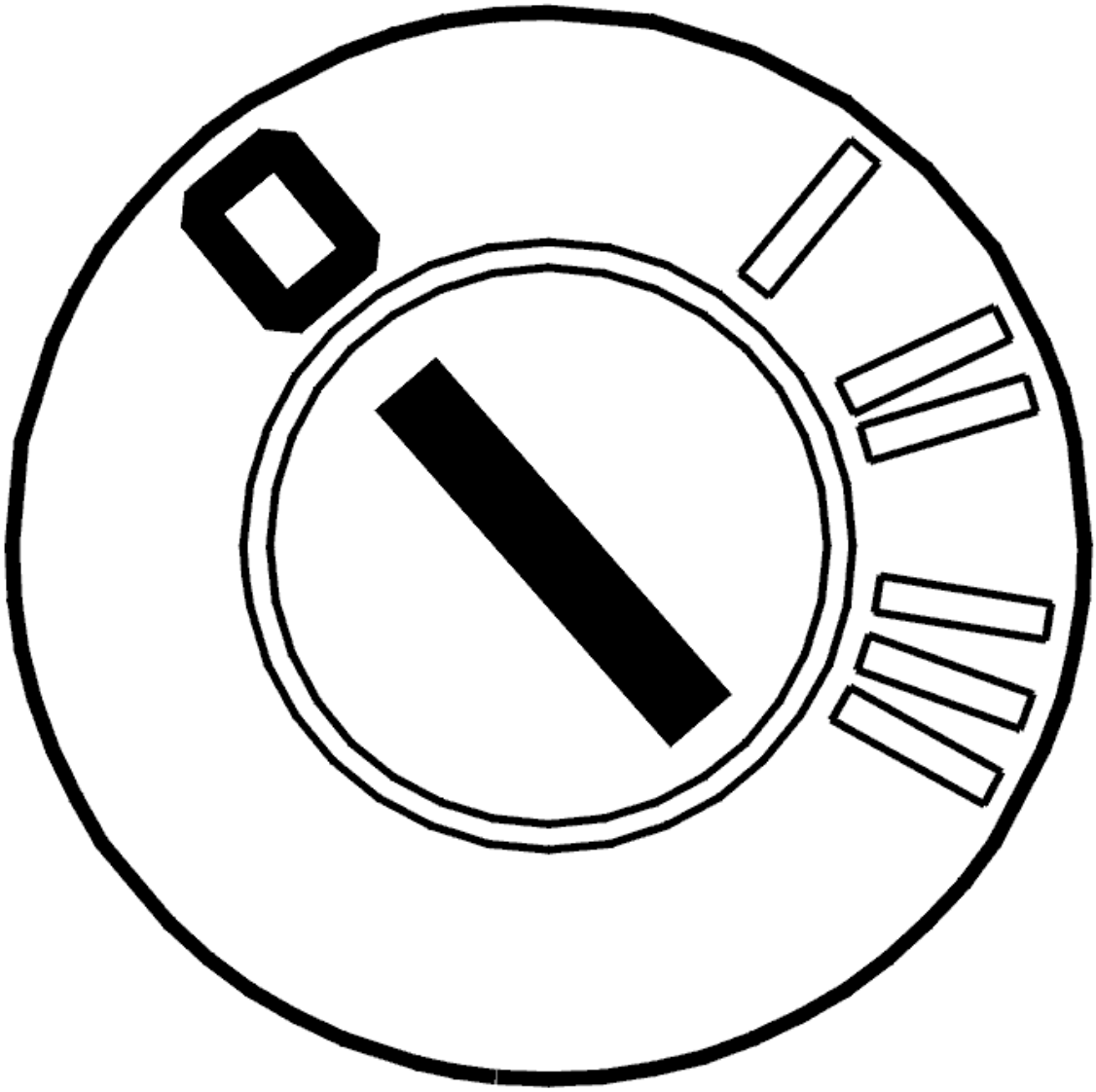


Fig. 95: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable for power supply between transmission connector terminal #S (#A16) and speed sensor connector terminal #A. Check for an open-circuit. Check for a short-circuit to ground.

  Check the signal cable between transmission connector terminal #V (#A19) and speed sensor connector terminal #B. Check for an open-circuit. Check for a short-circuit to ground.

  Remedy as necessary.

  Other information

- To open the transmission control system, For removal, see **SIDE COVER TRANSMISSION, REMOVING** and To install, see **SIDE COVER TRANSMISSION, INSTALLING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the transmission speed sensor, see **INPUT SPEED SENSOR TRANSMISSION, REPLACING**
- To replace the cable harness, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

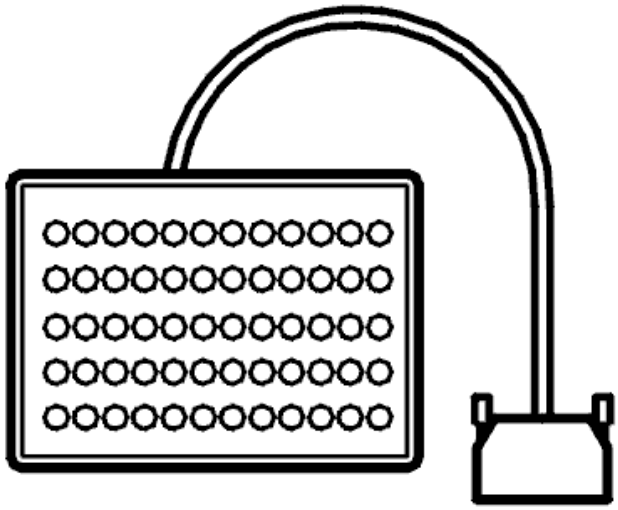


Fig. 96: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

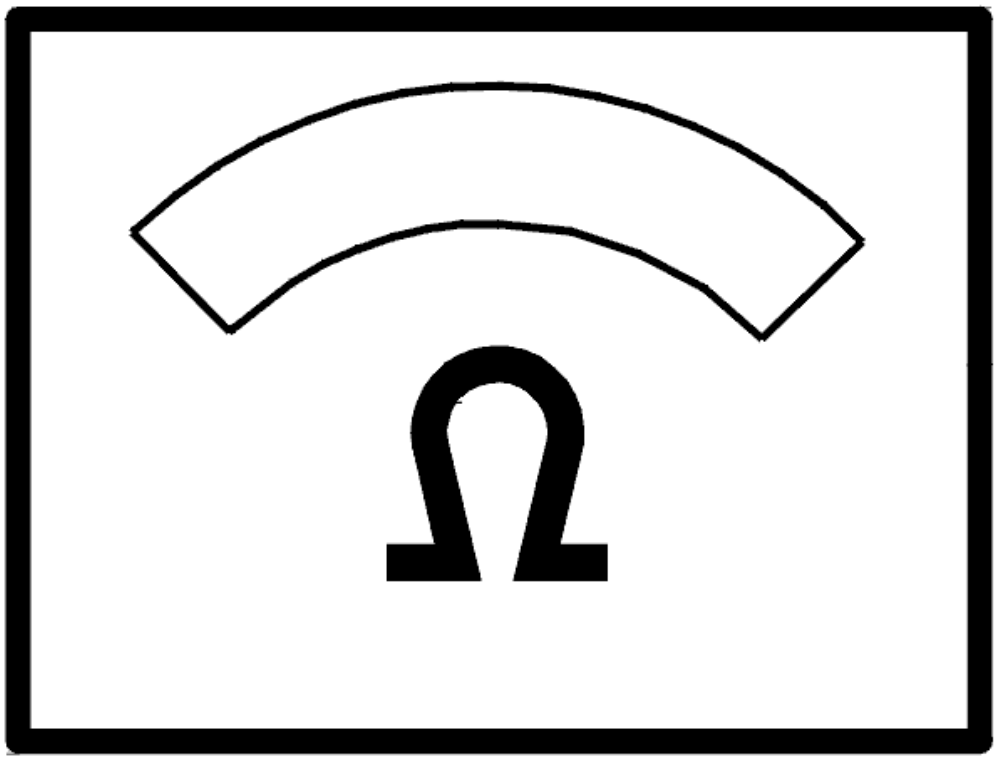


Fig. 97: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

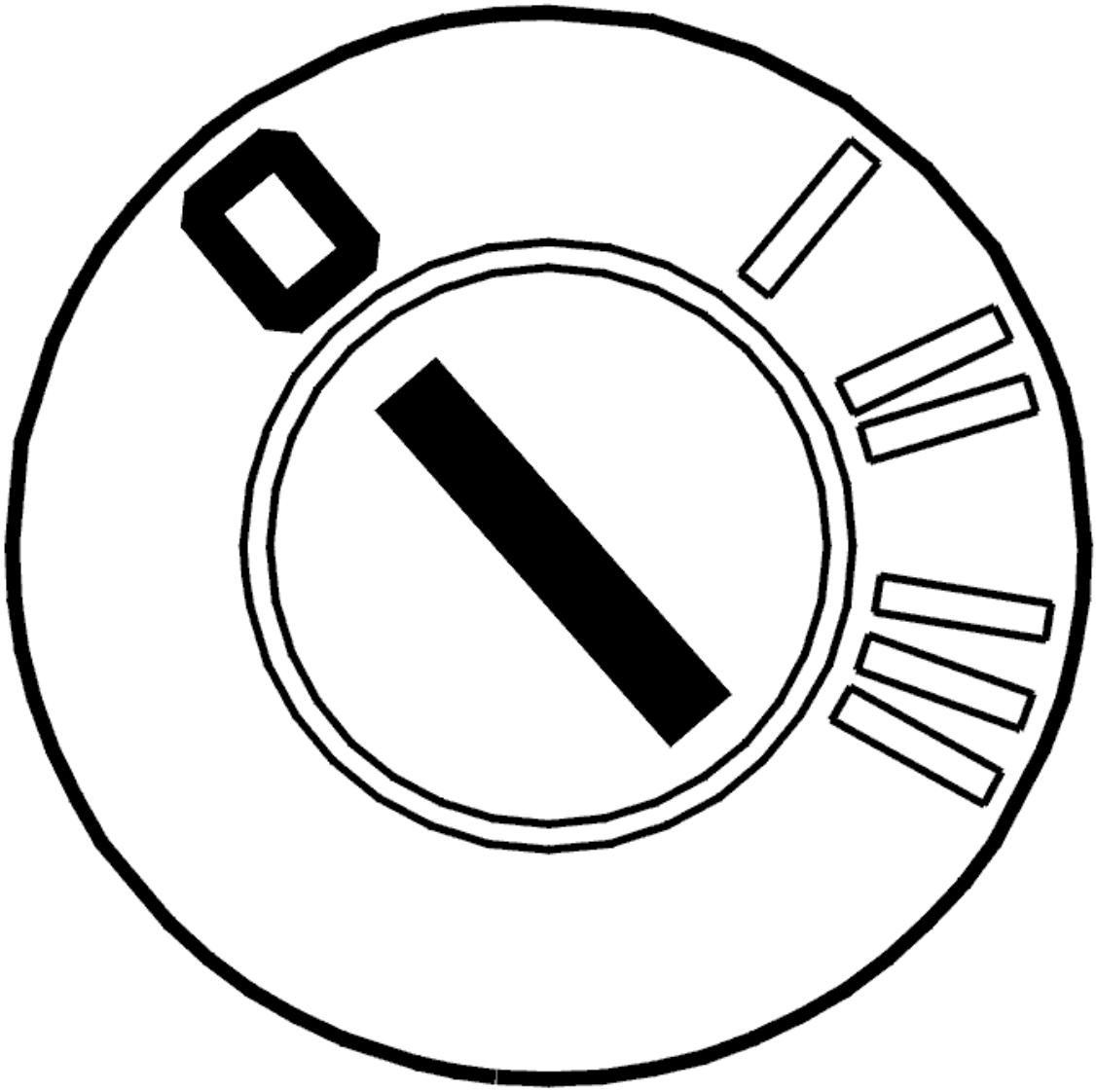


Fig. 98: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the control module and transmission connectors. Check for contact resistance and oxidation.

  Check the power supply cable between control module terminal #59 (#A59) and transmission connector terminal #S (#A16). Check for an intermittent open-circuit. Check for an intermittent short-circuit to ground.

  Check the signal cable between control module terminal #41 (#A41) and transmission connector terminal #V (#A19). Check for an intermittent open-circuit. Check for an intermittent short-circuit to ground.

  Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

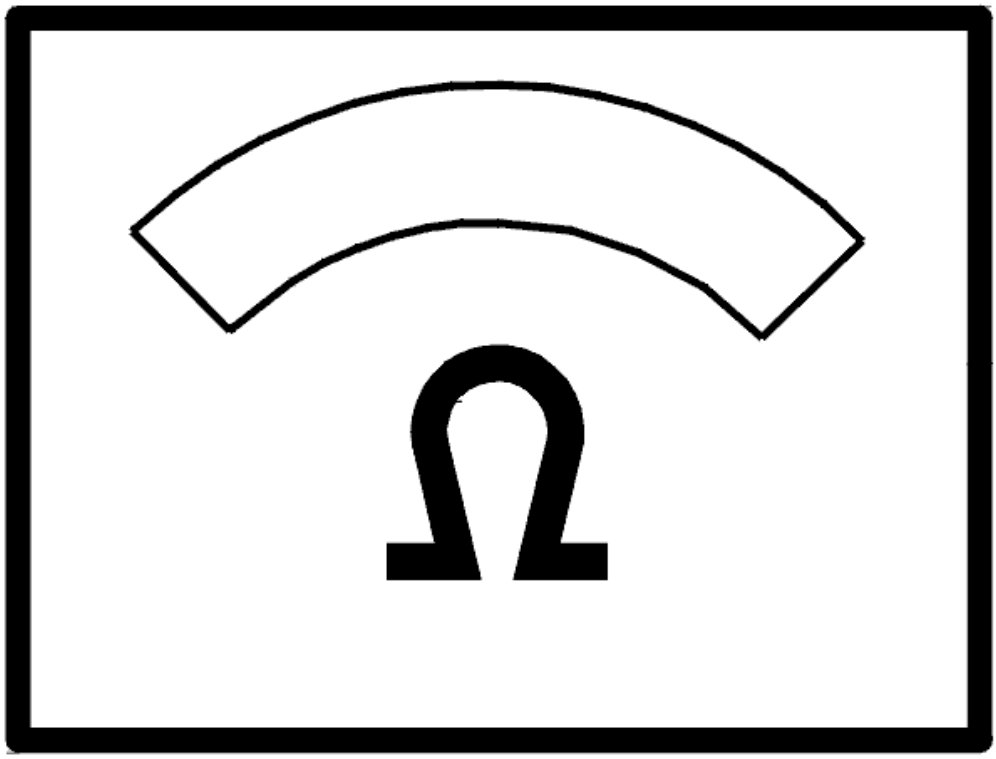


Fig. 99: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

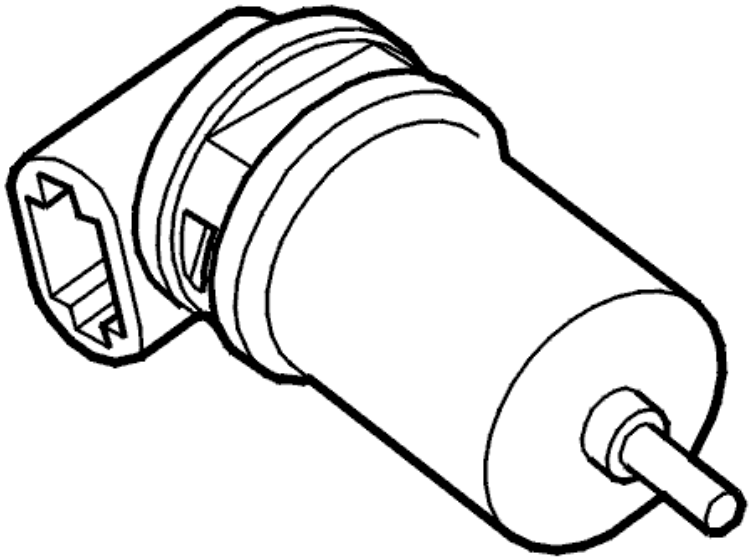


Fig. 100: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

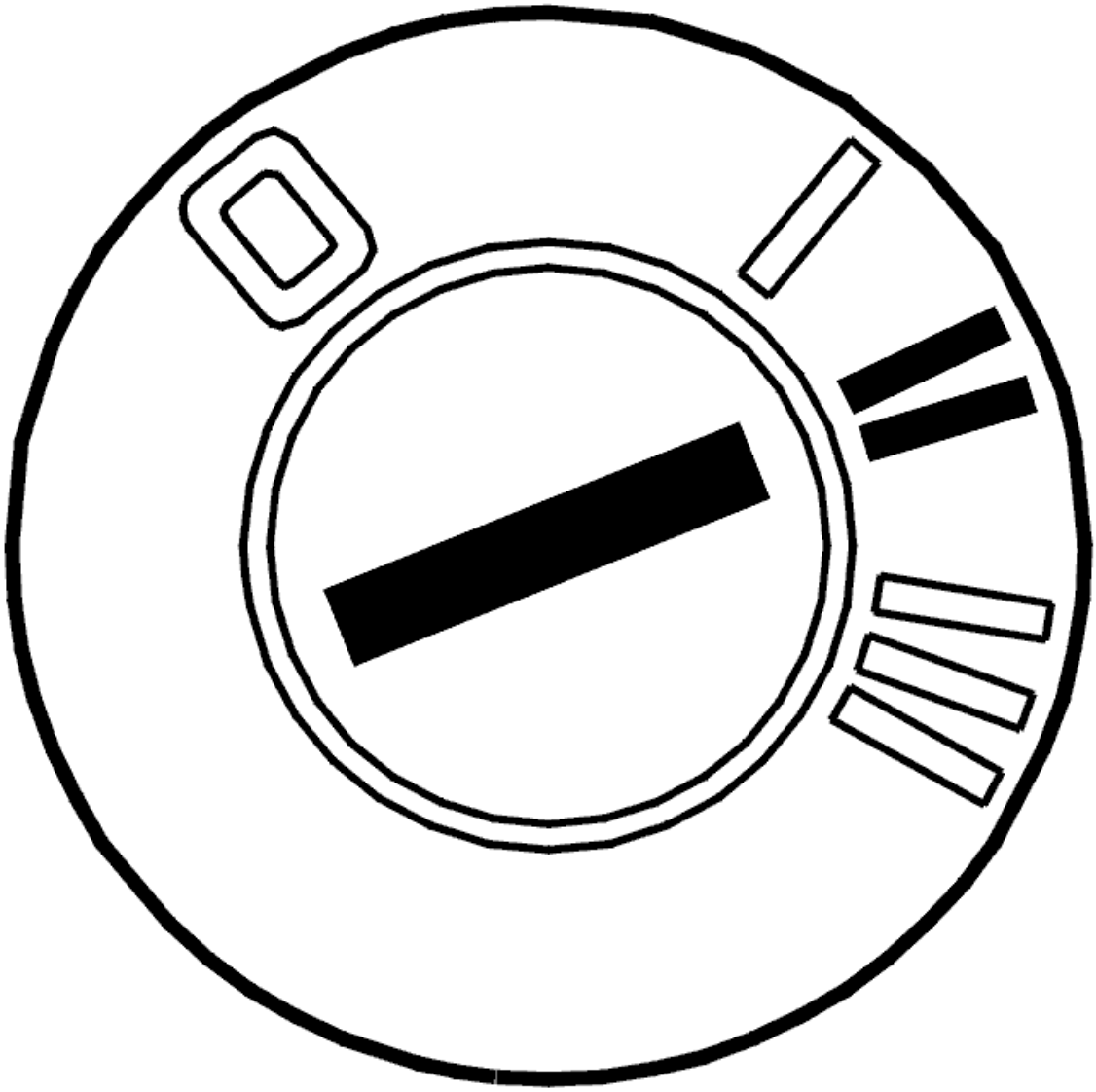


Fig. 101: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Use the VCT2000 (or appropriate scan tool) to reset the adaptation and counter.

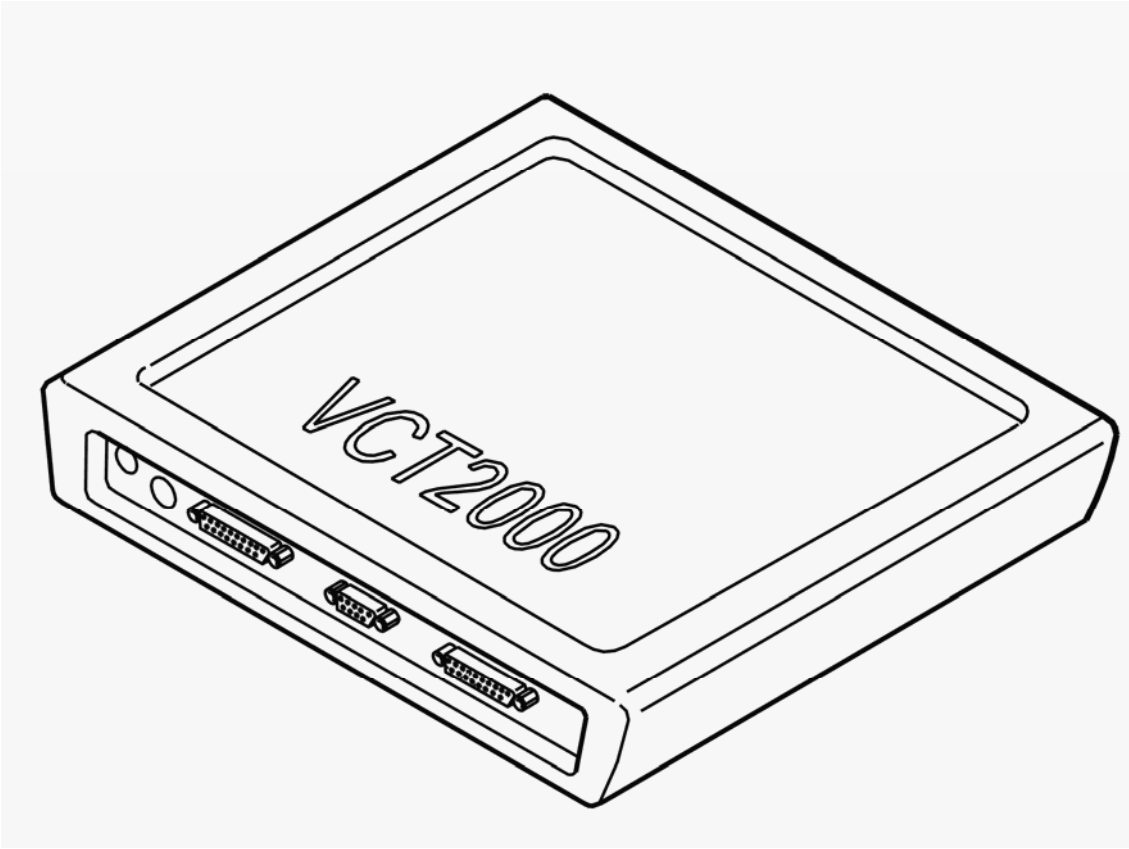


Fig. 102: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

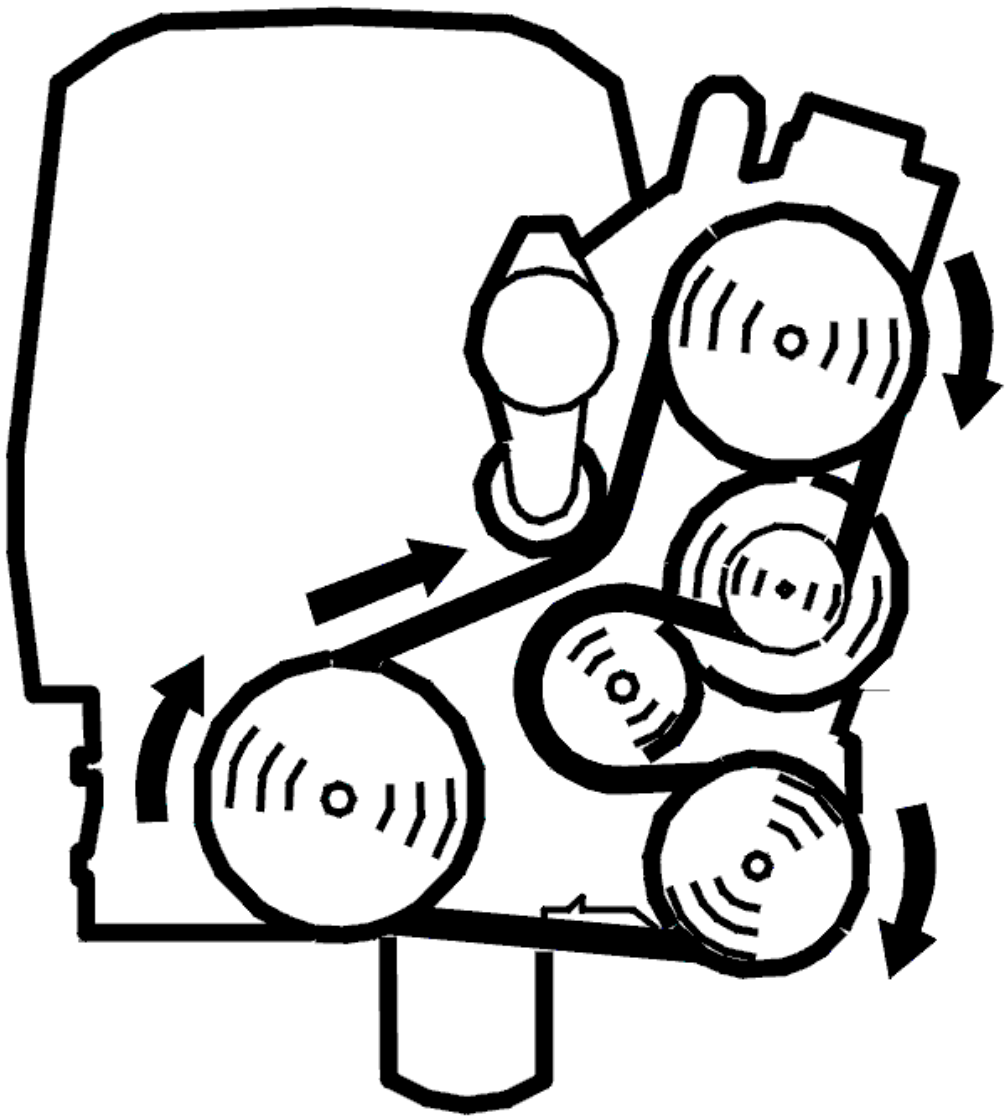


Fig. 103: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

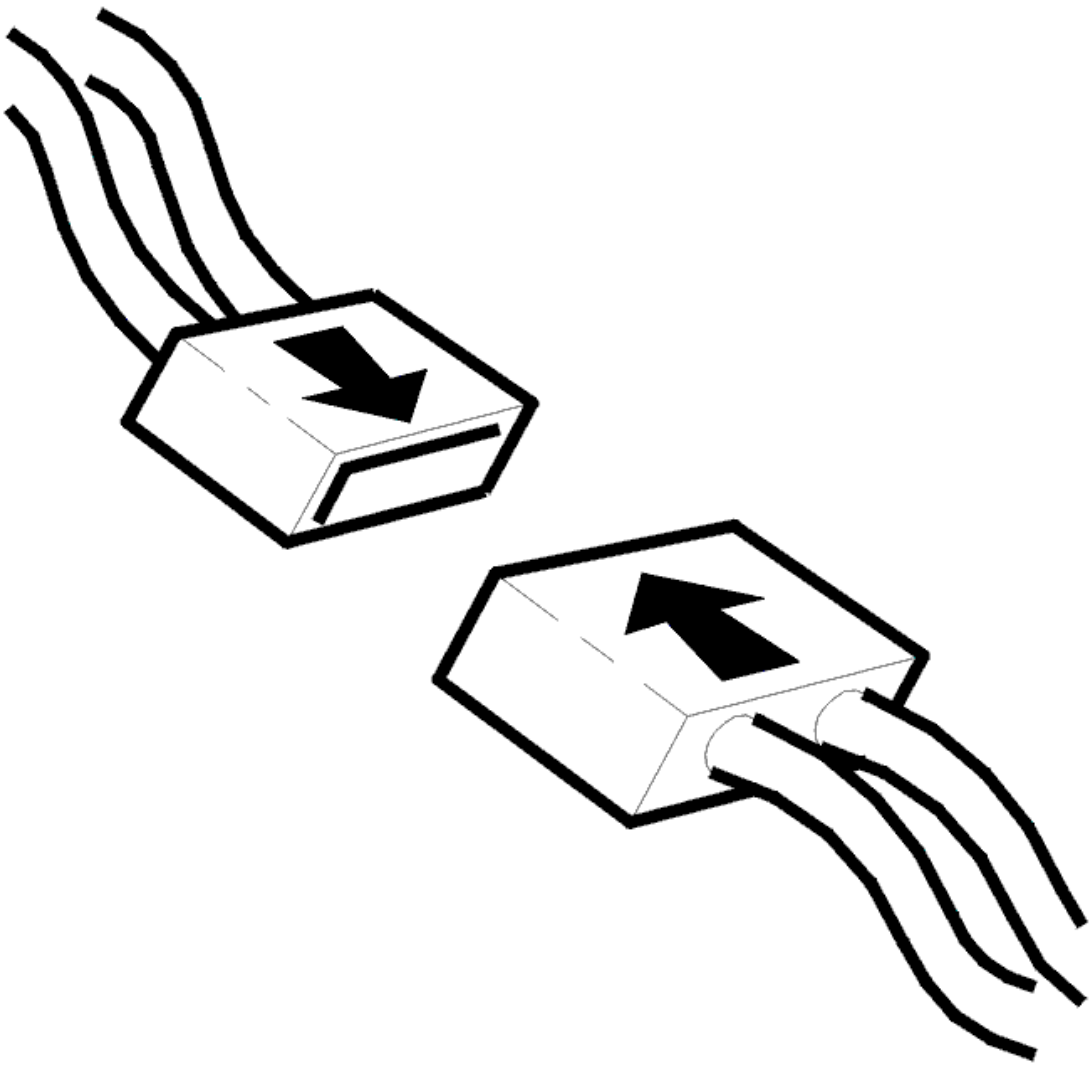


Fig. 104: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Start the engine and let it idle.
- Read off the transmission speed.

  Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated. Compare with the engine speed (RPM).

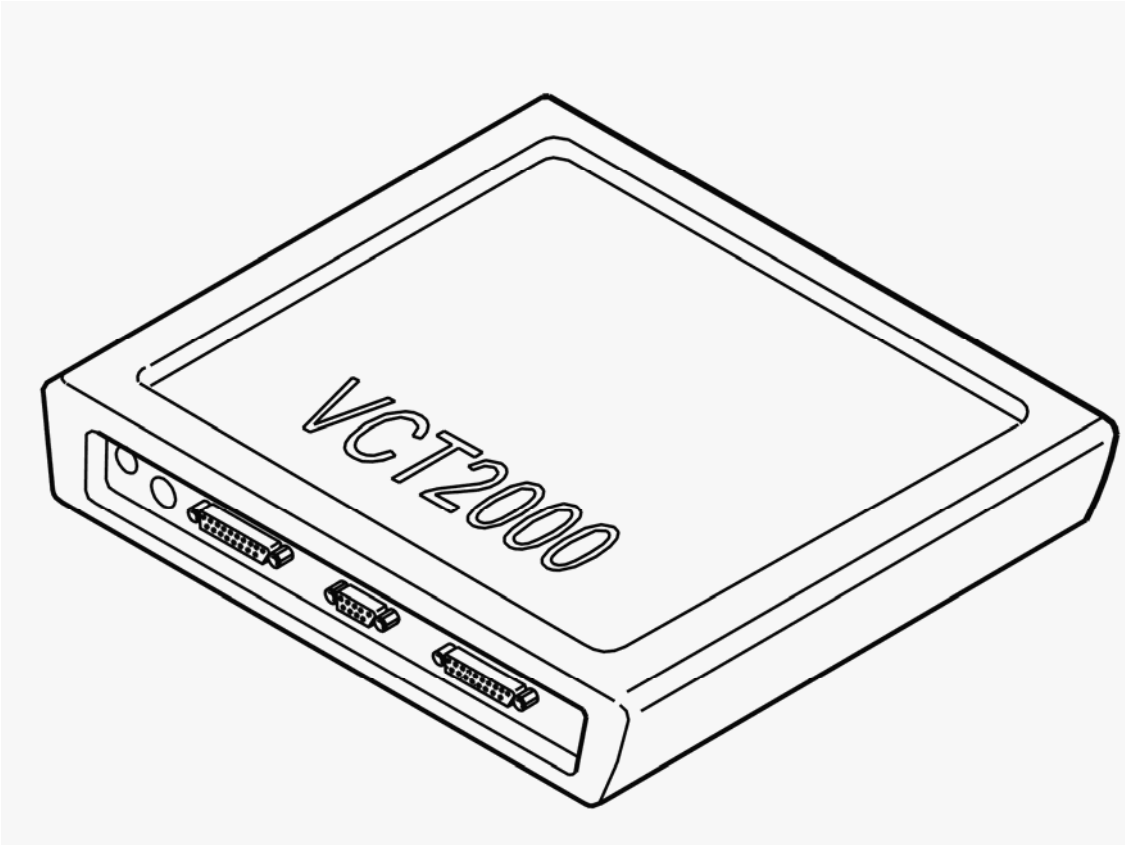


Fig. 105: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0089: TRANSMISSION INPUT SPEED SENSOR. SIGNAL TOO LOW (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

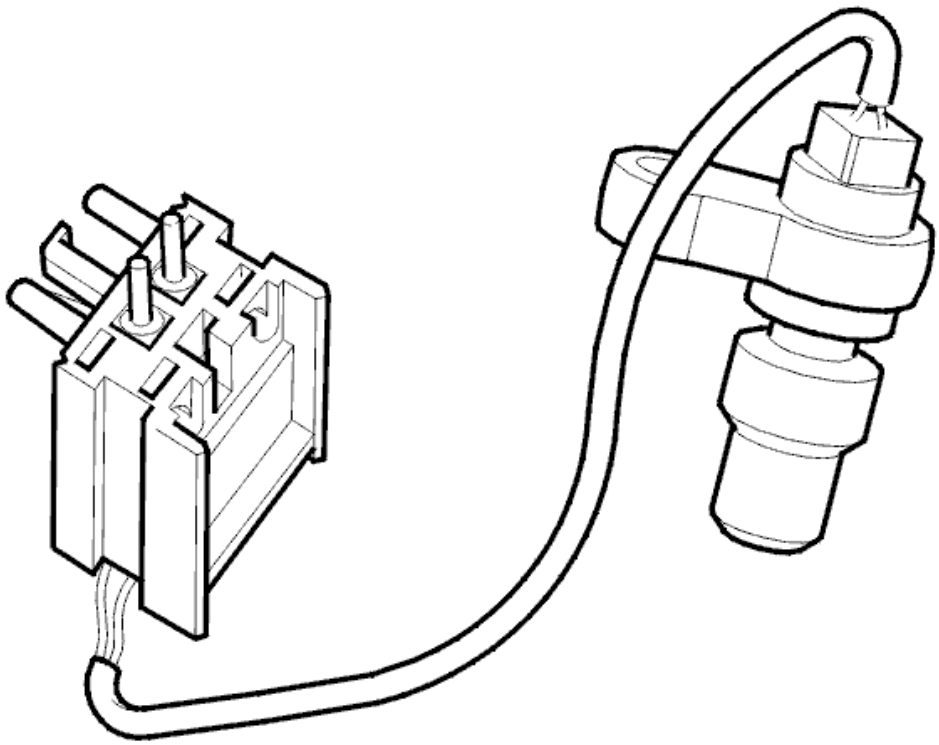


Fig. 106: Identifying Transmission Input Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The transmission speed signal is transmitted by a sensor on the transmission. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare the transmission speed with vehicle speed. The transmission control module (TCM) uses this comparison to calculate gear-shift timing. Engine speed (RPM) and vehicle speed data affects the adjustment of system pressure, lock-up function control and engine torque reduction. The result is smooth gear-shifting. Diagnostic trouble code (DTC) TCM-0089 is stored if the control module registers that the signal is too low when vehicle speed is over approximately 25 km/h.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Contact resistance in the terminals.
- Short-circuit to ground in the signal cable.
- Defective input speed sensor.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

SIGNAL TOO LOW

CHECKS

CHECKING THE TRANSMISSION INPUT SPEED SENSOR SIGNAL

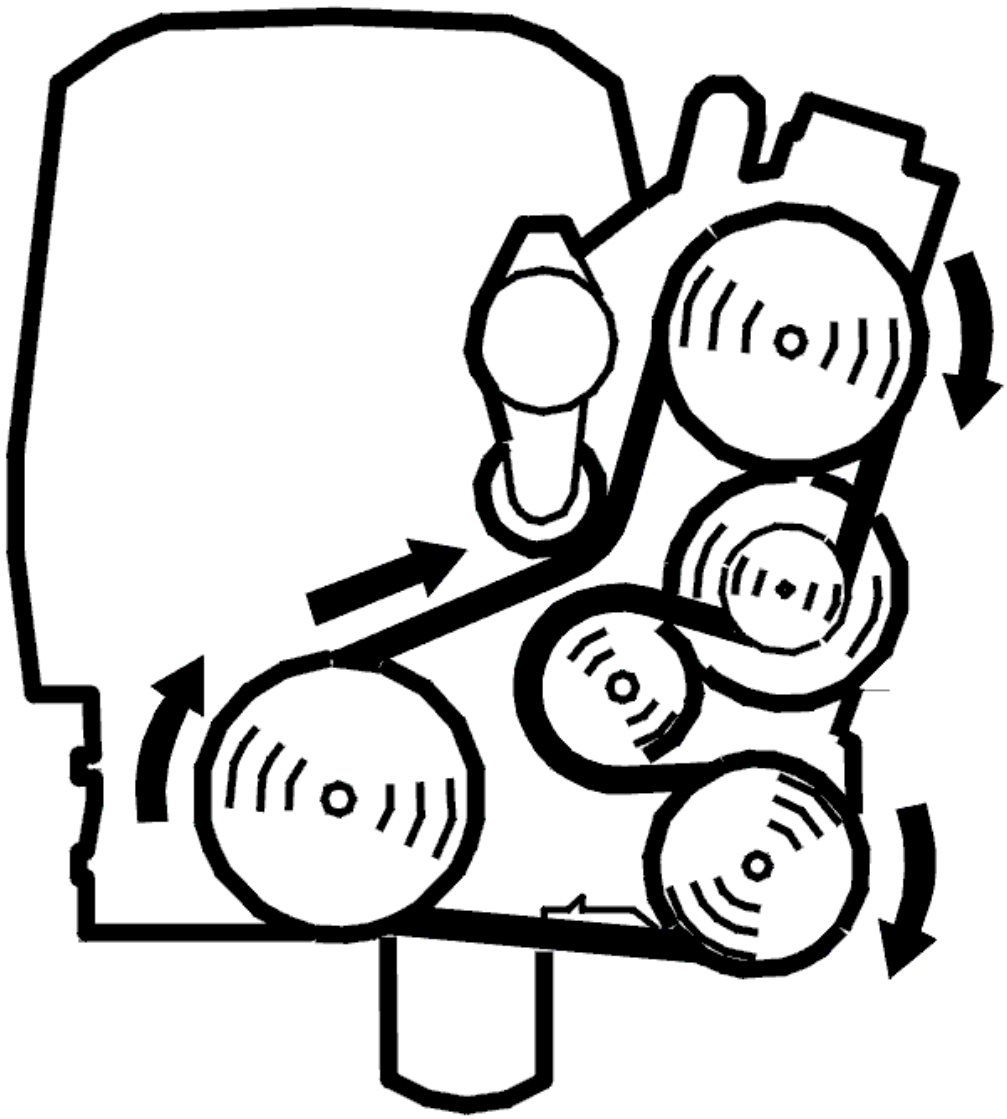


Fig. 107: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine. Allow the engine to idle
- Gear selector in position P
- Read off the transmission input speed.

  Check that the transmission speed is updated.

  Compare with the engine speed (RPM).

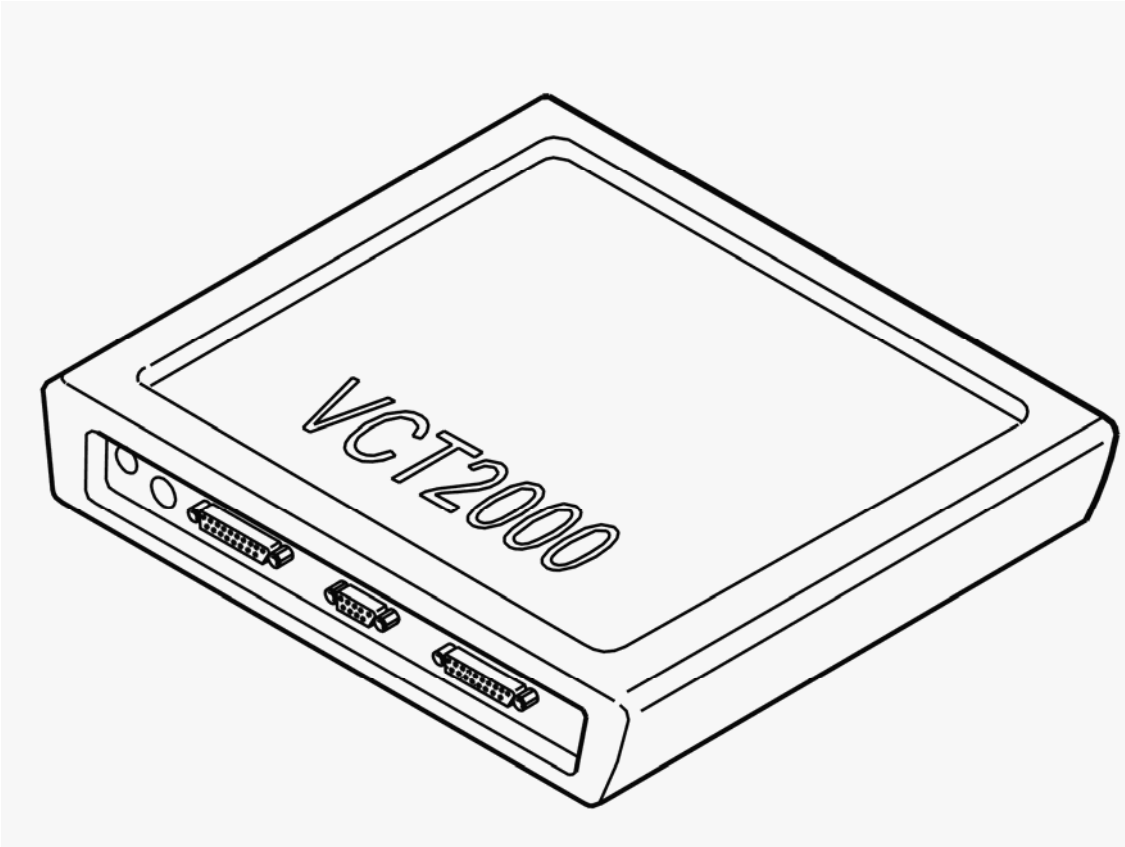


Fig. 108: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

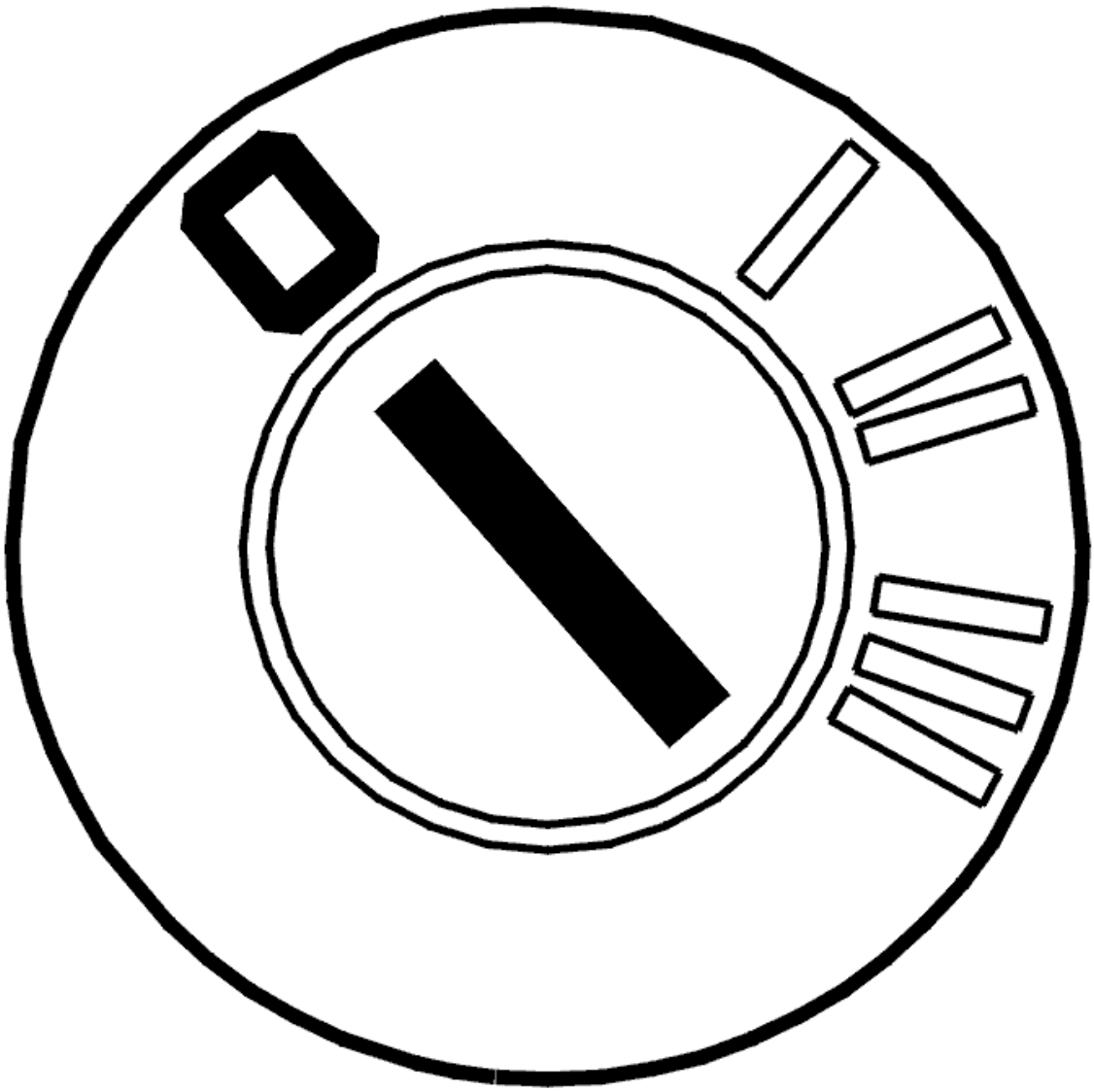


Fig. 109: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission control module (TCM) and transmission input speed sensor connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

  Check the power supply cable between control module terminal #A59 (#A59) and transmission connector terminal #A2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

  Check the signal cable between control module terminal #A41 (#A41) and transmission connector terminal #A1. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT**

FAULTS .

HINT: With the control module connected, the ignition on and a voltmeter connected between transmission connector terminals #A2 and #A1 (control module side), the voltage must be 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To check and replace the transmission speed sensor, see **INPUT SPEED SENSOR/OUTPUT SPEED SENSOR, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

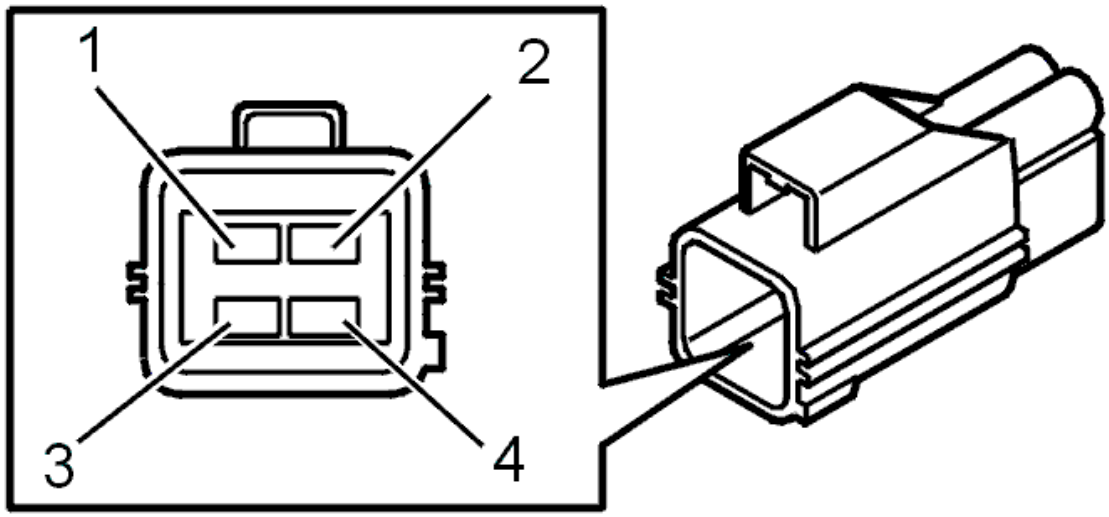


Fig. 110: Identifying Transmission Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

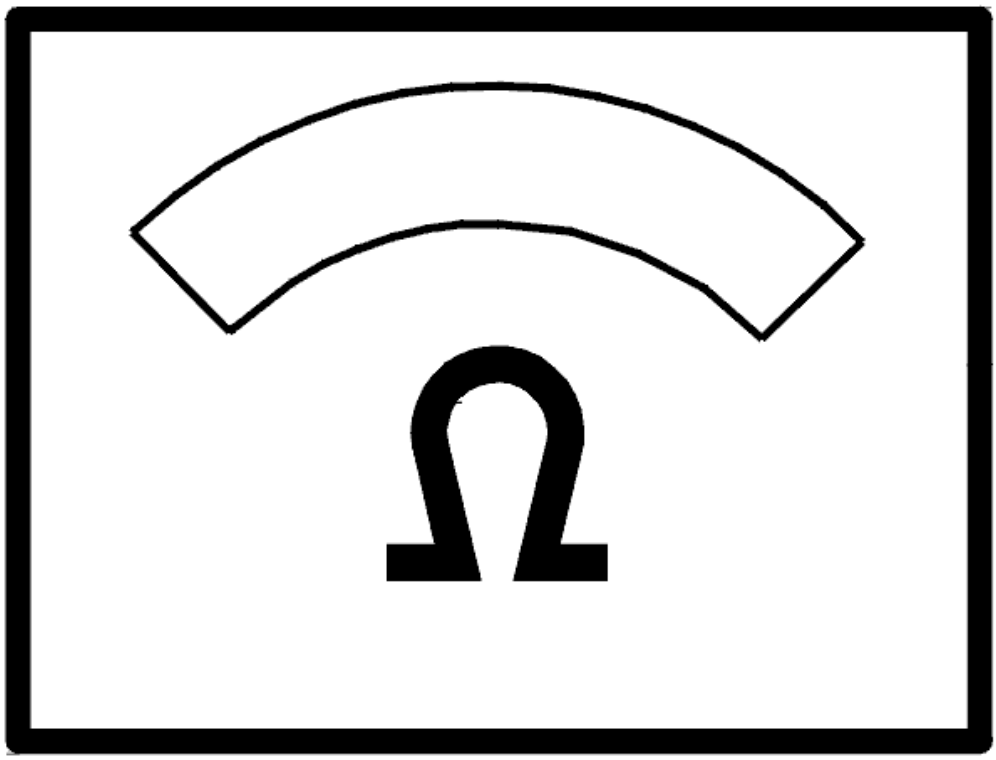


Fig. 111: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INTERMITTENT FAULT

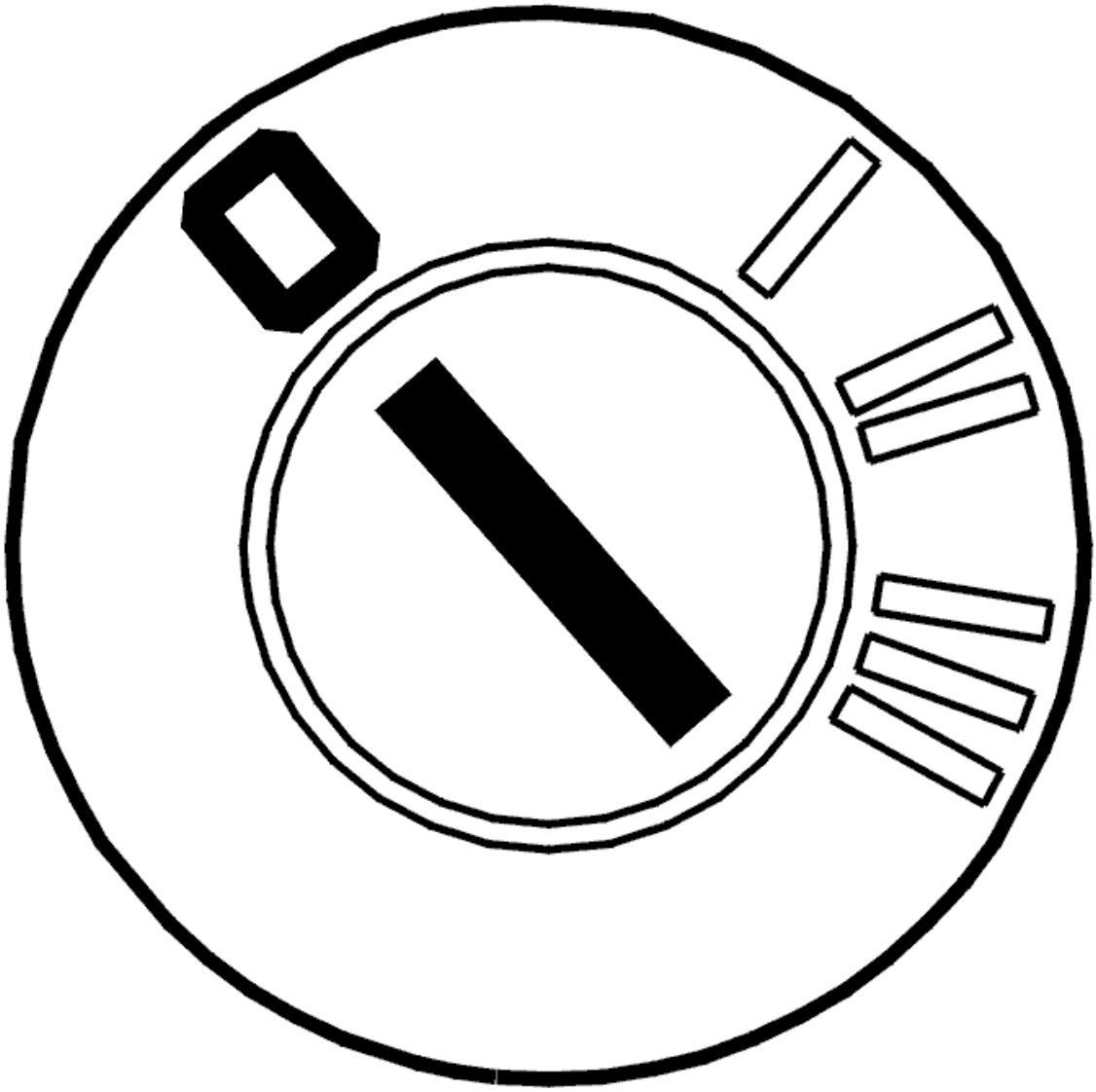


Fig. 112: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the control module and transmission input speed sensor connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

  Check the power supply cable between control module terminal #A59 (#A59) and transmission connector terminal #A2. Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** . Check for an intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** .

  Check the signal cable between control module terminal #A41 (#A41) and transmission connector terminal #A1. Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** . Check for an intermittent short-circuit to ground according to **SHORT-CIRCUIT TO**

GROUND, INTERMITTENT FAULTS .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

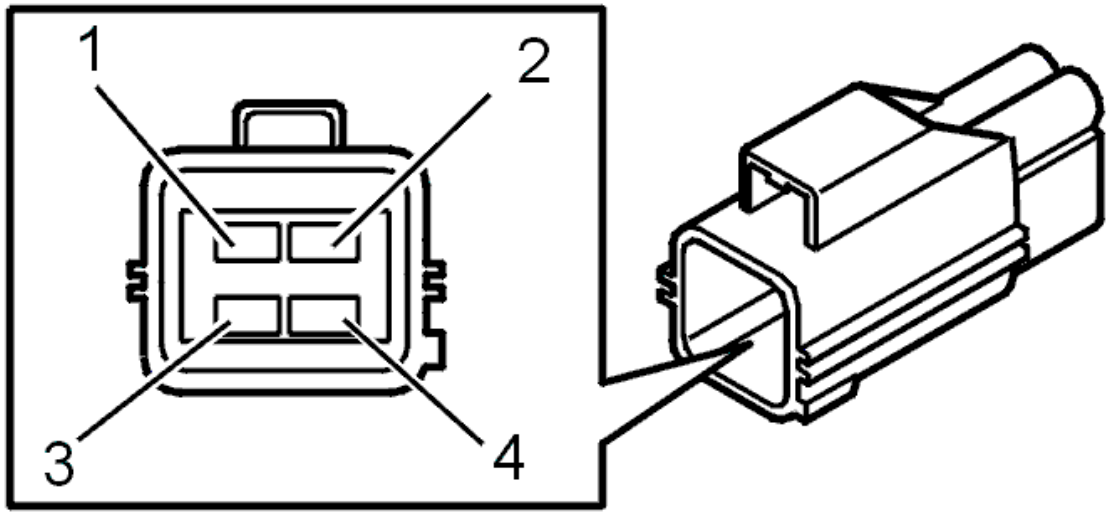


Fig. 113: Identifying Transmission Speed Sensor Terminals
Courtesy of VOLVO CARS CORPORATION

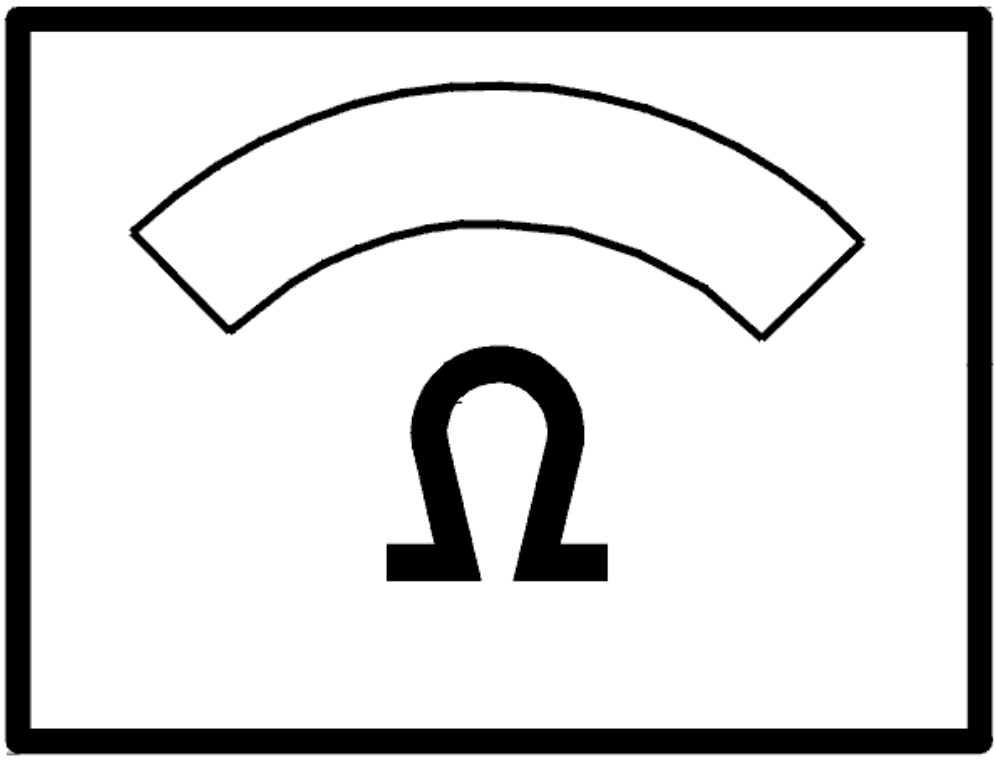


Fig. 114: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

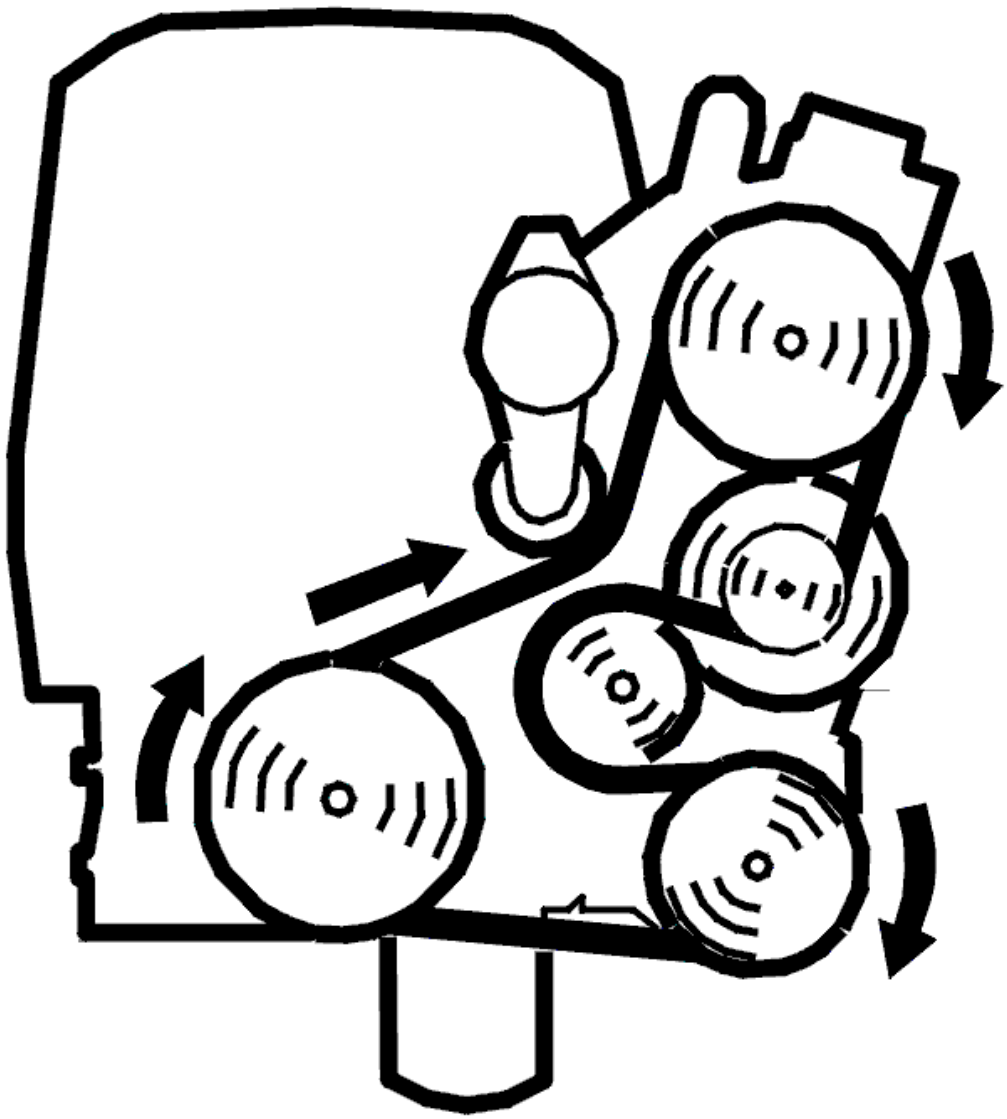


Fig. 115: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

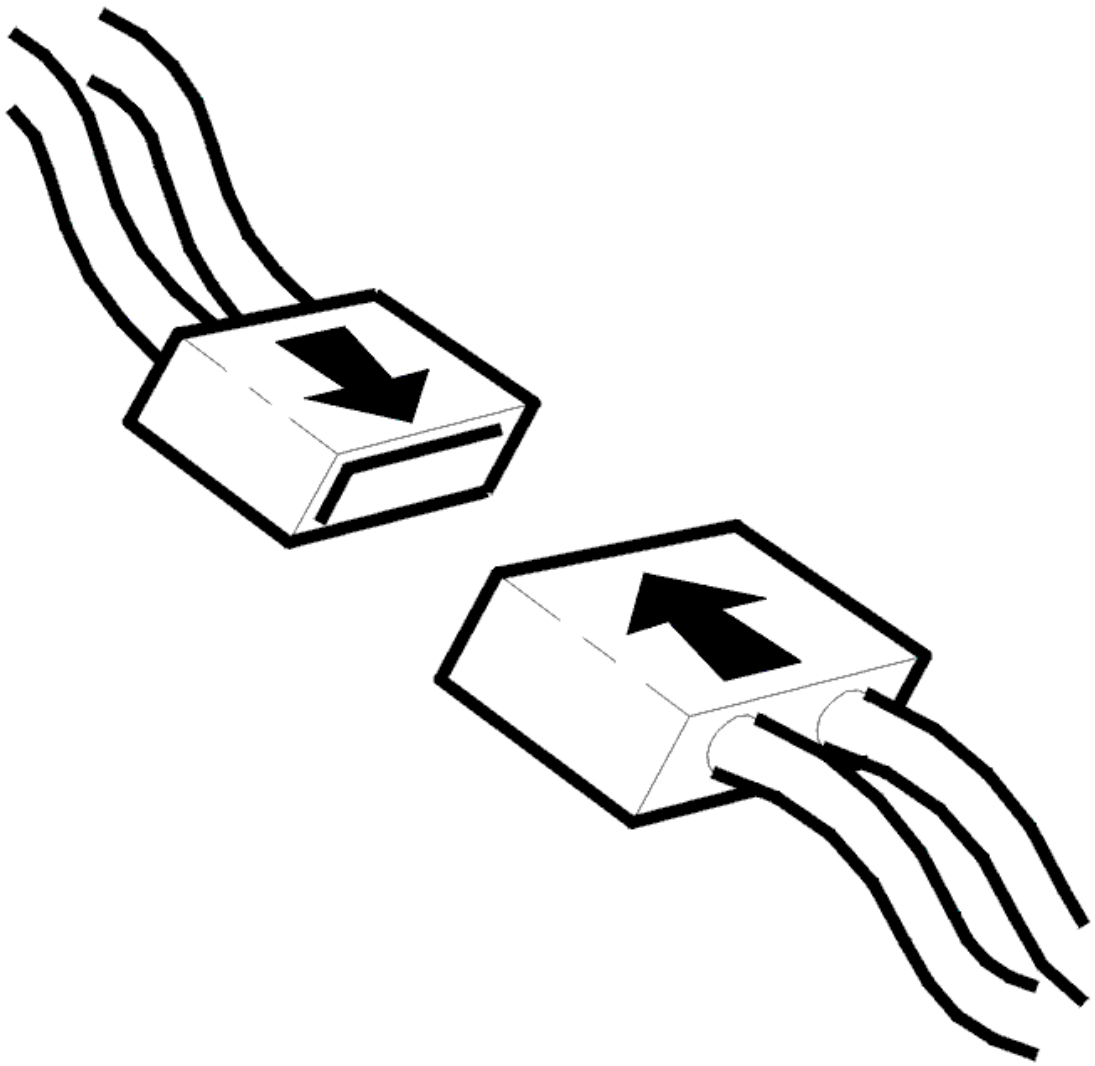


Fig. 116: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Start the engine and let it idle.
- Gear selector in position P.
- Read off the transmission speed.

  Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated.

  Compare with the engine speed (RPM).

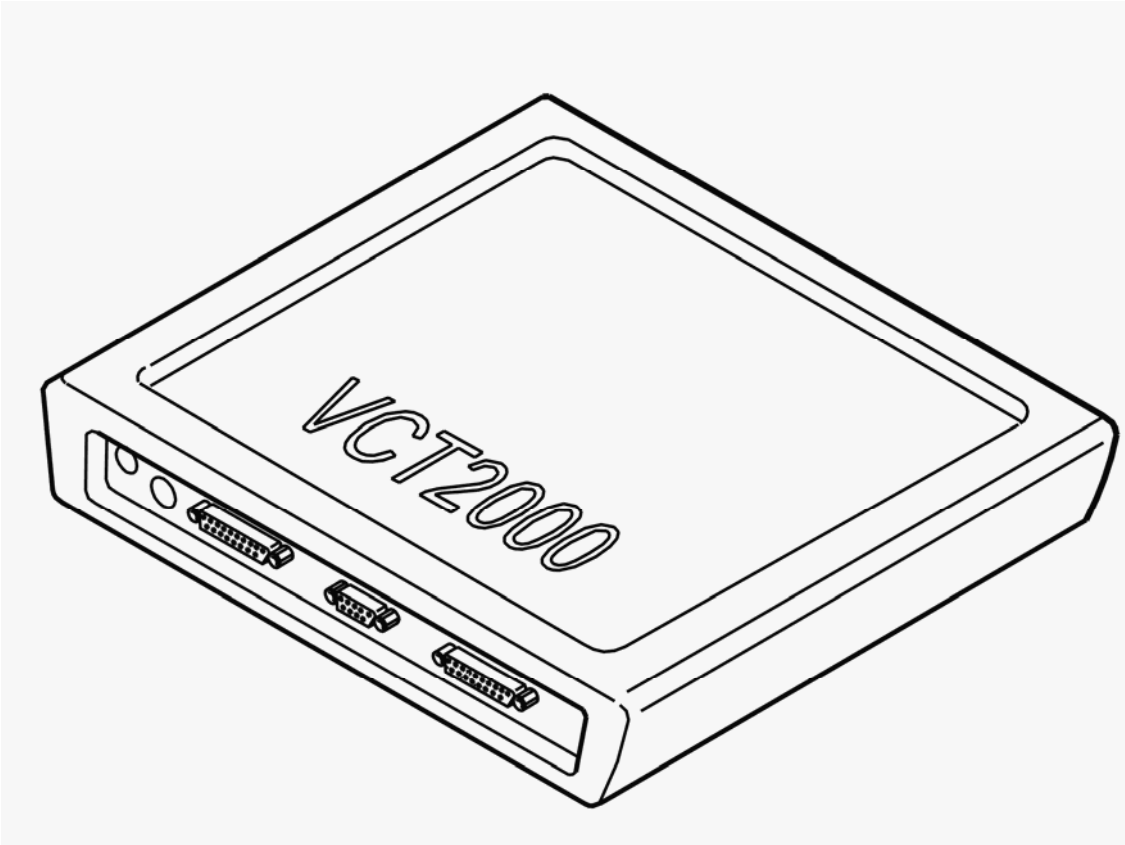


Fig. 117: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-008D: LOCK-UP PRESSURE SWITCH. FAULTY SIGNAL (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

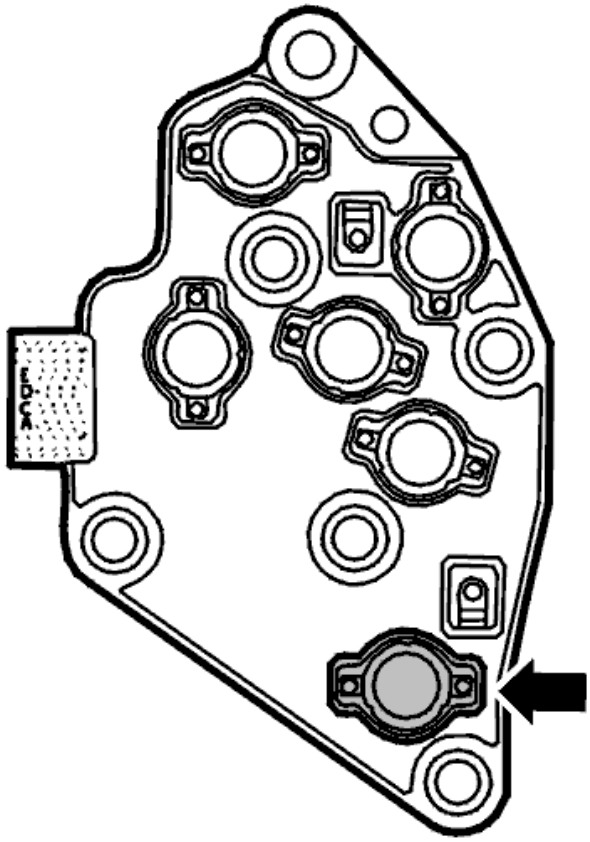


Fig. 118: Identifying Lock-Up Pressure Switch
Courtesy of VOLVO CARS CORPORATION

The automatic transmission control module (TCM) receives a signal from the pressure switch for lock up PS4 to control the lock-up valve position. Diagnostic trouble code (DTC) TCM-008D is stored if the lock-up solenoid has stuck in the open or closed position, transmitting a faulty signal to the control module.

Substitute Value

- TBD

Possible Source

- The pressure switch for lock-up is jammed.
- Contact resistance in the terminals.

Fault symptom[s]

- The automatic transmission warning lamp flashes.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

FAULTY SIGNAL

ORDERING AND PROGRAMMING SOFTWARE

The control module needs to be programmed with updated software. See the technical journal for information about the present software.

NOTE: After the software has been updated, diagnostic trouble code (DTC) TCM-008D is replaced with diagnostic trouble codes (DTCs) TCM-0053 and TCM-0054. Fault-trace according to the relevant information.

- **Continue**

  Refer to **TEST DRIVING**

TEST DRIVING

NOTE: Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

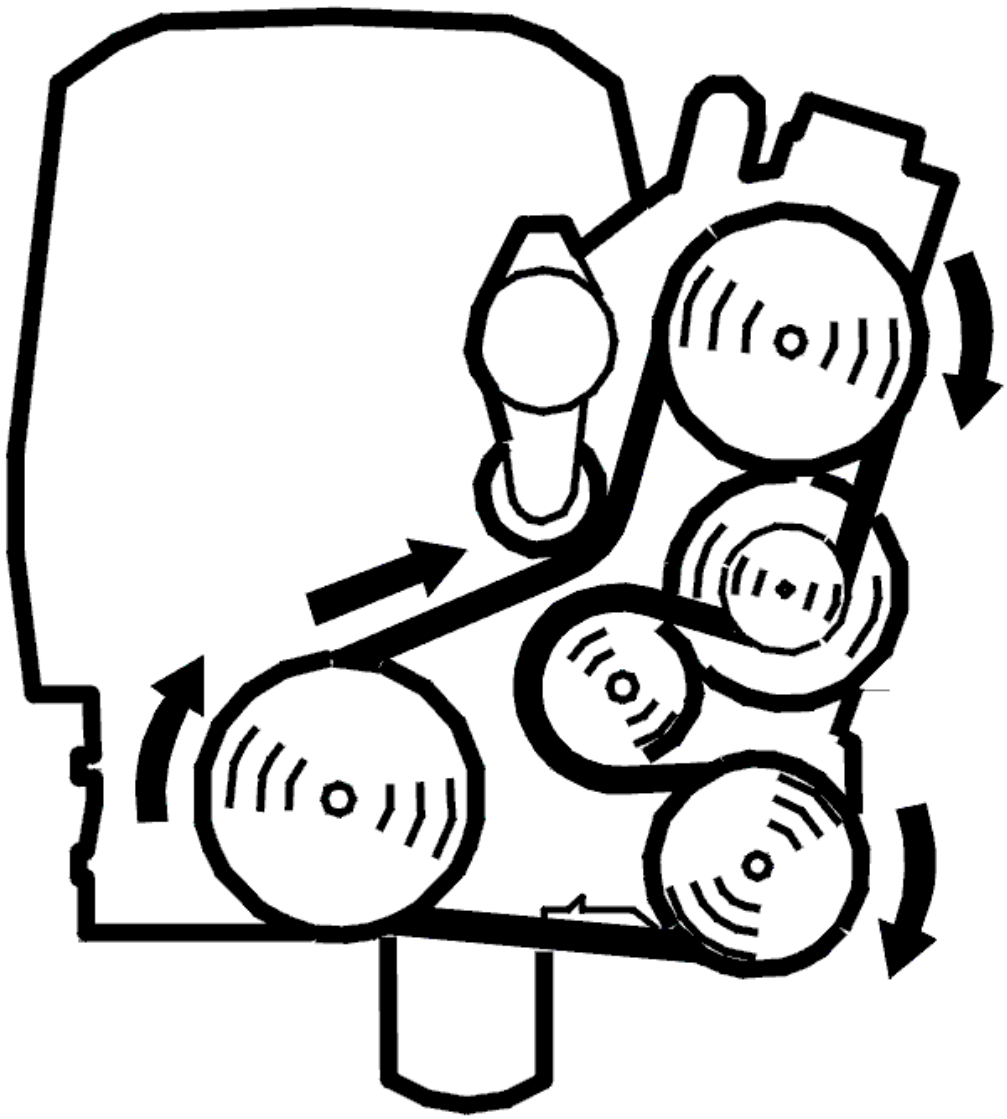


Fig. 119: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect scan tool. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission should be at operating temperature,

approximately 80-90 °C.

Shift the gear selector to position D (third gear with geartronic). Carefully accelerate to 50-65 km/h. Maintain the same speed for at least 20 seconds.

HINT: The car must be driven at an engine speed where the lock-up function is not normally activated.

Criteria for diagnostic trouble code (DTC):

- The transmission fluid temperature must exceed 30°C
- The engine must be running for at least 20 seconds
- Gear selector in position D, 3 or 2 (4T65EV).

  Gear selector in Geartronic position and gears 4, 3 or 2 (4T65EV-GT)

- Speed 50-65 km/h for at least 5 seconds
- At least 5 seconds since the last gear shift
- Positive engine torque (no engine braking).

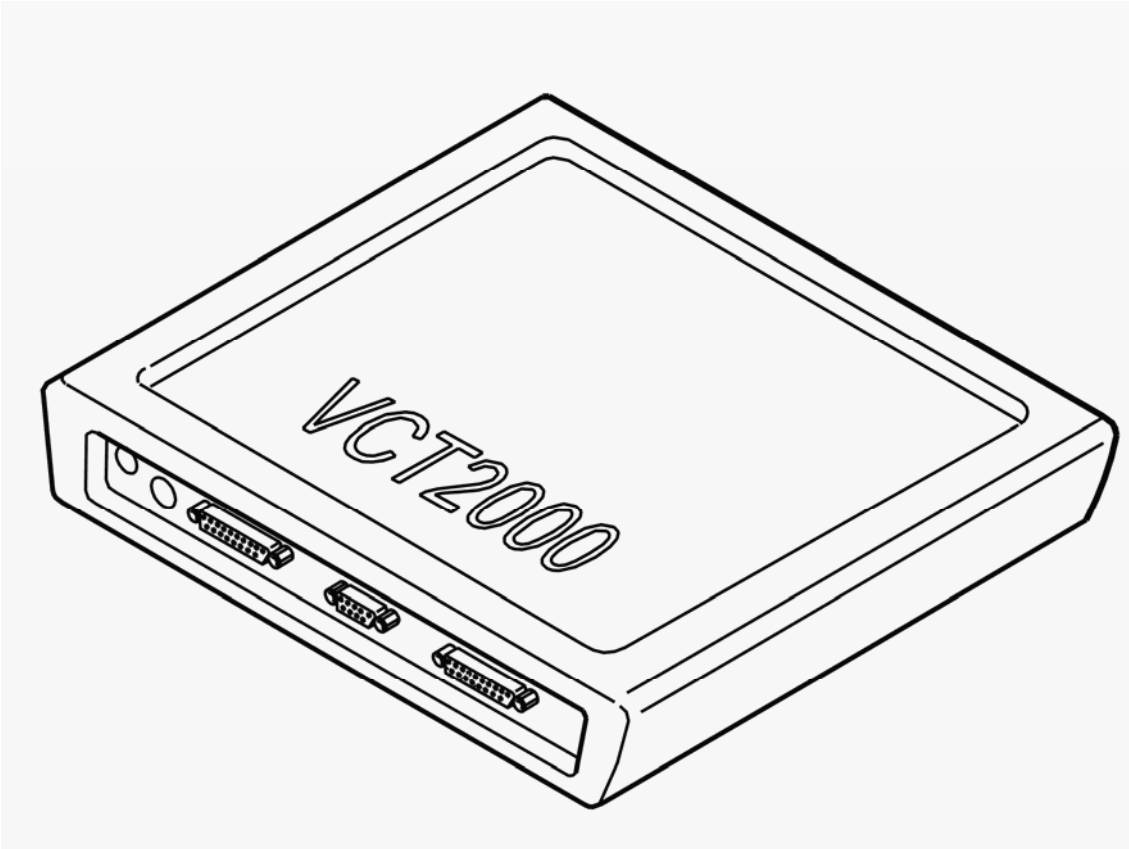


Fig. 120: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

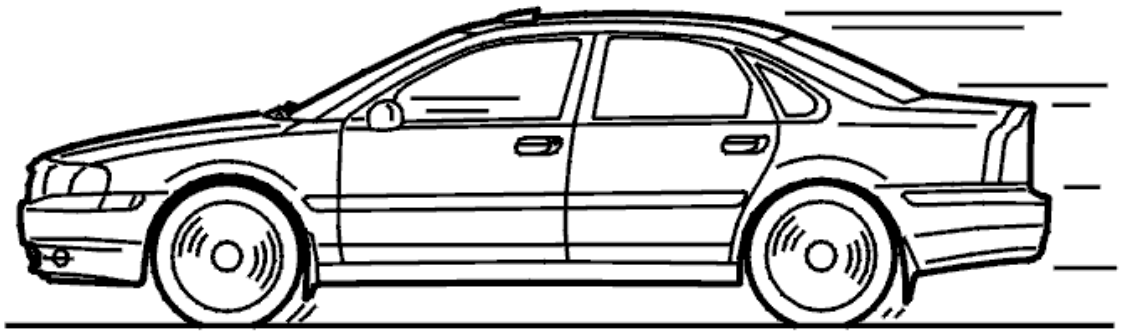


Fig. 121: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **READING OFF DIAGNOSTIC TROUBLE CODES (DTCS)**

READING OFF DIAGNOSTIC TROUBLE CODES (DTCS)

NOTE: After the software has been updated, diagnostic trouble code (DTC) TCM-008D is replaced with diagnostic trouble codes (DTCs) TCM-0053 and TCM-0054. Fault-trace according to the relevant information.

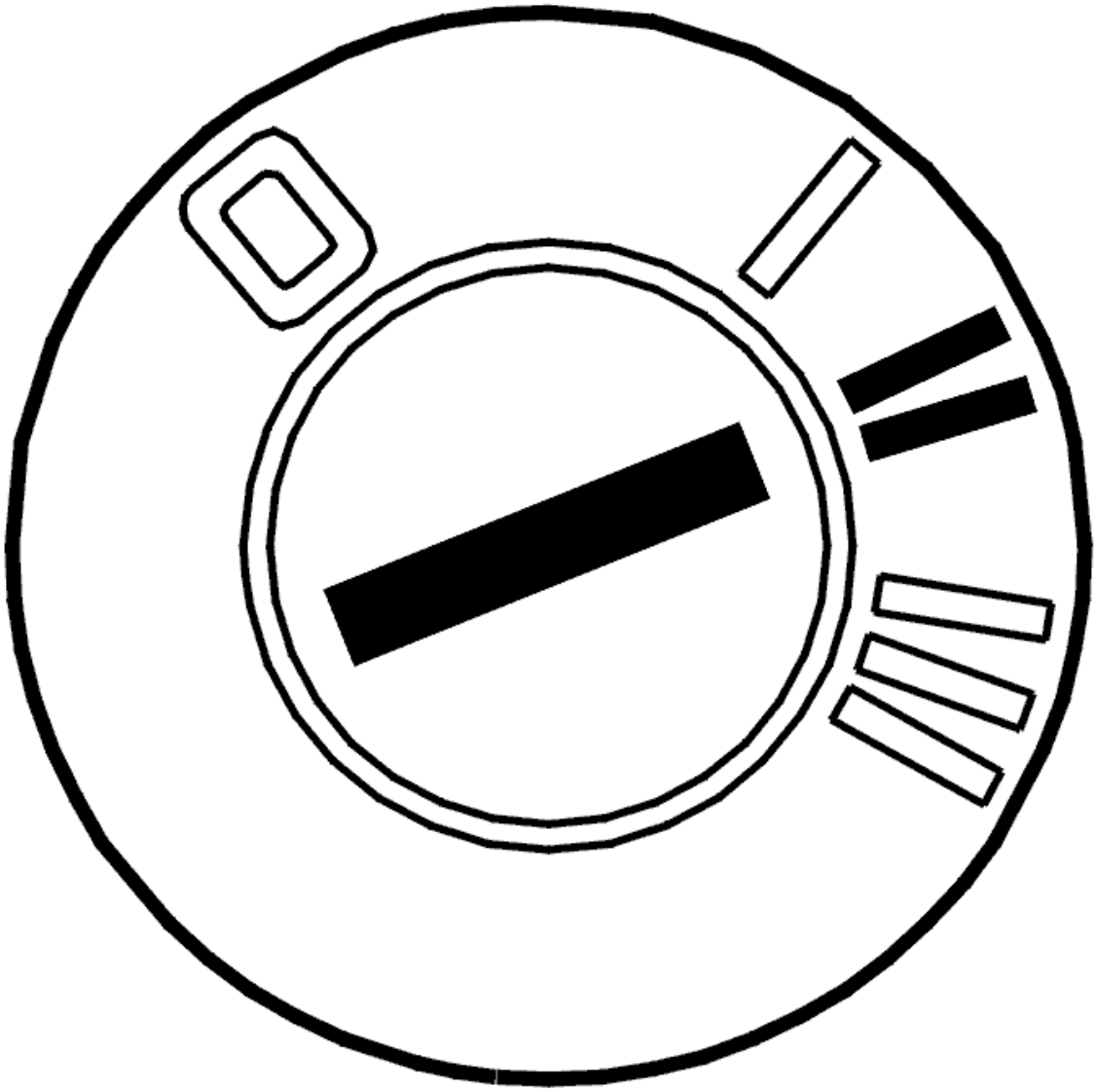


Fig. 122: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

  If the fault persists, diagnostic trouble code (DTC) TCM-0053 or TCM-0054 will still be stored. Fault-trace for codes after this fault-tracing is complete. If the diagnostic trouble codes (DTCs) are not stored, the fault has probably been remedied by replacing the software.

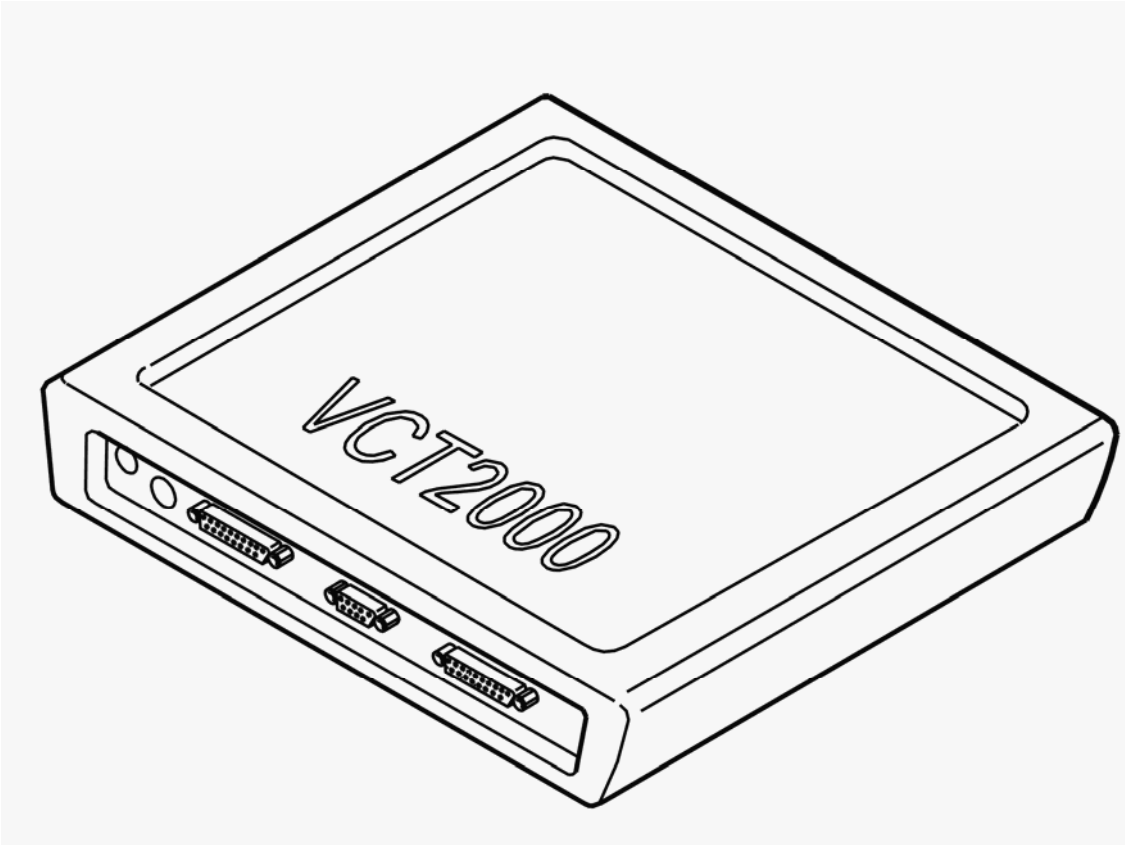


Fig. 123: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

TCM-0090: SHIFT LOCK SOLENOID. SIGNAL TOO HIGH (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE INFORMATION

Condition

If the control unit registers signal too high from solenoid P position lock, diagnostic trouble code TCM-0090 is set.

Substitute Value

- Gear selector not blocked.

Possible Source

- Signal wire short circuited to voltage supply.
- Solenoid defective.

Fault symptom[s]

- Orange general warning lamp is on.
- Malfunction indicator light (MIL) is on.
- Gear selector movable with ignition off.

SIGNAL TOO HIGH

CHECKS

CHECKING THE P-SHIFT LOCK SOLENOID

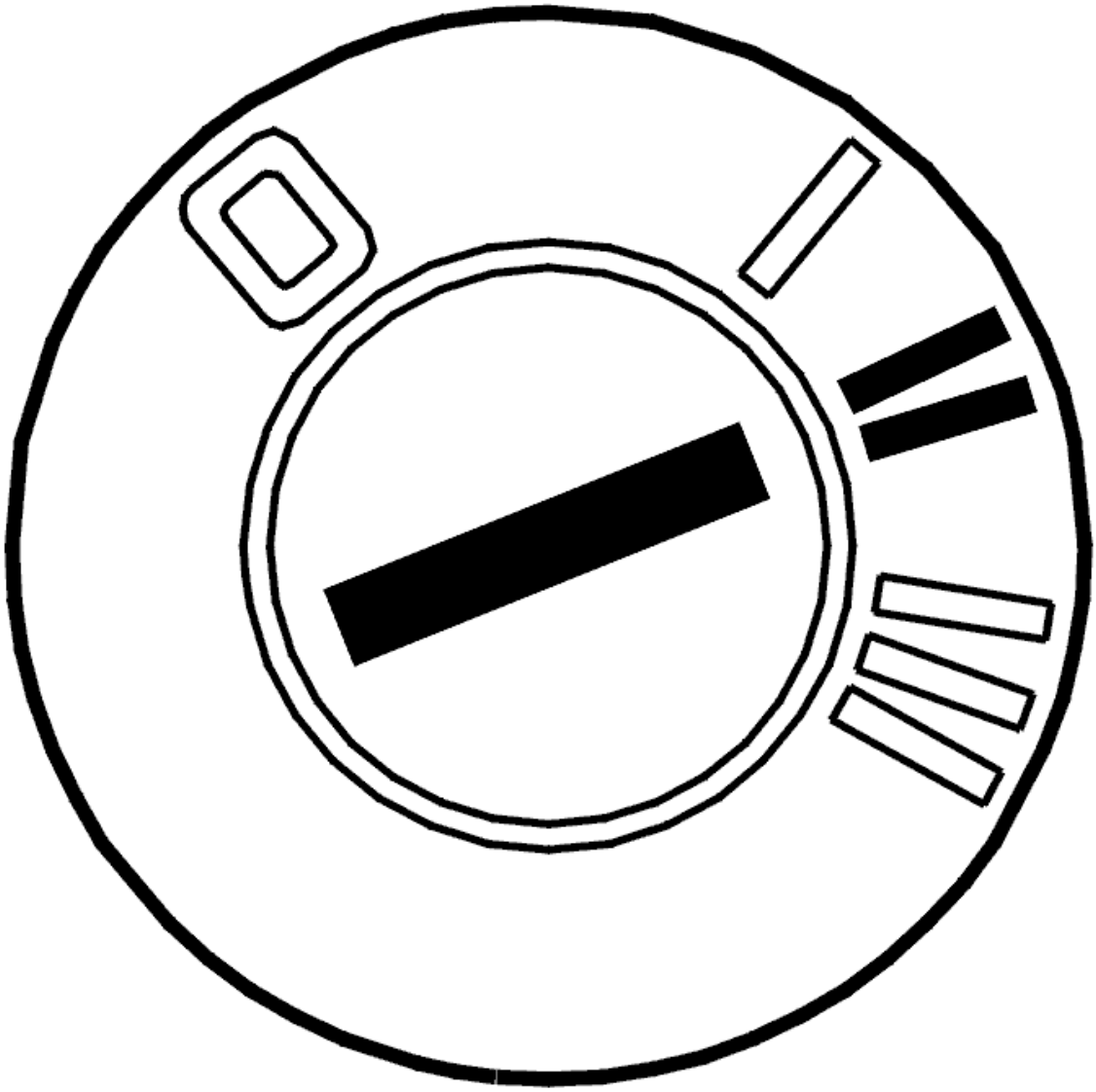


Fig. 124: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P

- Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector
- Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

Check the cable between the gear selector module (GSM) and the solenoid connectors. Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

HINT: With a voltmeter connected to solenoid connector terminals #1 and #2 (gear selector control module side), the voltage should be 0 V when the brake pedal is not depressed and approximately Ubat when it is depressed. Replace the solenoid if the voltage is OK

Remedy as necessary.

Other information

- To check or replace the shift lock solenoid, see **SOLENOID SHIFT LOCK, REPLACE** .
- **Continue**

  Refer to **VERIFICATION**

INTERMITTENT FAULT

Check the cable between the control module for the gear selector and the shift lock solenoid. Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To check or replace the shift lock solenoid, see **SOLENOID SHIFT LOCK, REPLACE** .

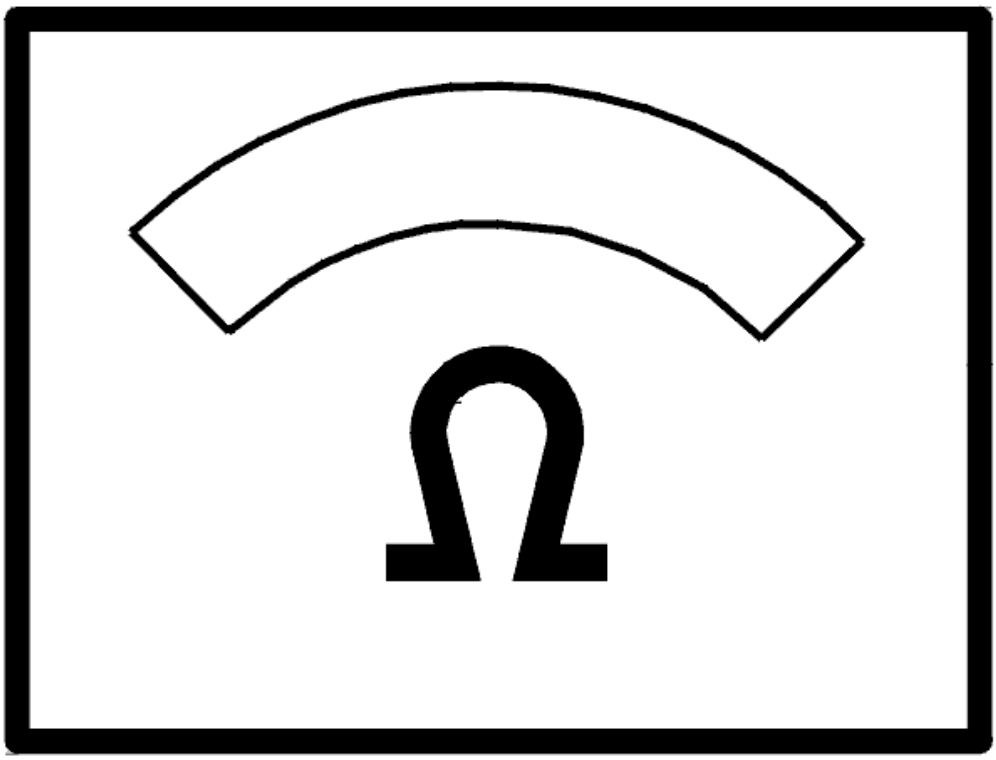


Fig. 125: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

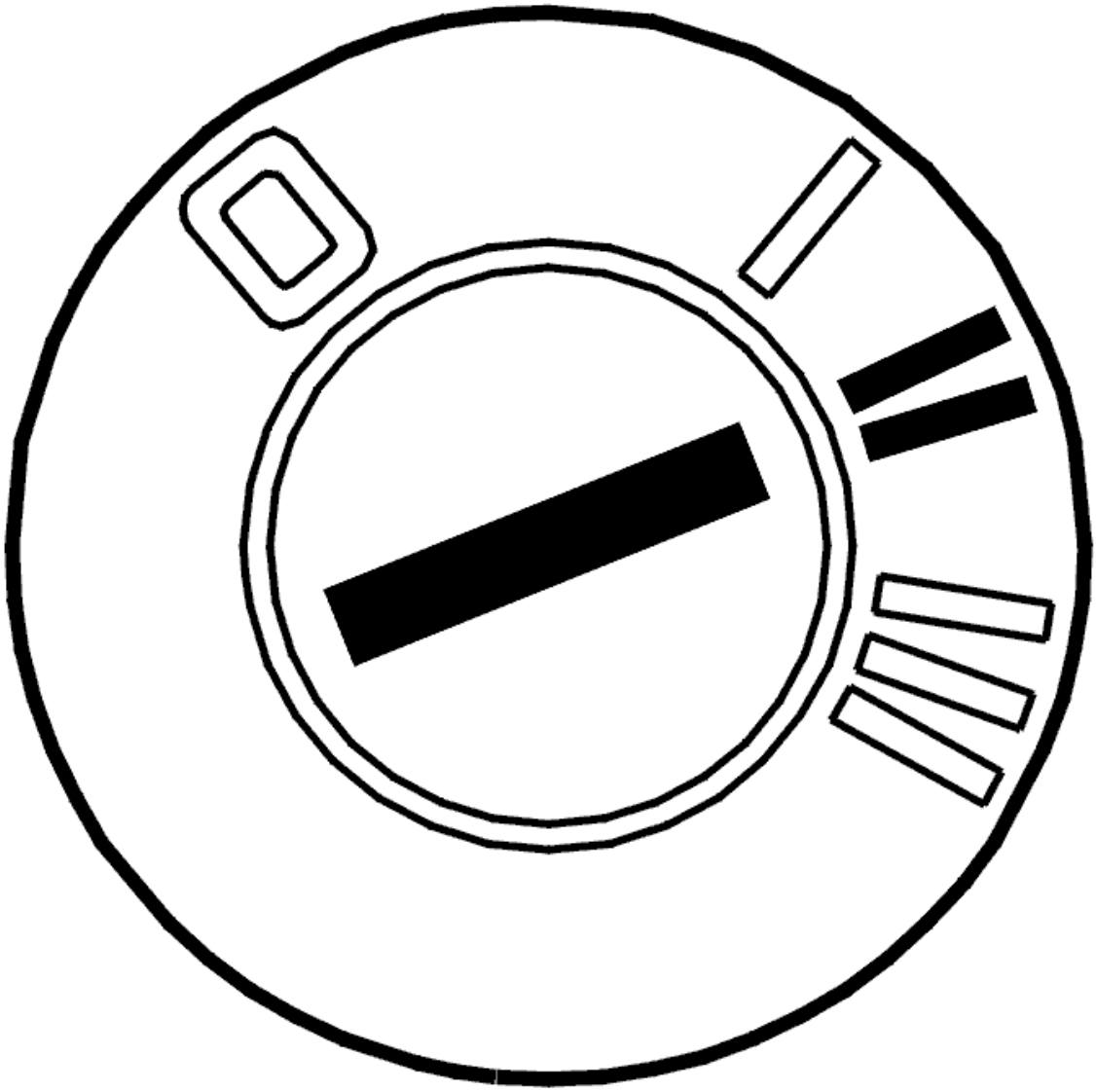


Fig. 126: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Gear selector in position P.

  Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.

  Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0090: SHIFT LOCK SOLENOID. SIGNAL TOO HIGH (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE INFORMATION

see **DIAGNOSTIC TROUBLE CODE INFORMATION**

SIGNAL TOO HIGH

CHECKS

CHECKING THE P-SHIFT LOCK SOLENOID

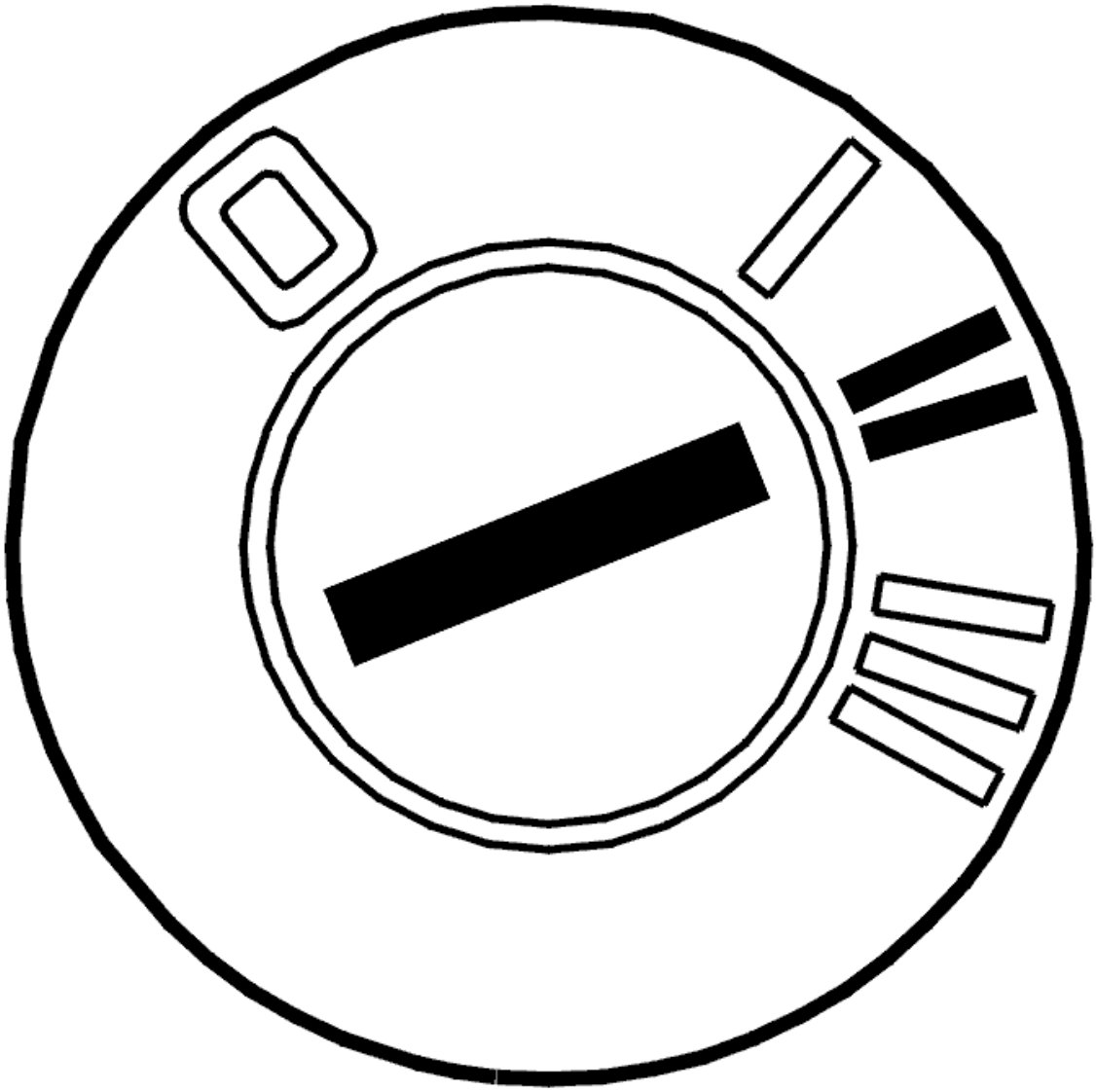


Fig. 127: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector
- Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

Check the cable between the control module for the gear selector and the solenoid connector. Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Check the voltage between terminals #1 and #2 on the solenoid connector (female half).

When the ignition is on and the brake pedal is not depressed the voltage should be 0 V. When the brake pedal is depressed the voltage should be Ubat.

Replace the solenoid if the voltage is OK.

Other information

- To check or replace the shift lock solenoid, see **SOLENOID SHIFT LOCK, REPLACE** .

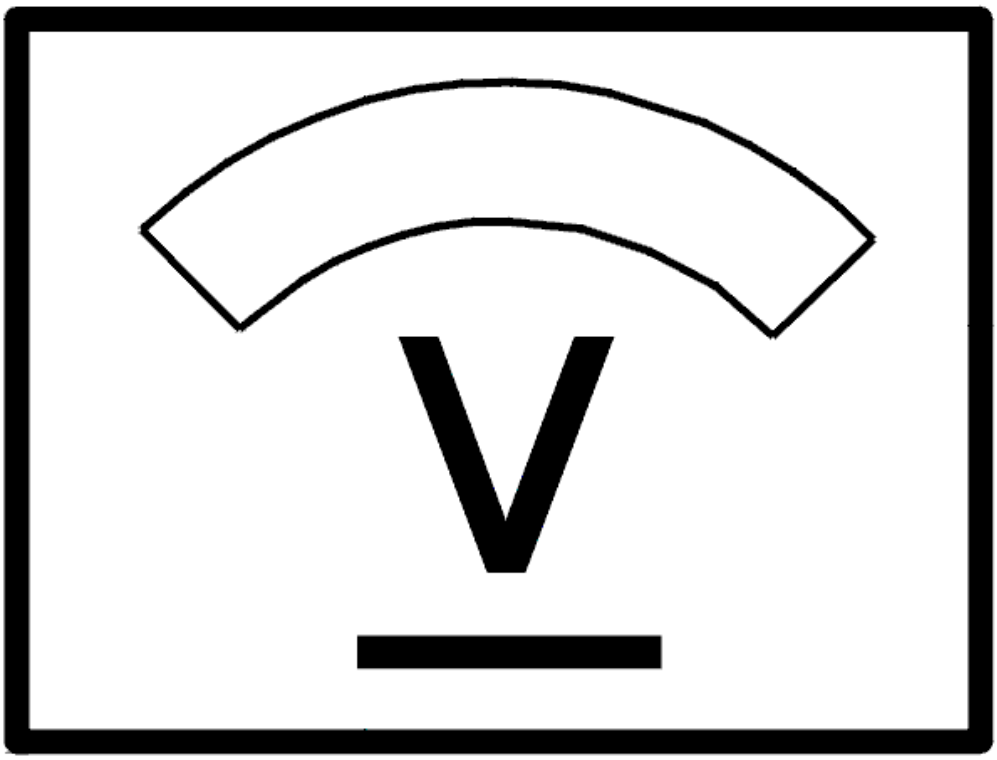


Fig. 128: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INTERMITTENT FAULT

Check the cable between the control module for the gear selector and the shift lock solenoid. Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To check or replace the shift lock solenoid, see **SOLENOID SHIFT LOCK, REPLACE** .

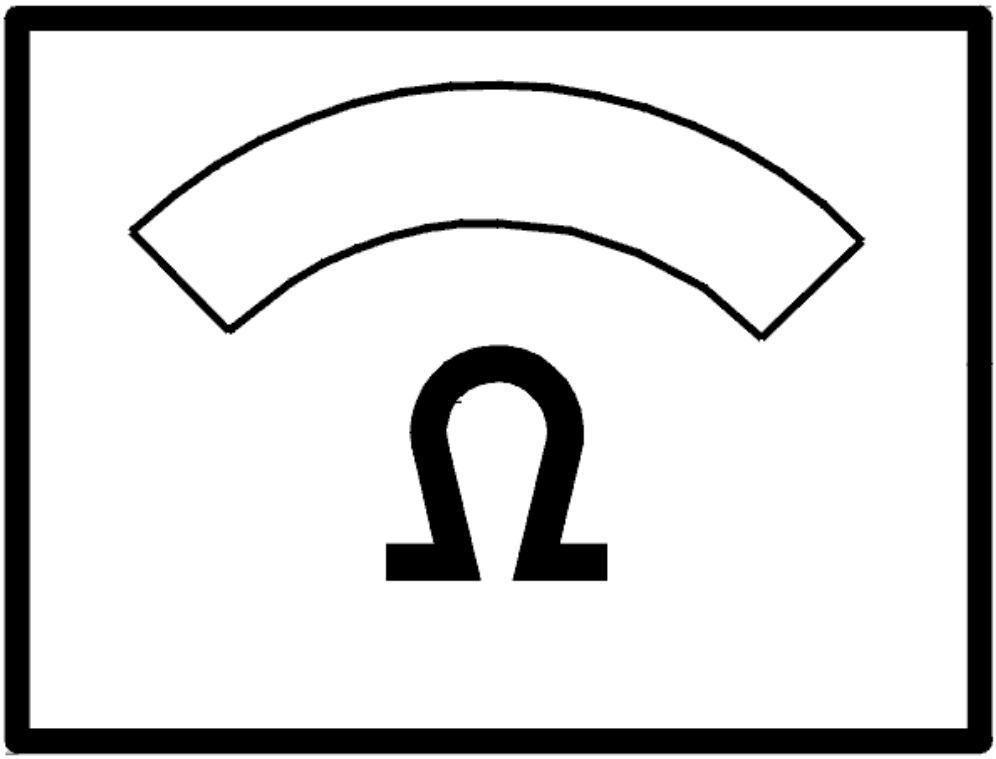


Fig. 129: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

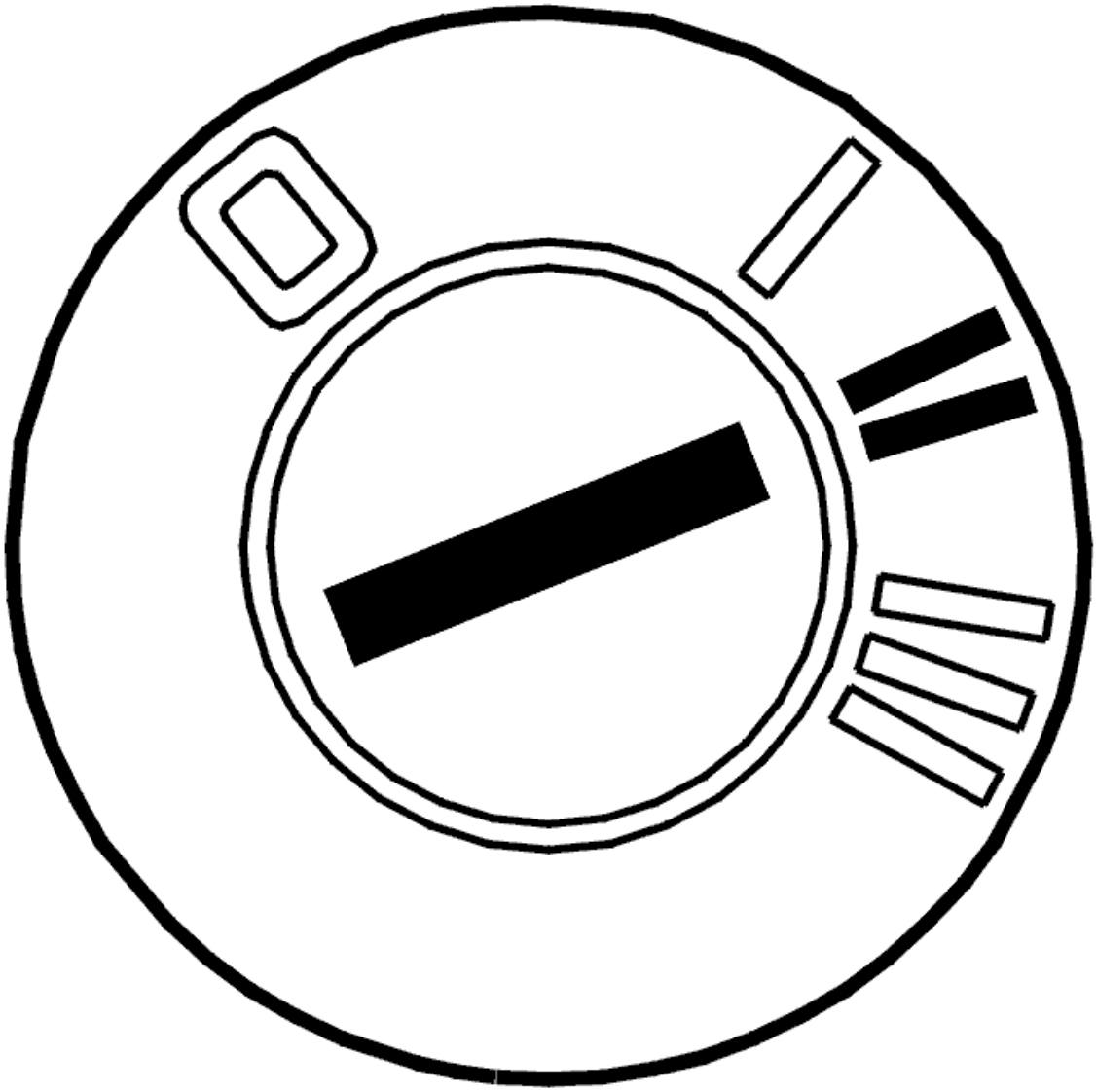


Fig. 130: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Gear selector in position P.

  Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.

  Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0091: SHIFT LOCK SOLENOID. SIGNAL MISSING (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE INFORMATION

Condition

If the control unit registers signal missing from solenoid P position lock, diagnostic trouble code TCM-0091 will be set.

Substitute Value

- Gear selector blocked.

Possible Source

- Contact resistance in the connectors.
- Open circuit in signal wire or ground wire

Fault symptom[s]

- Orange general warning lamp is on.
- Malfunction indicator light (MIL) is on.
- The gear selector cannot be moved.

SIGNAL MISSING

CHECKS

CHECKING THE P-SHIFT LOCK SOLENOID

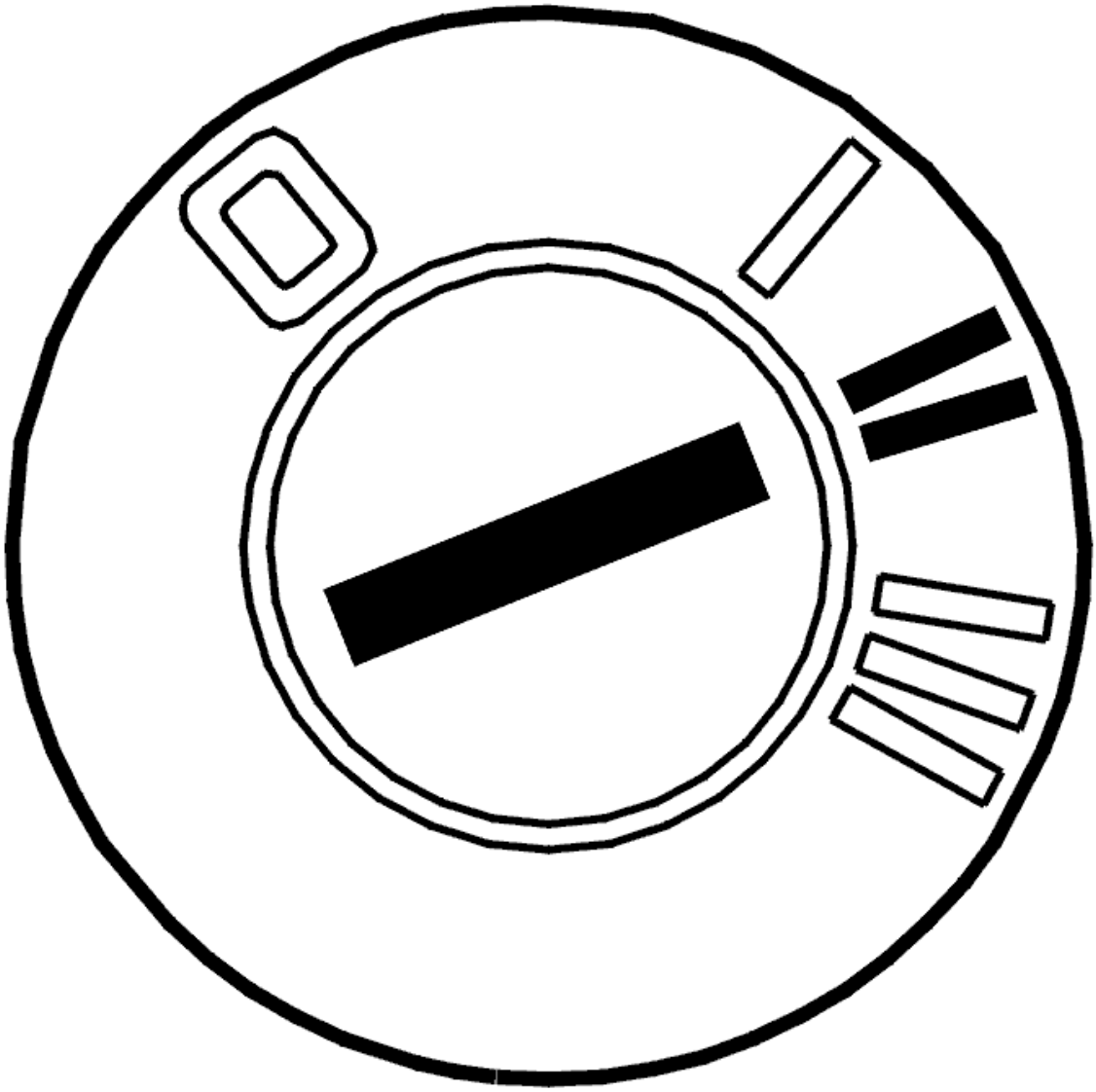


Fig. 131: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector
- Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

Check the cable between the gear selector module (GSM) and the shift lock solenoid connector (control module side). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

HINT: With a voltmeter connected to solenoid connector terminals #1 and #2 (gear selector control module side), the voltage should be 0 V when the brake pedal is not depressed and approximately Ubat when it is depressed. Replace the solenoid if the voltage is OK.

Remedy as necessary.

Other information

- To check or replace the shift lock solenoid, see **SOLENOID SHIFT LOCK, REPLACE** .
- **Continue**

  Refer to **VERIFICATION**

INTERMITTENT FAULT

Check the control module for the gear selector and the solenoid connectors. Check for intermittent contact resistance according to **LOOSE CONNECTIONS (TERMINALS)** .

Check the cable between the gear selector module (GSM) and the shift lock solenoid. Check for an intermittent open-circuit. See **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To check or replace the shift lock solenoid, see **SOLENOID SHIFT LOCK, REPLACE** .

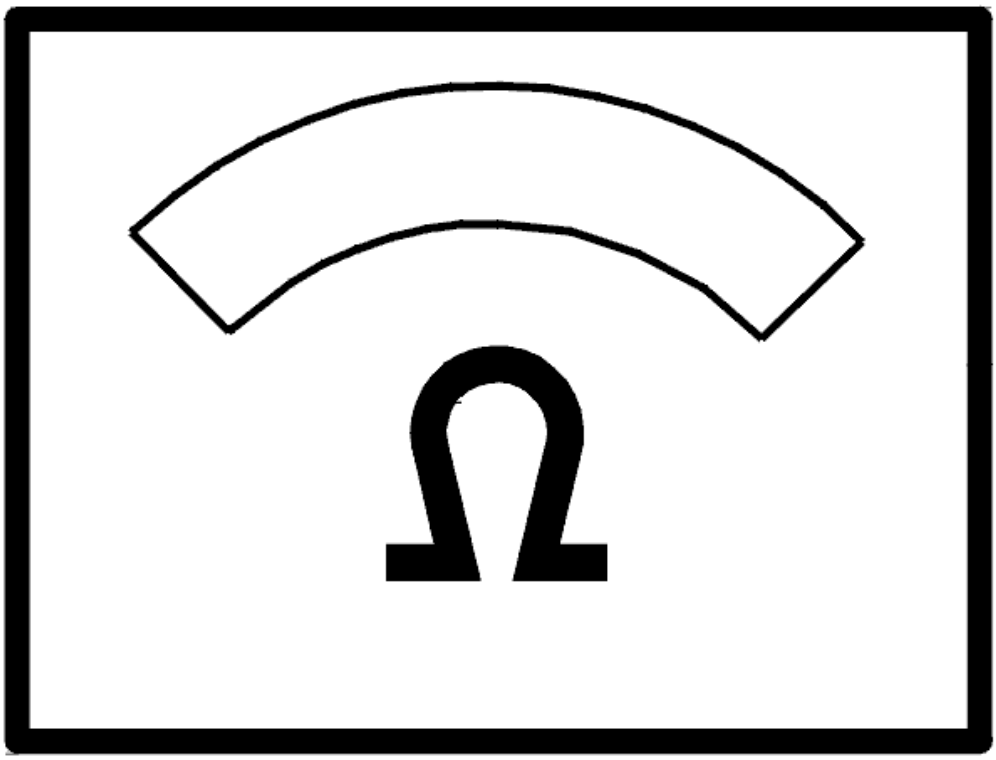


Fig. 132: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

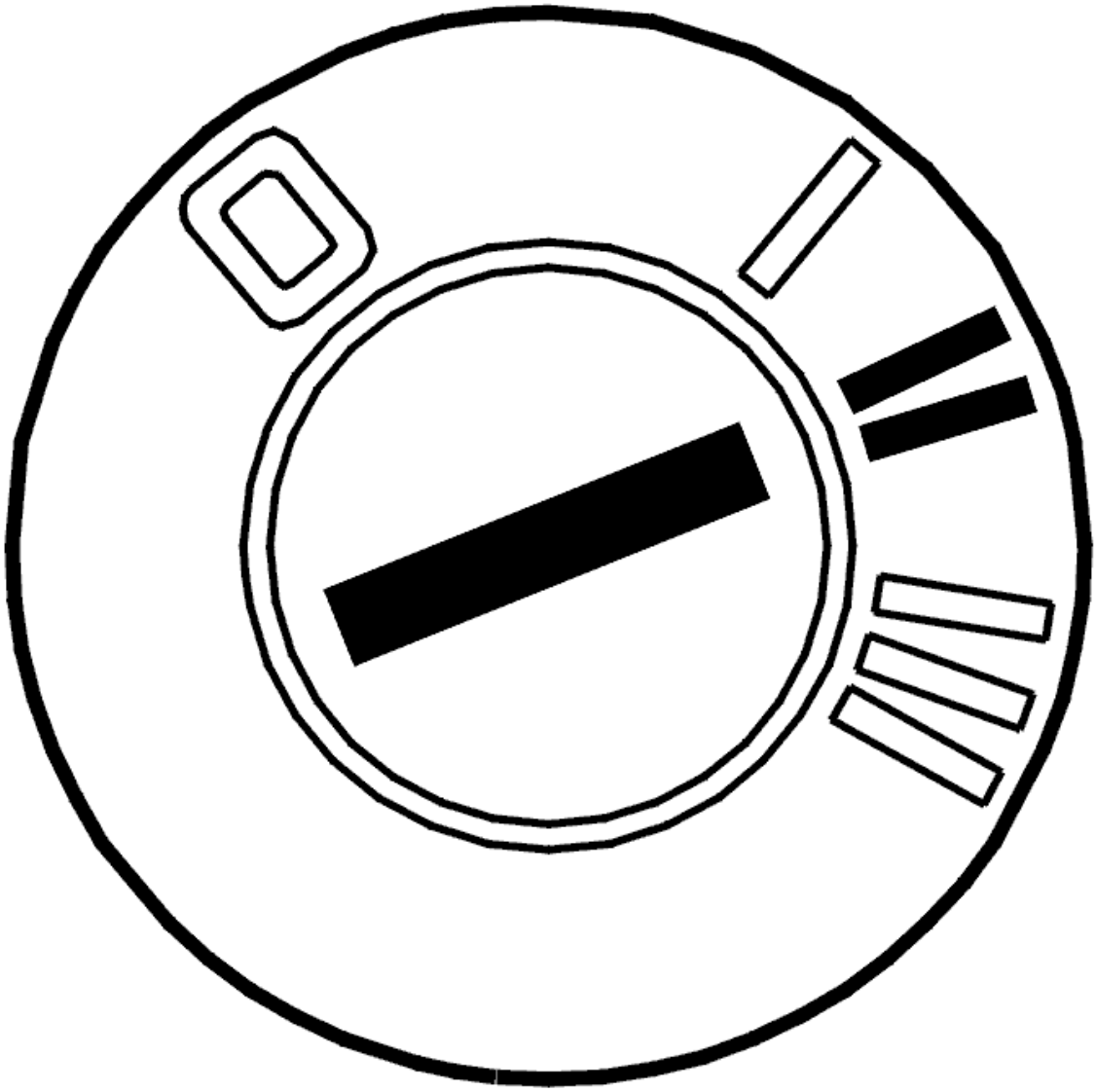


Fig. 133: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Gear selector in position P.

  Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.

  Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0091: SHIFT LOCK SOLENOID. SIGNAL MISSING (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE INFORMATION

see **DIAGNOSTIC TROUBLE CODE INFORMATION**

SIGNAL MISSING

CHECKS

CHECKING THE P-SHIFT LOCK SOLENOID

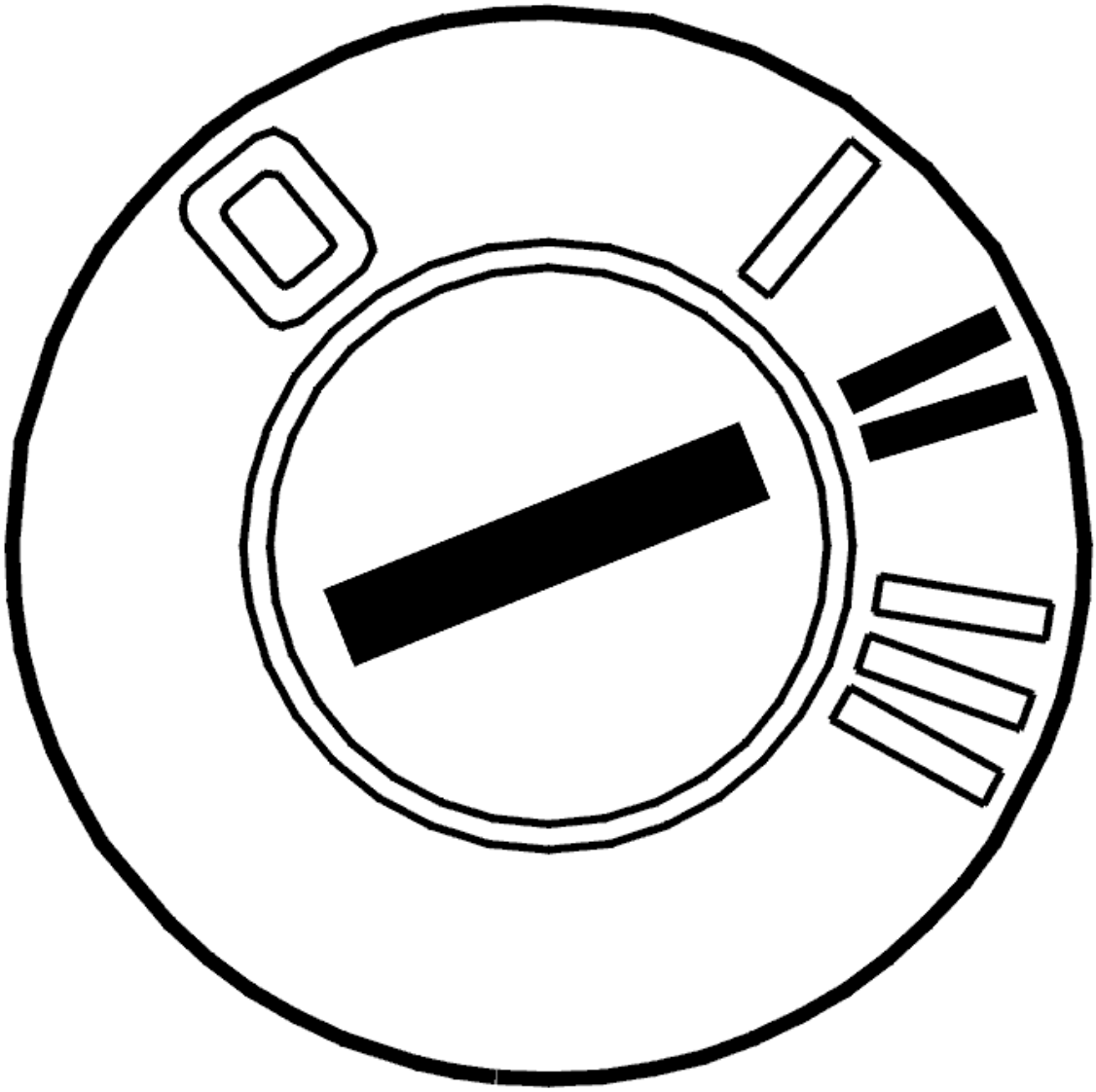


Fig. 134: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector
- Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

Check the cable between the control module for the gear selector and the shift lock solenoid connector (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the voltage between terminals #1 and #2 on the solenoid connector (female half).

When the brake pedal is not depressed the voltage should be 0 V. When the brake pedal is depressed the voltage should be battery voltage.

Replace the solenoid if the voltage is OK.

Other information

- To check or replace the shift lock solenoid, see **SOLENOID SHIFT LOCK, REPLACE** .
- **Continue**

  Refer to **VERIFICATION**

INTERMITTENT FAULT

Check the control module for the gear selector and the solenoid connectors. Check for intermittent contact resistance according to **LOOSE CONNECTIONS (TERMINALS)** .

Check the cable between the control module for the gear selector and the shift lock solenoid. Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To check or replace the shift lock solenoid, see **SOLENOID SHIFT LOCK, REPLACE** .

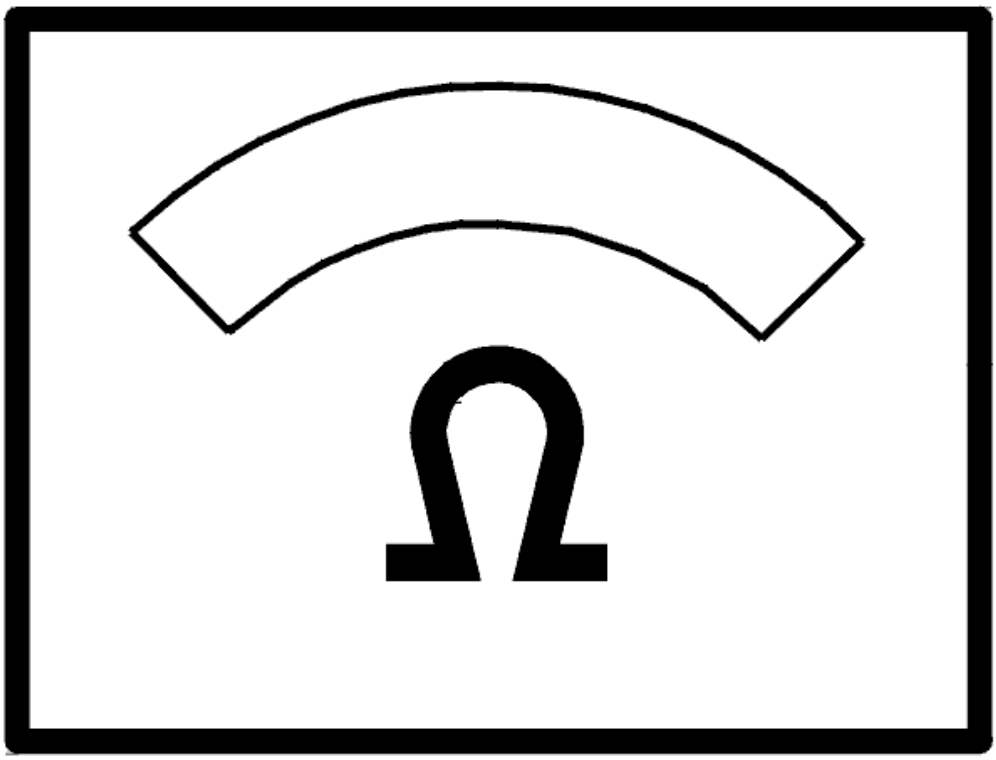


Fig. 135: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

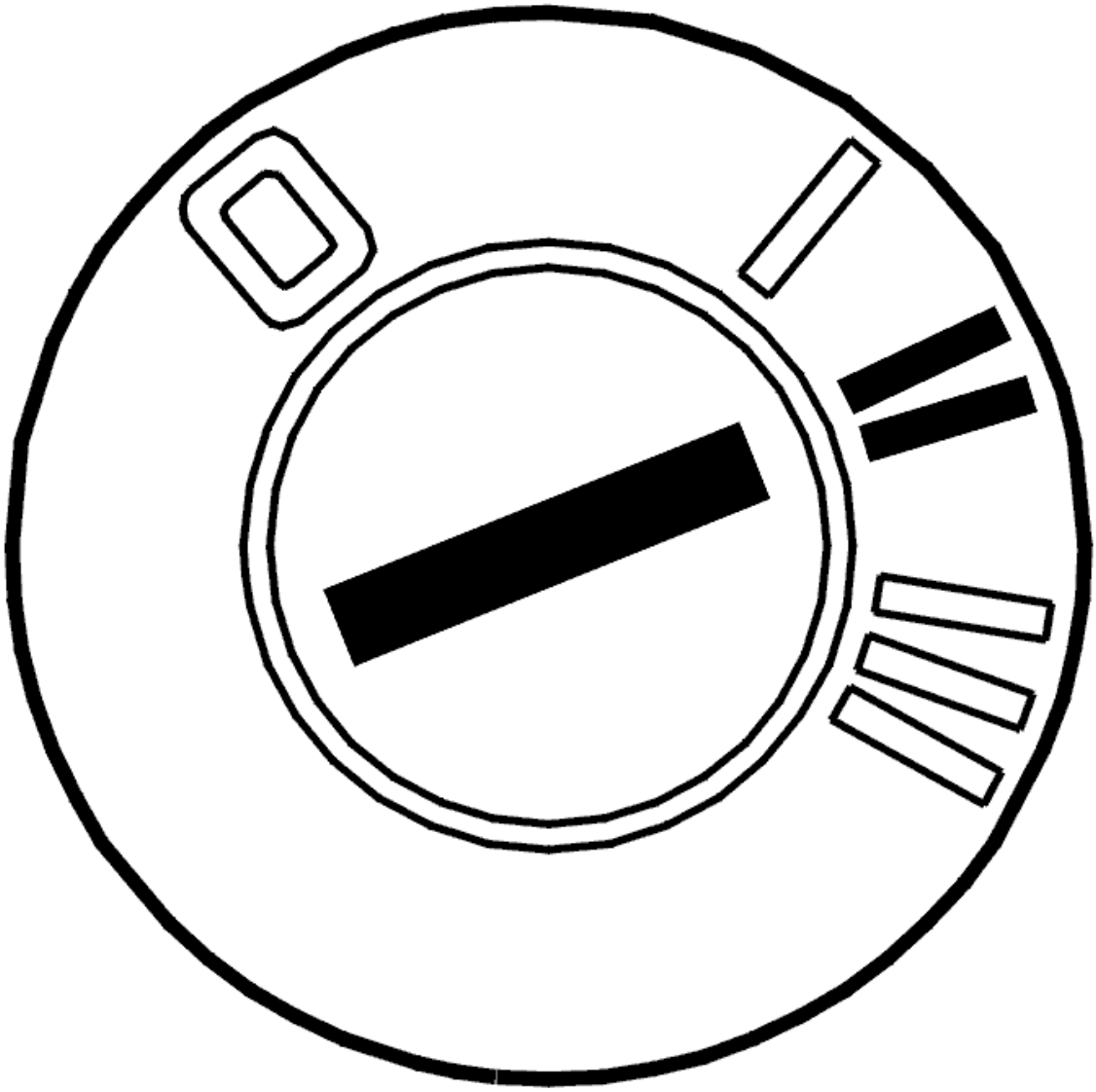


Fig. 136: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Gear selector in position P.

  Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.

  Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0092: SHIFT LOCK SOLENOID. SIGNAL TOO LOW (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE INFORMATION

Condition

If the control unit registers signal too low from solenoid P position lock, diagnostic trouble code TCM-0092 will be set.

Substitute Value

- Gear selector blocked.

Possible Source

- Contact resistance in the connectors.
- Signal wire short-circuited to ground.

Fault symptom[s]

- Orange general warning lamp is on.
- Malfunction indicator light (MIL) is on.
- The gear selector cannot be moved.

SIGNAL TOO LOW

CHECKS

CHECKING THE P-SHIFT LOCK SOLENOID

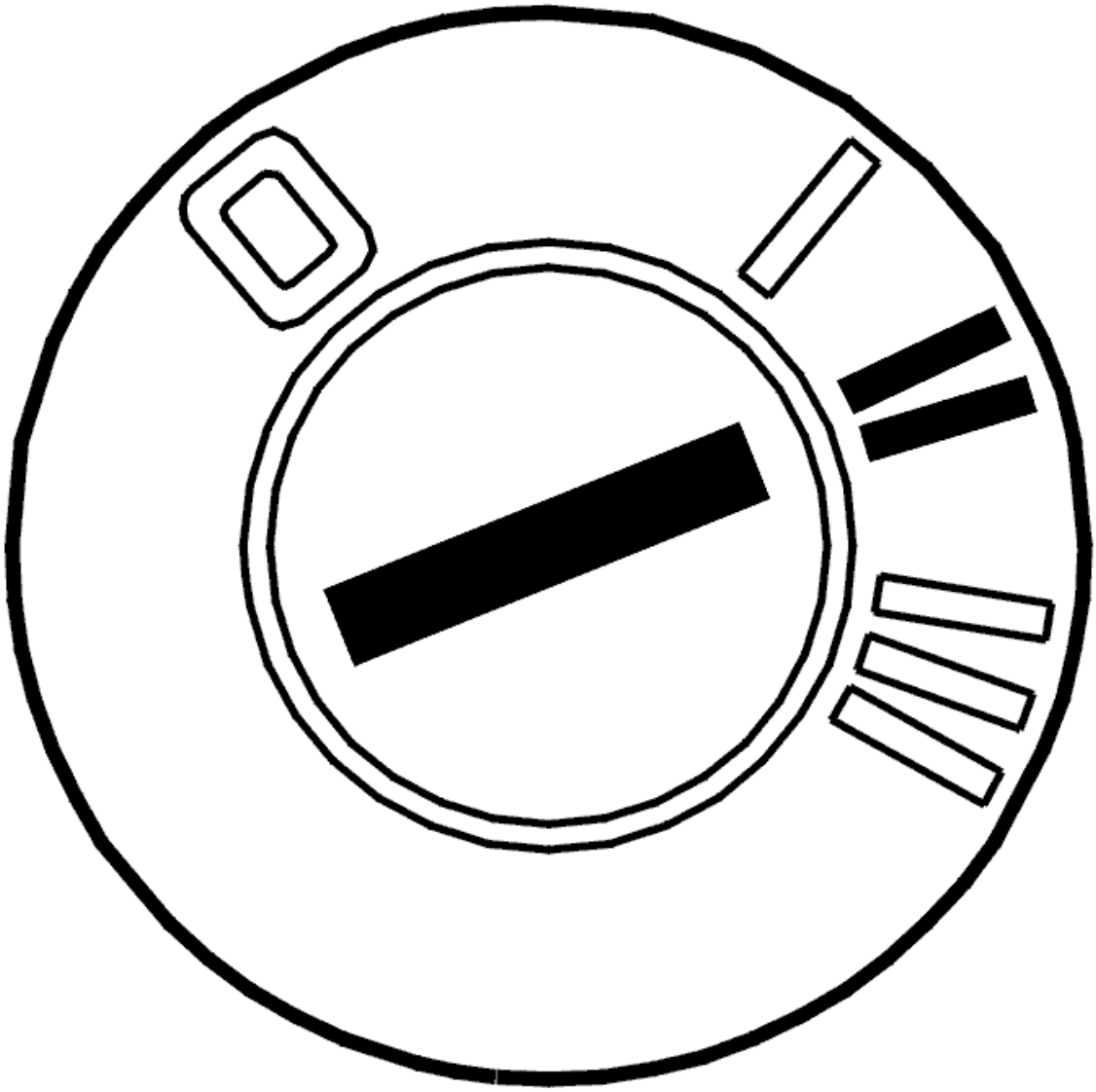


Fig. 137: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P.

  Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.

  Depress the brake pedal and try moving the gear selector to another position. It should now be possible to

move the gear selector to another position.

Was the function OK?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

Check the cable between the gear selector module (GSM) and the shift lock solenoid. Check for a short-circuit to ground.

If no fault is found in the wiring, connect an ohmmeter to solenoid connector terminals #1 and #2 (solenoid side).

The resistance must be 15-25 ohms. Replace the solenoid if the resistance is incorrect. Replace the printed circuit board in the top panel if the resistance is OK.

Remedy as necessary.

Other information

- To replace the shift lock solenoid, see **SOLENOID SHIFT LOCK, REPLACE**
- To replace the circuit board in the top panel (standard), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, REPLACING**
- To replace the circuit board in the top panel (Geartronic), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL GEARTRONIC, REPLACING**
- see **CHECKING WIRING AND TERMINALS**

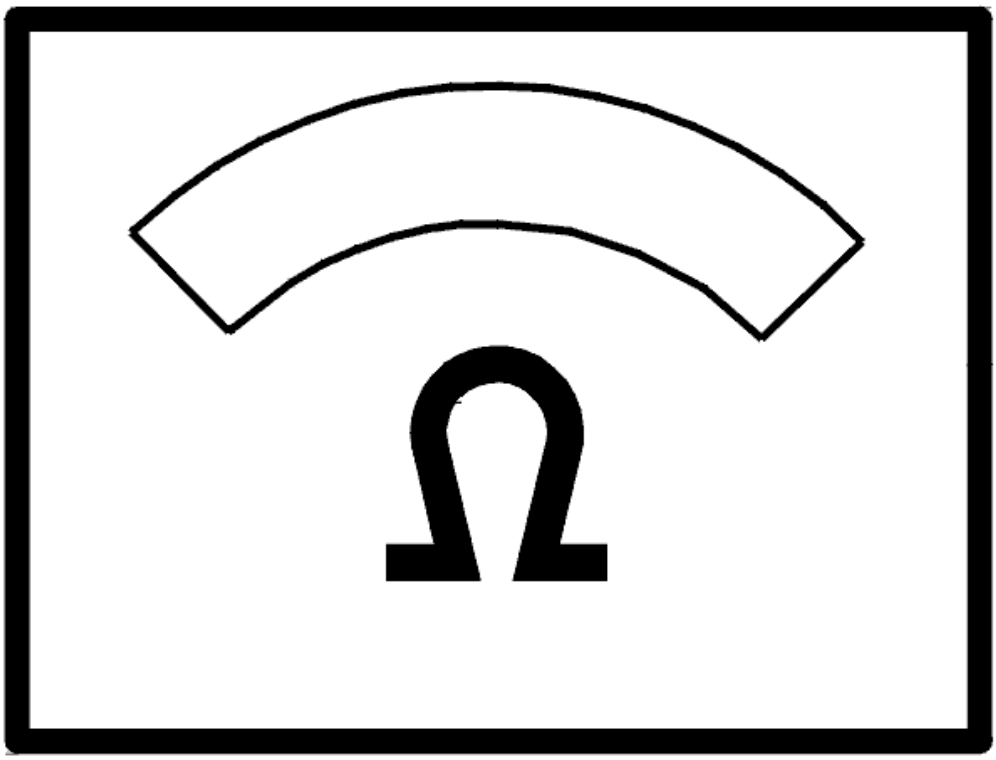


Fig. 138: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INTERMITTENT FAULT

Check ground terminal 31/6 at the A-post. Check for intermittent contact resistance and oxidation.

Check the 4-pin connector and connector 54/3RF (passenger compartment cable harness - engine compartment cable harness). Check for damage to the terminals and pins.

Check the connectors for the gear selector module (GSM) and for the shift lock solenoid. Check for an intermittent contact resistance.

Check the cable between the gear selector module (GSM) and the shift lock solenoid. Check for an intermittent short-circuit to ground.

Remedy as necessary.

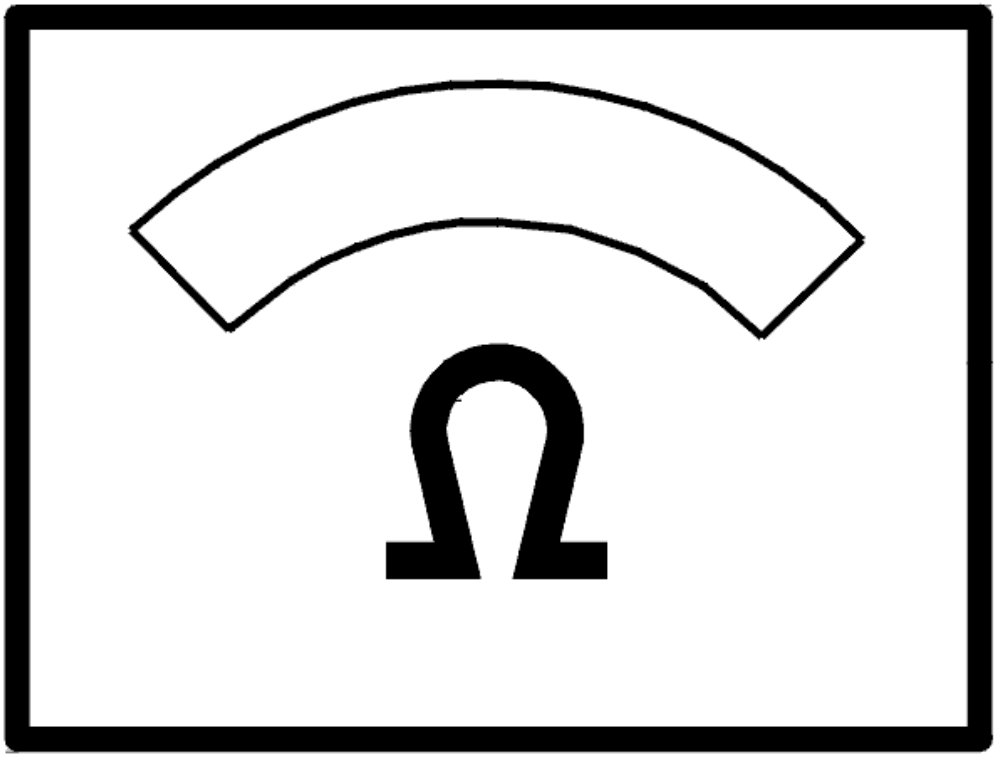


Fig. 139: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

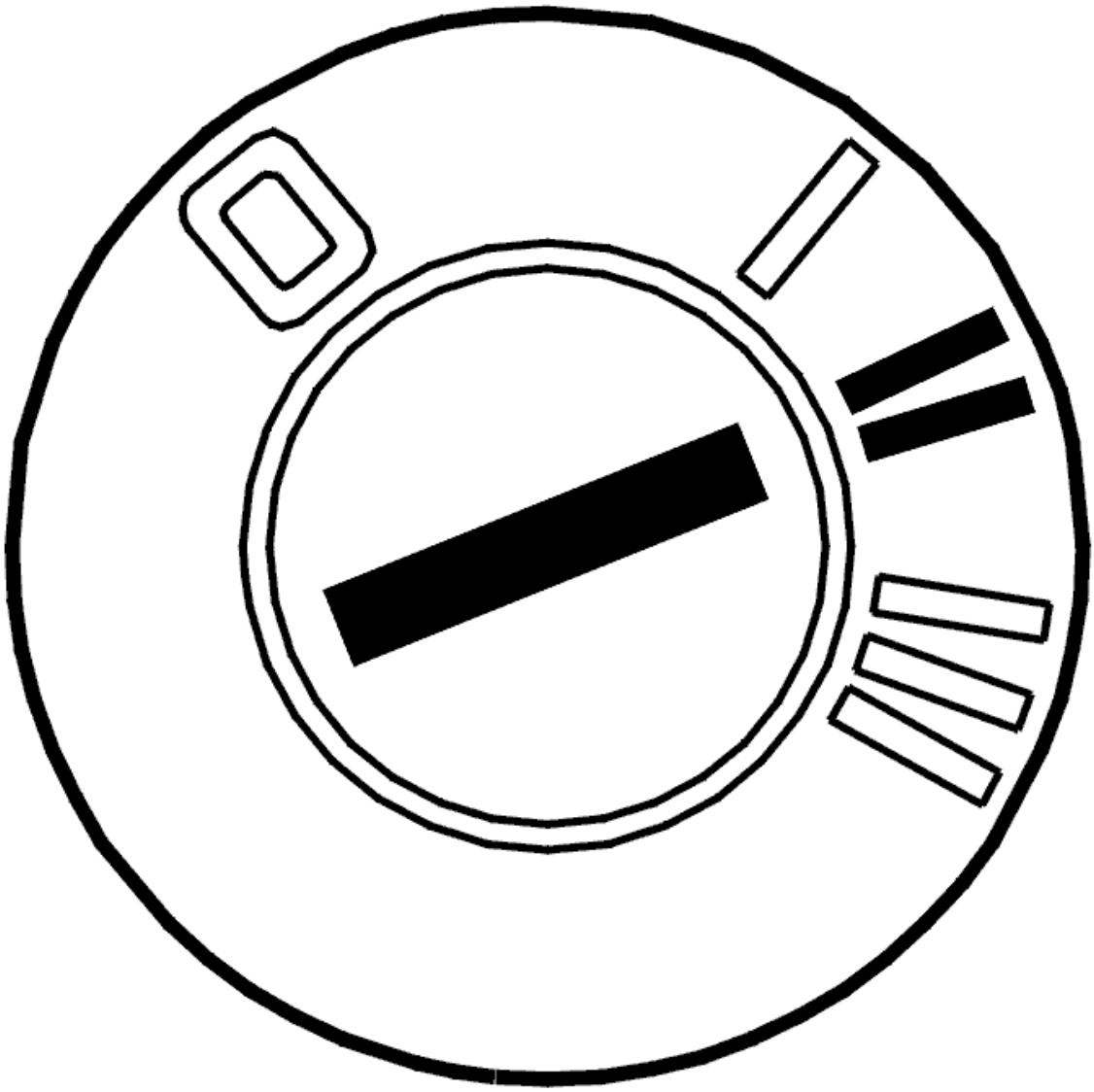


Fig. 140: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Gear selector in position P.

  Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.

  Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0092: SHIFT LOCK SOLENOID. SIGNAL TOO LOW (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE INFORMATION

see **DIAGNOSTIC TROUBLE CODE INFORMATION**

SIGNAL TOO LOW

CHECKS

CHECKING THE P-SHIFT LOCK SOLENOID

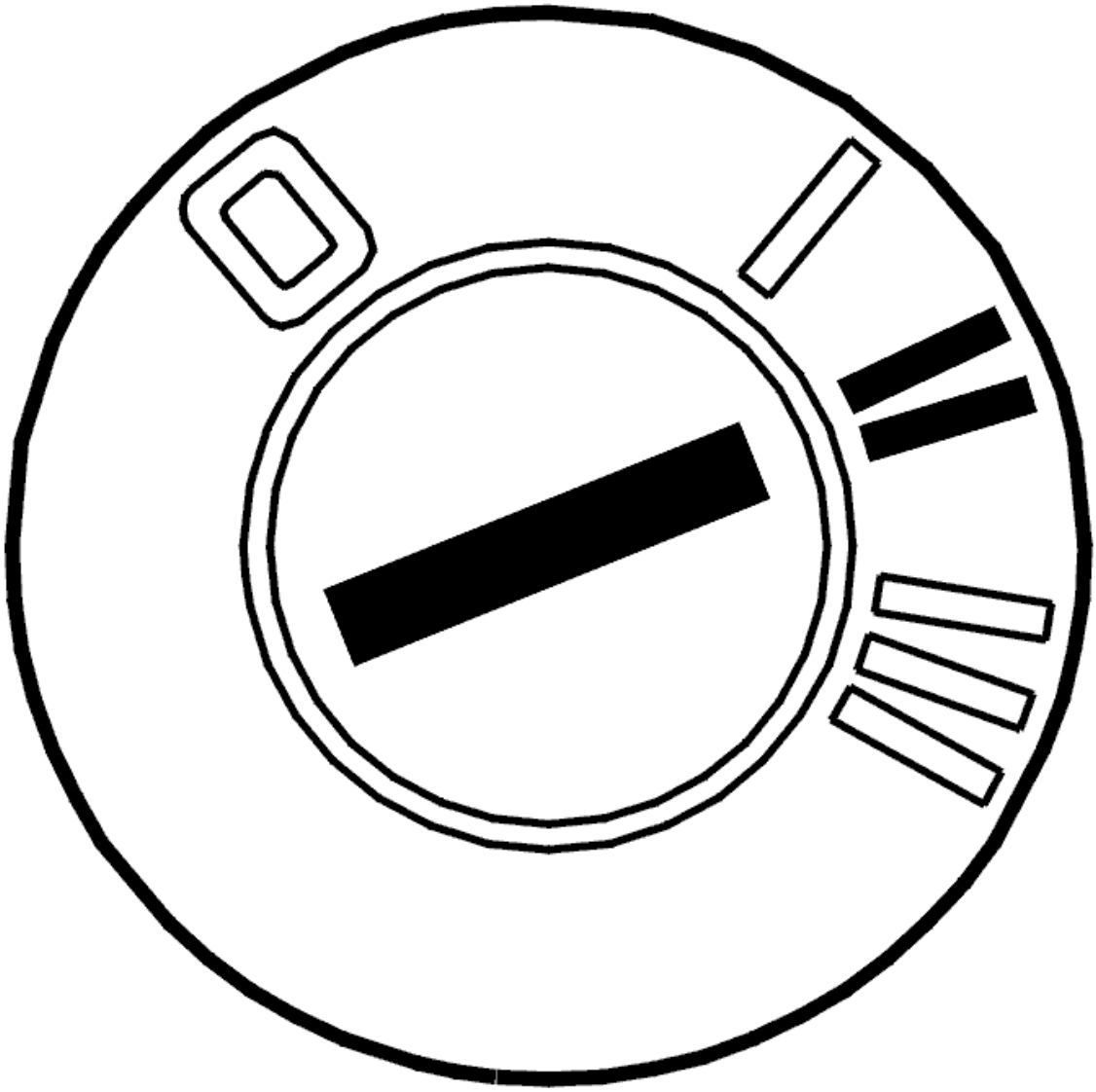


Fig. 141: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector
- Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector to another position.

Was the function OK?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

Check the cable between the gear selector module (GSM) and the shift lock solenoid. Check for a short-circuit to ground.

If no fault is found in the wiring, connect an ohmmeter to solenoid connector terminals #1 and #2 (solenoid side).

Resistance should be 35-45 ohmsReplace the solenoid if the resistance is incorrect. If the resistance is OK, replace the circuit board in the top panel.

Other information

- To check or replace the shift lock solenoid, see **SOLENOID SHIFT LOCK, REPLACE**
- To replace the circuit board in the top panel (standard), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, REPLACING**
- To replace the circuit board in the top panel (Geartronic), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, GEARTRONIC, REPLACING**
- see **CHECKING WIRING AND TERMINALS**

- **Continue**

  Refer to **VERIFICATION**

INTERMITTENT FAULT

Check the gear selector module (GSM) and solenoid connectors. Check for intermittent contact resistance.

Check the cable between the gear selector module (GSM) and the shift lock solenoid. Check for an intermittent short-circuit to ground.

Remedy as necessary.

Other information:

- To replace the shift lock solenoid, see **SOLENOID SHIFT LOCK, REPLACE**
- see **CHECKING WIRING AND TERMINALS**

- **Continue**

  Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

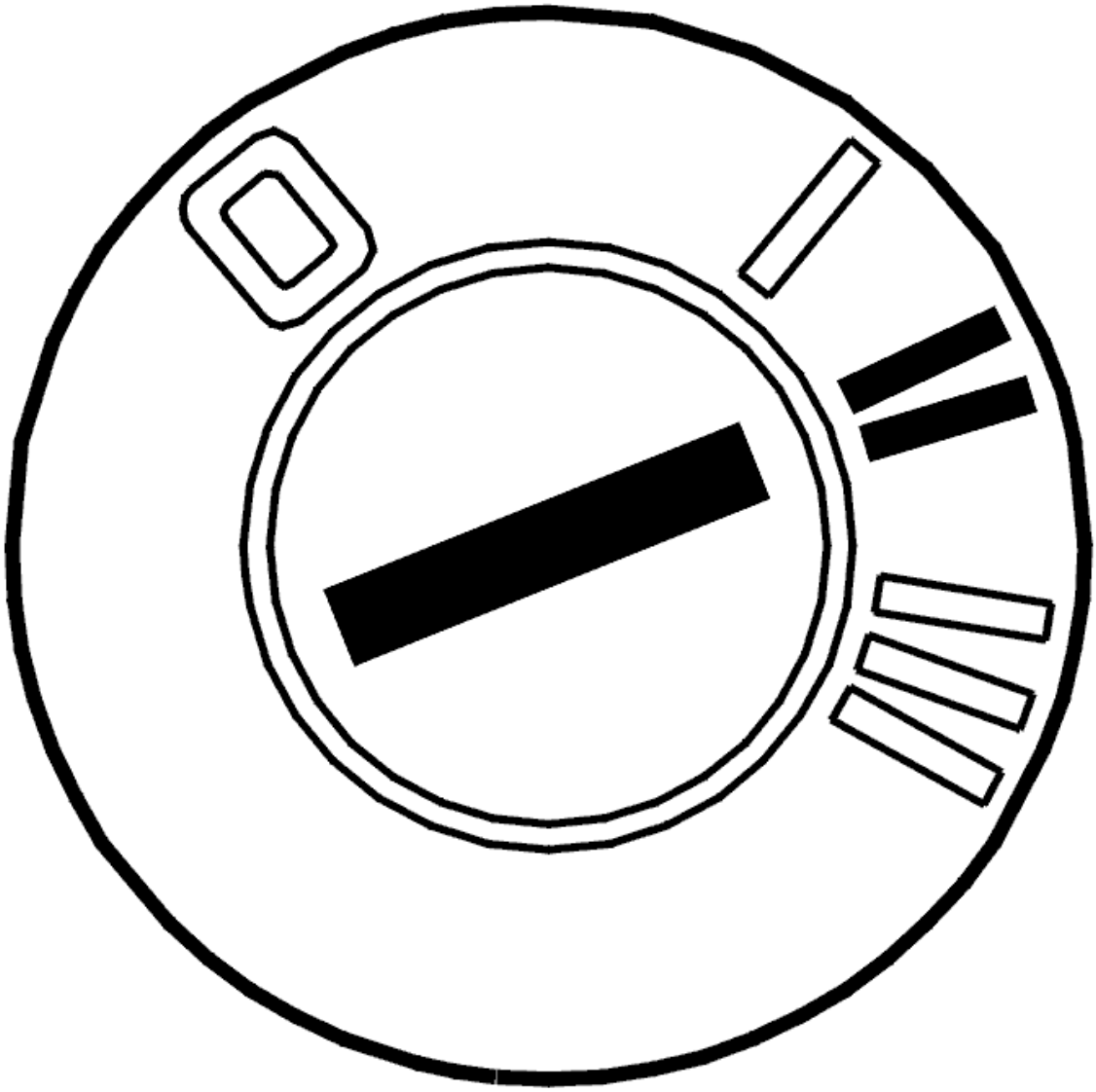


Fig. 142: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Gear selector in position P.

  Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.

  Depress the brake pedal and try moving the gear selector to another position. It should now be possible to

move the gear selector.

Was the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0093: CONTROL MODULE COMMUNICATION, GEAR SELECTOR LEVER SIGNAL TOO HIGH (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE INFORMATION

Condition

If the control unit registers that the signal from the gear selector control unit (GSM) is too high, diagnostic trouble code TCM-0093 is set.

Substitute Value

- No substitute value.

Possible Source

- Contact resistance in the connectors.
- Communication wire short-circuited to voltage supply.

Fault symptom[s]

- Malfunction indicator light (MIL) is on.
- Orange general warning lamp is on.
- Position indication on the gear selector panel not working.

SIGNAL TOO HIGH

CHECKS

CHECKING COMMUNICATION

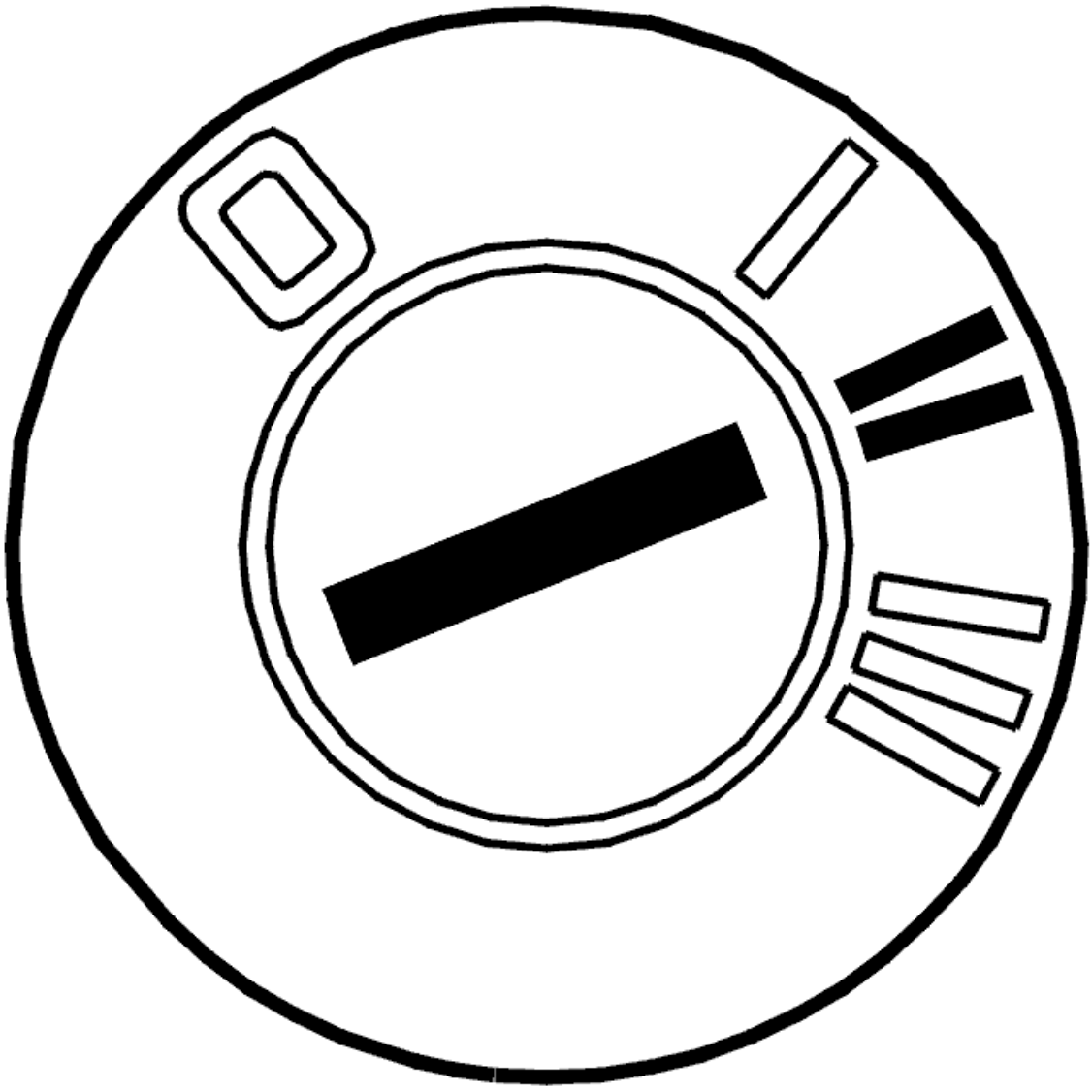


Fig. 143: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

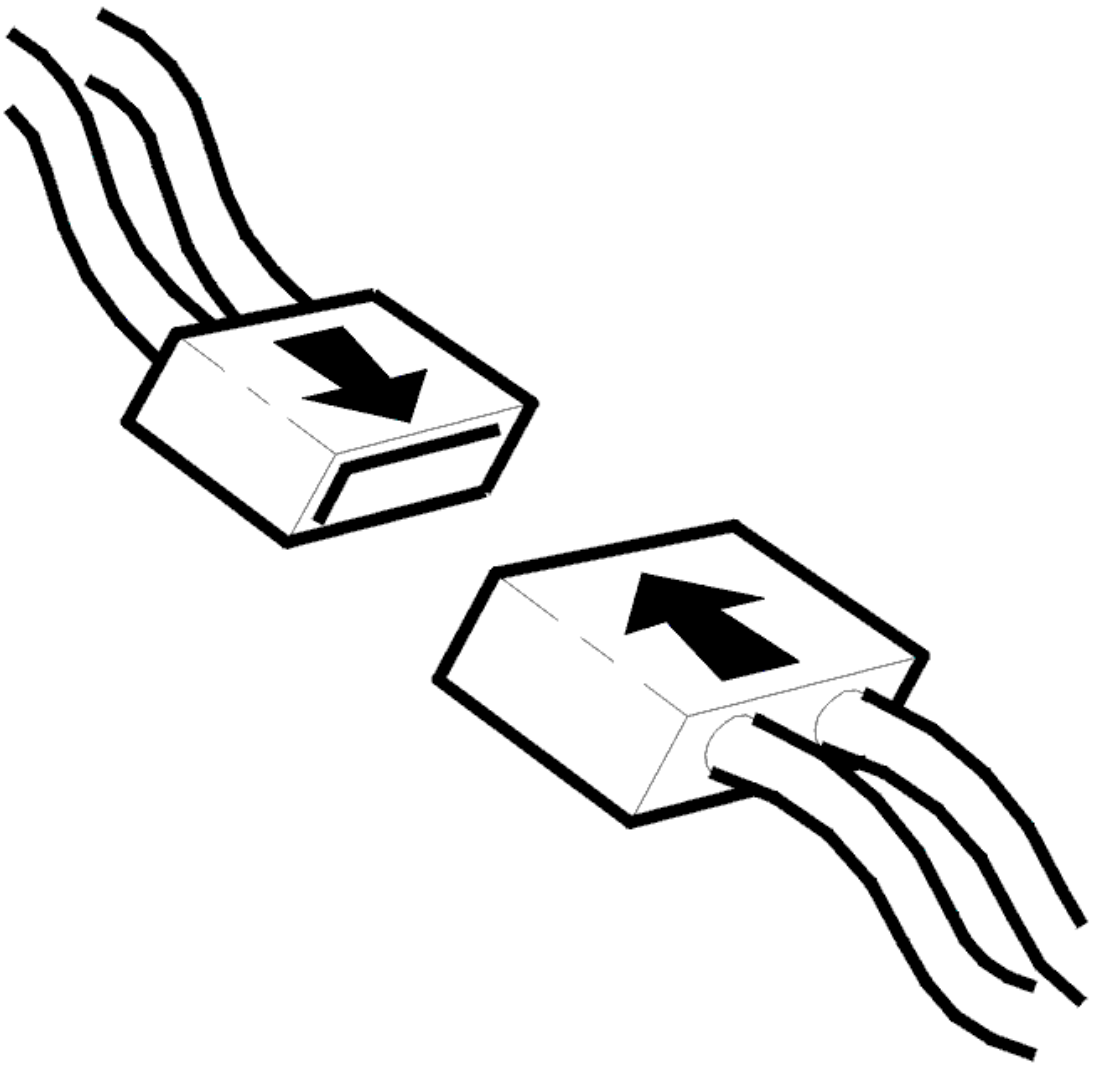


Fig. 144: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the transmission control module (TCM) and Gear selector module (GSM) connectors. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

  Press the brake pedal and move the gear shift selector to the different positions. Check that the gear position is updated in the display in the combined instrument panel. Compare with the indicators in the panel for the gear selector.

  If the gear position is updated in the combined instrument panel and in the panel at the gear selector, the problem was probably caused by contact resistance or oxidation.

If the gear position is updated in the combined instrument panel but not in the panel at the gear selector, replace the printed circuit board in the top panel.

If the gear position is updated in the panel at the gear selector but not in the combined instrument panel there is probably a fault in another system. Exit fault-tracing and fault-trace the central electronic module (CEM) or the driver information module (DIM).

Other information

- To check the transmission control module (TCM) connector, see **CONNECTING BREAKOUT BOX, TRANSMISSION CONTROL MODULE (TCM)**
- To check or replace the printed circuit board (standard), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, REPLACING**
- To check or replace the printed circuit board (Geartronic), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL GEARTRONIC, REPLACING** .

Select an option:

1. The gear position is updated in the combined instrument panel and in the panel at the gear selector

   OKAY: Troubleshooting has been completed.

2. The gear position is updated in the combined instrument panel but not in the panel at the gear selector

   Refer to **VERIFICATION**

3. The gear position is updated in the panel at the gear selector but not in the combined instrument panel

   OKAY: Troubleshooting has been completed.

4. The gear position is not updated in the combined instrument panel or in the panel at the gear selector.

   Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

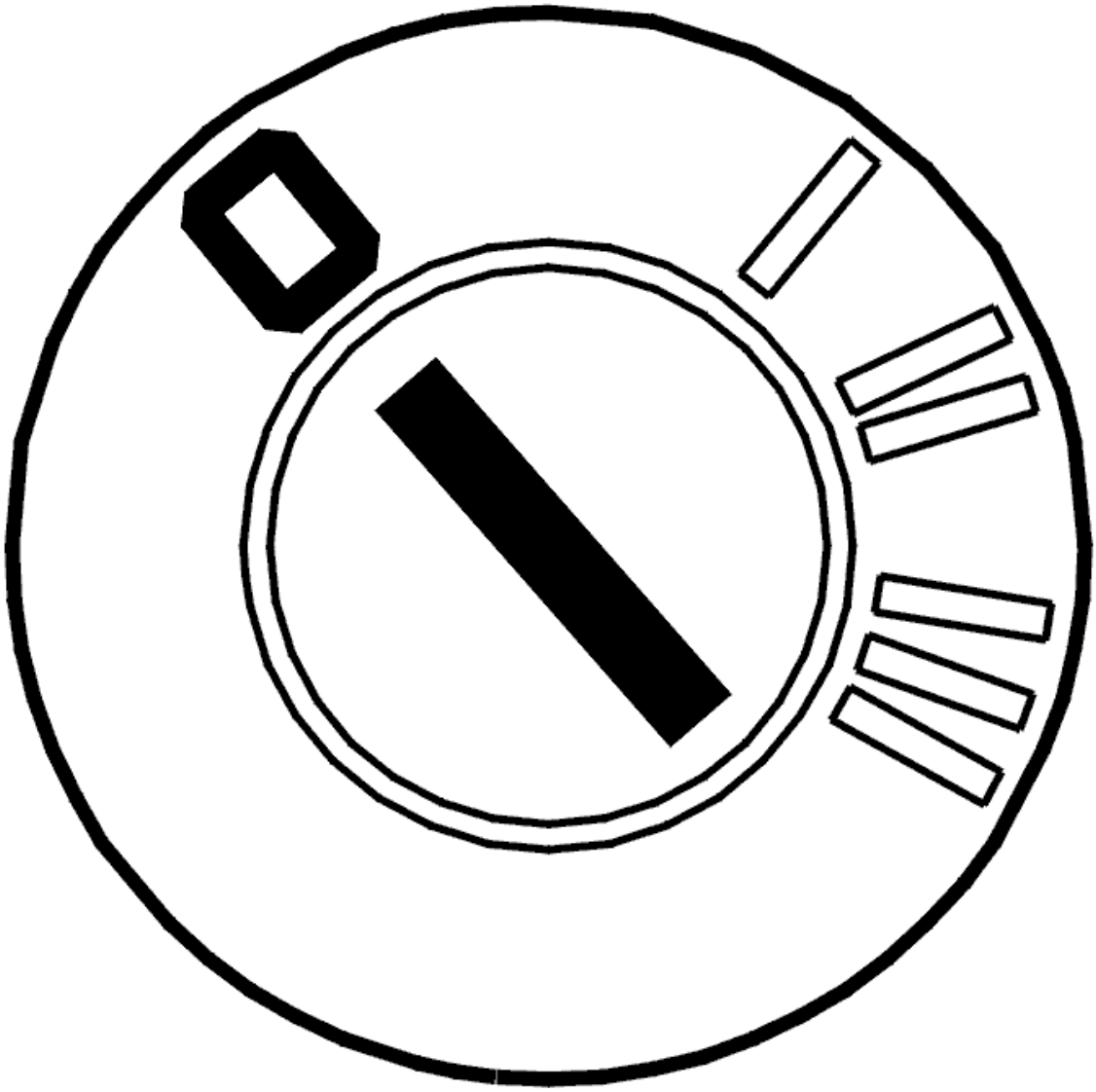


Fig. 145: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the communication cable between the gear selector module (GEM) terminal #2 and transmission control module (TCM) terminal #B21. Check for a short-circuit to supply voltage.

  Other information

  - To connect the breakout box, see **CONNECTING BREAKOUT BOX, TRANSMISSION CONTROL MODULE (TCM)**
  - For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)**
  - To replace the printed circuit board (standard), see **PRINTED CIRCUIT BOARD GEAR**

SELECTOR ASSEMBLY/TOP PANEL, REPLACING

- To replace the printed circuit board (geartronic), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL GEARTRONIC, REPLACING**
- see **CHECKING WIRING AND TERMINALS**

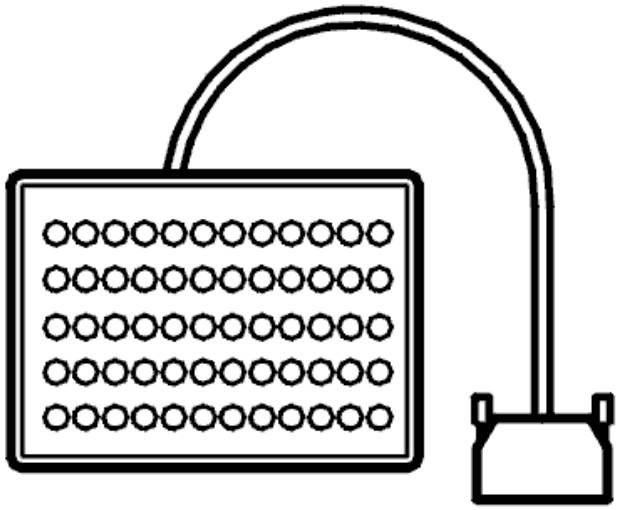


Fig. 146: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

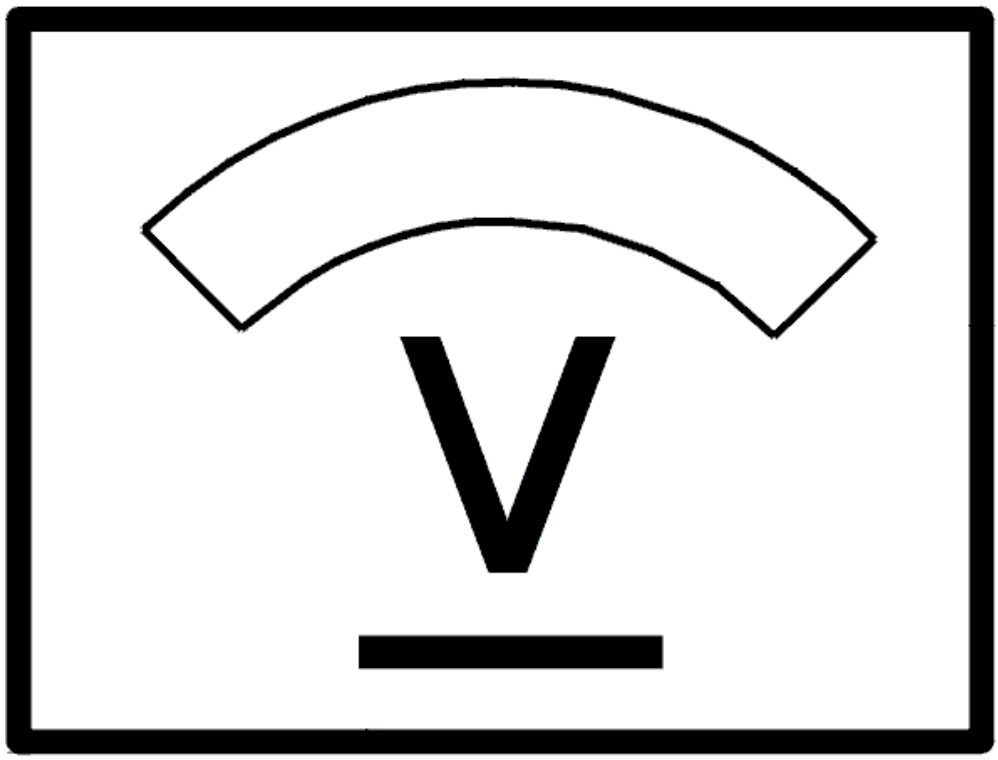


Fig. 147: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

HINT: To determine whether the control module is faulty, disconnect the connector for the gear selector

module (GSM) and temporarily connect a cable to short-circuit the control module terminals.

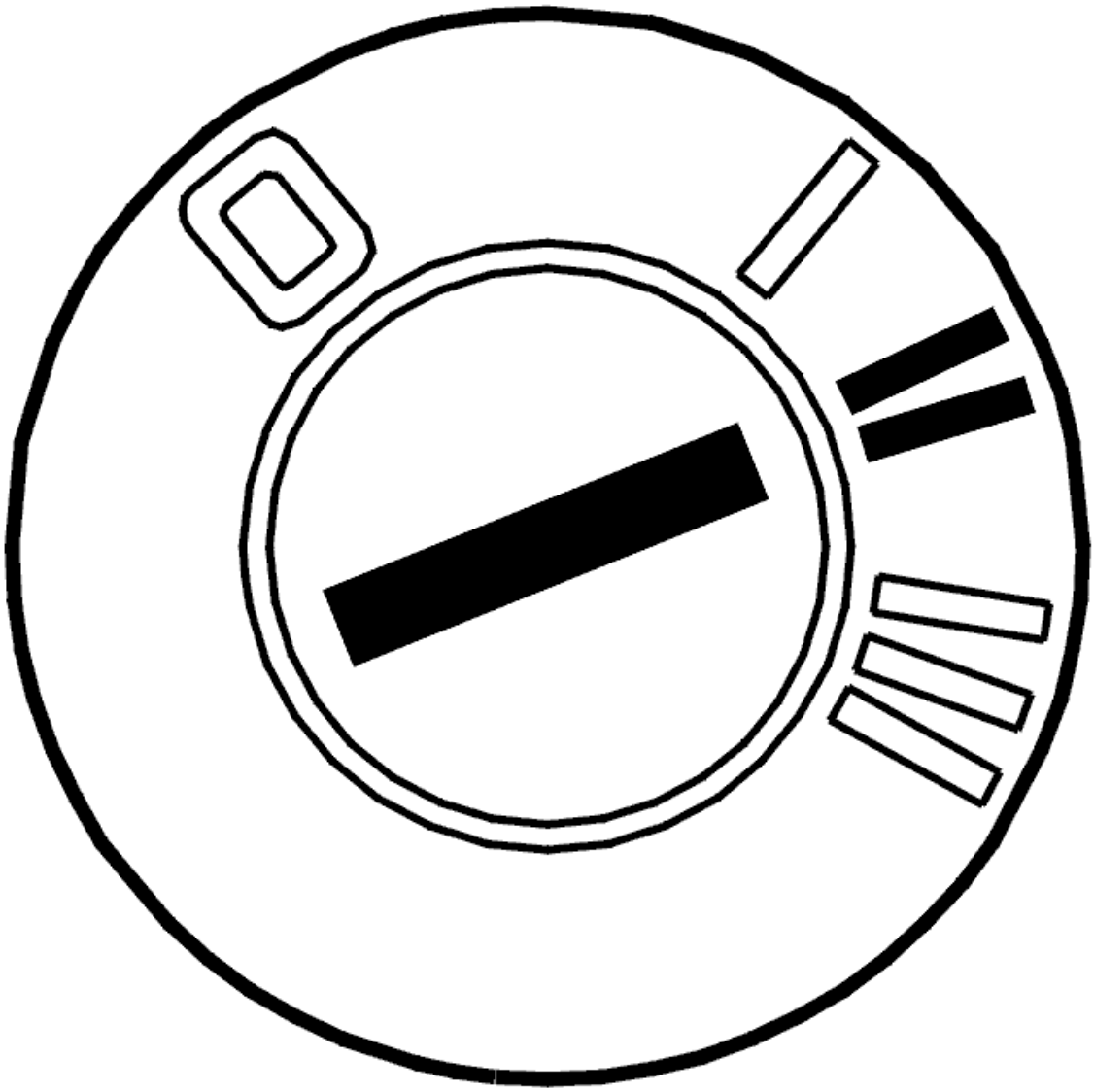


Fig. 148: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Disconnect the 6-pin connector for the gear selector module (GSM)
- Connect a temporary cable between terminals #A53 and #B31 on the breakout box.

CAUTION: Thoroughly check that the cable is connected to the correct terminals. Also check that there is no risk of unintentional short-circuits.

- Ignition on

- Read off the status.

  Check that the status indicates "1" when the cable is connected.

  Disconnect the cable end that is connected to terminal #A35 and move the cable to terminal #A53.

  NOTE: Leave the cable end connected to terminal #B31 in place.

  Check that the status changes to "0" when the cable has been transferred to terminal #A53.

  If the status shifts to "0" the transmission control module (TCM) is??? OK. Replace the circuit board in the top panel.

  If the status shifts to "0" the transmission control module (TCM) is??? faulty. Replace the control module.

  Remedy as necessary.

  Other information

  - To connect the breakout box, see **CONNECTING BREAKOUT BOX, TRANSMISSION CONTROL MODULE (TCM)**
  - For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)**
  - To replace the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
  - To replace the printed circuit board (standard), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, REPLACING**
  - To replace the printed circuit board (geartronic), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL GEARTRONIC, REPLACING** .

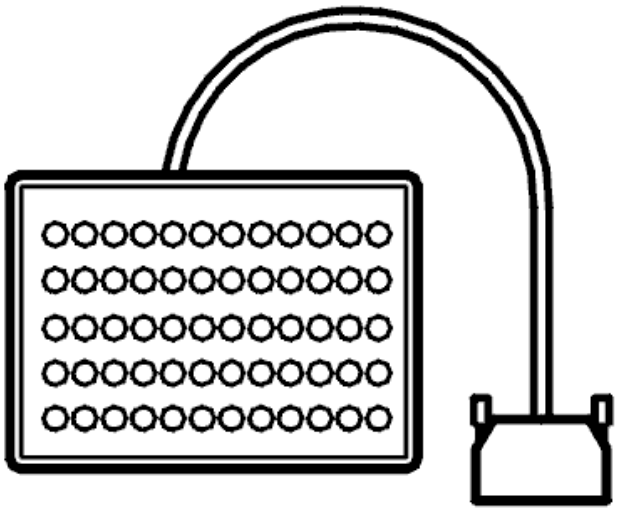


Fig. 149: Identifying Breakout Box

Courtesy of VOLVO CARS CORPORATION

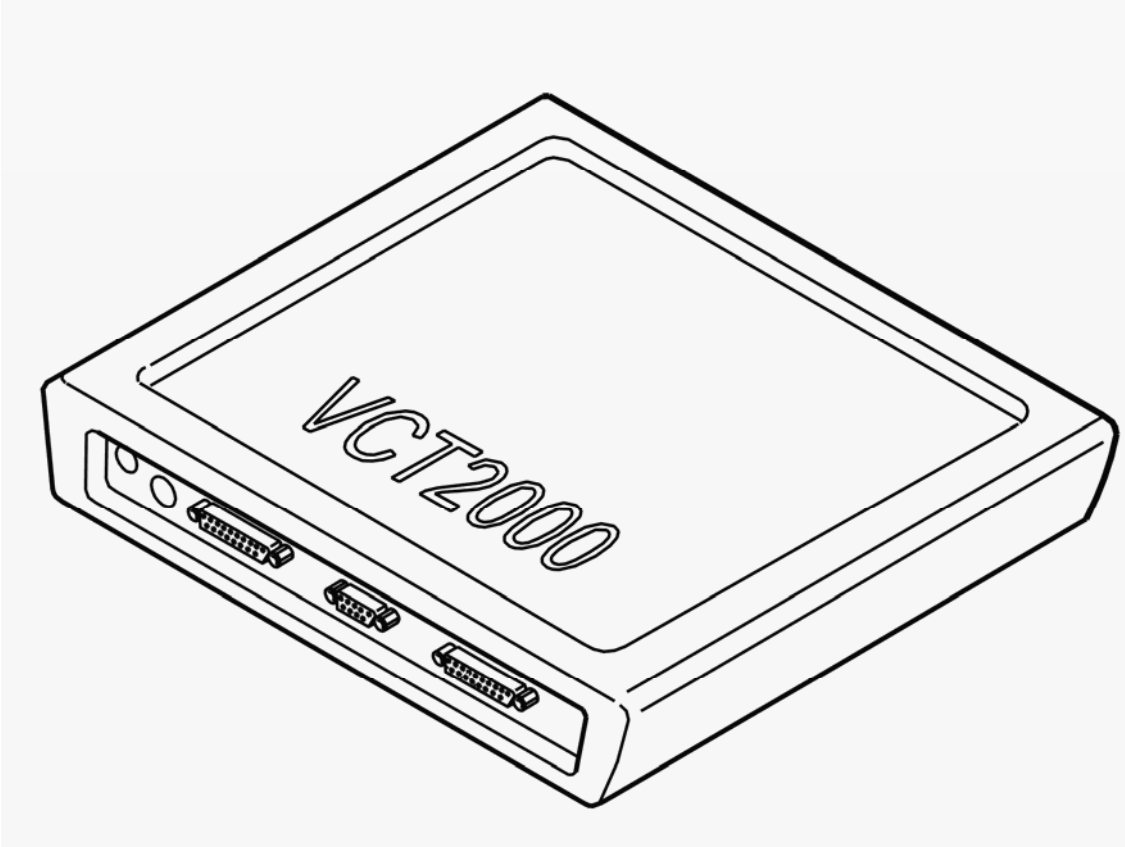


Fig. 150: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

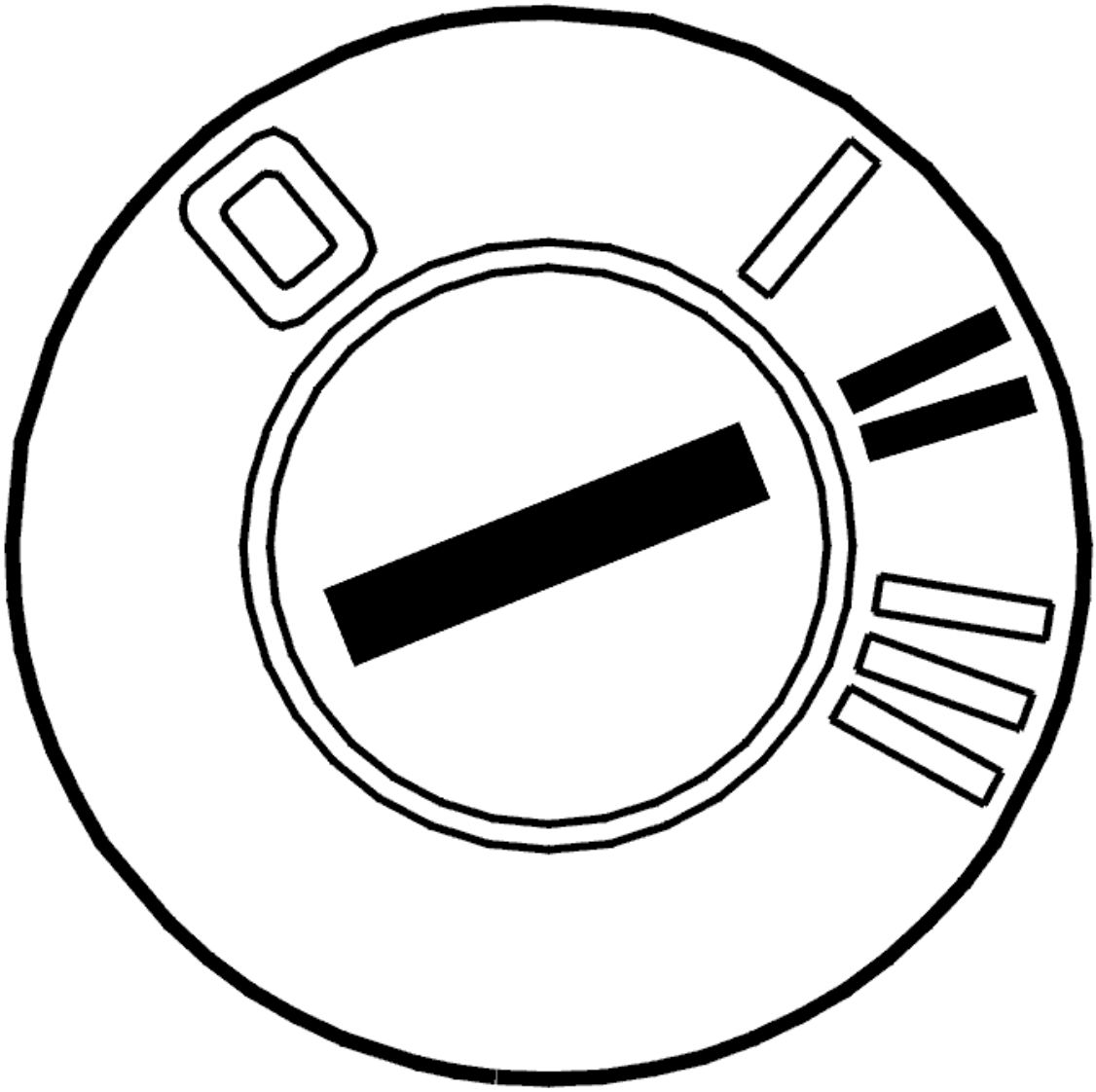


Fig. 151: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Depress the brake pedal. Move the gear shift selector to different positions. Check that the gear position is updated in the display in the combined instrument panel.

Is the gear position updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0093: GEAR SELECTOR LEVER CONTROL MODULE COMMUNICATION. SIGNAL TOO HIGH (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE INFORMATION

Condition

If the control unit registers that the signal from the gear selector control unit (GSM) is too high, diagnostic trouble code TCM-0093 is set.

Substitute Value

- None.

Possible Source

- Contact resistance in the connectors.
- Communication wire short-circuited to voltage supply.

Fault symptom[s]

- Malfunction indicator light (MIL) is on.
- General warning lamp on.
- Position indication on the gear selector panel not working.

SIGNAL TOO HIGH

CHECKS

CHECKING COMMUNICATION

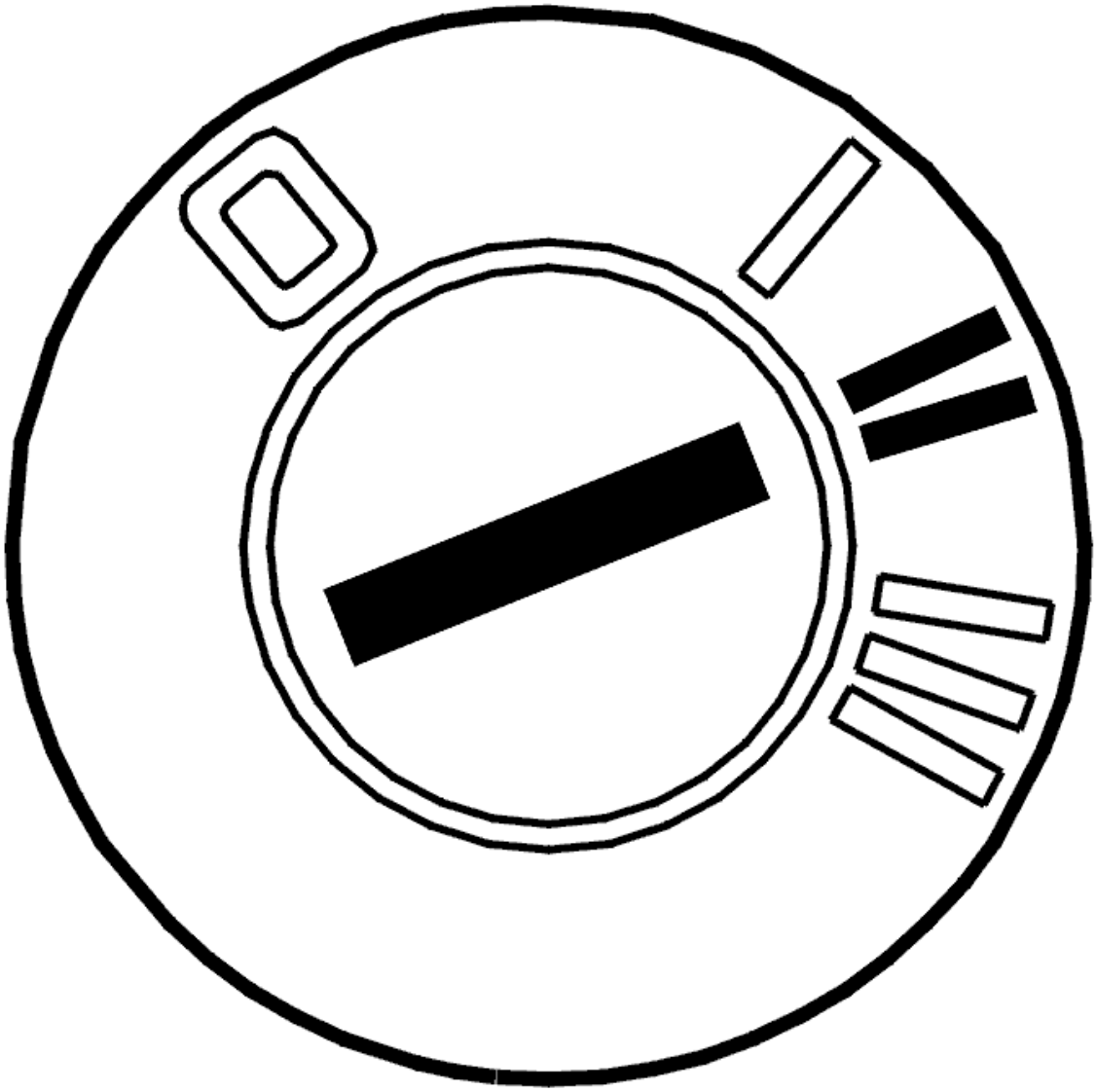


Fig. 152: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Depress the brake pedal and move the gear shift selector to different positions. Check that the gear position is updated in the display in the combined instrument panel and on the panel on the gear selector assembly.

Is the gear position updated?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

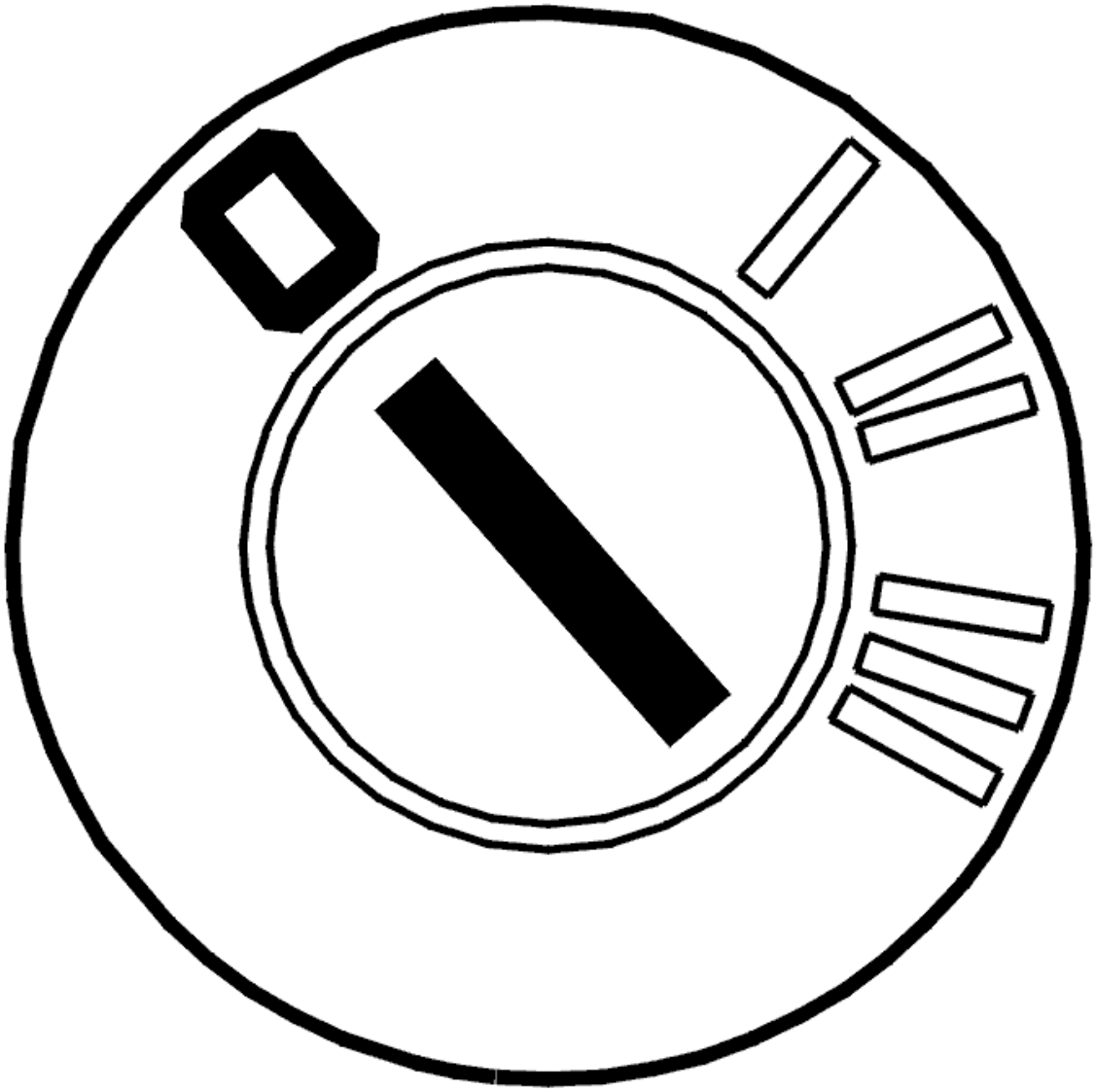


Fig. 153: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the communication cable between gear selector control module terminal #2 and the transmission control module (TCM) terminal #B31 (#B21). Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

  Replace the circuit board in the top panel if no fault is found in the cable.

  Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To replace the circuit board in the top panel (standard), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, REPLACING**
- To replace the circuit board in the top panel (geartronic), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL GEARTRONIC, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

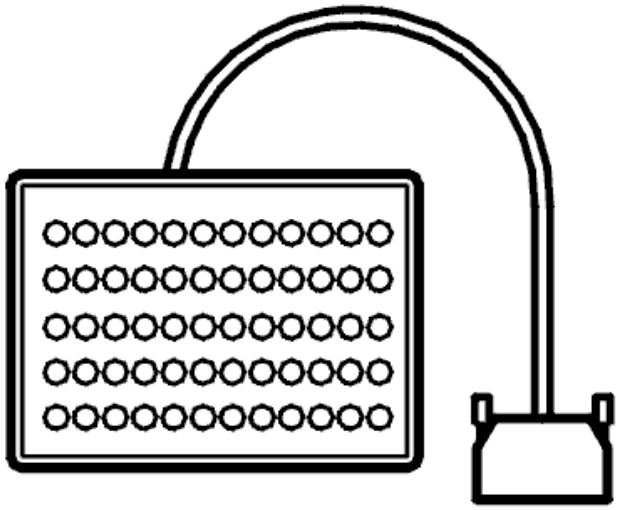


Fig. 154: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

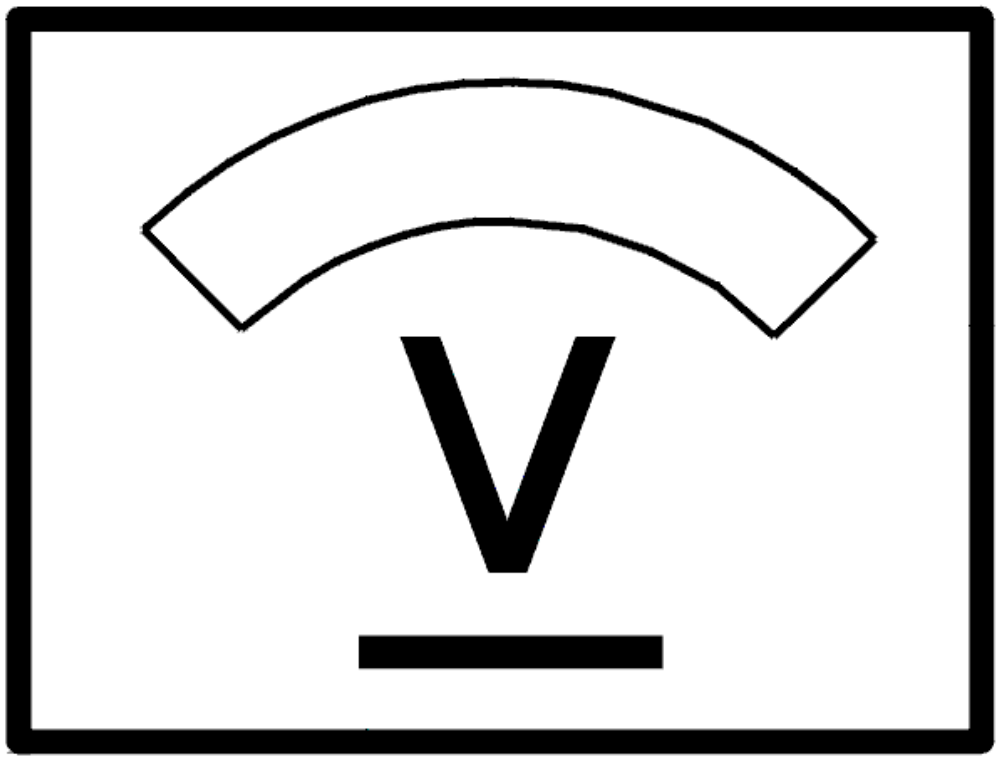


Fig. 155: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

INTERMITTENT FAULT

Check the communication cable between gear selector control module terminal #2 and transmission control

module (TCM) terminal #B31 (#B21). Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

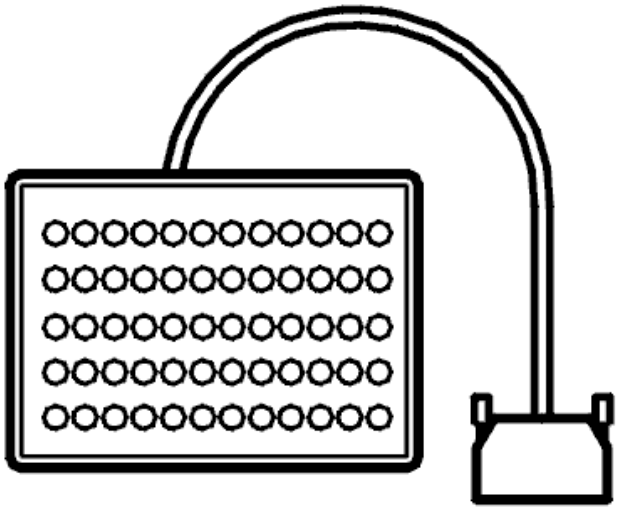


Fig. 156: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

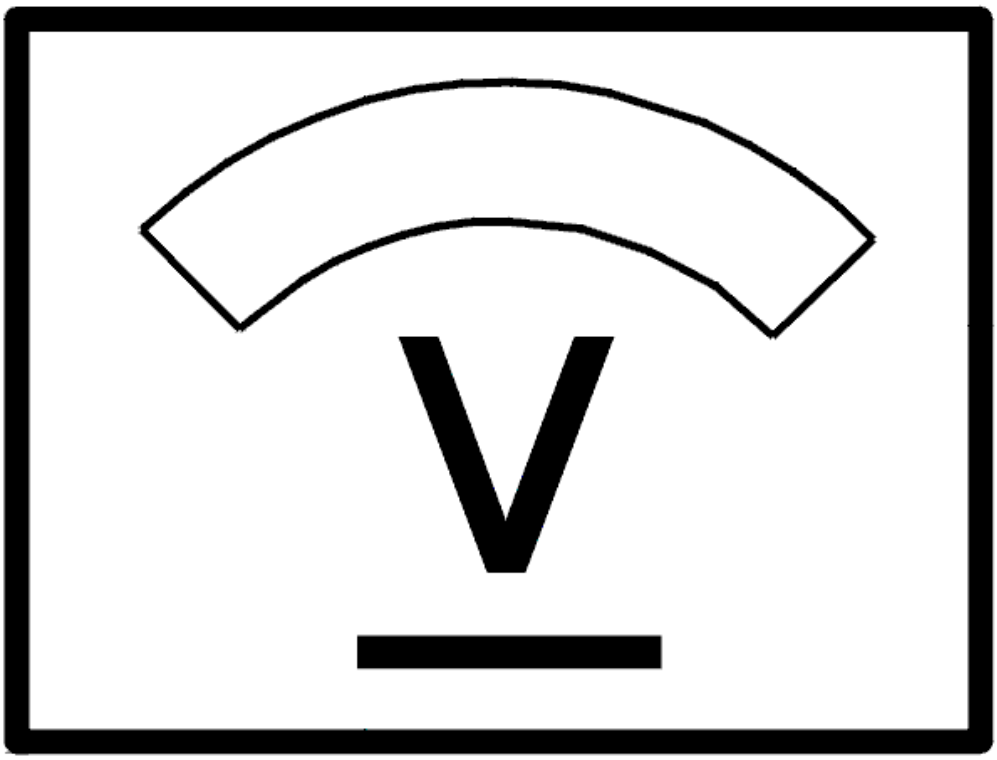


Fig. 157: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

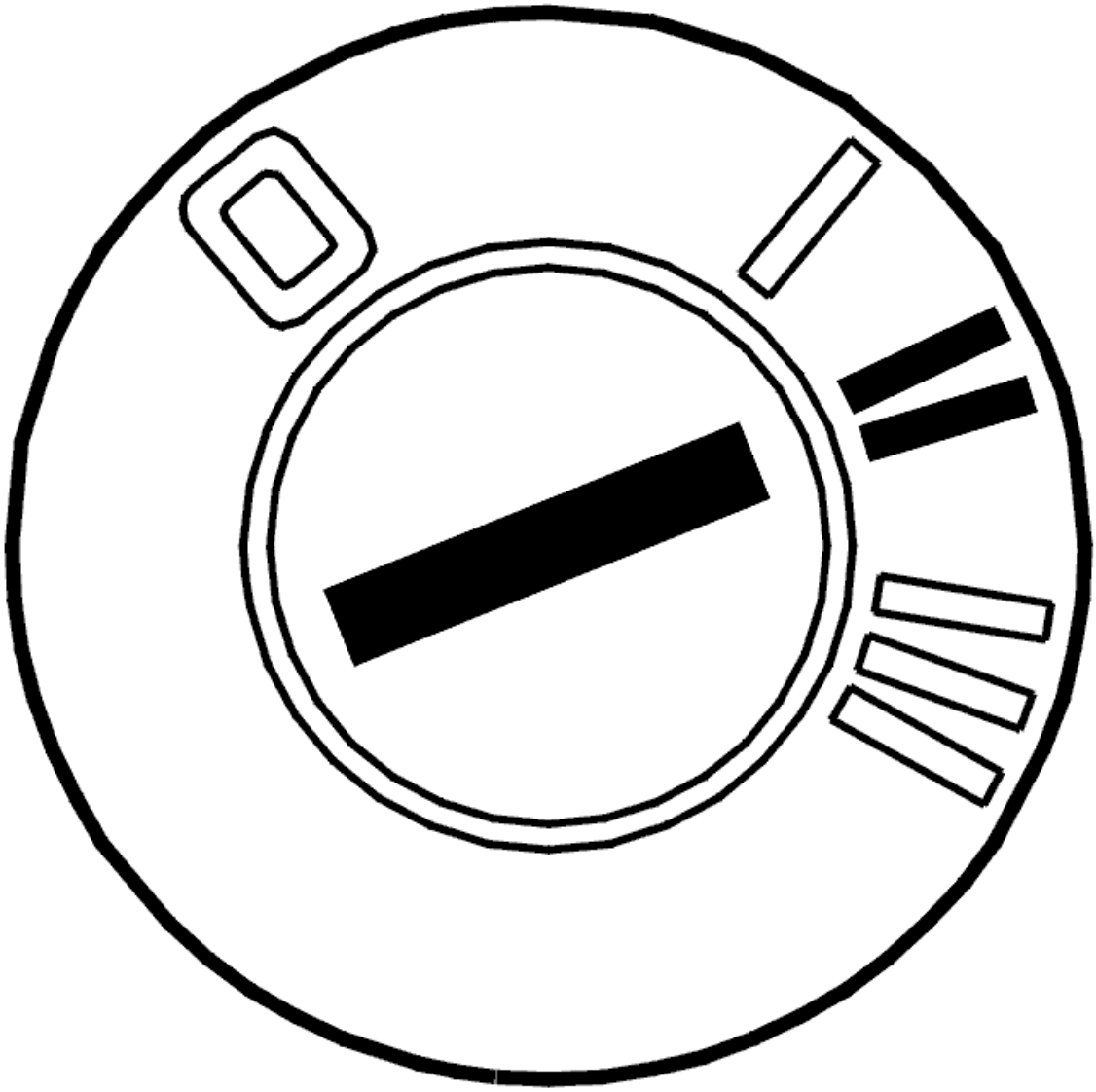


Fig. 158: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Depress the brake pedal and move the gear shift selector to different positions. Check that the gear position is updated in the display in the combined instrument panel and on the panel on the gear selector assembly.

Is the gear position updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0094: CONTROL MODULE COMMUNICATION, GEAR SELECTOR LEVER SIGNAL MISSING (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE INFORMATION

Condition

If the control unit registers no signal from P position lock solenoid, diagnostic trouble code TCM-0094 is set.

Substitute Value

- No substitute value.

Possible Source

- Contact resistance in the connectors.
- Open circuit in the communication wire.

Fault symptom[s]

- Malfunction indicator light (MIL) is on.
- Orange general warning lamp is on.
- Position indication on the gear selector panel not working.

SIGNAL MISSING

CHECKS

CHECKING COMMUNICATION

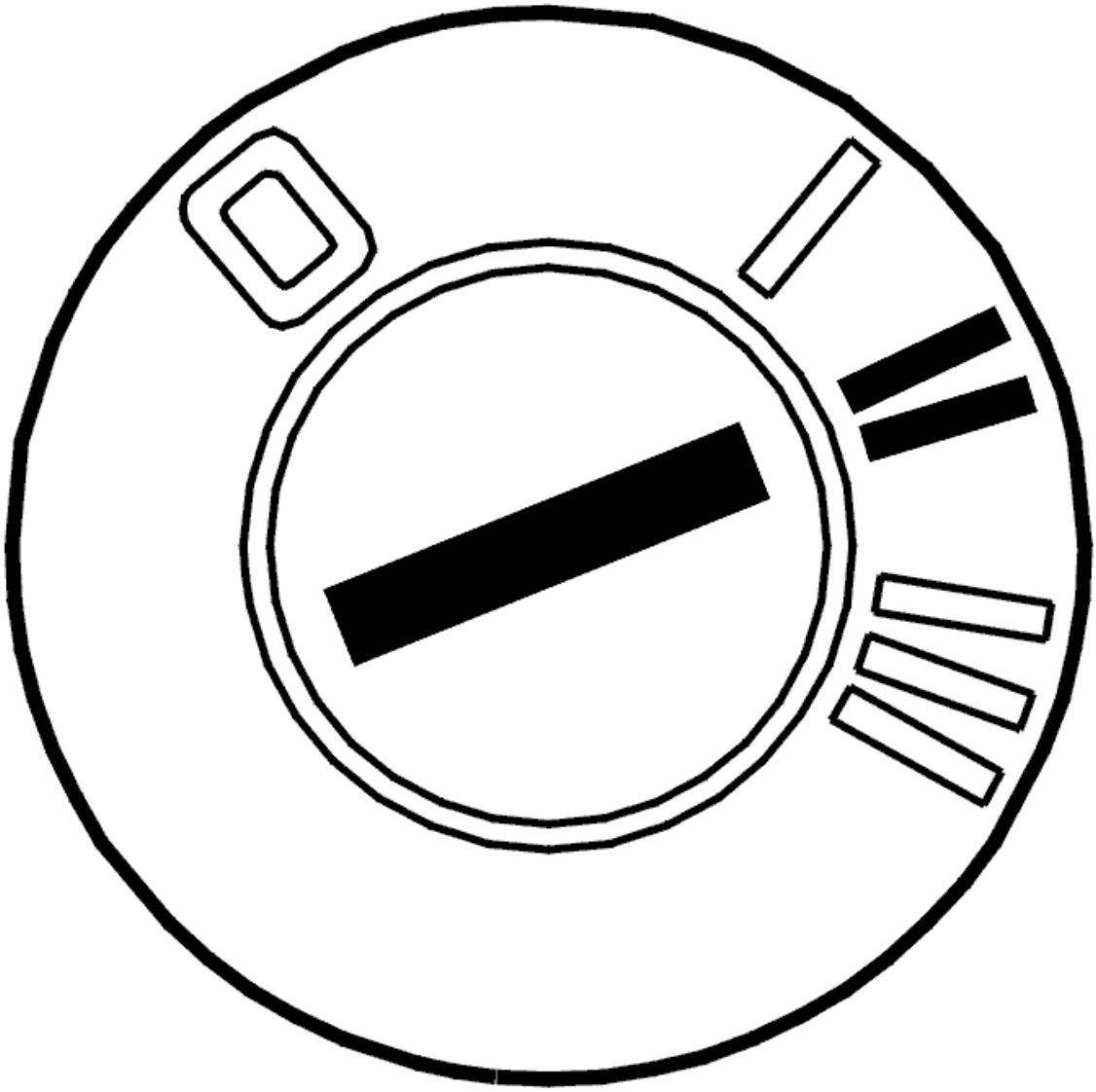


Fig. 159: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Press the brake pedal. Move the gear selector to different positions.

  Check that the gear position is updated in the display in the combined instrument panel.

Is the gear position updated?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

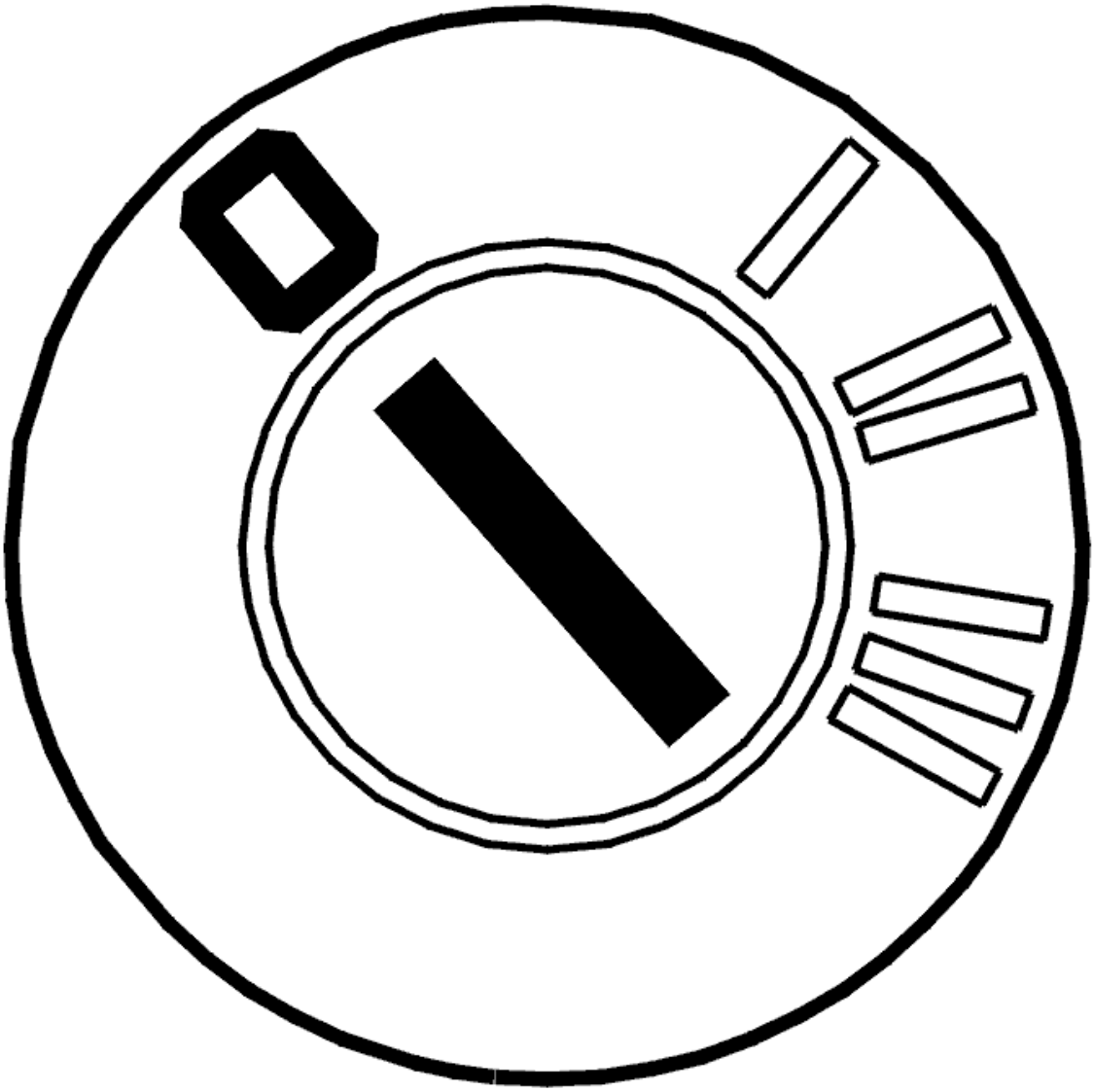


Fig. 160: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check ground terminal 31/6 at the A-post. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

  Check the communication cable between gear selector control module terminal #2 and transmission control module (TCM) terminal #B21 (#B31). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the 6-pin connector and connector 54/3RF (passenger compartment cable harness - engine compartment cable harness). Check for damage to the terminals and pins.

Check the cable between the gear selector module (GSM) terminal #6 and ground terminal 31/6. Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

Replace the circuit board in the top panel if no fault is found in the wiring or connectors.

Other information:

- To connect the breakout box, see **CONNECTING BREAKOUT BOX, TRANSMISSION CONTROL MODULE (TCM)**
- To replace the circuit board in the top panel (standard), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, REPLACING**
- To replace the circuit board in the top panel (Geartronic), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL GEARTRONIC, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

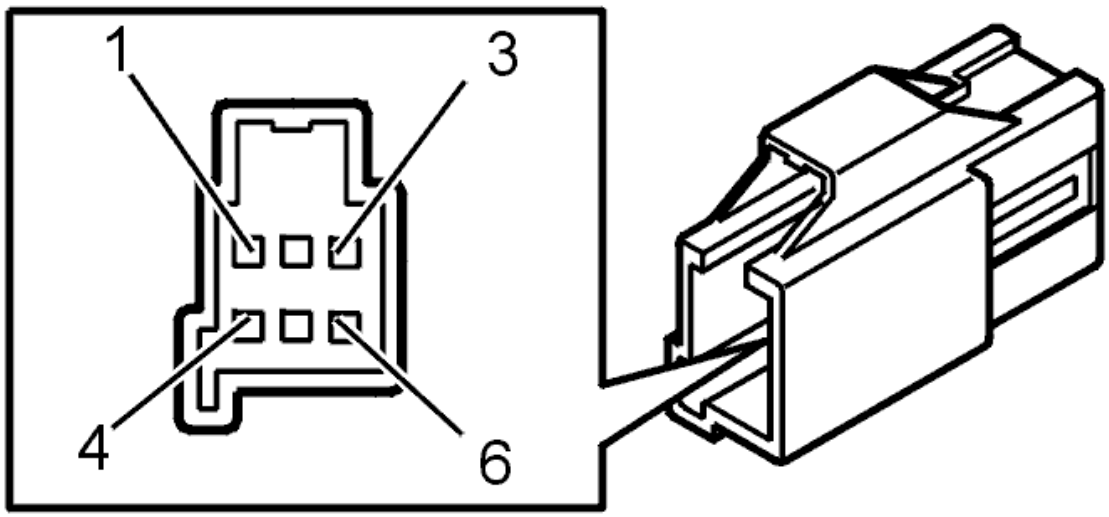


Fig. 161: Identifying 6--Pin Connector Terminals
Courtesy of VOLVO CARS CORPORATION

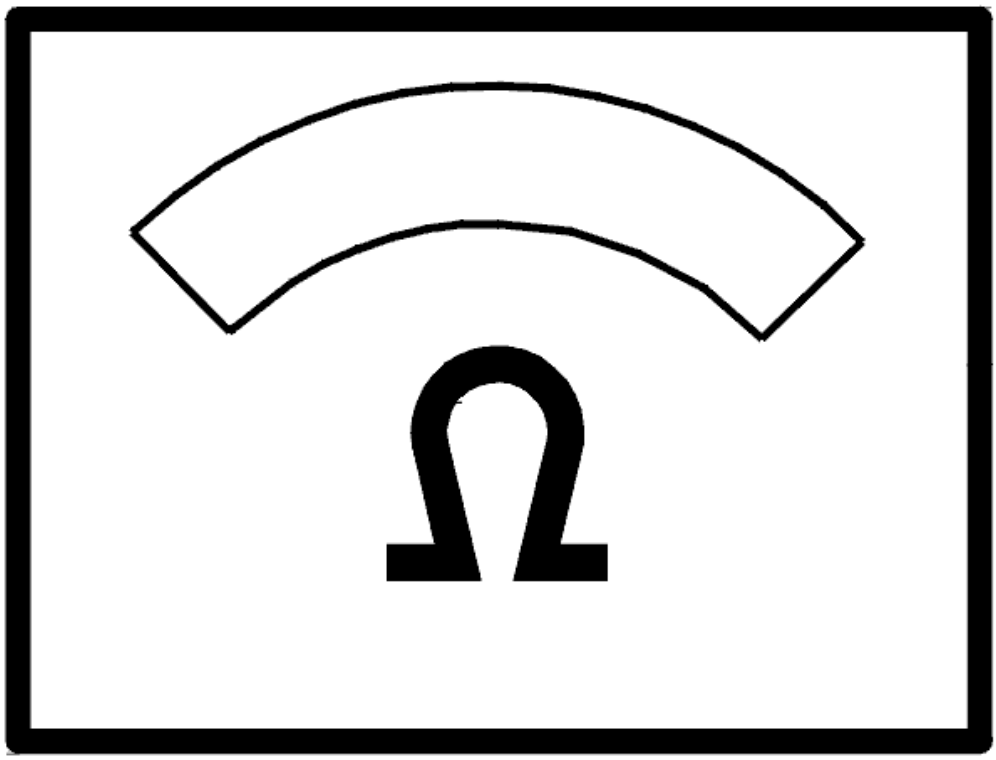


Fig. 162: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INTERMITTENT FAULT

Check ground terminal 31/6 at the A-post. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

Check the communication cable between gear selector control module terminal #2 and transmission control module (TCM) terminal #B21 (#B31). Check for an open-circuit. See **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the 6-pin connector and connector 54/3RF (passenger compartment cable harness - engine compartment cable harness). Check for damage to the terminals and pins.

Check the cable between the gear selector module (GSM) terminal #6 and ground terminal 31/6. Check for an open-circuit. See **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING BREAKOUT BOX, TRANSMISSION CONTROL MODULE (TCM)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

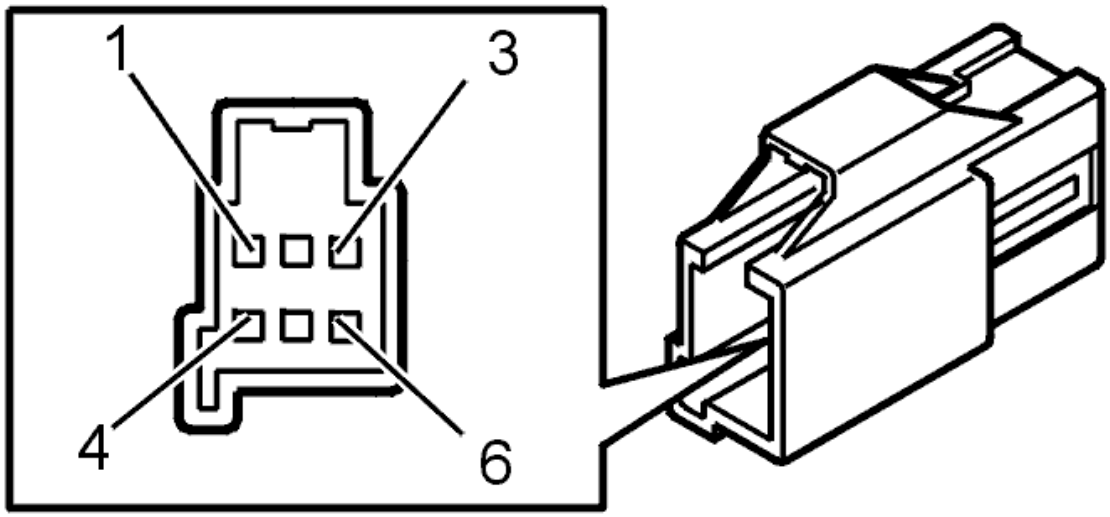


Fig. 163: Identifying 6--Pin Connector Terminals
Courtesy of VOLVO CARS CORPORATION

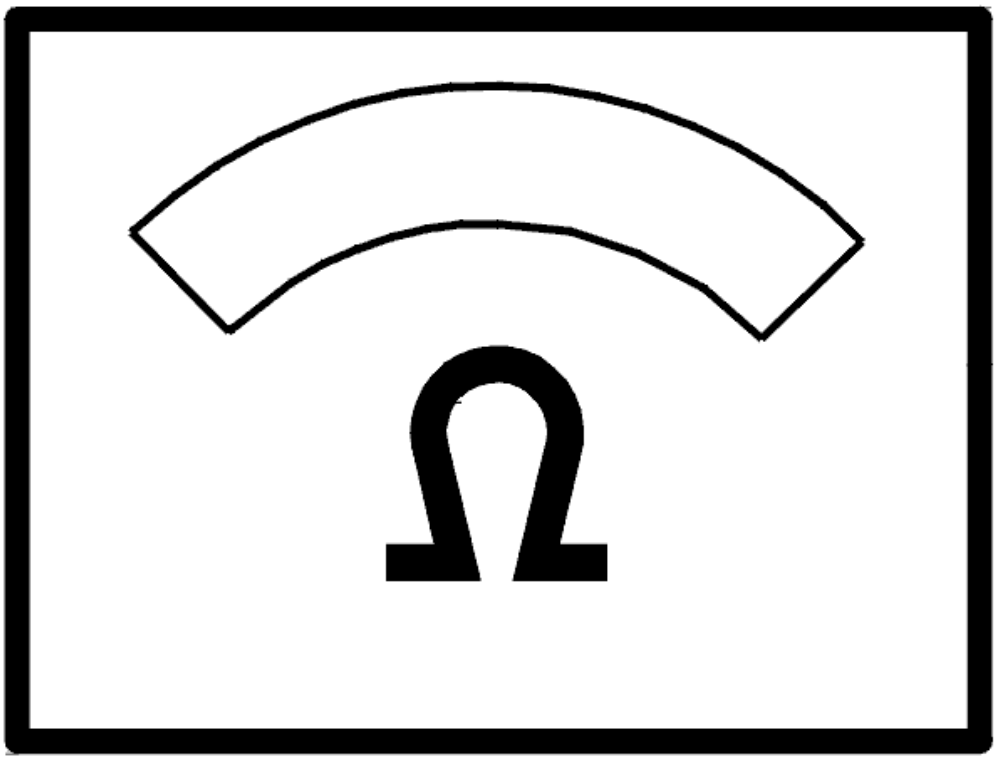


Fig. 164: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

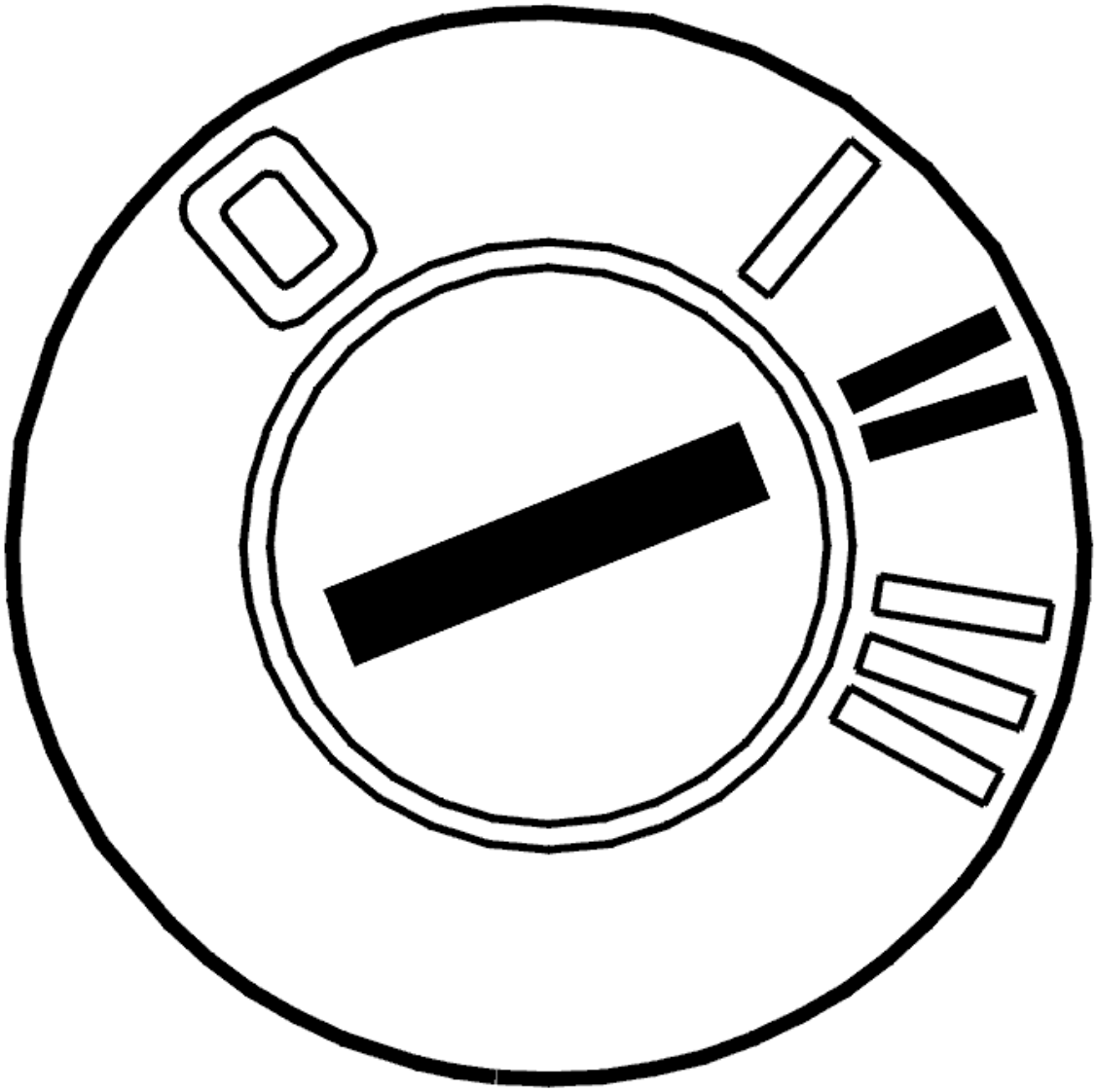


Fig. 165: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Depress the brake pedal. Move the gear shift selector to different positions. Check that the gear position is updated in the display in the combined instrument panel.

Is the gear position updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0094: GEAR SELECTOR LEVER CONTROL MODULE COMMUNICATION. SIGNAL MISSING (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE INFORMATION

Condition

If the control unit registers that there is no signal from the gear selector control unit (GSM) diagnostic trouble code TCM-0094 will be set.

Substitute Value

- None.

Possible Source

- Contact resistance in the connectors.
- Open circuit in the communication wire.

Fault symptom[s]

- Malfunction indicator light (MIL) is on.
- General warning lamp on.
- Position indication on the gear selector panel not working.

SIGNAL MISSING

CHECKS

CHECKING COMMUNICATION

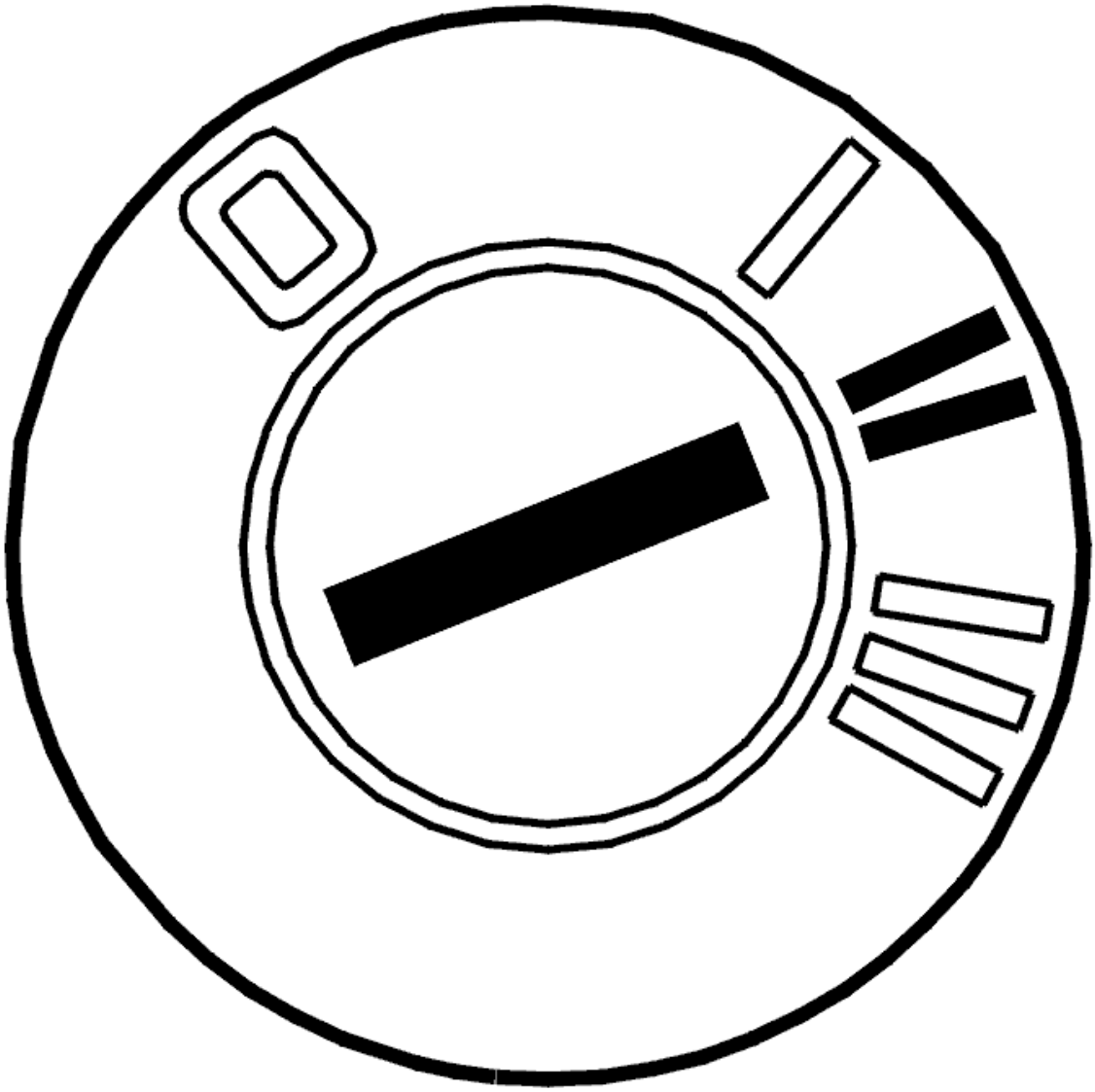


Fig. 166: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Depress the brake pedal and move the gear shift selector to different positions. Check that the gear position is updated in the display in the combined instrument panel and on the panel on the gear selector assembly.

Is the gear position updated?

- **YES**

Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

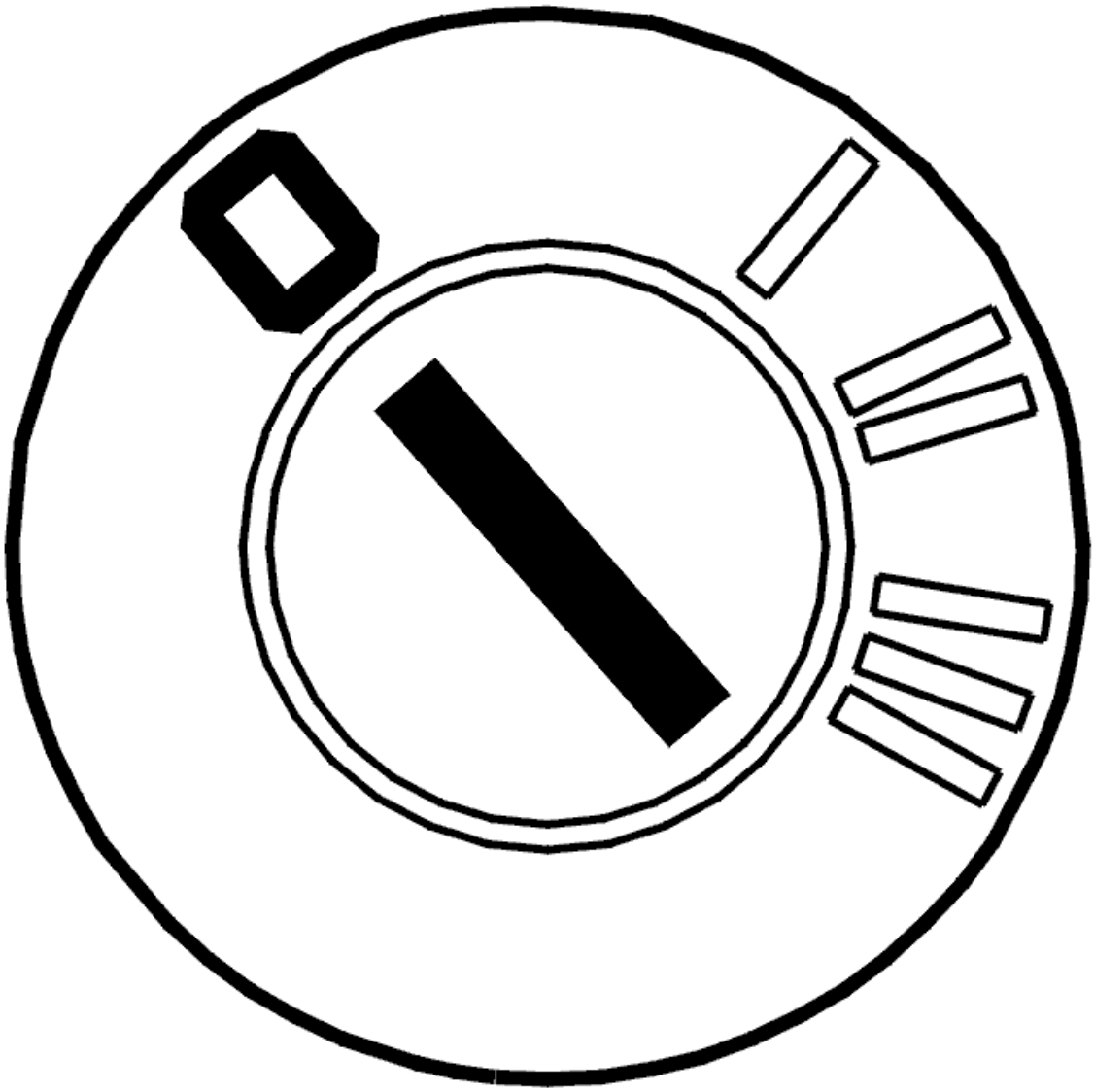


Fig. 167: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the communication cable between gear selector control module terminal #2 and transmission control module (TCM) terminal #B31 (#B21). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

Replace the circuit board in the top panel if no fault is found in the cable.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To replace the circuit board in the top panel (standard), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, REPLACING**
- To replace the circuit board in the top panel (Geartronic), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL GEARTRONIC, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

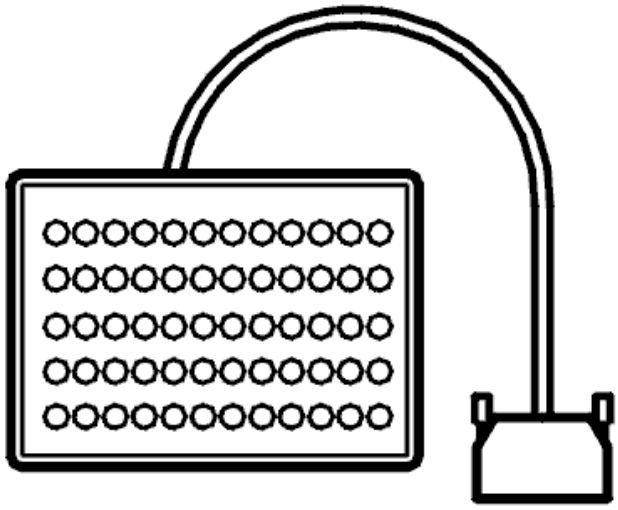


Fig. 168: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

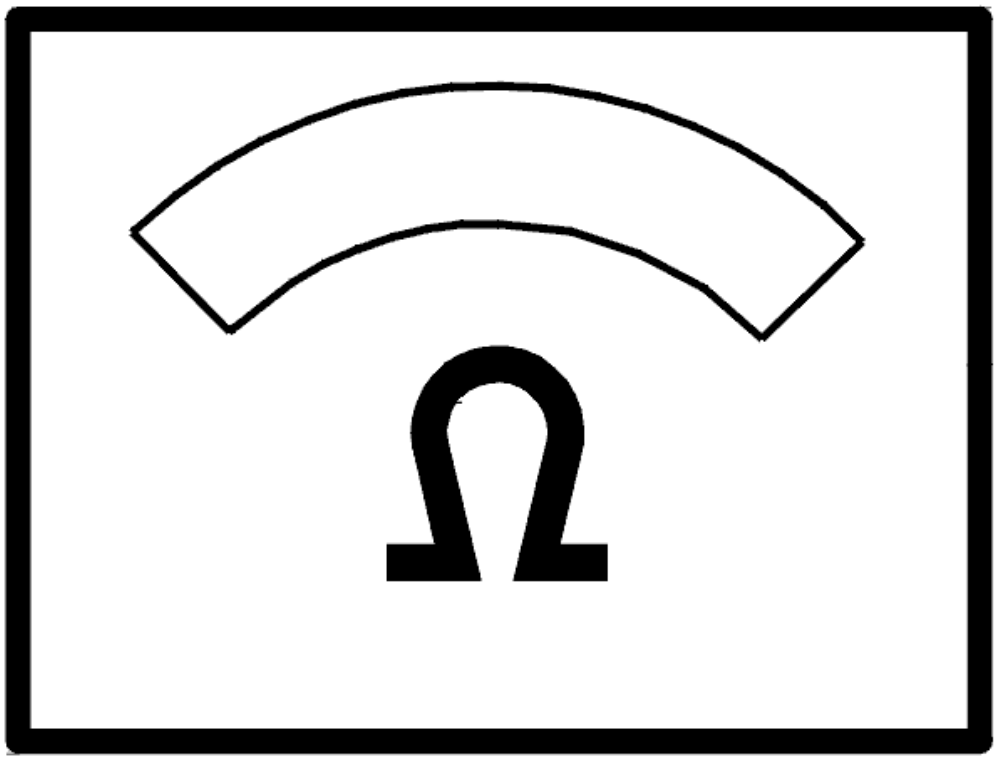


Fig. 169: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

INTERMITTENT FAULT

HINT: Check the communication cable between gear selector control module terminal #2 and

transmission control module (TCM) terminal #B31 (#B21). Check for an intermittent open-circuit. See OPEN-CIRCUIT, INTERMITTENT FAULTS . Check for contact resistance and oxidation. See CONTACT RESISTANCE AND OXIDATION .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

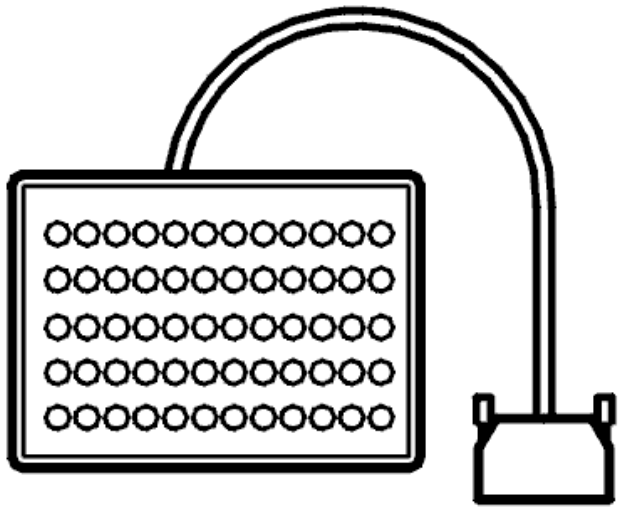


Fig. 170: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

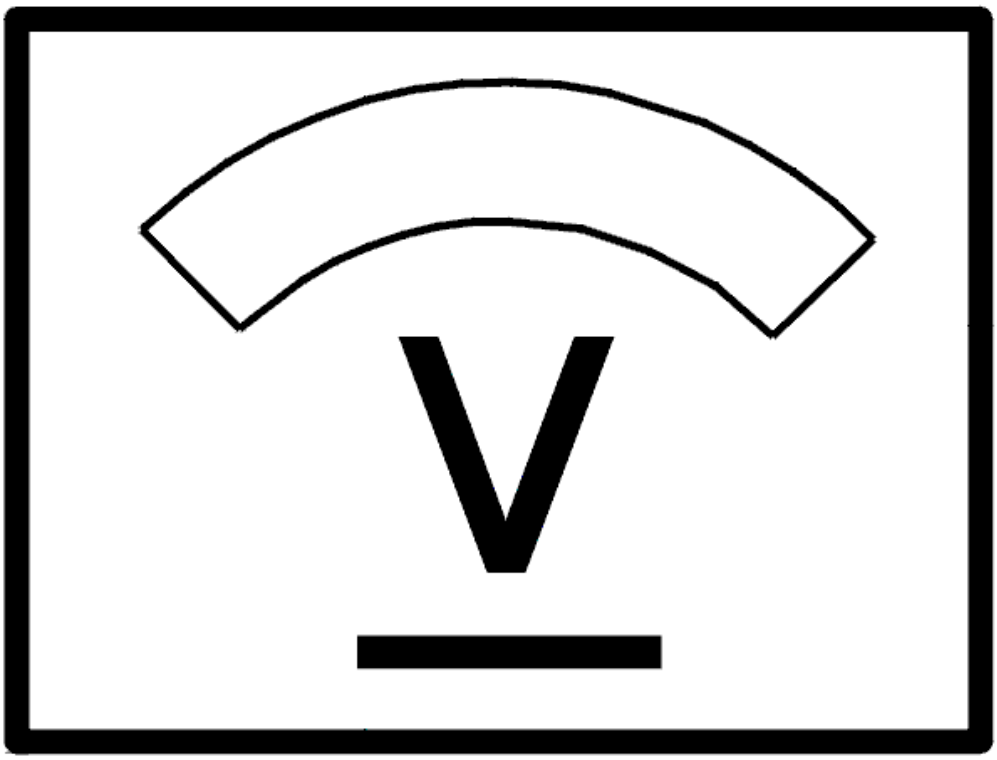


Fig. 171: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

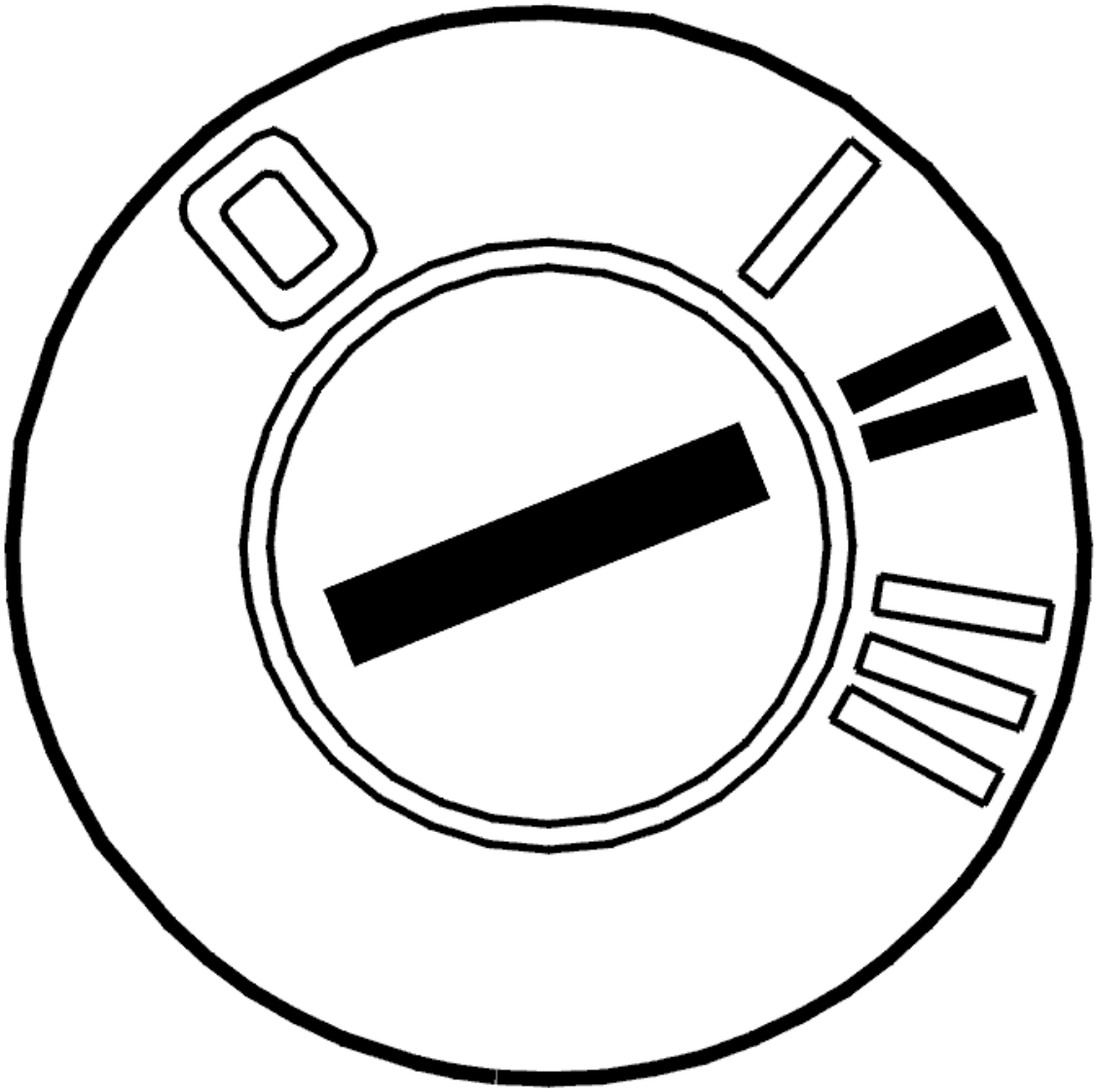


Fig. 172: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Depress the brake pedal and move the gear shift selector to different positions. Check that the gear position is updated in the display in the combined instrument panel and on the panel on the gear selector assembly.

Is the gear position updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0095: CONTROL MODULE COMMUNICATION, GEAR SELECTOR LEVER SIGNAL TOO LOW (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE INFORMATION

Condition

If the control unit registers that the signal from the gear selector control unit (GSM) is too low, diagnostic trouble code TCM-0095 is set.

Substitute Value

- No substitute value.

Possible Source

- Contact resistance in the connectors.
- Communication wire short-circuited to ground.

Fault symptom[s]

- Malfunction indicator light (MIL) is on.
- Orange general warning lamp is on.
- Position indication on the gear selector panel not working.

SIGNAL TOO LOW

CHECKS

CHECKING COMMUNICATION

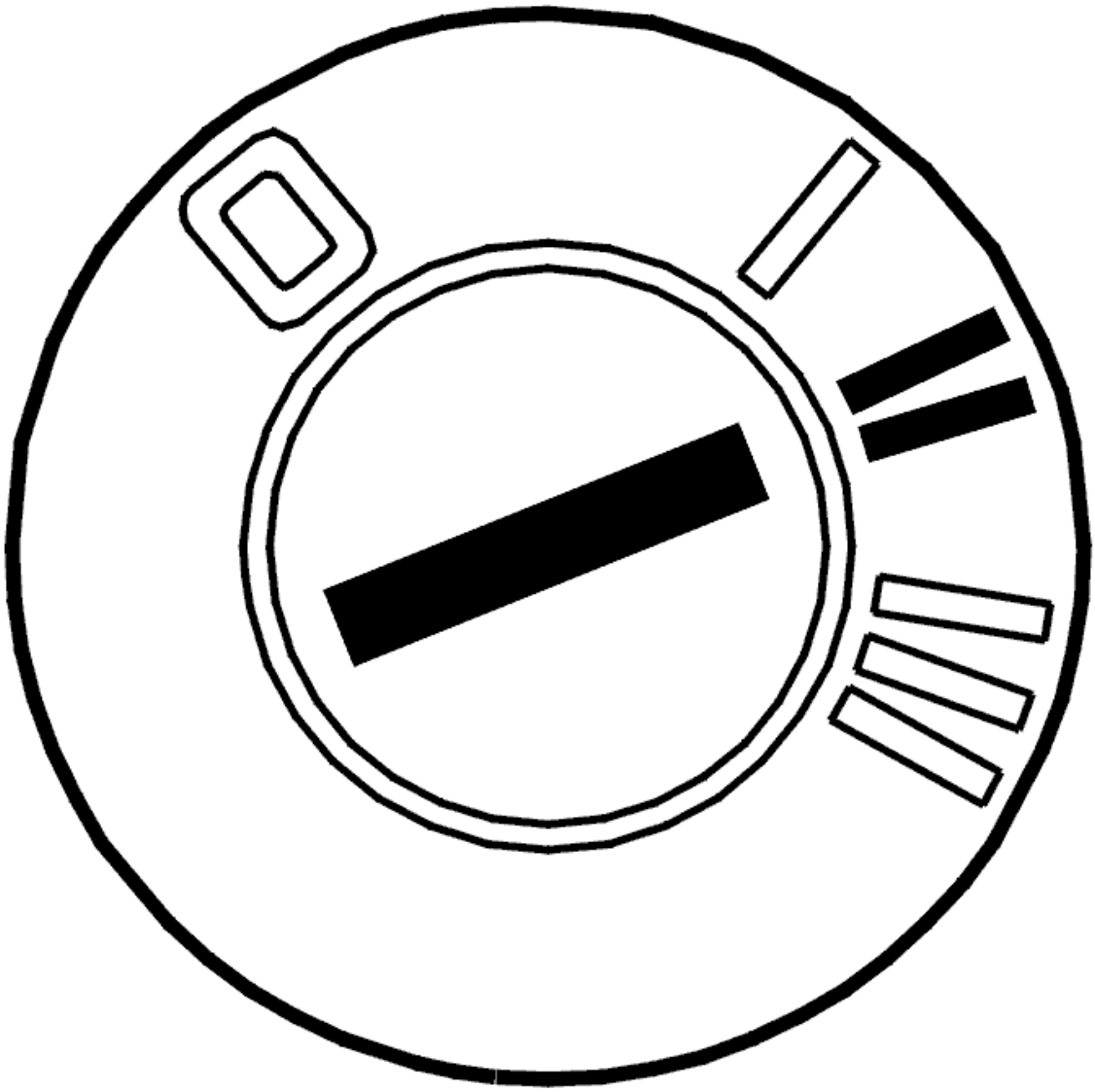


Fig. 173: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the transmission control module (TCM) and Gear selector module (GSM) connectors. Check for contact resistance and oxidation
- Ignition on.

  Press the brake pedal and move the gear shift selector to the different positions. Check that the gear position is updated in the display in the combined instrument panel. Compare with the indicators in the panel for the gear selector.

  If the gear position is updated in the combined instrument panel and in the panel at the gear selector, the problem was probably caused by contact resistance or oxidation.

If the gear position is updated in the combined instrument panel but not in the panel at the gear selector, replace the printed circuit board in the top panel.

If the gear position is updated in the panel at the gear selector but not in the combined instrument panel there is probably a fault in another system. Exit fault-tracing and fault-trace the central electronic module (CEM) or the driver information module (DIM).

Other information

- To check the transmission control module (TCM) connector, see **CONNECTING BREAKOUT BOX, TRANSMISSION CONTROL MODULE (TCM)**
- To check or replace the printed circuit board (standard), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, REPLACING**
- To check or replace the printed circuit board (Geartronic), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL GEARTRONIC, REPLACING** .

Select an option:

1. The gear position is updated in the combined instrument panel and in the panel at the gear selector

   OKAY: Troubleshooting has been completed.

2. The gear position is updated in the combined instrument panel but not in the panel at the gear selector

   Refer to **VERIFICATION**

3. The gear position is updated in the panel at the gear selector but not in the combined instrument panel

   OKAY: Troubleshooting has been completed.

4. The gear position is not updated in the combined instrument panel or in the panel at the gear selector.

   Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

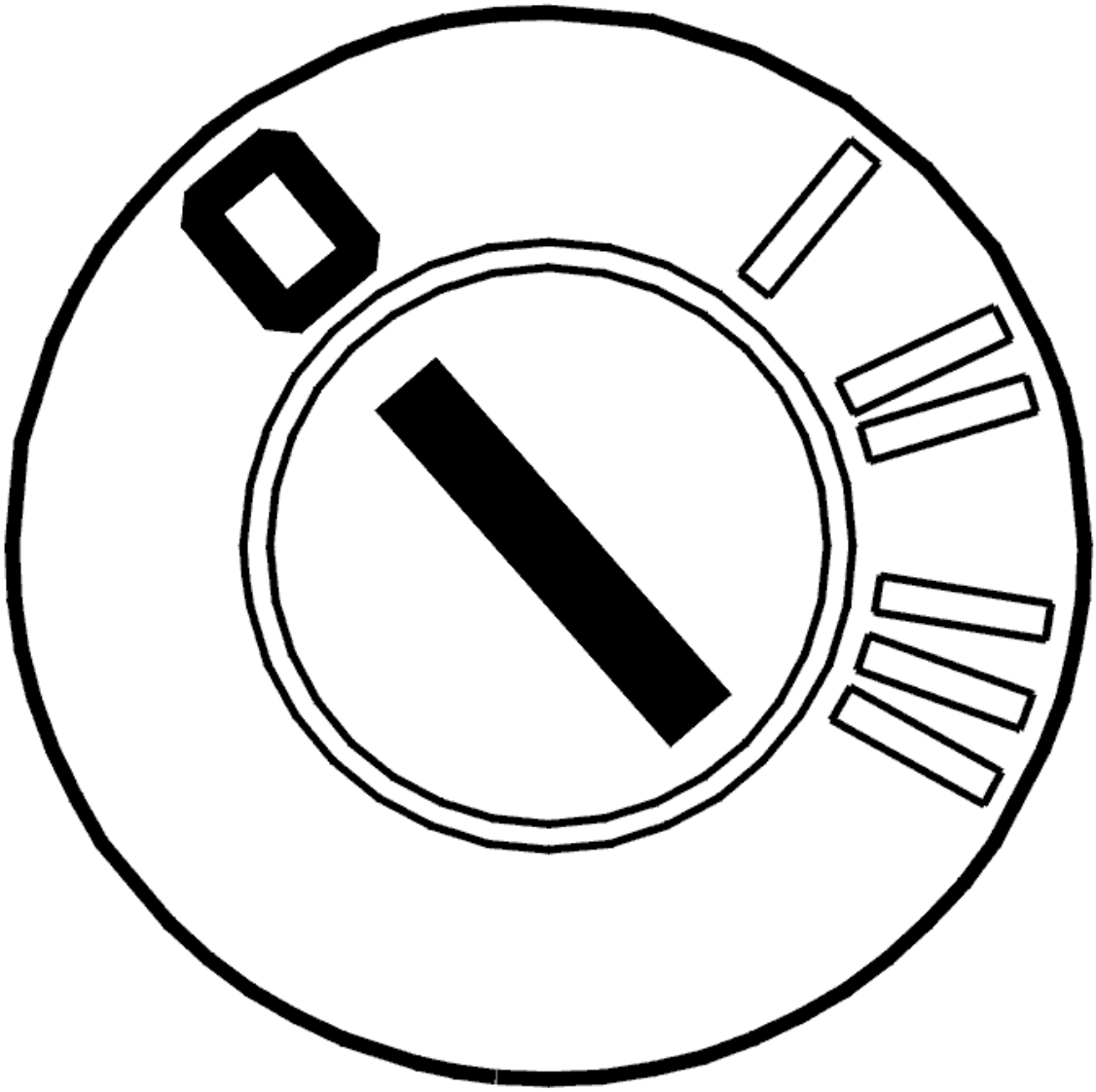


Fig. 174: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the communication cable between gear selector module (GSM) terminal #2 and transmission control module (TCM) terminal #B21. Check for short-circuit to ground.

  Other information

  - To connect the breakout box, see **CONNECTING BREAKOUT BOX, TRANSMISSION CONTROL MODULE (TCM)**
  - For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)**
  - To replace the printed circuit board (standard), see **PRINTED CIRCUIT BOARD GEAR**

SELECTOR ASSEMBLY/TOP PANEL, REPLACING

- To replace the printed circuit board (geartronic), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL GEARTRONIC, REPLACING**
- see **CHECKING WIRING AND TERMINALS**

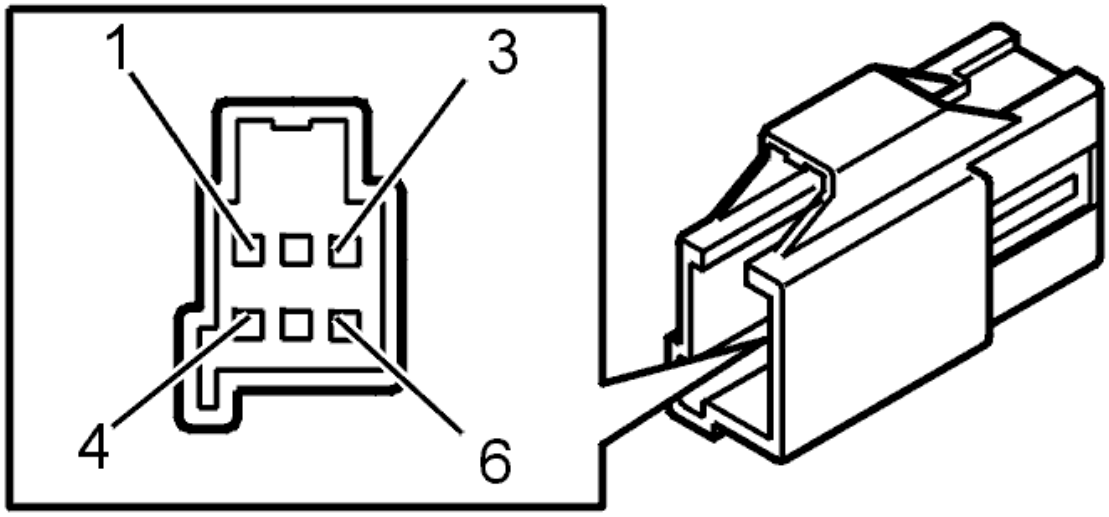


Fig. 175: Identifying 6--Pin Connector Terminals
Courtesy of VOLVO CARS CORPORATION

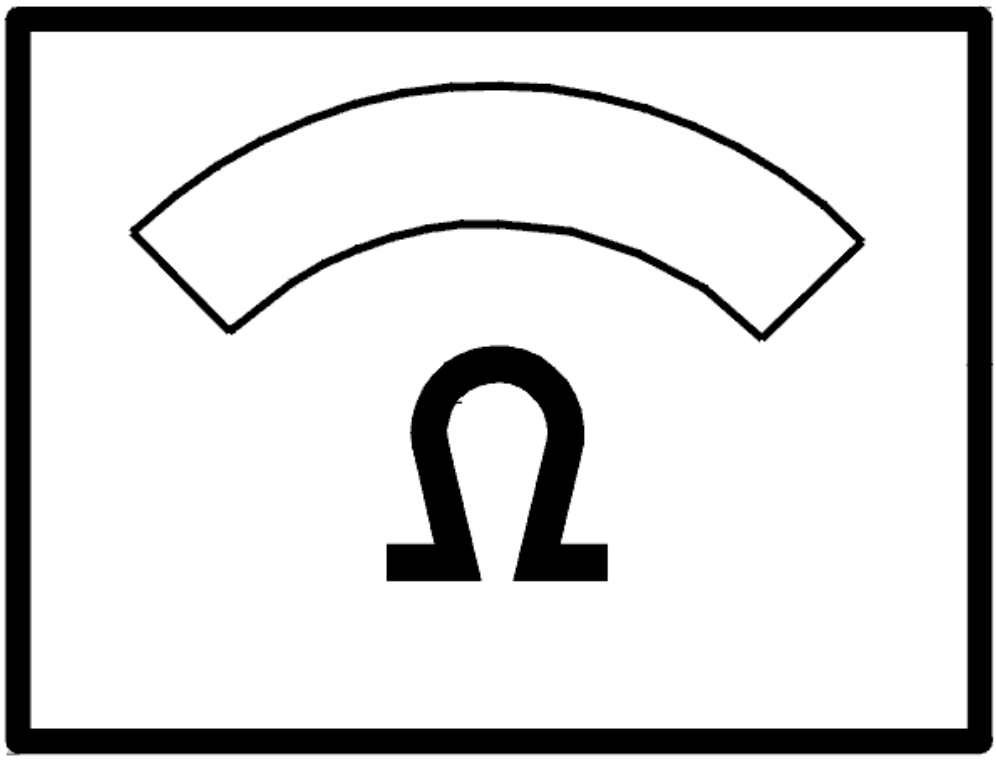


Fig. 176: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

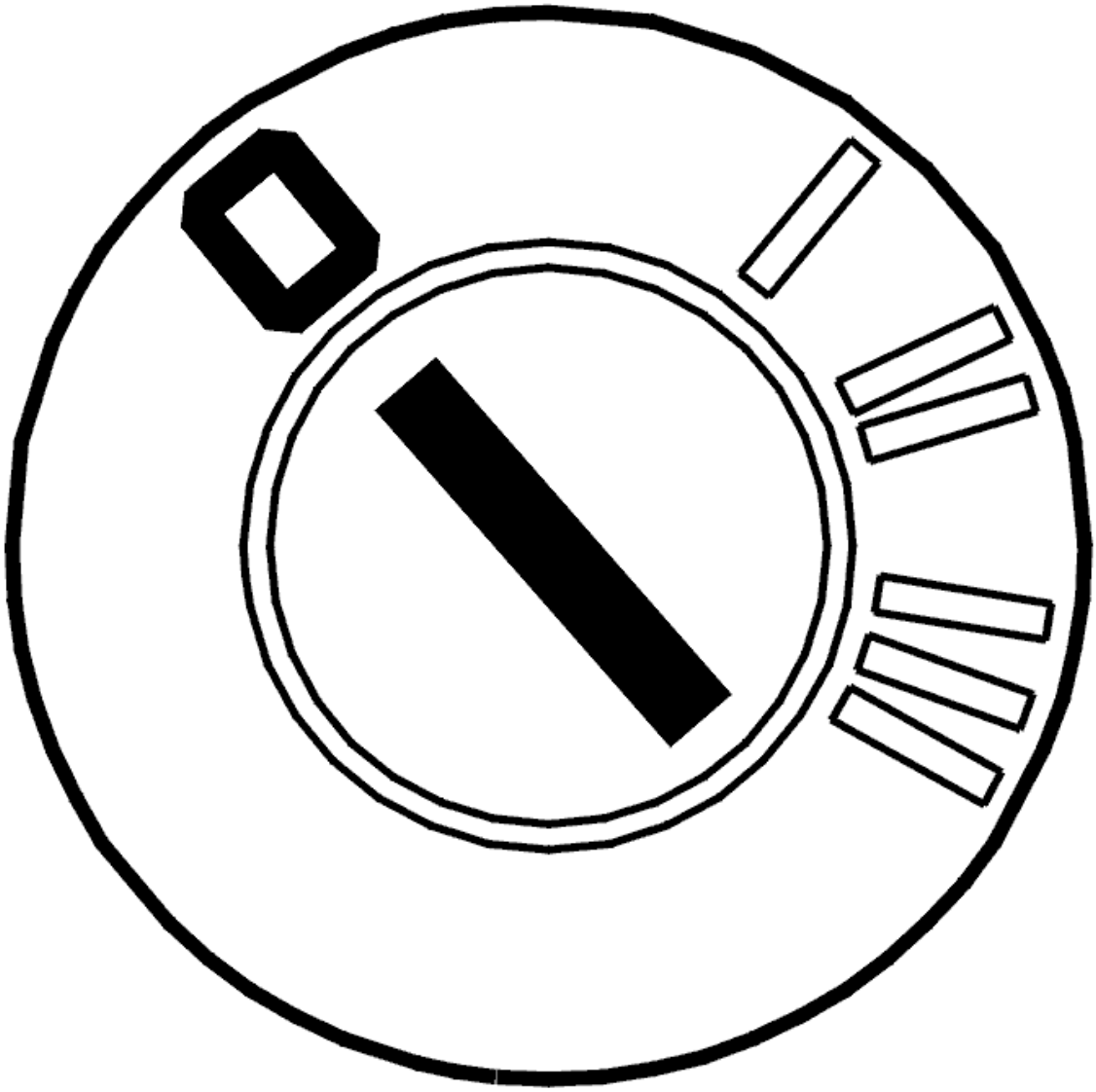


Fig. 177: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Disconnect the 6-pin connector for the gear selector module (GSM)
- Connect a temporary cable between terminals #A53 and #B31 on the breakout box.

CAUTION: Thoroughly check that the cable is connected to the correct terminals. Also check that there is no risk of unintentional short-circuits.

- Ignition on
- Read off the status.

Check that the status indicates "1" when the cable is connected.

Disconnect the cable end that is connected to terminal #A35 and move the cable to terminal #A53.

NOTE: Leave the cable end connected to terminal #B31 in place.

Check that the status changes to "0" when the cable has been transferred to terminal #A53.

If the status shifts to "0" the transmission control module (TCM) is??? OK. Replace the circuit board in the top panel.

If the status shifts to "0" the transmission control module (TCM) is??? faulty. Replace the control module.

Remedy as necessary.

Other information

- To connect the breakout box, see **CONNECTING BREAKOUT BOX, TRANSMISSION CONTROL MODULE (TCM)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)**
- To replace the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To replace the printed circuit board (standard), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, REPLACING**
- To replace the printed circuit board (geartronic), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL GEARTRONIC, REPLACING** .

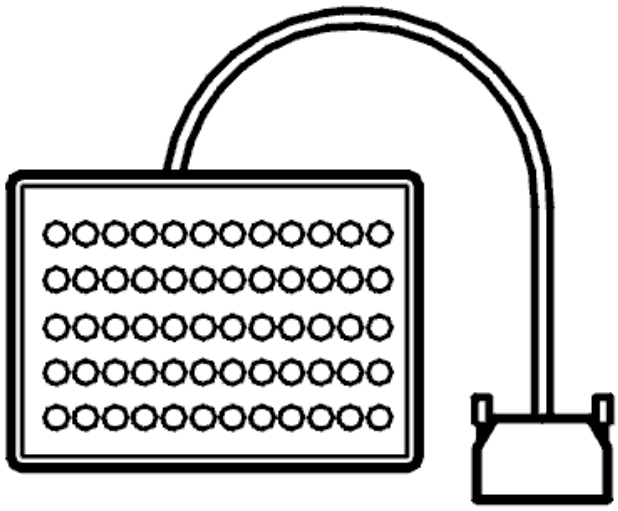


Fig. 178: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

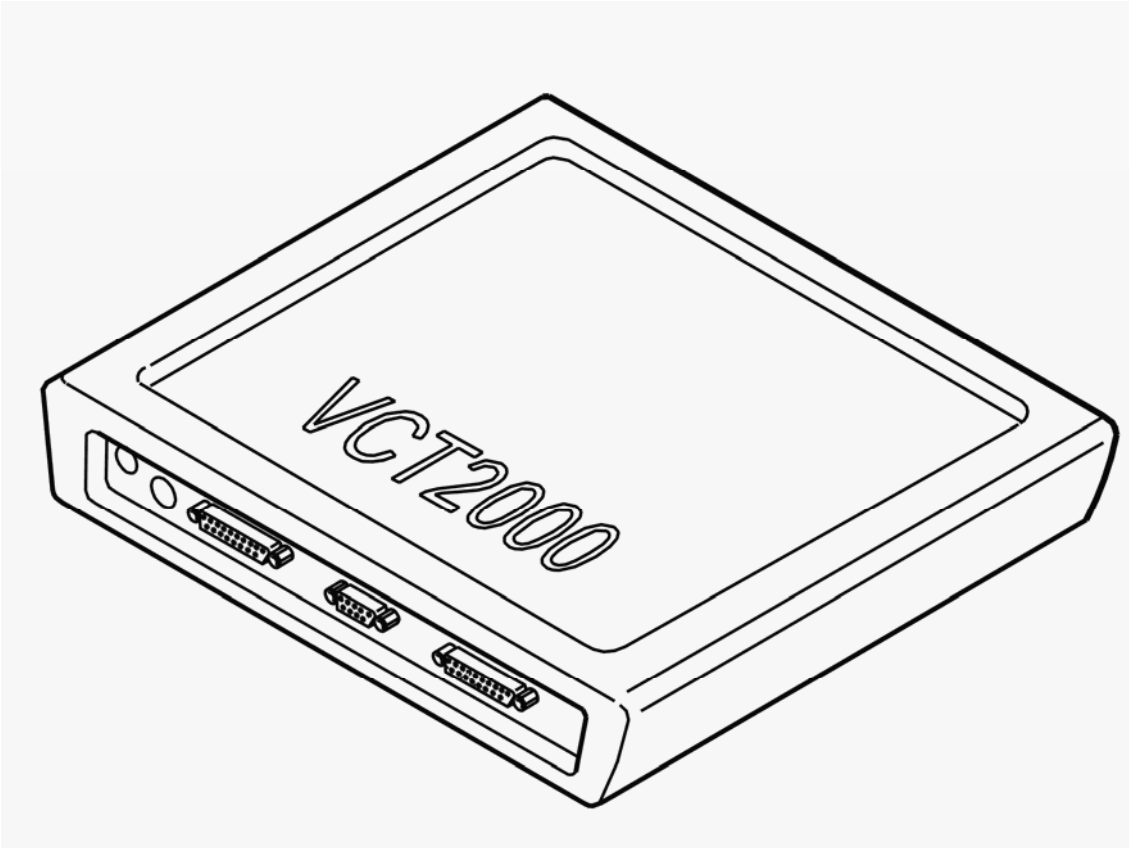


Fig. 179: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

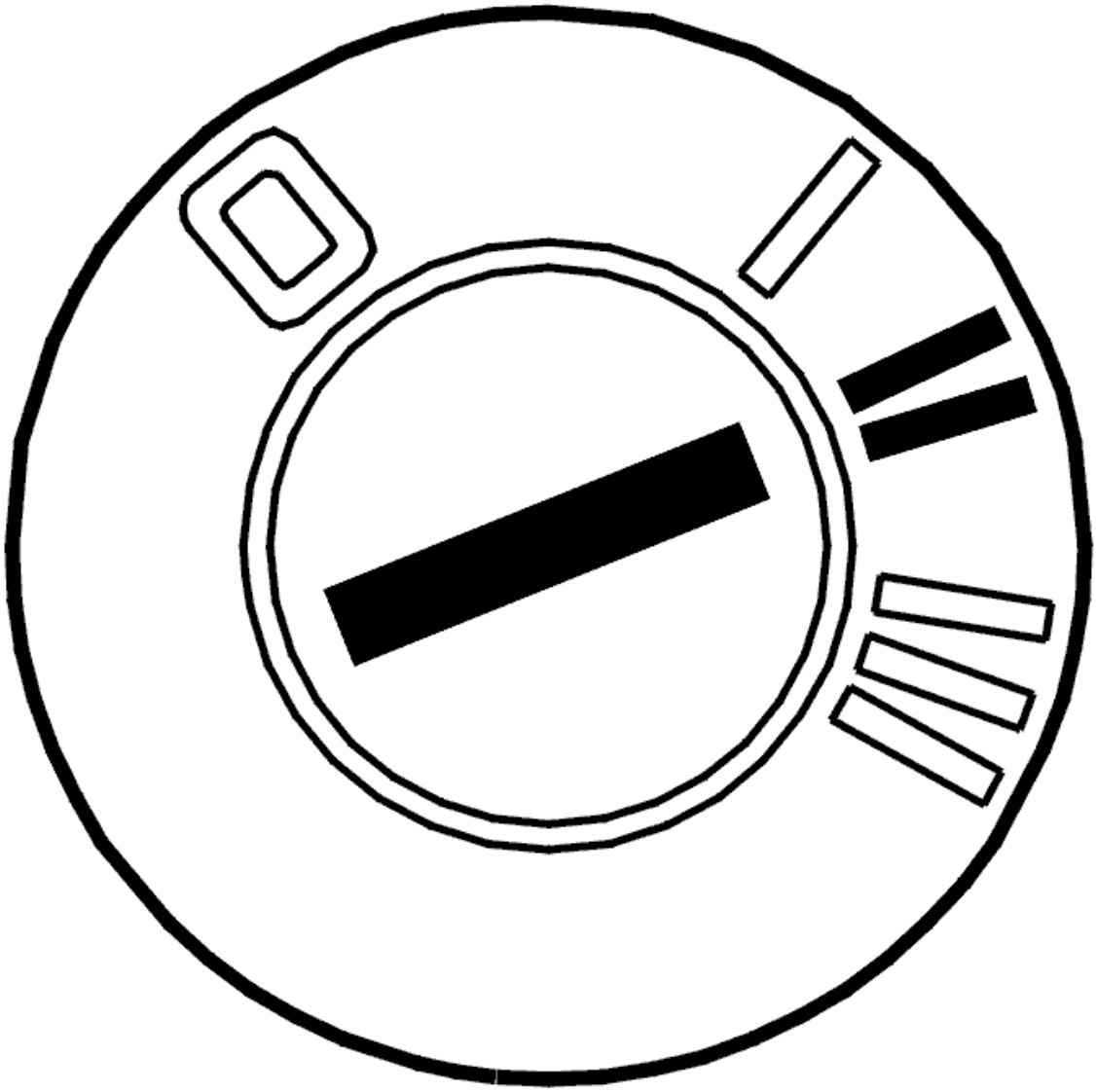


Fig. 180: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Depress the brake pedal. Move the gear shift selector to different positions. Check that the gear position is updated in the display in the combined instrument panel.

Is the gear position updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0095: GEAR SELECTOR LEVER CONTROL MODULE COMMUNICATION. SIGNAL TOO LOW (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE INFORMATION

Condition

If the control unit registers that the signal from the gear selector control unit (GSM) is too low, diagnostic trouble code TCM-0095 is set.

Substitute Value

- None.

Possible Source

- Contact resistance in the connectors.
- Communication wire short-circuited to ground.

Fault symptom[s]

- Malfunction indicator light (MIL) is on.
- General warning lamp on.
- Position indication on the gear selector panel not working.

SIGNAL TOO LOW

CHECKS

CHECKING COMMUNICATION

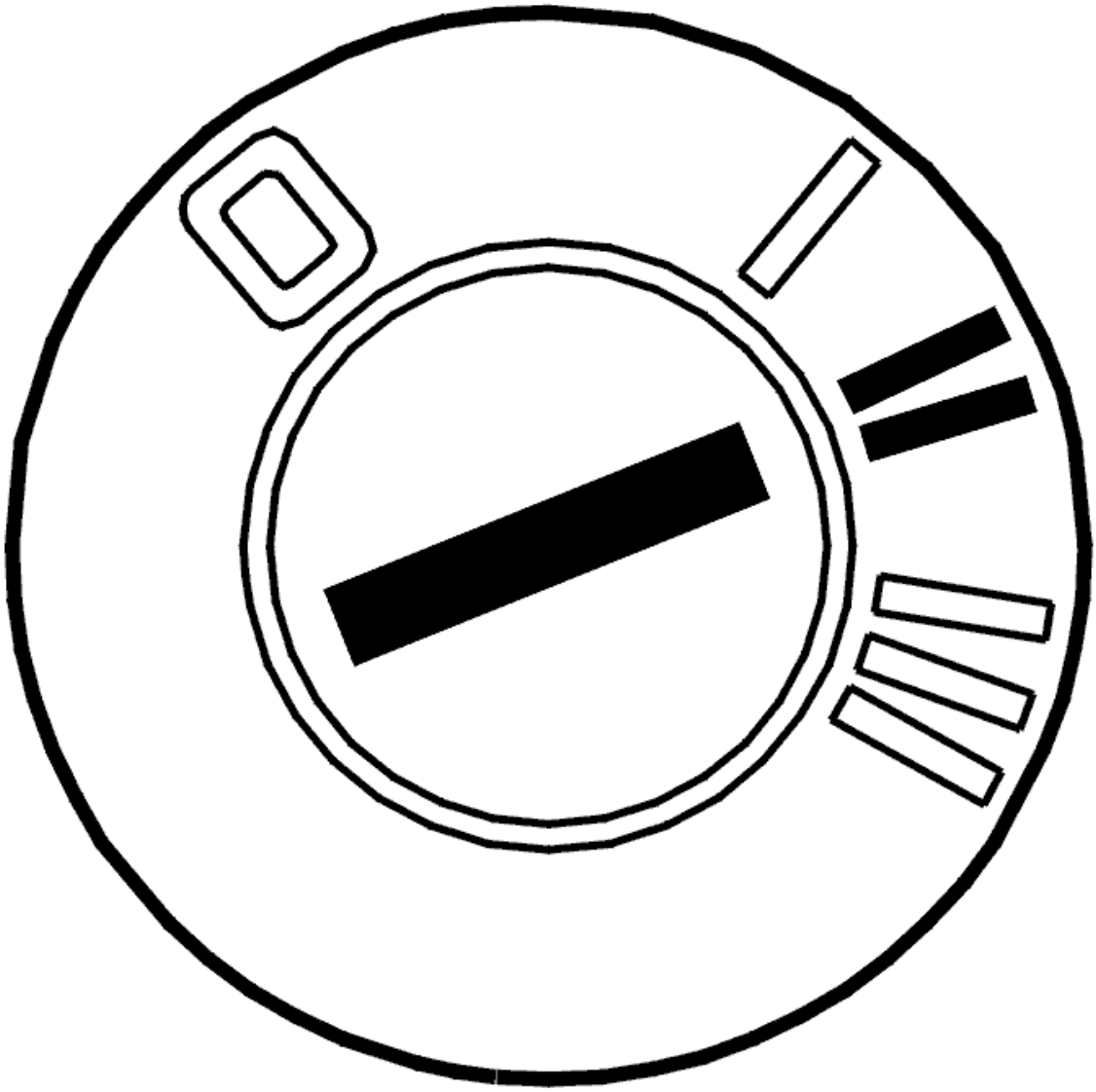


Fig. 181: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Depress the brake pedal and move the gear shift selector to different positions. Check that the gear position is updated in the display in the combined instrument panel and on the panel on the gear selector assembly.

Is the gear position updated?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

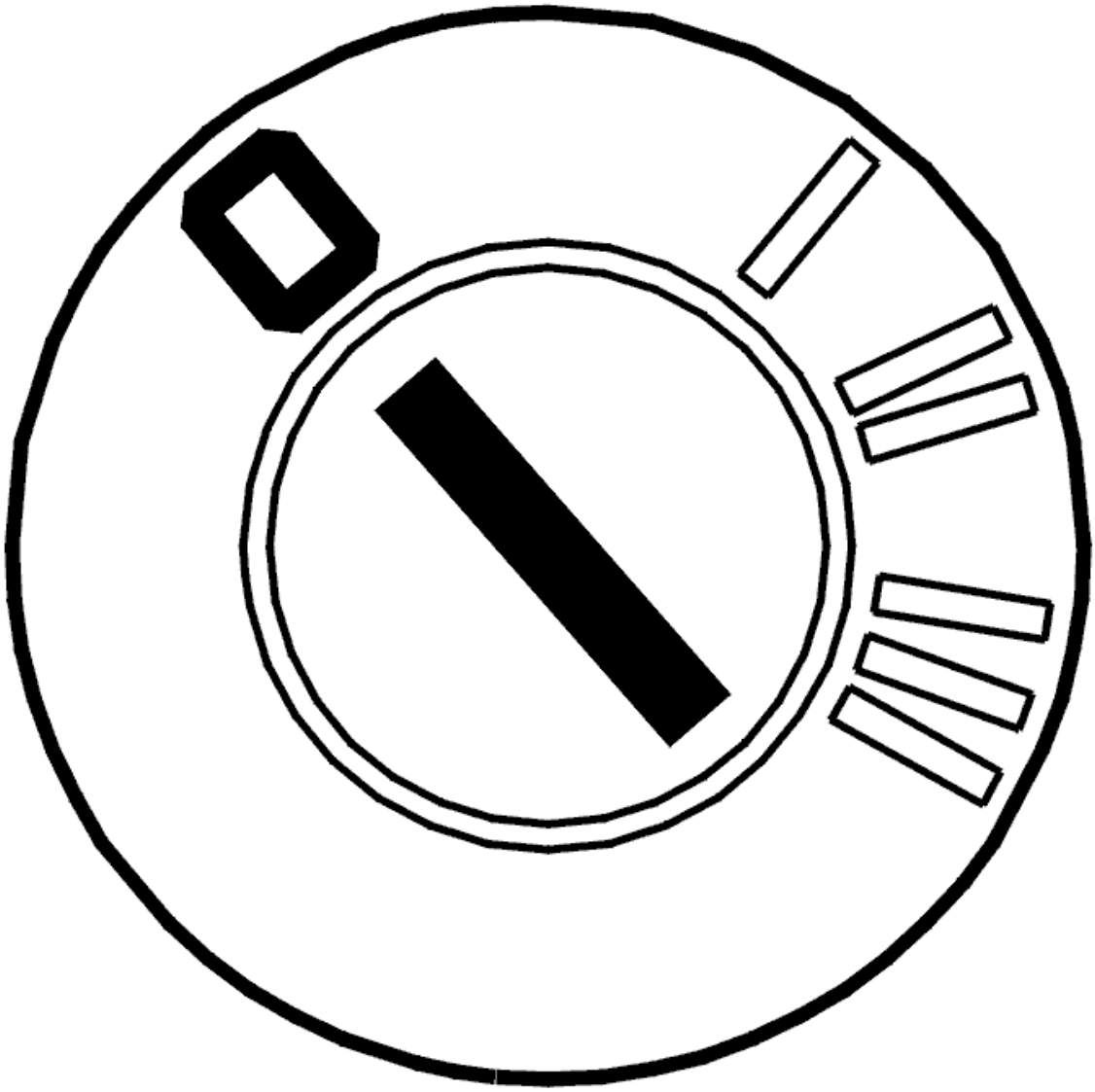


Fig. 182: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the communication cable between the gear selector control module terminal #2 and the transmission control module (TCM) terminal #B31 (#B21). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

  Replace the circuit board in the top panel if no fault is found in the cable.

  Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To replace the circuit board in the top panel (standard), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, REPLACING**
- To replace the circuit board in the top panel (geartronic), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL GEARTRONIC, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

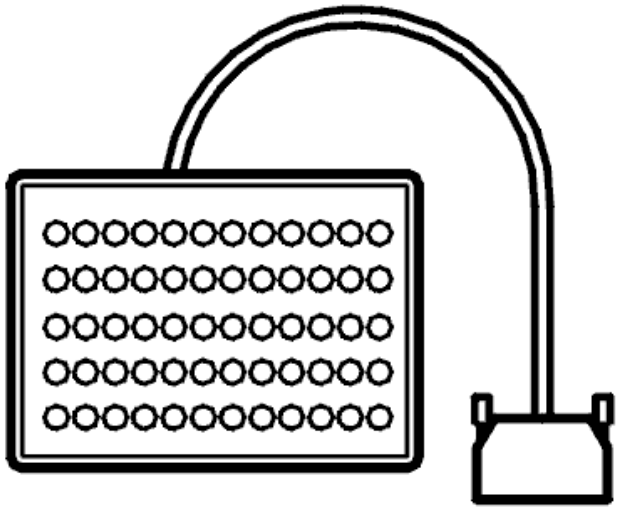


Fig. 183: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

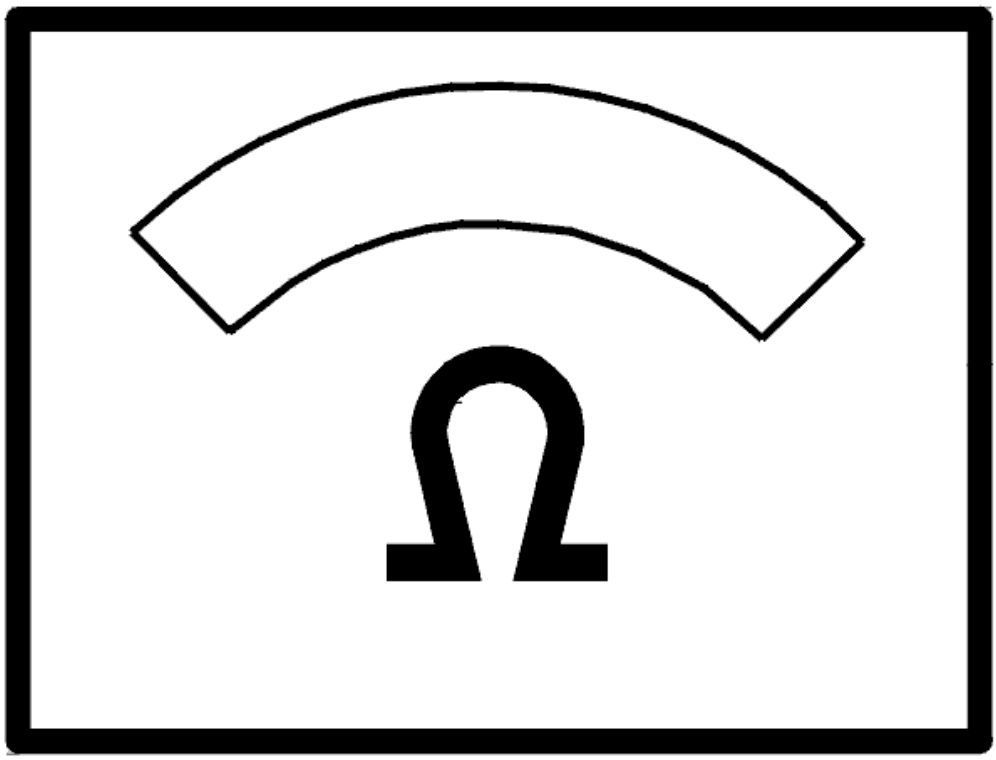


Fig. 184: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

INTERMITTENT FAULT

Check the communication cable between gear selector control module terminal #2 and transmission control

module (TCM) terminal #B31 (#B21). Check for an intermittent short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** . Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- For other values, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

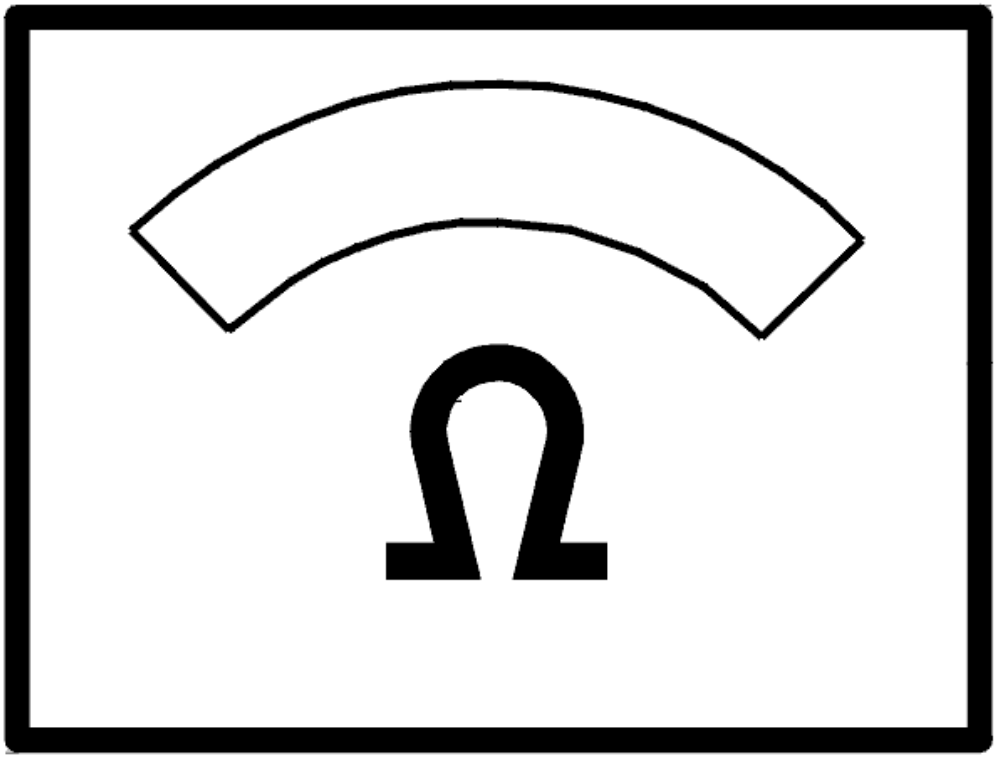


Fig. 185: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

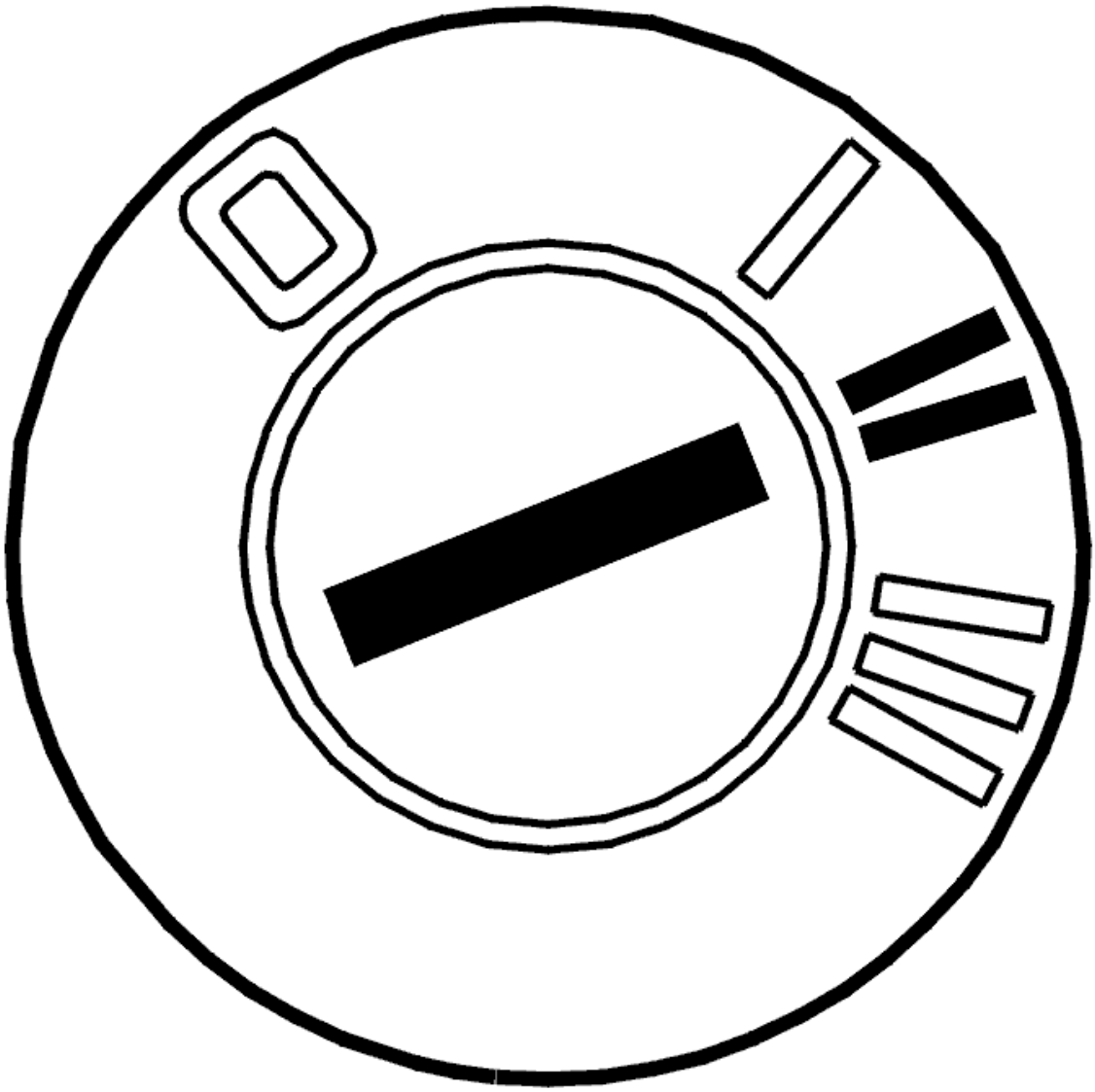


Fig. 186: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Depress the brake pedal and move the gear shift selector to different positions. Check that the gear position is updated in the display in the combined instrument panel and on the panel on the gear selector assembly.

Is the gear position updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0096: QUICKSHIFT SENSOR. FAULTY SIGNAL (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

Diagnostic trouble code (DTC) TCM-0096 is stored if the gear selector module registers that signals from the gear selector position Quickshift do not agree.

Possible Source

- Defective gear selector control module.

Fault symptom[s]

- No shifting.

FAULTY SIGNAL

CHECKS

CHECKING THE POSITION SENSOR

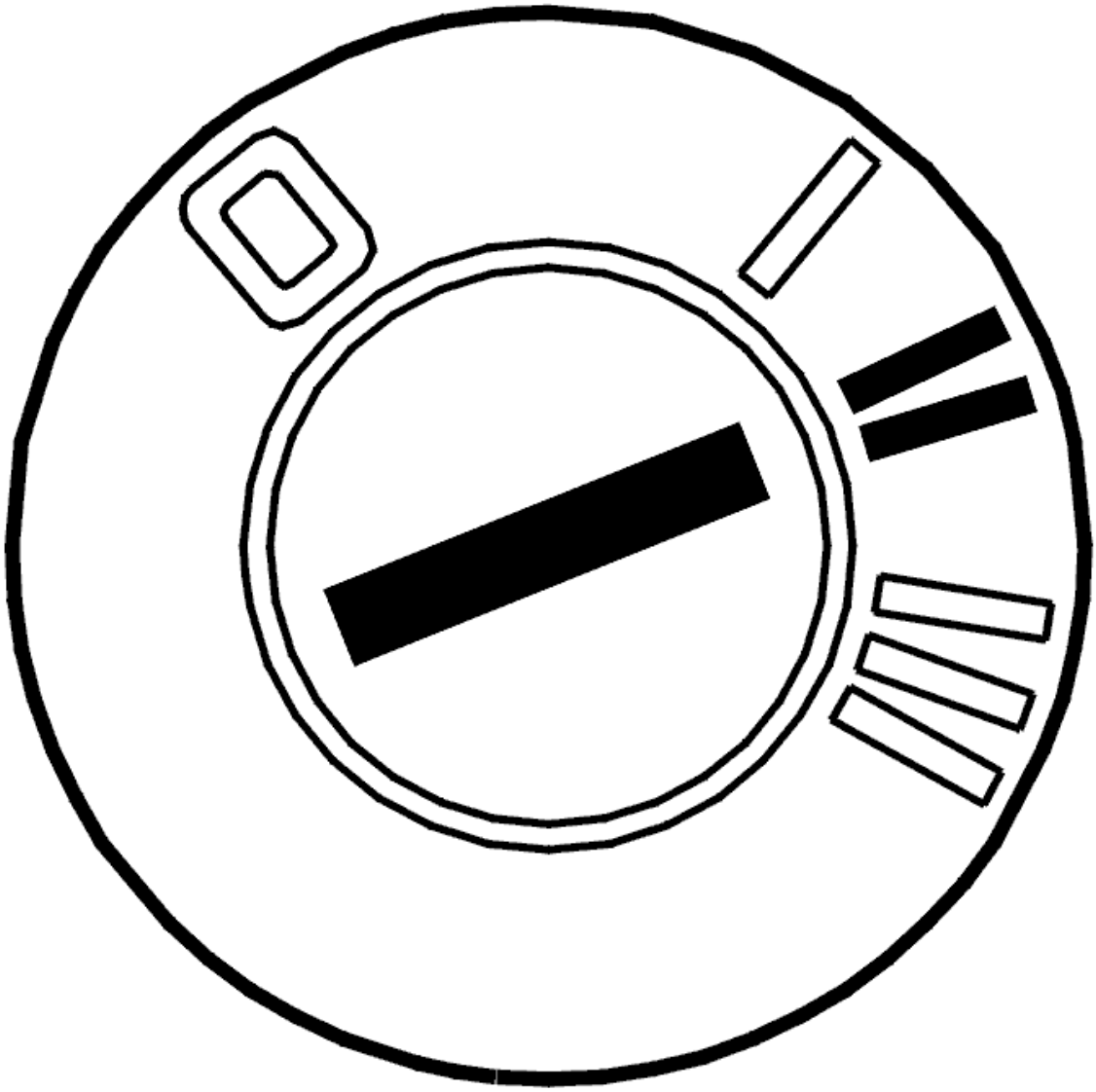


Fig. 187: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Depress the brake pedal. Move the gear selector to "Quickshift" position
- Move the gear selector to + and check that the gear selection is updated in the display on the combined instrument panel. Move the gear selector to -. Check that the gear selection is updated.

Was the function OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

Try a new gear shift selector control module.

Other information

- To access or replace the gear shift selector control module, see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL GEARTRONIC, REPLACING** .
- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

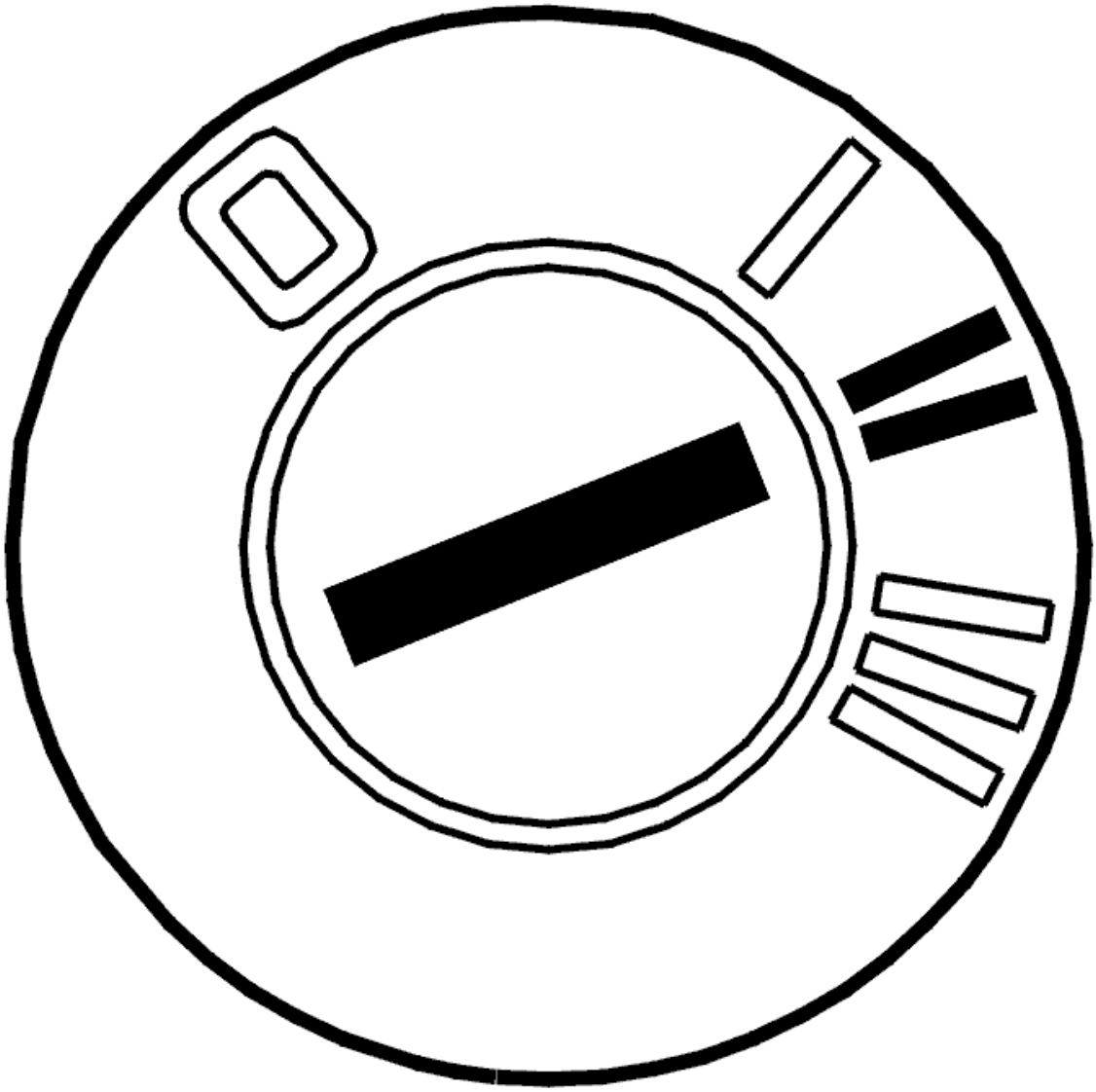


Fig. 188: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Depress the brake pedal. Move the gear selector to "Quickshift" position
- Move the gear selector to + and check that the gear selection is updated in the display on the combined instrument panel. Move the gear selector to -. Check that the gear selection is updated.

Was the function OK?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0096: QUICKSHIFT SENSOR. FAULTY SIGNAL (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULTY SIGNAL

see **FAULTY SIGNAL**

TCM-0097: FAULTY SOFTWARE (AW50/51 AWD; AW55-50/51SN; 2003-2007)

FAULTY SOFTWARE

ORDERING SOFTWARE AND PROGRAMMING THE CONTROL MODULE

The software in the control module requires updating with new software.

Order software according to the table below.

XC90	9438291

Programming can be carried out when the software has been delivered.

Program the control module according to the table below.

XC90	9438291

- **Continue**

  Refer to **TEST DRIVING AND READING OFF DIAGNOSTIC TROUBLE CODES (DTCS)**

TEST DRIVING AND READING OFF DIAGNOSTIC TROUBLE CODES (DTCS)

HINT: To check that the fault is remedied, test drive the car and then read off the diagnostic trouble codes (DTCs).

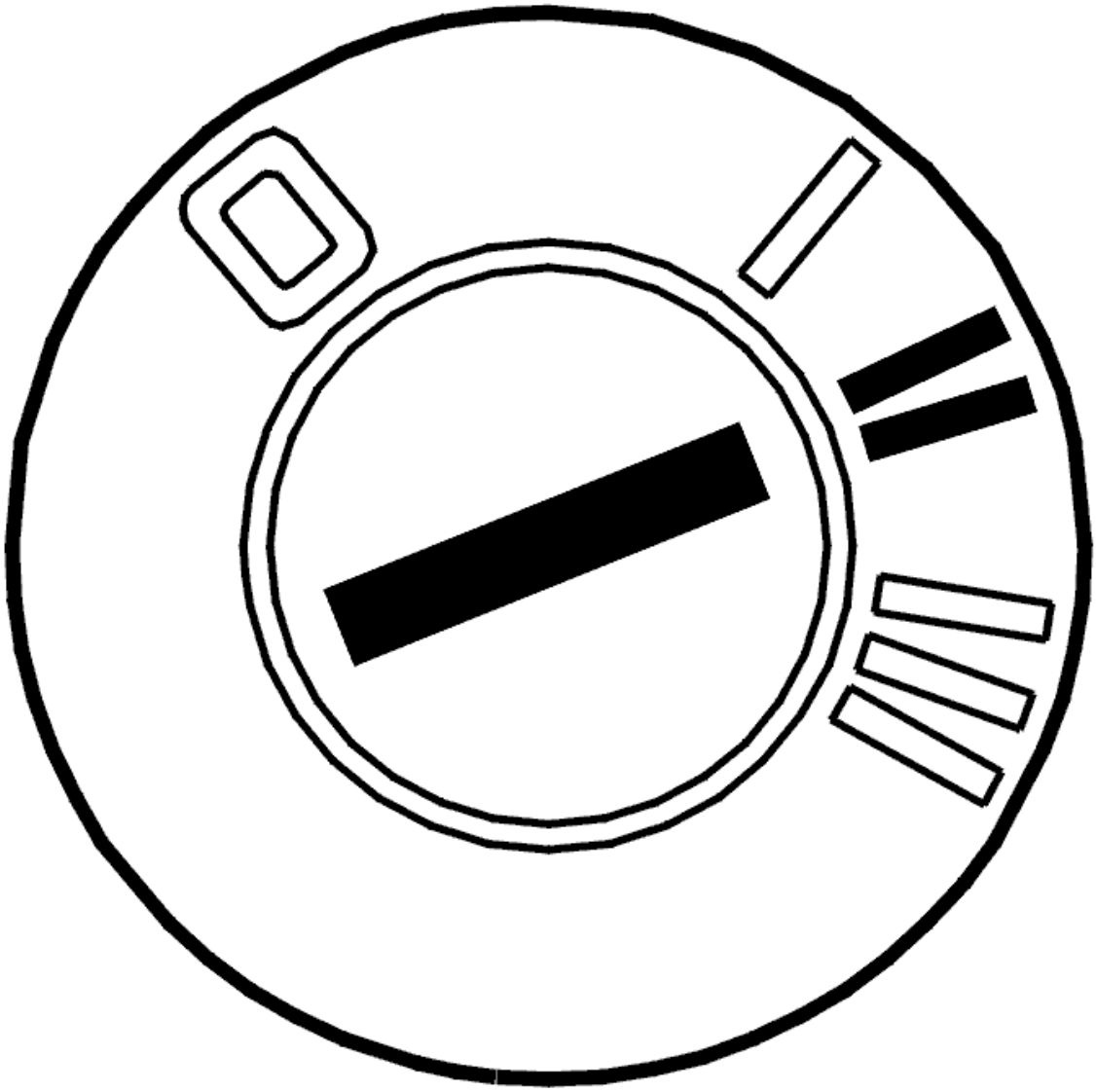


Fig. 189: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

Other information

- For the test driving schedule, see **TEST DRIVE SCHEDULE, DESCRIPTION** .

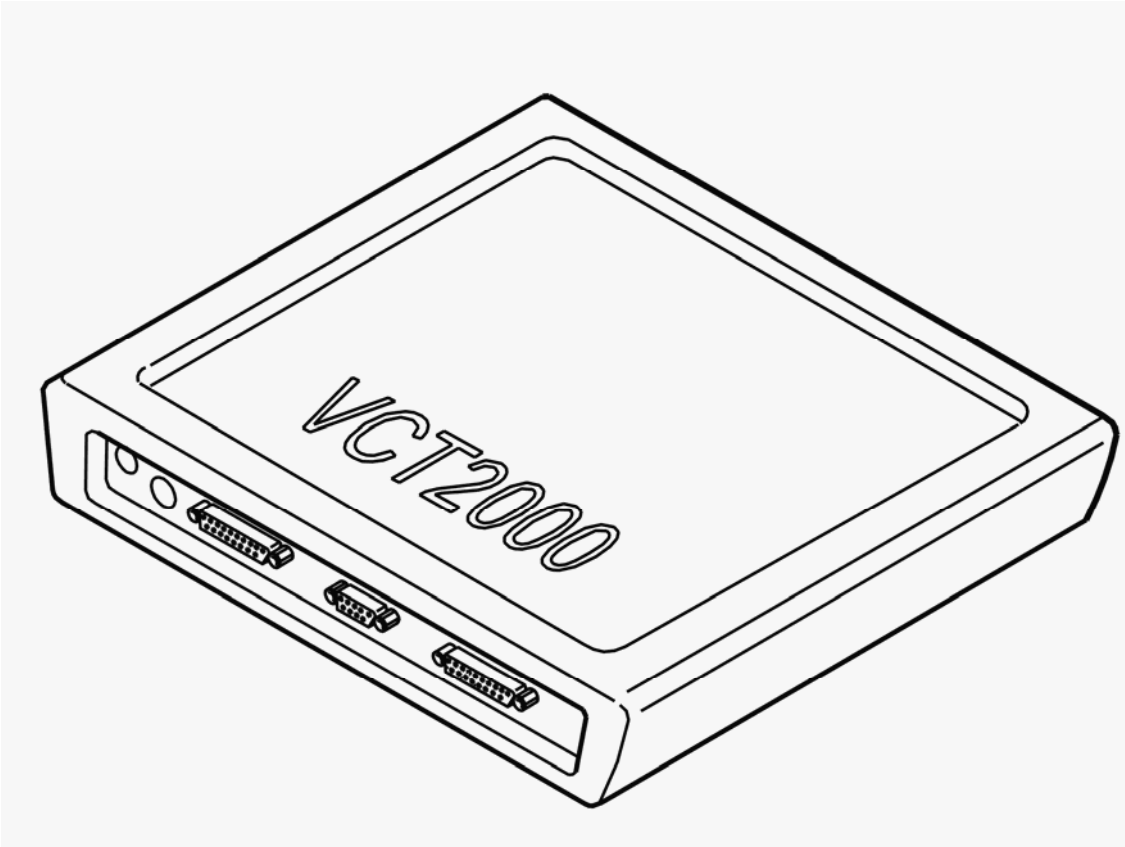


Fig. 190: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

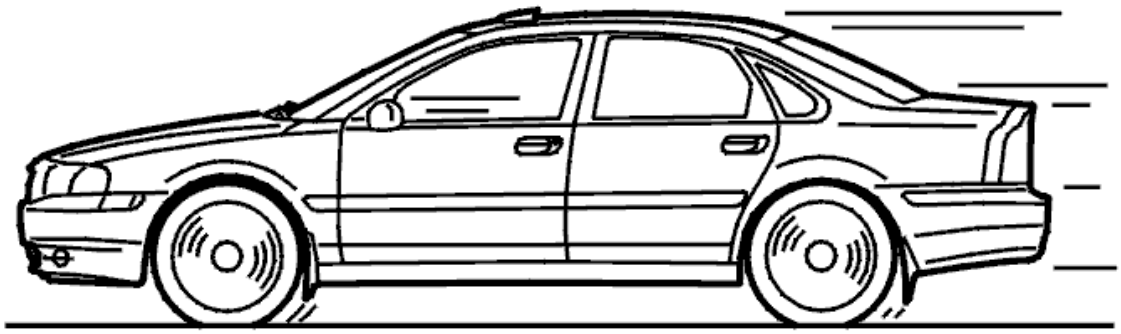


Fig. 191: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Does diagnostic trouble code (DTC) TCM-0097 or TCM-0098 recur?

- **YES**

  Refer to **REPLACING THE TRANSMISSION CONTROL MODULE (TCM)**

- **NO**

  OKAY: Troubleshooting has been completed.

REPLACING THE TRANSMISSION CONTROL MODULE (TCM)

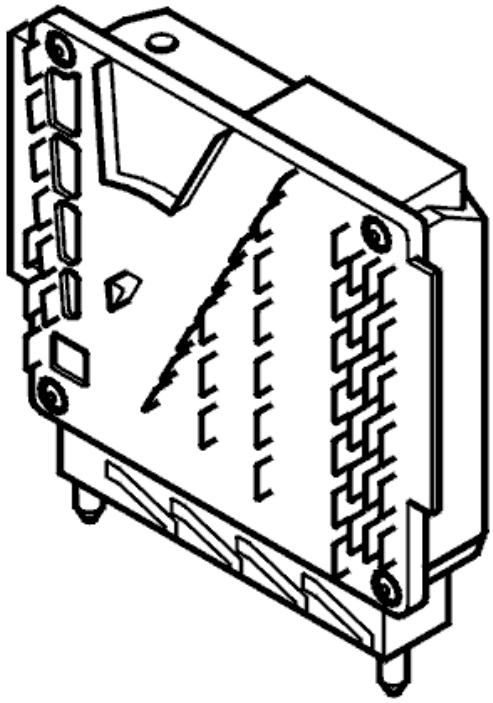


Fig. 192: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Replace the transmission control module (TCM). See **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

TCM-0099: CONTROL MODULE. INTERNAL FAULT (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

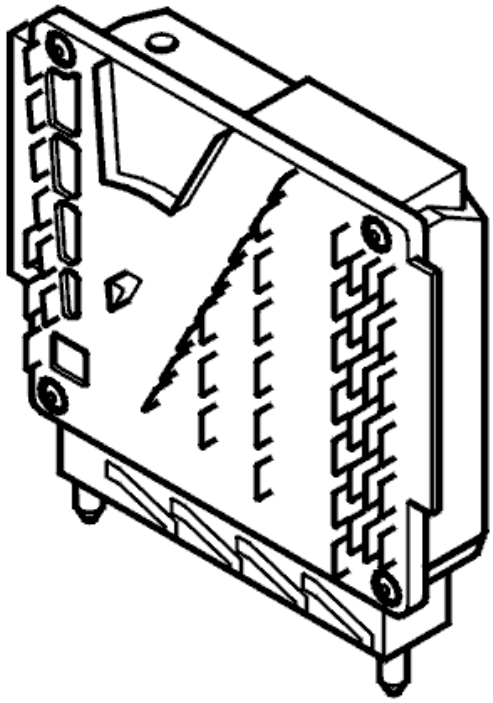


Fig. 193: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Diagnostic trouble code (DTC) TCM-0099 is stored if the transmission control module (TCM) registers that the storage of data to the control module EEPROM memory is not correctly completed.

Substitute Value

- None.

Possible Source

- Faulty software in the control module
- Defective EEPROM memory.

Fault symptom[s]

- None.

INTERNAL FAULT

REPLACING THE CONTROL MODULE AND PROGRAMMING

The control module has registered an internal fault.

CAUTION: A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

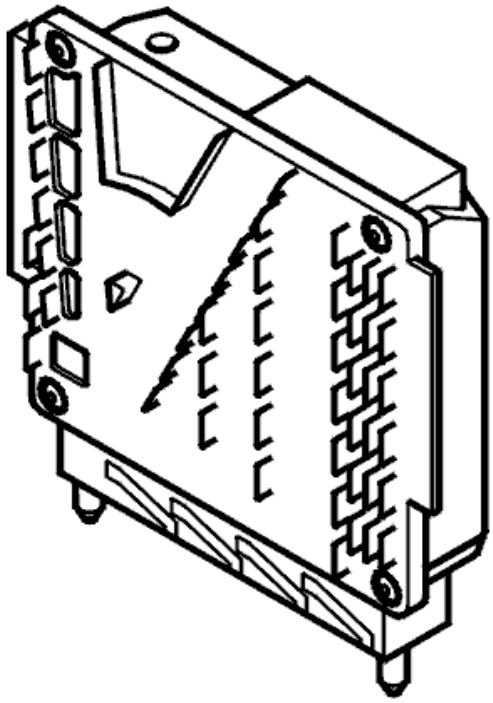


Fig. 194: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

TCM-0099: CONTROL MODULE. INTERNAL FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

INTERNAL FAULT

see **INTERNAL FAULT**

TCM-009A: BATTERY VOLTAGE. SIGNAL TOO LOW (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

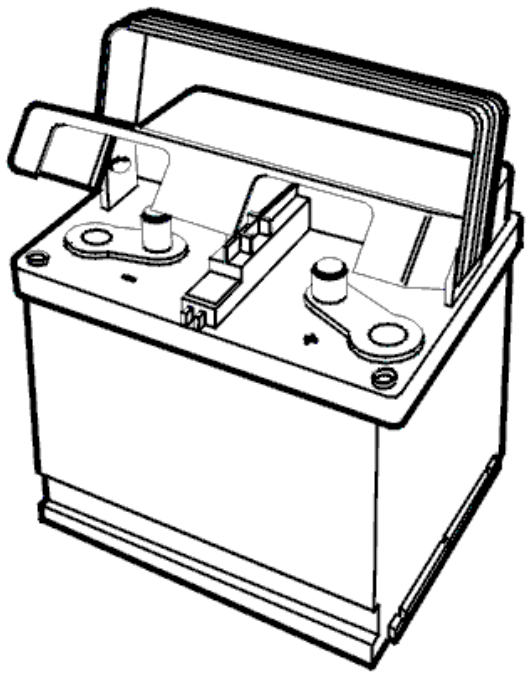


Fig. 195: Identifying Battery
Courtesy of VOLVO CARS CORPORATION

Diagnostic trouble code (DTC) TCM-009A is stored if the control module registers that the power supply is too low in comparison with the supply to the central electronic module (CEM).

Substitute Value

- None.

Possible Source

- Contact resistance or oxidation in the control module or transmission connectors.

Fault symptom[s]

- General orange warning lamp lit.

SIGNAL TOO LOW

CHECKS

CHECKING THE BATTERY VOLTAGE

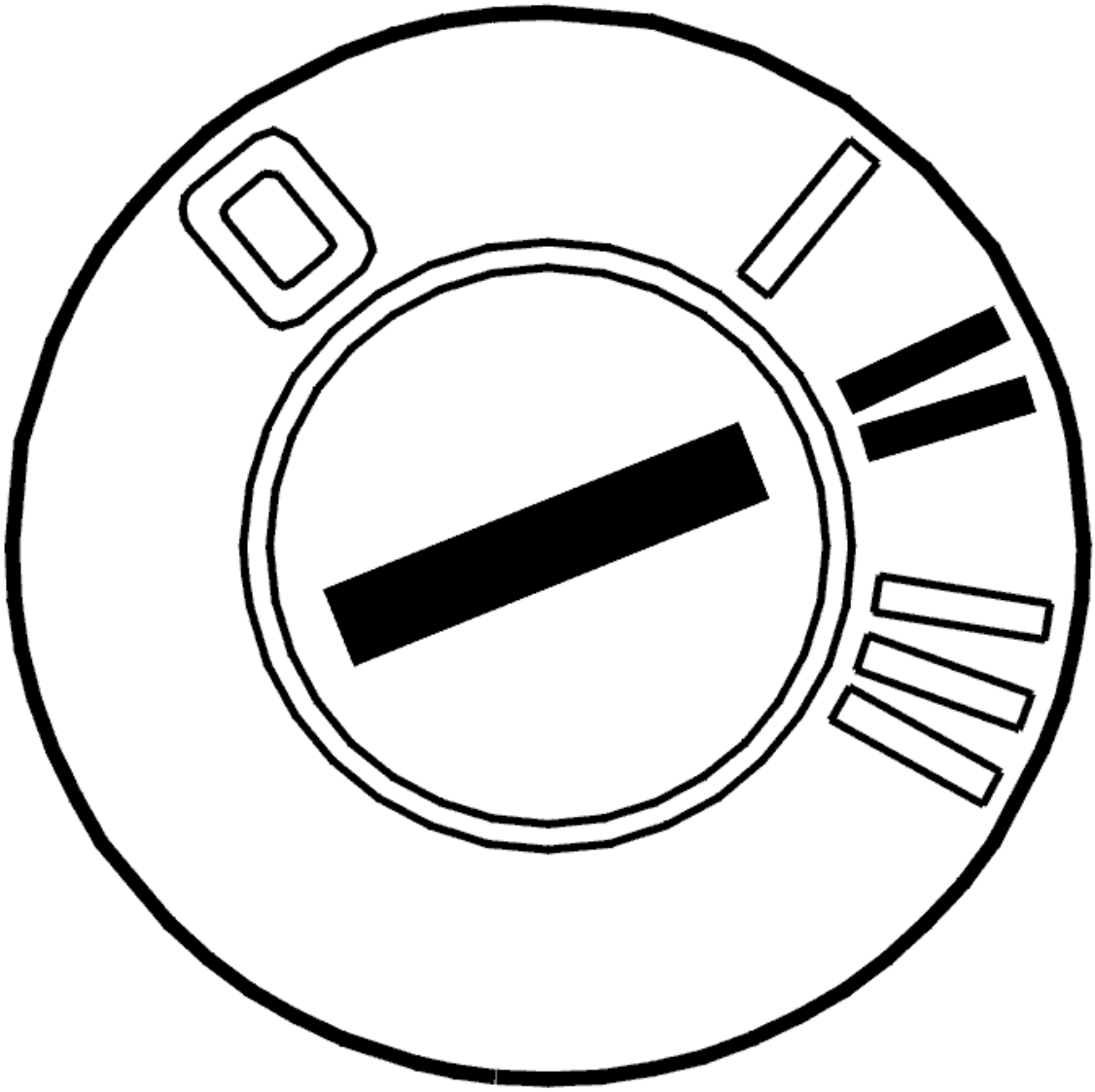


Fig. 196: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

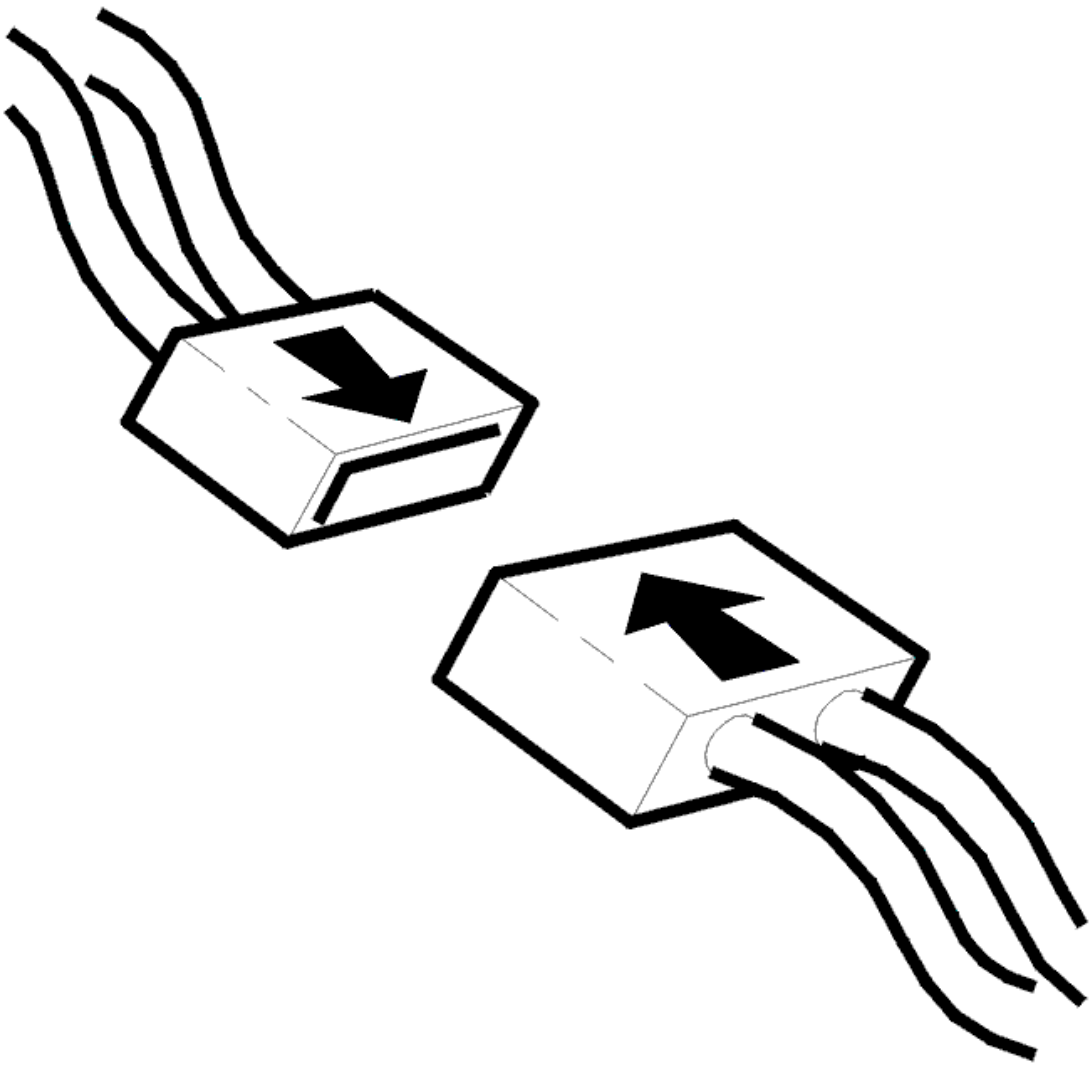


Fig. 197: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the voltage for the transmission control module (TCM) and the central electronic module (CEM).

  The voltage must be battery voltage for both the control modules.

  Select an option:

  1. Voltage too low for both control modules

     Refer to **CHECKING THE BATTERY VOLTAGE**

  2. Voltage too low for the transmission control module (TCM).

Refer to **CHECKING THE POWER SUPPLY**

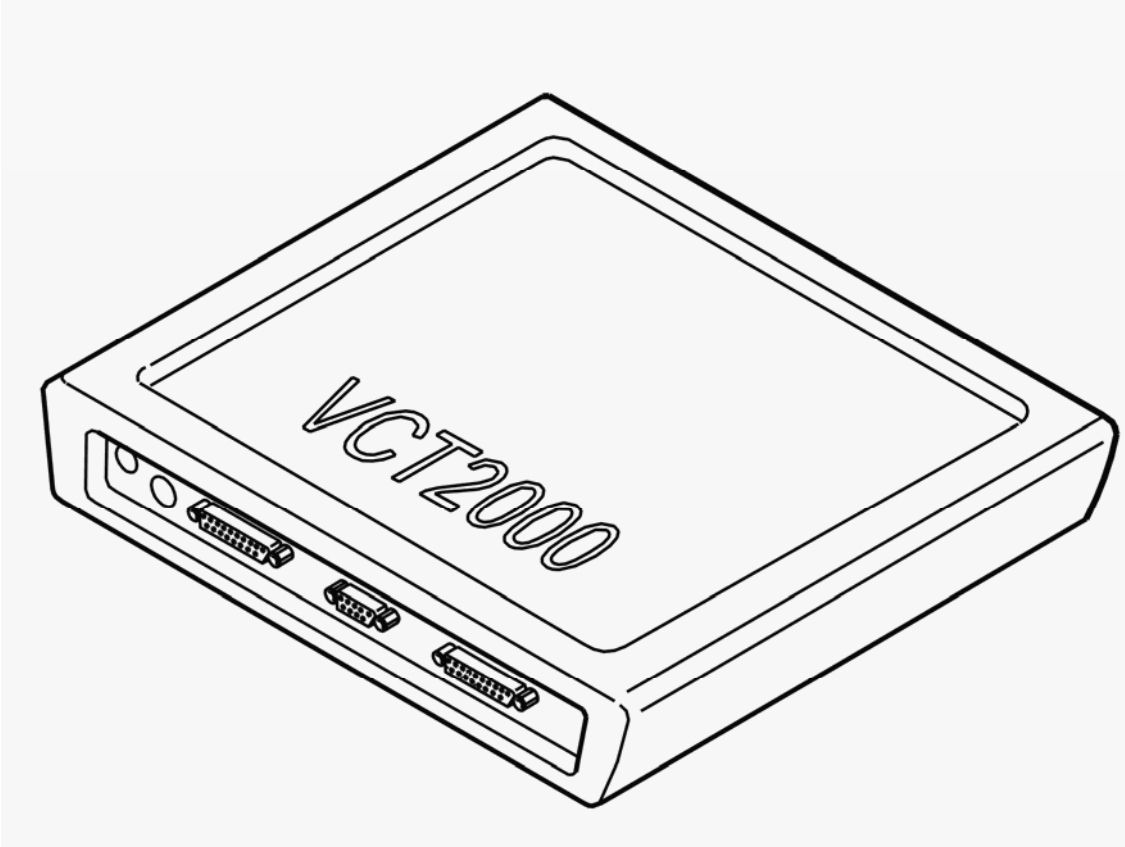


Fig. 198: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING THE BATTERY VOLTAGE

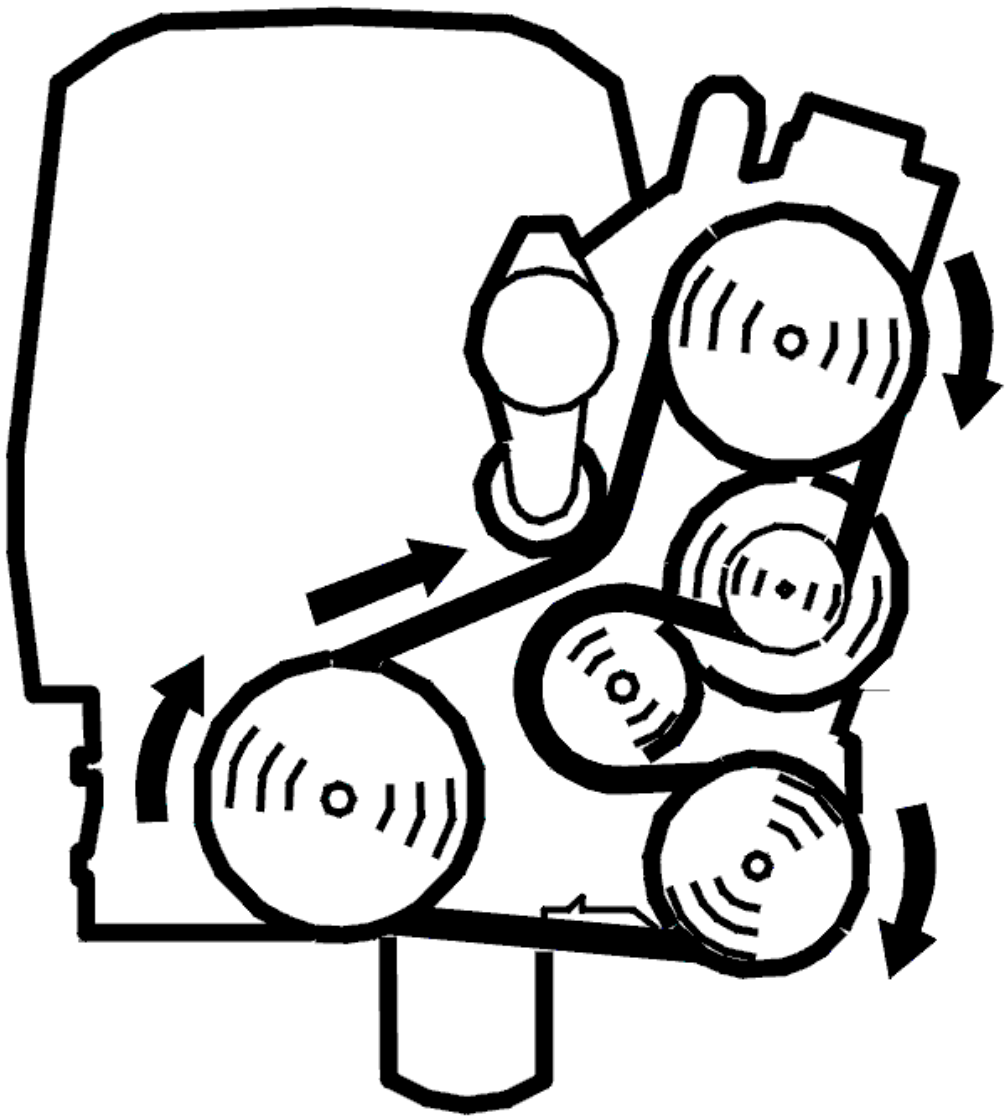


Fig. 199: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine and let it run at idle speed
- Connect a voltmeter between the battery positive and negative terminals.

  The voltmeter must read 12-15 V. If the voltage is lower, check the charging system. Check for low charge voltage.

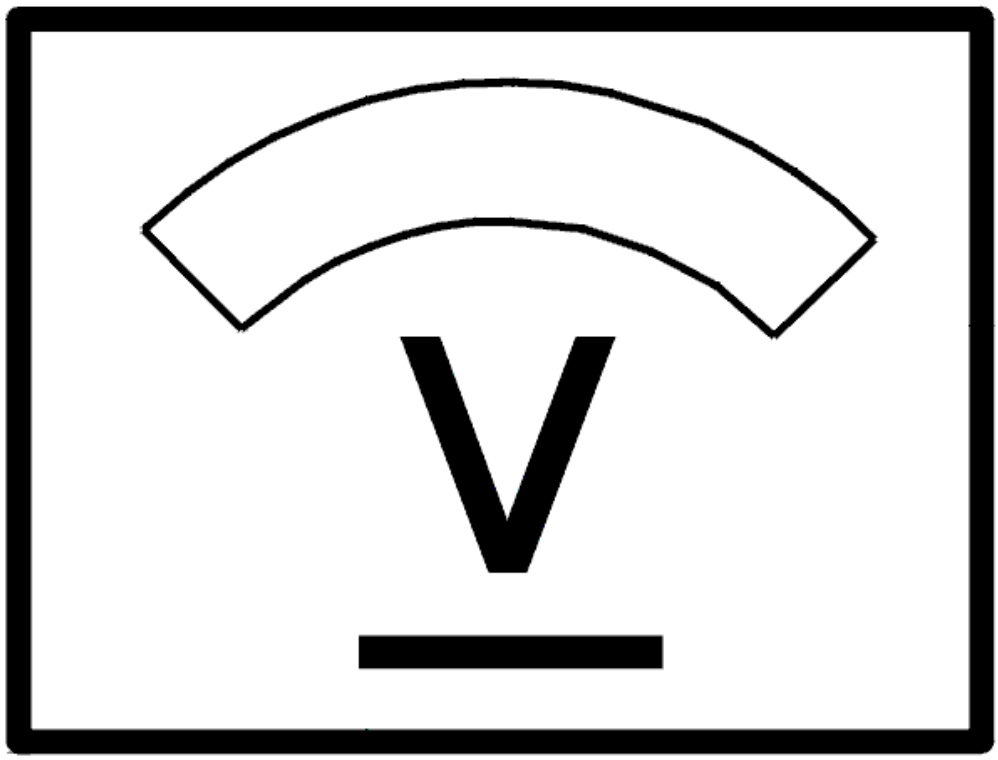


Fig. 200: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE BATTERY TERMINALS**

CHECKING THE BATTERY TERMINALS

Check the battery positive and negative terminals and the front terminals in the engine compartment. Check for

contact resistance and oxidation.

Remedy as necessary.

- **Continue**

  Refer to **INFORMATION**

CHECKING THE POWER SUPPLY

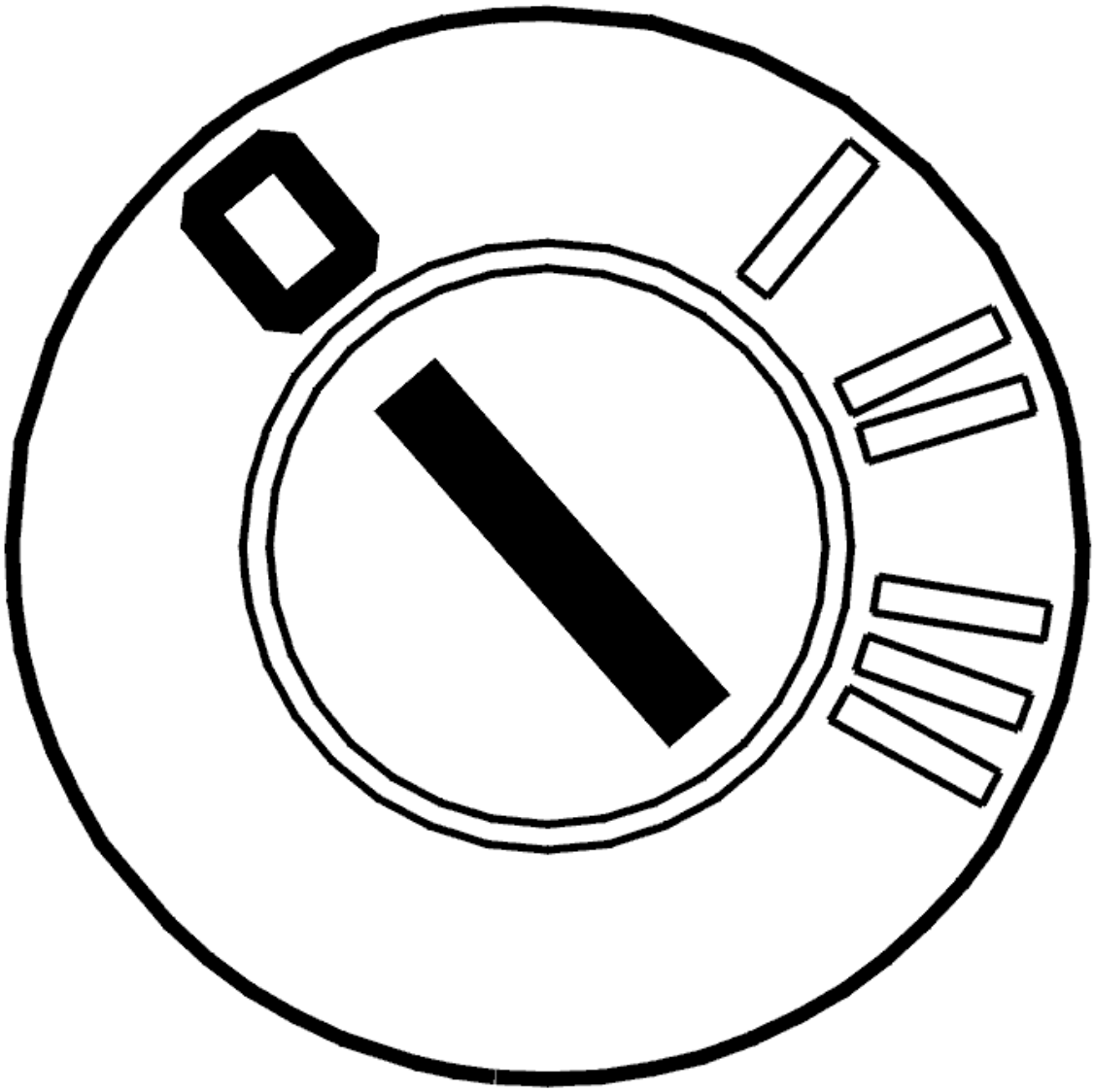


Fig. 201: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the control module connector. Check for contact resistance and oxidation.

Check the power supply cable. Check for an intermittent open-circuit.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

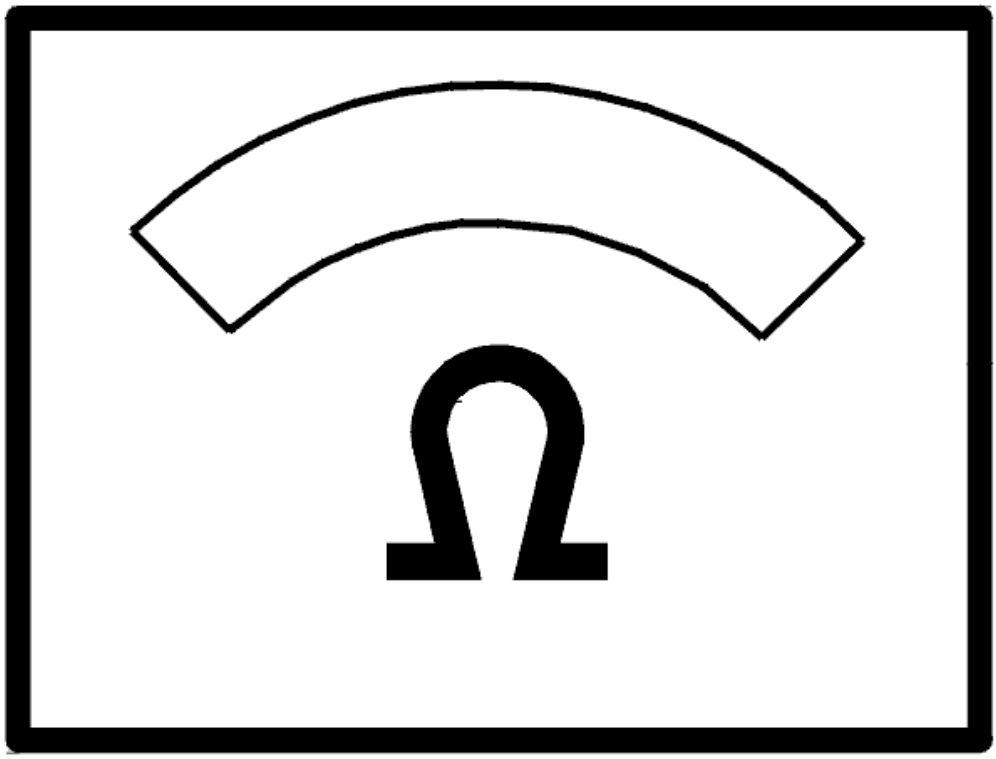


Fig. 202: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

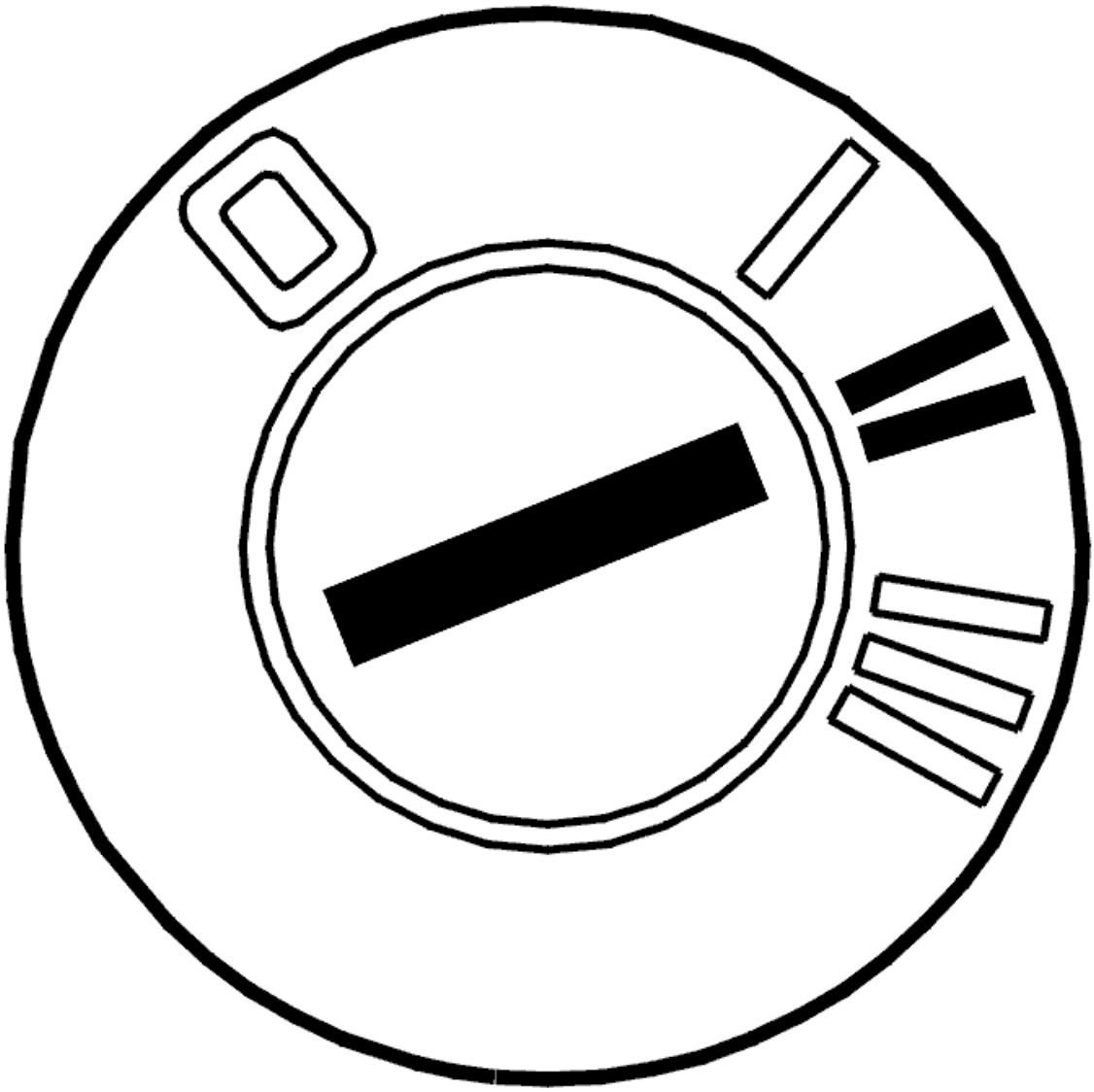


Fig. 203: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- The breakout box connected
- Ignition on
- Read off the voltage
- Connect a voltmeter between terminals #35 (#A35) and #53 (#A53) on the breakout box. The voltage

must be normal system voltage.

Compare the power supplies with each other.

The difference between the read off voltage and the voltmeter voltage must not exceed 1.5 V. If the difference is greater, replace the control module.

Other information

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- For information about signals, see **SIGNAL SPECIFICATION**
- To replace the transmission control module (TCM), see **SIGNAL SPECIFICATION** .

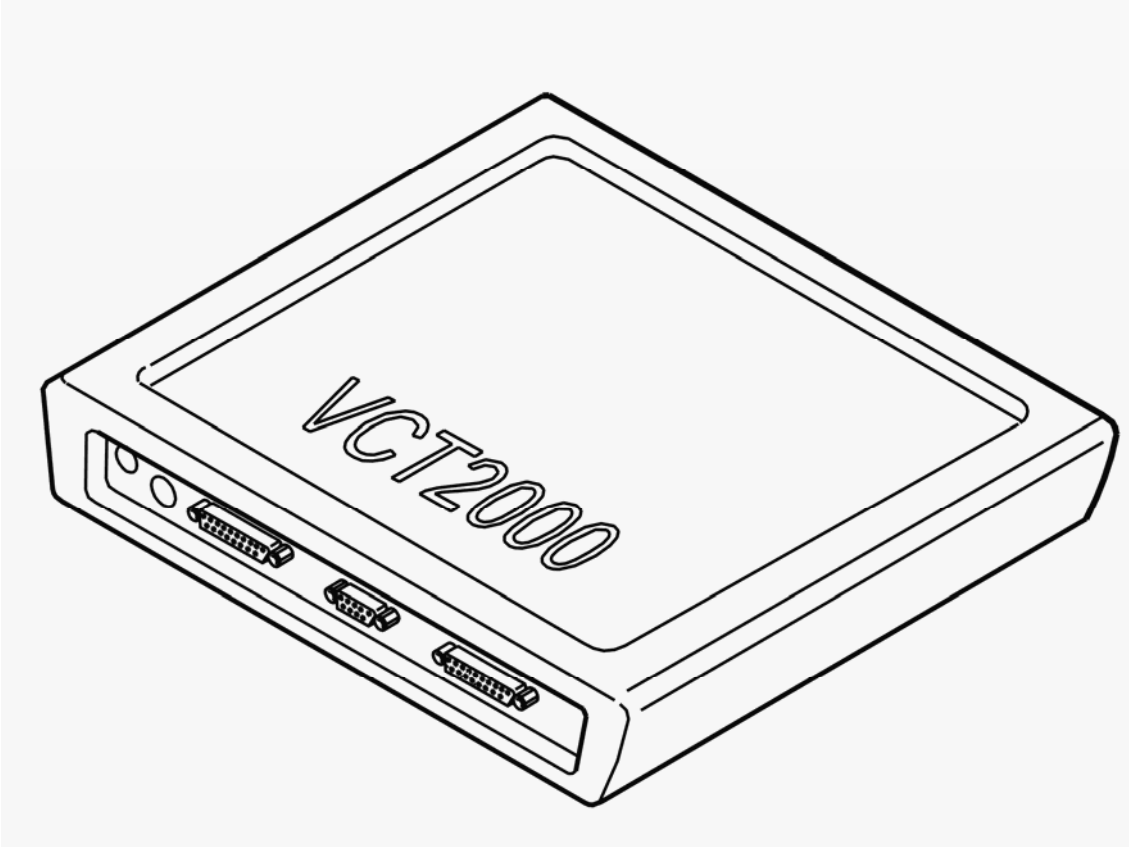


Fig. 204: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the difference greater than 1.5 V?

- **YES**

  Refer to **VERIFICATION**

- **NO**

Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should be diagnosed and remedied. Since this is not the case the fault-tracing process has failed.

Complete the fault-tracing for those fault or try again.

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

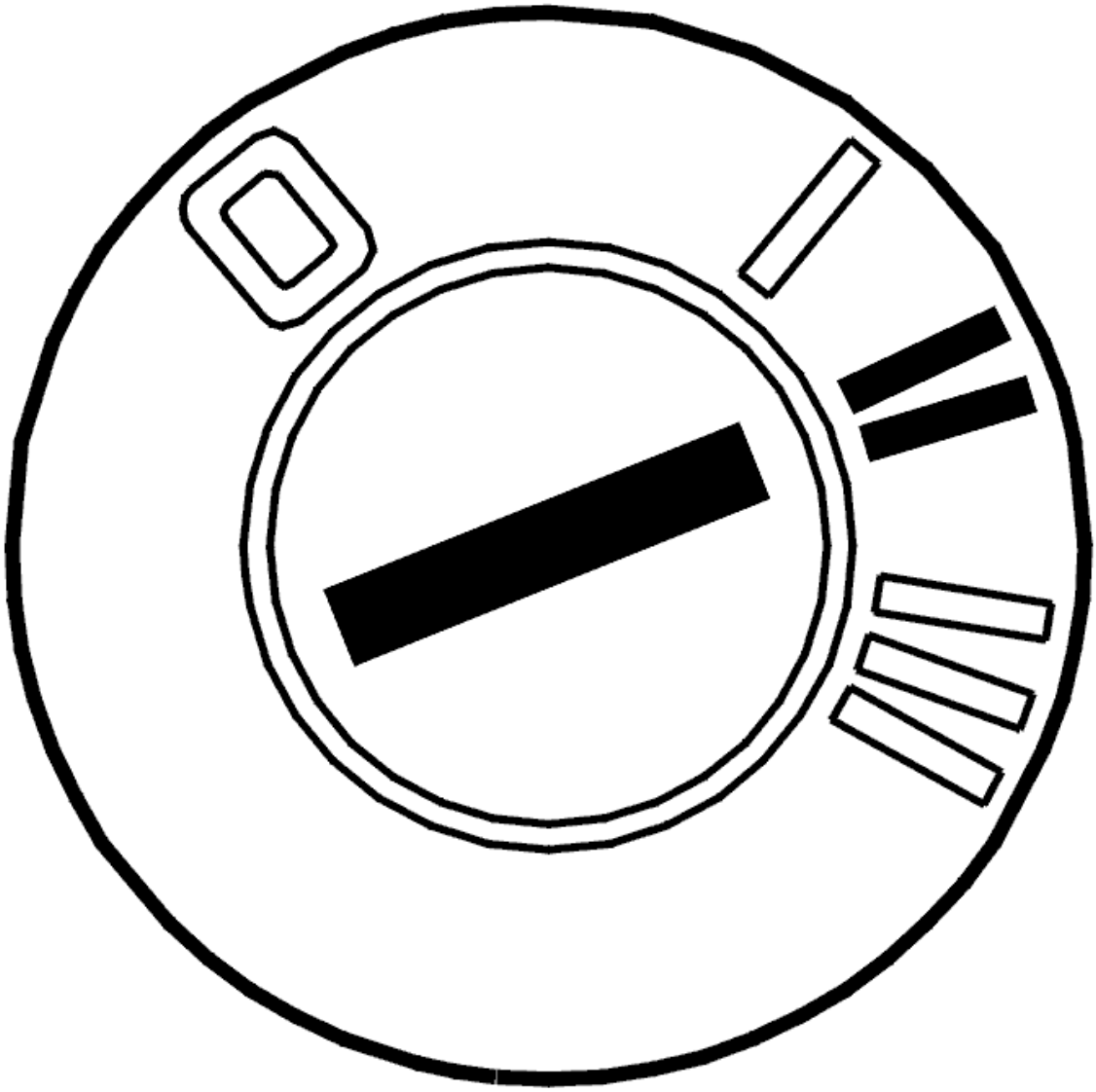


Fig. 205: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the voltage for the transmission control module (TCM) and the central electronic module (CEM).

  The voltage must be battery voltage for both the control modules.

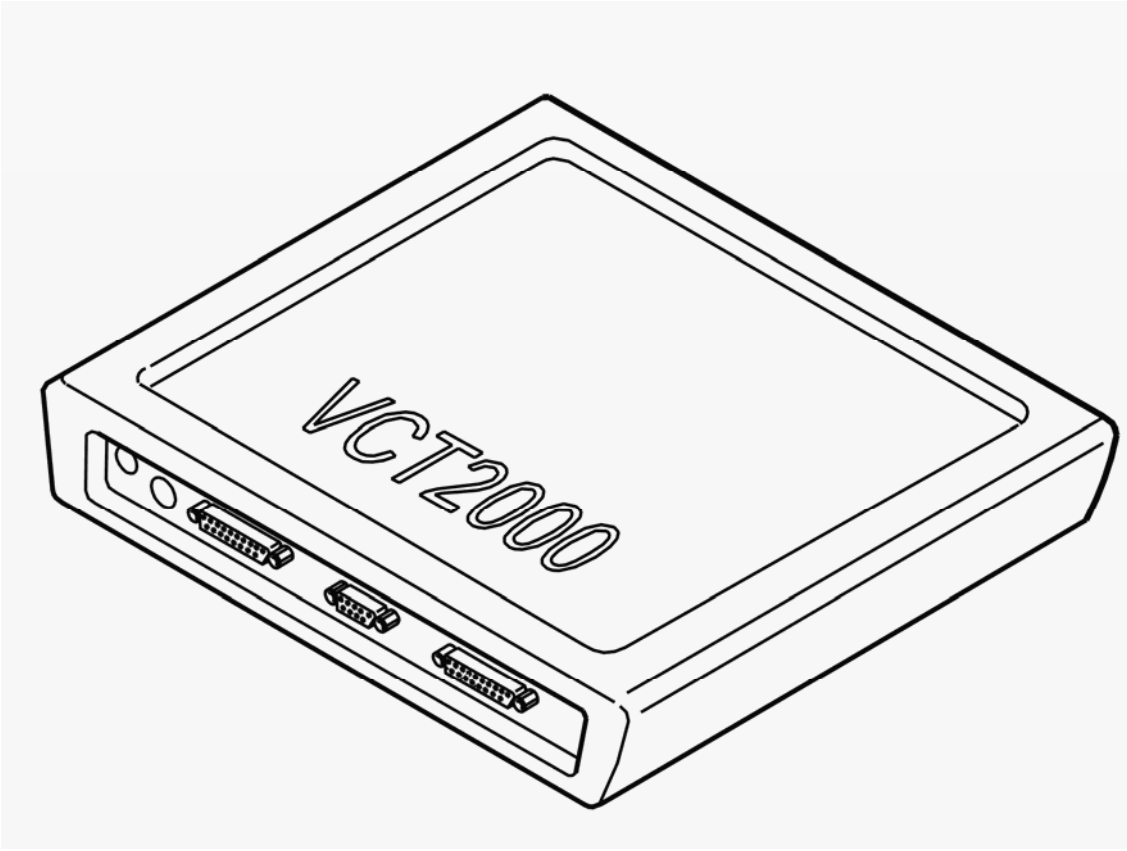


Fig. 206: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the voltage OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-009A: BATTERY VOLTAGE. SIGNAL TOO LOW (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL TOO LOW

CHECKS

CHECKING THE BATTERY VOLTAGE

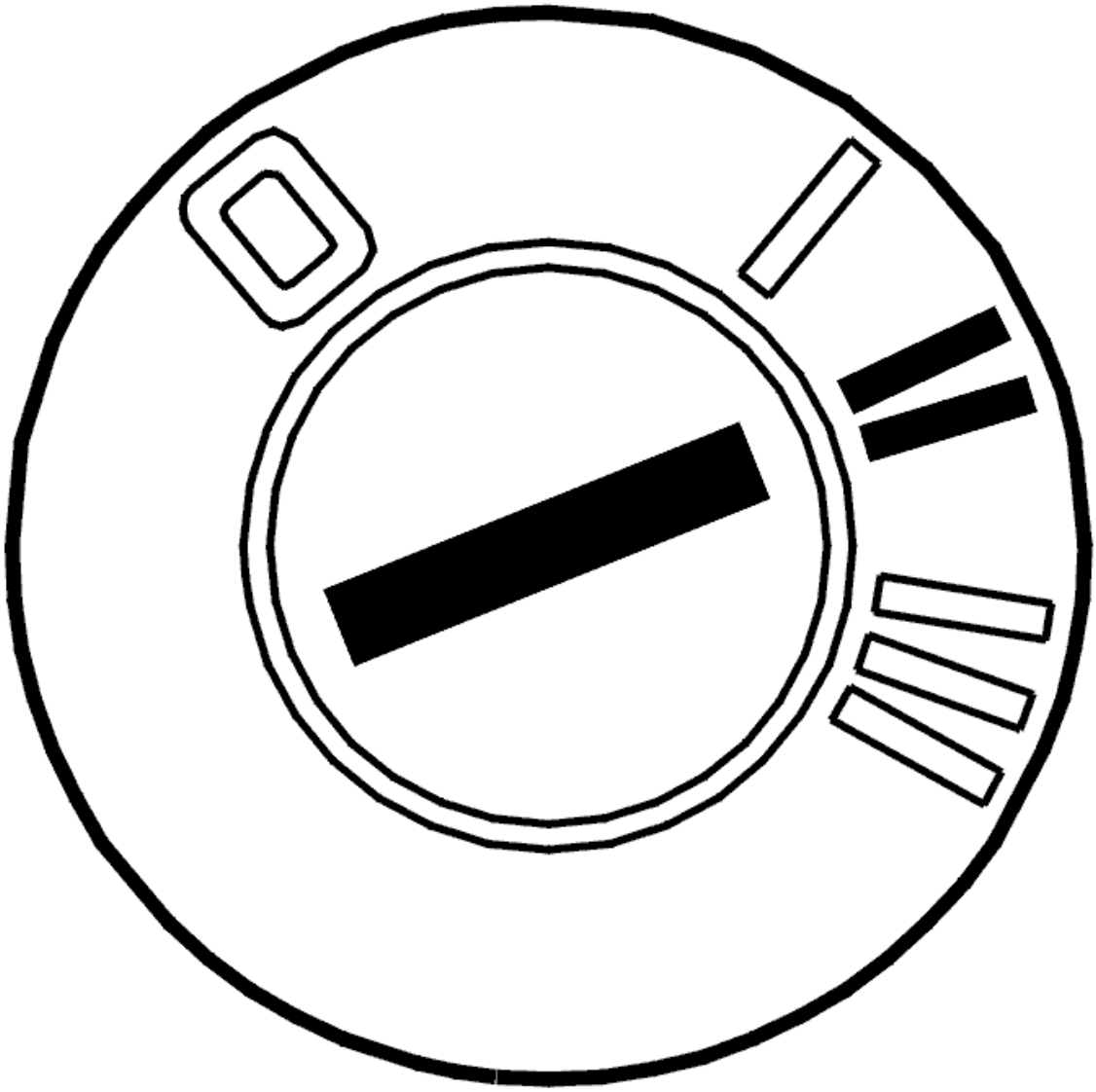


Fig. 207: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

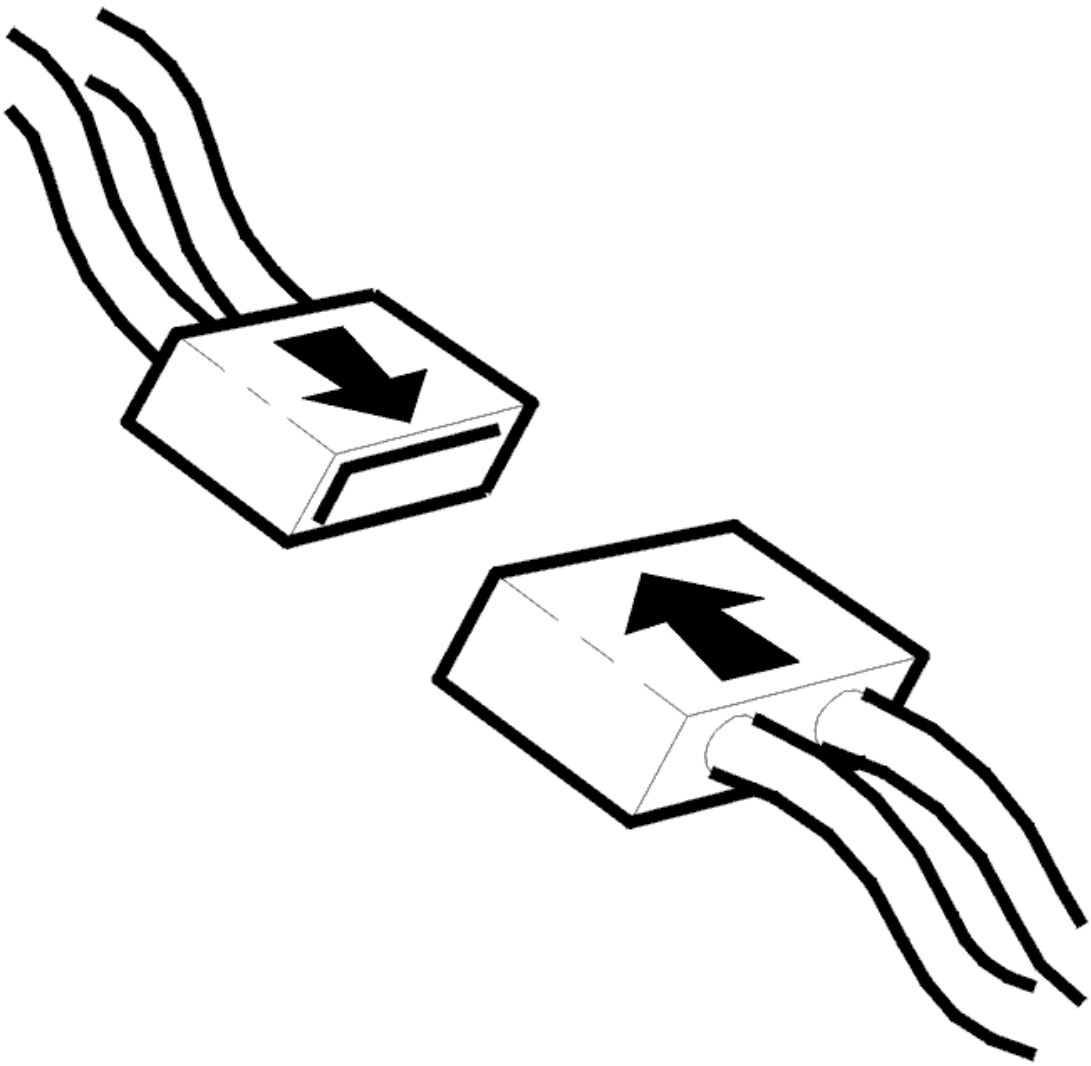


Fig. 208: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the voltage for the transmission control module (TCM) and the central electronic module (CEM).

  The voltage must be battery voltage for both the control modules.

  Other information:

  - To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

  Select an option:

1. Voltage too low for both control modules

   Refer to **CHECKING THE BATTERY VOLTAGE**

2. Voltage too low for the transmission control module (TCM).

   Refer to **CHECKING THE POWER SUPPLY**

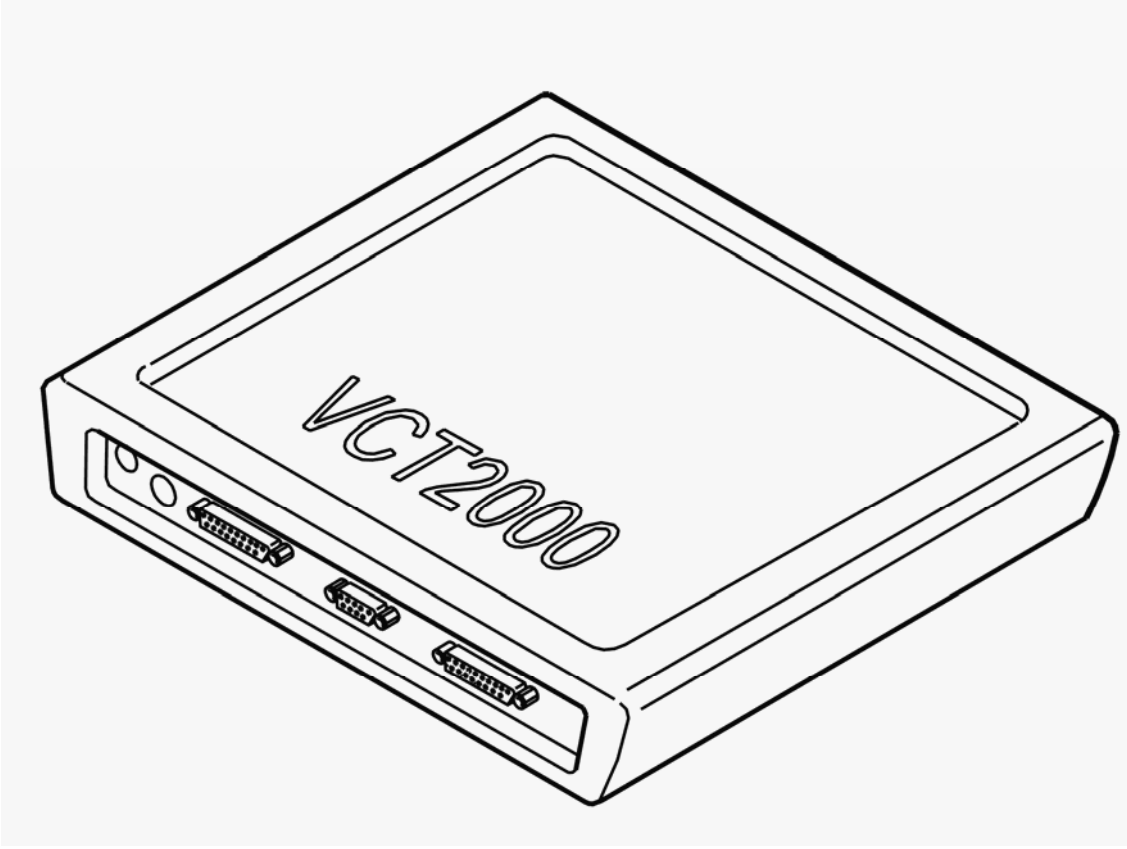


Fig. 209: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING THE BATTERY VOLTAGE

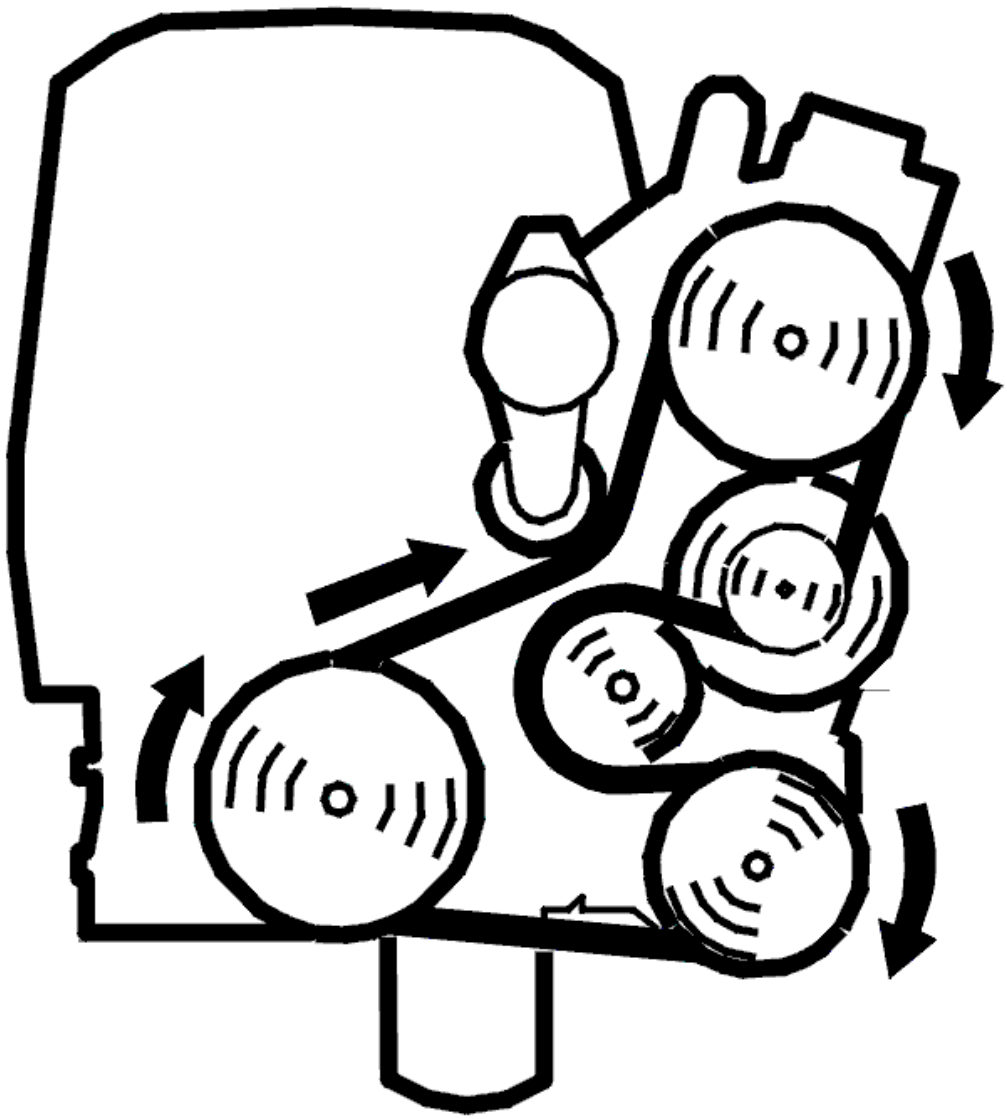


Fig. 210: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine and let it run at idle speed
- Connect a voltmeter between the battery positive and negative terminals.

  The voltmeter should read 12-15 V. If the voltage is lower, check the charging system for low charge voltage.

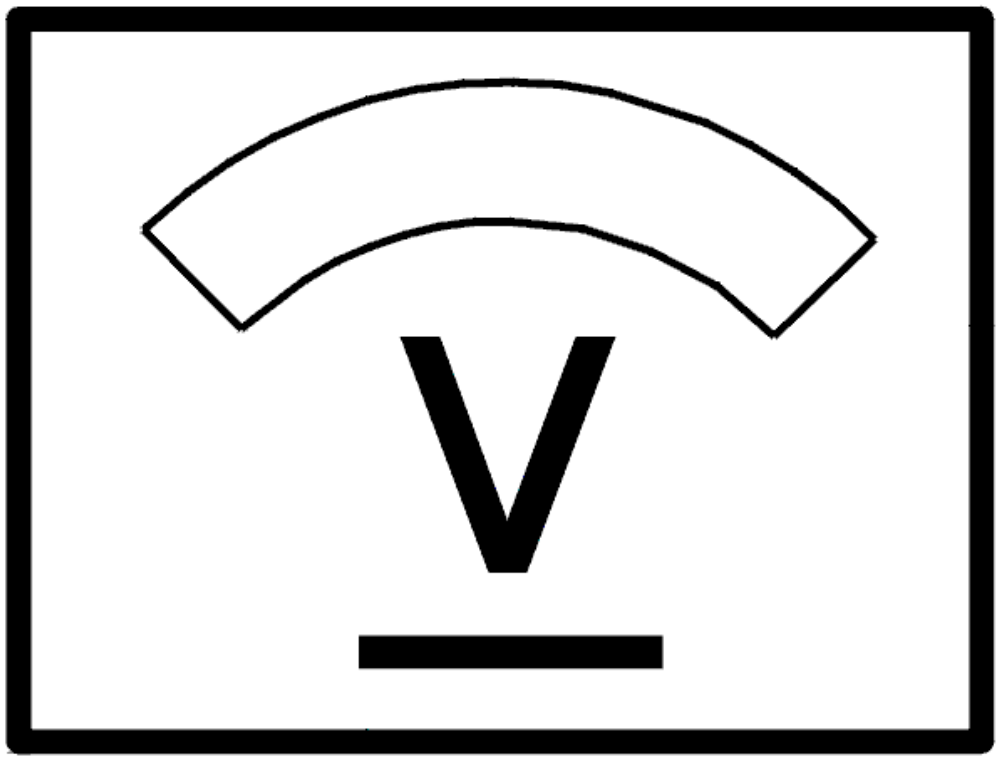


Fig. 211: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE BATTERY TERMINALS**

CHECKING THE BATTERY TERMINALS

Check the battery positive and negative terminals and the front terminals in the engine compartment. Check for

contact resistance and oxidation.

Remedy as necessary.

- **Continue**

  Refer to **INFORMATION**

CHECKING THE POWER SUPPLY

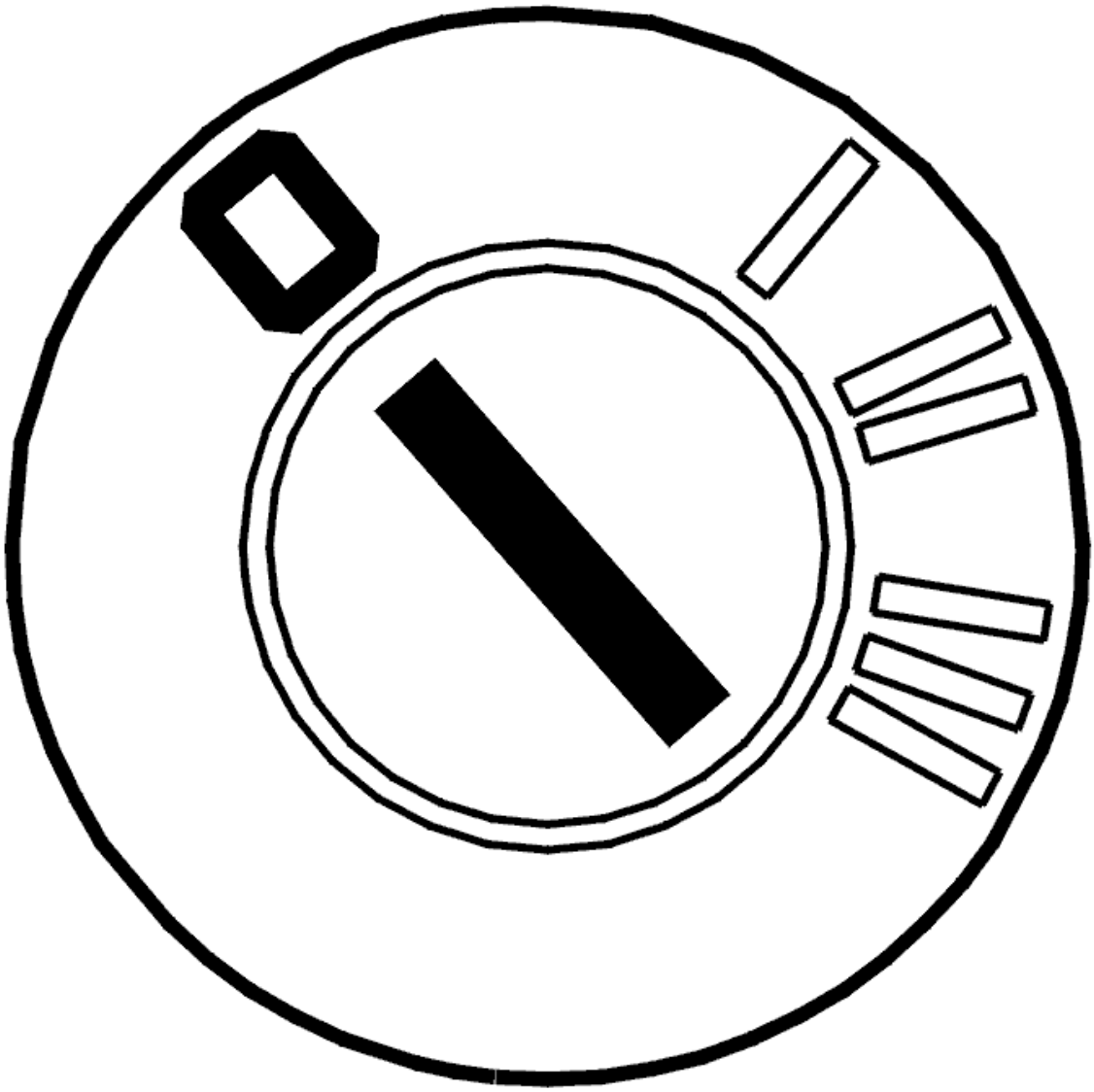


Fig. 212: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission control module (TCM) connector and the relay for extended X supply 2/101

(located in the central electronic module (CEM). Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the power supply cable between fuse 20 in the integrated relay / fusebox in the engine compartment and the relay for extended X supply 2/101 (terminal #3 on the central electronic module CEM). Check the power supply cable between relay terminal #1 and transmission control module (TCM) terminal #A35 (#A35). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

HINT: With the ignition on and voltmeter connected between transmission control module (TCM) terminals #A35 (#A35) and #A53 (#A53) the voltmeter should read battery voltage.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect relay 2/101 for extended X-supply:
  - For -2004, see: **CENTRAL ELECTRONIC MODULE (CEM), REPLACING**
  - For 2005-, see: **CENTRAL ELECTRONIC MODULE (CEM), REPLACING** .
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

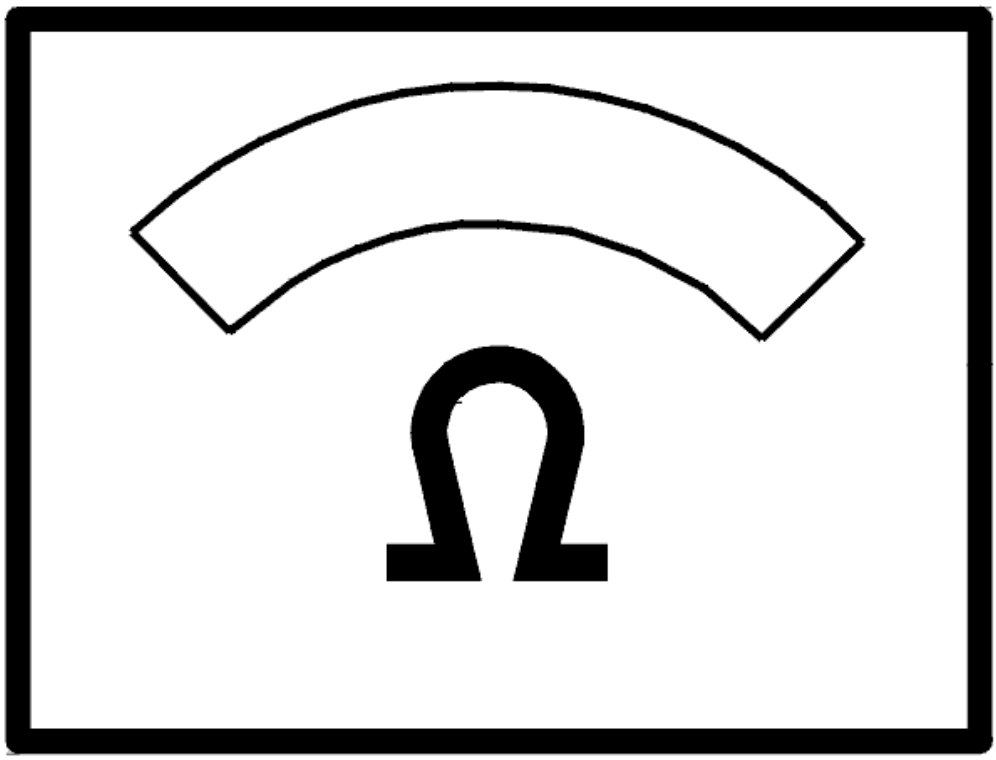


Fig. 213: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should be diagnosed and remedied. Since this is not the case the fault-tracing process has failed.

Complete the fault-tracing for those fault or try again.

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

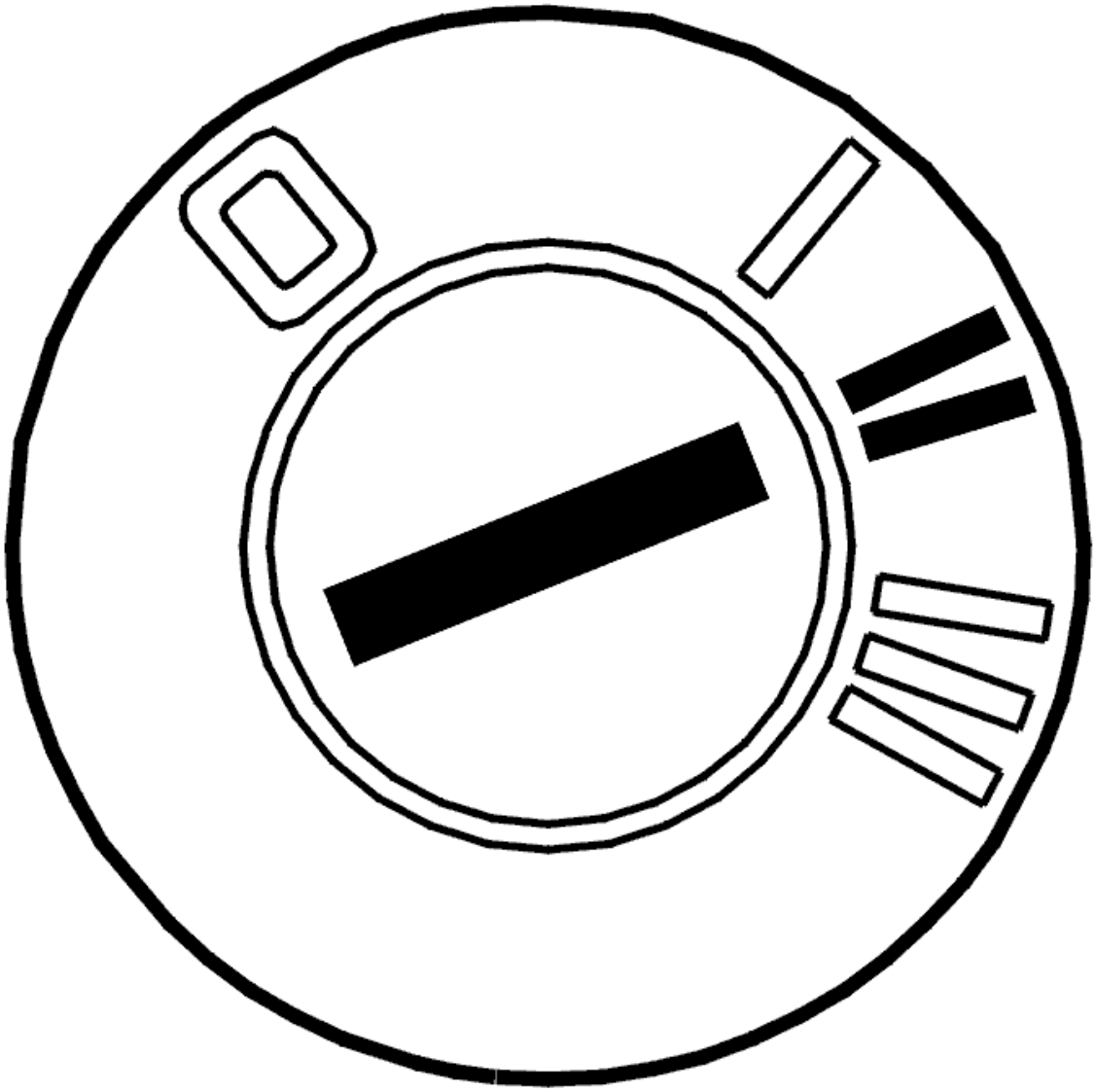


Fig. 214: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the voltage for the transmission control module (TCM) and the central electronic module (CEM).

  The voltage must be battery voltage for both the control modules.

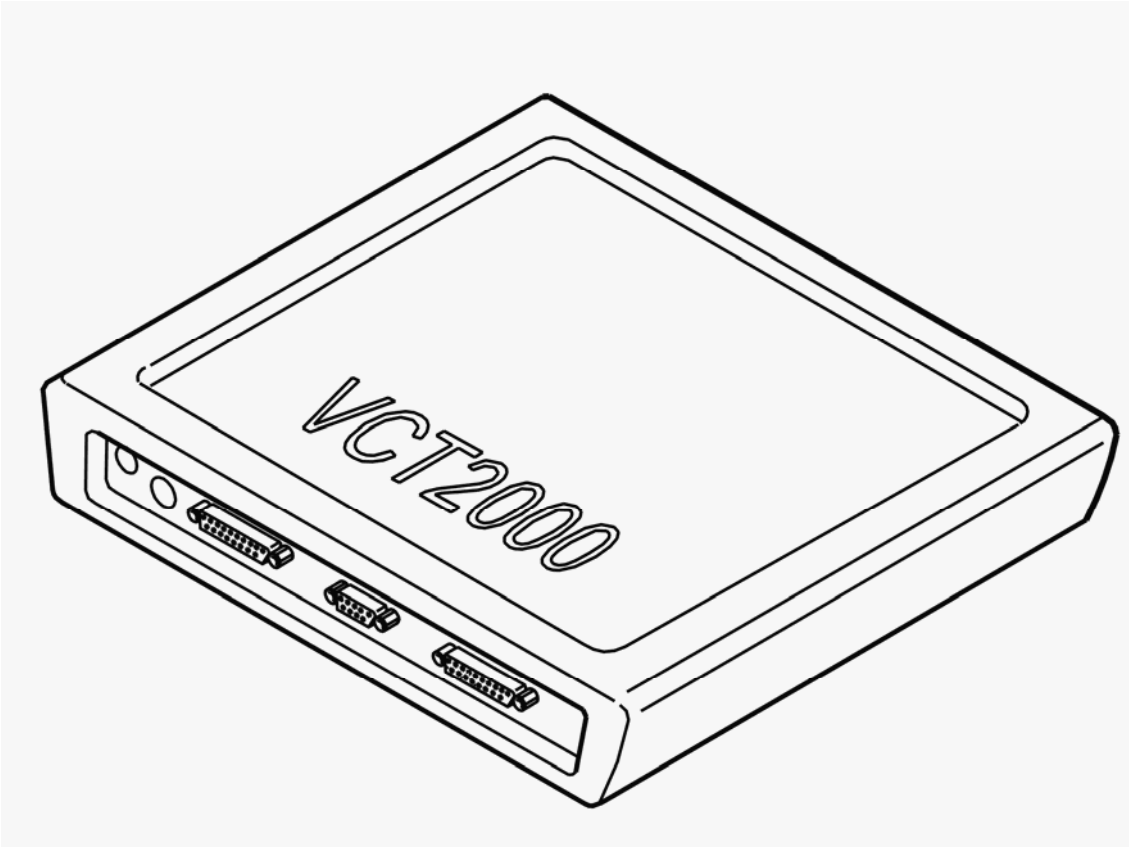


Fig. 215: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the voltage OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0100: POOR GEAR SHIFTING QUALITY (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

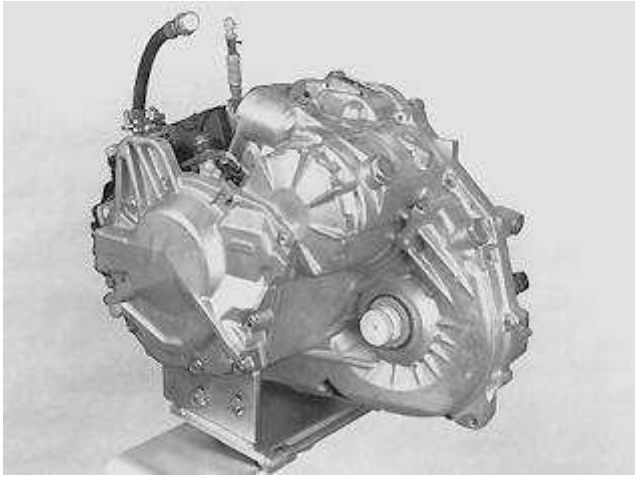


Fig. 216: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Diagnostic trouble code (DTC) TCM-0100 is stored if the transmission control module (TCM) registers that the quality of gearshifts in the transmission is too low.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Mechanical fault in the transmission.
- Hydraulic fault in the transmission.

Fault symptom[s]

- General warning lamp lit

POOR GEAR SHIFTING QUALITY

CHECKS

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

HINT: Remedy any other diagnostic trouble codes (DTCs) stored for the transmission control module (TCM) first. One of these faults could have caused diagnostic trouble code (DTC) TCM-0100.

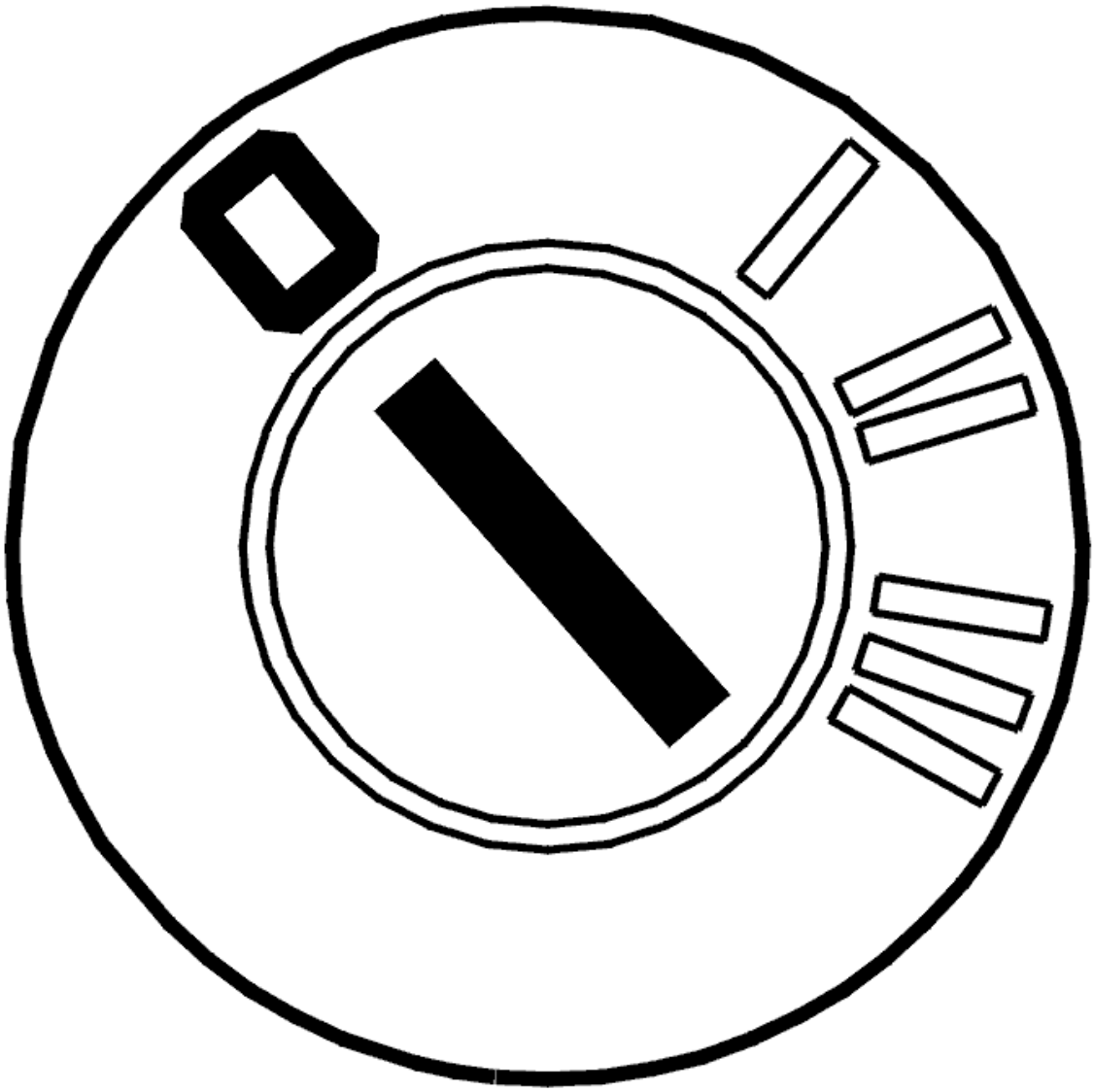


Fig. 217: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

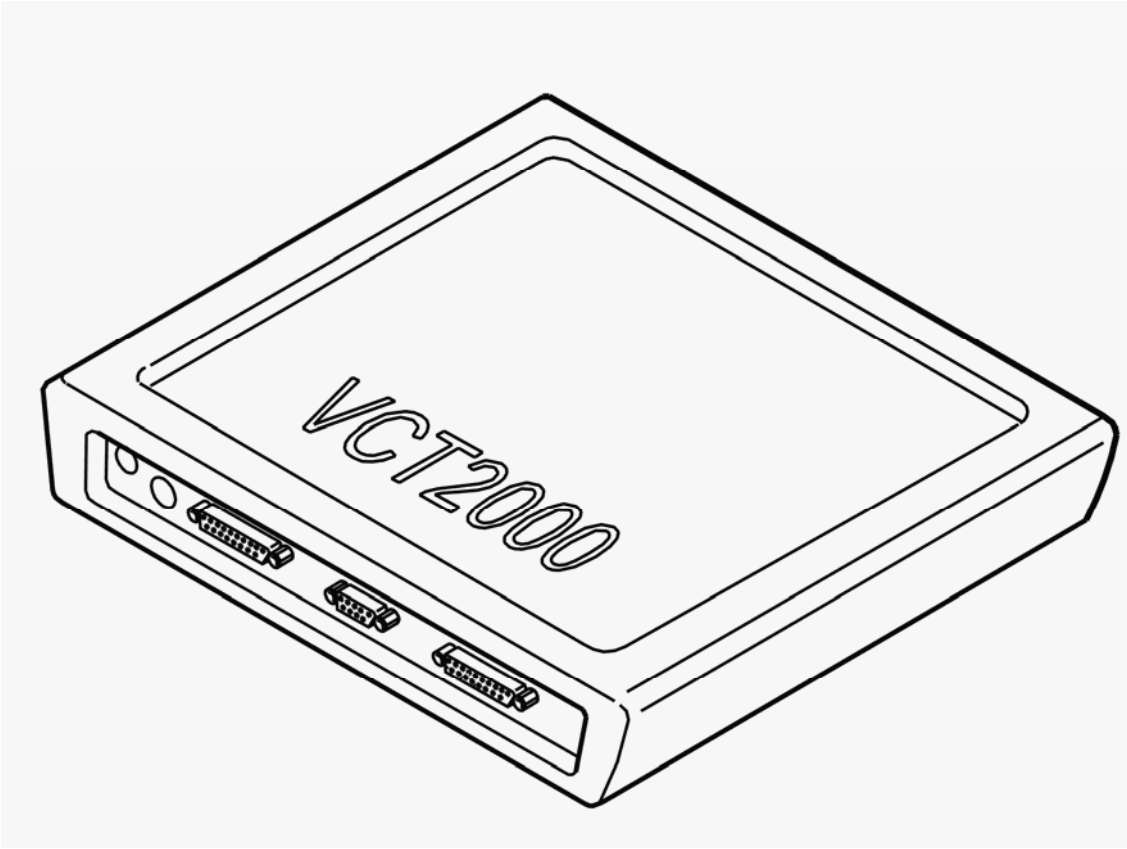


Fig. 218: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Are other diagnostic trouble codes (DTCs) stored?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING FOR CONTACT RESISTANCE AND OXIDATION**

CHECKING FOR CONTACT RESISTANCE AND OXIDATION

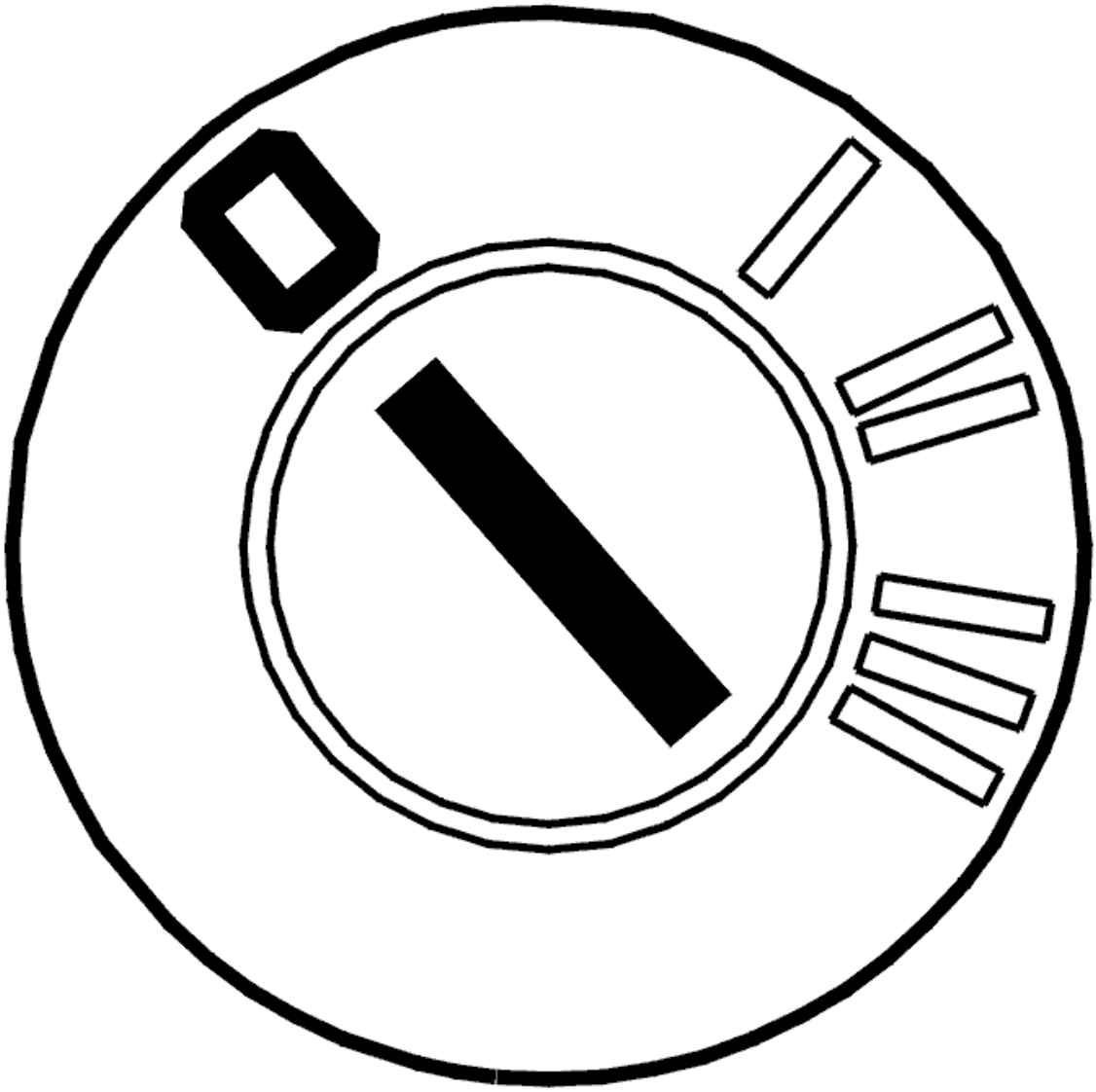


Fig. 219: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the transmission connectors and transmission control module (TCM) connector. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION**
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See **TEST DRIVE SCHEDULE, DESCRIPTION** .

  Check for any clearly audible noises from the transmission. Check for malfunctions.

  Other information

  - To access the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**

- To access the control module connector, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

Is the transmission operating correctly?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **REPLACING THE CONTROL SYSTEM**

REPLACING THE CONTROL SYSTEM

Fault-tracing indicates an internal fault in the transmission.

Replace the control system. See **SOLENOID CONTROL SYSTEM, REPLACING** .

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

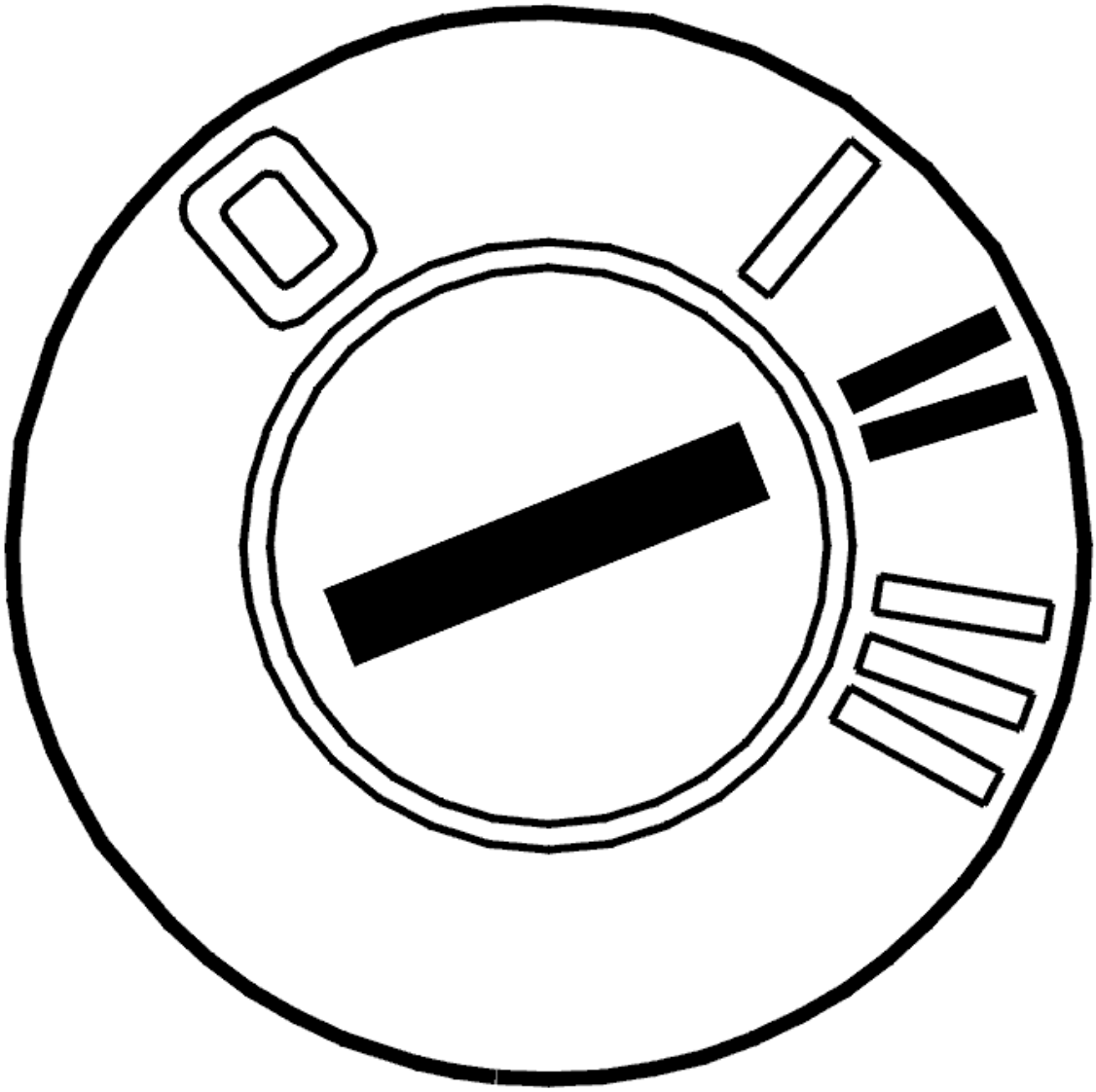


Fig. 220: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Use the VCT2000 (or appropriate scan tool) to reset the adaptation and counter.

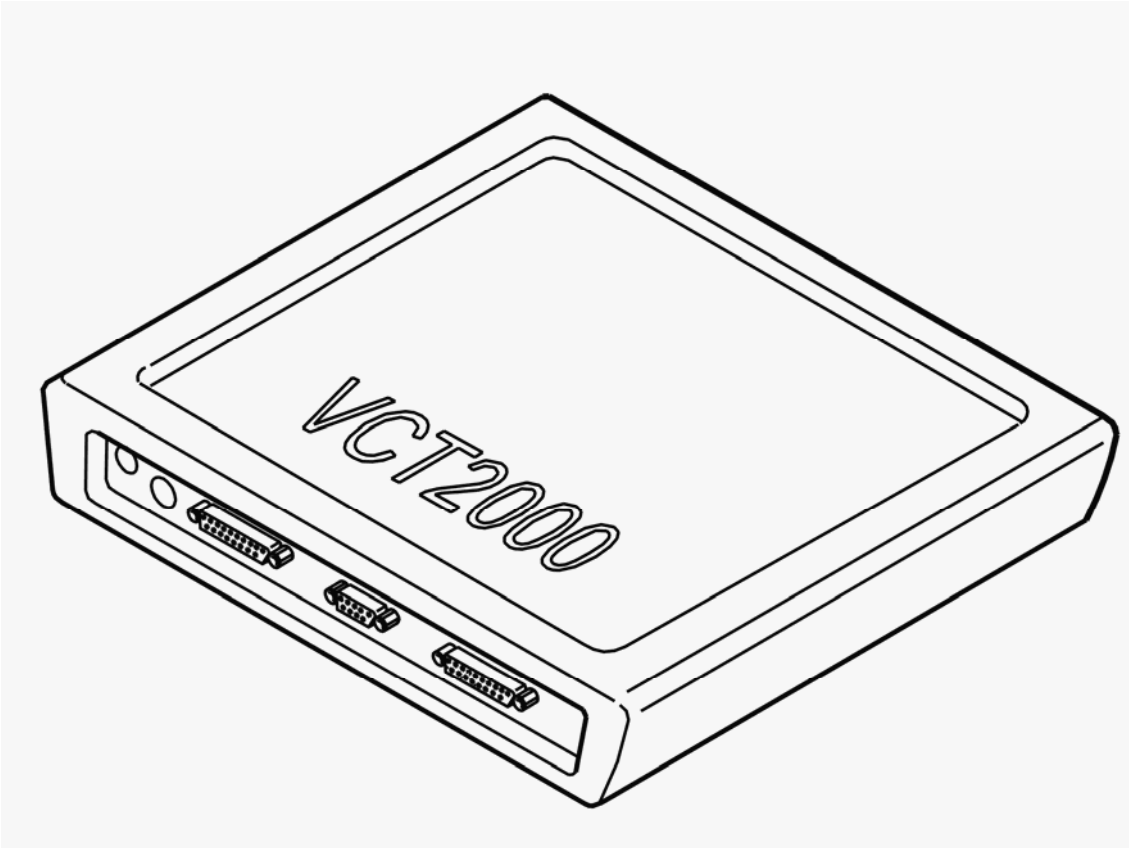


Fig. 221: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

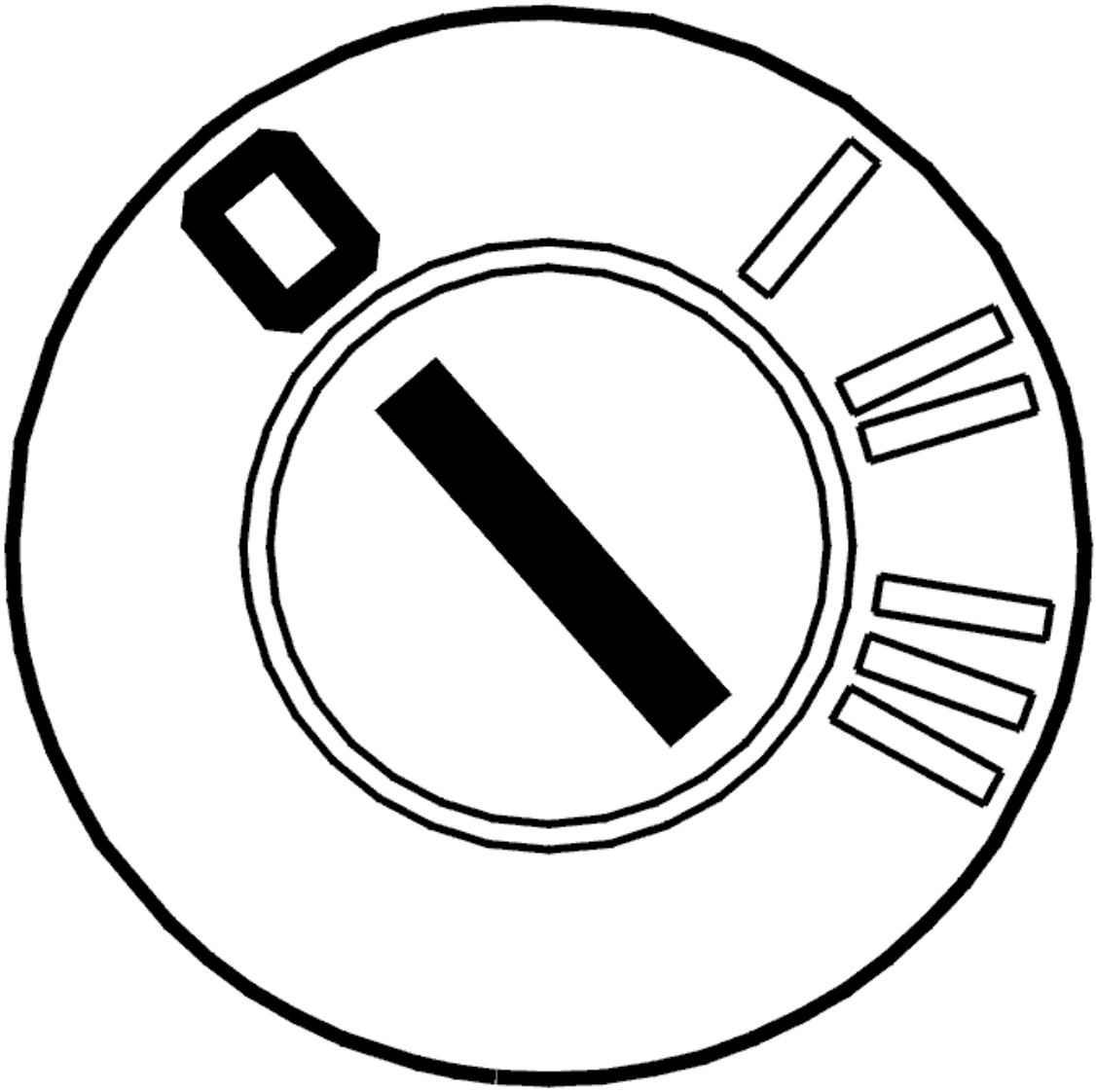


Fig. 222: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

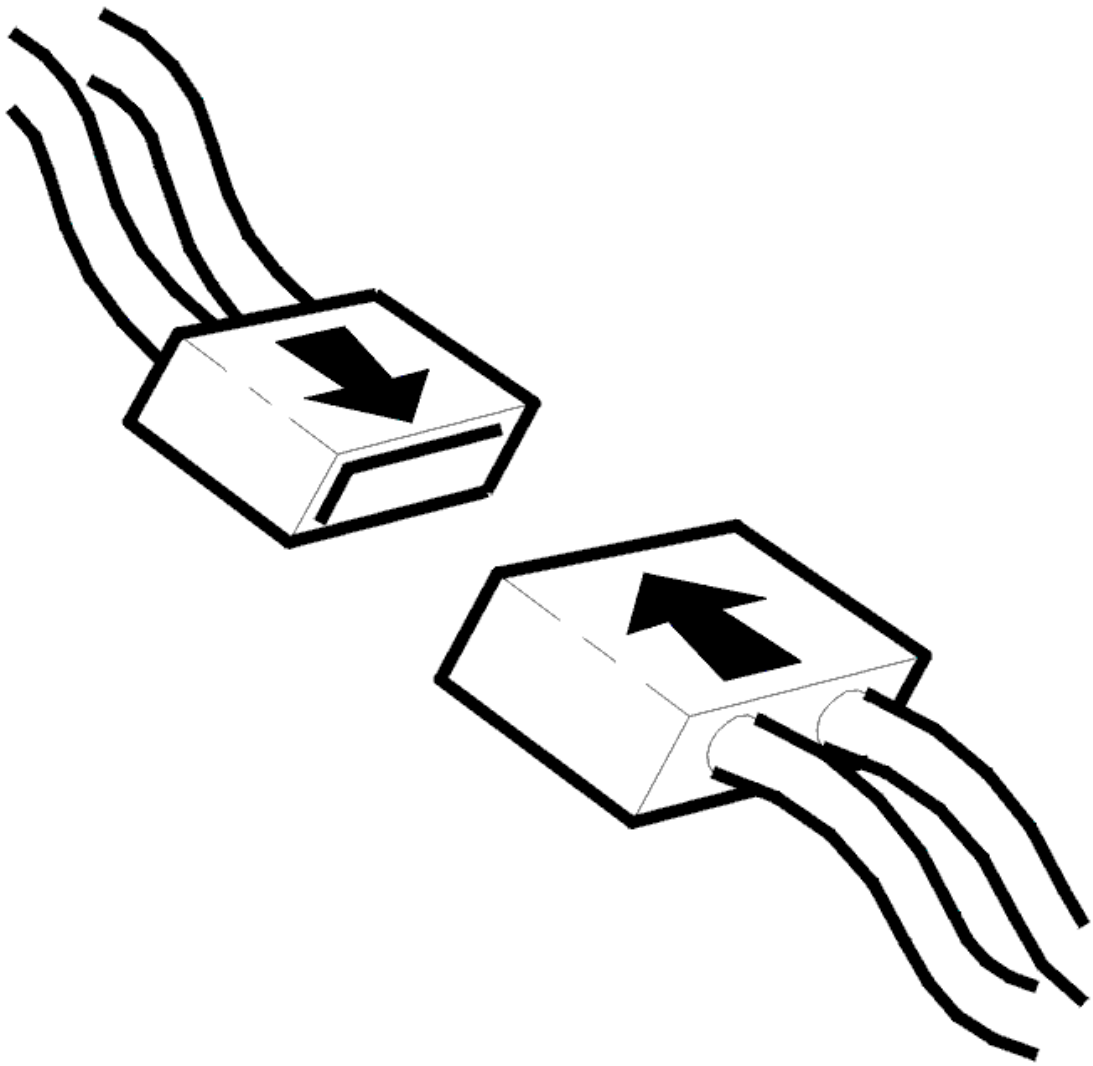


Fig. 223: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reconnect the connectors. Reinstall the components.
- Test drive the car according to **TEST DRIVE SCHEDULE, DESCRIPTION** .

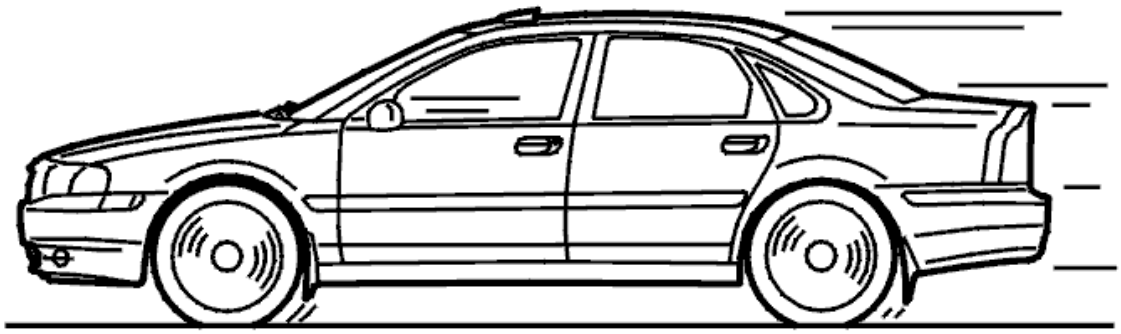


Fig. 224: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the function of the transmission OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0101: SHIFT SOLENOID S3. SIGNAL TOO HIGH (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

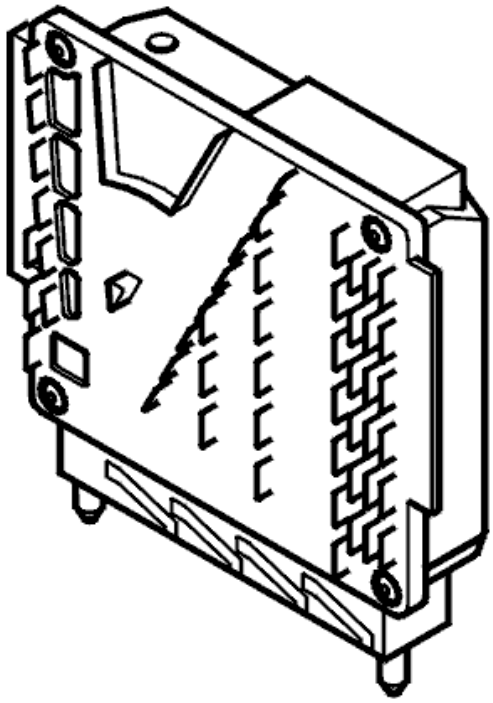


Fig. 225: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0001, TCM-0007, TCM-0101 TCM-0107 or TCM-010A are stored (depending on the solenoid) if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is too high when the solenoid should not be activated.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Short-circuit to supply voltage in the signal cable.
- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

SIGNAL TOO HIGH

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

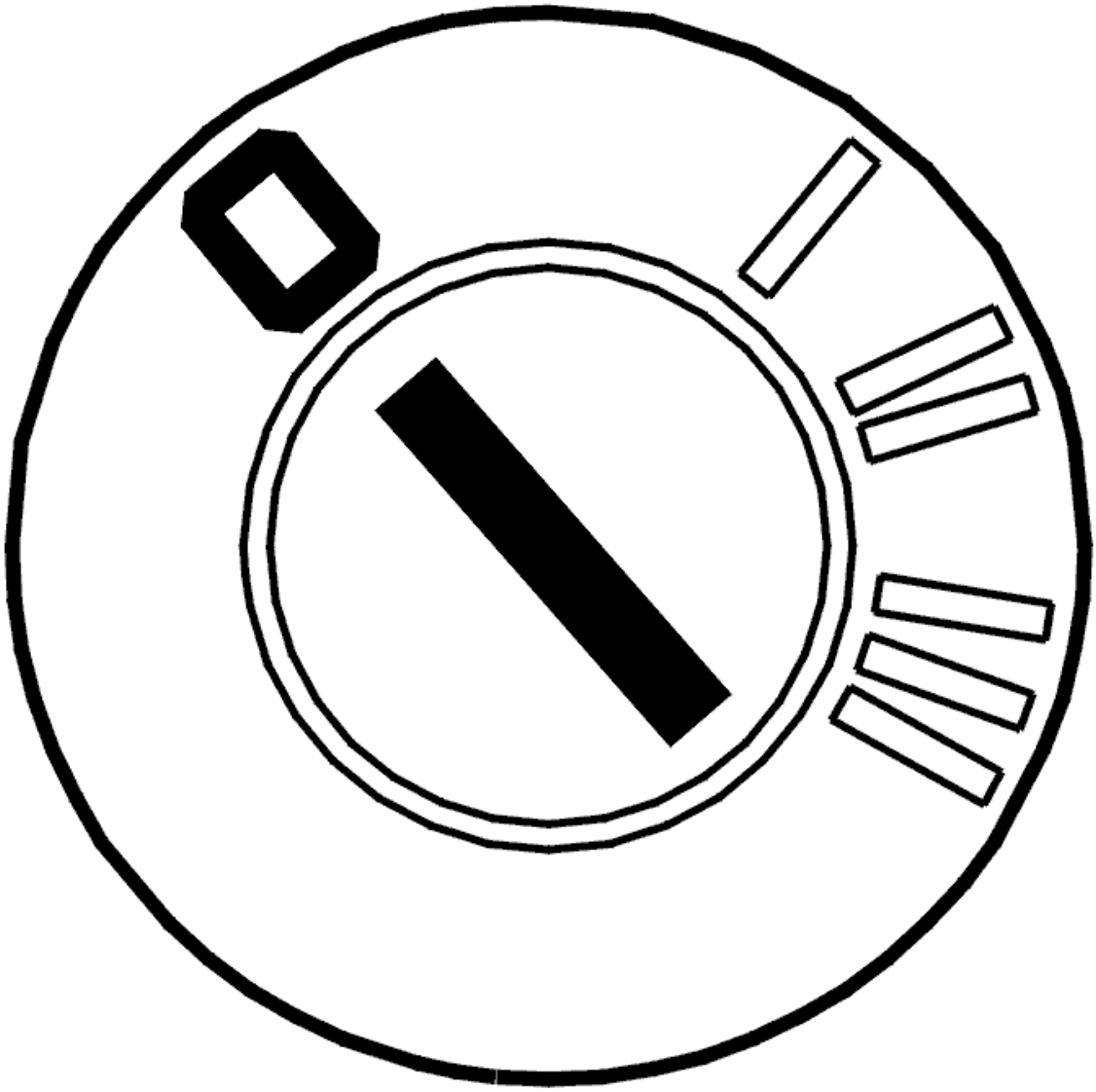


Fig. 226: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

NOTE: If the temperature is outside its permitted range, fault-trace the temperature sensor.

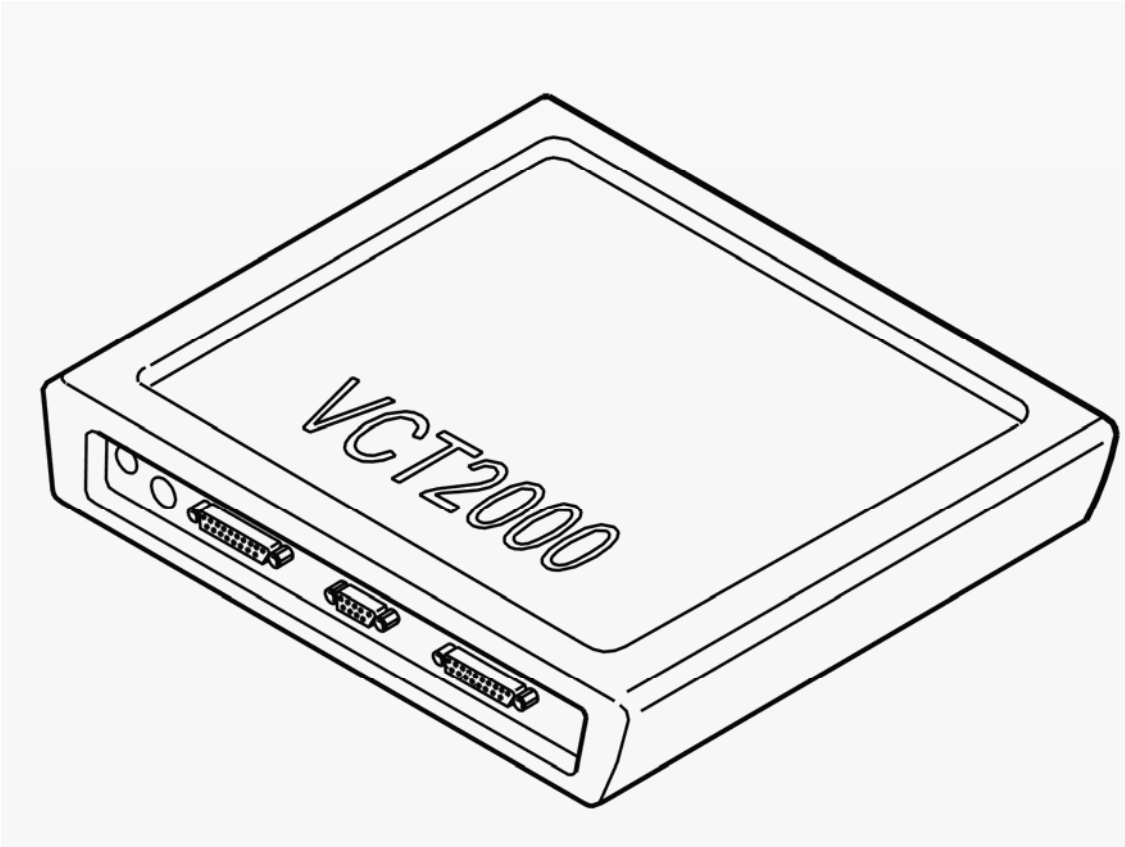


Fig. 227: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S3**

- **NO**

  Refer to **FAULTY SIGNAL**

CHECKING SHIFT SOLENOID S3

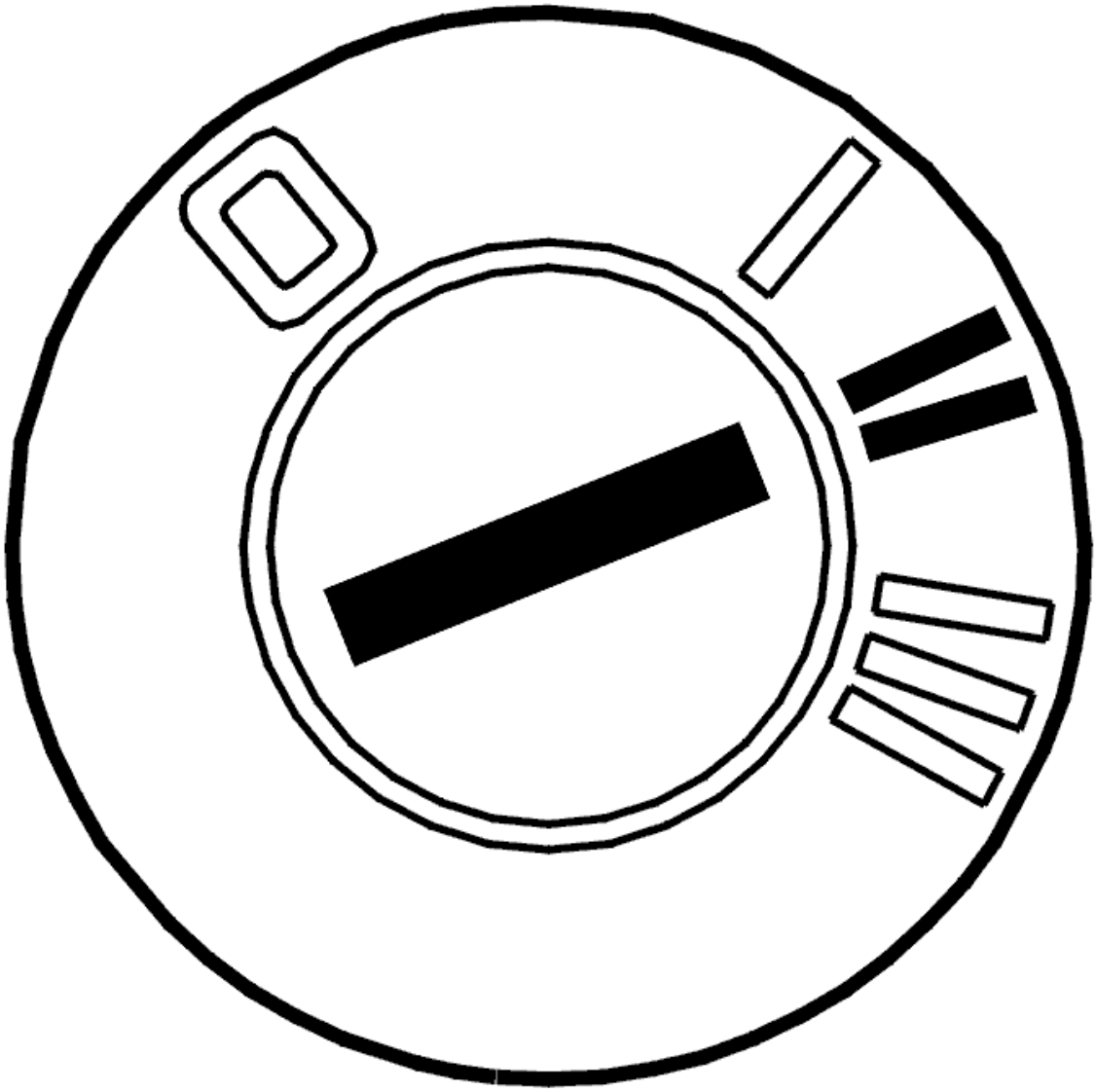


Fig. 228: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S3.

  The value must change between OFF and ON.

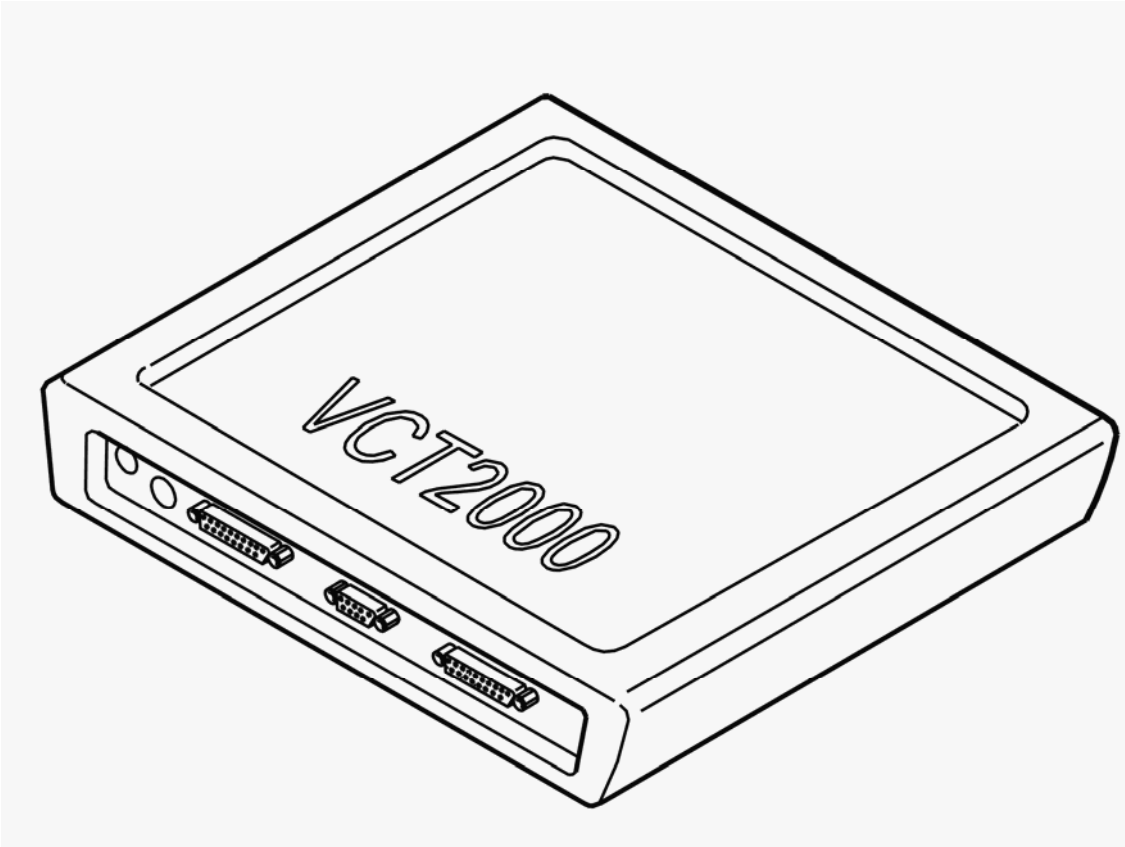


Fig. 229: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

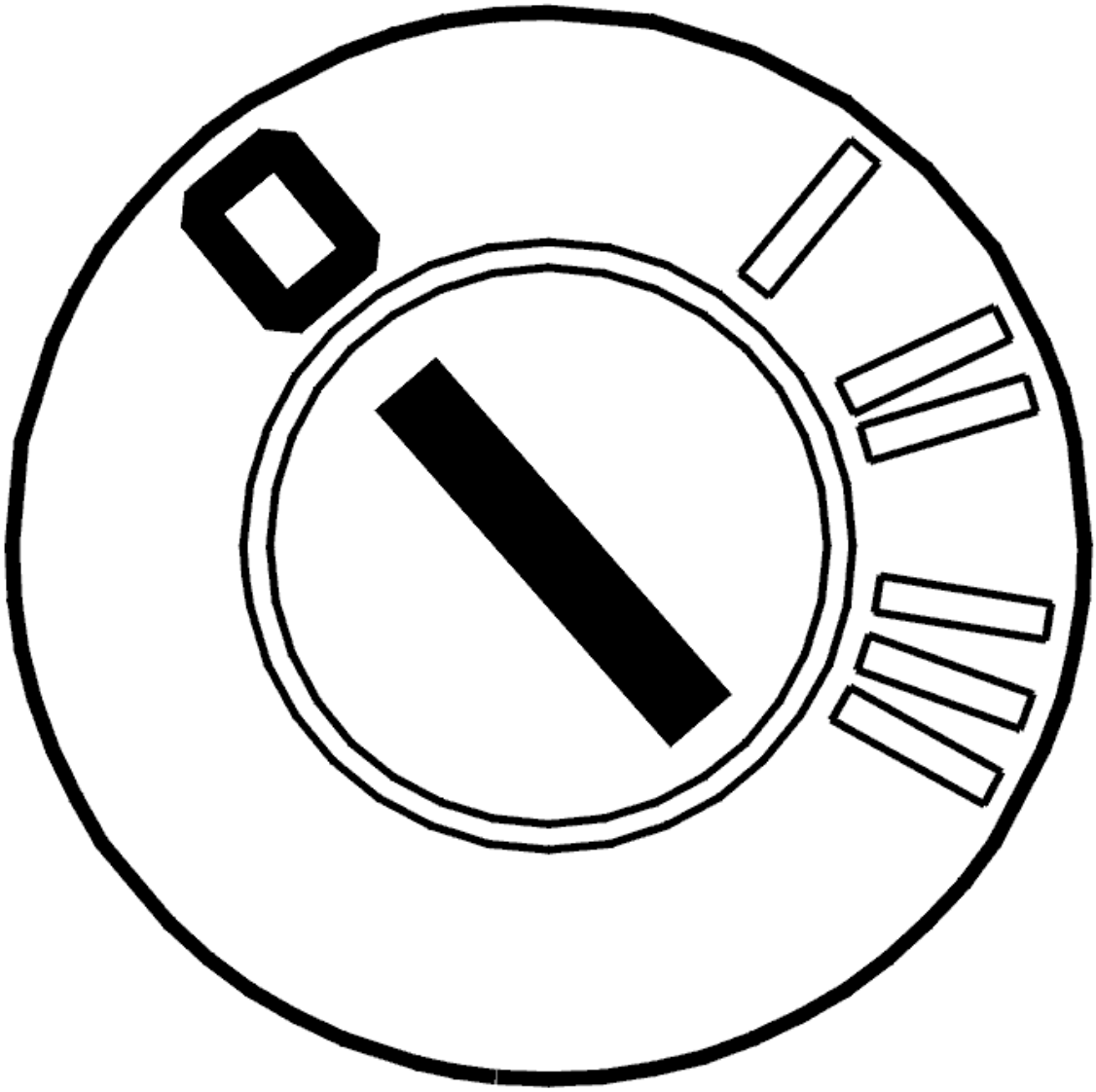


Fig. 230: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the cable between control module terminal #A48 (#A48) and transmission connector terminal #C3 (control module side). Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** . Also check against the other cables in the circuit.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
  - For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL**

MODULE (TCM) .

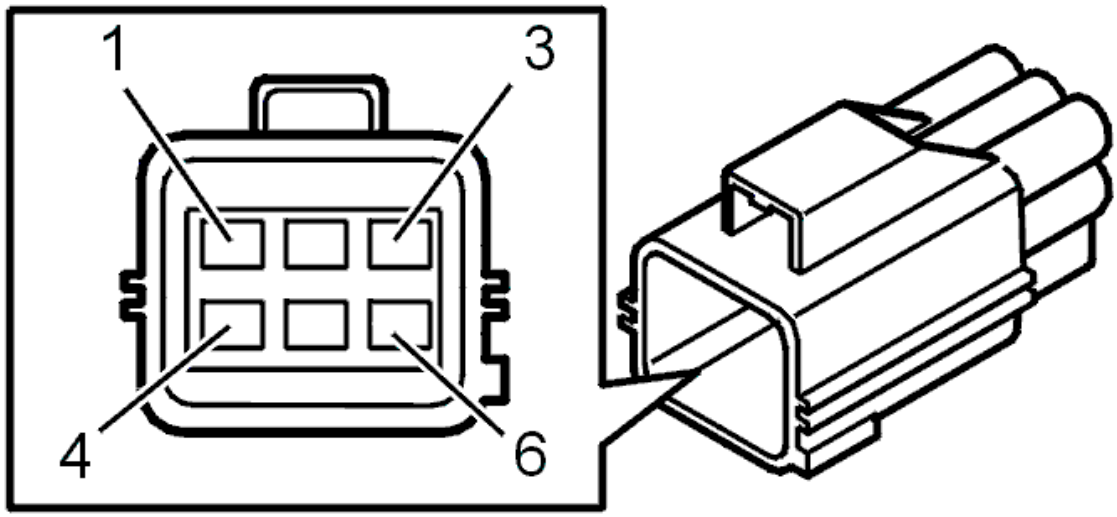


Fig. 231: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

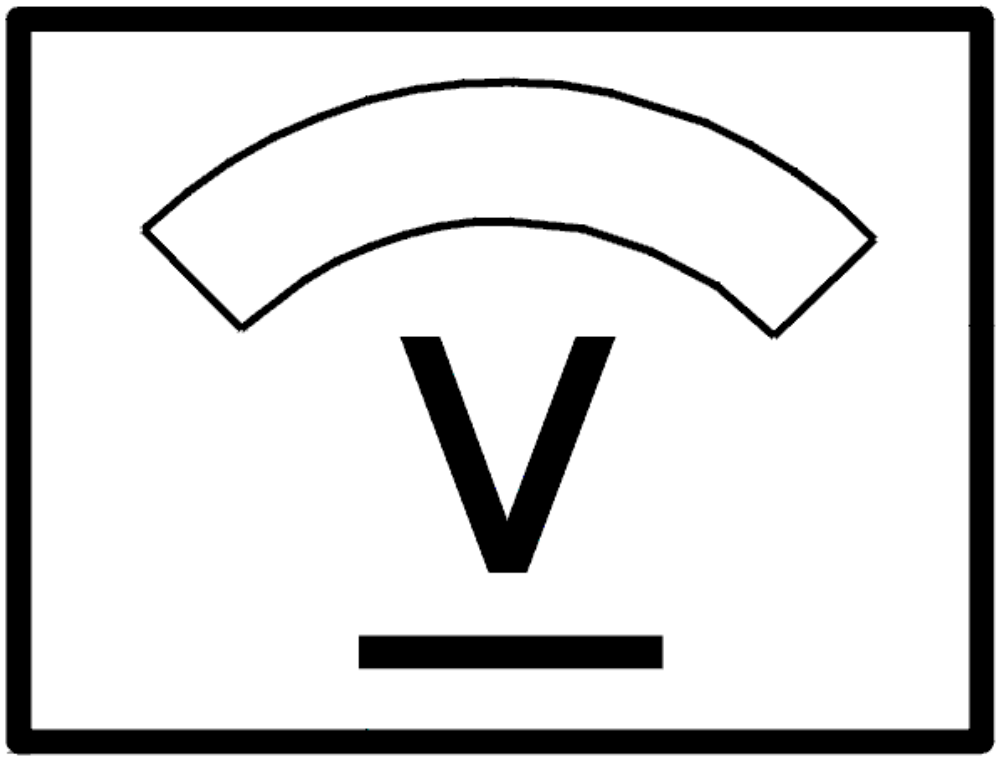


Fig. 232: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

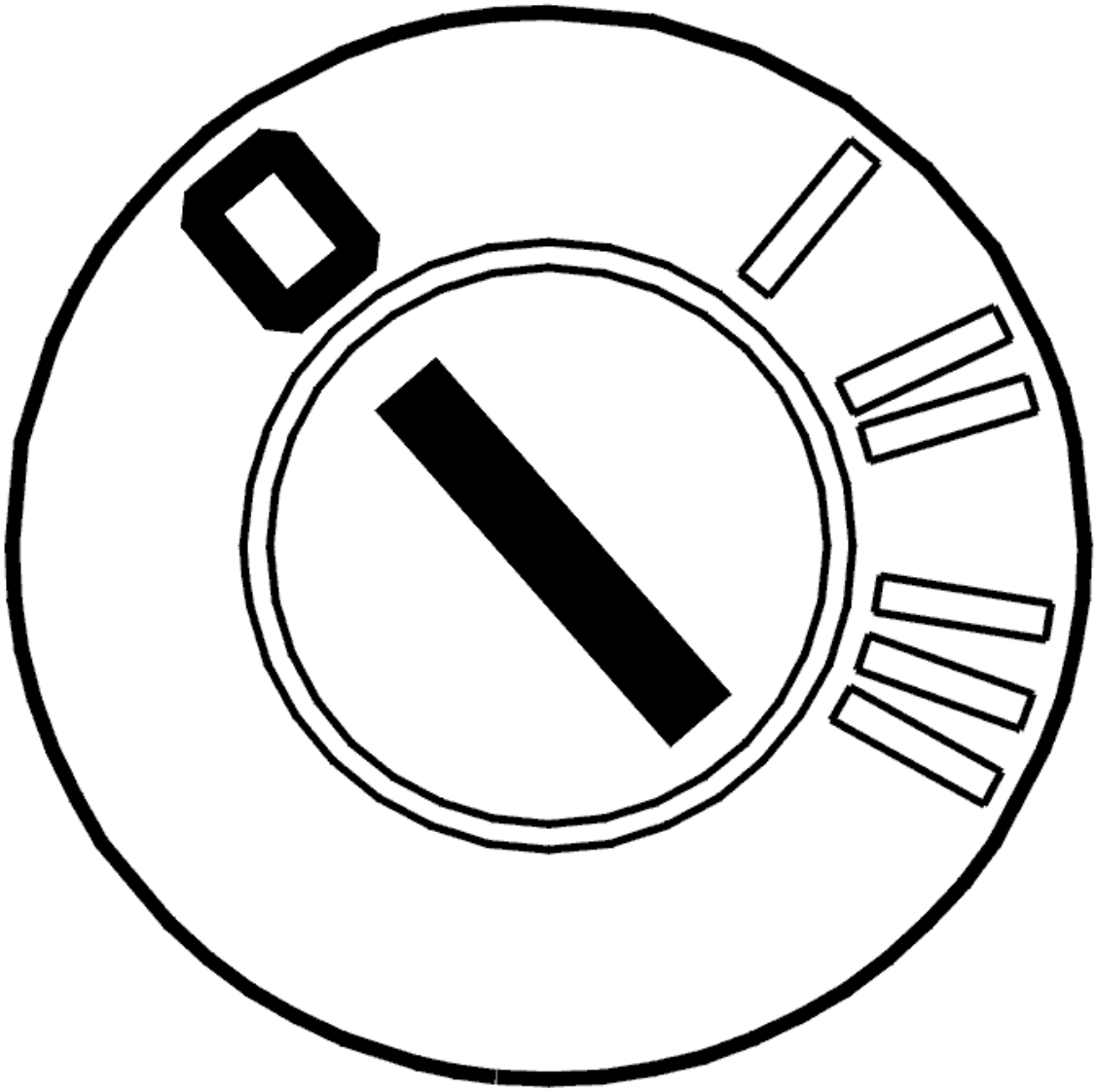


Fig. 233: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C3 (transmission side) and the connector for solenoid S3. Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** . Also check against the other cables in the circuit.

Replace solenoid S3 if no faults are found in the cable-.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the control system and to check or replace solenoid S3, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

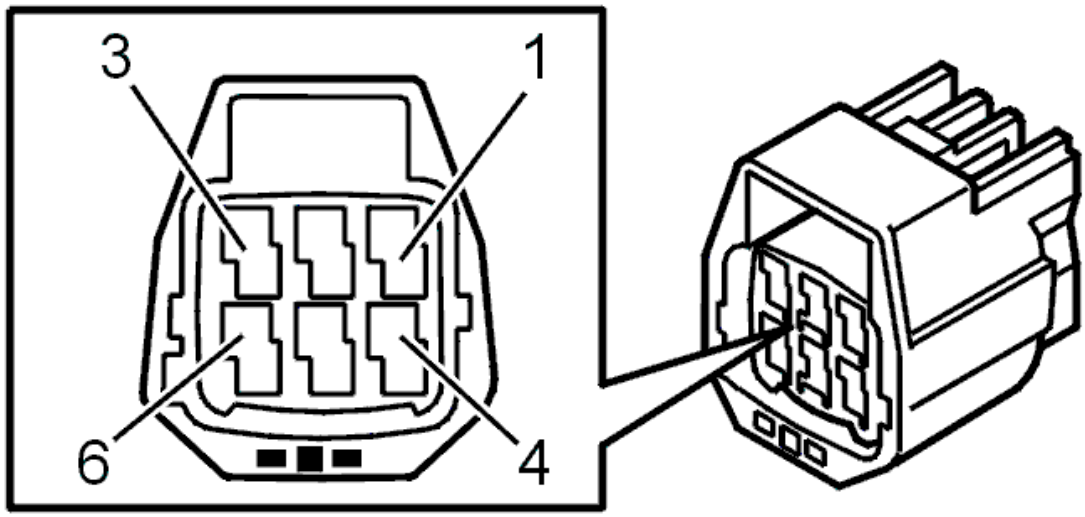


Fig. 234: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

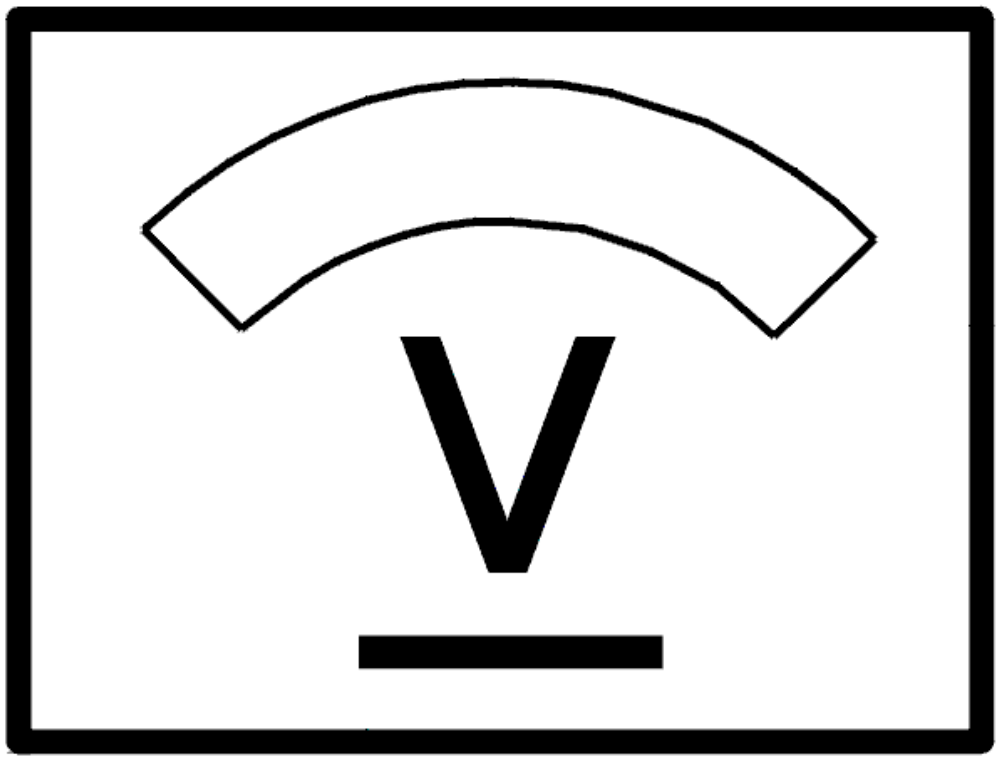


Fig. 235: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the cable between transmission control module (TCM) terminal #A48 (#A48) and transmission connector terminal #C3. Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

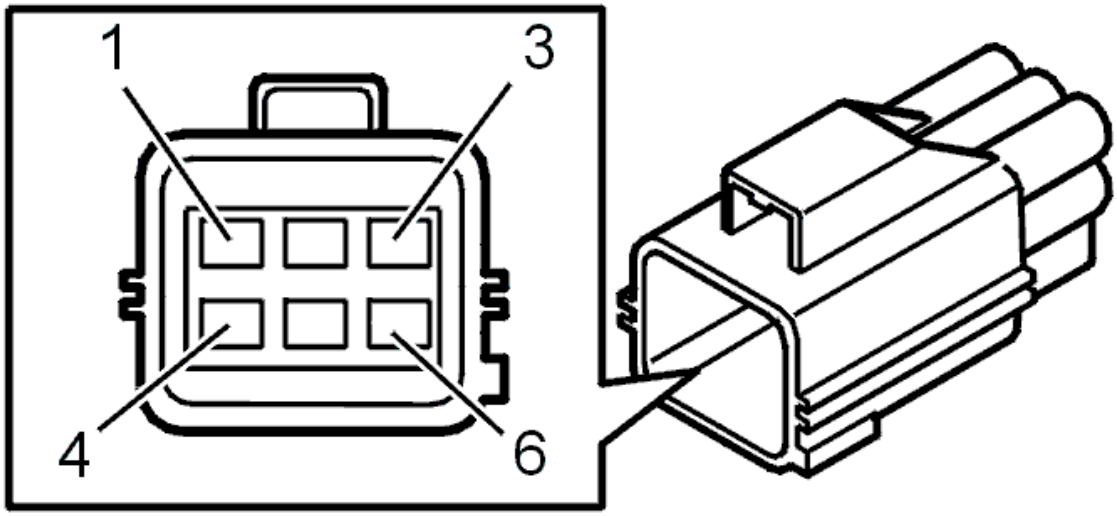


Fig. 236: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

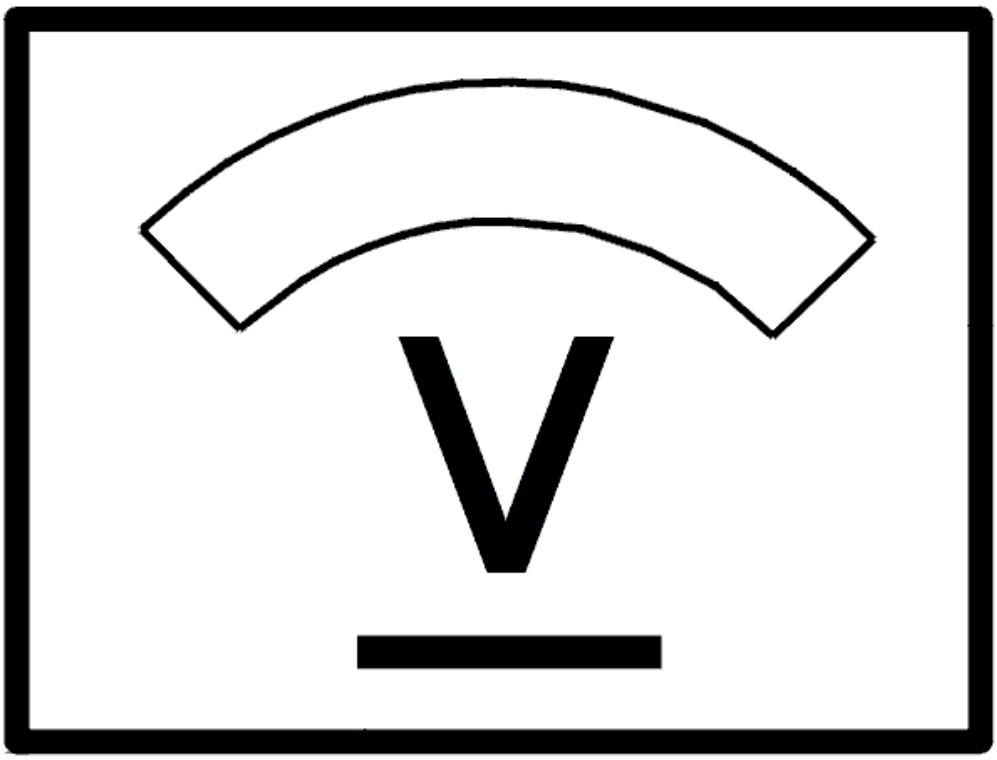


Fig. 237: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

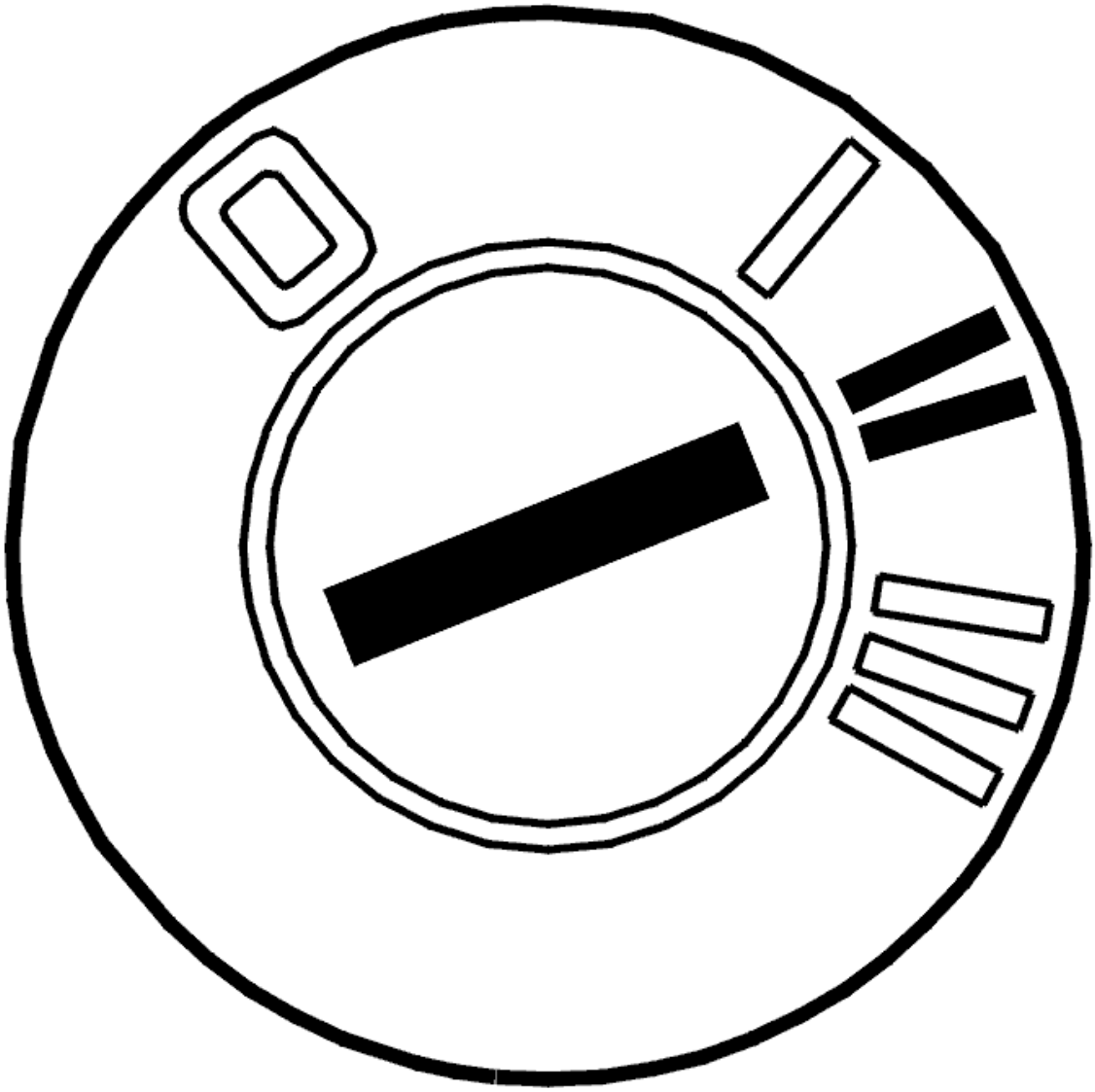


Fig. 238: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Use the VCT2000 (or appropriate scan tool) to reset the adaptation and counter.

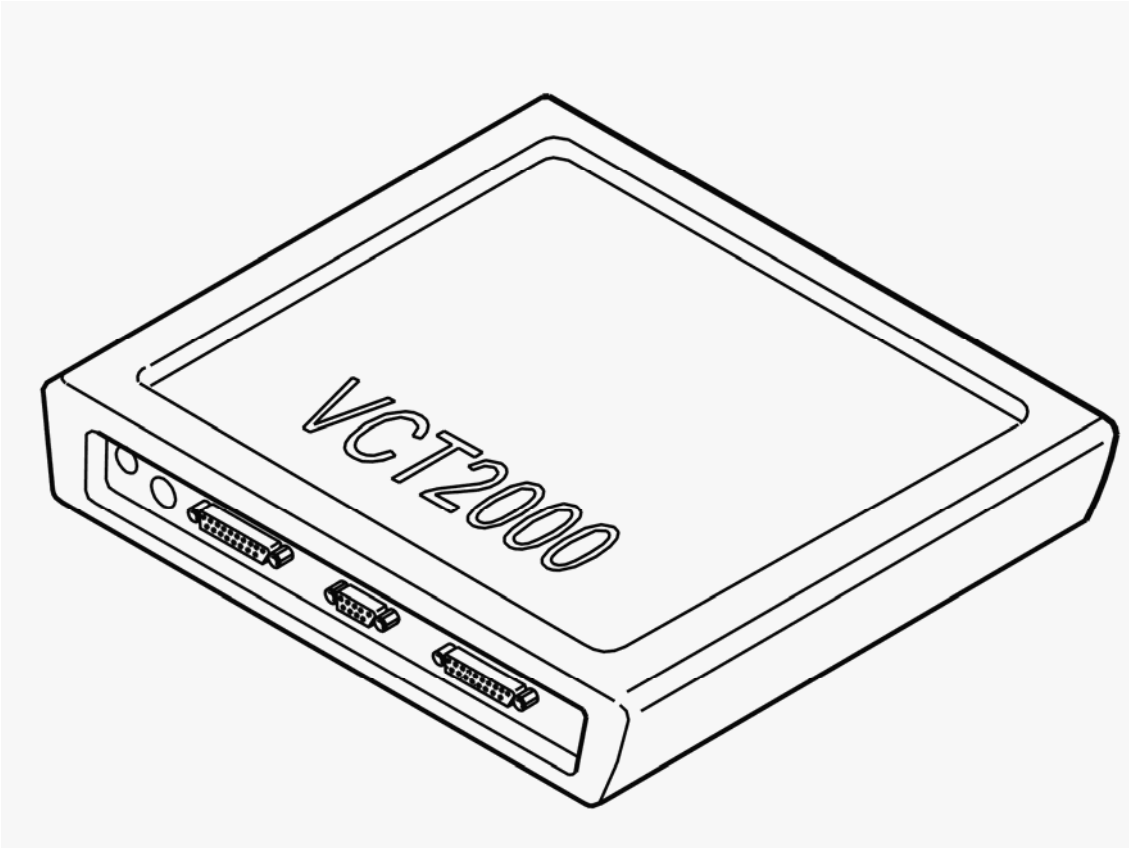


Fig. 239: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

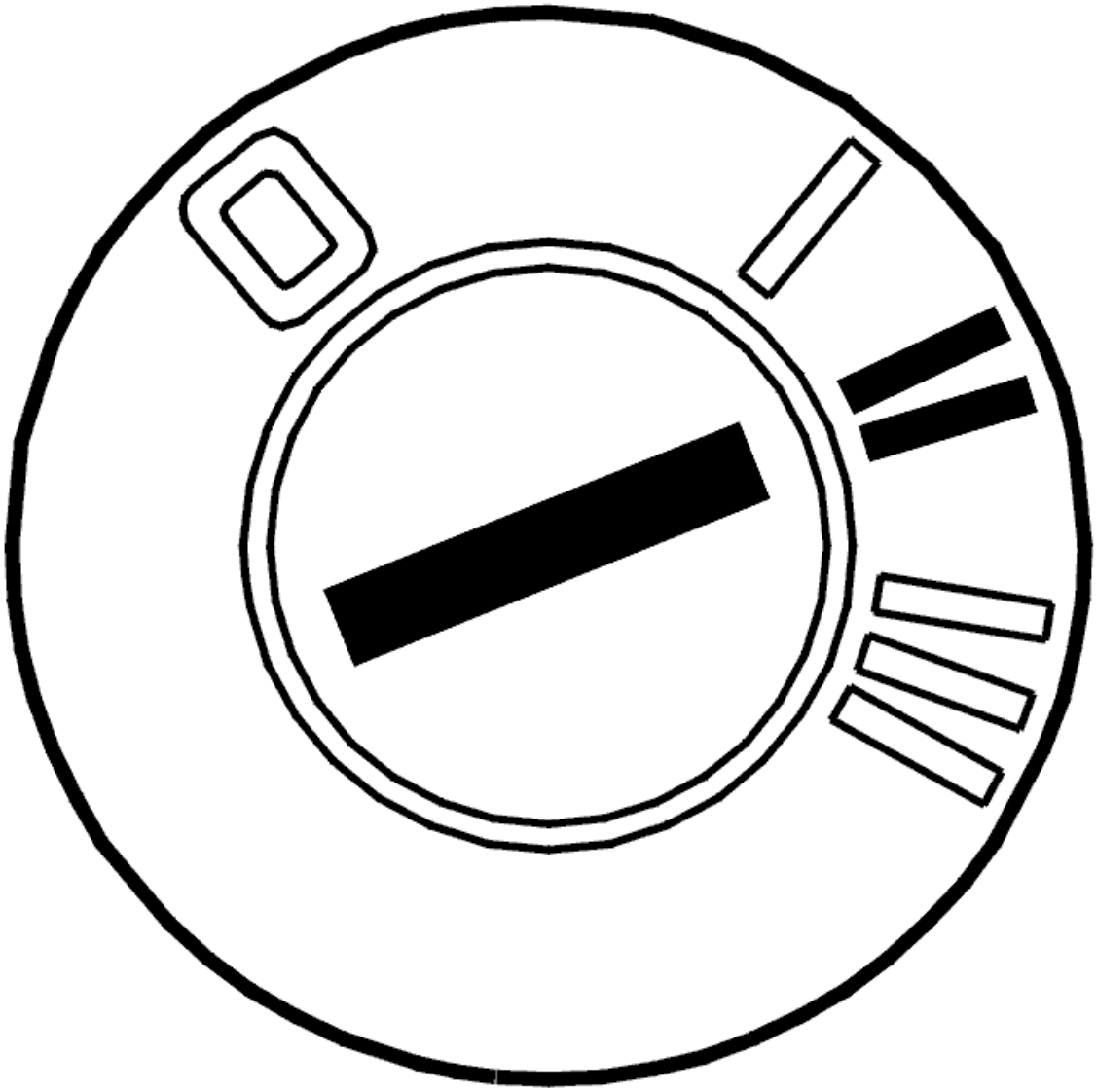


Fig. 240: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

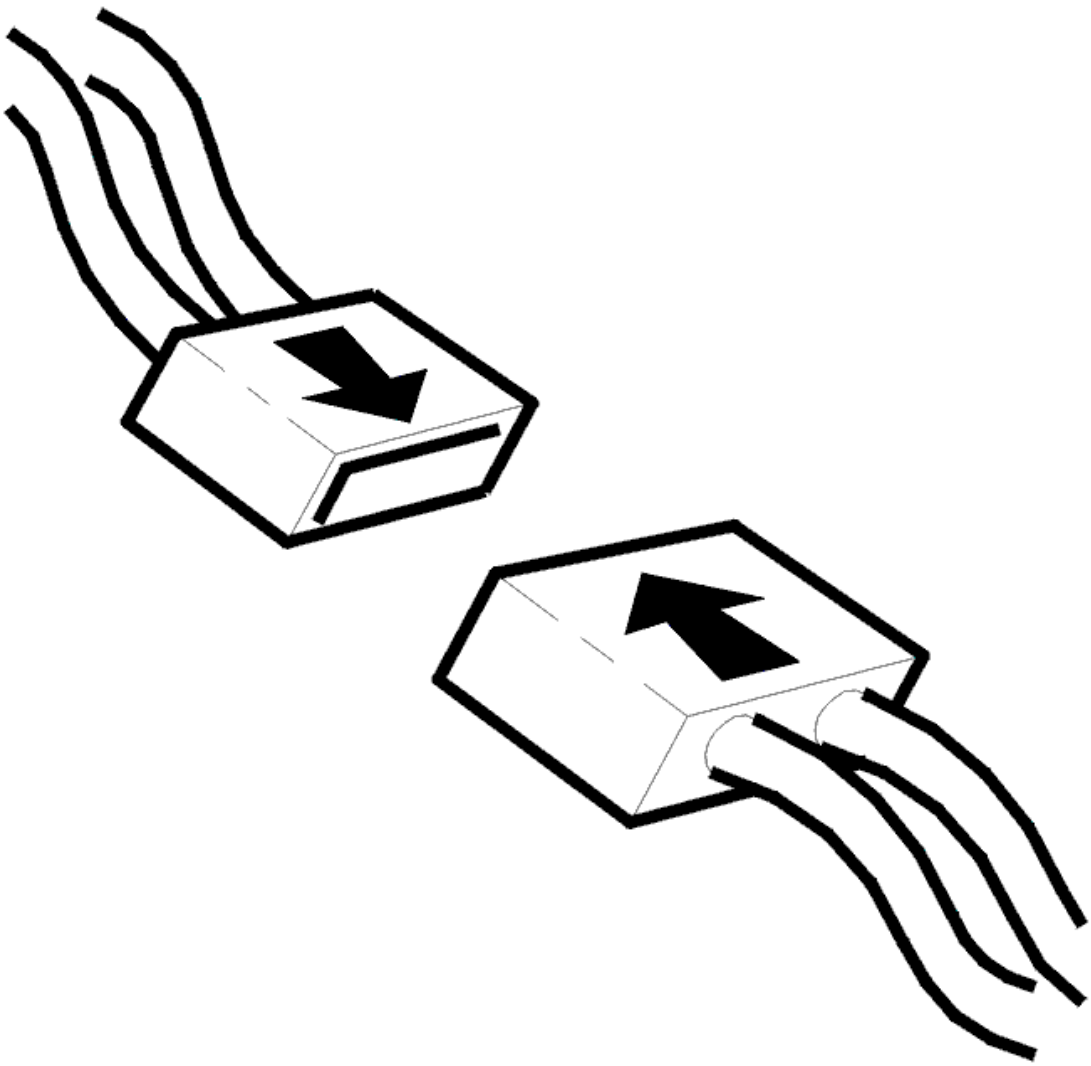


Fig. 241: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S3.

The value should change between OFF and ON.

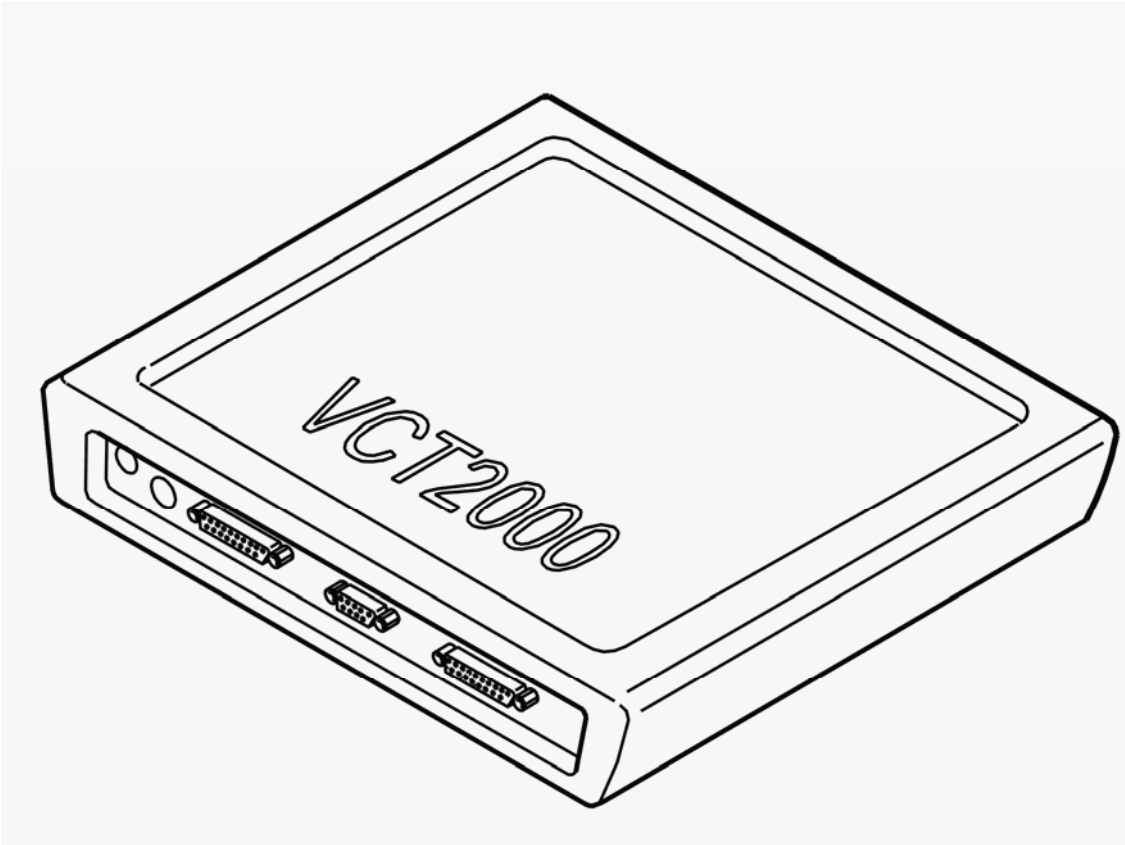


Fig. 242: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change between OFF and ON?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

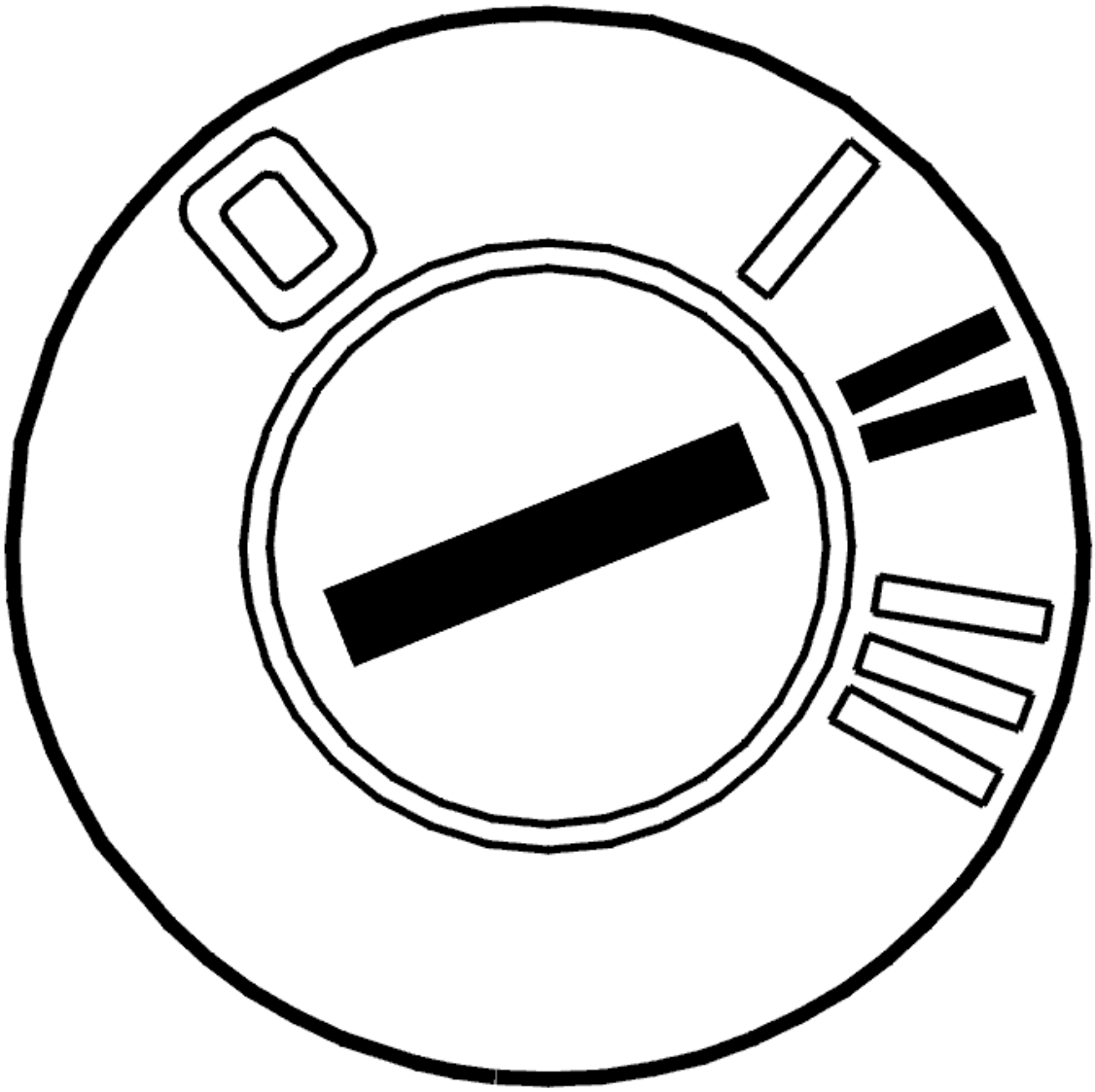


Fig. 243: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

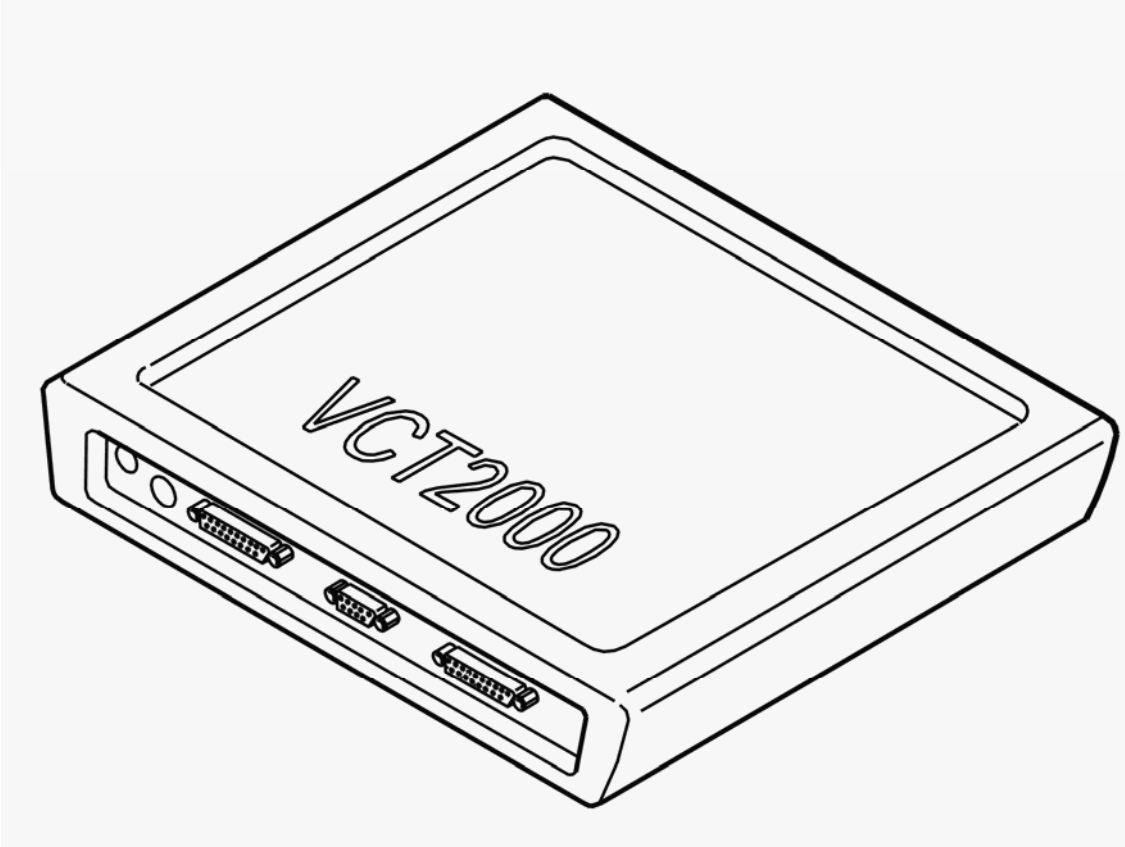


Fig. 244: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

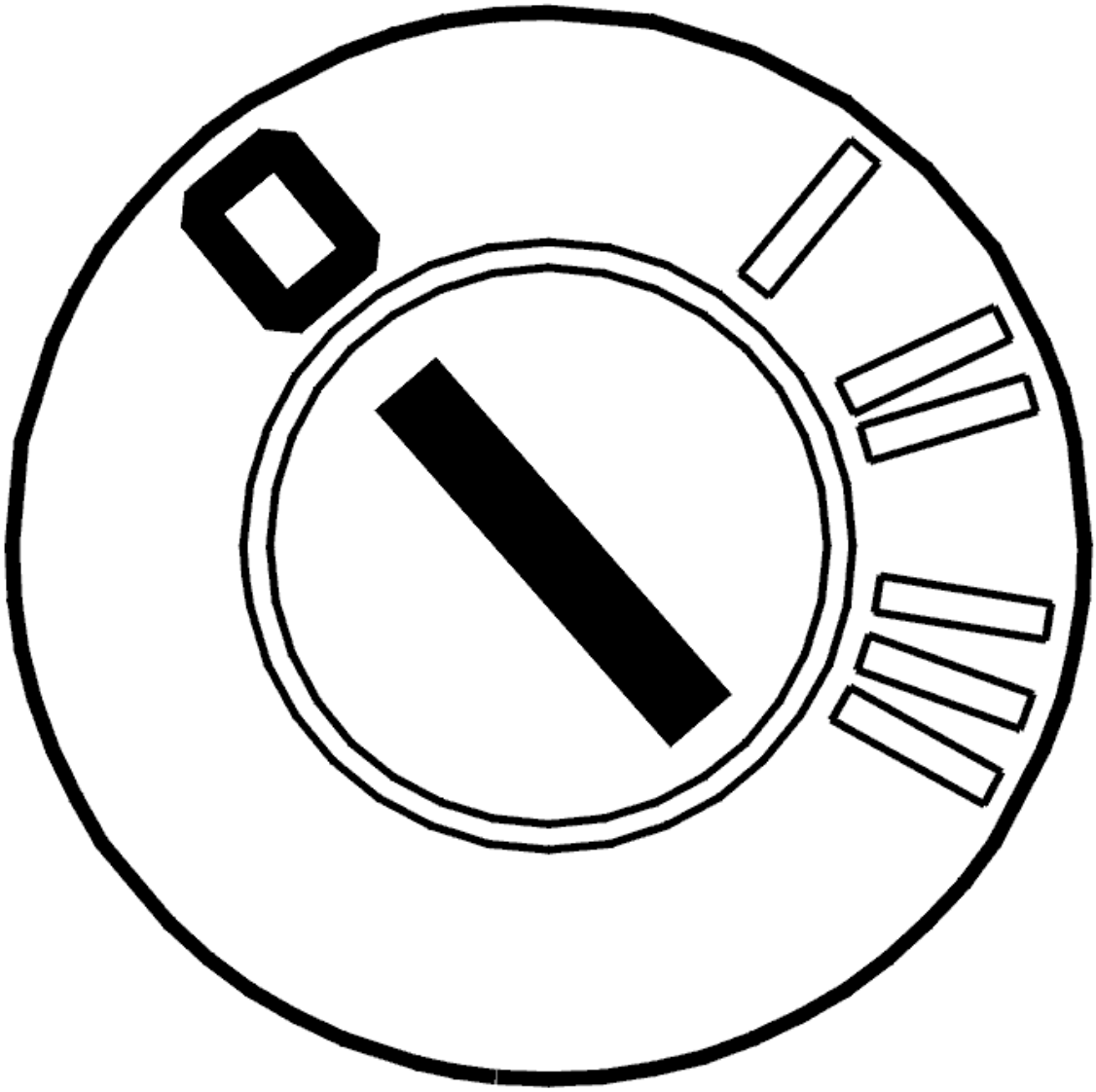


Fig. 245: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

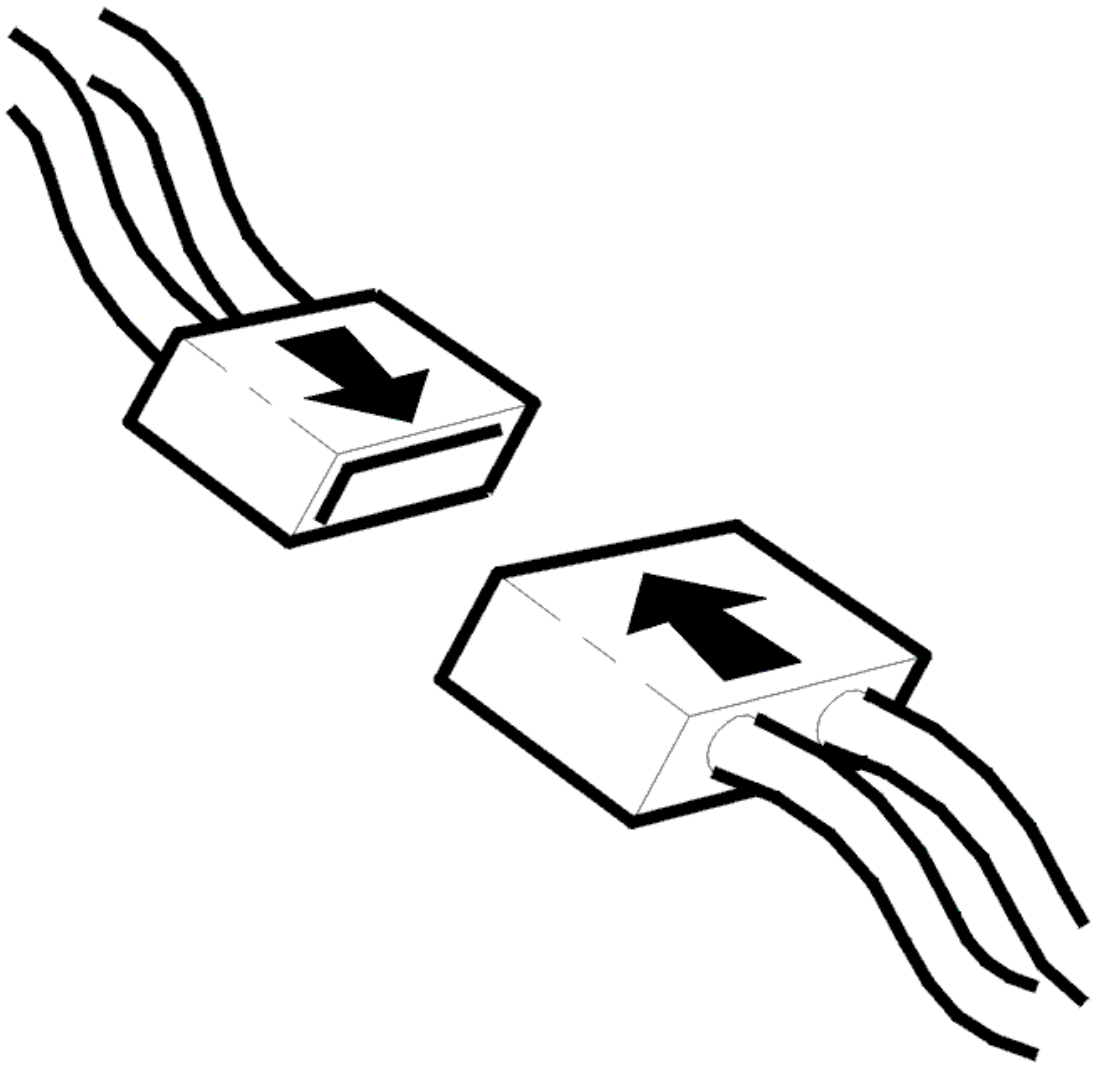


Fig. 246: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

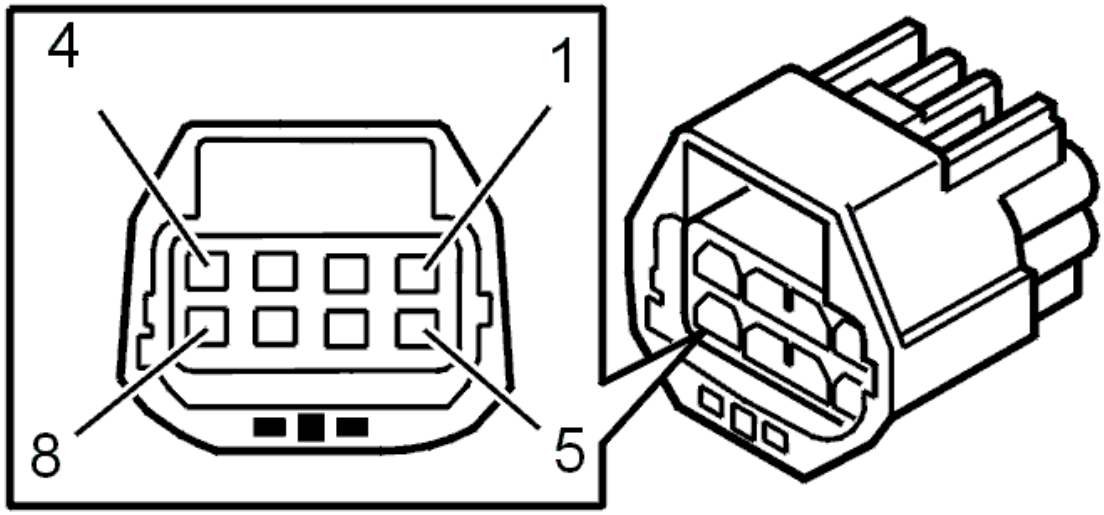


Fig. 247: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

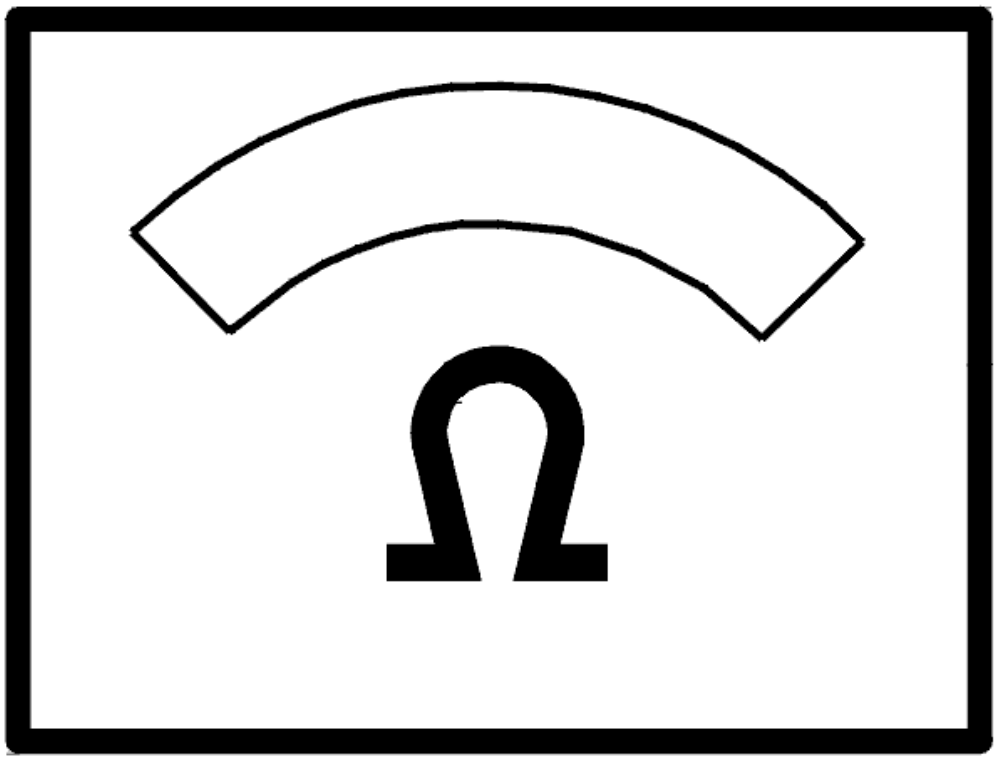


Fig. 248: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

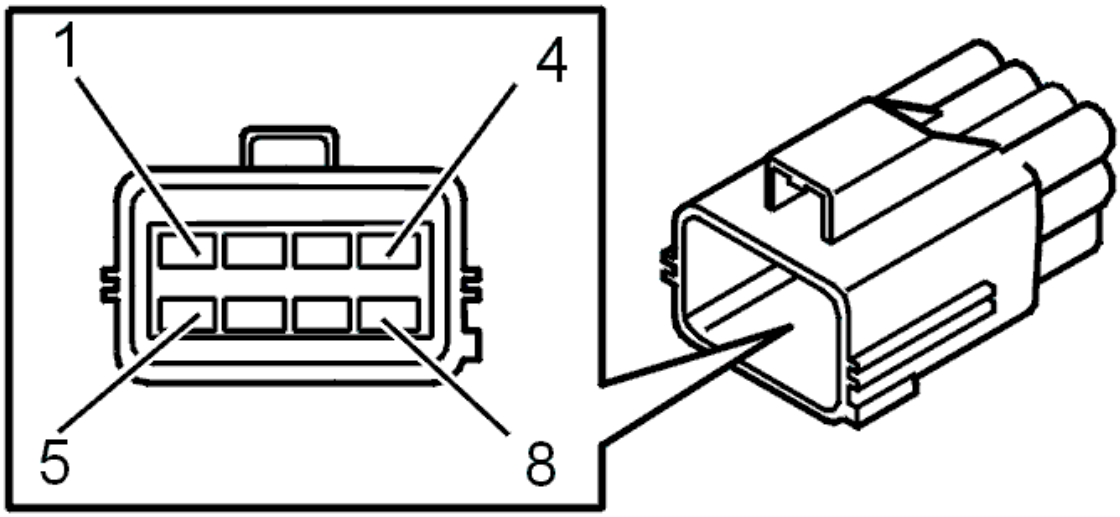


Fig. 249: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

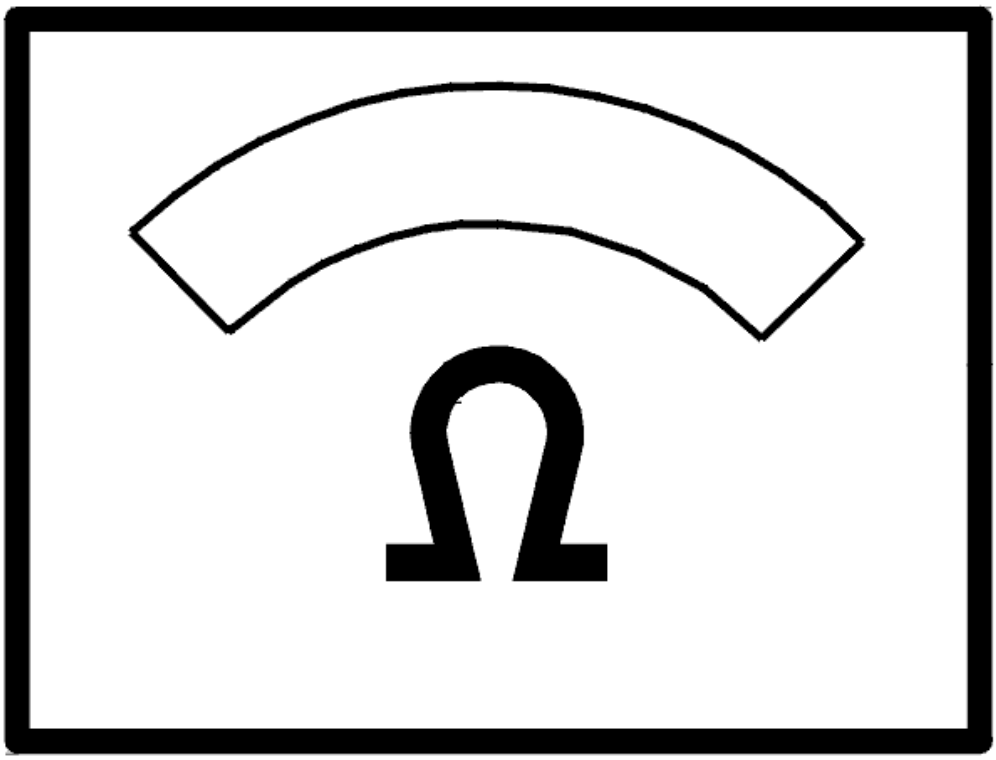


Fig. 250: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

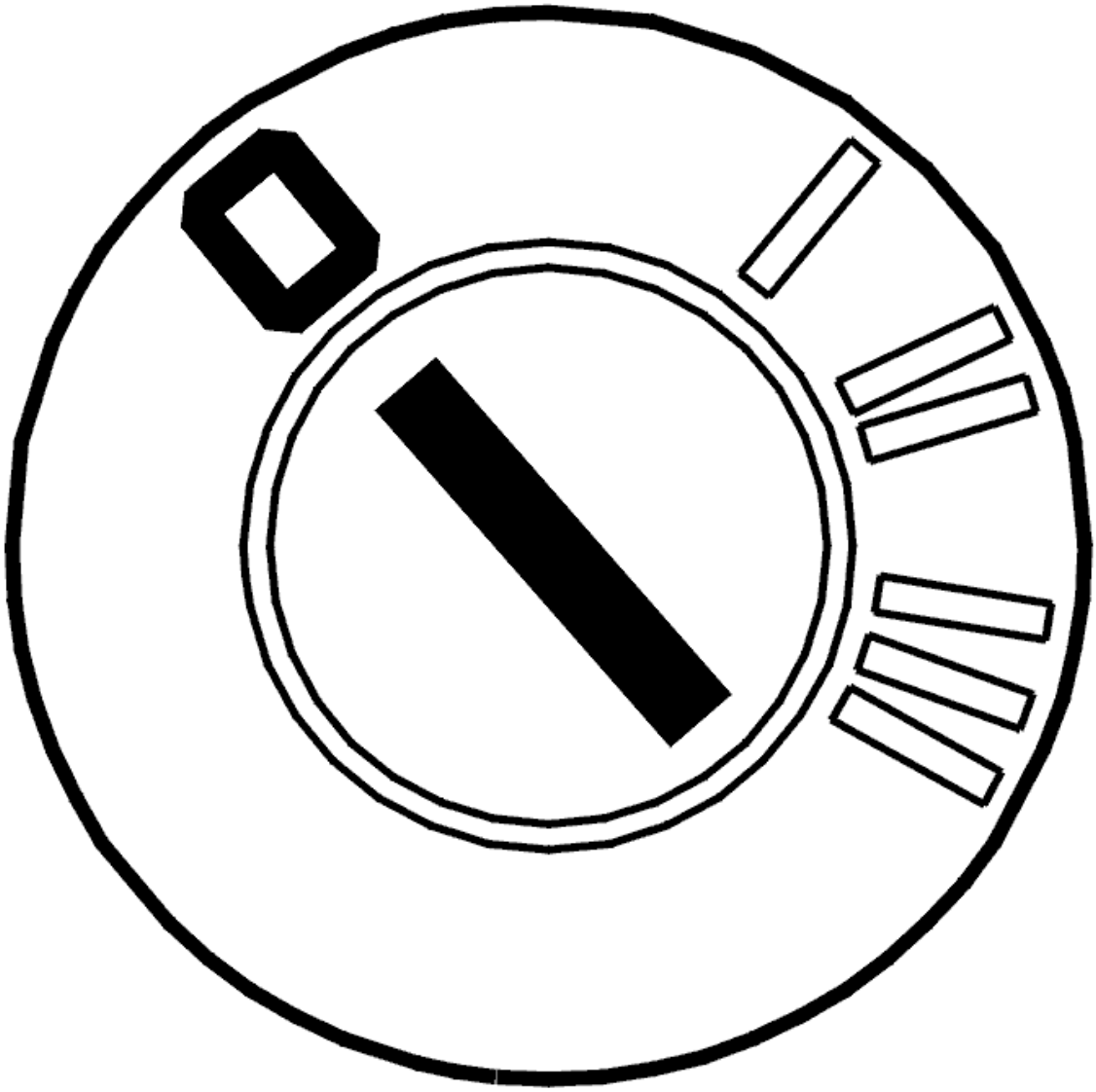


Fig. 251: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

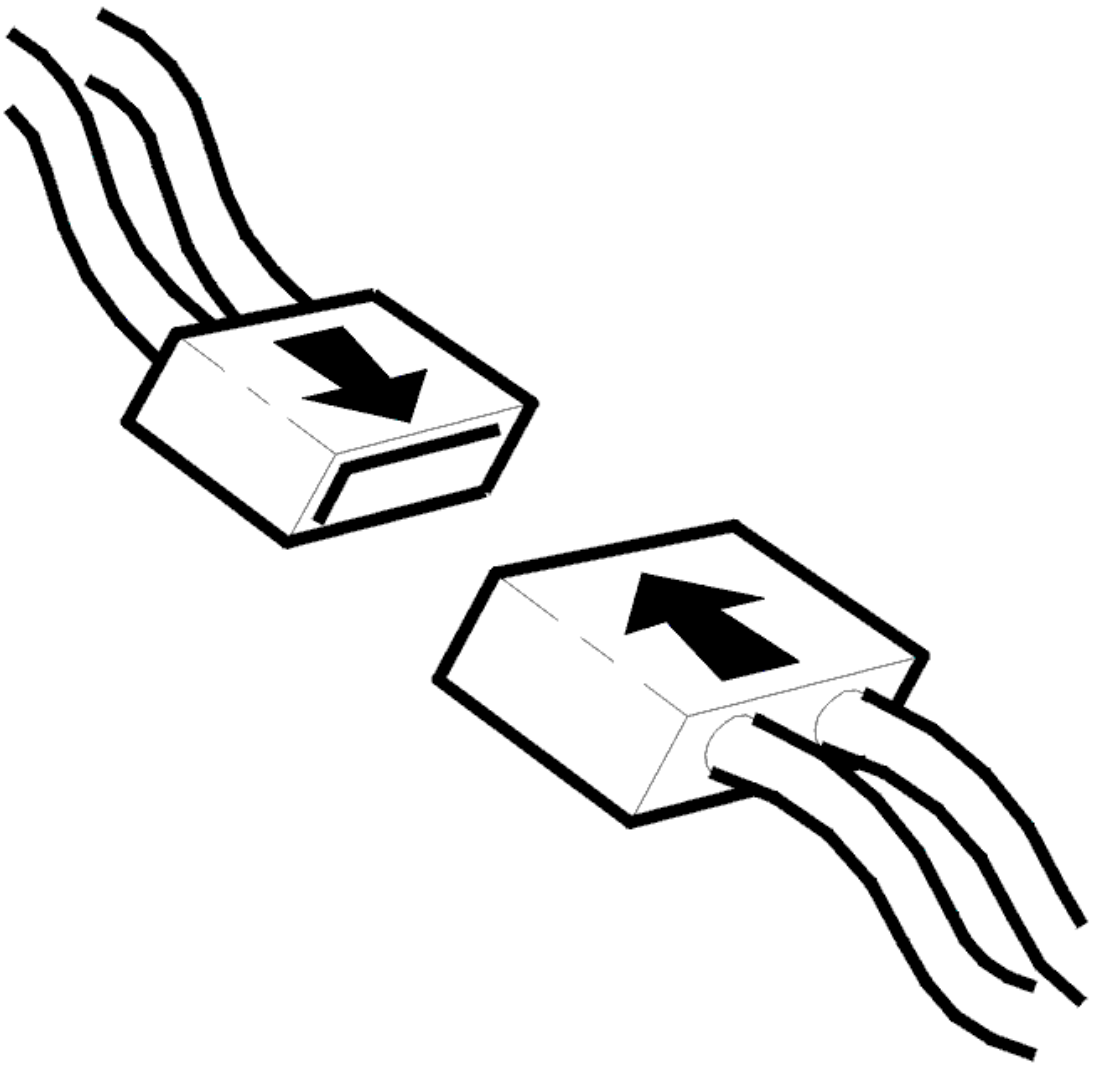


Fig. 252: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

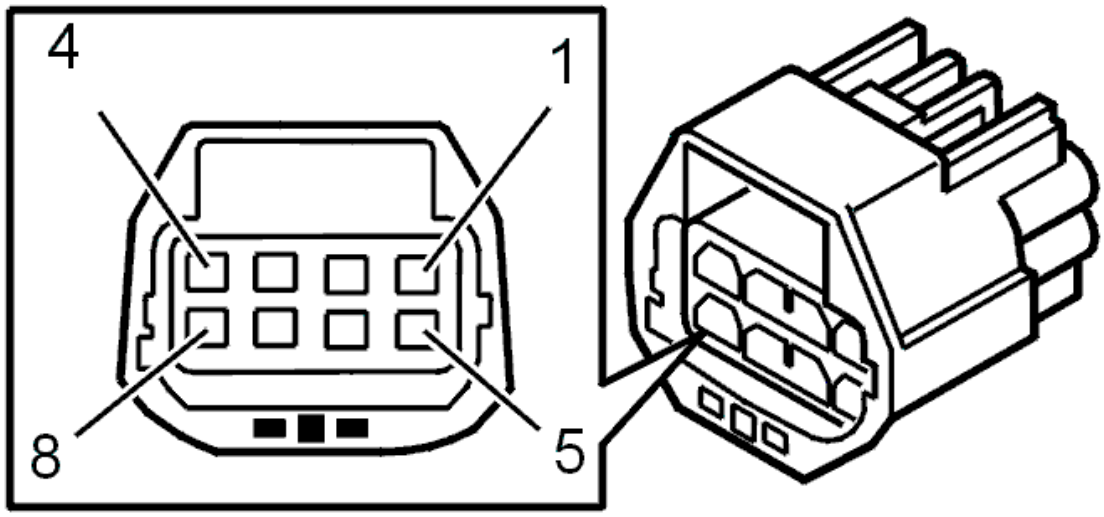


Fig. 253: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

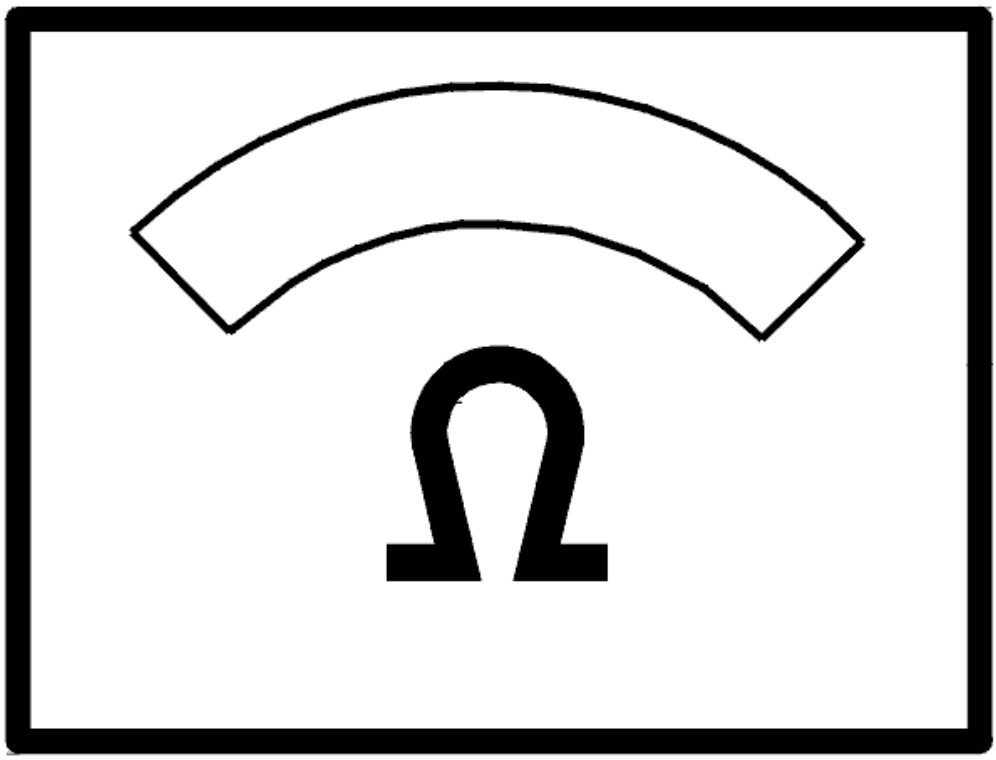


Fig. 254: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

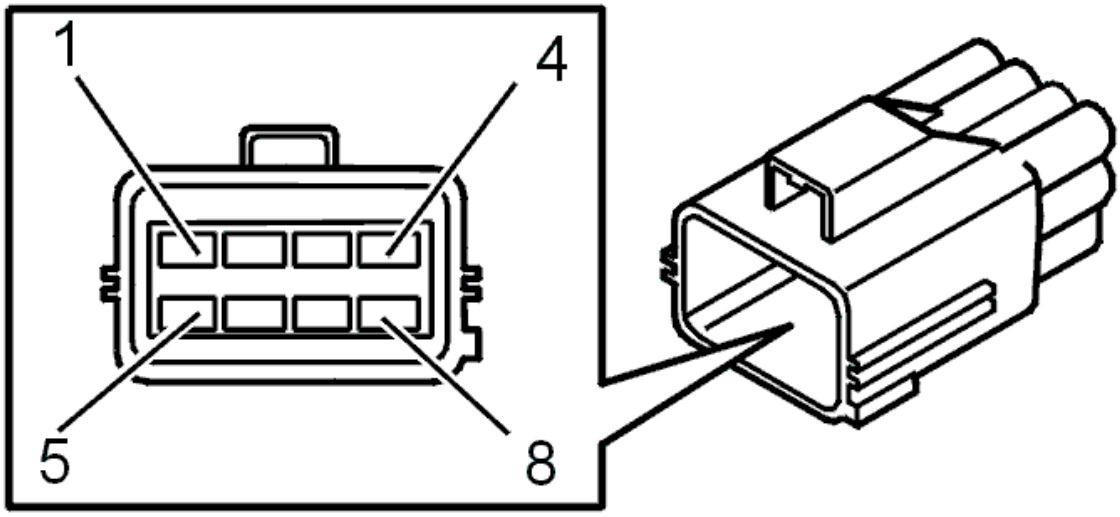


Fig. 255: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

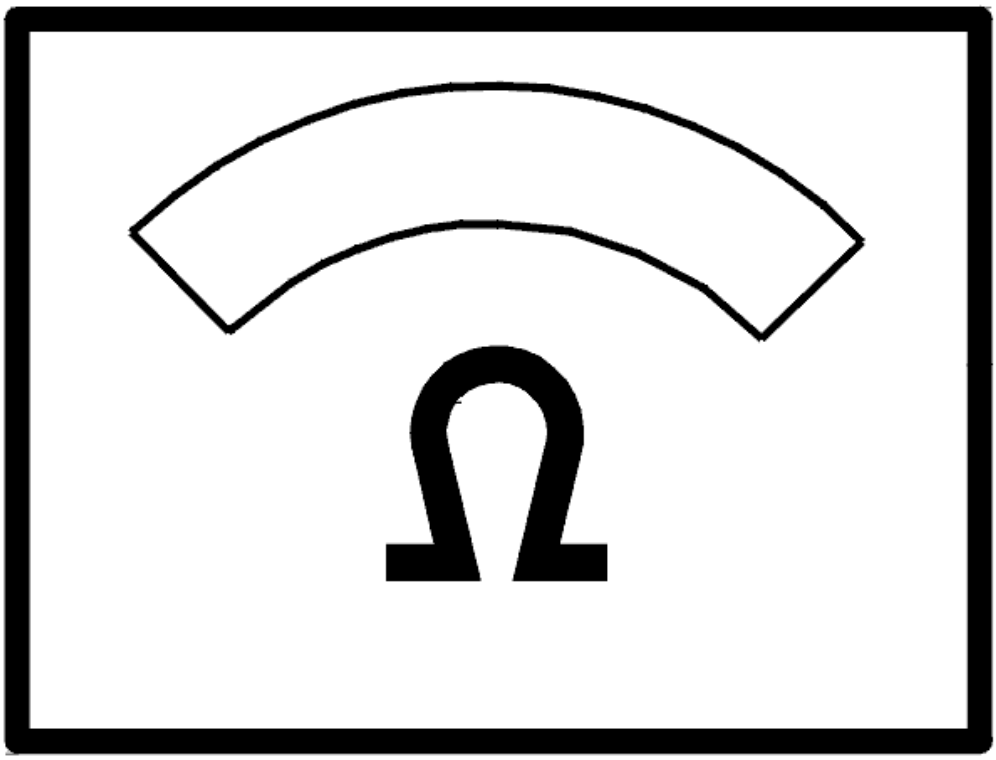


Fig. 256: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

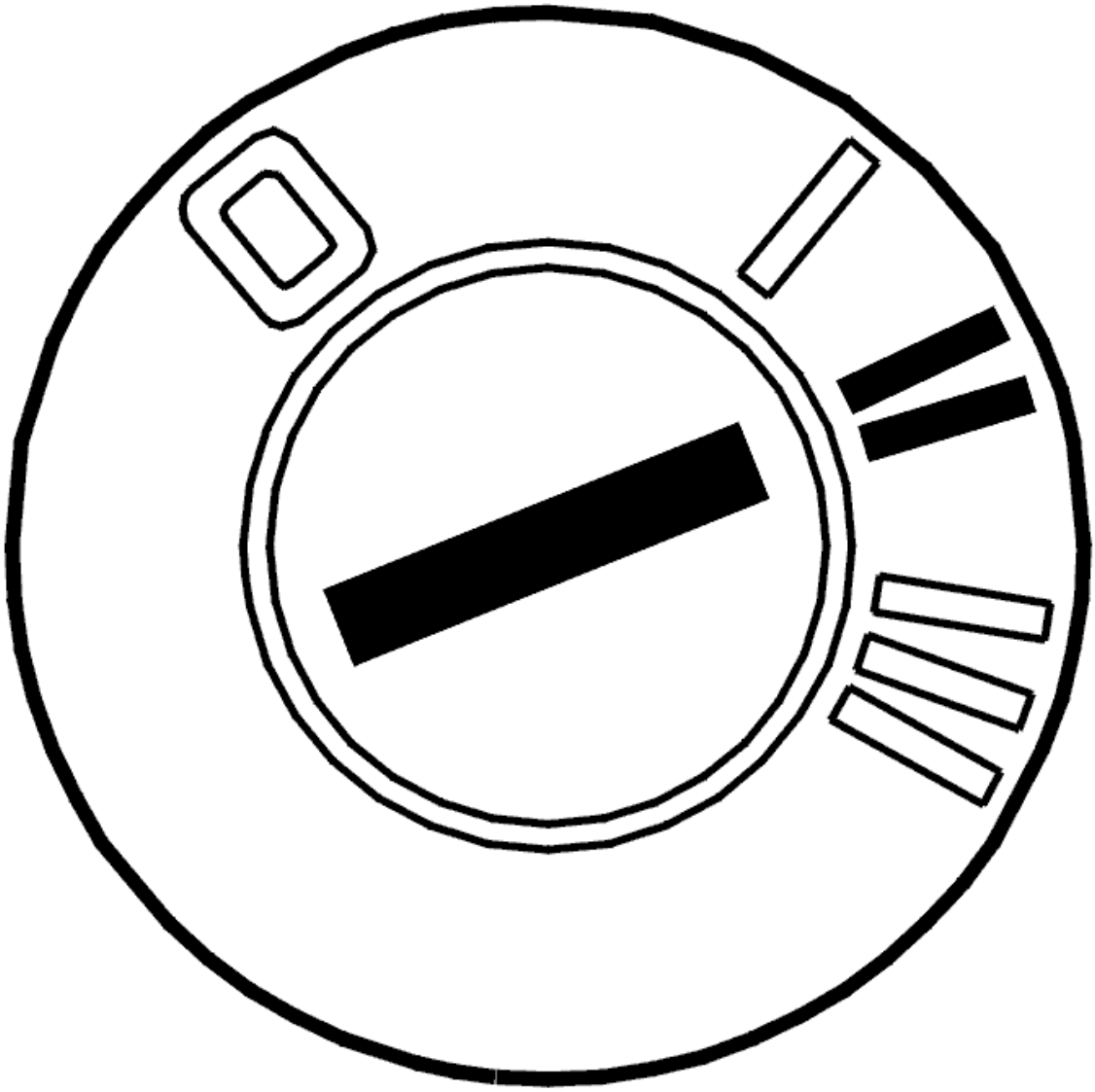


Fig. 257: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

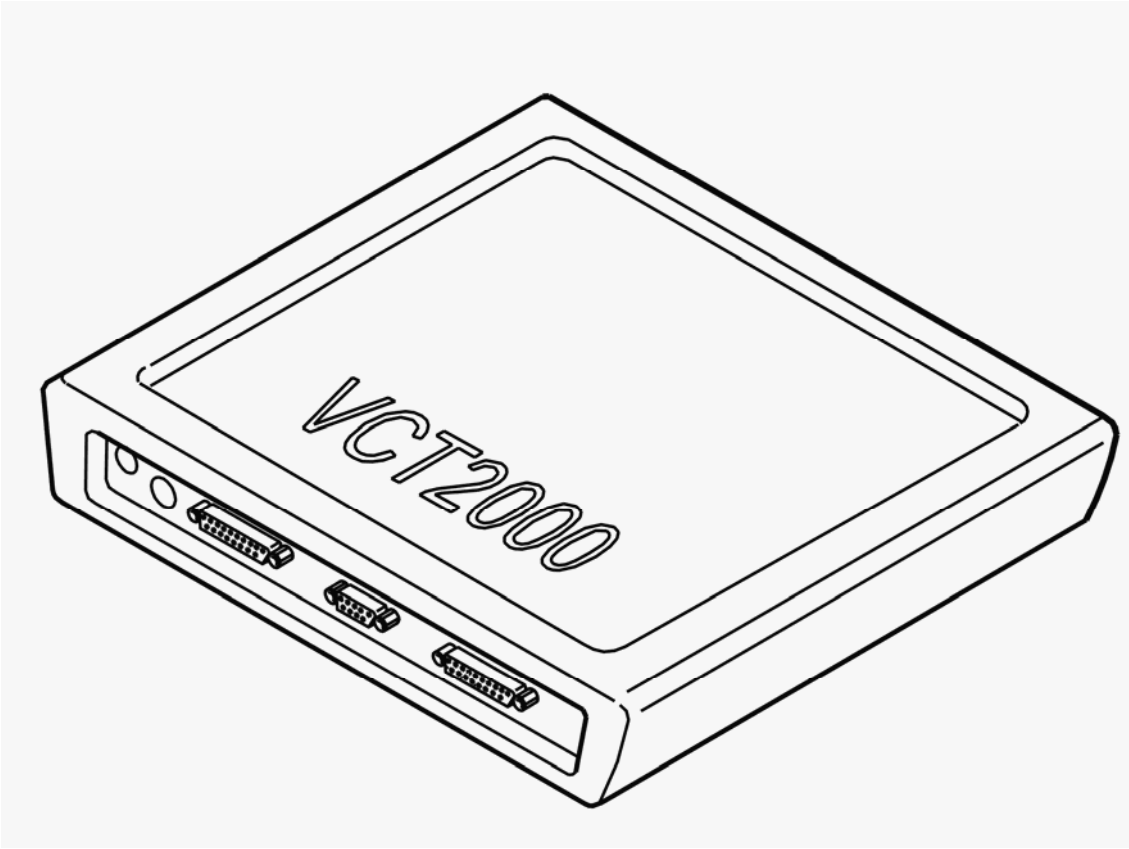


Fig. 258: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

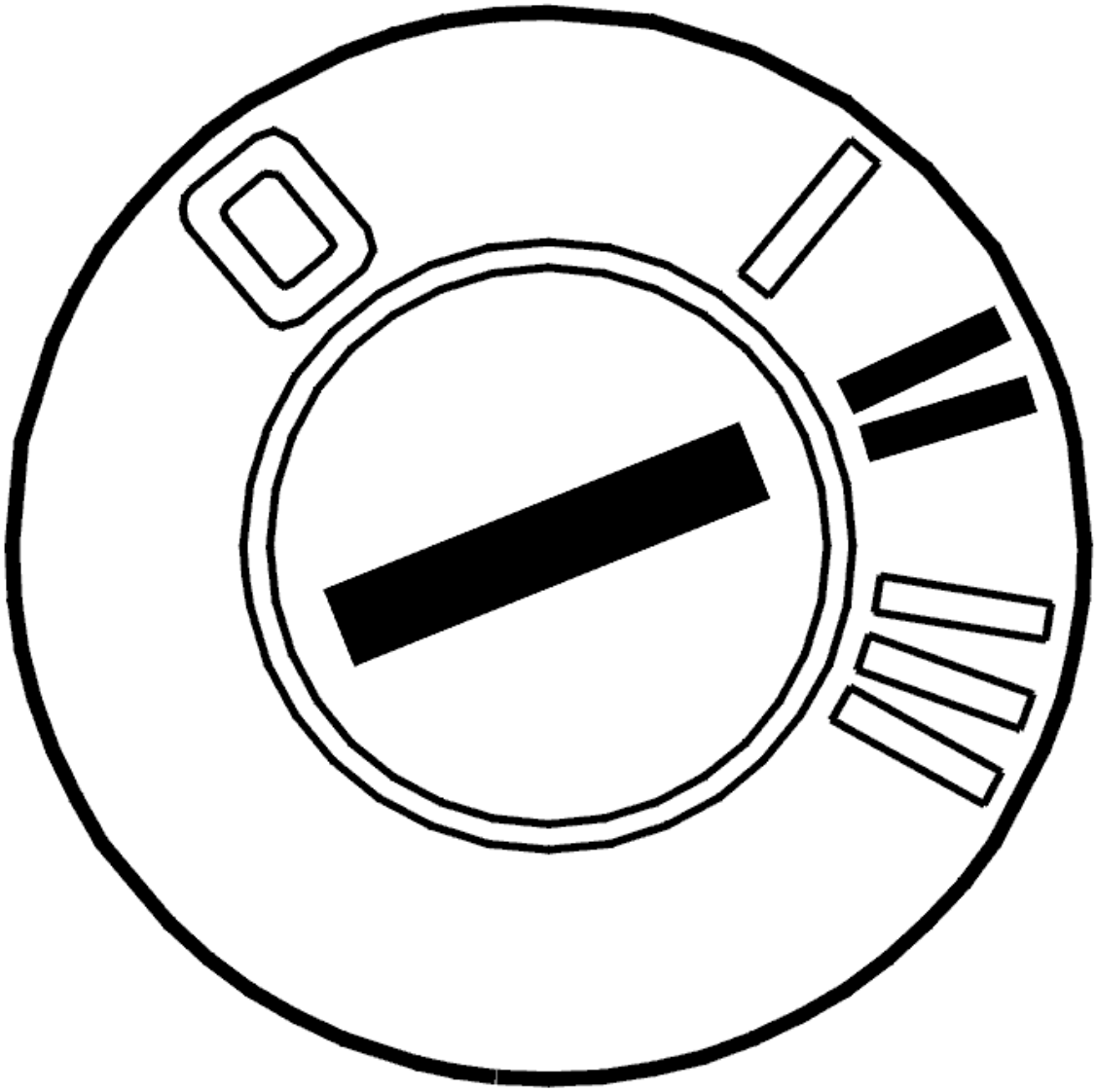


Fig. 259: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

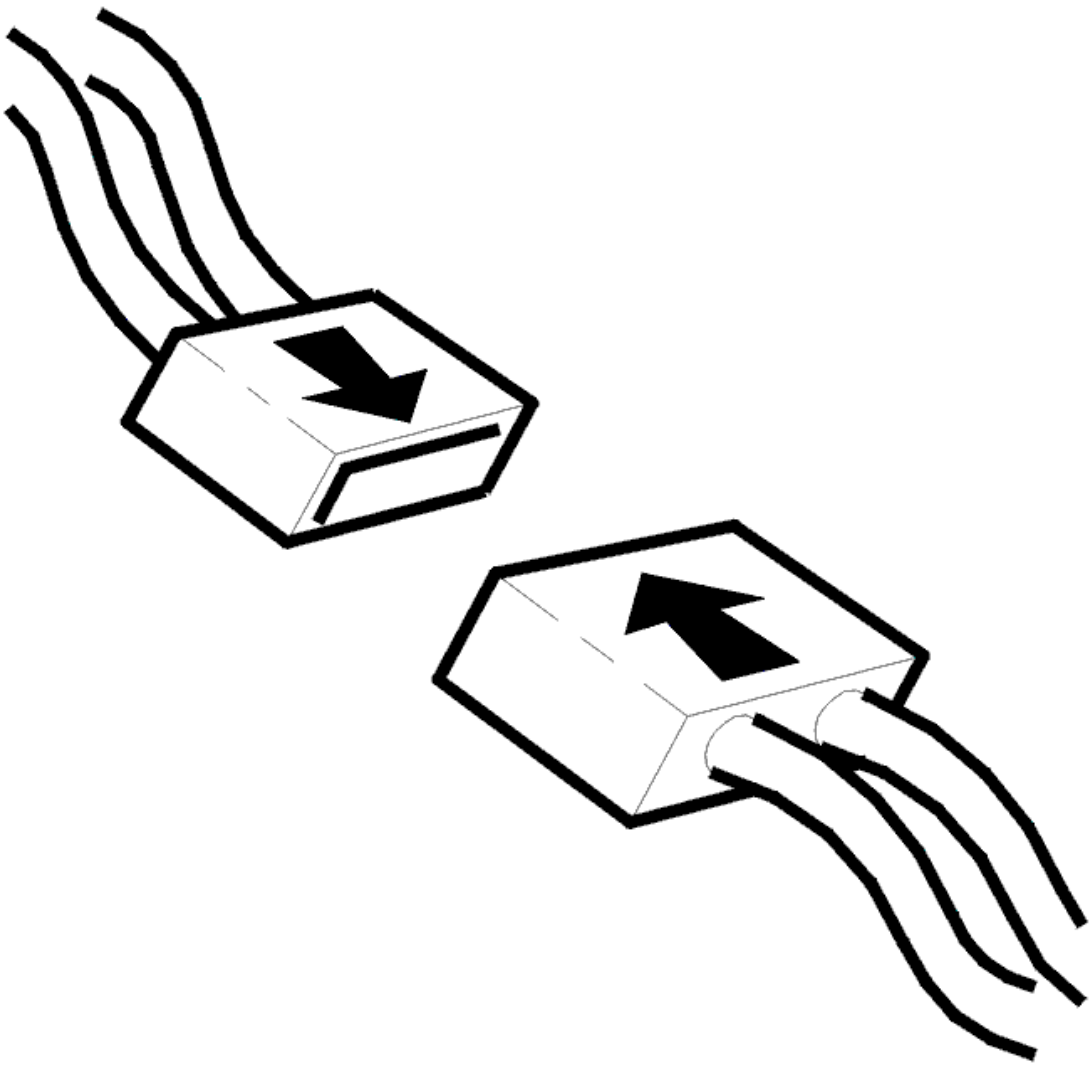


Fig. 260: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

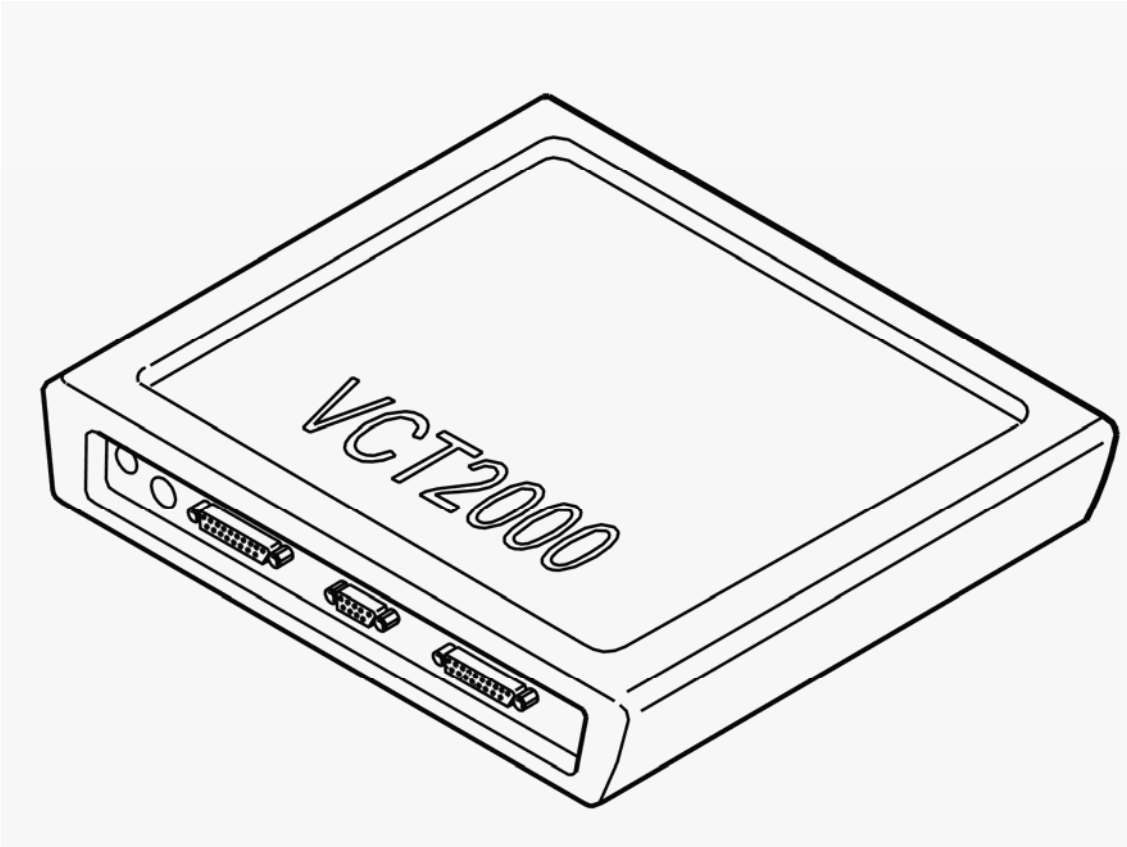


Fig. 261: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-0102: SHIFT SOLENOID S3. SIGNAL MISSING (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

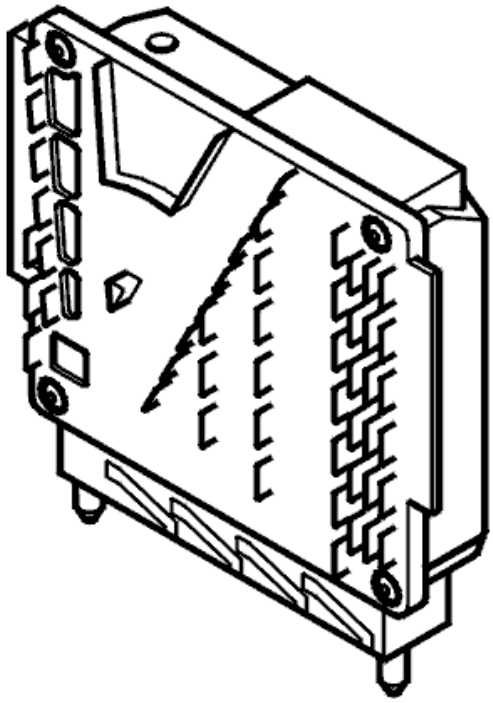


Fig. 262: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0002, TCM-0008, TCM-0102, TCM-0108 or TCM-010B are stored (depending on the solenoid) if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is missing when the solenoid is activated.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Contact resistance in terminals.
- Open-circuit in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

SIGNAL MISSING

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

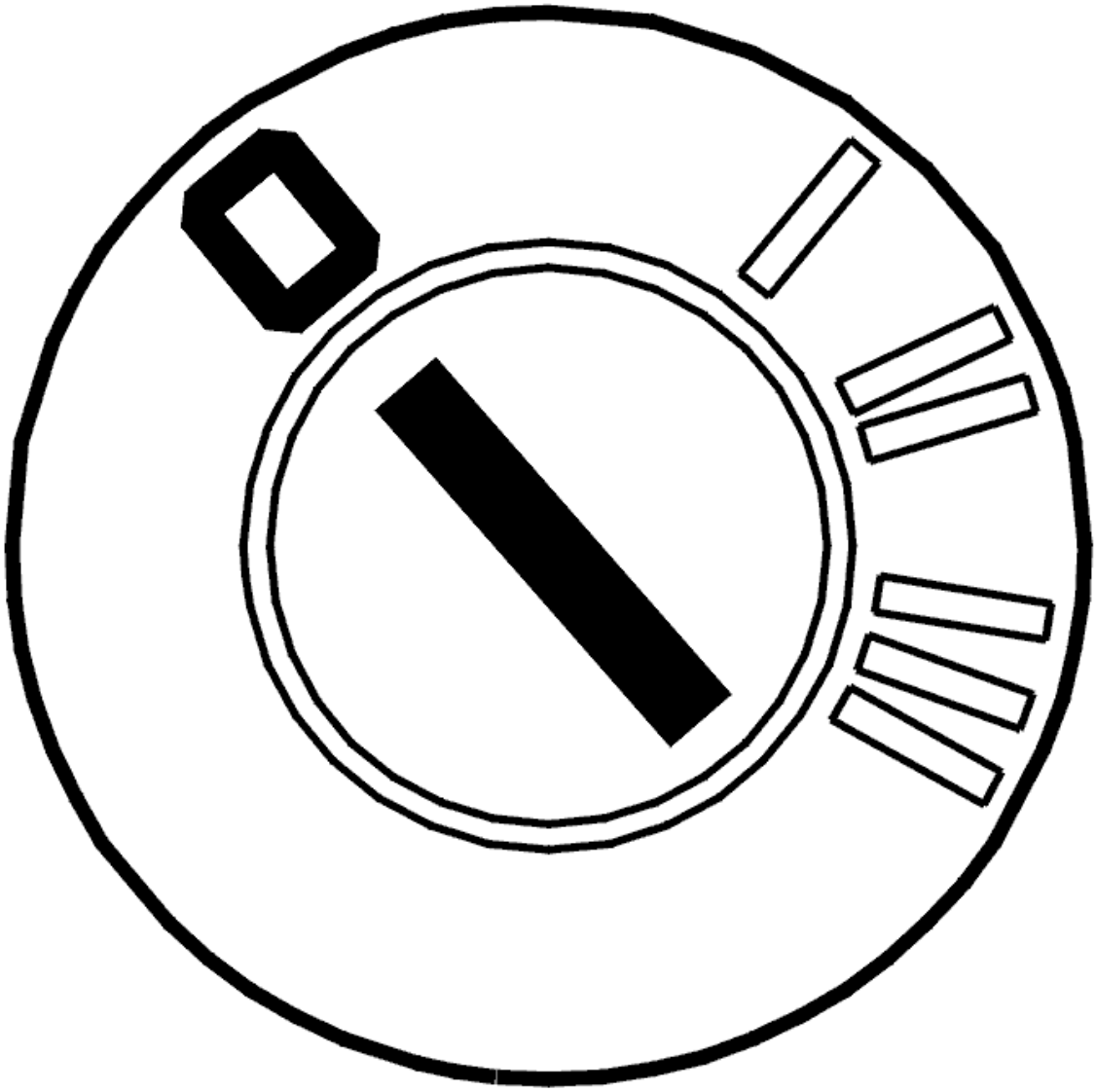


Fig. 263: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

  HINT: If the temperature is outside its permitted range, fault-trace the temperature sensor.

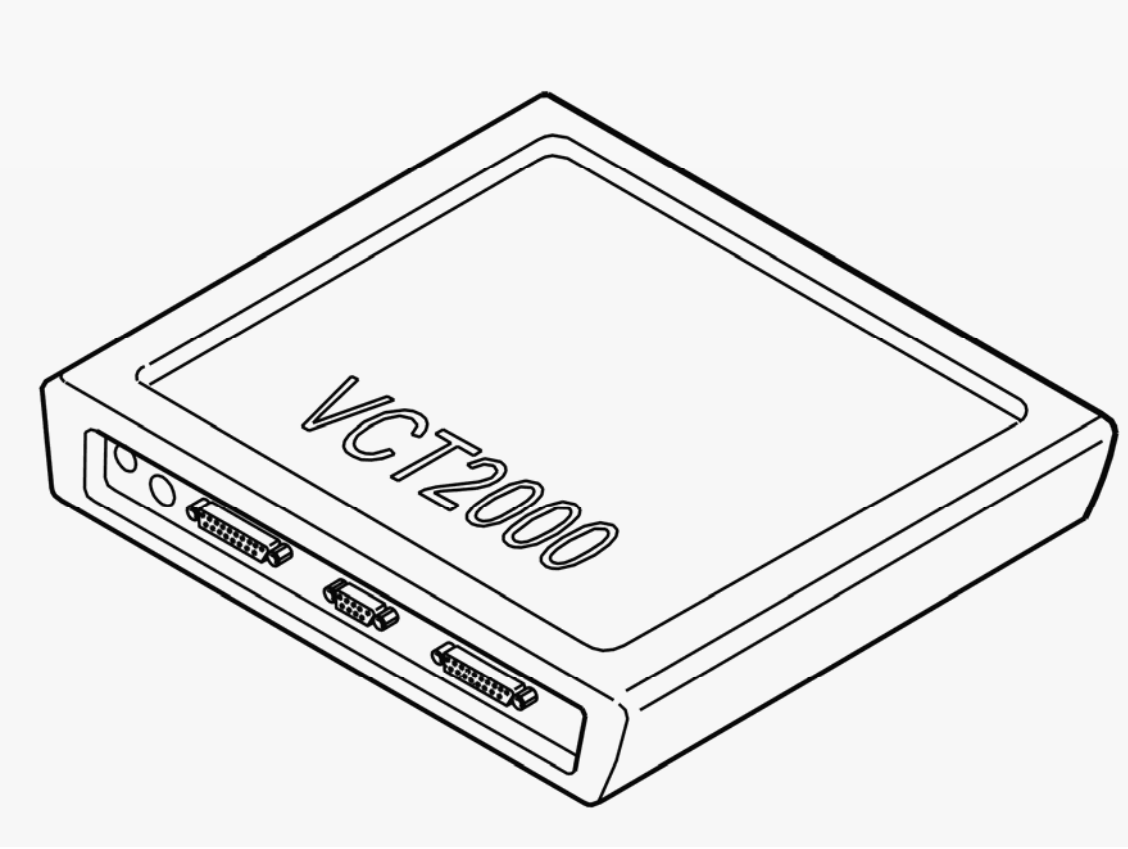


Fig. 264: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S3**

- **NO**

  Refer to **FAULTY SIGNAL**

CHECKING SHIFT SOLENOID S3

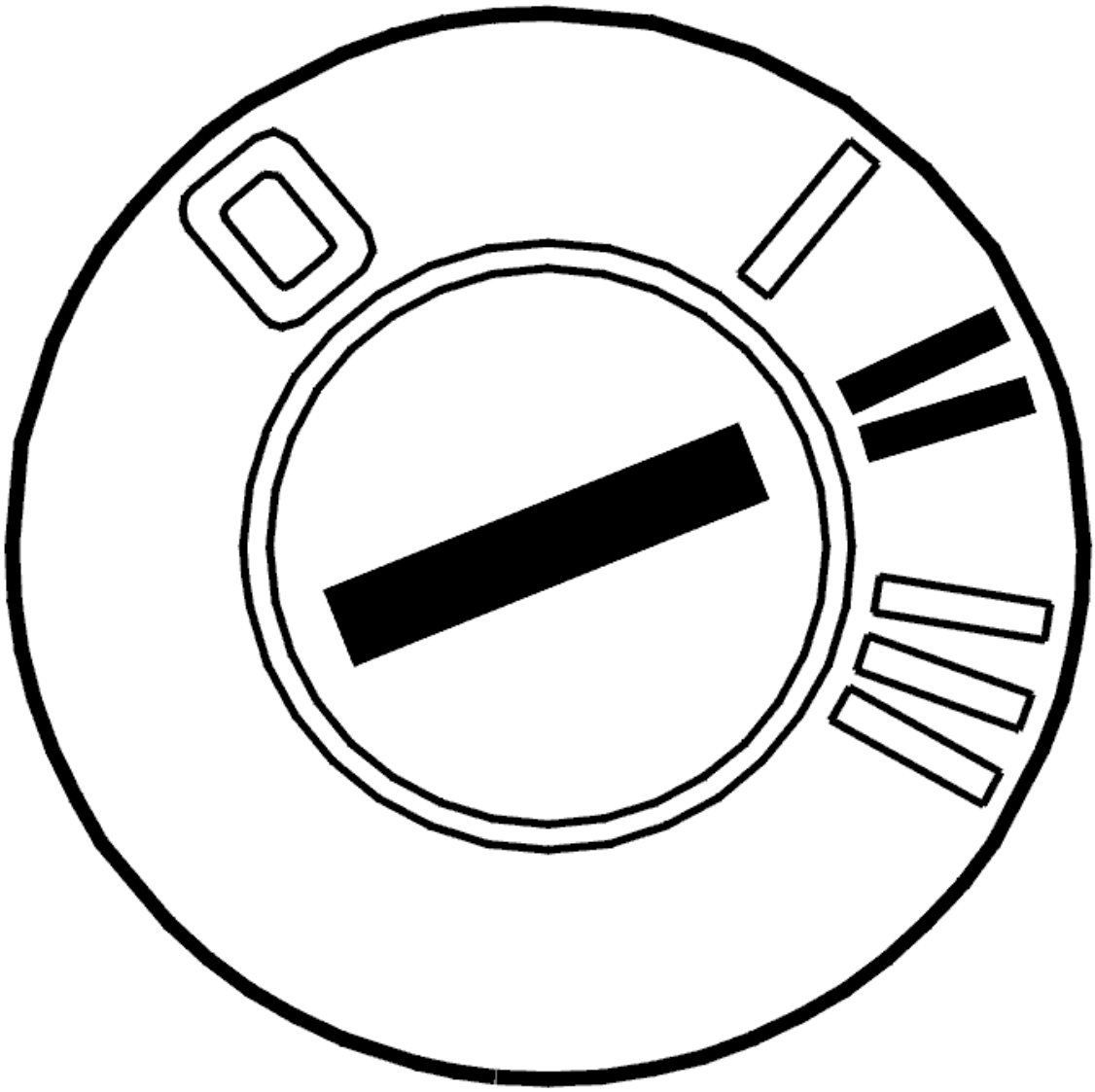


Fig. 265: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S3.

The current should oscillate between 0 and approximately 1.5 A.

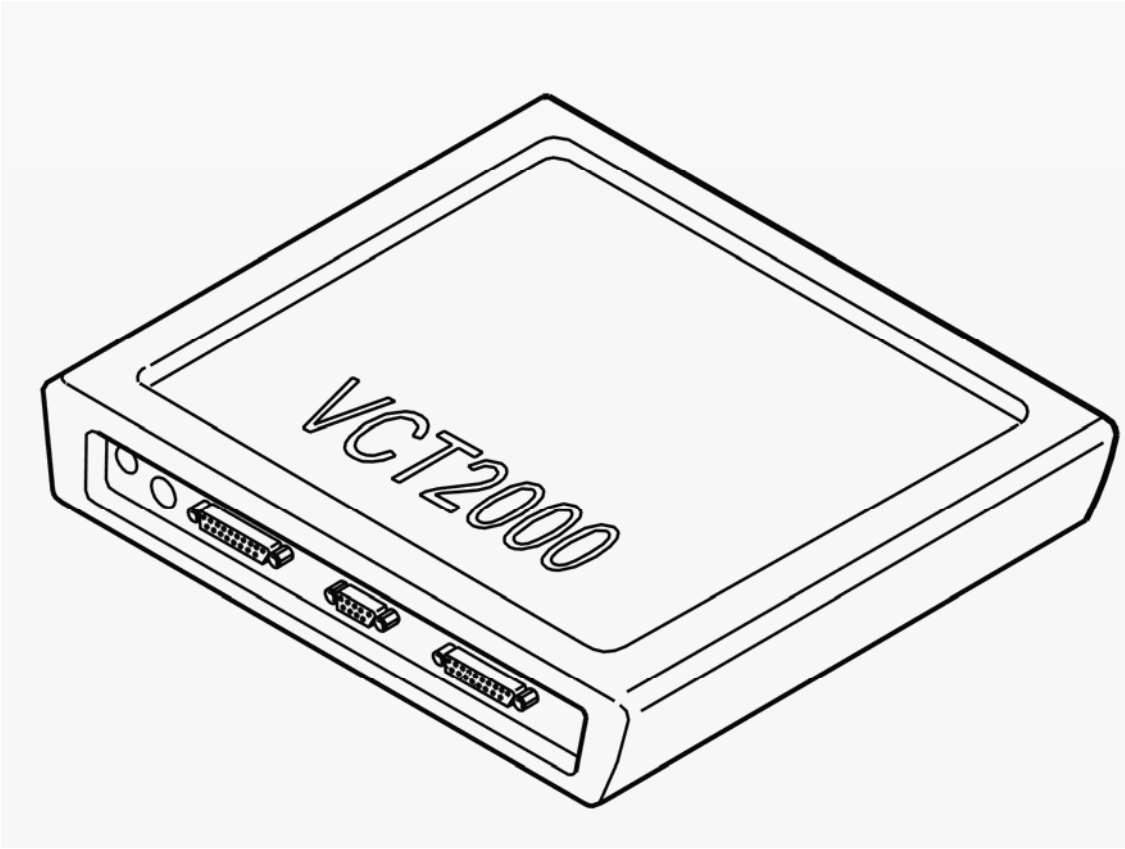


Fig. 266: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING RESISTANCE**

CHECKING RESISTANCE

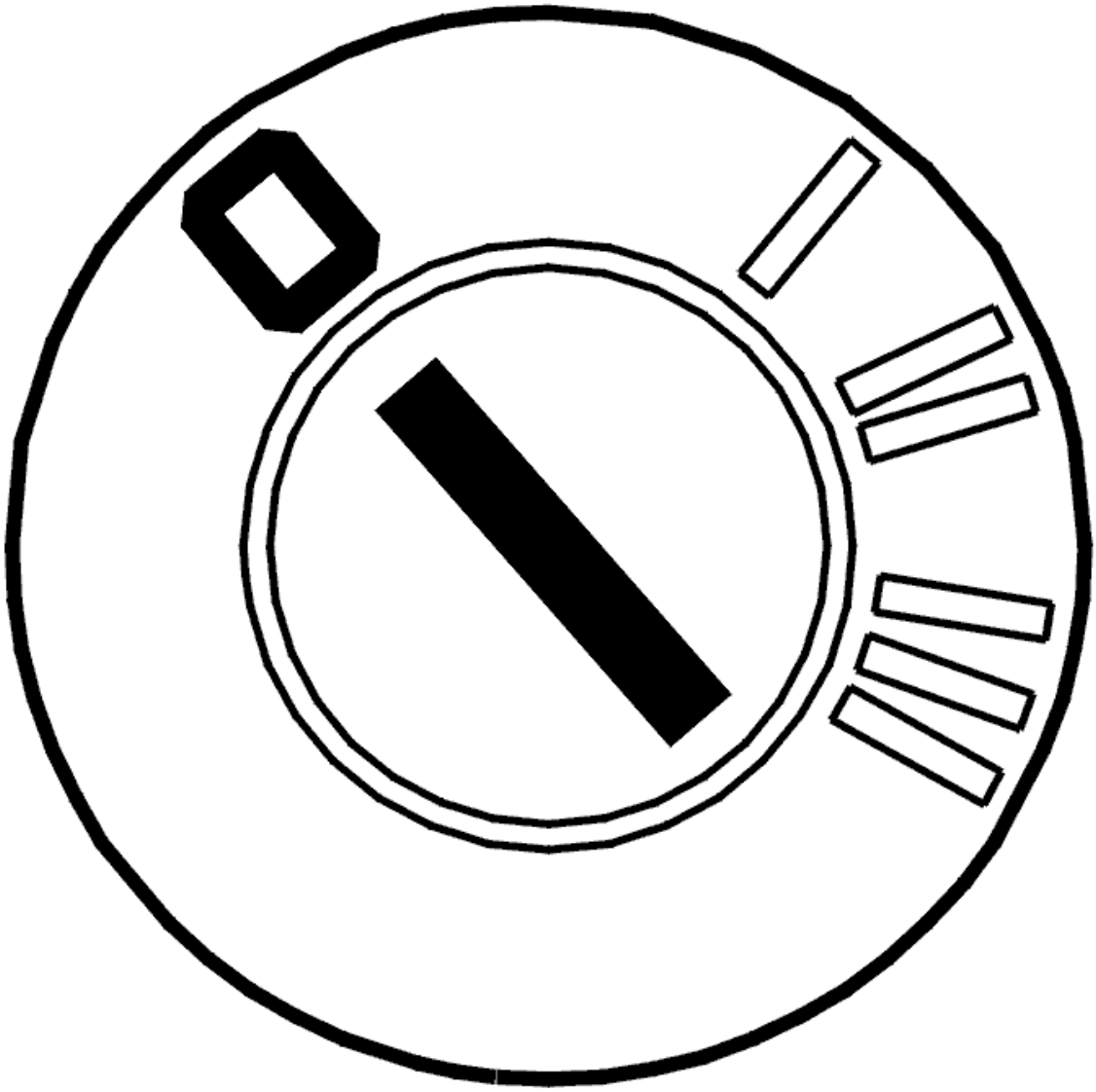


Fig. 267: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector.

Check solenoid S3 by measuring the resistance between transmission connector terminal #C3 and the transmission housing. The resistance must be 11-15 ohms.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

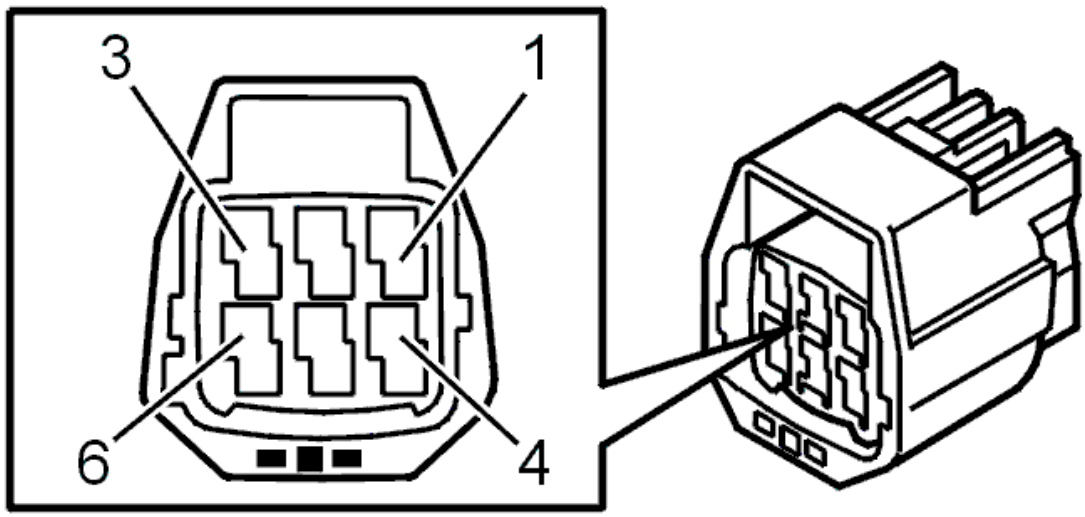


Fig. 268: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

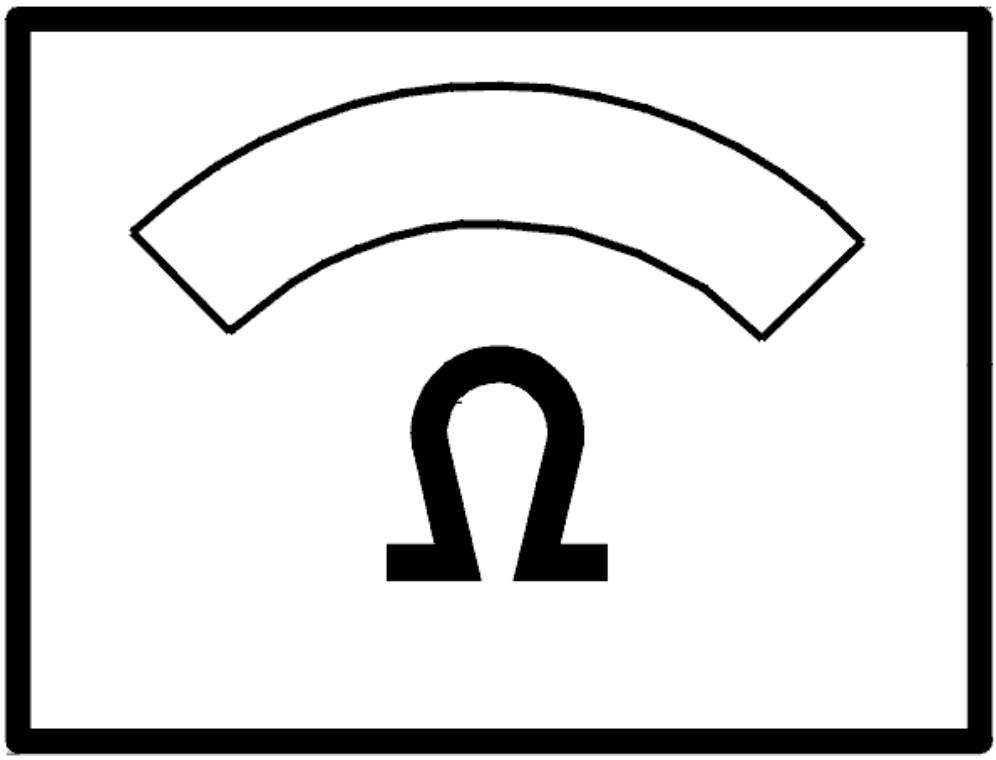


Fig. 269: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

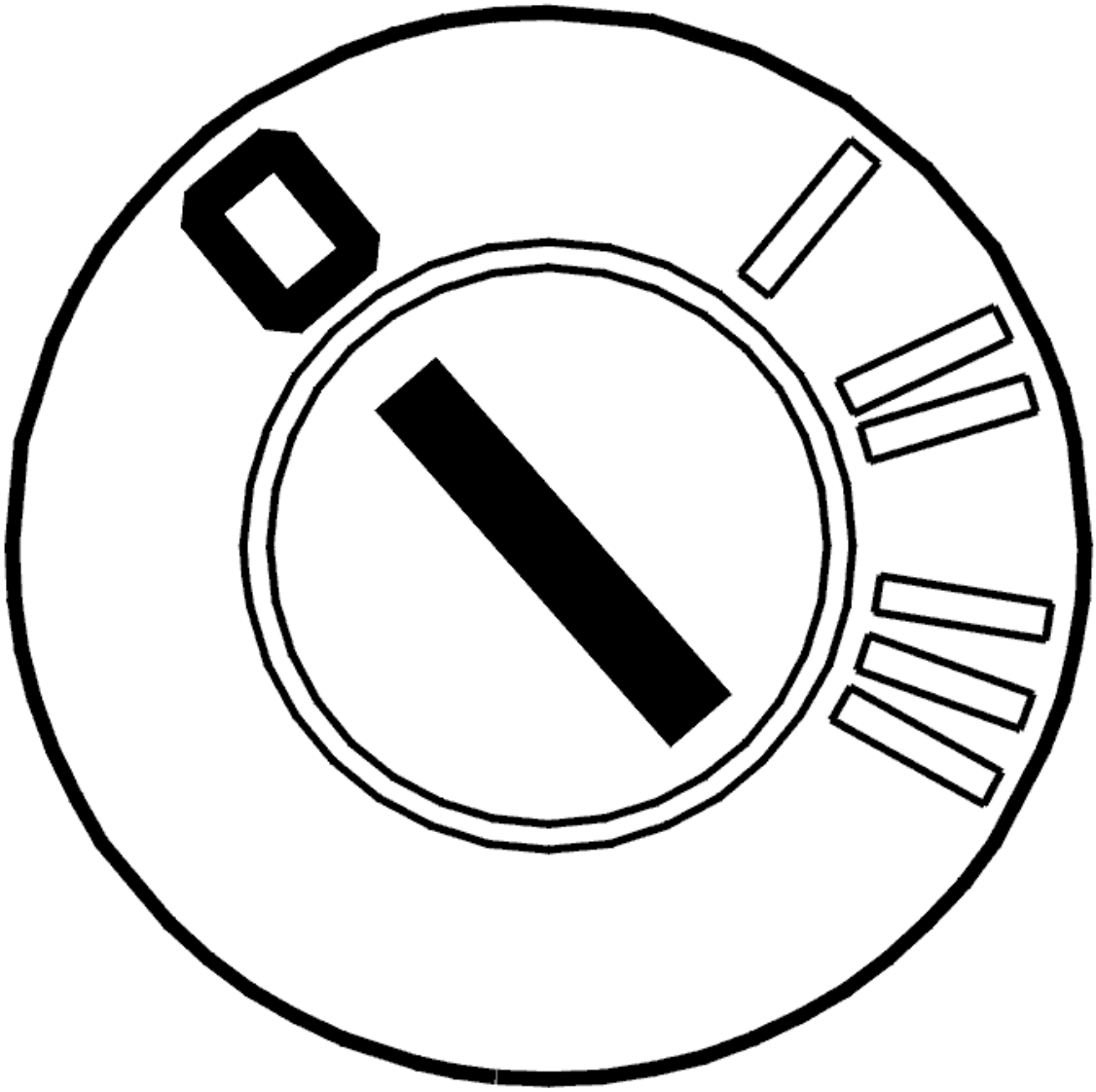


Fig. 270: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the cable between control module terminal #A48 (#A48) and transmission connector terminal #C3 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

  Remedy as necessary.

  Other information:

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**

- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

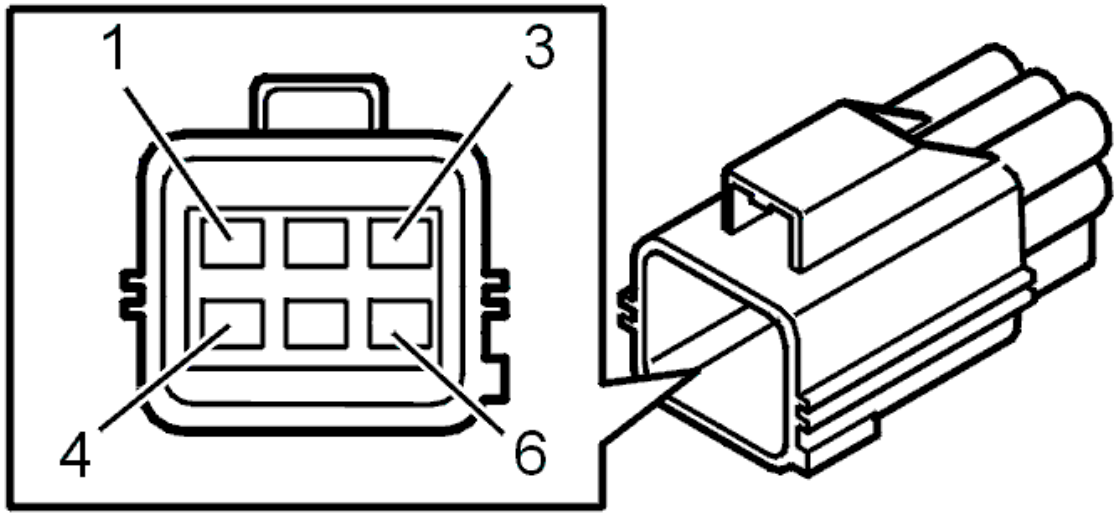


Fig. 271: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

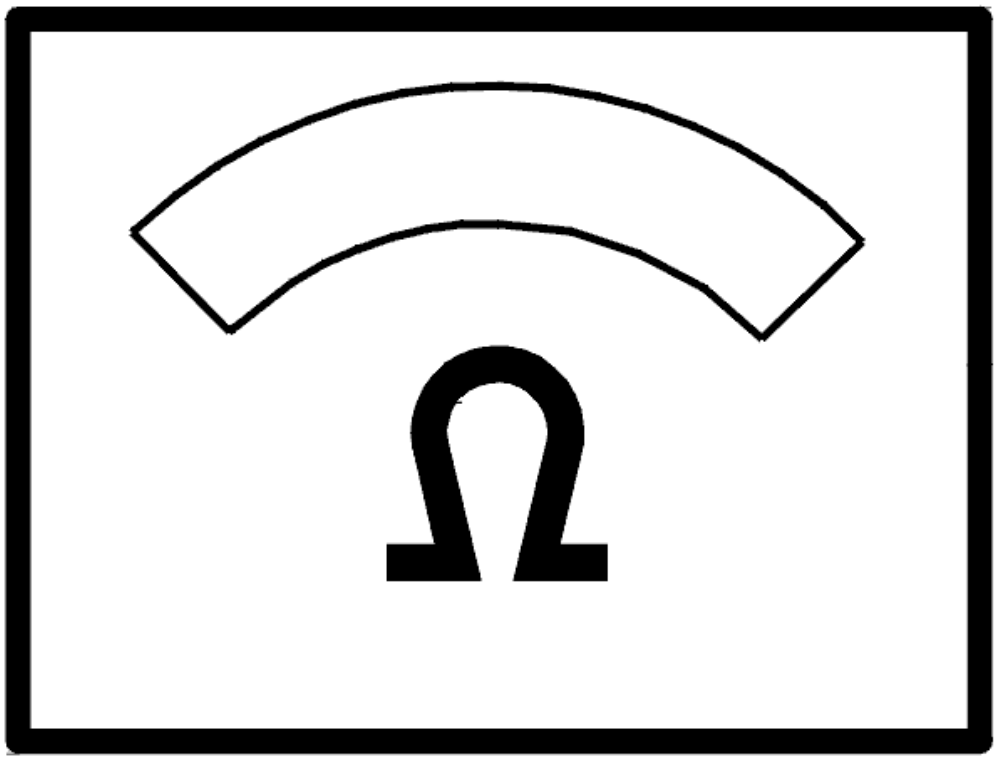


Fig. 272: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

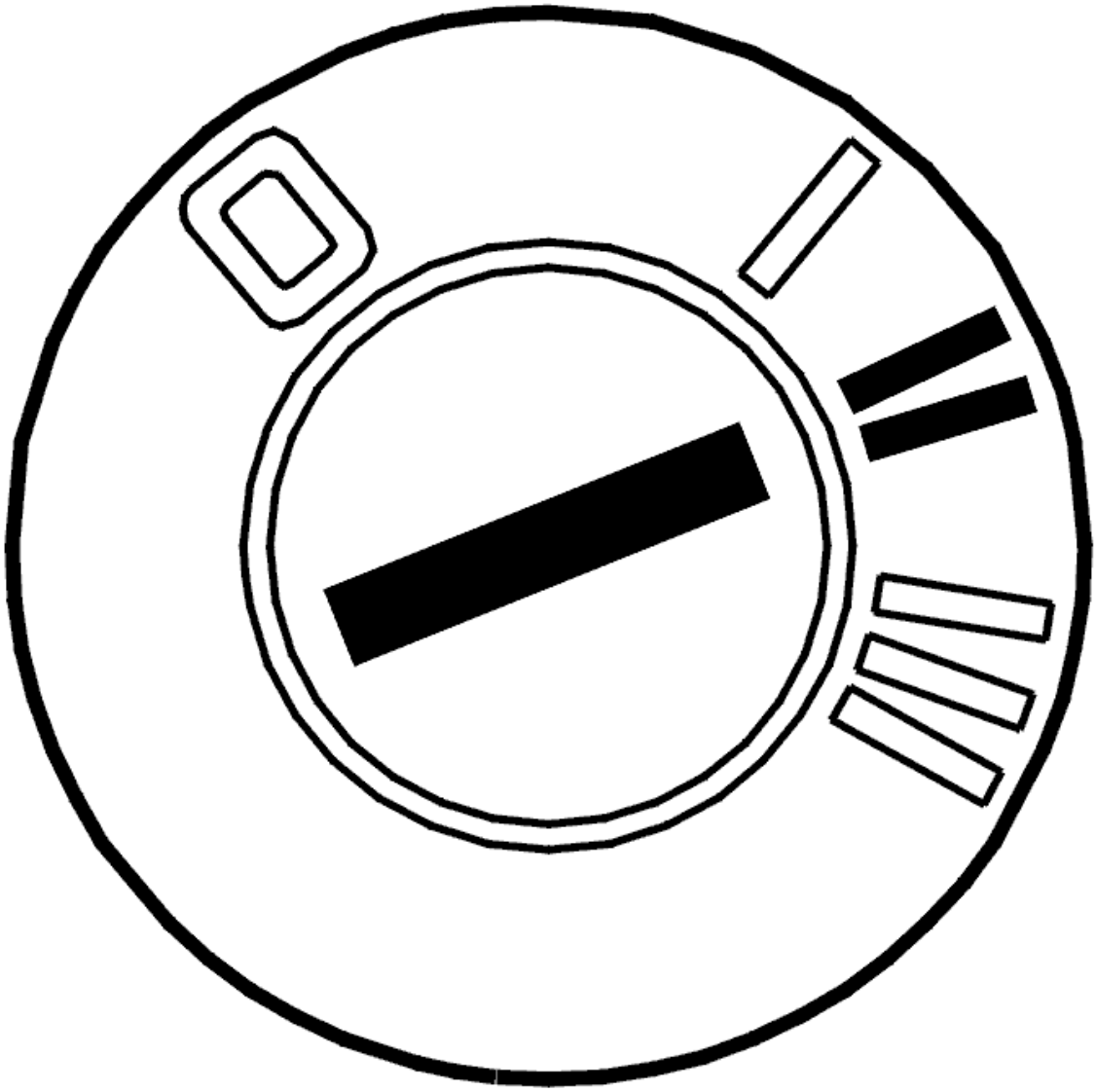


Fig. 273: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

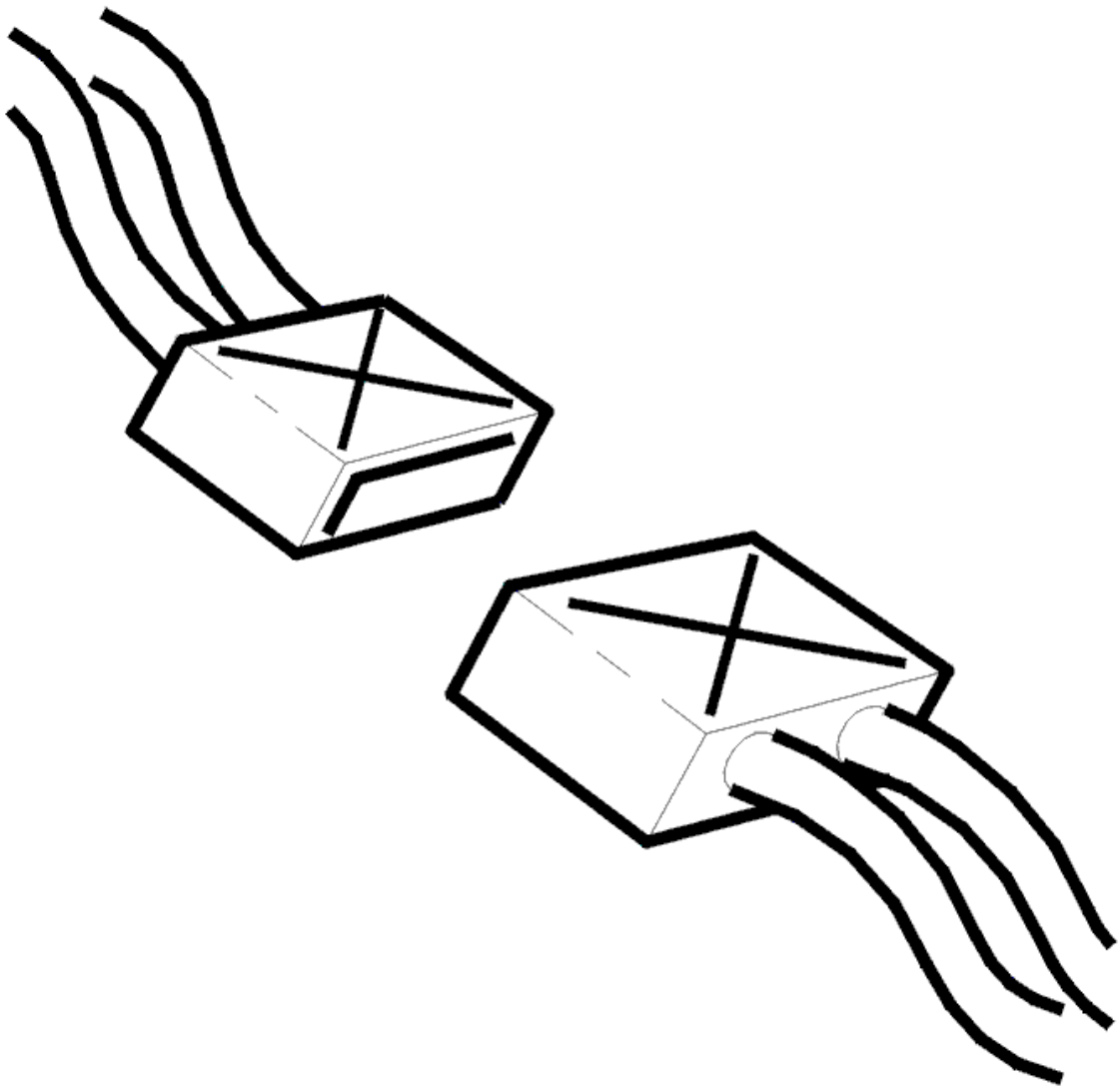


Fig. 274: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

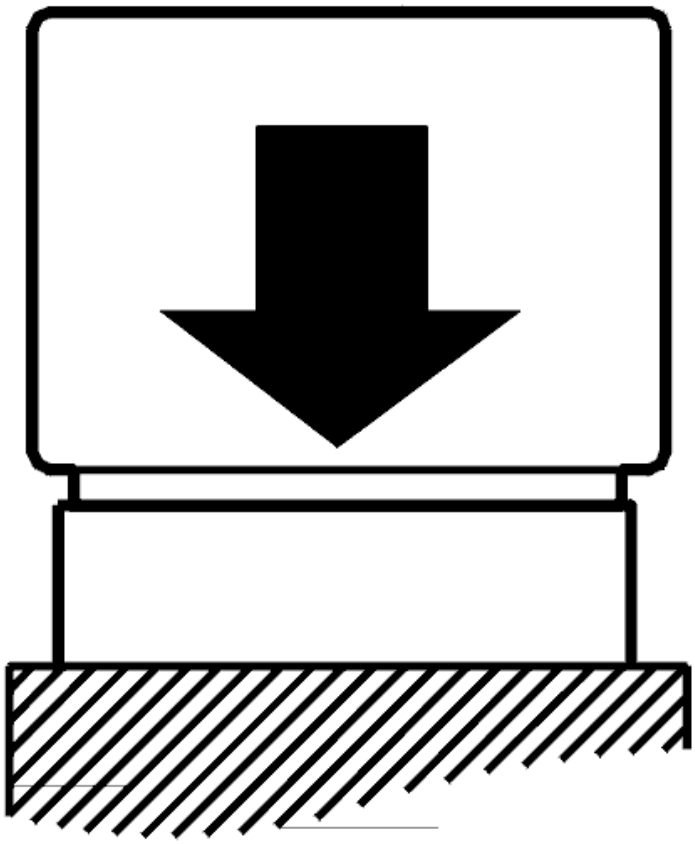


Fig. 275: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector C disconnected
- Ignition on
- Gear selector in position P.

Check the transmission control module (TCM) by measuring the resistance between terminals #A48 (#A48) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

NOTE: When removing the transmission connector, the control module may store

diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

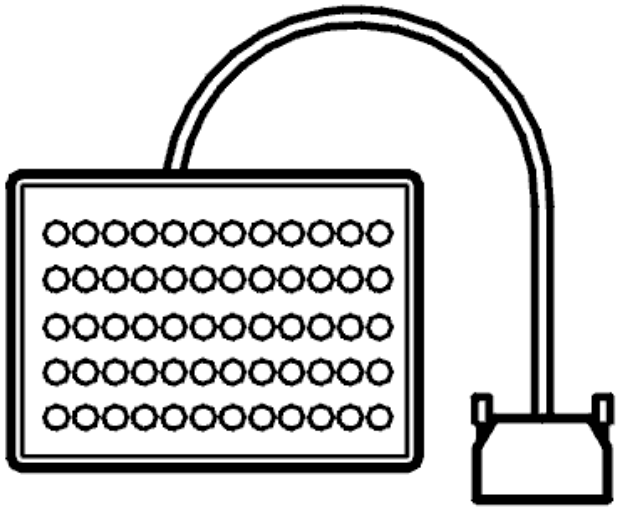


Fig. 276: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

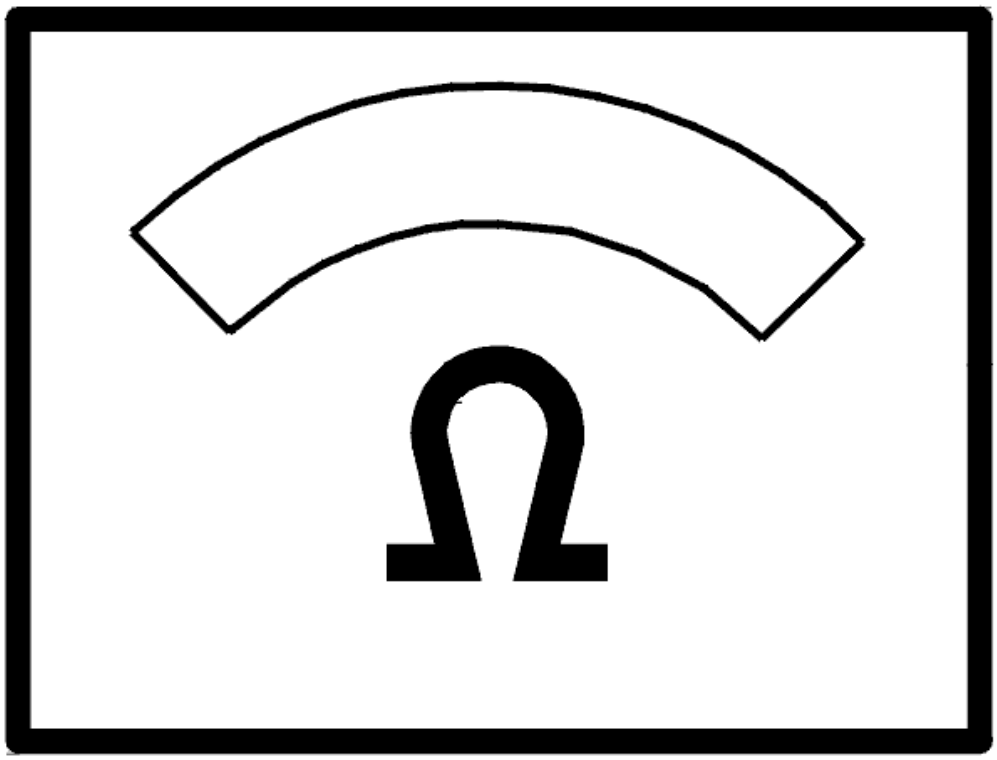


Fig. 277: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

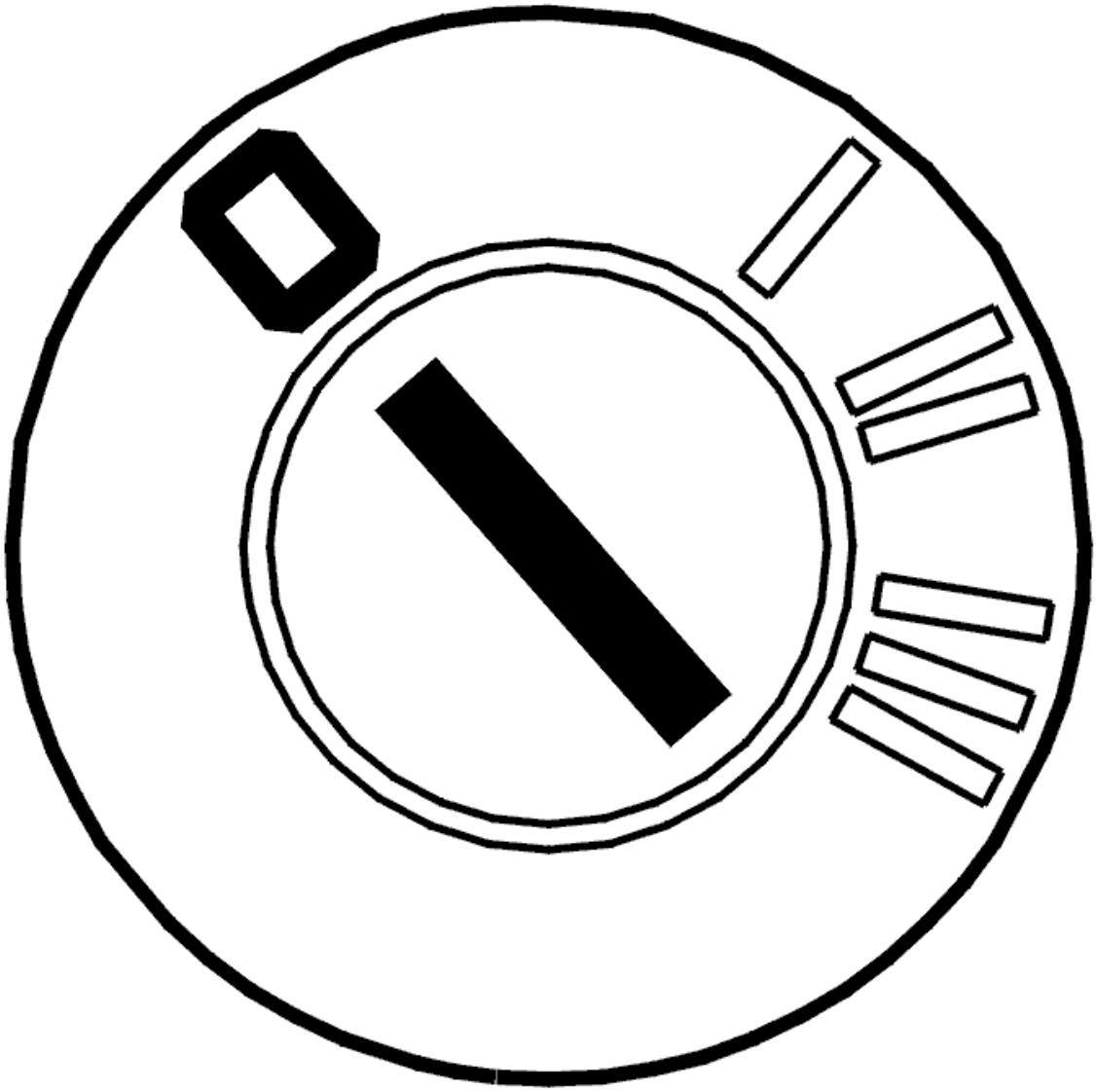


Fig. 278: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C3 (transmission side) and the connector for solenoid S3. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

- Check solenoid S3 by measuring the resistance between the terminal pin on solenoid S3 and the transmission housing. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the control system and to check or replace solenoid S3, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

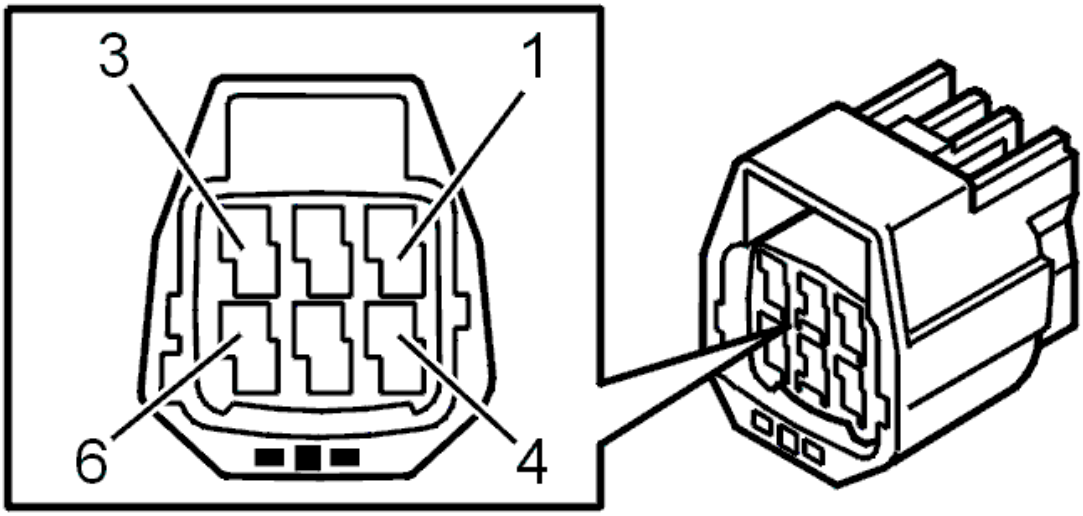


Fig. 279: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

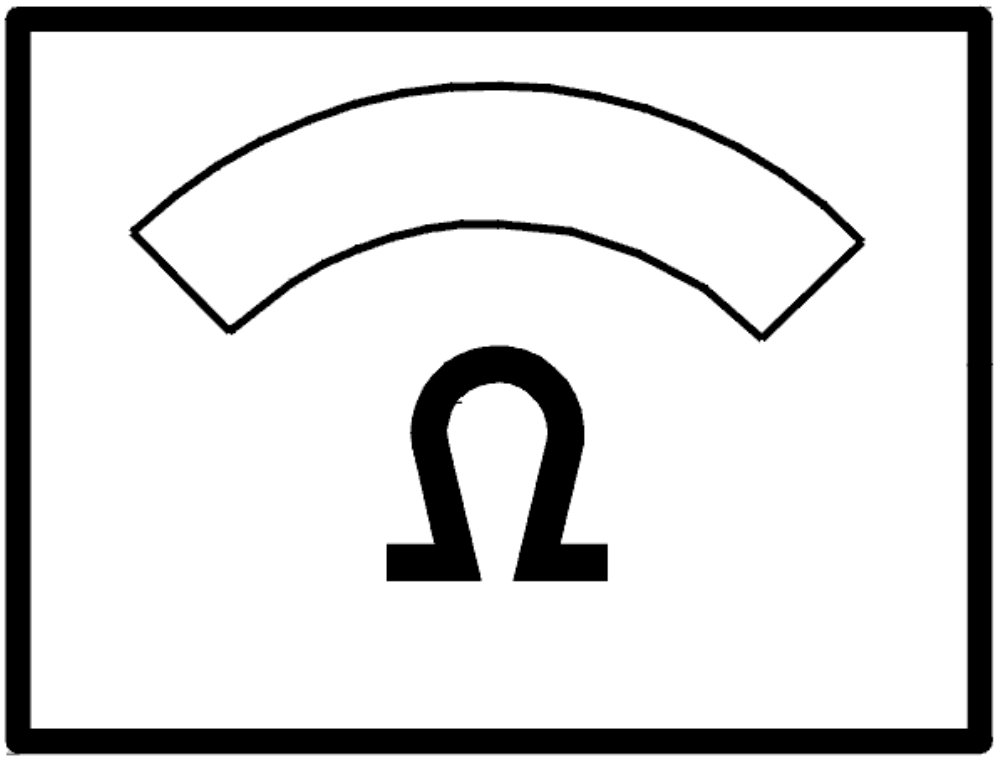


Fig. 280: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the transmission control module (TCM) connector and transmission connector C. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between control module terminal #A48 (#A48) and transmission connector terminal #C3 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

- Check the circuit for solenoid S3. Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #A48 (#A48) and #A53 (#A53) on the breakout box. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

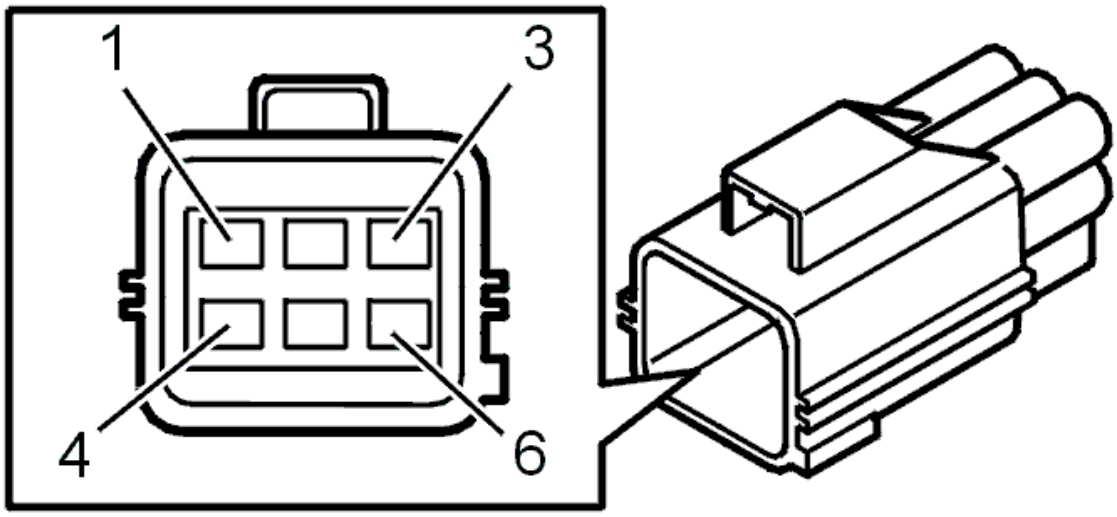


Fig. 281: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

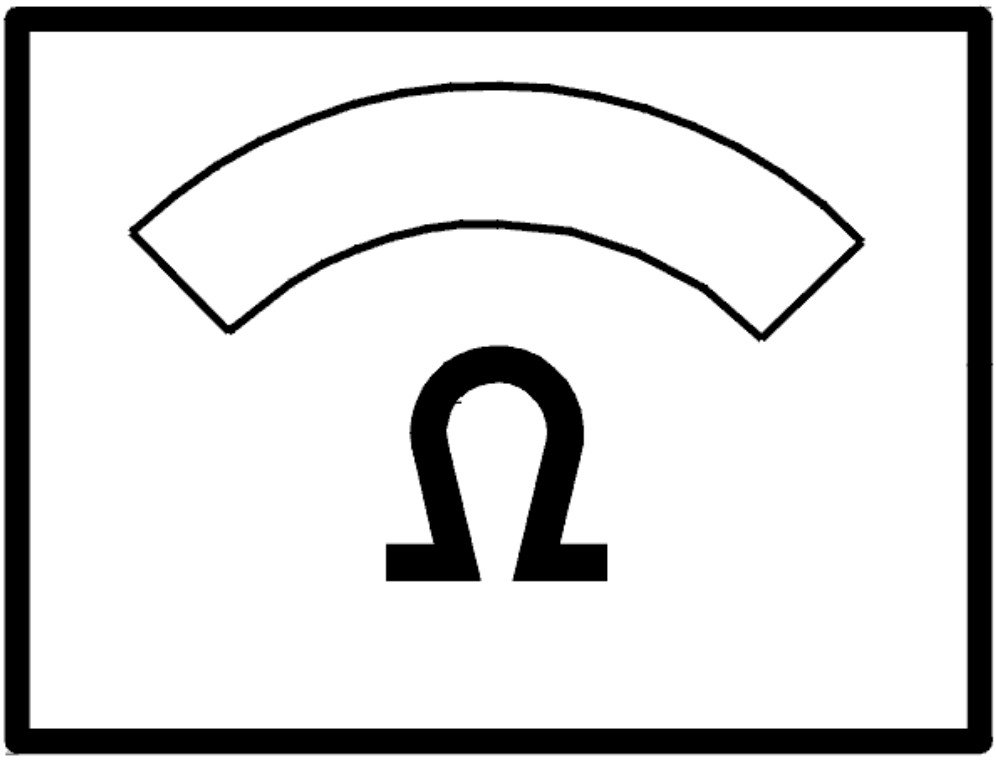


Fig. 282: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

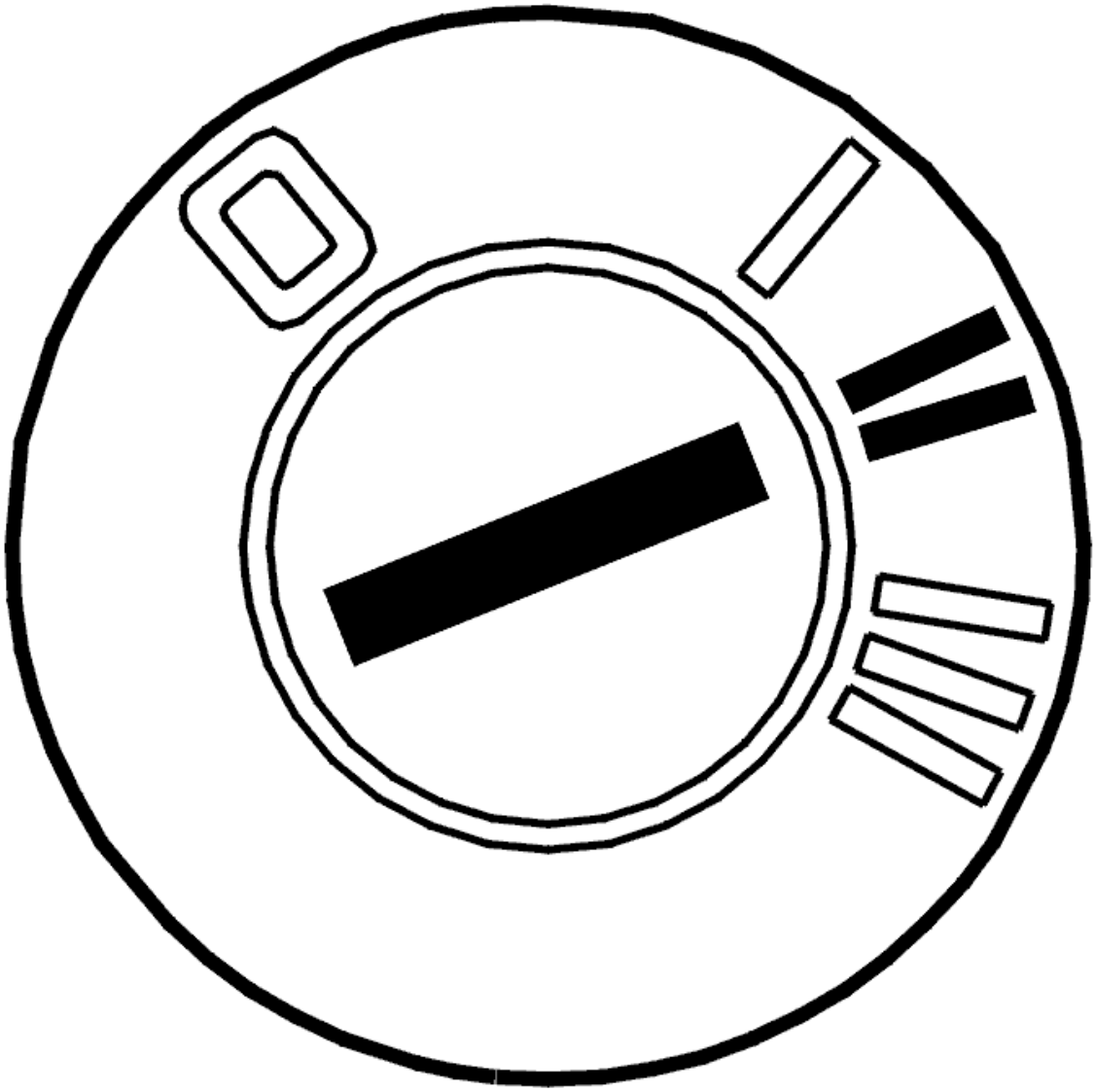


Fig. 283: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Use the VCT2000 (or appropriate scan tool) to reset the adaptation and counter.

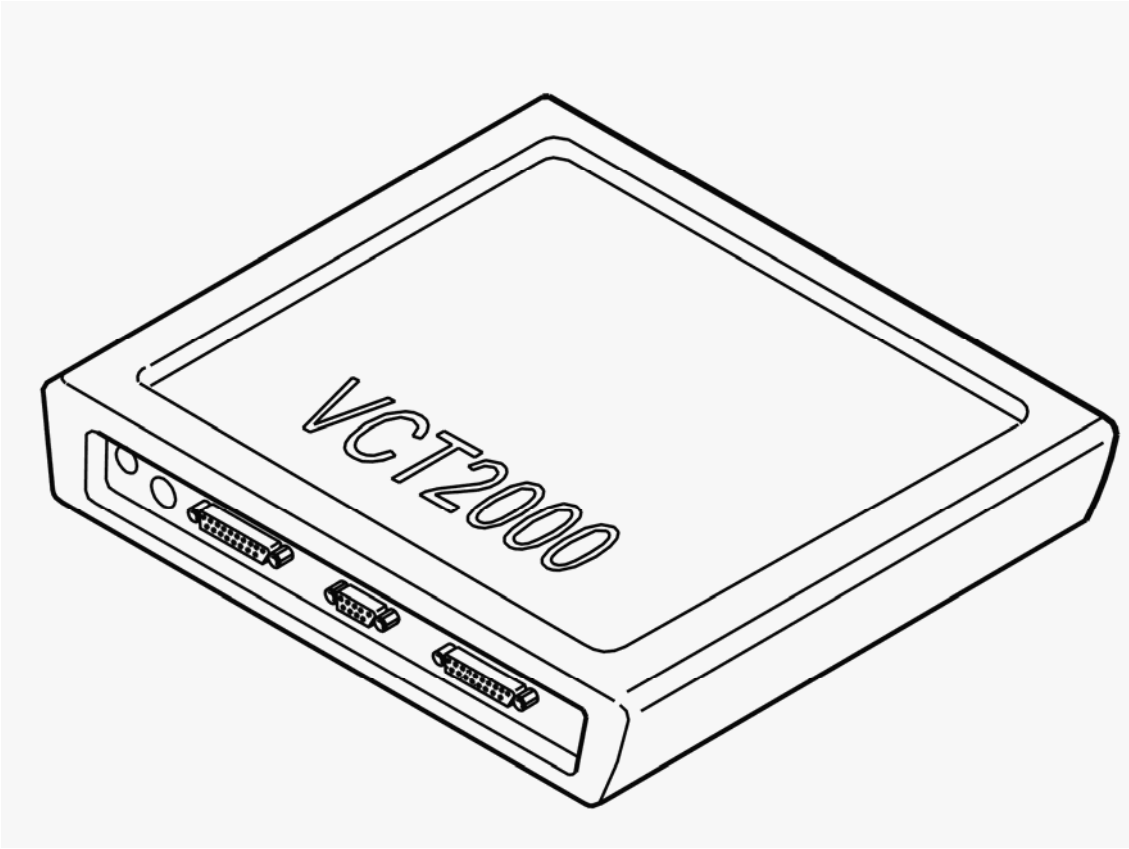


Fig. 284: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

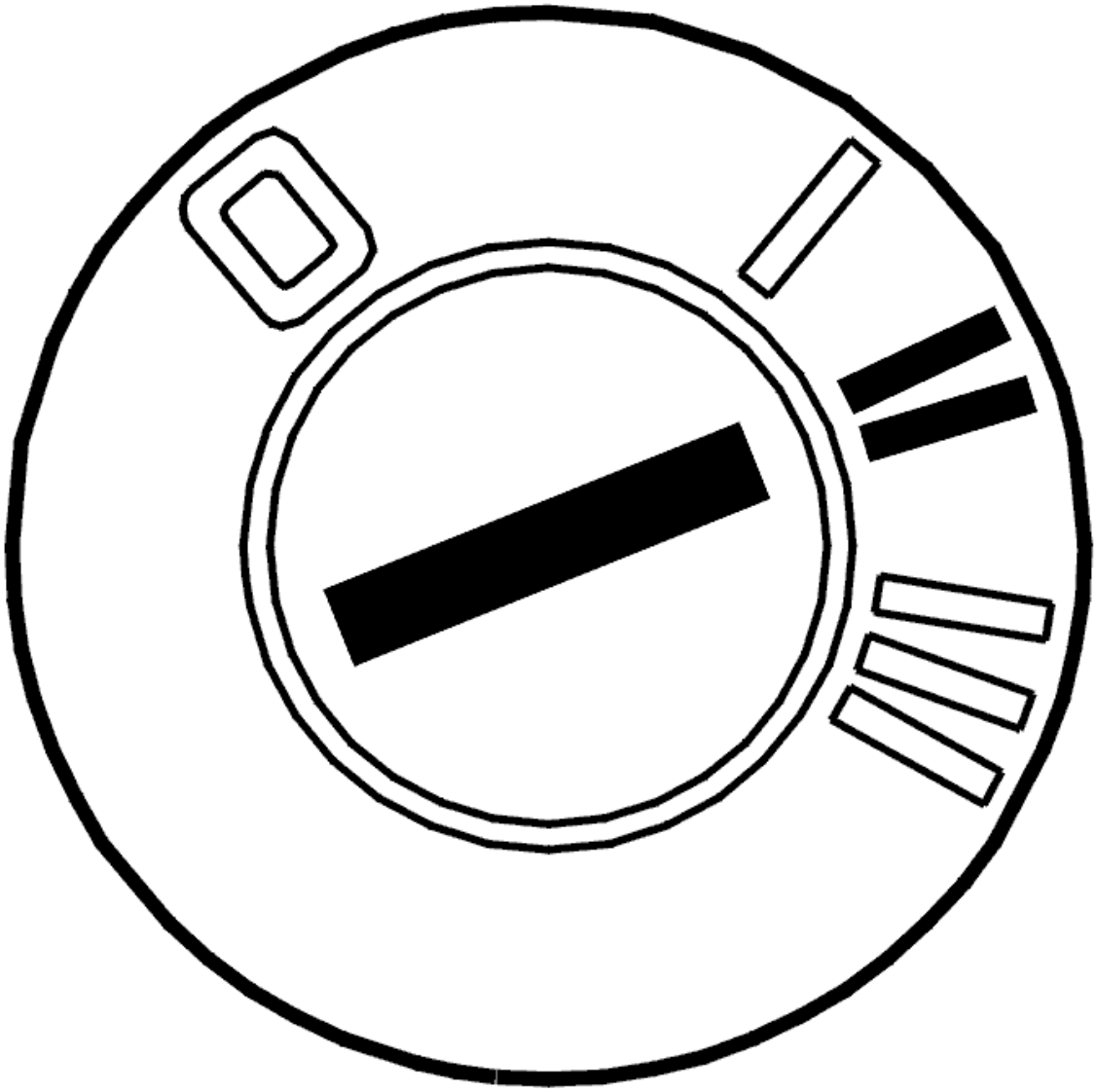


Fig. 285: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

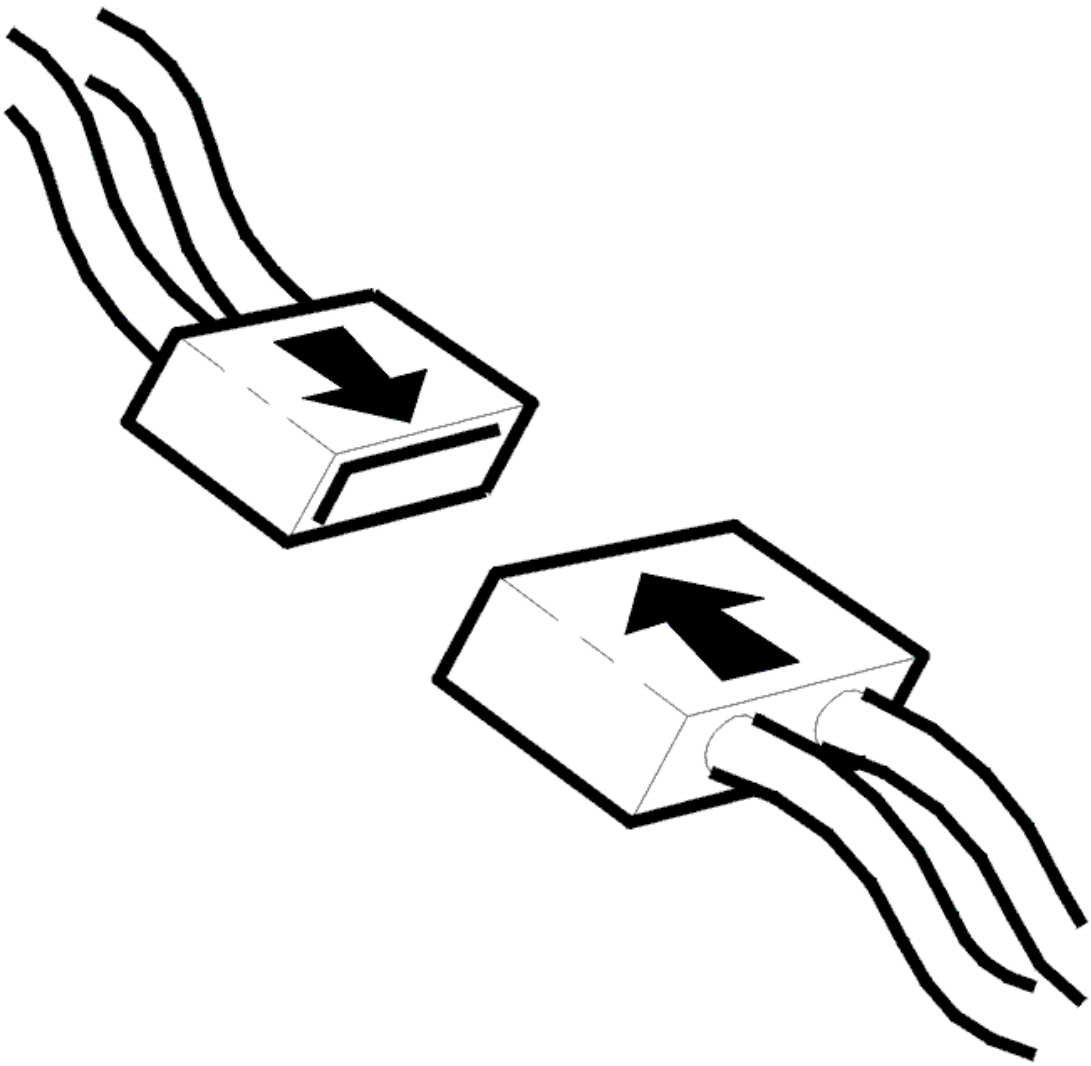


Fig. 286: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S3.

The current should oscillate between 0 and 1.5 A.

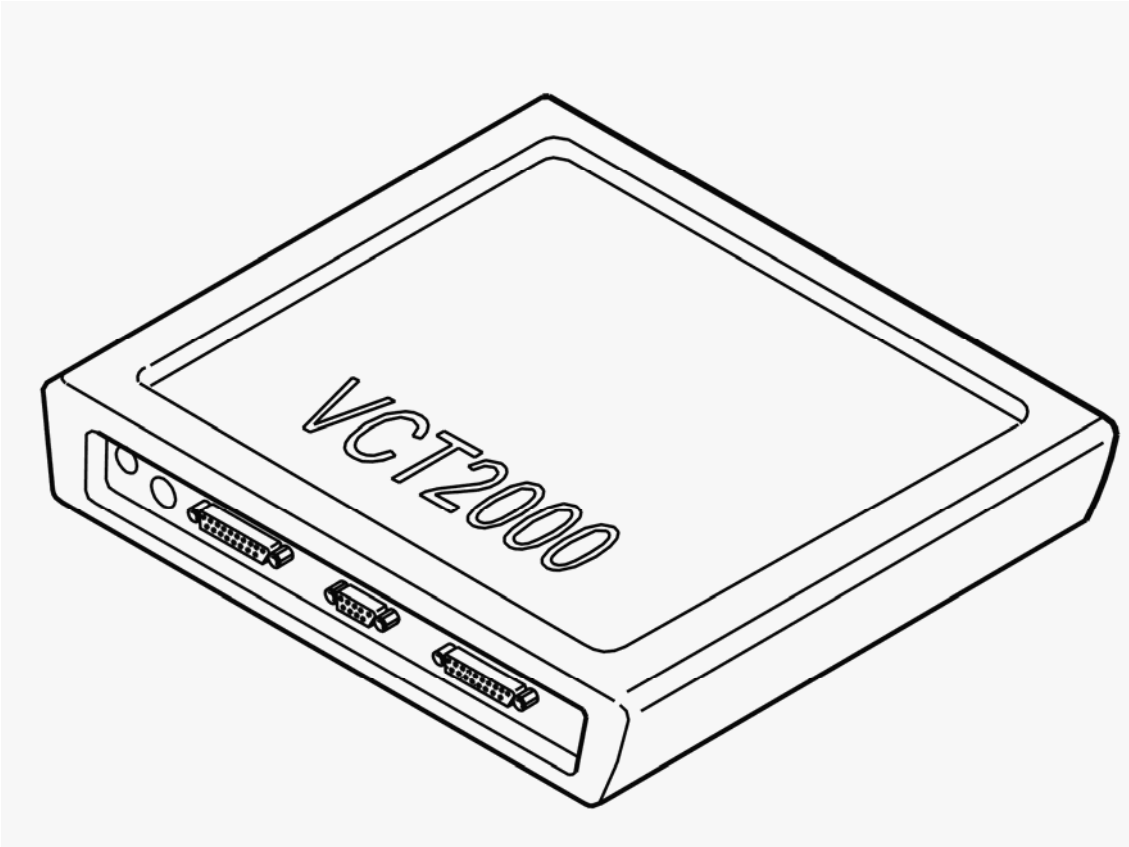


Fig. 287: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

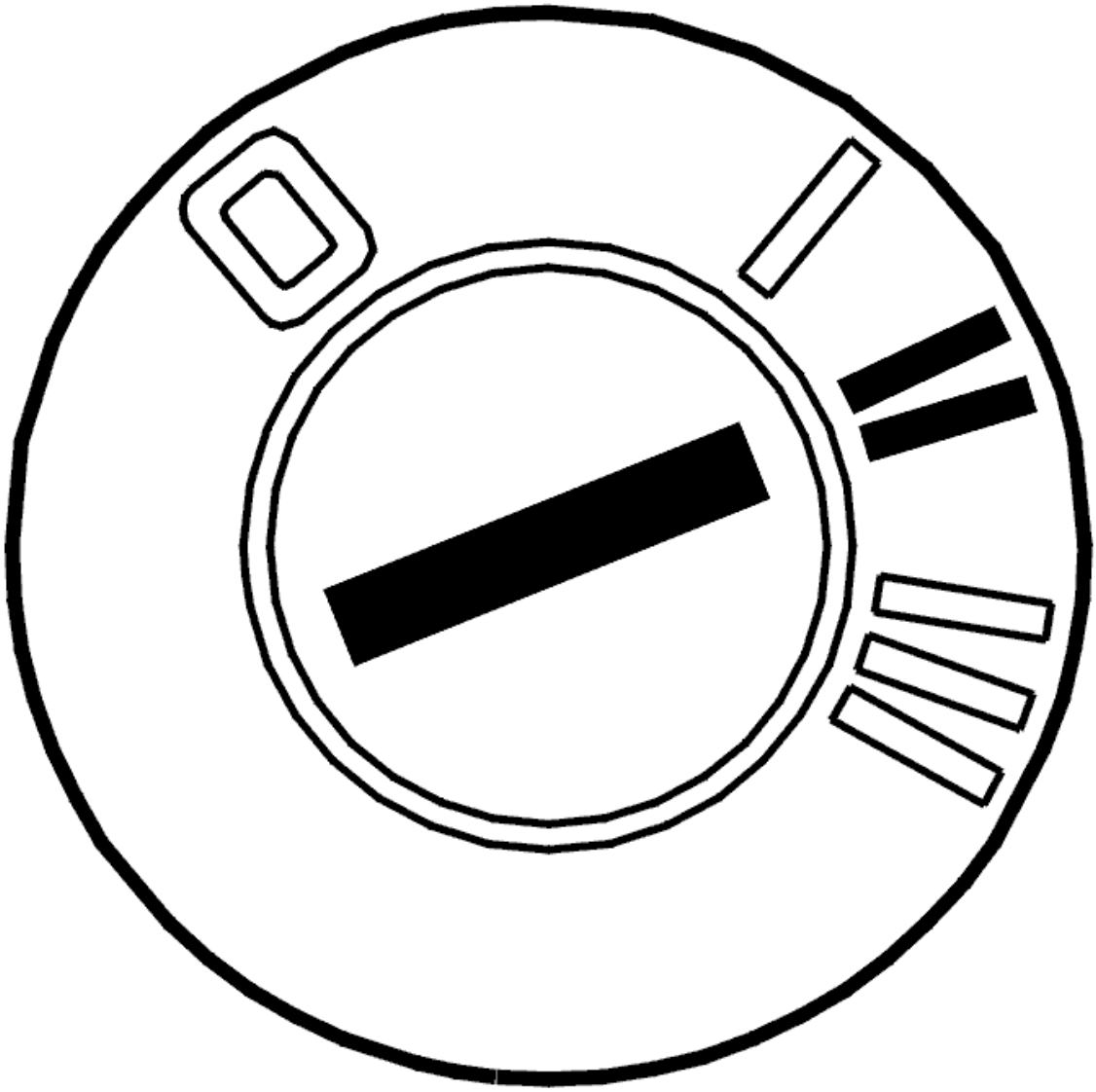


Fig. 288: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

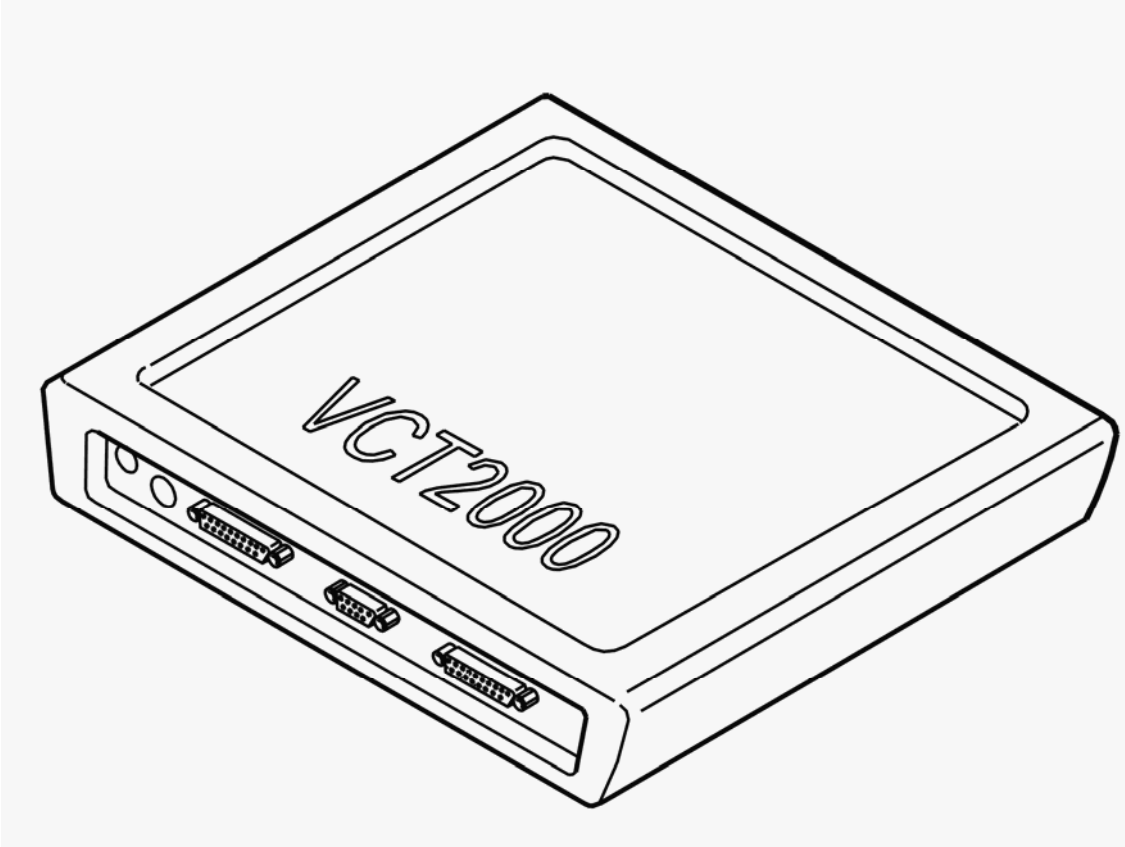


Fig. 289: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

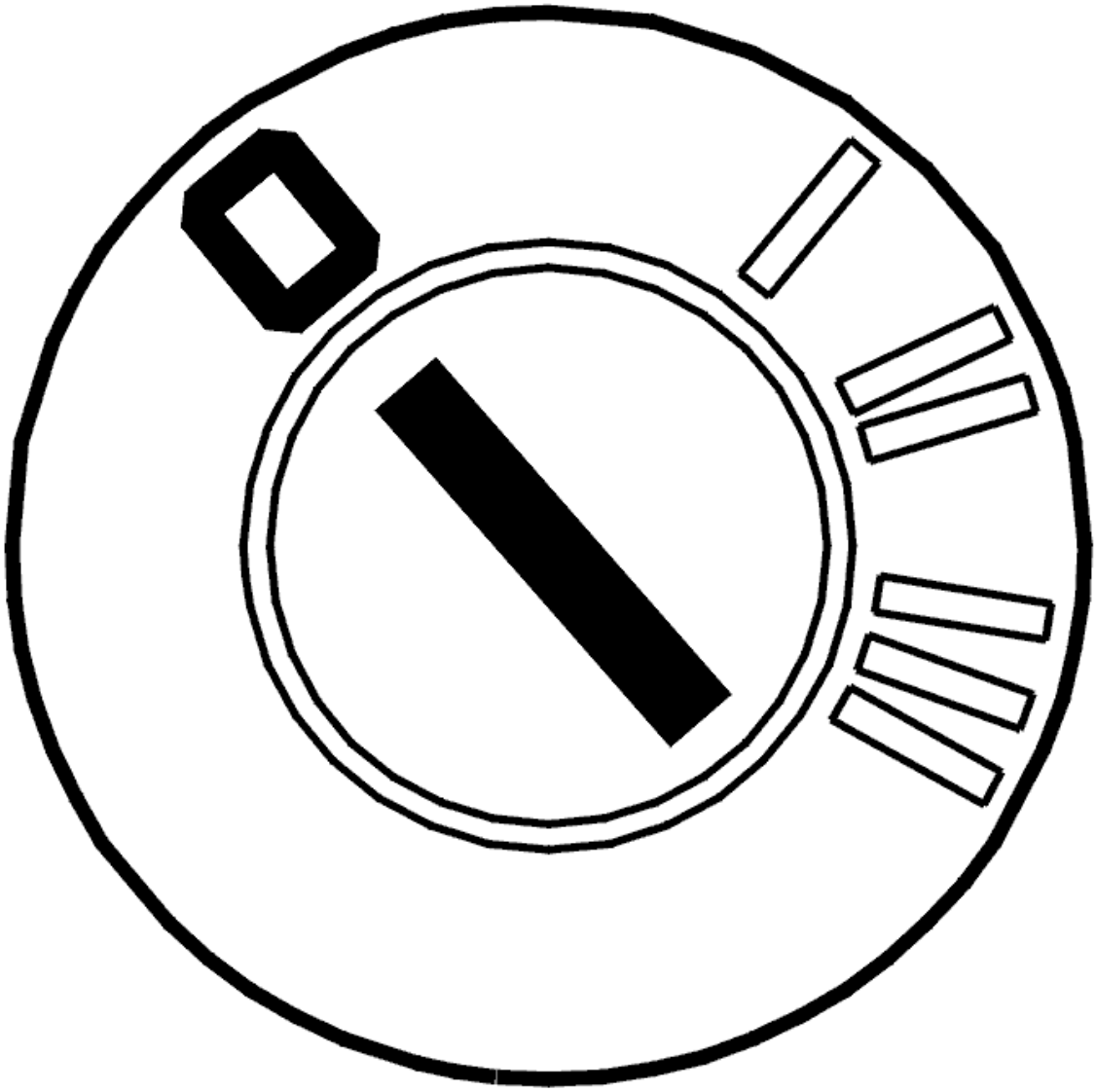


Fig. 290: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

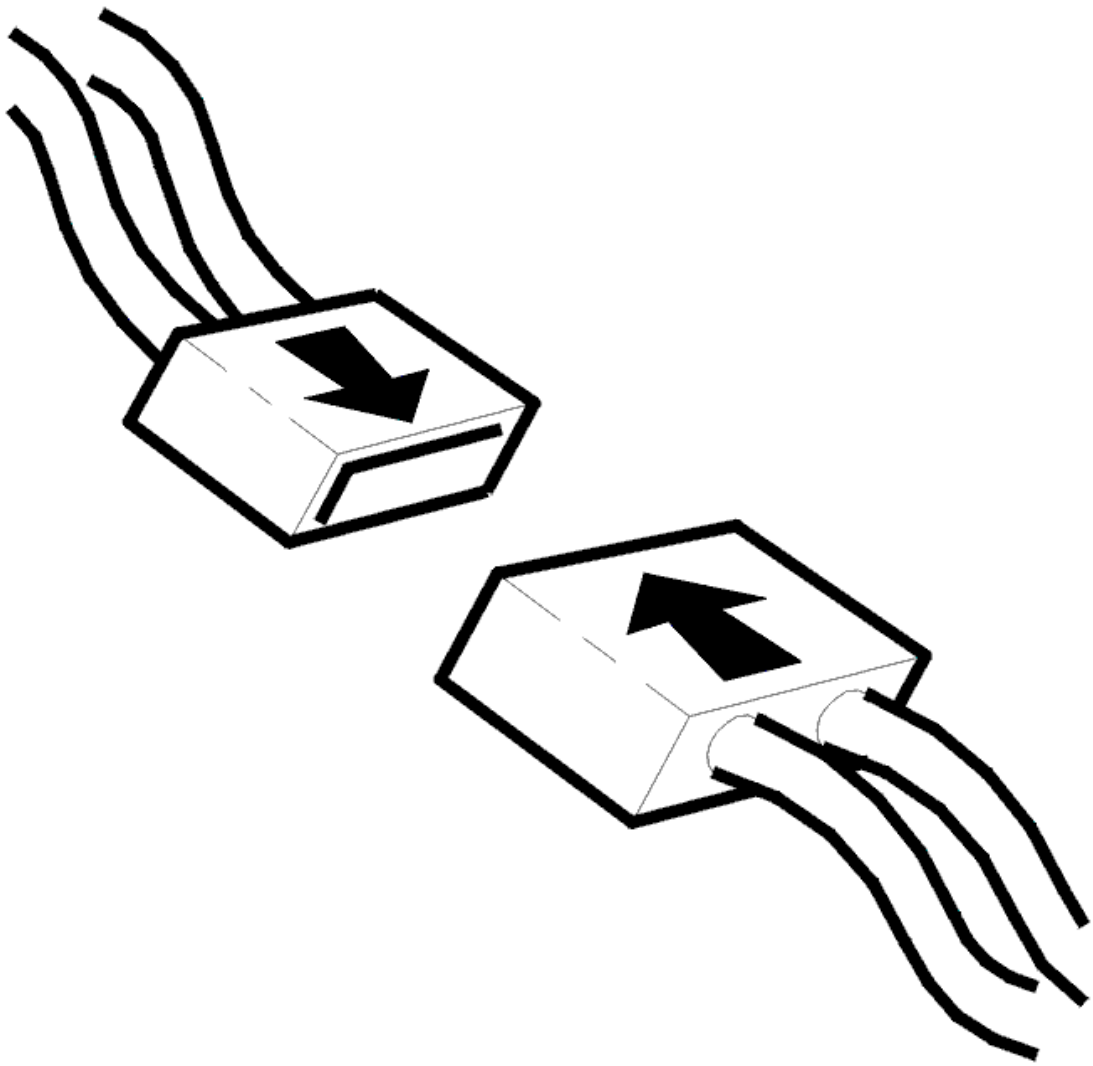


Fig. 291: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

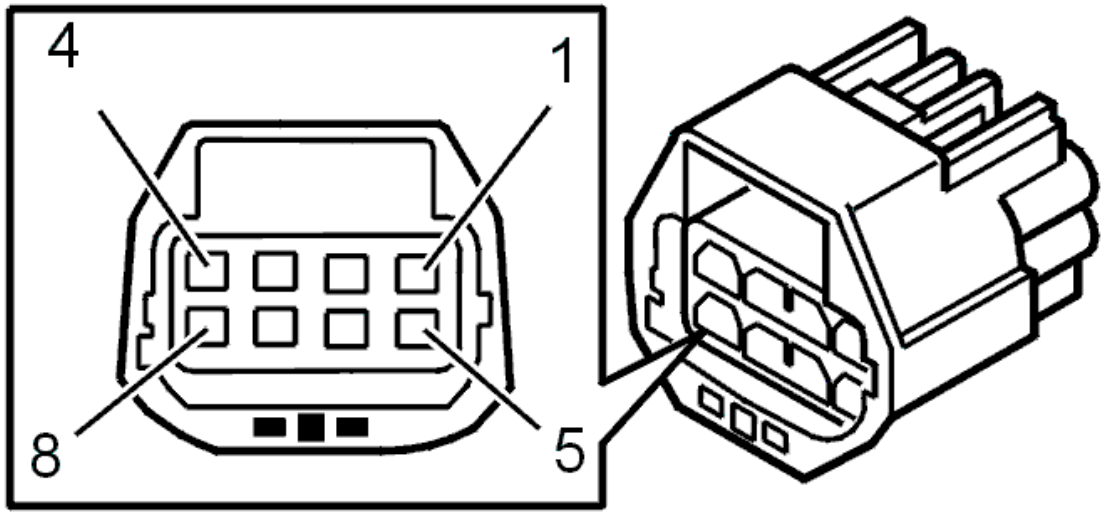


Fig. 292: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

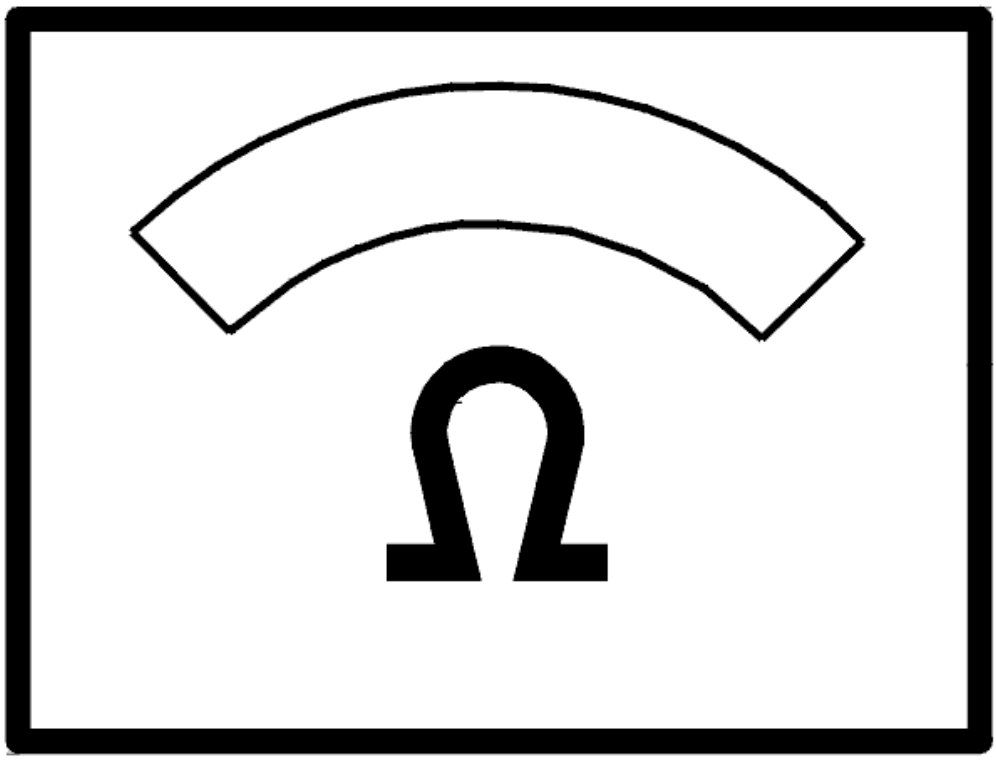


Fig. 293: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

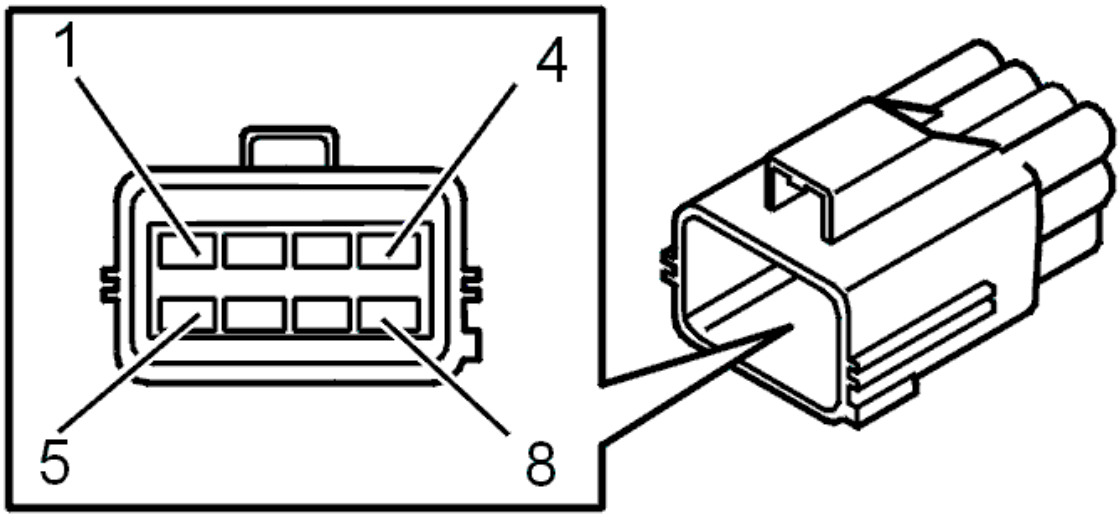


Fig. 294: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

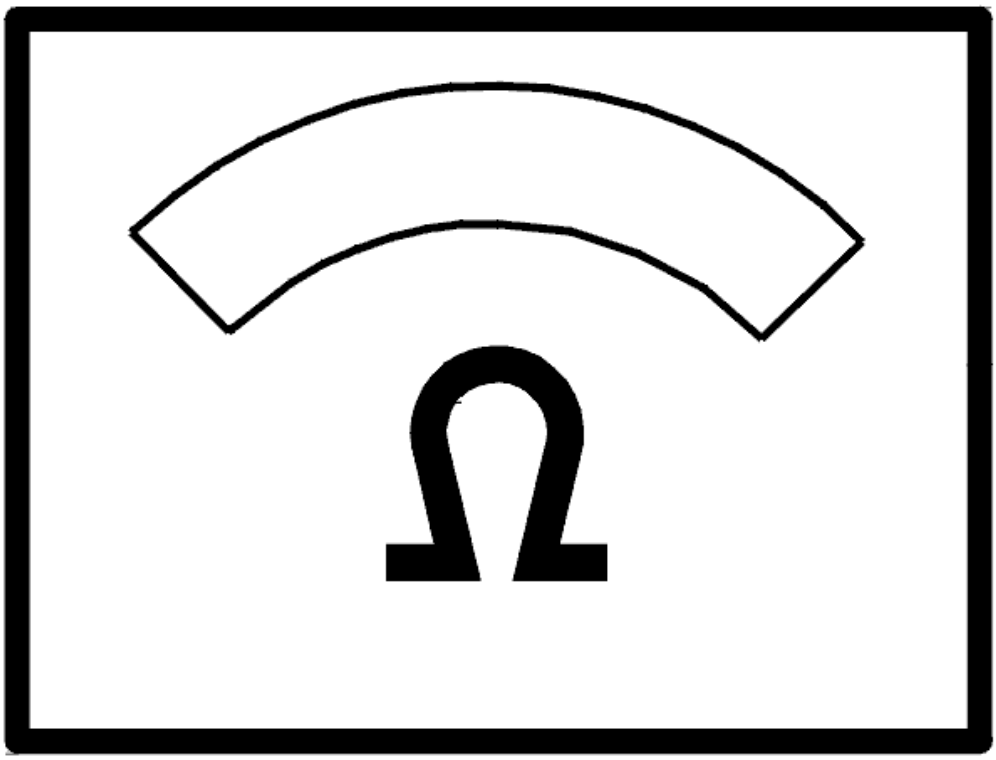


Fig. 295: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

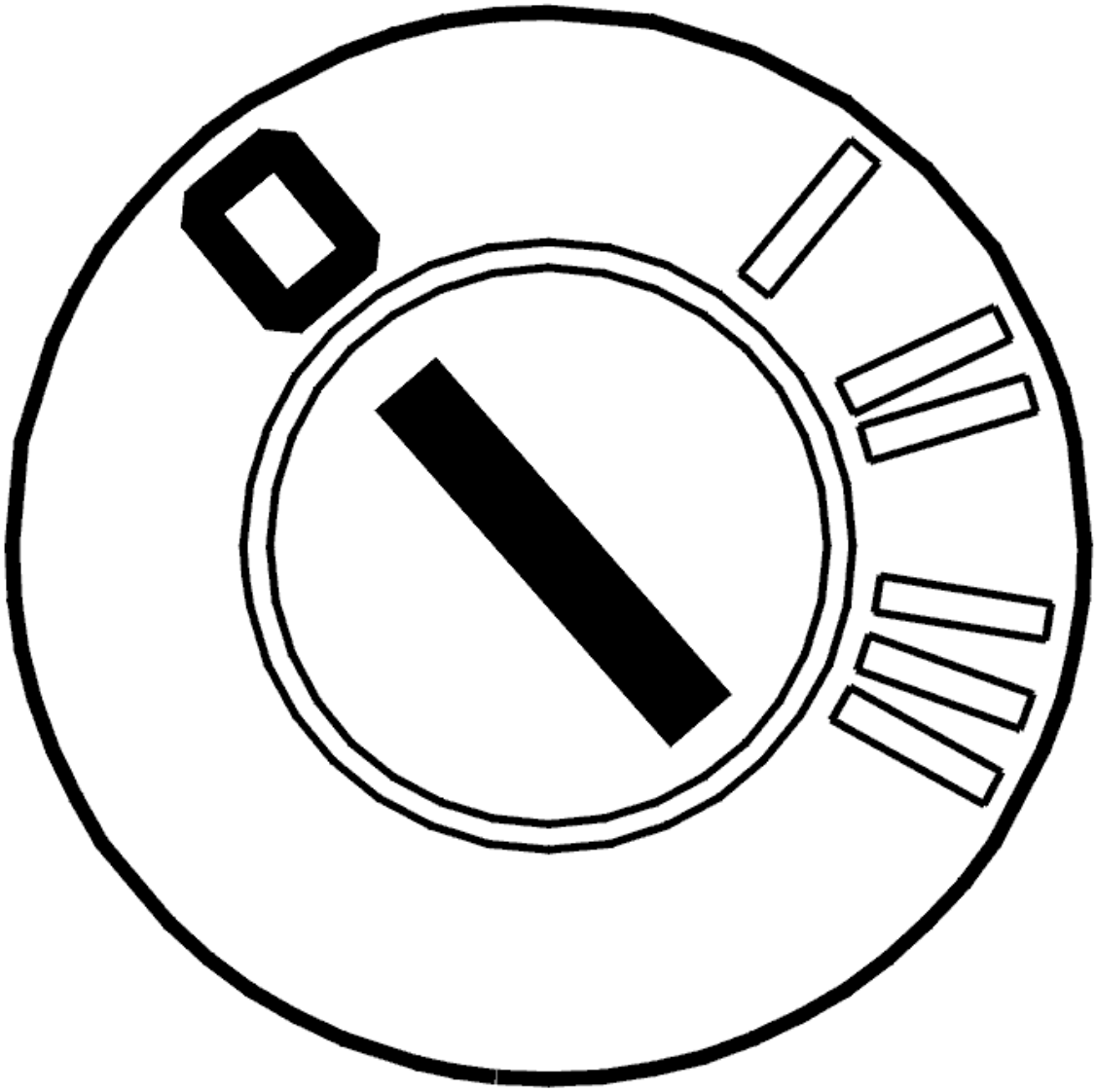


Fig. 296: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

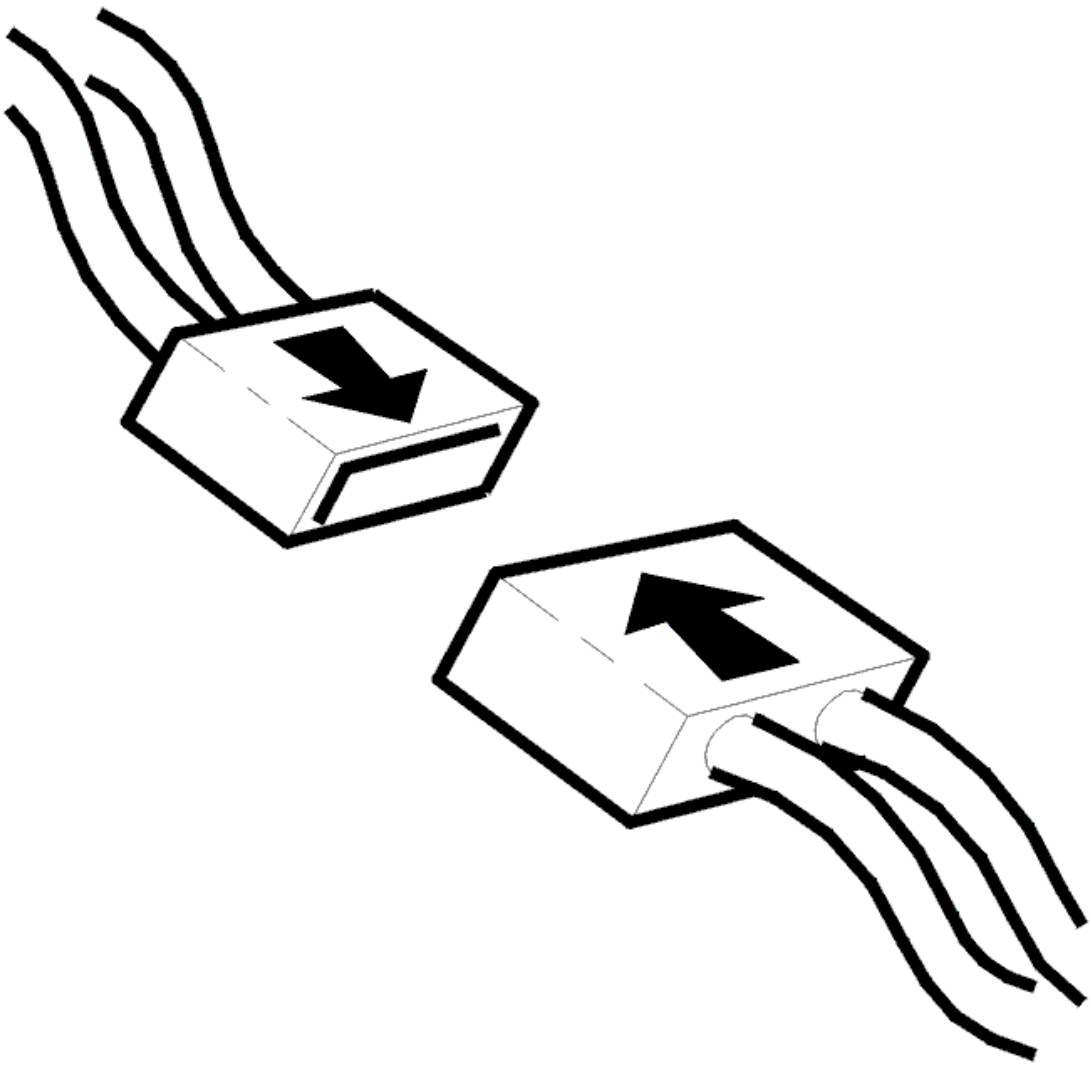


Fig. 297: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

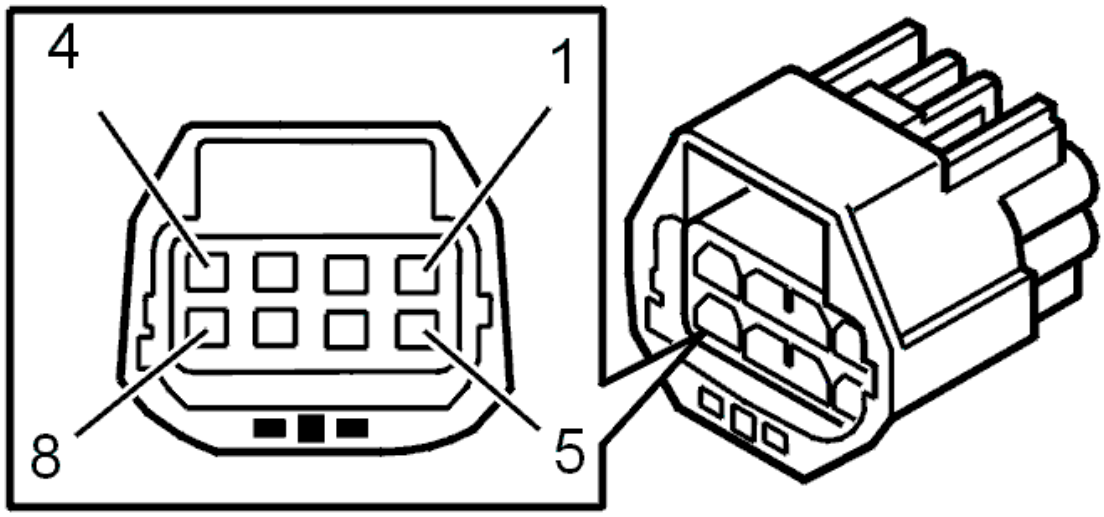


Fig. 298: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

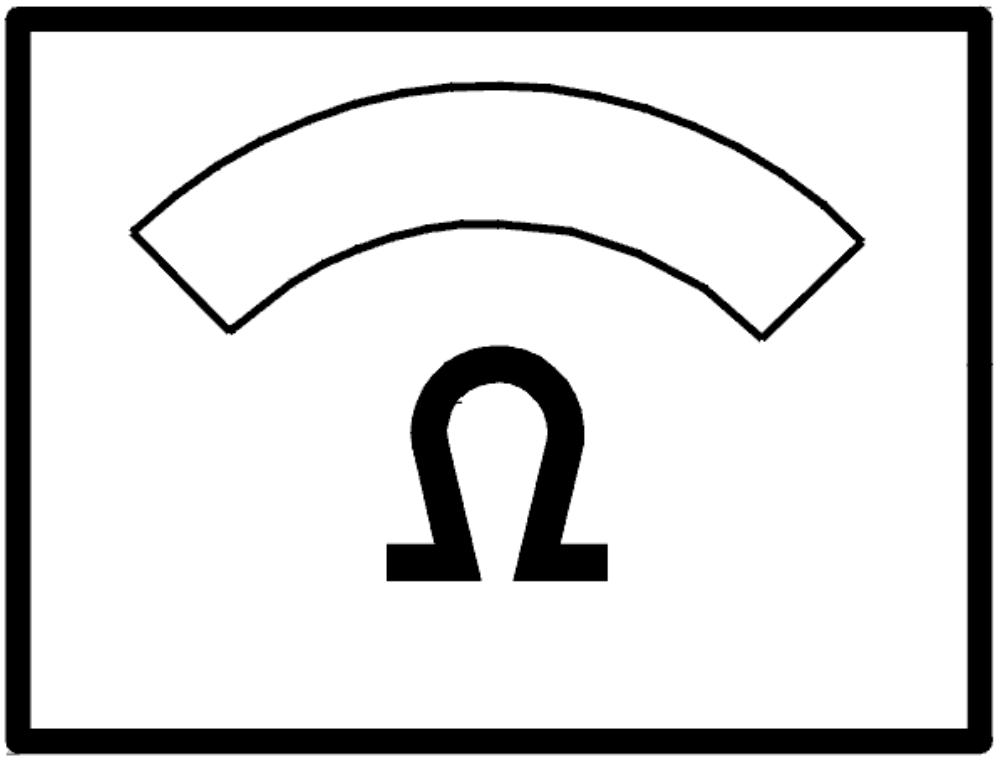


Fig. 299: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

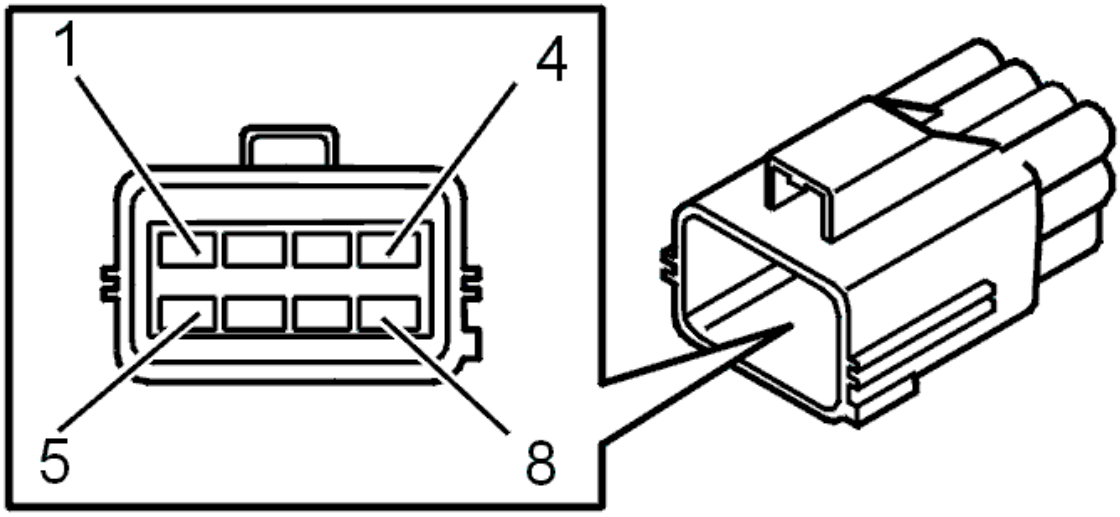


Fig. 300: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

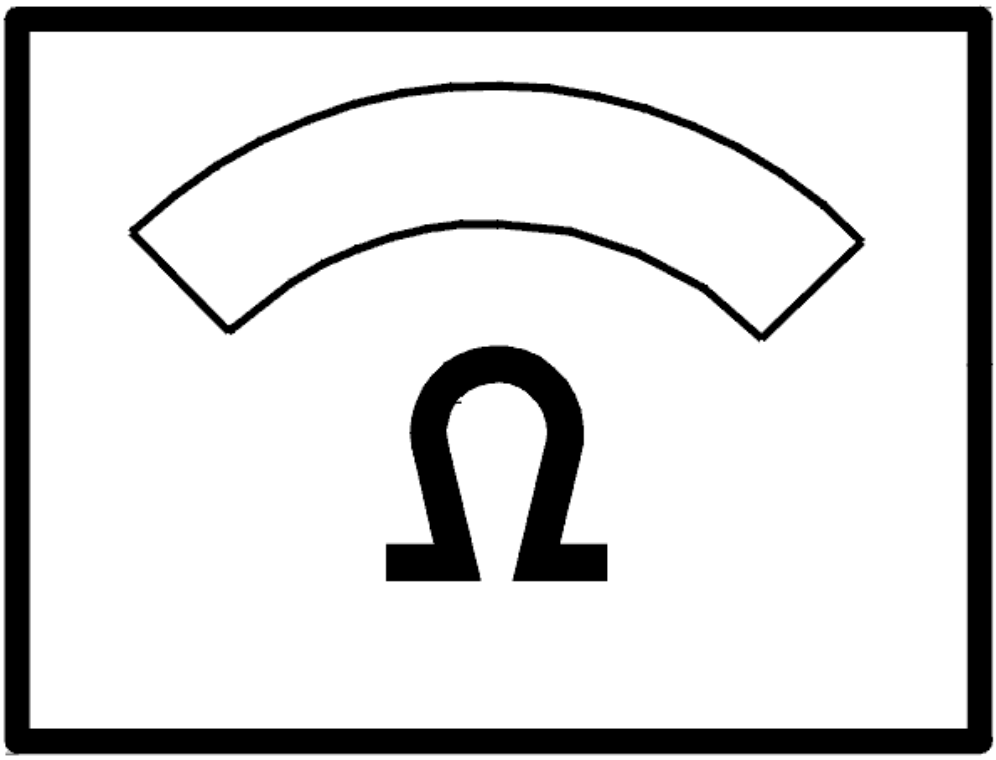


Fig. 301: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

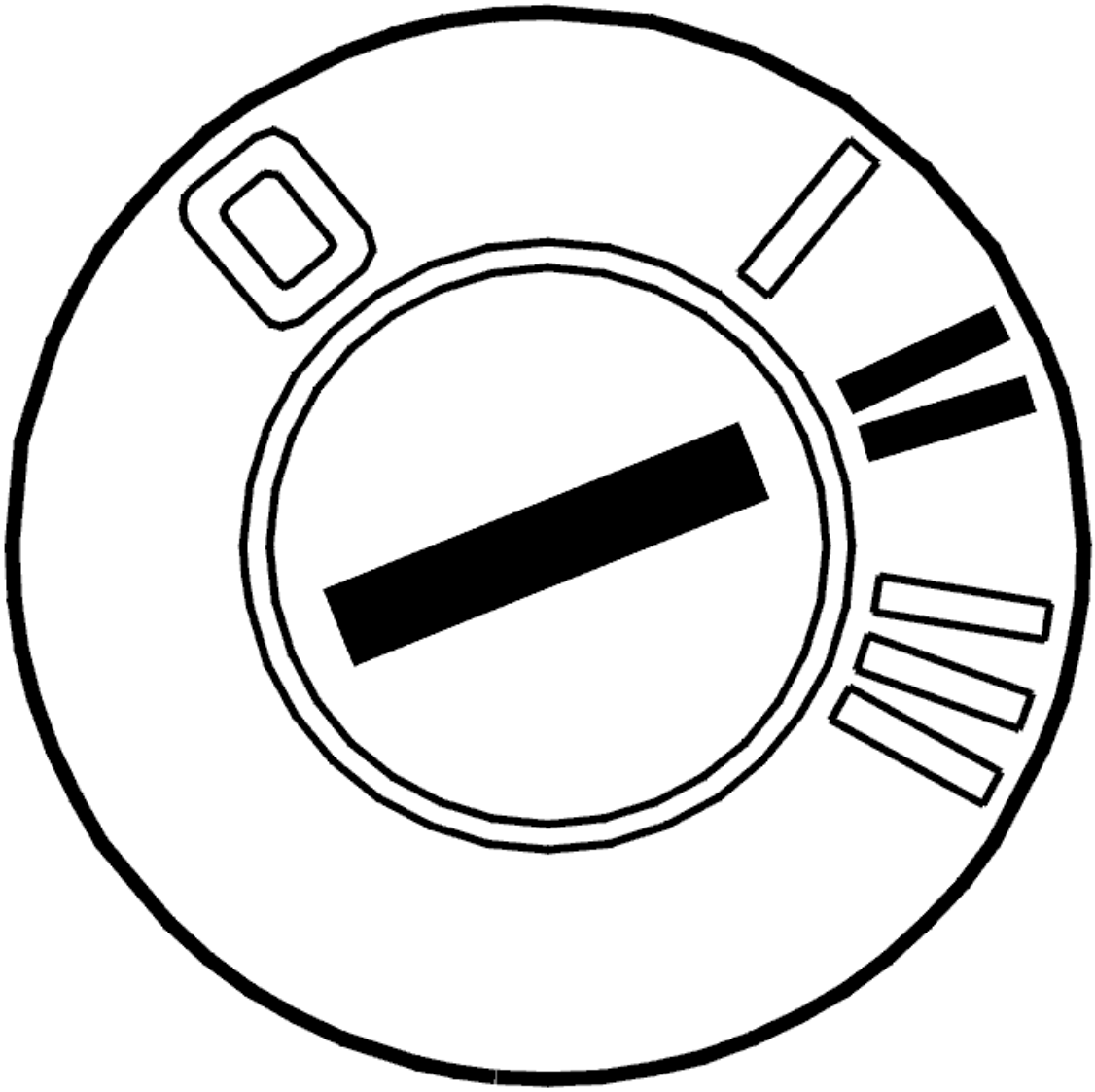


Fig. 302: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

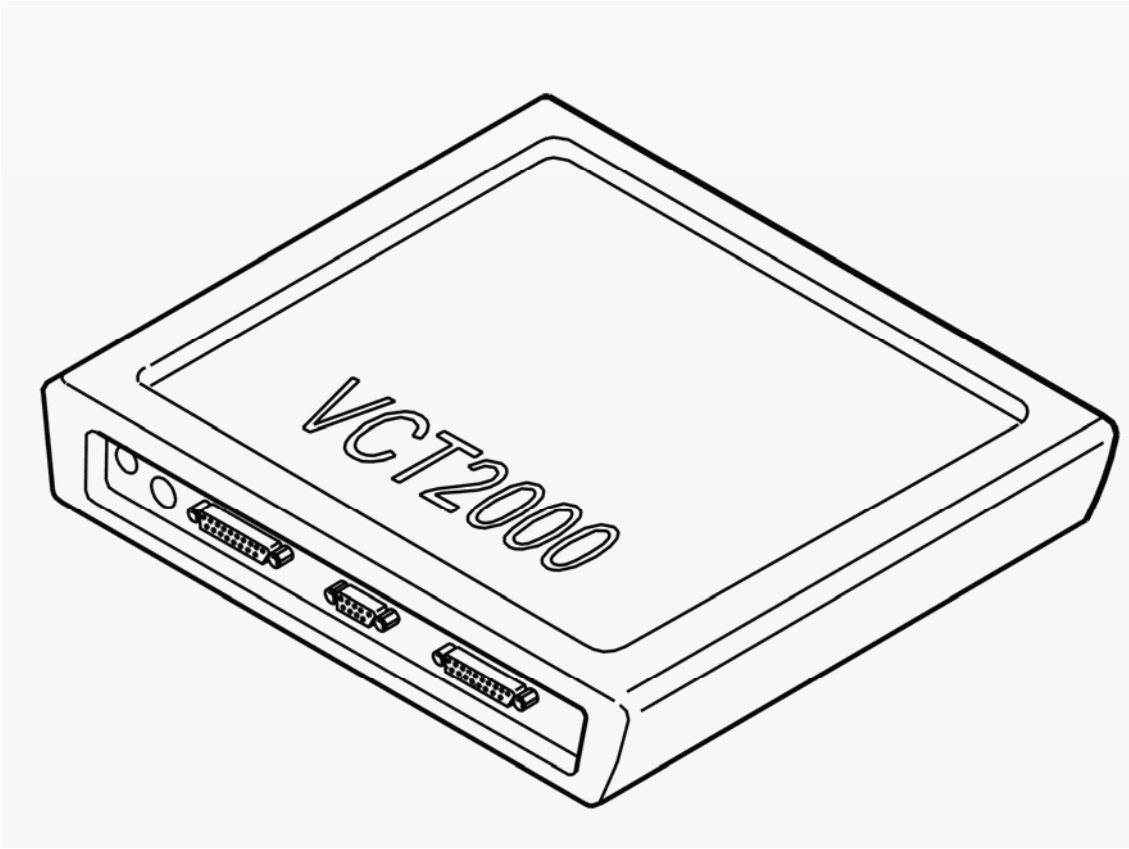


Fig. 303: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

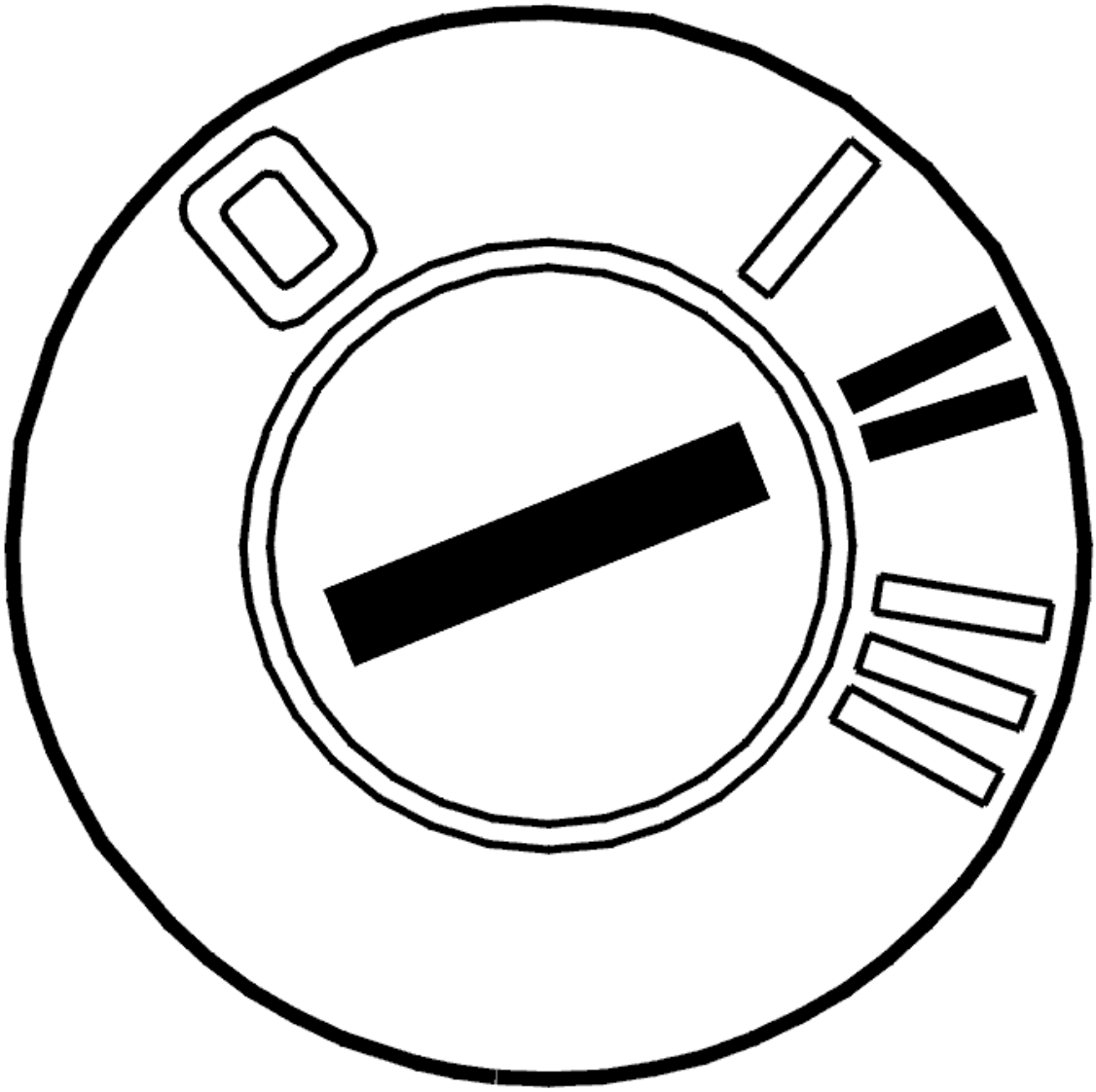


Fig. 304: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

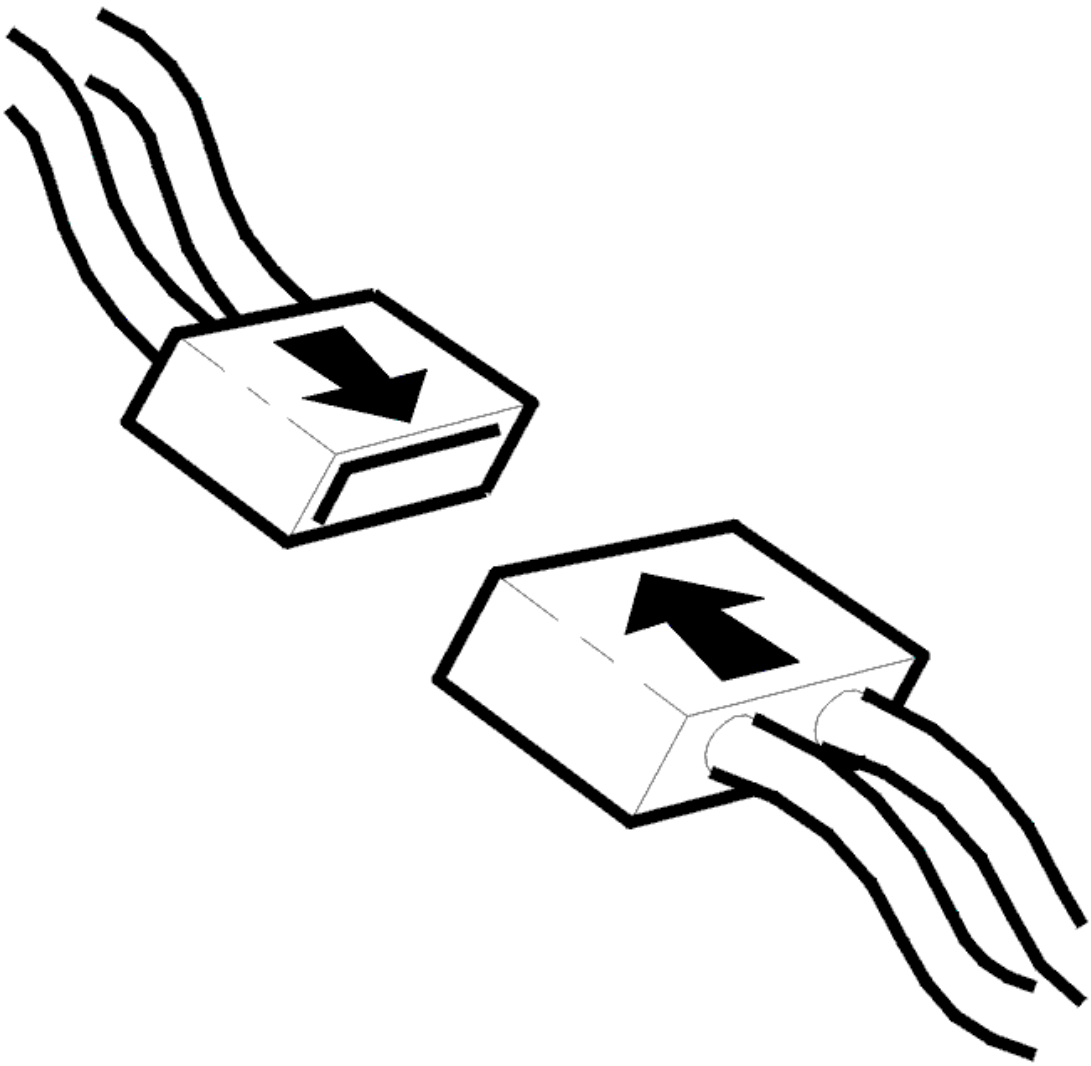


Fig. 305: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

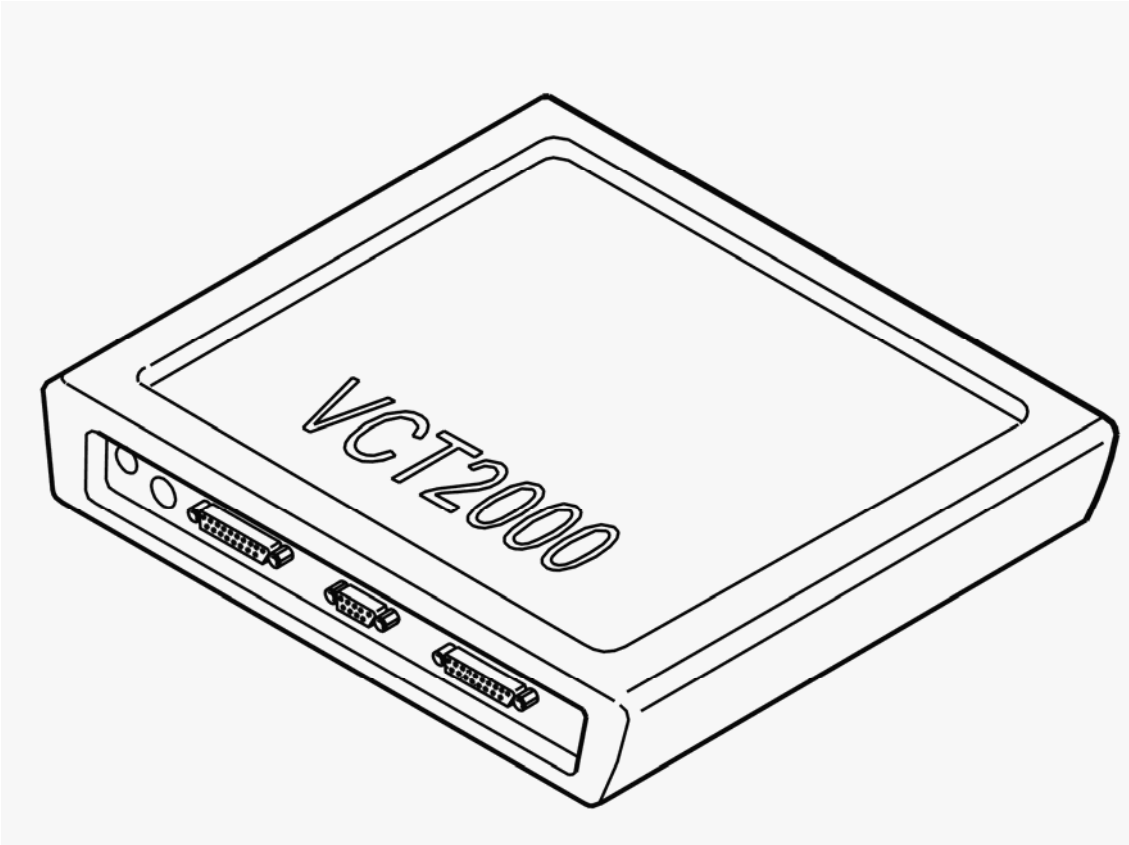


Fig. 306: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-0103: SHIFT SOLENOID S3. SIGNAL TOO LOW (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. Diagnostic trouble codes (DTCs) TCM-0003, TCM-0009, TCM-0103, TCM-0109 or TCM-010C are stored if the transmission control module (TCM) registers that there is a short-circuit to ground in circuits S1, S2, S3, S4 or S5 when the solenoid

should be activated.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Short-circuit to ground in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

SIGNAL TOO LOW

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

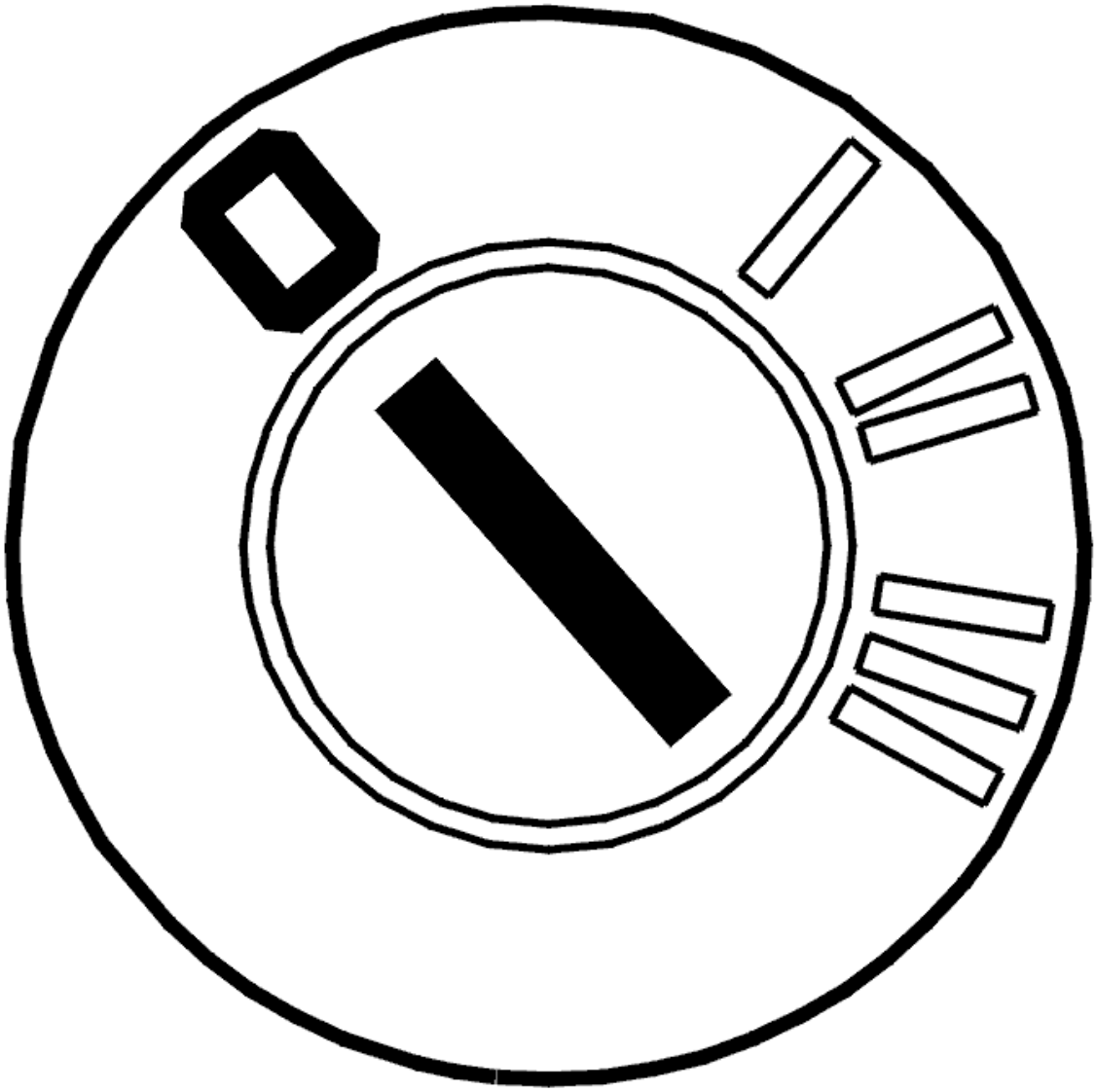


Fig. 307: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

  HINT: If the temperature is outside its permitted range, fault-trace the temperature sensor.

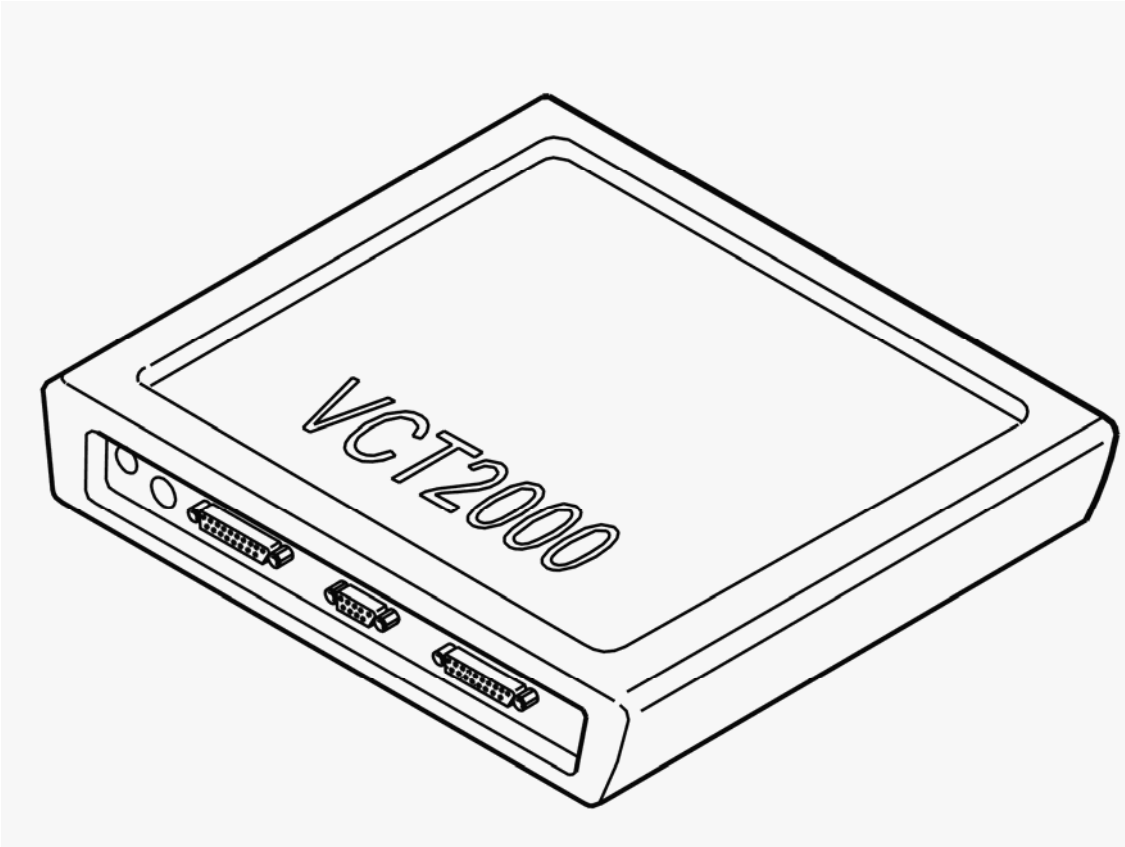


Fig. 308: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S3**

- **NO**

  Refer to **FAULTY SIGNAL**

CHECKING SHIFT SOLENOID S3

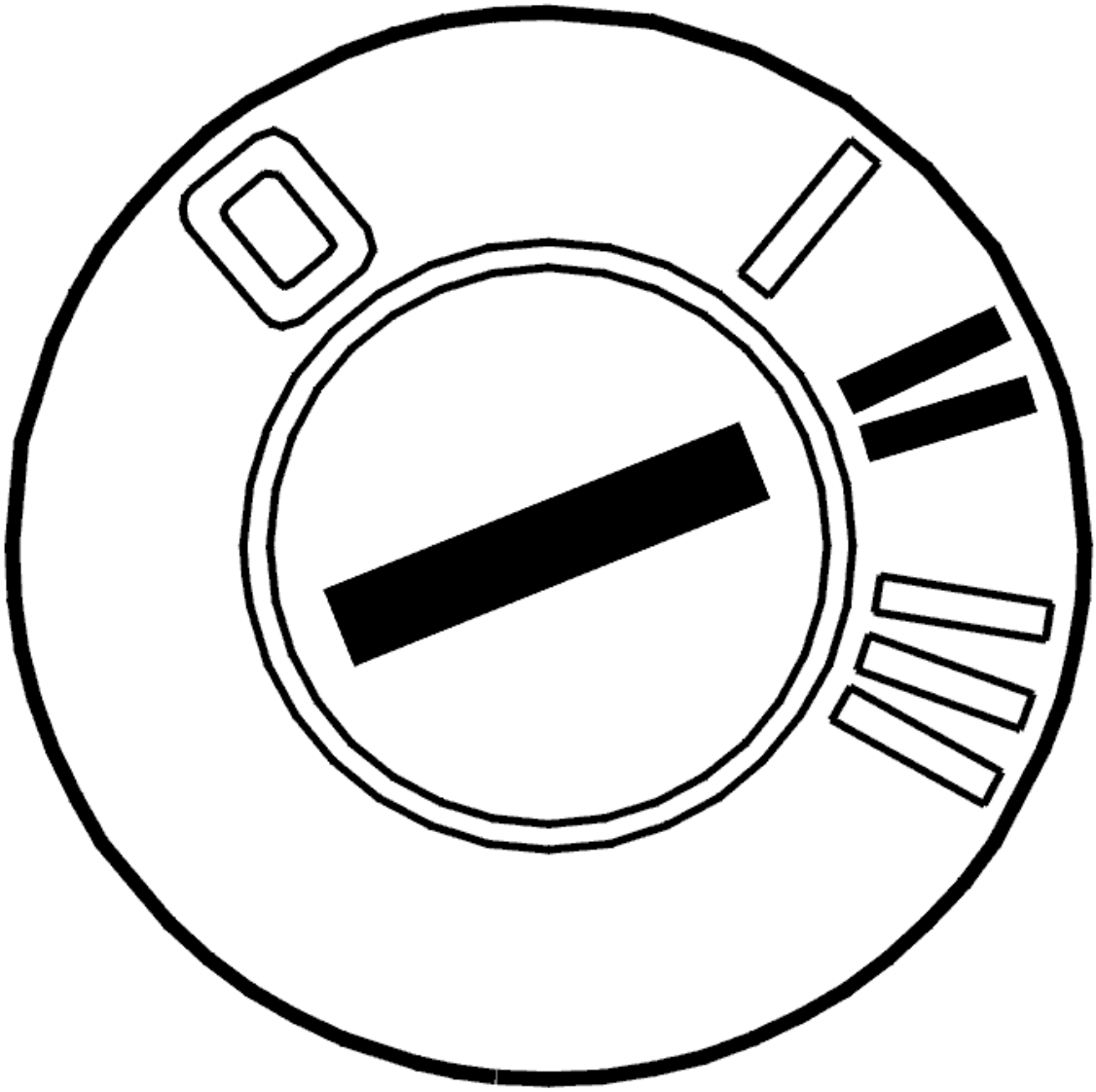


Fig. 309: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S3.

  The value must change between OFF and ON.

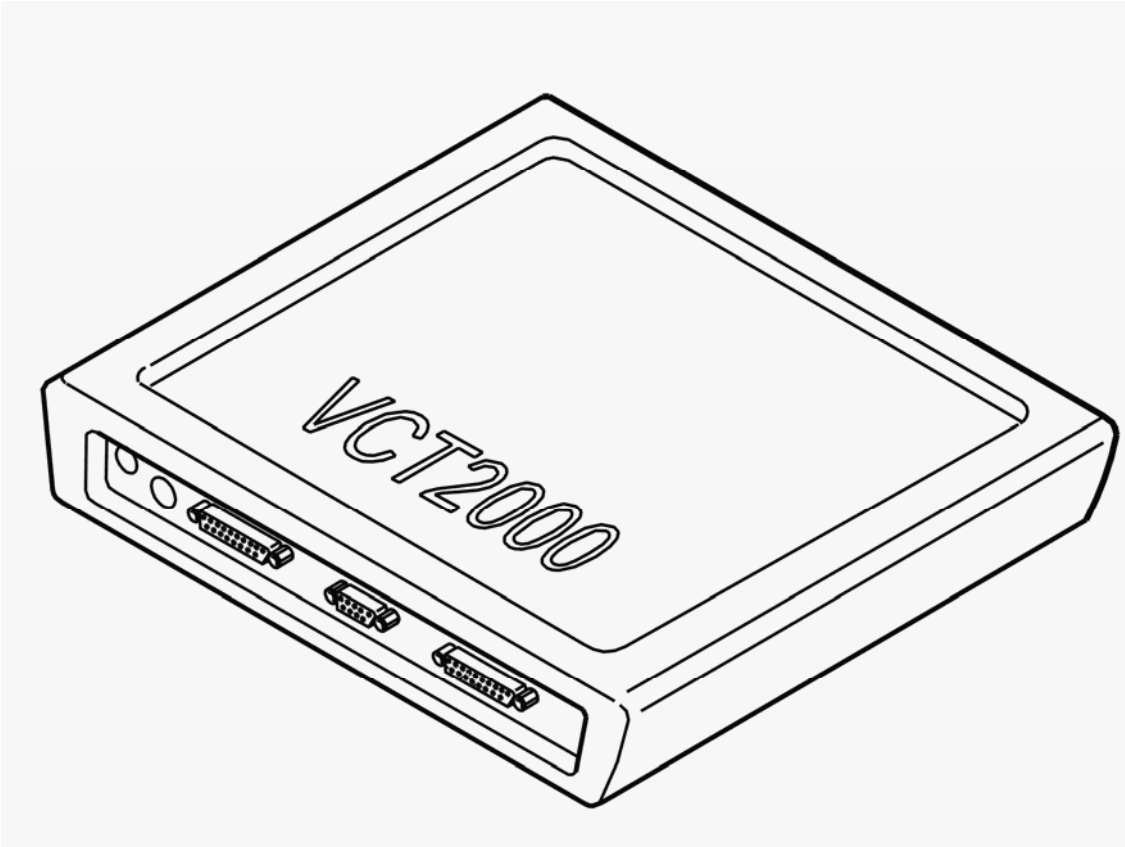


Fig. 310: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING RESISTANCE**

CHECKING RESISTANCE

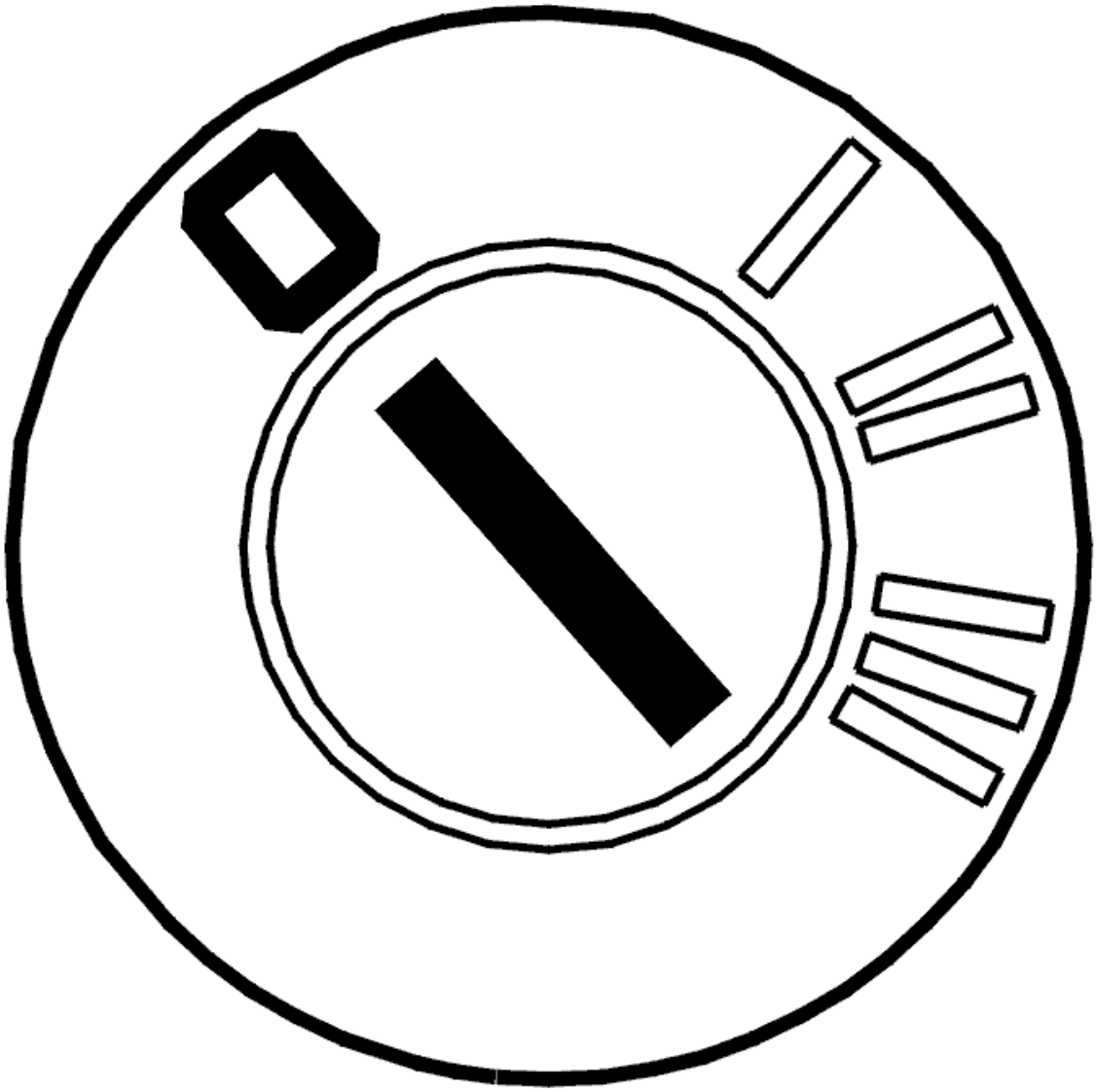


Fig. 311: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

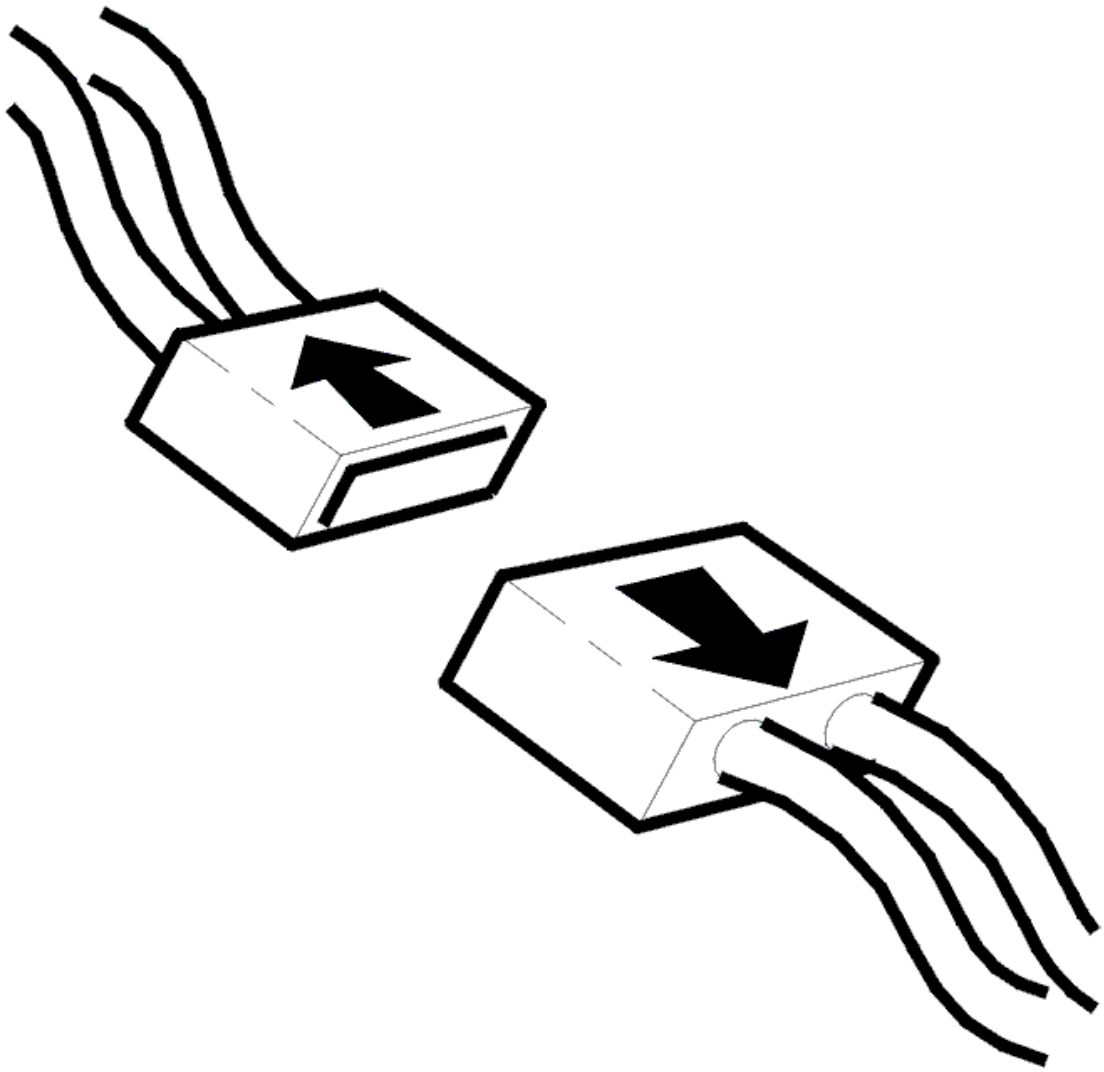


Fig. 312: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect transmission connector C.

Check solenoid S3 by measuring the resistance between transmission connector terminal #C3 and the transmission housing. The resistance must be 11-15 ohms.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

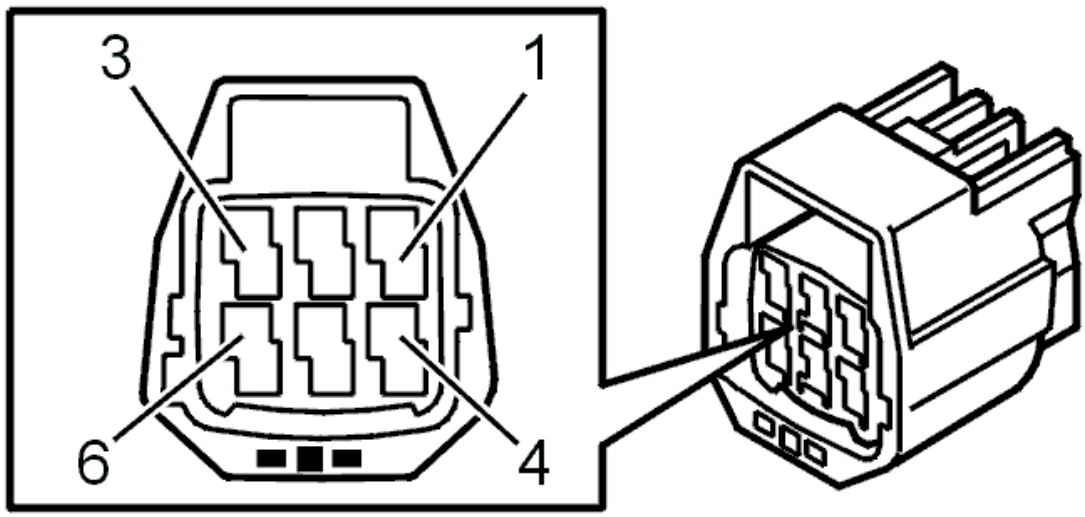


Fig. 313: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

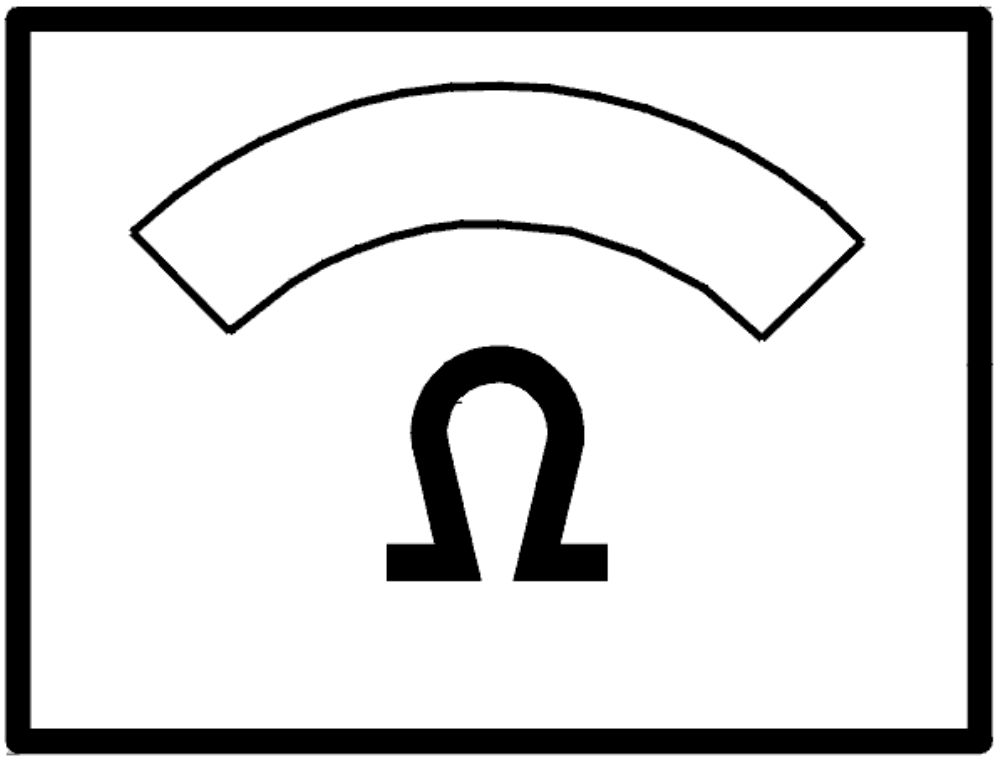


Fig. 314: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

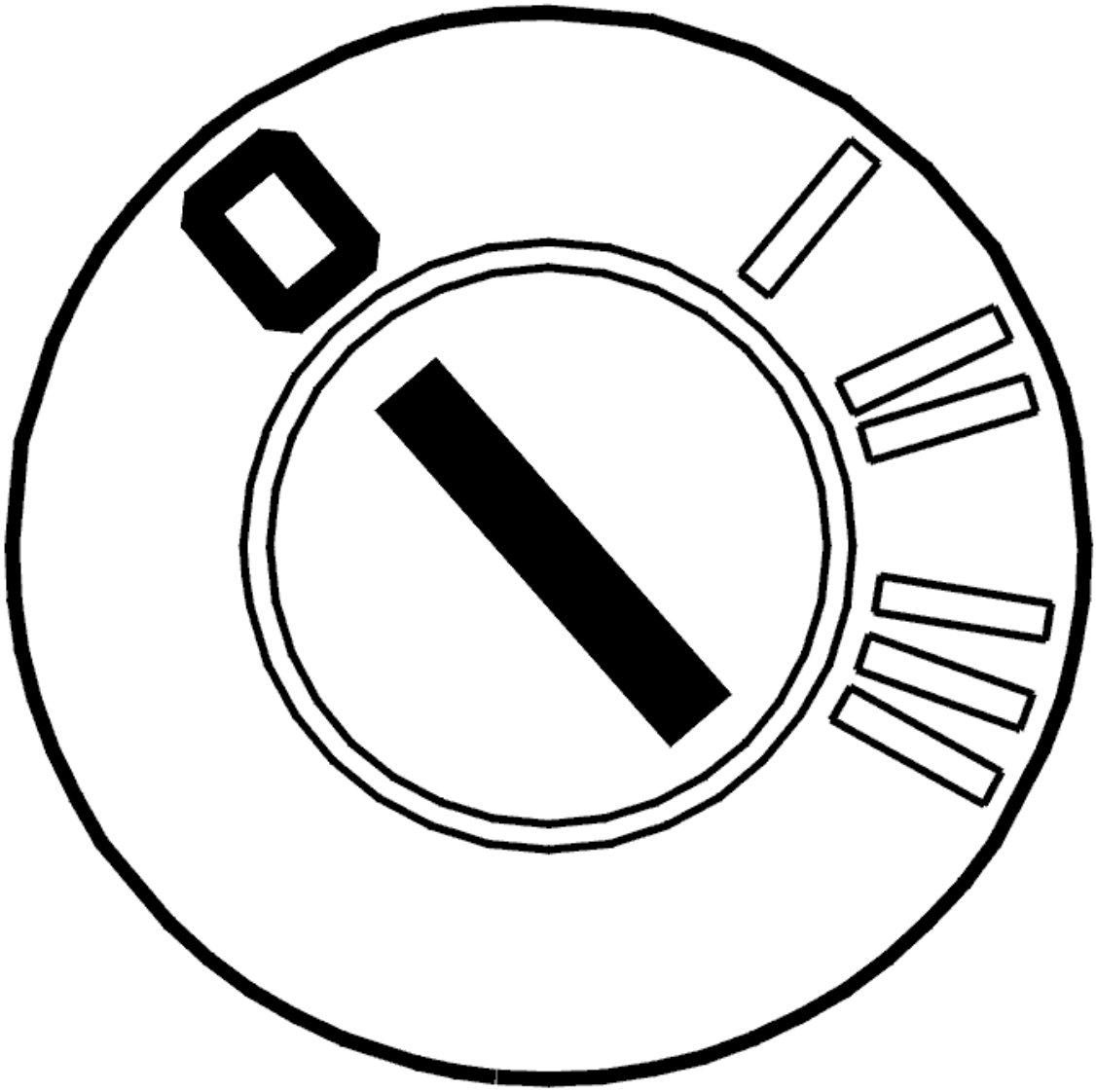


Fig. 315: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

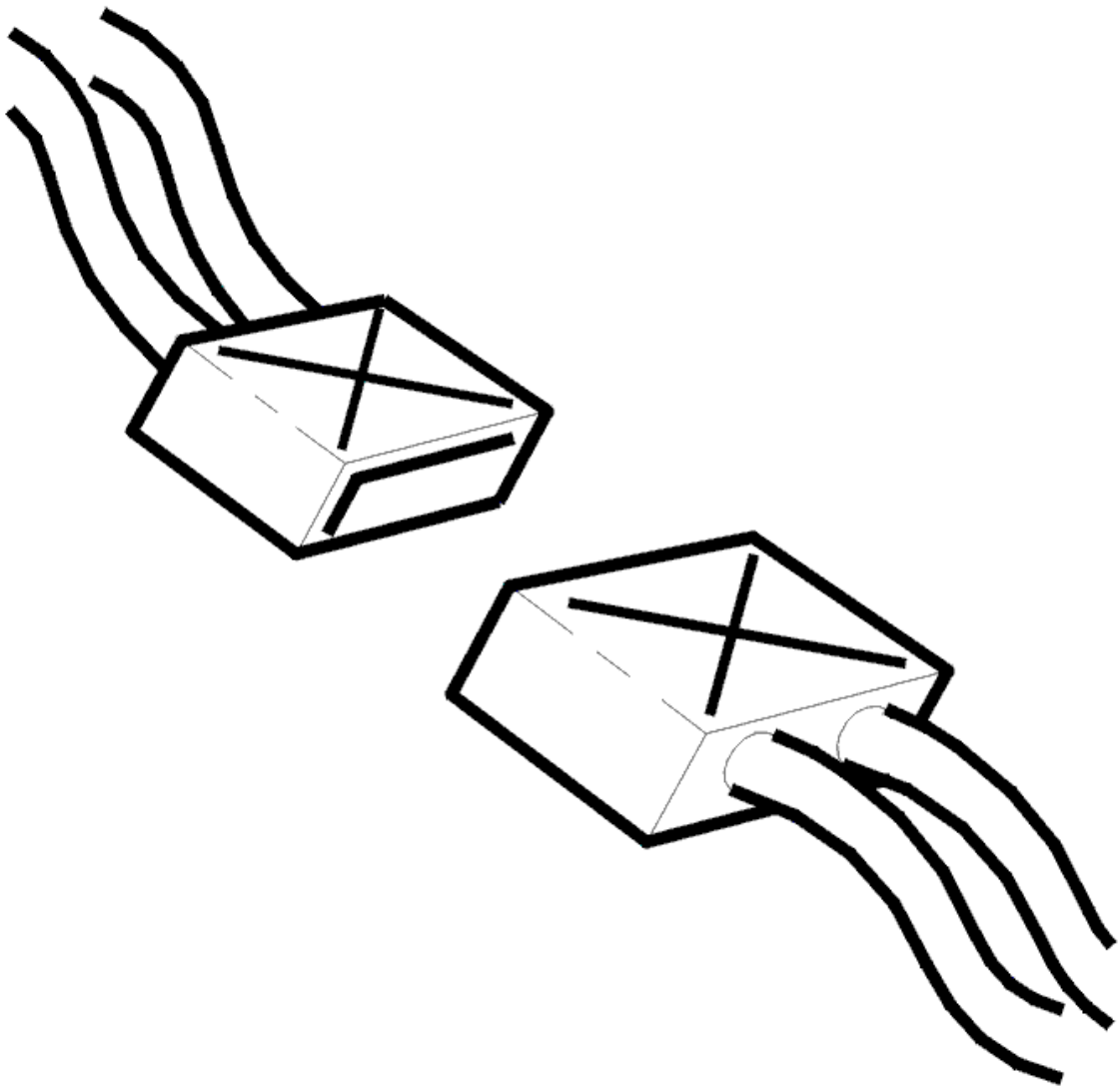


Fig. 316: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector C disconnected.

Check the cable between control module terminal #A48 (#A48) and transmission connector terminal #C3 (control module side). Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

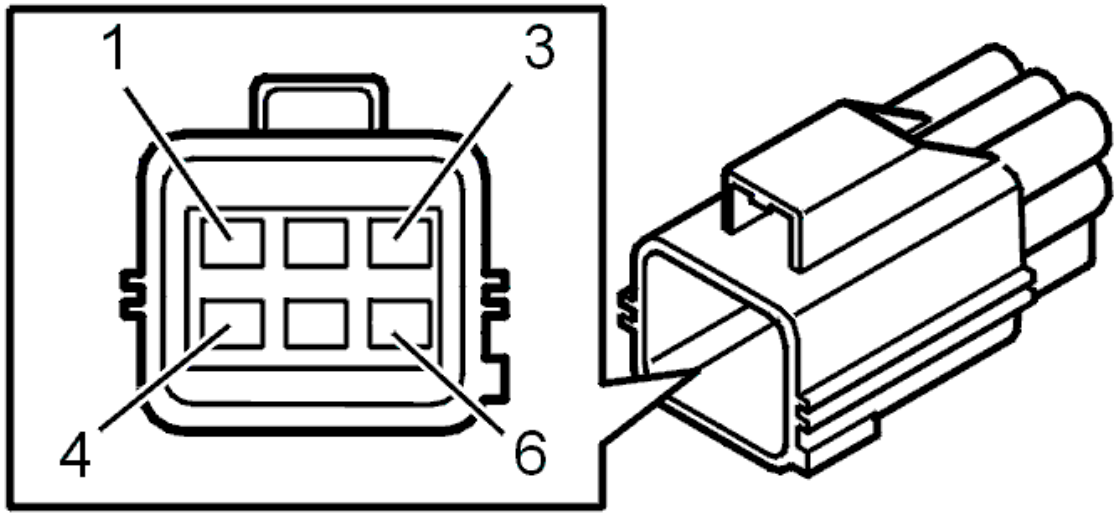


Fig. 317: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

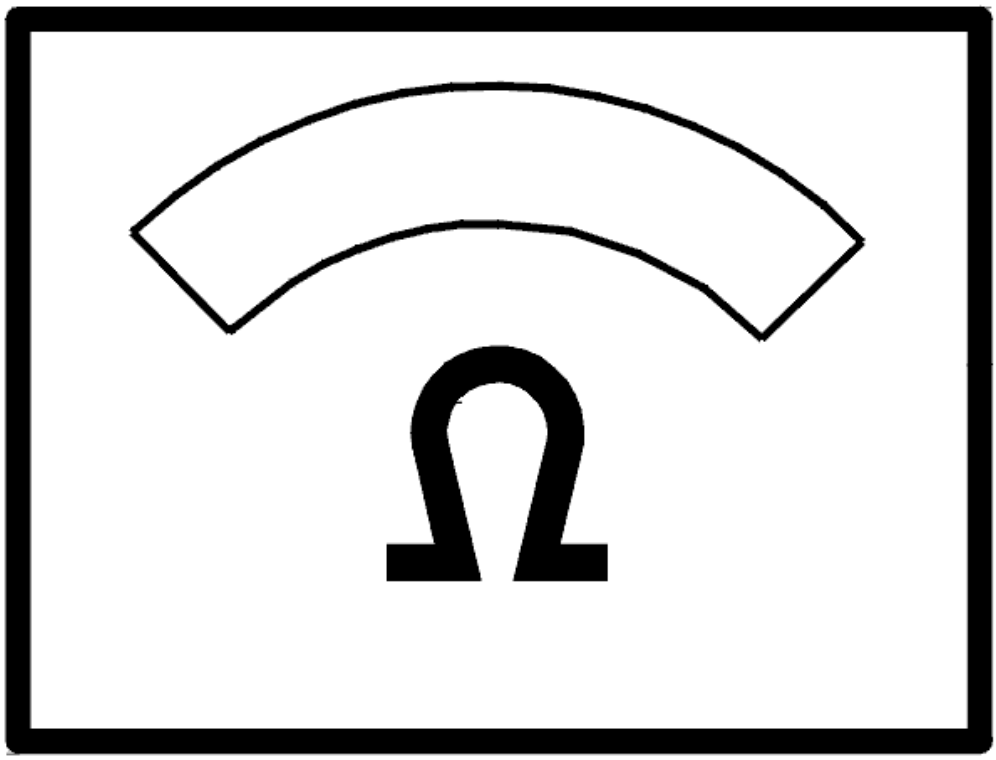


Fig. 318: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

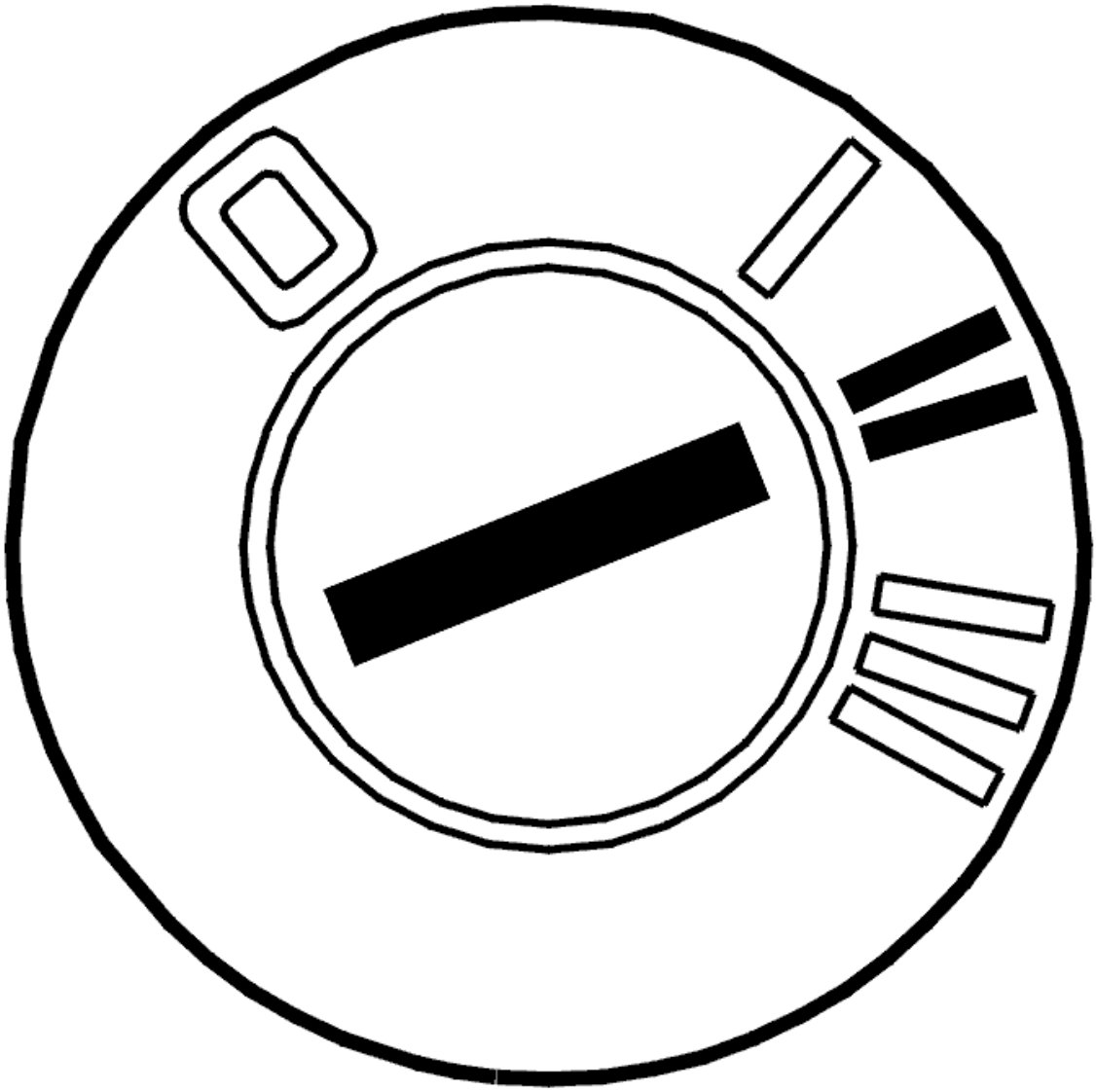


Fig. 319: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

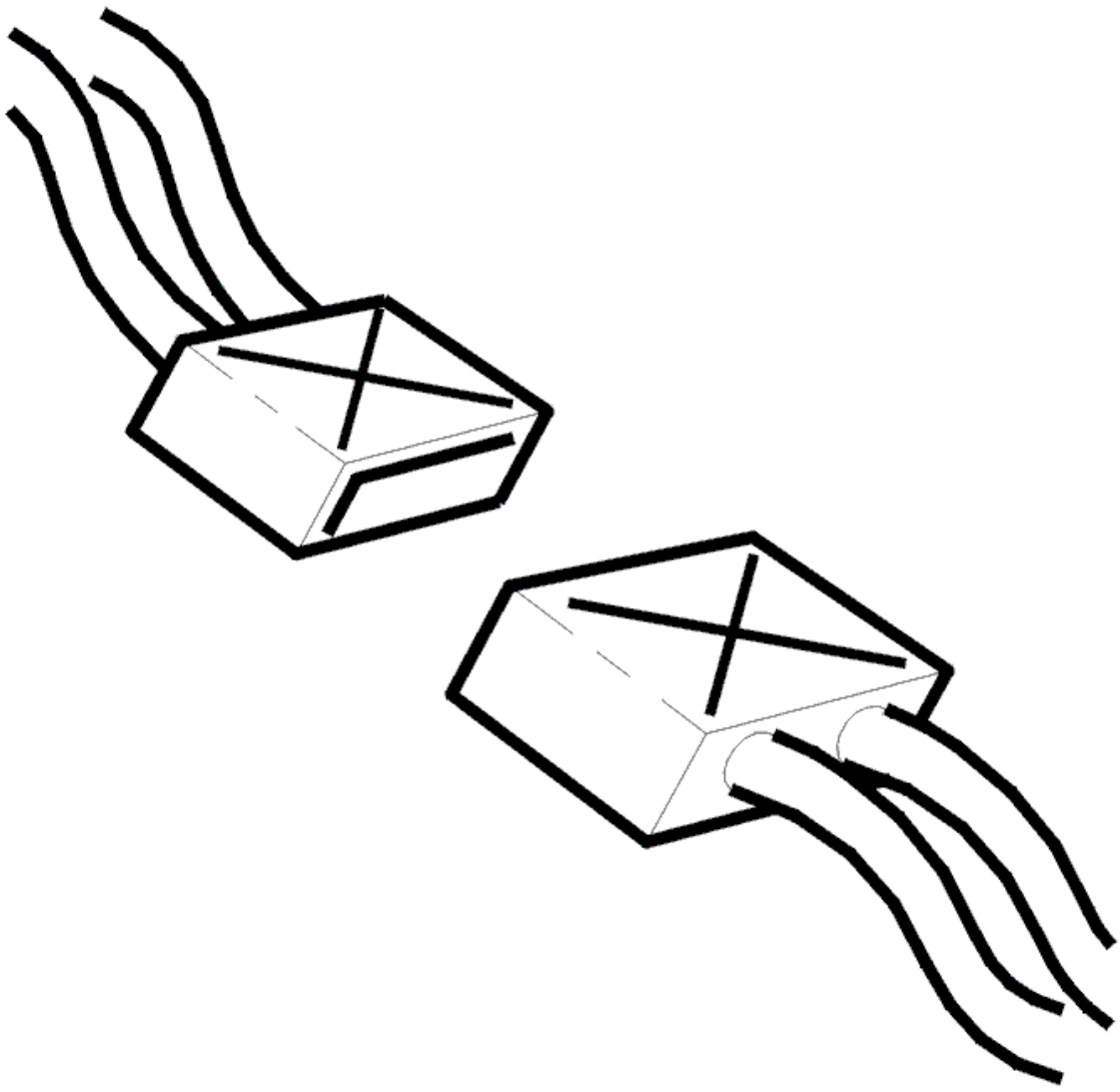


Fig. 320: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

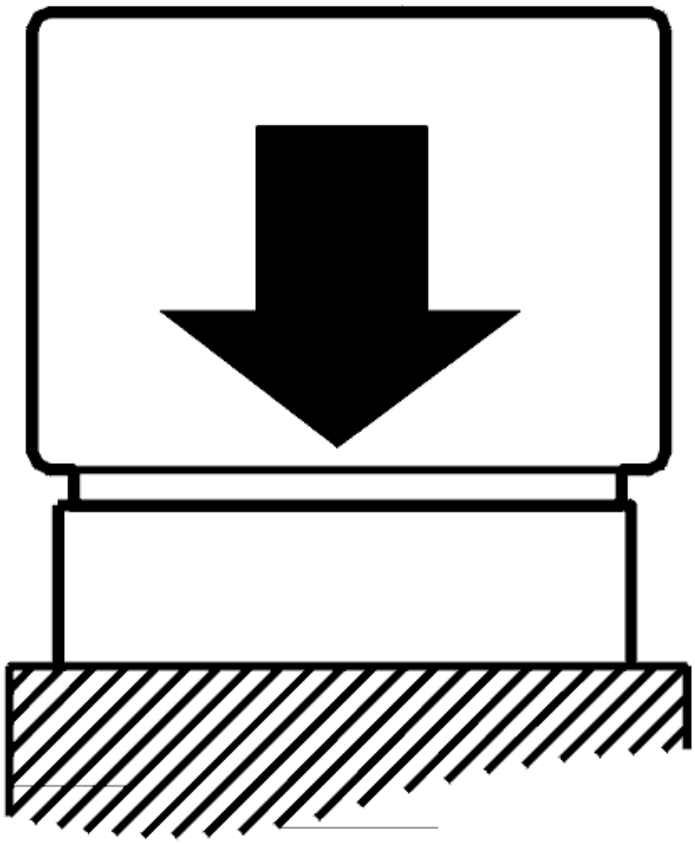


Fig. 321: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector disconnected
- Ignition on
- Gear selector in position P.

Check the transmission control module (TCM) by measuring the resistance between terminals #A48 (#A48) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

NOTE: When removing the transmission connector, the control module may store

diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

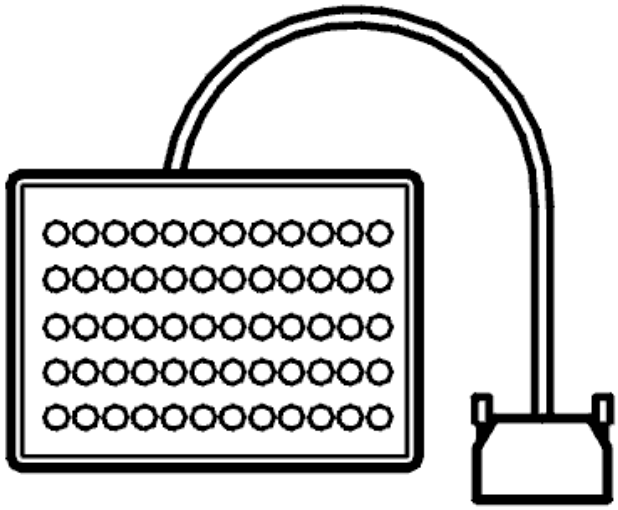


Fig. 322: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

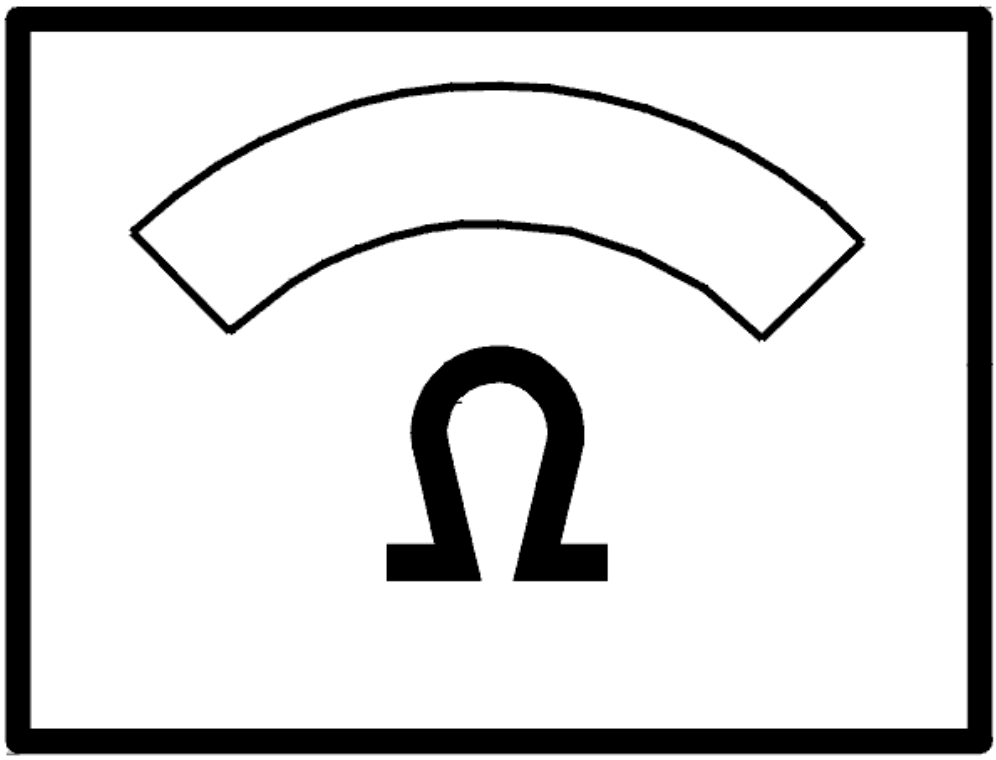


Fig. 323: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

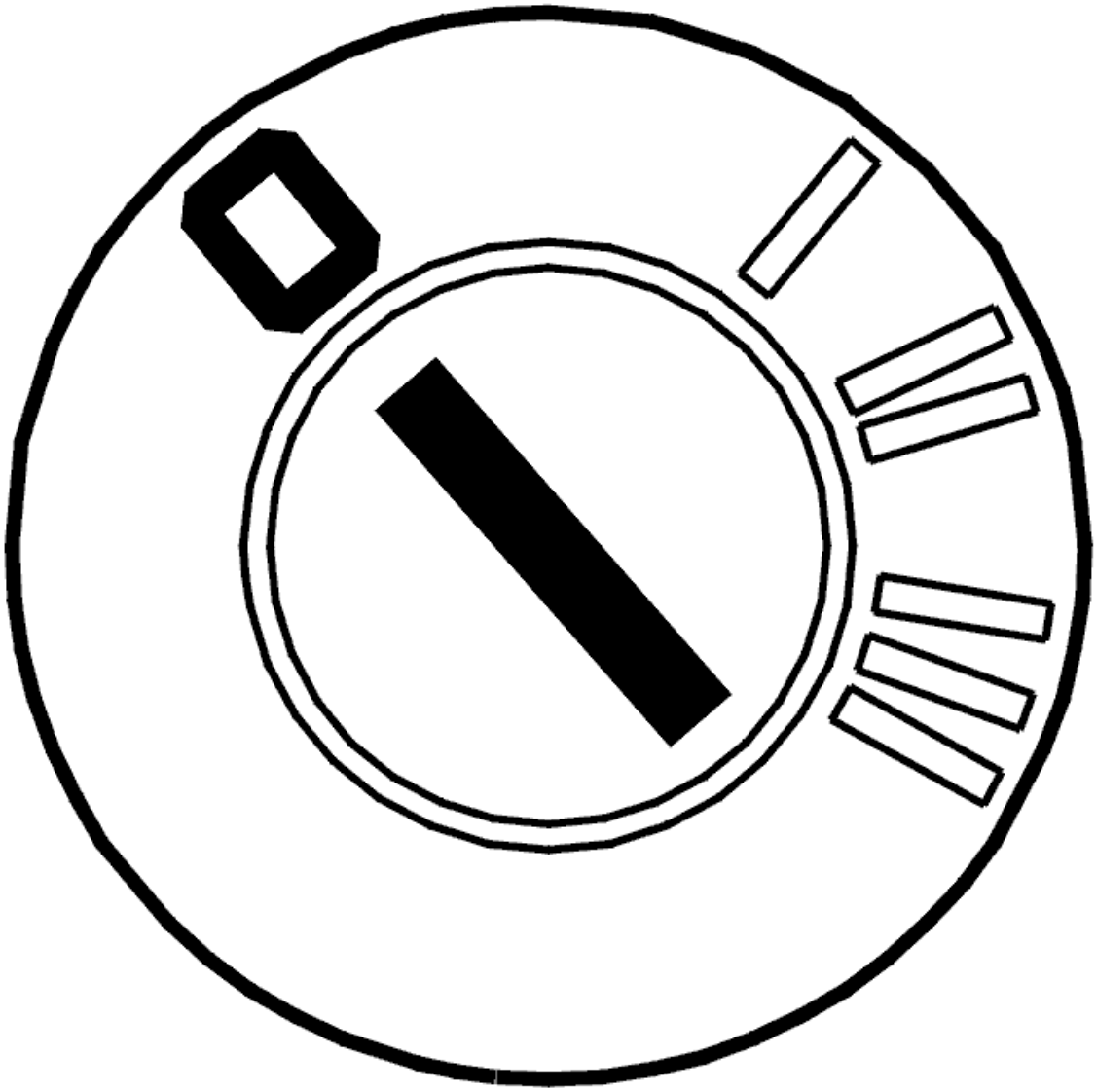


Fig. 324: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C3 (transmission side) and the connector for solenoid S3. Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Check solenoid S3 by measuring the resistance between the terminal pin on solenoid S3 and the transmission housing. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the control system and to check or replace solenoid S3, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

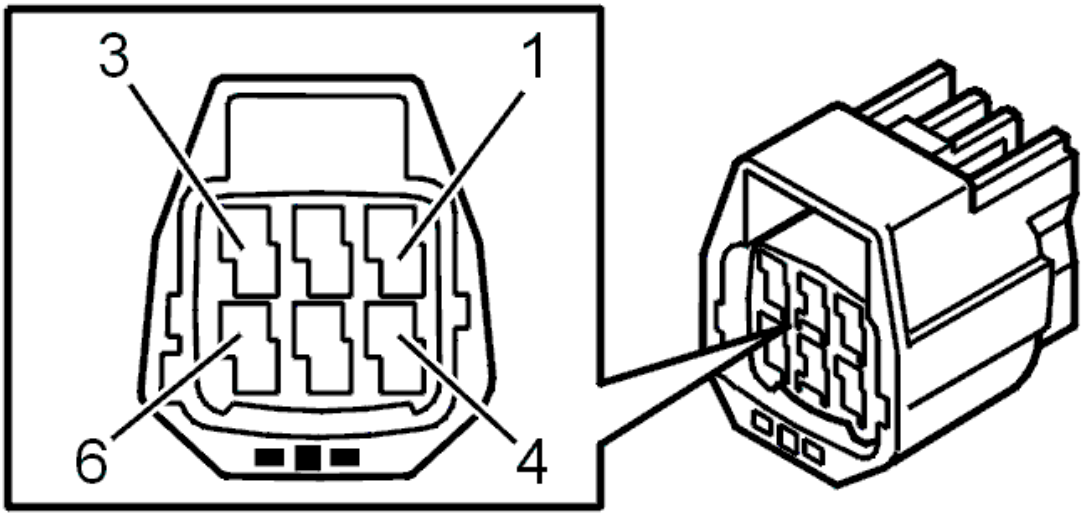


Fig. 325: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

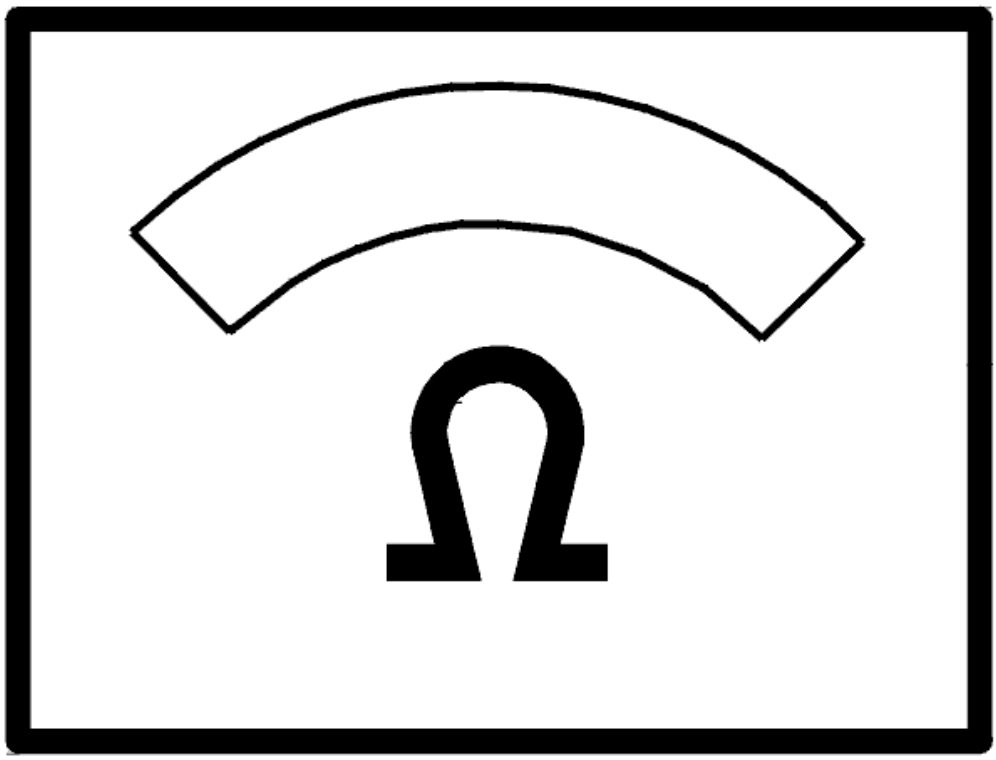


Fig. 326: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the cable between transmission control module (TCM) terminal #A48 (#A48) and transmission connector terminal #C3. Check for intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** . Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

- Check the circuit for solenoid S3. Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #A48 (#A48) and #A53 (#A53) on the breakout box. The resistance must be

11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

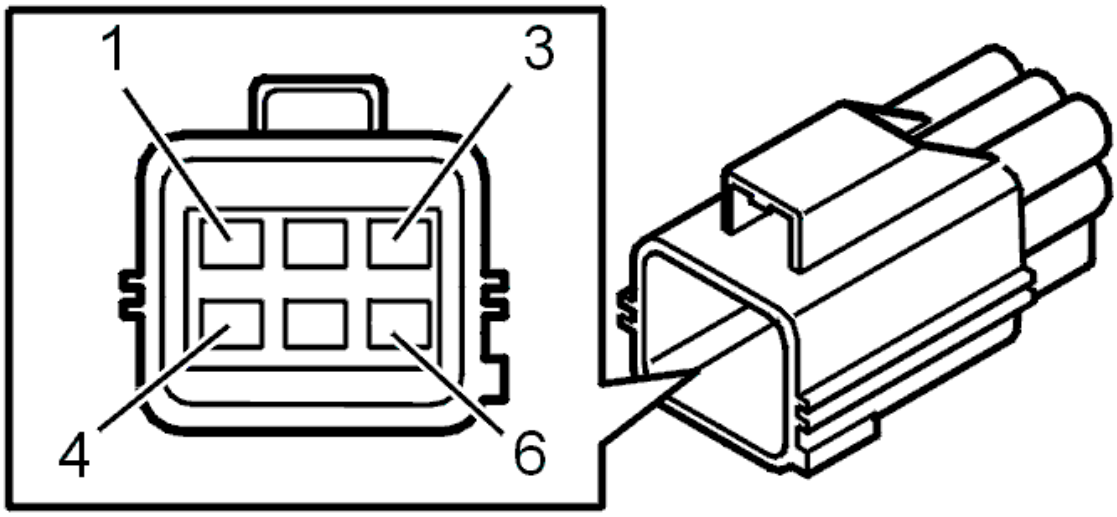


Fig. 327: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

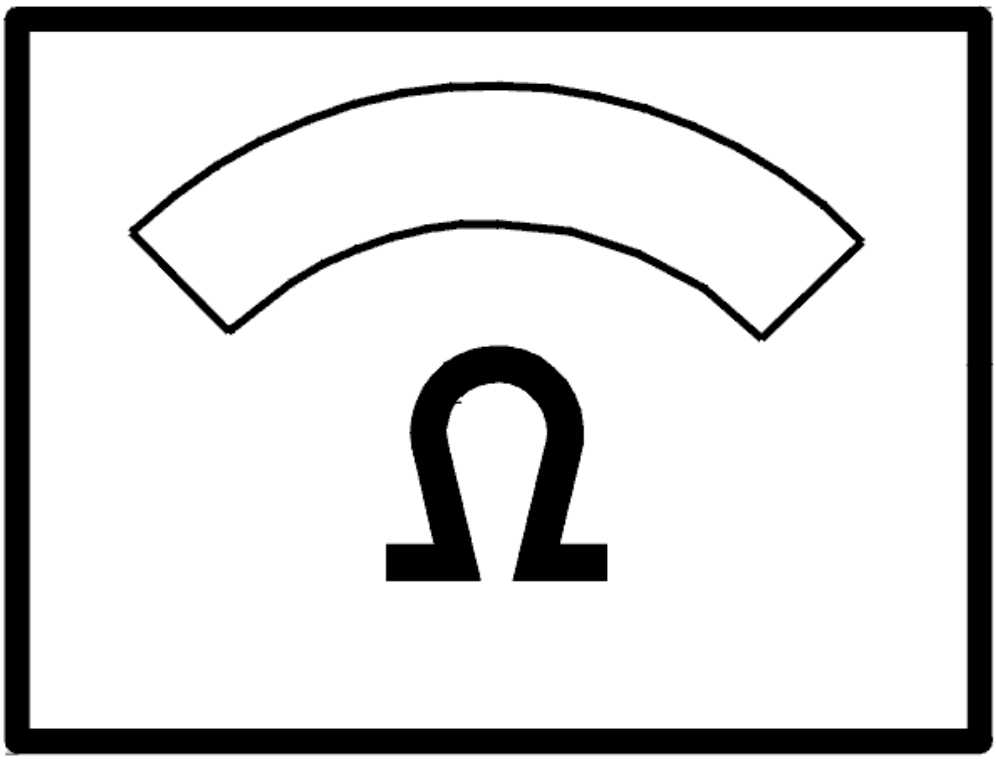


Fig. 328: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

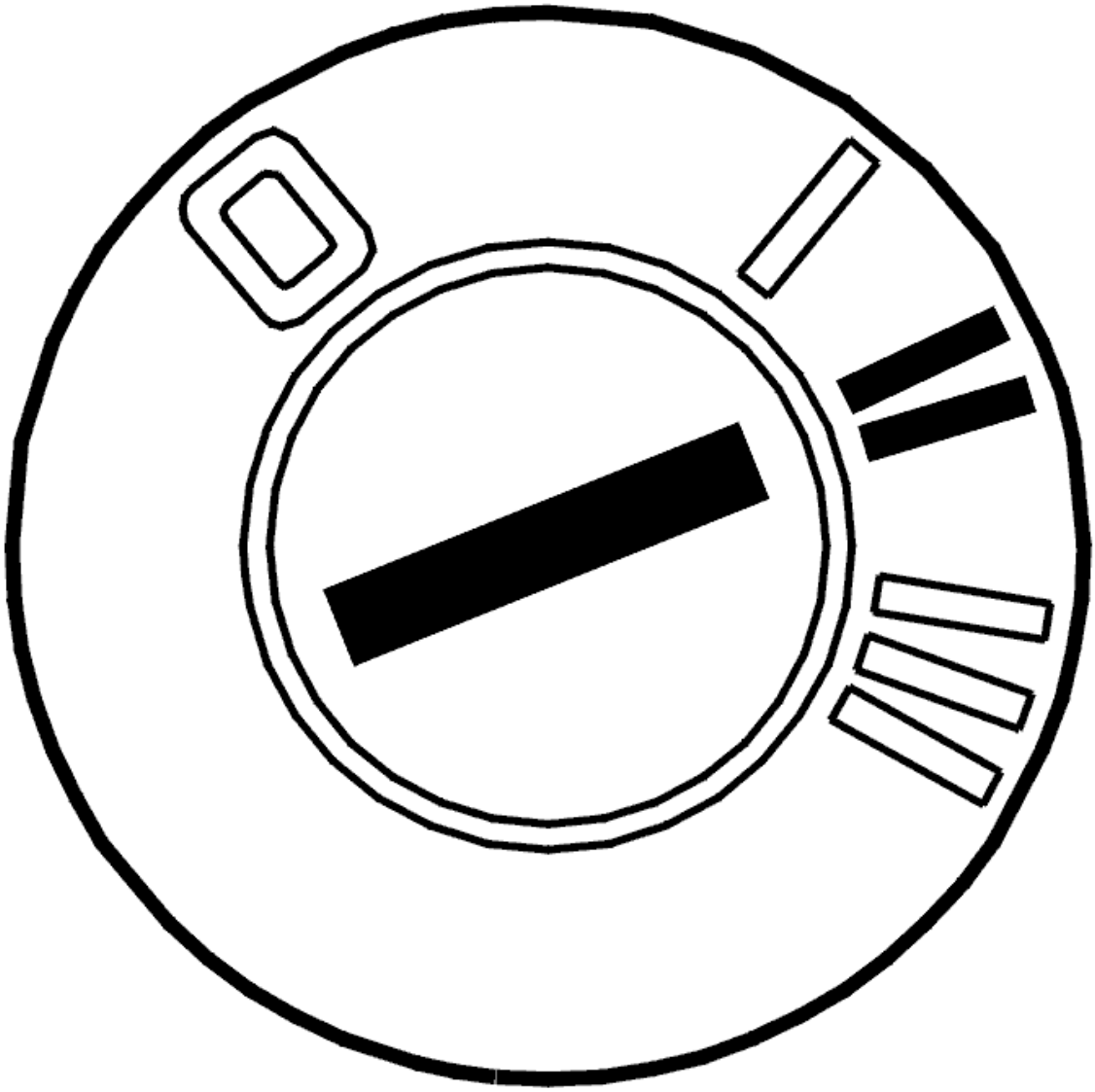


Fig. 329: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Use the VCT2000 (or appropriate scan tool) to reset the adaptation and counter.

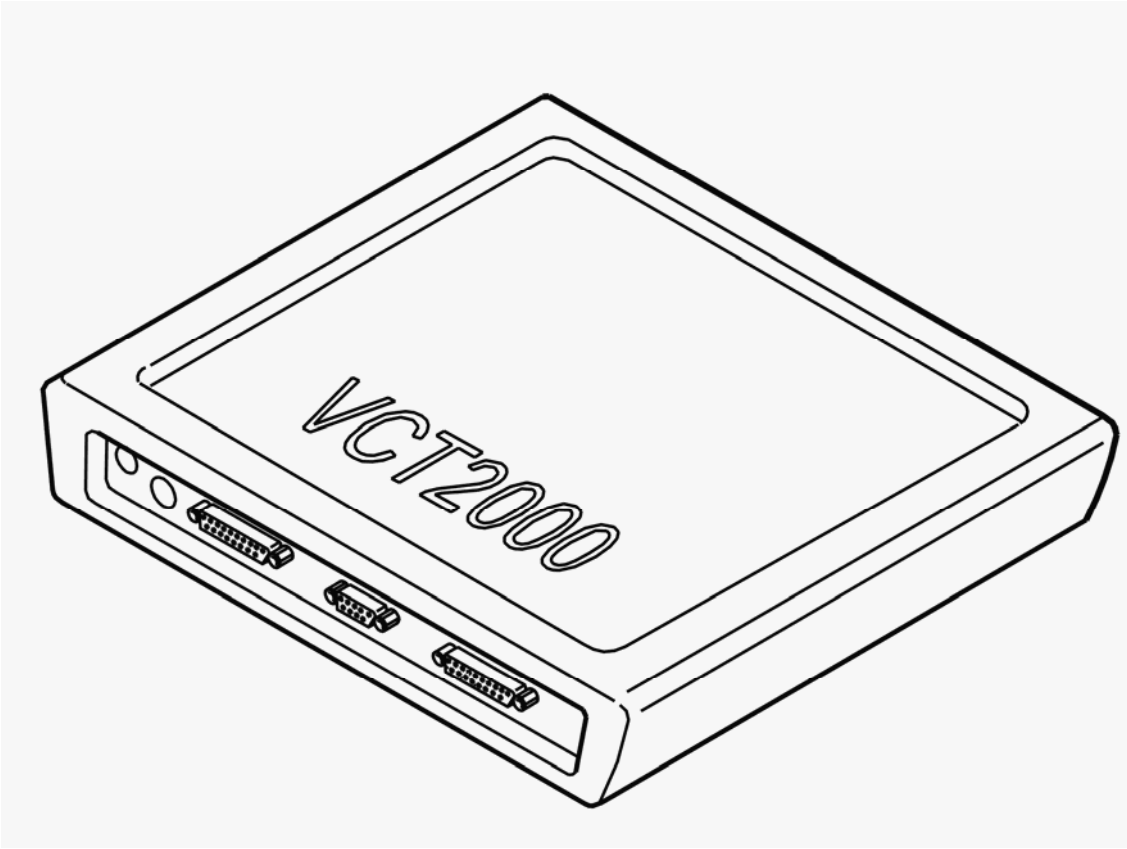


Fig. 330: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

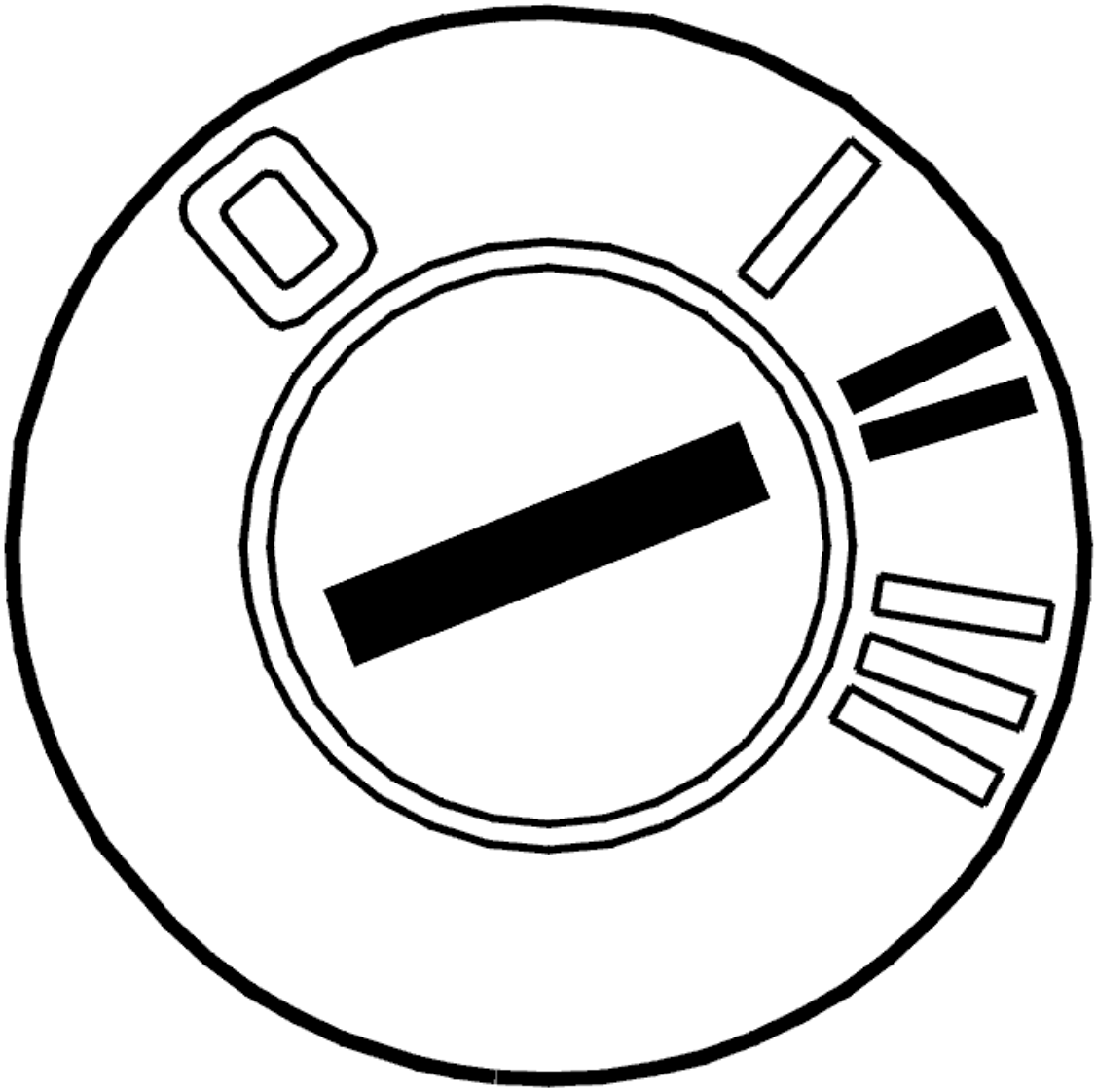


Fig. 331: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

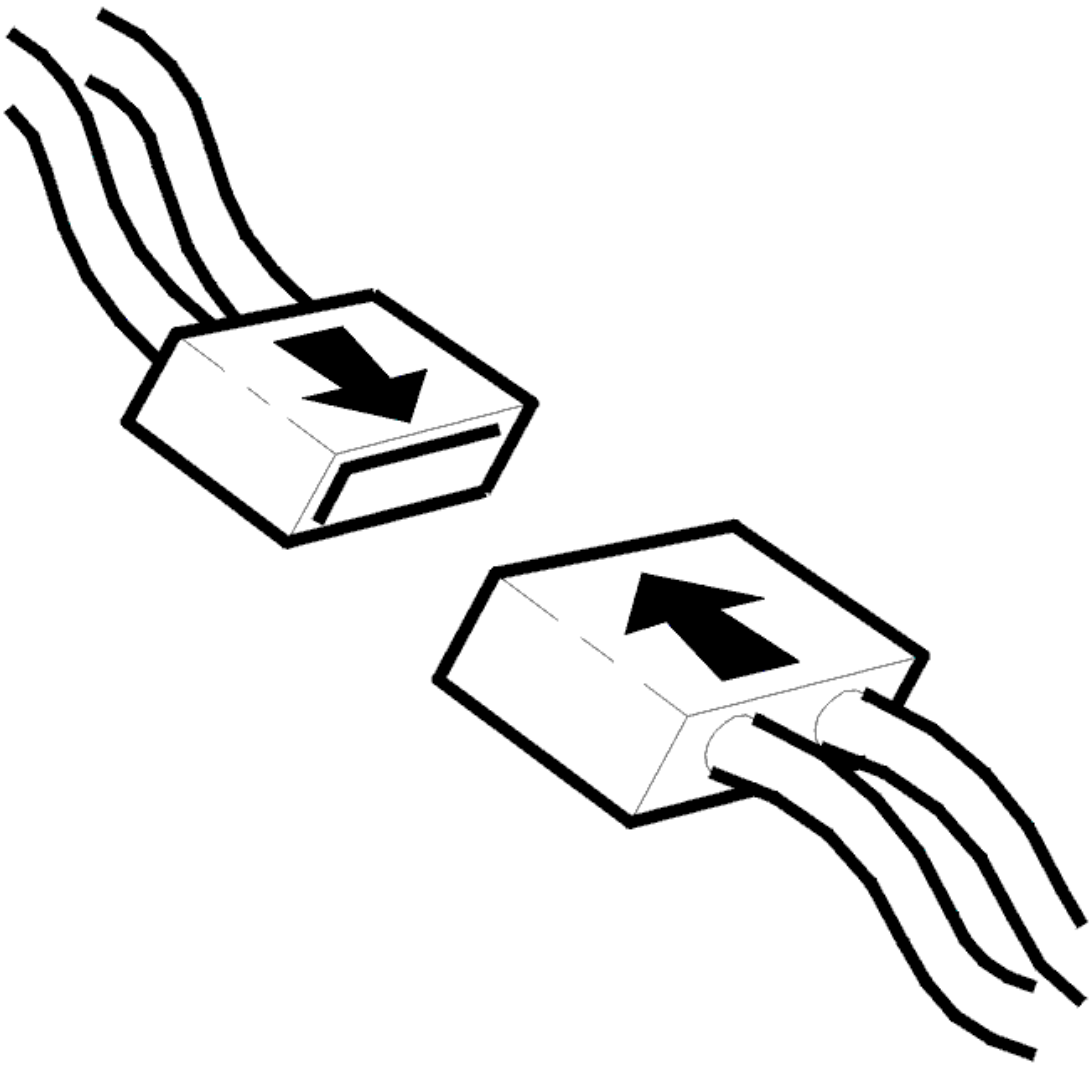


Fig. 332: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S3.

The value should change between OFF and ON.

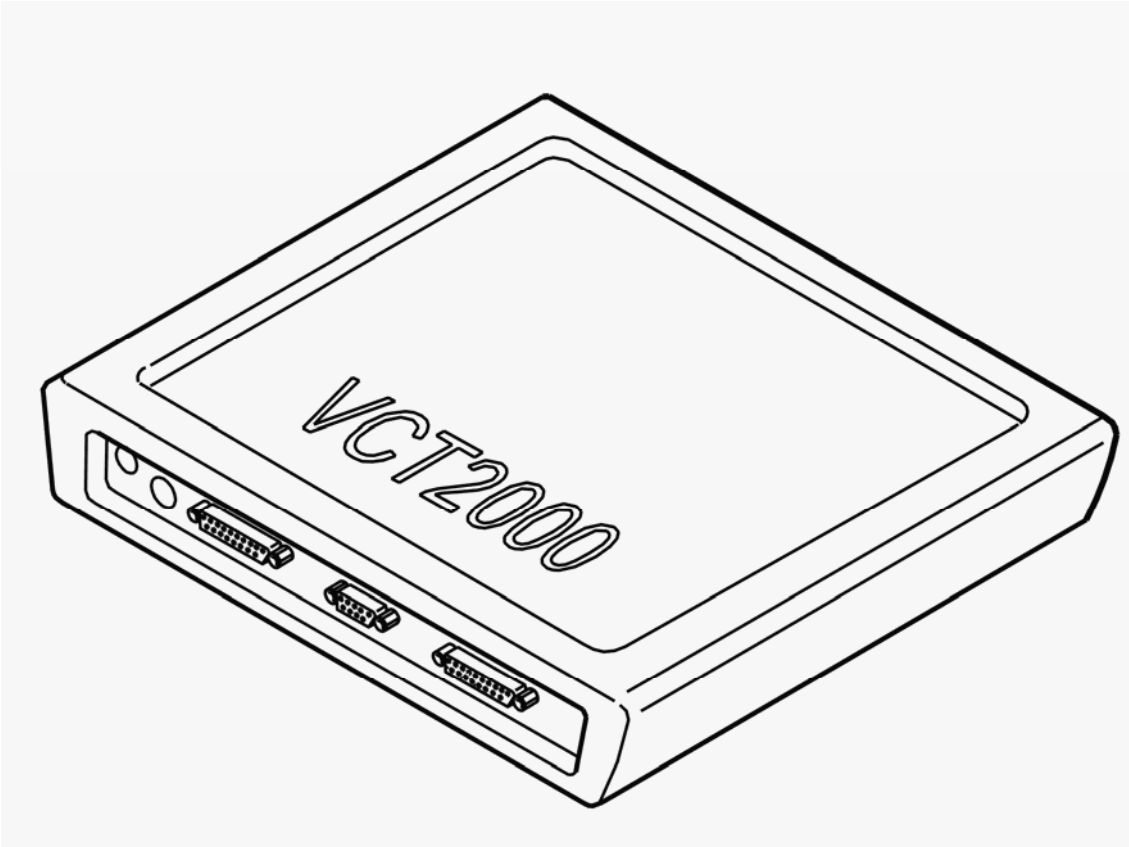


Fig. 333: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change between OFF and ON?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

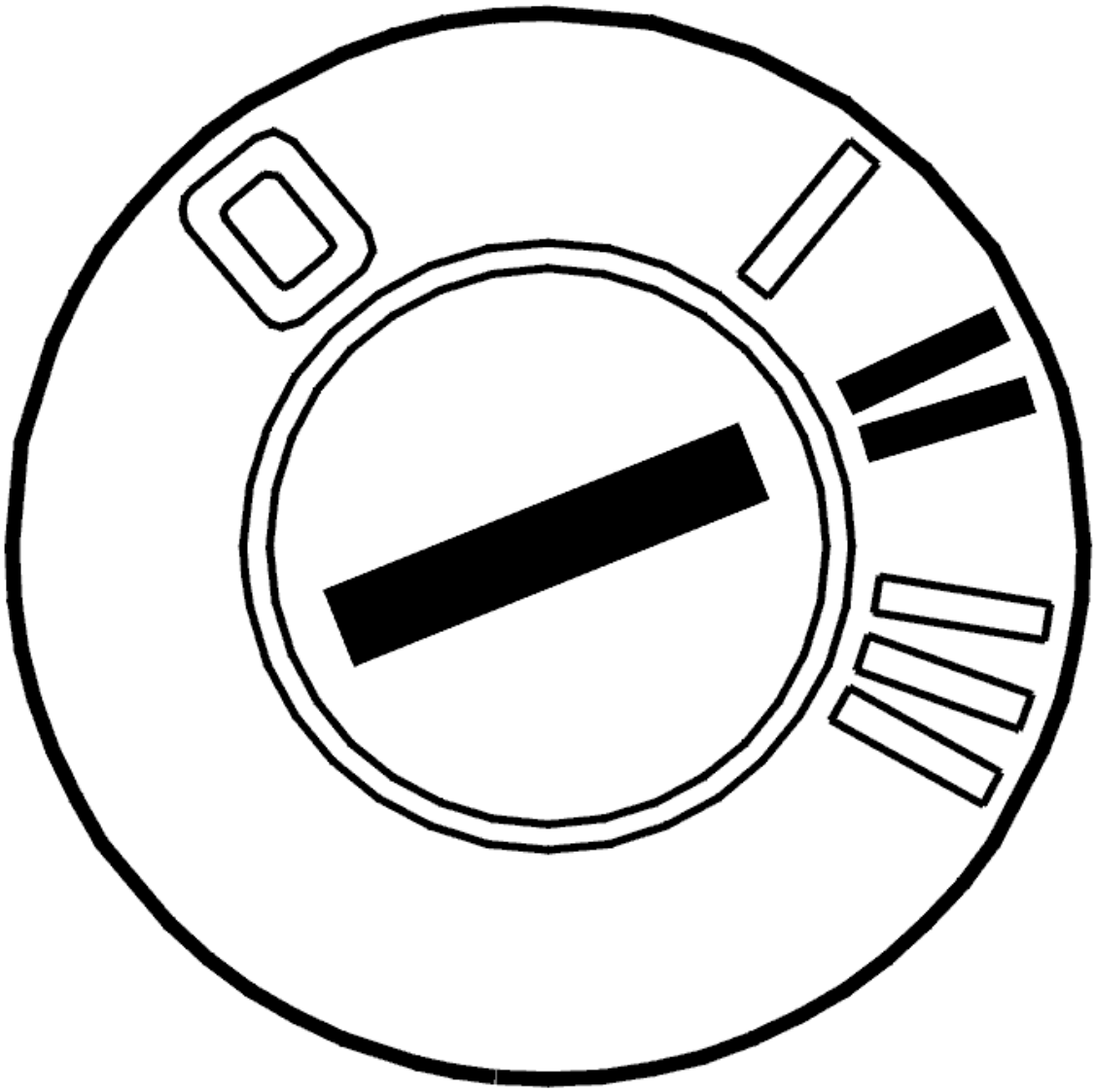


Fig. 334: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

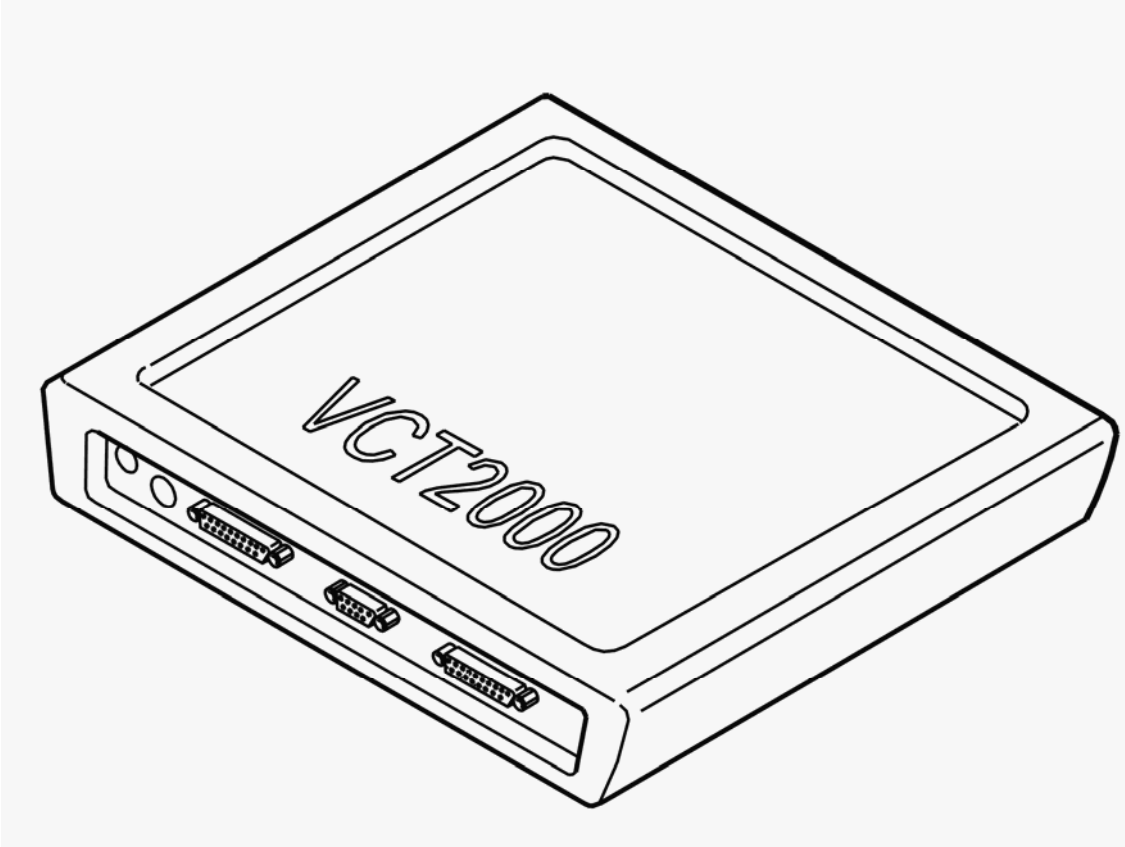


Fig. 335: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

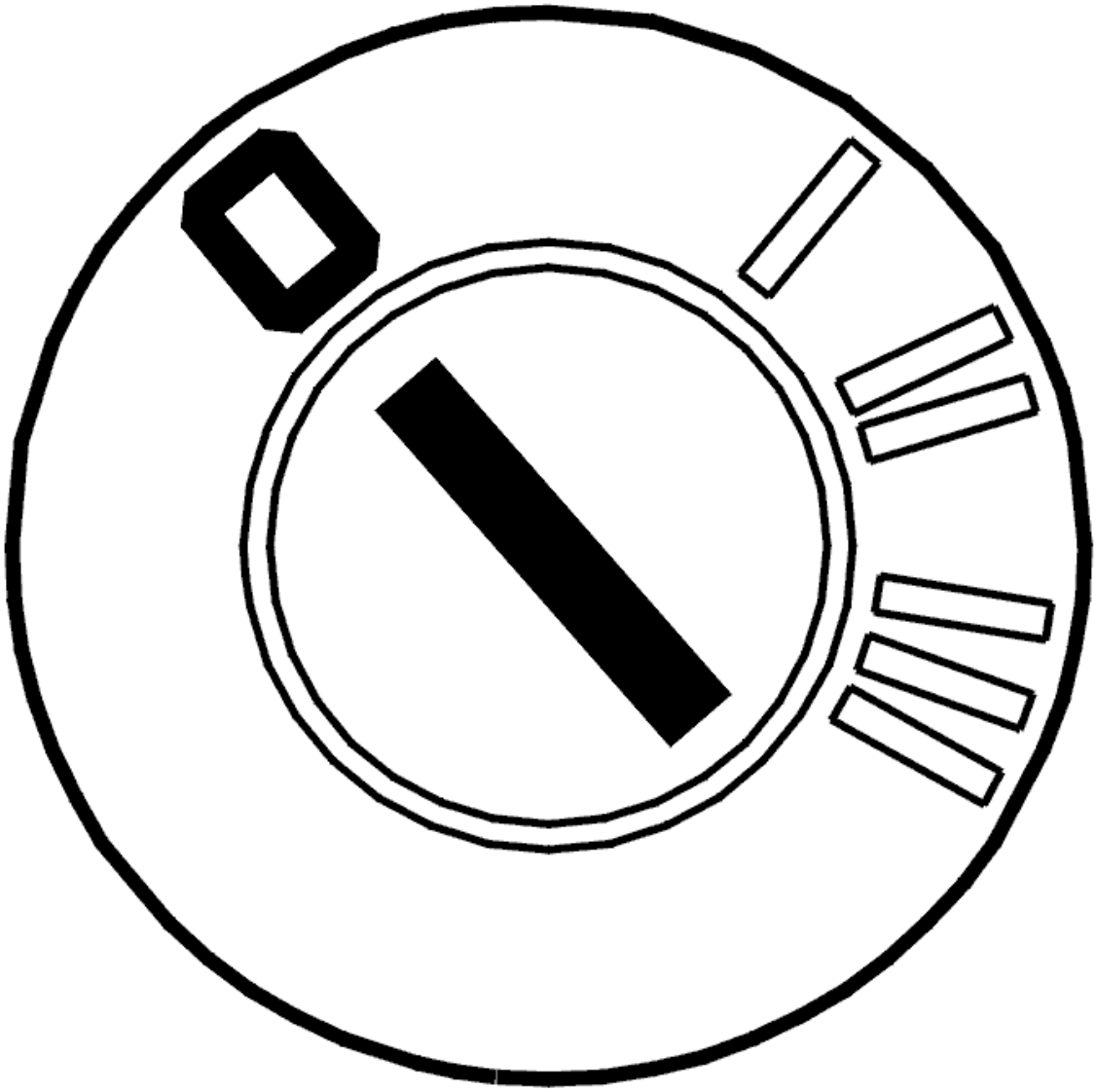


Fig. 336: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

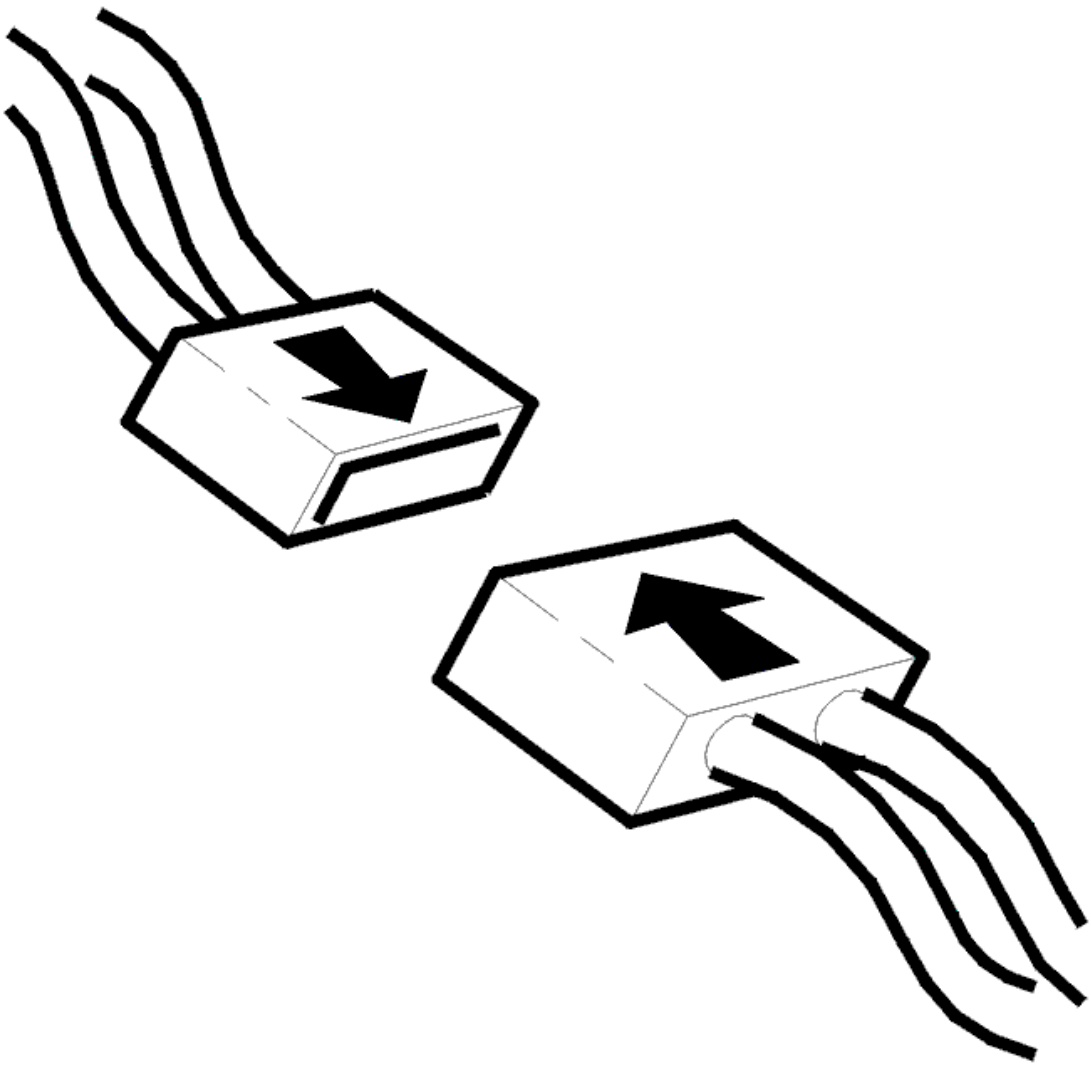


Fig. 337: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

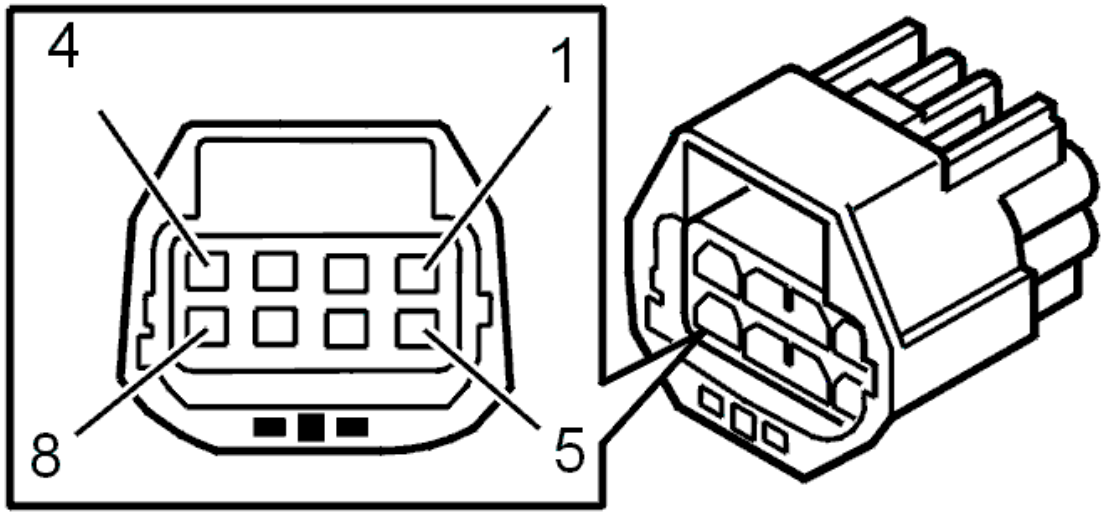


Fig. 338: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

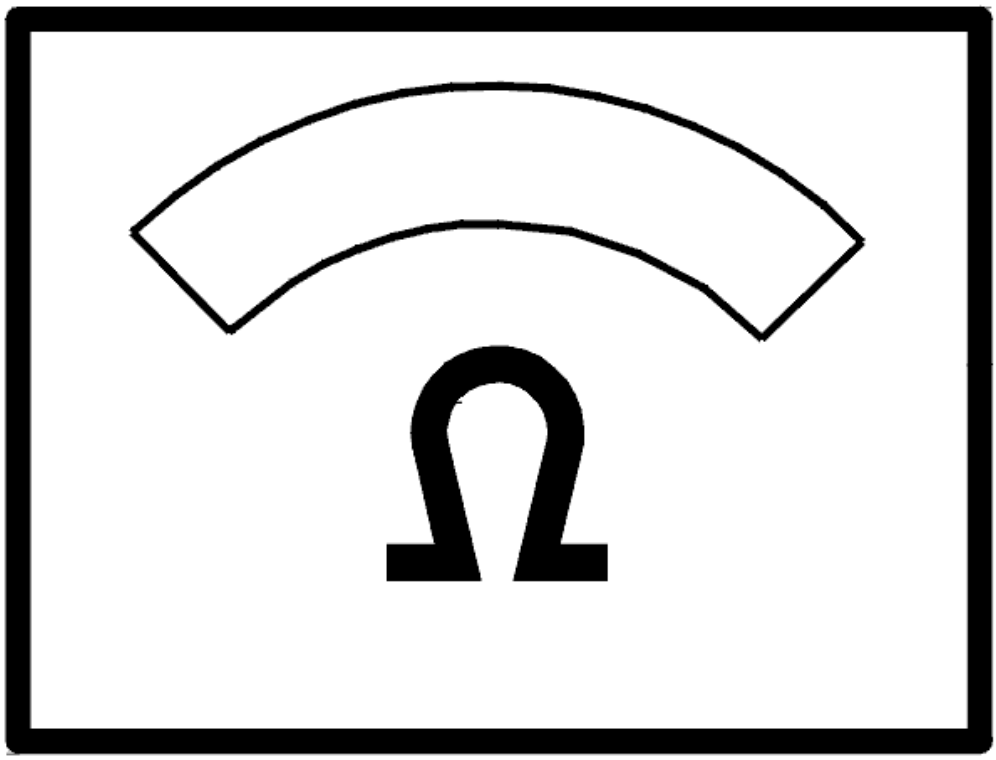


Fig. 339: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

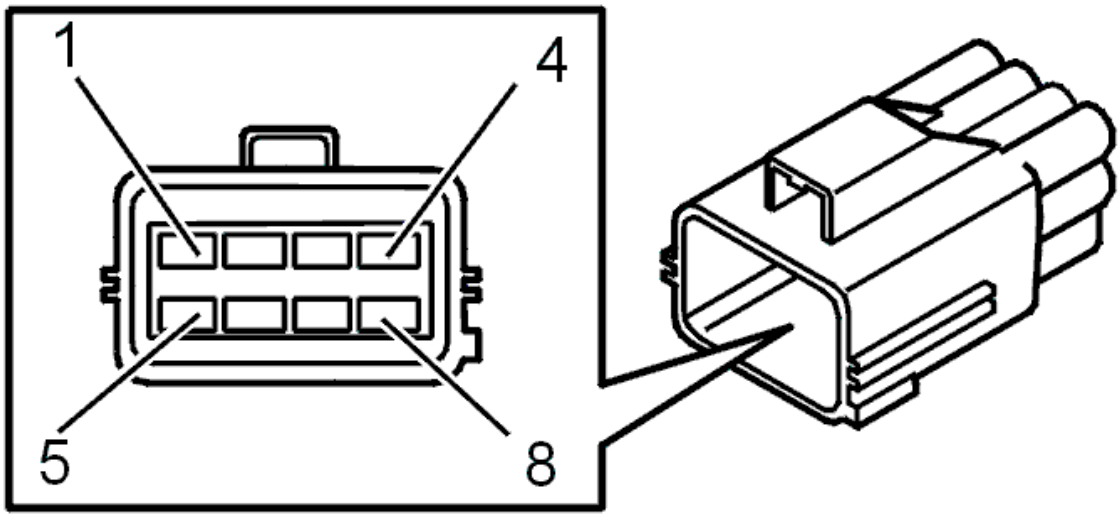


Fig. 340: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

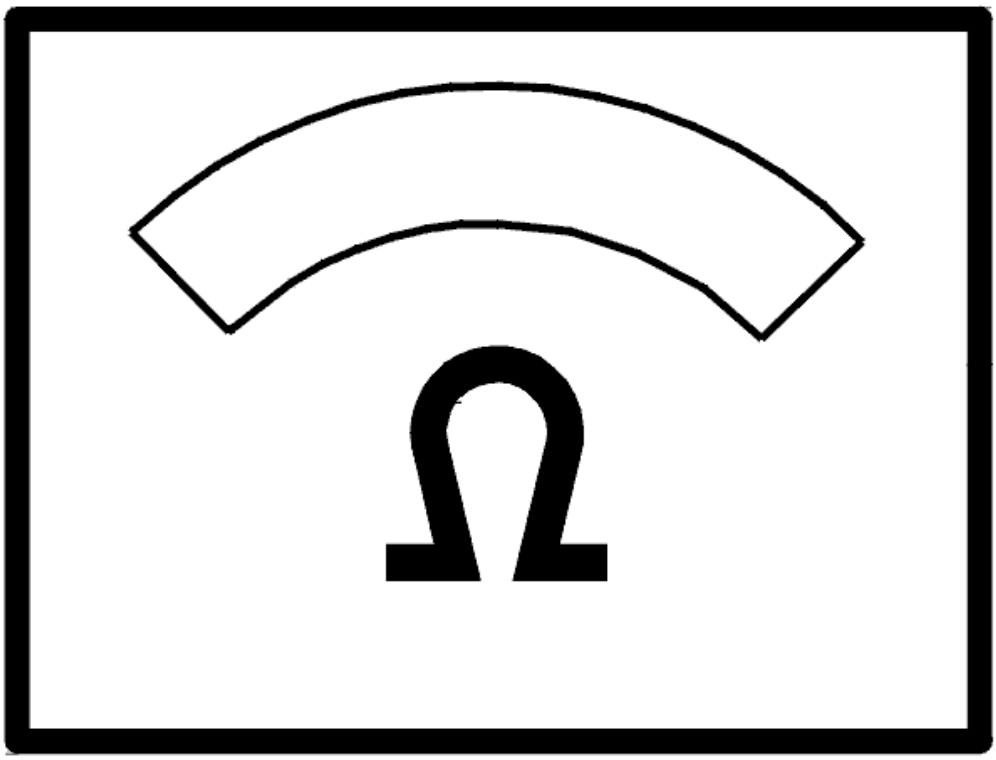


Fig. 341: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

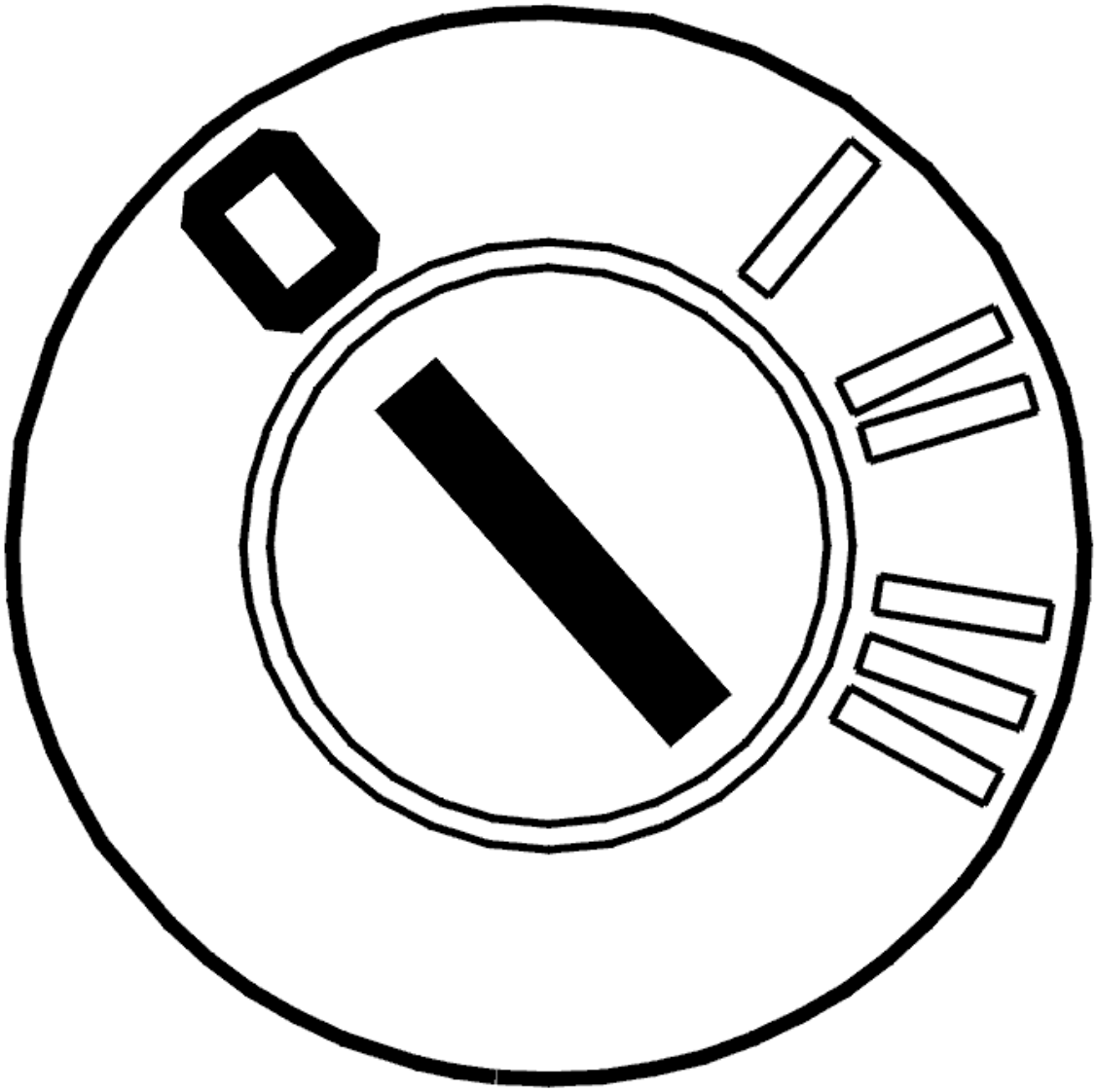


Fig. 342: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

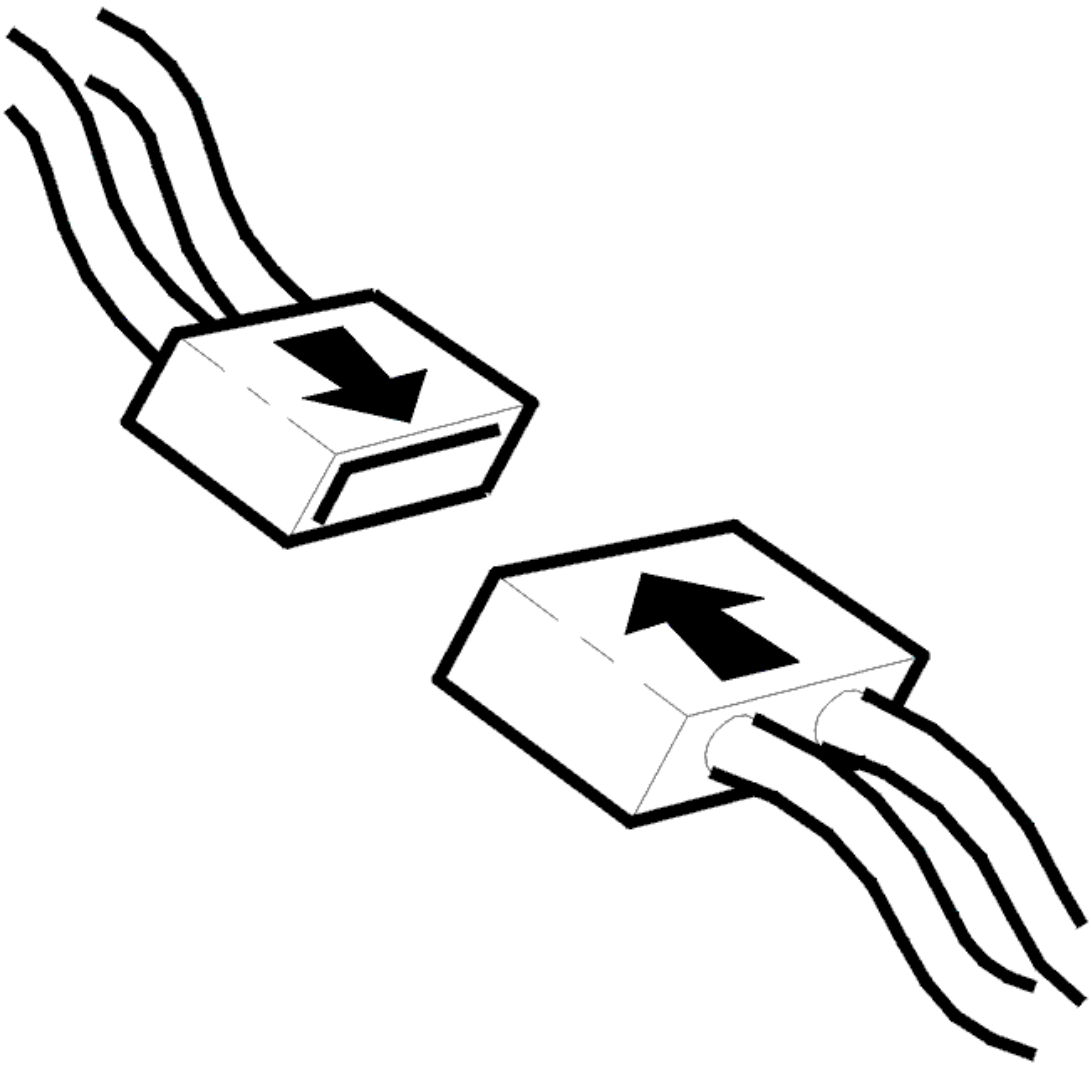


Fig. 343: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

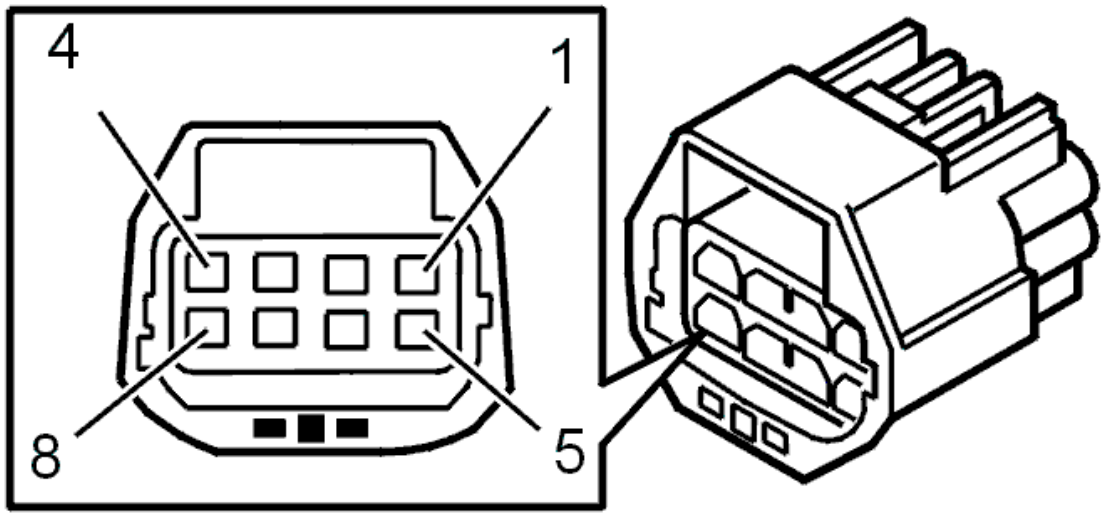


Fig. 344: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

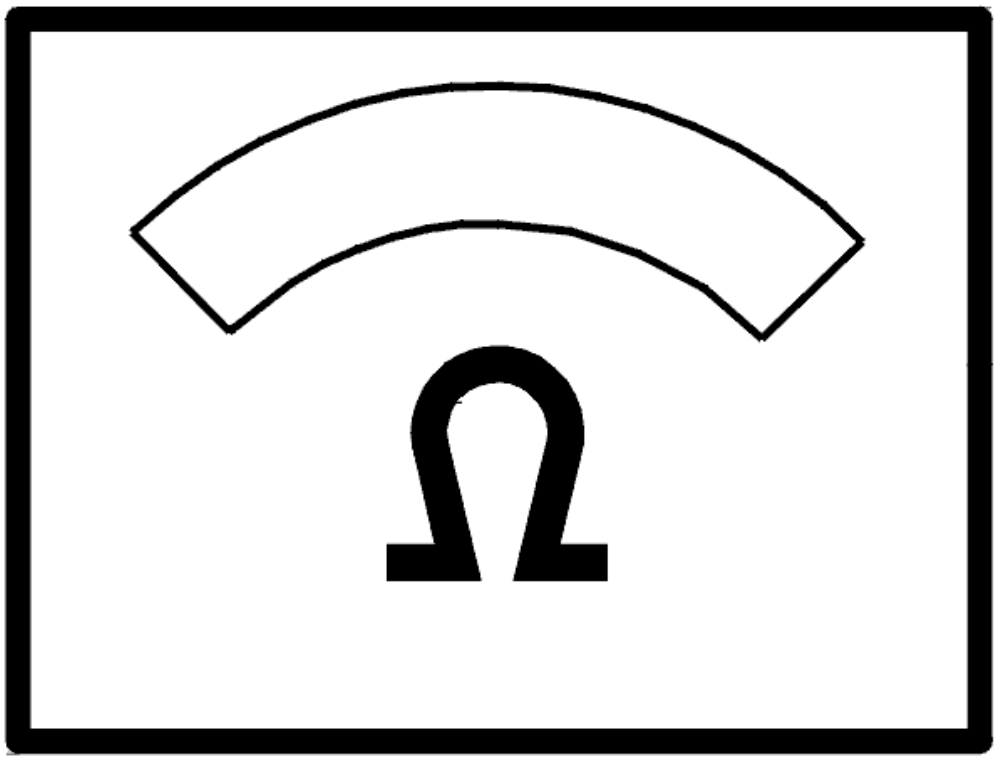


Fig. 345: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

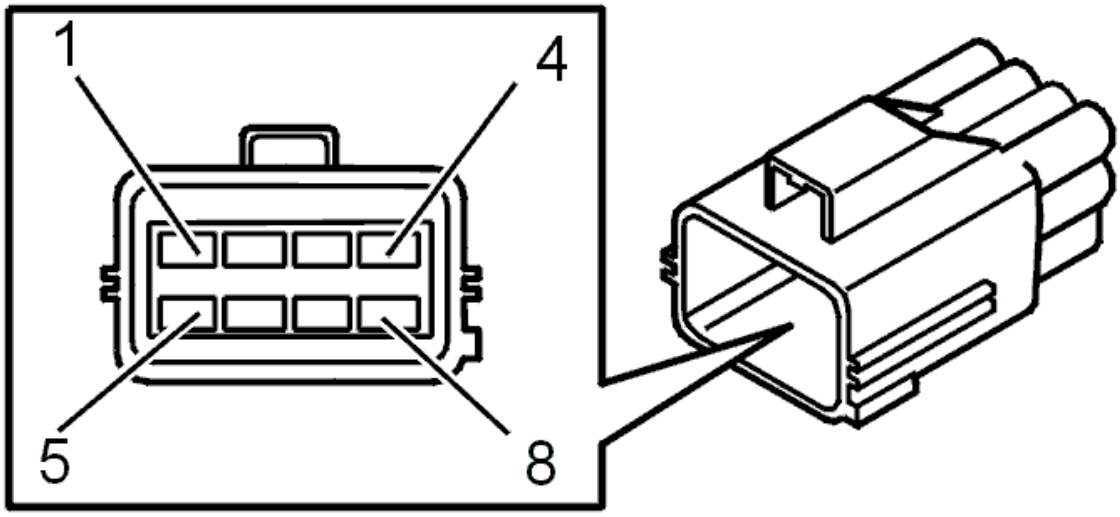


Fig. 346: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

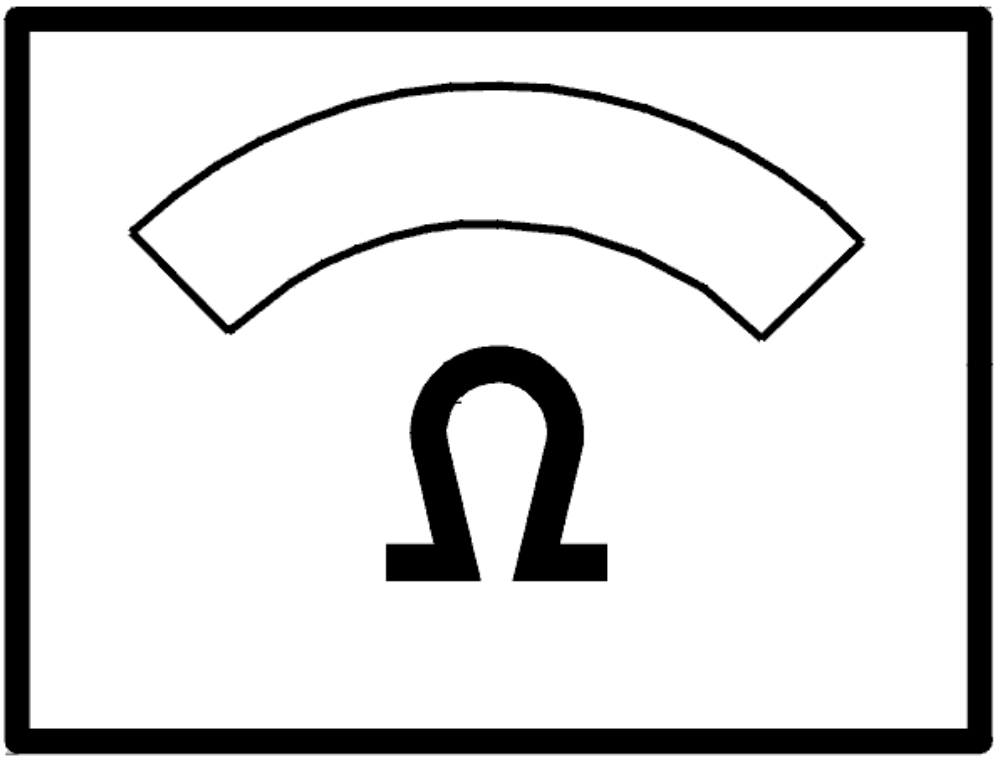


Fig. 347: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

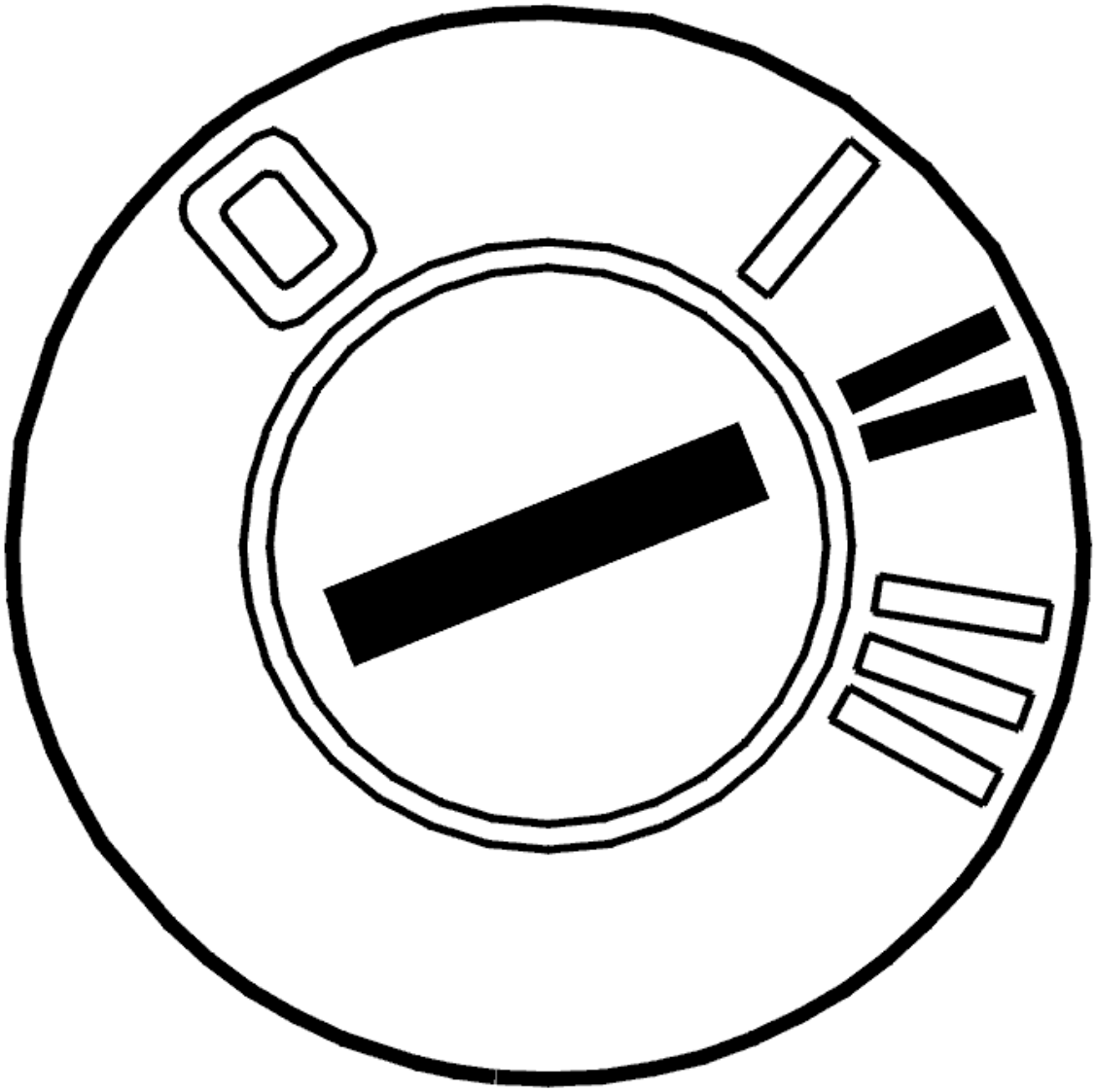


Fig. 348: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

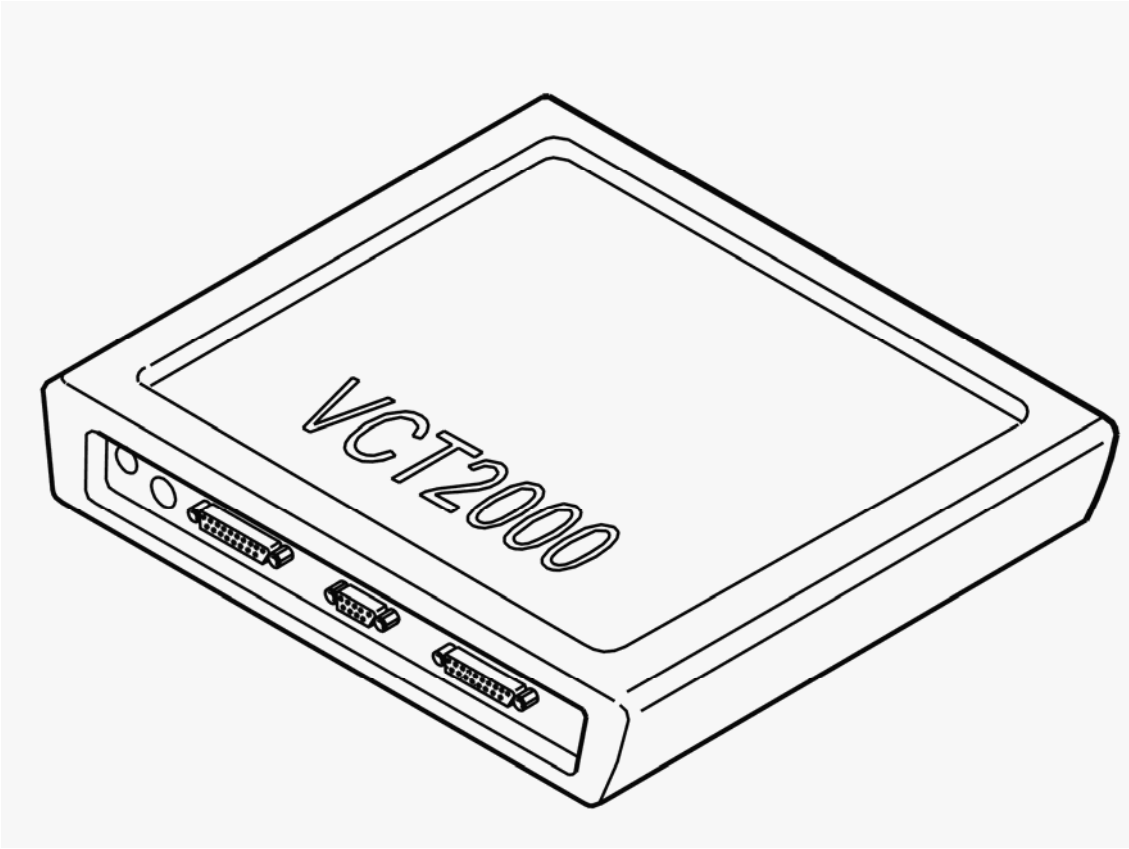


Fig. 349: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

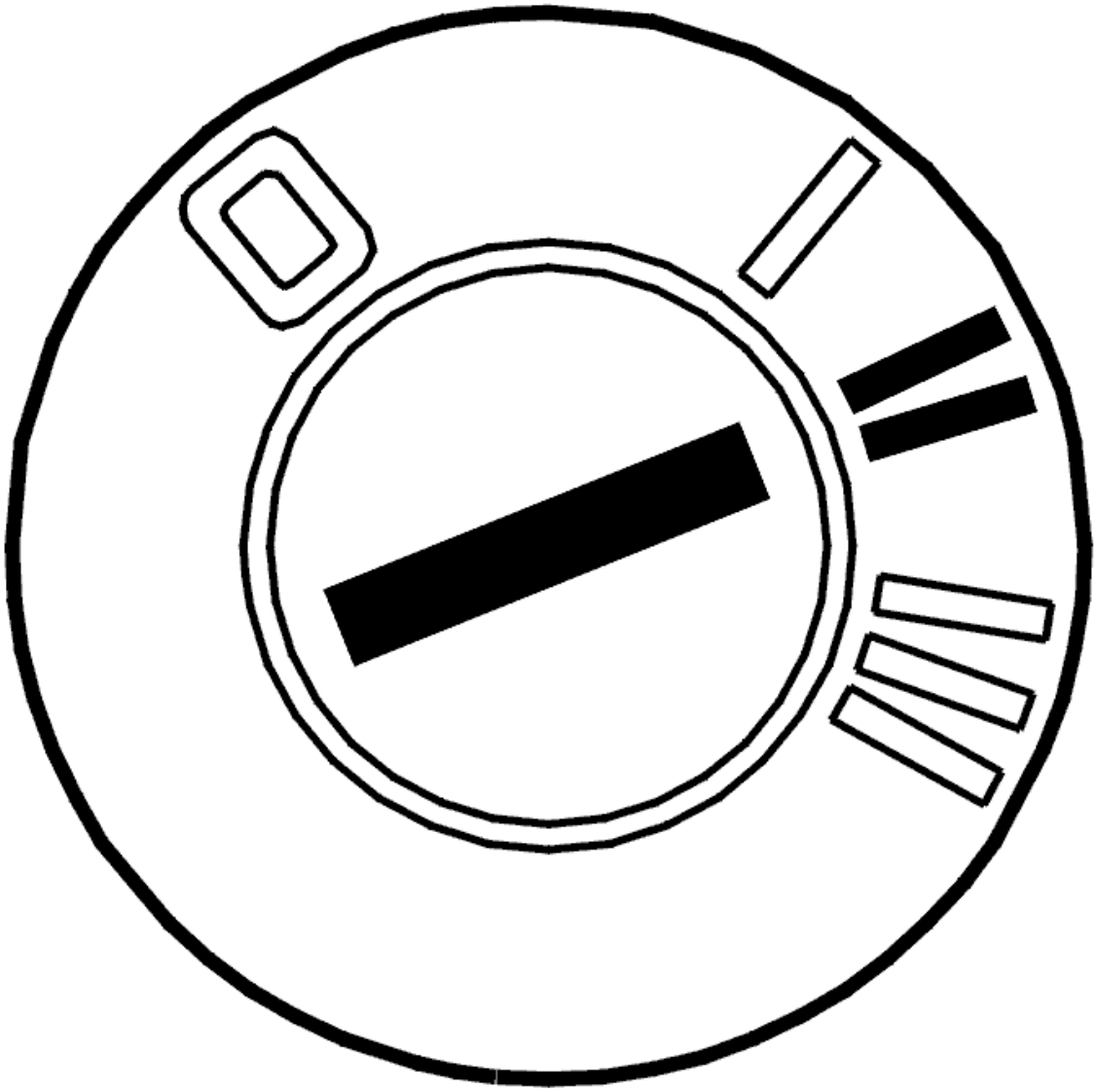


Fig. 350: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

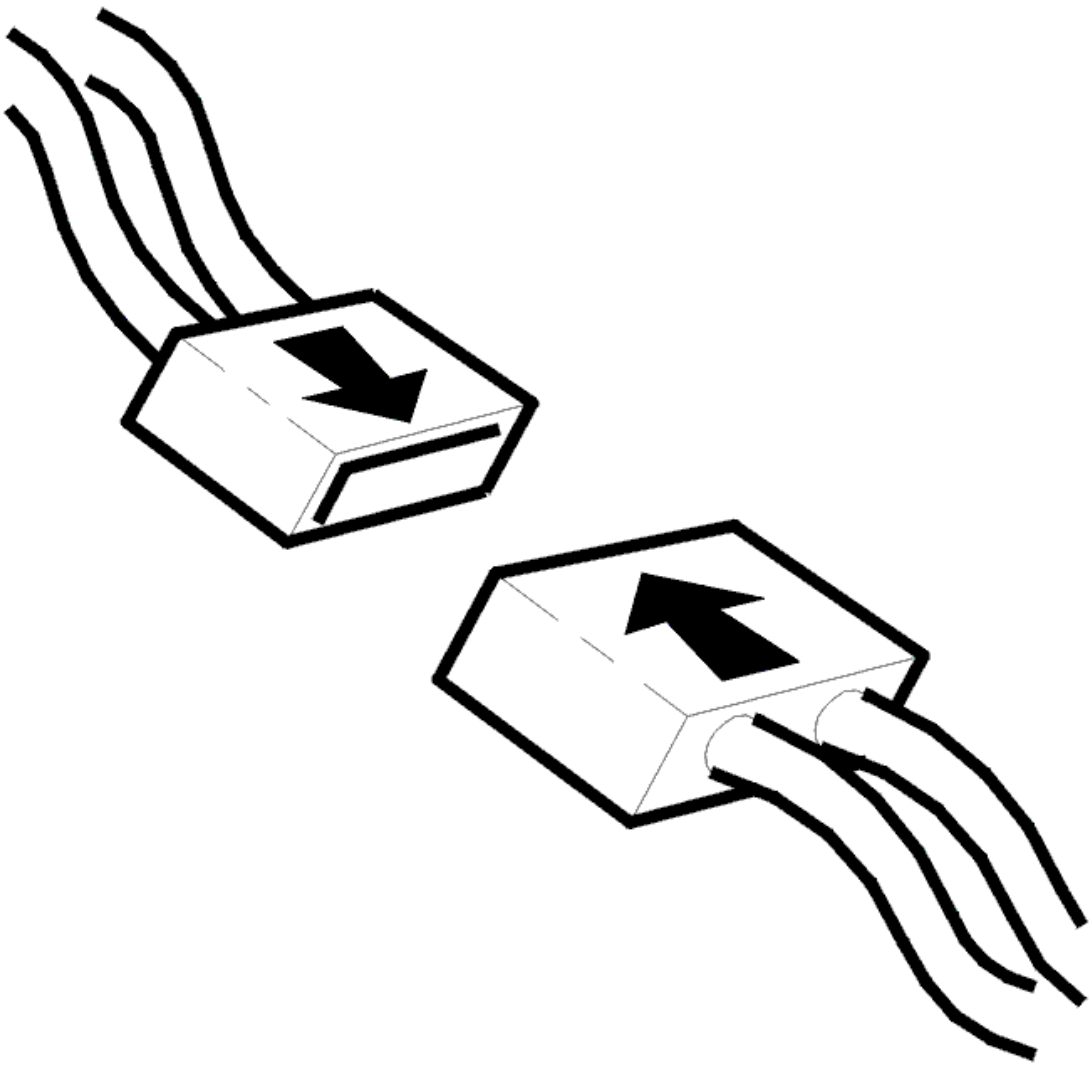


Fig. 351: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

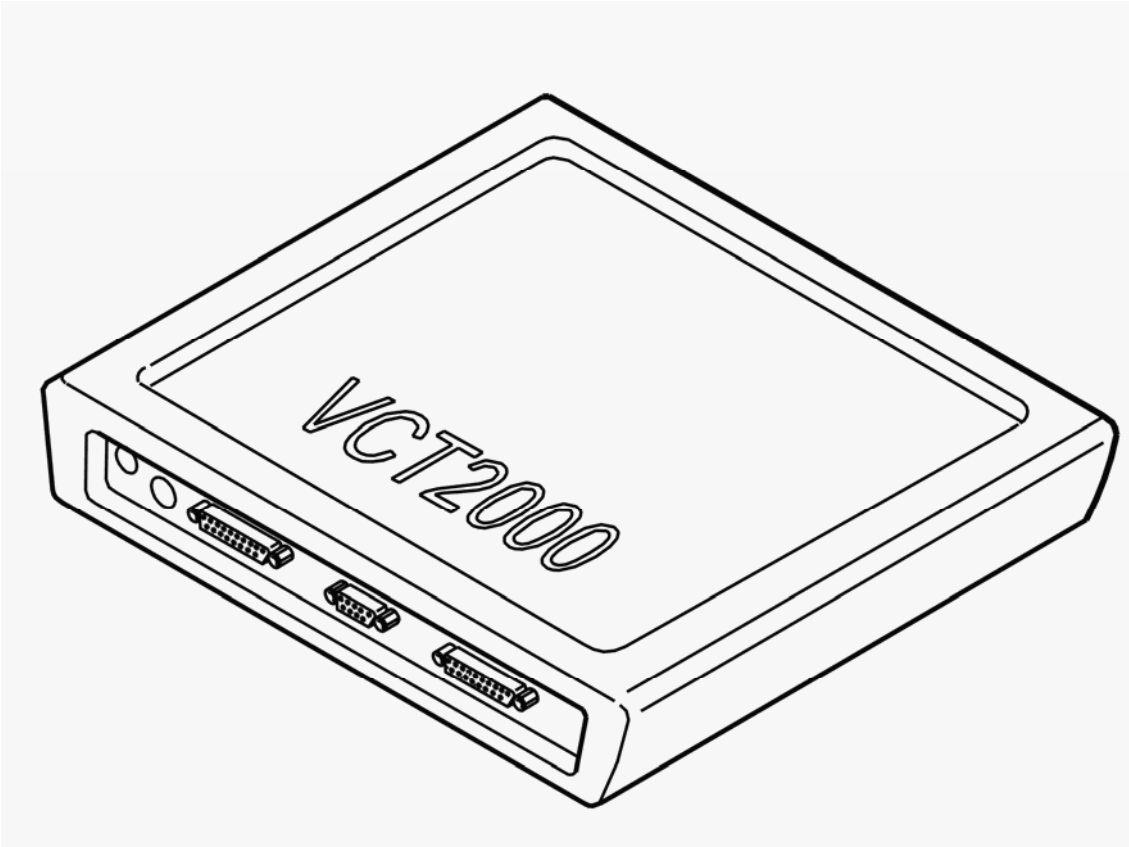


Fig. 352: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-0107: SHIFT SOLENOID S4. SIGNAL TOO HIGH (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

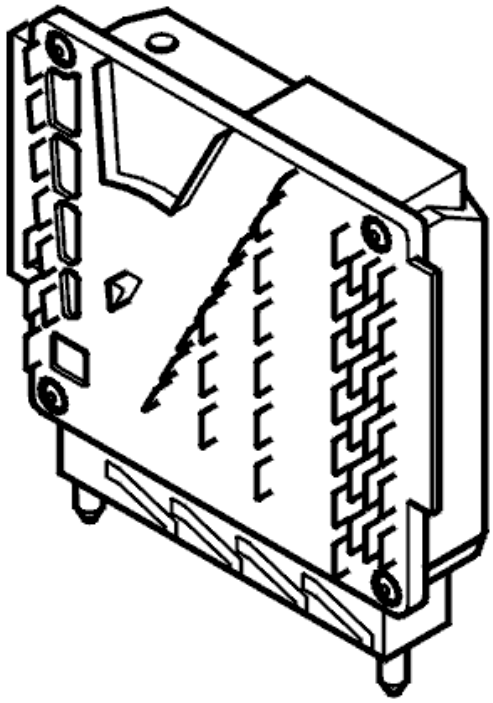


Fig. 353: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0001, TCM-0007, TCM-0101 TCM-0107 or TCM-010A are stored (depending on the solenoid) if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is too high when the solenoid should not be activated.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Short-circuit to supply voltage in the signal cable.
- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.

- Harsh gear shifting.
- No shifting.
- No lock-up function.

SIGNAL TOO HIGH

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

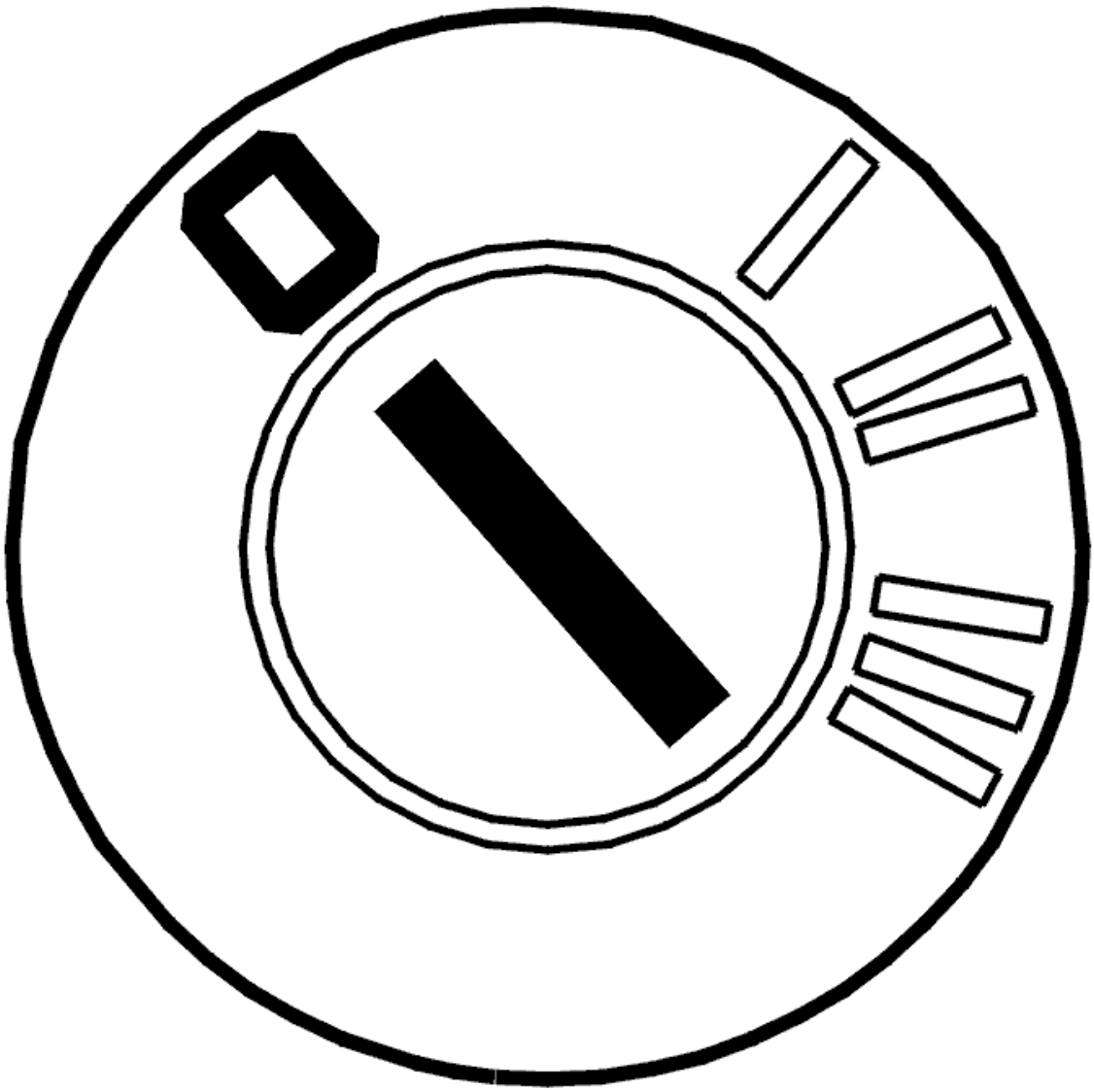


Fig. 354: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

NOTE: If the temperature is outside its permitted range, fault-trace the temperature sensor.

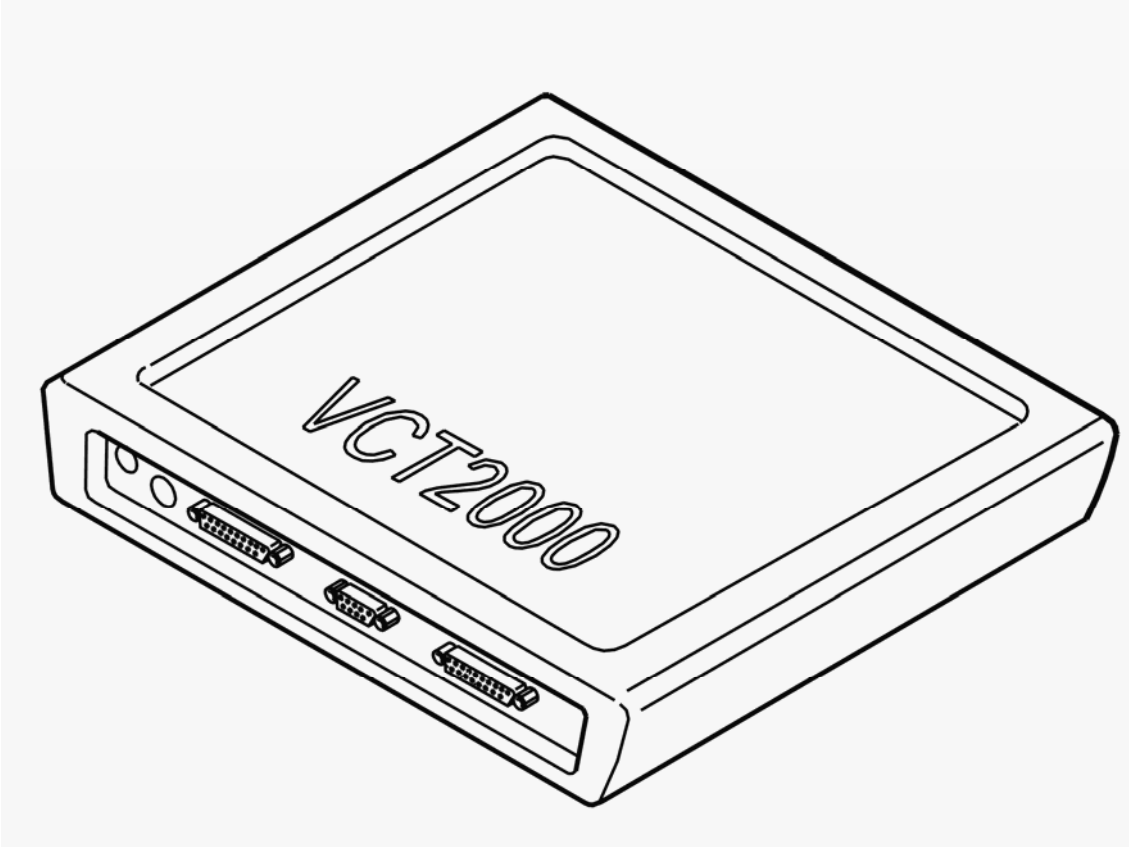


Fig. 355: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S4**

- **NO**

  Refer to **FAULTY SIGNAL**

CHECKING SHIFT SOLENOID S4

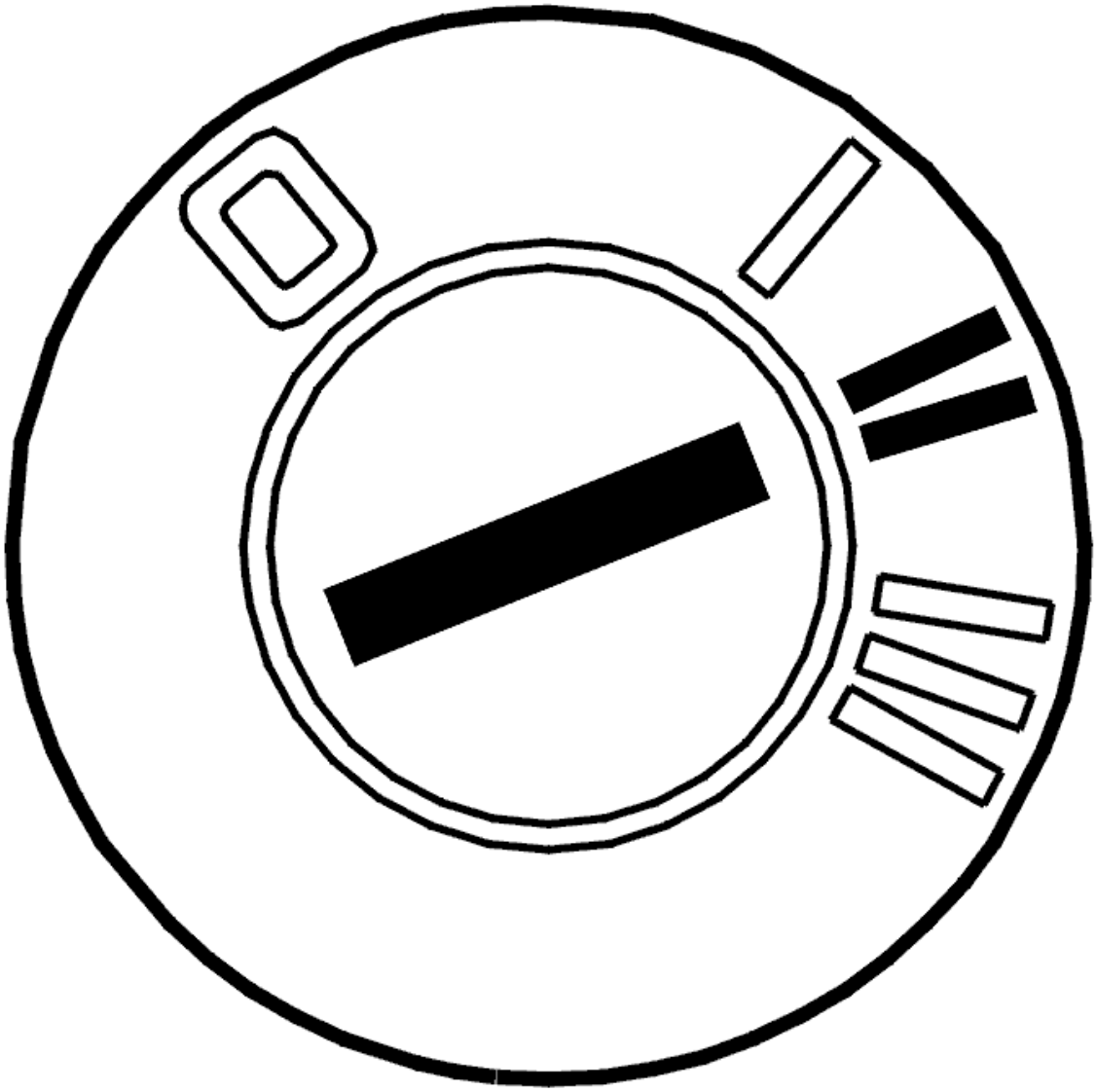


Fig. 356: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S4.

  The value must change between OFF and ON.

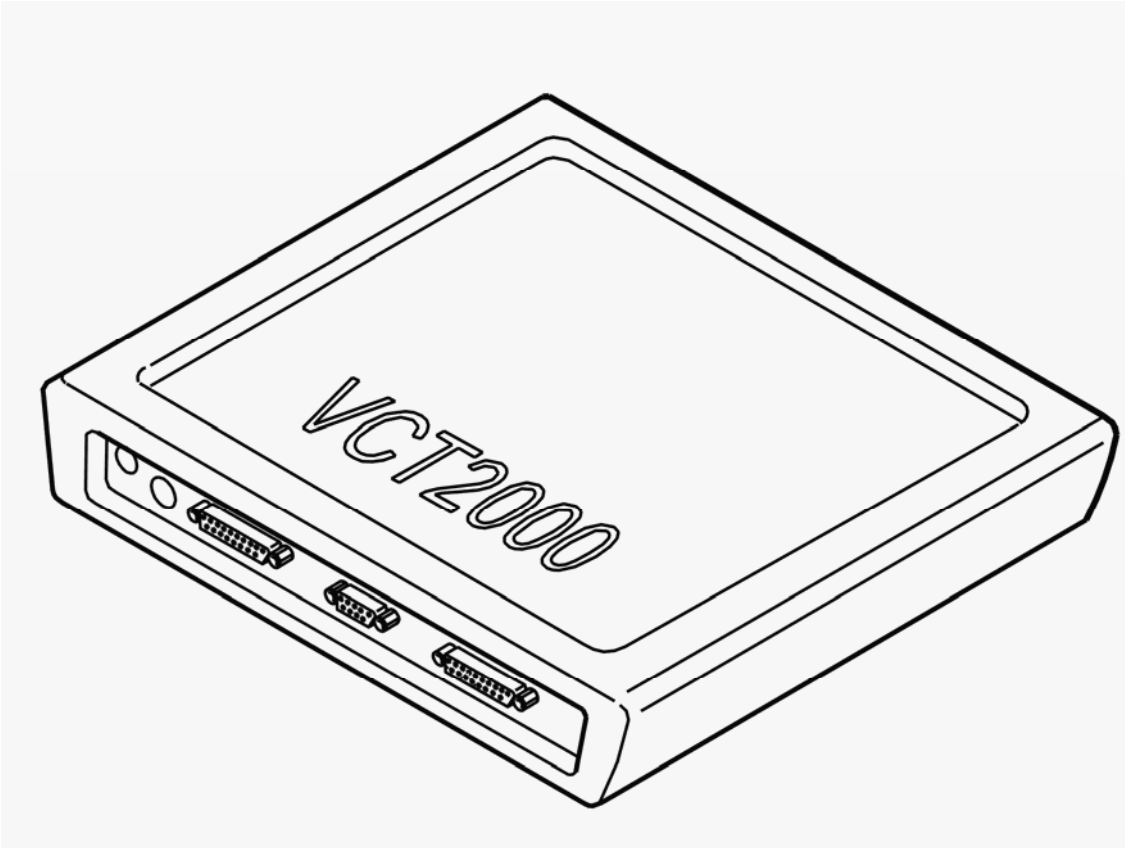


Fig. 357: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING SOLENOID S4**

CHECKING SOLENOID S4

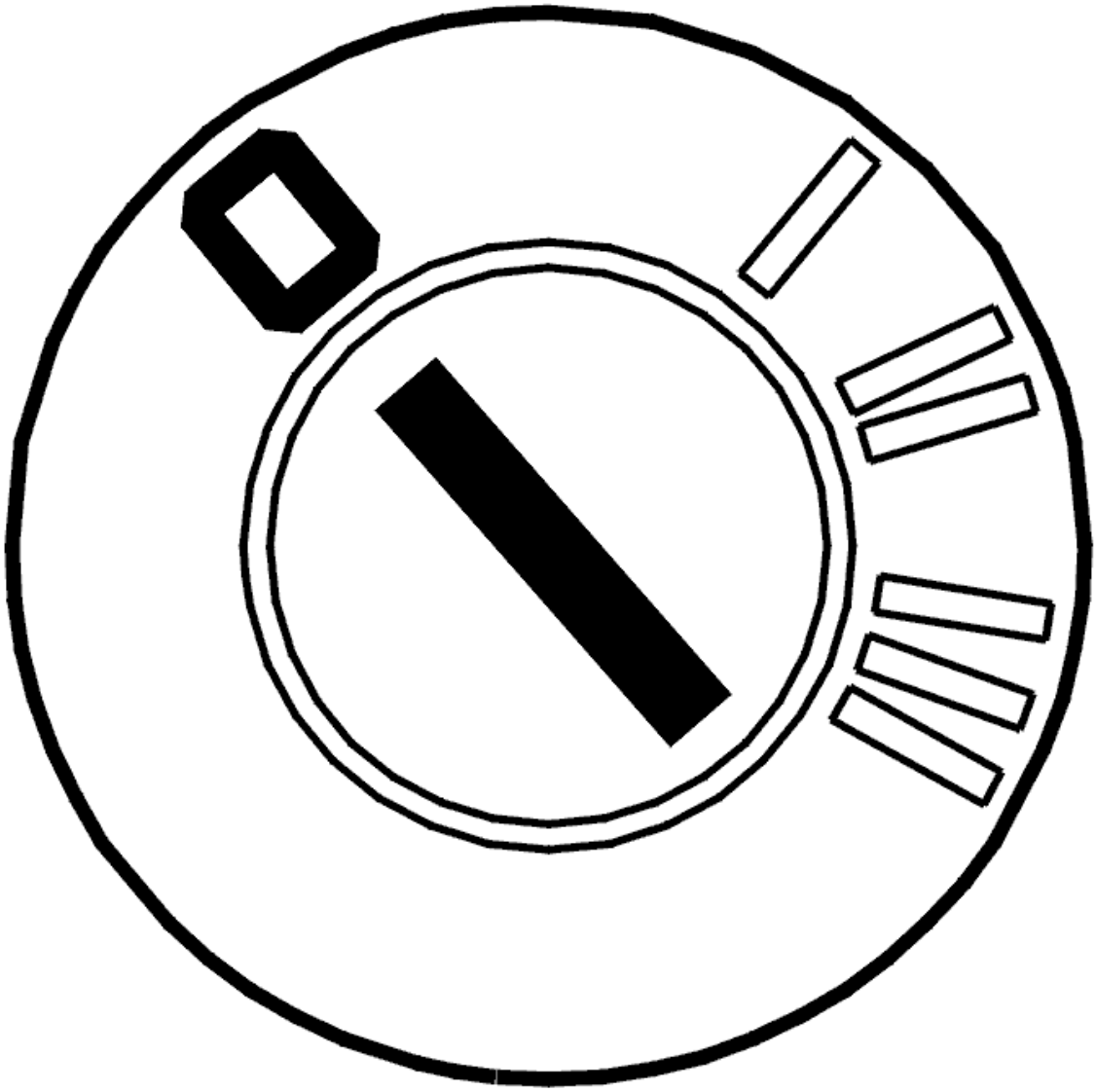


Fig. 358: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

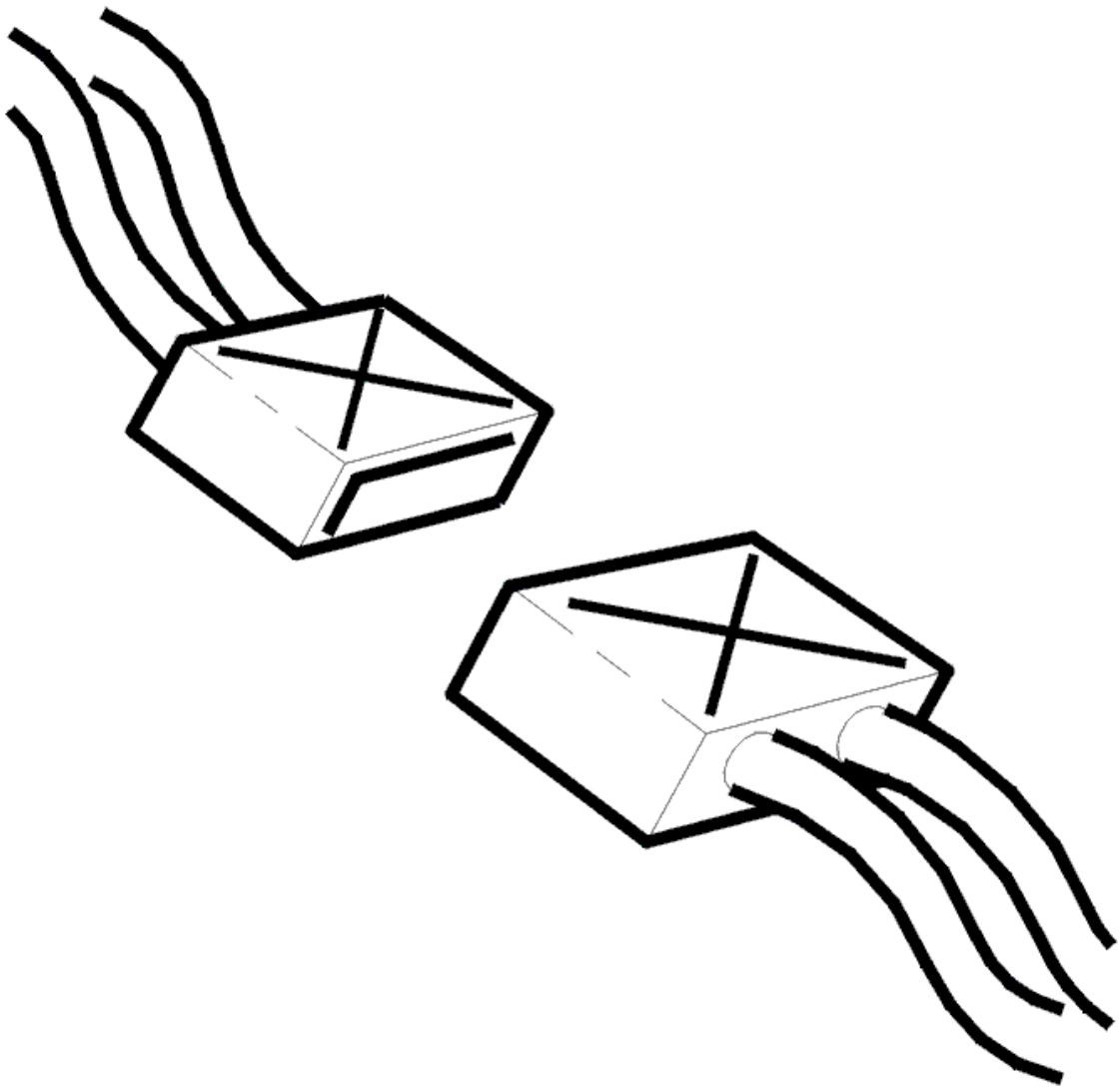


Fig. 359: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect transmission connector C.

Check solenoid S4 by measuring the resistance between transmission connector terminal #C4 and the transmission housing. The ohmmeter should read 11-15 ohms at 20°C.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

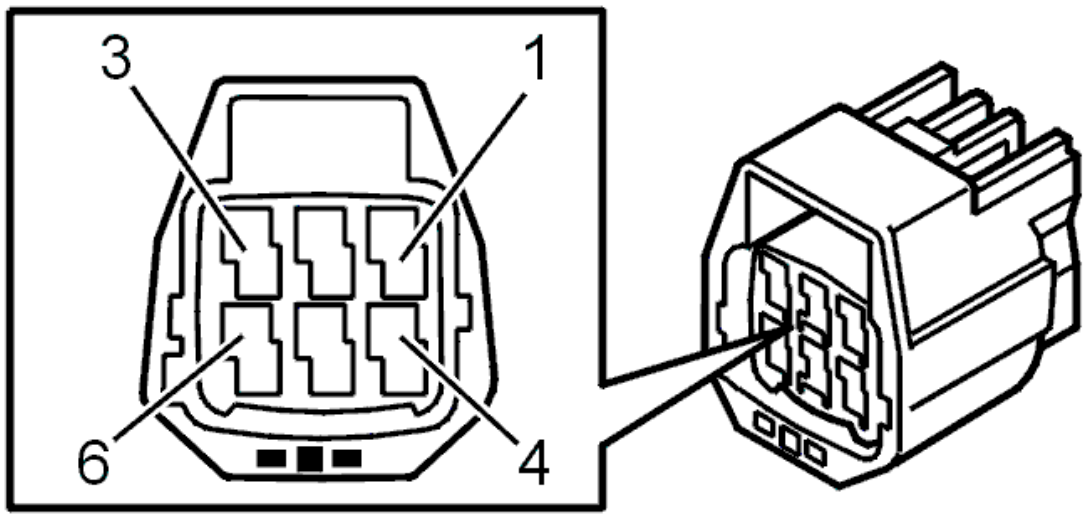


Fig. 360: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

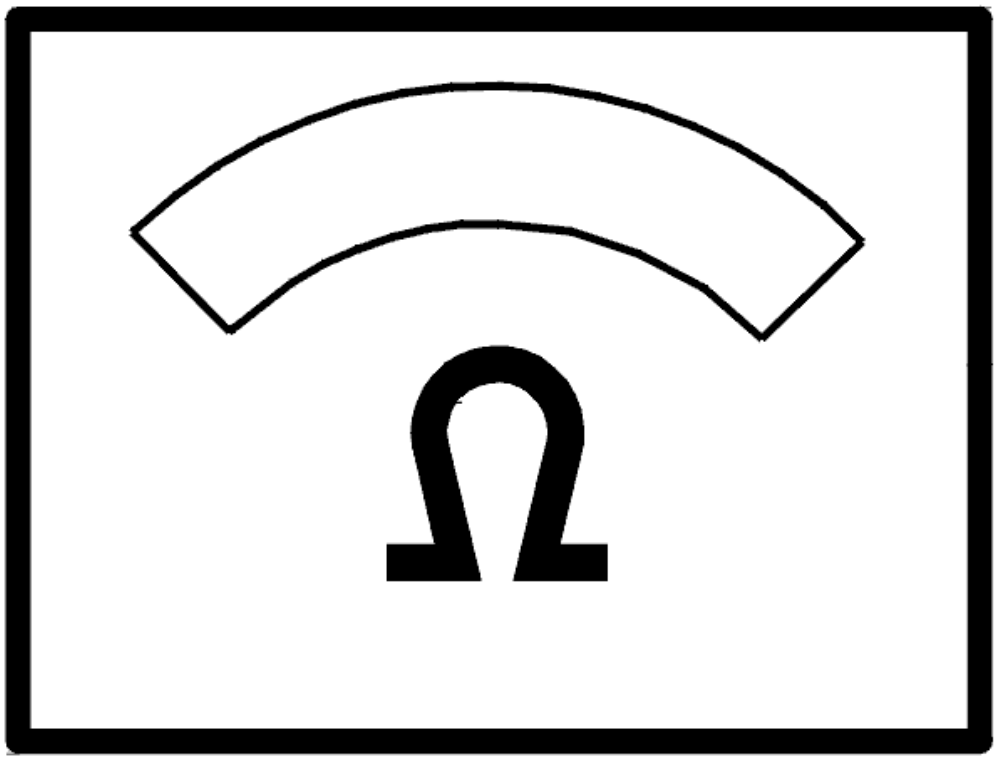


Fig. 361: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **OK**

  Refer to **CHECKING THE WIRING**

- **NOT OK**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

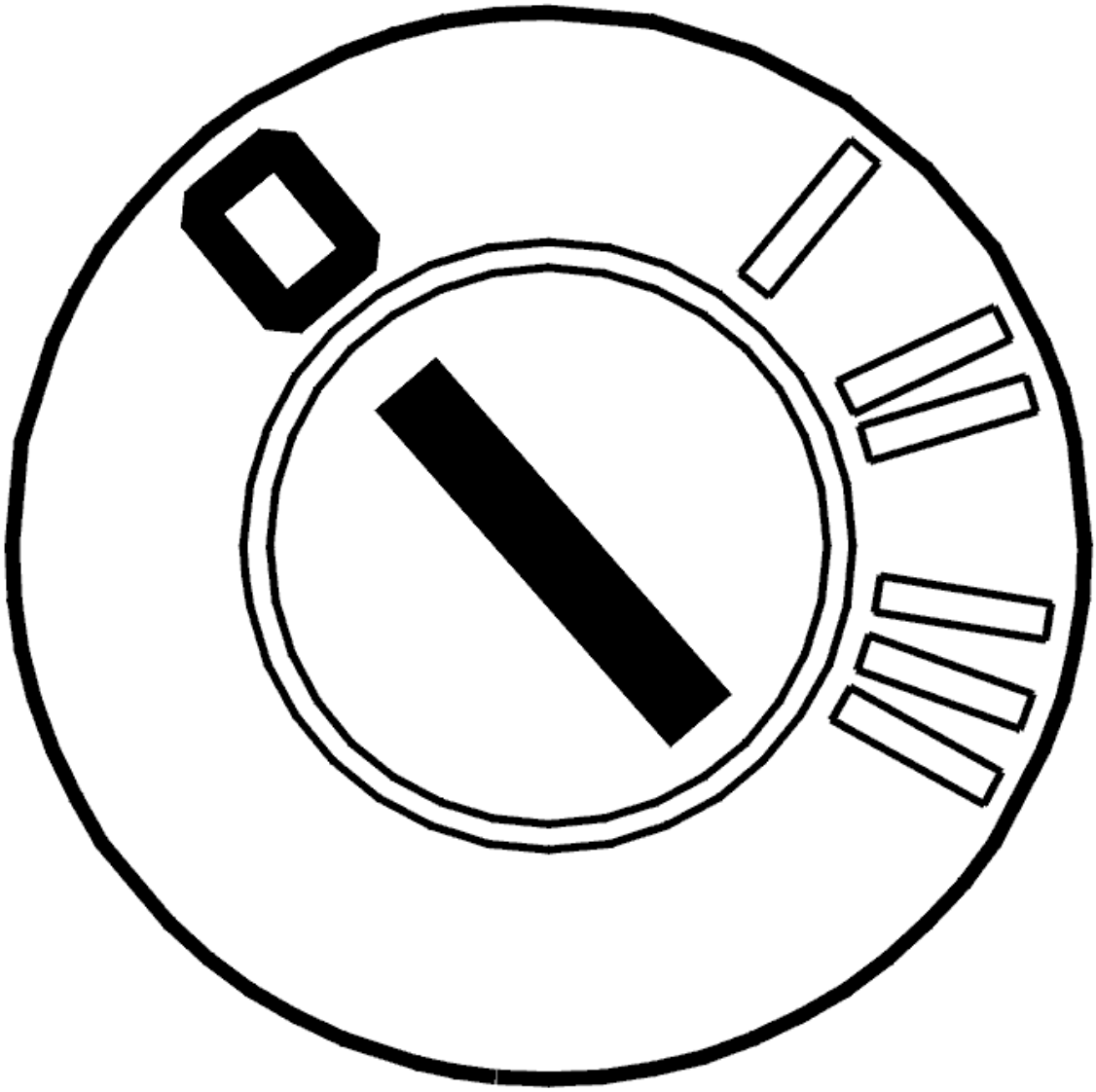


Fig. 362: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

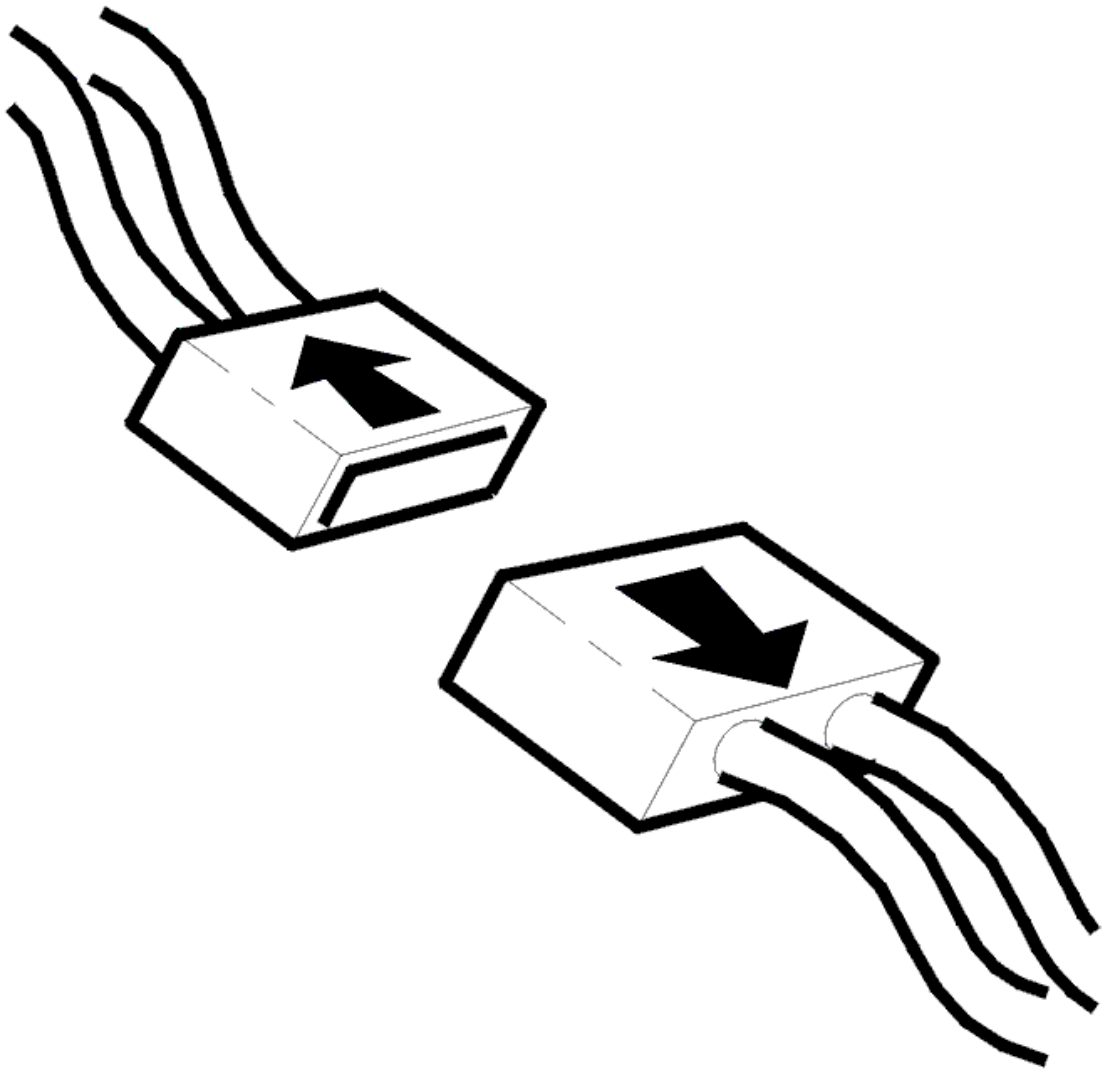


Fig. 363: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Transmission connector C disconnected.

Check the cable between control module terminal #A47 (#A47) and transmission connector terminal #C4 (control module side). Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** . Also check against the other cables in the circuit.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION,**

DISCONNECTING / CONNECTING

- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

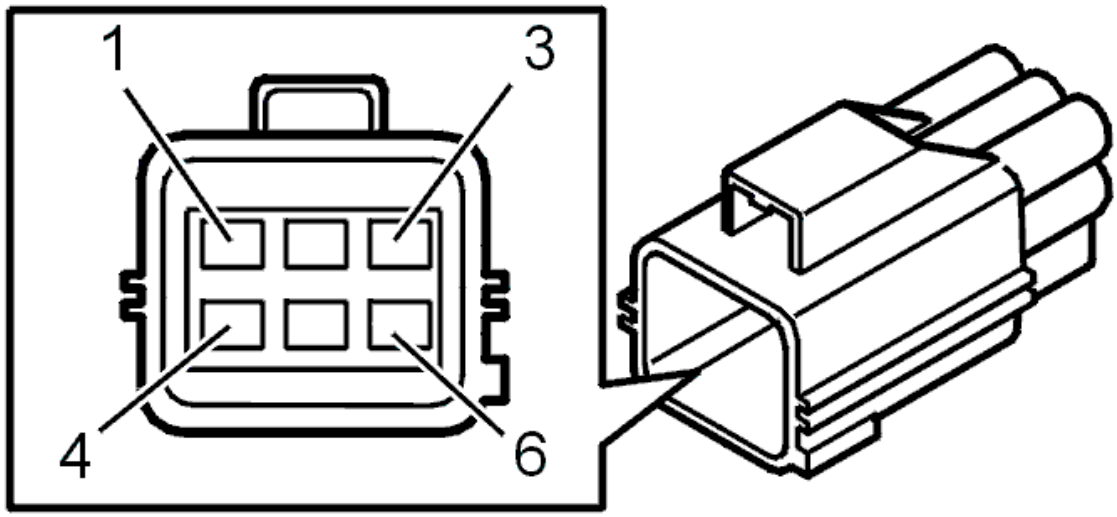


Fig. 364: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

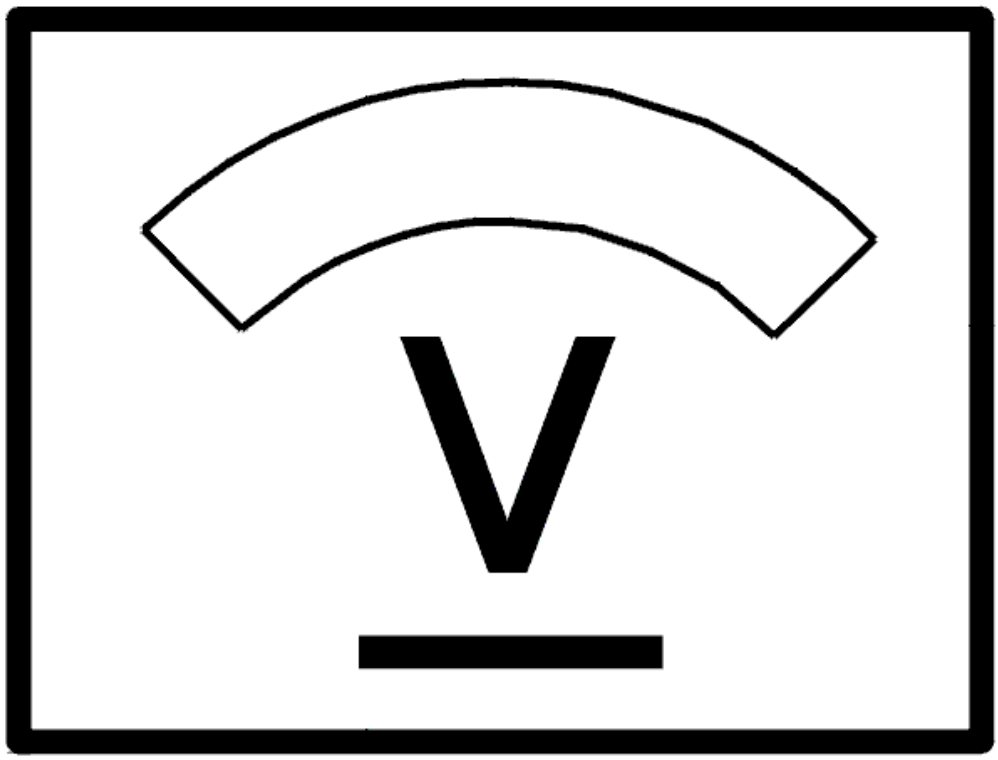


Fig. 365: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

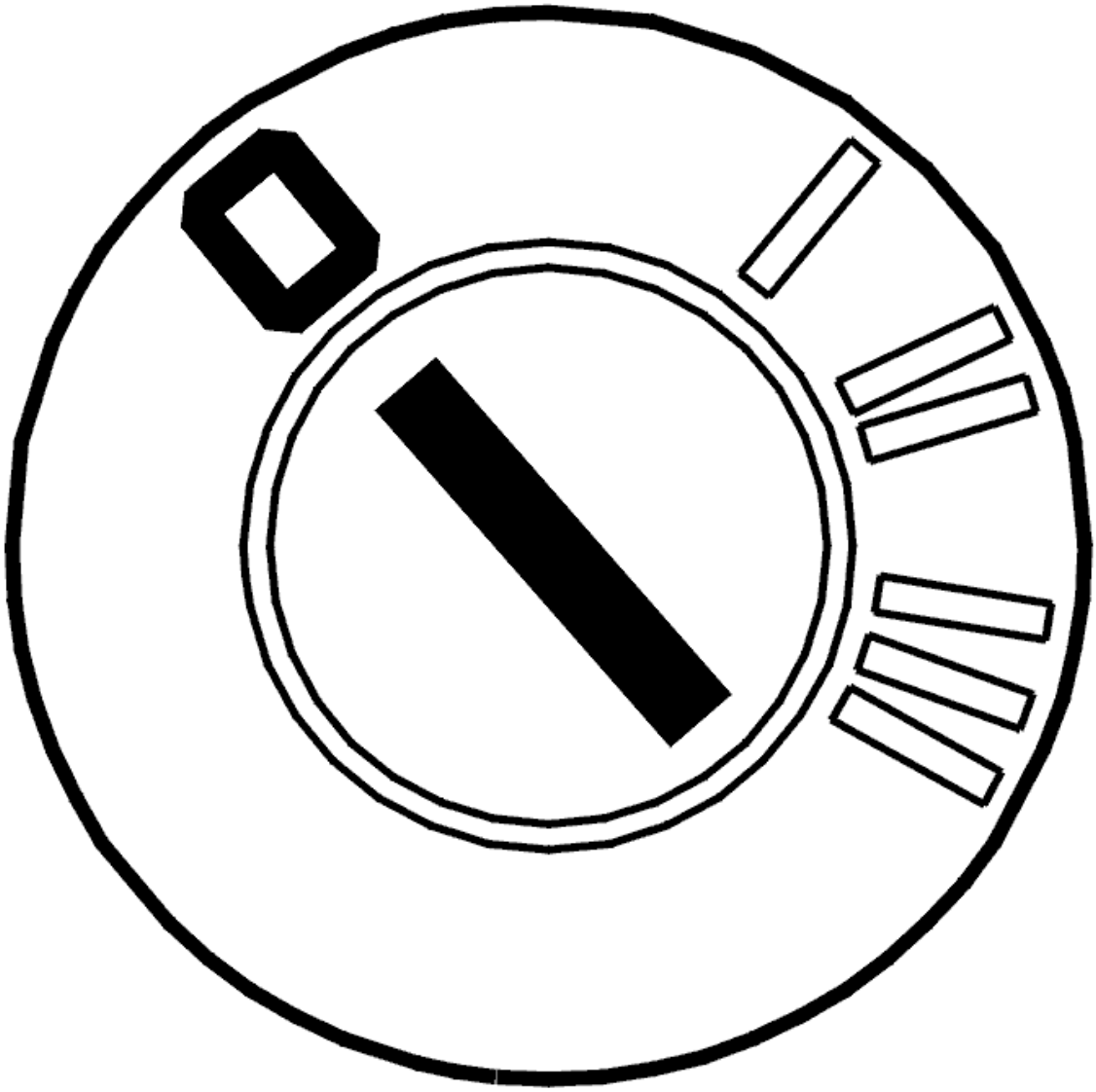


Fig. 366: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission connector terminal #C4 (transmission side) and the connector for solenoid S4. Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** . Also check against the other cables in the circuit.

  Replace solenoid S4 if no faults are found in the cable-.

  Remedy as necessary.

  Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the control system and to check or replace solenoid S4, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

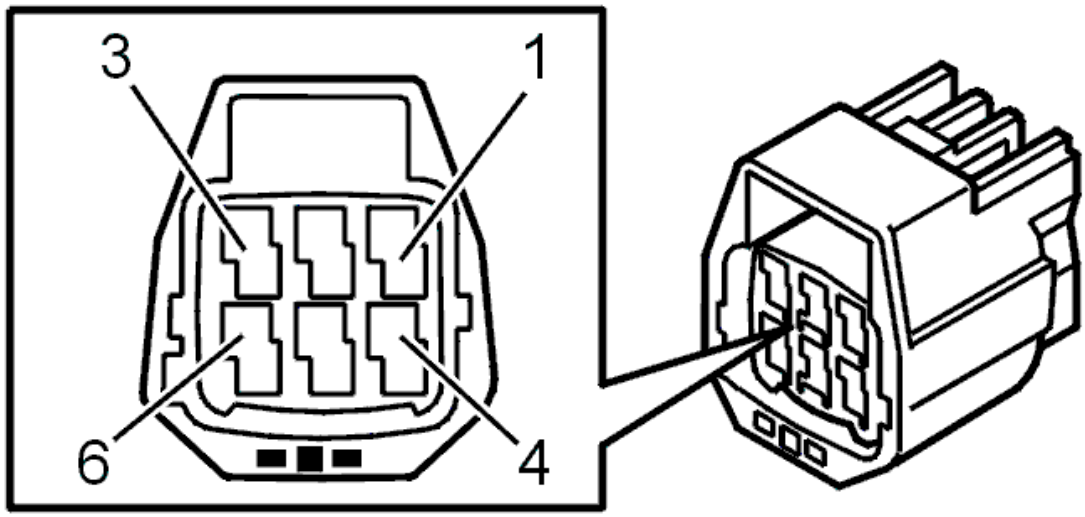


Fig. 367: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

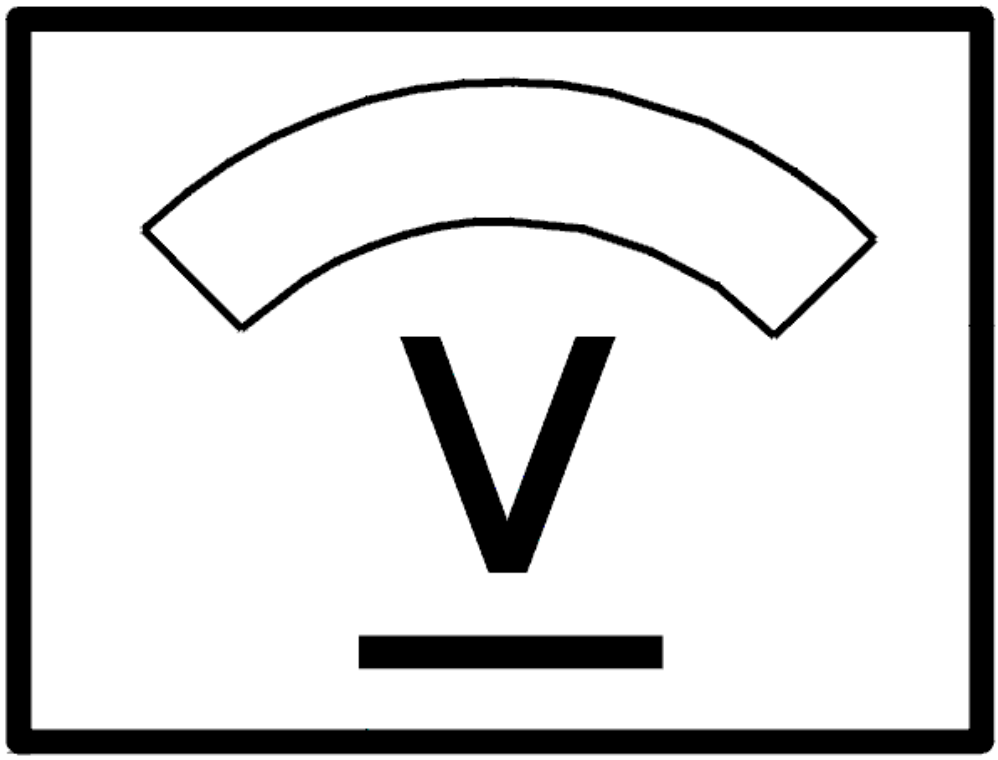


Fig. 368: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the cable between transmission control module (TCM) terminal #A47 (#A47) and transmission connector terminal #C4. Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

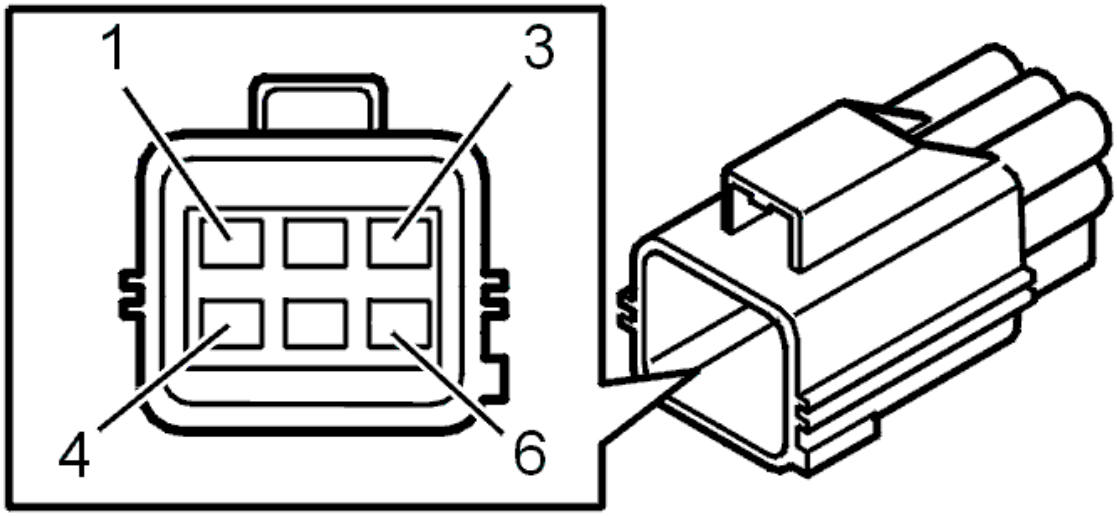


Fig. 369: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

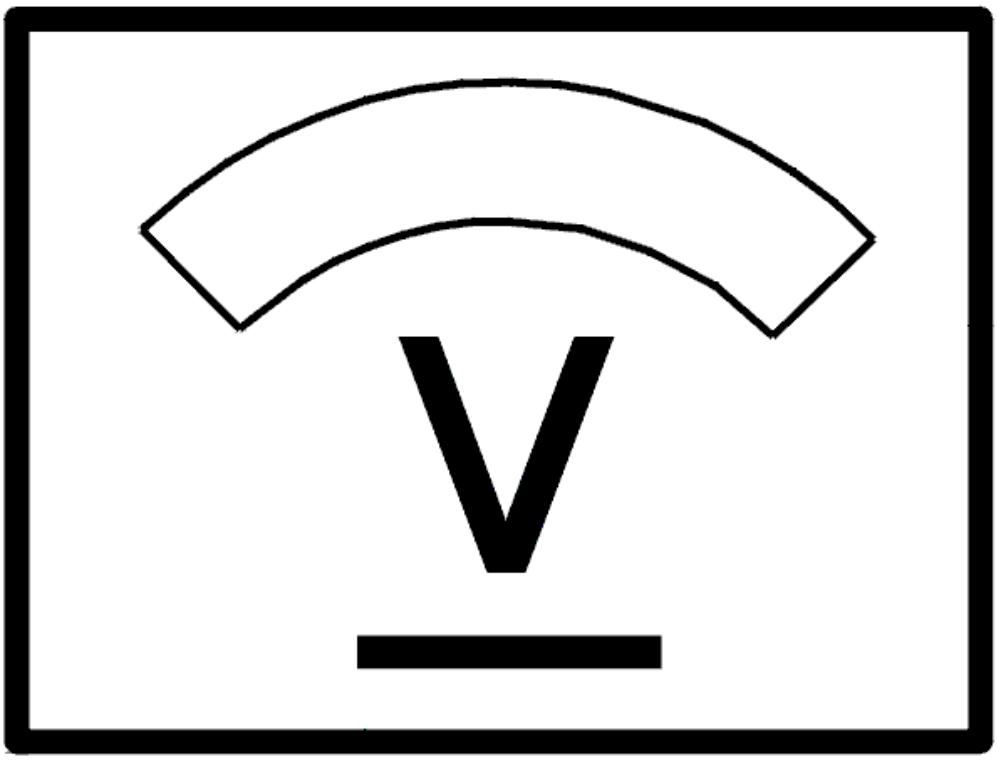


Fig. 370: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

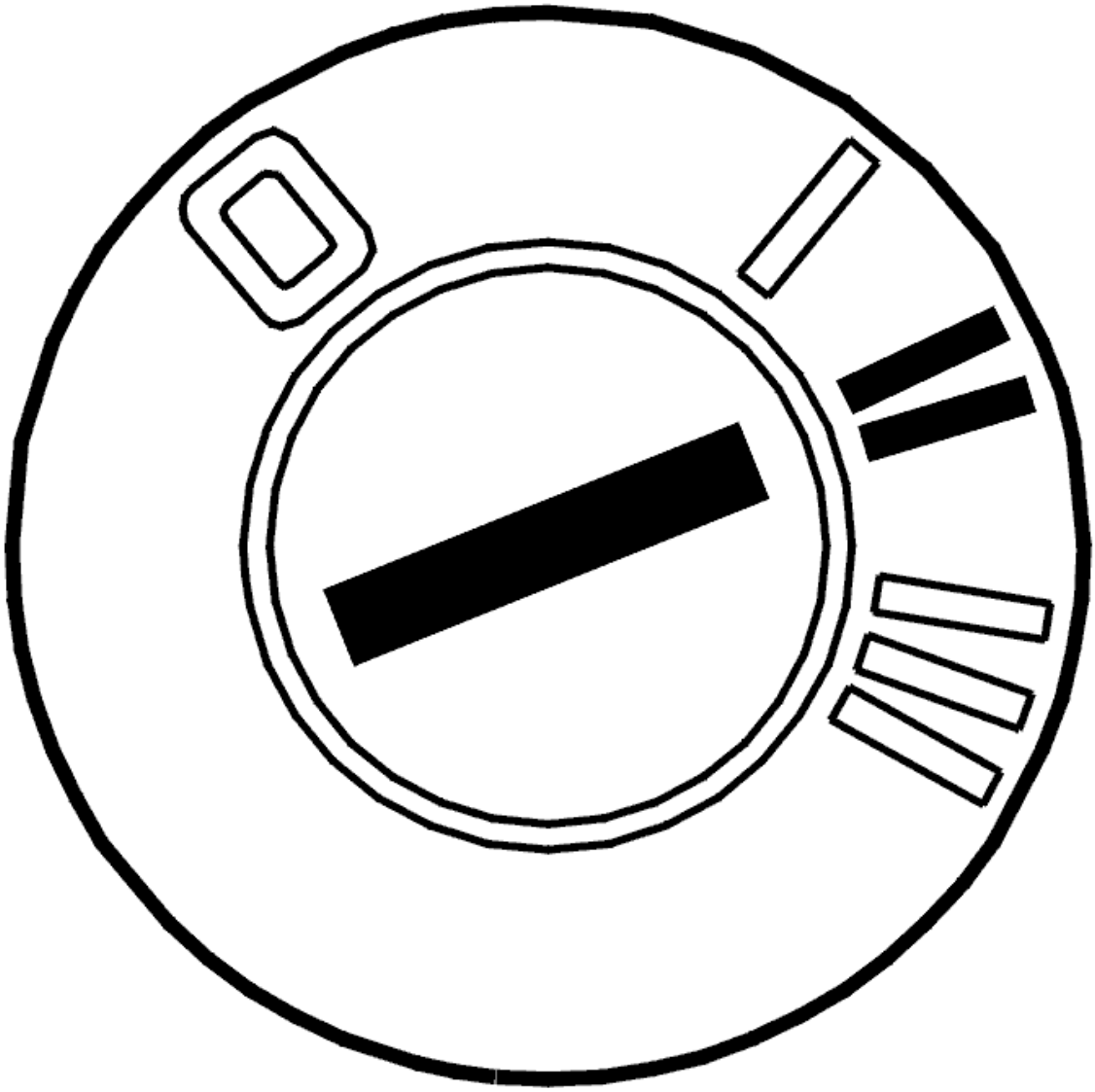


Fig. 371: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Use the VCT2000 (or appropriate scan tool) to reset the adaptation and counter.

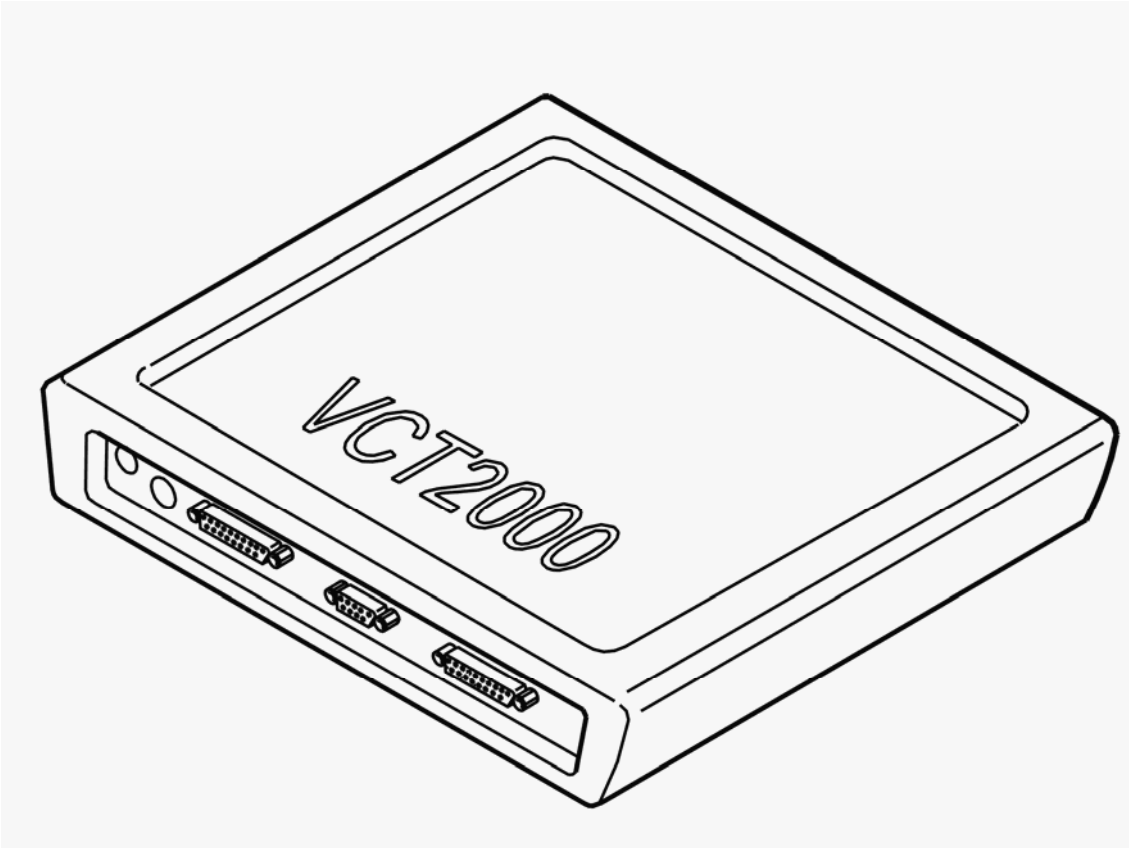


Fig. 372: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

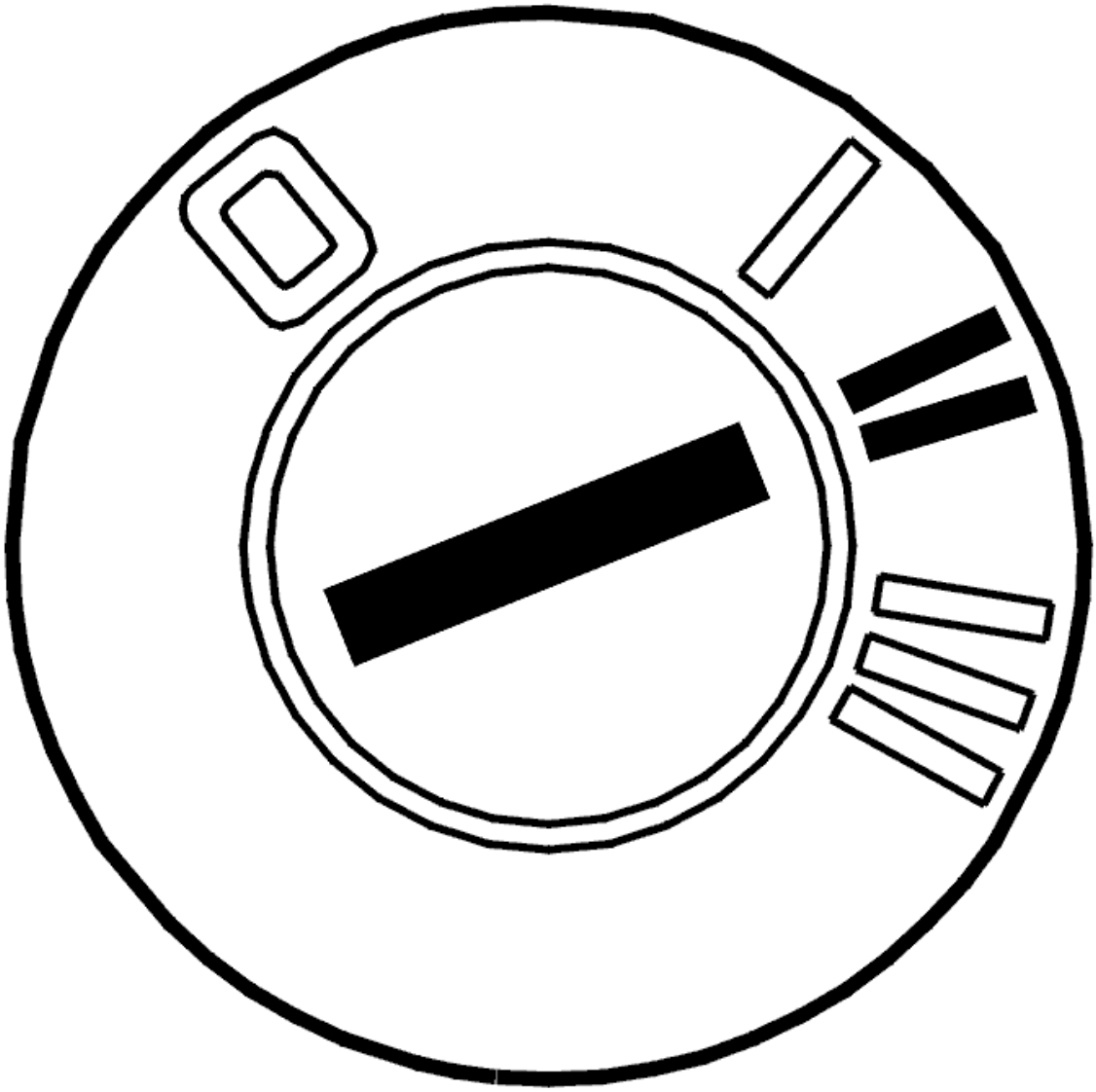


Fig. 373: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

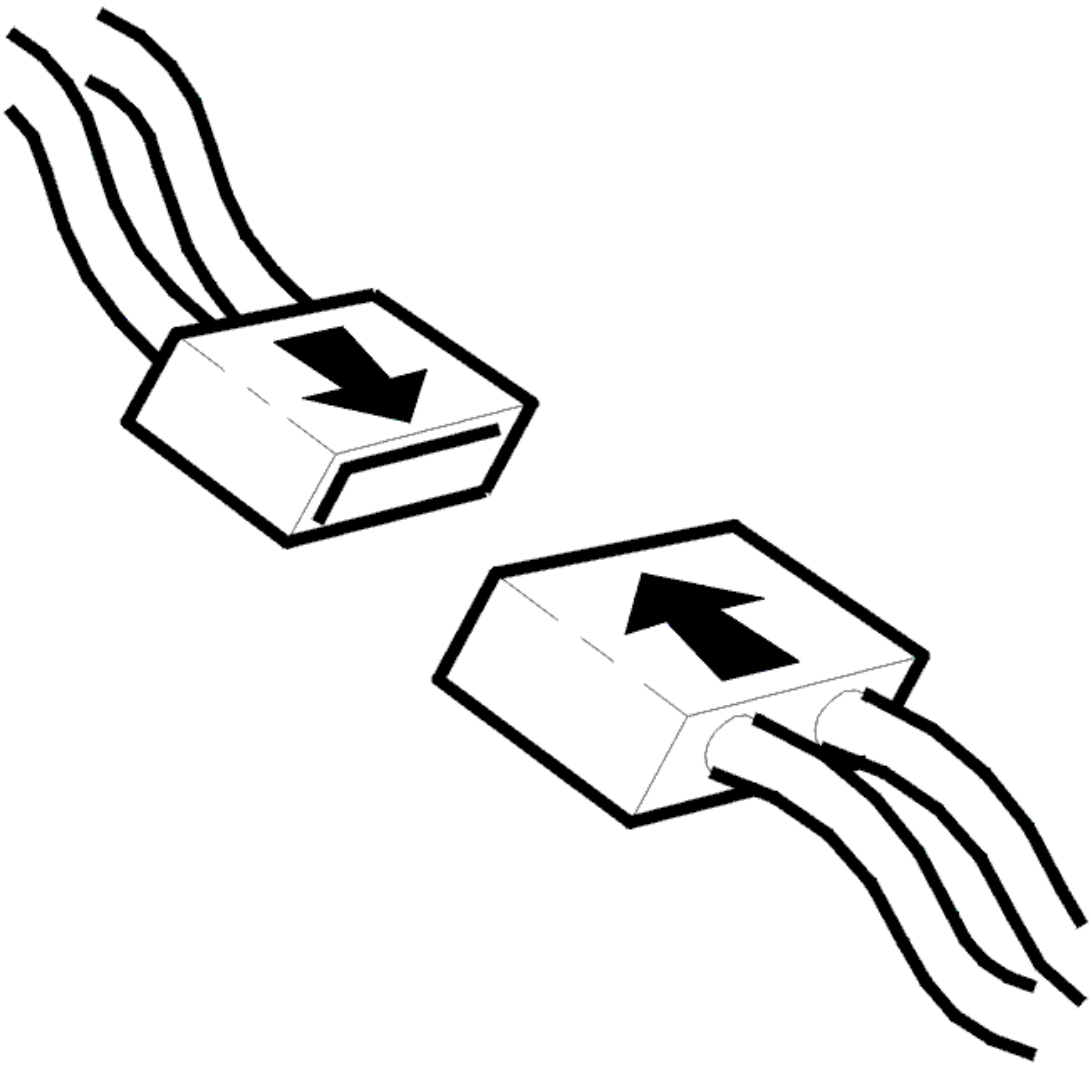


Fig. 374: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S4.

The value should change between OFF and ON.

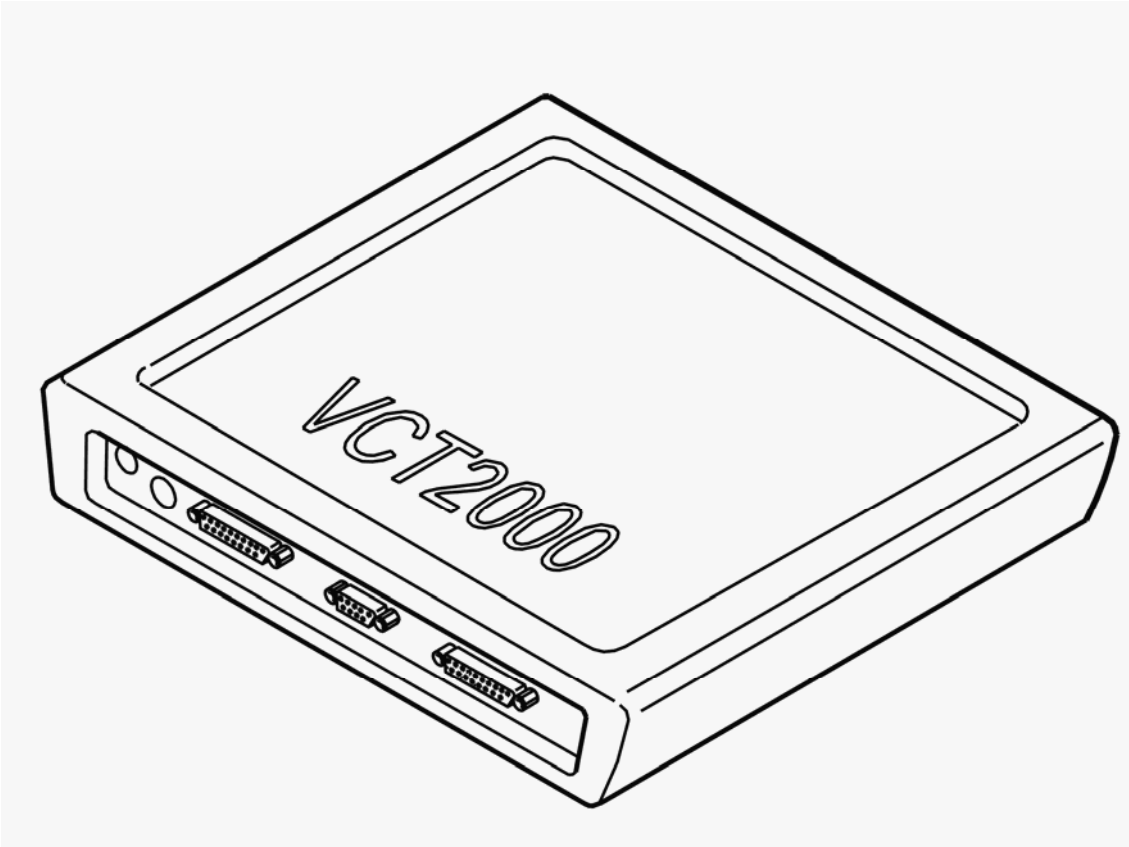


Fig. 375: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change between OFF and ON?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

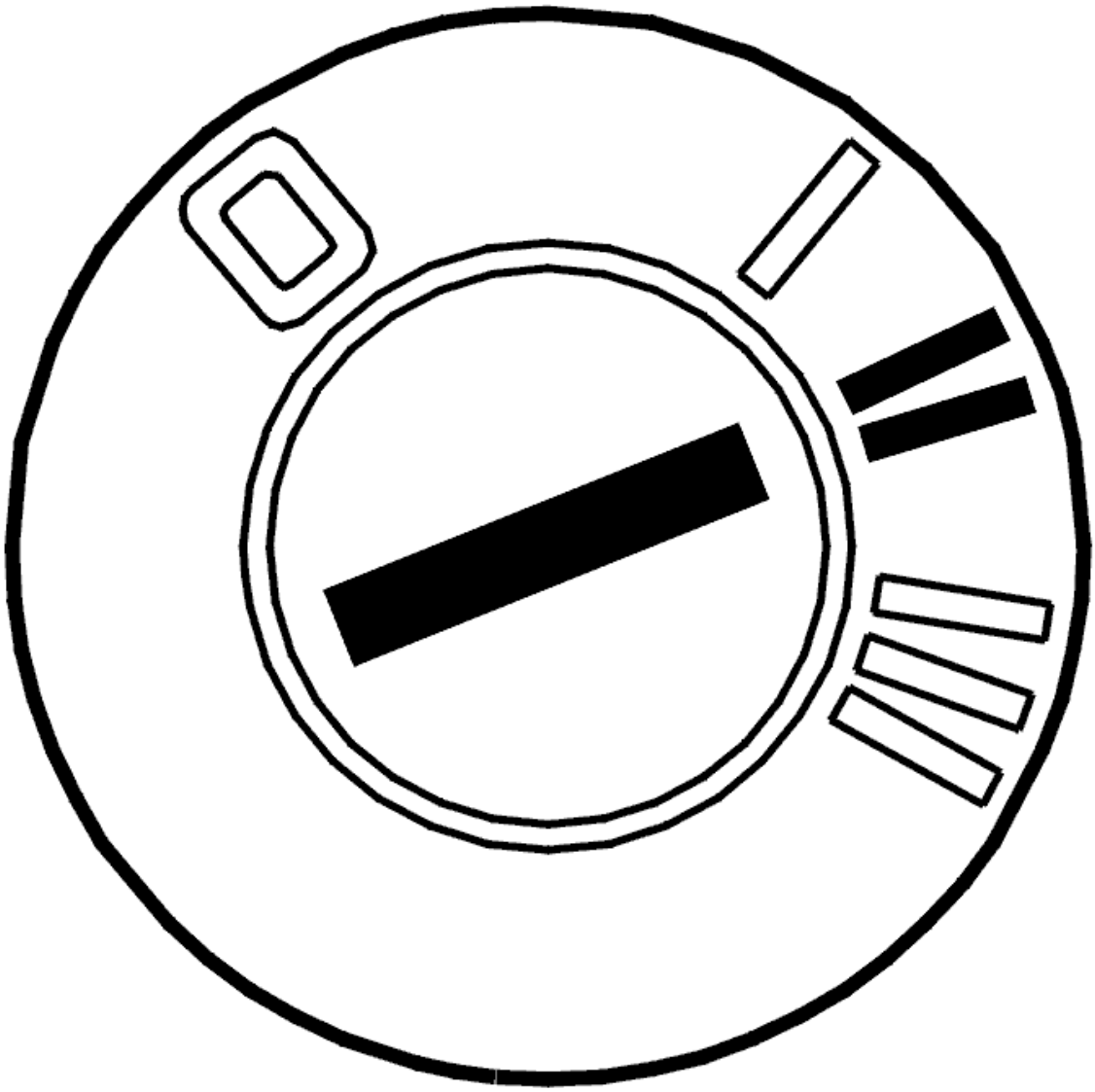


Fig. 376: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

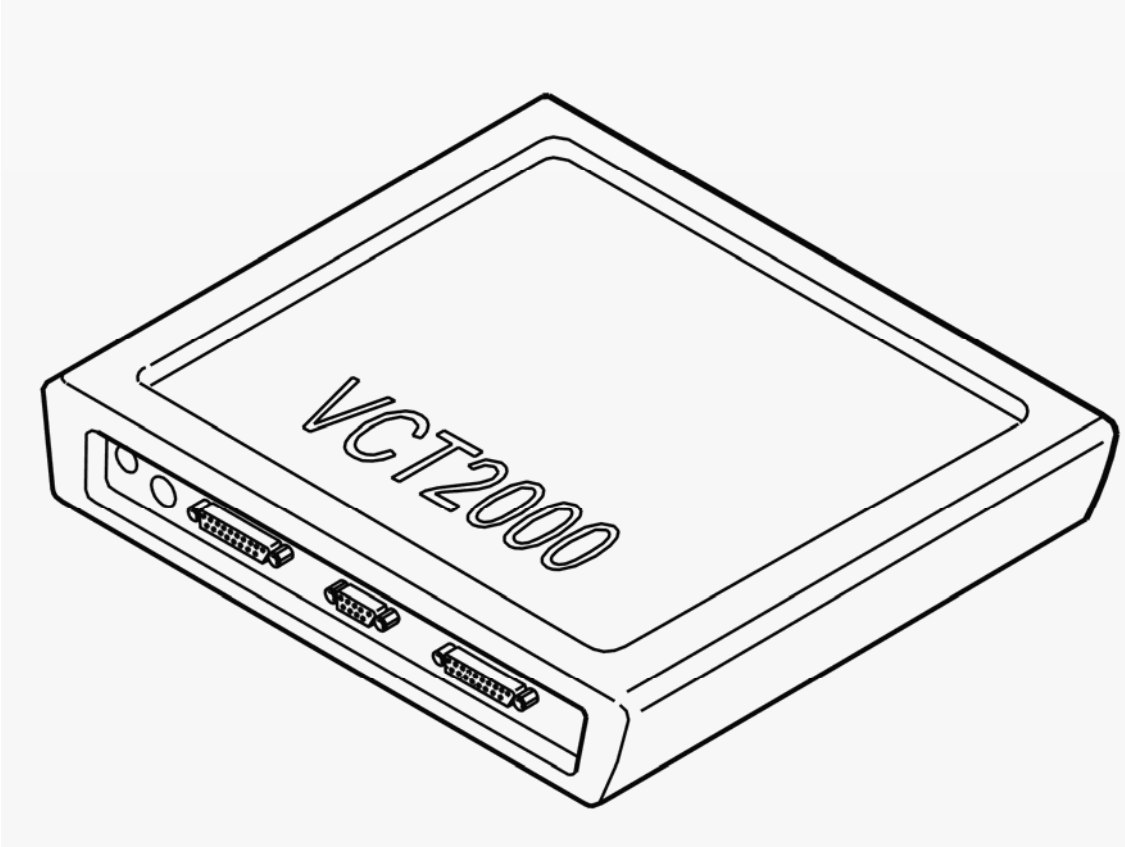


Fig. 377: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

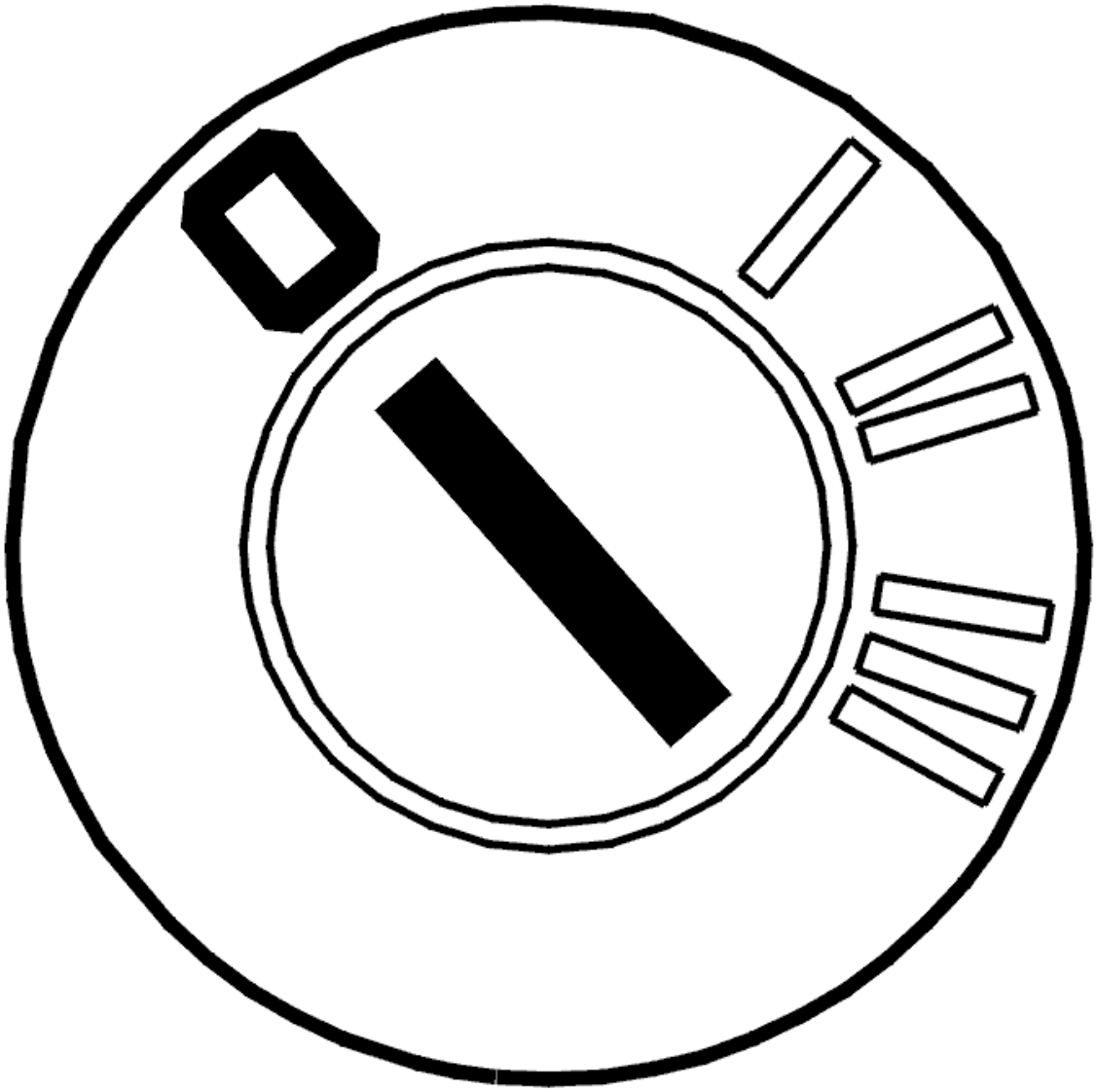


Fig. 378: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

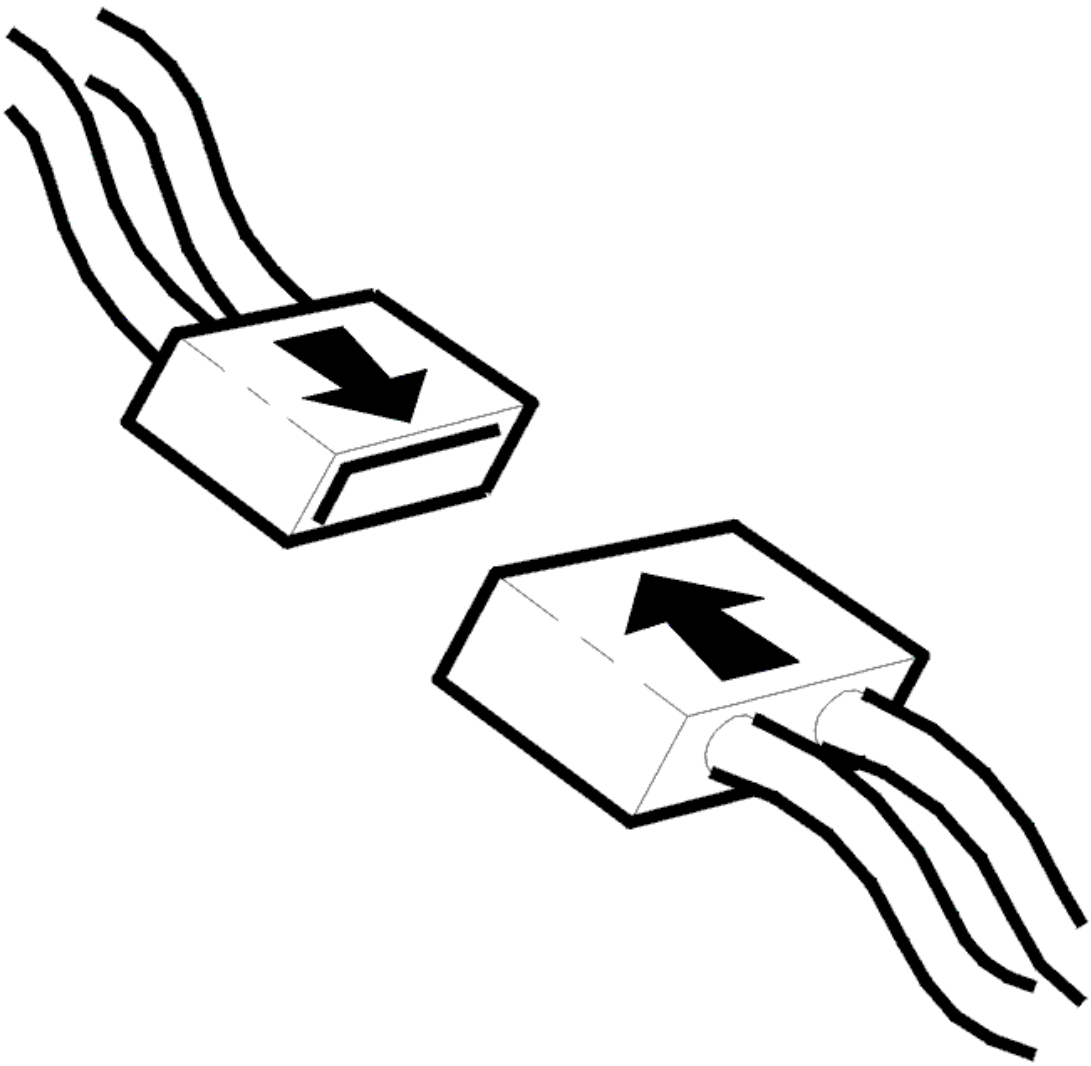


Fig. 379: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

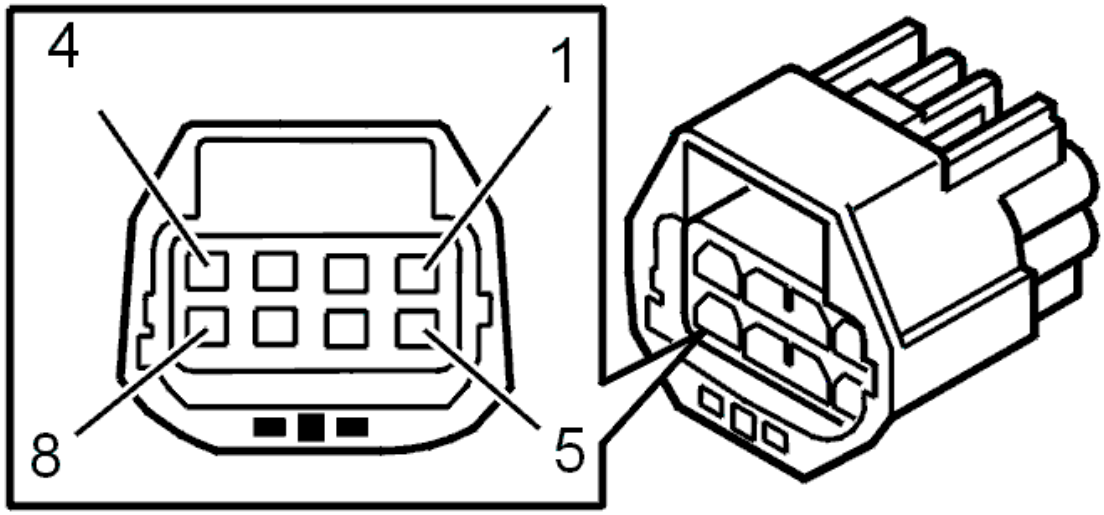


Fig. 380: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

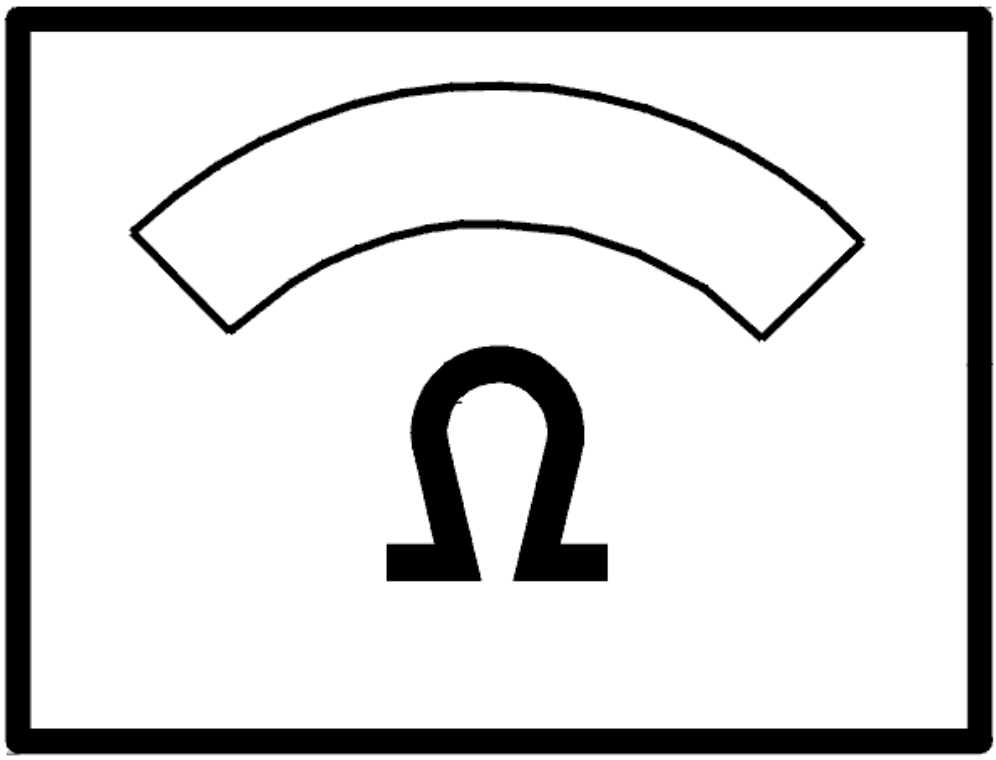


Fig. 381: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

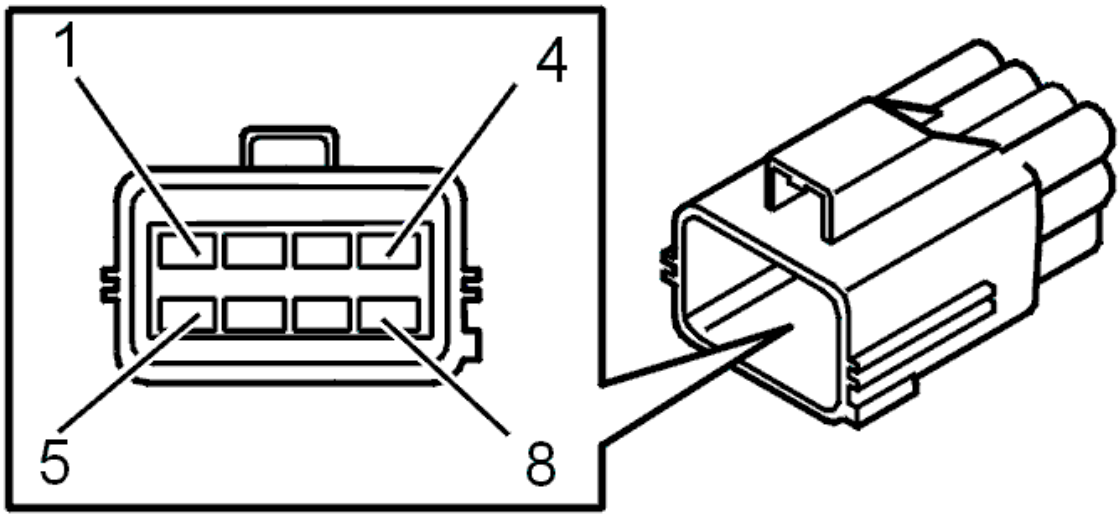


Fig. 382: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

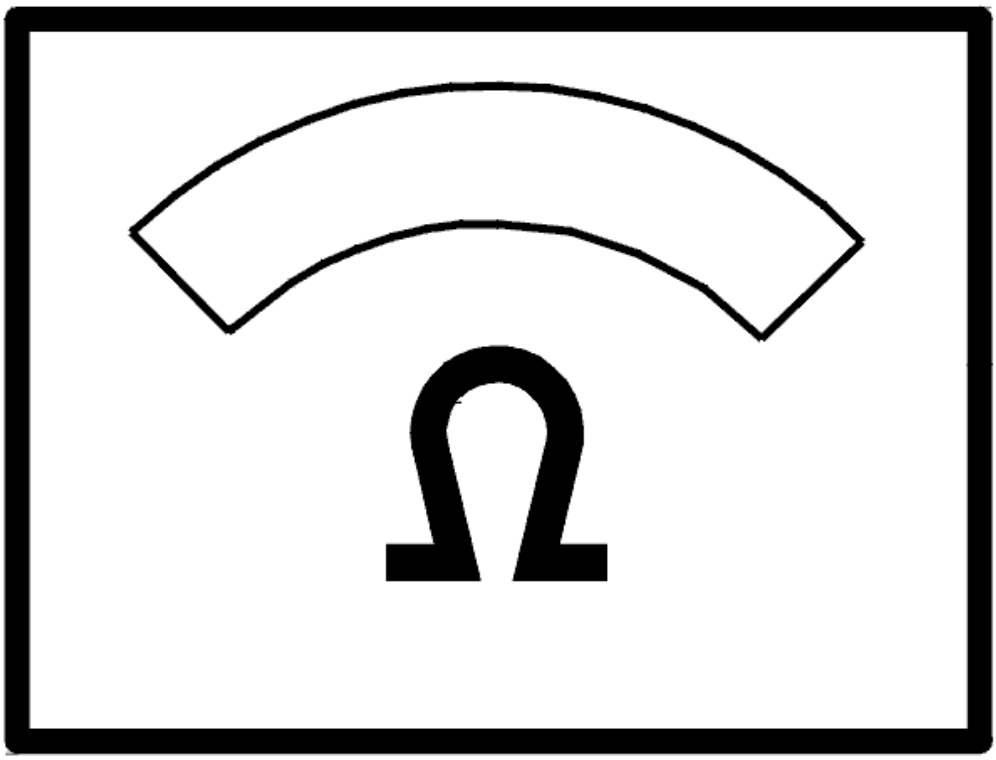


Fig. 383: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

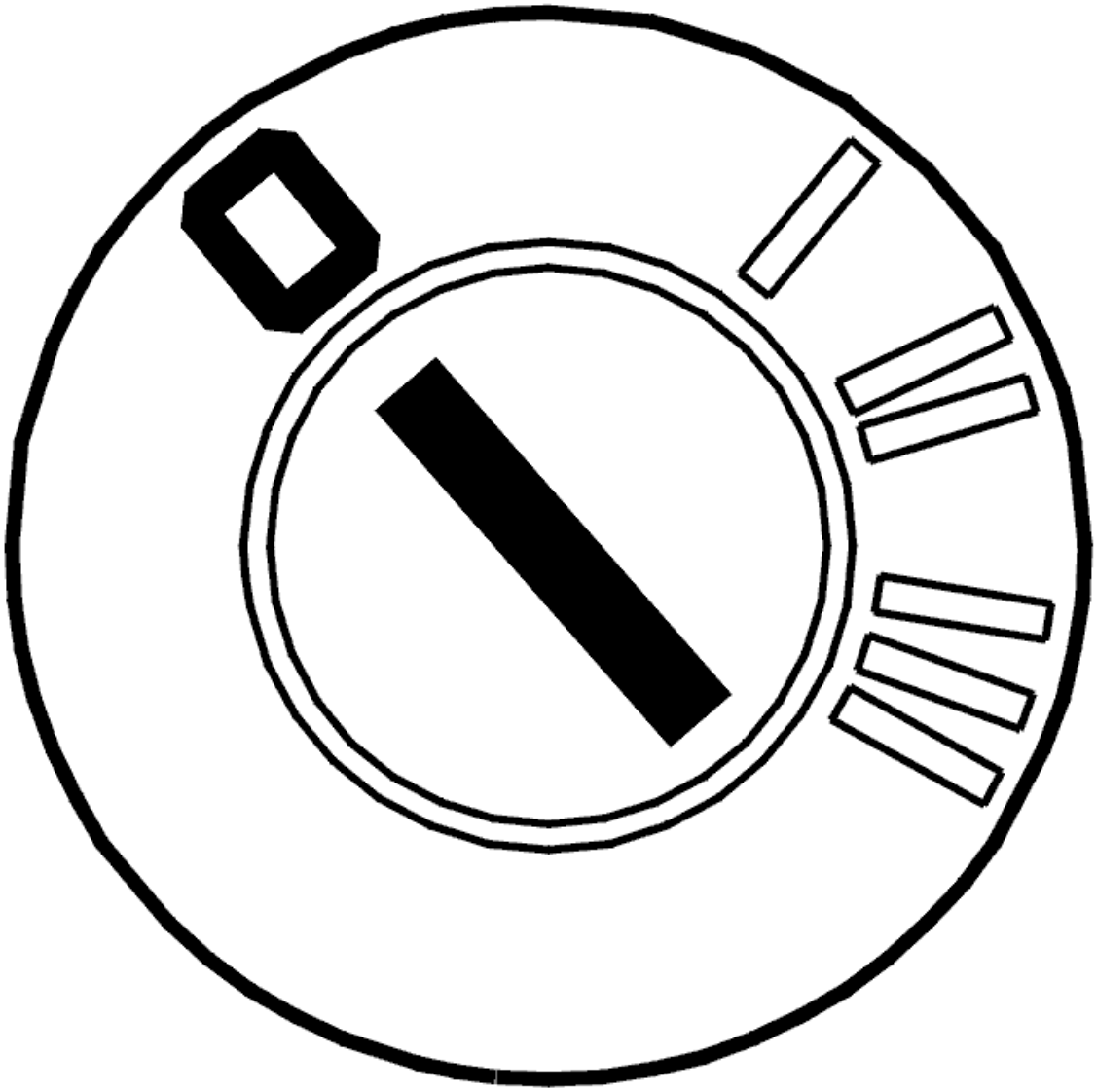


Fig. 384: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

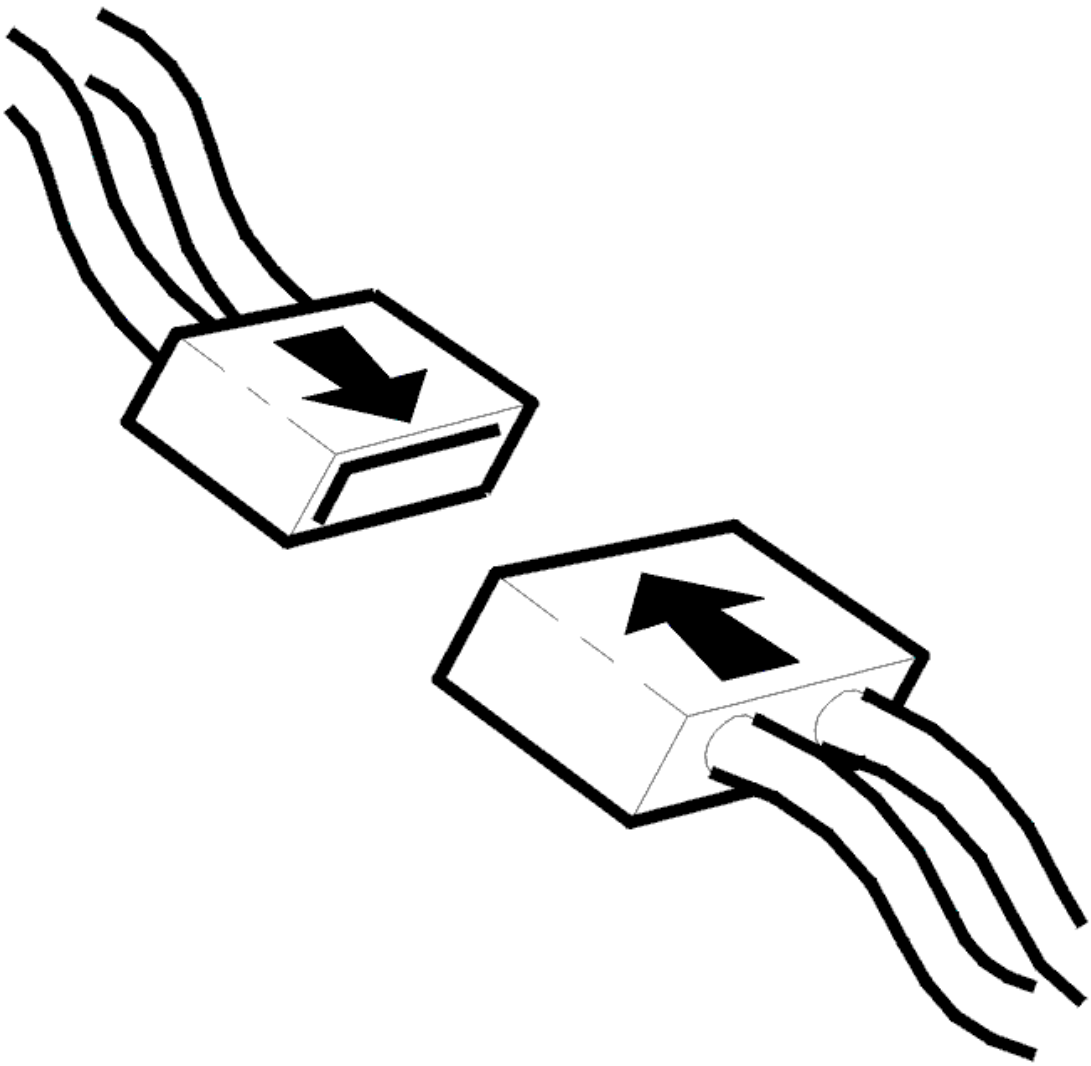


Fig. 385: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

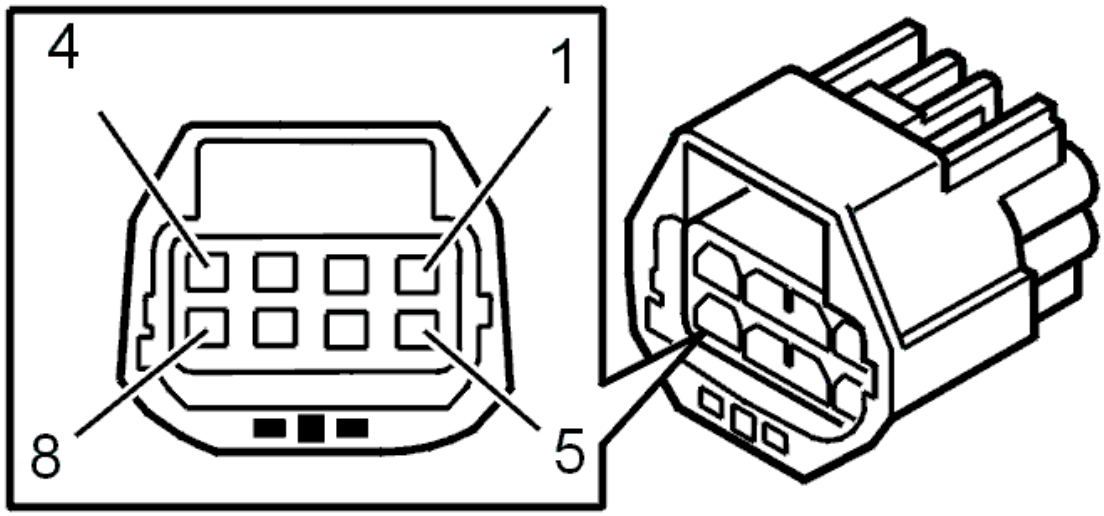


Fig. 386: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

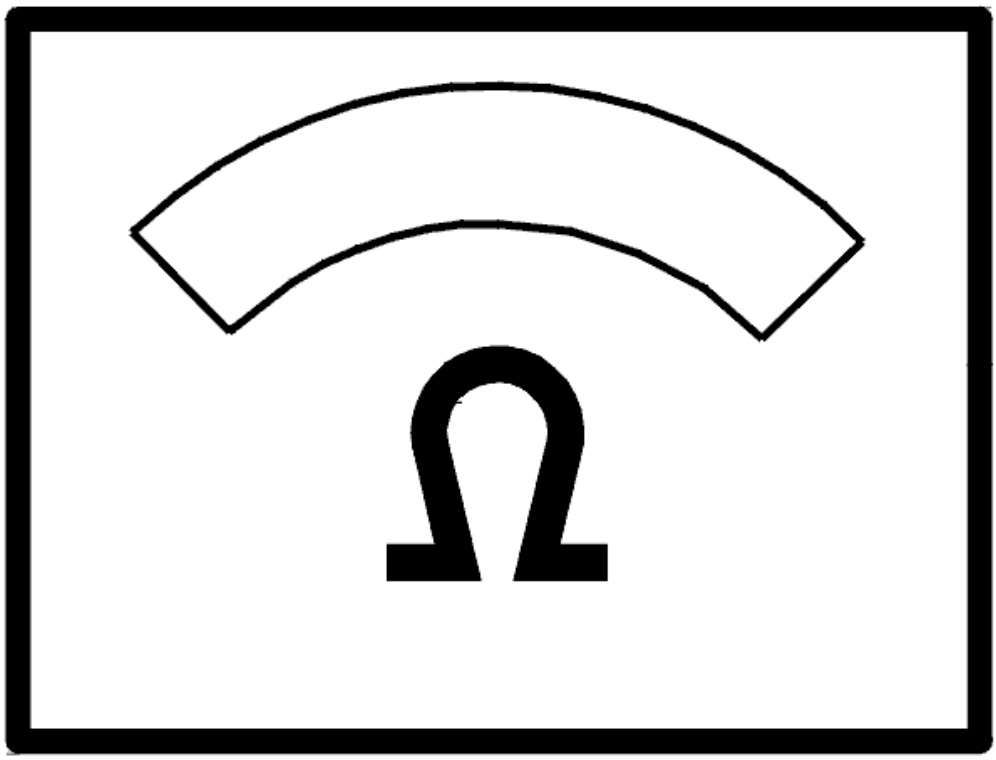


Fig. 387: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

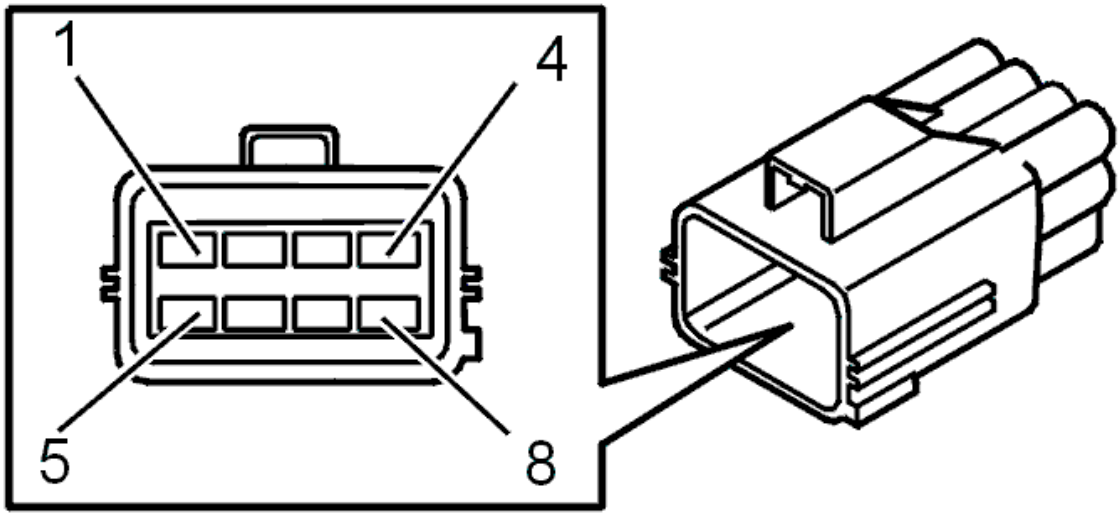


Fig. 388: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

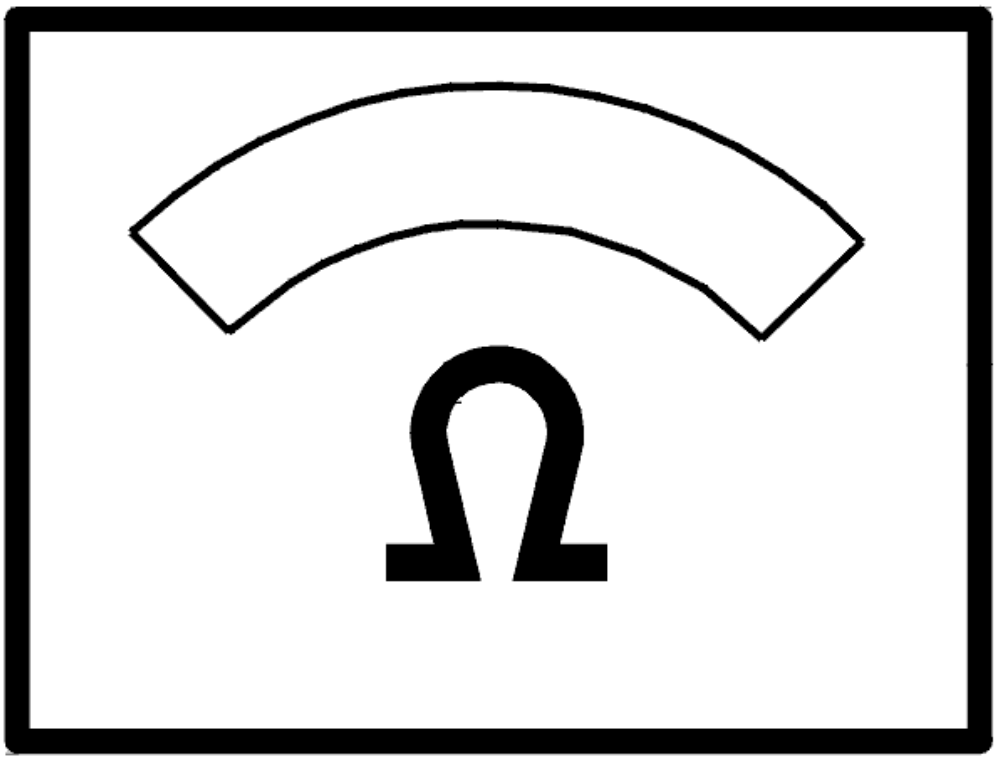


Fig. 389: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

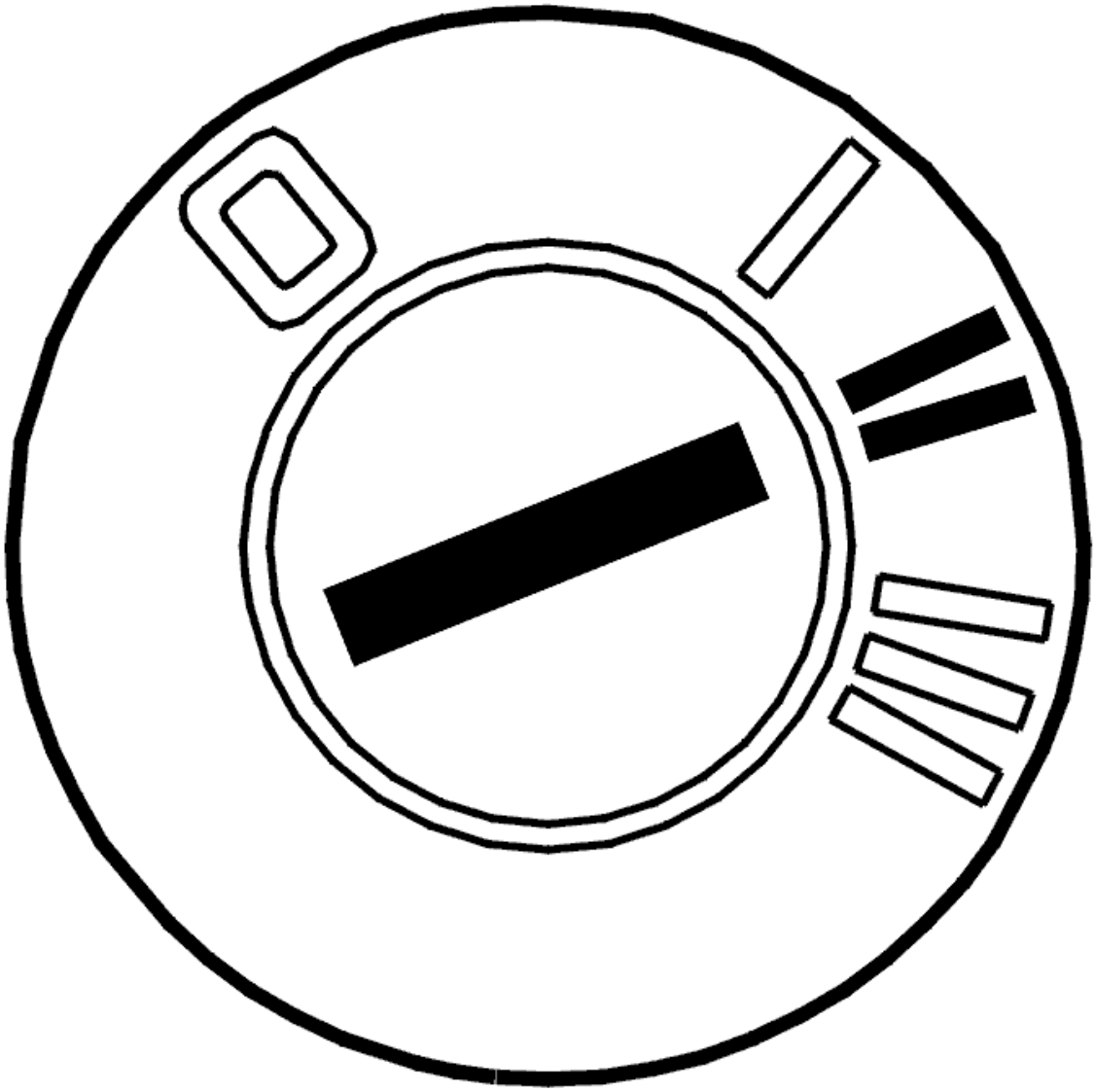


Fig. 390: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

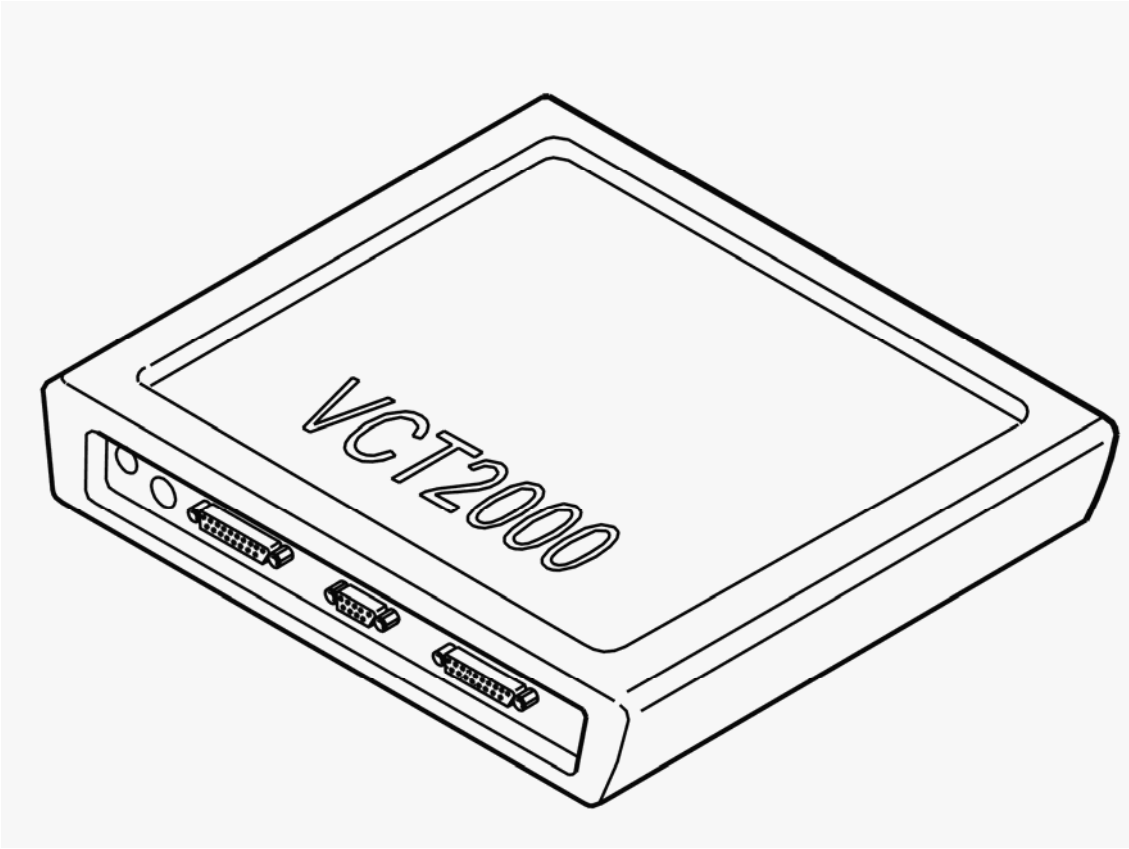


Fig. 391: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

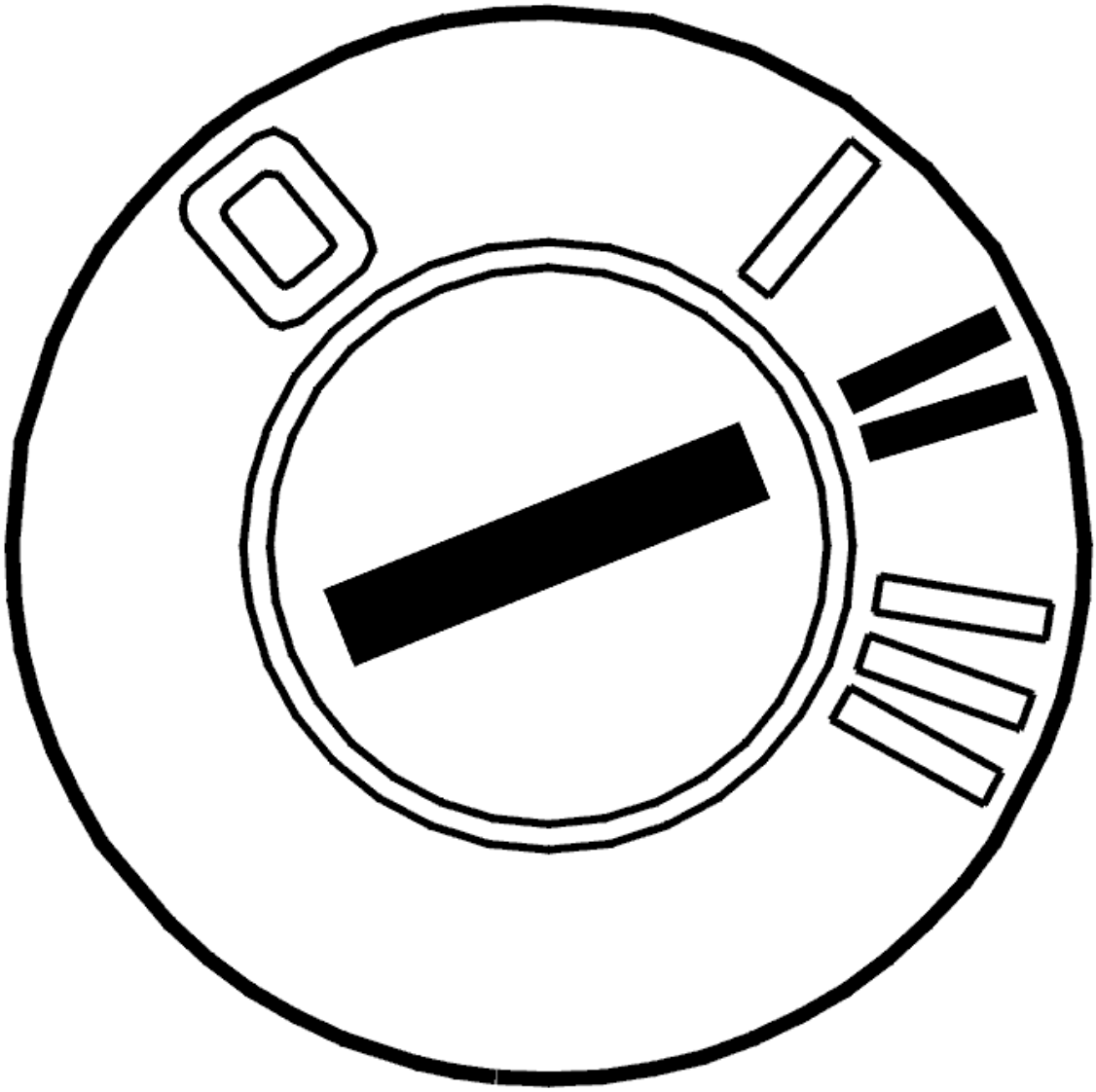


Fig. 392: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

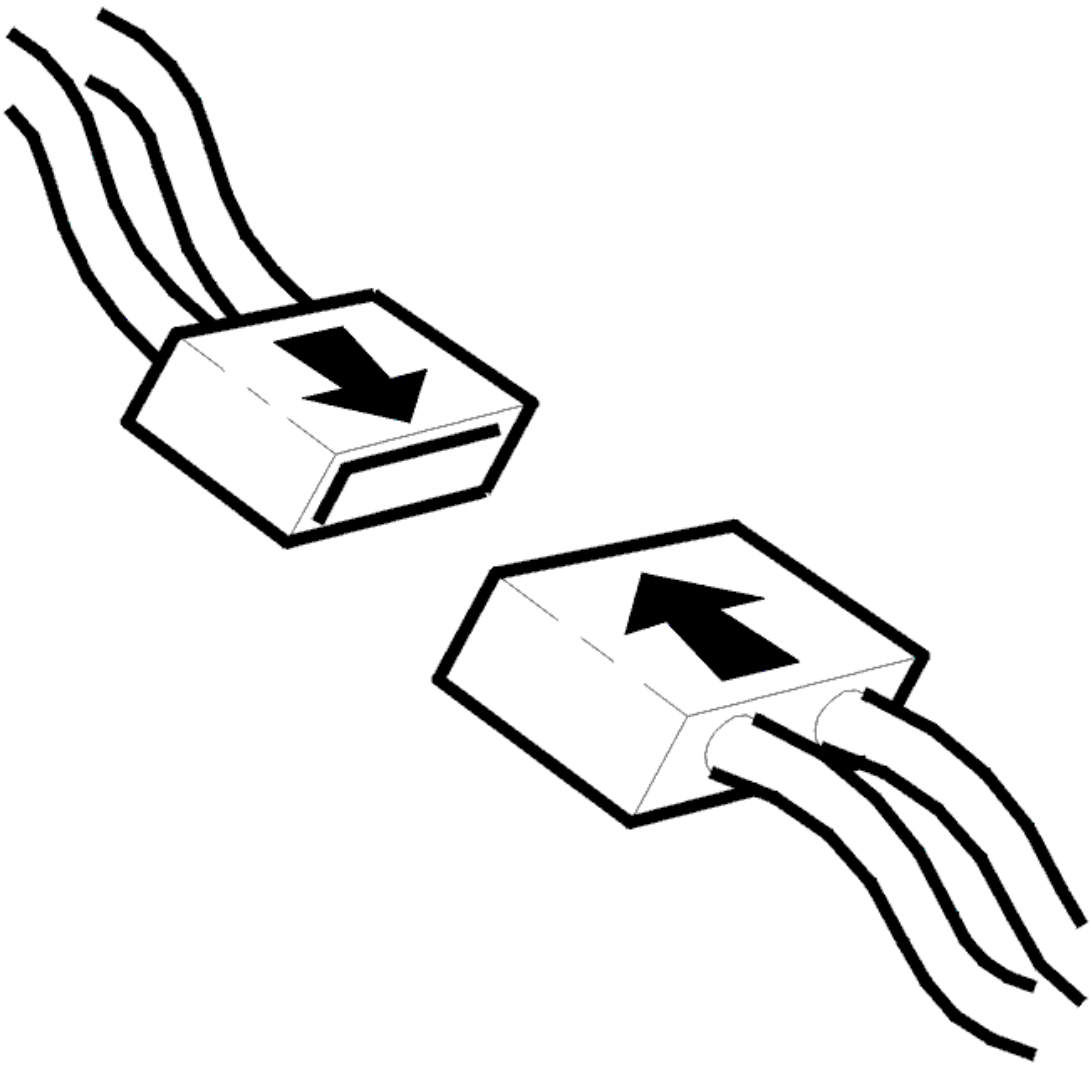


Fig. 393: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

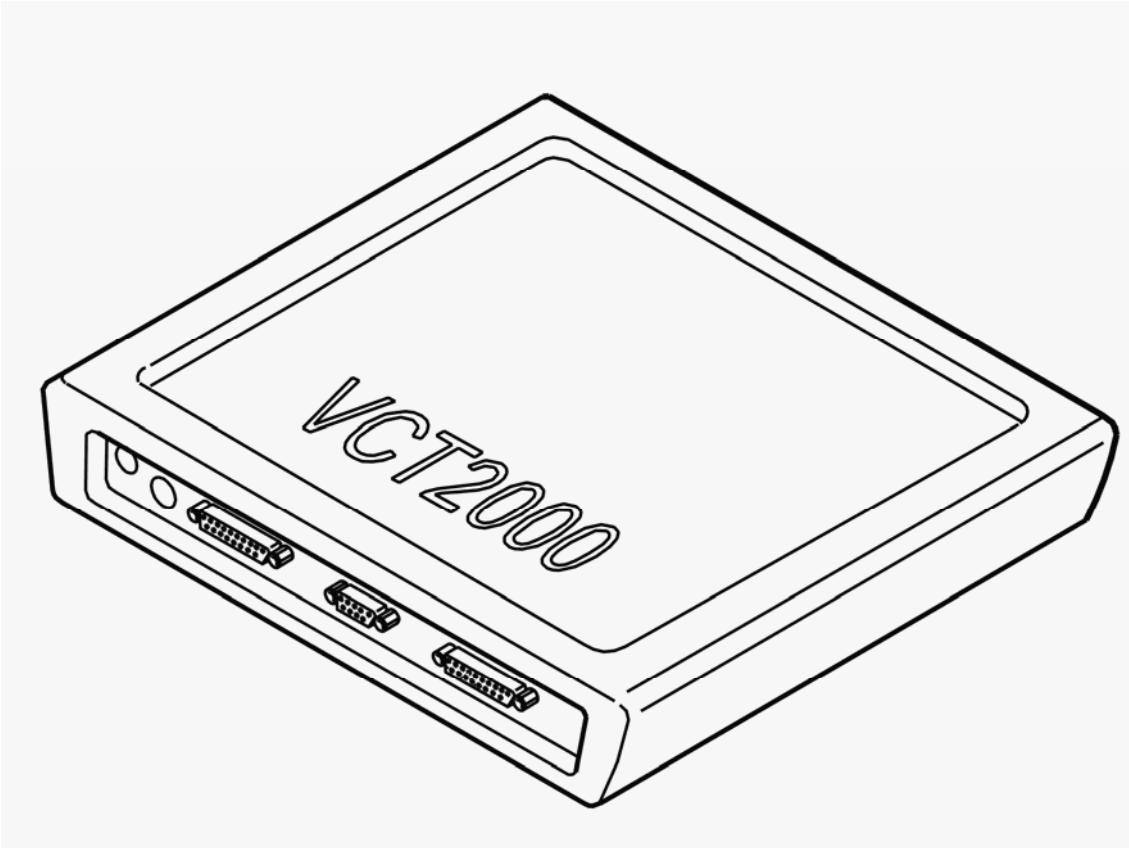


Fig. 394: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-0108: SHIFT SOLENOID S4. SIGNAL MISSING (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

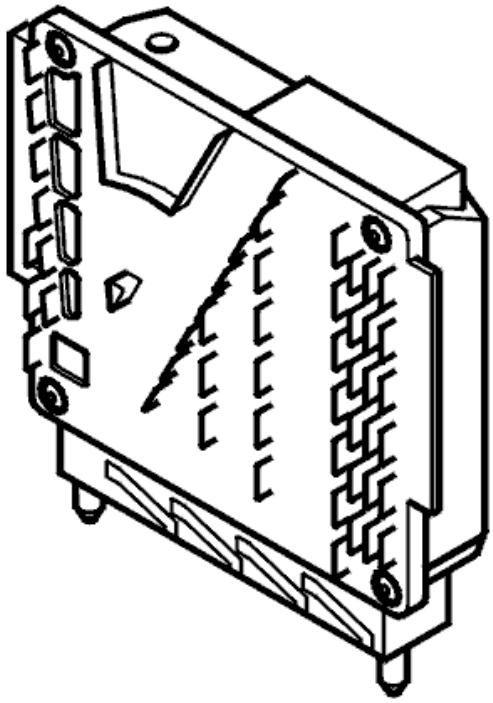


Fig. 395: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0002, TCM-0008, TCM-0102, TCM-0108 or TCM-010B are stored (depending on the solenoid) if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is missing when the solenoid is activated.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Contact resistance in terminals.
- Open-circuit in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

SIGNAL MISSING

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

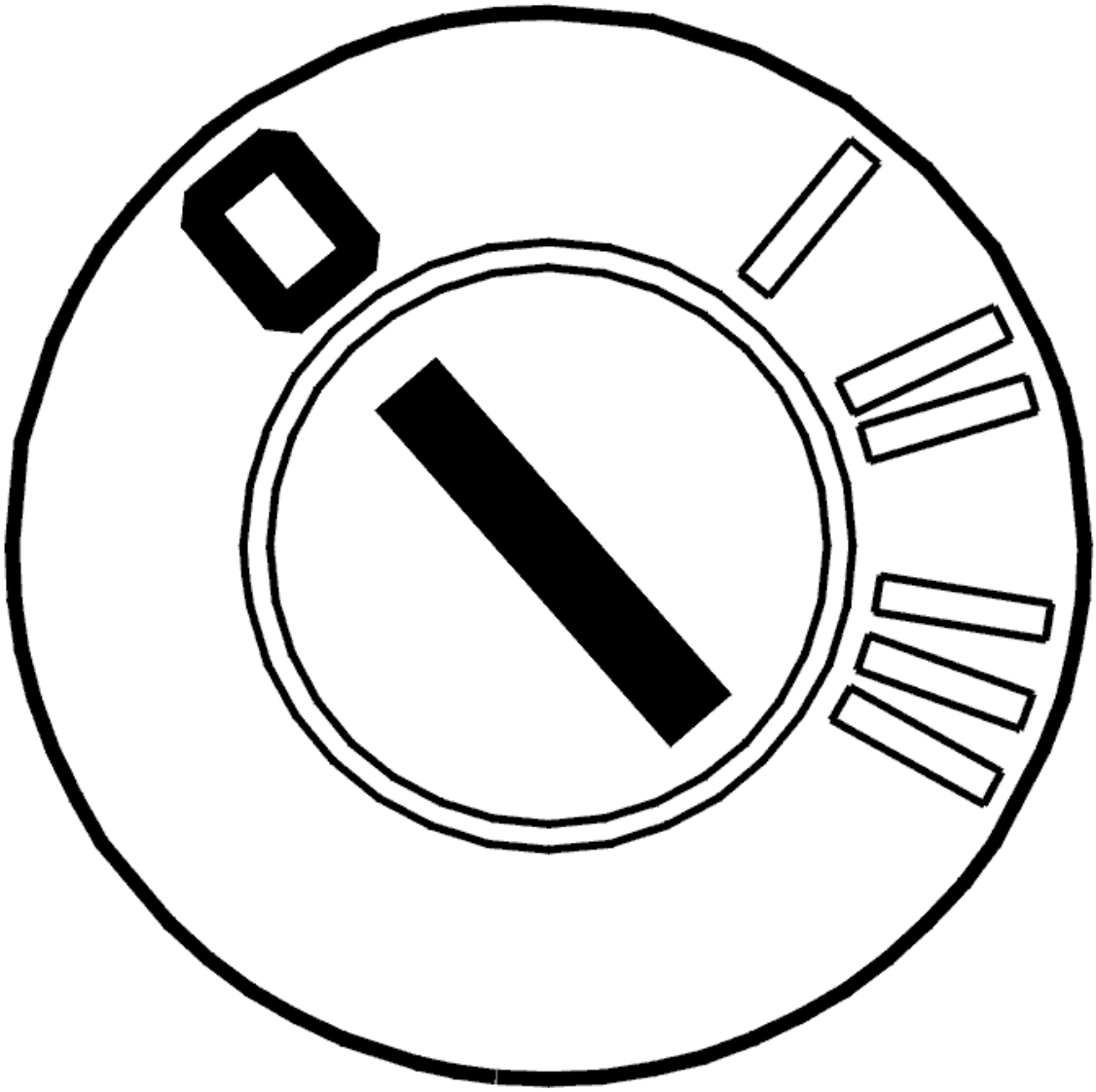


Fig. 396: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

  HINT: If the temperature is outside its permitted range, fault-trace the temperature sensor.

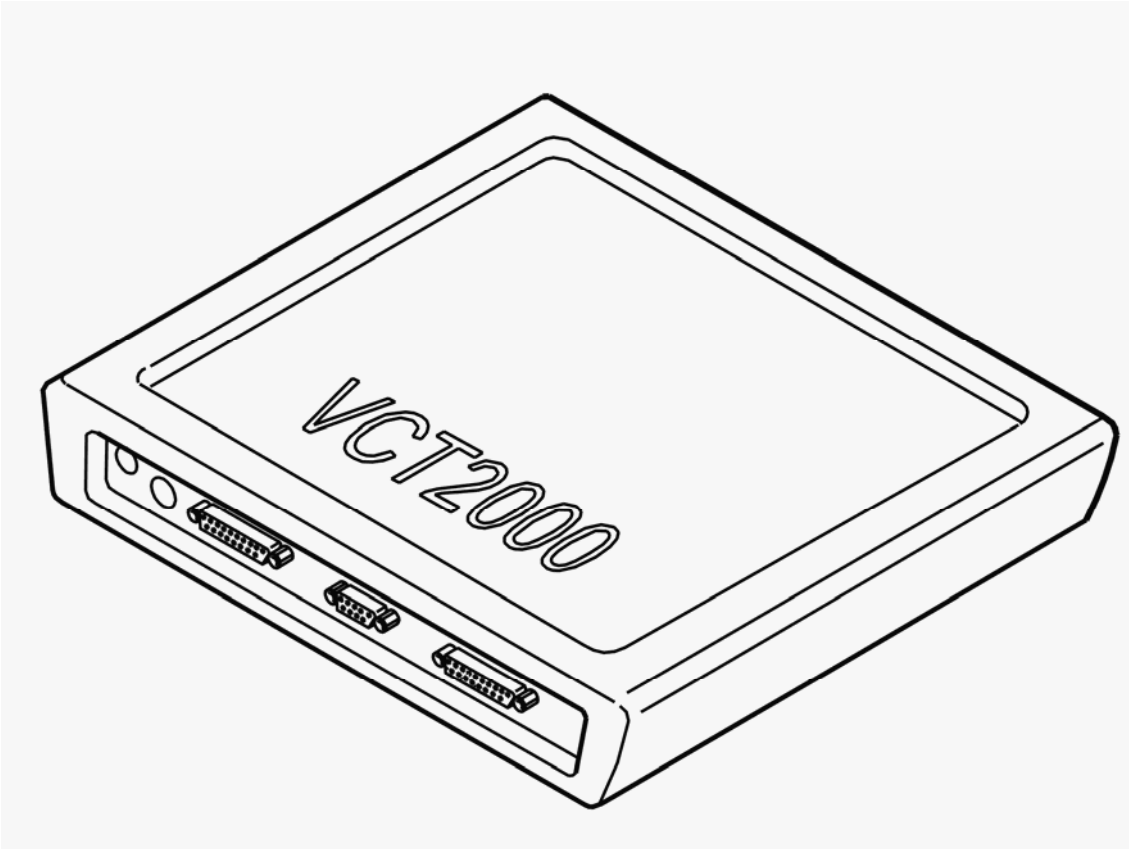


Fig. 397: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S4**

- **NO**

  Refer to **FAULTY SIGNAL**

CHECKING SHIFT SOLENOID S4

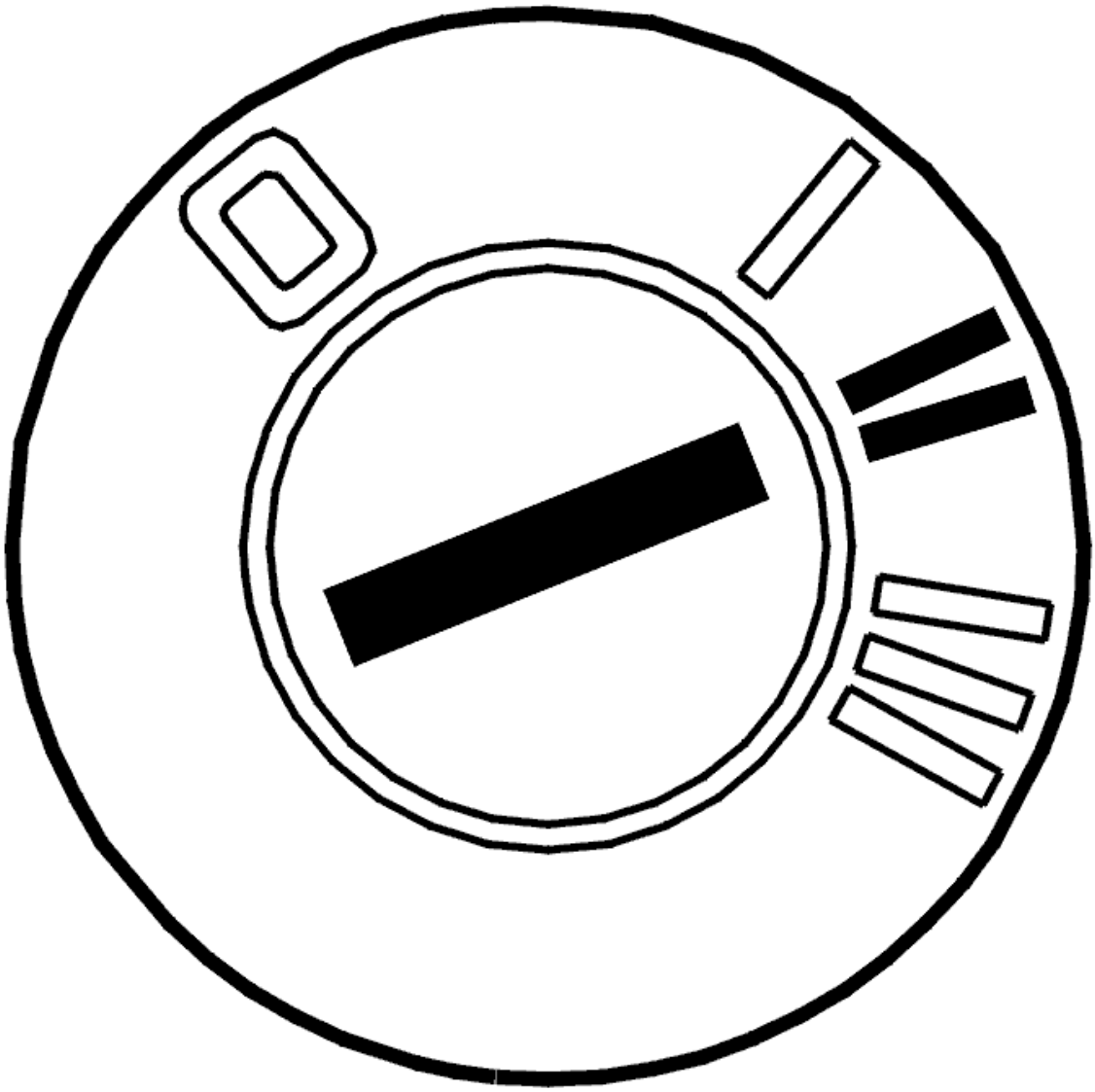


Fig. 398: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S4.

  The current should oscillate between 0 and approximately 1.5 A.

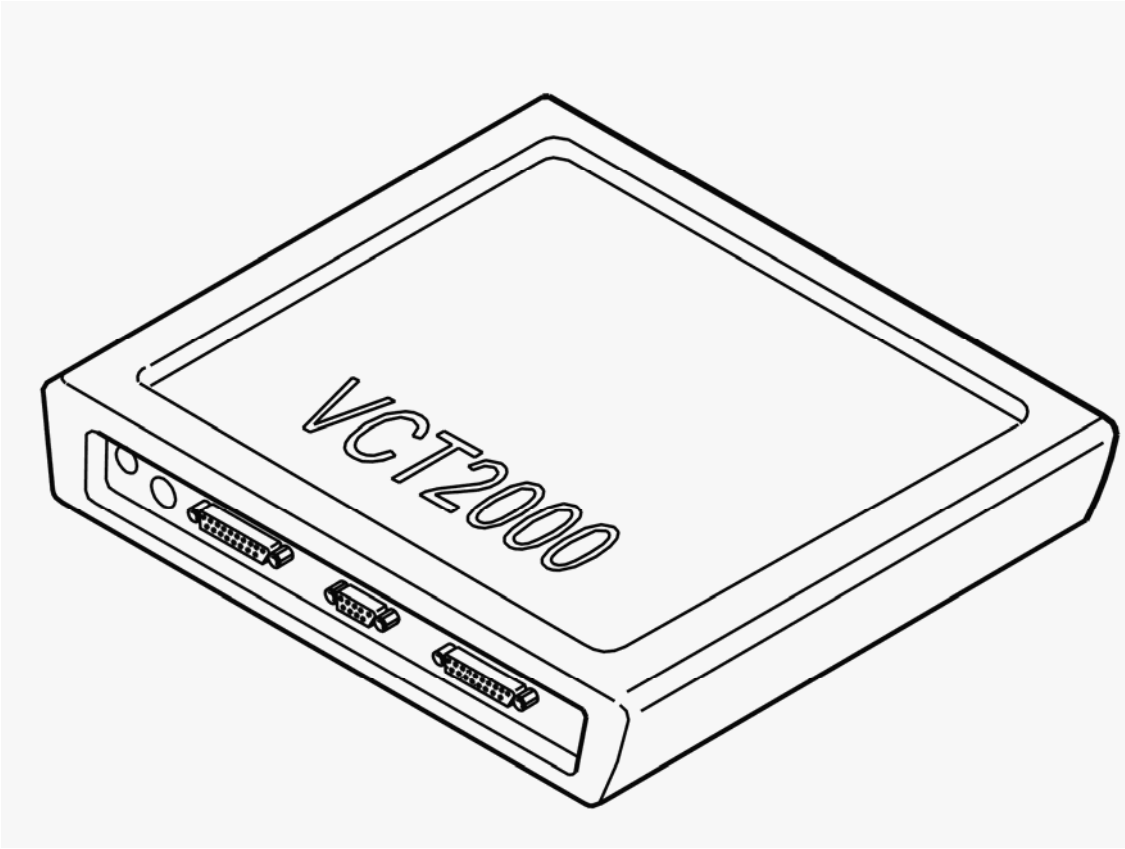


Fig. 399: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING RESISTANCE**

CHECKING RESISTANCE

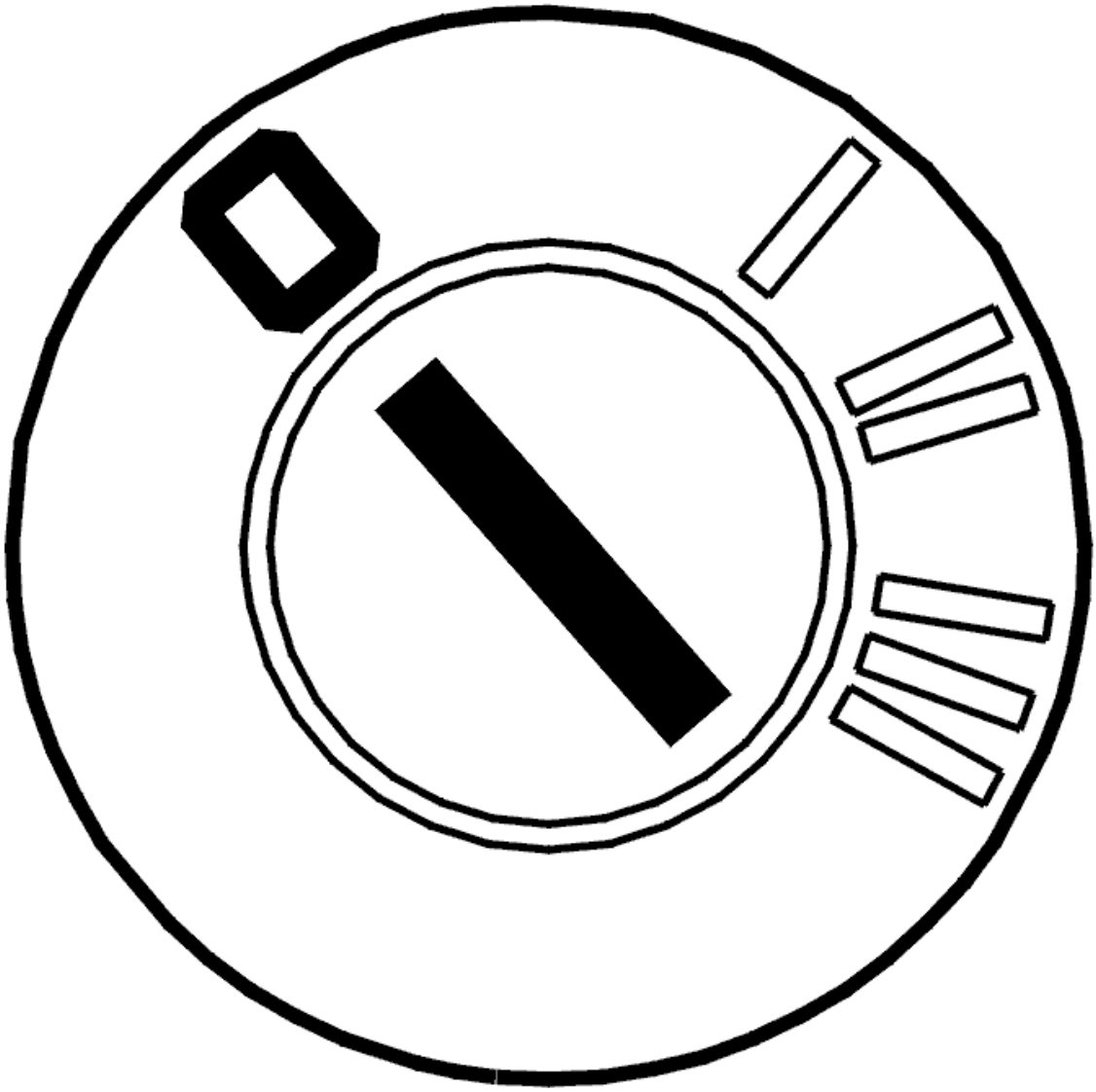


Fig. 400: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect transmission connector C.

Check solenoid S4 by measuring the resistance between transmission connector terminal #C4 and the transmission housing. The resistance must be 11-15 ohms.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

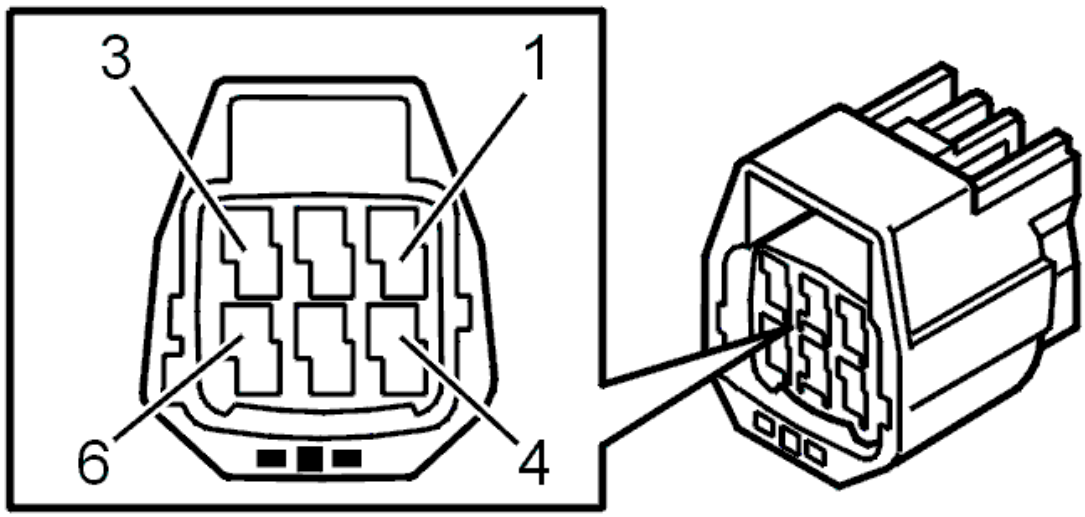


Fig. 401: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

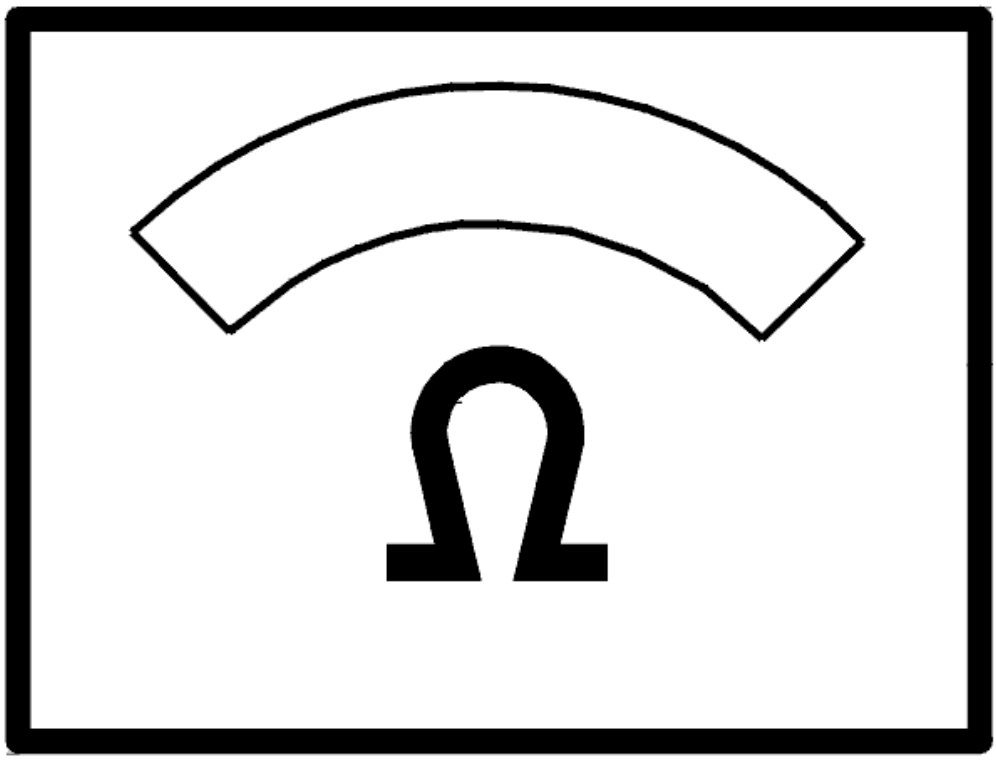


Fig. 402: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

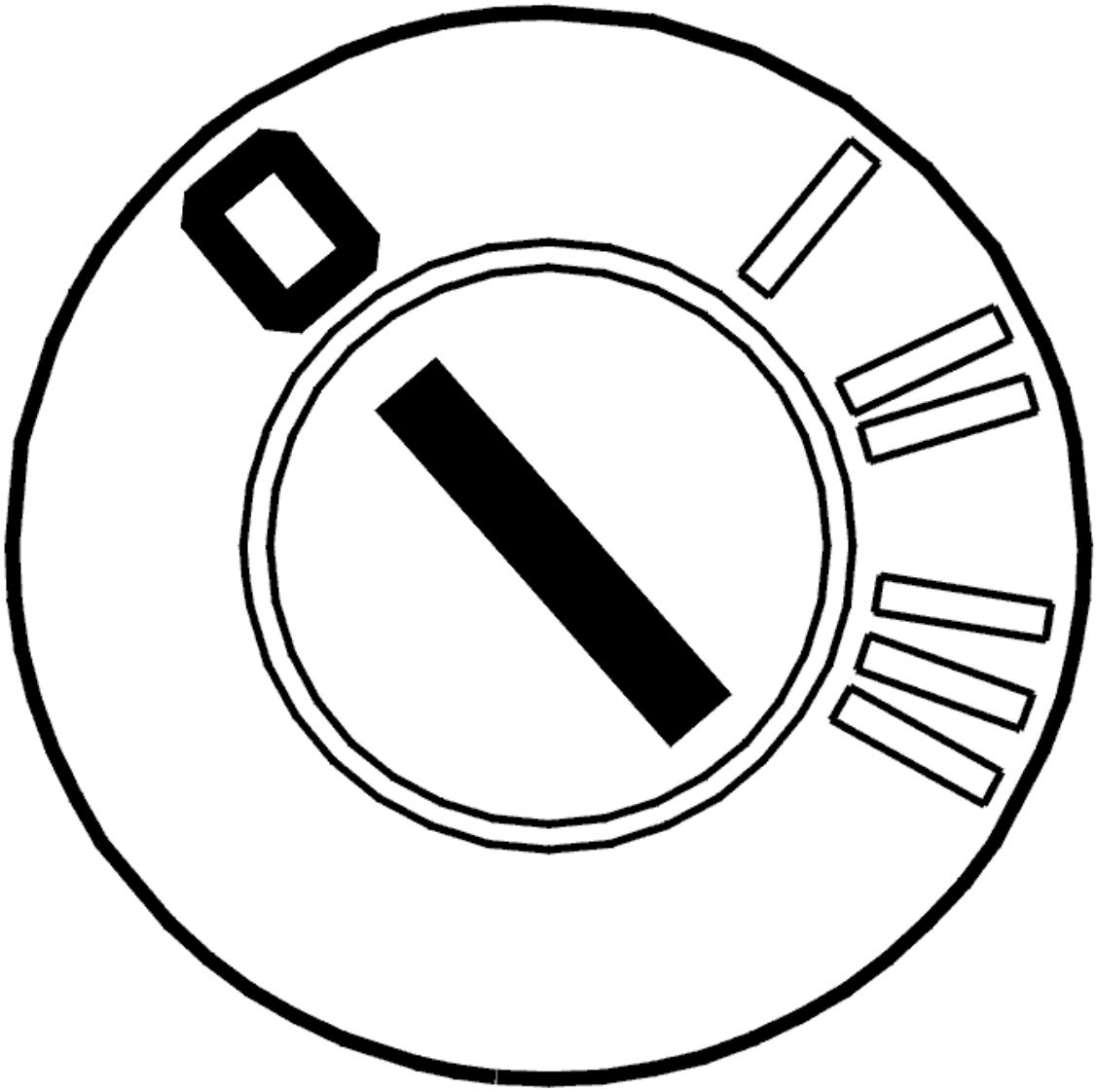


Fig. 403: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

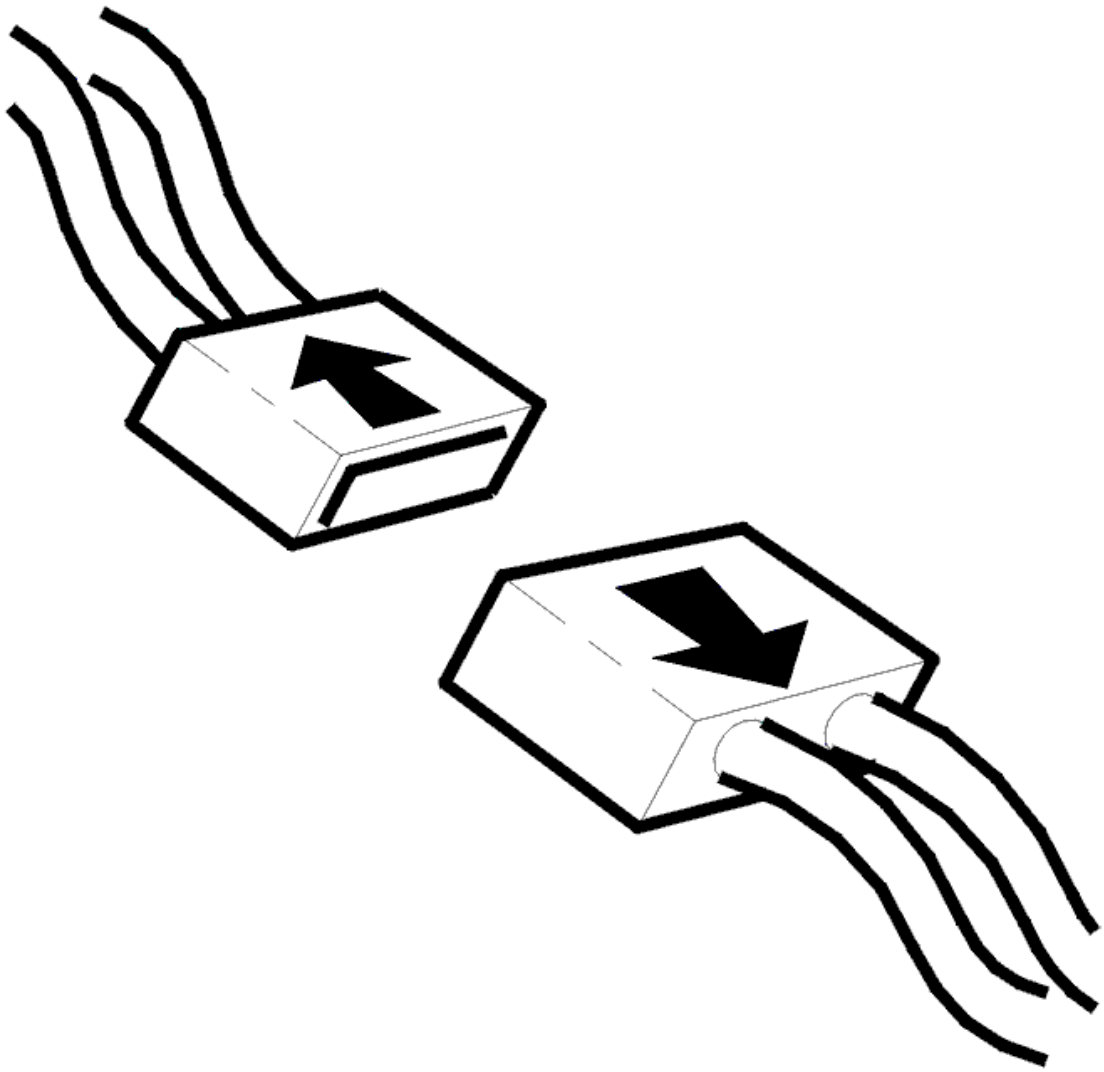


Fig. 404: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Transmission connector C disconnected.

Check the cable between control module terminal #A47 (#A47) and transmission connector terminal #C4 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

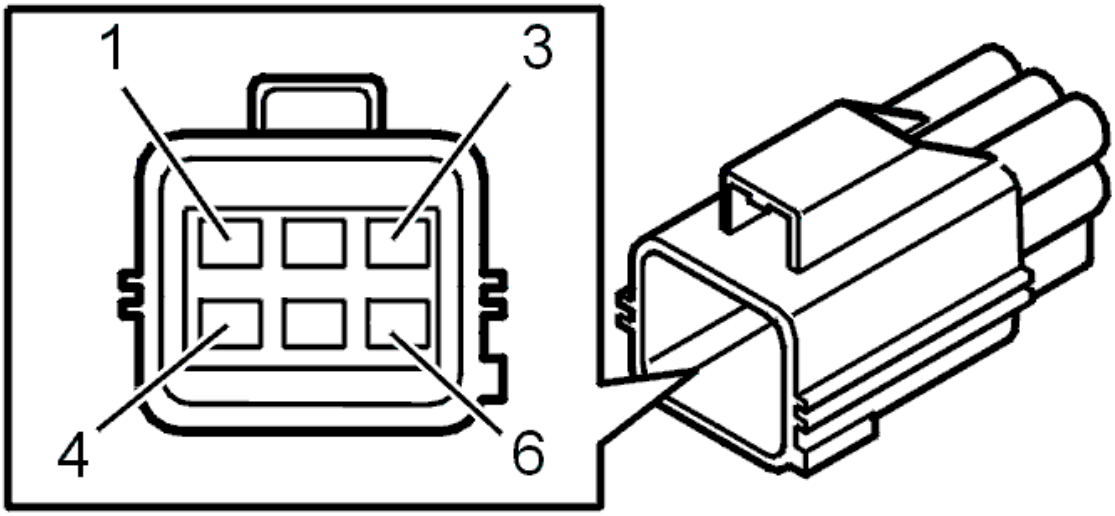


Fig. 405: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

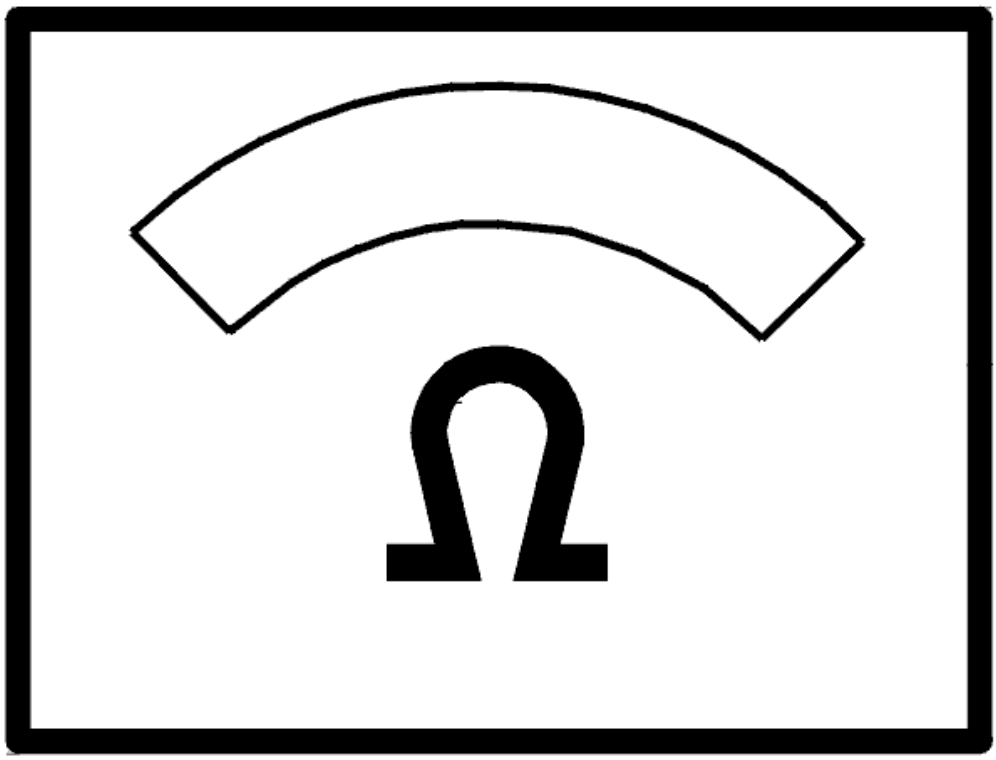


Fig. 406: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

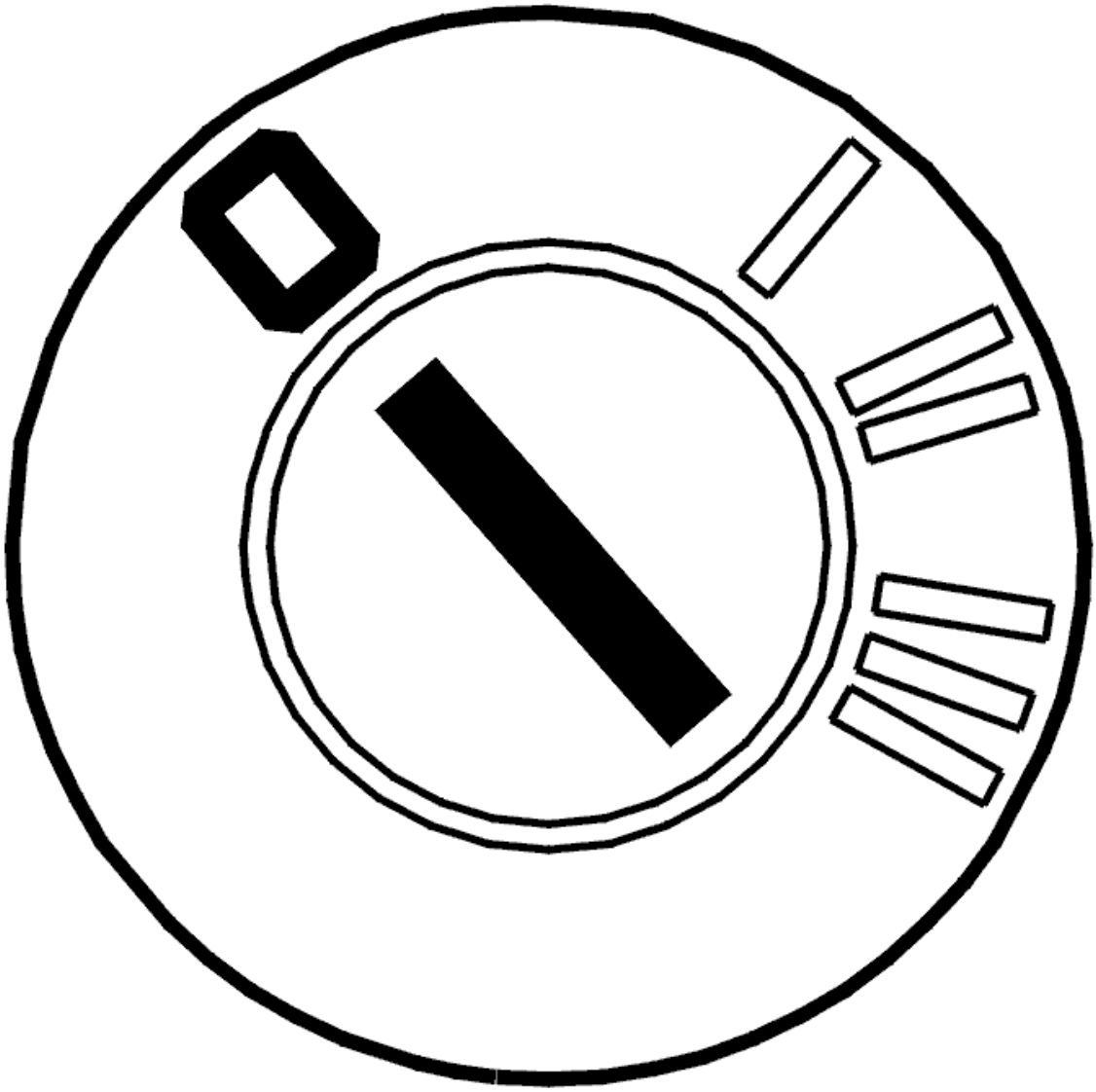


Fig. 407: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

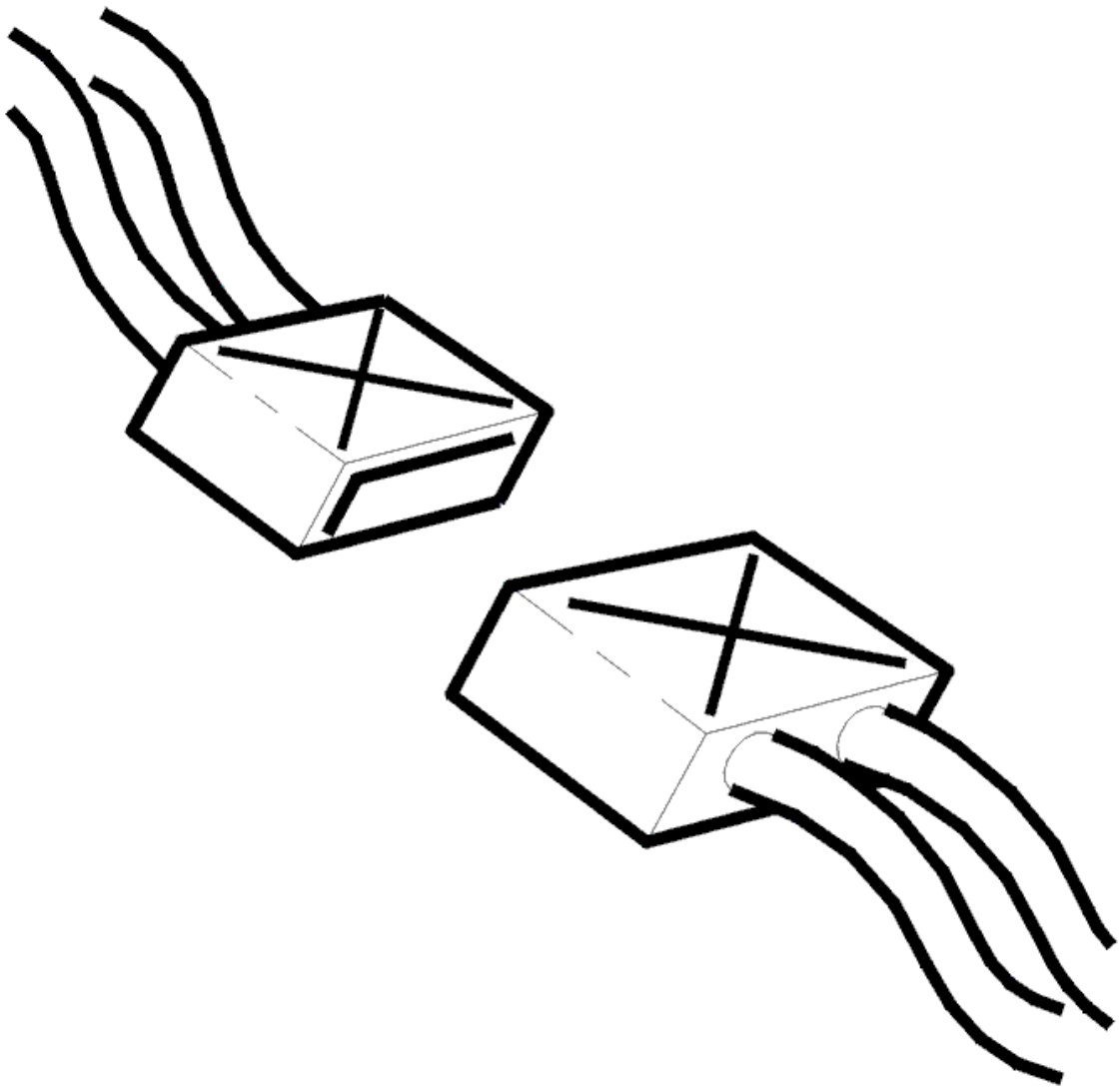


Fig. 408: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

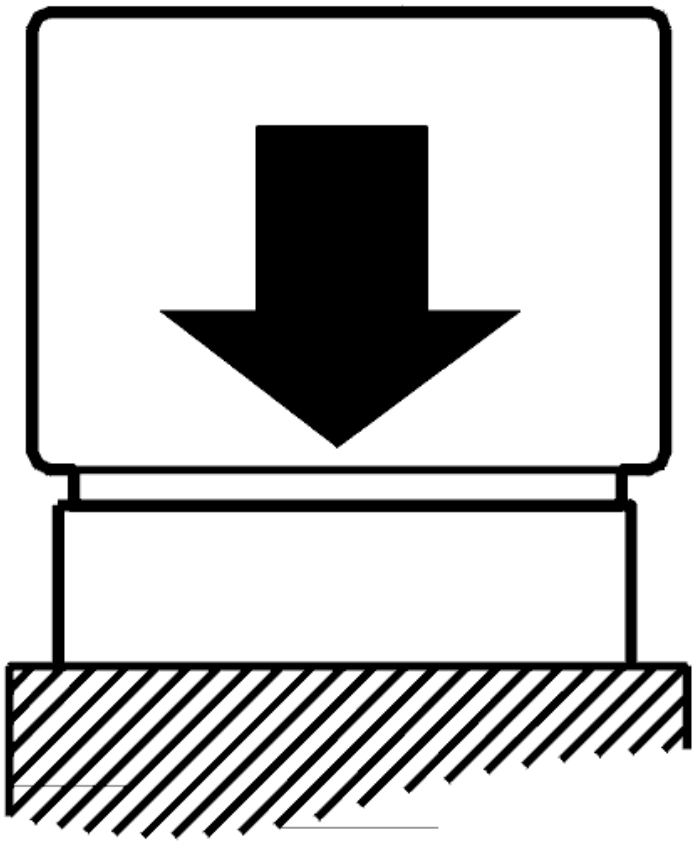


Fig. 409: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector C disconnected
- Gear selector in position P.

Check the transmission control module (TCM) by measuring the resistance between terminals #A47 (#A47) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

NOTE: When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

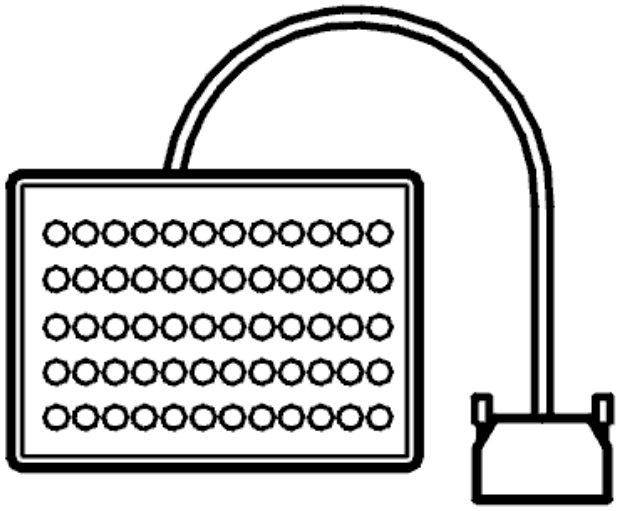


Fig. 410: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

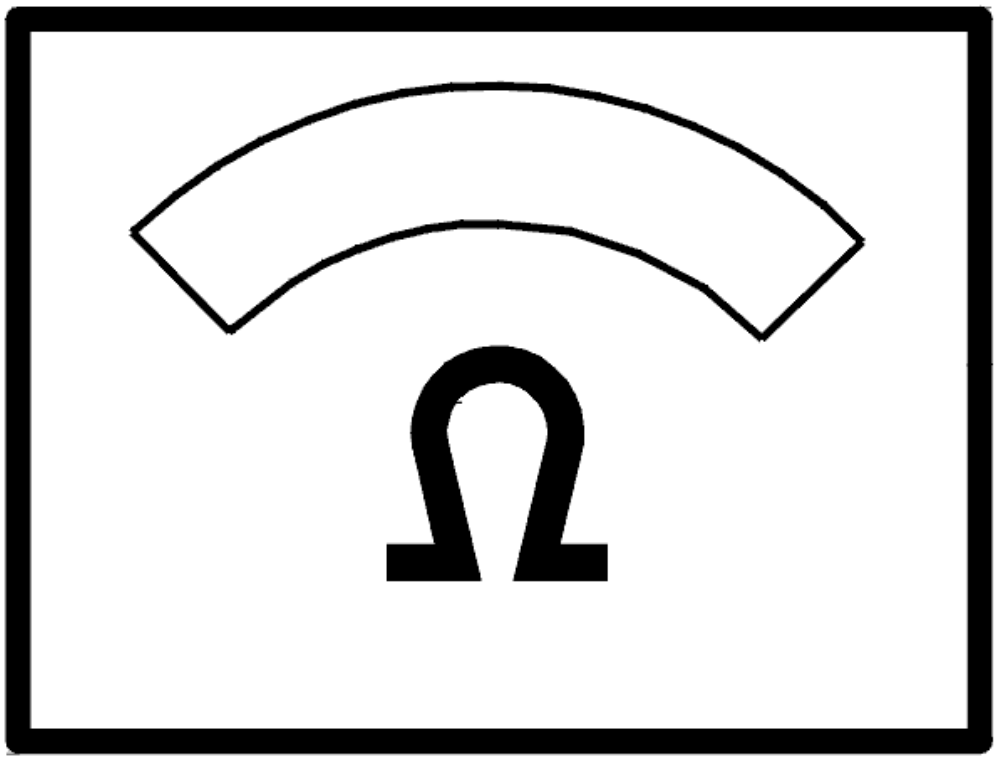


Fig. 411: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

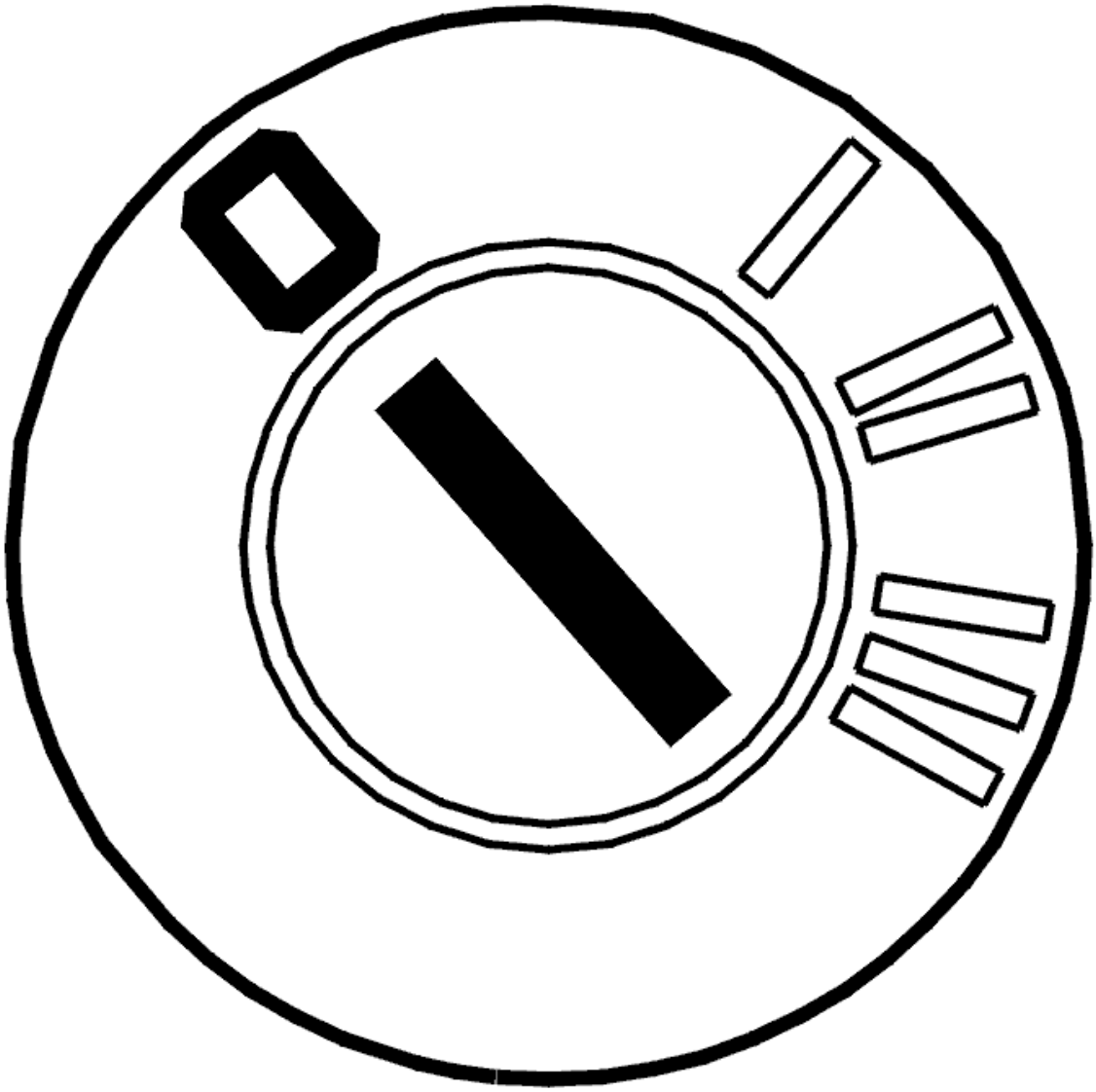


Fig. 412: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission connector terminal #C4 (transmission side) and the connector for solenoid S4. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

  Check solenoid S4 by measuring the resistance between the terminal pin on solenoid S4 and the transmission housing. The resistance must be 11-15 ohms. Replace solenoid S4 if the resistance is incorrect.

  Remedy as necessary.

  Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the control system and to check or replace solenoid S4, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

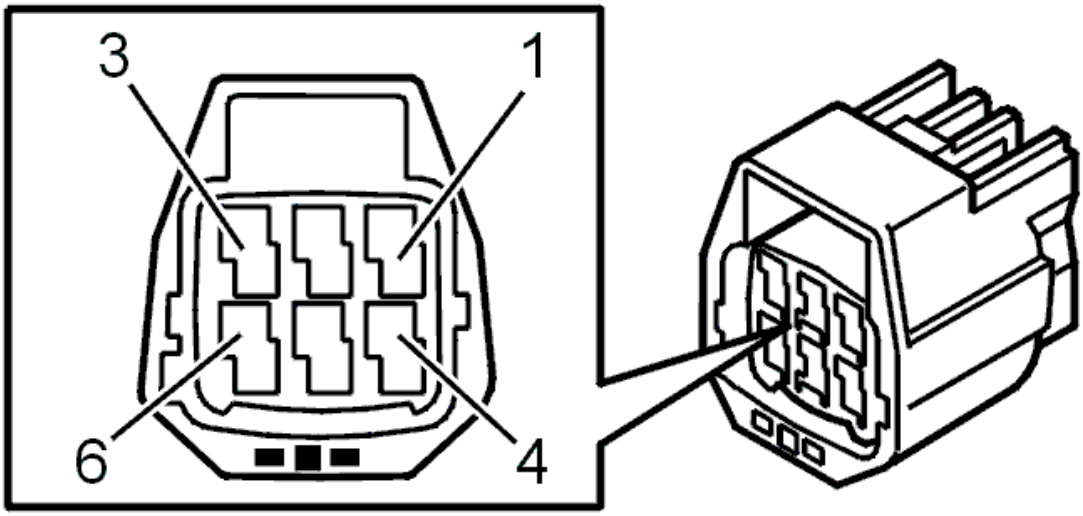


Fig. 413: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

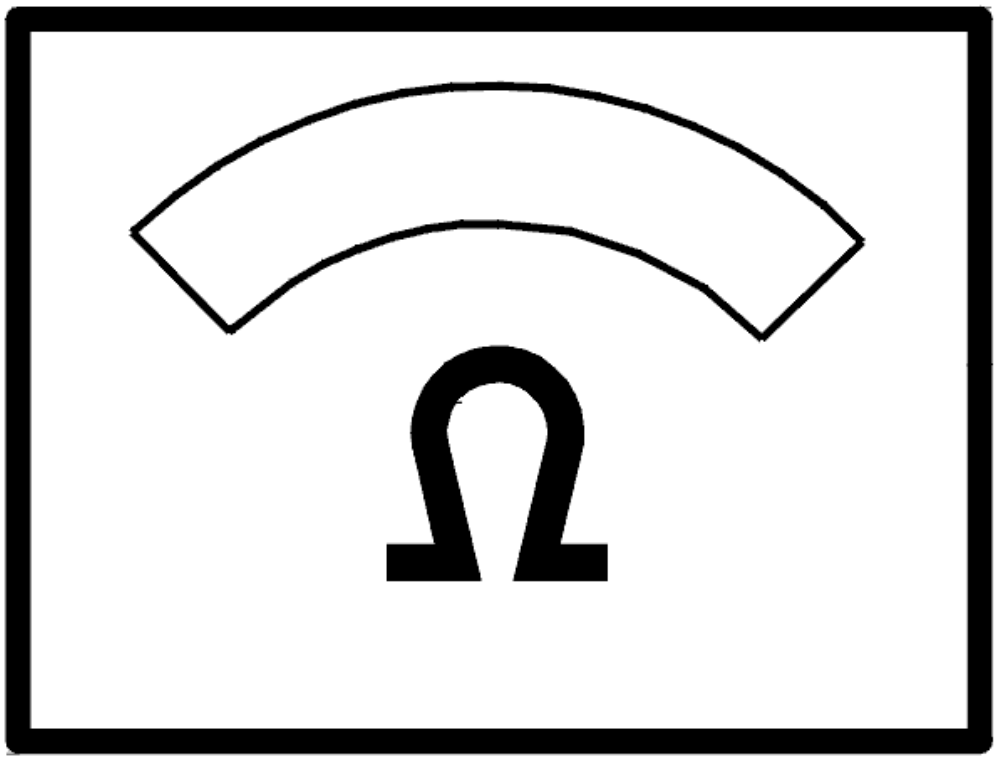


Fig. 414: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

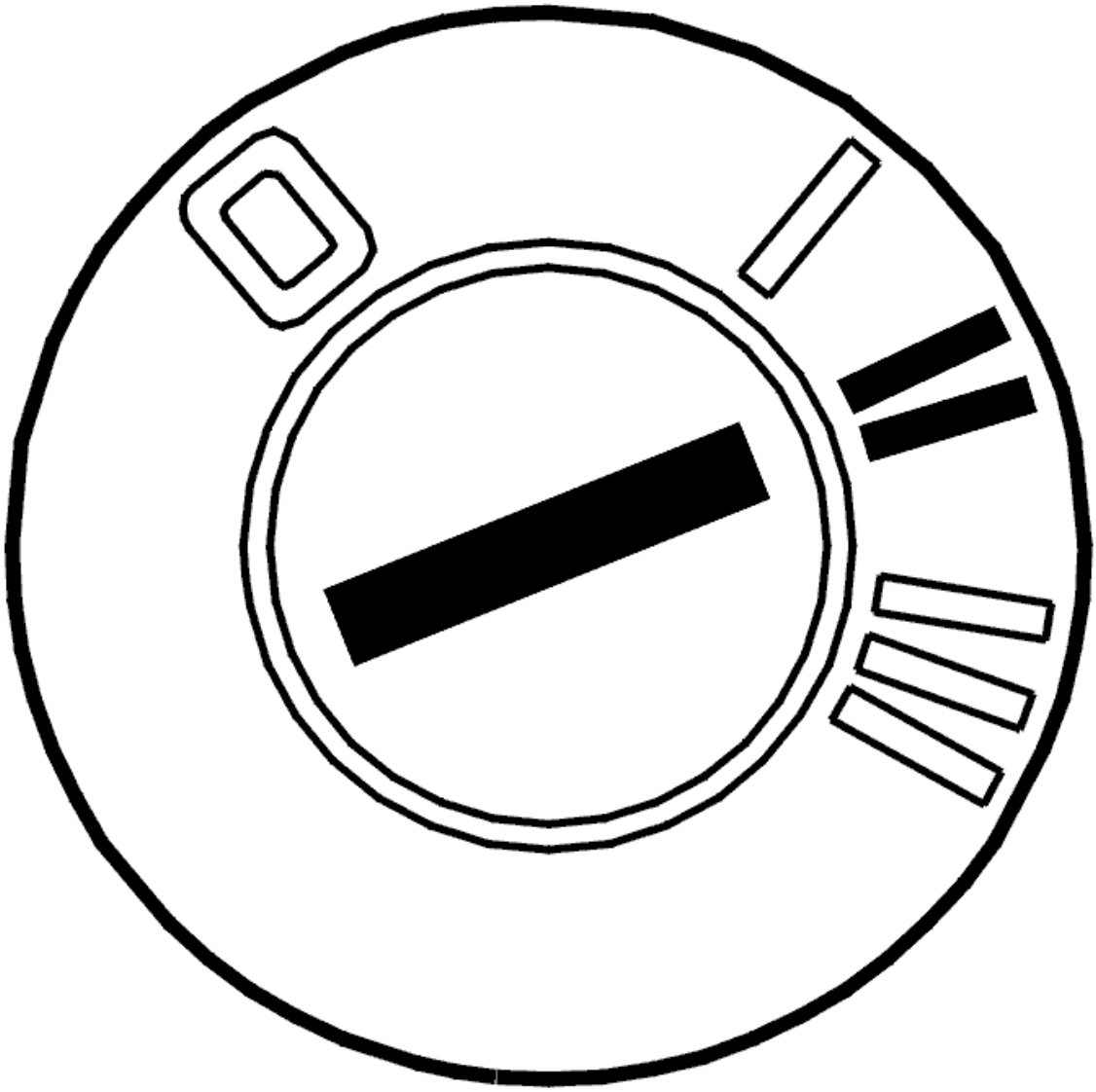


Fig. 415: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S4.

The current should oscillate between 0 and approximately 1.5 A.

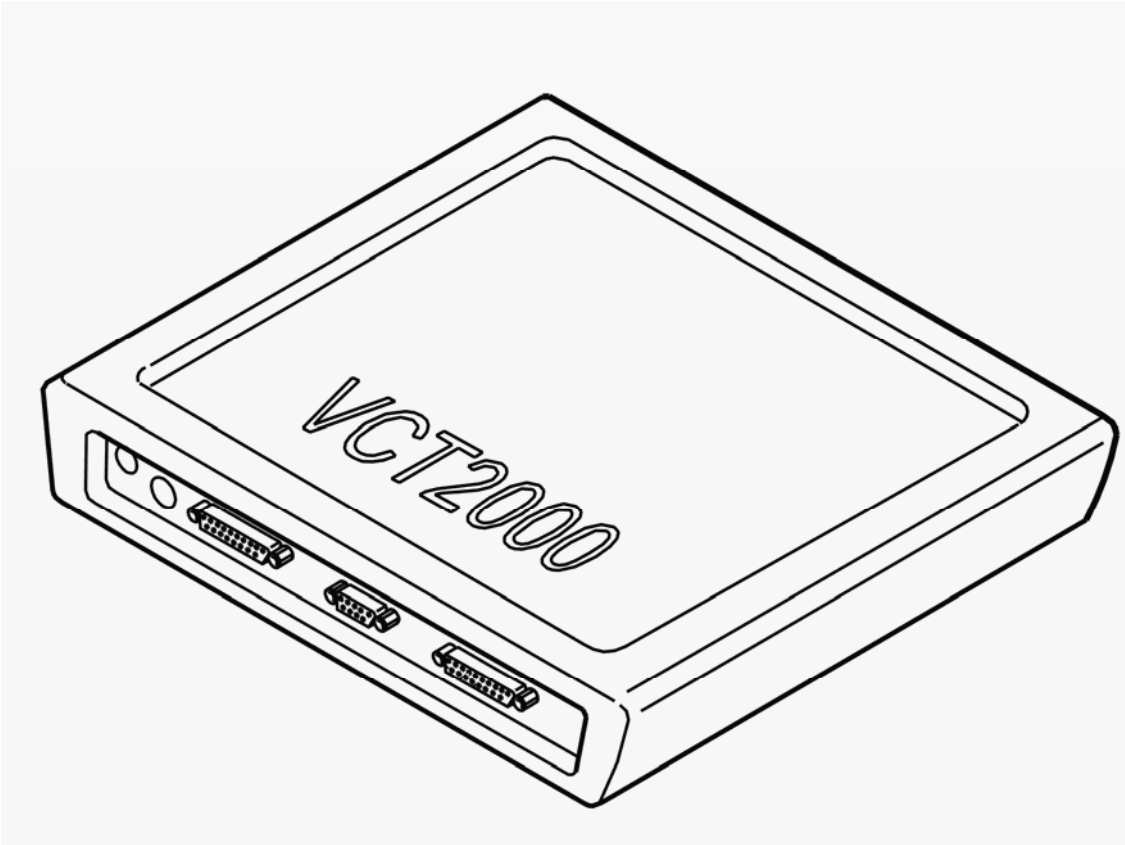


Fig. 416: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between control module terminal #A47 (#A47) and transmission connector terminal #C4. Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

- Check the circuit for solenoid S4. Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #A47 (#A47) and #A53 (#A53) on the breakout box. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

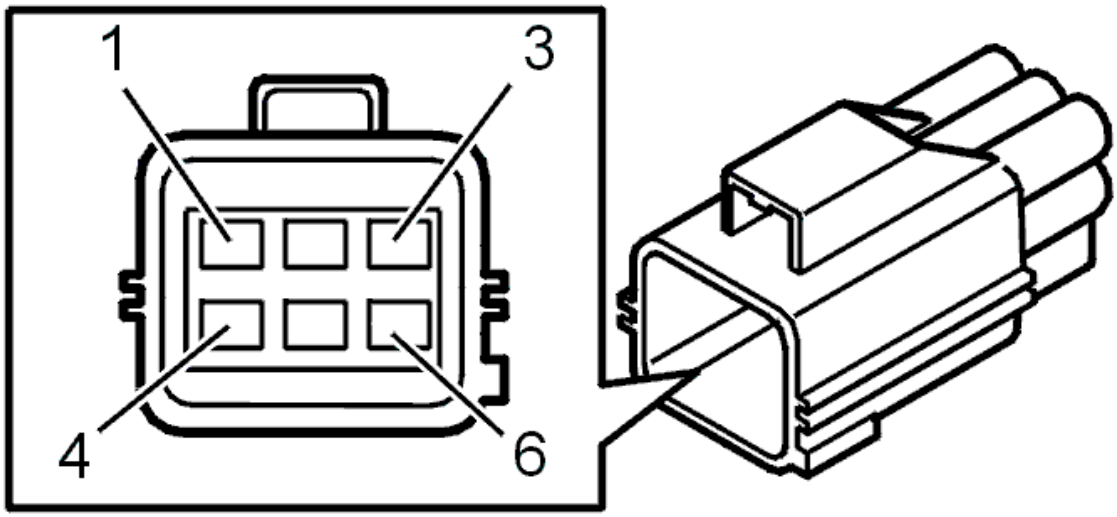


Fig. 417: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

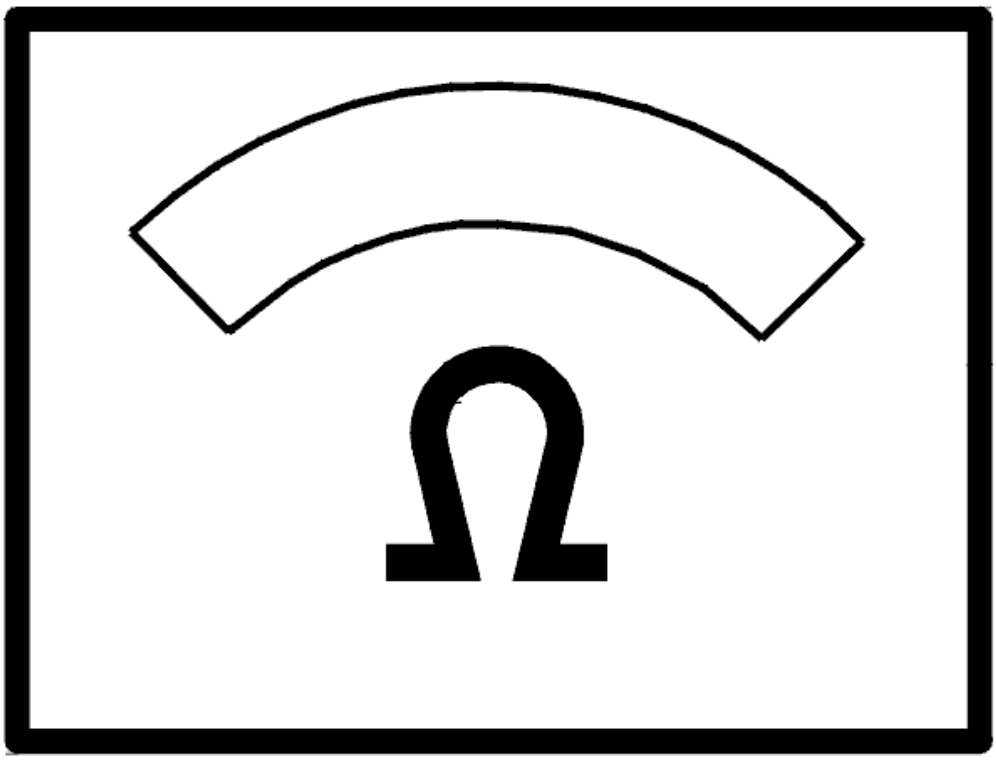


Fig. 418: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

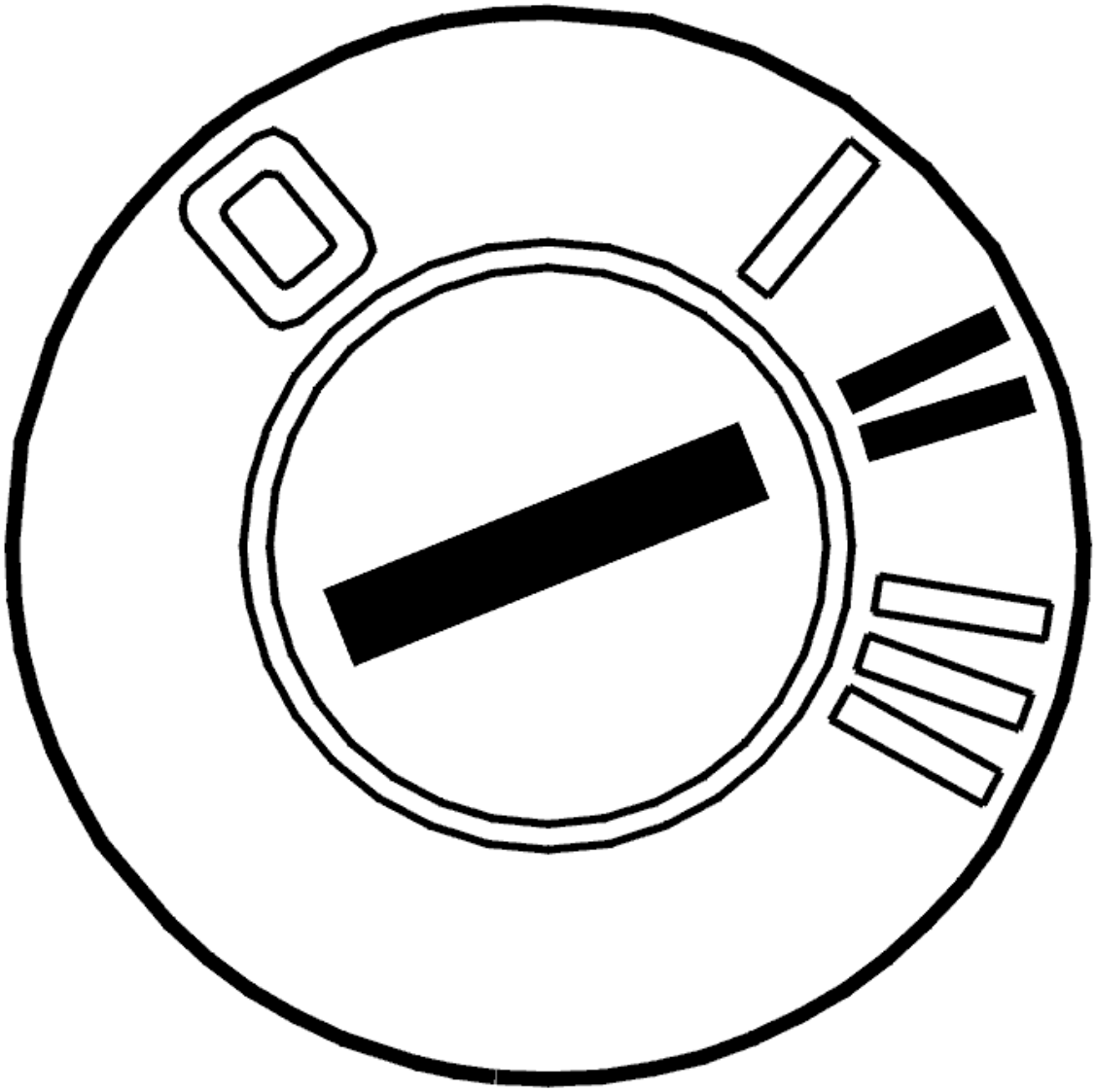


Fig. 419: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Use the VCT2000 (or appropriate scan tool) to reset the adaptation and counter.

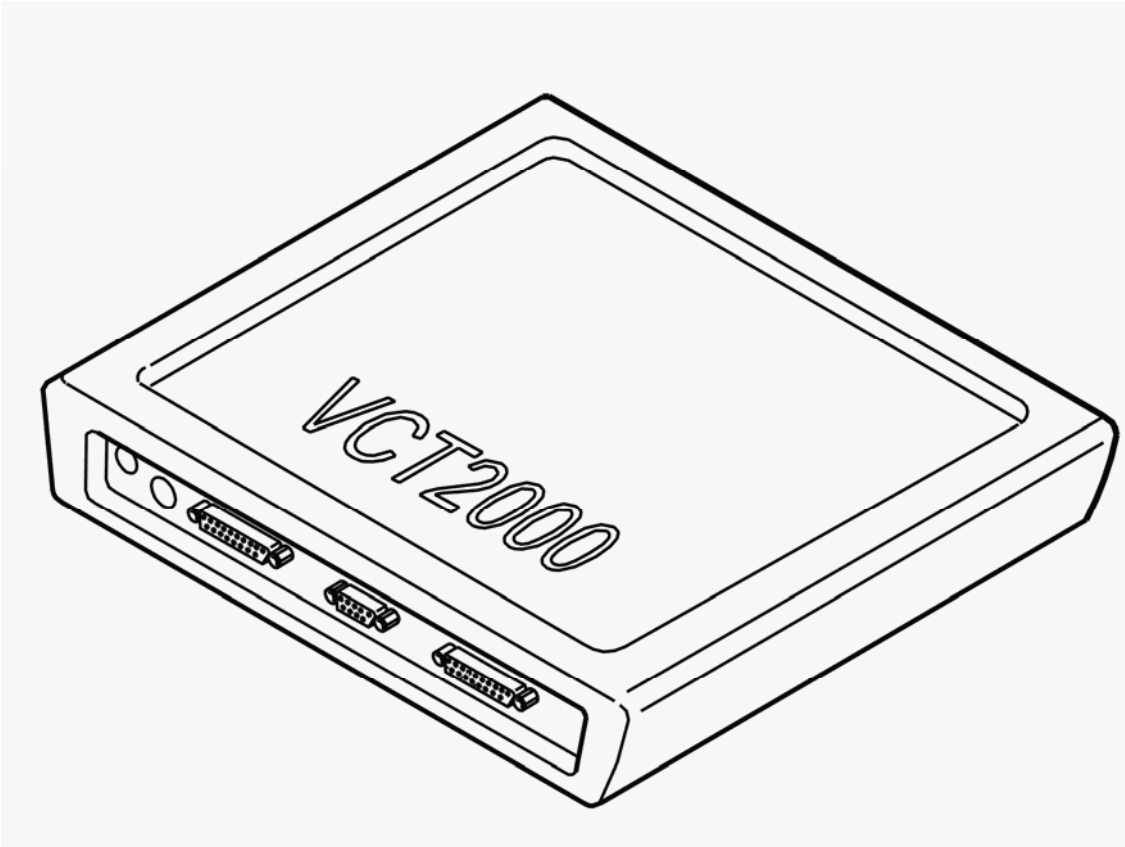


Fig. 420: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

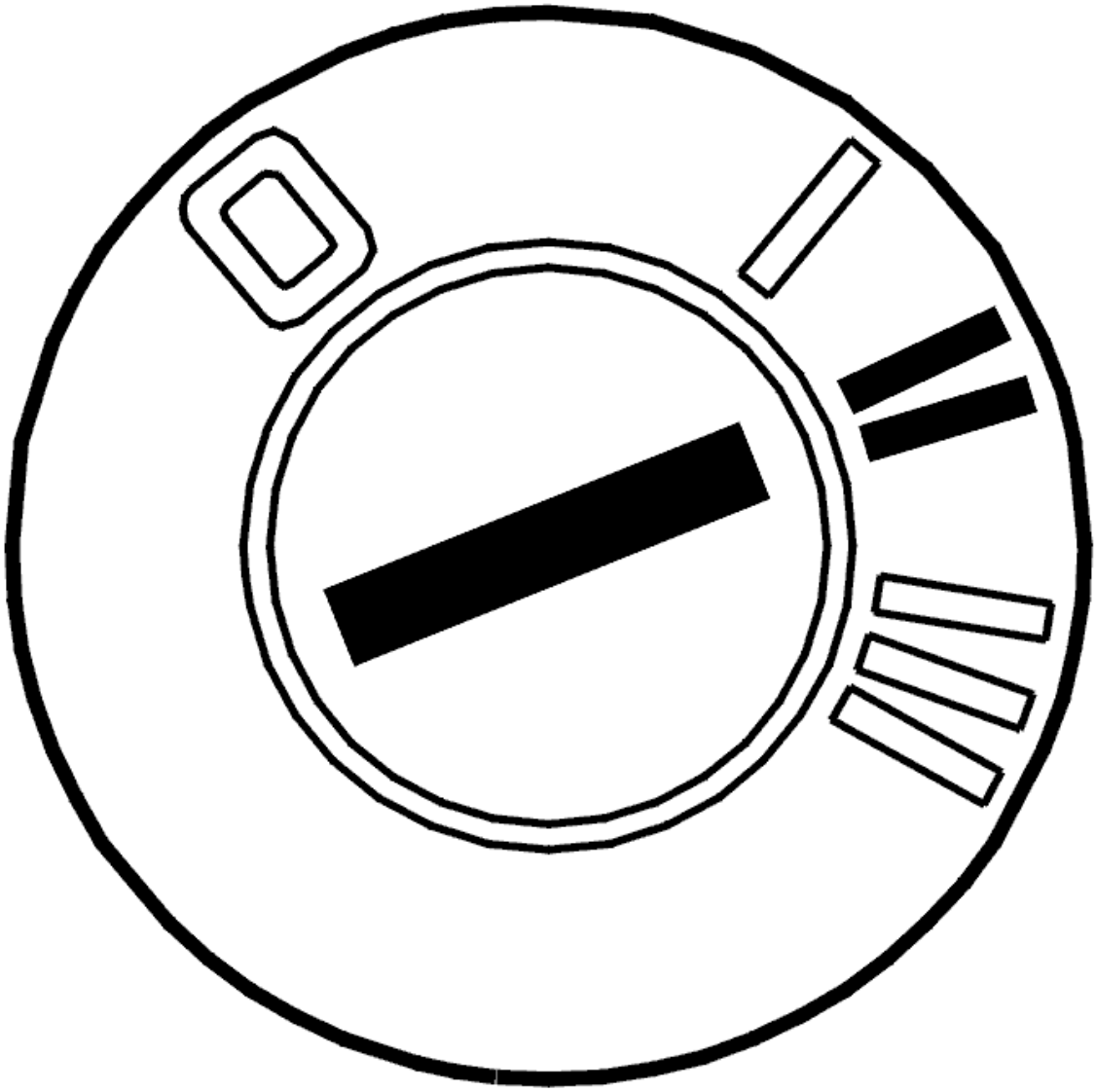


Fig. 421: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

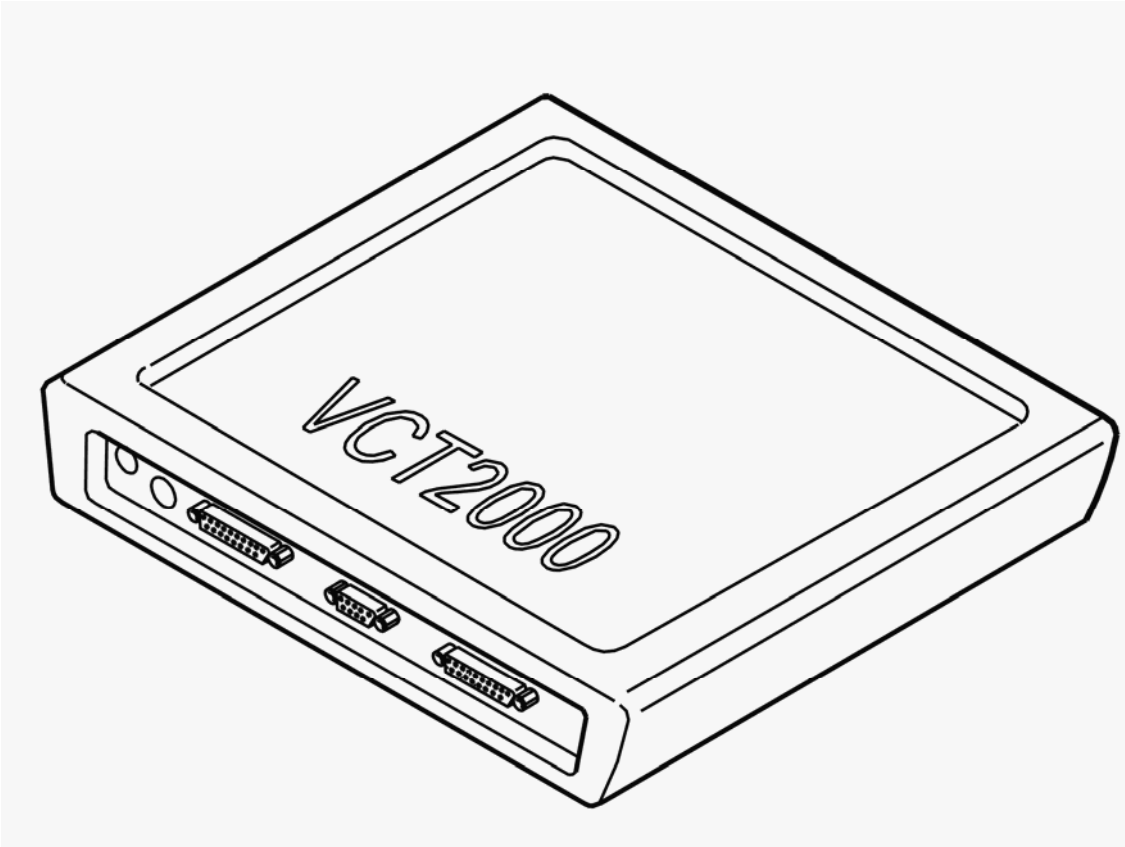


Fig. 422: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

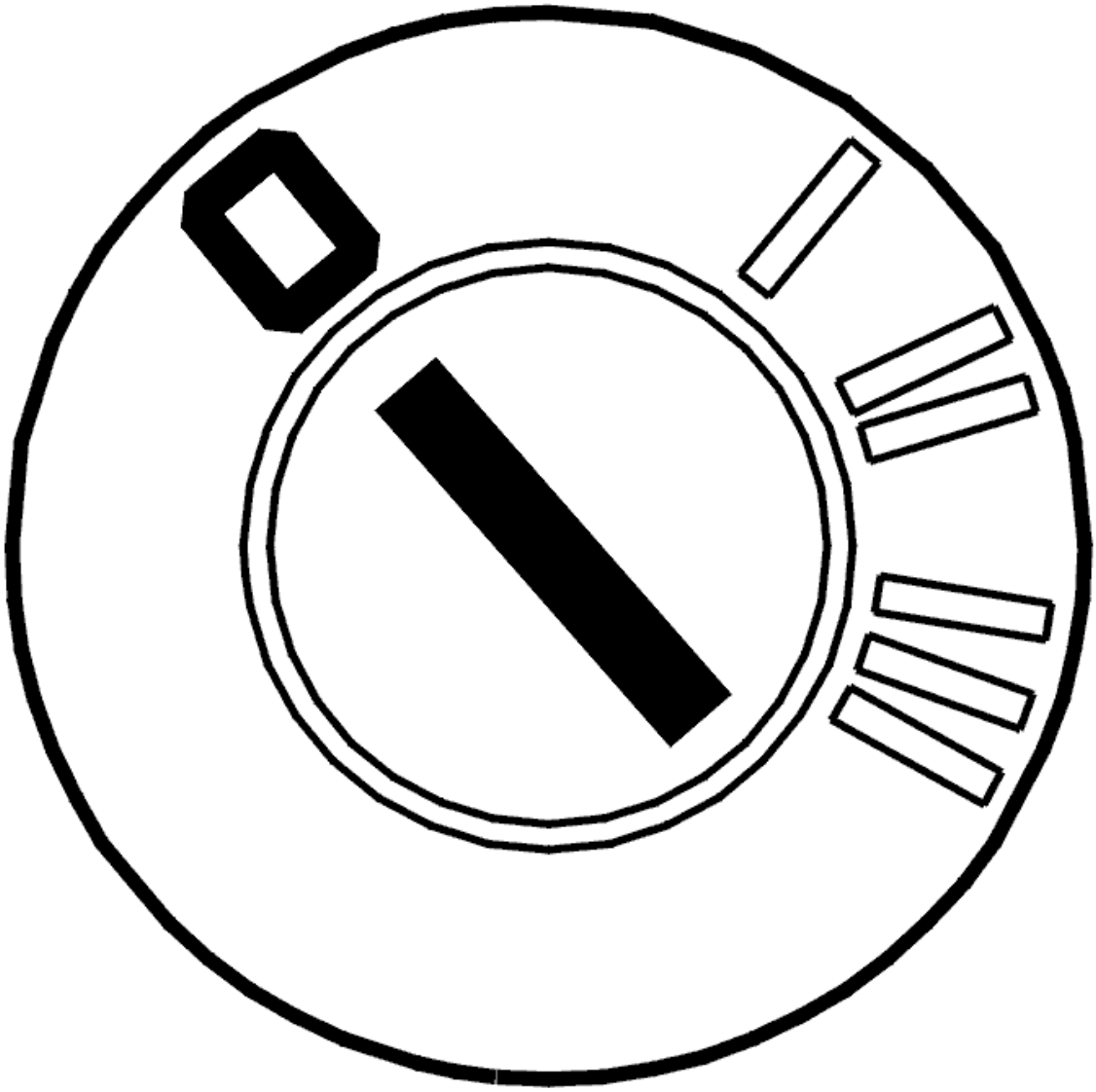


Fig. 423: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

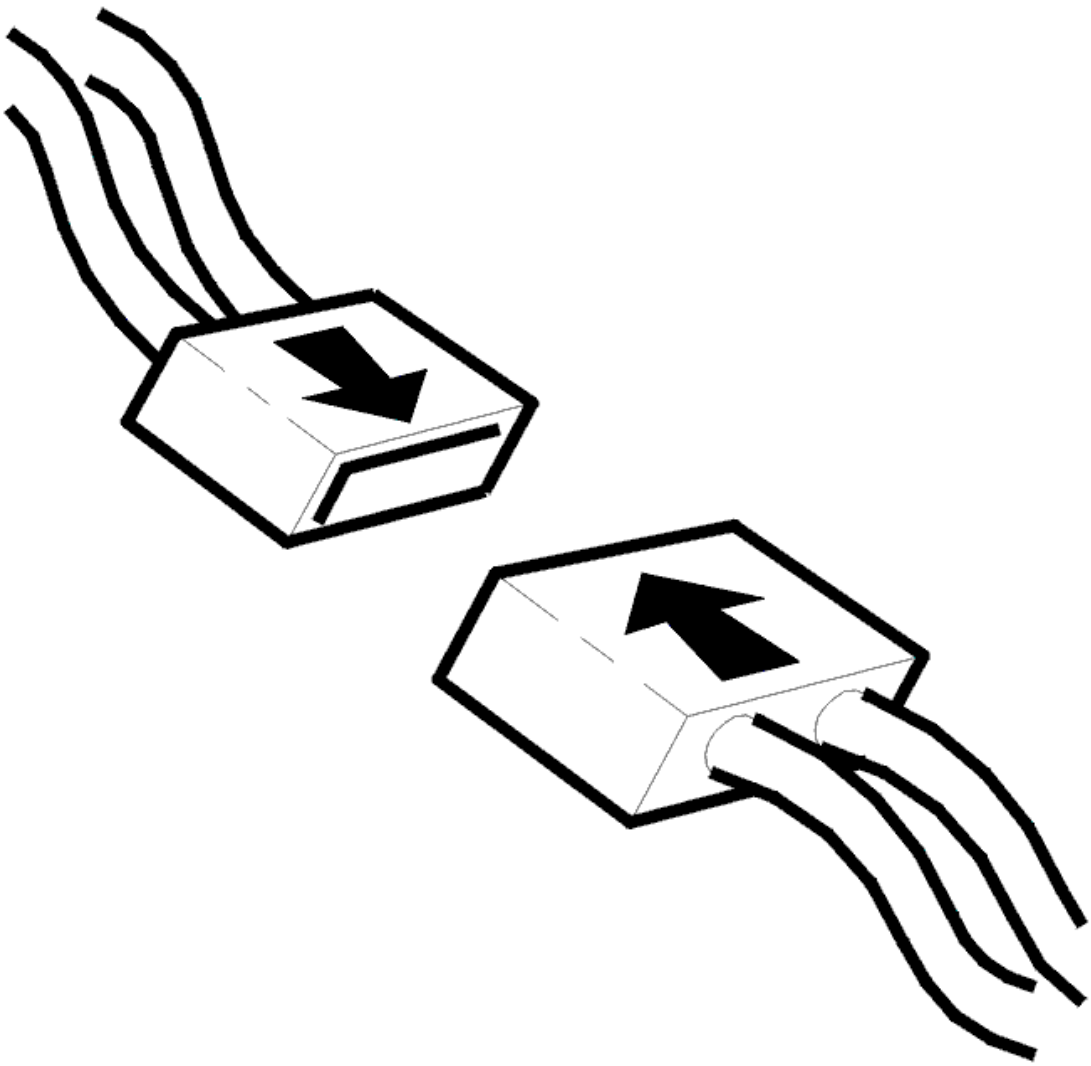


Fig. 424: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

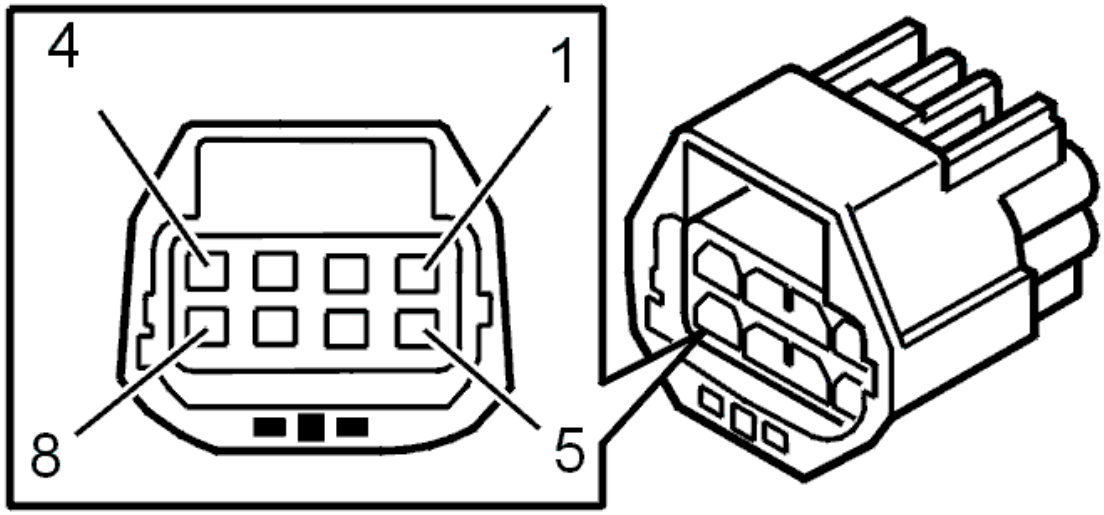


Fig. 425: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

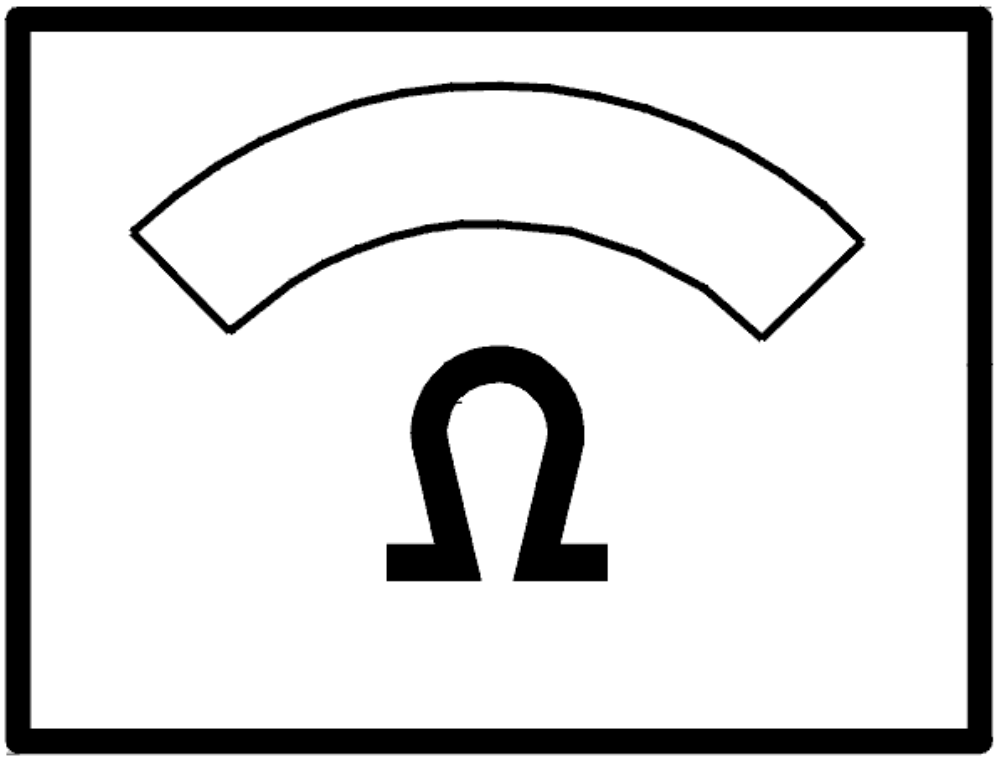


Fig. 426: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

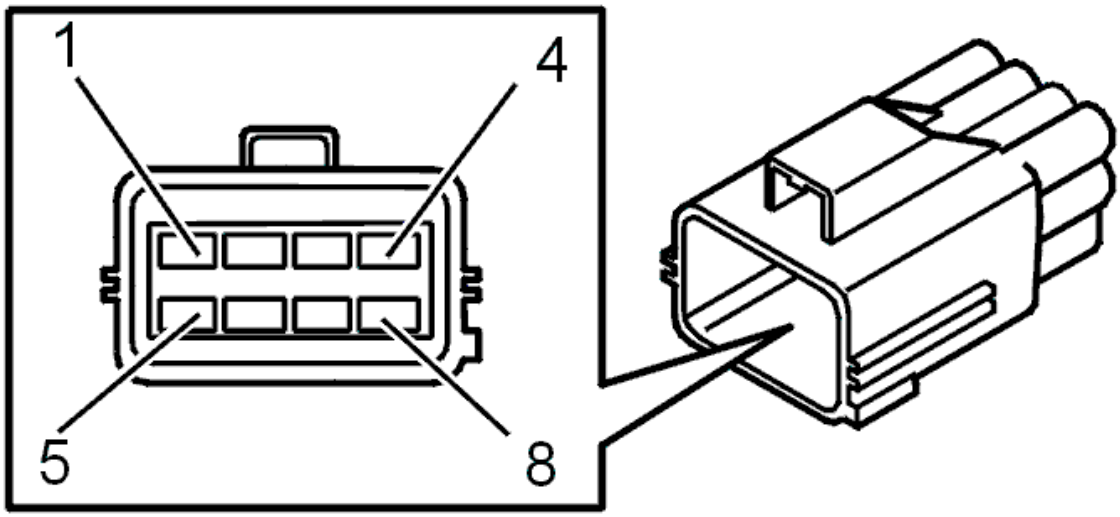


Fig. 427: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

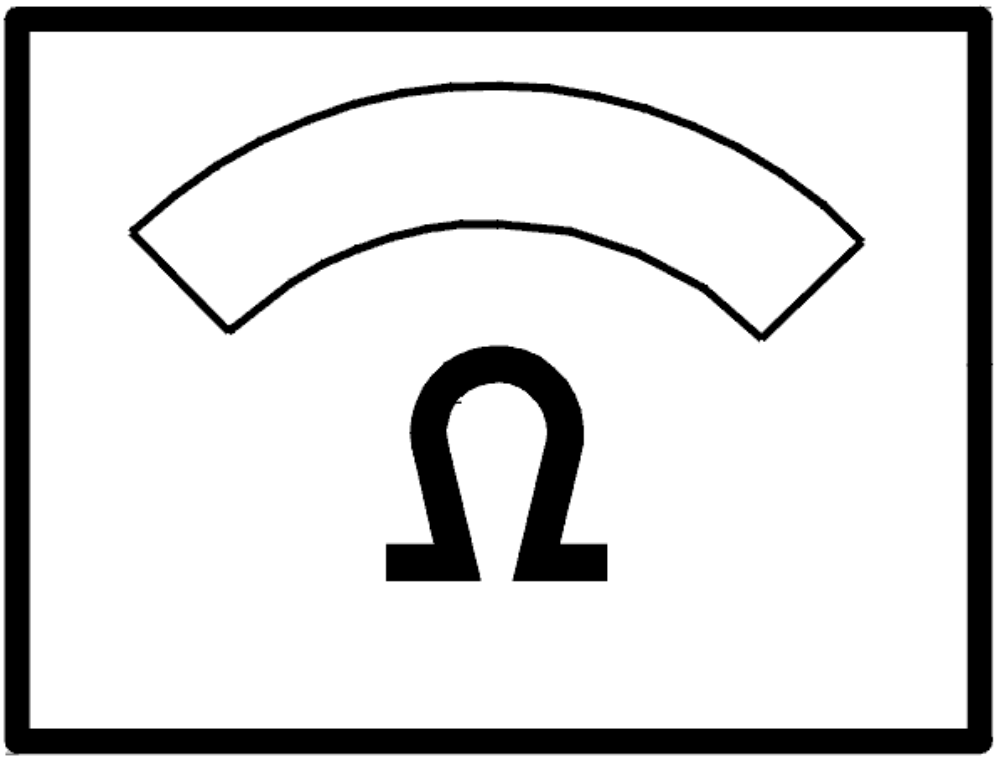


Fig. 428: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

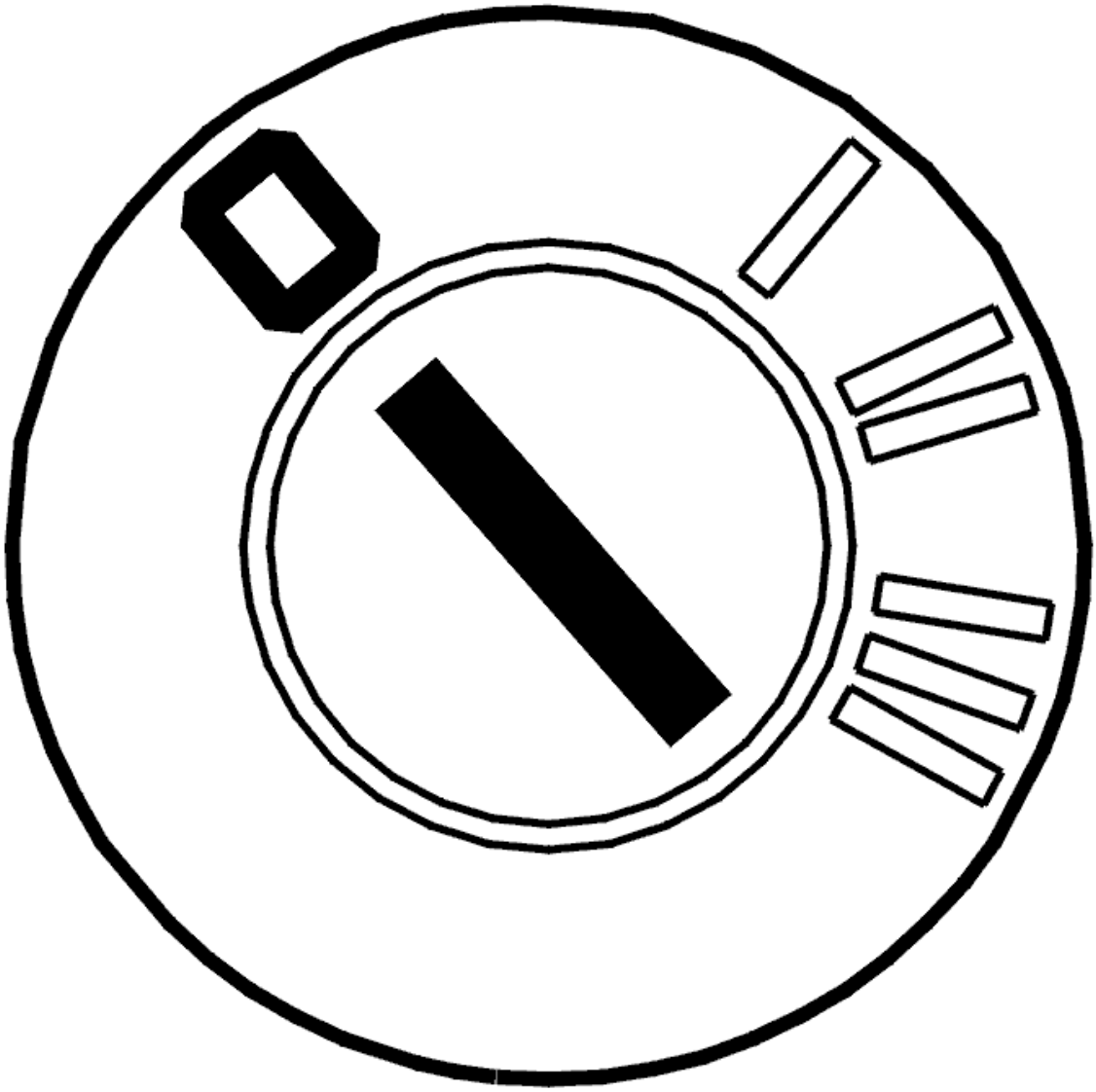


Fig. 429: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

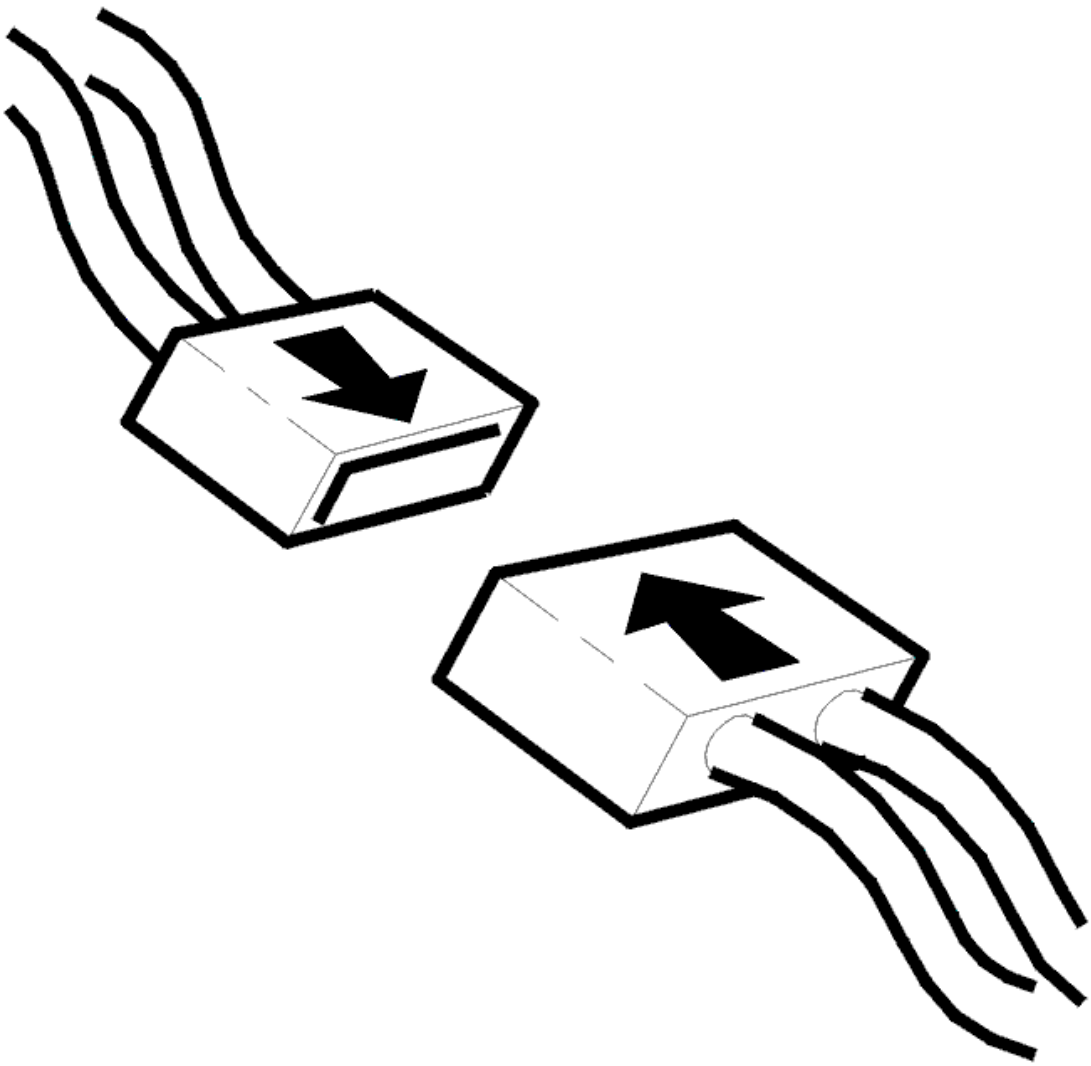


Fig. 430: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

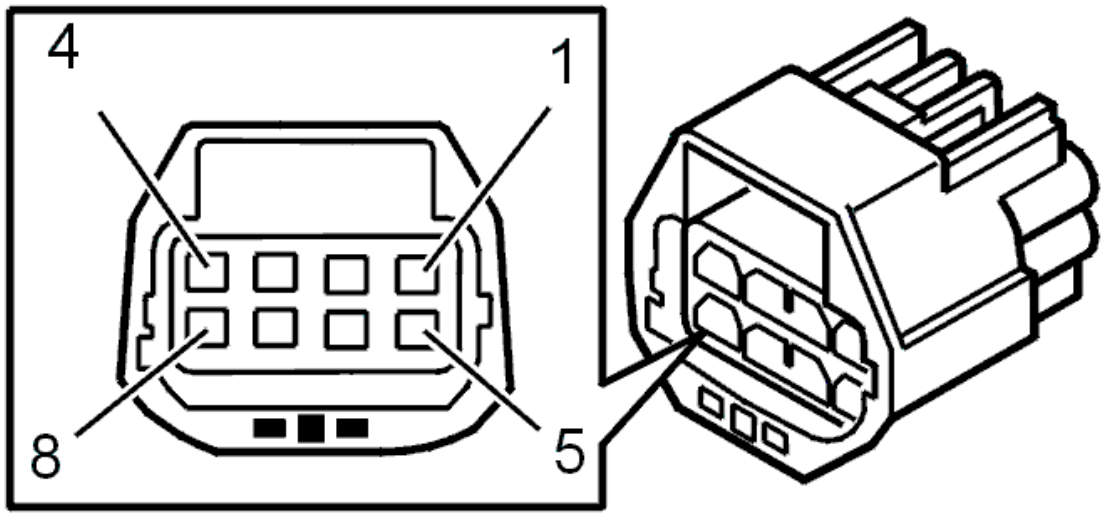


Fig. 431: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

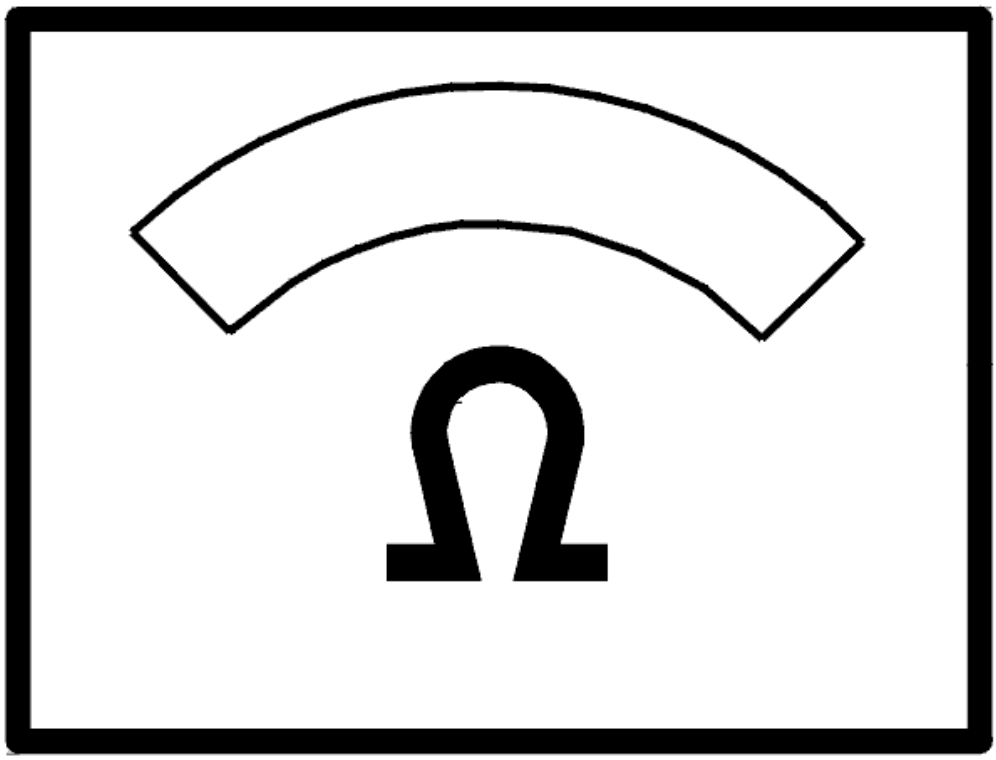


Fig. 432: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

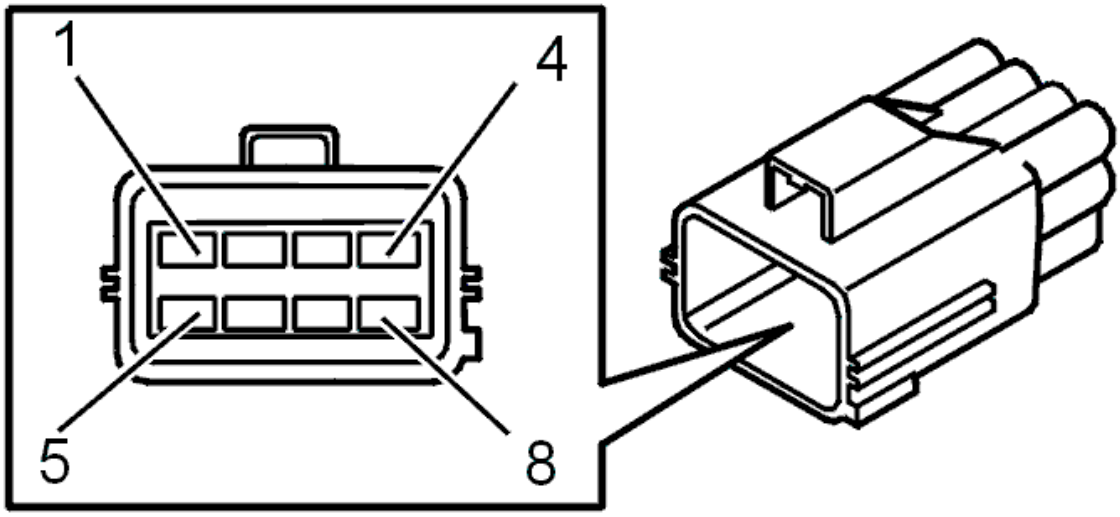


Fig. 433: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

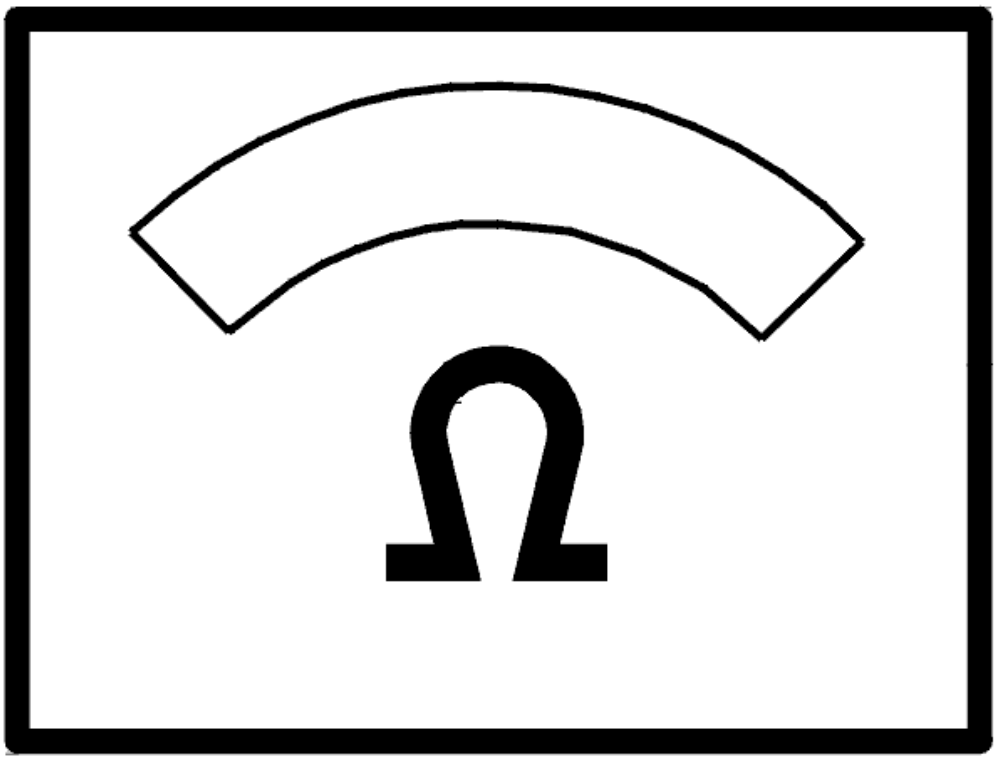


Fig. 434: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

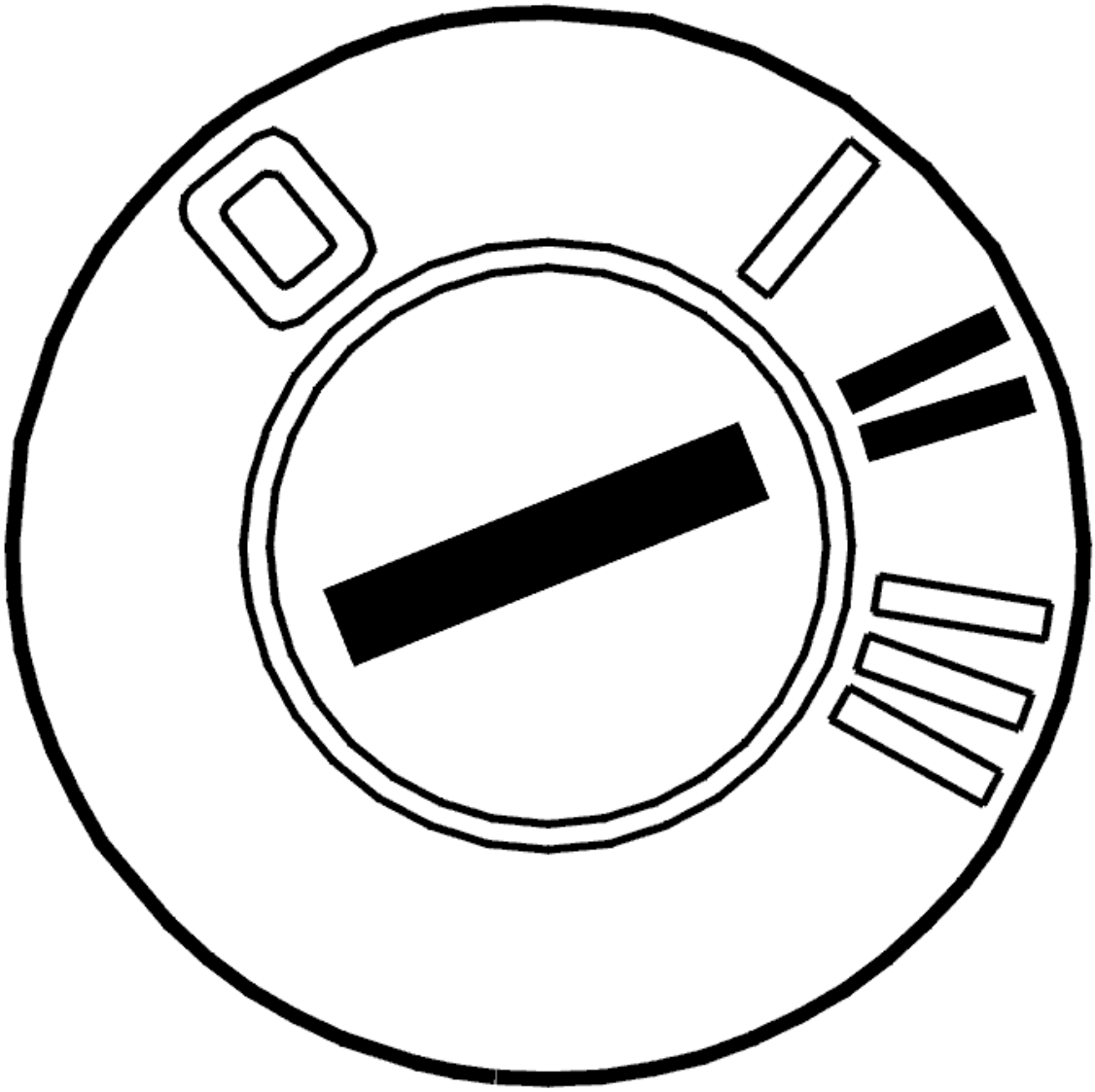


Fig. 435: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

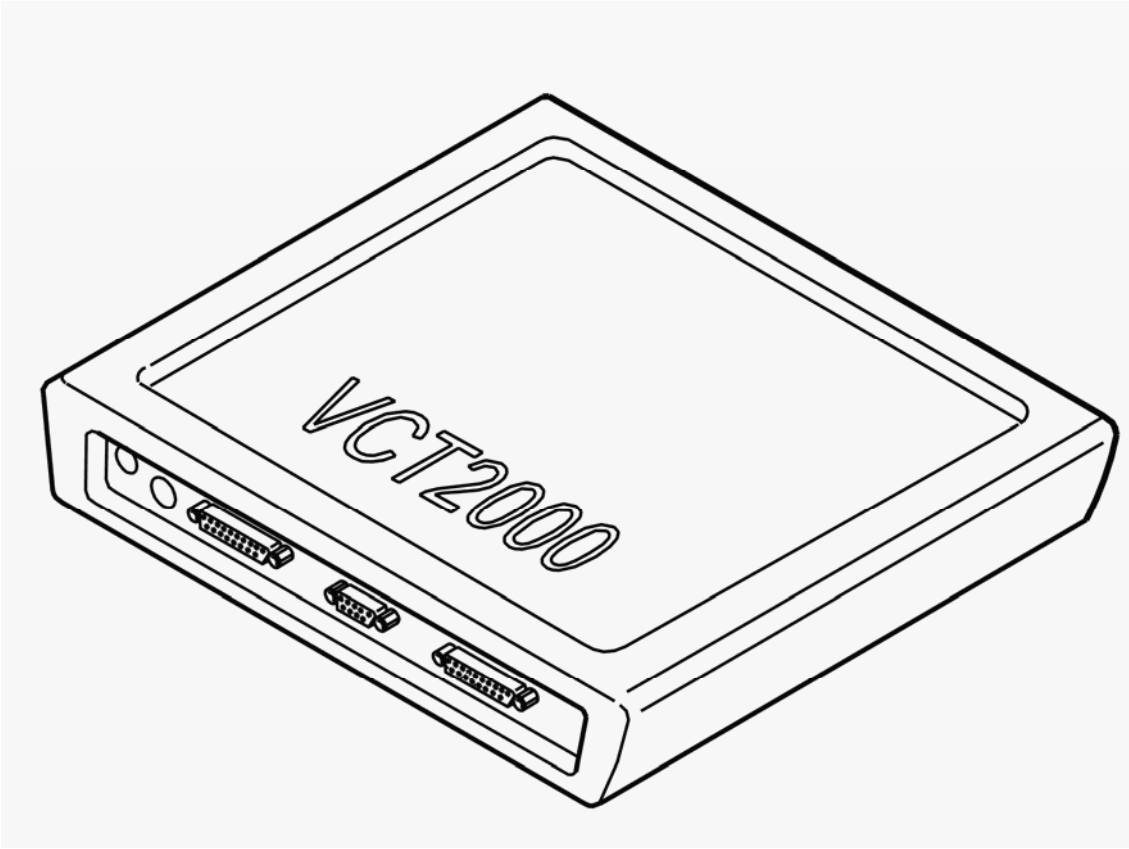


Fig. 436: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

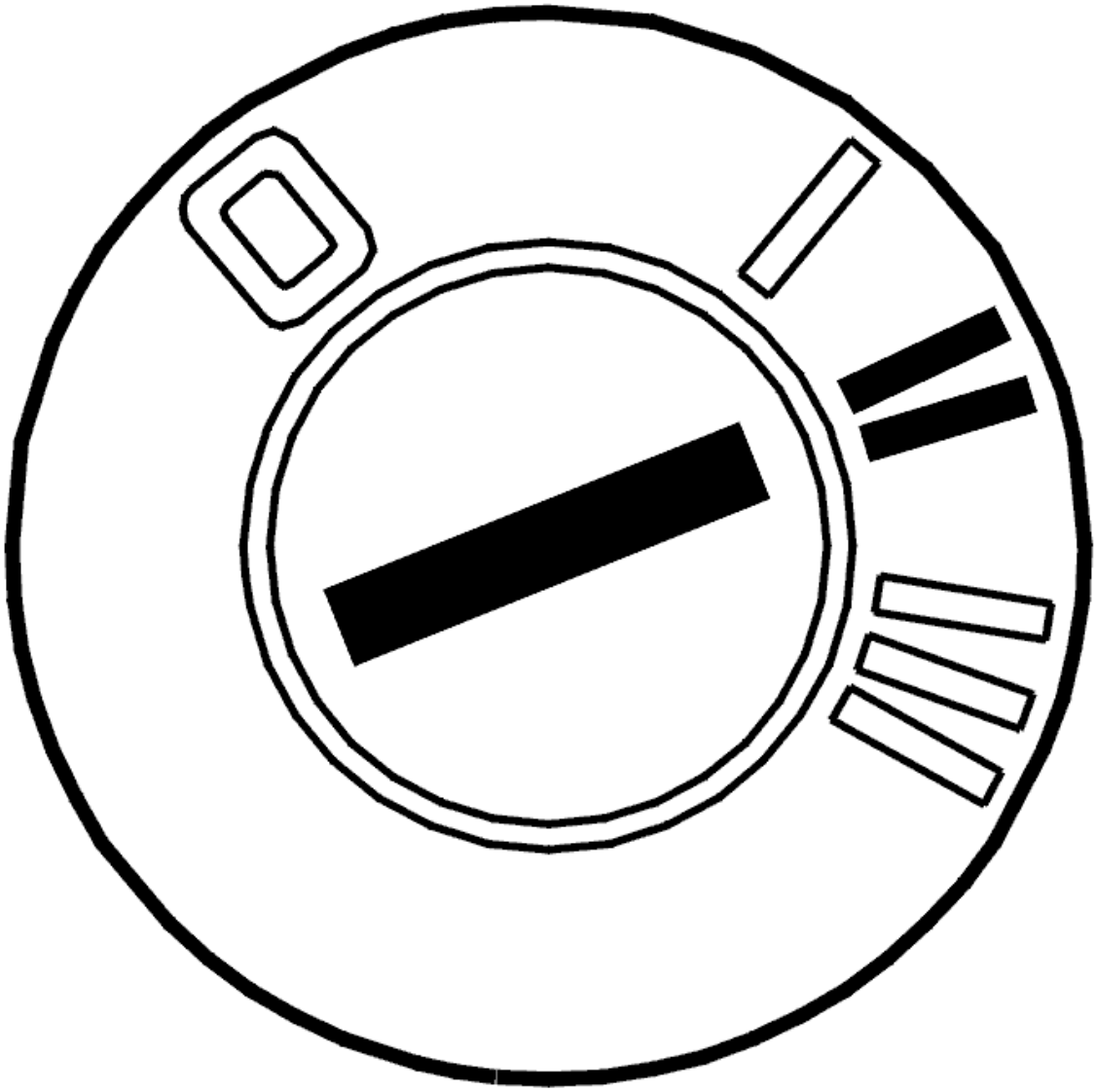


Fig. 437: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

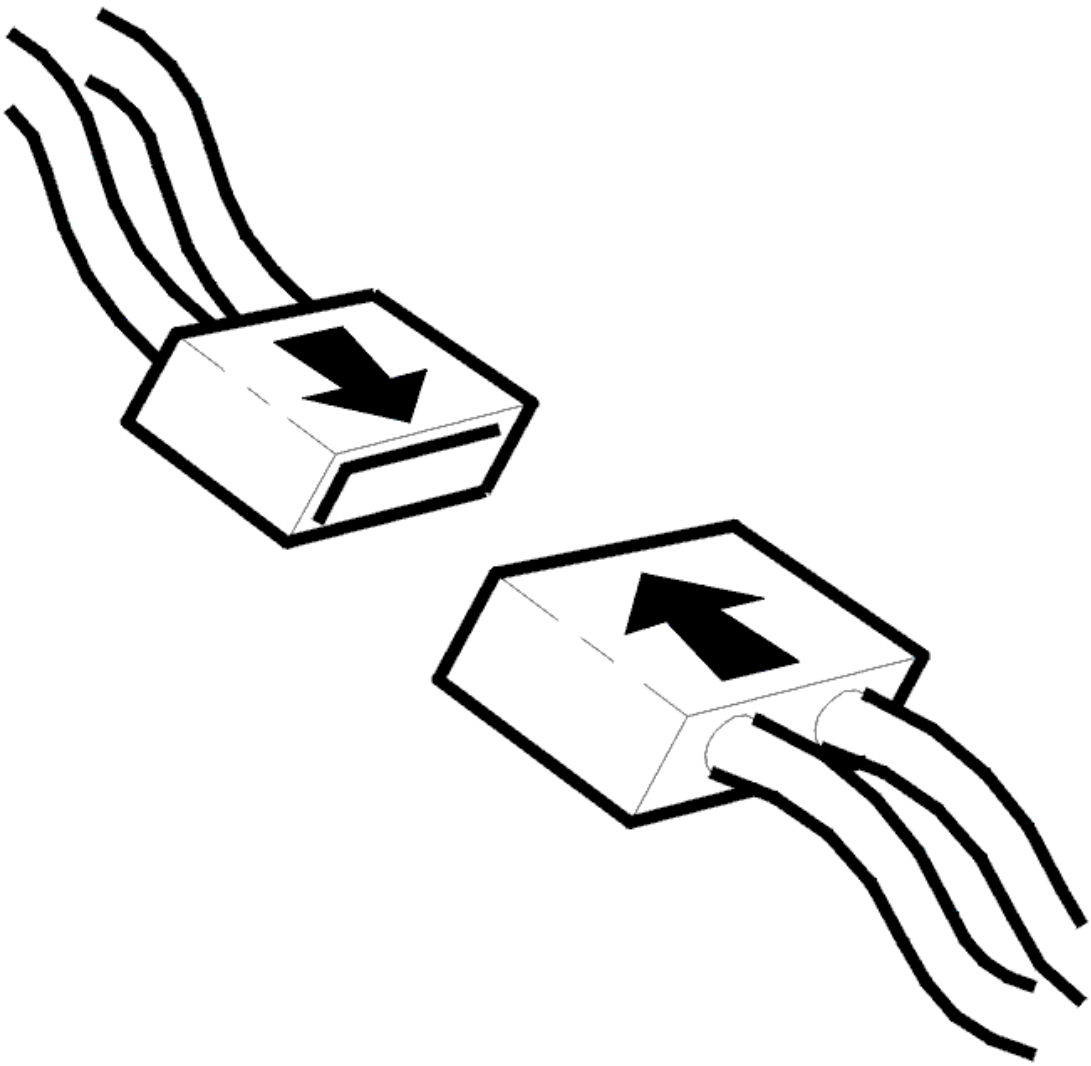


Fig. 438: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

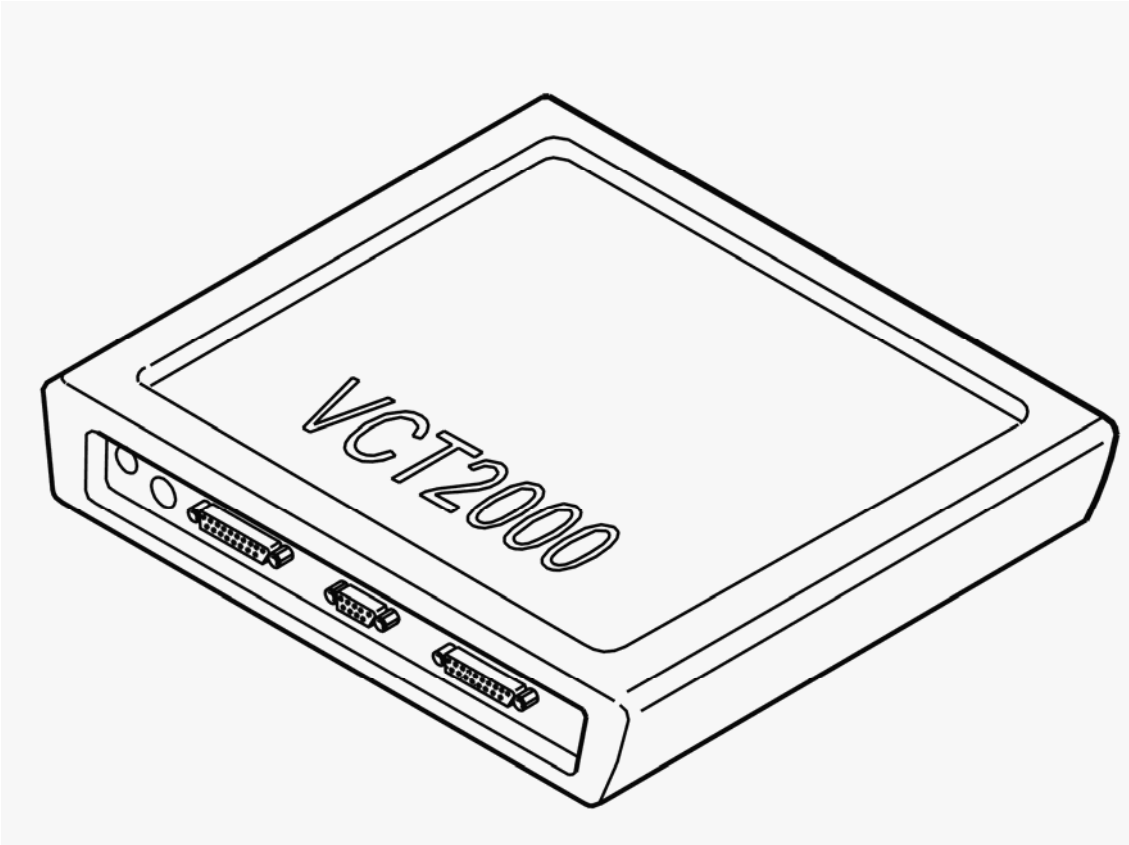


Fig. 439: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-0109: SHIFT SOLENOID S4. SIGNAL TOO LOW (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. Diagnostic trouble codes (DTCs) TCM-0003, TCM-0009, TCM-0103, TCM-0109 or TCM-010C are stored if the transmission control module (TCM) registers that there is a short-circuit to ground in circuits S1, S2, S3, S4 or S5 when the solenoid

should be activated.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Short-circuit to ground in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

SIGNAL TOO LOW

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

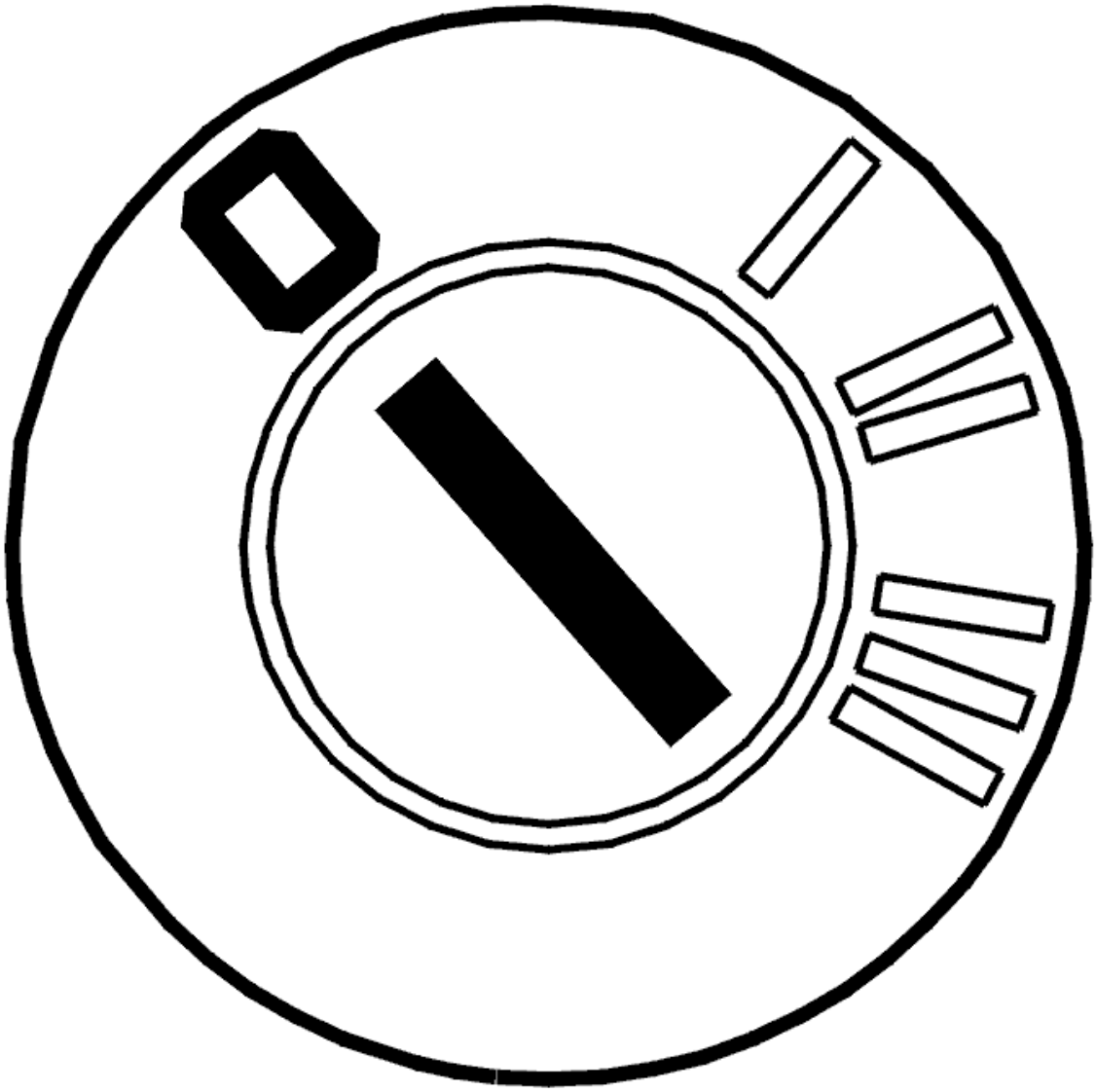


Fig. 440: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

  HINT: If the temperature is outside its permitted range, fault-trace the temperature sensor.

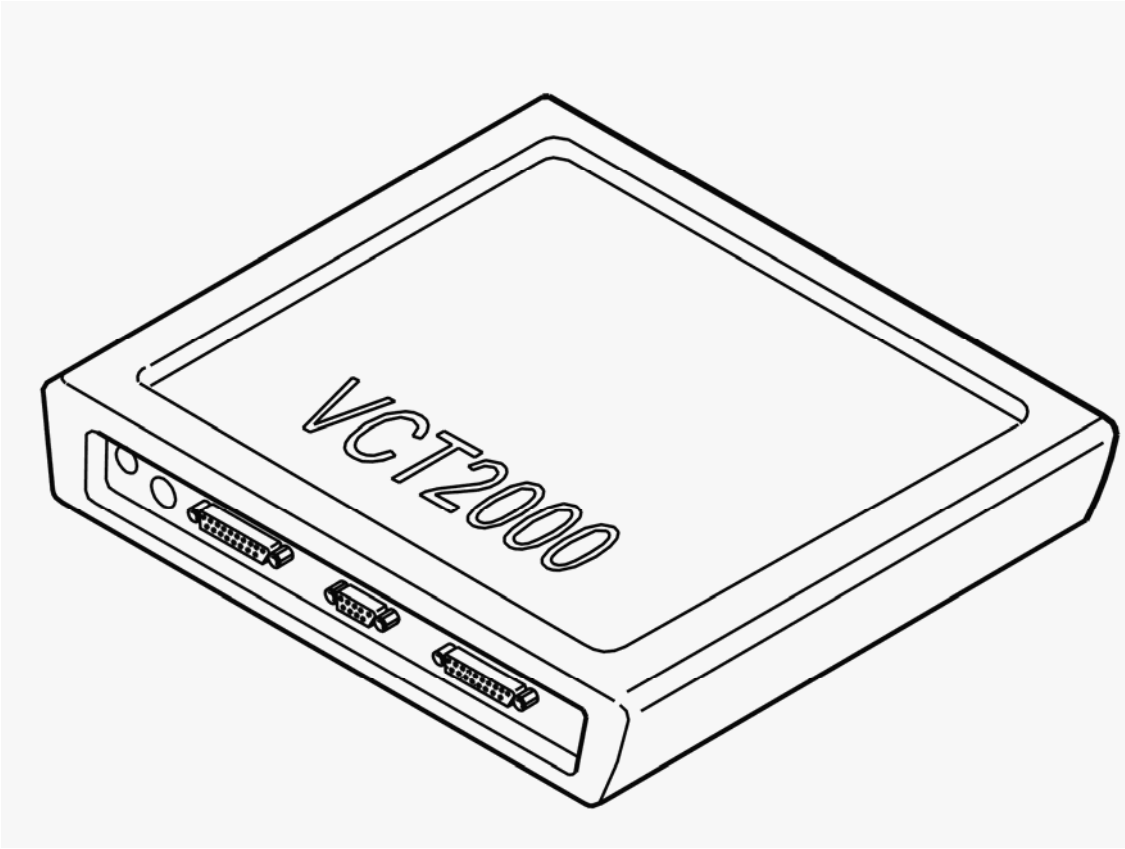


Fig. 441: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S4**

- **NO**

  Refer to **FAULTY SIGNAL**

CHECKING SHIFT SOLENOID S4

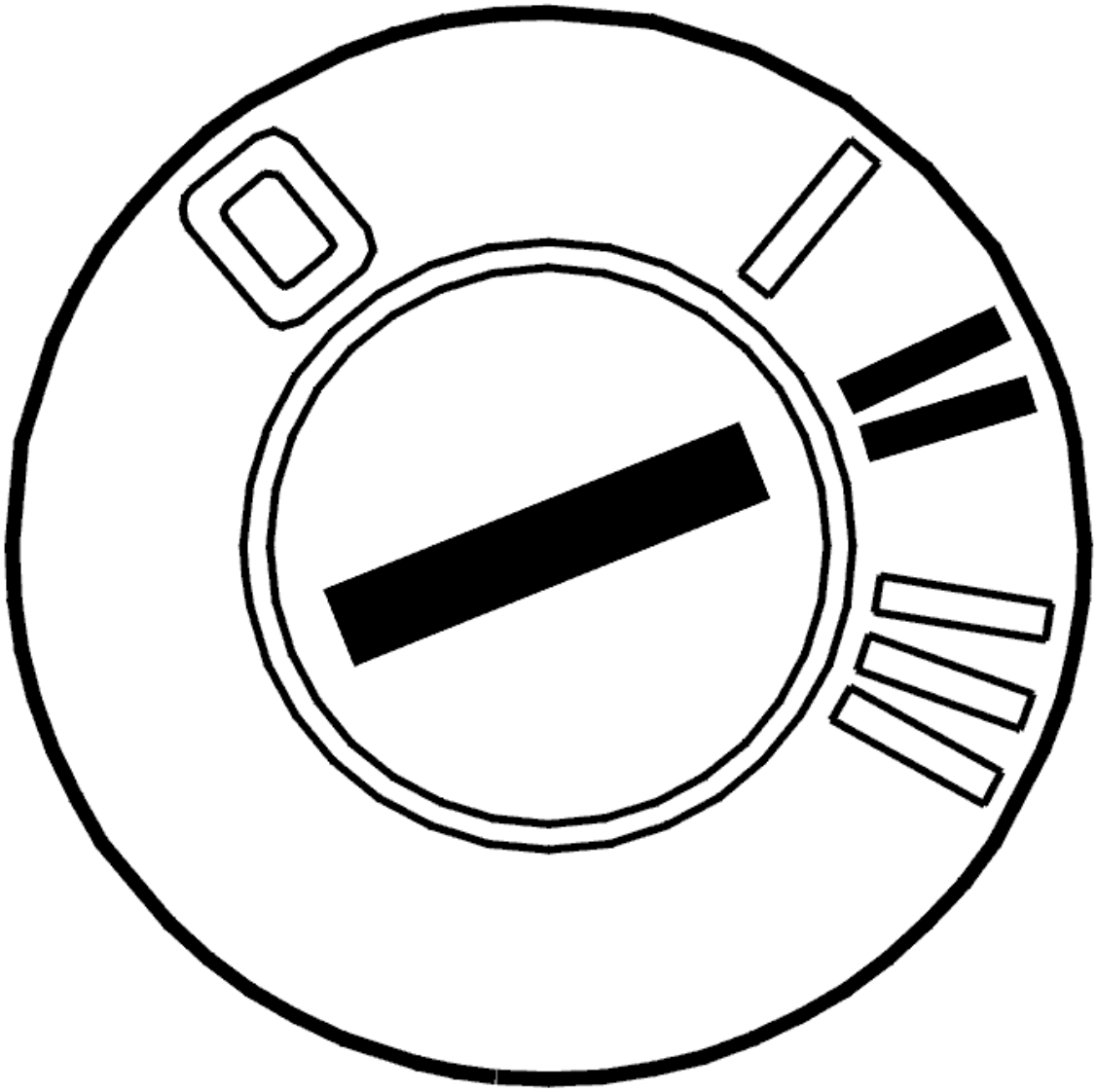


Fig. 442: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S4.

  The value must change between OFF and ON.

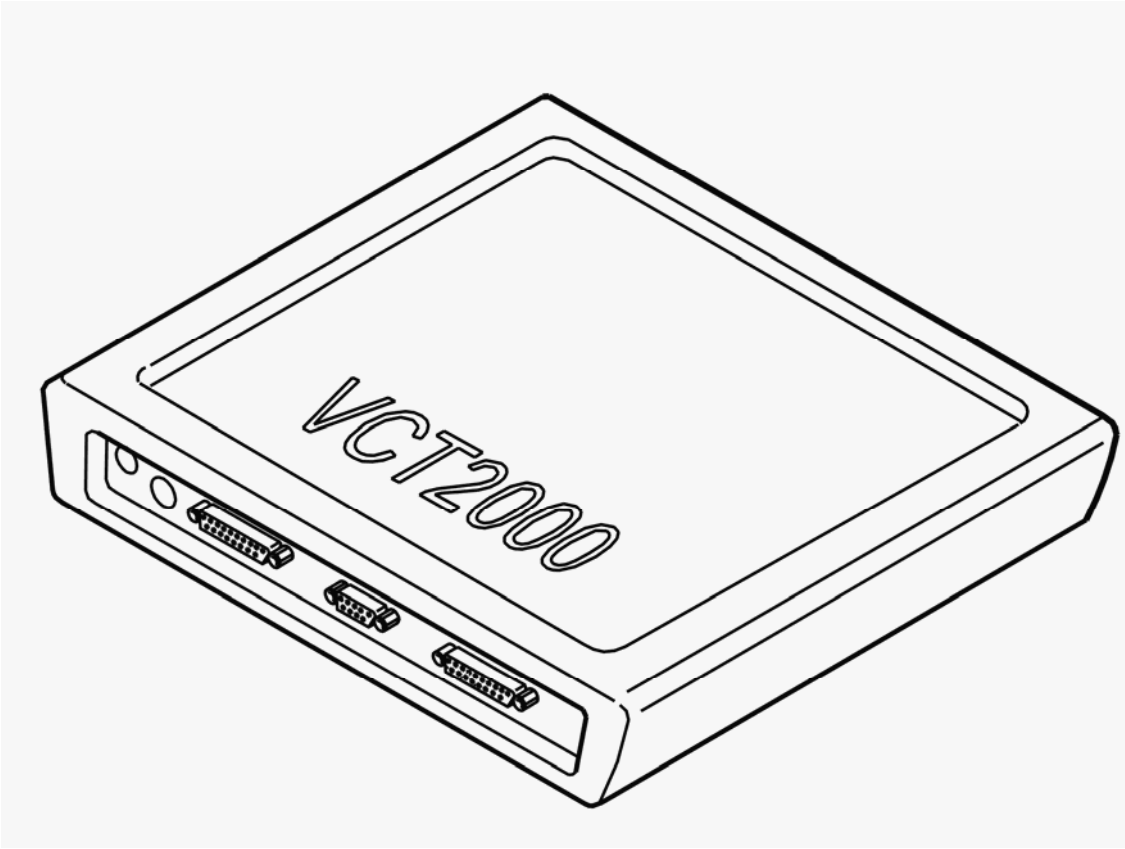


Fig. 443: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING RESISTANCE**

CHECKING RESISTANCE

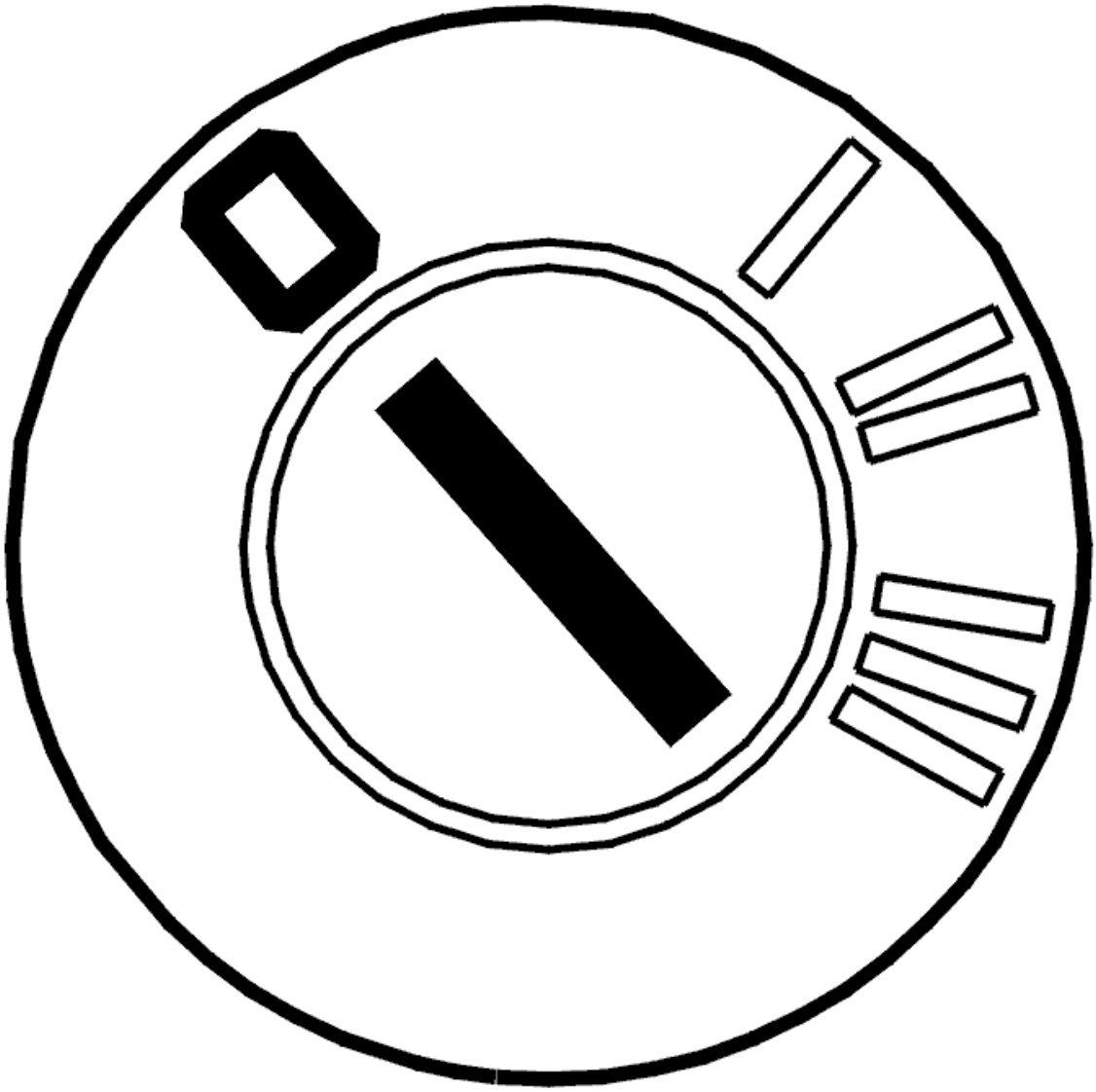


Fig. 444: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect transmission connector C.

Check solenoid S4 by measuring the resistance between transmission connector terminal #C4 and the transmission housing. The resistance must be 11-15 ohms.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

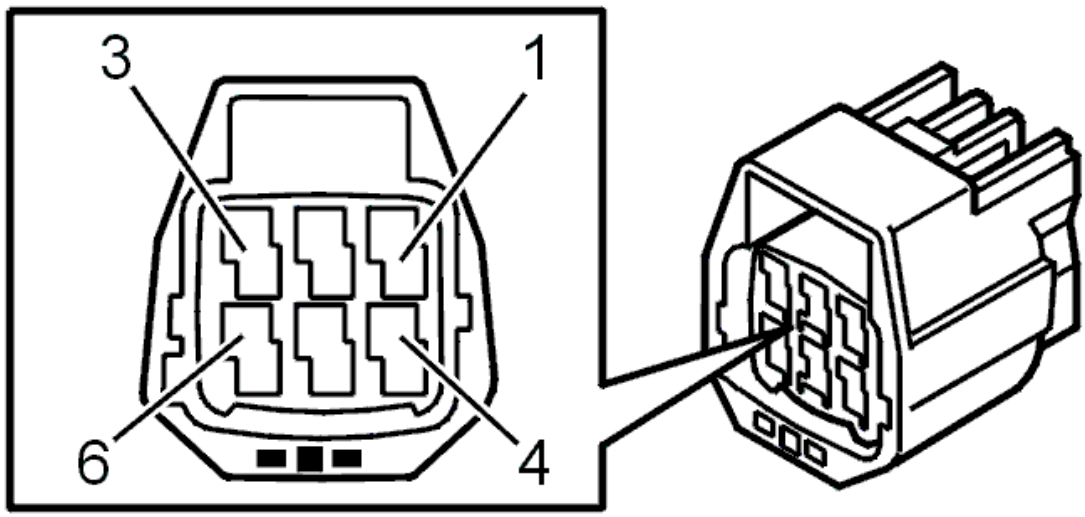


Fig. 445: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

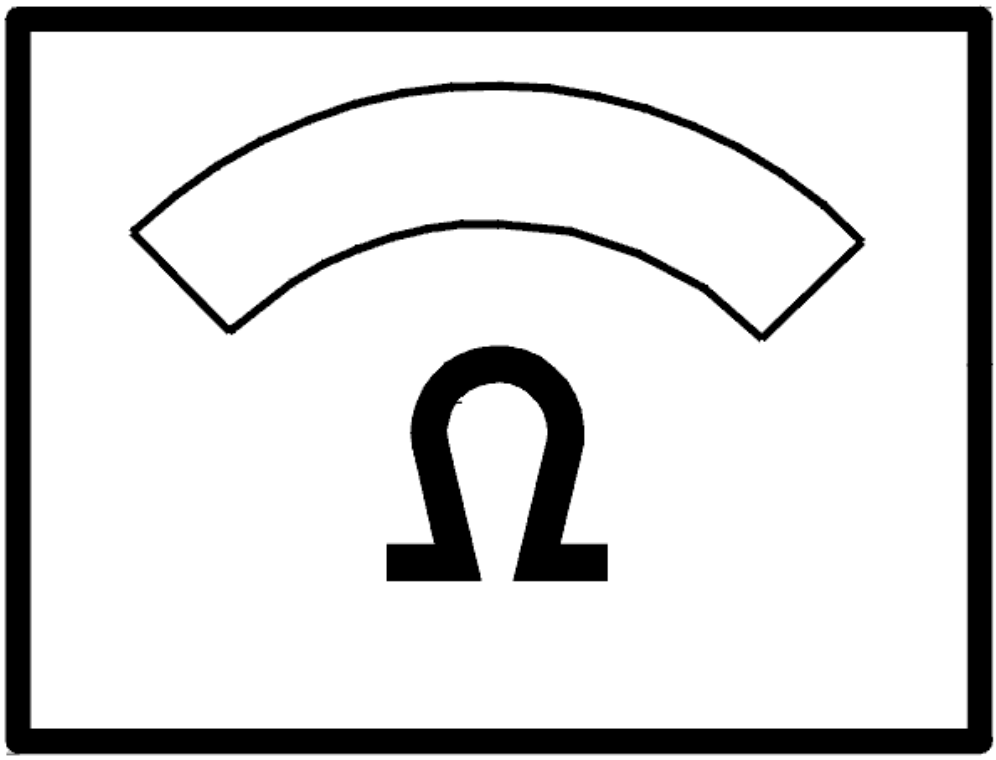


Fig. 446: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

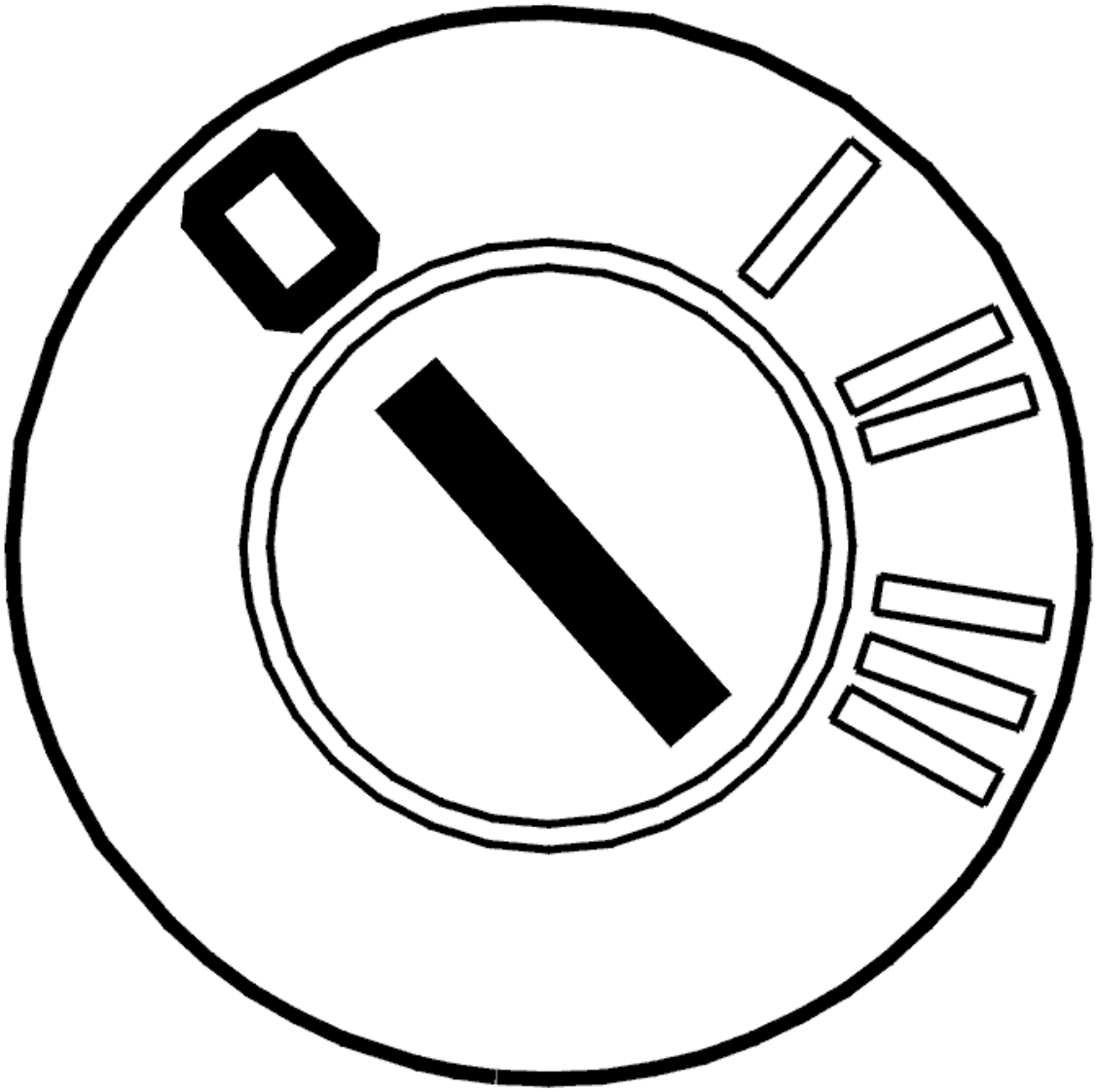


Fig. 447: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

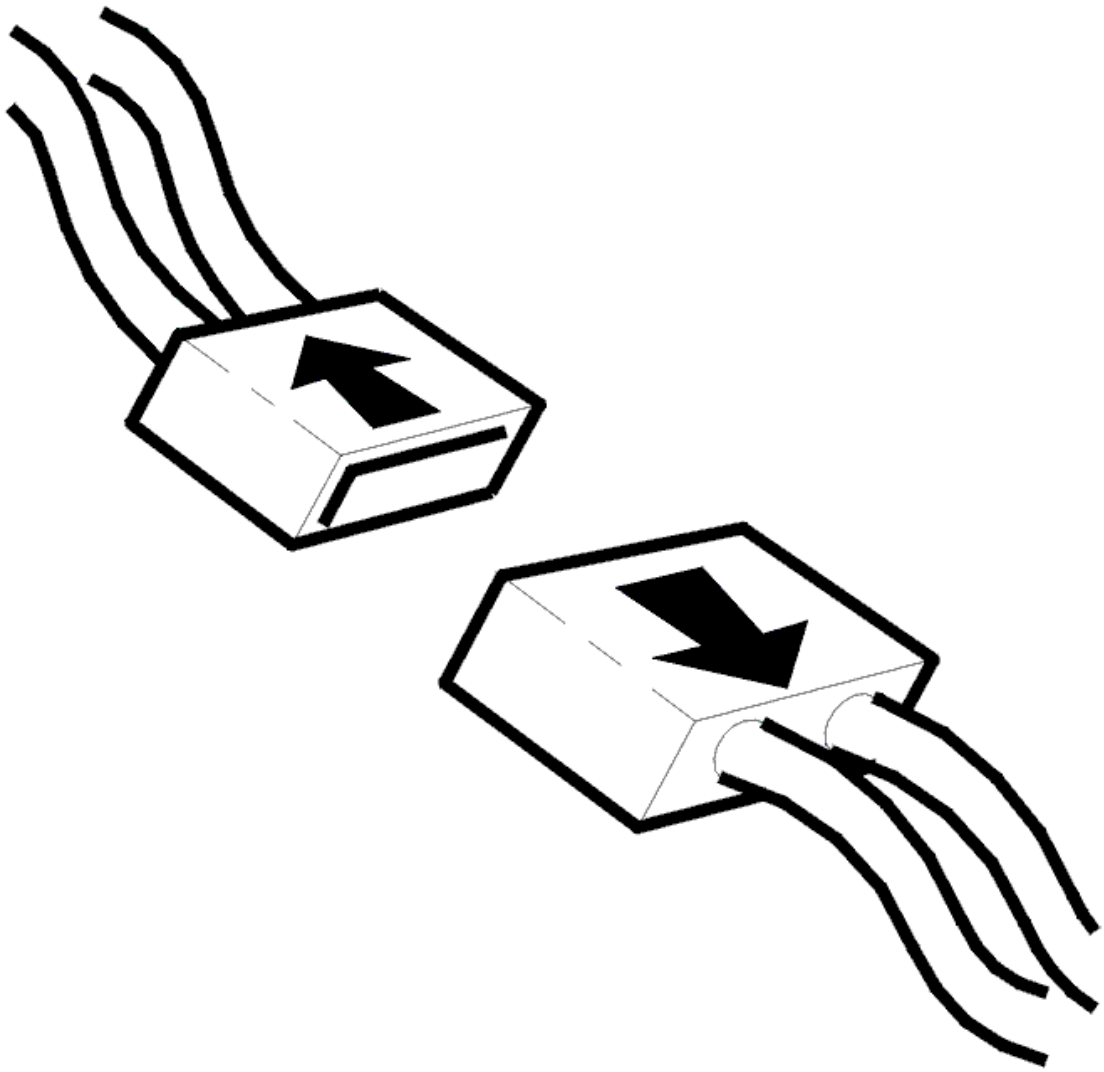


Fig. 448: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Transmission connector C disconnected.

Check the cable between transmission control module (TCM) terminal #A47 (#A47) and transmission connector terminal #C4 (control module side). Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

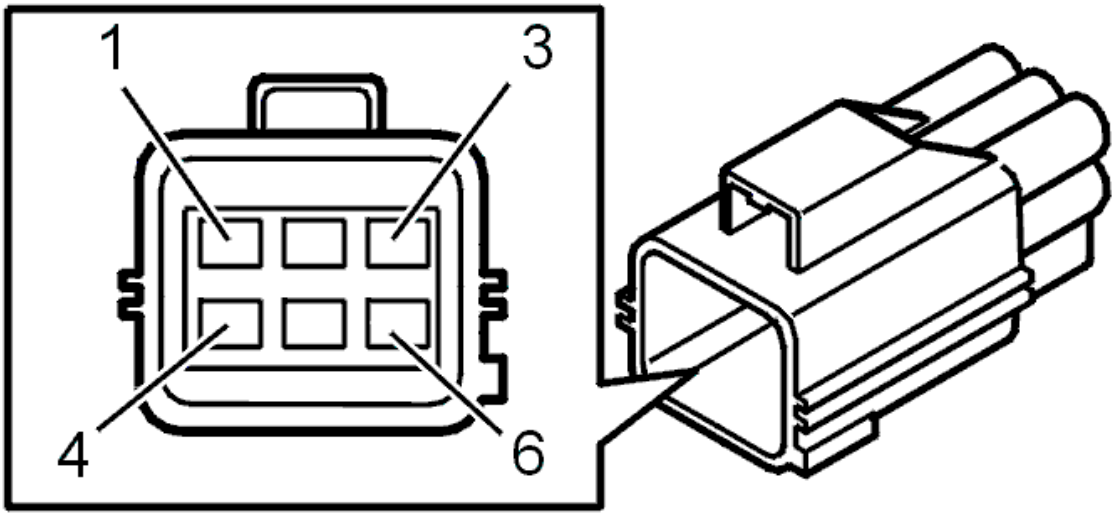


Fig. 449: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

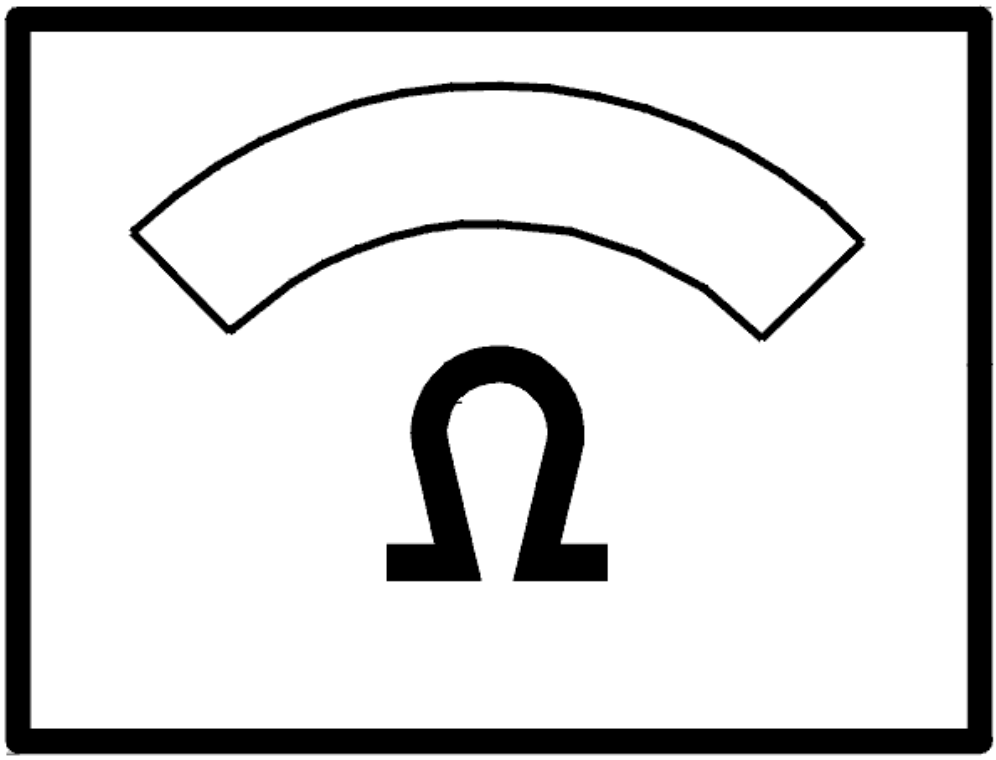


Fig. 450: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

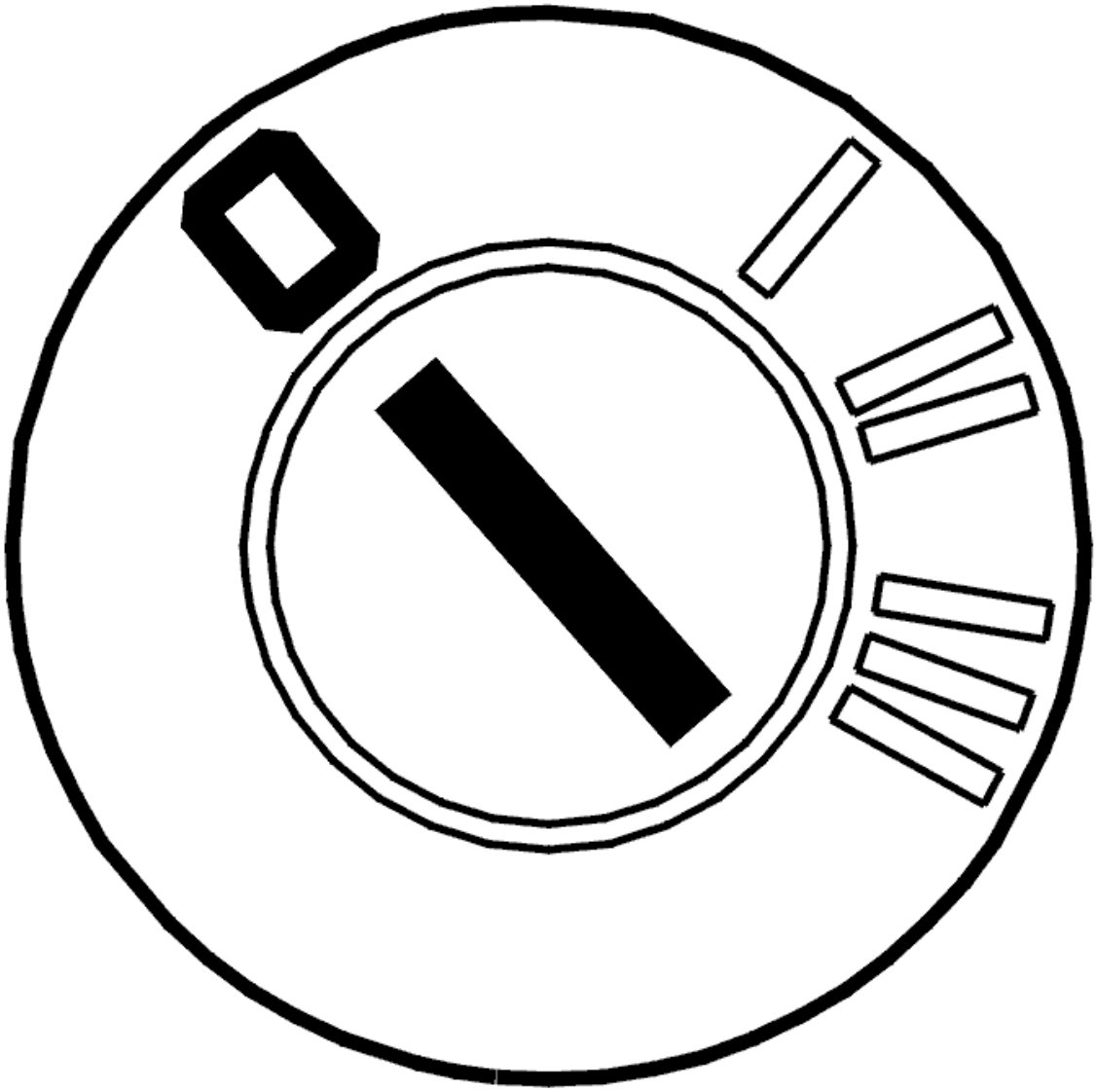


Fig. 451: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

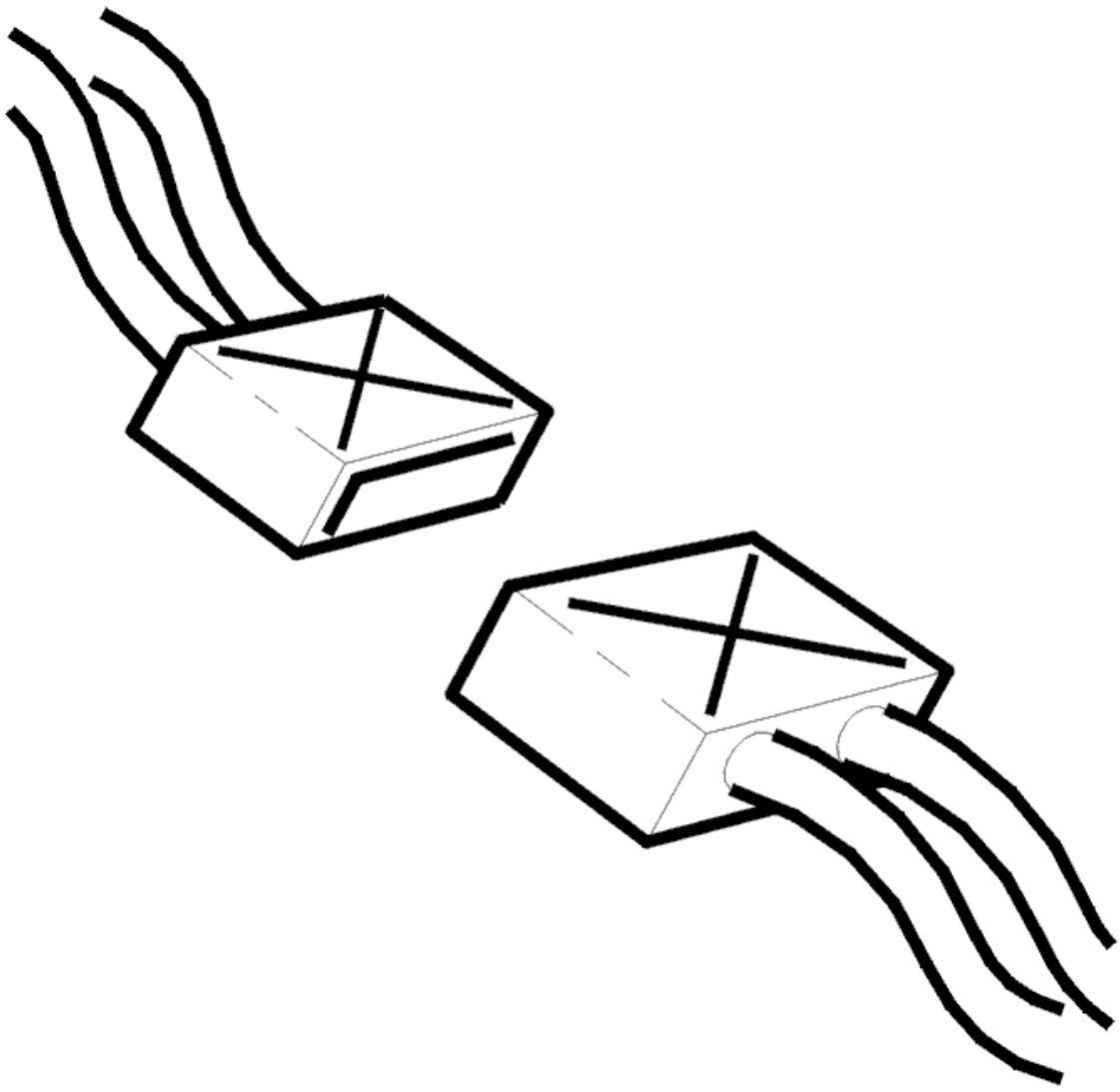


Fig. 452: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

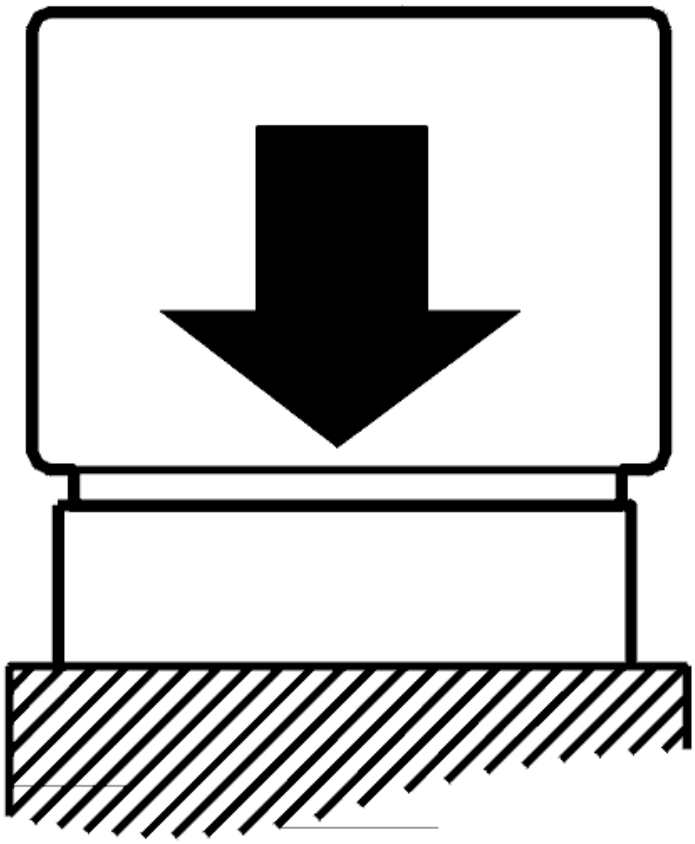


Fig. 453: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector disconnected
- Gear selector in position P.

Check the transmission control module (TCM) by measuring the resistance between terminals #A47 (#A47) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

NOTE: When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

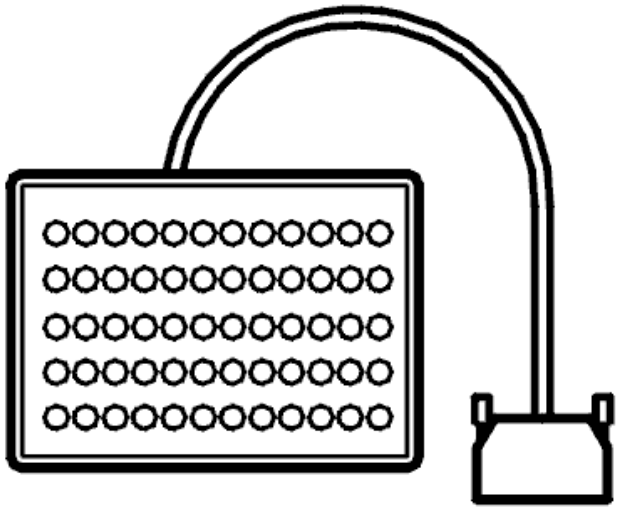


Fig. 454: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

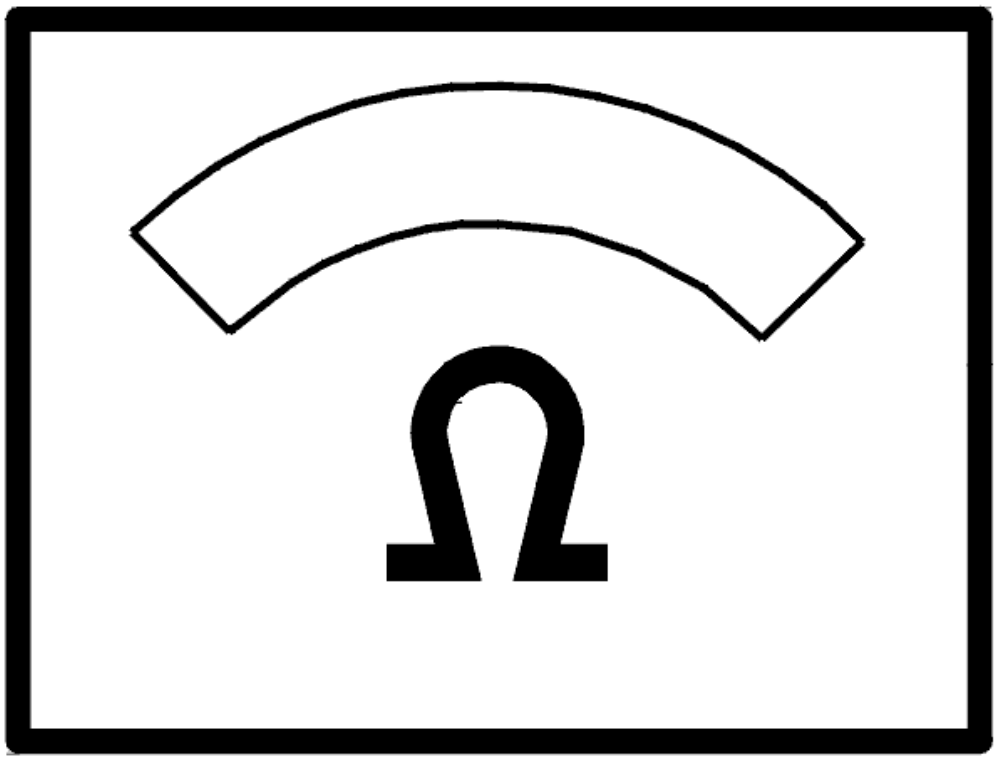


Fig. 455: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

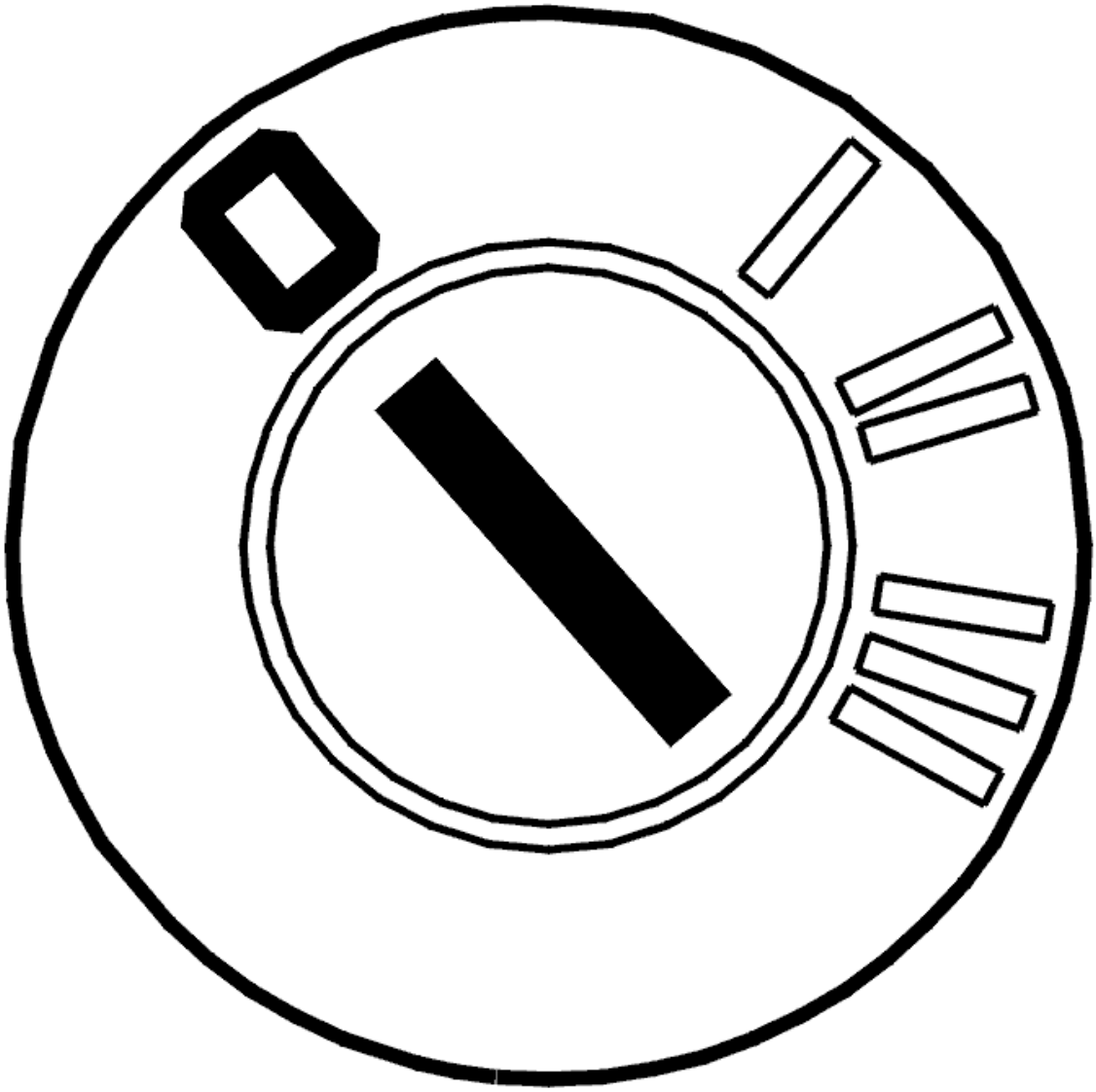


Fig. 456: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission connector terminal #C4 (transmission side) and the connector for solenoid S4. Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

  Check solenoid S4 by measuring the resistance between the terminal pin on solenoid S4 and the transmission housing. The resistance must be 11-15 ohms. Replace solenoid S4 if the resistance is incorrect.

  Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the control system and to check or replace solenoid S4, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

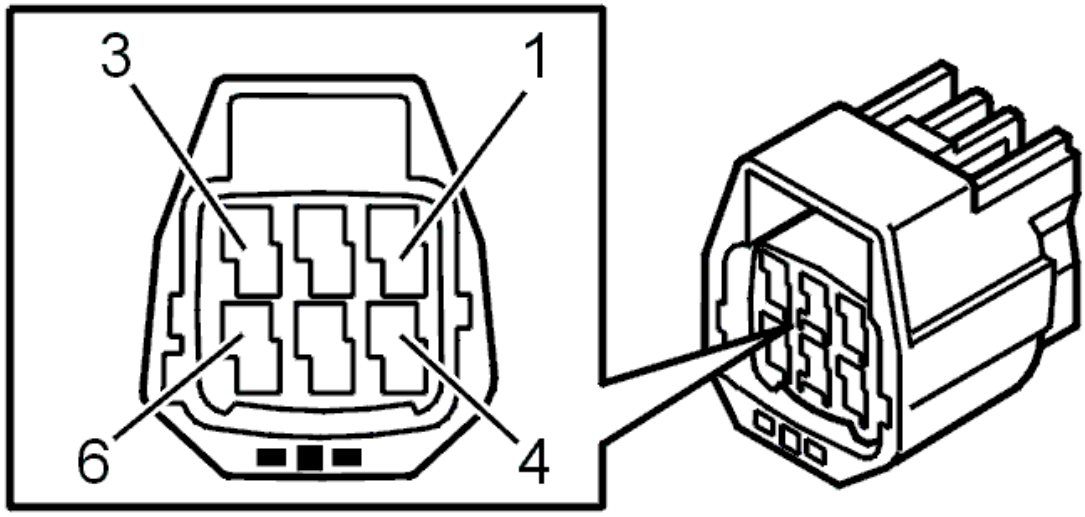


Fig. 457: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

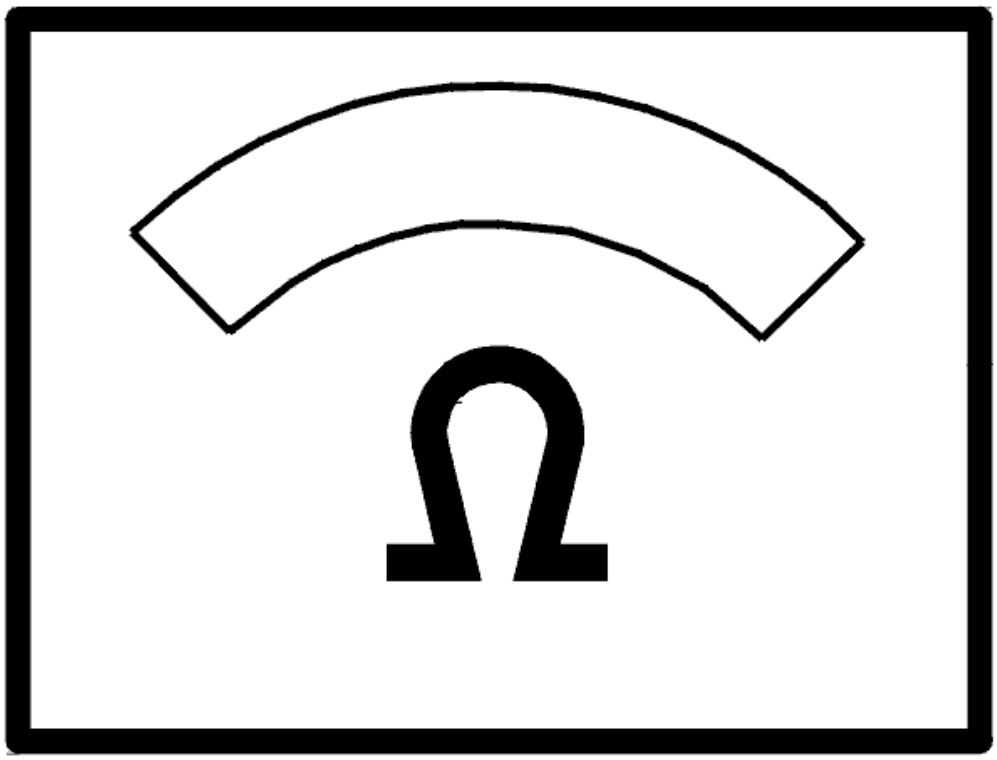


Fig. 458: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the cable between control module terminal #A47 (#A47) and transmission connector terminal #C4 (control module side). Check for intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** . Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

- Check the circuit for solenoid S4. Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #A47 (#A47) and #A53 (#A53) on the breakout box. The resistance must be

11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

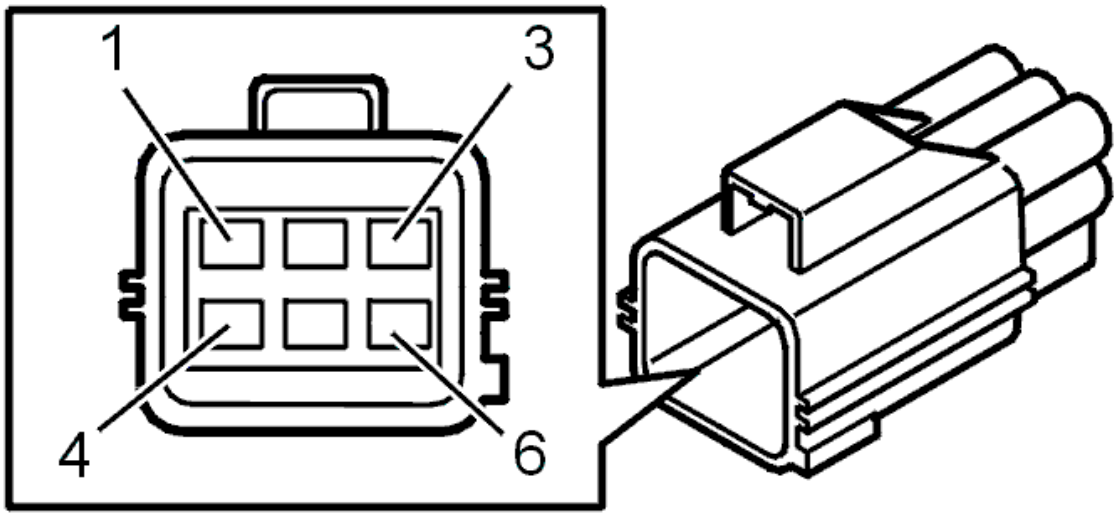


Fig. 459: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

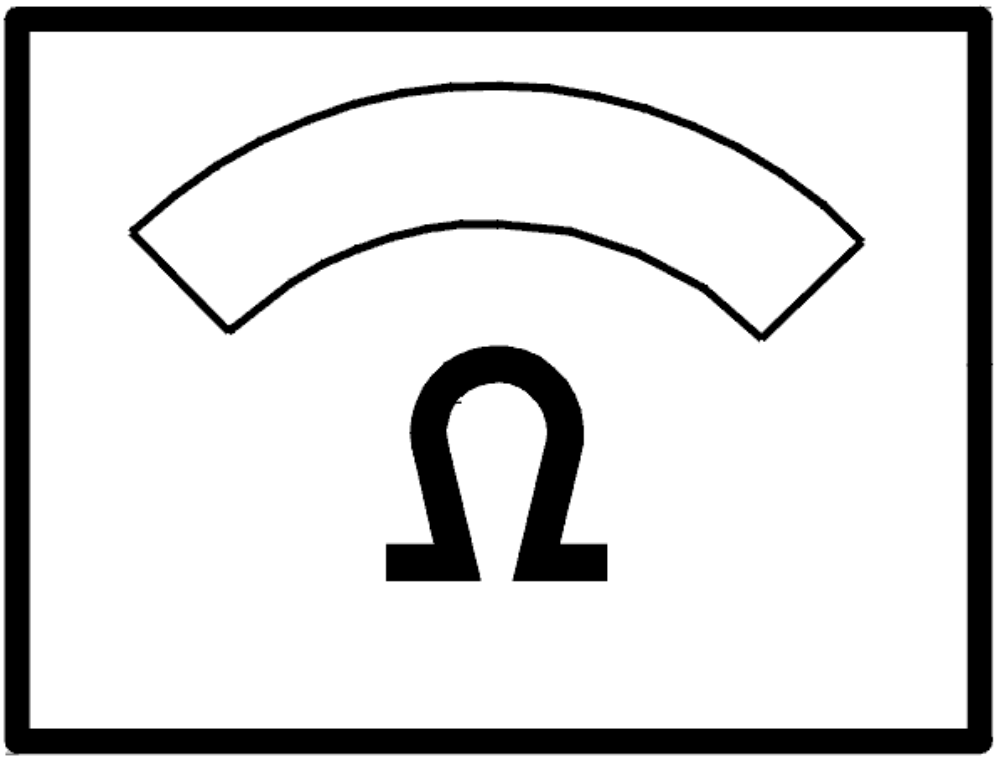


Fig. 460: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

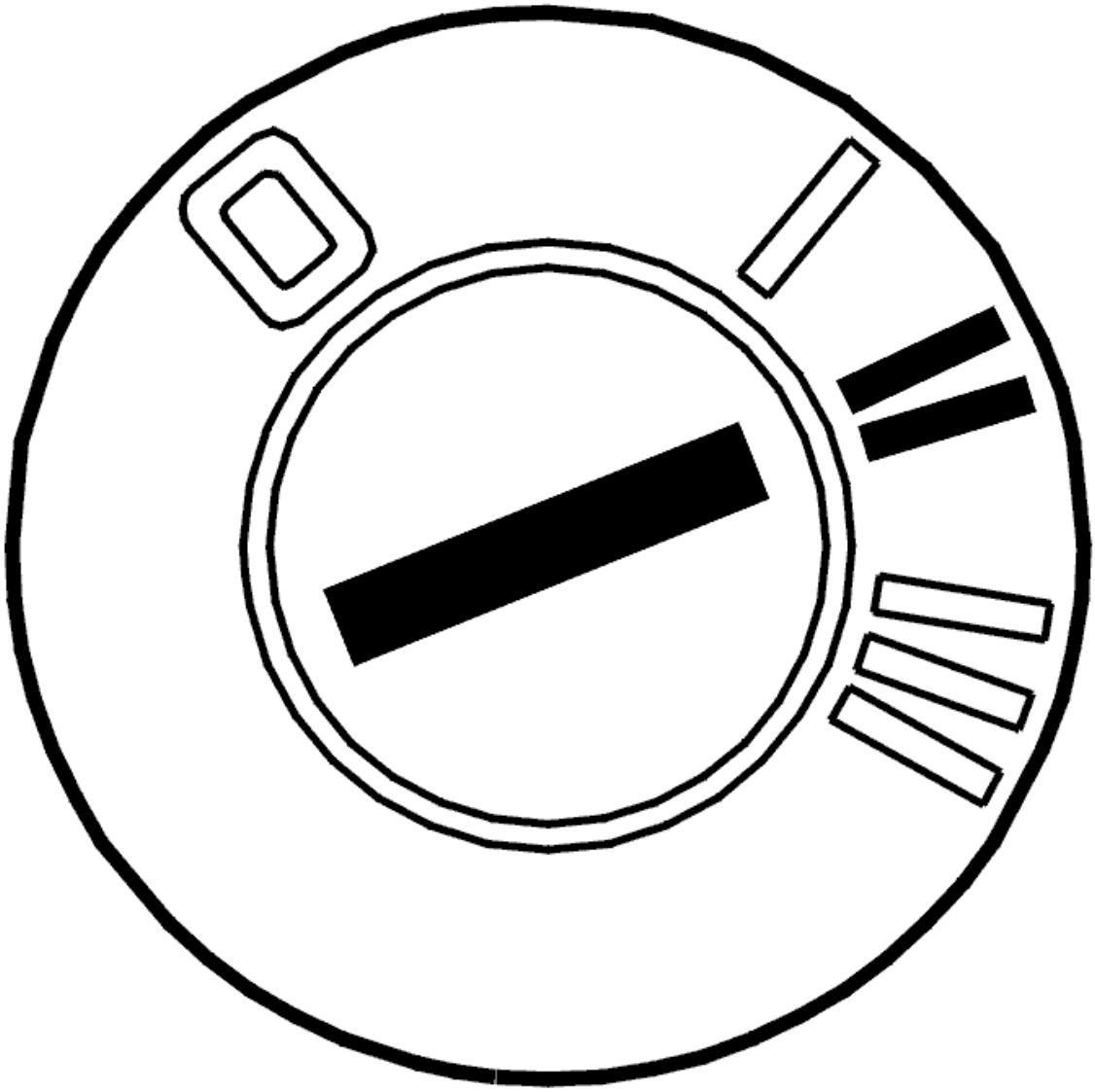


Fig. 461: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Use the VCT2000 (or appropriate scan tool) to reset the adaptation and counter.

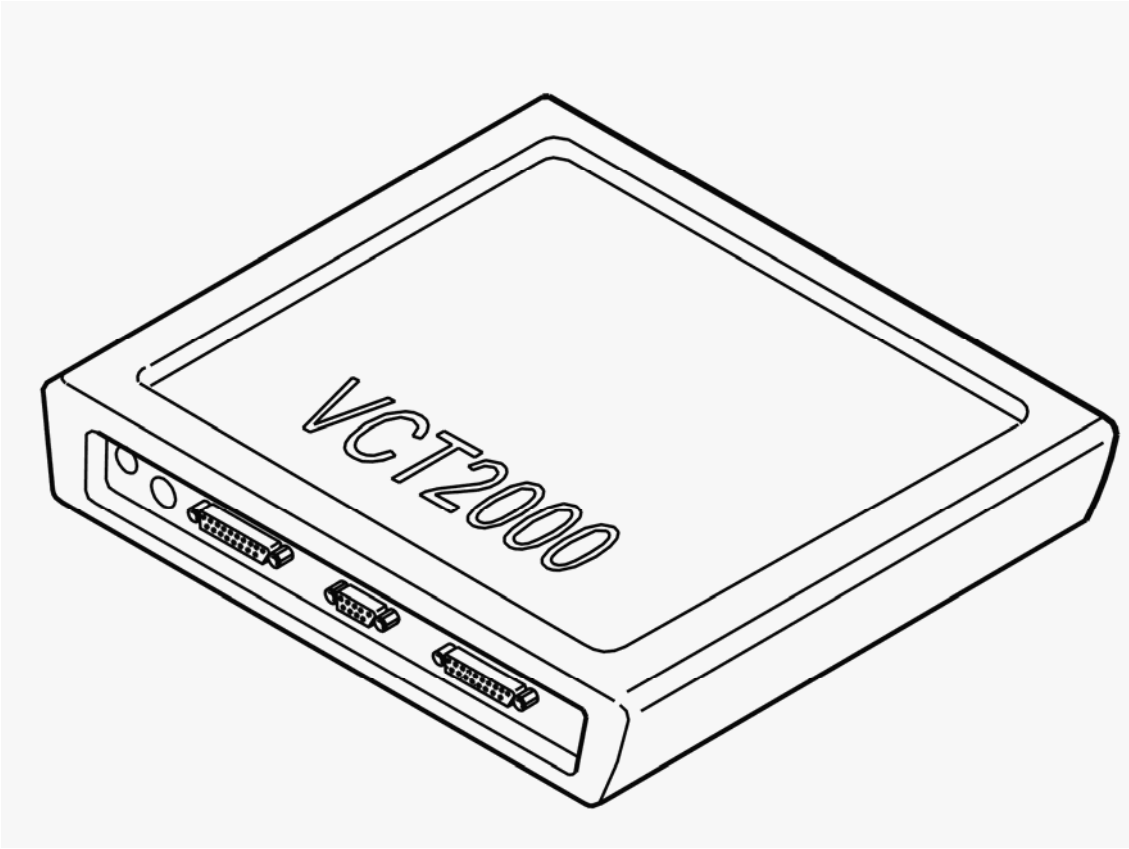


Fig. 462: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

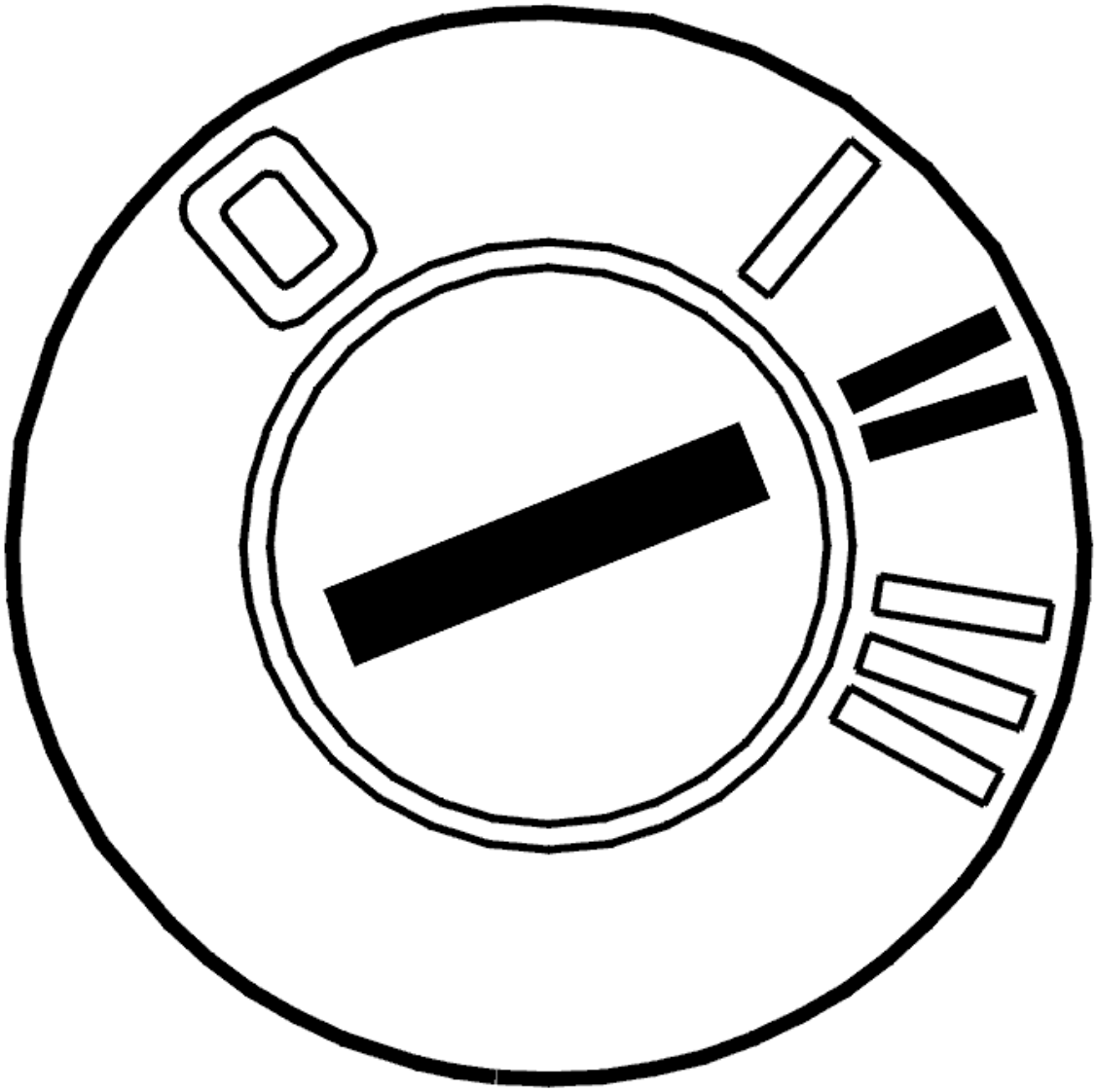


Fig. 463: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

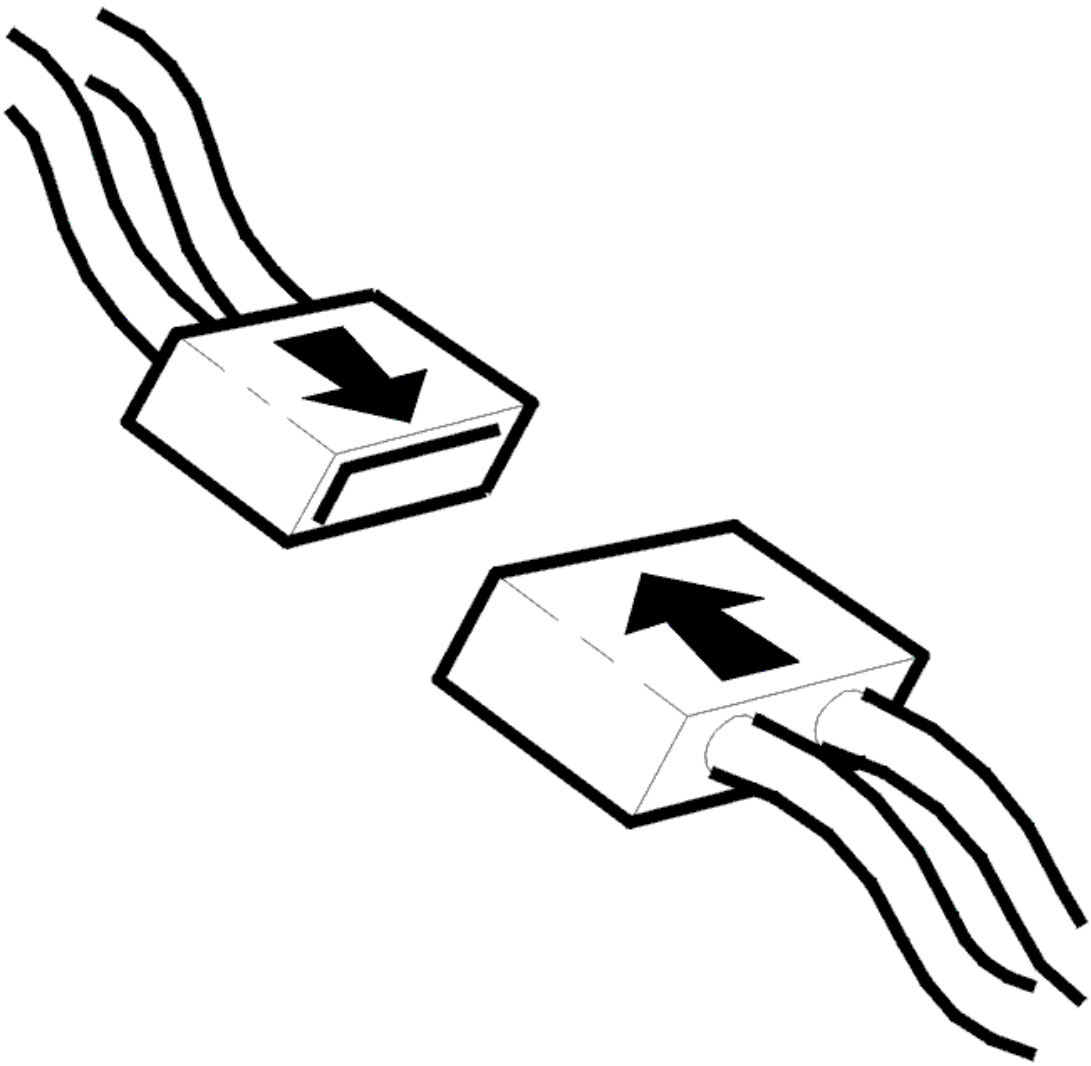


Fig. 464: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S4.

The value should change between OFF and ON.

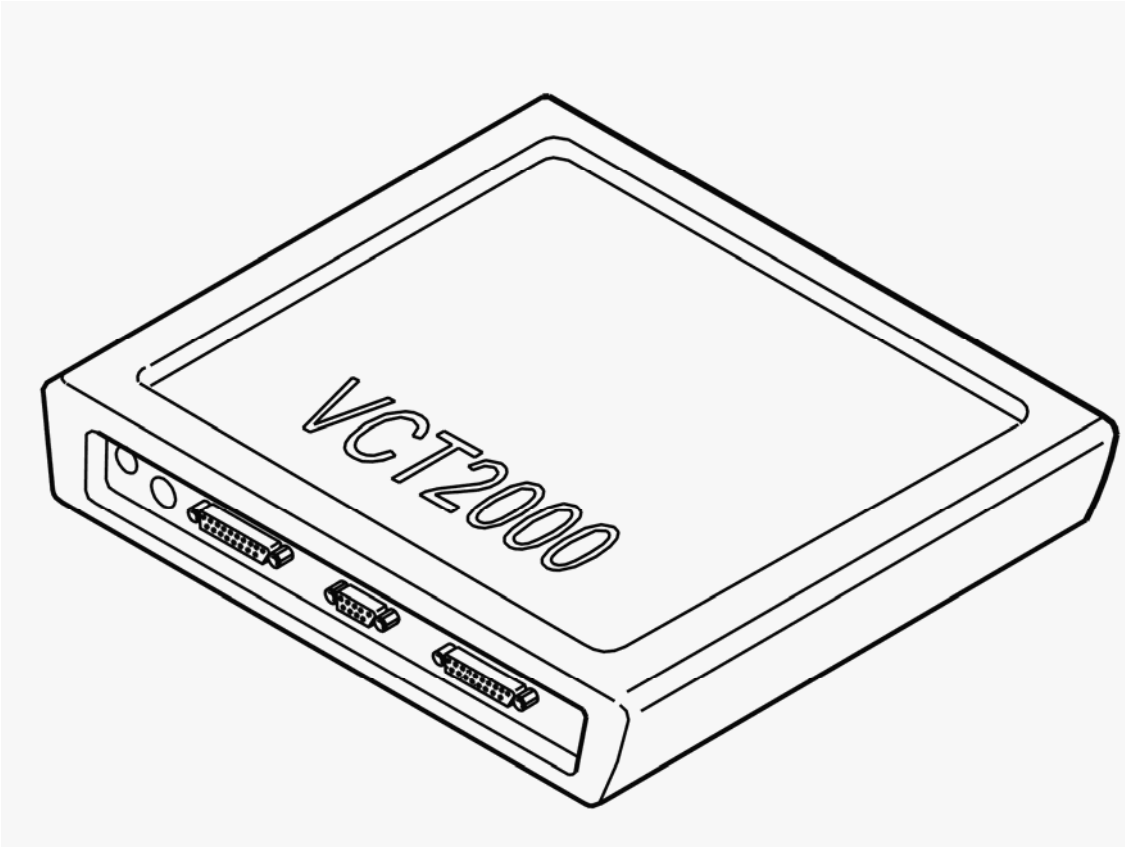


Fig. 465: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change between OFF and ON?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

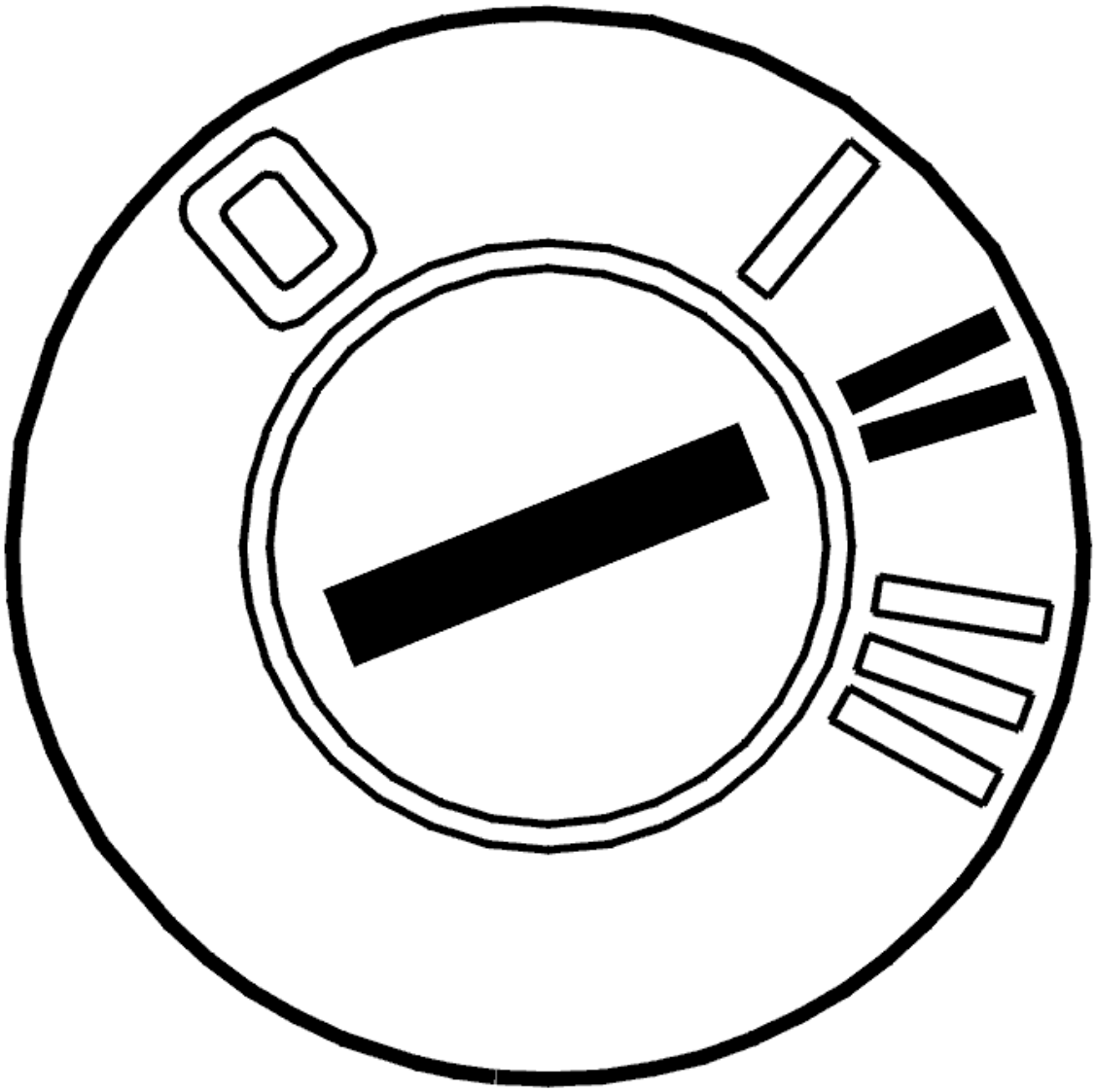


Fig. 466: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

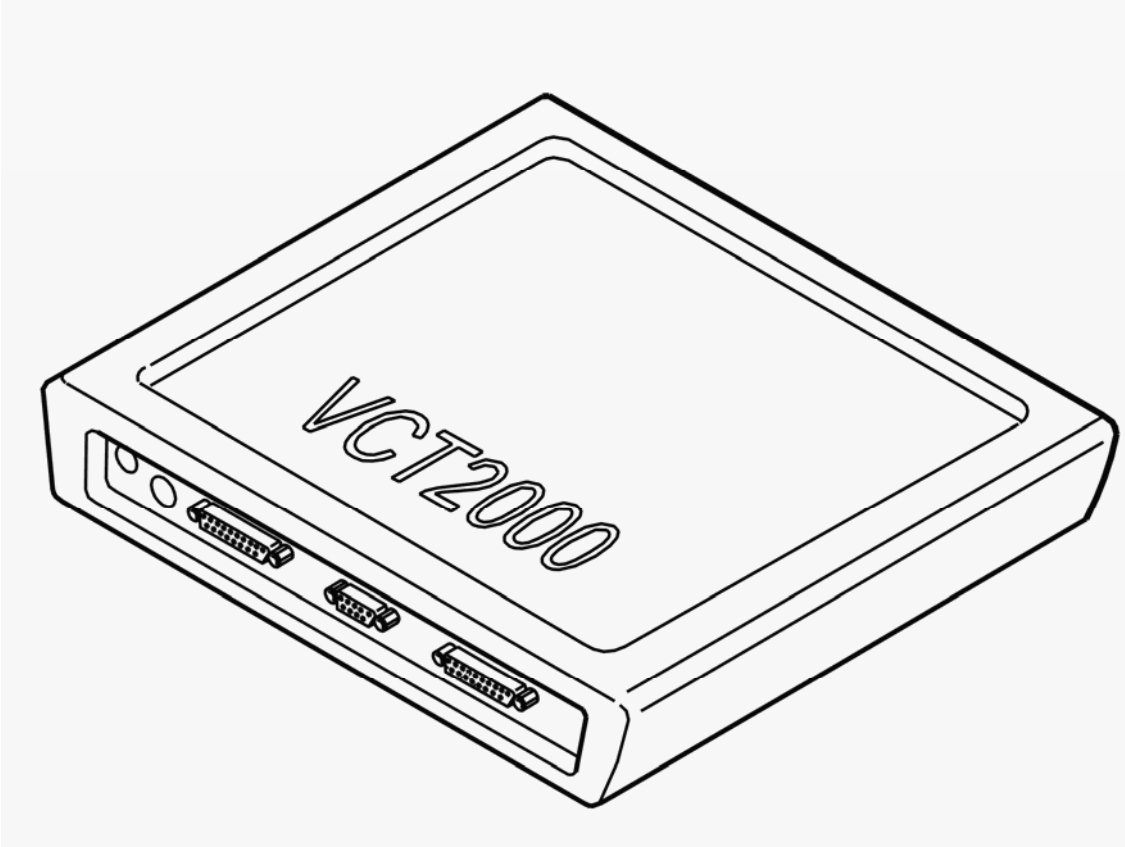


Fig. 467: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

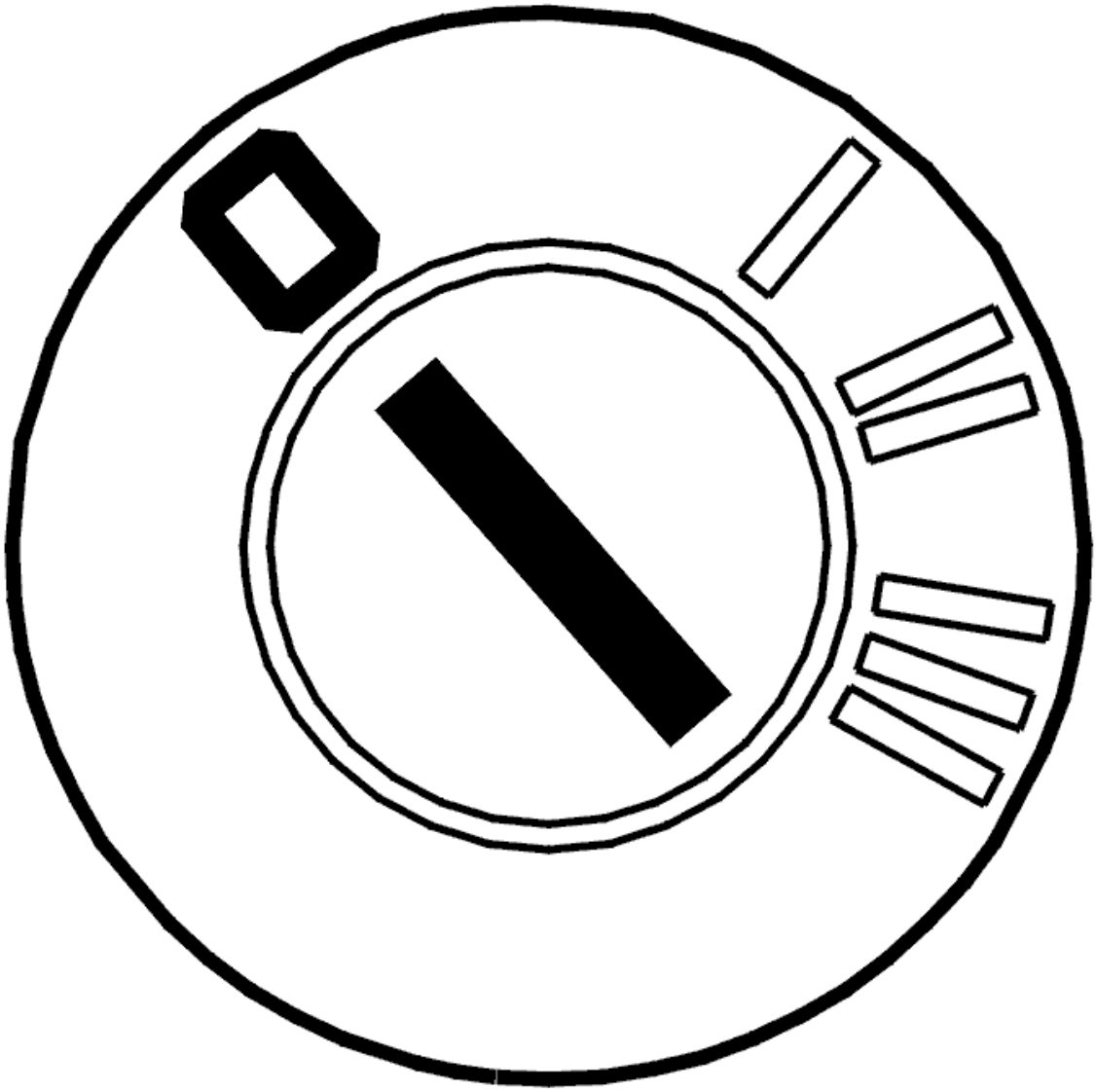


Fig. 468: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

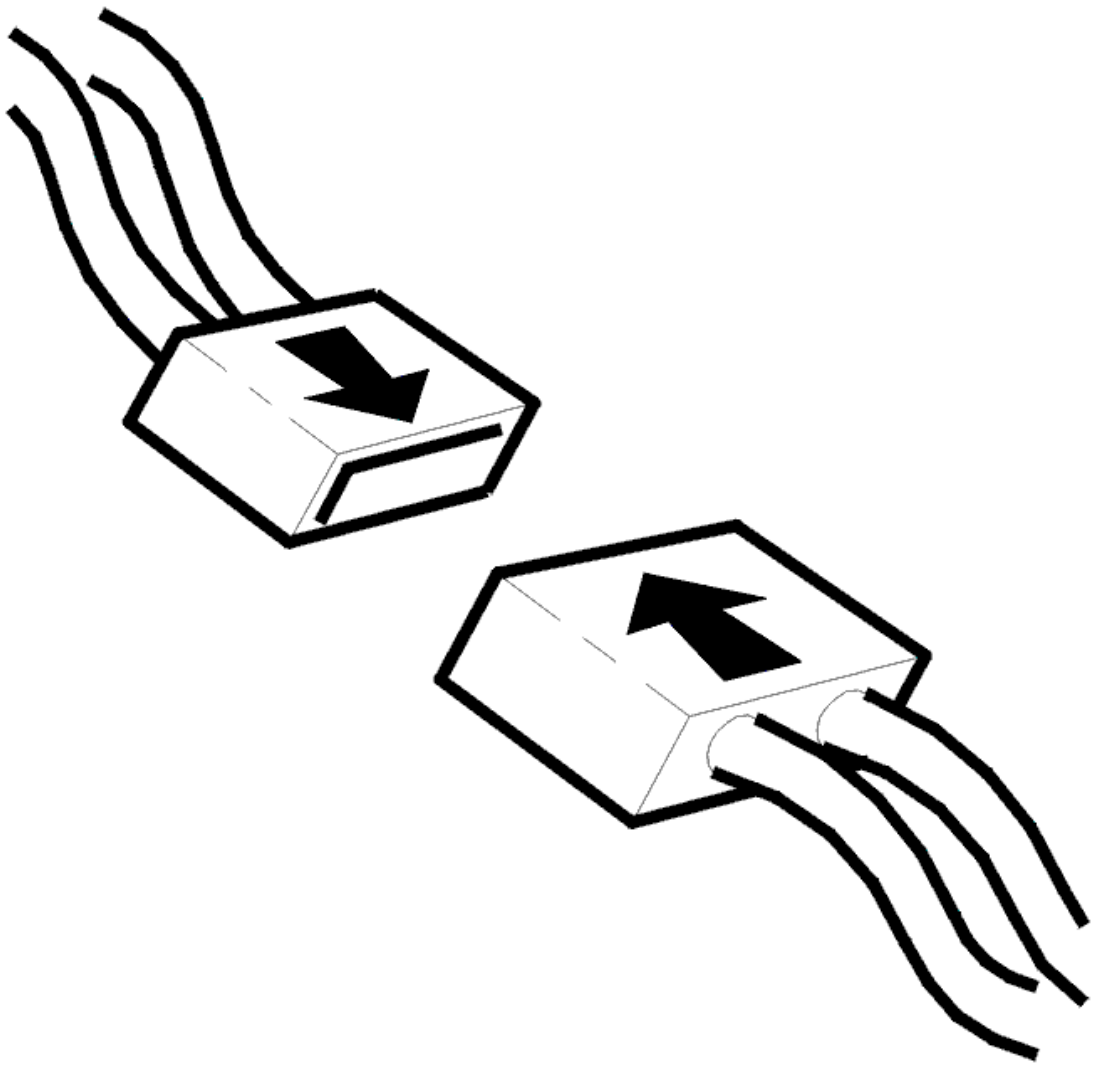


Fig. 469: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

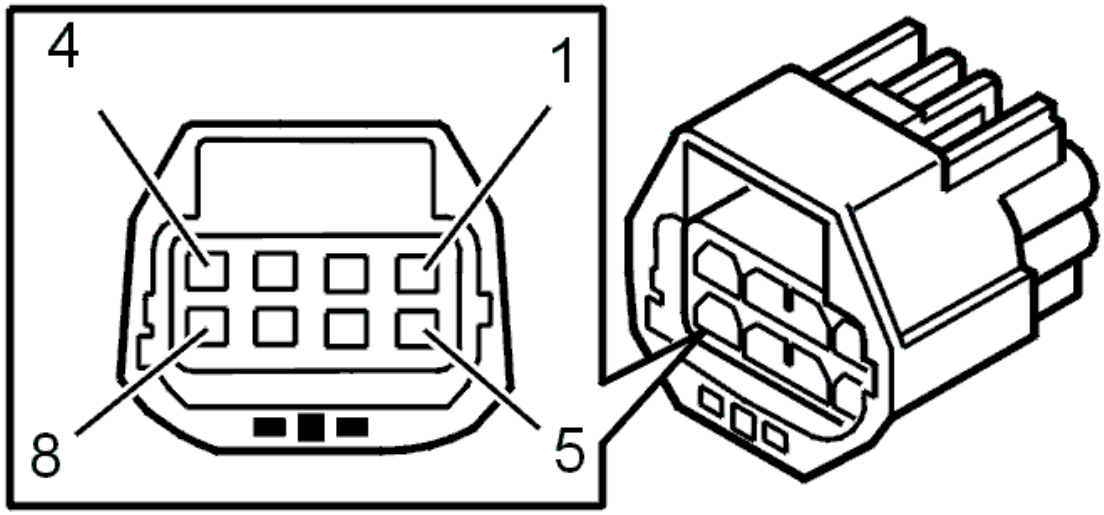


Fig. 470: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

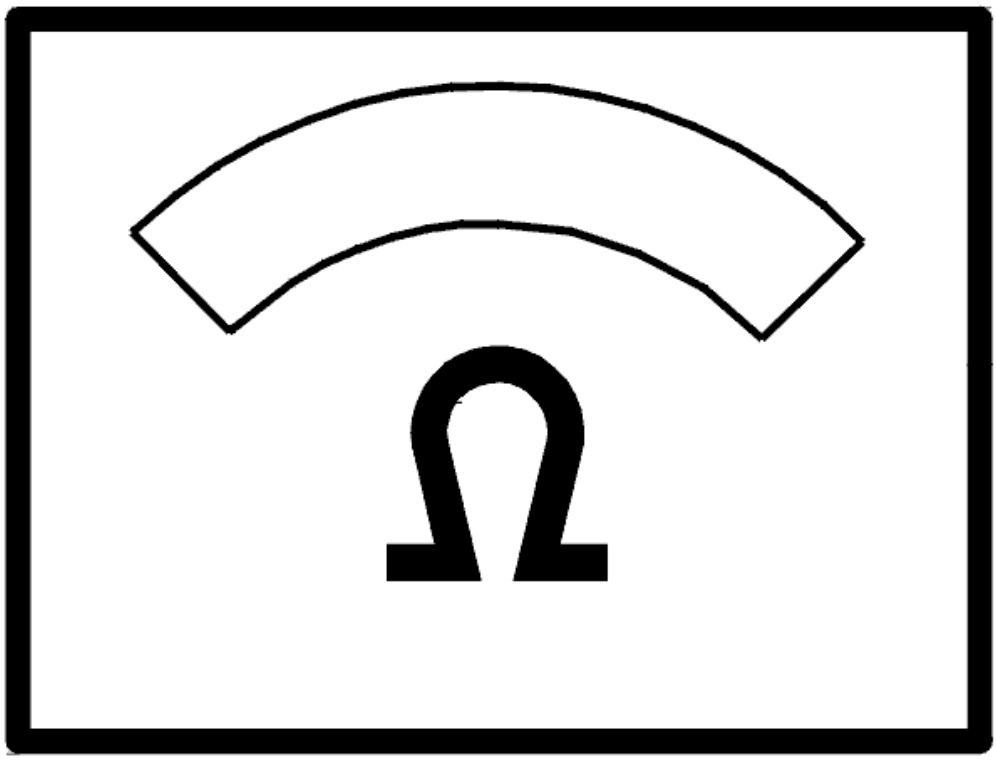


Fig. 471: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

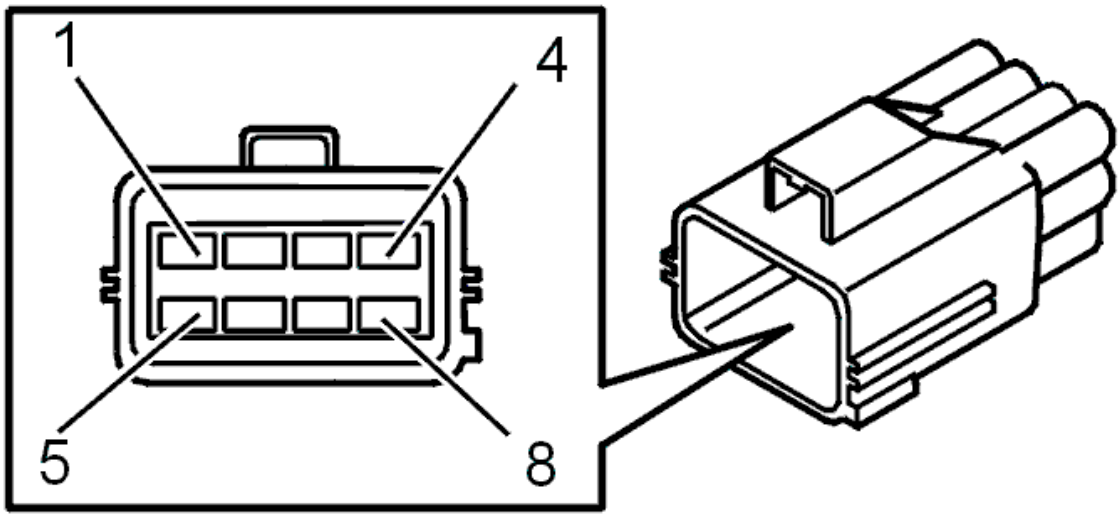


Fig. 472: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

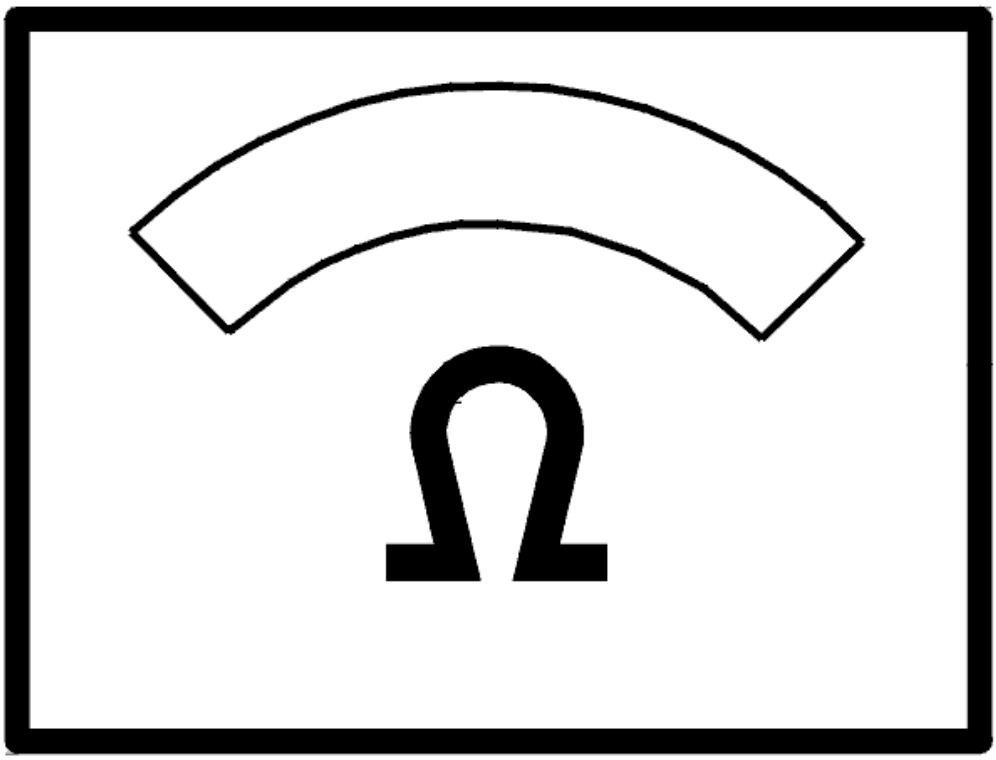


Fig. 473: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

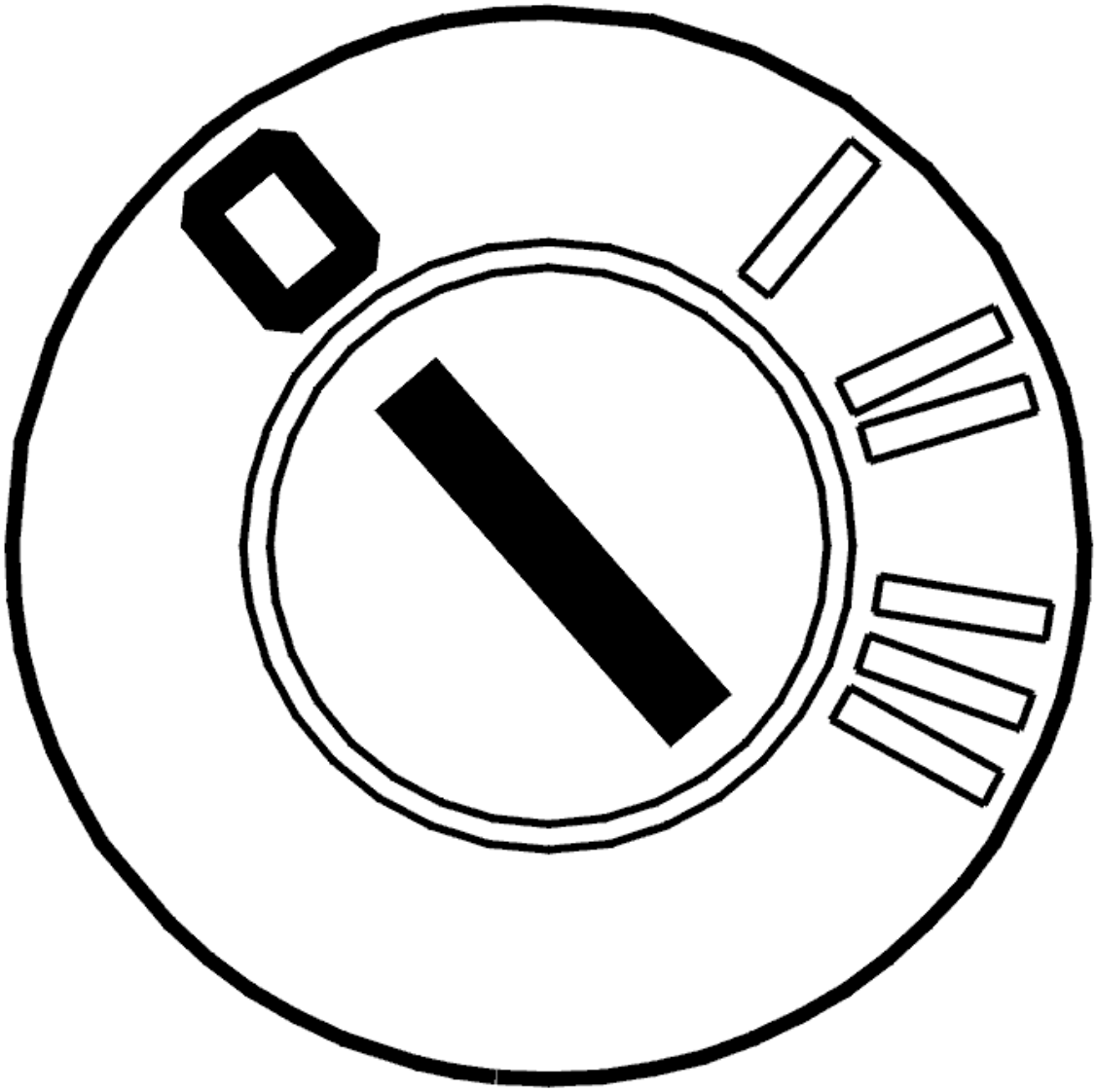


Fig. 474: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

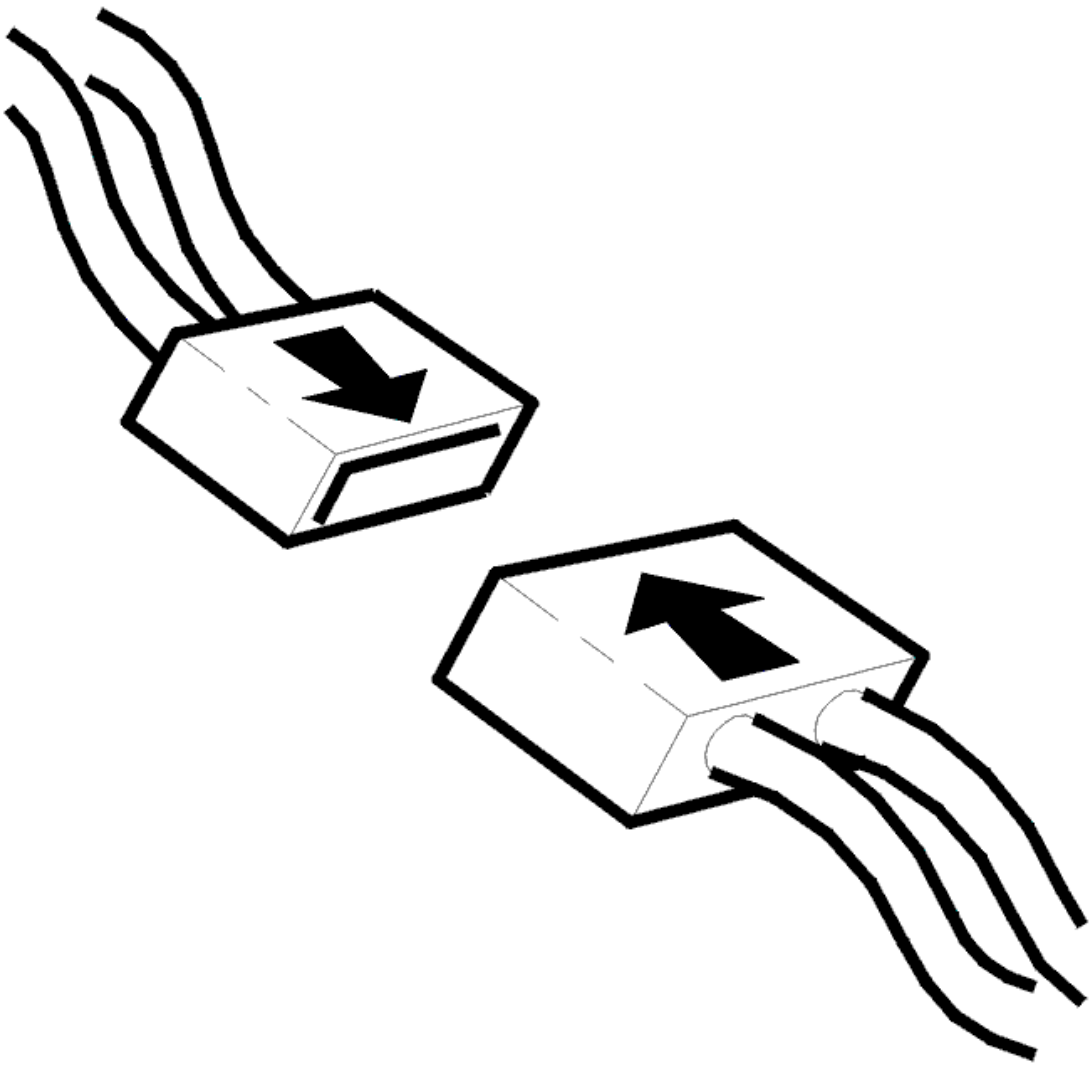


Fig. 475: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

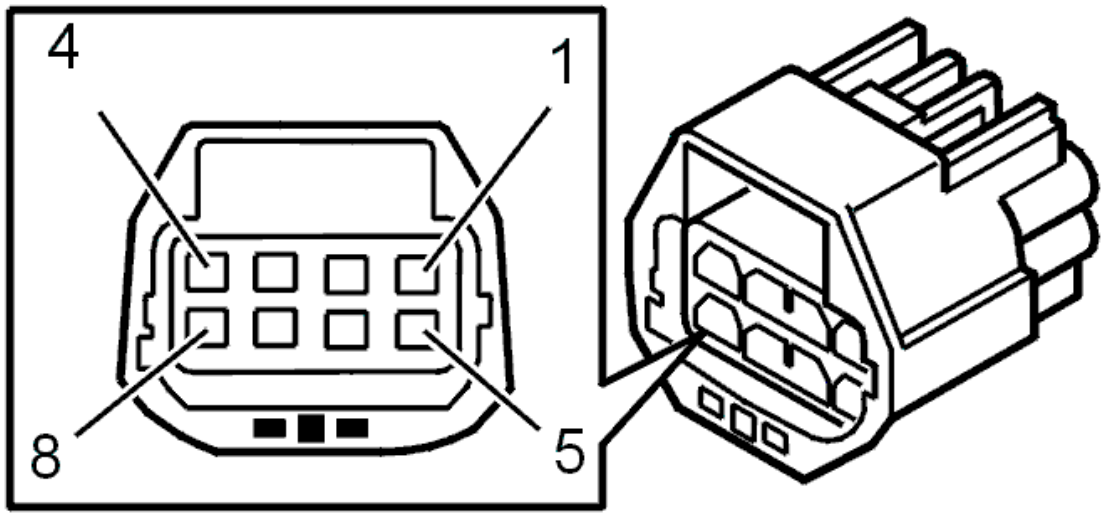


Fig. 476: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

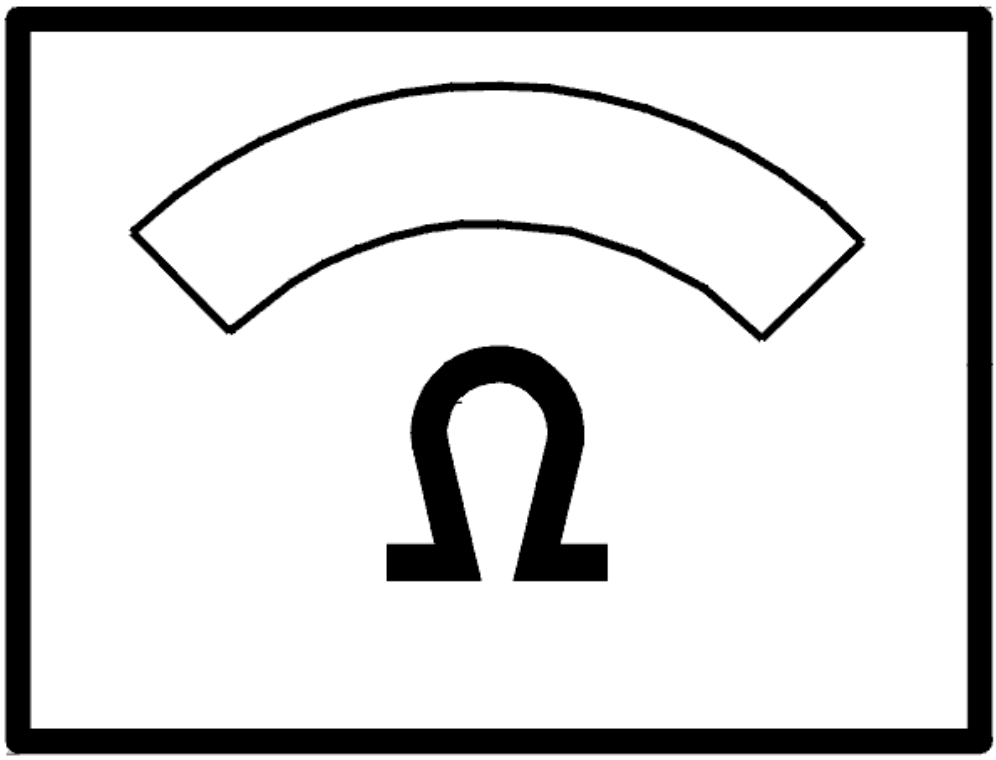


Fig. 477: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

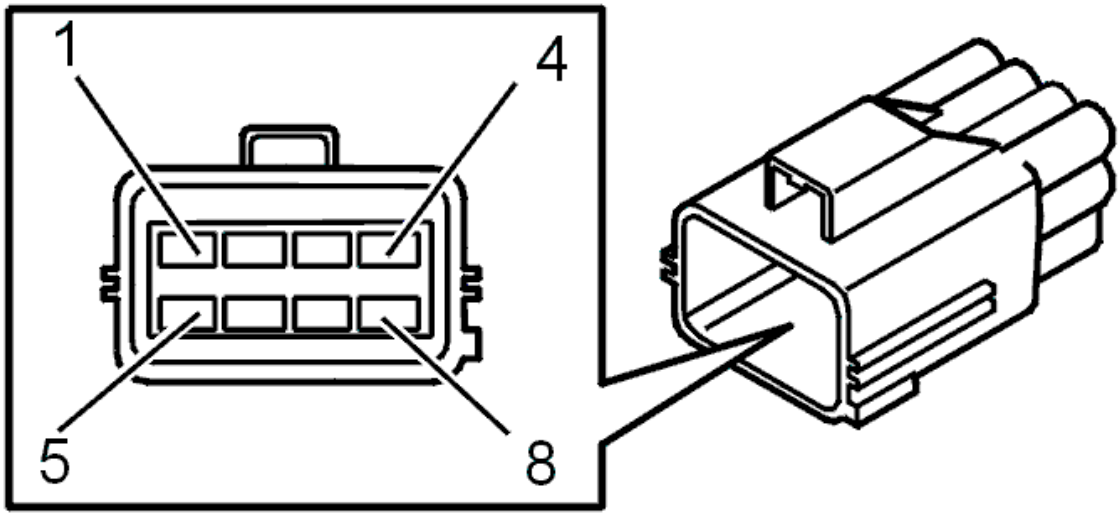


Fig. 478: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

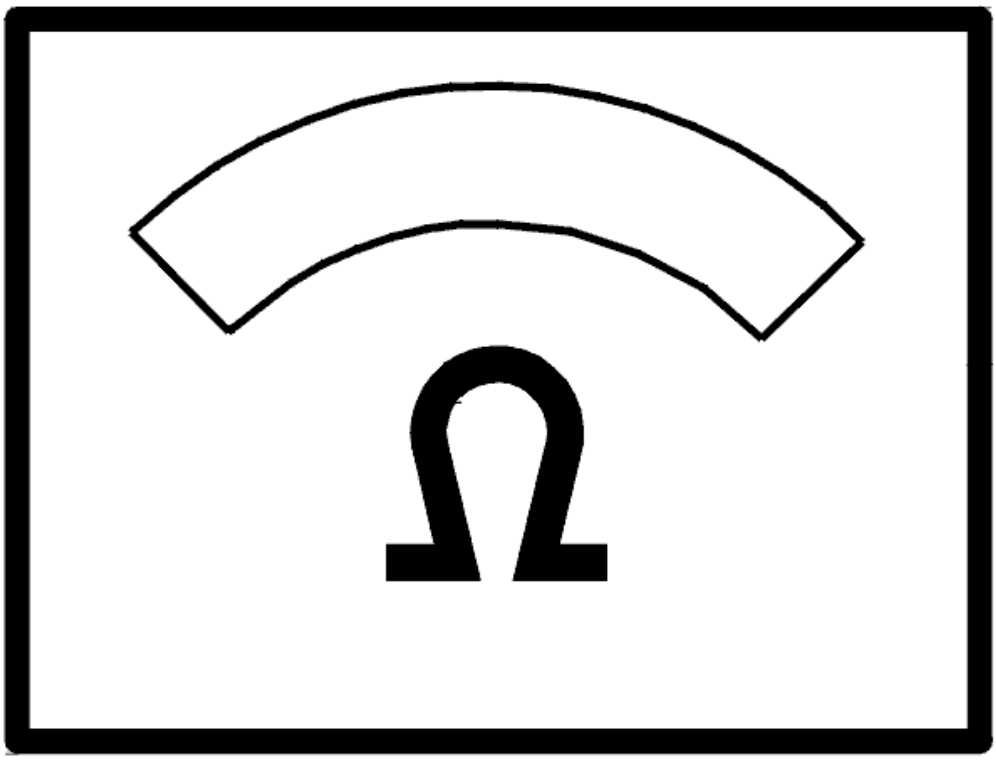


Fig. 479: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

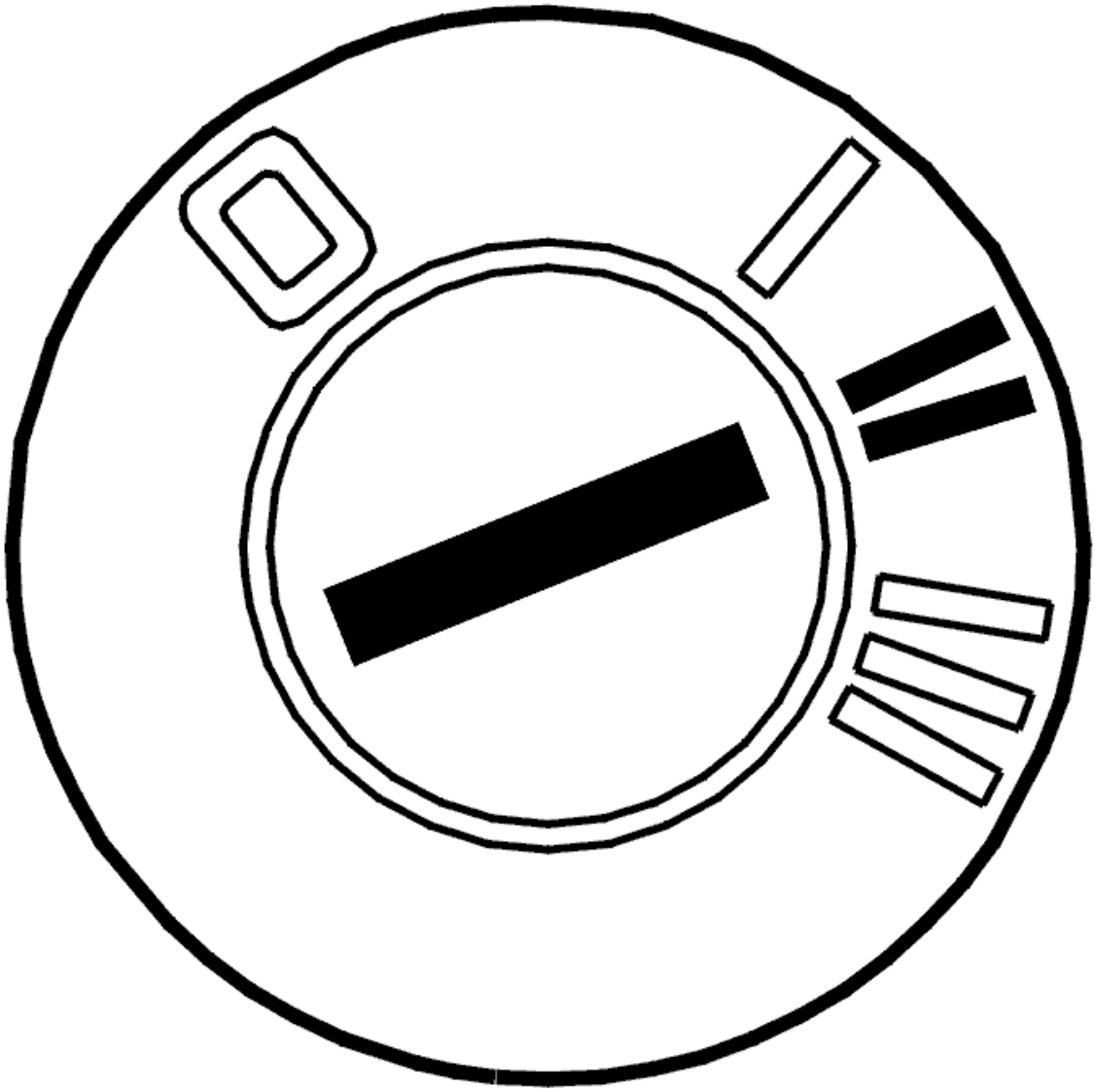


Fig. 480: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

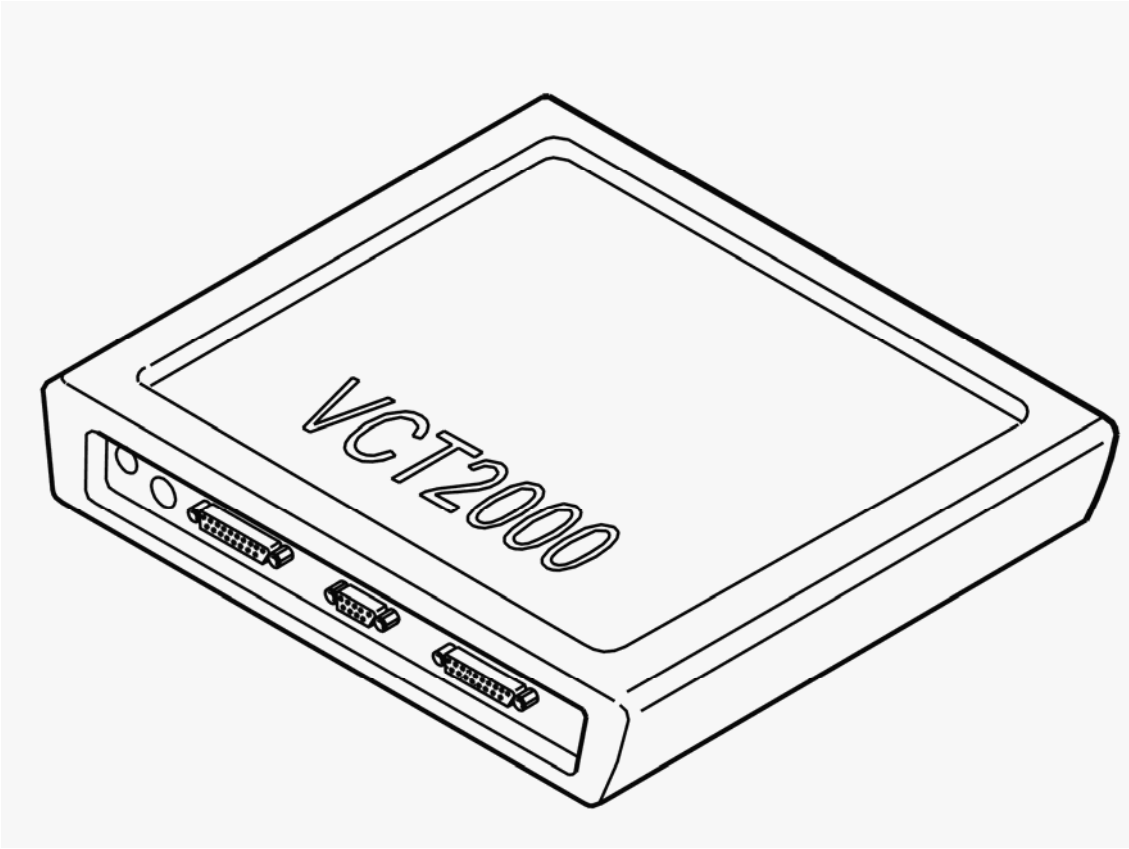


Fig. 481: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

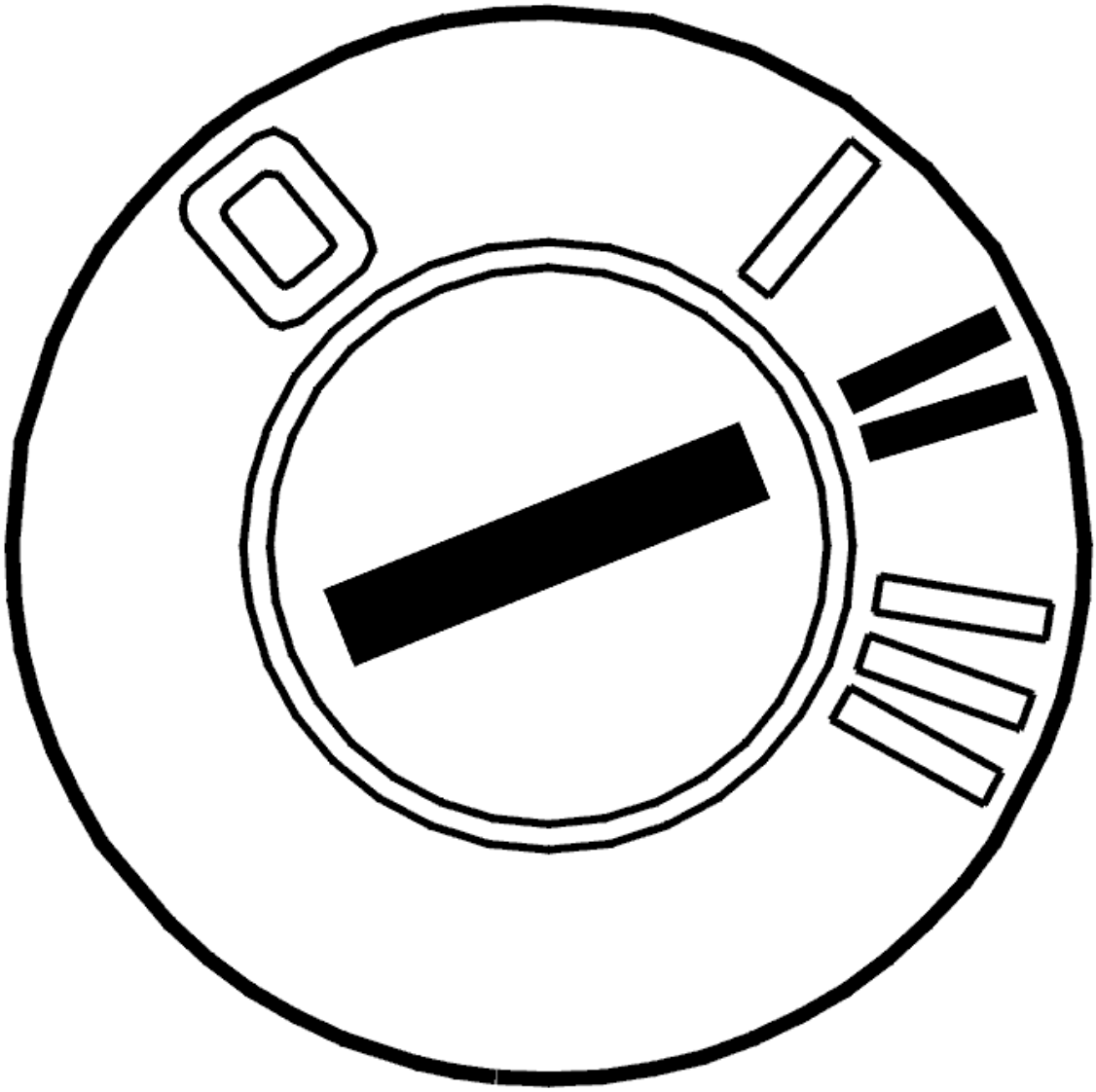


Fig. 482: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

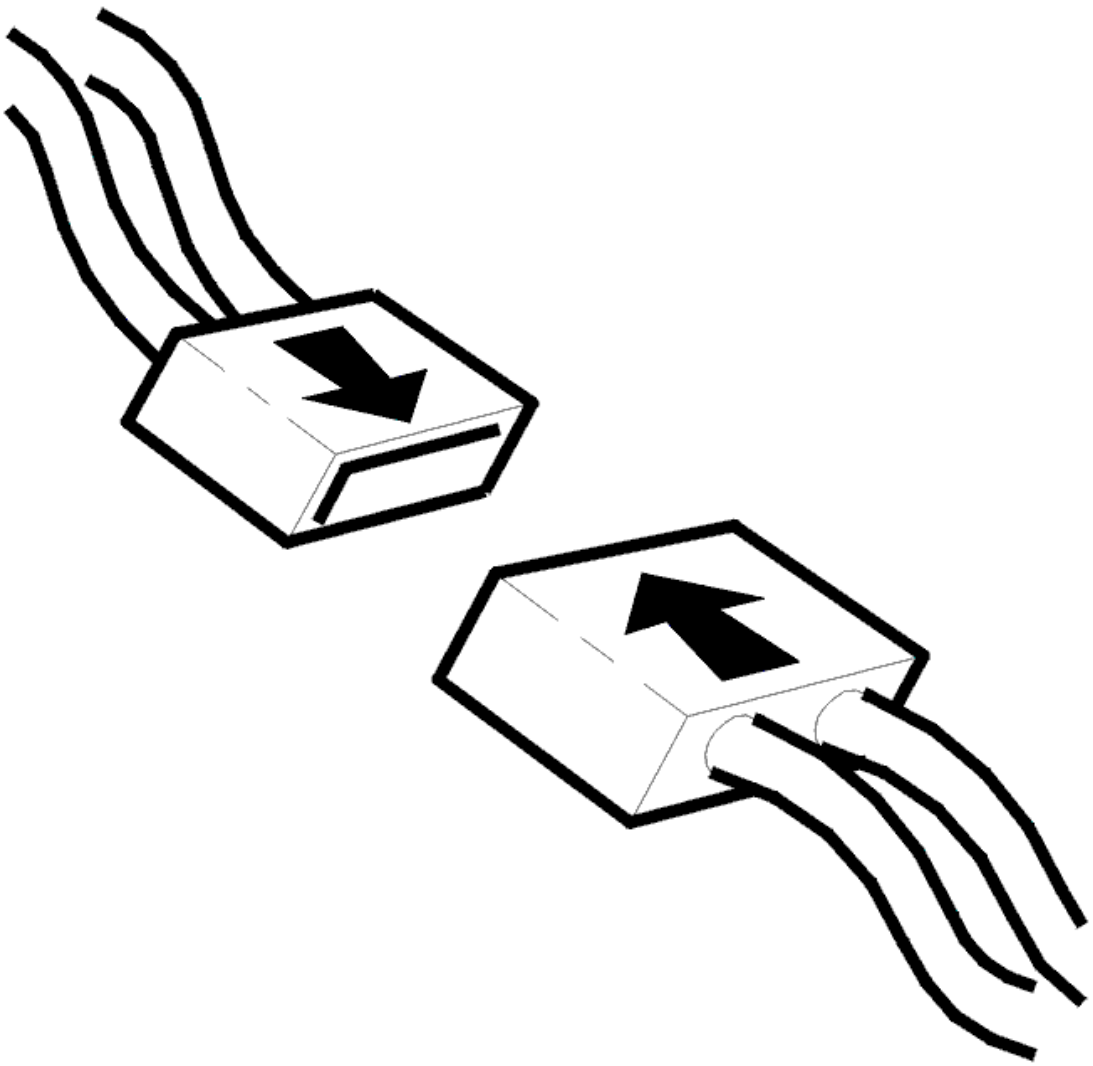


Fig. 483: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

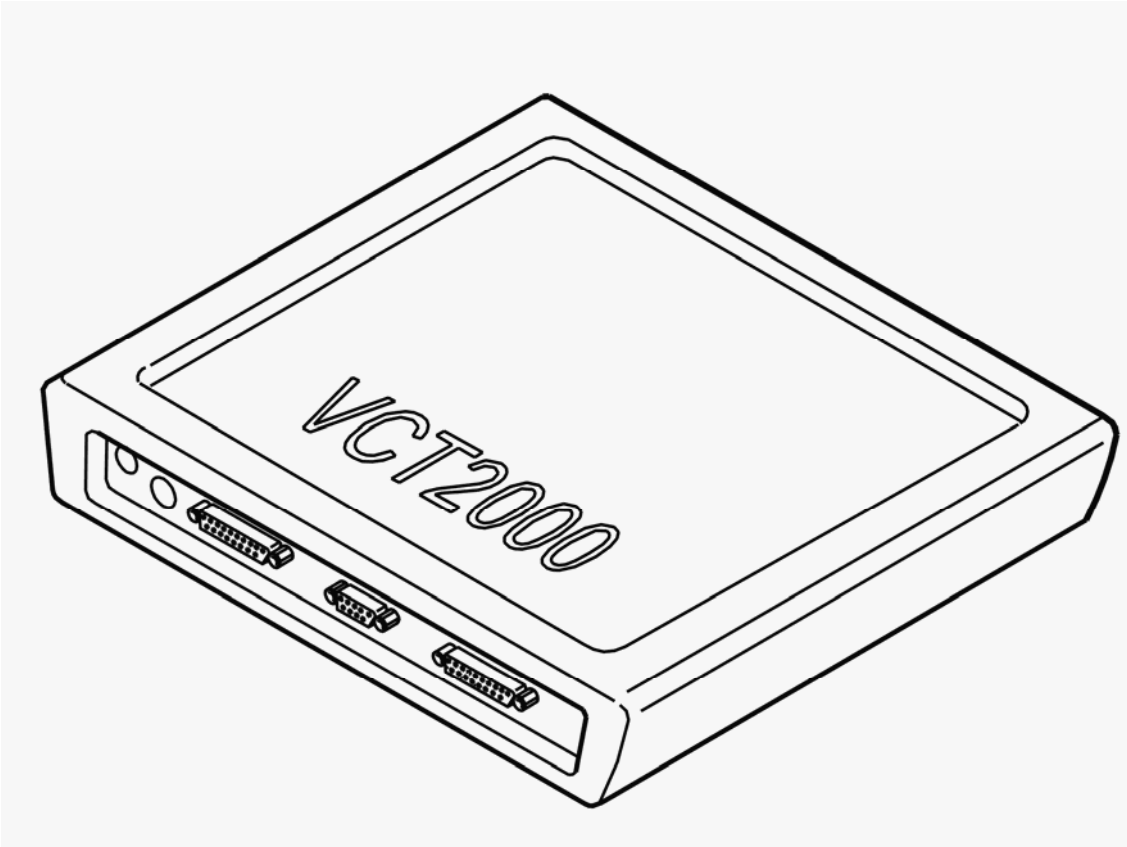


Fig. 484: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-010A: SHIFT SOLENOID S5. SIGNAL TOO HIGH (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

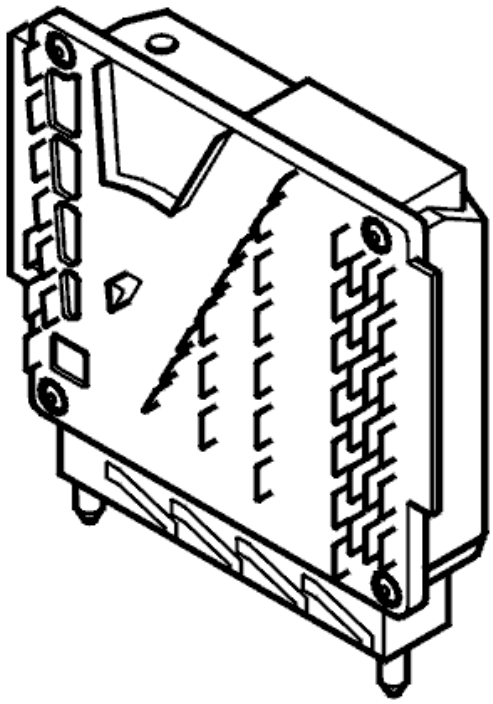


Fig. 1: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0001, TCM-0007, TCM-0101 TCM-0107 or TCM-010A are stored (depending on the solenoid) if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is too high when the solenoid should not be activated.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Short-circuit to supply voltage in the signal cable.
- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

SIGNAL TOO HIGH

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

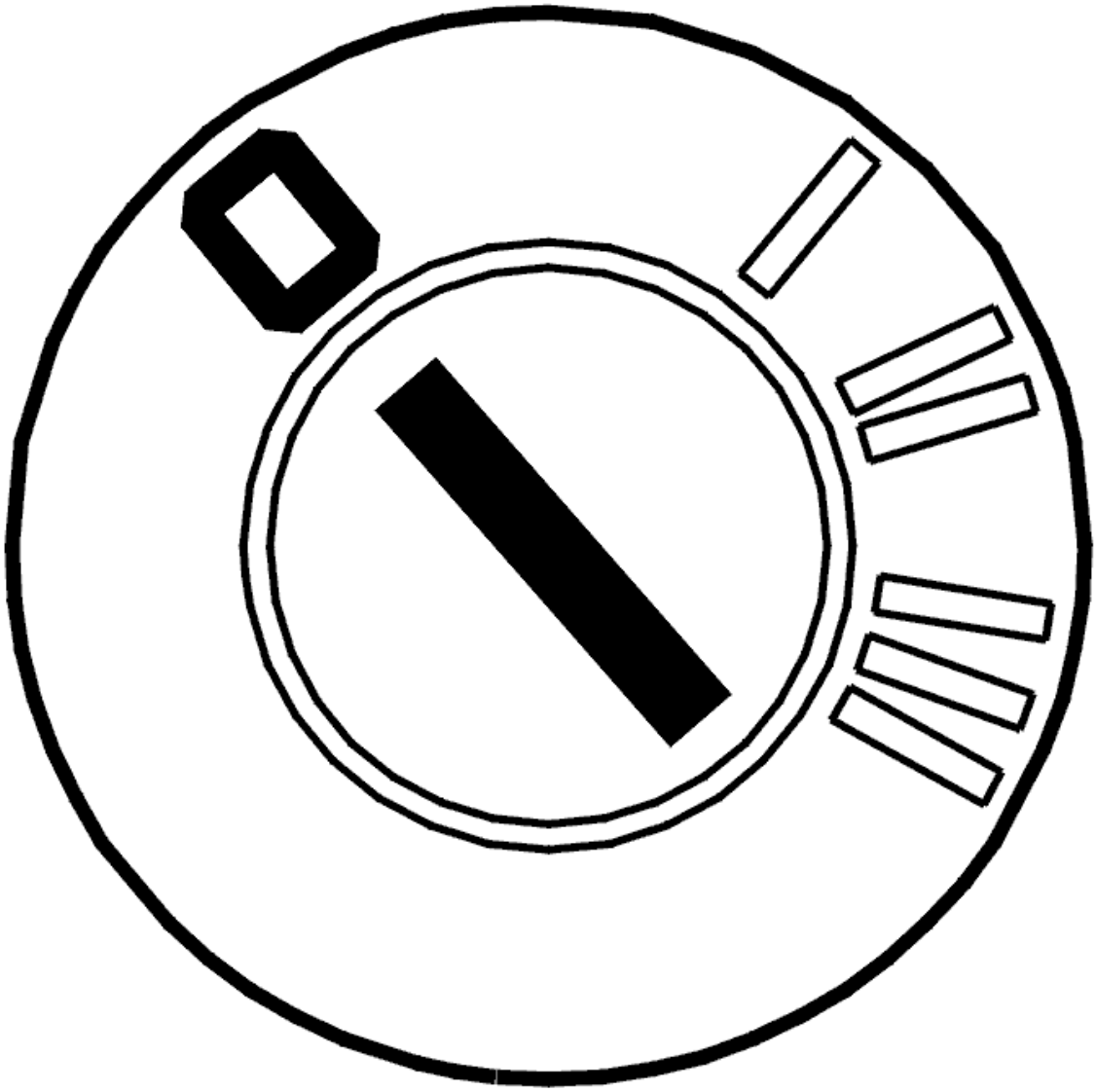


Fig. 2: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

NOTE: If the temperature is outside its permitted range, fault-trace the temperature sensor.

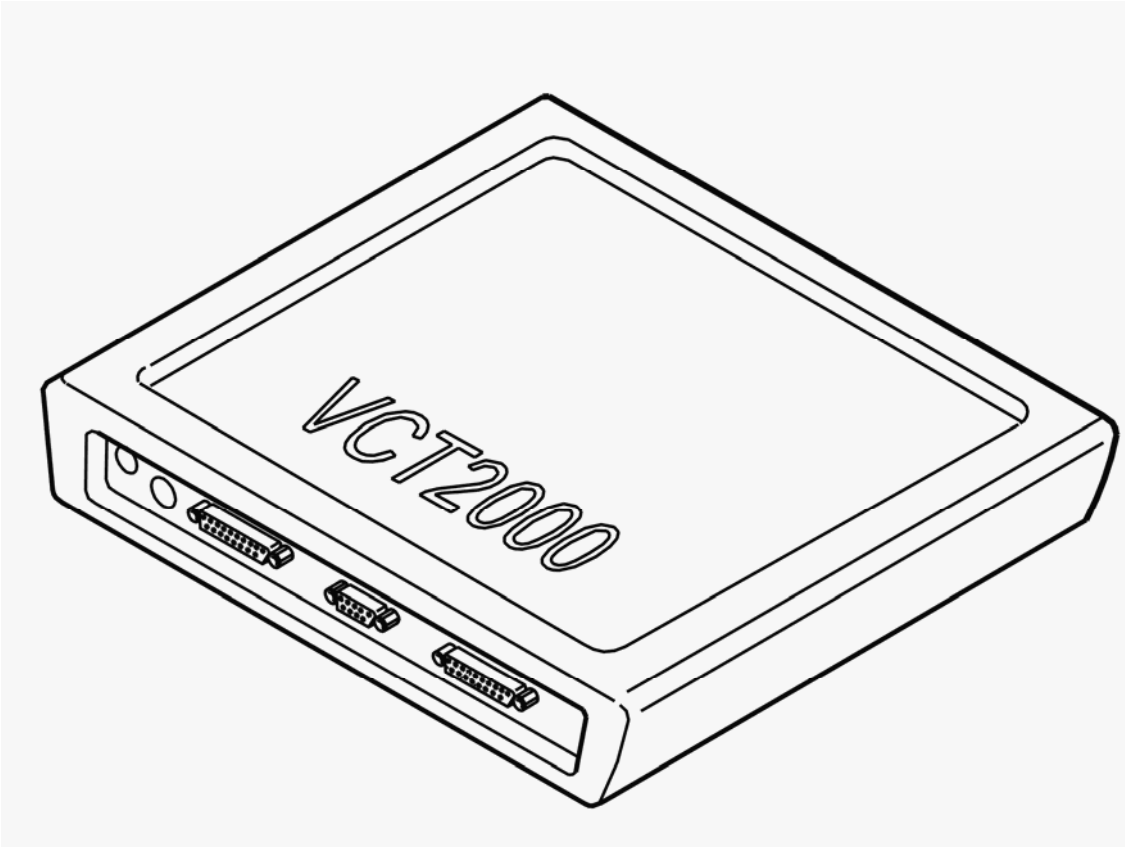


Fig. 3: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S5**

- **NO**

  Refer to **FAULTY SIGNAL**

CHECKING SHIFT SOLENOID S5

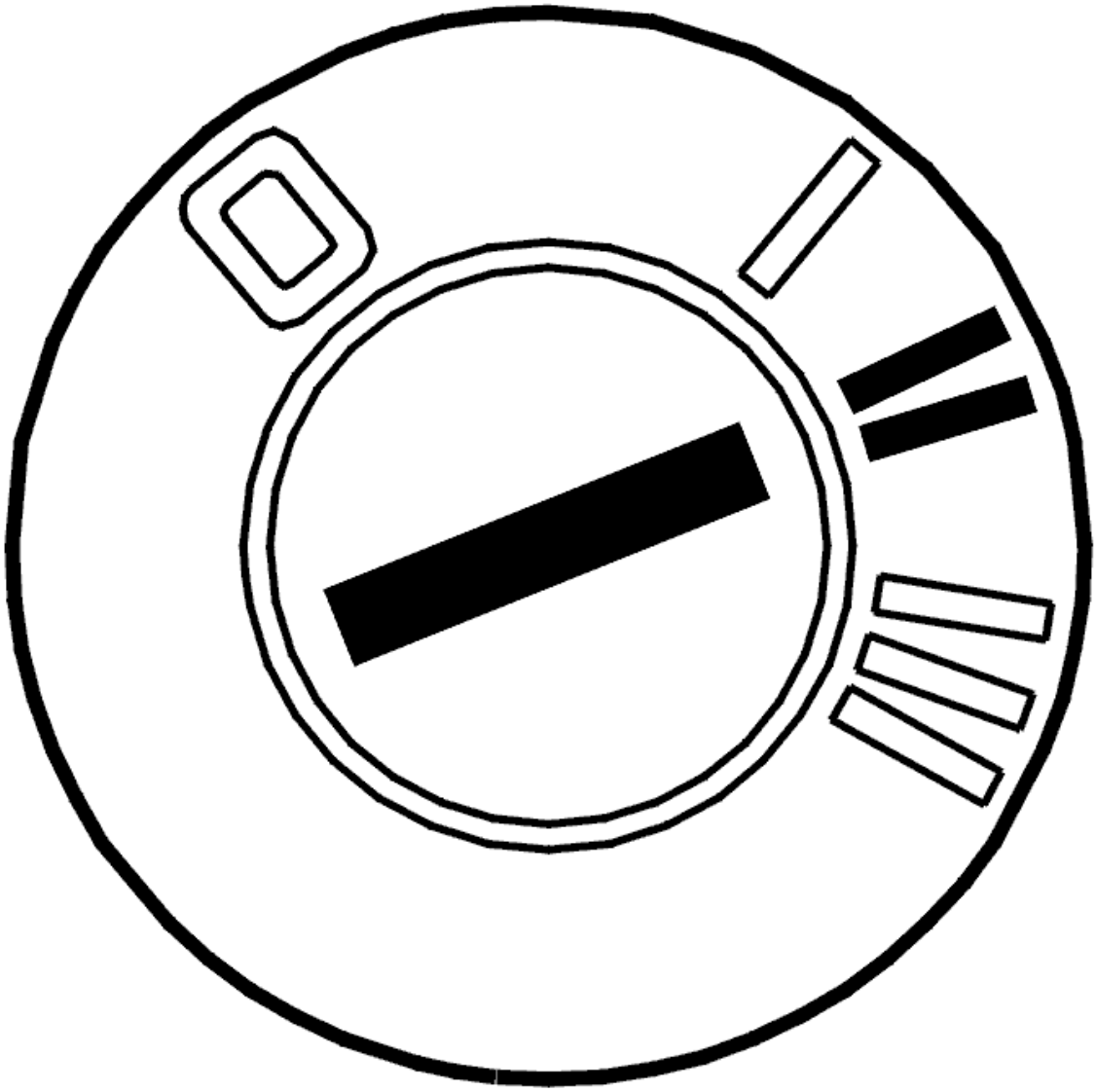


Fig. 4: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S5.

The value must change between OFF and ON.

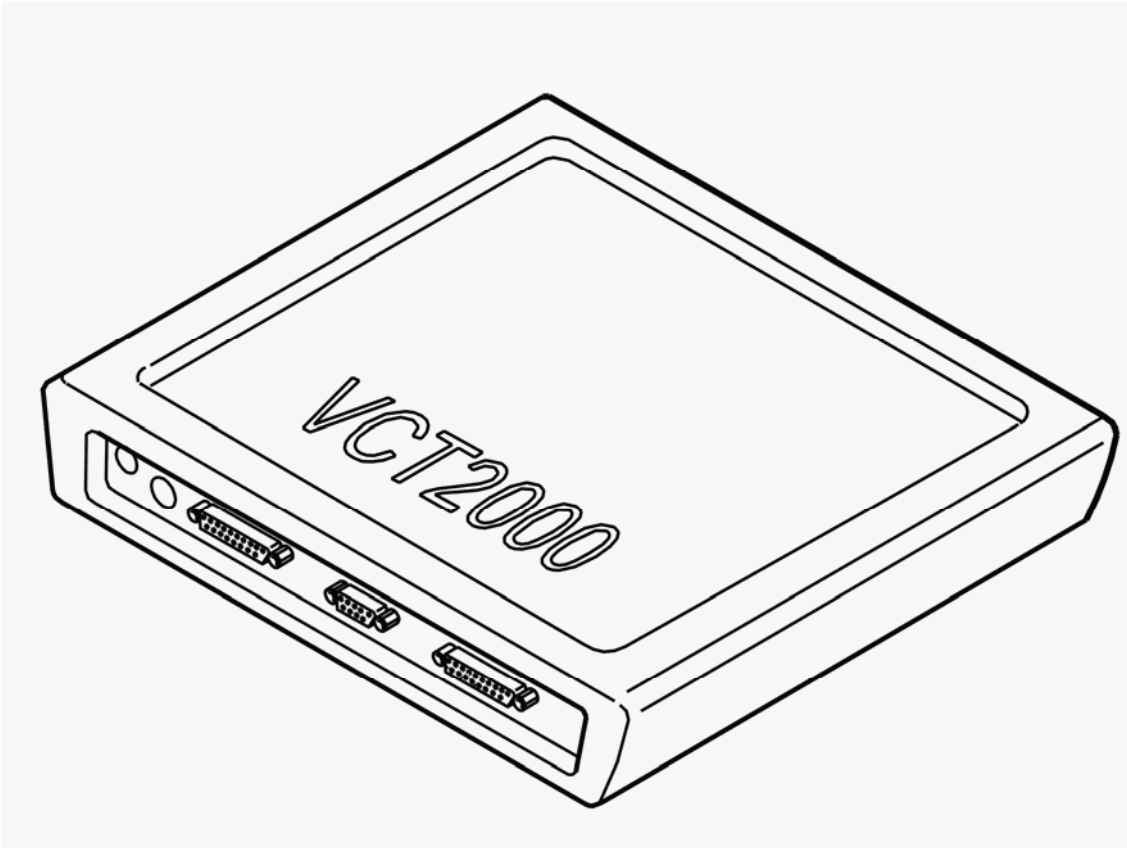


Fig. 5: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

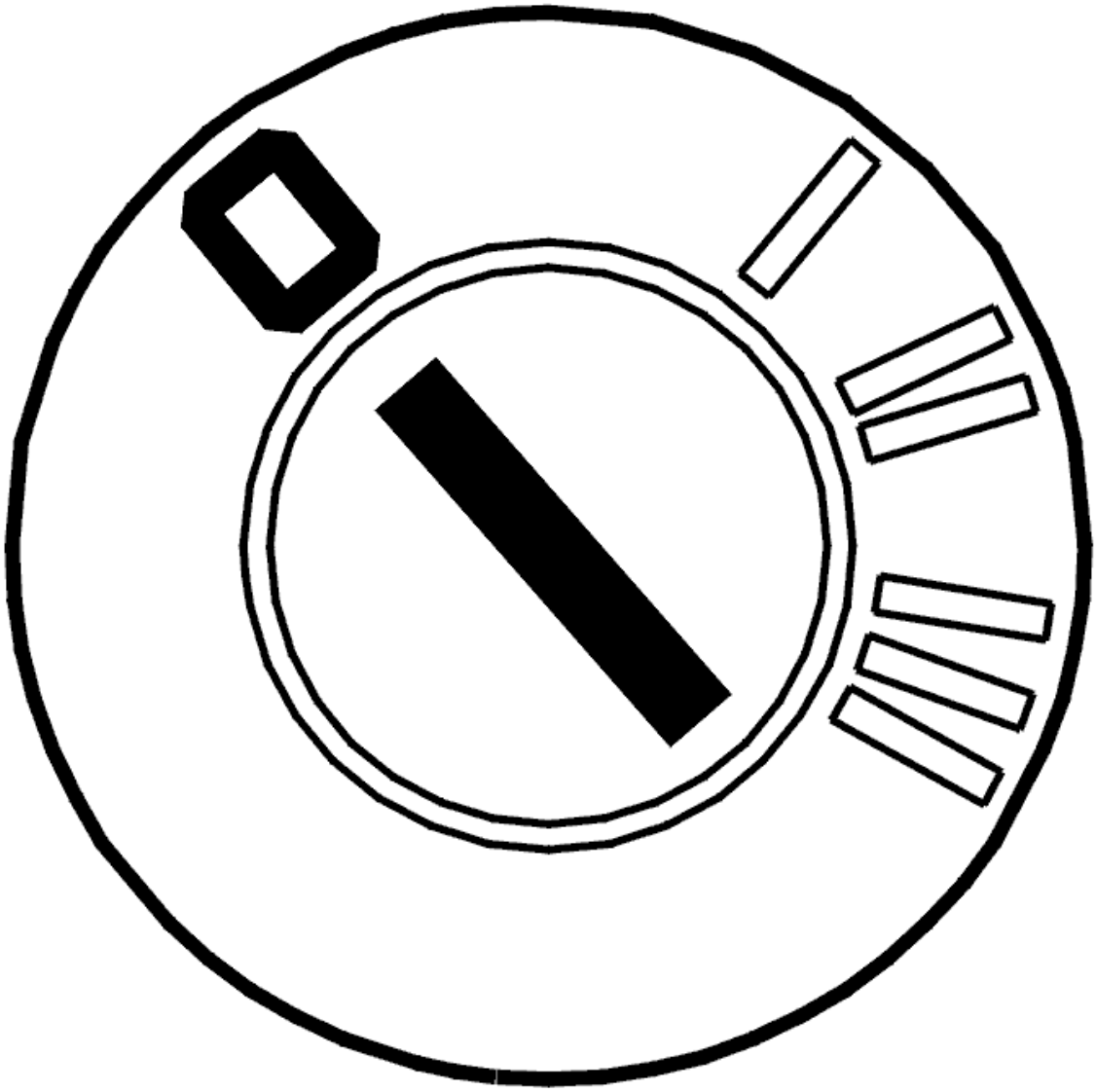


Fig. 6: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

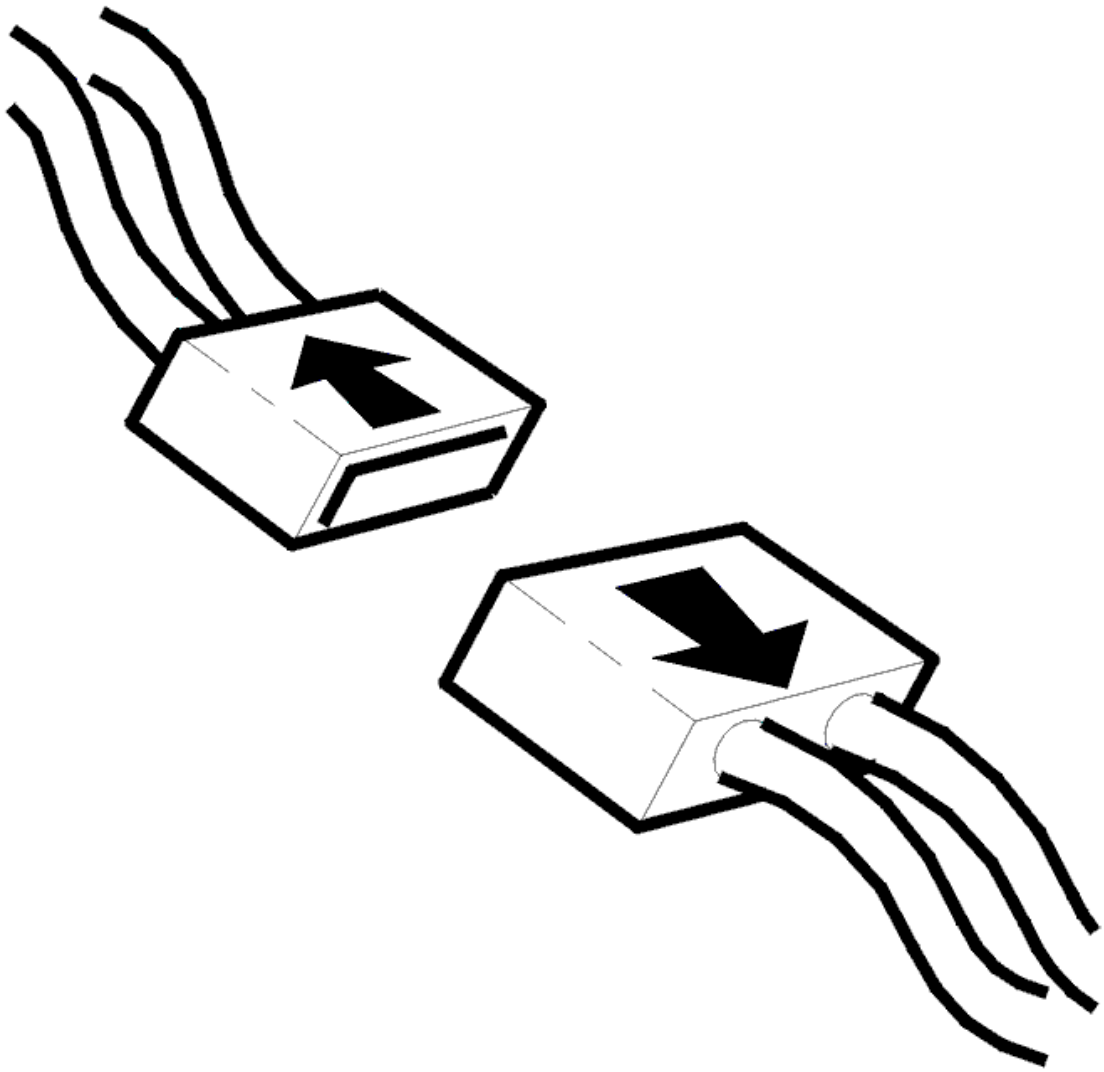


Fig. 7: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Transmission connector C disconnected.

Check the cable between control module terminal #B6 (#A66) and transmission connector terminal #C5 (control module side). Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** . Also check against the other cables in the circuit.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION,**

DISCONNECTING / CONNECTING

- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

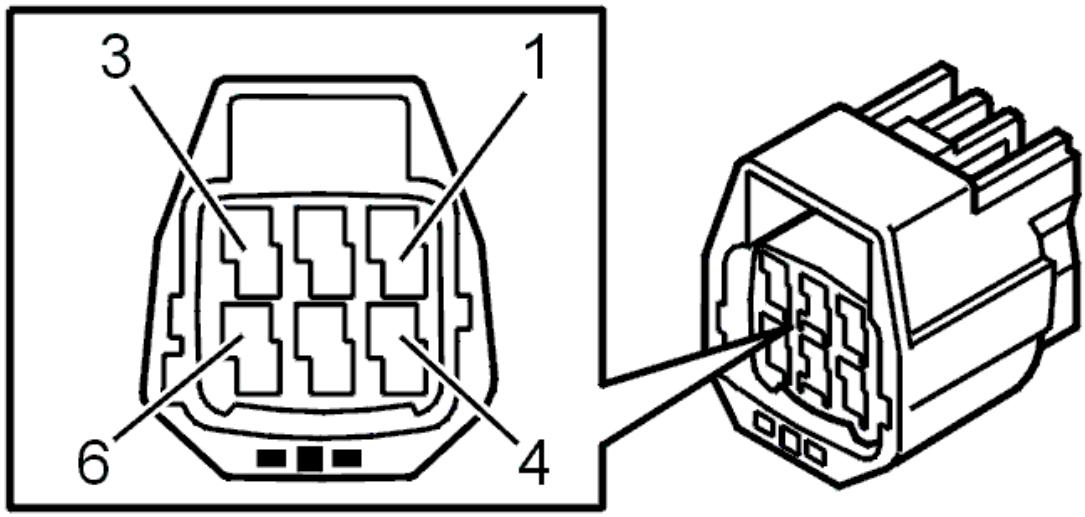


Fig. 8: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

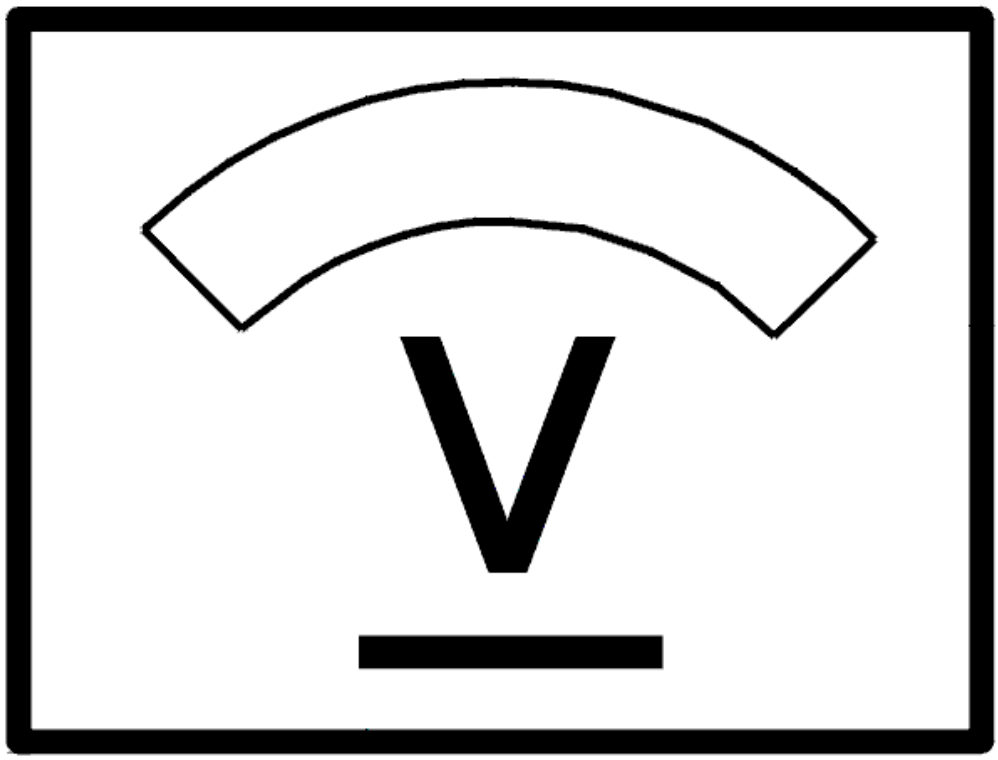


Fig. 9: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

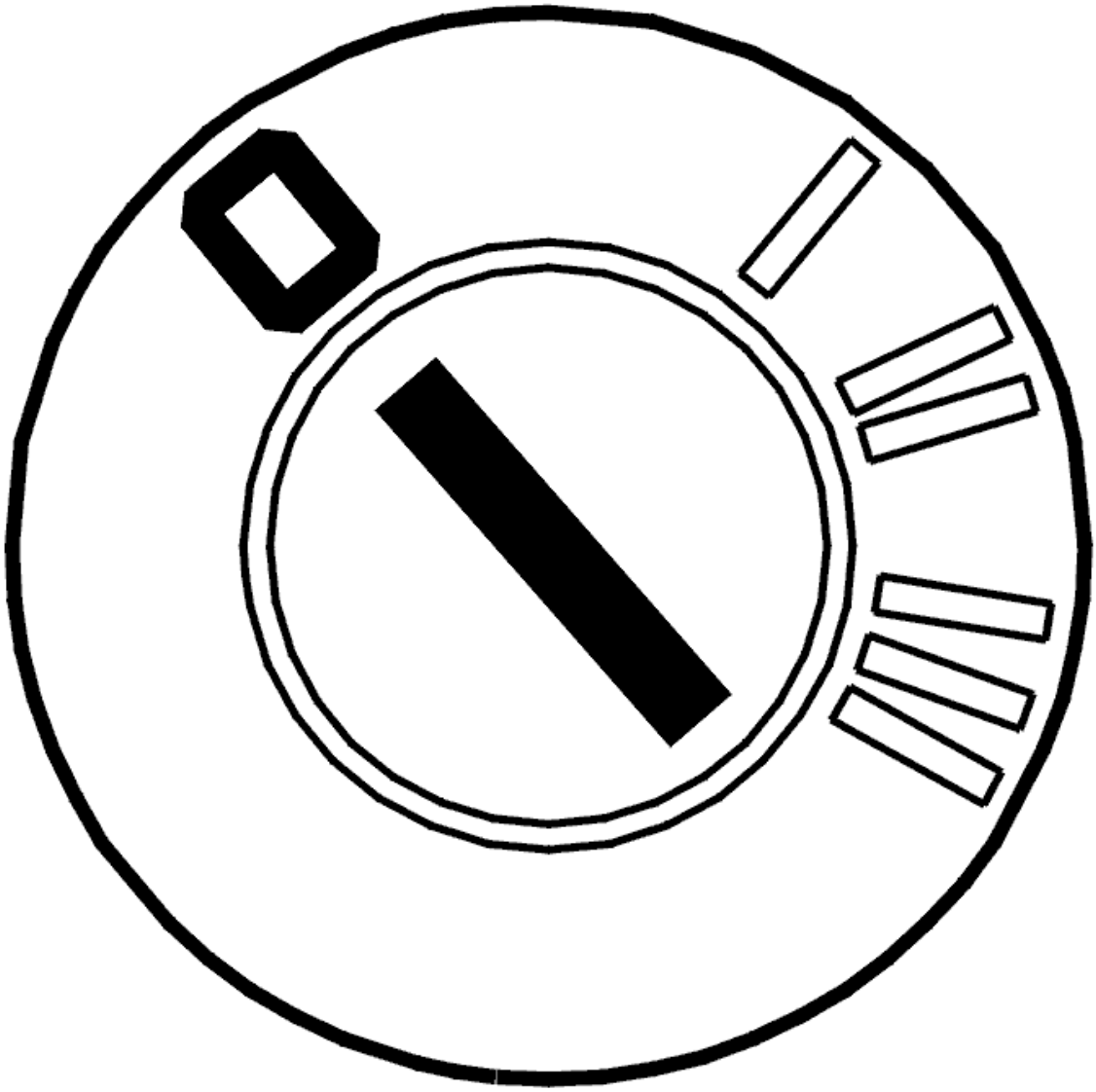


Fig. 10: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C5 (transmission side) and the connector for solenoid S5. Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** . Also check against the other cables in the circuit.

Replace solenoid S5 if no faults are found in the cable.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the control system and to check or replace solenoid S5, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

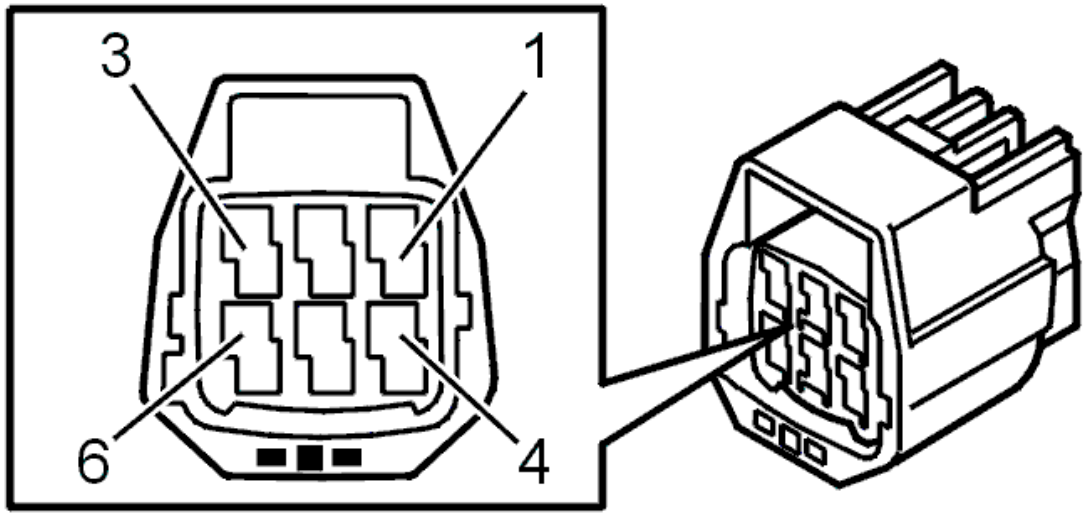


Fig. 11: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

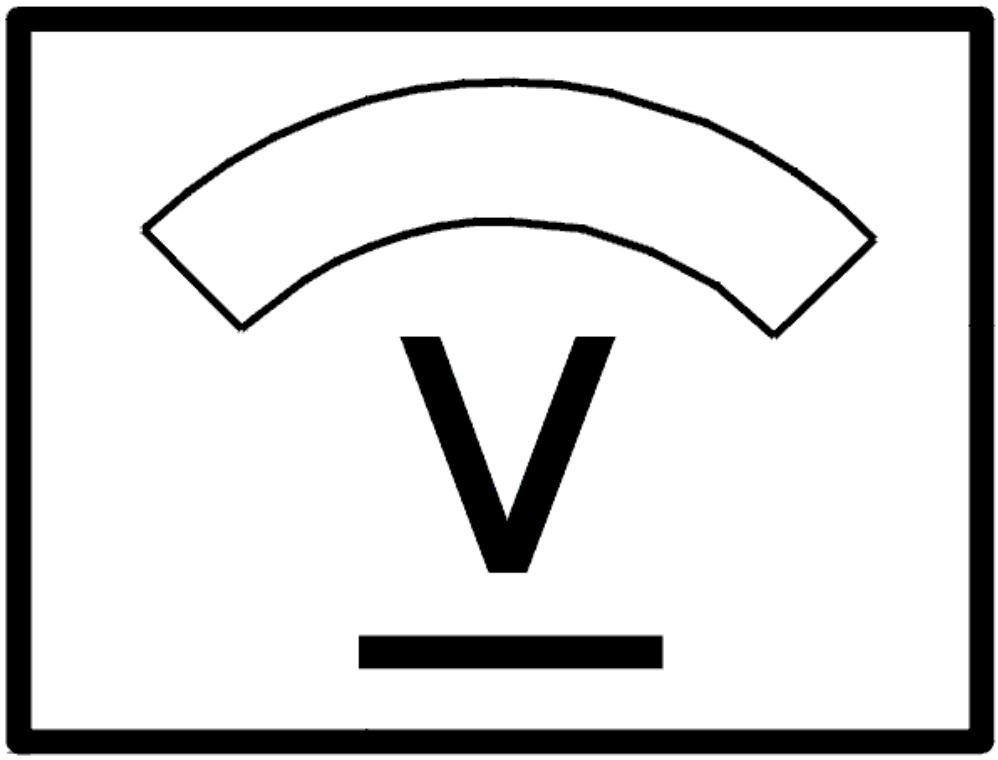


Fig. 12: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the cable between control module terminal #B6 (#A66) and transmission connector terminal #C5 (control module side). Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

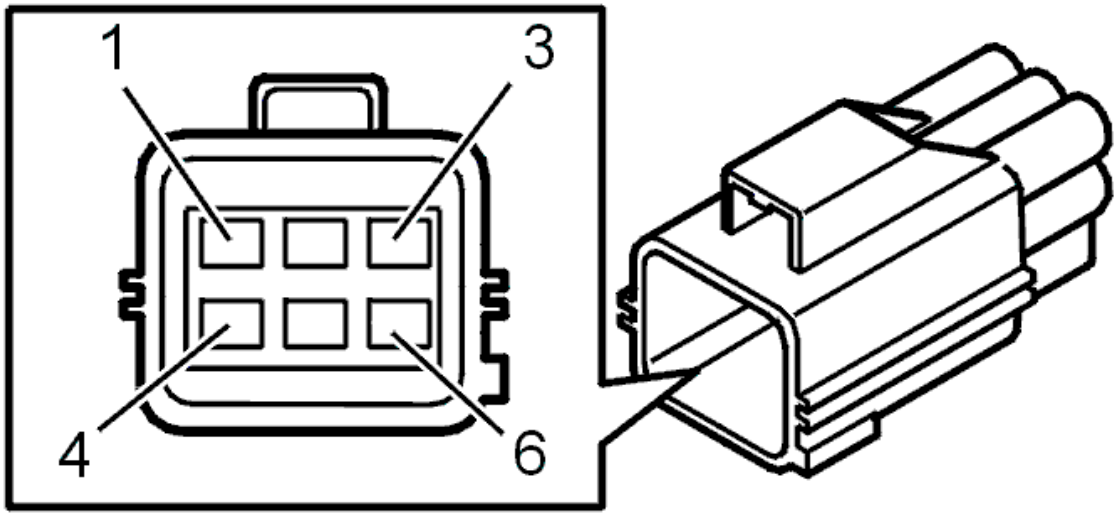


Fig. 13: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

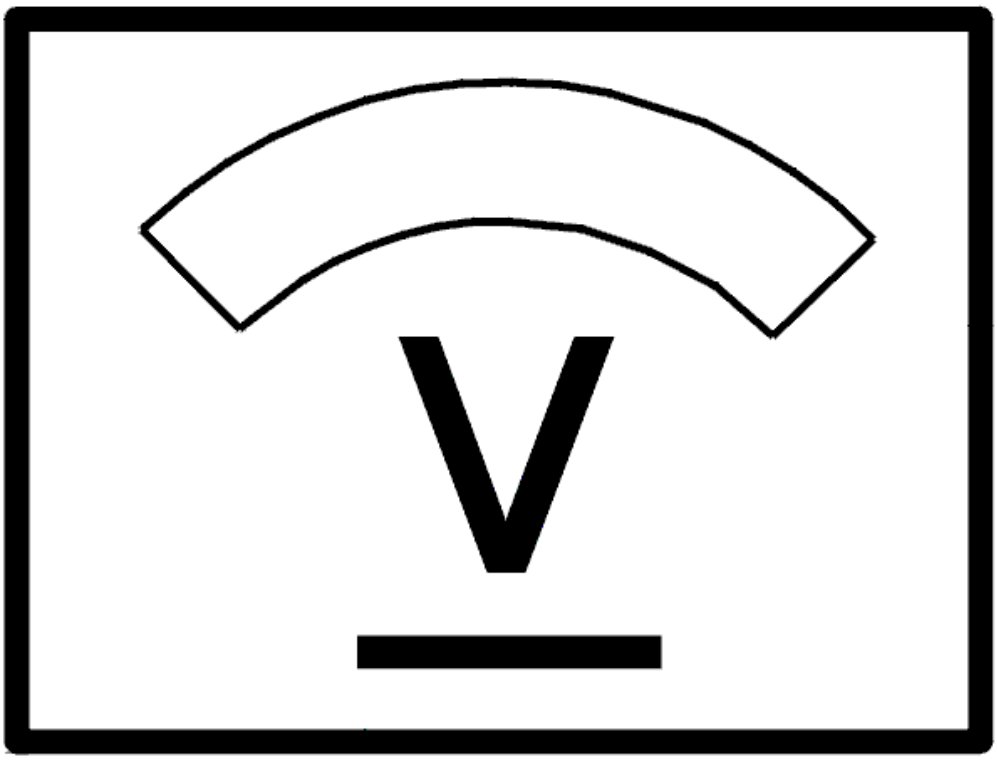


Fig. 14: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

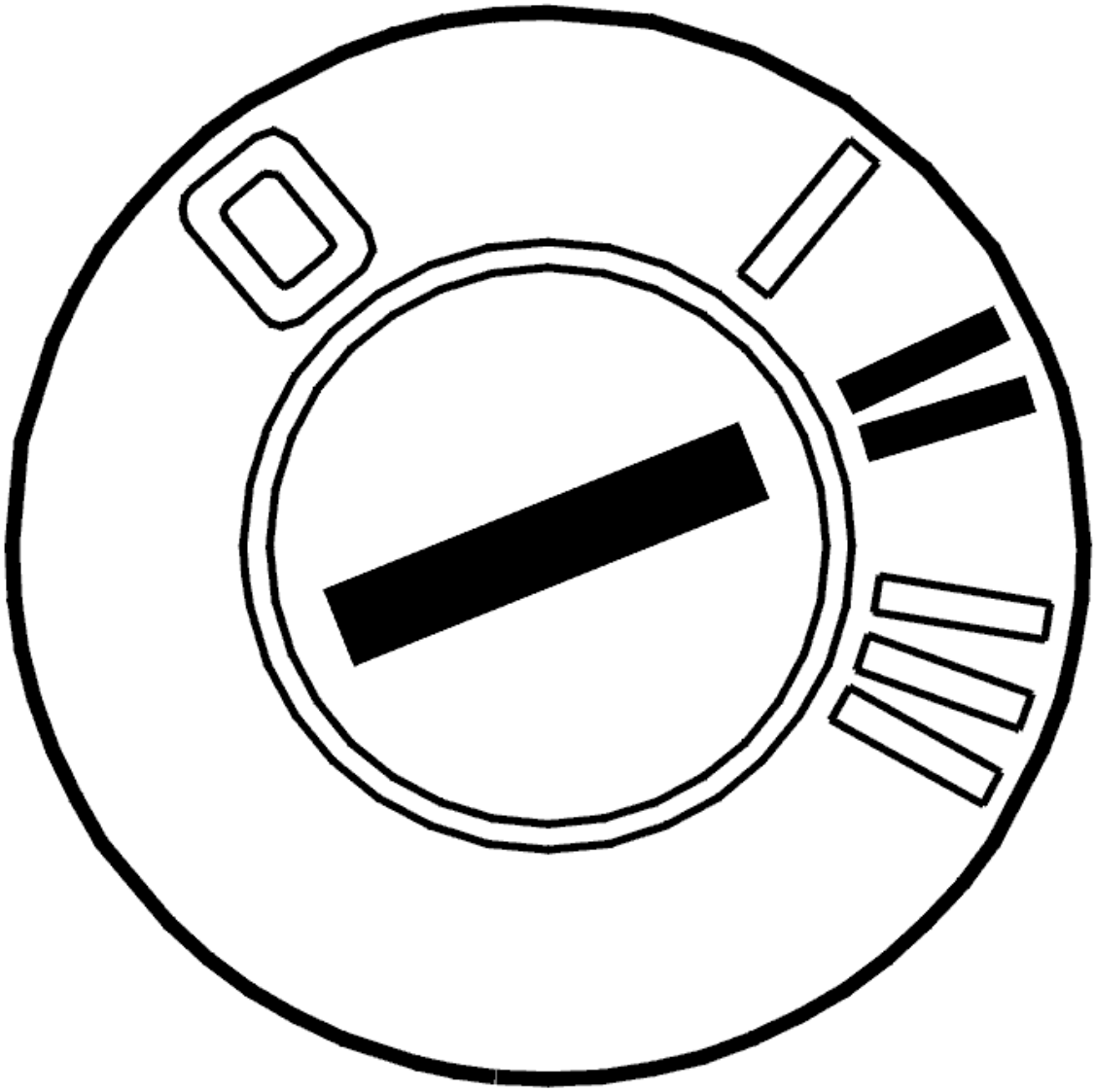


Fig. 15: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

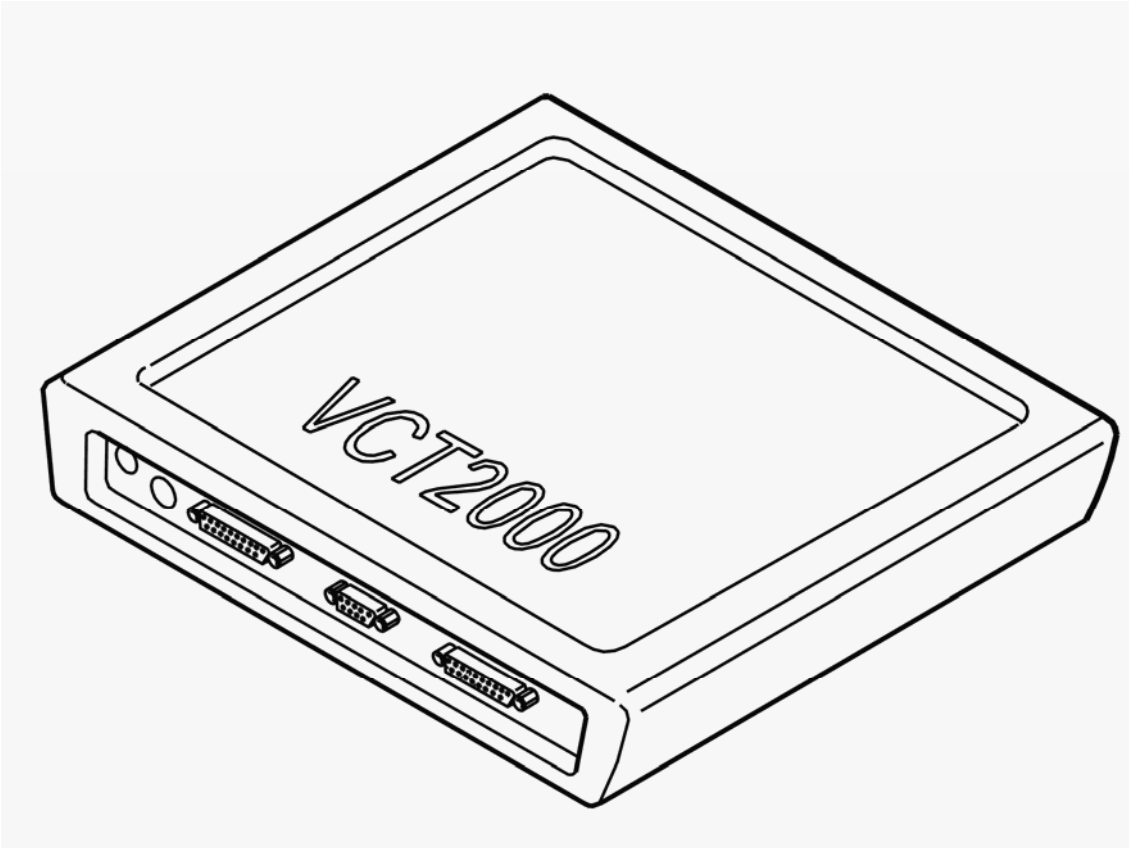


Fig. 16: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

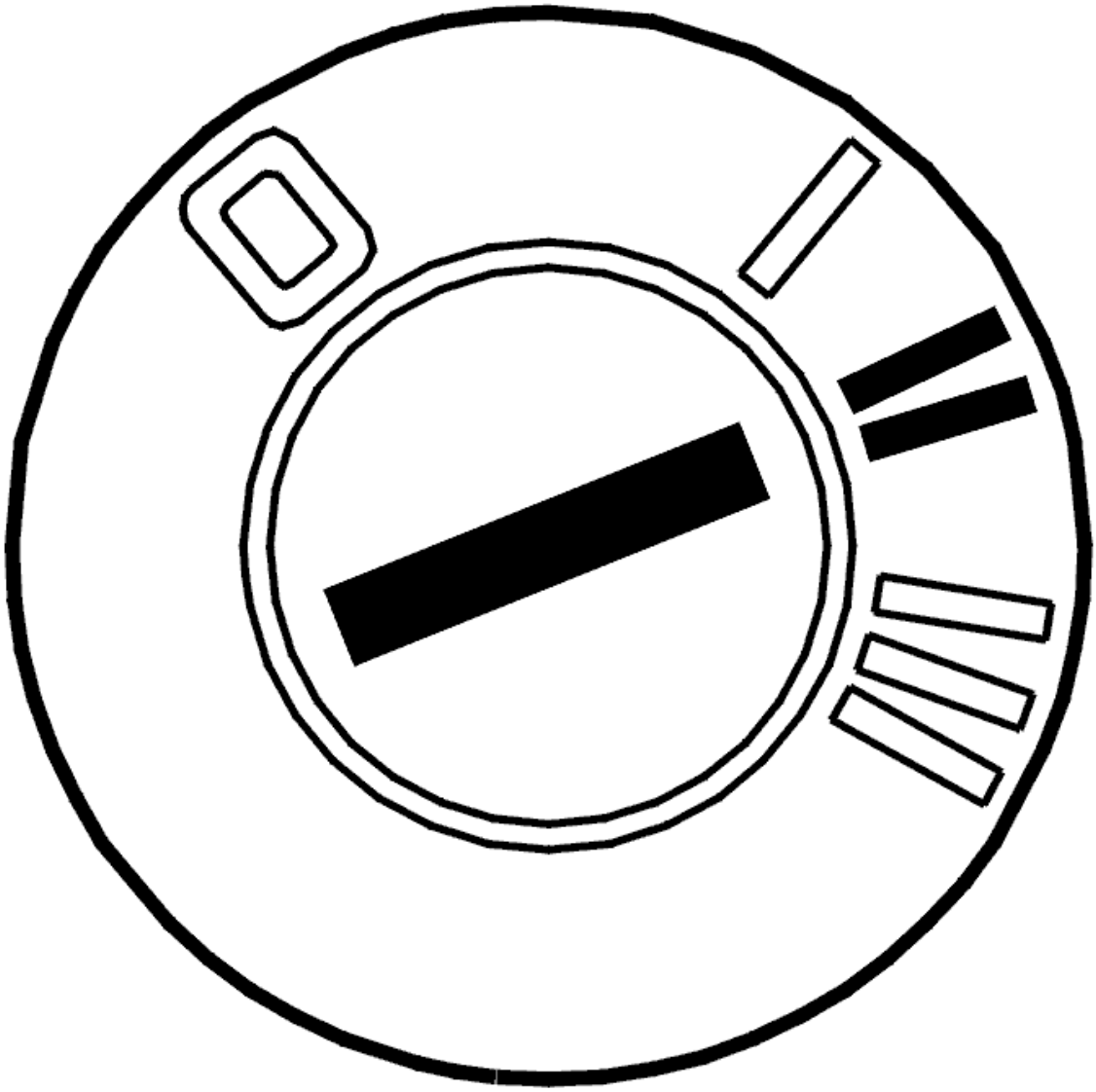


Fig. 17: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

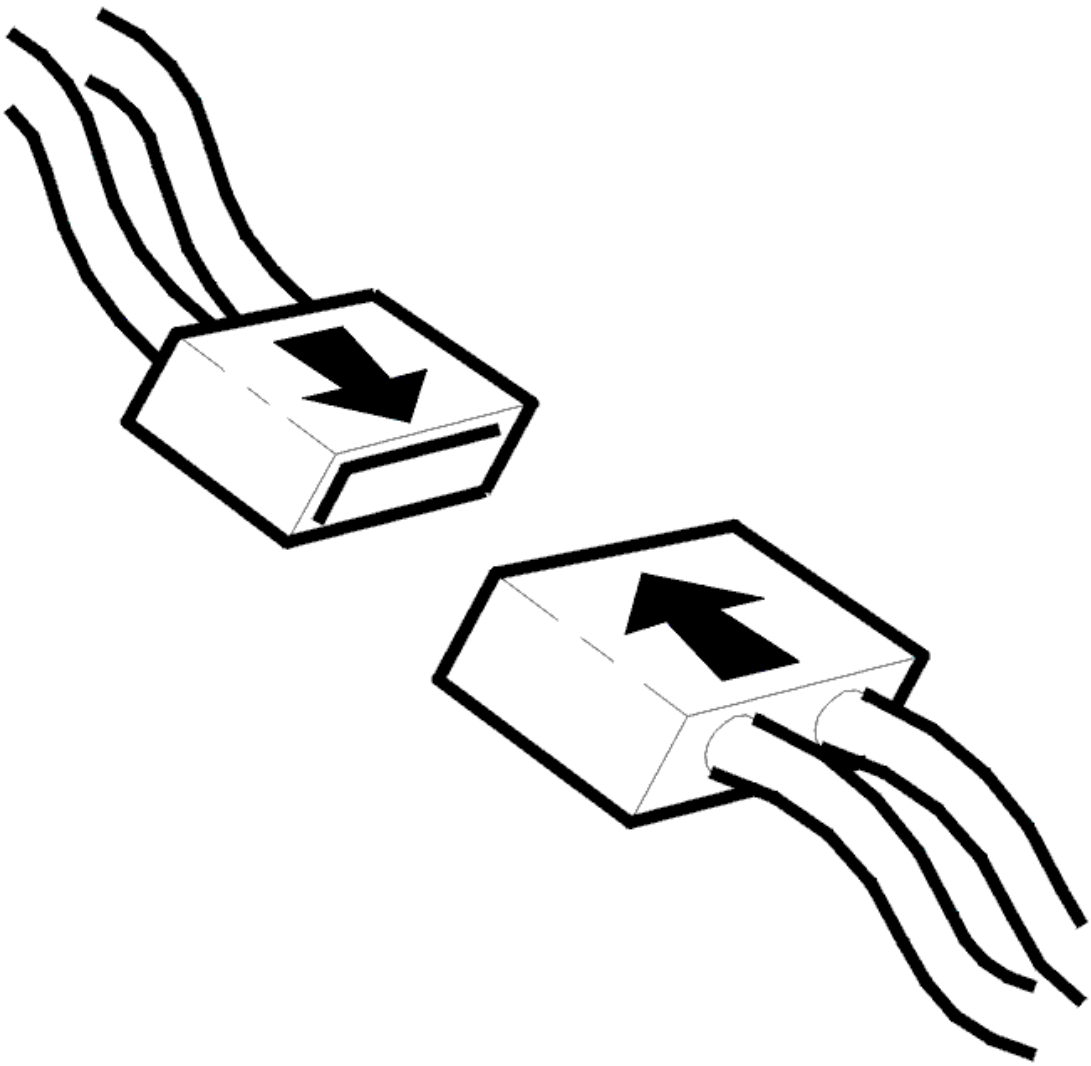


Fig. 18: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S5.

The value should change between OFF and ON.

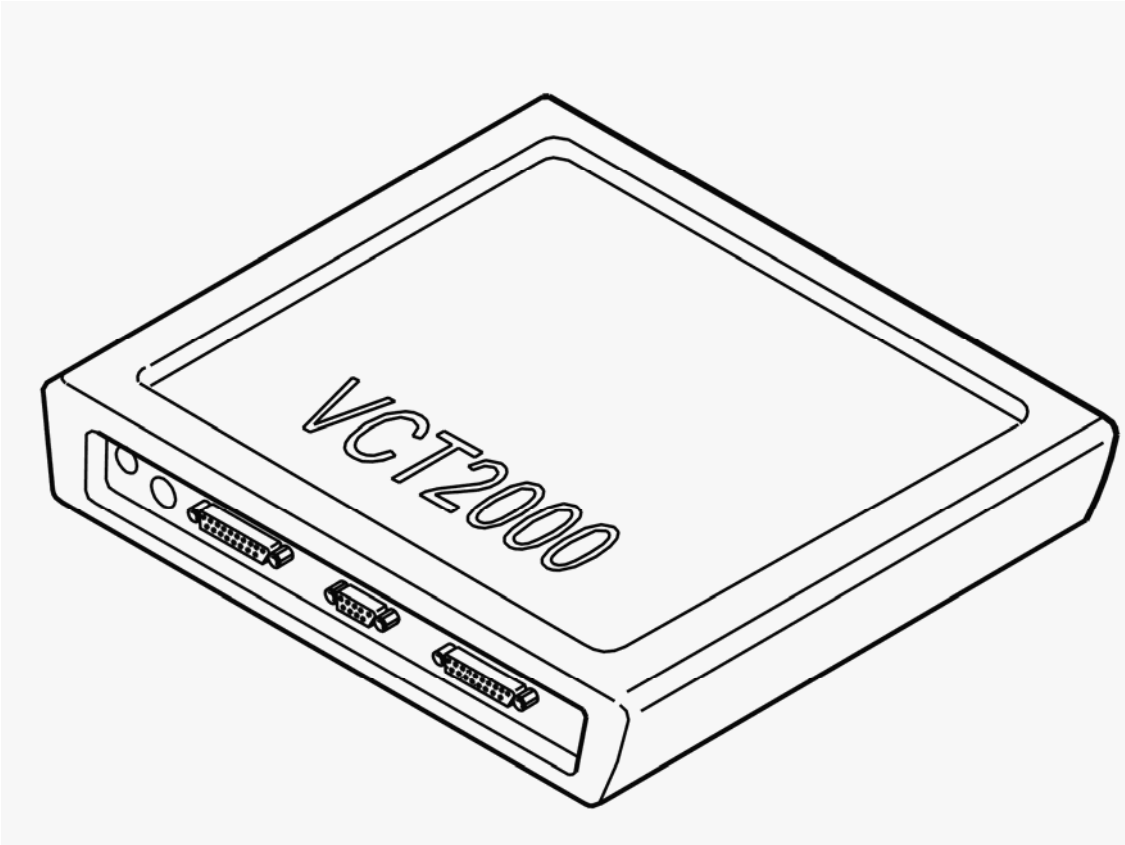


Fig. 19: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change between OFF and ON?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

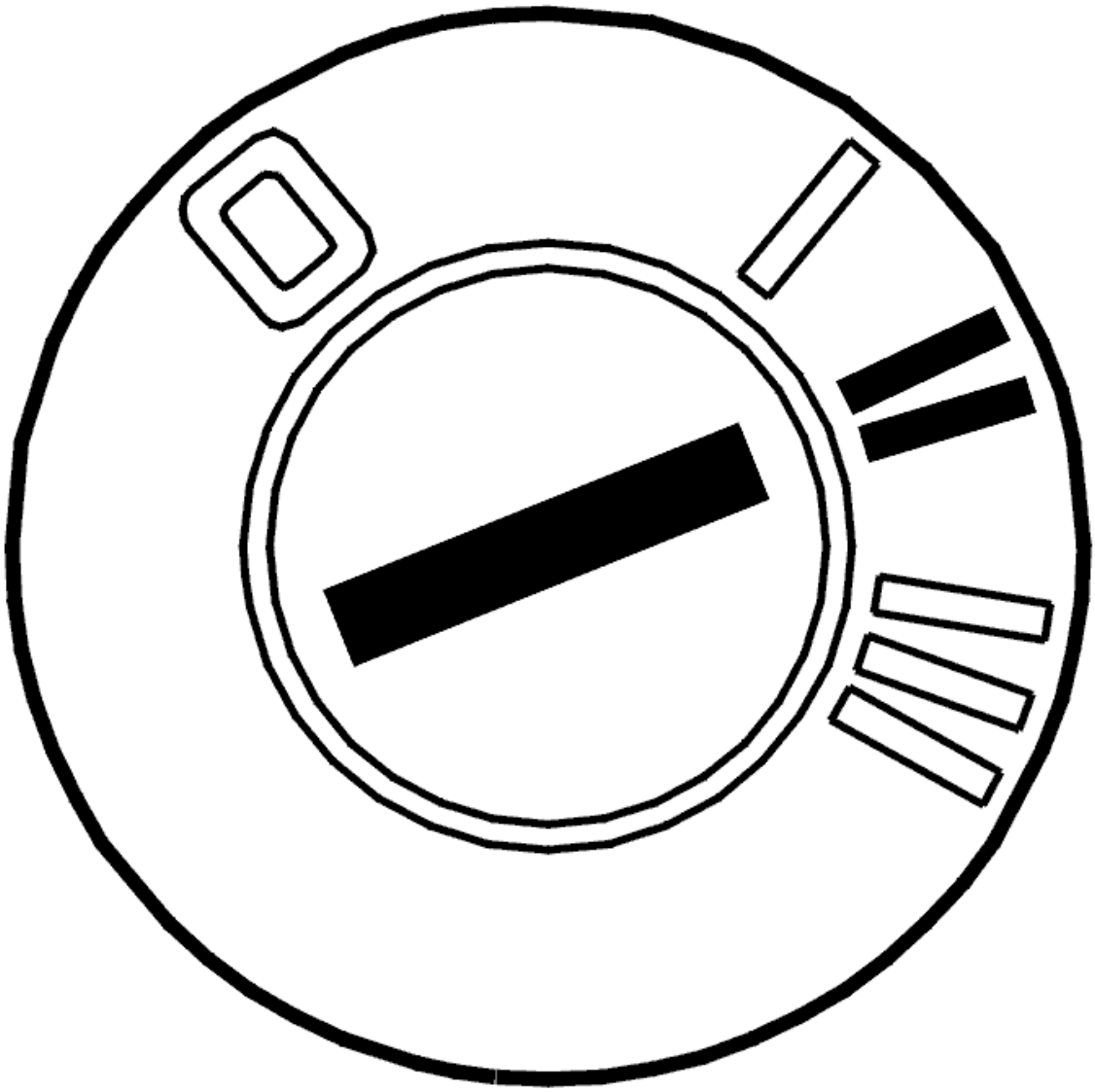


Fig. 20: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

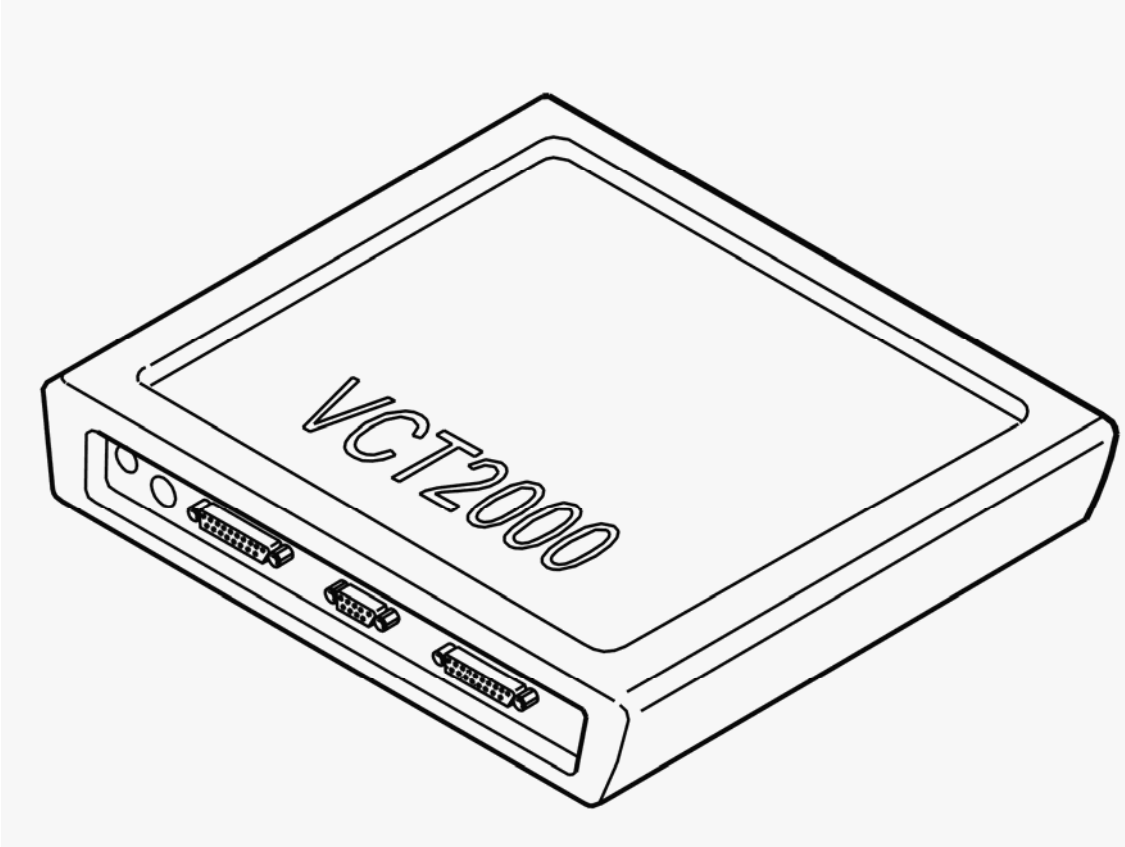


Fig. 21: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

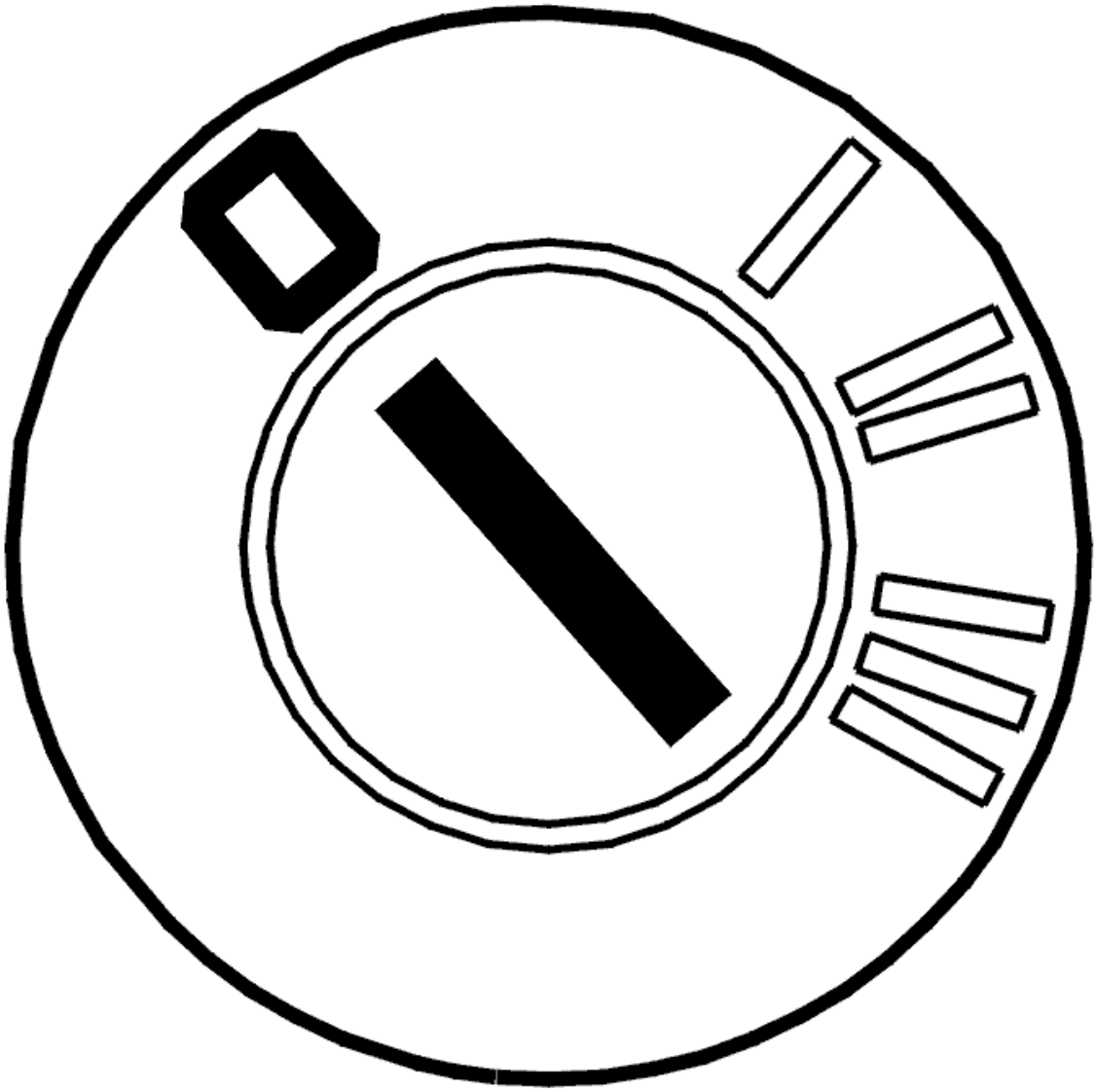


Fig. 22: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

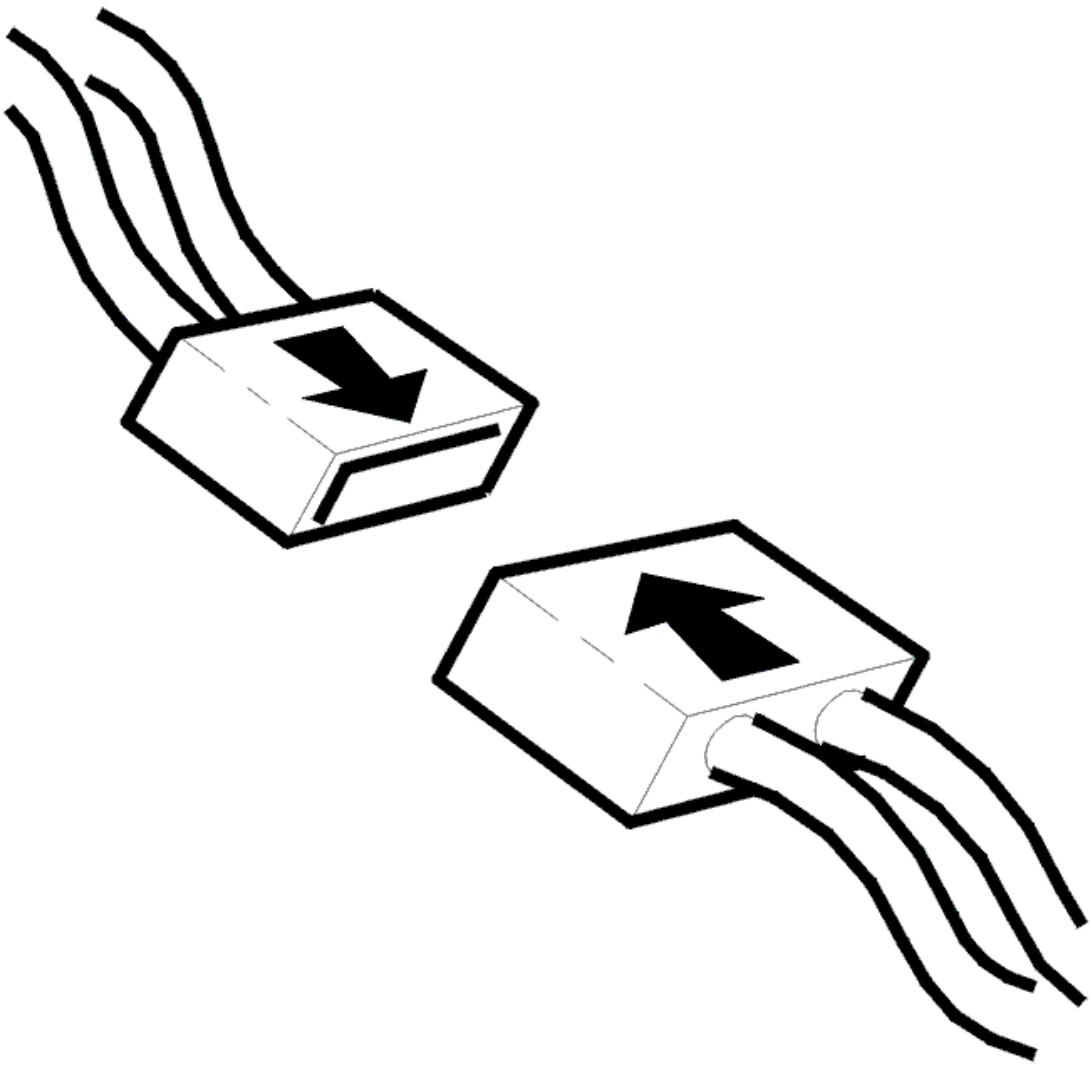


Fig. 23: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

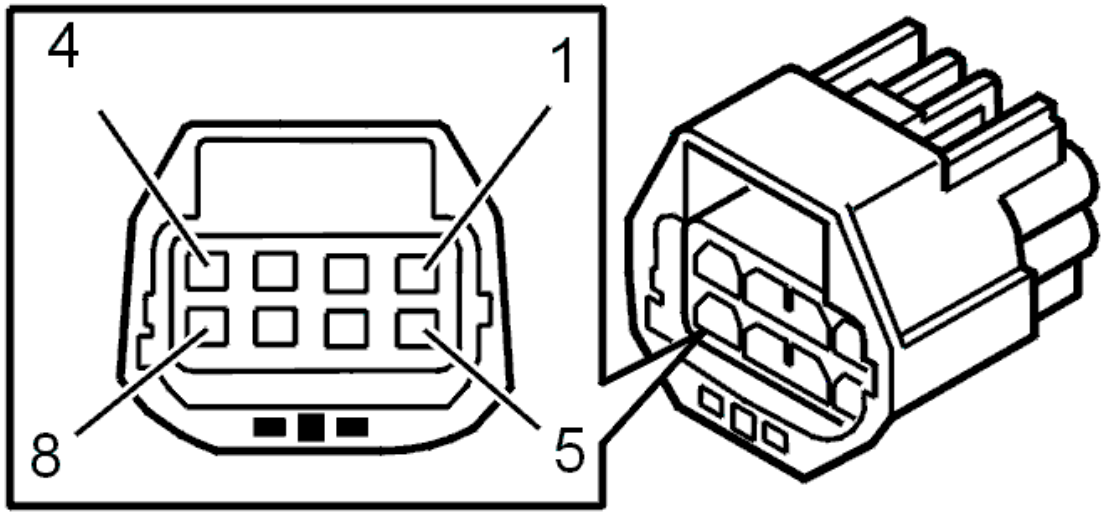


Fig. 24: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

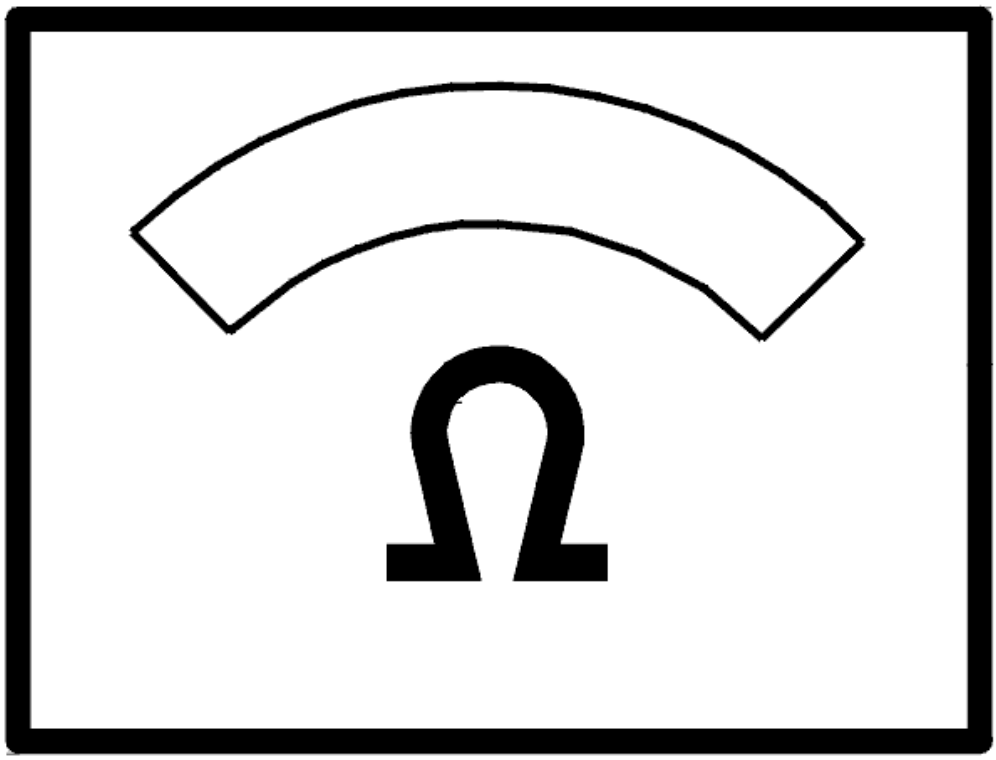


Fig. 25: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

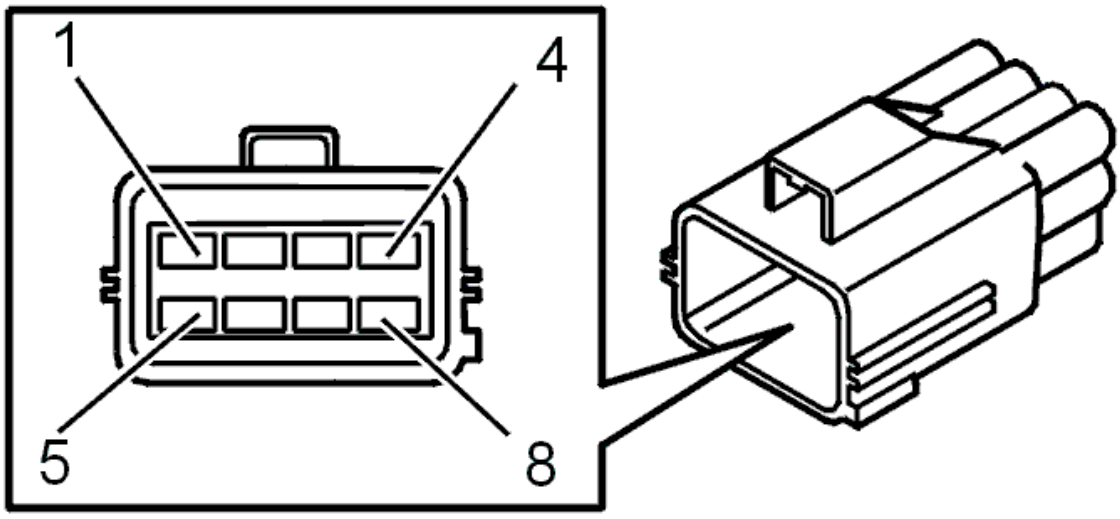


Fig. 26: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

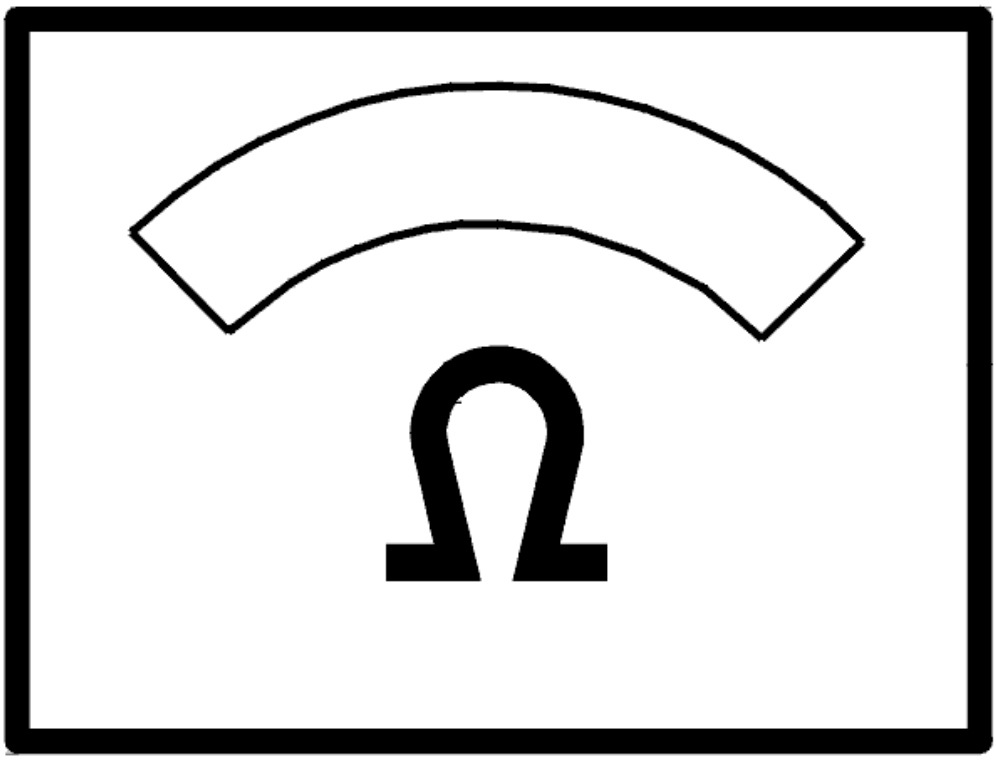


Fig. 27: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

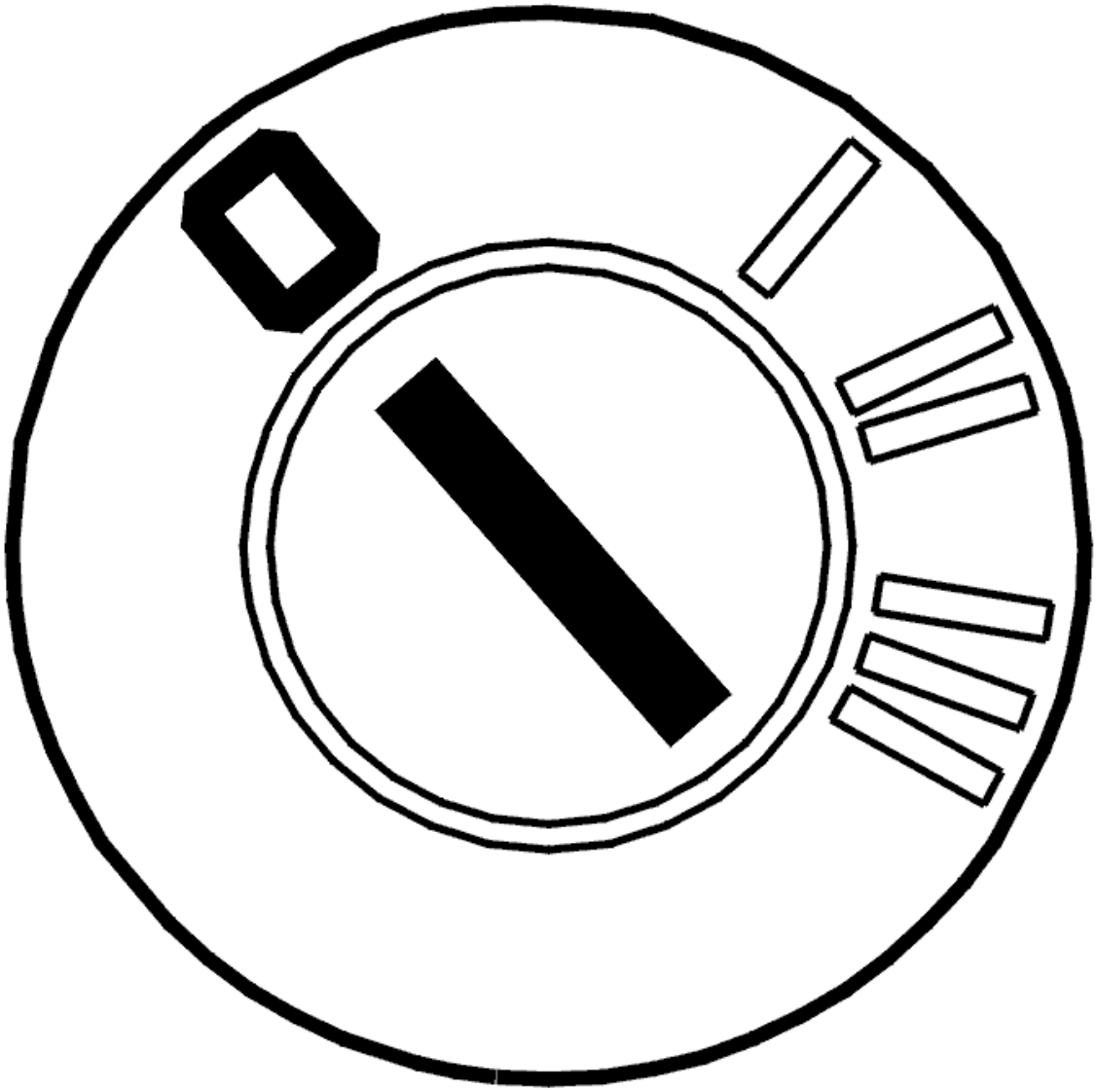


Fig. 28: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

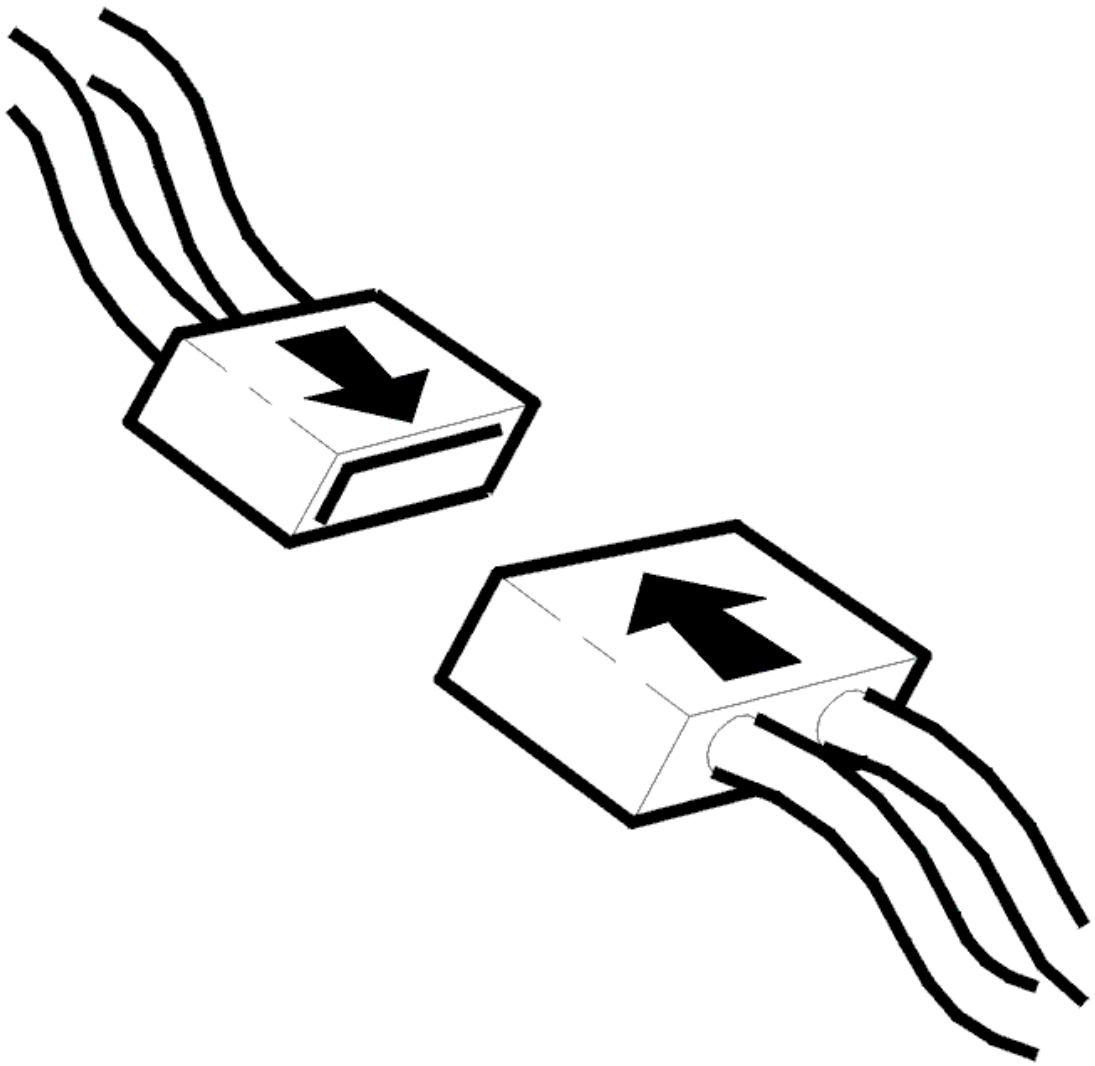


Fig. 29: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

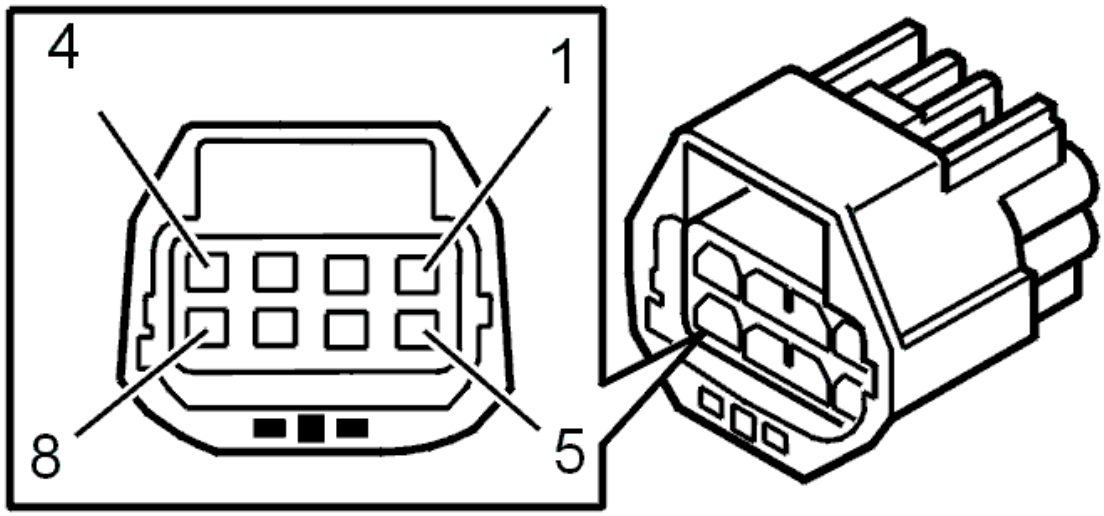


Fig. 30: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

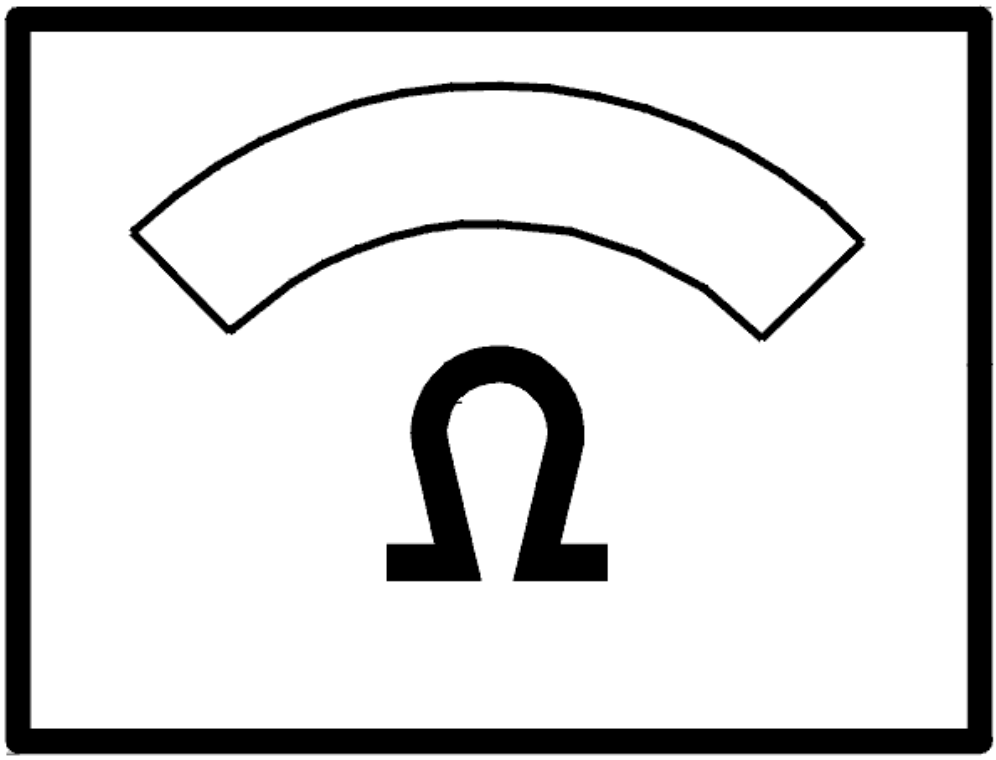


Fig. 31: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

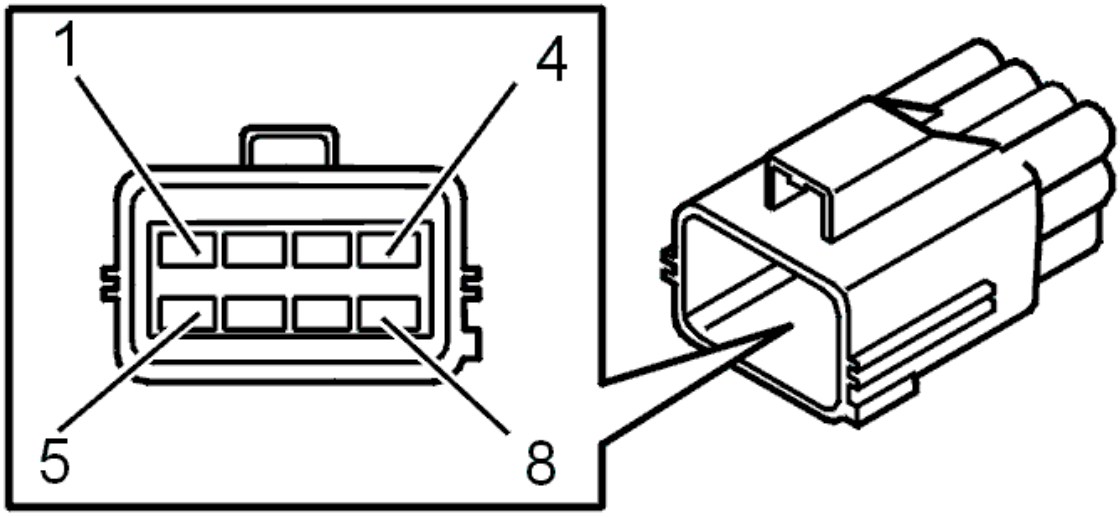


Fig. 32: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

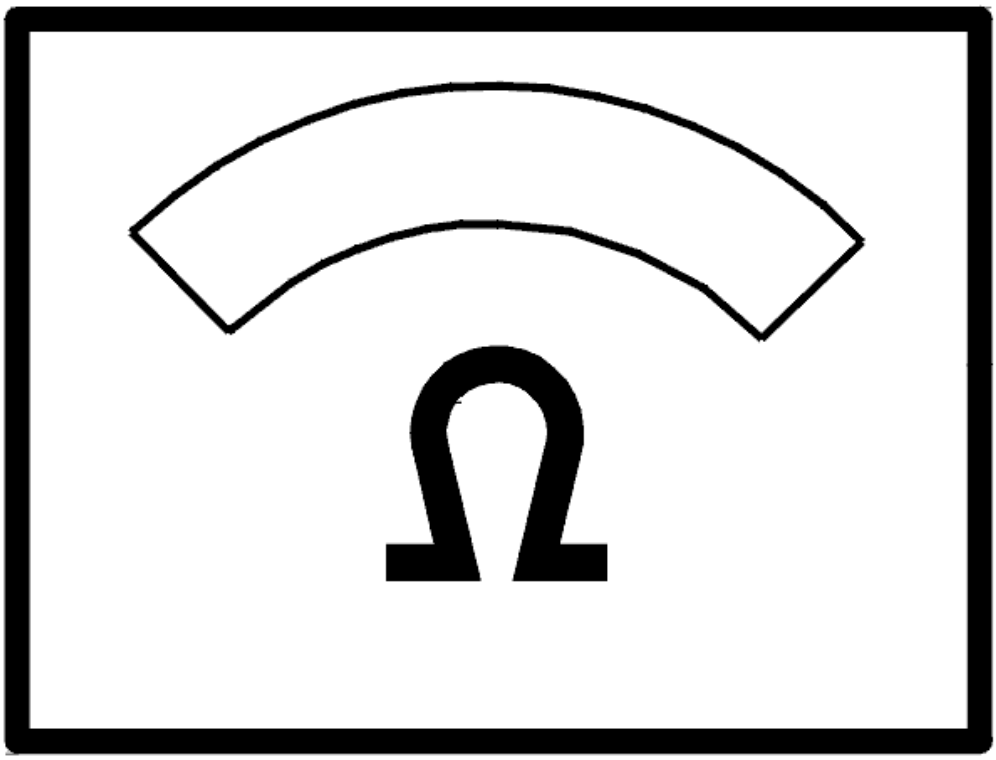


Fig. 33: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

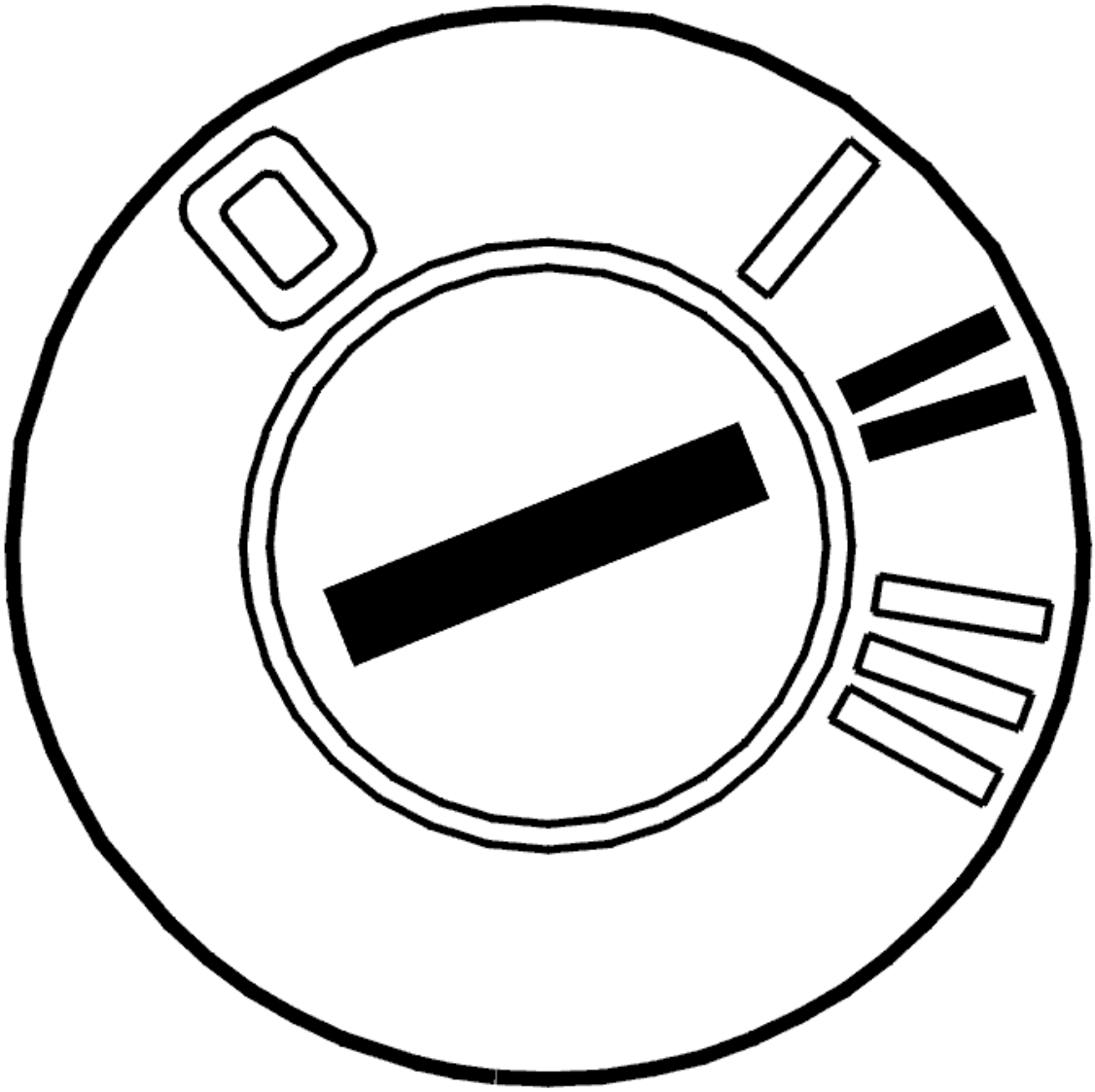


Fig. 34: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

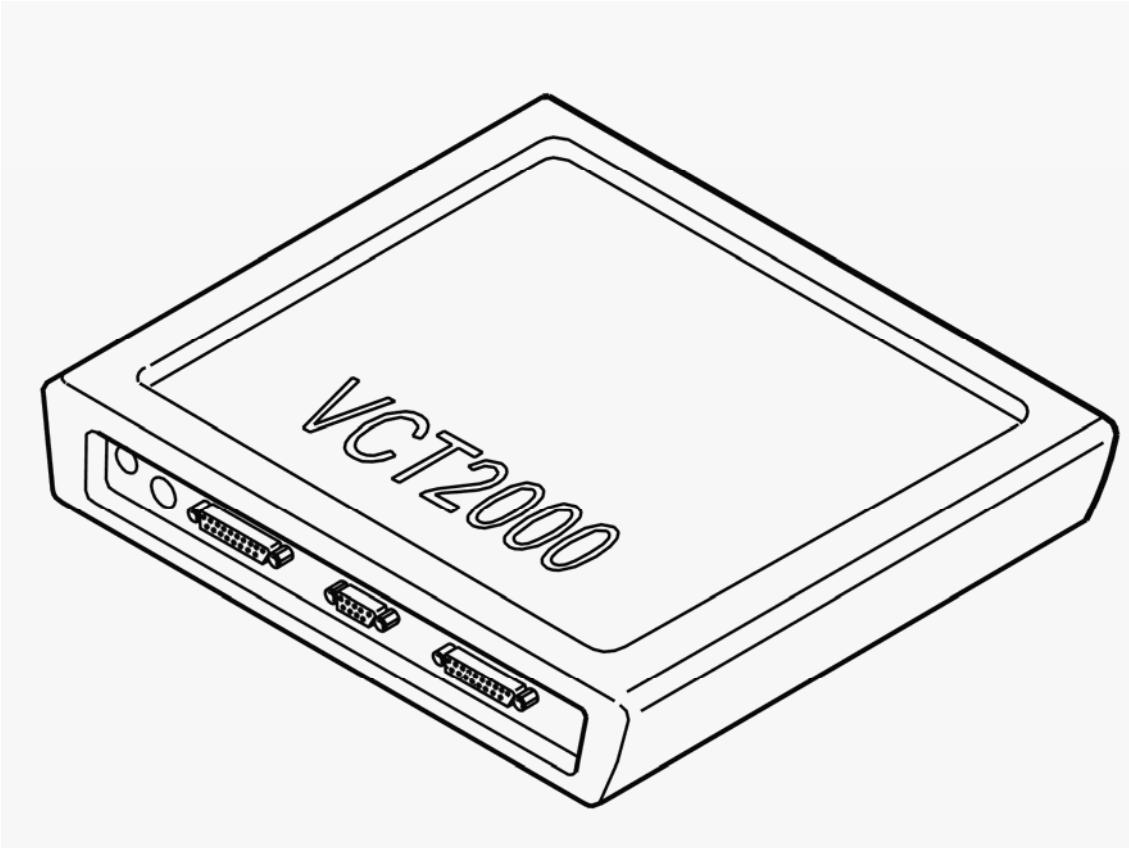


Fig. 35: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

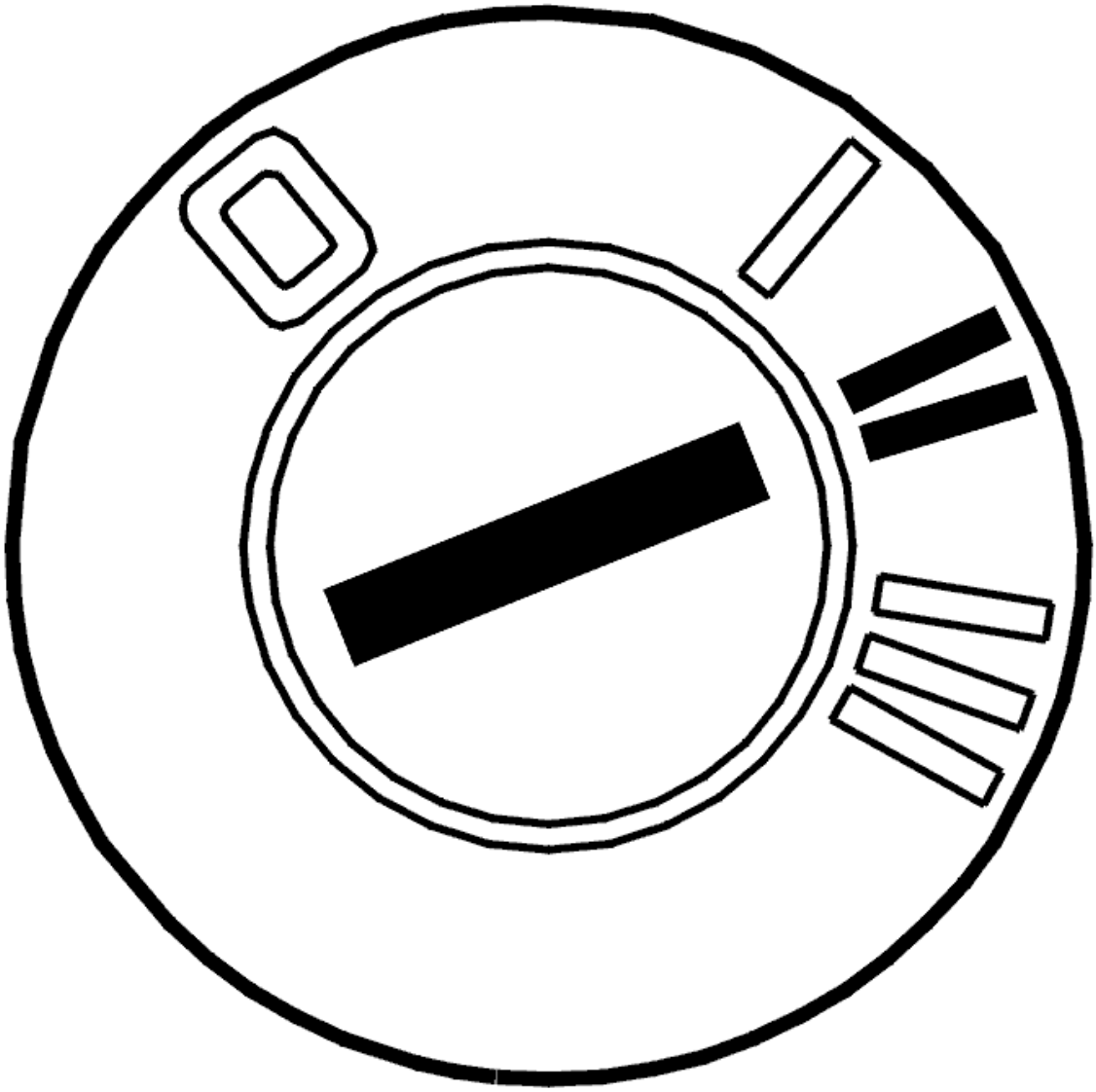


Fig. 36: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

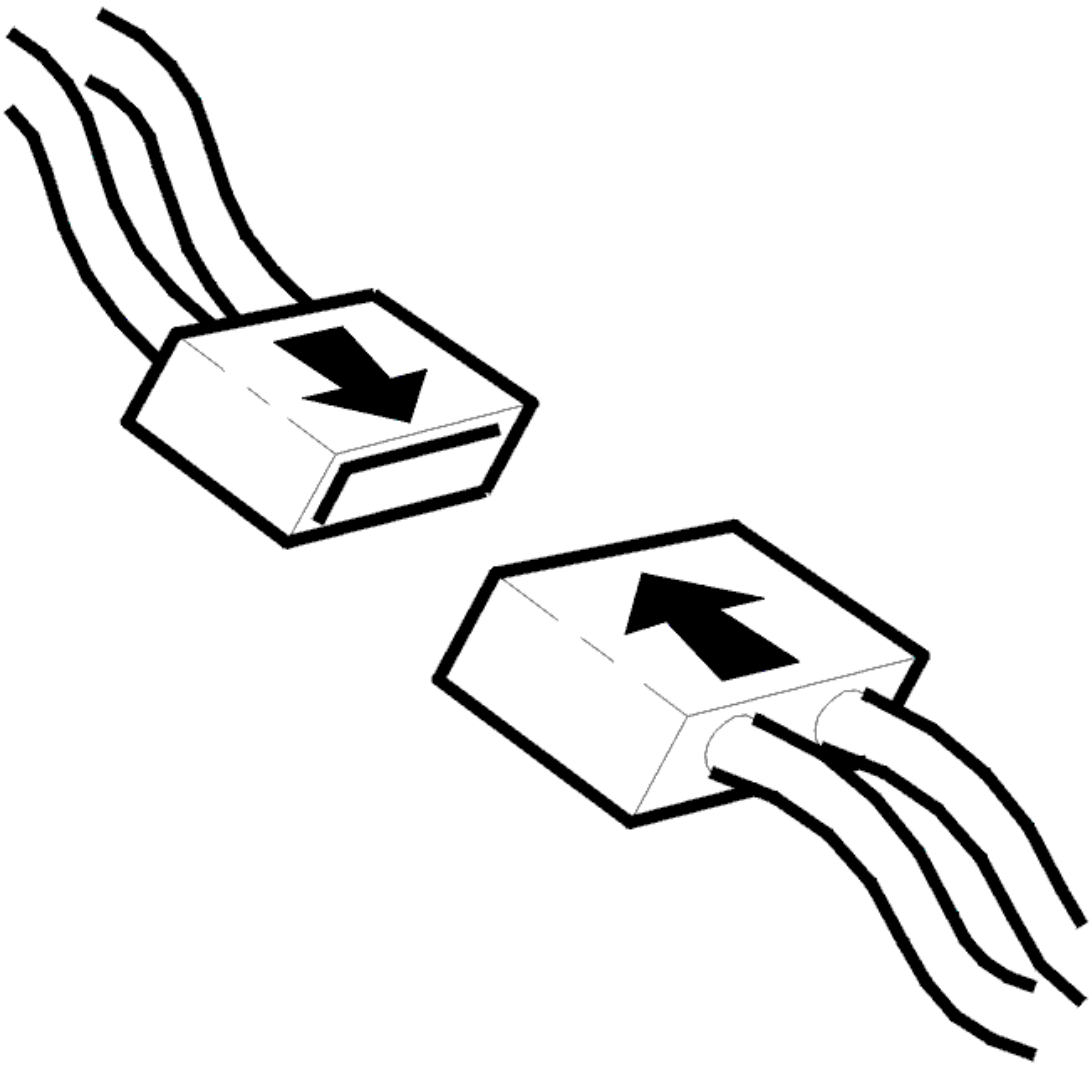


Fig. 37: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

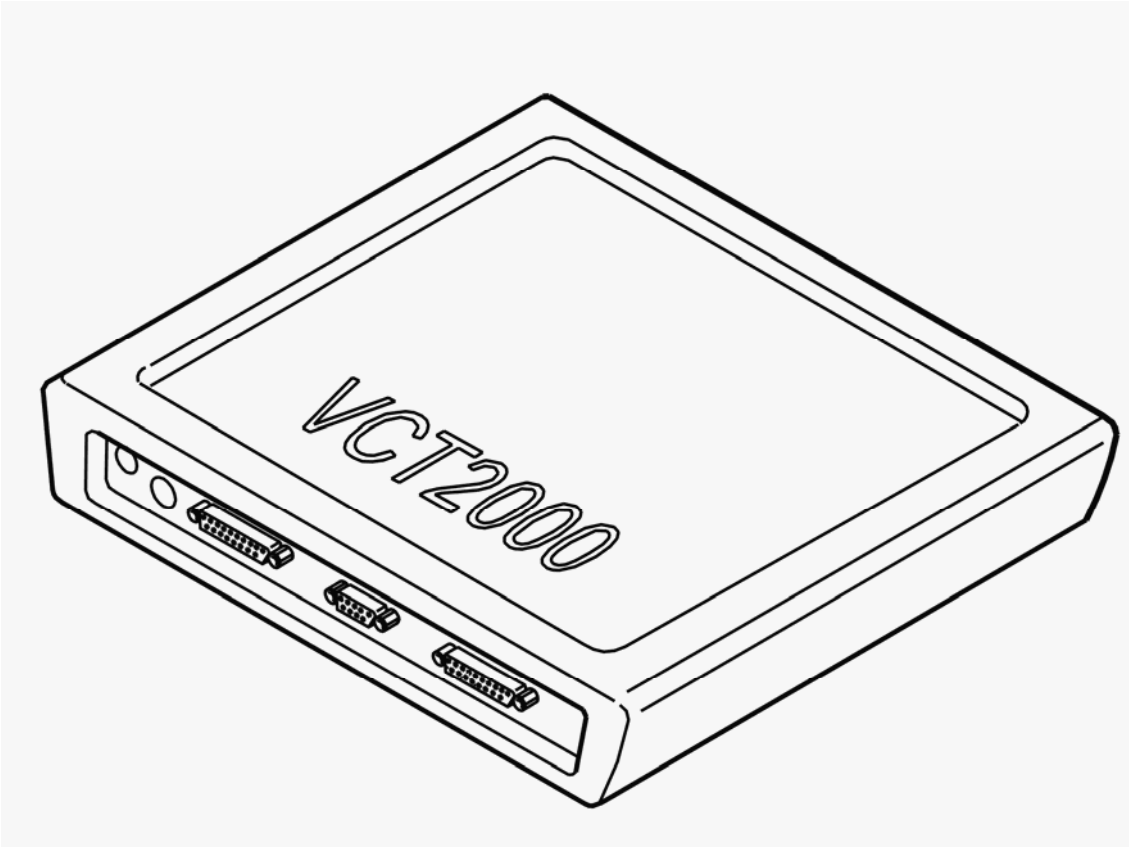


Fig. 38: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-010B: SHIFT SOLENOID S5. SIGNAL MISSING (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

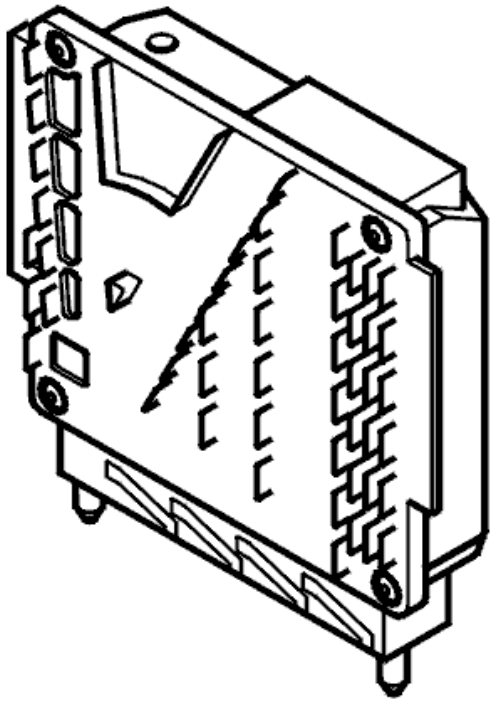


Fig. 39: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0002, TCM-0008, TCM-0102, TCM-0108 or TCM-010B are stored (depending on the solenoid) if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is missing when the solenoid is activated.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Contact resistance in terminals.
- Open-circuit in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

SIGNAL MISSING

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

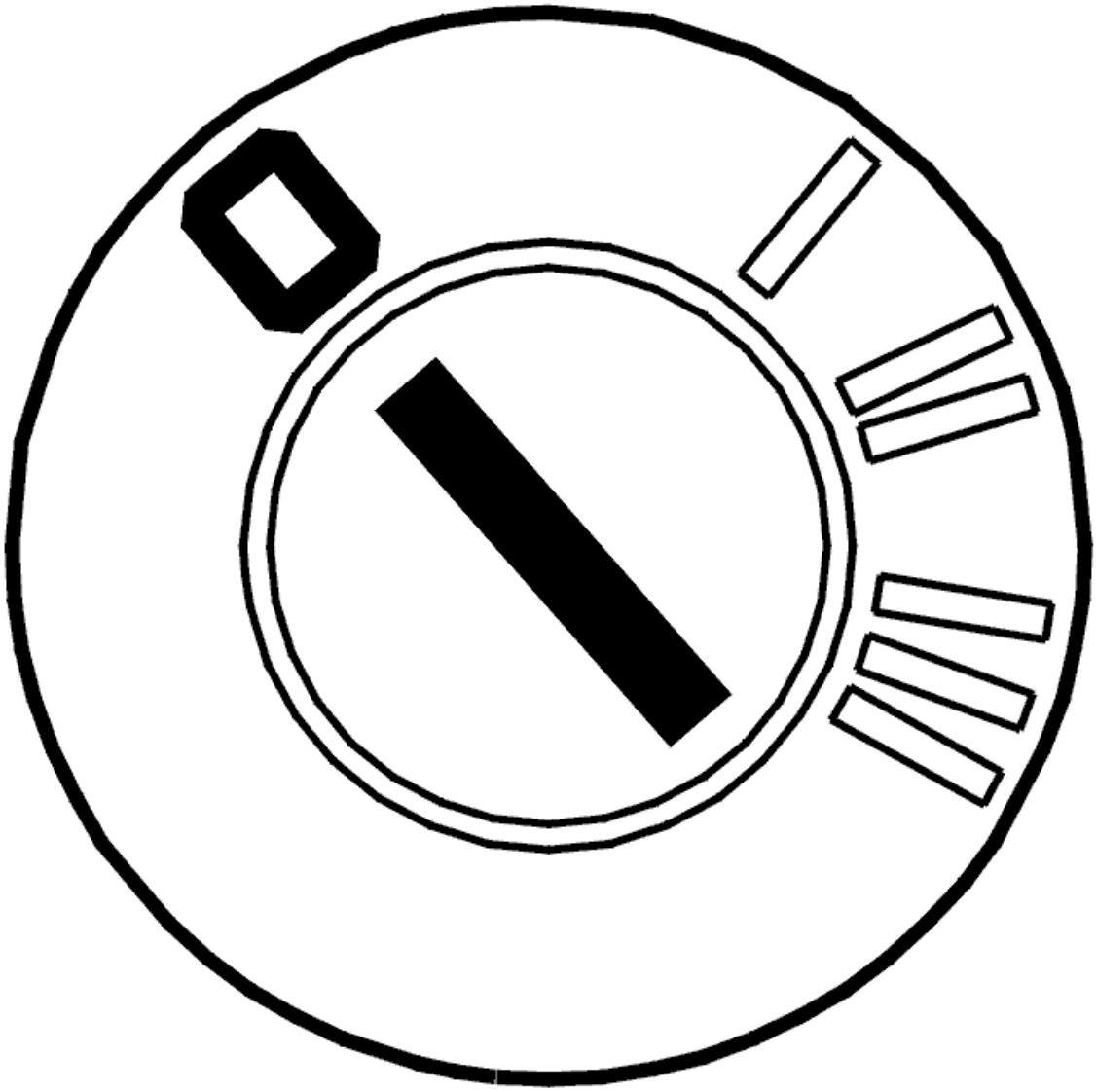


Fig. 40: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

  HINT: If the temperature is outside its permitted range, fault-trace the temperature sensor.

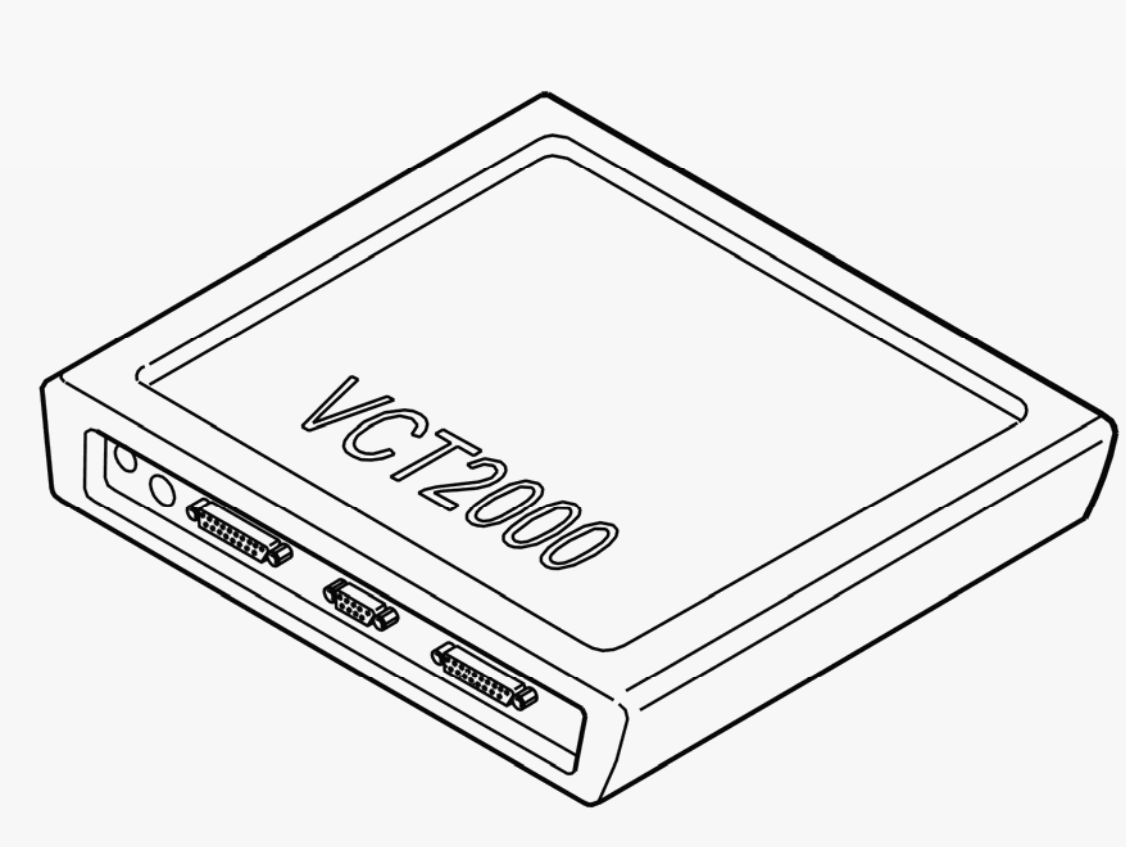


Fig. 41: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S5**

- **NO**

  Refer to **FAULTY SIGNAL**

CHECKING SHIFT SOLENOID S5

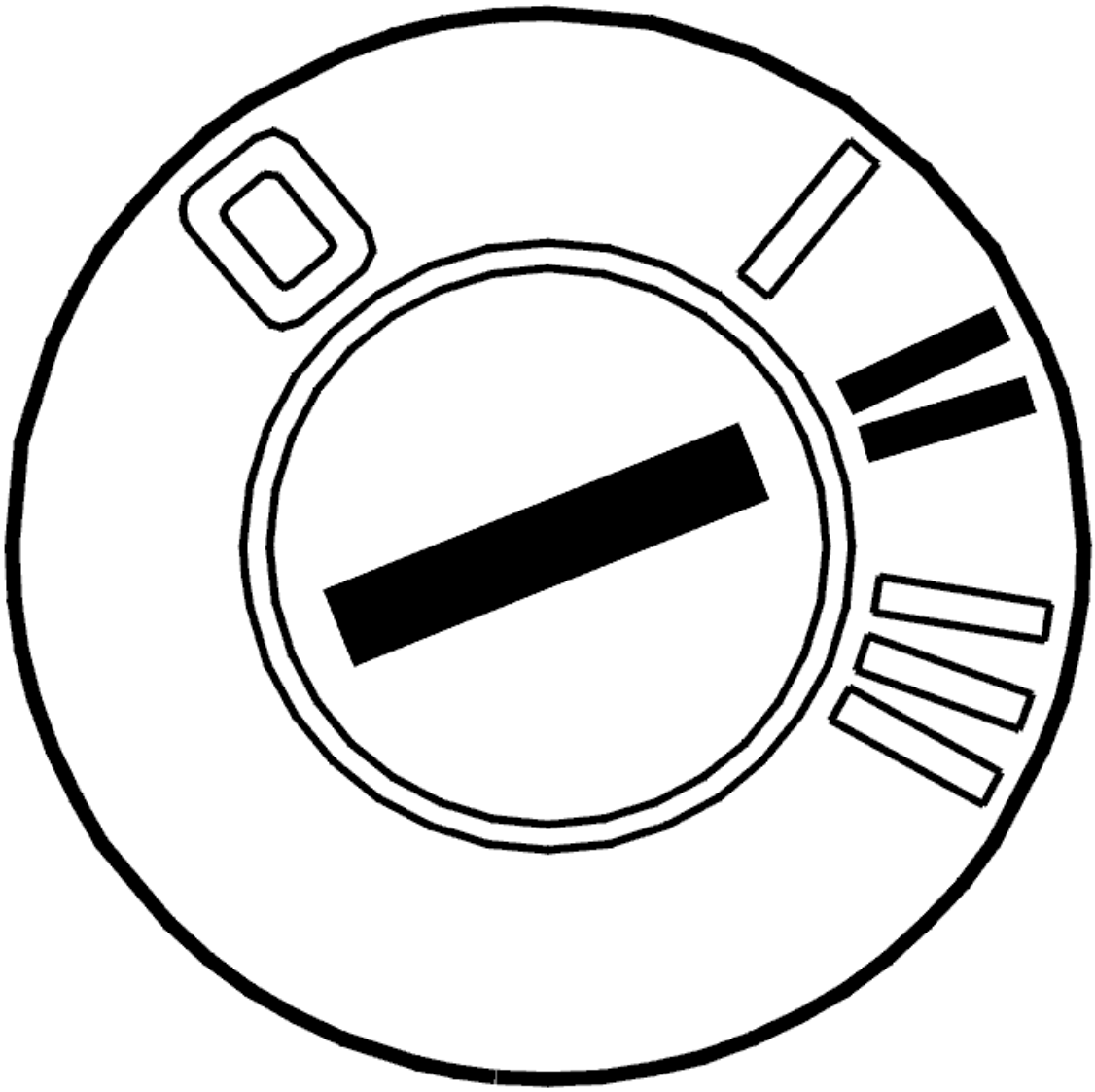


Fig. 42: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S5.

  The current should oscillate between 0 and approximately 1.5 A.

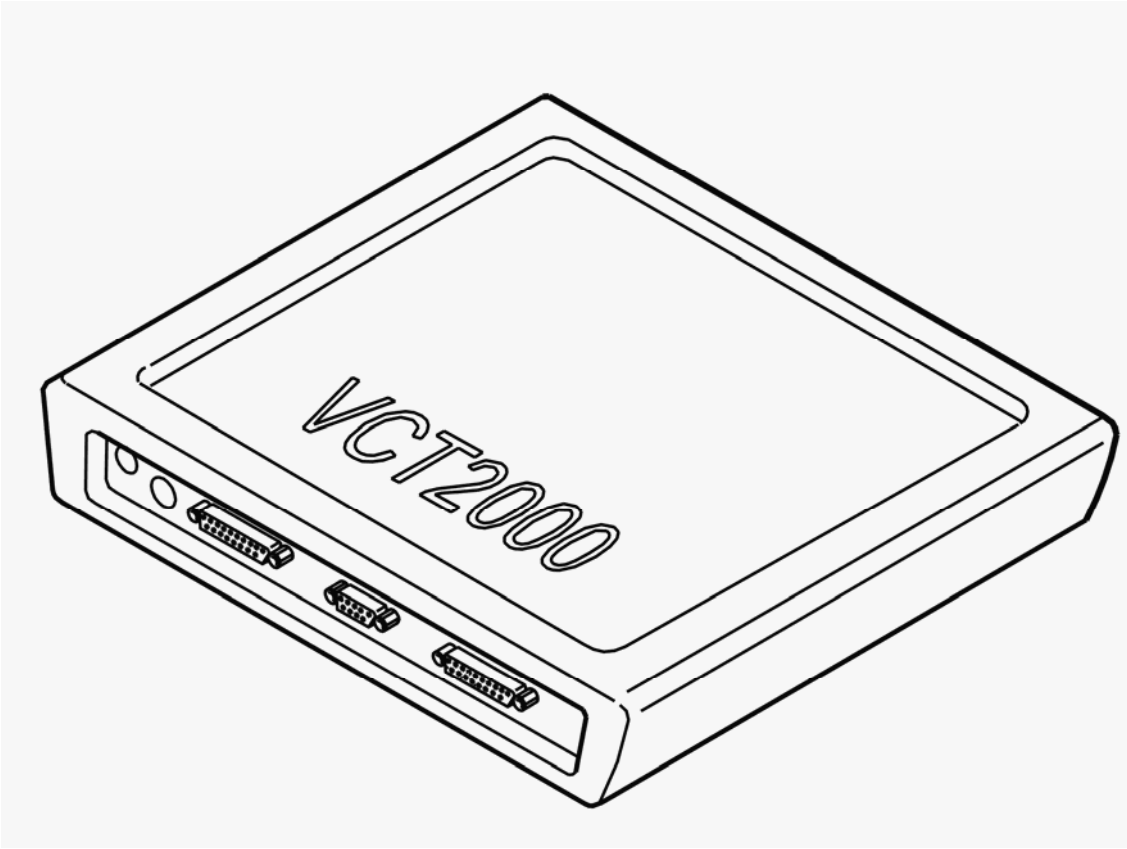


Fig. 43: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING RESISTANCE**

CHECKING RESISTANCE

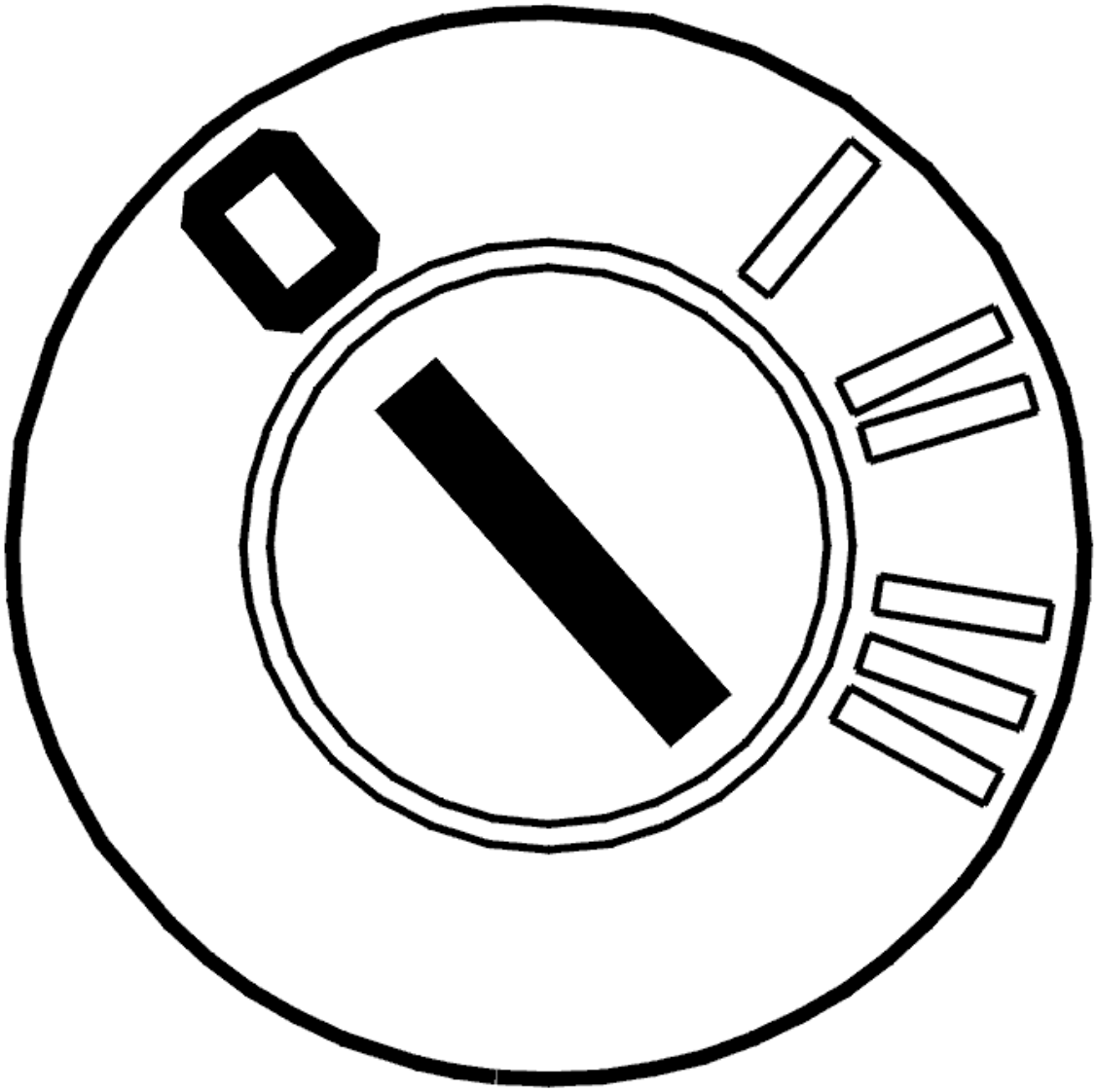


Fig. 44: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

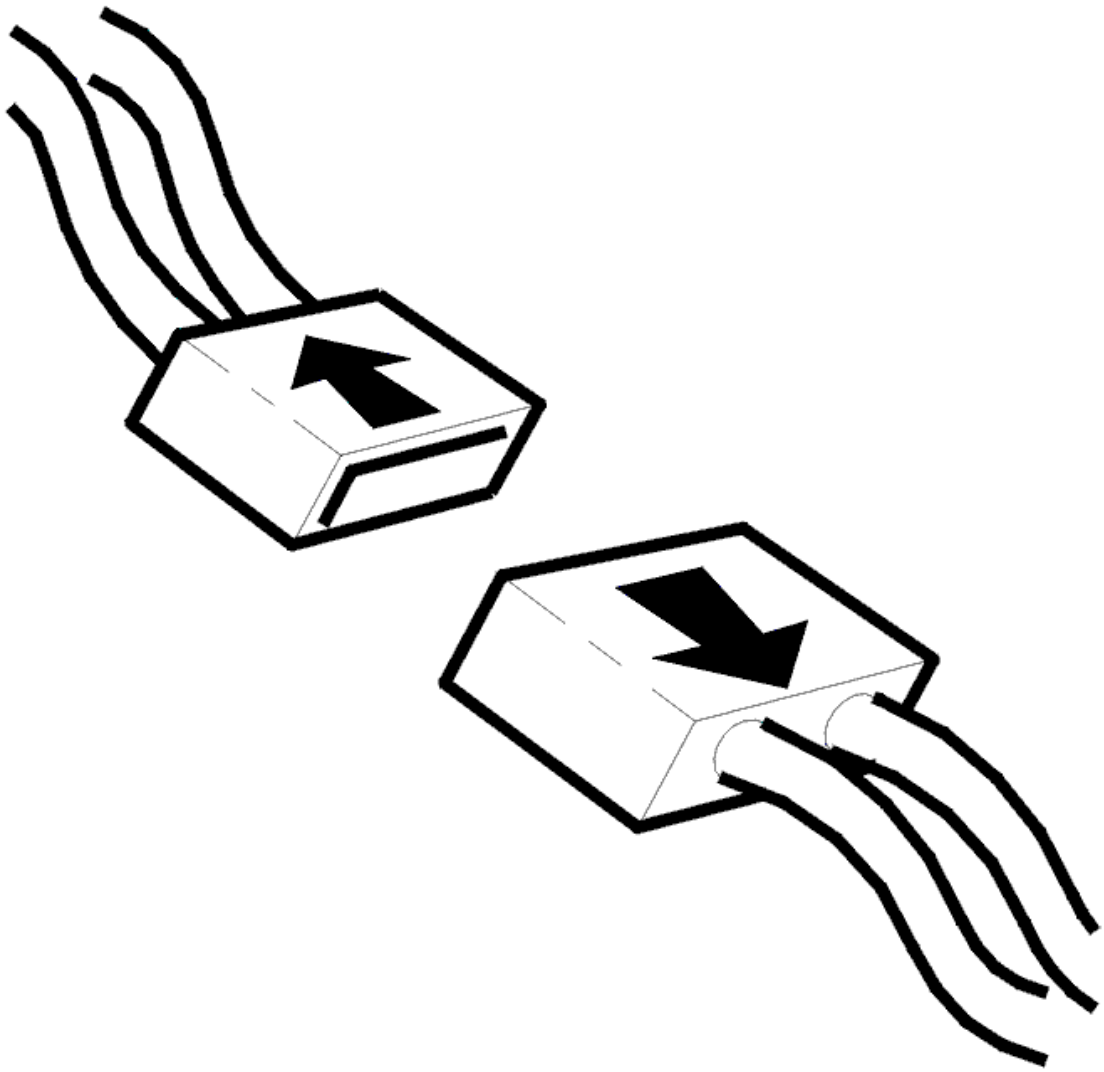


Fig. 45: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect transmission connector C.

Check solenoid S5. Measure the resistance between transmission connector terminal #C5 (transmission side) and the transmission housing. The resistance must be 11-15 ohms.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

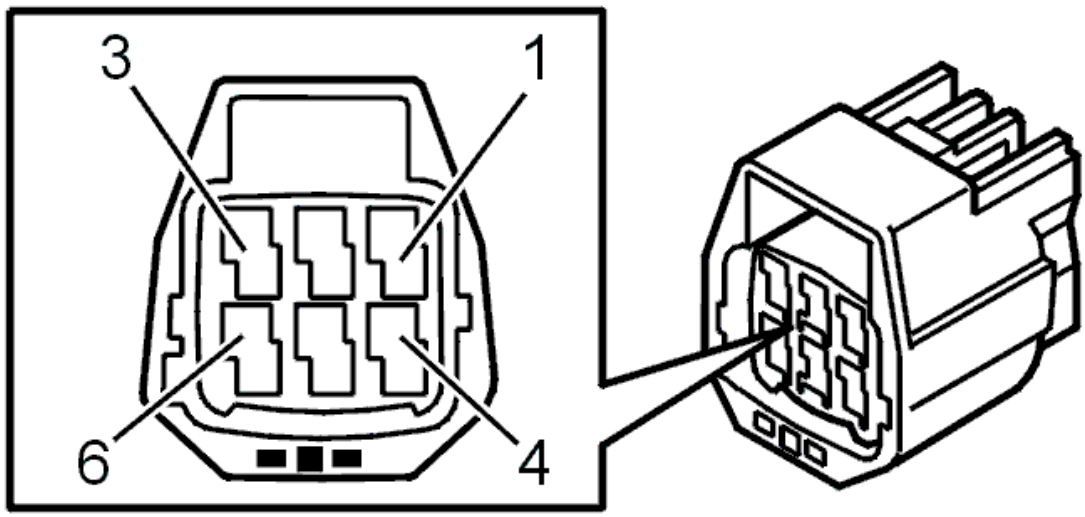


Fig. 46: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

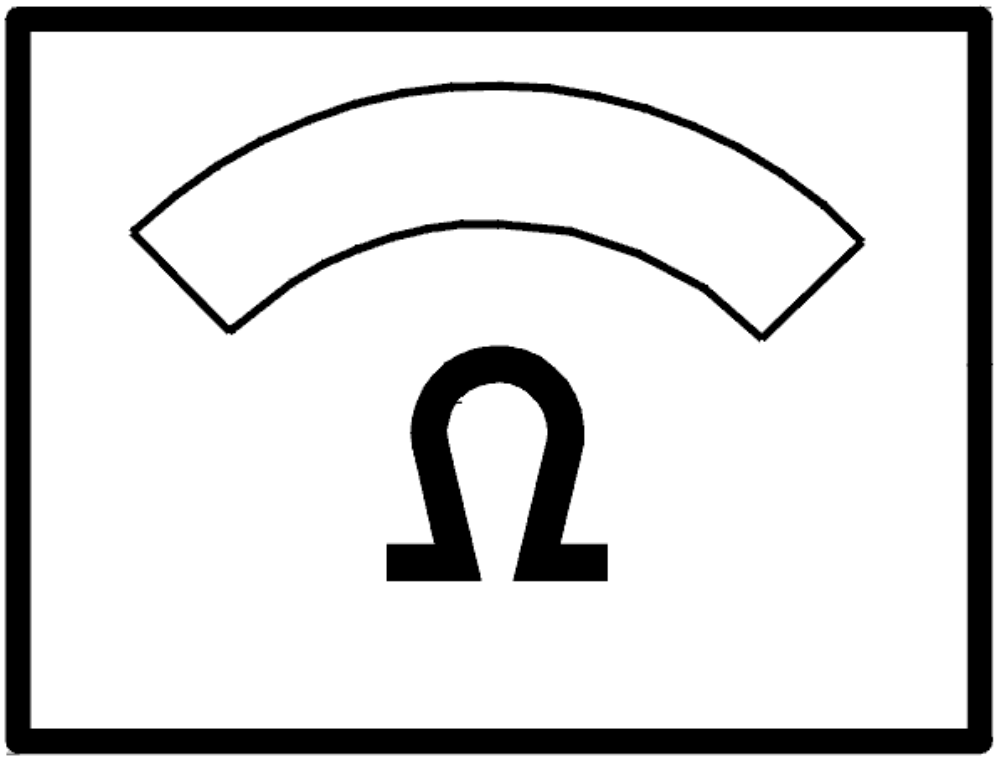


Fig. 47: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

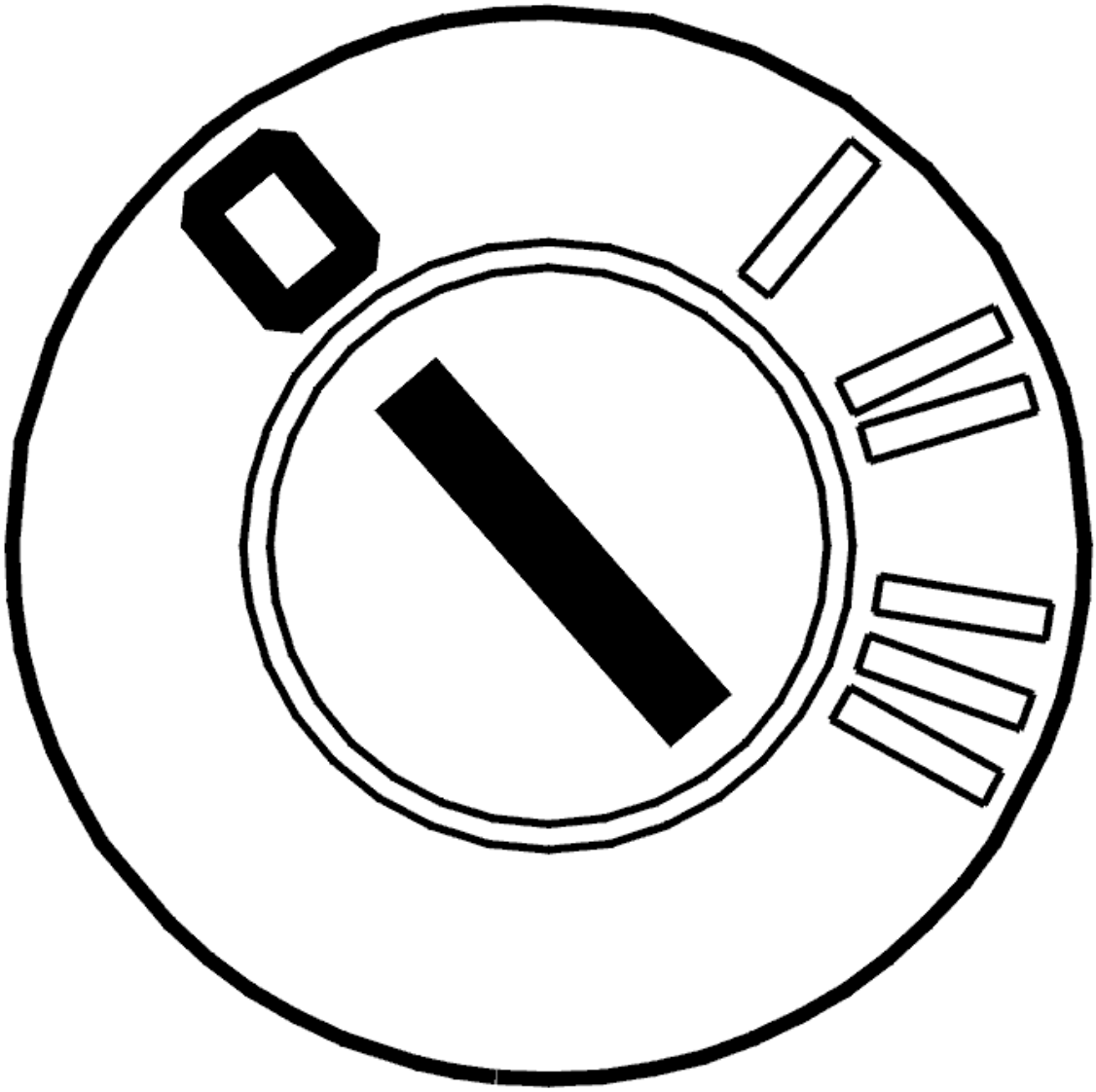


Fig. 48: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

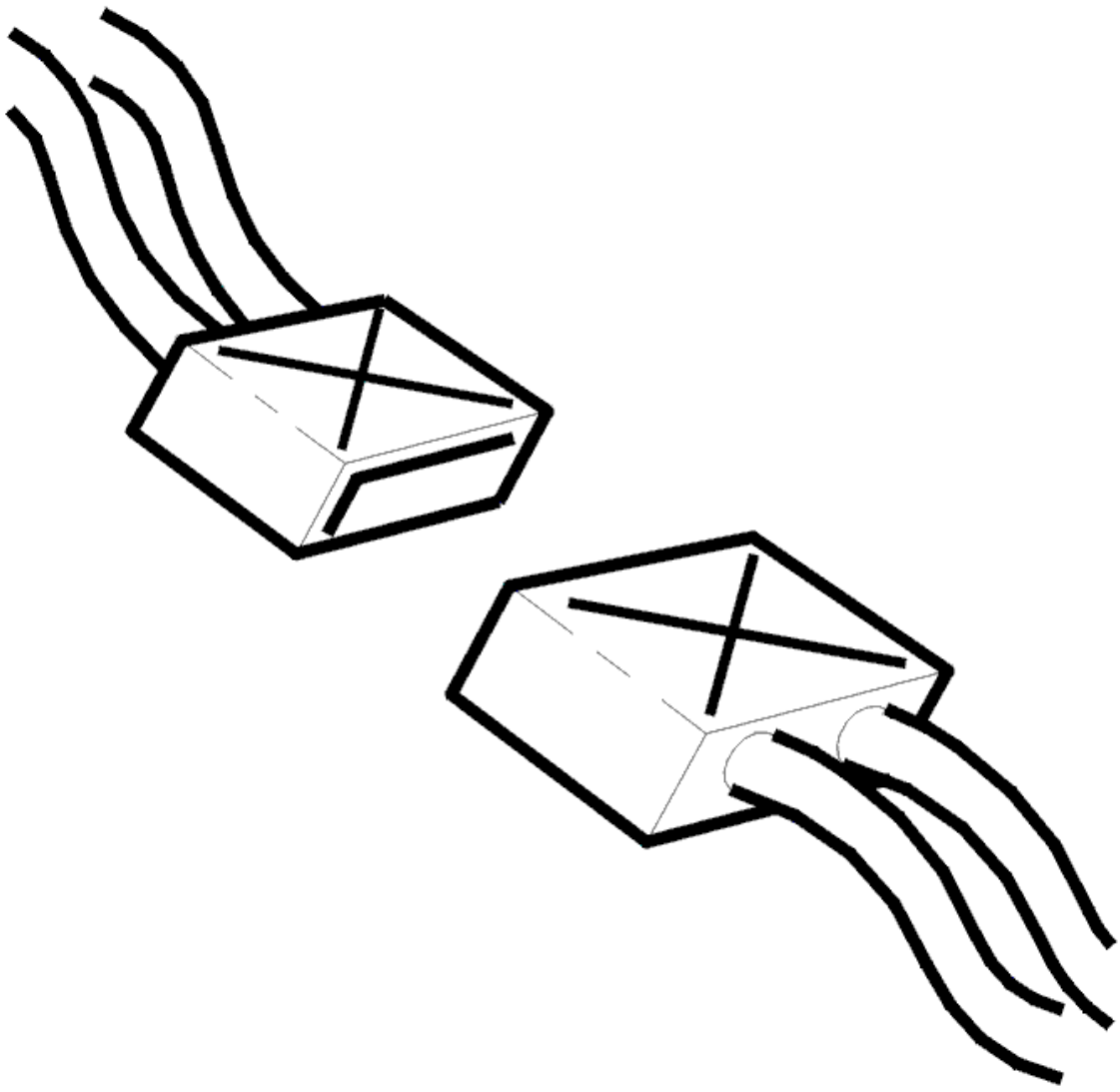


Fig. 49: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Transmission connector C disconnected.

Check the cable between transmission control module (TCM) terminal #B6 (#A66) and transmission connector terminal #C5 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

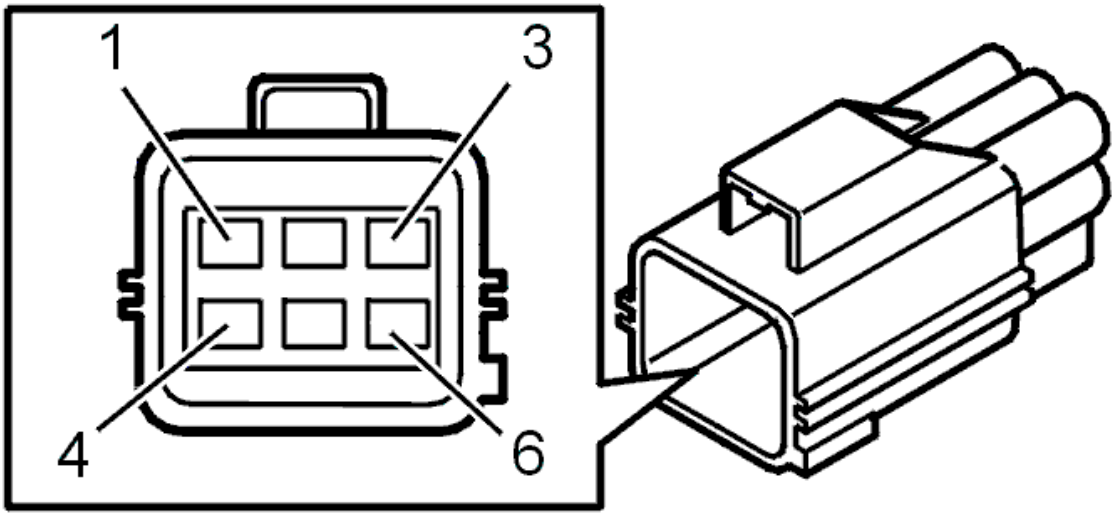


Fig. 50: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

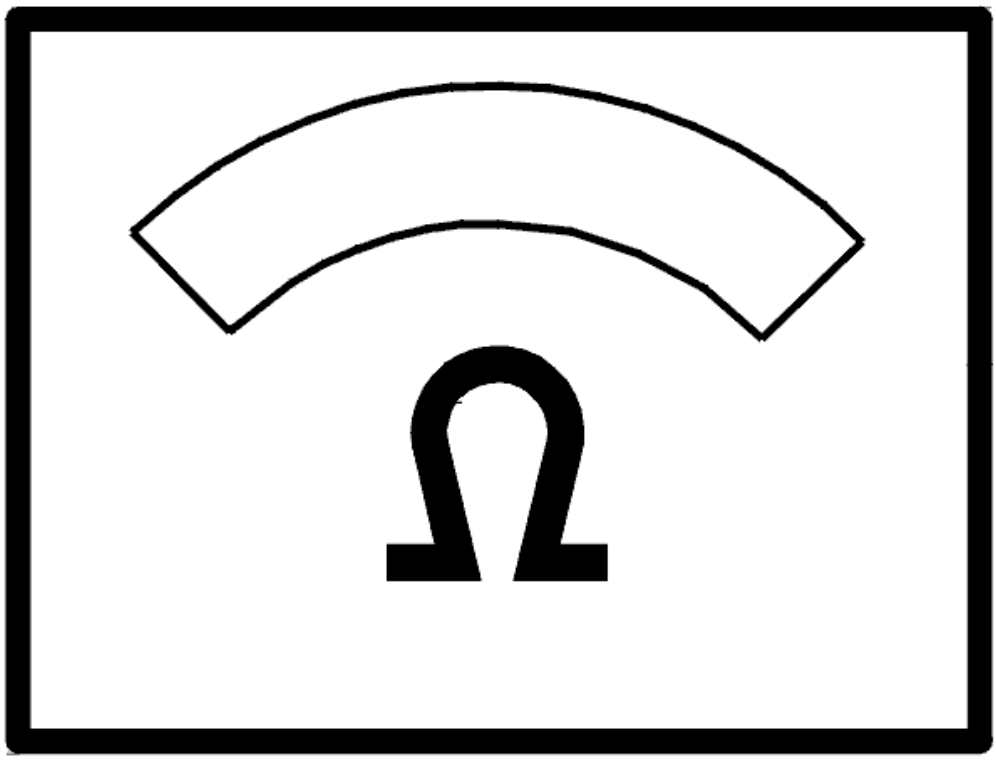


Fig. 51: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

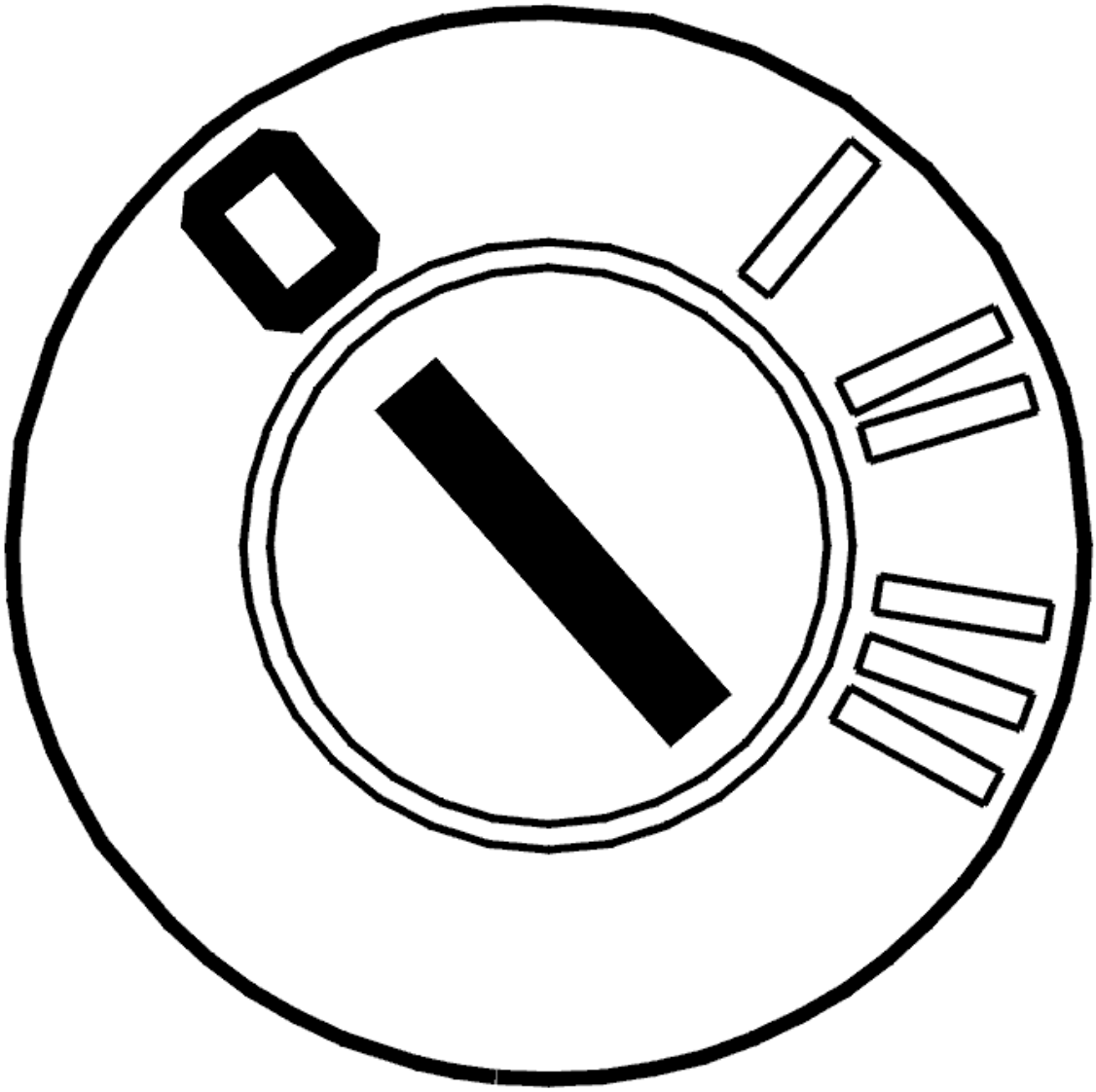


Fig. 52: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

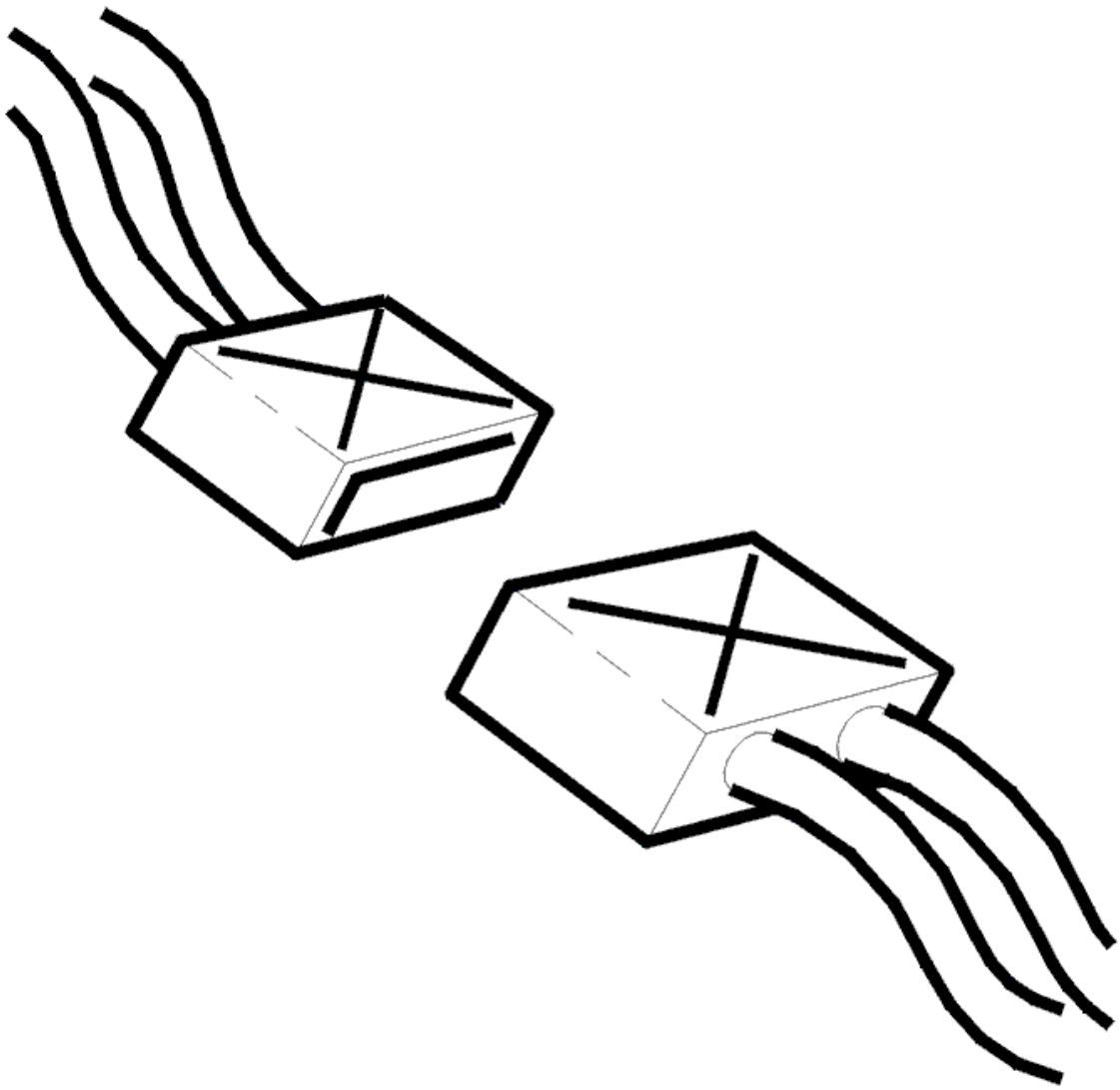


Fig. 53: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

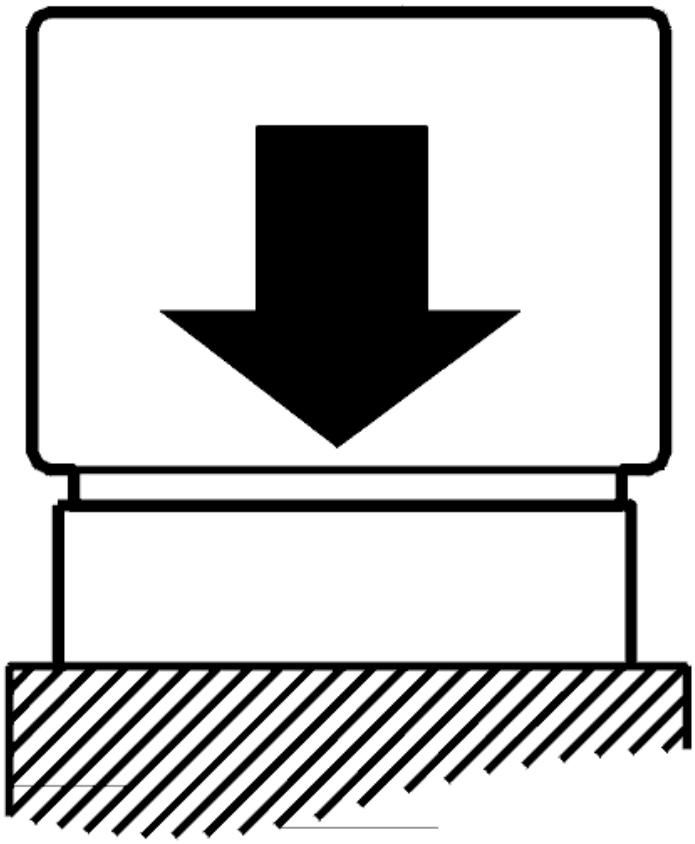


Fig. 54: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector C disconnected
- Gear selector in position P.

Check the transmission control module (TCM) by measuring the resistance between terminals #B6 (#A66) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

NOTE: When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

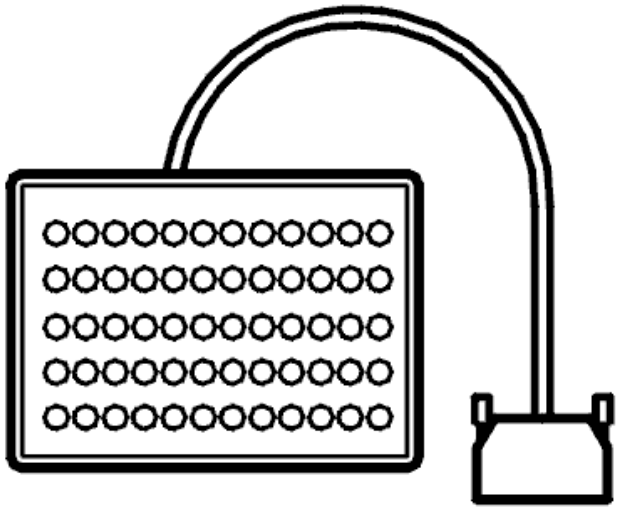


Fig. 55: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

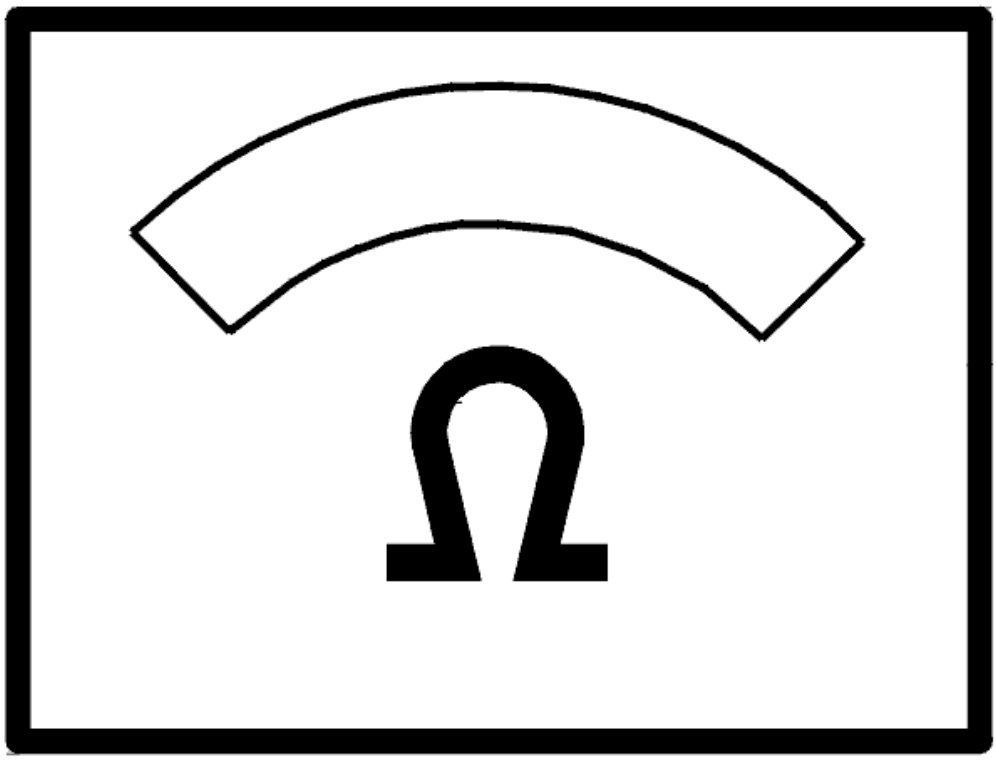


Fig. 56: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

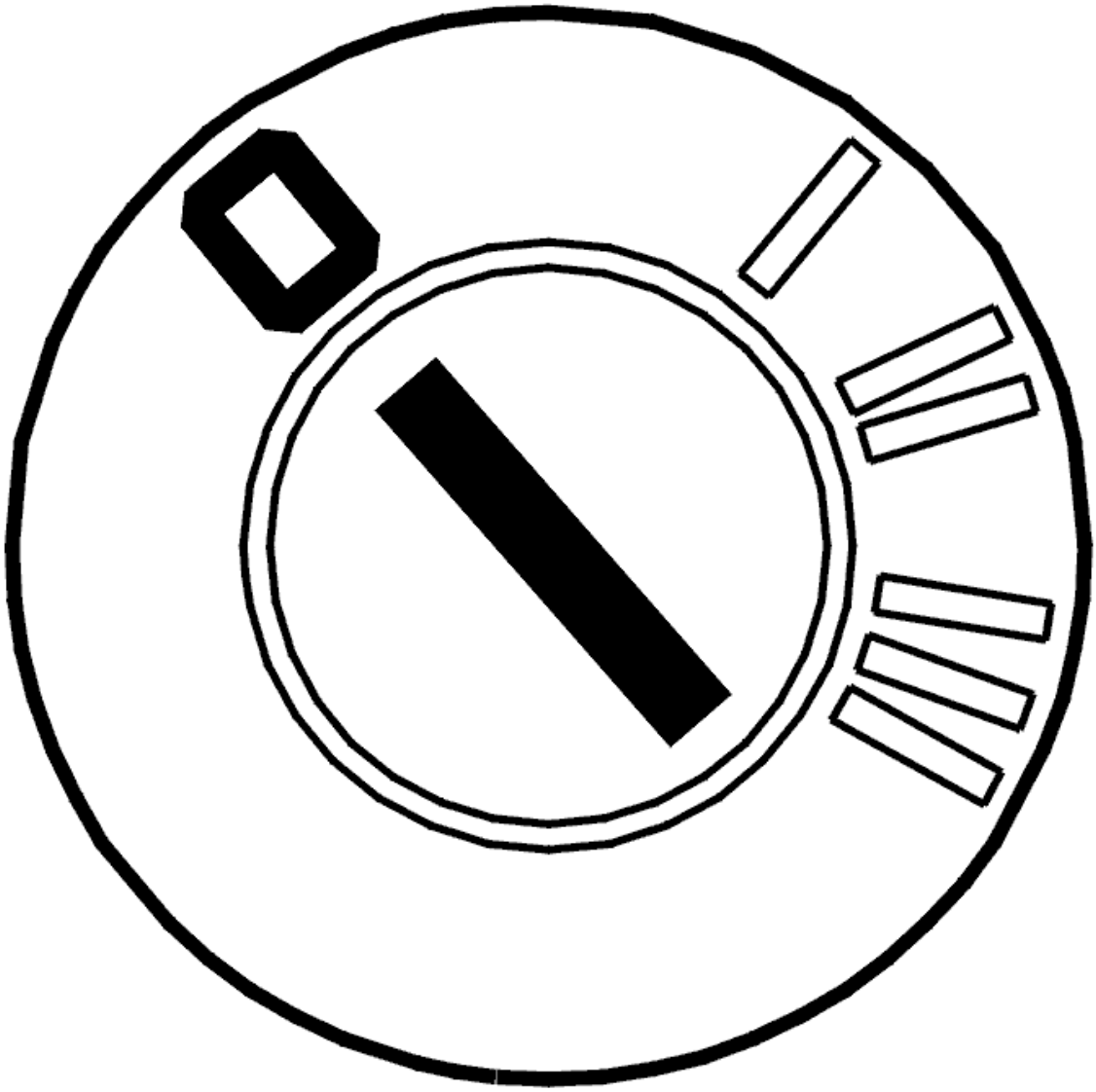


Fig. 57: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission connector terminal #C5 (transmission side) and the connector for solenoid S5. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

  Check solenoid S5 by measuring the resistance between the terminal pin on solenoid S5 and the transmission housing. The resistance must be 11-15 ohms. Replace solenoid S5 if the resistance is incorrect.

  Remedy as necessary.

  Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the control system and to check or replace solenoid S5, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

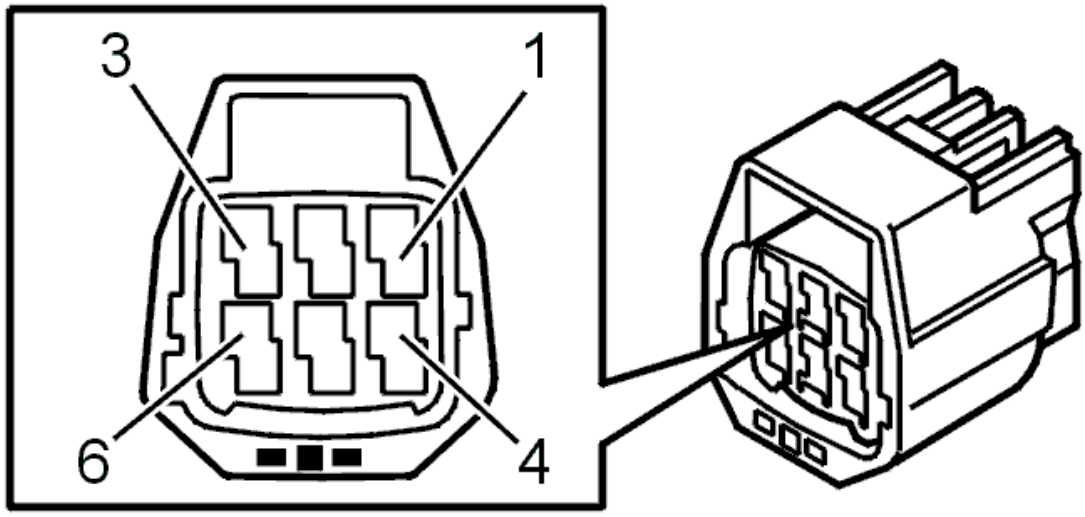


Fig. 58: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

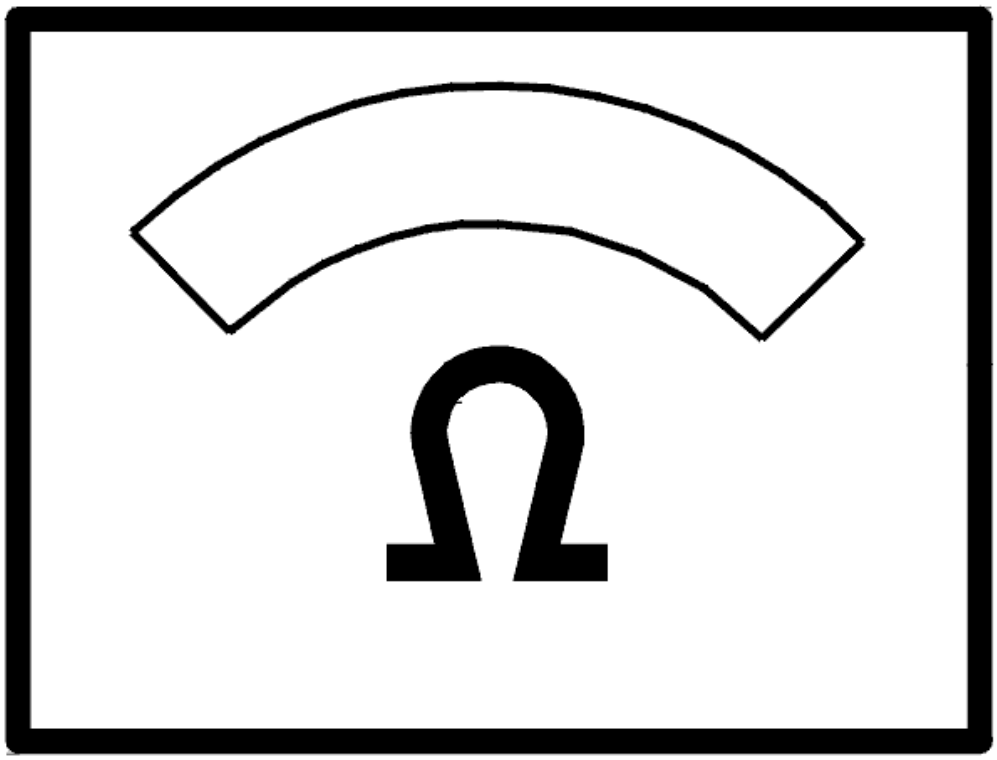


Fig. 59: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between control module terminal #B6 (#A66) and transmission connector terminal #C5 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

- Check the circuit for solenoid S5. Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #B6 (#A66) and #A53 (#A53) on the breakout box. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

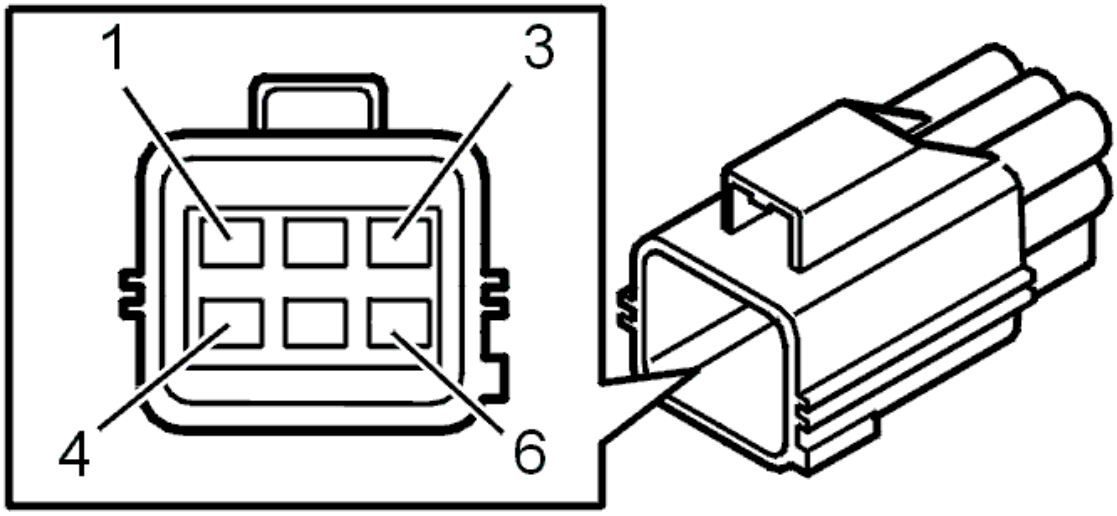


Fig. 60: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

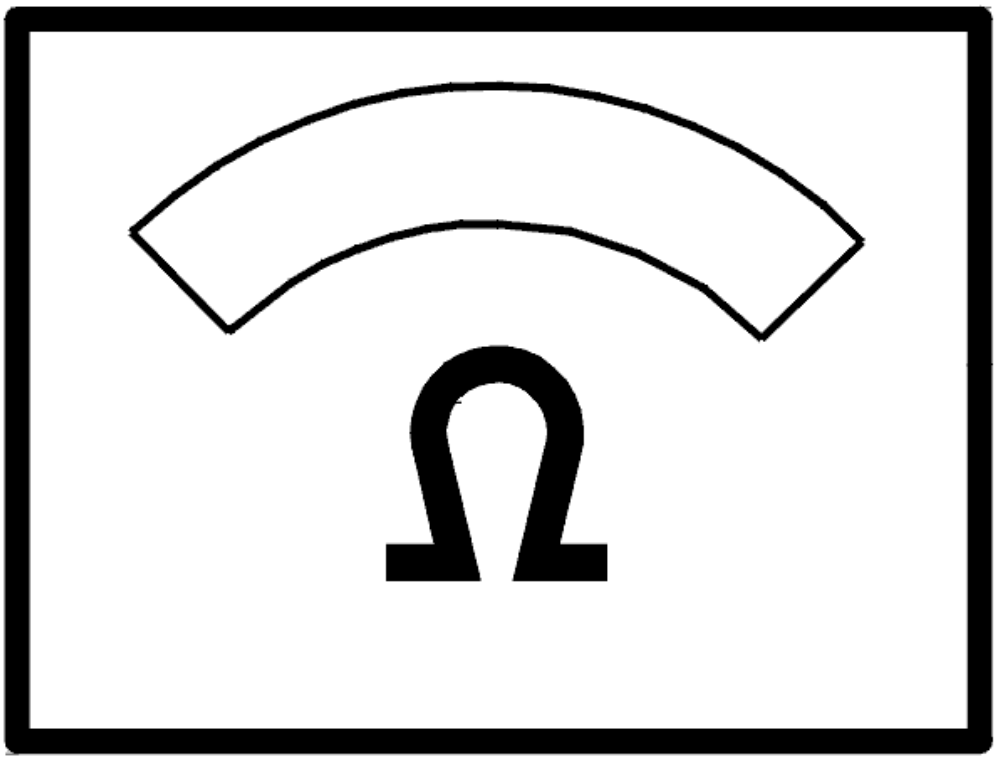


Fig. 61: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

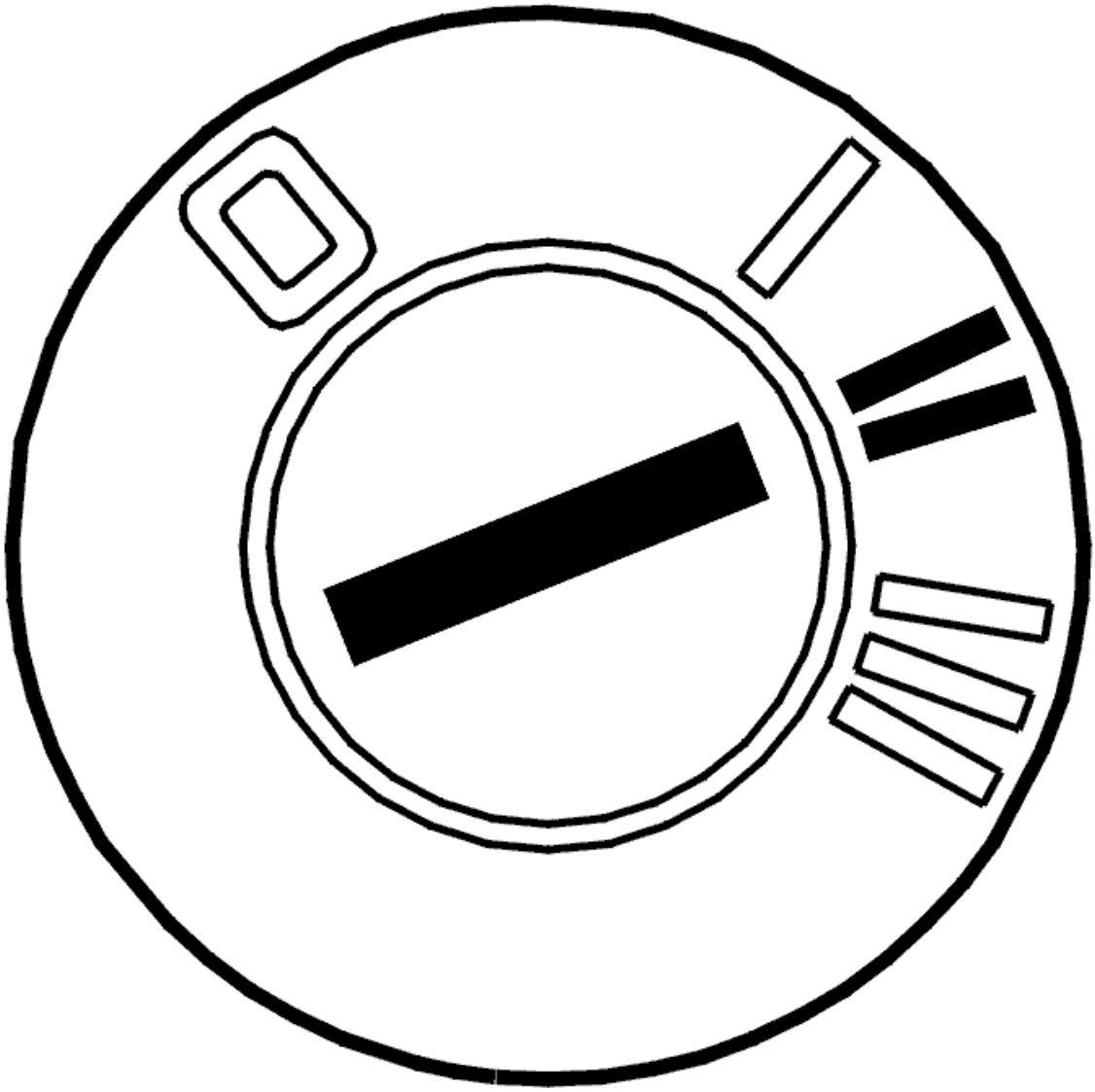


Fig. 62: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

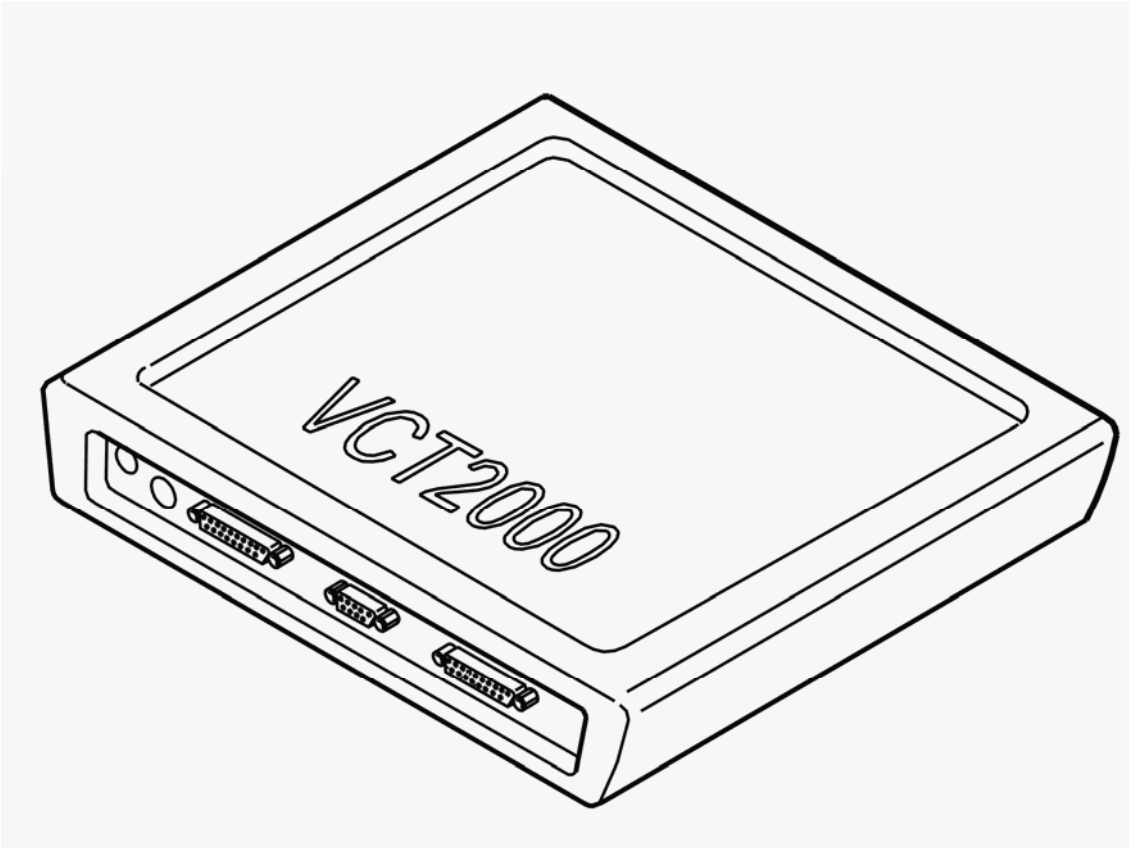


Fig. 63: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

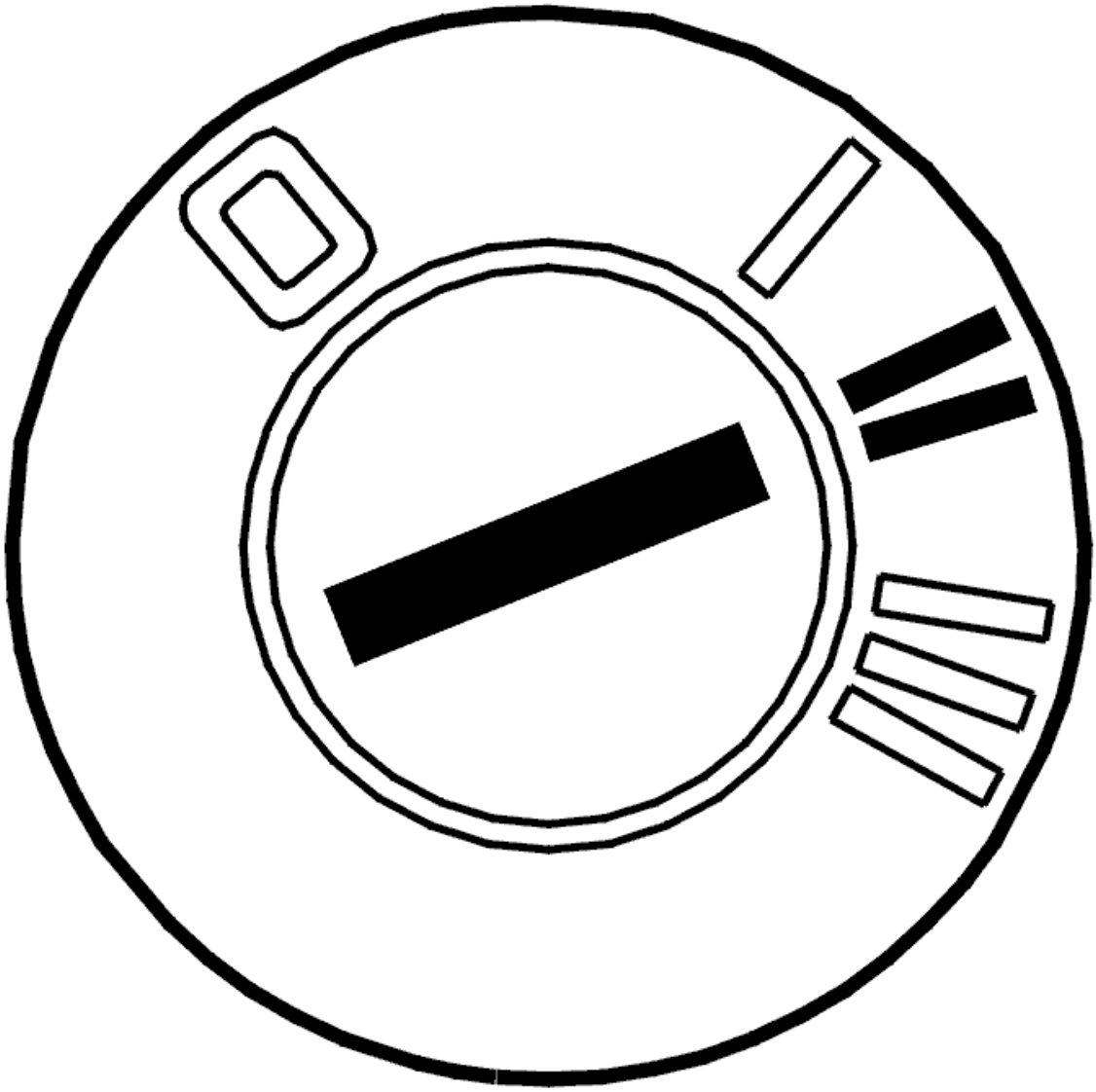


Fig. 64: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

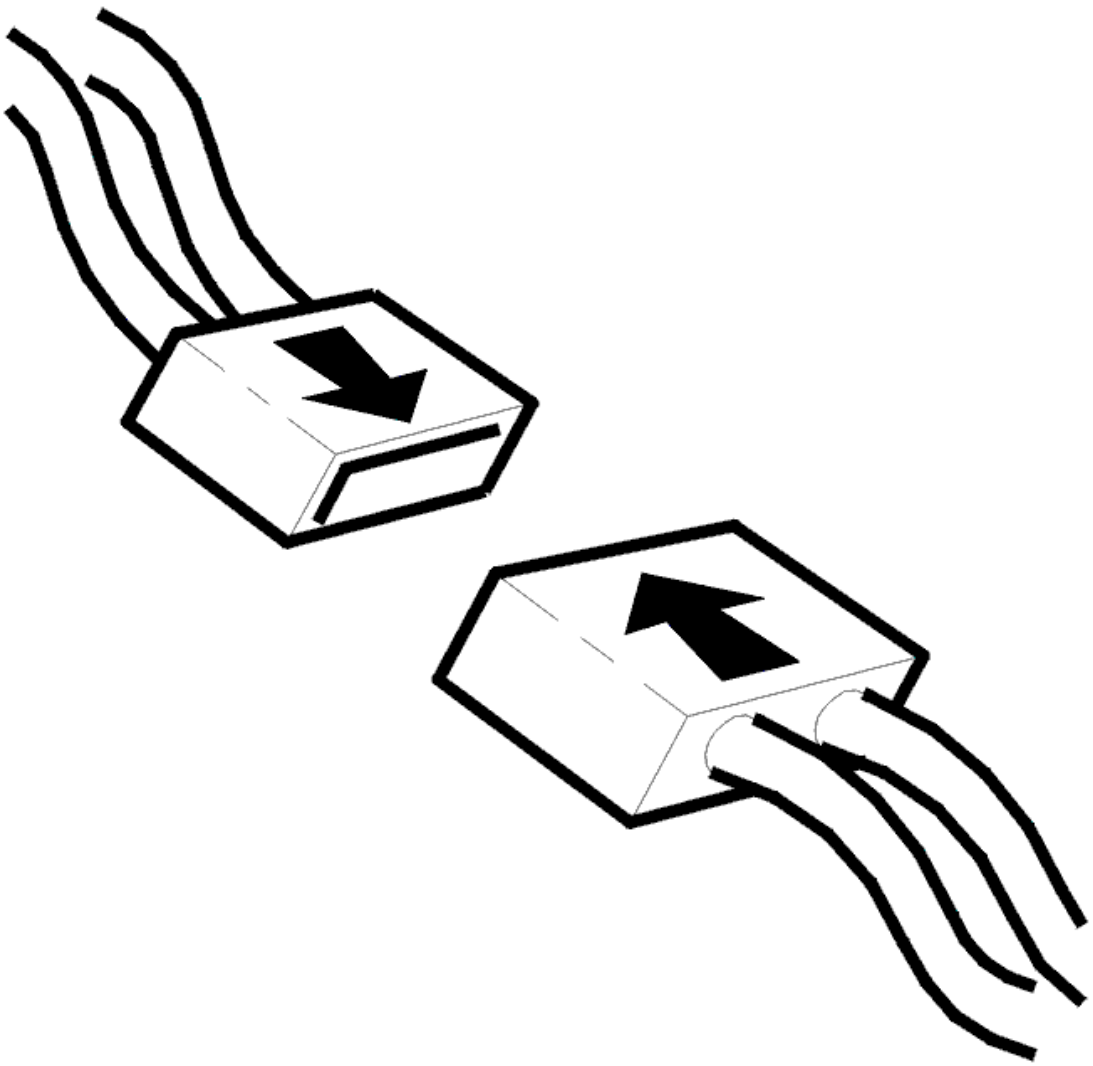


Fig. 65: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S5.

The current should oscillate between 0 and 1.5 A.

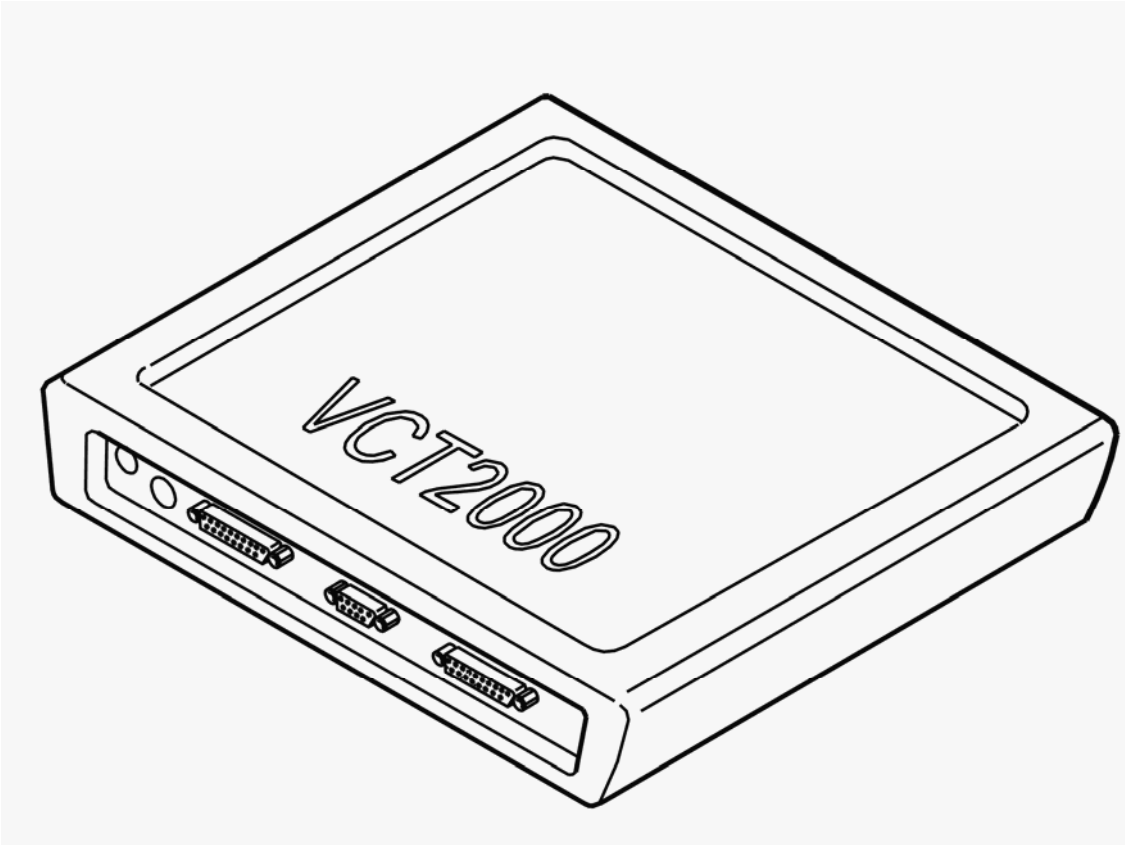


Fig. 66: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

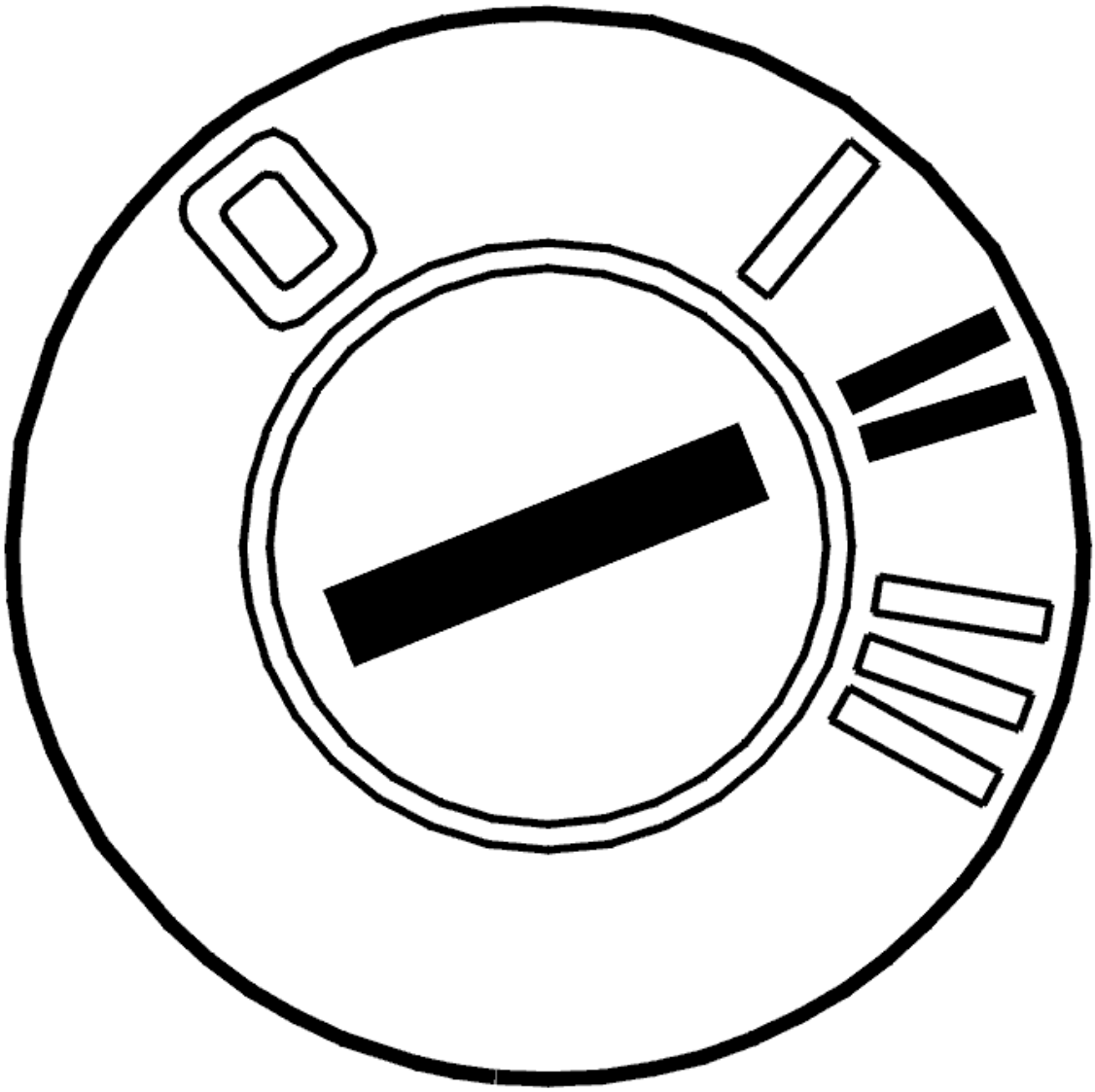


Fig. 67: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

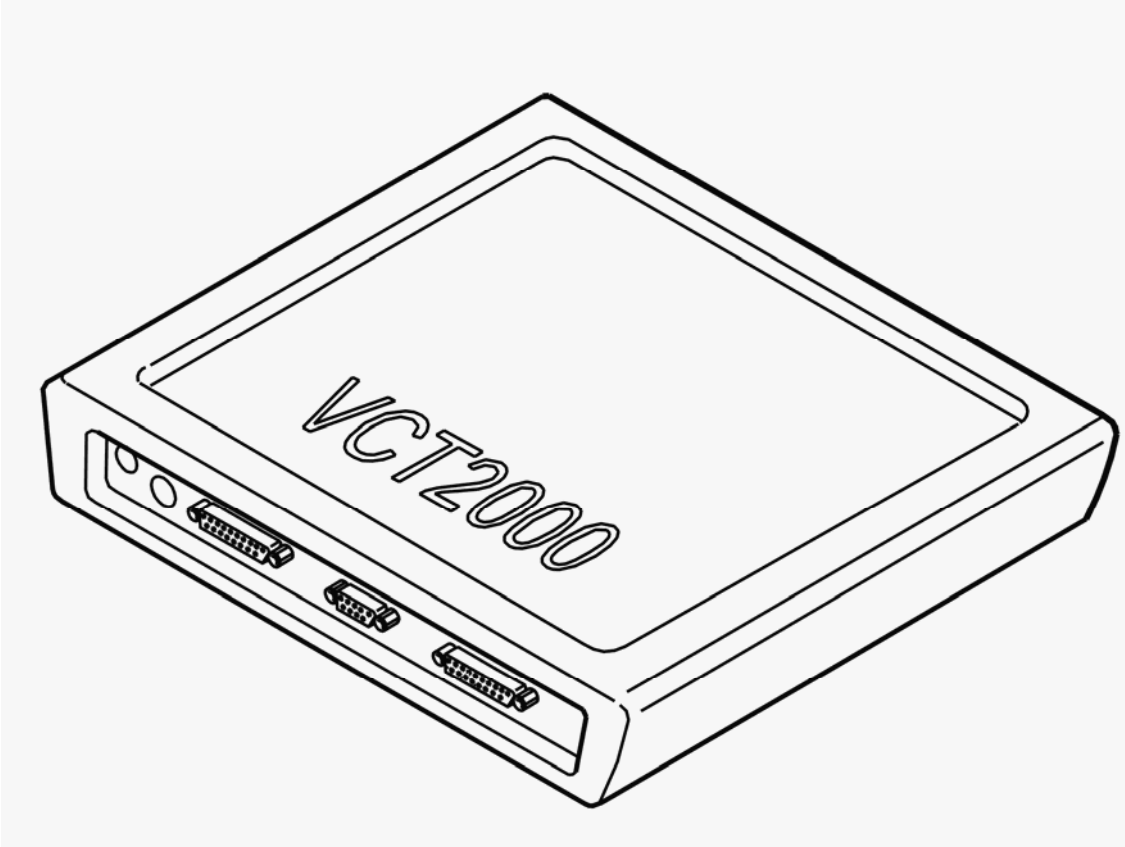


Fig. 68: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

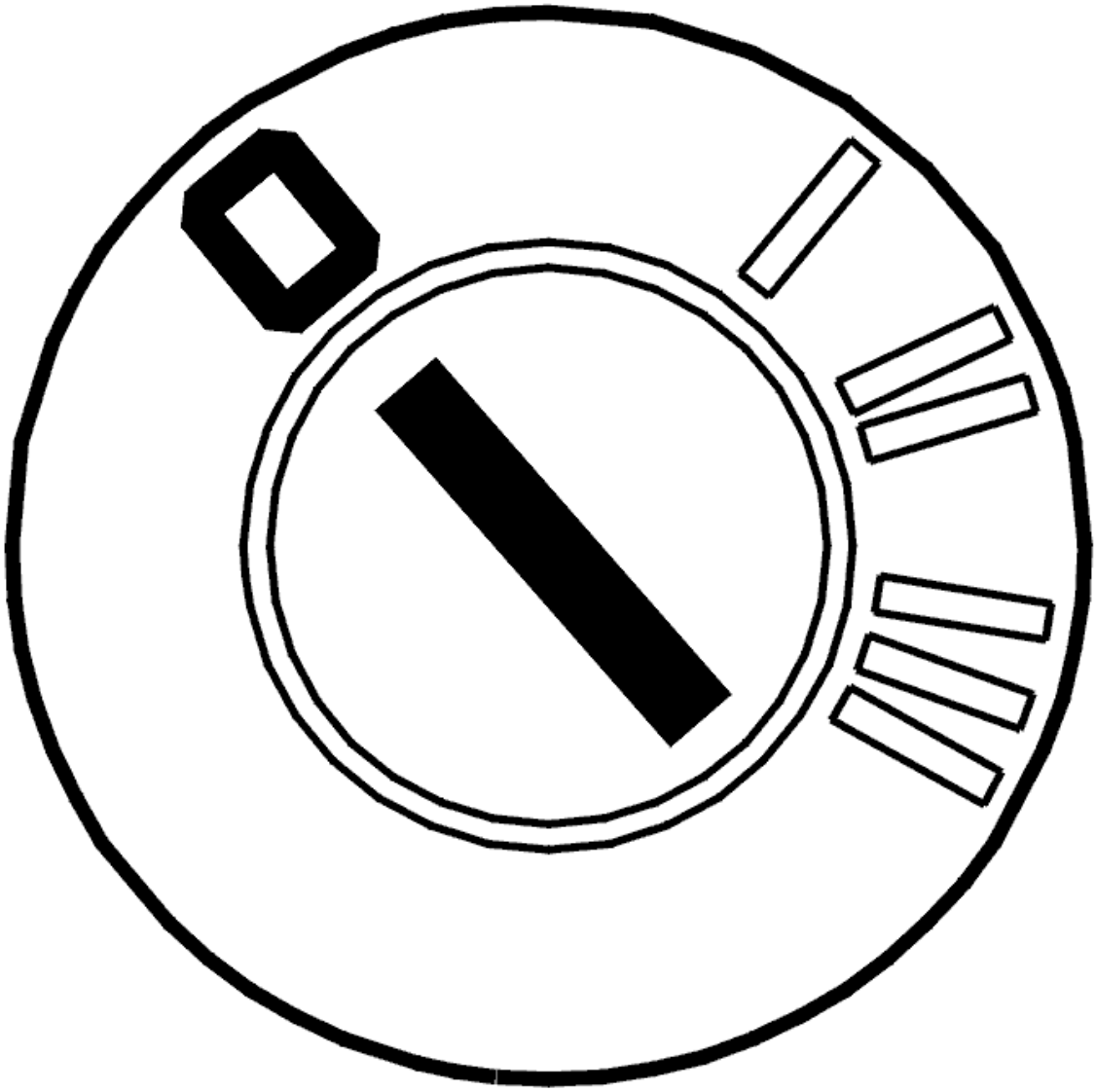


Fig. 69: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

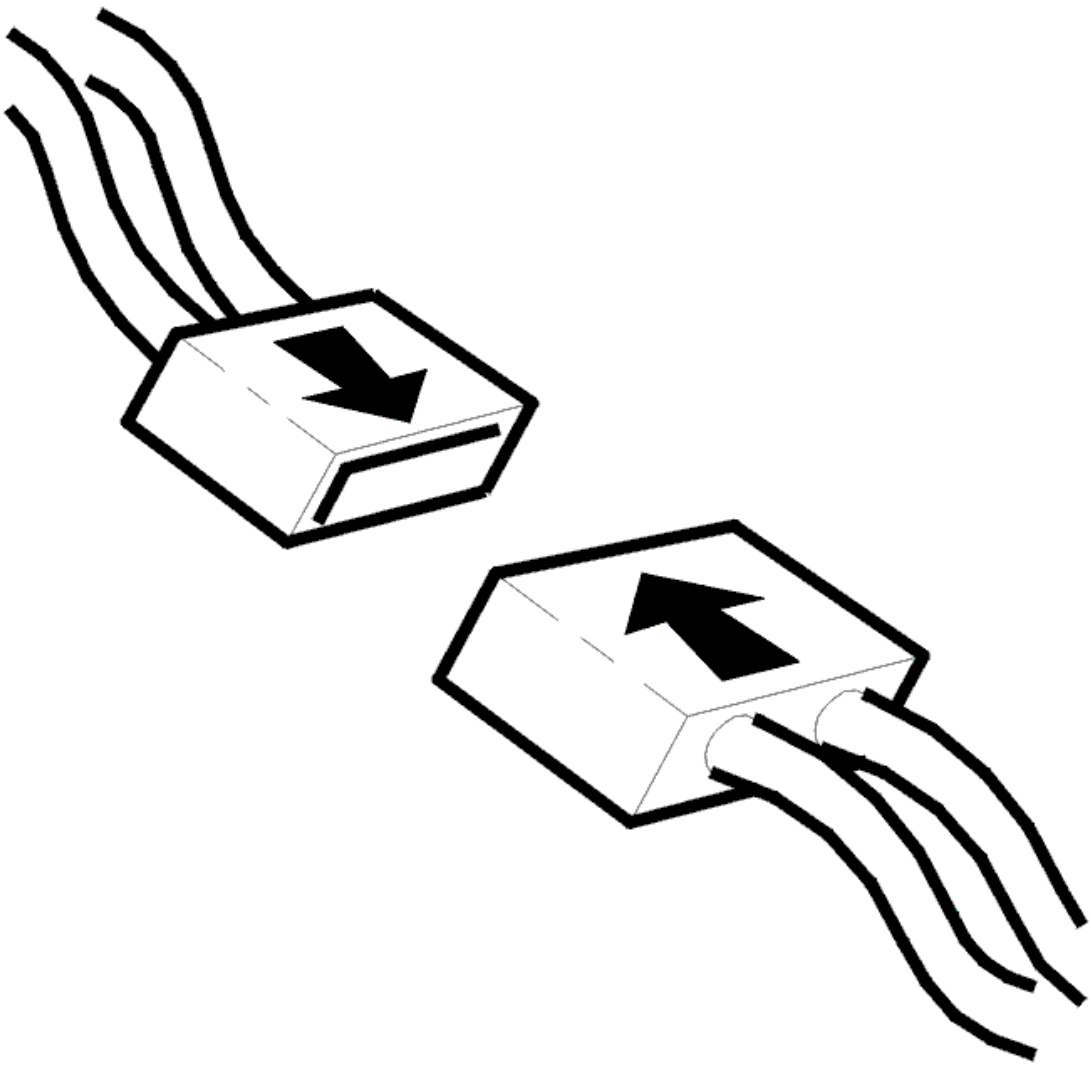


Fig. 70: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

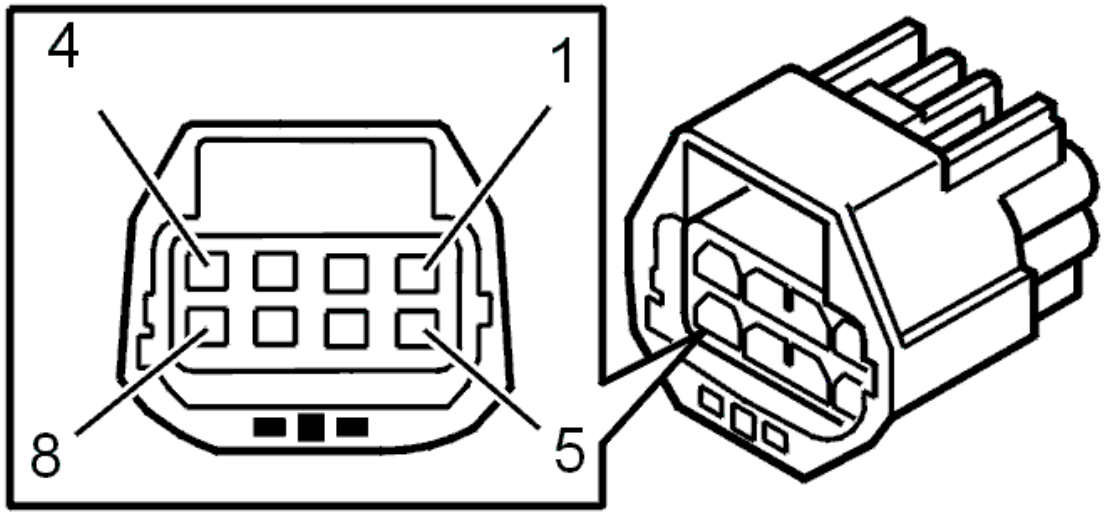


Fig. 71: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

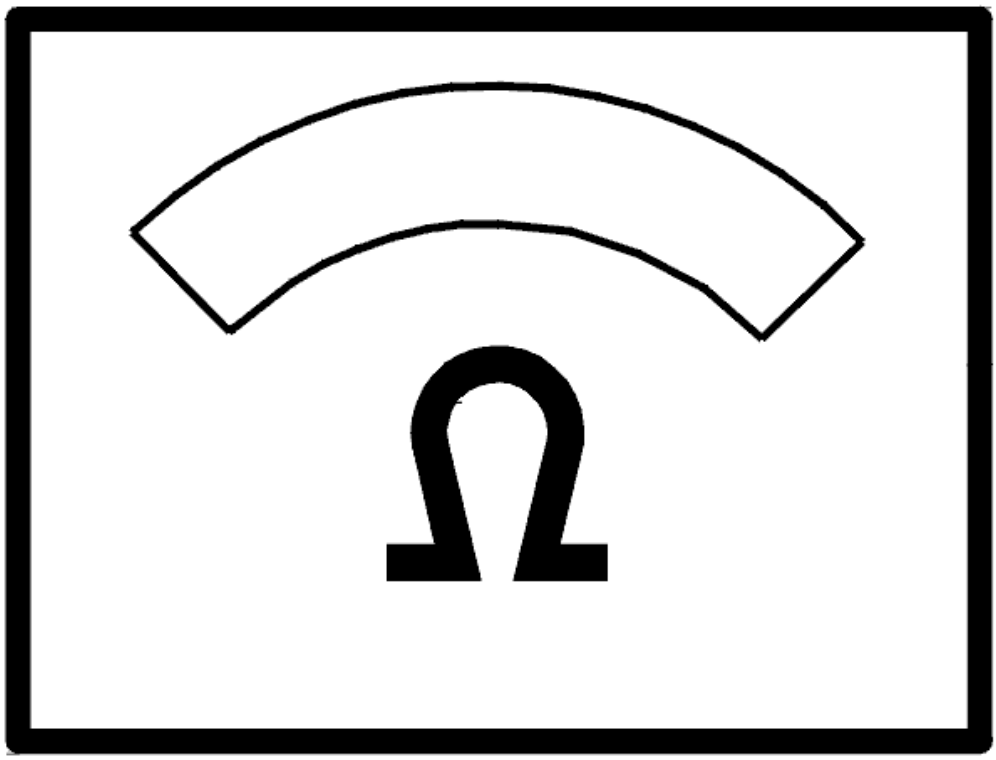


Fig. 72: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

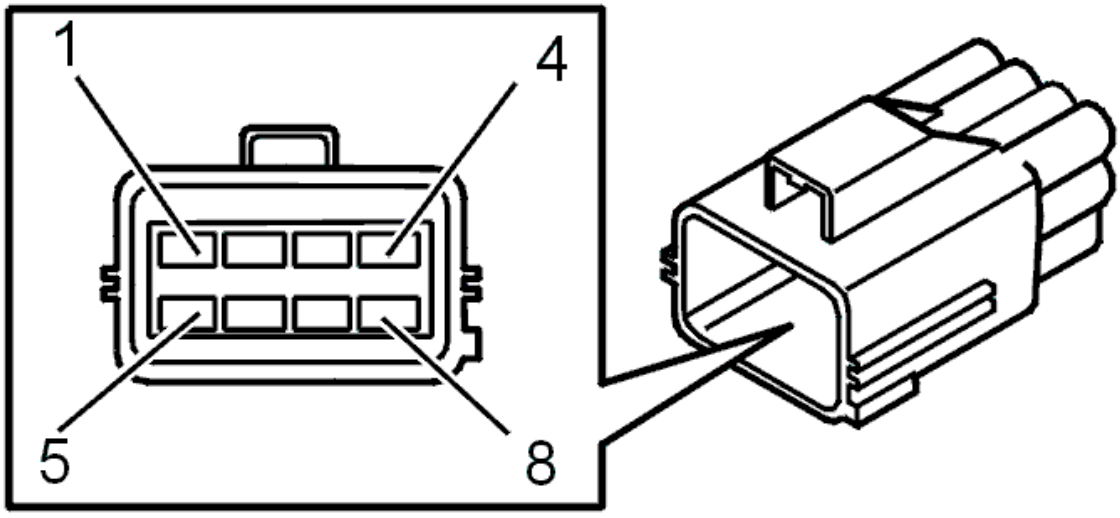


Fig. 73: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

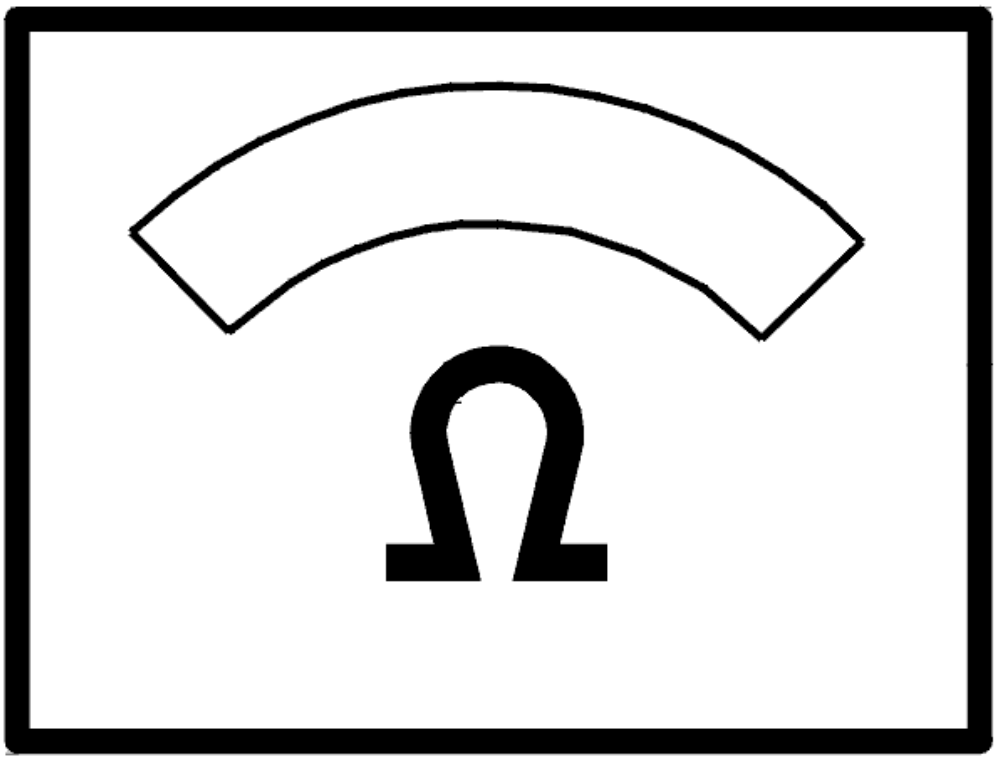


Fig. 74: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

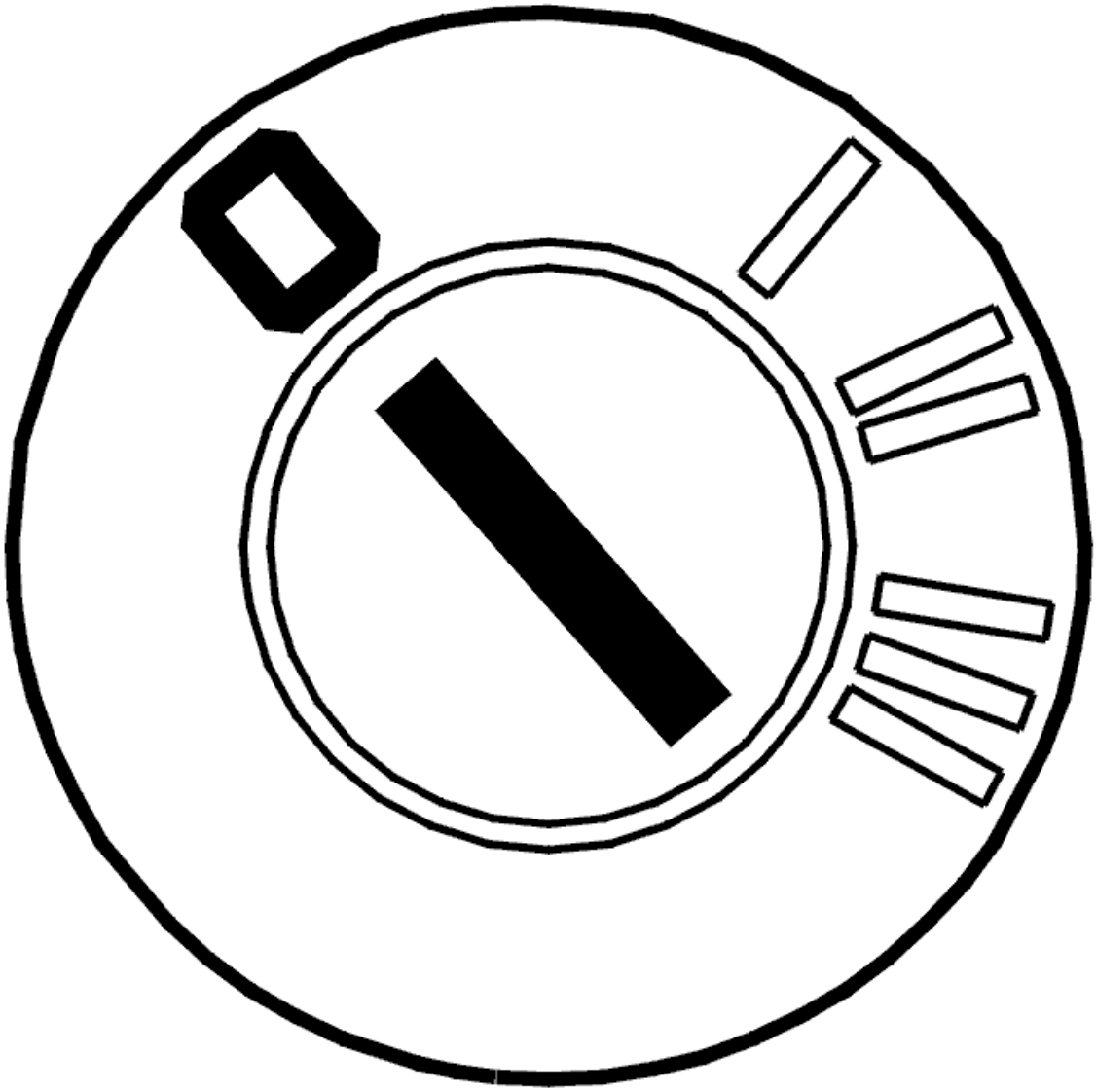


Fig. 75: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

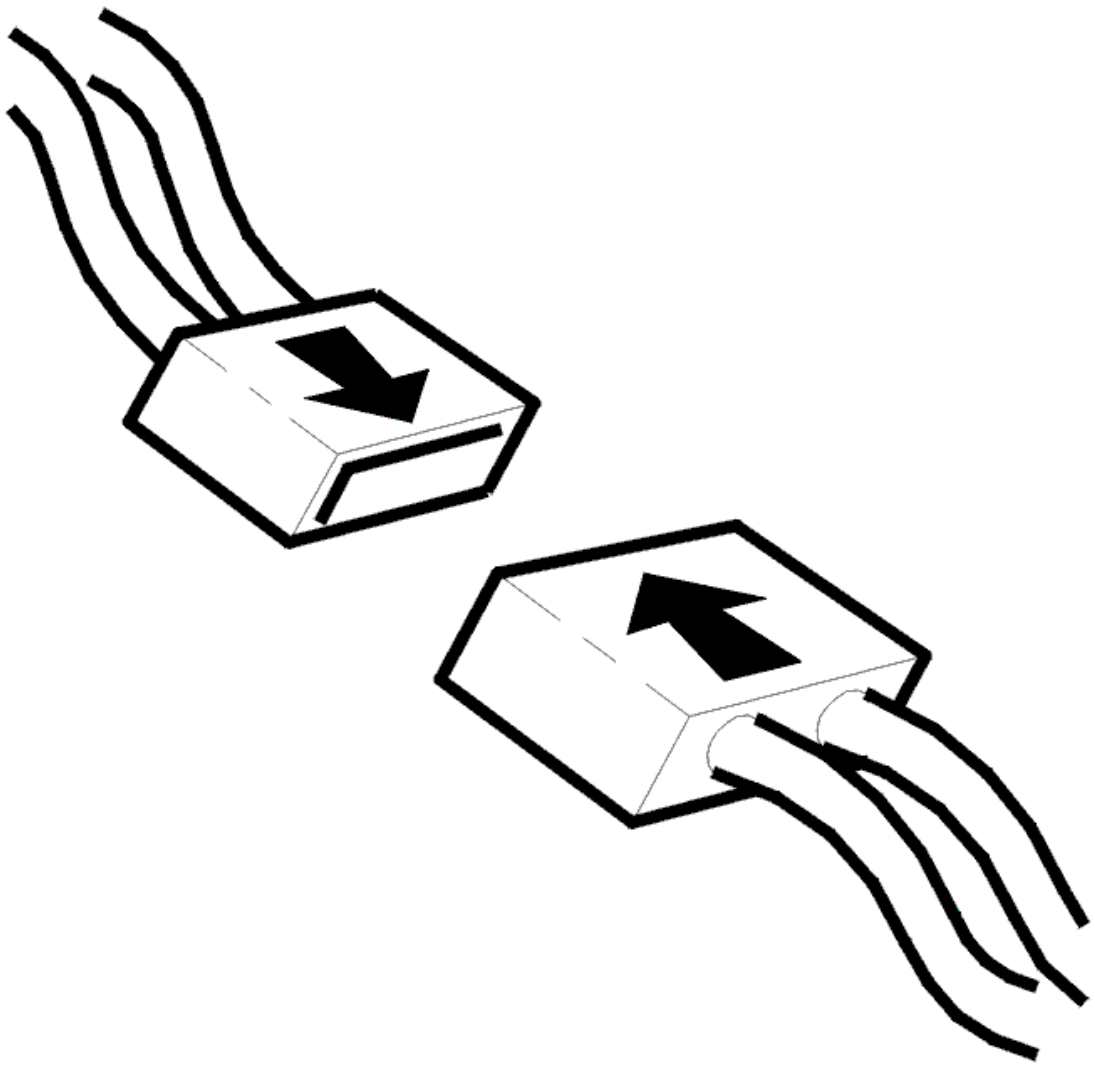


Fig. 76: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

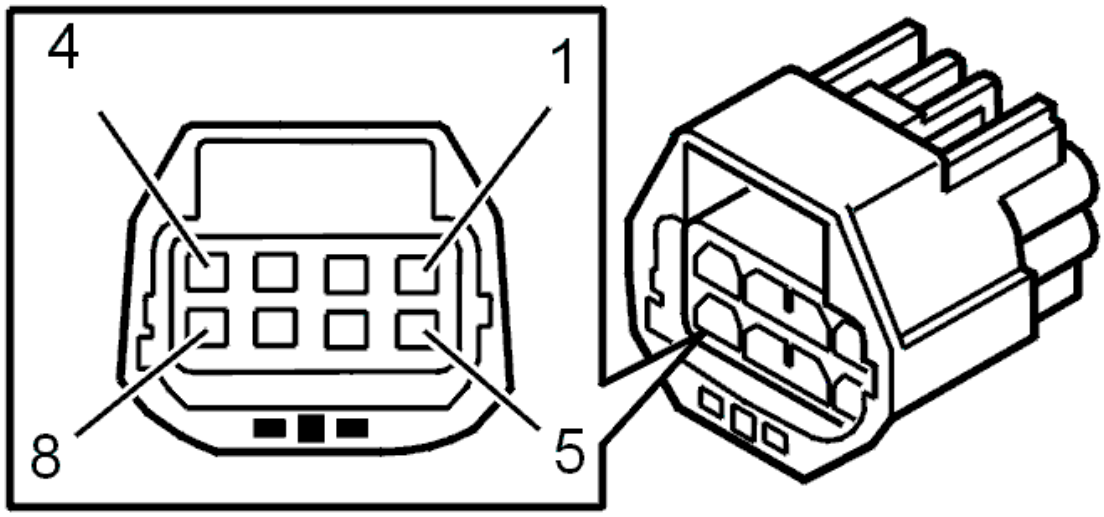


Fig. 77: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

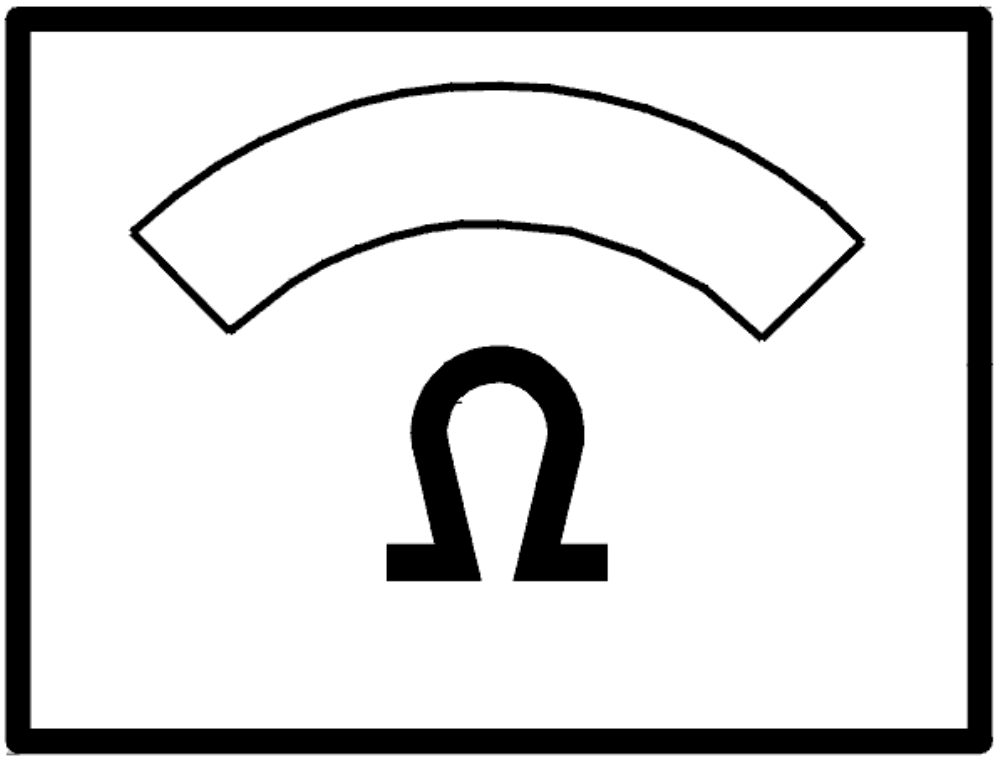


Fig. 78: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

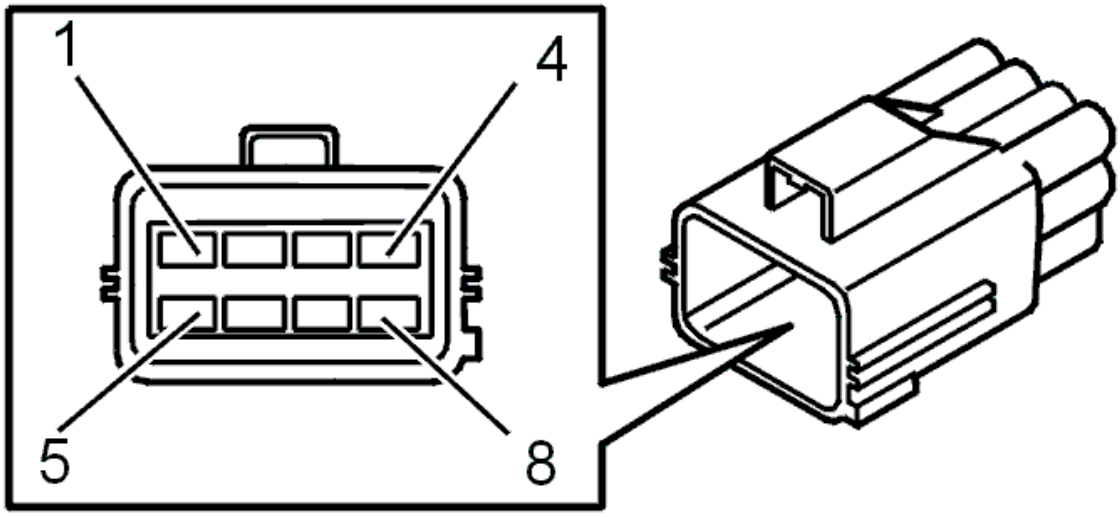


Fig. 79: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

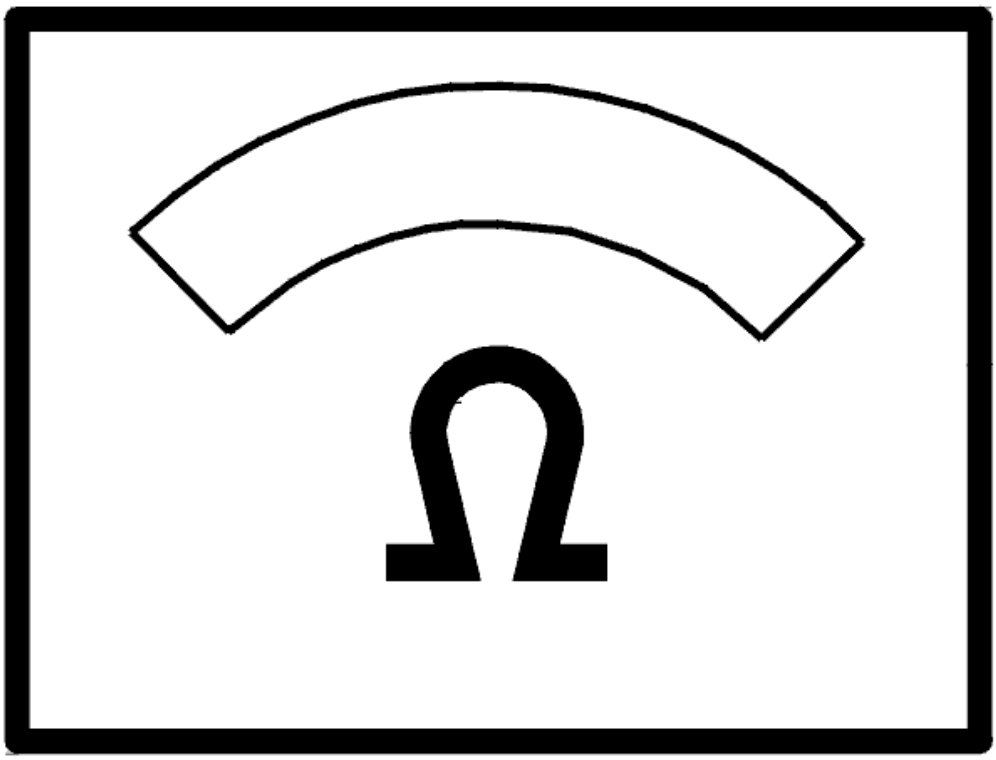


Fig. 80: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

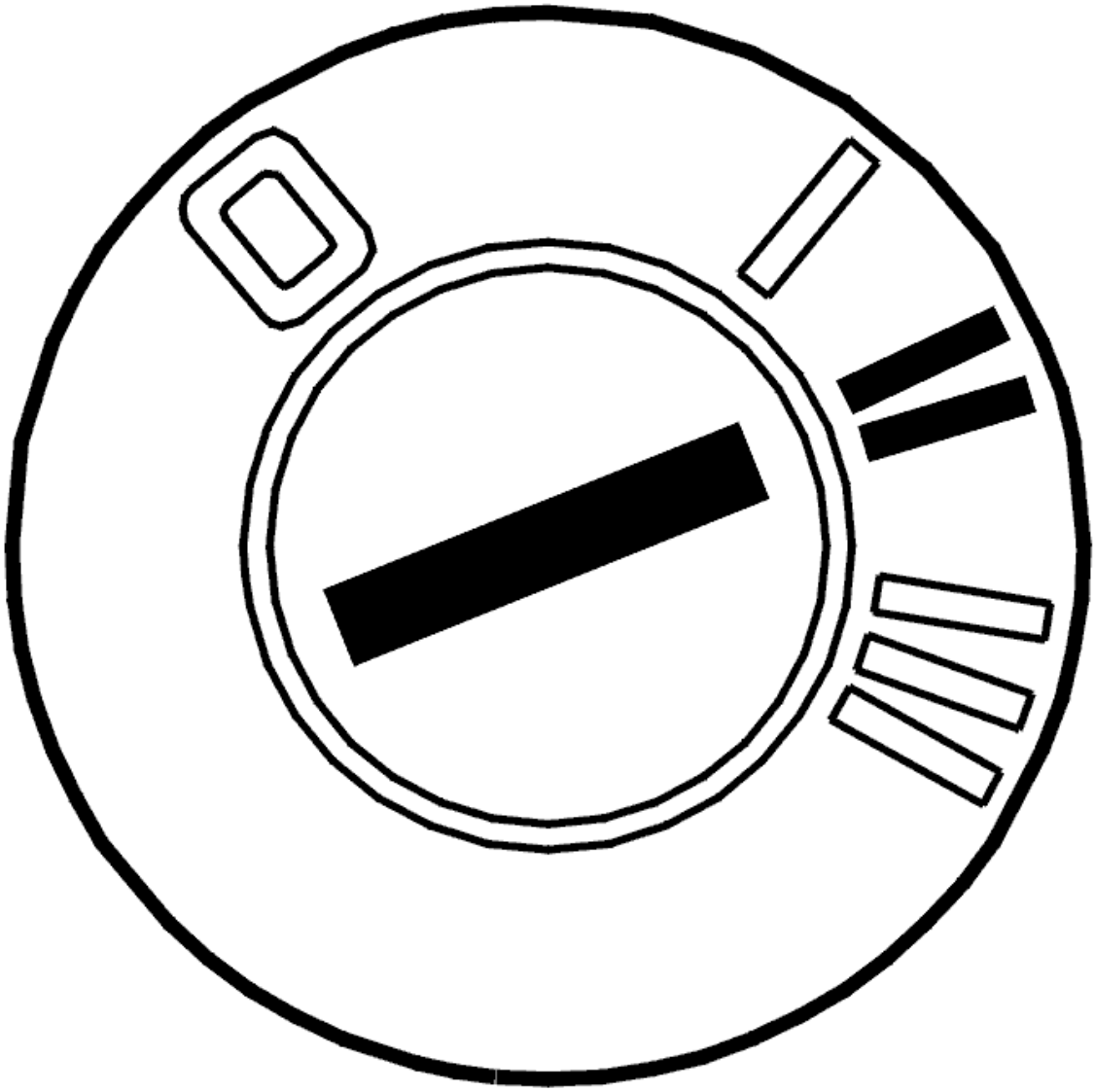


Fig. 81: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

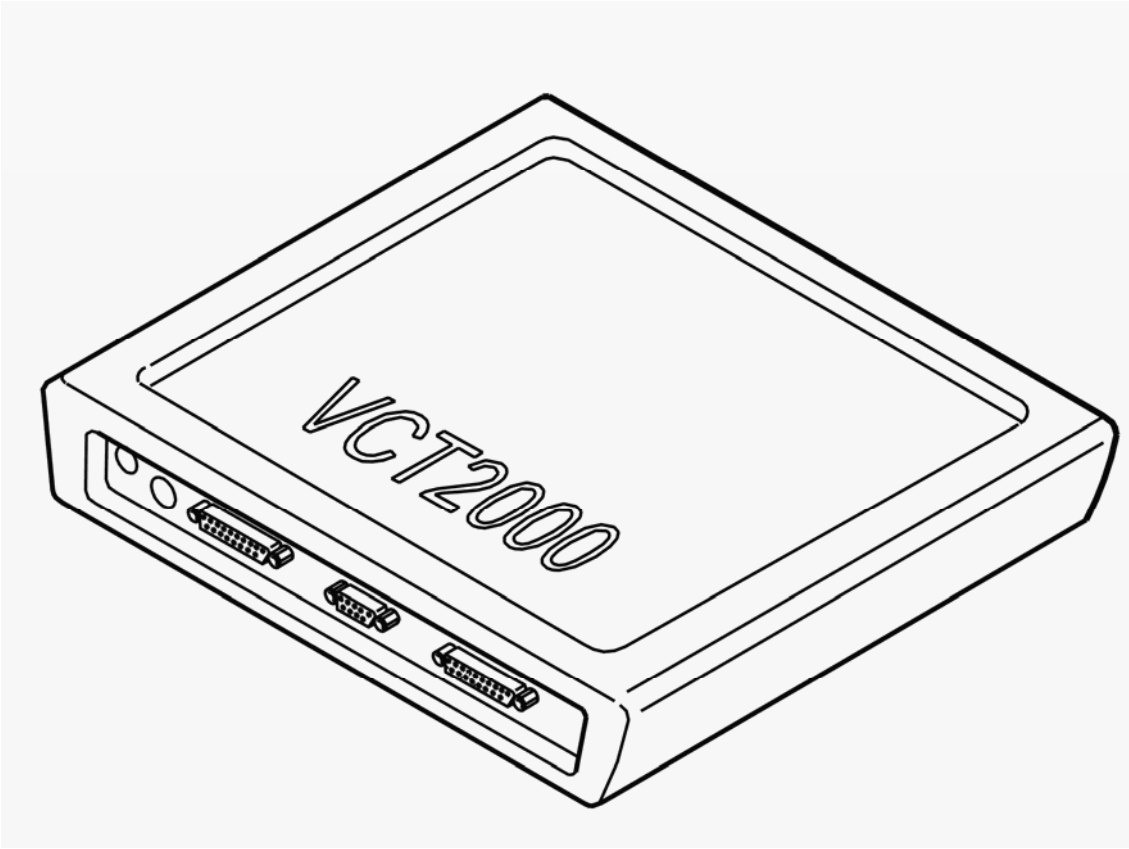


Fig. 82: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

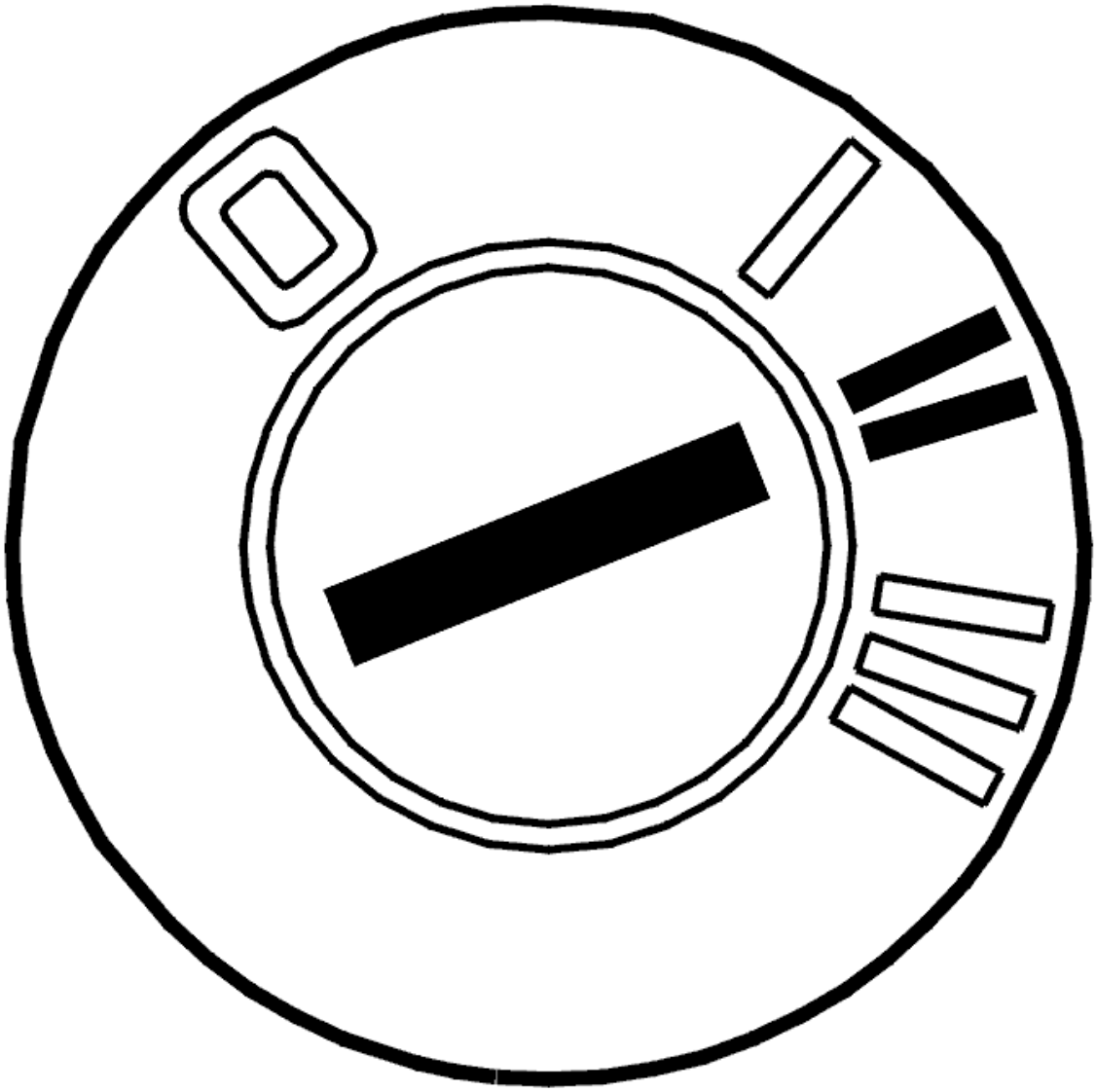


Fig. 83: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

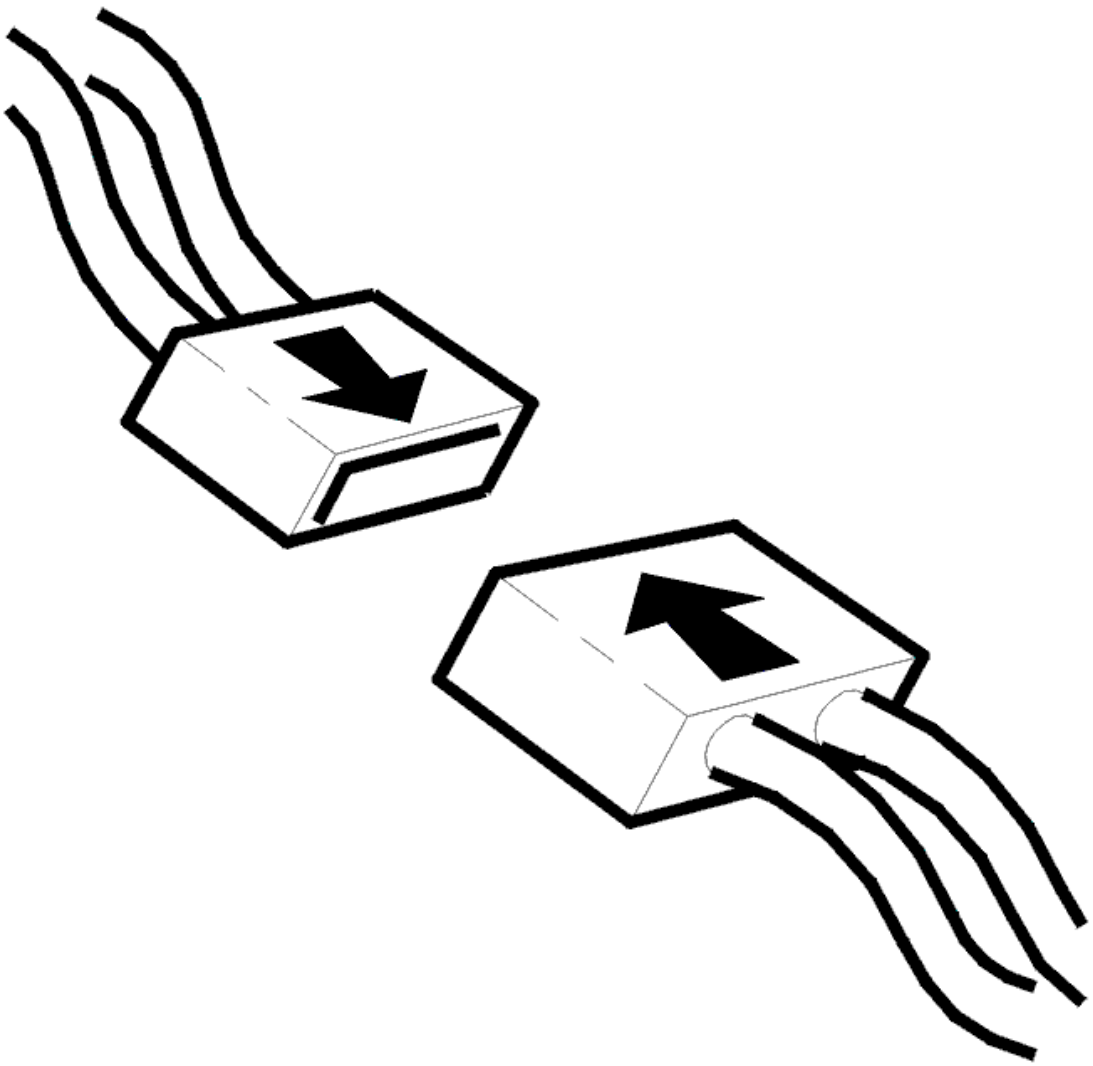


Fig. 84: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

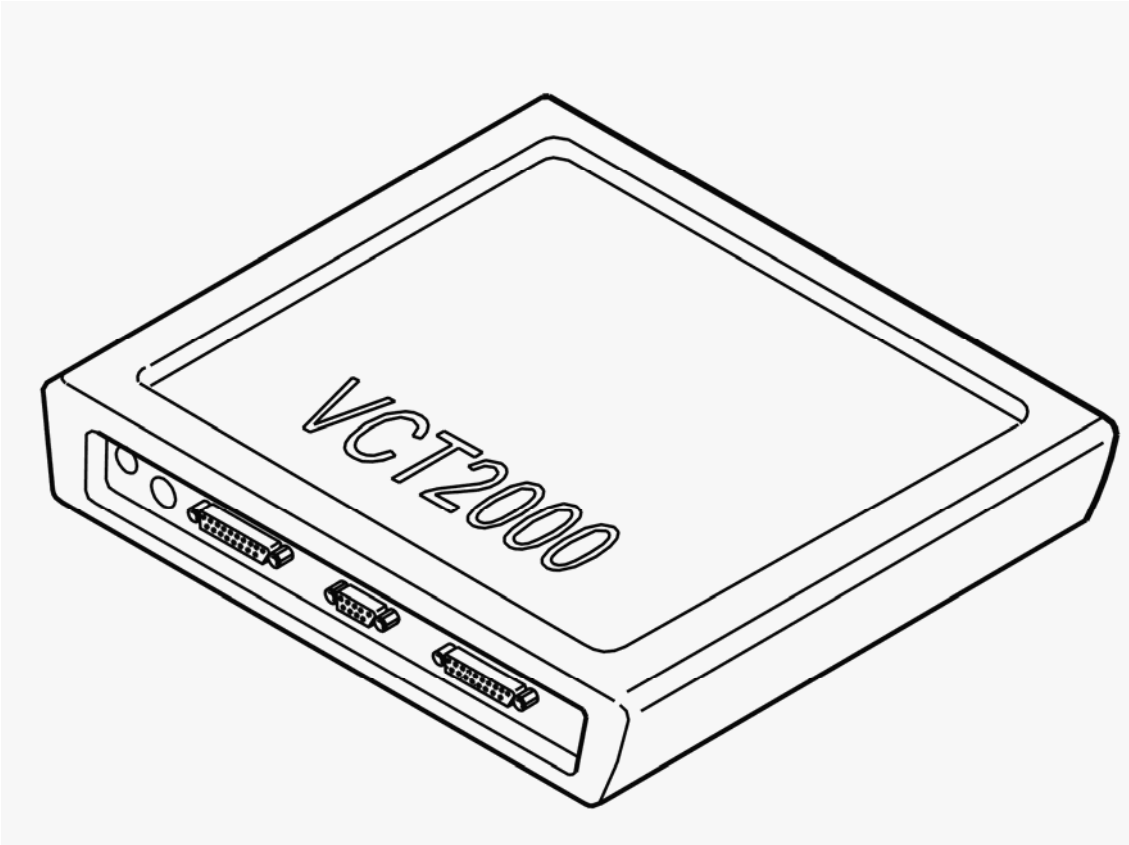


Fig. 85: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-010C: SHIFT SOLENOID S5. SIGNAL TOO LOW (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. Diagnostic trouble codes (DTCs) TCM-0003, TCM-0009, TCM-0103, TCM-0109 or TCM-010C are stored if the transmission control module (TCM) registers that there is a short-circuit to ground in circuits S1, S2, S3, S4 or S5 when the solenoid

should be activated.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Short-circuit to ground in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

SIGNAL TOO LOW

CHECKS

CHECKING THE TEMPERATURE SENSOR

HINT: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.

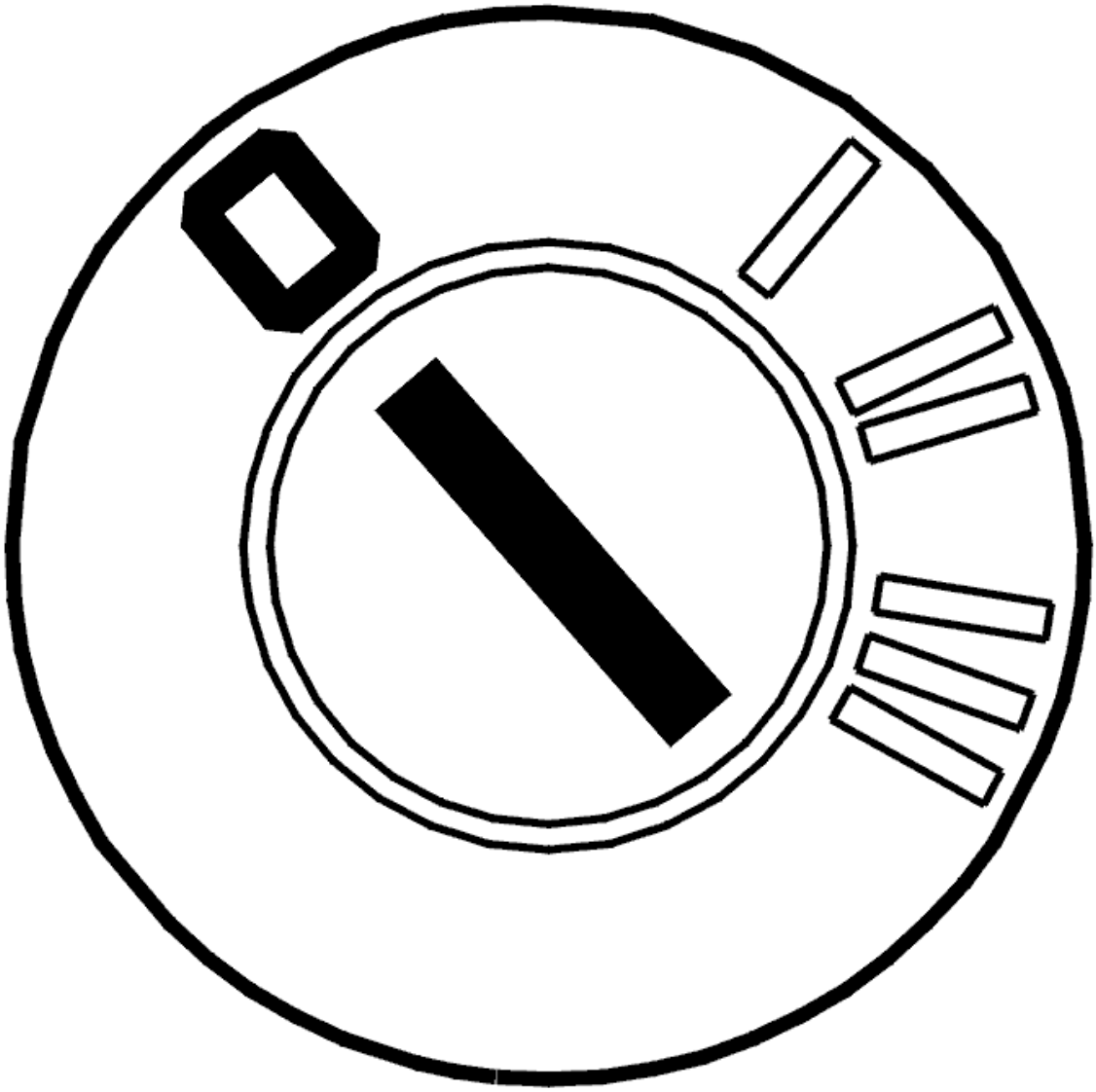


Fig. 86: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Read off the oil temperature.

  Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

  HINT: If the temperature is outside its permitted range, fault-trace the temperature sensor.

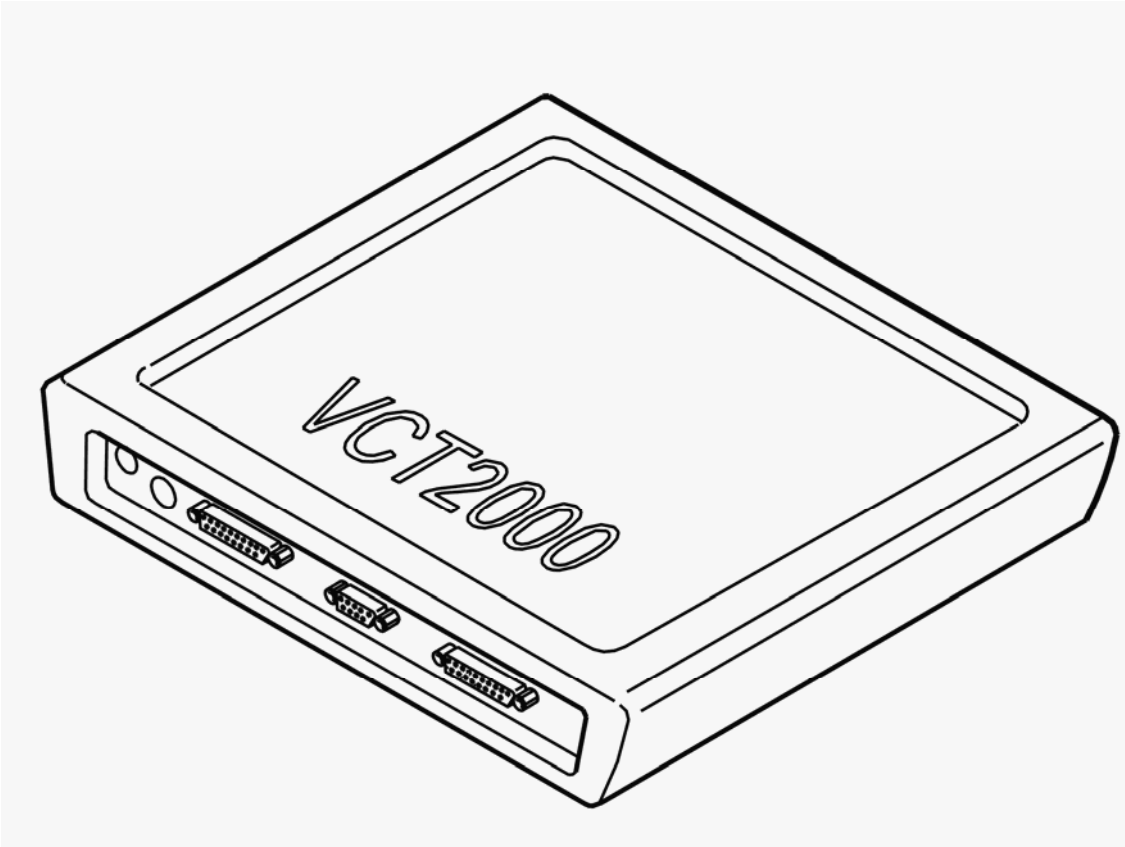


Fig. 87: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  Refer to **CHECKING SHIFT SOLENOID S5**

- **NO**

  Refer to **FAULTY SIGNAL**

CHECKING SHIFT SOLENOID S5

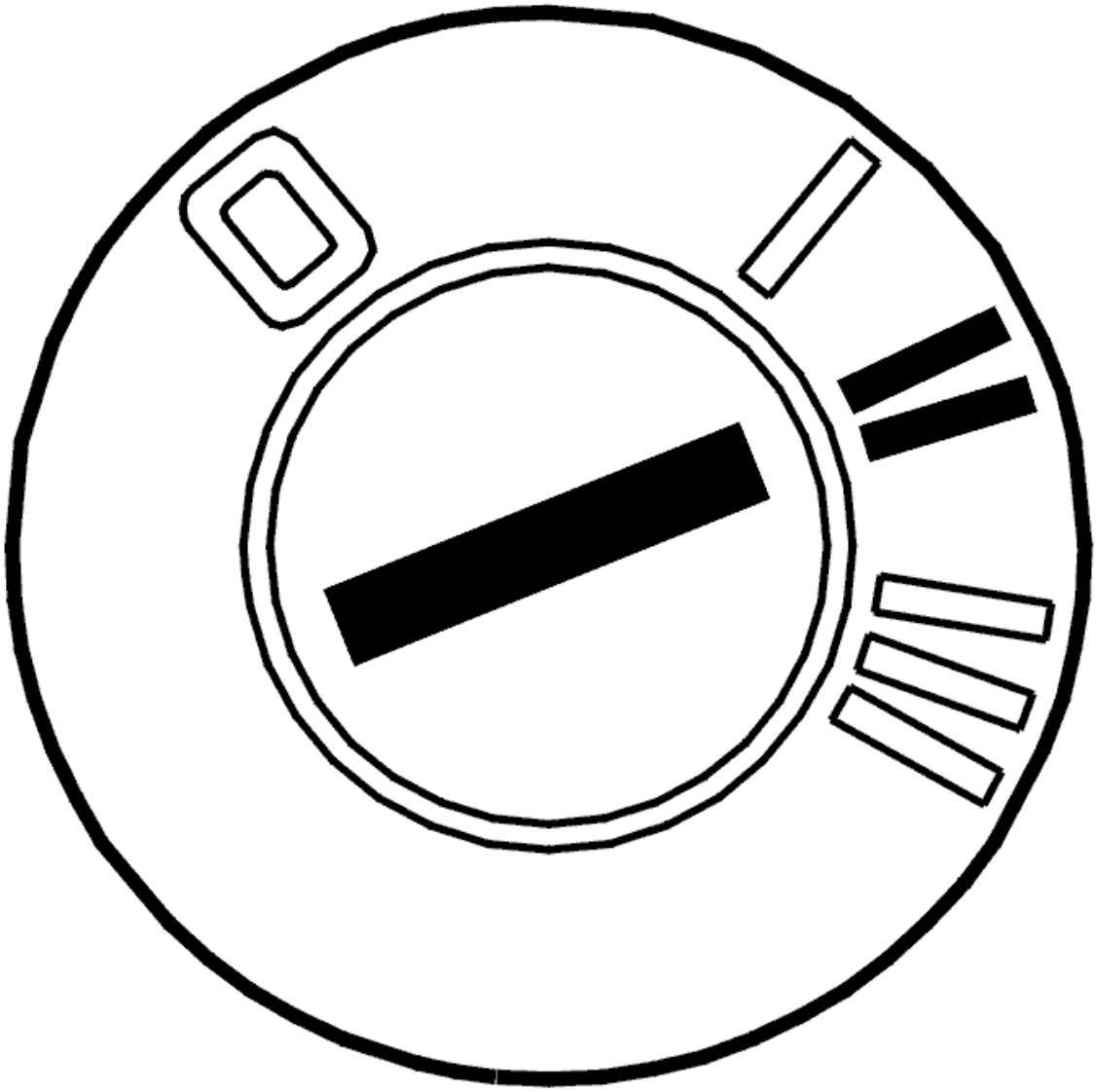


Fig. 88: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoid S5.

The value must change between OFF and ON.

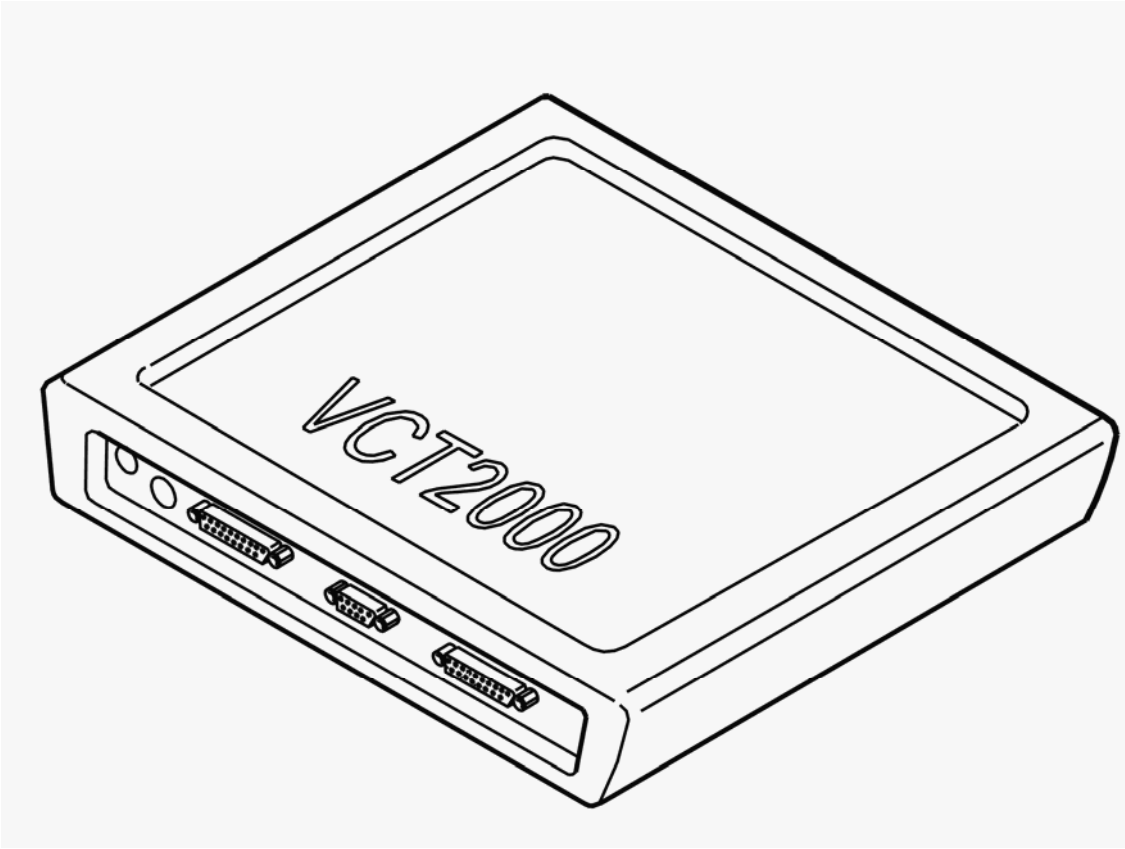


Fig. 89: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING RESISTANCE**

CHECKING RESISTANCE

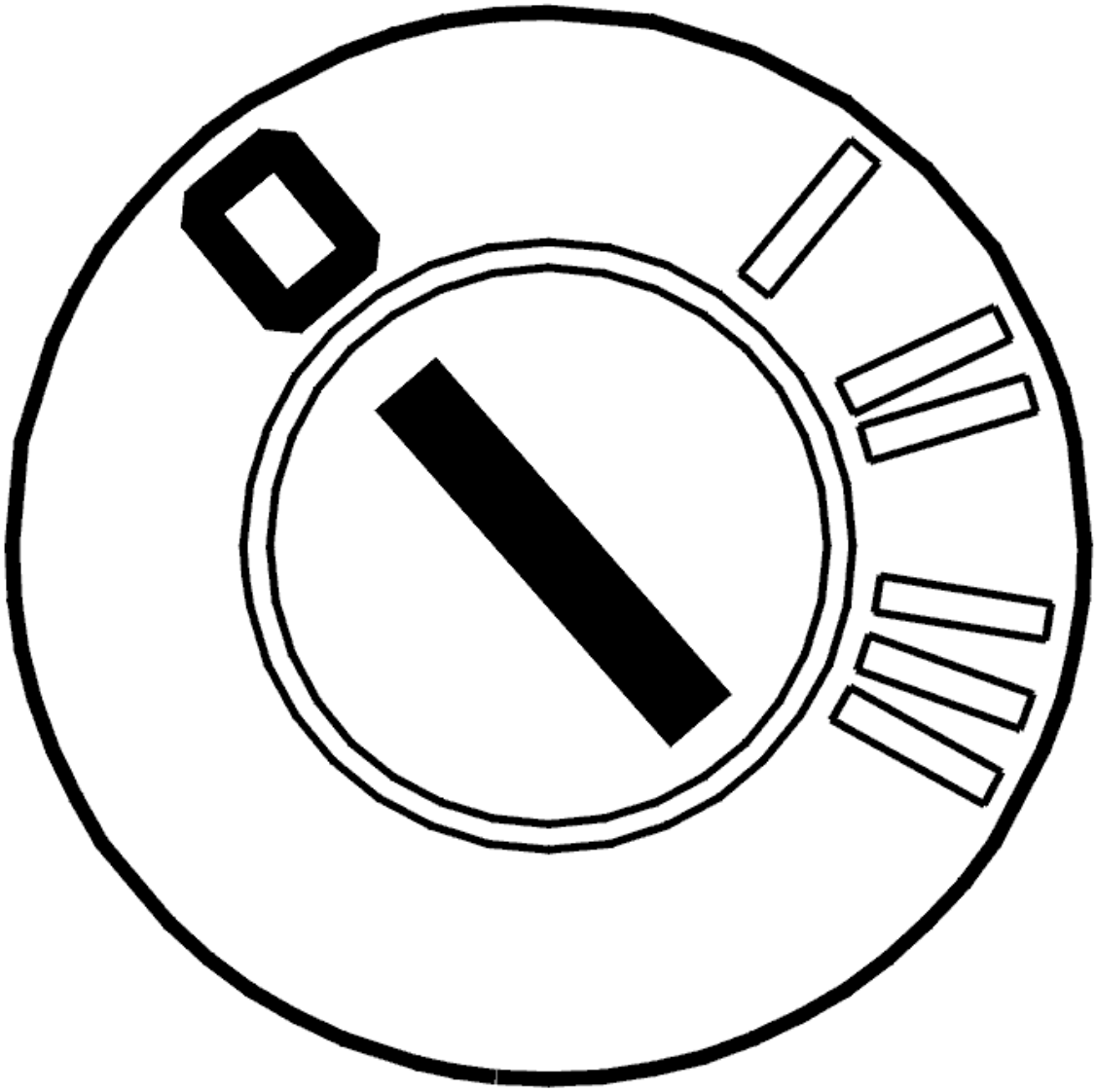


Fig. 90: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

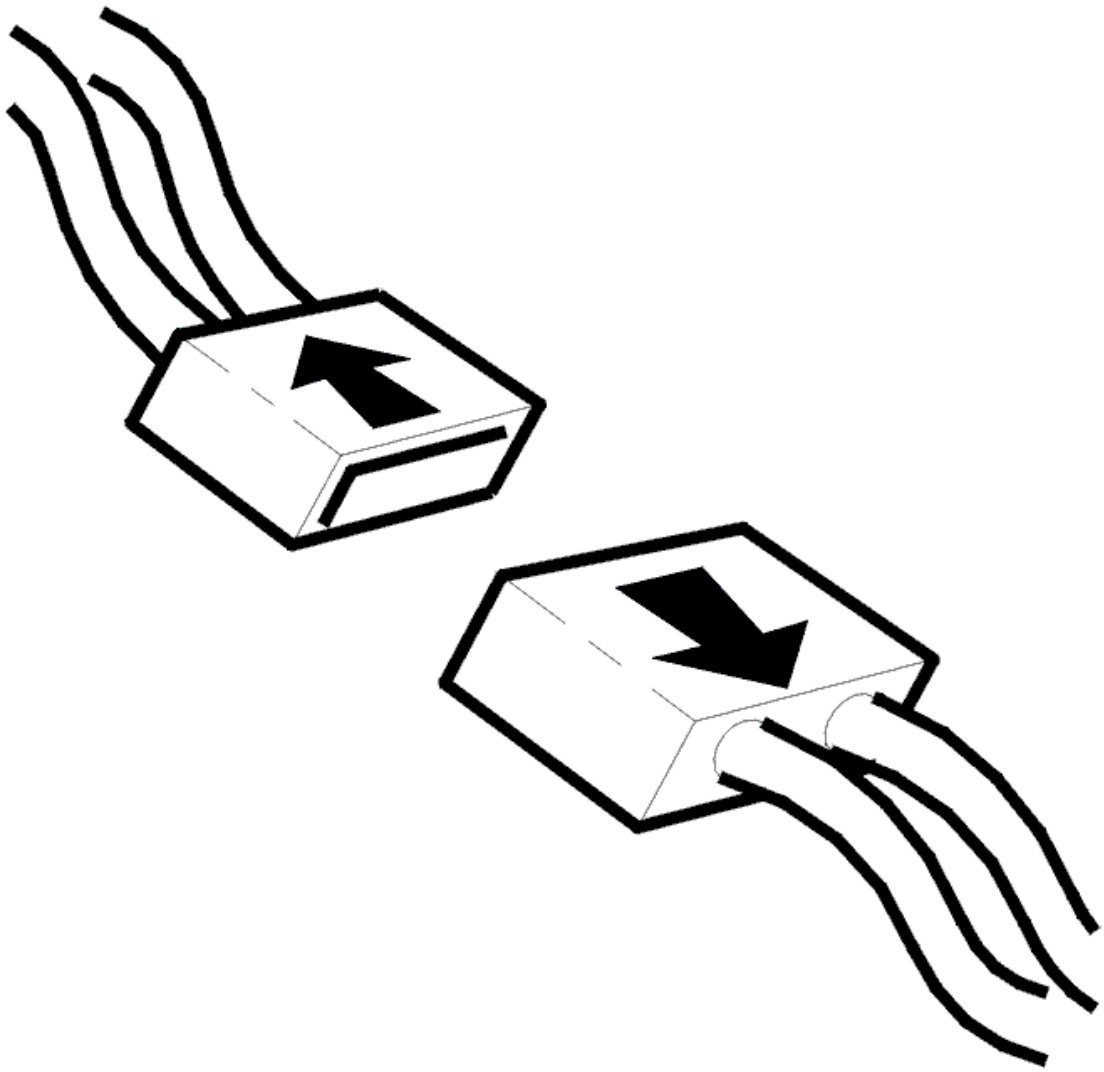


Fig. 91: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect transmission connector C.

Check solenoid S5. Measure the resistance between transmission connector terminal #C5 (transmission side) and the transmission housing. The resistance must be 11-15 ohms.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

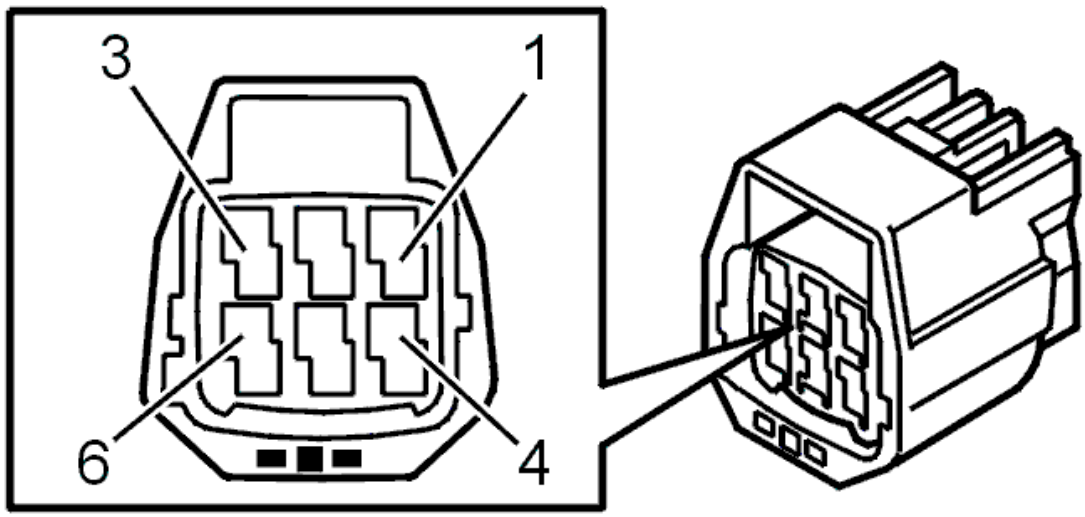


Fig. 92: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

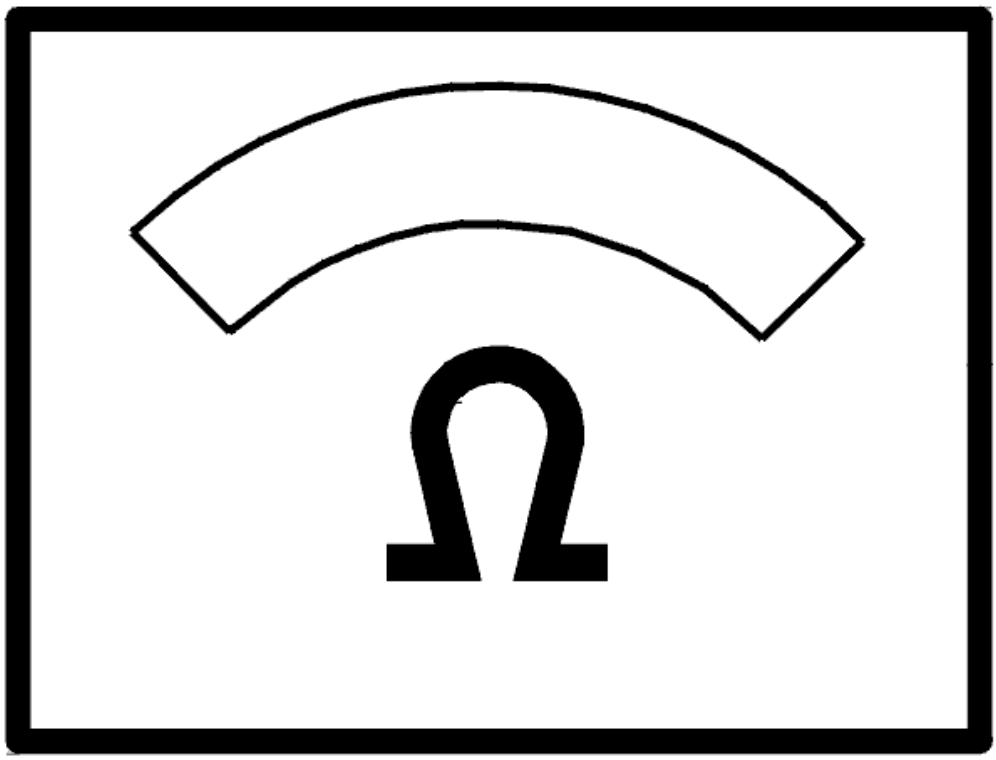


Fig. 93: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

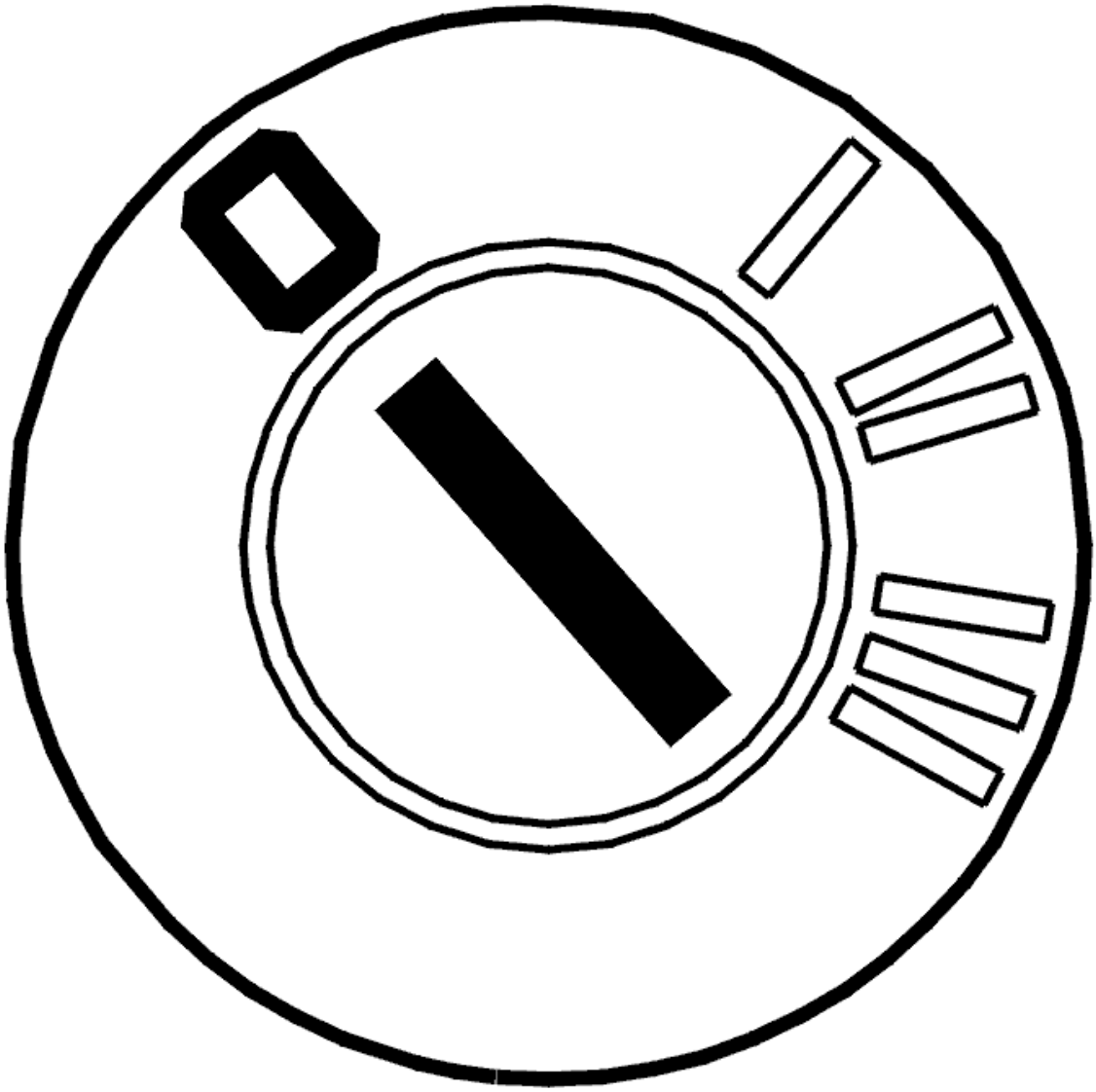


Fig. 94: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

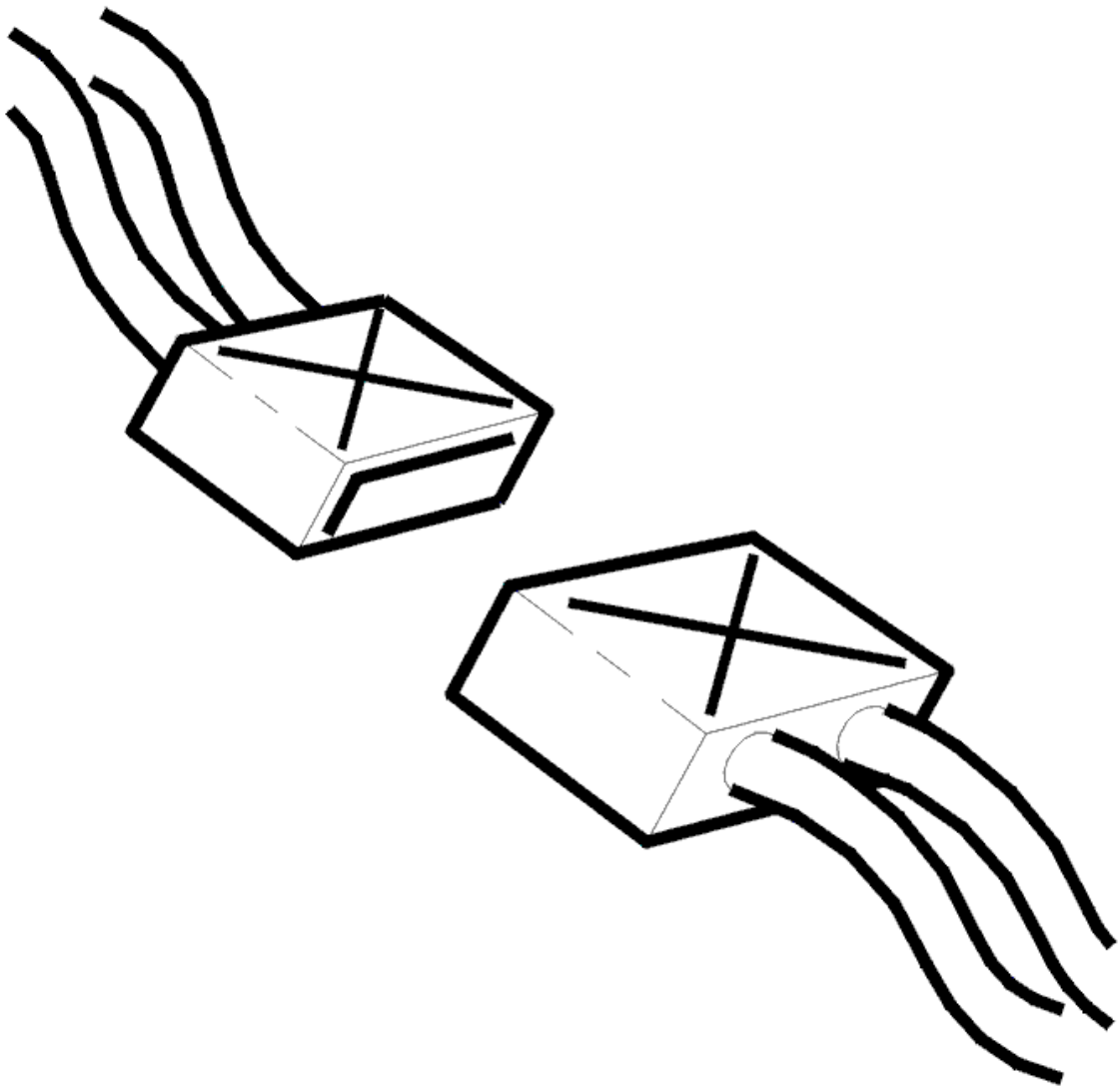


Fig. 95: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Transmission connector C disconnected.

Check the cable between control module terminal #B6 (#A66) and transmission connector terminal #C5 (control module side). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

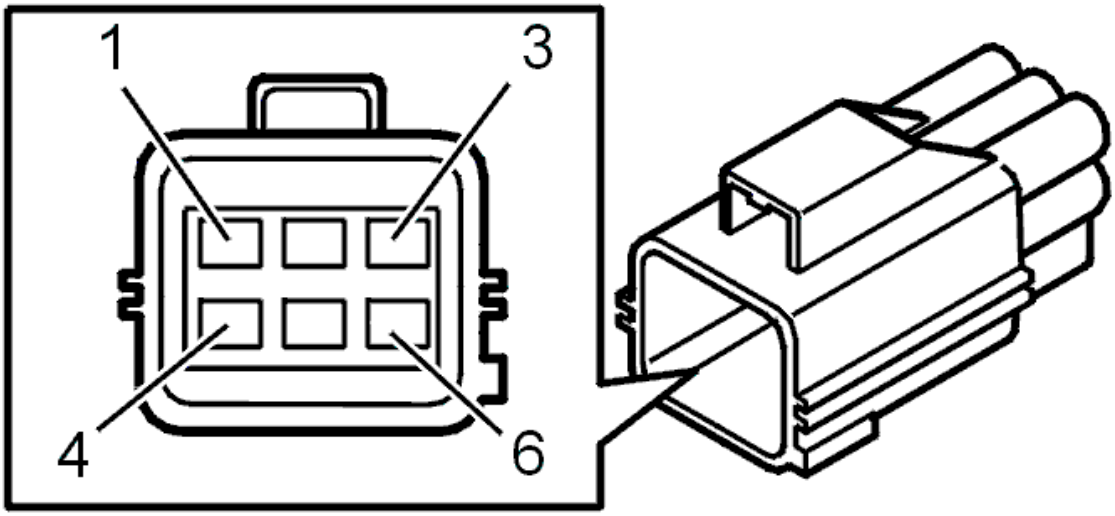


Fig. 96: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

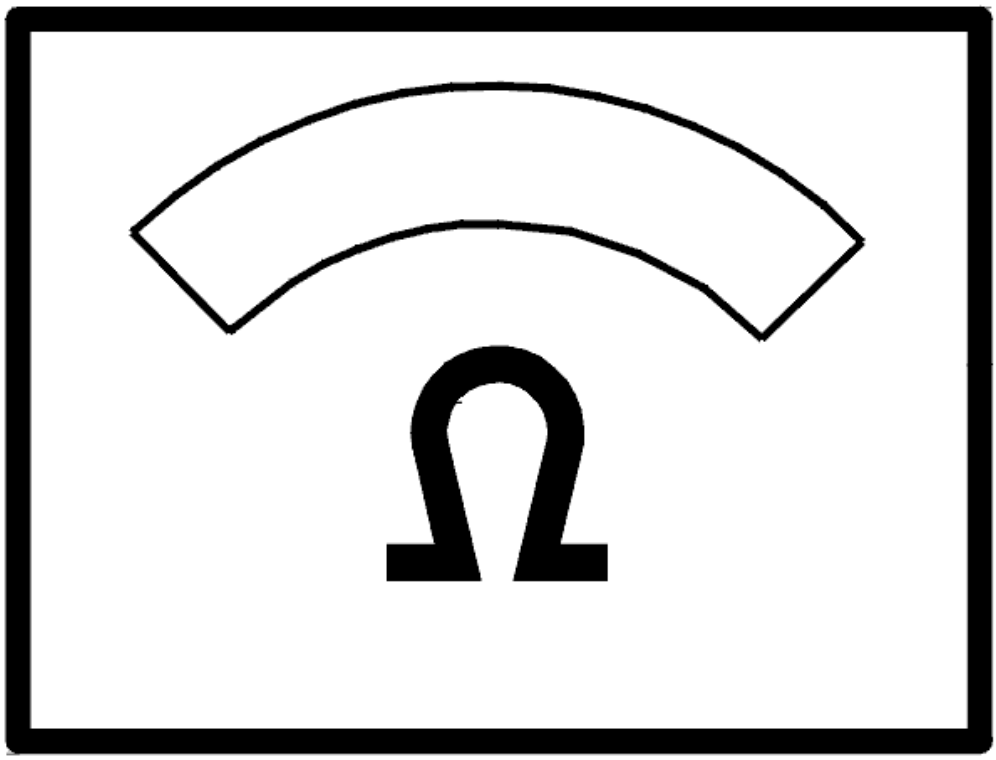


Fig. 97: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

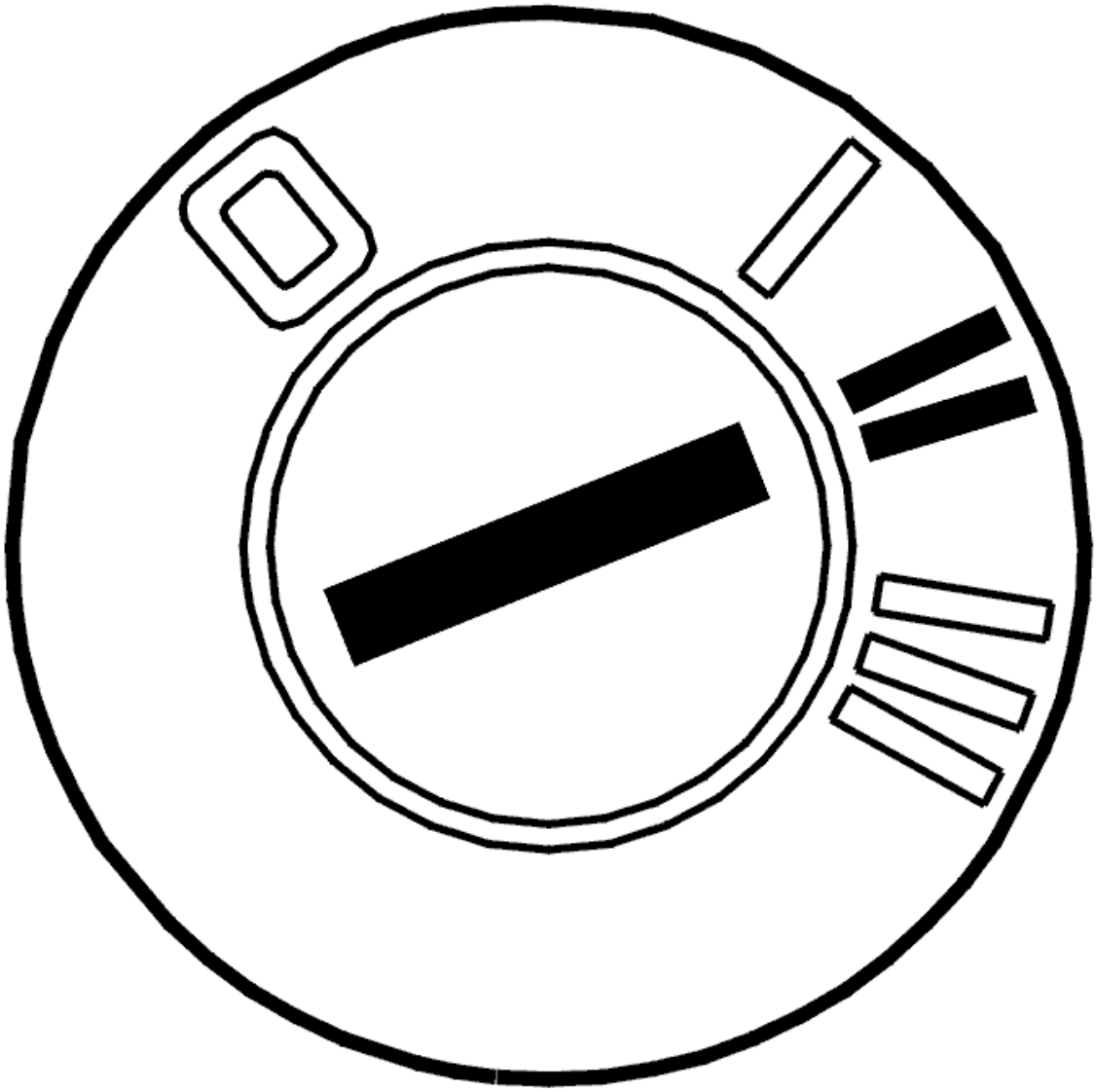


Fig. 98: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

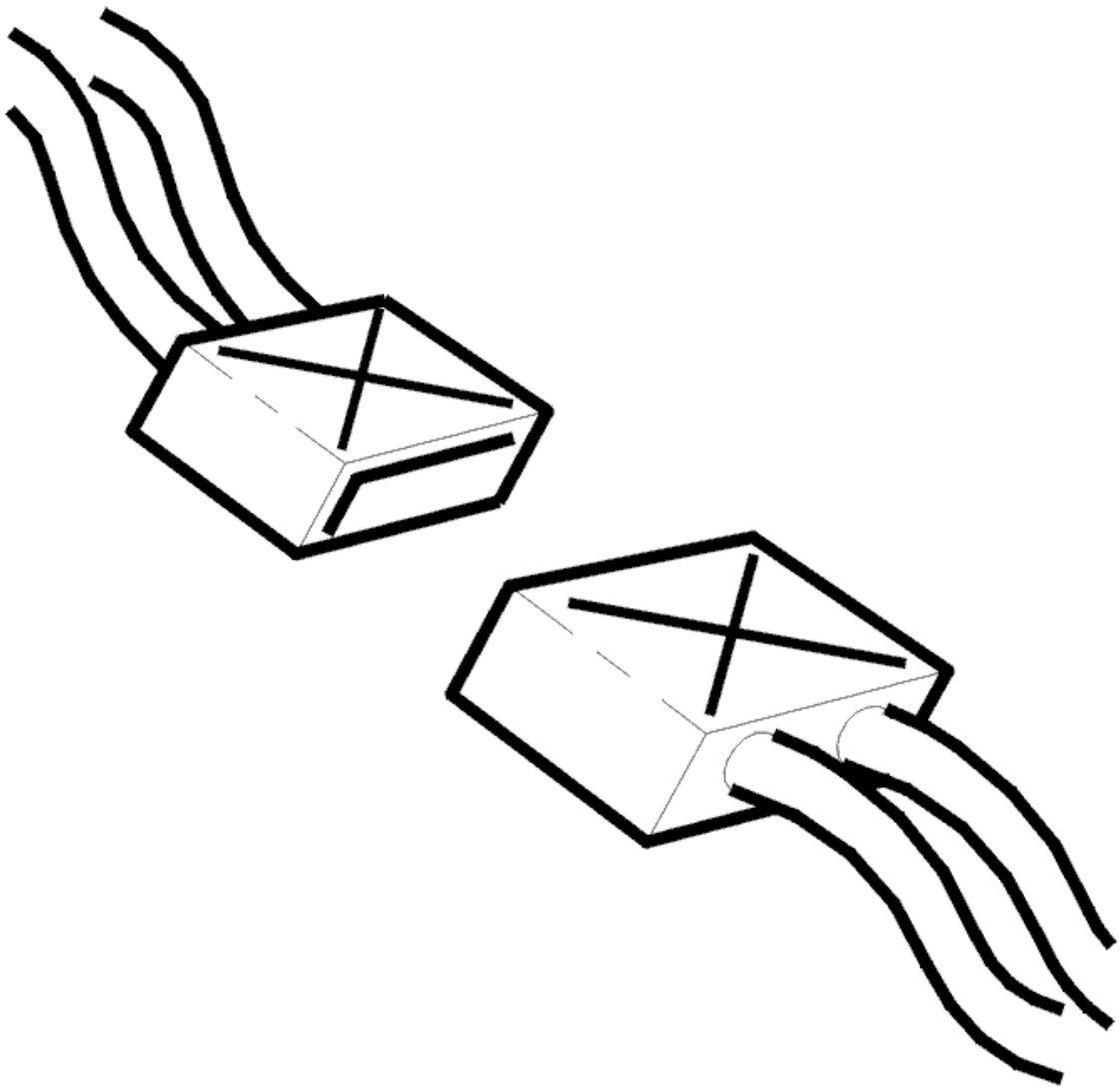


Fig. 99: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

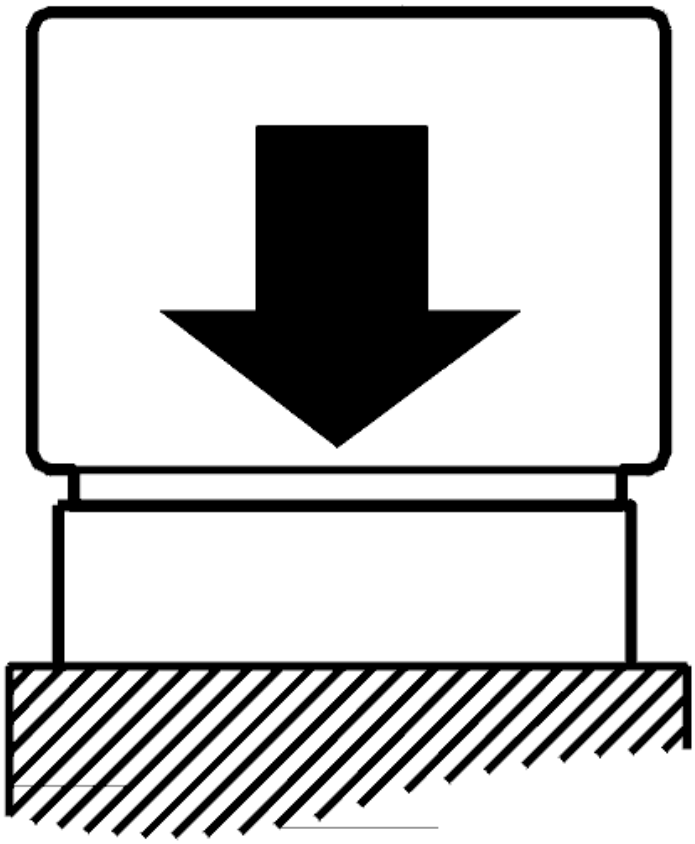


Fig. 100: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector disconnected
- Ignition on
- Gear selector in position P.

Check the transmission control module (TCM) by measuring the resistance between terminals #B6 (#A66) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

NOTE: When removing the transmission connector, the control module may store

diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

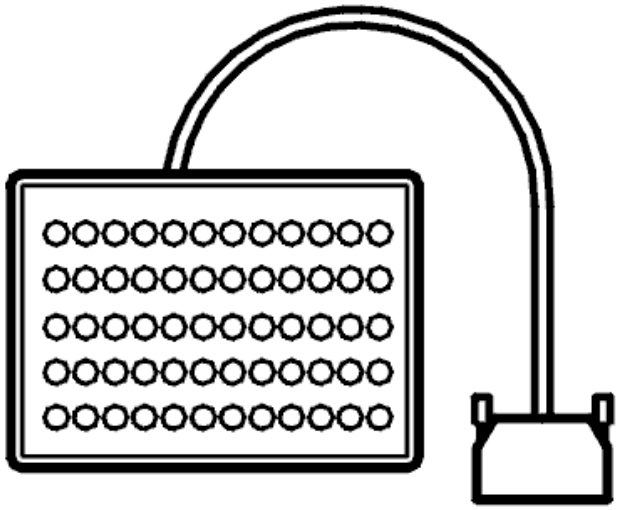


Fig. 101: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

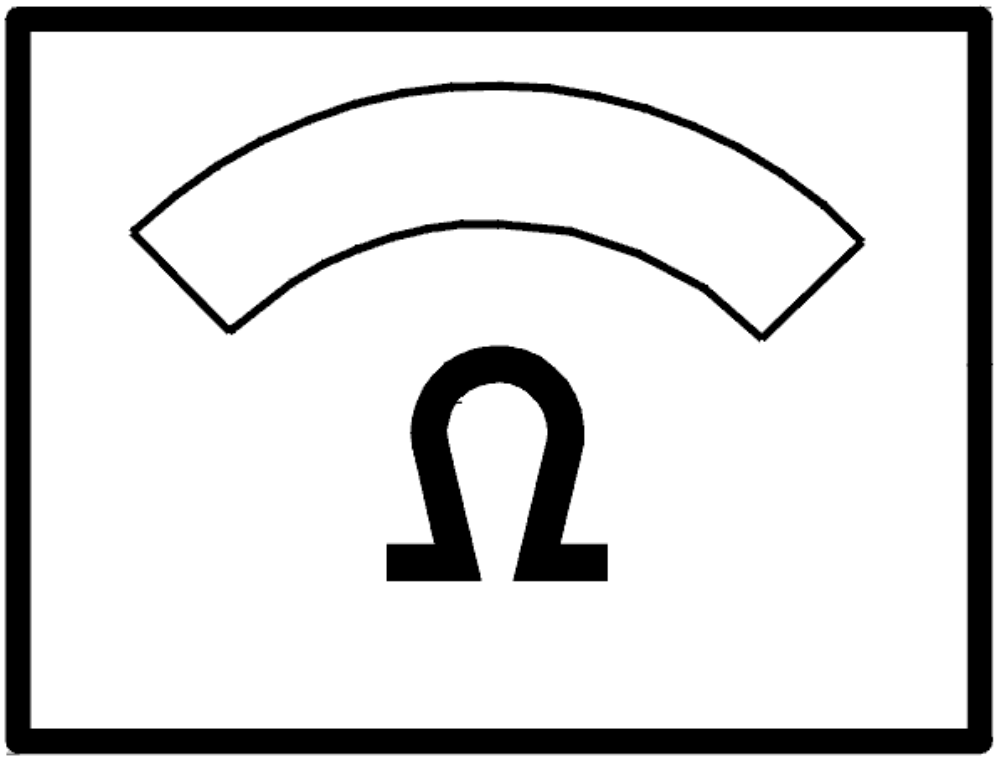


Fig. 102: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

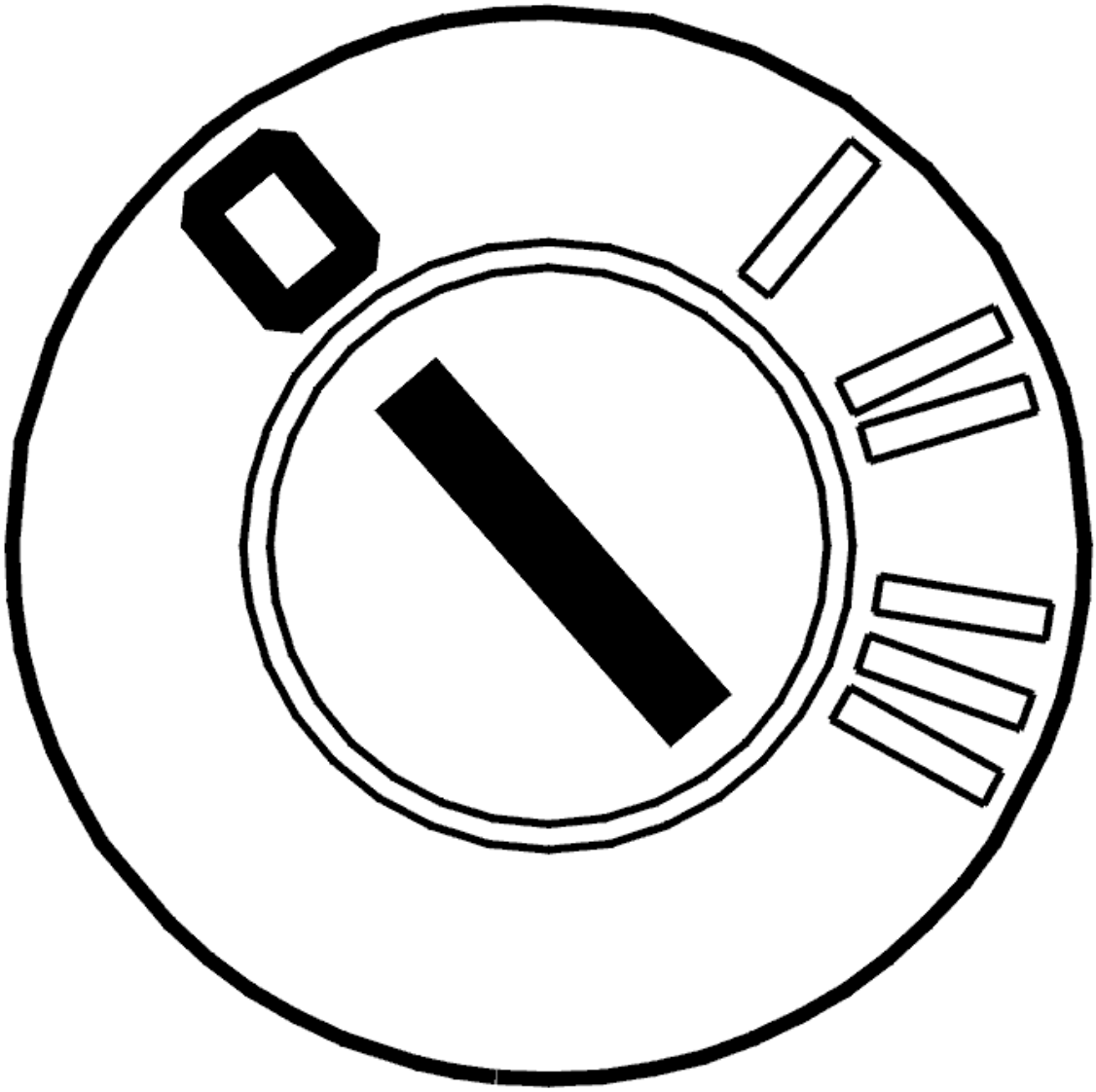


Fig. 103: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission connector terminal #C5 (transmission side) and the connector for solenoid S5. Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

  Check solenoid S5 by measuring the resistance between the terminal pin on solenoid S5 and the transmission housing. The resistance must be 11-15 ohms. Replace solenoid S5 if the resistance is incorrect.

  Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the control system and to check or replace solenoid S5, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

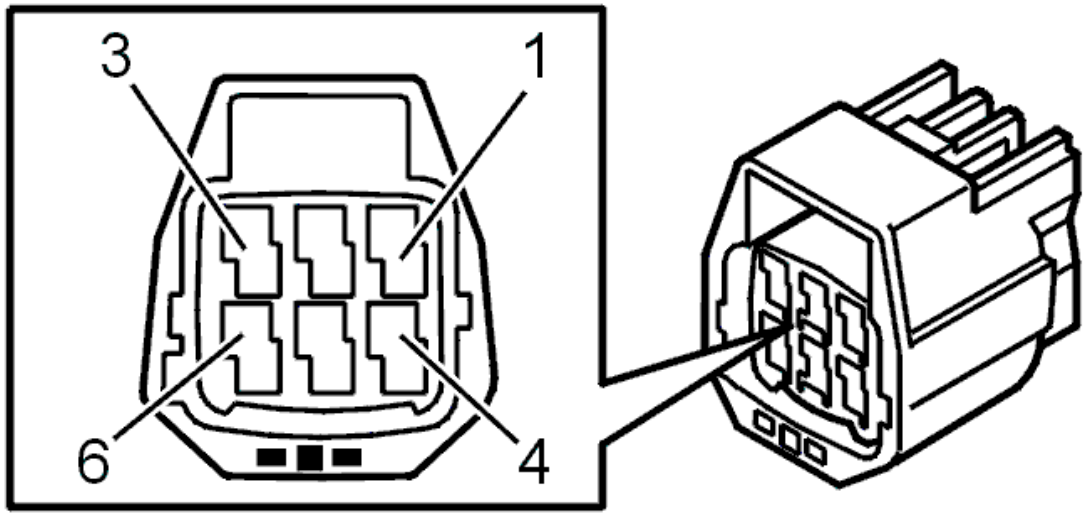


Fig. 104: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

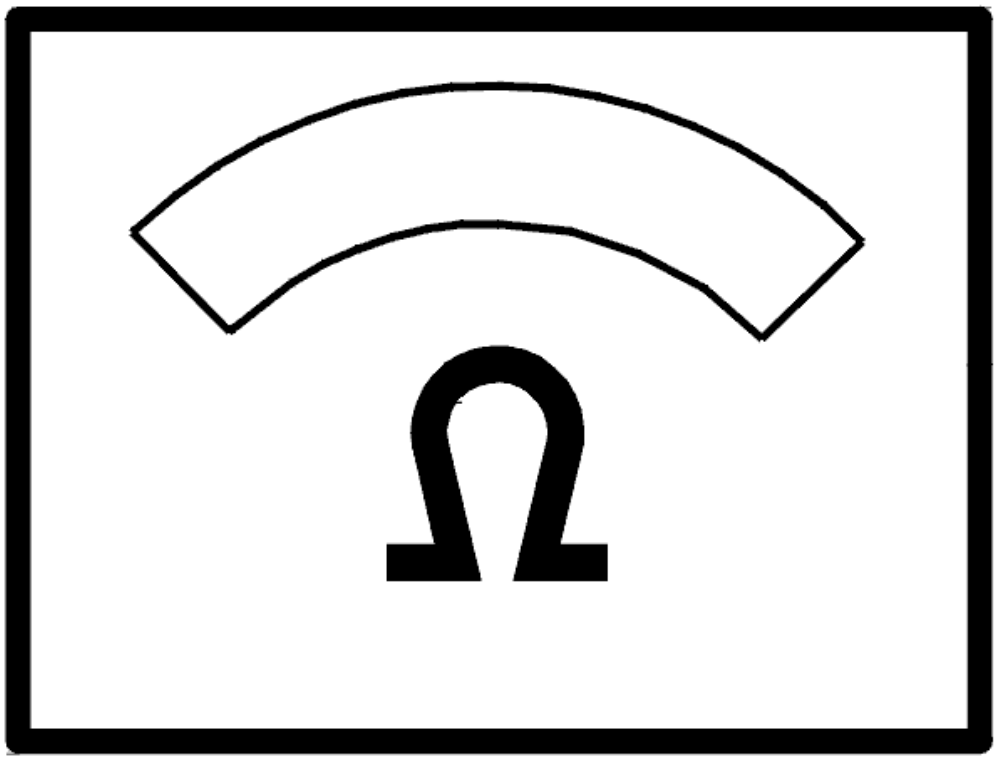


Fig. 105: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

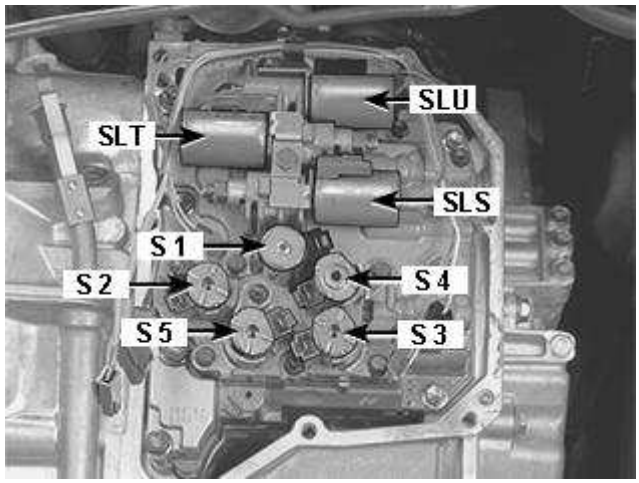


Fig. 106: Identifying S1-S5, SLT, SLU And SLS Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

INTERMITTENT FAULT

Check the cable between transmission control module (TCM) terminal #B6 (#A66) and transmission connector terminal #C5 (control module side). Check for an intermittent short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** . Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** .

- Check the circuit for solenoid S5. Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #B6 (#A66) and #A53 (#A53) on the breakout box. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

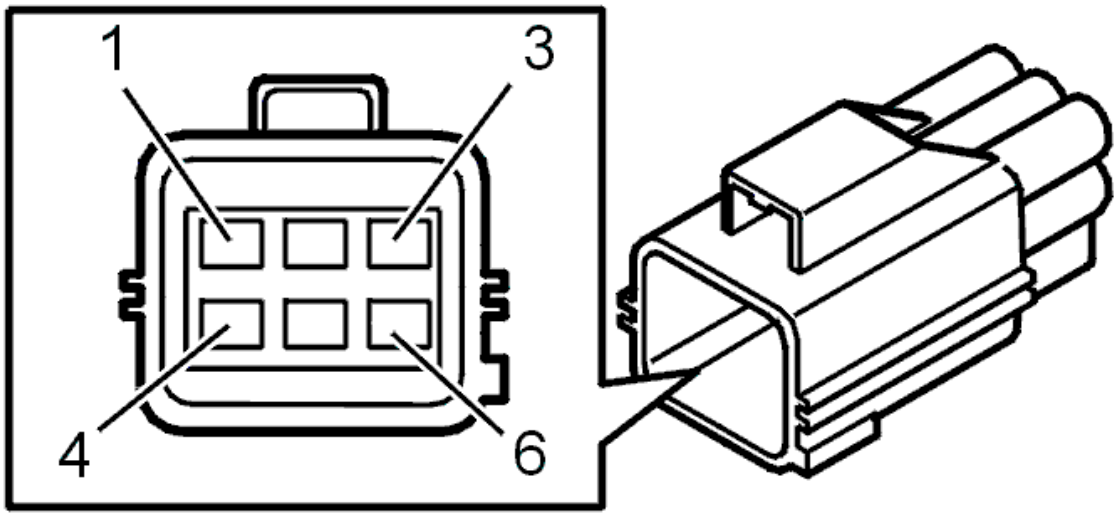


Fig. 107: Identifying 6-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

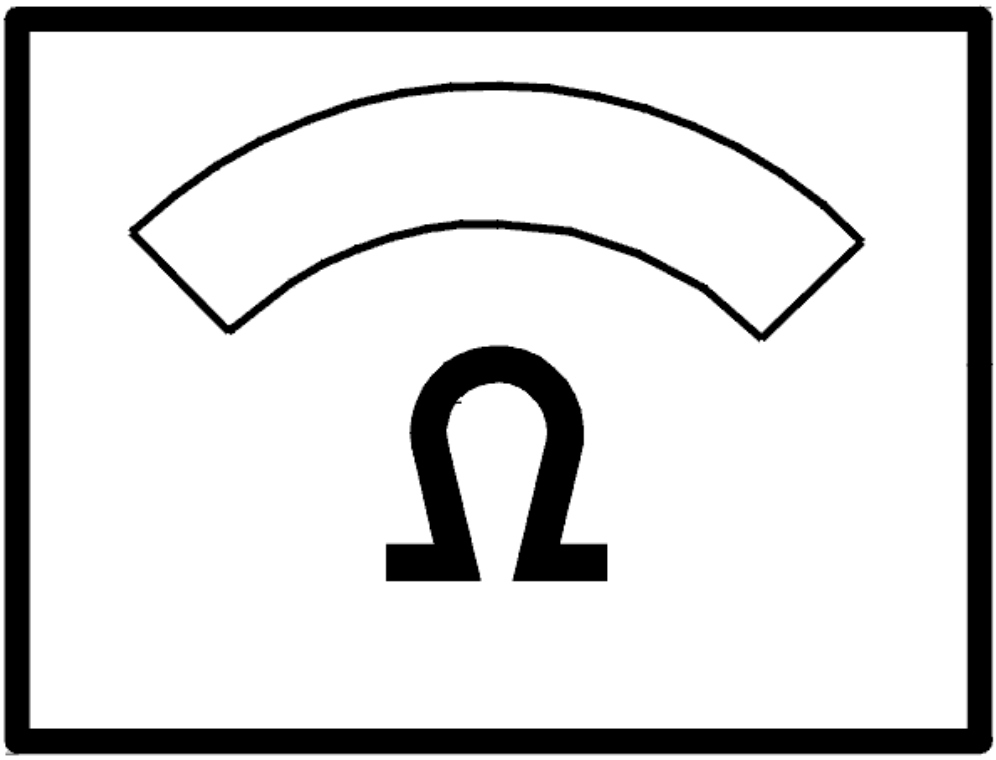


Fig. 108: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

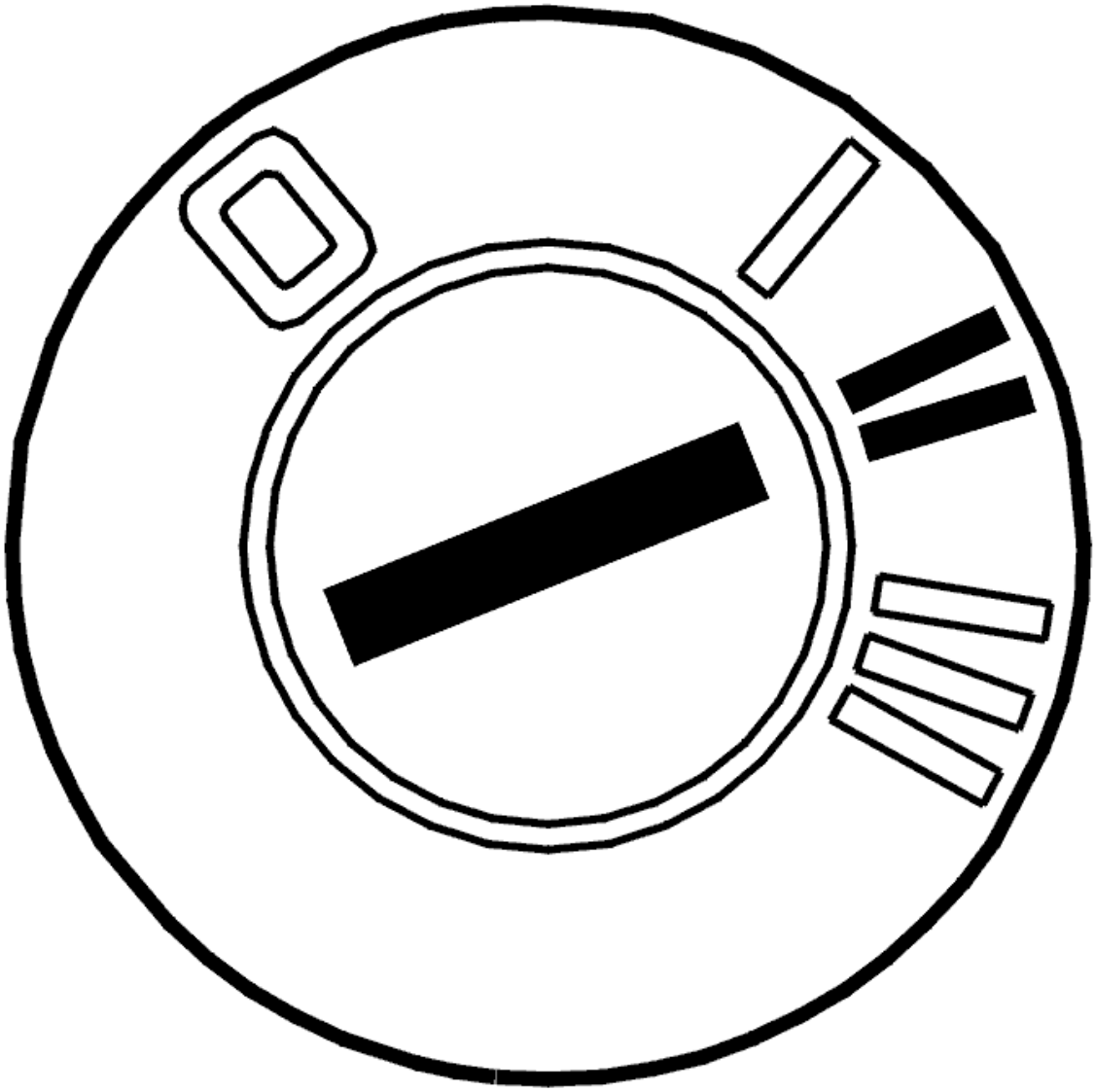


Fig. 109: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

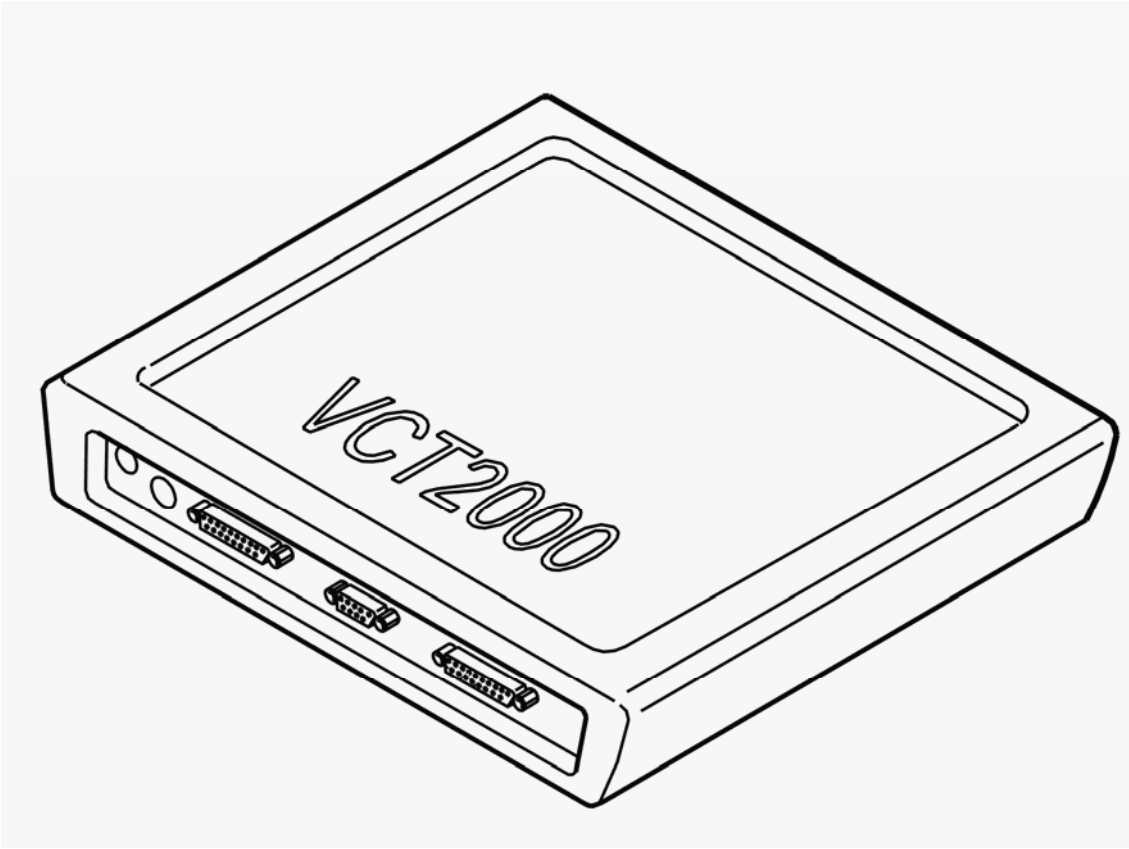


Fig. 110: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

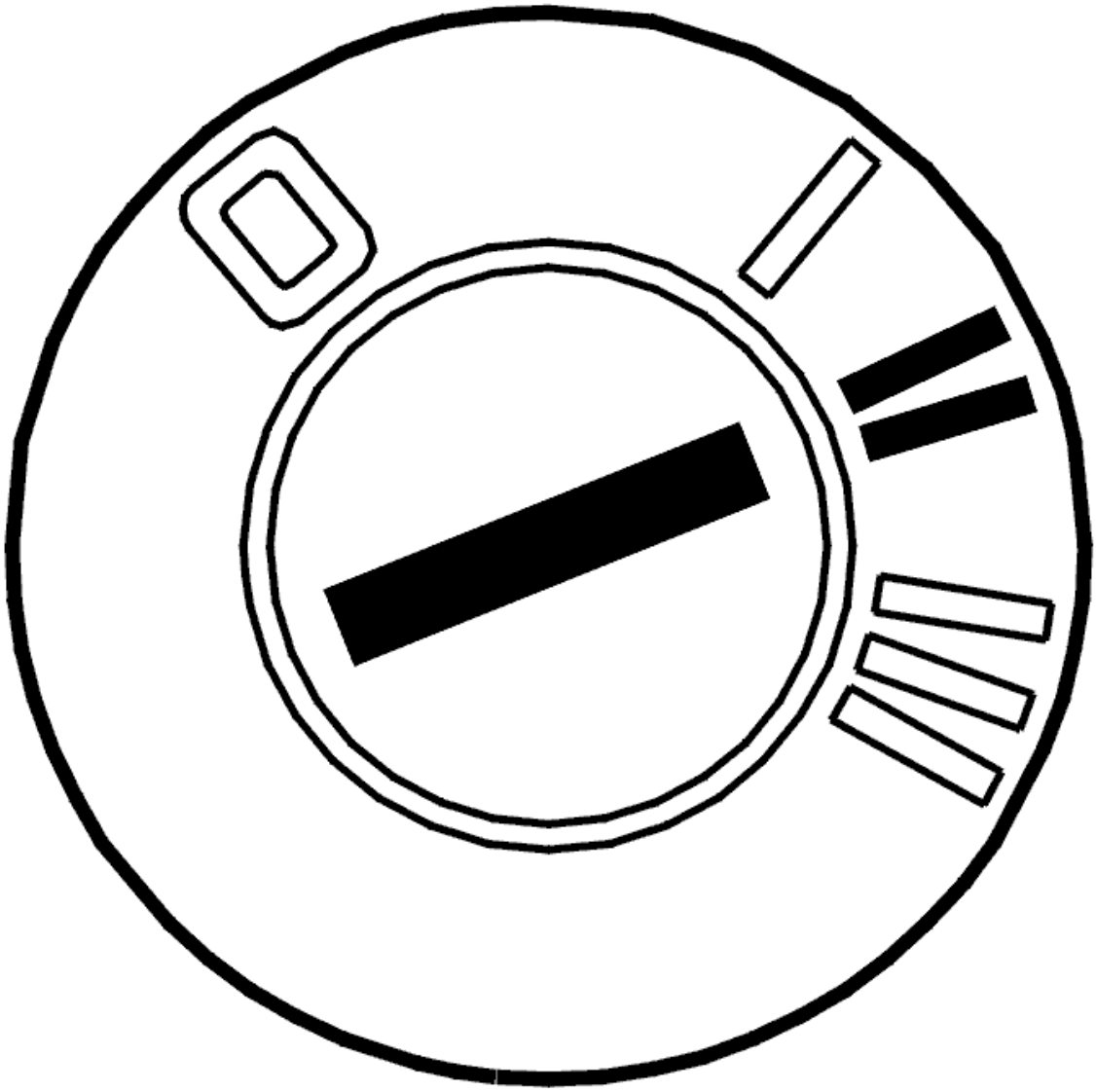


Fig. 111: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

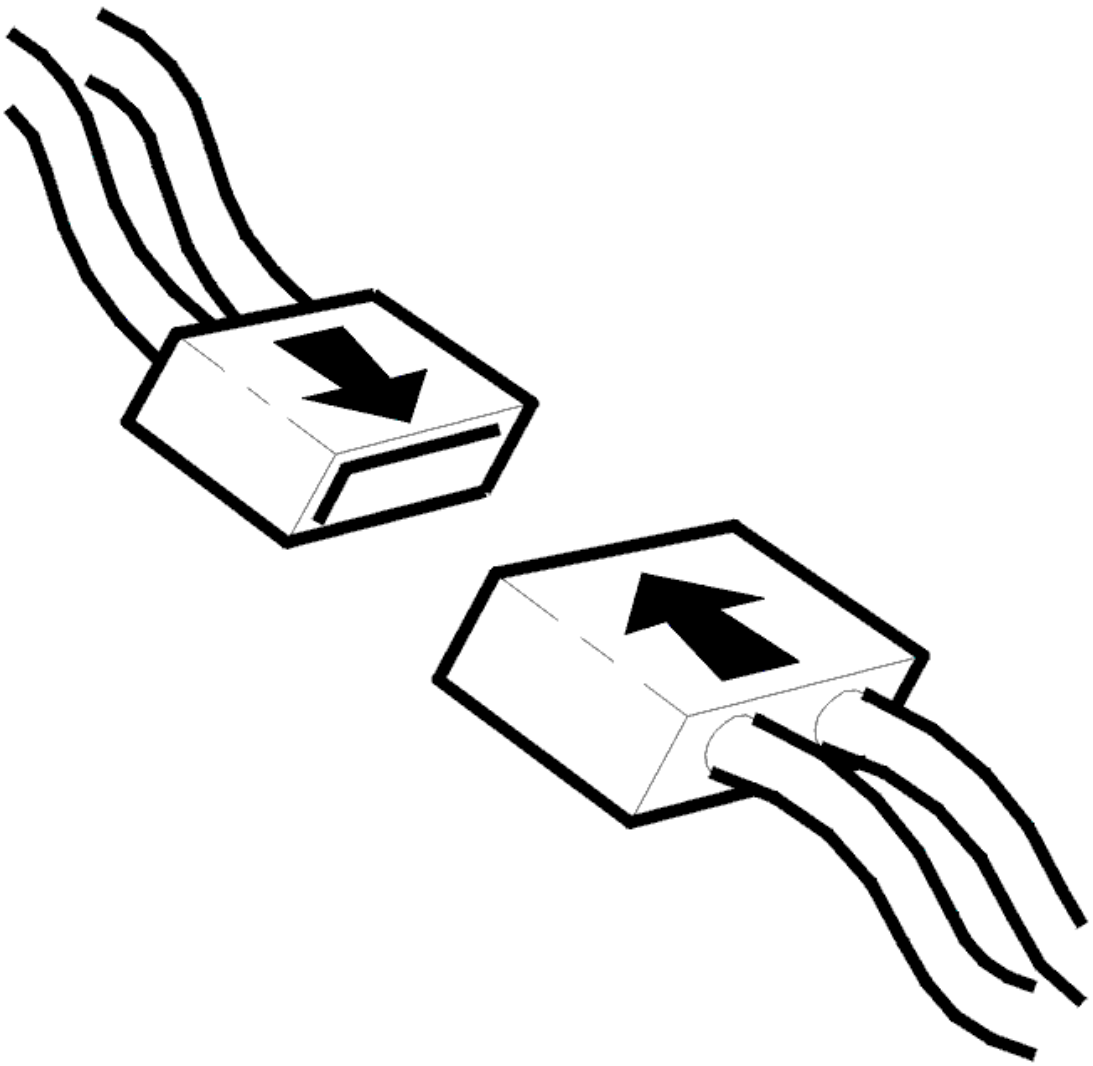


Fig. 112: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S5.

The value should change between OFF and ON.

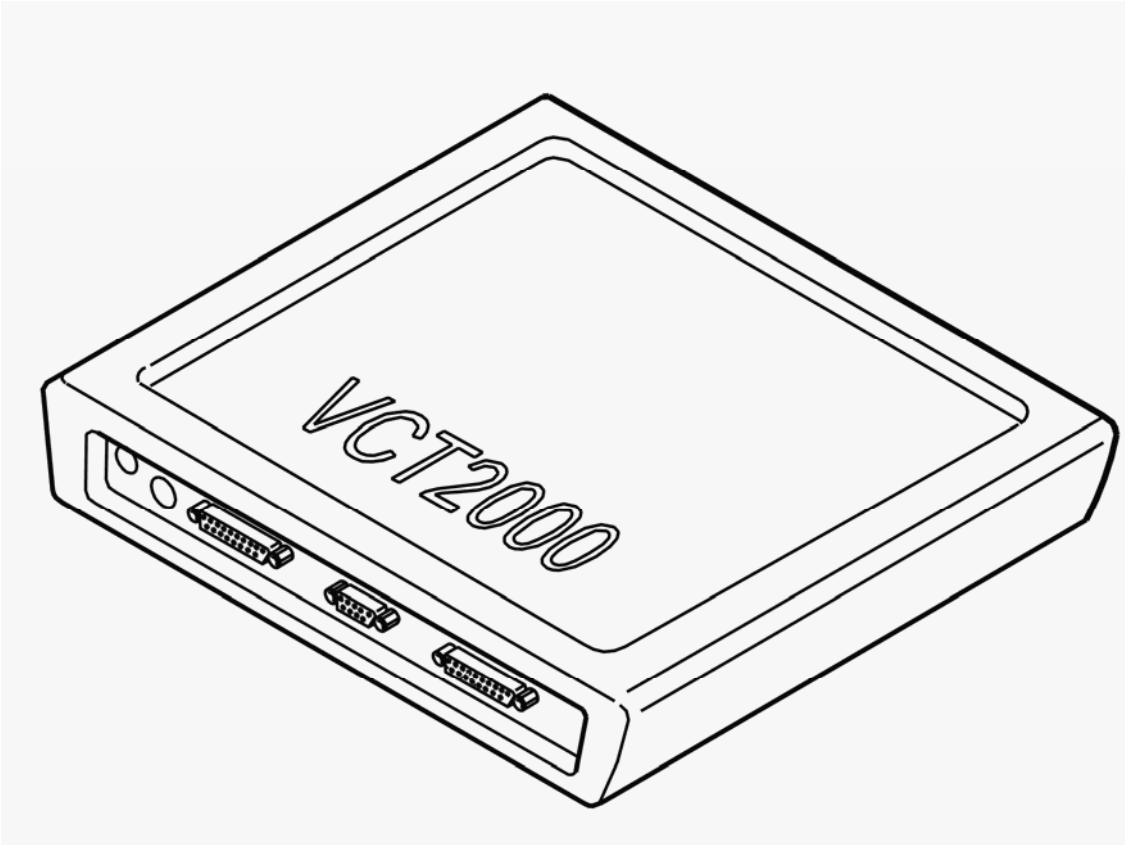


Fig. 113: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change between OFF and ON?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

FAULTY SIGNAL

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

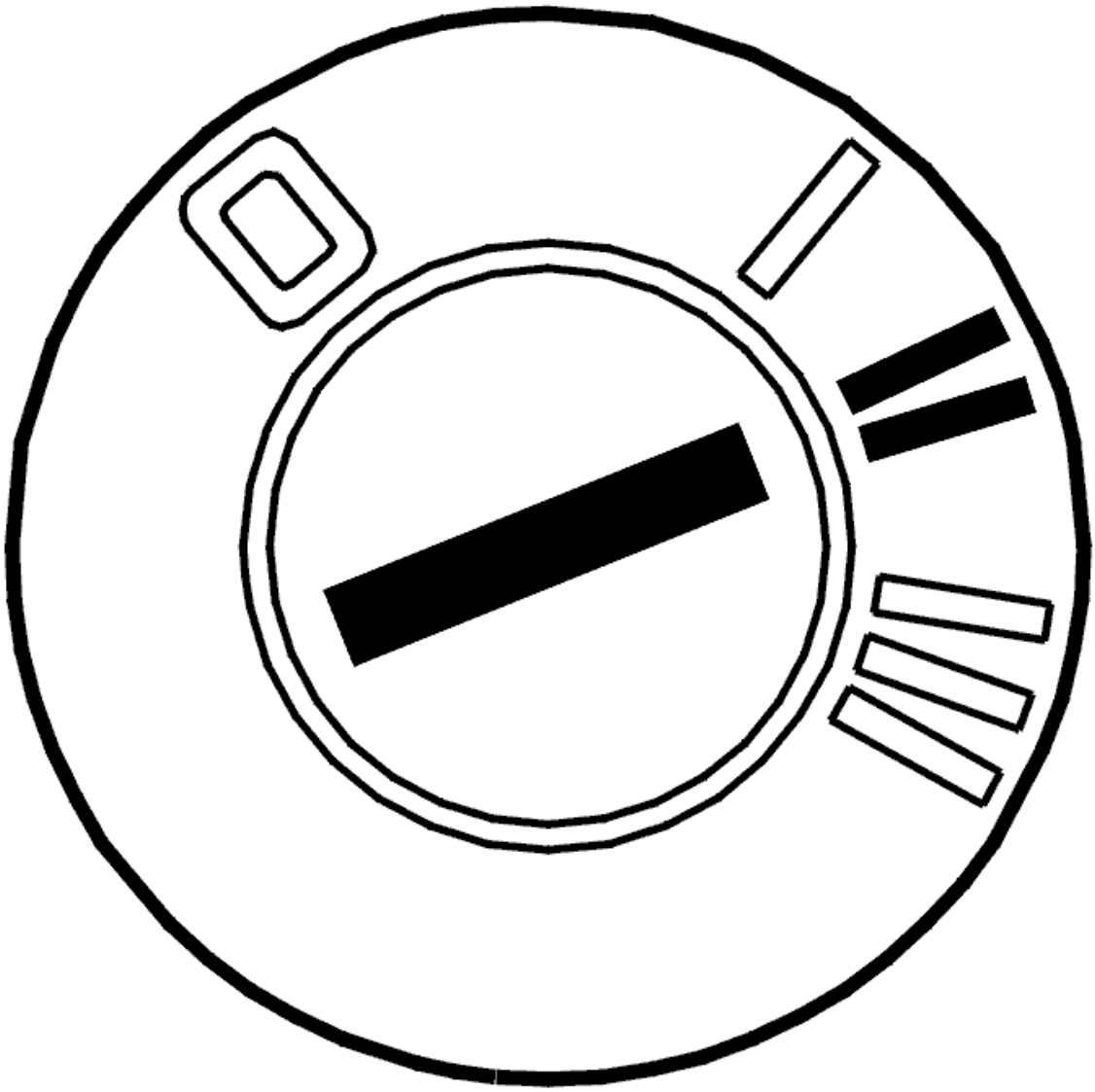


Fig. 114: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

Compare with the transmission temperature.

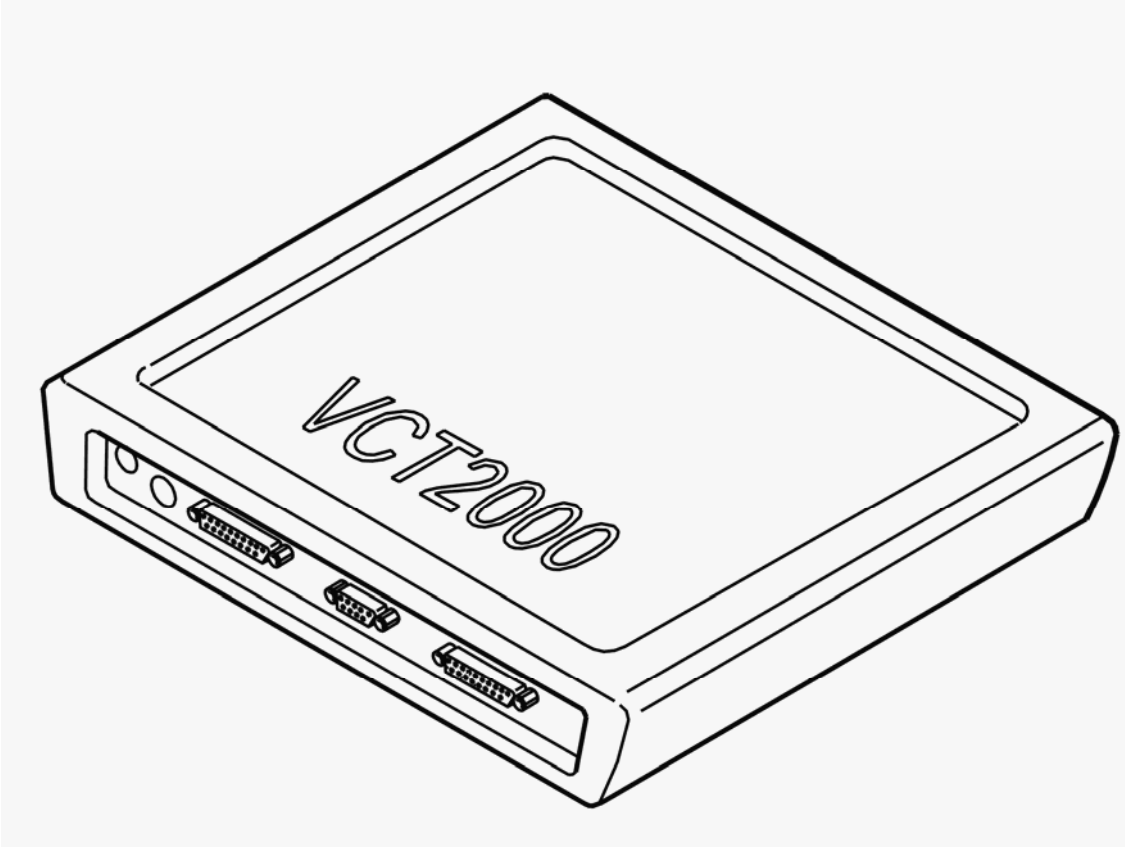


Fig. 115: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  Refer to **INTERMITTENT FAULT**

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

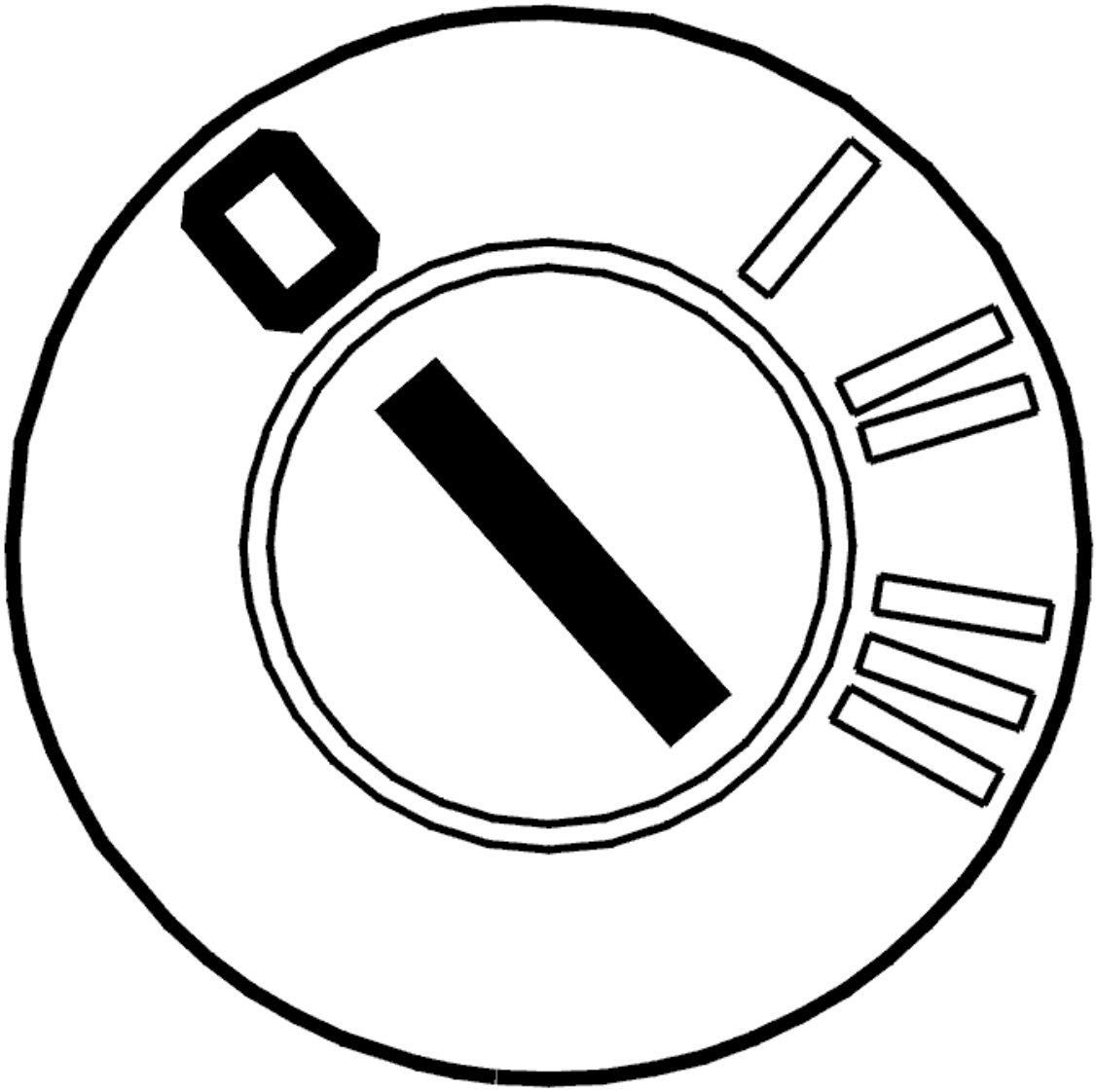


Fig. 116: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

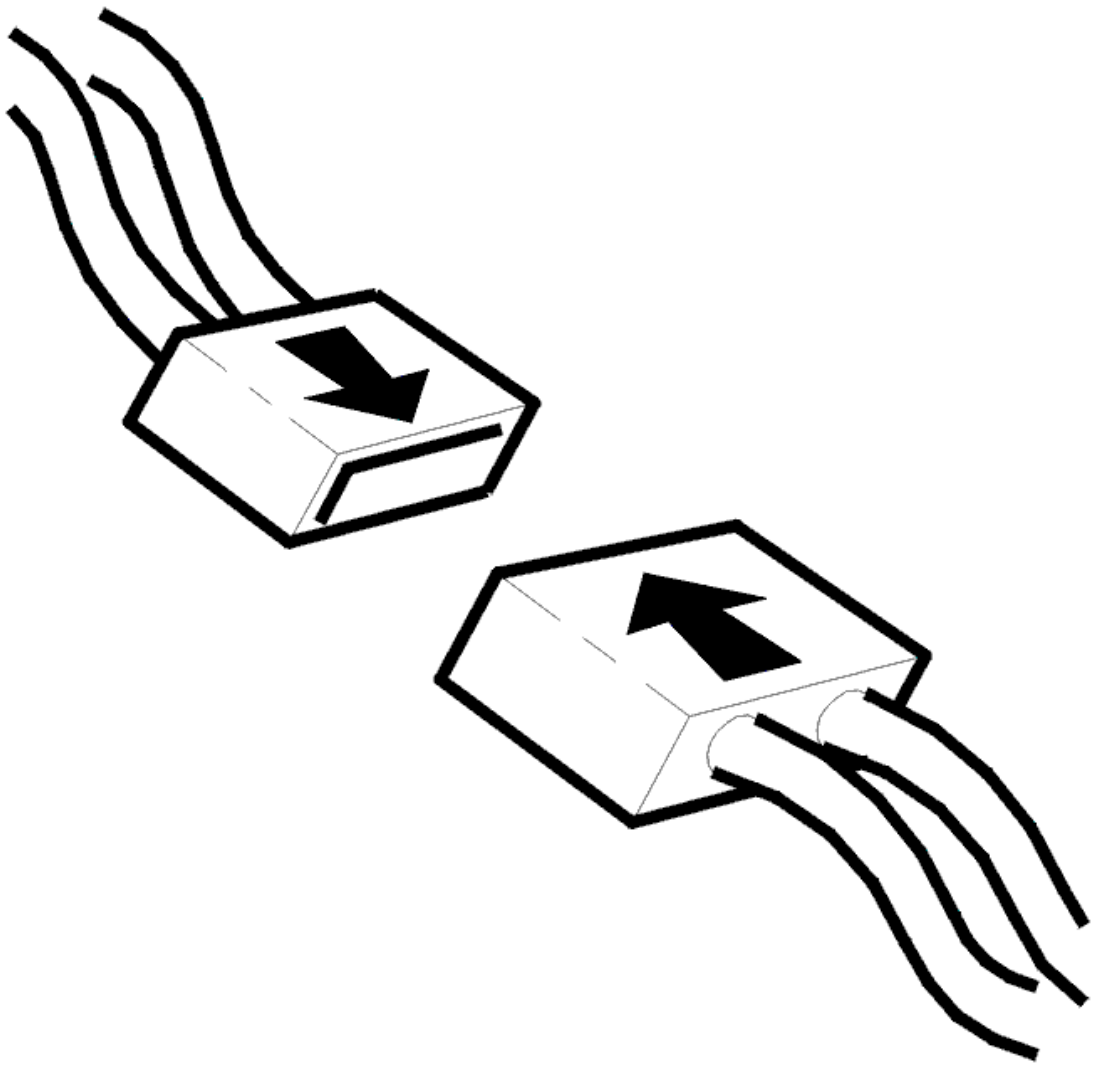


Fig. 117: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.

The resistance must be 4.5-6 kohms at 20°C.

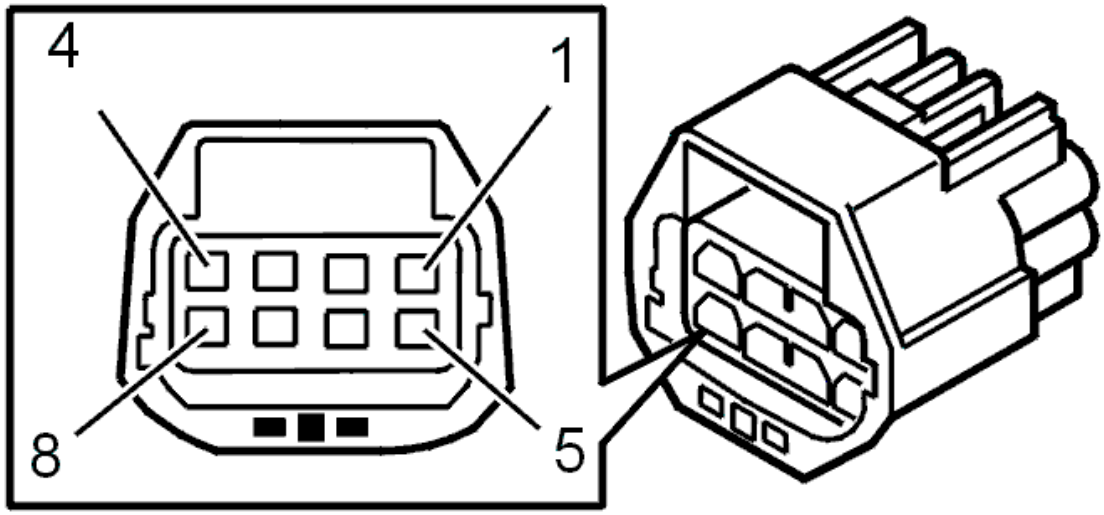


Fig. 118: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

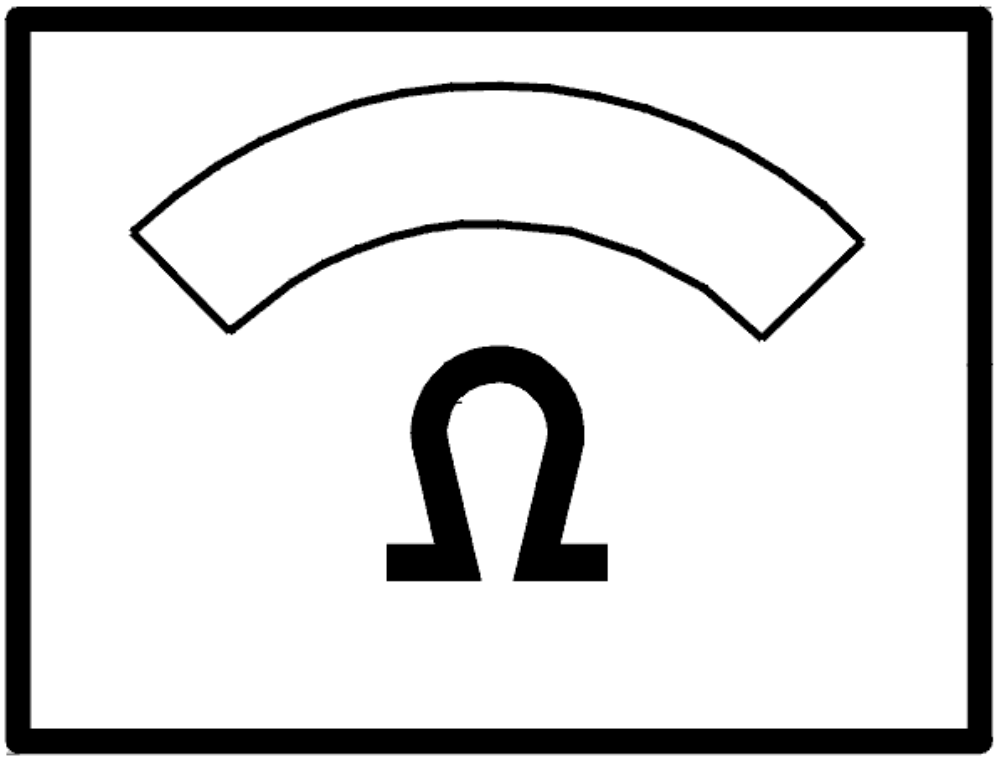


Fig. 119: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7

(control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

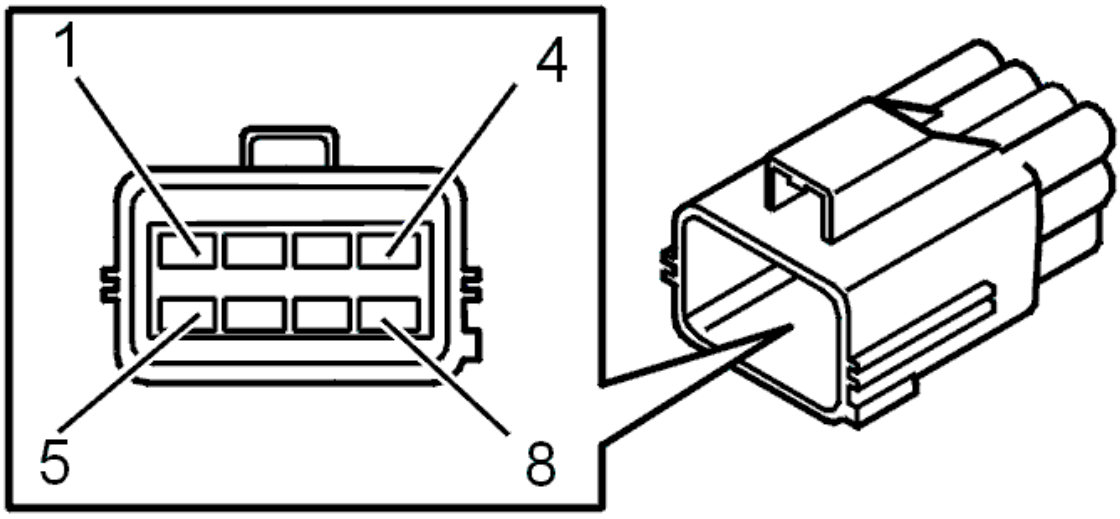


Fig. 120: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

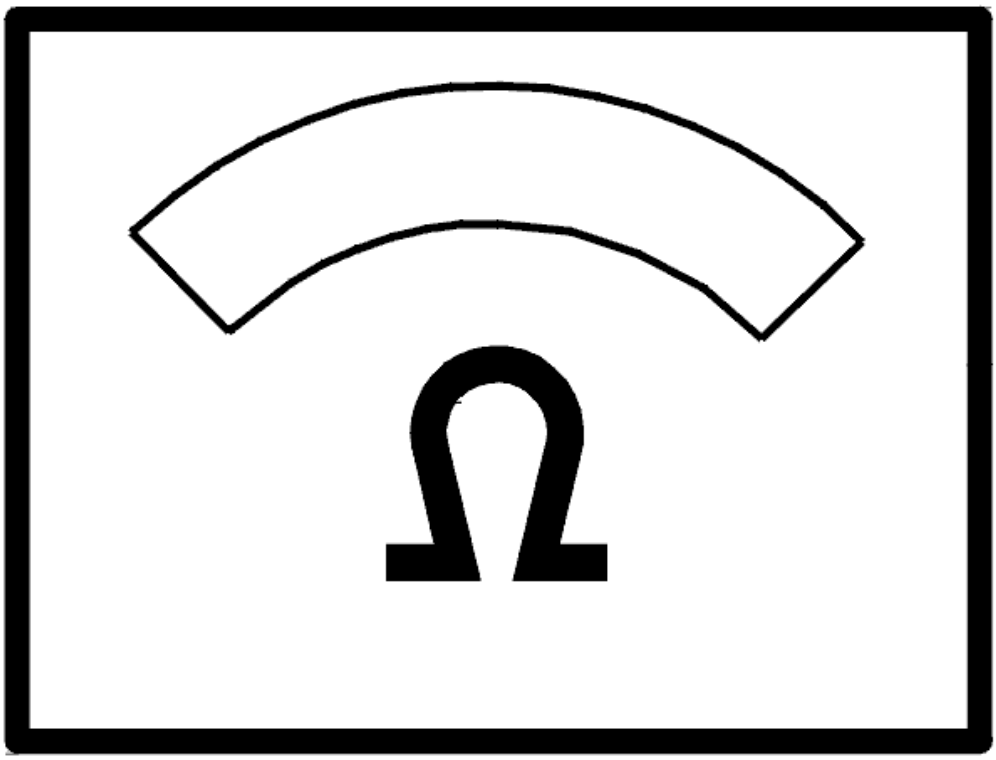


Fig. 121: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

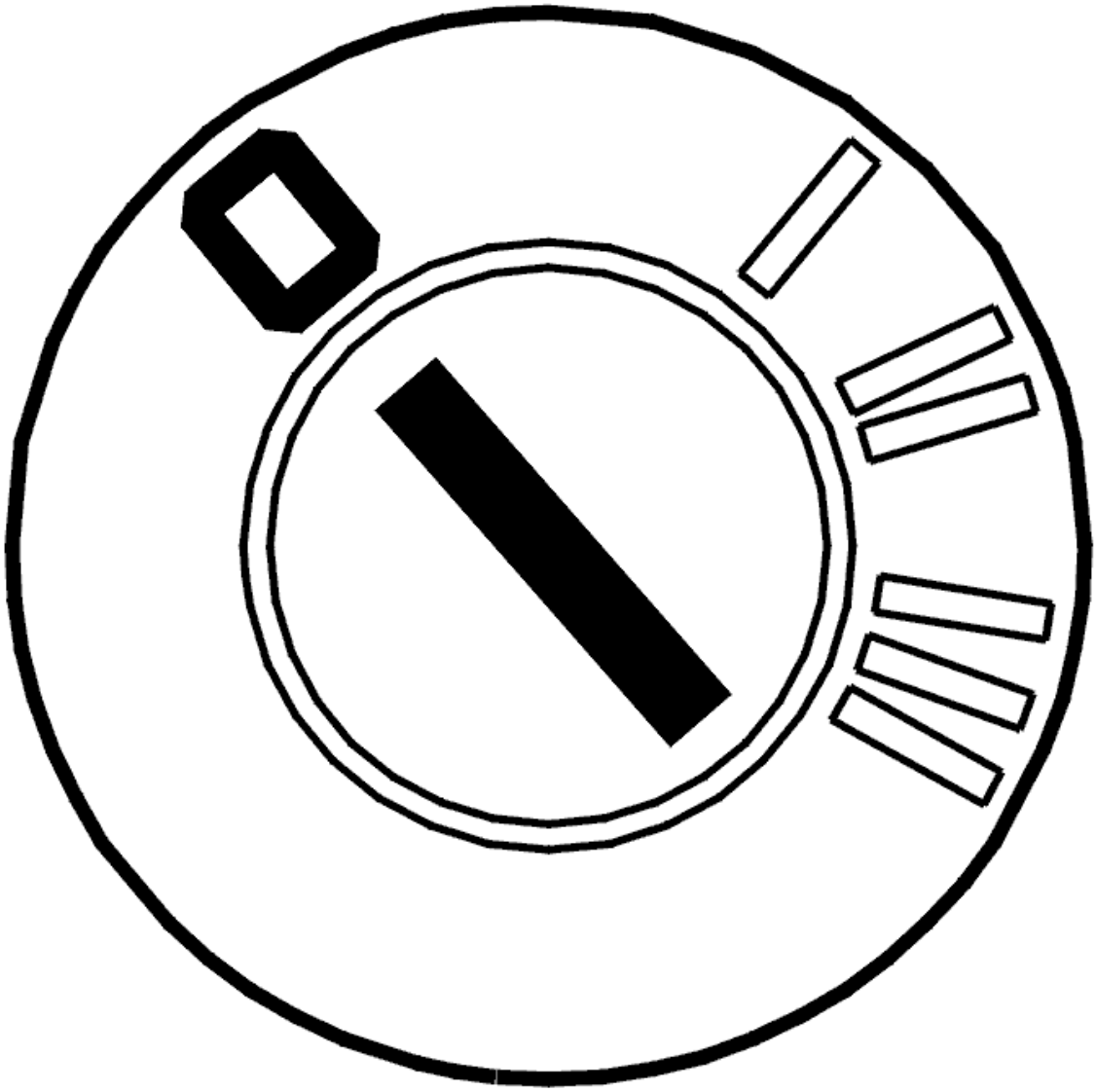


Fig. 122: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

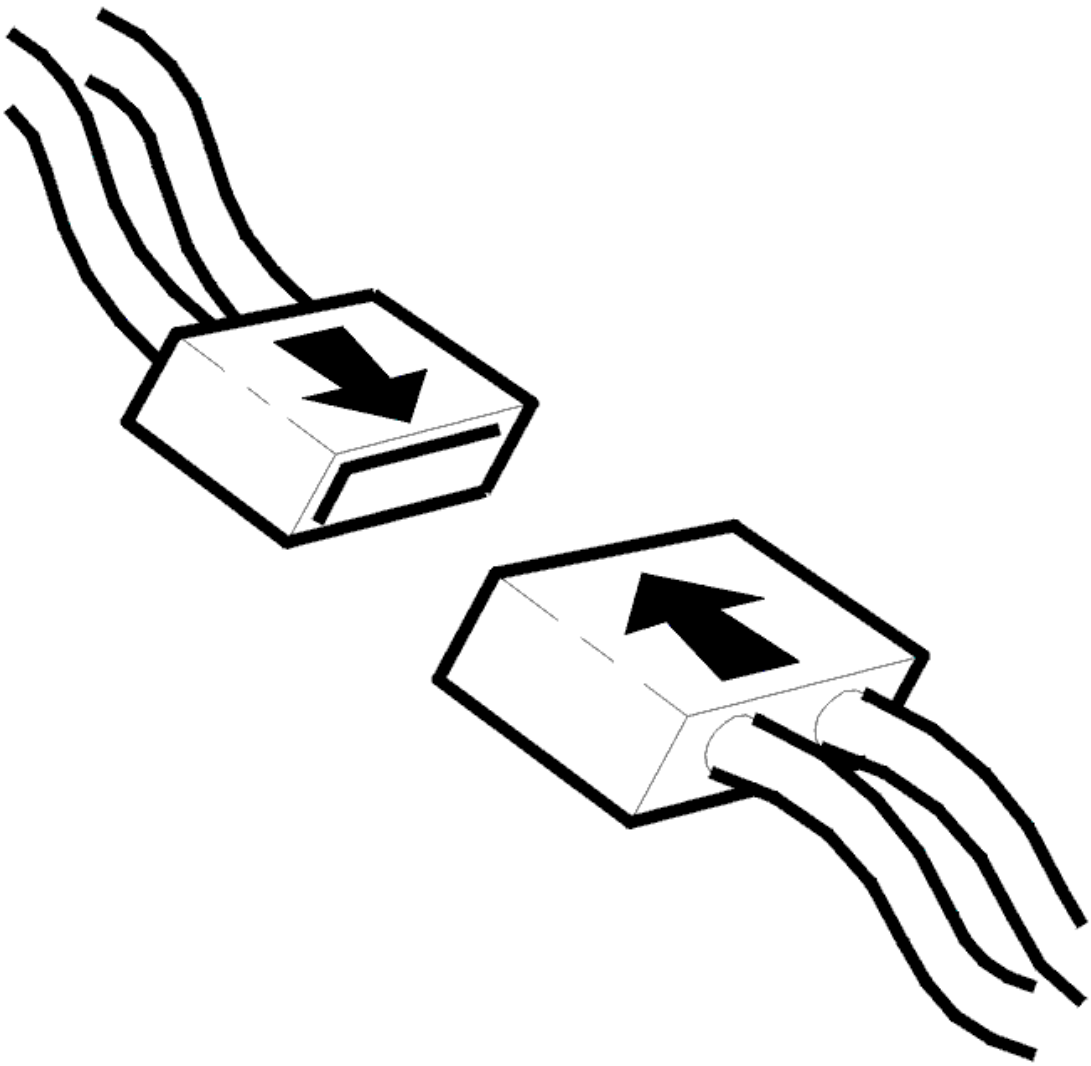


Fig. 123: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

Also check the cables for a short-circuit to each other.

HINT: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open the transmission control system and to check or replace the temperature sensor, see **SOLENOID CONTROL SYSTEM, REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

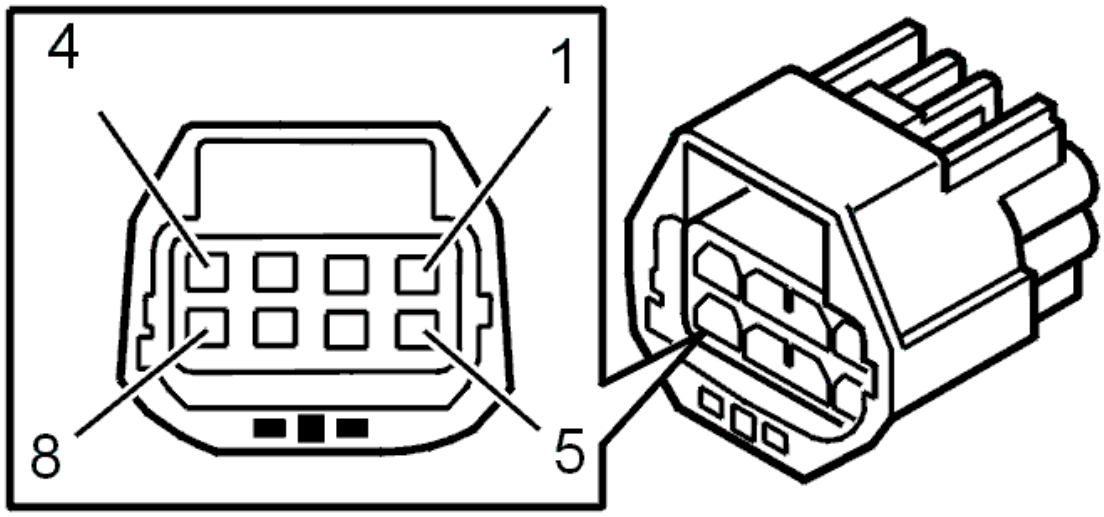


Fig. 124: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

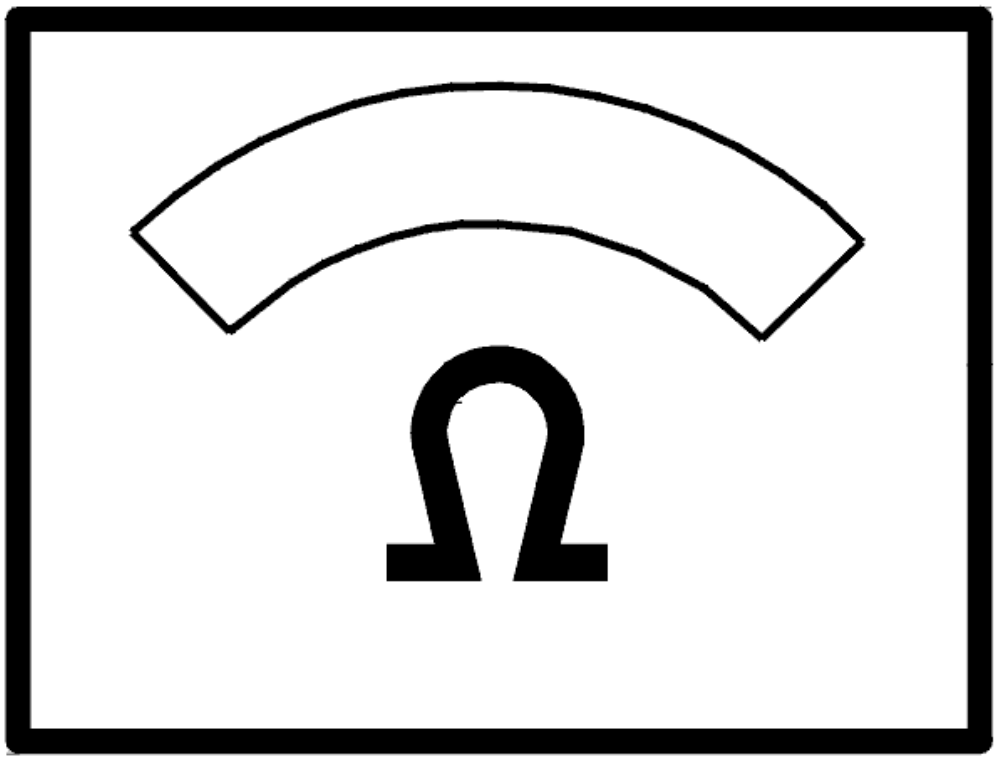


Fig. 125: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

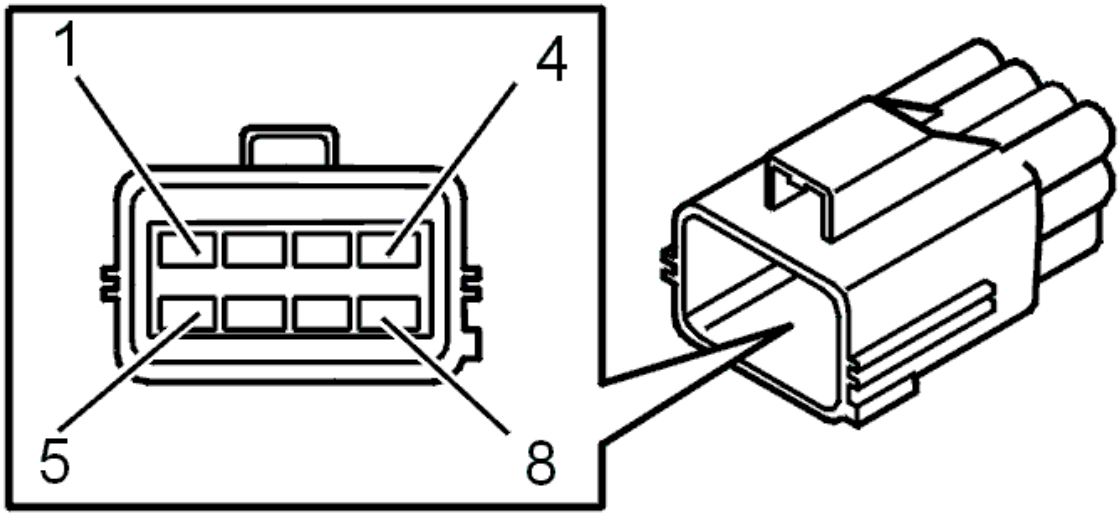


Fig. 126: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

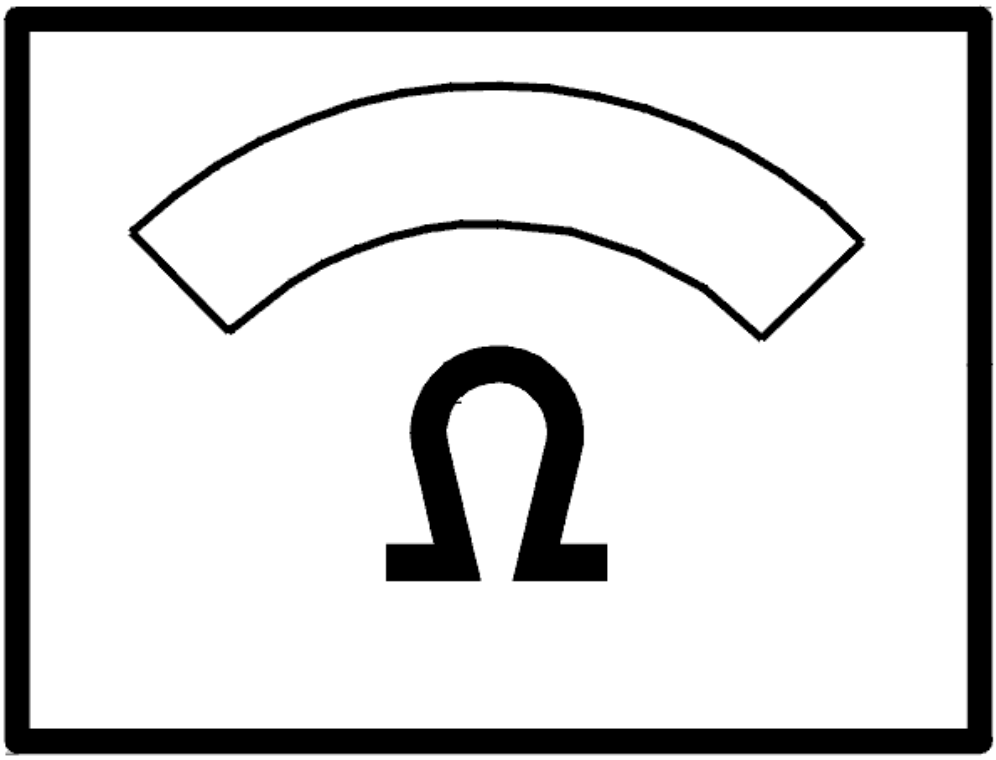


Fig. 127: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: **This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.**

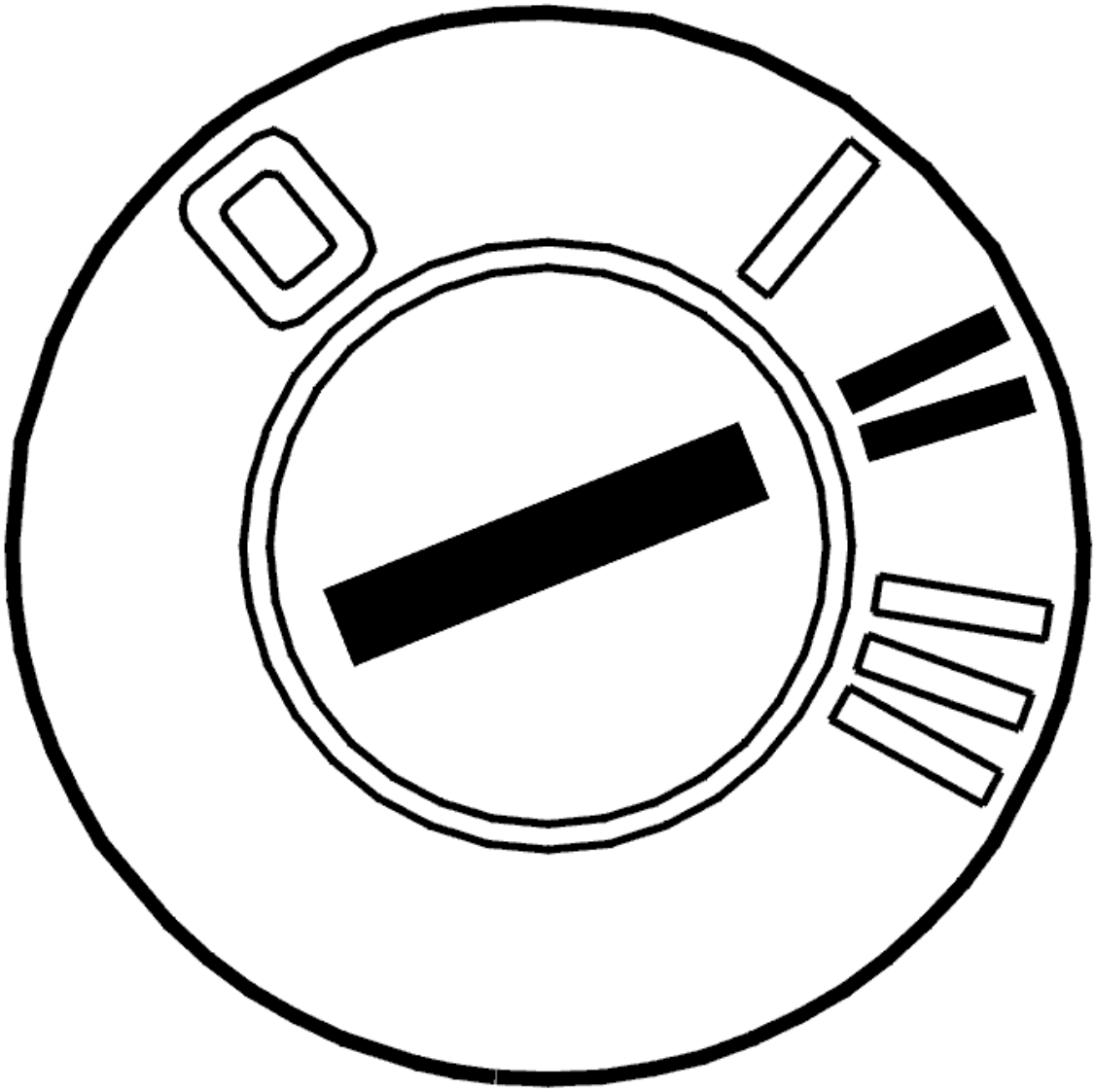


Fig. 128: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

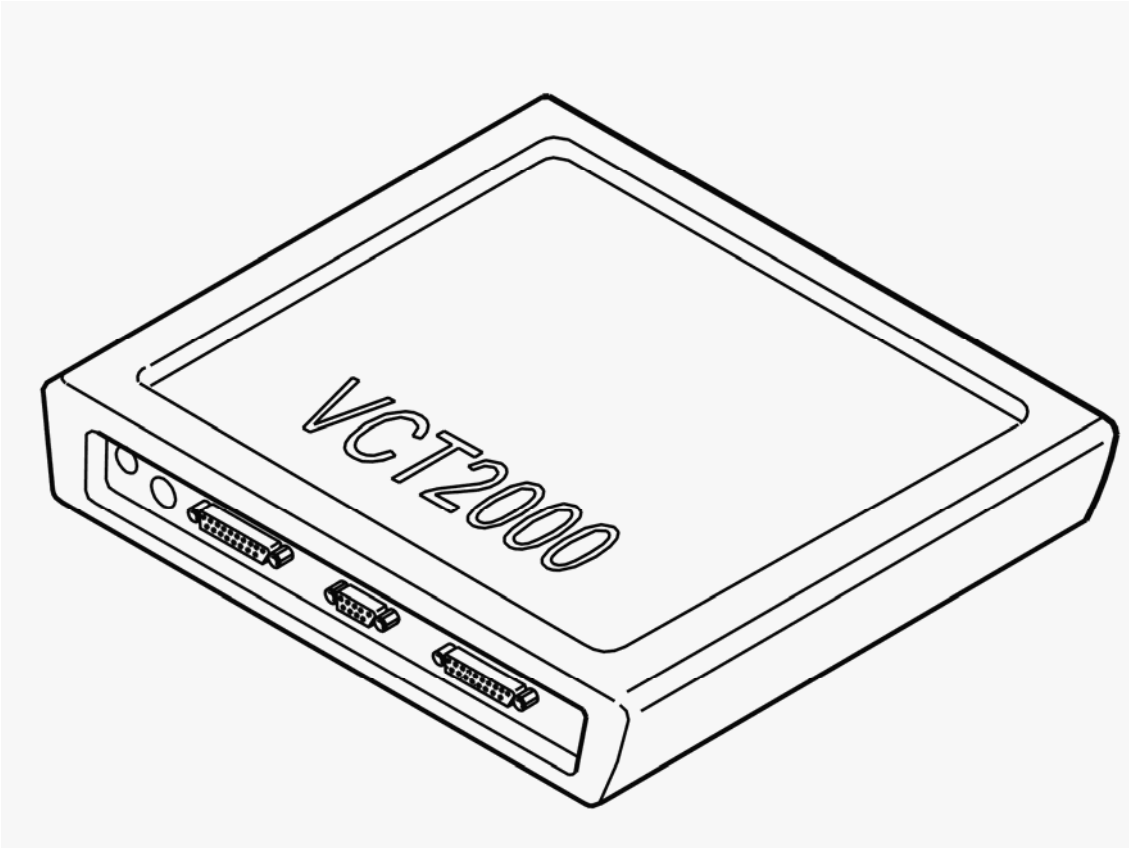


Fig. 129: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

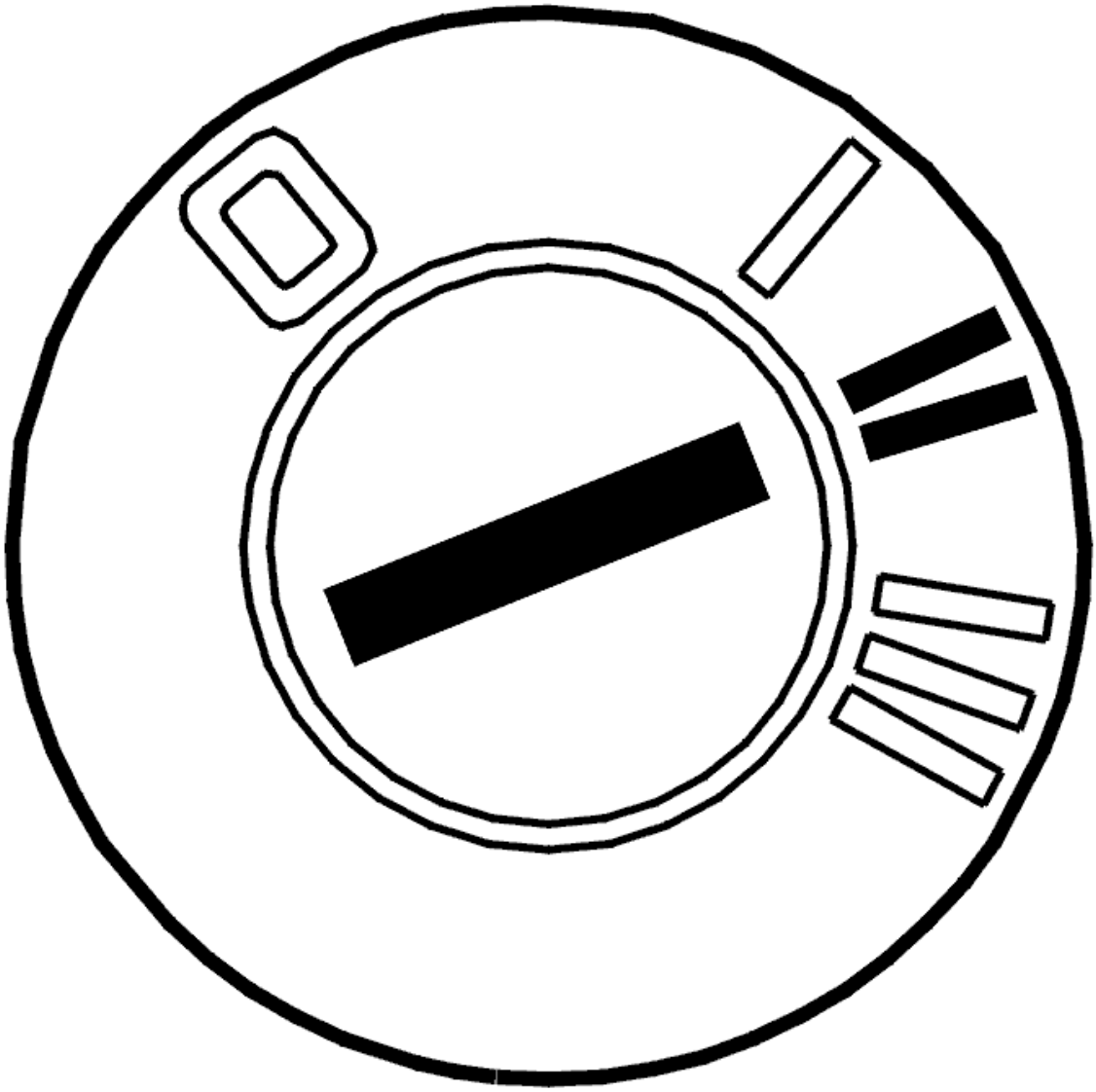


Fig. 130: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

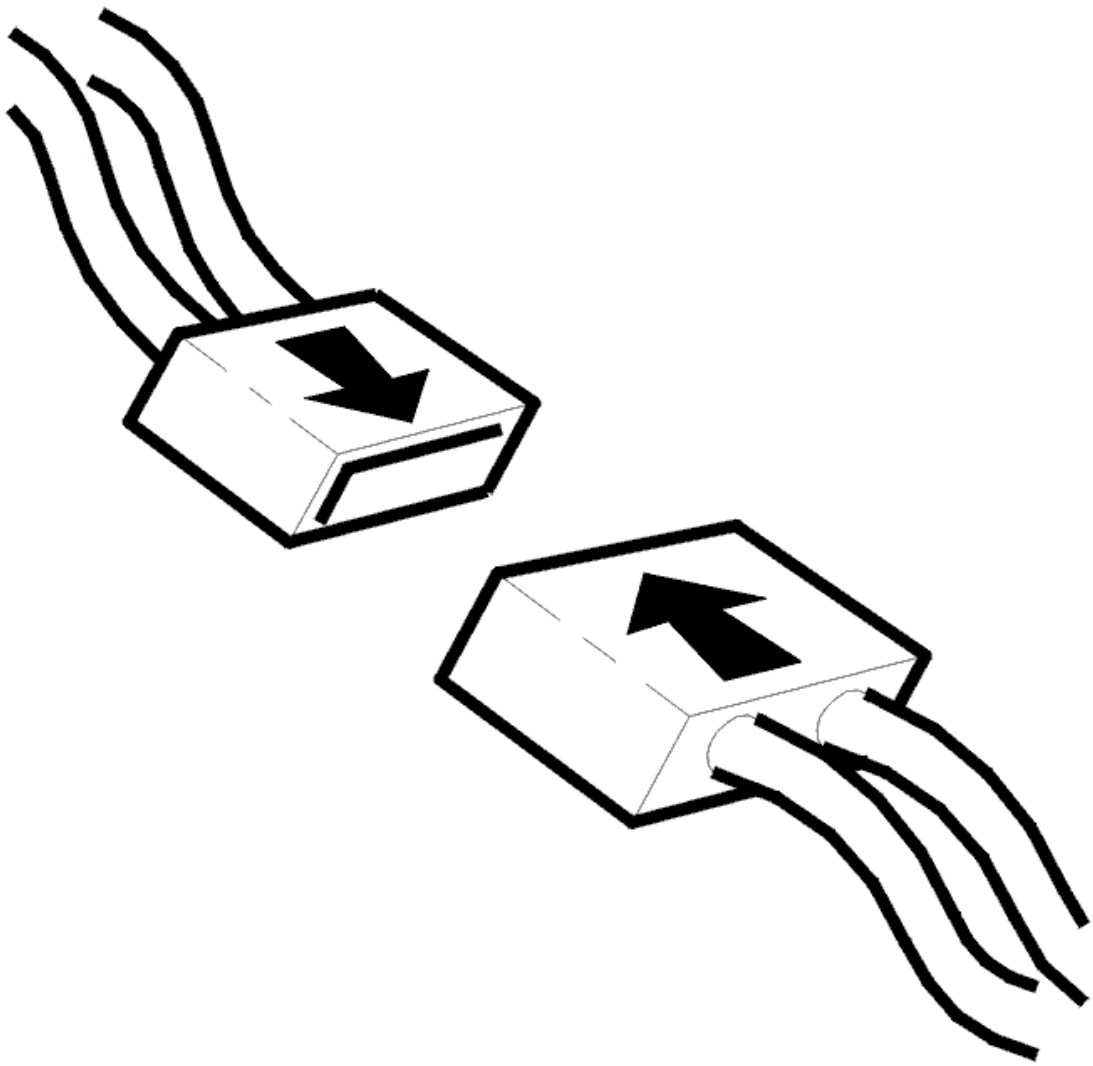


Fig. 131: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.

Compare with the transmission temperature.

NOTE: The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

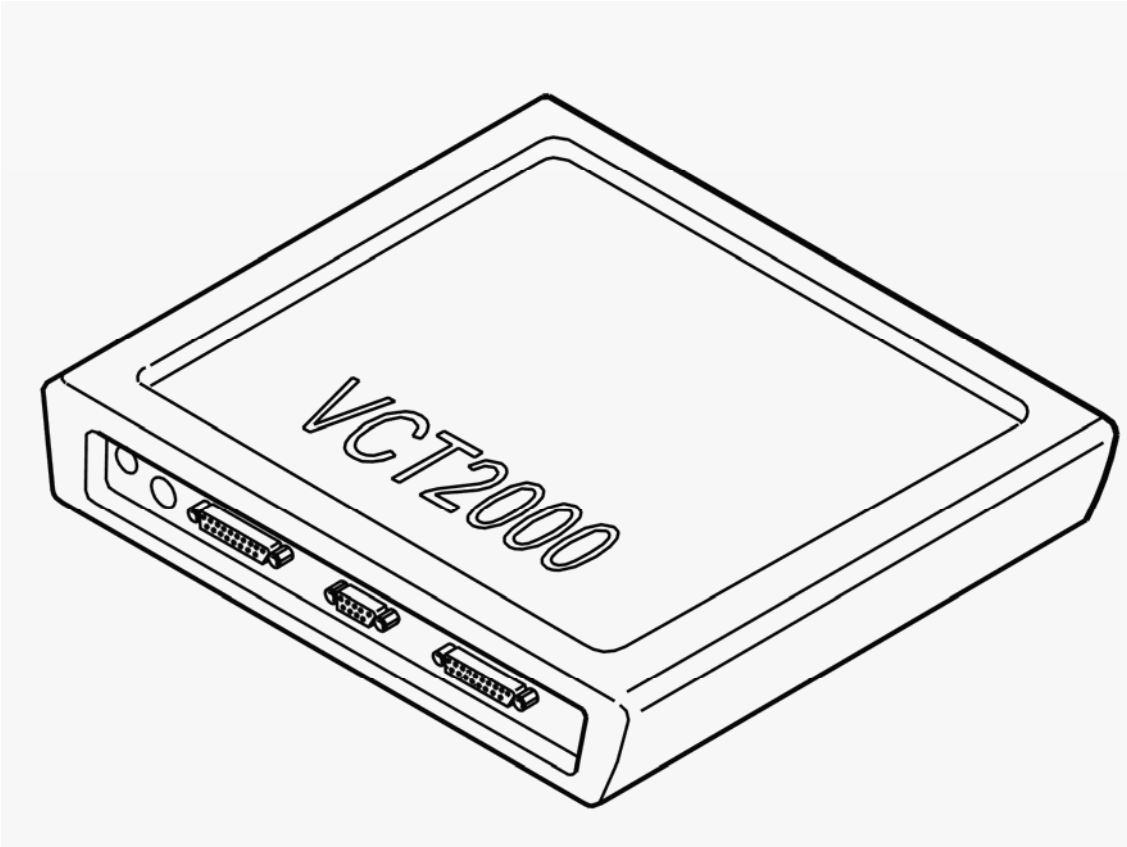


Fig. 132: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-010D: LOCK-UP SOLENOID SLU. SIGNAL TOO HIGH. INTERMITTENT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

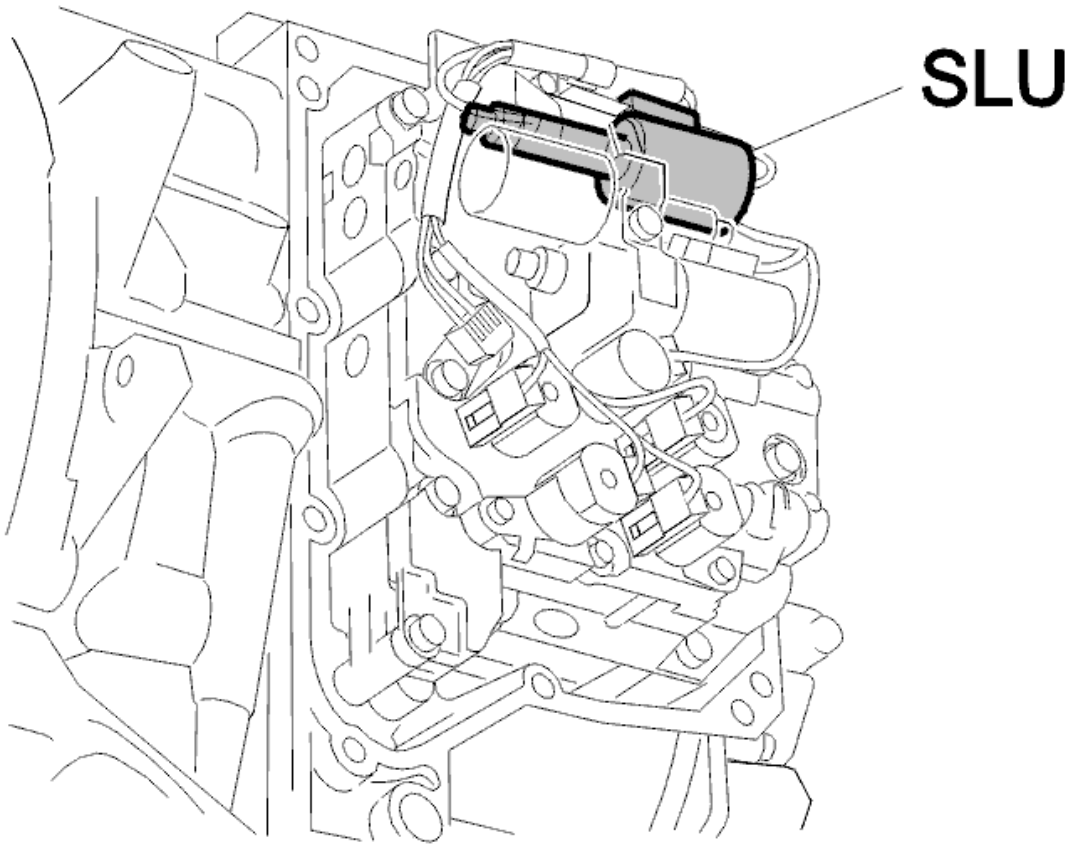


Fig. 133: Identifying Lock-Up Solenoid, SLU
Courtesy of VOLVO CARS CORPORATION

Lock-up solenoid SL controls the transmission lock-up function. Solenoid SLU operates when it receives voltage from the transmission control module (TCM) and is activated under different driving conditions depending on road speed, throttle position and the driving mode selected. Diagnostic trouble code (DTC) TCM-010D is stored if the transmission control module (TCM) registers a short-circuit to supply voltage in the solenoid SLU circuit when the solenoid should not be activated. Solenoid SLU is probably activated permanently.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.
- The transmission control module (TCM) does not activate the lock-up solenoid.

Possible Source

- Short-circuit to supply voltage in the signal cable.
- Defective control module.

Fault symptom[s]

- General orange warning lamp lit.

- Harsh gear shifting.
- No shifting.
- Irregular shifting.

HINT: Harsh shifting is caused by the solenoid being permanently activated.

SIGNAL TOO HIGH. INTERMITTENT FAULT

INTERMITTENT FAULT

Check the wiring between transmission control module (TCM) terminal #A51 (#A51) and transmission connector terminal #D1. Check the wiring between control module terminal #B9 (#A69) and transmission connector terminal #D2. Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

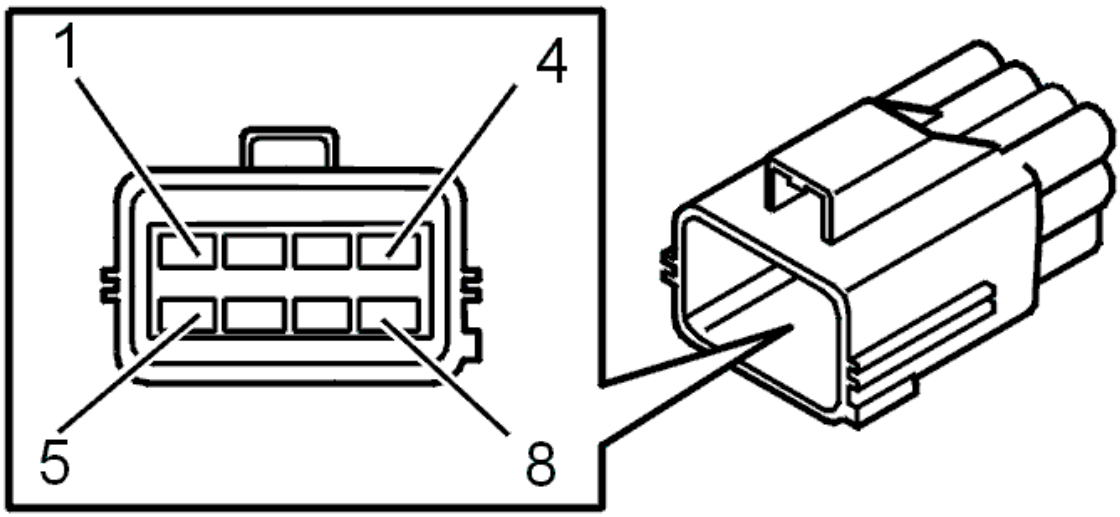


Fig. 134: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

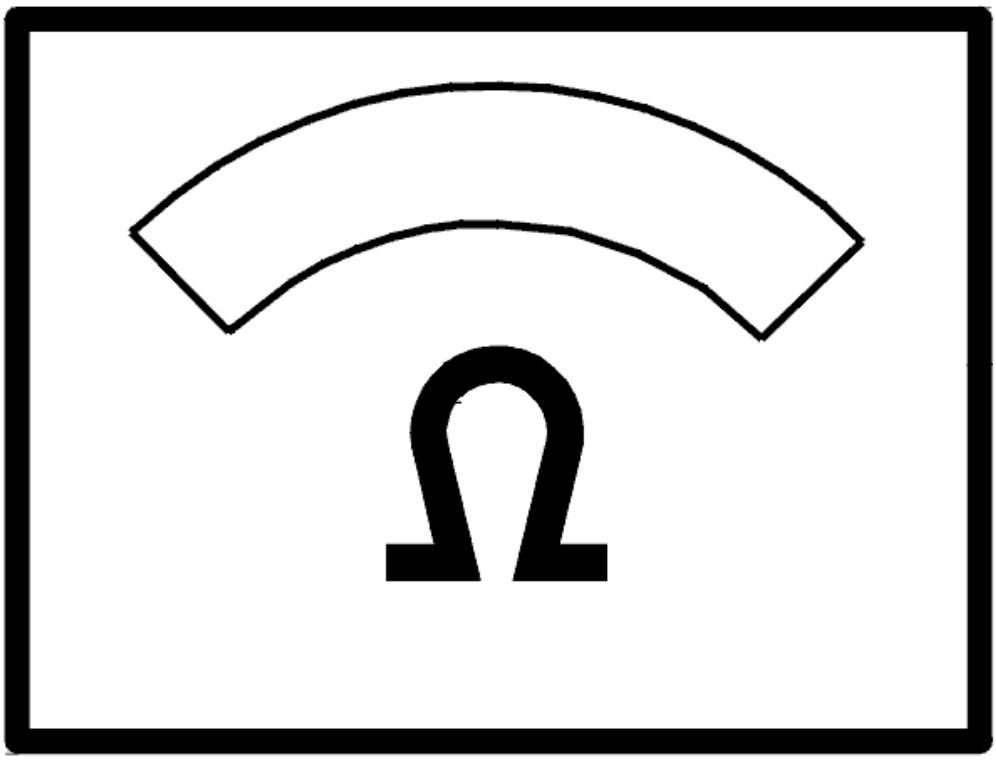


Fig. 135: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-010D: LOCK-UP SOLENOID SLU. SIGNAL TOO HIGH. PERMANENT

FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL TOO HIGH. PERMANENT FAULT

CHECKS

CHECKING LINE PRESSURE SOLENOID SLU

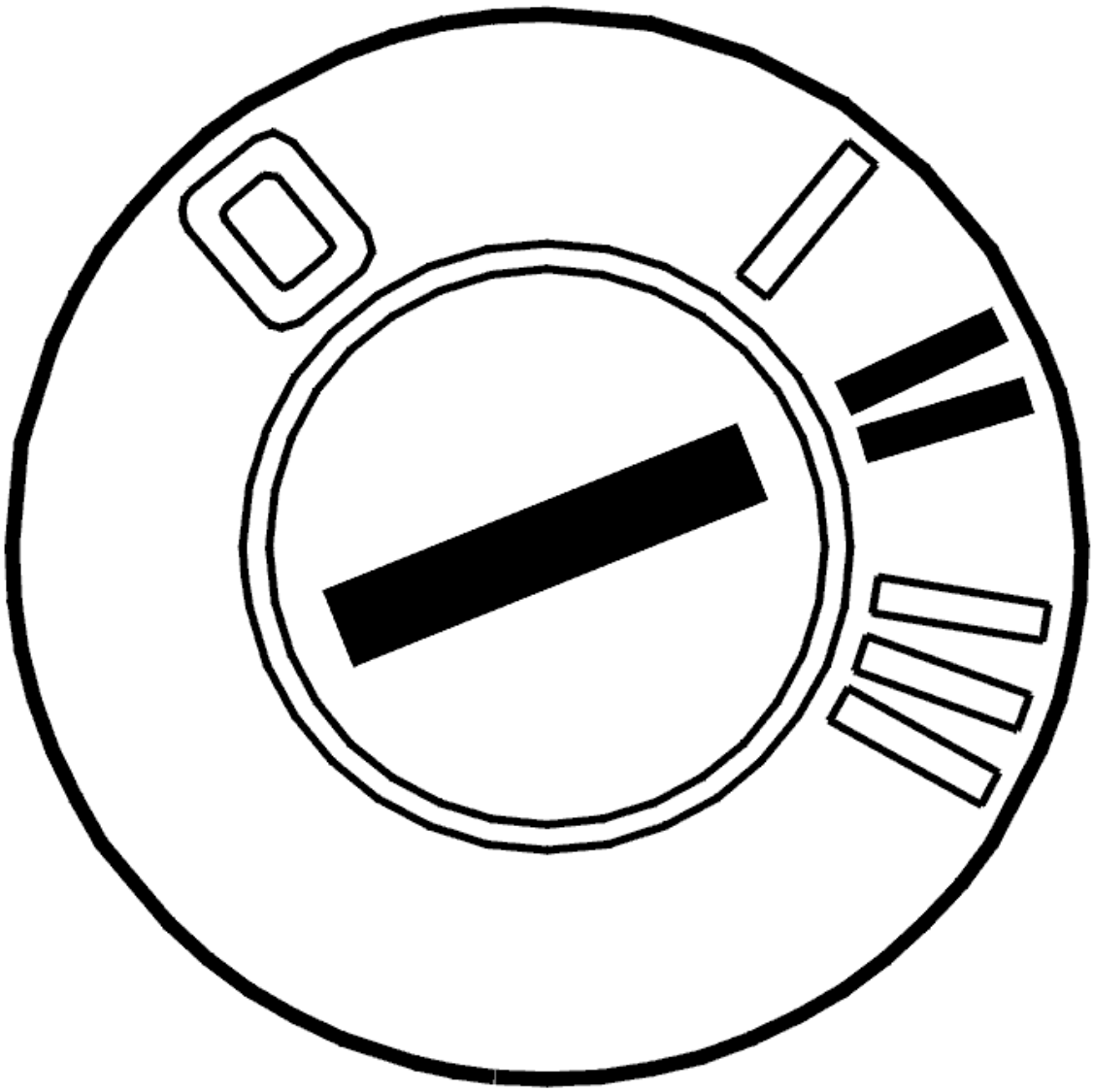


Fig. 136: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

- Activate solenoid SLU.

  Read off the current through the solenoid SLU circuit.

  The current should oscillate between 0 and 1000 mA.

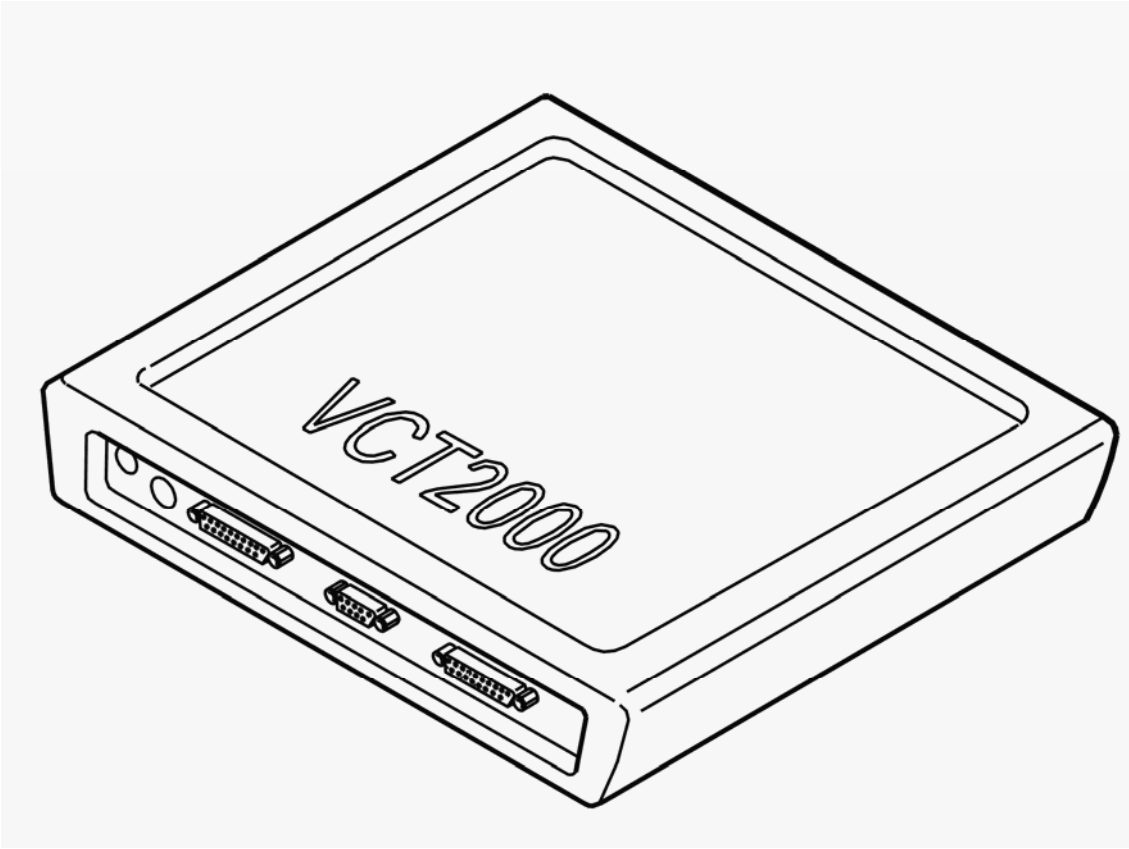


Fig. 137: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

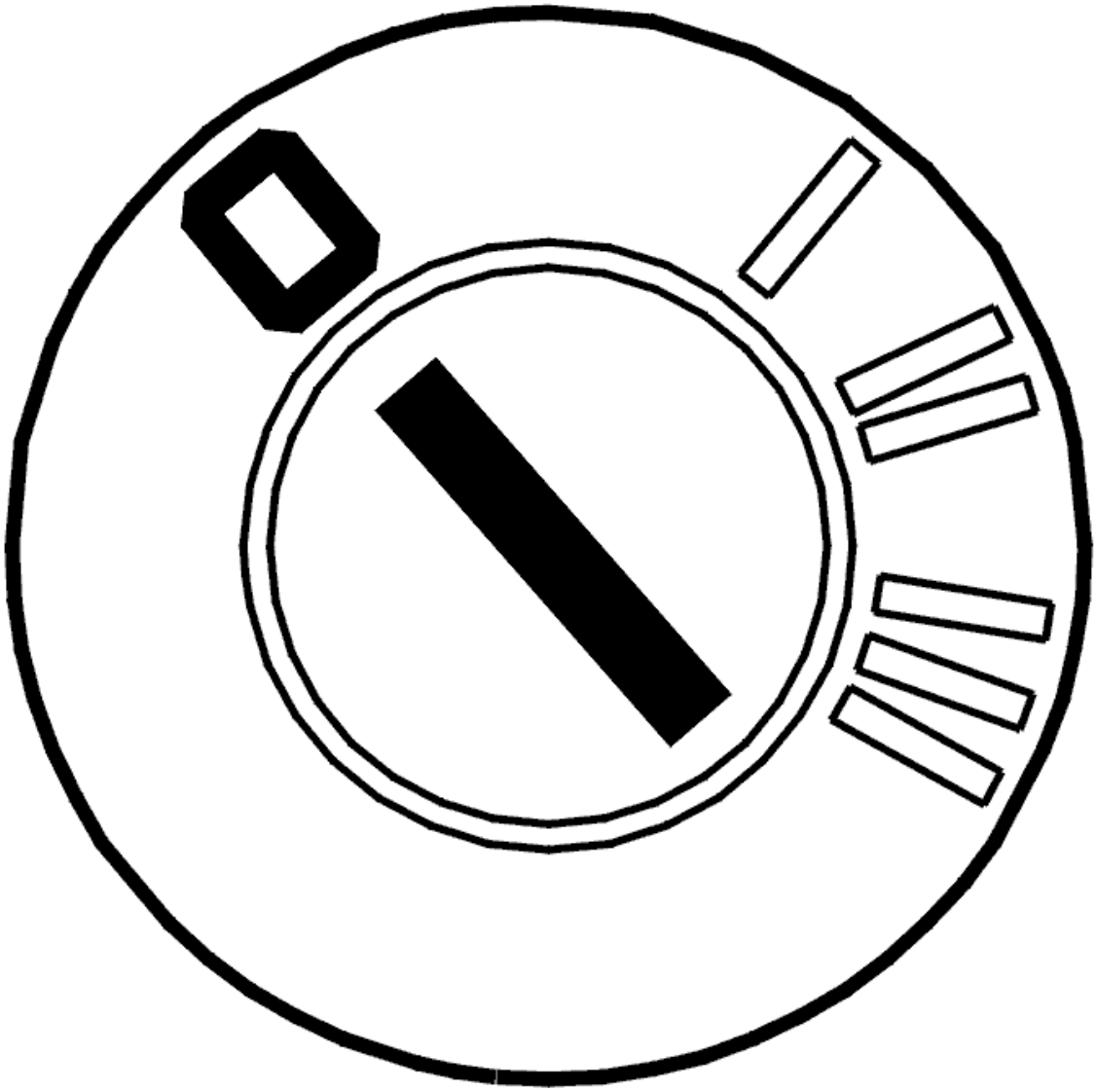


Fig. 138: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

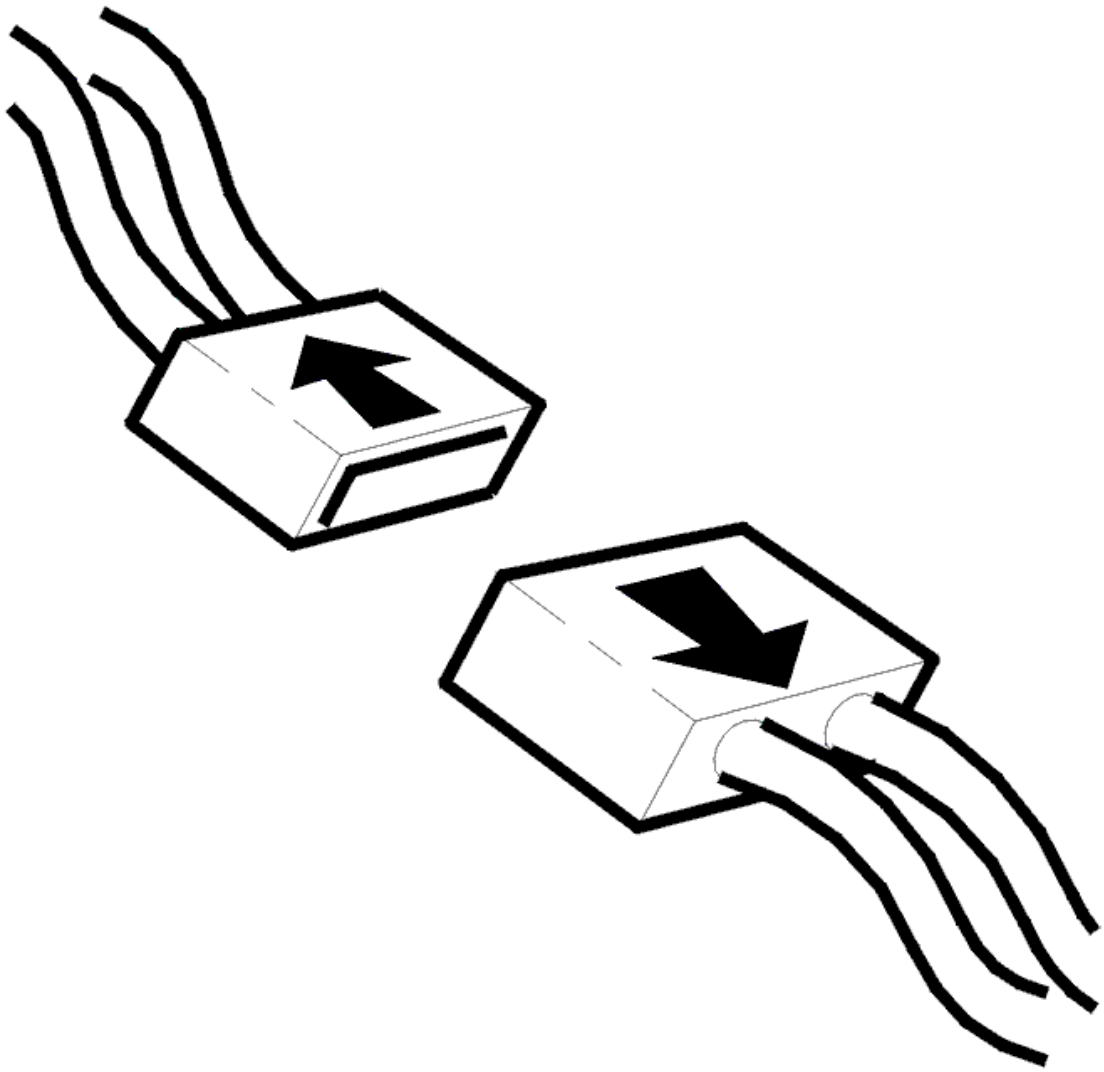


Fig. 139: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Disconnect transmission connector D.

Check the cable between transmission control module (TCM) terminal #A51 (#A51) and transmission connector terminal #D1 (control module side). Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Check the cable between control module terminal #B9 (#A69) and transmission connector terminal #D2 (control module side). Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Also check against the other cables in the circuit.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

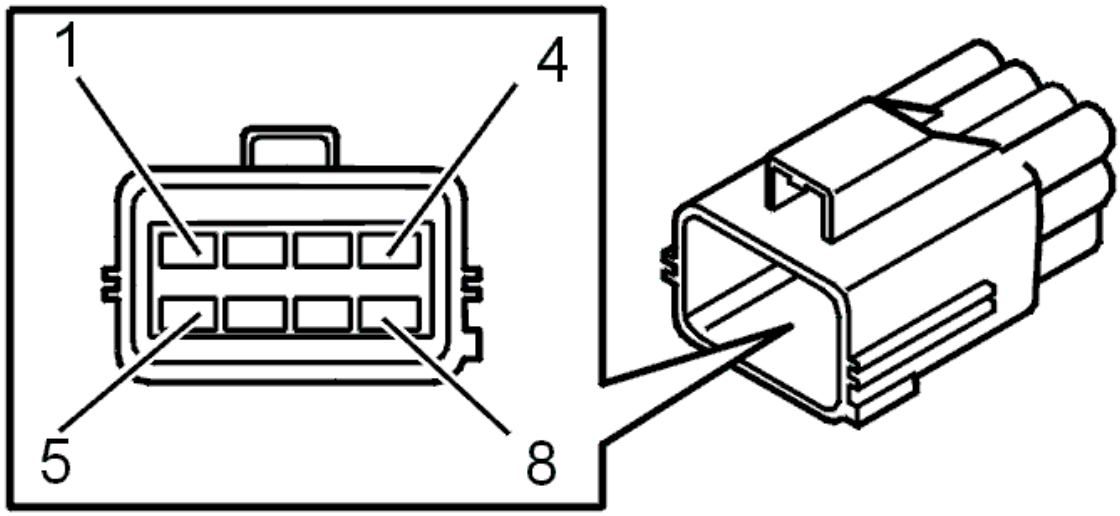


Fig. 140: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

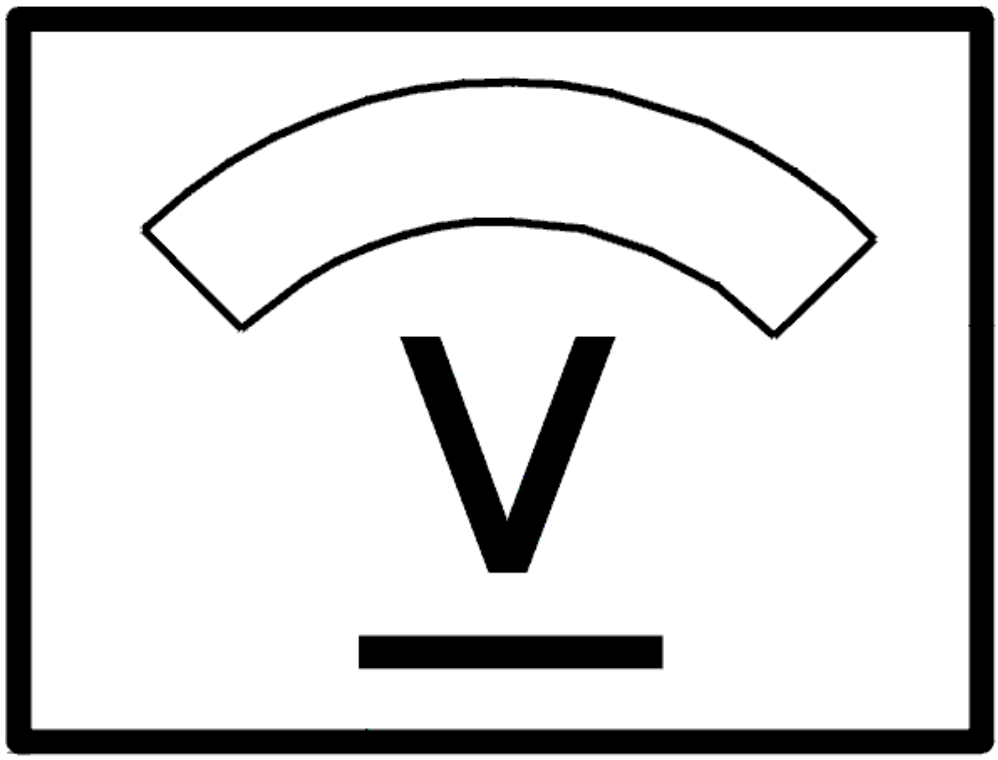


Fig. 141: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

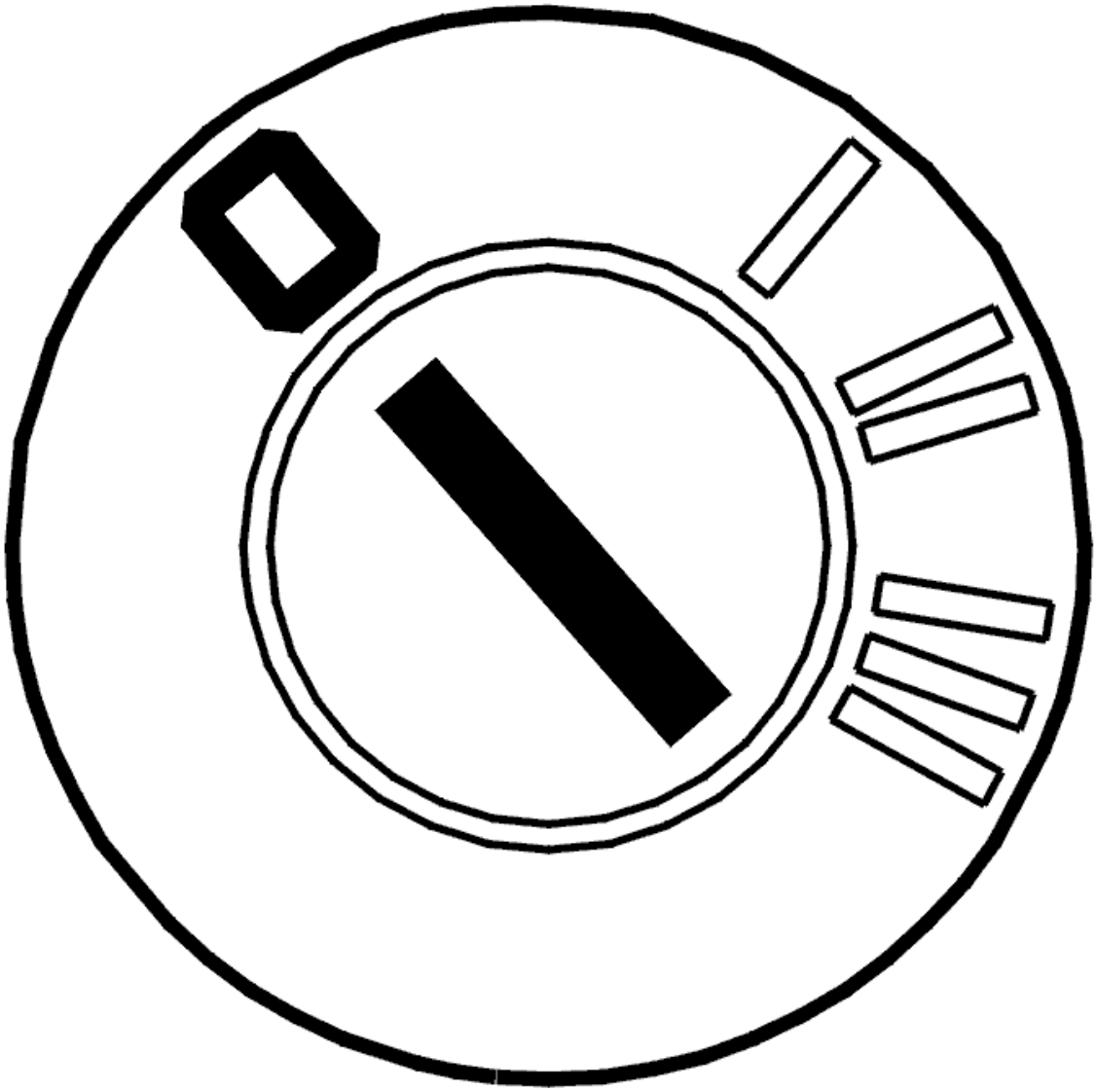


Fig. 142: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

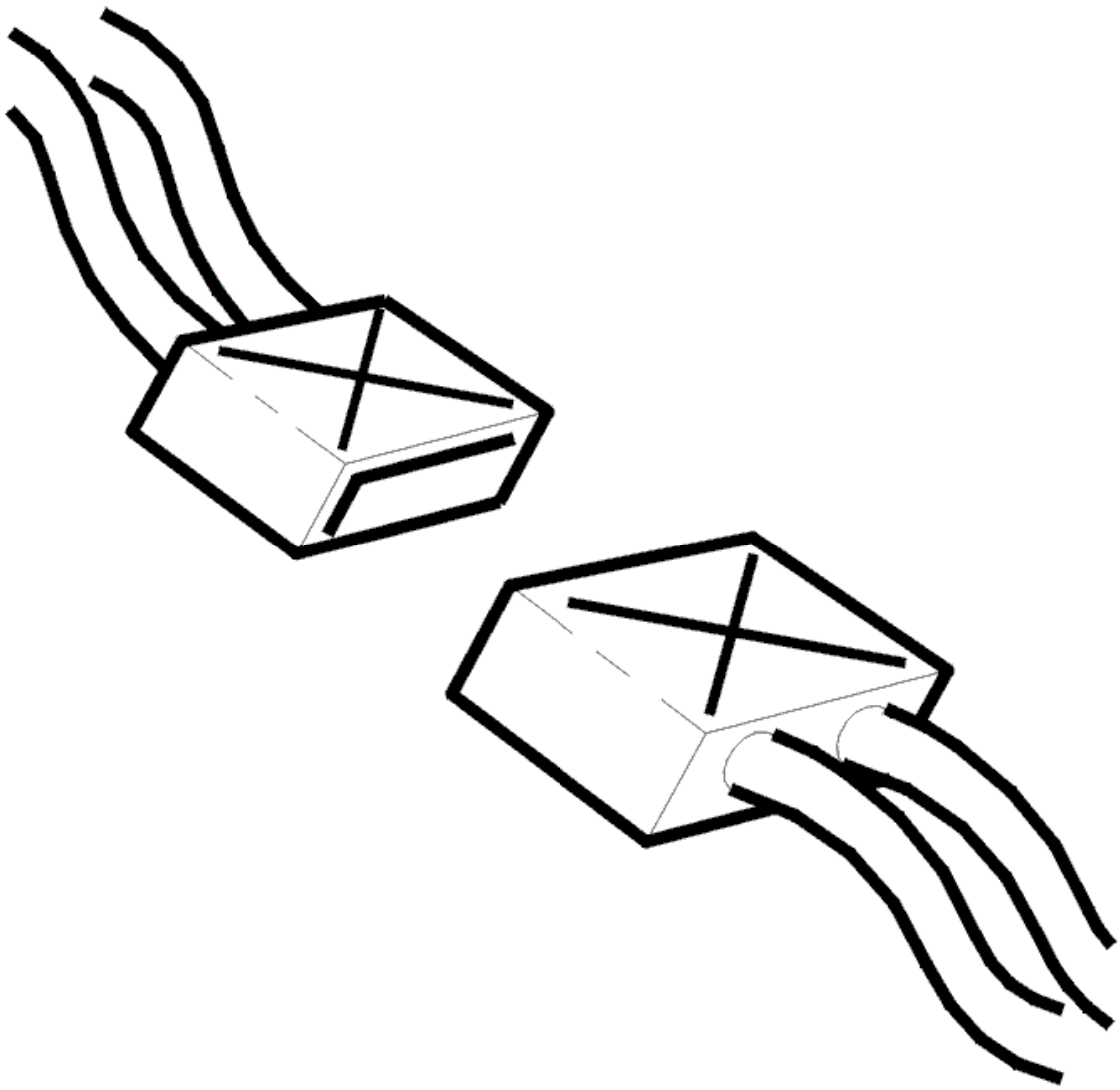


Fig. 143: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the wiring between transmission connector terminal #D1 and solenoid SLU terminal #1. Check the wiring between transmission connector terminal #D2 and solenoid SLU terminal #2. Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

  Also check against the other cables in the circuit.

  Check solenoid SLU by measuring the resistance between terminals #1 and #2 on the connector. The resistance must be 5-5.6 ohms at 20°C. Replace the transmission control system if the resistance is incorrect.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the transmission control system, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

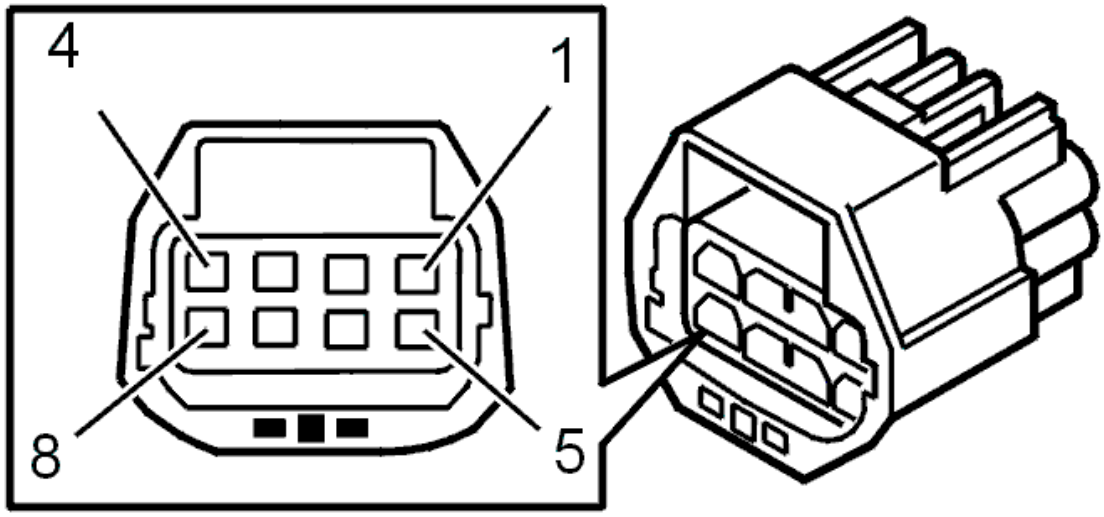


Fig. 144: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

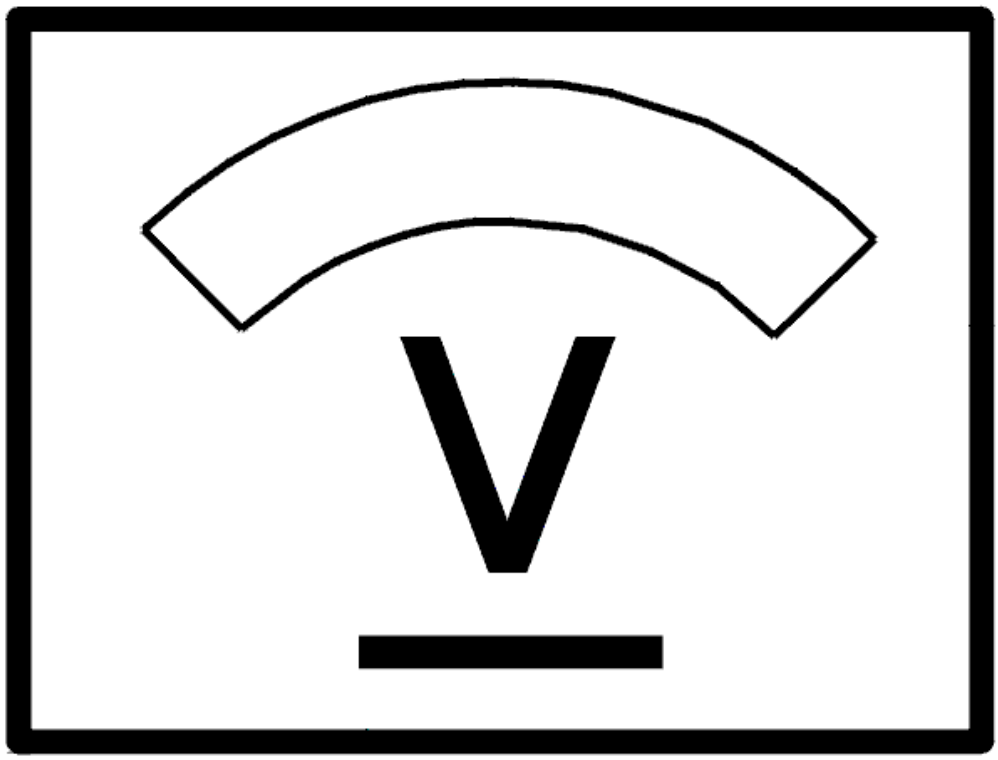


Fig. 145: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

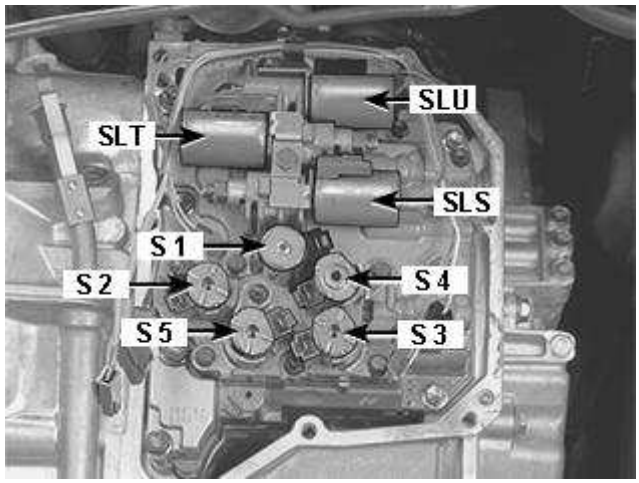


Fig. 146: Identifying S1-S5, SLT, SLU And SLS Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

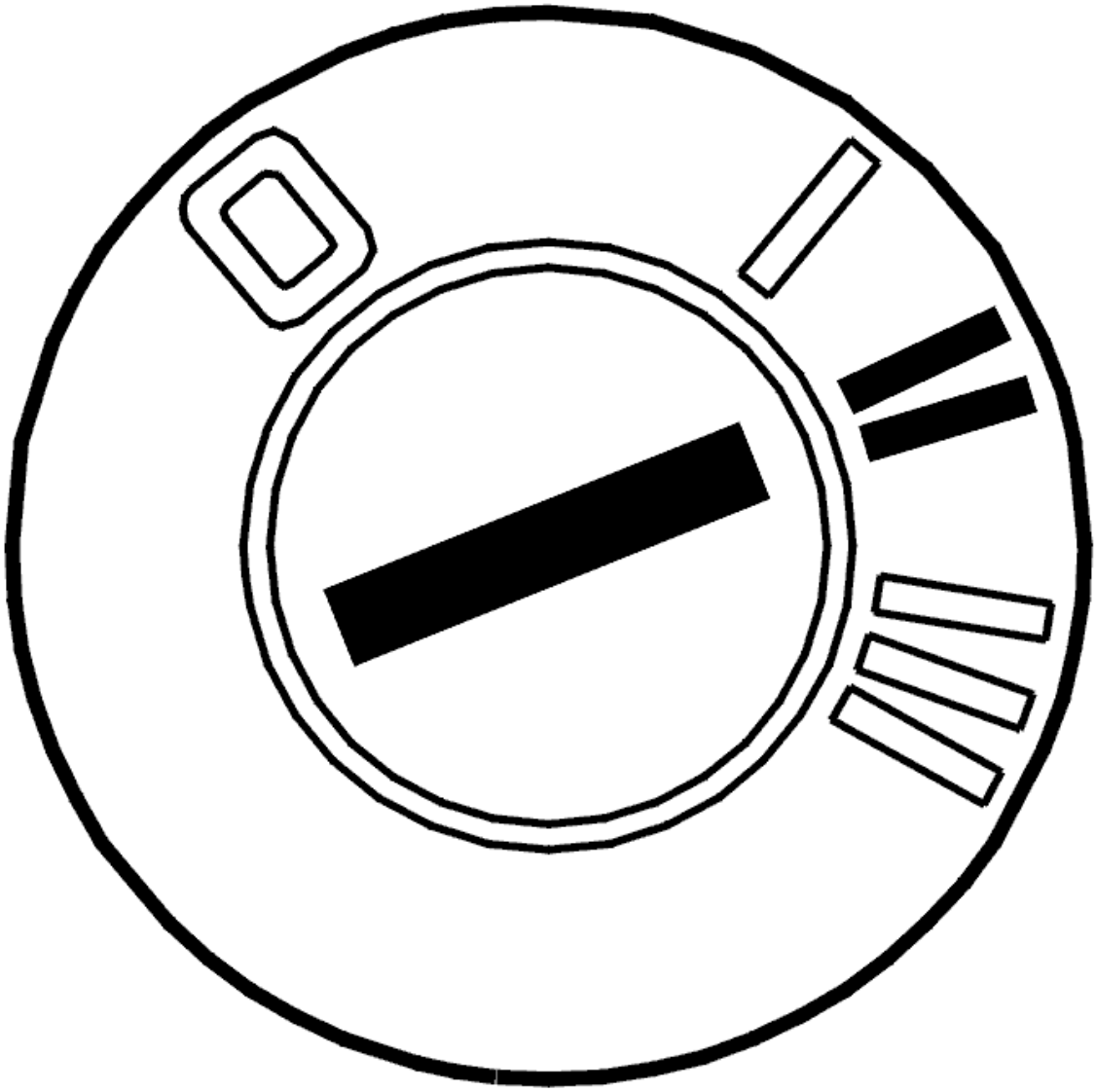


Fig. 147: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

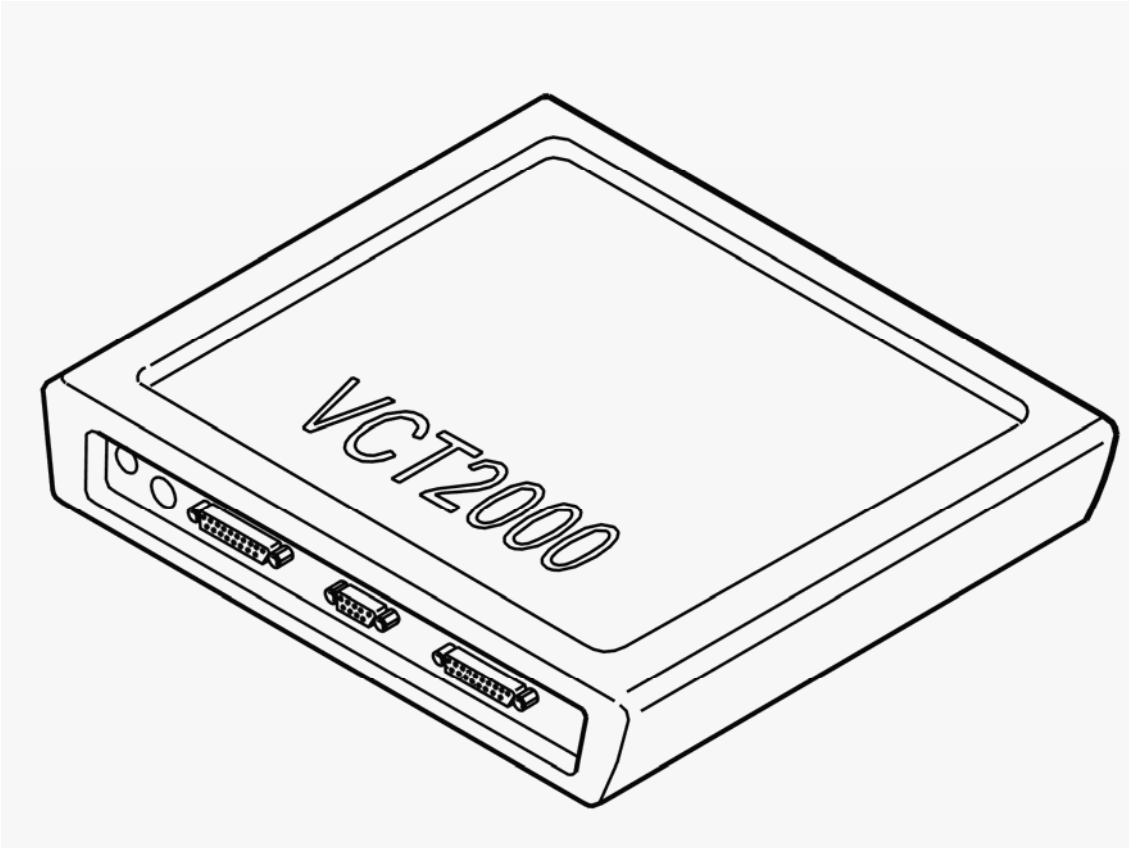


Fig. 148: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

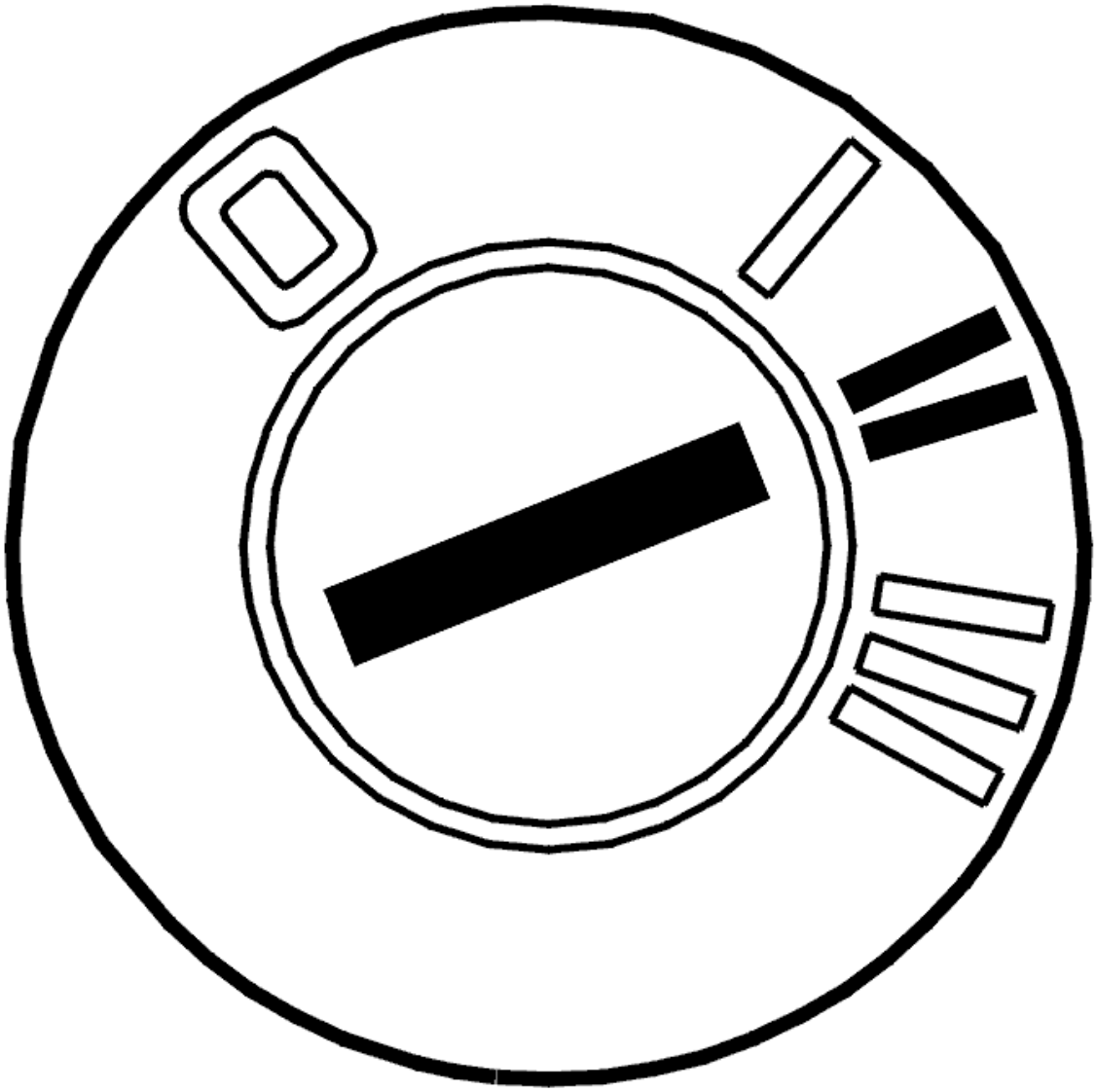


Fig. 149: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLU.

  Read off the current through the solenoid SLU circuit.

  The current should oscillate between 0 and 1000 mA.

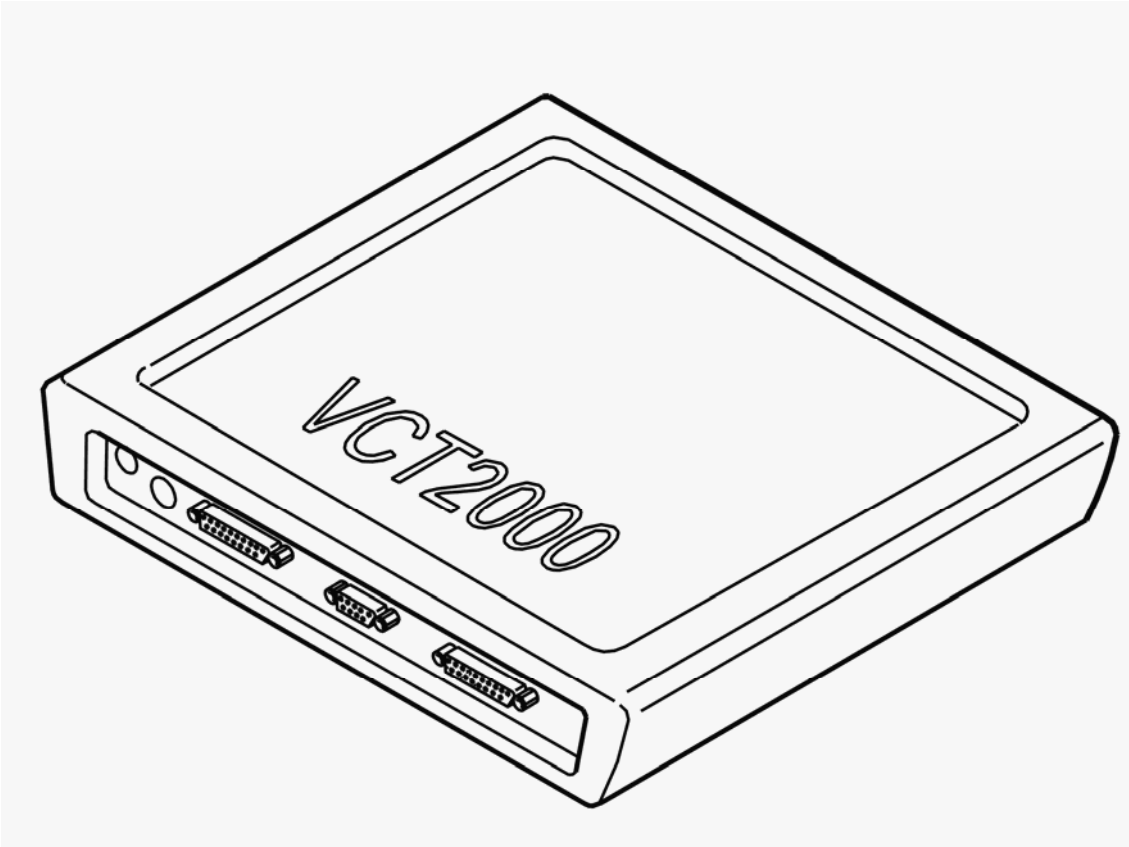


Fig. 150: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-010F: LOCK-UP SOLENOID SLU. SIGNAL MISSING. INTERMITTENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

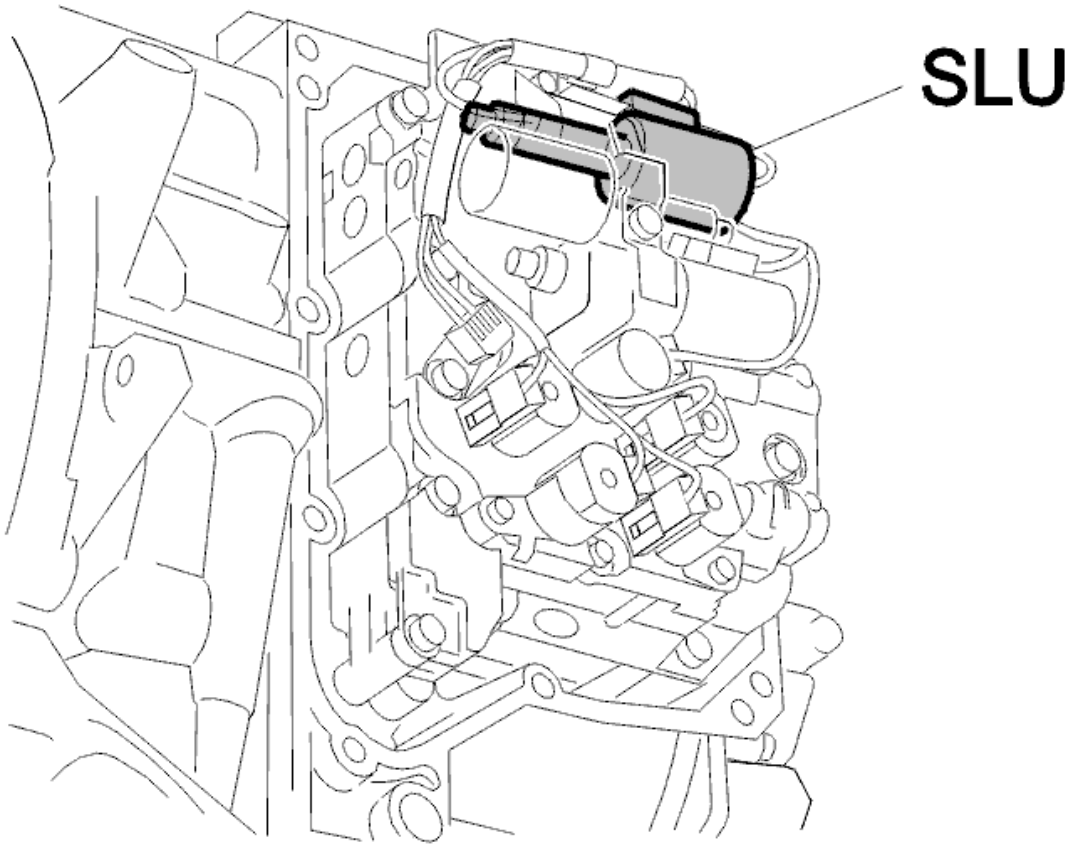


Fig. 151: Identifying Lock-Up Solenoid, SLU
Courtesy of VOLVO CARS CORPORATION

Lock-up solenoid SL controls the transmission lock-up function. Solenoid SLU operates when it receives voltage from the transmission control module (TCM) and is activated under different driving conditions depending on road speed, throttle position and the driving mode selected. Diagnostic trouble code (DTC) TCM-010F is stored if the control module registers an open-circuit in the solenoid SL circuit when the solenoid should be activated. Solenoid SLU cannot then be activated.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.
- The transmission control module (TCM) does not activate the lock-up solenoid.

Possible Source

- Contact resistance in terminals.
- Open-circuit in the signal cable.
- Defective solenoid.

- Open-circuit in the power ground.
- Defective control module.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

SIGNAL MISSING. INTERMITTENT FAULT

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the wiring between transmission control module (TCM) terminal #A51 (#A51) and transmission connector terminal #D1. Check the wiring between control module terminal #B9 (#A69) and transmission connector terminal #D2. Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

HINT: Check the solenoid SLU by measuring the resistance between terminals #D1 and #D2 on transmission connector D. The resistance should be 5-6 ohms at 20°C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

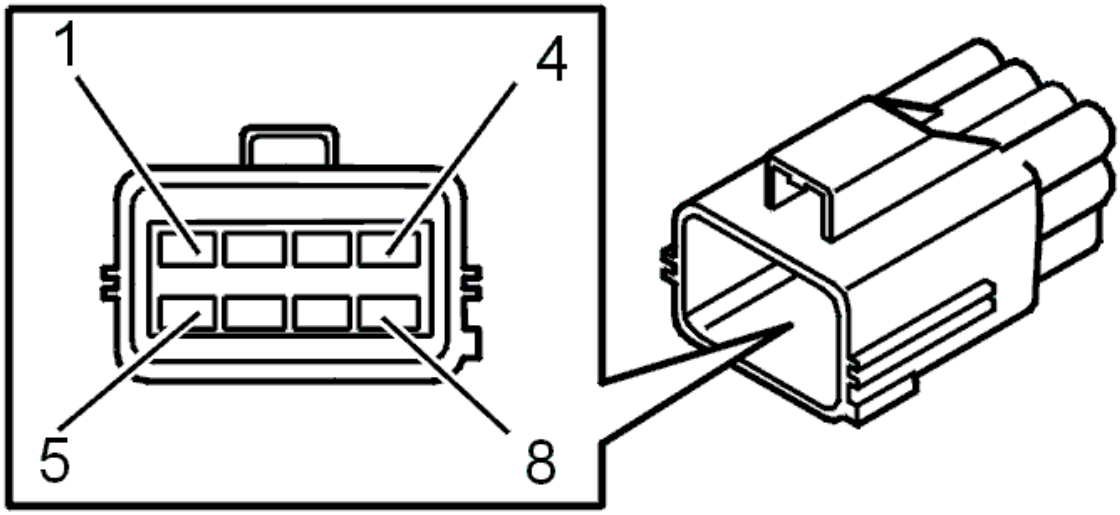


Fig. 152: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

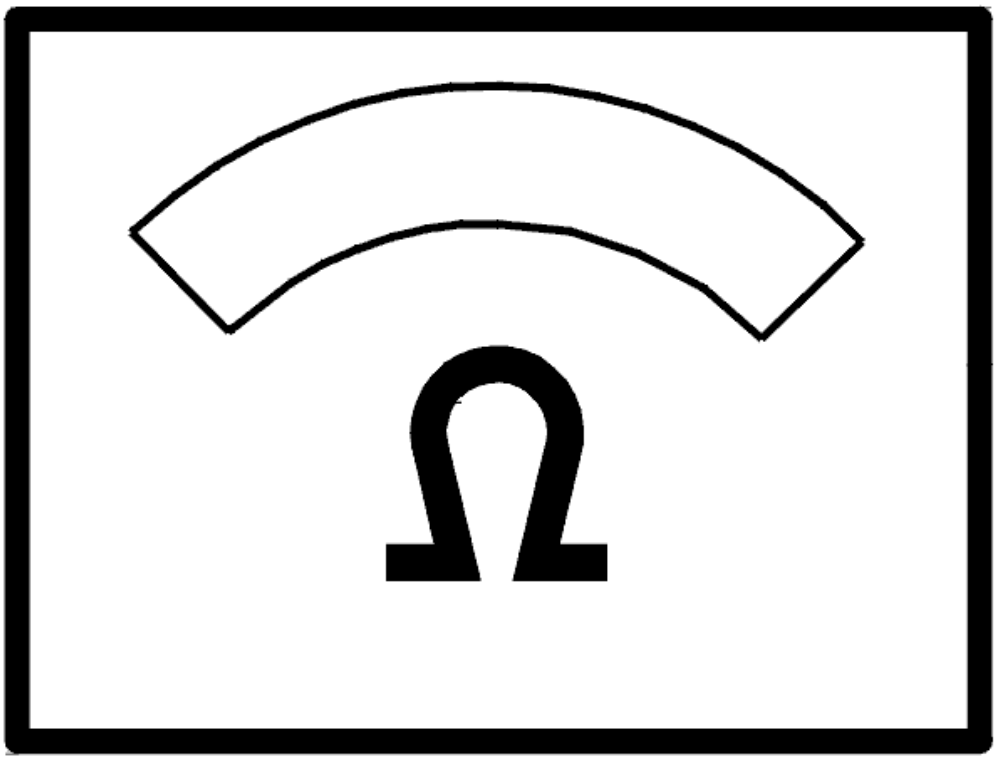


Fig. 153: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

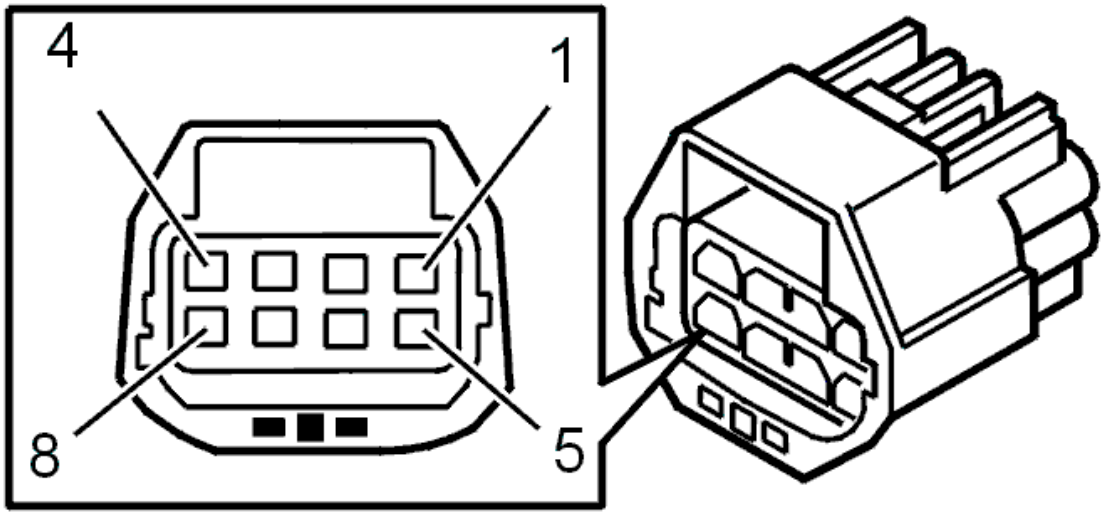


Fig. 154: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-010F: LOCK-UP SOLENOID SLU. SIGNAL MISSING. PERMANENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL MISSING. PERMANENT FAULT

CHECKS

CHECKING LINE PRESSURE SOLENOID SLU

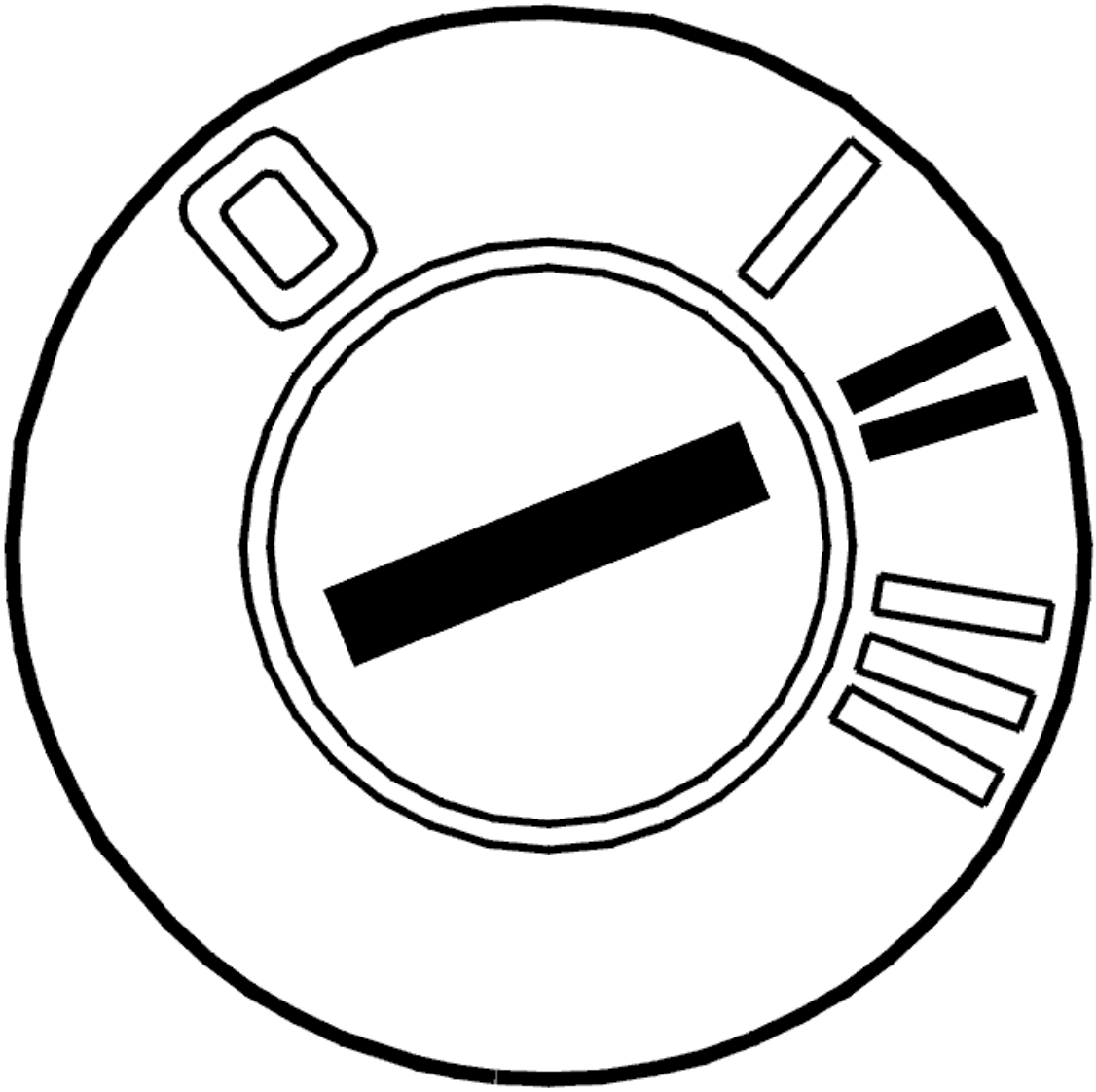


Fig. 155: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

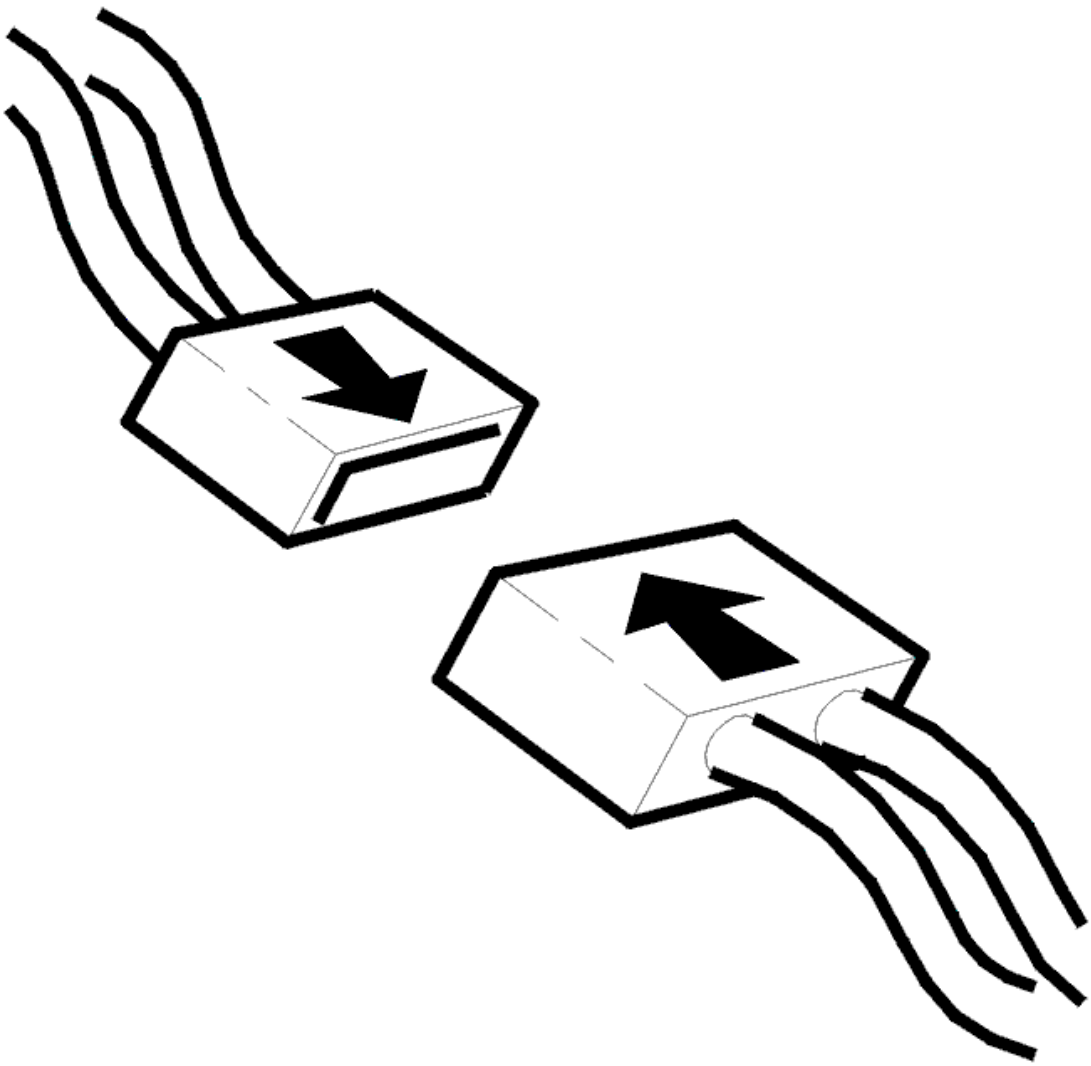


Fig. 156: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the transmission control module (TCM) connector and transmission connector D. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLU.

  Read off the current through the solenoid SLU circuit.

  The current should oscillate between 0 and 1000 mA.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

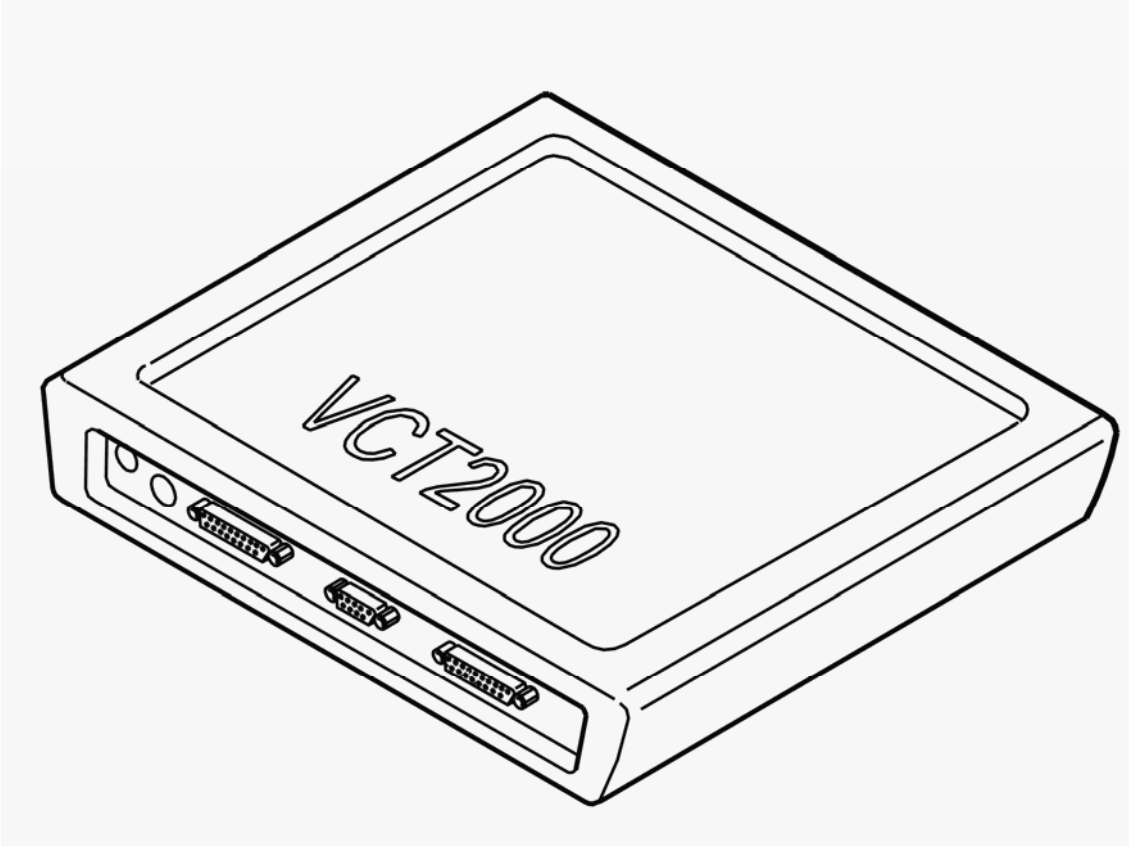


Fig. 157: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING RESISTANCE**

CHECKING RESISTANCE

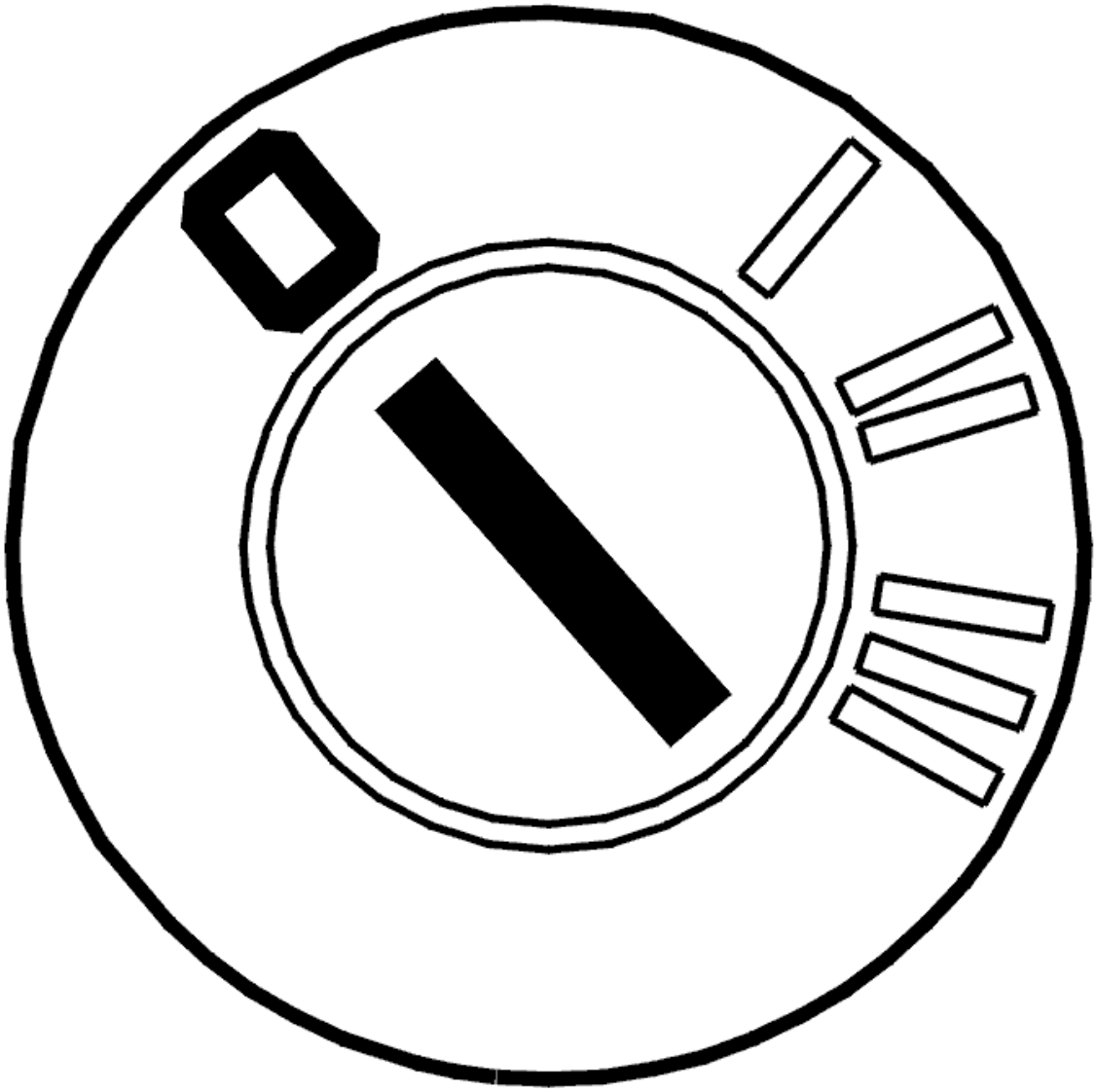


Fig. 158: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

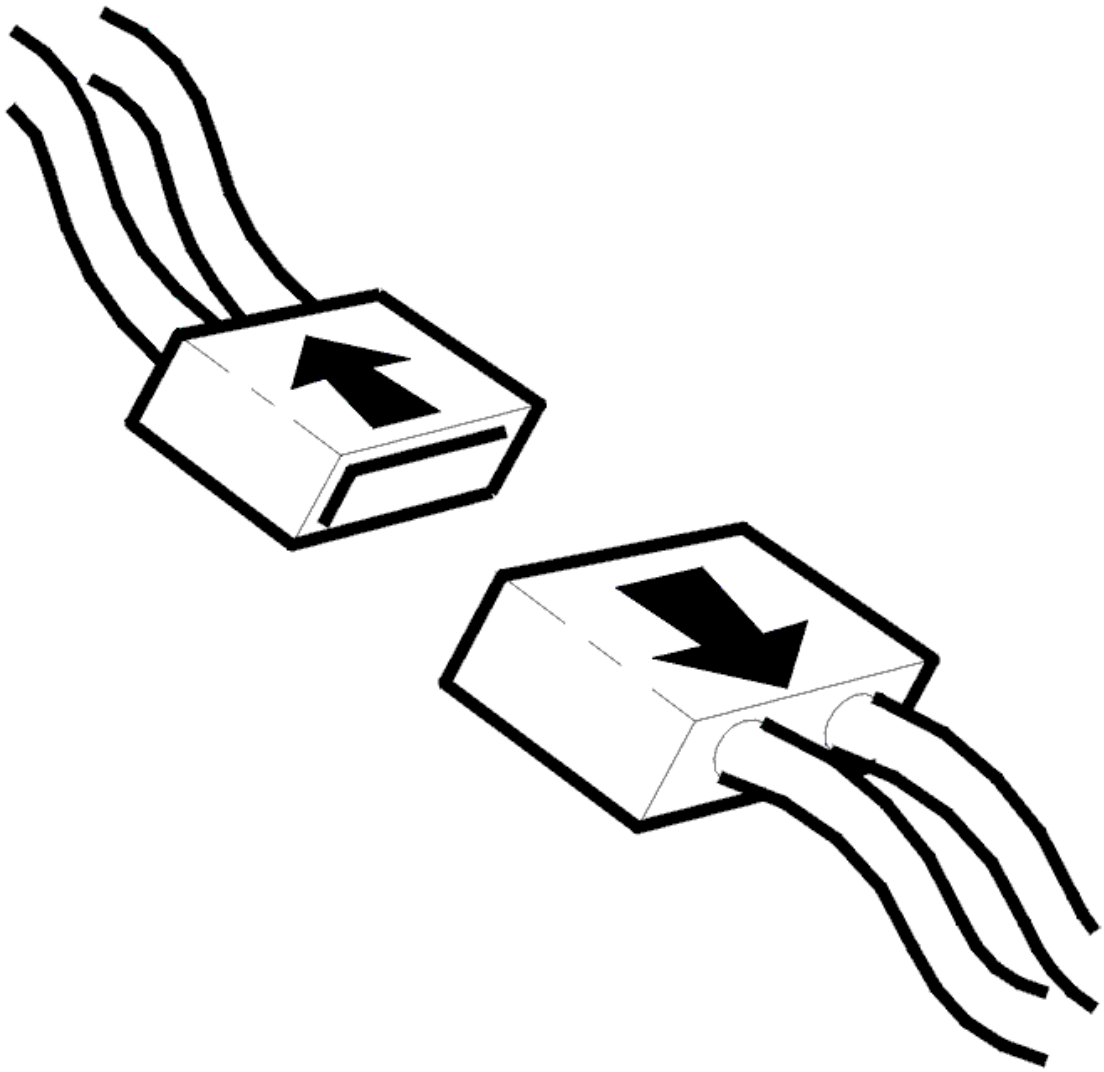


Fig. 159: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect transmission connector D.

Check the circuit for solenoid SLU. Measure the resistance between transmission connector D terminals #D1 and #D2.

The ohmmeter should read 5-5.6 ohms (at 20°C).

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**

- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

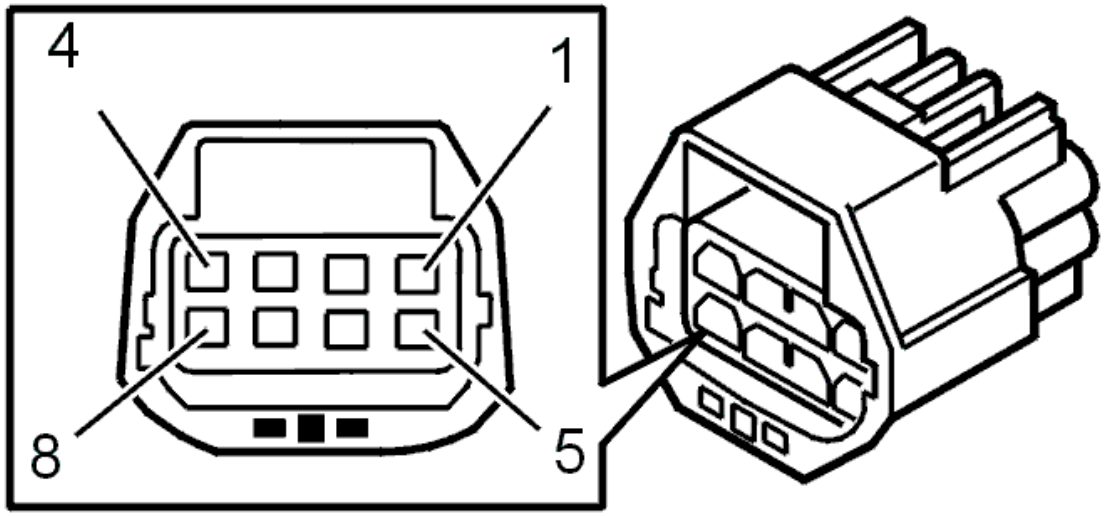


Fig. 160: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

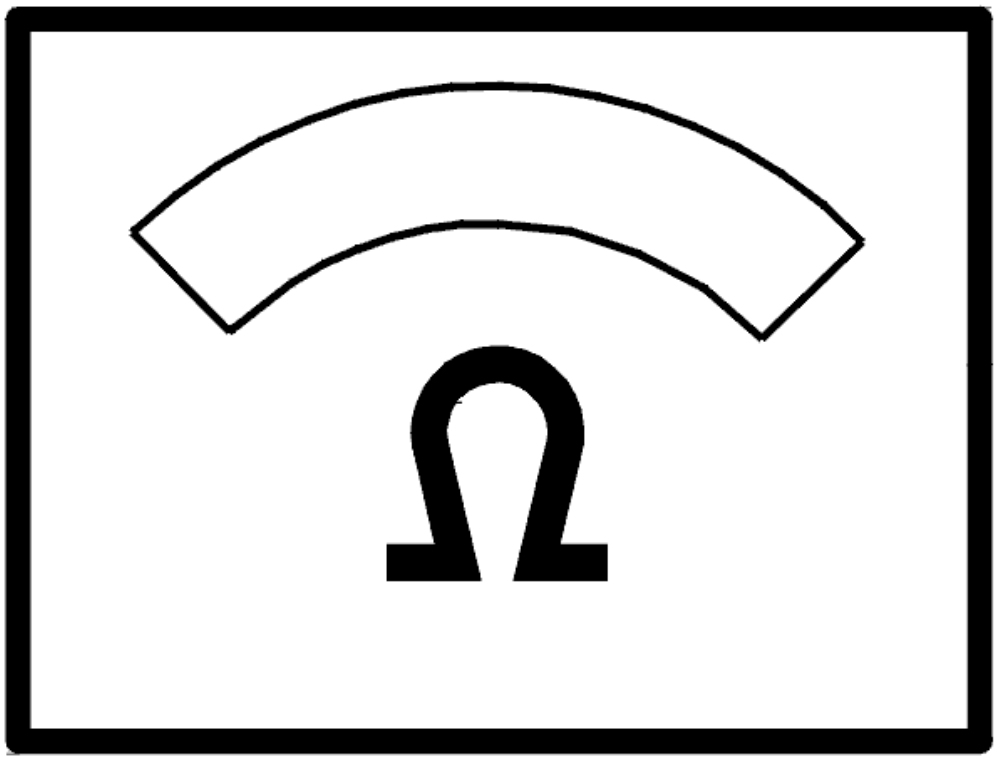


Fig. 161: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

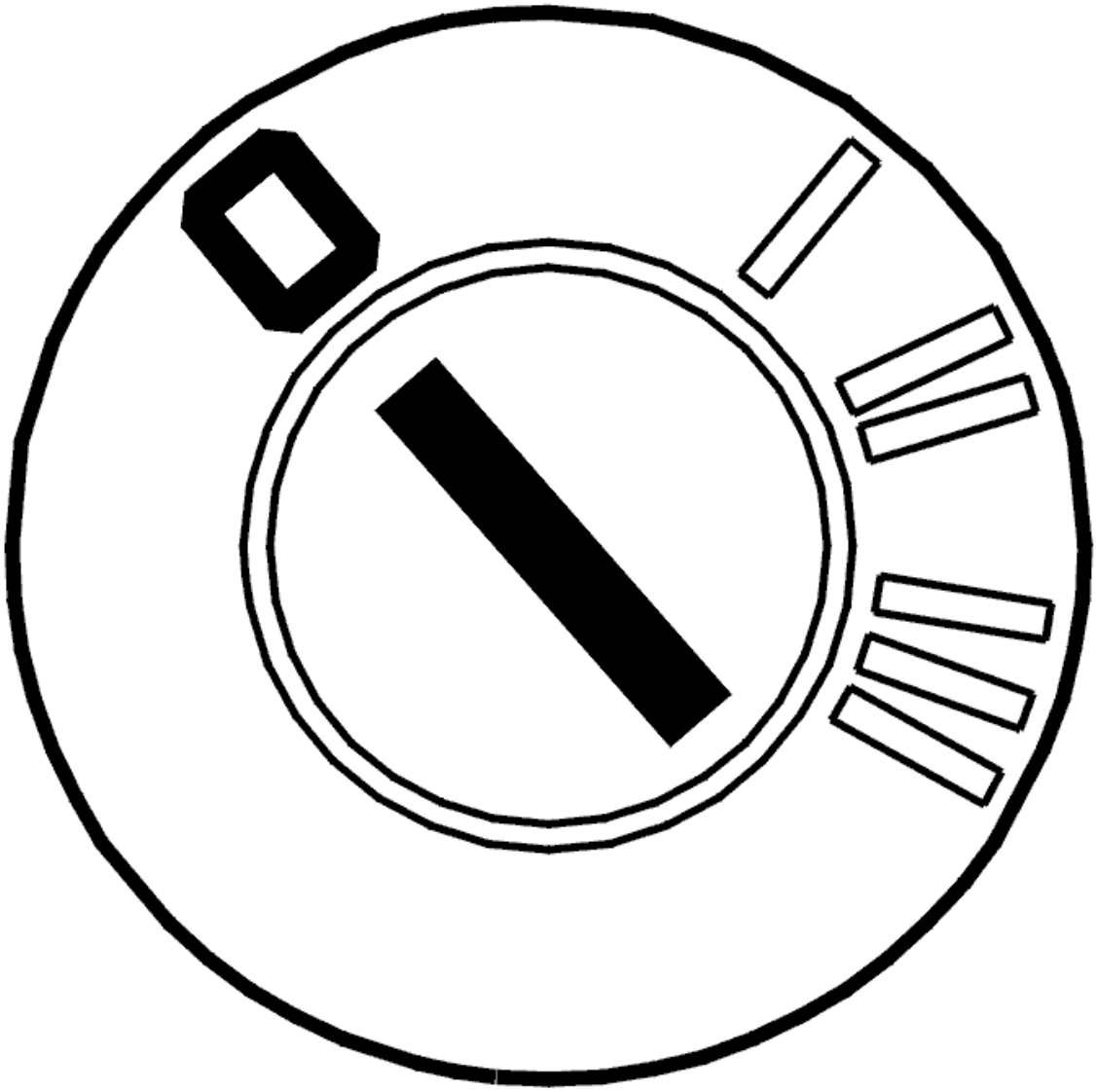


Fig. 162: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

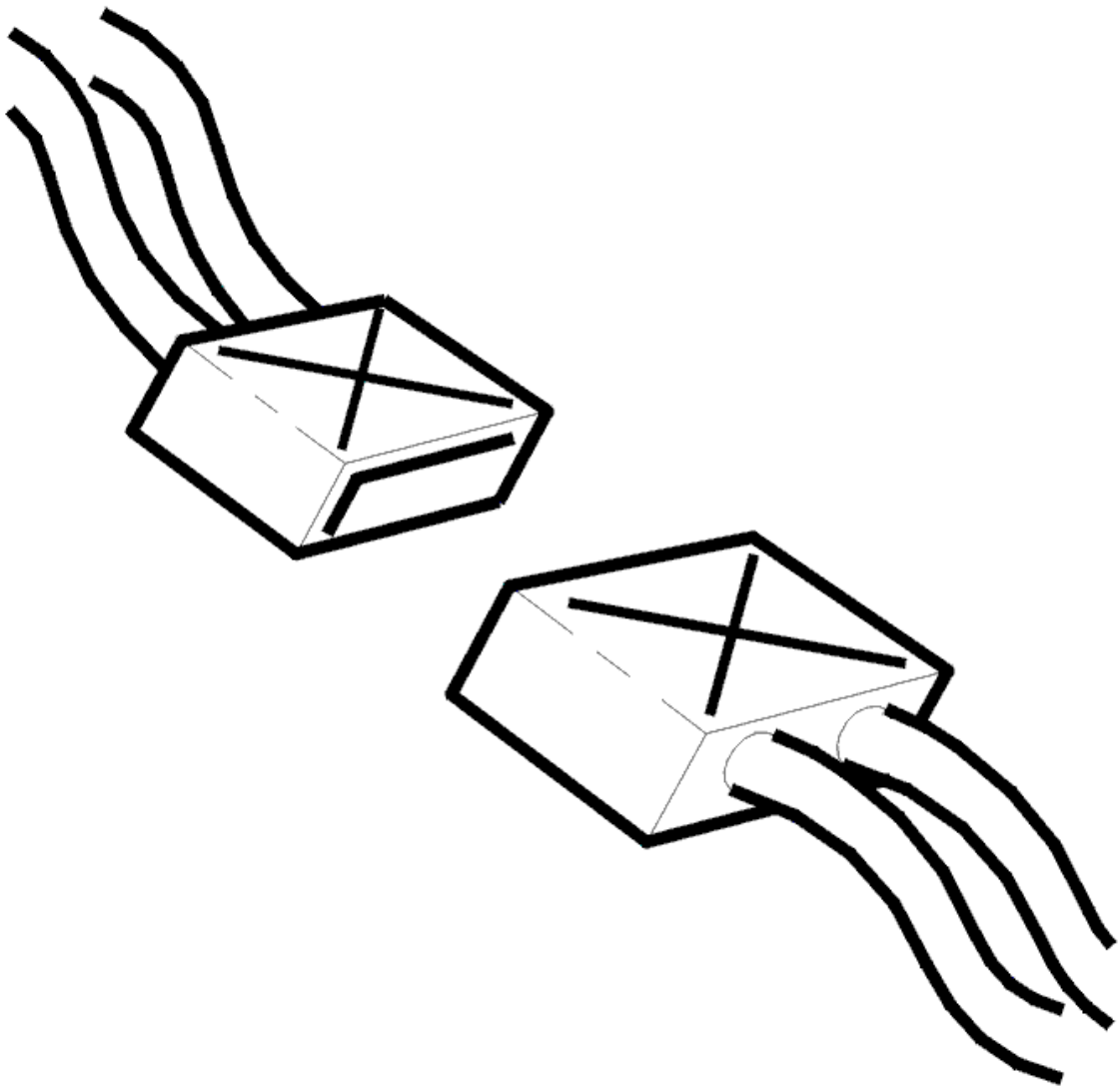


Fig. 163: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Transmission connector D disconnected.

Check the cable between control module terminal #A51 (#A51) and transmission connector terminal #D1 (control module side). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #B9 (#A69) and transmission connector #D2 (control module side). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

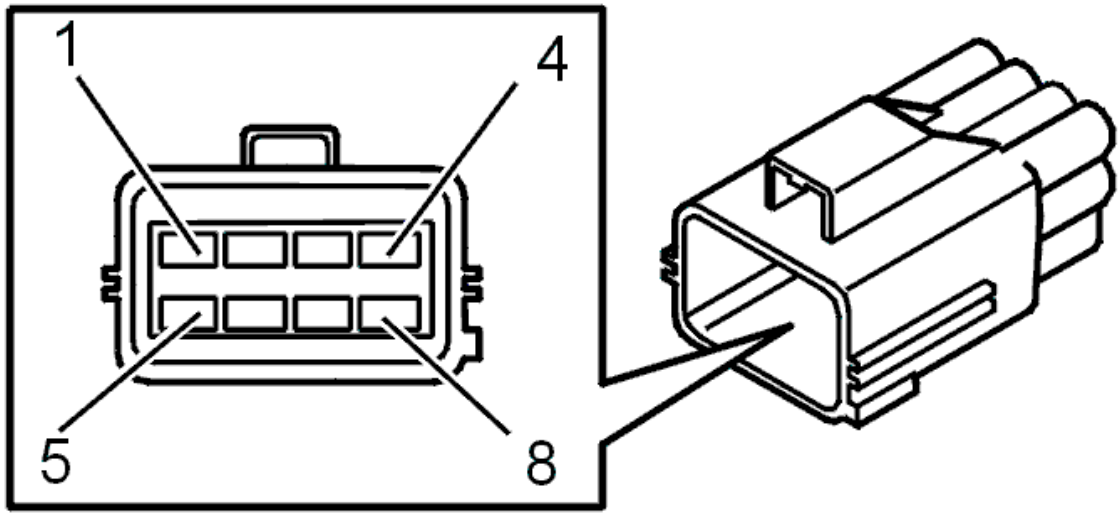


Fig. 164: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

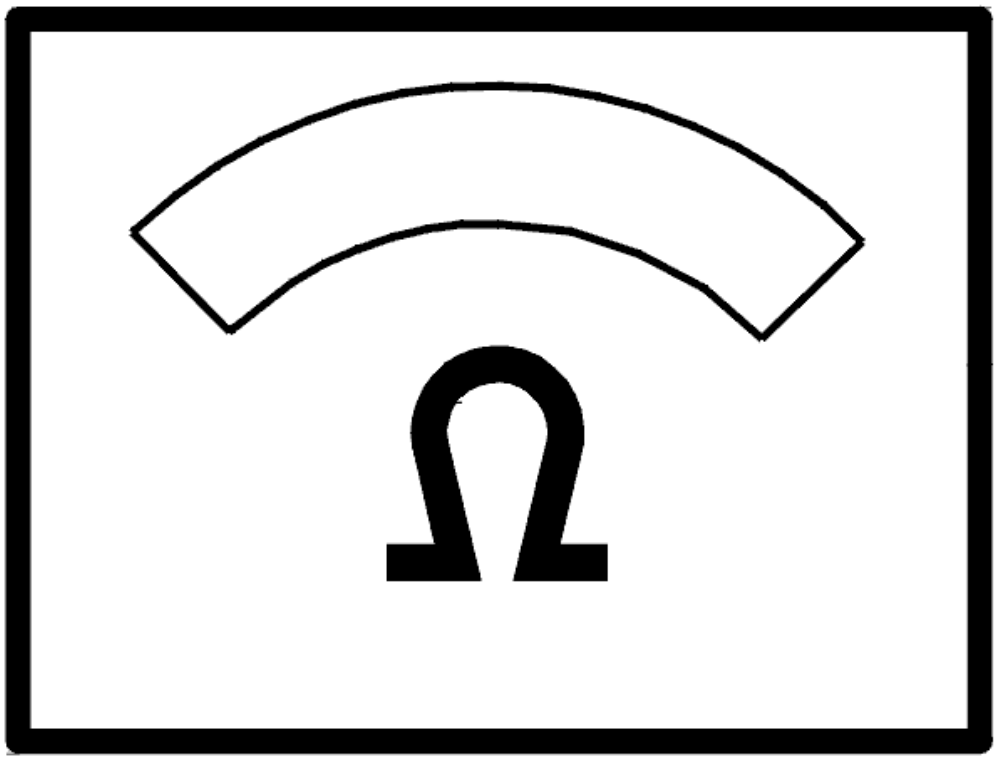


Fig. 165: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault found in the wiring?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

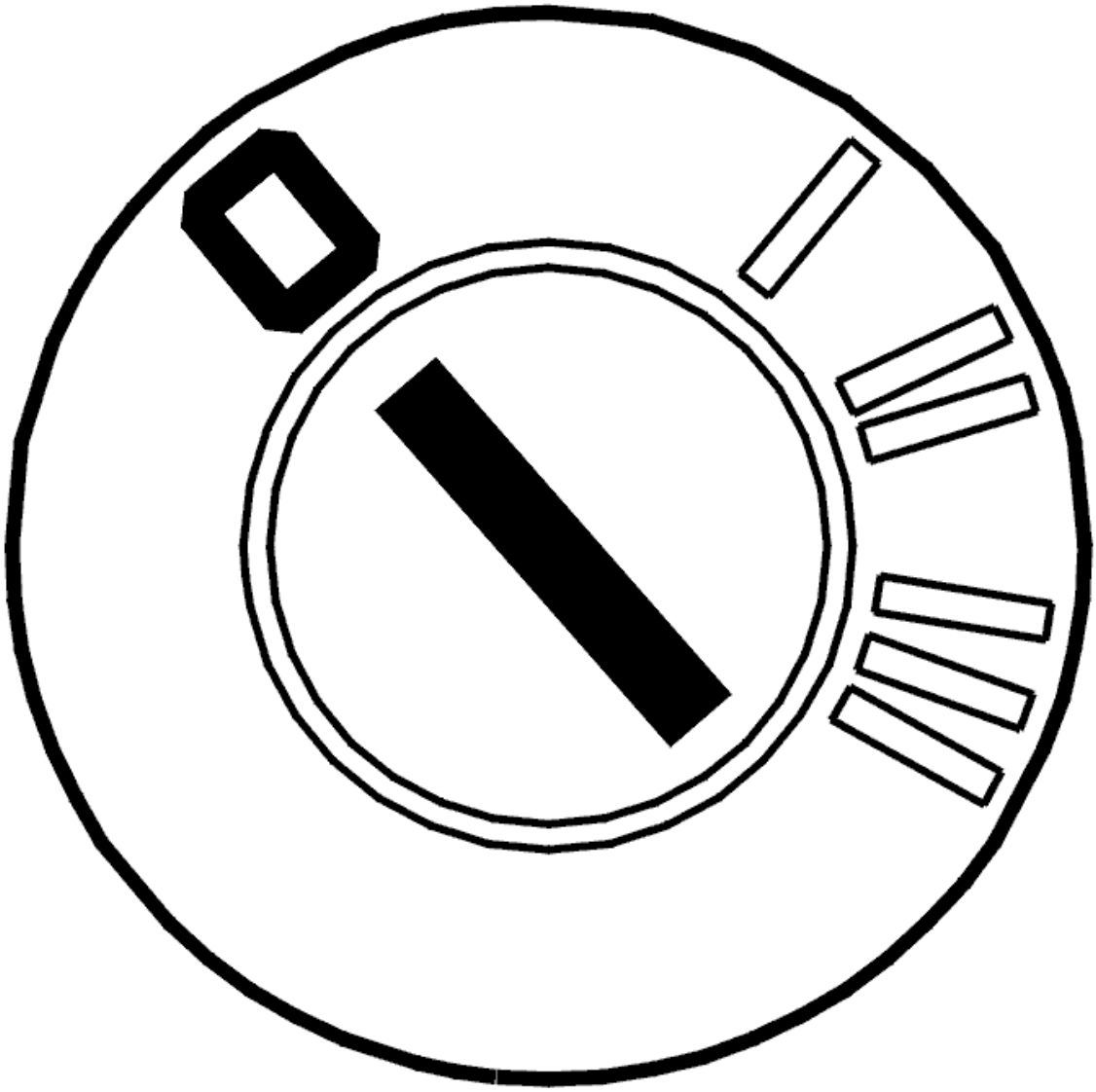


Fig. 166: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

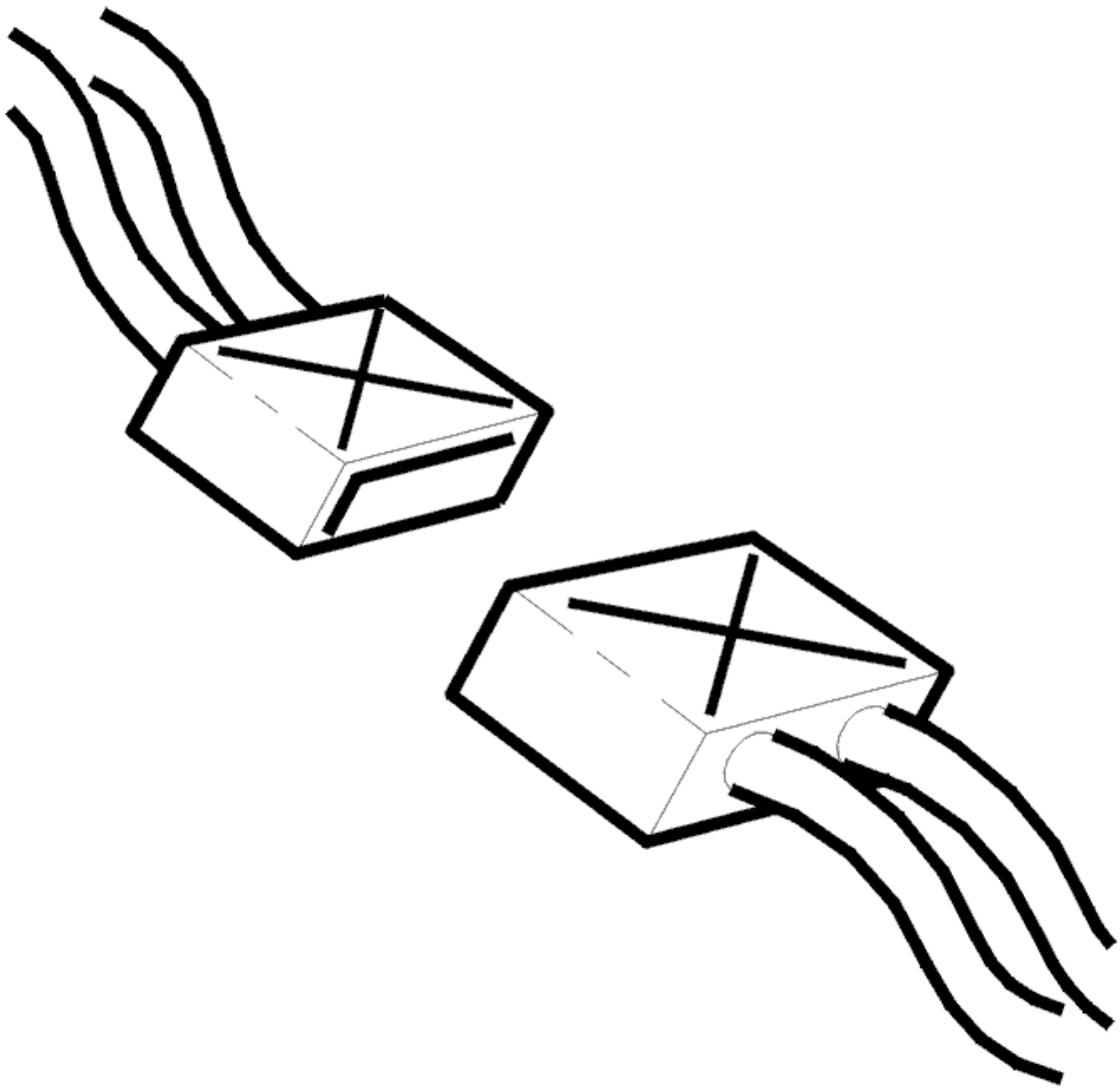


Fig. 167: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

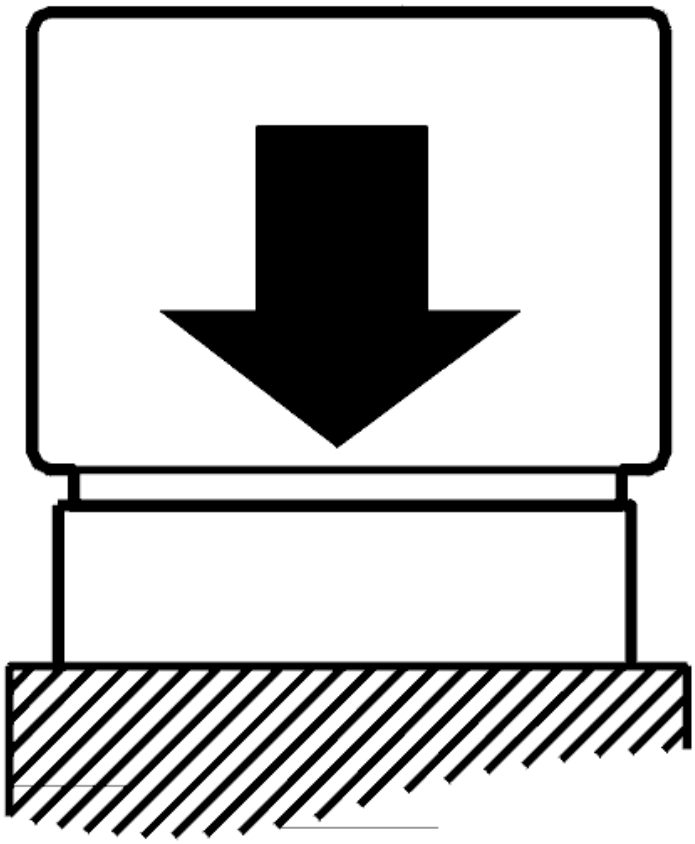


Fig. 168: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector D disconnected.

Check the transmission control module (TCM) by measuring the resistance between terminals #A51 (#A51) and #B9 (#A69) on the breakout box. The resistance must be approximately 9 kohms.

NOTE: When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

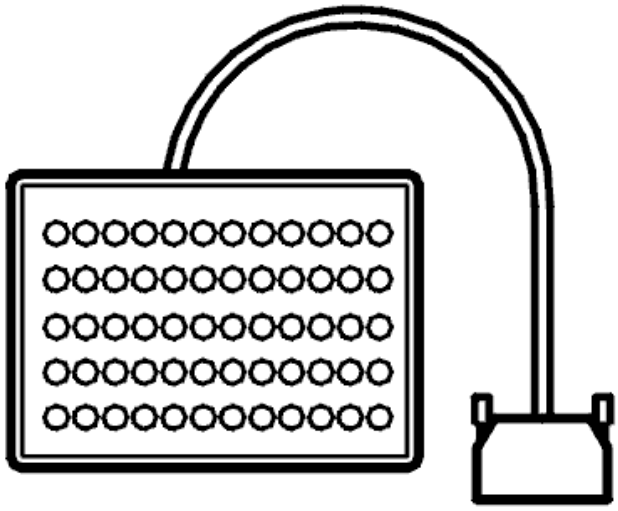


Fig. 169: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

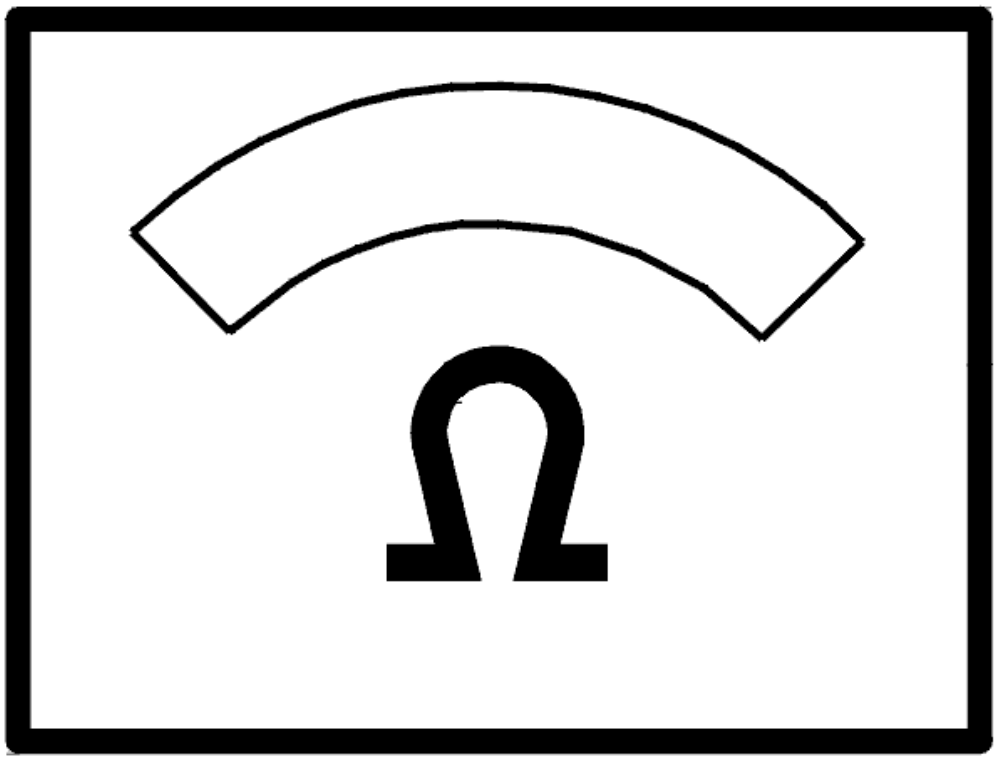


Fig. 170: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

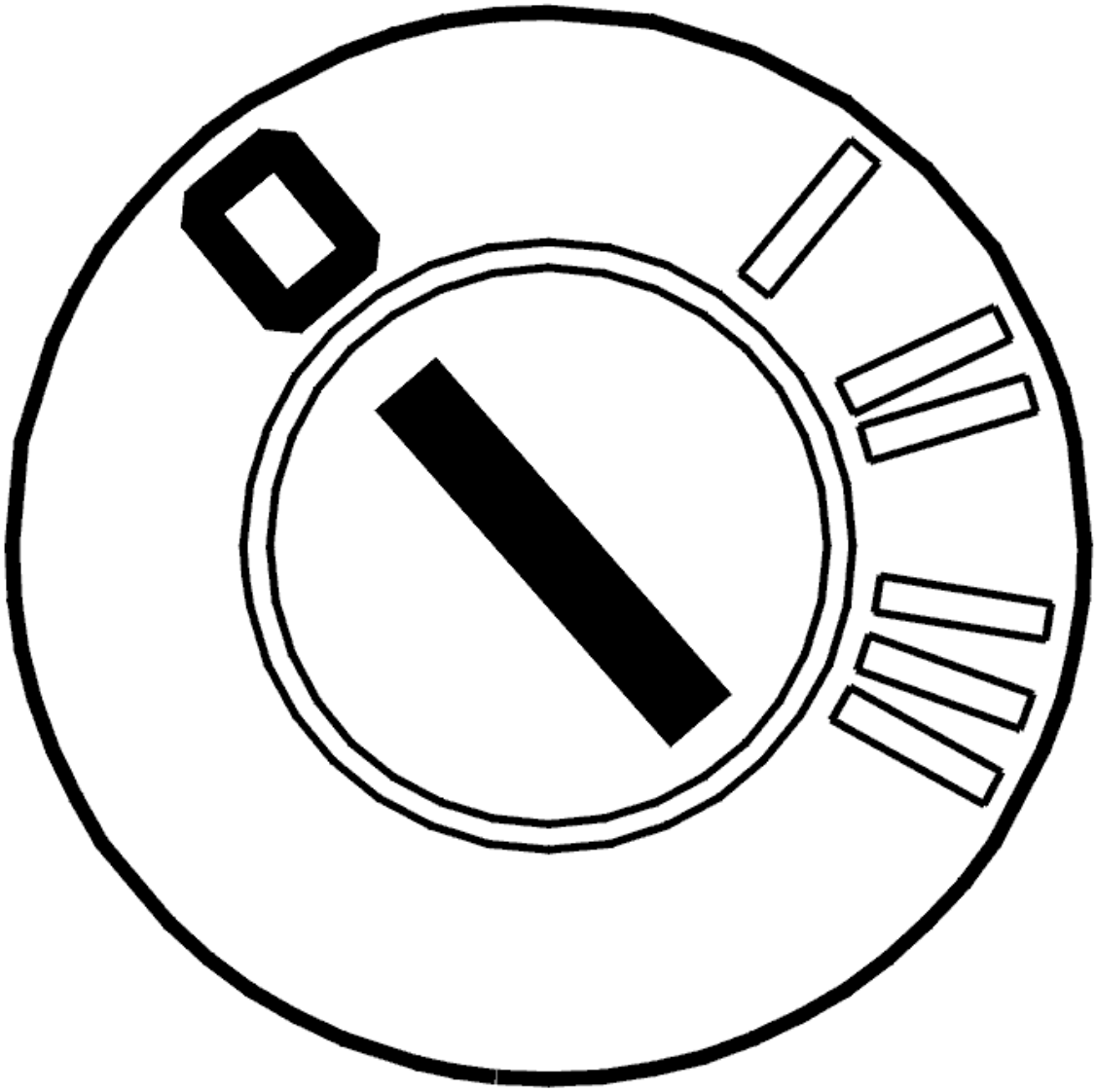


Fig. 171: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

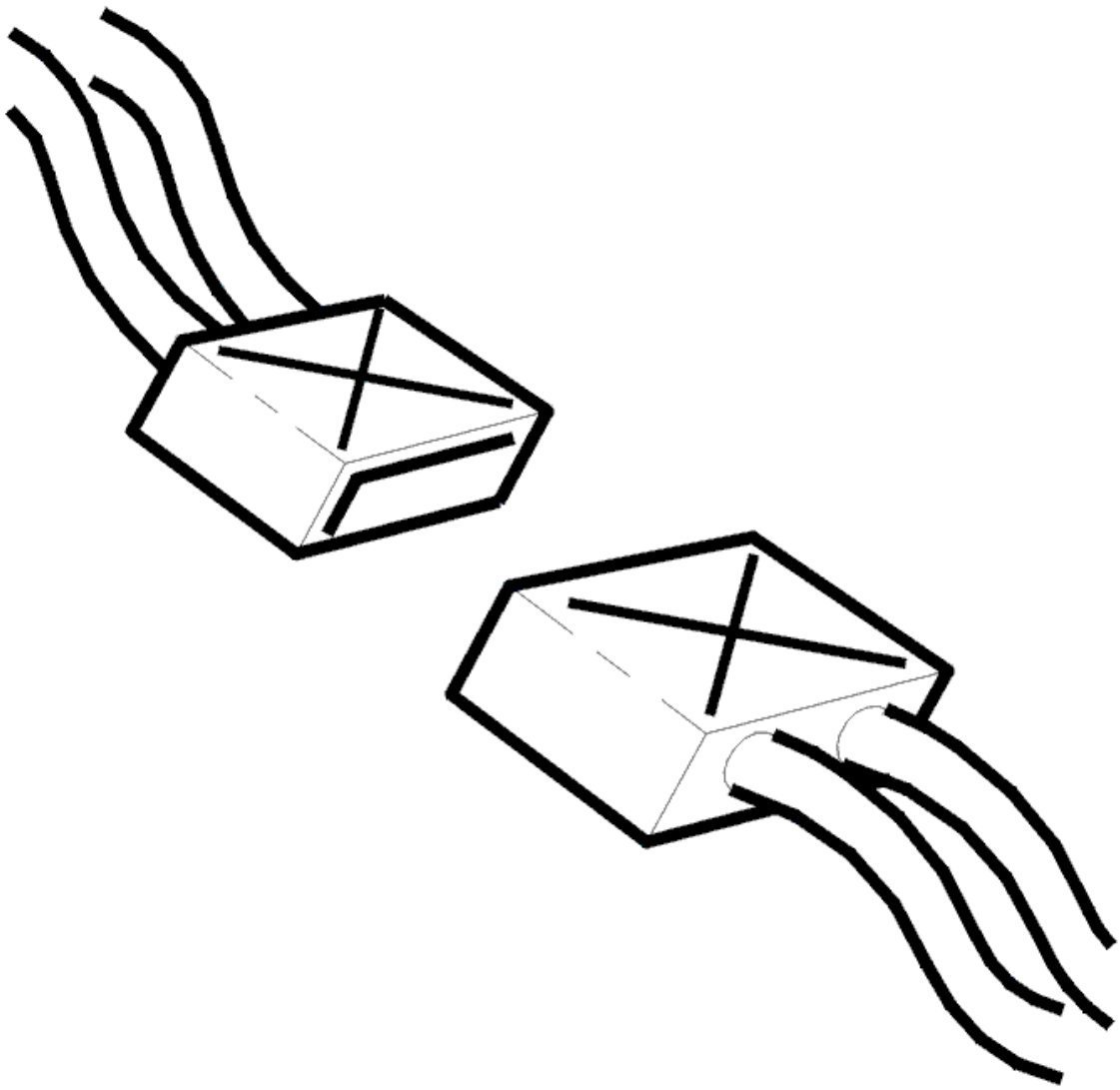


Fig. 172: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the wiring between transmission connector terminal #D1 and solenoid SLU terminal #1. Check the wiring between transmission connector terminal #D2 and solenoid SLU terminal #2. Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

  Also check against the other cables in the circuit.

  Check the solenoid SLU by measuring the resistance between terminals #1 and #2. The resistance should be 5-5.6 ohms at 20°C. Replace the transmission control system if the resistance is incorrect.

  Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the transmission control system, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

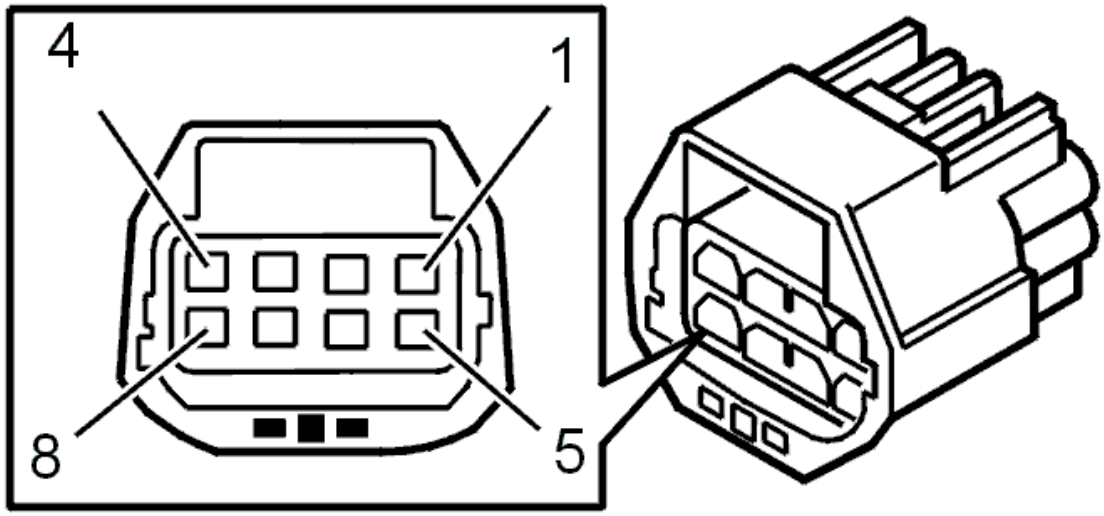


Fig. 173: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

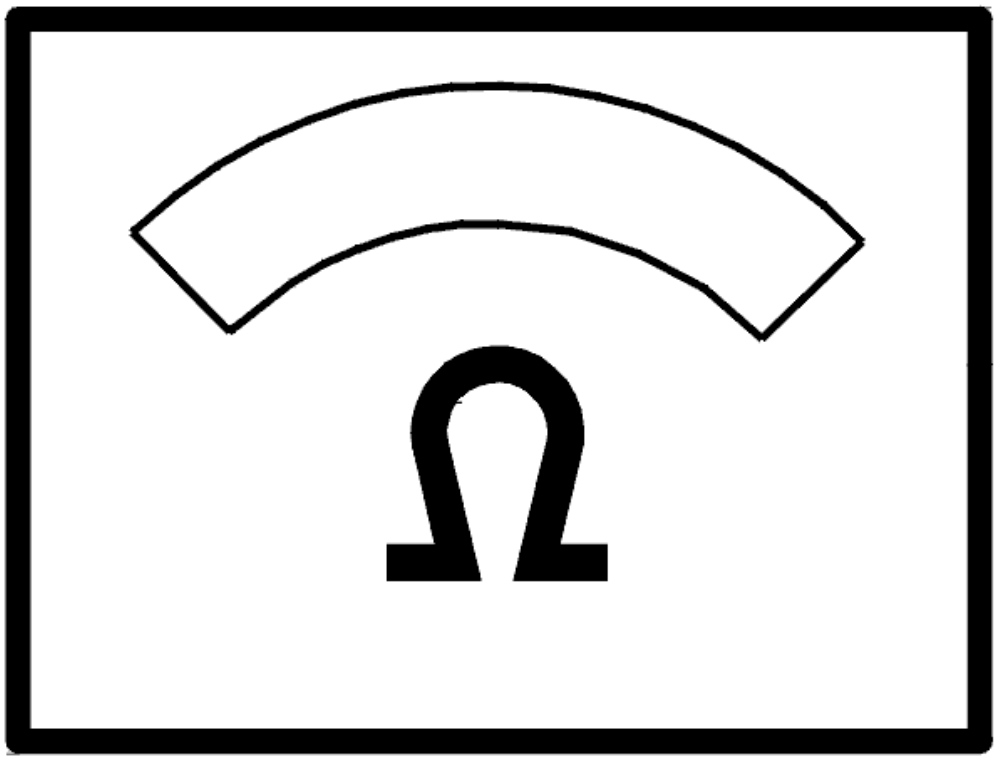


Fig. 174: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

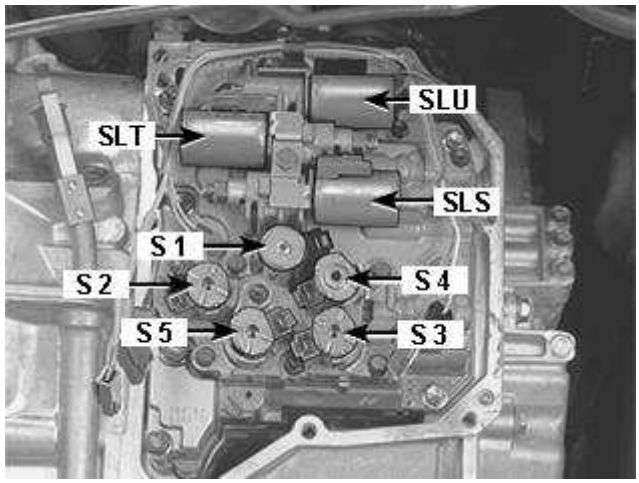


Fig. 175: Identifying S1-S5, SLT, SLU And SLS Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

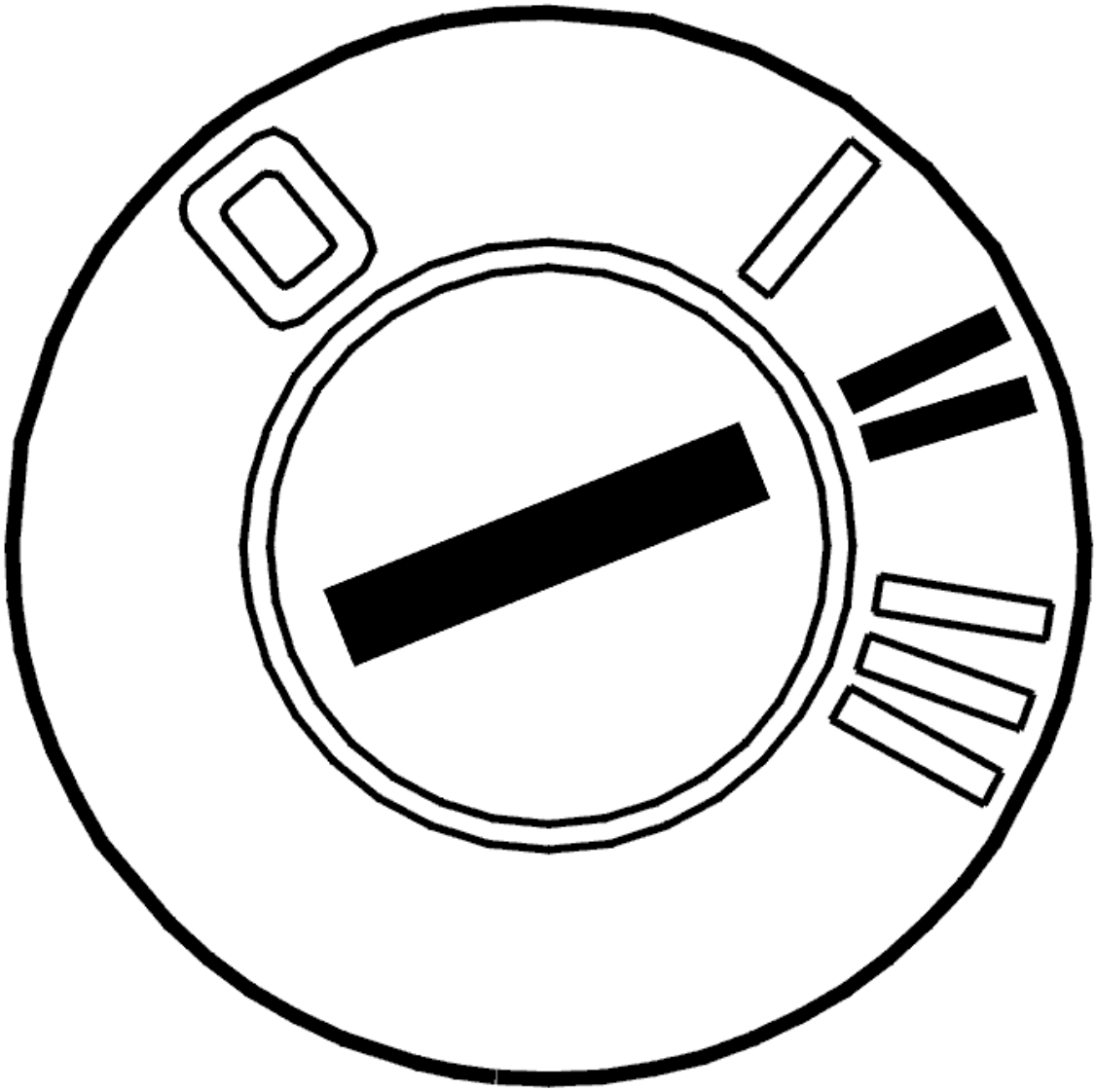


Fig. 176: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

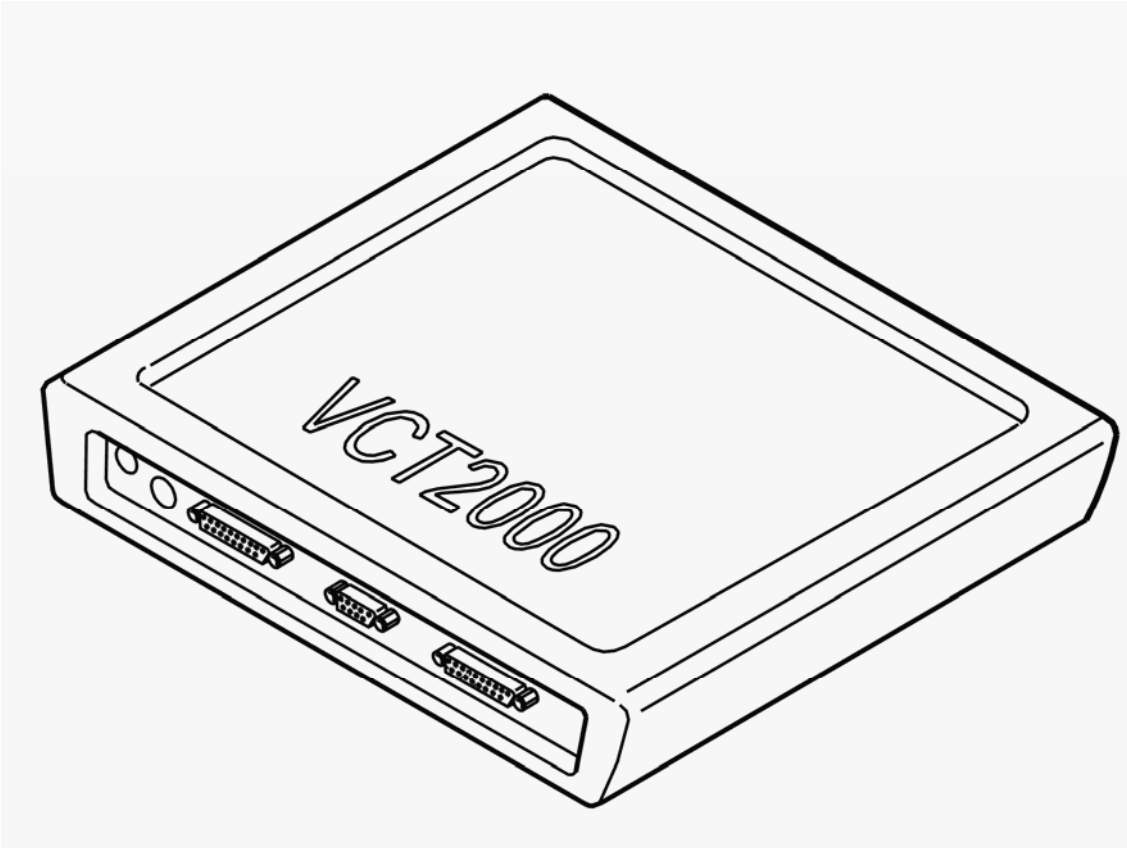


Fig. 177: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

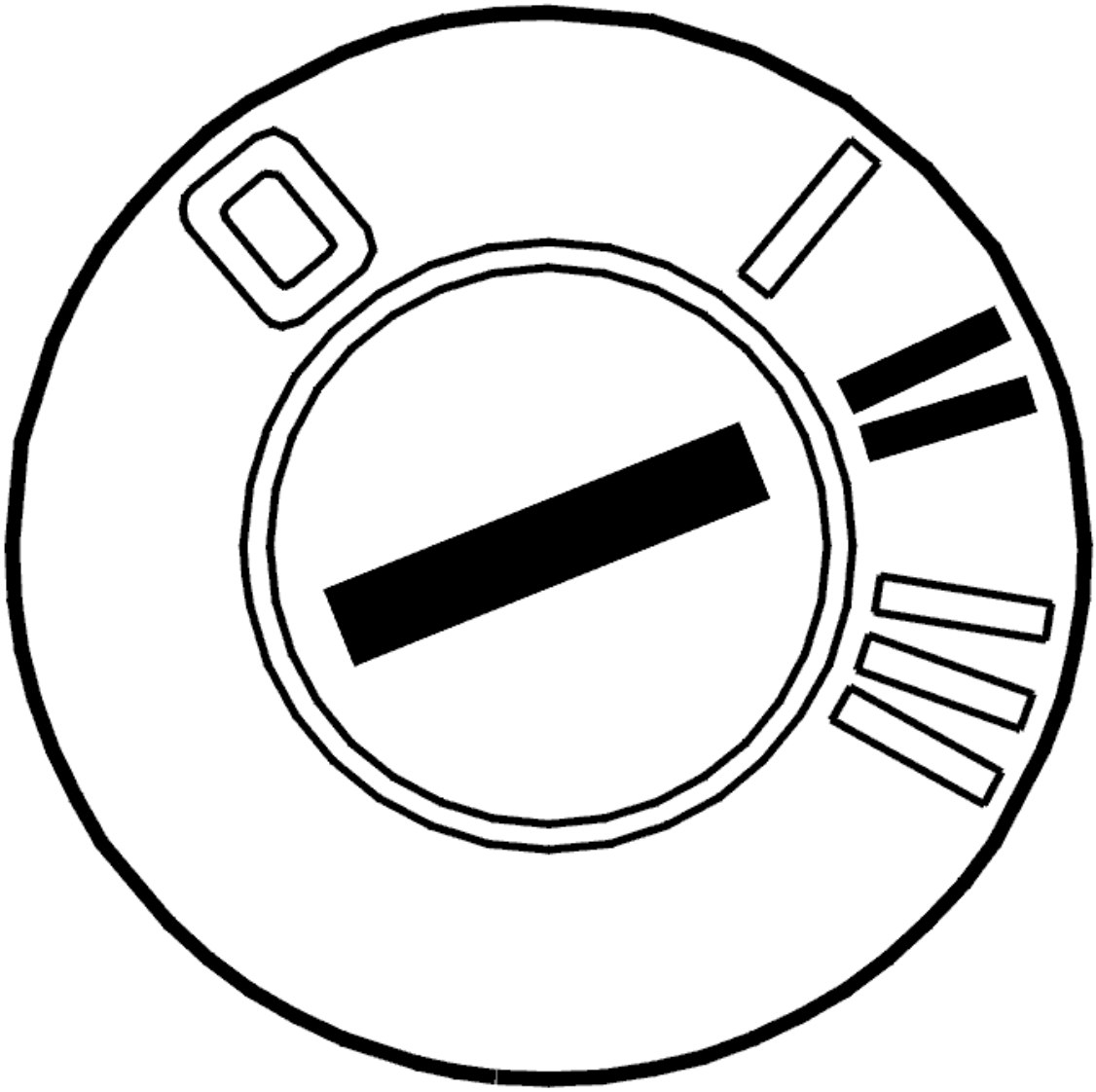


Fig. 178: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLU.

  Read off the current through the solenoid SLU circuit.

  The current should oscillate between 0 and 1000 mA.

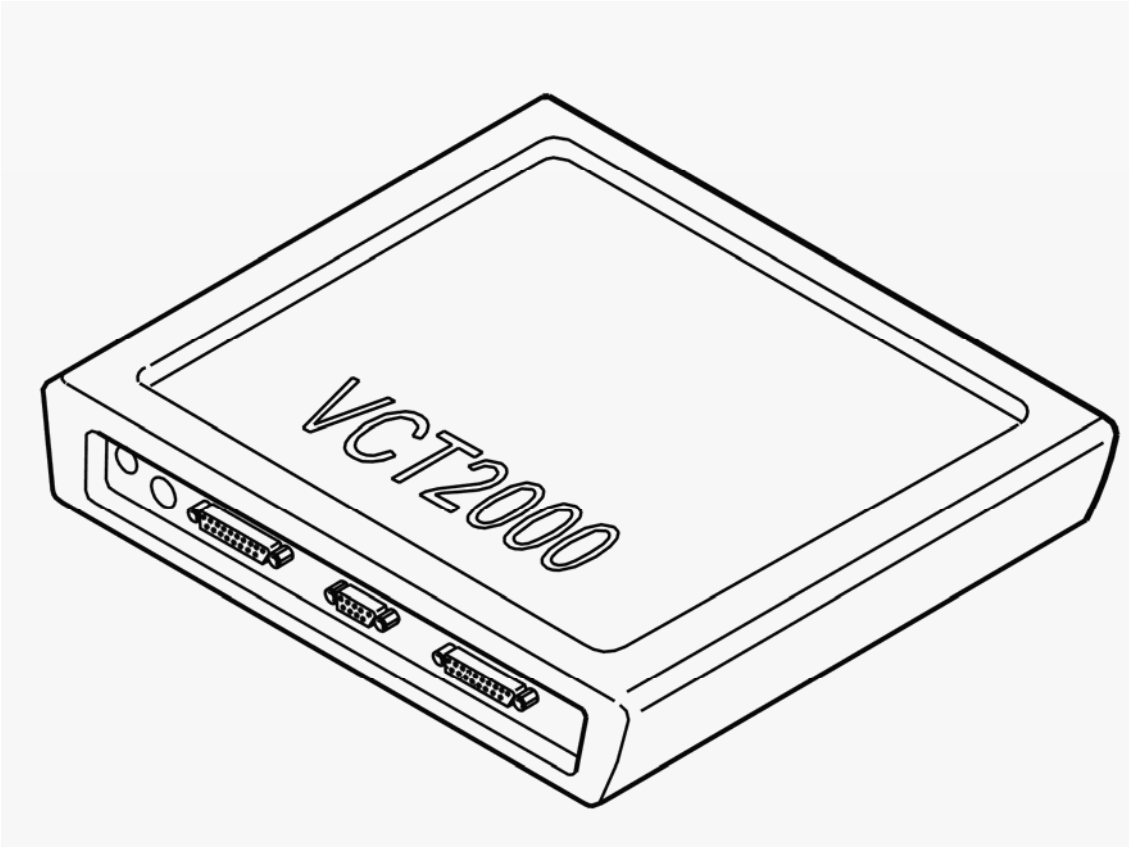


Fig. 179: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0110: LOCK-UP SOLENOID SLU. SIGNAL TOO LOW. INTERMITTENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

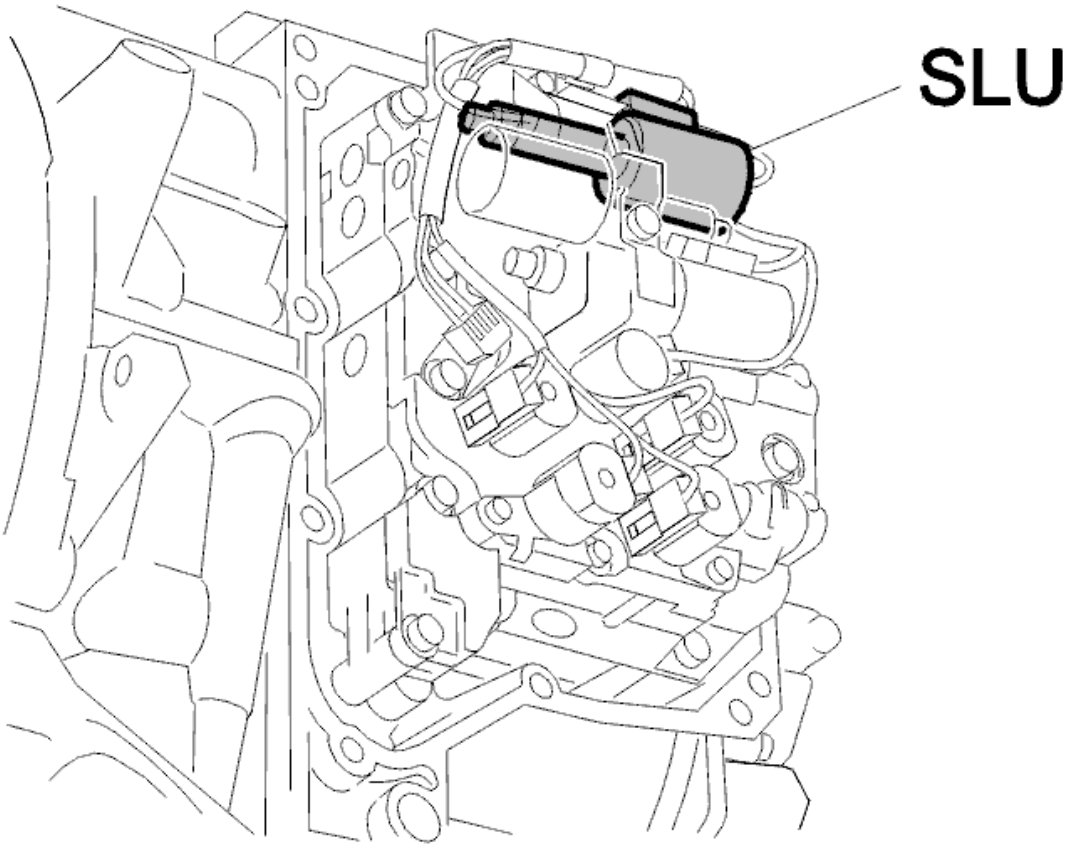


Fig. 180: Identifying Lock-Up Solenoid, SLU
Courtesy of VOLVO CARS CORPORATION

Lock-up solenoid SL controls the transmission lock-up function and certain gear shifts in the transmission. Solenoid SLU operates when it receives voltage from the transmission control module (TCM) and is activated under different driving conditions depending on road speed, throttle position and the driving mode selected. Diagnostic trouble code (DTC) TCM-0110 is stored if the control module registers a short-circuit to ground in the solenoid SLU circuit when the solenoid should be activated. Solenoid SLU can probably not be activated.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.
- The transmission control module (TCM) does not activate the lock-up solenoid.

Possible Source

- Short-circuit to ground in the signal cable.
- Defective control module.
- Defective solenoid.

Fault symptom[s]

- General orange warning lamp lit.
- No shifting.
- Irregular shifting.
- No lock-up function.

SIGNAL TOO LOW. INTERMITTENT FAULT

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the wiring between transmission control module (TCM) terminal #A51 (#A51) and transmission connector terminal #D1. Check the wiring between control module terminal #B9 (#A69) and transmission connector terminal #D2. Check for an intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** .

HINT: Check solenoid SLU. Measure the resistance between terminals #D1 and #D2 on transmission connector D. The resistance should be 5-5.6 ohms at 20°C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

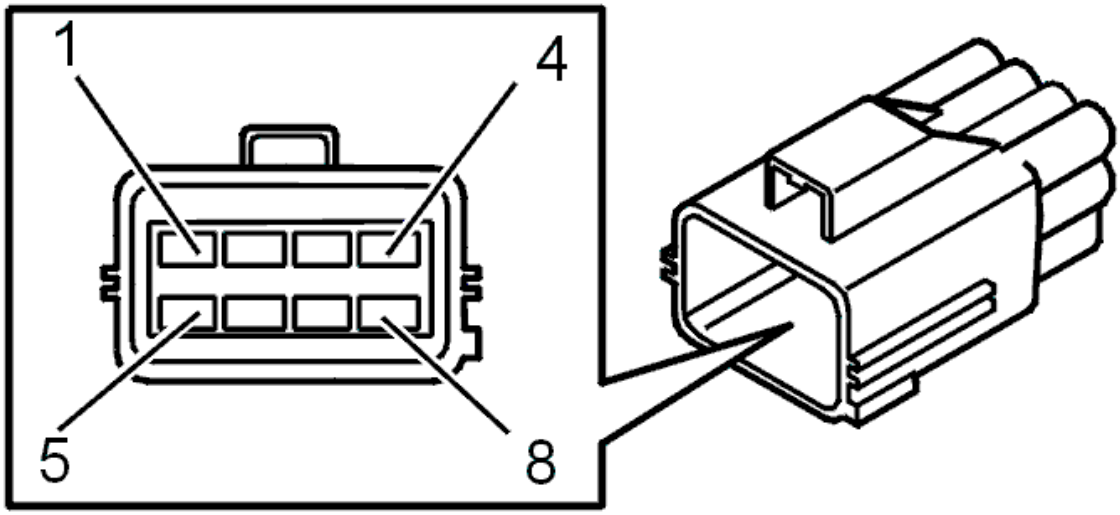


Fig. 181: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

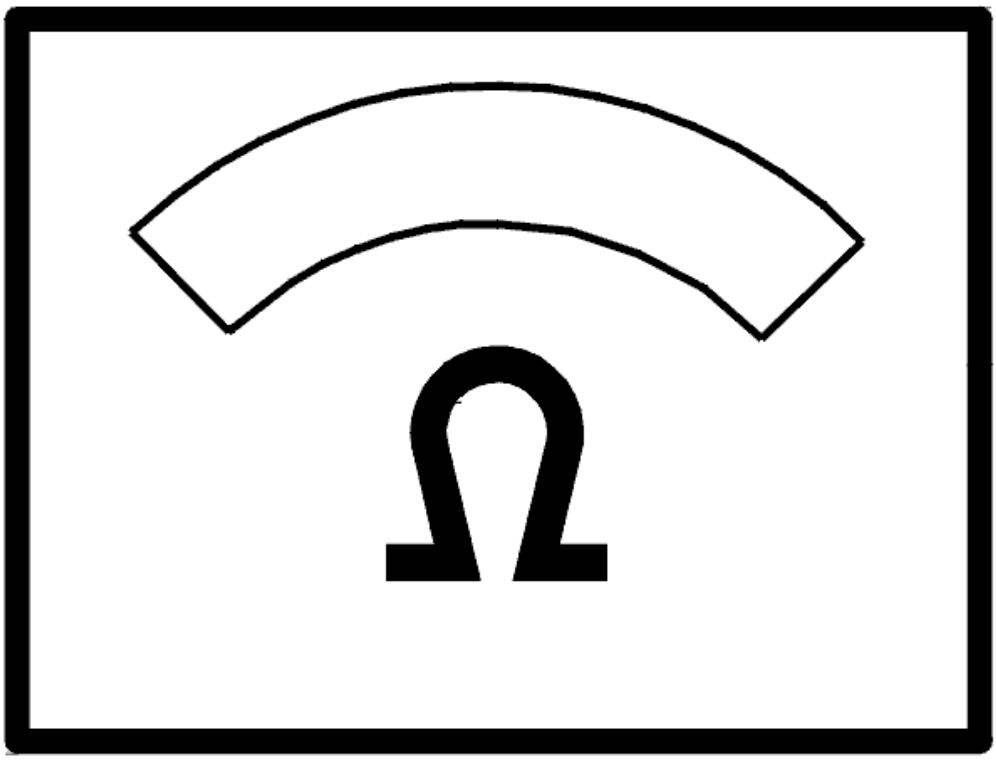


Fig. 182: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

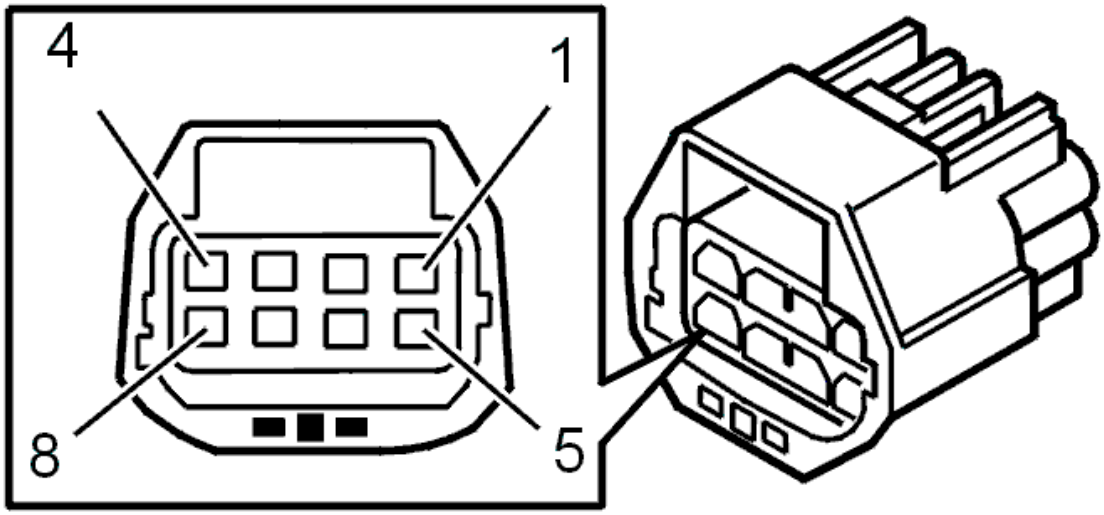


Fig. 183: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0110: LOCK-UP SOLENOID SLU. SIGNAL TOO LOW. PERMANENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL TOO LOW. PERMANENT FAULT

CHECKS

CHECKING LINE PRESSURE SOLENOID SLU

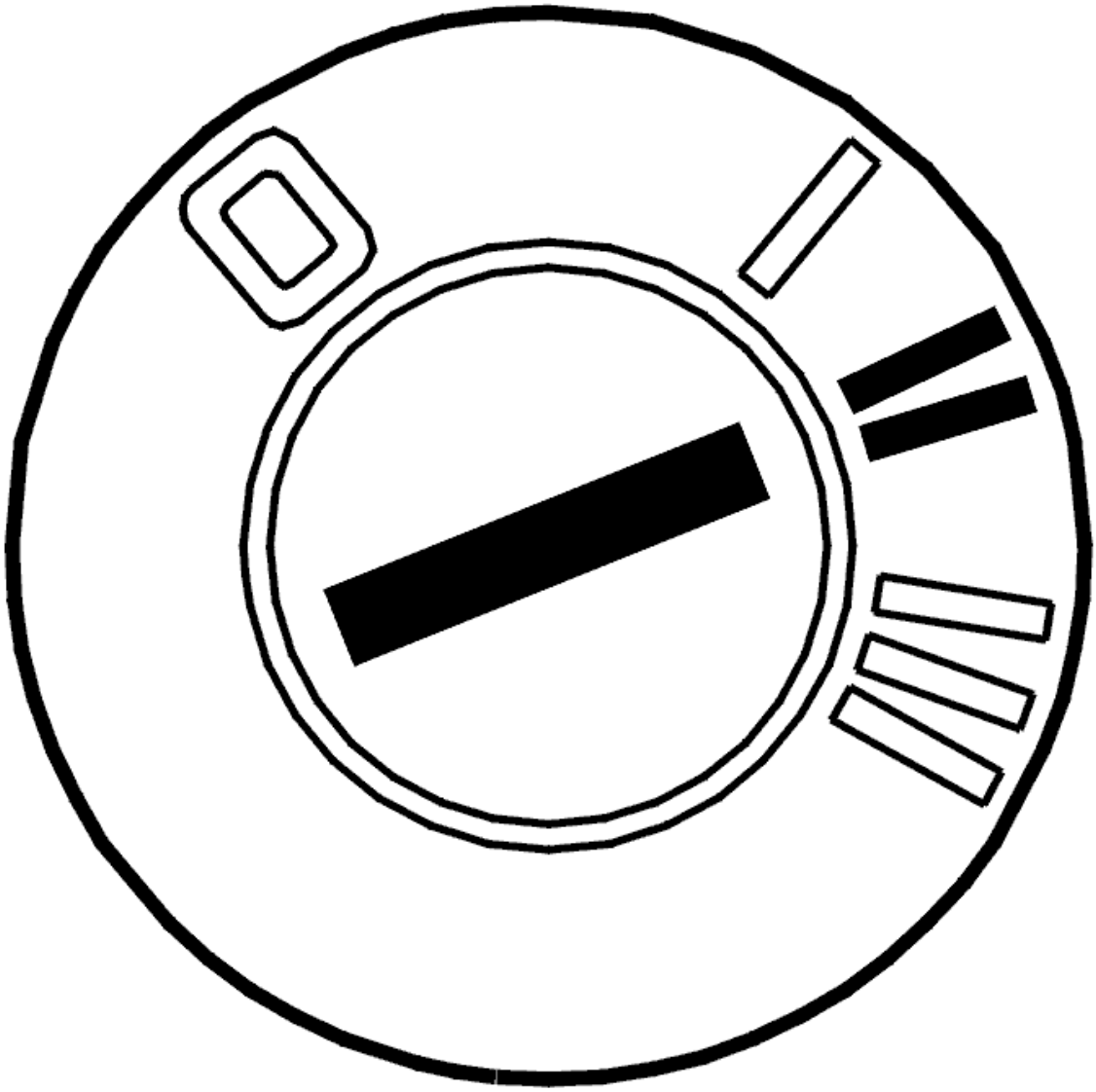


Fig. 184: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

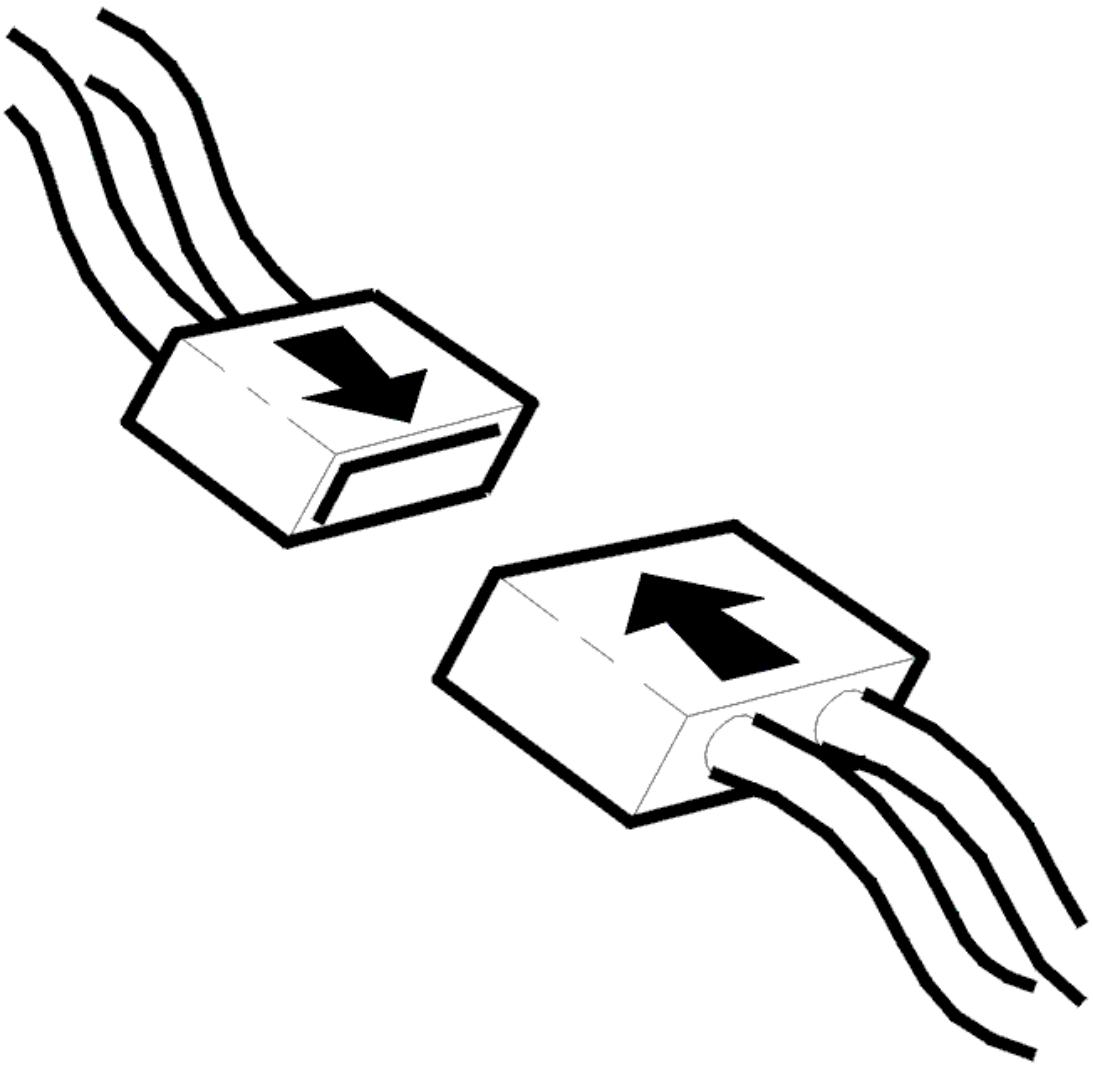


Fig. 185: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the transmission control module (TCM) connector and transmission connector D. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLU.

  Read off the current through the solenoid SLU circuit.

  The current should oscillate between 0 and 1000 mA.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

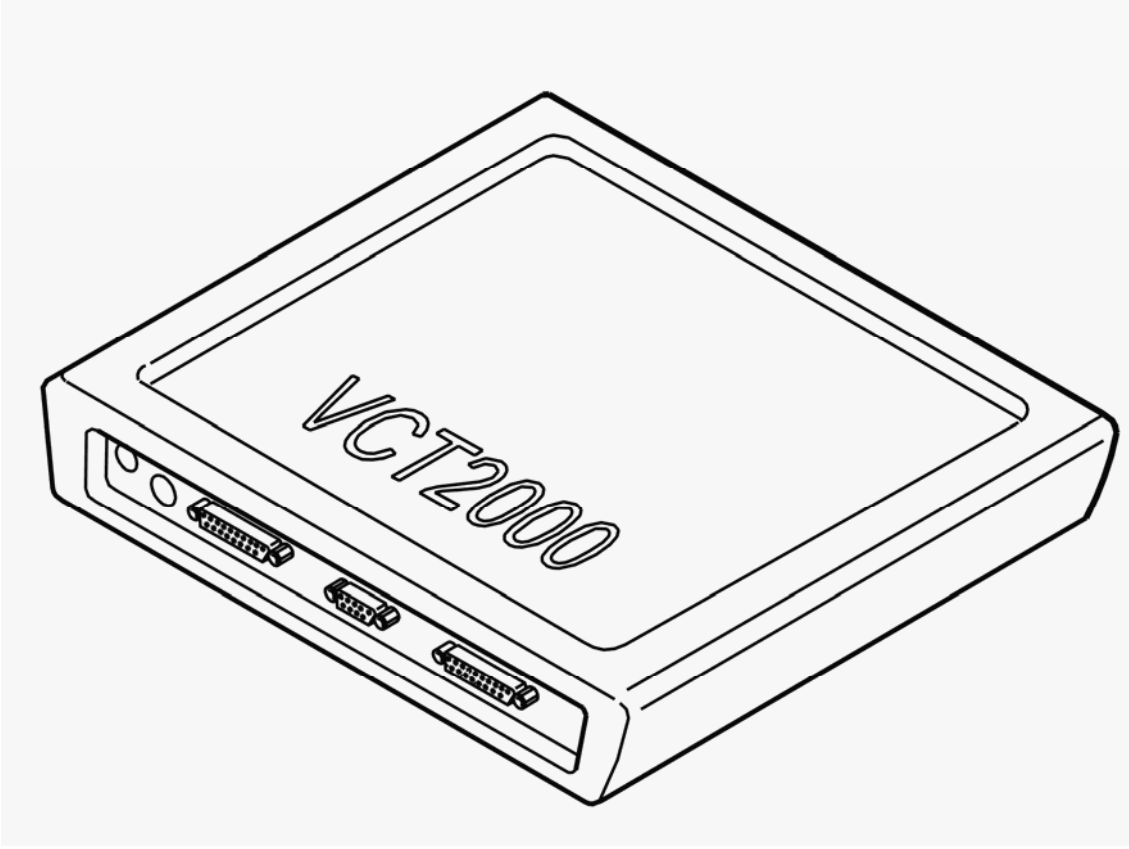


Fig. 186: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING RESISTANCE**

CHECKING RESISTANCE

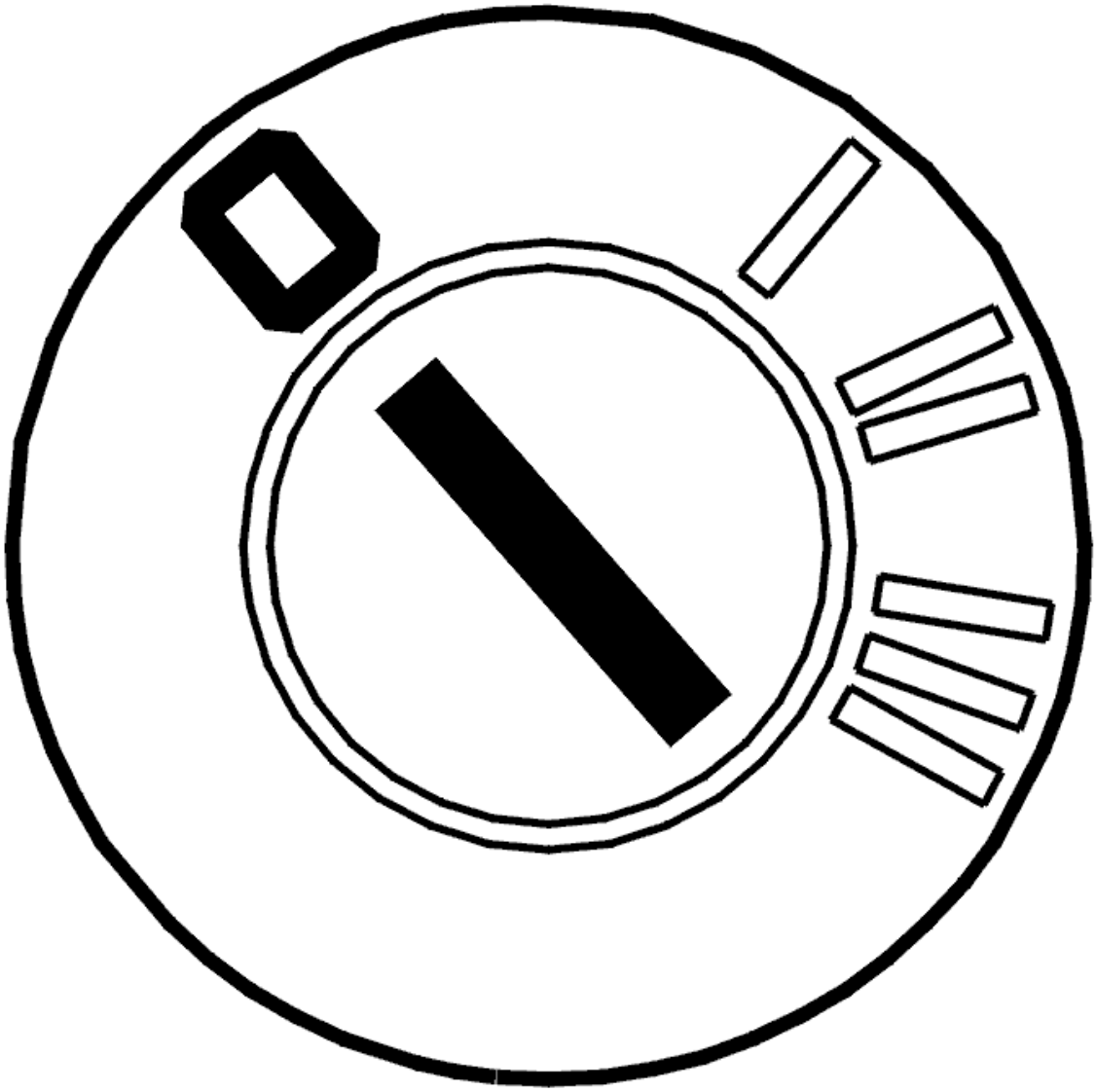


Fig. 187: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

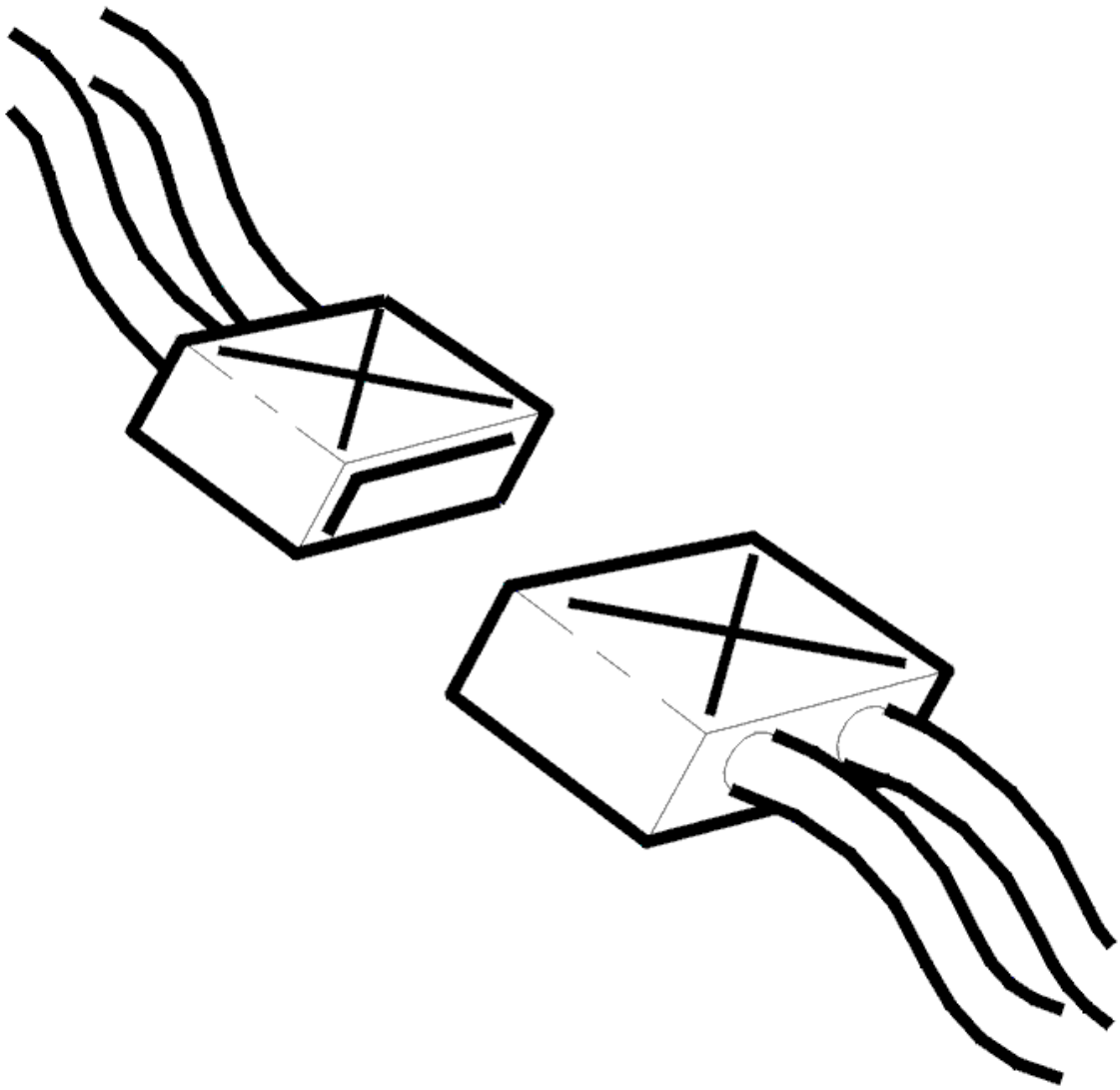


Fig. 188: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check solenoid SLU. Measure the resistance between terminals #D1 and #D2 on transmission connector D. The resistance must be 5-5.6 ohms at 20°C.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

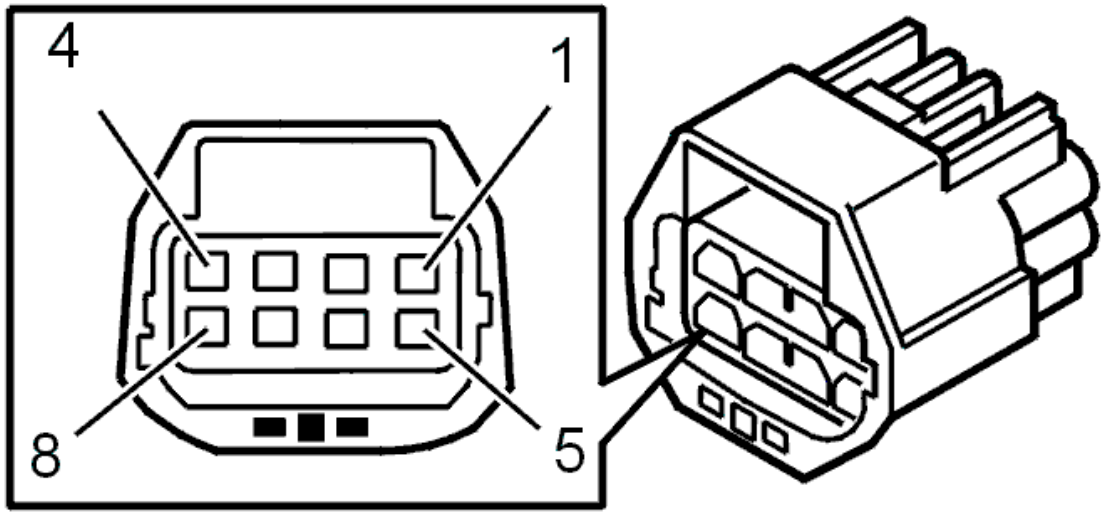


Fig. 189: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

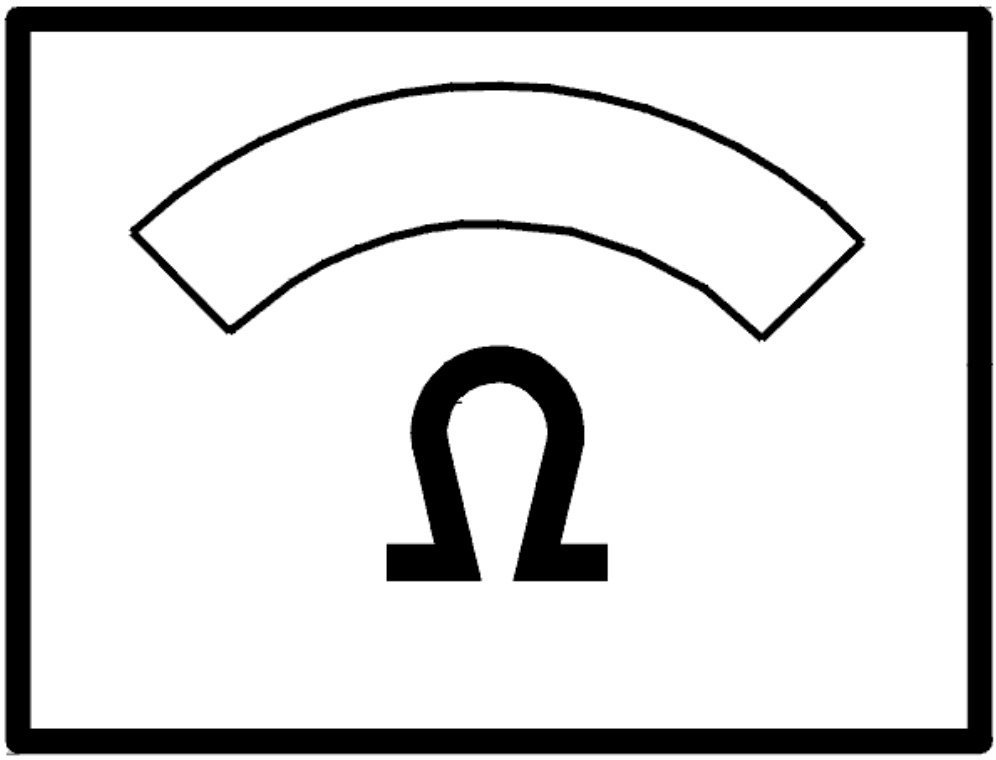


Fig. 190: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

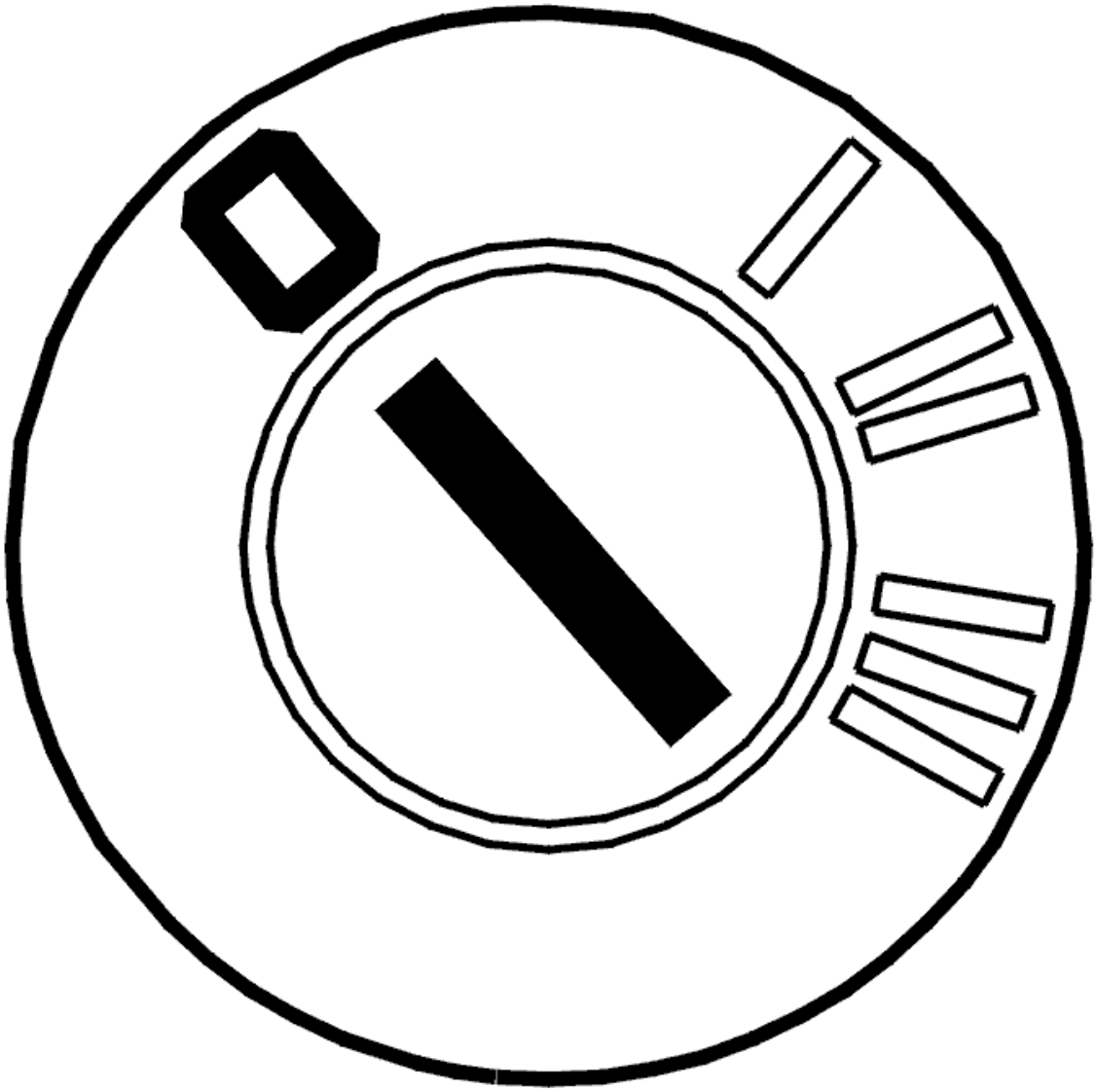


Fig. 191: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

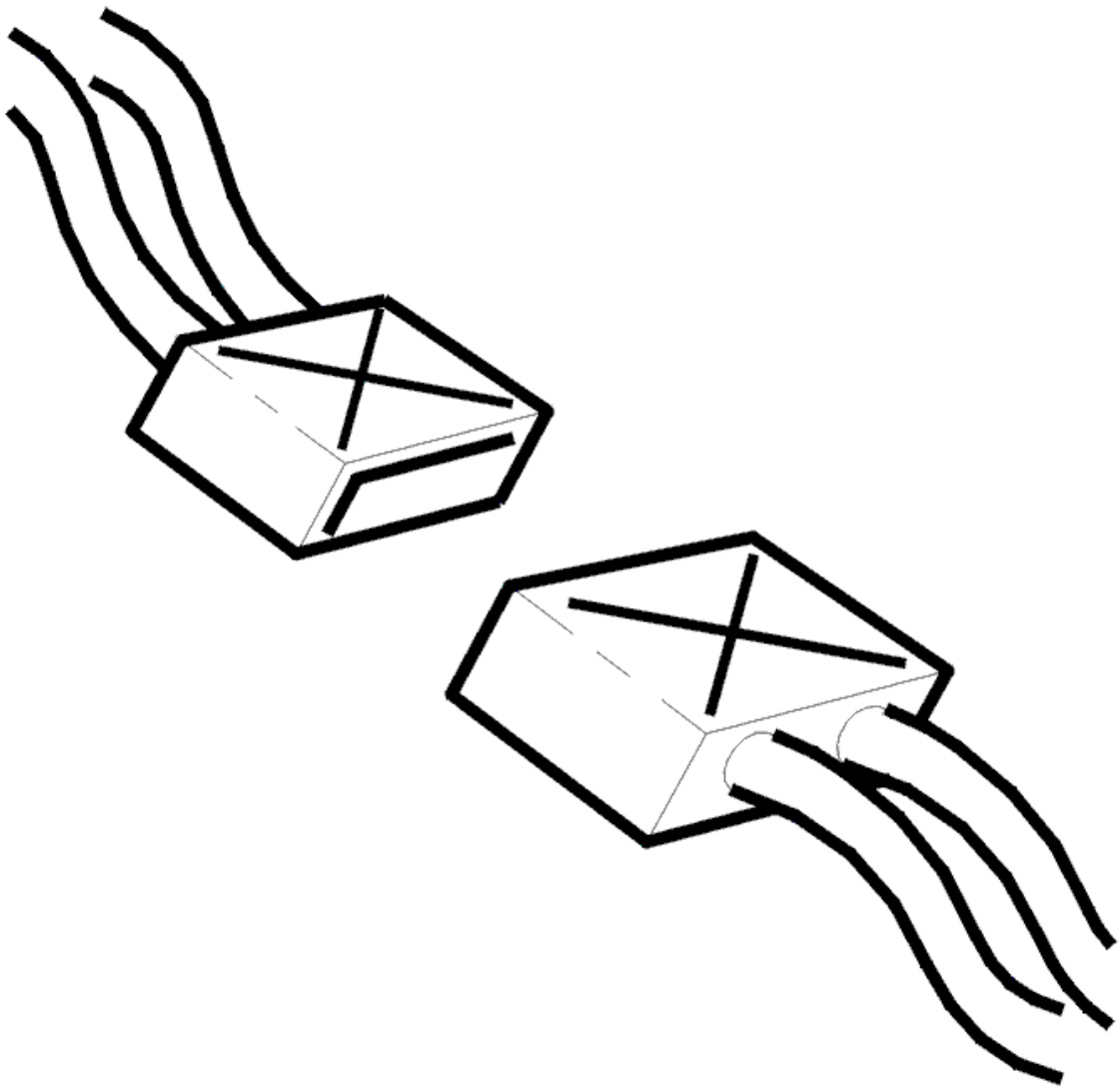


Fig. 192: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Transmission connector D disconnected.

Check the cable between control module terminal #A51 (#A51) and transmission connector terminal #D1 (control module side). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Check the cable between control module terminal #B9 (#A69) and transmission connector terminal #D2 (control module side). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

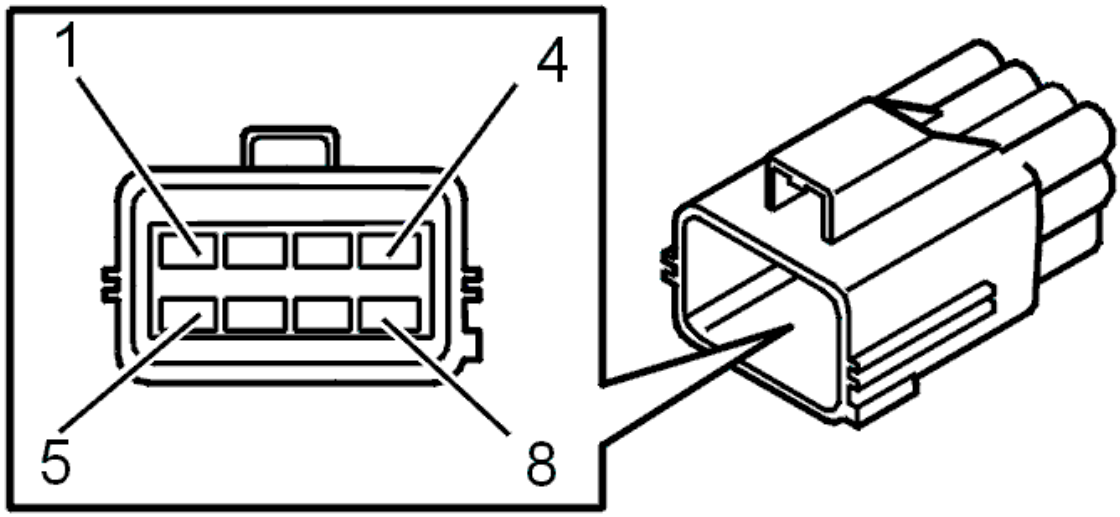


Fig. 193: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

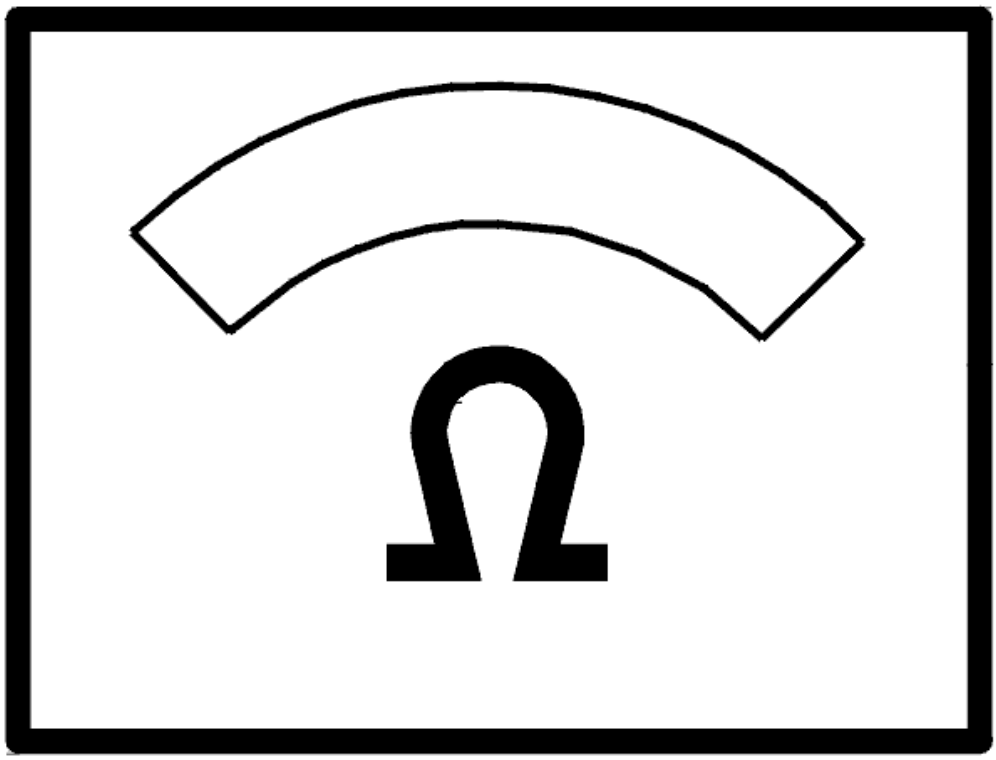


Fig. 194: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

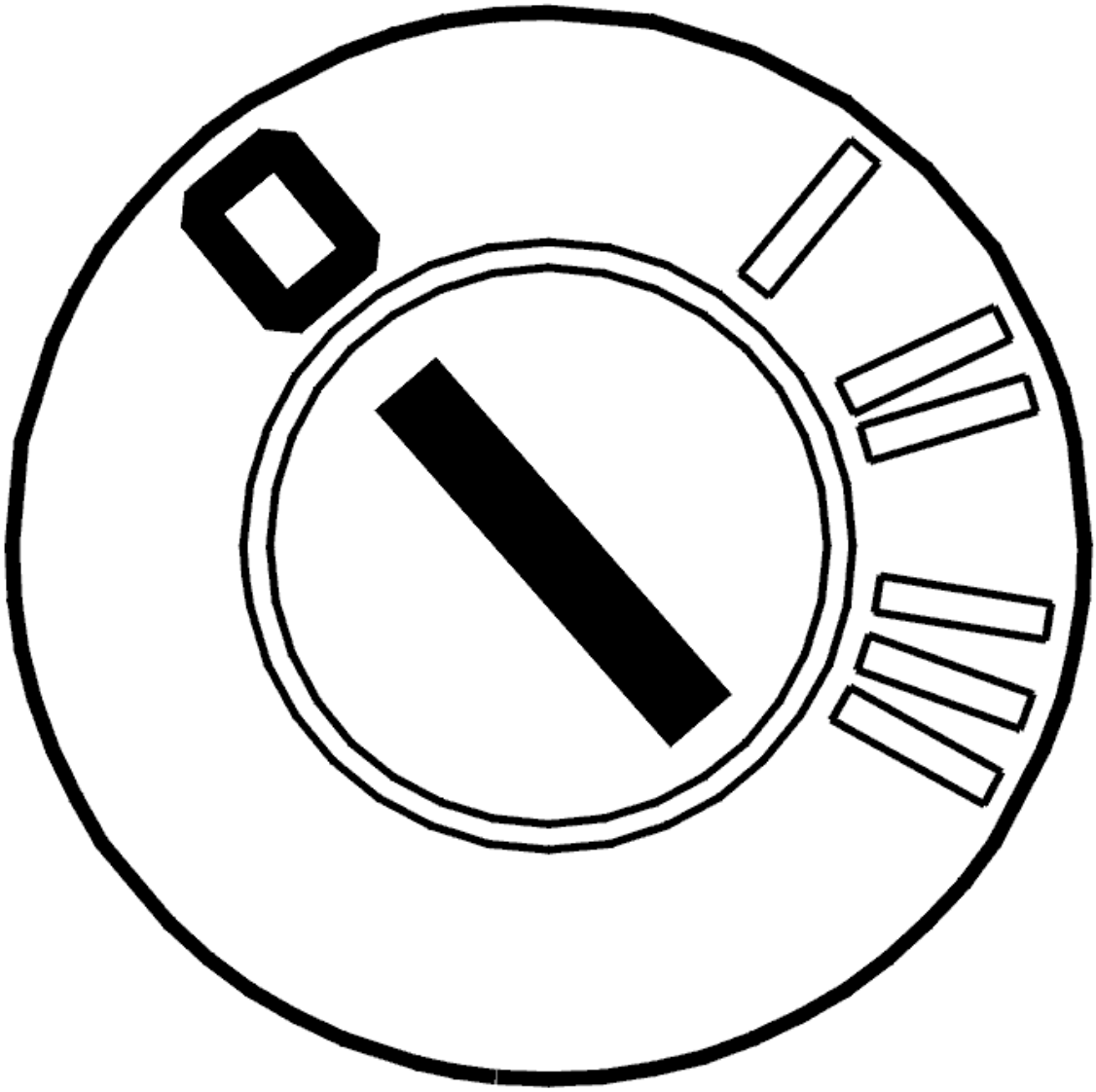


Fig. 195: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

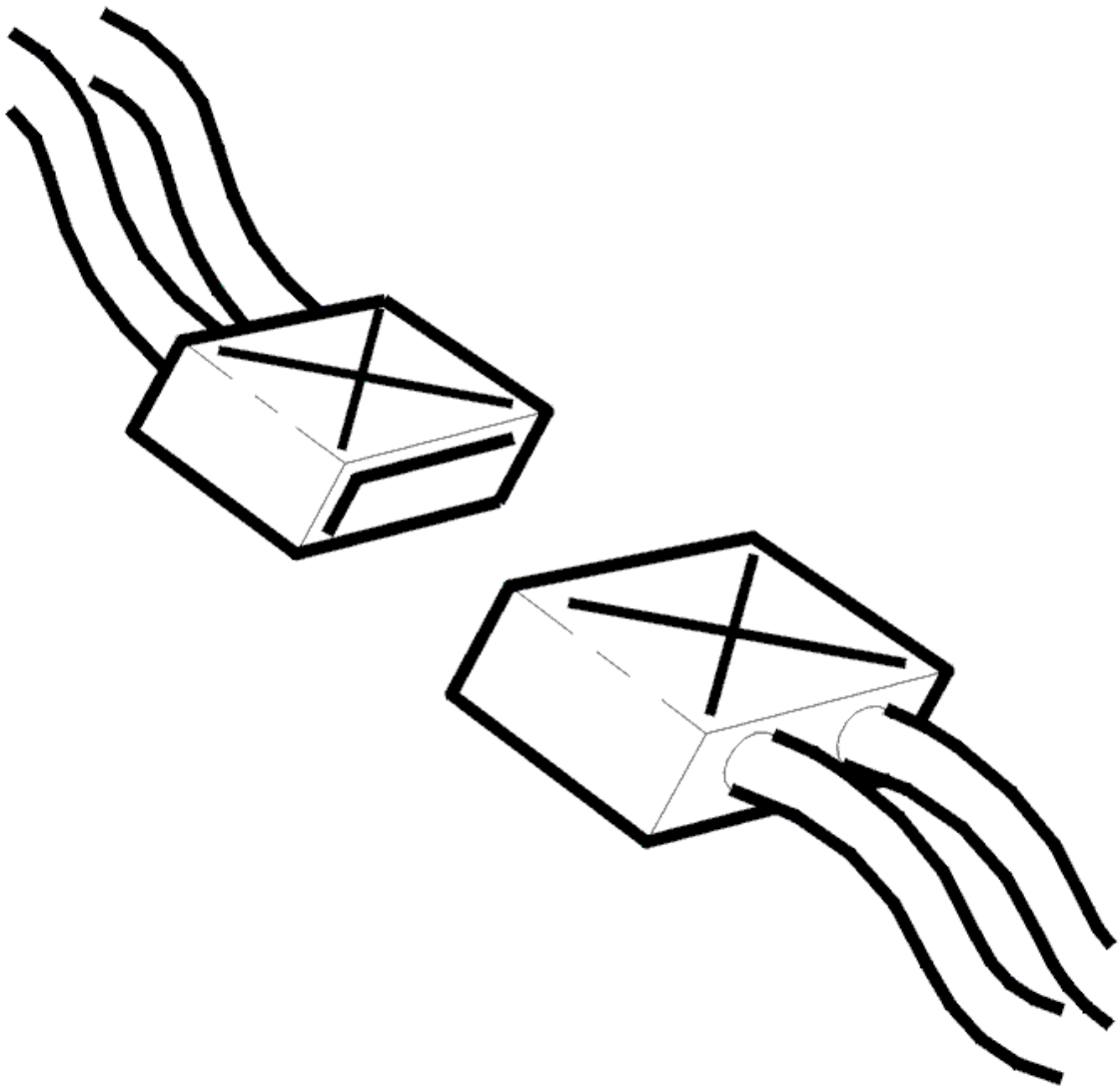


Fig. 196: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

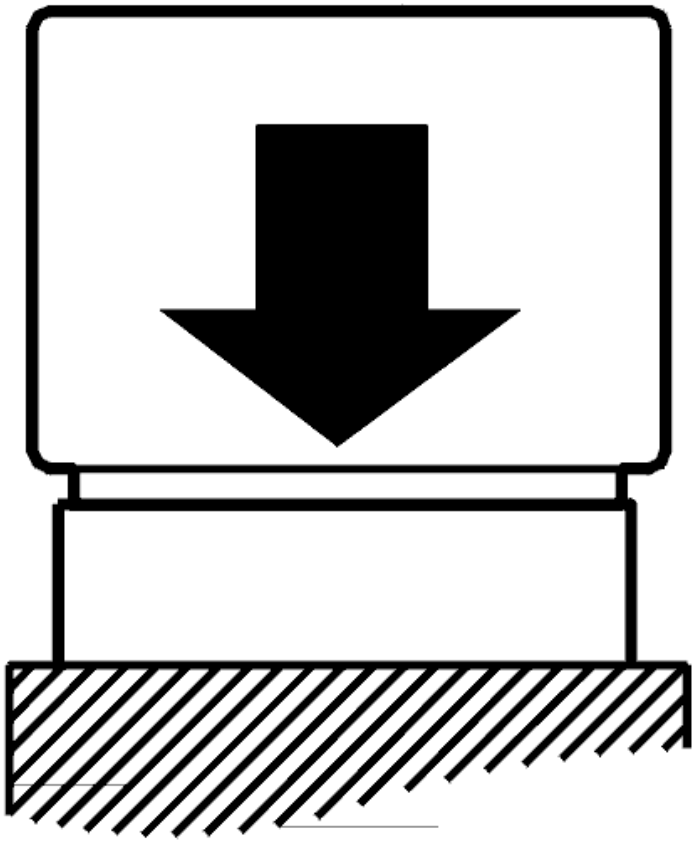


Fig. 197: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector D disconnected.

Check the transmission control module (TCM) by measuring the resistance between terminals #A51 (#A51) and #B9 (#A69). The resistance must be approximately 9 kohms.

NOTE: When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

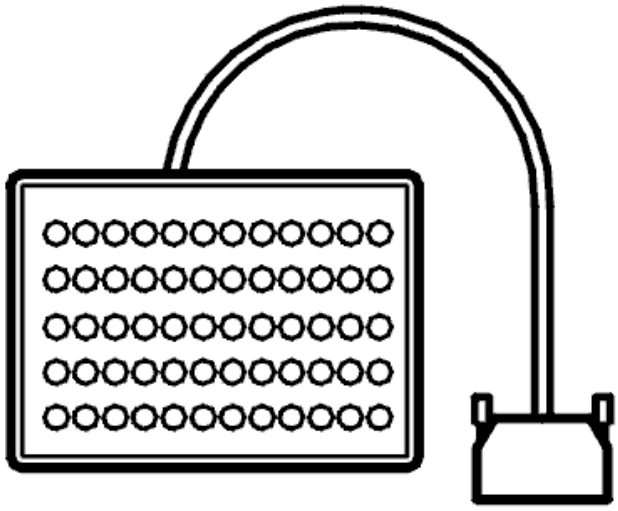


Fig. 198: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

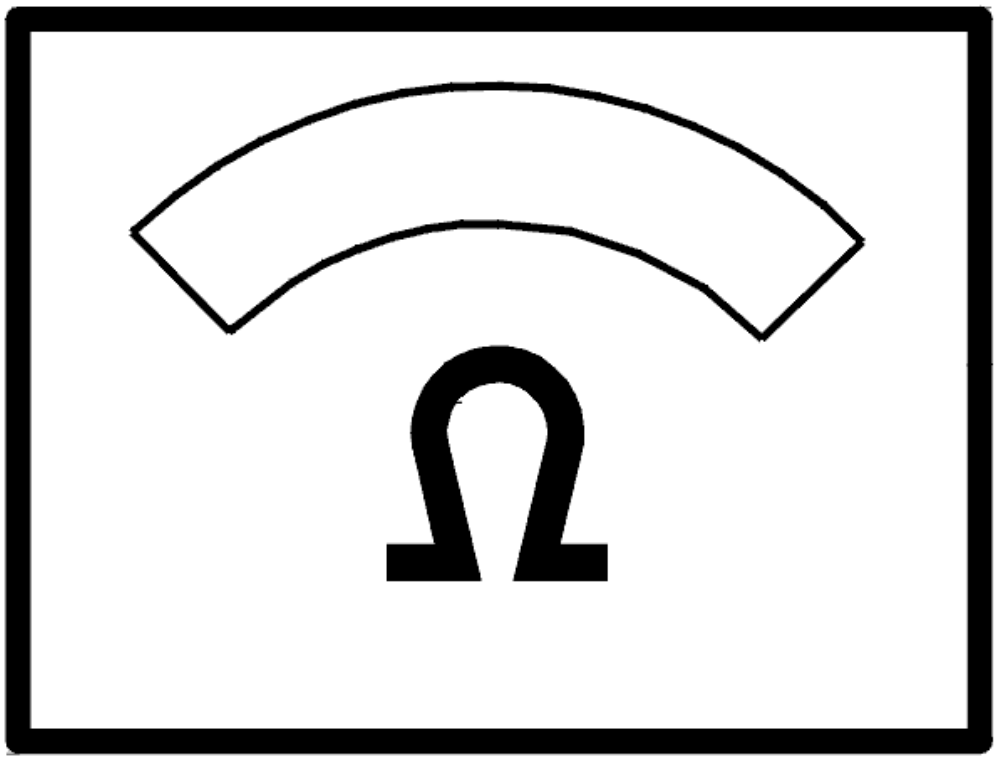


Fig. 199: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

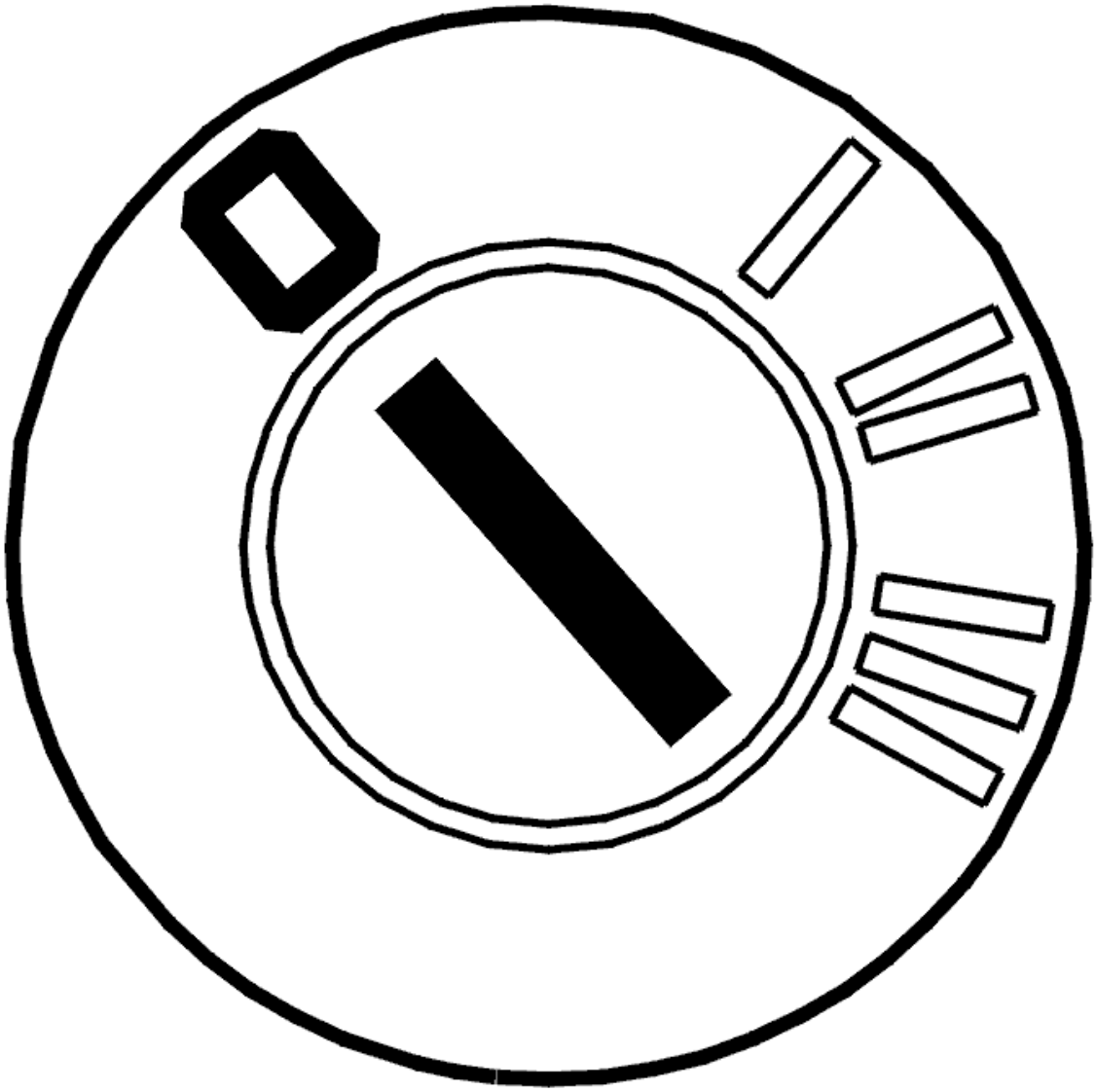


Fig. 200: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

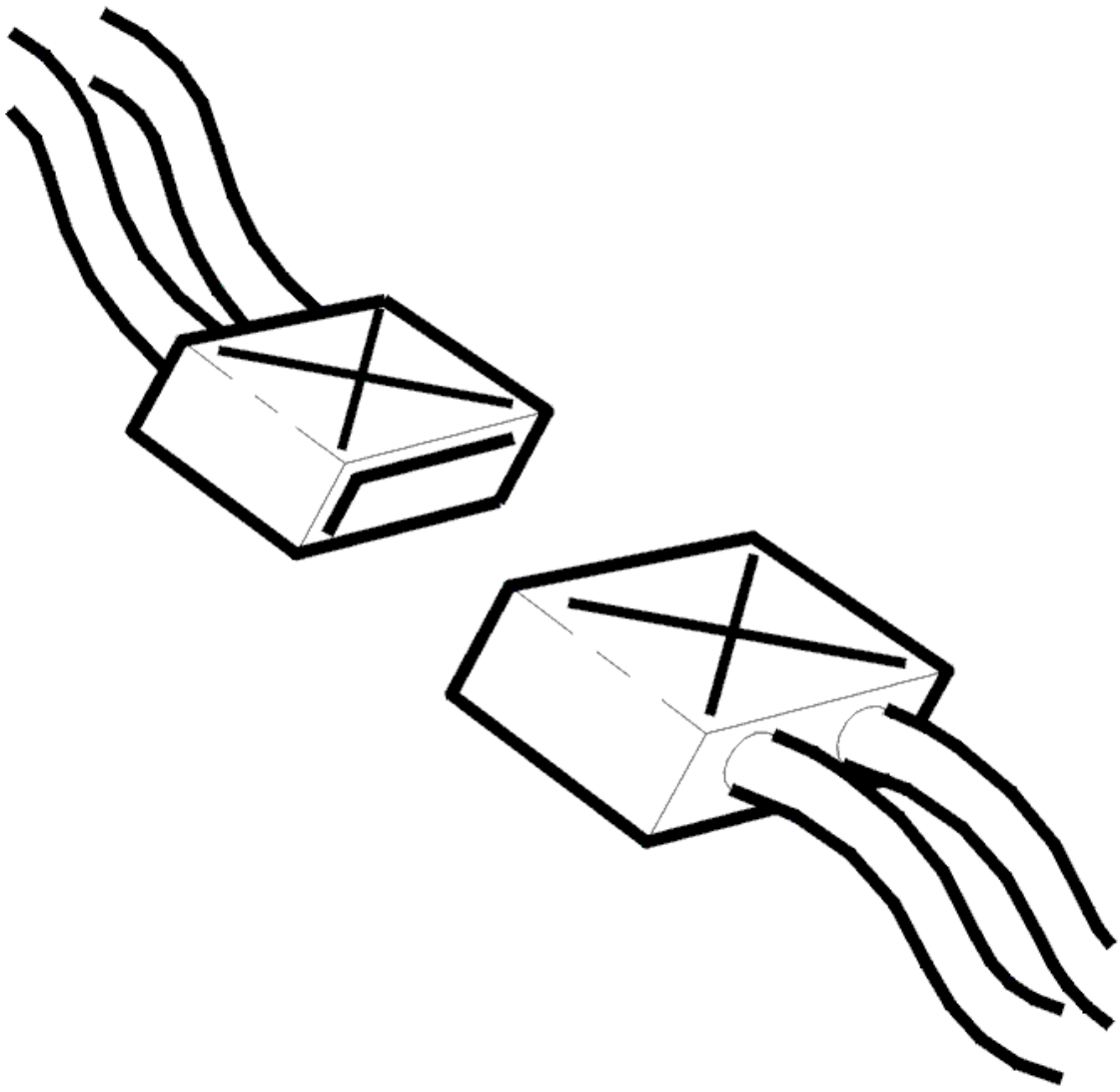


Fig. 201: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the wiring between transmission connector terminal #D1 and solenoid SLU terminal #1. Check the wiring between transmission connector terminal #D2 and solenoid SLU terminal #2. Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Check the solenoid SLU by measuring the resistance between solenoid connector terminals #1 and #2. The resistance should be 5-5.6 ohms at 20°C.

Replace the transmission control system if the resistance is incorrect.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open and replace the transmission control system, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

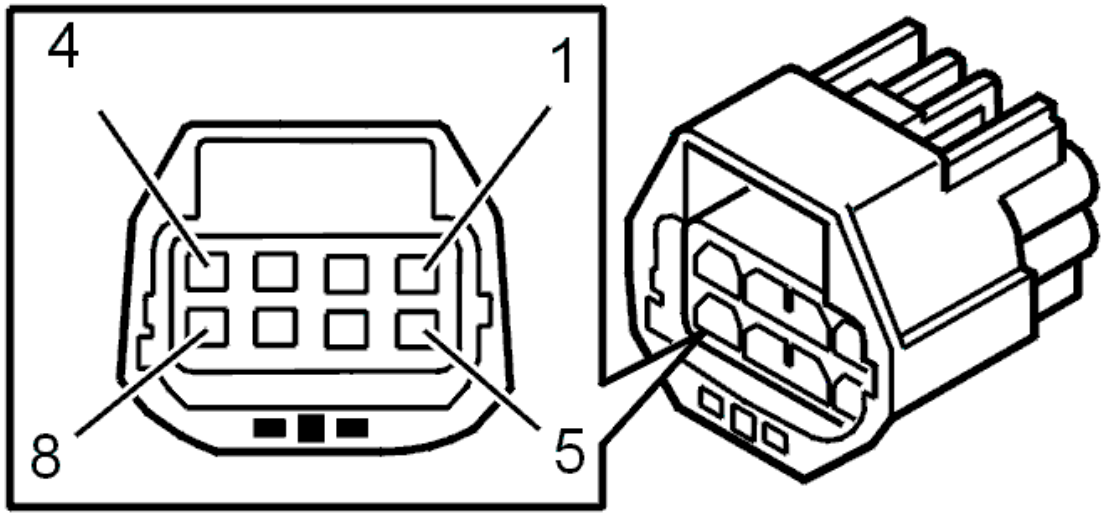


Fig. 202: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

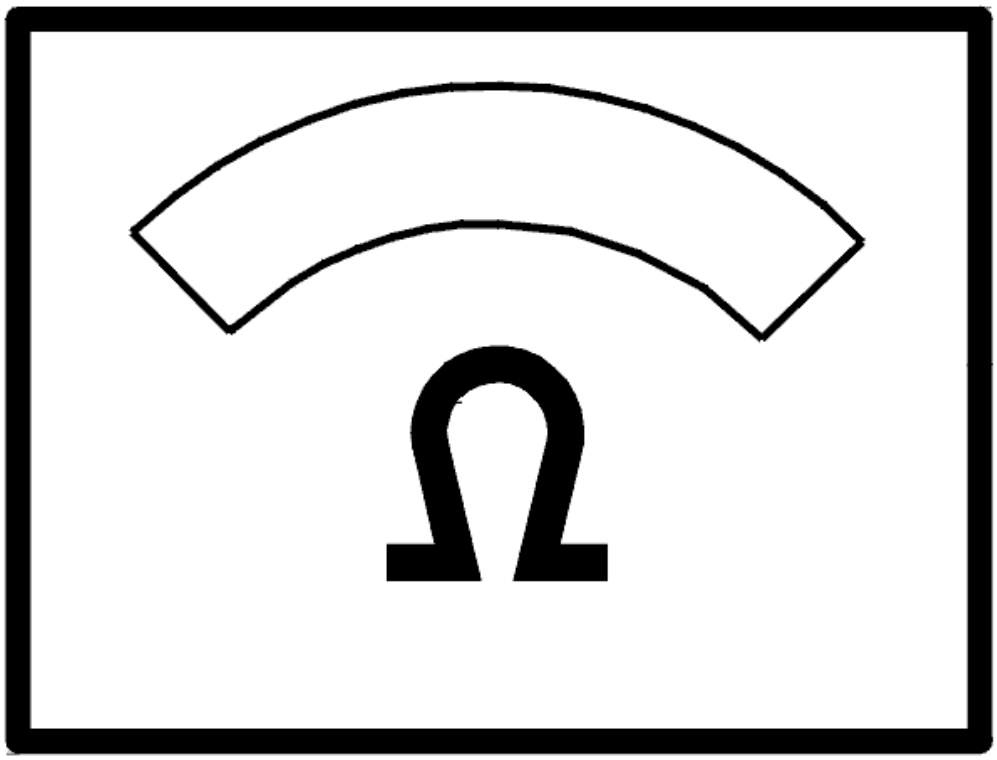


Fig. 203: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

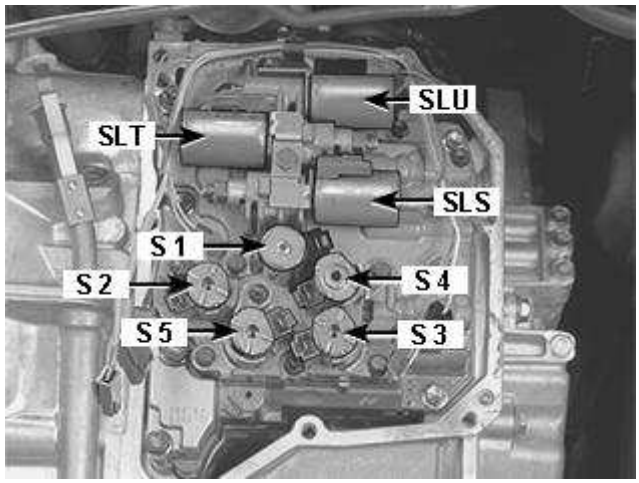


Fig. 204: Identifying S1-S5, SLT, SLU And SLS Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

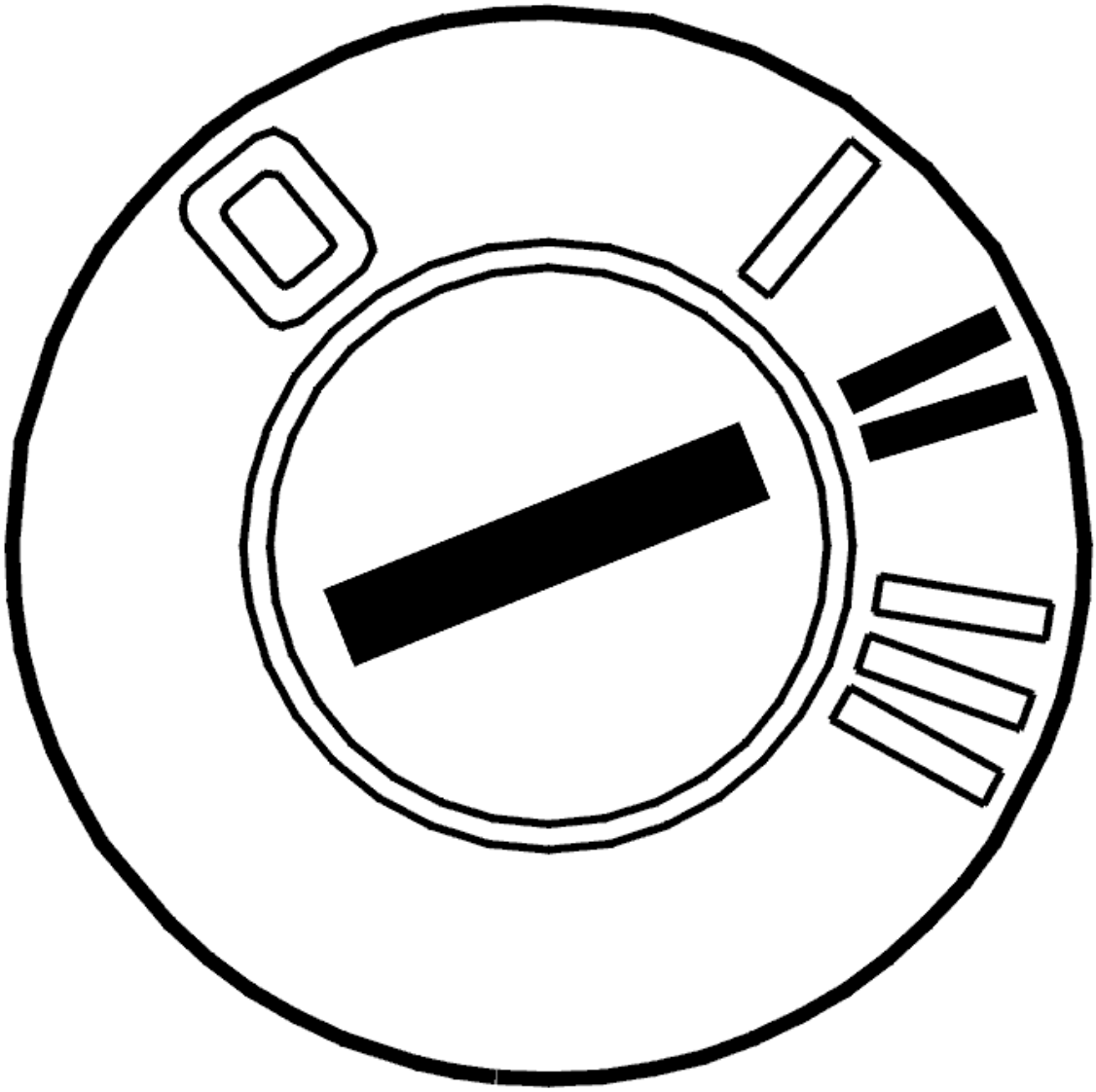


Fig. 205: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

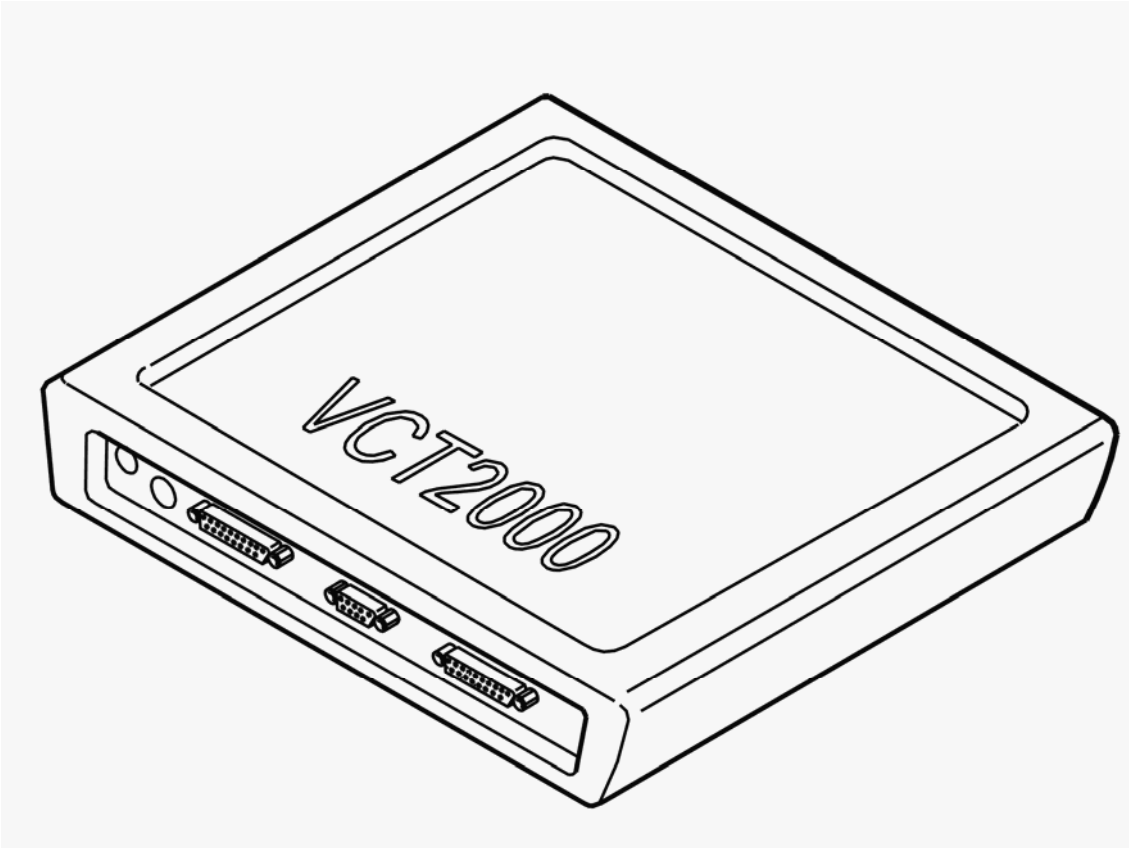


Fig. 206: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

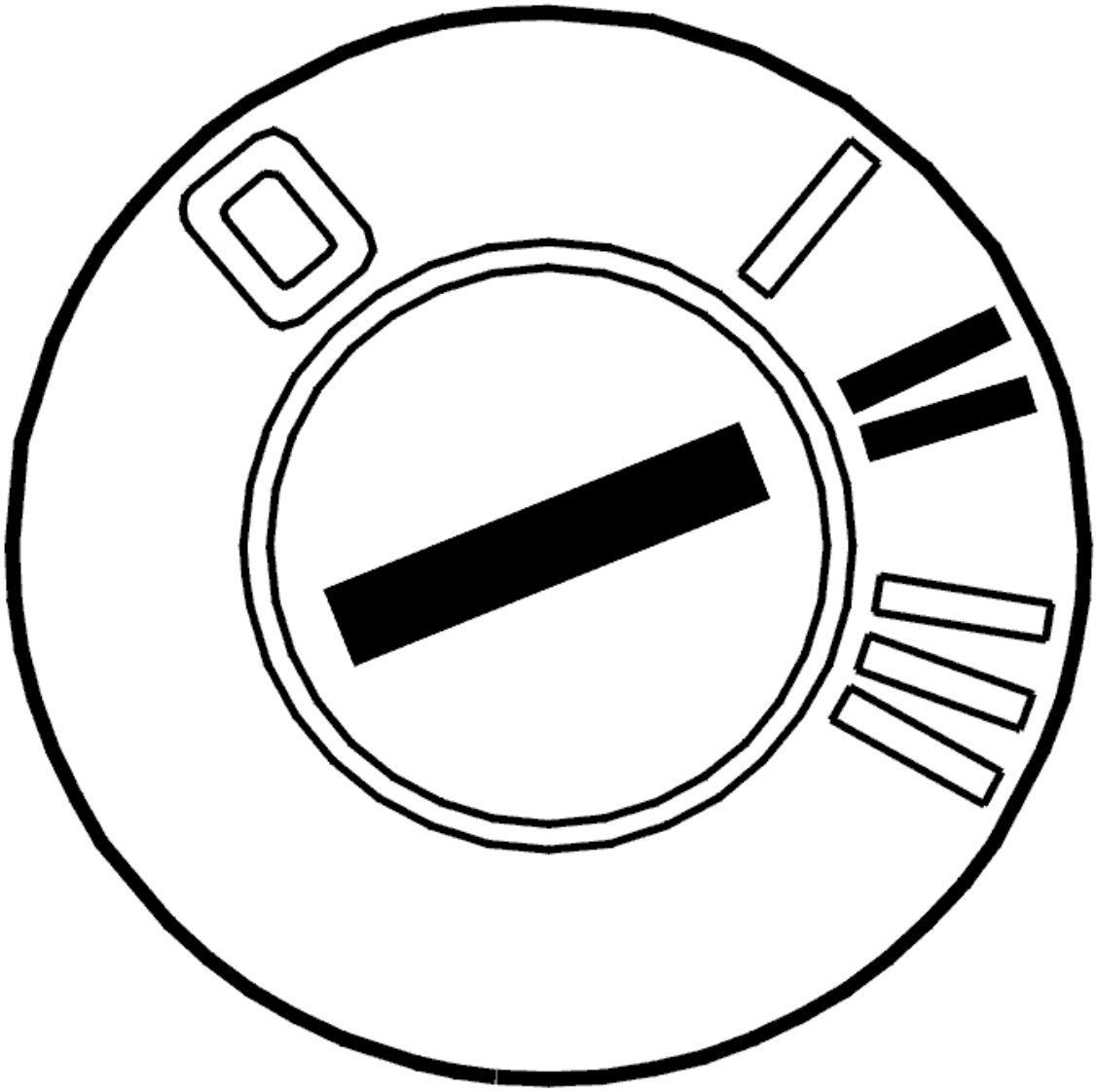


Fig. 207: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLU.

  Read off the current through the solenoid SLU circuit.

  The current should oscillate between 0 and 1000 mA.

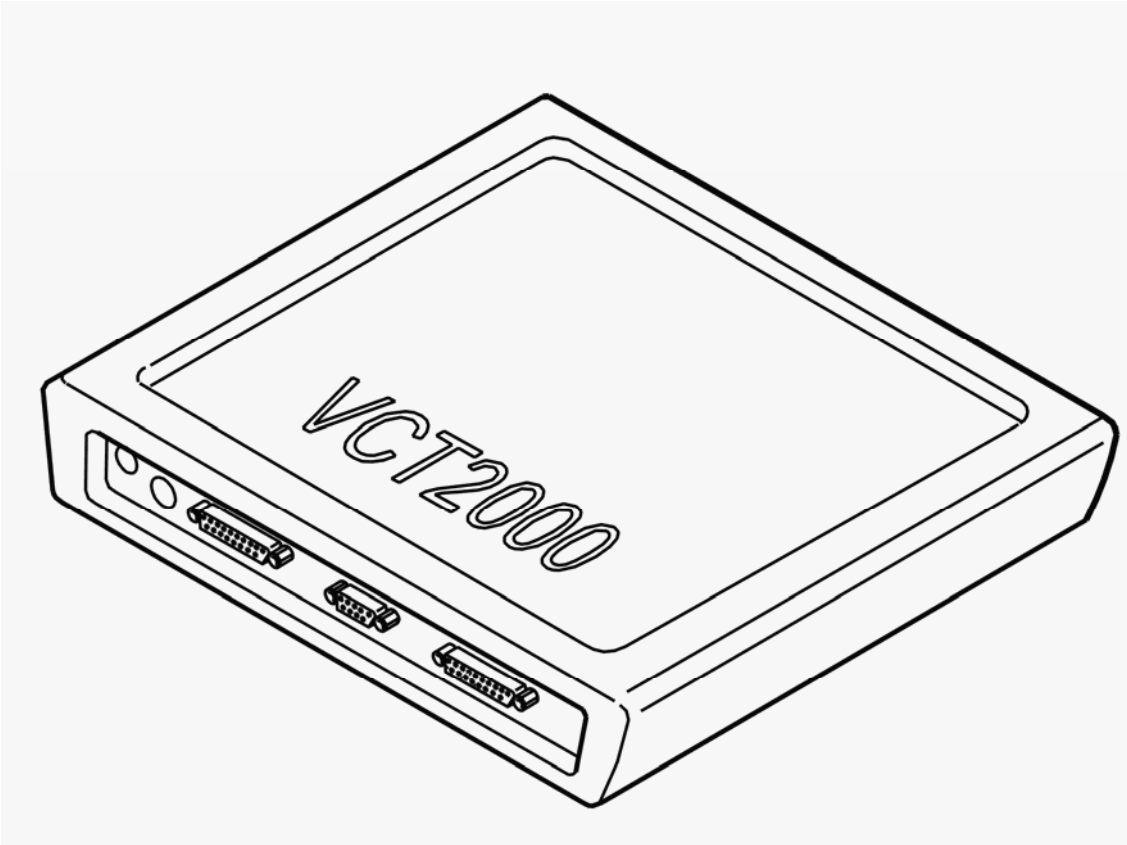


Fig. 208: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0112: LINE PRESSURE SOLENOID SLS. SIGNAL TOO HIGH. INTERMITTENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

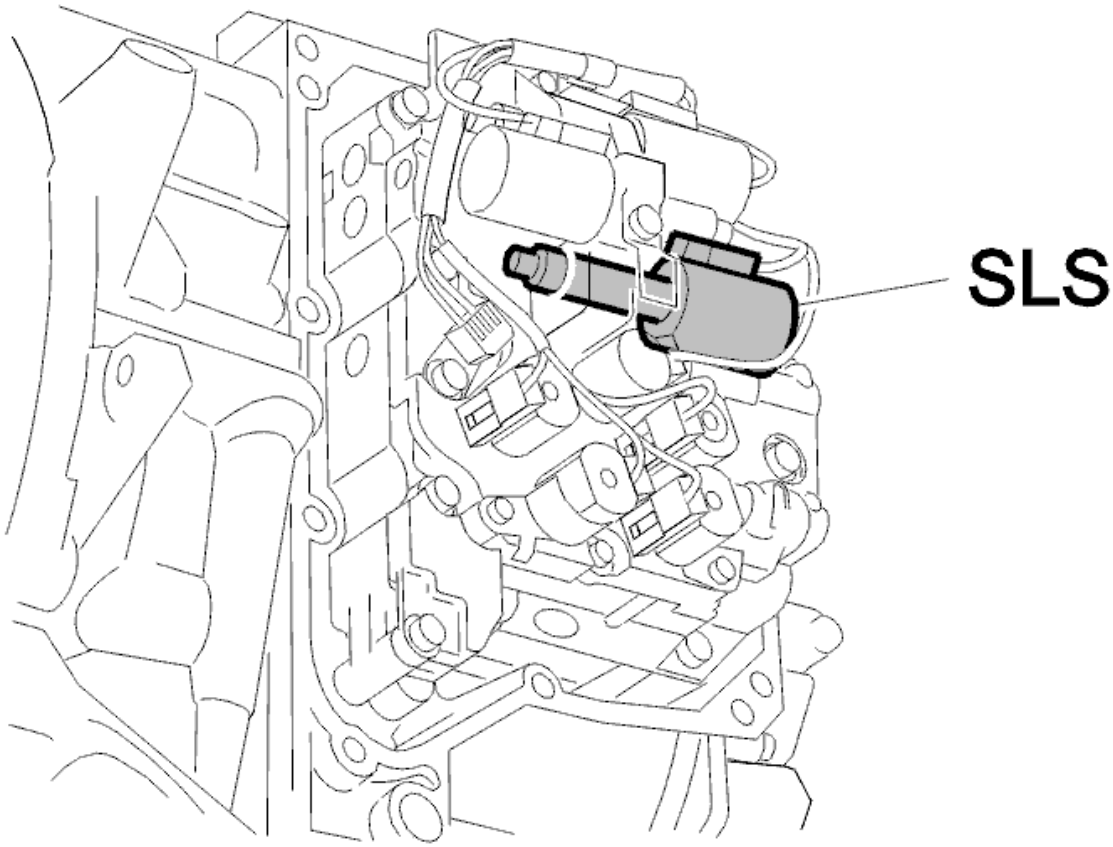


Fig. 209: Identifying Line Pressure Solenoid SLS
Courtesy of VOLVO CARS CORPORATION

Line pressure solenoid SLS regulates the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-0112 is stored if the control module (TCM) registers a short-circuit to battery voltage in the circuit for solenoid SLS. This results in too high an amperage in the circuit. Solenoid SLS cannot then control the line pressure.

Substitute Value

- The transmission control module (TCM) Emergency mode III program is initiated.

Possible Source

- Short-circuit to supply voltage in the control signal wiring or signal wiring.
- Short-circuit between the control signal cable and the signal cable.

- Defective solenoid.

Fault symptom[s]

- General orange warning lamp lit.
- No shifting.
- No lock-up function.

HINT: No shifting because the control module prevents activation of the solenoids.

CAUTION: There is a danger that this fault will cause line pressure in the transmission to be too low. This will result in a high level of wear.

SIGNAL TOO HIGH. INTERMITTENT FAULT

INTERMITTENT FAULT

Check the wiring between transmission control module (TCM) terminal #A49 (#A49) and transmission connector terminal #D5. Check the wiring between control module terminal #B7 (#A67) and transmission connector terminal #D6. Check for an intermittent short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

HINT: Check solenoid SLS. Measure the resistance between terminals #D5 and #D6 on transmission connector D. The resistance should be 5-5.6 ohms at 20°C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

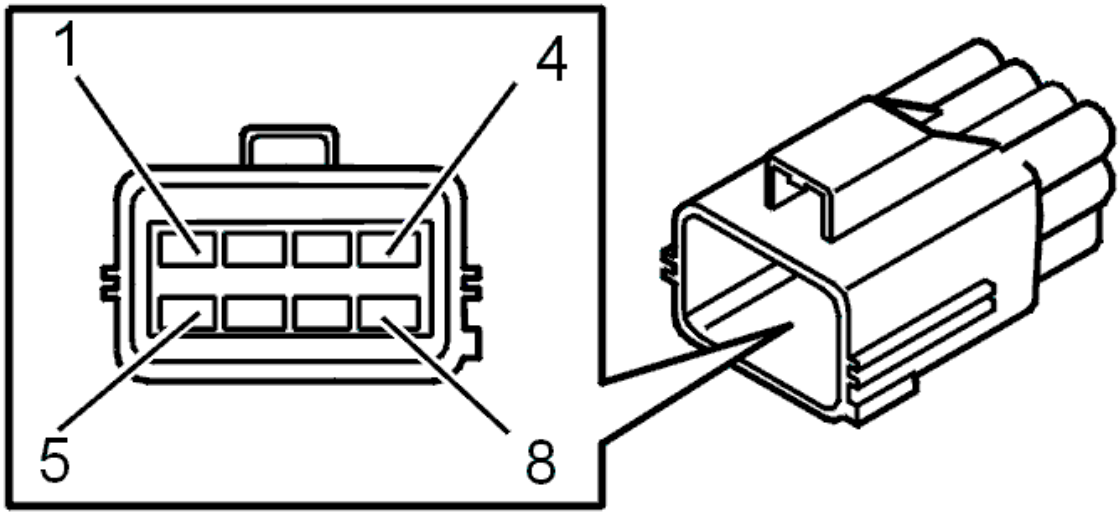


Fig. 210: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

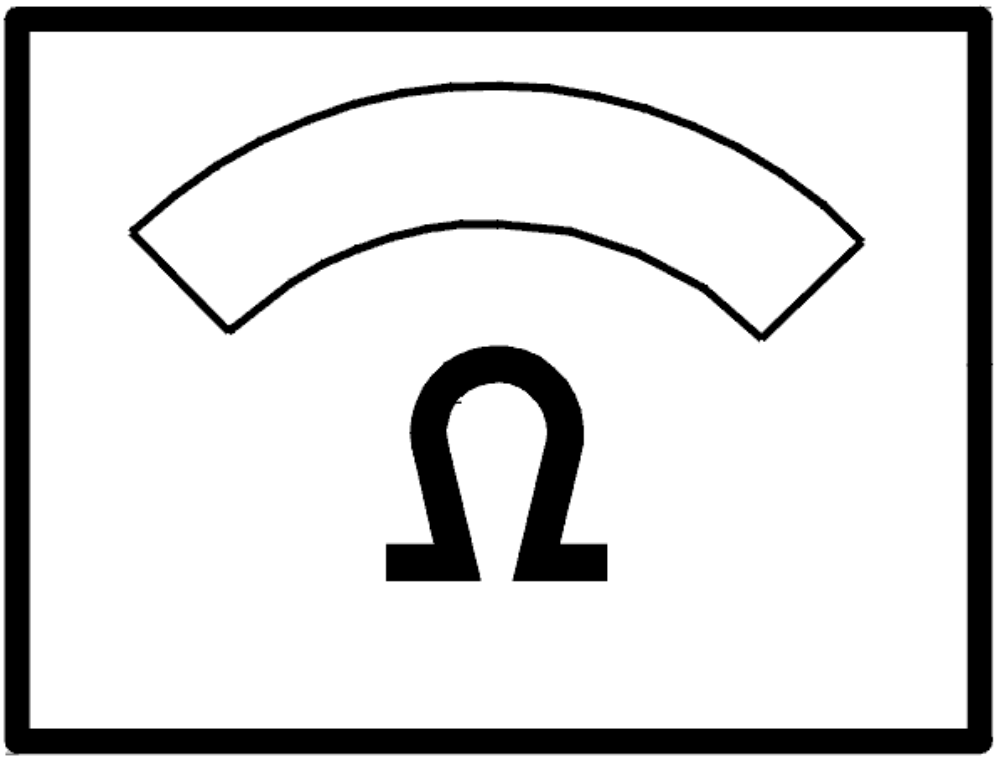


Fig. 211: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

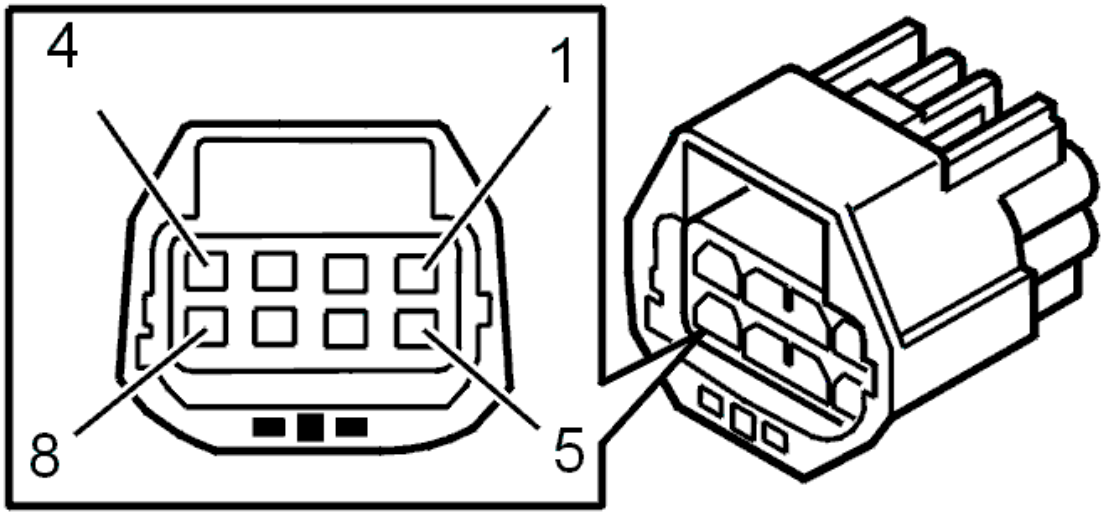


Fig. 212: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0112: LINE PRESSURE SOLENOID SLS. SIGNAL TOO HIGH. PERMANENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL TOO HIGH. PERMANENT FAULT

CHECKS

CHECKING LINE PRESSURE SOLENOID SLS

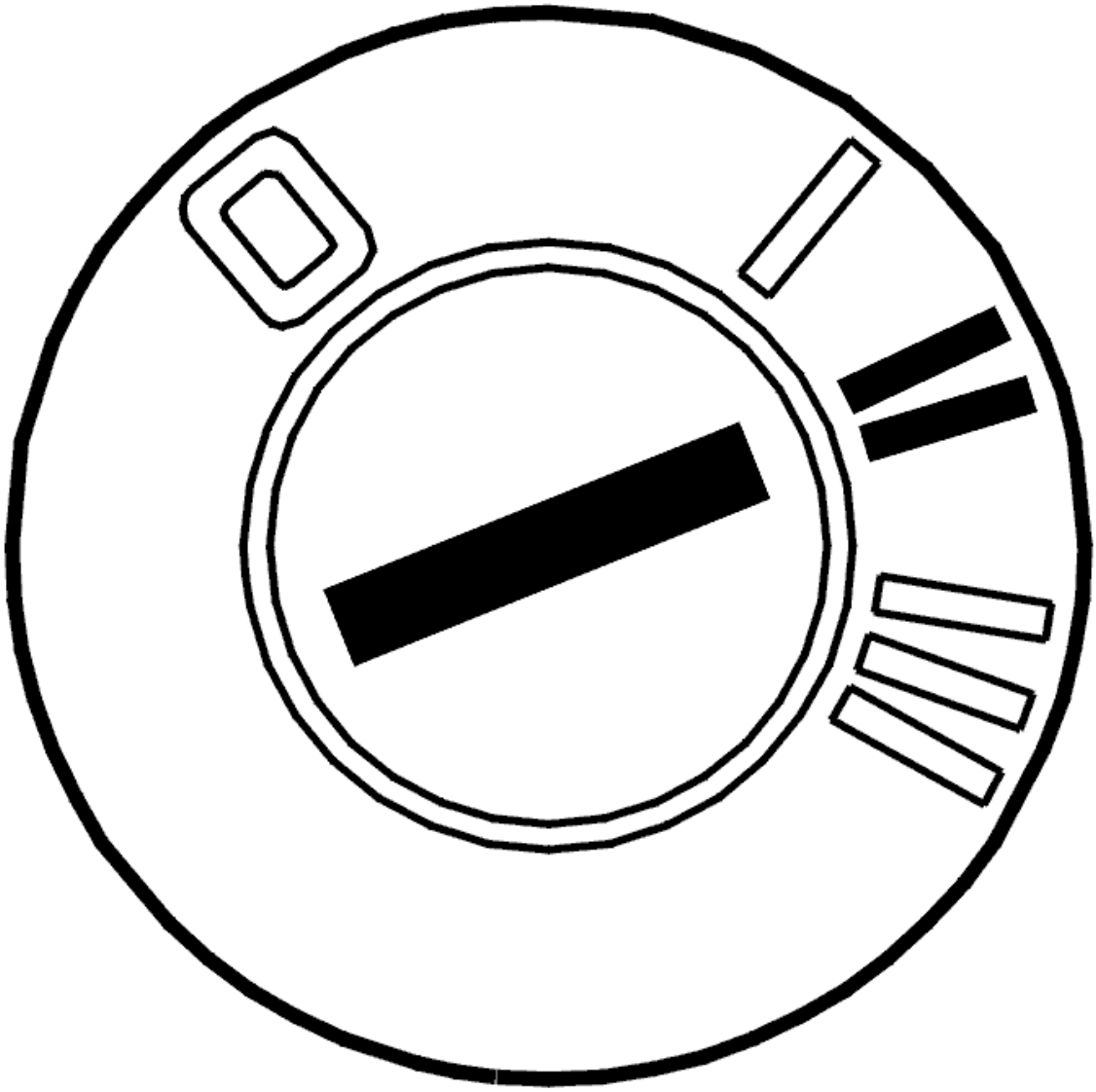


Fig. 213: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLS.

  Read off the current through the solenoid SLS circuit.

  The current should oscillate between 0 and 1000 mA.

  Other information:

  - To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
  - To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM),**

REPLACING

- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

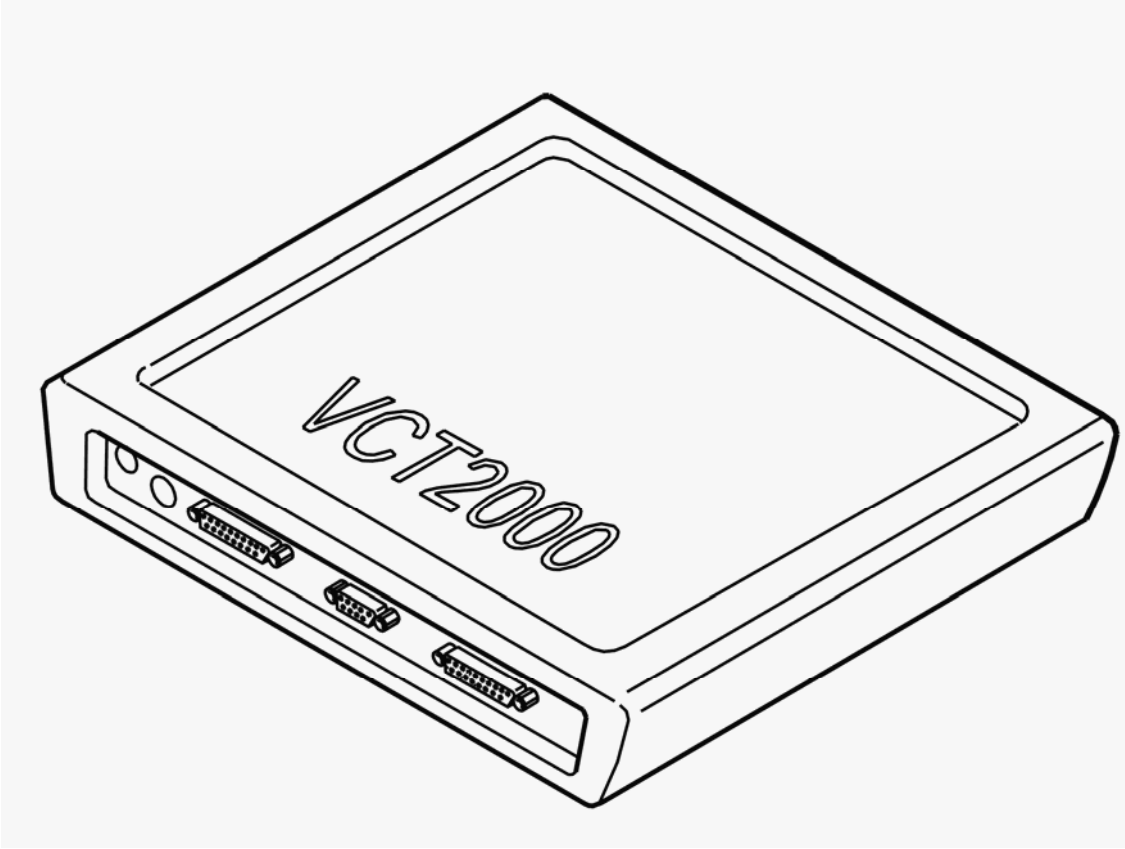


Fig. 214: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

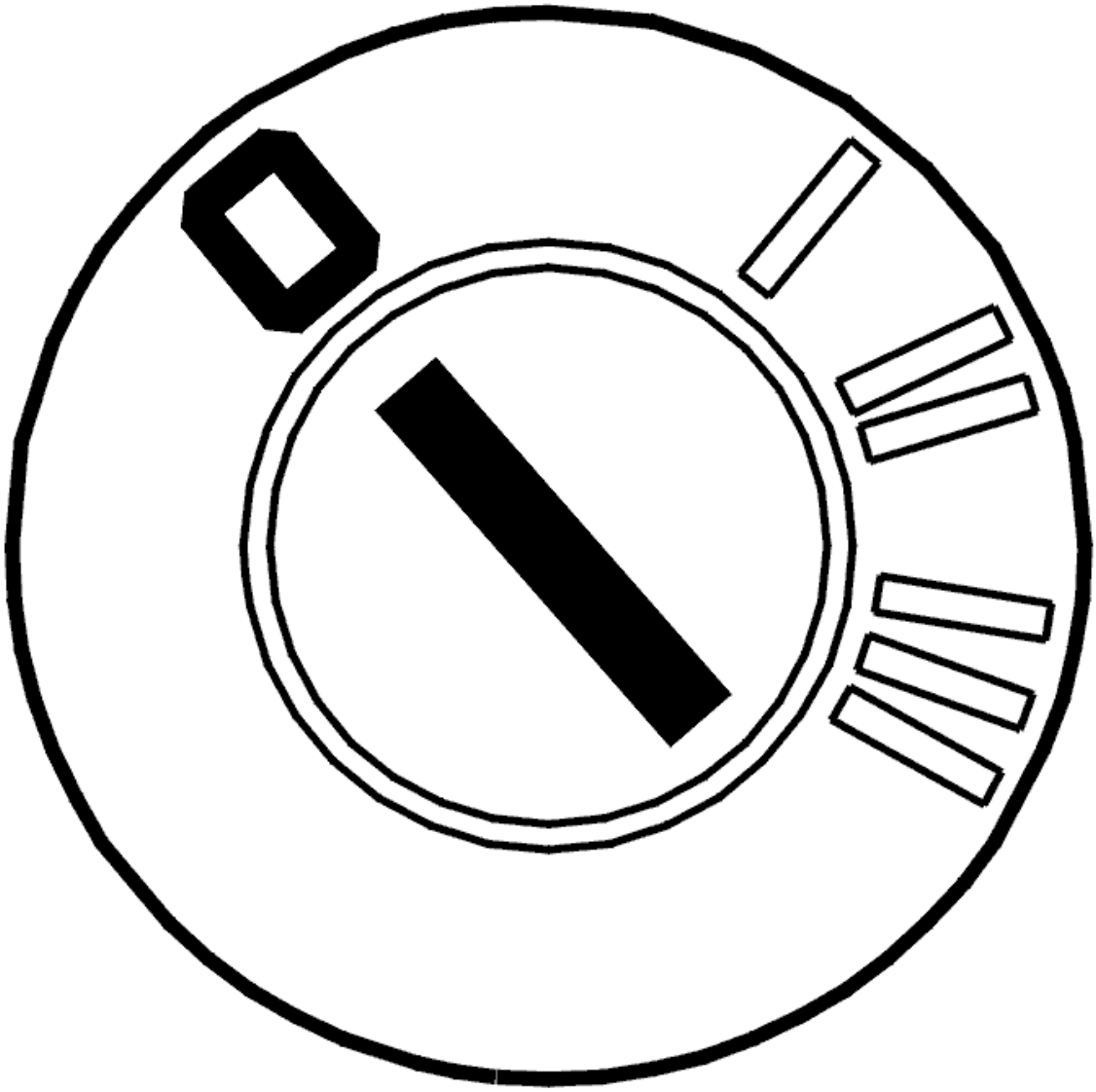


Fig. 215: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

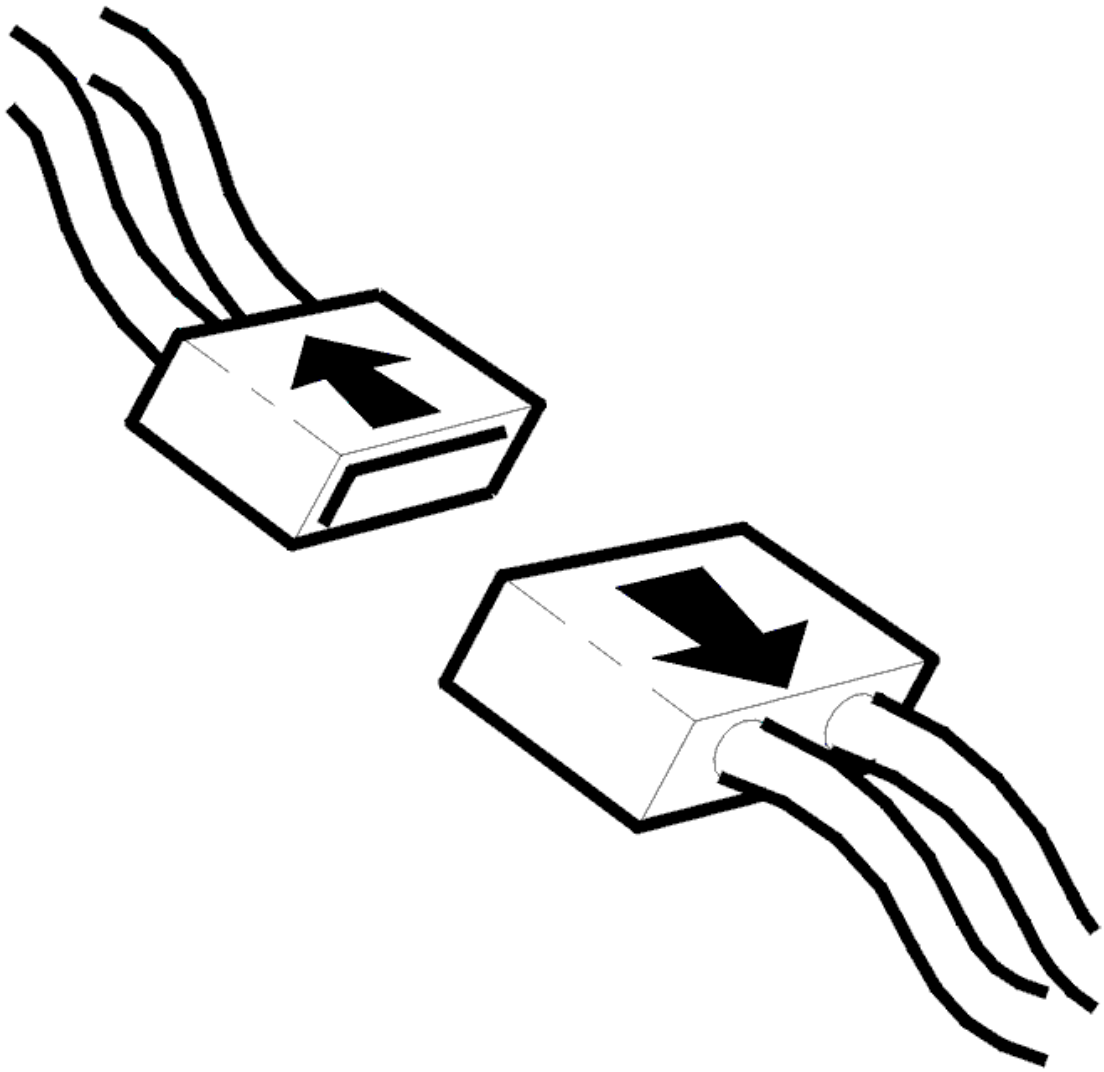


Fig. 216: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Disconnect transmission connector D.

Check the cable between control module terminal #A49 (#A49) and transmission connector terminal #D5 (control module side). Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Check the cable between control module terminal #B7 (#A67) and transmission connector terminal #D6 (control module side). Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Check the wiring in the circuit for short-circuits to other cables in the circuit.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

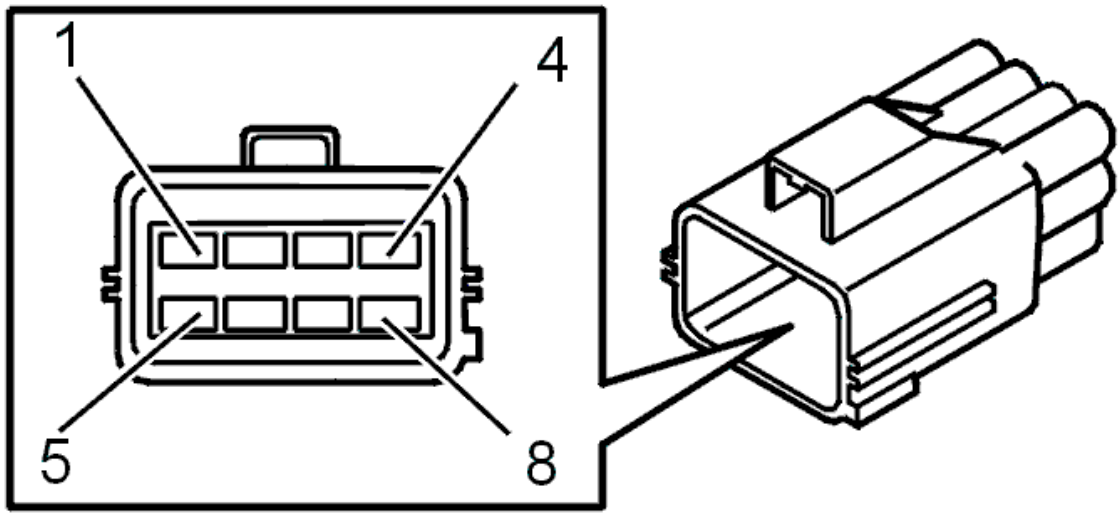


Fig. 217: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

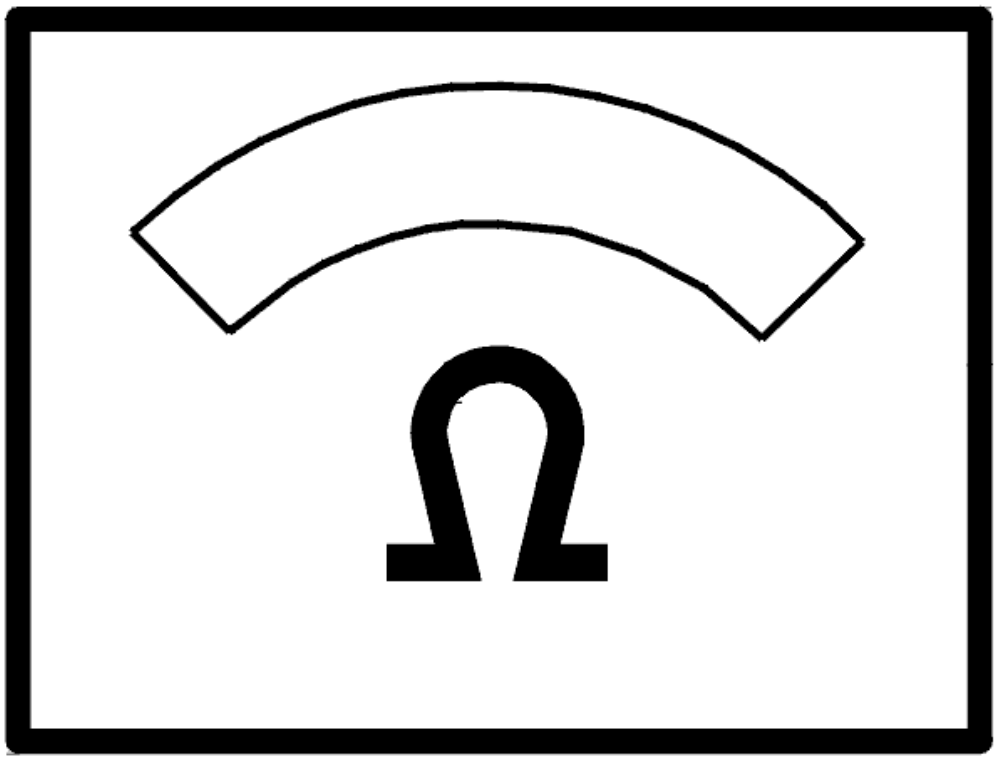


Fig. 218: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault found in the wiring?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

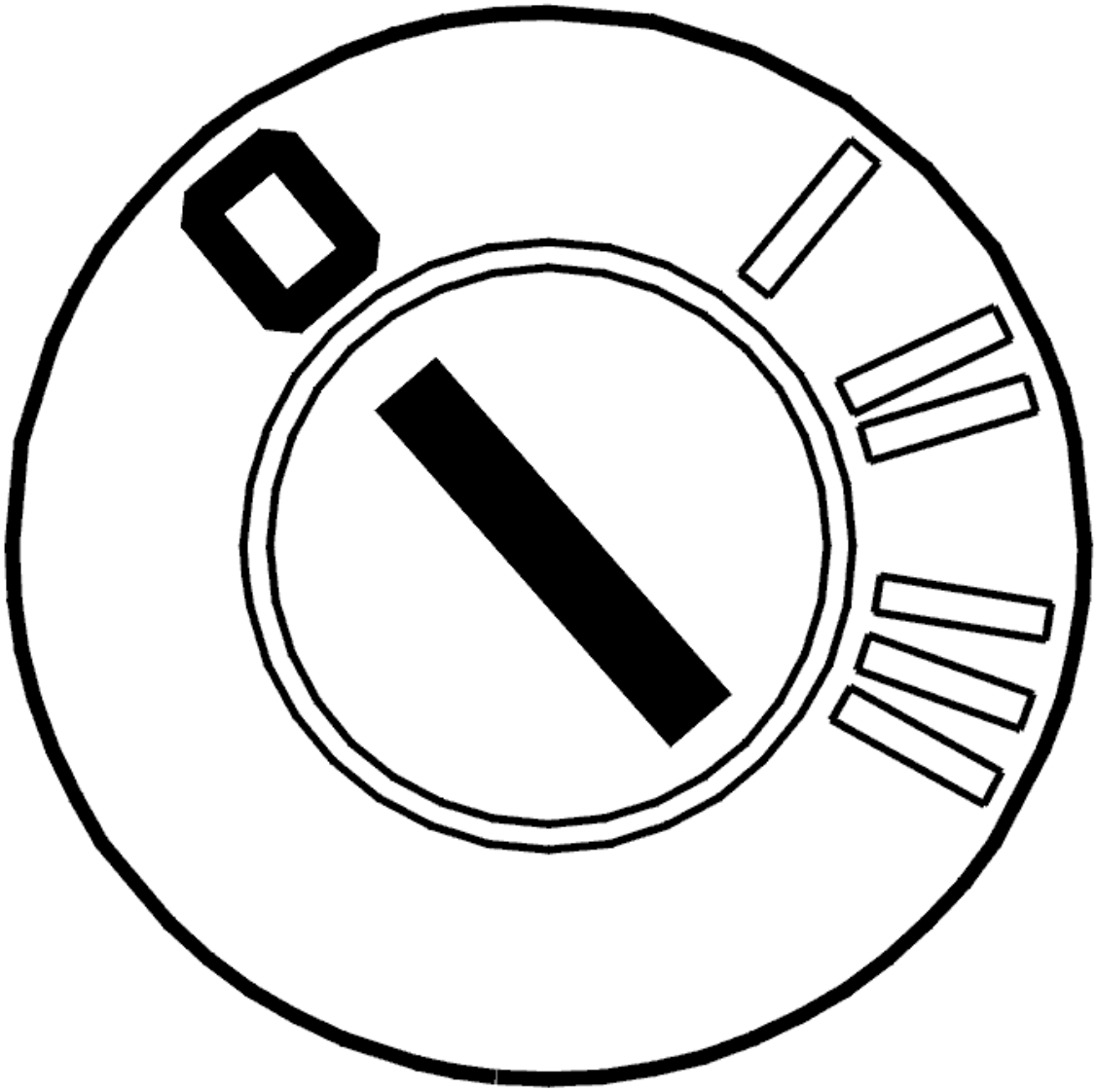


Fig. 219: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

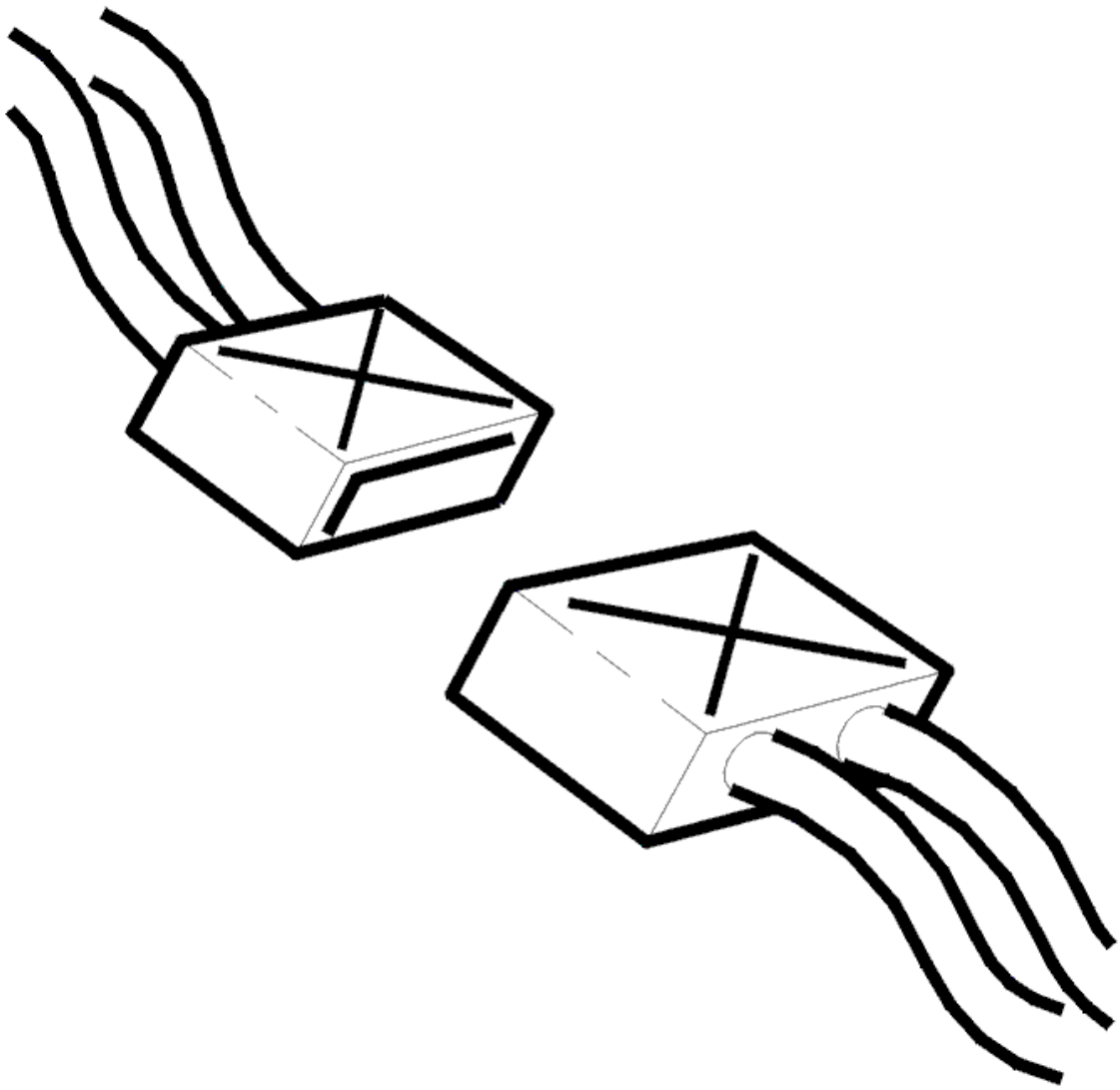


Fig. 220: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the wiring between transmission connector terminal #D5 (transmission side) and solenoid SLS terminal #1. Check the wiring between transmission connector terminal #D6 (transmission side) and solenoid SLS terminal #2. Check for a short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

Also check against the other cables in the circuit.

Check solenoid SLS by measuring the resistance between terminals #1 and #2 on the connector. The resistance must be 5-5.6 ohms (at 20°C). Replace the transmission control system if the resistance is incorrect.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open and replace the transmission control system, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

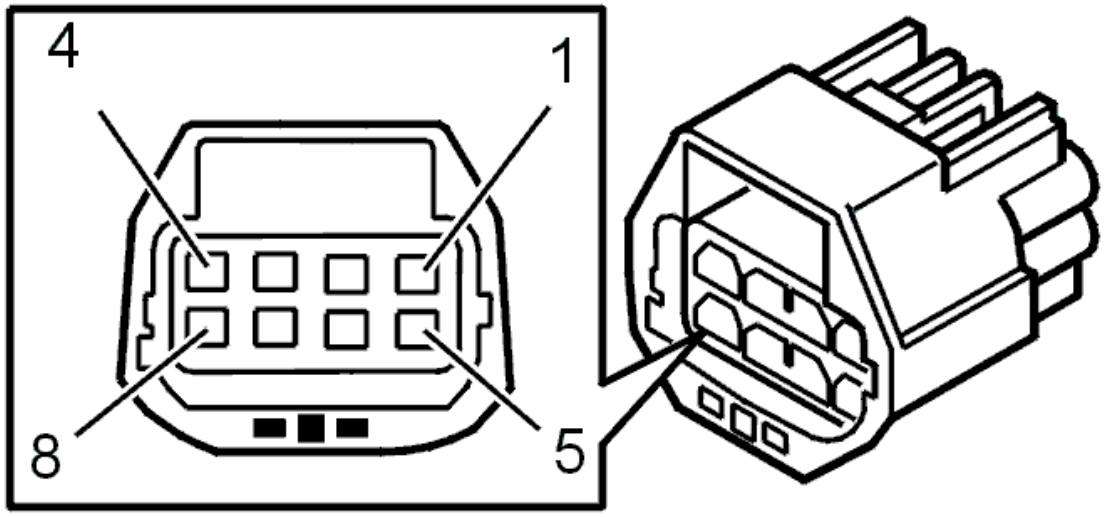


Fig. 221: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

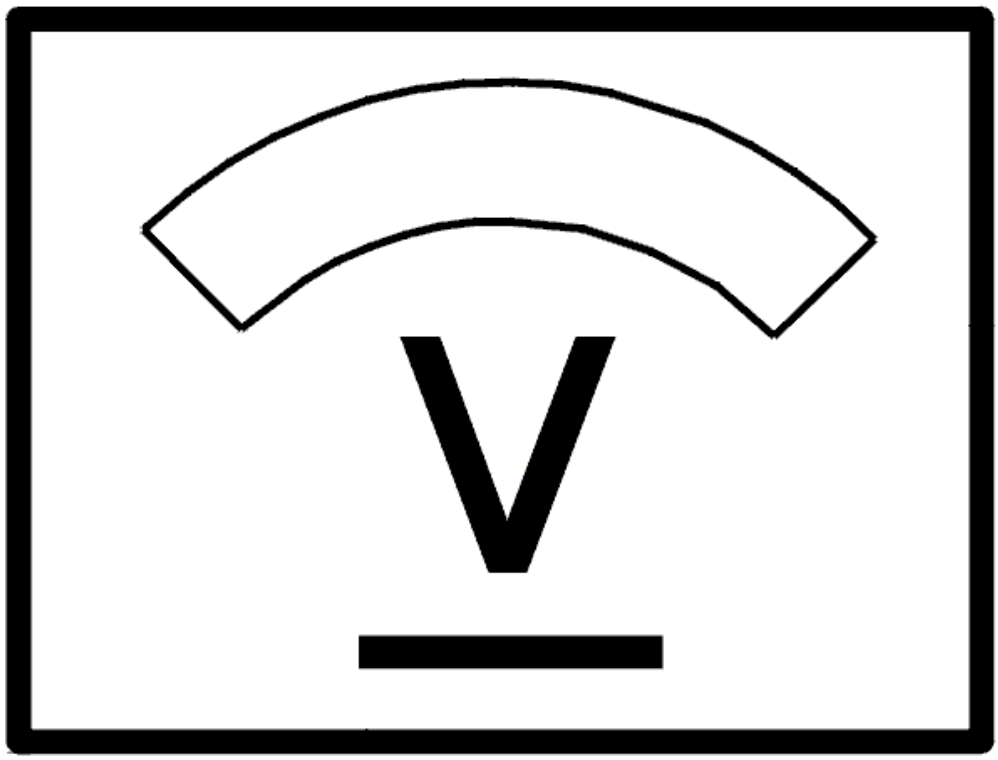


Fig. 222: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

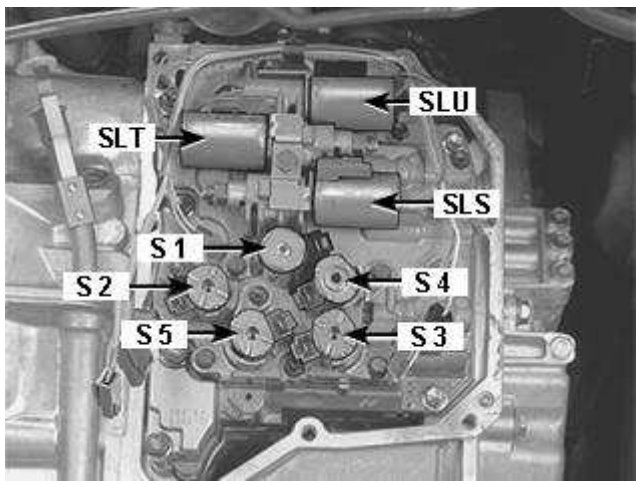


Fig. 223: Identifying S1-S5, SLT, SLU And SLS Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

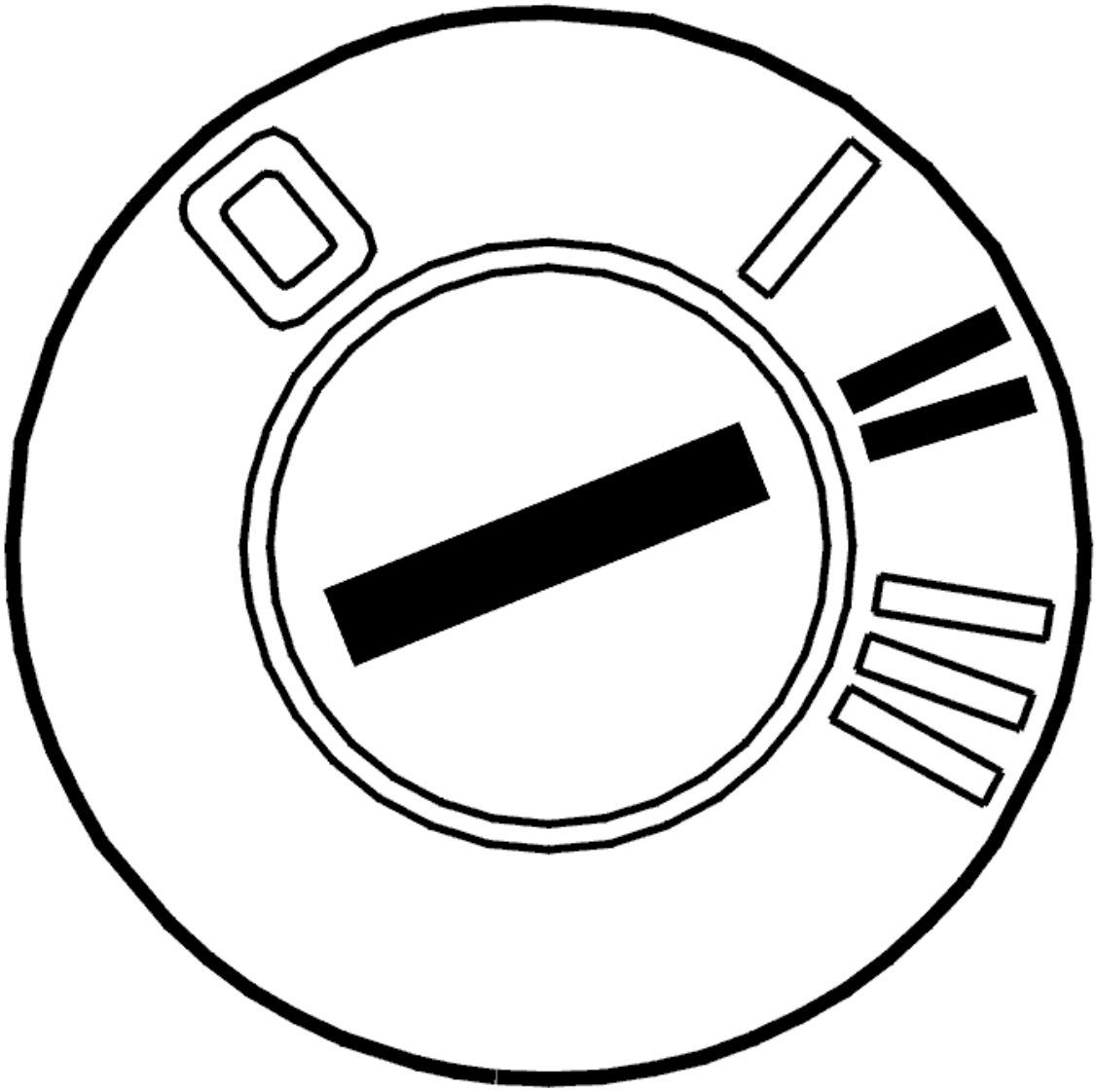


Fig. 224: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

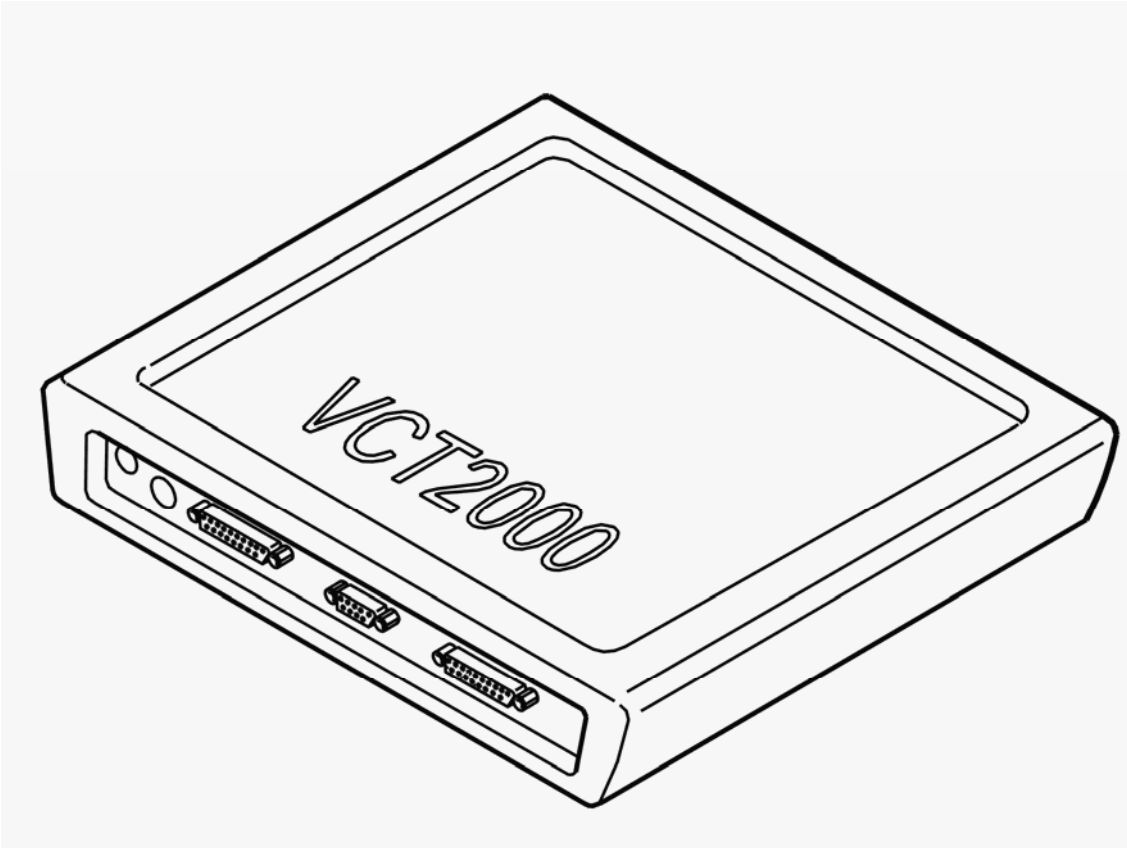


Fig. 225: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

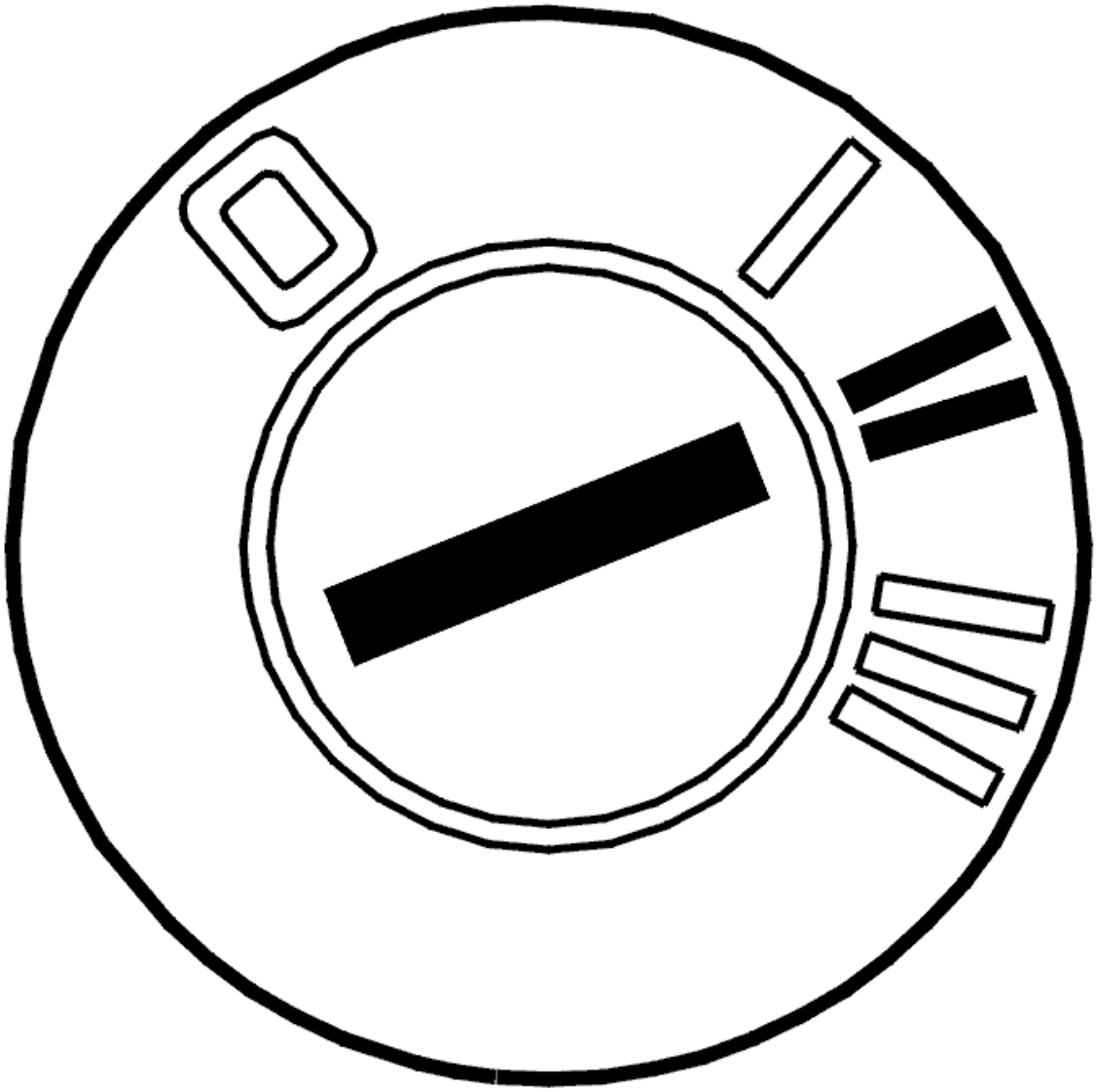


Fig. 226: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLU.

  Read off the current through the solenoid SLU circuit.

  The current should oscillate between 0 and 1000 mA.

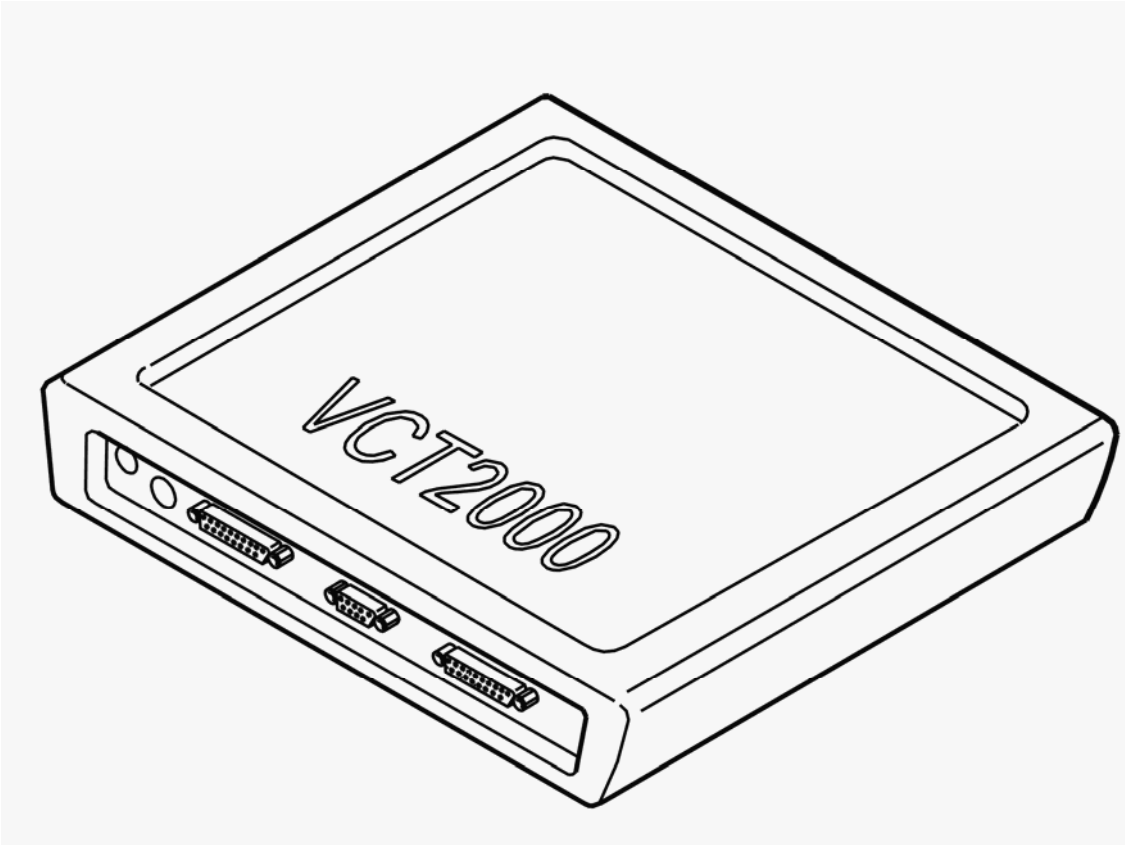


Fig. 227: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0113: LINE PRESSURE SOLENOID SLS. SIGNAL MISSING. INTERMITTENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

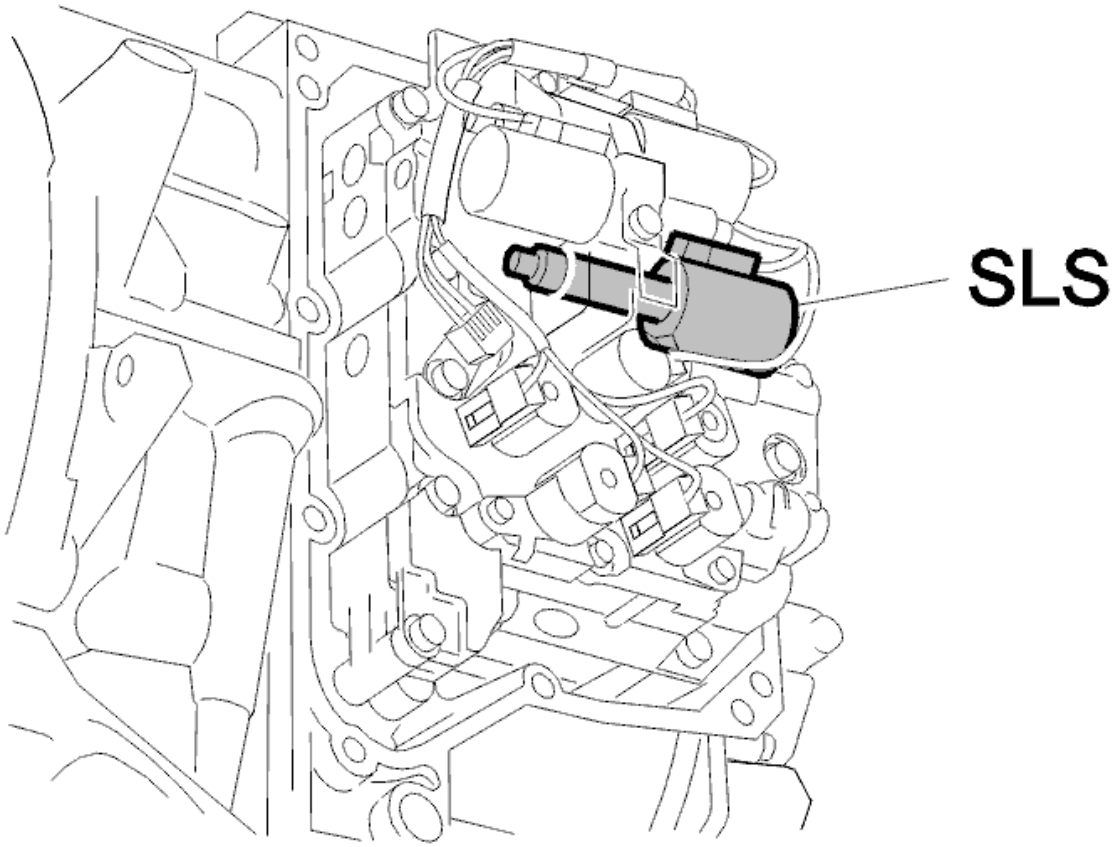


Fig. 228: Identifying Line Pressure Solenoid SLS
Courtesy of VOLVO CARS CORPORATION

Line pressure solenoid SLS regulates the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-113 is stored if the control module registers that there is an open-circuit in the circuit for solenoid SLS. Solenoid SLS cannot then control the line pressure.

Substitute Value

- The transmission control module (TCM) Emergency mode III program is initiated.

Possible Source

- Open-circuit in the control signal cable or the signal cable.
- Defective solenoid.
- Open-circuit in the power ground.

- Contact resistance in terminals.
- Defective control module.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No torque limiting request to the engine control module (ECM) when shifting.
- No line pressure solenoid SLS control. This results in constant maximum line pressure.

SIGNAL MISSING. INTERMITTENT FAULT

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the wiring between control module terminal #A49 (#A49) and transmission connector terminal #D5. Check the wiring between control module terminal #B7 (#A67) and transmission connector terminal #D6. Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

HINT: Check solenoid SLS. Measure the resistance between terminals #D5 and #D6 on transmission connector D. The resistance should be 5-6 ohms at 20°C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

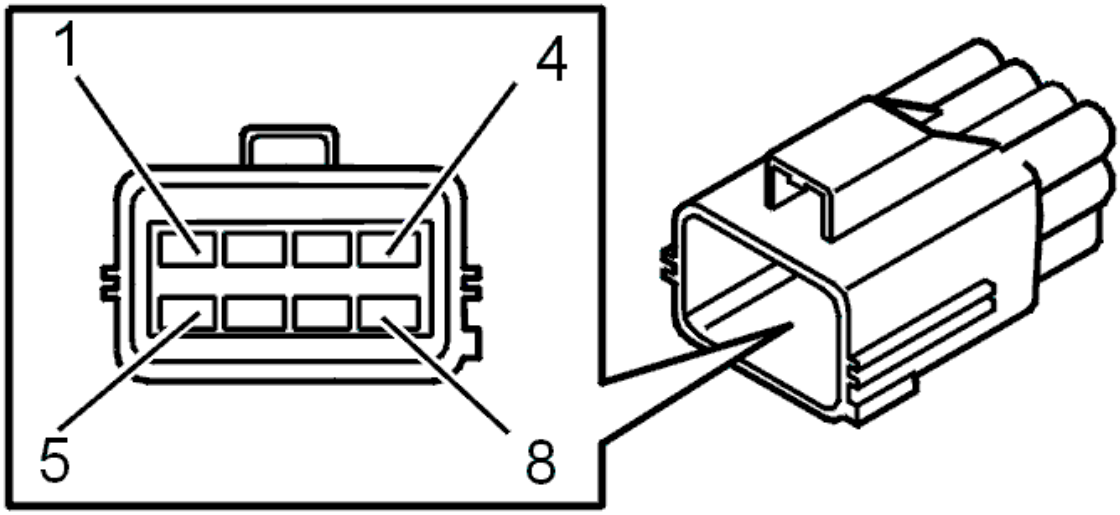


Fig. 229: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

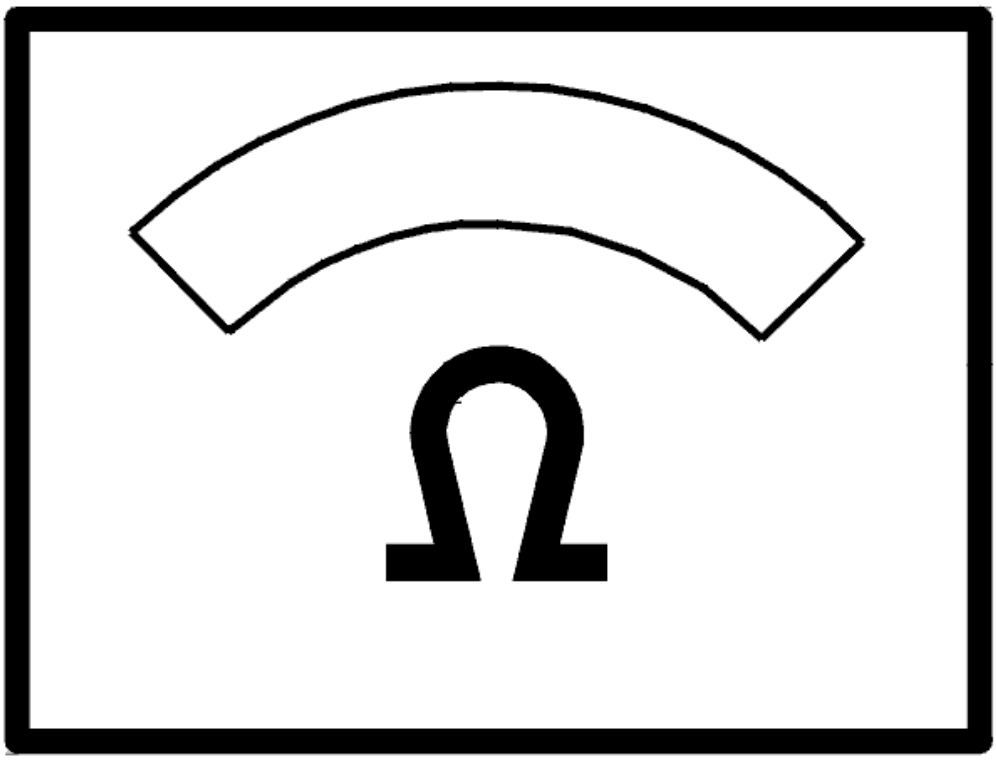


Fig. 230: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

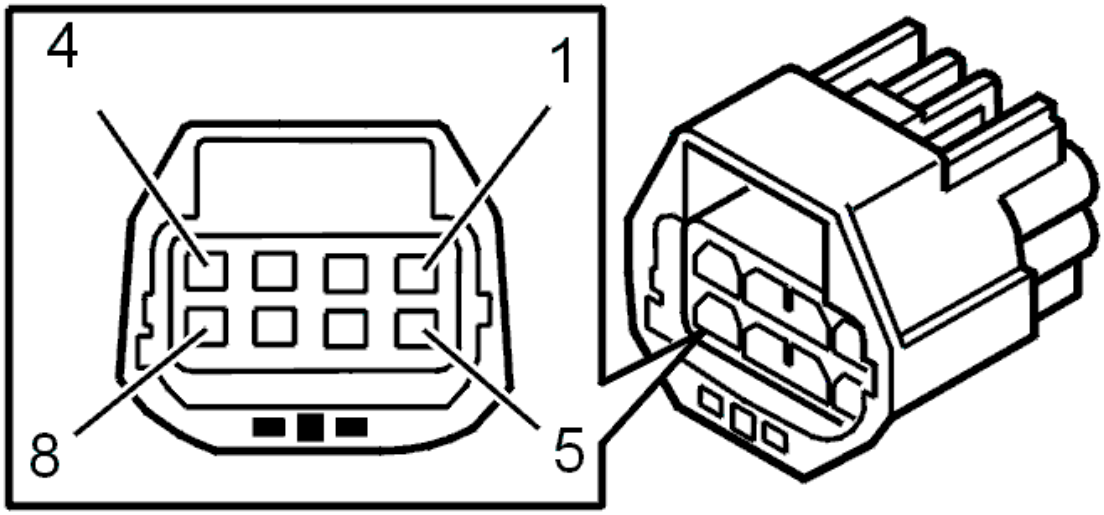


Fig. 231: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0113: LINE PRESSURE SOLENOID SLS. SIGNAL MISSING. PERMANENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL MISSING. PERMANENT FAULT

CHECKS

CHECKING LINE PRESSURE SOLENOID SLS

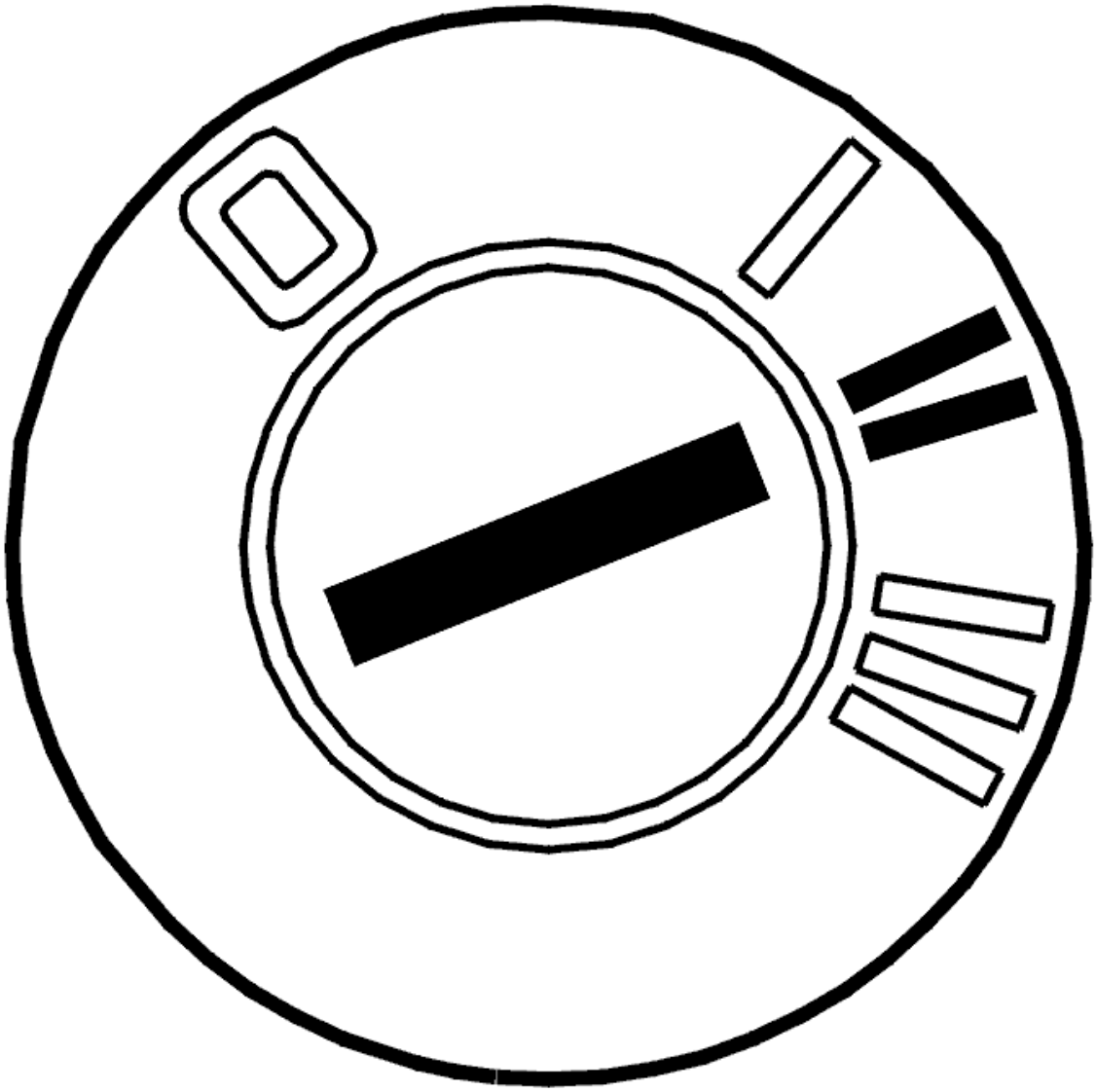


Fig. 232: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

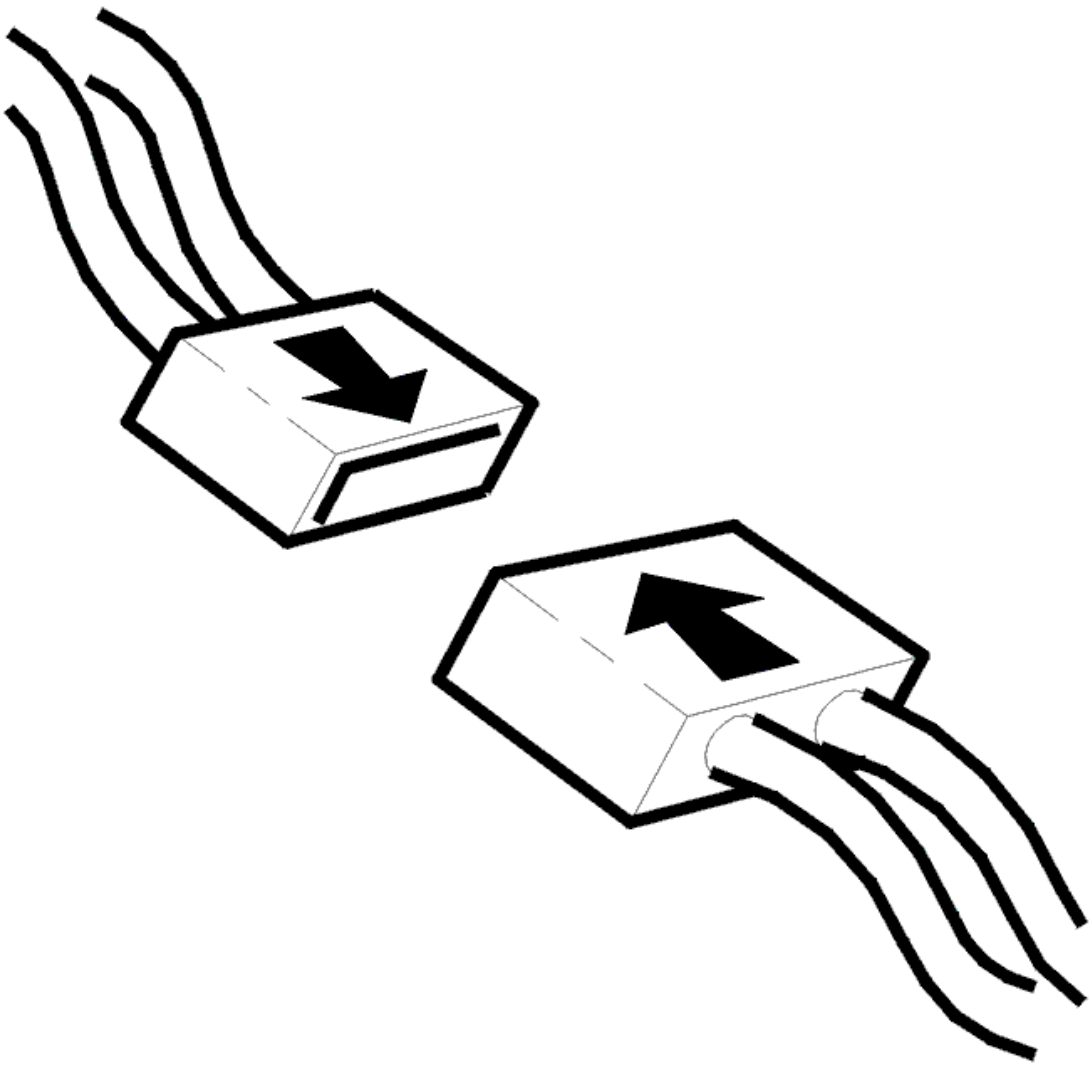


Fig. 233: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module connector and automatic transmission connector D. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLS.

  Read off the current through the solenoid SLS circuit.

  The current should oscillate between 0 and 1000 mA.

  Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

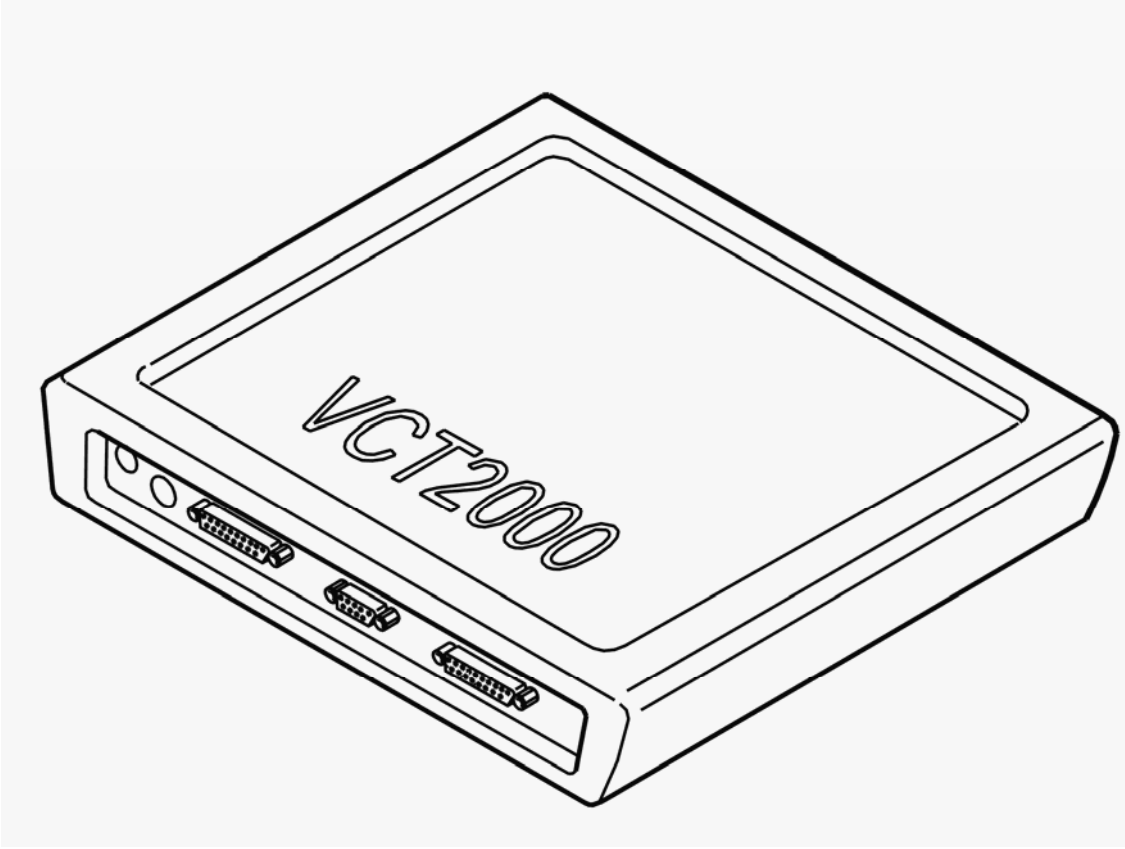


Fig. 234: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING RESISTANCE**

CHECKING RESISTANCE

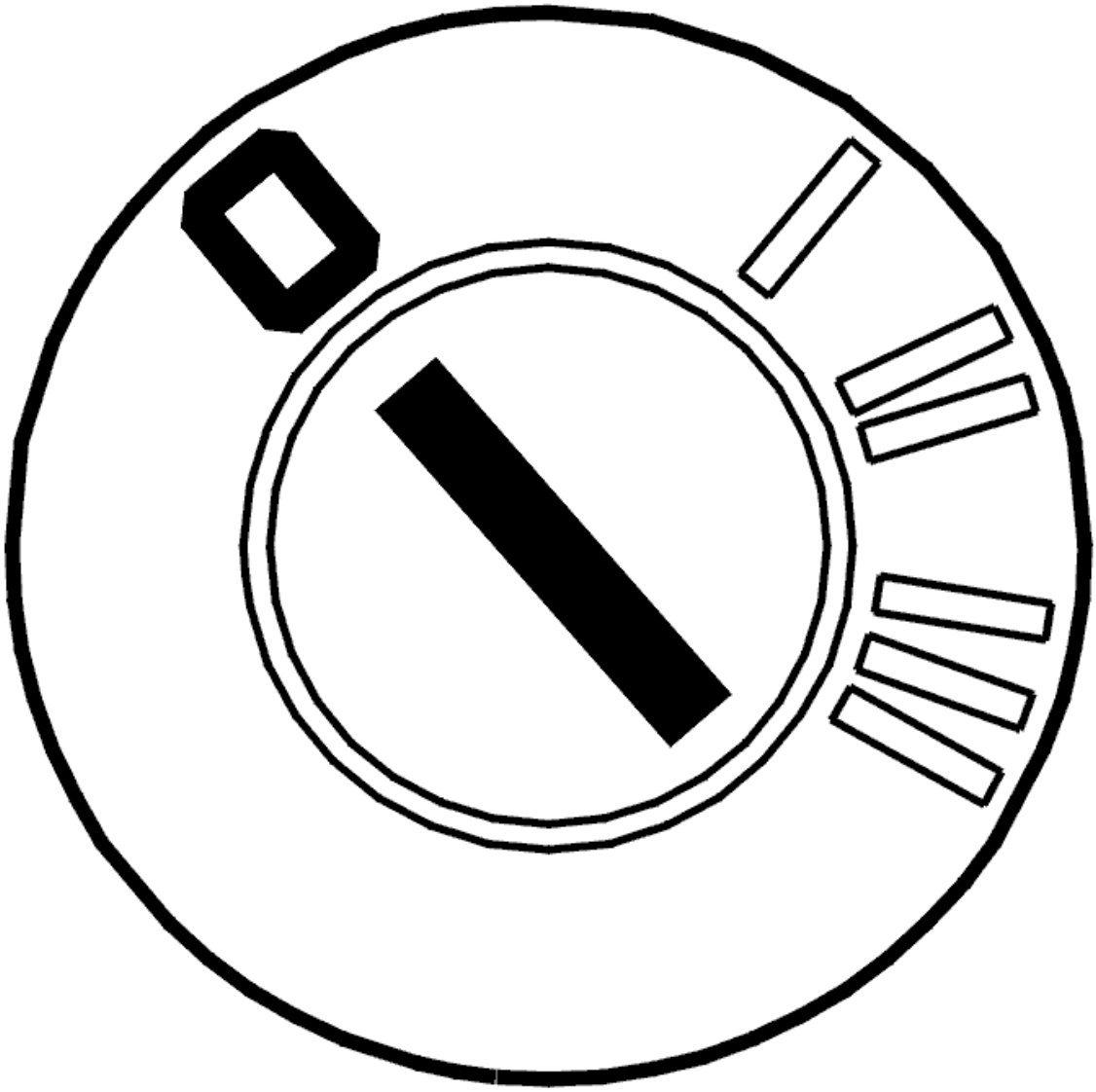


Fig. 235: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

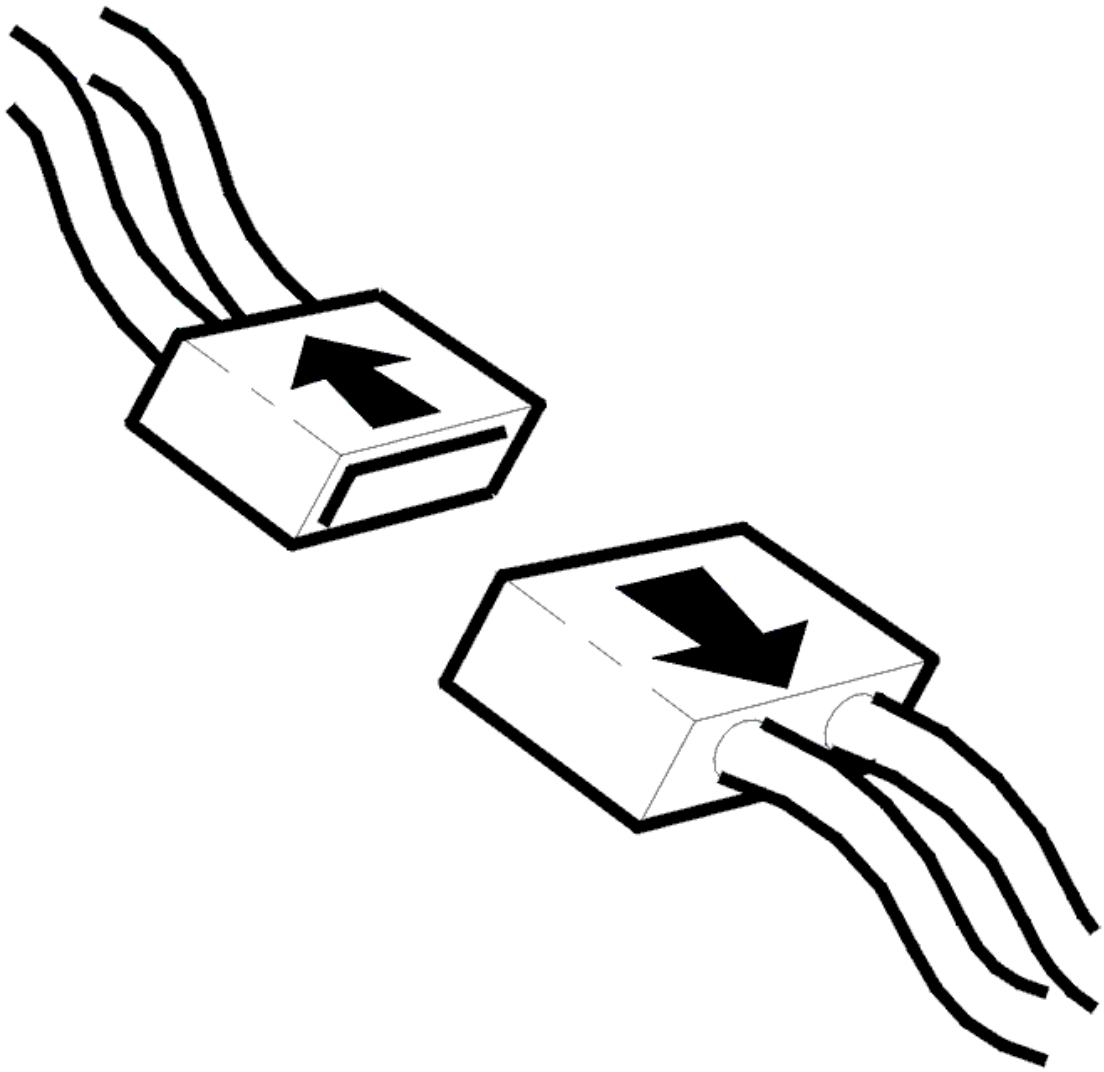


Fig. 236: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect transmission connector D.

Check solenoid SLS. Measure the resistance between terminals #D5 and #D6 on transmission connector D. The resistance should be 5-5.6 ohms at 20°C.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

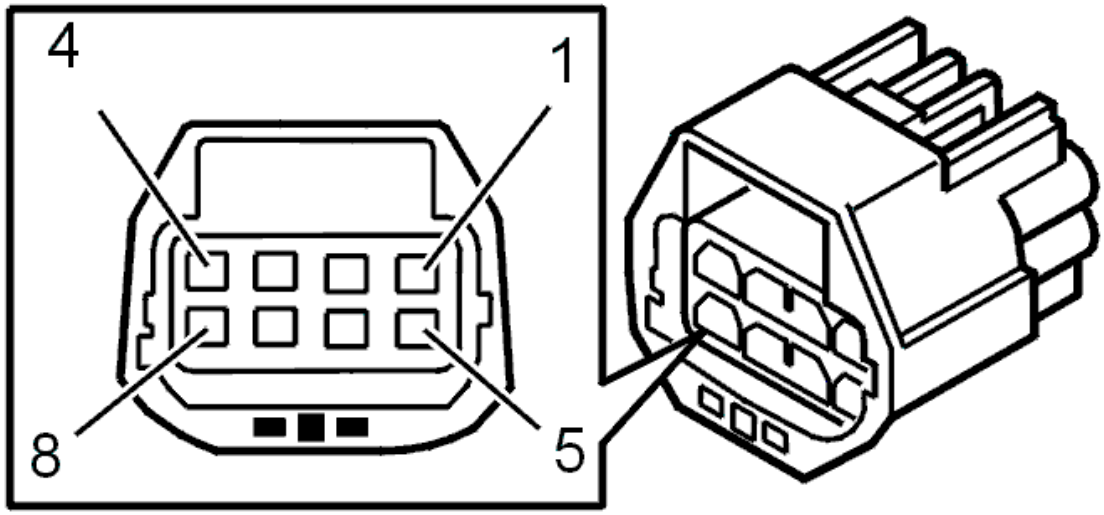


Fig. 237: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

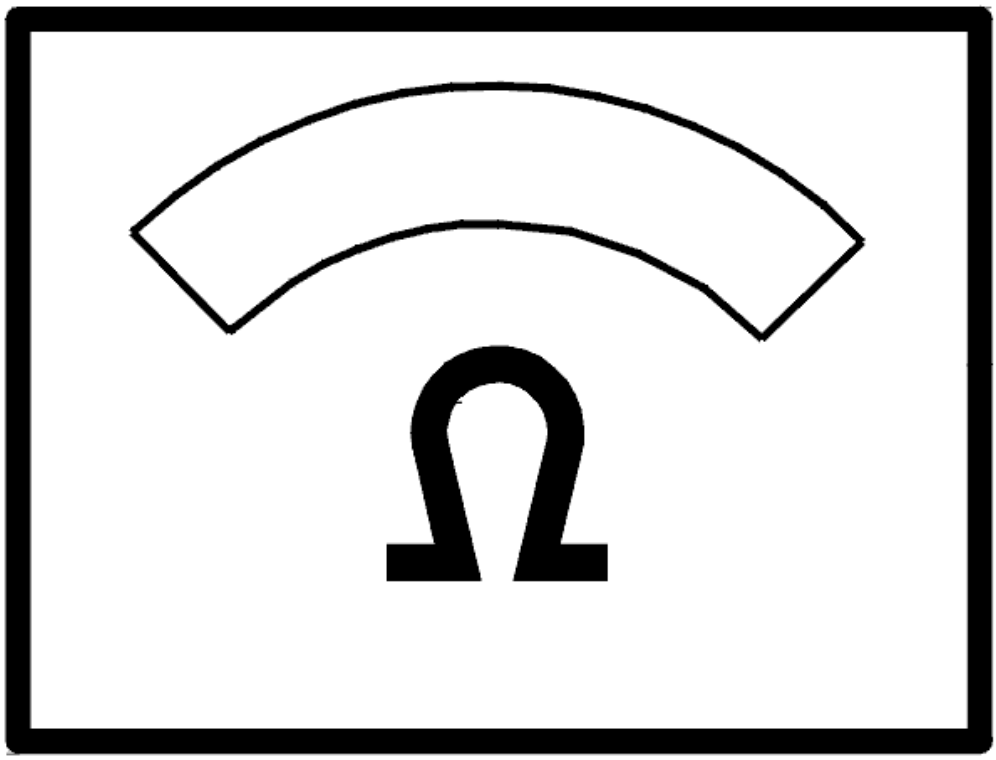


Fig. 238: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

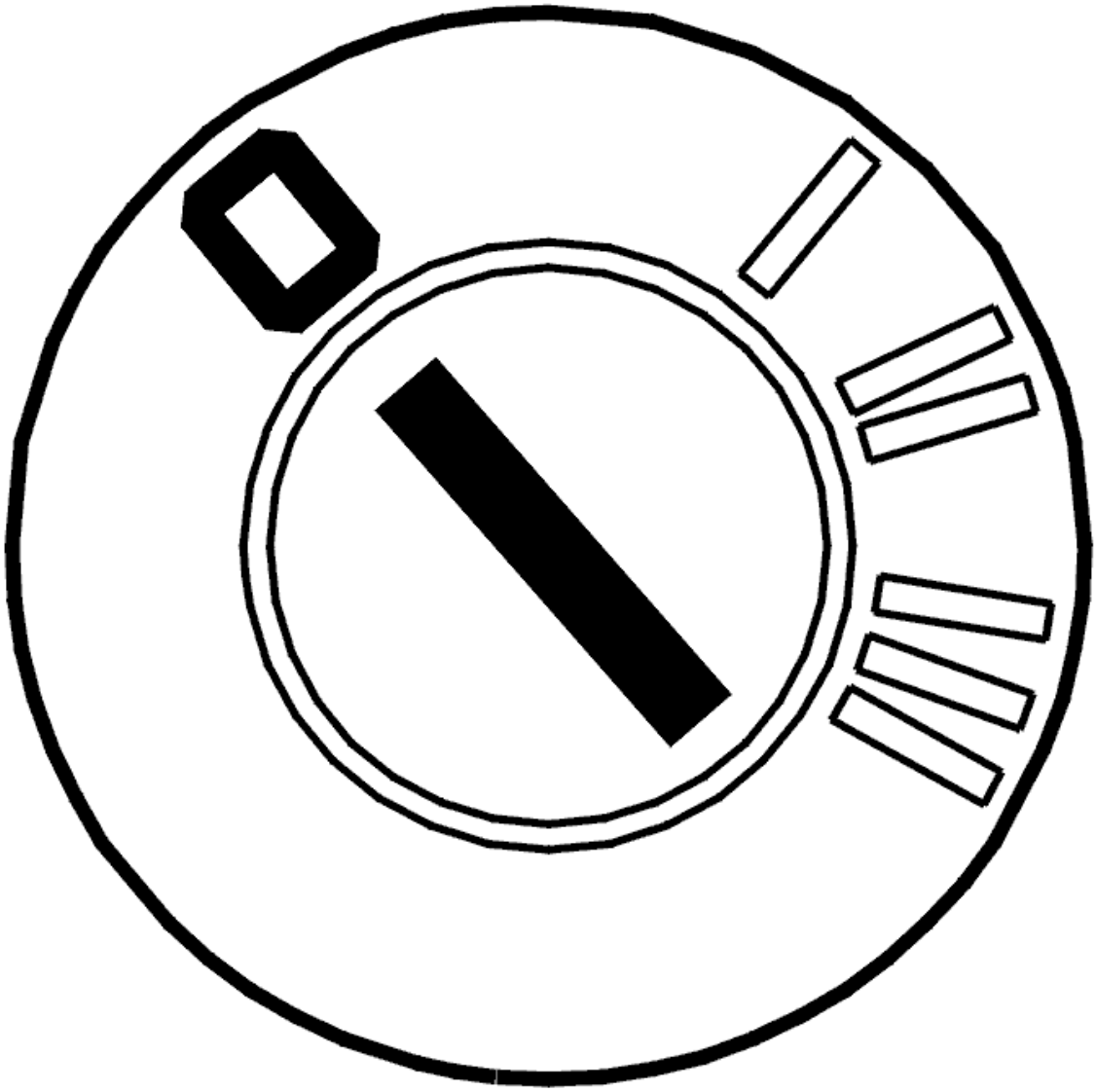


Fig. 239: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

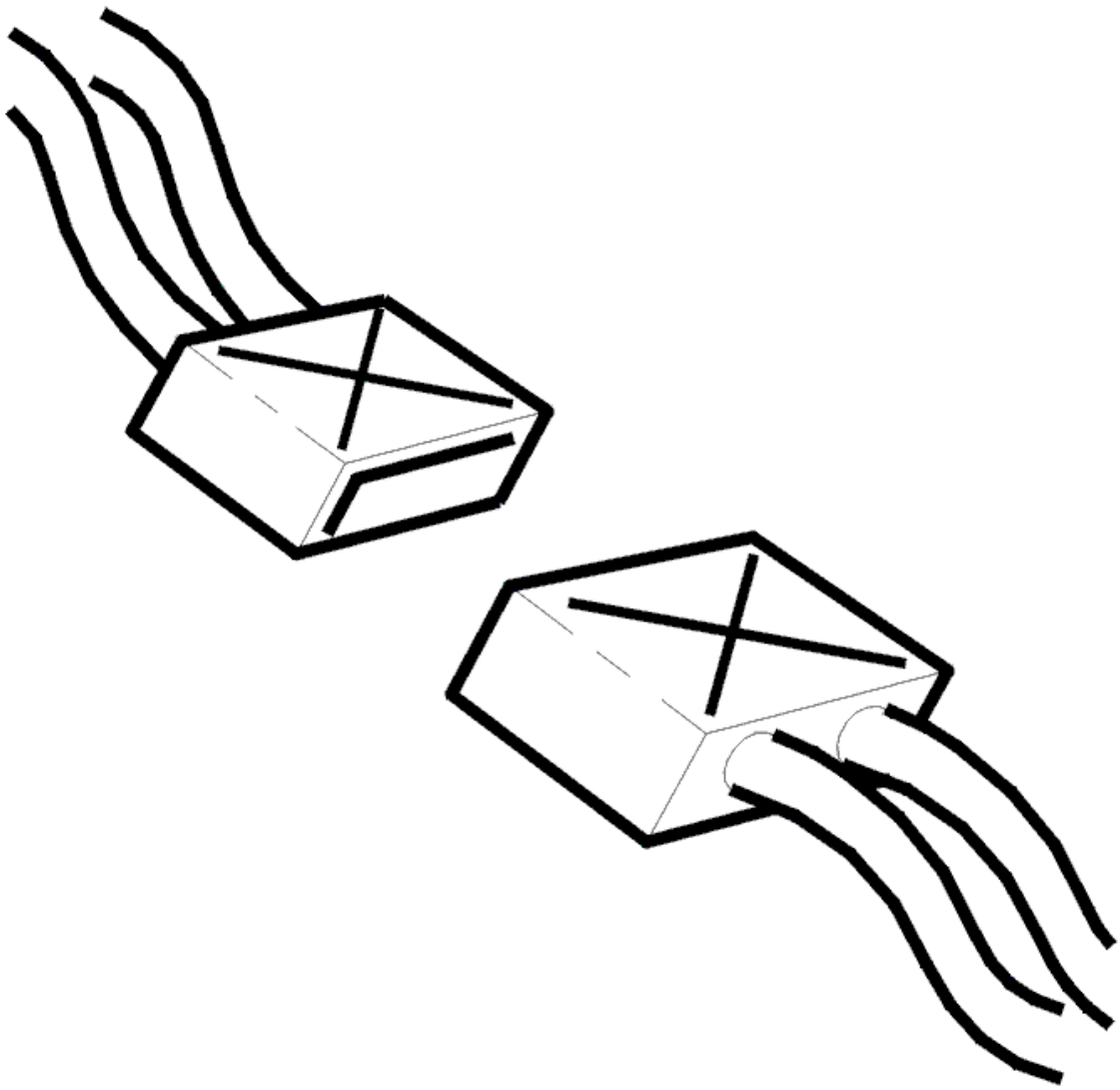


Fig. 240: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Transmission connector D disconnected.

Check the cable between control module terminal #A49 (#A49) and transmission connector terminal #D5 (control module side). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #B7 (#A67) and transmission connector #D6 (control module side). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

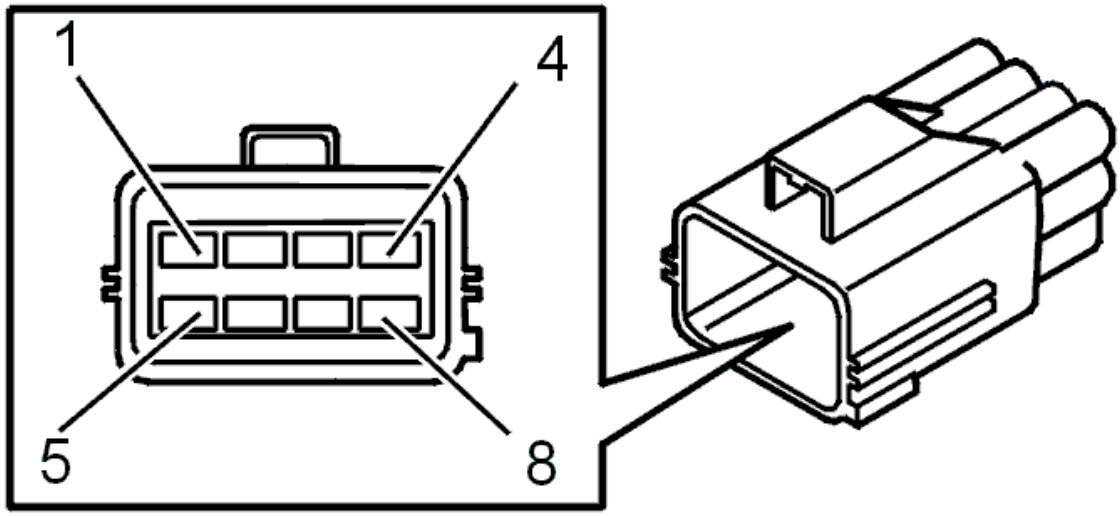


Fig. 241: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

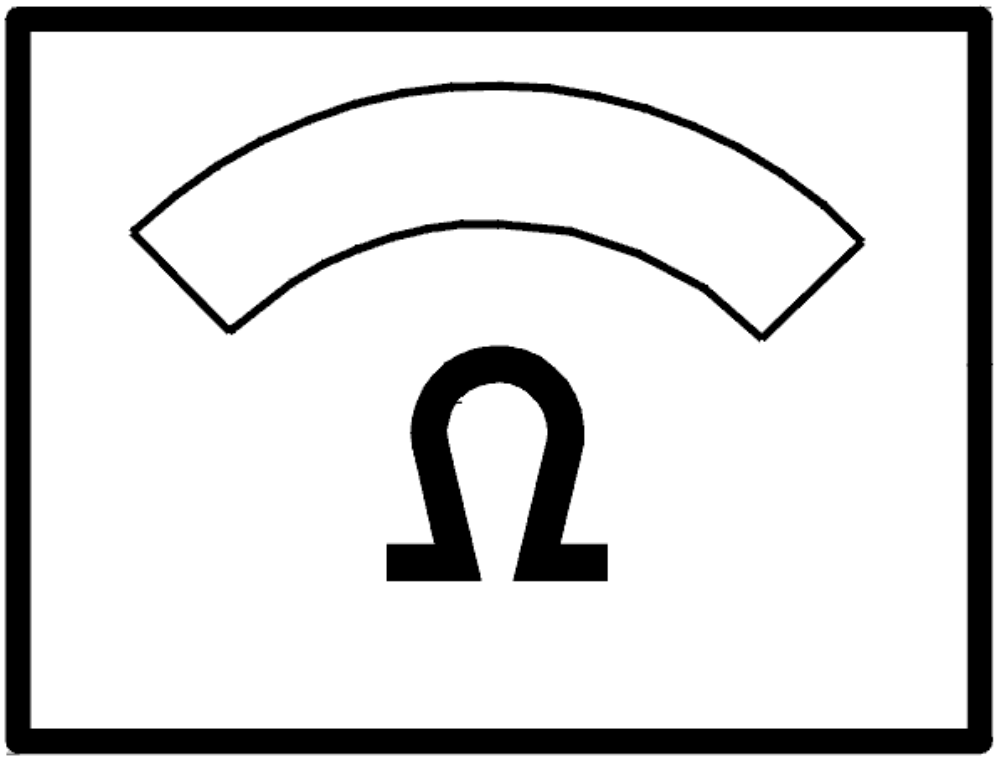


Fig. 242: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault found in the wiring?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

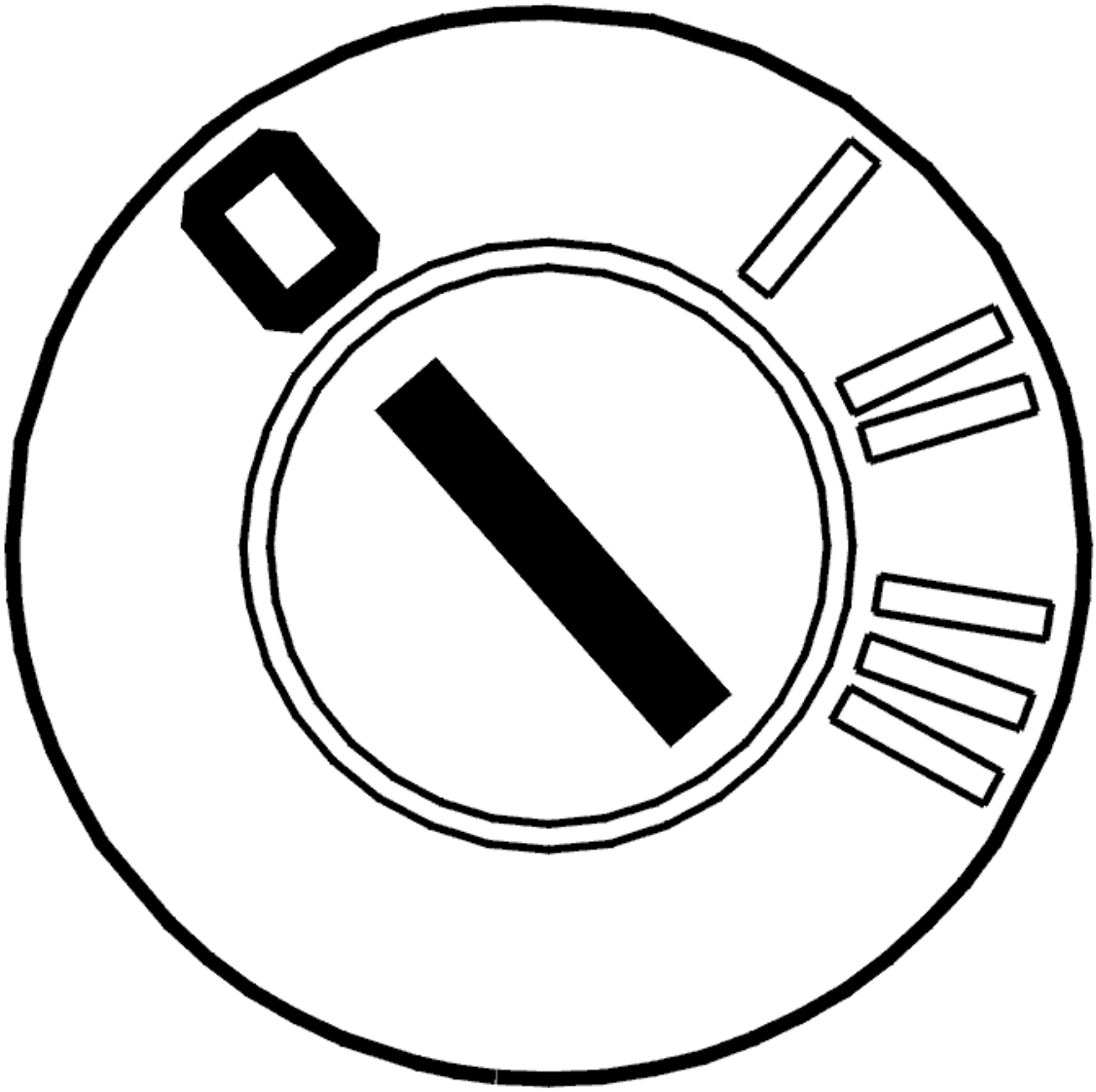


Fig. 243: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

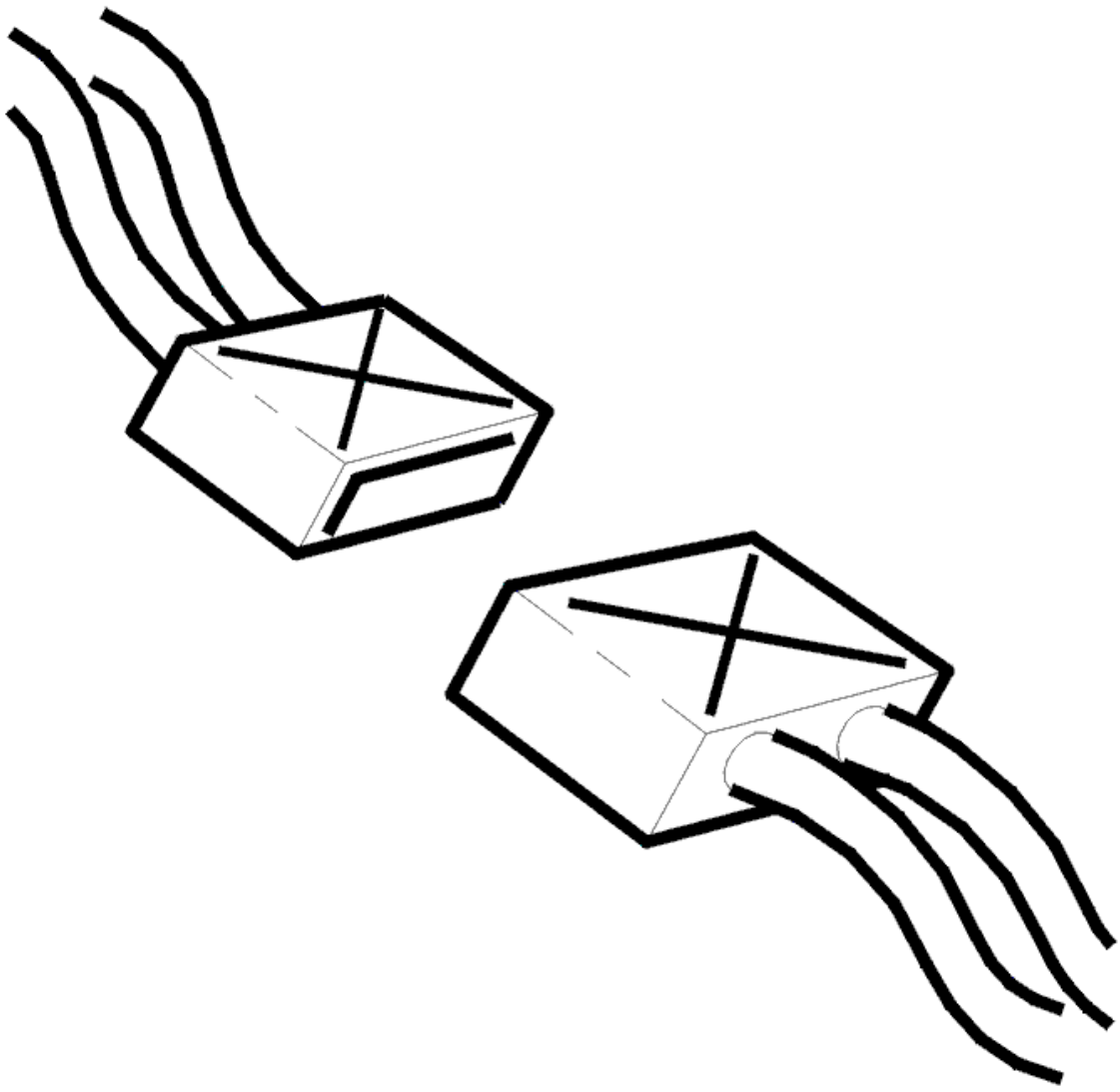


Fig. 244: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

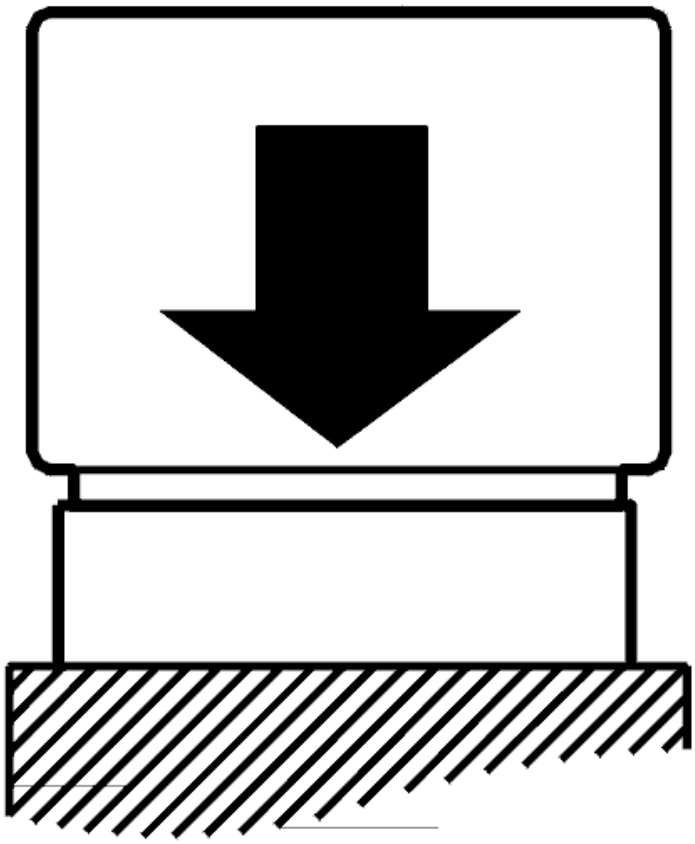


Fig. 245: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector D disconnected.

Check the transmission control module (TCM) by measuring the resistance between terminals #A49 (#A49) and #B7 (#A67) on the breakout box. The resistance must be approximately 9 kohms.

NOTE: When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

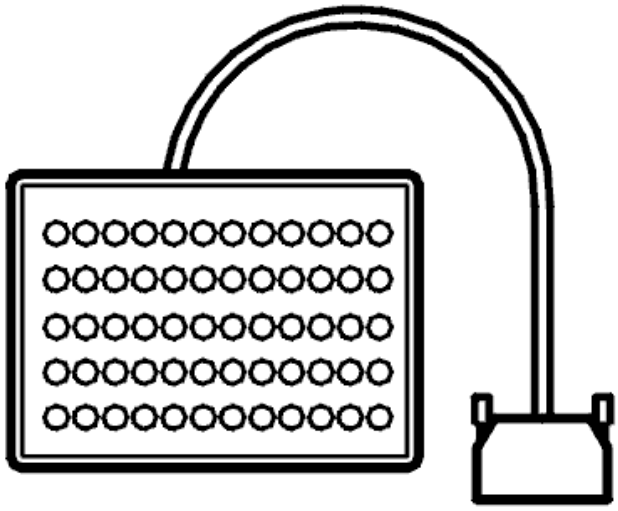


Fig. 246: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

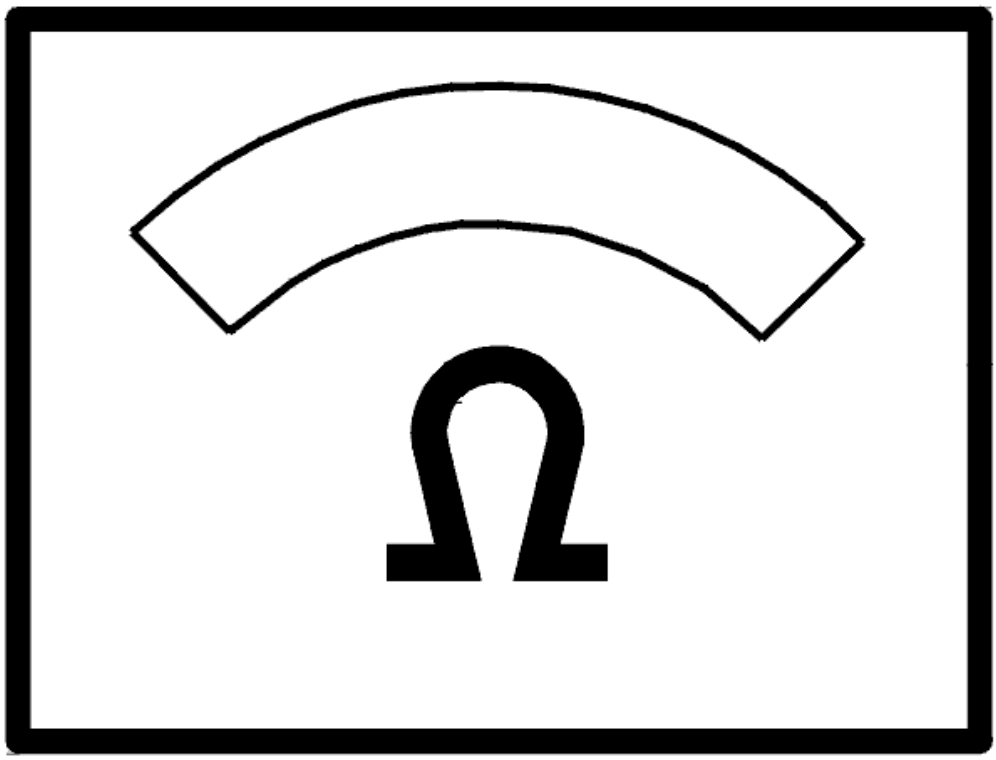


Fig. 247: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

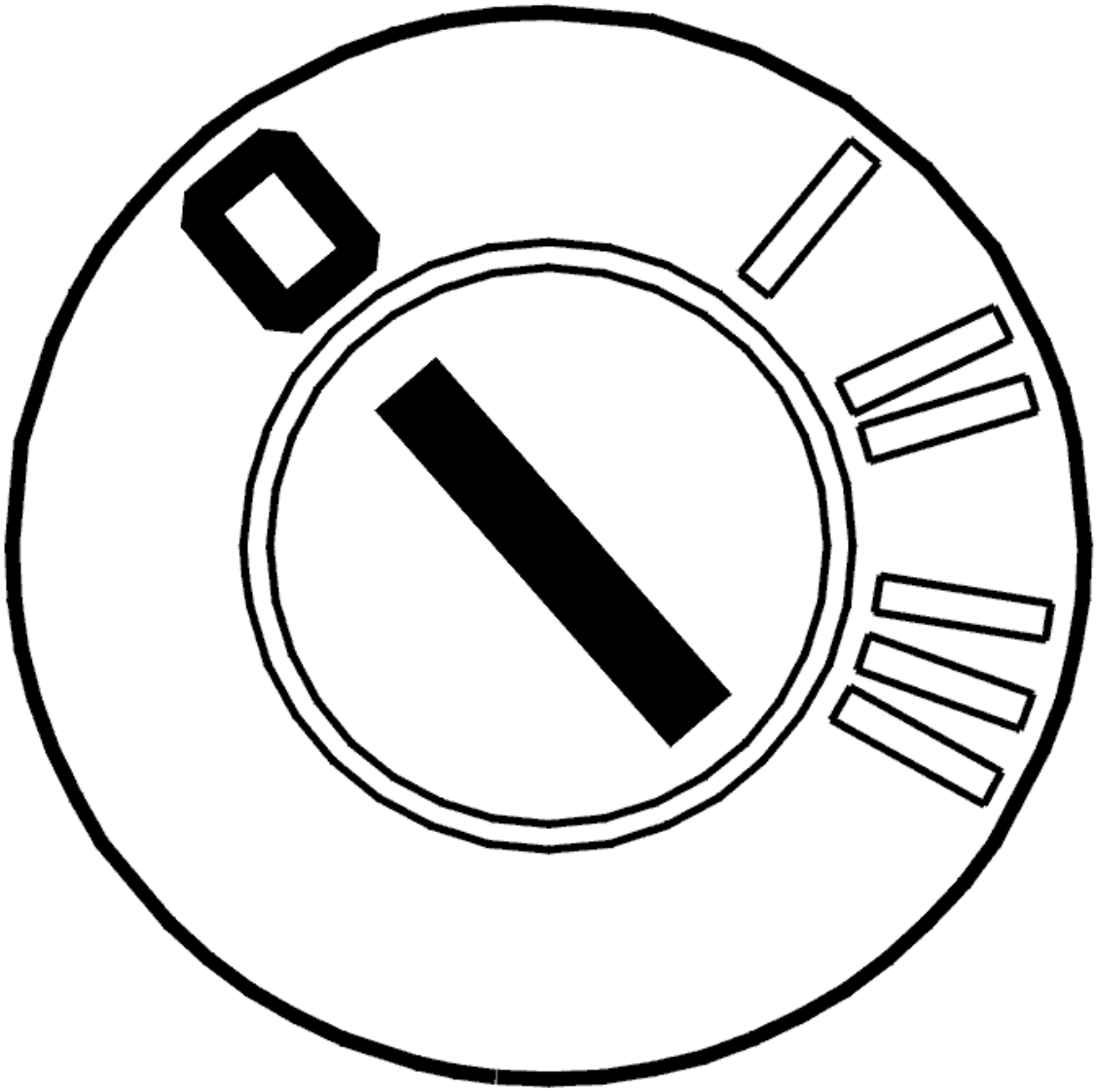


Fig. 248: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

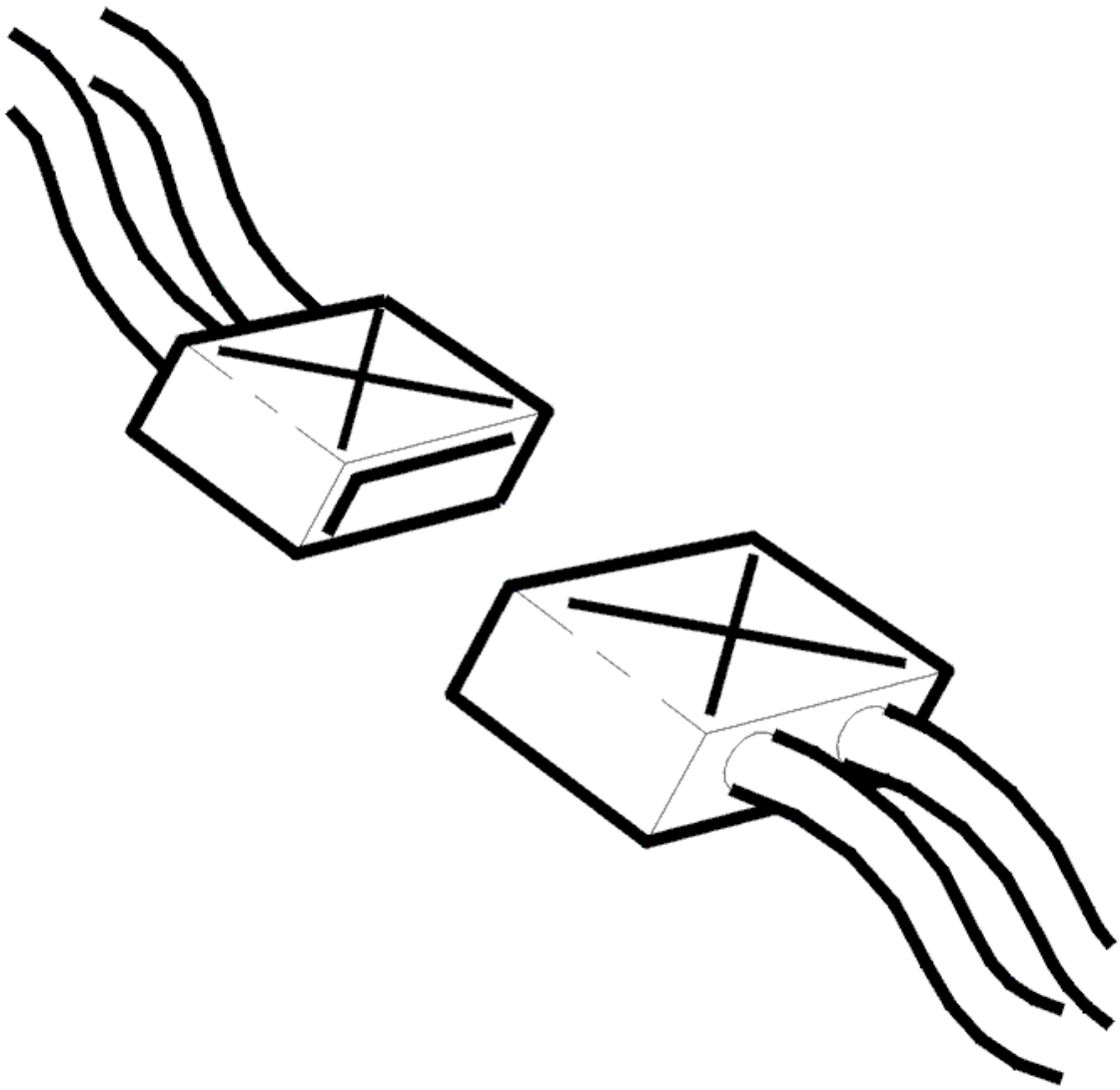


Fig. 249: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the wiring between transmission connector terminal #D5 (transmission side) and solenoid SLS terminal #1. Check the wiring between transmission connector terminal #D6 (transmission side) and solenoid SLS terminal #2. Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

  Also check against the other cables in the circuit.

  Check the solenoid SLS by measuring the resistance between terminals #1 and #2. The resistance should be 5-5.6 ohms at 20°C. Replace the transmission control system if the resistance is incorrect.

  Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open and replace the transmission control system, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

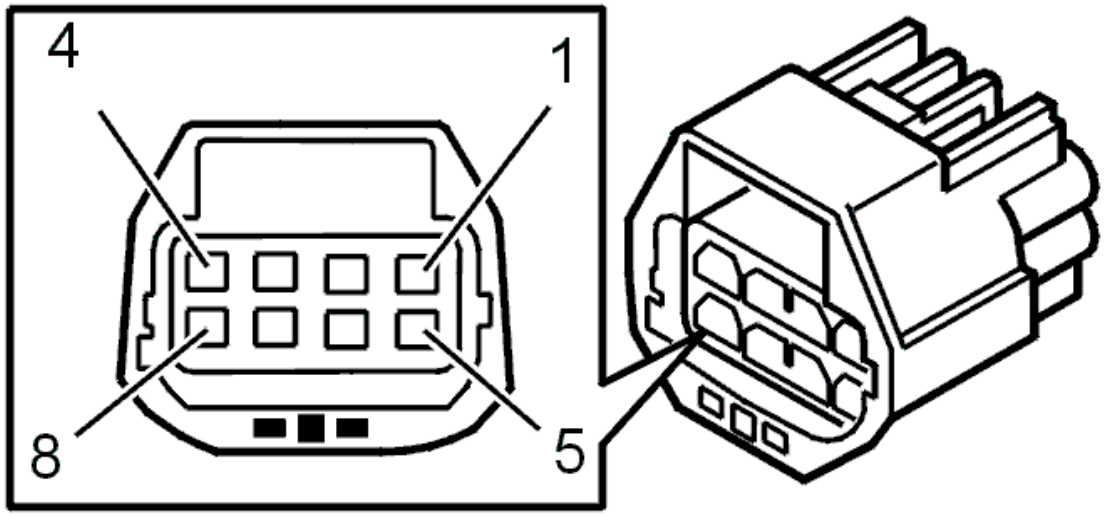


Fig. 250: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

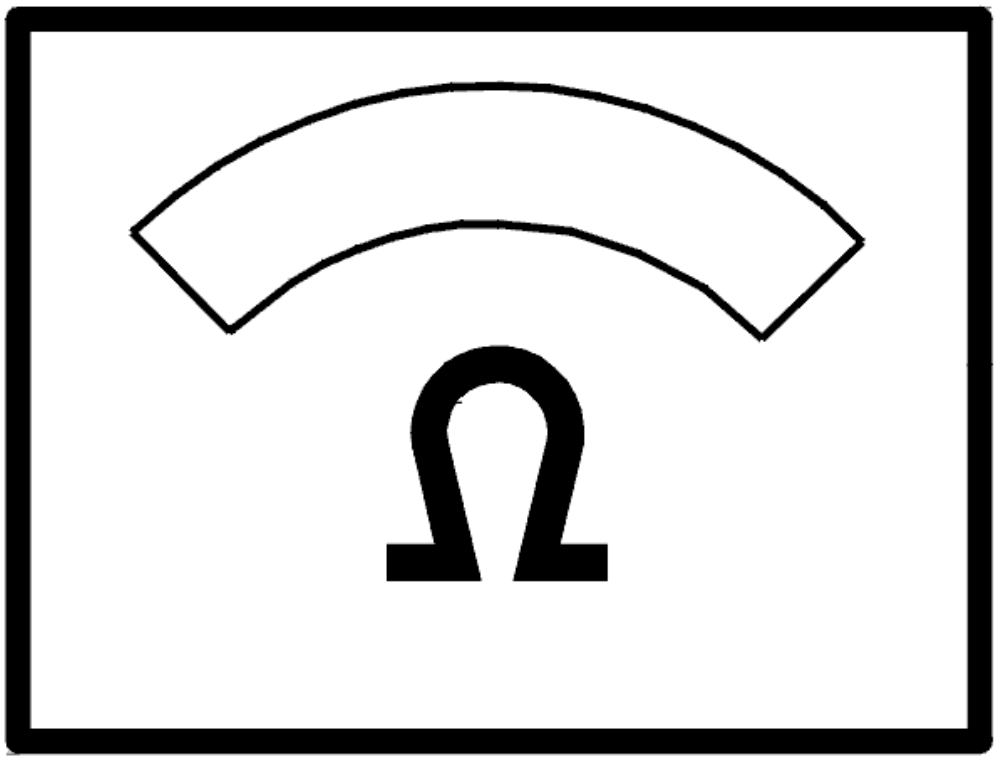


Fig. 251: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

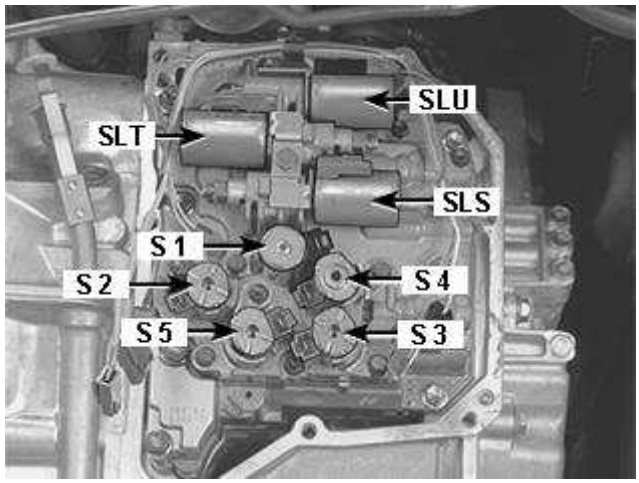


Fig. 252: Identifying S1-S5, SLT, SLU And SLS Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

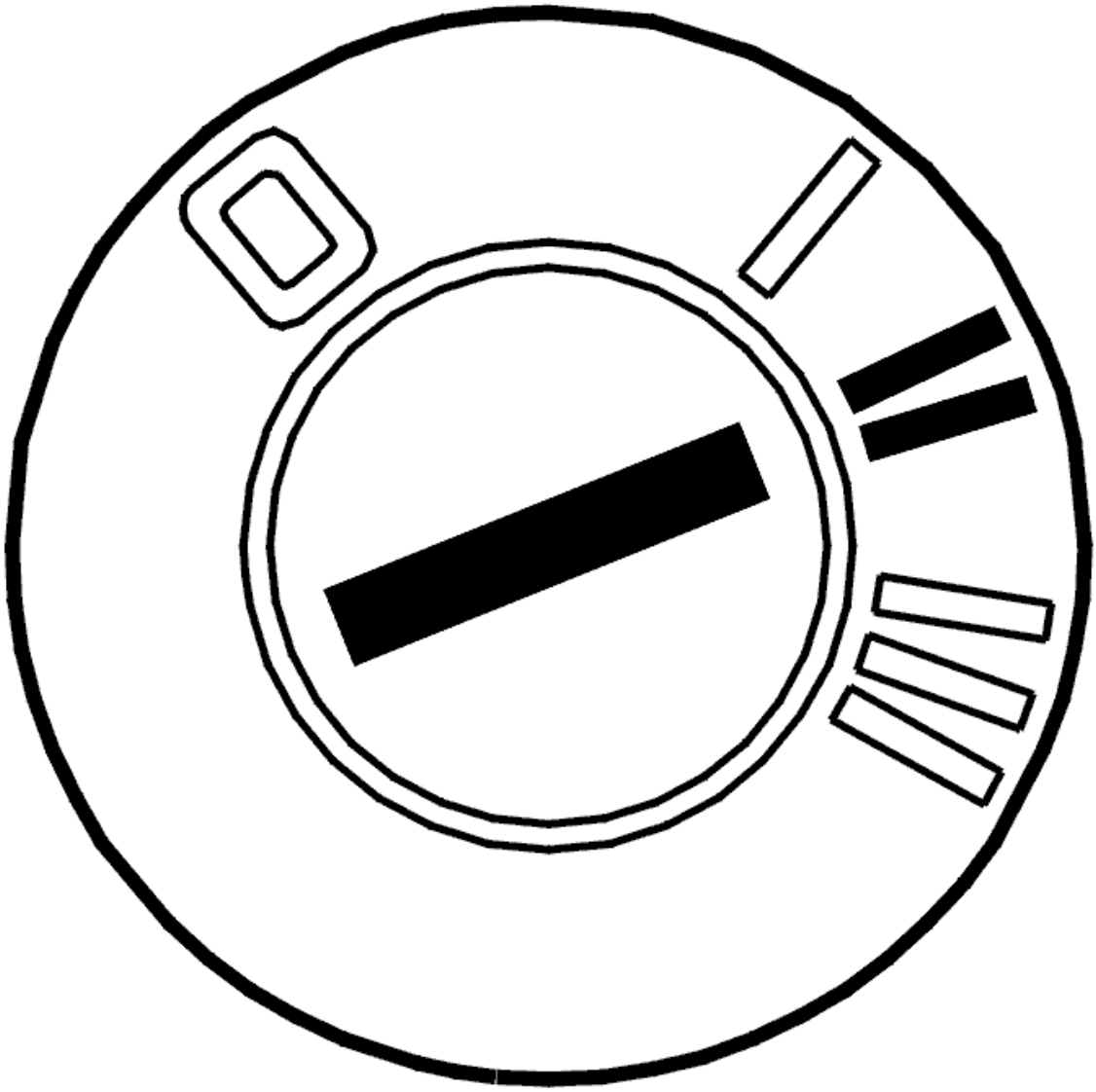


Fig. 253: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

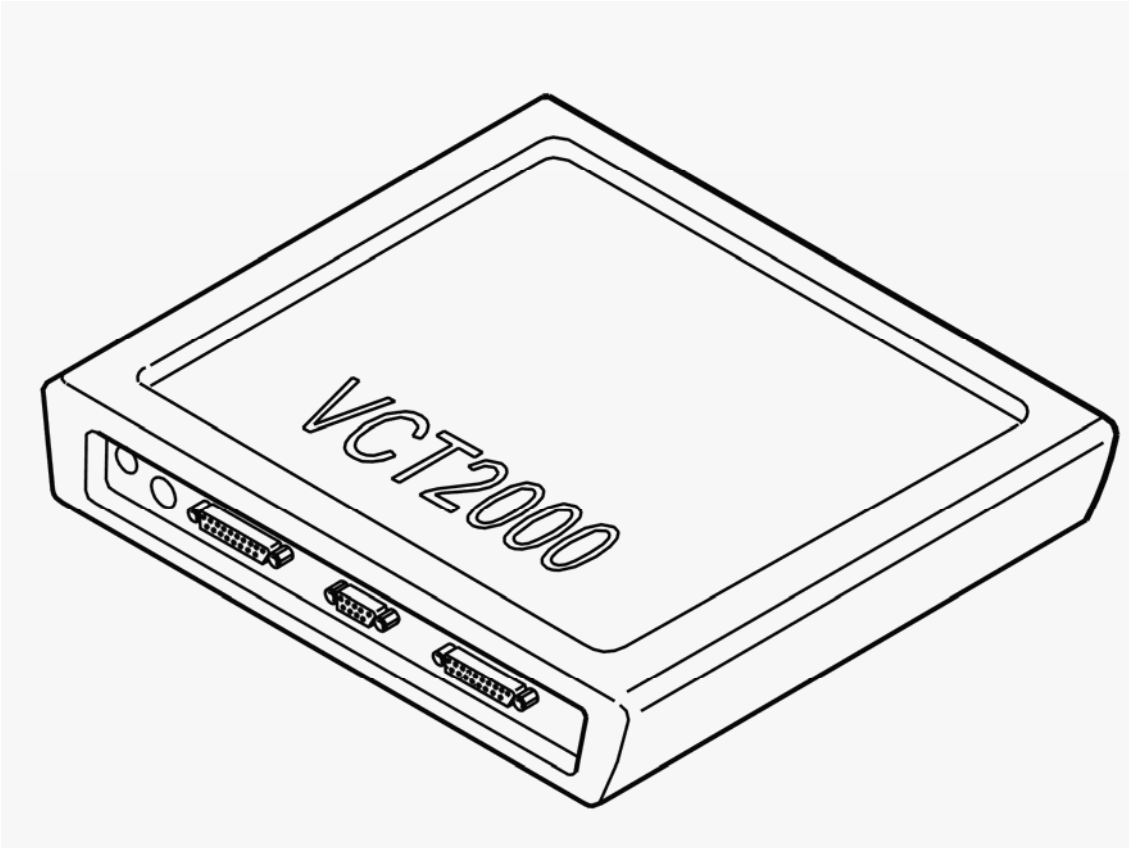


Fig. 254: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

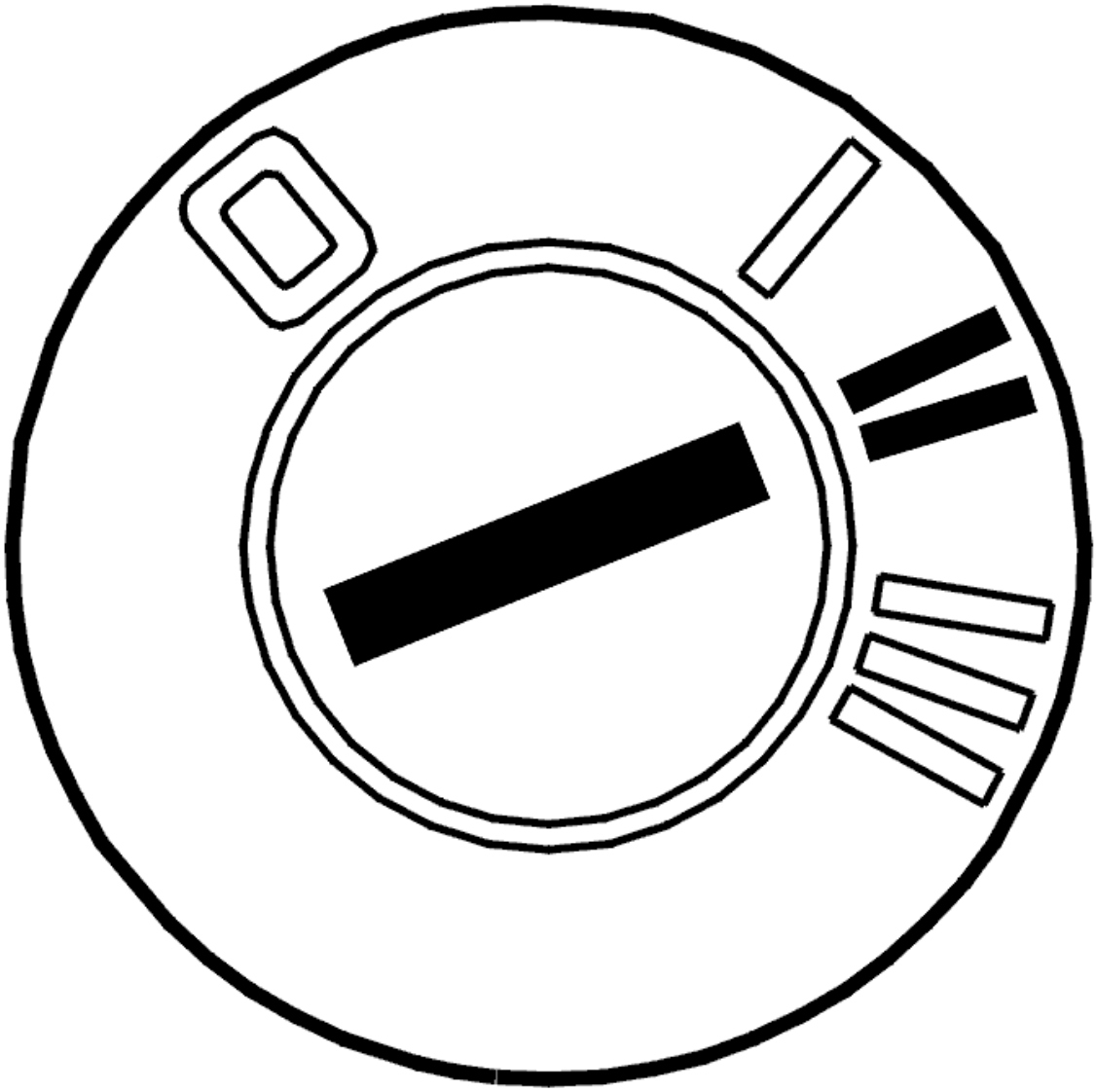


Fig. 255: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

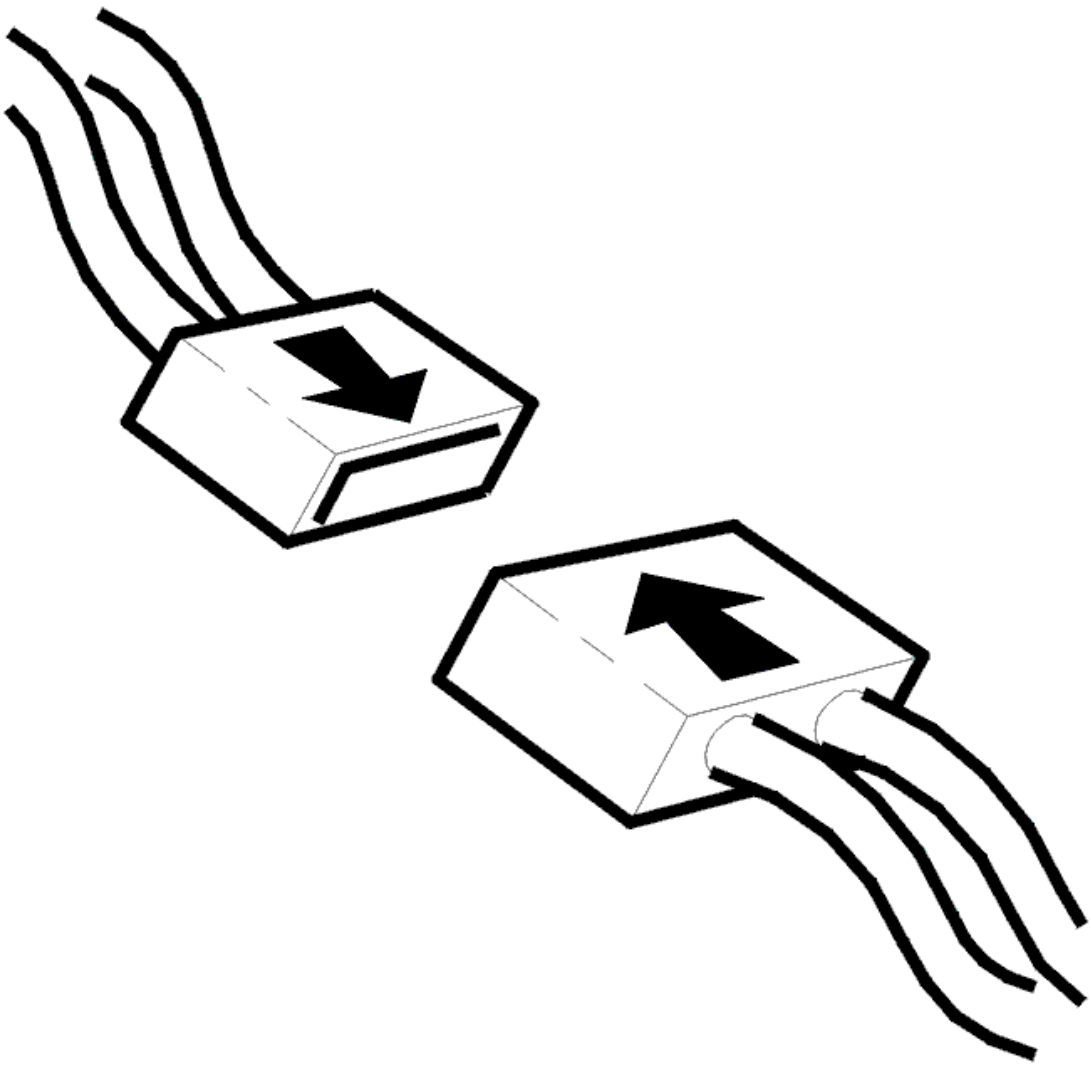


Fig. 256: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLS.

  Read off the current through the solenoid SLS circuit.

  The current should oscillate between 0 and 1000 mA.

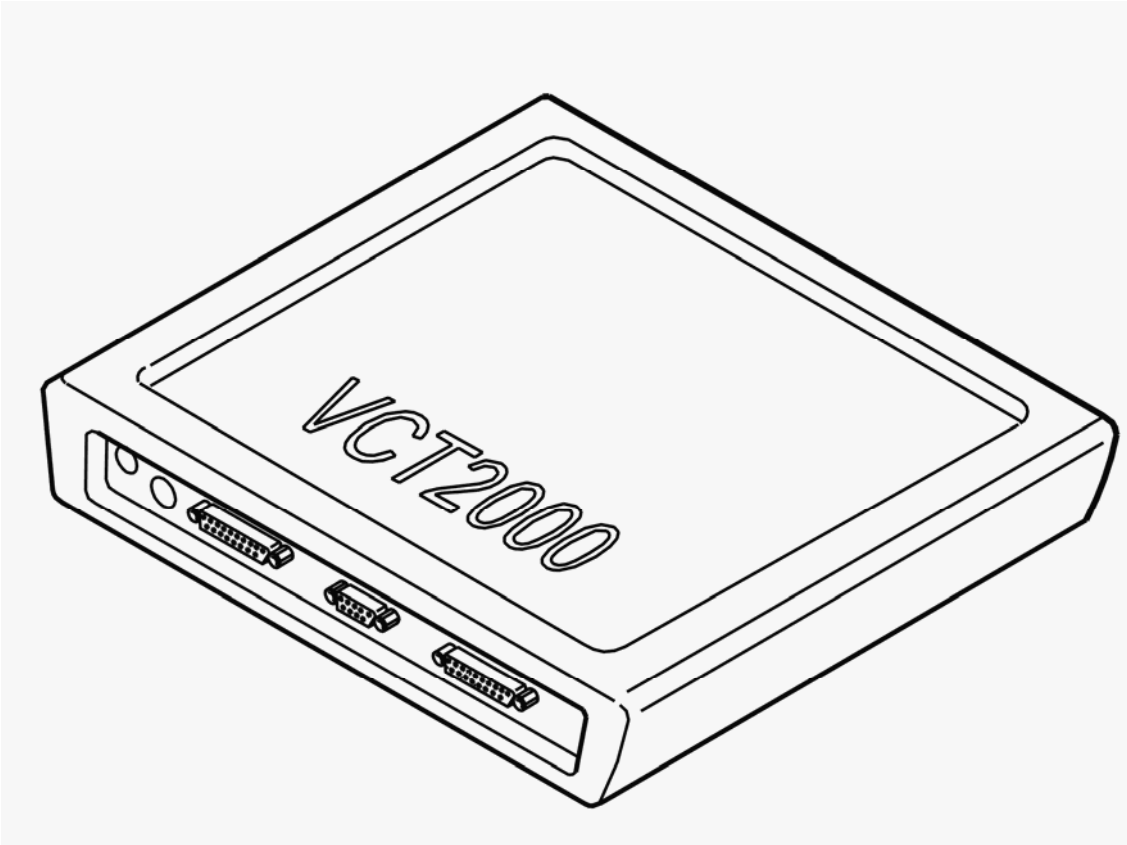


Fig. 257: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0114: LINE PRESSURE SOLENOID SLS. SIGNAL TOO LOW. INTERMITTENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

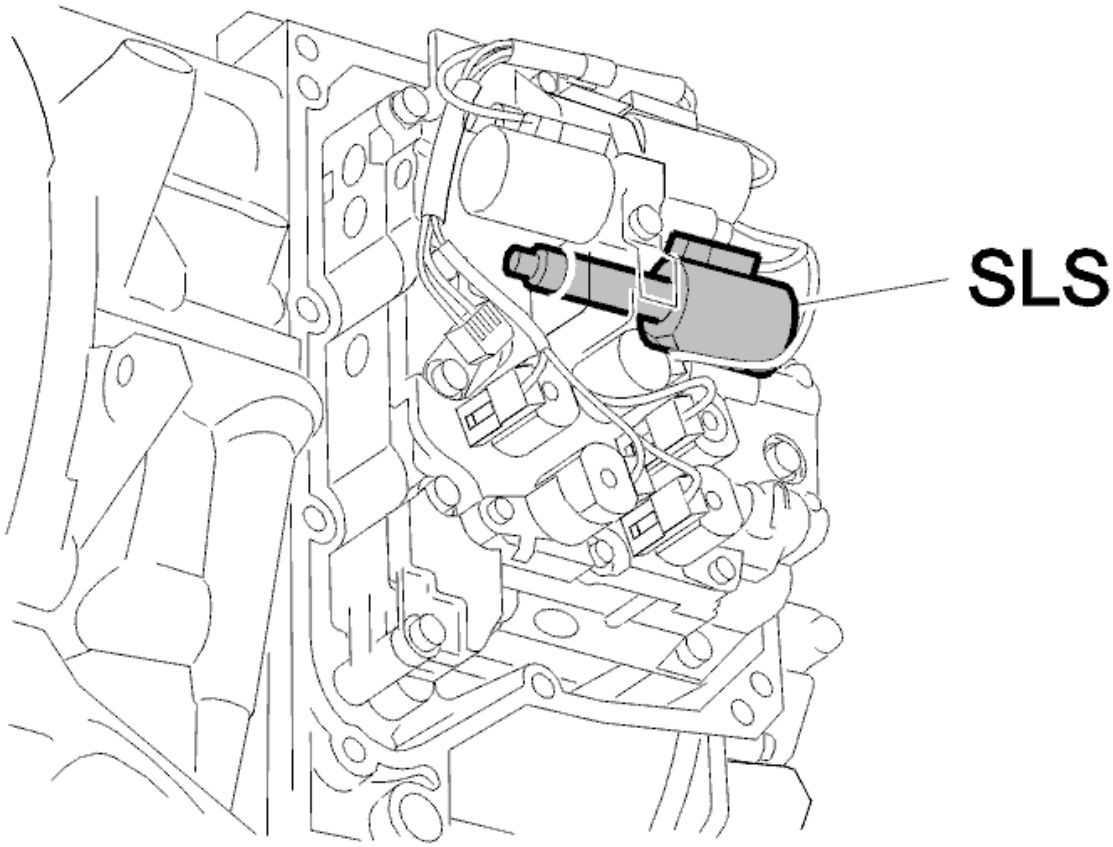


Fig. 258: Identifying Line Pressure Solenoid SLS
Courtesy of VOLVO CARS CORPORATION

Line pressure solenoid SLS regulates the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-114 is stored if the control module registers that there is an open-circuit in the circuit for solenoid SLS. Solenoid SLS cannot then control the line pressure.

Substitute Value

- The transmission control module (TCM) Emergency mode III program is initiated.

Possible Source

- Open-circuit in the control signal cable or the signal cable.
- Defective solenoid.
- Open-circuit in the power ground.

- Contact resistance in terminals.
- Defective control module.

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No torque limiting request to the engine control module (ECM) when shifting.
- No line pressure solenoid SLS or SLT control. This results in constant maximum line pressure.

SIGNAL TOO LOW. INTERMITTENT FAULT

INTERMITTENT FAULT

Check the transmission control module (TCM) connector and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the wiring between control module terminal #A49 (#A49) and transmission connector terminal #D5. Check the wiring between control module terminal #B7 (#A67) and transmission connector terminal #D6. Check for an intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** .

HINT: Check solenoid SLS. Measure the resistance between terminals #D5 and #D6 on transmission connector D. The resistance should be 5-5.6 ohms at 20°C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

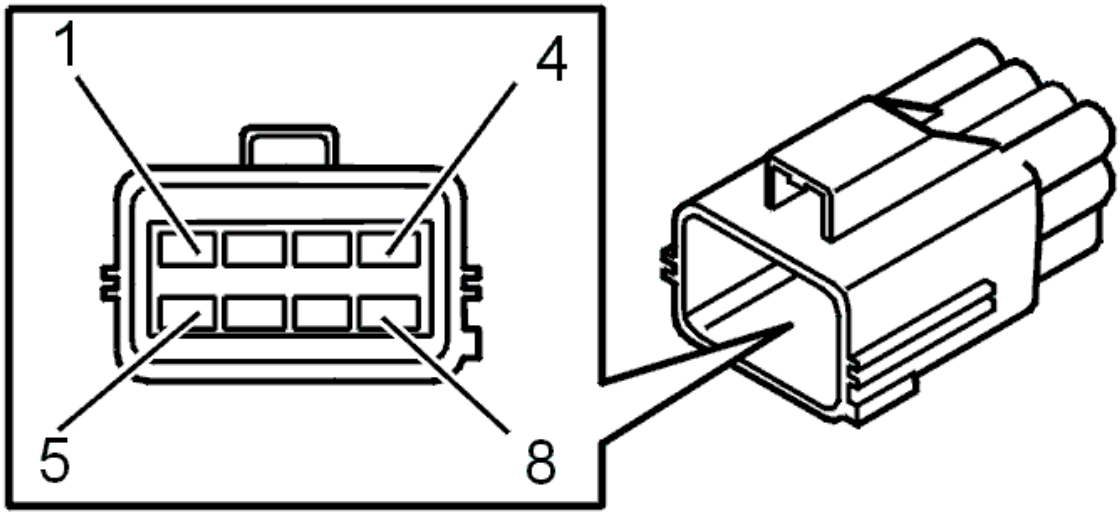


Fig. 259: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

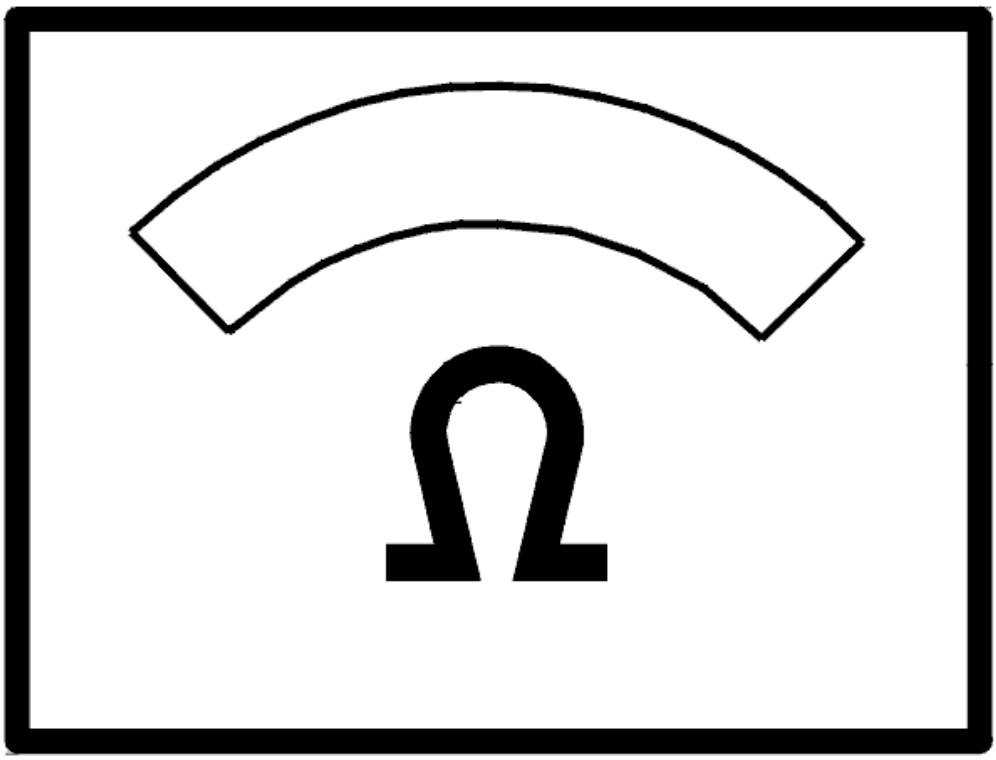


Fig. 260: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

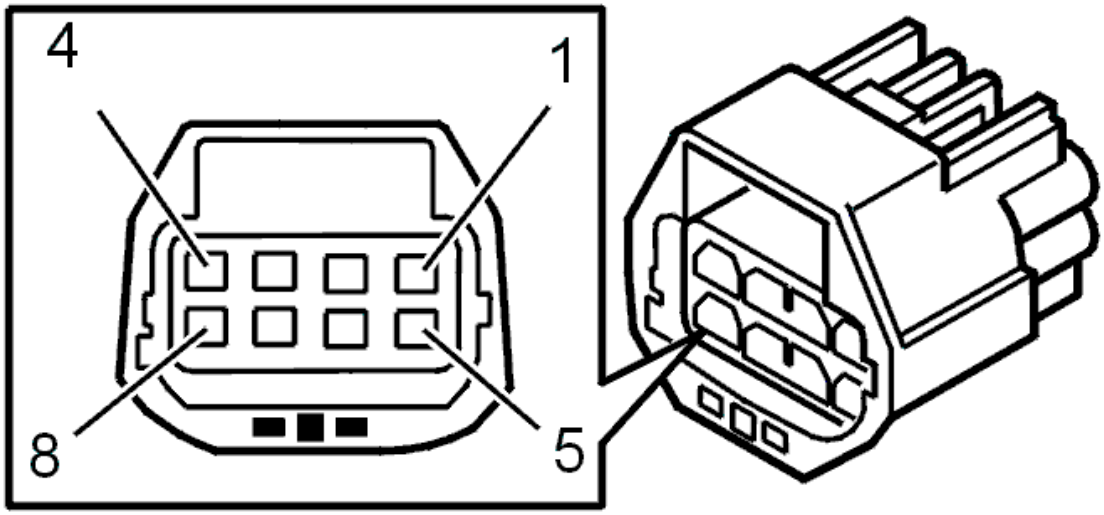


Fig. 261: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0114: LINE PRESSURE SOLENOID SLS. SIGNAL TOO LOW. PERMANENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL TOO LOW. PERMANENT FAULT

CHECKS

CHECKING LINE PRESSURE SOLENOID SLS

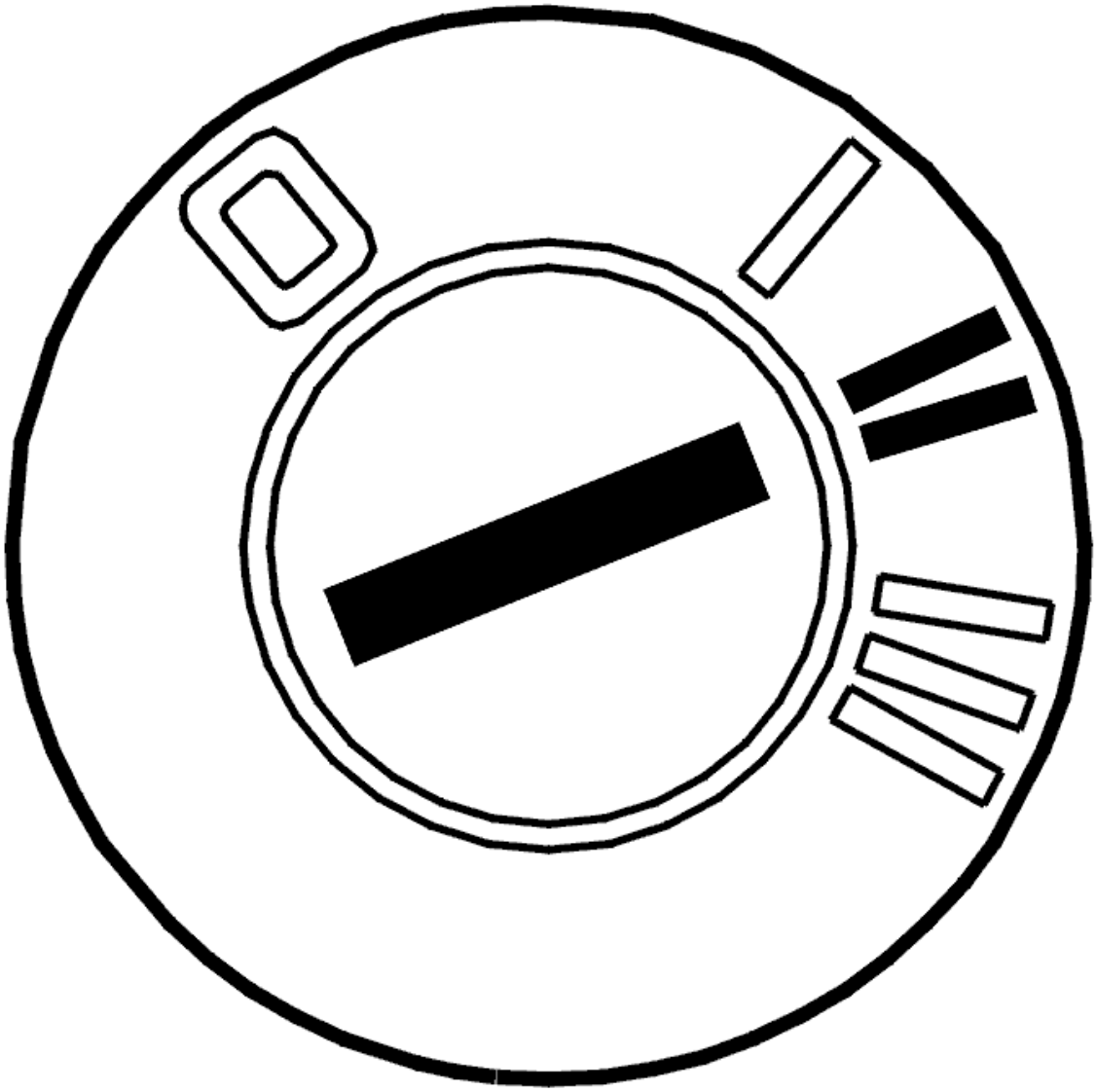


Fig. 262: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

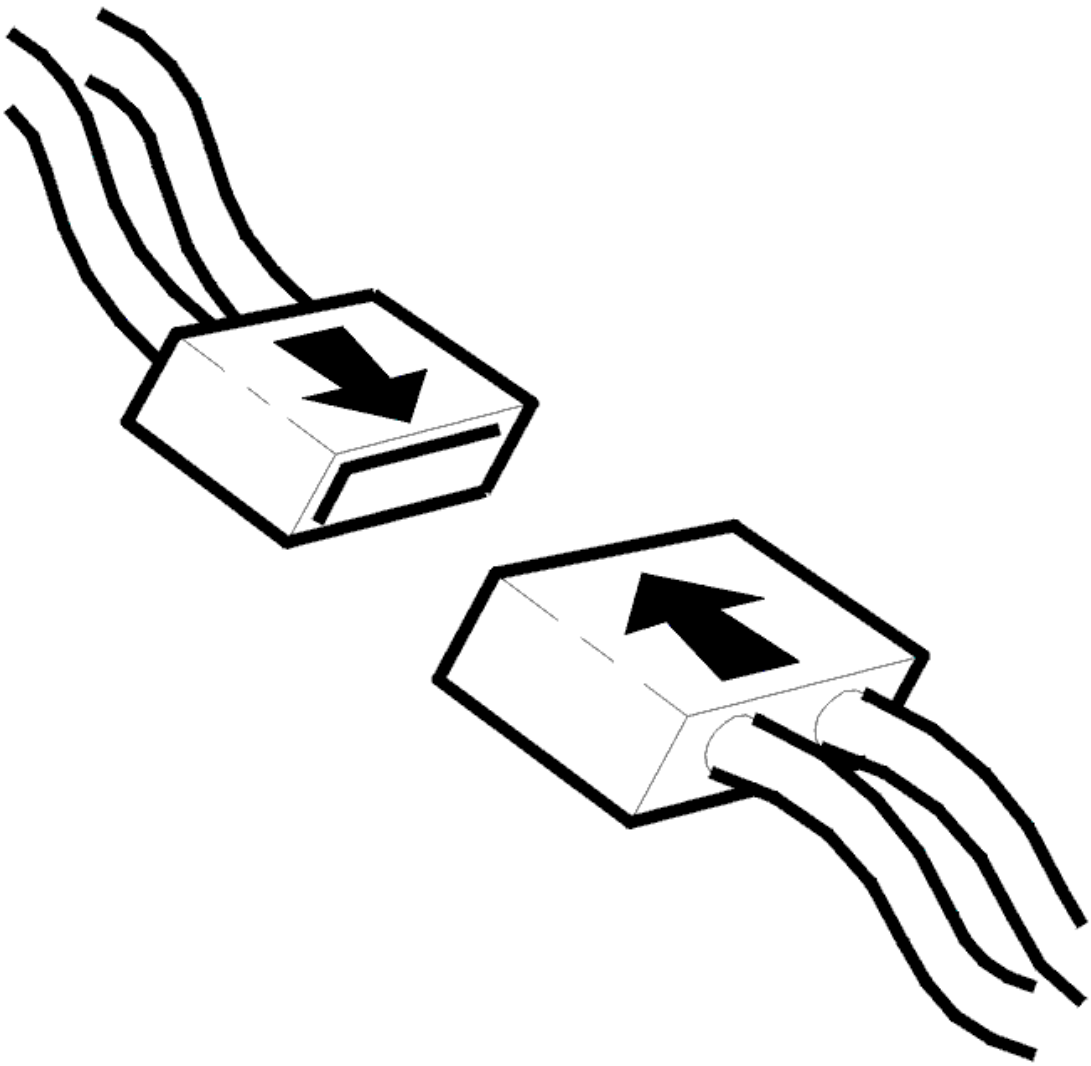


Fig. 263: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module connector and automatic transmission connector D. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLS.

  Read off the current through the solenoid SLS circuit.

  The current should oscillate between 0 and 1000 mA.

  Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

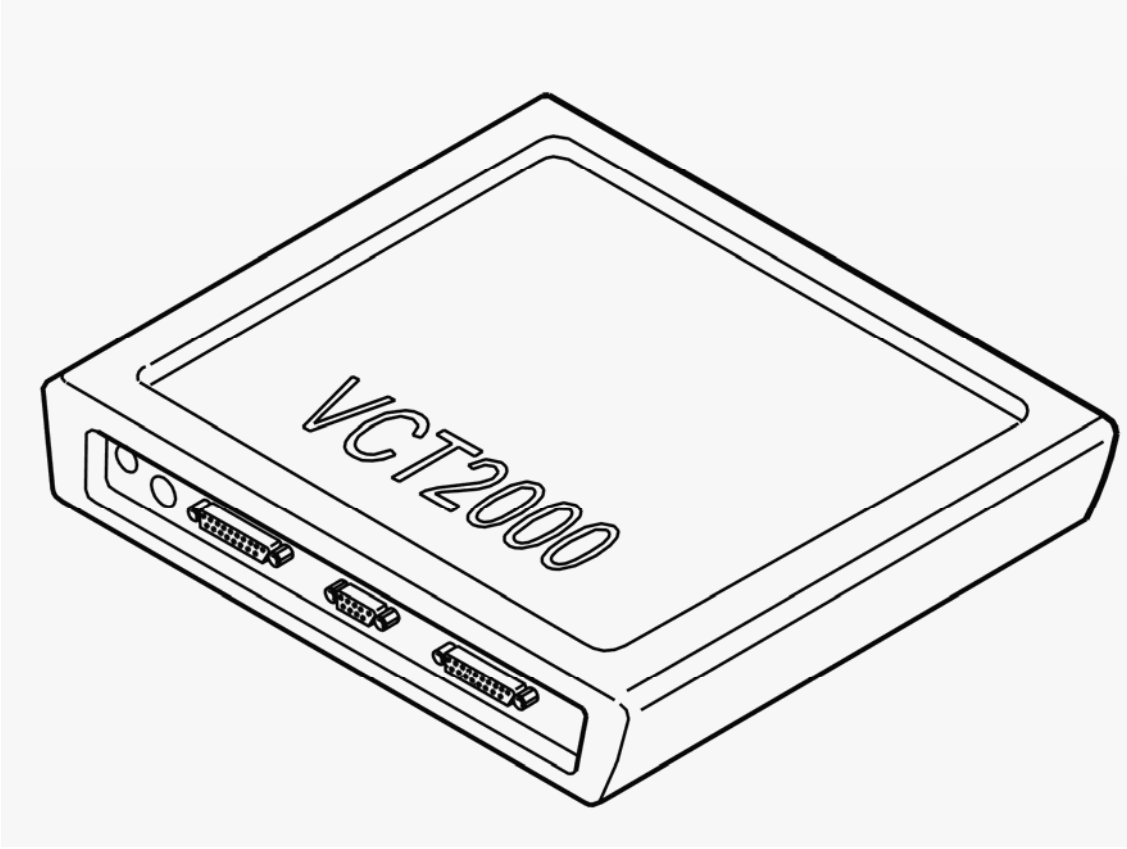


Fig. 264: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING RESISTANCE**

CHECKING RESISTANCE

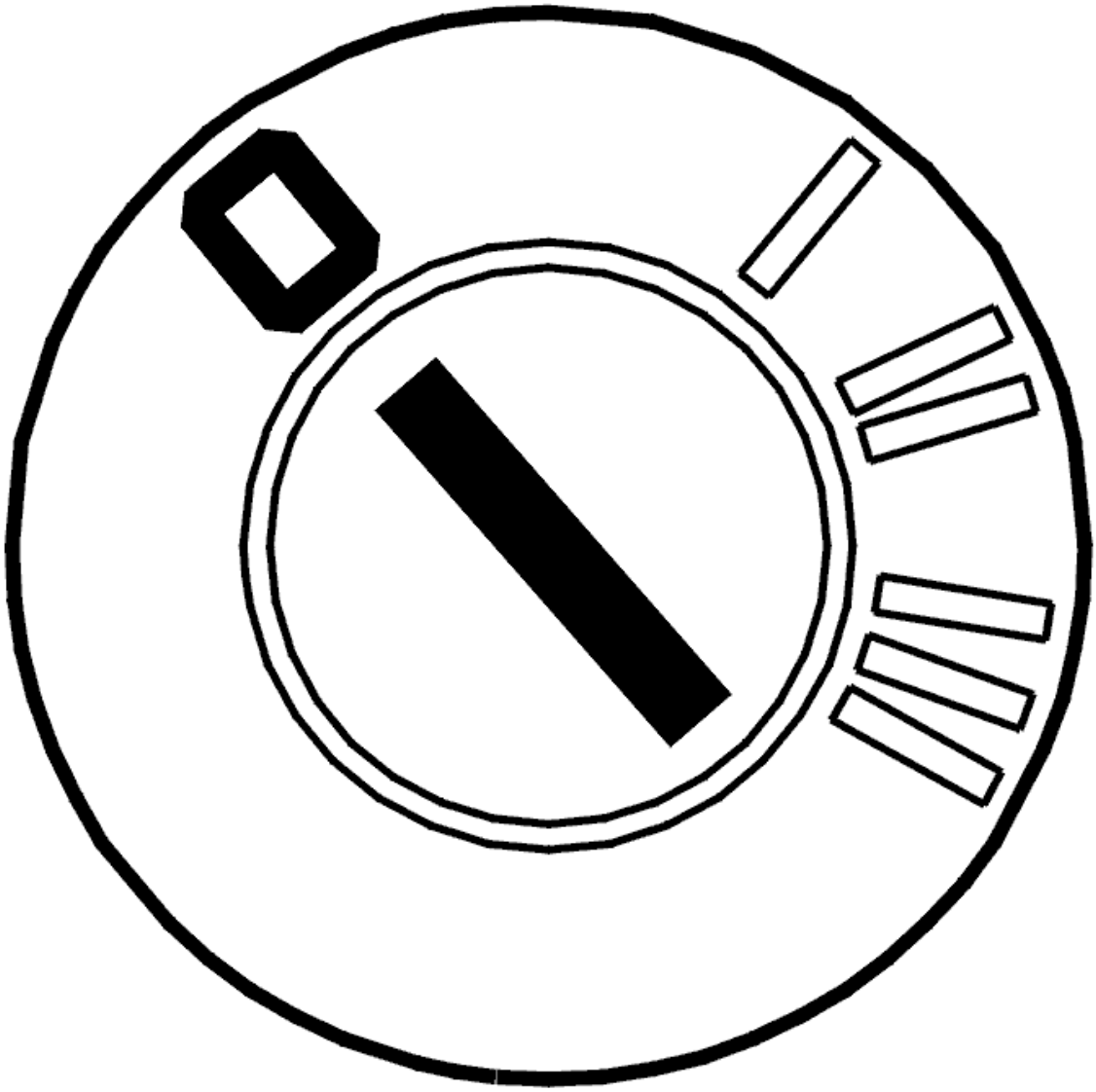


Fig. 265: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

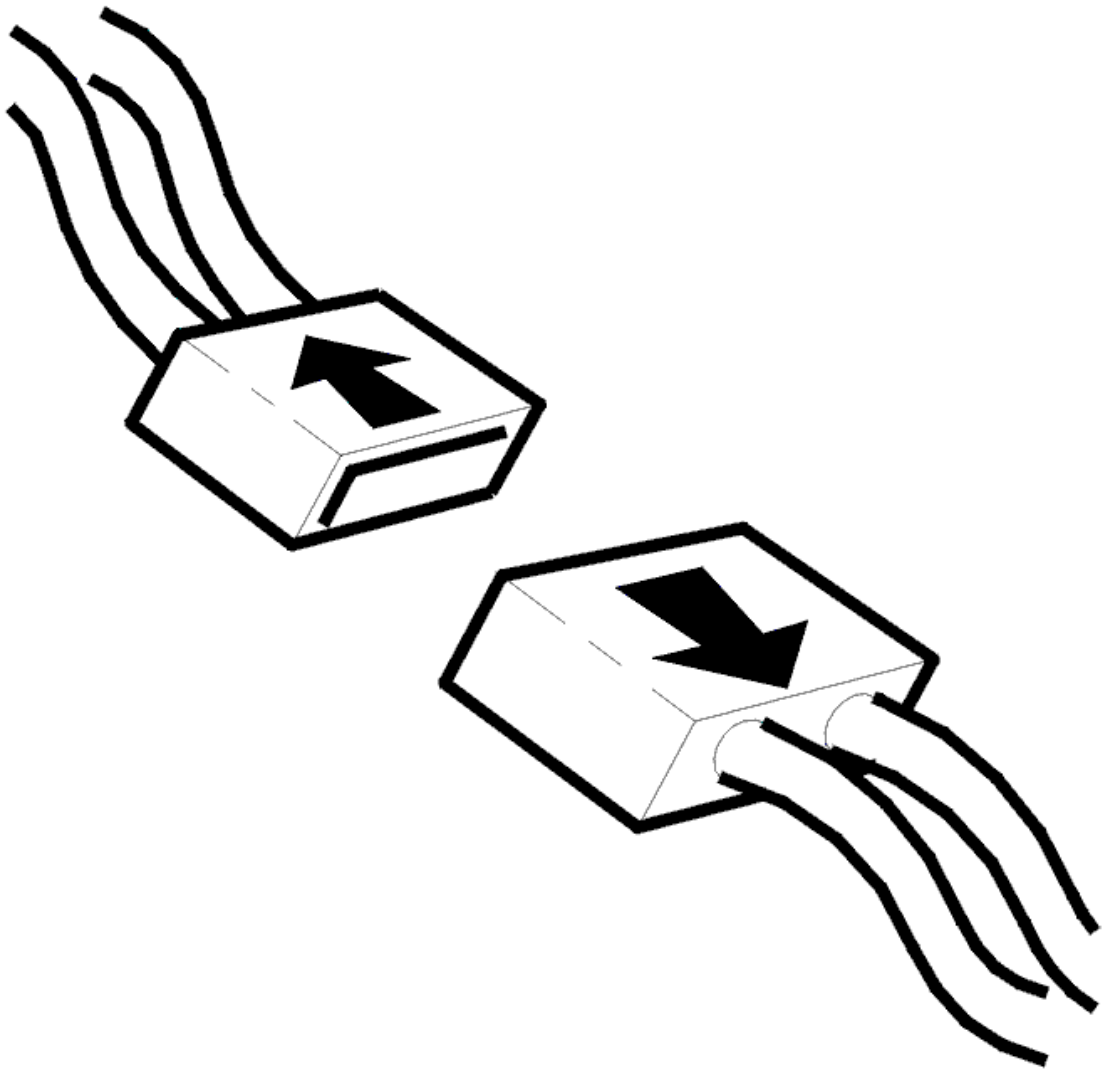


Fig. 266: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect transmission connector D.

Check solenoid SLS. Measure the resistance between terminals #D5 and #D6 on transmission connector D. The resistance should be 5-5.6 ohms at 20°C.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

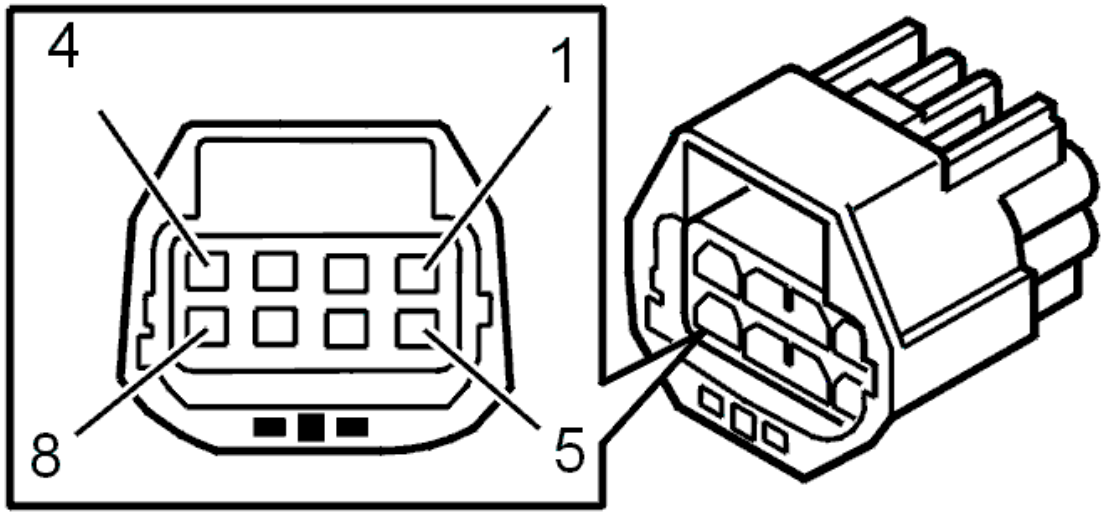


Fig. 267: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

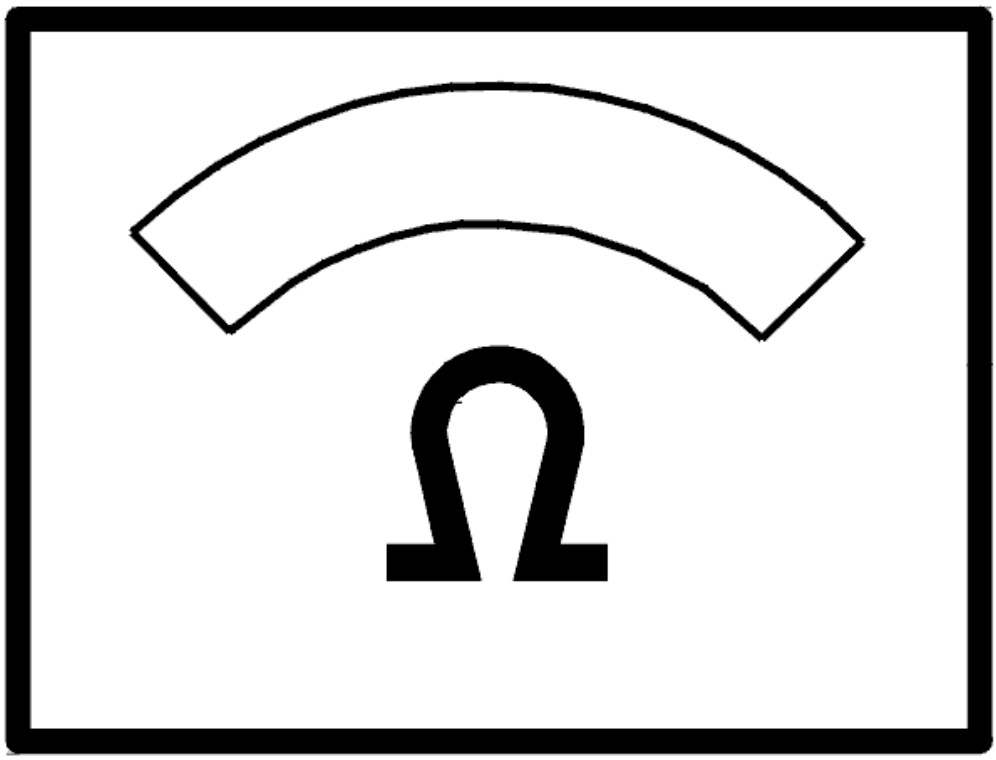


Fig. 268: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

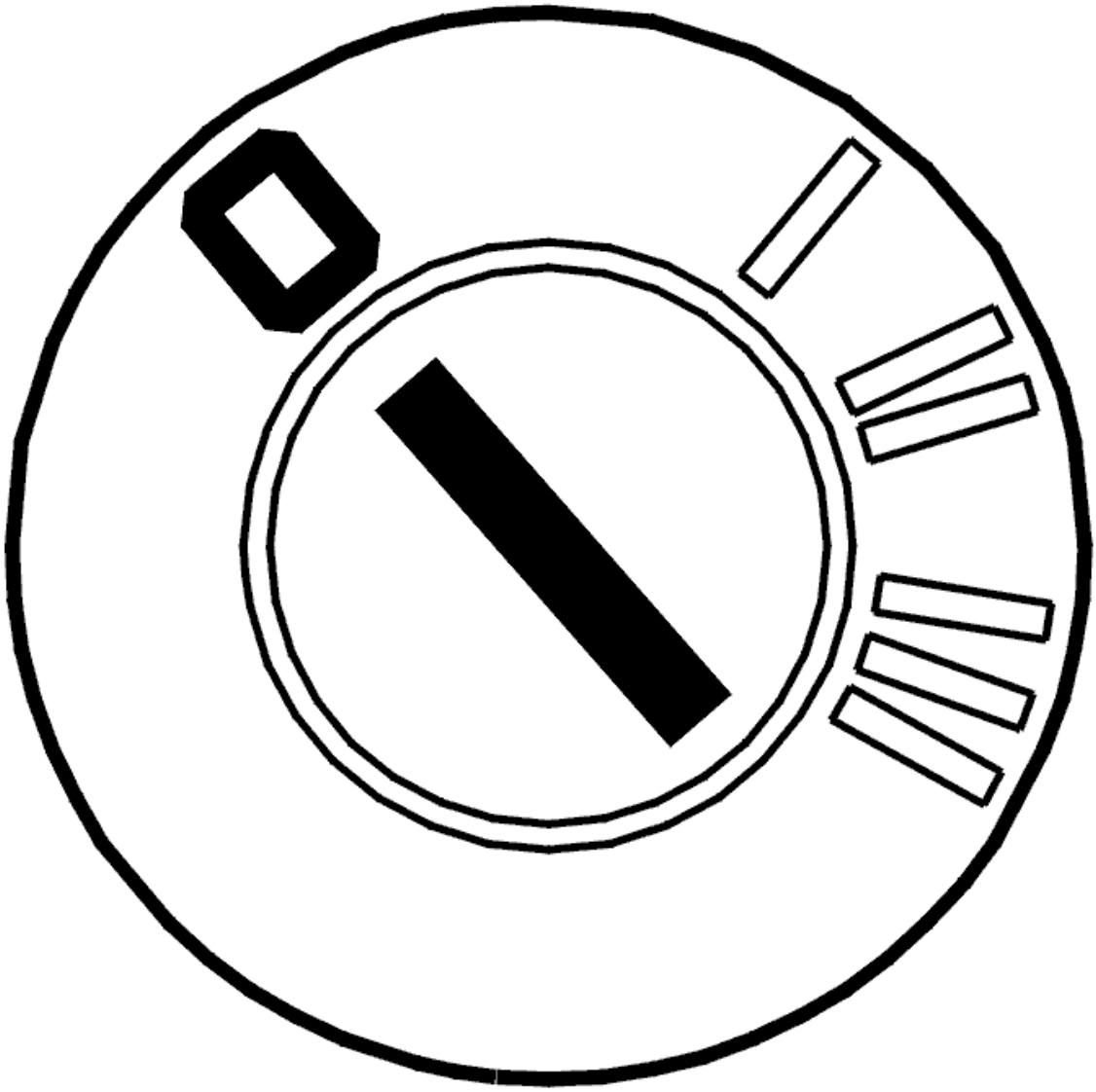


Fig. 269: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

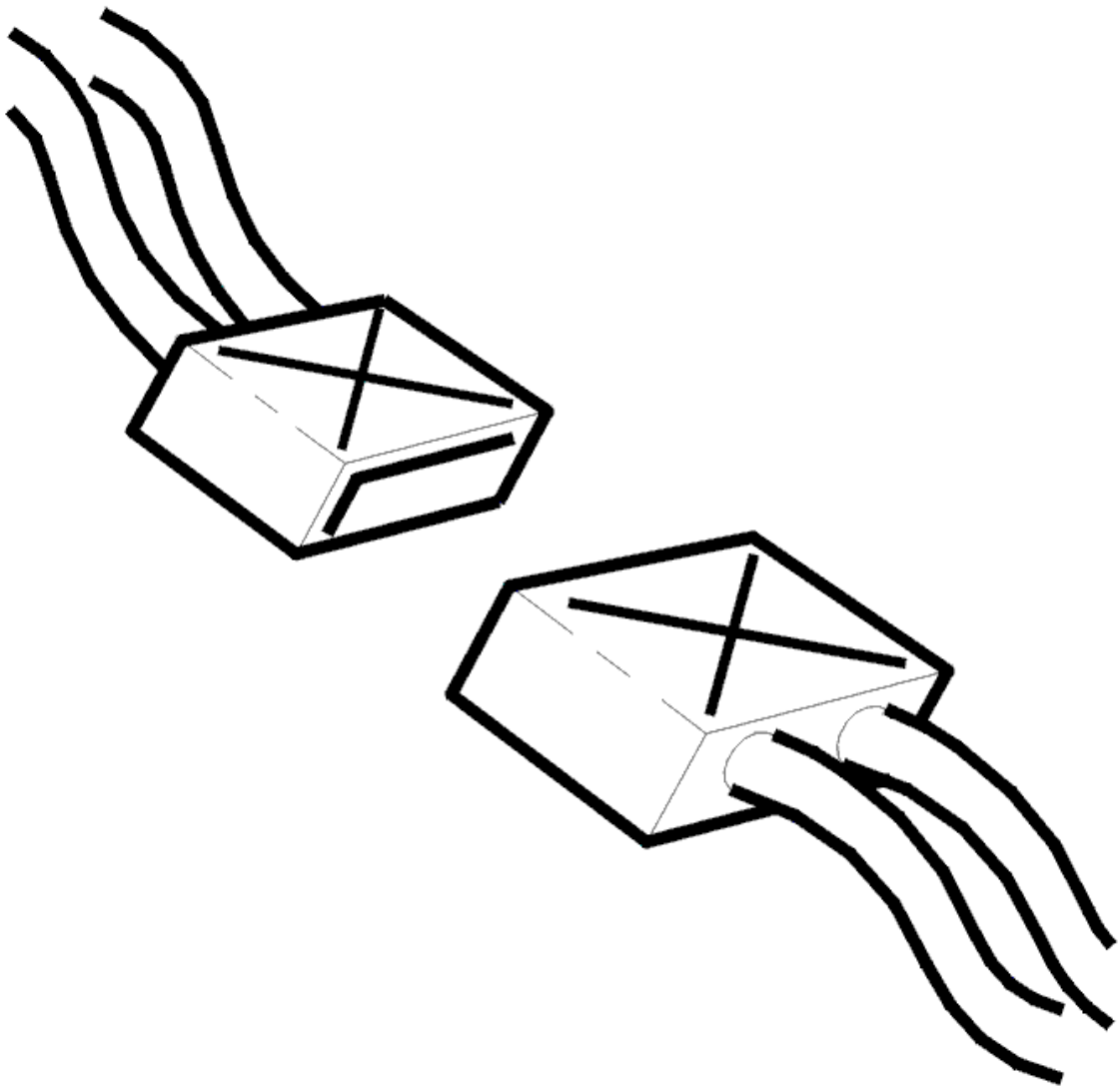


Fig. 270: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Transmission connector D disconnected.

Check the cable between transmission control module (TCM) terminal #A49 (#A49) and transmission connector terminal #D5 (control module side). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Check the cable between control module terminal #B7 (#A67) and transmission connector terminal #D6 (control module side). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

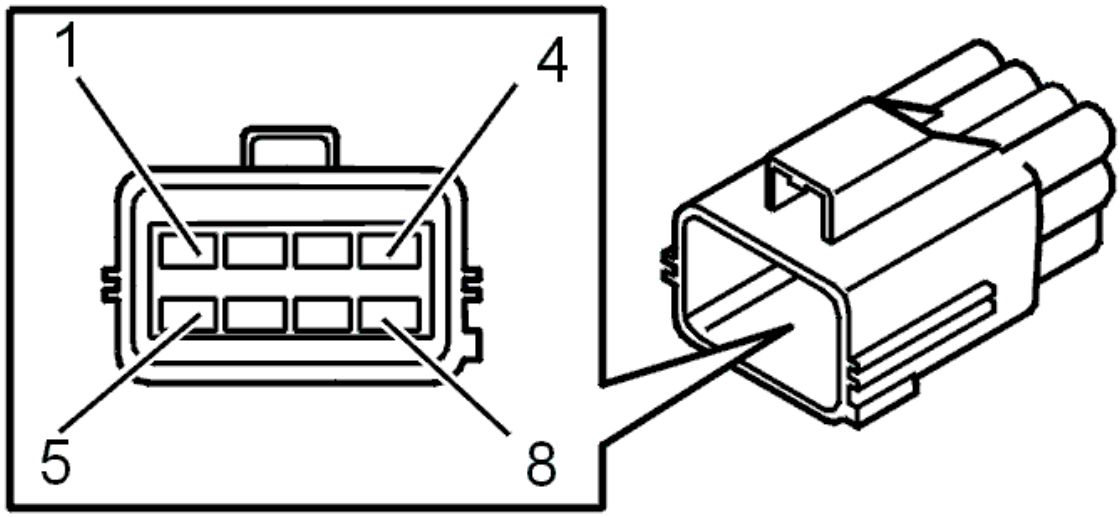


Fig. 271: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

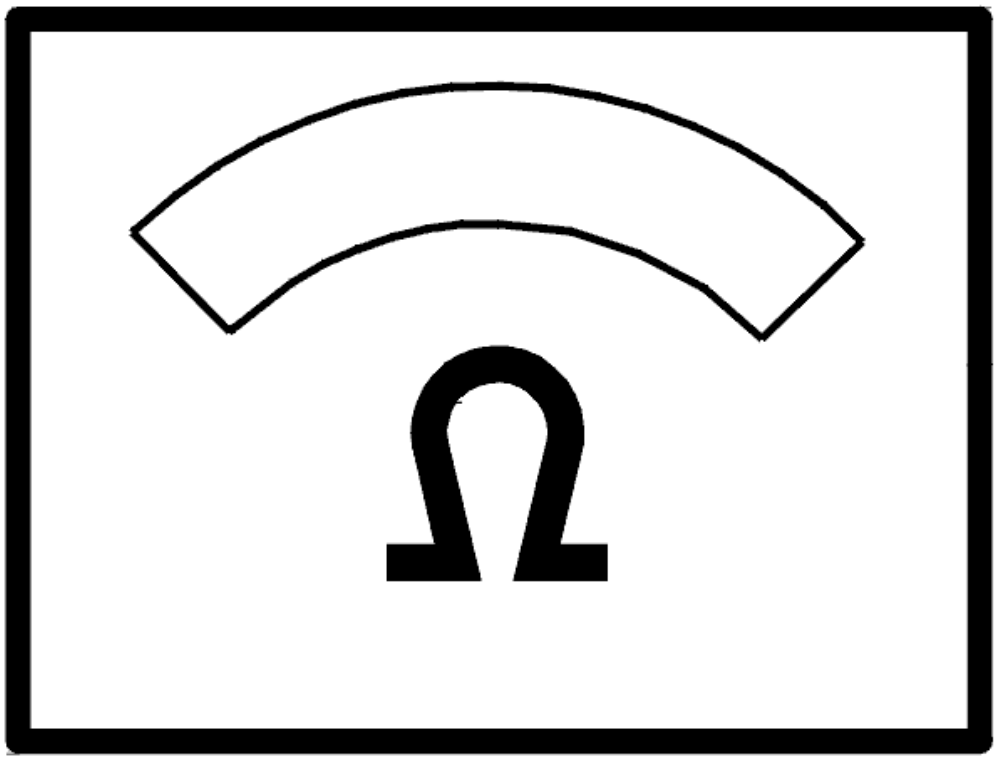


Fig. 272: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

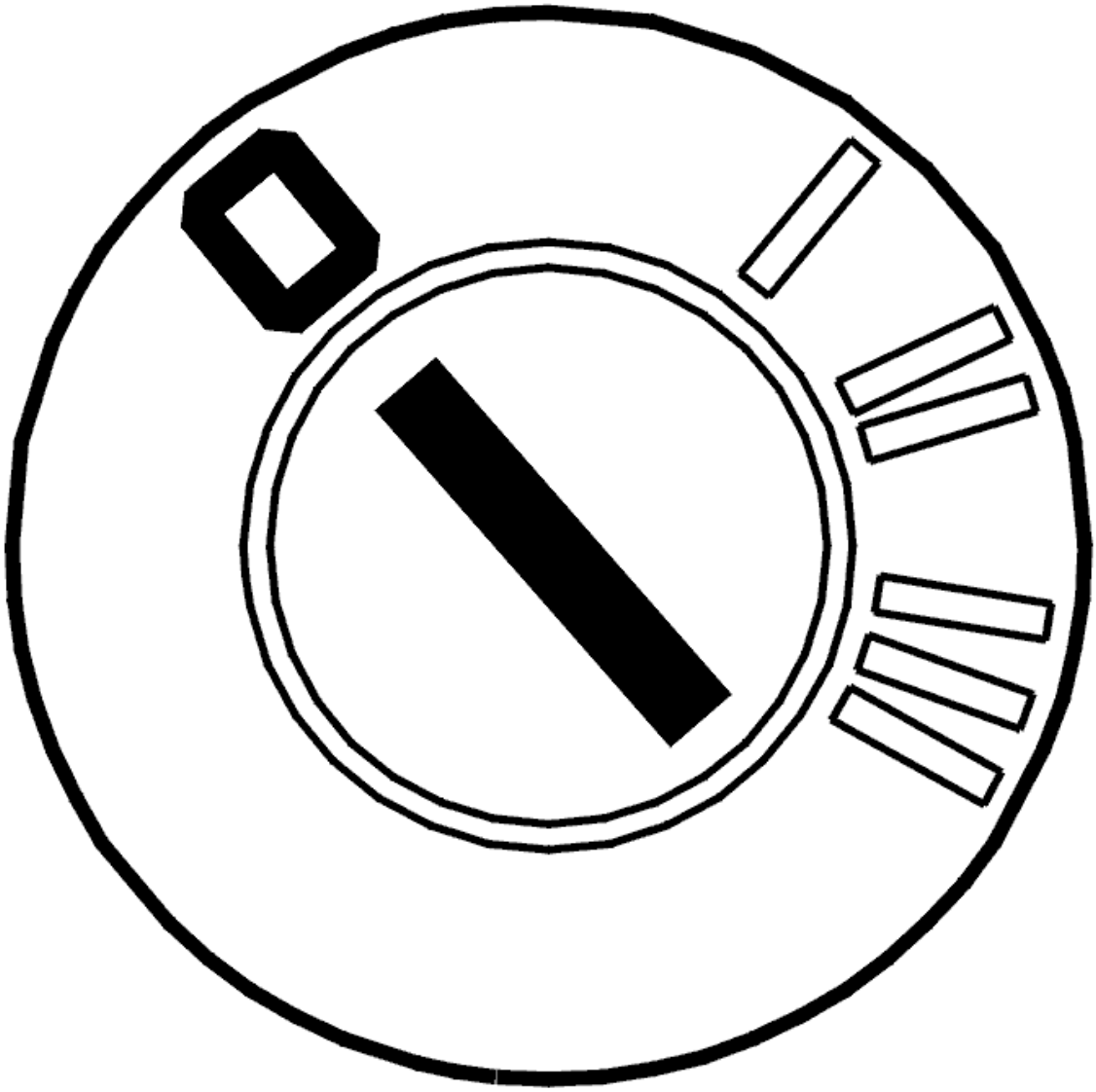


Fig. 273: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

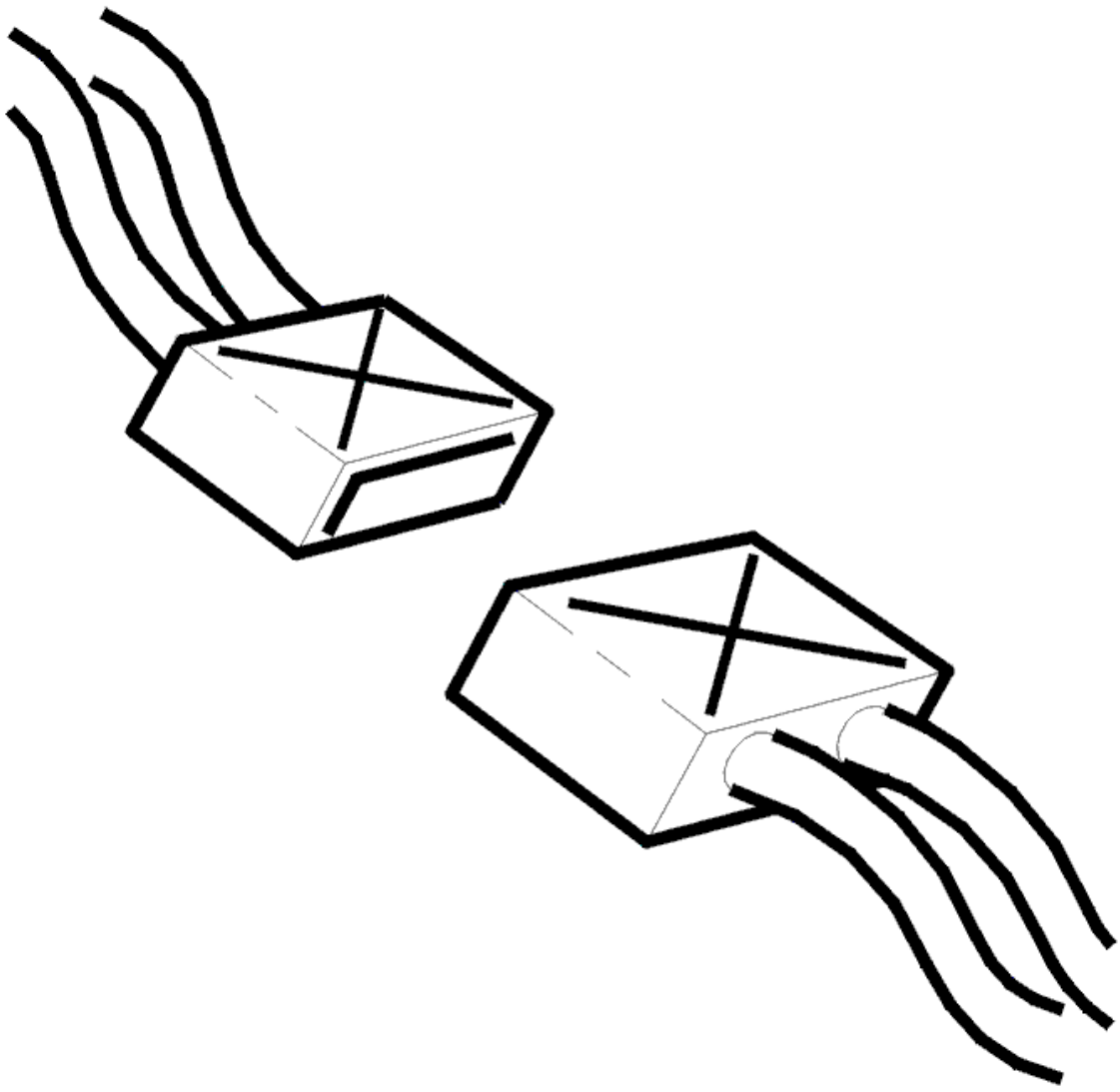


Fig. 274: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

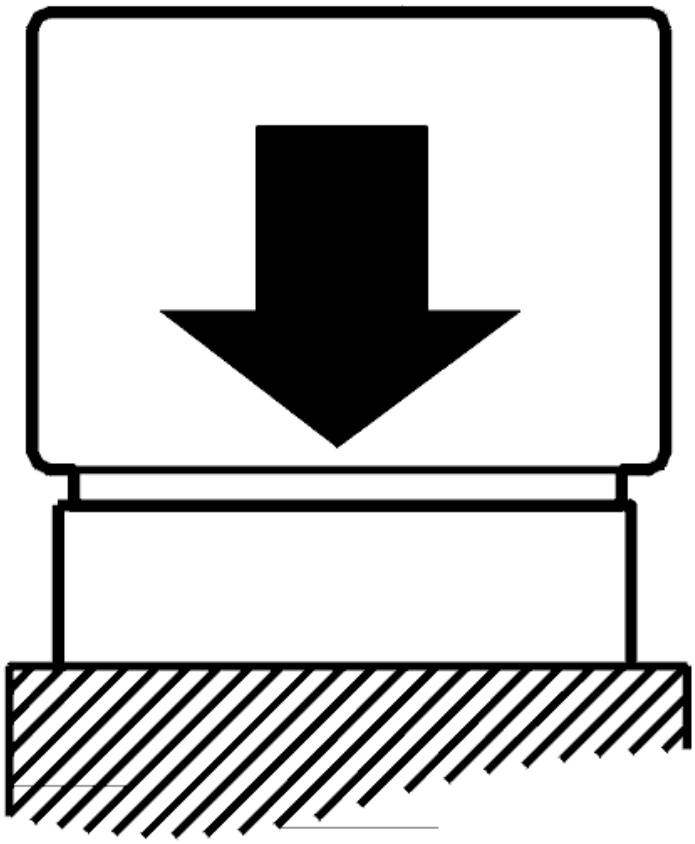


Fig. 275: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector D disconnected.

Check the transmission control module (TCM) by measuring the resistance between terminals #A49 (#A49) and #B7 (#A67) on the breakout box. The resistance must be approximately 9 kohms.

NOTE: When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

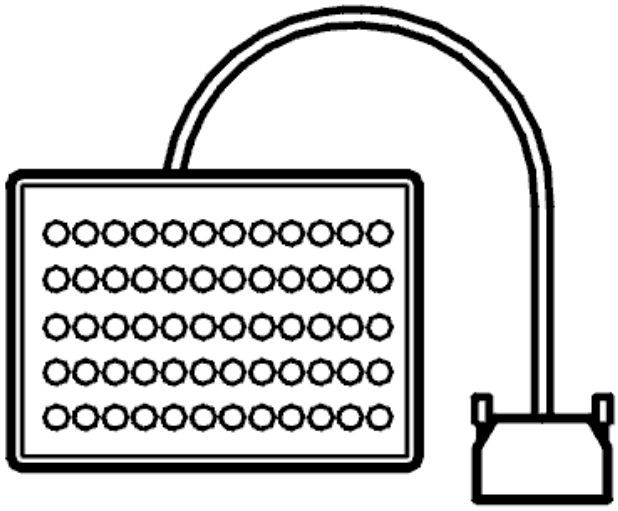


Fig. 276: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

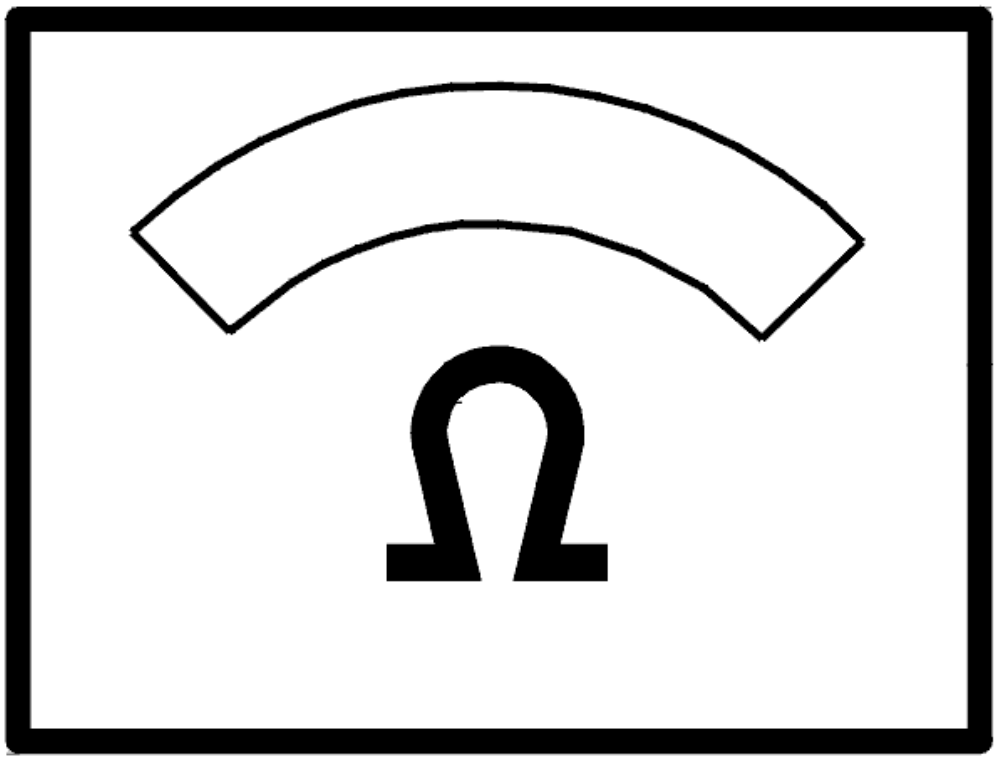


Fig. 277: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

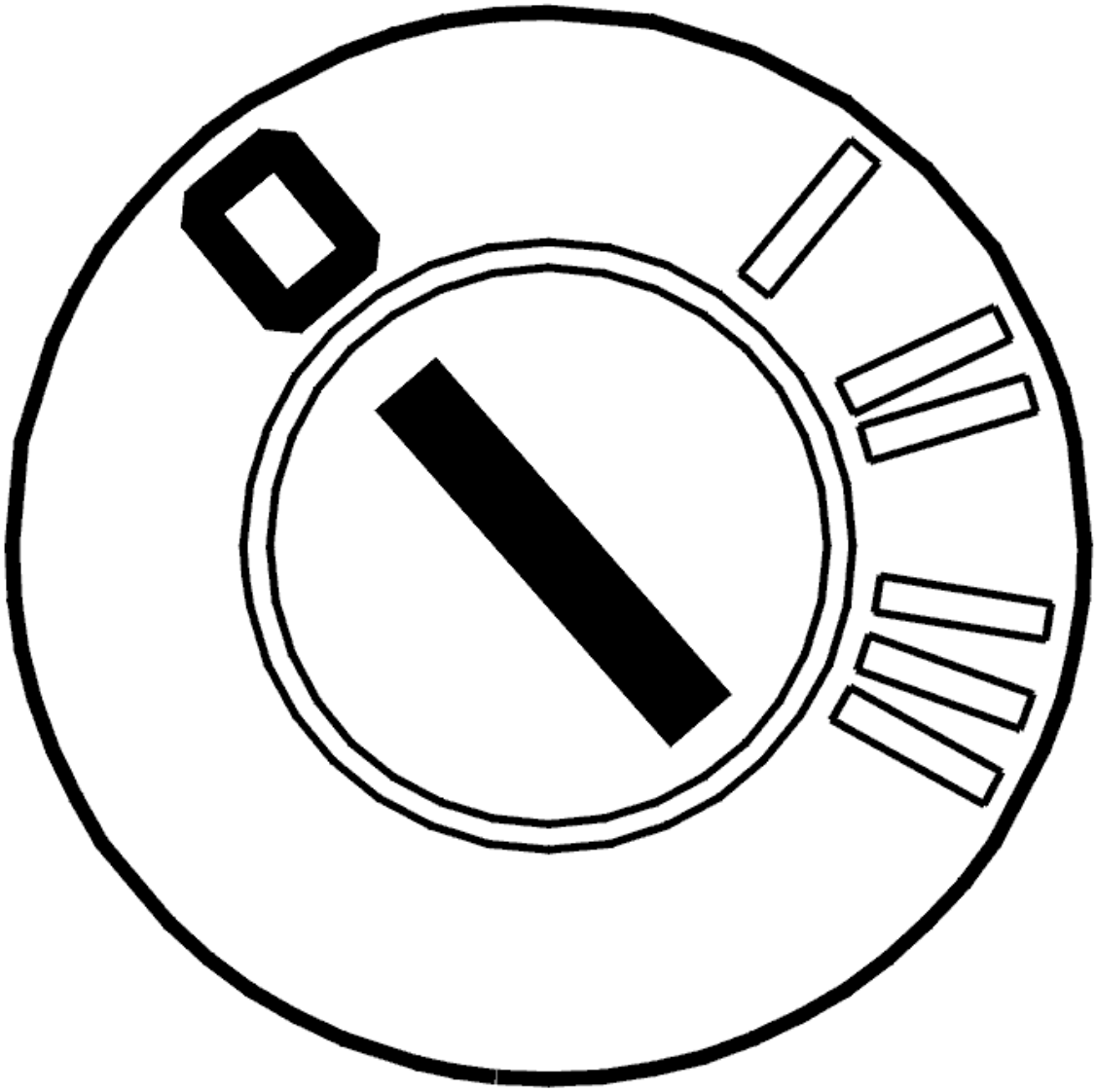


Fig. 278: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

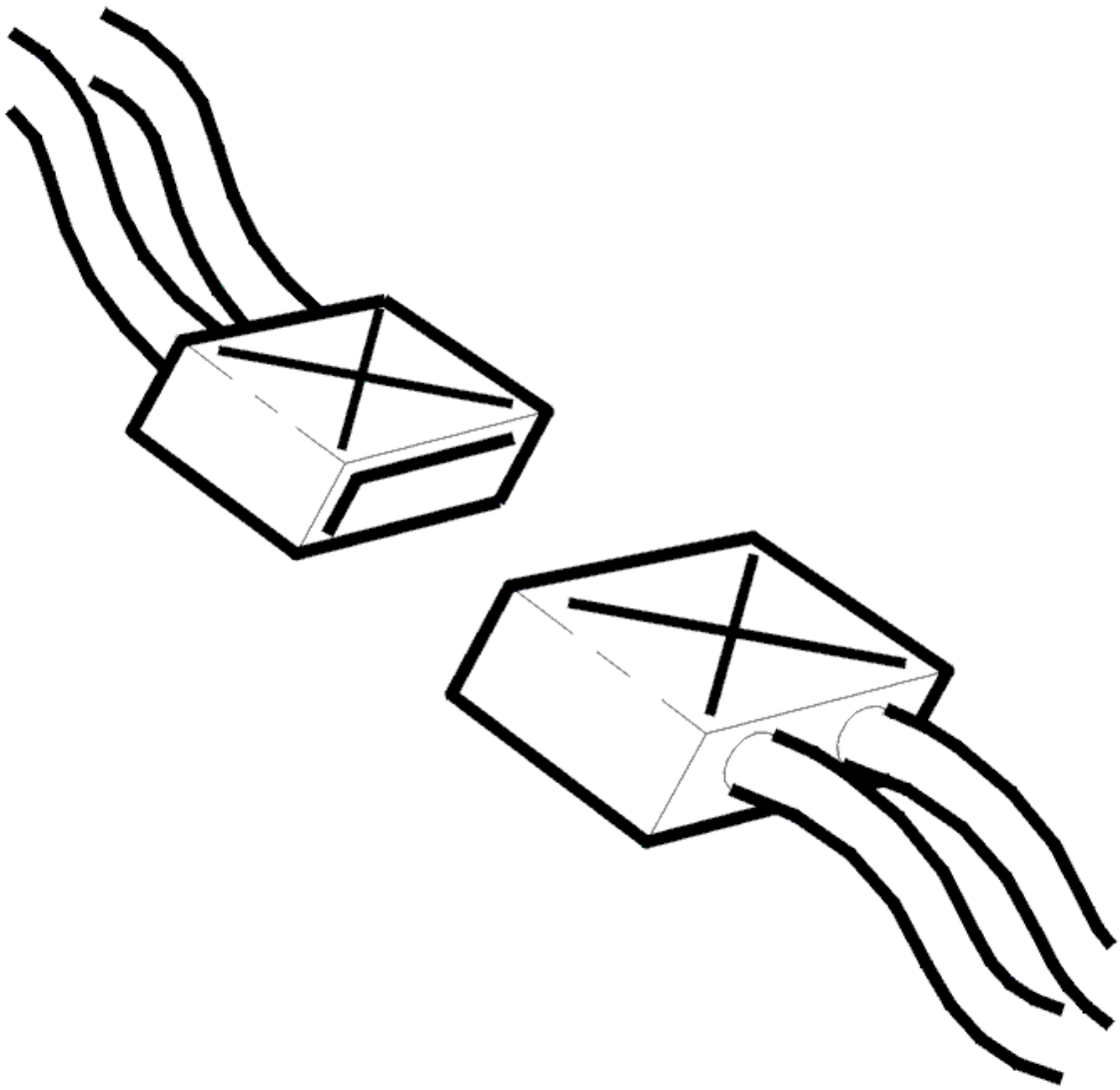


Fig. 279: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the wiring between transmission connector terminal #D5 (transmission side) and solenoid SLS terminal #1. Check the wiring between transmission connector terminal #D6 (transmission side) and solenoid SLS terminal #2. Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Check solenoid SLS by measuring the resistance between terminals #1 and #2 on the connector. The resistance must be 5-5.6 ohms at 20°C. Replace the transmission control system if the resistance is incorrect.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open and replace the transmission control system, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

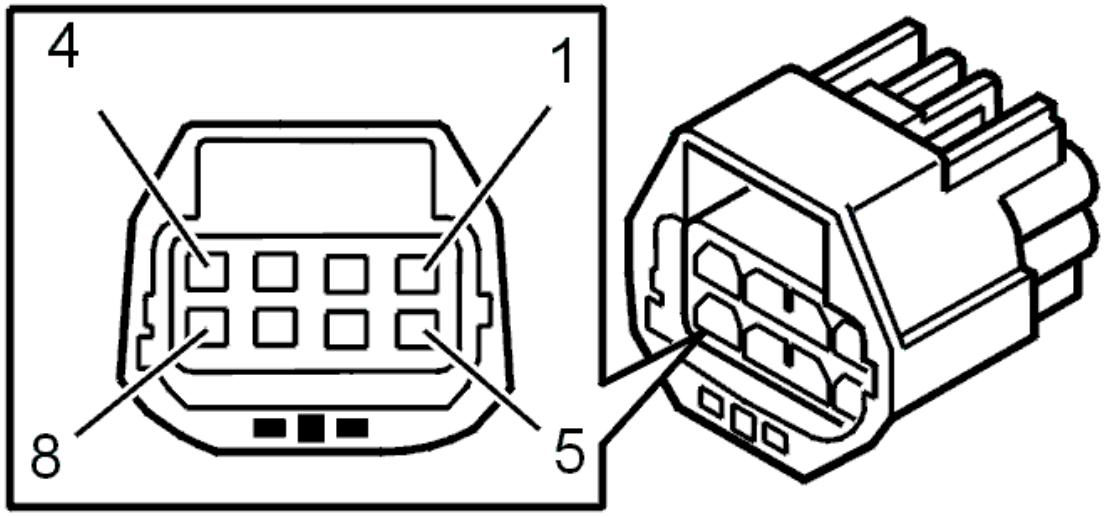


Fig. 280: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

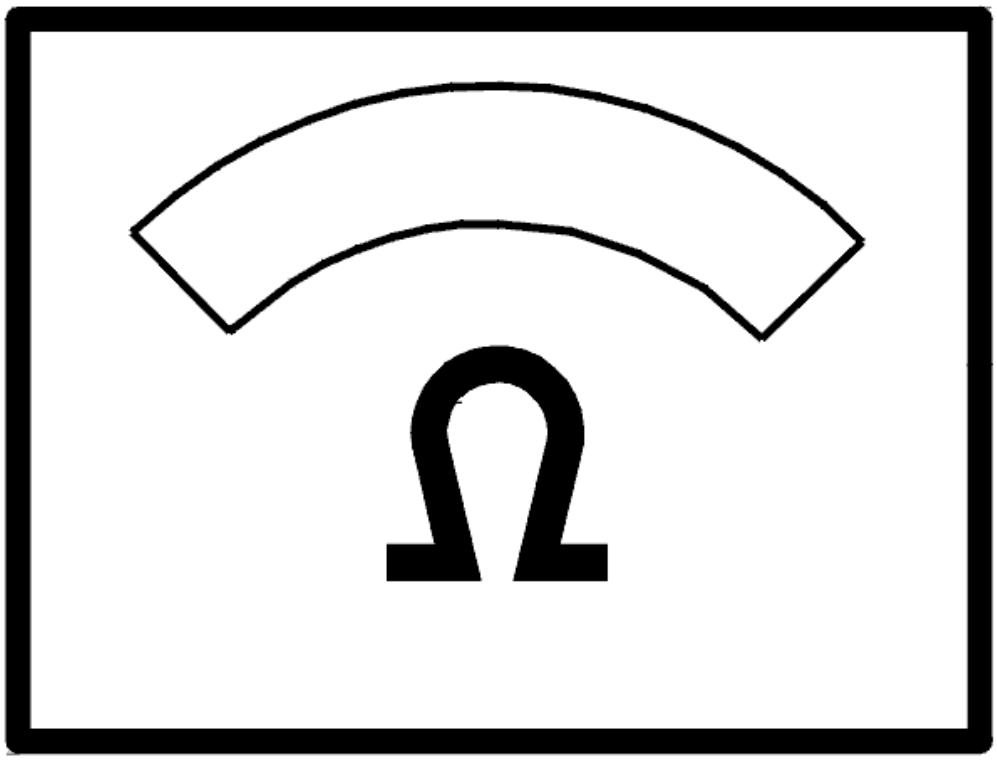


Fig. 281: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

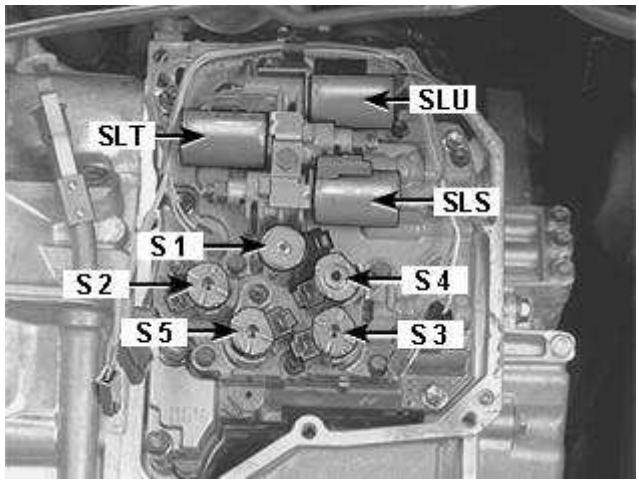


Fig. 282: Identifying S1-S5, SLT, SLU And SLS Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

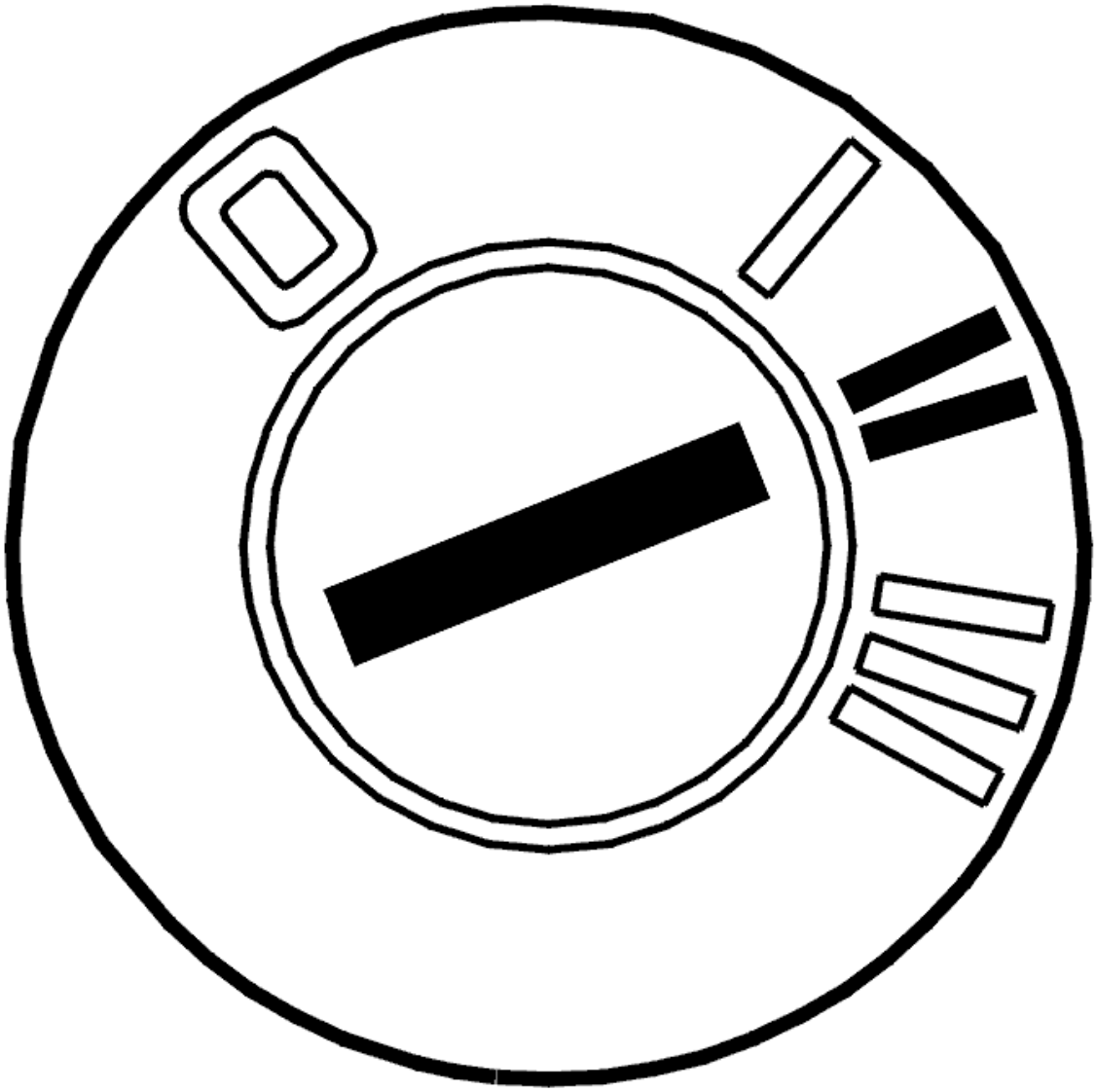


Fig. 283: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

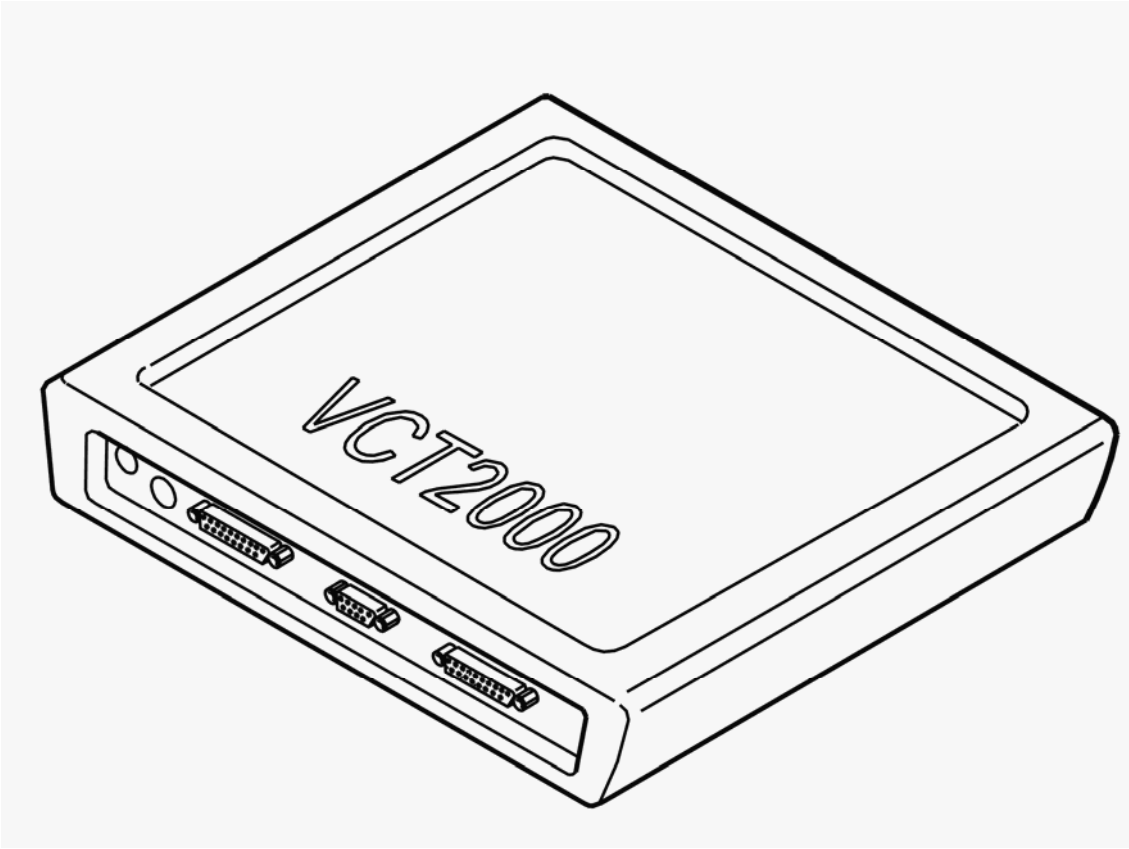


Fig. 284: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

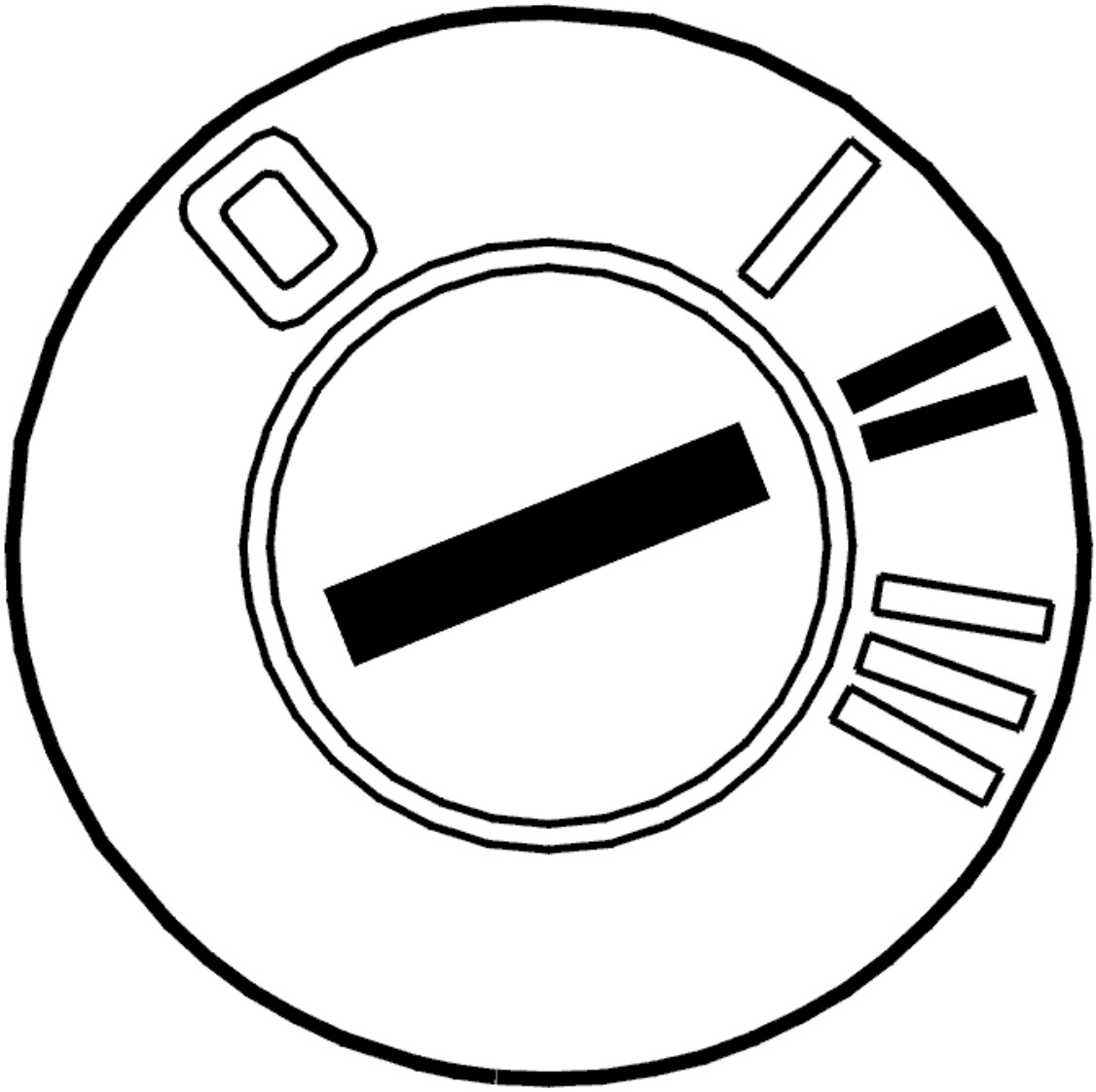


Fig. 285: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

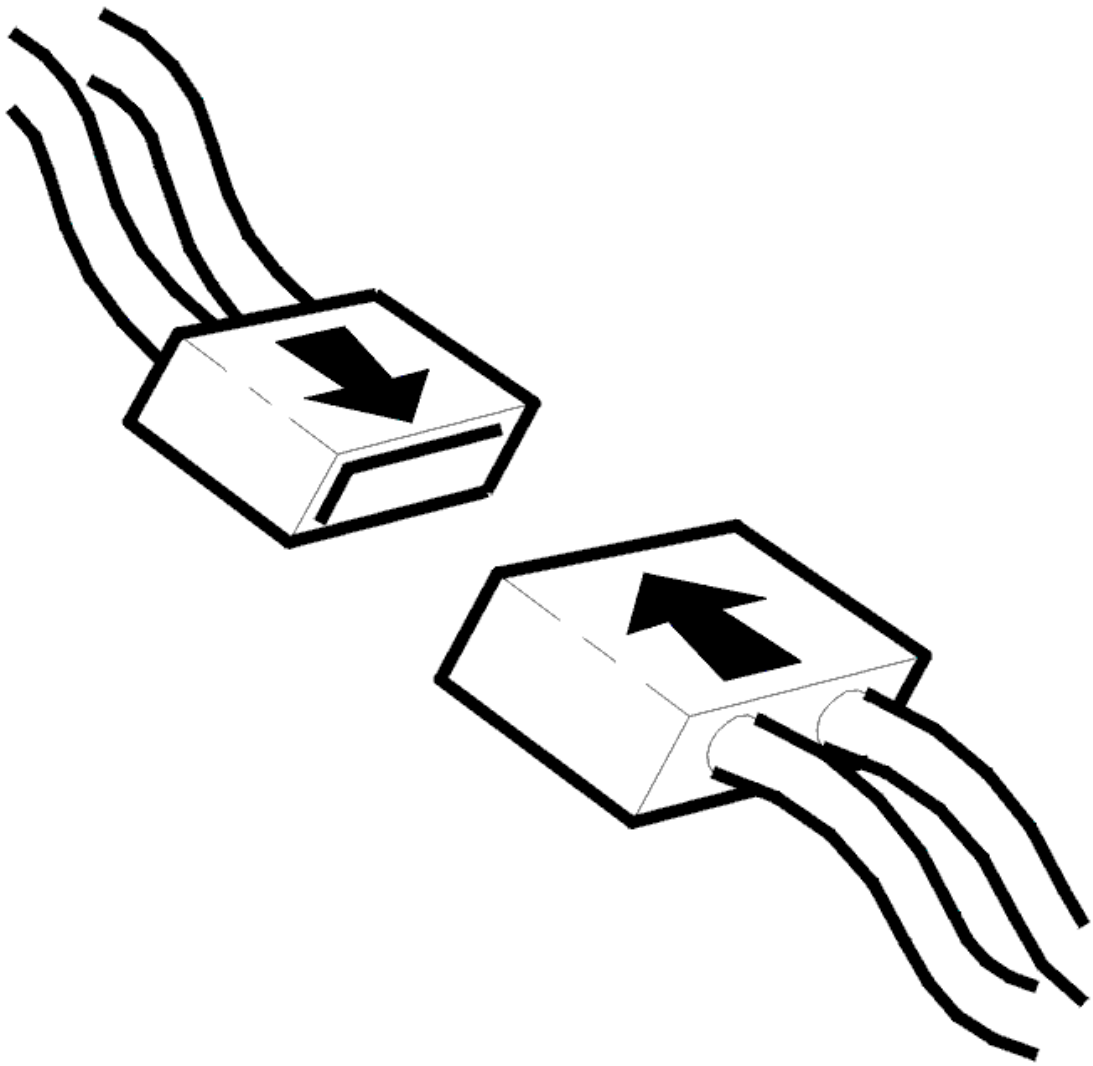


Fig. 286: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLS.

  Read off the current through the solenoid SLS circuit.

  The current should oscillate between 0 and 1000 mA.

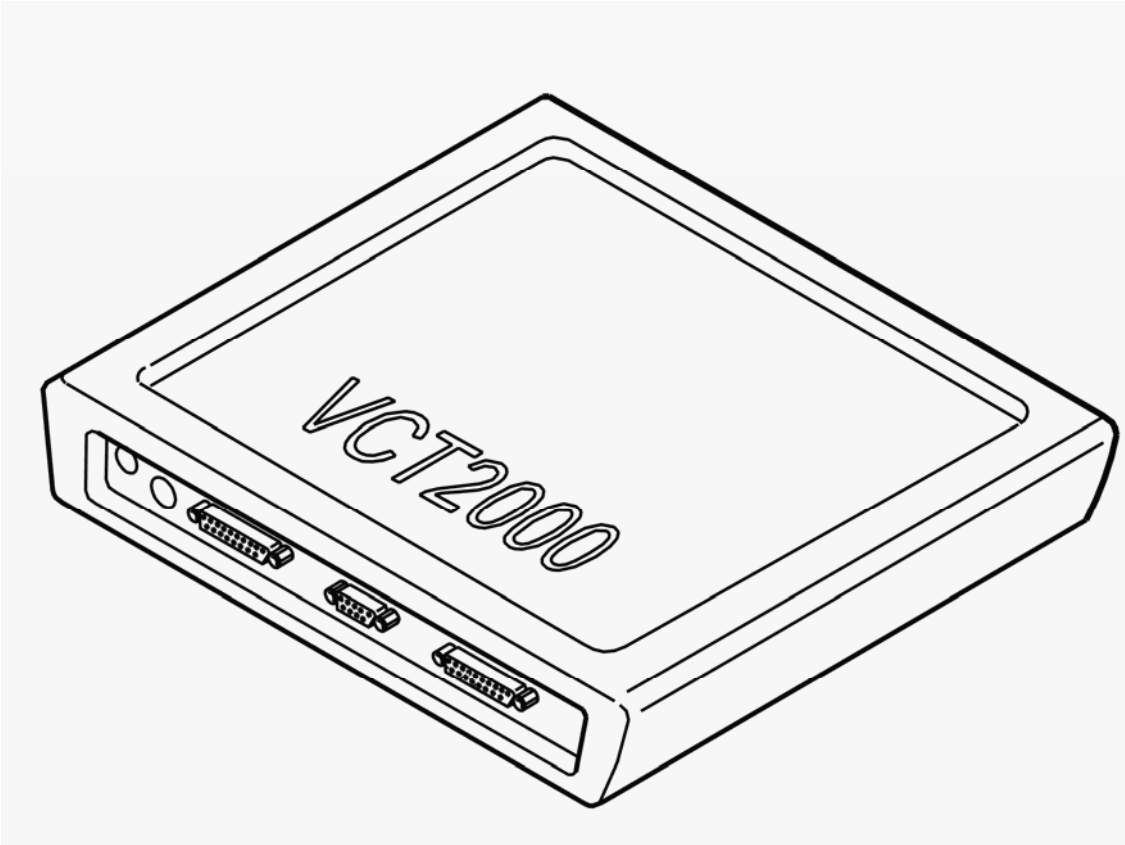


Fig. 287: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0115: SHIFT SOLENOID S3. HYDRAULIC FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

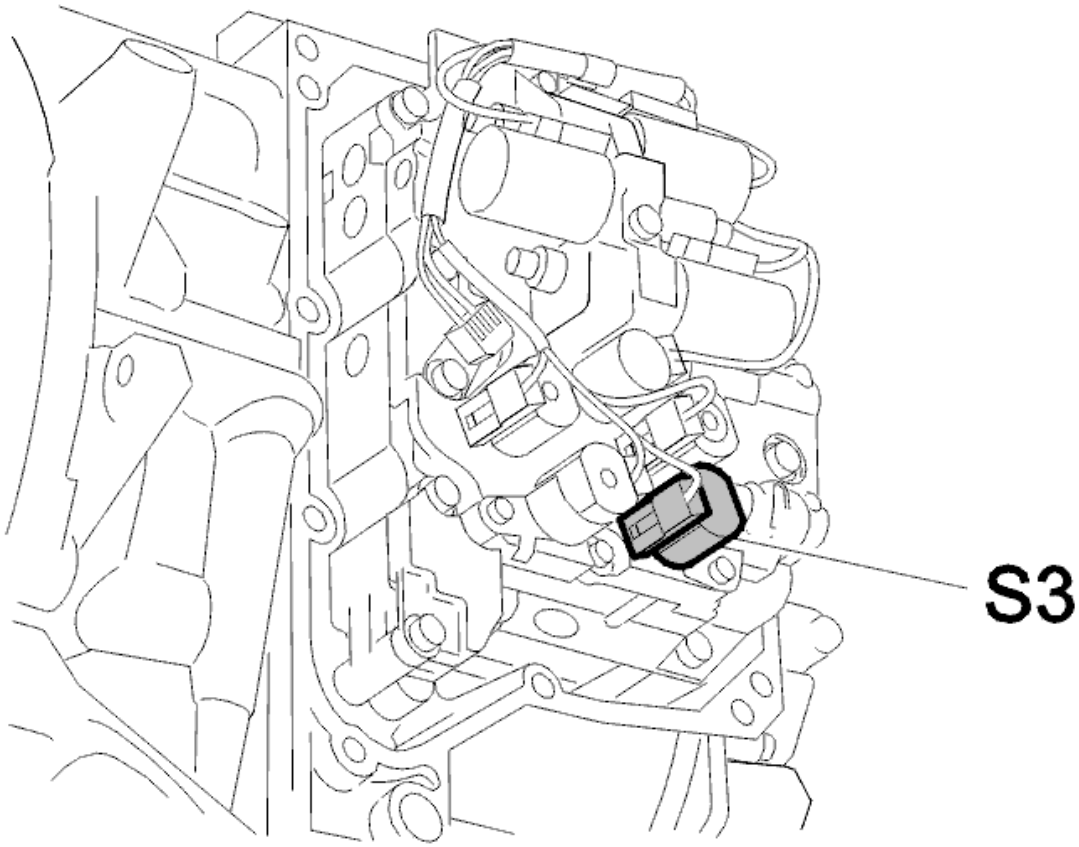


Fig. 288: Identifying Solenoid S3
Courtesy of VOLVO CARS CORPORATION

Transmission control module (TCM) receives a speed signal from the ABS system and from the automatic transmission speed sensor. The transmission control module (TCM) compares the speed signals from the ABS system and from the transmission speed sensor. The two signals should be approximately the same. The control module derives and compares the transmission speed with the vehicle speed. The transmission control module (TCM) uses this comparison to calculate gear-shift timing. Engine speed (RPM) and vehicle speed data affects the adjustment of system pressure, lock-up function control and engine torque reduction. The result is smooth gear-shifting. The transmission control module also derives and calculates the ABS system signal with the engine speed (RPM) signal. The control module also checks which gear is selected and compares it with the calculated gear. The ABS system and transmission speed signals should be almost identical. The engine speed (RPM) signal should be greater or lower than the ABS system speed signal (note that vehicle speed must be above 30 km/h, engine speed (RPM) above 1400 RPM and transmission oil temperature over 20°C). Diagnostic trouble code (DTC) TCM-0115 is stored if the control module detects that the transmission speed and engine speed (RPM) signals do not correspond with the programmed values and that an "incorrect" gear is selected. This is because solenoid S3 is stuck in the open or closed position.

Substitute Value

- The transmission control module (TCM) Emergency mode II program is initiated.

Possible Source

- The solenoid has stuck in the open or closed position.
- Defective solenoid.

Fault symptom[s]

- General orange warning lamp lit.
- No shifting.
- Harsh gear shifting.
- No lock-up function.

HINT: Harsh shifting because there is no line pressure solenoid SLT control. This results in constant maximum line pressure.

HINT: No shifting because the control module prevents activation of the solenoids.

HYDRAULIC FAULT

CHECKS

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for transmission function. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

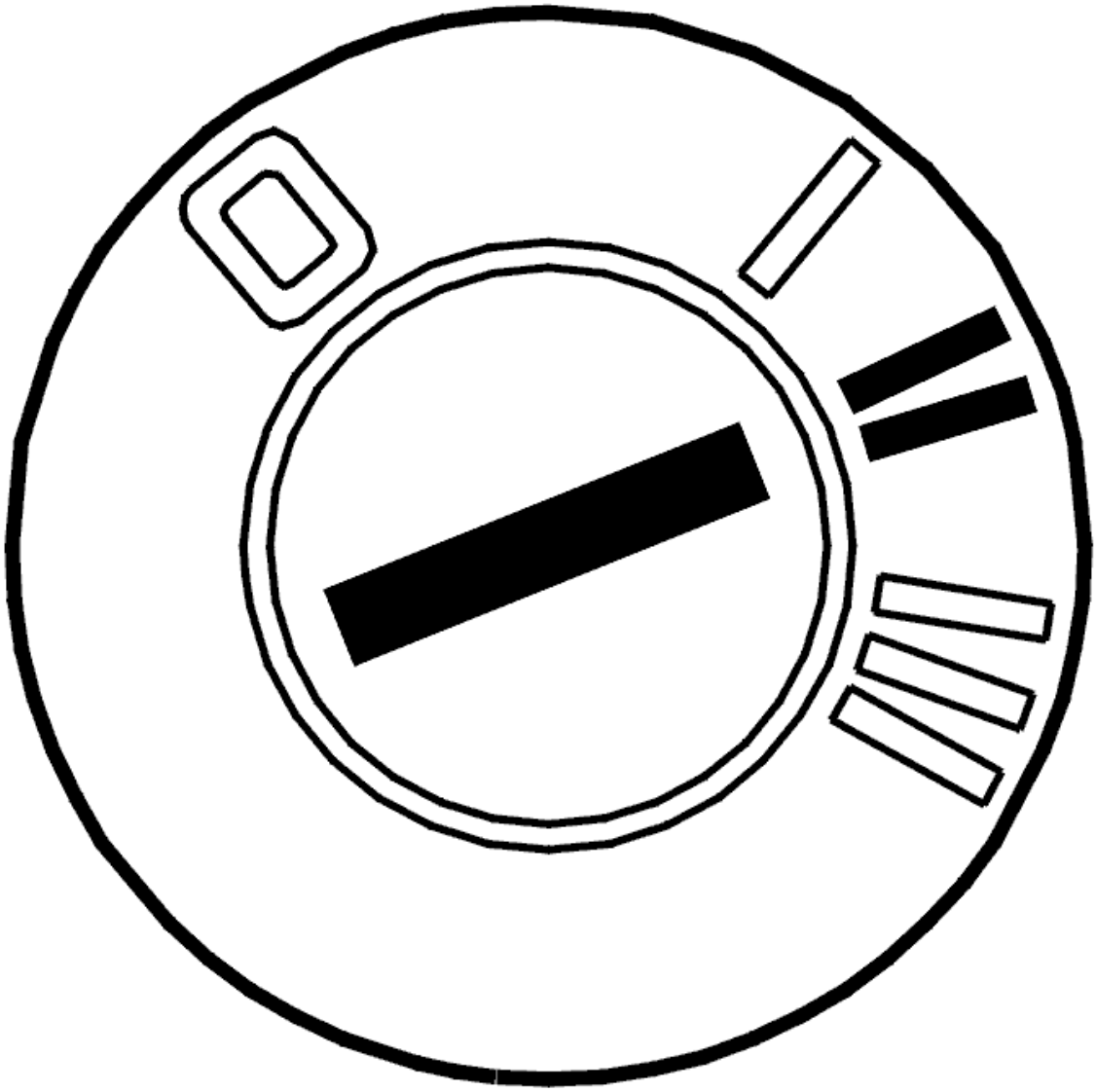


Fig. 289: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check the oil level. If the oil level is low check for leakage. Top up with oil.

  Check the quality of the oil.

  Replace the transmission fluid if the fluid smells burnt.

  Check the transmission fluid for metal shavings. Take a sample using the dip stick.

  Replace the transmission if the transmission fluid contains metal shavings.

Other information:

- To replace the transmission fluid, see **TRANSMISSION FLUID, REPLACING**
- To check the level, see **OIL LEVEL, CHECKING**
- To check the quality of the transmission fluid, see **OIL GRADE, CHECKING** .

Select an alternative below:

1. No fault detected

   Refer to **CHECKING SHIFT SOLENOID S3**

2. Transmission fluid replaced, the level was low or quality was poor

   Refer to **RESETTING THE ADAPTATION**

3. The transmission fluid contains metal shavings.

   Refer to **REPLACING THE TRANSMISSION**

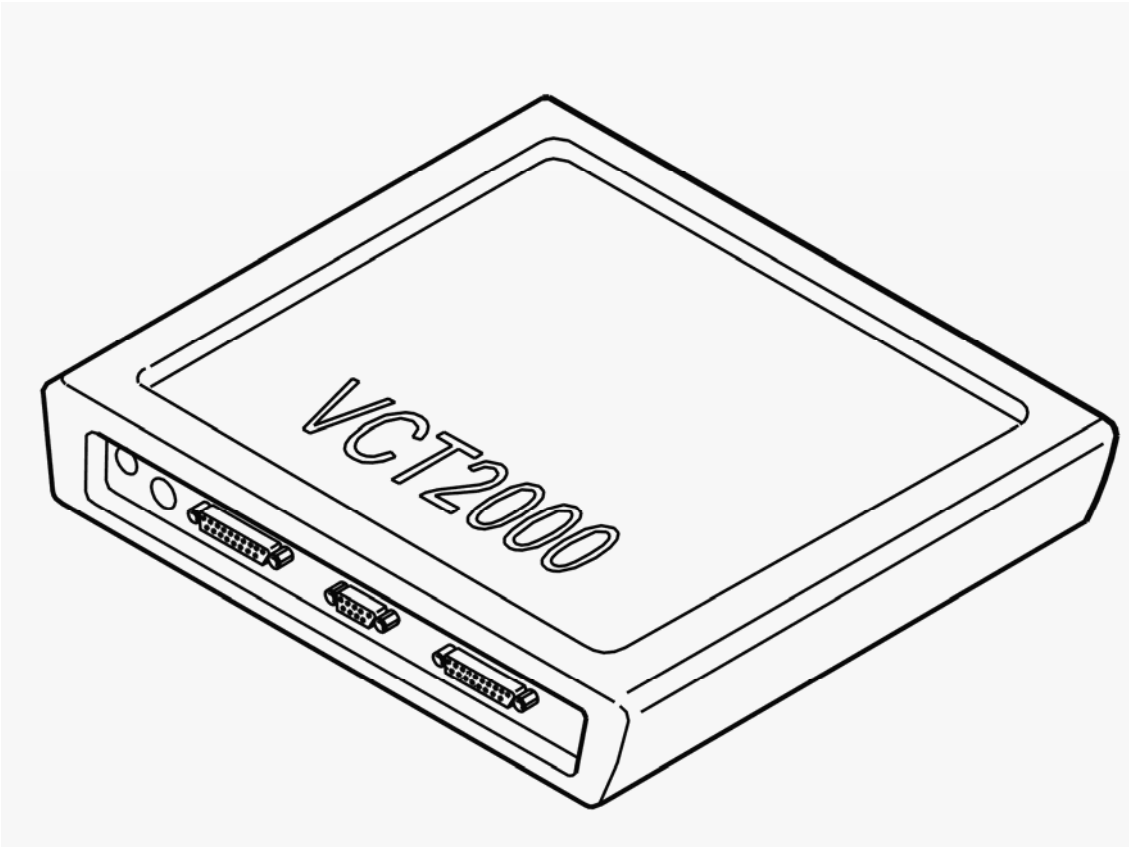


Fig. 290: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

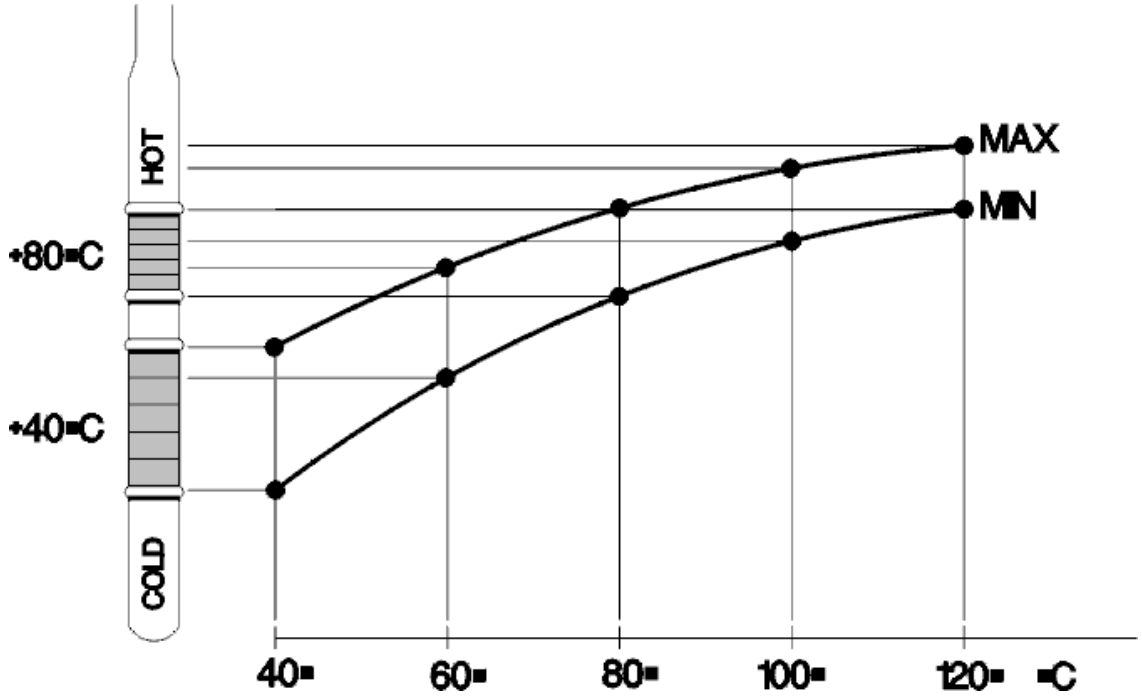


Fig. 291: Identifying Oil Level Temperature Graph
Courtesy of VOLVO CARS CORPORATION

CHECKING SHIFT SOLENOID S3

NOTE: The transmission must not be colder than room temperature when activated.

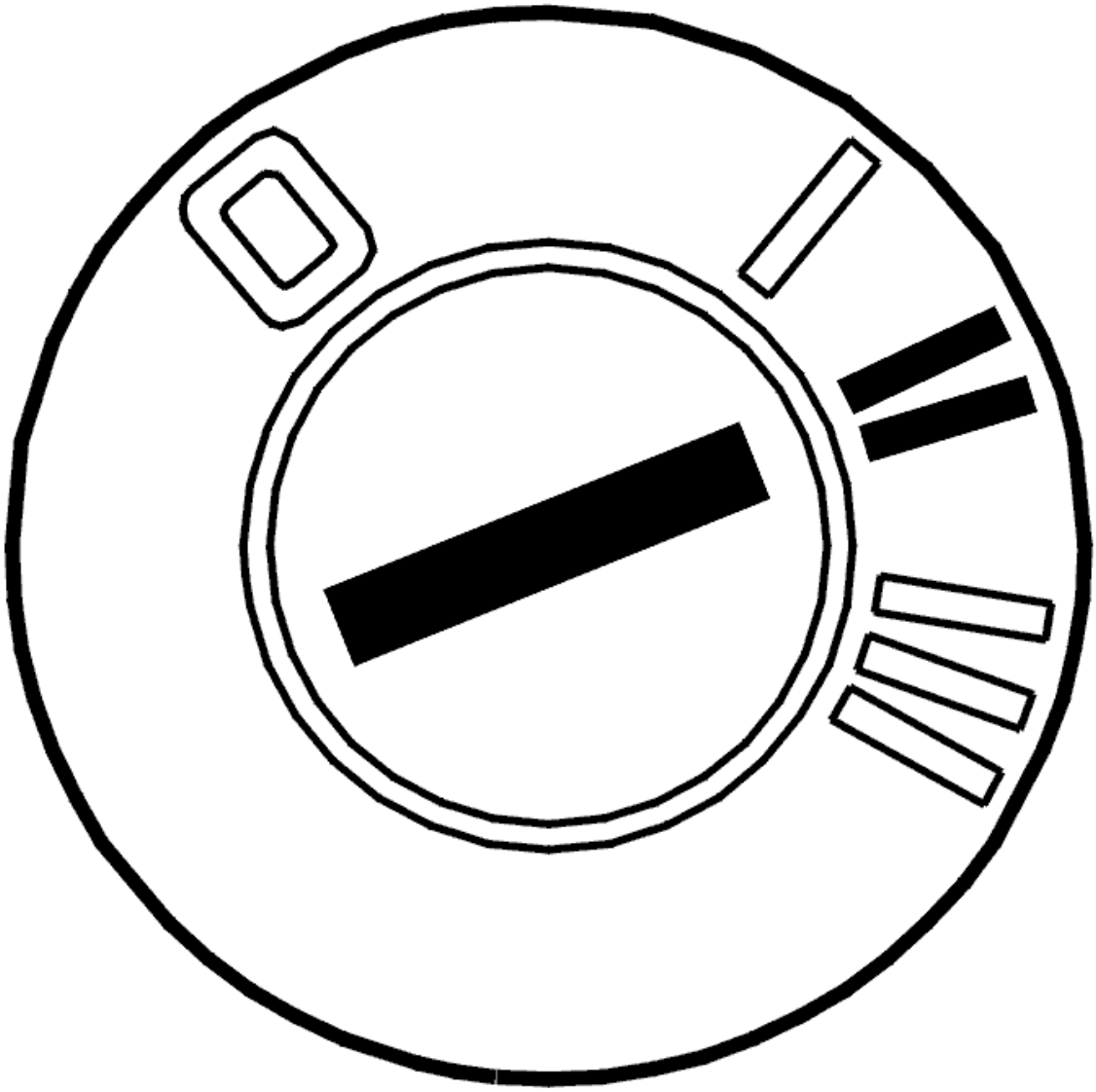


Fig. 292: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the transmission and control module connectors. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION**
- Ignition on
- Activate shift solenoid S3.

  A "click" should be heard when the solenoid is activated. Use a stethoscope to hear the click more clearly.

  There is a mechanical fault if the solenoids do not click. If the solenoid "clicks" the cause of the fault is contact resistance and oxidation.

  Other information

- To access the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To access the control module connector, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

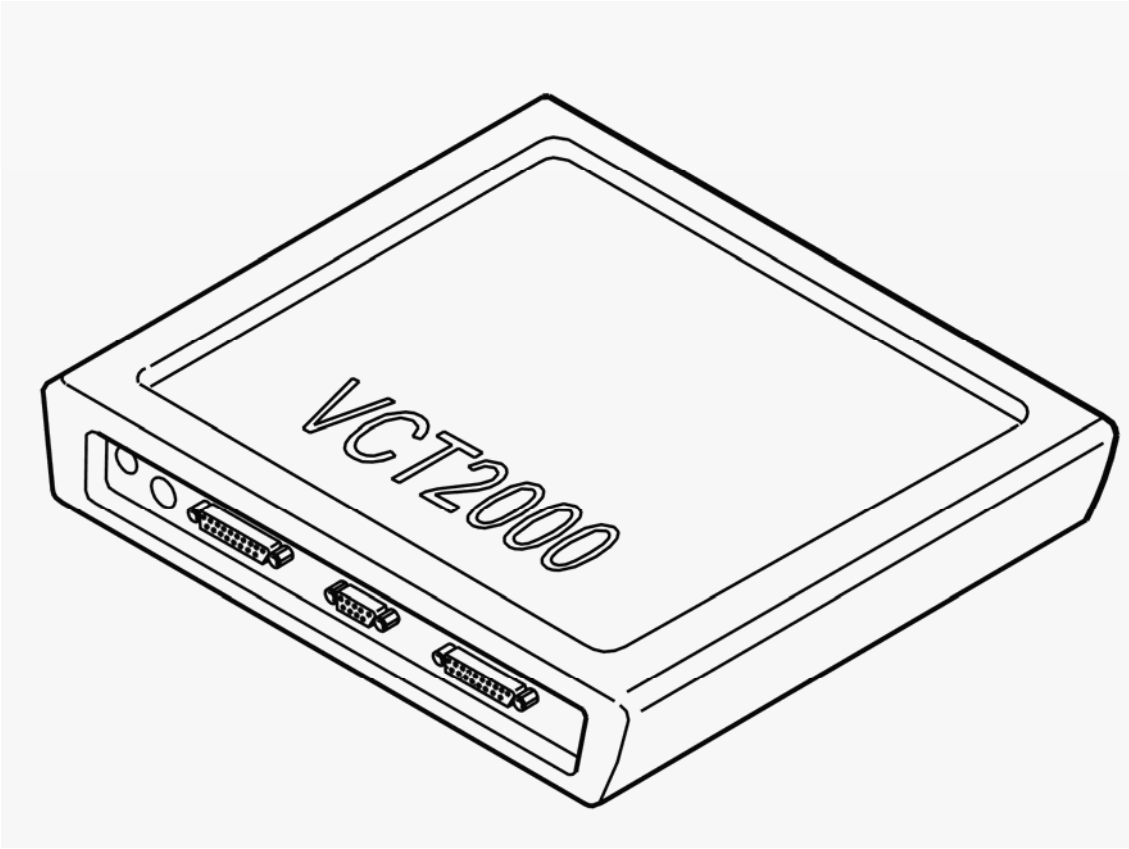


Fig. 293: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was there a click from the solenoid?

- **YES**

  Refer to **CHECKING NOISE IN THE TRANSMISSION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

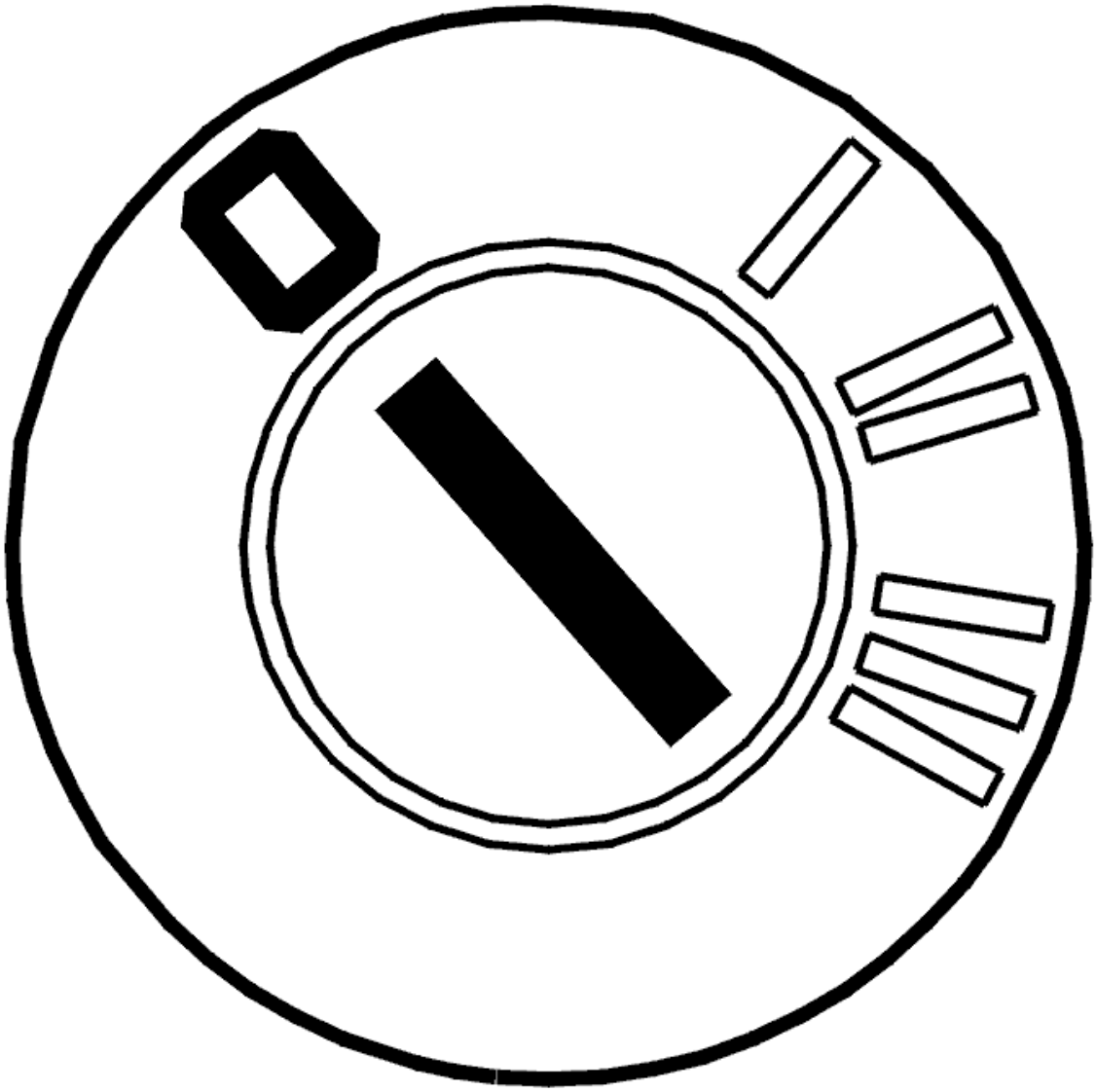


Fig. 294: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check that there is no metal shavings or dirt in the control system. Replace solenoid S3 if the control system is OK.

  Replace the transmission if there is any metal shavings in the control system.

  Remedy as necessary.

  Other information:

  - To open the control system and to check or replace solenoid S3, see **SOLENOID CONTROL**

SYSTEM, REPLACING

- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

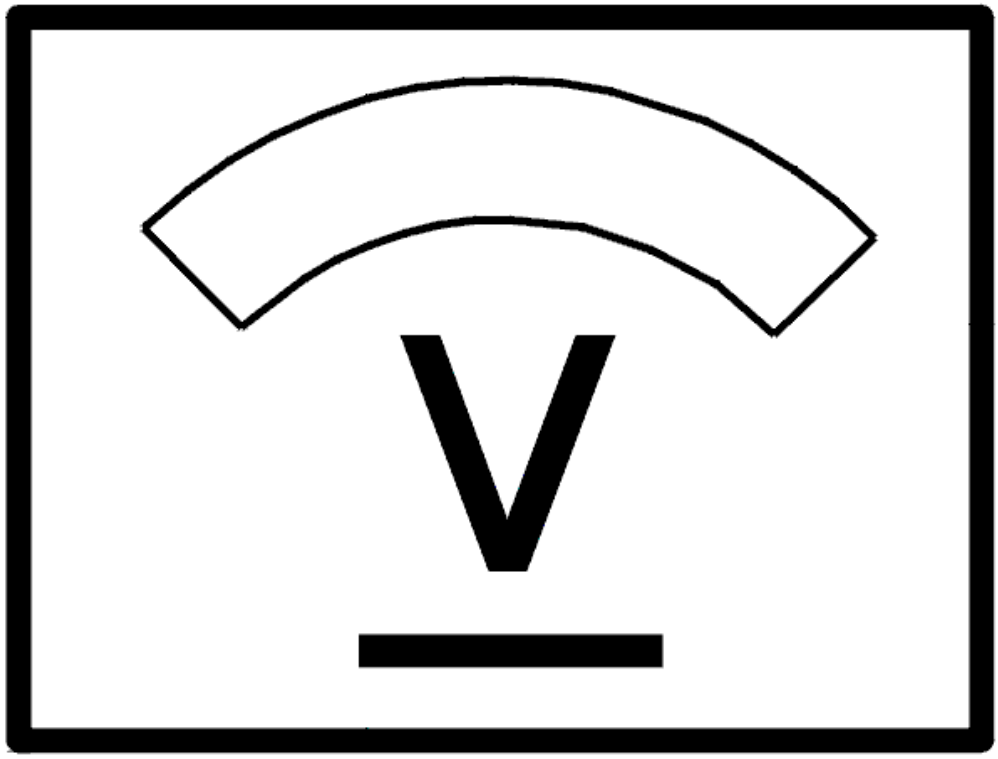


Fig. 295: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

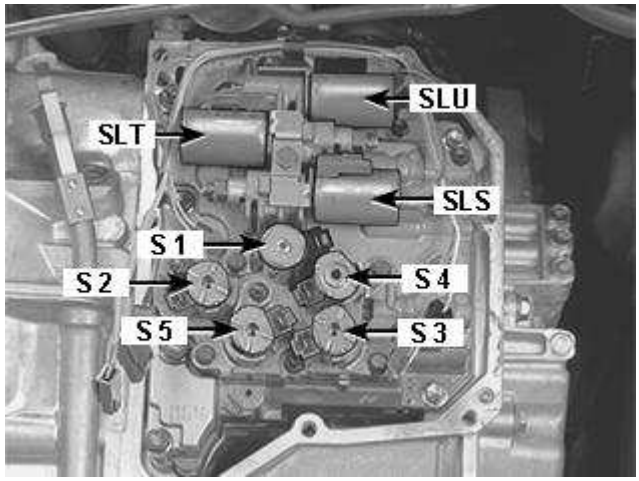


Fig. 296: Identifying S1-S5, SLT, SLU And SLS Solenoids
Courtesy of VOLVO CARS CORPORATION

Is there any metal shavings in the transmission?

- **YES**

  Refer to **REPLACING THE TRANSMISSION**

- **NO**

  Refer to **RESETTING THE ADAPTATION**

CHECKING NOISE IN THE TRANSMISSION

- Test drive the car. See **TEST DRIVE SCHEDULE, DESCRIPTION**
- Check for any clearly audible noises from the transmission. Check for malfunctions.

Is the function of the transmission OK?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **REPLACING THE TRANSMISSION**

REPLACING THE TRANSMISSION

The previous tests indicate an internal fault in the transmission.

Replace the transmission. See **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

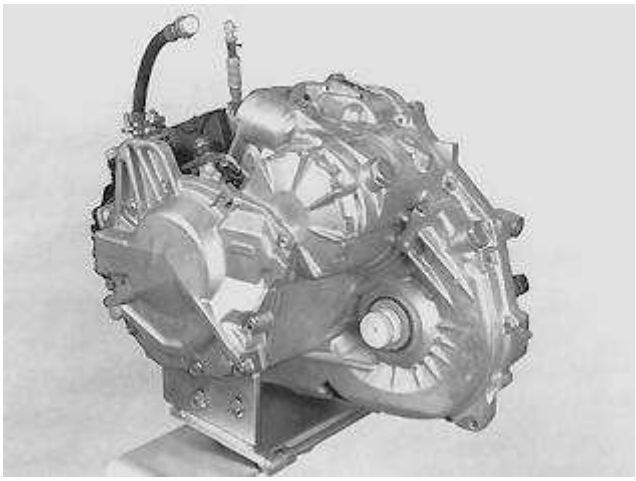


Fig. 297: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

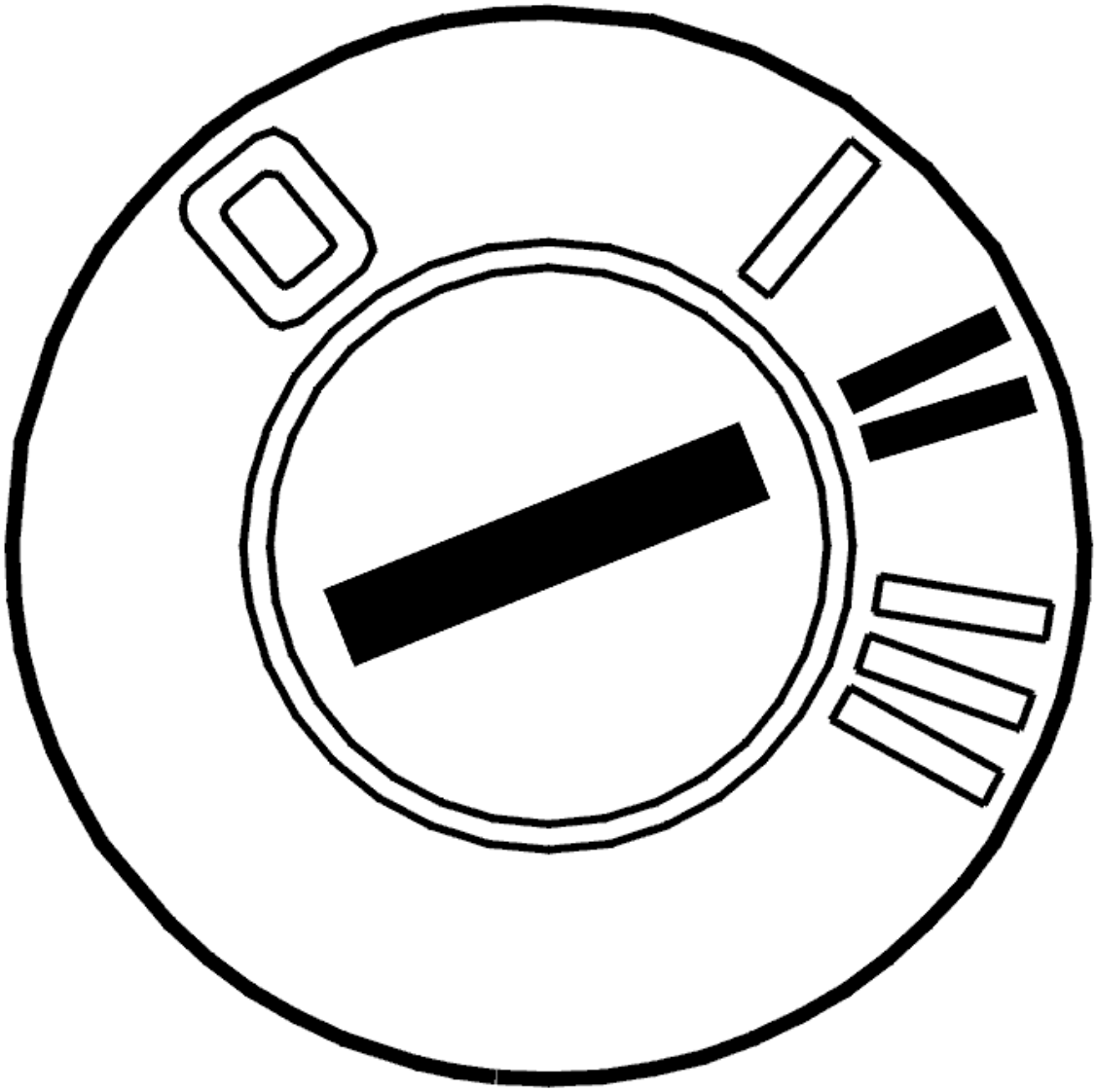


Fig. 298: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

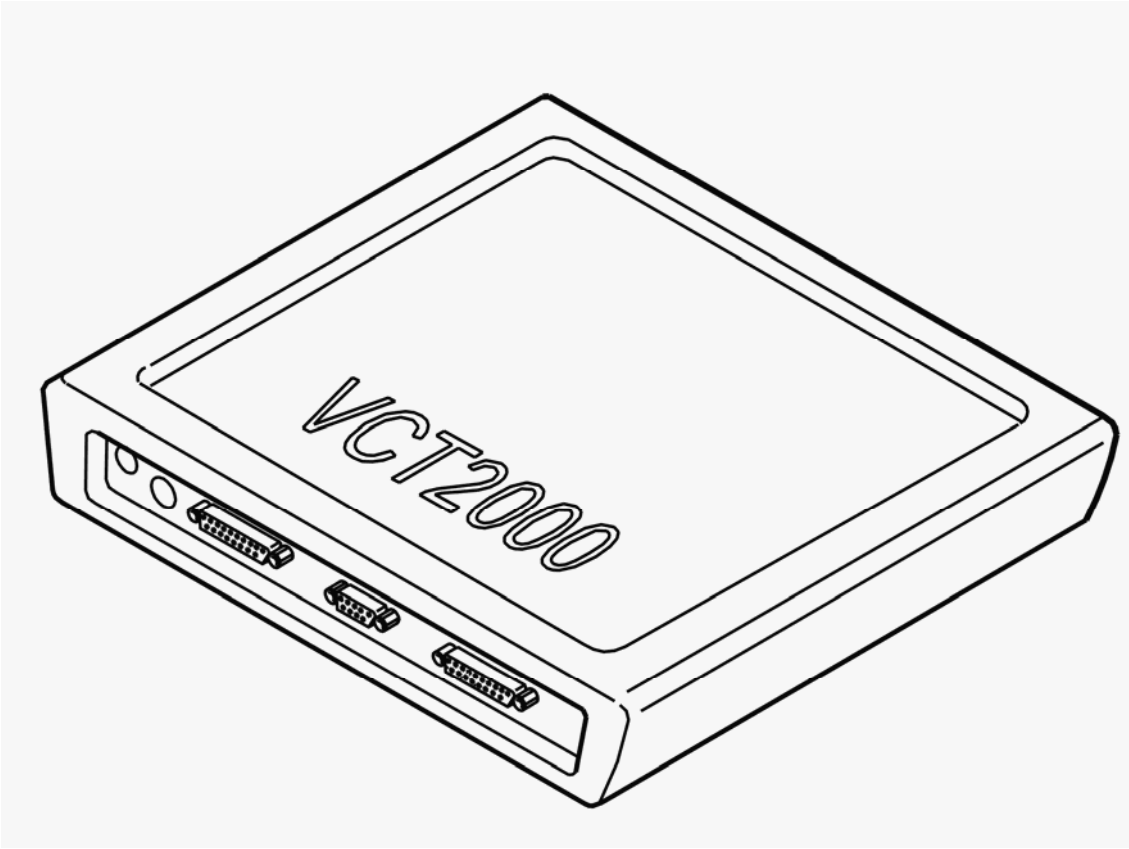


Fig. 299: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

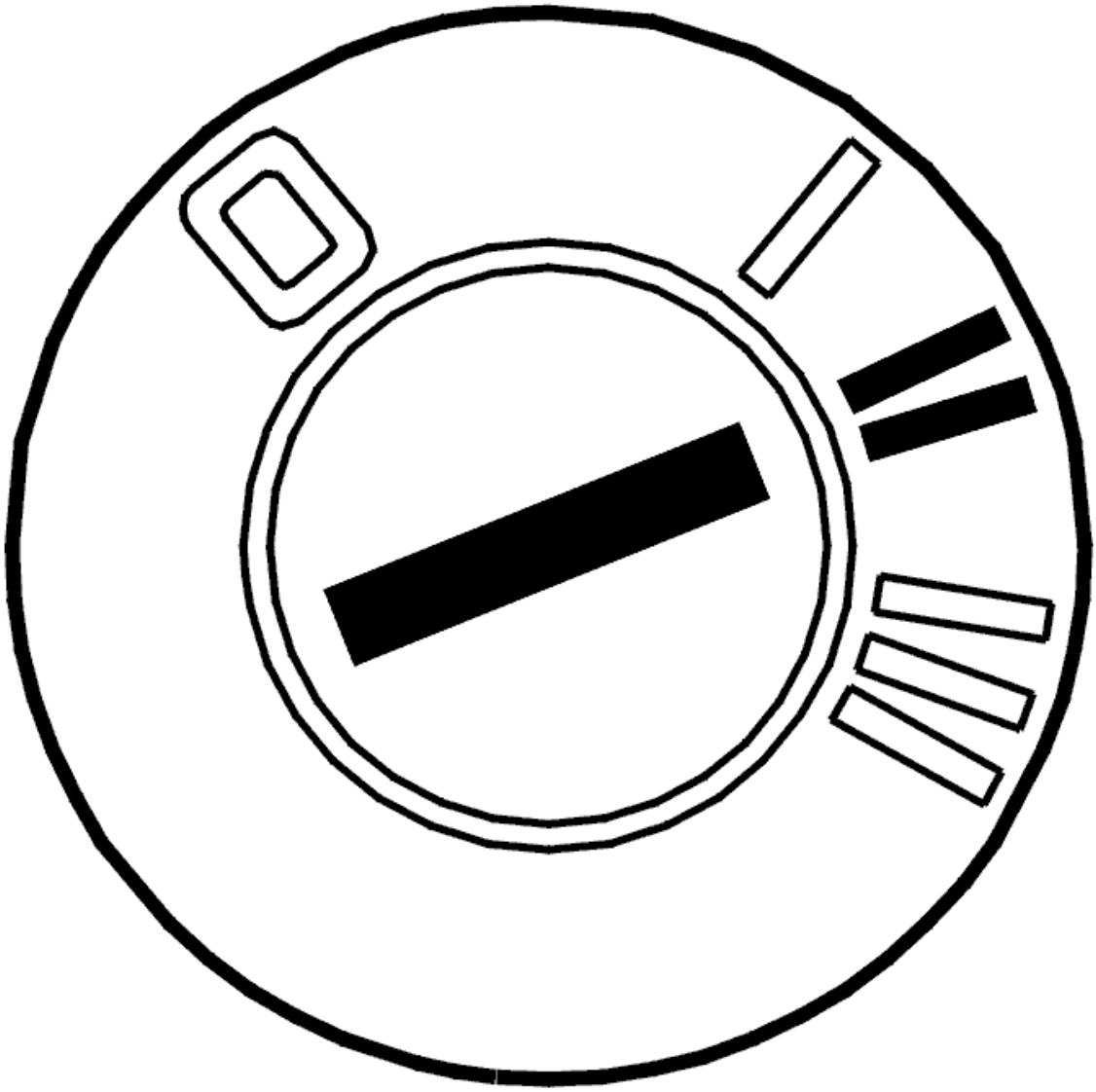


Fig. 300: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

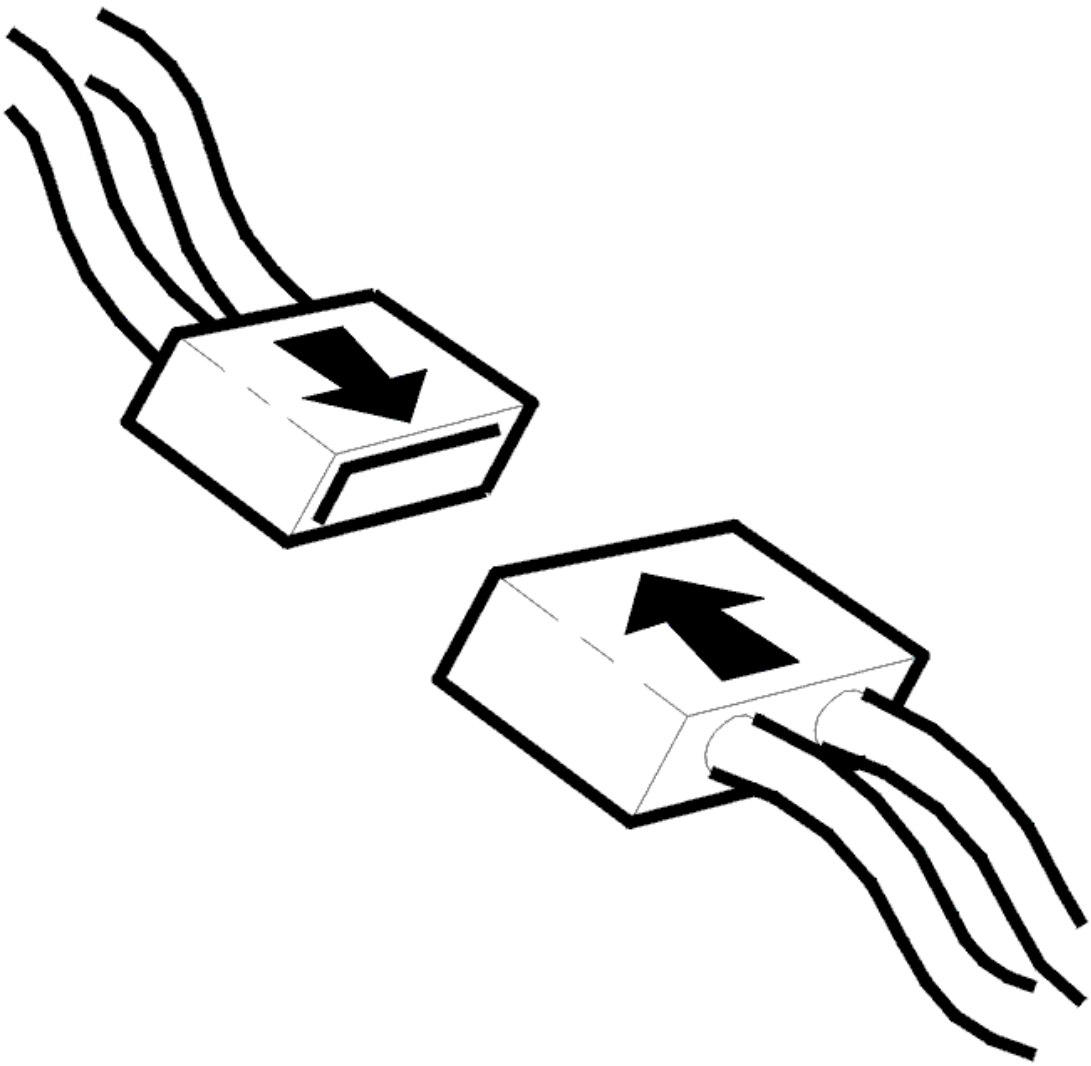


Fig. 301: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following:**TEST DRIVE FORM, DESCRIPTION**

During the test drive, oil temperature should be over 20 °C.

Note any deviations in transmission function.

Does the transmission function flawlessly?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0116: THROTTLE SOLENOID SLT. SIGNAL TOO HIGH. INTERMITTENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

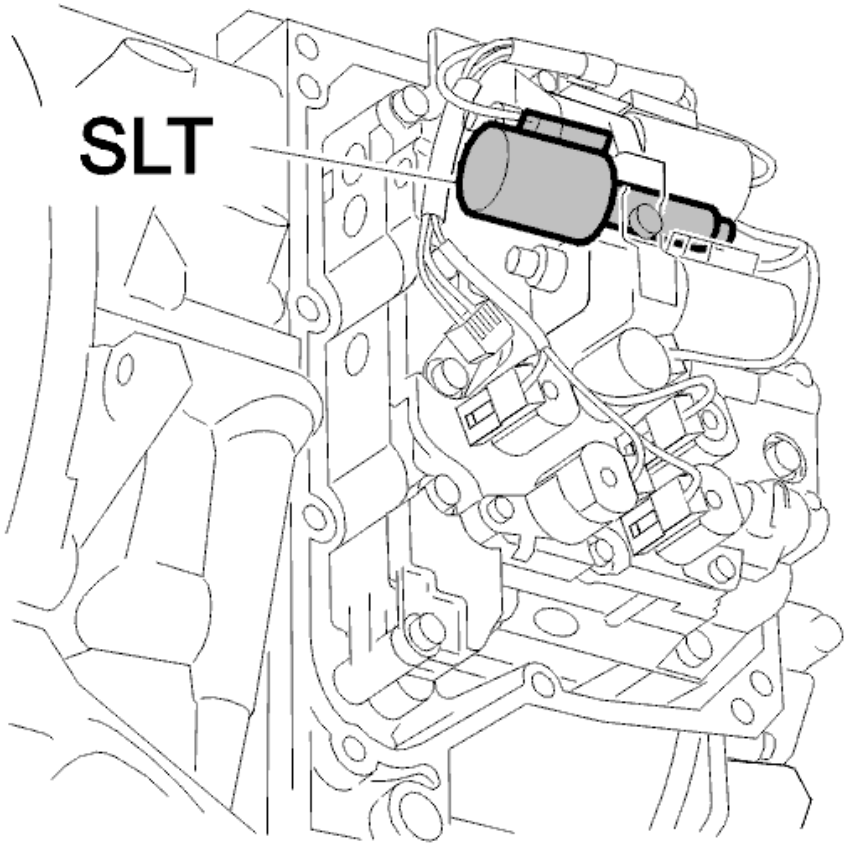


Fig. 302: Identifying Line Pressure Solenoid
Courtesy of VOLVO CARS CORPORATION

Throttle solenoid SLT controls the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-0116 is stored if the transmission control module (TCM) registers a short-circuit to battery voltage in the solenoid SLT circuit. This results in too high an amperage. Solenoid SLT cannot then control the line pressure.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Short-circuit to supply voltage in the control signal wiring or signal wiring.
- Short-circuit between the control signal cable and the signal cable.
- Defective solenoid.

Fault symptom[s]

- General orange warning lamp lit.
- No shifting.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.

HINT: No shifting because the control module prevents activation of the solenoids.

CAUTION: There is a danger that this fault will cause line pressure in the transmission to be too low. This will result in a high level of wear.

SIGNAL TOO HIGH. INTERMITTENT FAULT

INTERMITTENT FAULT

Check the wiring between transmission control module (TCM) terminal #A52 (#A52) and transmission connector terminal #D3. Check the wiring between control module terminal #B10 (#A70) and transmission connector terminal #D4. Check for an intermittent short-circuit to supply voltage. See **SHORT-CIRCUIT TO SUPPLY VOLTAGE, INTERMITTENT FAULTS** .

HINT: Check solenoid SLT. Measure the resistance between terminals #D3 and #D4 on transmission connector D. The resistance should be 5-5.6 ohms at 20°C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

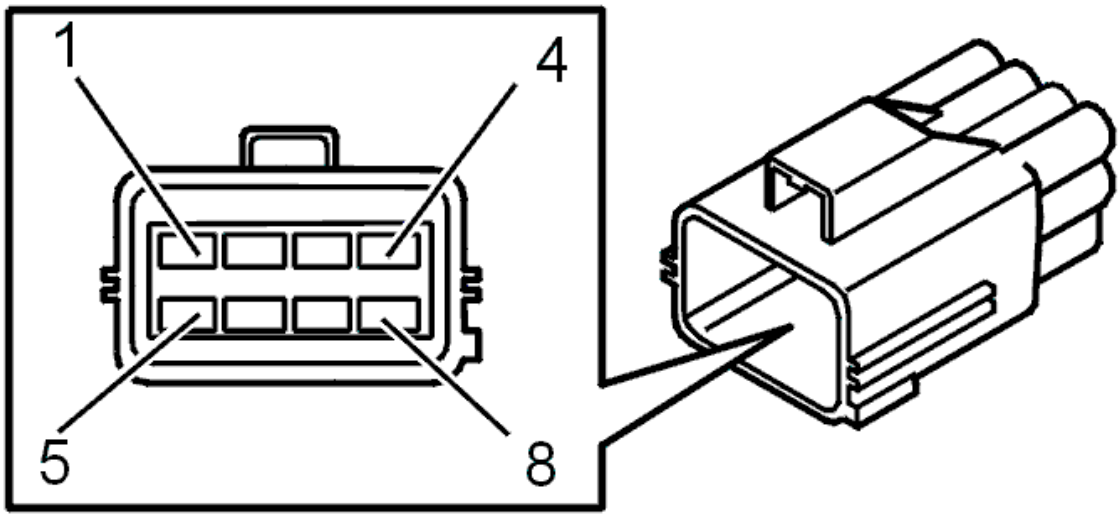


Fig. 303: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

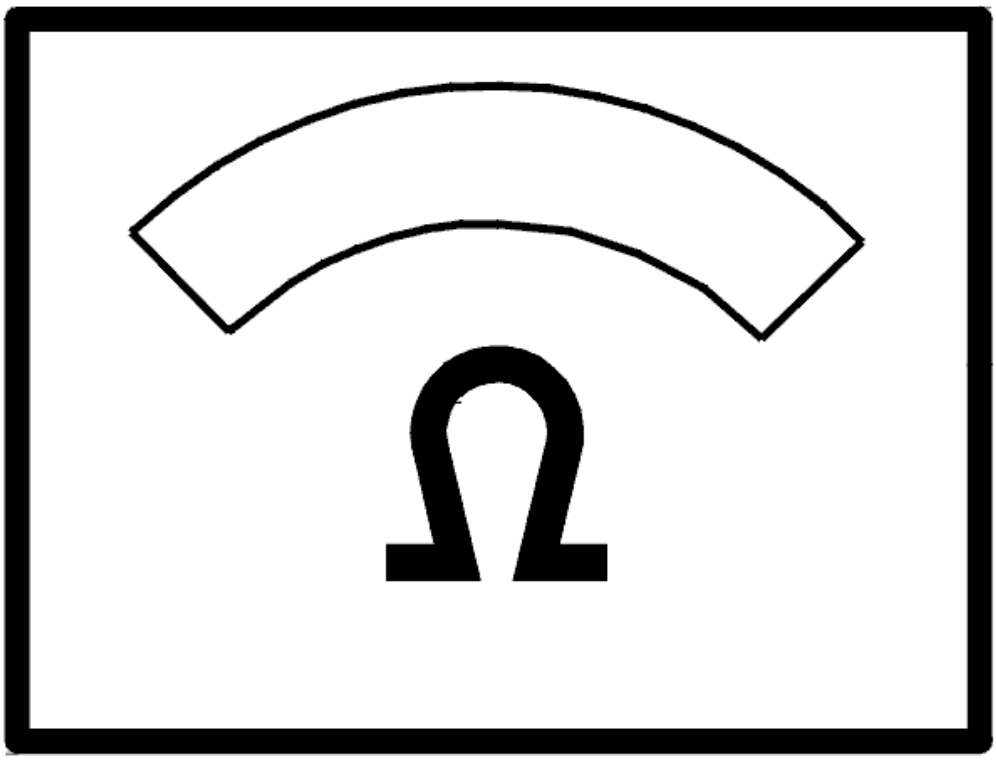


Fig. 304: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

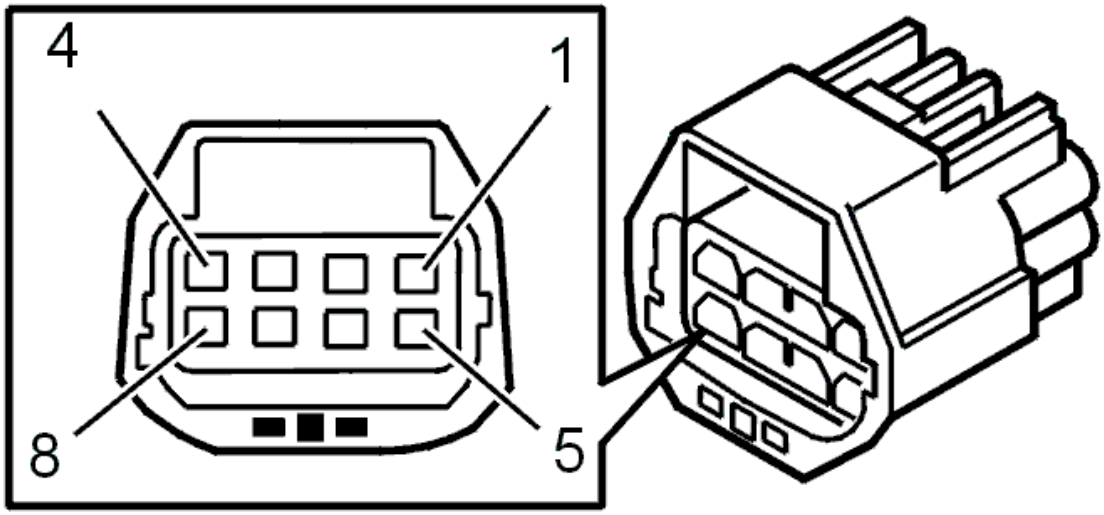


Fig. 305: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0116: THROTTLE SOLENOID SLT. SIGNAL TOO HIGH. PERMANENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL TOO HIGH. PERMANENT FAULT

CHECKS

CHECKING LINE PRESSURE SOLENOID SLT

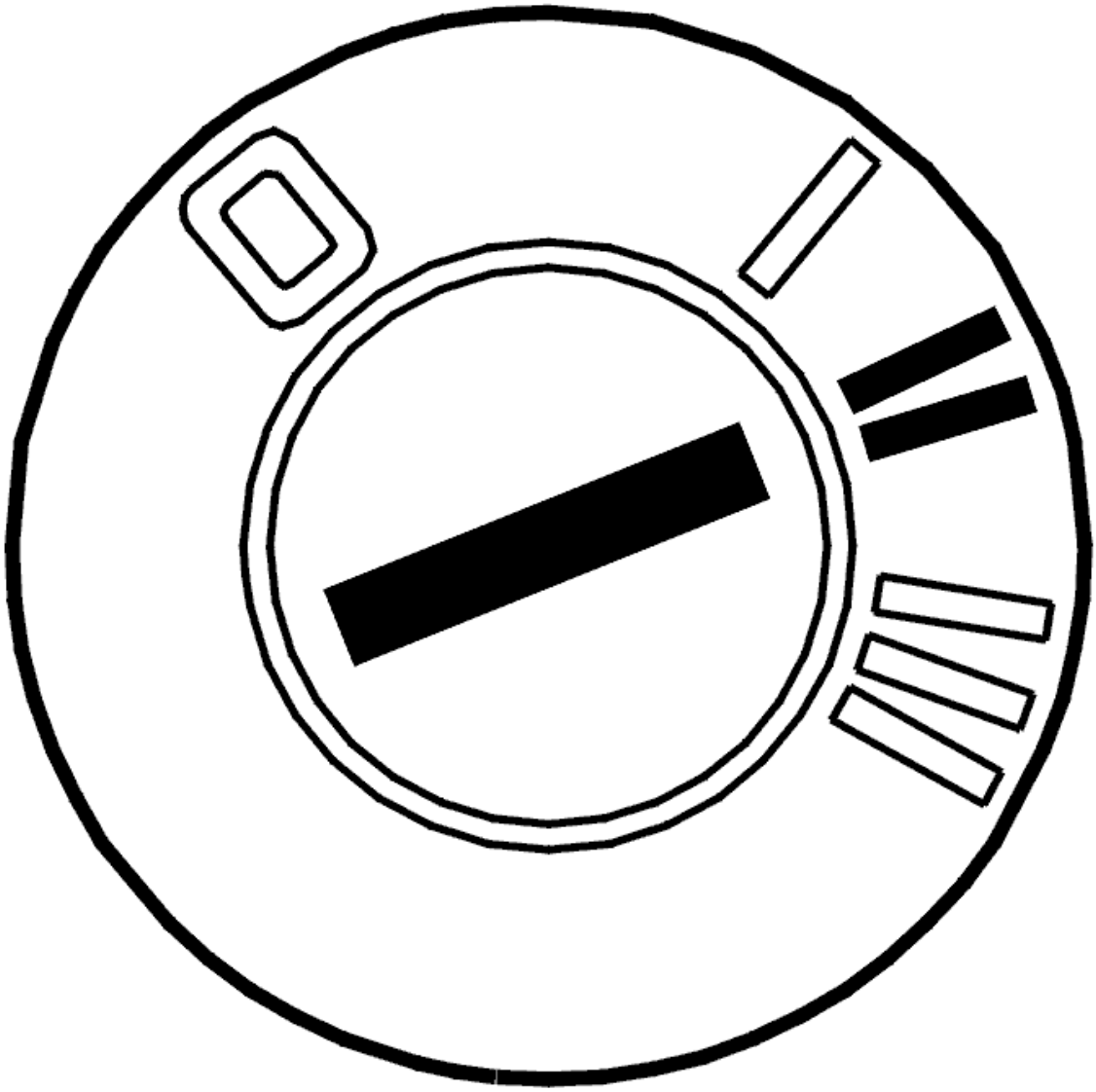


Fig. 306: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLT.

  Read off the current through the solenoid SLT circuit.

  The current should oscillate between 0 and 1000 mA.

  Other information:

  - see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)**
  - see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
  - see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**

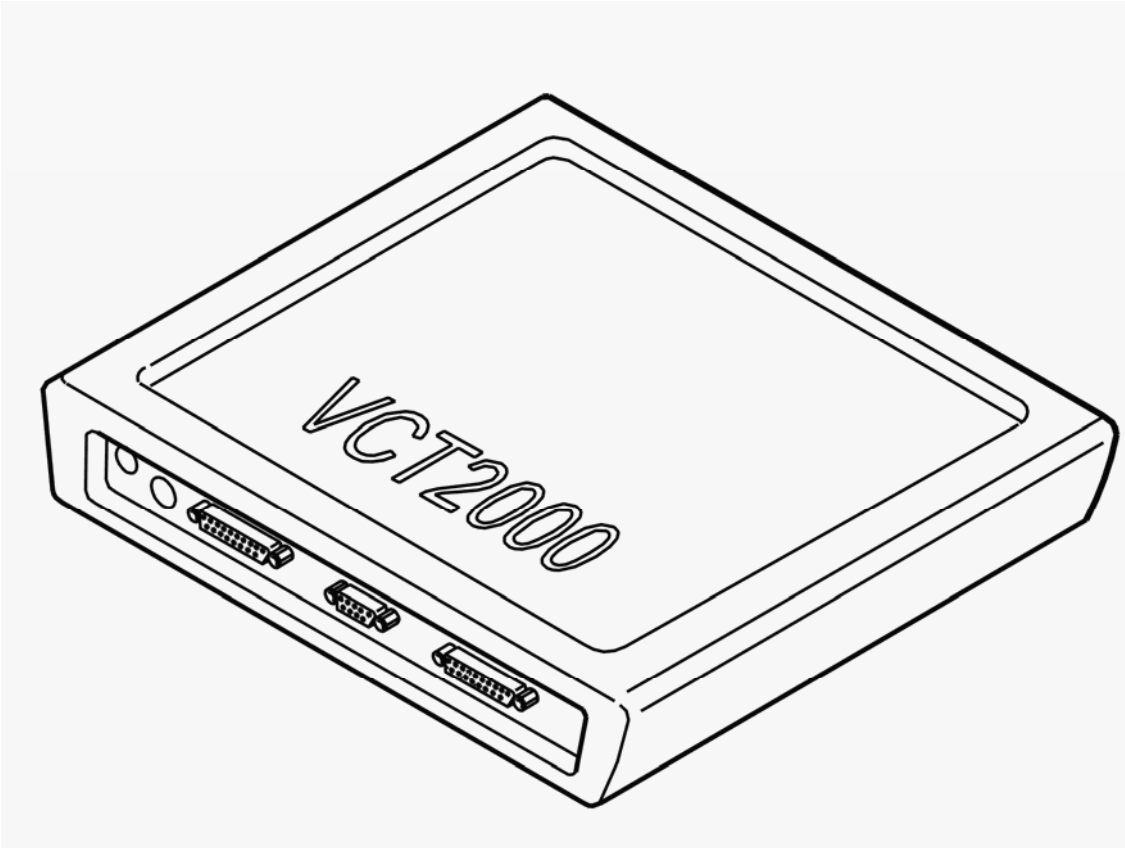


Fig. 307: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  Refer to **FAULT-TRACING INFORMATION**

- **NO**

  Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

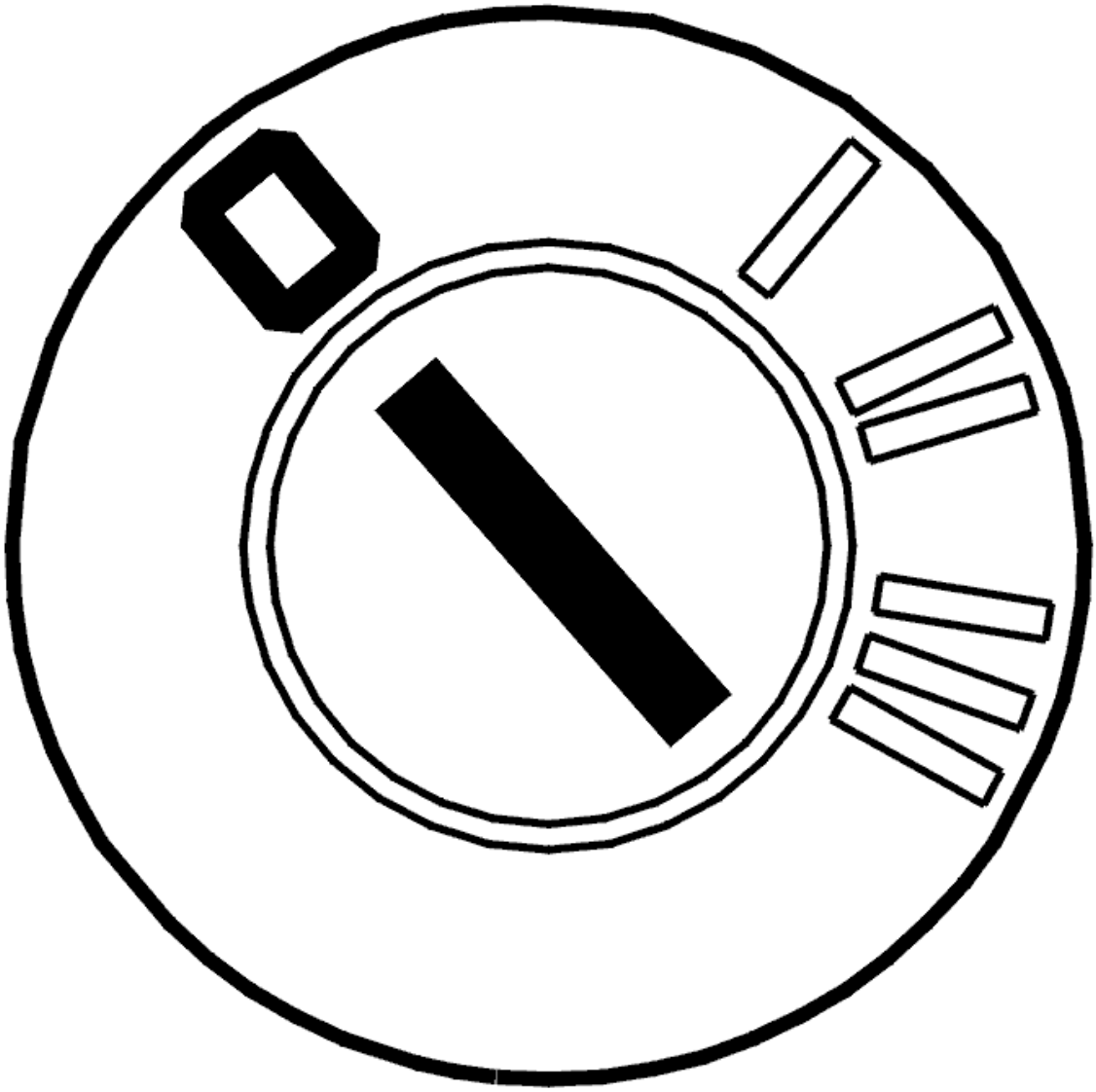


Fig. 308: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

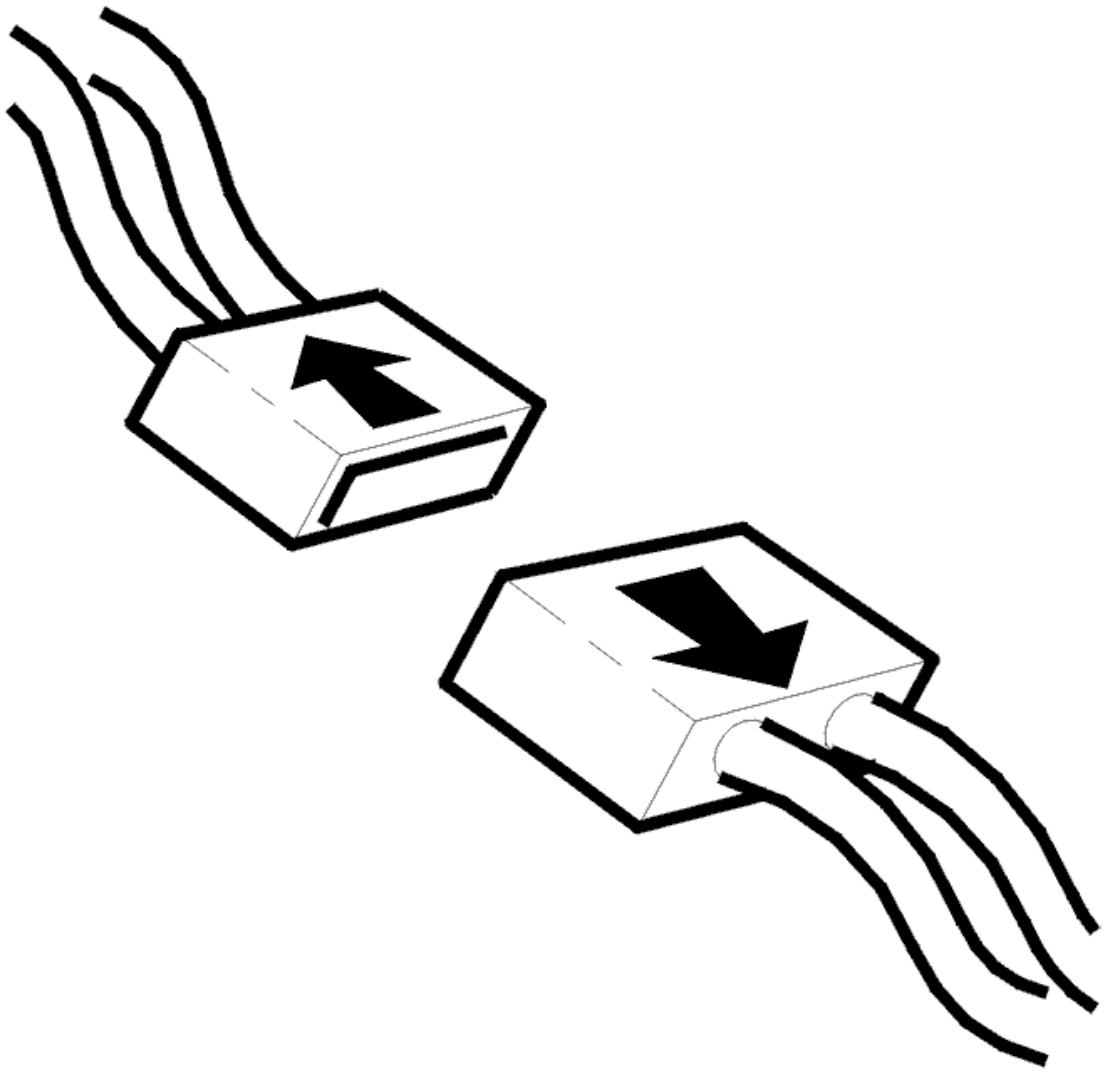


Fig. 309: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Breakout box connected.
- Disconnect gearbox connector D.

Check the cable between transmission control module (TCM) terminal #A52 (#A52) and transmission connector terminal #D3 (control module side). Check for a short-circuit to supply voltage. Check the cable for short-circuits to other cables in the circuit.

Check the cable between control module terminal #B10 (#A70) and transmission connector terminal #D4 (control module side). Check for a short-circuit to supply voltage. Check the cable for short-circuits to other cables in the circuit.

Check the cables between connector terminals #D3 and #D4 on the transmission side. Check for damage. Check for short-circuits to other cables in the circuit.

Check the connector. Check for damage and pressed in pins.

Remedy as necessary.

Other information:

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)**
- see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- see **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS**

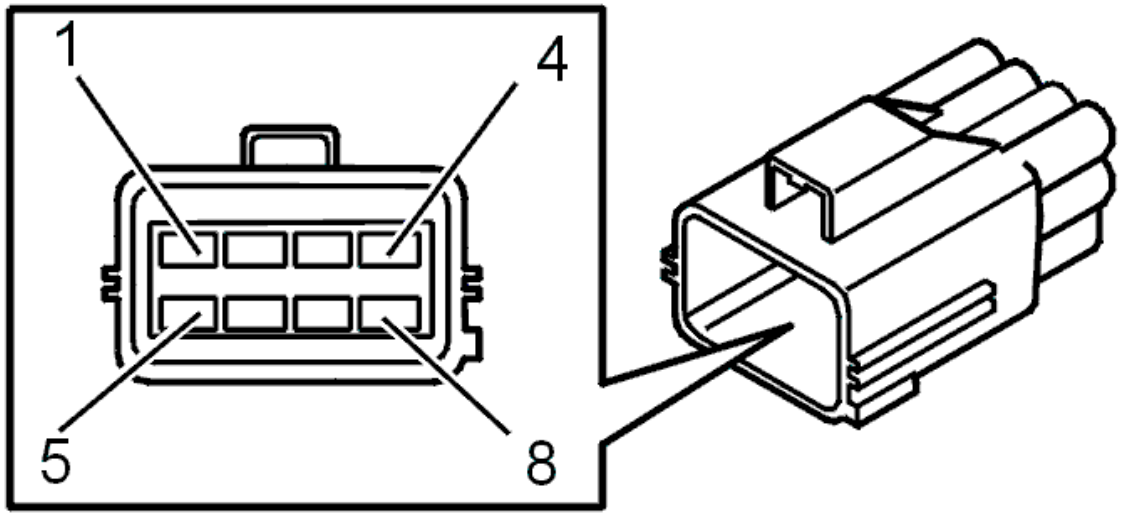


Fig. 310: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

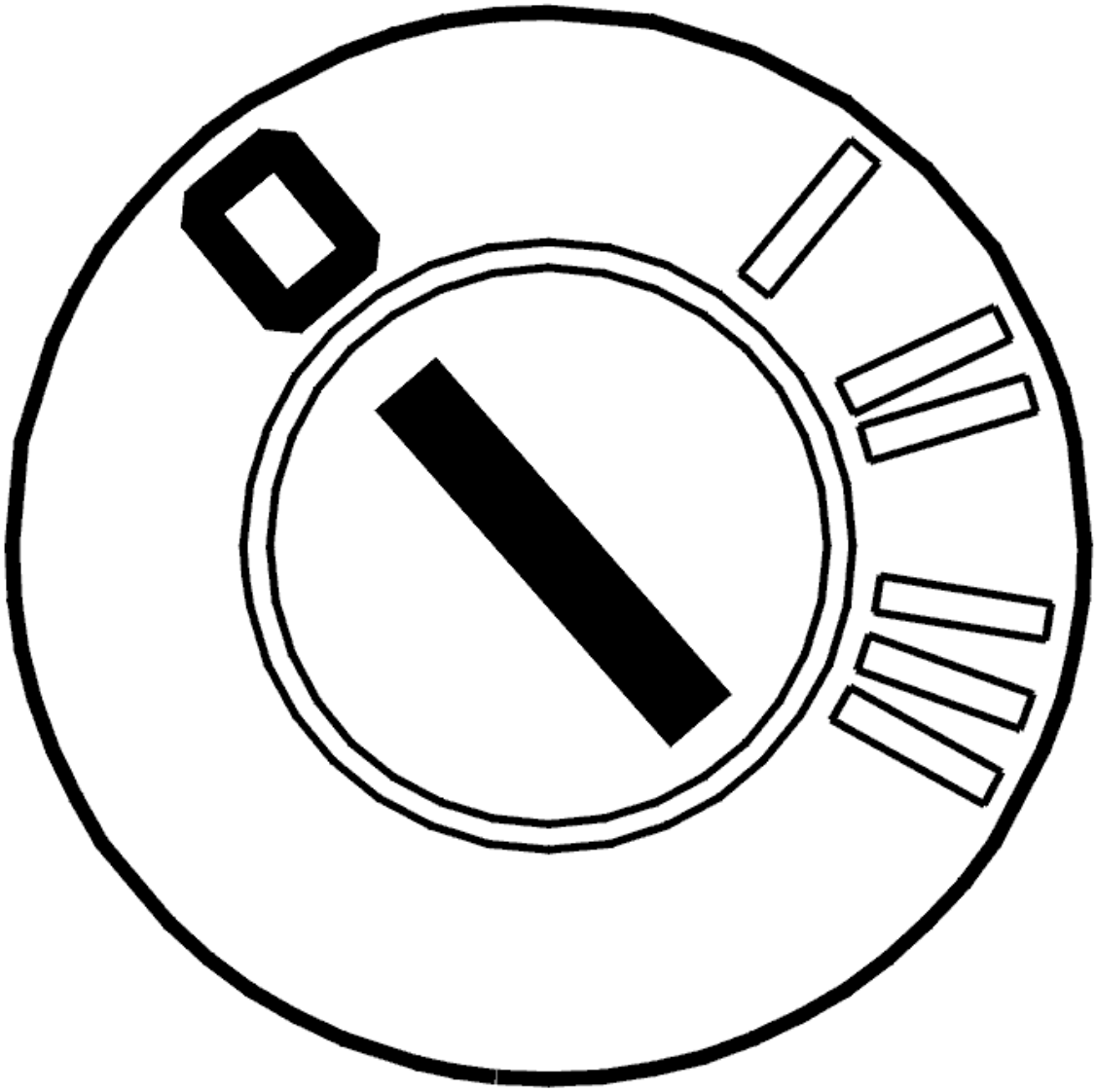


Fig. 311: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

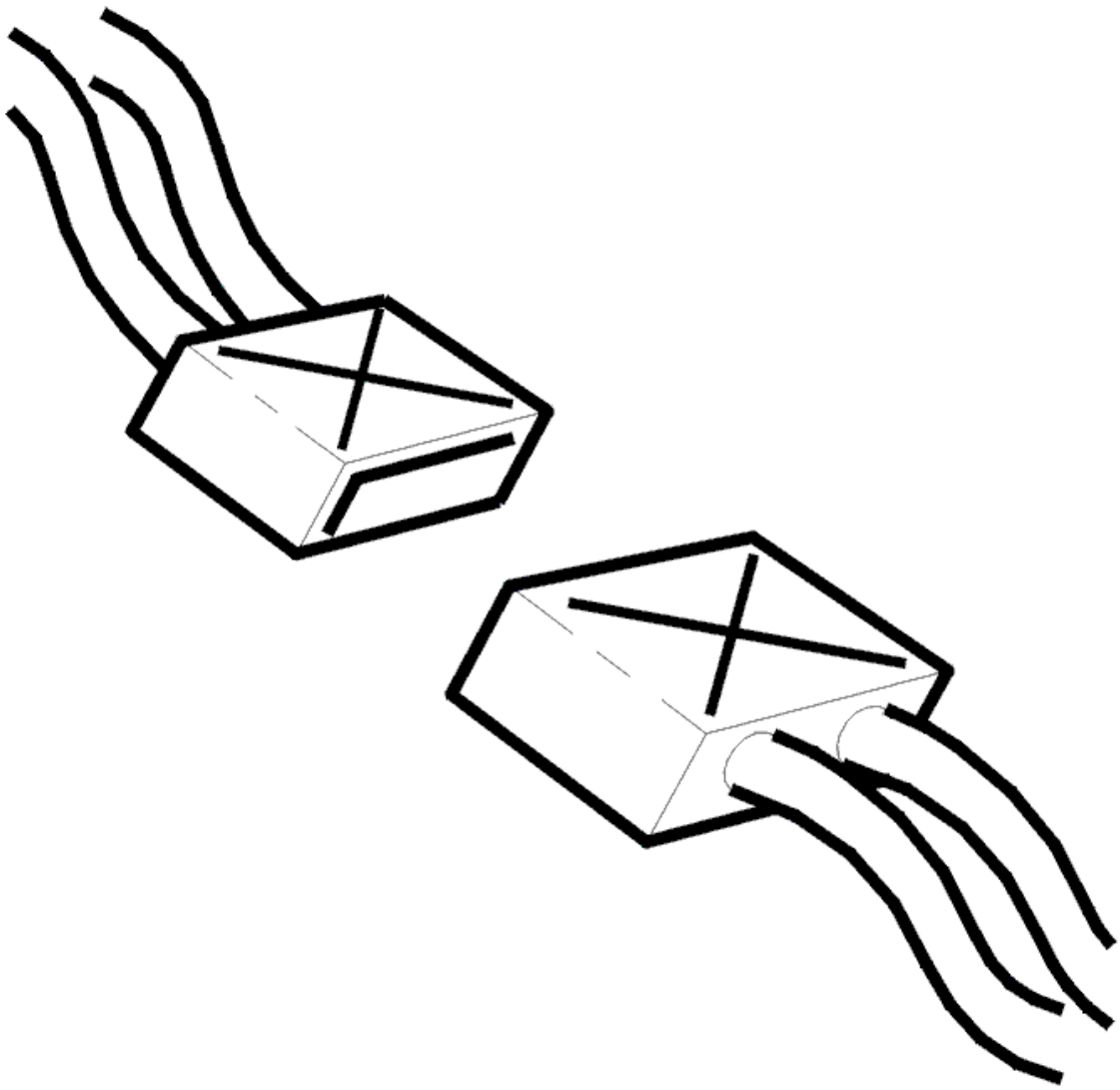


Fig. 312: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check the connector. Check for damage and pressed in pins.

Check the wiring between transmission connector terminal #D3 and solenoid SLT terminal #1. Check the wiring between transmission connector terminal #D4 and solenoid SLT terminal #2. Check for a short-circuit to supply voltage.

Also check against the other cables in the circuit.

Check the solenoid SLT by measuring the resistance between terminals #1 and #2. The resistance must be 5-5.6 ohms at 20°C. Replace the transmission control system if the resistance is incorrect.

Other information:

- see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)**
- see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- see **SOLENOID CONTROL SYSTEM, REPLACING**
- see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- see **CONTENTS**

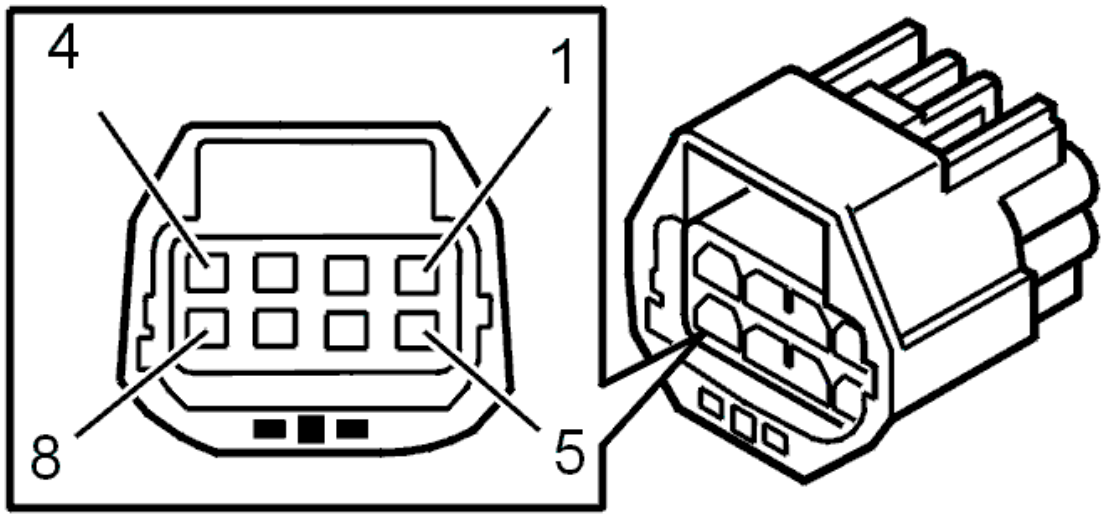


Fig. 313: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

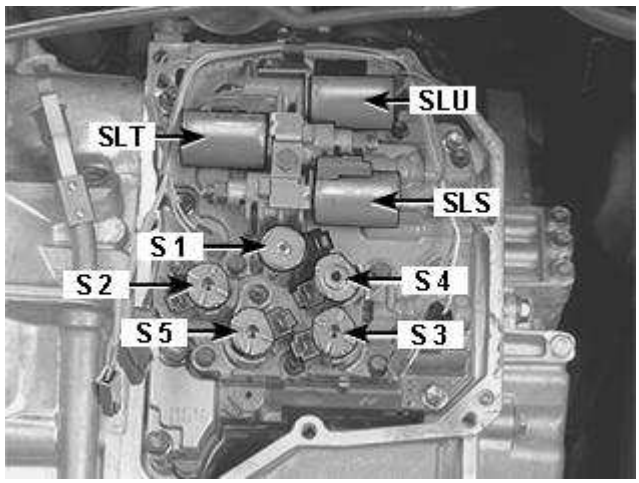


Fig. 314: Identifying S1-S5, SLT, SLU And SLS Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

FAULT-TRACING INFORMATION

The transmission control module (TCM) has previously registered a fault but the faulty no longer occurs. The diagnostic trouble code (DTC) was probably caused by an intermittent fault. If the fault remains, fault tracing according to this diagnostic trouble code (DTC) should be carried out despite no fault symptoms being detected. The fault is evaluated on an individual basis.

- **Continue**

  FAULT NOT FOUND: Troubleshooting has been completed.

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

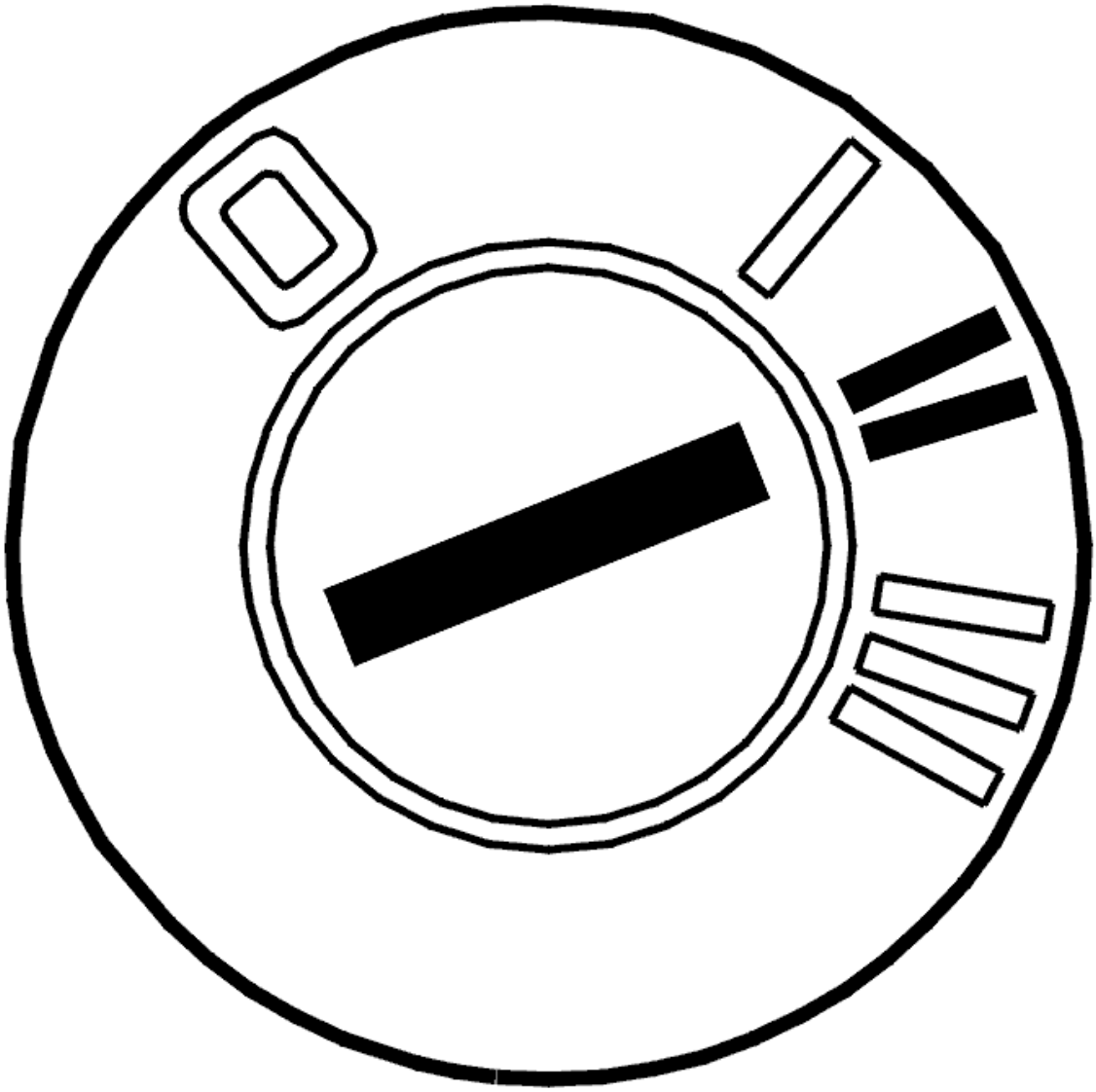


Fig. 315: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

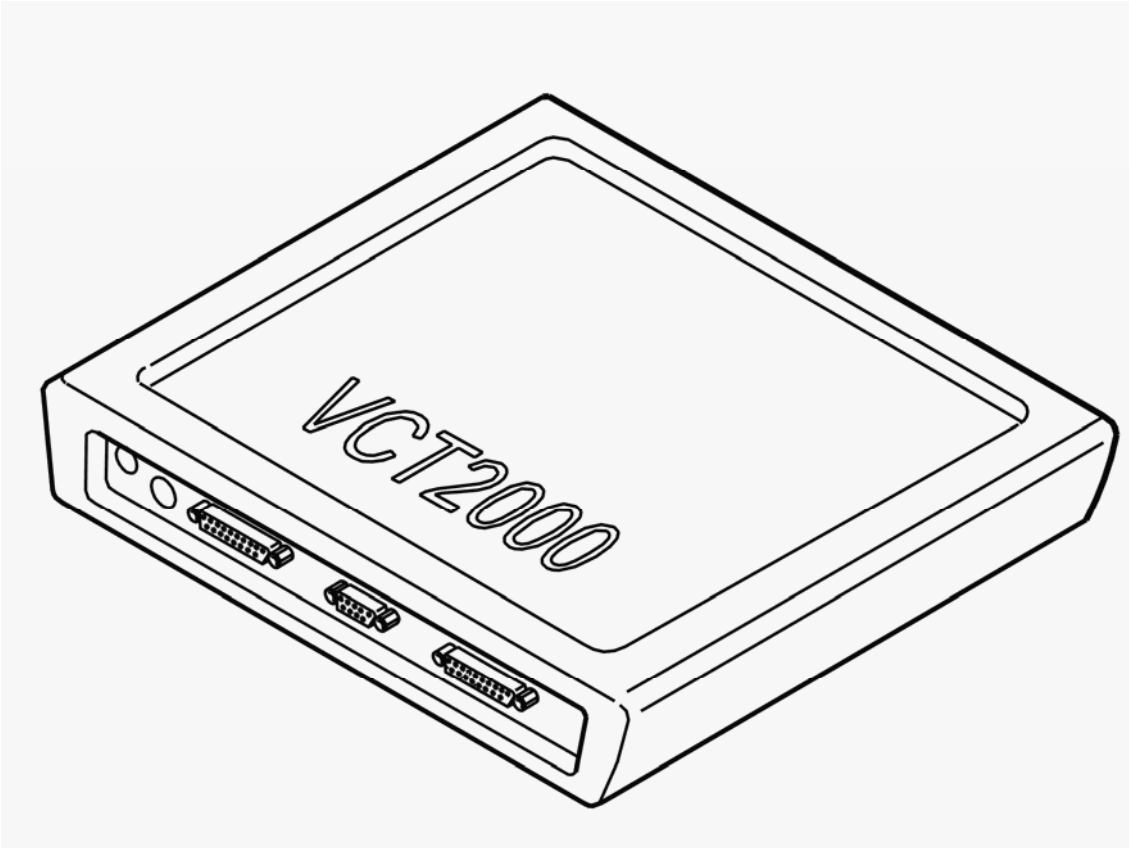


Fig. 316: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

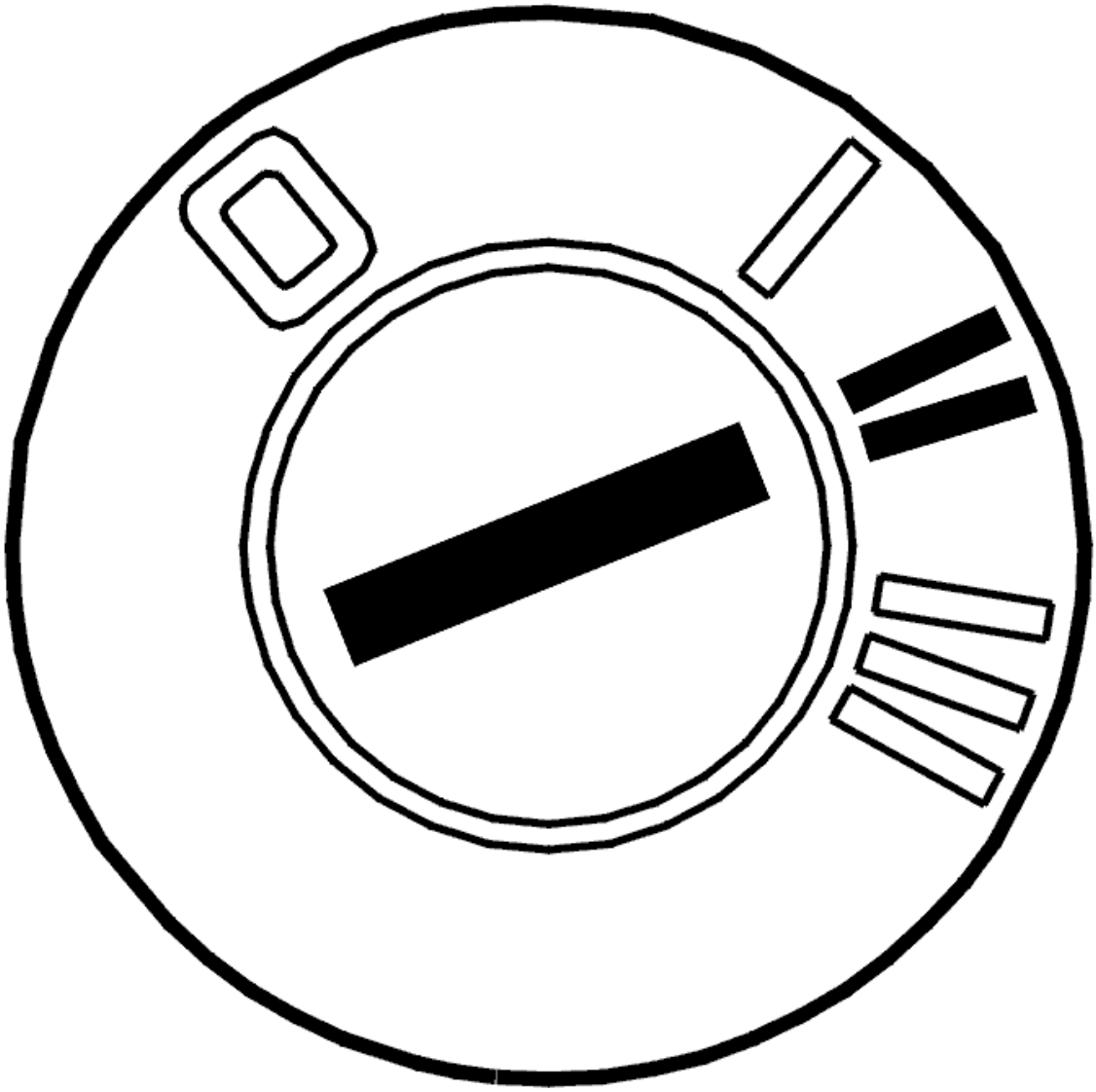


Fig. 317: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLT.

  Read off the current through the solenoid SLT circuit.

  The current should oscillate between 0 and 1000 mA.

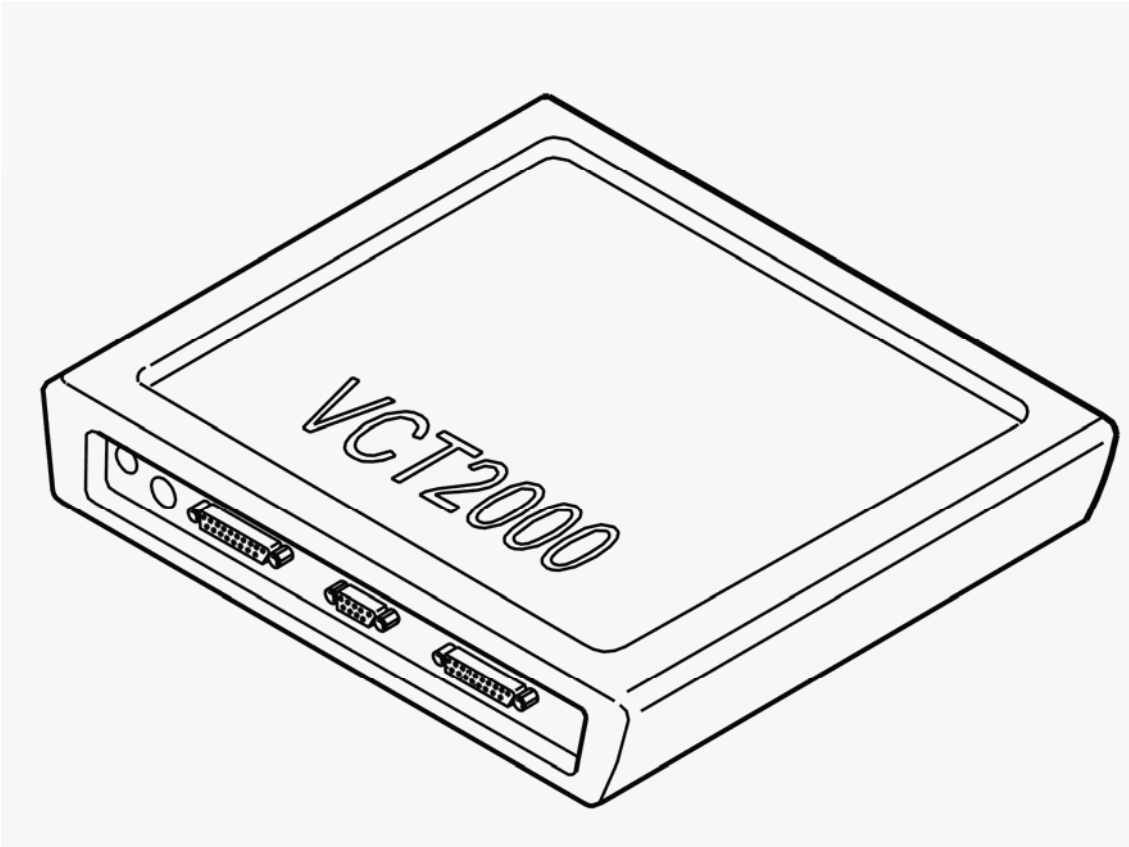


Fig. 318: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0117: THROTTLE SOLENOID SLT. SIGNAL MISSING. INTERMITTENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

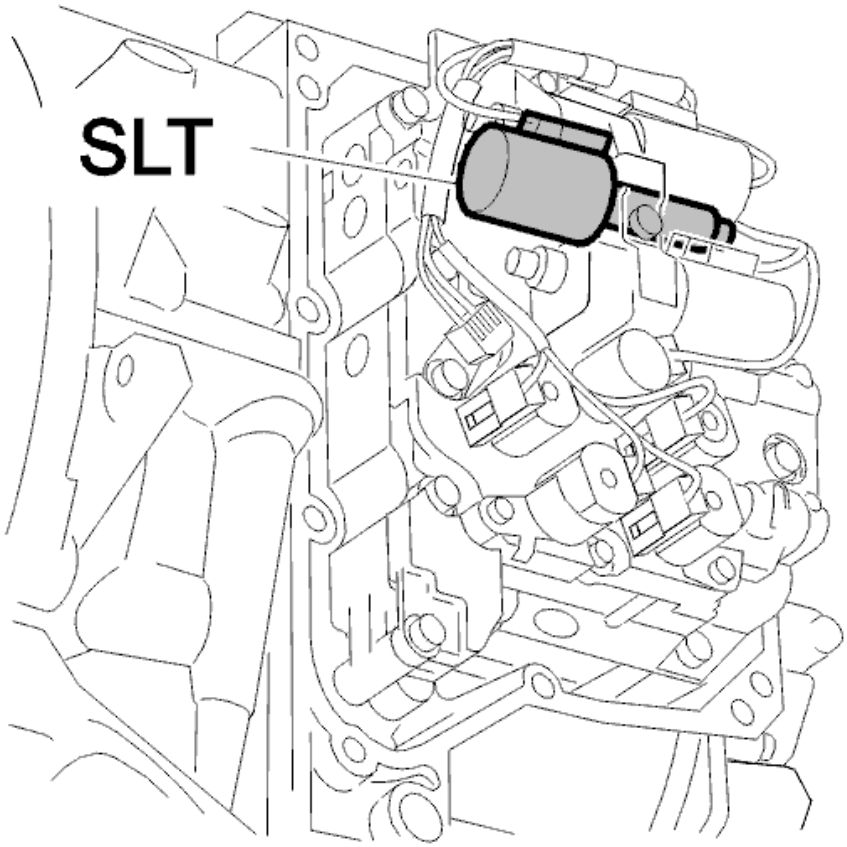


Fig. 319: Identifying Line Pressure Solenoid
Courtesy of VOLVO CARS CORPORATION

Throttle solenoid SLT controls the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-0117 is stored if the control module registers that there is an open-circuit in the circuit for solenoid SLT. Solenoid SLT cannot then control the line pressure.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Contact resistance in terminals.
- Open-circuit in the control signal cable or the signal cable.
- Defective solenoid SLT.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

HINT: Harsh gear shifting can be caused by:

- No torque limiting request to the engine control module (ECM) when shifting.

SIGNAL MISSING. INTERMITTENT FAULT

INTERMITTENT FAULT

Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the cables between control module terminal #A52 (#A52) and transmission connector terminal #D3. Check the cables between control module terminal #B10 (#A70) and transmission connector terminal #D4. Check for an intermittent open-circuit according to **OPEN-CIRCUIT, INTERMITTENT FAULTS** .

HINT: Check solenoid SLT. Measure the resistance between terminals #D3 and #D4 on transmission connector A. The resistance should be 5-6 ohms at 20°C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

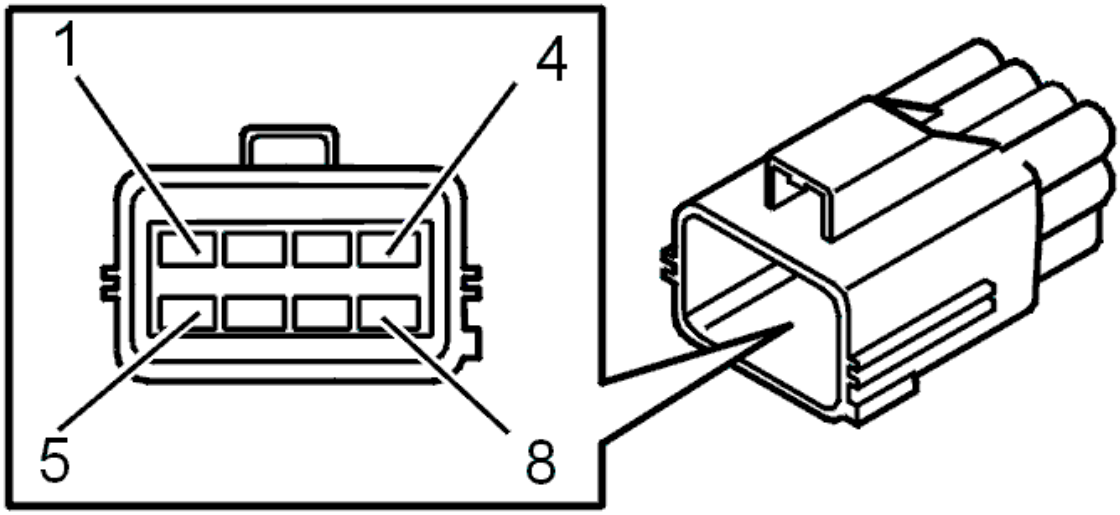


Fig. 320: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

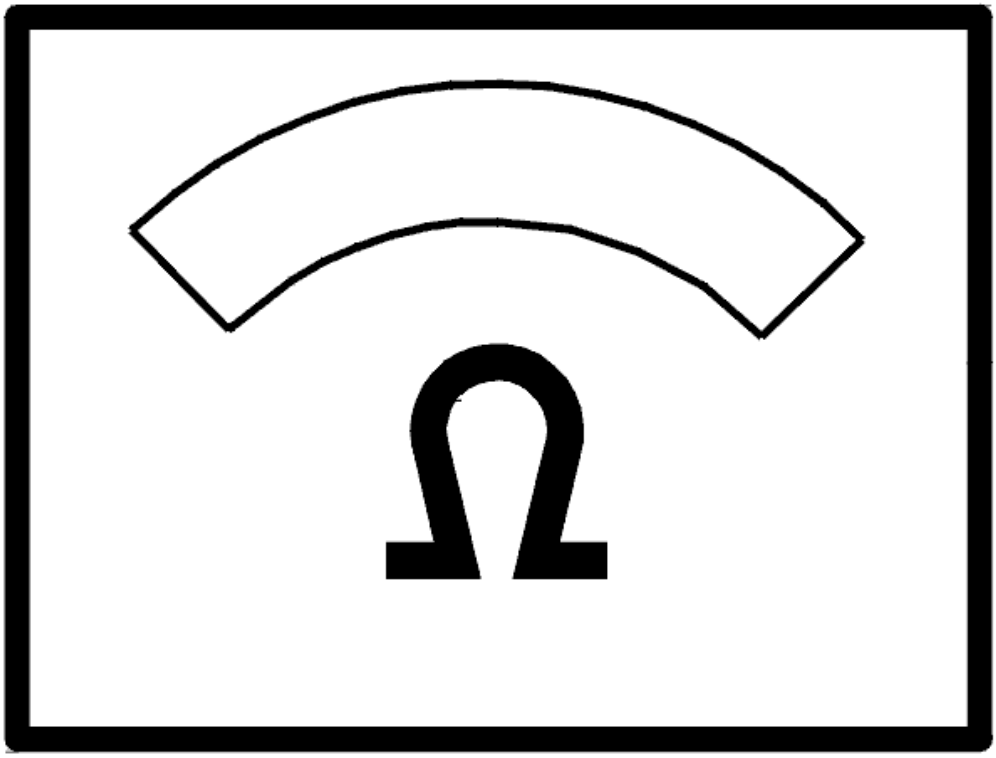


Fig. 321: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

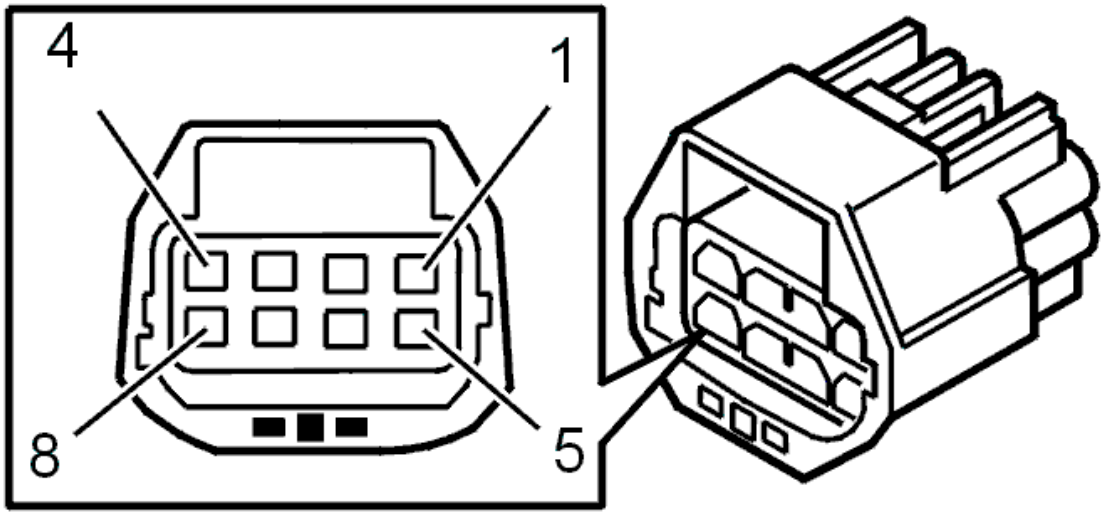


Fig. 322: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0117: THROTTLE SOLENOID SLT. SIGNAL MISSING. PERMANENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL MISSING. PERMANENT FAULT

CHECKS

CHECKING LINE PRESSURE SOLENOID SLT

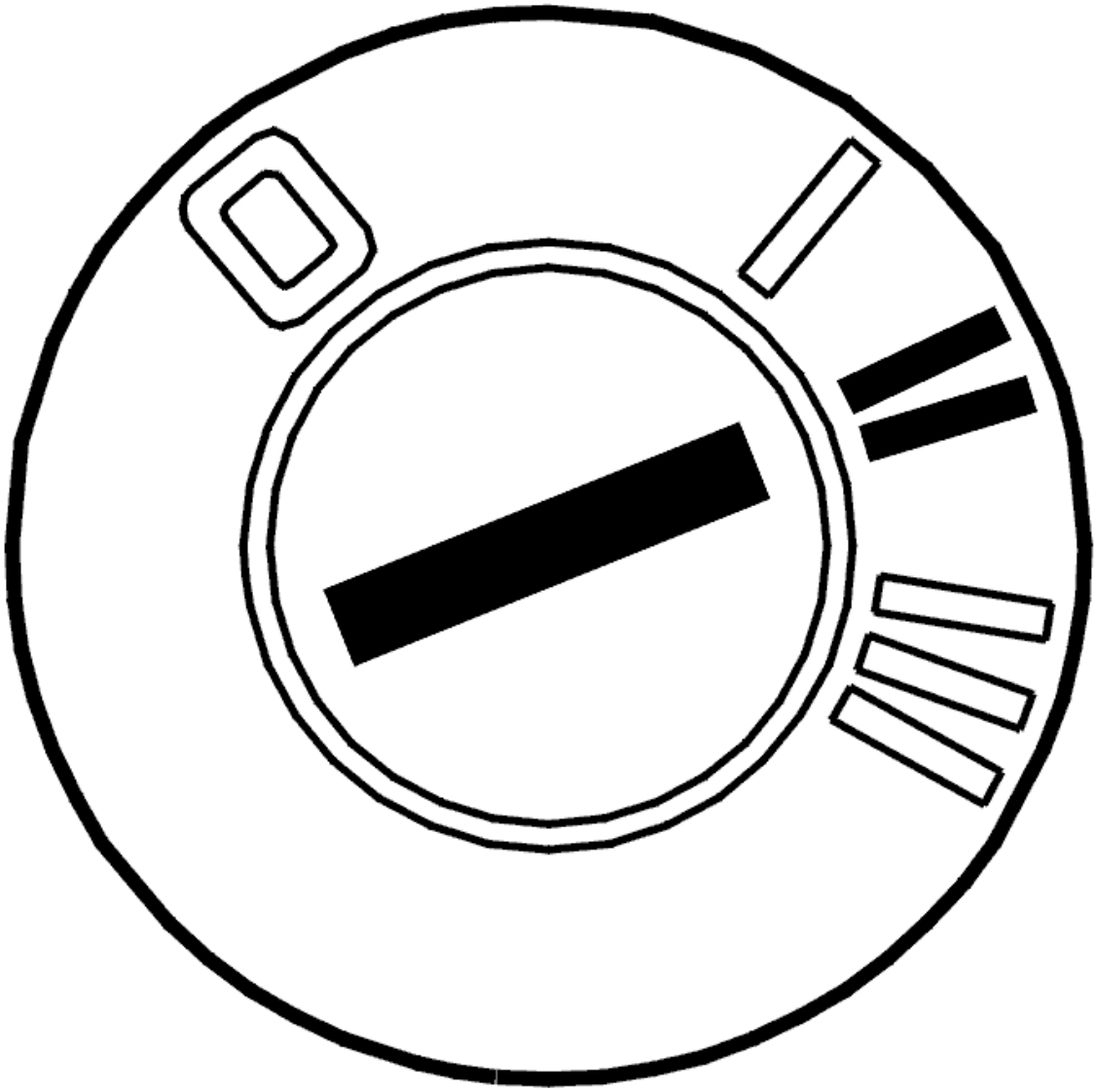


Fig. 323: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

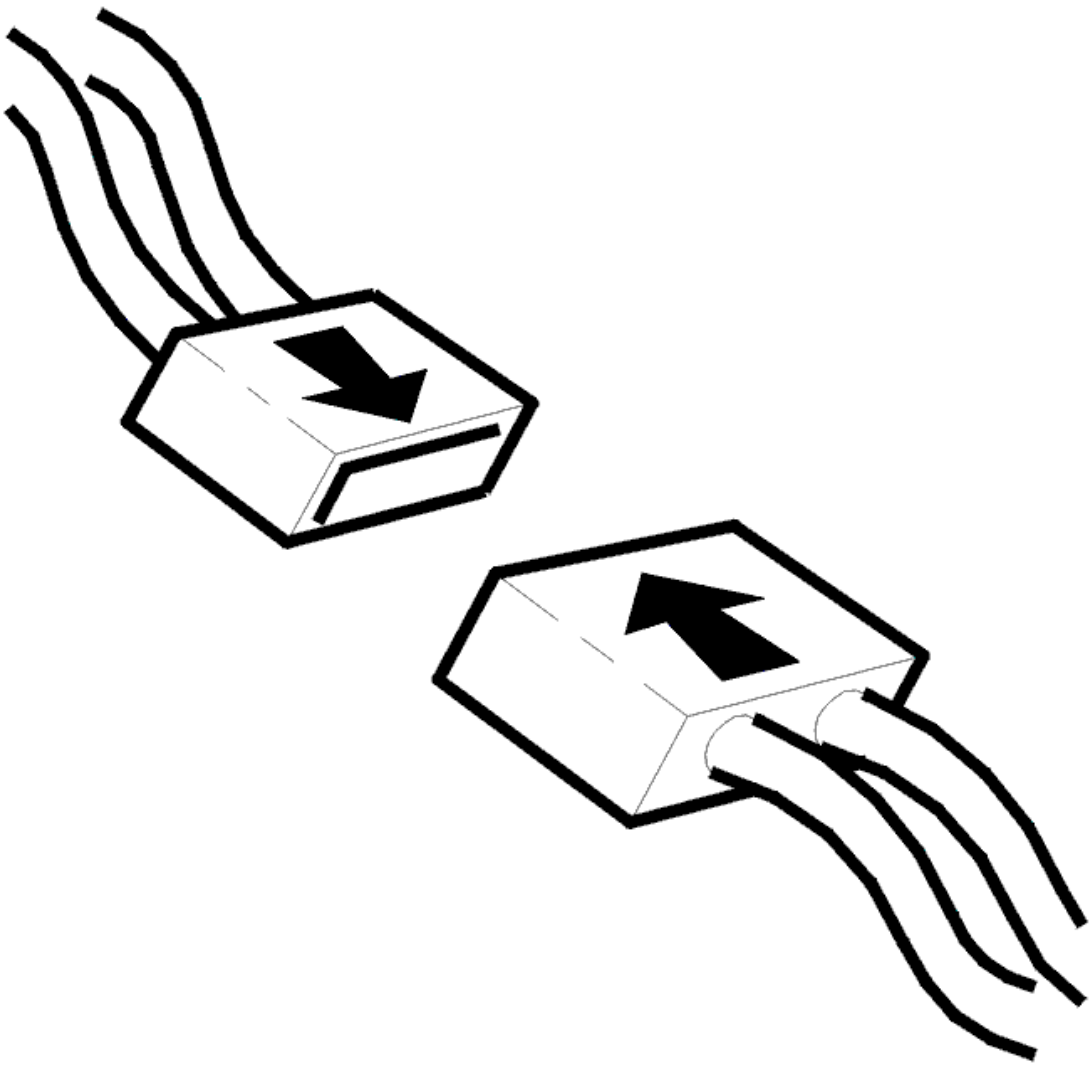


Fig. 324: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module connector and automatic transmission connector D. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLT.

  Read off the current through the solenoid SLT circuit.

  The current should oscillate between 0 and 1000 mA.

  Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

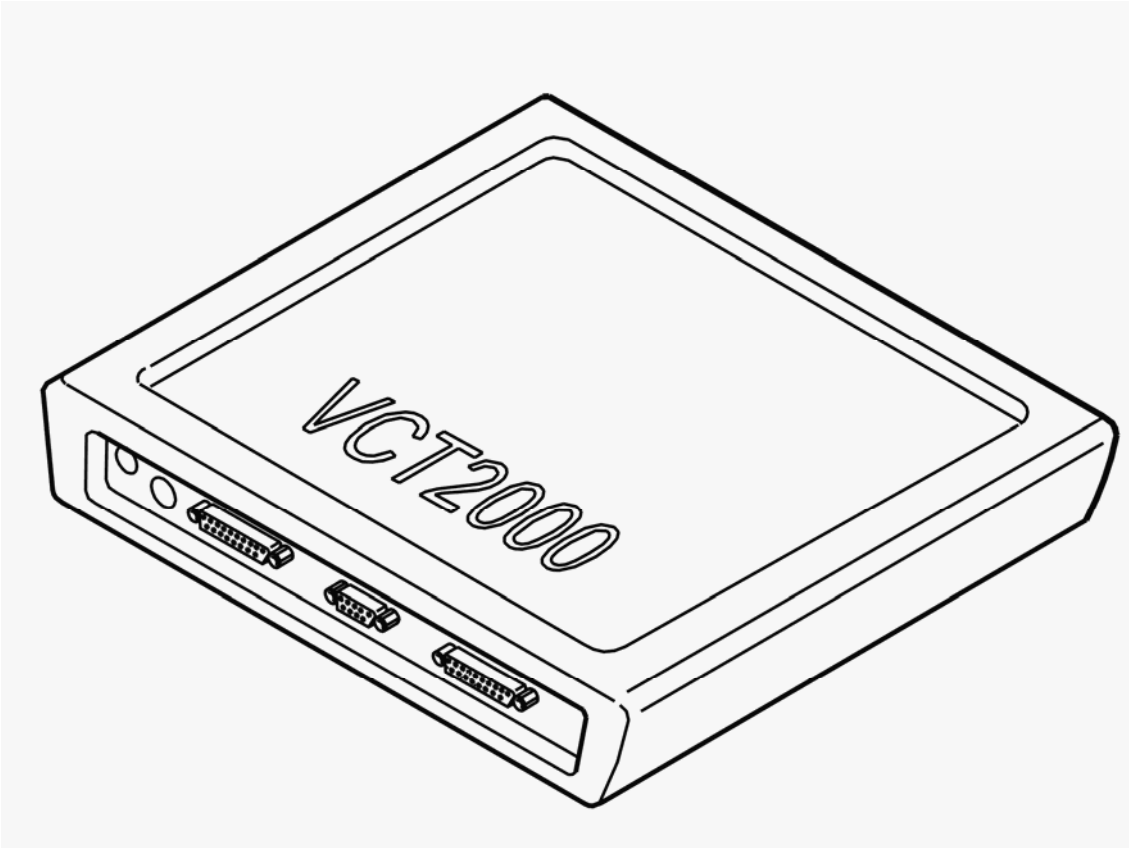


Fig. 325: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING RESISTANCE**

CHECKING RESISTANCE

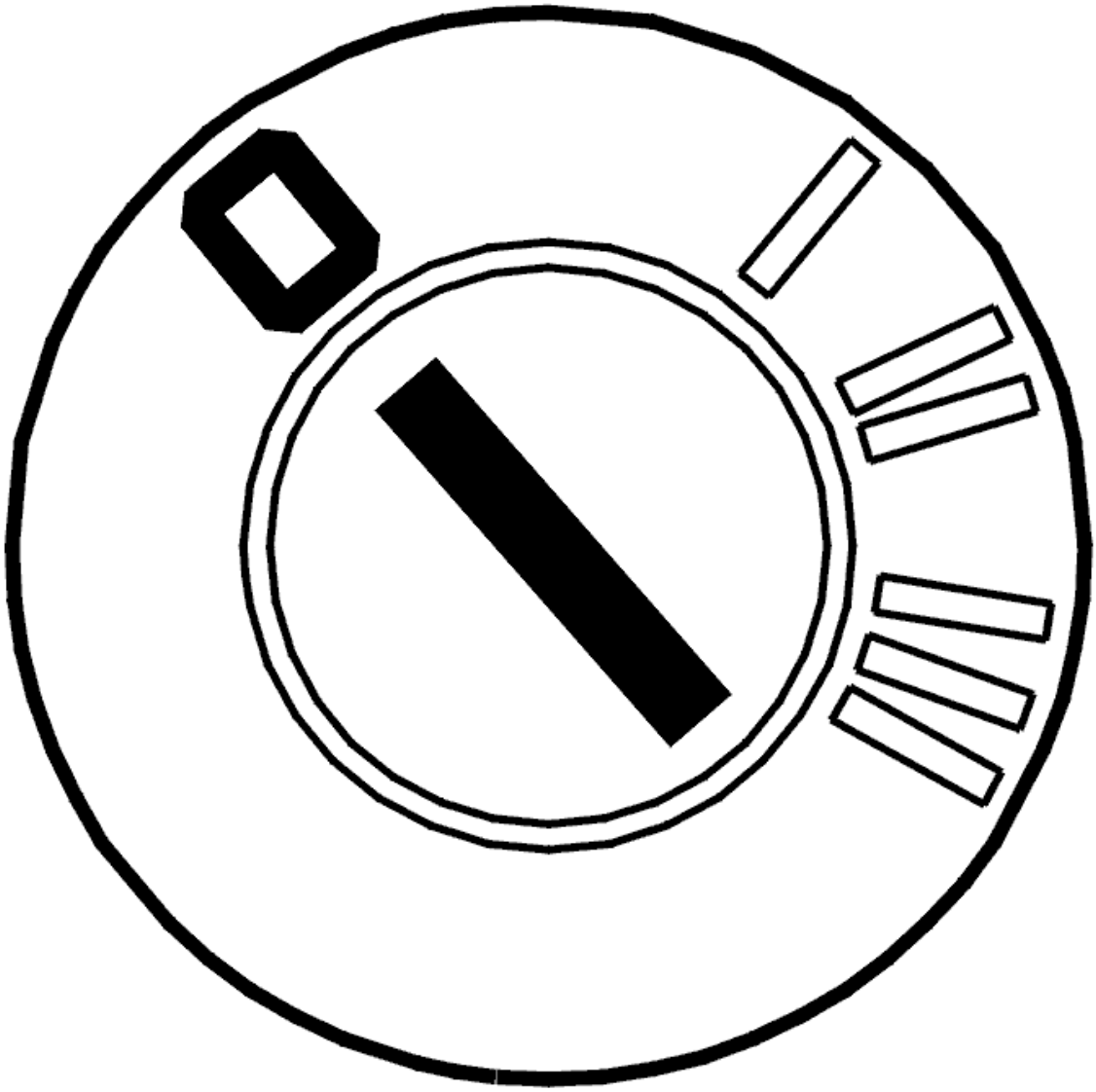


Fig. 326: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

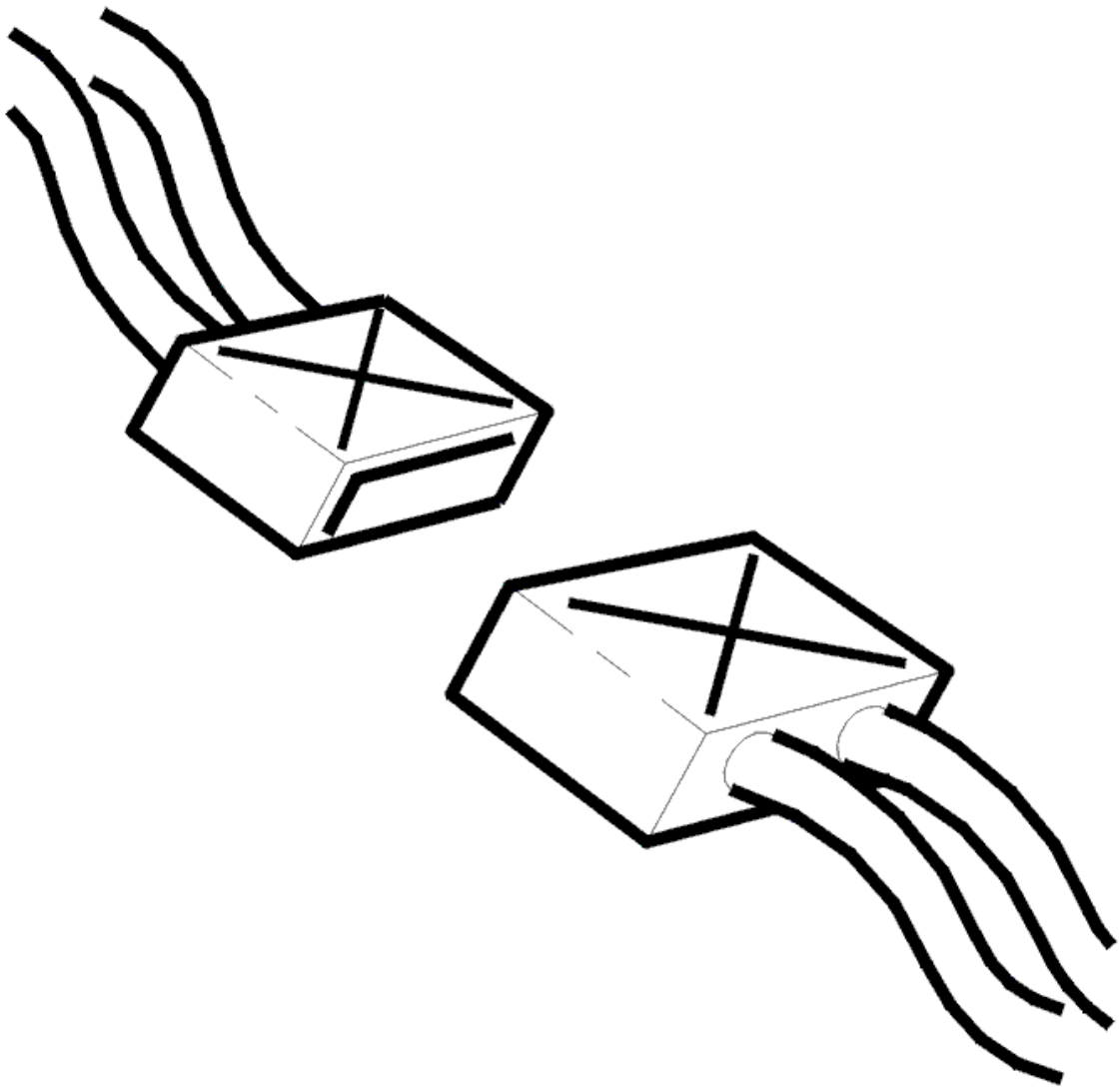


Fig. 327: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check the circuit for solenoid SLT. Measure the resistance between terminals #D3 and #D4 on transmission connector D. The resistance must be 5-5.6 ohms at 20°C.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

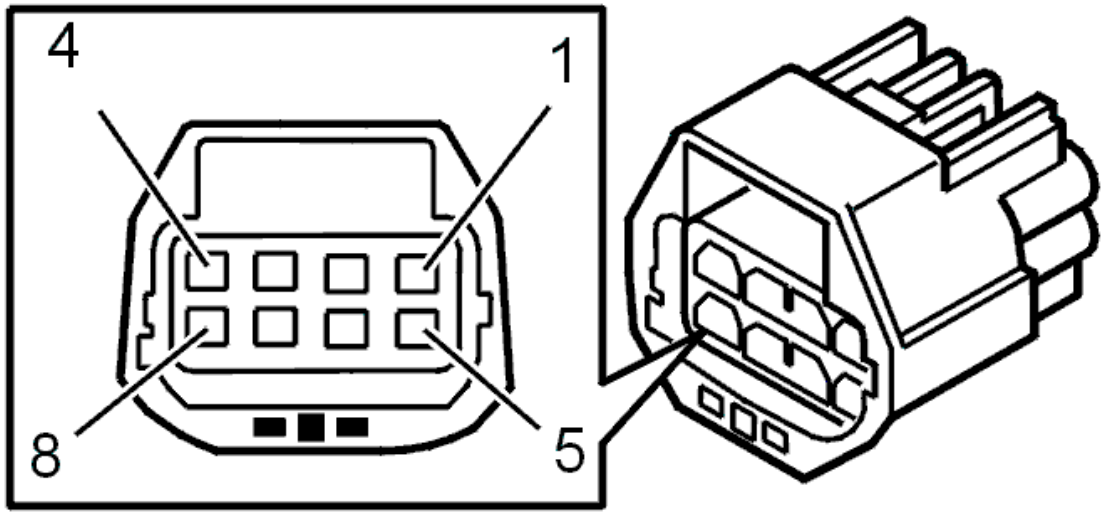


Fig. 328: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

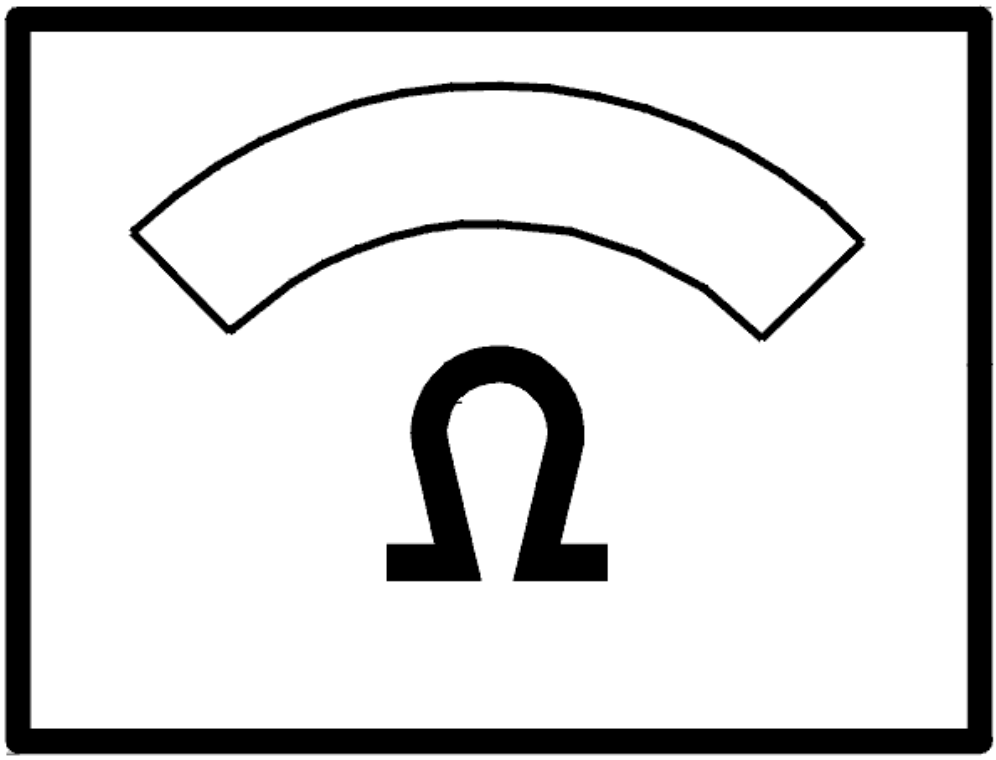


Fig. 329: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **OK**

  Refer to **CHECKING THE WIRING**

- **NOT OK**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

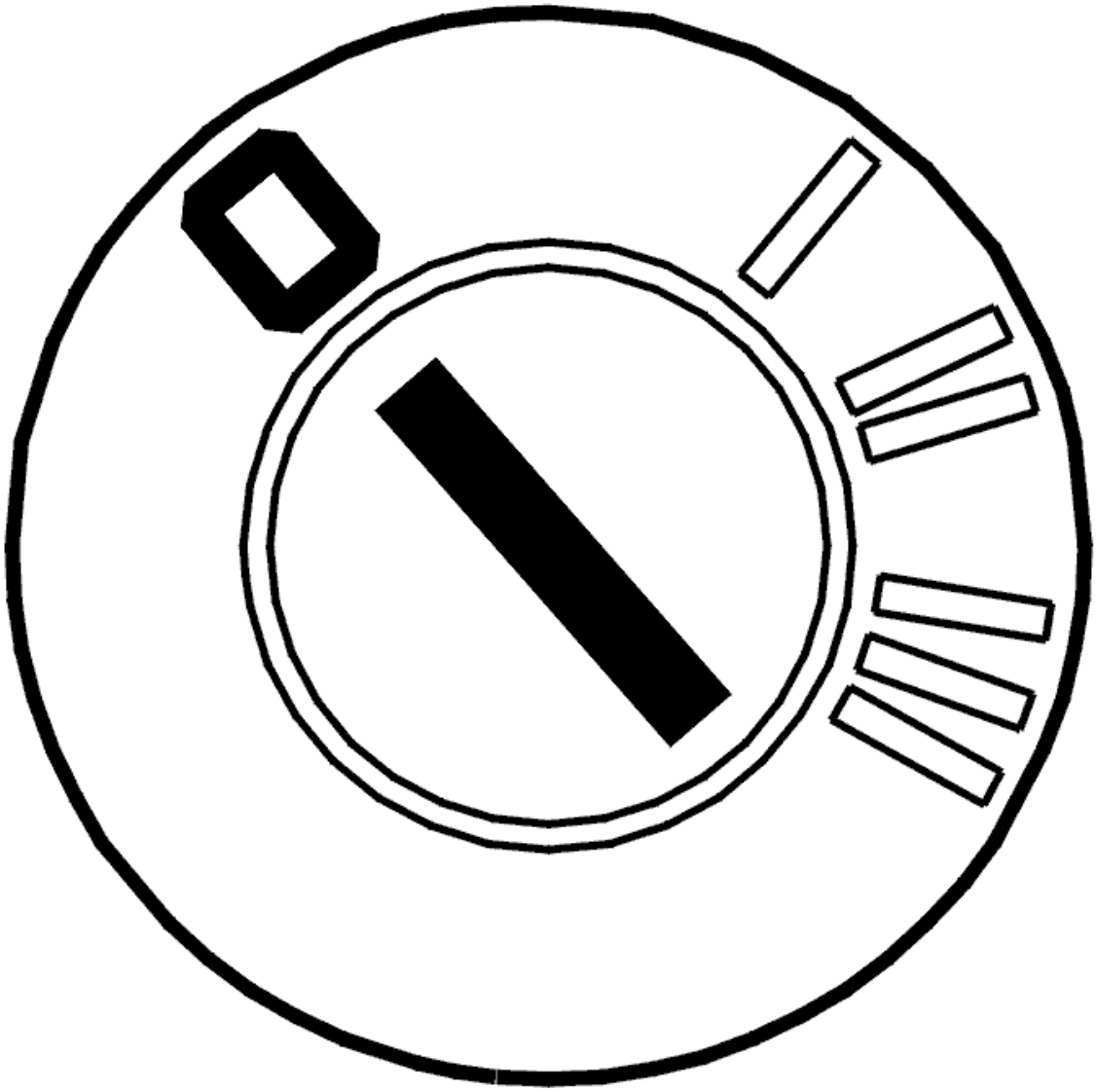


Fig. 330: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

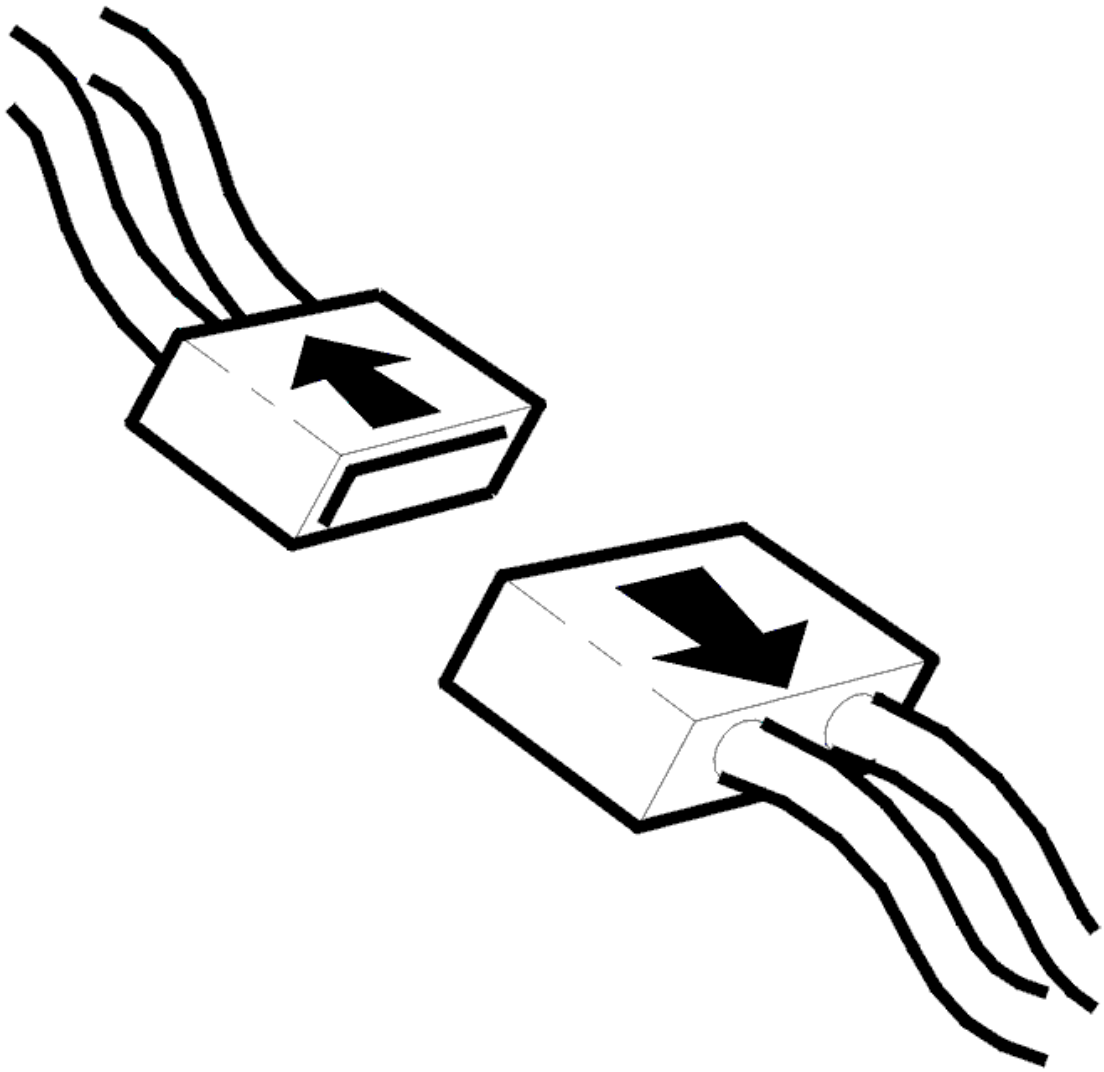


Fig. 331: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect transmission connector D.

Check the cable between transmission control module (TCM) terminal #A52 (#A52) and transmission connector terminal #D3 (control module side). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

Check the cable between control module terminal #B10 (#A70) and transmission connector terminal #D4 (control module side). Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

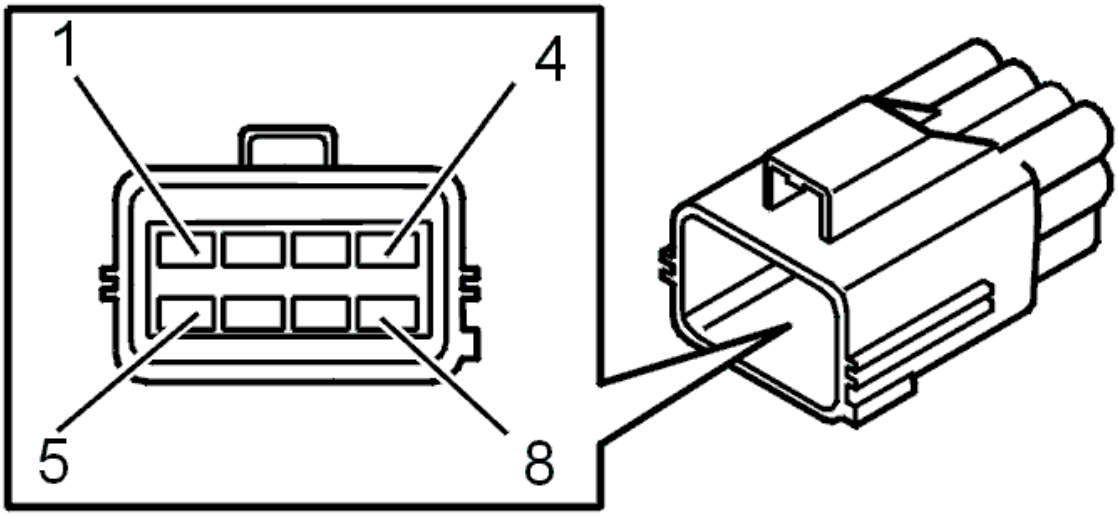


Fig. 332: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

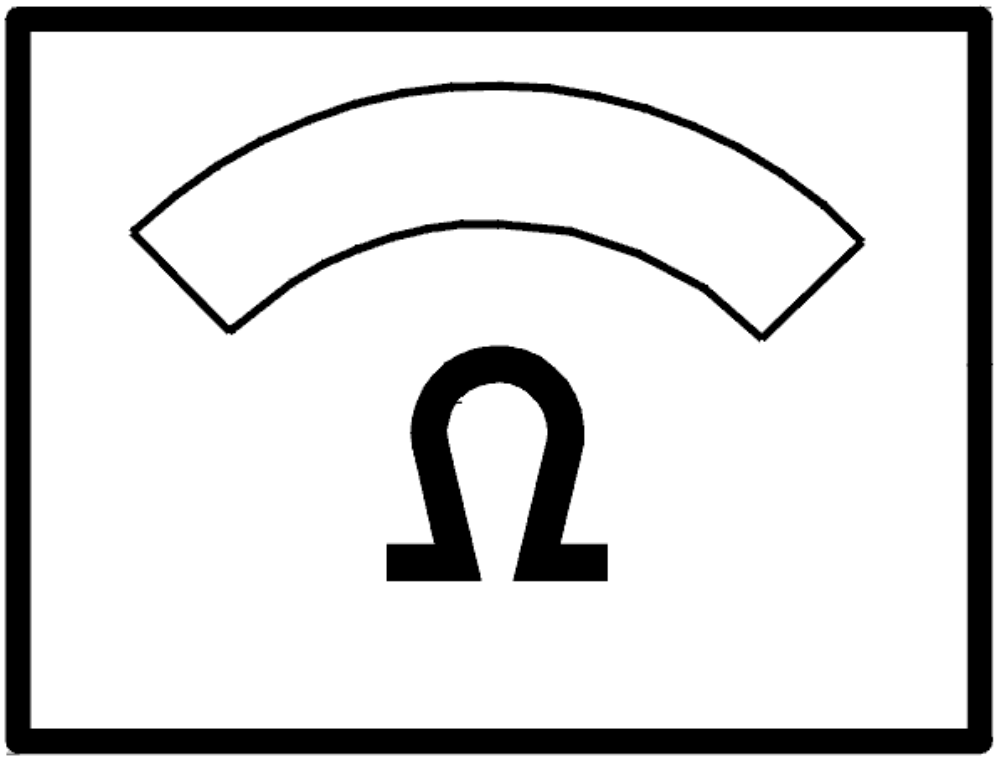


Fig. 333: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault found in the wiring?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

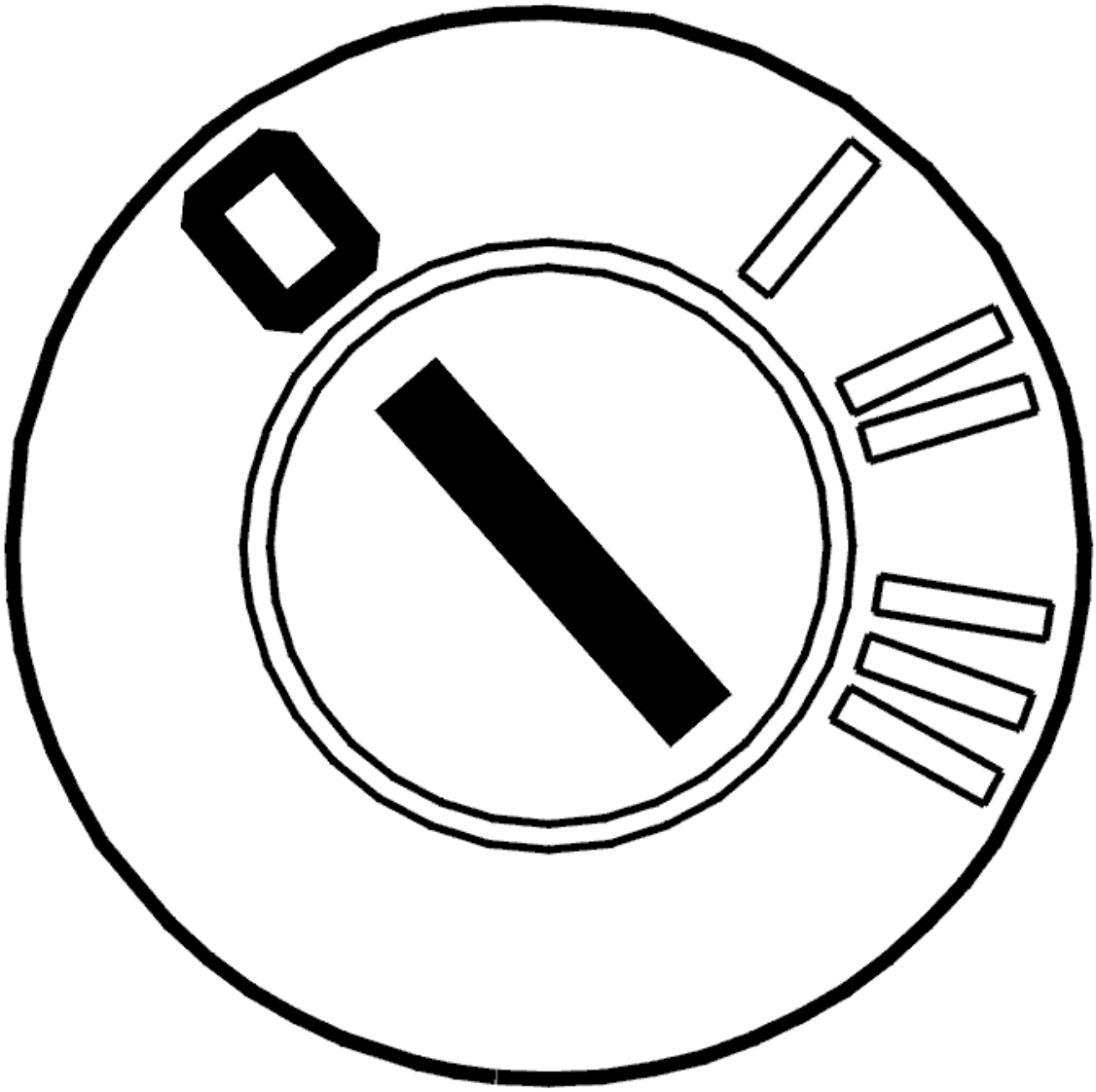


Fig. 334: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

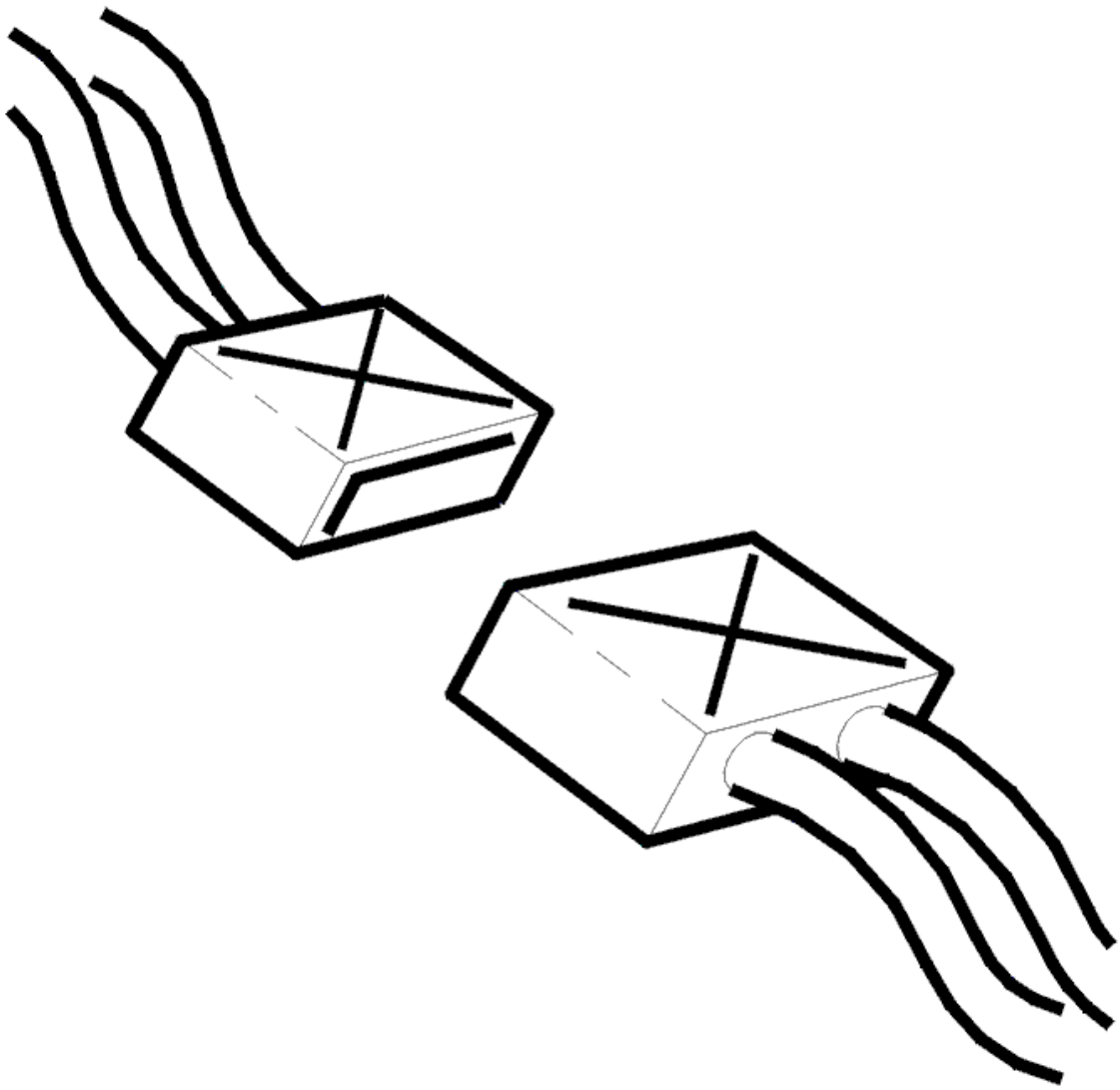


Fig. 335: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

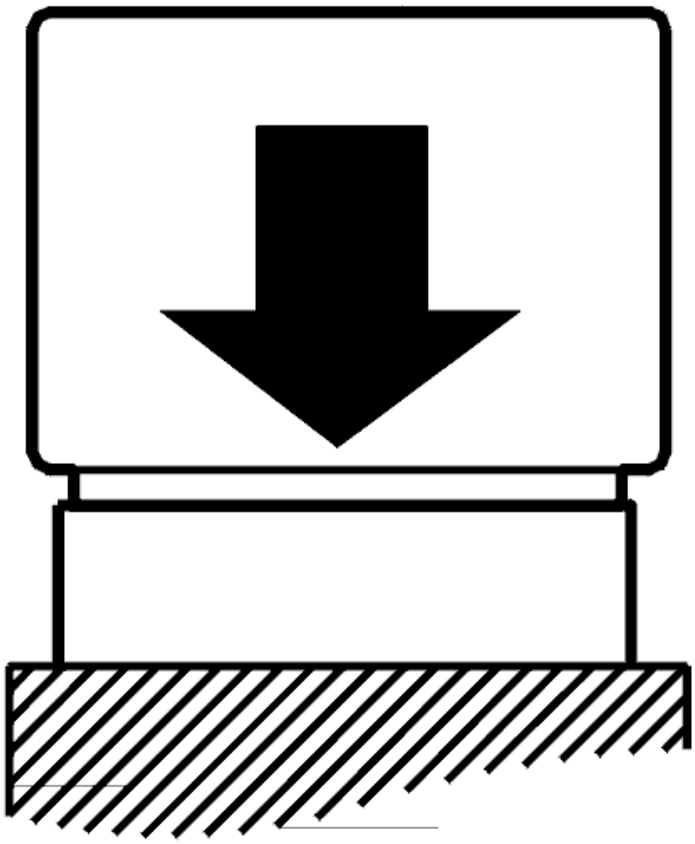


Fig. 336: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector D disconnected.

Check the transmission control module (TCM) by measuring the resistance between terminals #52 (#A52) and #B10 (#A70) on the breakout box. The resistance must be approximately 9 kohms.

NOTE: When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

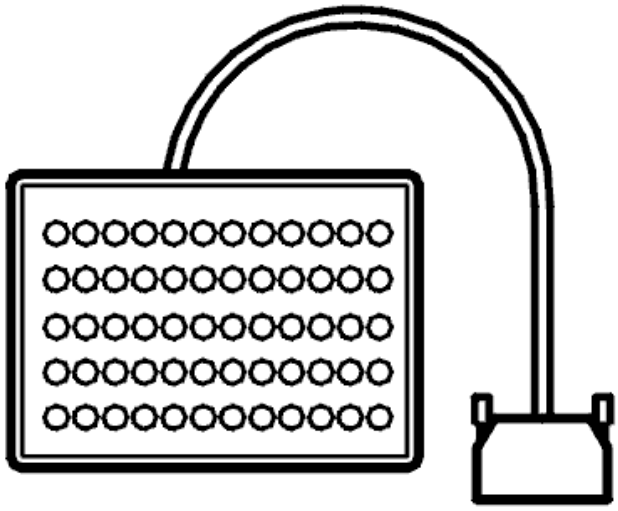


Fig. 337: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

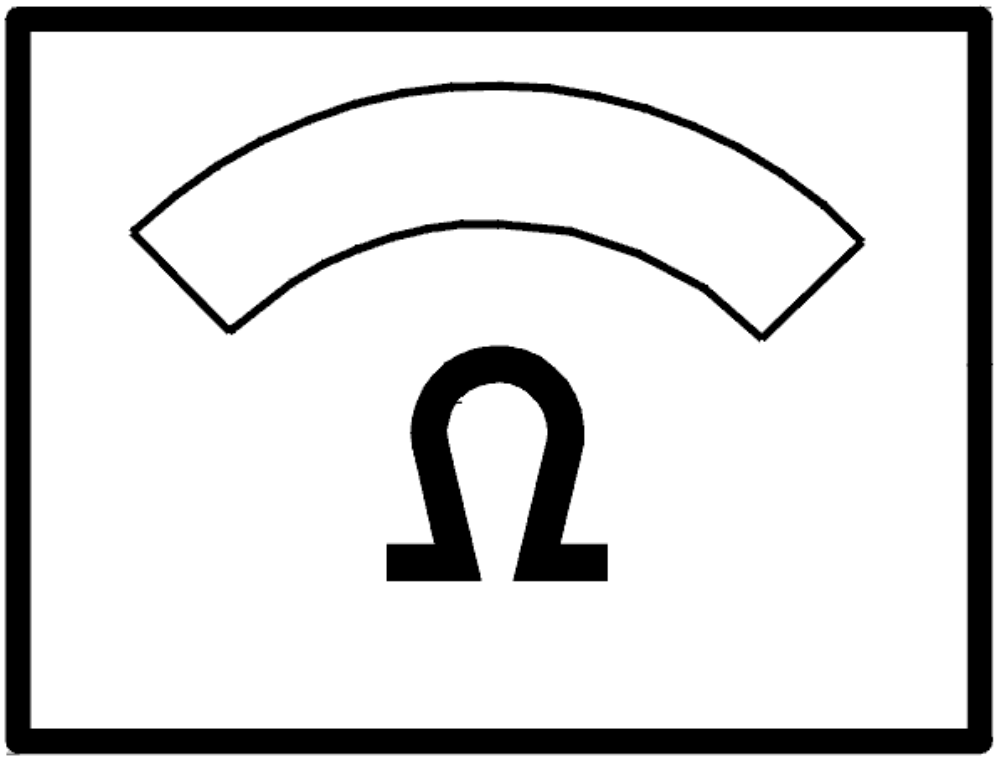


Fig. 338: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

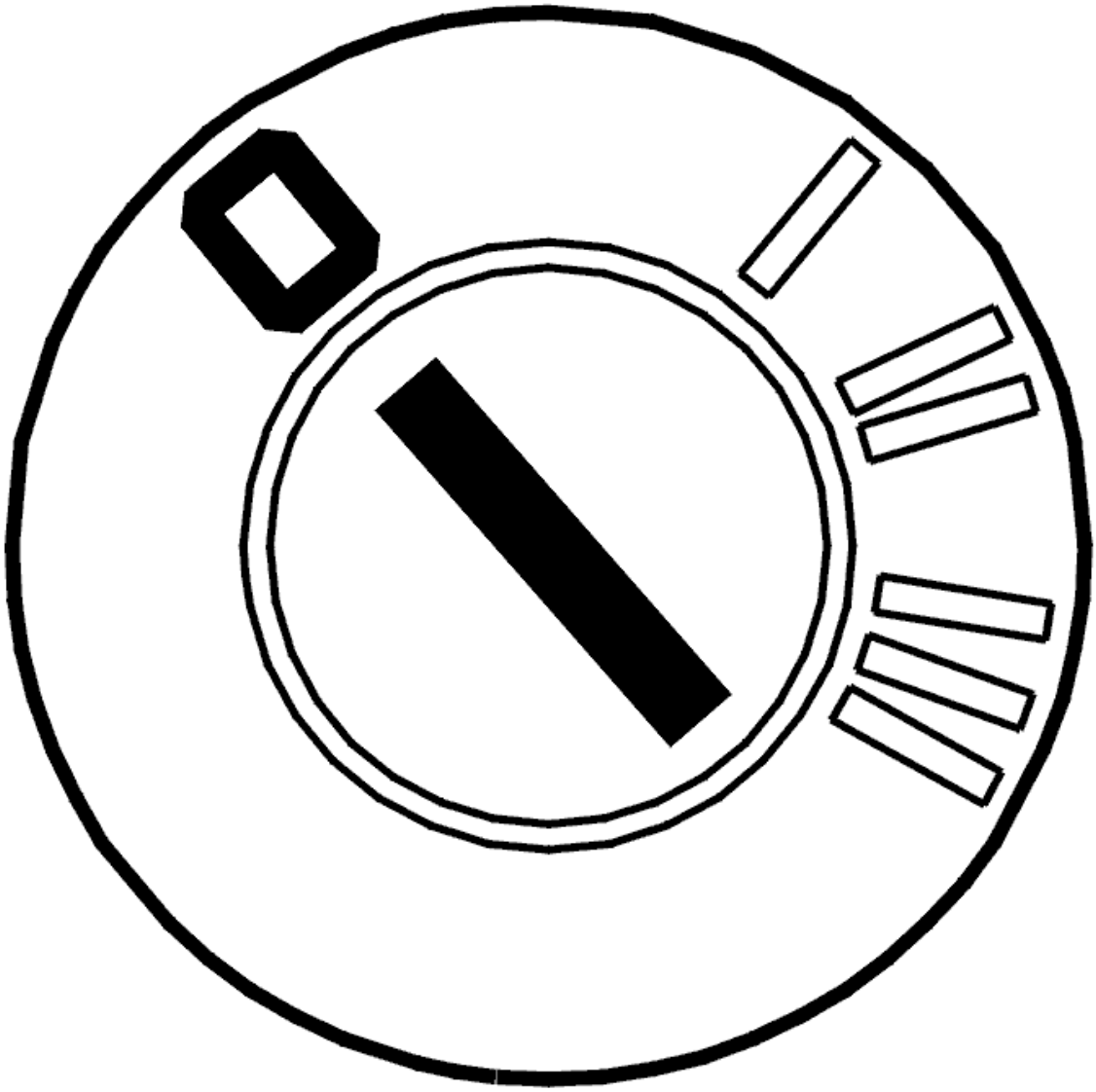


Fig. 339: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

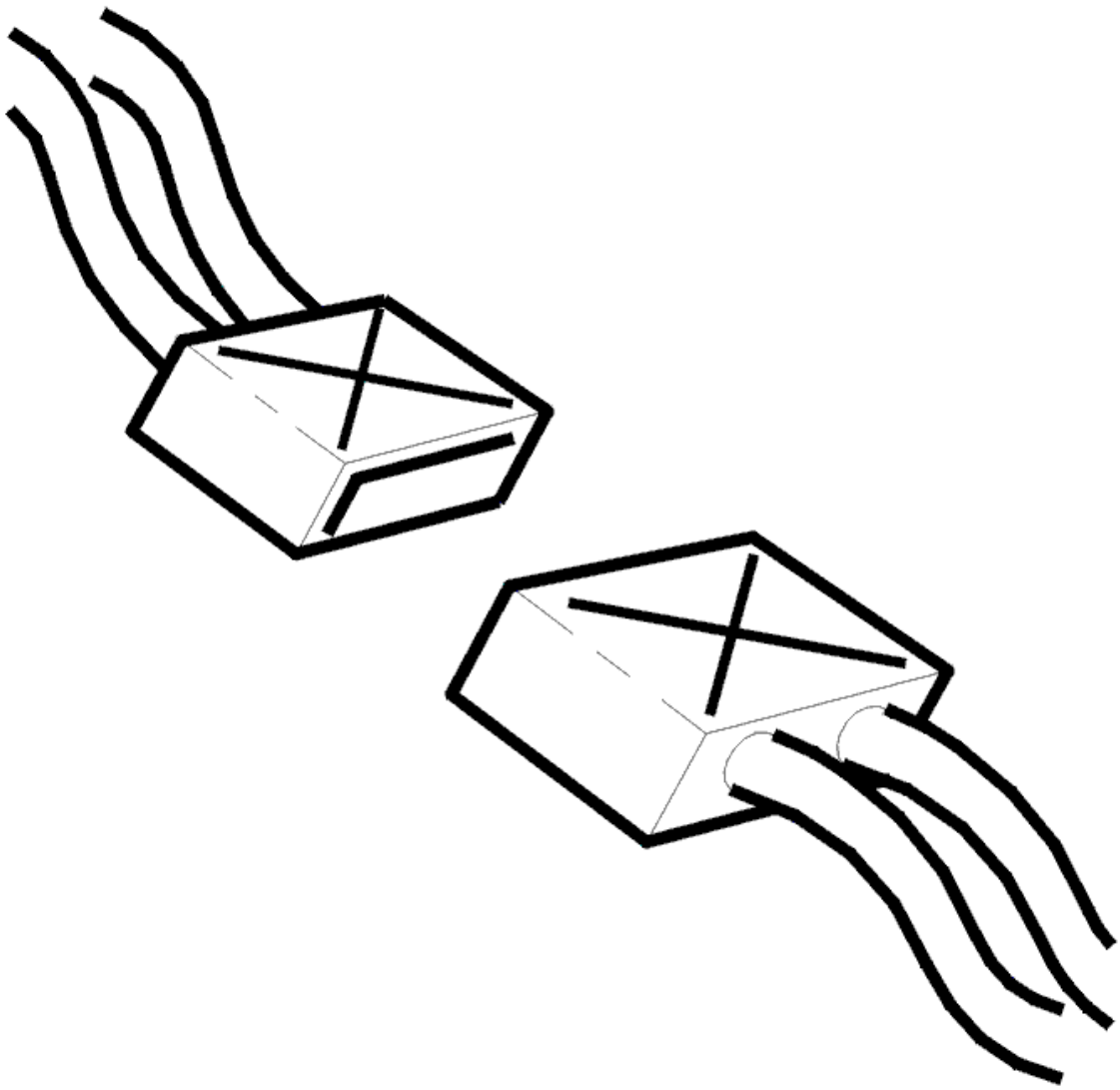


Fig. 340: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the wiring between transmission connector terminal #D3 and solenoid SLT terminal #1. Check the wiring between transmission connector terminal #D4 and solenoid SLT terminal #2. Check for an open-circuit. See **OPEN-CIRCUIT, PERMANENT FAULTS** .

  Also check against the other cables in the circuit.

  Check solenoid SLT by measuring the resistance between terminals #1 and #2 on the connector. The resistance must be 5-5.6 ohms at 20°C. Replace the control system if the resistance is incorrect.

  Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open and replace the transmission control system, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **CONNECTOR A, TRANSMISSION**.

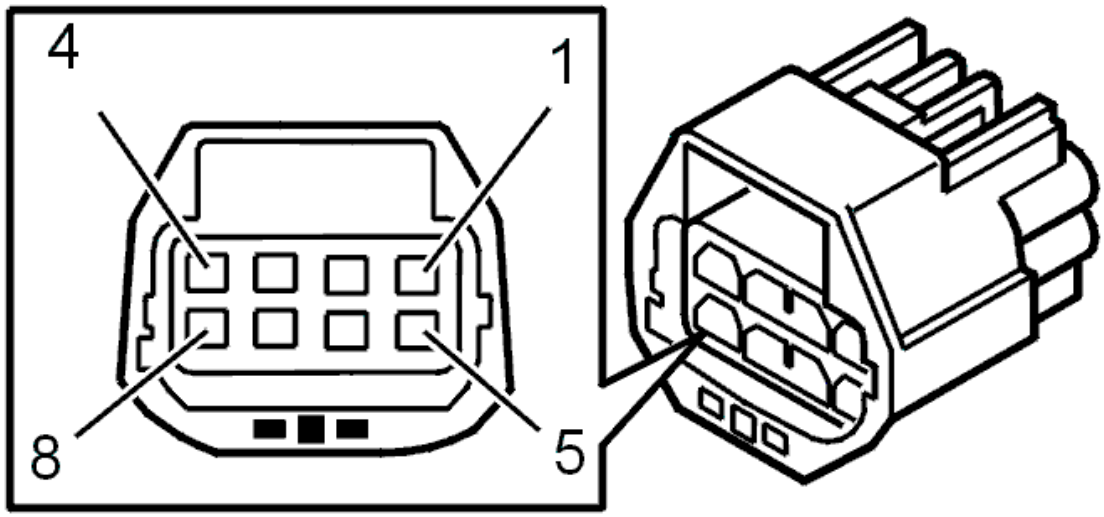


Fig. 341: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

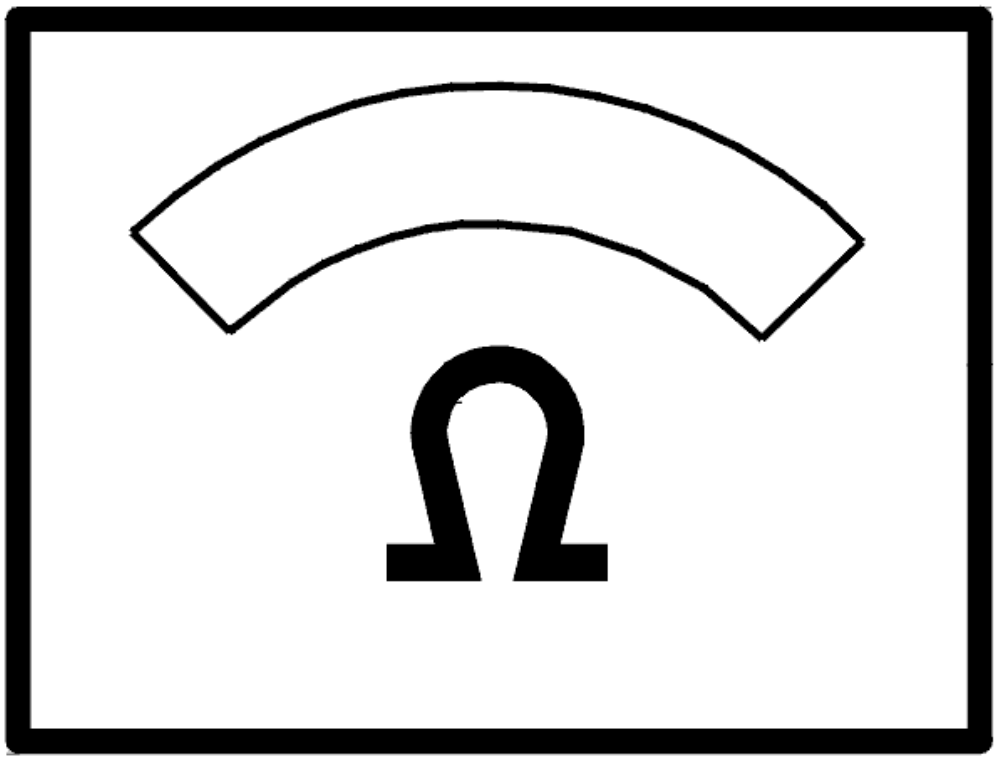


Fig. 342: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

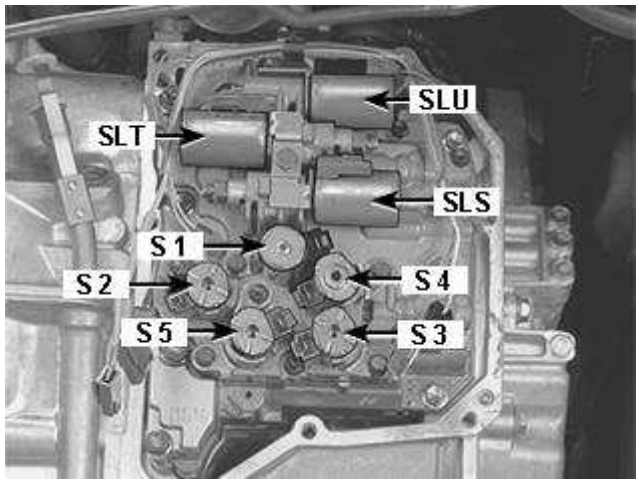


Fig. 343: Identifying S1-S5, SLT, SLU And SLS Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

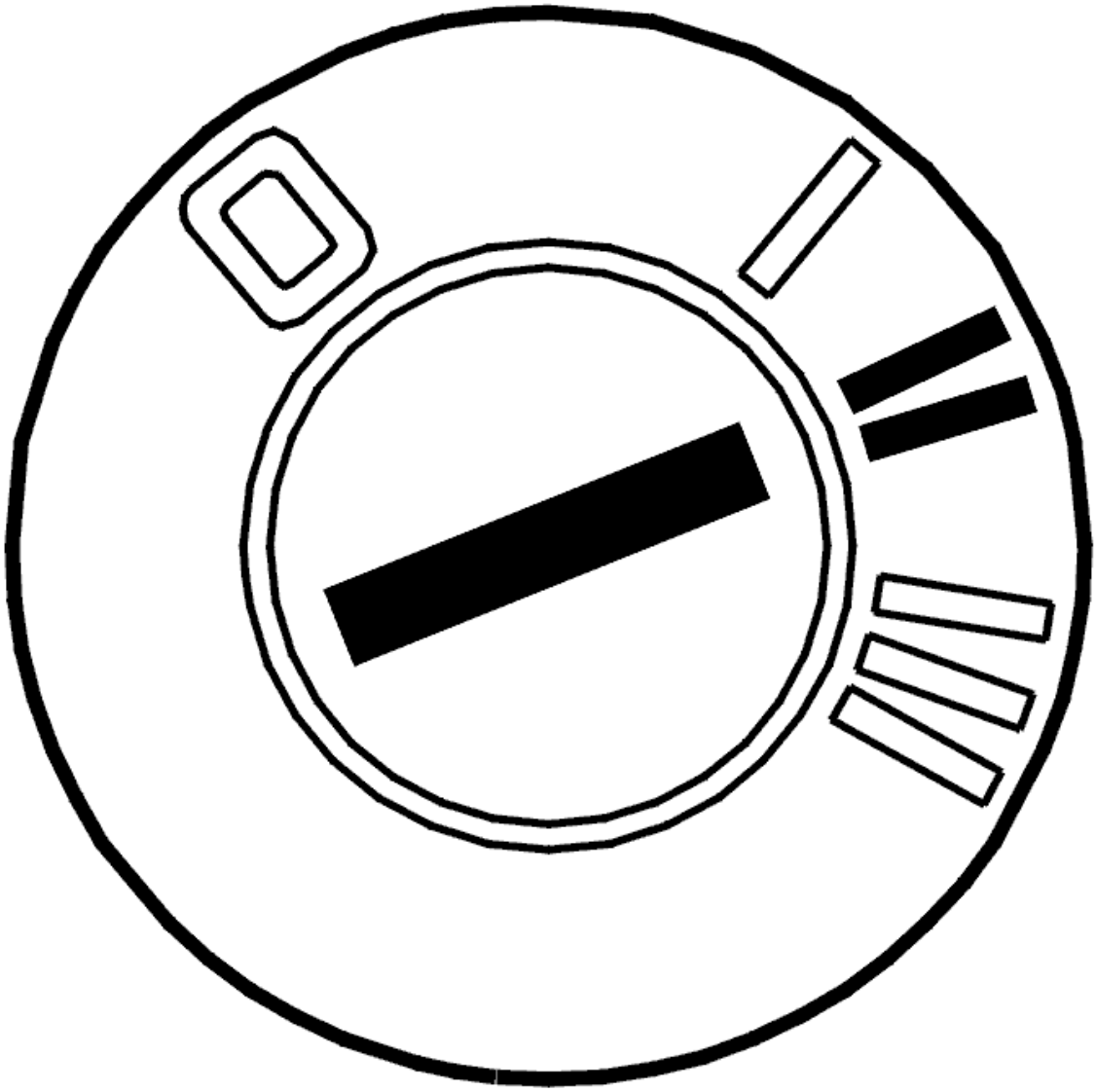


Fig. 344: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

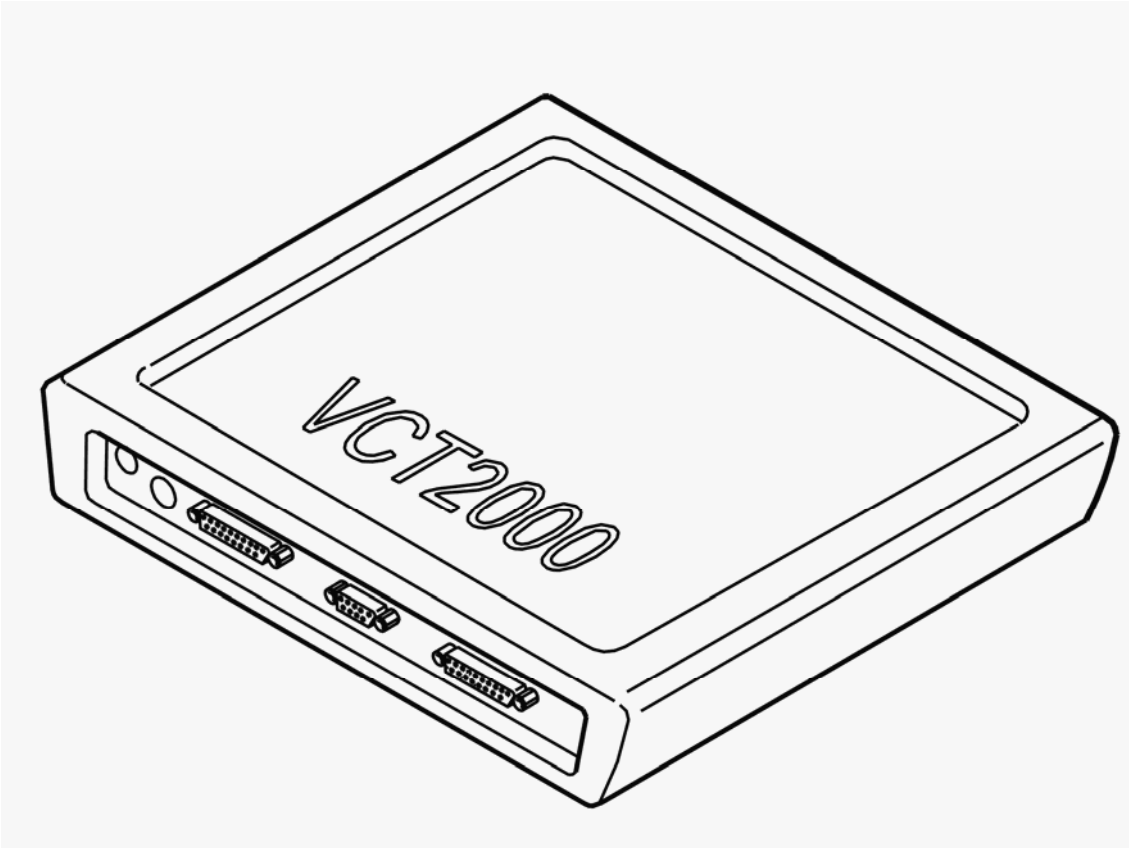


Fig. 345: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

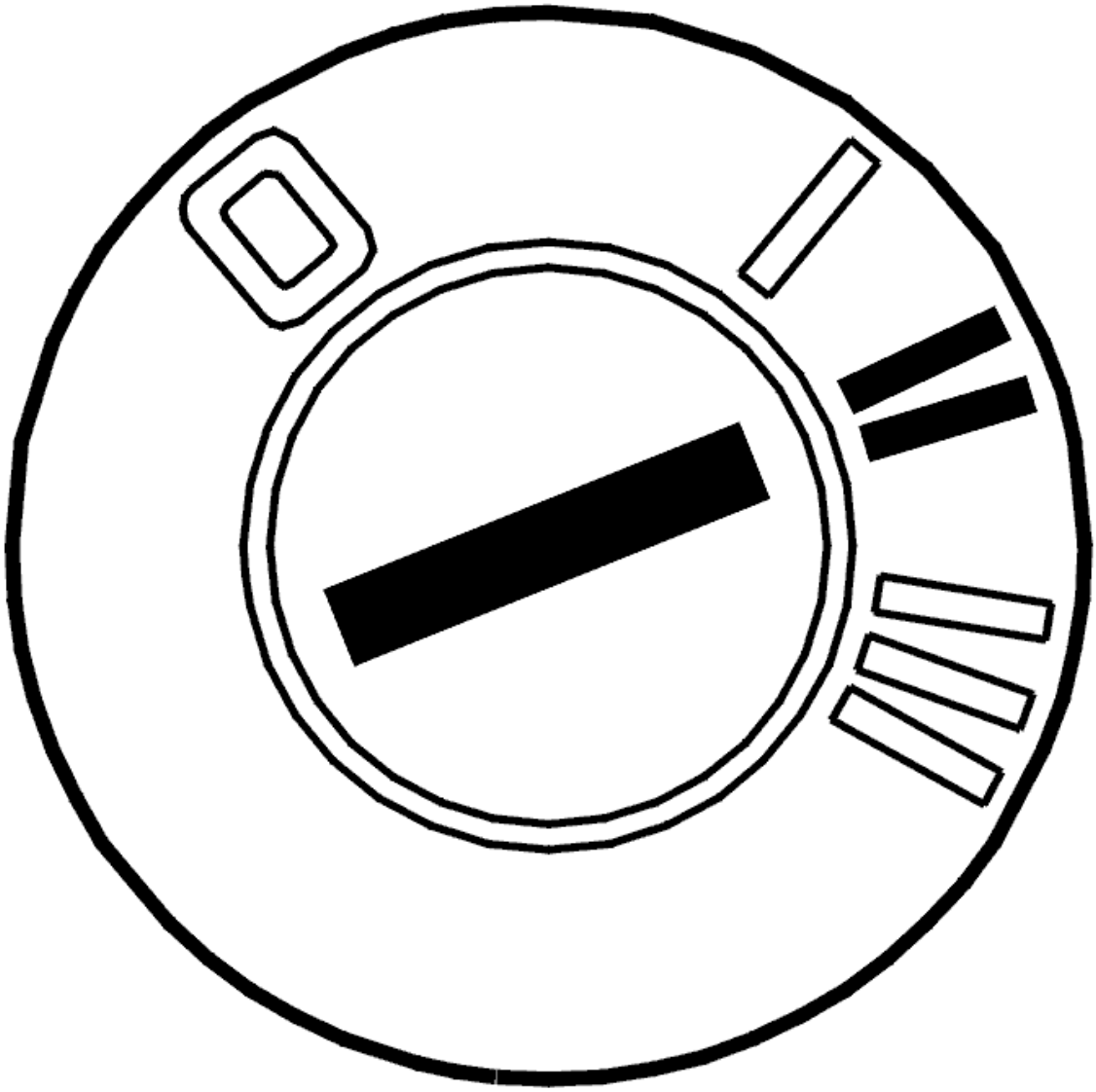


Fig. 346: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLT.

  Read off the current through the solenoid SLT circuit.

  The current should oscillate between 0 and 1000 mA.

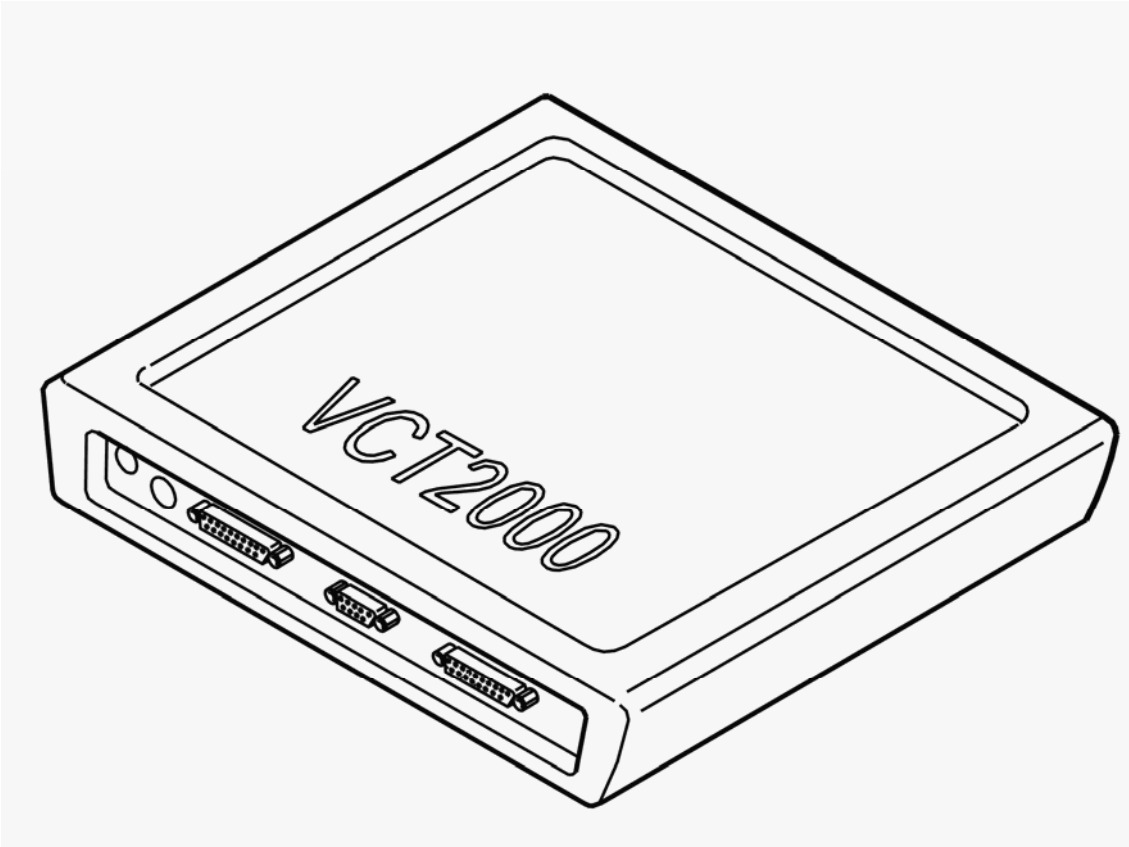


Fig. 347: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

CONNECTOR A, TRANSMISSION

4-WAY, 26-PIN CONNECTOR

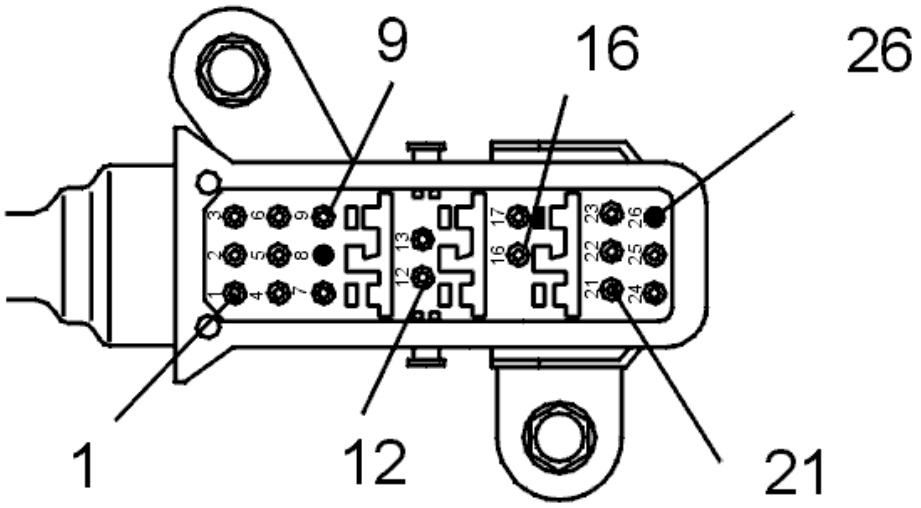


Fig. 348: Identifying Transmission Connector
Courtesy of VOLVO CARS CORPORATION

Control module terminals #A1-#A60 correspond to #A1-#A60 on the breakout box, #A61-#A70 correspond to #B1-#B10 on the breakout box.

Pin	Signal	Connected to control module #
1	Signal, gear-shift position sensor terminal A	A46
2	Signal, gear-shift position sensor terminal B	A64
3	Signal, gear-shift position sensor terminal C	A45
4	Signal, gear-shift position sensor terminal PA	A63
5	-	-
6	-	-
7	-	-
8	Signal ground, gear-shift position sensor	A53
9	-	-
12	Signal (OT), oil temperature sensor	A37
13	Signal ground (OTG), oil temperature sensor	A55
16	Signal (NC1), engine speed (RPM) sensor	A59
17	Signal ground (NC1G), engine speed (RPM) sensor	A41
21	Control signal, solenoid S1	A50
22	Control signal, solenoid S2	A68
23	Control signal (SLU), lock-up solenoid SLU	A51
24	Control signal (SLT), throttle solenoid SLT	A52
25	Signal ground (SLTG), throttle solenoid SLT	A70
26	Signal ground (SLUG), lock-up solenoid SLU	A69

TCM-0118: THROTTLE SOLENOID SLT. SIGNAL TOO LOW. INTERMITTENT

FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

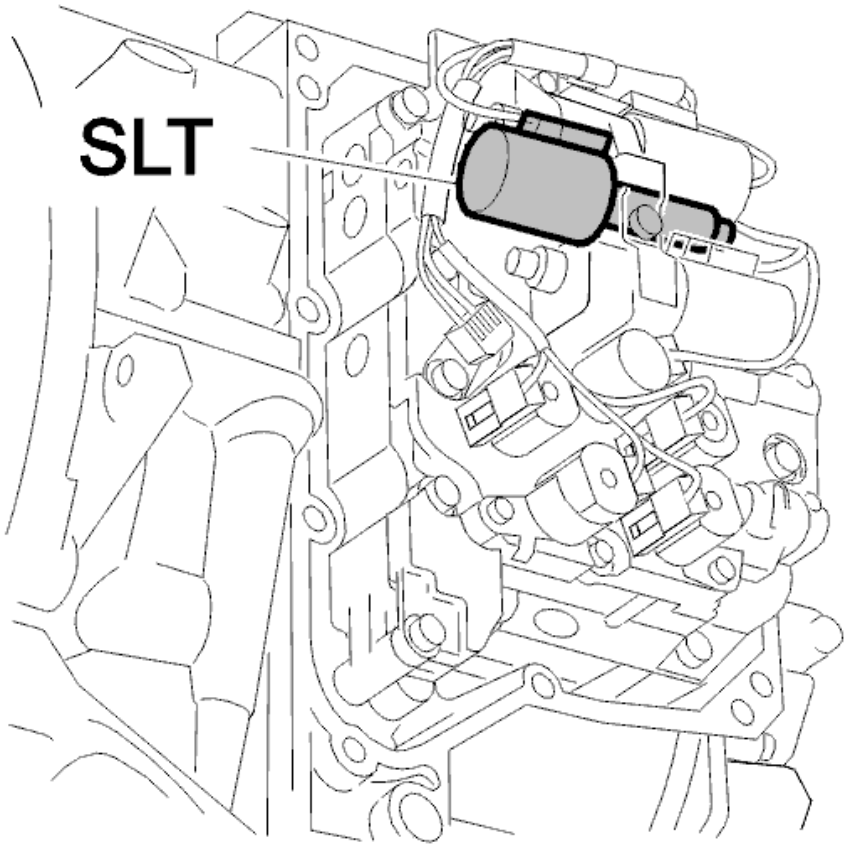


Fig. 349: Identifying Line Pressure Solenoid
Courtesy of VOLVO CARS CORPORATION

Throttle solenoid SLT controls the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) results in a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-0118 is stored if the control module registers a short-circuit to ground in the solenoid SLT circuit. Solenoid SLT cannot then control the line pressure.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Short-circuit to ground in the control signal cable or the signal cable.

- Defective solenoid SLT.

Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

HINT: The shifting may be harsh if there is no request for torque limiting to the engine control module (ECM) during shifting.

SIGNAL TOO LOW. INTERMITTENT FAULT

INTERMITTENT FAULT

Check control module connector and transmission connector D. Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the wiring between transmission control module (TCM) terminal #A52 (#A52) and transmission connector terminal #D3. Check the wiring between control module terminal #B10 (#A70) and transmission connector terminal #D4. Check for an intermittent short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, INTERMITTENT FAULTS** .

HINT: Check solenoid SLT. Measure the resistance between terminals #D3 and #D4 on transmission connector D. The resistance should be 5-5.6 ohms at 20°C.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

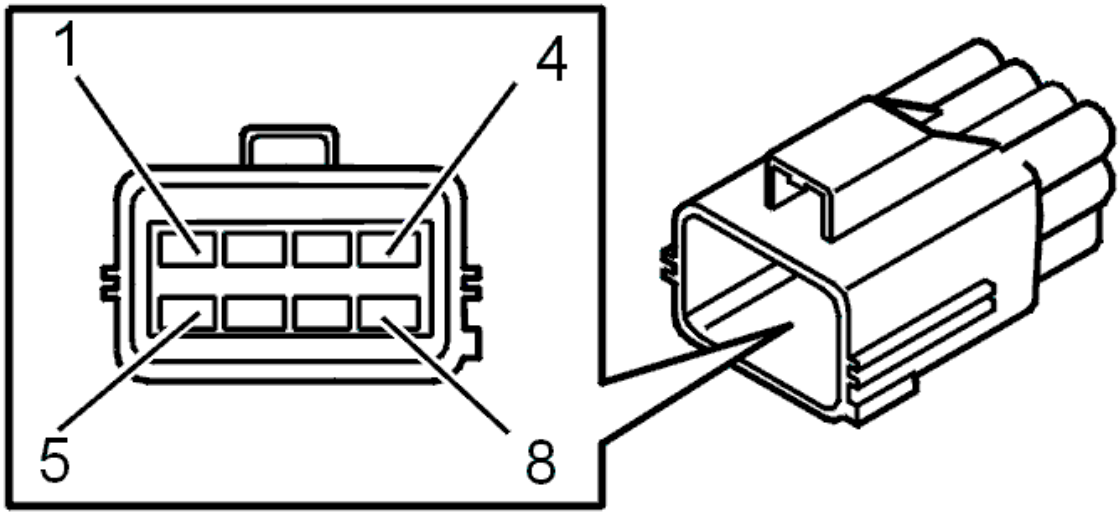


Fig. 350: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

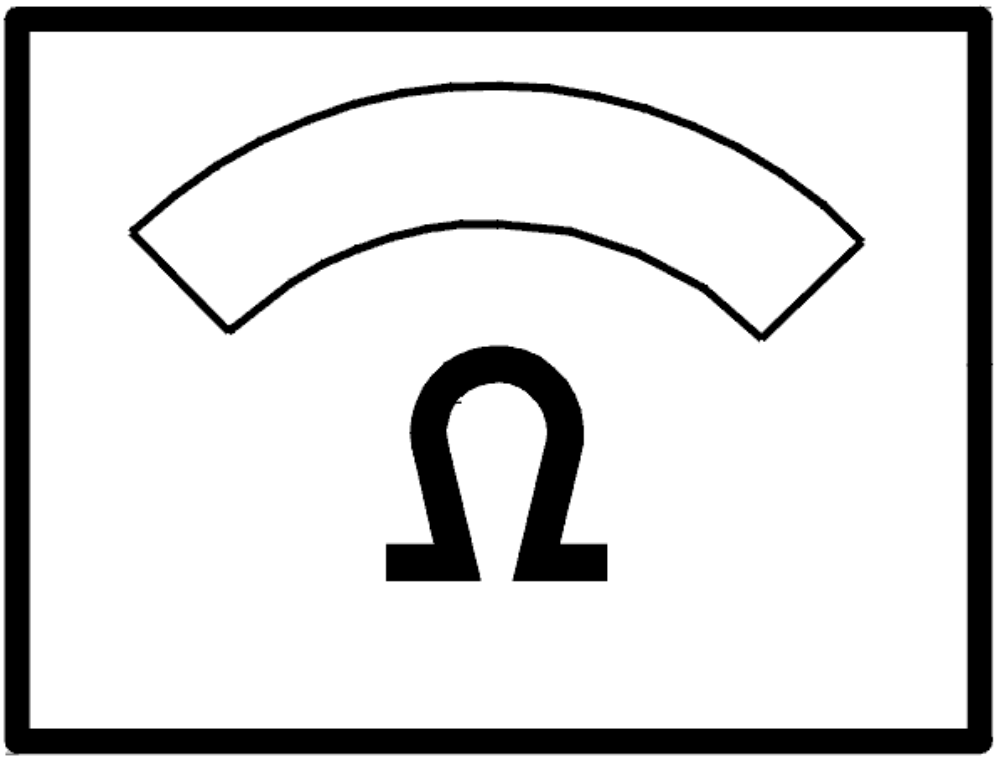


Fig. 351: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

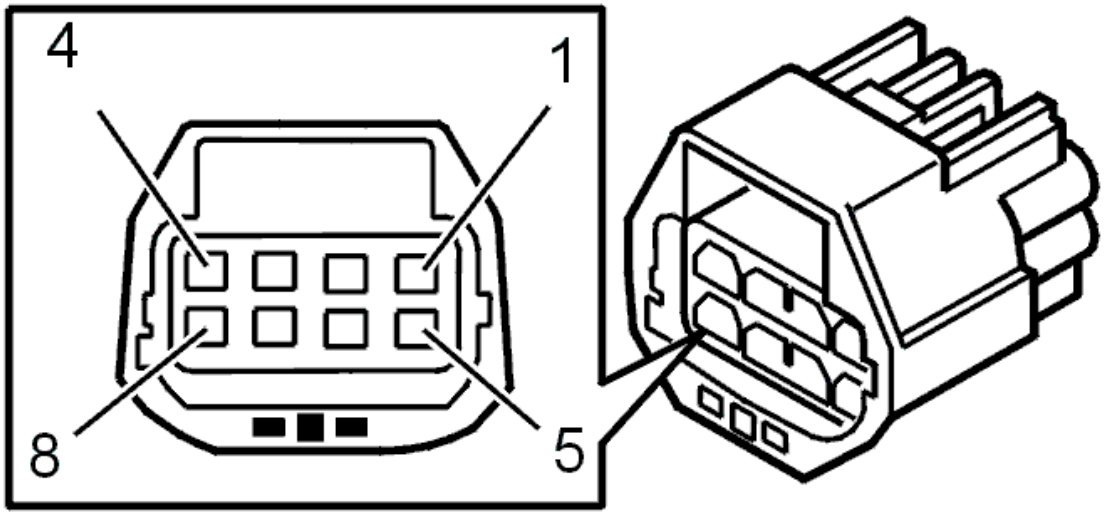


Fig. 352: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-0118: THROTTLE SOLENOID SLT. SIGNAL TOO LOW. PERMANENT FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

SIGNAL TOO LOW. PERMANENT FAULT

CHECKS

CHECKING LINE PRESSURE SOLENOID SLT

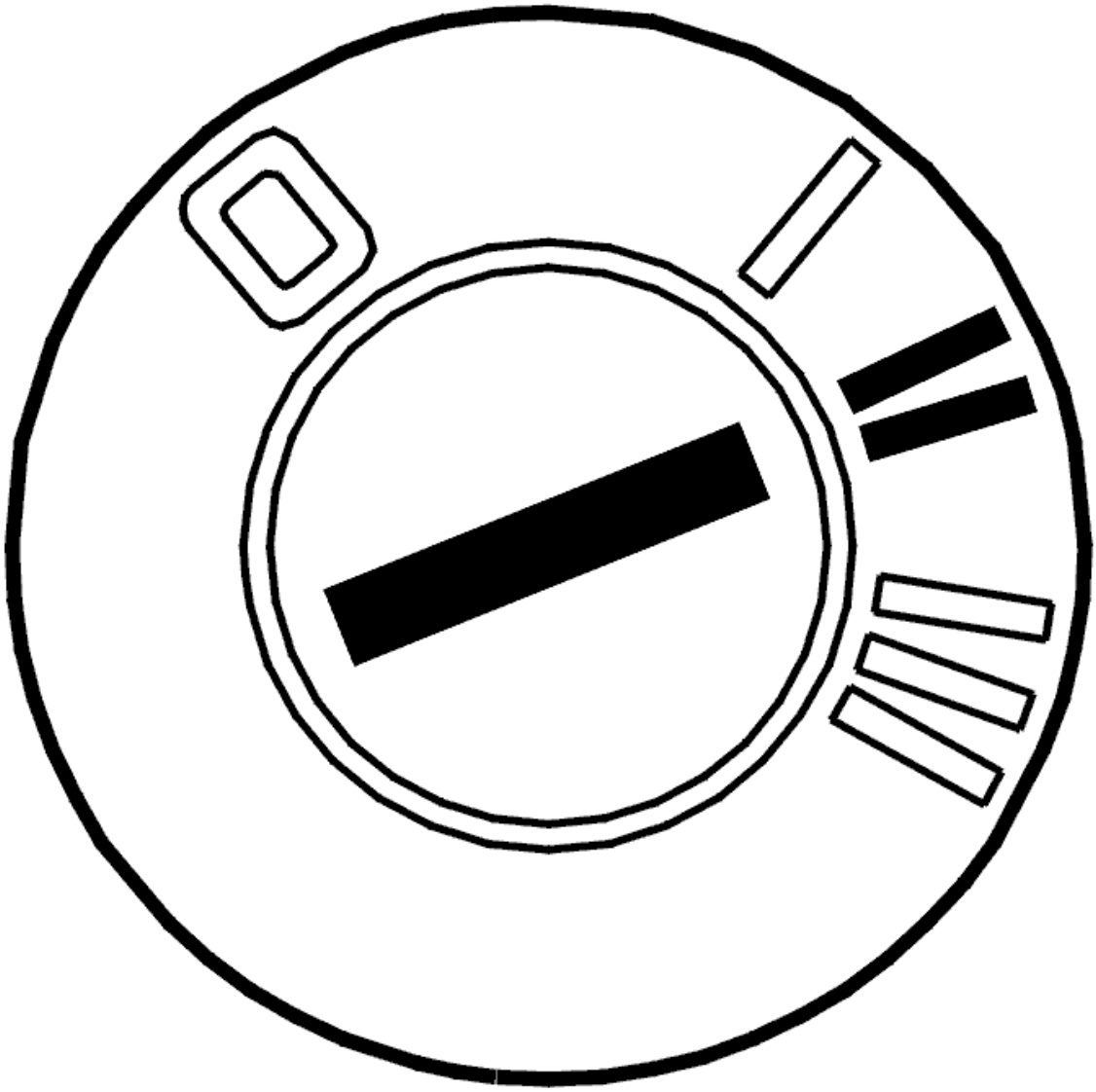


Fig. 353: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

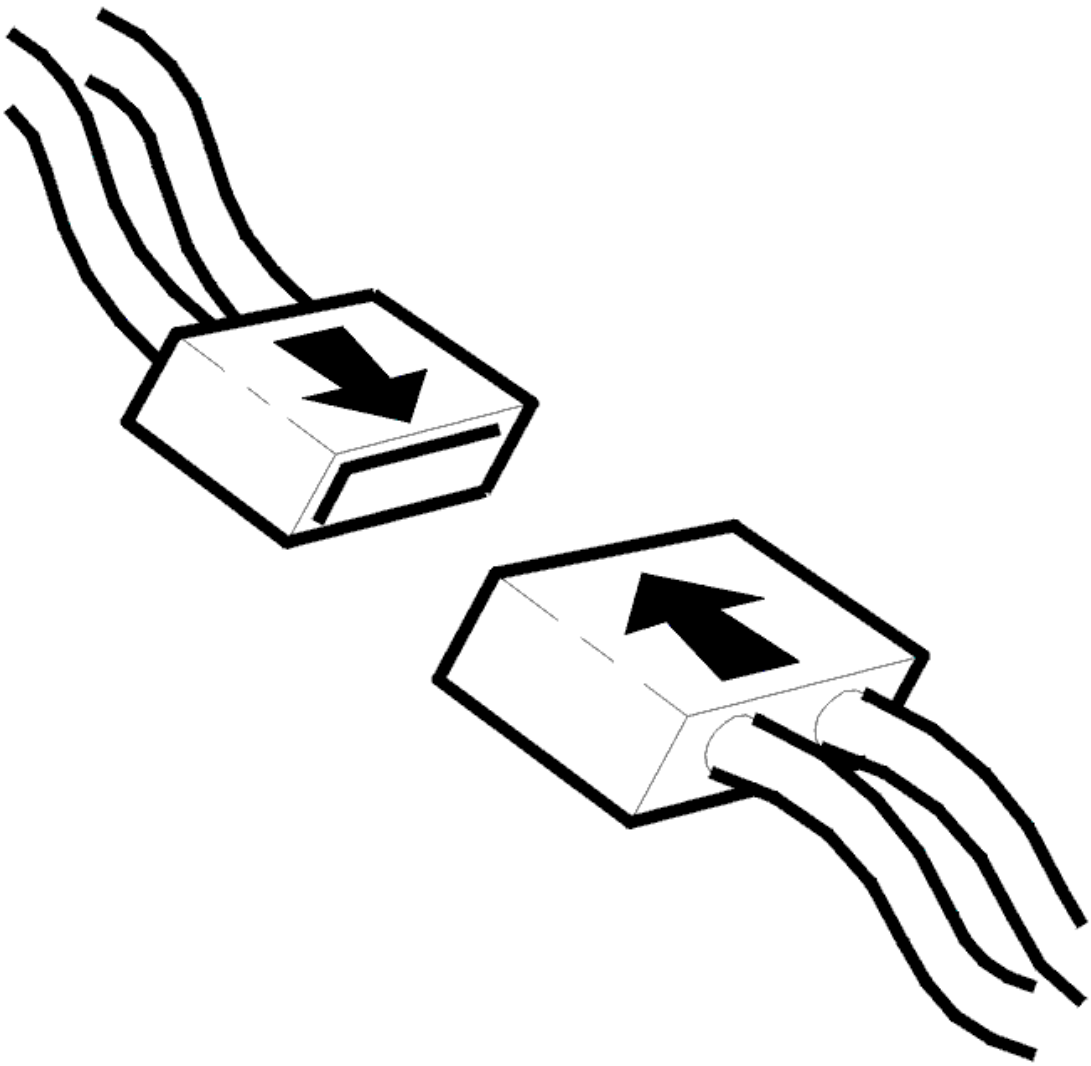


Fig. 354: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the control module connector and automatic transmission connector D. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION** . Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLT.

  Read off the current through the solenoid SLT circuit.

  The current should oscillate between 0 and 1000 mA.

  Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To disconnect the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

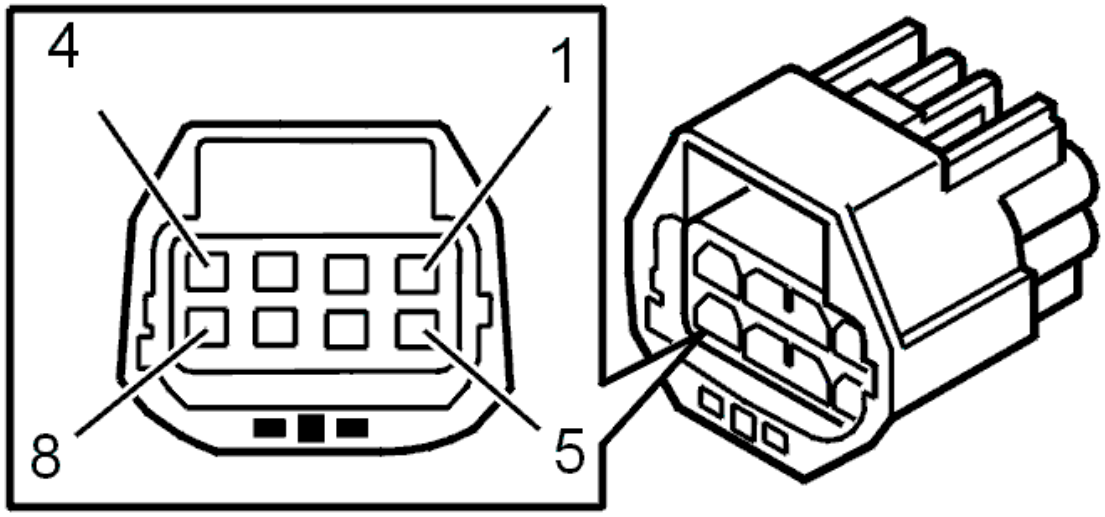


Fig. 355: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

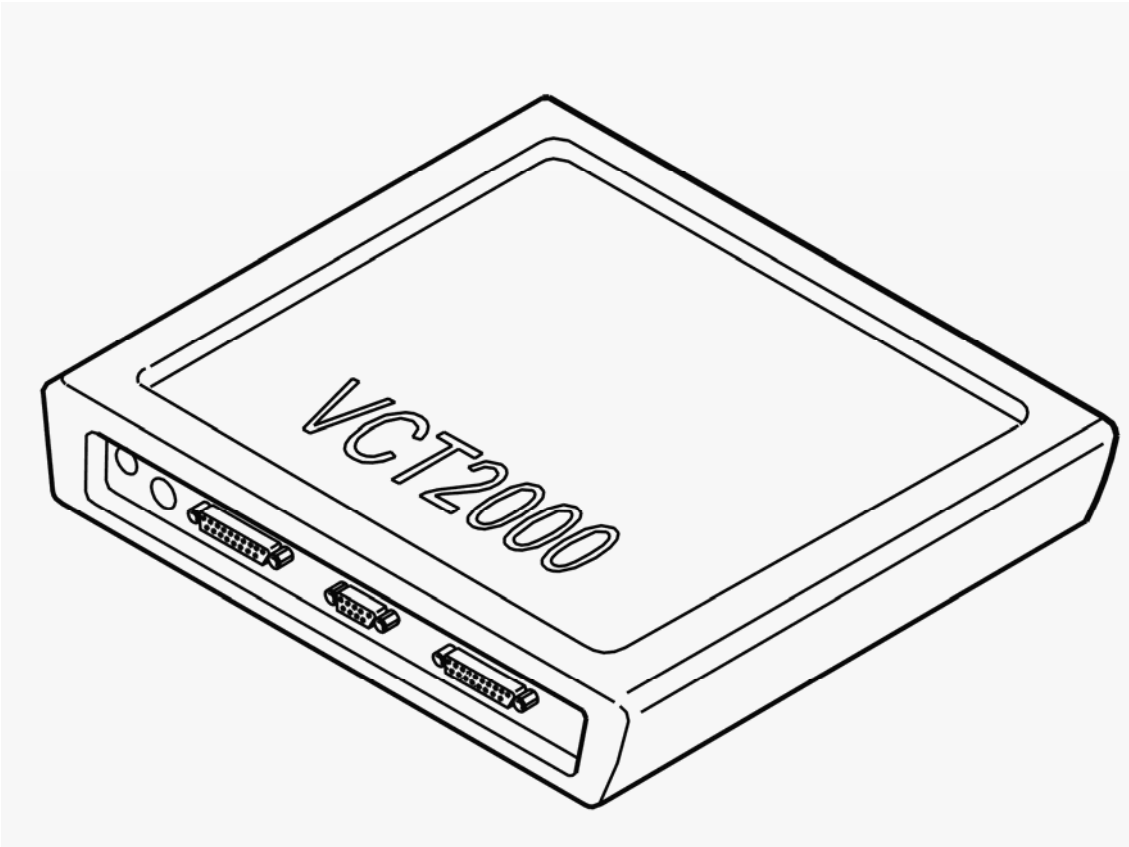


Fig. 356: Identifying VCT2000 Diagnostic Tool Symbol In VIDA

Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING RESISTANCE**

CHECKING RESISTANCE

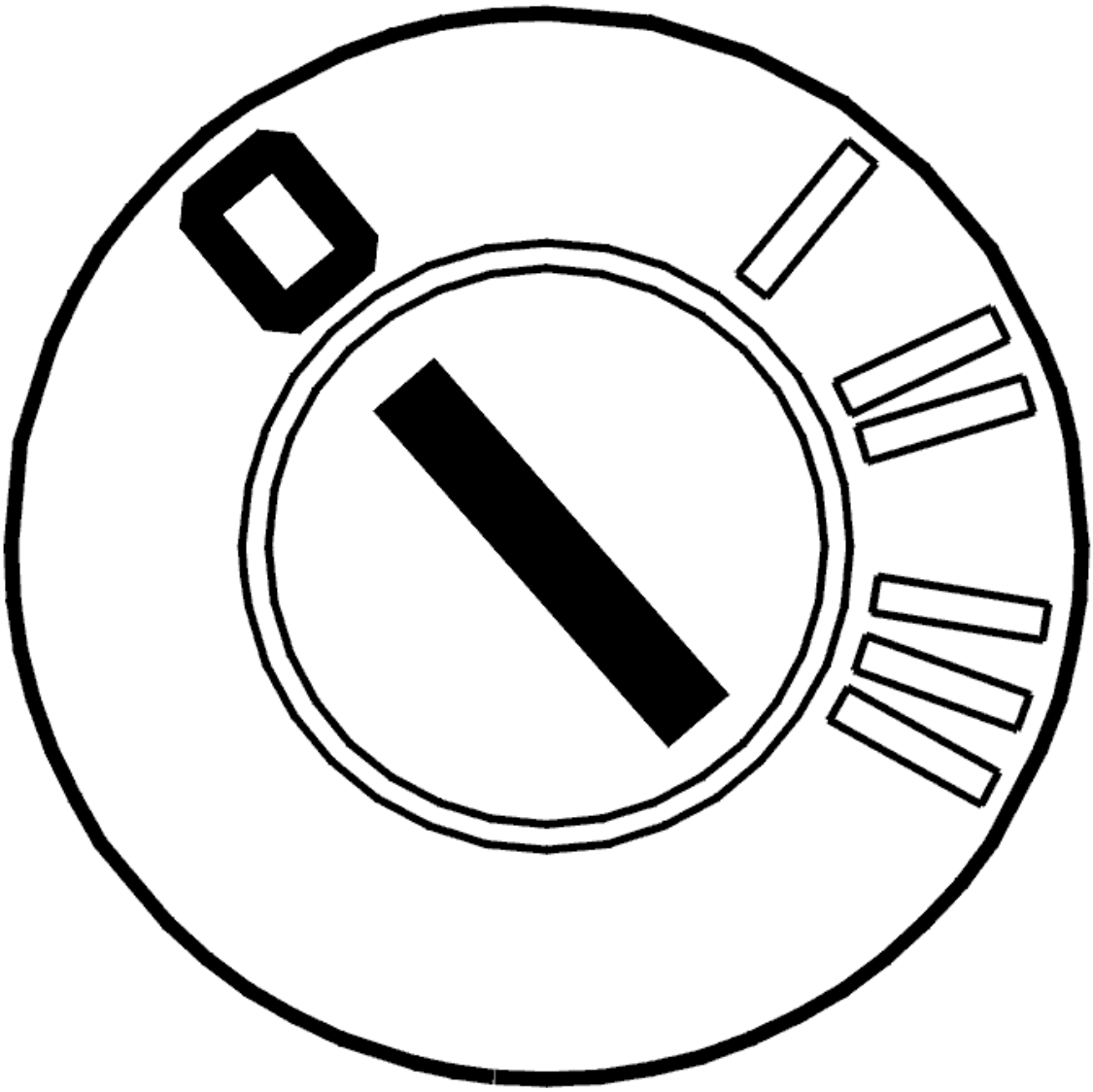


Fig. 357: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

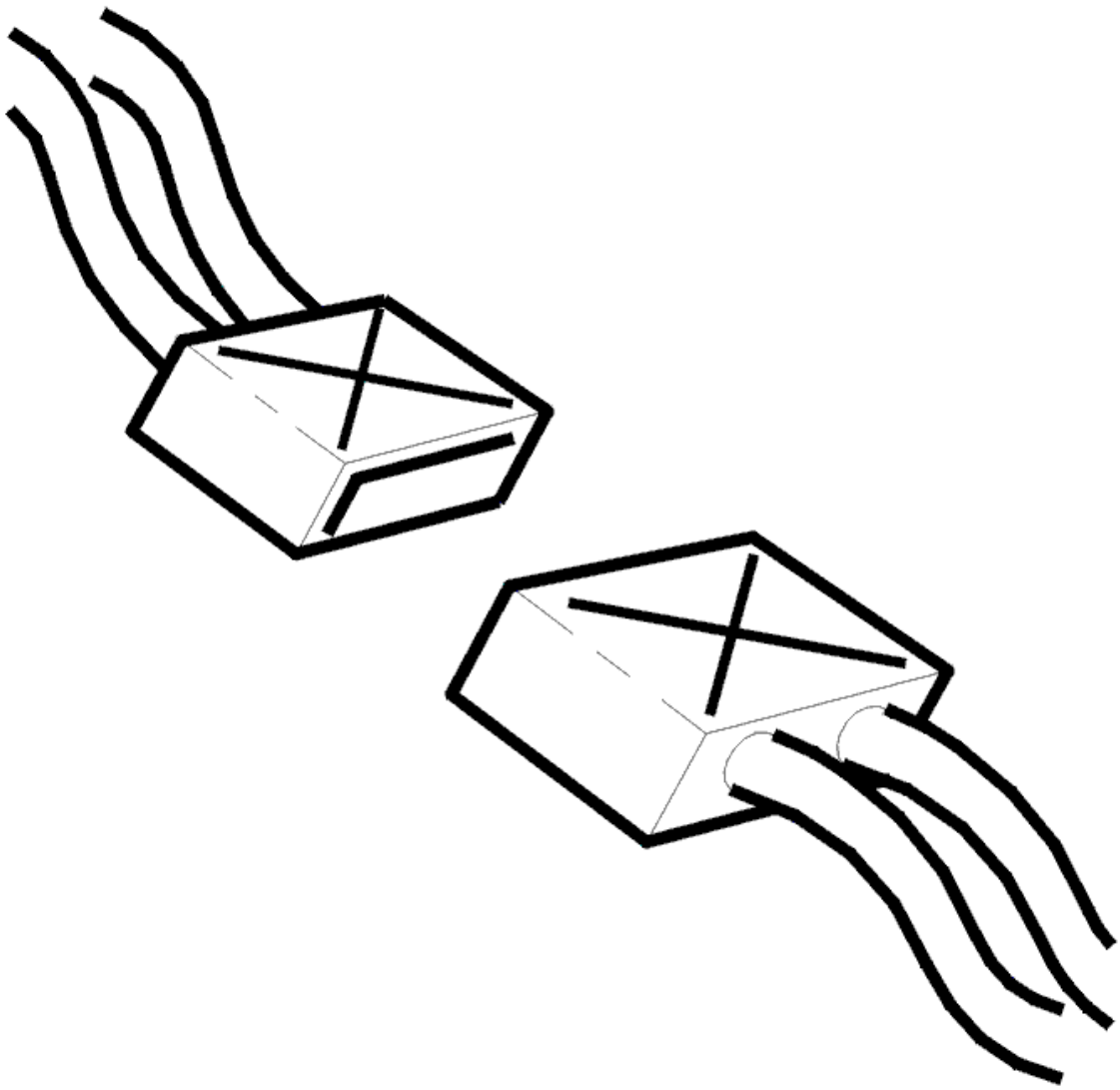


Fig. 358: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission connector D disconnected.

Check solenoid SLT. Measure the resistance between terminals #D3 and #D4 on transmission connector D. The resistance should be 5-5.6 ohms at 20°C.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

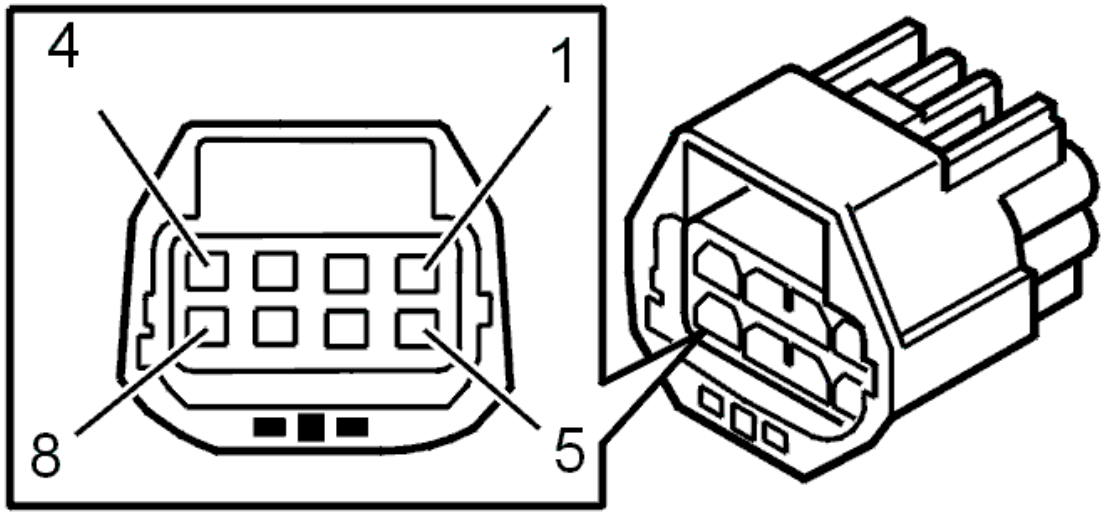


Fig. 359: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

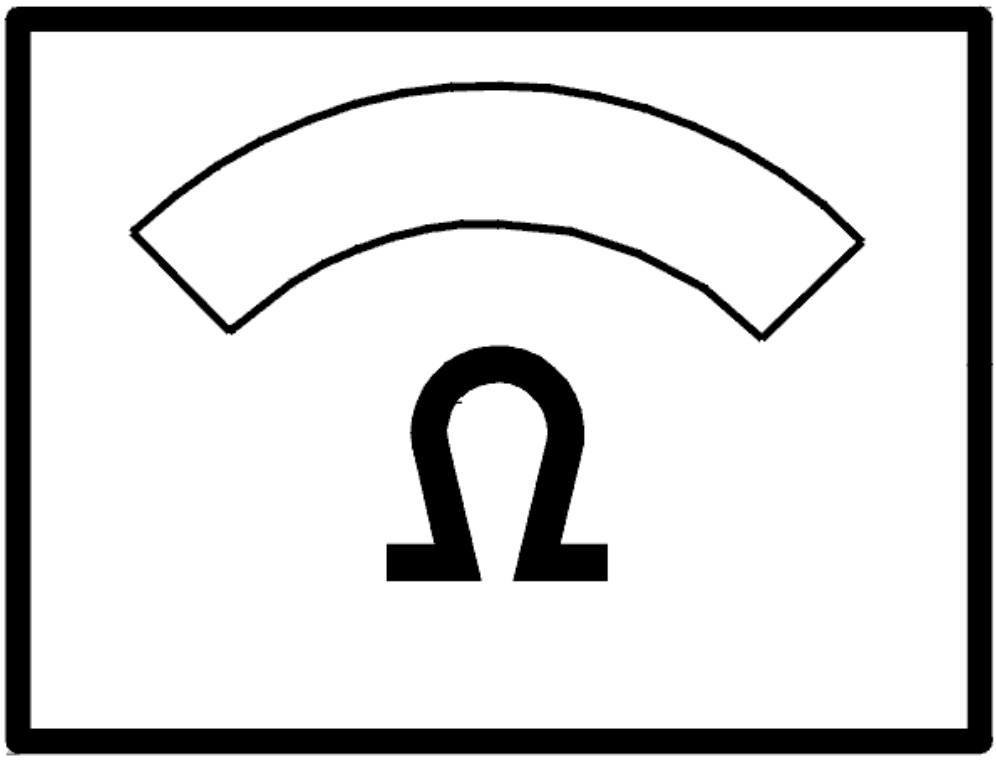


Fig. 360: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING THE WIRING**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING

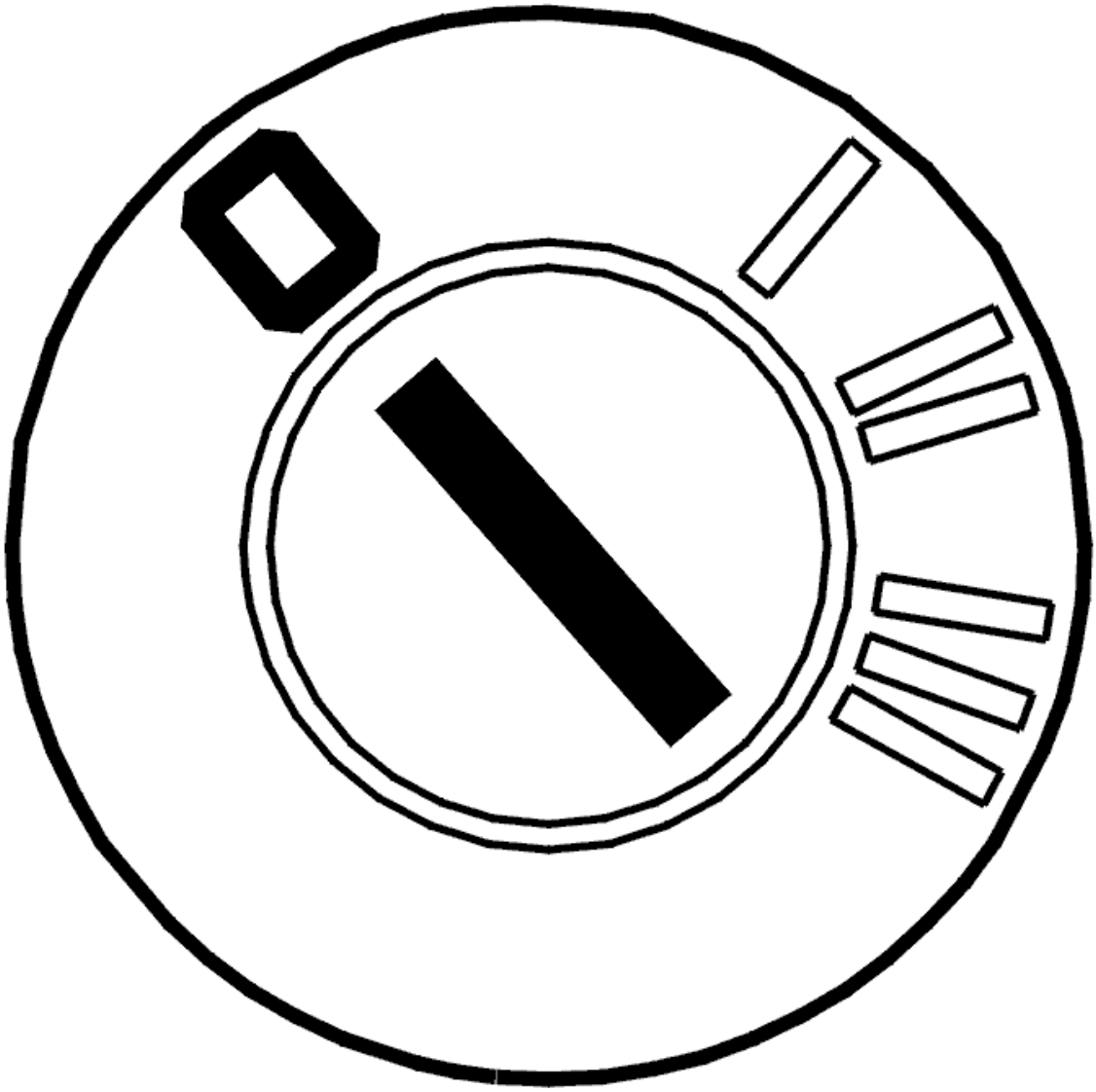


Fig. 361: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

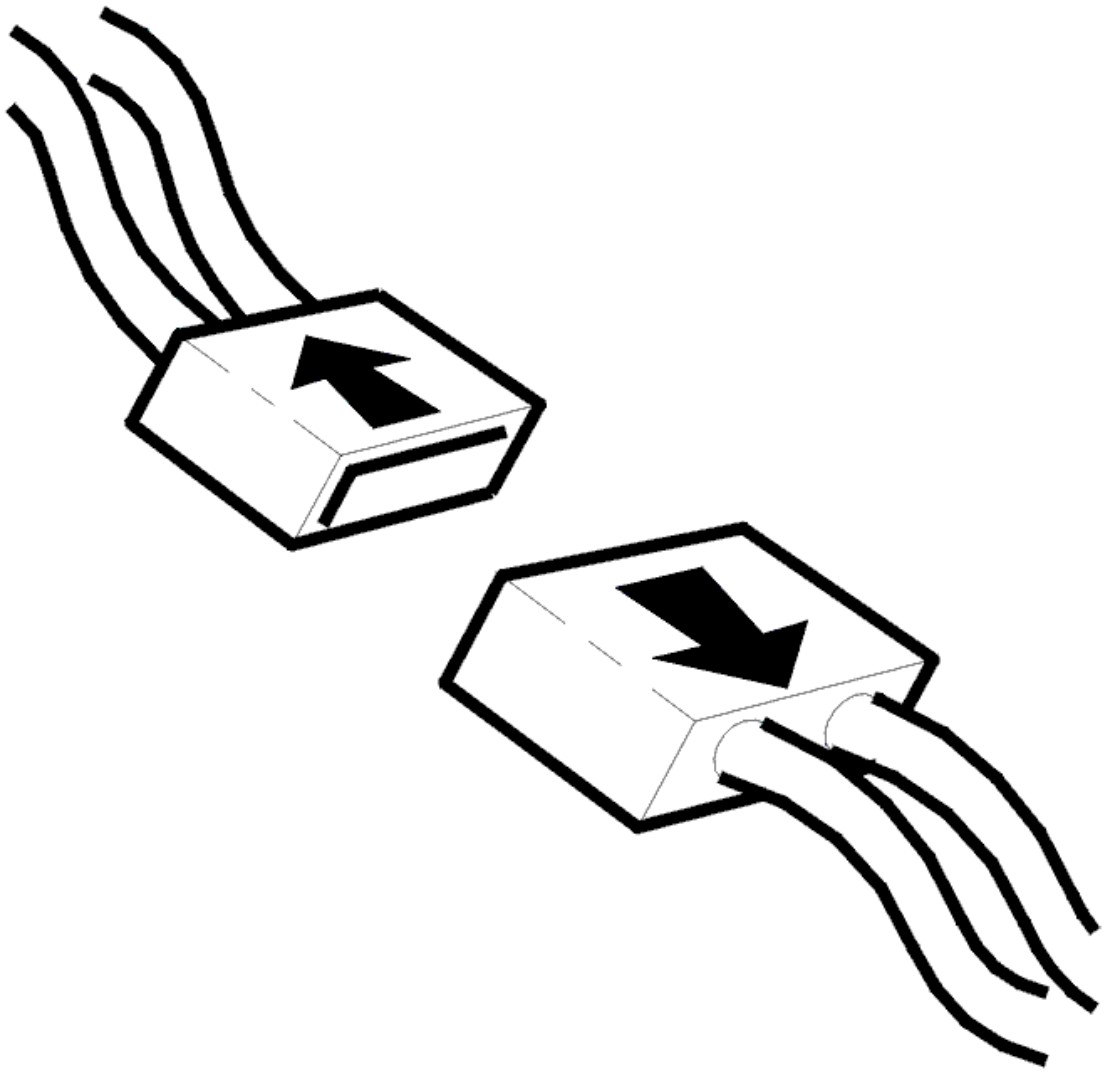


Fig. 362: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Disconnect transmission connector D.

Check the cable between control module terminal #A52 (#A52) and transmission connector terminal #D3 (control module side). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Check the cable between control module terminal #B10 (#A70) and transmission connector terminal #D4 (control module side). Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

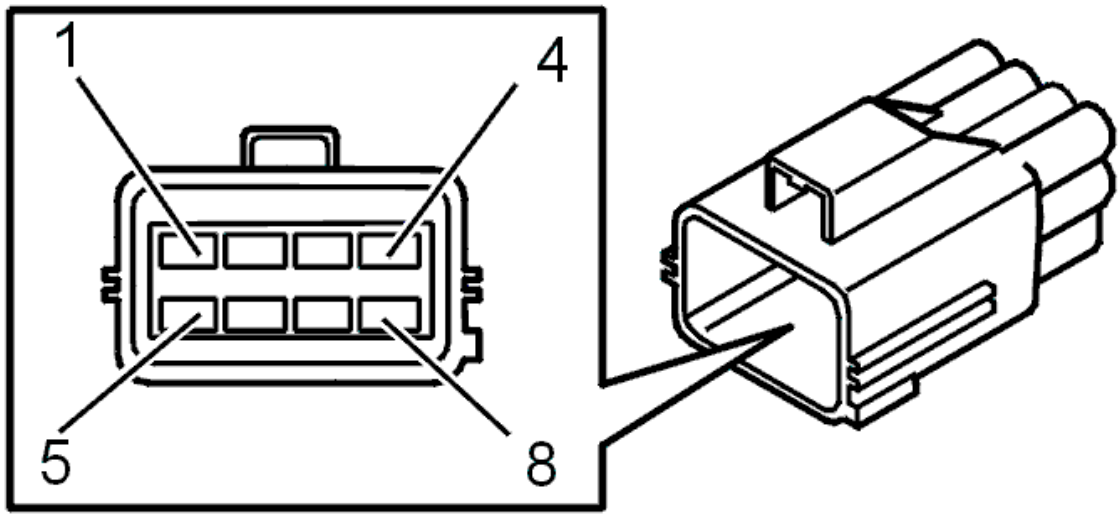


Fig. 363: Identifying Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

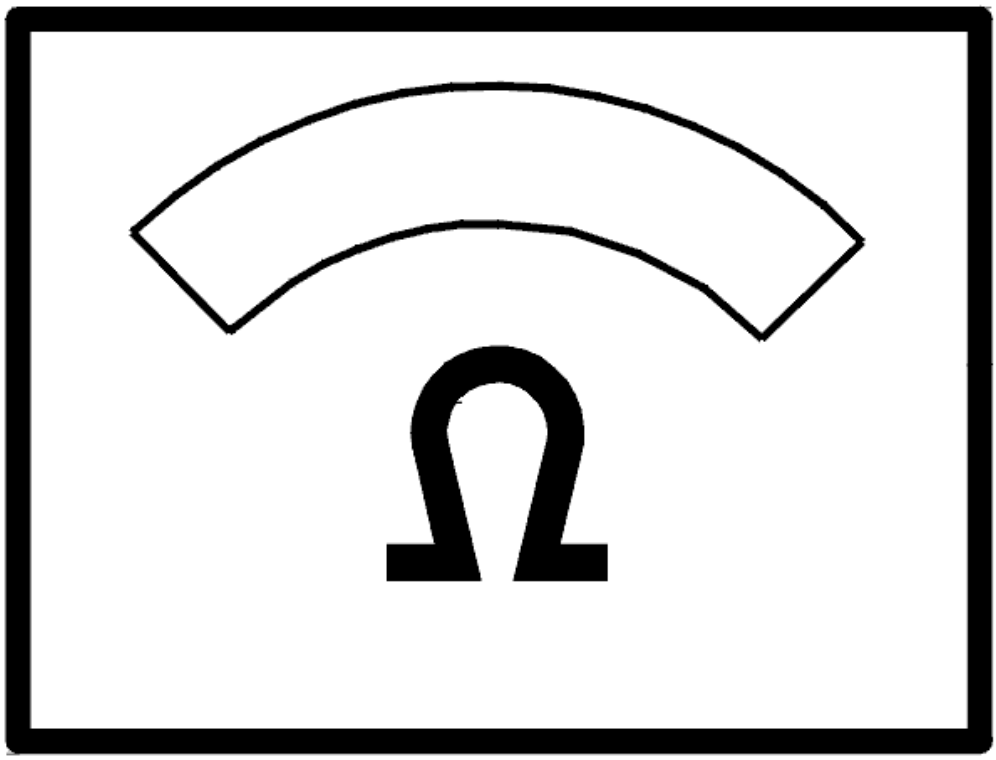


Fig. 364: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE CONTROL MODULE**

CHECKING THE CONTROL MODULE

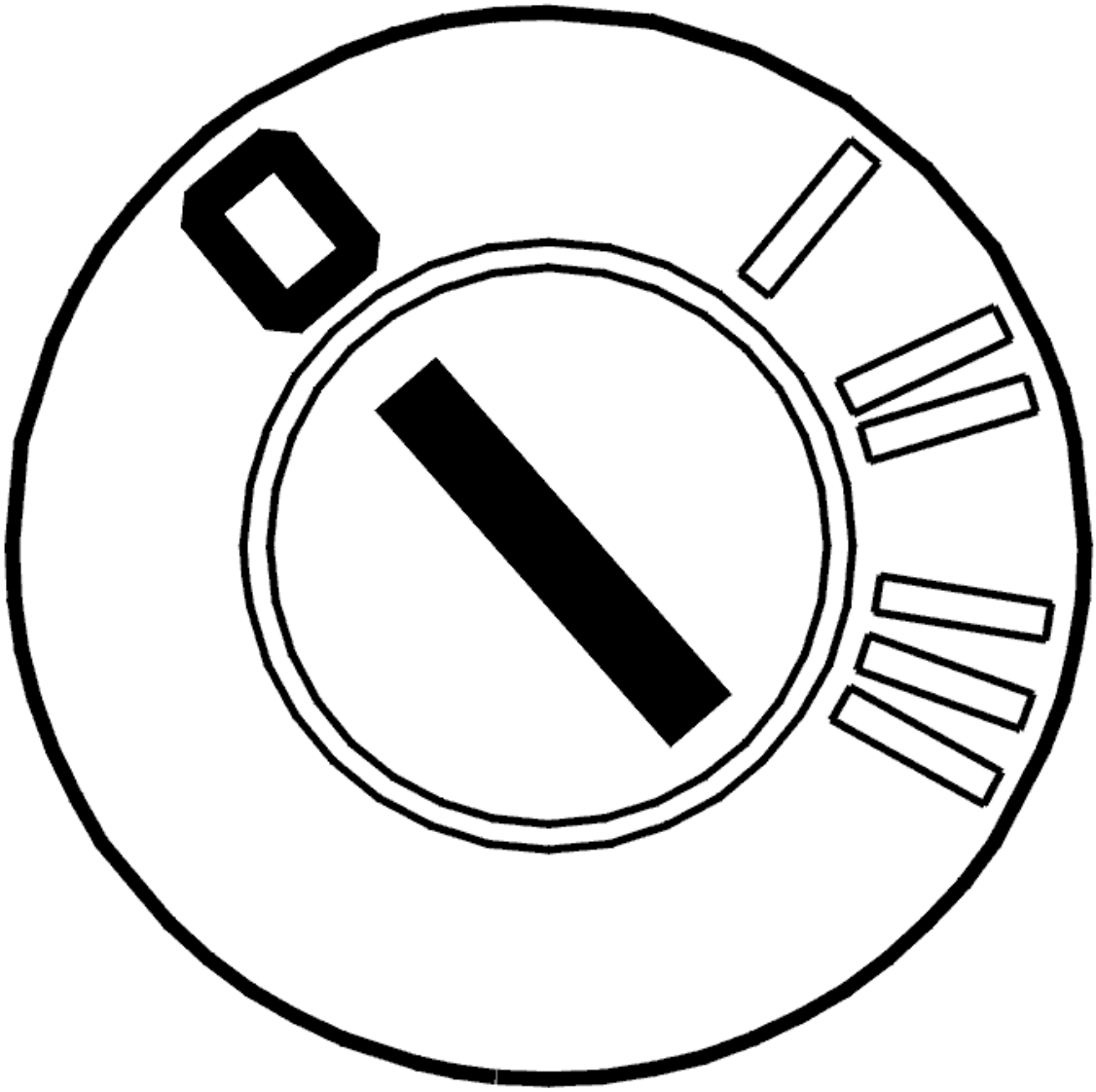


Fig. 365: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

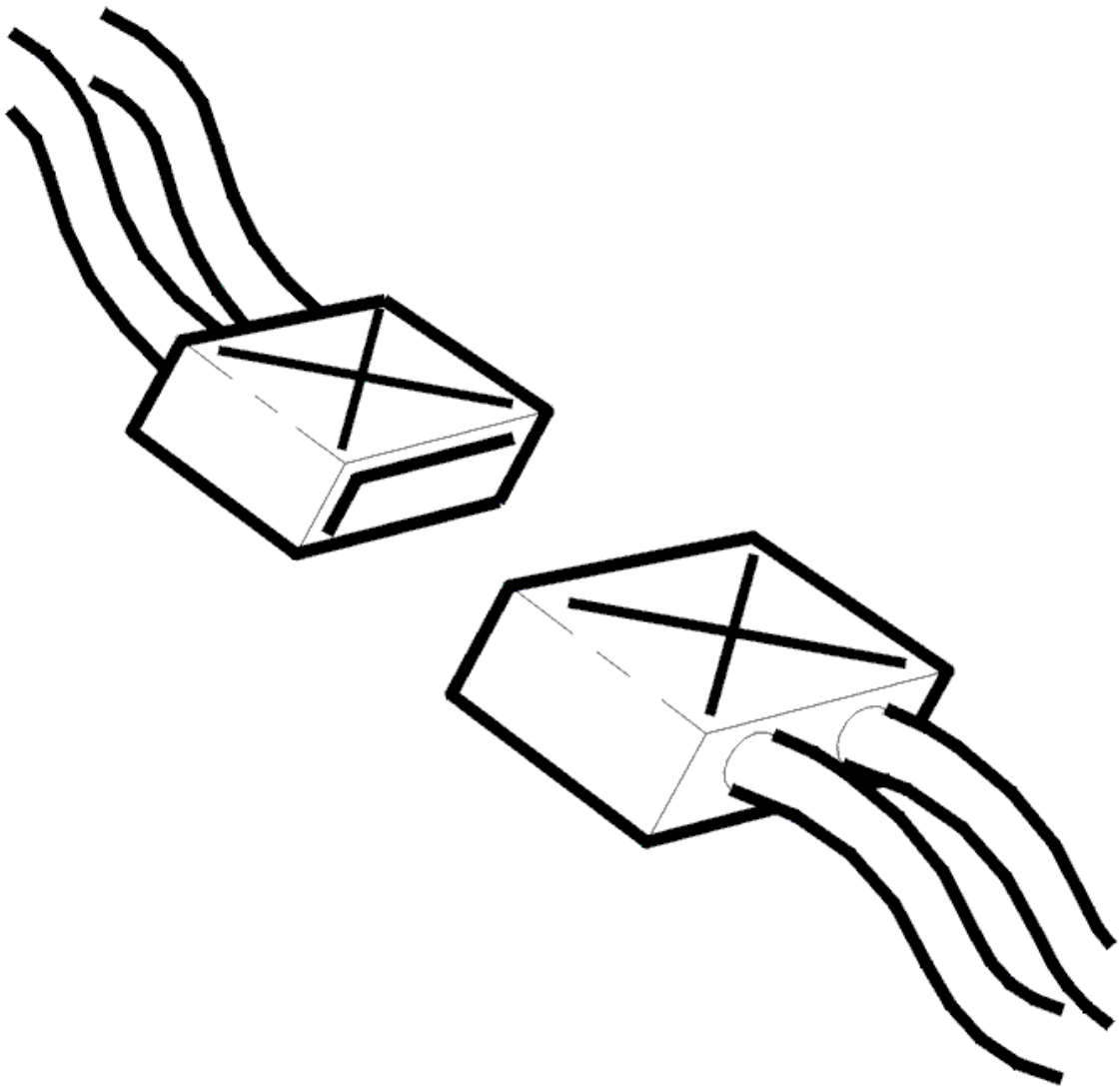


Fig. 366: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

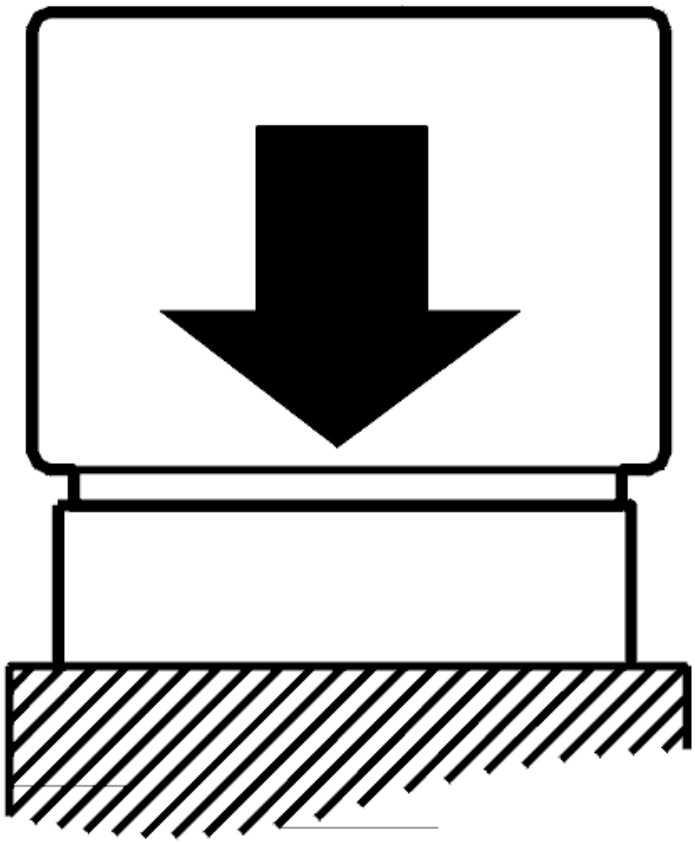


Fig. 367: Identifying Control Module Connected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector D disconnected.

Check the transmission control module (TCM) by measuring the resistance between terminals #A52 (#A52) and #B10 (#A70) on the breakout box. The resistance must be approximately 9 kohms.

NOTE: When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To replace the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

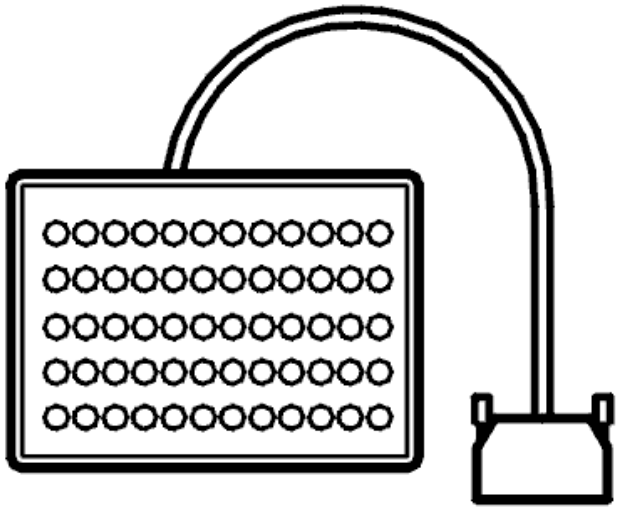


Fig. 368: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

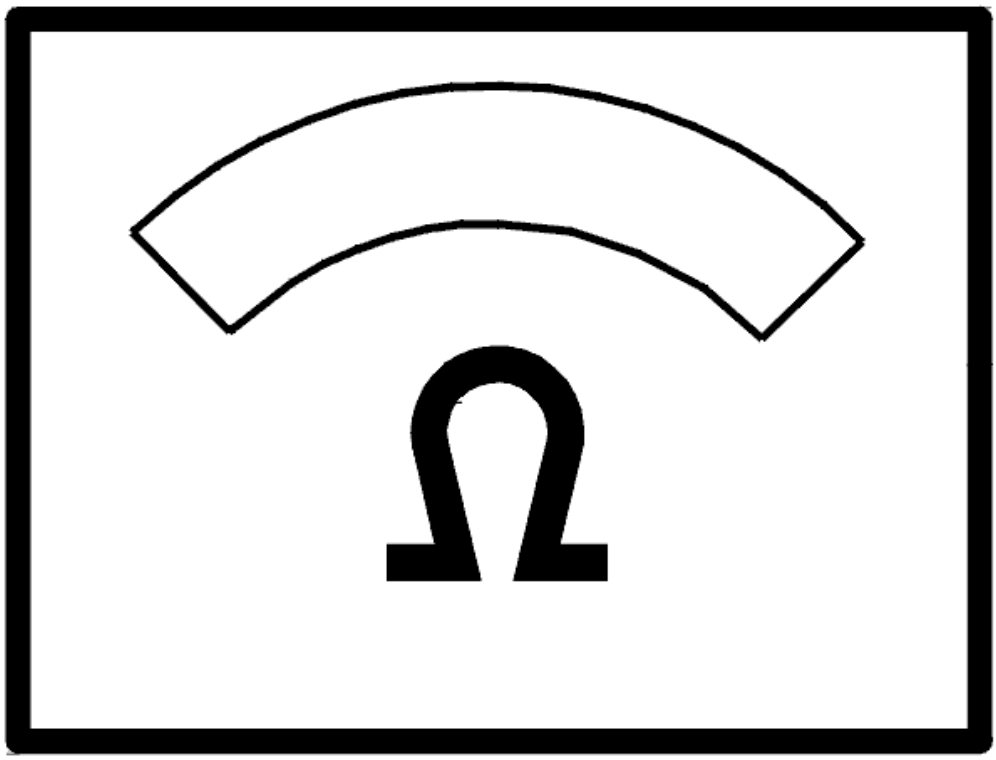


Fig. 369: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

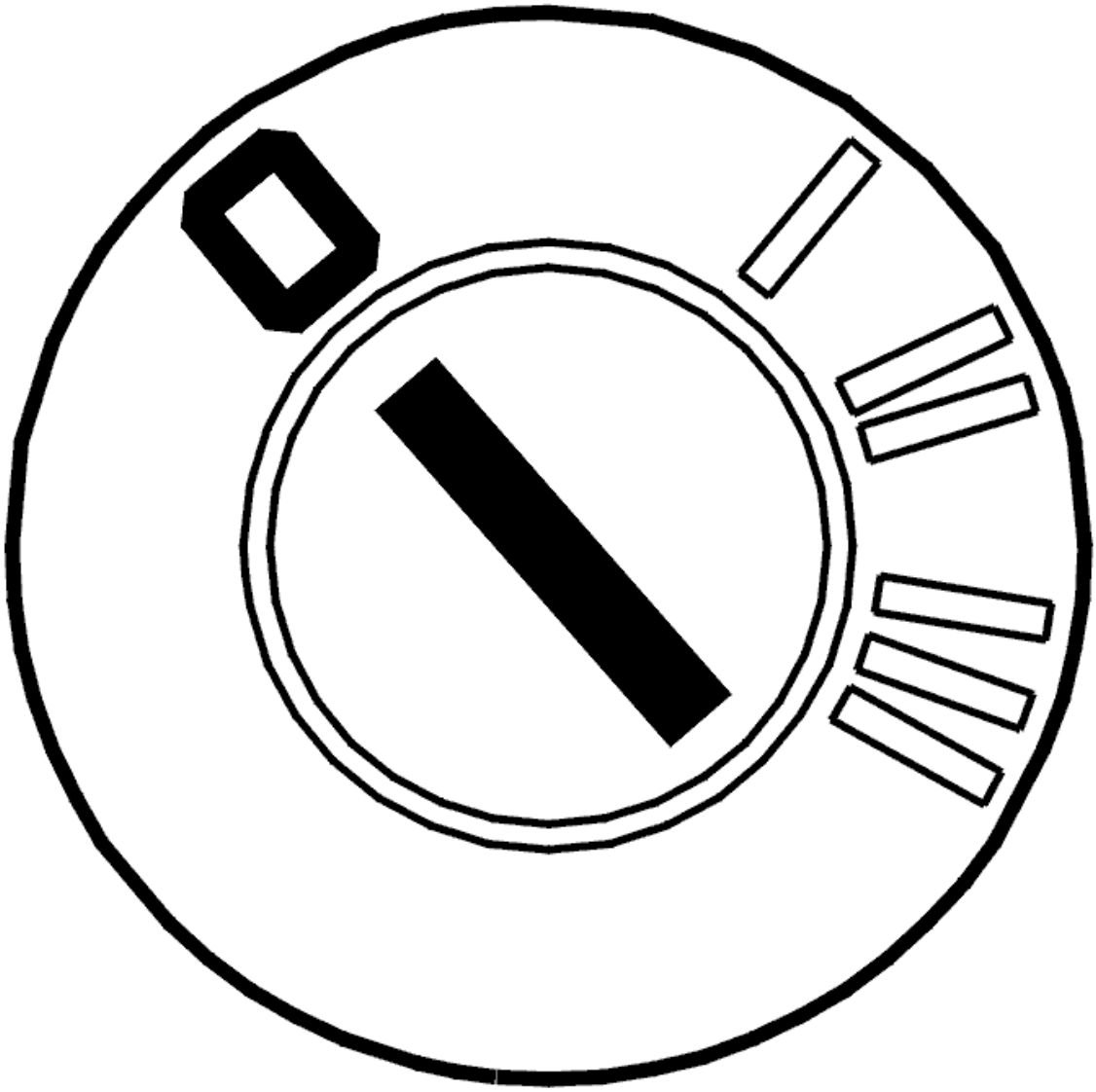


Fig. 370: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

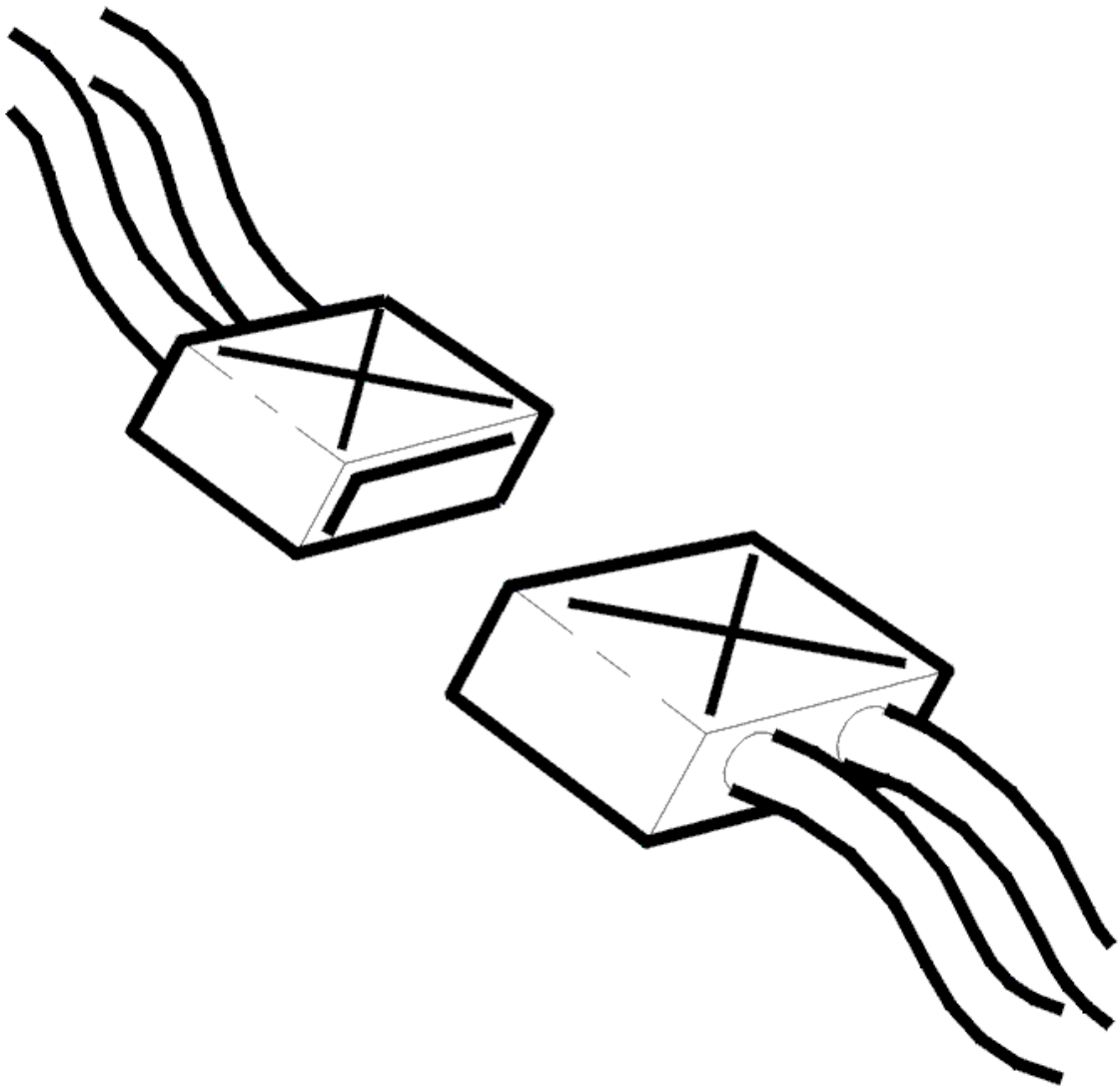


Fig. 371: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

Check the wiring between transmission connector terminal #D3 and solenoid SLT terminal #1. Check the wiring between transmission connector terminal #D4 and solenoid SLT terminal #2. Check for a short-circuit to ground. See **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** .

Also check against the other cables in the circuit.

Check solenoid SLT by measuring the resistance between terminals #1 and #2 on the connector. The resistance must be 5-5.6 ohms at 20°C. Replace the transmission control system if the resistance is incorrect.

Other information:

- To disconnect the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To open and replace the transmission control system, see **SOLENOID CONTROL SYSTEM, REPLACING**
- To replace the cable harness for the control system, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For information about signals, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** .

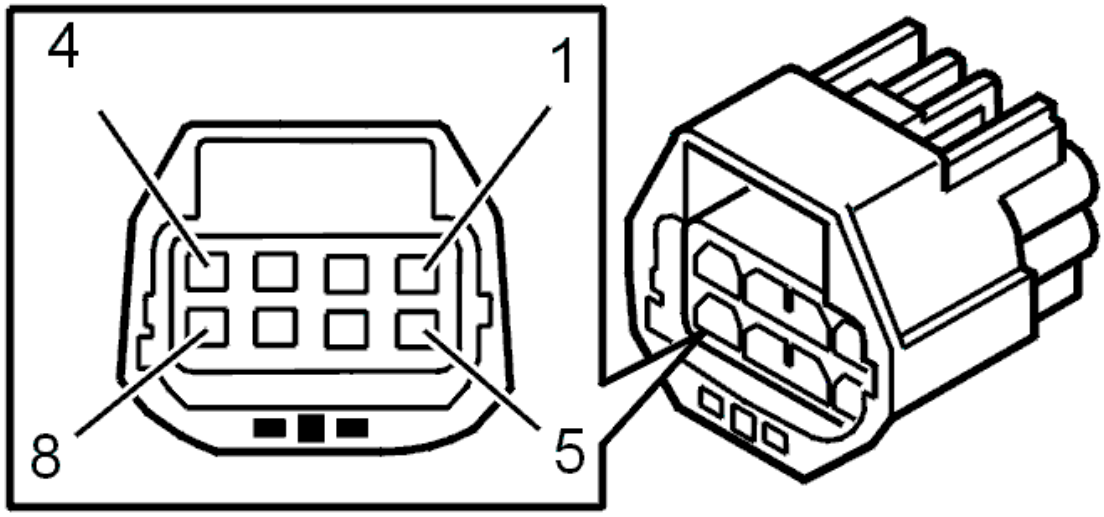


Fig. 372: Identifying 8-Pin Transmission Connector Terminals
Courtesy of VOLVO CARS CORPORATION

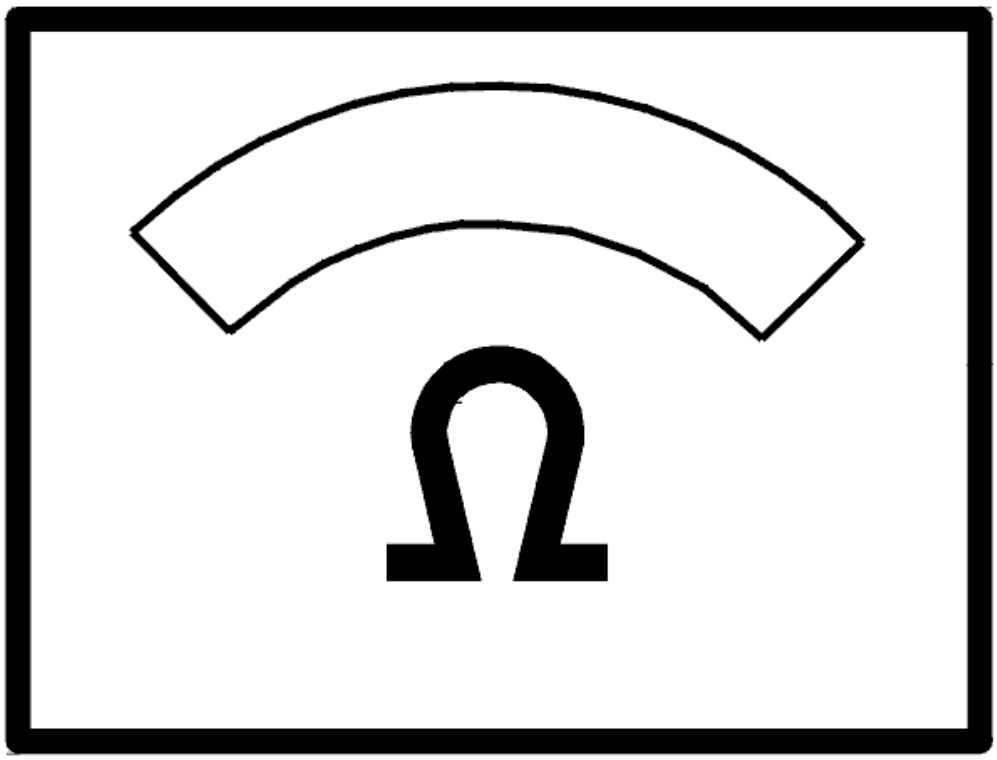


Fig. 373: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

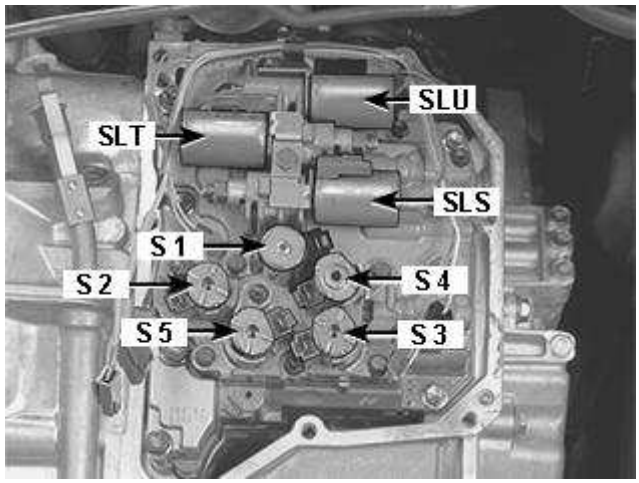


Fig. 374: Identifying S1-S5, SLT, SLU And SLS Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

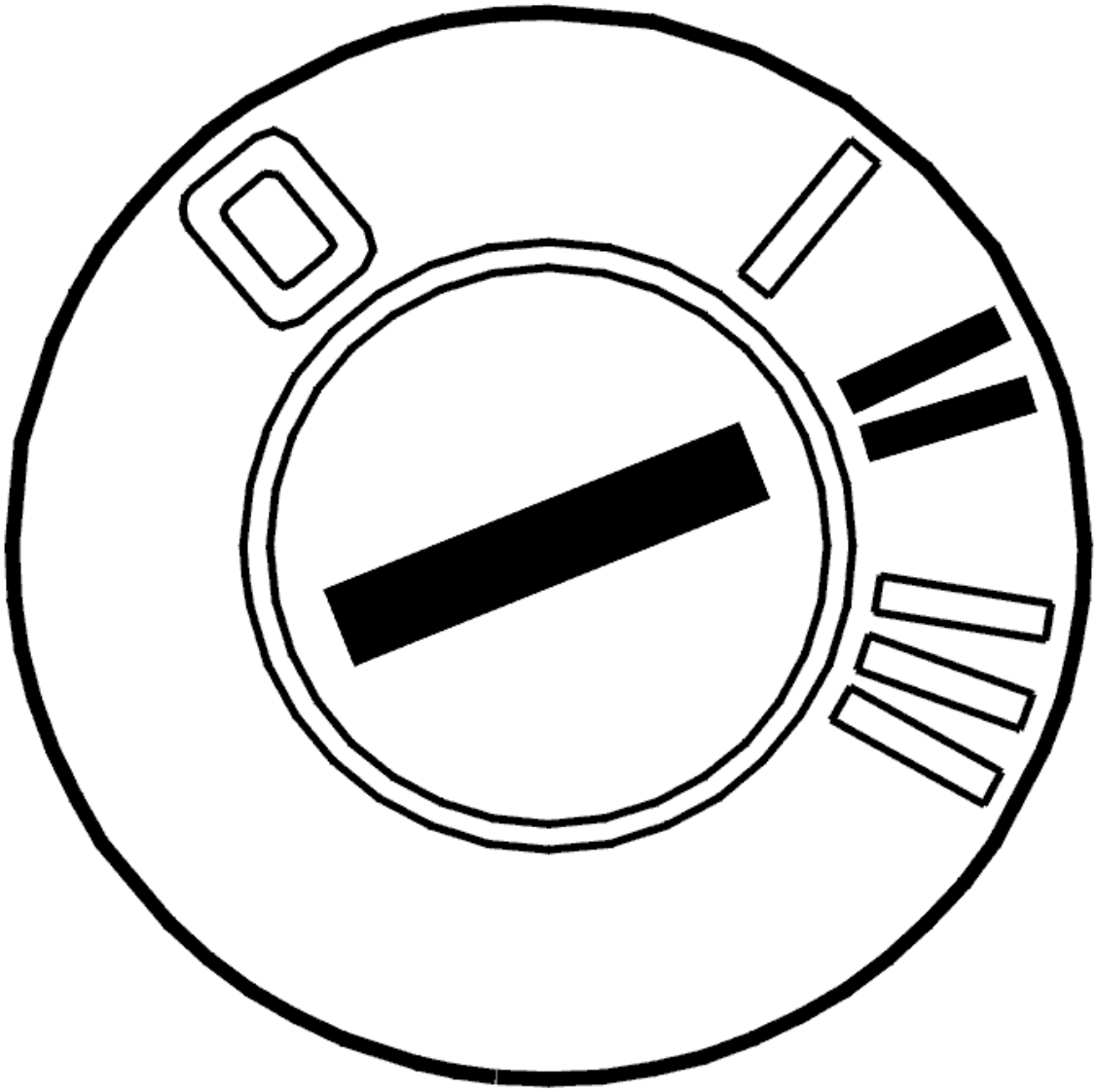


Fig. 375: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

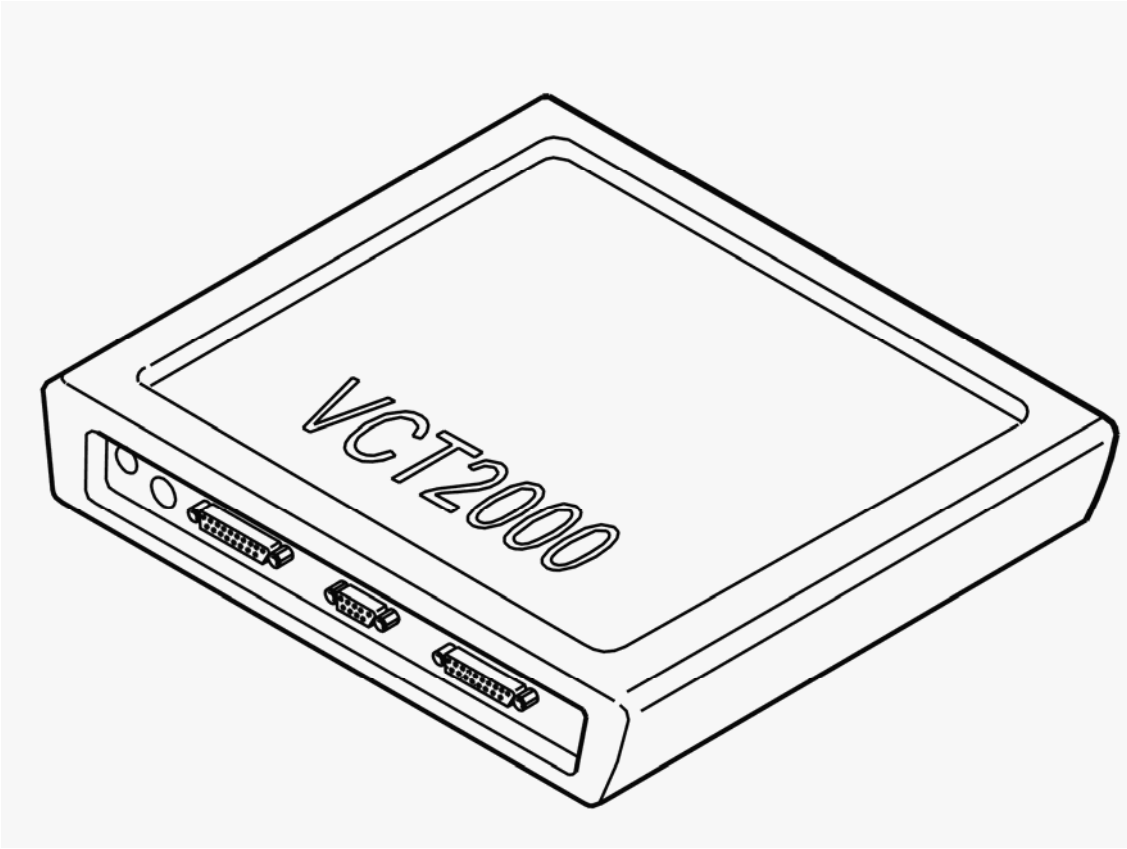


Fig. 376: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

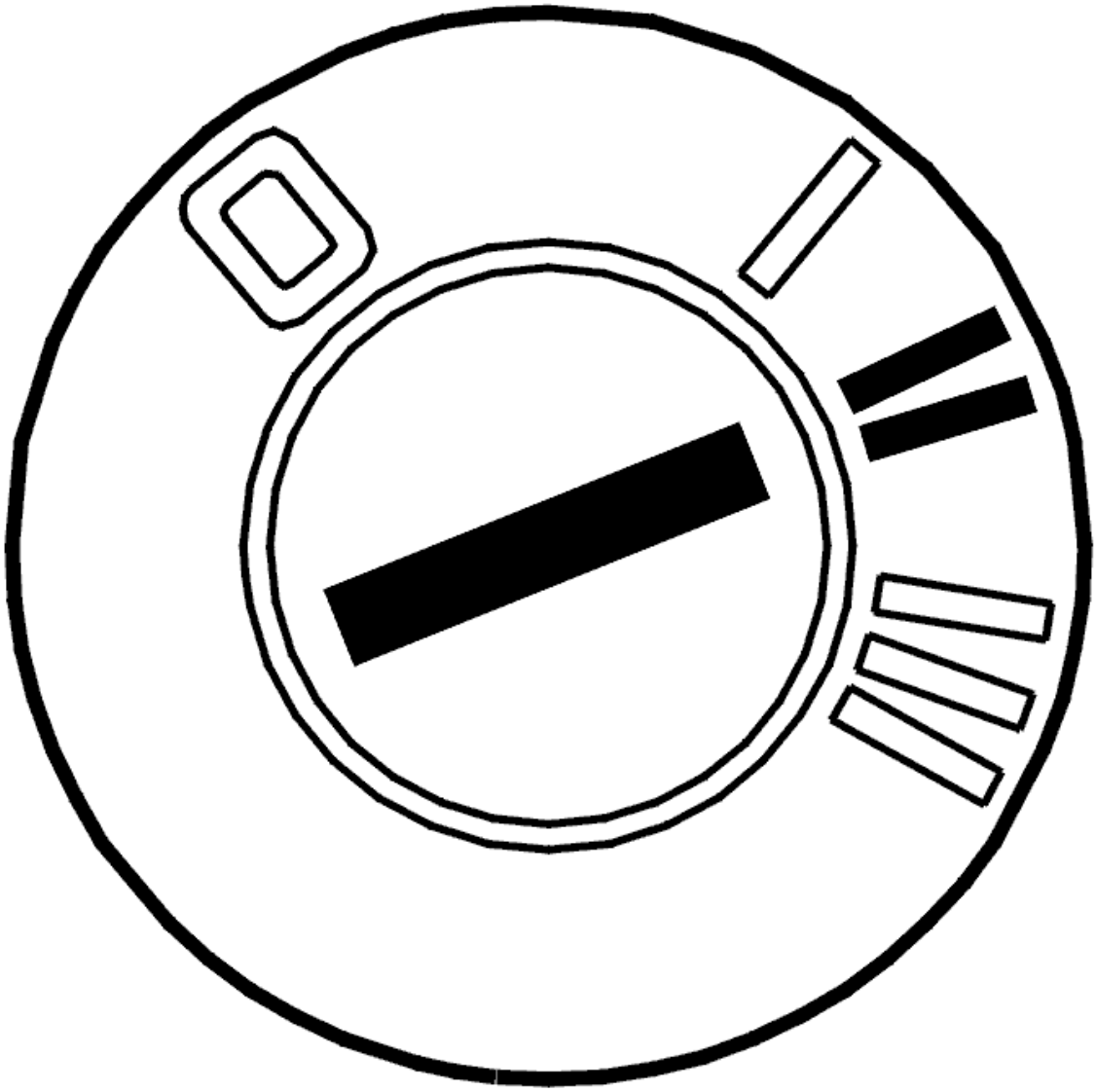


Fig. 377: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLT.

  Read off the current through the solenoid SLT circuit.

  The current should oscillate between 0 and 1000 mA.

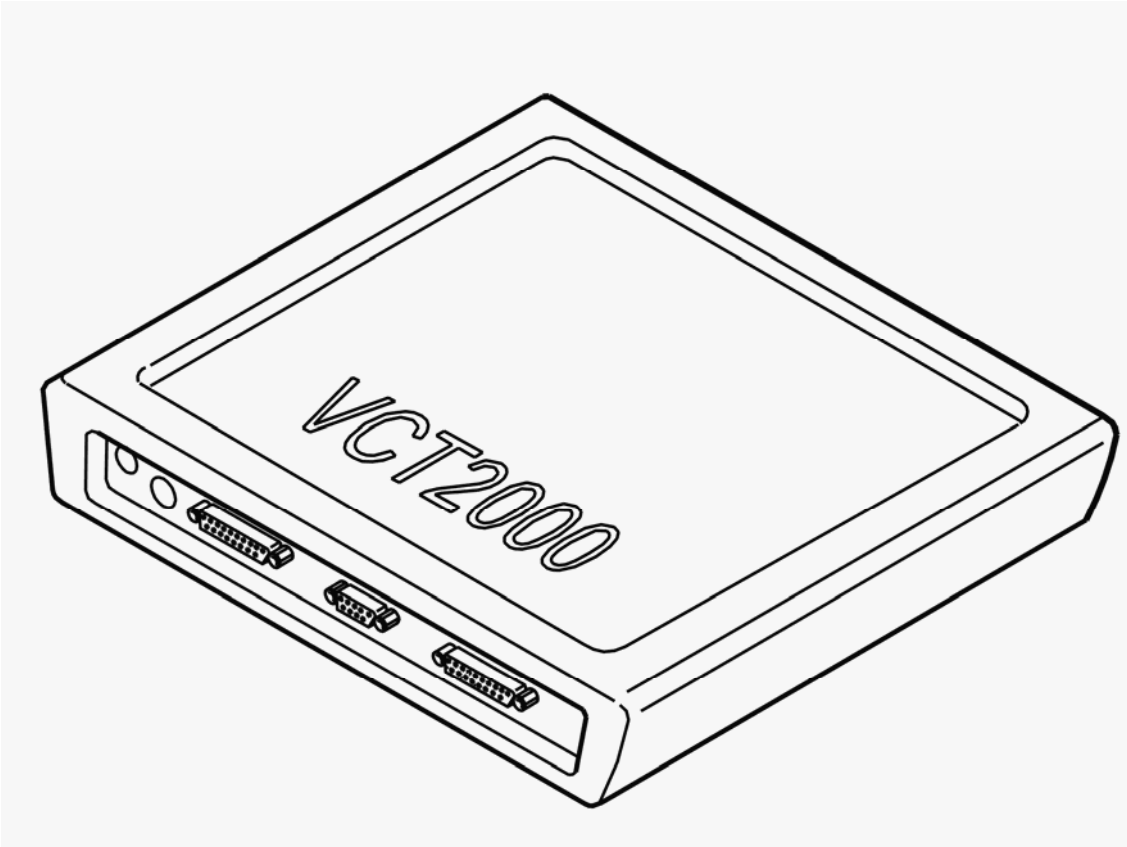


Fig. 378: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0120: CONTROL UNIT. INTERNAL FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE INFORMATION

Condition

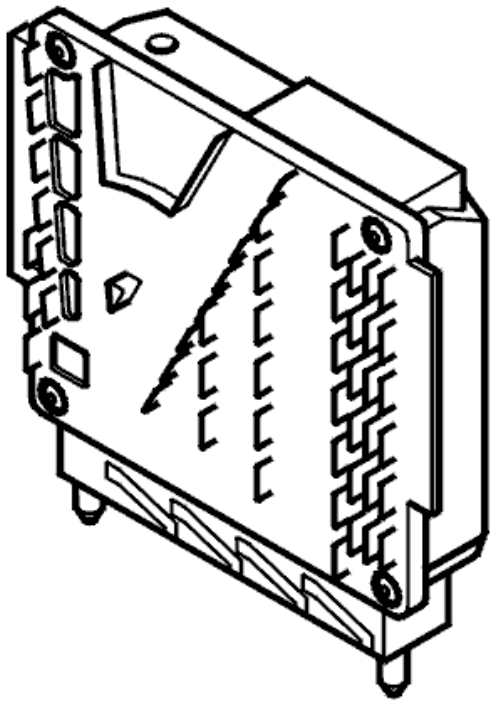


Fig. 379: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Solenoids are controlled by output stages in the transmission control unit (TCM). The control unit opens the output stages when the solenoids should be activated, and voltage is supplied to the circuit. If the control unit registers that there is an internal fault in the output stage circuit for solenoid S1, S2, S3, S4, S5, SLU, SLT or SLS diagnostic trouble code TCM-0060, TCM-0120, TCM-0121, TCM-0122, TCM-0123 or TCM-0124 will be stored depending on the output stage.

Substitute Value

- Transmission control unit help program "Limp-home" has started to work.

Possible Source

- Internal fault in control unit.

Fault symptom[s]

- Orange general warning lamp is on.
- Malfunction indicator light (MIL) is on.
- Lock up function not working.
- Rough gear shifts.
- Gear shifts not working.

- Rough gear shifts can be caused by:

- No reduction of system pressure during gear shifts
- No request for torque limitation to the engine control unit during gear shifts

HINT: Gear shift failure is caused by the transmission control unit interrupting all solenoid activation.

INTERNAL FAULT

REPLACING THE CONTROL MODULE

The control module has registered an internal fault.

CAUTION: A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

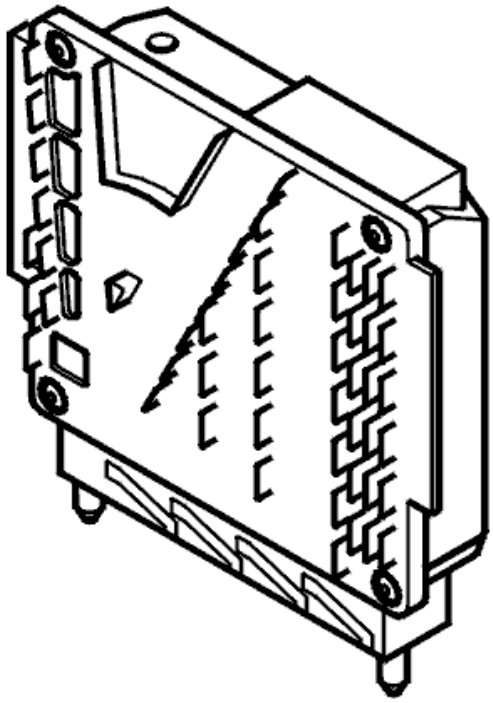


Fig. 380: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

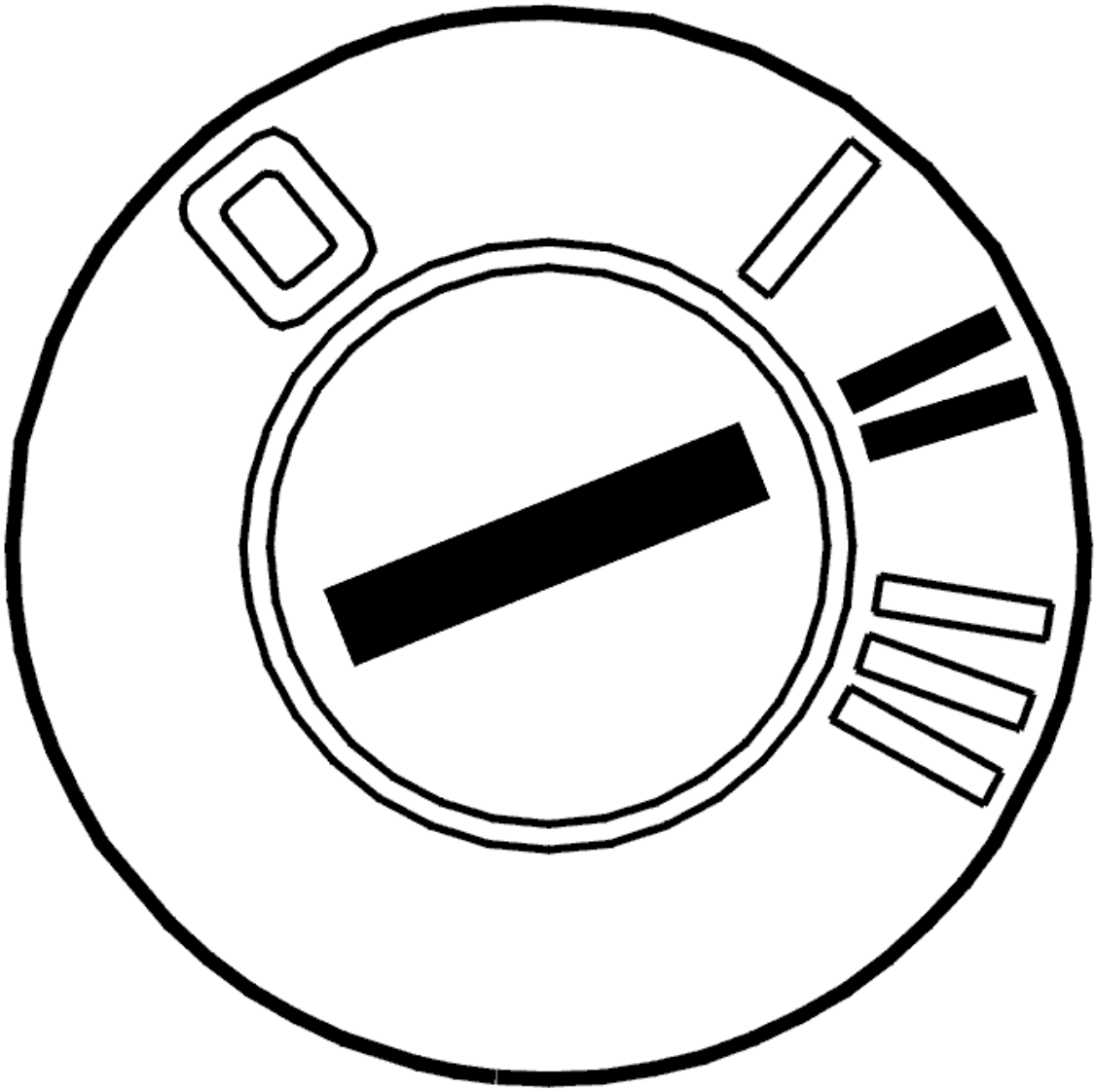


Fig. 381: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

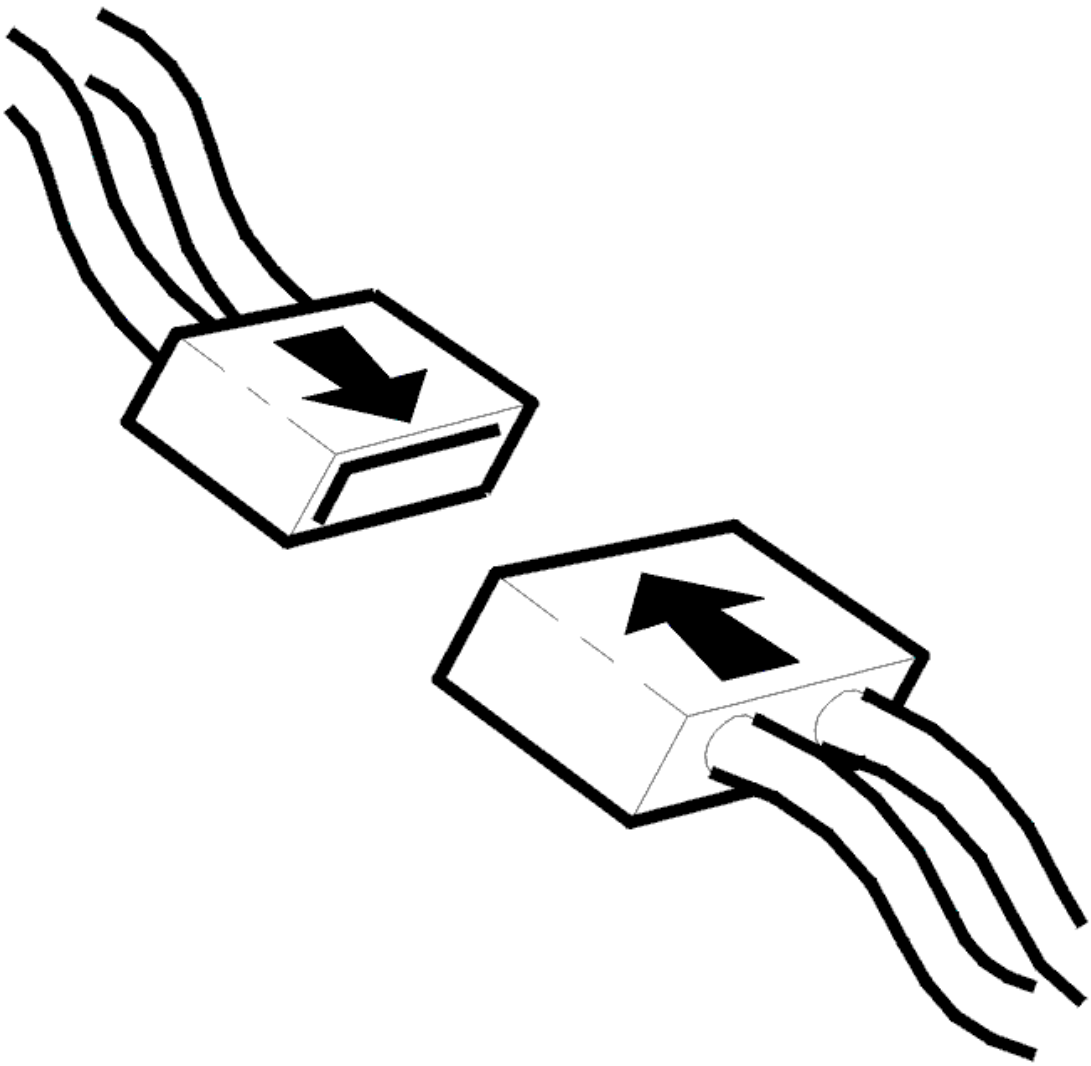


Fig. 382: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S3.

The value should change between OFF and ON.

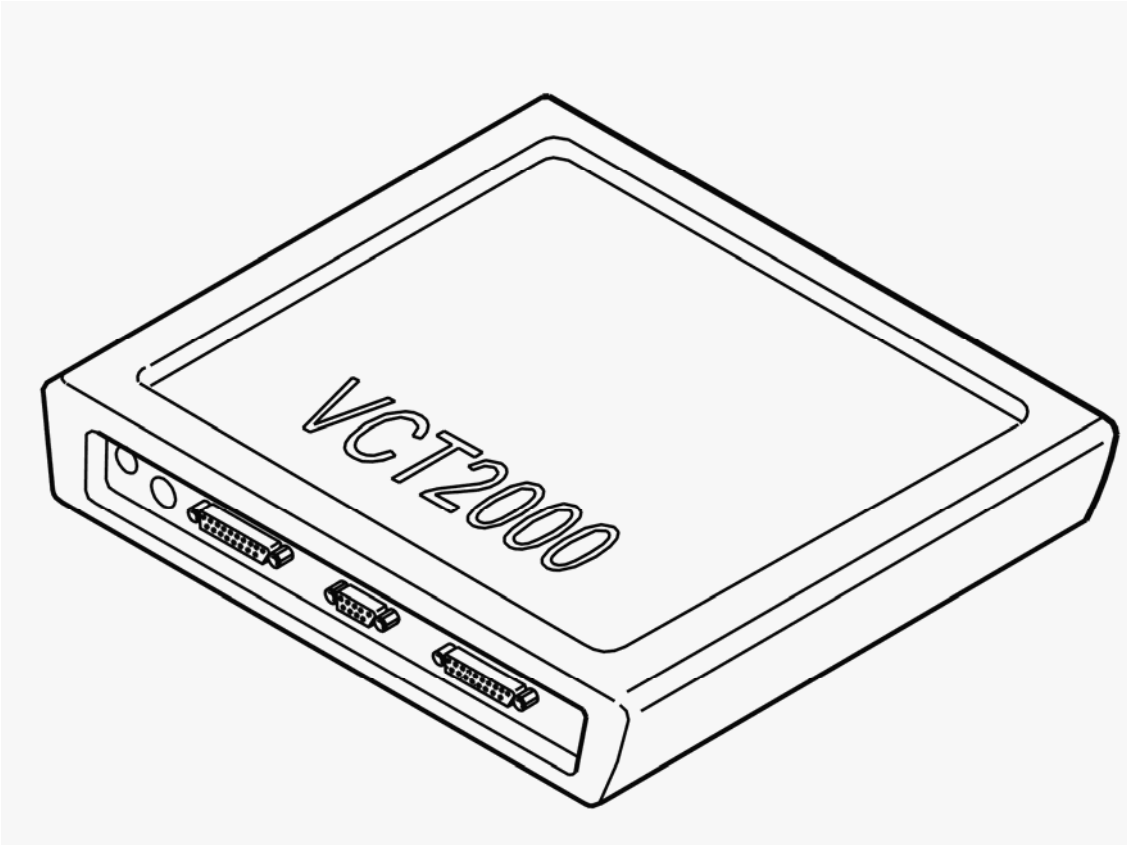


Fig. 383: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change between OFF and ON?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0121: CONTROL UNIT. INTERNAL FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE INFORMATION

see **DIAGNOSTIC TROUBLE CODE INFORMATION**

INTERNAL FAULT

REPLACING THE CONTROL MODULE

The control module has registered an internal fault.

CAUTION: A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

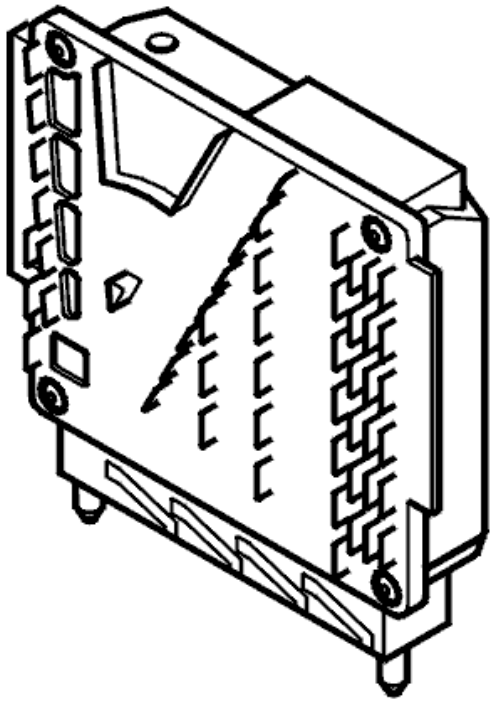


Fig. 384: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

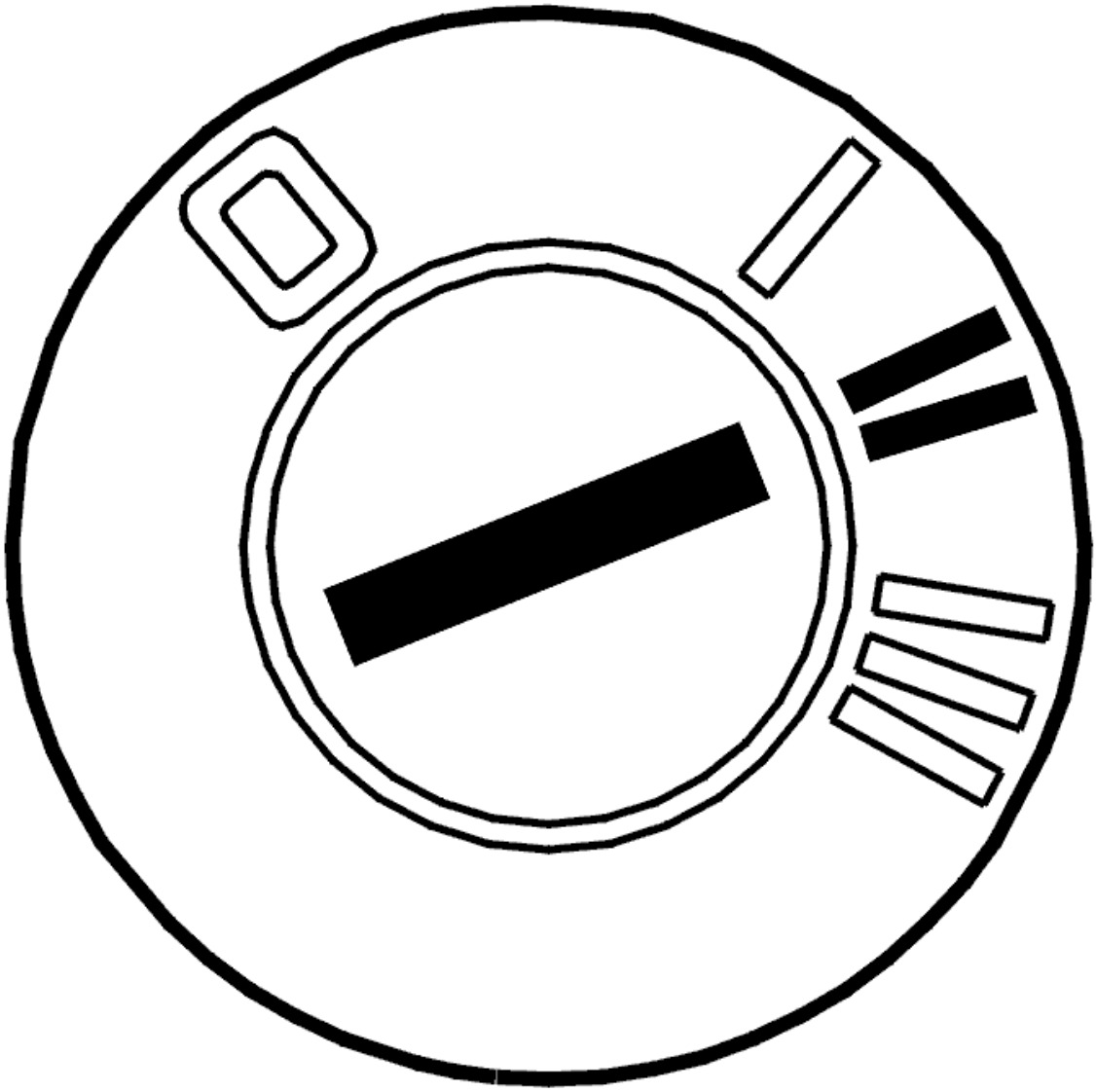


Fig. 385: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

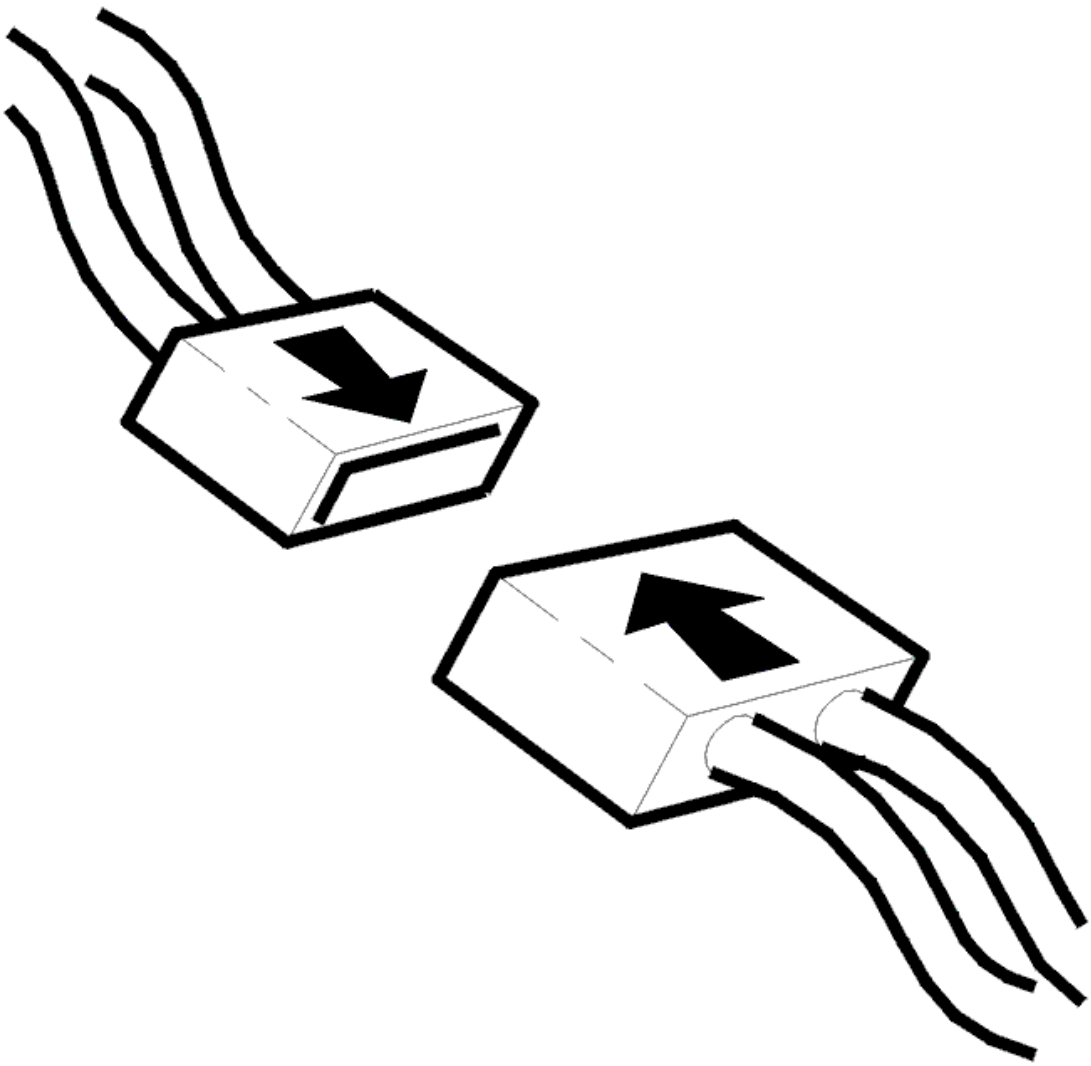


Fig. 386: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoids S4 and S5 individually.

  Read off the current in the circuit. The current should oscillate between 0 and approximately 1 A.

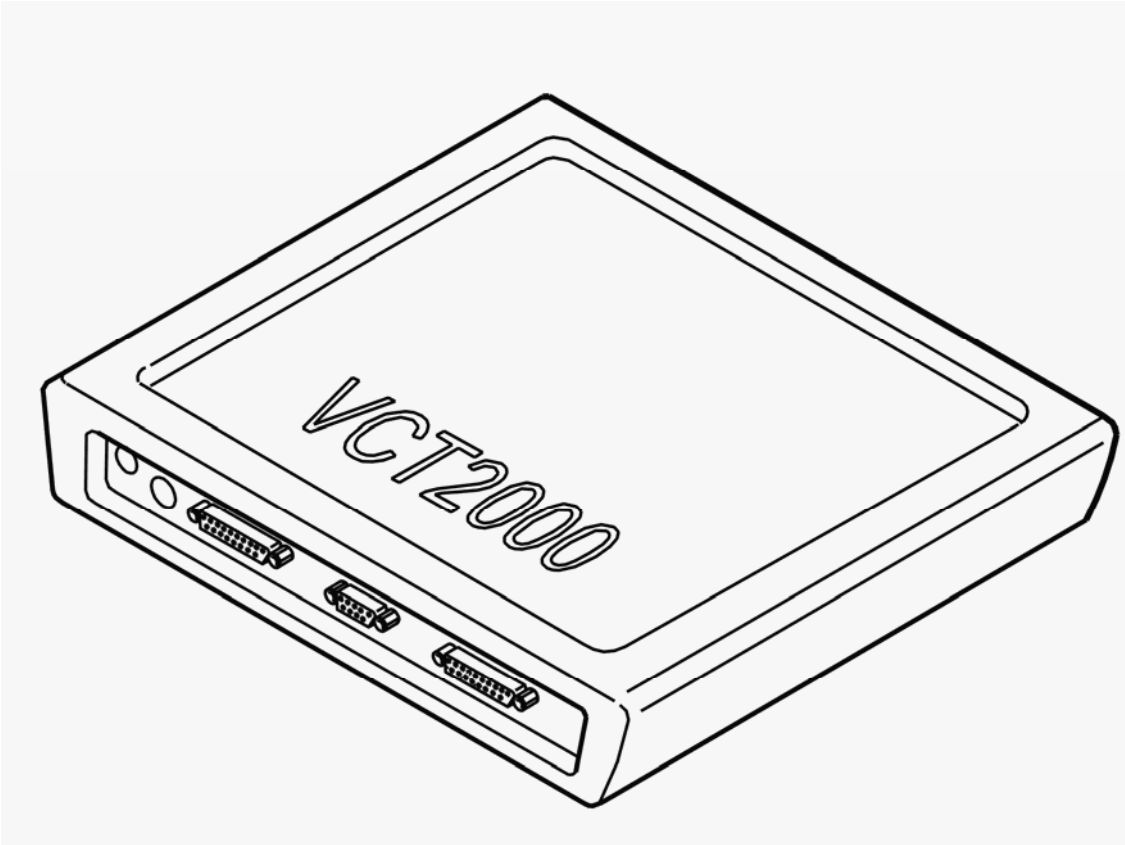


Fig. 387: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0122: CONTROL UNIT. INTERNAL FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE INFORMATION

see **DIAGNOSTIC TROUBLE CODE INFORMATION**

INTERNAL FAULT

REPLACING THE CONTROL MODULE

The control module has registered an internal fault.

CAUTION: A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

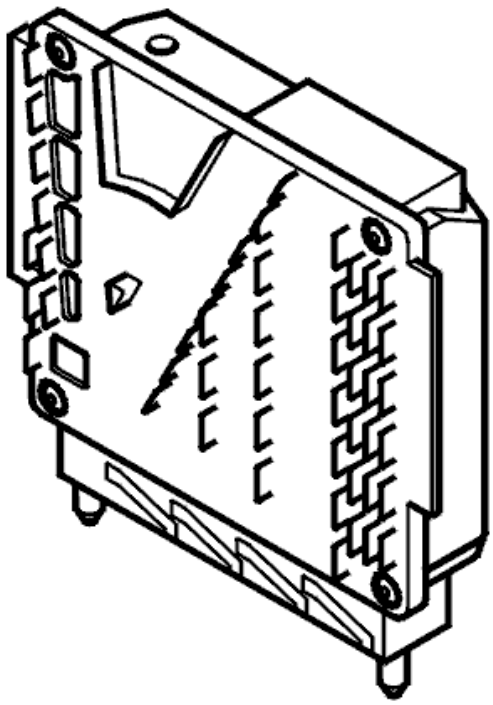


Fig. 388: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

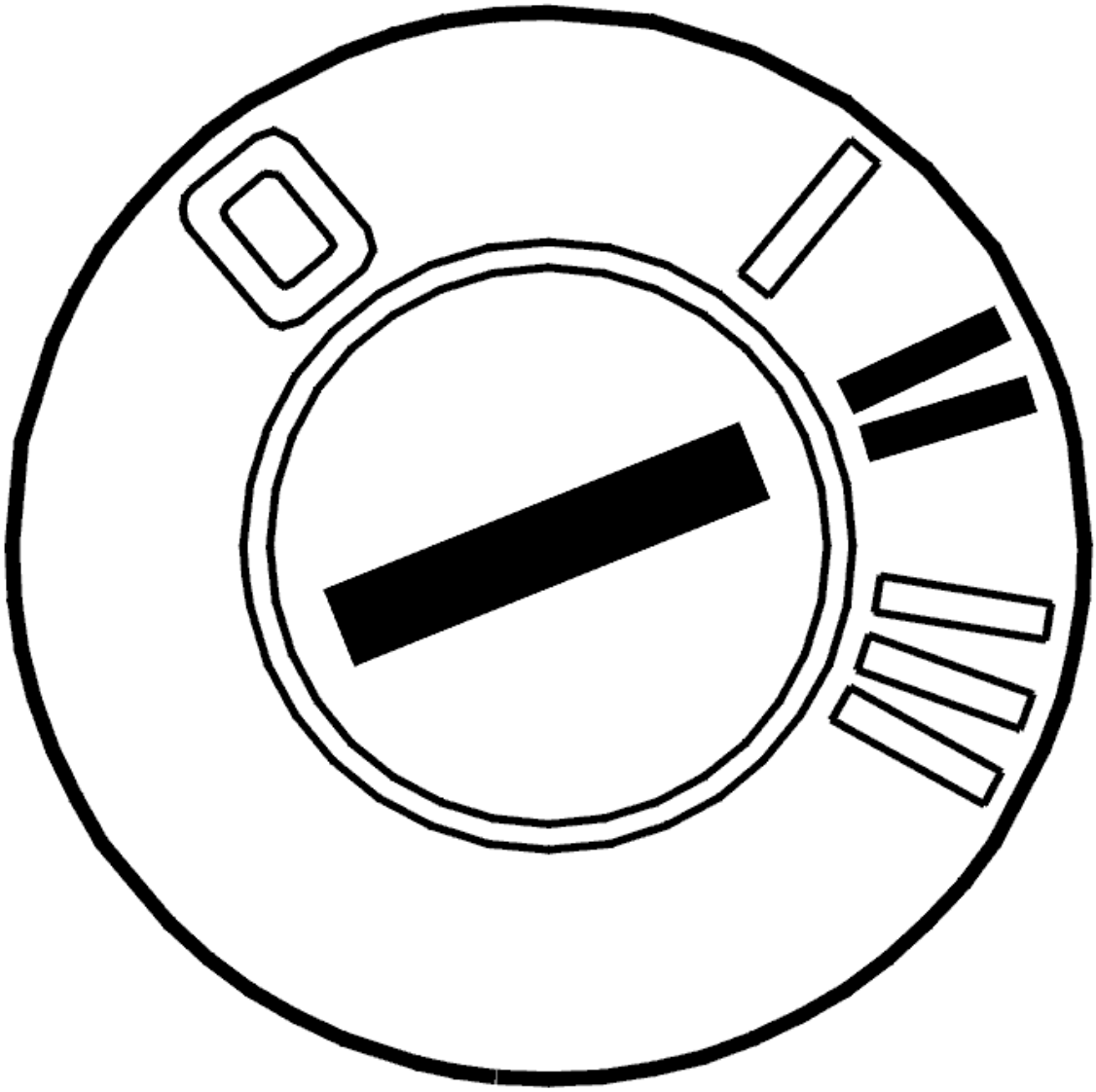


Fig. 389: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

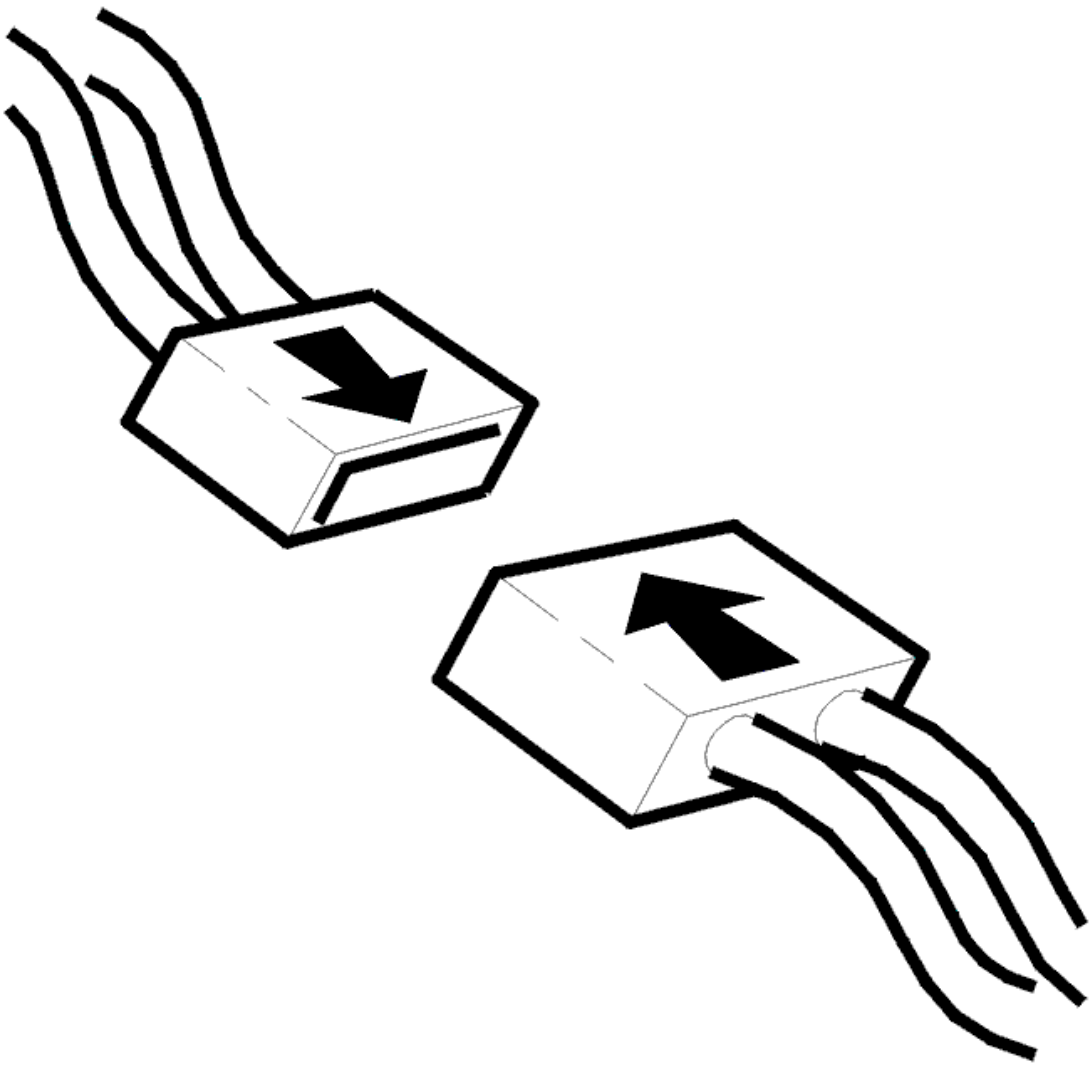


Fig. 390: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLS.

  Read off the current through the solenoid SLS circuit.

  The current should oscillate between 0 and 1000 mA.

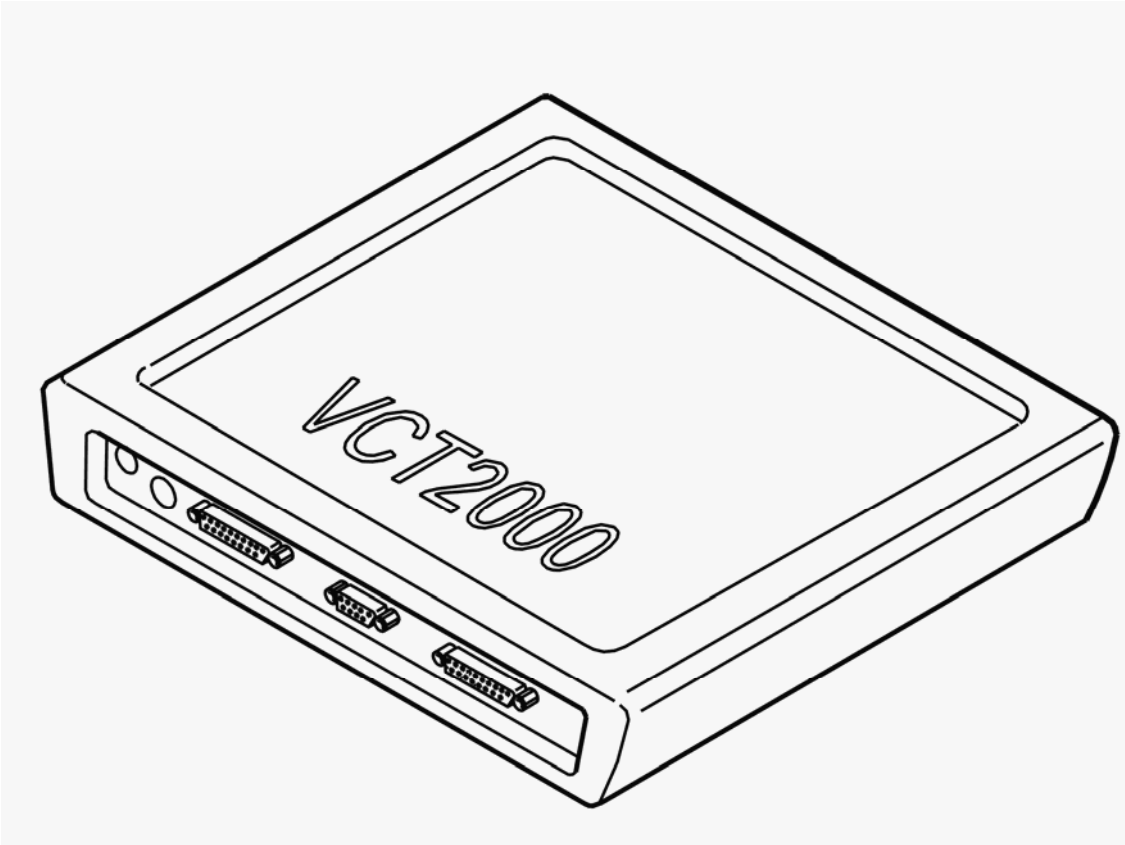


Fig. 391: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0123: CONTROL UNIT. INTERNAL FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE INFORMATION

see **DIAGNOSTIC TROUBLE CODE INFORMATION**

INTERNAL FAULT

REPLACING THE CONTROL MODULE

The control module has registered an internal fault.

CAUTION: A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

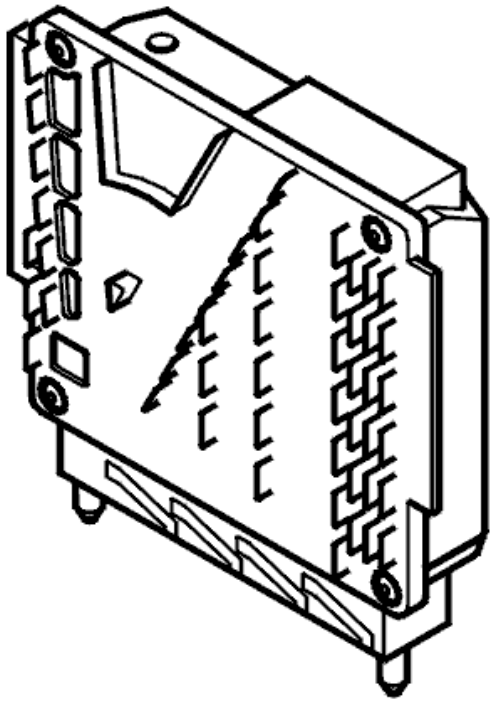


Fig. 392: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

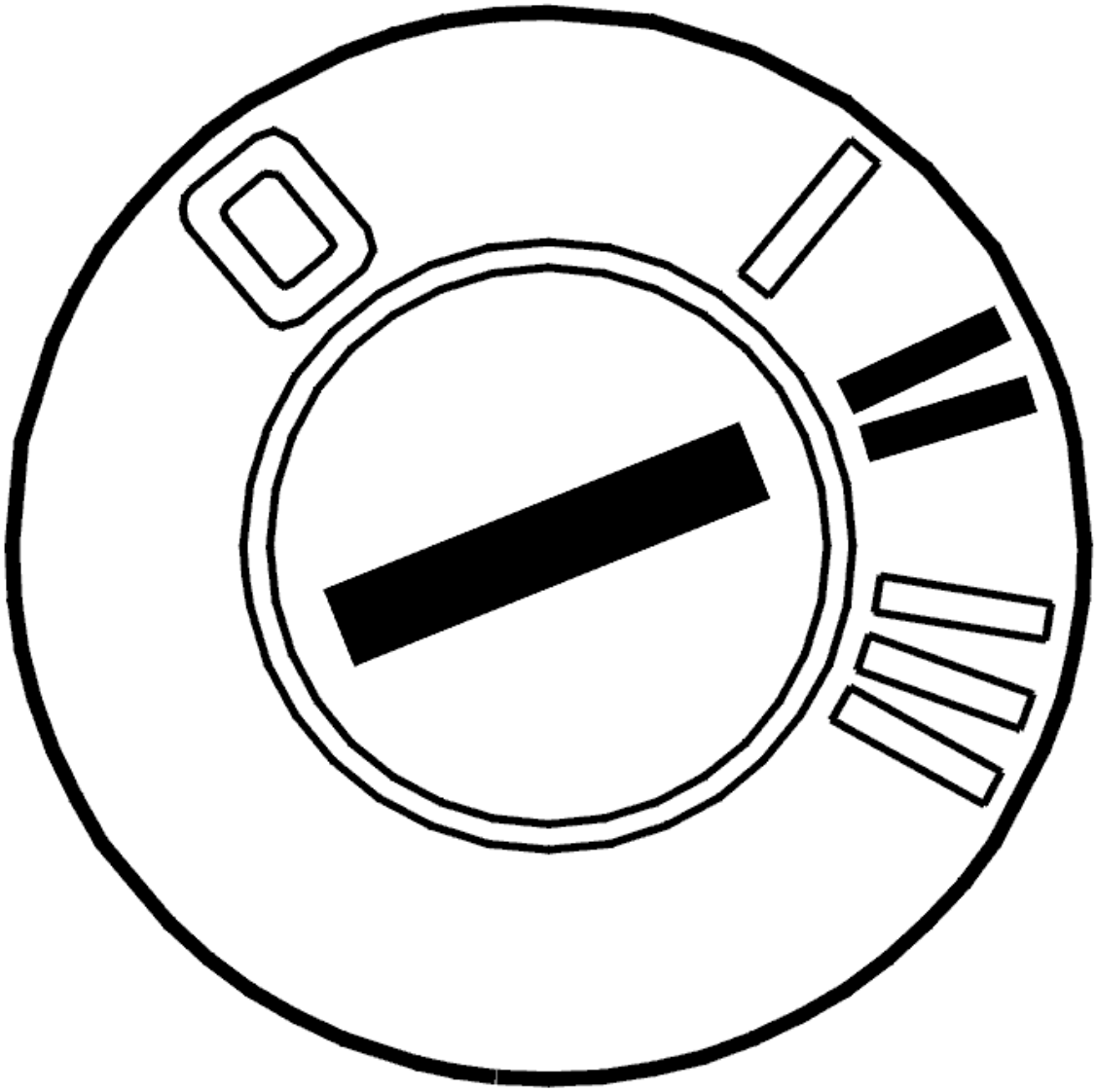


Fig. 393: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLU.

  Read off the current through the solenoid SLU circuit.

  The current should oscillate between 0 and 1000 mA.

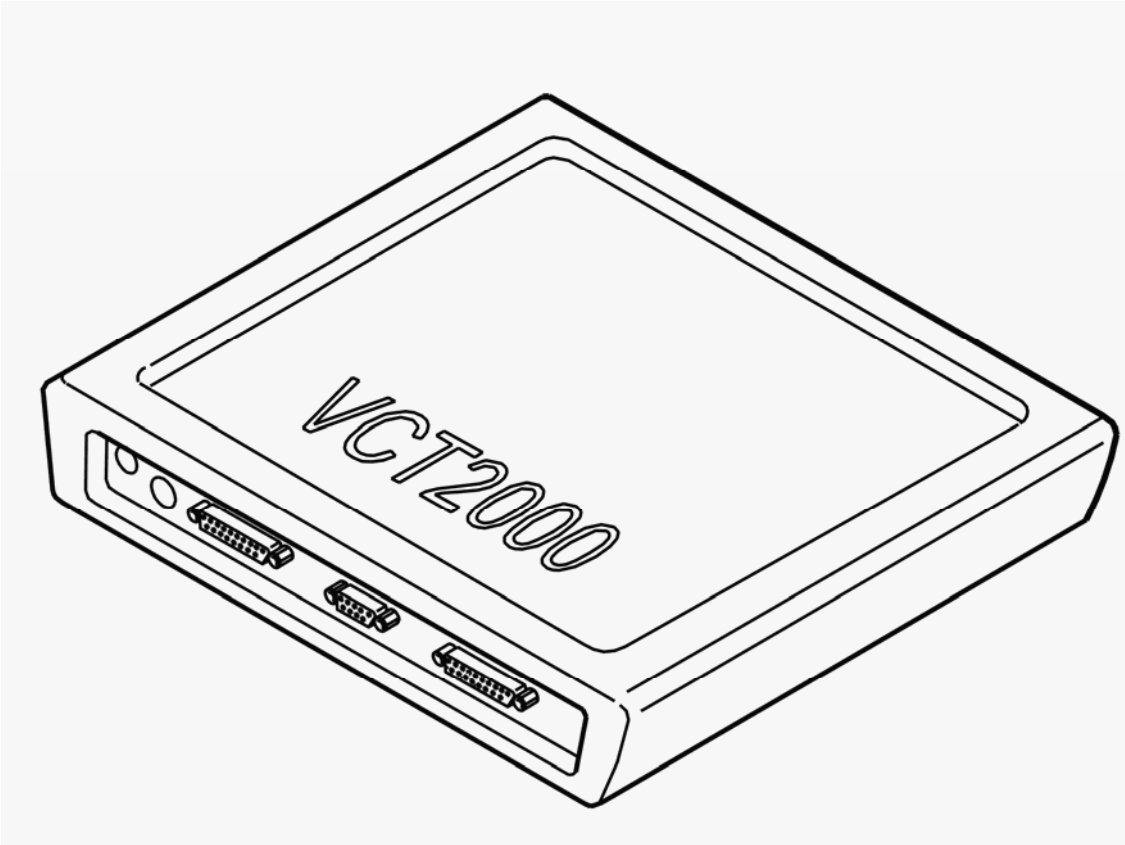


Fig. 394: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current oscillate?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0124: CONTROL UNIT. INTERNAL FAULT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE INFORMATION

see **DIAGNOSTIC TROUBLE CODE INFORMATION**

INTERNAL FAULT

REPLACING THE CONTROL MODULE

The control module has registered an internal fault.

CAUTION: A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

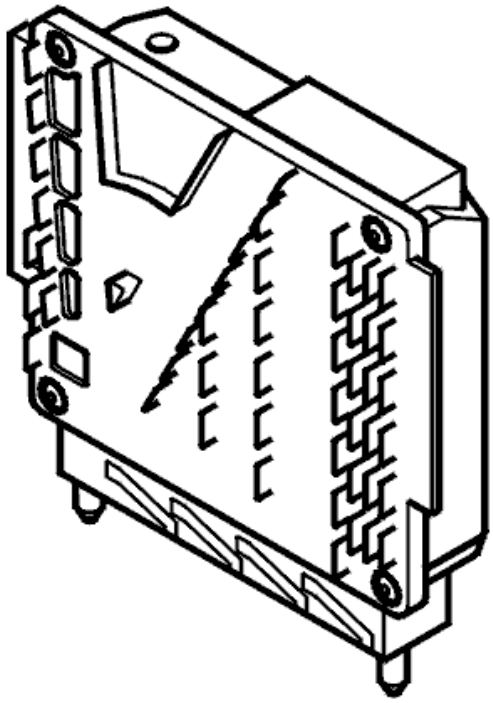


Fig. 395: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

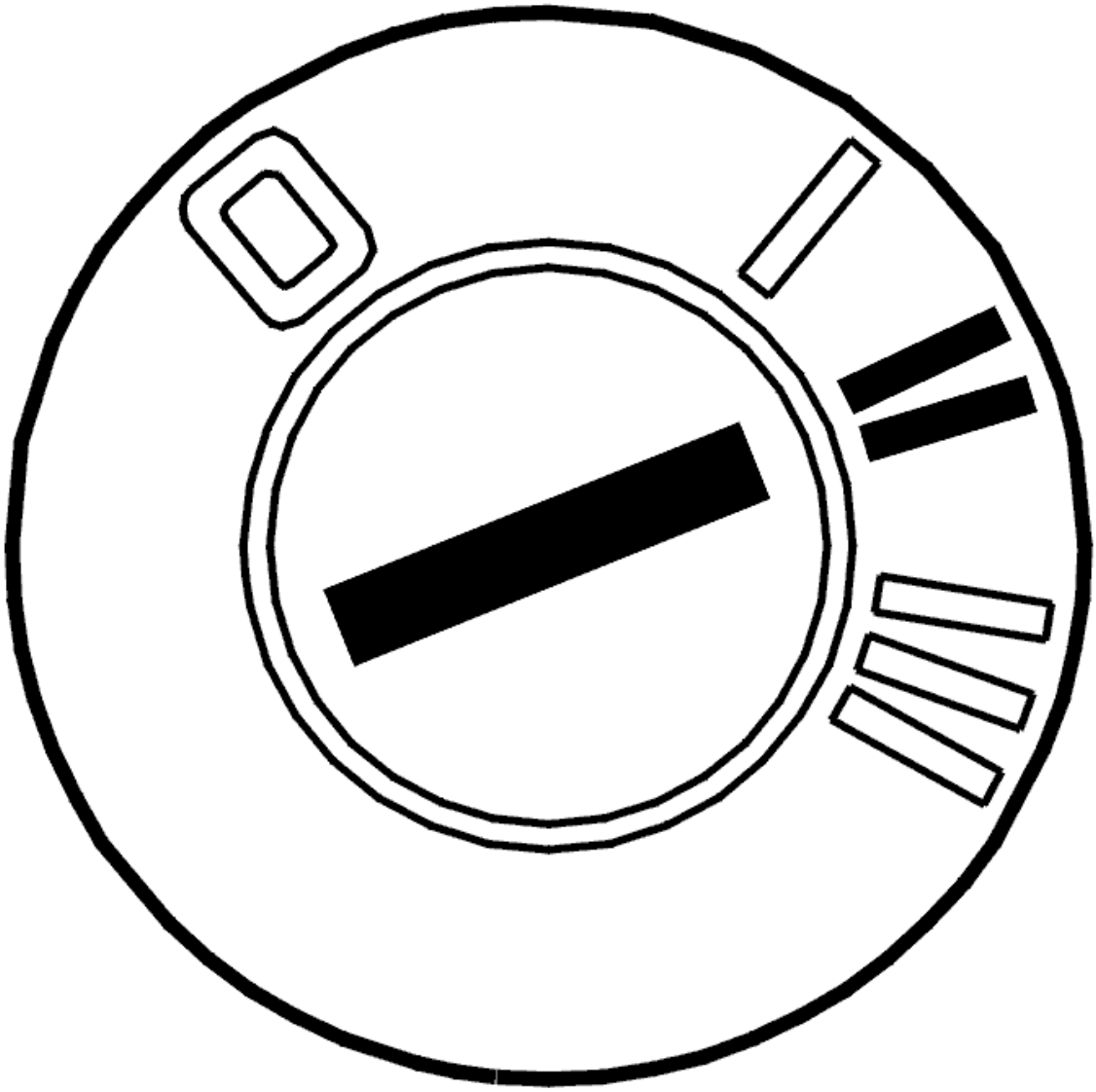


Fig. 396: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

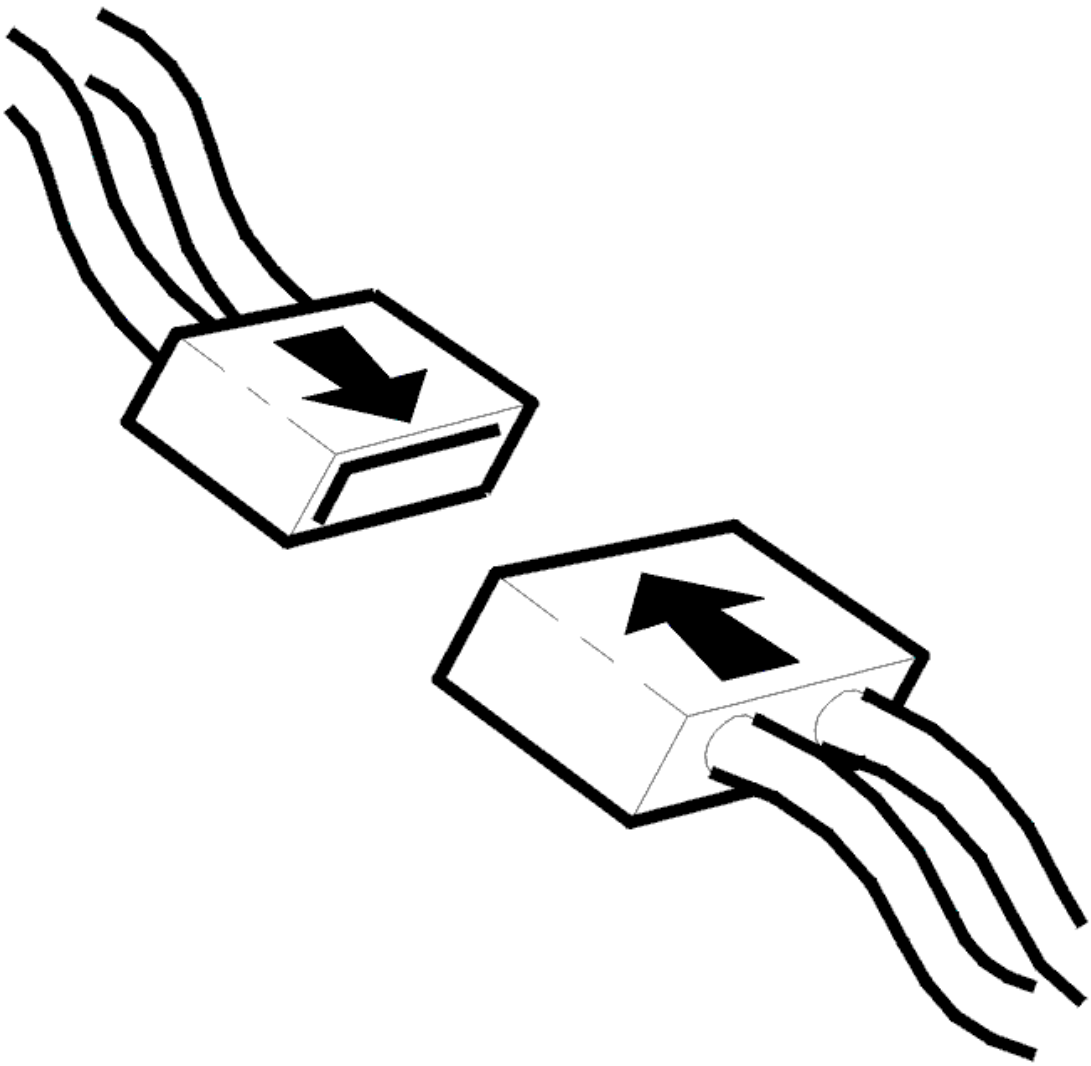


Fig. 397: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reconnect connectors, reinstall components etc.
- Start the car.
- Depress the accelerator pedal (AP) slowly.
- Read off the current through the solenoid circuit.

The current should decrease as the accelerator pedal (AP) is depressed.

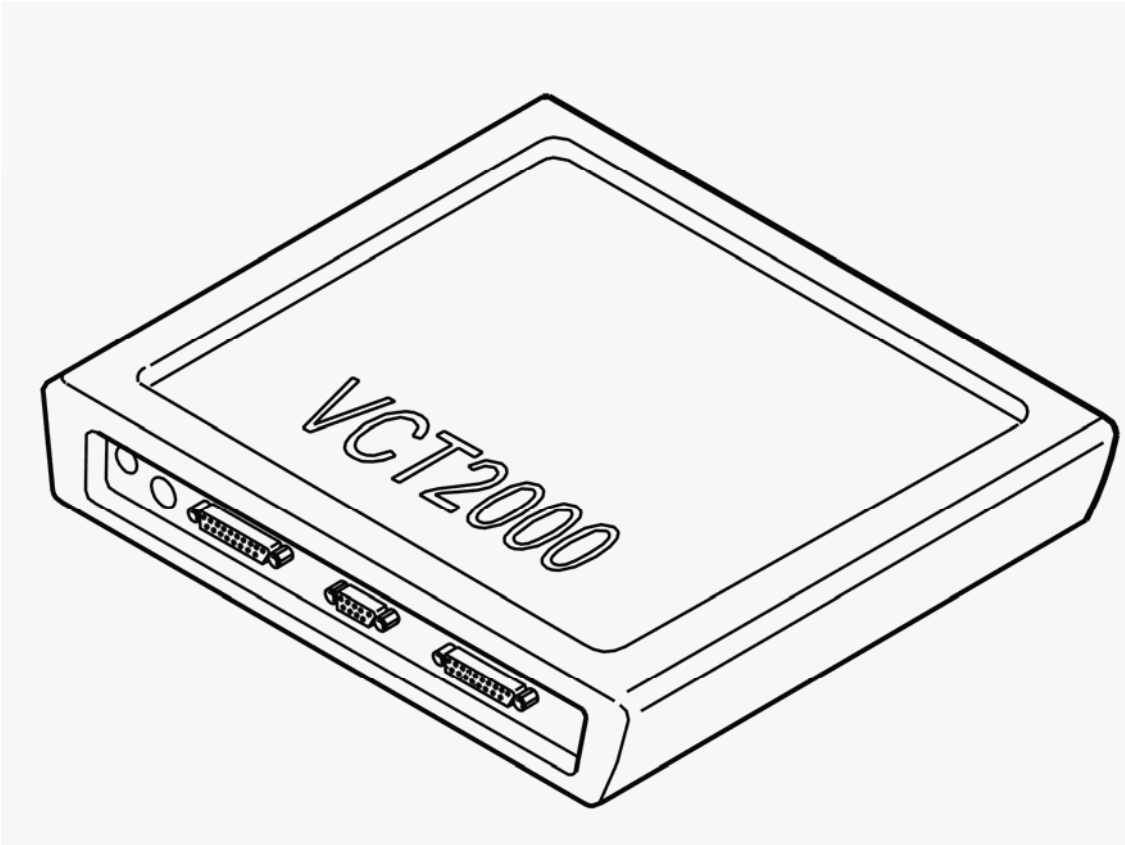


Fig. 398: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the current decrease?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-012A: NEUTRAL CHECK FAULTY CONNECTION (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

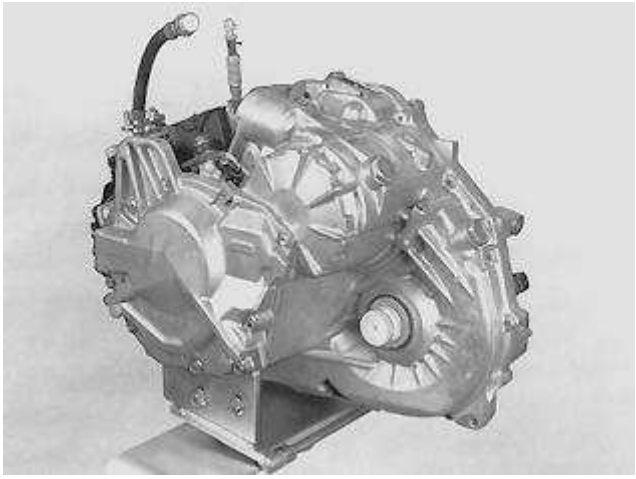


Fig. 399: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

The driving section of the transmission is disengaged when certain conditions are met:

- Stationary
- Engine idling
- Stop pedal depressed
- Gear position D, 3 or 4.

The function decreases fuel consumption and vibration from the transmission when running the engine at idle speed.

Diagnostic trouble code (DTC) TCM-012A is stored if the transmission control module (TCM) registers that clutch C1 disengages incorrectly.

Substitute Value

- None.

Possible Source

- Shift solenoid S1 has jammed in the OFF position
- Shift solenoid S2 has jammed in the ON position
- Solenoid SLT has jammed in the OFF position
- Internal fault in the transmission
- Defective control module.

Fault symptom[s]

- General orange warning lamp lit
- Malfunction indicator lamp (MIL) lit.

FAULTY CONNECTION

CHECKS

CHECKING THE NEUTRAL CHECK

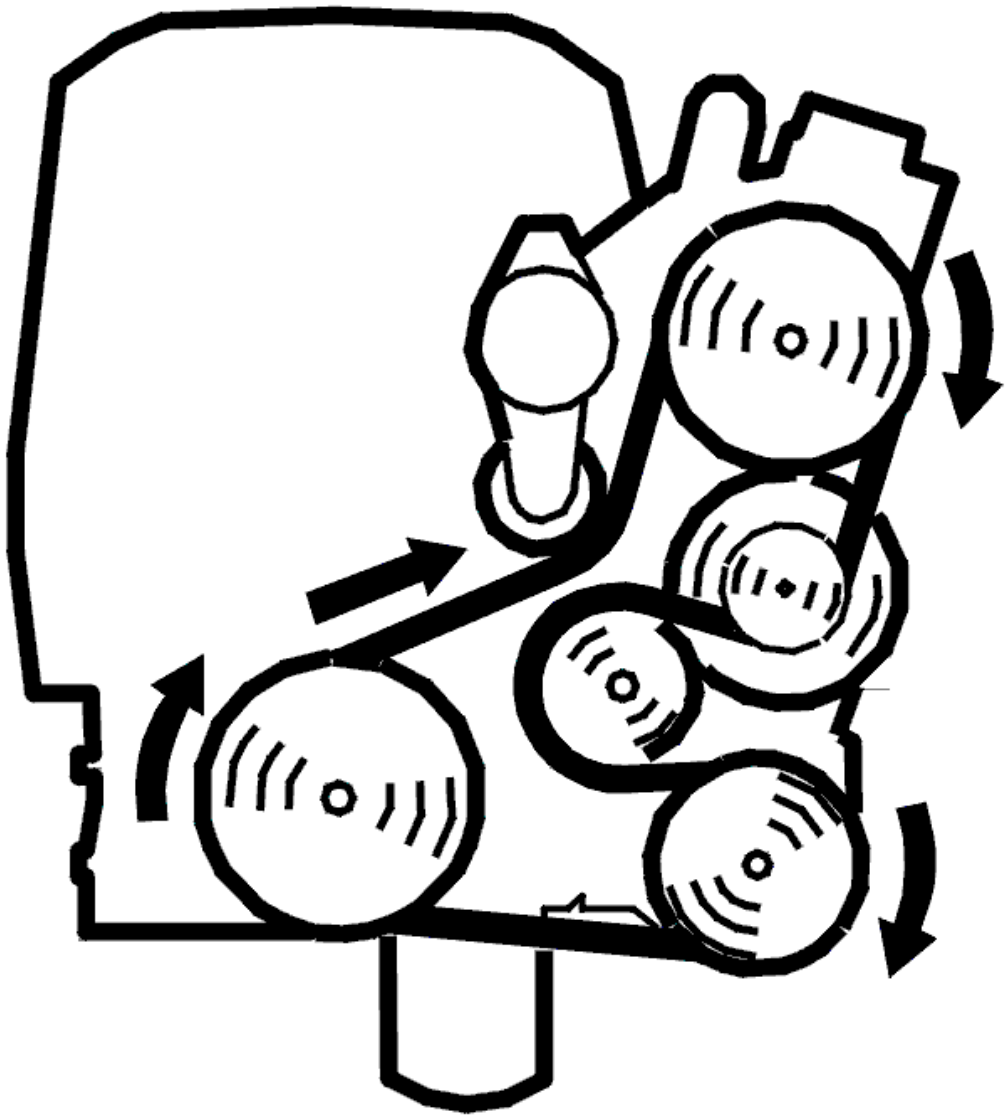


Fig. 400: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the transmission connectors and the control module connector. Check for contact resistance and

oxidation. See **CONTACT RESISTANCE AND OXIDATION**

- Reconnect the connectors, reinstall components etc.
- Raise the car so that the drive wheels can rotate freely
- Start the car
- Move the gear selector to position D. Accelerate so that the speed exceeds 50 km/h
- Brake the wheels and let the engine run at idling speed without touching the accelerator pedal (AP). The neutral check must display the status as "Active" (this may take up to 30 seconds)
- Brake the wheels. Move the gear selector to position D. Carefully depress the accelerator. Check that the neutral check changes to the "Inactive" status.

  Check that the function operates in gear positions 4, 3 and 2.

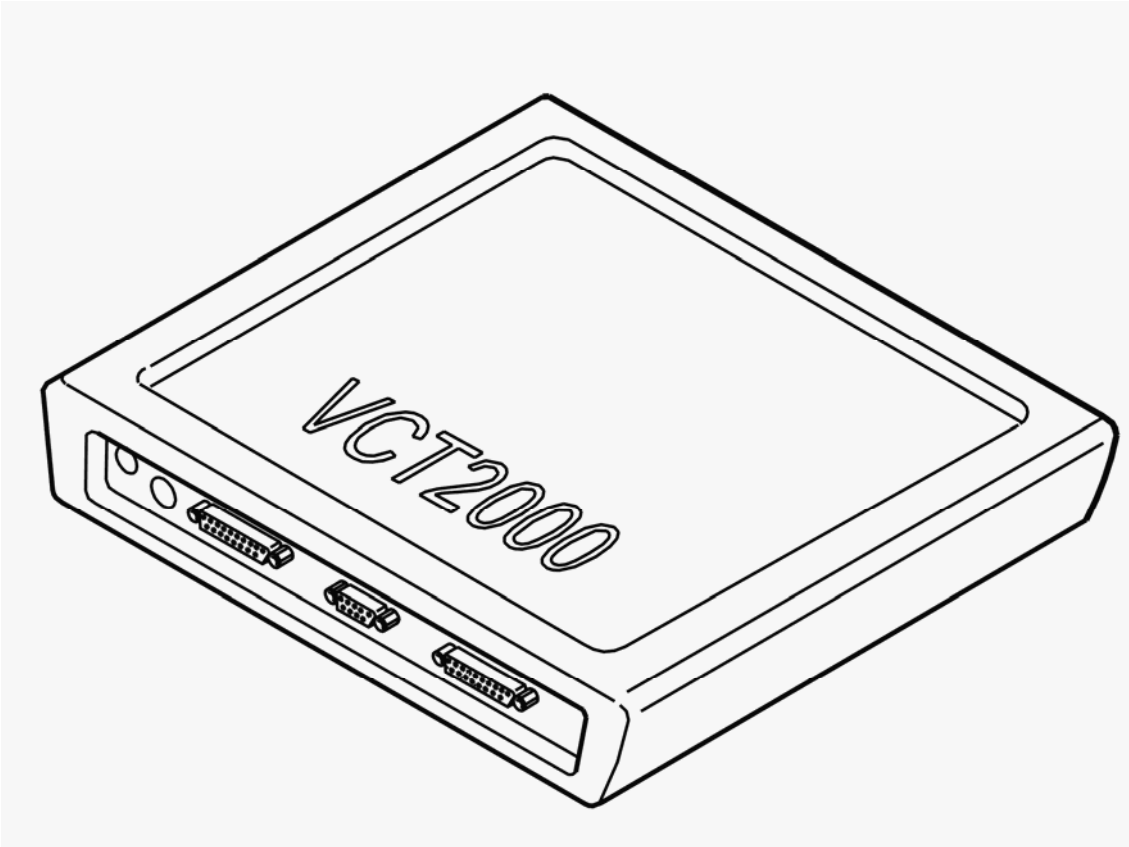


Fig. 401: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the status change?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

Refer to **CHECKING SHIFT SOLENOIDS S1 AND S2**

CHECKING SHIFT SOLENOIDS S1 AND S2

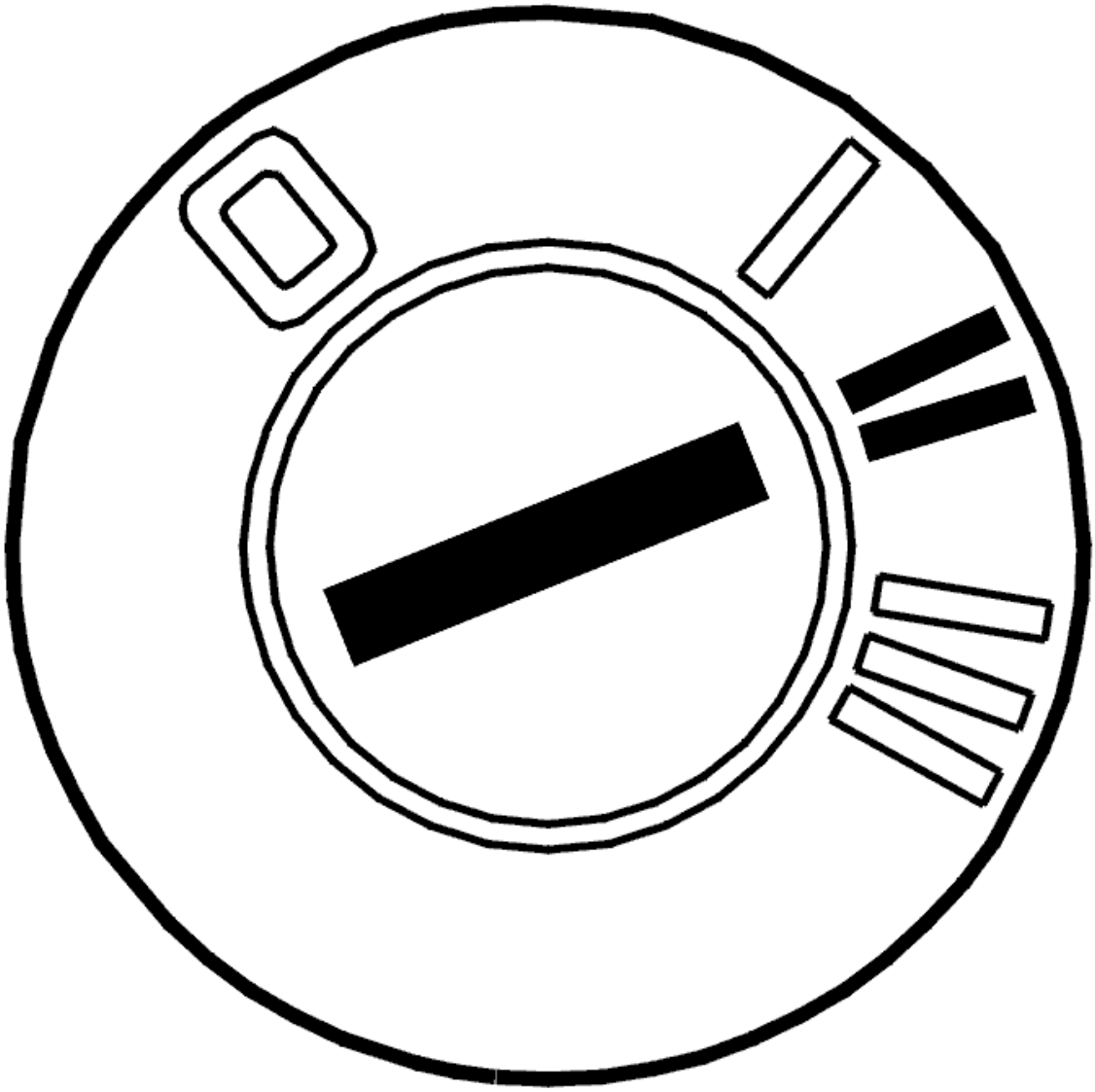


Fig. 402: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Activate solenoids S1 and S2 individually.

NOTE: Select to read the status for the solenoid that should be activated.

The value should shift between OFF and ON and a " clicking sound" should be heard in the transmission (at 20° C).

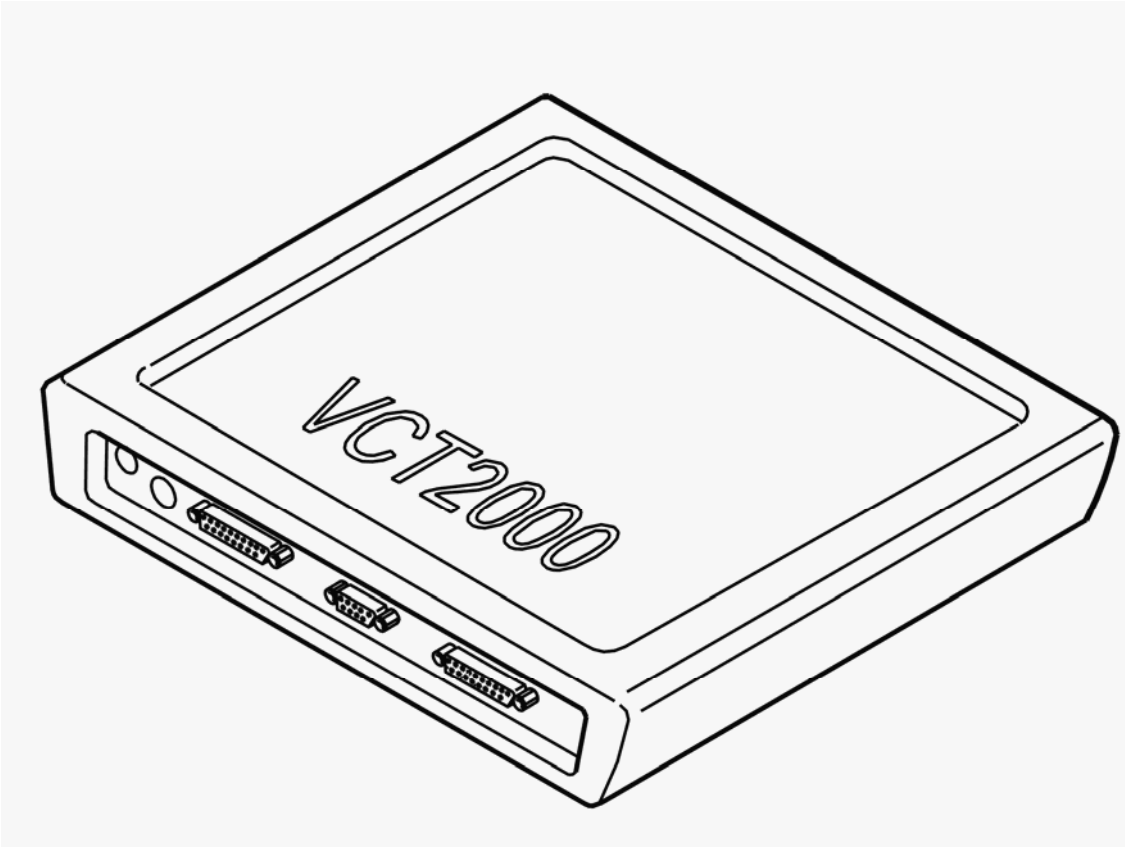


Fig. 403: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  Refer to **CHECKING SOLENOID SLT**

- **NO**

  Refer to **REPLACING THE TRANSMISSION CONTROL SYSTEM**

CHECKING SOLENOID SLT

NOTE: The transmission must not be colder than room temperature when activated.

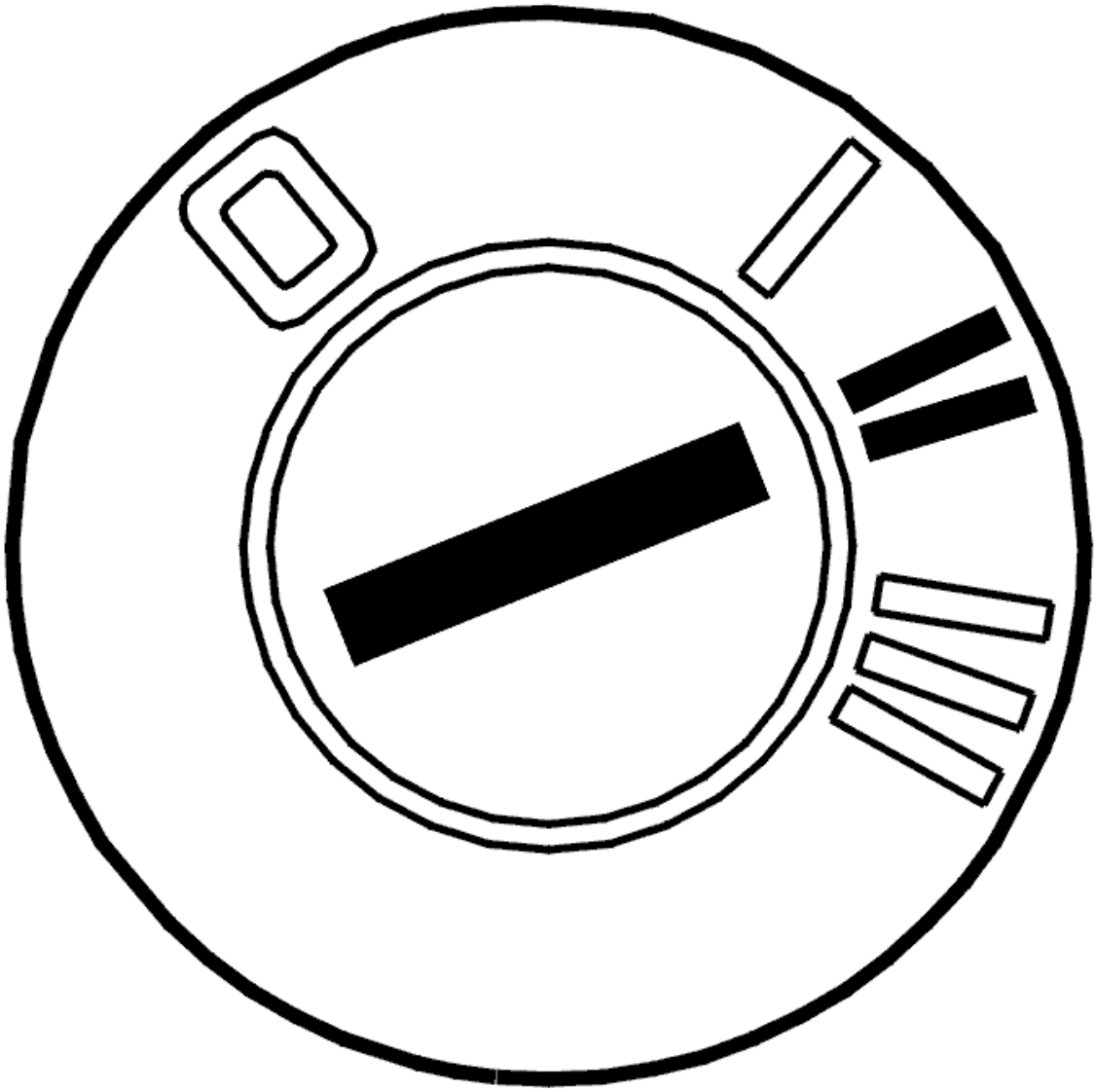


Fig. 404: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLT.

  Check that the solenoid " clicks" on activation. Use a stethoscope to hear the sound more clearly.

  If no "click" is heard, this indicates that there is a mechanical fault.

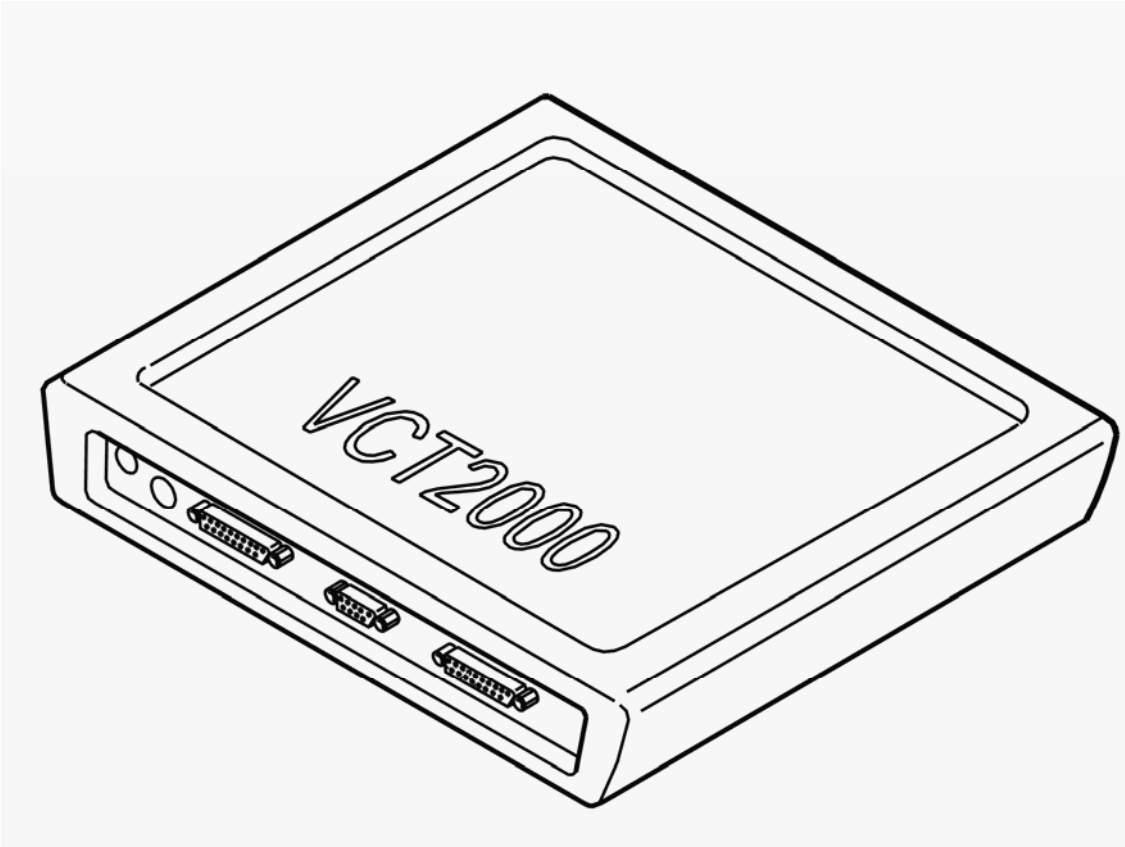


Fig. 405: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

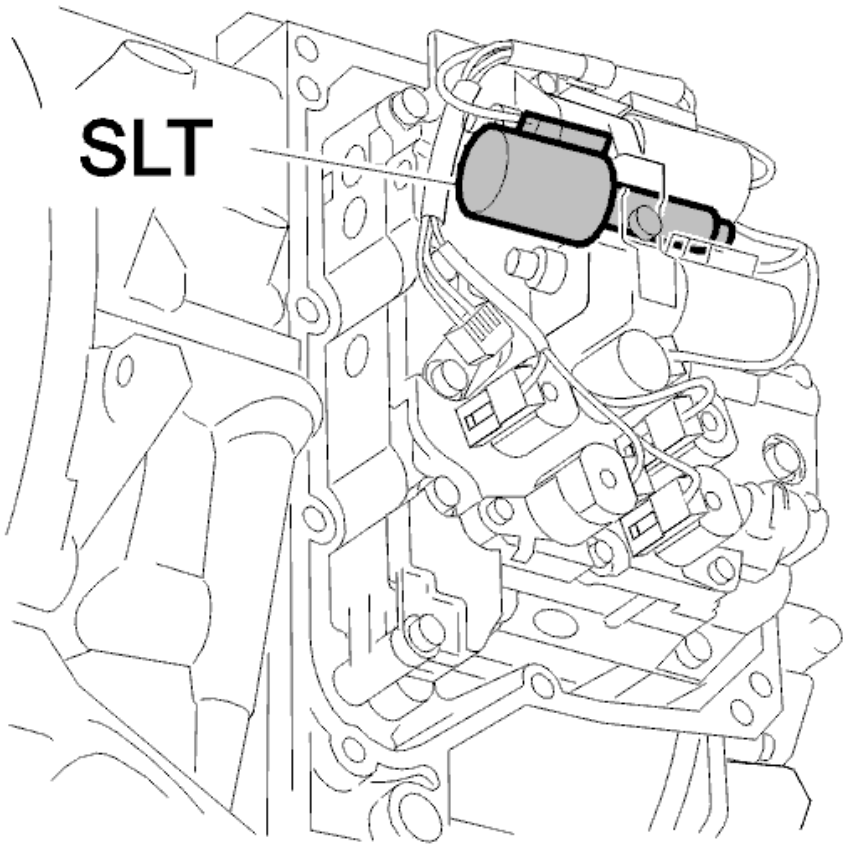


Fig. 406: Identifying Line Pressure Solenoid
Courtesy of VOLVO CARS CORPORATION

Was solenoid SLT OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **REPLACING THE TRANSMISSION CONTROL SYSTEM**

REPLACING THE TRANSMISSION CONTROL SYSTEM

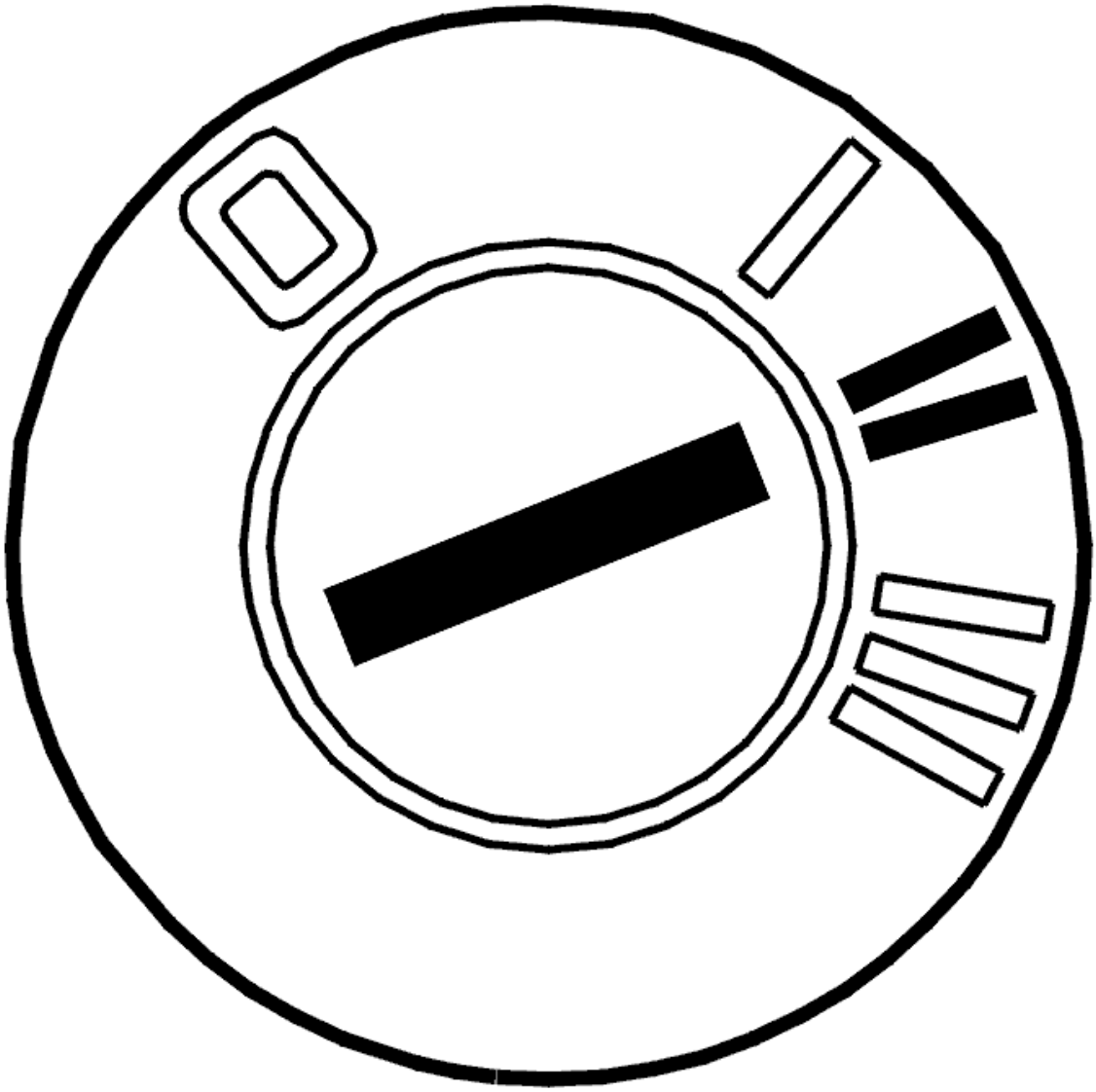


Fig. 407: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Replace the faulty shift solenoid.

  The transmission control system must be replaced if there is a fault in solenoid SLT. To replace the solenoids and the transmission control system, see **SOLENOID CONTROL SYSTEM, REPLACING** .

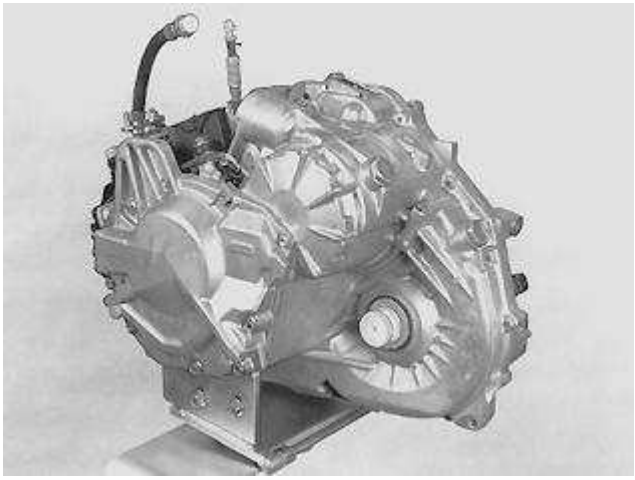


Fig. 408: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

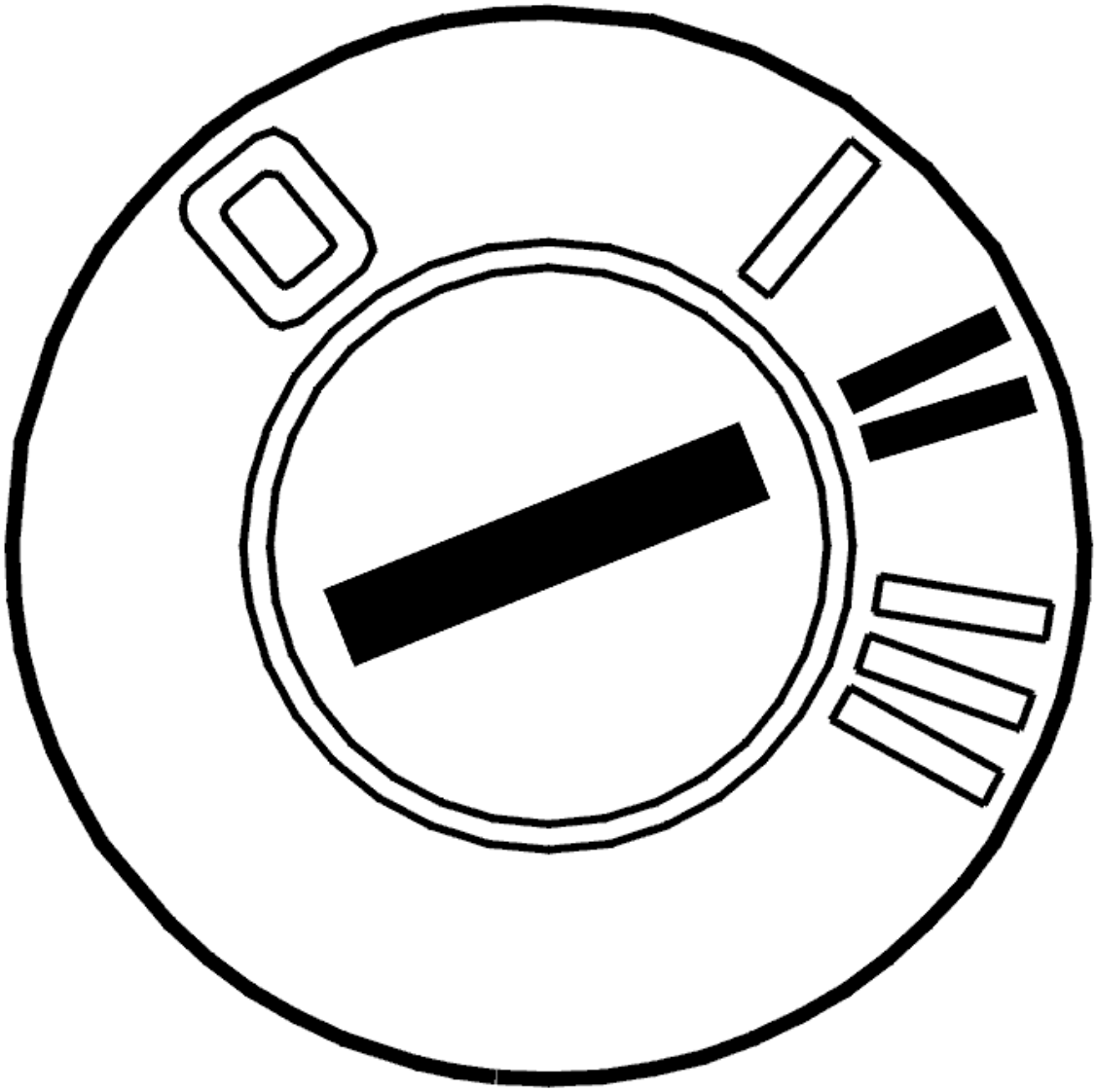


Fig. 409: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

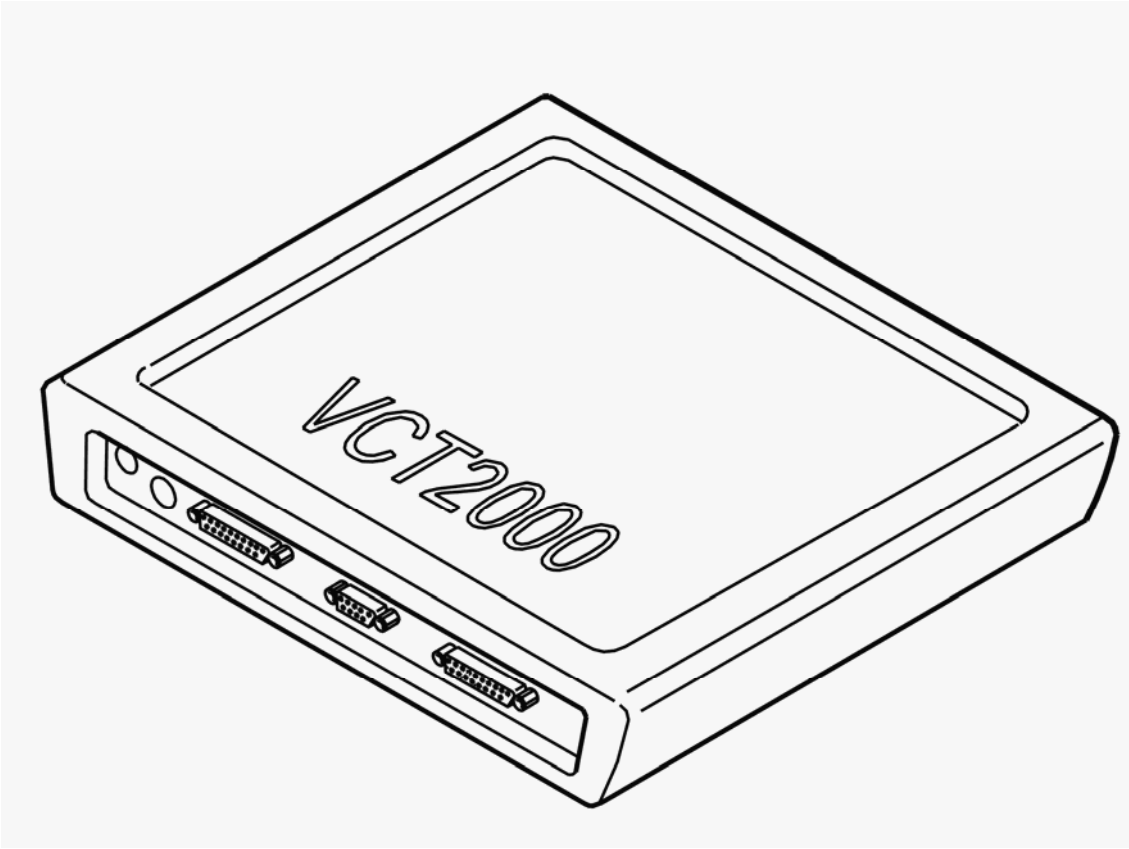


Fig. 410: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

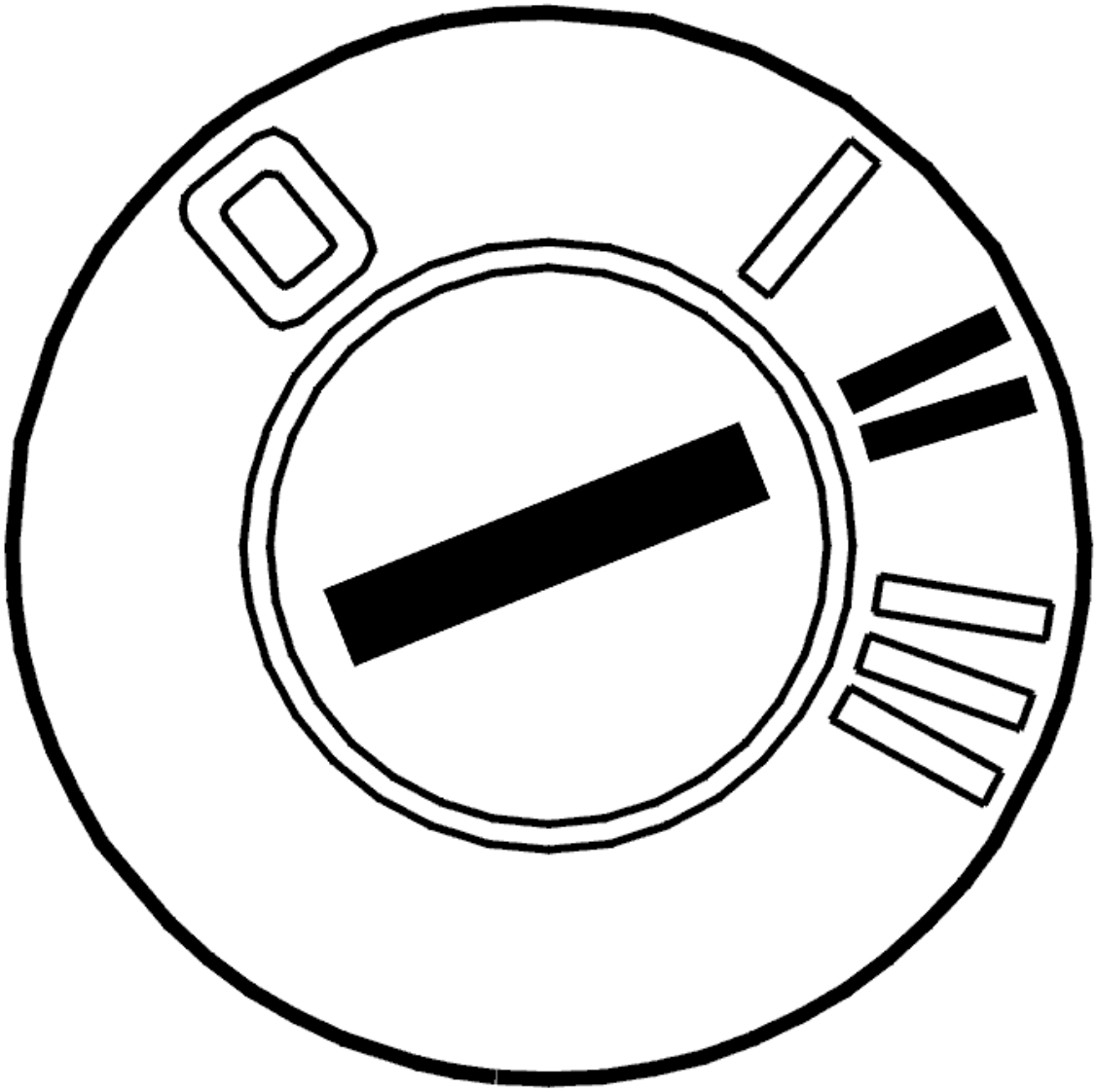


Fig. 411: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

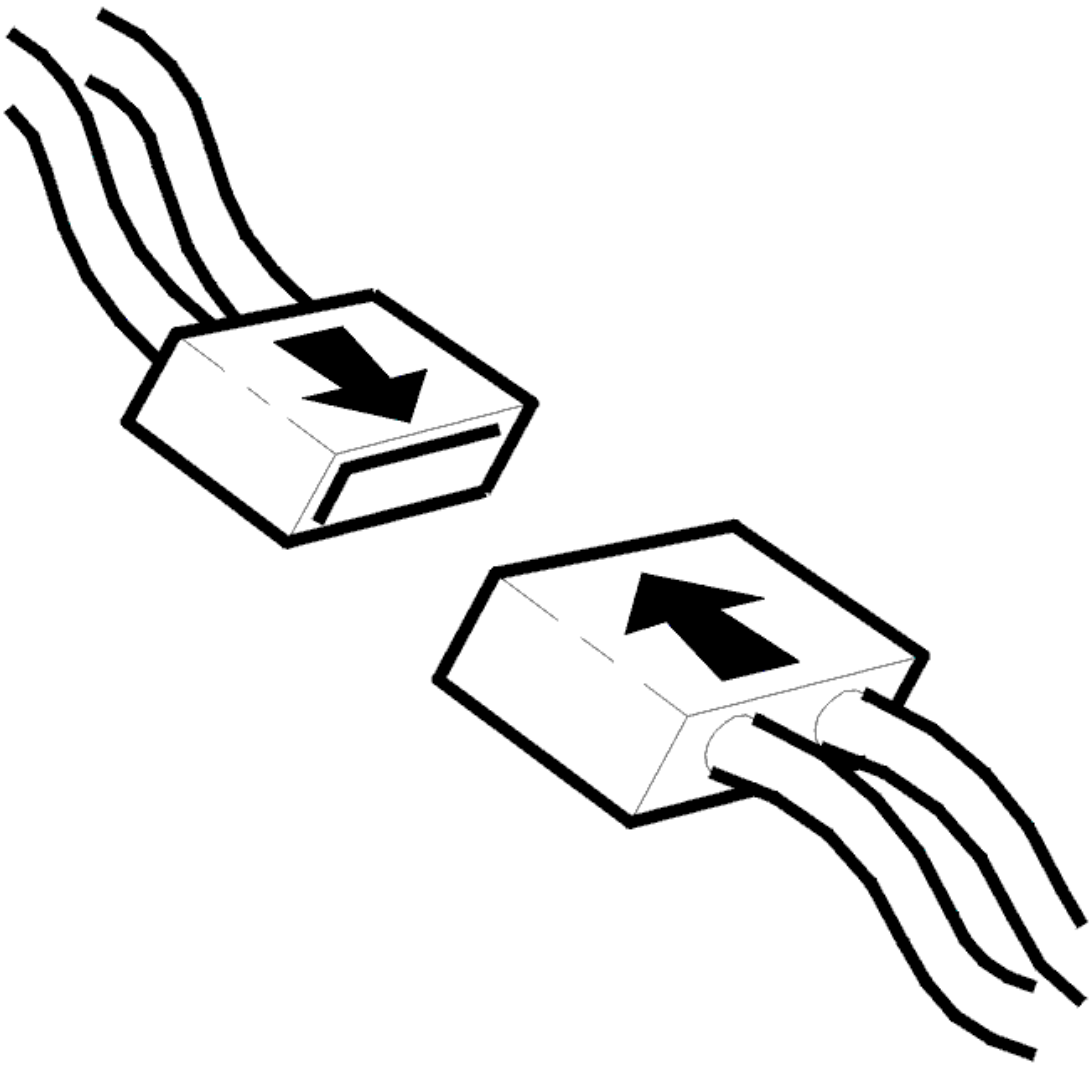


Fig. 412: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reconnect the connectors, reinstall components etc.
- Raise the car so that the drive wheels are unimpeded.
- Start the car.
- Move the gear selector to position D and accelerate so that the speed exceeds 50 km/h.
- Brake the wheels and let the engine run at idling speed without touching the accelerator pedal (AP). The neutral check should display "Active" status (this may take up to 30 seconds).
- Brake the wheels, move the gear selector to position D. Carefully depress the accelerator and check that the neutral check changes to the "Inactive" status.

  Check that the function operates in gear positions 4, 3 and 2.

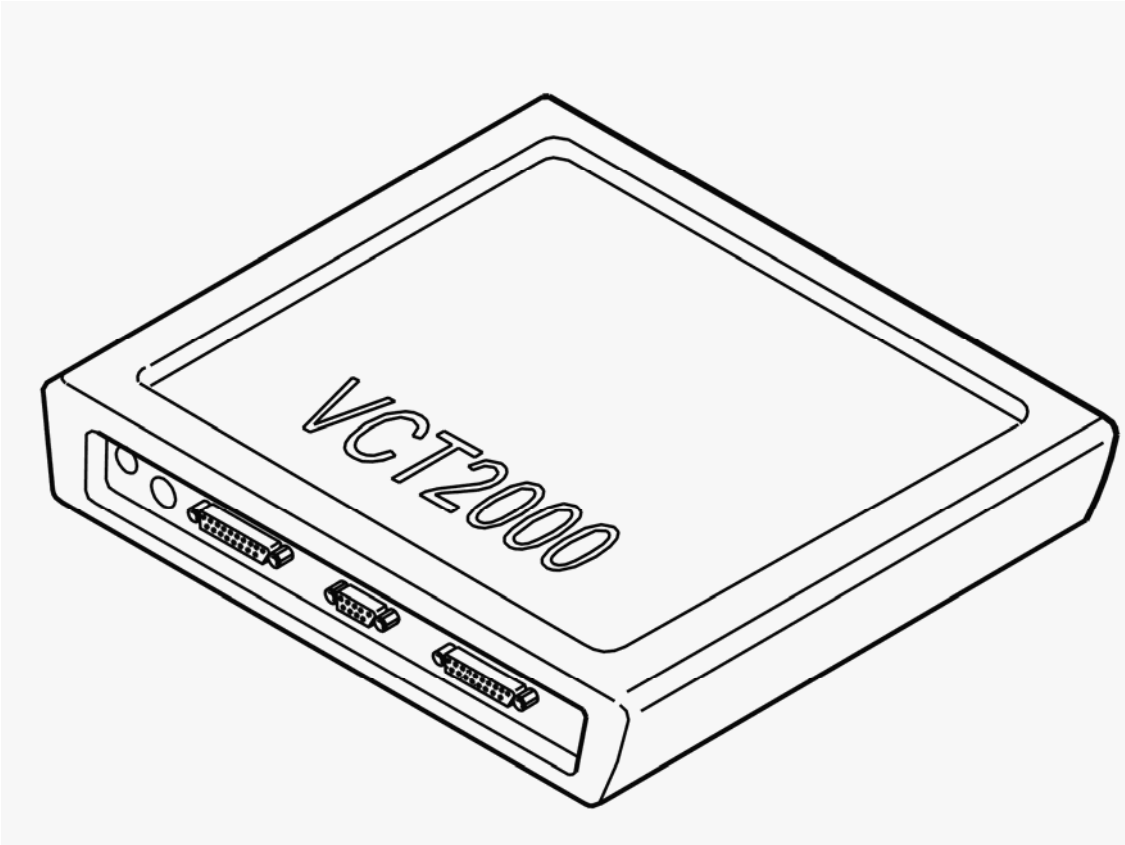


Fig. 413: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is transmission function OK ?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-012B: NEUTRAL CHECK NO NEUTRAL CHECK (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

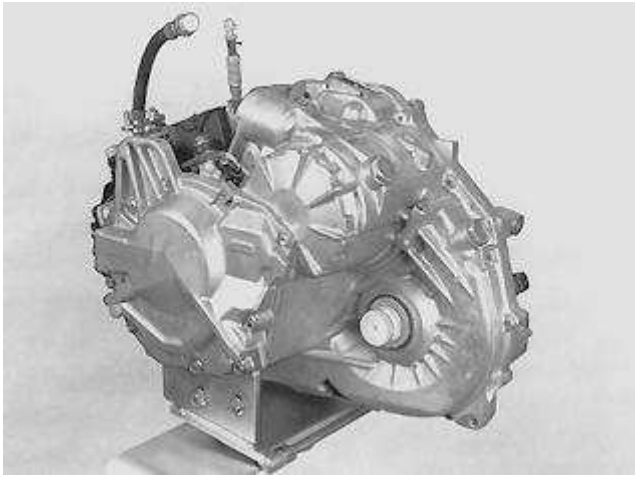


Fig. 414: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

The driving section of the transmission is disengaged when certain conditions are met:

- Stationary
- Engine idling
- Stop pedal depressed
- Gear position D, 3 or 4.

The function decreases fuel consumption and vibration from the transmission when running the engine at idle speed.

Diagnostic trouble code (DTC) TCM-012B is stored if the transmission control module (TCM) registers that clutch C1 does not engage.

Substitute Value

- None.

Possible Source

- Shift solenoid SLS has jammed in the OFF position
- Internal fault in the transmission
- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit

- Malfunction indicator lamp (MIL) lit.

NO NEUTRAL CHECK

CHECKS

CHECKING THE NEUTRAL CHECK

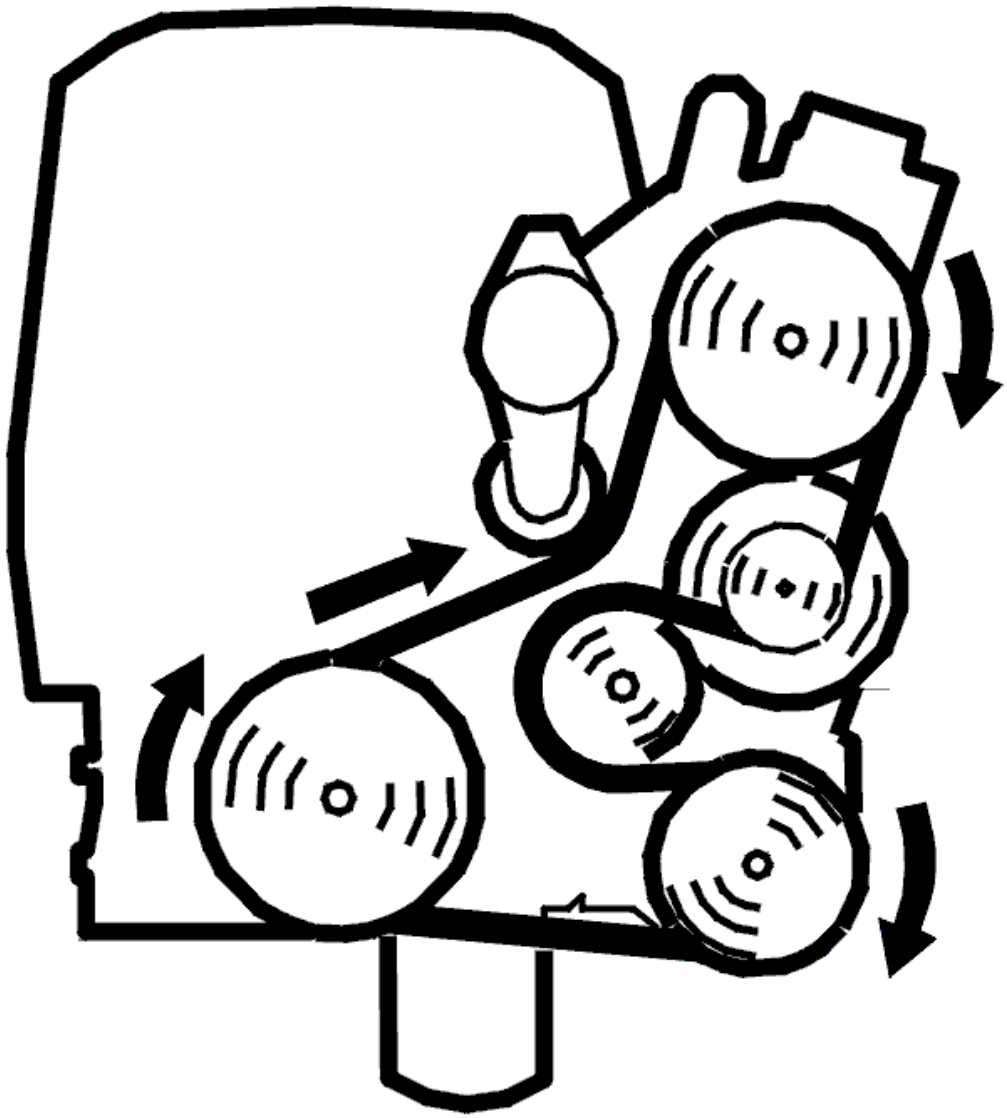


Fig. 415: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the transmission connectors and the control module connector. Check for contact resistance and oxidation. See **CONTACT RESISTANCE AND OXIDATION**
- Reconnect the connectors, reinstall components etc.

- Raise the car so that the drive wheels can rotate freely
- Start the car
- Move the gear selector to position D. Accelerate so that the speed exceeds 50 km/h
- Brake the wheels and let the engine run at idling speed without touching the accelerator pedal (AP). The neutral check must display the status as "Active" (this may take up to 30 seconds)
- Brake the wheels. Move the gear selector to position D. Carefully depress the accelerator. Check that the neutral check changes to the "Inactive" status.

  The engine speed (RPM) should be even when transferring from Active to Inactive status.

  Check that the function operates in gear positions 4, 3 and 2.

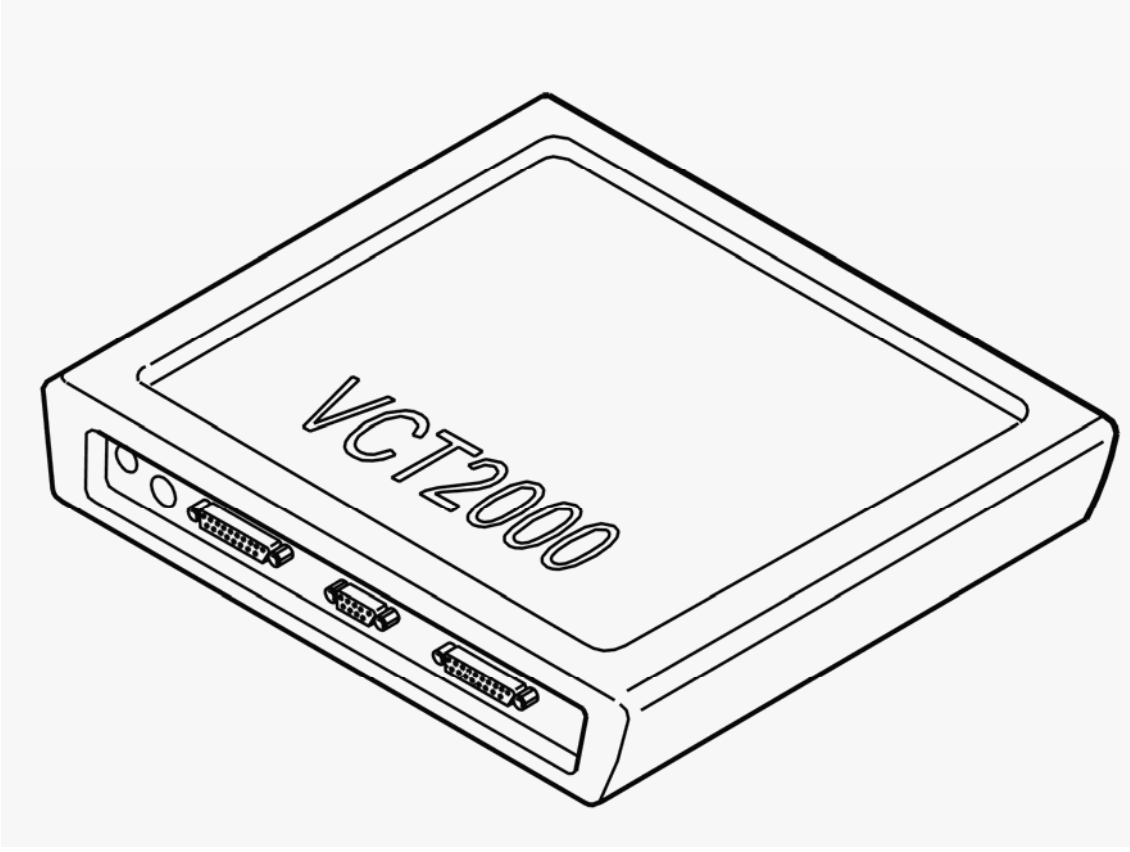


Fig. 416: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function of the transmission OK?

- **YES**

  Refer to **TEST DRIVING**

- **NO**

Refer to **CHECKING SOLENOID SLT**

CHECKING SOLENOID SLT

NOTE: The transmission must not be colder than room temperature when activated.

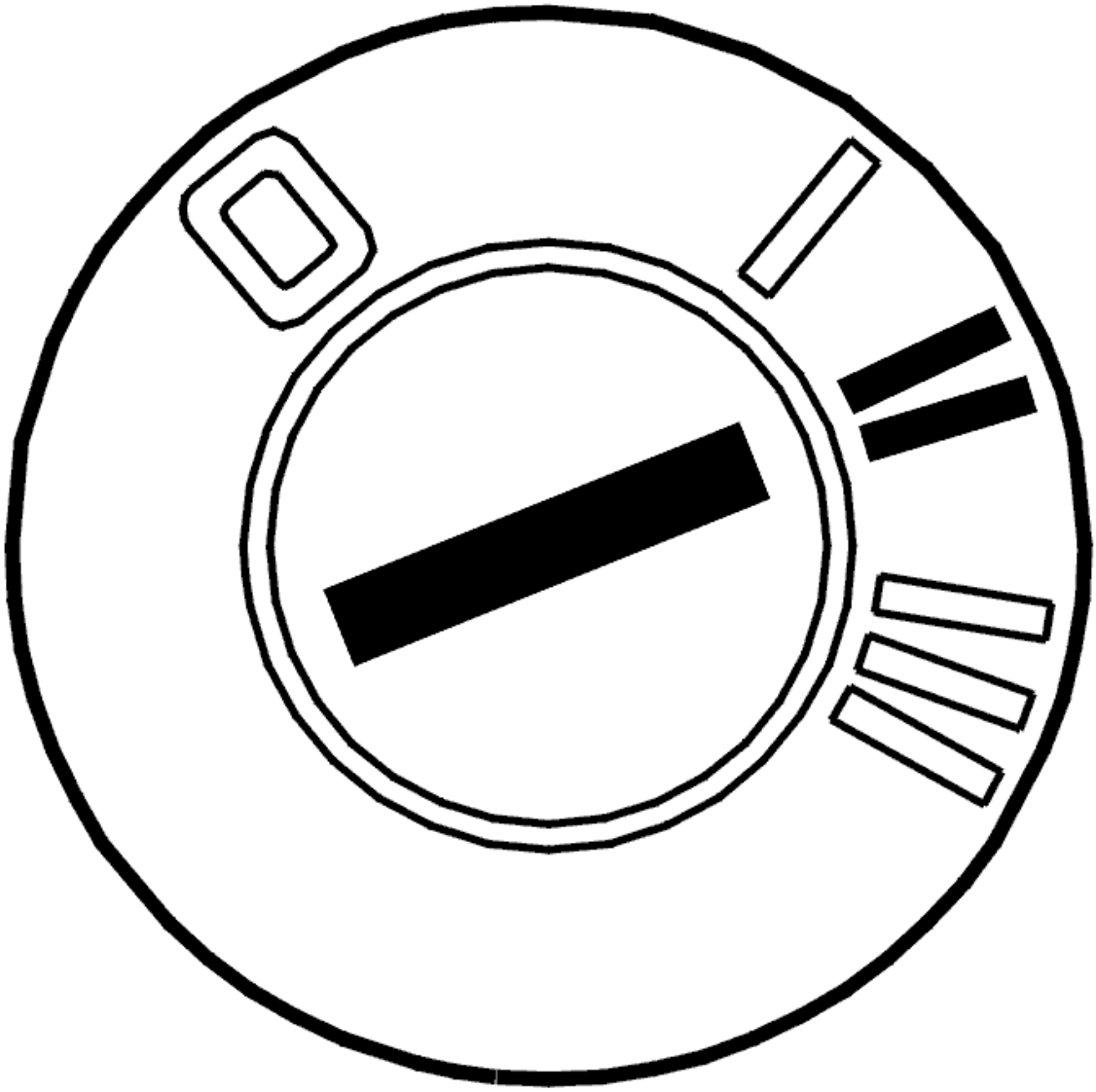


Fig. 417: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLT.

Check that the solenoid " clicks" on activation and that the current changes from approximately 0 to 1 A. Use a stethoscope to hear the sound more clearly.

If no "click" is heard, this indicates that there is a mechanical fault.

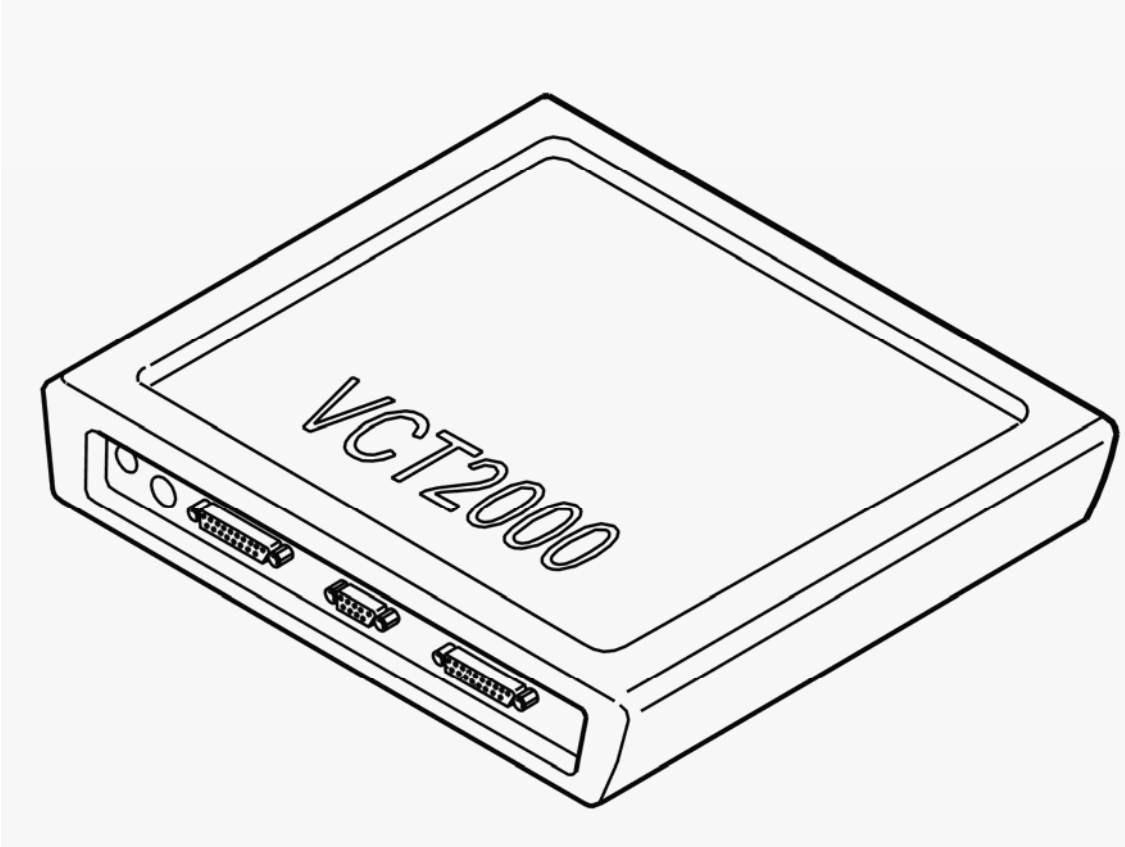


Fig. 418: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

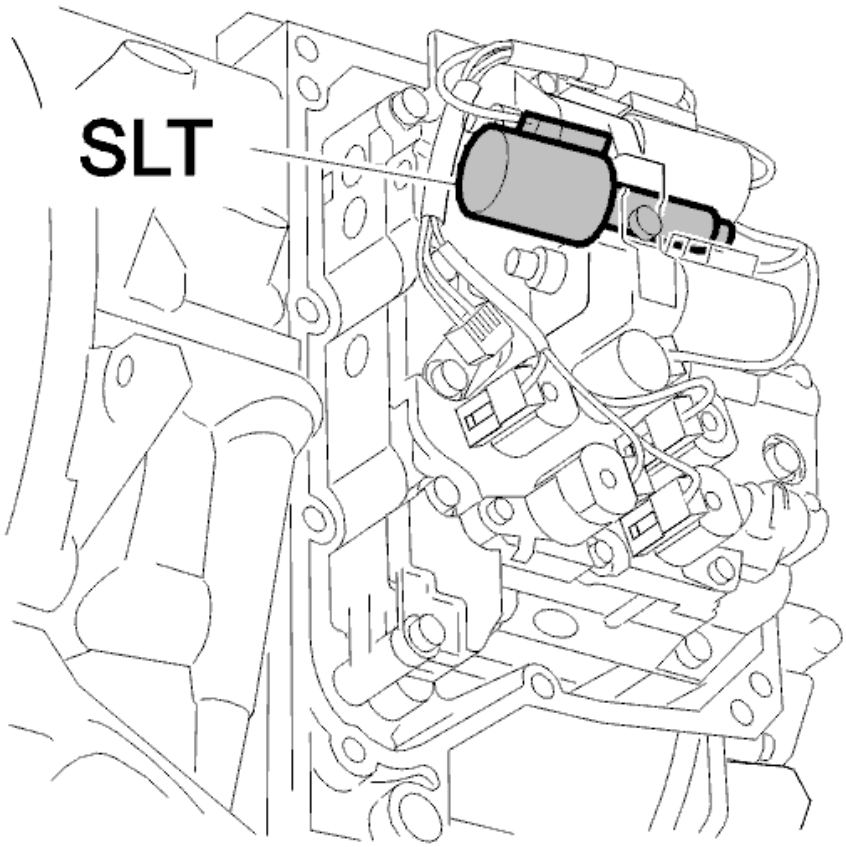


Fig. 419: Identifying Line Pressure Solenoid
Courtesy of VOLVO CARS CORPORATION

Was there a click from the solenoid?

- **YES**

  Refer to **TEST DRIVING**

- **NO**

  Refer to **REPLACING THE TRANSMISSION CONTROL SYSTEM**

TEST DRIVING

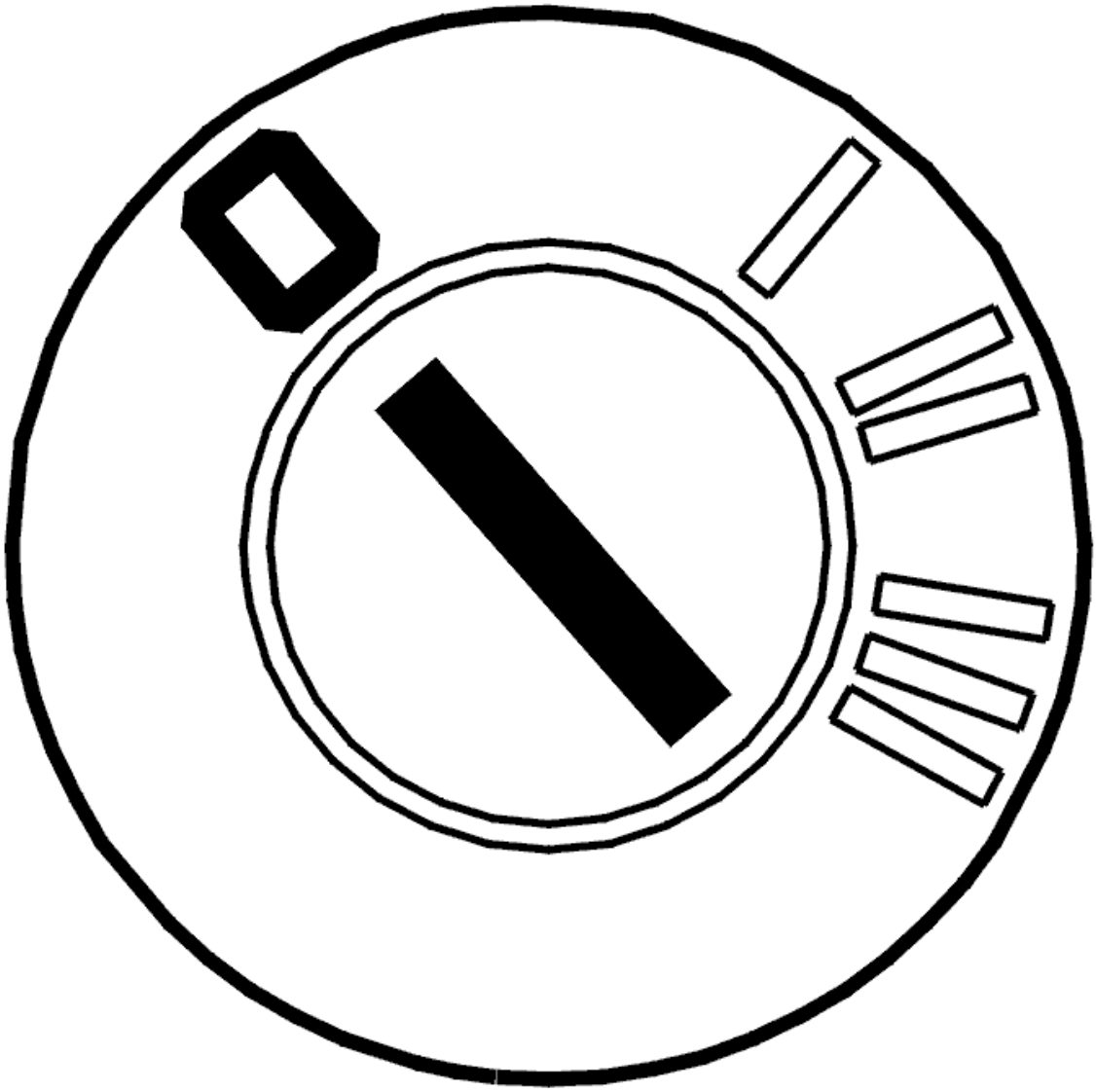


Fig. 420: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See **TEST DRIVE SCHEDULE, DESCRIPTION** .

Check that the shifts and the neutral check function without any problems.

Other information

- To access the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To access the control module connector, see **CONNECTING THE BREAKOUT BOX** .

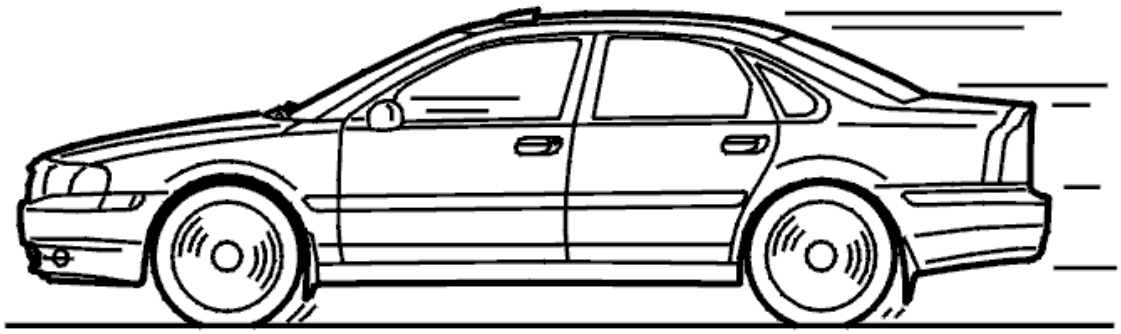


Fig. 421: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the transmission operating correctly?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **REPLACING THE TRANSMISSION CONTROL SYSTEM**

REPLACING THE TRANSMISSION CONTROL SYSTEM

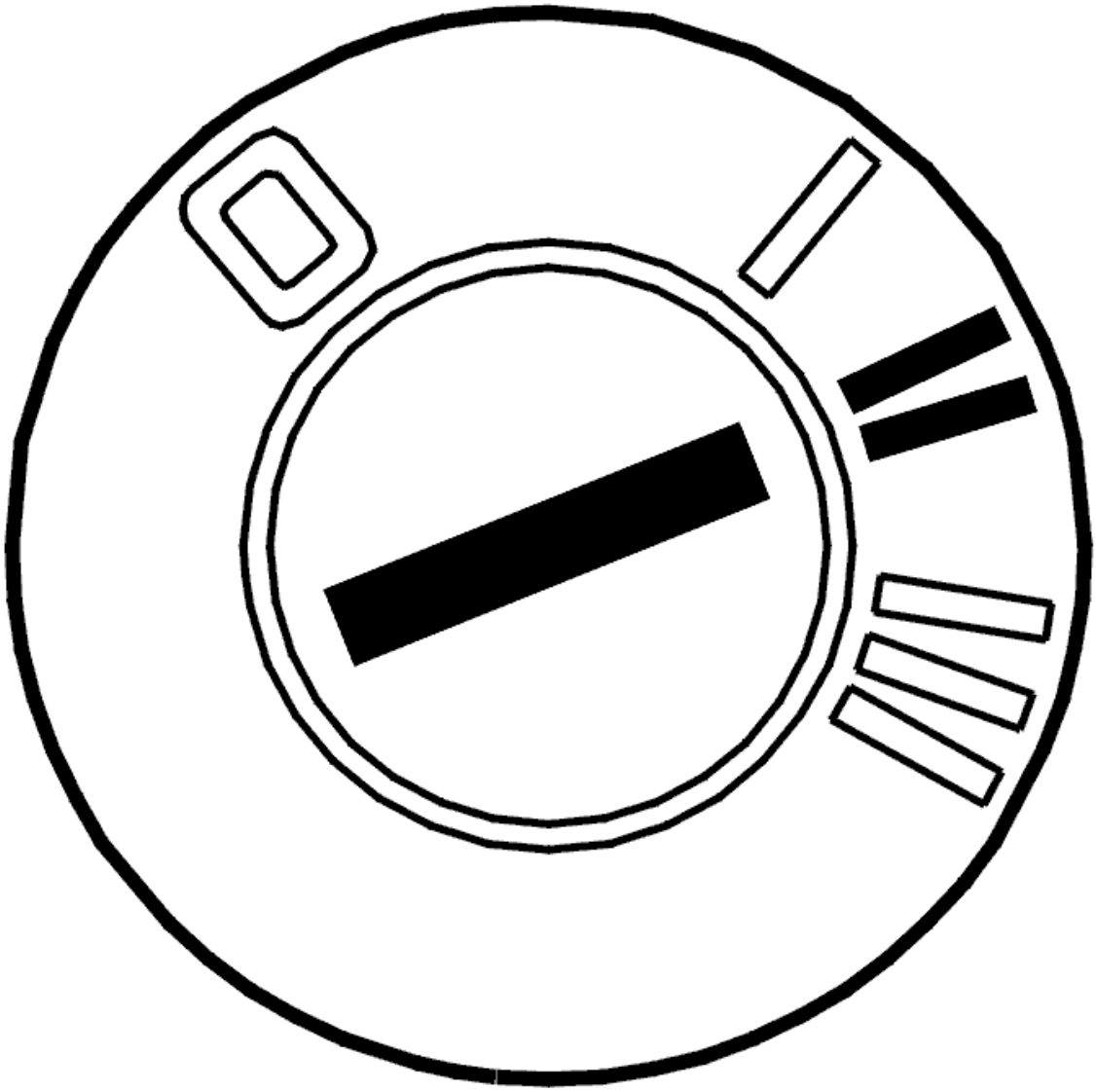


Fig. 422: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  The transmission control system must be replaced if there is a fault in solenoid SLT. To replace the solenoids and the transmission control system, see **SOLENOID CONTROL SYSTEM, REPLACING** .

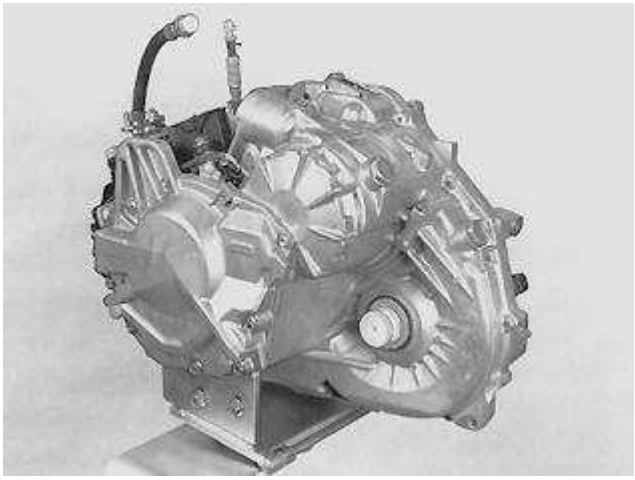


Fig. 423: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

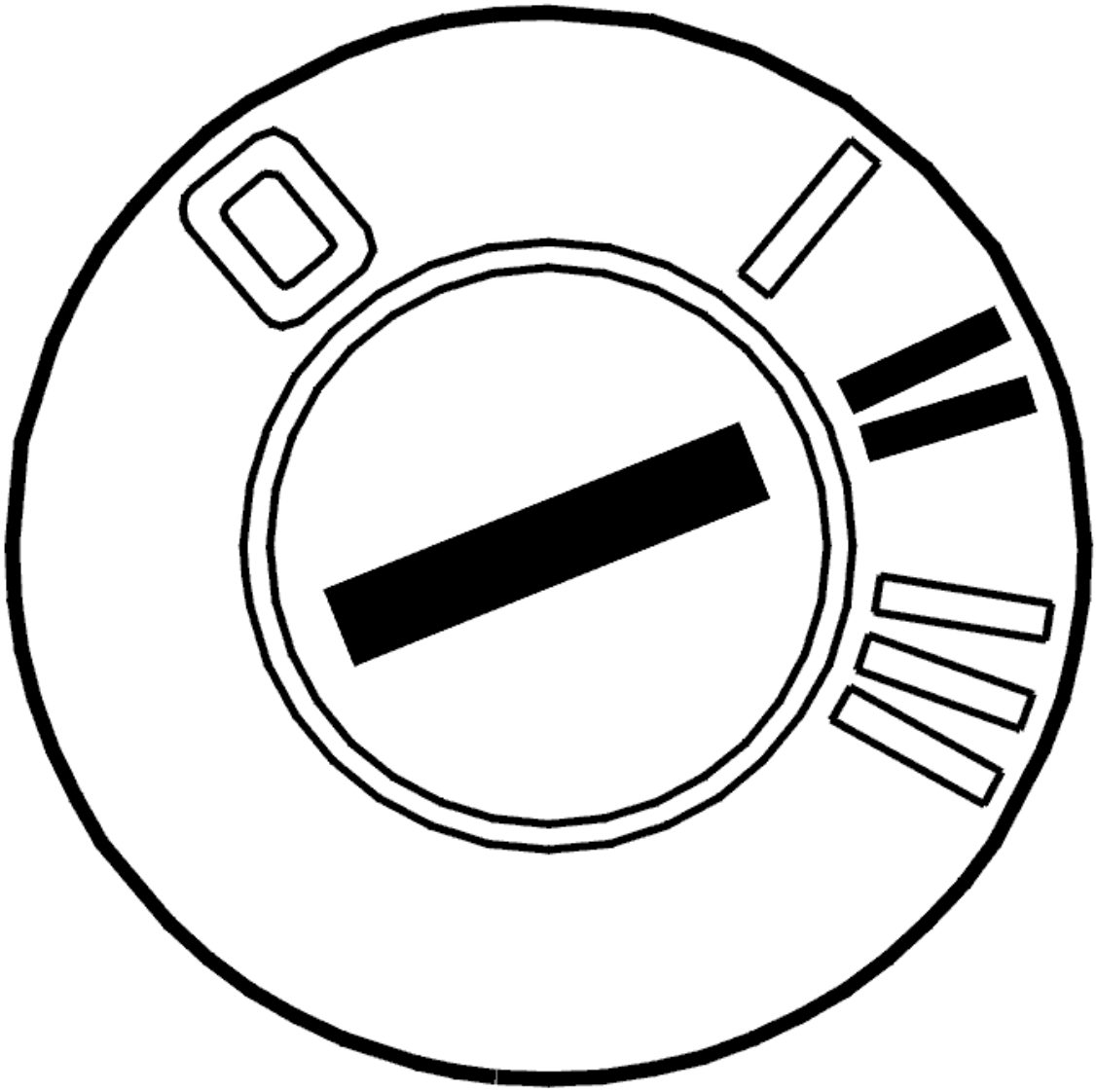


Fig. 424: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

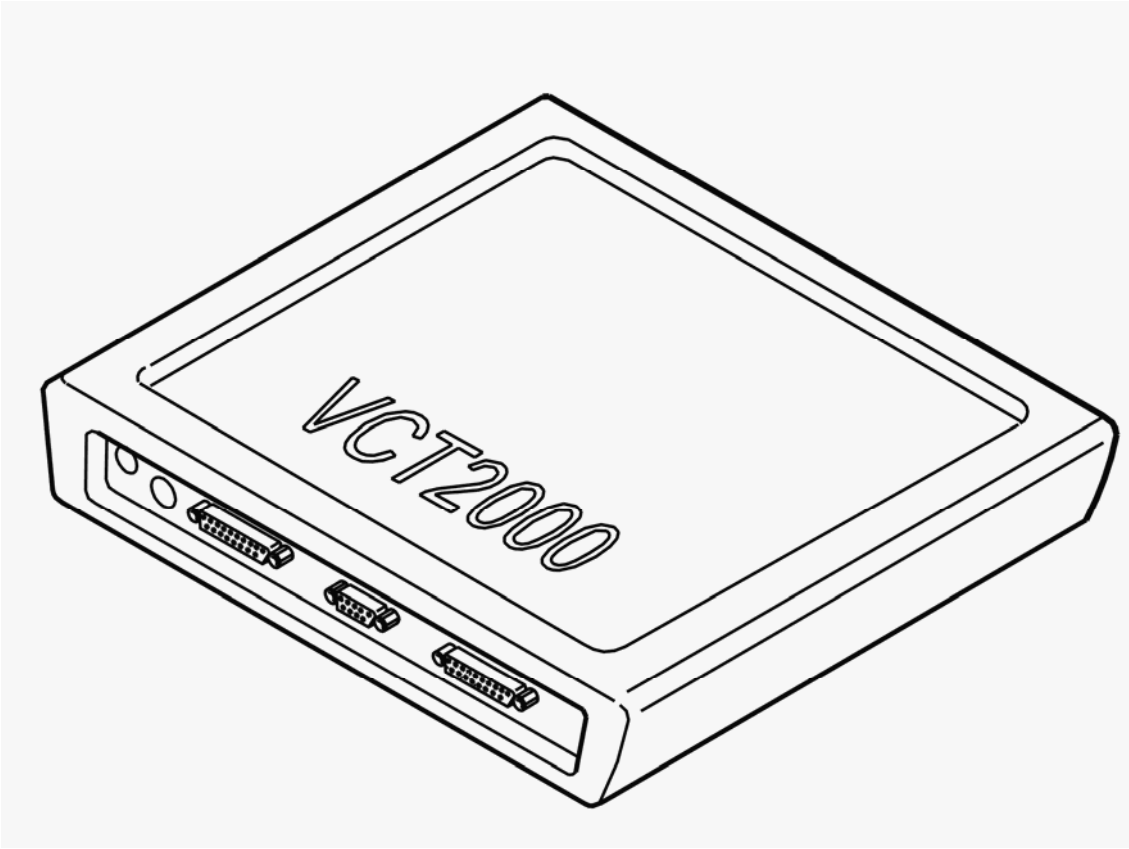


Fig. 425: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

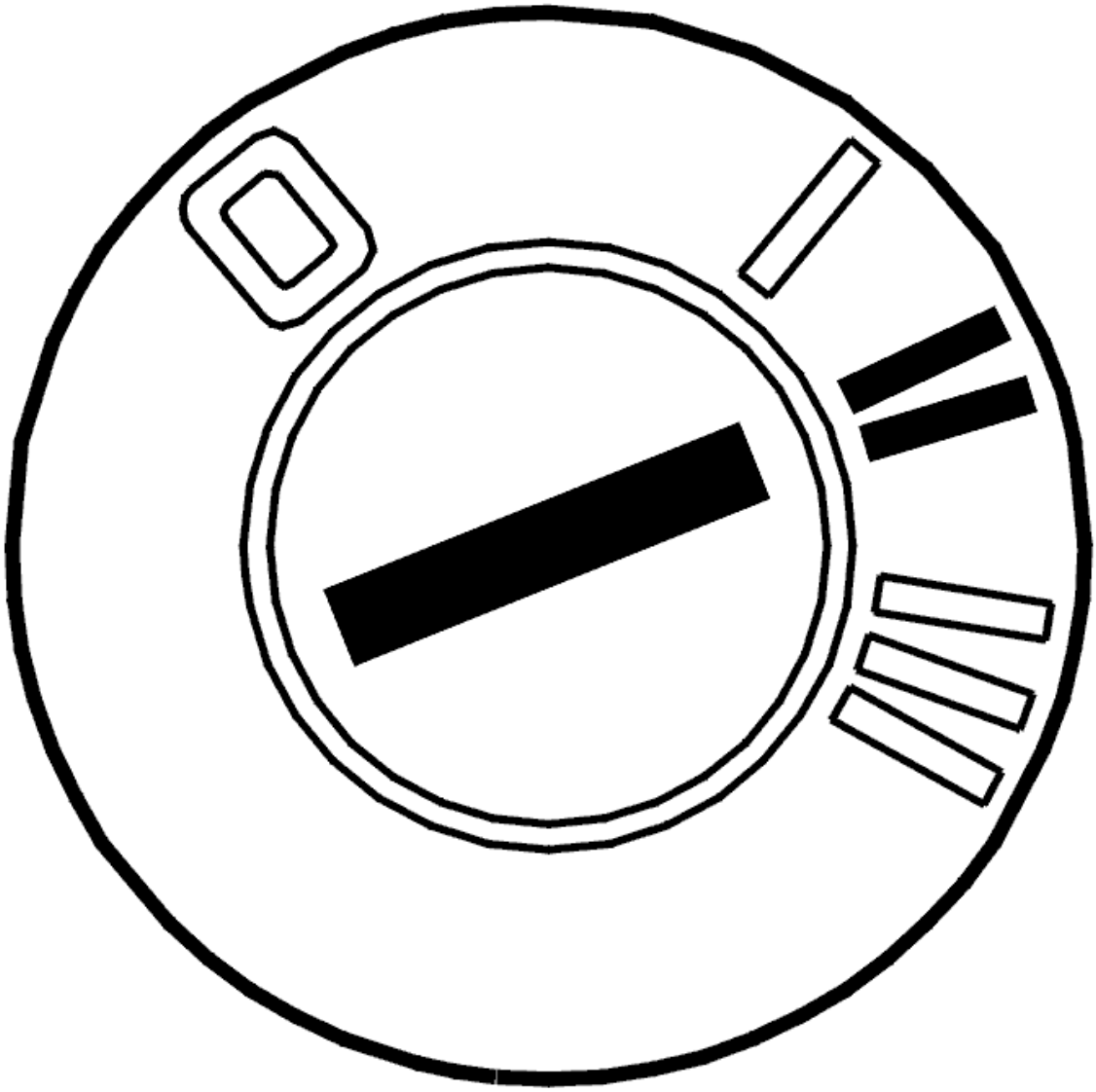


Fig. 426: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

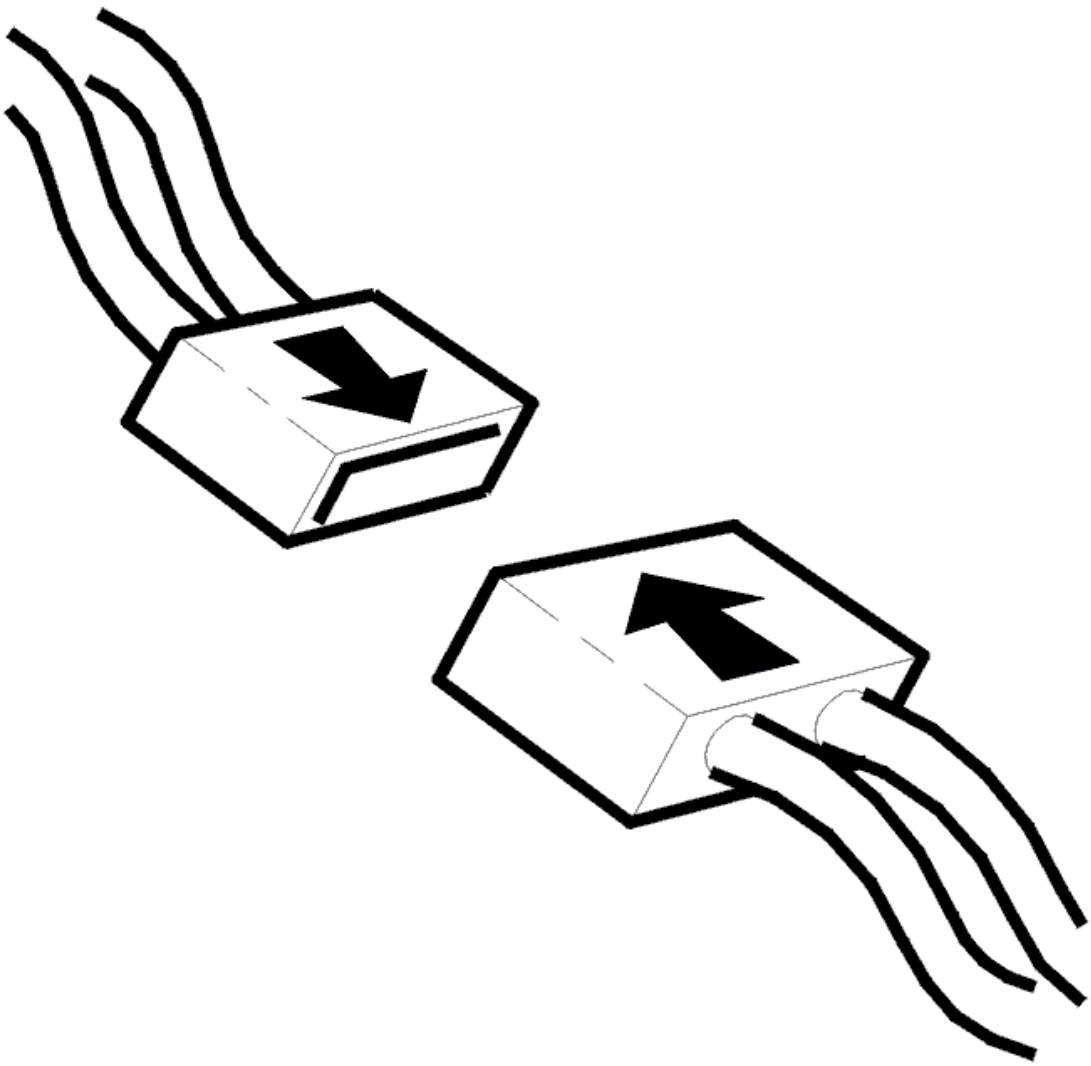


Fig. 427: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reconnect the connectors, reinstall components etc.
- Raise the car so that the drive wheels are unimpeded.
- Start the car.
- Move the gear selector to position D and accelerate so that the speed exceeds 50 km/h.
- Brake the wheels and let the engine run at idling speed without touching the accelerator pedal (AP). The neutral check should display "Active" status (this may take up to 30 seconds).
- Brake the wheels, move the gear selector to position D. Carefully depress the accelerator and check that the neutral check changes to the "Inactive" status.

  Check that the function operates in gear positions 4, 3 and 2.

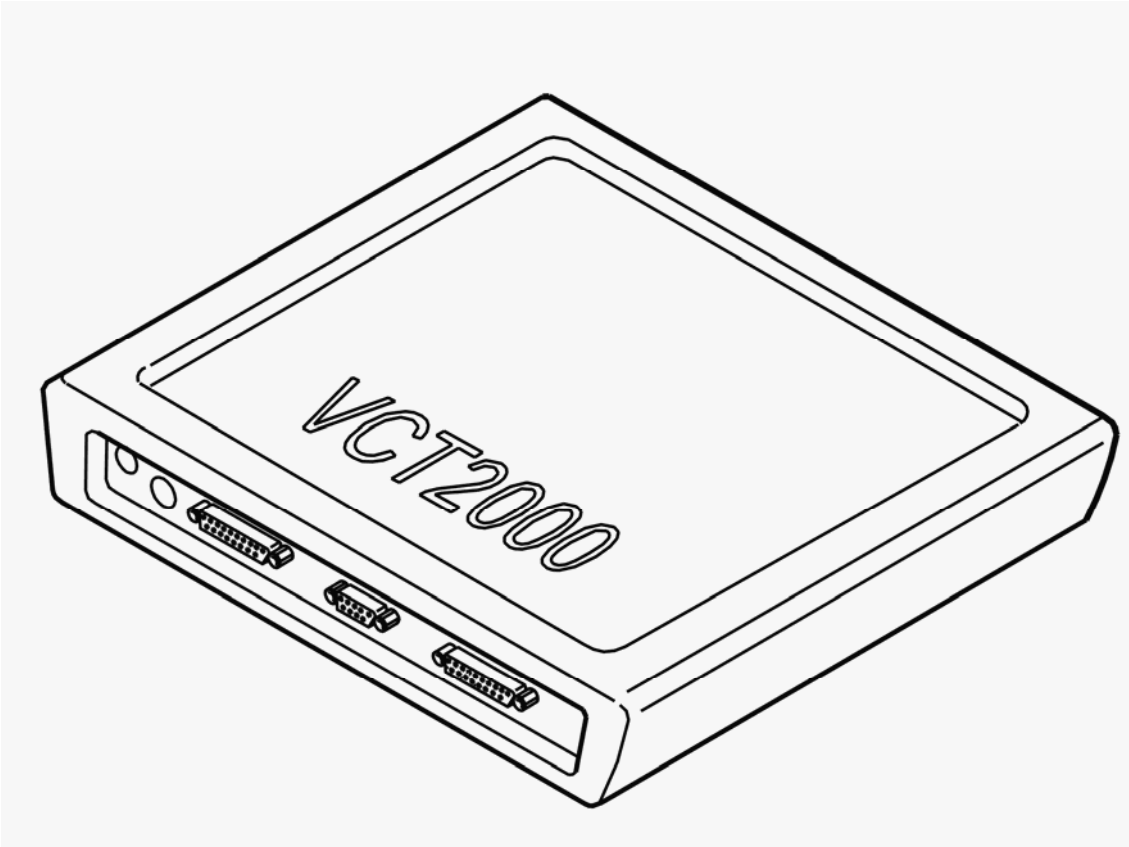


Fig. 428: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is transmission function OK ?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-012C: NEUTRAL CHECK. THE ENGINE SPEED (RPM) OSCILLATES (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

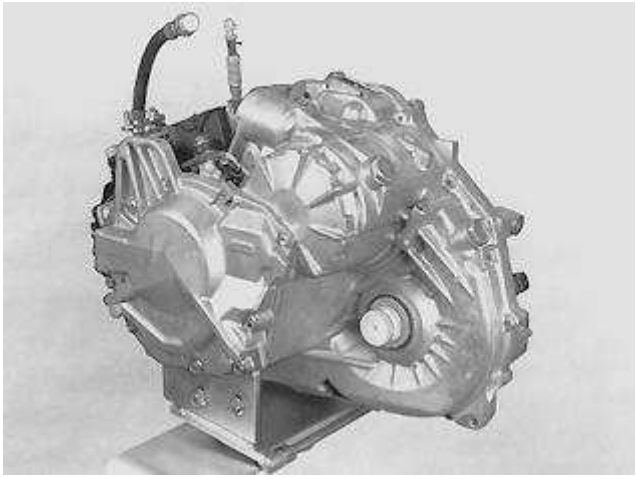


Fig. 429: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

The driving section of the transmission is disengaged when certain conditions are met:

- Stationary
- Engine idling
- Stop pedal depressed
- Gear position D, 3 or 4.

The function decreases fuel consumption and vibration from the transmission when running the engine at idle speed.

Diagnostic trouble code (DTC) TCM-012C is stored if the transmission control module (TCM) registers that the engine is juddering or running unevenly when engaging clutch C1.

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Solenoid SLS jammed in the ON position
- Internal fault in the transmission
- Internal fault in the control module.

Fault symptom[s]

- General orange warning lamp lit

- The engine speed (RPM) oscillates
- No lock-up function
- Malfunction indicator lamp (MIL) lit.

THE-ENGINE: SPEED (RPM) OSCILLATES

CHECKS

CHECKING THE NEUTRAL CHECK

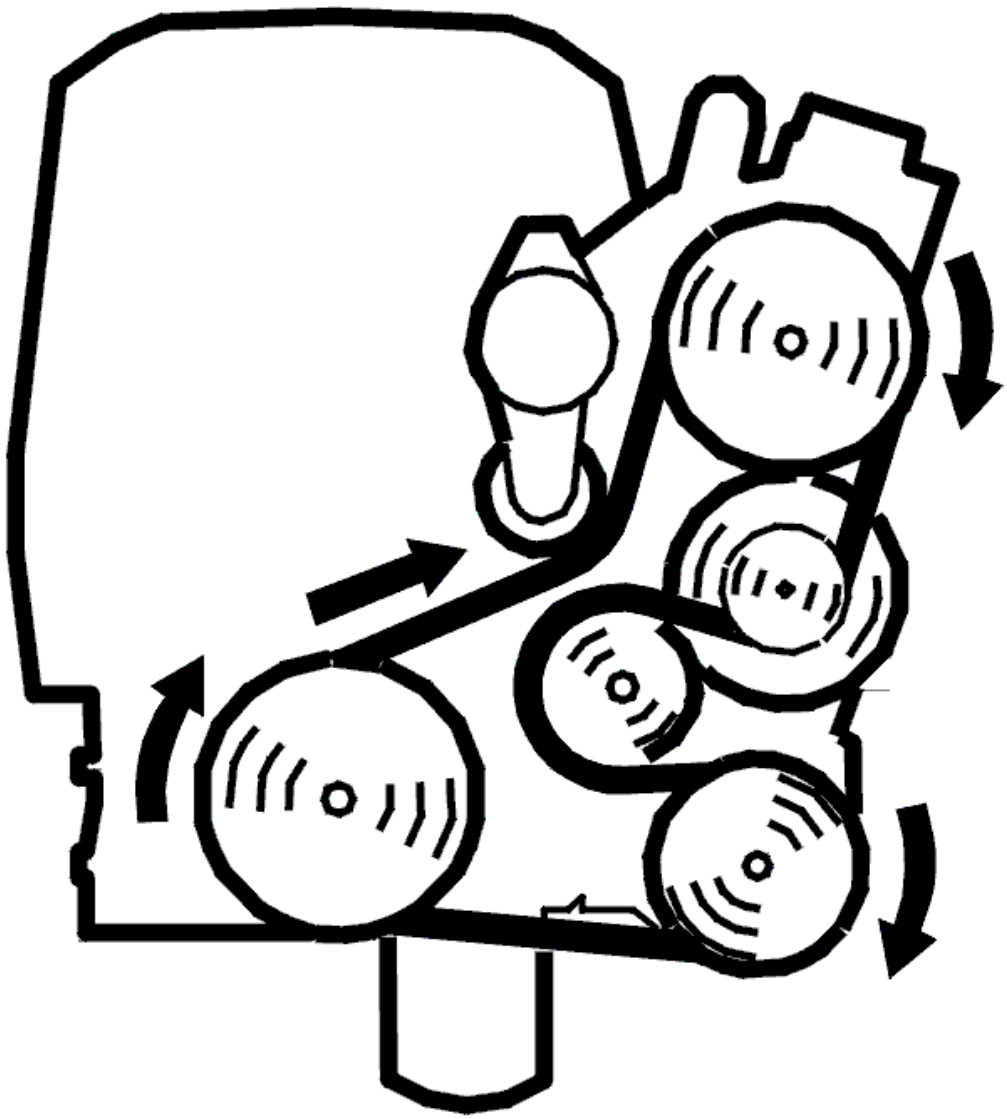


Fig. 430: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the transmission connectors and the control module connector. Check for contact resistance and

oxidation. See **CONTACT RESISTANCE AND OXIDATION**

- Reconnect the connectors, reinstall components etc.
- Raise the car so that the drive wheels can rotate freely
- Start the car
- Move the gear selector to position D. Accelerate so that the speed exceeds 50 km/h
- Brake the wheels and let the engine run at idling speed without touching the accelerator pedal (AP). The neutral check must display the status as "Active" (this may take up to 30 seconds)
- Brake the wheels. Move the gear selector to position D. Carefully depress the accelerator. Check that the neutral check changes to the "Inactive" status.

  The engine speed (RPM) should be even when transferring from Active to Inactive status.

  Check that the function operates in gear positions 4, 3 and 2.

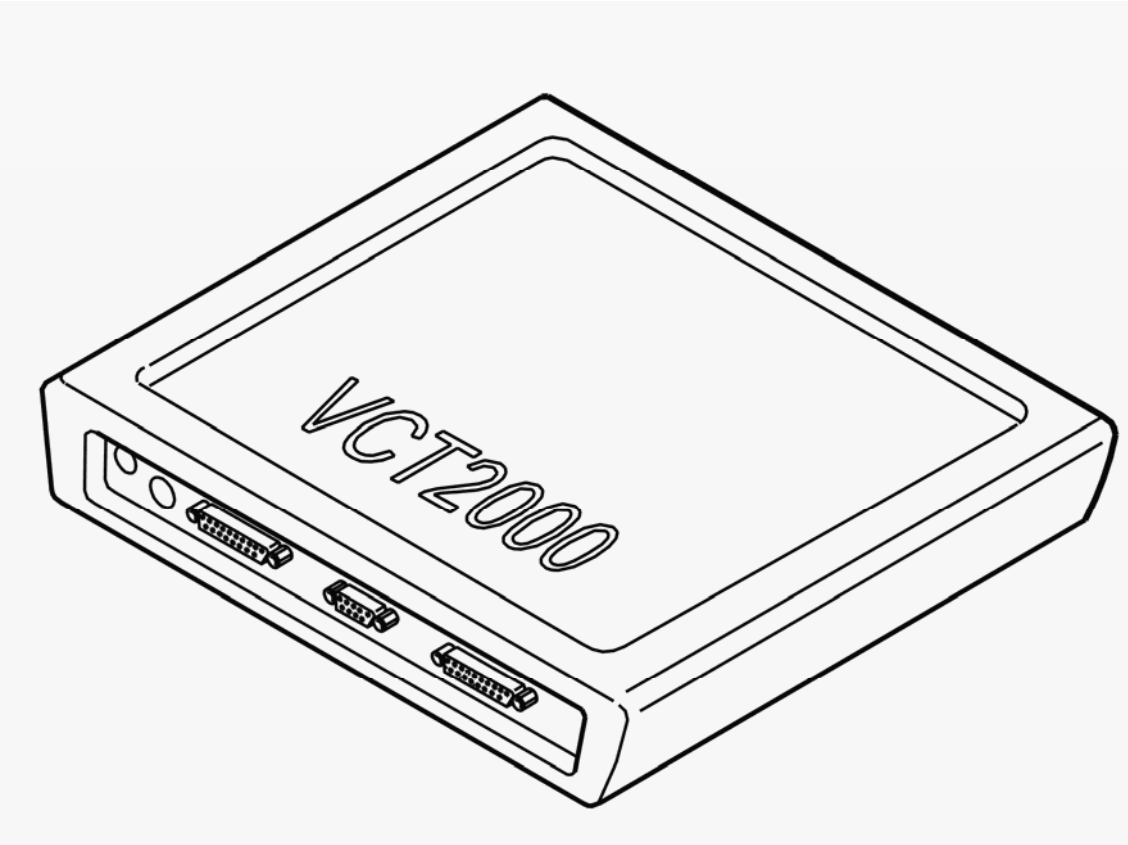


Fig. 431: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function of the transmission OK?

- **YES**

  Refer to **TEST DRIVING**

- **NO**

  Refer to **CHECKING SOLENOID SLT**

CHECKING SOLENOID SLT

NOTE: The transmission must not be colder than room temperature when activated.

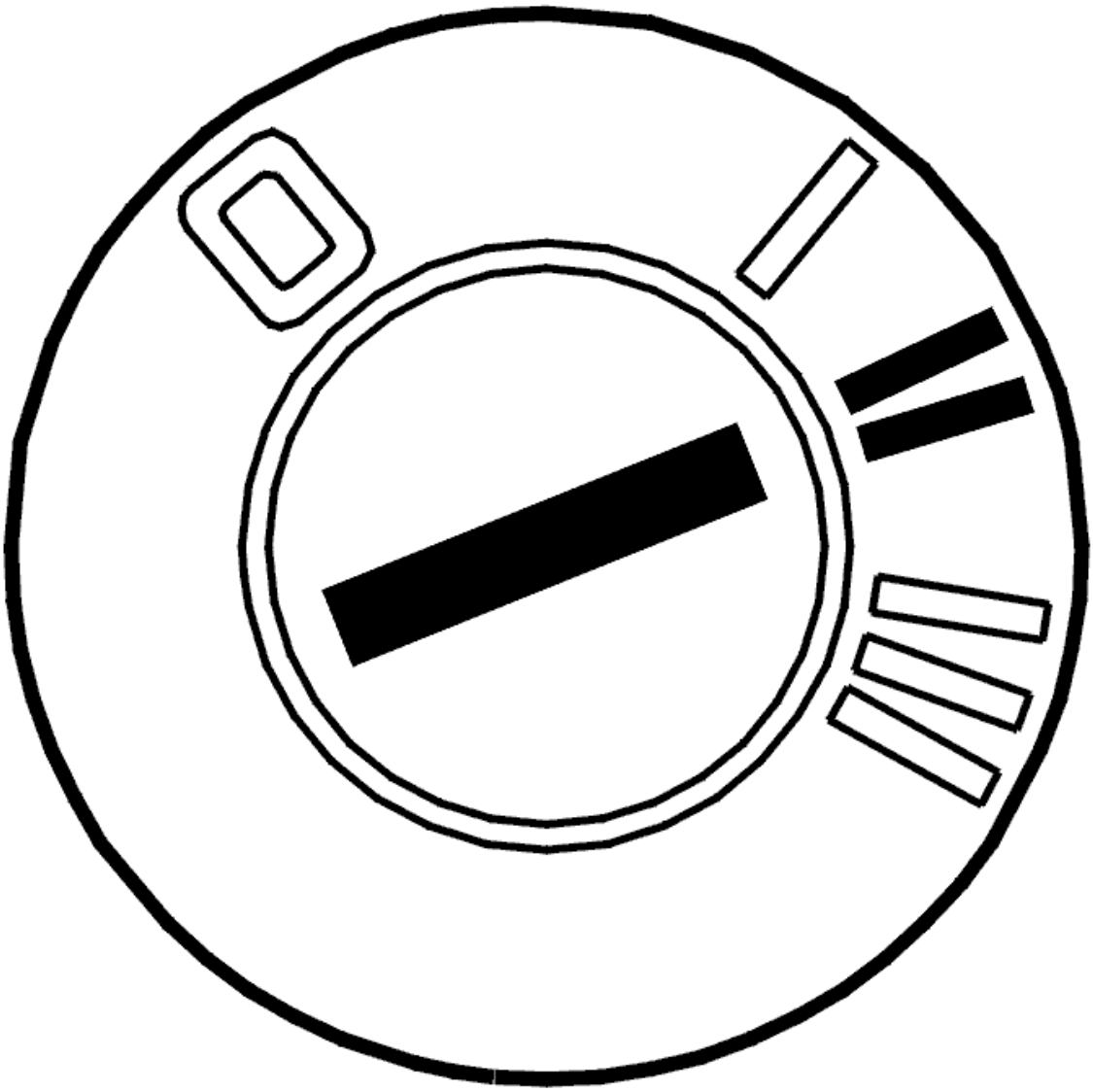


Fig. 432: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLT.

  The solenoid must "click" on activation (use a stethoscope to hear the sound more clearly) and the current

must oscillate between 0 and 1 A. There is a mechanical fault if no "clicking" noise is heard.

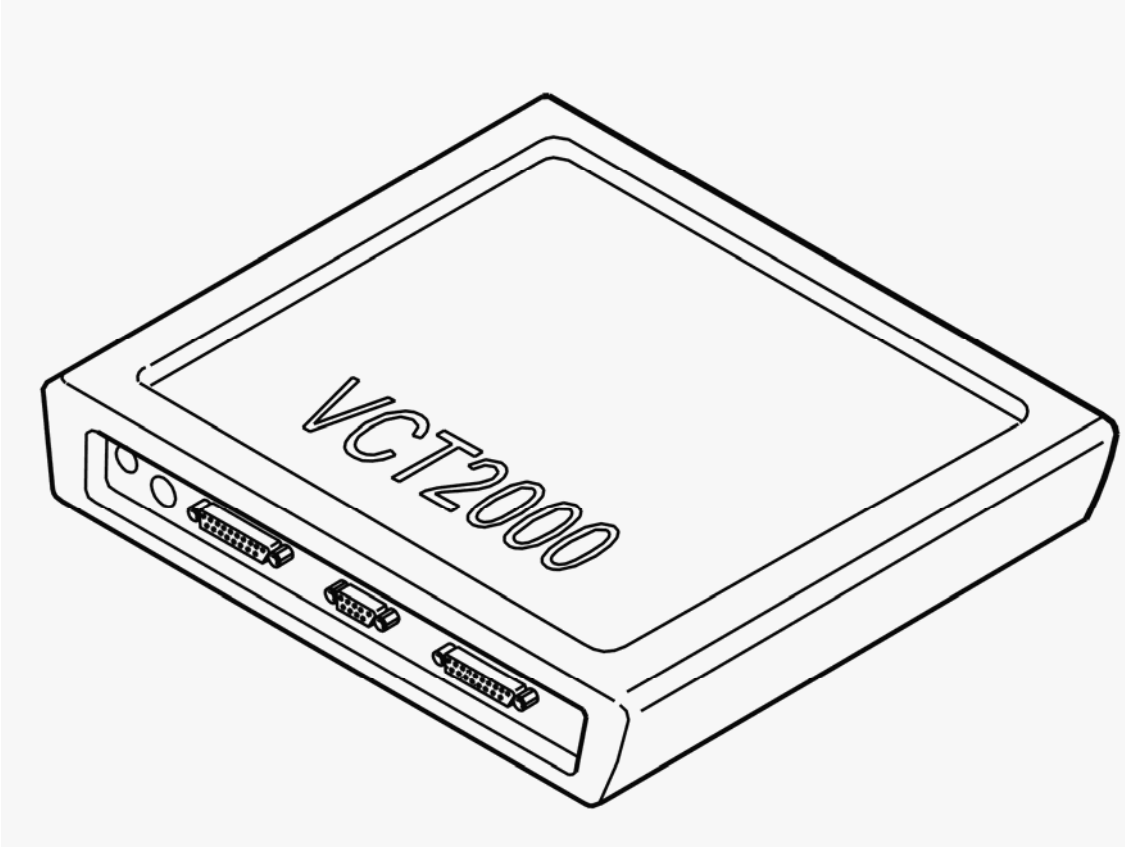


Fig. 433: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

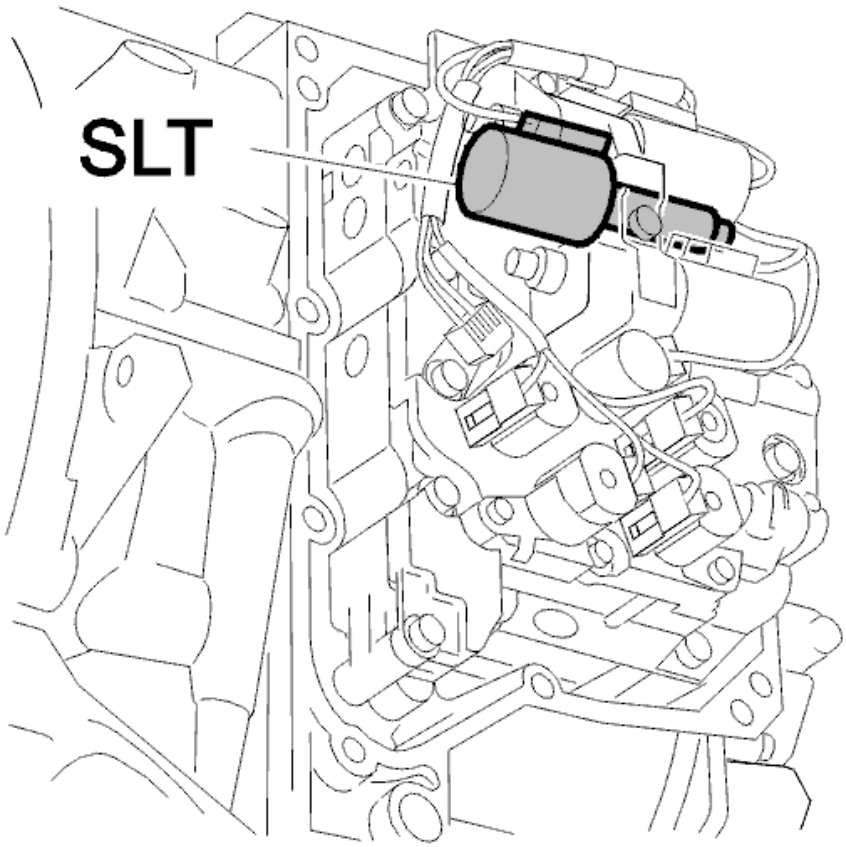


Fig. 434: Identifying Line Pressure Solenoid
Courtesy of VOLVO CARS CORPORATION

Was solenoid SLT OK?

- **YES**

  Refer to **TEST DRIVING**

- **NO**

  Refer to **REPLACING THE TRANSMISSION CONTROL SYSTEM**

TEST DRIVING

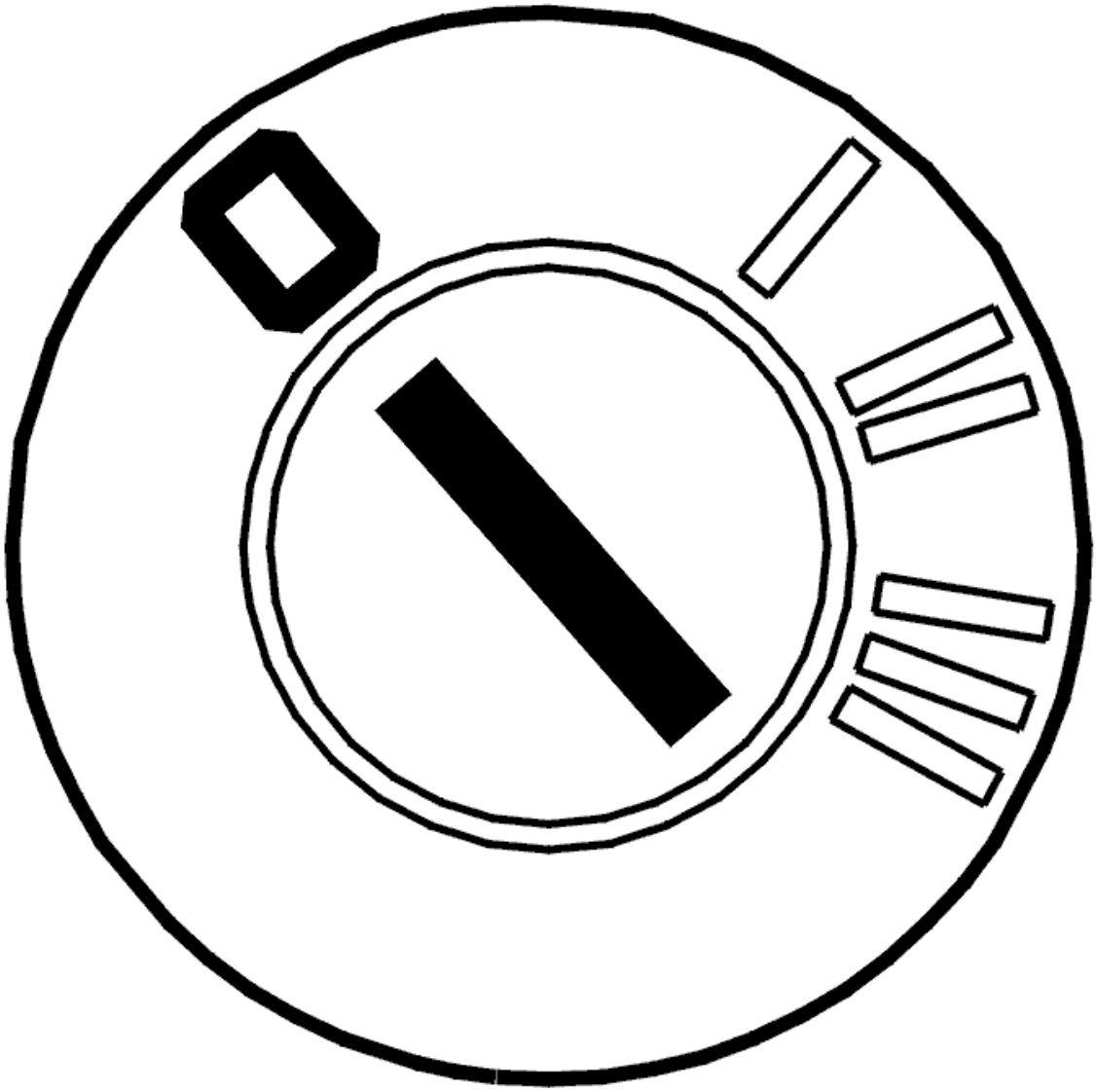


Fig. 435: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See **VERIFICATION**.

Check that the shifts and the neutral check function without any problems.

Other information

- To access the transmission connectors, see **CONNECTORS, TRANSMISSION, DISCONNECTING / CONNECTING**
- To access the control module connector, see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

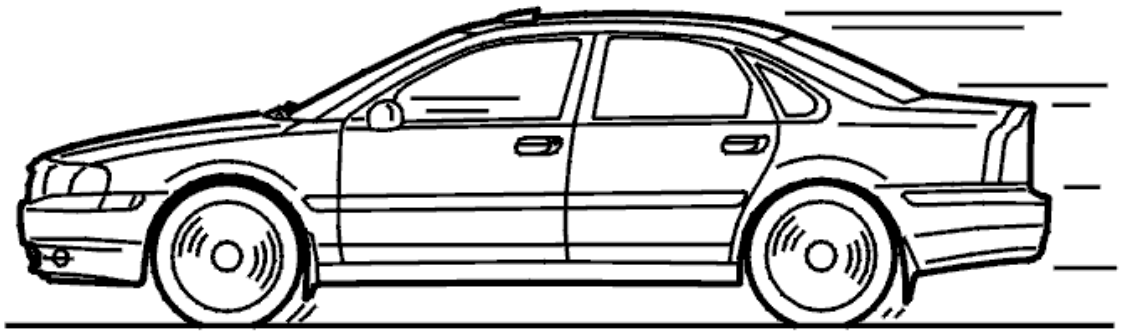


Fig. 436: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the transmission operating correctly?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **REPLACING THE TRANSMISSION CONTROL SYSTEM**

REPLACING THE TRANSMISSION CONTROL SYSTEM

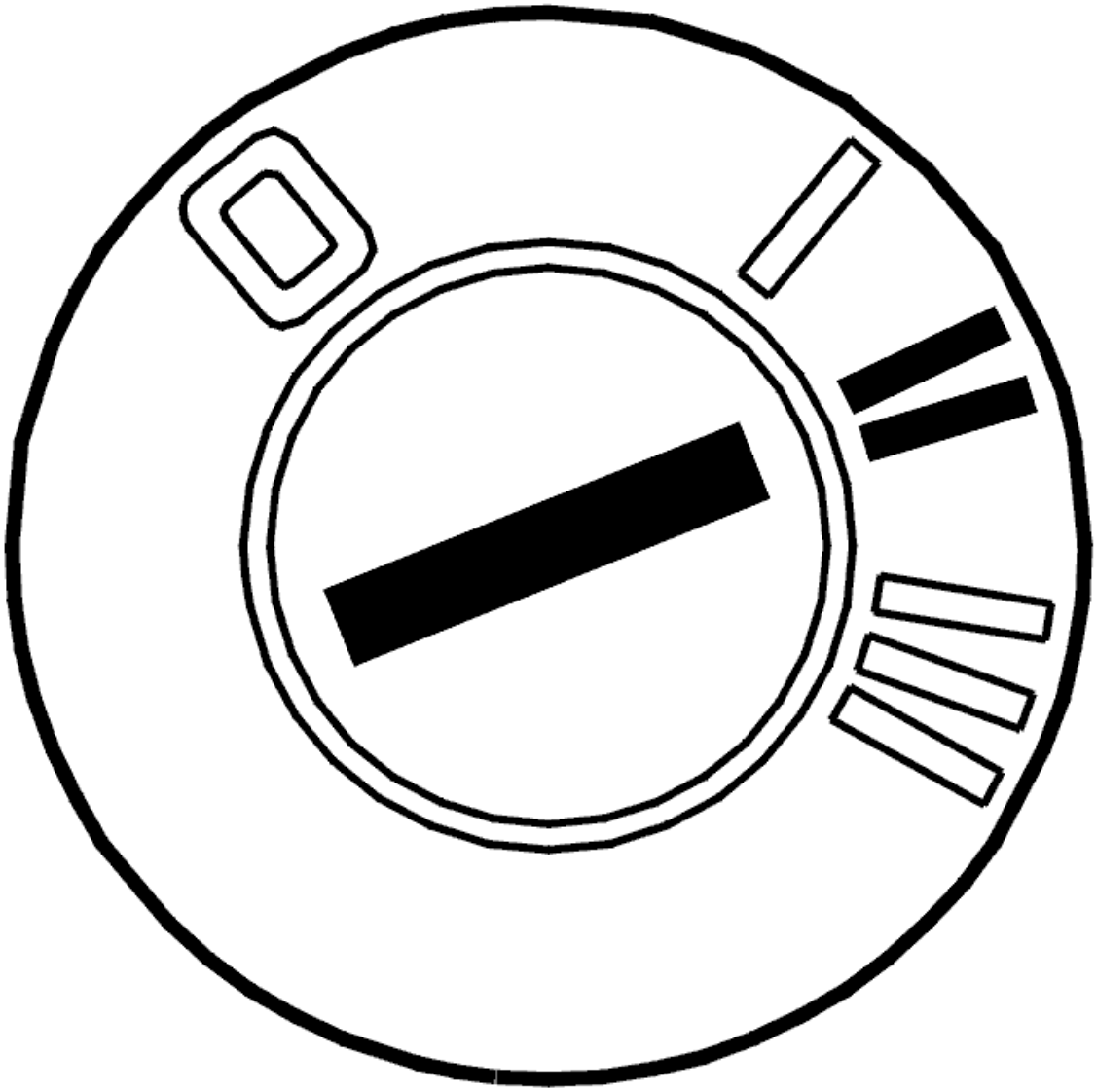


Fig. 437: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  The transmission control system must be replaced if there is a fault in solenoid SLT. To replace the solenoids and the transmission control system, see **SOLENOID CONTROL SYSTEM, REPLACING** .

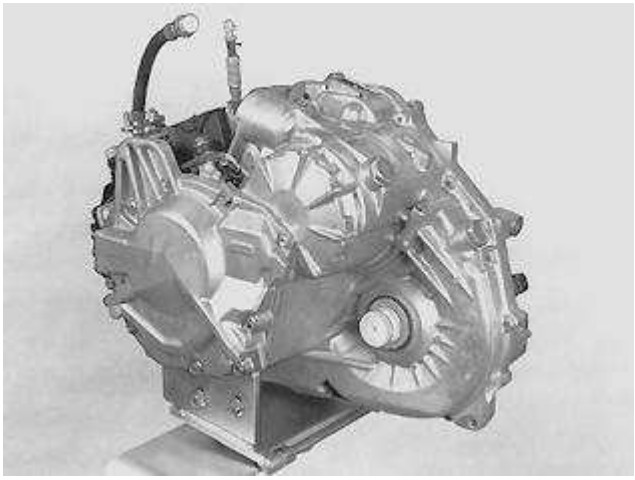


Fig. 438: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

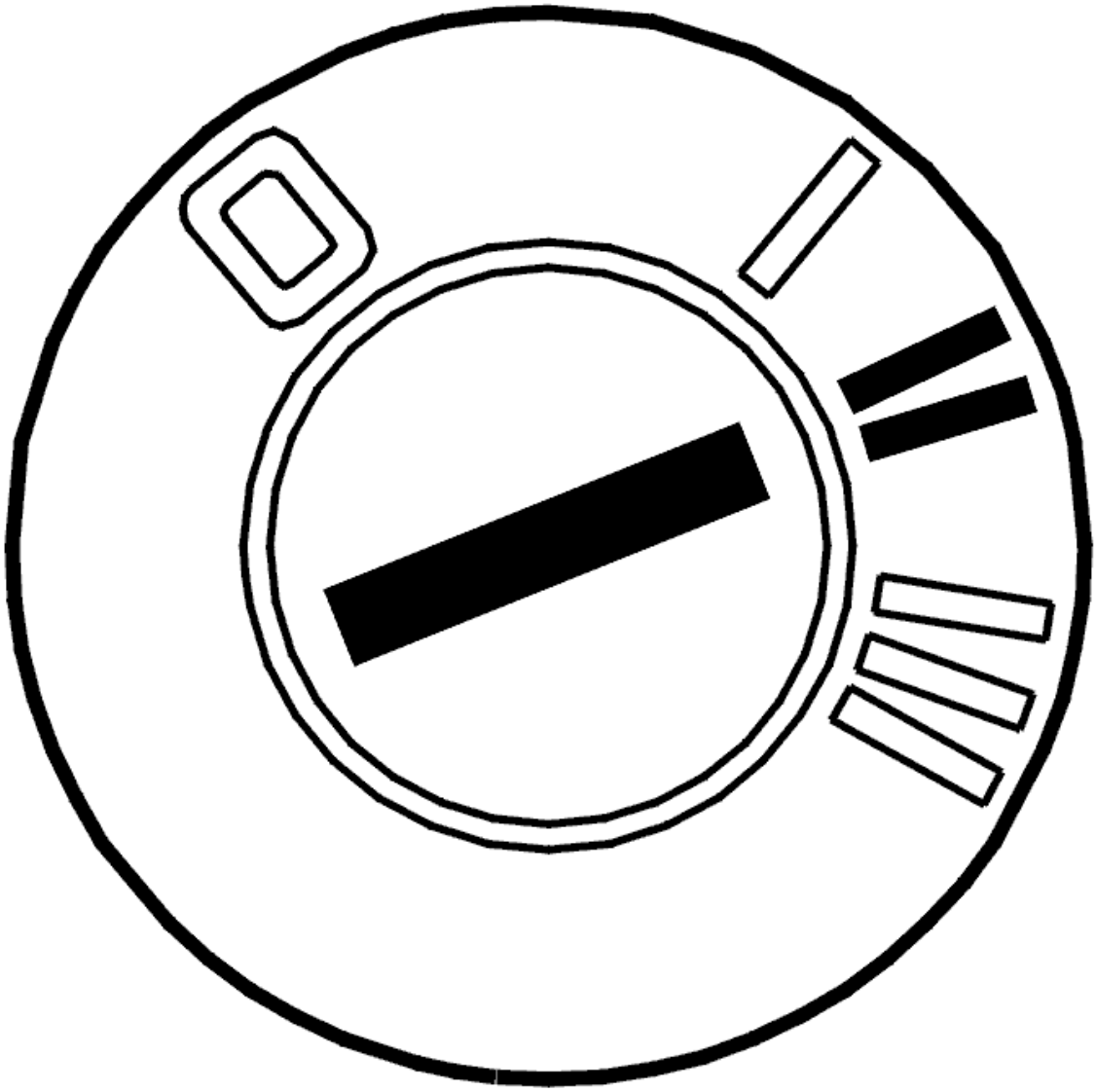


Fig. 439: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

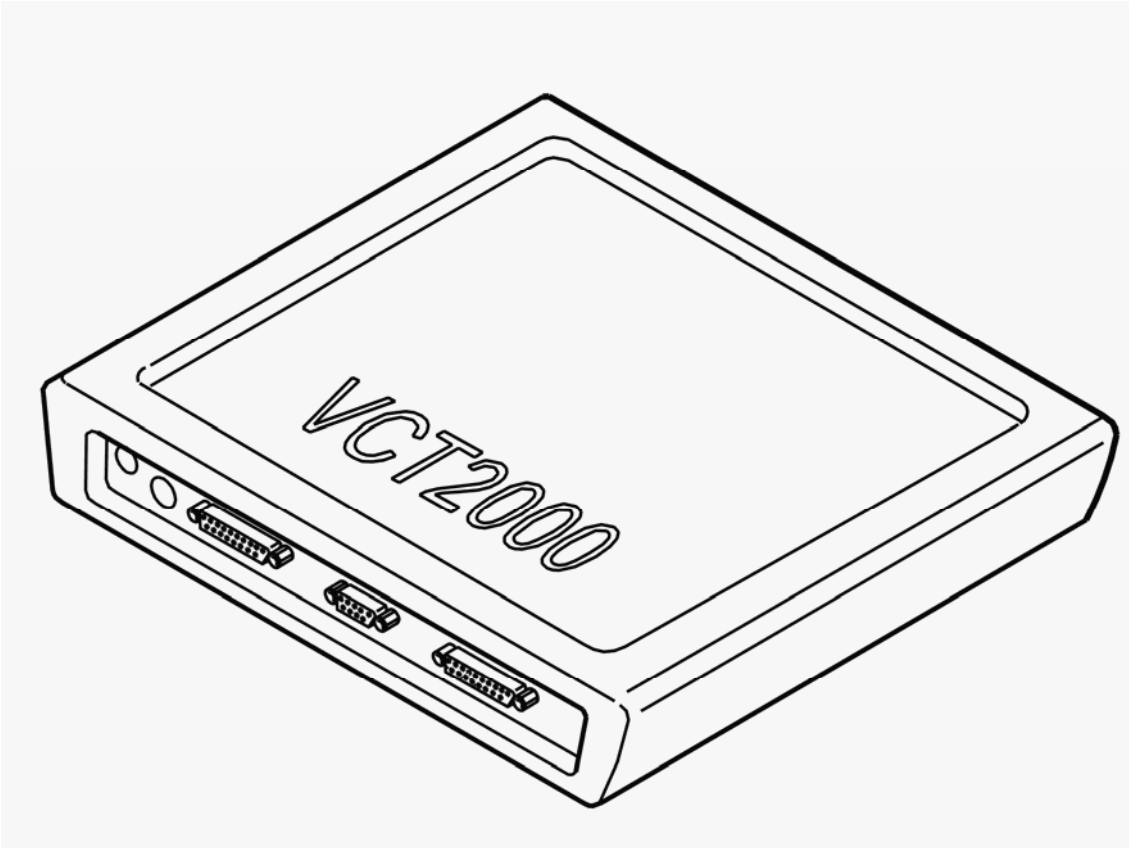


Fig. 440: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

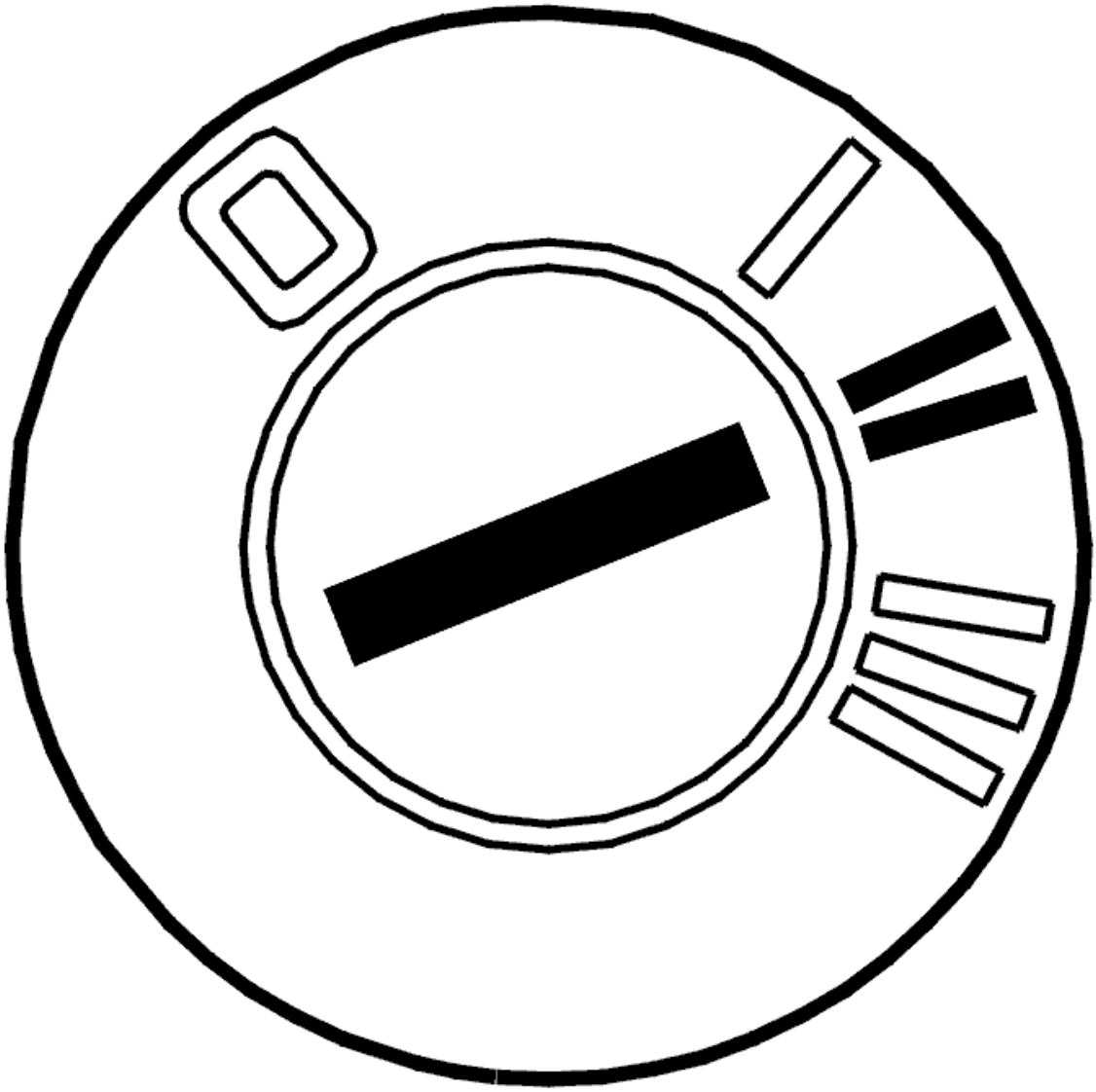


Fig. 441: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

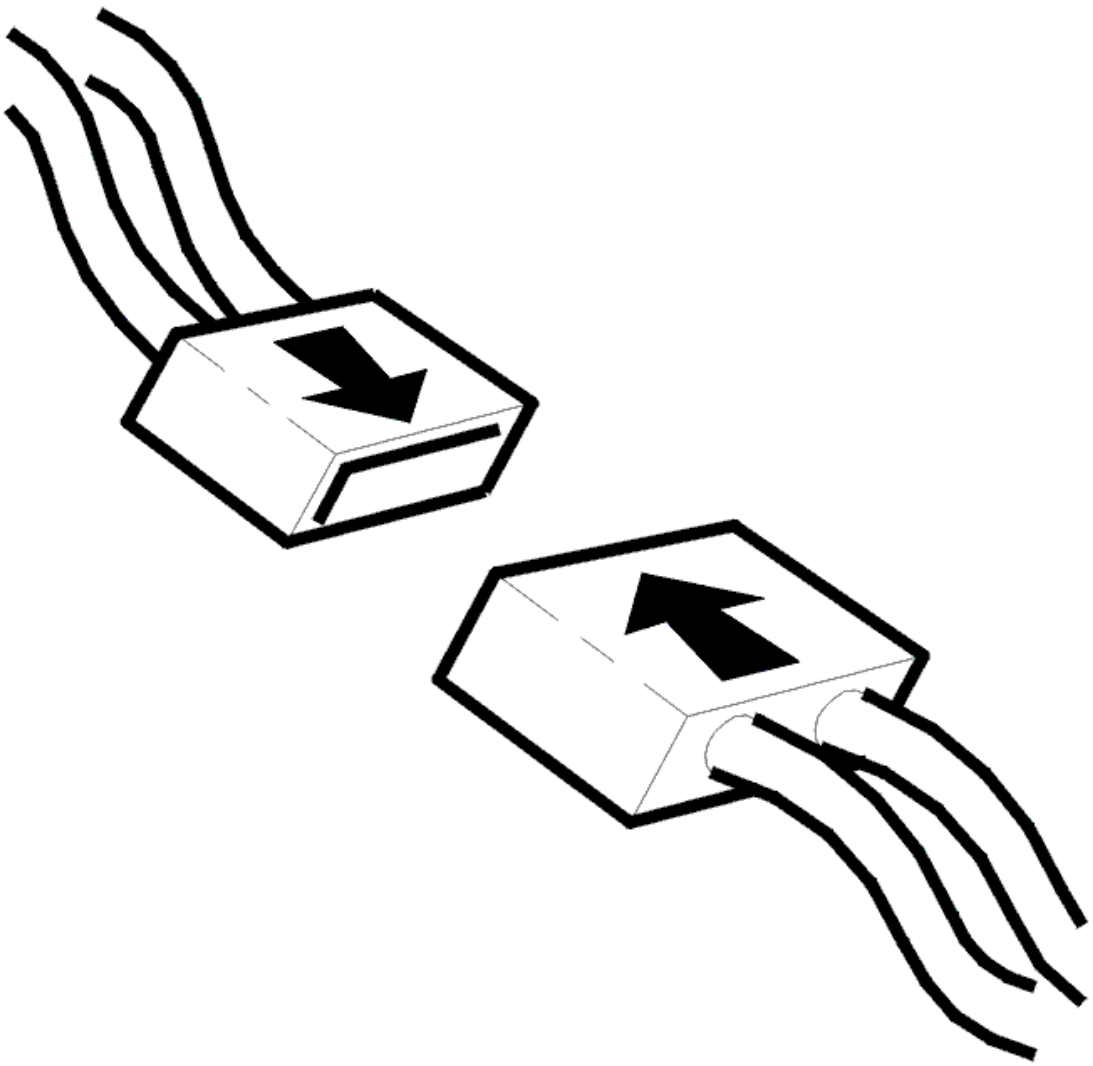


Fig. 442: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reconnect the connectors, reinstall components etc.
- Raise the car so that the drive wheels are unimpeded.
- Start the car.
- Move the gear selector to position D and accelerate so that the speed exceeds 50 km/h.
- Brake the wheels and let the engine run at idling speed without touching the accelerator pedal (AP). The neutral check should display "Active" status (this may take up to 30 seconds).
- Brake the wheels, move the gear selector to position D. Carefully depress the accelerator and check that the neutral check changes to the "Inactive" status.

  Check that the function operates in gear positions 4, 3 and 2.

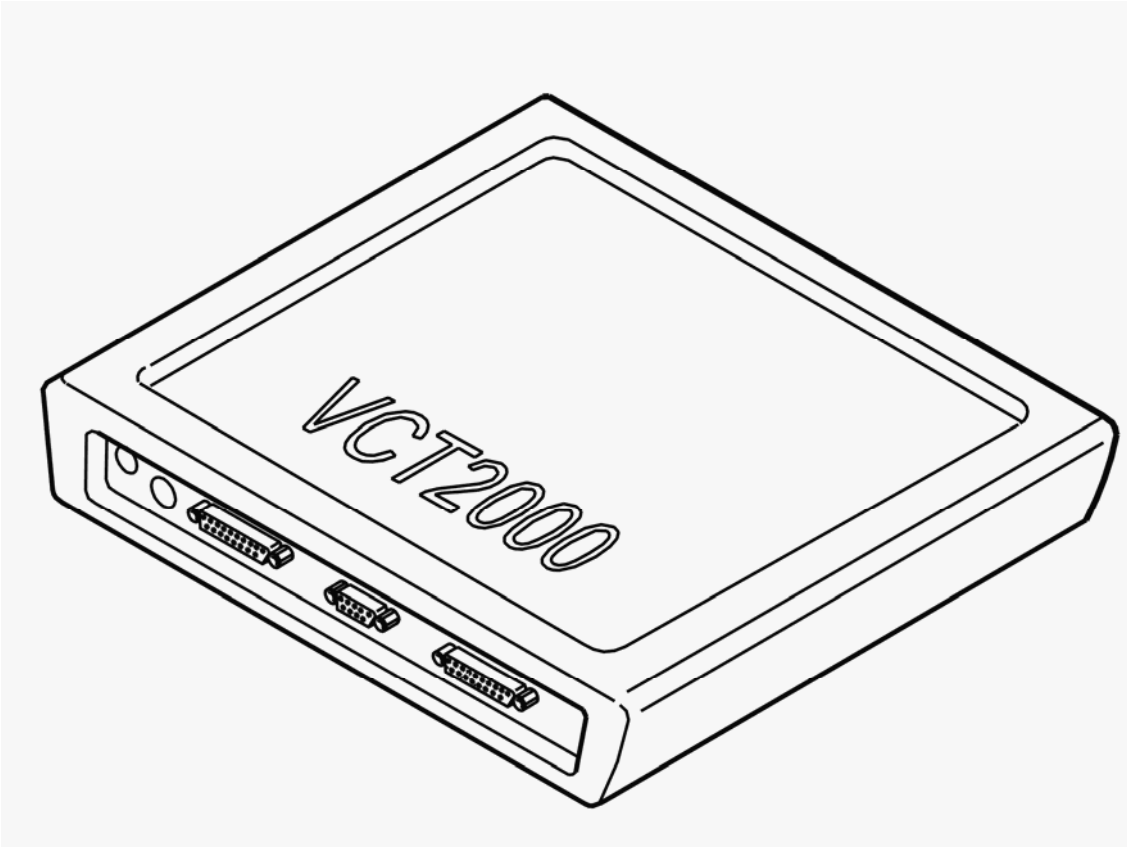


Fig. 443: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is transmission function OK ?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-0350: TRANSMISSION. WRONG TYPE OF TRANSMISSION (4T65 AWD; 2003-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-0350

Condition

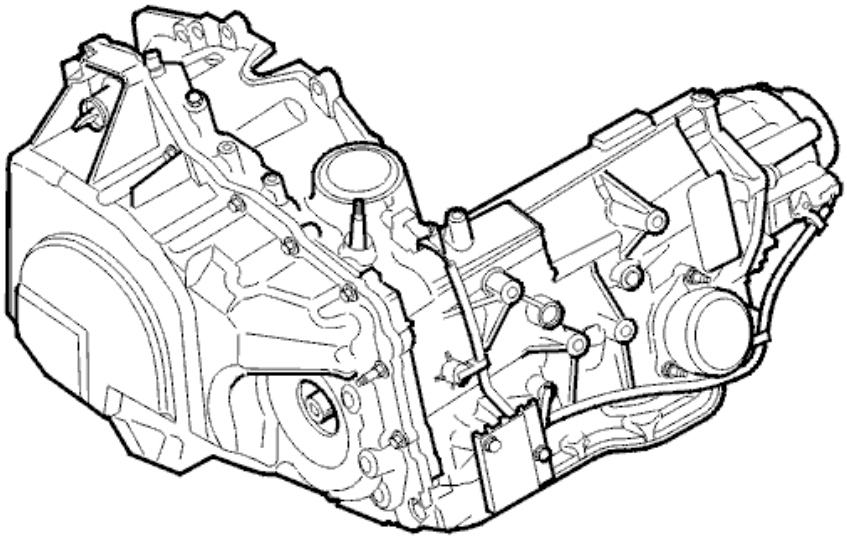


Fig. 444: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Transmissions 4T65EV and 4T65EV-GT have mechanical differences but the same appearance. If a transmission of the wrong type be installed in the car, the transmission control module (TCM) can use the gear ratios to identify that it is the wrong type.

Diagnostic trouble code (DTC) TCM-0350 is stored if the transmission control module (TCM) registers that the wrong type of transmission is installed in the vehicle.

Substitute Value

- None.

Possible Source

- Incorrect transmission in the vehicle.

Fault symptom[s]

- General warning lamp lit.

TCM-E000: CONTROL MODULE COMMUNICATION. FAULTY COMMUNICATION (4T65 AWD; 2005-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-E000

Condition

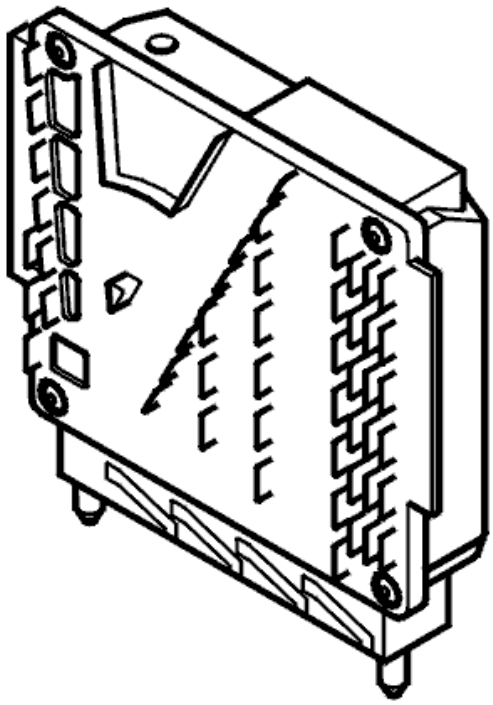


Fig. 445: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The control modules transmit and receive information via a standardized serial communication method - CAN (Controller Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (CAN communication blocked).

NOTE: In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the fault if it is intermittent.

Substitute Value

- Control module shuts itself off ("bus-off").

  HINT: The control module will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

Possible Source

- Short-circuit between the control area network (CAN) wiring
- Open-circuit in the control area network (CAN) wiring
- Damaged pins on Transmission control module (TCM).
- Internal fault in the control module
- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]

- No shifting.
- Text window and warning symbol/Yellow symbol and text message

TCM-E000: CONTROL MODULE COMMUNICATION. FAULTY COMMUNICATION (4T65 AWD; AW50/51 AWD; AW55-50/51SN; 2003-2004)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-E000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-E000**

FAULTY COMMUNICATION

see **FAULTY COMMUNICATION**

TCM-E000: CONTROL MODULE COMMUNICATION. FAULTY COMMUNICATION (AW50/51 AWD; AW55-50/51SN; 2005-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-E000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-E000**

TCM-E003: CONFIGURATION FAULT. FAULTY CONFIGURATION (4T65 AWD; 2005-2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-E003

Condition

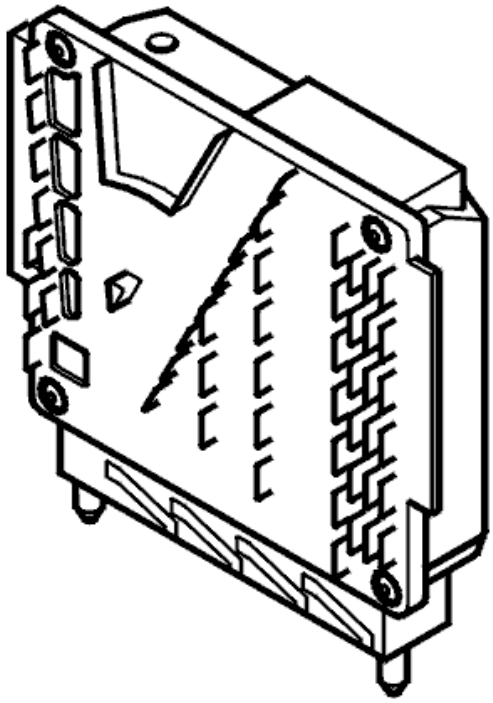


Fig. 446: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The control module compares its configuration ID with the signal configuration transmitted on the control area network (CAN) by the central electronic module (CEM). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the control module and the central electronic module (CEM) is interrupted.

NOTE: In the event of open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the control module responds to the diagnostic command, however normal control area network (CAN) communication does not work. ("Expulsion mode")

Substitute Value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible Source

- Faulty control area network (CAN) configuration ID. (The node is not intended for this car, for example a used control module with different software/hardware.)

- Open-circuit in the control area network (CAN) wiring between the control module and the central electrical module (CEM).

Fault symptom[s]

- No shifting.

TCM-E003: CONFIGURATION FAULT. FAULTY CONFIGURATION (4T65 AWD; AW50/51 AWD; AW55-50/51SN; 2003-2004)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-E003

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-E003**

TCM-E003: CONFIGURATION FAULT. FAULTY CONFIGURATION (AW50/51 AWD; AW55-50/51SN; 2005-2007)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-E003

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-E003**

TCM-P021868: TRANSMISSION FLUID OVERTEMPERATURE CONDITION. ALGORITHM BASED FAILURES. EVENT INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P021868

Condition

NOTE: This diagnostic trouble code (DTC) status is an event controlled diagnostic trouble code (DTC). An event controlled diagnostic trouble code (DTC) does not mean that there is a fault in the control module when it is active, but is designed as information.

The oil temperature sensor provides the Transmission control module (TCM) with a signal that is used, among other things, for the temperature controlled lock-up and engagement high temperature program functions.

If the Transmission control module (TCM) registers that oil temperature in the transmission is too high, a signal is transmitted to the Engine control module (ECM) to reduce the engine's torque. This is to protect the gear box from too high load, which can result in internal mechanical faults.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The gear box oil temperature has been greater than 135 °C for longer than 1 minute.
- The output speed from the gearbox exceeds 5726 RPM (approximately 140 km/h).

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Normal driving.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

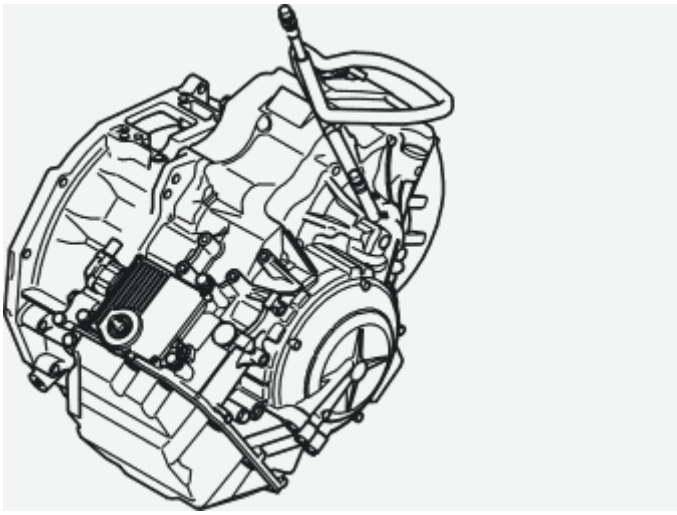


Fig. 447: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- The engine limits the torque until the gear box oil temperature has dropped below a certain level.

Possible Source

- The gear box oil has had too high a temperature for too long.

Fault symptom[s]

- Message in information display

FAULT-TRACING INFORMATION

INFORMATION

There is no fault-tracing for this diagnostic fault code (DTC).

For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

TCM-P021868: TRANSMISSION FLUID OVERTEMPERATURE CONDITION. ALGORITHM BASED FAILURES. EVENT INFORMATION (B6324S5, TF-

80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P021868

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P021868**

FAULT-TRACING INFORMATION

INFORMATION

There is no fault-tracing for this diagnostic fault code (DTC).

For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

TCM-P050000: VEHICLE SPEED SENSOR A. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P050000

Condition

The output speed sensor is located within the transmission. The transmission control module (TCM) uses the signal to calculate the RPM of the transmission output shaft. The signal is used to compare the outgoing RPM with the incoming RPM on the transmission and with vehicle speed. The brake control module transmits information on speed via the CAN network.

The control module uses these signals to calculate shifting time points. The RPM and vehicle speed data are also used to adjust system pressure and reduce engine torque when shifting. The result is smooth gear-shifting.

The information is also used to control the function.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The voltage in the circuit of the transmission output speed sensor is too low.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Normal driving.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

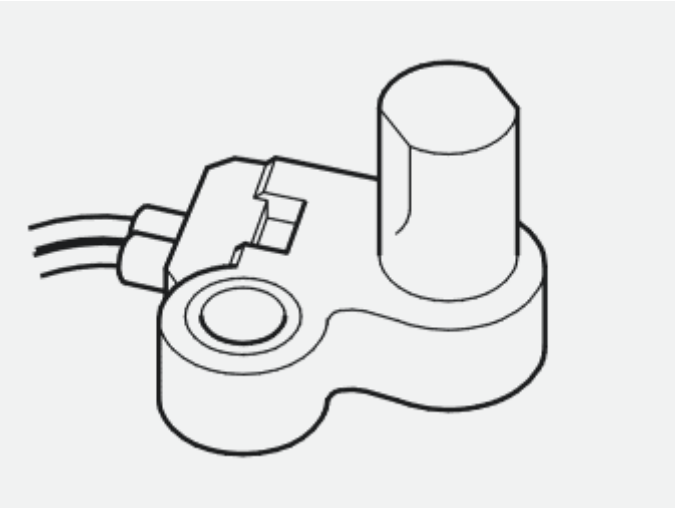


Fig. 448: Identifying Vehicle Speed Sensor
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- The transmission control module (TCM) uses the speed signal from the brake control module (BCM).
- If the brake control module also sends a signal that the speed signal is incorrect, the auxiliary program **Emergency mode 1 will become** active.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

- Neutral control function is blocked.
- function is blocked.

Possible Source

- Break in circuit for output speed sensor.
- Power supply to output speed sensor short-circuited to ground.
- Transmission output speed sensor not working.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- No lock-up
- Rough gear shift
- No gear shift

FAULT-TRACING

CHECKS

CHECKING THE FUNCTION

WARNING: Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

CAUTION: On vehicles with four-wheel-drive, the tests should be carried out with the vehicle raised so that all four wheels can rotate freely with attachments far out on the link arms so that the drive shafts are not damaged.

NOTE: If the vehicle has TRACS or TC (STC, DSTC), this function must be disabled. This is carried out by removing the fuse for the brake system pump motor in the engine compartment relay and fusebox. Note that this will generate diagnostic trouble codes in the brake control module (BCM). These diagnostic trouble codes must be erased before the vehicle is returned to the customer.

Fig. 449: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Raise the vehicle so that the drive wheels can rotate freely.
- Start the engine. Allow the engine to idle.
- Shift the gear selector to position D so that the drive wheels begin to rotate.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

Read off the transmission output speed.

Check that the transmission speed is updated.

If the transmission input speed updates correctly it means that the fault was present previously but is not active now. There is an intermittent fault.

If the transmission input speed does not update correctly it means that the fault is permanent.

Fig. 450: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE WIRING AND SENSORS**

CHECKING THE WIRING AND SENSORS

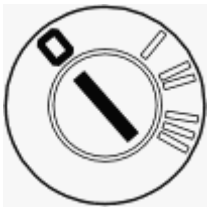


Fig. 451: Identifying Ignition In Off Position
Courtesy of VOLVO CARS CORPORATION

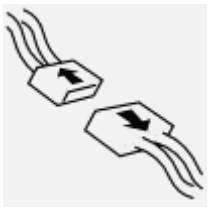


Fig. 452: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Disconnect the transmission connector.
- Transmission control module (TCM) disconnected.

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  HINT: Check the transmission speed sensor. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

  If a faulty value is measured in the test above, open the control system for the transmission and fault trace the wiring and components.

  If the wiring is faulty, replace the cable harness.

If the sensor is faulty, replace the transmission.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access connector B:**TRANSMISSION CONTROL MODULE (TCM)**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**

Select one of the following options

1. Transmission replaced.

   Refer to **VERIFICATION**

2. Cable harness replaced.

   Refer to **RESETTING ADAPTATION**

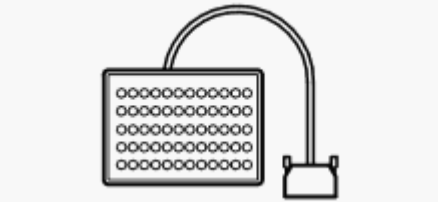


Fig. 453: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

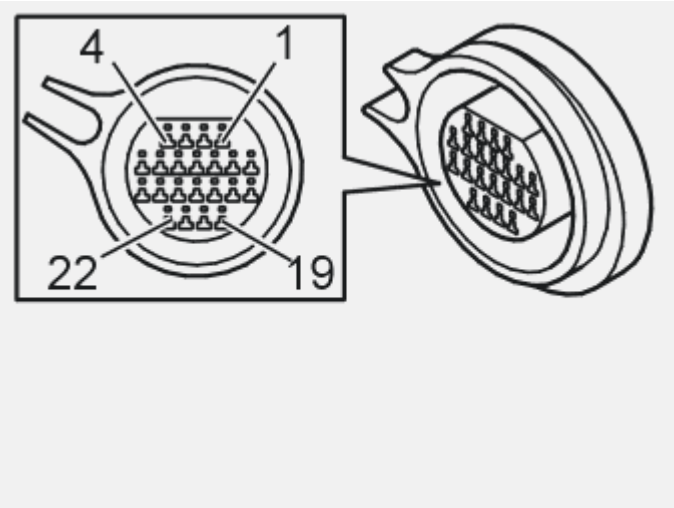


Fig. 454: Identifying 22--Pin Connector
Courtesy of VOLVO CARS CORPORATION

INFORMATION

FAULT-TRACING INFORMATION

In case of this defect, troubleshooting is not followed by verification.

The information can be displayed again or the fault-tracing for this fault can be interrupted.

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

CAUTION: On vehicles with four-wheel-drive, the tests should be carried out with the vehicle raised so that all four wheels can rotate freely with attachments far out on the link arms so that the drive shafts are not damaged.

WARNING: Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

NOTE: If the vehicle has TRACS or TC (STC, DSTC), this function must be disabled. This is carried out by removing the fuse for the brake system pump motor in the engine compartment relay and fusebox. Note that this will generate diagnostic trouble codes in the brake control module (BCM). These diagnostic trouble codes must be erased before the vehicle is returned to the customer.

Fig. 455: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

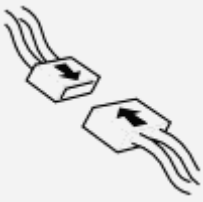


Fig. 456: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Raise the vehicle so that the drive wheels can rotate freely.
- Start the engine. Allow the engine to idle.
- Shift the gear selector to position D so that the drive wheels begin to rotate.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

- Read off the transmission output speed.

Check that the transmission speed is updated.

NOTE: Diagnostic trouble codes may be stored in the brake control module (BCM) when the back wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) after fault-tracing.

Fig. 457: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 458: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 459: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P050000: VEHICLE SPEED SENSOR A. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P050000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P050000**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P050000: SPEED SENSOR A. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P050000

Condition

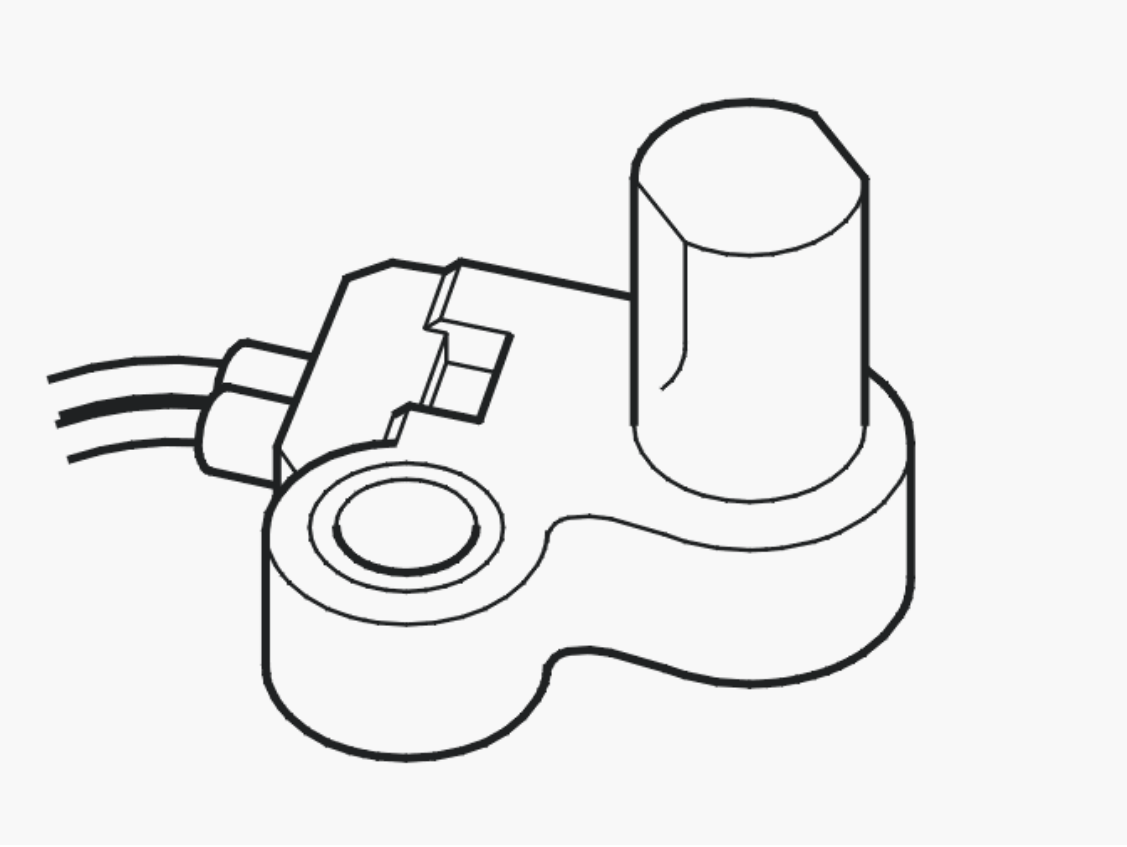


Fig. 460: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The output speed sensor is located inside the gearbox. The transmission control module (TCM) calculates the speed of the gearbox output shaft based on the signal. The signal is used to compare the output speed with the input speed of the gearbox and with the vehicle speed. The speed information is put on the CAN network by the brake control module (BCM).

With the help of these signals, the control module can calculate the shifting points. RPM and speed information affect the adjustment of the system pressure and the reduction in engine torque for gear changing. This results in smoother gear changes.

The information is also used to control the lock-up function. If the control module registers that the voltage in the circuit to the gearbox output speed sensor is too low, a diagnostic trouble code (DTC) will be generated.

The diagnostic trouble code (DTC) can be diagnosed when driving normally.

Substitute Value

- The transmission control module (TCM) uses the speed signal from the brake control module (BCM).
- If the brake control module (ECM) also sends a signal that the speed signal is incorrect, the auxiliary program **Emergency mode 1** will become active.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

- The neutral check function is blocked.
- Lock-up function is blocked.

Possible Source

- Break in circuit for output speed sensor.
- Power supply to output speed sensor short-circuited to ground.
- Gearbox output speed sensor not working.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit (if Emergency mode 1).
- General warning lamp lit.
- No lock-up function.
- Harsh gear changing (if Emergency mode 1).
- No gear changing (if Emergency mode 1).

FAULT TRACING TCM-P050000

CHECKS

CHECKING THE FUNCTION

WARNING: Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

CAUTION: On vehicles with four-wheel-drive, the tests should be carried out with the vehicle raised so that all four wheels can rotate freely with attachments far out on the link arms so that the drive shafts are not damaged.

NOTE: If the vehicle is equipped with TRACS or traction control (STC, DSTC) this function must be deactivated. Remove the fuse for the pump motor for the brake system in the relay/fusebox in the engine compartment. Note that this will store a diagnostic trouble code (DTC) in the brake control module (BCM). These diagnostic trouble codes (DTC) must be erased before delivery to the customer.

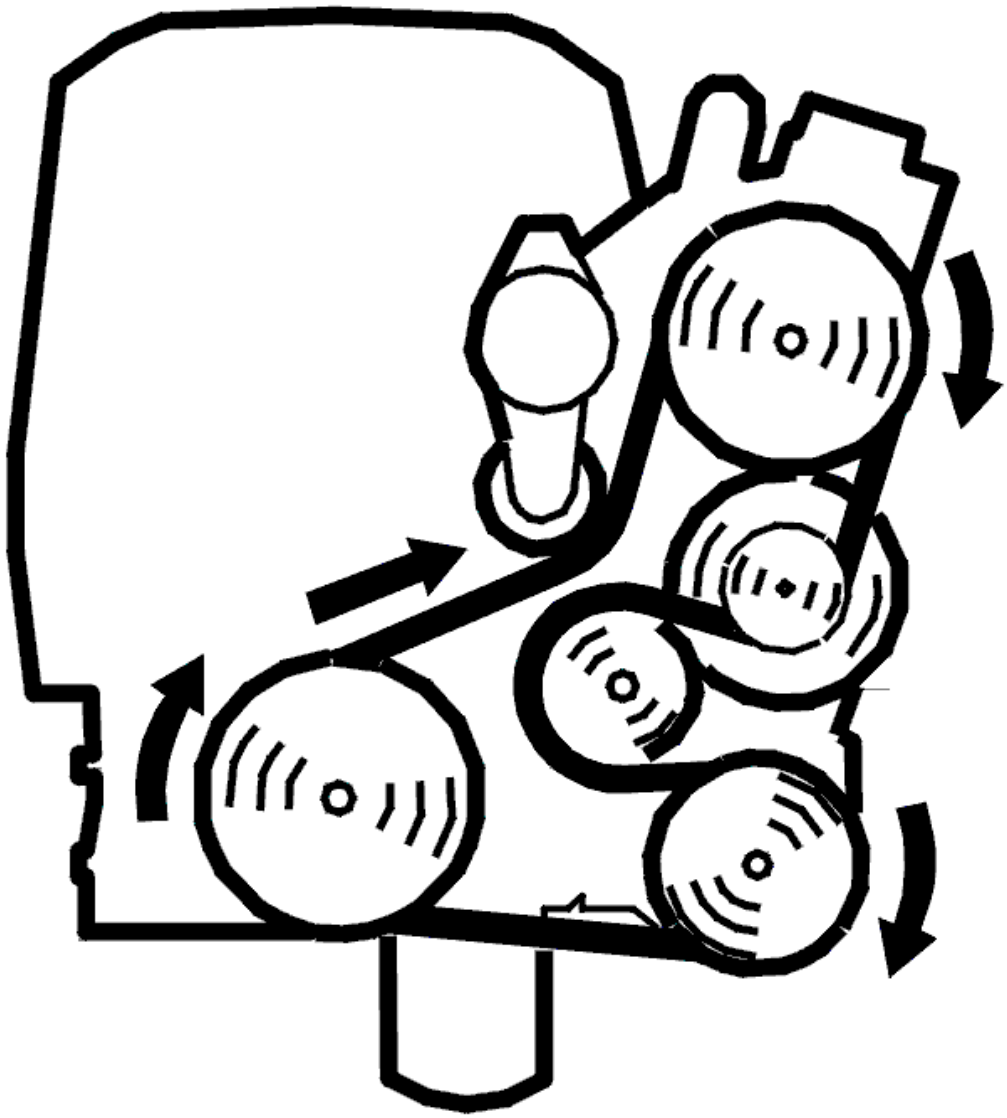


Fig. 461: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Raise the vehicle so that the drive wheels hang freely.
- Start the engine and allow it to idle.
- Put the gear selector in position D so that the drive wheels start to rotate.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

- Read off the gearbox output speed.

  Read off the transmission input speed.

  If the transmission input speed updates correctly it means that the fault was present previously but is not active now. There is an intermittent fault.

  If the transmission input speed does not update correctly it means that the fault is permanent.

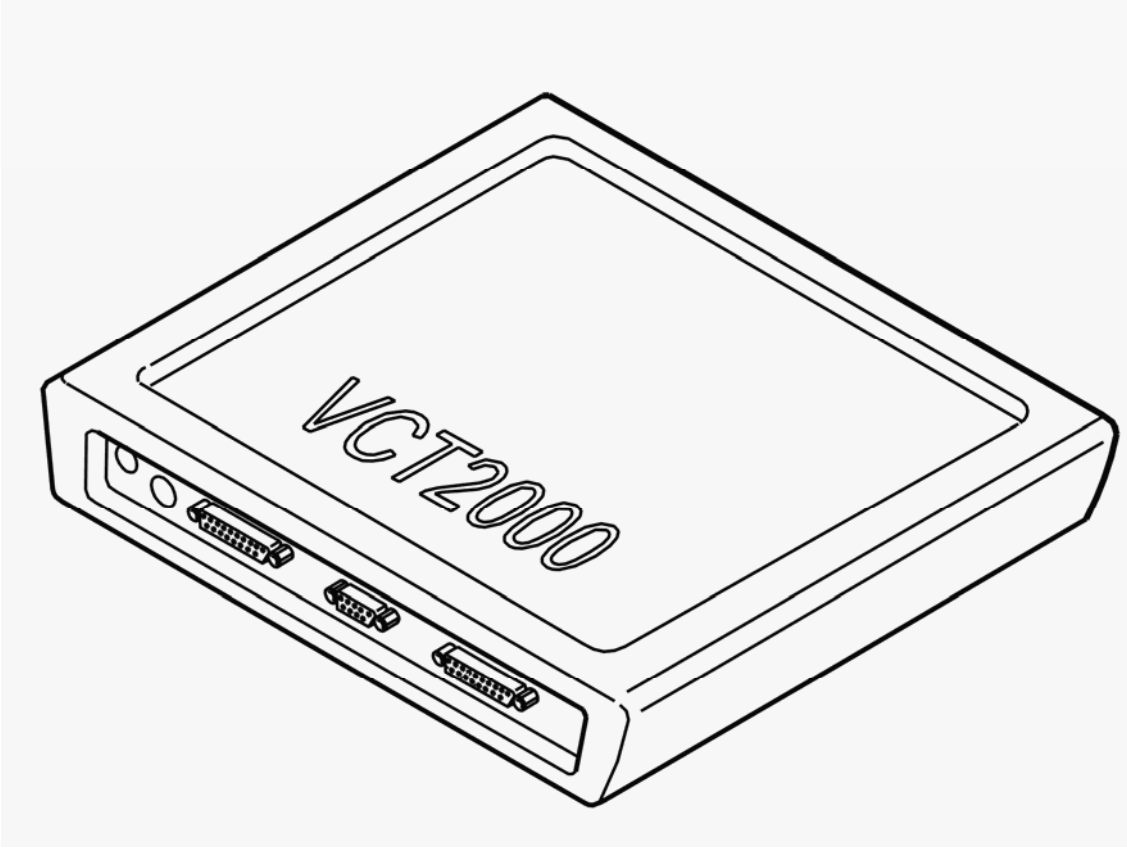


Fig. 462: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

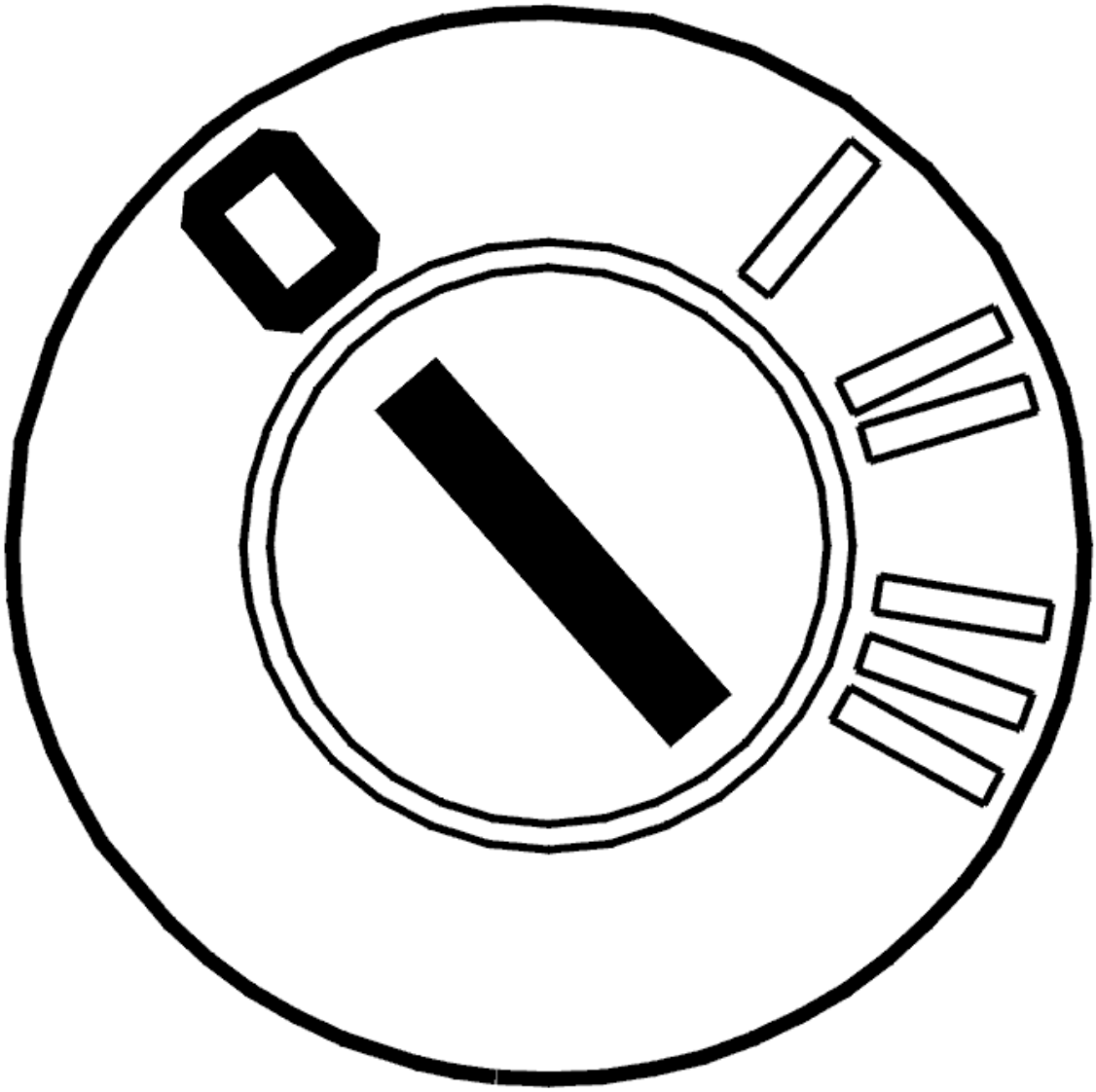


Fig. 463: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

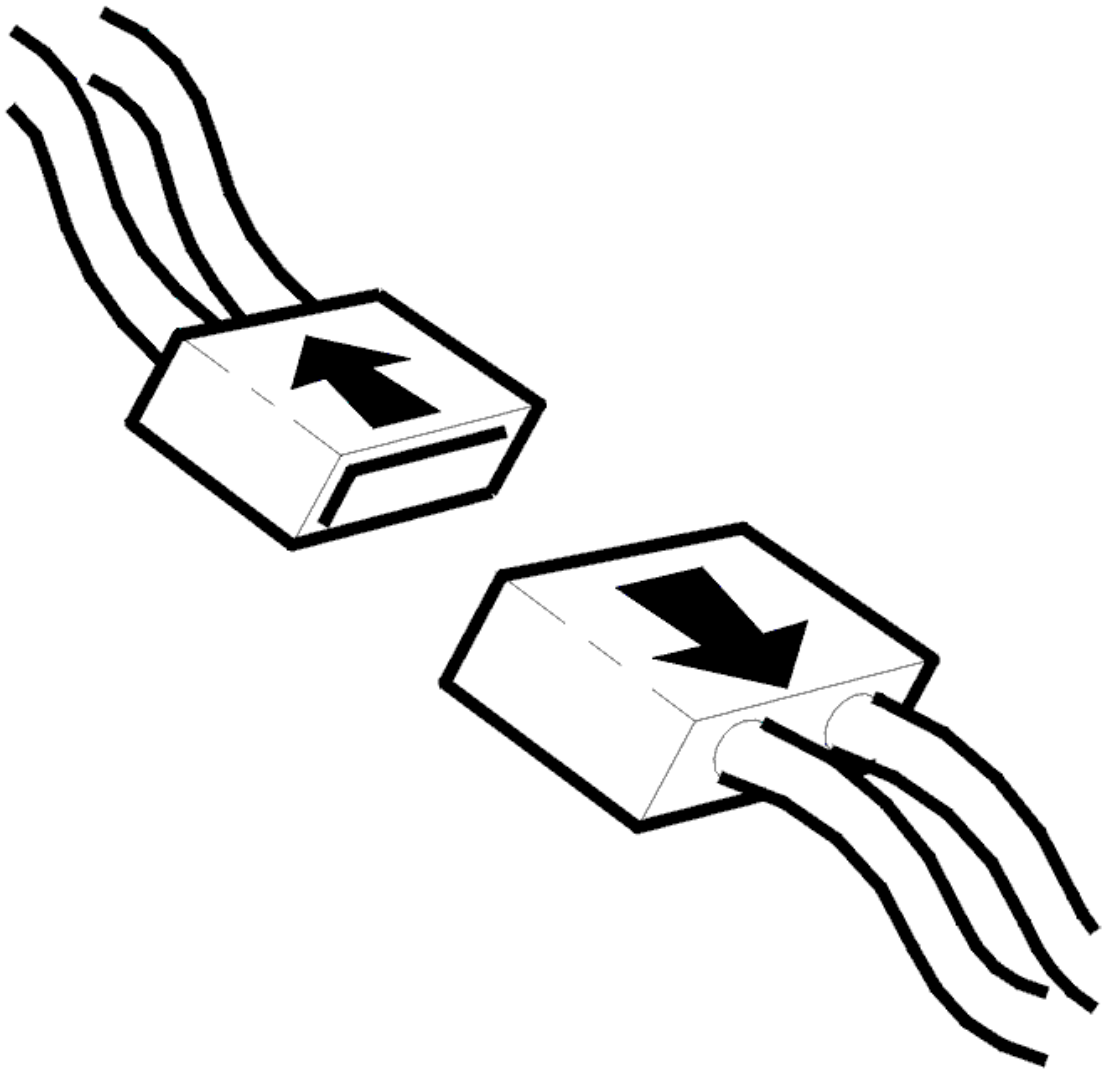


Fig. 464: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the connector for the transmission.
- Transmission control module (TCM) disconnected.
- Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  HINT: Check the transmission speed sensor. See CHECKING THE INPUT AND OUTPUT SPEED SENSORS FOR THE TRANSMISSION

  If a faulty value is measured in the test above, open the control system for the transmission and fault trace the wiring and components.

If the sensor is faulty - replace the transmission.

If the wiring is faulty - replace the cable harness.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **REPLACING THE GEARBOX**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**

Select an alternative:

1. Transmission replaced.
2. Cable harness replaced.

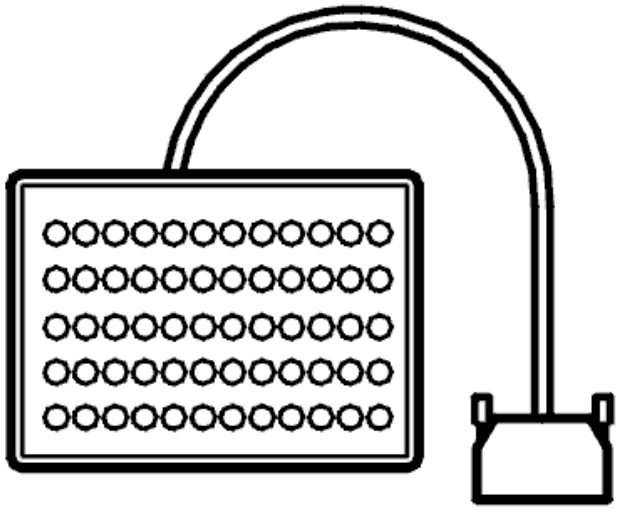


Fig. 465: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

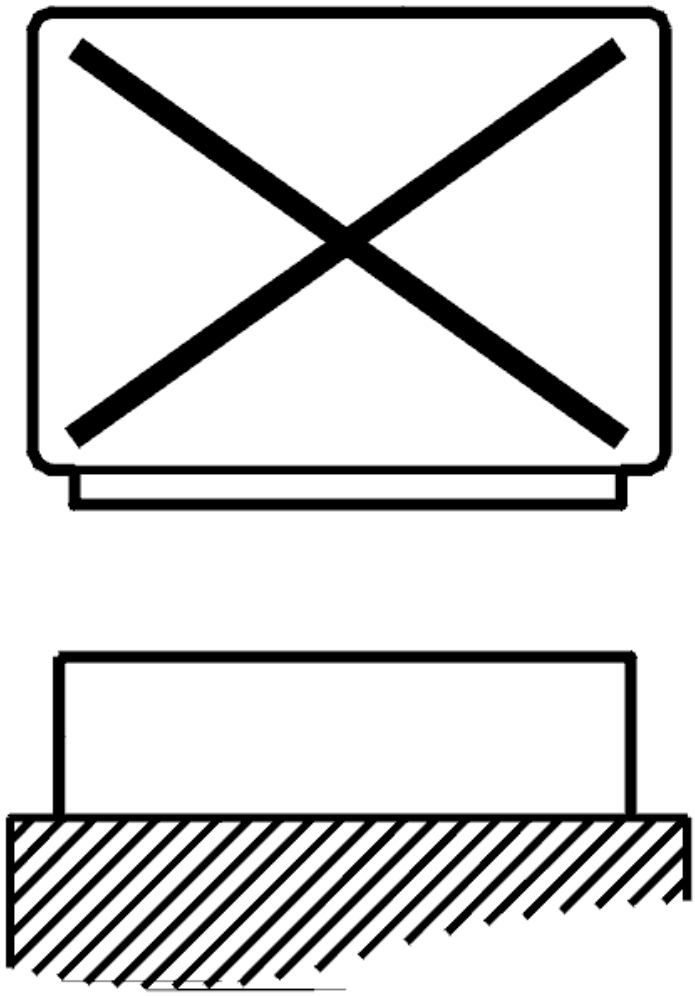


Fig. 466: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

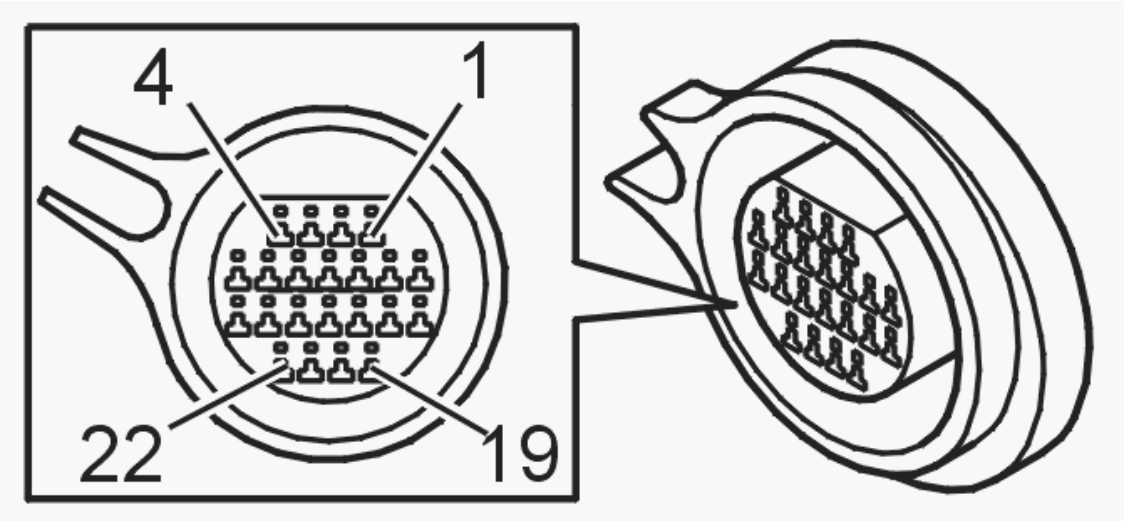


Fig. 467: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

- **1**

  Refer to **VERIFICATION**

- **2**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

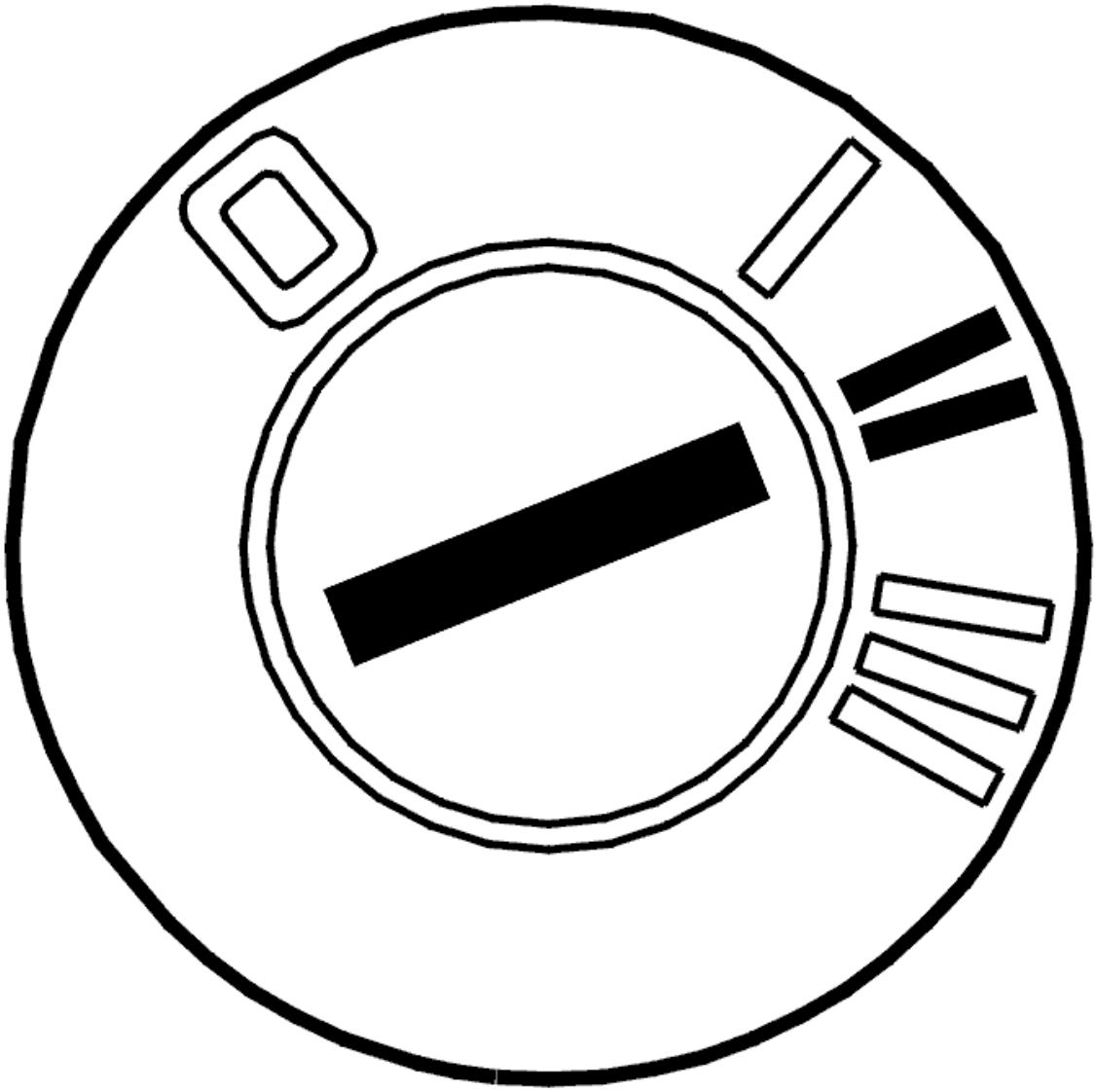


Fig. 468: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

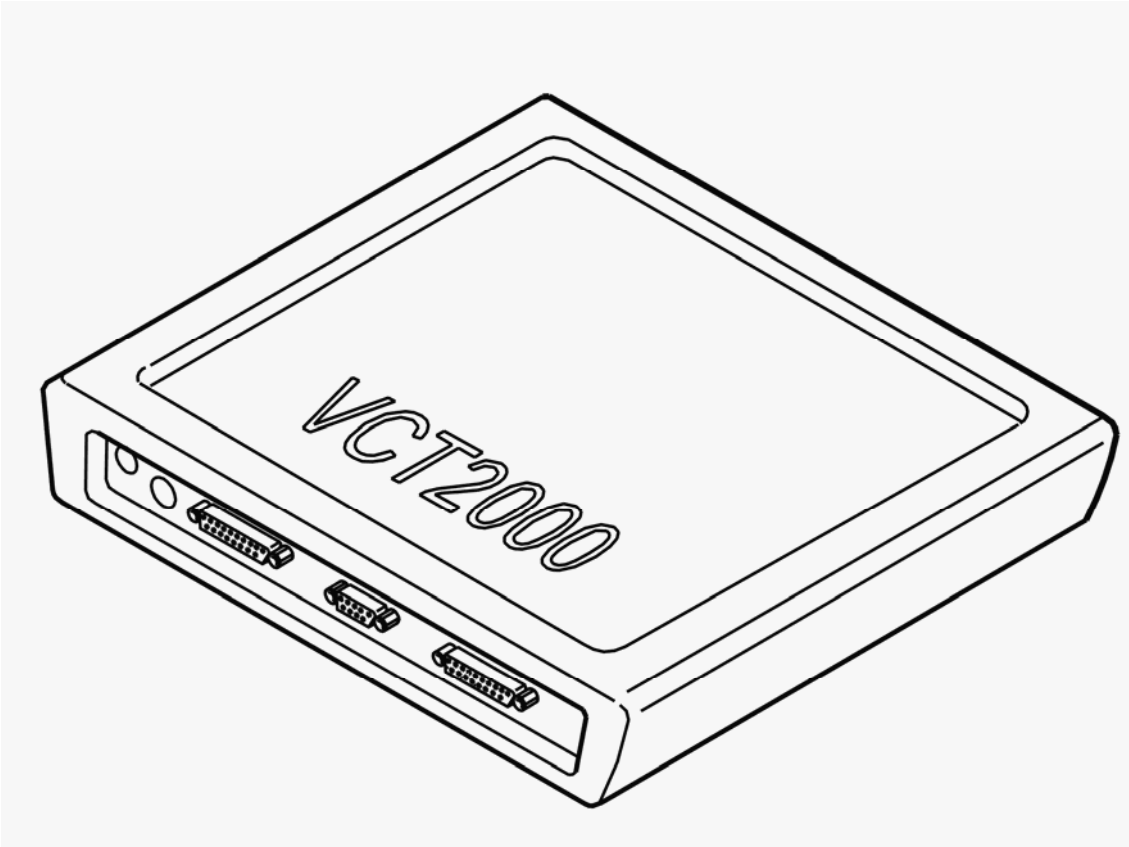


Fig. 469: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

CAUTION: On vehicles with four-wheel-drive, the tests should be carried out with the vehicle raised so that all four wheels can rotate freely with attachments far out on the link arms so that the drive shafts are not damaged.

WARNING: Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

NOTE: If the vehicle is equipped with TRACS (traction control system) or Traction Control (DSTC (Dynamic stability and traction control), STC (Stability and traction control) the function must be deactivated. This is carried out by

removing the fuse for the brake system pump motor in the engine compartment relay and fusebox. Note that diagnostic trouble codes (DTCs) will be stored in the brake control module (BCM). These must be erased before returning the vehicle to the customer.

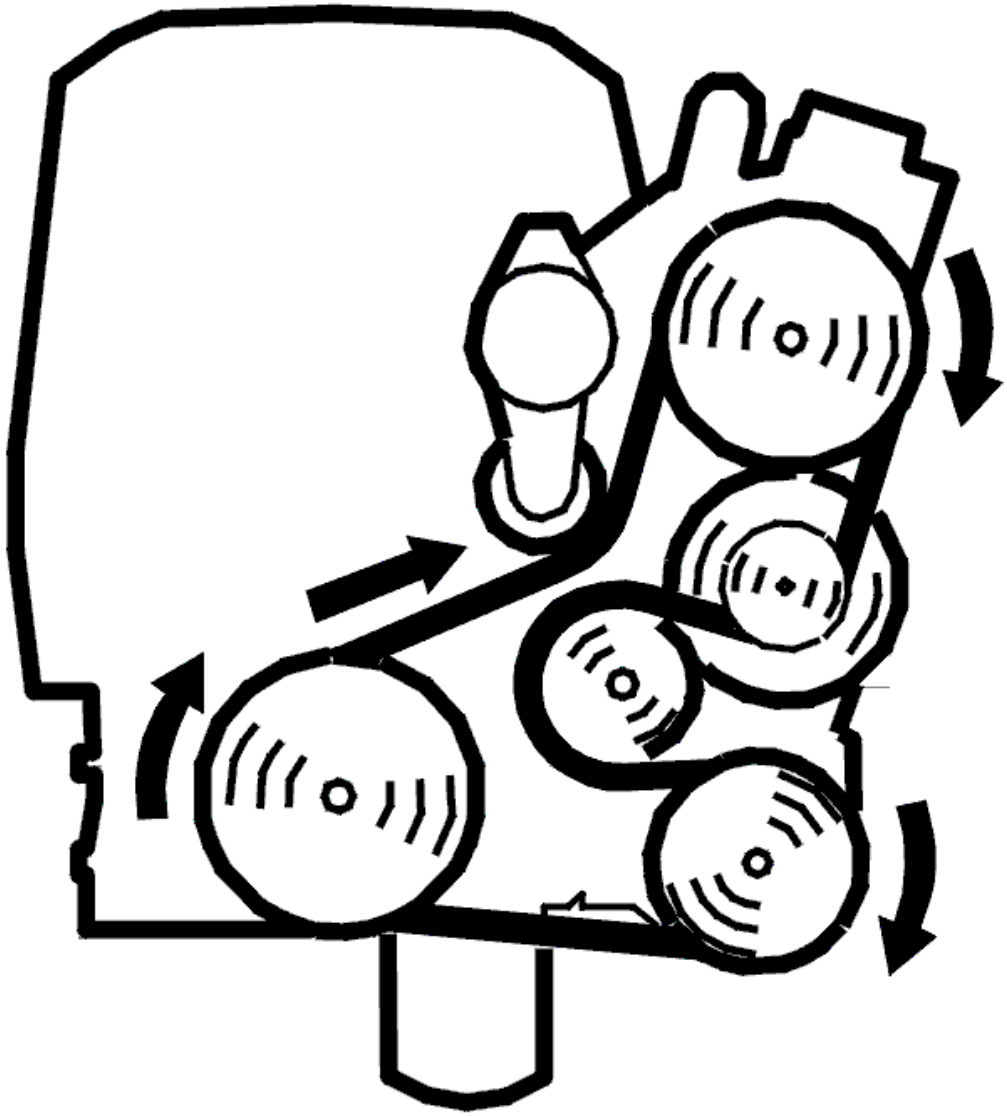


Fig. 470: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

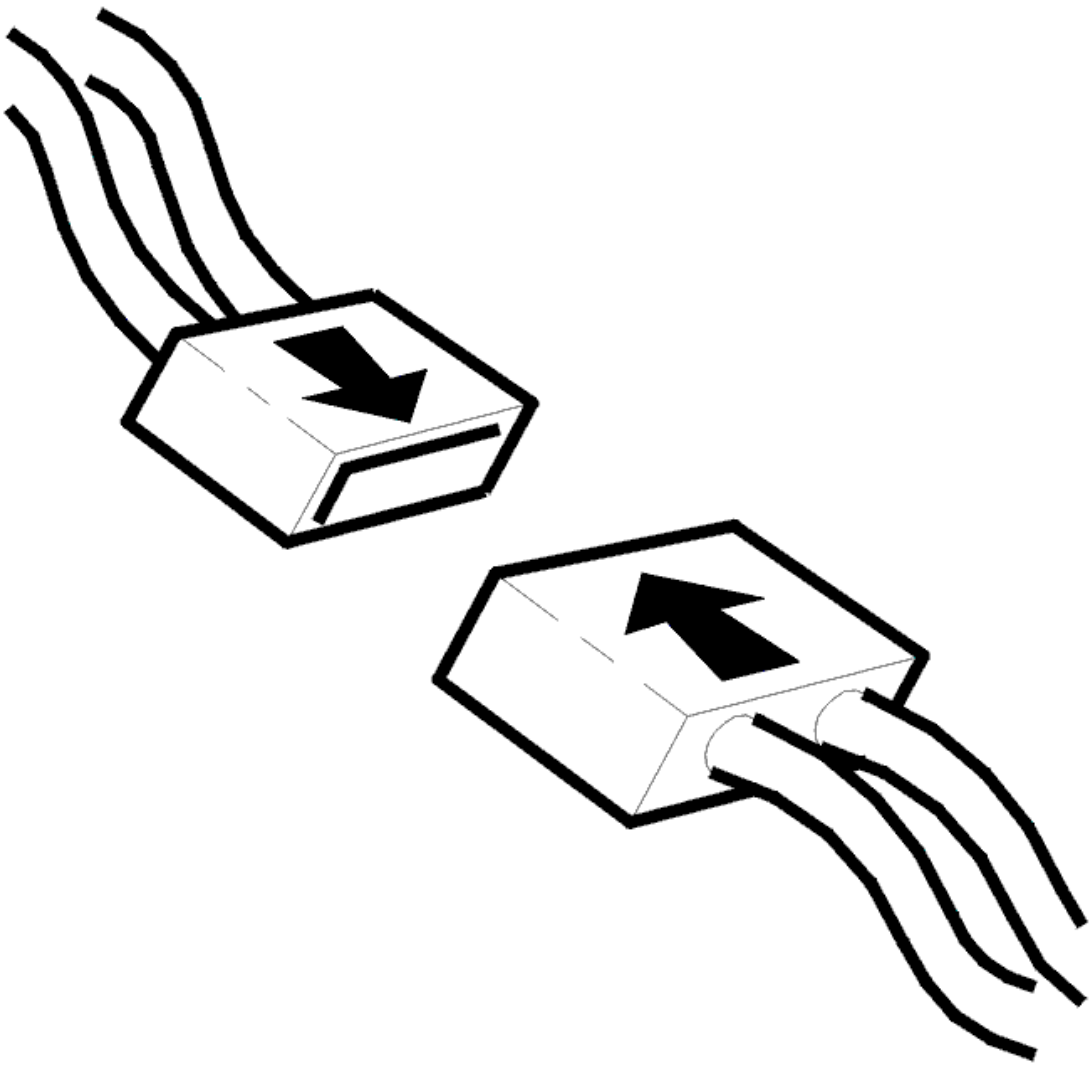


Fig. 471: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the connectors, components etc.
- Raise the vehicle so that the drive wheels hang freely.
- Start the engine and allow it to idle.
- Put the gear selector in position D so that the drive wheels start to rotate.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

- Read off the gearbox output speed.

  Check that the speed is updated.

NOTE: Diagnostic trouble codes (DTCs) may be stored in the brake control module (BCM) when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) after fault-tracing.

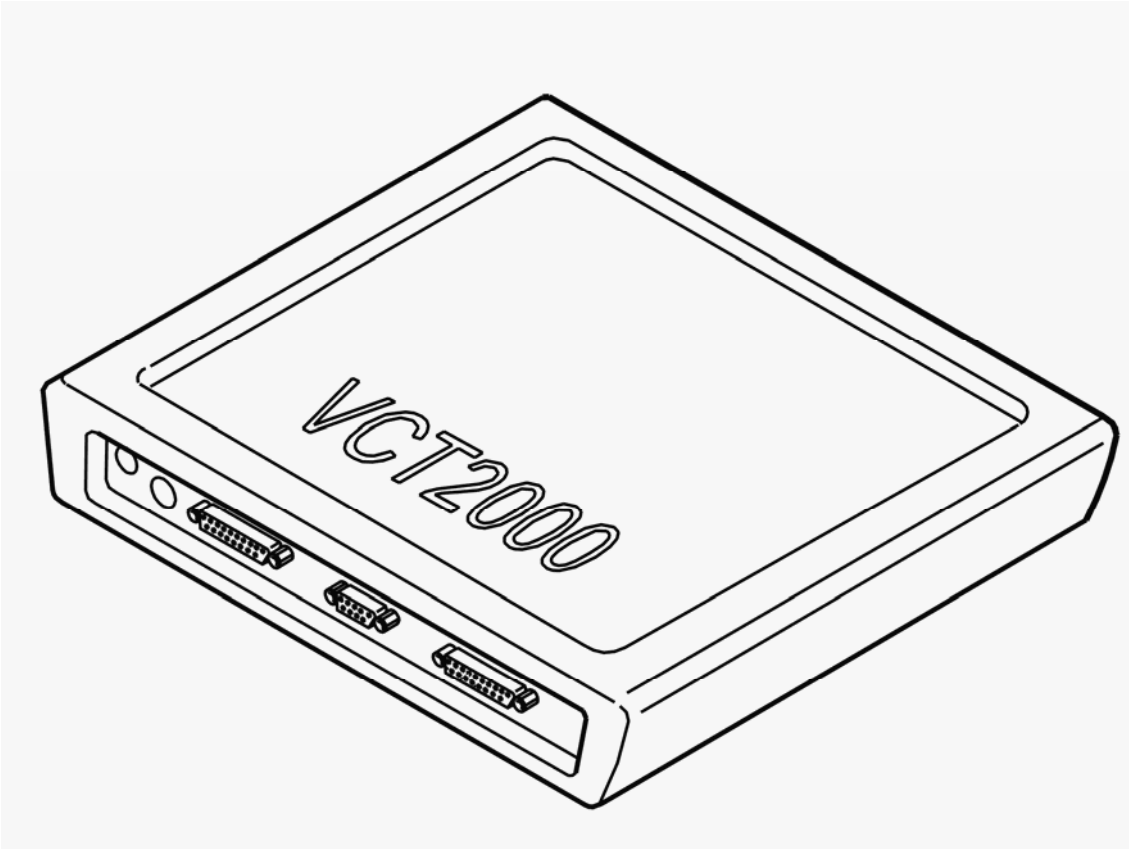


Fig. 472: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P050000: SPEED SENSOR A. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P050000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P050000**

FAULT TRACING TCM-P050000

see **FAULT TRACING TCM-P050000**

TCM-P056008: SYSTEM VOLTAGE. GENERAL FAULT INFORMATION. BUS/MESSAGE FAULT (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) TCM-P056008

Condition

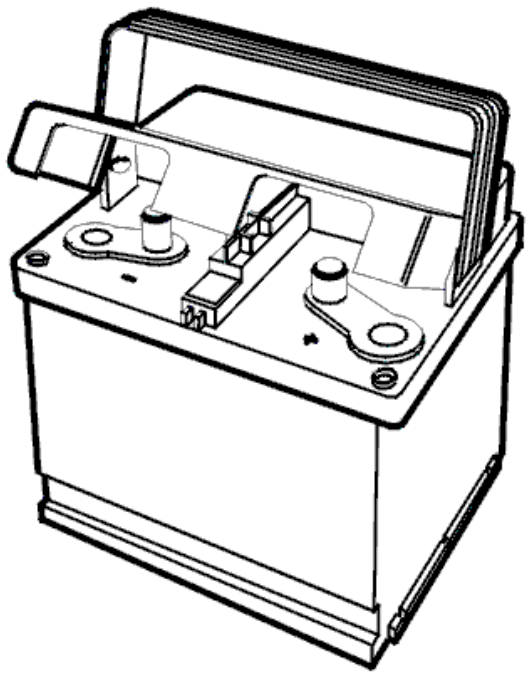


Fig. 473: Identifying Battery
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) continuously monitors the voltage and compares it with a voltage value sent out on the CAN network by the central electronic module (CEM).

If the transmission control module (TCM) registers that the system voltage differs more than ±1.7V from the voltage in the central electronic module (CEM) a fault code will be generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance or oxidation in the connector on the transmission control model (TCM) or the gearbox.
- Battery charger with incorrect voltage has been used.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit

FAULT TRACING TCM-P056008

CHECKS

CHECKING THE POWER SUPPLY

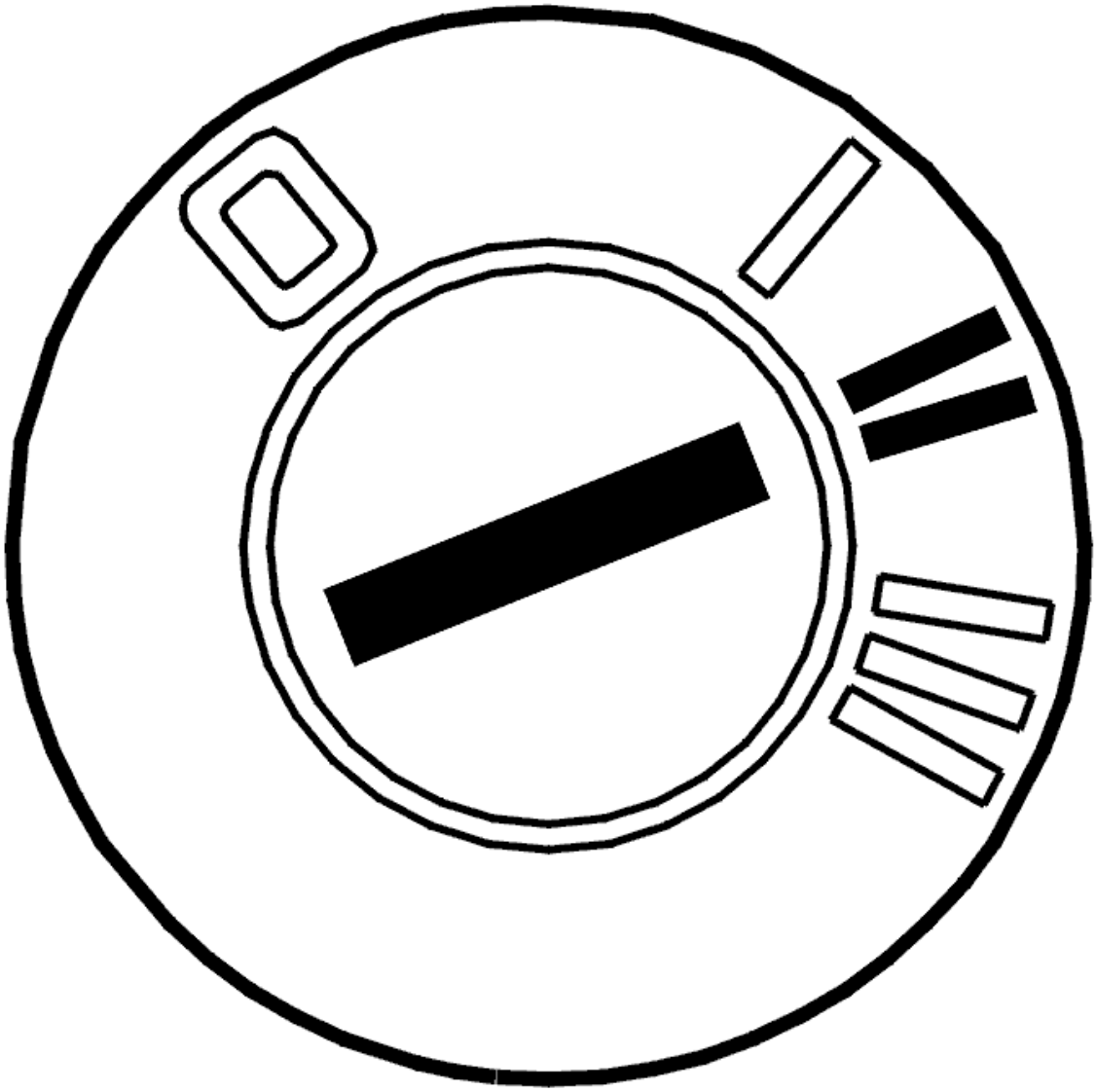


Fig. 474: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read the voltage supply for the transmission control module (TCM) and central electronic module (CEM).

  The voltage supply for the transmission control module (TCM) and central electronic module (CEM) must be approximately the same.

  If the voltage for the transmission control module (TCM) deviates more than 1.7 V from the central electronic module (CEM) it means that the fault is permanent.

  If the voltages are approximately the same then this would suggest that the fault is intermittent, i. e. that the fault has previously been present but is no longer active.

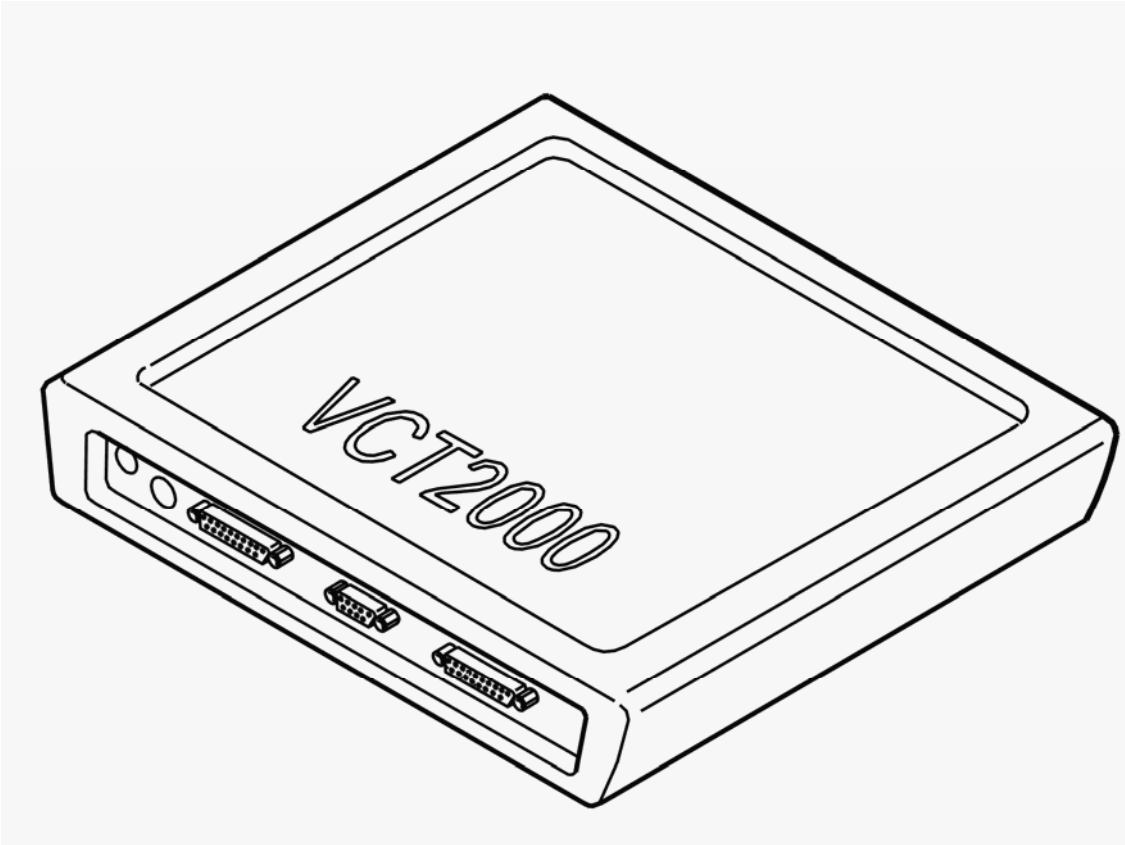


Fig. 475: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

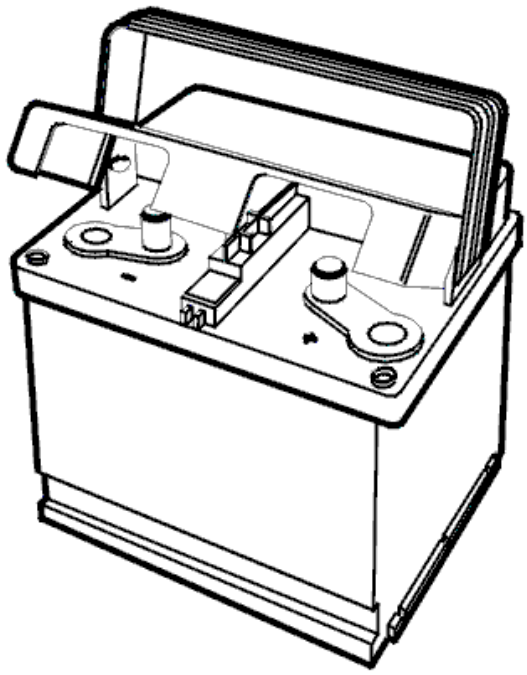


Fig. 476: Identifying Battery

Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING CABLE AND COMPONENT**

CHECKING CABLE AND COMPONENT

Check connector A on the transmission control module (TCM). Check for contact resistance and oxidation.

Check the power supply cable (30 supply) between the fuse in the relay /fusebox in the engine compartment and the transmission control module (TCM) terminal #A1 (#31). Check for contact resistance and oxidation.

Check the power supply cable (15 supply) between the fuse in the relay /fusebox in the engine compartment and the transmission control module (TCM) terminal #A11 (#41). Check for contact resistance and oxidation.

HINT: With the ignition on the voltmeter must display battery voltage at both terminals when measured against ground.

Check the ground cable between the ground terminal and the transmission control module (TCM) terminal #A9 (#39). Check for contact resistance and oxidation.

HINT: With the ignition on the voltmeter must display battery voltage between #A9 (#39) and the battery + pole.

NOTE: No fault is found, fault trace central electronic module (CEM).

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- To access connector A: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- see **CONTENTS**

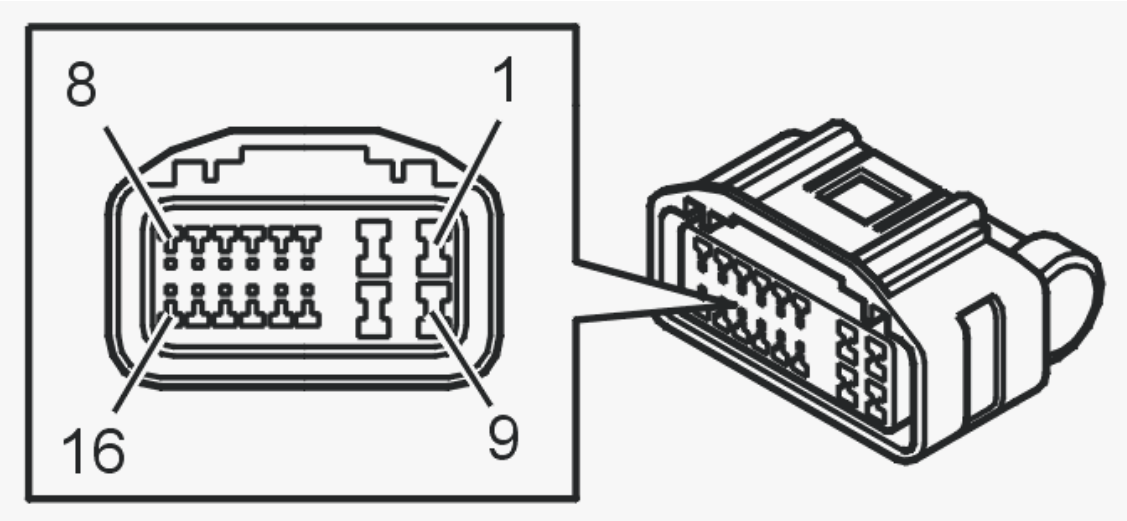


Fig. 477: Identifying Connector A Terminals
Courtesy of VOLVO CARS CORPORATION

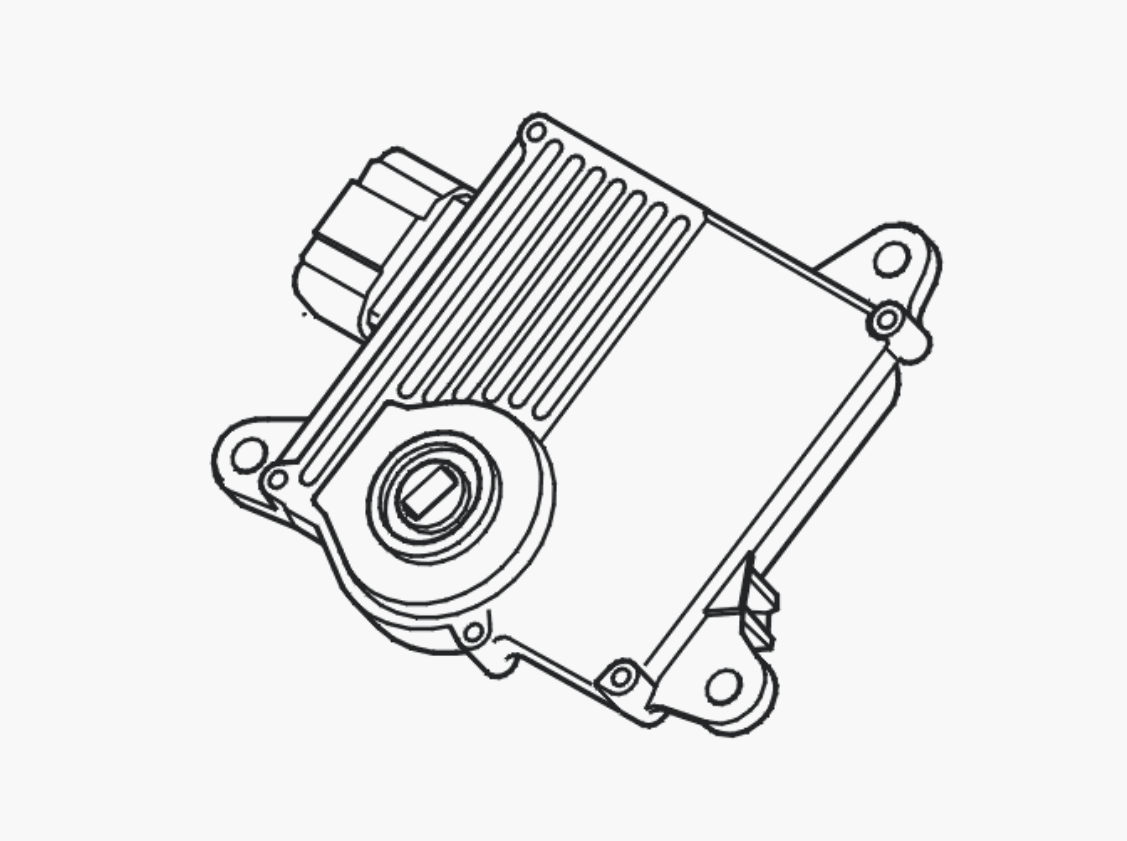


Fig. 478: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

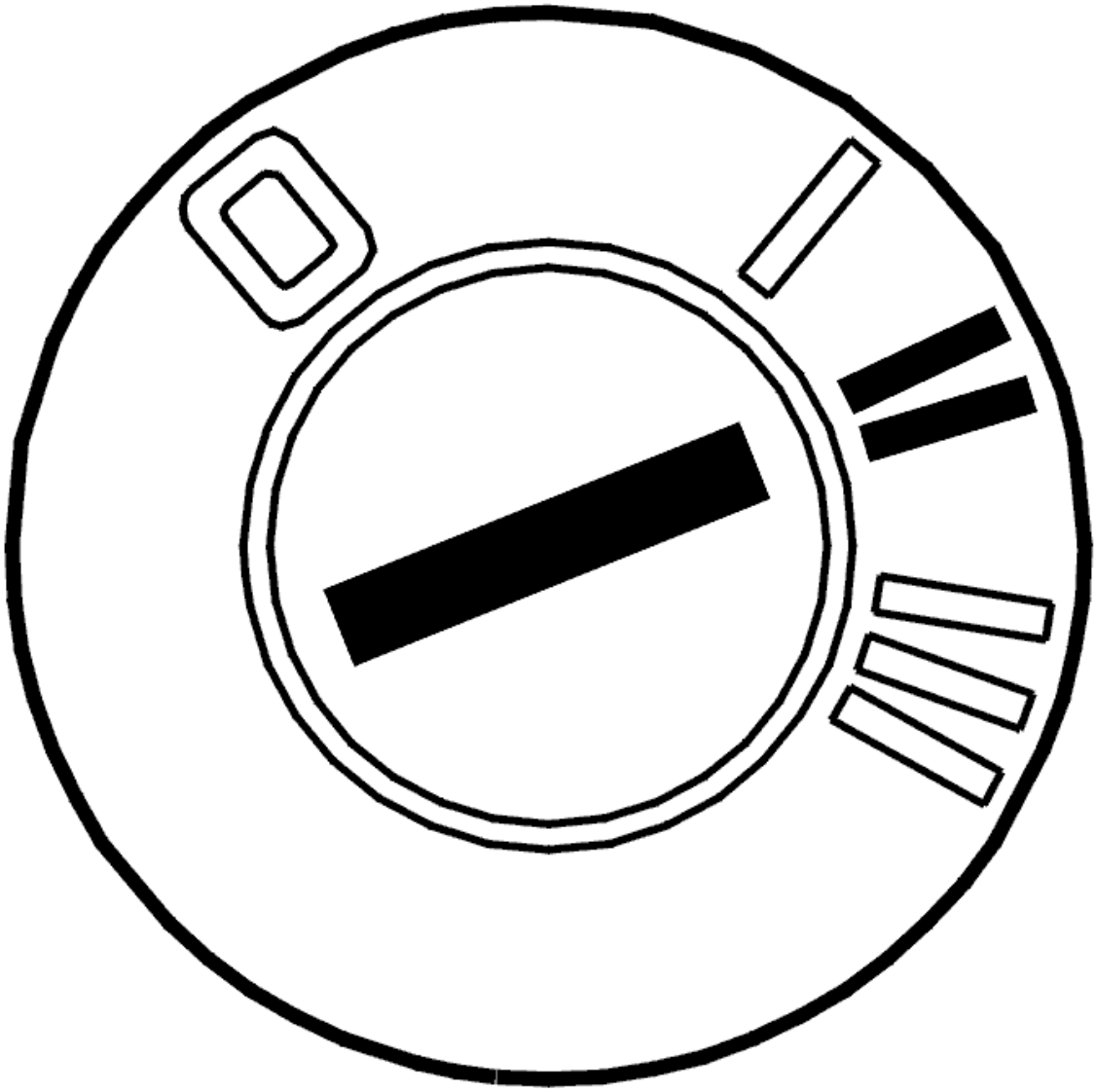


Fig. 479: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

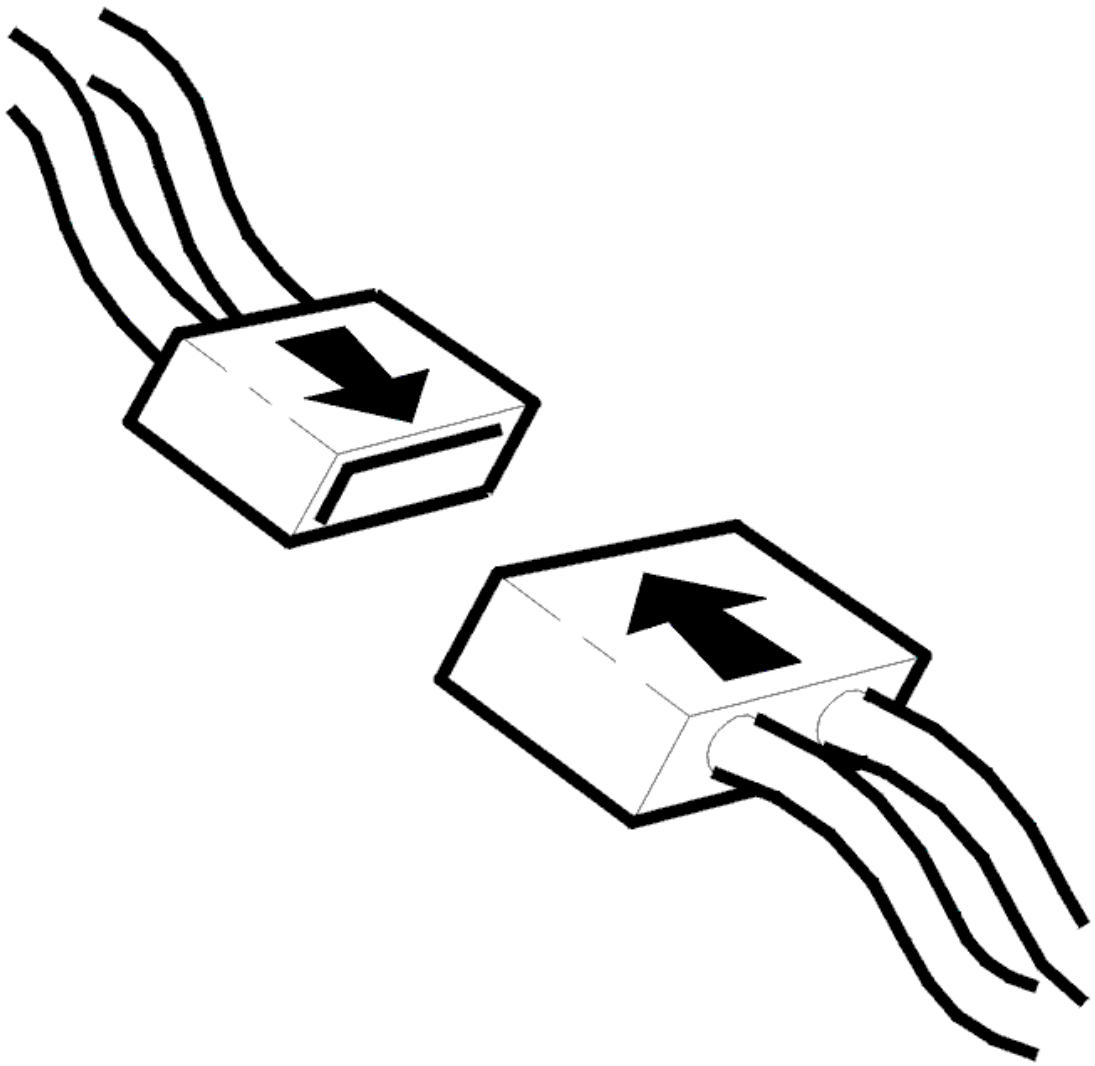


Fig. 480: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the power supply for the transmission control module (TCM).

The voltage must be about the same as the battery voltage.

- Start the engine and allow it to idle.
- Read off the power supply for the transmission control module (TCM) again.

The voltage should rise to 13-15 V, depending on the alternator charging voltage.

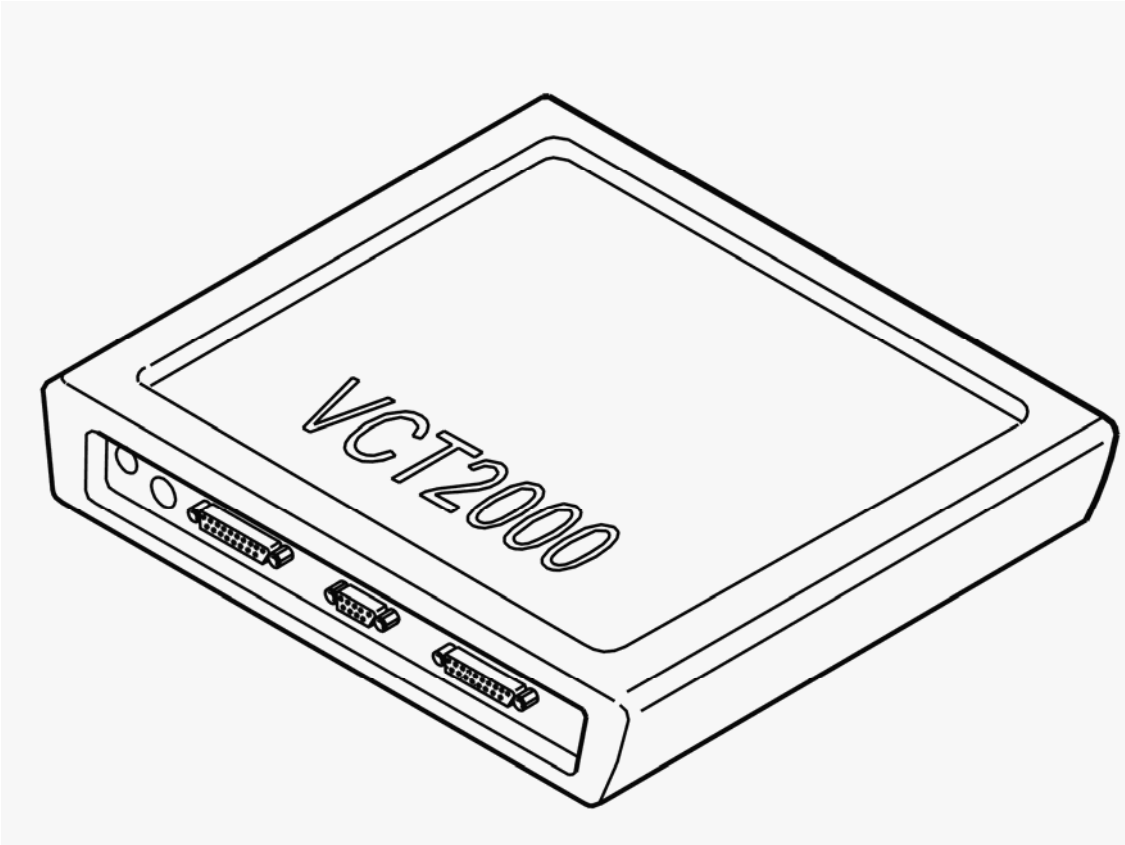


Fig. 481: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the voltage OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P056008: SYSTEM VOLTAGE. GENERAL FAULT INFORMATION. BUS/MESSAGE FAULT (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) TCM-P056008

see **DIAGNOSTIC TROUBLE CODE (DTC) TCM-P056008**

FAULT TRACING TCM-P056008

see **FAULT TRACING TCM-P056008**

TCM-P056100: SYSTEM VOLTAGE UNSTABLE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P056100

Condition

The transmission control module (TCM) continuously monitors the voltage and compares it with a voltage value sent out on the CAN network by the central electronic module (CEM).

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Power supply to the control module is less than 10.2 V or is greater than 15.5 V.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Engine running.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

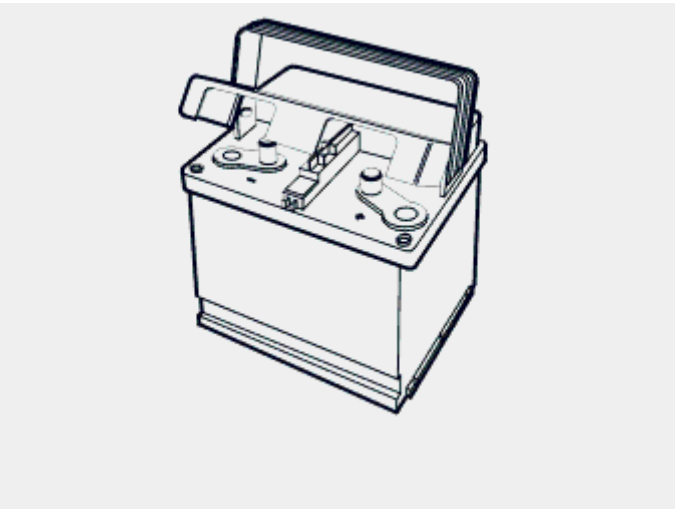


Fig. 482: Identifying Battery
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Battery voltage too low.
- Contact resistance or oxidation in the connector on the transmission control model (TCM) or the gearbox.
- Battery charger with incorrect voltage has been used.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit

FAULT-TRACING

CHECKS

CHECKING THE POWER SUPPLY

Fig. 483: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

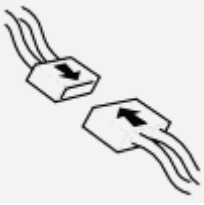


Fig. 484: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the power supply for the transmission control module (TCM).

  Voltage should be about equal to battery voltage.

- Start the engine. Allow the engine to idle.
- Read off the power supply for the transmission control module (TCM) again.

The voltage must be raised to 13-15V depending on the generator (GEN) charging voltage.

Select an option:

1. Normal voltage.

   Refer to **CHECKING THE COMPONENTS AND WIRING**

2. Voltage too low

   Refer to **CHECKING THE BATTERY VOLTAGE**

3. Voltage too high.

   Refer to **CHECKING THE POWER SUPPLY**

Fig. 485: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

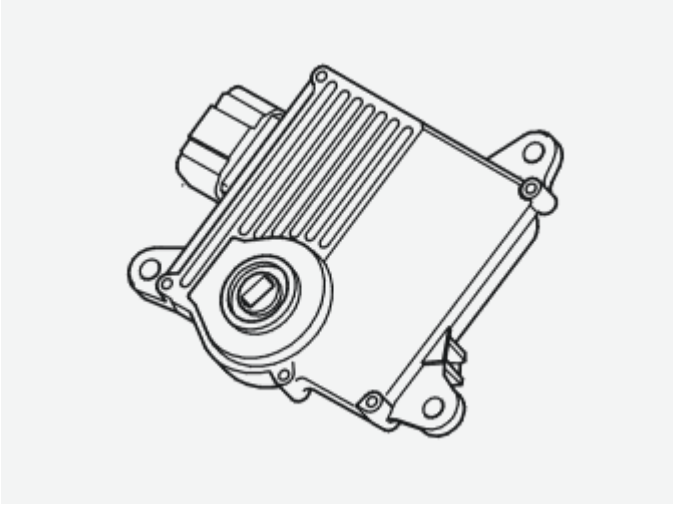


Fig. 486: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

CHECKING THE BATTERY VOLTAGE

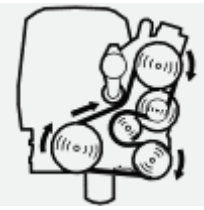


Fig. 487: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine. Allow the engine to idle.
- Expose the battery.
- Connect a voltmeter between the battery positive and negative terminals.

  The voltmeter should read 13-15 V depending on the alternator charging voltage.

Is the voltage OK?

- **YES**

  Refer to **CHECKING THE WIRING AND TERMINALS**

- **NO**

  Refer to **CHECKING THE POWER SUPPLY**

CHECKING THE POWER SUPPLY

Check that no battery charger is connected with too high a charge voltage.

Check the vehicle's charging system with regard to high charging voltage.

Remedy as necessary.

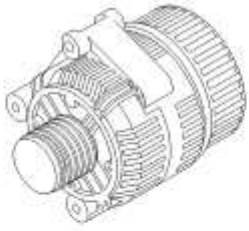


Fig. 488: Identifying Alternator
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

CHECKING THE COMPONENTS AND WIRING

Fault tracing indicates that the transmission control module (TCM) has previously registered a fault but the fault is no longer active.

Check connector A on the transmission control module (TCM). Check for contact resistance and oxidation.

Check the power supply cable (30 supply). Check for an intermittent open-circuit.

Take readings between:

- Transmission control module (TCM) terminal #A1 (#31) and the fuse in the engine compartment relay/fuse box.

Check the power supply cable (15 supply). Check for an intermittent open-circuit.

Take readings between:

- Transmission control module (TCM) and ignition switch (via central electronic module (CEM).

HINT: With the ignition on the voltmeter must display battery voltage at both terminals when measured against ground.

Check the ground cable. Check for an intermittent open-circuit.

Take readings between:

- Transmission control module (TCM) terminal #A9 (#39) and grounding point.

HINT: The diagnostic trouble code has been stored because a battery charger with too high of a charging voltage had been connected previously.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- To access connector A:**TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

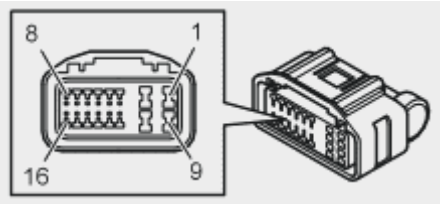


Fig. 489: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

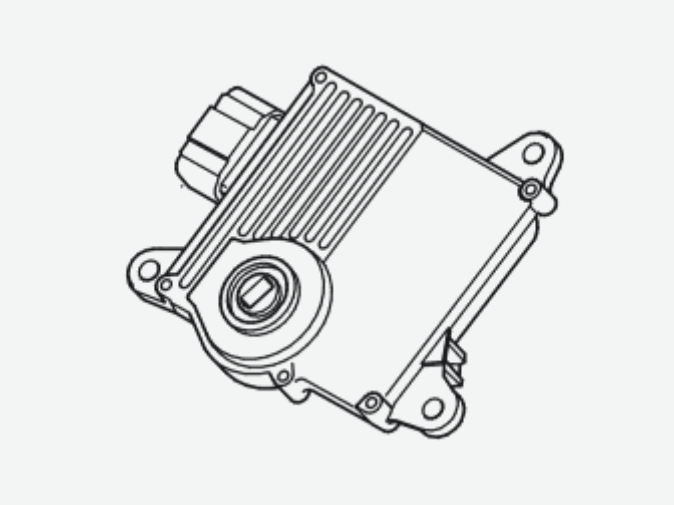


Fig. 490: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

CHECKING THE WIRING AND TERMINALS

Check connector A on the transmission control module (TCM). Check for contact resistance and oxidation.

Check the power supply cable (30 supply). Check for an intermittent open-circuit.

Take readings between:

- Transmission control module (TCM) terminal #A1 (#31) and the fuse in the engine compartment relay/fuse box.

Check the power supply cable (15 supply). Check for an intermittent open-circuit.

Take readings between:

- Transmission control module (TCM) terminal #A11 (#41) and the fuse in the passenger compartment relay/fuse box.

HINT: With the ignition on the voltmeter must display battery voltage at both terminals when measured against ground.

Check the ground lead. Check for an open-circuit.

Take readings between:

- Transmission control module (TCM) terminal #A9 (#39) and grounding point.

HINT: When the ignition is on, the voltmeter should show battery voltage between #A9 (#39) and the positive battery terminal.

NOTE: No fault is found, fault trace central electronic module (CEM).

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- To access connector A:**TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

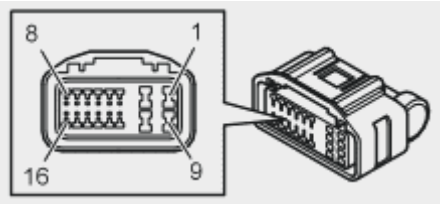


Fig. 491: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

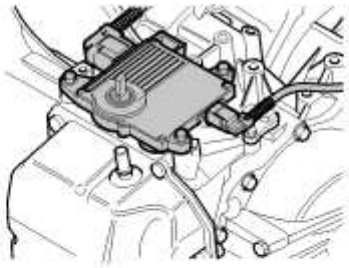


Fig. 492: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

CHECKING THE POWER SUPPLY

Check the vehicle's charging system with regard to the charging.

Remedy as necessary.

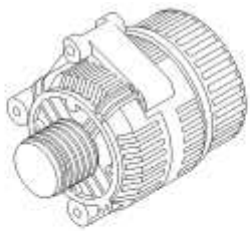


Fig. 493: Identifying Alternator
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 494: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

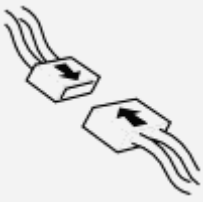


Fig. 495: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the power supply for the transmission control module (TCM).

  Voltage should be about equal to battery voltage.

  - Start the engine. Allow the engine to idle.
  - Read off the power supply for the transmission control module (TCM) again.

  The voltage must be raised to 13-15V depending on the generator (GEN) charging voltage.

  Fig. 496: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
  Courtesy of VOLVO CARS CORPORATION

Is the voltage OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P056100: SYSTEM VOLTAGE UNSTABLE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P056100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P056100**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P056100: SYSTEM VOLTAGE UNSTABLE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P056100

Condition

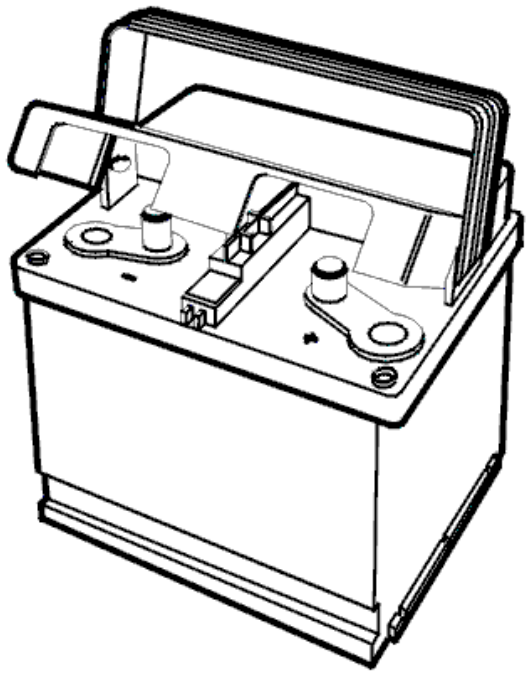


Fig. 497: Identifying Battery
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) continuously monitors the voltage and compares it with a voltage value sent out on the CAN network by the central electronic module (CEM).

If transmission control module (TCM) registers that the power supply to the control unit is below approximately 10.2V or above 15.5V, the diagnostic trouble code (DTC) will be generated.

The diagnostic trouble code (DTC) can be diagnosed while the engine is running.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Battery voltage too low.
- Contact resistance or oxidation in the connector on the transmission control model (TCM) or the gearbox.
- Battery charger with incorrect voltage has been used.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.

- General warning lamp lit

FAULT TRACING

CHECKS

CHECKING THE POWER SUPPLY

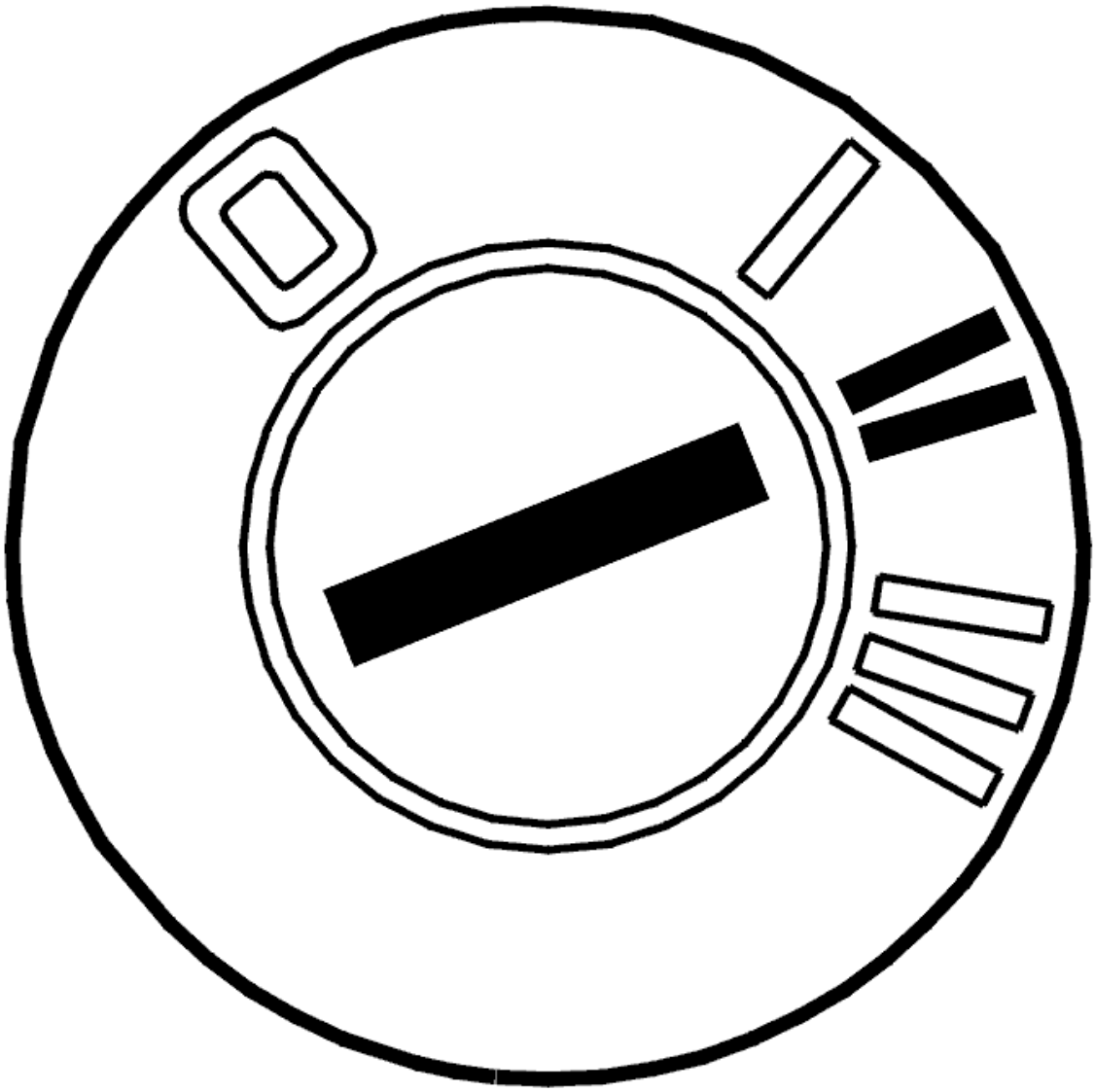


Fig. 498: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

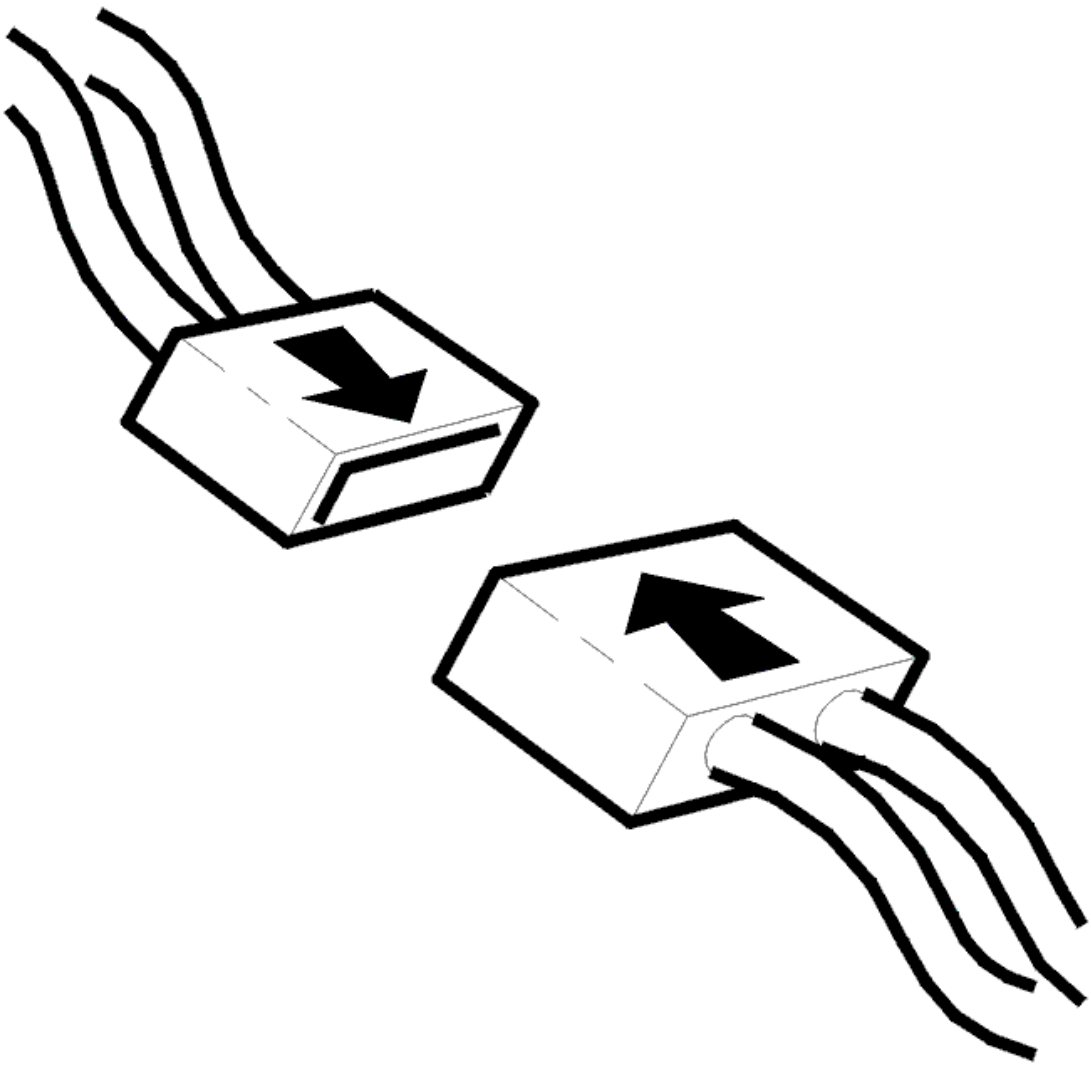


Fig. 499: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the power supply for the transmission control module (TCM).

  The voltage must be about the same as the battery voltage.

  - Start the engine and allow it to idle.
  - Read off the power supply for the transmission control module (TCM) again.

  The voltage should rise to 13-15 V, depending on the alternator charging voltage.

  Select an alternative:

1. Normal voltage.

   Refer to **CHECKING THE COMPONENTS AND WIRING**

2. Voltage too low.

   Refer to **CHECKING THE BATTERY VOLTAGE**

3. Voltage too high.

   Refer to **CHECKING THE POWER SUPPLY**

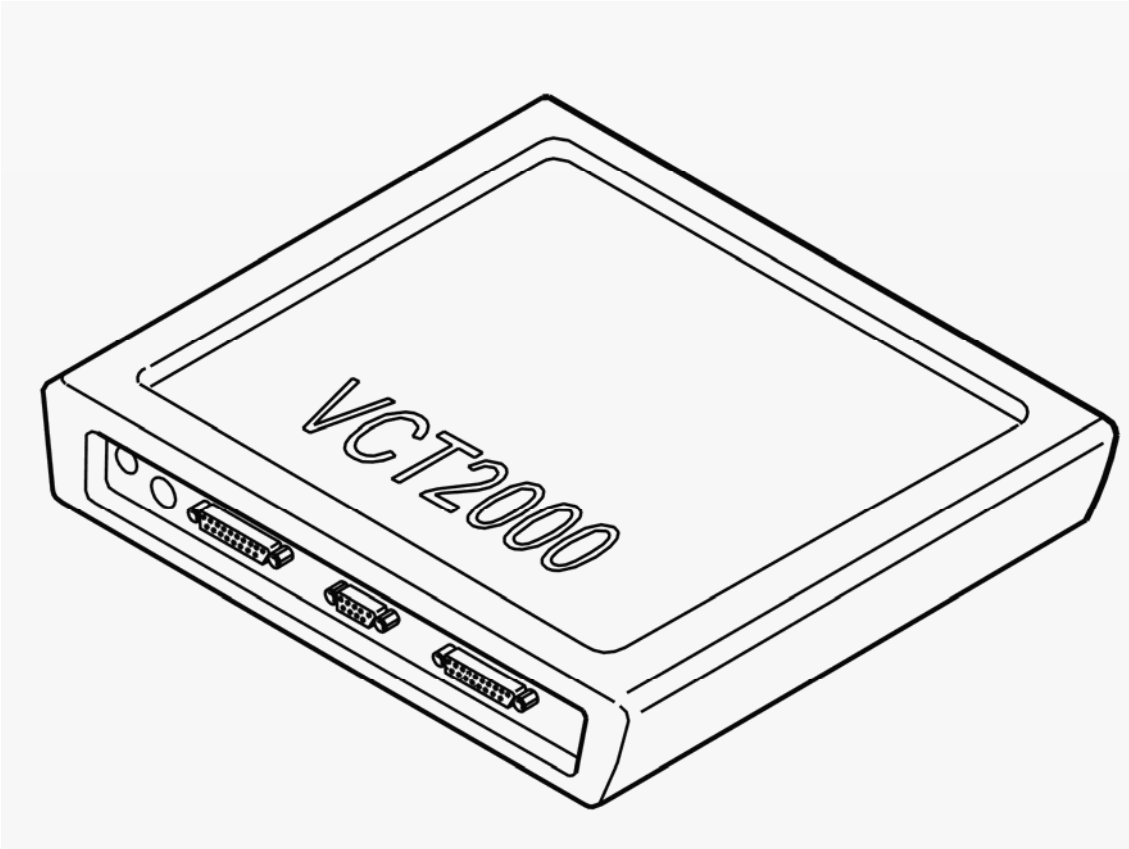


Fig. 500: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

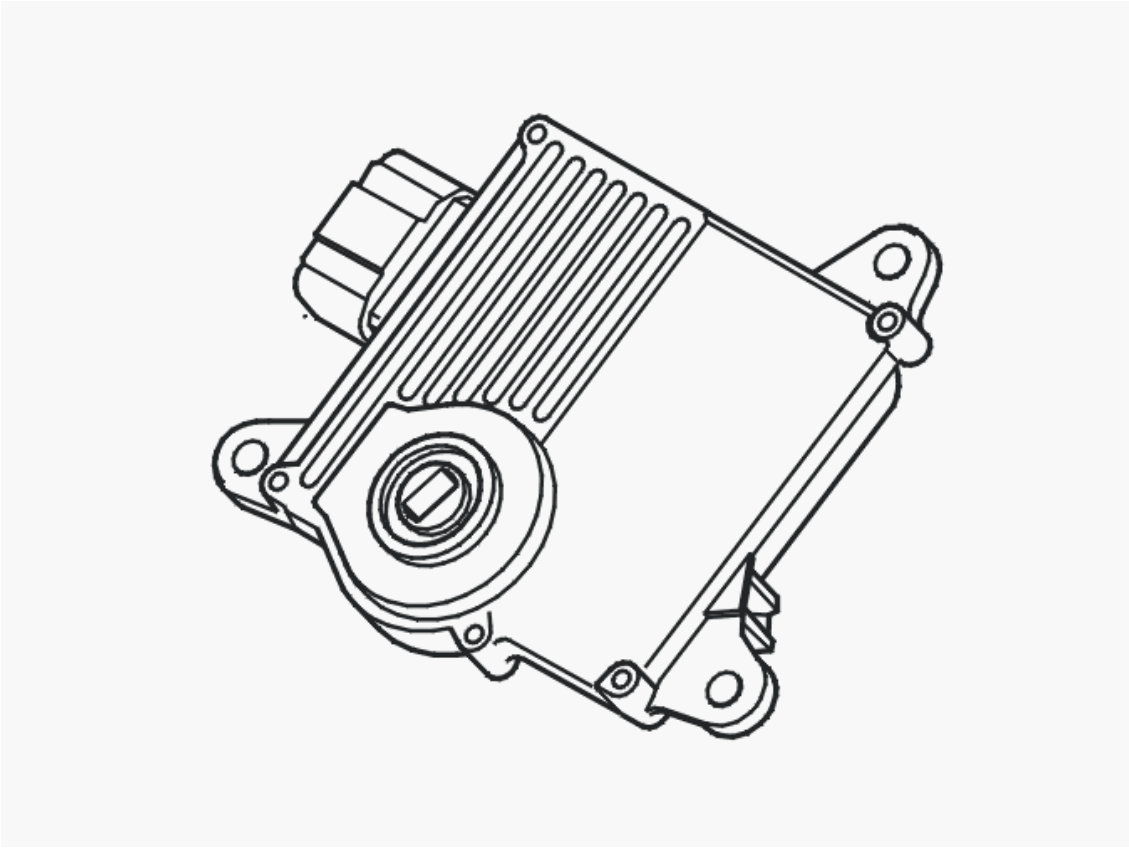


Fig. 501: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

CHECKING THE BATTERY VOLTAGE

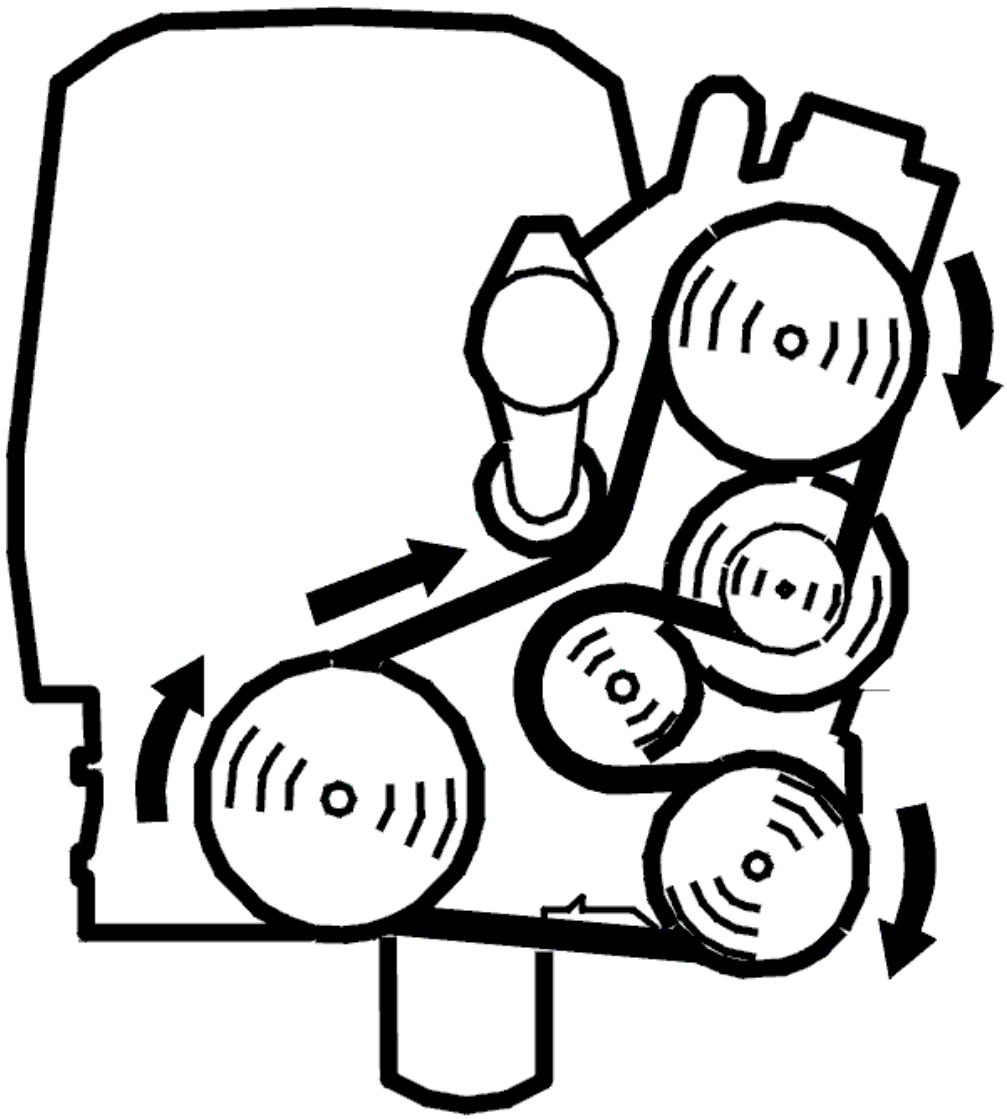


Fig. 502: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine and allow it to idle.
- Expose the battery.
- Connect a voltmeter between the positive and negative battery terminals.

  The voltmeter should read 13-15V depending on the alternator charging voltage.

Is the voltage OK?

- **OK**

  Refer to **CHECKING WIRING AND TERMINALS**

- **NOT OK**

  Refer to **CHECKING THE POWER SUPPLY**

CHECKING WIRING AND TERMINALS

Check the connector A one the transmission control module (TCM) with regard to contact resistance and oxidation.

Check the power supply lead (30 supply) between the fuse in the main relay and fuse box in the engine compartment and the transmission control module (TCM) #A1 (#31) with regard to an open circuit.

Check the power supply lead (15 supply) between the fuse in the main relay and fuse box in the cabin and transmission control module (TCM) #A11 (#41) with regard to intermittent open circuits.

HINT: When the ignition is on, the voltmeter should show battery voltage on both connections when measuring to chassis ground.

Check the ground lead between the chassis ground point and transmission control module (TCM) #A9 (#39) with regard to open circuits.

HINT: When the ignition is on, the voltmeter should show battery voltage between #A9 (#39) and the positive battery terminal.

NOTE: If a fault was not found, check for faults in the central electronic module (CEM).

Remedy as necessary.

Other information:

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- For access to connector A: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- see **CONTENTS**

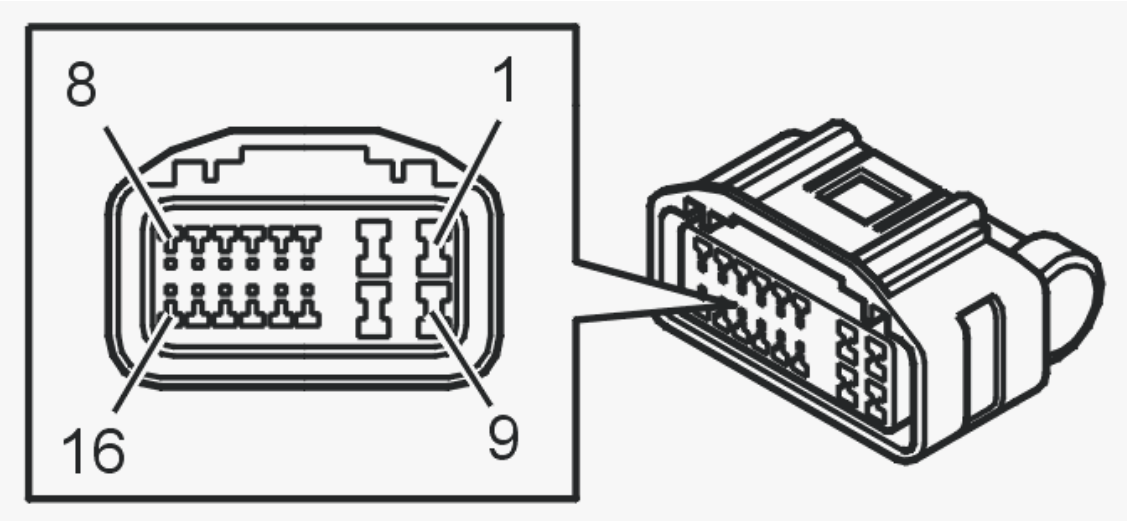


Fig. 503: Identifying Connector A Terminals
Courtesy of VOLVO CARS CORPORATION

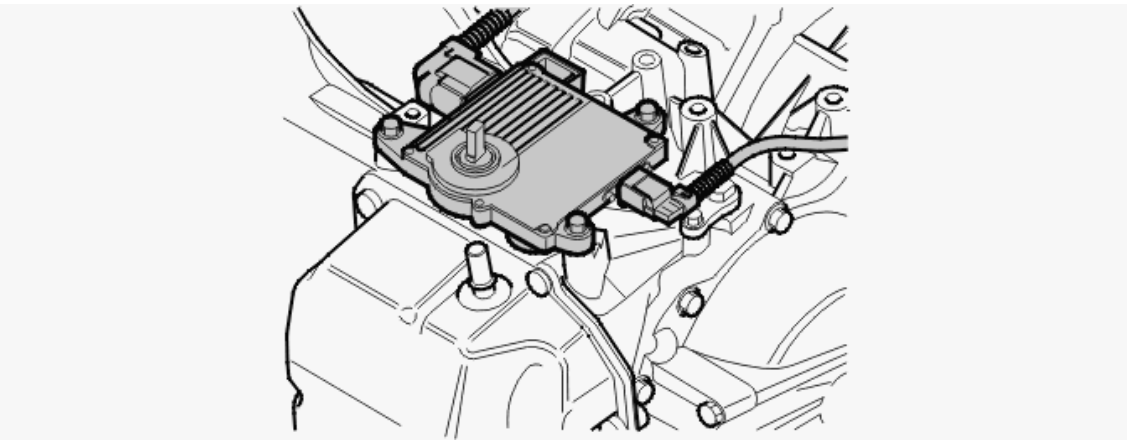


Fig. 504: Identifying Rear Electronic Module (REM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

CHECKING THE POWER SUPPLY

Check the vehicle's charging system with regard to the charging.

Remedy as necessary.

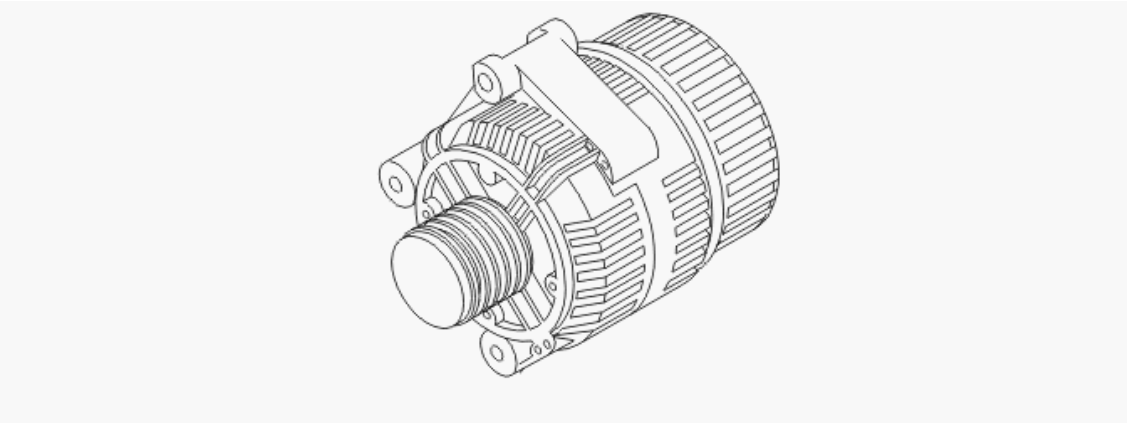


Fig. 505: Identifying Generator (GEN)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

CHECKING THE POWER SUPPLY

Make sure a battery charger with a charging voltage that is too high is not connected.

Check the vehicle's charging system with regard to high charging voltage.

Remedy as necessary.

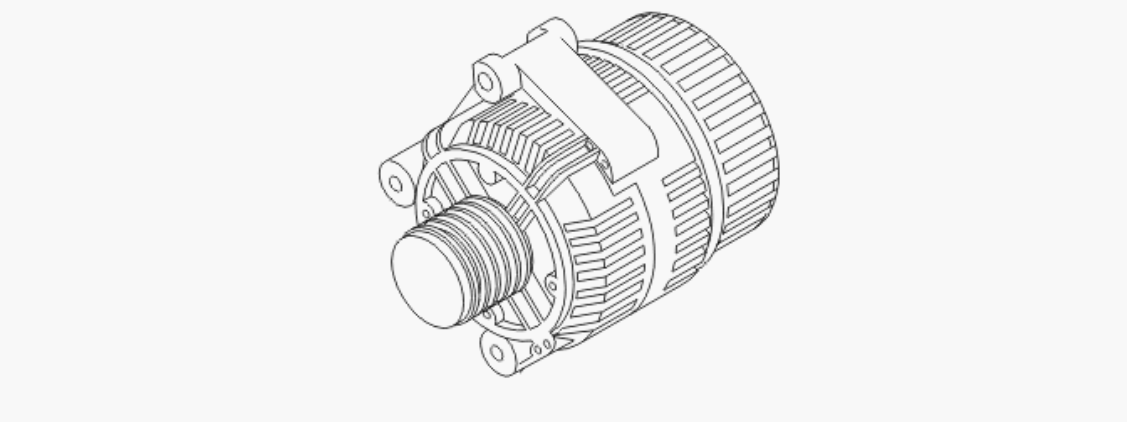


Fig. 506: Identifying Generator (GEN)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

CHECKING THE COMPONENTS AND WIRING

Fault tracing indicates that the transmission control module (TCM) has previously registered a fault but the fault is no longer active.

Check the connector A one the transmission control module (TCM) with regard to contact resistance and oxidation.

Check the power supply lead (30 supply) between the fuse in the main relay and fuse box in the engine compartment and transmission control module (TCM) #A1 (#31) with regard to an intermittent open circuit.

Check the power supply lead (15 supply) between the transmission control module (TCM) and the ignition switch (via the central electronic module (CEM).

HINT: When the ignition is on, the voltmeter should show battery voltage on both connections when measuring to chassis ground.

Check the ground lead between the chassis ground point and transmission control module (TCM) #A9 (#39) with regard to an intermittent open circuit.

HINT: The diagnostic trouble code (DTC) may have been stored due to a battery charger with a charging voltage that is too high having earlier been connected.

Remedy as necessary.

Other information:

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- For access to connector A: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- see **CONTENTS**

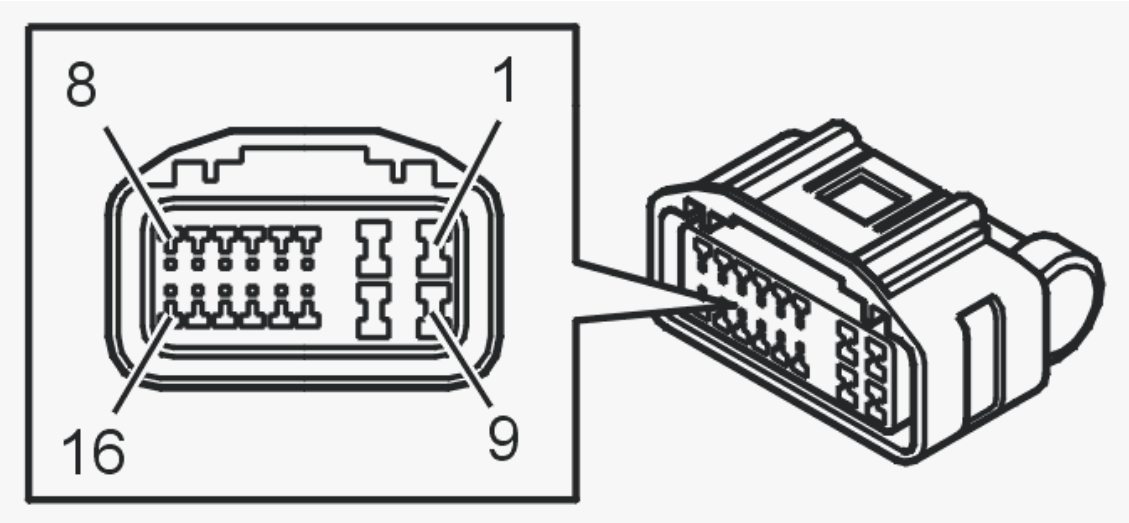


Fig. 507: Identifying Connector A Terminals
Courtesy of VOLVO CARS CORPORATION

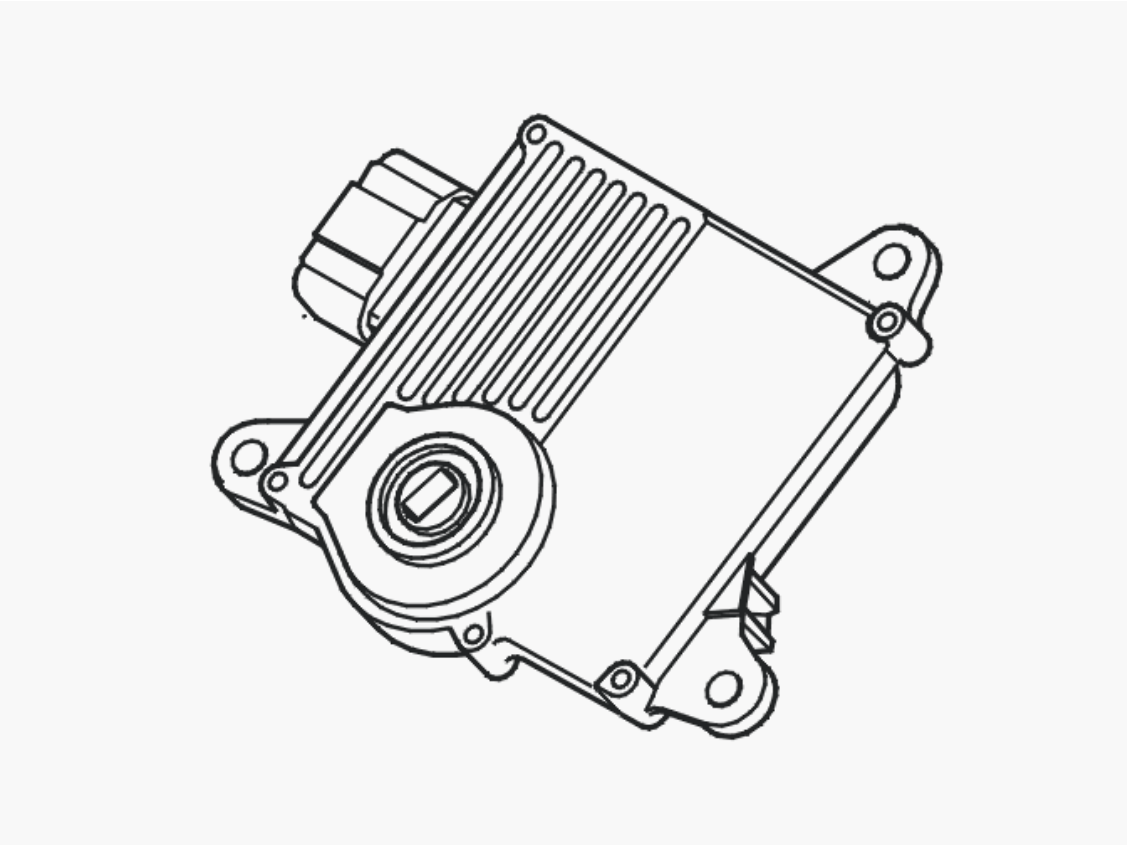


Fig. 508: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **INFORMATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

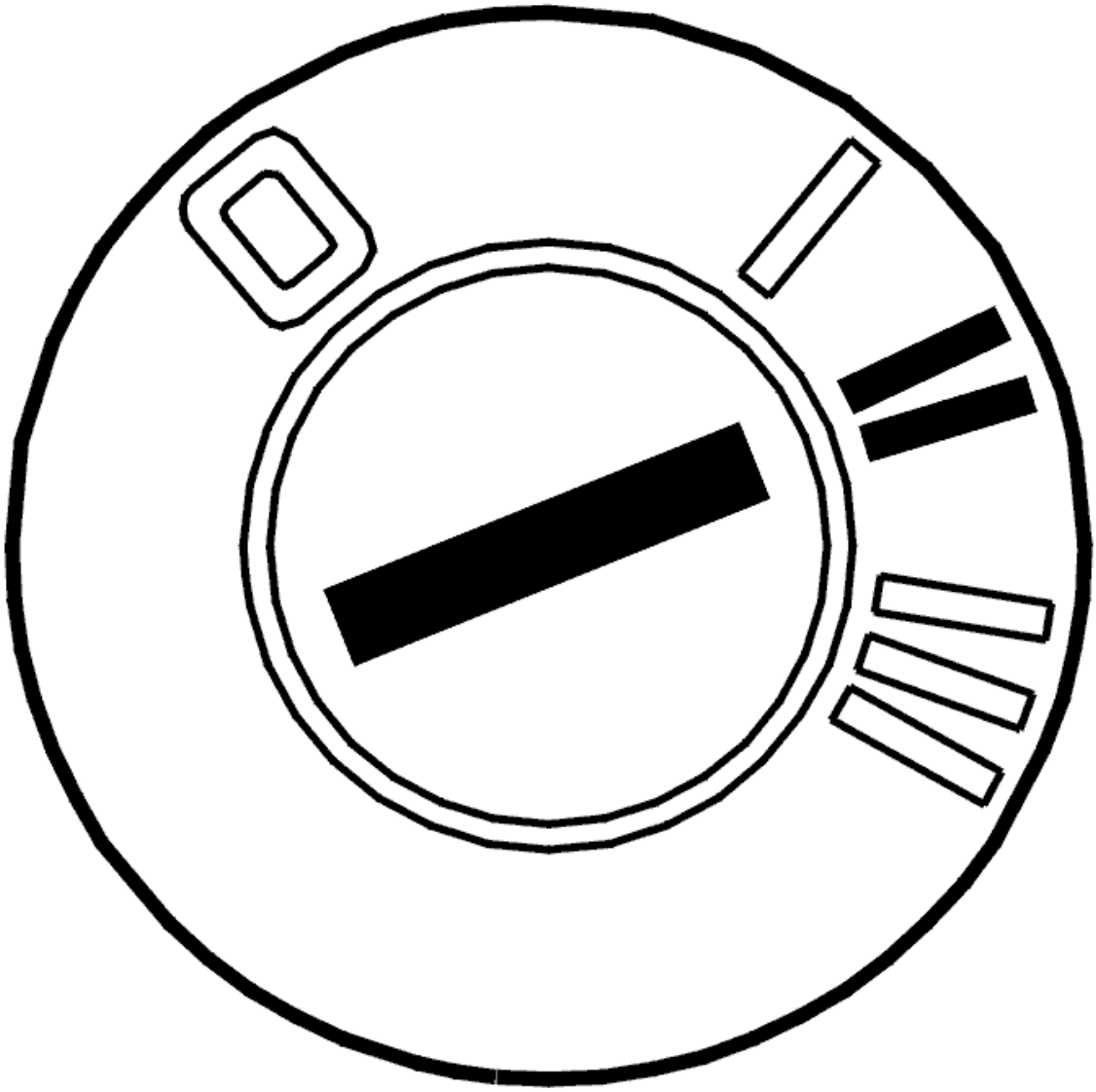


Fig. 509: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

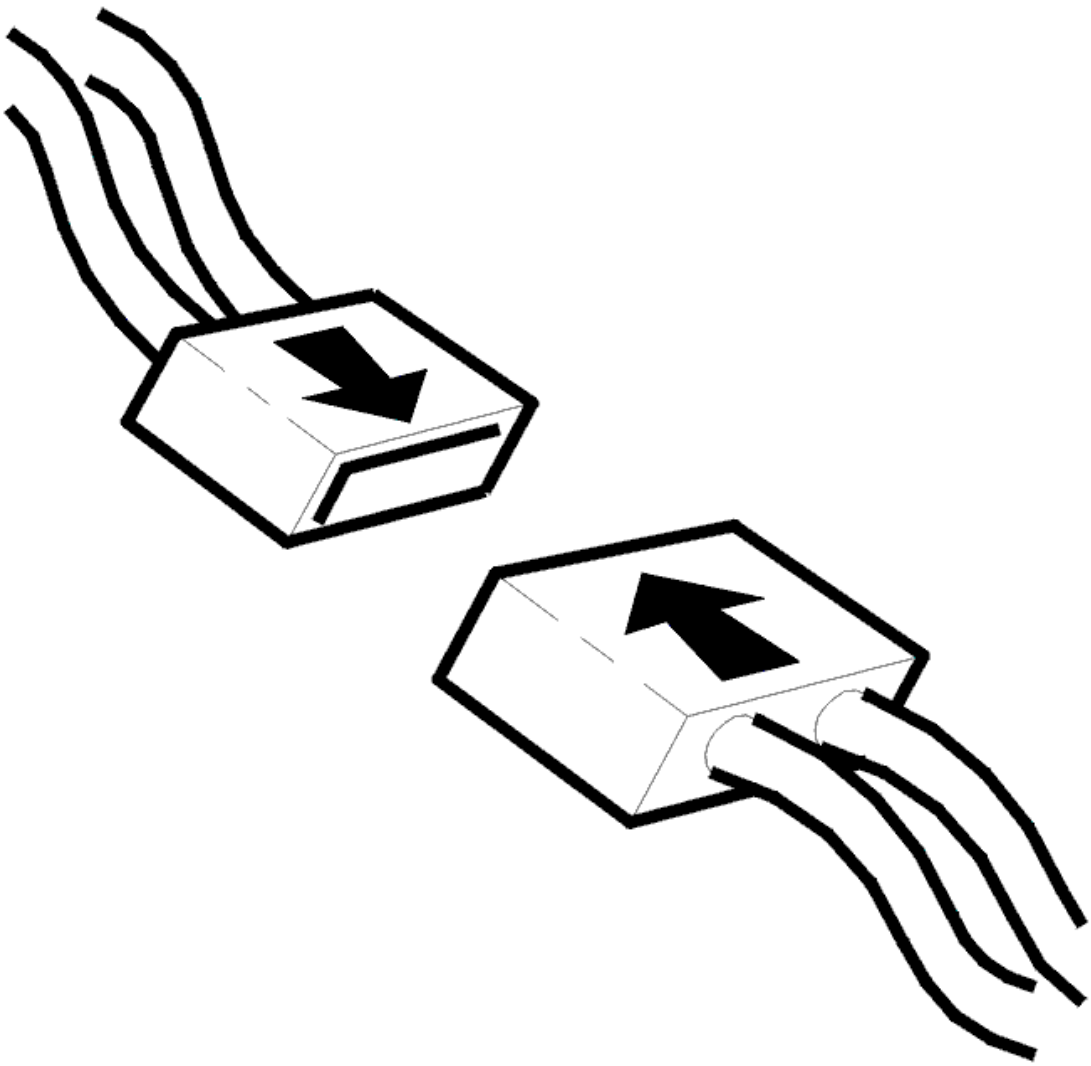


Fig. 510: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the power supply for the transmission control module (TCM).

The voltage must be about the same as the battery voltage.

- Start the engine and allow it to idle.
- Read off the power supply for the transmission control module (TCM) again.

The voltage should rise to 13-15 V, depending on the alternator charging voltage.

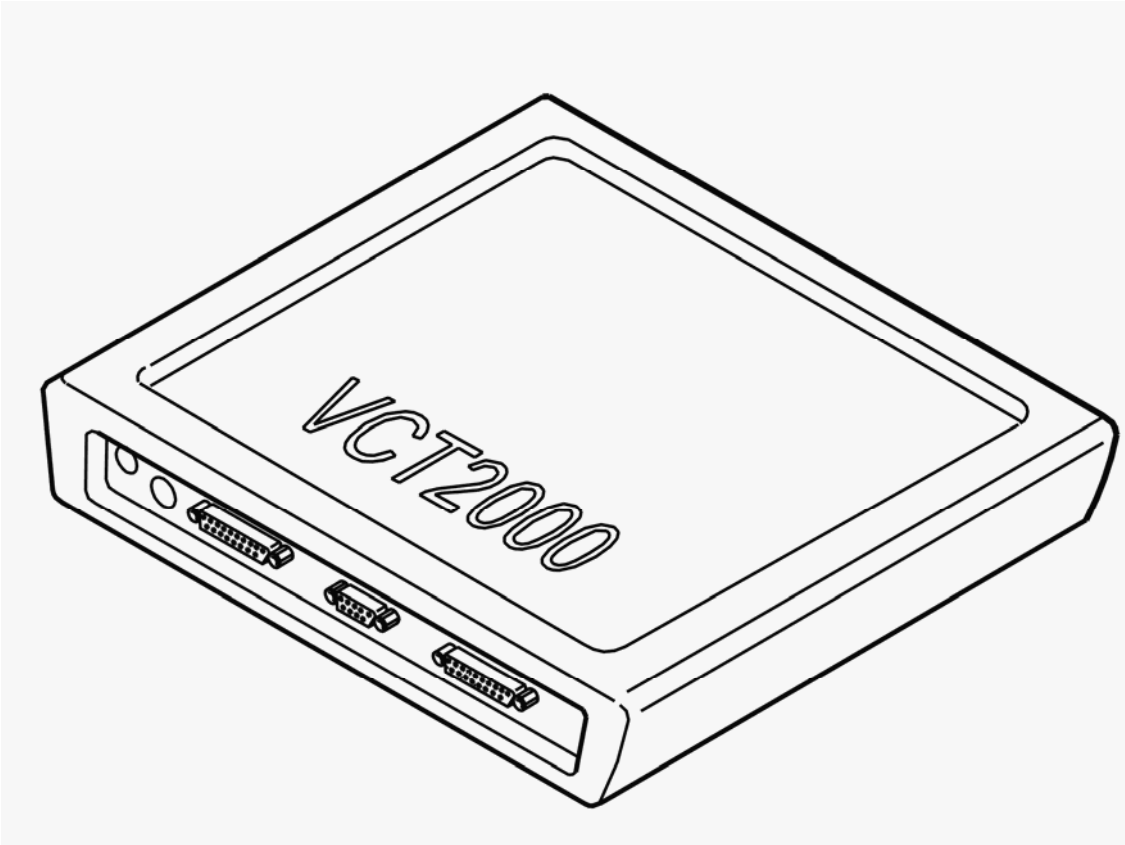


Fig. 511: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the voltage OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

TCM-P056100: SYSTEM VOLTAGE UNSTABLE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P056100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P056100**

FAULT TRACING

see **FAULT TRACING**

TCM-P056200: SYSTEM VOLTAGE LOW. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P056200

Condition

The transmission control module (TCM) continuously monitors the voltage and compares it with a voltage value sent out on the CAN network by the central electronic module (CEM).

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The system voltage is lower than 9.0 V.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Engine running.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

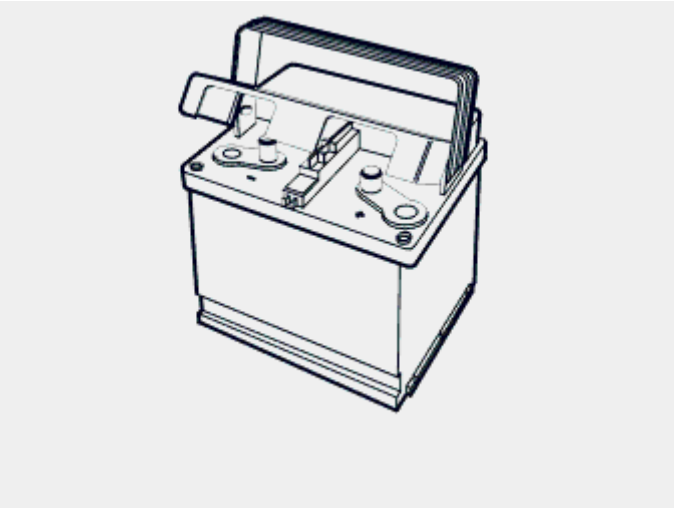


Fig. 512: Identifying Battery
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Battery voltage too low.
- Contact resistance or oxidation in the connector on the transmission control model (TCM) or the gearbox.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit

FAULT-TRACING

CHECKS

CHECKING THE POWER SUPPLY

Fig. 513: Identifying Ignition ON

Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read the voltage supply for the transmission control module (TCM) and central electronic module (CEM).

  The voltage supply for the transmission control module (TCM) and central electronic module (CEM) must be approximately the same.

  If the voltage for the transmission control module (TCM) is below 9 V it means that the fault is permanent.

  If the voltages are approximately the same then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

Fig. 514: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

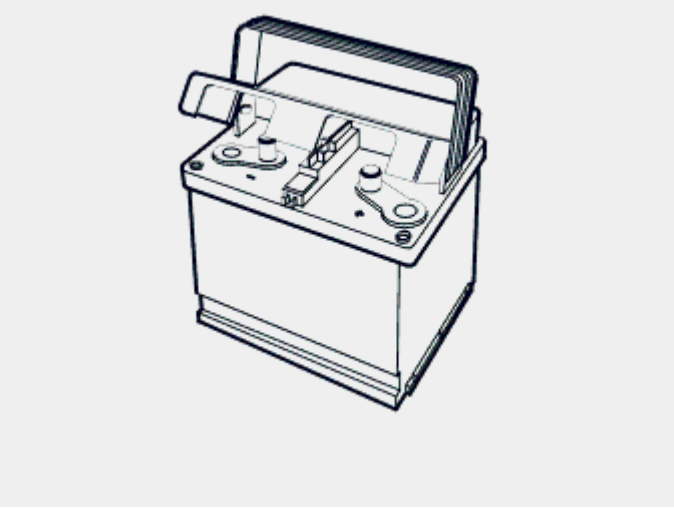


Fig. 515: Identifying Battery
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

Check the battery status.

Check connector A on the transmission control module (TCM). Check for contact resistance and oxidation.

Check the power supply cable (30 supply). Check for an intermittent open-circuit.

Take readings between:

- Transmission control module (TCM) terminal #A1 (#31) and the fuse in the engine compartment relay/fuse box.

Check the power supply cable (15 supply). Check for contact resistance and oxidation.

Take readings between:

- Transmission control module (TCM) terminal #A11 (#41) and the fuse in the passenger compartment relay/fuse box.

HINT: With the ignition on the voltmeter must display battery voltage at both terminals when measured against ground.

Check the ground cable. Check for an intermittent open-circuit.

Take readings between:

- Transmission control module (TCM) terminal #A9 (#39) and grounding point.

HINT: When the ignition is on, the voltmeter should show battery voltage between #A9 (#39) and the positive battery terminal.

NOTE: No fault is found, fault trace central electronic module (CEM).

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- To access connector A:**TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

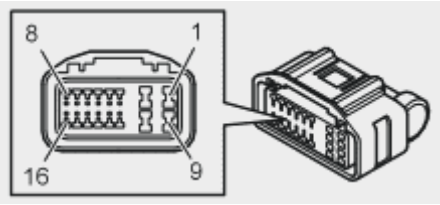


Fig. 516: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

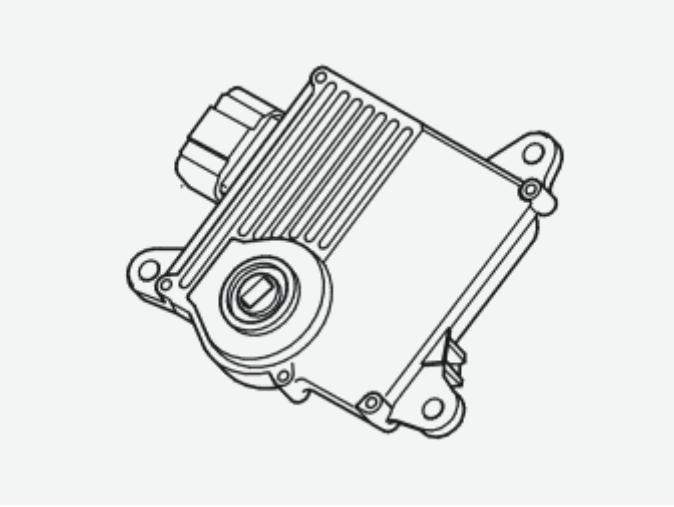


Fig. 517: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 518: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

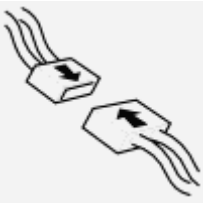


Fig. 519: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the power supply for the transmission control module (TCM).

  Voltage should be about equal to battery voltage.

  - Start the engine. Allow the engine to idle.
  - Read off the power supply for the transmission control module (TCM) again.

  The voltage must be raised to 13-15V depending on the generator (GEN) charging voltage.

Fig. 520: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the voltage OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P056200: SYSTEM VOLTAGE LOW. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P056200

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P056200**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P056200: SYSTEM VOLTAGE LOW. GENERAL INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P056200

Condition

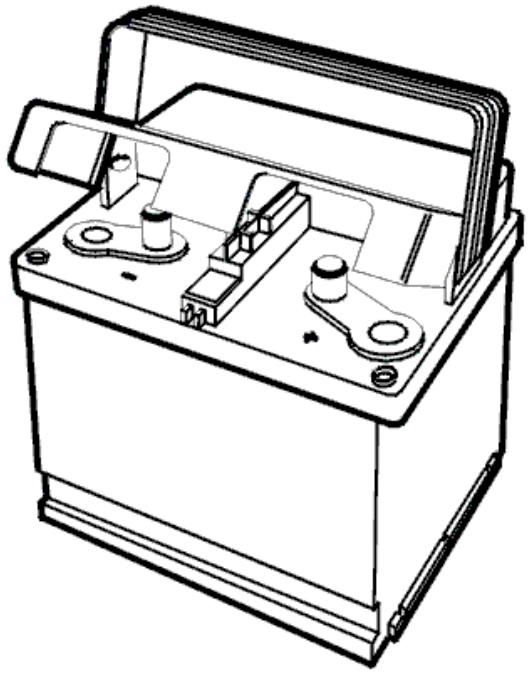


Fig. 1: Identifying Battery
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) continuously monitors the supply voltage and compares it with a voltage value sent out on the CAN network by the central electronic module (CEM).

If the transmission control module (TCM) registers a system voltage below 9.0V, the diagnostic trouble code (DTC) will be generated.

The diagnostic trouble code can be diagnosed when the engine is running.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Battery voltage too low.

- Contact resistance or oxidation in the connector on the transmission control model (TCM) or the gearbox.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit

FAULT TRACING TCM-P056200

CHECKS

CHECKING THE POWER SUPPLY

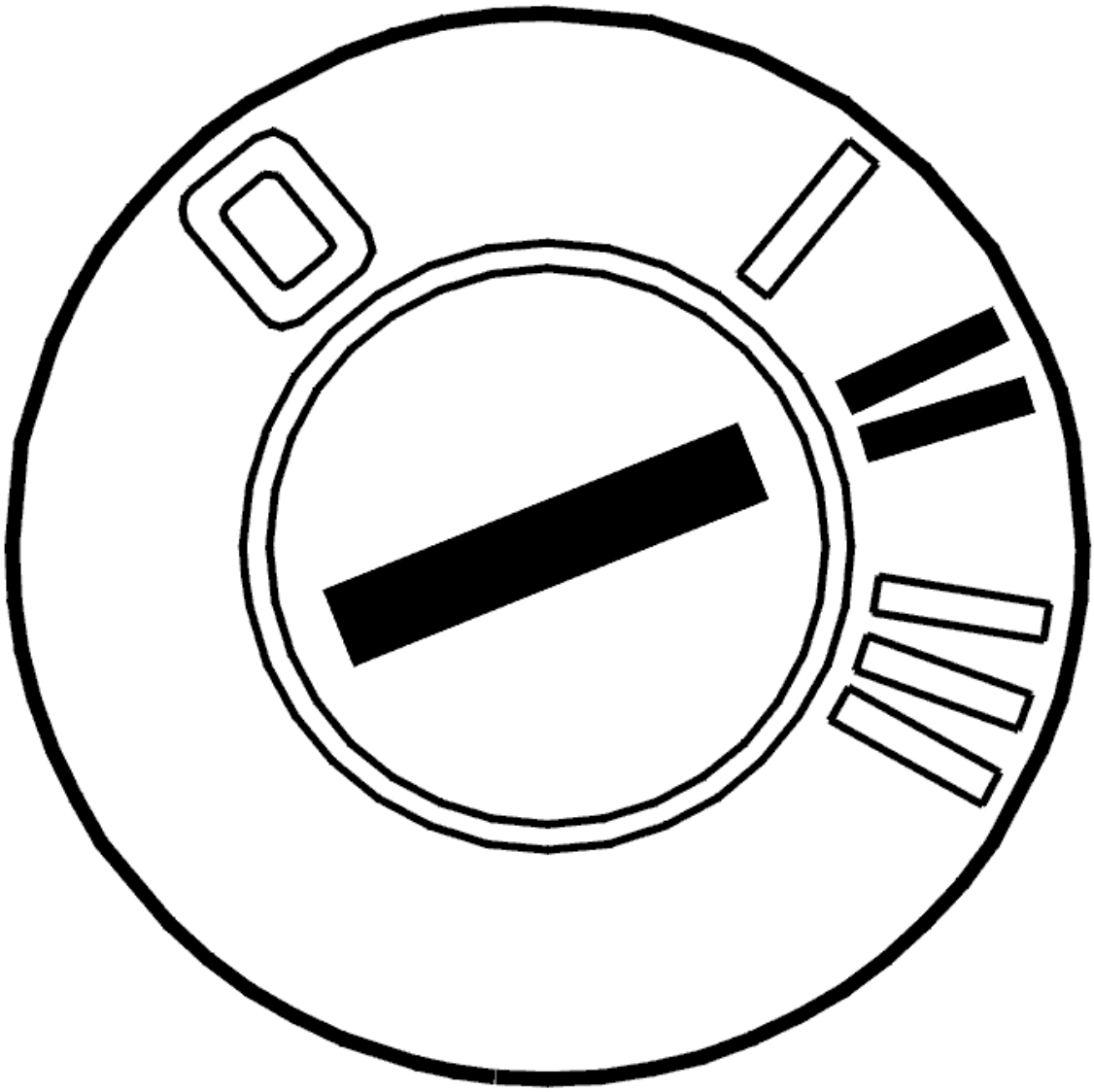


Fig. 2: Identifying Ignition ON

Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read the voltage supply for the transmission control module (TCM) and central electronic module (CEM).

  The voltage supply for the transmission control module (TCM) and central electronic module (CEM) must be approximately the same.

  If the voltage for the transmission control module (TCM) is below 9 V it means that the fault is permanent.

  If the voltages are approximately the same then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

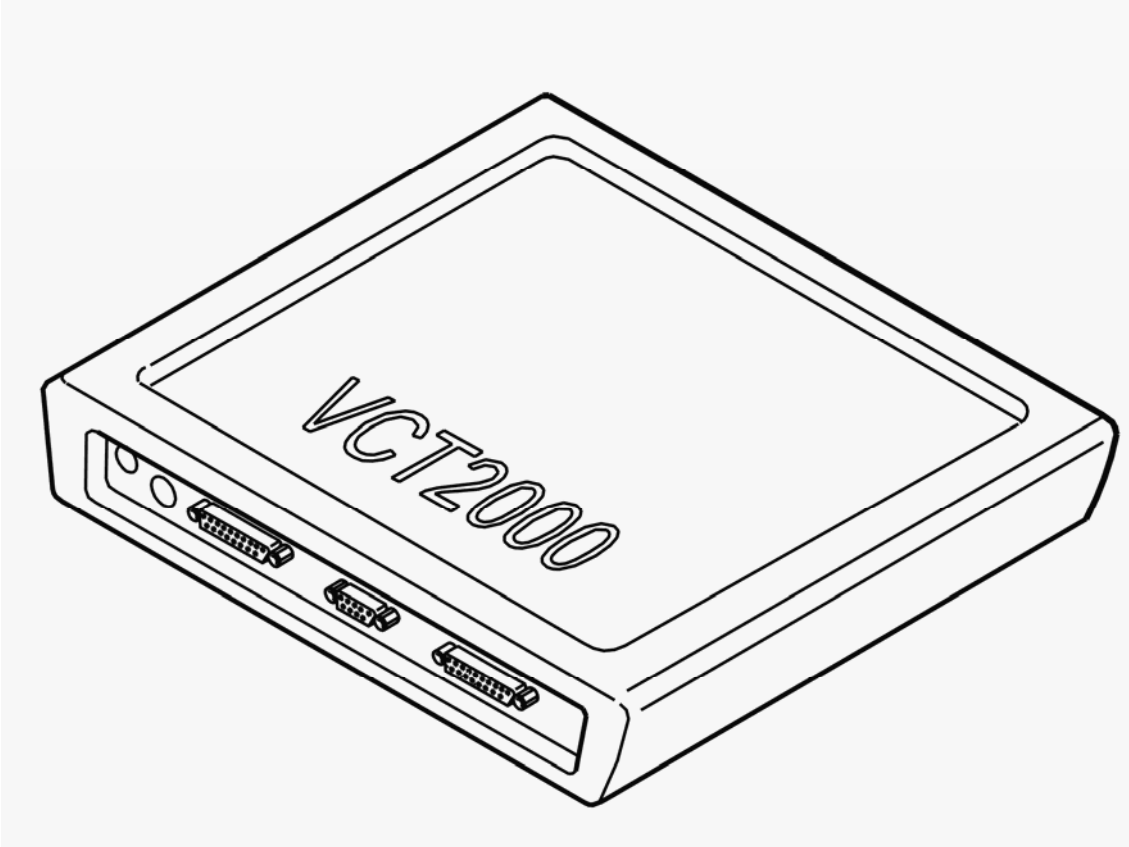


Fig. 3: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

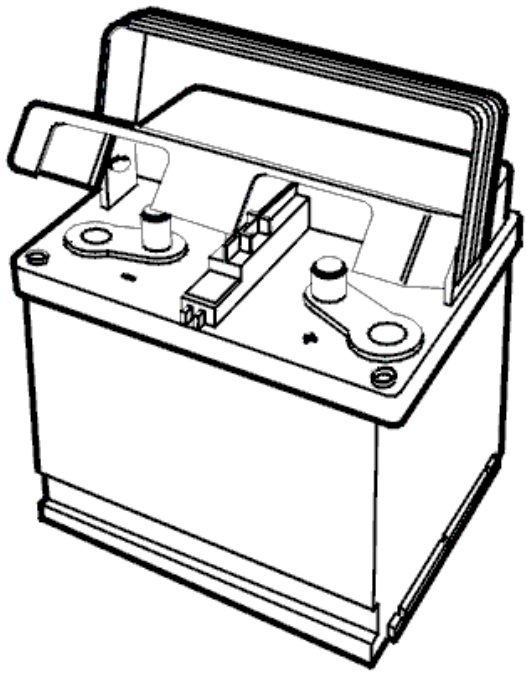


Fig. 4: Identifying Battery
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING CABLE AND COMPONENT**

CHECKING CABLE AND COMPONENT

Check the battery status.

Check connector A on the transmission control module (TCM). Check for contact resistance and oxidation.

Check the power supply cable (30 supply) between the fuse in the relay /fusebox in the engine compartment and the transmission control module (TCM) terminal #A1 (#31). Check for contact resistance and oxidation.

Check the power supply cable (15 supply) between the fuse in the relay /fusebox in the engine compartment and the transmission control module (TCM) terminal #A11 (#41). Check for contact resistance and oxidation.

HINT: With the ignition on the voltmeter must display battery voltage at both terminals when measured against ground.

Check the ground cable between the ground terminal and the transmission control module (TCM) terminal #A9 (#39). Check for contact resistance and oxidation.

HINT: With the ignition on the voltmeter must display battery voltage between #A9 (#39) and the battery + pole.

NOTE: No fault is found, fault trace central electronic module (CEM).

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- To access connector A: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- see **CONTENTS**

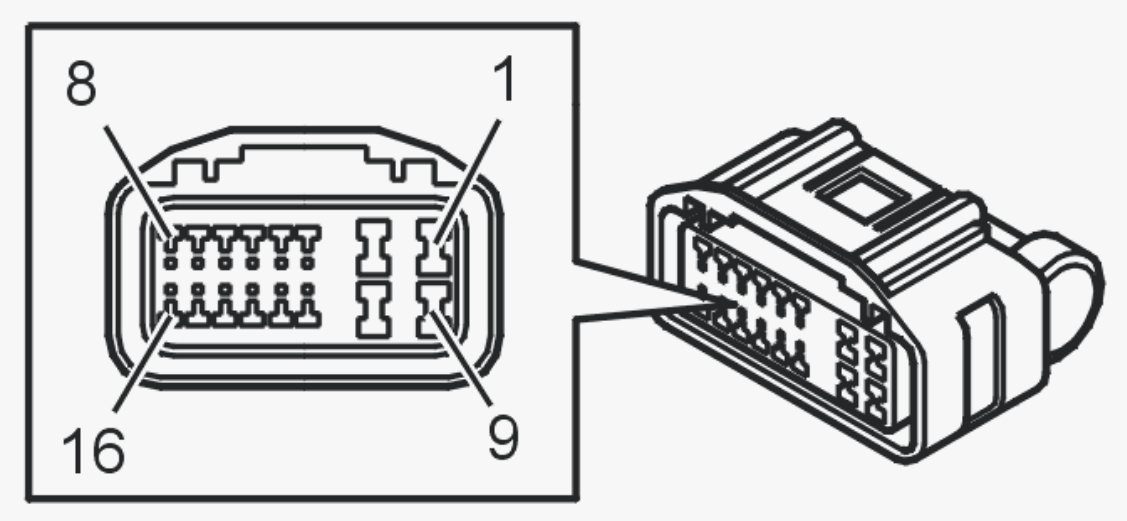


Fig. 5: Identifying Connector A Terminals
Courtesy of VOLVO CARS CORPORATION

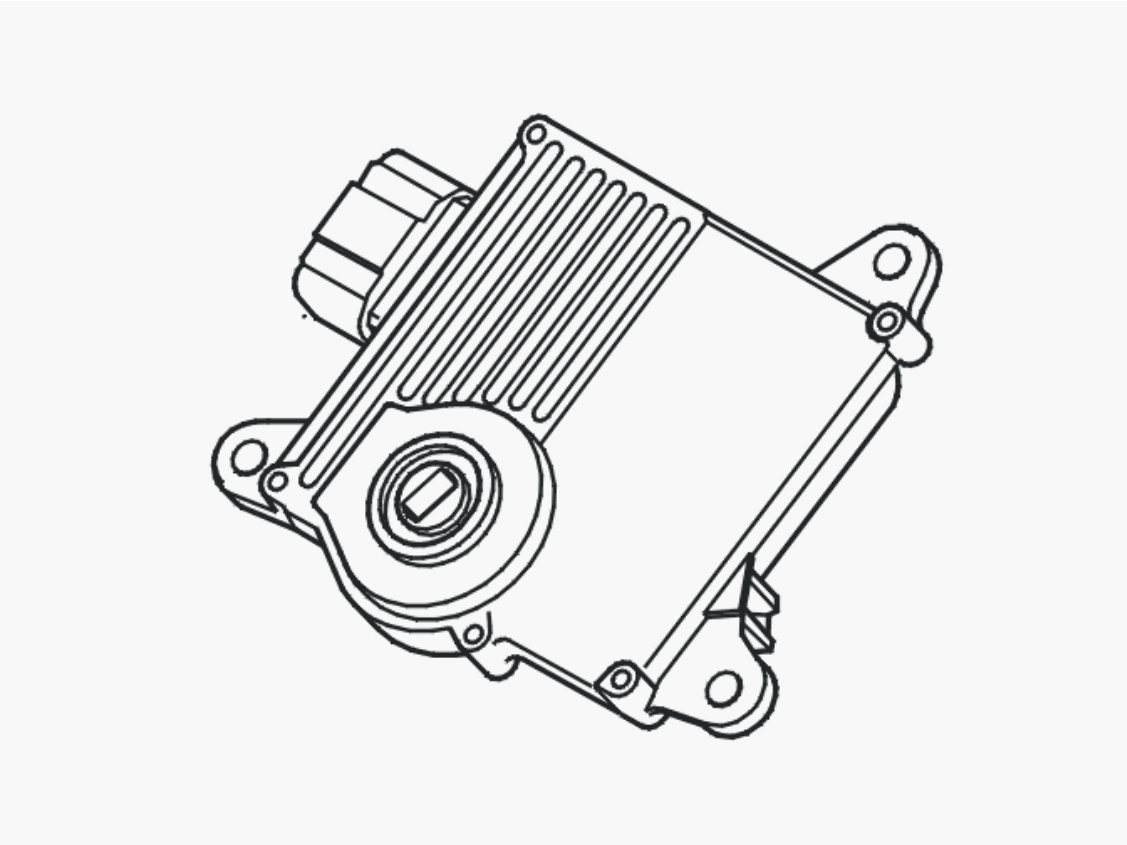


Fig. 6: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

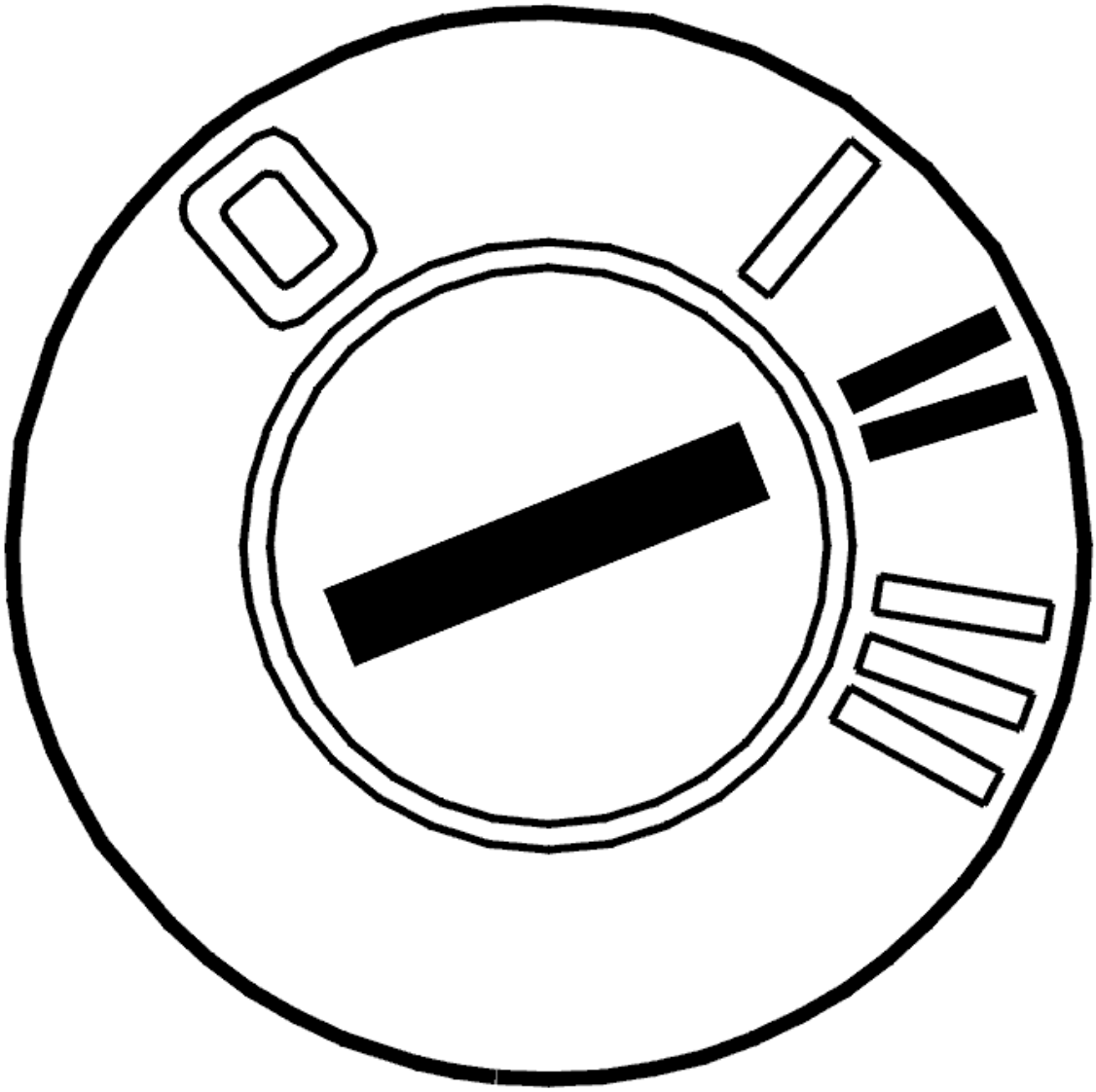


Fig. 7: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

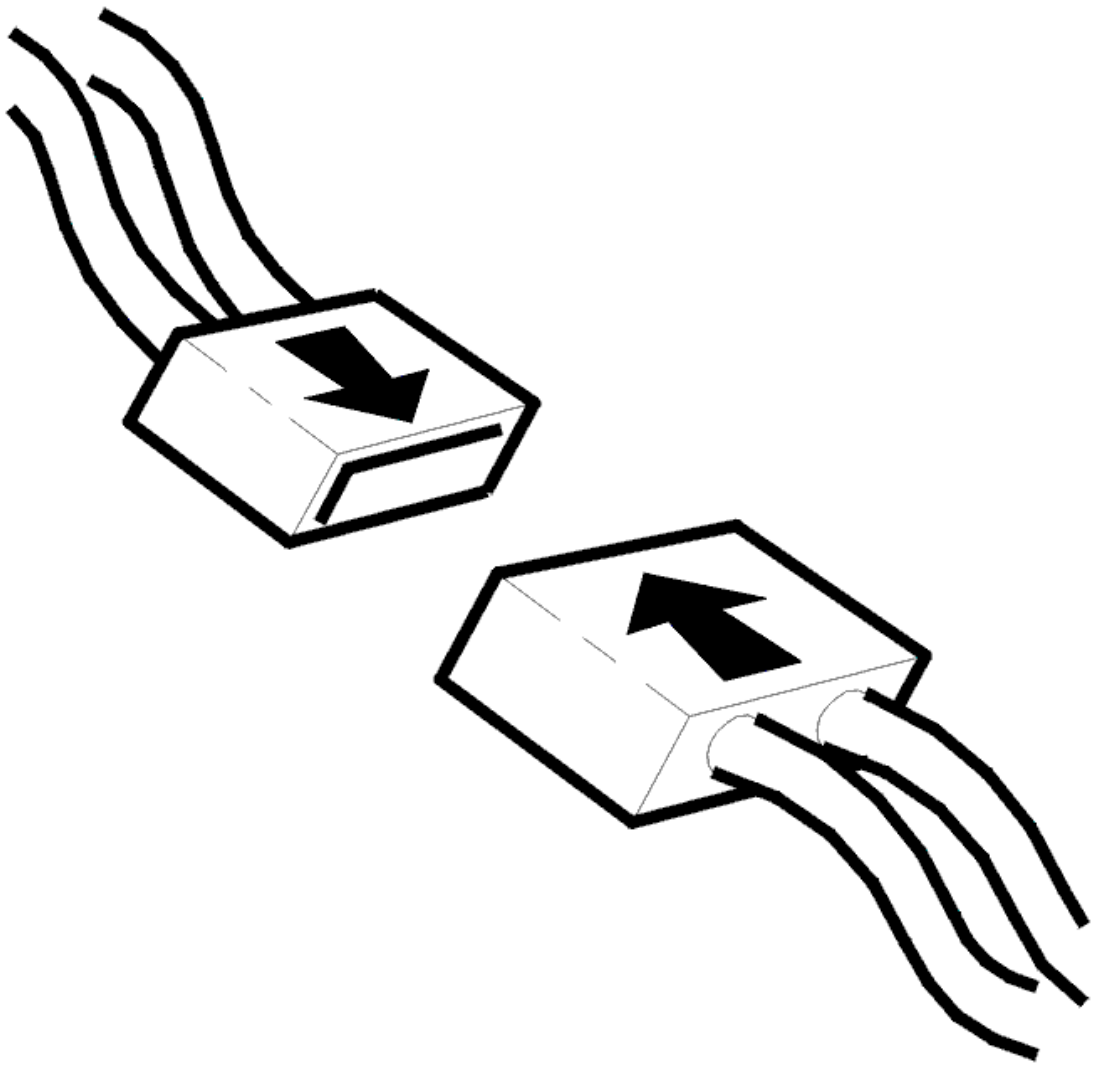


Fig. 8: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the power supply for the transmission control module (TCM).

The voltage should be approx. the same as the battery voltage.

- Start the engine and allow it to idle.
- Read off the power supply for the transmission control module (TCM) again.

The voltage should rise to 13-15 V, depending on the alternator charging voltage.

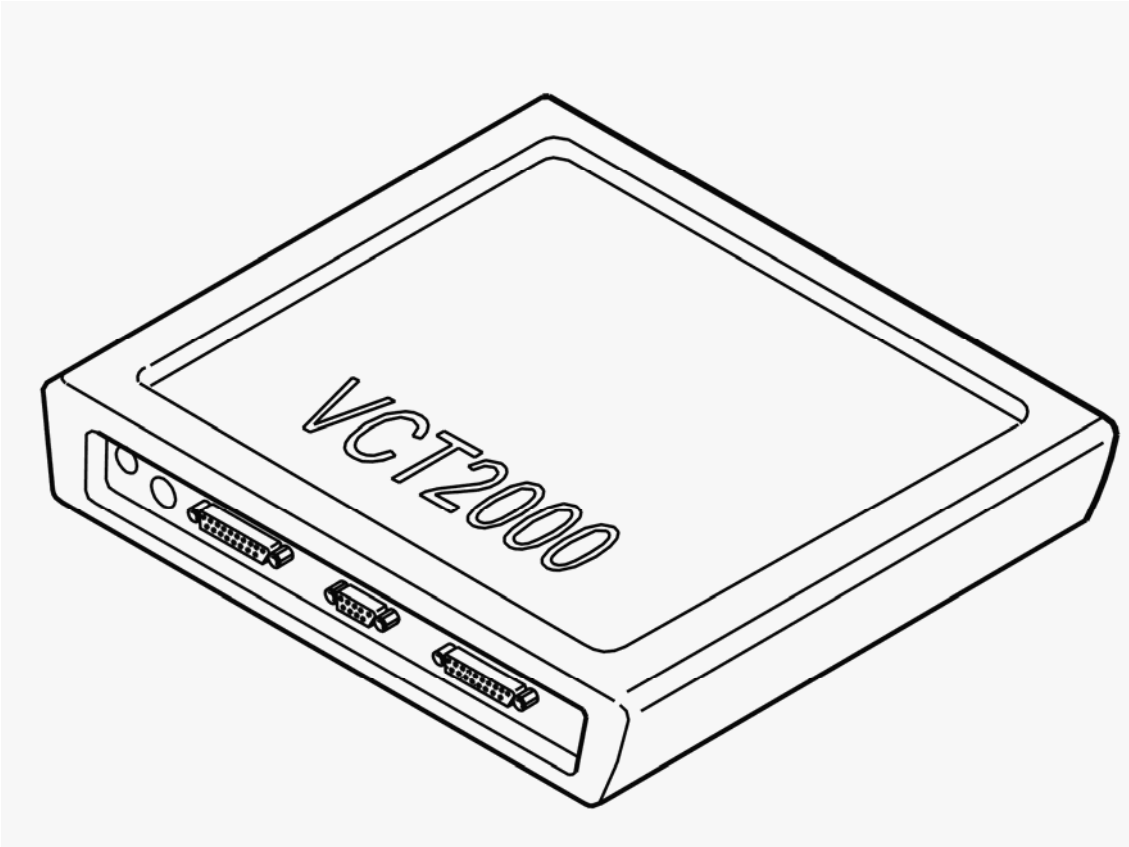


Fig. 9: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the voltage OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P056200: SYSTEM VOLTAGE LOW. GENERAL INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P056200

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P056200**

FAULT TRACING TCM-P056200

see **FAULT TRACING TCM-P056200**

TCM-P056300: SYSTEM VOLTAGE HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P056300

Condition

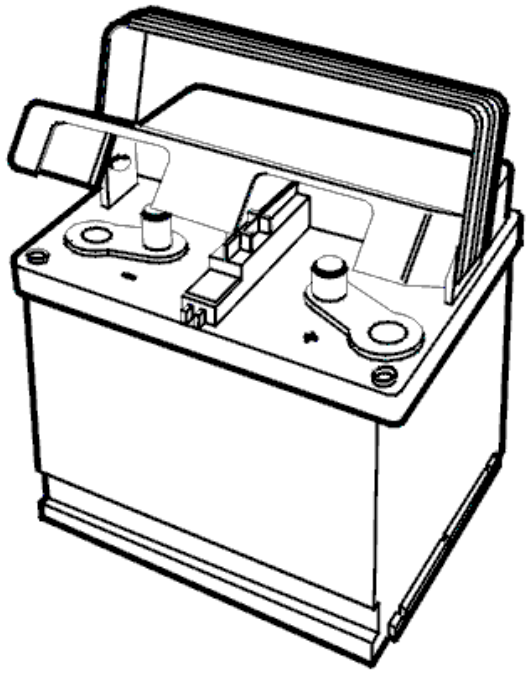


Fig. 10: Identifying Battery
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) continuously monitors the voltage and compares it with a voltage value sent out on the CAN network by the central electronic module (CEM).

If the transmission control module (TCM) registers that the power supply is too high (above 15.5V) to guarantee the function of the control module, the diagnostic trouble code (DTC) will be generated.

The diagnostic trouble code (DTC) can be diagnosed while the engine is running.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Battery charger with incorrect voltage has been used.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit

FAULT TRACING

see **FAULT TRACING**

TCM-P056300: SYSTEM VOLTAGE HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P056300

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P056300**

FAULT TRACING

see **FAULT TRACING**

TCM-P060000: SERIAL COMMUNICATION LINK. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060000

Condition

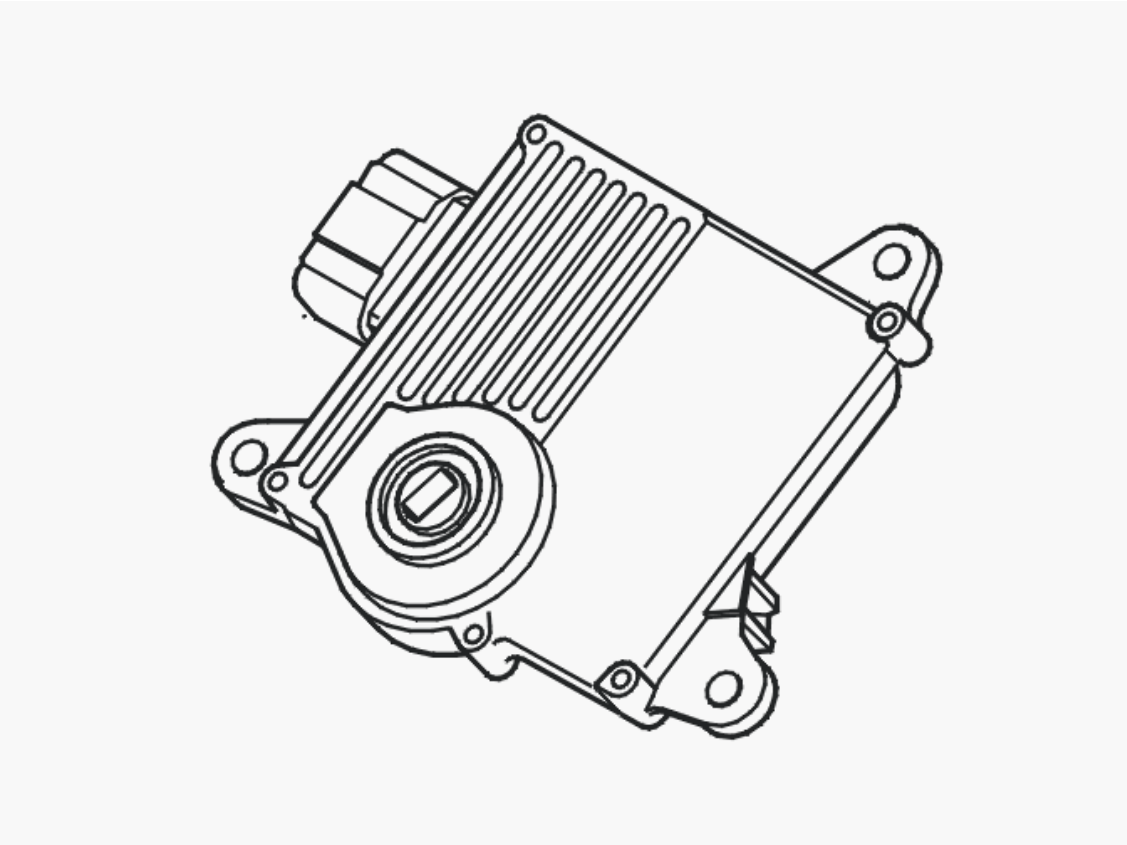


Fig. 11: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The control modules transmit and receive information via a standardized serial communication method - CAN (Control Area Network). The diagnostic trouble code (DTC) is stored if the transmission control module (TCM) registers serious interference (CAN communication blocked).

NOTE: In case of a system communication fault, it will not be possible to communicate with the transmission control module (TCM). It will therefore only be possible to read if the fault is intermittent.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance or oxidation in the terminals
- Open-circuit in the control area network (CAN) wiring.
- Short-circuit between the control area network (CAN) wiring.
- Internal fault in transmission control module (TCM).

- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]

- General warning lamp lit
- No gear changing.

TCM-P060100: INTERNAL CONTROL MODULE MEMORY CHECK SUM ERROR. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060100

Condition

The Transmission control module (TCM) has three different internal memories, one for the program application (FLASH), one for permanent storage of information (EEPROM) and one for current information (RAM).

With the ignition off, certain information is saved from RAM to EEPROM and then the information is erased from RAM.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The checksum calculated after the ignition is switched on differs from the saved one.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

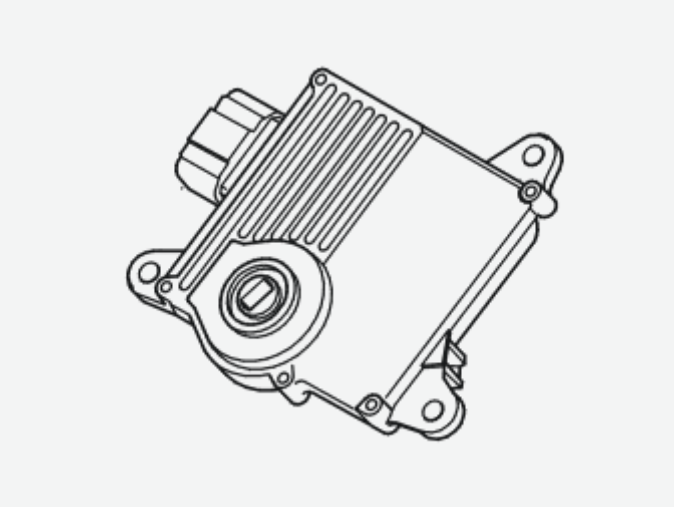


Fig. 12: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- No gear shift
- Rough gear shift

FAULT-TRACING

ERASING DIAGNOSTIC TROUBLE CODE (DTC)

HINT: The transmission control module (TCM) has registered an internal fault.

HINT: The fault may intermittent and is why the diagnostic trouble code (DTC) must be erased and read off again.

NOTE: In the event of erasing, all stored diagnostic trouble codes (DTCs) with corresponding information disappear.

If there are other diagnostic trouble codes (DTCs) for Transmission control module (TCM), these must be fault-traced first.

If necessary, go to Vehicle communication and read out "Extended diagnostic trouble code (DTC) information"

Fig. 13: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Erase the diagnostic trouble code (DTC) by clicking the VCT2000 symbol.

Fig. 14: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **READING OFF DIAGNOSTIC TROUBLE CODES (DTCS)**

READING OFF DIAGNOSTIC TROUBLE CODES (DTCS)

Fig. 15: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Wait for two minutes so that the diagnostic trouble codes (DTCs) are stored in the memory of the transmission control module (TCM).
- Ignition on.
- Read off the diagnostic trouble codes (DTCs) by clicking on the VCT2000 symbol.

Fig. 16: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

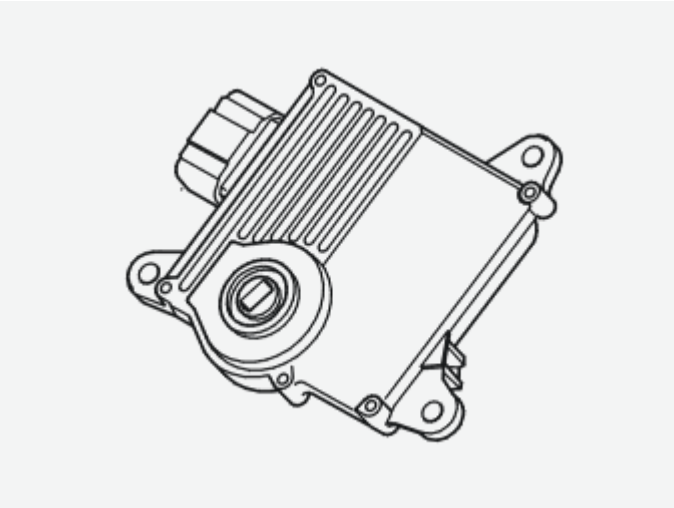


Fig. 17: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Are the diagnostic trouble code (DTCs) still stored?

- **YES**

  Refer to **REPLACING THE CONTROL MODULE AND PROGRAMMING**

- **NO**

  OKAY: Troubleshooting has been completed.

REPLACING THE CONTROL MODULE AND PROGRAMMING

The transmission control module (TCM) has registered an internal fault.

Replace control module.

CAUTION: A new control module is delivered without software.

For the transmission control module (TCM) to work after replacement, it must be programmed.

Other information

- Program and change control module according to:**TRANSMISSION CONTROL MODULE (TCM)**

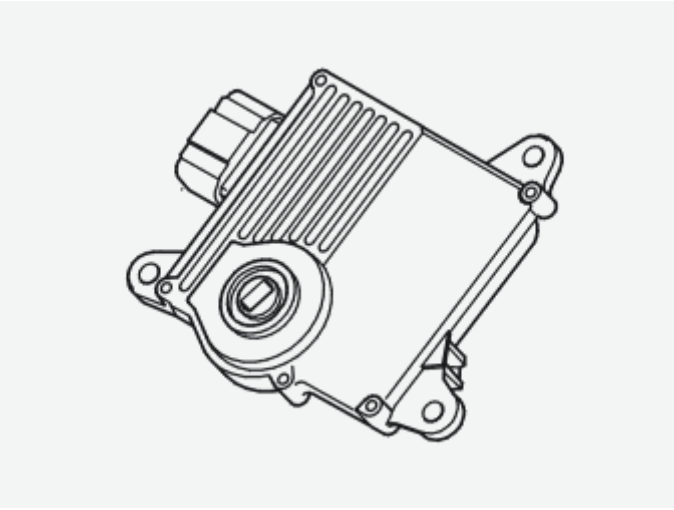


Fig. 18: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

TCM-P060100: INTERNAL CONTROL MODULE MEMORY CHECK SUM ERROR. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060100**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P060100: INTERNAL FAULT IN CONTROL MODULE MEMORY CHECKSUM. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060100

Condition

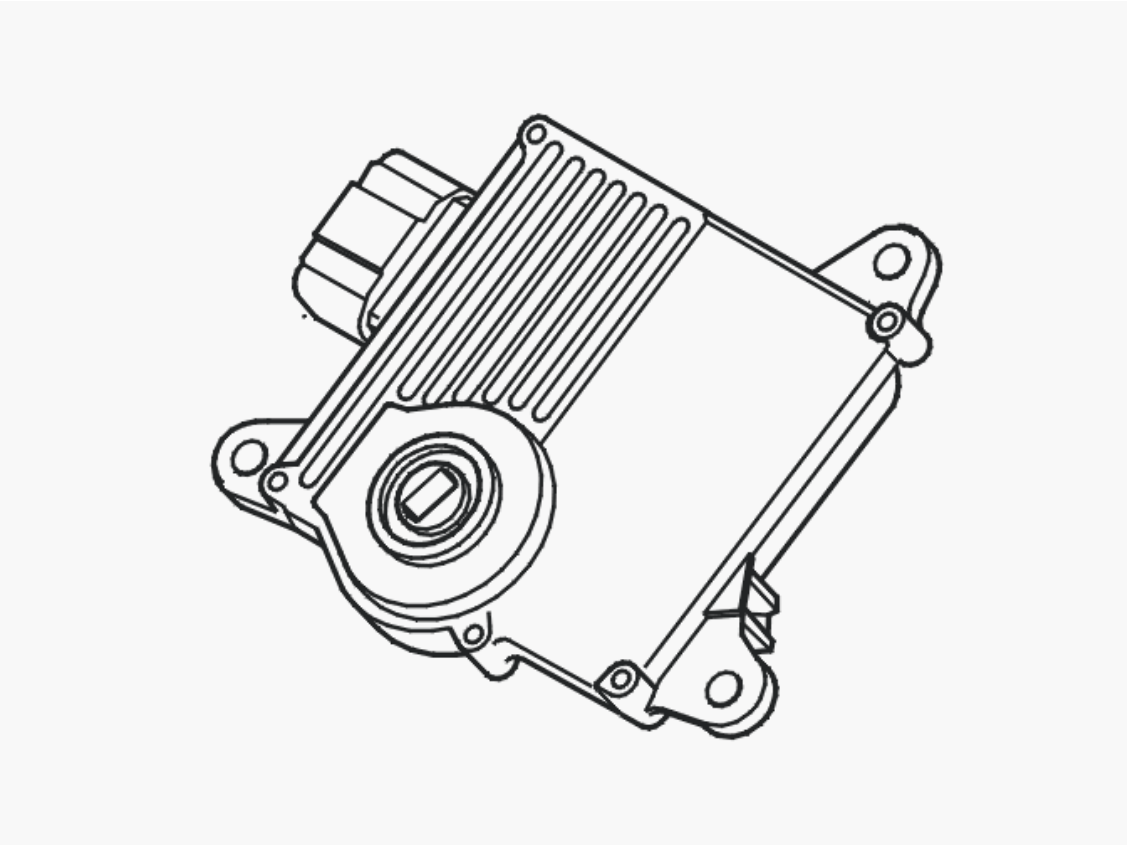


Fig. 19: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) has three different internal memories, one for the software application (FLASH), one for permanent storage of information (EEPROM) and one for current information (RAM). When turning off the ignition, certain information will be saved from the RAM memory to the EEPROM and then deleted from RAM.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Internal fault in transmission control module (TCM).

Fault symptom[s]

- No gear changing.

- Harsh gear changing

FAULT TRACING TCM-P060100

ERASING DIAGNOSTIC TROUBLE CODE (DTC)

HINT: The transmission control module (TCM) has registered an internal fault. The fault can be of intermittent nature, so the diagnostic trouble code (DTC) should be deleted and read again.

NOTE: Erasing will delete all the stored diagnostic trouble codes (DTC) with any associated information. If there are any other diagnostic trouble codes (DTC) present for the transmission control module (TCM), they should be investigated first. If necessary, go to Car Communication and read off "Extended diagnostic trouble code (DTC) information".

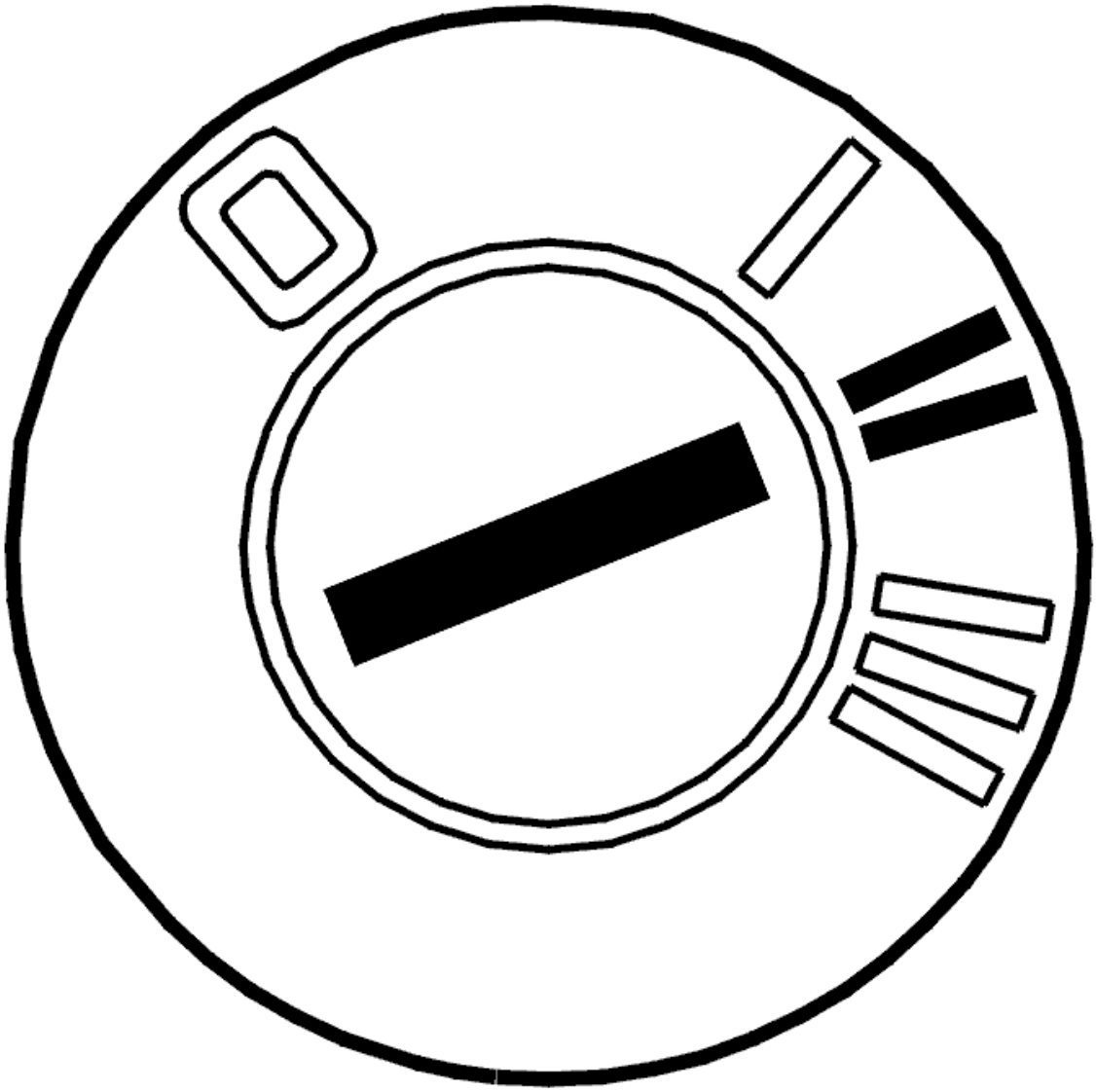


Fig. 20: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Erase diagnostic trouble code (DTC) by clicking the VCT2000 symbol.

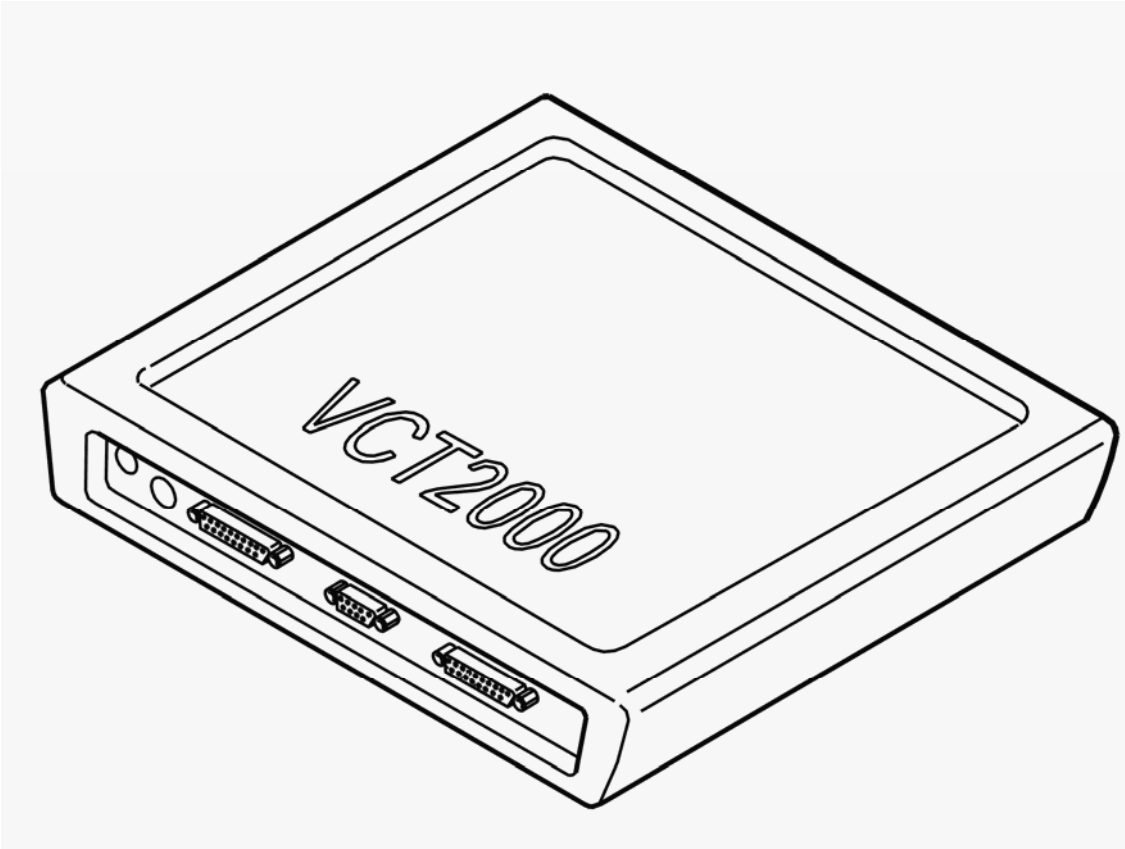


Fig. 21: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

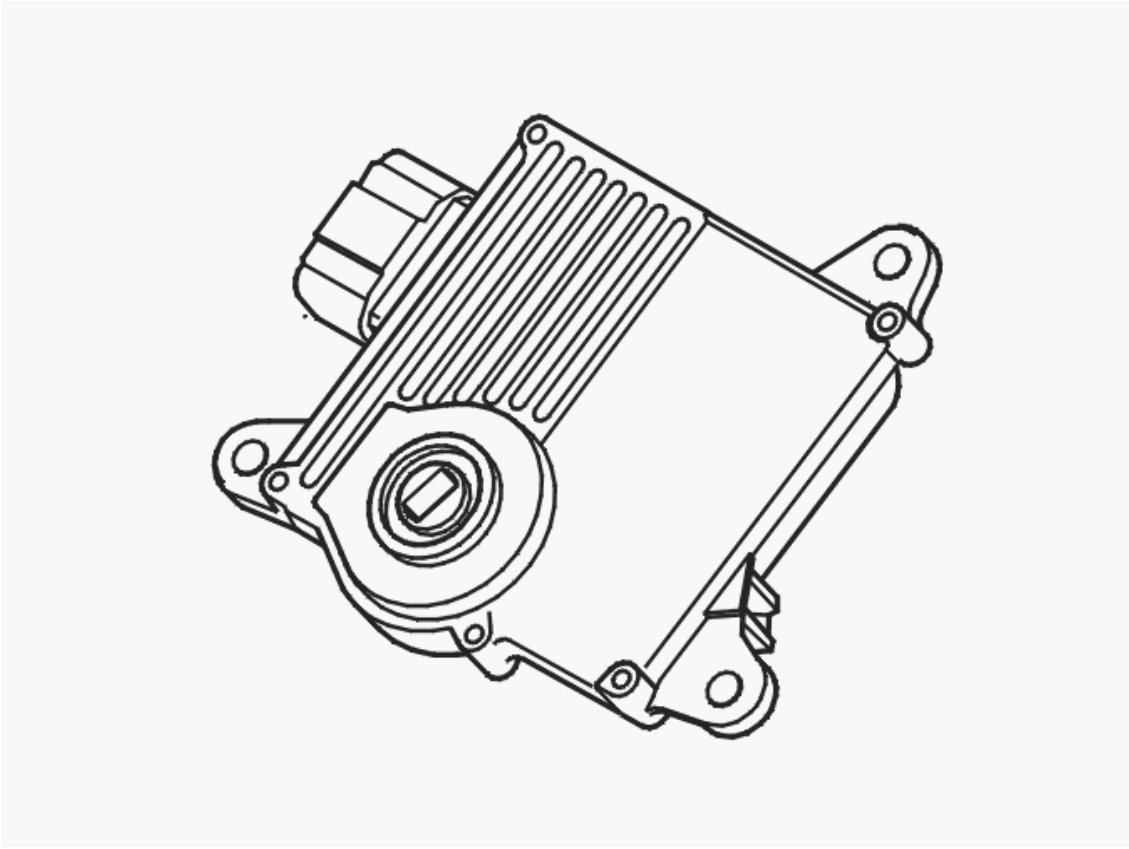


Fig. 22: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **READING OFF DIAGNOSTIC TROUBLE CODES (DTCS)**

READING OFF DIAGNOSTIC TROUBLE CODES (DTCS)

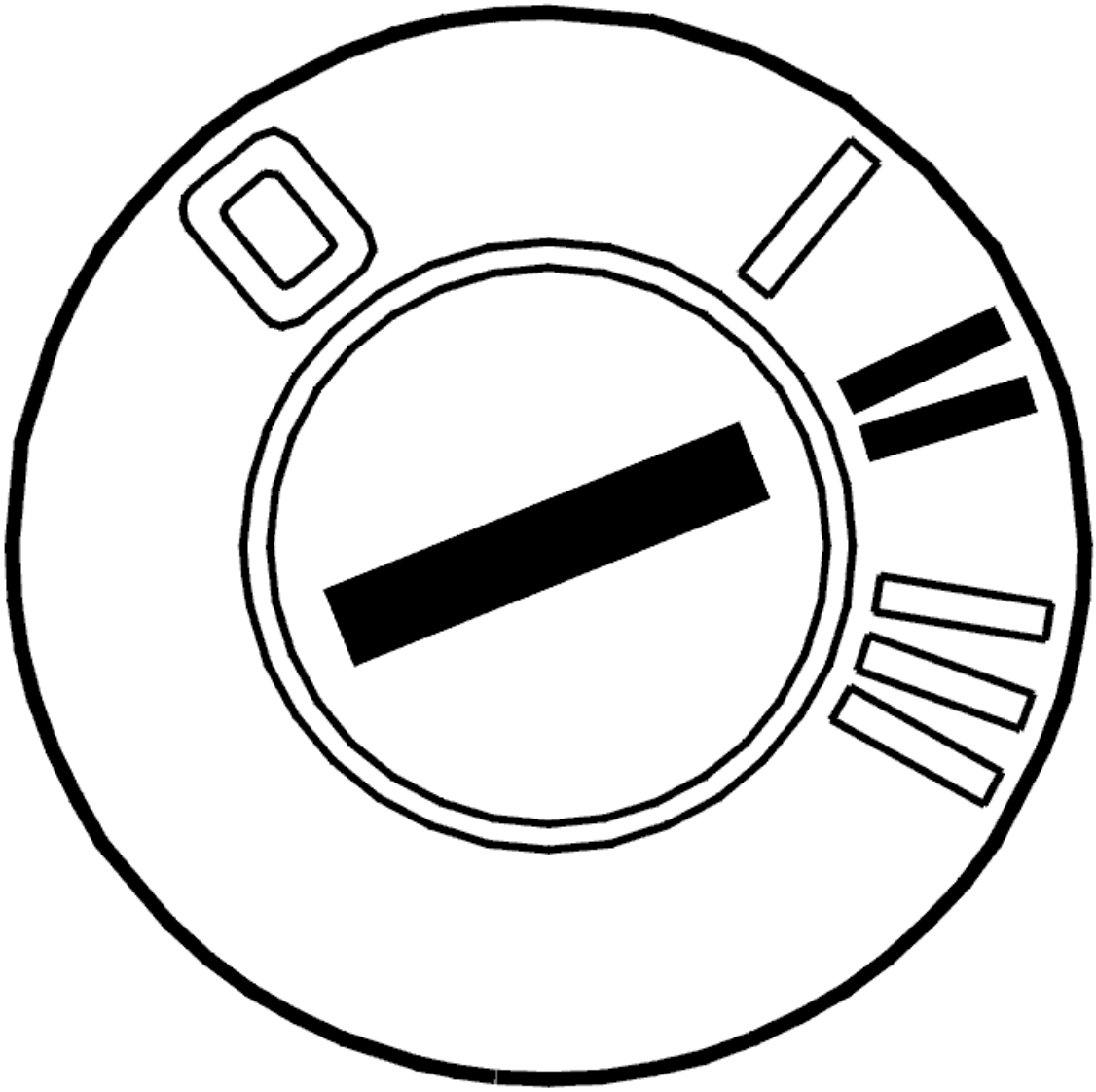


Fig. 23: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes so that the diagnostic trouble codes (DTC) can be stored in memory in the transmission control module (TCM).
- Ignition on
- Read out diagnostic trouble codes by clicking the VCT2000 symbol.

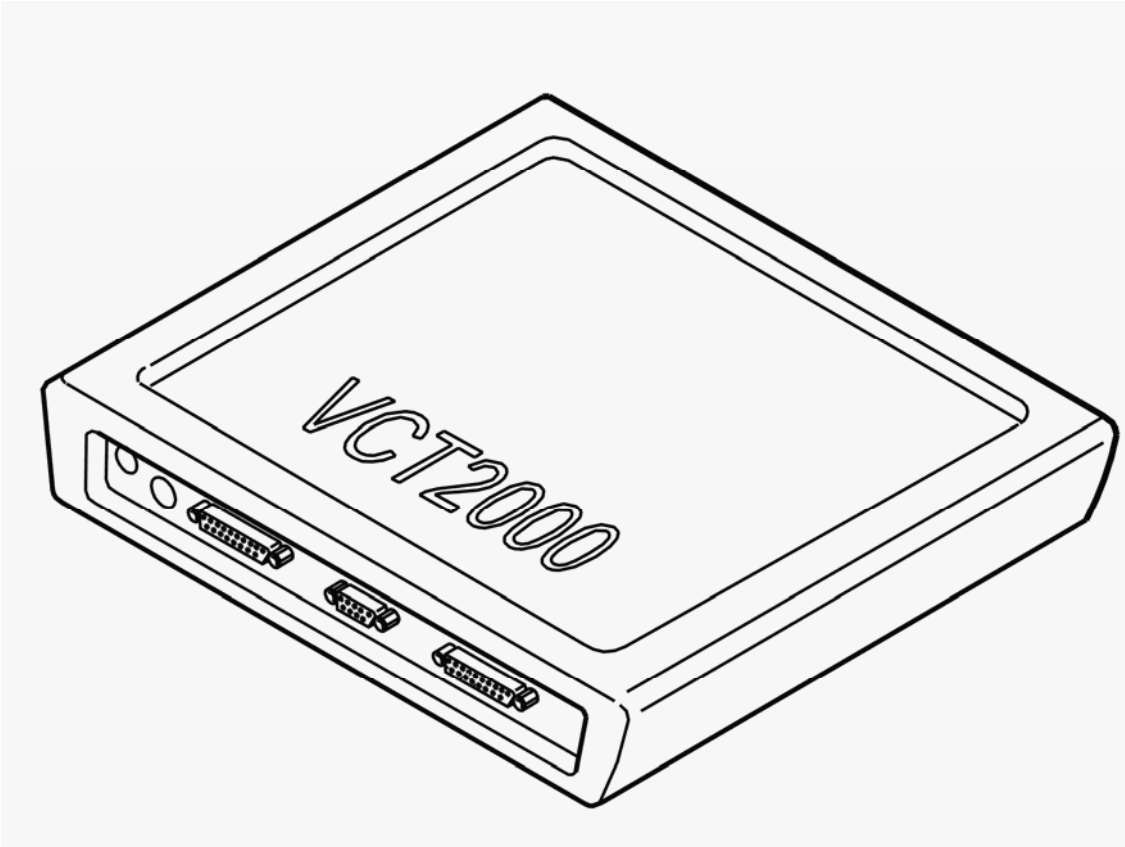


Fig. 24: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

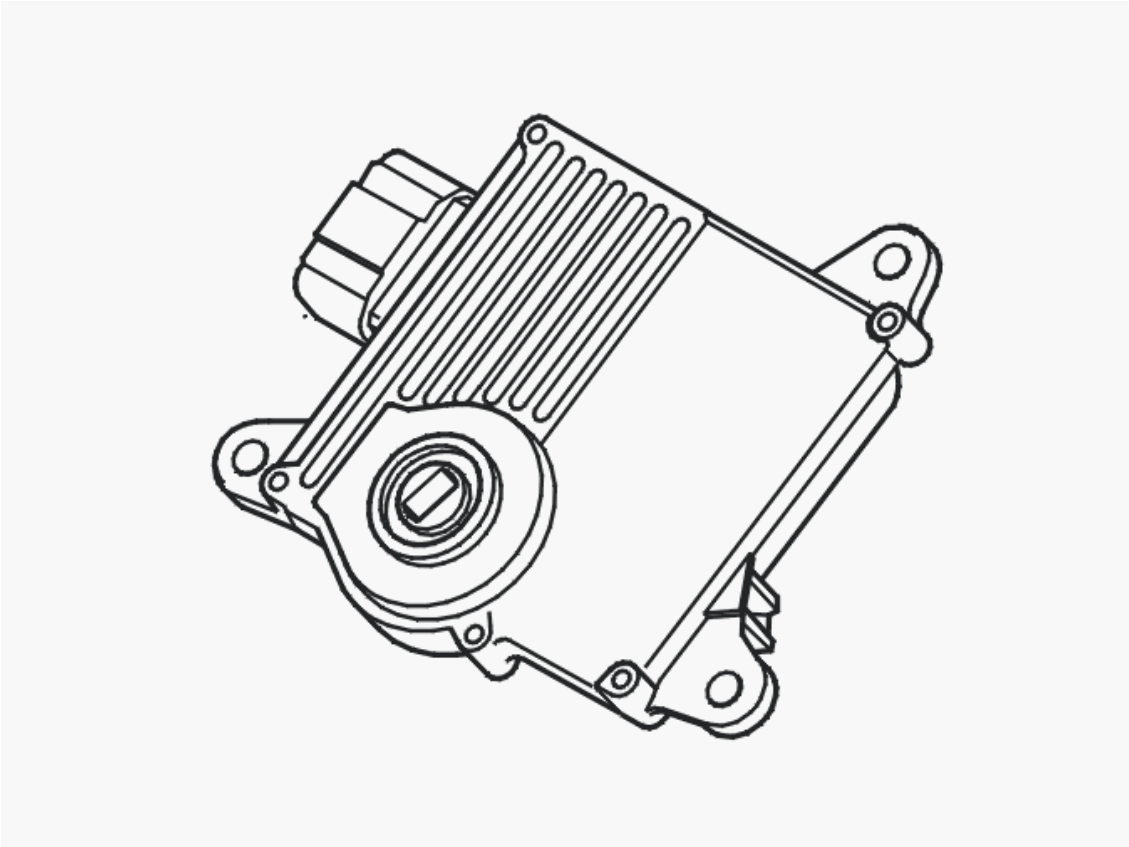


Fig. 25: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Are there any diagnostic trouble codes (DTC) still stored?

- **YES**

  Refer to **CONTROL MODULE REPLACEMENT AND PROGRAMMING**

- **NO**

  OKAY: Troubleshooting has been completed.

CONTROL MODULE REPLACEMENT AND PROGRAMMING

Transmission control module (TCM) has registered an internal fault.

Replace control module.

CAUTION: A new control module is delivered without software. The control module must be programmed in order to function after replacement.

Other information

- Program and change control module according to: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**

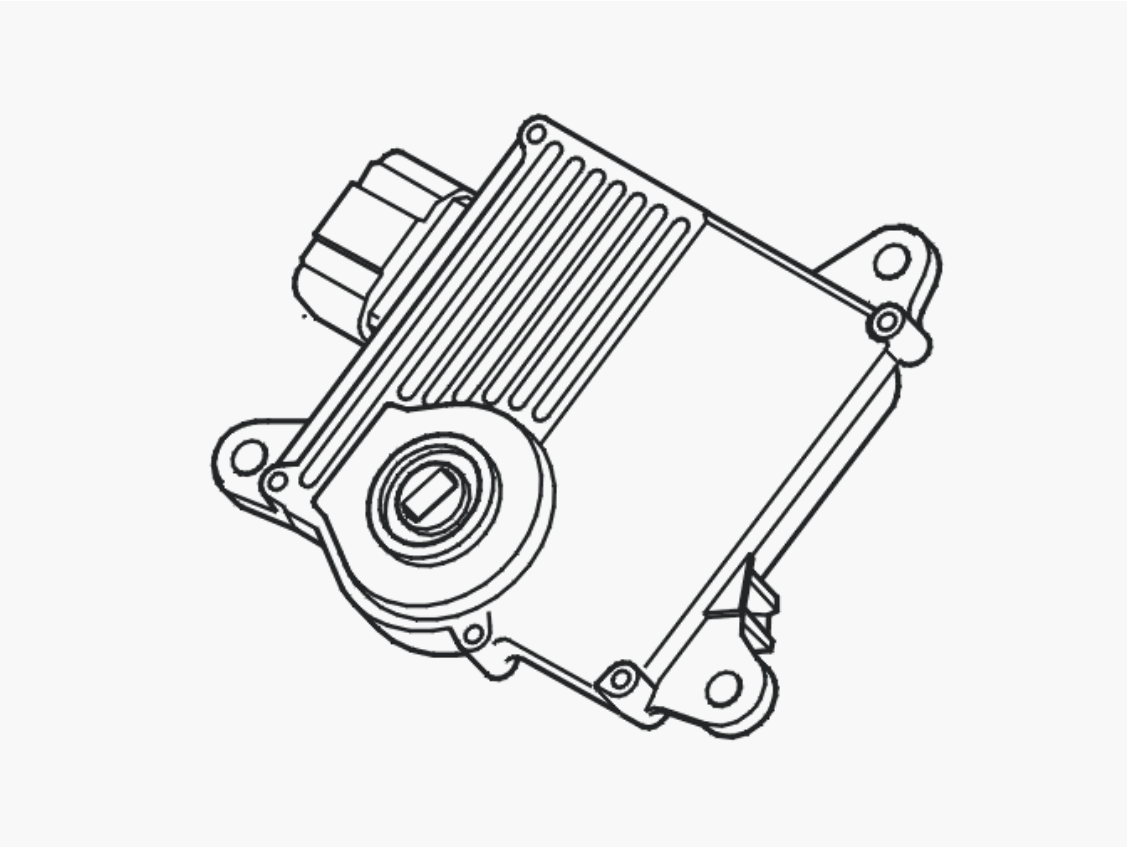


Fig. 26: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

TCM-P060100: INTERNAL FAULT IN CONTROL MODULE MEMORY CHECKSUM. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060100**

FAULT TRACING TCM-P060100

see **FAULT TRACING TCM-P060100**

TCM-P060300: INTERNAL CONTROL MODULE KEEP ALIVE MEMORY (KAM) ERROR. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060300

Condition

The Transmission control module (TCM) has three different internal memories, one for the program application (FLASH), one for permanent storage of information (EEPROM) and one for current information (RAM).

With the ignition off, certain information is saved from RAM to EEPROM and then the information is erased from RAM.

The information that is stored includes diagnostic trouble codes (DTCs) and accompanying data, adaptation values, etc.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Fault arise when information is to be written to the control module memory.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

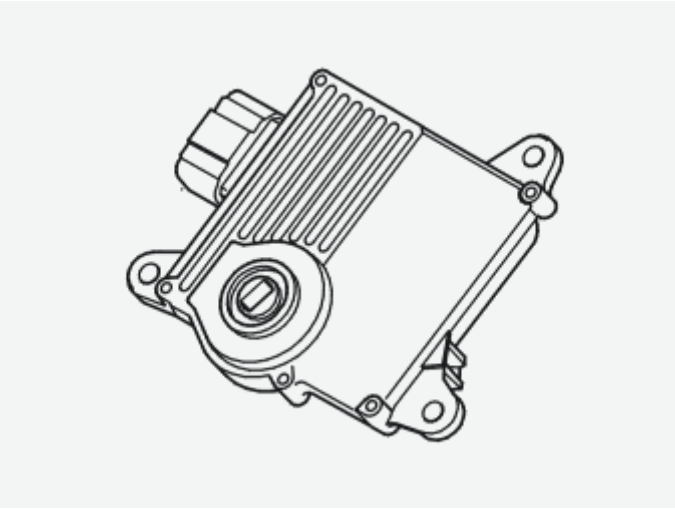


Fig. 27: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- The transmission control module (TCM) takes a basic value for adaptation.
- Any stored diagnostic trouble codes (DTCs) can disappear.

Possible Source

- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- No gear shift
- Rough gear shift

FAULT-TRACING

REPLACING THE CONTROL MODULE AND PROGRAMMING

The transmission control module (TCM) has registered an internal fault.

Replace control module.

CAUTION: A new control module is delivered without software.

For the transmission control module (TCM) to work after replacement, it must be programmed.

Other information

- Program and change control module according to:**TRANSMISSION CONTROL MODULE (TCM)**

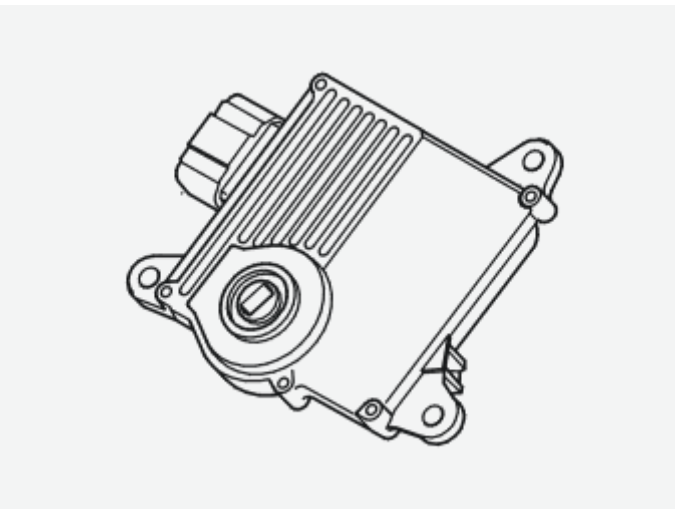


Fig. 28: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

TCM-P060300: INTERNAL CONTROL MODULE KEEP ALIVE MEMORY (KAM) ERROR. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060300

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060300**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P060300: INTERNAL MEMORY FAULT IN CONTROL MODULE (KAM). GENERAL FOR INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060300

Condition

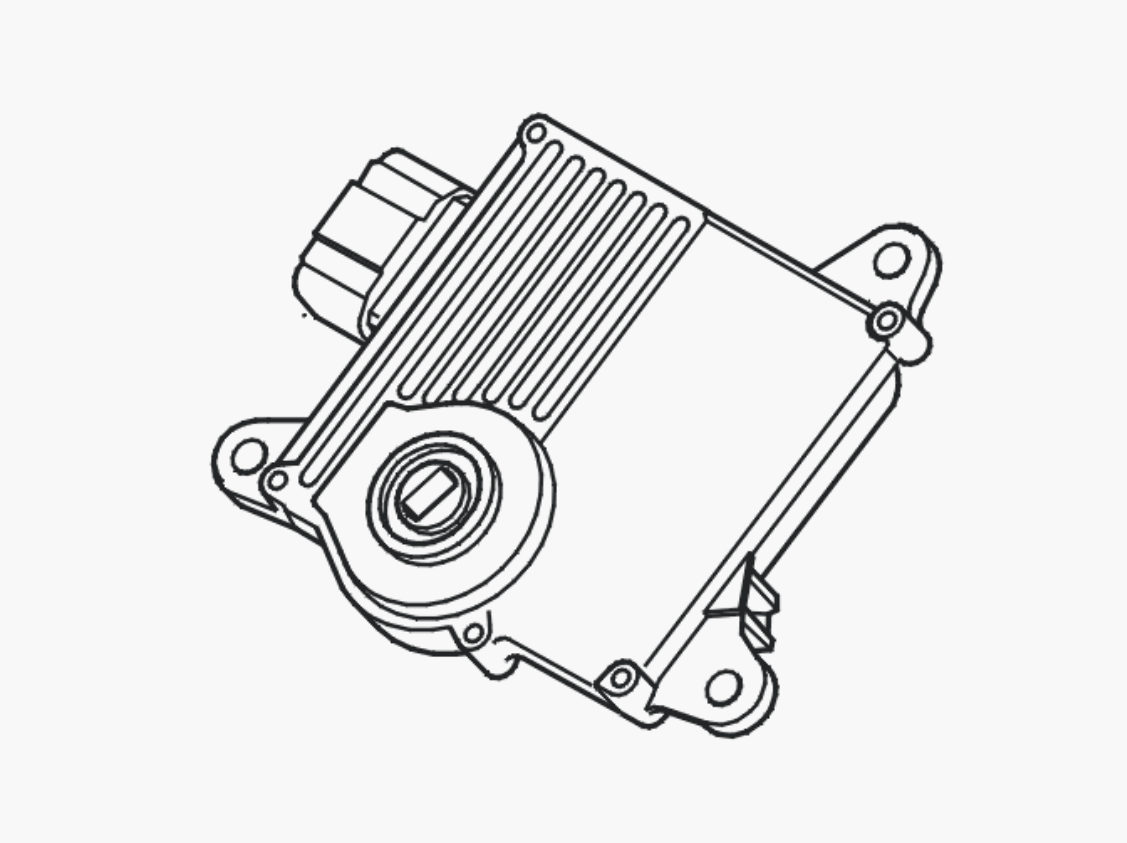


Fig. 29: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) has three different internal memories, one for the software application (FLASH), one for permanent storage of information (EEPROM) and one for current information (RAM). When turning off the ignition, certain information will be saved from the RAM memory to the EEPROM and then deleted from RAM. The information that is stored includes diagnostic trouble codes (DTC) with associated

data, adaptation values, etc.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- The transmission control module (TCM) takes a basic value for adaptation.
- Stored diagnostic trouble codes (DTC) with associated information may be lost.

Possible Source

- Internal fault in transmission control module (TCM).

Fault symptom[s]

- No gear changing.
- Harsh gear changing

FAULT TRACING

CONTROL MODULE REPLACEMENT AND PROGRAMMING

Transmission control module (TCM) has registered an internal fault.

Replace control module.

CAUTION: A new control module is delivered without software. The control module must be programmed in order to function after replacement.

see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**

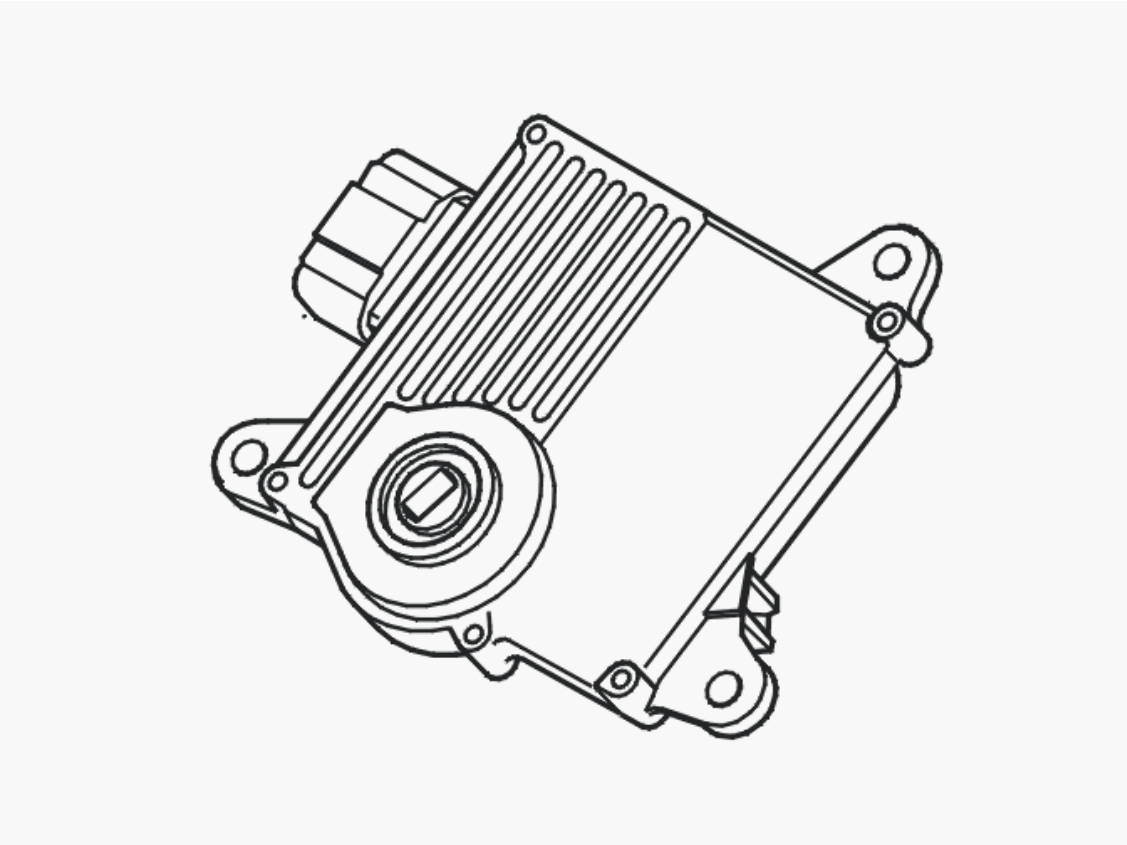


Fig. 30: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

TCM-P060300: INTERNAL MEMORY FAULT IN CONTROL MODULE (KAM). GENERAL FOR INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060300

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060300**

FAULT TRACING

see **FAULT TRACING**

TCM-P060400: INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060400

Condition

The Transmission control module (TCM) has three different internal memories, one for the program application (FLASH), one for permanent storage of information (EEPROM) and one for current information (RAM).

With the ignition off, certain information is saved from RAM to EEPROM and then the information is erased from RAM.

The information that is stored includes diagnostic trouble codes (DTCs) and accompanying data, adaptation values, etc.

The diagnostic trouble code is generated if the control module detects the following upon start-up:

- An incorrect value after information has been written to the control module's RAM memory and then read again.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

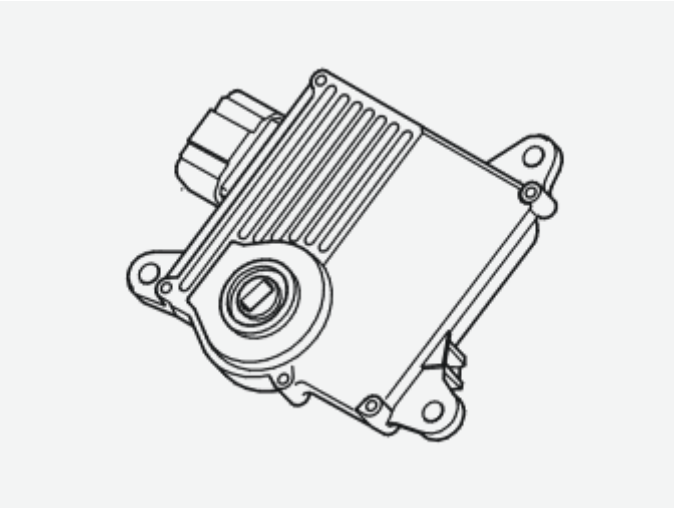


Fig. 31: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- The transmission control module (TCM) takes a basic value for adaptation.
- Any stored diagnostic trouble codes (DTCs) can disappear.

Possible Source

- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- No gear shift
- Rough gear shift

FAULT-TRACING

see **FAULT-TRACING**

TCM-P060400: INTERNAL CONTROL MODULE RANDOM ACCESS MEMORY (RAM) ERROR. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060400

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060400**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P060400: INTERNAL MEMORY FAULT IN CONTROL MODULE (RAM). GENERAL FOR INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060400

Condition

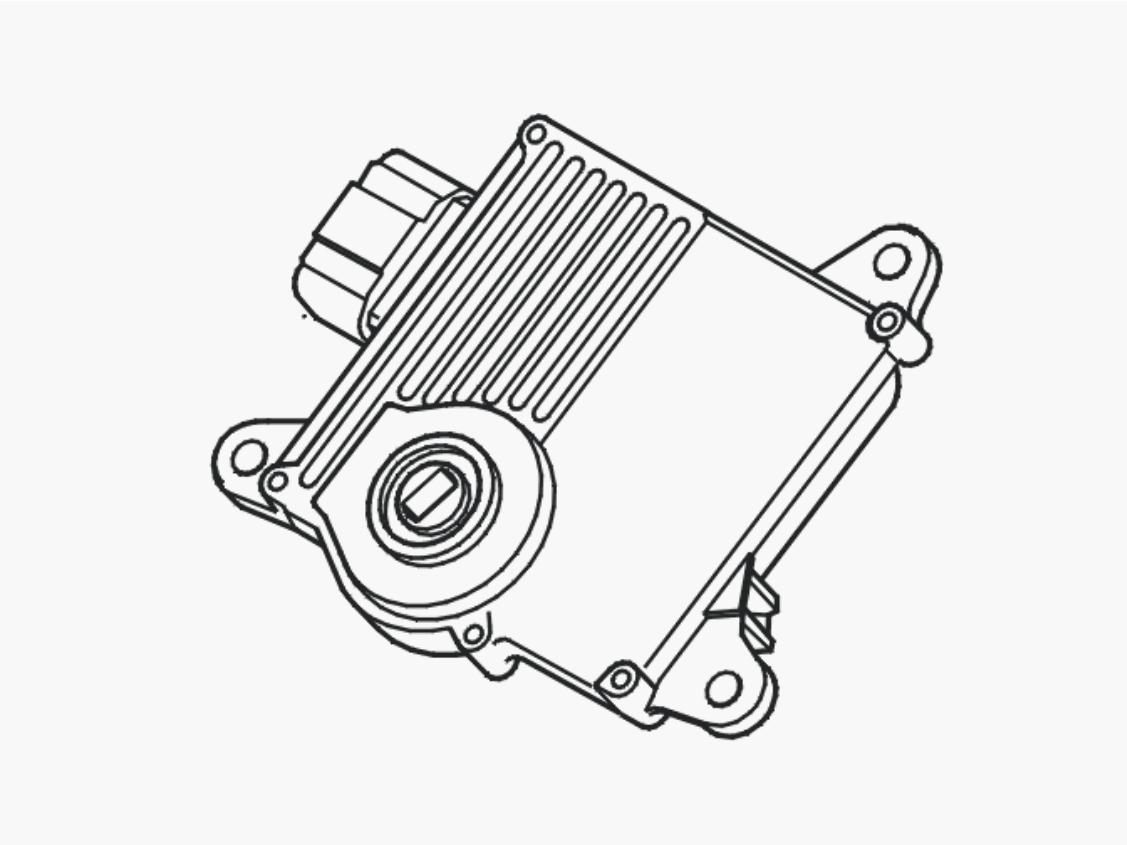


Fig. 32: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) has three different internal memories, one for the software application (FLASH), one for permanent storage of information (EEPROM) and one for current information (RAM). When turning off the ignition, certain information will be saved from the RAM memory to the EEPROM and then deleted from RAM. The information that is stored includes diagnostic trouble codes (DTC) with associated data, adaptation values, etc.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- The transmission control module (TCM) takes a basic value for adaptation.
- Any stored diagnostic trouble codes (DTC) may be lost.

Possible Source

- Internal fault in transmission control module (TCM).

Fault symptom[s]

- No gear changing.

- Harsh gear changing

FAULT TRACING

see **FAULT TRACING**

TCM-P060400: INTERNAL MEMORY FAULT IN CONTROL MODULE (RAM). GENERAL FOR INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060400

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060400**

FAULT TRACING

see **FAULT TRACING**

TCM-P060500: INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060500

Condition

The Transmission control module (TCM) has three different internal memories, one for the program application (FLASH), one for permanent storage of information (EEPROM) and one for current information (RAM).

With the ignition off, certain information is saved from RAM to EEPROM and then the information is erased from RAM.

The information that is stored includes diagnostic trouble codes (DTCs) and accompanying data, adaptation values, etc.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Data storage to the control module's EEPROM memory is not correctly carried out.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

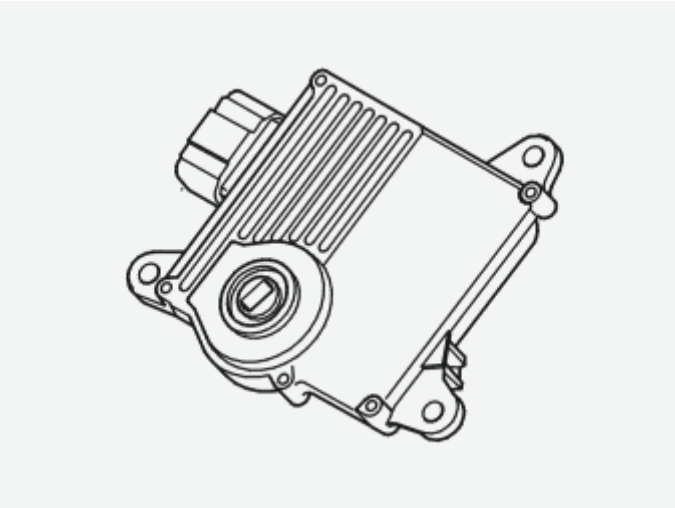


Fig. 33: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- The transmission control module (TCM) takes a basic value for adaptation.
- Any stored diagnostic trouble codes (DTCs) can disappear.

Possible Source

- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- No gear shift
- Rough gear shift

FAULT-TRACING

see **FAULT-TRACING**

TCM-P060500: INTERNAL CONTROL MODULE READ ONLY MEMORY (ROM) ERROR. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060500

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060500**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P060500: INTERNAL MEMORY FAULT IN CONTROL MODULE (ROM). GENERAL FOR INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060500

Condition

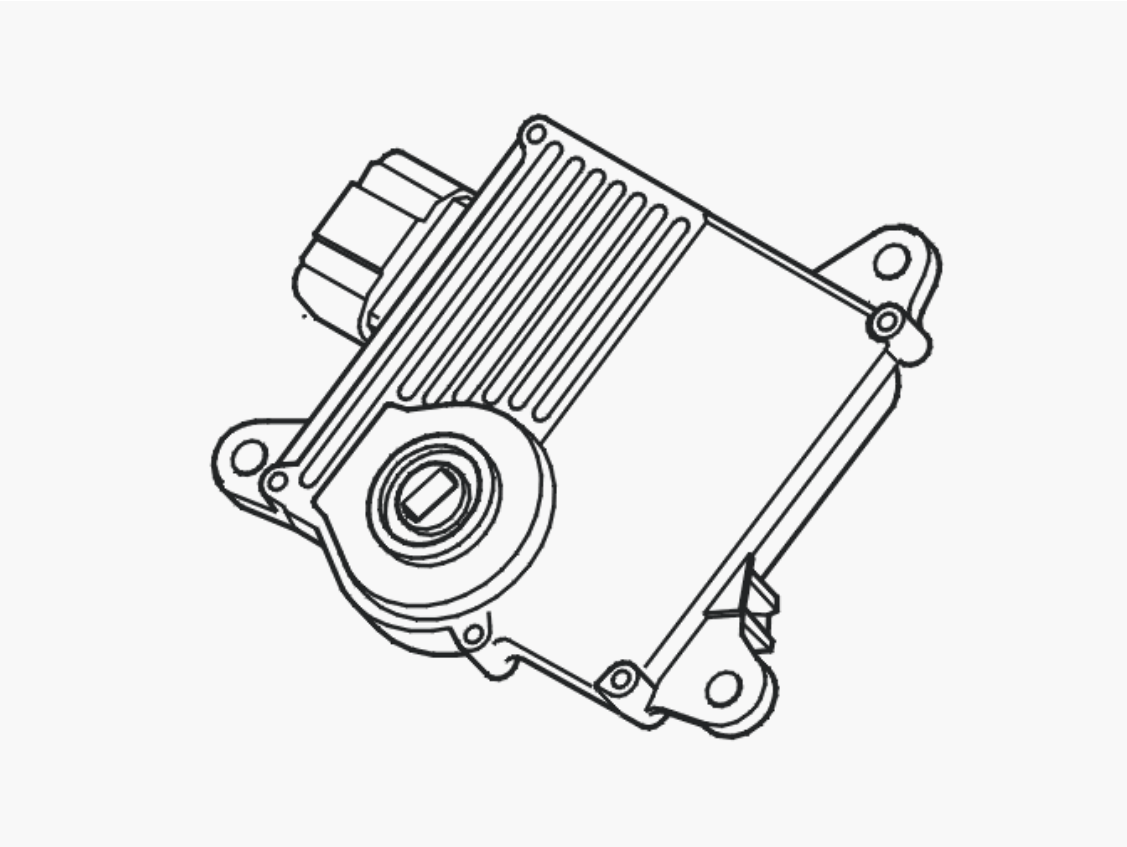


Fig. 34: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) has three different internal memories, one for the software application (FLASH), one for permanent storage of information (EEPROM) and one for current information (RAM). When turning off the ignition, certain information will be saved from the RAM memory to the EEPROM and then deleted from RAM. The information that is stored includes diagnostic trouble codes (DTC) with associated data, adaptation values, etc. If the transmission control module (TCM) registers that the storage of data to the control module EEPROM memory has not been carried out correctly, the diagnostic trouble code (DTC) will be generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- The transmission control module (TCM) takes a basic value for adaptation.
- Any stored diagnostic trouble codes (DTC) may be lost.

Possible Source

- Internal fault in transmission control module (TCM).

Fault symptom[s]

- No gear changing.
- Harsh gear changing

FAULT TRACING

see **FAULT TRACING**

TCM-P060500: INTERNAL MEMORY FAULT IN CONTROL MODULE (ROM). GENERAL FOR INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060500

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P060500**

FAULT TRACING

see **FAULT TRACING**

TCM-P061000: CONFIGURATION FAULT IN THE CONTROL MODULE. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT THE FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P061000

Condition

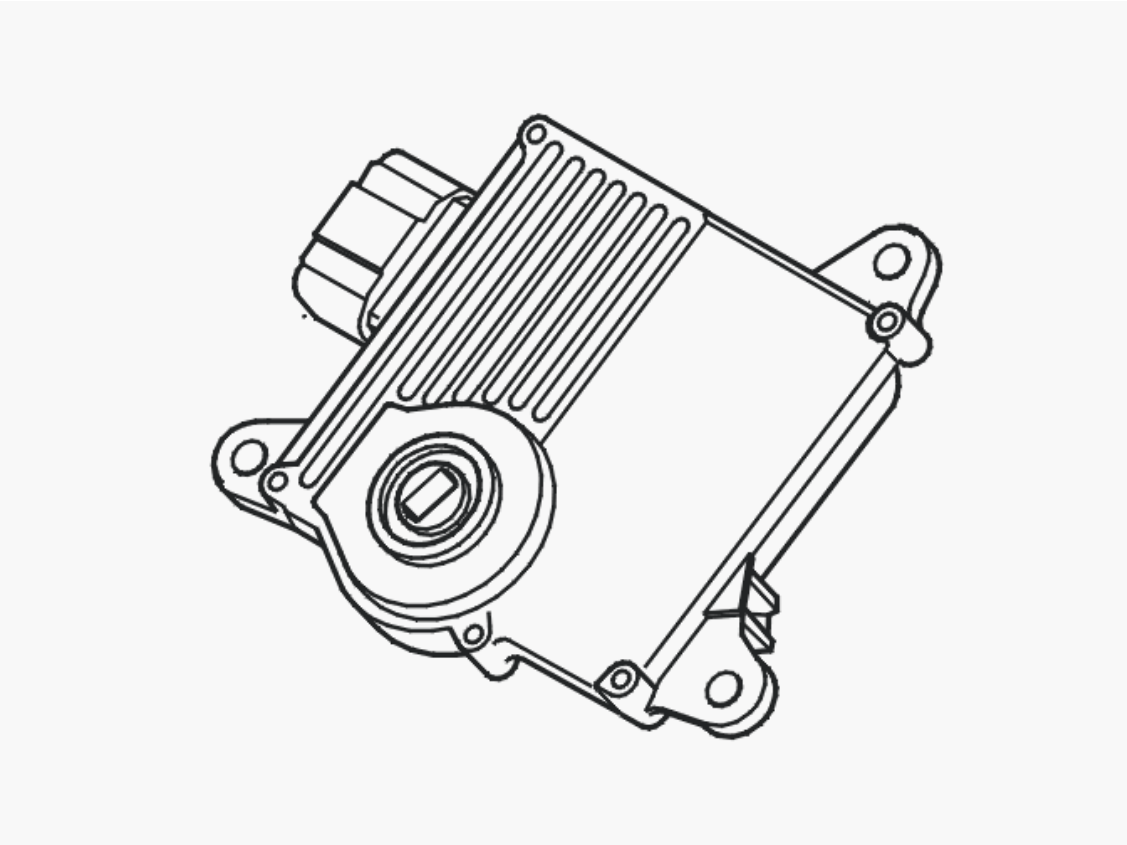


Fig. 35: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) compares its configuration ID with the signal configuration sent out on the CAN network by the central electronic module (CEM). If the configuration IDs do not agree, the diagnostic trouble code (DTC) will be generated. The diagnostic trouble code (DTC) will also be generated if communication between the transmission control module (TCM) and the central electronic module (CEM) is broken.

NOTE: **If there is a break in both CAN wires, it will not be possible to communicate with the transmission control module (TCM). It will therefore only be possible to read the diagnostic trouble code (DTC) if such a fault is intermittent. When the diagnostic trouble code (DTC) is set, the transmission control module (TCM) will respond to diagnostic commands, but it will not work for normal CAN communication "Expulsion mode".**

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Incorrect CAN configuration ID. (Transmission control module (TCM) in question is not intended for the vehicle, a used control module with another software/hardware for example).
- A break in the CAN leads between the transmission control module (TCM) and the central electronic module (CEM).

Fault symptom[s]

- General warning lamp lit
- No gear changing.

TCM-P061400: ECM / TCM INCOMPATIBLE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P061400

Condition

Information about the vehicle configuration is sent on the CAN network.

Depending on the model and equipment, the vehicle can be configured in different ways.

The central electronic module (CEM) sends the applicable signal ID for the vehicle.

The Transmission control module (TCM) compares this ID with the ID internally stored in the software.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- These do not correspond, which means that the software in the Transmission control module (TCM) is not compatible with other software in the vehicle.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

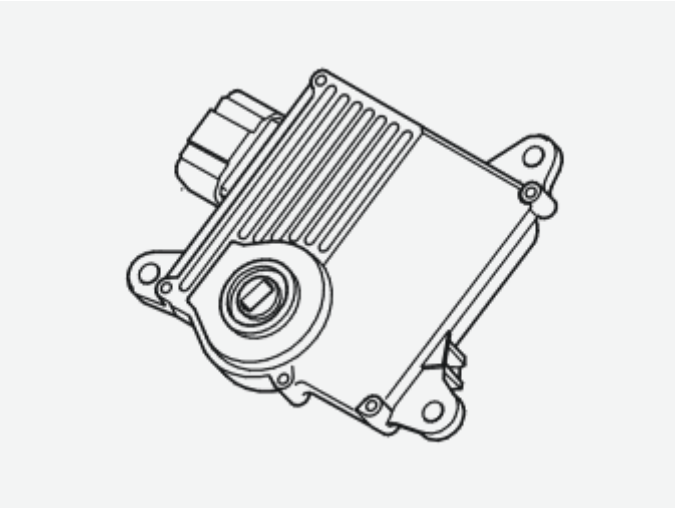


Fig. 36: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Faulty software in the transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit

FAULT-TRACING

PROGRAMMING CONTROL MODULE

Transmission control module (TCM) has registered an internal fault that may be due to a software error.

Cancel fault-tracing.

Go to the program software manager and reprogram the Transmission control module (TCM) with the latest software.

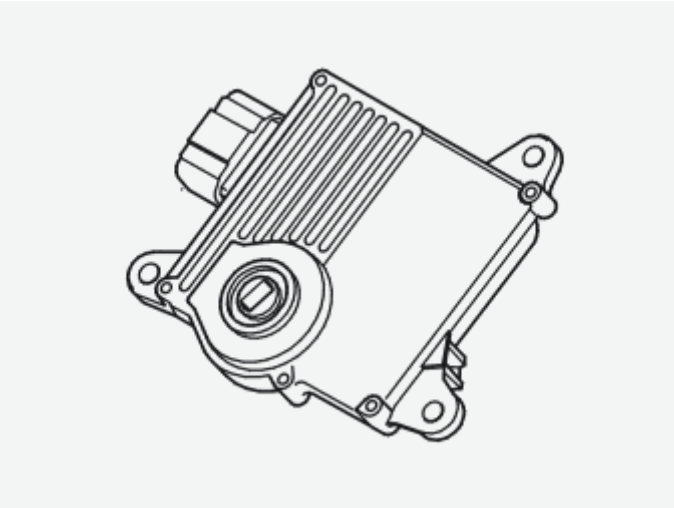


Fig. 37: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

TCM-P061400: ECM / TCM INCOMPATIBLE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P061400

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P061400**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P061400: ECM/TCM NOT COMPATIBLE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P061400

Condition

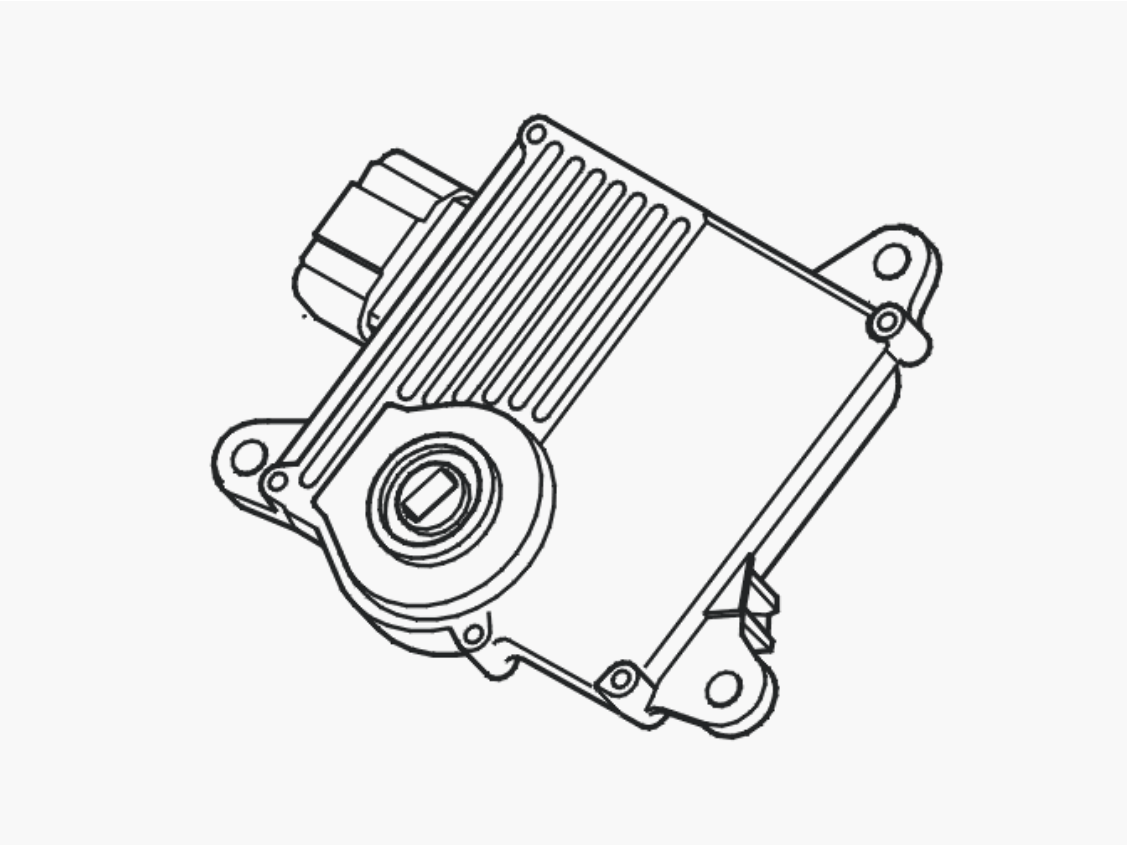


Fig. 38: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Information on the vehicle configuration is sent on the vehicle's CAN network. The vehicle can be configured in different ways, depending on model and equipment, etc. The central electronic module (TM) sends the signal ID that applies to the vehicle. The transmission control module (TCM) compares this ID with the one stored internally in the software. If the two do not agree, it means that the software in the transmission control module (TCM) is not compatible with the other software in the vehicle and the diagnostic trouble code (DTC) will be generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Incorrect software in transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit

FAULT TRACING TCM-P061400

PROGRAMMING CONTROL MODULE

Transmission control module (TCM) has registered an internal fault that may be due to a software error.

Cancel fault tracing. Go to the software manager and reprogram transmission control module (TCM) with the latest software.

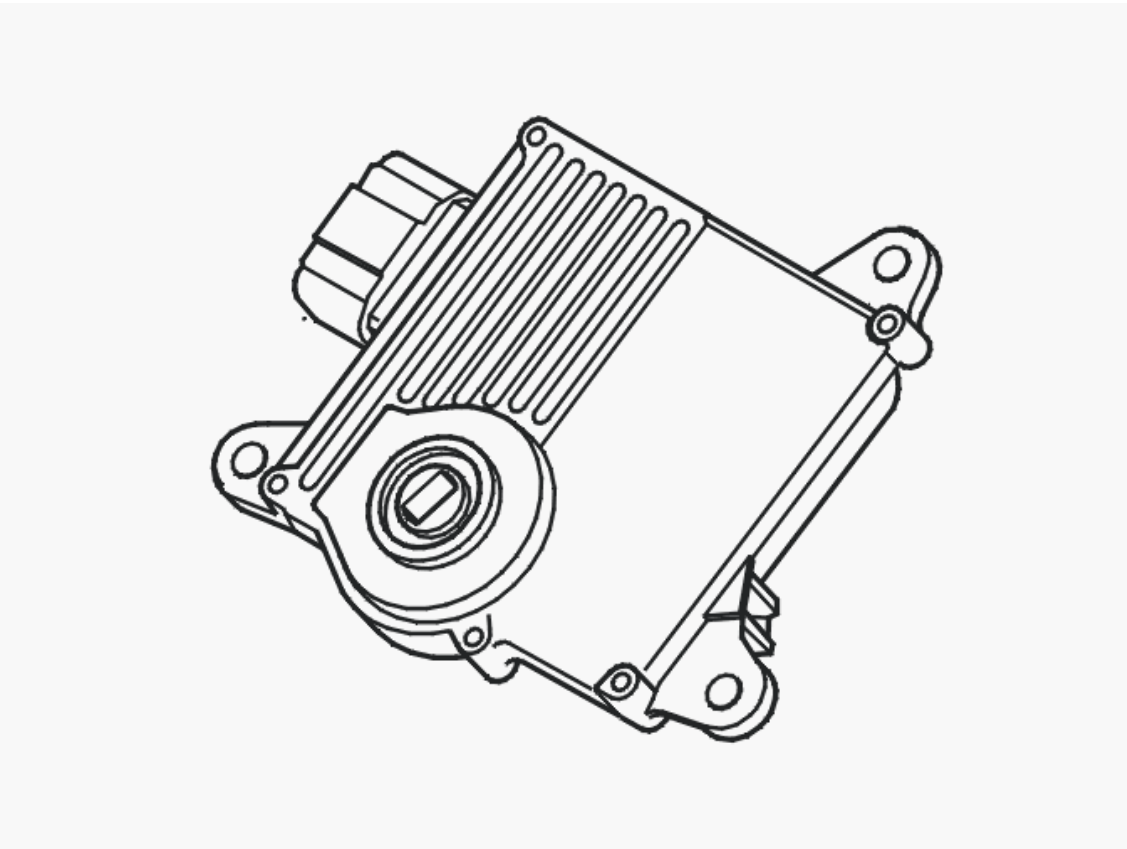


Fig. 39: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

TCM-P061400: ECM/TCM NOT COMPATIBLE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P061400

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P061400**

FAULT TRACING TCM-P061400

see **FAULT TRACING TCM-P061400**

TCM-P062F00 INTERNAL CONTROL MODULE EEPROM ERROR. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P062F00

Condition

The Transmission control module (TCM) has three different internal memories, one for the program application (FLASH), one for permanent storage of information (EEPROM) and one for current information (RAM).

With the ignition off, certain information is saved from RAM to EEPROM and then the information is erased from RAM.

The information that is stored includes diagnostic trouble codes (DTCs) and accompanying data, adaptation values, etc.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Data storage to the control module's EEPROM memory is not correctly carried out.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

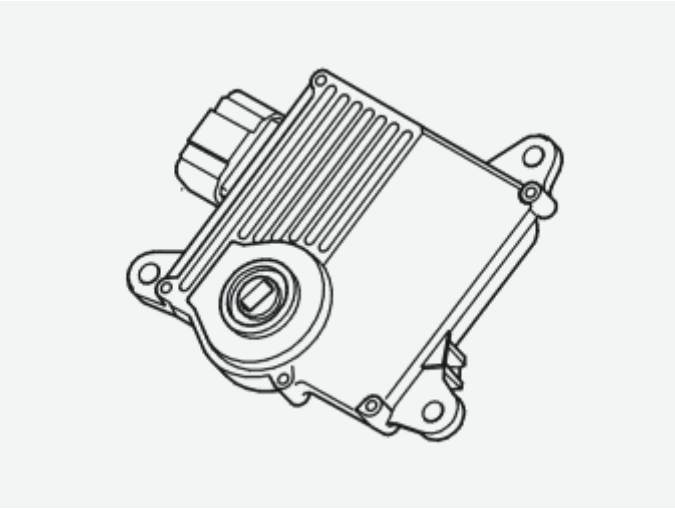


Fig. 40: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- The transmission control module (TCM) takes a basic value for adaptation.
- Any stored diagnostic trouble codes (DTCs) can disappear.

Possible Source

- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- Vibration and jerking when shifting

FAULT-TRACING

see **FAULT-TRACING**

TCM-P062F00 INTERNAL CONTROL MODULE EEPROM ERROR. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P062F00

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P062F00**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P062F00 INTERNAL EEPROM MEMORY FAULT IN CONTROL MODULE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P062F00

Condition

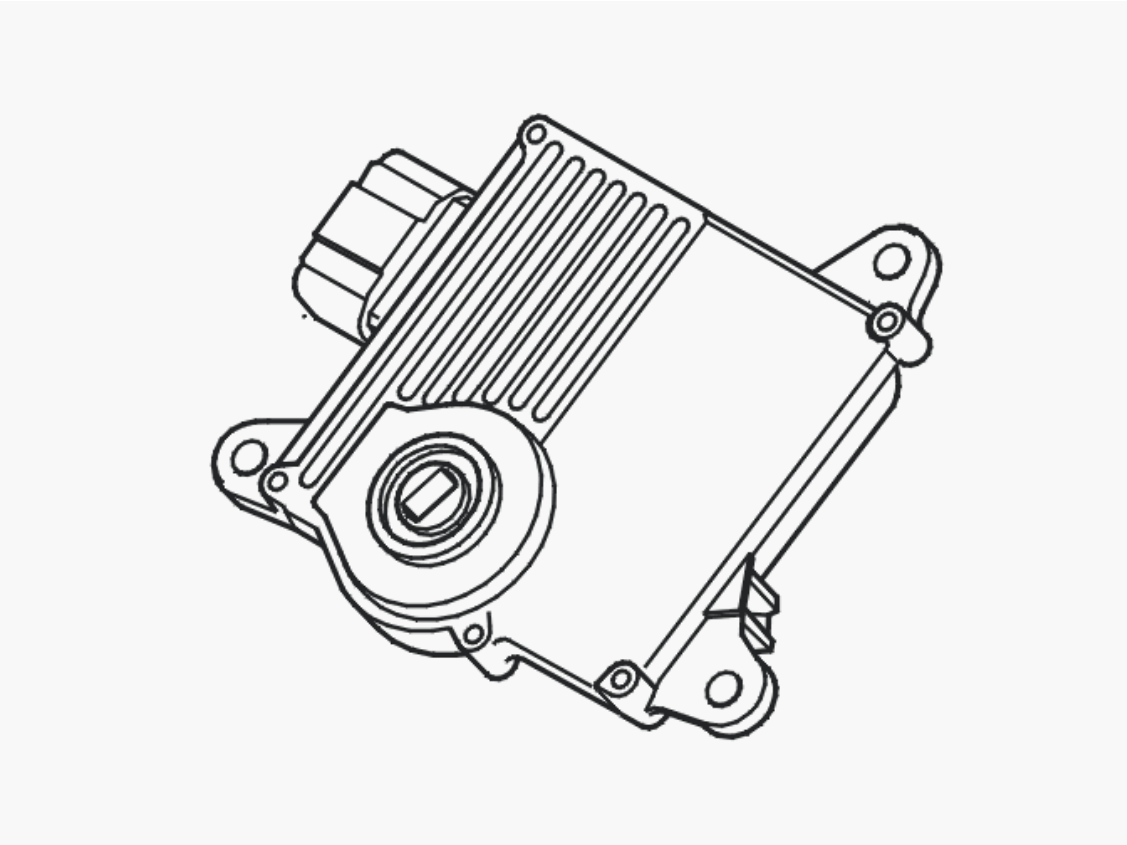


Fig. 41: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) has three different internal memories, one for the software application (FLASH), one for permanent storage of information (EEPROM) and one for current information (RAM). When turning off the ignition, certain information will be saved from the RAM memory to the EEPROM and then deleted from RAM.

The information that is stored includes diagnostic trouble codes (DTC) with associated data, adaptation values, etc. If the transmission control module (TCM) registers that the storage of data to the control module EEPROM memory has not been carried out correctly, the diagnostic trouble code (DTC) will be generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- The transmission control module (TCM) takes a basic value for adaptation.
- Any stored diagnostic trouble codes (DTC) may be lost.

Possible Source

- Internal fault in transmission control module (TCM).

Fault symptom[s]

- Vibration or jerkiness when changing gear.

FAULT TRACING

see **FAULT TRACING**

TCM-P062F00 INTERNAL EEPROM MEMORY FAULT IN CONTROL MODULE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P062F00

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P062F00**

FAULT TRACING

see **FAULT TRACING**

TCM-P070500: TRANSMISSION RANGE SENSOR A CIRCUIT (PRNDL INPUT). GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070500

Condition

The gear position sensor is integrated in the transmission control module (TCM) and provides information about the selected gear position.

Two Hall sensors in the transmission control module (TCM) detect whether the selector lever is in position.

For diagnostics, there is a parallel hall sensor (2) that gives a reversed signal characteristic, so that the sum of the signal voltages from hall sensor (1) and (2) are constant.

The signal voltage (0 and 5 V) corresponds to the current gear selector position.

The diagnostic trouble code (DTC) is stored if the control module detects:

- Faulty signal

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

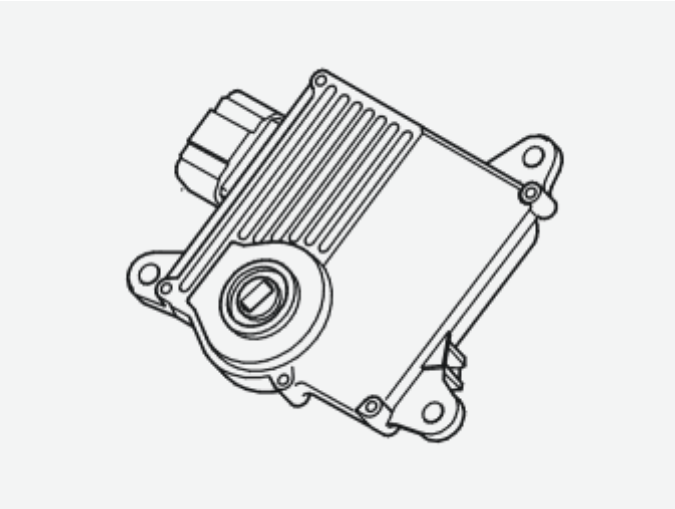


Fig. 42: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Incorrectly adjusted gear-shift position sensor.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- Engine fails to start

FAULT-TRACING

CHECKS

CHECKING THE GEAR-SHIFT POSITION SENSOR

Fig. 43: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Check that the gear selector cable is correctly adjusted. Adjust if necessary.
- Ignition on.
- Read off the position of the gear selector.

  Shift the gear selector to all gear positions several times. This is to check the function of the gear selector sensor.

  The selected position must be the same as that displayed in the diagnostic tool.

  NOTE: If the value indicates "Undefined position" in P, R, N or D, the adjustment of the mechanical cable must be checked and the values must be read off again.

  Other information

  - For B5xx4T2, see **GEAR SELECTOR CABLES, ADJUSTING**
  - For B6xx4T, see **GEAR SELECTOR CABLE, ADJUSTING** .

Fig. 44: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

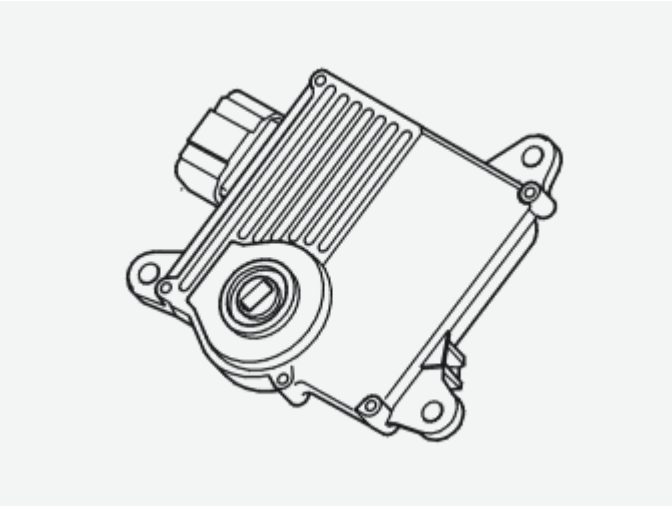


Fig. 45: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **ERASING DIAGNOSTIC TROUBLE CODE (DTC)**

ERASING DIAGNOSTIC TROUBLE CODE (DTC)

NOTE: In the event of erasing, all stored diagnostic trouble codes (DTCs) with corresponding information disappear. If there are other diagnostic trouble codes (DTCs) for Transmission control module (TCM), these must be fault-traced first. If necessary, go to Vehicle communication and read out "Extended diagnostic trouble code (DTC) information"

Fig. 46: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Erase diagnostic trouble codes by clicking the VCT2000 symbol.

Fig. 47: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

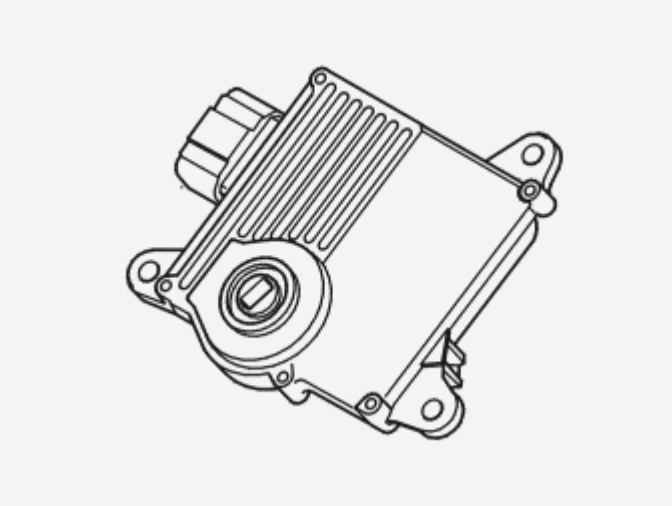


Fig. 48: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CALIBRATING THE POSITION SENSOR IN THE CONTROL MODULE**

CALIBRATING THE POSITION SENSOR IN THE CONTROL MODULE

Fig. 49: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Place the gear selector lever in neutral position (N).

Activate calibration of the position sensor in the control module by clicking on the VCT2000 symbol.

CAUTION: During calibration, it is important that no diagnostic trouble codes (DTCs) for the gear selector module (GSM) are stored and that the gear selector assembly is otherwise free of faults.

Fig. 50: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

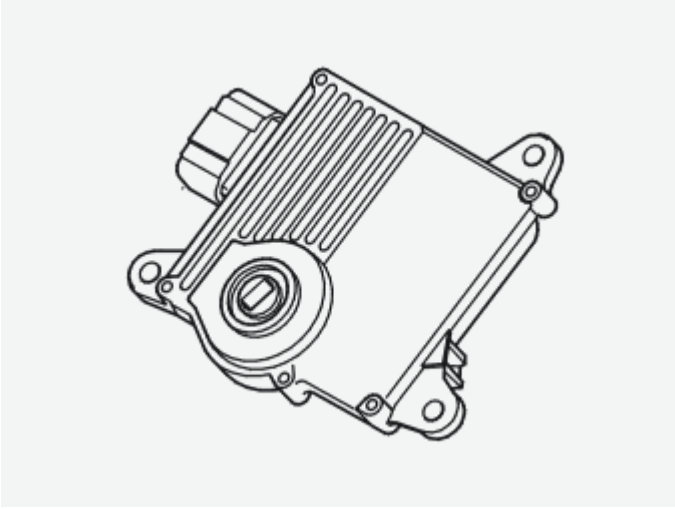


Fig. 51: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **READING OFF DIAGNOSTIC TROUBLE CODES (DTCS)**

READING OFF DIAGNOSTIC TROUBLE CODES (DTCS)

Fig. 52: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Wait two minutes.
- Ignition on.
- Move the gear selector several times to all gear positions.
  - Read off the diagnostic trouble codes (DTCs) by clicking on the VCT2000 symbol.

If present code diagnostic fault code (DTC) remains stored replace the transmission control module (TCM).

Other information

- see **TRANSMISSION CONTROL MODULE (TCM)**

Fig. 53: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

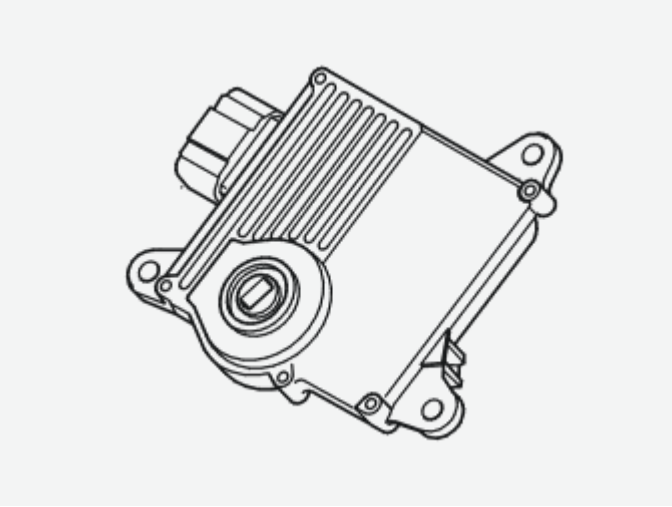


Fig. 54: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

Fig. 55: Identifying Ignition ON

Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Wait two minutes.
- Ignition on.
- Move the gear selector several times to all gear positions.

Fig. 56: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- Read off the diagnostic trouble codes (DTCs) by clicking on the VCT2000 symbol.

Is the relevant diagnostic trouble code (DTC) still stored?

- **YES**

  Refer to **INFORMATION**

- **NO**

  OKAY: Troubleshooting has been completed.

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P070500: TRANSMISSION RANGE SENSOR A CIRCUIT (PRNDL INPUT). GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070500

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070500**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P070500: GEARBOX POSITION SENSOR A CIRCUIT (PRNDL INPUT). GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070500

Condition

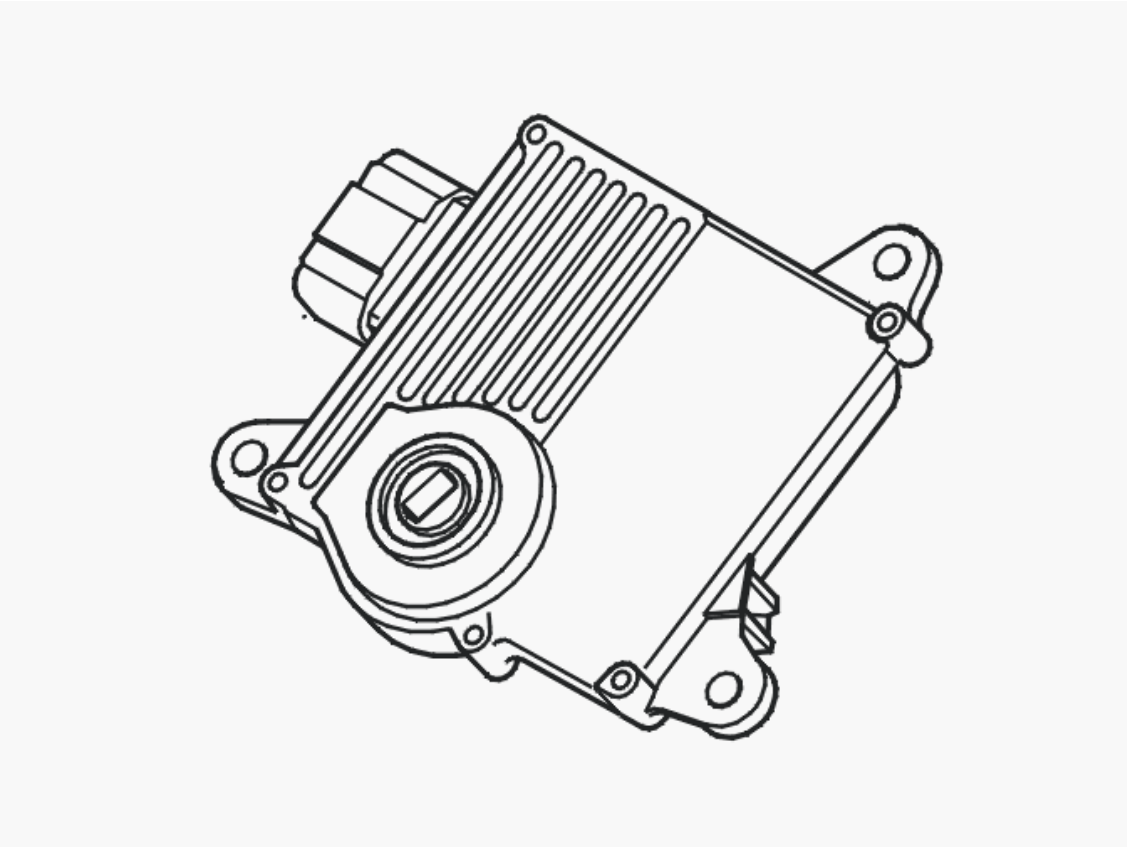


Fig. 57: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The gear position sensor is integrated in the transmission control module (TCM) and provides information on the selected gear position. Internally in the transmission control module (TCM) there are two Hall sensors used to detect whether the gear selector is in position. For diagnostic purposes, there is a parallel Hall sensor (2) that gives a reverse signal characteristic, so that the sum of the signal voltages from the Hall sensors (1) and (2) is constant. The signal voltage (0V and 5V) corresponds to the current gear lever position. If the transmission control module (TCM) registers an incorrect signal, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Incorrect adjustment of gear position sensor.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- The engine does not start.

FAULT TRACING

CHECKS

CHECKING THE GEARSHIFT POSITION SENSOR

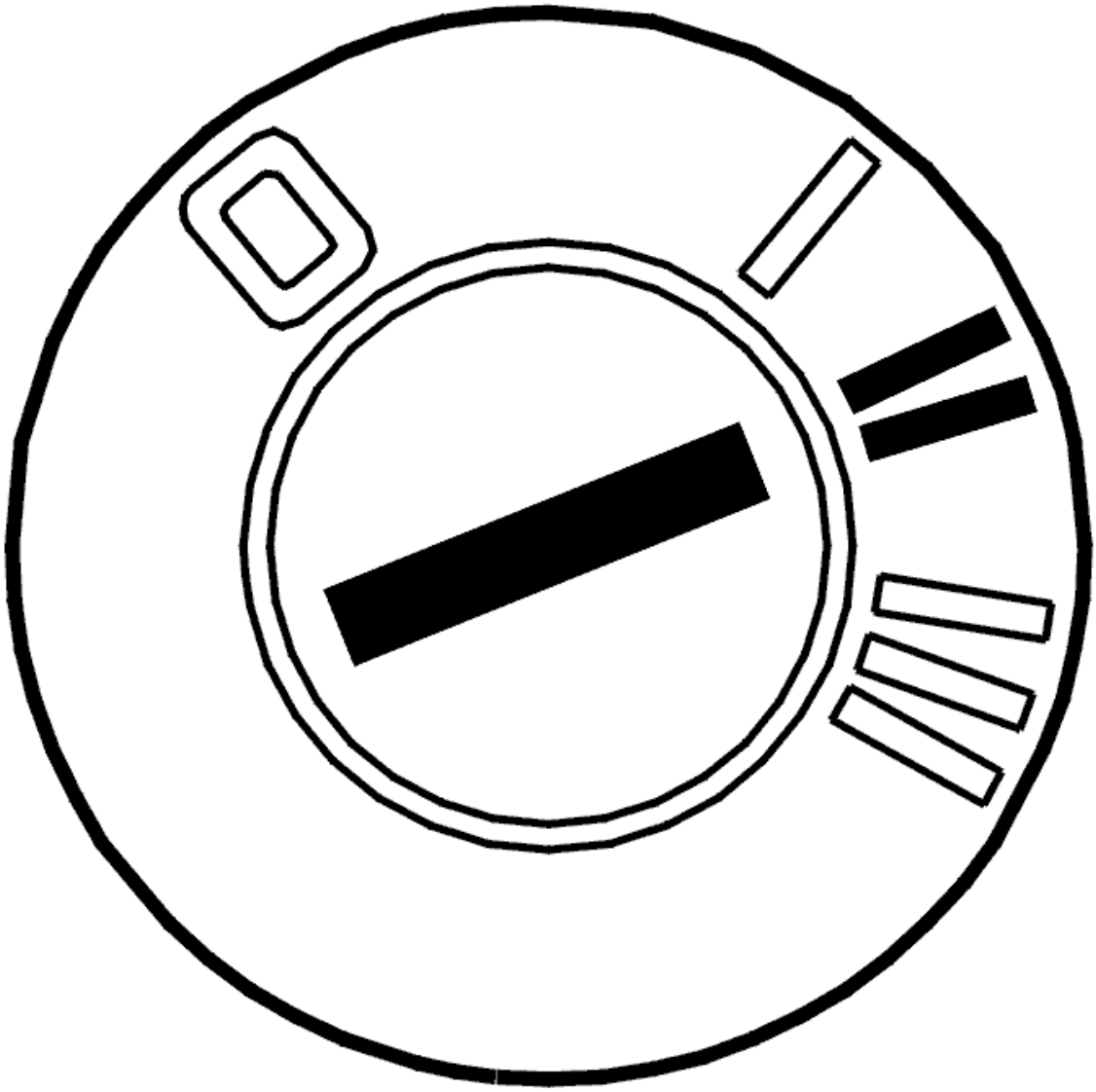


Fig. 58: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Check that the mechanical gear selector cable is correctly adjusted. Adjust if necessary.
- Ignition on.
- Read off the position of the gear selector.

  Move the gear selector lever to all the gear positions several times to check the function of the gearshift position sensor.

  The selected position must be the same as that displayed in the diagnostic tool.

NOTE: **If the value indicates "Undefined position" in P, R, N or D, the adjustment of the mechanical cable must be checked and the values must be read off again.**

Other information

- see **GEAR SELECTOR CABLE, ADJUSTING**

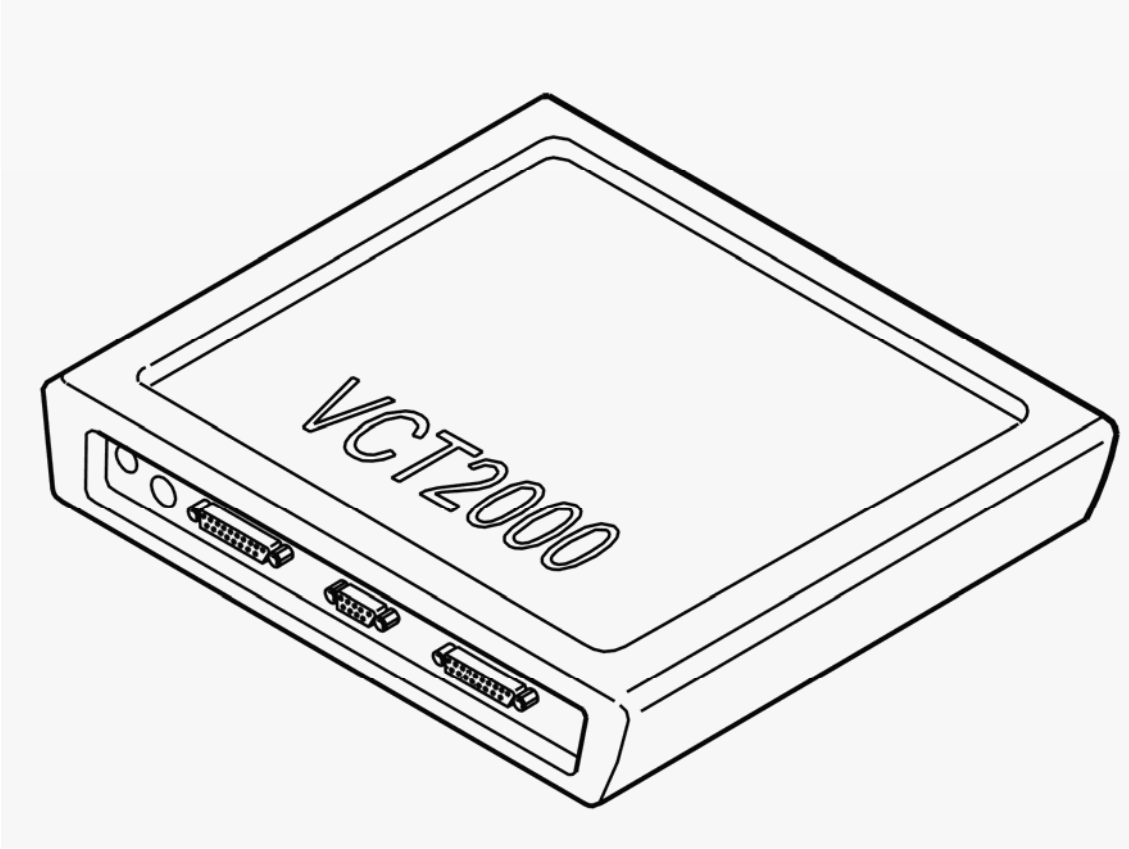


Fig. 59: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

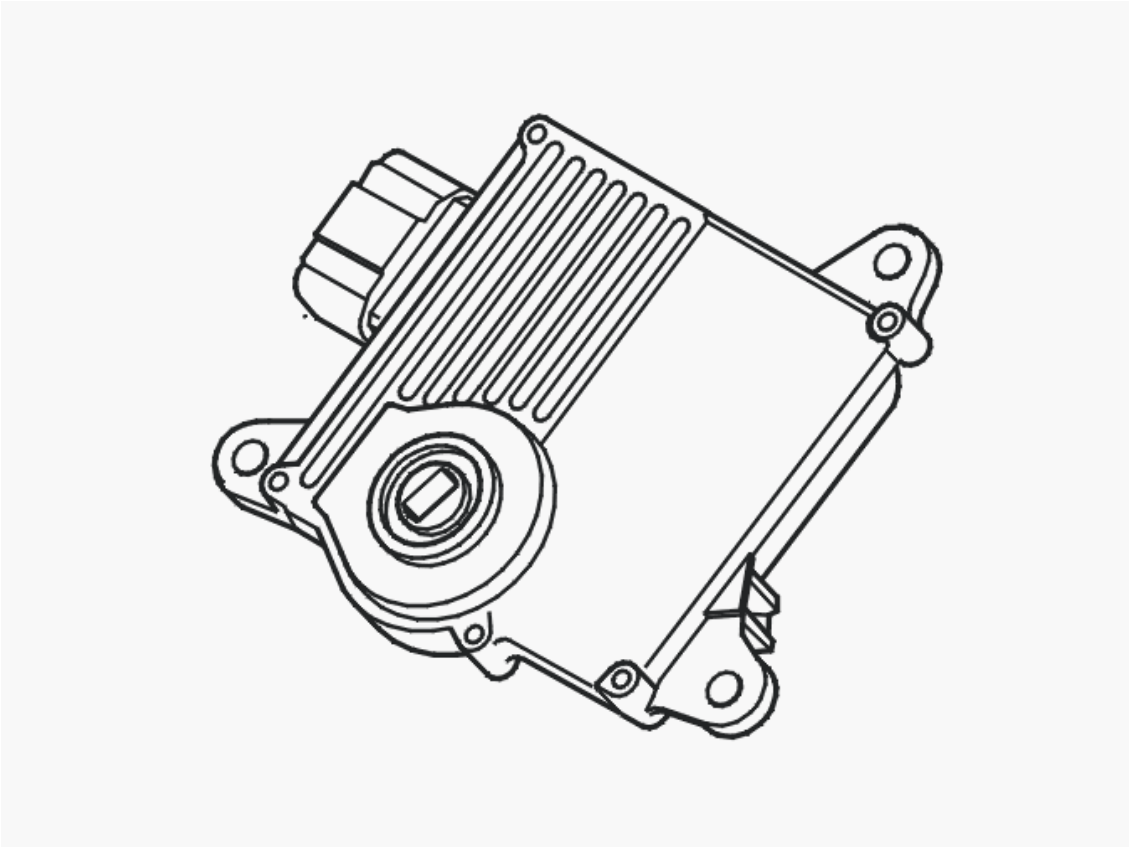


Fig. 60: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **ERASING DIAGNOSTIC TROUBLE CODE (DTC)**

ERASING DIAGNOSTIC TROUBLE CODE (DTC)

NOTE: When erased all stored diagnostic trouble codes (DTCs) with relevant information disappear. If there are other diagnostic trouble codes (DTCs) for the transmission control module (TCM) these must be fault-traced first. If necessary go to Car communication and read "Extended diagnostic trouble codes (DTCs)".

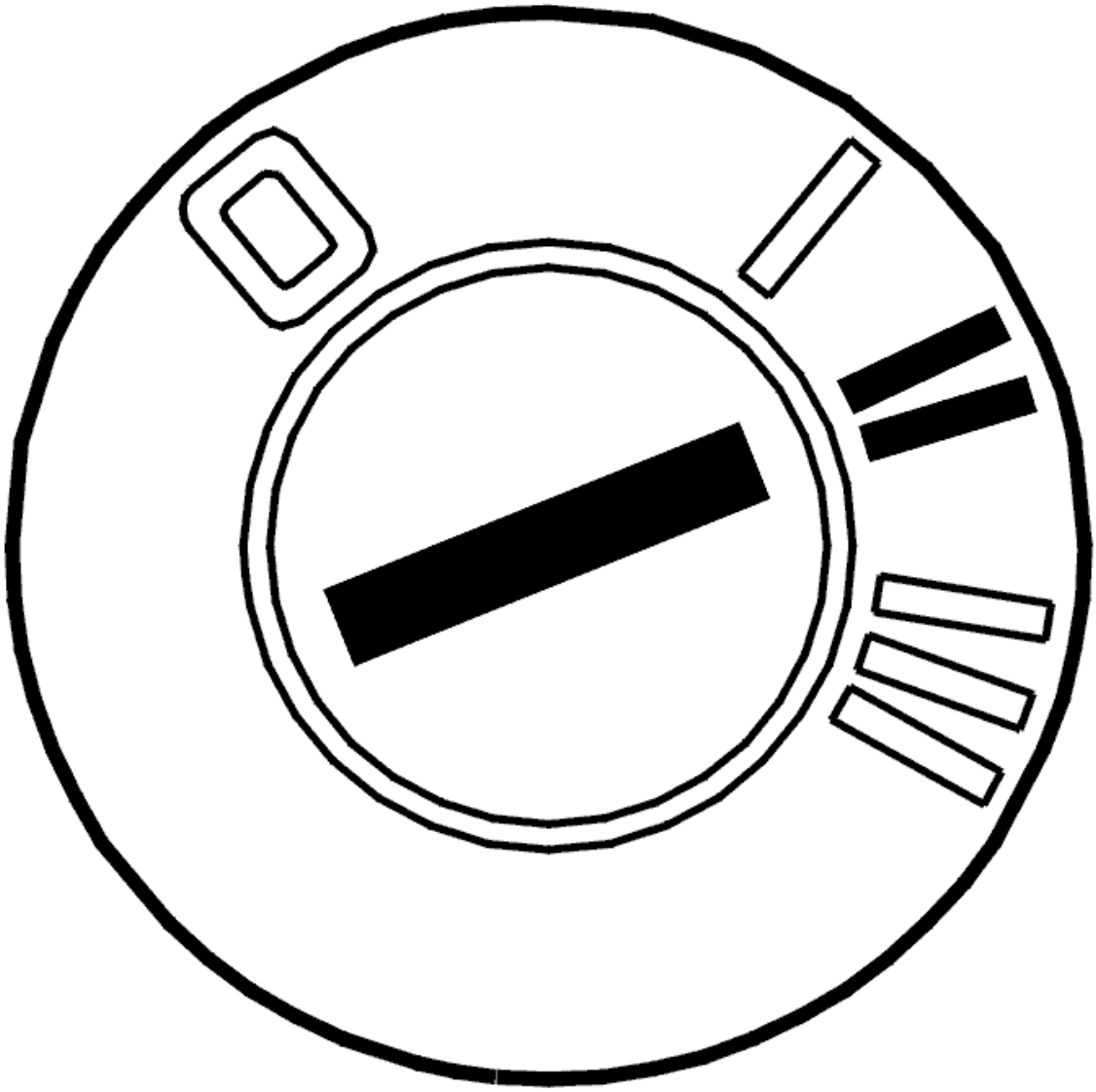


Fig. 61: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Erase diagnostic trouble codes by clicking the VCT2000 symbol.

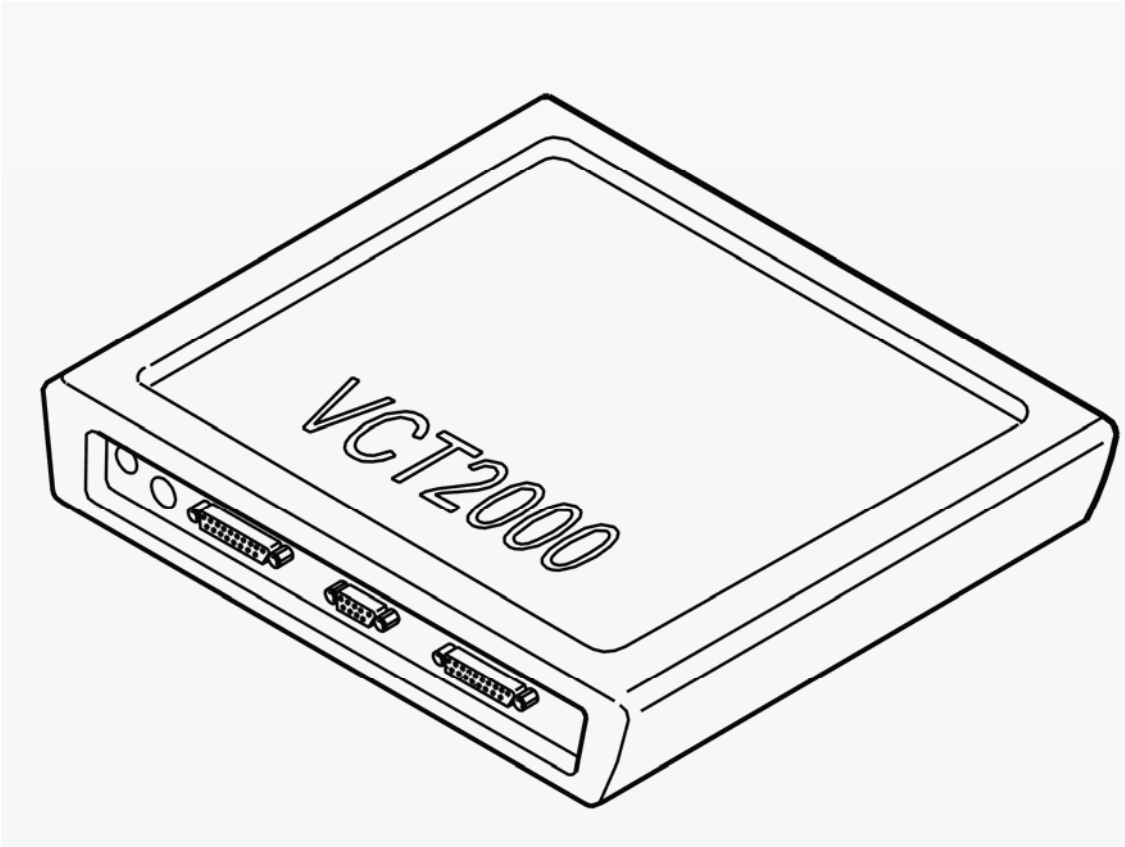


Fig. 62: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

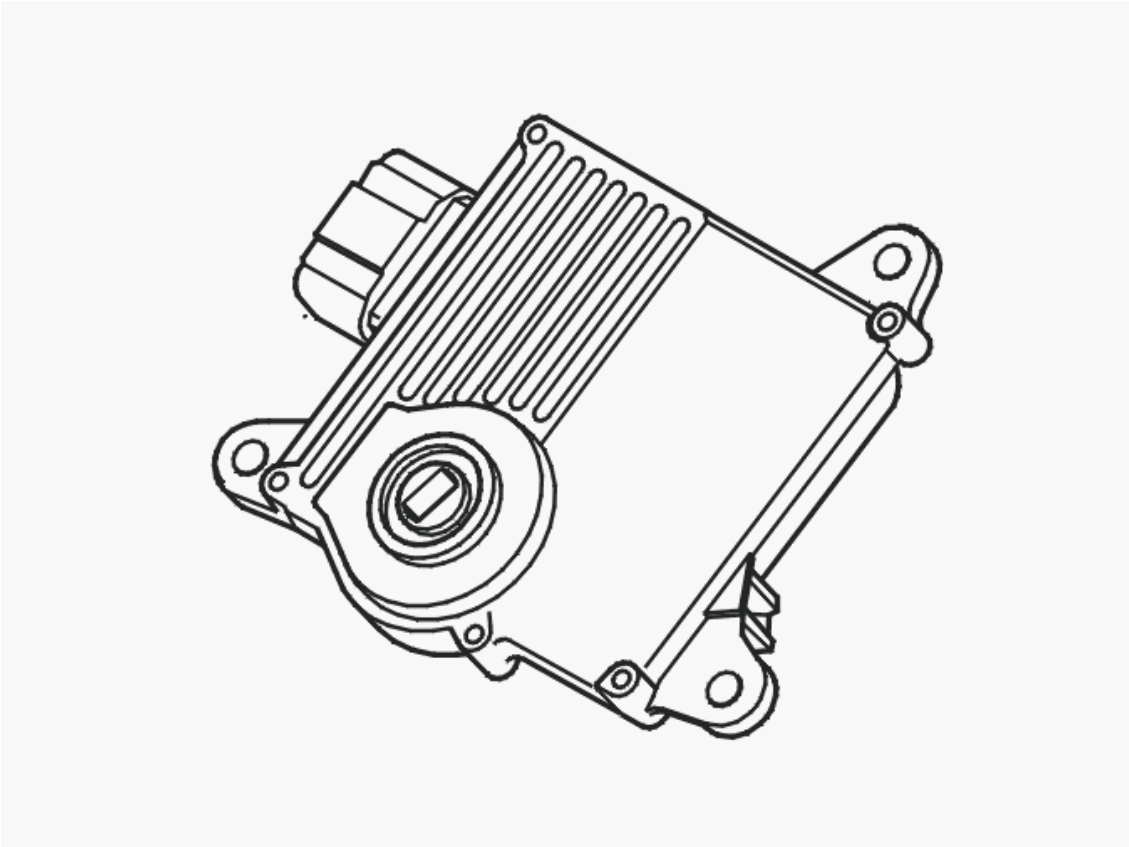


Fig. 63: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CALIBRATING THE POSITION SENSOR IN THE CONTROL MODULE**

CALIBRATING THE POSITION SENSOR IN THE CONTROL MODULE

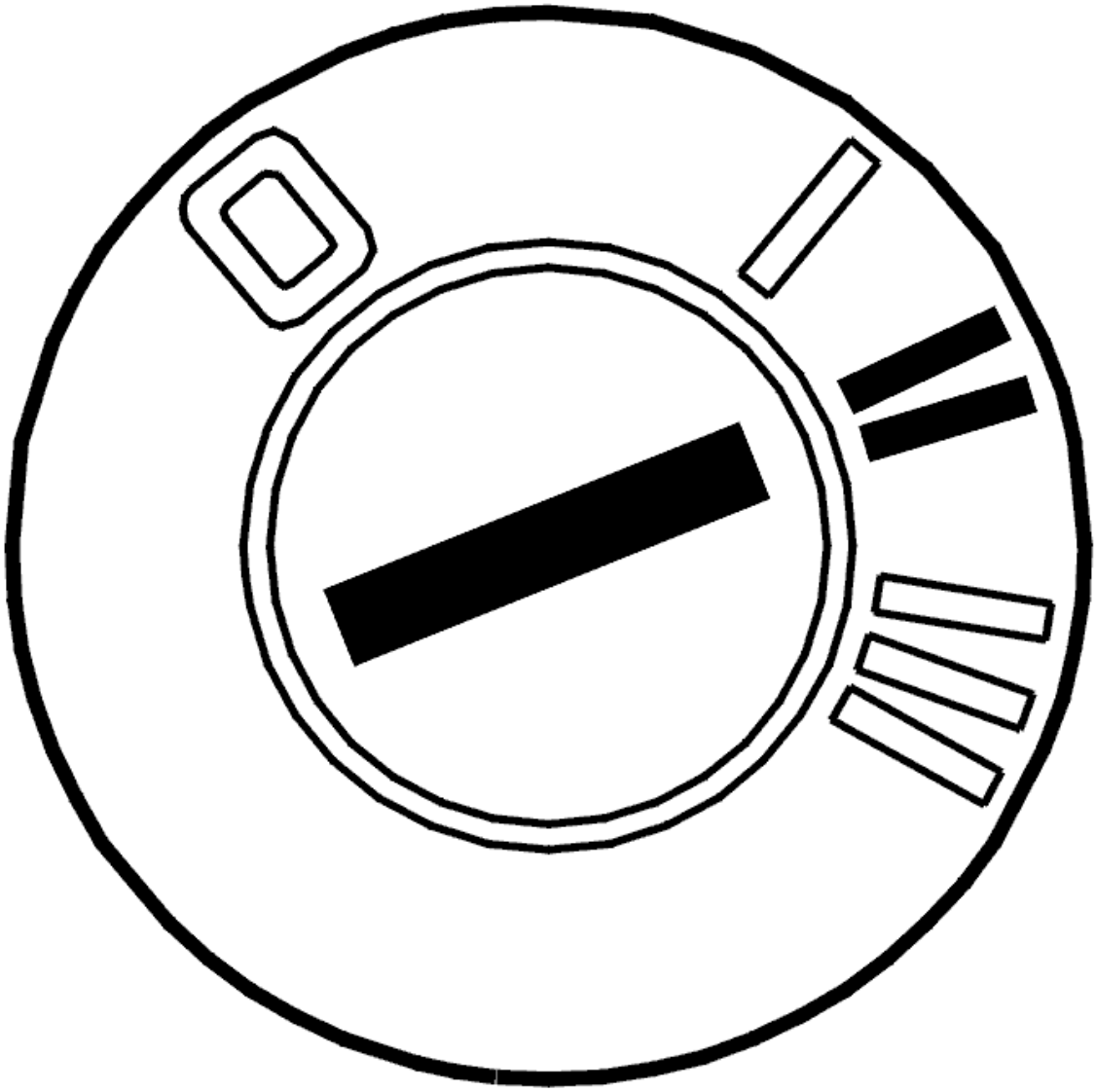


Fig. 64: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Move the gear selector lever to Neutral position (N).

Activate calibration of the position sensor in the transmission control module (TCM) by clicking the VCT2000 symbol.

CAUTION: During calibration, it is important that no diagnostic trouble codes (DTCs) for the gear selector module (GSM) are stored and that the gear selector assembly is otherwise free of faults.

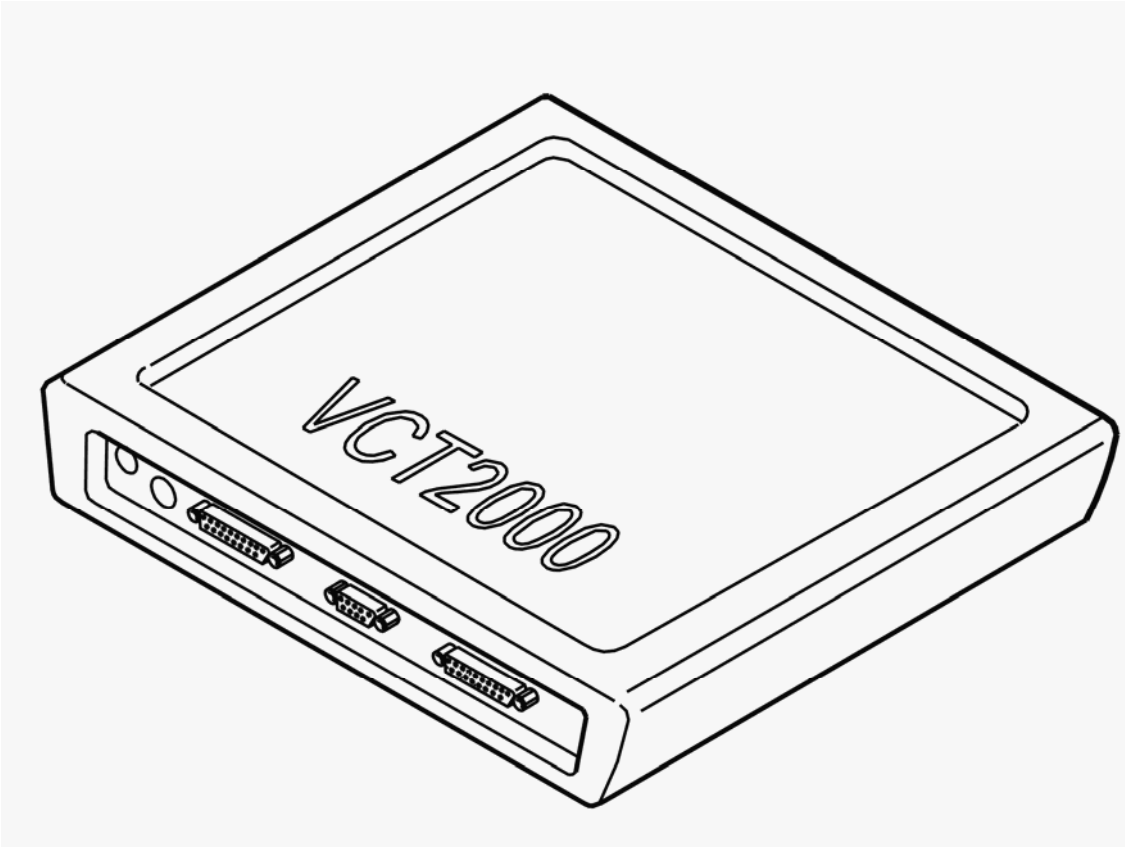


Fig. 65: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

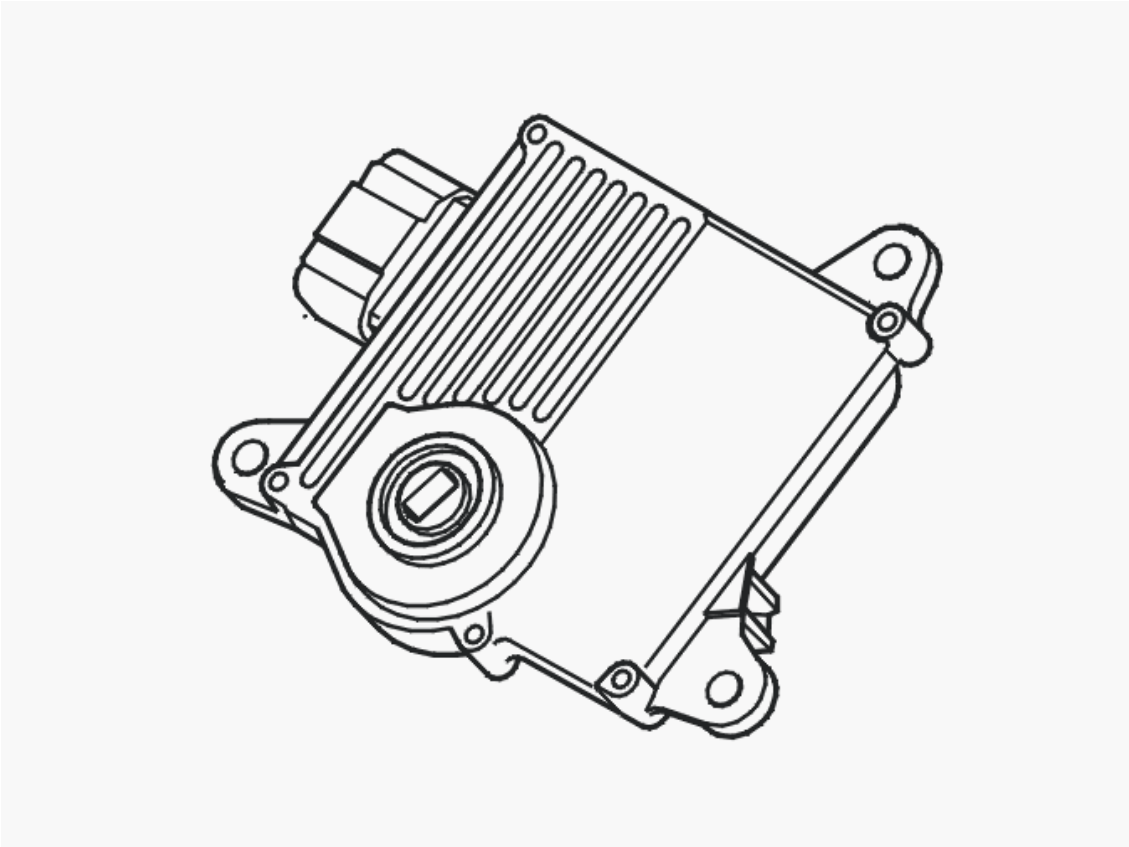


Fig. 66: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **READING OFF DIAGNOSTIC TROUBLE CODES (DTCS)**

READING OFF DIAGNOSTIC TROUBLE CODES (DTCS)

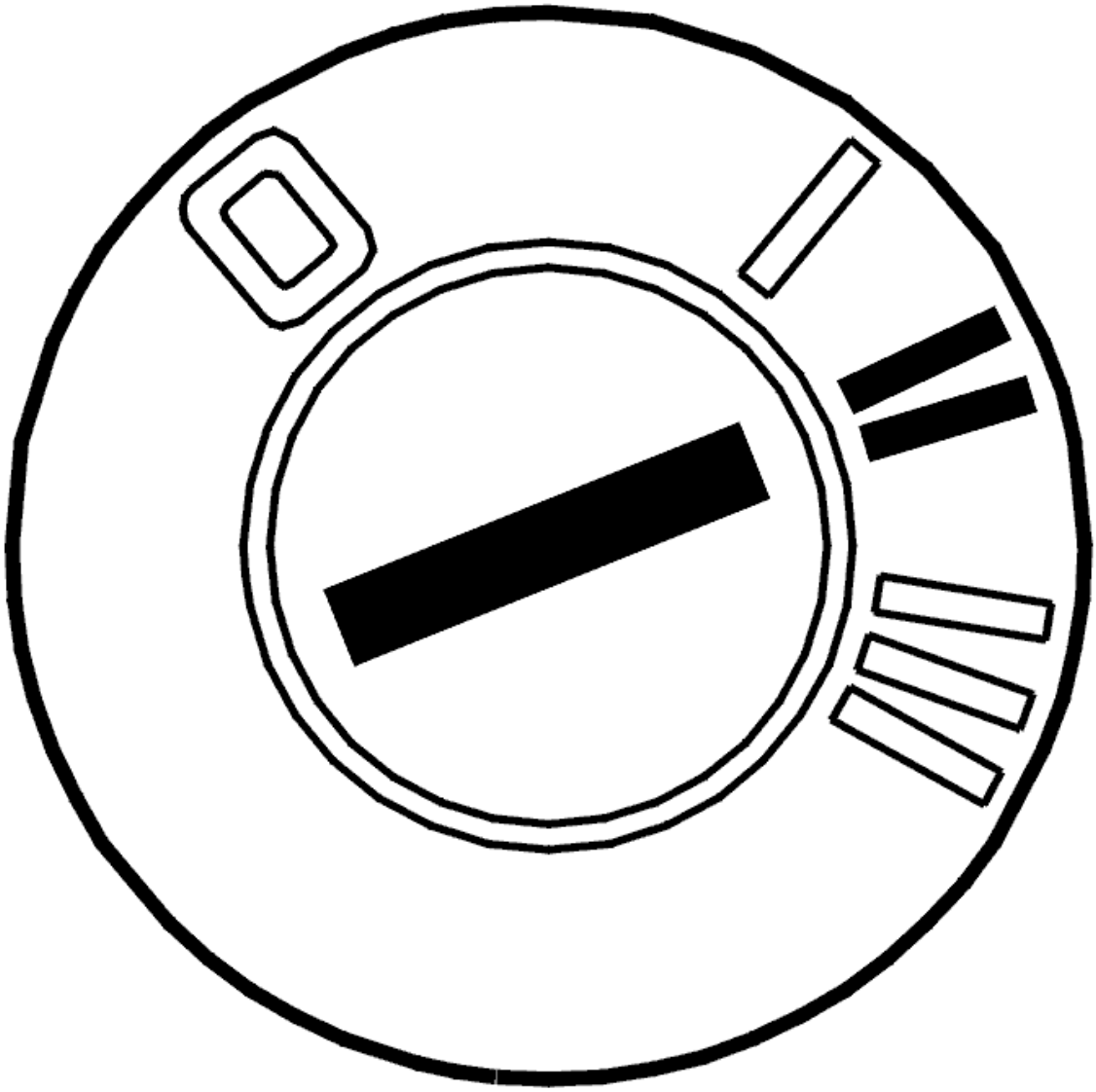


Fig. 67: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait two minutes.
- Ignition on.
- Move the gear selector lever to all the gear positions several times.
- Read out diagnostic trouble codes by clicking the VCT2000 symbol.

  If present code diagnostic fault code (DTC) remains stored replace the transmission control module (TCM).

  Other information

  - see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**

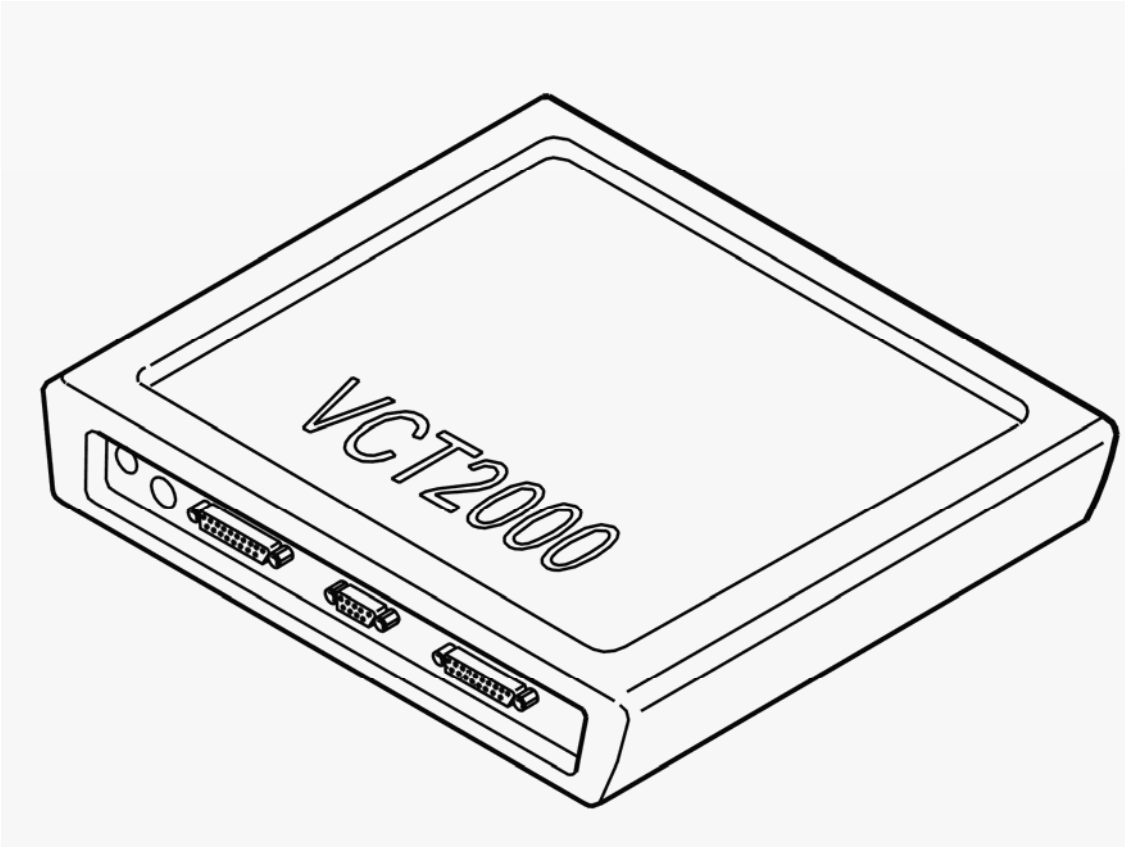


Fig. 68: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

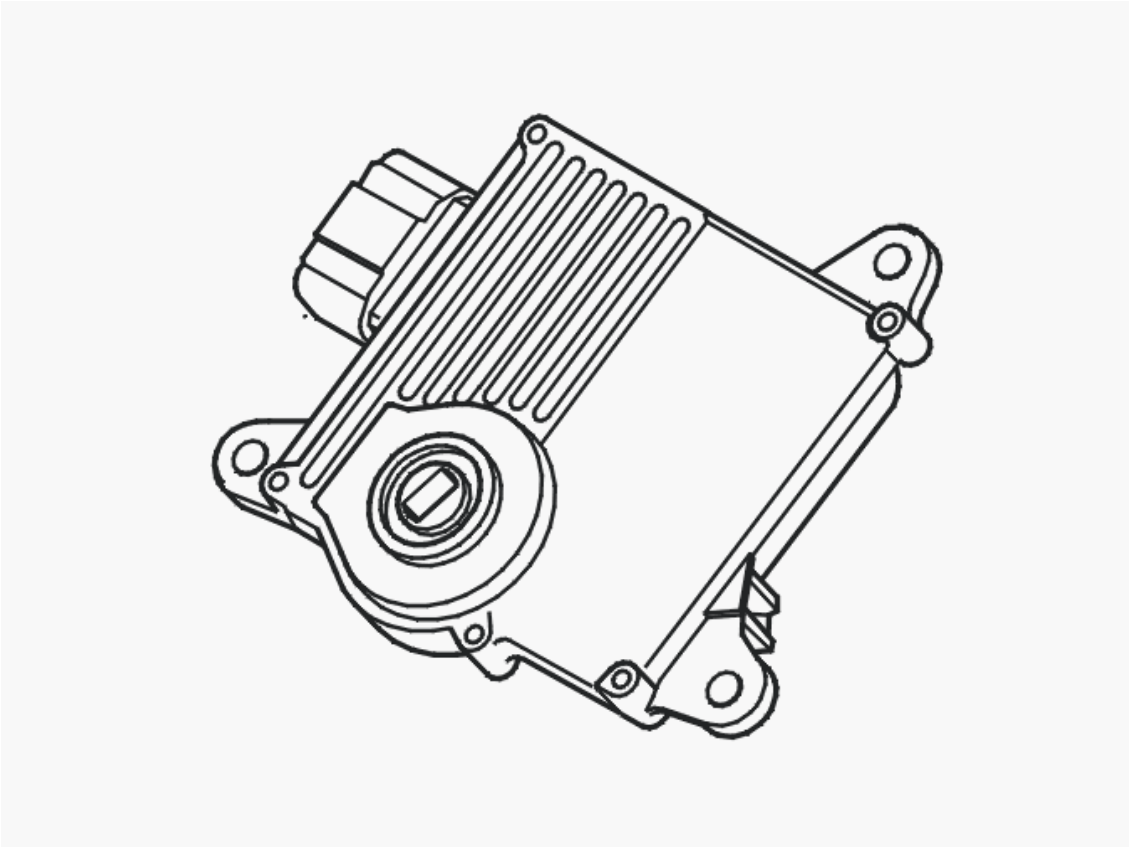


Fig. 69: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

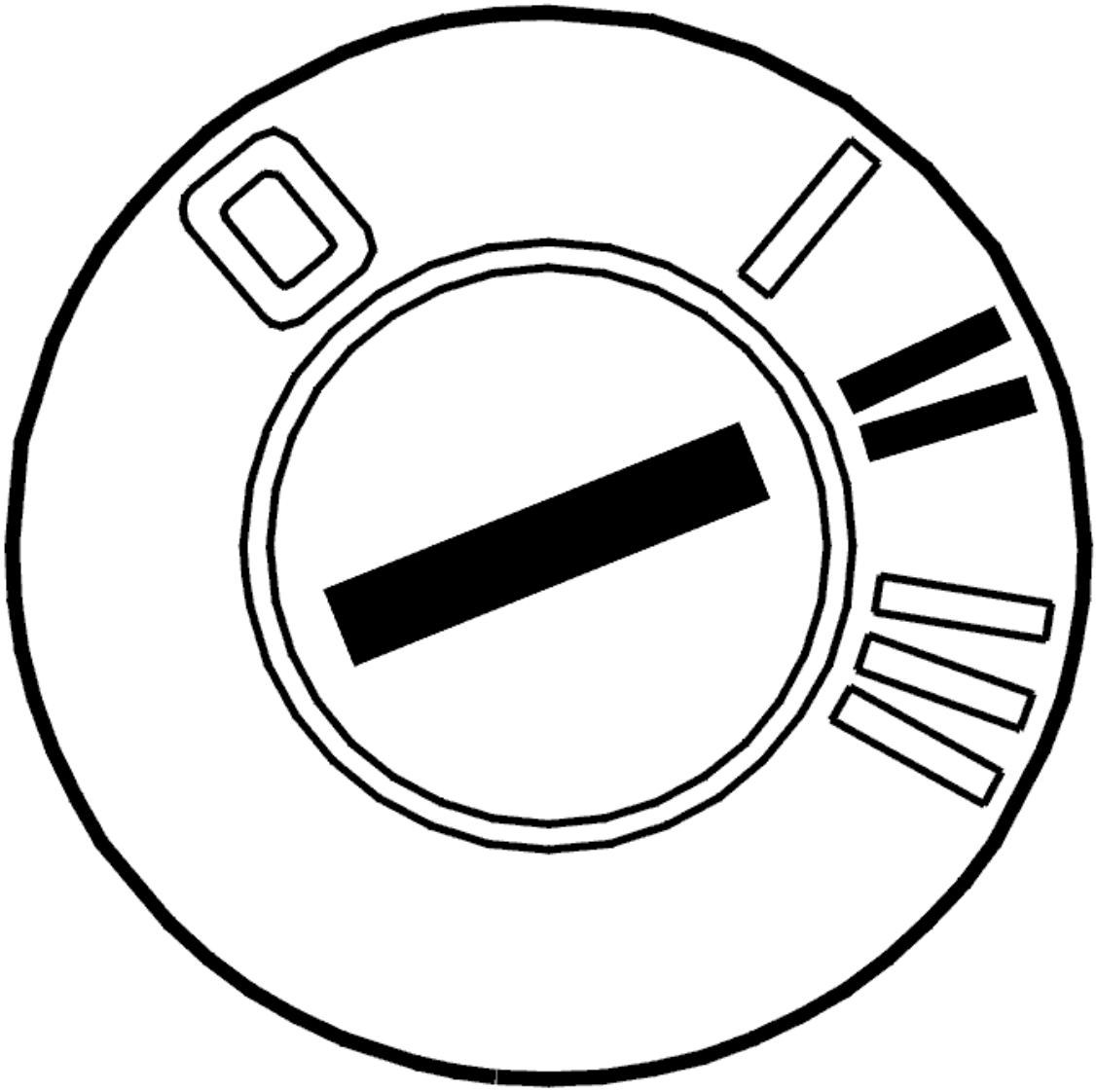


Fig. 70: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait two minutes.
- Ignition on.
- Move the gear selector lever to all the gear positions several times.
- Read out diagnostic trouble codes by clicking the VCT2000 symbol.

  If present code diagnostic fault code (DTC) remains stored replace the transmission control module (TCM).

  Other information

  - see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**

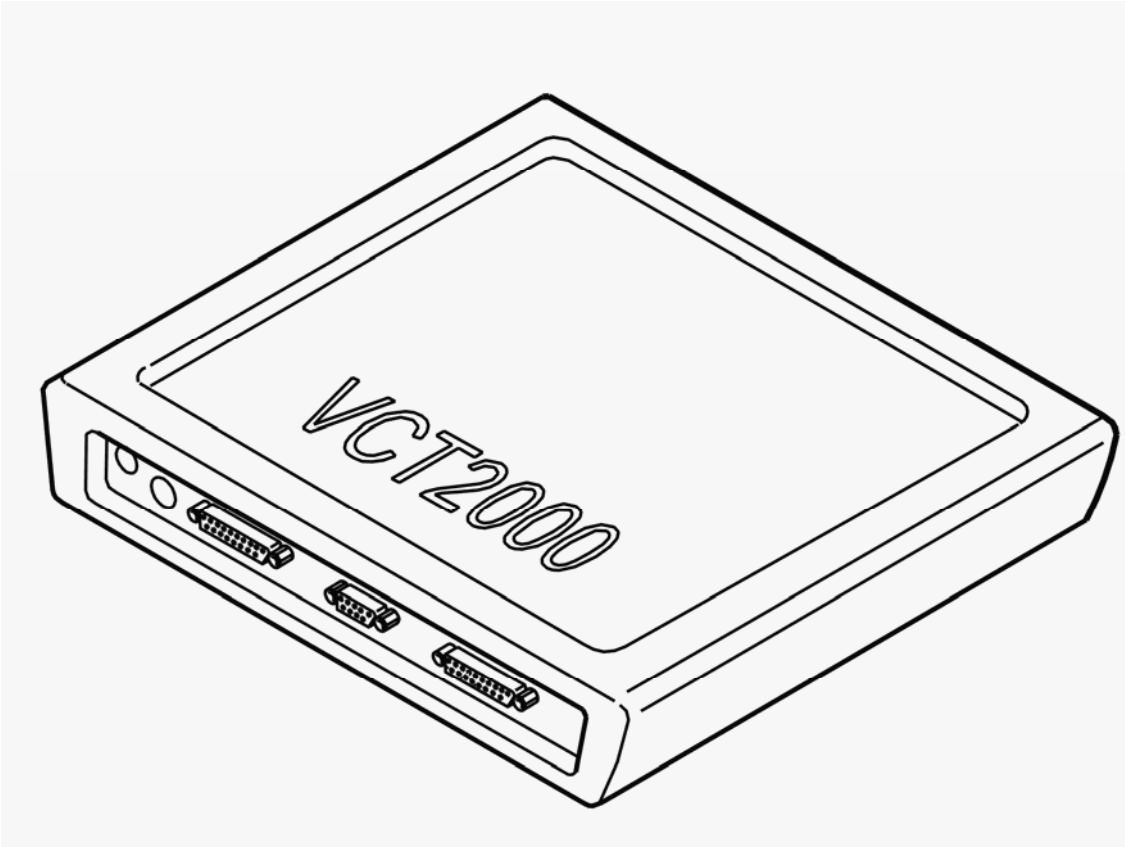


Fig. 71: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

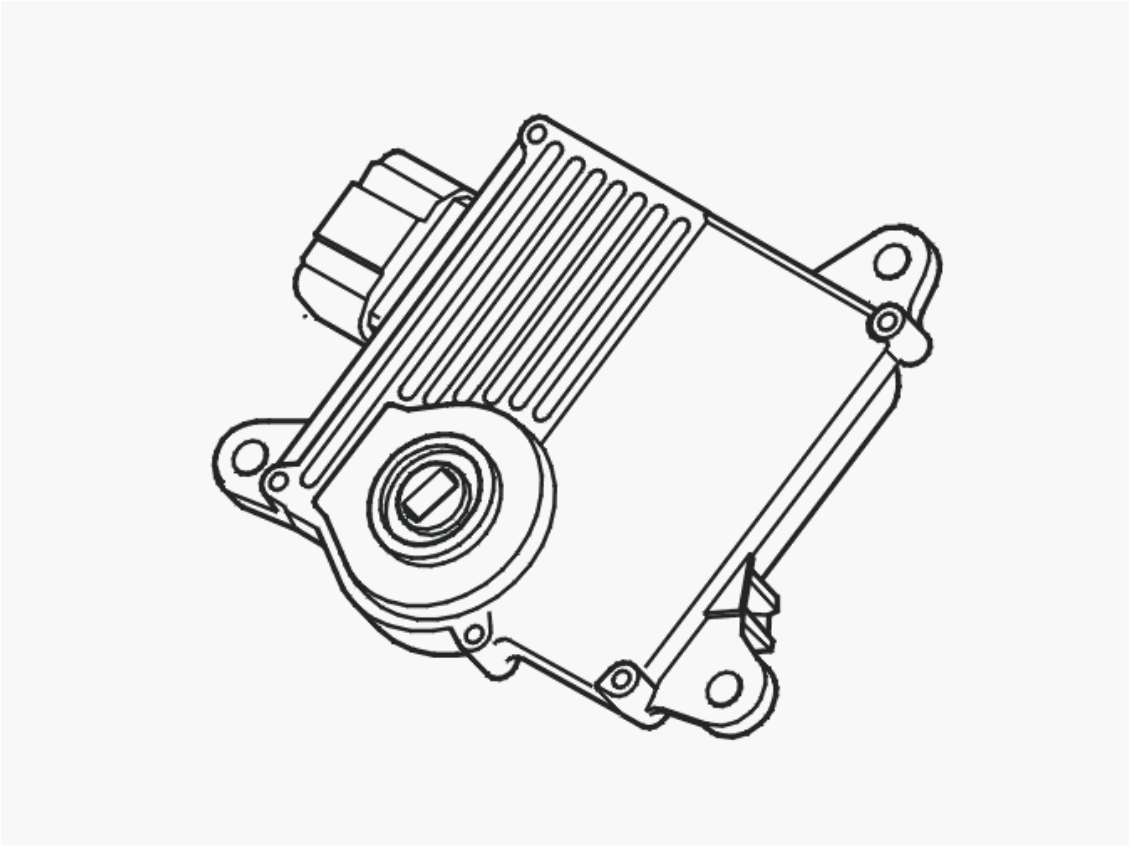


Fig. 72: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Is the present code diagnostic fault code (DTC) still stored?

- **YES**

  Refer to **INFORMATION**

- **NO**

  OKAY: Troubleshooting has been completed.

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P070500: GEARBOX POSITION SENSOR A CIRCUIT (PRNDL INPUT). GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-

80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070500

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070500**

FAULT TRACING

see **FAULT TRACING**

TCM-P070600: TRANSMISSION RANGE SENSOR A CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070600

Condition

So that the selected gear position is always correct, the gear selector cable must be fitted, adjusted and then calibrated correctly.

The diagnostic trouble code (DTC) is stored if the control module detects:

- Incorrect signal from the gear selector sensor.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

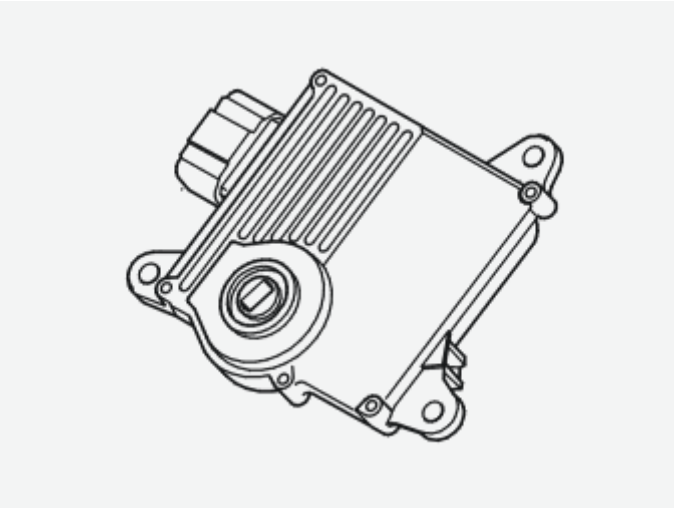


Fig. 73: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- None.

Possible Source

- Gear selector cable fitted incorrectly.
- Gear position sensor is not calibrated.

Fault symptom[s]

- General warning lamp lit

FAULT-TRACING

CALIBRATING THE POSITION SENSOR IN THE CONTROL MODULE

Fig. 74: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Check that the gear selector cable is correctly adjusted. Adjust if necessary.
- Ignition on.
- Place the gear selector lever in neutral position (N).

Activate calibration of the position sensor in the control module by clicking on the VCT2000 symbol.

Other information

- For B5xx4T2, see **GEAR SELECTOR CABLES, ADJUSTING**
- For B6xx4T, see **GEAR SELECTOR CABLE, ADJUSTING** .

Fig. 75: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

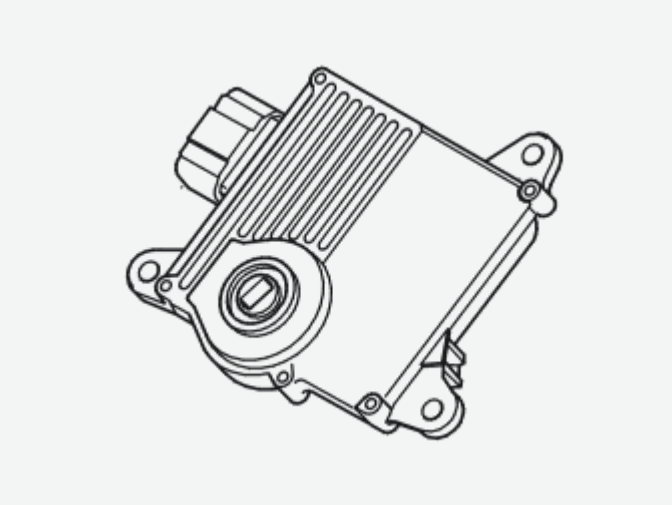


Fig. 76: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

Fig. 77: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Wait two minutes.
- Ignition on.
- Move the gear selector several times to all gear positions.
    - Read off the diagnostic trouble codes (DTCs) by clicking on the VCT2000 symbol.

If present code diagnostic fault code (DTC) remains stored replace the transmission control module (TCM).

Other information

- see **TRANSMISSION CONTROL MODULE (TCM)**

Fig. 78: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

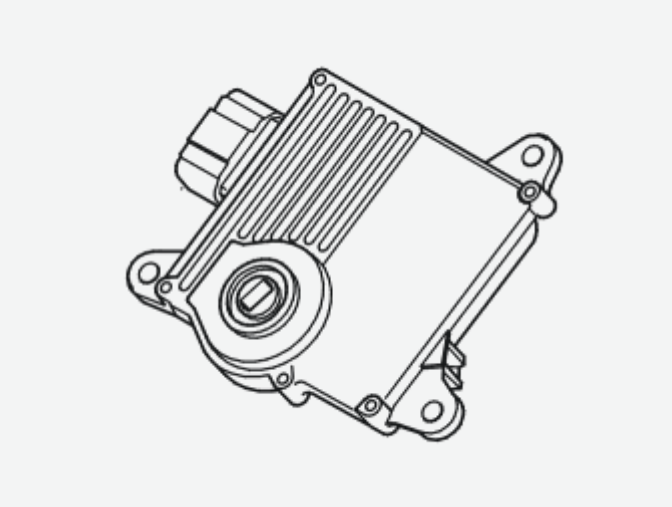


Fig. 79: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Is the relevant diagnostic trouble code (DTC) still stored?

- **YES**

  Refer to **INFORMATION**

- **NO**

OKAY: Troubleshooting has been completed.

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P070600: TRANSMISSION RANGE SENSOR A CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070600

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070600**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P070600: GEARBOX POSITION SENSOR A CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070600

Condition

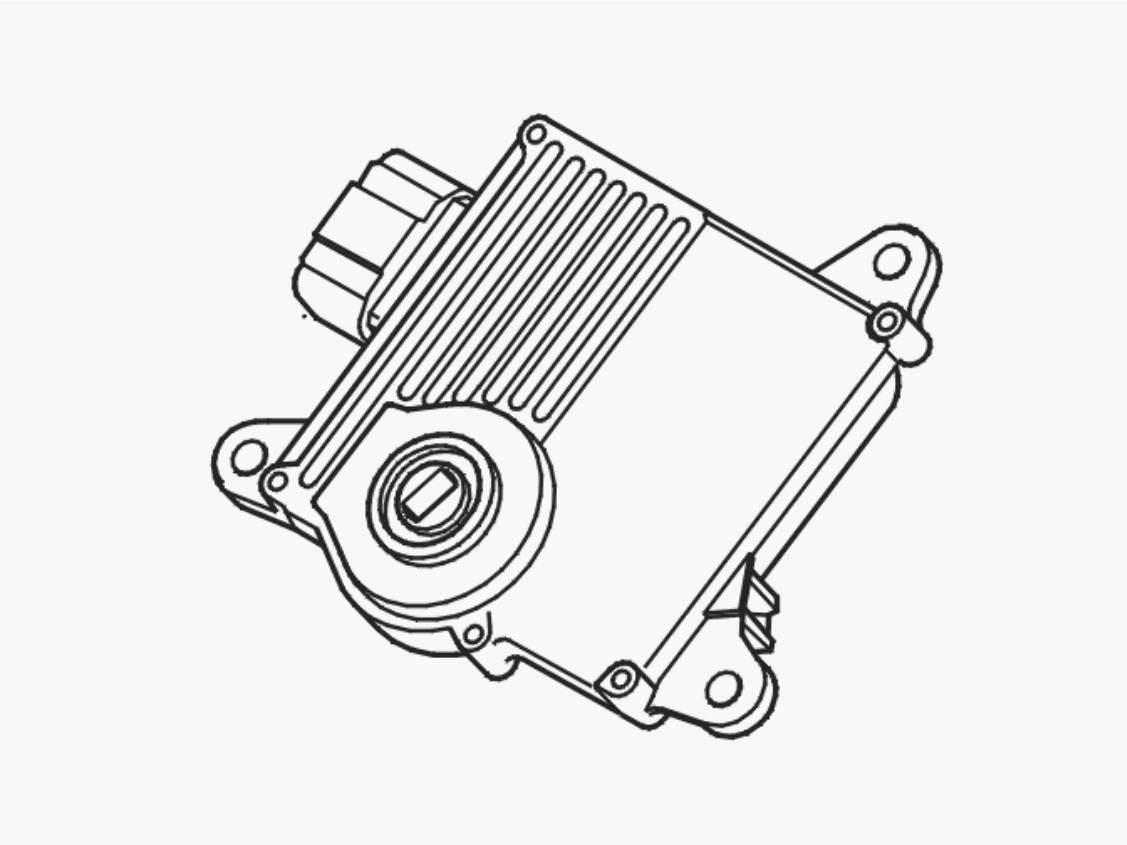


Fig. 80: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

So that the selected gear position is always correct, the gear selector cable must be fitted, adjusted and then calibrated correctly.

If the transmission control module (TCM) registers an incorrect signal from the gear position sensor, the diagnostic trouble code (DTC) is generated.

Substitute Value

- Nothing.

Possible Source

- Gear selector cable fitted incorrectly.
- Gear position sensor not calibrated.

Fault symptom[s]

- General warning lamp lit

FAULT TRACING

CALIBRATION OF POSITION SENSOR IN TRANSMISSION CONTROL MODULE (TCM)

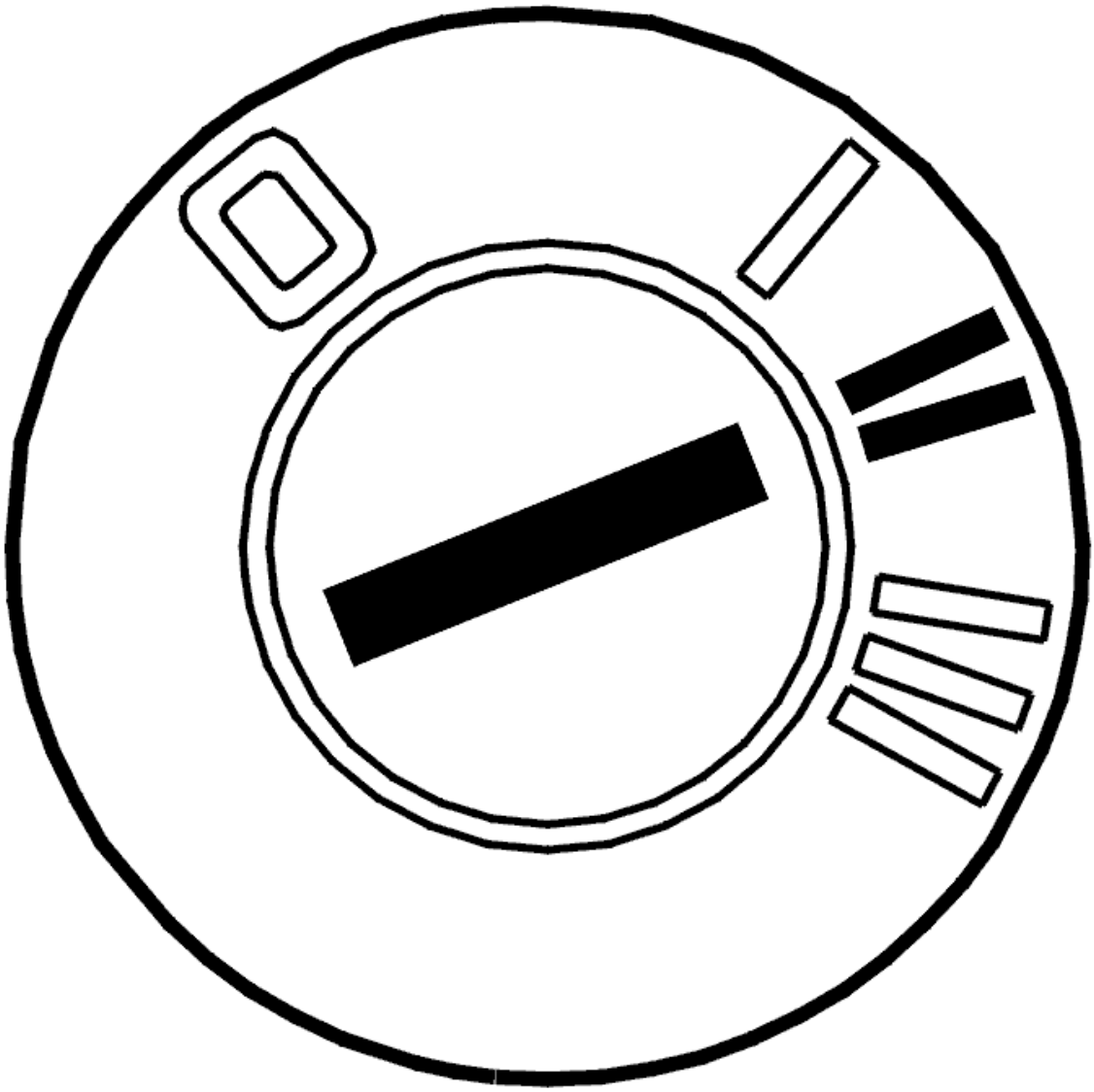


Fig. 81: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Check that the gear selector cable is adjusted correctly and readjust as necessary.
- Ignition on.
- Put gear lever in neutral (N).

  Activate calibration of position sensor in transmission control module (TCM) by clicking on the VCT2000 symbol.

  Other information

  - see **GEAR SELECTOR CABLE, ADJUSTING**

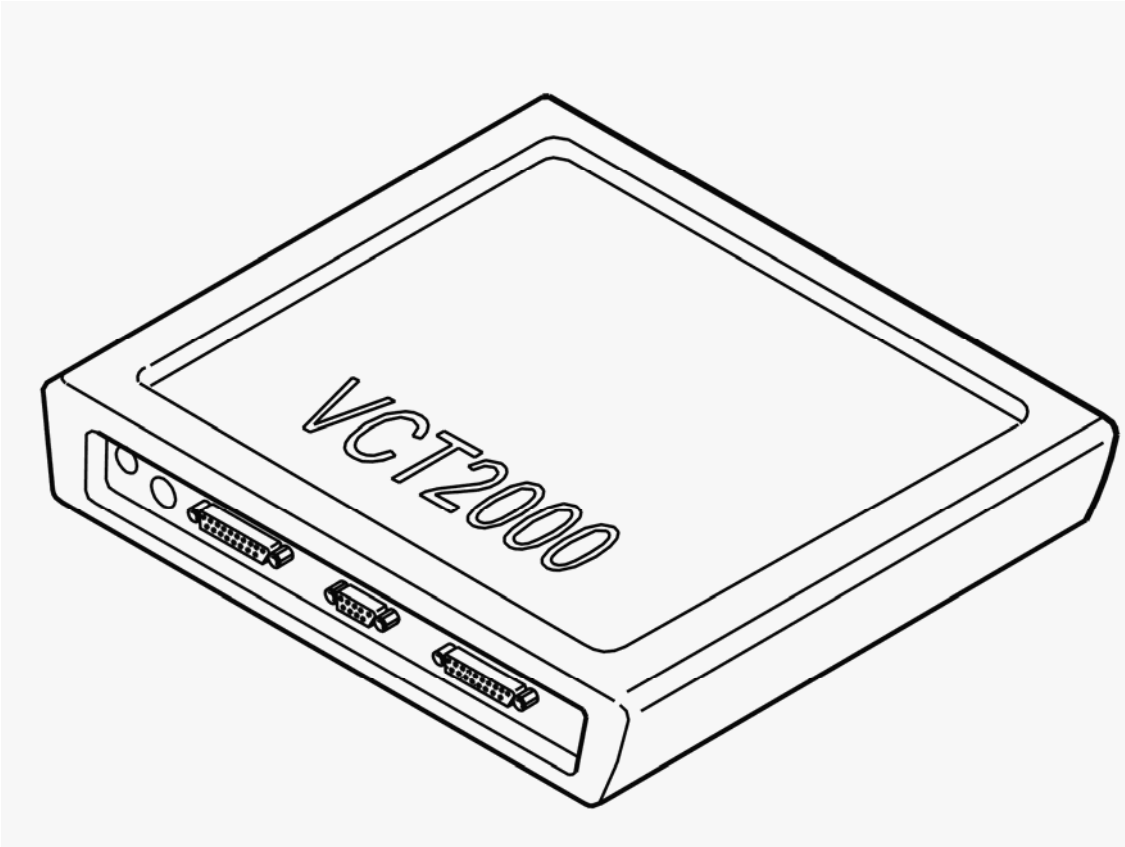


Fig. 82: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

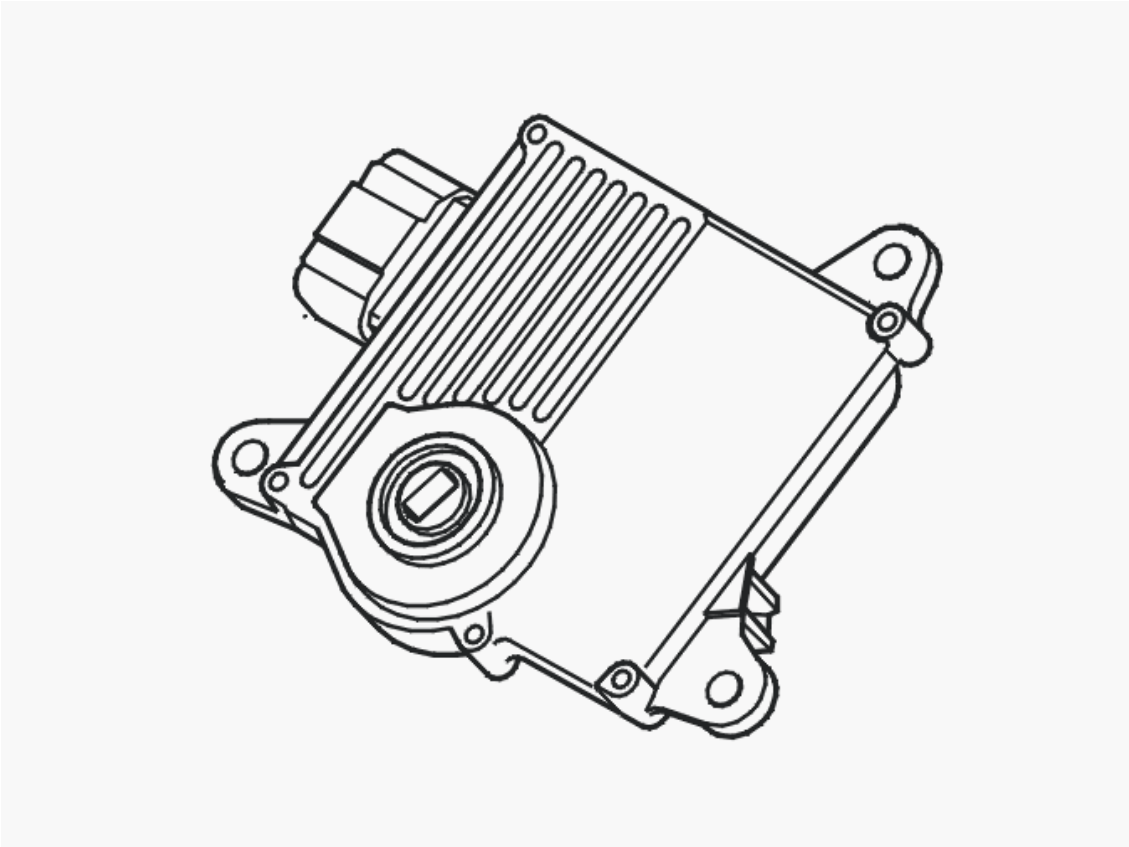


Fig. 83: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

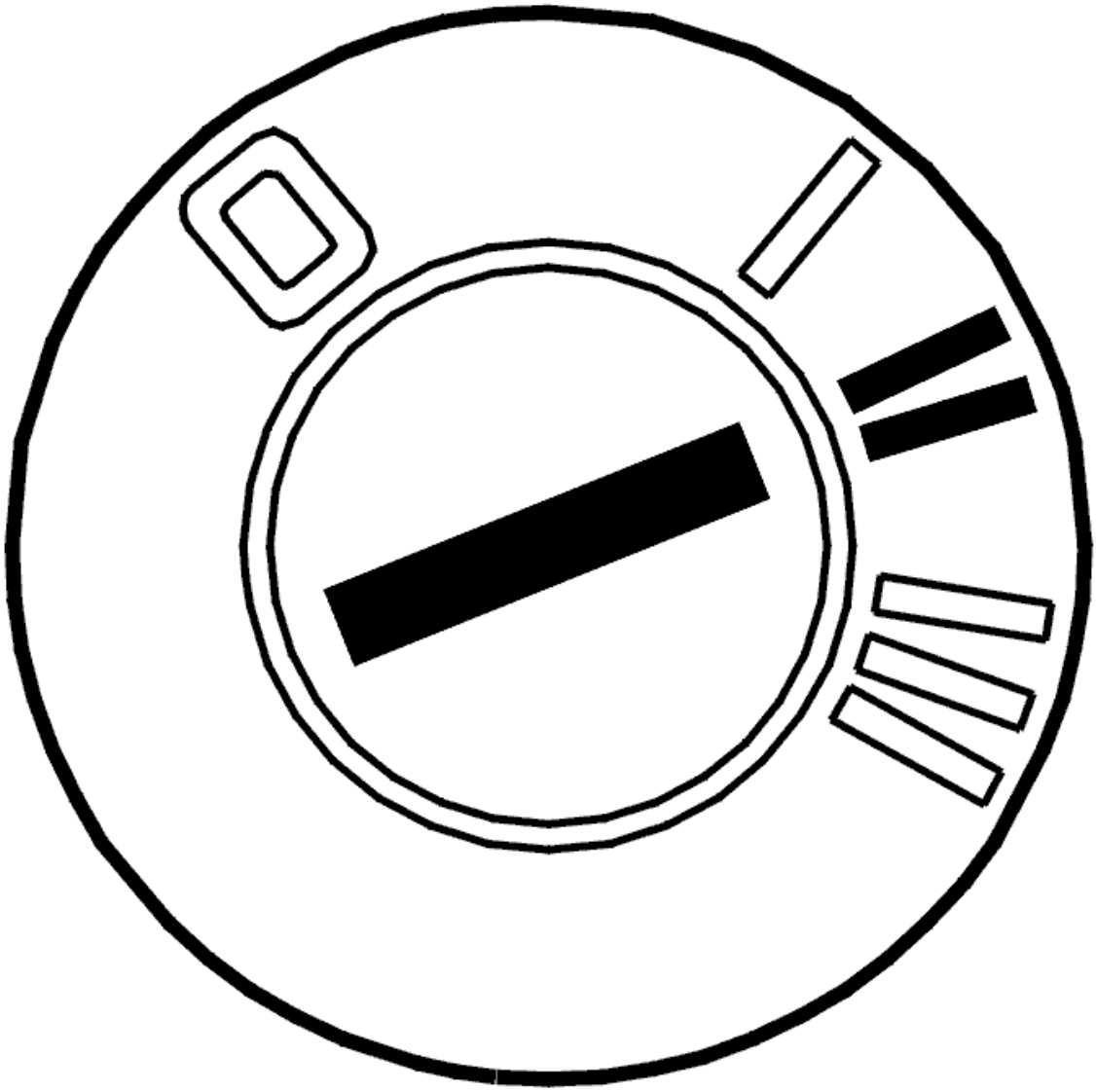


Fig. 84: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Wait for two minutes.
- Ignition on.
- Move the gear selector several times through all the gear positions.
- Read out diagnostic trouble codes by clicking the VCT2000 symbol.

If the current diagnostic trouble code (DTC) is still stored, replace the transmission control module (TCM).

Other information

- see **TRANSMISSION CONTROL MODULE (TCM), REPLACING**

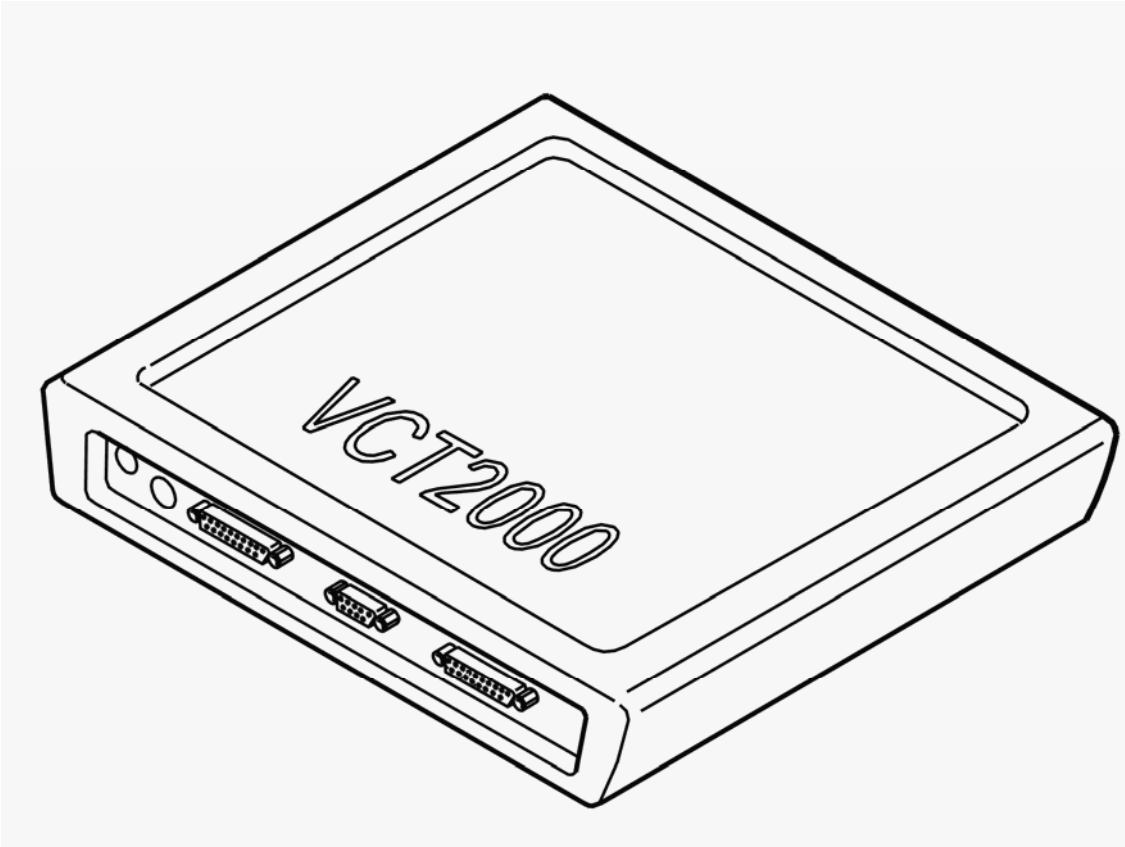


Fig. 85: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

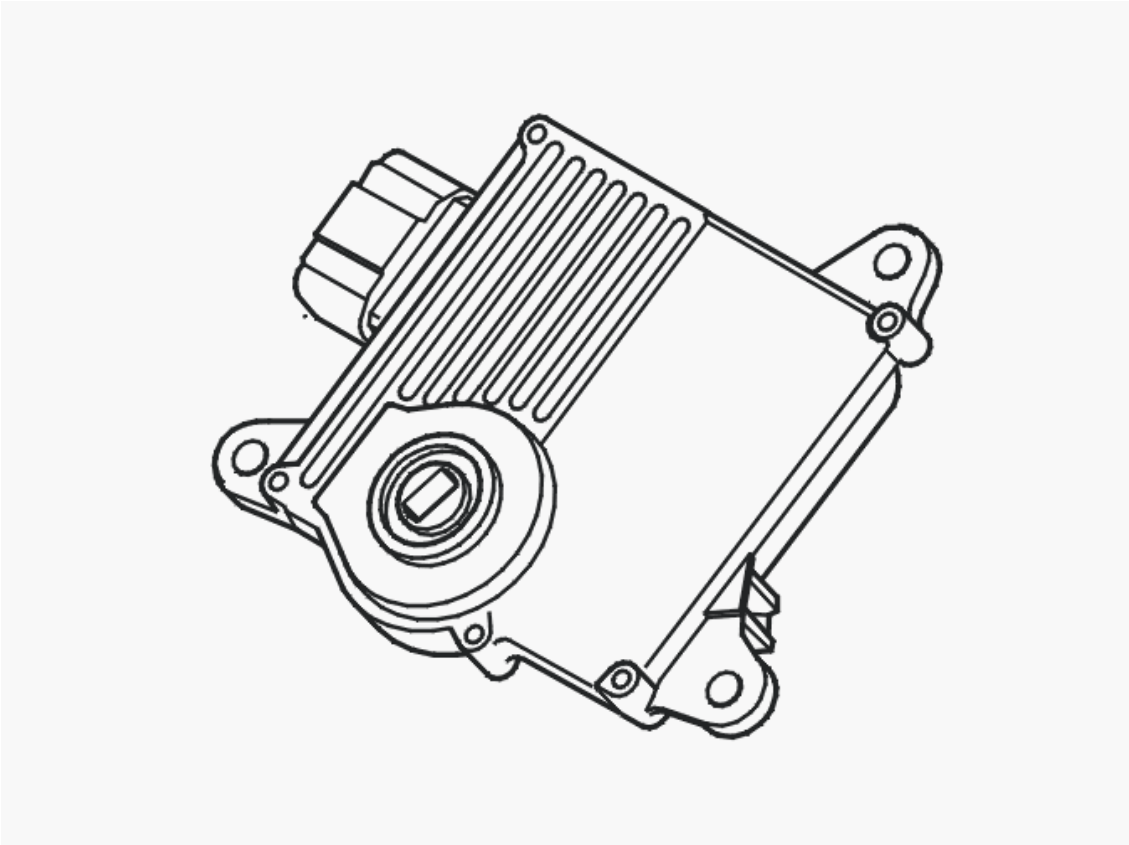


Fig. 86: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Is the current diagnostic trouble code still stored?

- **YES**

  Refer to **INFORMATION**

- **NO**

  OKAY: Troubleshooting has been completed.

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P070600: GEARBOX POSITION SENSOR A CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO INFORMATION ON

FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070600

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070600**

FAULT TRACING

see **FAULT TRACING**

TCM-P070900: TRANSMISSION RANGE SENSOR A CIRCUIT INTERMITTENT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070900

Condition

So that the selected gear position is always correct, the gear selector cable must be fitted, adjusted and then calibrated correctly.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Gear position sensor is not calibrated.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

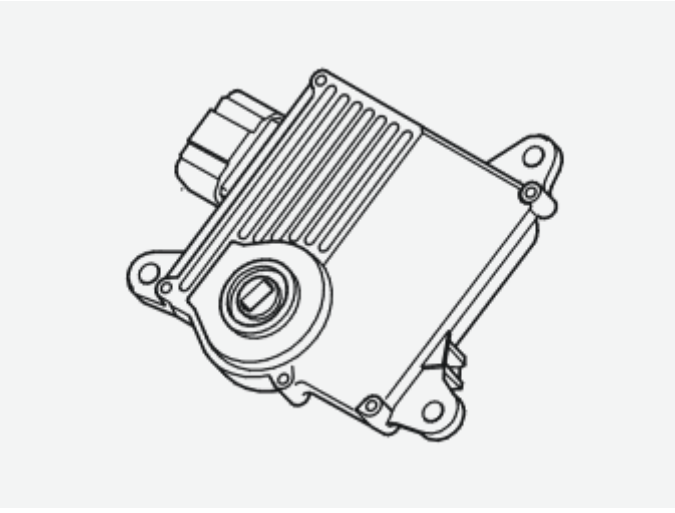


Fig. 87: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- None.

Possible Source

- Gear selector cable fitted incorrectly.
- Gear position sensor is not calibrated.

Fault symptom[s]

- General warning lamp lit

FAULT-TRACING

see **FAULT-TRACING**

TCM-P070900: TRANSMISSION RANGE SENSOR A CIRCUIT INTERMITTENT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070900

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070900**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P070900: GEARBOX POSITION SENSOR A CIRCUIT INTERMITTENT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070900

Condition

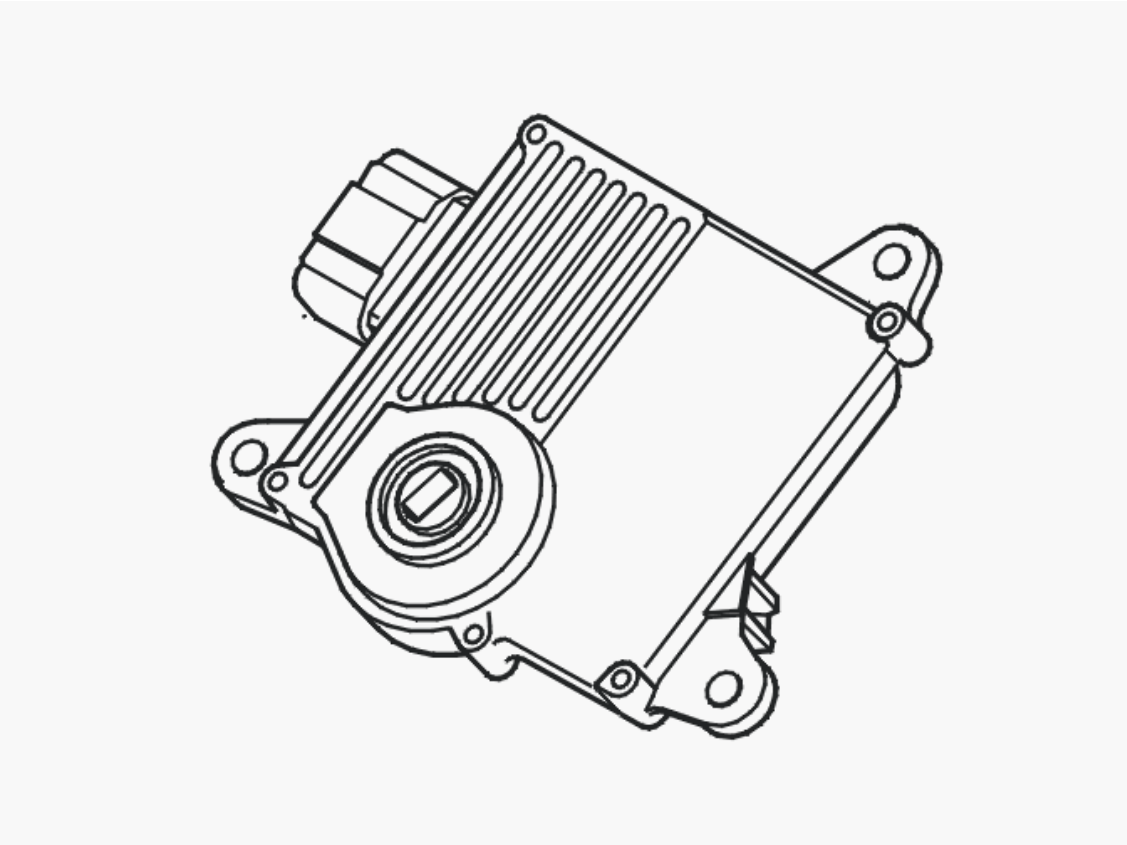


Fig. 88: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

So that the selected gear position is always correct, the gear selector cable must be fitted, adjusted and then calibrated correctly.

If the transmission control module (TCM) registers that the gear position sensor is not calibrated, the diagnostic trouble code (DTC) is generated.

Substitute Value

- Nothing.

Possible Source

- Gear selector cable fitted incorrectly.
- Gear position sensor not calibrated.

Fault symptom[s]

- General warning lamp lit

FAULT TRACING

see **FAULT TRACING**

TCM-P070900: GEARBOX POSITION SENSOR A CIRCUIT INTERMITTENT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070900

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P070900**

FAULT TRACING

see **FAULT TRACING**

TCM-P071100: TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071100

Condition

The oil temperature sensor provides the Transmission control module (TCM) with a signal that is used, among other things, for the temperature controlled lock-up and engagement high temperature program functions.

The sensor has an NTC (negative temperature coefficient) resistor.

The signal (voltage) drops with increased oil temperature.

The diagnostic trouble code (DTC) is stored if control module:

- After the engine has run for approximately 10 minutes, an unchanged signal is received from the oil temperature sensor.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- After at least two minutes normal driving in gear position D, 4, 3, 2 or geartronic (MAN) and engine temperature at start-up more than 70 °C or transmission oil temperature more than 50 °C.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

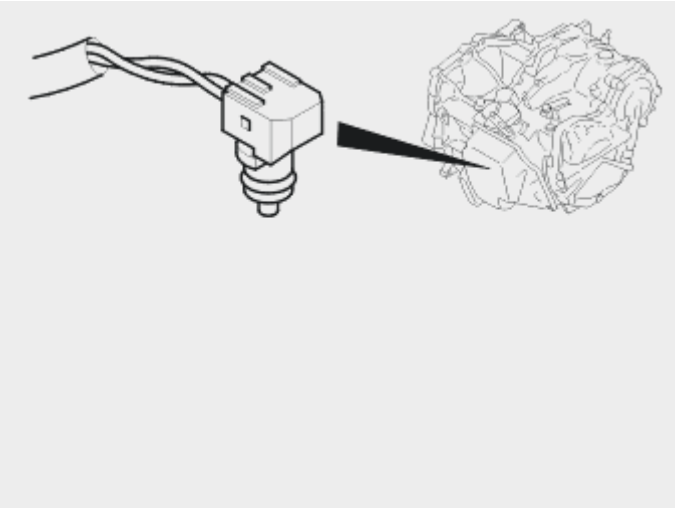


Fig. 89: Locating Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Transmission control module assumes an oil temperature of 80 °C.
- function is blocked.
- Slip lock-up function is blocked.
- Neutral check function is blocked.

Possible Source

- Contact resistance in the terminals.
- Oil temperature sensor not working.

Fault symptom[s]

- General warning lamp lit

FAULT-TRACING

CHECKS

CHECKING THE OIL TEMPERATURE SENSOR

NOTE: During this fault tracing the transmission and oil should be at room temperature from the start.

This is to control the sensor function.

Fig. 90: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Start the engine. Allow the engine to idle.
- Read off the oil temperature.

Allow the transmission to warm up. Check that the oil temperature increases and appears to be within the permitted range.

Compare with transmission external temperature.

NOTE: The transmission temperature sensor is inside the control system and may be affected by the heat given off by the solenoids.

The fault is permanent if the temperature is outside the permitted range.

If the temperature is within the permitted range, this is an indication that the fault was present previously but that it is not active at the moment, i. e. the fault is intermittent.

Fig. 91: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

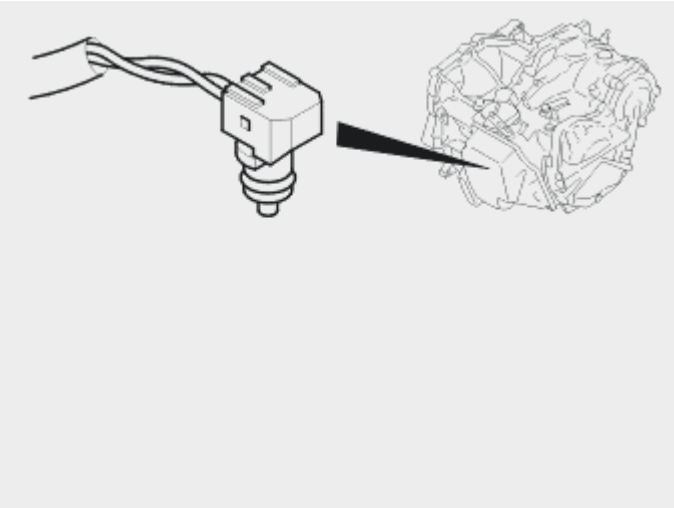


Fig. 92: Locating Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING INTERNAL COMPONENTS**

CHECKING INTERNAL COMPONENTS

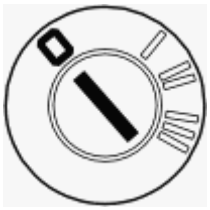


Fig. 93: Identifying Ignition In Off Position
Courtesy of VOLVO CARS CORPORATION

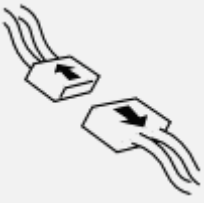


Fig. 94: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Expose the connector for the transmission control module (TCM).

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

HINT: Check the temperature. See CHECKING THE OIL TEMPERATURE SENSOR

Remedy as necessary.

Other information

- To replace Temperature Sensor Fluid, Transaxle, (TFT) see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access connector B:**TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

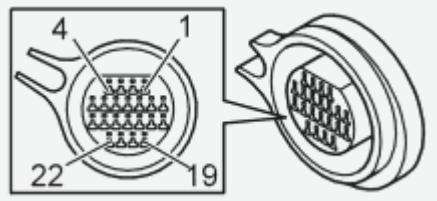


Fig. 95: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

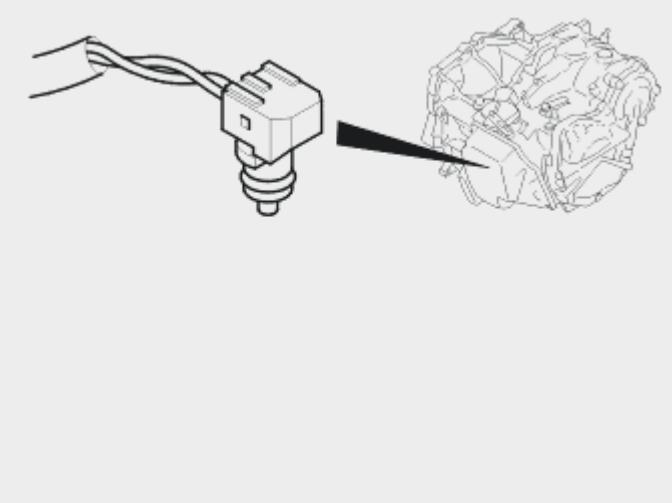


Fig. 96: Locating Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 97: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

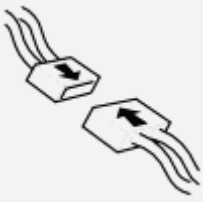


Fig. 98: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Start the engine. Allow the engine to idle.
- Read off the oil temperature.

Check that the oil temperature is within its permitted range. Compare it to the automatic transmission temperature.

NOTE: The transmission temperature sensor is inside the control system and may be affected by the heat given off by the solenoids.

Fig. 99: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

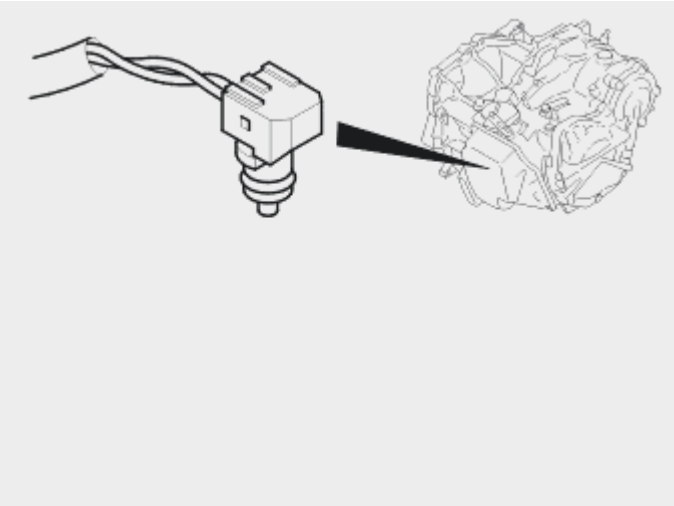


Fig. 100: Locating Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Is the temperature reading OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER

CHECKING THE FUNCTION

HINT: The transmission control module (TCM) has a counter for fluid quality that counts the number of times the transmission is subjected to too hard a load or too high an ambient temperature. If the counter is not reset during draining/replacement, there is a risk that a diagnostic trouble code will be set under the wrong conditions. Thus, it is important that the counter for transmission fluid change be reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

Fig. 101: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the counter.

  Fig. 102: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
  Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P071100: TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071100**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P071100: GEARBOX OIL TEMPERATURE SENSOR A CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071100

Condition

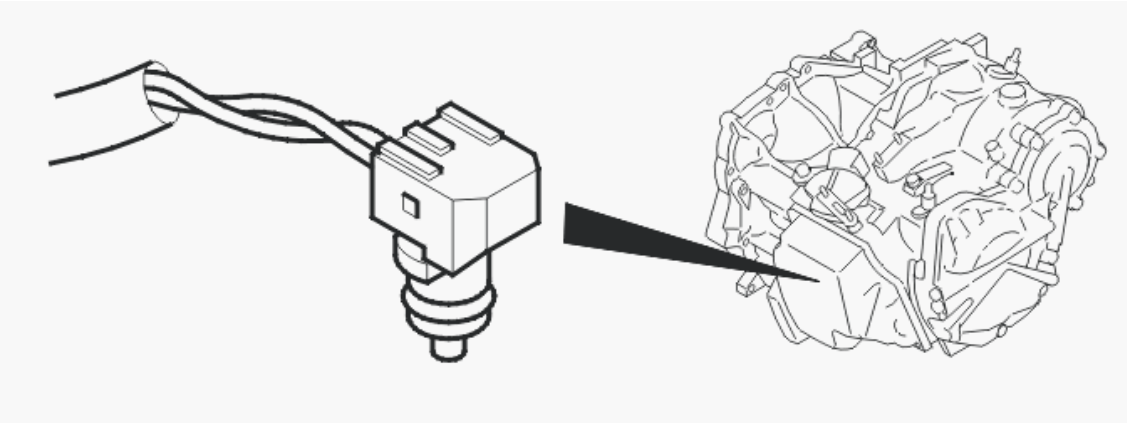


Fig. 103: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

The oil temperature sensor gives the transmission control module (TCM) a signal that is used for the temperature controlled lock-up and high temperature program functions. The sensor has a temperature sensitive resistor with negative temperature coefficient (NTC). The signal (voltage) drops with rising oil temperature. If the transmission control module (TCM) receives a signal from the oil temperature sensor that has not changed for about 10 minutes since the engine was started, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code (DTC) can be diagnosed for at least two minutes of normal driving in gear positions D, 4, 3, 2 or Geartronic (**MAN**) and engine temperature when starting higher than 70 °C or the gearbox oil temperature is higher than 50 °C.

Substitute Value

- Transmission control module (TCM) assumes an oil temperature of 80 °C.
- Lock-up function is blocked.
- Slip lock-up function is blocked.
- Neutral check function is blocked.

Possible Source

- Contact resistance in the terminals
- Oil temperature sensor not working.

Fault symptom[s]

- General warning lamp lit

FAULT TRACING TCM-P071100

CHECKS

CHECKING THE OIL TEMPERATURE SENSOR

NOTE: During this fault-tracing, the transmission and the oil should be at room temperature from the start in order to check the sensor function.

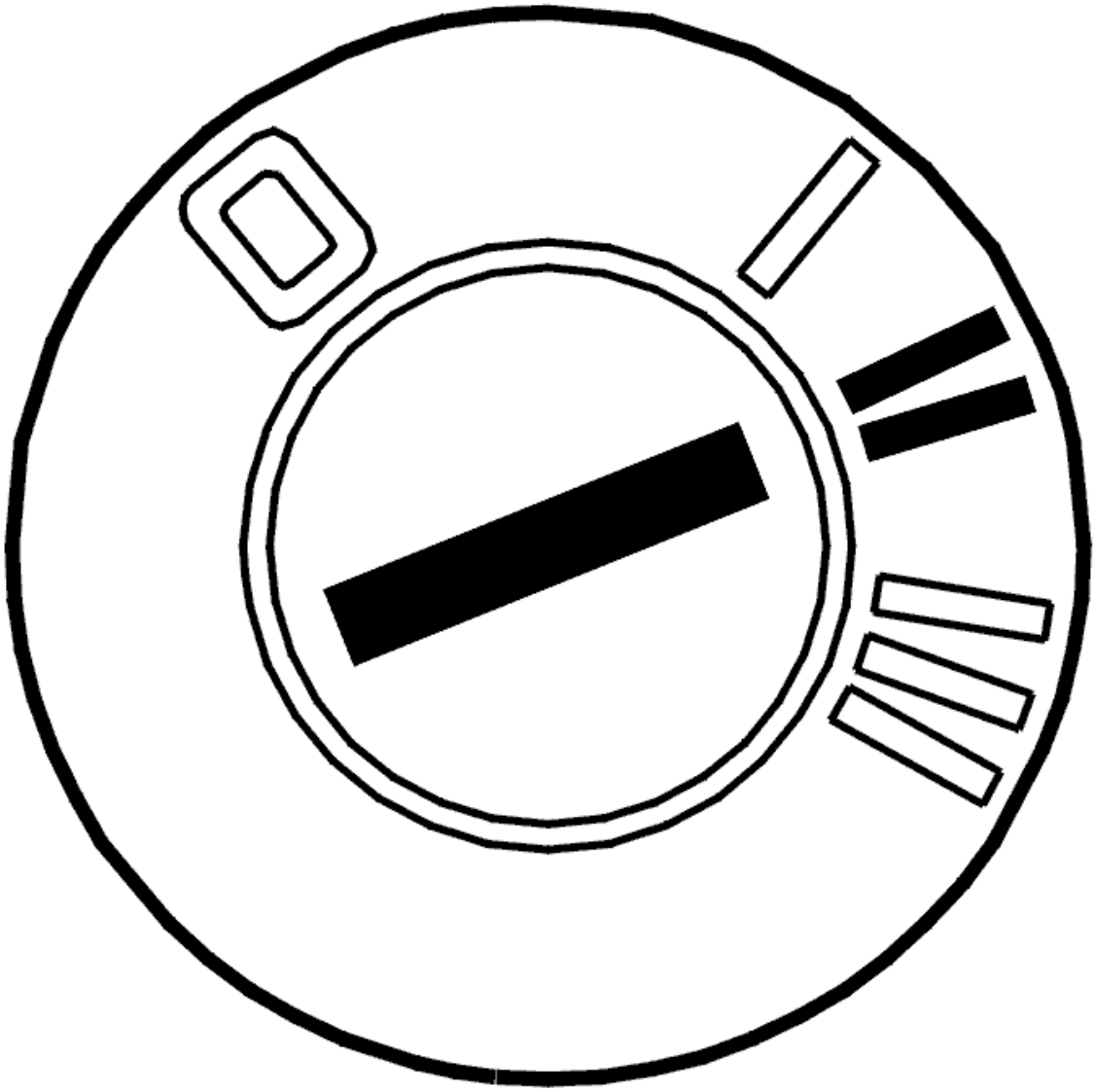


Fig. 104: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Start the engine and allow it to idle.
- Read the oil temperature.

Let the transmission heat up. Check that the oil temperature increases and is within the permitted range. Compare with the external temperature of the transmission.

NOTE: The transmission temperature sensor is located inside the control system and may be affected by the heat given off by the solenoids.

If the temperature is not within the permitted range it means that the fault is permanent.

If the temperature is within the permitted range, it means that the fault was present previously but is not active now. The fault is intermittent.

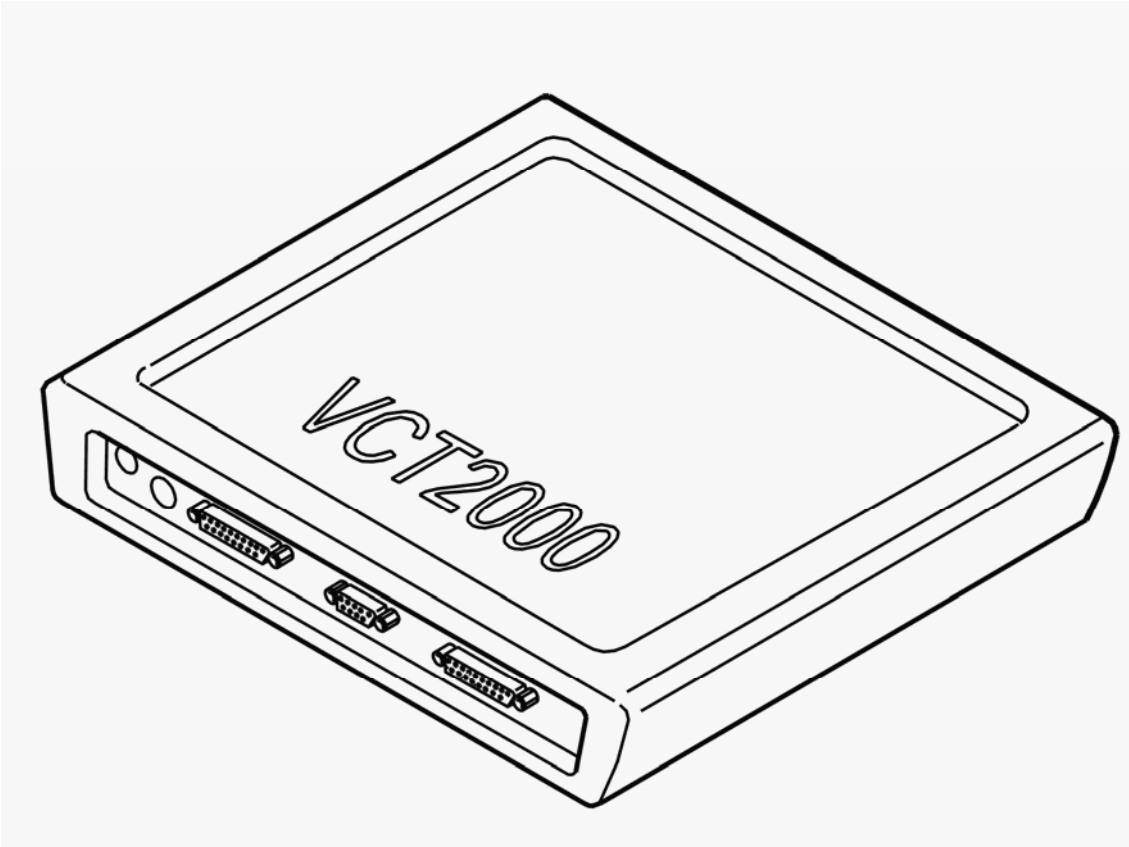


Fig. 105: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

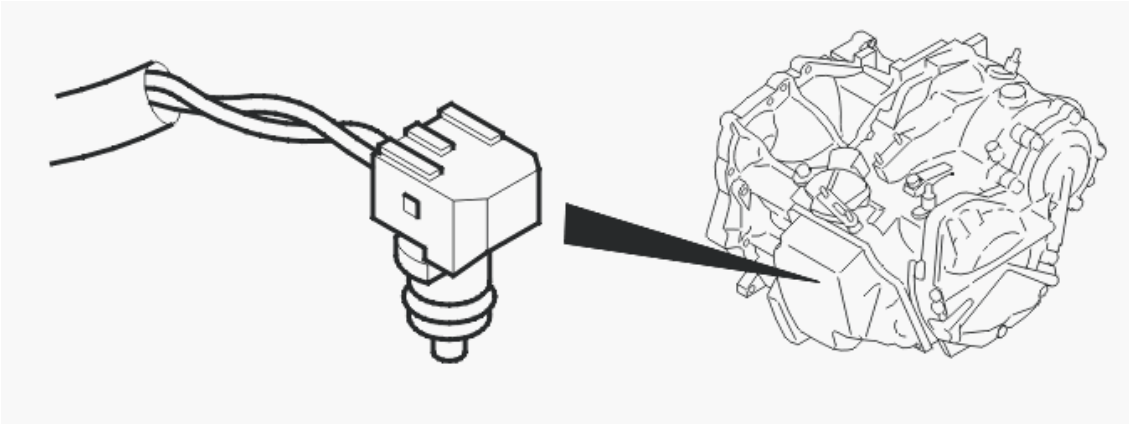


Fig. 106: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING INTERNAL COMPONENTS**

CHECKING INTERNAL COMPONENTS

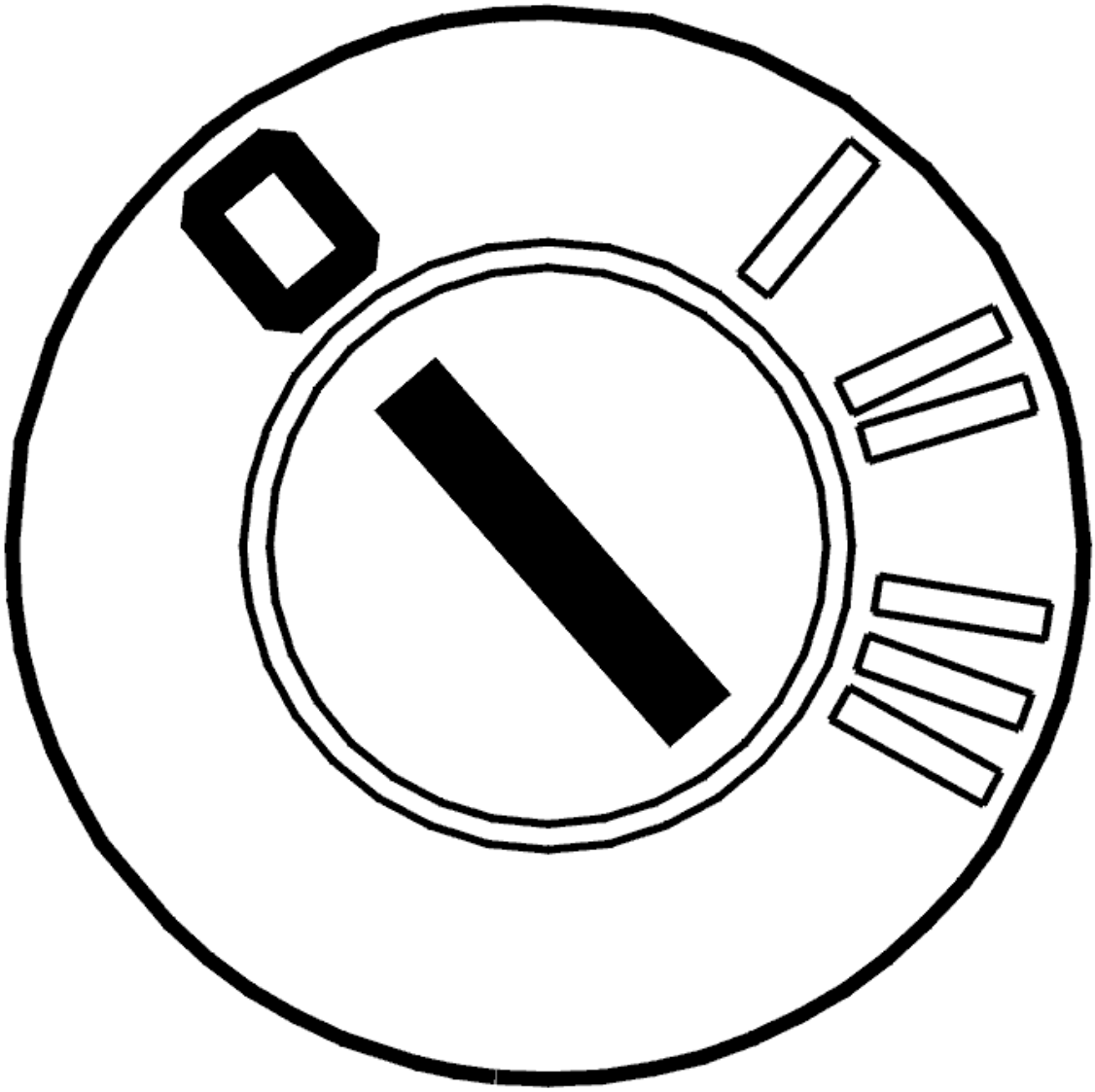


Fig. 107: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

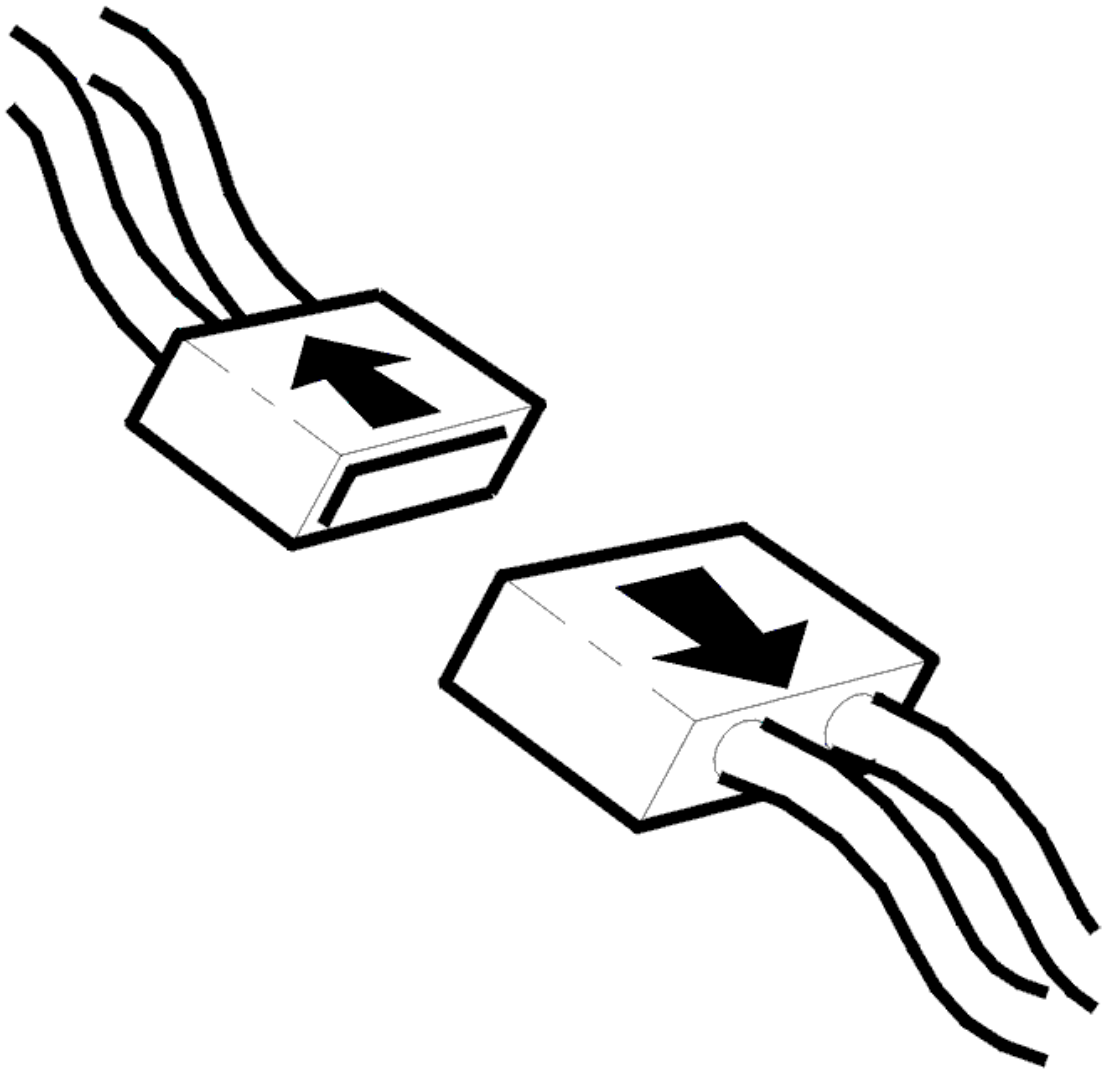


Fig. 108: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Expose the connector for the transmission control module (TCM).

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  HINT: Check the temperature. See CHECKING THE OIL TEMPERATURE SENSOR

  Remedy as necessary.

  Other information

  - To replace Temperature Sensor Fluid, Transaxle, (TFT) see **CABLE HARNESS, CONTROL**

SYSTEM, GEARBOX, REPLACING

- To access connector B: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- see **CONTENTS**

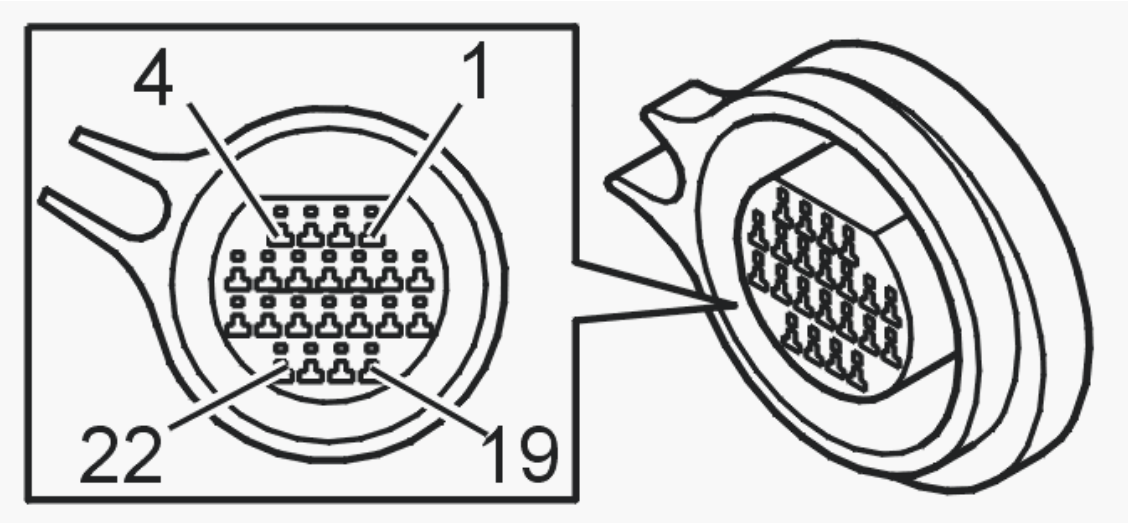


Fig. 109: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

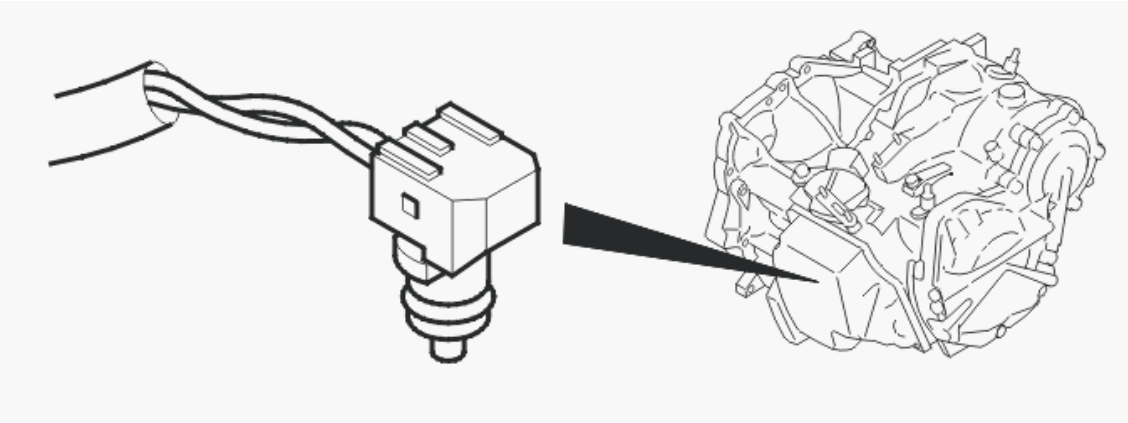


Fig. 110: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE**

RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE

RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE

HINT: The transmission control module (TCM) has a counter for the oil's quality that counts up when the transmission is exposed to very heavy loads or high ambient temperature. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under

incorrect conditions. That is why it is important that the counter for Transmission oil, change is reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

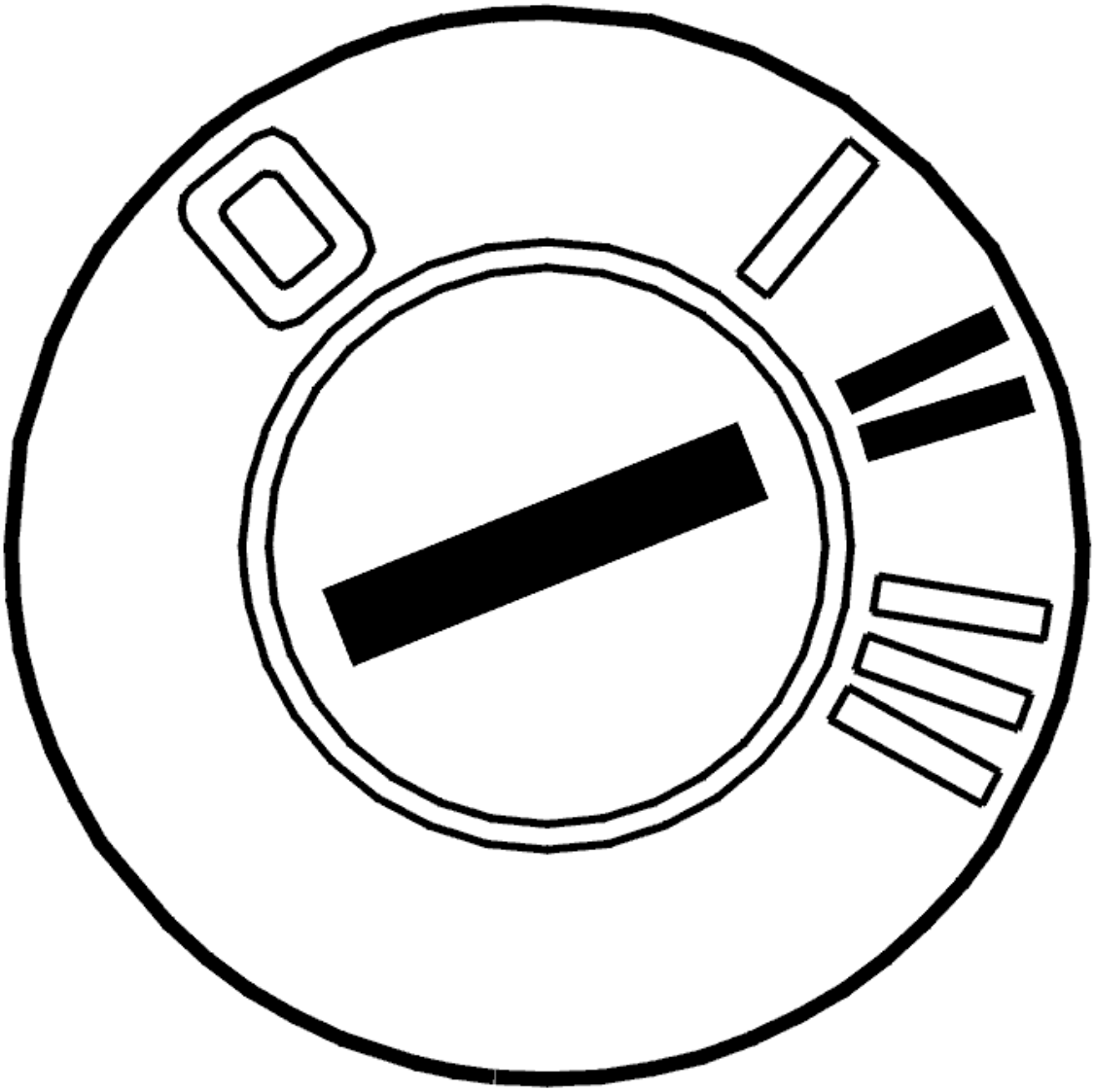


Fig. 111: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the counter by clicking on the symbol for VCT2000.

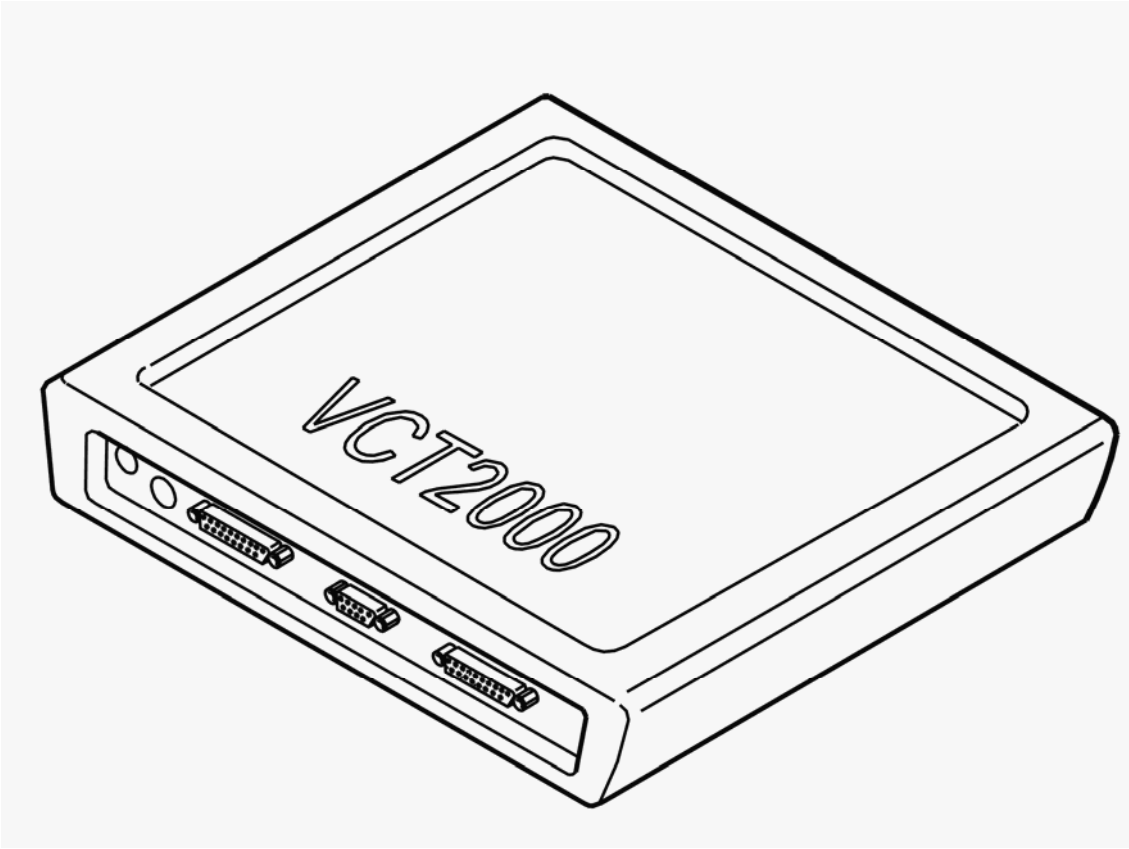


Fig. 112: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

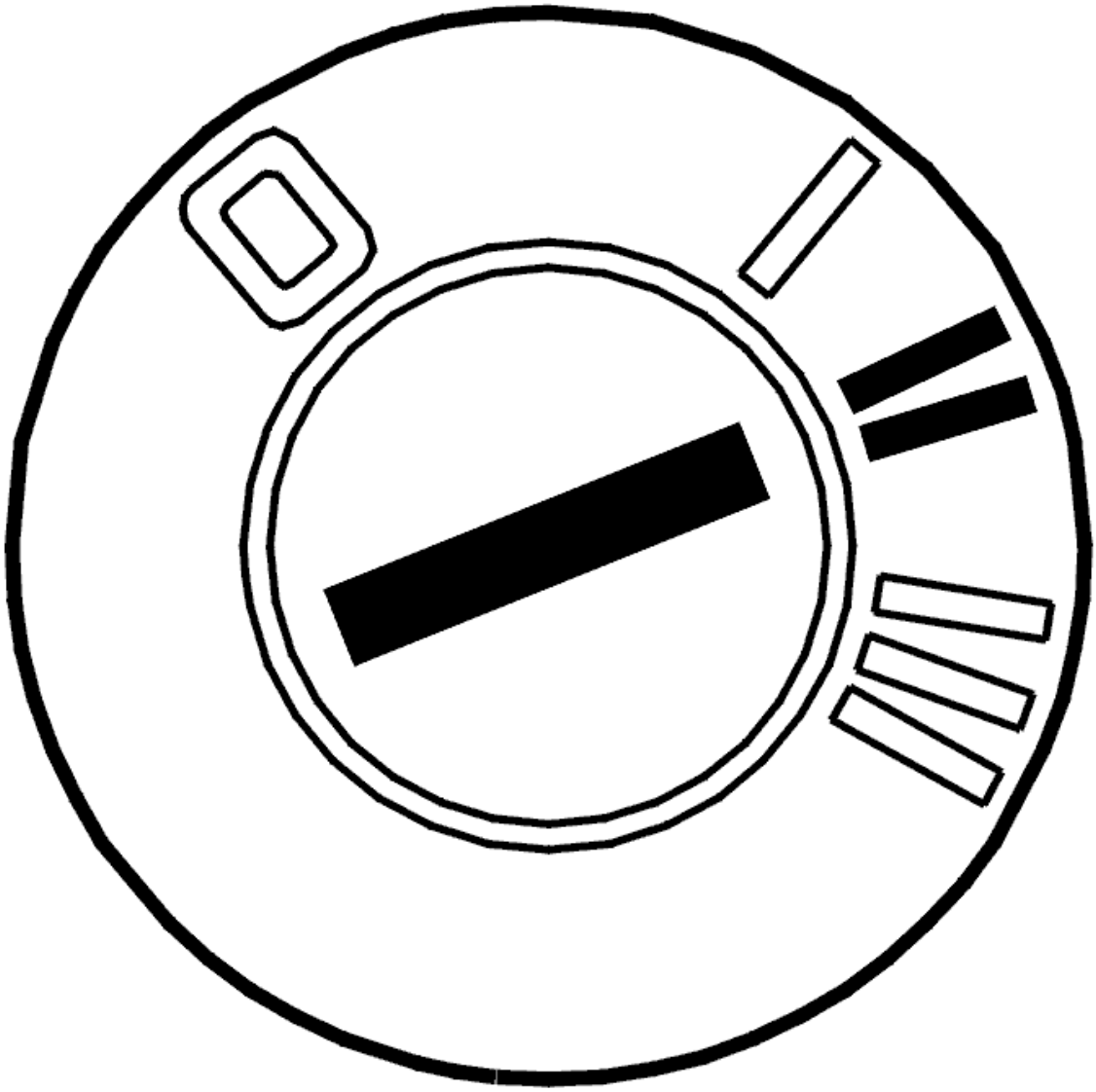


Fig. 113: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

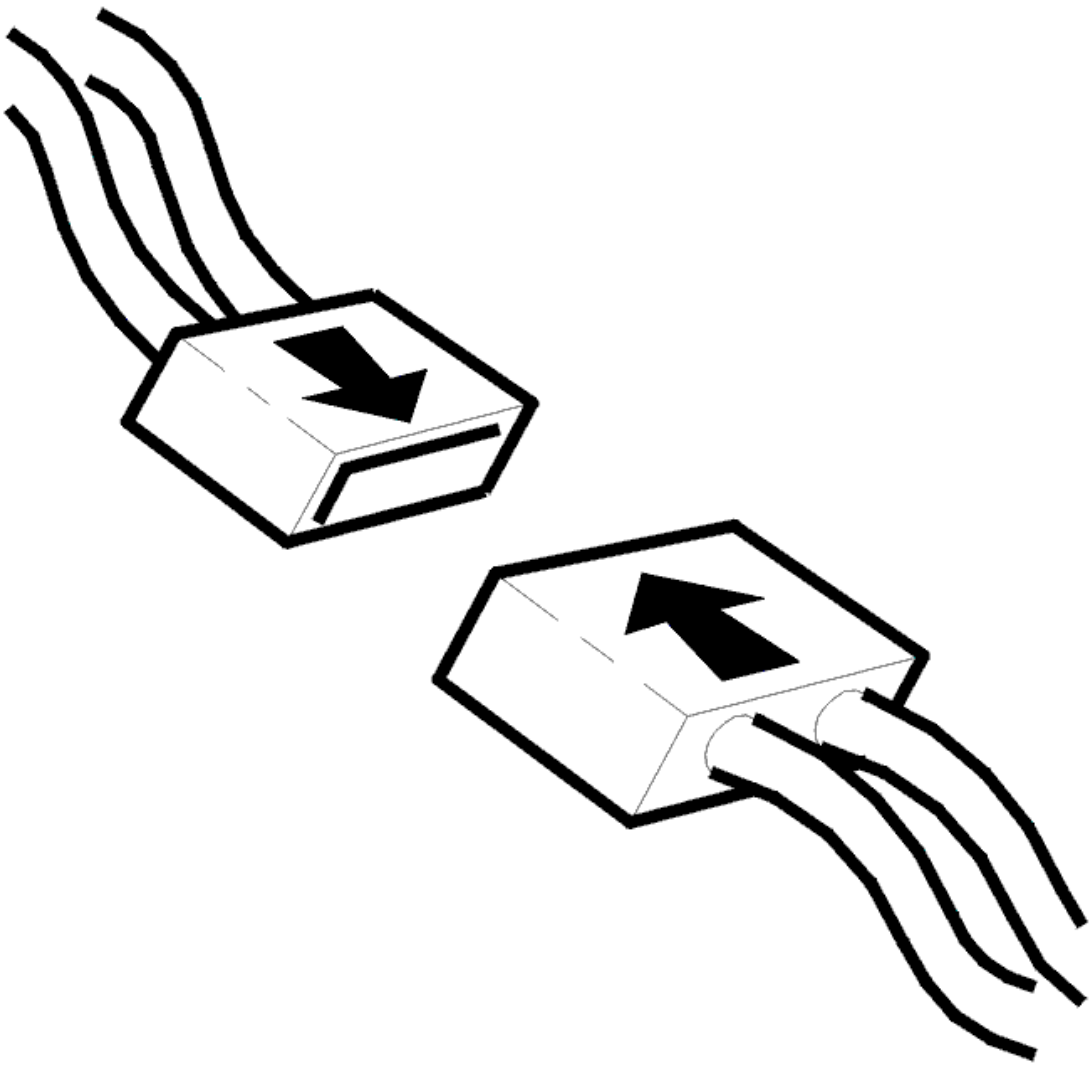


Fig. 114: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Start the engine and allow it to idle.
- Read the oil temperature for the transmission control module (TCM).

Check that oil temperature is within the permitted range. Compare with the external temperature of the transmission.

NOTE: The transmission temperature sensor is located inside the control system and may be affected by the heat given off by the solenoids.

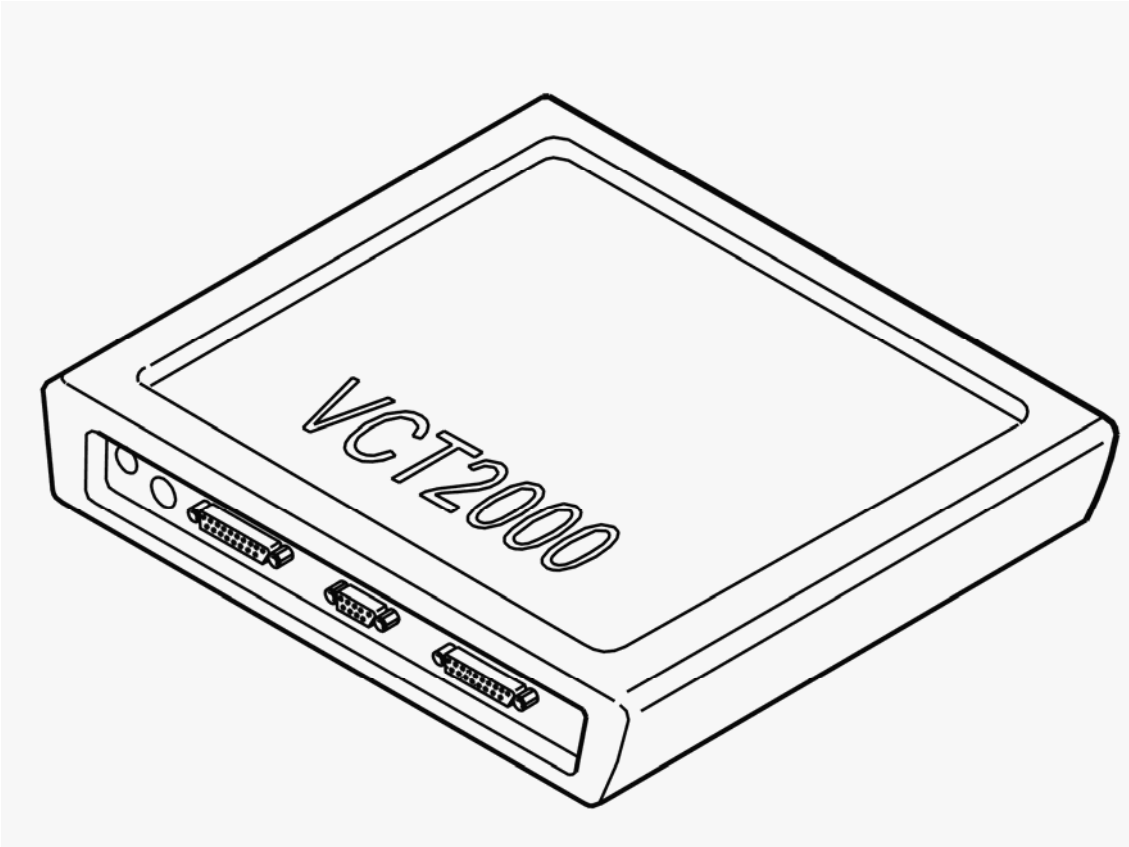


Fig. 115: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

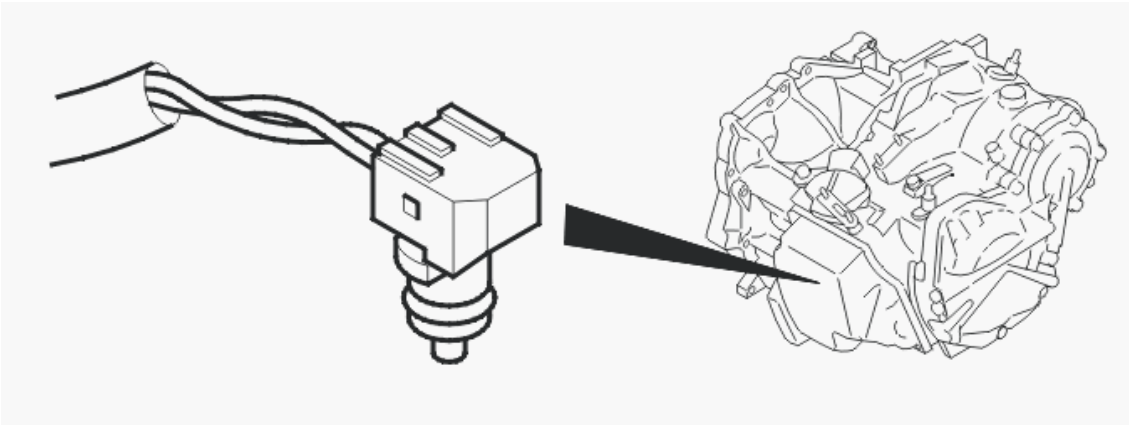


Fig. 116: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Is the temperature OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P071100: GEARBOX OIL TEMPERATURE SENSOR A CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071100**

FAULT TRACING TCM-P071100

see **FAULT TRACING TCM-P071100**

TCM-P071200: TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT LOW INPUT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071200

Condition

The oil temperature sensor provides the Transmission control module (TCM) with a signal that is used, among other things, for the temperature controlled lock-up and engagement high temperature program functions.

The sensor has an NTC (negative temperature coefficient) resistor.

The signal (voltage) drops with increased oil temperature.

The diagnostic trouble code (DTC) is stored if control module:

- Receive a too low signal from the oil temperature sensor for approx. 10 seconds.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

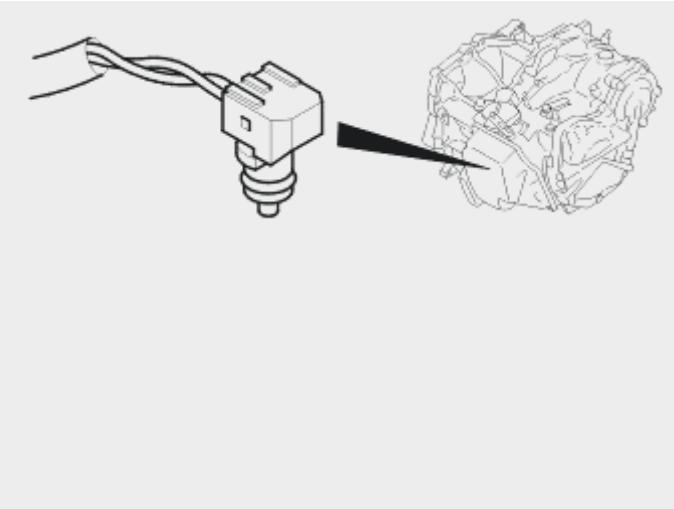


Fig. 117: Locating Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Transmission control module assumes an oil temperature of 80 °C.
- function is blocked.
- Slip lock-up function is blocked.
- Neutral check function is blocked.

Possible Source

- Short-circuit to ground in the signal cable.
- Oil temperature sensor not working.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- No lock-up
- Rough gear shift

FAULT-TRACING

CHECKS

CHECKING THE OIL TEMPERATURE SENSOR

NOTE: During this fault tracing the transmission and oil should be at room temperature from the start.

This is to control the sensor function.

Fig. 118: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Start the engine. Allow the engine to idle.
- Read off the oil temperature.

Allow the transmission to warm up. Check that the oil temperature increases and appears to be within the permitted range.

Compare with transmission external temperature.

NOTE: The transmission temperature sensor is inside the control system and may be affected by the heat given off by the solenoids.

The fault is permanent if the temperature is outside the permitted range.

If the temperature is within the permitted range, this is an indication that the fault was present previously but that it is not active at the moment, i. e. the fault is intermittent.

Fig. 119: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

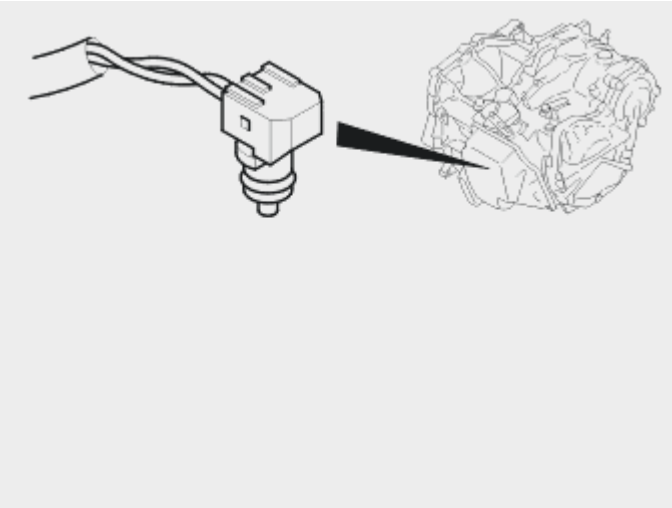


Fig. 120: Locating Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

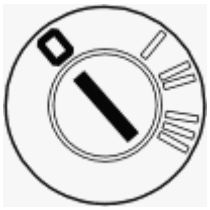


Fig. 121: Identifying Ignition In Off Position
Courtesy of VOLVO CARS CORPORATION

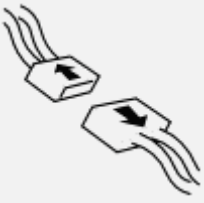


Fig. 122: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Expose the transmission control system.

  Check the cable for short-circuit to ground.

  Take readings between:

- Transmission connector terminal #B7 and temperature sensor.
- Transmission connector terminal #B8 and temperature sensor.

Also check the cables for a short-circuit to each other.

HINT: Check the temperature. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

Remedy as necessary.

Other information

- see **SIGNAL SPECIFICATION**
- To replace Temperature Sensor Fluid, Transaxle, (TFT) see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access connector B:**TRANSMISSION CONTROL MODULE (TCM)**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

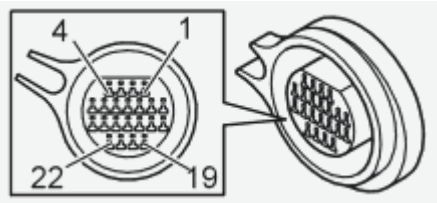


Fig. 123: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

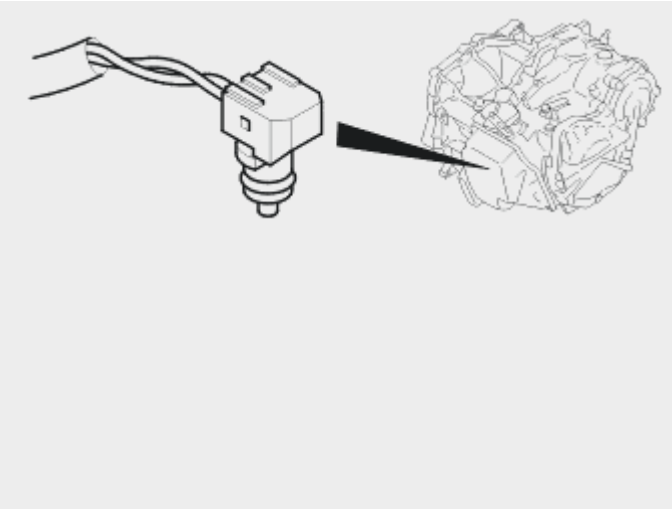


Fig. 124: Locating Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 125: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

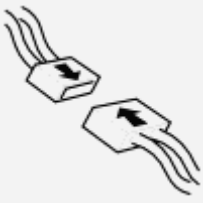


Fig. 126: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Start the engine. Allow the engine to idle.
- Read off the oil temperature.

  Check that the oil temperature is within its permitted range. Compare it to the automatic transmission temperature.

  NOTE: The transmission temperature sensor is inside the control system and may be affected by the heat given off by the solenoids.

Fig. 127: Identifying VCT2000 Diagnostic Tool Symbol In VIDA

Courtesy of VOLVO CARS CORPORATION

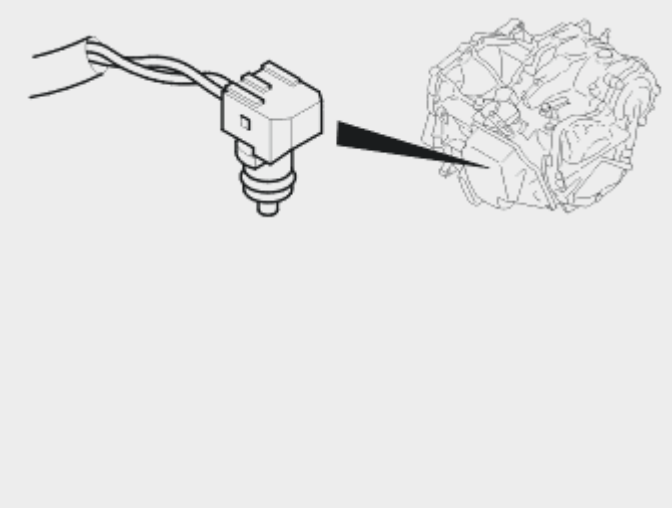


Fig. 128: Locating Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Is the temperature reading OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER

CHECKING THE FUNCTION

HINT: The transmission control module (TCM) has a counter for fluid quality that counts the number of times the transmission is subjected to too hard a load or too high an ambient temperature. If the counter is not reset during draining/replacement, there is a risk that a diagnostic trouble code will be set under the wrong conditions. Thus, it is important that the counter for transmission fluid change be reset.

NOTE: This only applies when the transmission oil is changed and when the oil is

changed during repairs to the transmission's temperature sensor.

Fig. 129: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the counter.

  Fig. 130: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
  Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P071200: TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT LOW INPUT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071200

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071200**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P071200: GEARBOX OIL TEMPERATURE SENSOR A CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071200

Condition

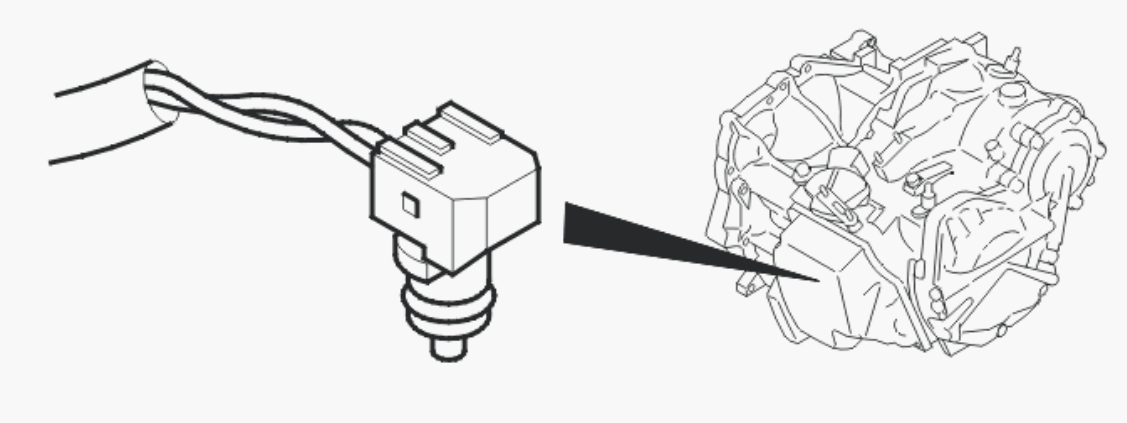


Fig. 131: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

The oil temperature sensor gives the transmission control module (TCM) a signal that is used for the temperature controlled lock-up and high temperature program functions. The sensor has a temperature sensitive resistor with negative temperature coefficient (NTC). The signal (voltage) drops with rising oil temperature. If the transmission control module (TCM) receives a signal from the oil temperature sensor that is too low for about 10 seconds, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Transmission control module (TCM) assumes an oil temperature of 80 °C.
- Lock-up function is blocked.
- Slip lock-up function is blocked.
- Neutral check function is blocked.

Possible Source

- The signal cable is short-circuited to ground.
- Oil temperature sensor not working.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear changing

FAULT TRACING TCM-P071200

CHECKS

CHECKING THE OIL TEMPERATURE SENSOR

NOTE: During this fault-tracing, the transmission and the oil should be at room temperature from the start in order to check the sensor function.

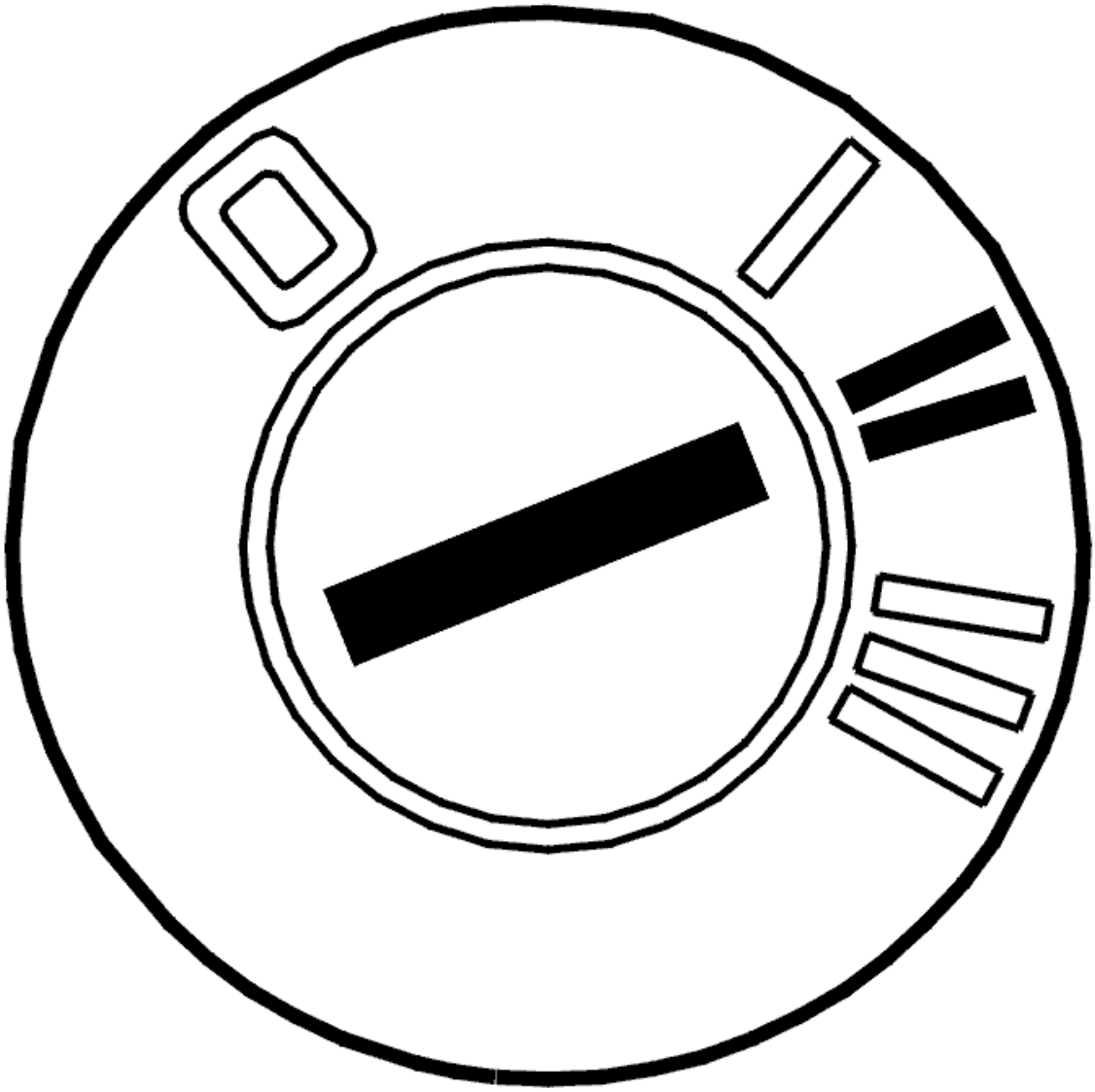


Fig. 132: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Start the engine and allow it to idle.
- Read the oil temperature.

Let the transmission heat up. Check that the oil temperature increases and is within the permitted range.

Compare with the external temperature of the transmission.

NOTE: The transmission temperature sensor is located inside the control system and may be affected by the heat given off by the solenoids.

If the temperature is outside the permitted range it means that the fault is permanent.

If the temperature is within the permitted range, it means that the fault was present previously but is not active now. The fault is intermittent.

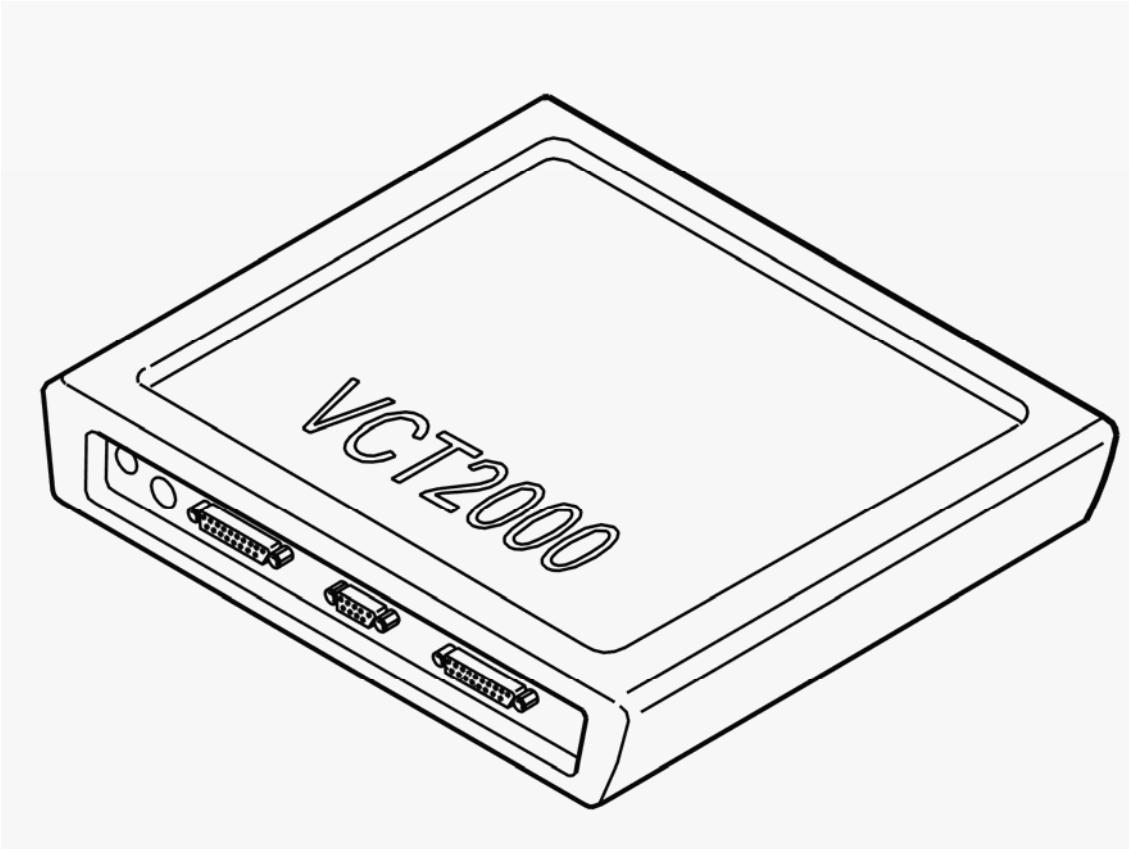


Fig. 133: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

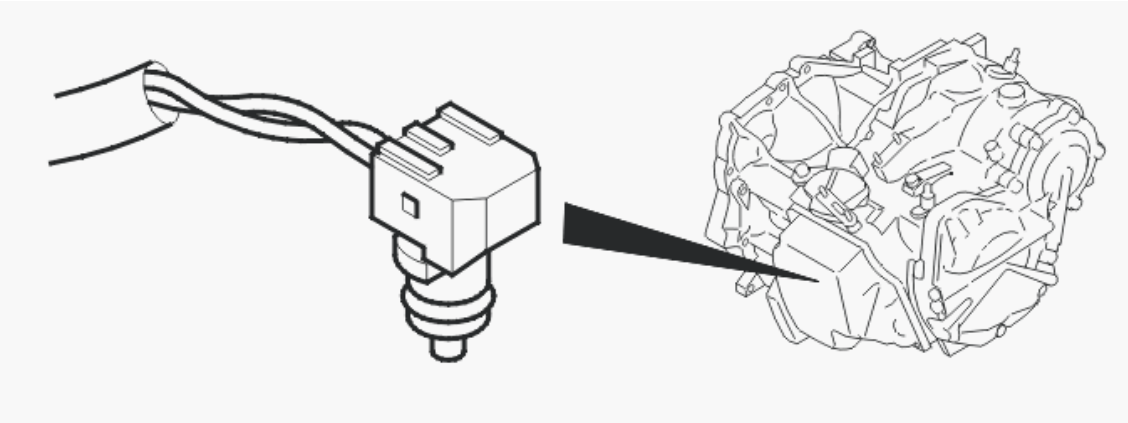


Fig. 134: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING CABLE AND COMPONENT**

CHECKING CABLE AND COMPONENT

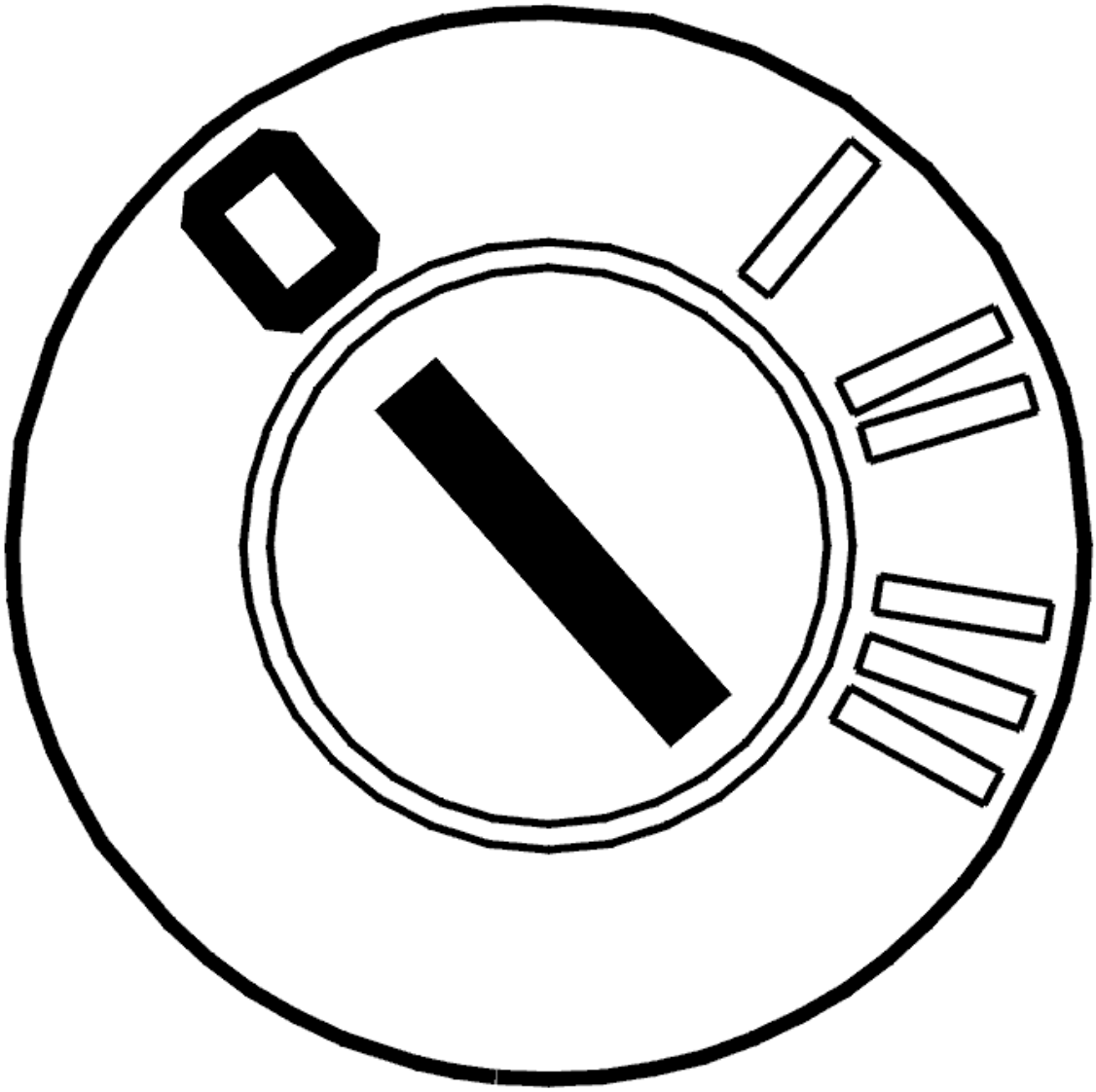


Fig. 135: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

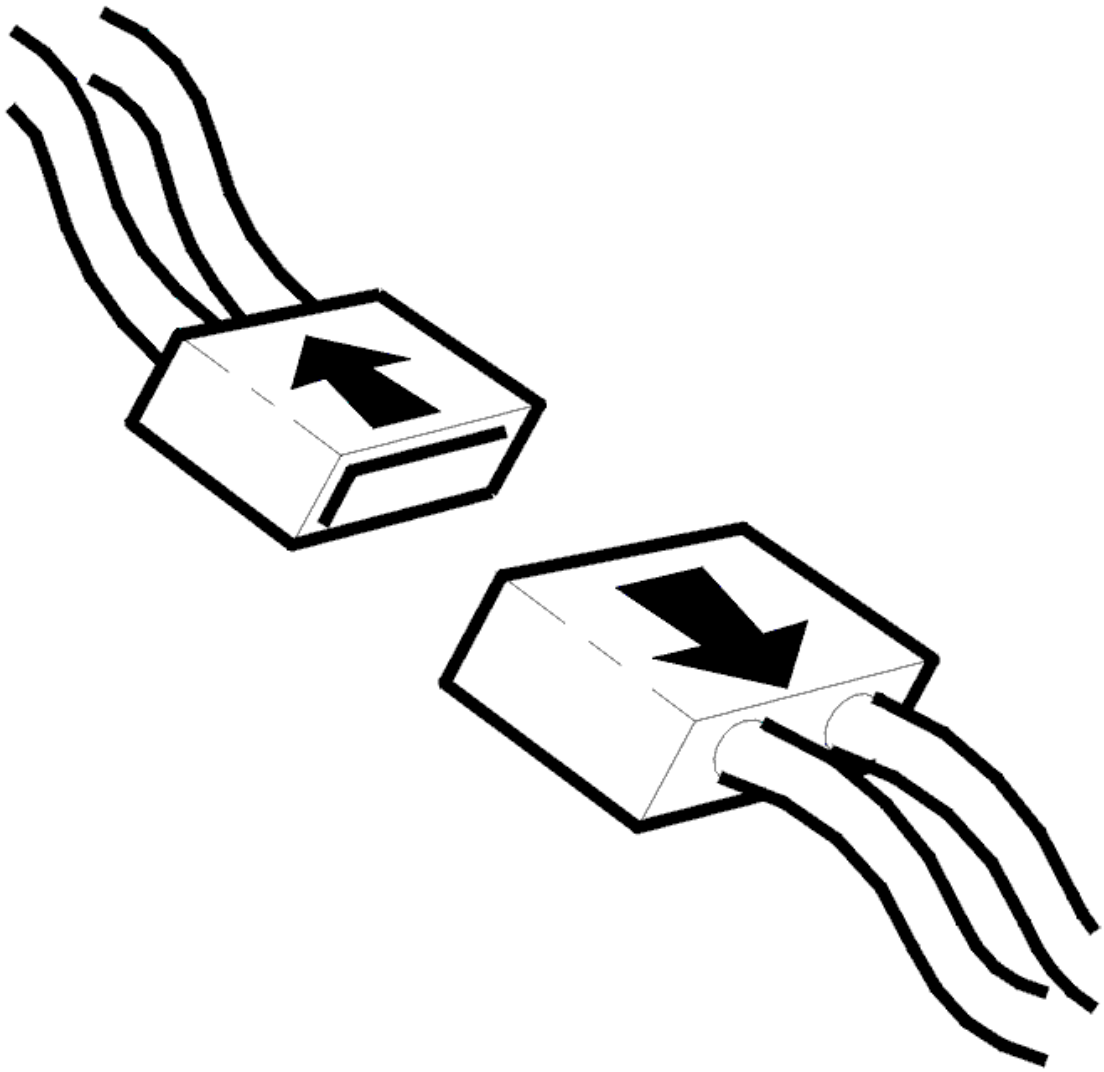


Fig. 136: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Expose the control system of the transmission.

  Check the cable between transmission connector #B7 and the temperature sensor. Check the cable between transmission connector #B8 and the temperature sensor. Check for a short-circuit to ground. Check the cables for short-circuits to each other.

  HINT: Check the temperature. See CHECKING THE OIL TEMPERATURE SENSOR

  Remedy as necessary.

  Other information

- see **SIGNAL DESCRIPTION**
- To replace Temperature Sensor Fluid, Transaxle, (TFT) see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

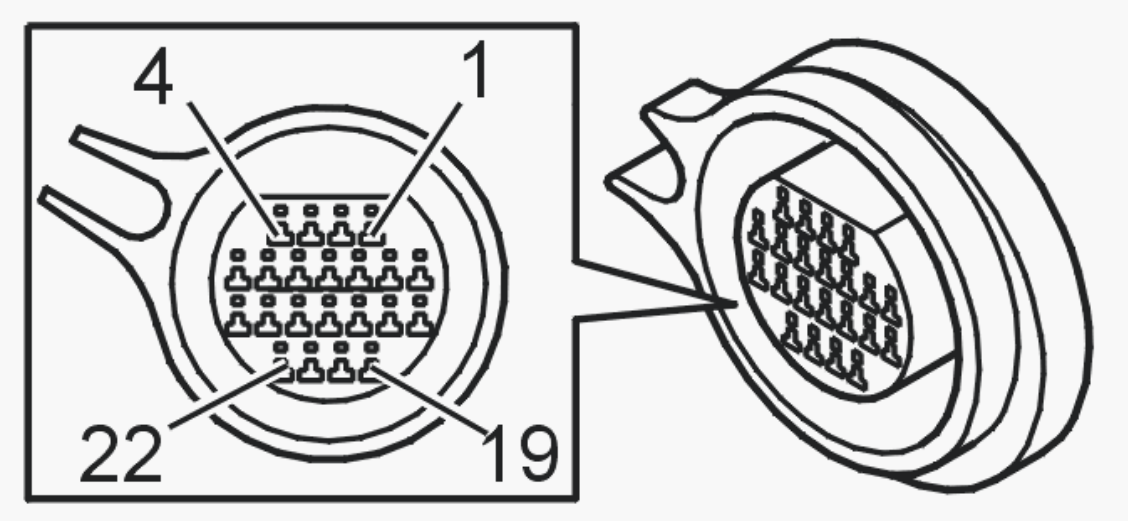


Fig. 137: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

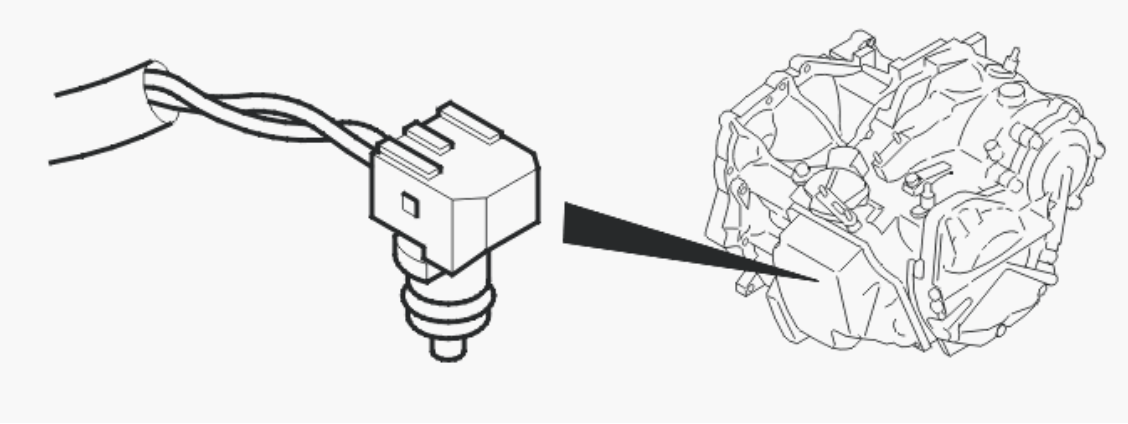


Fig. 138: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE**

RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE

RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE

HINT: The transmission control module (TCM) has a counter for the oil's quality that counts up when the transmission is exposed to very heavy loads or high ambient temperature. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions. That is why it is important that the counter for Transmission oil, change is reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

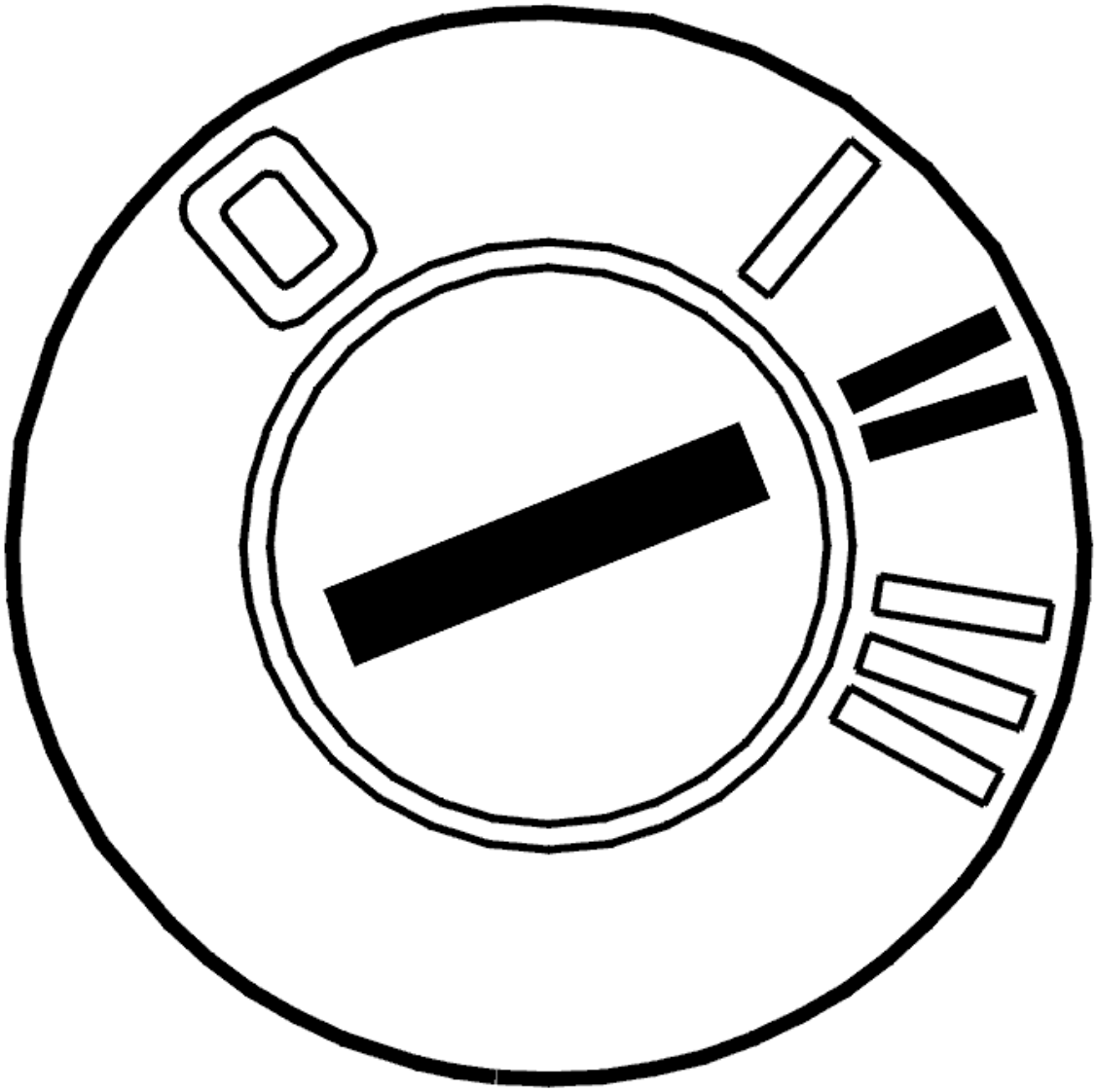


Fig. 139: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the counter by clicking on the symbol for VCT2000.

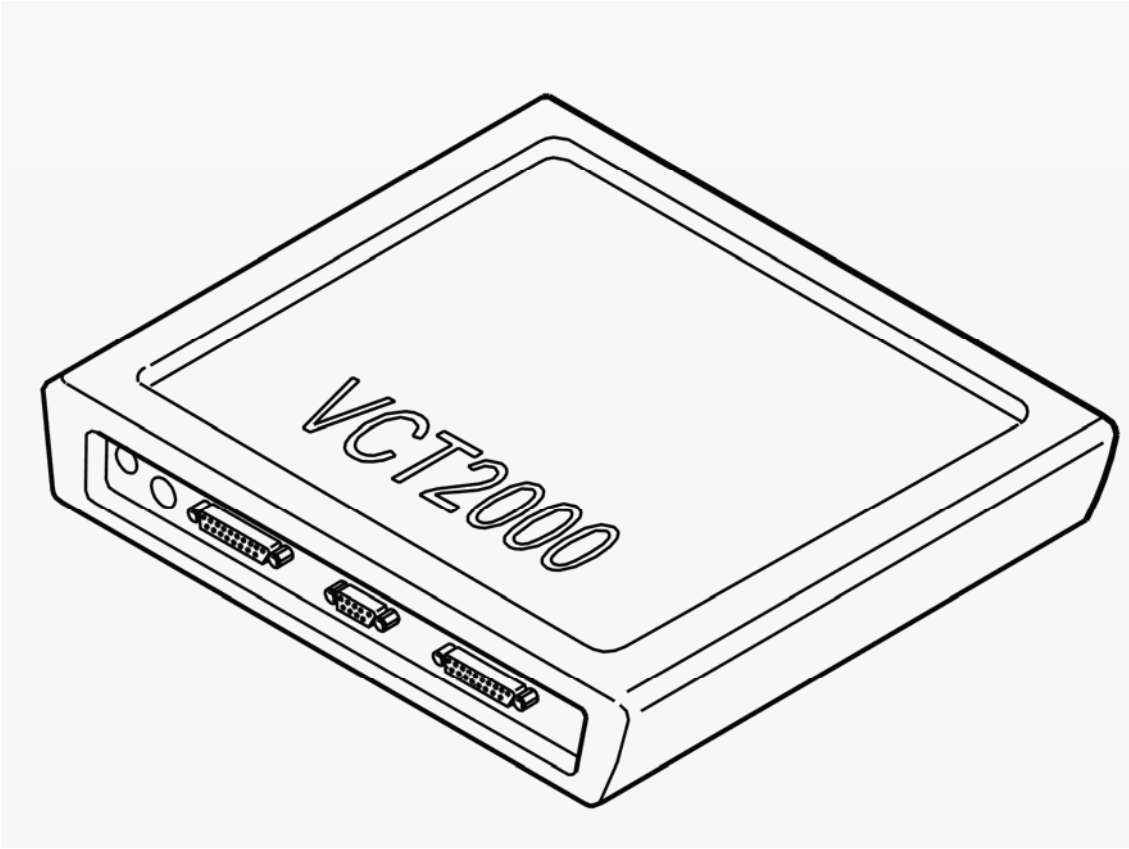


Fig. 140: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

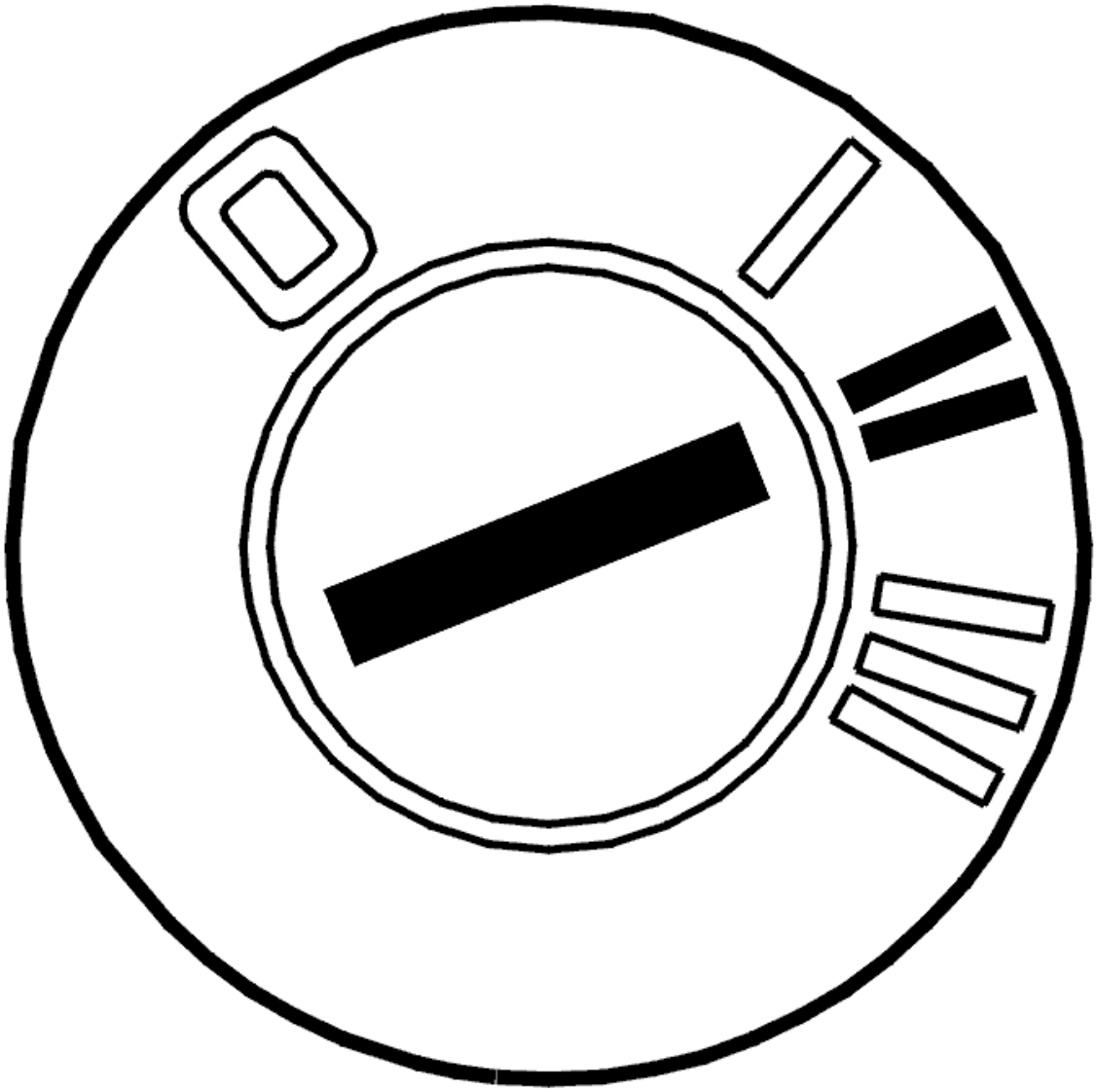


Fig. 141: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

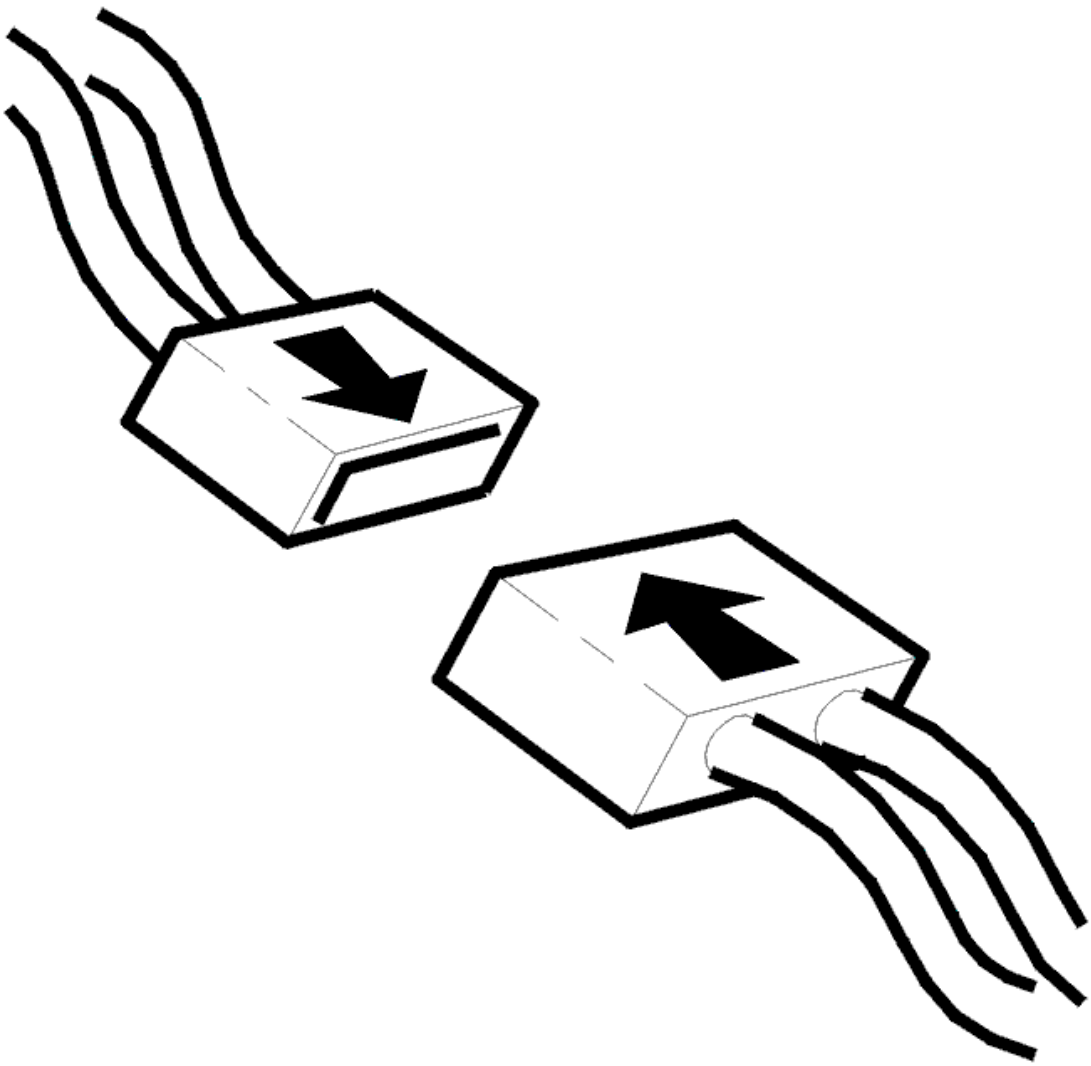


Fig. 142: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Start the engine and allow it to idle.
- Read the oil temperature for the transmission control module (TCM).

Check that oil temperature is within the permitted range. Compare with the external temperature of the transmission.

NOTE: The transmission temperature sensor is located inside the control system and may be affected by the heat given off by the solenoids.

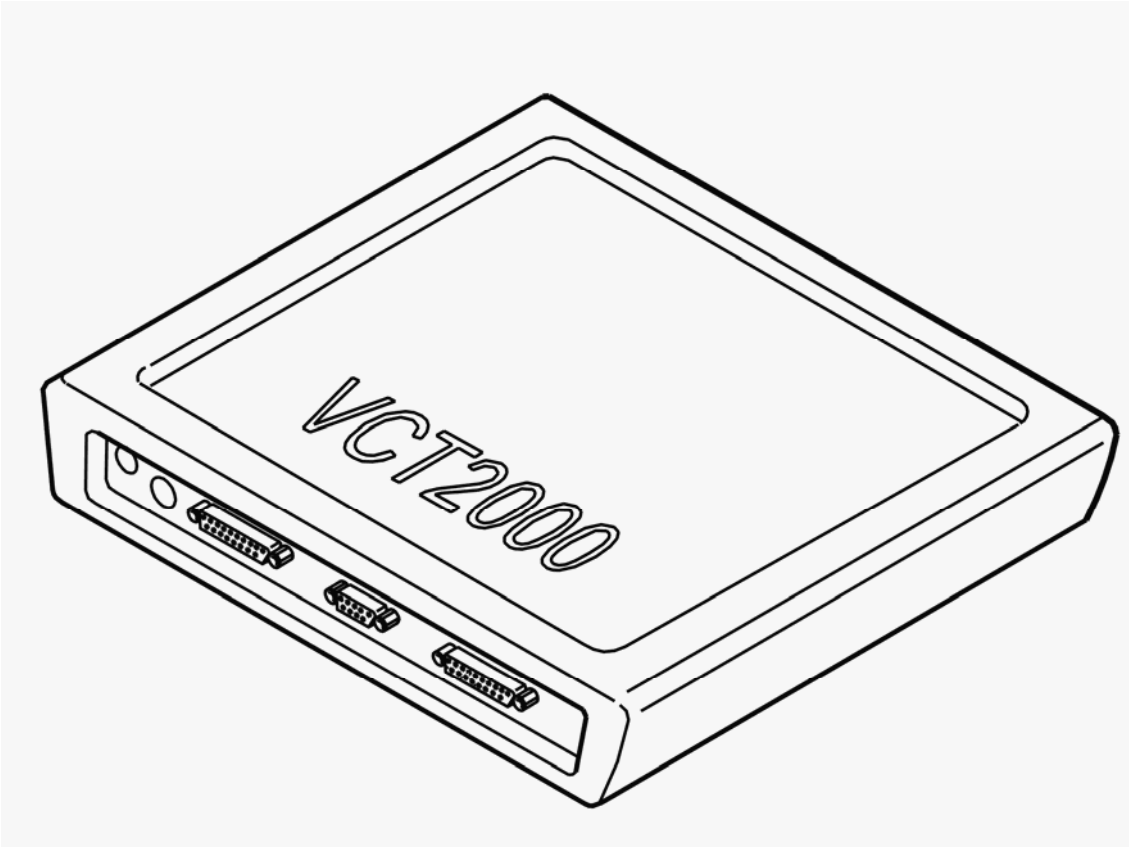


Fig. 143: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

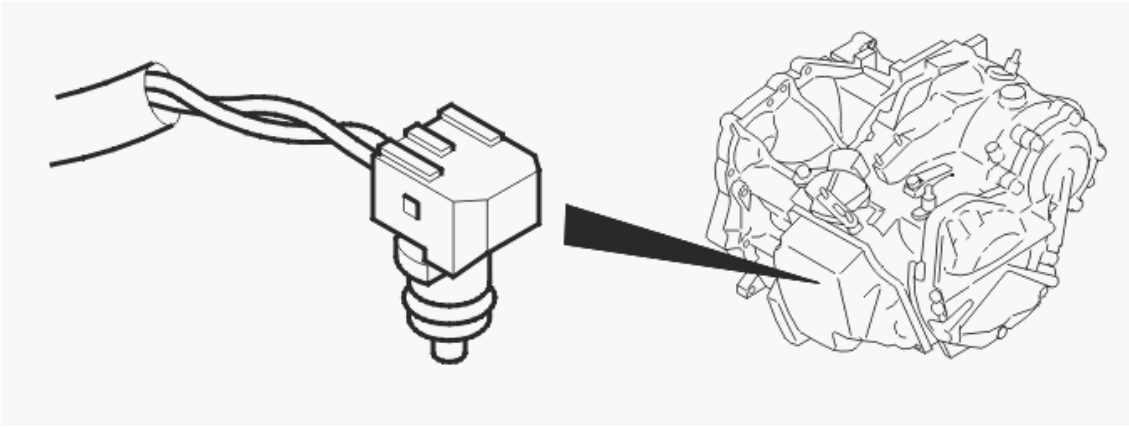


Fig. 144: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Is the temperature OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P071200: GEARBOX OIL TEMPERATURE SENSOR A CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071200

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071200**

FAULT TRACING TCM-P071200

see **FAULT TRACING TCM-P071200**

TCM-P071300: TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT HIGH INPUT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071300

Condition

The oil temperature sensor provides the Transmission control module (TCM) with a signal that is used, among other things, for the temperature controlled lock-up and engagement high temperature program functions.

The sensor has an NTC (negative temperature coefficient) resistor.

The signal (voltage) increases with decreasing oil temperature.

The diagnostic trouble code (DTC) is stored if control module:

- Receive a too high signal from the oil temperature sensor for approx. 10 seconds.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- At least two minutes normal driving with an engine temperature that exceeds 50°C.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

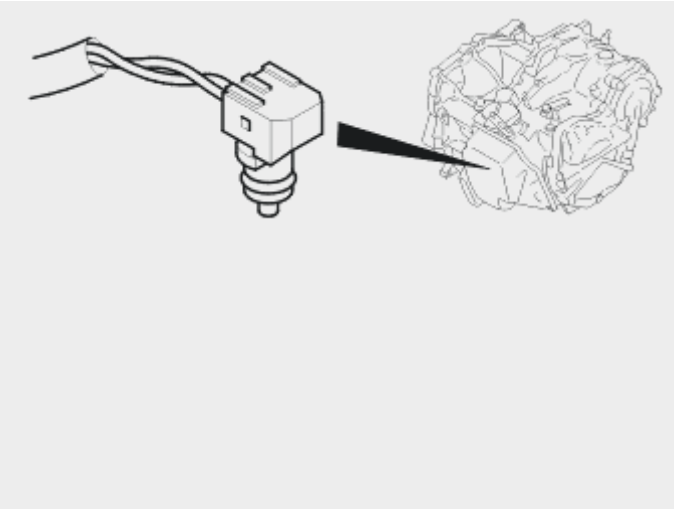


Fig. 145: Locating Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Transmission control module assumes an oil temperature of 80 °C.
- function is blocked.
- Slip lock-up function is blocked.
- Neutral check function is blocked.

Possible Source

- Contact resistance in the terminals.
- Short-circuit to supply voltage in the signal cable.
- Oil temperature sensor not working.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Rough gear shift

FAULT-TRACING

CHECKS

CHECKING THE OIL TEMPERATURE SENSOR

NOTE: During this fault tracing the transmission and oil should be at room temperature from the start.

This is to control the sensor function.

Fig. 146: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Start the engine. Allow the engine to idle.
- Read off the oil temperature.

Allow the transmission to warm up. Check that the oil temperature increases and appears to be within the permitted range.

Compare with transmission external temperature.

NOTE: The transmission temperature sensor is inside the control system and may be affected by the heat given off by the solenoids.

The fault is permanent if the temperature is outside the permitted range.

If the temperature is within the permitted range, this is an indication that the fault was present previously but that it is not active at the moment, i. e. the fault is intermittent.

Fig. 147: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

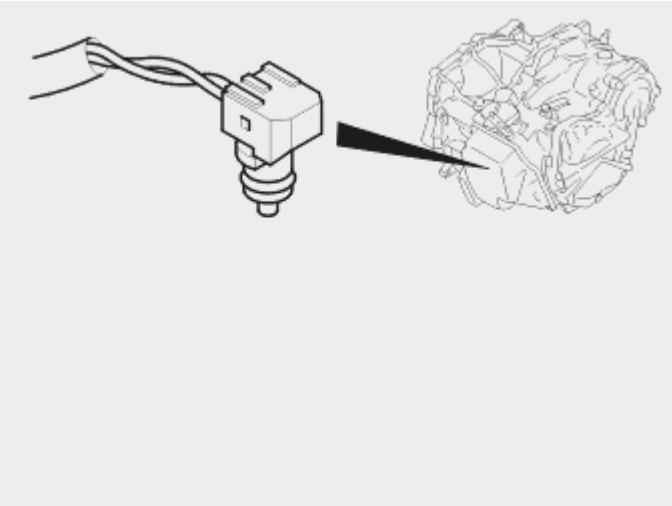


Fig. 148: Locating Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE CABLE AND COMPONENT**

CHECKING THE CABLE AND COMPONENT

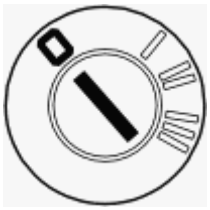


Fig. 149: Identifying Ignition In Off Position
Courtesy of VOLVO CARS CORPORATION

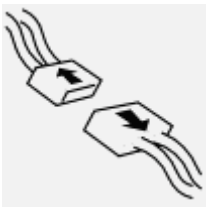


Fig. 150: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Expose the transmission control system.

  Check connector B (22 pin) for the transmission control module (TCM). Check for contact resistance and oxidation.

Check the cable. Check for an open-circuit. Check for a short-circuit to supply voltage.

Take readings between:

- Transmission connector terminal #B7 and temperature sensor.
- Transmission connector terminal #B8 and temperature sensor.

Also check the cables for a short-circuit to each other.

HINT: Check the temperature. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

Remedy as necessary.

Other information

- see **SIGNAL SPECIFICATION**
- To replace Temperature Sensor Fluid, Transaxle, (TFT) see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access connector B:**TRANSMISSION CONTROL MODULE (TCM)**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

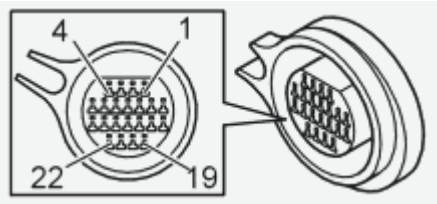


Fig. 151: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

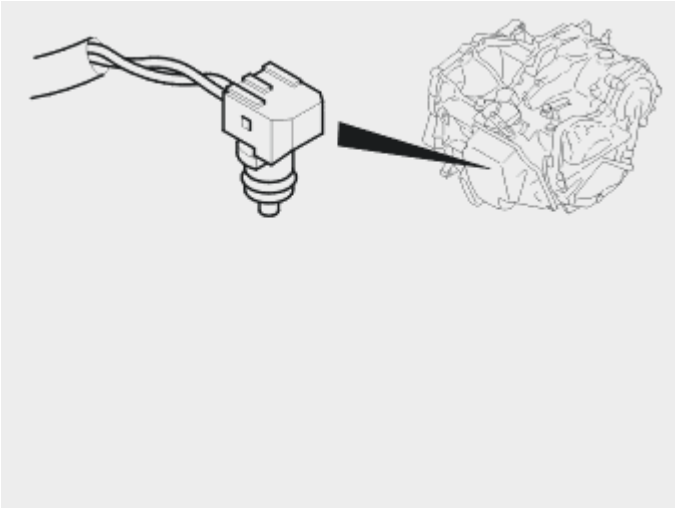


Fig. 152: Locating Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 153: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

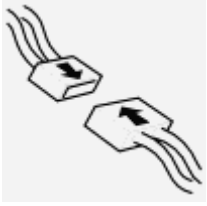


Fig. 154: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.

- Ignition on.
- Start the engine. Allow the engine to idle.
- Read off the oil temperature.

  Check that the oil temperature is within its permitted range. Compare it to the automatic transmission temperature.

  NOTE: The transmission temperature sensor is inside the control system and may be affected by the heat given off by the solenoids.

Fig. 155: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

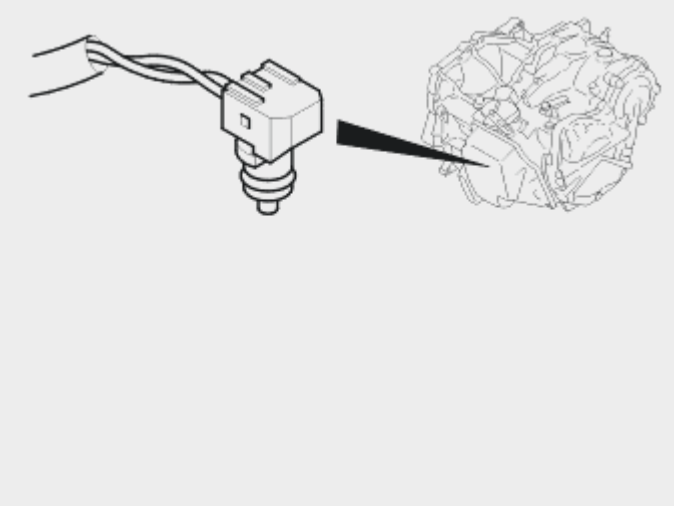


Fig. 156: Locating Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Is the temperature reading OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER

CHECKING THE FUNCTION

HINT: The transmission control module (TCM) has a counter for fluid quality that counts the number of times the transmission is subjected to too hard a load or too high an ambient temperature. If the counter is not reset during draining/replacement, there is a risk that a diagnostic trouble code will be set under the wrong conditions. Thus, it is important that the counter for transmission fluid change be reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

Fig. 157: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the counter.

  Fig. 158: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
  Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P071300: TRANSMISSION FLUID TEMPERATURE SENSOR A CIRCUIT

HIGH INPUT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071300

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071300**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P071300: GEARBOX OIL TEMPERATURE SENSOR A CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071300

Condition

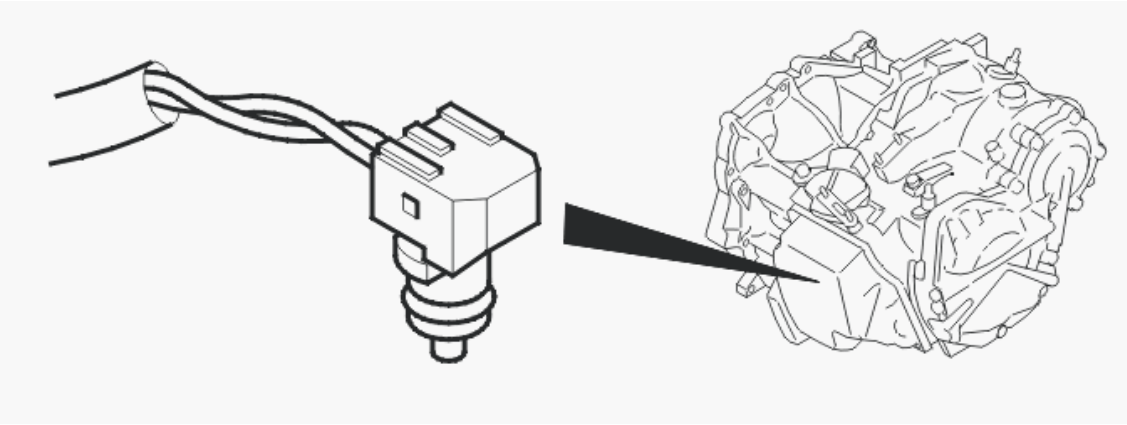


Fig. 159: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

The oil temperature sensor gives the transmission control module (TCM) a signal that is used for the temperature controlled lock-up and high temperature program functions. The sensor has a temperature sensitive resistor with negative temperature coefficient (NTC). The signal (voltage) increases with decreasing oil temperature. If the transmission control module (TCM) receives a signal from the oil temperature sensor that is too high for about 10 seconds, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code (DTC) can be diagnosed after at least two minutes of normal driving with an engine temperature in excess of 50 °C.

Substitute Value

- Transmission control module (TCM) assumes an oil temperature of 80 °C.

- Lock-up function is blocked.
- Slip lock-up function is blocked.
- Neutral check function is blocked.

Possible Source

- Contact resistance in the terminals
- The signal cable is short-circuited to voltage.
- Oil temperature sensor not working.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Harsh gear changing

FAULT TRACING TCM-P071300

CHECKS

CHECKING THE OIL TEMPERATURE SENSOR

NOTE: During this fault-tracing, the transmission and the oil should be at room temperature from the start in order to check the sensor function.

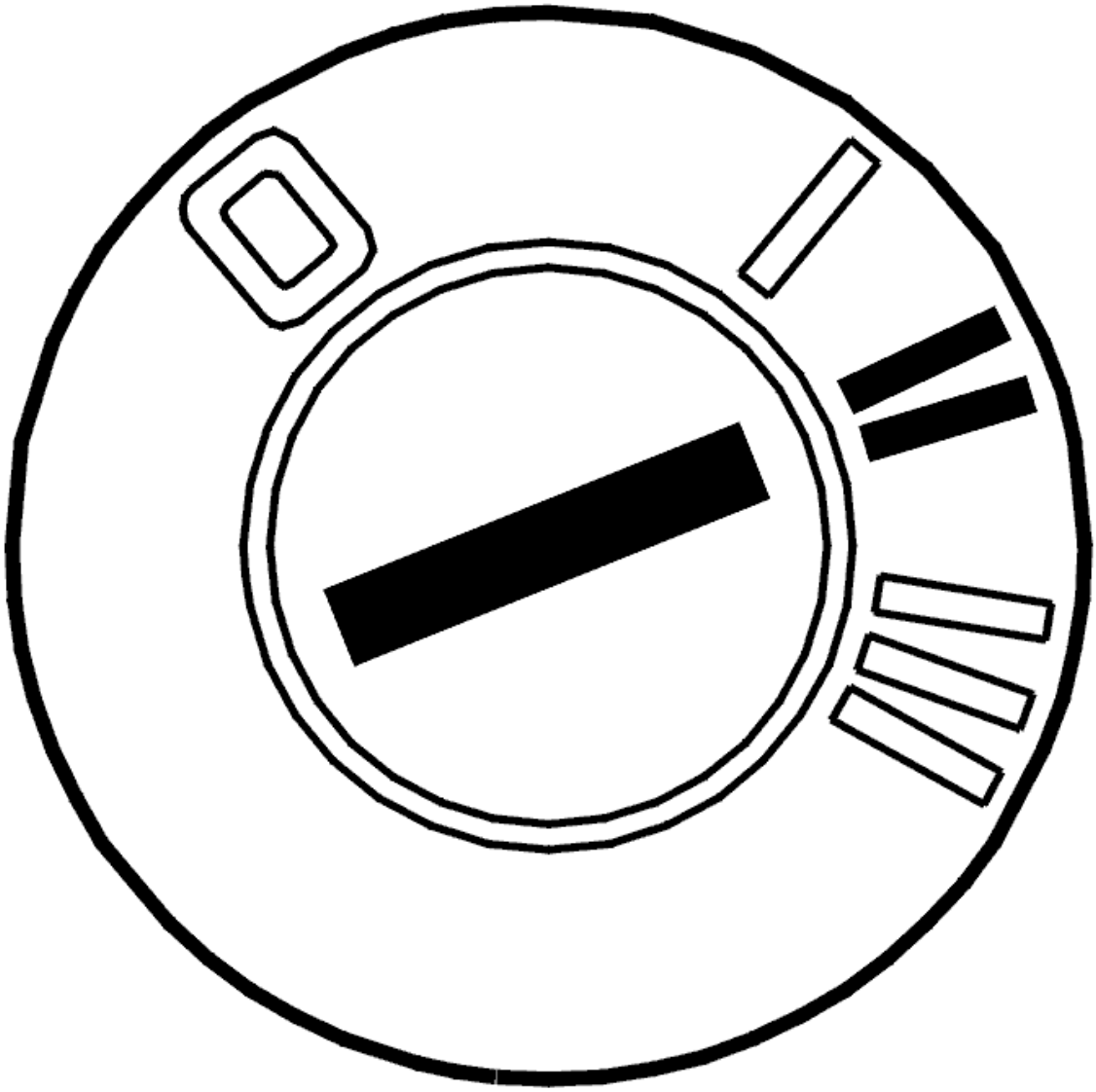


Fig. 160: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Start the engine and allow it to idle.
- Read the oil temperature.

Let the transmission heat up. Check that the oil temperature increases and is within the permitted range. Compare with the external temperature of the transmission.

NOTE: The transmission temperature sensor is located inside the control system and may be affected by the heat given off by the solenoids.

If the temperature is outside the permitted range it means that the fault is permanent.

If the temperature is within the permitted range, it means that the fault was present previously but is not active now. The fault is intermittent.

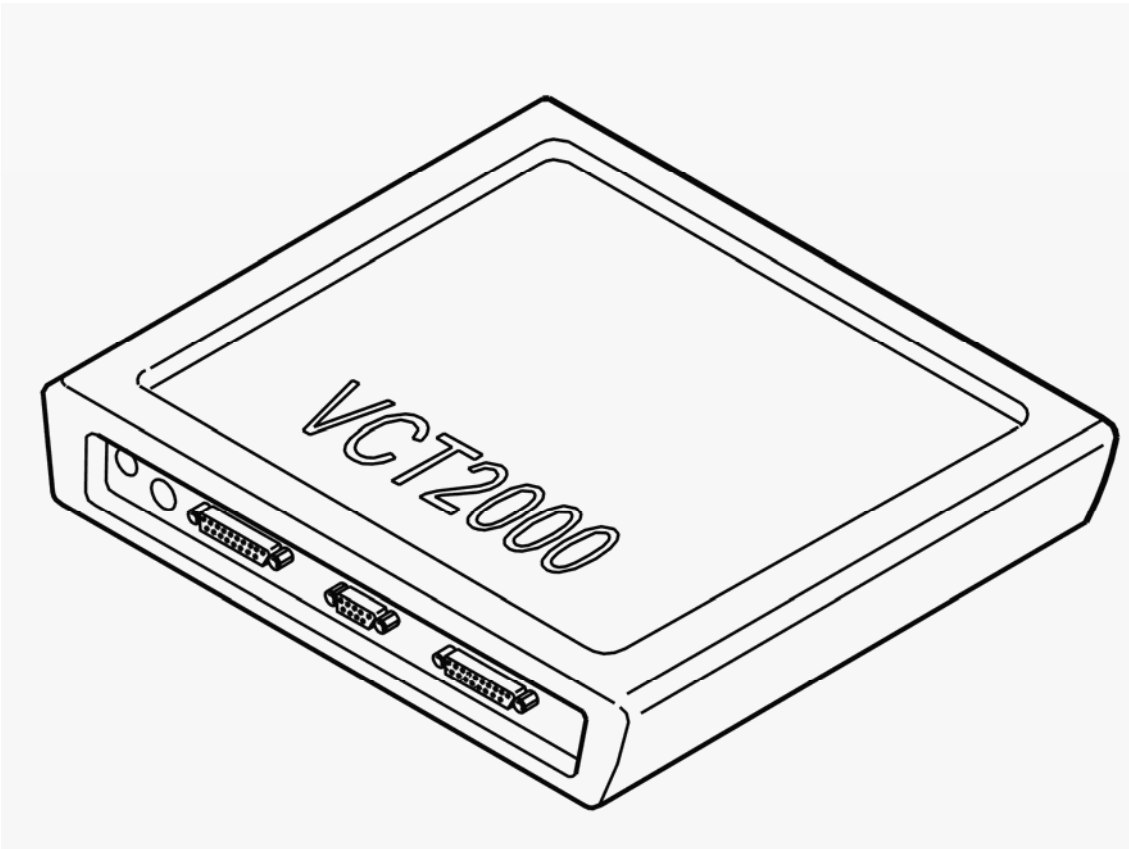


Fig. 161: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

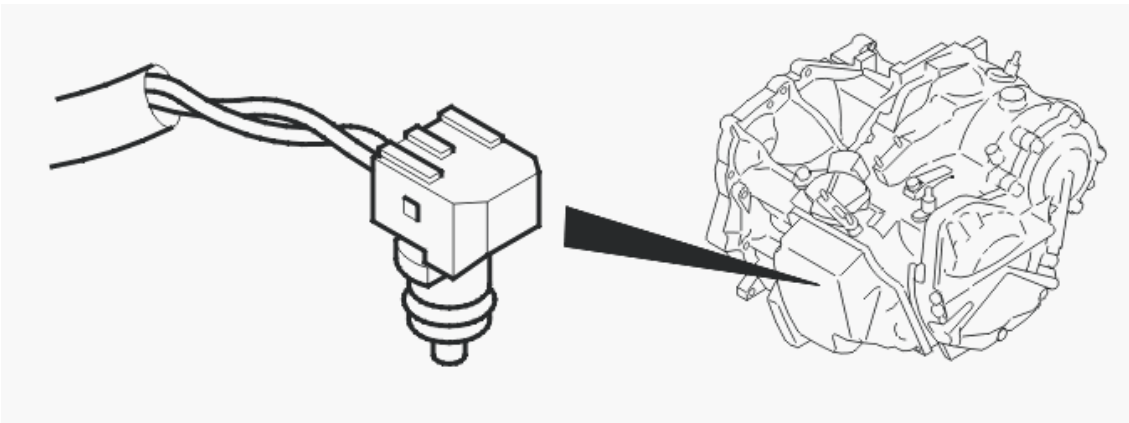


Fig. 162: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING CABLE AND COMPONENT**

CHECKING CABLE AND COMPONENT

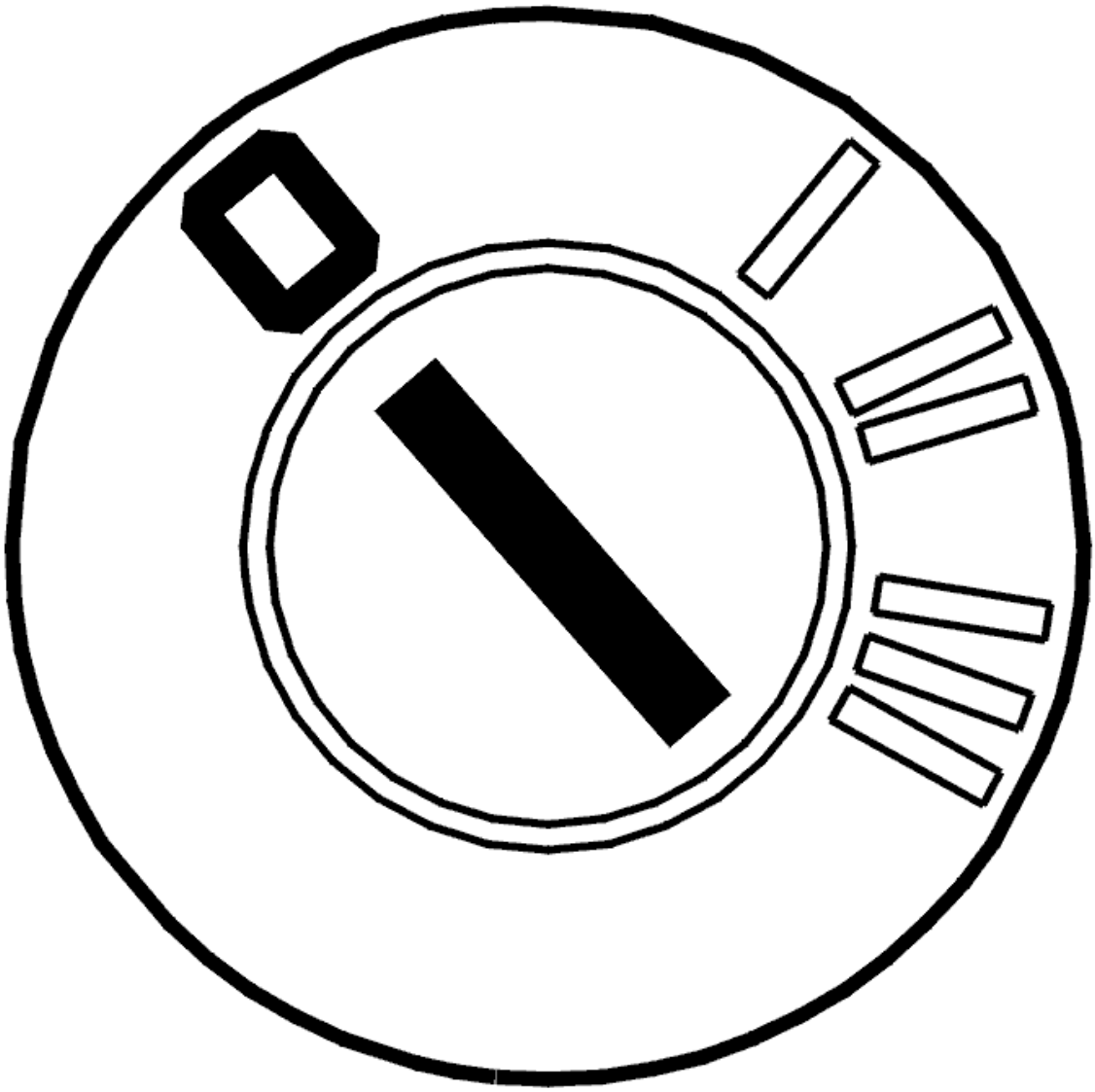


Fig. 163: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

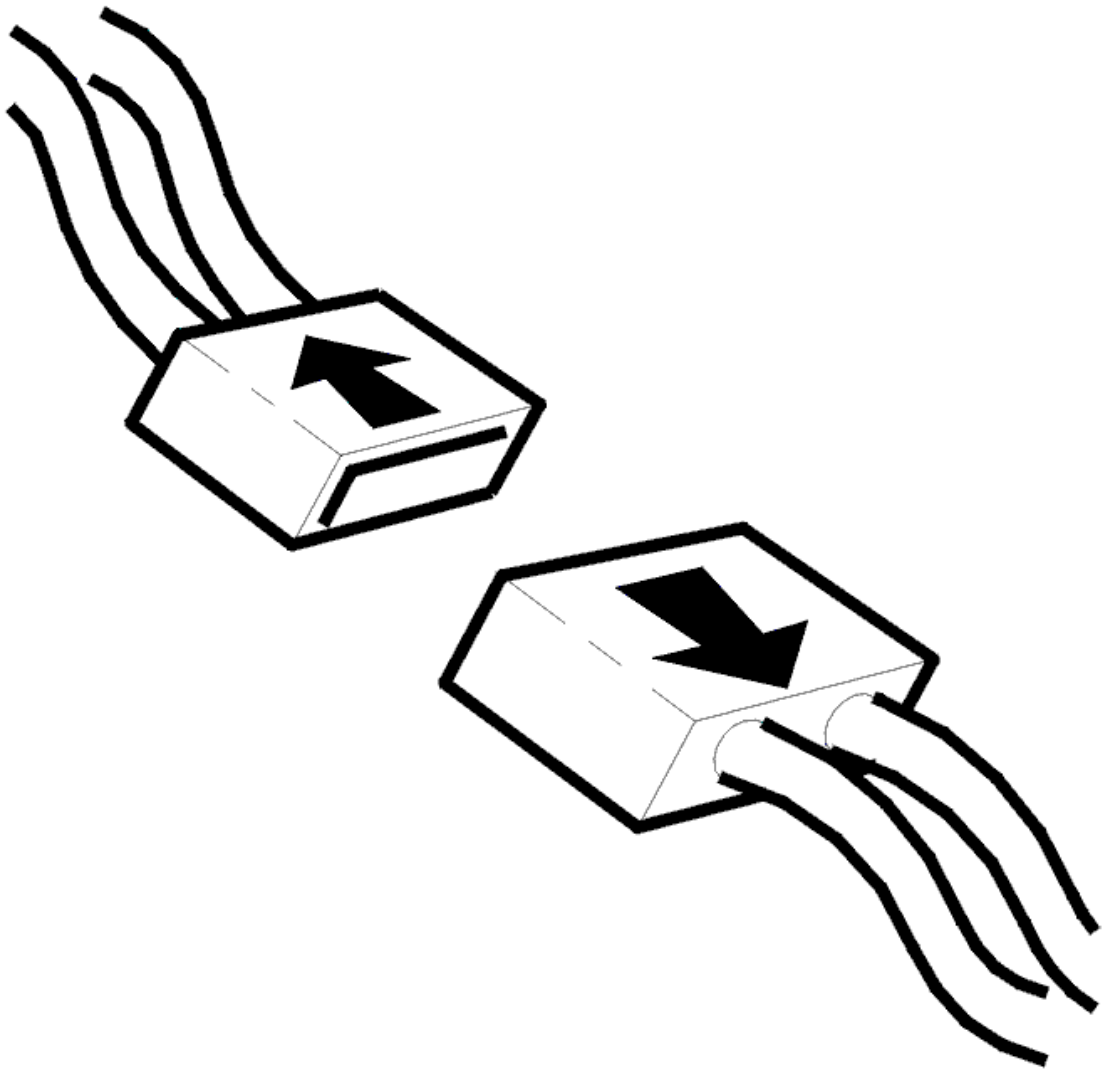


Fig. 164: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Expose the control system of the transmission.

  Check connector B (22 pin) for the transmission control module (TCM). Check for contact resistance and oxidation.

  Check the cable between transmission connector #B7 and the temperature sensor. Check the cable between transmission connector #B8 and the temperature sensor. Check for an open-circuit. Check for a short-circuit to supply voltage. Check the cables for short-circuits to each other.

  HINT: Check the temperature. See CHECKING THE OIL TEMPERATURE SENSOR

  Remedy as necessary.

Other information

- see **SIGNAL DESCRIPTION**
- To replace Temperature Sensor Fluid, Transaxle, (TFT) see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

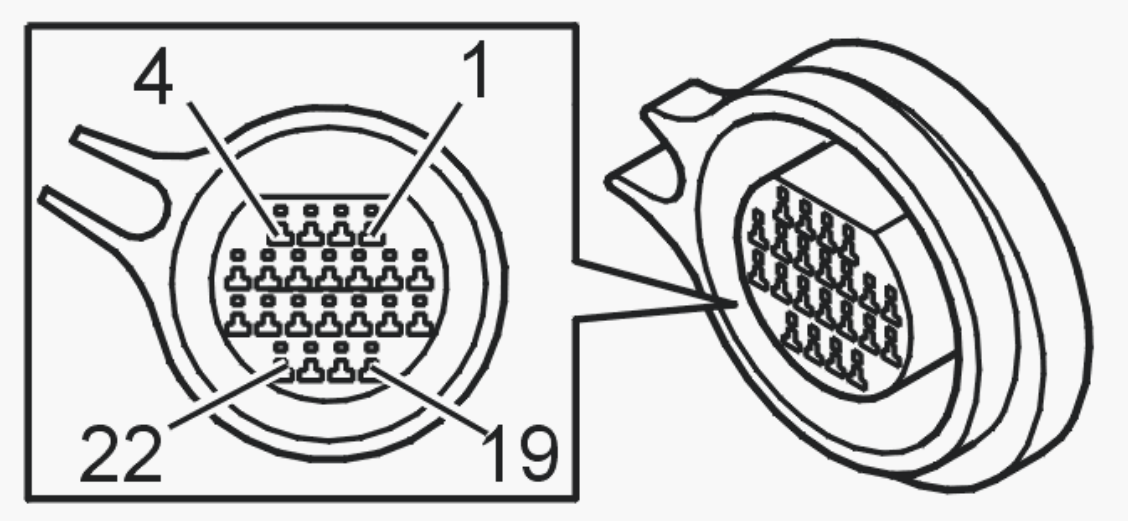


Fig. 165: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

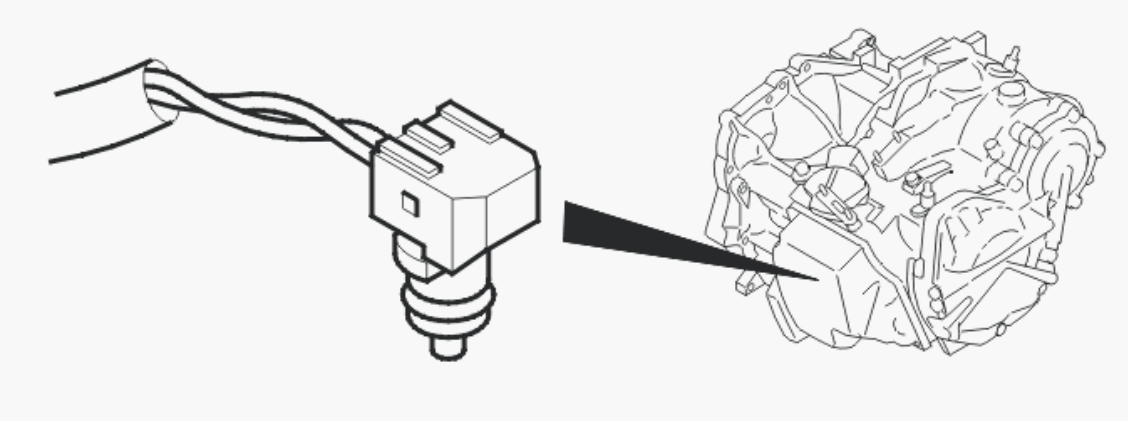


Fig. 166: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE**

RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE

RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE

HINT: The transmission control module (TCM) has a counter for the oil's quality that counts up when the transmission is exposed to very heavy loads or high ambient temperature. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions. That is why it is important that the counter for Transmission oil, change is reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

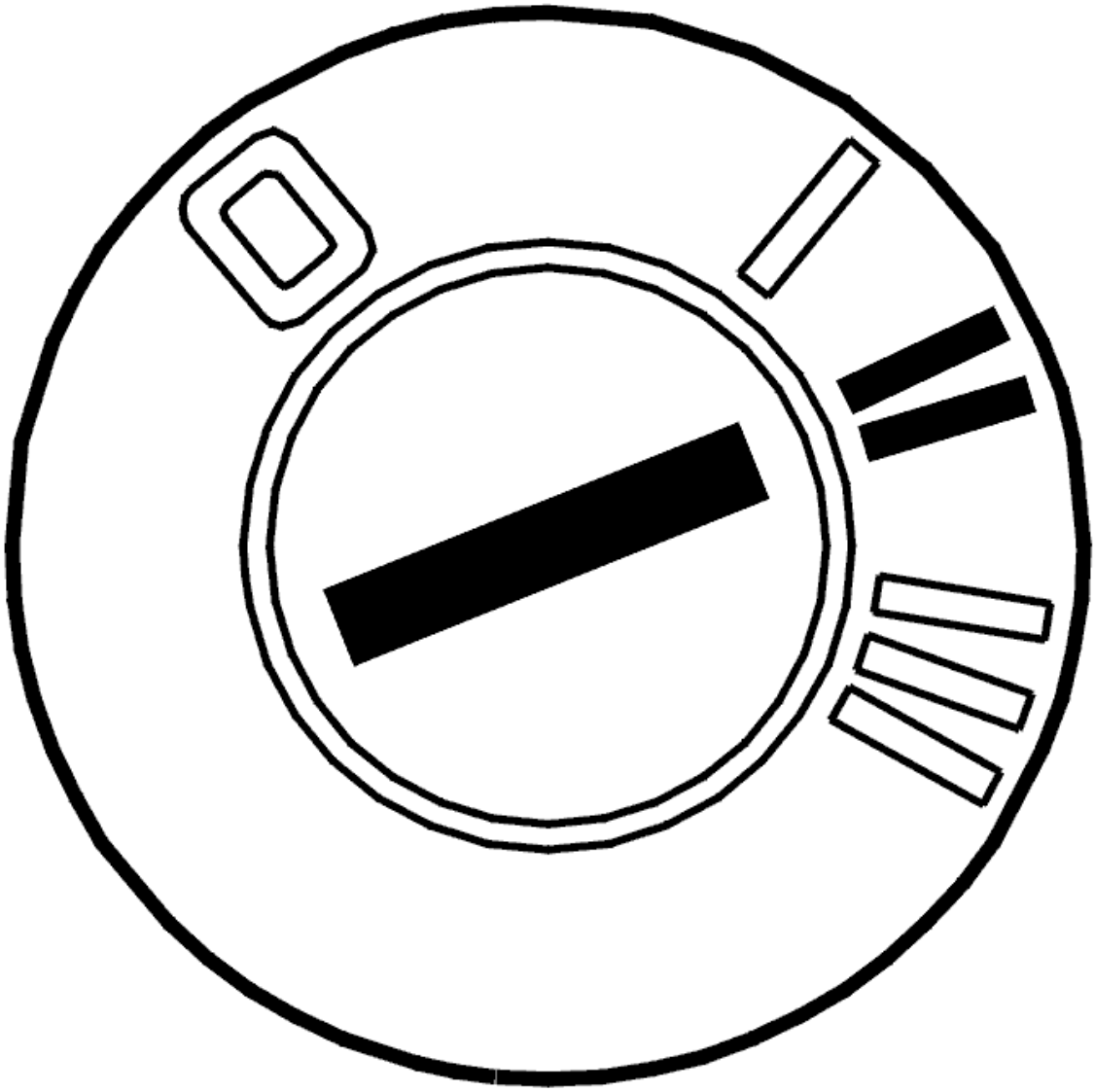


Fig. 167: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

Activate reset of the counter by clicking on the symbol for VCT2000.

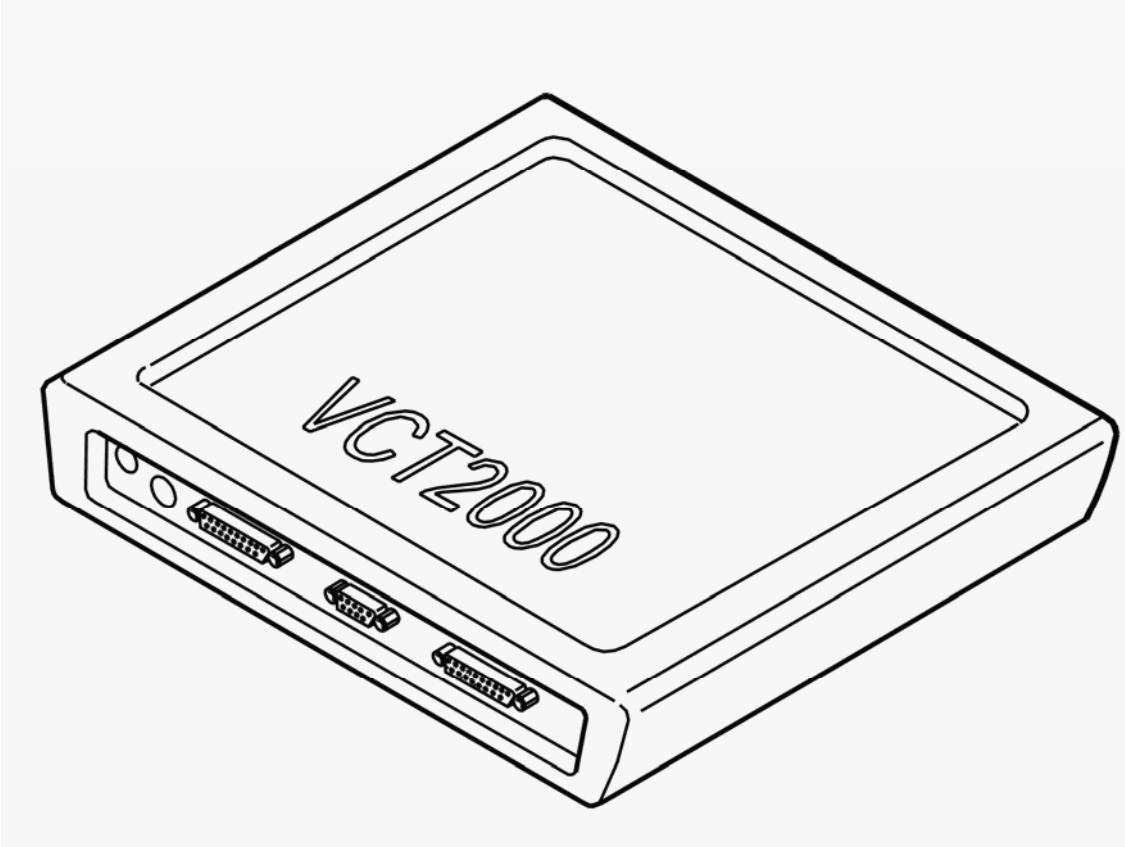


Fig. 168: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

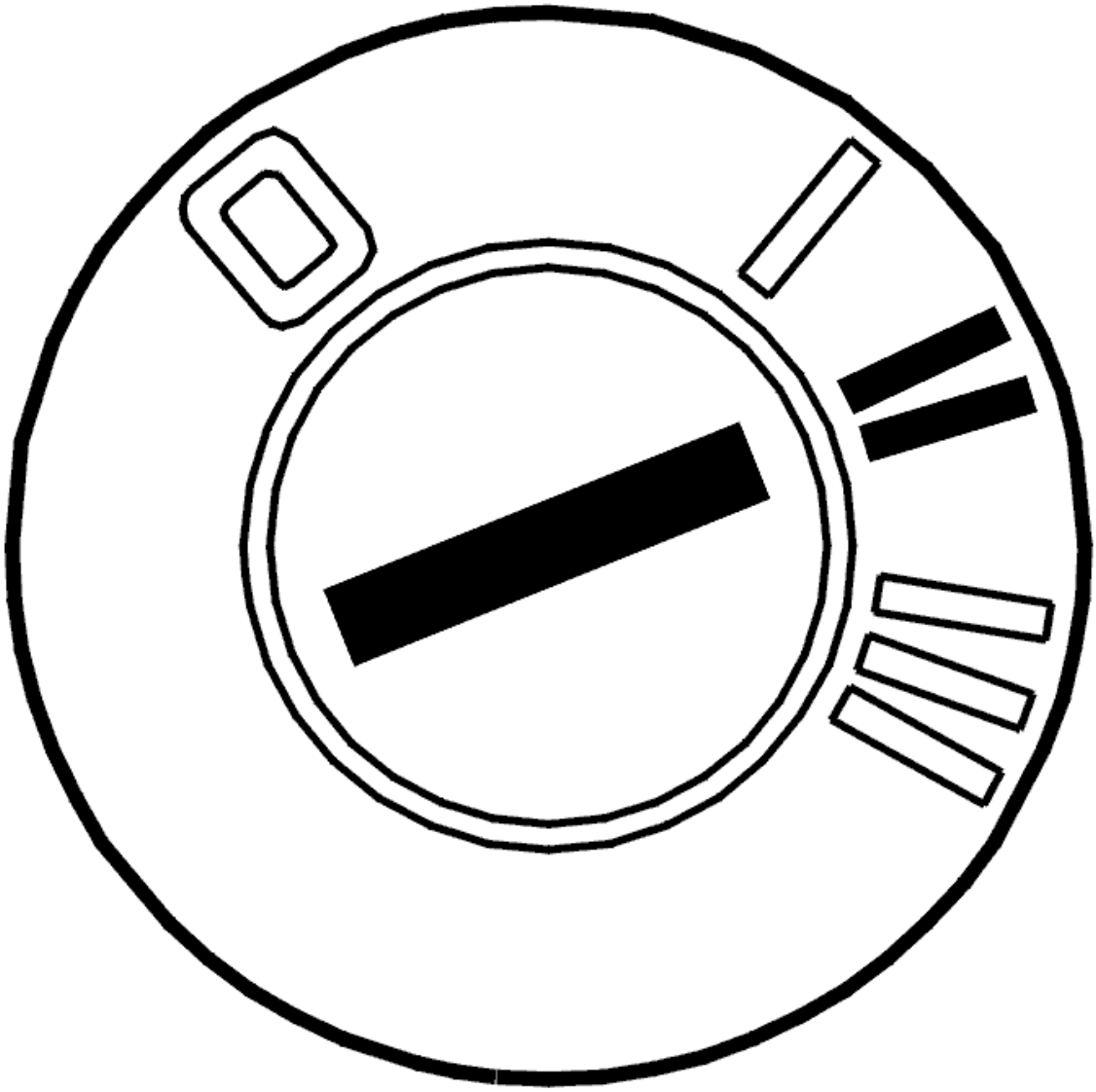


Fig. 169: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

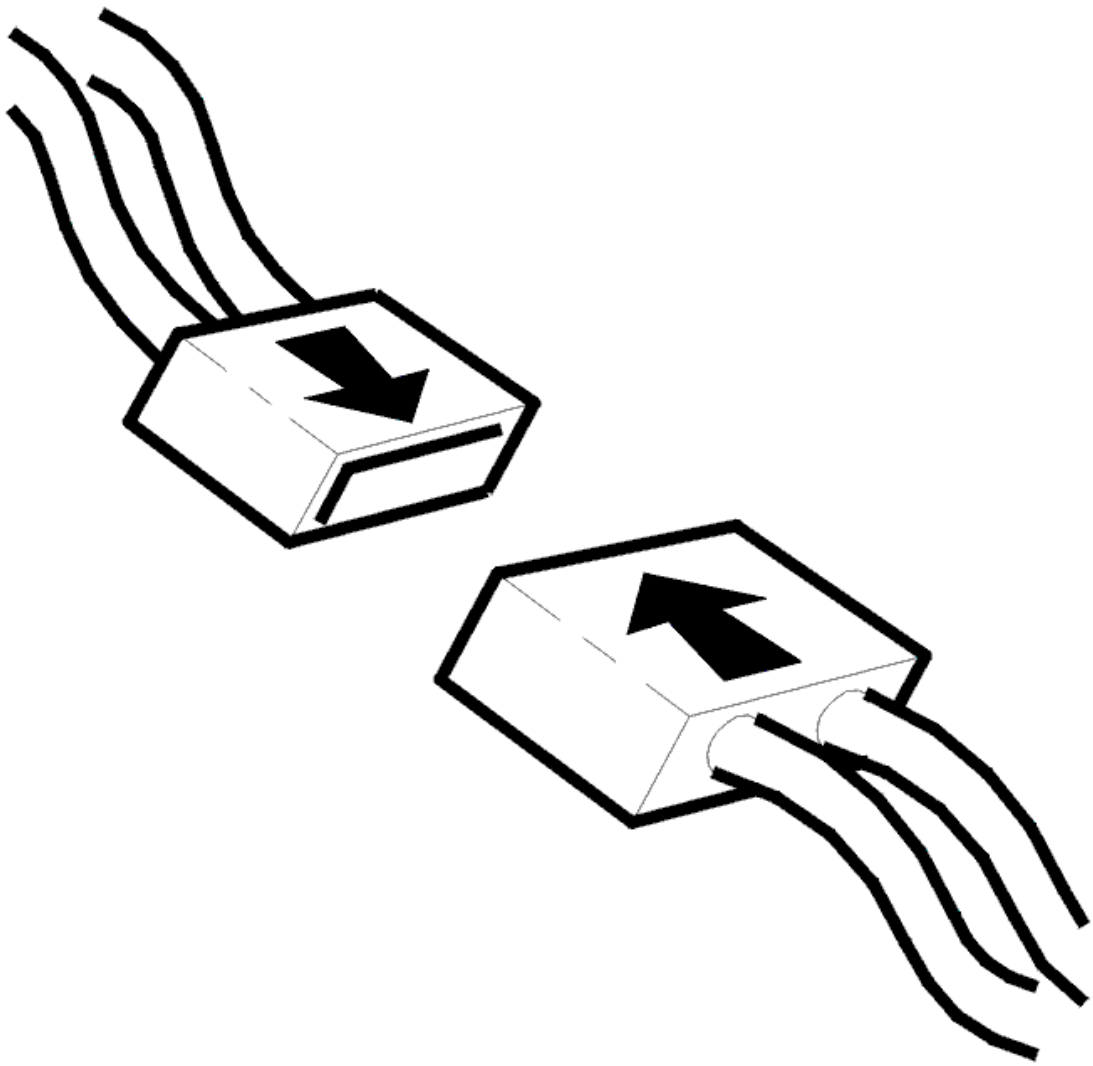


Fig. 170: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Start the engine and allow it to idle.
- Read the oil temperature for the transmission control module (TCM).

Check that oil temperature is within the permitted range. Compare with the external temperature of the transmission.

NOTE: The transmission temperature sensor is located inside the control system and may be affected by the heat given off by the solenoids.

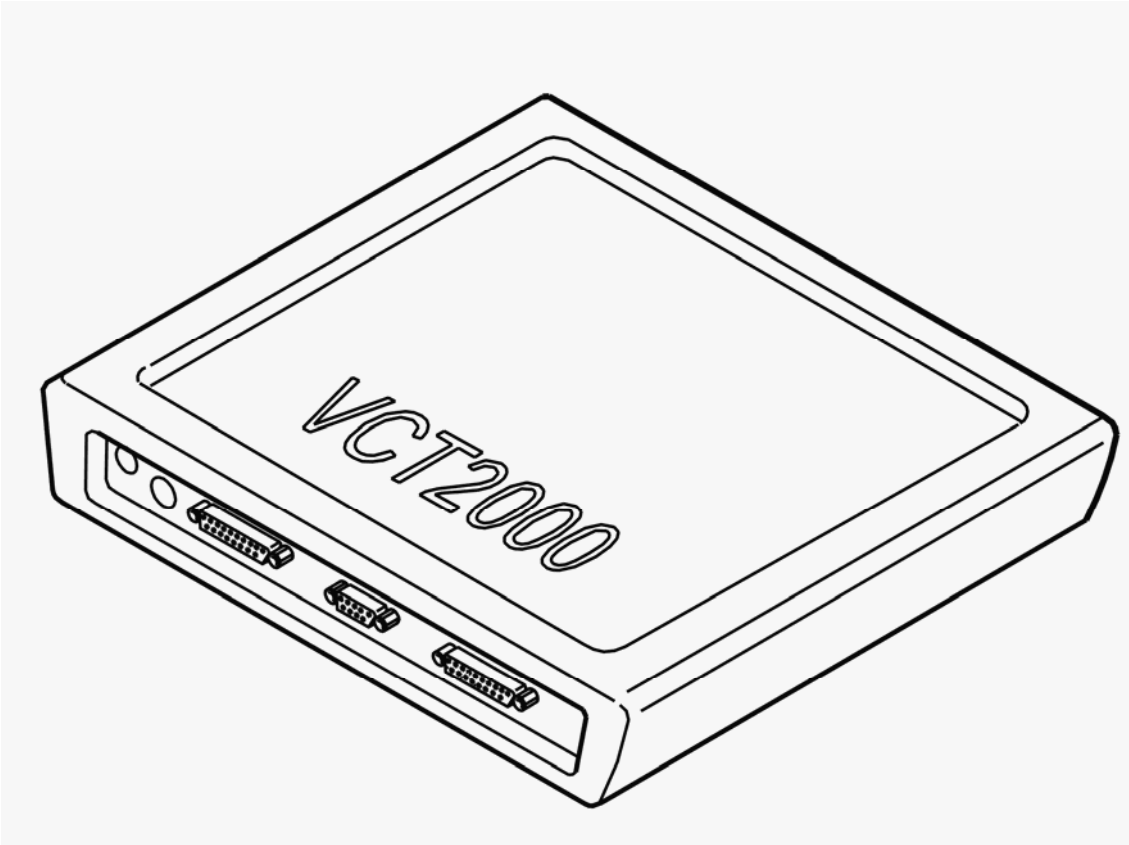


Fig. 171: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

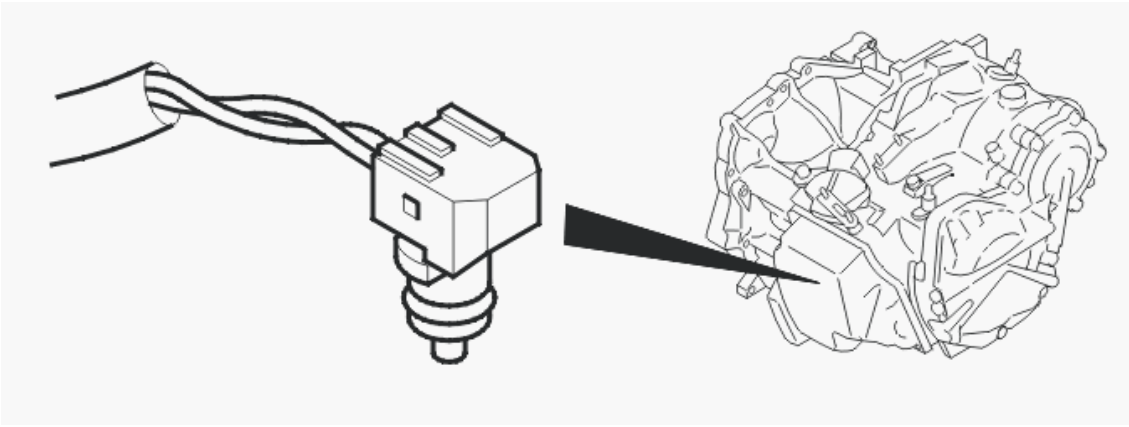


Fig. 172: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Is the temperature OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P071300: GEARBOX OIL TEMPERATURE SENSOR A CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071300

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071300**

FAULT TRACING TCM-P071300

see **FAULT TRACING TCM-P071300**

TCM-P071500: TURBINE/INPUT SHAFT SPEED SENSOR A CIRCUIT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071500

Condition

The signal for input speed comes from a sensor within the transmission control system.

The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter.

This signal is used to compare transmission speed and vehicle speed.

The transmission control module uses this comparison to calculate the gear-shift timing.

The rpm and road speed data are also utilized in modulating the system pressure and in reducing engine torque when shifting gear. The result is smooth gear-shifting.

The information is also used to control the function.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Voltage in the circuit to the transmission input speed sensor is too high.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Normal driving.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

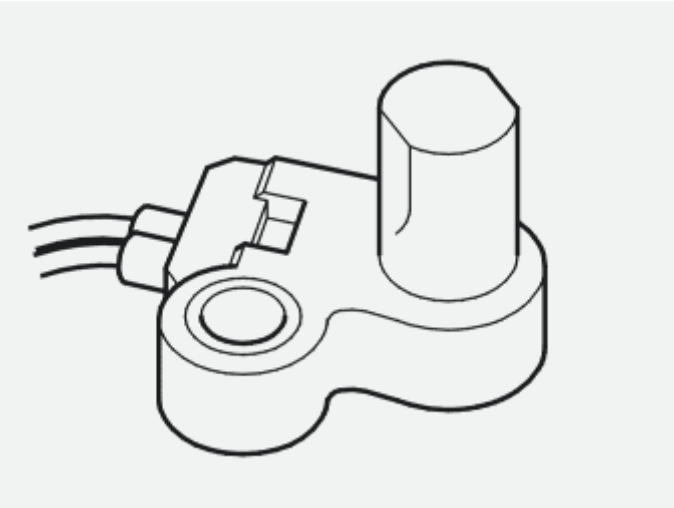


Fig. 173: Identifying Turbine/Input Shaft Speed Sensor
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Power supply to input speed sensor is short circuited to supply voltage.
- Transmission input speed sensor not working.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- No lock-up
- Rough gear shift
- No gear shift

FAULT-TRACING

CHECKS

CHECKING THE FUNCTION

Fig. 174: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

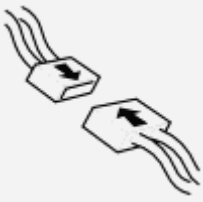


Fig. 175: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Start the engine. Allow the engine to idle.
- Read off the transmission input speed.

  Increase rpm and check that it is updated. Compare with the engine speed (RPM).

  Read off the transmission input speed.

  If the transmission input speed updates correctly it means that the fault was present previously but is not active now. There is an intermittent fault.

  If the transmission input speed does not update correctly it means that the fault is permanent.

Fig. 176: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE WIRING AND SENSORS**

CHECKING THE WIRING AND SENSORS

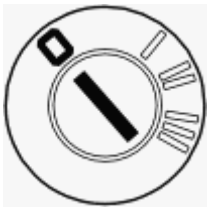


Fig. 177: Identifying Ignition In Off Position
Courtesy of VOLVO CARS CORPORATION

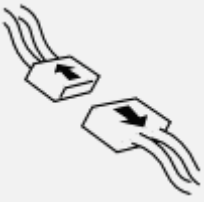


Fig. 178: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Connect the breakout box to the transmission.
- Expose the transmission control system.
- Disconnect the connector for the transmission speed input sensor.

Check the input speed sensor cables by connecting an ohmmeter between terminal #B12 (#A12) and input speed sensor terminal #2 plus between breakout box terminal #B13 (#A13) and input speed sensor terminal #1. The resistance must be 0 ohms. Also check the cables for short circuit to nearby cables in the cable harness.

HINT: If no faults are found in the wiring check the input speed sensor. See: CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- For access to connector: **GEARBOX INPUT SPEED SENSOR, REPLACING**
- see **CHECKING WIRING AND TERMINALS**

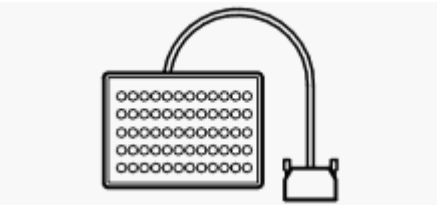


Fig. 179: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

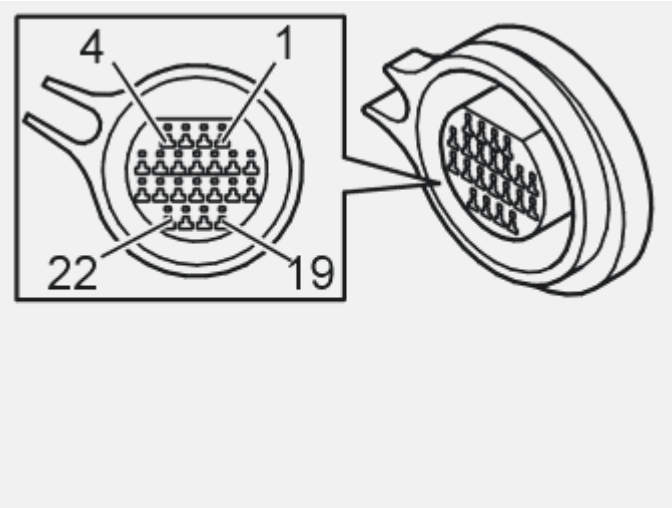


Fig. 180: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

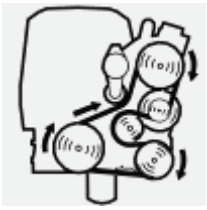


Fig. 181: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

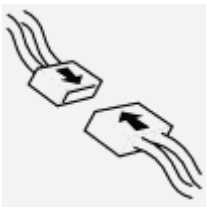


Fig. 182: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Start the engine. Allow the engine to idle.
- Read off the transmission input speed.

  Increase rpm and check that it is updated. Compare with the engine speed (RPM).

Fig. 183: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the

transmission have been replaced.

Fig. 184: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

  Fig. 185: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
  Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P071500: TURBINE/INPUT SHAFT SPEED SENSOR A CIRCUIT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071500

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071500**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P071500: TURBINE/INPUT SHAFT SPEED SENSOR A CIRCUIT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071500

Condition

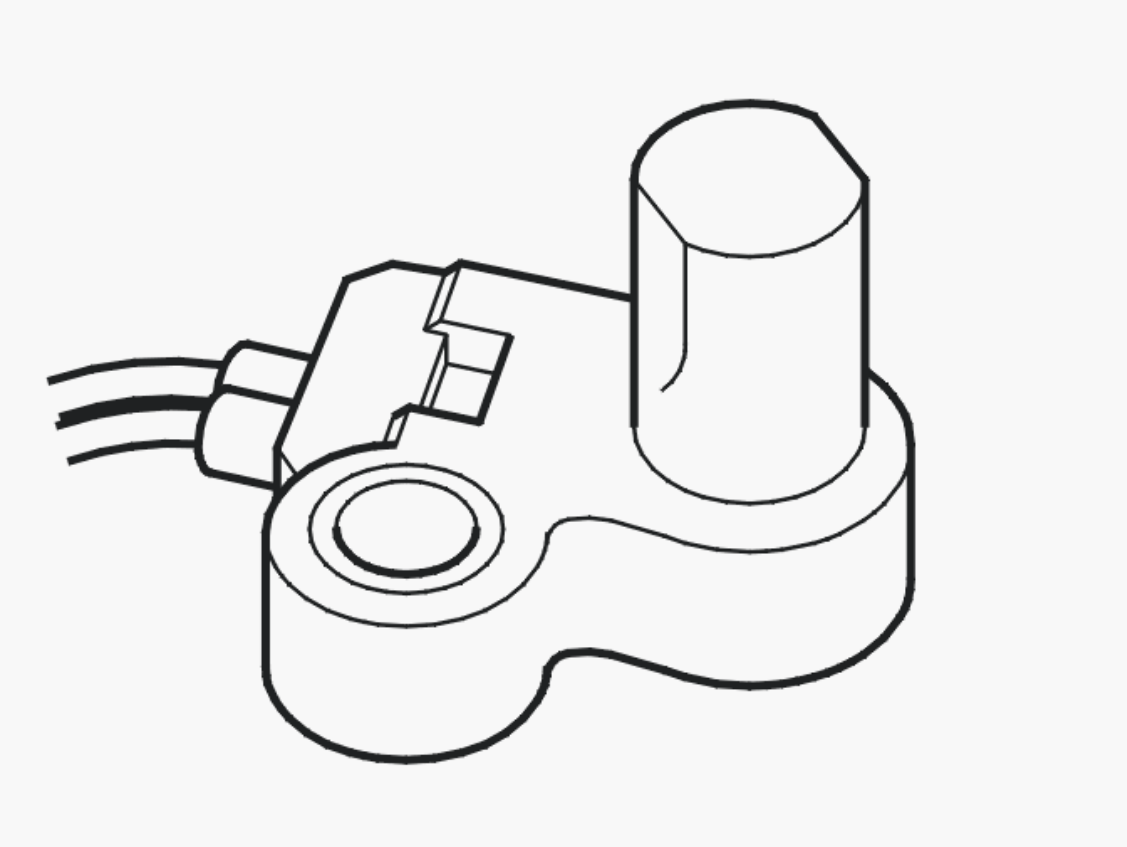


Fig. 186: Identifying Transmission Output Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The signal for the input speed comes from a sensor inside the transmission control system. The transmission control module (TCM) bases its calculation of the speed of the input shaft after the torque converter on this signal. The signal is used to compare the speed of the gearbox with the vehicle speed. Using this comparison, the control module can calculate the gear shifting points.

The information on RPM and speed affects the adjustment of the system pressure and the reduction of the engine torque when changing gear. This results in smoother gear changes. The information is also used to control the lock-up function. If the control module registers that the voltage in the circuit to the gearbox input speed sensor is too high, a diagnostic trouble code (DTC) will be generated.

The diagnostic trouble code (DTC) can be diagnosed when driving normally.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Power supply to input speed sensor short-circuited to voltage.
- Gearbox input speed sensor not working.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- No lock-up function.
- Harsh gear changing
- No gear changing.

FAULT TRACING

CHECKS

CHECKING THE FUNCTION

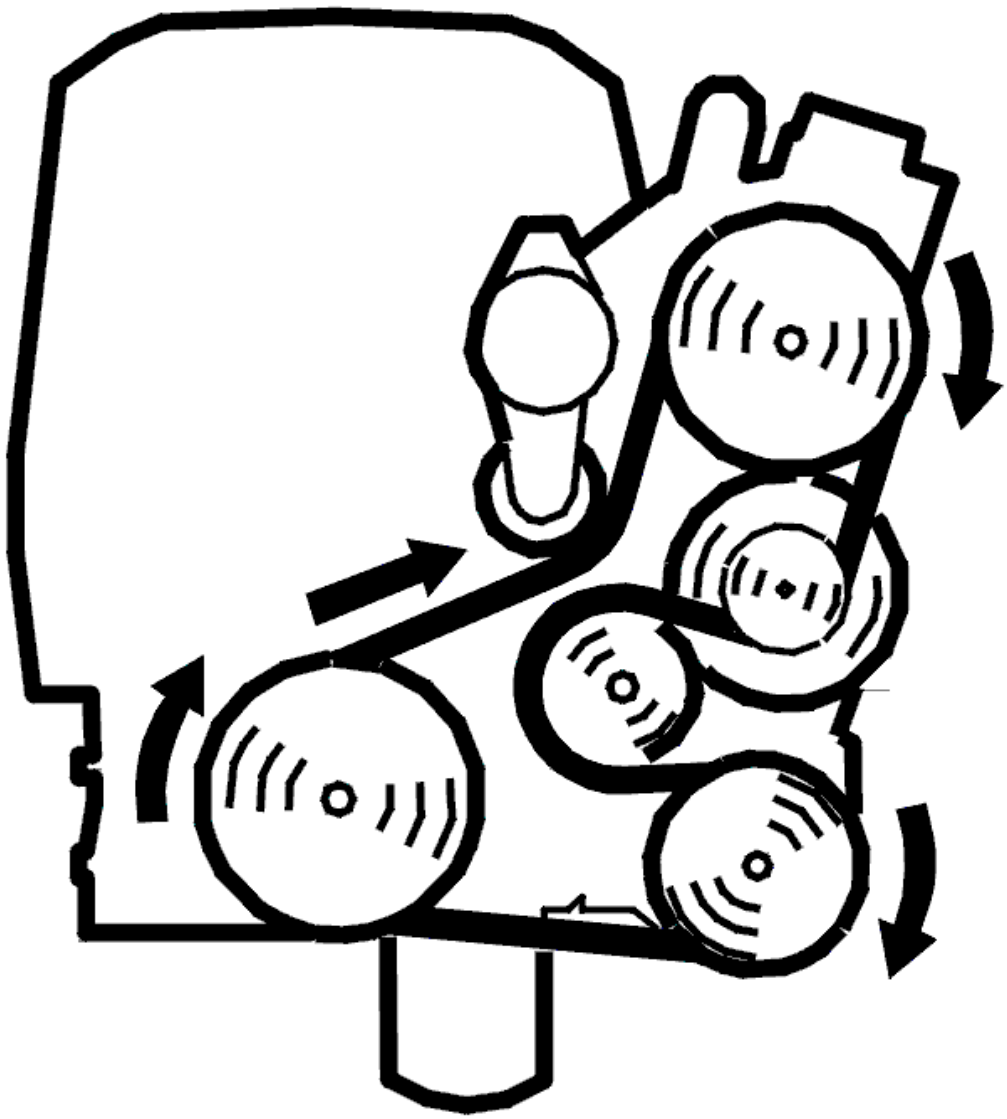


Fig. 187: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

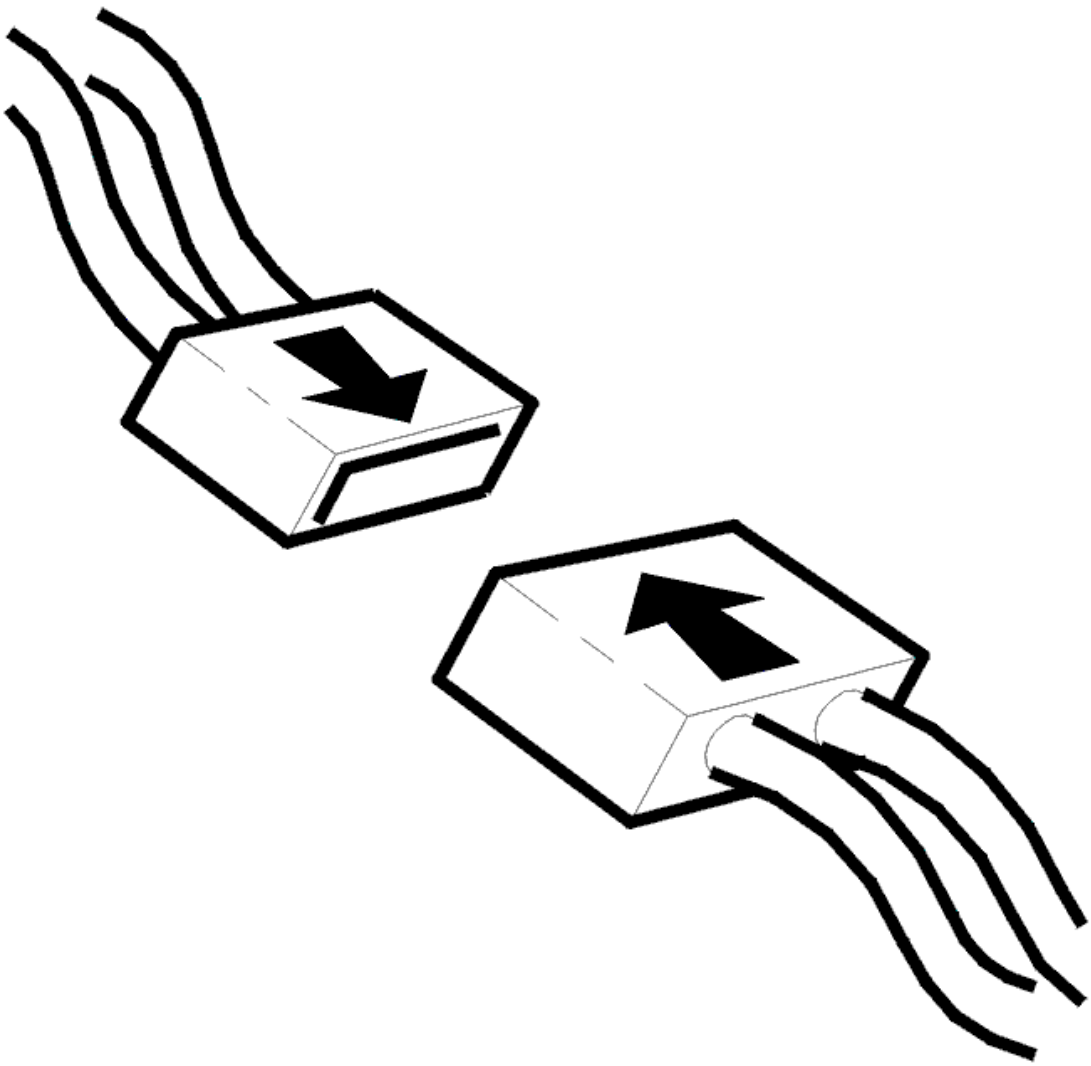


Fig. 188: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Start the engine and allow it to idle.
- Read off the transmission input speed.

  Read off the transmission input speed.

  If the transmission input speed updates correctly it means that the fault was present previously but is not active now. There is an intermittent fault.

  If the transmission input speed does not update correctly it means that the fault is permanent.

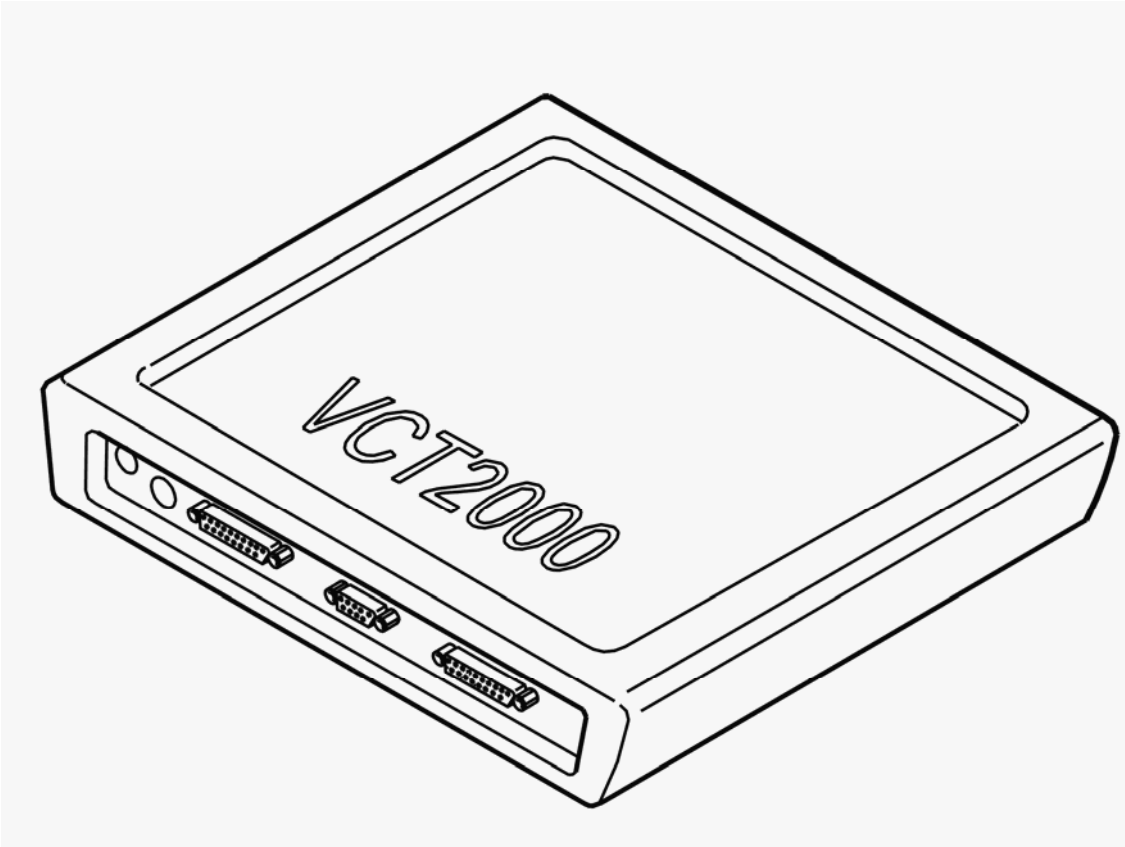


Fig. 189: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

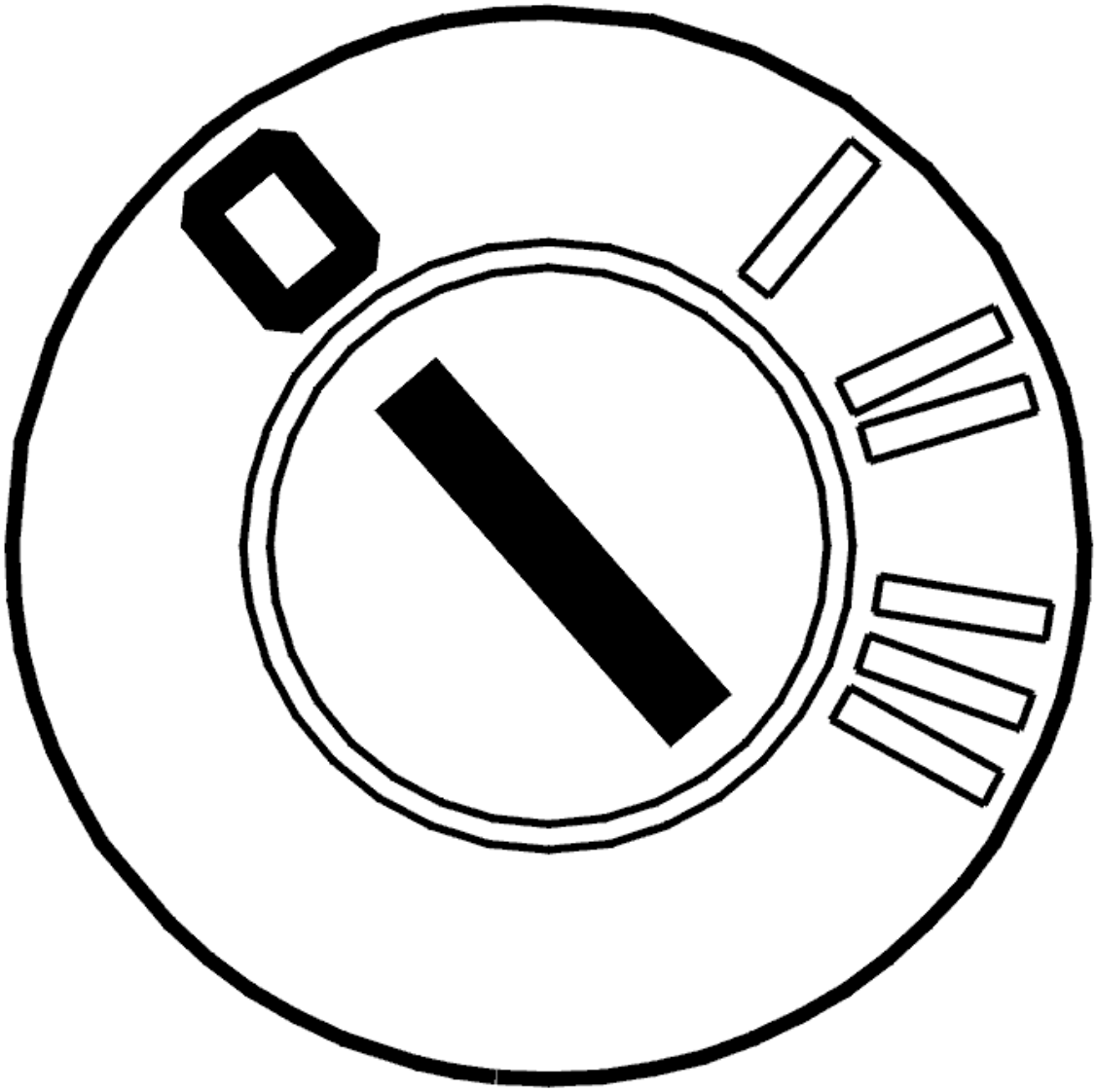


Fig. 190: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

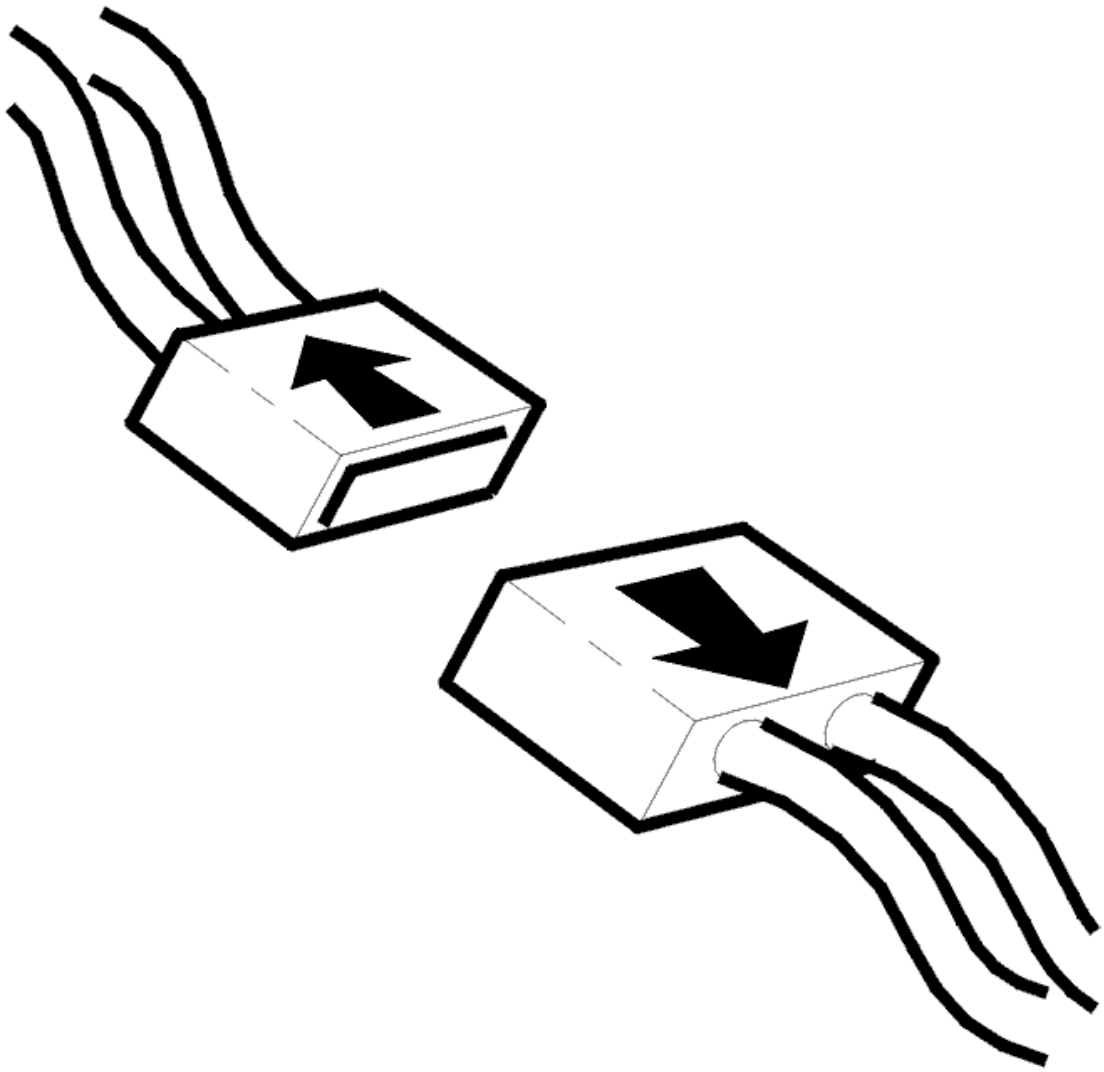


Fig. 191: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the transmission.
- Expose the control system of the transmission.
- Disconnect the connector for the transmission speed input sensor.

Check the wiring for the transmission input speed sensor. Connect an ohmmeter between terminal #B12 (#A12) and input speed sensor terminal #2 and between terminal #B13 (#A13) on the breakout box and input speed sensor terminal #1. The resistance must be 0 ohms. Check the wiring. Check for short-circuits to adjacent cables in the cable harness.

HINT: If no faults are found in the wiring check the input speed sensor. See : CHECKING THE INPUT AND OUTPUT SPEED SENSORS FOR THE TRANSMISSION

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- For access to connector: **GEARBOX INPUT SPEED SENSOR, REPLACING**
- see **CONTENTS**

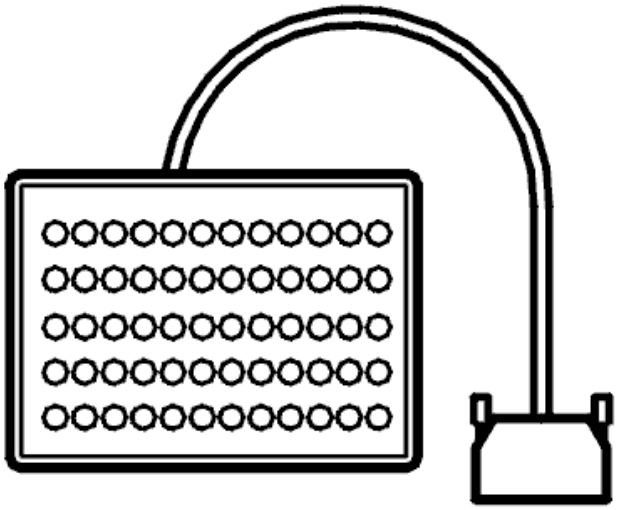


Fig. 192: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

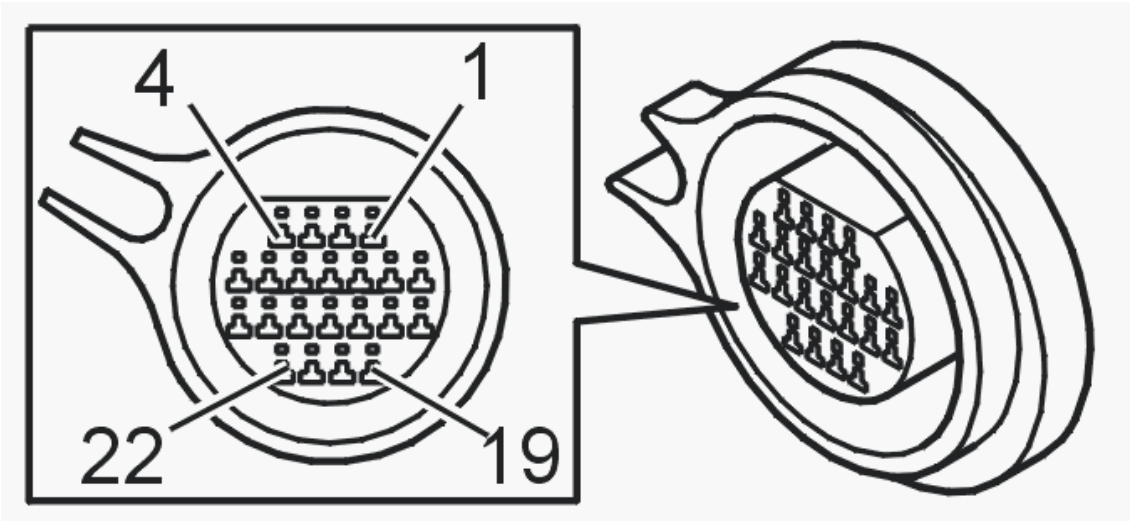


Fig. 193: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

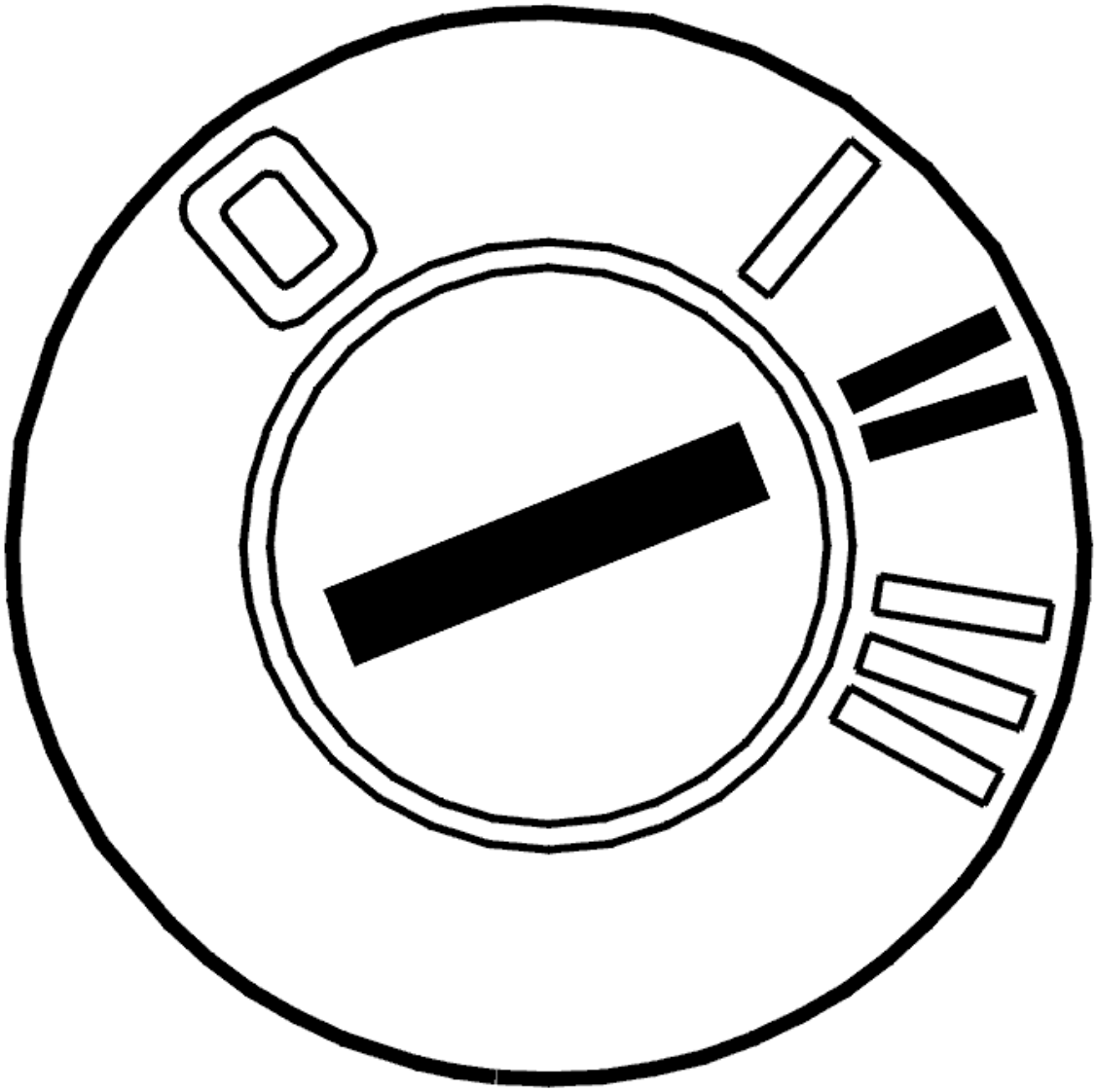


Fig. 194: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

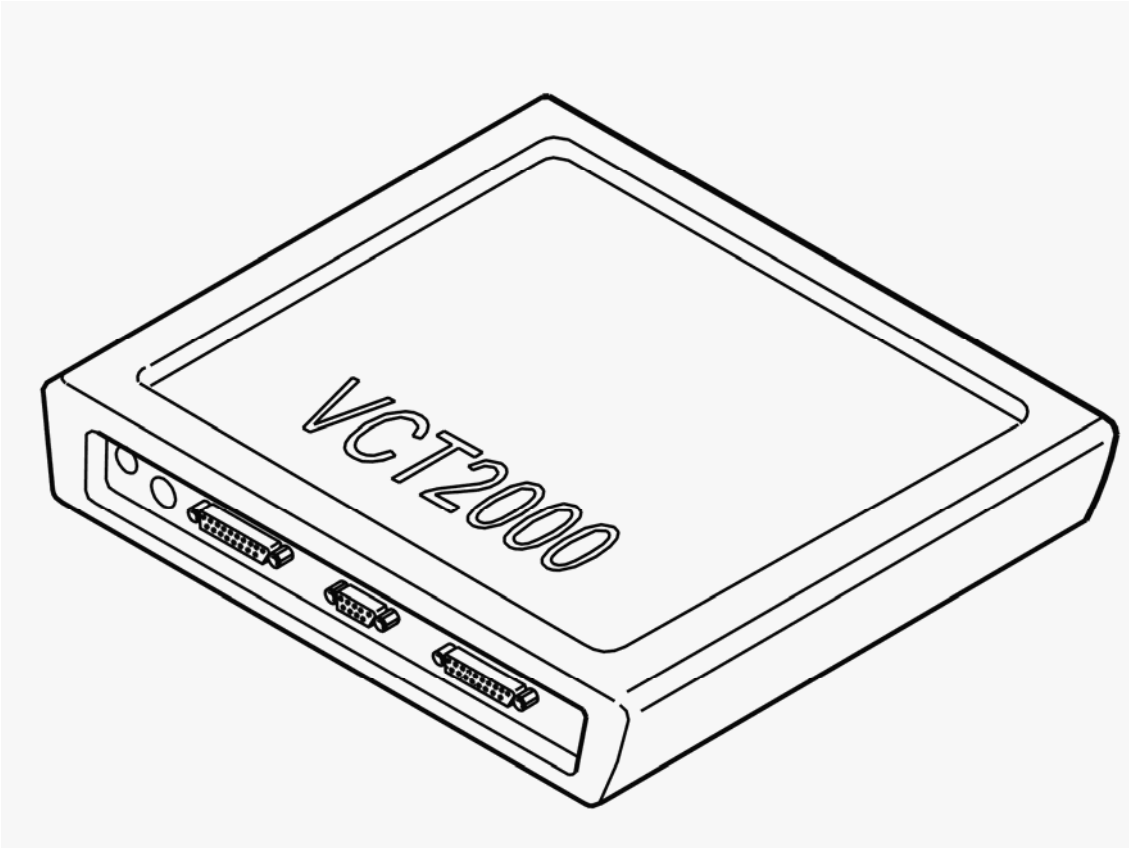


Fig. 195: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

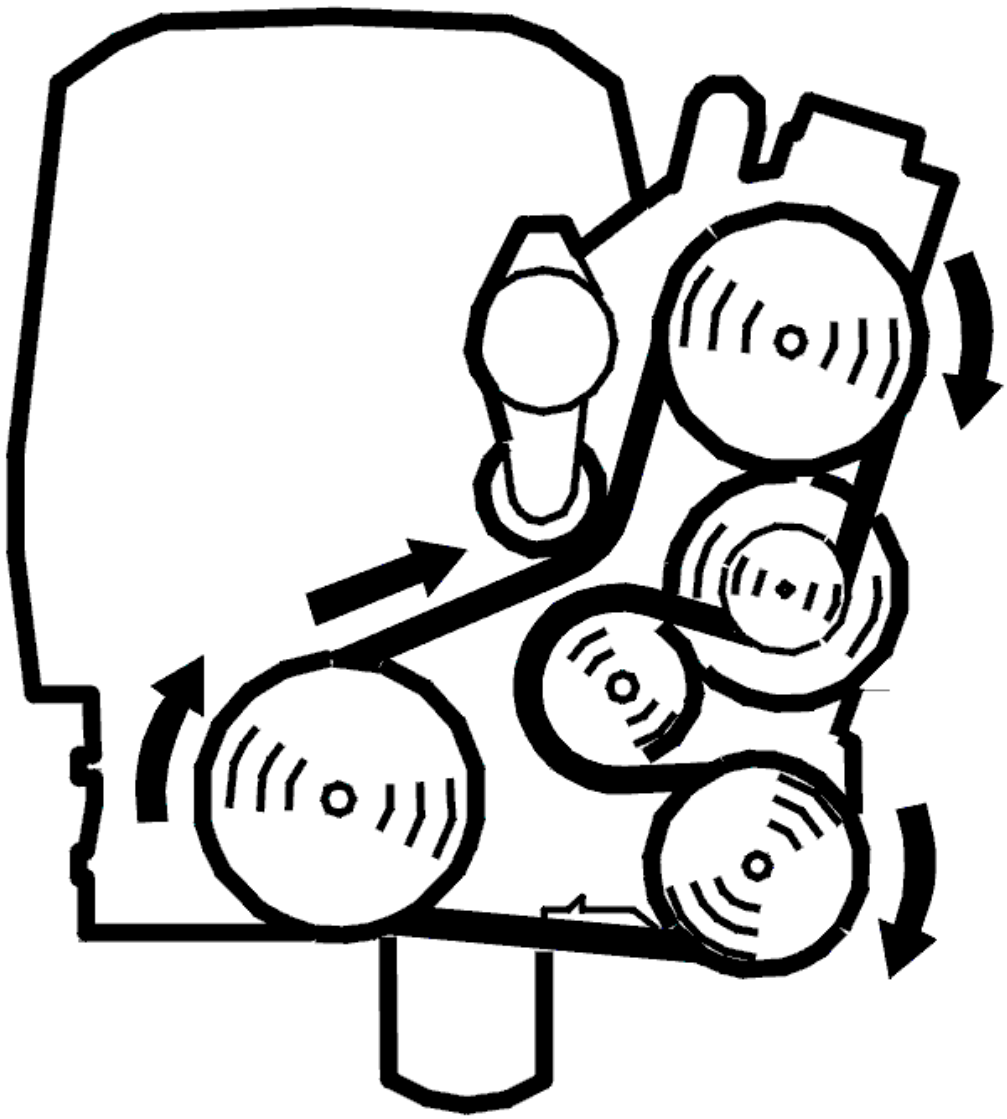


Fig. 196: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

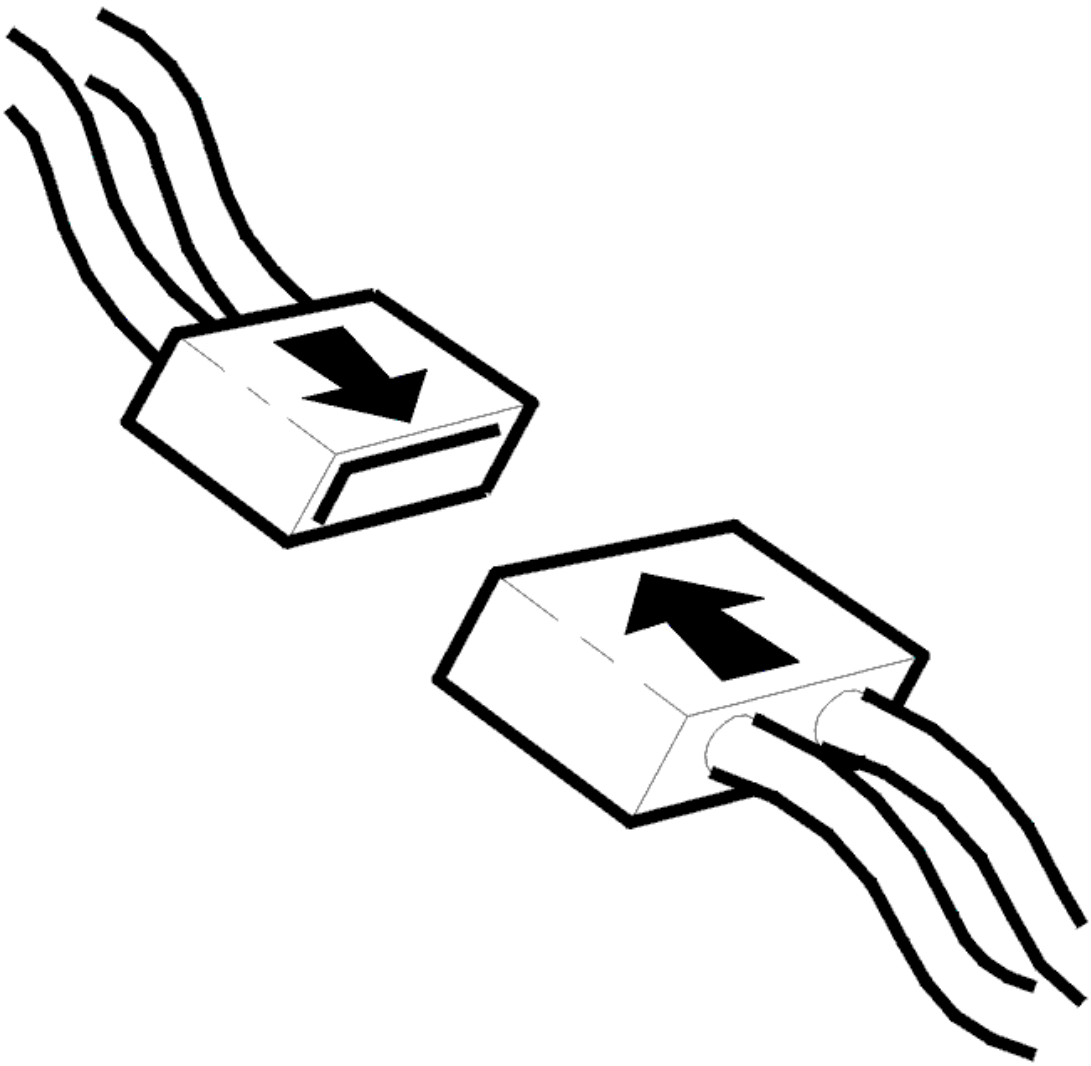


Fig. 197: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the connectors, components etc.
- Start the engine and allow it to idle.
- Read off the transmission's input rpm.

  Increase the rpm and check that the rpm is updated. Compare to the engine rpm.

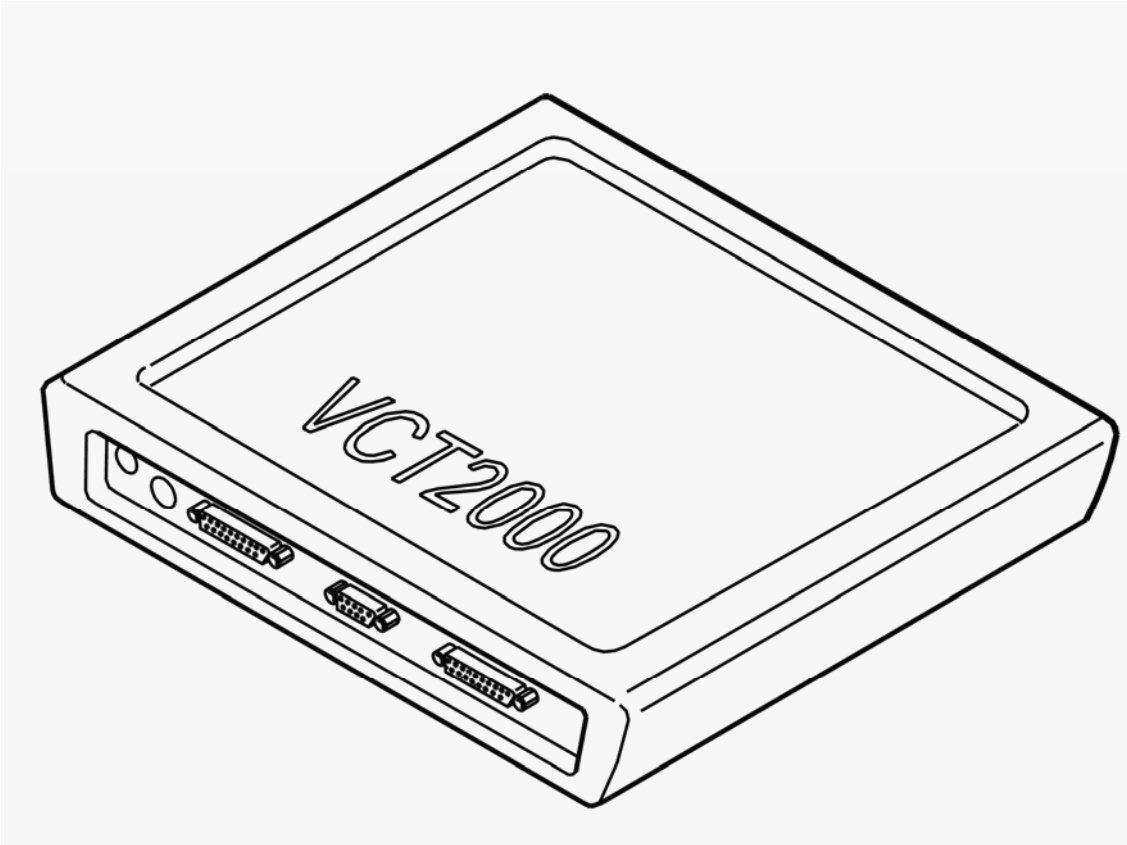


Fig. 198: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the rpm updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P071500: TURBINE/INPUT SHAFT SPEED SENSOR A CIRCUIT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-

80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071500

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071500**

FAULT TRACING

see **FAULT TRACING**

TCM-P071600: TURBINE/INPUT SHAFT SPEED SENSOR A CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071600

Condition

The signal for input speed comes from a sensor within the transmission control system. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare transmission speed and vehicle speed. The transmission control module uses this comparison to calculate the gear-shift timing.

The rpm and road speed data are also utilized in modulating the system pressure and in reducing engine torque when shifting gear. The result is smooth gear-shifting. The information is also used to control the function.

The transmission control module (TCM) calculates and compares also the transmission input speed and output speed plus the engine speed for diagnosis.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The signal is incorrect when vehicle speed is over about 7 km/h (4 mph).

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Speed higher than 30 km/h (20 mph), engine speed over 400 rpm and at least 3rd gear engaged.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

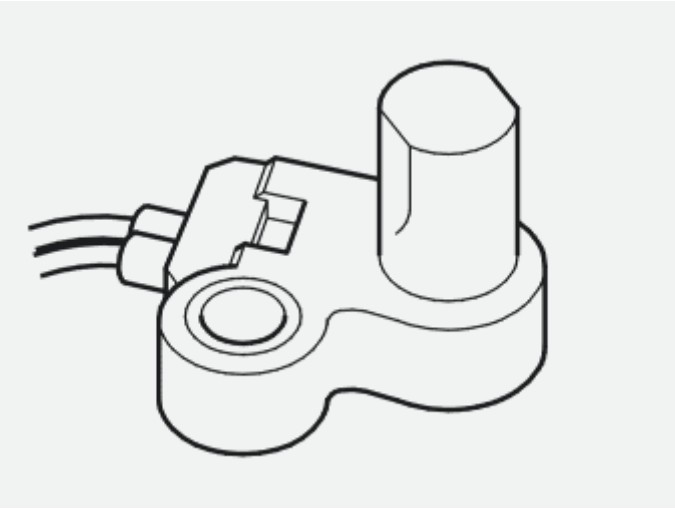


Fig. 199: Identifying Turbine/Input Shaft Speed Sensor
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance in the terminals.
- Transmission input speed sensor not fitted correctly.
- Speed sensor not working.

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- No lock-up
- Rough gear shift
- No gear shift

FAULT-TRACING

CHECKS

CHECKING THE FUNCTION

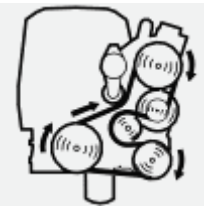


Fig. 200: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

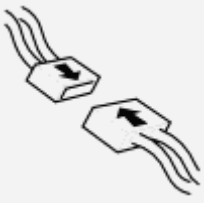


Fig. 201: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Start the engine. Allow the engine to idle.
- Read off the transmission input speed.

  Read off the transmission input speed.

  If the transmission input speed updates correctly it means that the fault was present previously but is not active now. There is an intermittent fault.

  If the transmission input speed does not update correctly it means that the fault is permanent.

Fig. 202: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE WIRING AND SENSORS**

CHECKING THE WIRING AND SENSORS

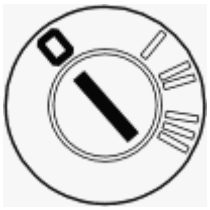


Fig. 203: Identifying Ignition In Off Position
Courtesy of VOLVO CARS CORPORATION

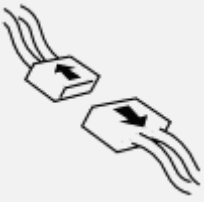


Fig. 204: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Connect the breakout box to the transmission.
- Expose the transmission control system.
- Disconnect the connector for the transmission speed input sensor.

  Check the input speed sensor cables by connecting an ohmmeter between terminal #B12 (#A12) and input speed sensor terminal #2 plus between breakout box terminal #B13 (#A13) and input speed sensor terminal #1. The resistance must be 0 ohms.

  Also check the cables for short circuit to nearby cables in the cable harness.

  Check that the rpm sensor for input rpm is not loose and that the sensor is installed correctly.

  HINT: If no faults are found in the wiring check the input speed sensor. See :CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

  Remedy as necessary.

  Other information

  - see **CONNECTING THE BREAKOUT BOX**
  - see **SIGNAL SPECIFICATION**
  - For access to connector: **GEARBOX INPUT SPEED SENSOR, REPLACING**
  - see **CHECKING WIRING AND TERMINALS**

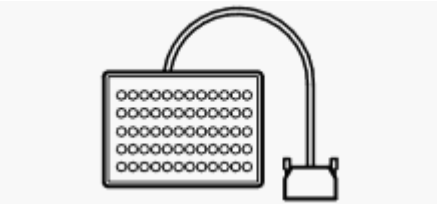


Fig. 205: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

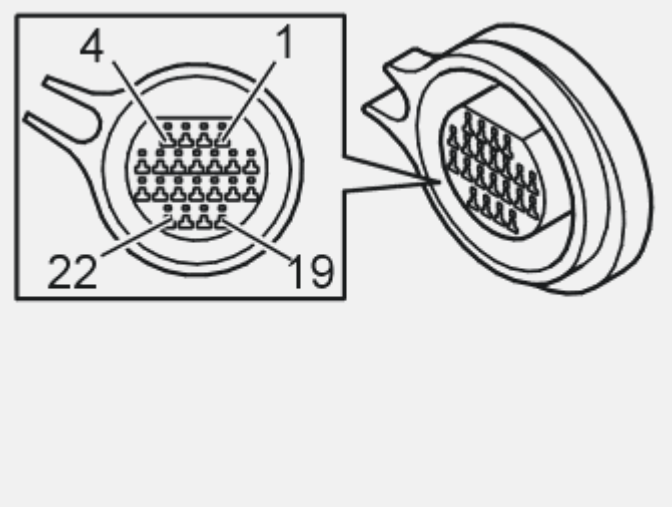


Fig. 206: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

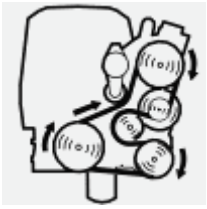


Fig. 207: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

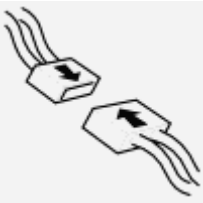


Fig. 208: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Start the engine. Allow the engine to idle.
- Read off the transmission input speed.

  Increase rpm and check that it is updated. Compare with the engine speed (RPM).

Fig. 209: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 210: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

  Fig. 211: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
  Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P071600: TURBINE/INPUT SHAFT SPEED SENSOR A CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071600

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071600**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P071600: TURBINE/INPUT SHAFT SPEED SENSOR A CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071600

Condition

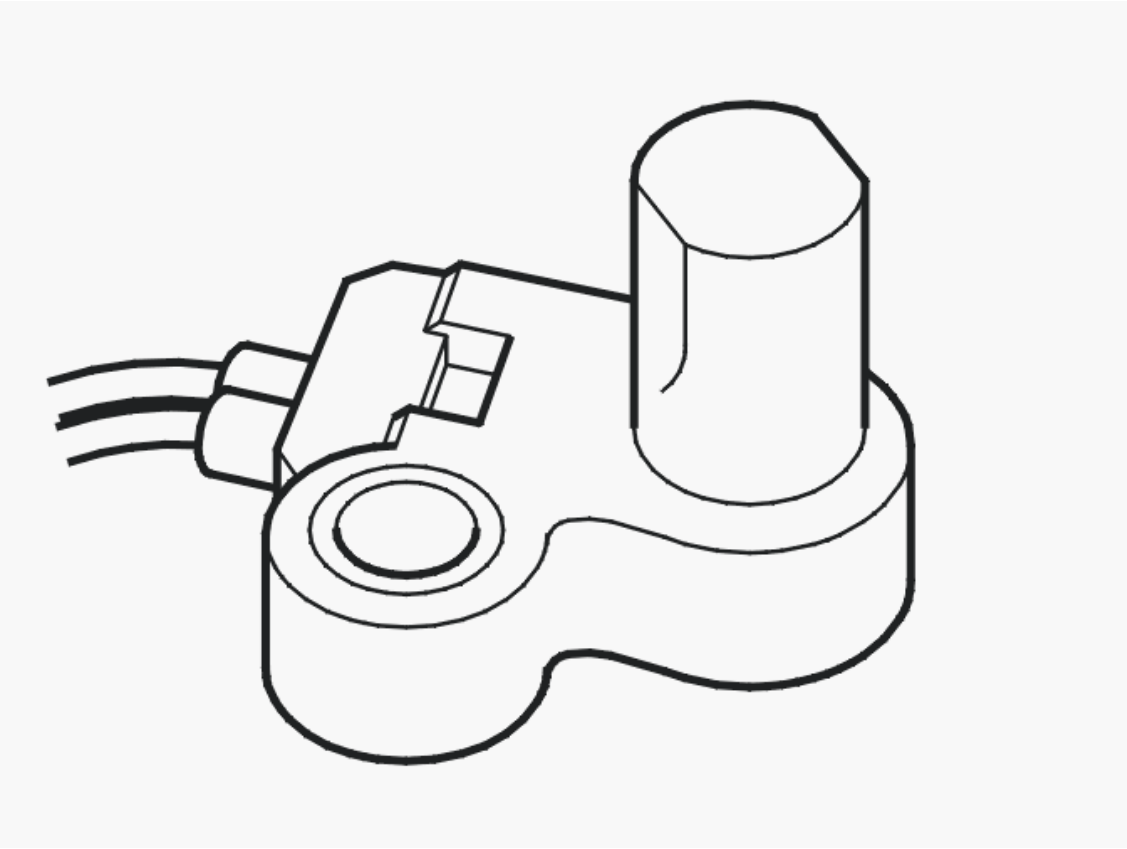


Fig. 212: Identifying Transmission Output Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The signal for the input speed comes from a sensor inside the transmission control system. The transmission control module (TCM) bases its calculation of the speed of the input shaft after the torque converter on this signal. The signal is used to compare the speed of the gearbox with the vehicle speed. Using this comparison, the transmission control module (TCM) can calculate the gear shifting points.

The information on RPM and speed affects the adjustment of the system pressure (control of the lock-up function) and the reduction of the engine torque when changing gear. This results in smoother gear changes. The information is also used to control the lock-up function.

The transmission control module (TCM) calculates and compares also the gearbox input speed and output speed plus the engine speed for diagnosis. If the transmission control module (TCM) registers that the signal is incorrect when the vehicle speed is above approximately 7 km/h, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code (DTC) can be diagnosed at speeds above approximately 30 km/h and engine speeds above 400 rpm with at least 3rd gear engaged.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals
- Gearbox input speed sensor not fitted correctly.
- Speed sensor not working.

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- No lock-up function.
- Harsh gear changing
- No gear changing.

FAULT TRACING

CHECKS

CHECKING THE FUNCTION

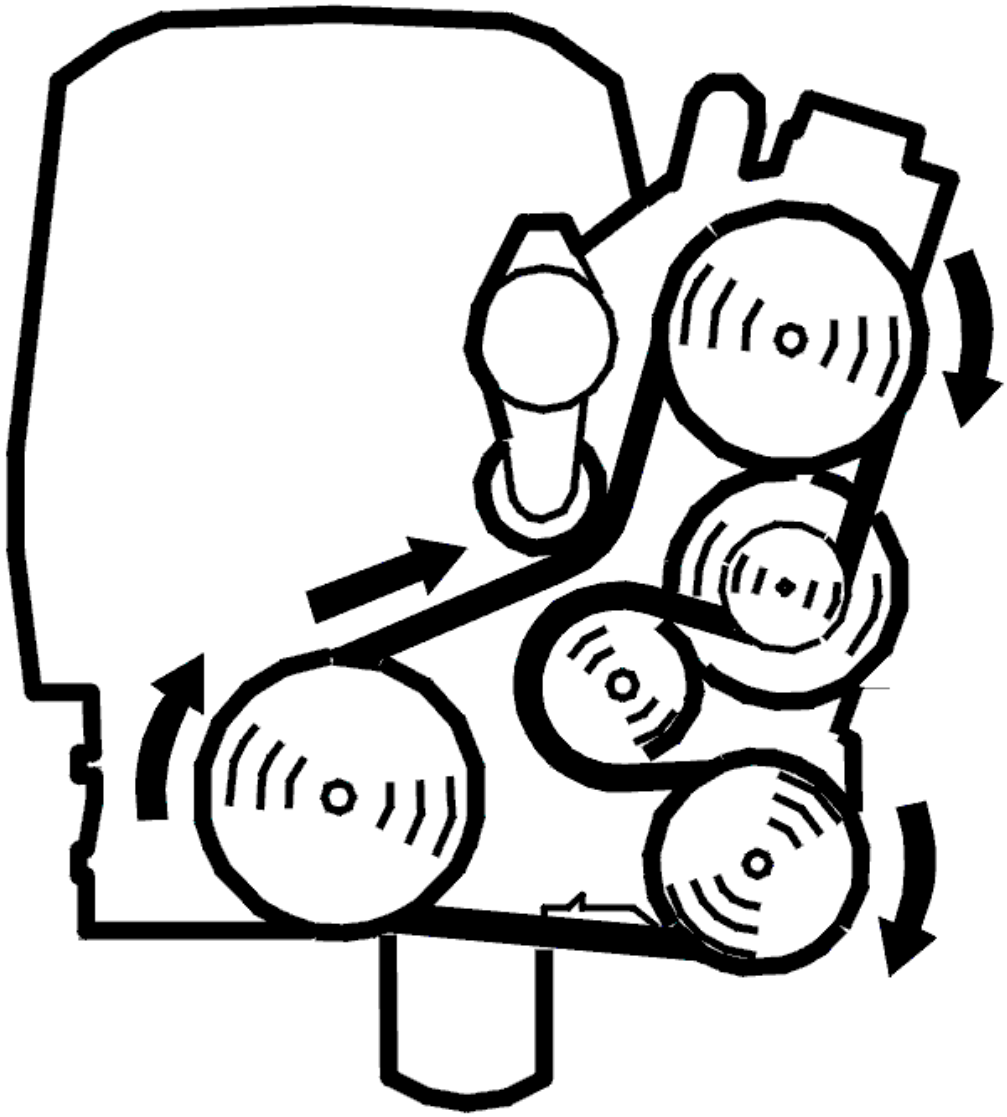


Fig. 213: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine and allow it to idle.
- Read off the transmission input speed.

  Read off the transmission input speed.

  If the transmission input speed updates correctly it means that the fault was present previously but is not active now. There is an intermittent fault.

  If the transmission input speed does not update correctly it means that the fault is permanent.

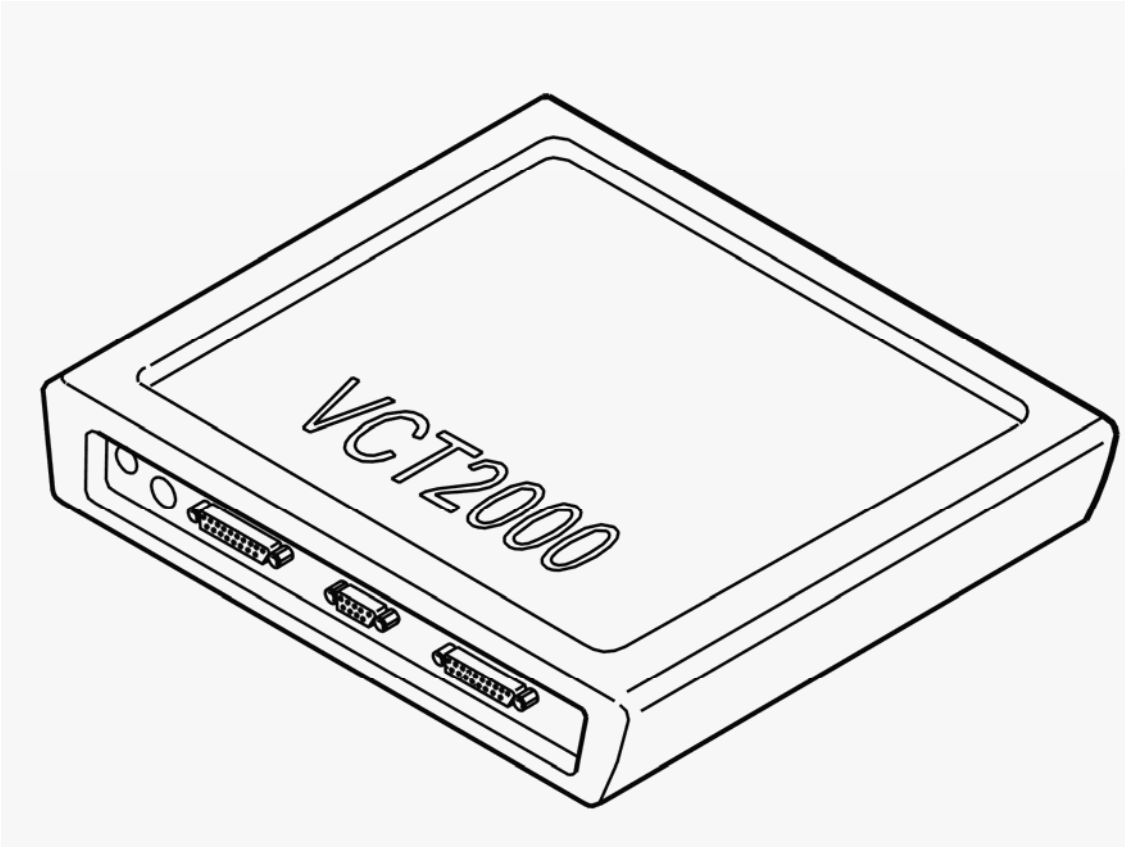


Fig. 214: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

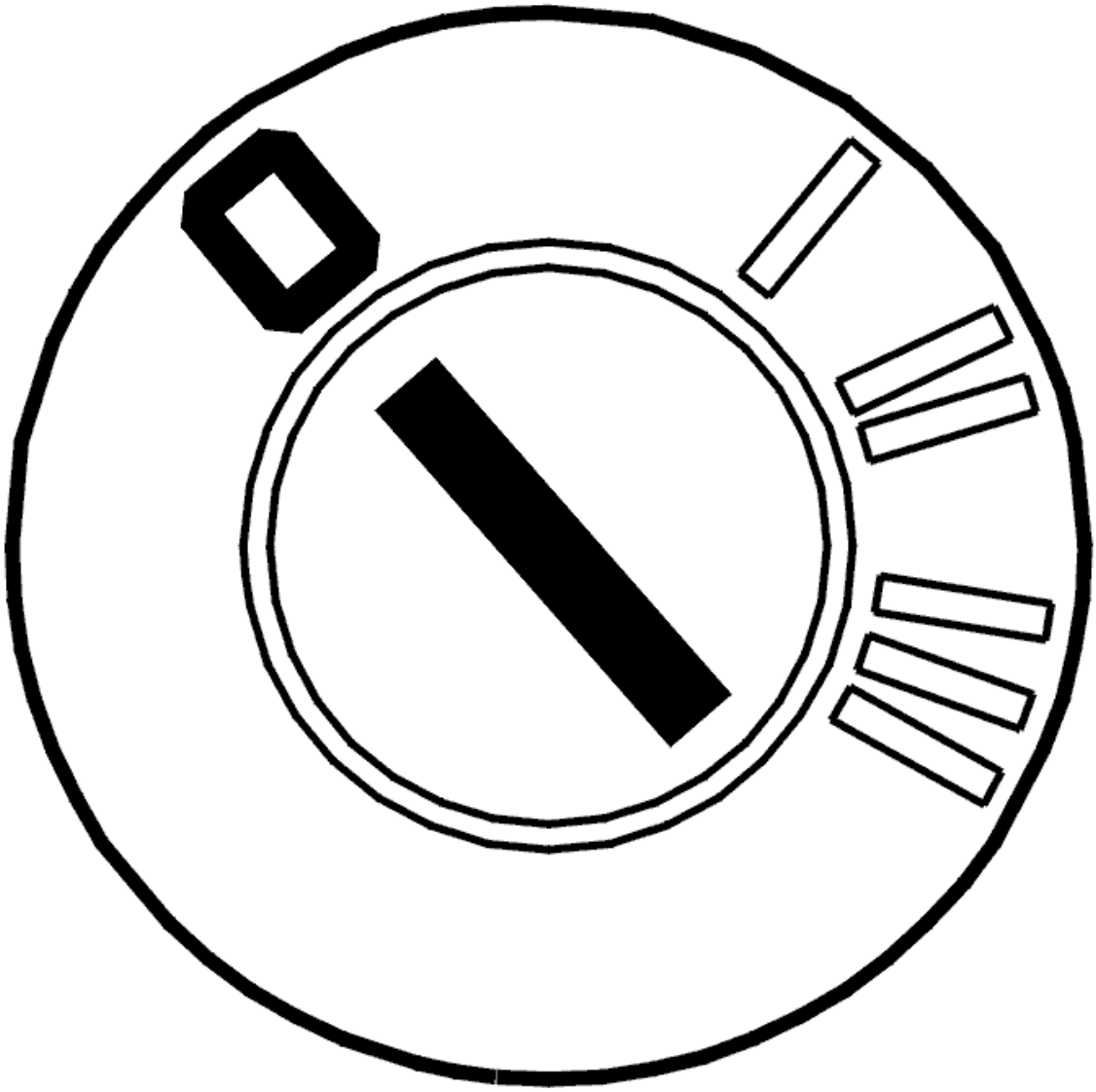


Fig. 215: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

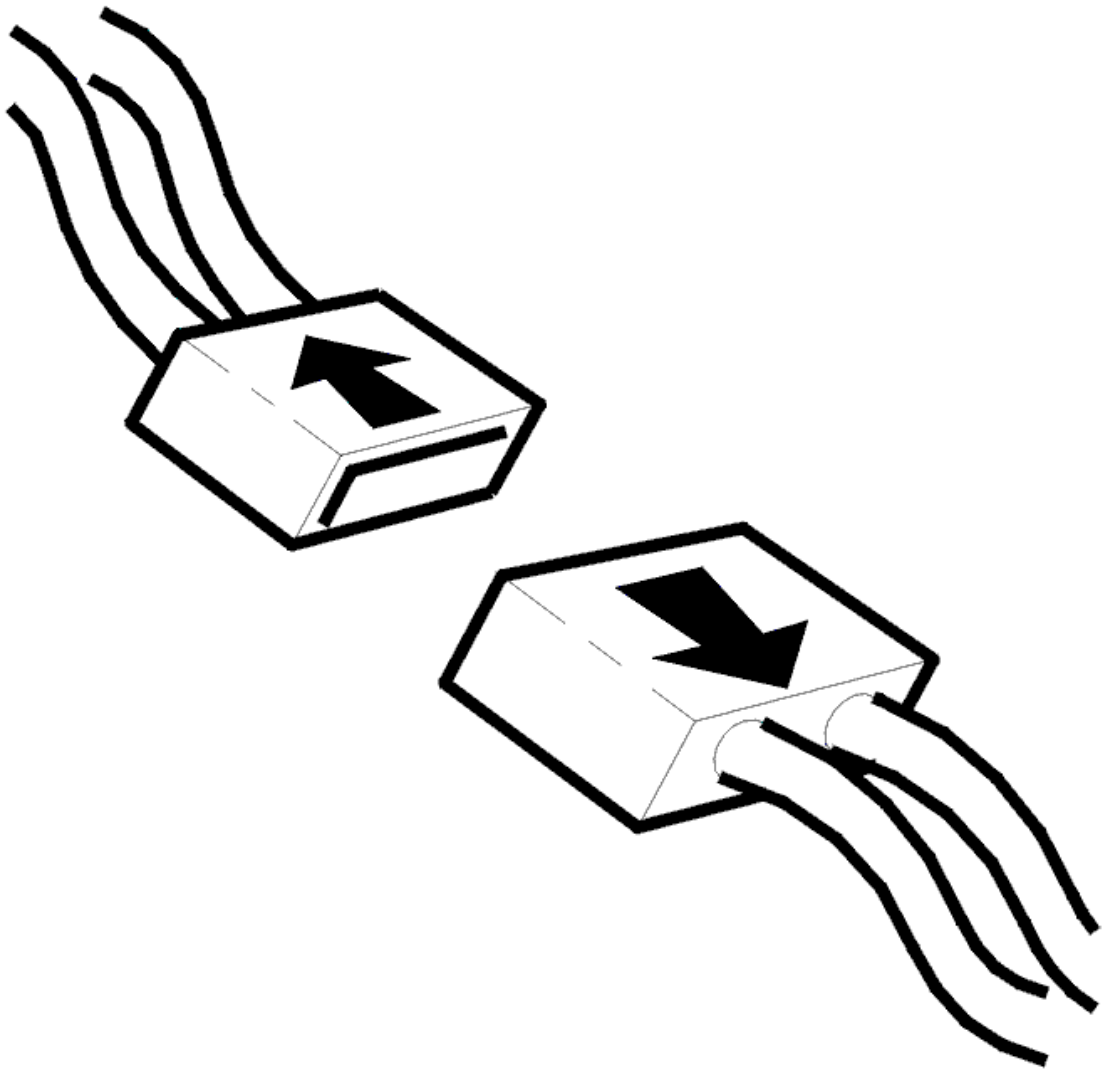


Fig. 216: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the transmission.
- Expose the control system of the transmission.
- Disconnect the connector for the transmission speed input sensor.

  Check the wiring for the transmission input speed sensor. Connect an ohmmeter between terminal #B12 (#A12) and input speed sensor terminal #2 and between terminal #B13 (#A13) on the breakout box and input speed sensor terminal #1. The resistance must be 0 ohms. Check the wiring. Check for short-circuits to adjacent cables in the cable harness.

  Check that the rpm sensor for input rpm is not loose and that the sensor is installed correctly.

HINT: If no defects were found on the cables, check the rpm sensor for input rpm according to: CHECKING THE INPUT AND OUTPUT SPEED SENSORS FOR THE TRANSMISSION

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- For access to connector: **GEARBOX INPUT SPEED SENSOR, REPLACING**
- see **CONTENTS**

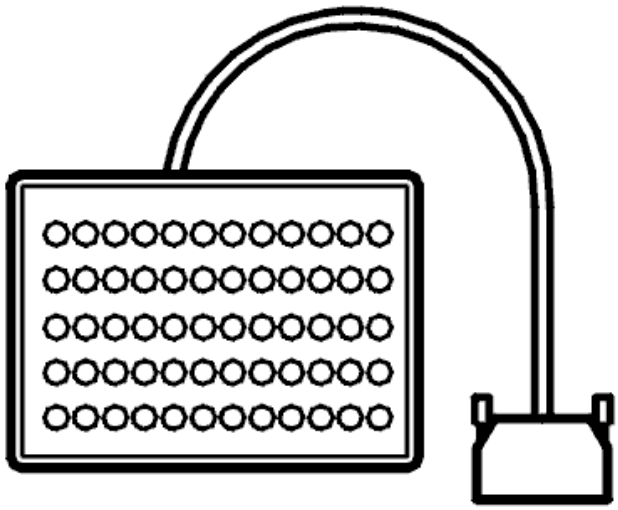


Fig. 217: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

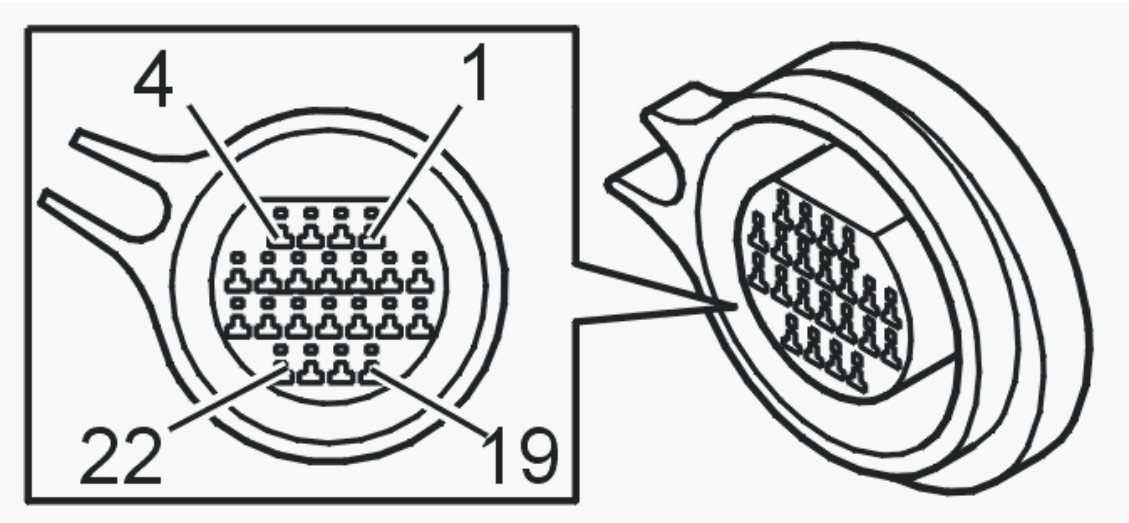


Fig. 218: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

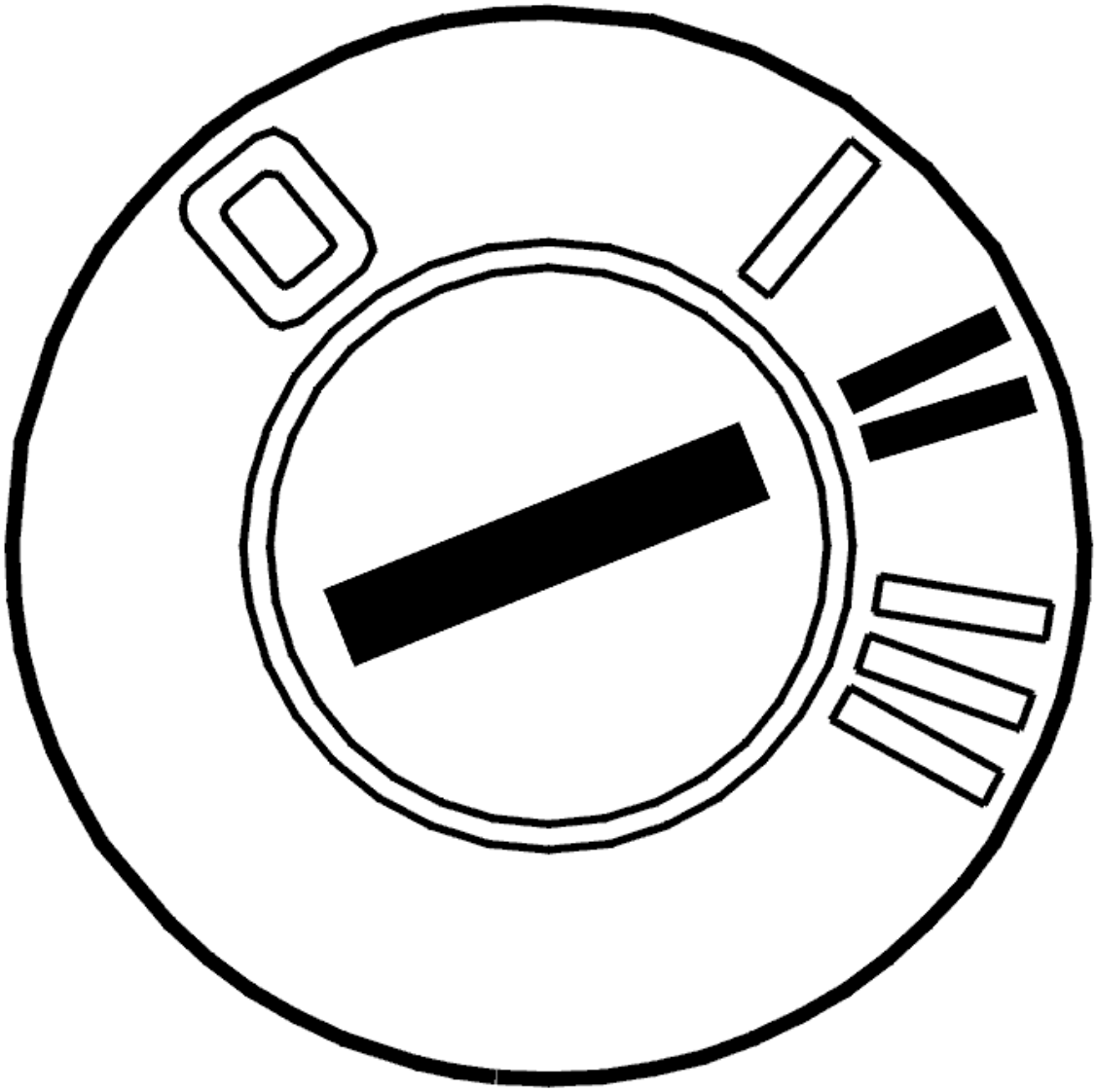


Fig. 219: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

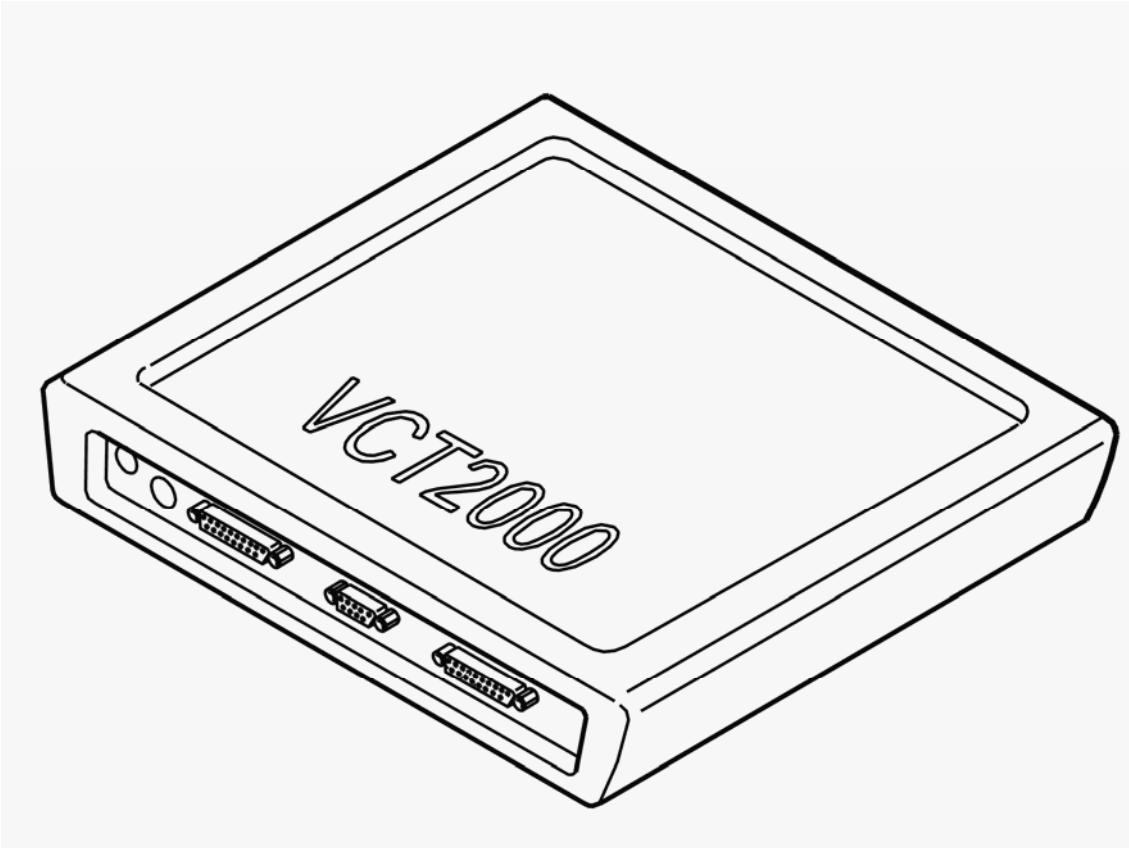


Fig. 220: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

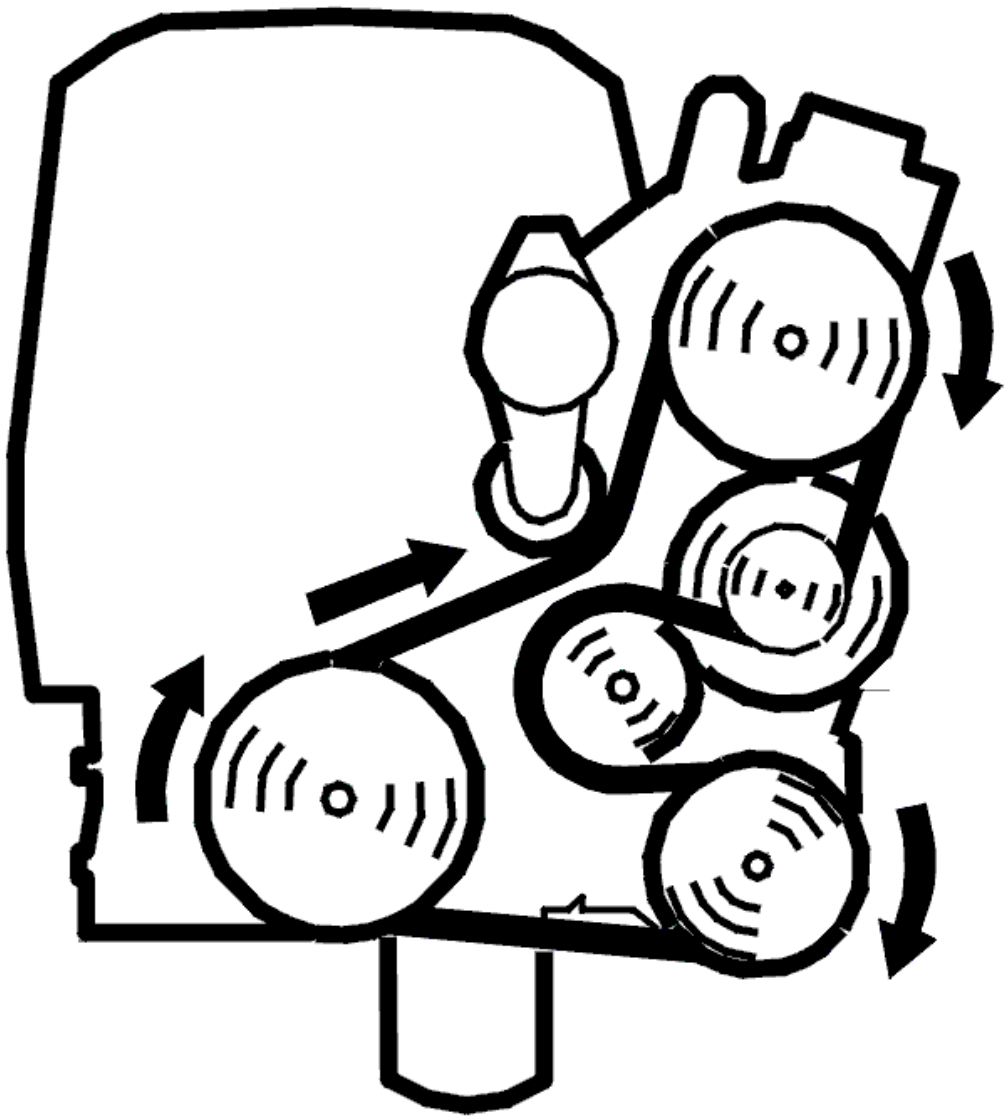


Fig. 221: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

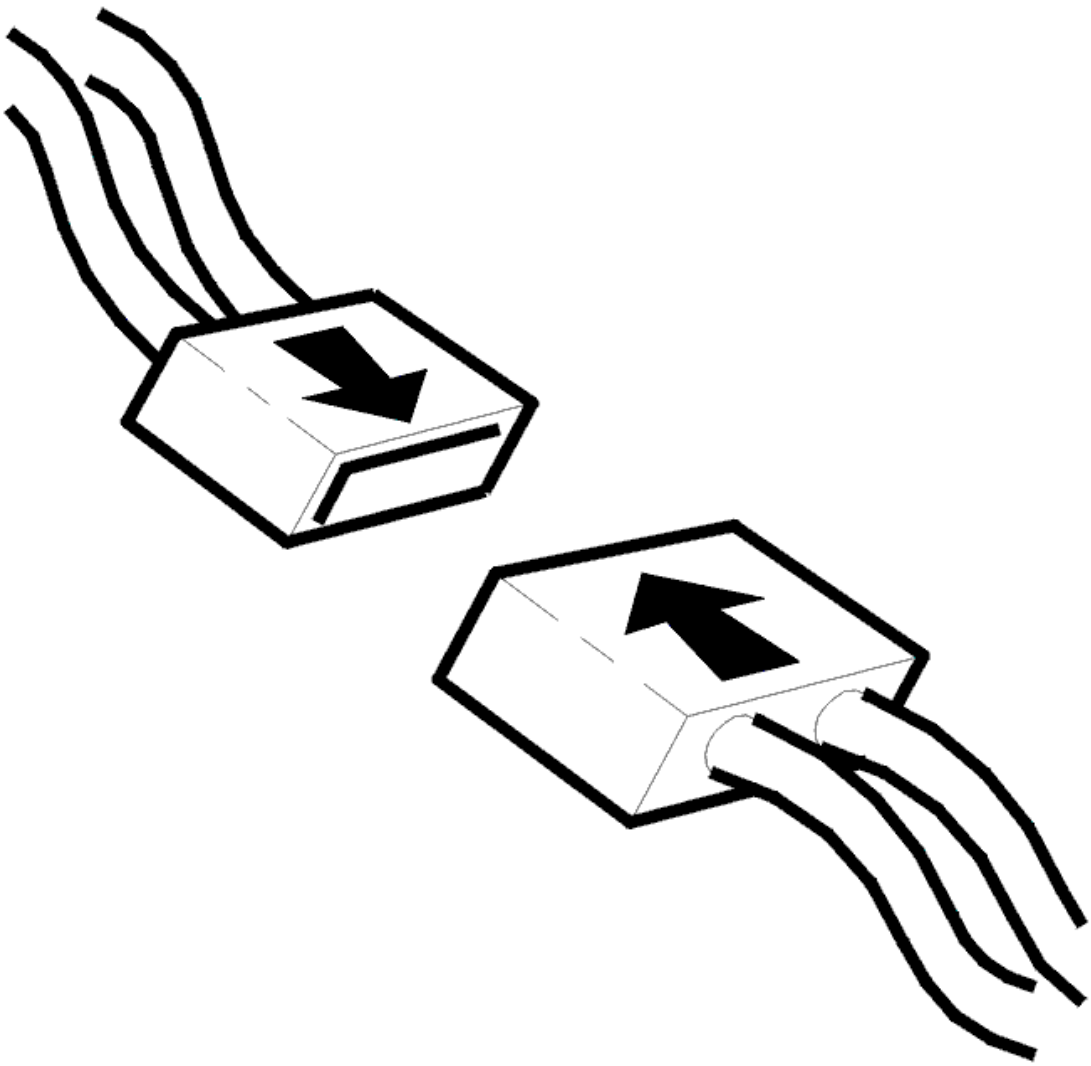


Fig. 222: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the connectors, components etc.
- Start the engine and allow it to idle.
- Read off the transmission's input rpm.

  Increase the rpm and check that the rpm is updated. Compare to the engine rpm.

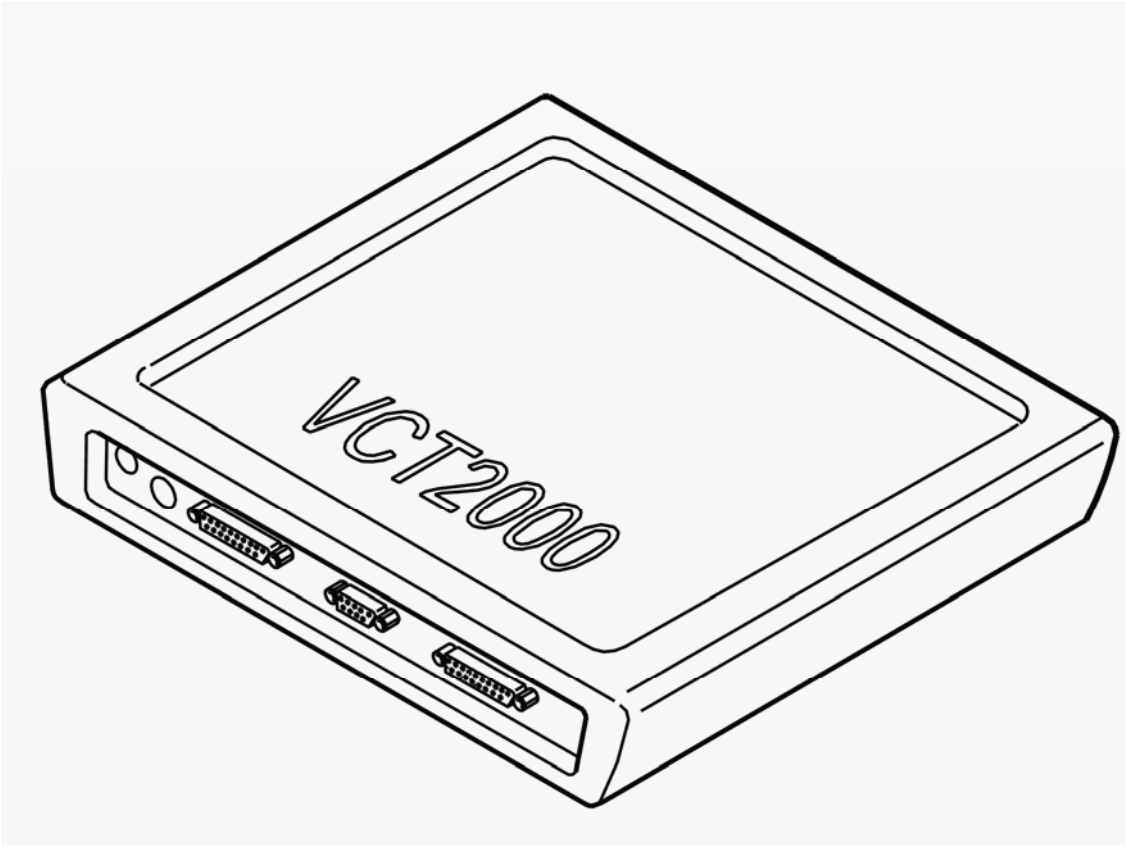


Fig. 223: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the rpm updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P071600: TURBINE/INPUT SHAFT SPEED SENSOR A CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO

INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071600

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071600**

FAULT TRACING

see **FAULT TRACING**

TCM-P071700: TURBINE/INPUT SHAFT SPEED SENSOR A CIRCUIT NO SIGNAL. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071700

Condition

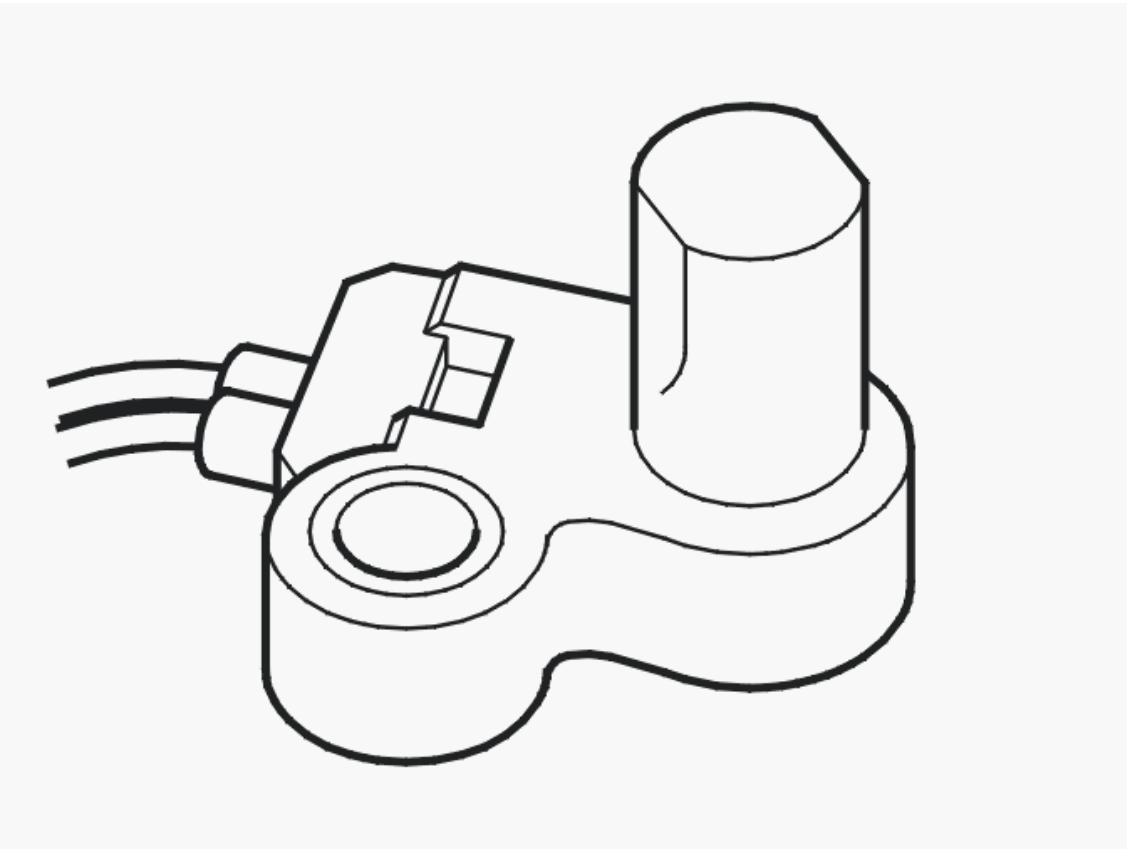


Fig. 224: Identifying Transmission Output Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The signal for the input speed comes from a sensor inside the transmission control system. The transmission control module (TCM) bases its calculation of the speed of the input shaft after the torque converter on this

signal. The signal is used to compare the speed of the gearbox with the vehicle speed. Using this comparison, the control module can calculate the gear shifting points.

The information on RPM and speed affects the adjustment of the system pressure (control of the lock-up function) and the reduction of the engine torque when changing gear. This results in smoother gear changes.

The information is used also for controlling the lock-up function. The transmission control module (TCM) calculates and compares also the gearbox input speed and output speed plus the engine speed for diagnosis.

If the transmission control module (TCM) registers that the signal from the speed sensor is missing, the diagnostic trouble code (DTC) will be generated.

The diagnostic trouble code (DTC) can be diagnosed at speeds above approximately 70 km/h and when the temperature of the transmission fluid exceeds 20 °C.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals
- Gearbox input speed sensor not working.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- No lock-up function.
- Harsh gear changing
- No gear changing.

FAULT TRACING

see **FAULT TRACING**

TCM-P071700: TURBINE/INPUT SHAFT SPEED SENSOR A CIRCUIT NO SIGNAL. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071700

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071700**

FAULT TRACING

see **FAULT TRACING**

TCM-P071800: TURBINE/INPUT SHAFT SPEED SENSOR A CIRCUIT INTERMITTENT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071800

Condition

The signal for input speed comes from a sensor within the transmission control system. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare transmission speed and vehicle speed. The transmission control module uses this comparison to calculate the gear-shift timing.

The rpm and road speed data are also utilized in modulating the system pressure and in reducing engine torque when shifting gear. The result is smooth gear-shifting. The information is also used to control the function.

The transmission control module (TCM) calculates and compares also the transmission input speed and output speed plus the engine speed for diagnosis.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- No signal from the speed (rpm) sensor.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Engine speed above 600 rpm.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

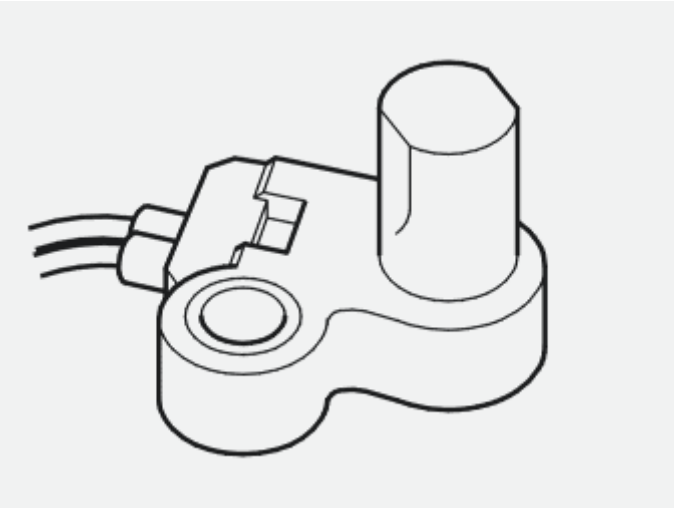


Fig. 225: Identifying Turbine/Input Shaft Speed Sensor
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance in the terminals.
- Transmission input speed sensor not fitted correctly.
- Transmission input speed sensor not working.

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- No lock-up
- Rough gear shift
- No gear shift

FAULT-TRACING

see **FAULT-TRACING**

TCM-P071800: TURBINE/INPUT SHAFT SPEED SENSOR A CIRCUIT INTERMITTENT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071800

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071800**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P071800: TURBINE/INPUT SHAFT SPEED SENSOR A CIRCUIT INTERMITTENT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071800

Condition

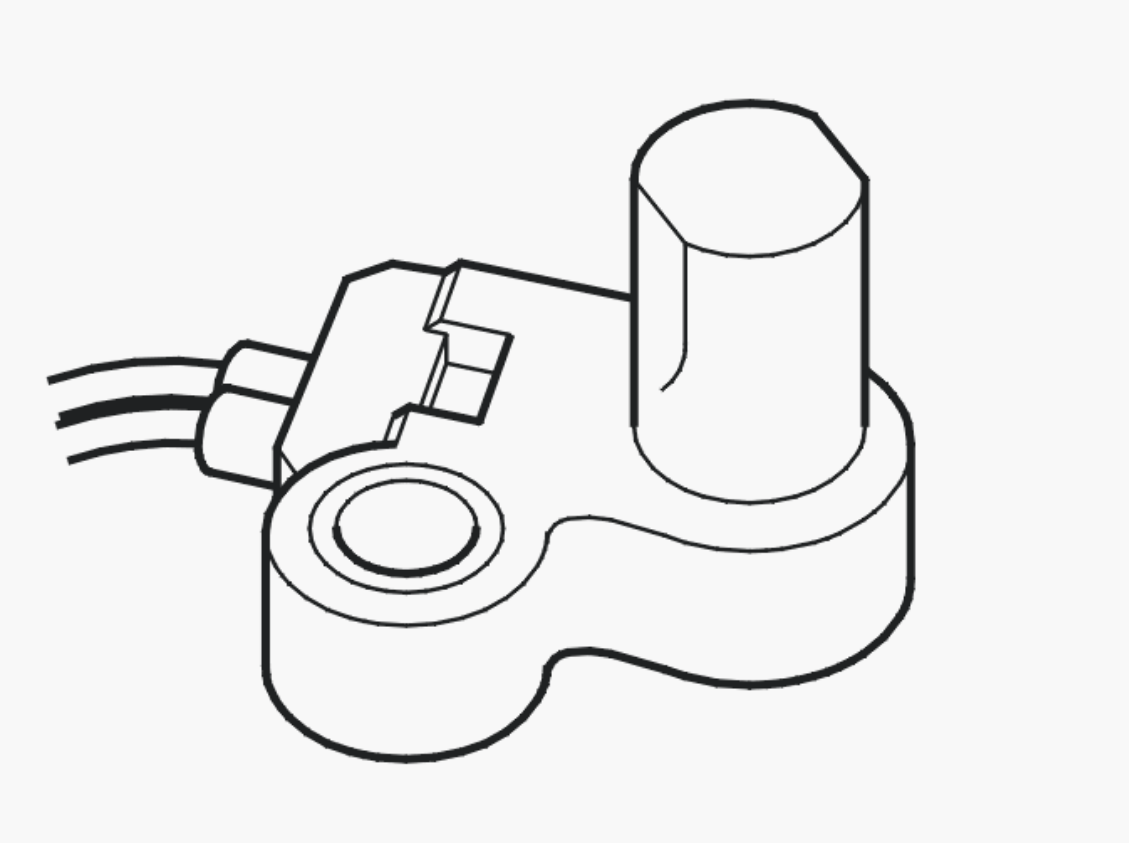


Fig. 226: Identifying Transmission Output Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The signal for the input speed comes from a sensor inside the transmission control system. The transmission control module (TCM) bases its calculation of the speed of the input shaft after the torque converter on this signal. The signal is used to compare the speed of the gearbox with the vehicle speed. Using this comparison, the control module can calculate the gear shifting points.

The information on RPM and speed affects the adjustment of the system pressure (control of the lock-up function) and the reduction of the engine torque when changing gear. This results in smoother gear changes. The information is also used to control the lock-up function.

The transmission control module (TCM) calculates and compares also the gearbox input speed and output speed plus the engine speed for diagnosis.

If the transmission control module (TCM) registers that the signal from the speed sensor is missing, the diagnostic trouble code (DTC) will be generated.

The diagnostic trouble code (DTC) can be diagnosed at engine speeds above 600 rpm.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals
- Gearbox input speed sensor not fitted correctly.
- Gearbox input speed sensor not working.

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- No lock-up function.
- Harsh gear changing
- No gear changing.

FAULT TRACING

see **FAULT TRACING**

TCM-P071800: TURBINE/INPUT SHAFT SPEED SENSOR A CIRCUIT INTERMITTENT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071800

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P071800**

FAULT TRACING

see **FAULT TRACING**

TCM-P072000: OUTPUT SHAFT SPEED SENSOR CIRCUIT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072000

Condition

The transmission's output speed sensor sends the transmission control module (TCM) a signal on the speed of the output drive shaft. Using this signal, the control module calculates the outgoing speed of the transmission. The signal is compared to the input speed signal from the transmission speed sensor and is used to calculation the transmission's gear ratio and for diagnostics.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Circuit for transmission speed sensor is open.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Normal driving above 30 km/h (about 20 mph).

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code is stored when the conditions are met.

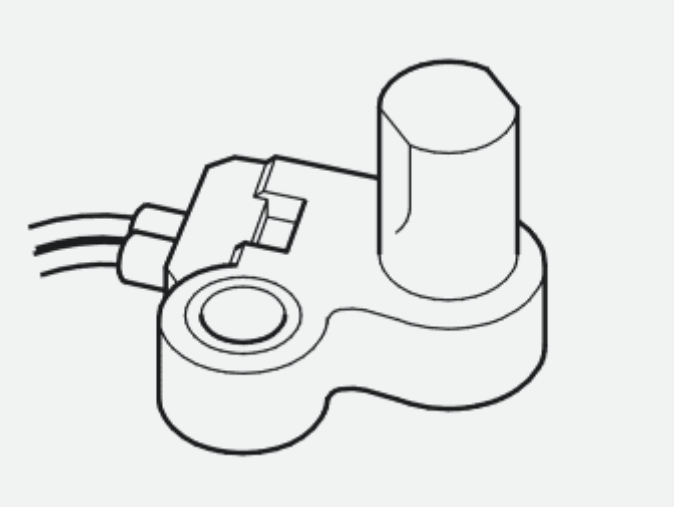


Fig. 227: Identifying Turbine/Input Shaft Speed Sensor
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Adaptation function is blocked.

- function is blocked.
- Slip lock-up function is blocked.
- Neutral check function is blocked.
- The transmission control module (TCM) uses the speed signal that the brake control module (BCM) puts on the CAN network.
- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Open circuit in power supply or signal lead.
- Power supply or signal cable is short circuited to supply voltage.
- Transmission output speed sensor not working.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- No lock-up
- Rough gear shift

FAULT-TRACING

CHECKS

CHECKING THE FUNCTION

WARNING: Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

CAUTION: On vehicles with four-wheel-drive, the tests should be carried out with the vehicle raised so that all four wheels can rotate freely with attachments far out on the link arms so that the drive shafts are not damaged.

NOTE: If the vehicle has TRACS or TC (STC, DSTC), this function must be disabled. This is carried out by removing the fuse for the brake system pump motor in the engine compartment relay and fusebox. Note that this will generate diagnostic trouble codes in the brake control module (BCM). These diagnostic trouble codes must be erased before the vehicle is returned to the customer.

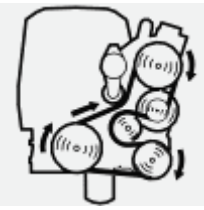


Fig. 228: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Raise the vehicle so that the drive wheels can rotate freely.
- Start the engine. Allow the engine to idle.
- Shift the gear selector to position D so that the drive wheels begin to rotate.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

Read off the transmission output speed.

Check that the transmission speed is updated.

If the transmission input speed updates correctly it means that the fault was present previously but is not active now. There is an intermittent fault.

If the transmission input speed does not update correctly it means that the fault is permanent.

Fig. 229: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING THE WIRING AND SENSORS**

CHECKING THE WIRING AND SENSORS

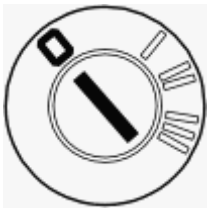


Fig. 230: Identifying Ignition In Off Position
Courtesy of VOLVO CARS CORPORATION

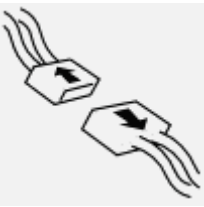


Fig. 231: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Disconnect the transmission connector.
- Transmission control module (TCM) disconnected.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

HINT: Check the transmission speed sensor. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If a faulty value is measured in the test above, open the control system for the transmission and fault trace the wiring and components.

If the wiring is faulty, replace the cable harness.

If the sensor is faulty, replace the transmission.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access connector B:**TRANSMISSION CONTROL MODULE (TCM)**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**

Select an alternative:

1. Transmission replaced.

   Refer to **VERIFICATION**

2. Cable harness replaced.

Refer to **RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER**

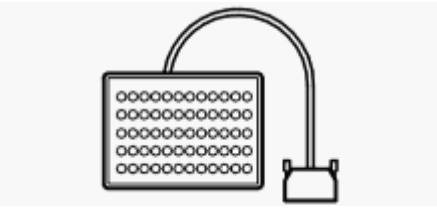


Fig. 232: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

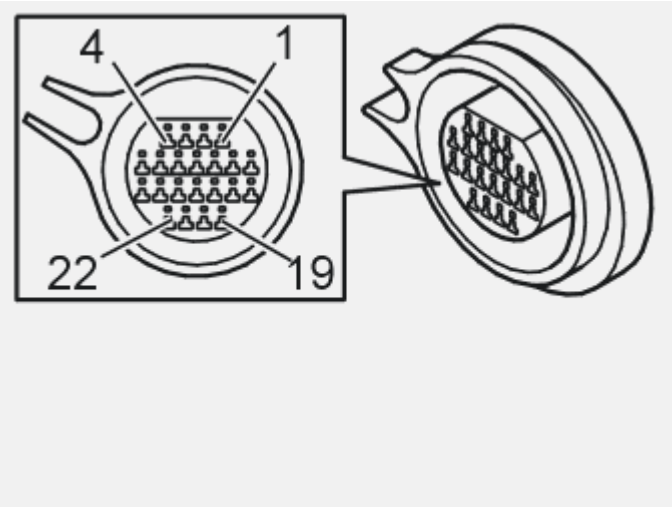


Fig. 233: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

CAUTION: On vehicles with four-wheel-drive, the tests should be carried out with the vehicle raised so that all four wheels can rotate freely with attachments far out on the link arms so that the drive shafts are not damaged.

WARNING: Ensure that the vehicle is safely raised. Check that no objects are caught

in the tire treads.

NOTE: If the vehicle has TRACS or TC (STC, DSTC), this function must be disabled. This is carried out by removing the fuse for the brake system pump motor in the engine compartment relay and fusebox. Note that diagnostic trouble codes will be generated in the brake control module (BCM). These must be erased before the vehicle is returned to the customer.

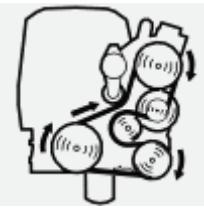


Fig. 234: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

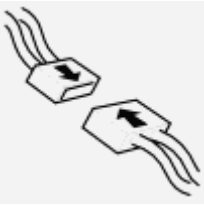


Fig. 235: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Raise the vehicle so that the drive wheels hang freely.
- Start the engine. Allow the engine to idle.
- Shift the gear selector to position D so that the drive wheels begin to rotate.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

- Read off the transmission output speed.

  Check that the transmission speed is updated.

NOTE: Diagnostic trouble codes may be stored in the brake control module (BCM) when the back wheels are stationary and the front wheels rotate.

Fig. 236: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER

CHECKING THE FUNCTION

HINT: The transmission control module (TCM) has a counter for fluid quality that counts the number of times the transmission is subjected to too hard a load or too high an ambient temperature. If the counter is not reset during draining/replacement, there is a risk that a diagnostic trouble code will be set under the wrong conditions. Thus, it is important that the counter for transmission fluid change be reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

Fig. 237: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the counter.

Fig. 238: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P072000: OUTPUT SHAFT SPEED SENSOR CIRCUIT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072000**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P072000: OUTPUT SHAFT SPEED SENSOR CIRCUIT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072000

Condition

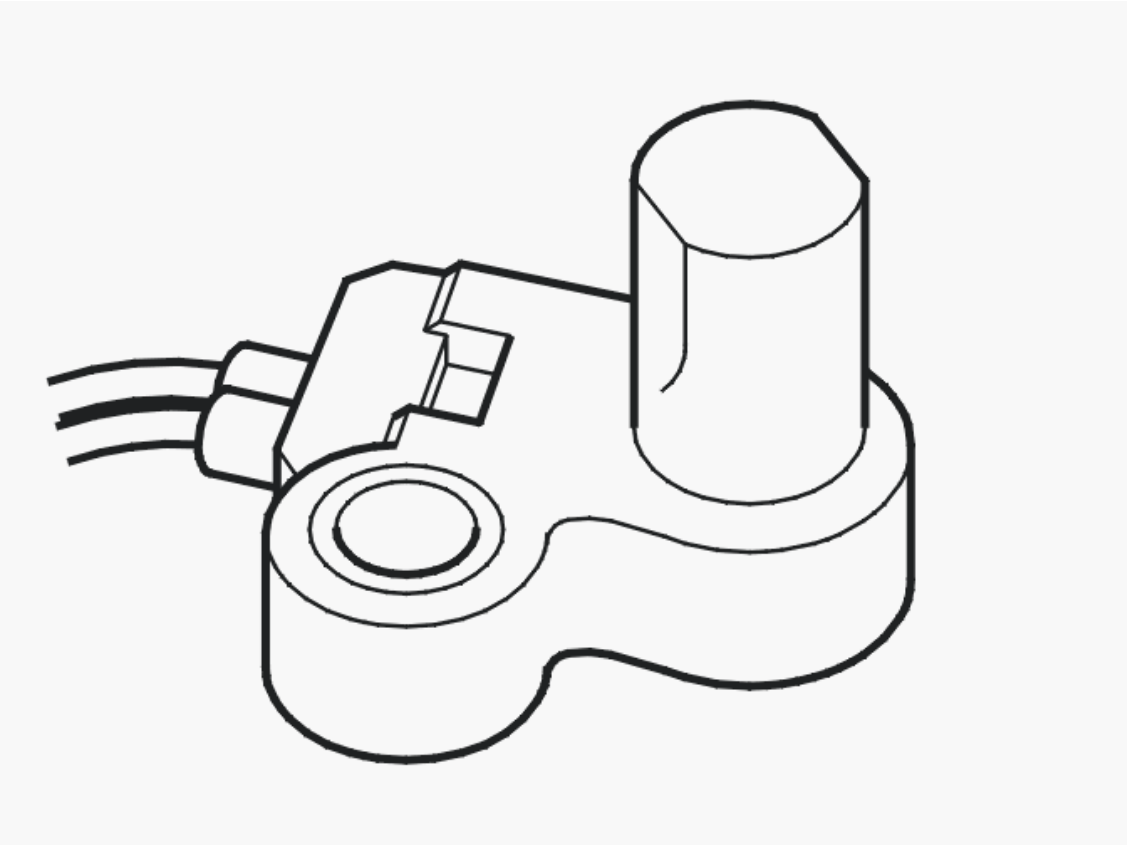


Fig. 239: Identifying Transmission Output Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The gearbox output speed sensor gives the transmission control module (TCM) a signal on the speed of the output drive shaft. Using this signal, the control module can calculate the output speed of the gearbox. The signal is compared with a signal from the gearbox input speed sensor and is used to calculate the gear ratio of the gearbox as well as for diagnosis. If the control module registers that the circuit to the gearbox speed sensor is open, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code (DTC) can be diagnosed during normal driving above 30 km/h.

Substitute Value

- Adaptation function is blocked.
- Lock-up function is blocked.
- Slip lock-up function is blocked.
- Neutral check function is blocked.
- The transmission control module (TCM) uses the speed signal that the brake control module (BCM) puts on the CAN network.
- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Open circuit in power supply or signal lead.
- Power supply or signal lead short-circuited to voltage.
- Gearbox output speed sensor not working.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- No lock-up function.
- Harsh gear changing

FAULT TRACING TCM-P072000

CHECKS

CHECKING THE FUNCTION

WARNING: Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

CAUTION: On vehicles with four-wheel-drive, the tests should be carried out with the vehicle raised so that all four wheels can rotate freely with attachments far out on the link arms so that the drive shafts are not damaged.

NOTE: If the vehicle is equipped with TRACS or traction control (STC, DSTC) this function must be deactivated. Remove the fuse for the pump motor for the brake system in the relay/fusebox in the engine compartment. Note that this will store a diagnostic trouble code (DTC) in the brake control module (BCM). These diagnostic trouble codes (DTC) must be erased before delivery to the customer.

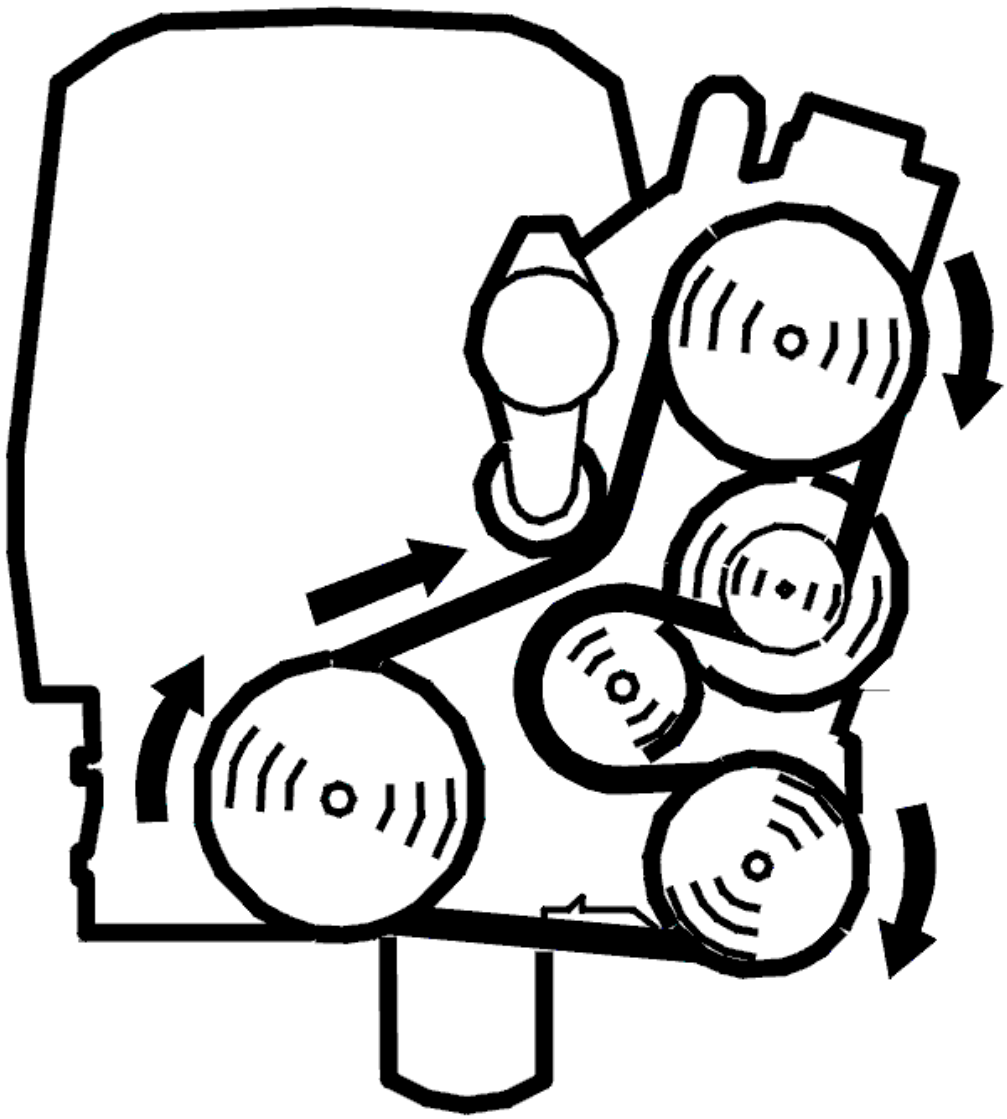


Fig. 240: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Raise the vehicle so that the drive wheels hang freely.
- Start the engine and allow it to idle.
- Put the gear selector in position D so that the drive wheels start to rotate.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

- Read off the gearbox output speed.

  Read off the transmission input speed.

  If the transmission input speed updates correctly it means that the fault was present previously but is not active now. There is an intermittent fault.

If the transmission input speed does not update correctly it means that the fault is permanent.

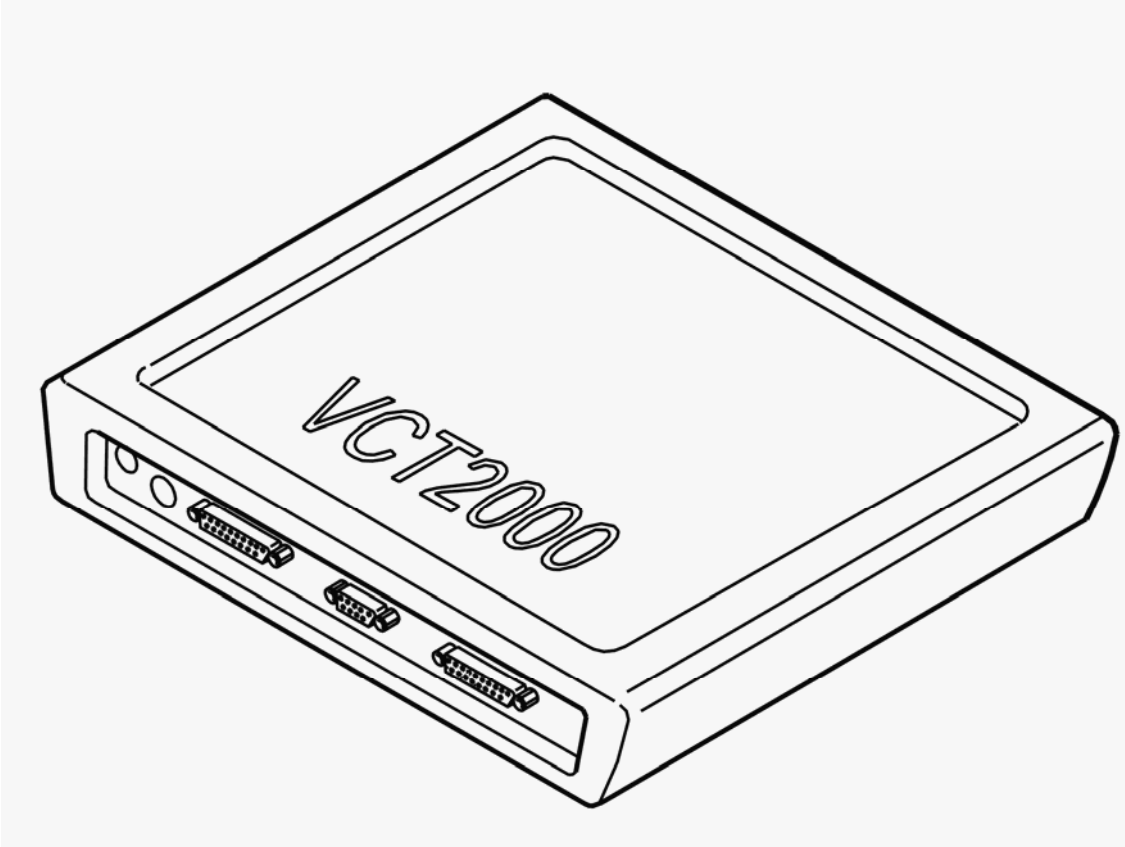


Fig. 241: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

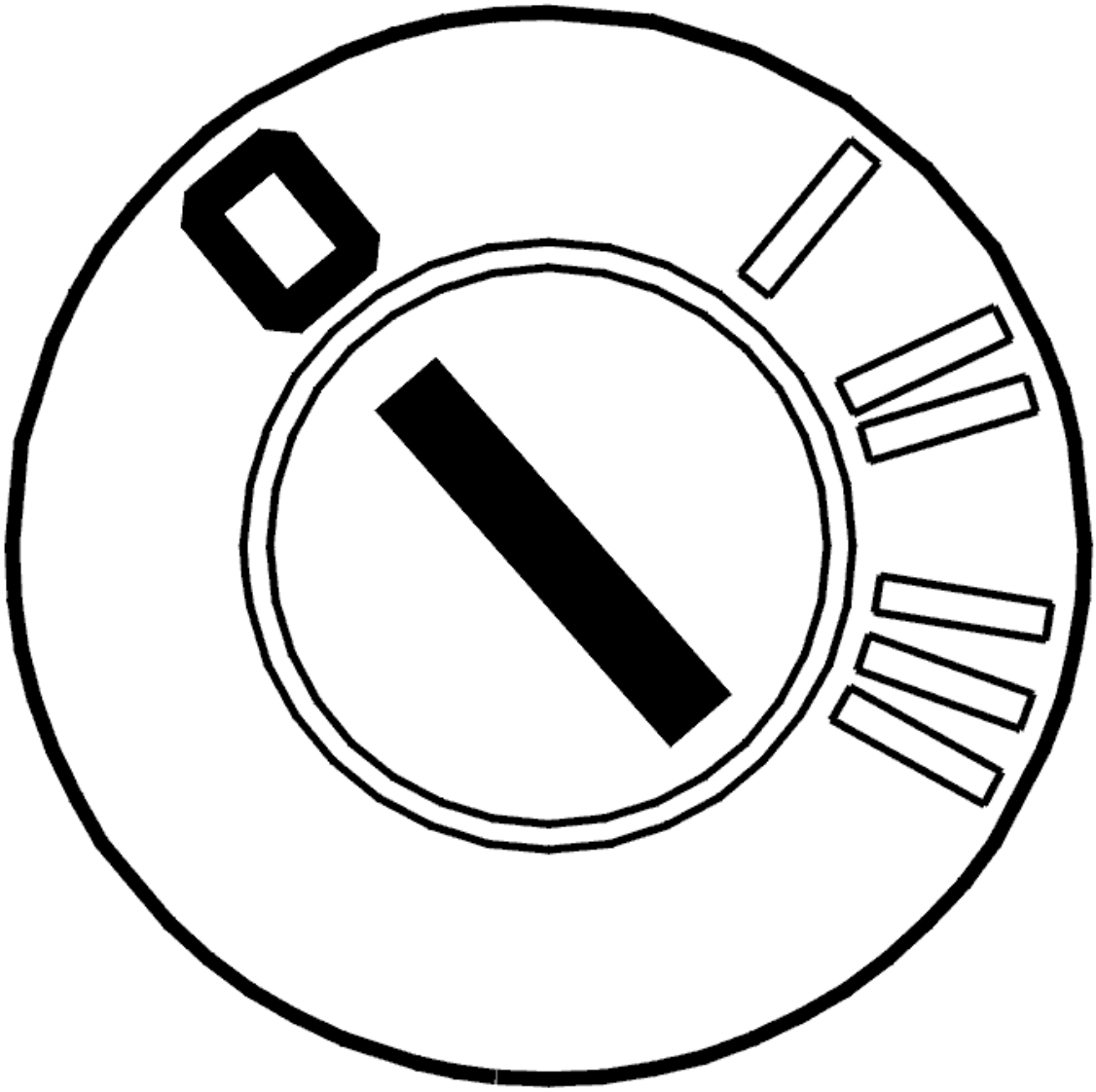


Fig. 242: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the connector for the transmission.
- Transmission control module (TCM) disconnected.
- Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  HINT: Check the transmission speed sensor. See CHECKING THE INPUT AND OUTPUT SPEED SENSORS FOR THE TRANSMISSION

  If any incorrect value was measured in the test above, open the transmission's control system and troubleshoot cables and component for open circuit or short-circuit to voltage.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **REPLACING THE GEARBOX**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**

Select an alternative:

1. Transmission replaced

   Refer to **VERIFICATION**

2. Cable harness replaced.

   Refer to **RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE**

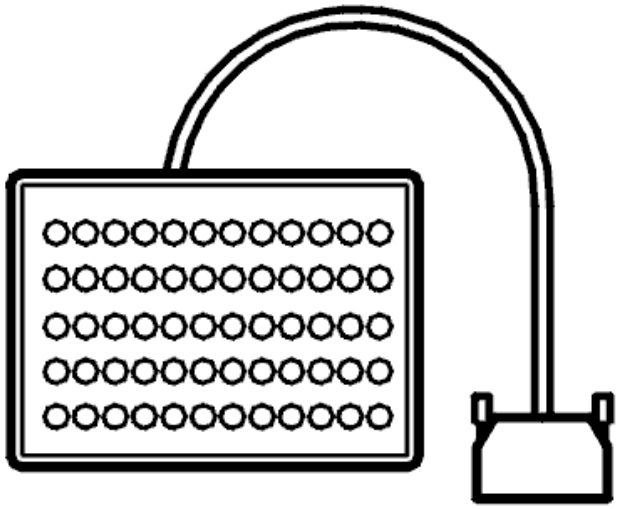


Fig. 243: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

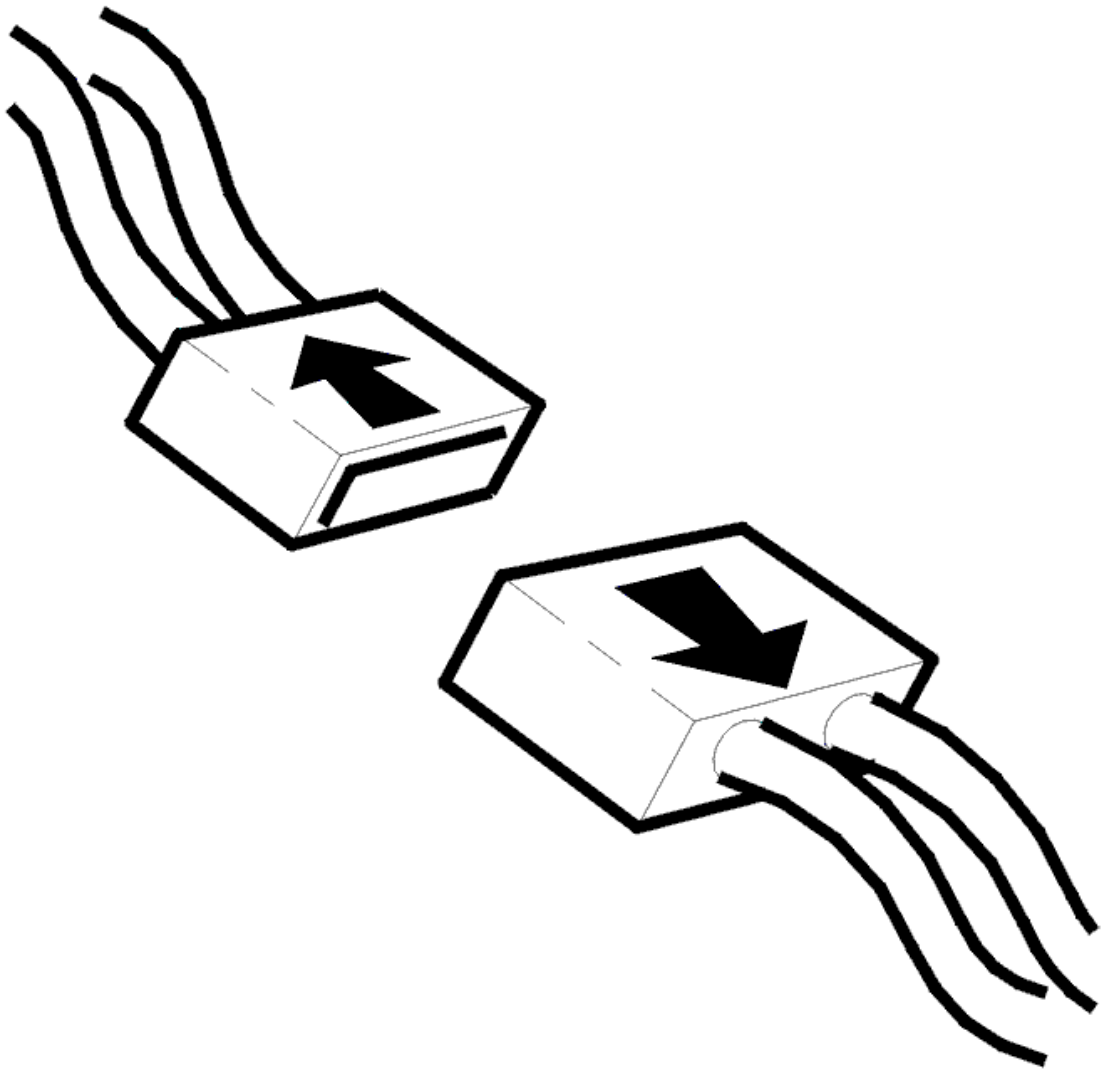


Fig. 244: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

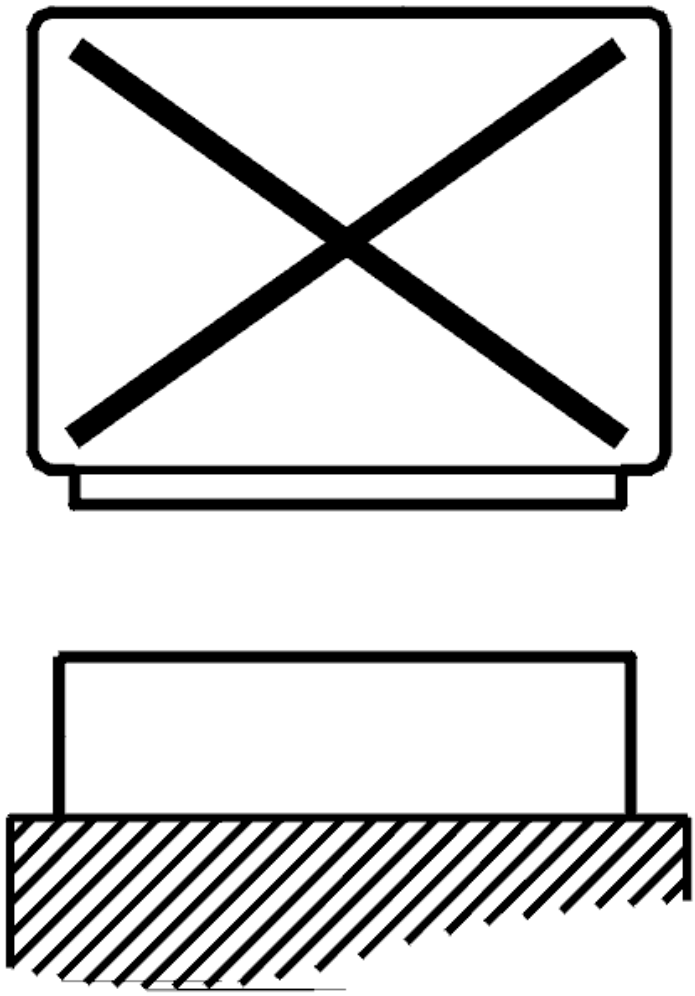


Fig. 245: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

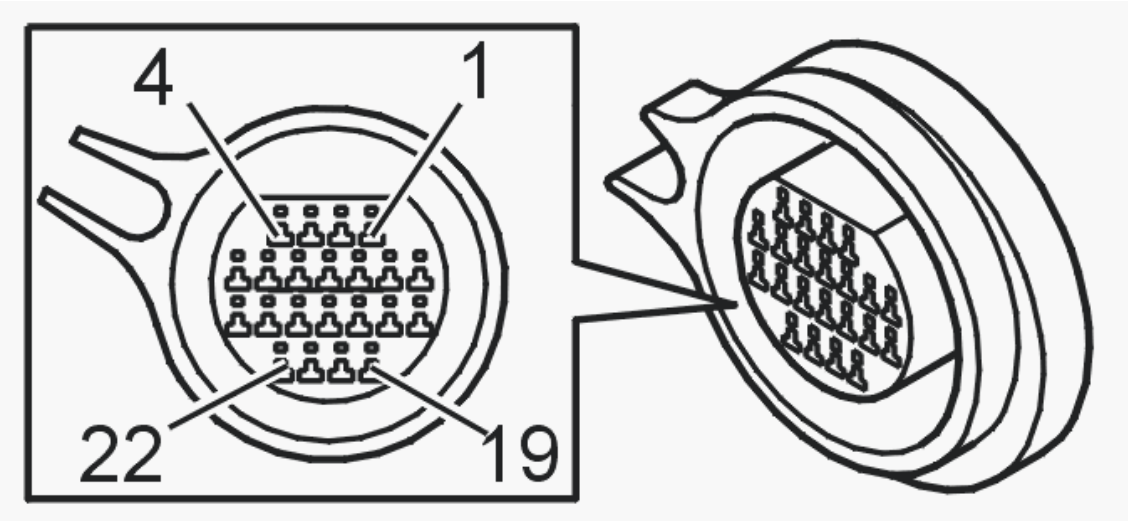


Fig. 246: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE

RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE

HINT: The transmission control module (TCM) has a counter for the oil's quality that counts up when the transmission is exposed to very heavy loads or high ambient temperature. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions. That is why it is important that the counter for Transmission oil, change is reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

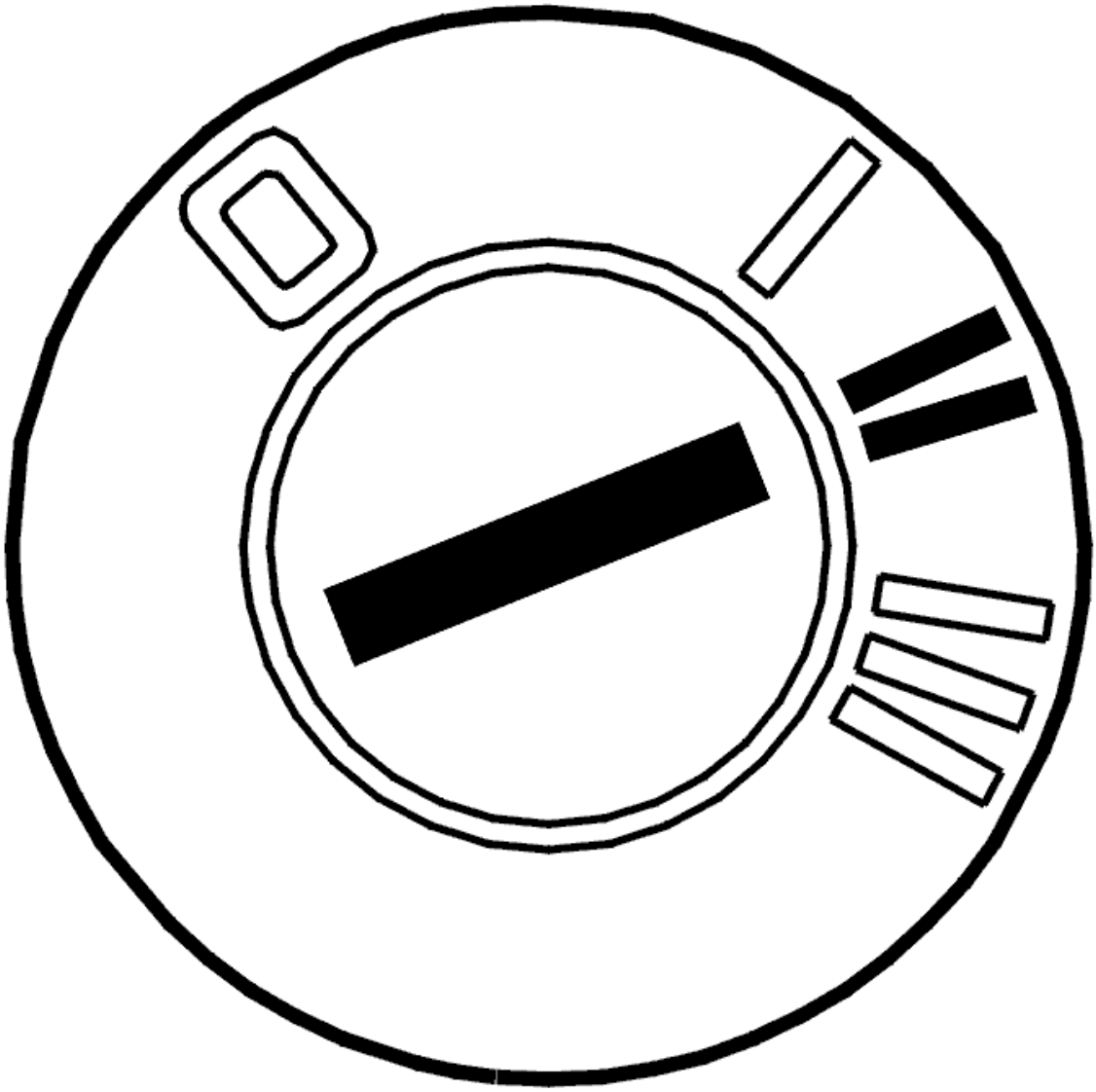


Fig. 247: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the counter by clicking on the symbol for VCT2000.

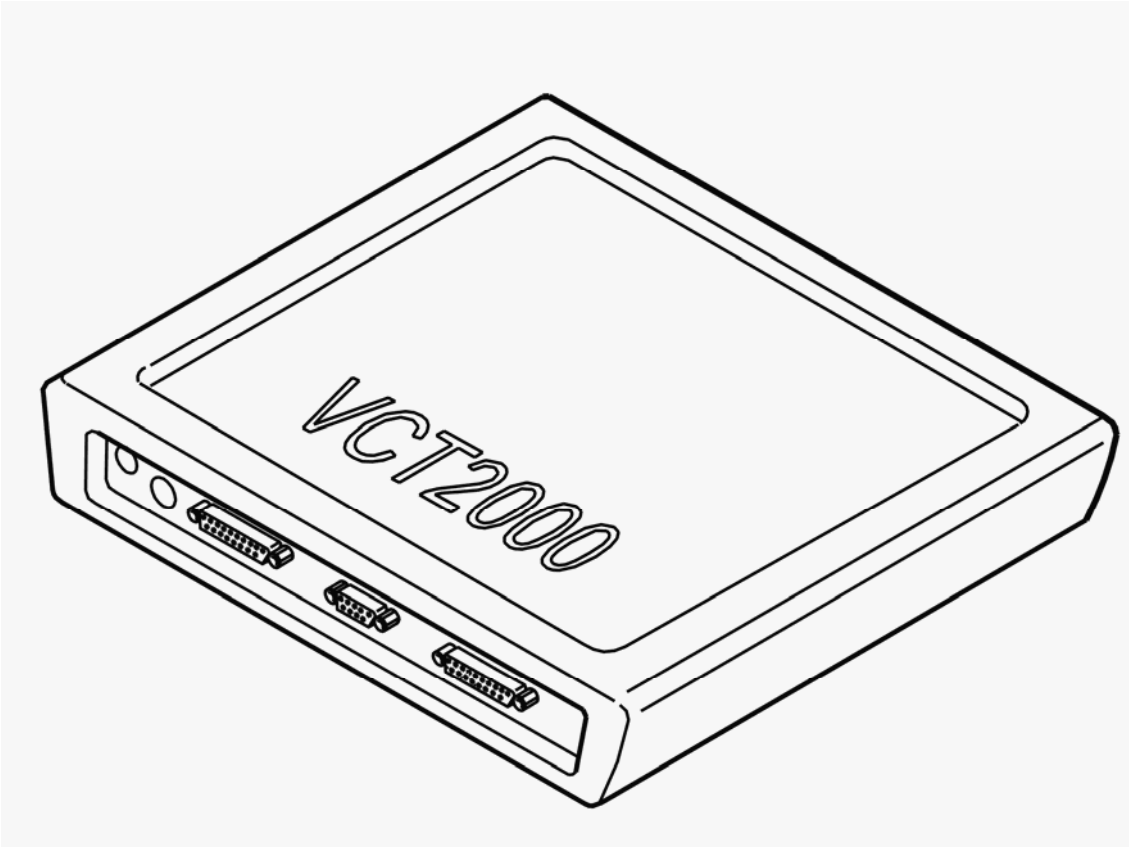


Fig. 248: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

CAUTION: On vehicles with four-wheel-drive, the tests should be carried out with the vehicle raised so that all four wheels can rotate freely with attachments far out on the link arms so that the drive shafts are not damaged.

WARNING: Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

NOTE: If the vehicle is equipped with TRACS (traction control system) or Traction Control (DSTC (Dynamic stability and traction control), STC (Stability and traction control) the function must be deactivated. This is carried out by

removing the fuse for the brake system pump motor in the engine compartment relay and fusebox. Note that diagnostic trouble codes (DTCs) will be stored in the brake control module (BCM). These must be erased before returning the vehicle to the customer.

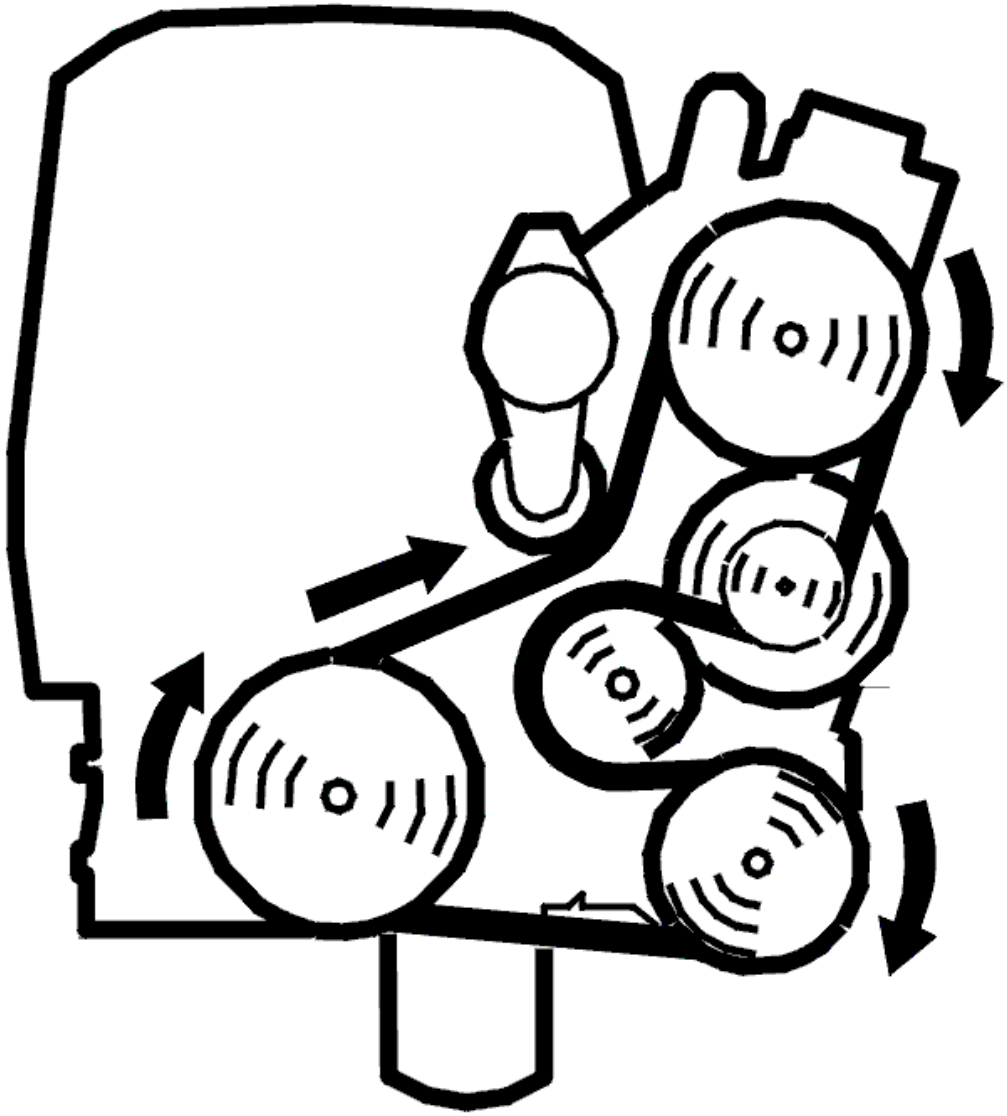


Fig. 249: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

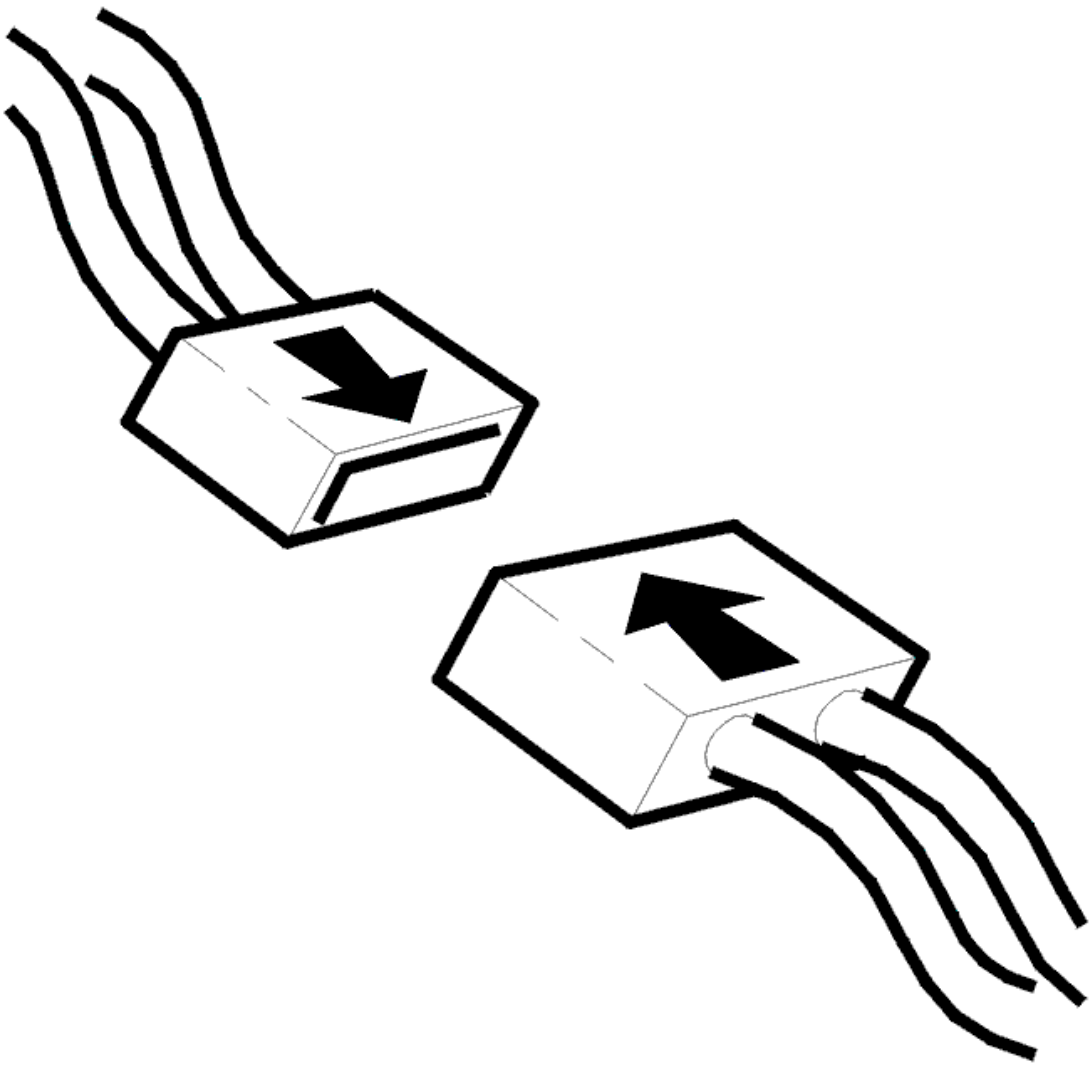


Fig. 250: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the connectors, components etc.
- Raise the vehicle so that the drive wheels hang freely.
- Start the engine and allow it to idle.
- Put the gear selector in position D so that the drive wheels start to rotate.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

- Read off the gearbox output speed.

  Check that the speed is updated.

NOTE: Diagnostic trouble codes (DTCs) may be stored in the brake control module (BCM) when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) after fault-tracing.

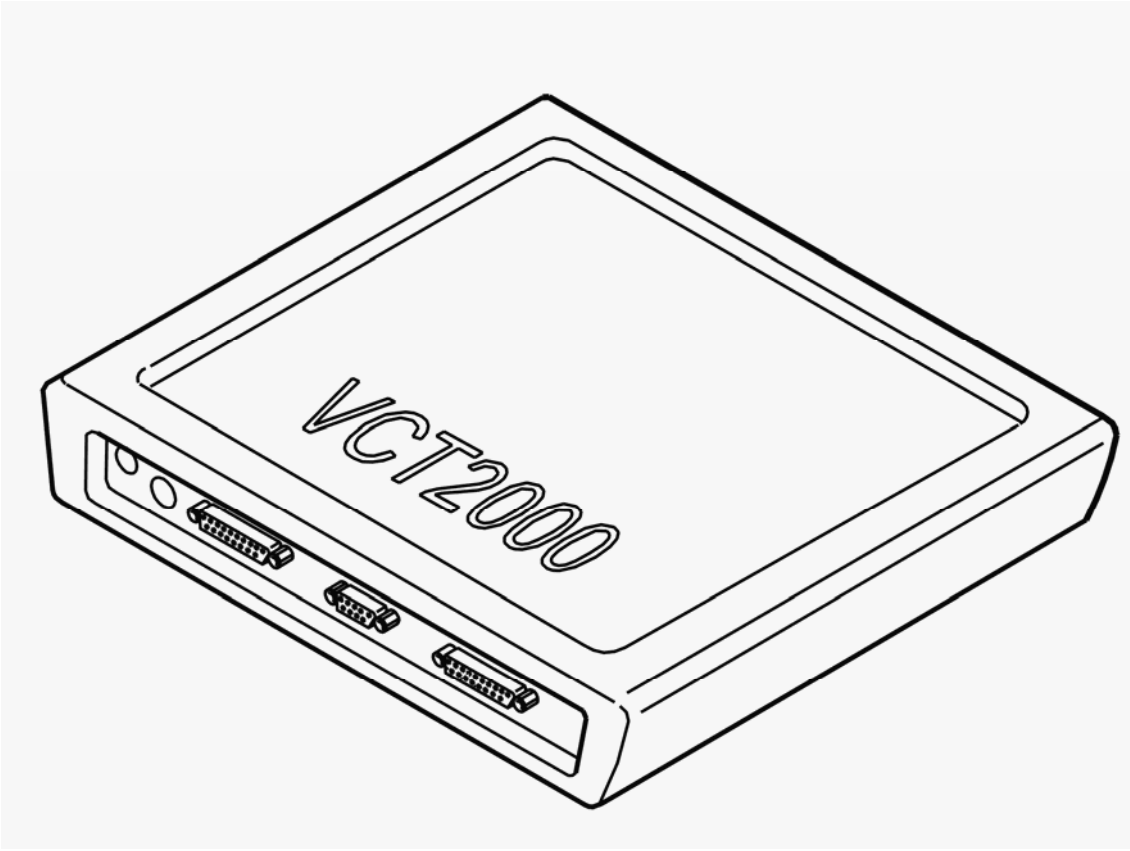


Fig. 251: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the rpm updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P072000: OUTPUT SHAFT SPEED SENSOR CIRCUIT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072000**

FAULT TRACING TCM-P072000

see **FAULT TRACING TCM-P072000**

TCM-P072100: OUTPUT SHAFT SPEED SENSOR CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072100

Condition

The transmission's output speed sensor sends the transmission control module (TCM) a signal on the speed of the output drive shaft. Using this signal, the control module calculates the outgoing speed of the transmission. The signal is compared to the input speed signal from the transmission speed sensor and is used to calculation the transmission's gear ratio and for diagnostics.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The speed signal from the brake control module (BCM) does not match the signal from the output speed sensor.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Speed higher than 30 km/h (20 mph) and engine speed over 400 rpm.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code is stored when the conditions are met.

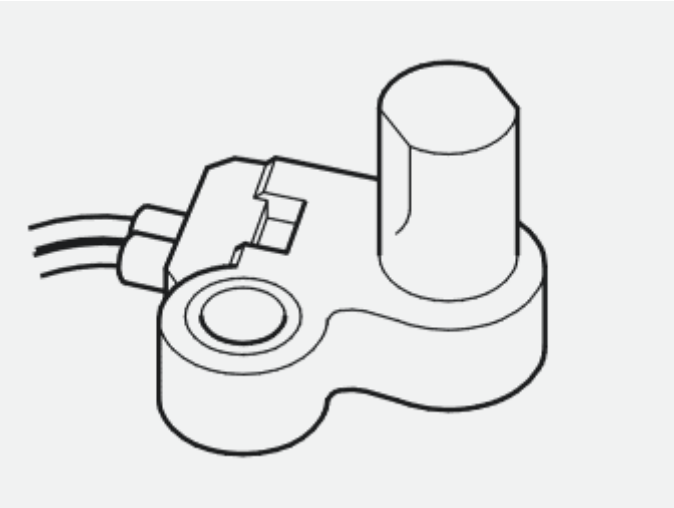


Fig. 252: Identifying Turbine/Input Shaft Speed Sensor
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Adaptation function is blocked.
- function is blocked.
- Slip lock-up function is blocked.
- Neutral check function is blocked.
- The transmission control module (TCM) uses the speed signal that the brake control module (BCM) puts on the CAN network.
- If the speed signal from the brake control module (BCM) is also missing, the auxiliary program **Emergency mode 1** in the transmission control module (TCM) will become active.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance in the terminals.
- Transmission output speed sensor not fitted correctly.
- Transmission output speed sensor not working.
- The wheel radius does not agree with the wheel radius programmed in the vehicle's configuration file.

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- No lock-up
- Rough gear shift
- No gear shift

FAULT-TRACING

FAULT-TRACING INFORMATION

NOTE: The diagnostic trouble code may have been caused by the wheel radius not matching with the radius that is programmed in the vehicle's configuration file.

If needed, check the programmed value in the central electronic module (CEM).

- **Continue**

  Refer to **CHECKING THE FUNCTION**

CHECKING THE FUNCTION

WARNING: Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

CAUTION: On vehicles with four-wheel-drive, the tests should be carried out with the vehicle raised so that all four wheels can rotate freely with attachments far out on the link arms so that the drive shafts are not damaged.

NOTE: If the vehicle has TRACS or TC (STC, DSTC), this function must be disabled. This is carried out by removing the fuse for the brake system pump motor in the engine compartment relay and fusebox. Note that this will generate diagnostic trouble codes in the brake control module (BCM). These diagnostic trouble codes must be erased before the vehicle is returned to the customer.

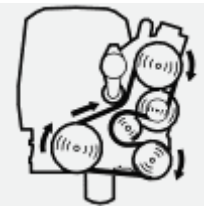


Fig. 253: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Raise the vehicle so that the drive wheels can rotate freely.
- Start the engine. Allow the engine to idle.
- Shift the gear selector to position D so that the drive wheels begin to rotate.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

Read off the transmission output speed.

Check that the transmission speed is updated.

If the transmission input speed updates correctly it means that the fault was present previously but is not active now. There is an intermittent fault.

If the transmission input speed does not update correctly it means that the fault is permanent.

Fig. 254: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE WIRING AND SENSORS**

CHECKING THE WIRING AND SENSORS

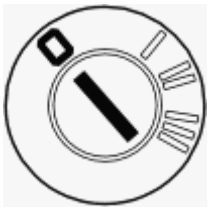


Fig. 255: Identifying Ignition In Off Position
Courtesy of VOLVO CARS CORPORATION

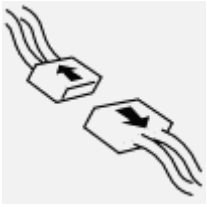


Fig. 256: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Disconnect the transmission connector.
- Transmission control module (TCM) disconnected.

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

HINT: Check the transmission speed sensor. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If a faulty value is measured in the test above, open the control system for the transmission and fault trace the wiring and components.

If the wiring is faulty, replace the cable harness.

If the sensor is faulty, replace the transmission.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access connector B:**TRANSMISSION CONTROL MODULE (TCM)**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**

Select an alternative:

1. Transmission replaced.

   Refer to **VERIFICATION**

2. Cable harness replaced.

   Refer to **RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER**

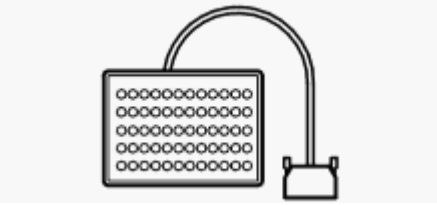


Fig. 257: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

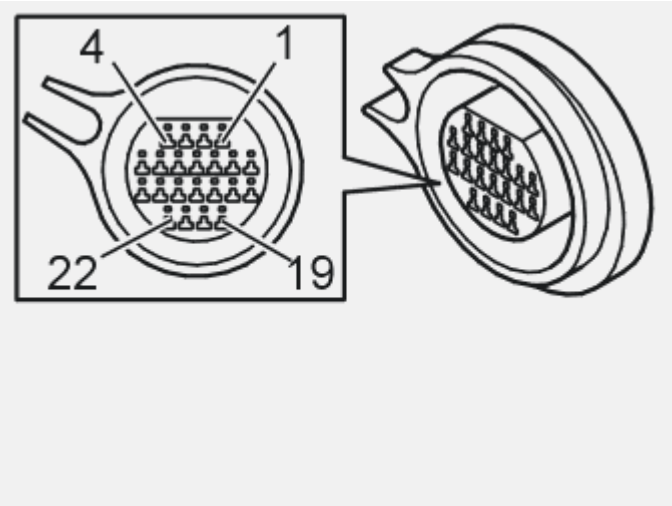


Fig. 258: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

CAUTION: On vehicles with four-wheel-drive, the tests should be carried out with the vehicle raised so that all four wheels can rotate freely with attachments far out on the link arms so that the drive shafts are not damaged.

WARNING: Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

NOTE: If the vehicle has TRACS or TC (STC, DSTC), this function must be disabled. This is carried out by removing the fuse for the brake system pump motor in the engine compartment relay and fusebox. Note that diagnostic trouble codes will be generated in the brake control module (BCM). These must be erased before the vehicle is returned to the customer.

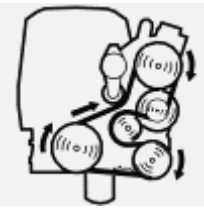


Fig. 259: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

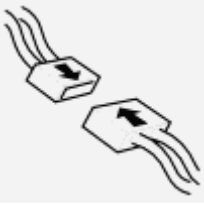


Fig. 260: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Raise the vehicle so that the drive wheels hang freely.
- Start the engine. Allow the engine to idle.
- Shift the gear selector to position D so that the drive wheels begin to rotate.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

- Read off the transmission output speed.

  Check that the transmission speed is updated.

NOTE: Diagnostic trouble codes may be stored in the brake control module (BCM) when the back wheels are stationary and the front wheels rotate.

Fig. 261: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER

CHECKING THE FUNCTION

HINT: The transmission control module (TCM) has a counter for fluid quality that counts the number of times the transmission is subjected to too hard a load or too high an ambient temperature. If the counter is not reset during draining/replacement, there is a risk that a diagnostic trouble code will be set under the wrong conditions. Thus, it is important that the counter for transmission fluid change be reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

Fig. 262: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the counter.

Fig. 263: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P072100: OUTPUT SHAFT SPEED SENSOR CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-

2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072100**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P072100: OUTPUT SHAFT SPEED SENSOR CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072100

Condition

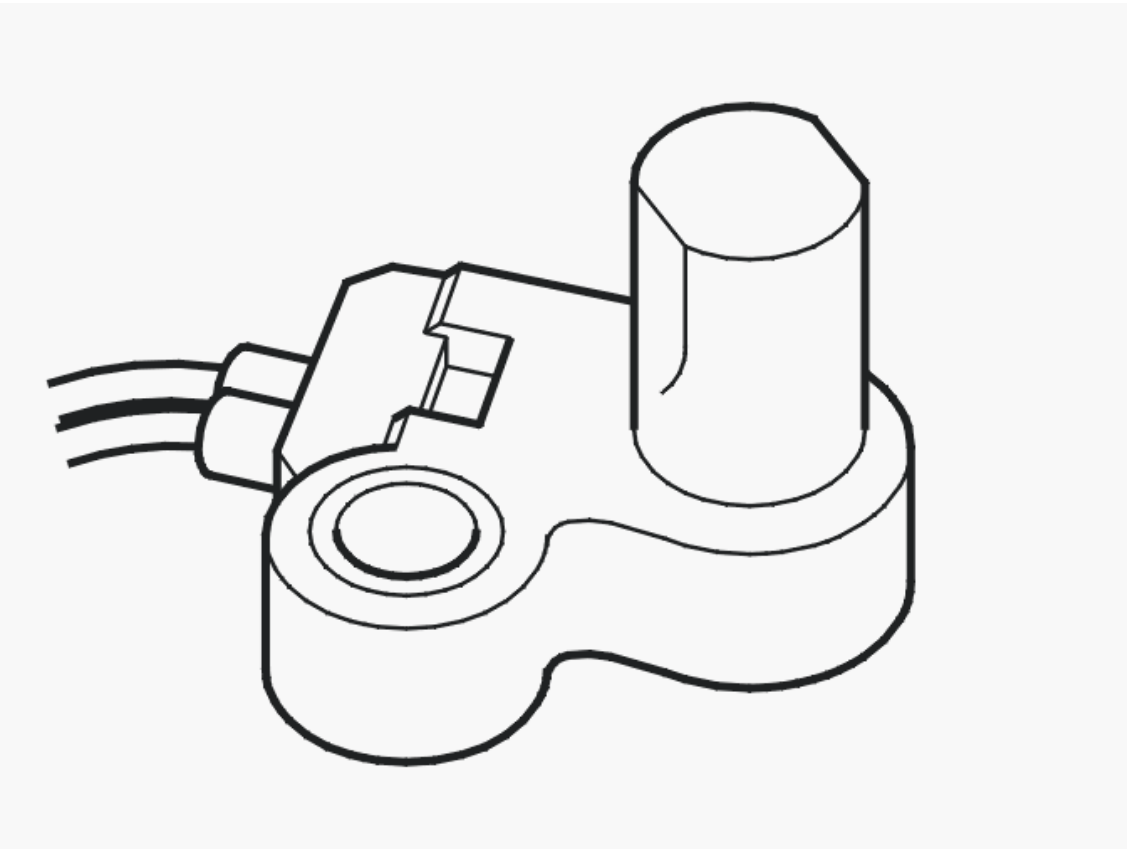


Fig. 264: Identifying Transmission Output Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The gearbox output speed sensor gives the transmission control module (TCM) a signal on the speed of the output drive shaft. Using this signal, the control module can calculate the output speed of the gearbox. The

signal is compared with a signal from the gearbox input speed sensor and is used to calculate the gear ratio of the gearbox as well as for diagnosis.

If the transmission control module (TCM) registers that the speed signal from the brake control module (BCM) does not agree with the signal from the output speed sensor, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code (DTC) can be diagnosed at speeds above approximately 30 km/h and engine speeds above 400 rpm.

Substitute Value

- Adaptation function is blocked.
- Lock-up function is blocked.
- Slip lock-up function is blocked.
- Neutral check function is blocked.
- The transmission control module (TCM) uses the speed signal that the brake control module (BCM) puts on the CAN network.
- If the speed signal from the brake control module (BCM) is also missing, the auxiliary program **Emergency mode 1** in the transmission control module (TCM) will become active.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals
- Gearbox output speed sensor not fitted correctly.
- Gearbox output speed sensor not working.
- The wheel radius does not agree with the wheel radius programmed in the vehicle's configuration file.

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- No lock-up function.
- Harsh gear changing
- No gear changing.

FAULT TRACING

FAULT-TRACING INFORMATION

NOTE: The diagnostic trouble code may have been caused by the wheel radius not matching with the radius that is programmed in the vehicle's configuration file.

If needed, check the programmed value in the central electronic module (CEM).

- **Continue**

Refer to **CHECKING THE FUNCTION**

CHECKING THE FUNCTION

WARNING: Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

CAUTION: On vehicles with four-wheel-drive, the tests should be carried out with the vehicle raised so that all four wheels can rotate freely with attachments far out on the link arms so that the drive shafts are not damaged.

NOTE: If the vehicle is equipped with TRACS or traction control (STC, DSTC) this function must be deactivated. Remove the fuse for the pump motor for the brake system in the relay/fusebox in the engine compartment. Note that this will store a diagnostic trouble code (DTC) in the brake control module (BCM). These diagnostic trouble codes (DTC) must be erased before delivery to the customer.

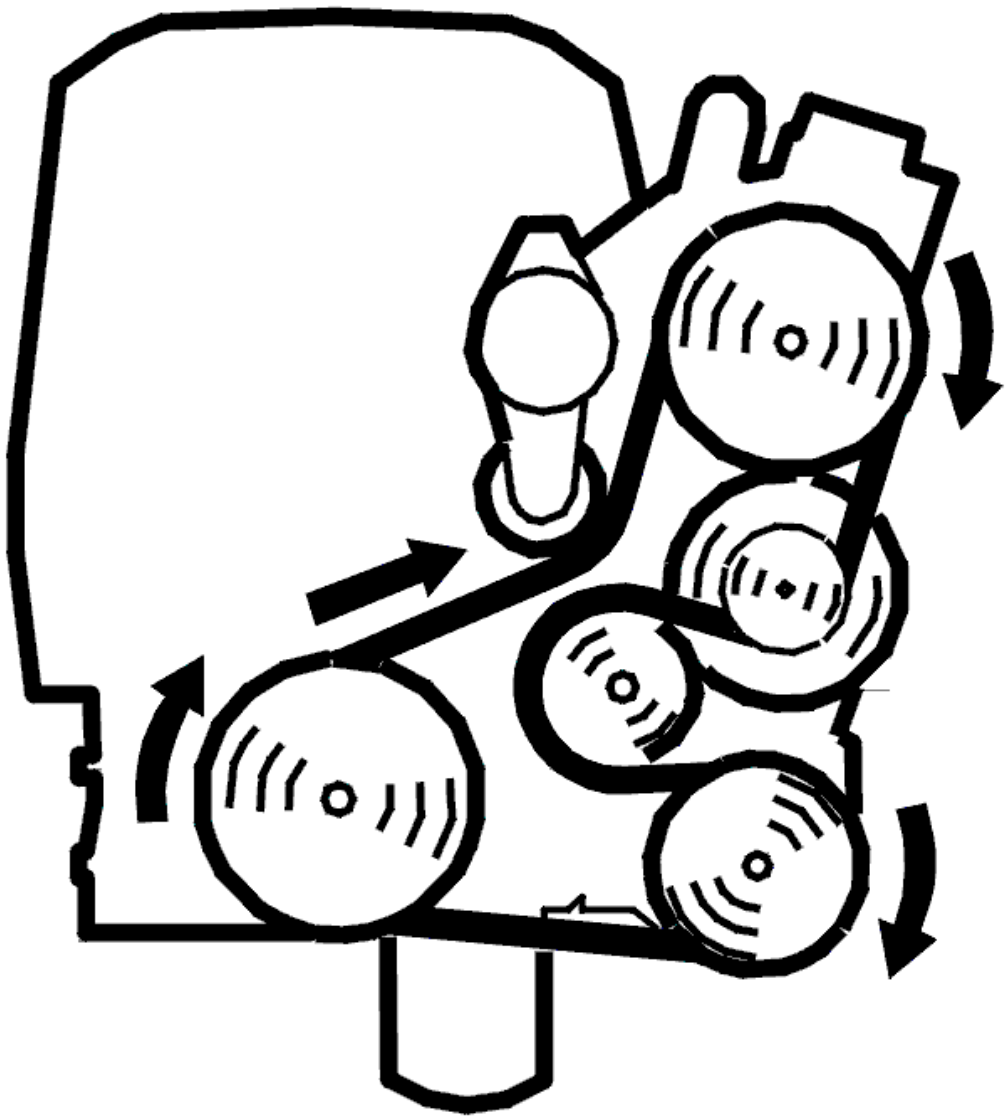


Fig. 265: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Raise the vehicle so that the drive wheels hang freely.
- Start the engine and allow it to idle.
- Put the gear selector in position D so that the drive wheels start to rotate.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

- Read off the gearbox output speed.

  Read off the transmission input speed.

  If the transmission input speed updates correctly it means that the fault was present previously but is not active now. There is an intermittent fault.

If the transmission input speed does not update correctly it means that the fault is permanent.

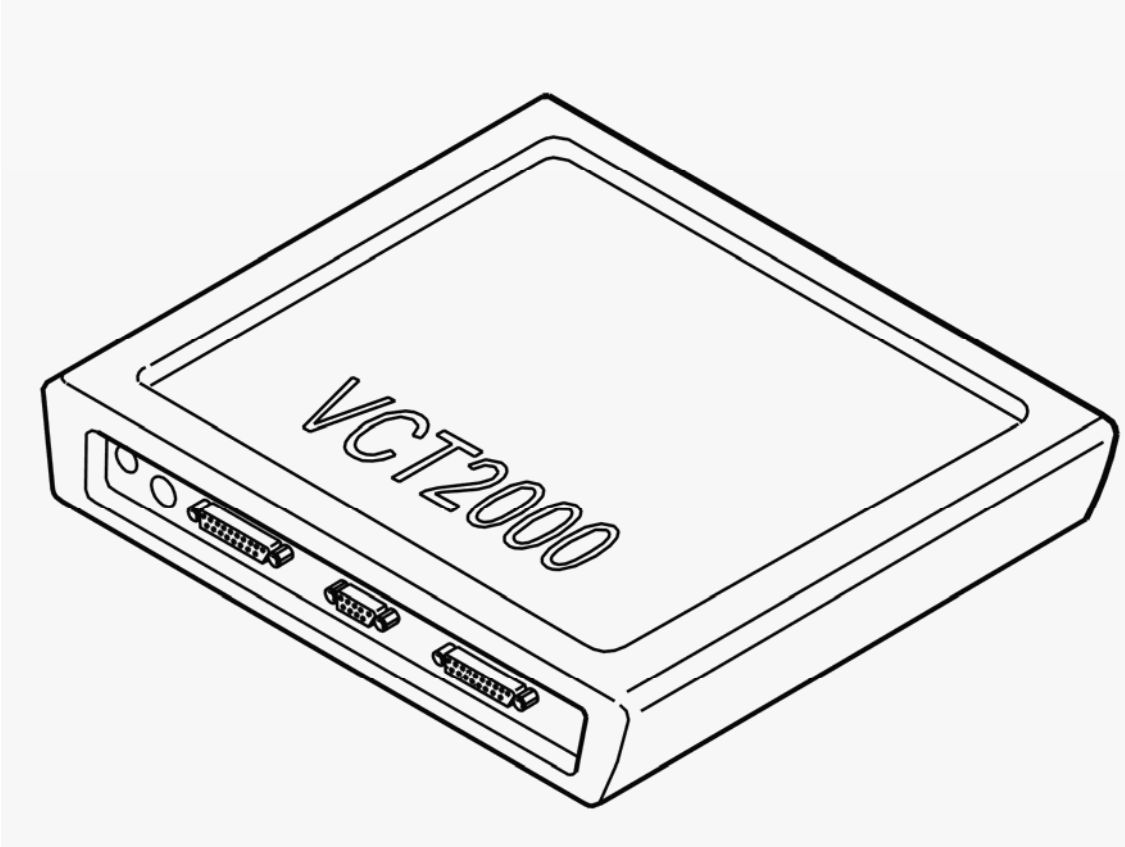


Fig. 266: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

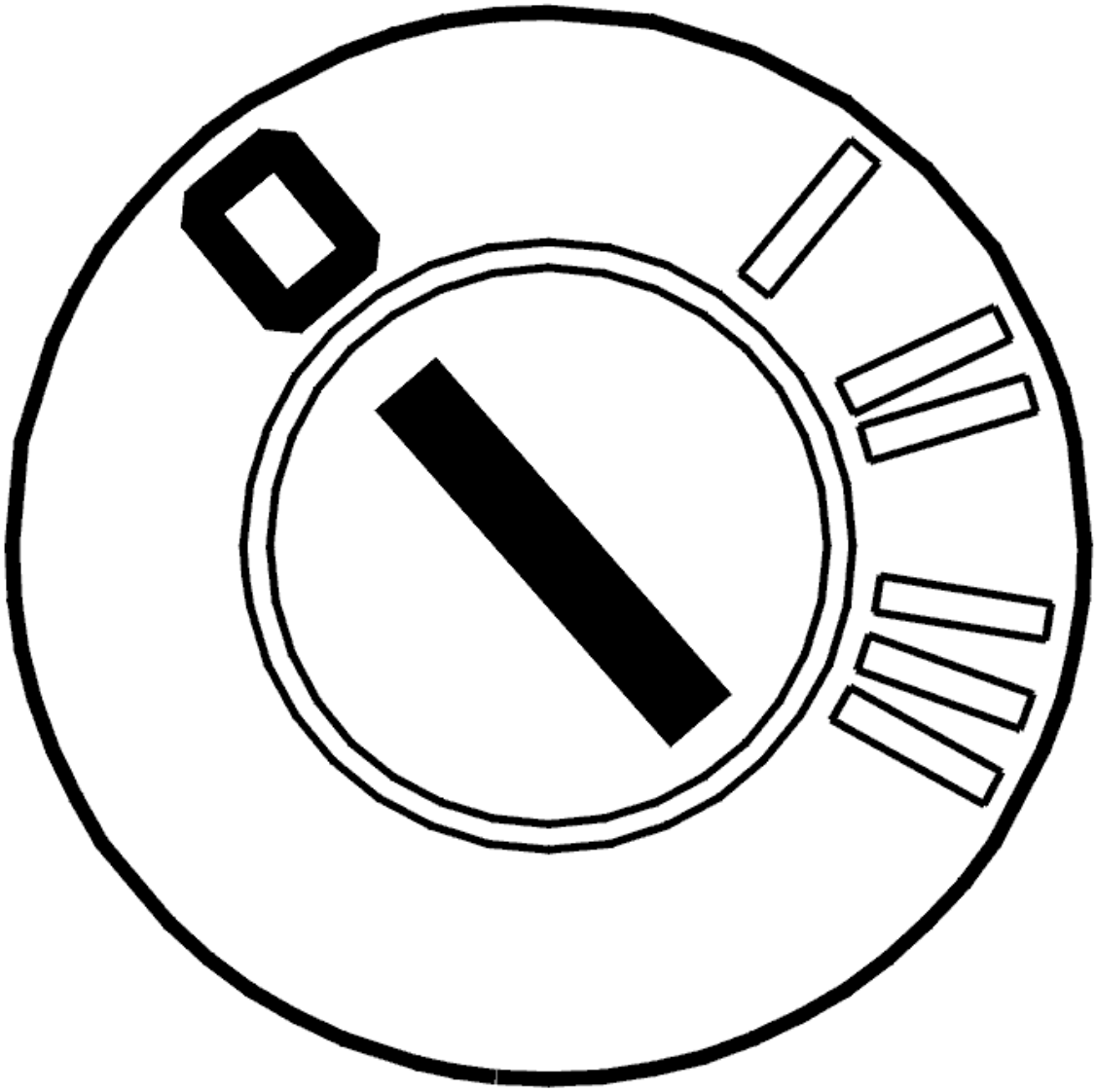


Fig. 267: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the connector for the transmission.
- Transmission control module (TCM) disconnected.
- Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  HINT: Check the transmission speed sensor. See CHECKING THE INPUT AND OUTPUT SPEED SENSORS FOR THE TRANSMISSION

  If any incorrect value was measured in the test above, open the transmission's control system and troubleshoot cables and component for open circuit or short-circuit to voltage.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **REPLACING THE GEARBOX**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**

Select an alternative:

1. Transmission replaced

   Refer to **VERIFICATION**

2. Transmission replaced

   Refer to **RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE**

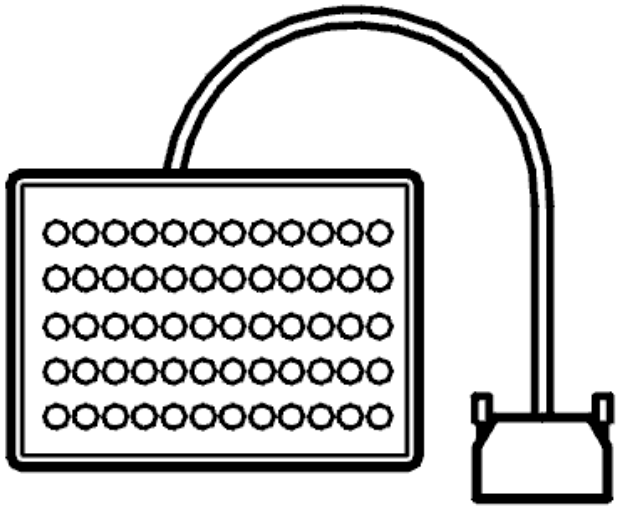


Fig. 268: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

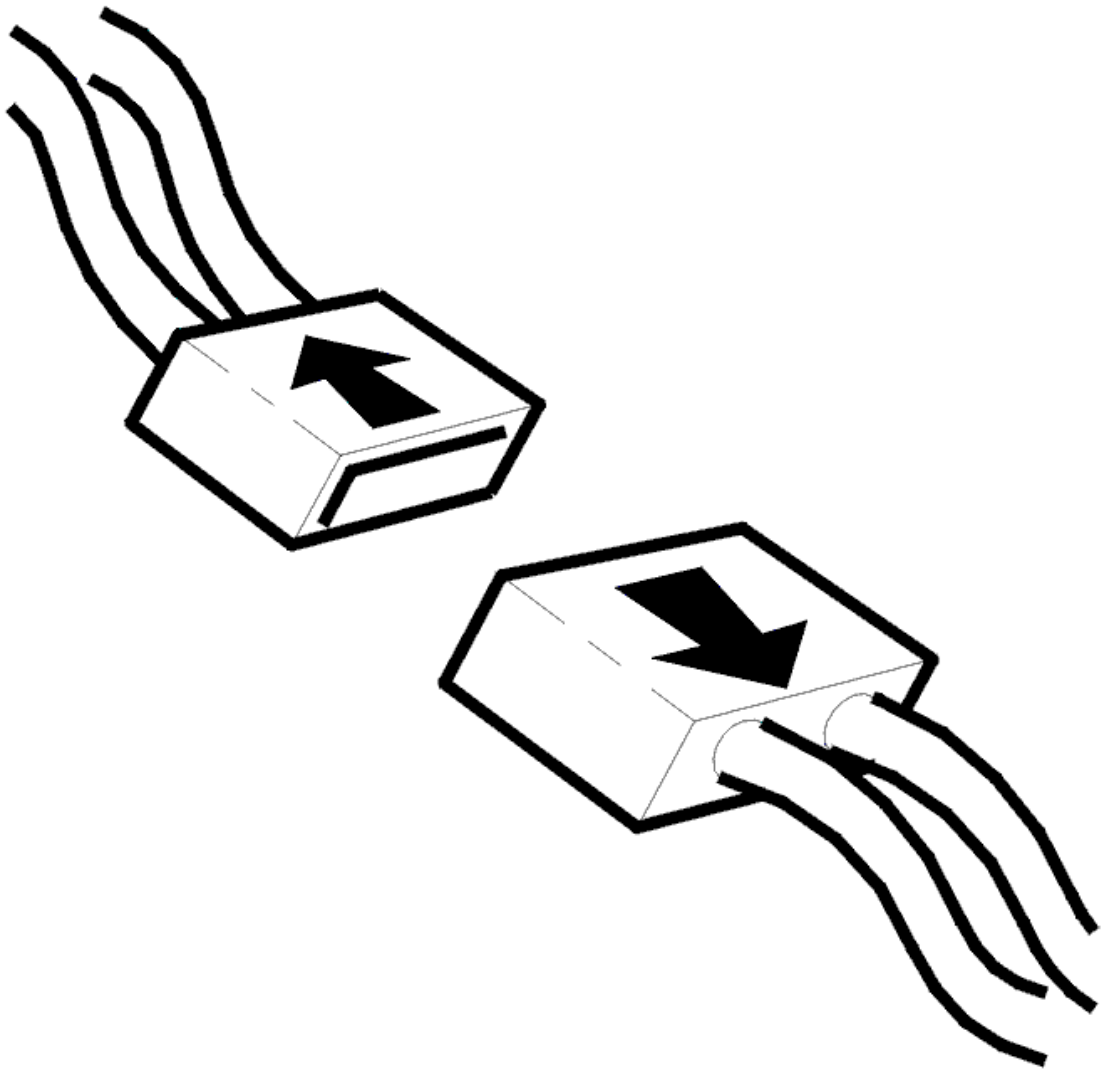


Fig. 269: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

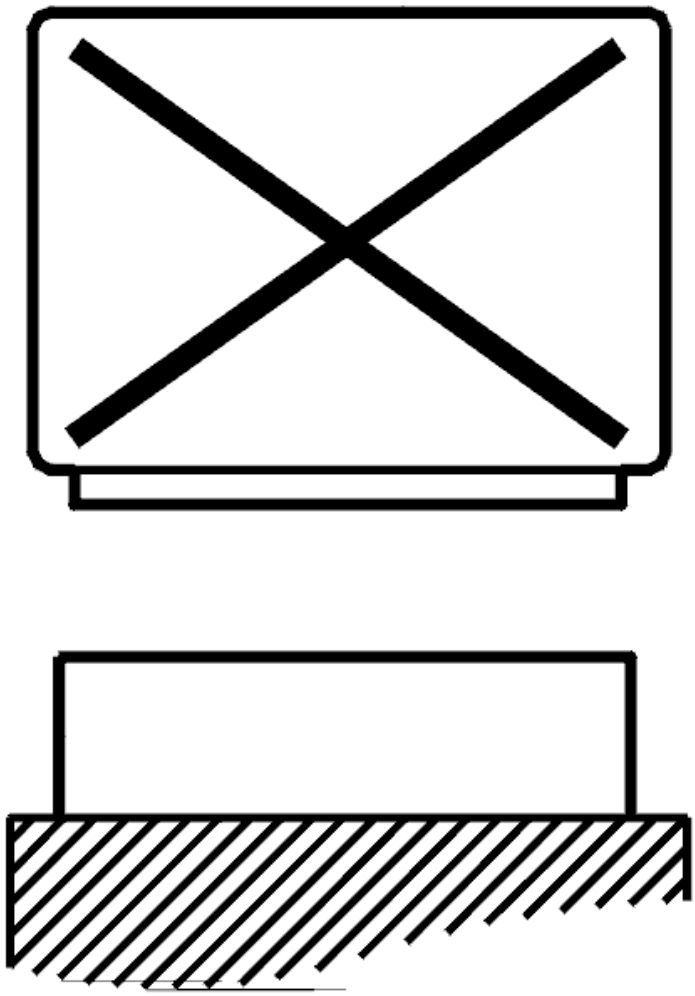


Fig. 270: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

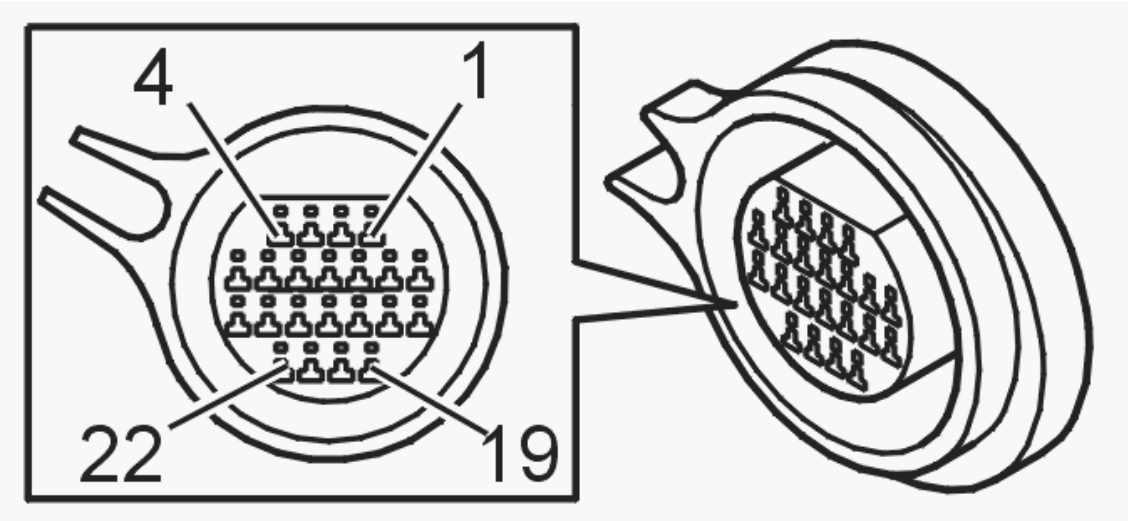


Fig. 271: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE

RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE

HINT: The transmission control module (TCM) has a counter for the oil's quality that counts up when the transmission is exposed to very heavy loads or high ambient temperature. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions. That is why it is important that the counter for Transmission oil, change is reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

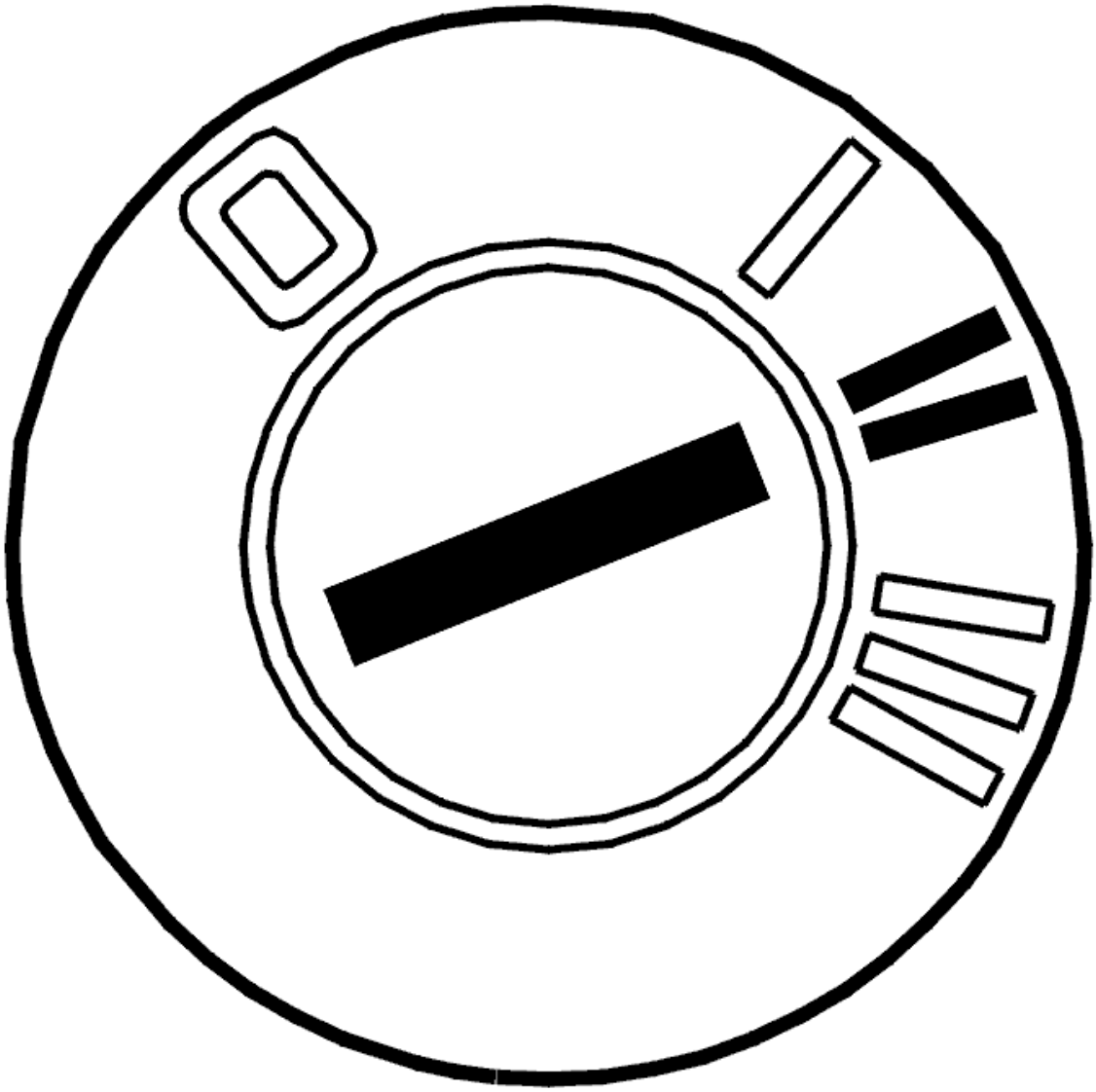


Fig. 272: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the counter by clicking on the symbol for VCT2000.

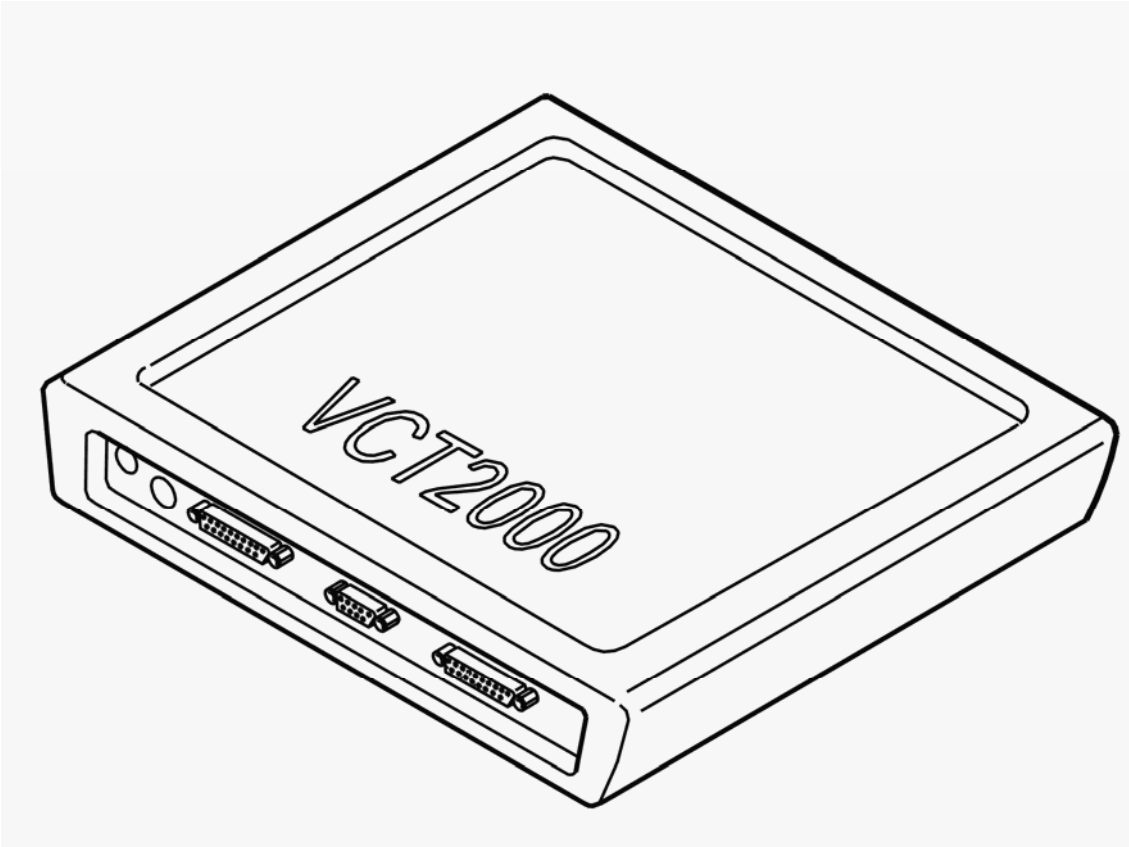


Fig. 273: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

CAUTION: On vehicles with four-wheel-drive, the tests should be carried out with the vehicle raised so that all four wheels can rotate freely with attachments far out on the link arms so that the drive shafts are not damaged.

WARNING: Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

NOTE: If the vehicle is equipped with TRACS (traction control system) or Traction Control (DSTC (Dynamic stability and traction control), STC (Stability and traction control) the function must be deactivated. This is carried out by

removing the fuse for the brake system pump motor in the engine compartment relay and fusebox. Note that diagnostic trouble codes (DTCs) will be stored in the brake control module (BCM). These must be erased before returning the vehicle to the customer.

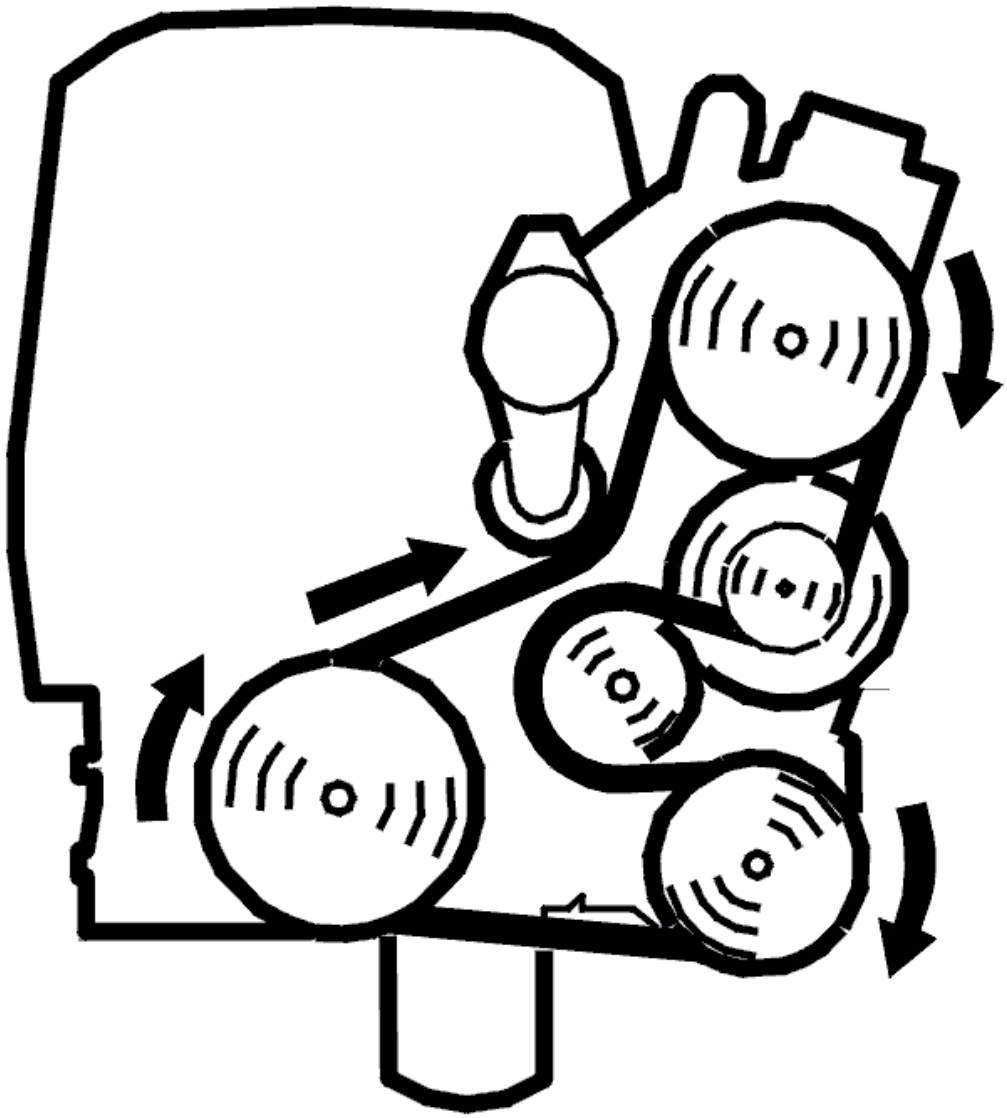


Fig. 274: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

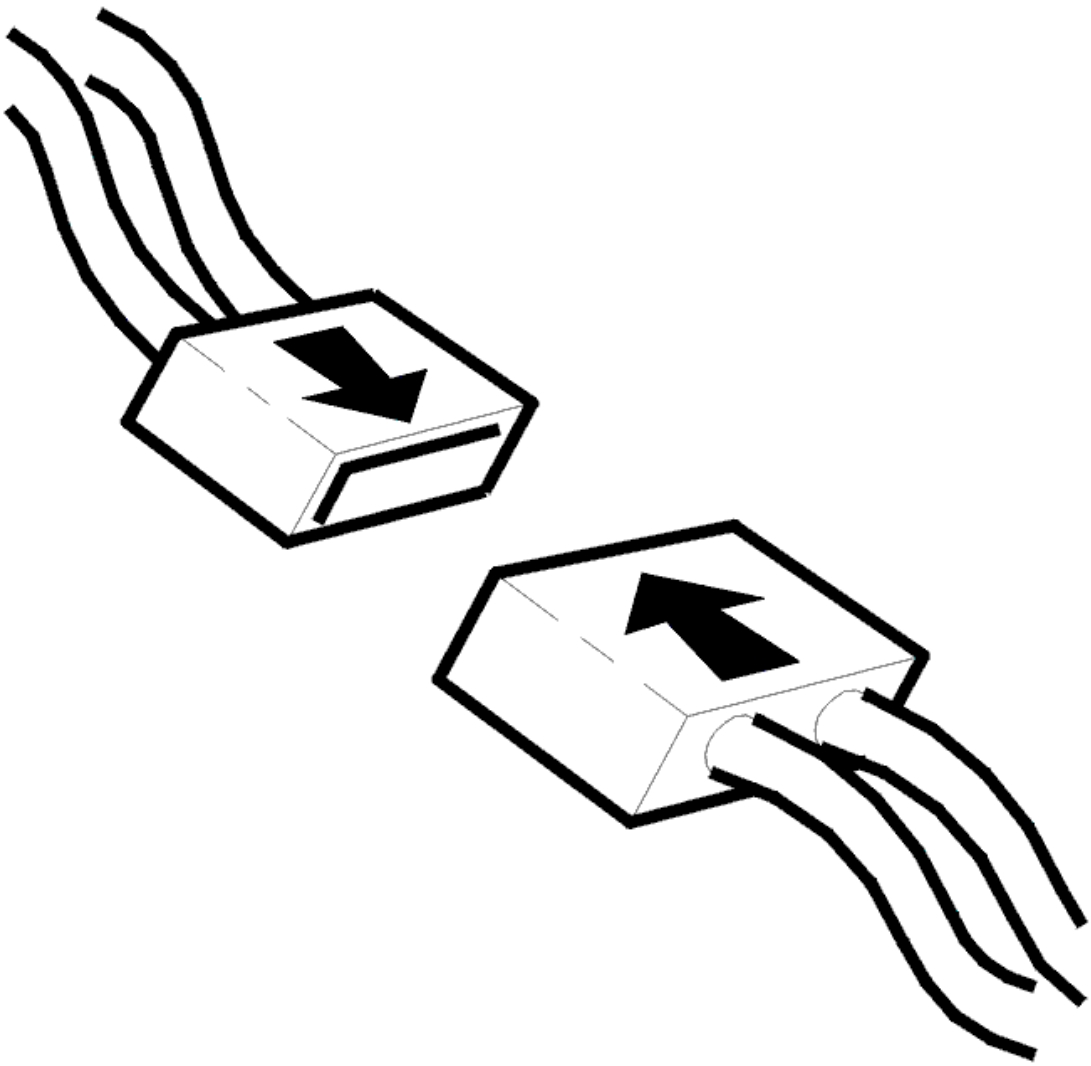


Fig. 275: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the connectors, components etc.
- Raise the vehicle so that the drive wheels hang freely.
- Start the engine and allow it to idle.
- Put the gear selector in position D so that the drive wheels start to rotate.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

- Read off the gearbox output speed.

  Check that the speed is updated.

NOTE: Diagnostic trouble codes (DTCs) may be stored in the brake control module (BCM) when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) after fault-tracing.

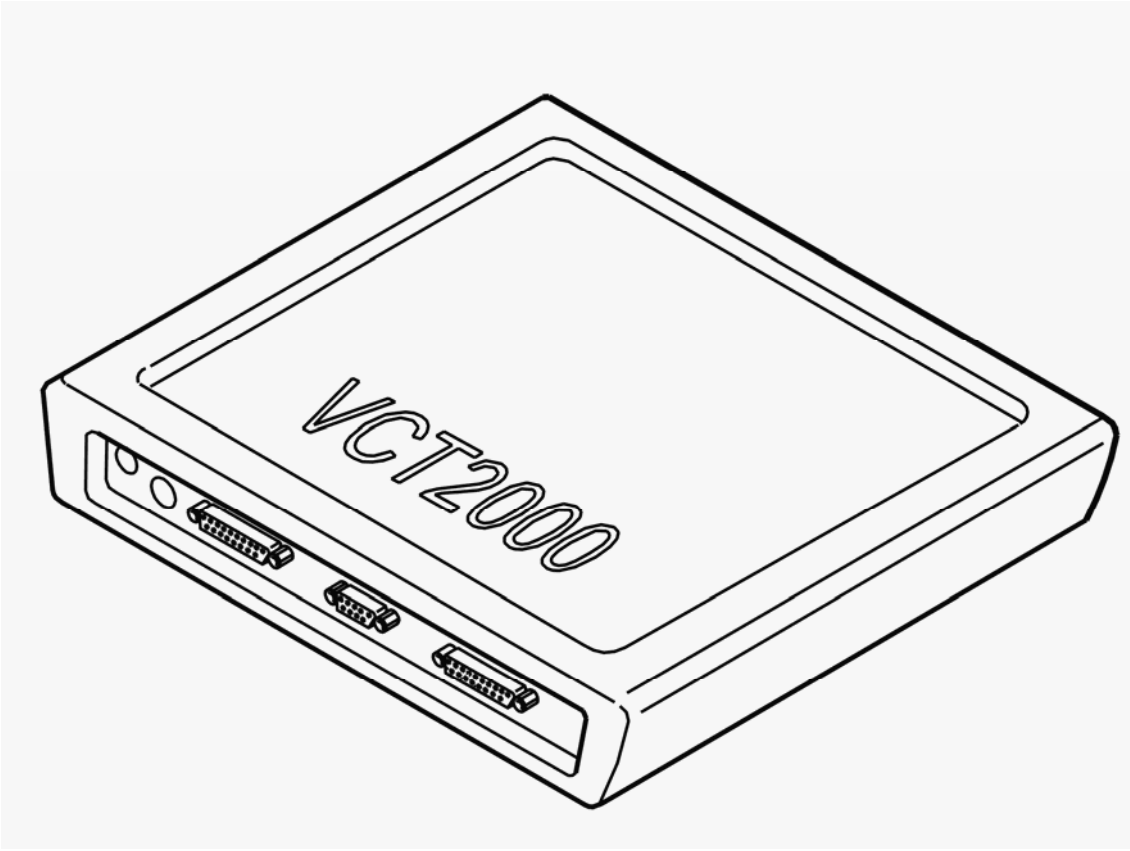


Fig. 276: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the rpm updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P072100: OUTPUT SHAFT SPEED SENSOR CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072100**

FAULT TRACING

see **FAULT TRACING**

TCM-P072200: OUTPUT SHAFT SPEED SENSOR CIRCUIT NO SIGNAL. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072200

Condition

The transmission's output speed sensor sends the transmission control module (TCM) a signal on the speed of the output drive shaft. Using this signal, the control module calculates the outgoing speed of the transmission. The signal is compared to the input speed signal from the transmission speed sensor and is used to calculation the transmission's gear ratio and for diagnostics.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- No output speed signal from the transmission speed sensor.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Speed higher than 70 km/h (44 mph) and transmission fluid temperature over 20 °C (68 °F).

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code is stored when the conditions are met.

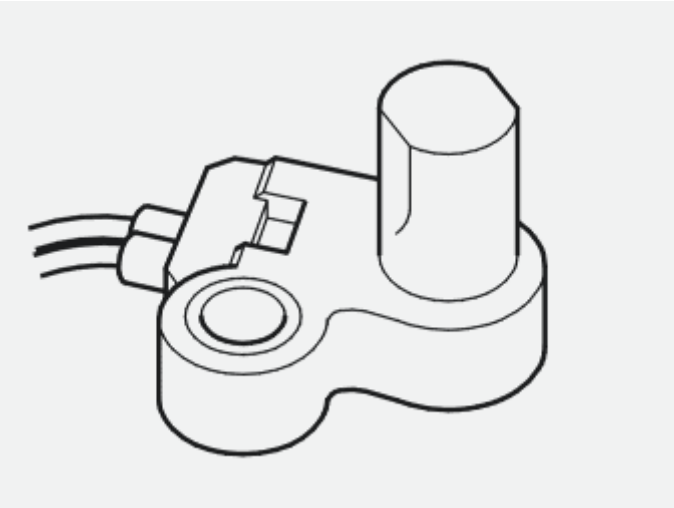


Fig. 277: Identifying Turbine/Input Shaft Speed Sensor
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Adaptation function is blocked.
- function is blocked.
- Slip lock-up function is blocked.
- Neutral check function is blocked.
- The transmission control module (TCM) uses the speed signal that the brake control module (BCM) puts on the CAN network.
- If the speed signal from the brake control module (BCM) is also missing, the auxiliary program **Emergency mode 1** in the transmission control module (TCM) will become active.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance in the terminals.
- Transmission output speed sensor not working.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- No lock-up
- Rough gear shift
- No gear shift

FAULT-TRACING

CHECKS

CHECKING THE FUNCTION

WARNING: Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

CAUTION: On vehicles with four-wheel-drive, the tests should be carried out with the vehicle raised so that all four wheels can rotate freely with attachments far out on the link arms so that the drive shafts are not damaged.

NOTE: If the vehicle has TRACS or TC (STC, DSTC), this function must be disabled. This is carried out by removing the fuse for the brake system pump motor in the engine compartment relay and fusebox. Note that this will generate diagnostic trouble codes in the brake control module (BCM). These diagnostic trouble codes must be erased before the vehicle is returned to the customer.

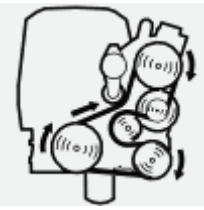


Fig. 278: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Raise the vehicle so that the drive wheels can rotate freely.
- Start the engine. Allow the engine to idle.
- Shift the gear selector to position D so that the drive wheels begin to rotate.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

- Read off the transmission output speed.

Check that the transmission speed is updated.

If the transmission input speed updates correctly it means that the fault was present previously but is not active now. There is an intermittent fault.

If the transmission input speed does not update correctly it means that the fault is permanent.

Fig. 279: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE WIRING AND SENSORS**

CHECKING THE WIRING AND SENSORS

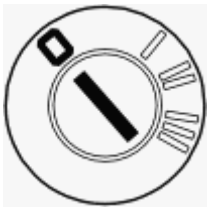


Fig. 280: Identifying Ignition In Off Position
Courtesy of VOLVO CARS CORPORATION

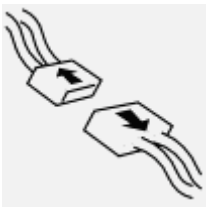


Fig. 281: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Disconnect the transmission connector.
- Transmission control module (TCM) disconnected.

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  HINT: Check the transmission speed sensor. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

  If a faulty value is measured in the test above, open the control system for the transmission and fault trace the wiring and components.

  NOTE: The cause of the malfunction may be that the sensor is loose or not

connected correctly.

If the wiring is faulty, replace the cable harness.

If the sensor is faulty, replace the transmission.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access connector B:**TRANSMISSION CONTROL MODULE (TCM)**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**

Select an alternative:

1. Transmission replaced.

   Refer to **VERIFICATION**

2. Cable harness replaced.

   Refer to **RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER**

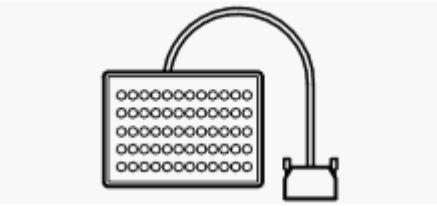


Fig. 282: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

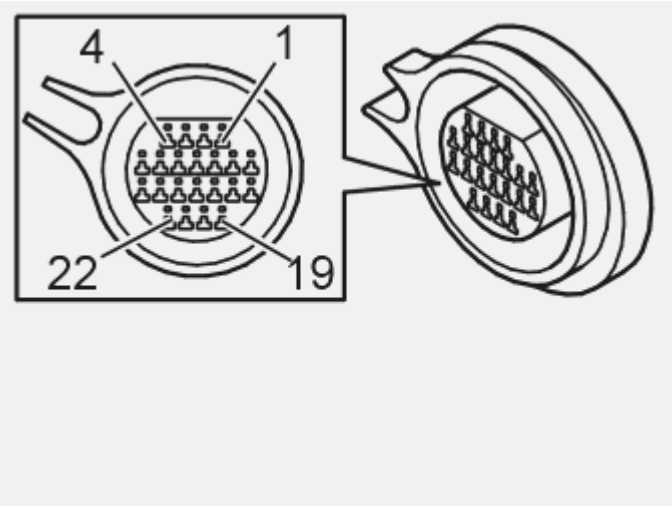


Fig. 283: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

CAUTION: On vehicles with four-wheel-drive, the tests should be carried out with the vehicle raised so that all four wheels can rotate freely with attachments far out on the link arms so that the drive shafts are not damaged.

WARNING: Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

NOTE: If the vehicle has TRACS or TC (STC, DSTC), this function must be disabled. This is carried out by removing the fuse for the brake system pump motor in the engine compartment relay and fusebox. Note that this will generate diagnostic trouble codes in the brake control module (BCM). These diagnostic trouble codes must be erased before the vehicle is returned to the customer.

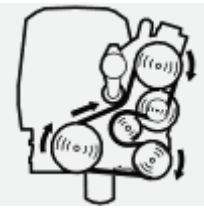


Fig. 284: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

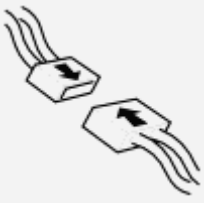


Fig. 285: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Raise the vehicle so that the drive wheels can rotate freely.
- Start the engine. Allow the engine to idle.
- Shift the gear selector to position D so that the drive wheels begin to rotate.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

- Read off the transmission output speed.

Check that the transmission speed is updated.

NOTE: Diagnostic trouble codes may be stored in the brake control module (BCM) when the back wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) after fault-tracing.

Fig. 286: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the speed updated?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER

CHECKING THE FUNCTION

HINT: The transmission control module (TCM) has a counter for fluid quality that counts the number of times the transmission is subjected to too hard a load or too high an ambient temperature. If the counter is not reset during draining/replacement, there is a risk that a diagnostic trouble code will be set under the wrong conditions. Thus, it is important that the counter for transmission fluid change be reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

Fig. 287: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the counter.

Fig. 288: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P072200: OUTPUT SHAFT SPEED SENSOR CIRCUIT NO SIGNAL. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072200

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072200**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P072200: OUTPUT SHAFT SPEED SENSOR CIRCUIT NO SIGNAL. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072200

Condition

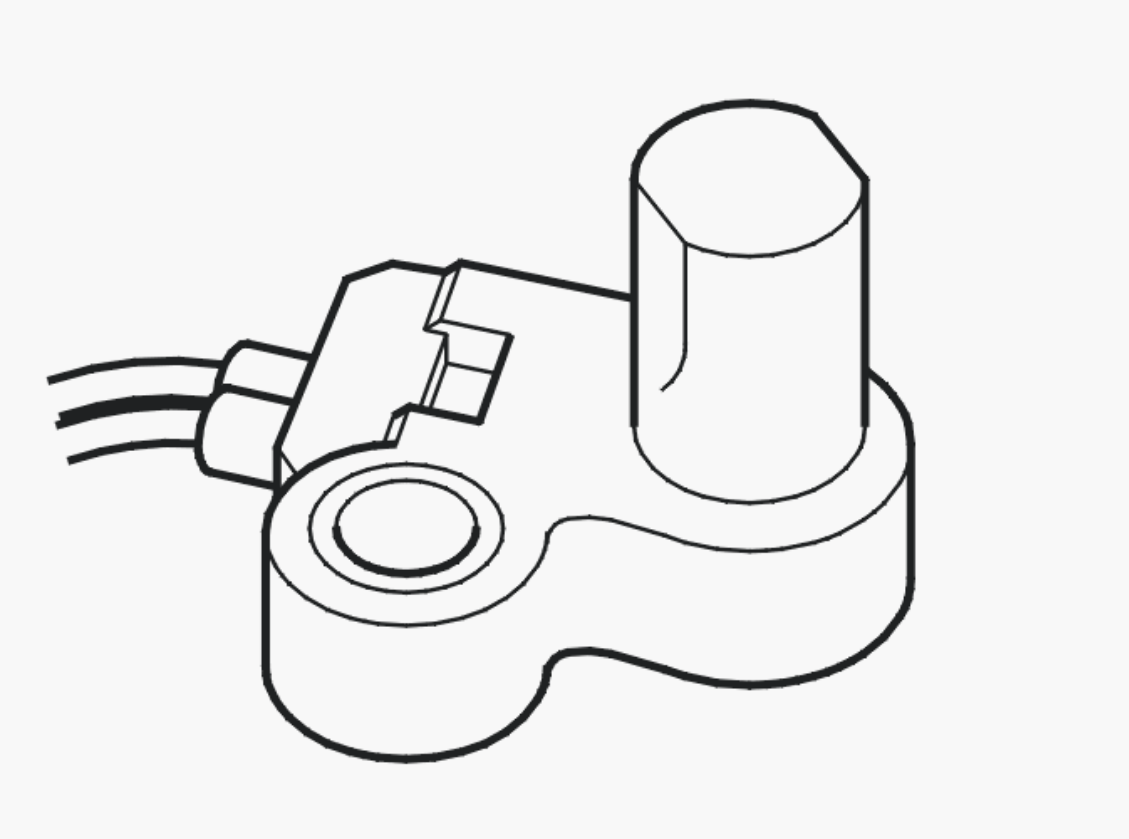


Fig. 289: Identifying Transmission Output Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The gearbox output speed sensor gives the transmission control module (TCM) a signal on the speed of the output drive shaft. Using this signal, the control module can calculate the output speed of the gearbox. The signal is compared with a signal from the gearbox input speed sensor and is used to calculate the gear ratio of the gearbox as well as for diagnosis.

If the transmission control module (TCM) registers that the signal from the gearbox output speed sensor is missing, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code (DTC) can be diagnosed at speeds above approximately 70 km/hand transmission fluid above 20 °C.

Substitute Value

- Adaptation function is blocked.
- Lock-up function is blocked.
- Slip lock-up function is blocked.
- Neutral check function is blocked.
- The transmission control module (TCM) uses the speed signal that the brake control module (BCM) puts on the CAN network.
- If the speed signal from the brake control module (BCM) is also missing, the auxiliary program **Emergency mode 1** in the transmission control module (TCM) will become active.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals
- Gearbox output speed sensor not working.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- No lock-up function.
- Harsh gear changing
- No gear changing.

FAULT TRACING TCM-P072200

CHECKS

CHECKING THE FUNCTION

WARNING: Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

CAUTION: On vehicles with four-wheel-drive, the tests should be carried out with the vehicle raised so that all four wheels can rotate freely with attachments far

out on the link arms so that the drive shafts are not damaged.

NOTE: If the vehicle is equipped with TRACS or traction control (STC, DSTC) this function must be deactivated. Remove the fuse for the pump motor for the brake system in the relay/fusebox in the engine compartment. Note that this will store a diagnostic trouble code (DTC) in the brake control module (BCM). These diagnostic trouble codes (DTC) must be erased before delivery to the customer.

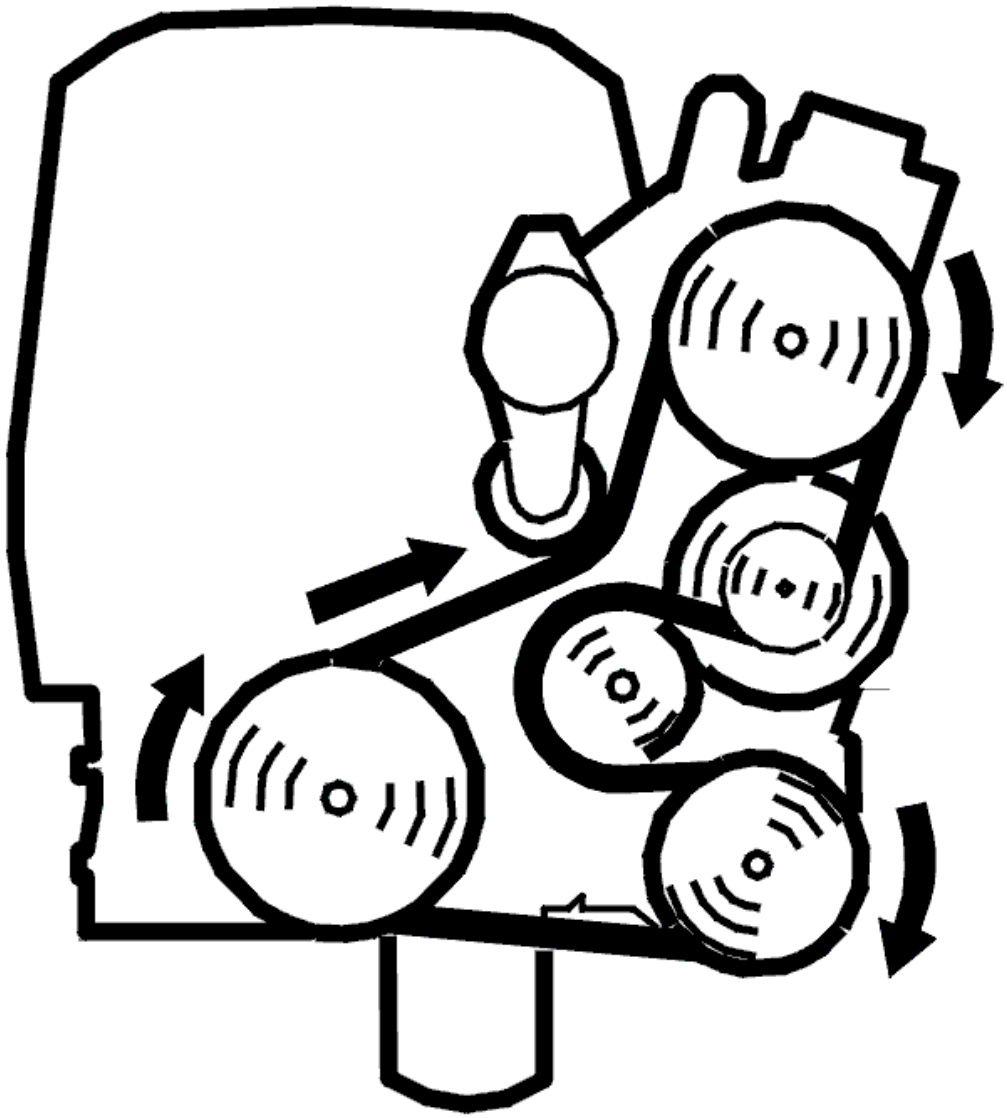


Fig. 290: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Raise the vehicle so that the drive wheels hang freely.
- Start the engine and allow it to idle.
- Put the gear selector in position D so that the drive wheels start to rotate.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

- Read off the gearbox output speed.

  Read off the transmission input speed.

  If the transmission input speed updates correctly it means that the fault was present previously but is not active now. There is an intermittent fault.

  If the transmission input speed does not update correctly it means that the fault is permanent.

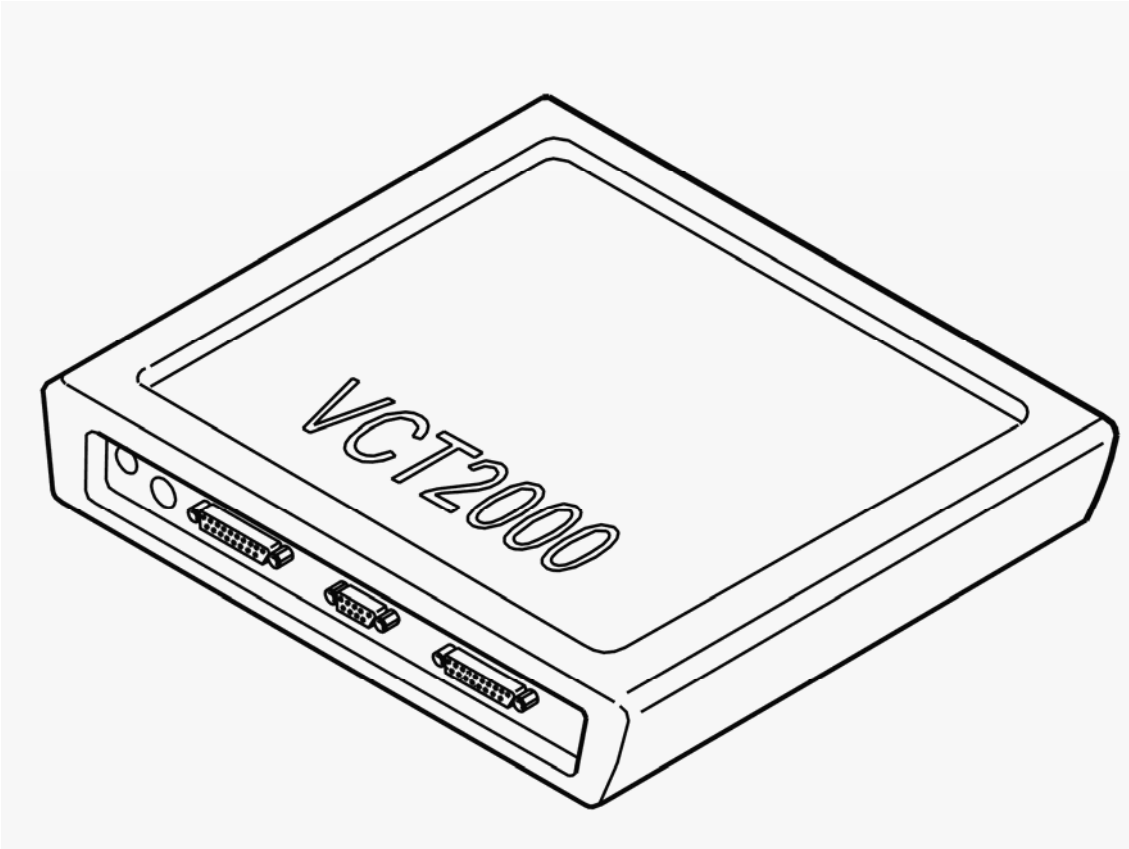


Fig. 291: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

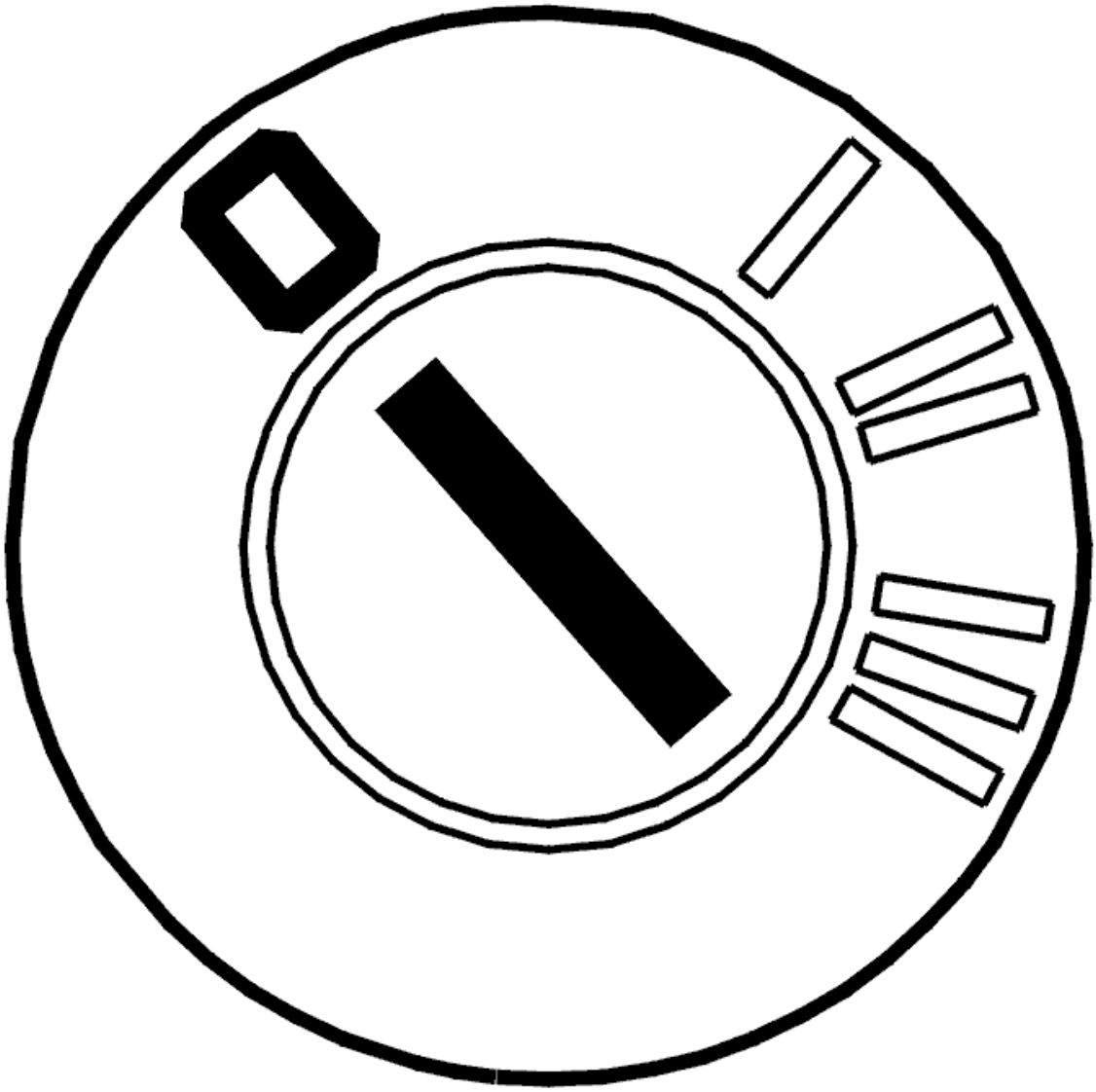


Fig. 292: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

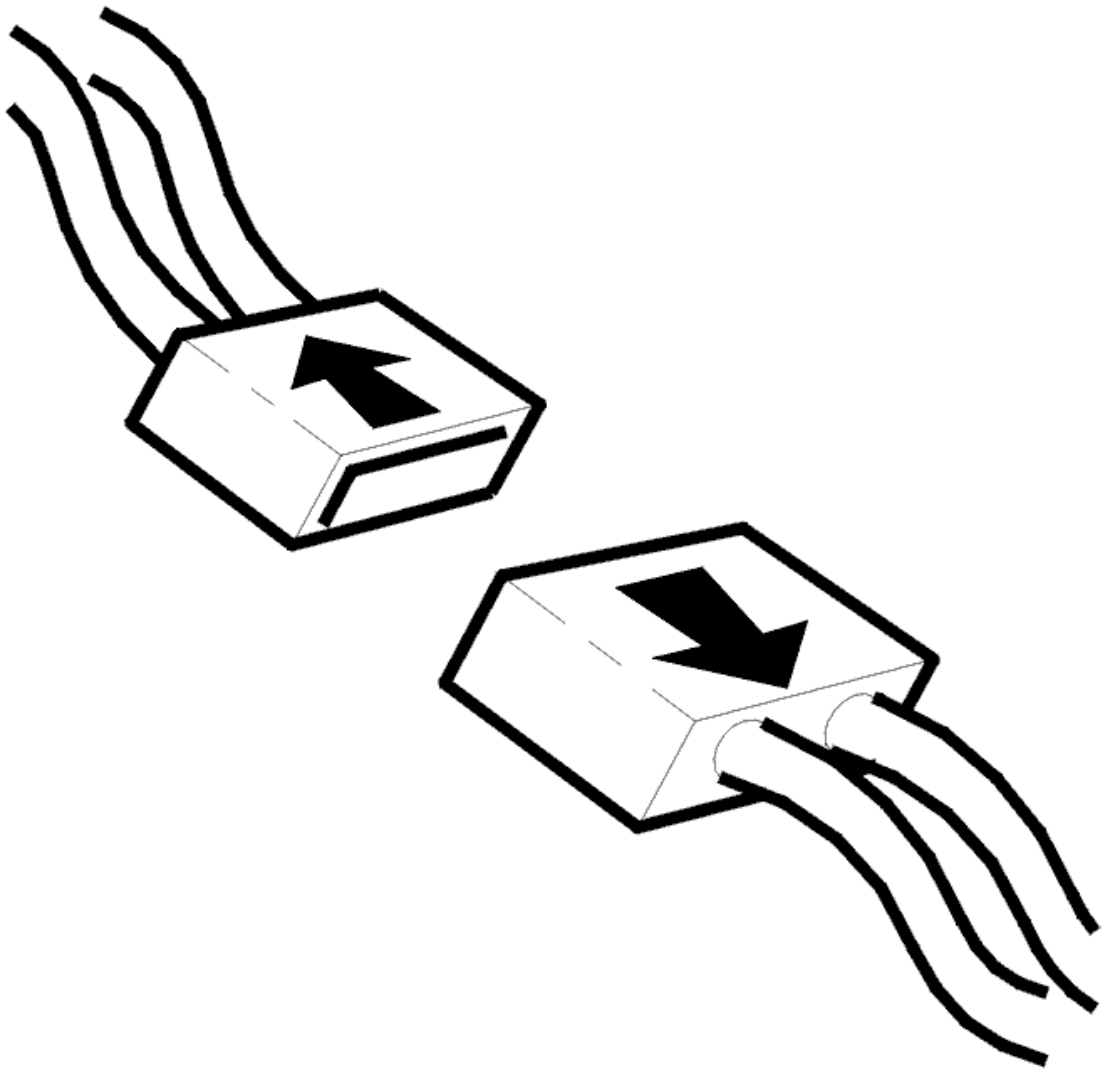


Fig. 293: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the connector for the transmission.
- Transmission control module (TCM) disconnected.
- Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  HINT: Check the transmission speed sensor. See CHECKING THE INPUT AND OUTPUT SPEED SENSORS FOR THE TRANSMISSION

  If a faulty value is measured in the test above open the control system for the transmission and fault trace the wiring and components.

NOTE: The cause of the malfunction may be that the sensor is loose or not connected correctly.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **REPLACING THE GEARBOX**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**

Select an alternative:

1. Transmission replaced.

   Refer to **VERIFICATION**

2. Cable harness replaced or sensor loose.

   Refer to **RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE**

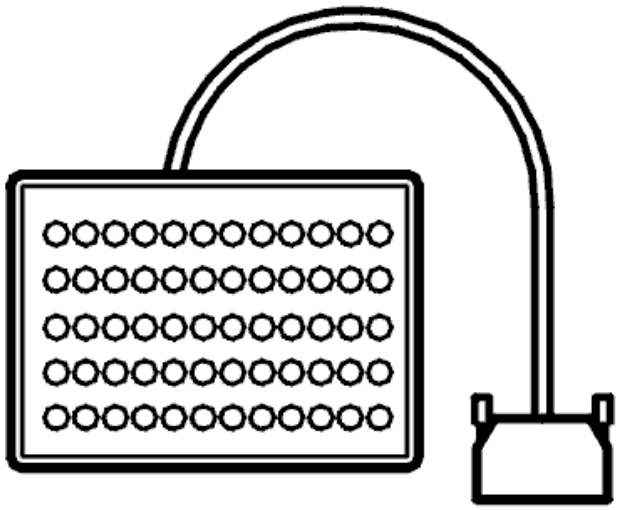


Fig. 294: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

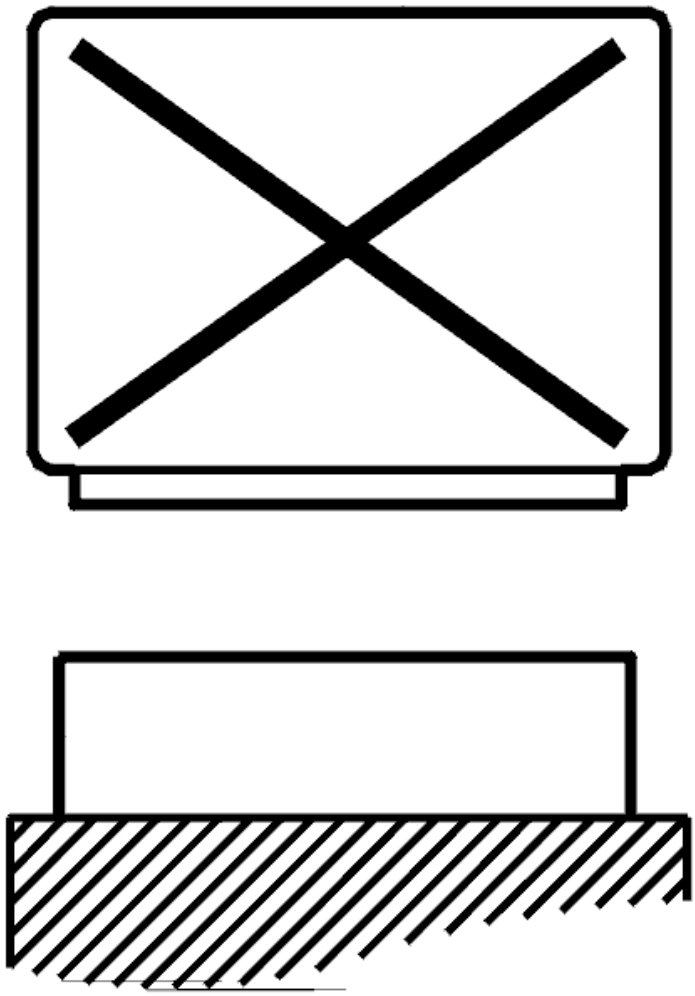


Fig. 295: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

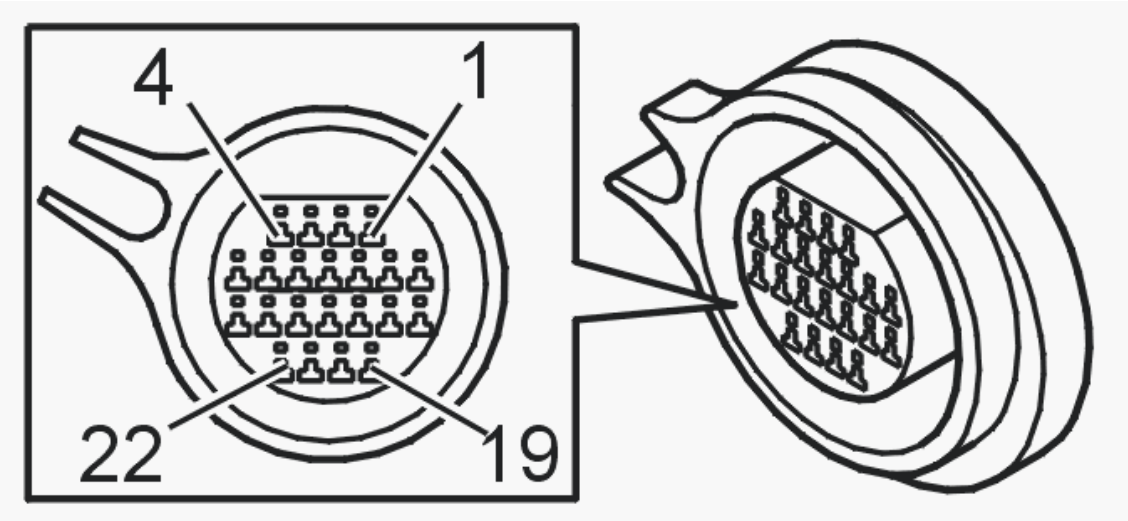


Fig. 296: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE

RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE

HINT: The transmission control module (TCM) has a counter for the oil's quality that counts up when the transmission is exposed to very heavy loads or high ambient temperature. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions. That is why it is important that the counter for Transmission oil, change is reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

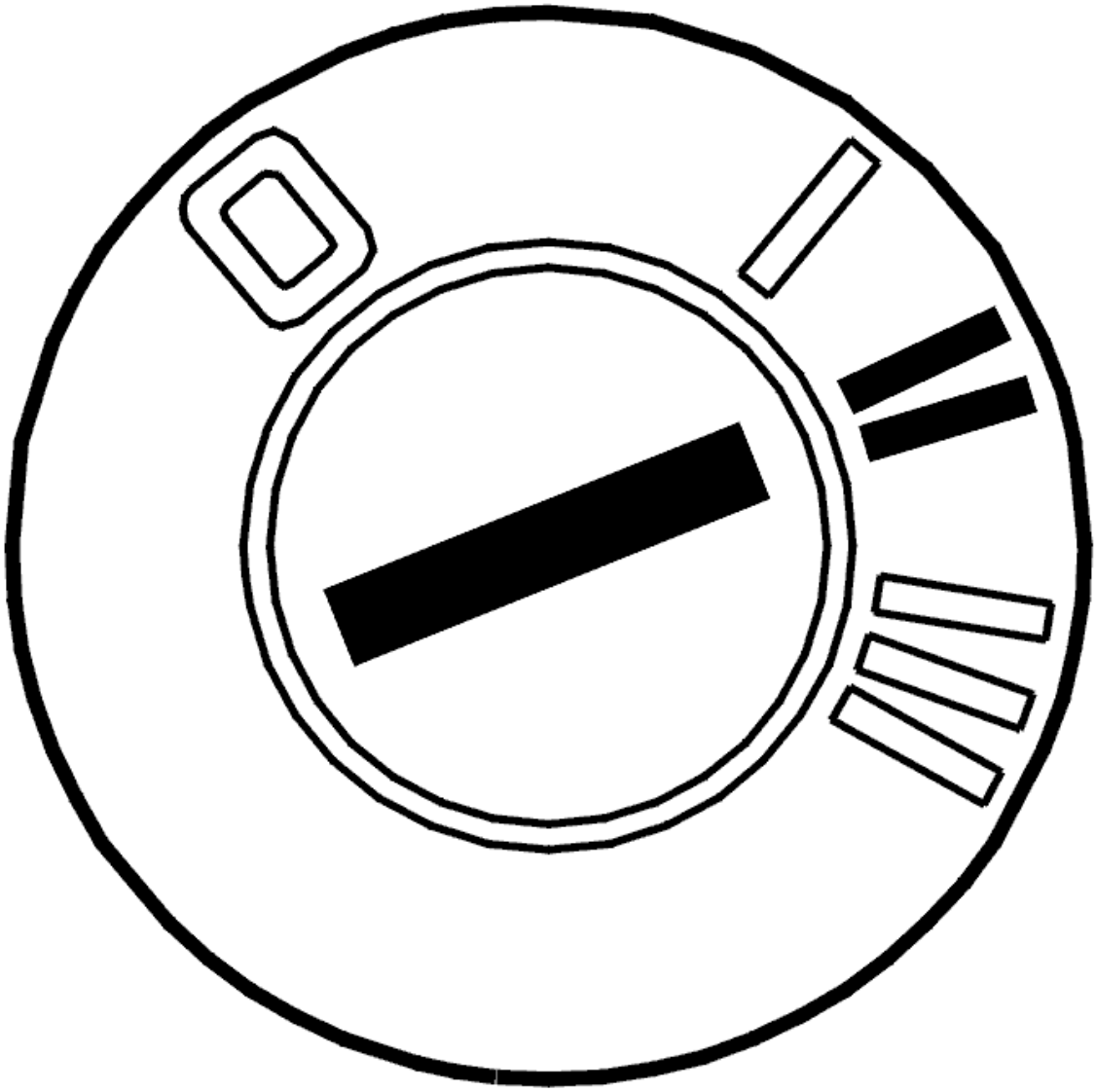


Fig. 297: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the counter by clicking on the symbol for VCT2000.

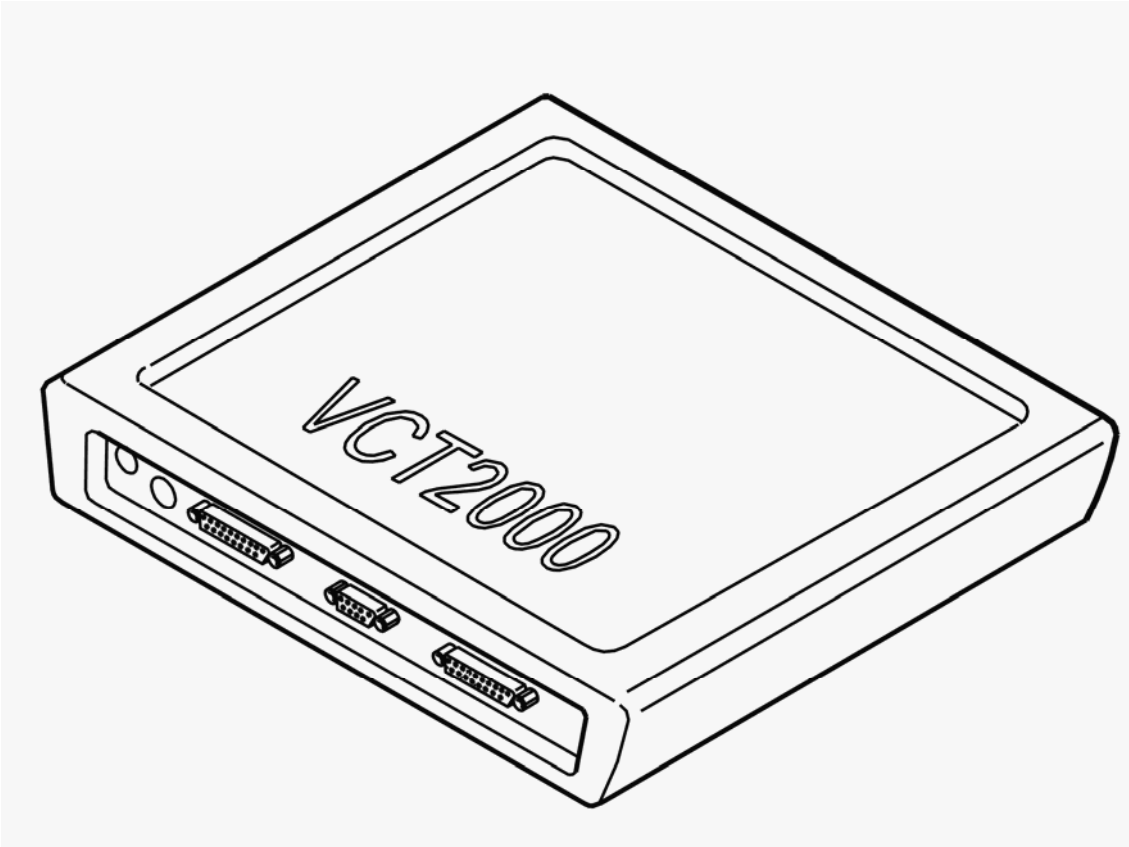


Fig. 298: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

CAUTION: On vehicles with four-wheel-drive, the tests should be carried out with the vehicle raised so that all four wheels can rotate freely with attachments far out on the link arms so that the drive shafts are not damaged.

WARNING: Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

NOTE: If the vehicle is equipped with TRACS (traction control system) or Traction Control (DSTC (Dynamic stability and traction control), STC (Stability and traction control) the function must be deactivated. This is carried out by

removing the fuse for the brake system pump motor in the engine compartment relay and fusebox. Note that diagnostic trouble codes (DTCs) will be stored in the brake control module (BCM). These must be erased before returning the vehicle to the customer.

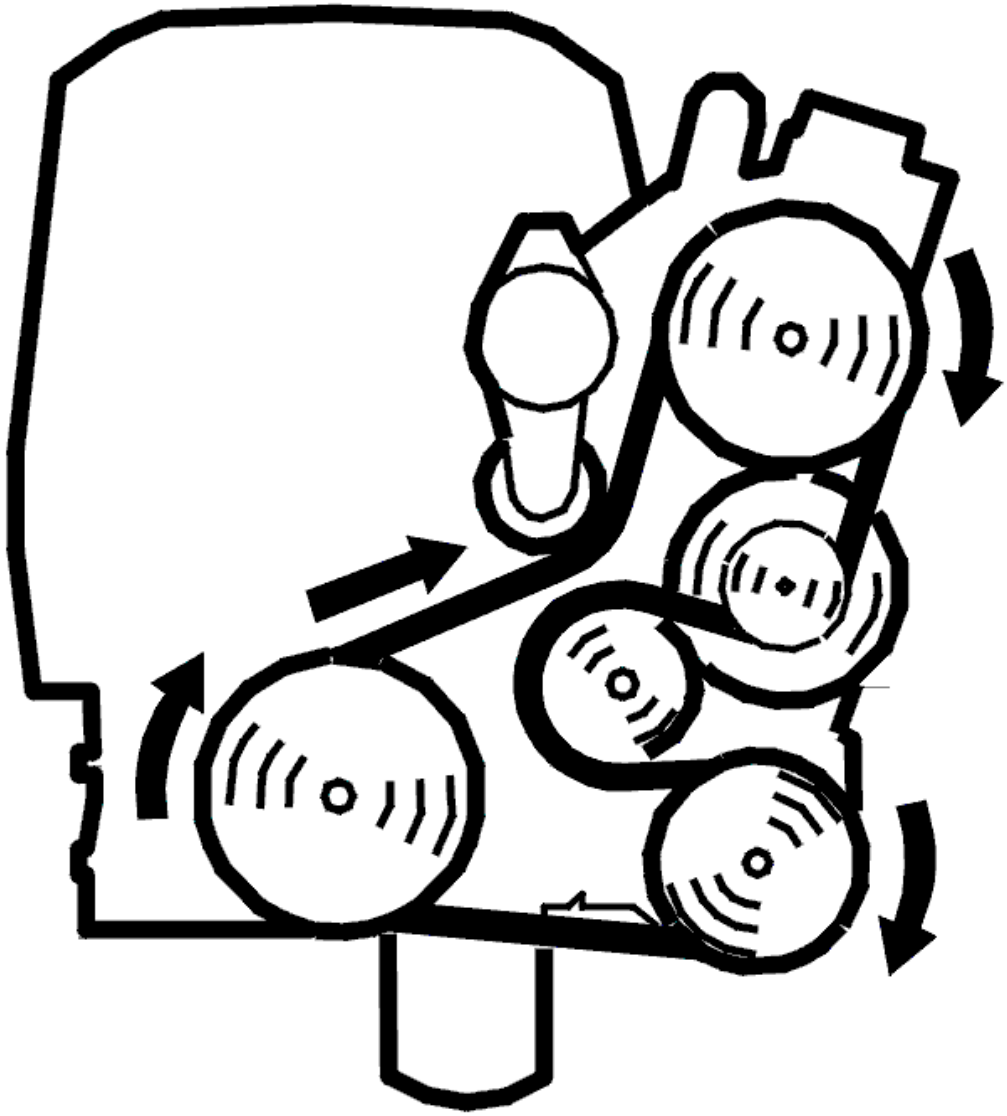


Fig. 299: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

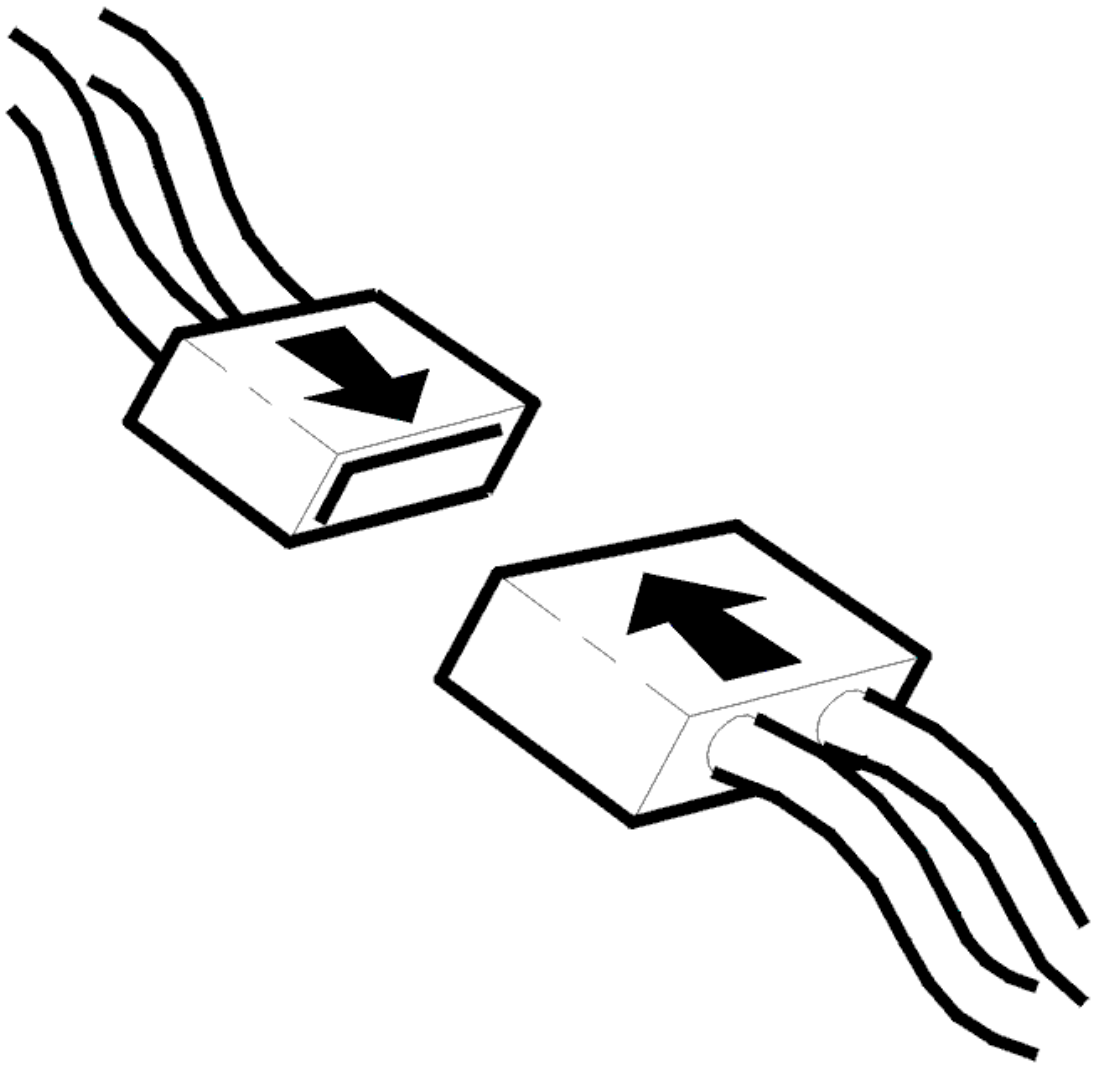


Fig. 300: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the connectors, components etc.
- Raise the vehicle so that the drive wheels hang freely.
- Start the engine and allow it to idle.
- Put the gear selector in position D so that the drive wheels start to rotate.

NOTE: Ensure that the wheels are not rotating when the gear selector is moved.

- Read off the gearbox output speed.

  Check that the speed is updated.

NOTE: Diagnostic trouble codes (DTCs) may be stored in the brake control module (BCM) when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) after fault-tracing.

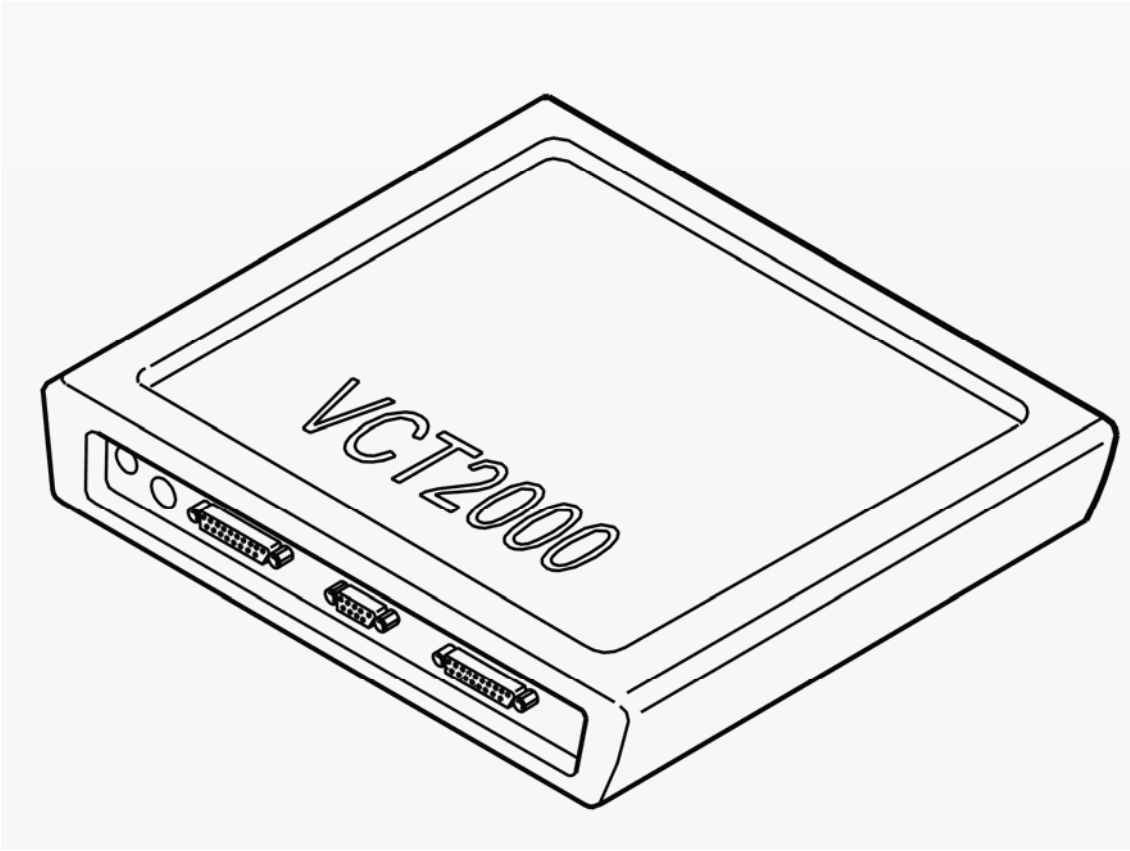


Fig. 301: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the speed updated?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P072200: OUTPUT SHAFT SPEED SENSOR CIRCUIT NO SIGNAL. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072200

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072200**

FAULT TRACING TCM-P072200

see **FAULT TRACING TCM-P072200**

TCM-P072300: OUTPUT SHAFT SPEED SENSOR CIRCUIT INTERMITTENT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072300

Condition

The transmission's output speed sensor sends the transmission control module (TCM) a signal on the speed of the output drive shaft. Using this signal, the control module calculates the outgoing speed of the transmission. The signal is compared to the input speed signal from the transmission speed sensor and is used to calculation the transmission's gear ratio and for diagnostics.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- No output speed signal from the transmission speed sensor.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Speeds above 20 km/h.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code is stored when the conditions are met.

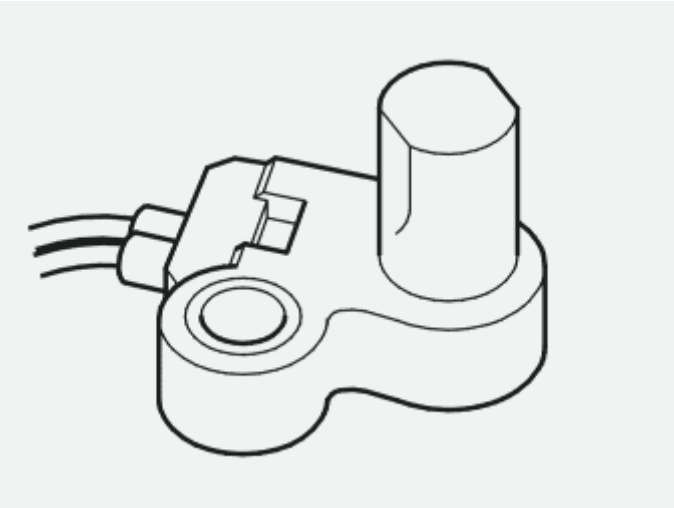


Fig. 302: Identifying Turbine/Input Shaft Speed Sensor
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Adaptation function is blocked.
- function is blocked.
- Slip lock-up function is blocked.
- Neutral check function is blocked.
- The transmission control module (TCM) uses the speed signal that the brake control module (BCM) puts on the CAN network.
- If the speed signal from the brake control module (BCM) is also missing, the auxiliary program **Emergency mode 1** in the transmission control module (TCM) will become active.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance in the terminals.
- Transmission output speed sensor not fitted correctly.
- Transmission output speed sensor not working.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- No lock-up
- Rough gear shift
- No gear shift

FAULT-TRACING

see **FAULT-TRACING**

TCM-P072300: OUTPUT SHAFT SPEED SENSOR CIRCUIT INTERMITTENT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072300

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072300**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P072300: OUTPUT SHAFT SPEED SENSOR CIRCUIT INTERMITTENT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072300

Condition

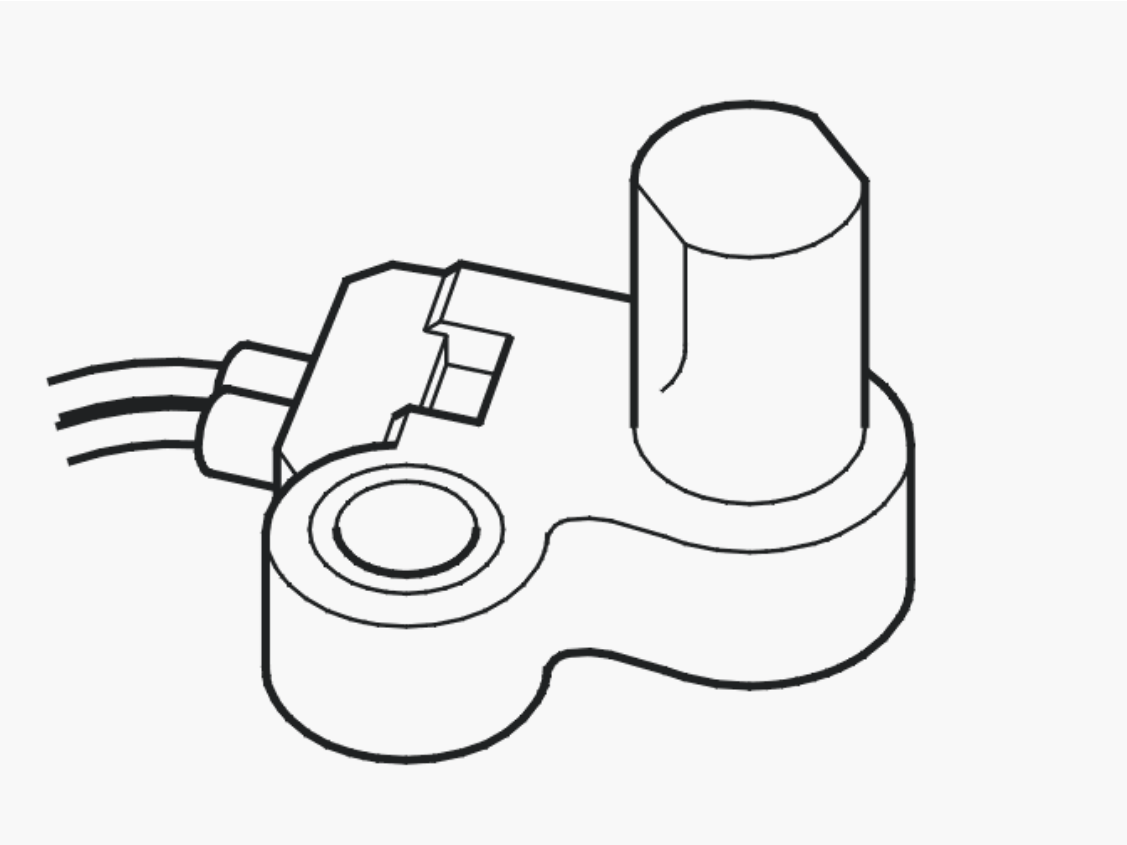


Fig. 303: Identifying Transmission Output Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The gearbox output speed sensor gives the transmission control module (TCM) a signal on the speed of the output drive shaft. Using this signal, the control module can calculate the output speed of the gearbox. The signal is compared with a signal from the gearbox input speed sensor and is used to calculate the gear ratio of the gearbox as well as for diagnosis.

If the transmission control module (TCM) registers that the signal from the gearbox output speed sensor is missing, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code (DTC) can be diagnosed when driving over 20 km/h.

Substitute Value

- Adaptation function is blocked.
- Lock-up function is blocked.
- Slip lock-up function is blocked.
- Neutral check function is blocked.
- The transmission control module (TCM) uses the speed signal that the brake control module (BCM) puts on the CAN network.
- If the speed signal from the brake control module (BCM) is also missing, the auxiliary program **Emergency mode 1** in the transmission control module (TCM) will become active.

HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals
- Gearbox output speed sensor not fitted correctly.
- Gearbox output speed sensor not working.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- No lock-up function.
- Harsh gear changing
- No gear changing.

FAULT TRACING

see **FAULT TRACING**

TCM-P072300: OUTPUT SHAFT SPEED SENSOR CIRCUIT INTERMITTENT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072300

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072300**

FAULT TRACING

see **FAULT TRACING**

TCM-P072500: ENGINE SPEED INPUT CIRCUIT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072500

Condition

The engine control module (ECM) transmits a signal on engine speed on the CAN network. The transmission control module (TCM) uses the signal to check the lock-up function.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- There is no speed (rpm) signal from the engine control module (ECM) or the signal is faulty.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on and when CAN network is OK.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

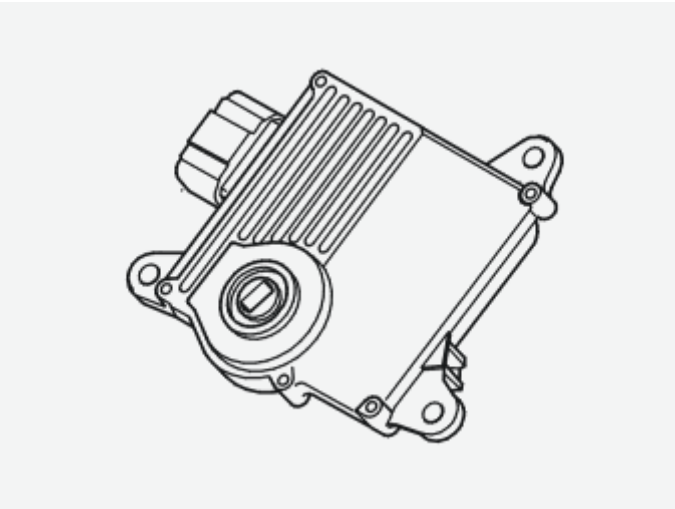


Fig. 304: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Fault-trace the central electronic module (CEM).
- Locate the cause of the fault in the engine control module (ECM).
- Intermittent open circuit or short-circuit on the CAN lead between the engine control module (ECM) and the transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Rough gear shift
- No gear shift

- No lock-up

FAULT-TRACING

INFORMATION

There is no fault-tracing for this diagnostic fault code (DTC).

A diagnostic trouble code for CAN communication can be stored in the central electronic module (CEM). IN some cases, a diagnostic trouble code is stored in other affected control modules. This diagnostic trouble code is not to be erased until any CAN communication trouble codes in the central electronic module (CEM) or engine control module (ECM) are remedied and erased.

Therefore, first read the diagnostic trouble codes in the central electronic module (CEM) and the engine control module (ECM), perform troubleshooting and remedy as necessary. If no diagnostic trouble codes (DTCs) are stored, fault-trace the controller area network (CAN) as follows. This diagnostic trouble code (DTC) can then be erased.

For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Other information

- see **GENERAL INFORMATION ABOUT FAULT-TRACING IN THE CAN NETWORK**

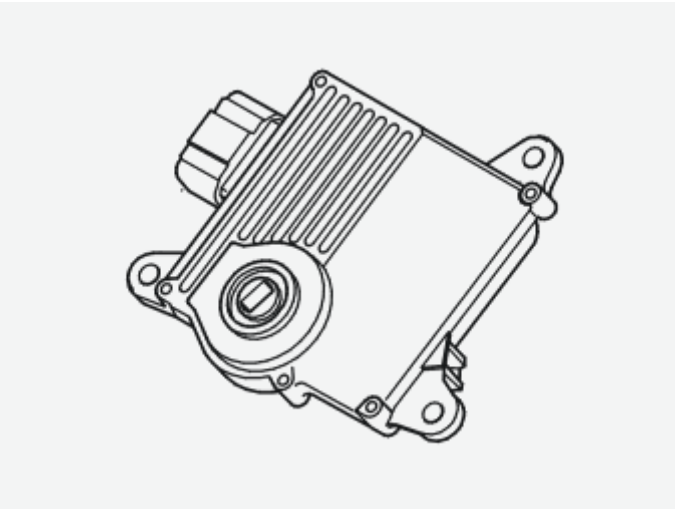


Fig. 305: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

TCM-P072500: ENGINE SPEED INPUT CIRCUIT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072500

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072500**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P072500: ENGINE SPEED INPUT CIRCUIT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072500

Condition

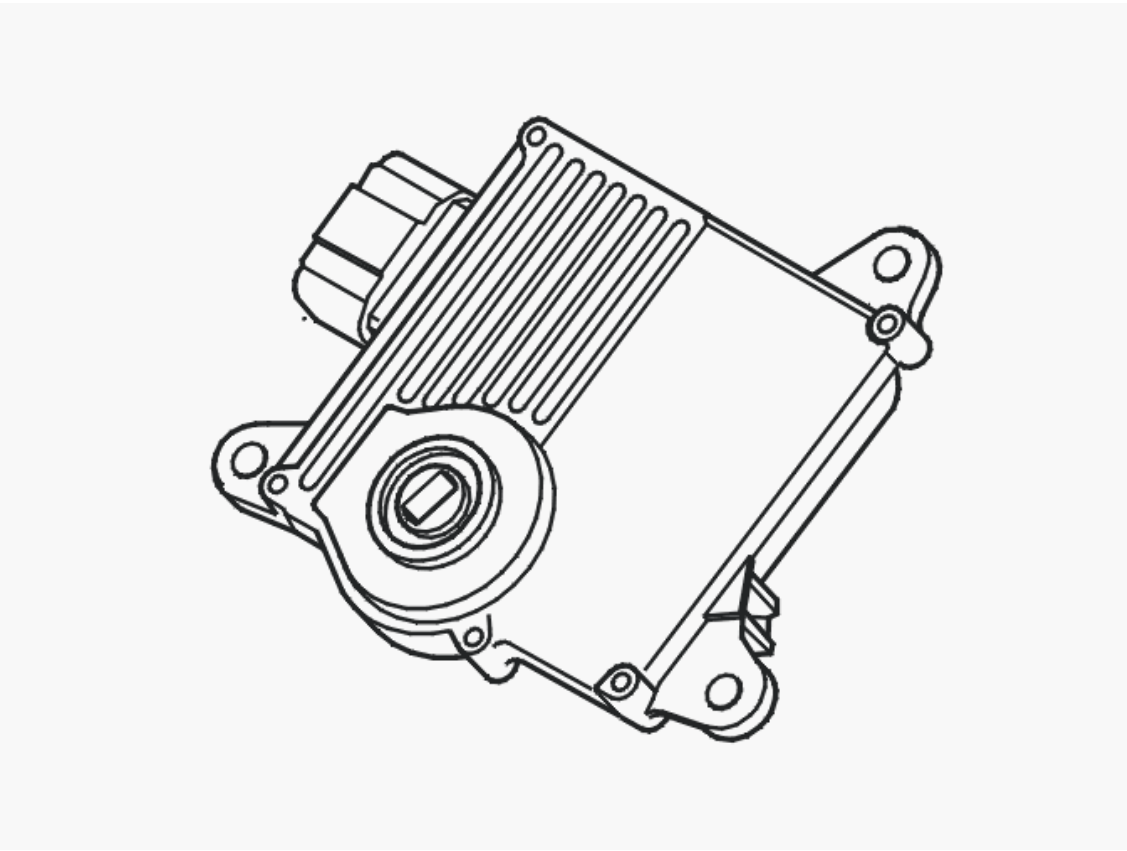


Fig. 306: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The engine control module (ECM) puts the signal for the engine speed on the CAN network. The transmission control module (TCM) uses the signal to check the lock-up function.

If the transmission control module (TCM) registers that the speed signal from the engine control module (ECM) is missing or is indicated as incorrect, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code (DTC) can be diagnosed when the ignition is turned on and the CAN network is OK.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Seek cause of fault in central electronic module (CEM).
- Locate the cause of the fault in the engine control module (ECM).
- Intermittent open circuit or short-circuit on the CAN lead between the engine control module (ECM) and the transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Harsh gear changing
- No gear changing.
- No lock-up function.

FAULT-TRACING INFORMATION

INFORMATION

No fault tracing procedure has been defined for this diagnostic trouble code (DTC).

The diagnostic trouble code (DTC) for CAN communication can also be stored in the Central Electronic module (CEM). In certain instances the diagnostic trouble code (DTC) is also set in other affected control modules. This diagnostic trouble code (DTC) must not be erased before any diagnostic trouble codes (DTC) in the Central Electronic Module (CEM), for CAN communication, and in the Engine Control Module (ECM) have first been remedied and erased.

Therefore, read off any diagnostic trouble codes (DTCs) in the Central Electronic Module (CEM) and the Engine Control Module (ECM). Carry out fault tracing procedures and remedy as necessary. If no trouble codes are stored, look for faults in the Control Area Network (CAN) as described below. This diagnostic trouble code (DTC) may be then erased.

For more information about the diagnostic trouble code (DTC) see diagnostic trouble code (DTC) information.

Other information

- see **GENERAL INFORMATION ABOUT FAULT-TRACING IN THE CAN NETWORK (2005-2012)**

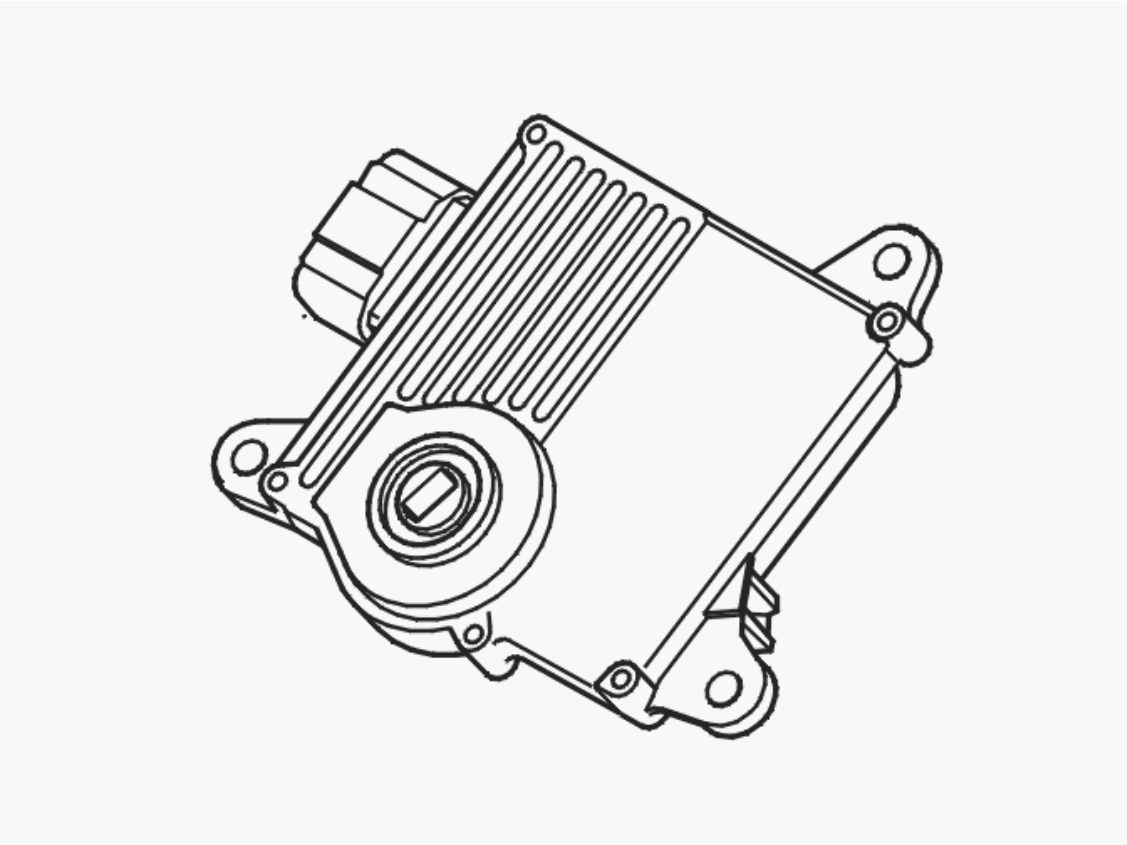


Fig. 307: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

TCM-P072500: ENGINE SPEED INPUT CIRCUIT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072500

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072500**

FAULT-TRACING INFORMATION

see **FAULT-TRACING INFORMATION**

TCM-P072900: GEAR 6 INCORRECT RATIO. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072900

Condition

The transmission control module (TCM) receives a signal about input and output speed from the transmission's two speed sensors. There is a determined ratio for each gear and the signals help calculate the transmission control module (TCM) gear ratio.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Gear ratio differs by more than 10%.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Fluid temperature over +20 °C (68 °F).
- 6th gear is engaged, engine speed is greater than or equal to 250 rpm, engine torque is greater than or equal to 80 Nm and there is no acceleration.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

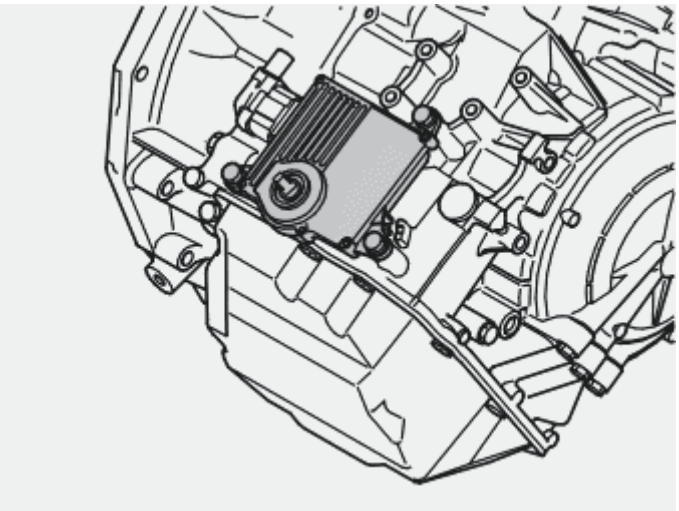


Fig. 308: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 2** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance or one of the solenoids controlling in an incorrect manner.
- Circuit for the solenoid. SLT, SLC3
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- Abnormal slipping gearshifts
- Rough gear shift
- No gear shift

FAULT-TRACING

FAULT-TRACING INFORMATION

CHECKING THE GEAR SYSTEM

Problems that the customer may experience are hard shifts or slipping shifts. The following test-drive contains several different driving situations that may provoke these symptoms if the transmission is damaged.

NOTE: It is important that the transmission oil is above 70 °C before the test-drive starts

Test 1

1. Driving at 100 km/h, 6th gear.
2. Perform a kickdown to 4th gear.
3. Let the transmission automatically shift up to 5th gear.
4. Let up the accelerator pedal and let the transmission shift up to 6th gear.

Test 2

1. Driving at 100 km/h, 6th gear.
2. Slight uphill grade, press accelerator pedal until you obtain shifting 6-5, not kickdown.

Test 3

1. Driving at 80 km/h.
2. Move the gear selector to position M and engage 6th gear.
3. Perform a kickdown and shift 6-5, 5-4, 4-3 at the same time.
4. Then upshift immediately to 6th gear.

Test 4

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position R.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

Test 5

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position D.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

If the symptoms hard shifts or slipping shifts arise during the test-drive, the transmission's control system must be replaced.

Other information

- see **CONTROL SYSTEMS**

Is the function OK?

- **YES**

  Refer to **CHECKING SOLENOIDS**

- **NO**

  Refer to **RESETTING ADAPTATION**

CHECKING SOLENOIDS

Fig. 309: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between approx. 100 and 950 mA.

  Solenoid SLT, SLC3.

Fig. 310: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  Refer to **CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION**

- **NO**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

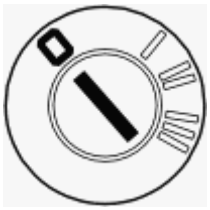


Fig. 311: Identifying Ignition In Off Position
Courtesy of VOLVO CARS CORPORATION

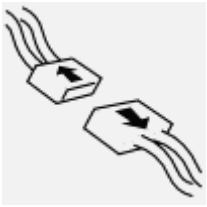


Fig. 312: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  HINT: Check solenoids SLT, SLC3 as described in:CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no defects were found on connectors or cables, replace the transmission.

Remedy as necessary.

Other information

- see **TRANSMISSION** (B6324S, TF-80SC; 2007-2010) or **TRANSMISSION** (B6324S, TF-80SC AWD; 2007-2010)
- see **COVER CONTROL SYSTEM, REPLACING**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access connector B:**TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

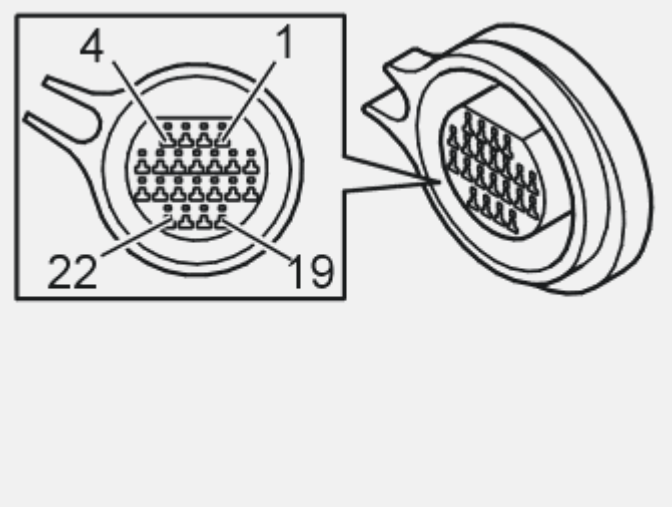


Fig. 313: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

Fig. 314: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check the transmission oil level. If the oil level is low, check the transmission for leakage, then top up with oil.

  Check the quality of the oil.

  Replace the transmission fluid if the fluid smells burnt.

  Other information

  - see **OIL LEVEL, CHECKING**
  - see **OIL GRADE, CHECKING**
  - see **TRANSAXLE OIL**

  Select an alternative:

  1. No fault detected.

     Refer to **CHECKING THE COMPONENTS AND WIRING**

  2. Transmission fluid replaced, low level or poor quality.

     Refer to **RESETTING ADAPTATION**

Fig. 315: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

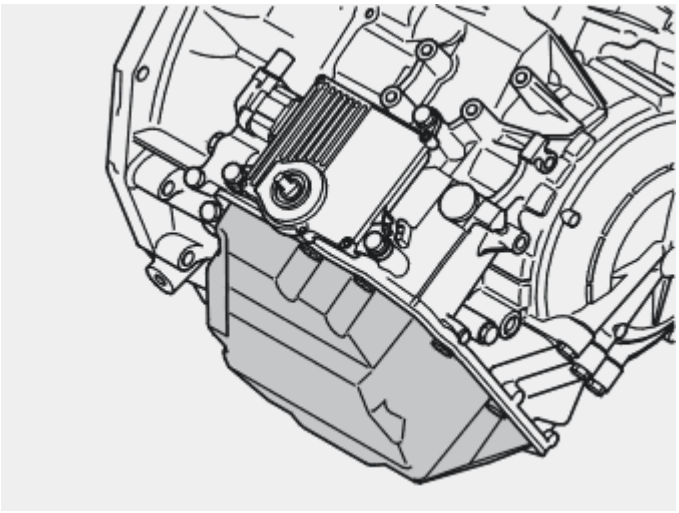


Fig. 316: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

VERIFICATION

VERIFICATION

NOTE: When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select Pause and create a bookmark. Then select Vehicle communication using Volvo Scantool (VIDA).

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 317: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

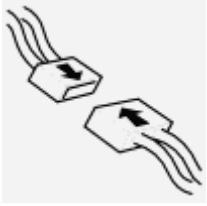


Fig. 318: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.

- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

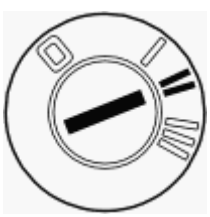


Fig. 319: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 320: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P072900: GEAR 6 INCORRECT RATIO. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072900

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P072900**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P072900: GEAR 6 INCORRECT RATIO. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

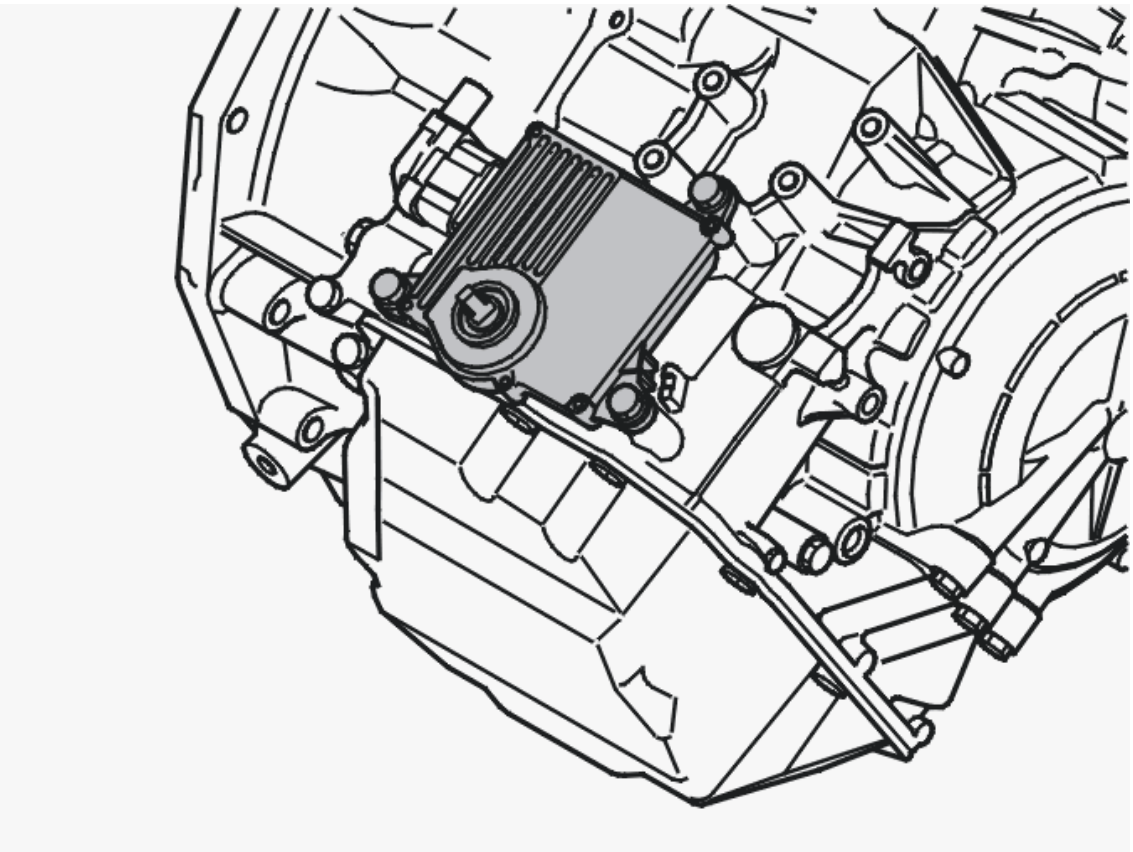


Fig. 321: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) receive signals on the input and output speed from the two gearbox speed sensors. There is a predetermined ratio for each gear and using the signals, the control module can calculate the gearbox gear ratio. If the transmission control module (TCM) registers that the gear ratio deviates more than 10%, the diagnostic trouble code (DTC) TCM-P073100, TCM-P073200, TCM-P073300, TCM-P073400, TCM-P073500 or TCM-P072900 is generated depending on the cause of the fault.

The diagnostic trouble: (DTC) can be diagnosed at transmission fluid temperatures above +20 °C and for:

- **TCM-P073100** Gear 1 and engine speed above 250 but below 1350 rpm and accelerator pedal position greater than 10% and gear ratio = 2.301 +/- 20%
- **TCM-P073200** Gear 2 and engine speed above 500 rpm plus accelerator pedal position greater than 10% and gear ratio =2.301 +/- 20%.
- **TCM-P073300** Gear 3 and engine speed above 500 rpm plus accelerator pedal position greater than 10% and gear ratio =2.301 +/- 20%.
- **TCM-P073400** Gear 4 and engine speed above 500 rpm plus accelerator pedal position greater than 10% and gear ratio =2.301 +/- 20%.
- **TCM-P073500** Gear 5 and engine speed above 500 rpm plus accelerator pedal position greater than 10% and gear ratio =2.301 +/- 20%.
- **TCM-P072900** Gear 6 and engine speed above or equal to 250 rpm plus engine torque greater than or equal to 80Nm and no acceleration.

Substitute Value

- Auxiliary program **Emergency mode 2** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance or one of solenoid's regulating incorrectly. See table below:

Gear/DTC	Circuit for solenoid
1/TCM-P073100	SLT, SLC2, SLC3, SLB1
2/TCM-P073200	SLT, SLC2, SLC3
3/TCM-P073300	SLT, SLC2, SLB1
4/TCM-P073400	SLT, SLC3, SLB1
5/TCM-P073500	SLT, SLC1, SLB1
6/TCM-P072900	SLT,, SLC3

- Mechanical fault in gearbox. Gearbox components worn and causing slip or system pressure too low.

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- Abnormally slipping gears.
- Harsh gear changing
- No gear changing.

FAULT TRACING

FAULT-TRACING INFORMATION

CHECKING THE GEAR SYSTEM

Problems that the customer may experience are hard shifts or slipping shifts. The following test-drive contains several different driving situations that may provoke these symptoms if the transmission is damaged.

NOTE: It is important that the transmission oil is above 70 °C before the test-drive starts

Test 1

1. Driving at 100 km/h, 6th gear.
2. Perform a kickdown to 4th gear.

3. Let the transmission automatically shift up to 5th gear.
4. Let up the accelerator pedal and let the transmission shift up to 6th gear.

Test 2

1. Driving at 100 km/h, 6th gear.
2. Slight uphill grade, press accelerator pedal until you obtain shifting 6-5, not kickdown.

Test 3

1. Driving at 80 km/h.
2. Move the gear selector to position M and engage 6th gear.
3. Perform a kickdown and shift 6-5, 5-4, 4-3 at the same time.
4. Then upshift immediately to 6th gear.

Test 4

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position R.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

Test 5

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position D.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

If the symptoms hard shifts or slipping shifts arise during the test-drive, the transmission's control system must be replaced.

Other information

- see **CONTROL SYSTEM, REPLACING**

Is the function OK?

- **YES**

  Refer to **CHECKING SOLENOIDS**

- **NO**

  Refer to **RESETTING ADAPTATION**

CHECKS

CHECKING SOLENOIDS

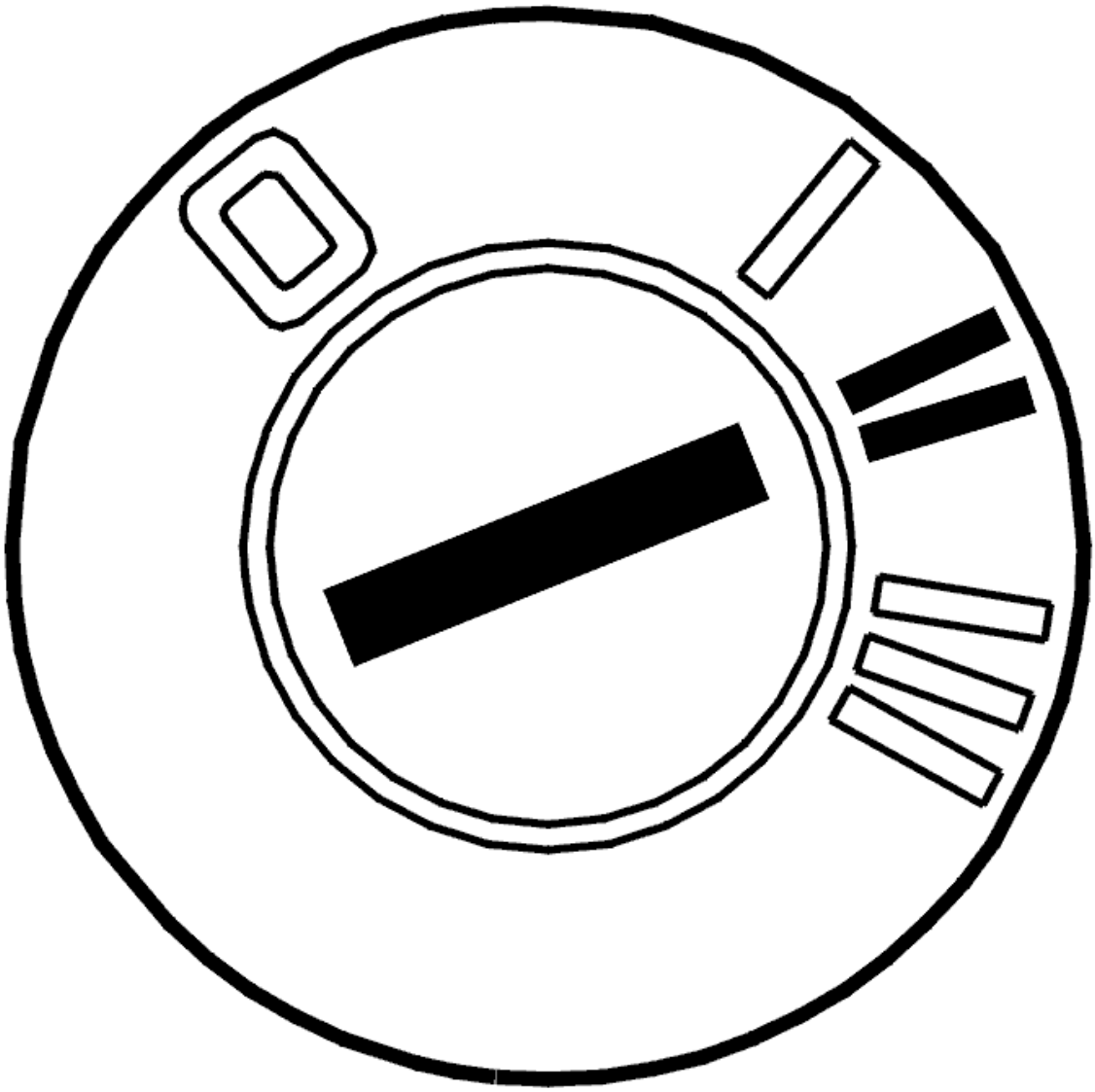


Fig. 322: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between approx. 0 and 1000 mA.

Gear/DTC	Solenoid
1/TCM-P073100	SLT, SLC2, SLC3, SLB1
2/TCM-P073200	SLT, SLC2, SLC3
3/TCM-P073300	SLT, SLC2, SLB1
4/TCM-P073400	SLT, SLC3, SLB1
5/TCM-P073500	SLT, SLC1, SLB1
6/TCM-P072900	SLT, SLC3

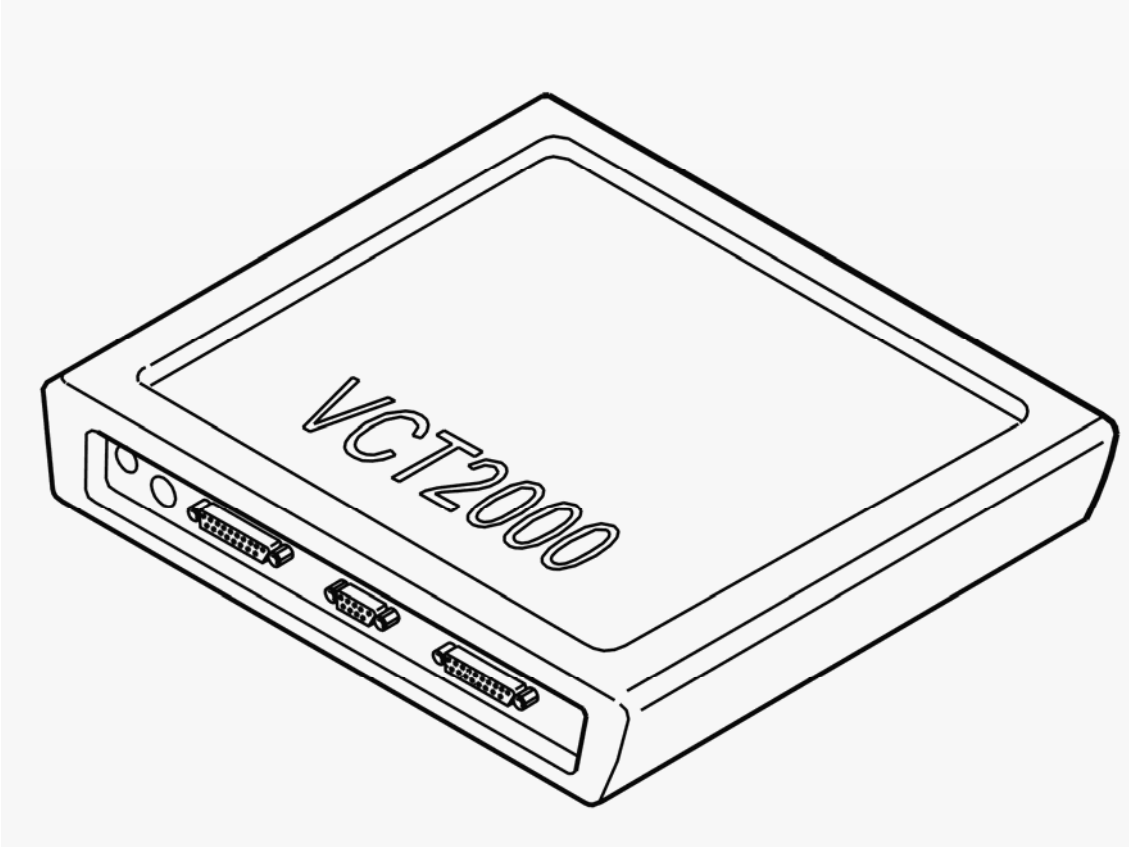


Fig. 323: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  Refer to **CHECKING OIL QUALITY AND OIL LEVEL IN TRANSMISSION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING OIL QUALITY AND OIL LEVEL IN TRANSMISSION

NOTE: **The transmission oil's quality and level are extremely important for the function of the transmission. Therefore it is important that these are correct. In addition, the oil level is dependent on oil temperature.**

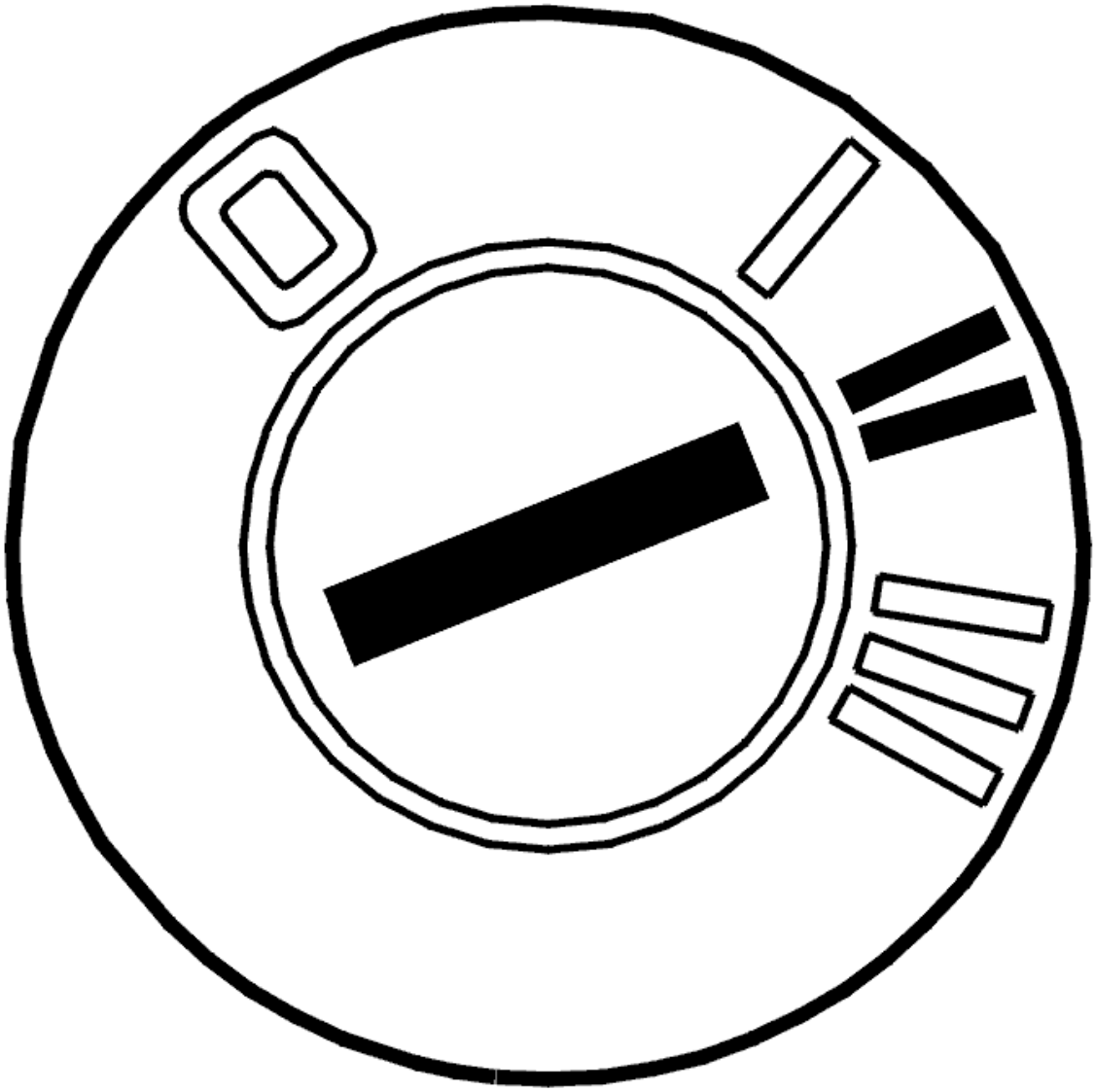


Fig. 324: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil's temperature.

Check the transmission's oil level. If it is low, check the transmission for leaks and then top off the oil.

Check the oil's quality.

If the oil smells burnt, change transmission oil.

Other information

- see **OIL LEVEL, CHECKING**
- see **OIL GRADE, CHECKING (2007-2011)**
- see **TRANSMISSION FLUID, CHANGING**

Select an alternative:

1. No defect found.

   Refer to **CHECKING THE WIRING AND COMPONENT**

2. Transmission oil changed, level low or quality poor.

   Refer to **RESETTING ADAPTATION**

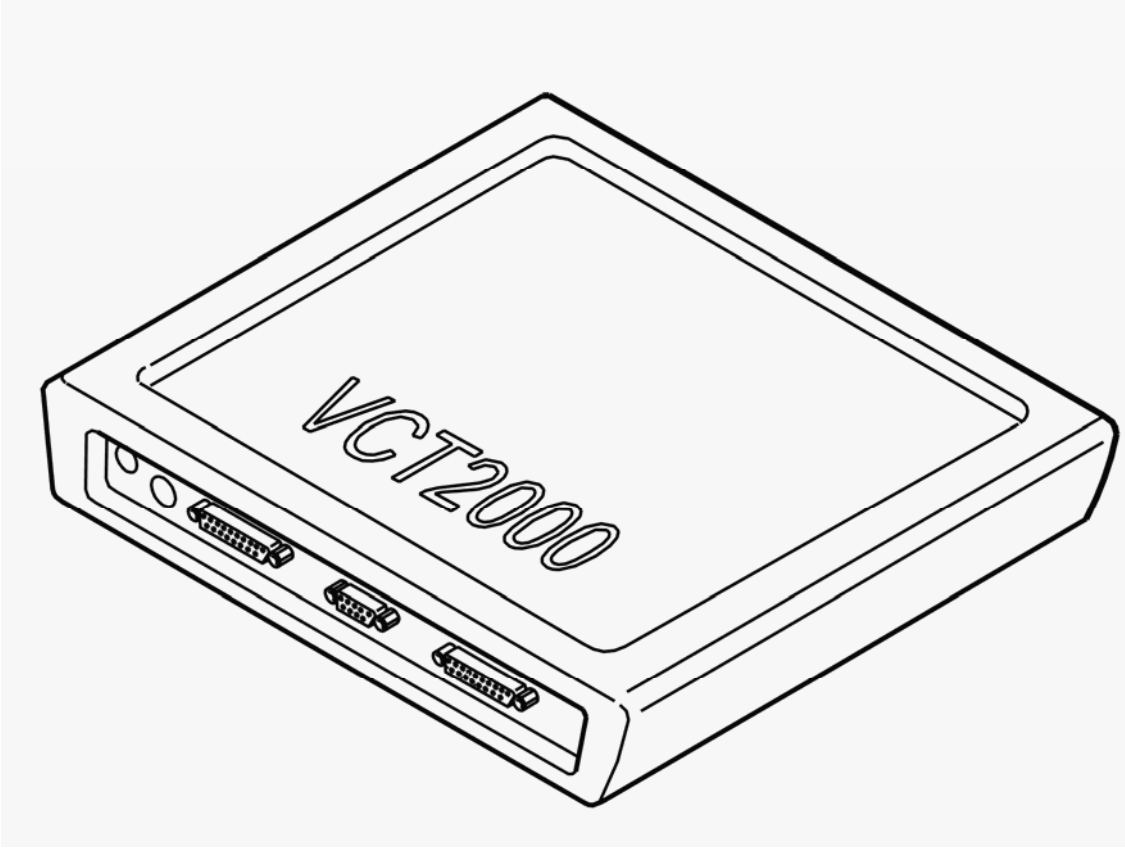


Fig. 325: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

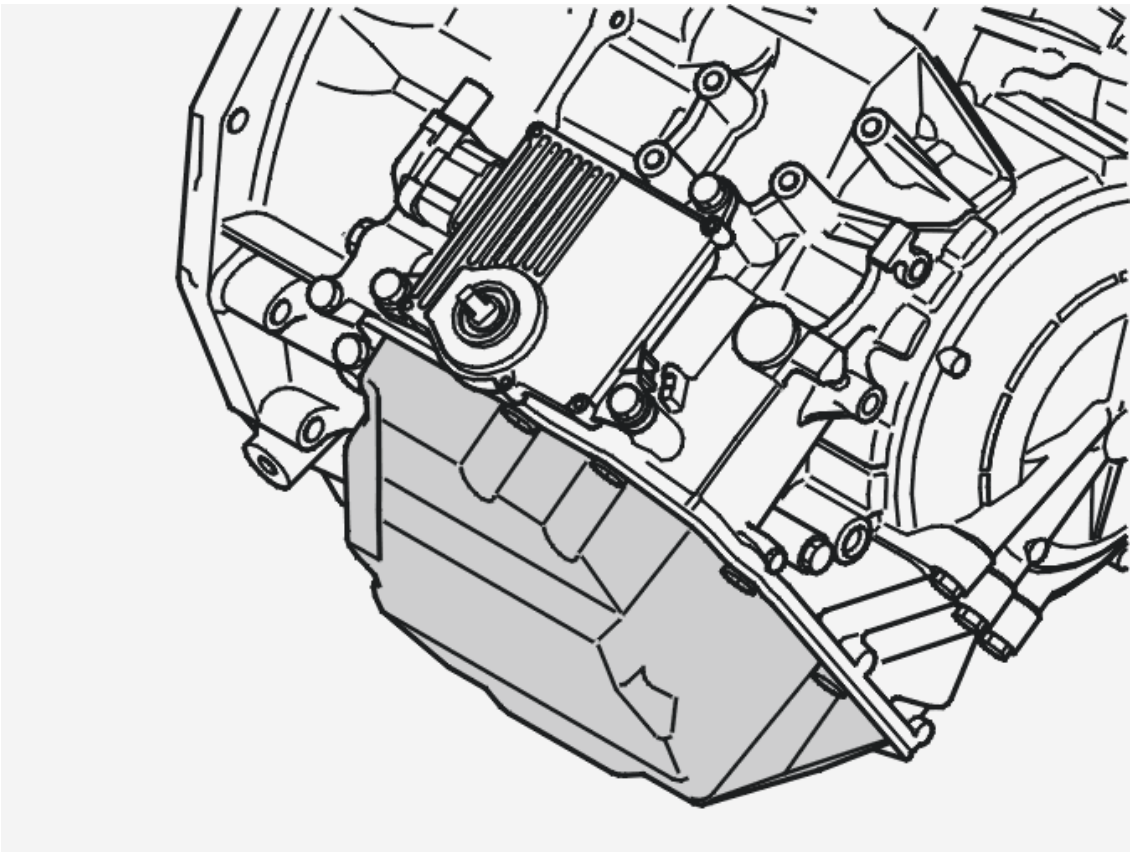


Fig. 326: Identifying Transmission Oil Pan
Courtesy of VOLVO CARS CORPORATION

CHECKING THE WIRING AND COMPONENT

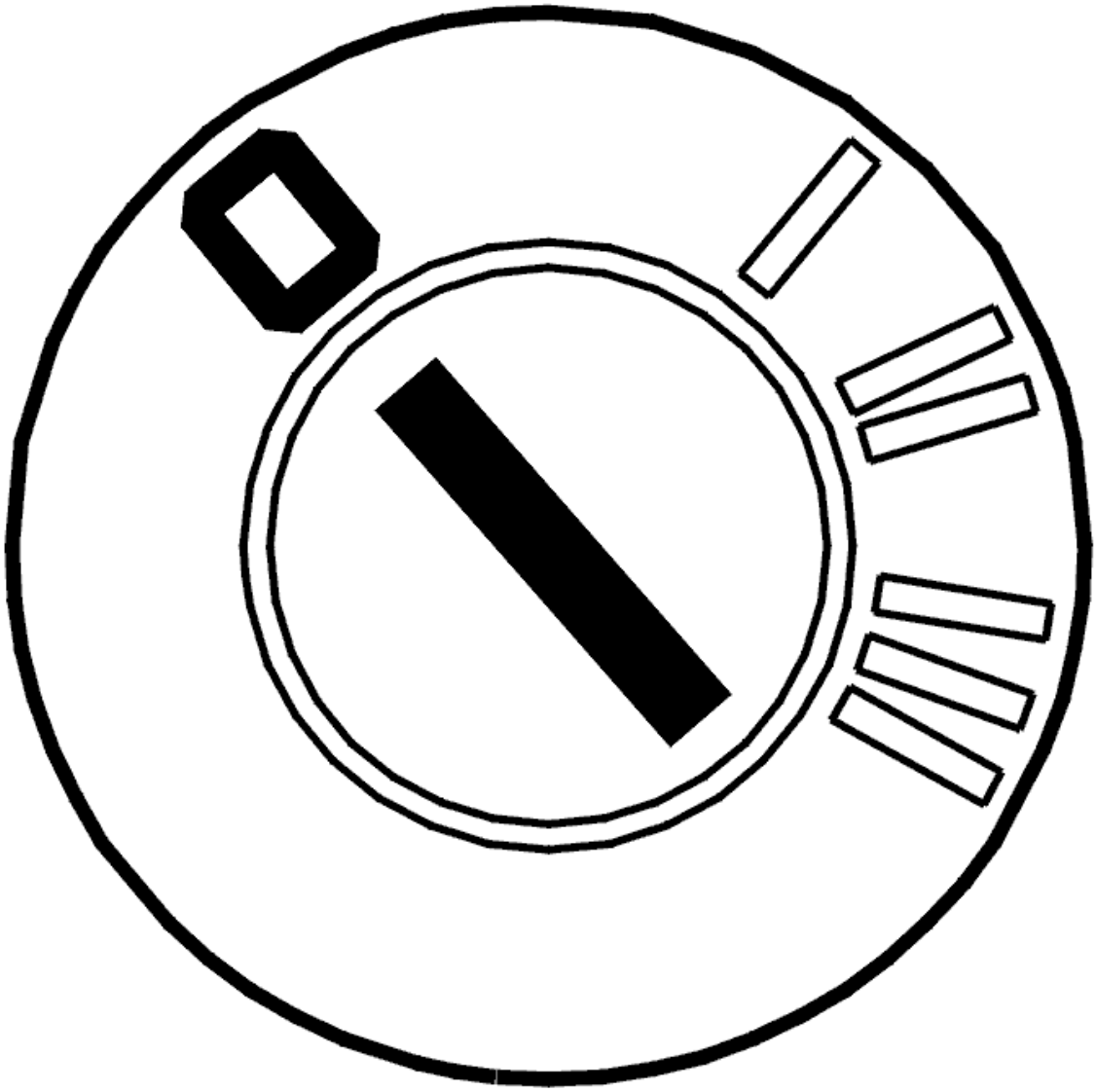


Fig. 327: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

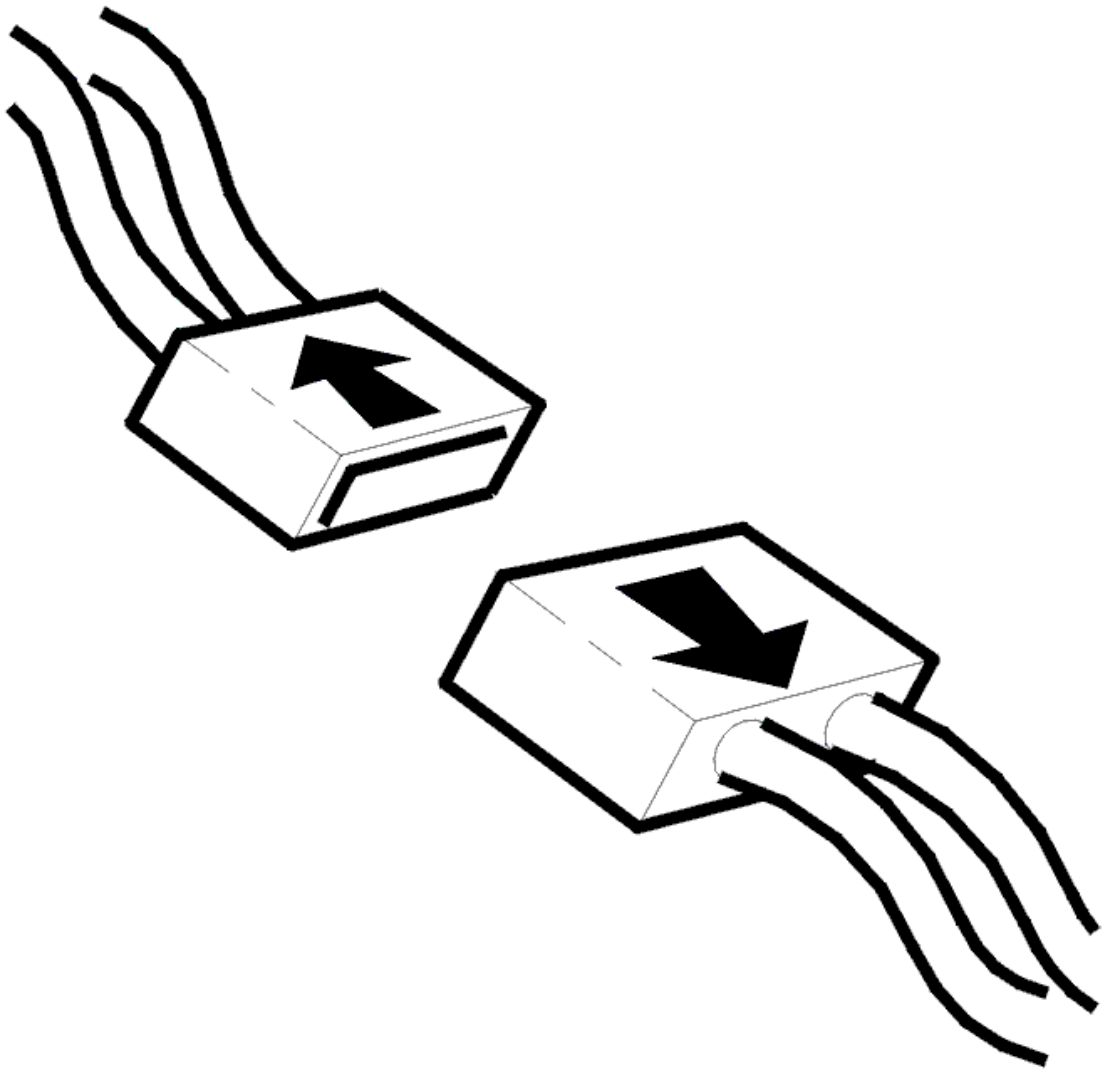


Fig. 328: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

HINT: Check solenoid SLT, SLC1, SLC2, SLC3 and SLB1 according to: CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

Gear/DTC	Solenoid
1/TCM-P073100	SLT, SLC2, SLC3, SLB1
2/TCM-P073200	SLT, SLC2, SLC3

3/TCM-P073300	SLT, SLC2, SLB1
4/TCM-P073400	SLT, SLC3, SLB1
5/TCM-P073500	SLT, SLC1, SLB1
6/TCM-P072900	SLT, SLC3

If no defects were found on connectors or cables, replace the transmission.

Remedy as necessary.

Other information

- see **REPLACING THE GEARBOX**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- see **CONTENTS**

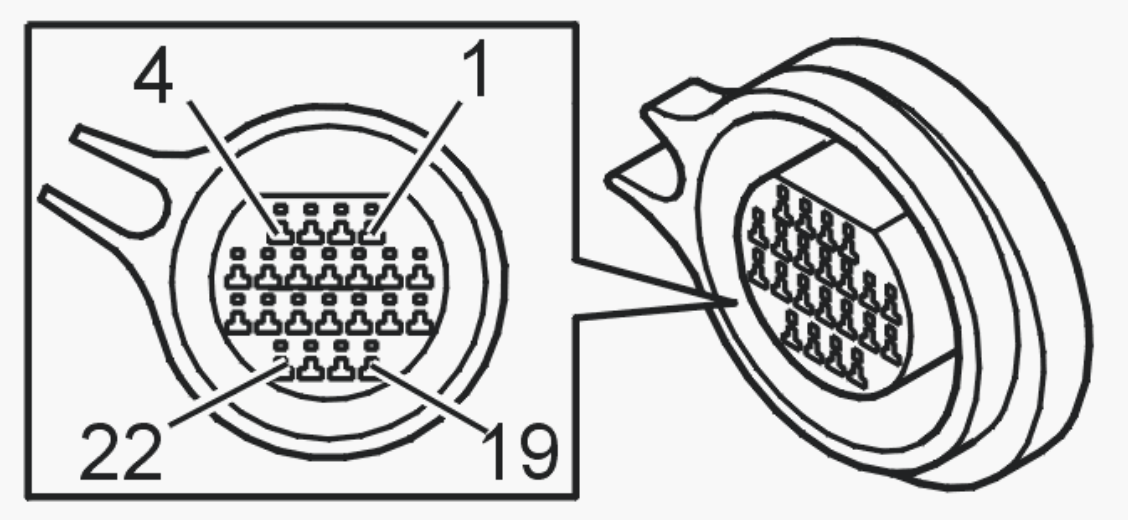


Fig. 329: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

REPLACING THE TRANSMISSION

Previous tests indicate an internal malfunction in the transmission.

Other information

- see **REPLACING THE GEARBOX**

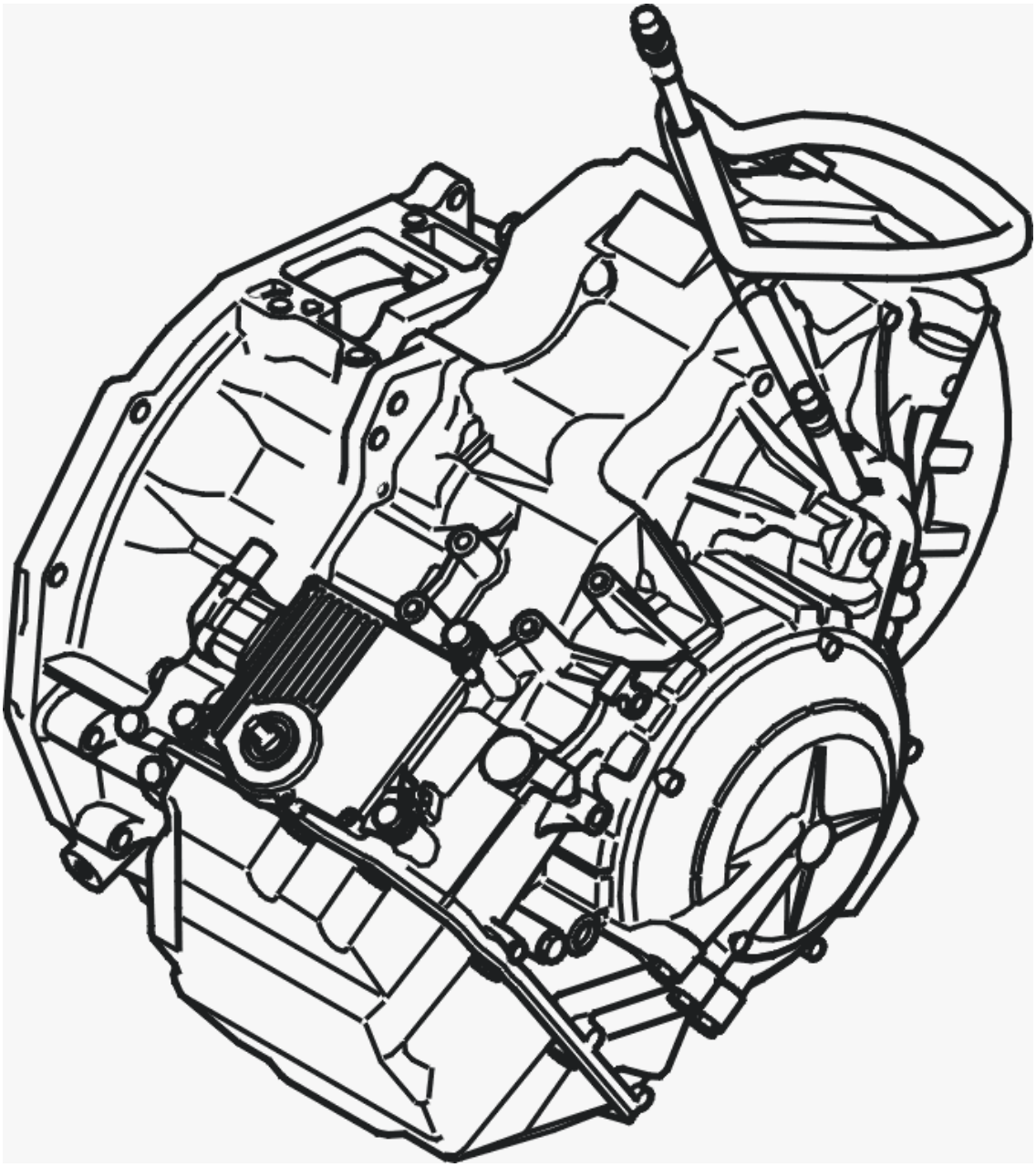


Fig. 330: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means

that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

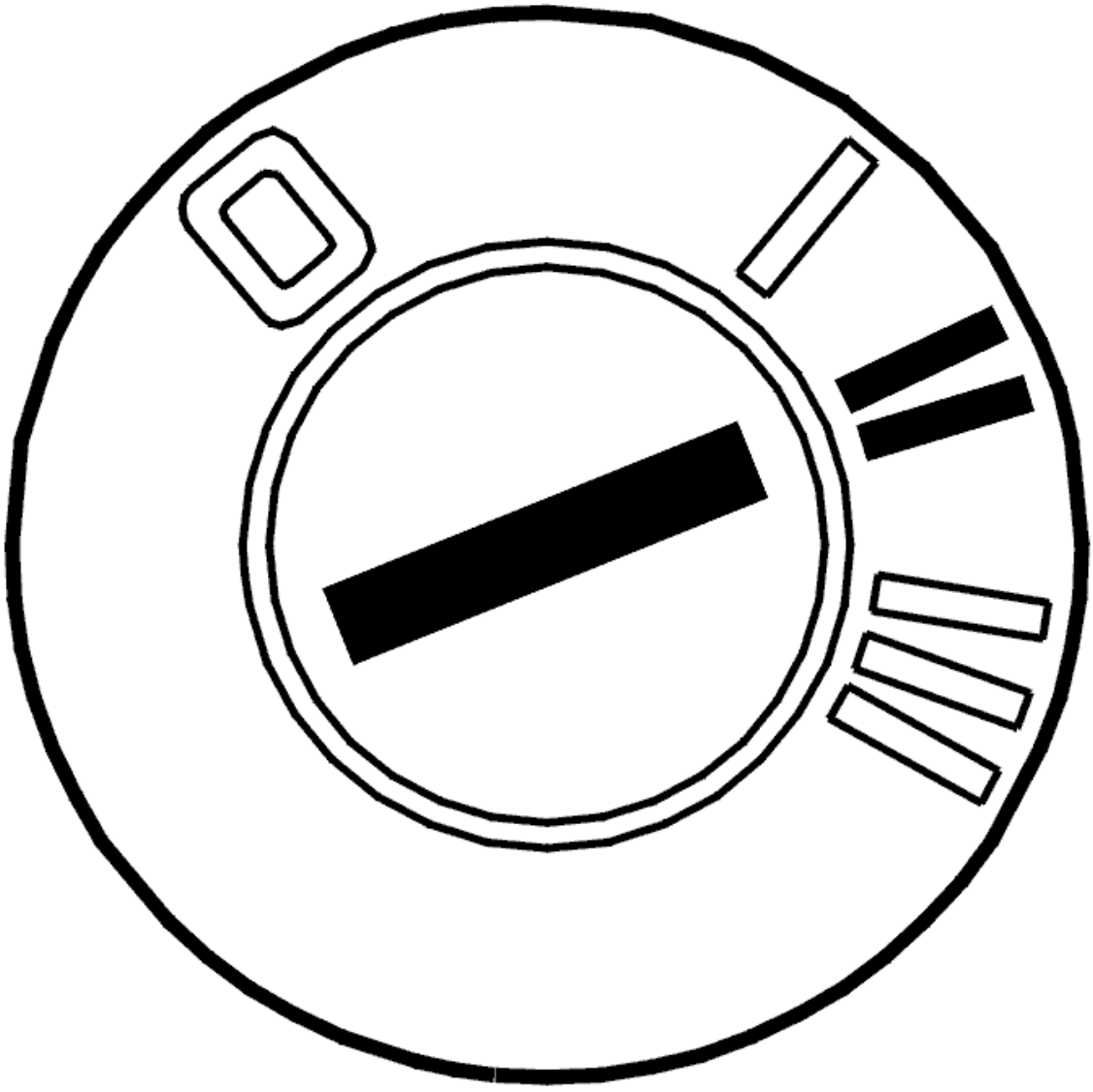


Fig. 331: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

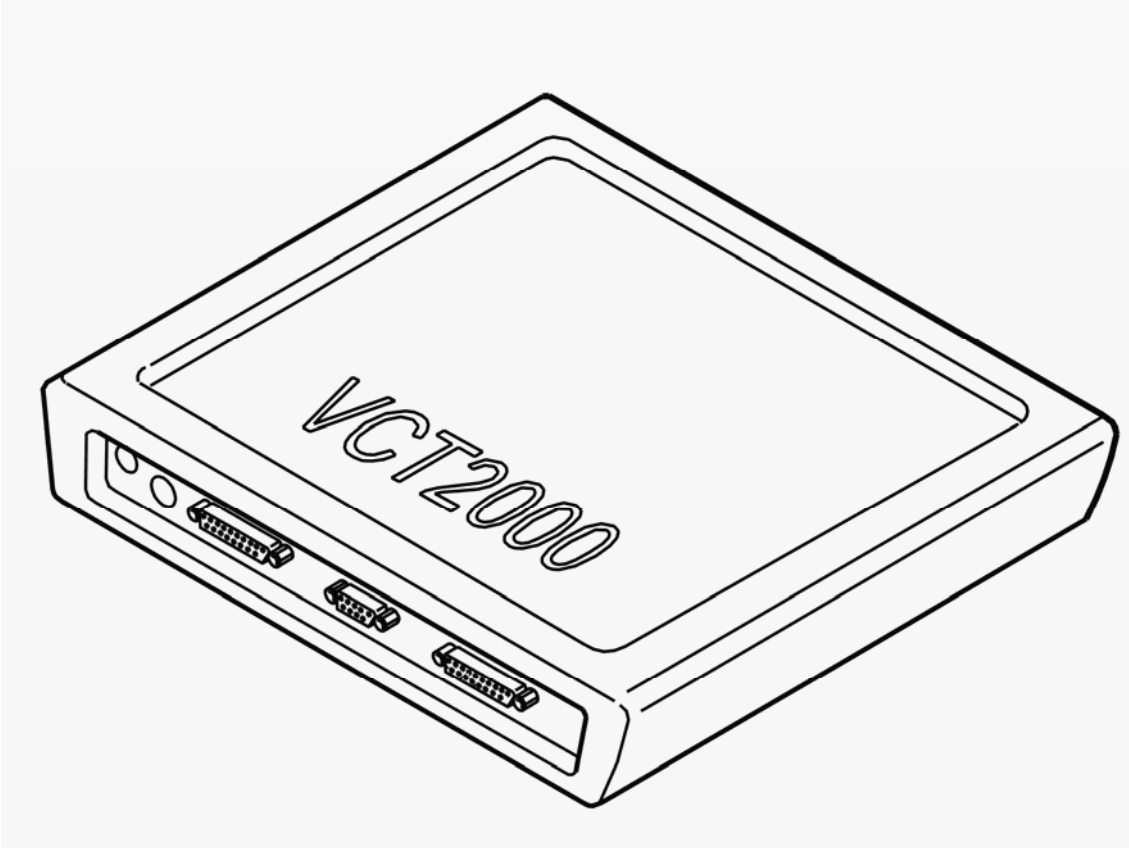


Fig. 332: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

NOTE: When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select Pause and create a bookmark. Then select Vehicle communication using Volvo Scantool (VIDA).

HINT: After carrying out the repair, check that the fault has been remedied.

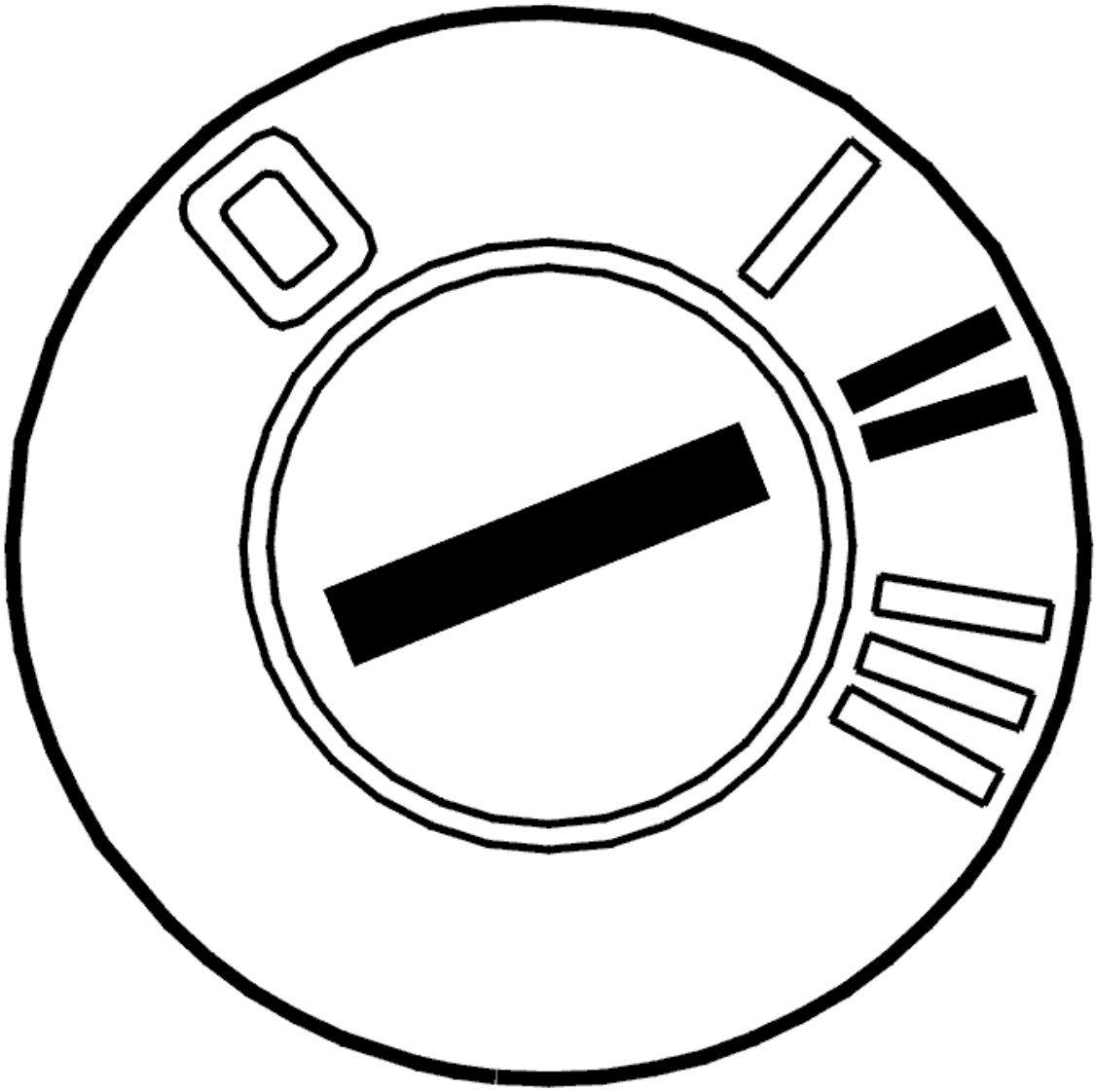


Fig. 333: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

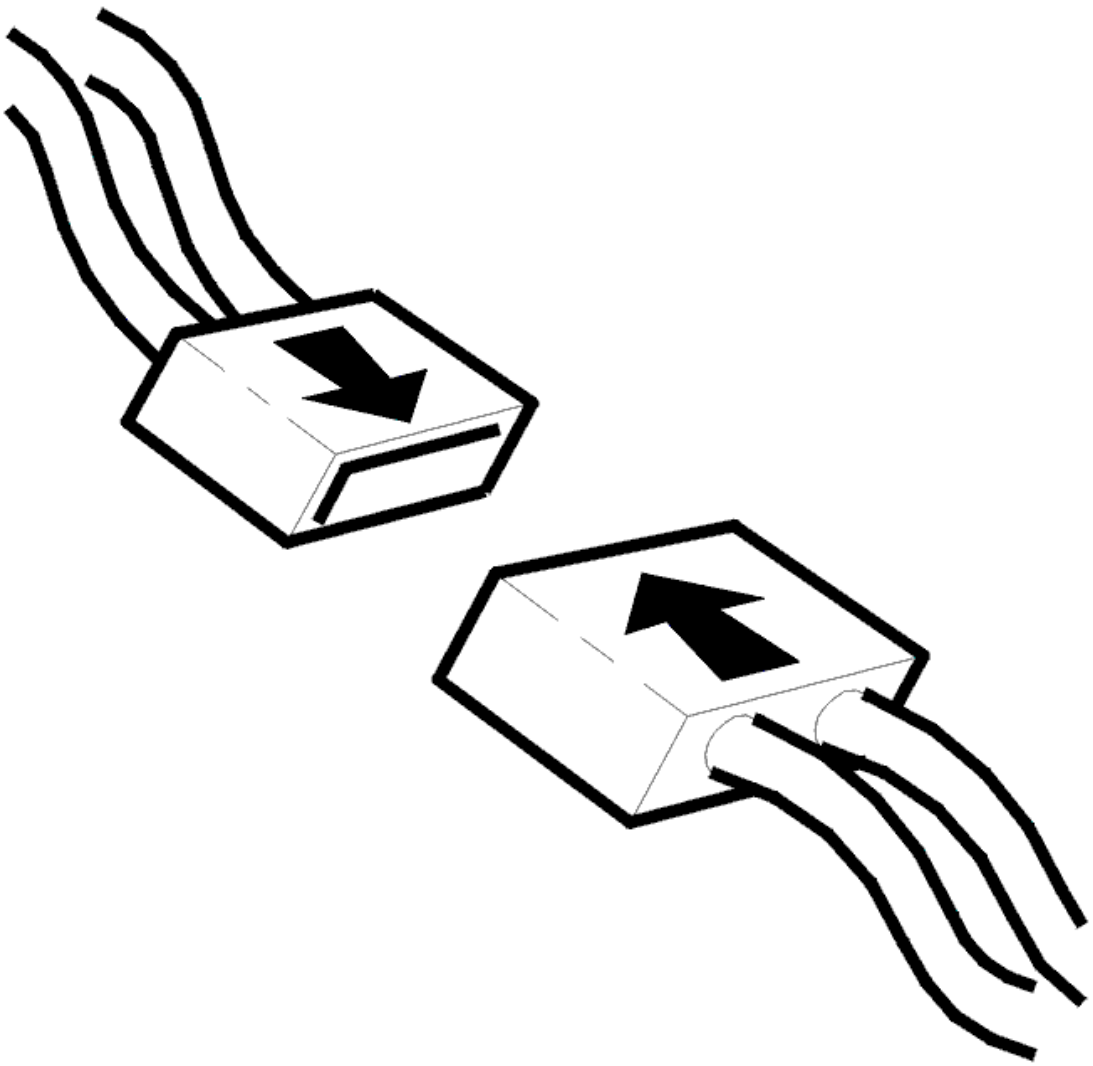


Fig. 334: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.

  Test drive the vehicle following: **TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P072900: GEAR 6 INCORRECT RATIO. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT TRACING

see **FAULT TRACING**

TCM-P073000: INCORRECT GEAR RATIO. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073000

Condition

The transmission control module (TCM) receives a signal about input and output speed from the transmission's two speed sensors. There is a determined ratio for each gear and the signals help calculate the transmission control module (TCM) gear ratio.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Transmission is in mechanical neutral position despite the gear selector being moved to **D** .

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Driving forward (gear position **D**).
- The engine speed is above 600 rpm.
- Throttle angle open more than 10%.

- Transmission's oil temperature exceeds +0 °C.
- Brake pedal unaffected.

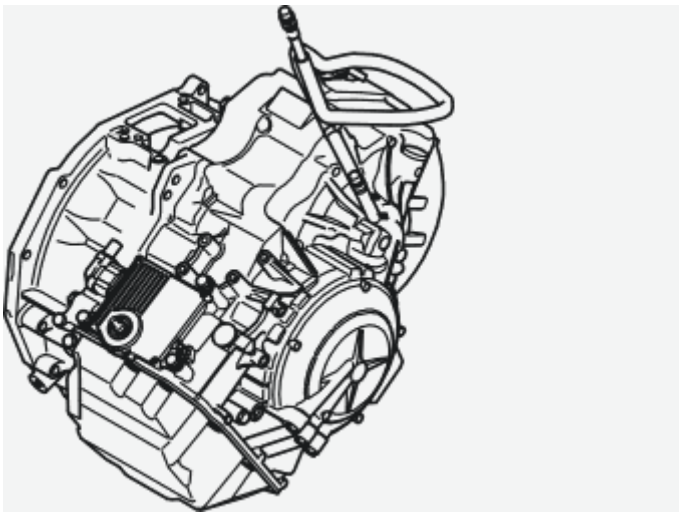


Fig. 335: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Internal malfunction in the transmission

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- No gear shift
- Abnormal slipping gearshifts

FAULT-TRACING

FAULT-TRACING INFORMATION

CHECKING THE GEAR SYSTEM

Problems that the customer may experience are hard shifts or slipping shifts. The following test-drive contains several different driving situations that may provoke these symptoms if the transmission is damaged.

NOTE: It is important that the transmission oil is above 70 °C before the test-drive starts

Test 1

1. Driving at 100 km/h, 6th gear.
2. Perform a kickdown to 4th gear.
3. Let the transmission automatically shift up to 5th gear.
4. Let up the accelerator pedal and let the transmission shift up to 6th gear.

Test 2

1. Driving at 100 km/h, 6th gear.
2. Slight uphill grade, press accelerator pedal until you obtain shifting 6-5, not kickdown.

Test 3

1. Driving at 80 km/h.
2. Move the gear selector to position M and engage 6th gear.
3. Perform a kickdown and shift 6-5, 5-4, 4-3 at the same time.
4. Then upshift immediately to 6th gear.

Test 4

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position R.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

Test 5

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position D.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

If the symptoms hard shifts or slipping shifts arise during the test-drive, the transmission's control system must be replaced.

Other information

- see **CONTROL SYSTEMS**

Is the function OK?

- **YES**

  Refer to **CHECKING SOLENOIDS**

- **NO**

  Refer to **RESETTING ADAPTATION**

CHECKS

CHECKING SOLENOIDS

Fig. 336: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between approx. 100 and 950 mA.

  Solenoid SLT, SLC2, SLC3, SLB1.

Fig. 337: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  Refer to **CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION**

- **NO**

Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

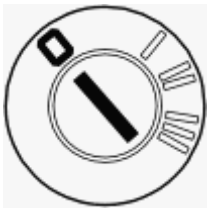


Fig. 338: Identifying Ignition In Off Position
Courtesy of VOLVO CARS CORPORATION

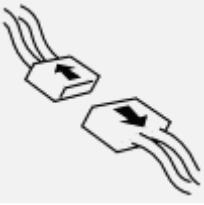


Fig. 339: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

HINT: Check solenoids SLT, SLC2, SLC3, SLB1 as described in:CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no defects were found on connectors or cables, replace the transmission.

Remedy as necessary.

Other information

- see **TRANSMISSION** (B6324S, TF-80SC; 2007-2010) or **TRANSMISSION** (B6324S, TF-80SC AWD; 2007-2010)
- see **COVER CONTROL SYSTEM, REPLACING**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access connector B:**TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

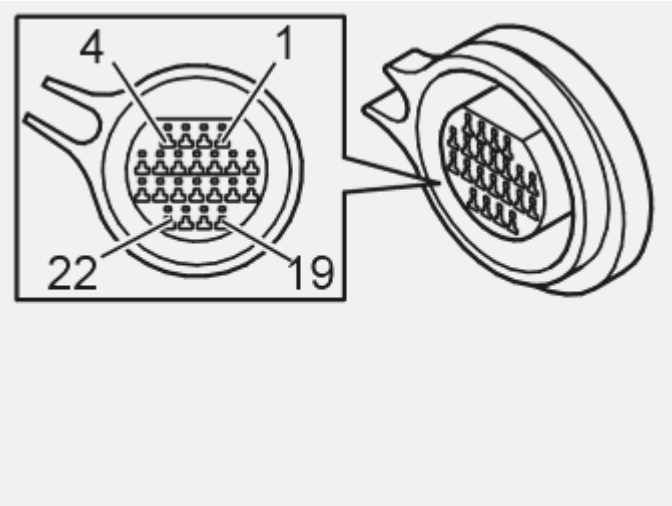


Fig. 340: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

Fig. 341: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check the transmission oil level. If the oil level is low, check the transmission for leakage, then top up with oil.

  Check the quality of the oil.

  Replace the transmission fluid if the fluid smells burnt.

  Other information

- see **OIL LEVEL, CHECKING**
- see **OIL GRADE, CHECKING**
- see **TRANSAXLE OIL**

Select an alternative:

1. No fault detected.

   Refer to **CHECKING THE COMPONENTS AND WIRING**

2. Transmission fluid replaced, low level or poor quality.

   Refer to **RESETTING ADAPTATION**

Fig. 342: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

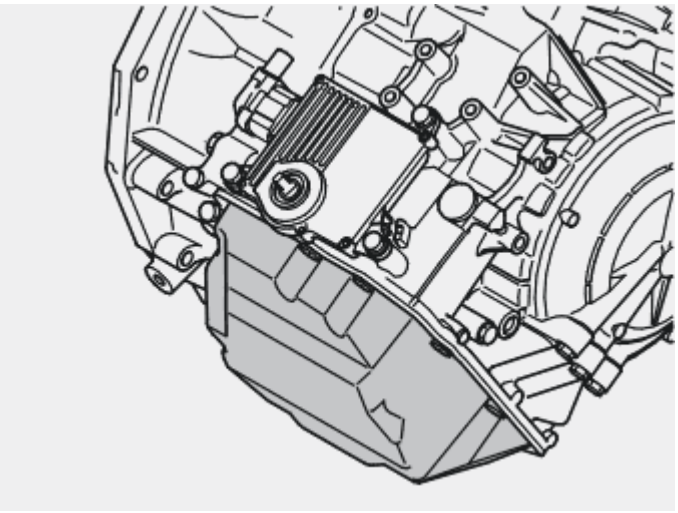


Fig. 343: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

VERIFICATION

VERIFICATION

NOTE: **When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select Pause and create a**

bookmark. Then select Vehicle communication using Volvo Scantool (VIDA).

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 344: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

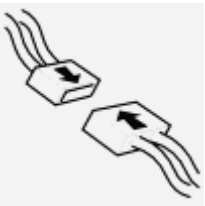


Fig. 345: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 346: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 347: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P073000: INCORRECT GEAR RATIO. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073000**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P073000: INCORRECT GEAR RATIO. GENERAL MALFUNCTION INFORMATION. NO INFORMATION ON MALFUNCTION TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073000

Condition

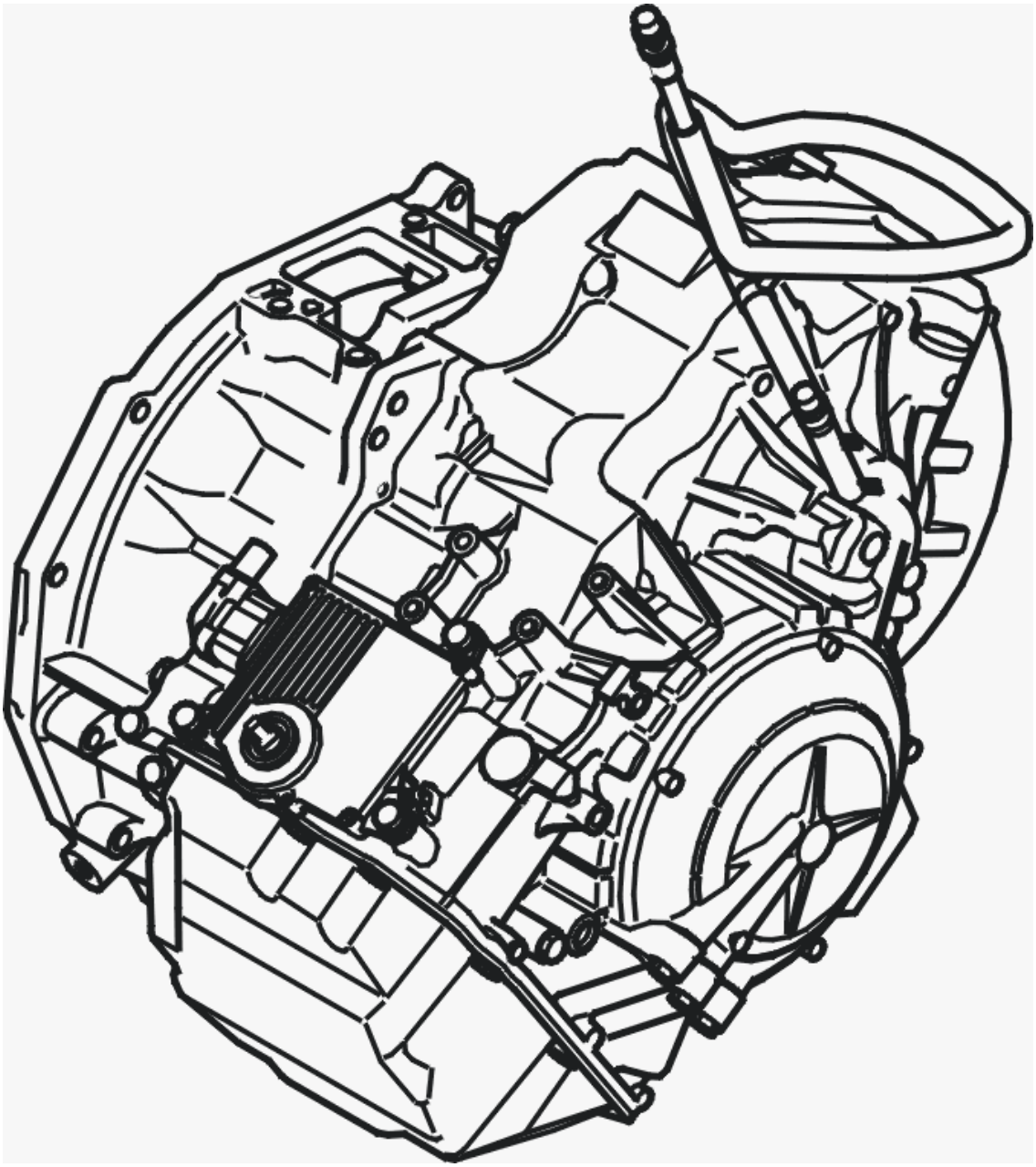


Fig. 348: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

If the transmission control module (TCM) registers that reverse or forward drive is not engaged when the gear selector is moved to position R or D, diagnostic trouble code (DTC) TCM-P170100 or TCM-P273200 depending on the cause of the fault.

The diagnostic trouble code can be diagnosed when the engine is running.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Internal malfunction in the transmission

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- No gear changing.
- Abnormal slipping gearshifts

FAULT TRACING

FAULT-TRACING INFORMATION

CHECKING THE GEAR SYSTEM

Problems that the customer may experience are hard shifts or slipping shifts. The following test-drive contains several different driving situations that may provoke these symptoms if the transmission is damaged.

NOTE: It is important that the transmission oil is above 70 °C before the test-drive starts

Test 1

1. Driving at 100 km/h, 6th gear.
2. Perform a kickdown to 4th gear.
3. Let the transmission automatically shift up to 5th gear.
4. Let up the accelerator pedal and let the transmission shift up to 6th gear.

Test 2

1. Driving at 100 km/h, 6th gear.
2. Slight uphill grade, press accelerator pedal until you obtain shifting 6-5, not kickdown.

Test 3

1. Driving at 80 km/h.
2. Move the gear selector to position M and engage 6th gear.
3. Perform a kickdown and shift 6-5, 5-4, 4-3 at the same time.
4. Then upshift immediately to 6th gear.

Test 4

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position R.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

Test 5

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position D.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

If the symptoms hard shifts or slipping shifts arise during the test-drive, the transmission's control system must be replaced.

Other information

- see **CONTROL SYSTEM, REPLACING**

Is the function OK?

- **YES**

  Refer to **CHECKING SOLENOID SLC1**

- **NO**

  Refer to **REPLACING THE CONTROL SYSTEM**

CHECKS

CHECKING SOLENOID SLC1

Fig. 349: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLC1 by clicking the VCT2000 symbol.

Read the current through the circuit for solenoid SLC1. The current should oscillate between 100 and 950 mA.

The fault is in the control system if the current does not oscillate. If the current varies and a clicking noise is heard, the control signal from the Transmission control module (TCM) and the solenoid's function is OK.

NOTE: Depending on the transaxle and oil temperature, the noise level from the solenoids may vary considerably. When the transaxle is hot or extremely cold, the noise level may be extremely low. Use a stethoscope.

HINT: To obtain a "click" more easily, move the gear selector to different positions and then try to activate the solenoid again.

Fig. 350: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

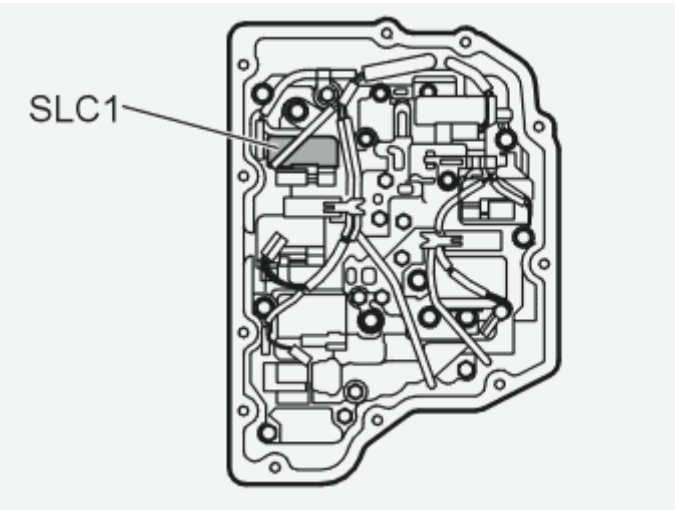


Fig. 351: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

Is the control signal of the solenoid OK?

- **YES**

  Refer to **REPLACING THE TRANSMISSION**

- **NO**

  Refer to **REPLACING THE CONTROL SYSTEM**

REPLACING THE TRANSMISSION

The transmission control module (TCM) has registered an internal malfunction in the transmission. Replace the transmission.

Other information

- see **REPLACING THE GEARBOX**

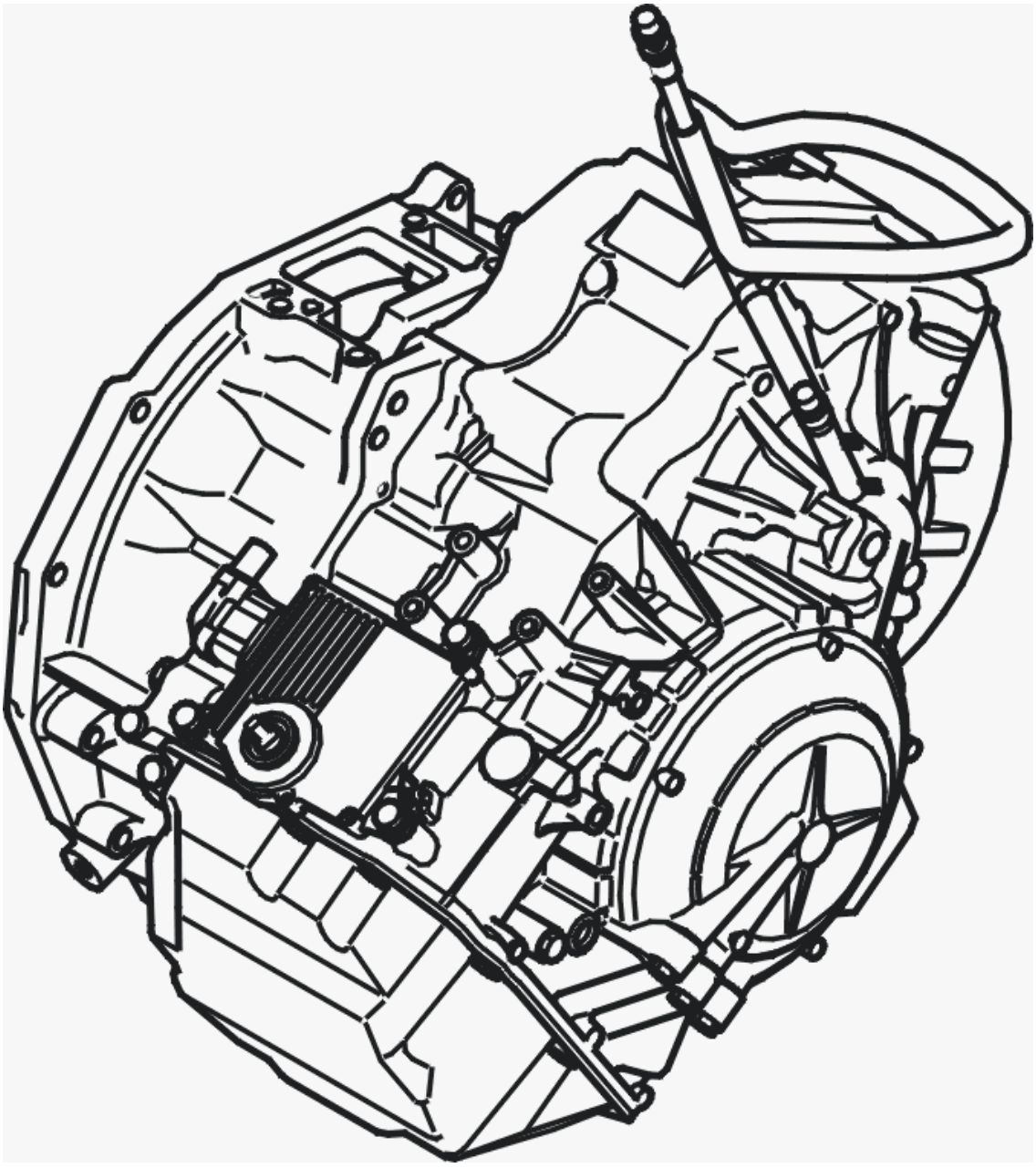


Fig. 352: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

REPLACING THE CONTROL SYSTEM

Replace control system as follows:**CONTROL SYSTEM, REPLACING**

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

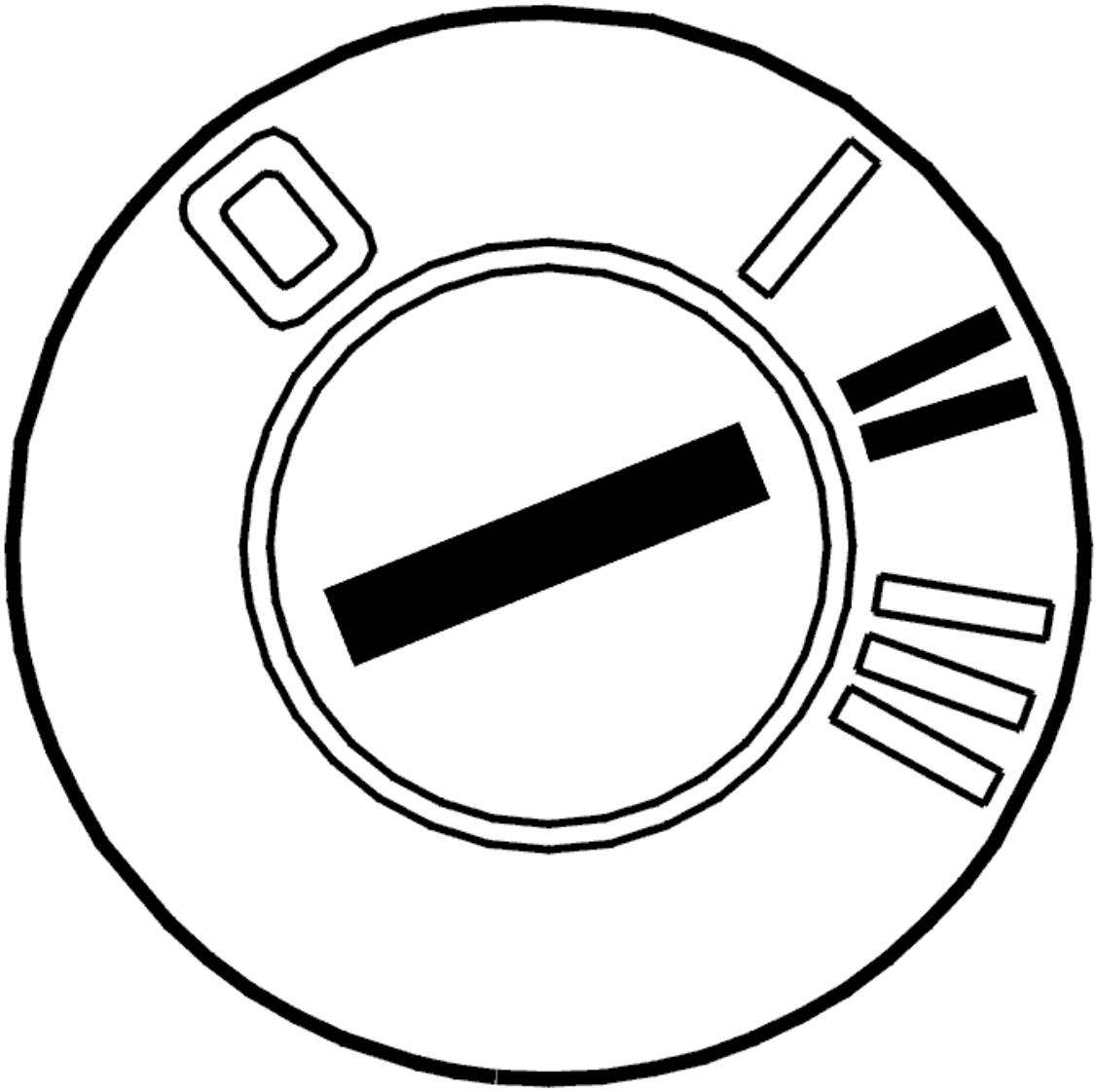


Fig. 353: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

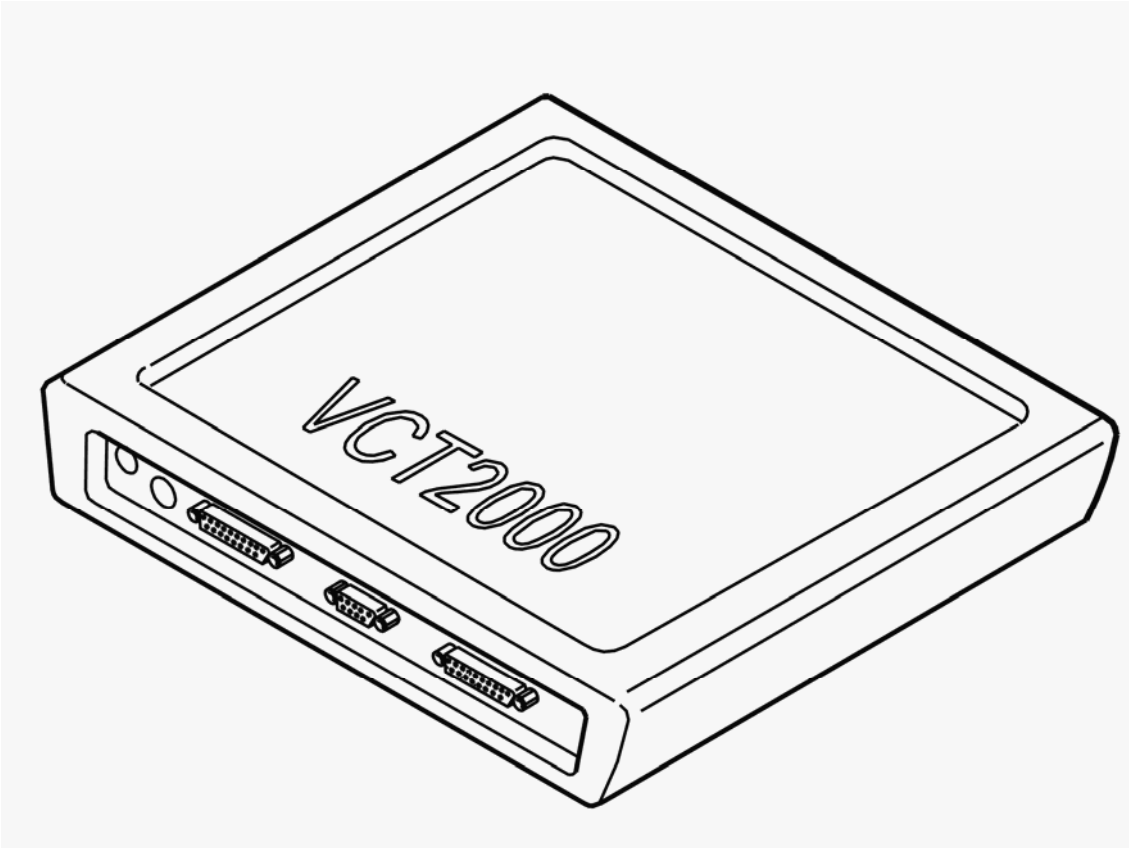


Fig. 354: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

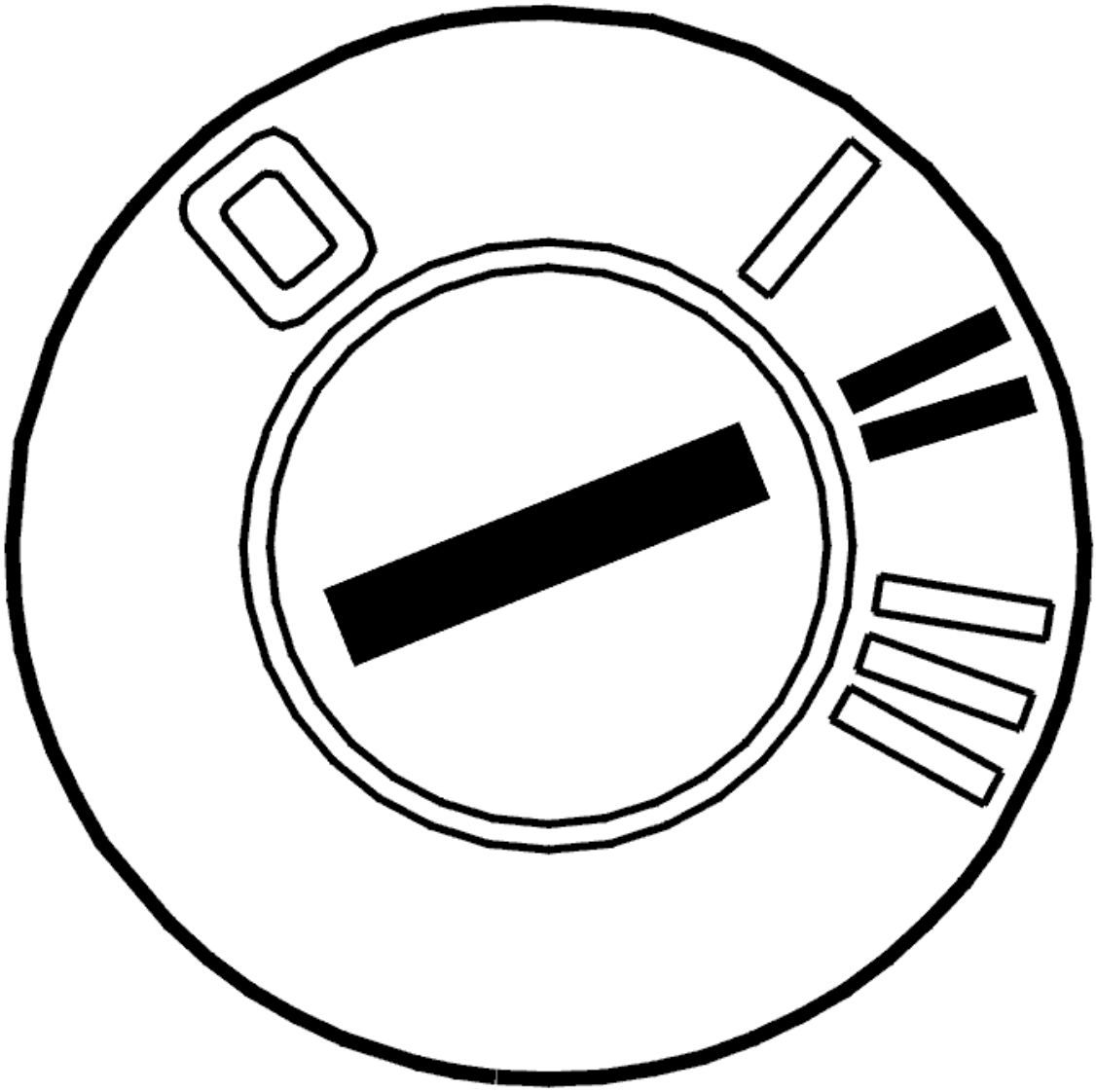


Fig. 355: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

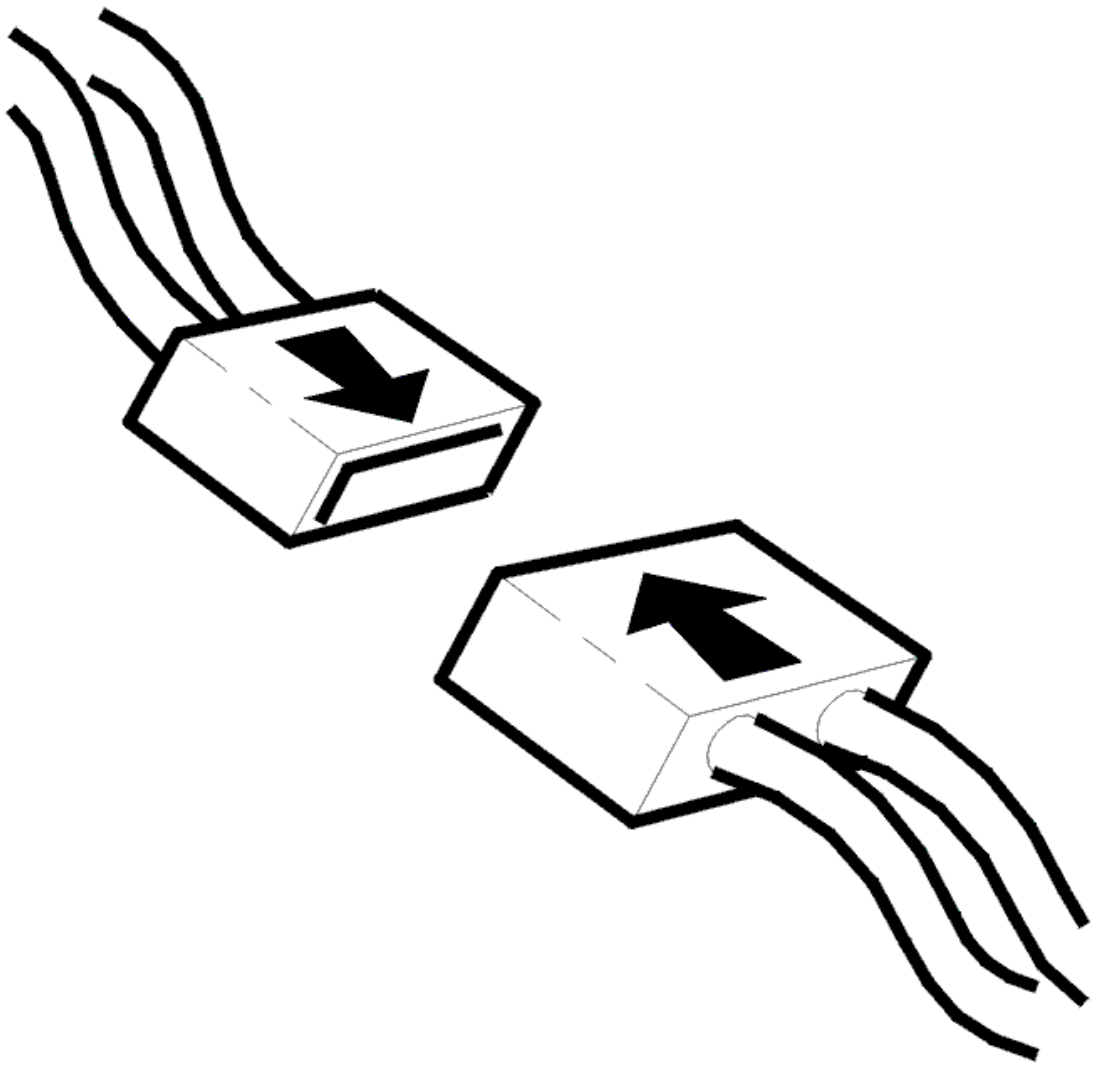


Fig. 356: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- The gear shift position sensor for the transmission must be calibrated if the control module has been disconnected.

  HINT: Save a bookmark. Cancel fault-tracing and select Vehicle communication.

- Start the engine.

  Test drive the vehicle following: **TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

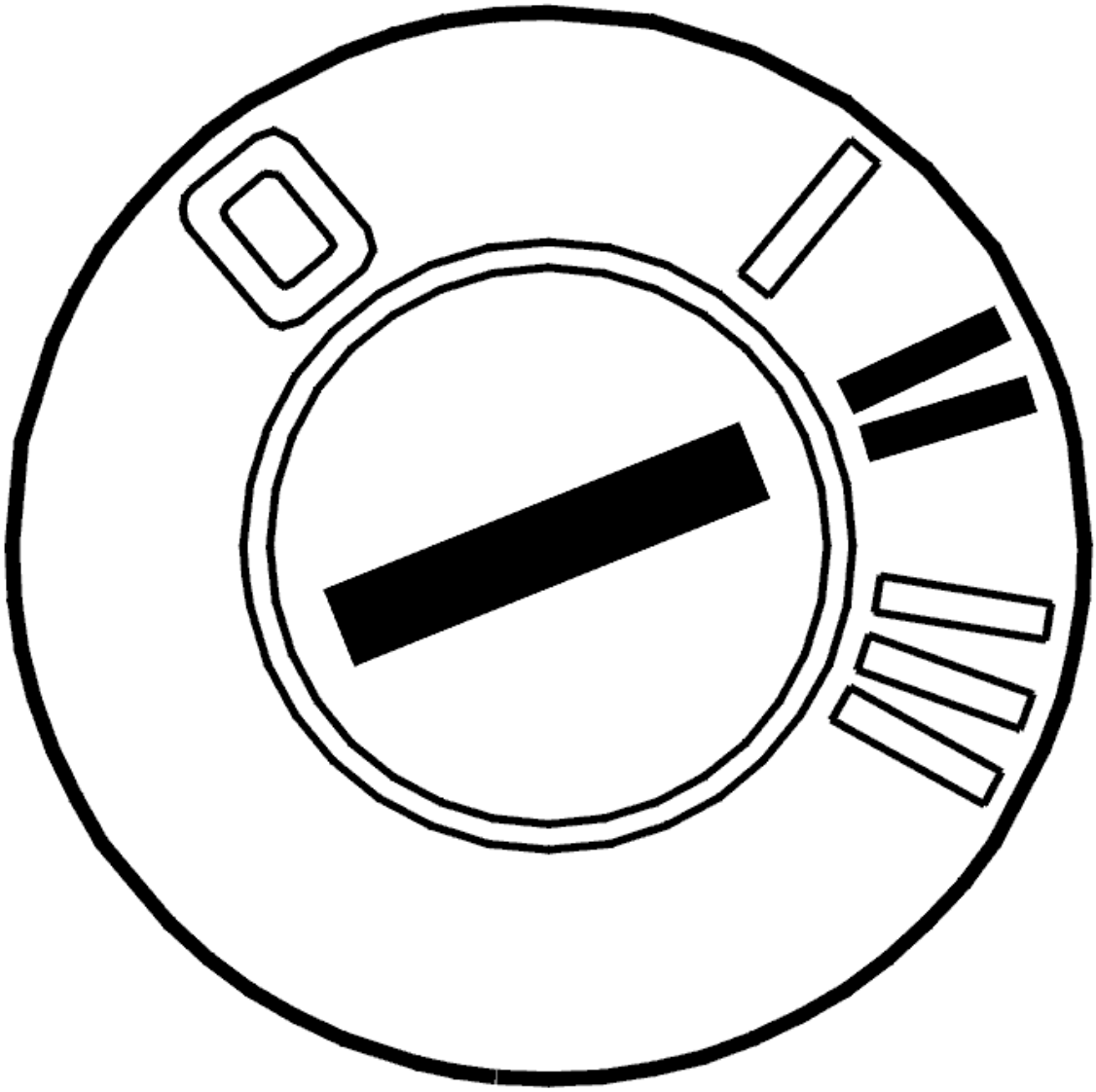


Fig. 357: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

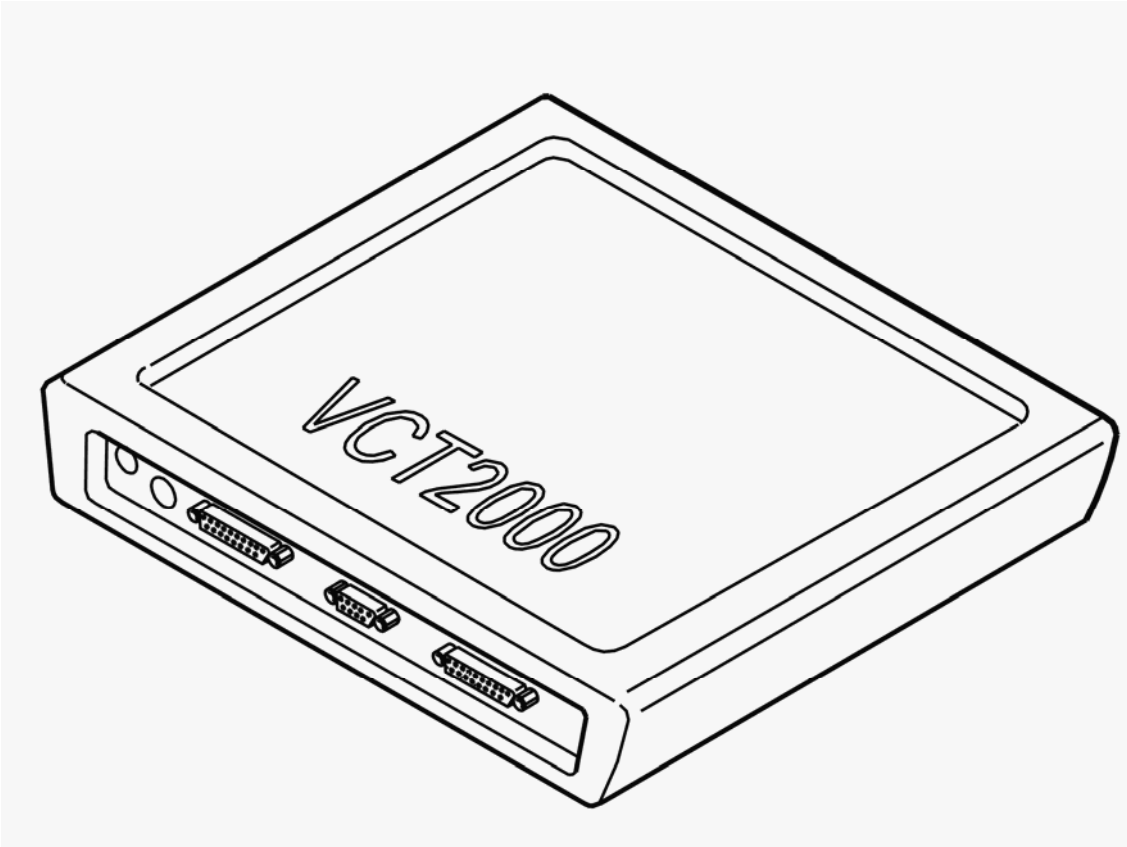


Fig. 358: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P073000: INCORRECT GEAR RATIO. GENERAL MALFUNCTION INFORMATION. NO INFORMATION ON MALFUNCTION TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073000**

FAULT TRACING

see **FAULT TRACING**

TCM-P073095: INCORRECT GEAR RATIO. COMPONENT FAILURES. INCORRECT ASSEMBLY (B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073095

Condition

Transmission control module (TCM) calculates the vehicle's speed using the signal from the transmission's speed sensor, output rpm. The calculated speed signal is compared with the speed signal that the Brake control module (BCM) transmits on the CAN network. Both signals should have approximately the same value.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The calculated speed between the transmission output speed signal and the speed signal from the brake control module (BCM) differ.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Normal driving.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

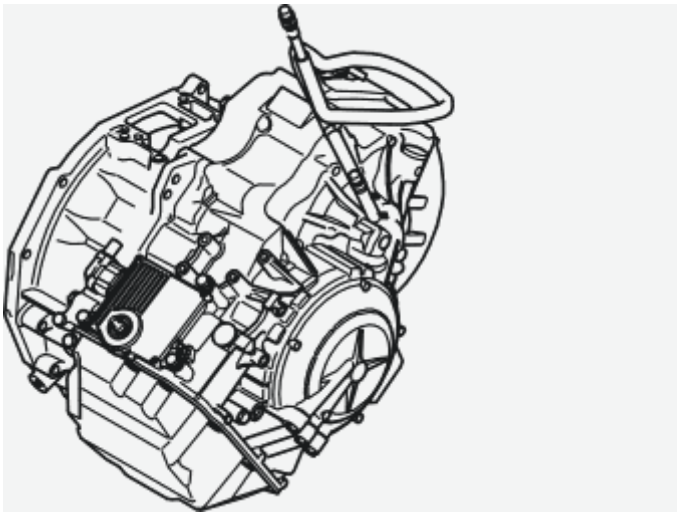


Fig. 359: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- None.

Possible Source

- Incorrect final drive installed.

Fault symptom[s]

- General warning lamp lit
- Irregular gear shift

FAULT-TRACING

FAULT-TRACING INFORMATION

The diagnostic trouble code is generated if a final drive not designed for the vehicle has been installed. Check the part number of the final drive. Replace the final drive if it is not the right one.

TCM-P073095: INCORRECT GEAR RATIO. COMPONENT FAILURES. INCORRECT ASSEMBLY (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073095

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073095**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P073100: GEAR 1 INCORRECT RATIO. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073100

Condition

The transmission control module (TCM) receives a signal about input and output speed from the transmission's two speed sensors. There is a determined ratio for each gear and the signals help calculate the transmission control module (TCM) gear ratio.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Gear ratio differs by more than 10%.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Fluid temperature over +20 °C (68 °F).
- 1st gear is engaged, engine speed is between 250 and 1350 rpm, accelerator pedal position is greater than 10% and the gear ratio is 4.148 +/- 20%.

NOTE: The control module can only detect the fault once the test has been started and

the diagnostic trouble code (DTC) is stored when the conditions are met.

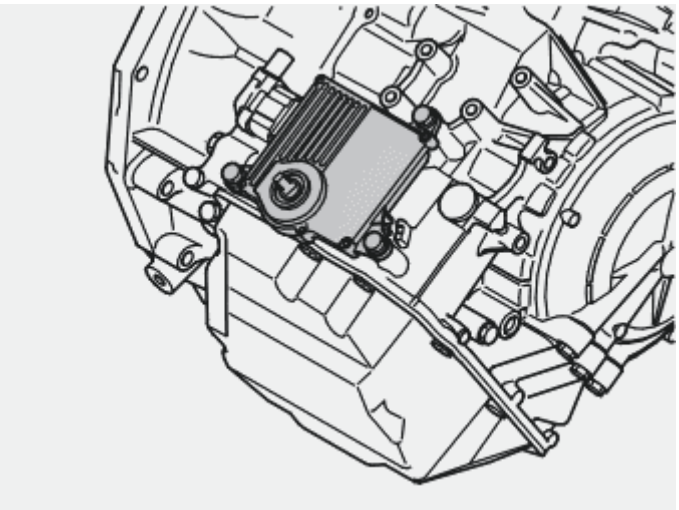


Fig. 360: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 2** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance or one of the solenoids controlling in an incorrect manner.
  - Circuit for the solenoid:SLT, SLC2, SLC3, SLB1
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- Abnormal slipping gearshifts
- Rough gear shift
- No gear shift

FAULT-TRACING

FAULT-TRACING INFORMATION

CHECKING THE GEAR SYSTEM

Problems that the customer may experience are hard shifts or slipping shifts. The following test-drive contains several different driving situations that may provoke these symptoms if the transmission is damaged.

NOTE: It is important that the transmission oil is above 70 °C before the test-drive starts

Test 1

1. Driving at 100 km/h, 6th gear.
2. Perform a kickdown to 4th gear.
3. Let the transmission automatically shift up to 5th gear.
4. Let up the accelerator pedal and let the transmission shift up to 6th gear.

Test 2

1. Driving at 100 km/h, 6th gear.
2. Slight uphill grade, press accelerator pedal until you obtain shifting 6-5, not kickdown.

Test 3

1. Driving at 80 km/h.
2. Move the gear selector to position M and engage 6th gear.
3. Perform a kickdown and shift 6-5, 5-4, 4-3 at the same time.
4. Then upshift immediately to 6th gear.

Test 4

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position R.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

Test 5

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position D.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

If the symptoms hard shifts or slipping shifts arise during the test-drive, the transmission's control system must be replaced.

Other information

- see **CONTROL SYSTEMS**

Is the function OK?

- **YES**

  Refer to **CHECKING SOLENOIDS**

- **NO**

  Refer to **RESETTING ADAPTATION**

CHECKS

CHECKING SOLENOIDS

Fig. 361: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between approx. 100 and 950 mA.

  Solenoid SLT, SLC2, SLC3, SLB1.

Fig. 362: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

Refer to **CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION**

- **NO**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

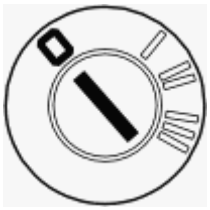


Fig. 363: Identifying Ignition In Off Position
Courtesy of VOLVO CARS CORPORATION

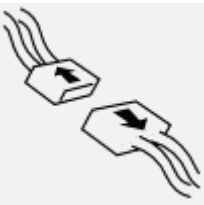


Fig. 364: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  HINT: Check solenoids SLT, SLC2, SLC3, SLB1 as described in:CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

  If no defects were found on connectors or cables, replace the transmission.

  Remedy as necessary.

  Other information

  - see **TRANSMISSION** (B6324S, TF-80SC; 2007-2010) or **TRANSMISSION** (B6324S, TF-80SC AWD; 2007-2010)
  - see **COVER CONTROL SYSTEM, REPLACING**
  - see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
  - To access connector B:**TRANSMISSION CONTROL MODULE (TCM)**
  - see **CHECKING WIRING AND TERMINALS**

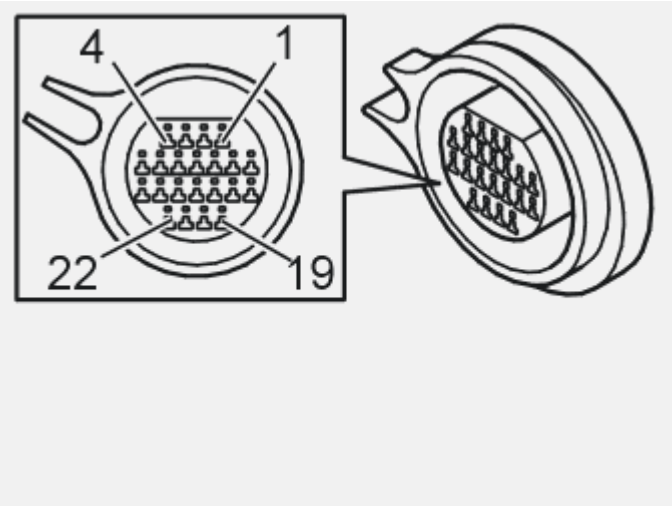


Fig. 365: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

Fig. 366: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check the transmission oil level. If the oil level is low, check the transmission for leakage, then top up with oil.

  Check the quality of the oil.

  Replace the transmission fluid if the fluid smells burnt.

  Other information

- see **OIL LEVEL, CHECKING**
- see **OIL GRADE, CHECKING**
- see **TRANSAXLE OIL**

Select an alternative:

1. No fault detected.

   Refer to **CHECKING THE COMPONENTS AND WIRING**

2. Transmission fluid replaced, low level or poor quality.

   Refer to **RESETTING ADAPTATION**

Fig. 367: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

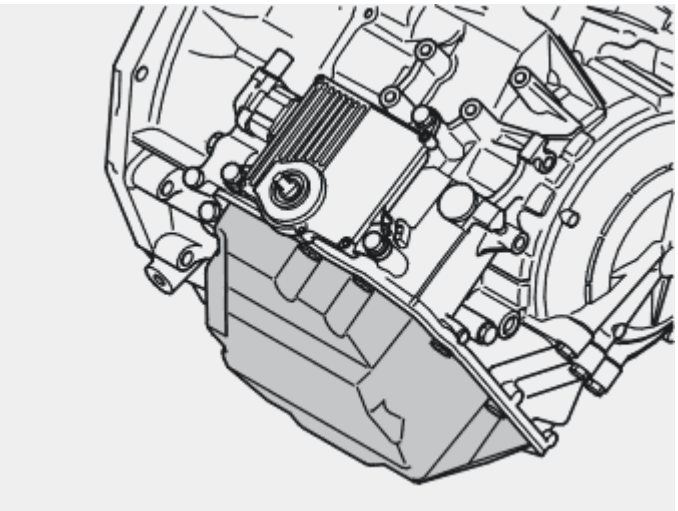


Fig. 368: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it

possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 369: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 370: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

NOTE: When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select Pause and create a bookmark. Then select Vehicle communication using Volvo Scantool (VIDA).

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 371: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

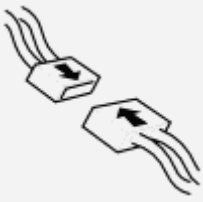


Fig. 372: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TRANSMISSION

Transmission - Diagnostic Trouble Codes and Associated Procedures

TCM-P073100: GEAR 1 INCORRECT RATIO. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073100**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P073200: GEAR 2 INCORRECT RATIO. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073200

Condition

The transmission control module (TCM) receives a signal about input and output speed from the transmission's two speed sensors. There is a determined ratio for each gear and the signals help calculate the transmission control module (TCM) gear ratio.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Gear ratio differs by more than 10%.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Fluid temperature over +20 °C (68 °F).
- 2nd gear is engaged, engine speed is greater than 500 rpm, accelerator pedal position is greater than 10% and the gear ratio is 2.370 +/- 20%.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

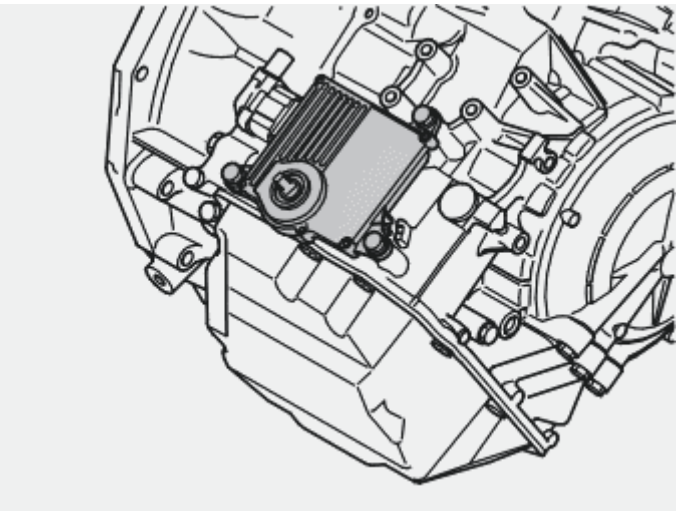


Fig. 1: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 2** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance or one of the solenoids controlling in an incorrect manner.
  - Circuit for the solenoid:SLT, SLC2, SLC3
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- Abnormal slipping gearshifts
- Rough gear shift
- No gear shift

FAULT-TRACING

FAULT-TRACING INFORMATION

CHECKING THE GEAR SYSTEM

Problems that the customer may experience are hard shifts or slipping shifts. The following test-drive contains several different driving situations that may provoke these symptoms if the transmission is damaged.

NOTE: It is important that the transmission oil is above 70 °C before the test-drive starts

Test 1

1. Driving at 100 km/h, 6th gear.
2. Perform a kickdown to 4th gear.
3. Let the transmission automatically shift up to 5th gear.
4. Let up the accelerator pedal and let the transmission shift up to 6th gear.

Test 2

1. Driving at 100 km/h, 6th gear.
2. Slight uphill grade, press accelerator pedal until you obtain shifting 6-5, not kickdown.

Test 3

1. Driving at 80 km/h.
2. Move the gear selector to position M and engage 6th gear.
3. Perform a kickdown and shift 6-5, 5-4, 4-3 at the same time.
4. Then upshift immediately to 6th gear.

Test 4

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position R.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

Test 5

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position D.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

If the symptoms hard shifts or slipping shifts arise during the test-drive, the transmission's control system must be replaced.

Other information

- see **CONTROL SYSTEMS**

Is the function OK?

- **YES**

  Refer to **CHECKING SOLENOIDS**

- **NO**

  Refer to **RESETTING ADAPTATION**

CHECKING SOLENOIDS

Fig. 2: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between approx. 100 and 950 mA.

  Solenoid SLT, SLC2, SLC3.

Fig. 3: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  Refer to **CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION**

- **NO**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

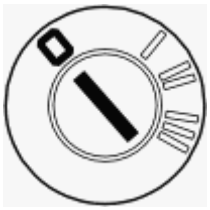


Fig. 4: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

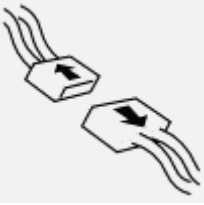


Fig. 5: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

HINT: Check solenoids SLT, SLC2, SLC3 as described in:CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no defects were found on connectors or cables, replace the transmission.

Remedy as necessary.

Other information

- see **TRANSMISSION** or **TRANSMISSION** (AWD)
- see **COVER CONTROL SYSTEM, REPLACING**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

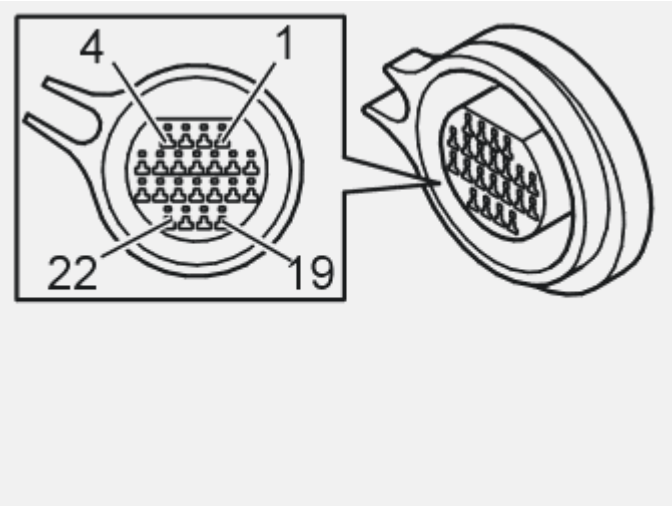


Fig. 6: Identifying 22--Pin Connector
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

Fig. 7: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check the transmission oil level. If the oil level is low, check the transmission for leakage, then top up with oil.

  Check the quality of the oil.

  Replace the transmission fluid if the fluid smells burnt.

  Other information

- see **OIL LEVEL, CHECKING**
- see **OIL GRADE, CHECKING**
- see **TRANSAXLE OIL**

Select an alternative below

1. No fault detected.

   Refer to **CHECKING THE COMPONENTS AND WIRING**

2. Transmission fluid replaced, low level or poor quality.

   Refer to **RESETTING ADAPTATION**

Fig. 8: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

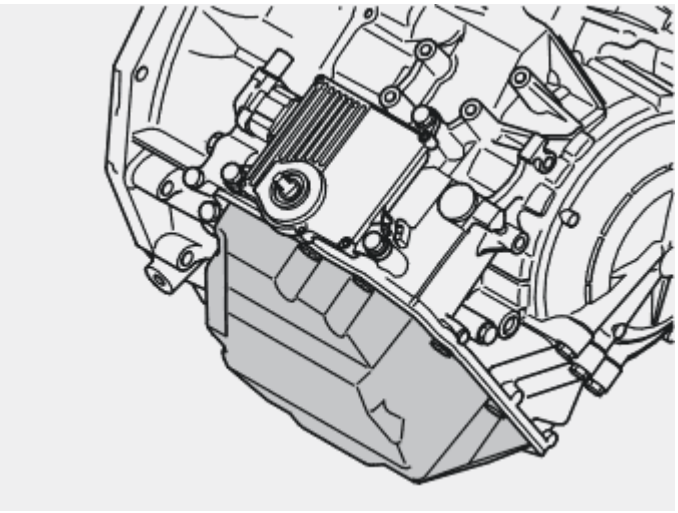


Fig. 9: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

VERIFICATION

VERIFICATION

NOTE: When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select Pause and create a

bookmark. Then select Vehicle communication.

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 10: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

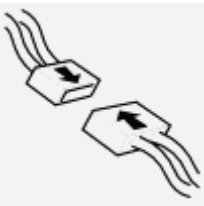


Fig. 11: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 12: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 13: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P073200: GEAR 2 INCORRECT RATIO. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073200

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073200**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P073300: GEAR 3 INCORRECT RATIO. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073300

Condition

The transmission control module (TCM) receives a signal about input and output speed from the transmission's two speed sensors. There is a determined ratio for each gear and the signals help calculate the transmission control module (TCM) gear ratio.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Gear ratio differs by more than 10%.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Fluid temperature over +20 °C (68 °F).
- 3rd gear is engaged, engine speed is greater than 500 rpm, accelerator pedal position is greater than 10% and the gear ratio is 1.556 +/- 20%.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

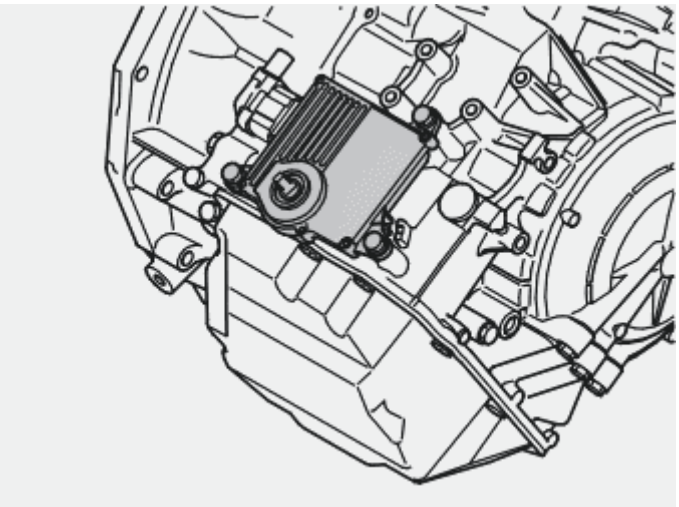


Fig. 14: Identifying Transmission Control Module (TCM)

Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 2** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance or one of the solenoids controlling in an incorrect manner.
  - Circuit for the solenoid:SLT, SLC2, SLB1
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- Abnormal slipping gearshifts
- Rough gear shift
- No gear shift

FAULT-TRACING

FAULT-TRACING INFORMATION

CHECKING THE GEAR SYSTEM

Problems that the customer may experience are hard shifts or slipping shifts. The following test-drive contains several different driving situations that may provoke these symptoms if the transmission is damaged.

NOTE: It is important that the transmission oil is above 70 °C before the test-drive starts

Test 1

1. Driving at 100 km/h, 6th gear.
2. Perform a kickdown to 4th gear.
3. Let the transmission automatically shift up to 5th gear.
4. Let up the accelerator pedal and let the transmission shift up to 6th gear.

Test 2

1. Driving at 100 km/h, 6th gear.

2. Slight uphill grade, press accelerator pedal until you obtain shifting 6-5, not kickdown.

Test 3

1. Driving at 80 km/h.
2. Move the gear selector to position M and engage 6th gear.
3. Perform a kickdown and shift 6-5, 5-4, 4-3 at the same time.
4. Then upshift immediately to 6th gear.

Test 4

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position R.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

Test 5

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position D.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

If the symptoms hard shifts or slipping shifts arise during the test-drive, the transmission's control system must be replaced.

Other information

- see **CONTROL SYSTEMS**

Is the function OK?

- **YES**

  Refer to **CHECKING SOLENOIDS**

- **NO**

  Refer to **RESETTING ADAPTATION**

CHECKING SOLENOIDS

Fig. 15: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between approx. 100 and 950 mA.

  Solenoid SLT, SLC2, SLB1.

Fig. 16: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  Refer to **CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION**

- **NO**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

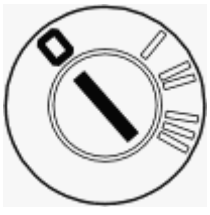


Fig. 17: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

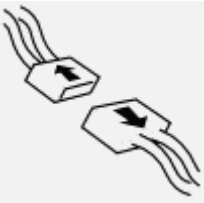


Fig. 18: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

HINT: Check solenoids SLT, SLC2, SLB1 as described in:CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no defects were found on connectors or cables, replace the transmission.

Remedy as necessary.

Other information

- see **TRANSMISSION** or **TRANSMISSION** (AWD)
- see **COVER CONTROL SYSTEM, REPLACING**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

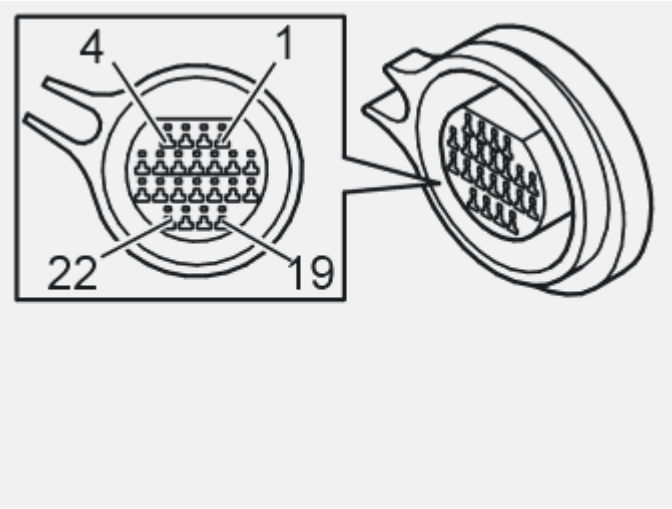


Fig. 19: Identifying 22--Pin Connector
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

Fig. 20: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check the transmission oil level. If the oil level is low, check the transmission for leakage, then top up with oil.

  Check the quality of the oil.

  Replace the transmission fluid if the fluid smells burnt.

  Other information

  - see **OIL LEVEL, CHECKING**
  - see **OIL GRADE, CHECKING**
  - see **TRANSAXLE OIL**

  Select an alternative below

  1. No fault detected.

     Refer to **CHECKING THE COMPONENTS AND WIRING**

  2. Transmission fluid replaced, low level or poor quality.

     Refer to **RESETTING ADAPTATION**

Fig. 21: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

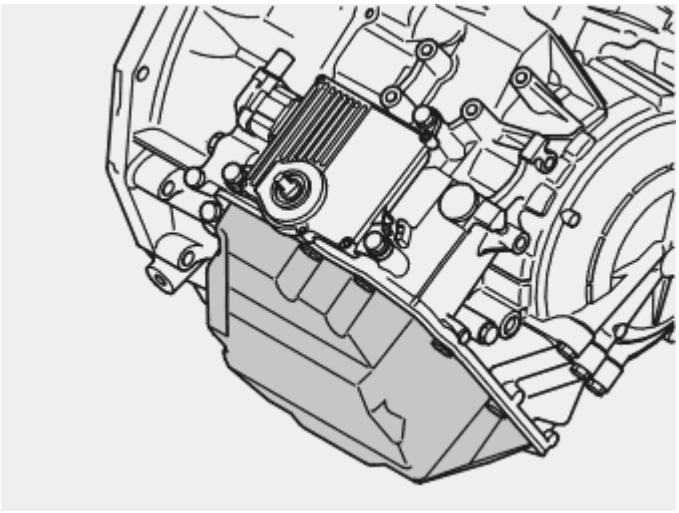


Fig. 22: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

VERIFICATION

VERIFICATION

NOTE: When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select Pause and create a bookmark. Then select Vehicle communication.

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 23: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

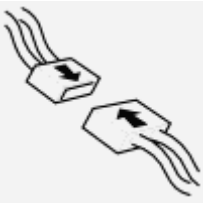


Fig. 24: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 25: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

  Fig. 26: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
  Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P073300: GEAR 3 INCORRECT RATIO. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073300

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073300**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P073400: GEAR 4 INCORRECT RATIO. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073400

Condition

The transmission control module (TCM) receives a signal about input and output speed from the transmission's two speed sensors. There is a determined ratio for each gear and the signals help calculate the transmission control module (TCM) gear ratio.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Gear ratio differs by more than 10%.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Fluid temperature over +20 °C (68 °F).
- 4th gear is engaged, engine speed is greater than 500 rpm, accelerator pedal position is greater than 10% and the gear ratio is 1.155 +/- 20%.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

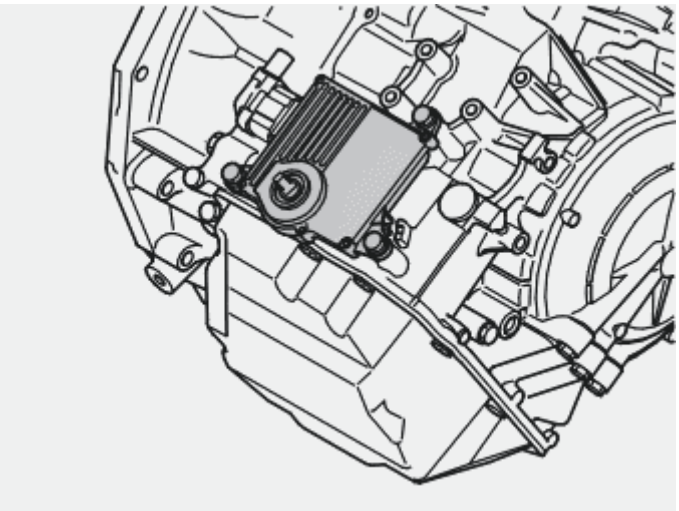


Fig. 27: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 2** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance or one of the solenoids controlling in an incorrect manner.
  - Circuit for the solenoid:SLT, SLC2, SLC3, SLB1

- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- Abnormal slipping gearshifts
- Rough gear shift
- No gear shift

FAULT-TRACING

FAULT-TRACING INFORMATION

CHECKING THE GEAR SYSTEM

Problems that the customer may experience are hard shifts or slipping shifts. The following test-drive contains several different driving situations that may provoke these symptoms if the transmission is damaged.

NOTE: It is important that the transmission oil is above 70 °C before the test-drive starts

Test 1

1. Driving at 100 km/h, 6th gear.
2. Perform a kickdown to 4th gear.
3. Let the transmission automatically shift up to 5th gear.
4. Let up the accelerator pedal and let the transmission shift up to 6th gear.

Test 2

1. Driving at 100 km/h, 6th gear.
2. Slight uphill grade, press accelerator pedal until you obtain shifting 6-5, not kickdown.

Test 3

1. Driving at 80 km/h.
2. Move the gear selector to position M and engage 6th gear.
3. Perform a kickdown and shift 6-5, 5-4, 4-3 at the same time.
4. Then upshift immediately to 6th gear.

Test 4

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position R.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

Test 5

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position D.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

If the symptoms hard shifts or slipping shifts arise during the test-drive, the transmission's control system must be replaced.

Other information

- see **CONTROL SYSTEMS**

Is the function OK?

- **YES**

  Refer to **CHECKING SOLENOIDS**

- **NO**

  Refer to **RESETTING ADAPTATION**

CHECKING SOLENOIDS

Fig. 28: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between

approx. 100 and 950 mA.

Solenoid SLT, SLC3, SLB1.

Fig. 29: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  Refer to **CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION**

- **NO**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

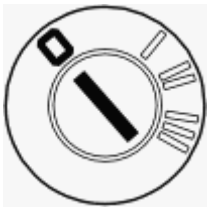


Fig. 30: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

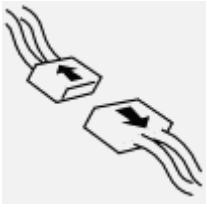


Fig. 31: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

HINT: Check solenoids SLT, SLC3, SLB1 as described in:CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no defects were found on connectors or cables, replace the transmission.

Remedy as necessary.

Other information

- see **TRANSMISSION** (AWD) or **TRANSMISSION**
- see **COVER CONTROL SYSTEM, REPLACING**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

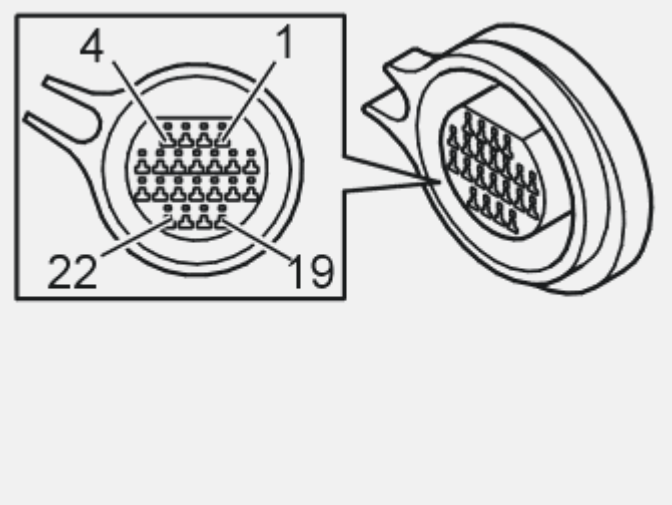


Fig. 32: Identifying 22--Pin Connector
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

Fig. 33: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check the transmission oil level. If the oil level is low, check the transmission for leakage, then top up with oil.

  Check the quality of the oil.

  Replace the transmission fluid if the fluid smells burnt.

  Other information

  - see **OIL LEVEL, CHECKING**
  - see **OIL GRADE, CHECKING**
  - see **TRANSAXLE OIL**

  Select an alternative below

  1. No fault detected.

     Refer to **CHECKING THE COMPONENTS AND WIRING**

  2. Transmission fluid replaced, low level or poor quality.

     Refer to **RESETTING ADAPTATION**

Fig. 34: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

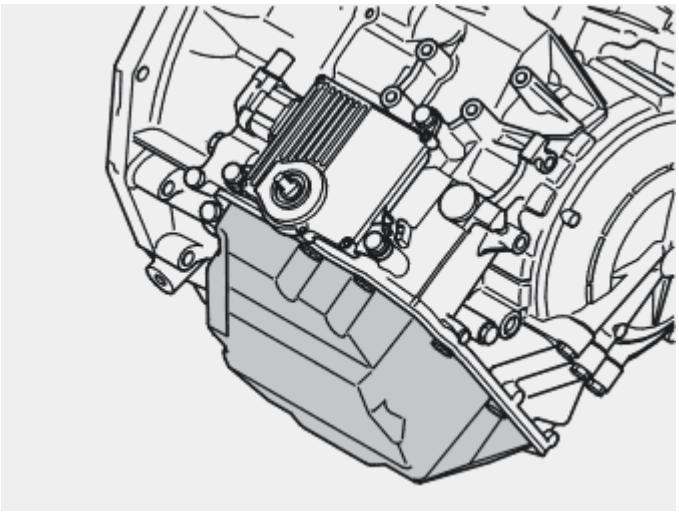


Fig. 35: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

VERIFICATION

VERIFICATION

NOTE: **When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select Pause and create a bookmark. Then select Vehicle communication.**

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 36: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

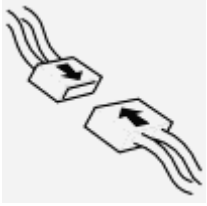


Fig. 37: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.

- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

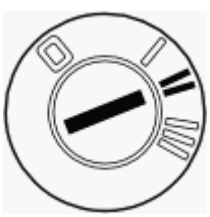


Fig. 38: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 39: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P073400: GEAR 4 INCORRECT RATIO. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073400

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073400**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P073500: GEAR 5 INCORRECT RATIO. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073500

Condition

The transmission control module (TCM) receives a signal about input and output speed from the transmission's two speed sensors. There is a determined ratio for each gear and the signals help calculate the transmission control module (TCM) gear ratio.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Gear ratio differs by more than 10%.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Fluid temperature over +20 °C (68 °F).
- 5th gear is engaged, engine speed is greater than 500 rpm, accelerator pedal position is greater than 10% and the gear ratio is 0.859 +/- 20%.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

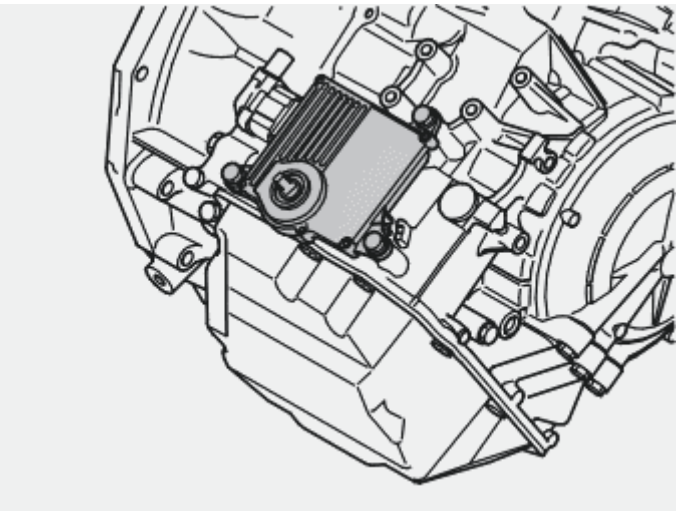


Fig. 40: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 2** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance or one of the solenoids controlling in an incorrect manner.
  - Circuit for the solenoid:SLT, SLC1, SLB1
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- Abnormal slipping gearshifts
- Rough gear shift
- No gear shift

FAULT-TRACING

FAULT-TRACING INFORMATION

CHECKING THE GEAR SYSTEM

Problems that the customer may experience are hard shifts or slipping shifts. The following test-drive contains several different driving situations that may provoke these symptoms if the transmission is damaged.

NOTE: It is important that the transmission oil is above 70 °C before the test-drive starts

Test 1

1. Driving at 100 km/h, 6th gear.
2. Perform a kickdown to 4th gear.
3. Let the transmission automatically shift up to 5th gear.
4. Let up the accelerator pedal and let the transmission shift up to 6th gear.

Test 2

1. Driving at 100 km/h, 6th gear.
2. Slight uphill grade, press accelerator pedal until you obtain shifting 6-5, not kickdown.

Test 3

1. Driving at 80 km/h.
2. Move the gear selector to position M and engage 6th gear.
3. Perform a kickdown and shift 6-5, 5-4, 4-3 at the same time.
4. Then upshift immediately to 6th gear.

Test 4

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position R.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

Test 5

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position D.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

If the symptoms hard shifts or slipping shifts arise during the test-drive, the transmission's control system must be replaced.

Other information

- see **CONTROL SYSTEMS**

Is the function OK?

- **YES**

  Refer to **CHECKING SOLENOIDS**

- **NO**

  Refer to **RESETTING ADAPTATION**

CHECKING SOLENOIDS

Fig. 41: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between approx. 100 and 950 mA.

  Solenoid SLT, SLC1, SLB1.

Fig. 42: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  Refer to **CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION**

- **NO**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

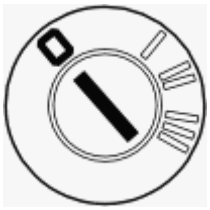


Fig. 43: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

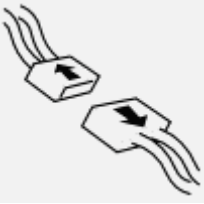


Fig. 44: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  HINT: Check solenoids SLT, SLC1, SLB1 as described in:CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

  If no defects were found on connectors or cables, replace the transmission.

  Remedy as necessary.

  Other information

  - see **TRANSMISSION** (AWD) or **TRANSMISSION**
  - see **COVER CONTROL SYSTEM, REPLACING**

- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

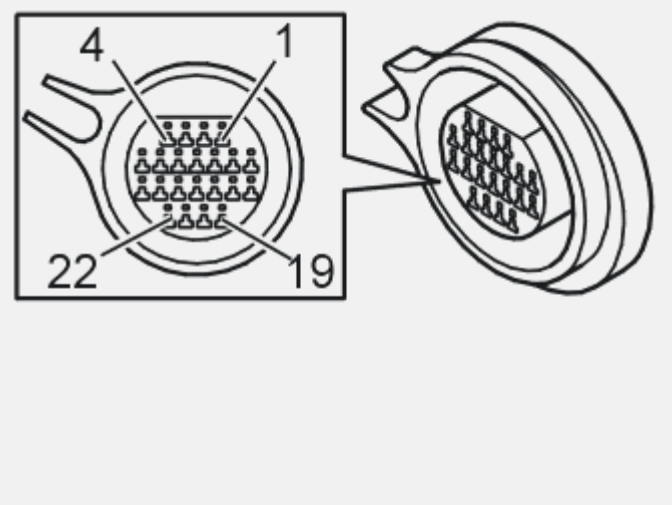


Fig. 45: Identifying 22--Pin Connector
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

Fig. 46: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check the transmission oil level. If the oil level is low, check the transmission for leakage, then top up with oil.

Check the quality of the oil.

Replace the transmission fluid if the fluid smells burnt.

Other information

- see **OIL LEVEL, CHECKING**
- see **OIL GRADE, CHECKING**
- see **TRANSAXLE OIL**

Select an alternative below

1. No fault detected.

   Refer to **CHECKING THE COMPONENTS AND WIRING**

2. Transmission fluid replaced, low level or poor quality.

   Refer to **RESETTING ADAPTATION**

Fig. 47: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

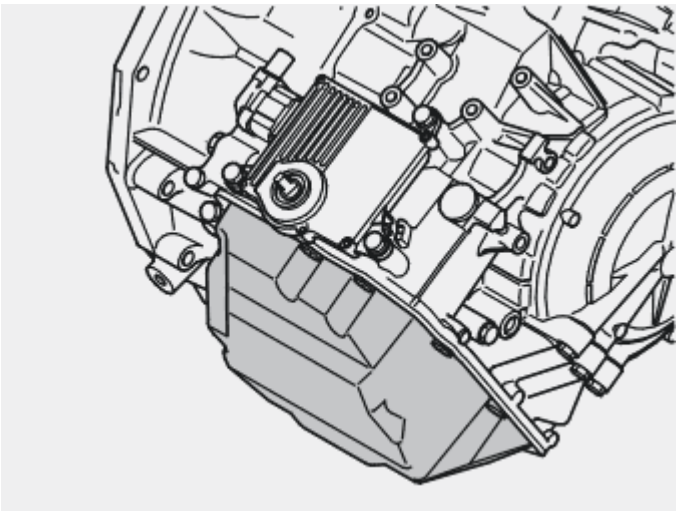


Fig. 48: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

VERIFICATION

VERIFICATION

NOTE: When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select Pause and create a bookmark. Then select Vehicle communication.

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 49: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

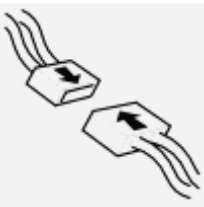


Fig. 50: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 51: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

  Fig. 52: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
  Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P073500: GEAR 5 INCORRECT RATIO. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC;

B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073500

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073500**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P073600: REVERSE INCORRECT RATIO. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073600

Condition

The transmission control module (TCM) receives a signal about input and output speed from the transmission's two speed sensors. There is a determined ratio for each gear and the signals help calculate the transmission control module (TCM) gear ratio.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Transmission is in mechanical neutral position despite the gear selector being moved to **R** .

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Driving reverse (gear position **R**).
- The engine speed is above 600 rpm.
- Throttle angle open more than 10%.
- Transmission's oil temperature exceeds +0 °C.
- Brake pedal unaffected.

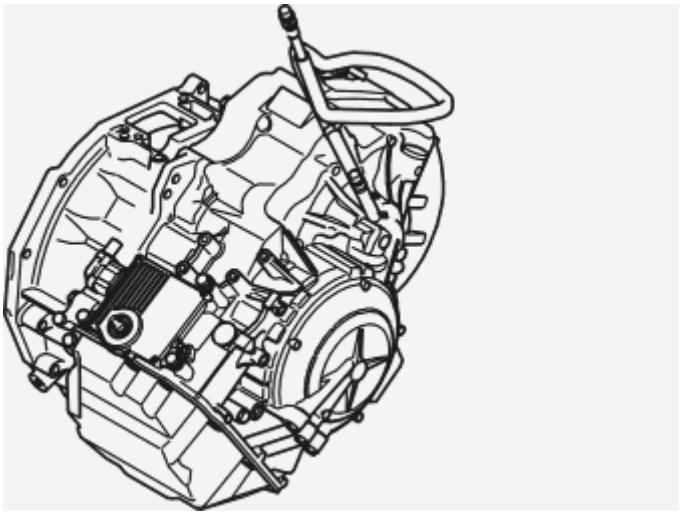


Fig. 53: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Internal malfunction in the transmission

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- No gear shift

FAULT-TRACING

CHECKING SOLENOIDS

Fig. 54: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between approx. 100 and 950 mA.

  Solenoid SLT, SLC1, SLC2, SLC3, SLB1.

Fig. 55: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  Refer to **CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION**

- **NO**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

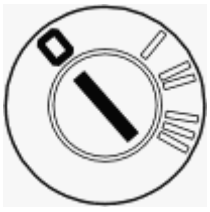


Fig. 56: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

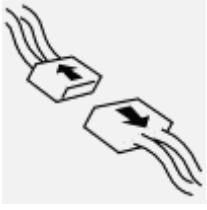


Fig. 57: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

- Open the transmission control system.

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  HINT: Check solenoid SLT, SLC1, SLC2, SLC3 and SLB1 according to:CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

  If no defects were found on connectors or cables, replace the transmission.

  Remedy as necessary.

  Other information

  - see **TRANSMISSION** (AWD) or **TRANSMISSION**
  - see **COVER CONTROL SYSTEM, REPLACING**
  - see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
  - To access connector B: **TRANSMISSION CONTROL MODULE (TCM)**
  - see **CHECKING WIRING AND TERMINALS**

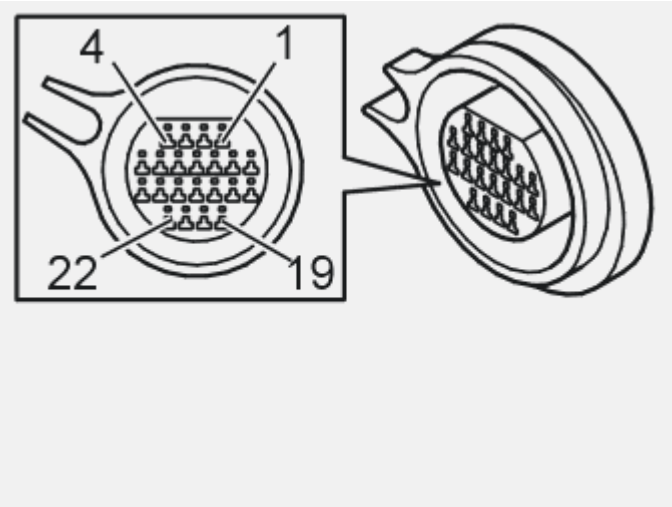


Fig. 58: Identifying 22--Pin Connector
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

Fig. 59: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check the transmission oil level. If the oil level is low, check the transmission for leakage, then top up with oil.

  Check the quality of the oil.

  Replace the transmission fluid if the fluid smells burnt.

  Other information

  - see **OIL LEVEL, CHECKING**
  - see **OIL GRADE, CHECKING**
  - see **TRANSAXLE OIL**

  Select an alternative below

  1. No fault detected.
  2. Transmission fluid replaced, low level or poor quality.

Fig. 60: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

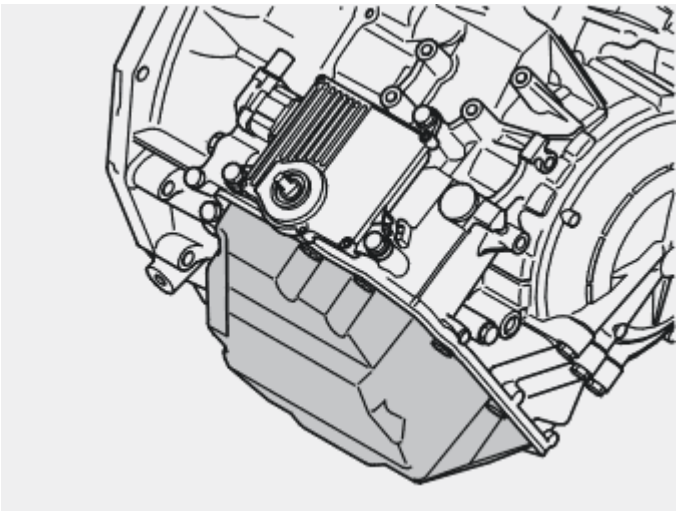


Fig. 61: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

- **1**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

- **2**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

NOTE: When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select Pause and create a bookmark. Then select Vehicle communication.

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 62: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

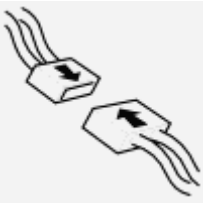


Fig. 63: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 64: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

  Fig. 65: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
  Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P073600: REVERSE INCORRECT RATIO. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073600

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073600**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P073600: REVERSE INCORRECT RATIO. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073600

Condition

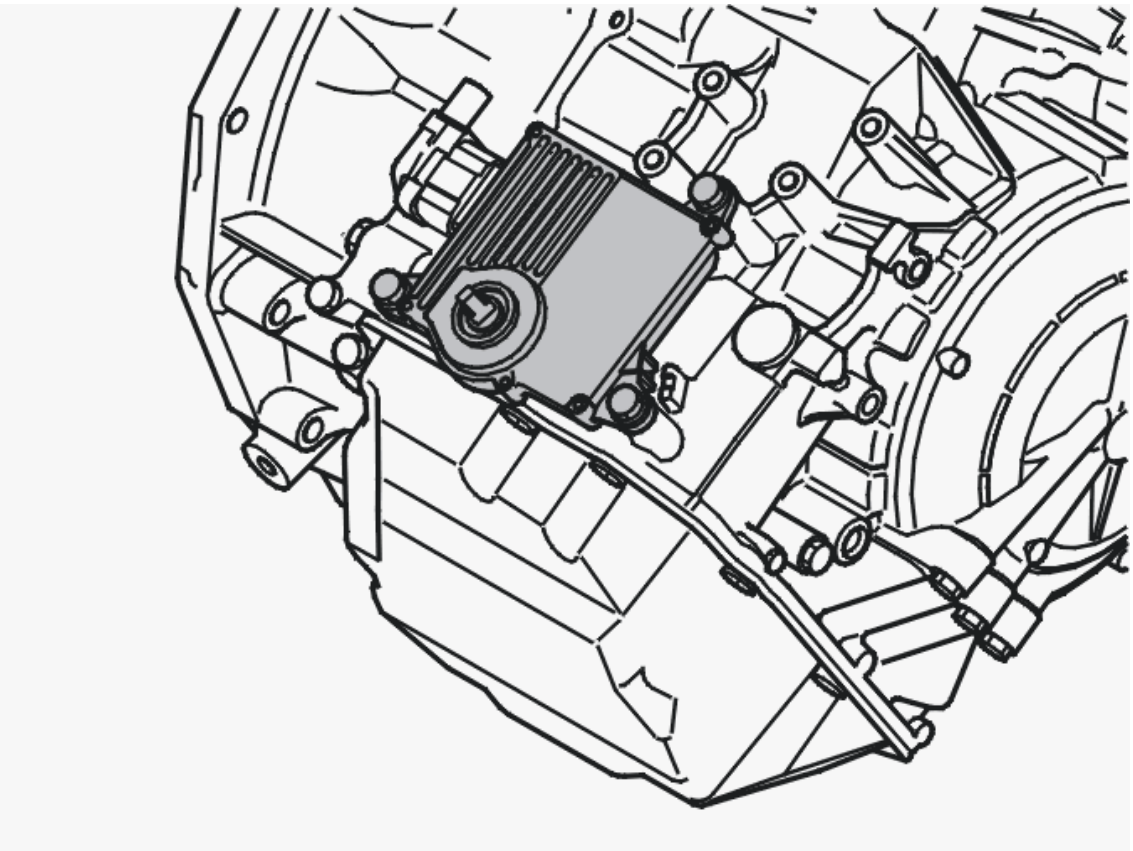


Fig. 66: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) receives signal about input and output rpm from the transmission's two rpm sensors. For each gear there is a determined ratio and, using the signals, the control module calculates the transmission's gear ratio. If the transmission control module (TCM) registers that the transmission is mechanically in neutral position but the gear selector has been moved to "D" or "R", diagnostic trouble code TCM-P073000 or TCM-P073600 is generated, depending on the cause of the malfunction.

TCM-P073000

The diagnostic trouble code can be diagnosed when driving forward (gear position "D"), engine rpm above 600 rpm, throttle damper angle open more than 10%, transmission's oil temperature above +0 °C and brake pedal unaffected.

TCM-P073600

The diagnostic trouble code can be diagnosed when reversing (gear position "R"), engine rpm above 600 rpm, throttle damper angle open more than 10%, transmission's oil temperature above +0 °C and brake pedal unaffected.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Internal malfunction in the transmission's control system.
- Mechanical fault in gearbox. Gearbox components worn and causing slip or system pressure too low.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Abnormally slipping gears.
- Harsh gear changing
- No gear changing.

FAULT TRACING

CHECKING SOLENOIDS

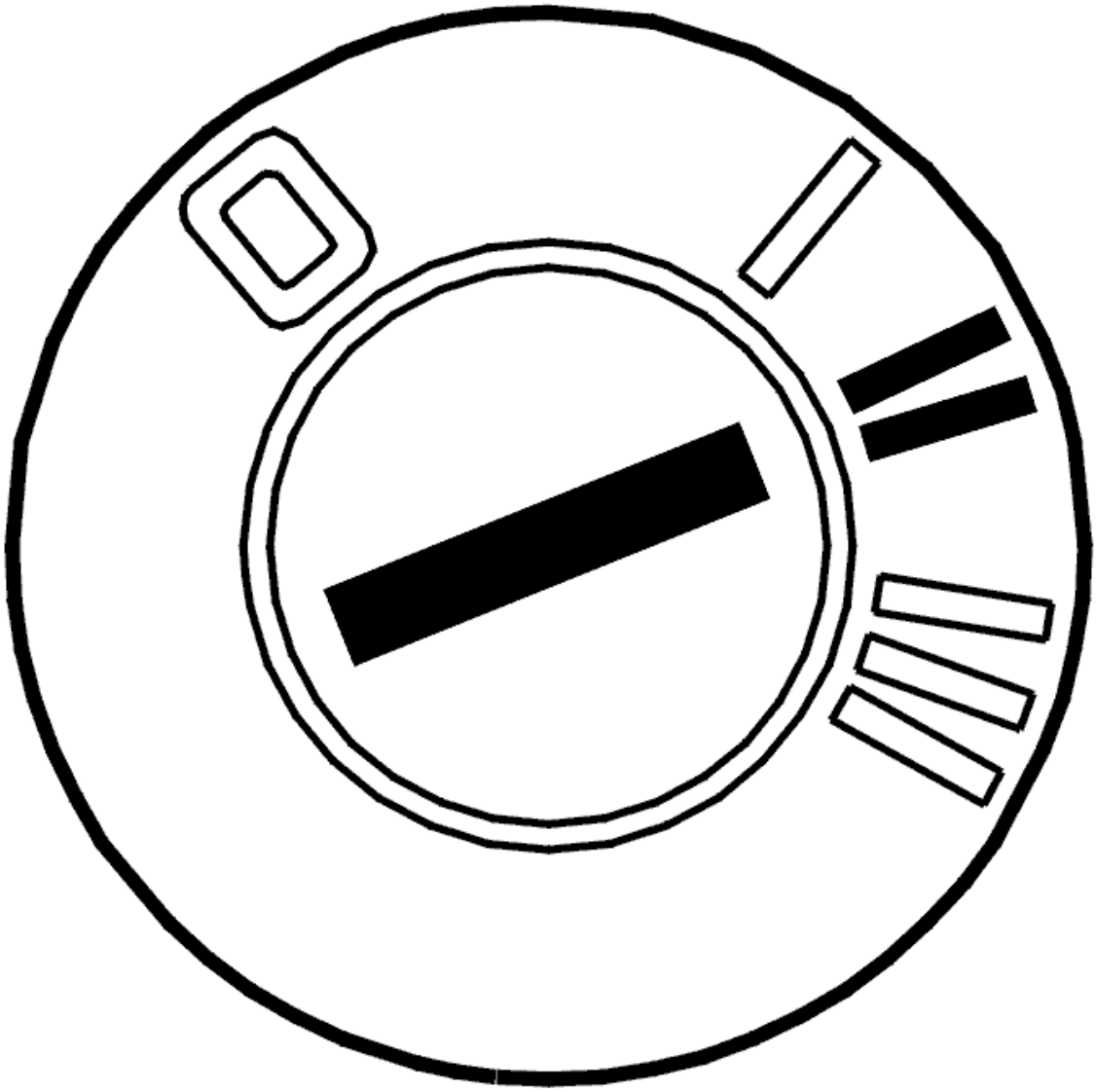


Fig. 67: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between approx. 0 and 1000 mA.

Gear selector position/diagnostic trouble code	Solenoid
D/TCM-P073000	SLT, SLC2, SLC3, SLB1
R/TCM-P073600	SLT, SLC1, SLC2, SLC3, SLB1

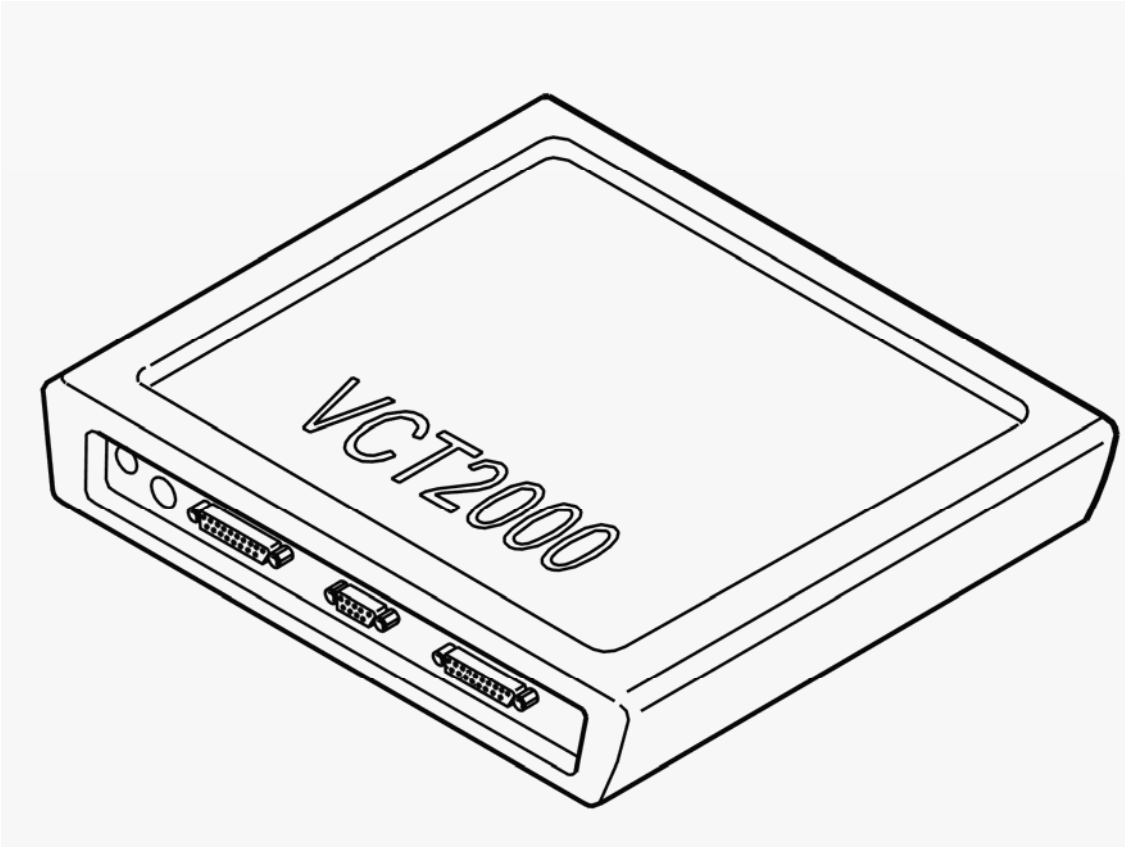


Fig. 68: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  Refer to **CHECKING OIL QUALITY AND OIL LEVEL IN TRANSMISSION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING OIL QUALITY AND OIL LEVEL IN TRANSMISSION

NOTE: The transmission oil's quality and level are extremely important for the function of the transmission. Therefore it is important that these values are correct. In addition, the oil level is dependent on oil temperature.

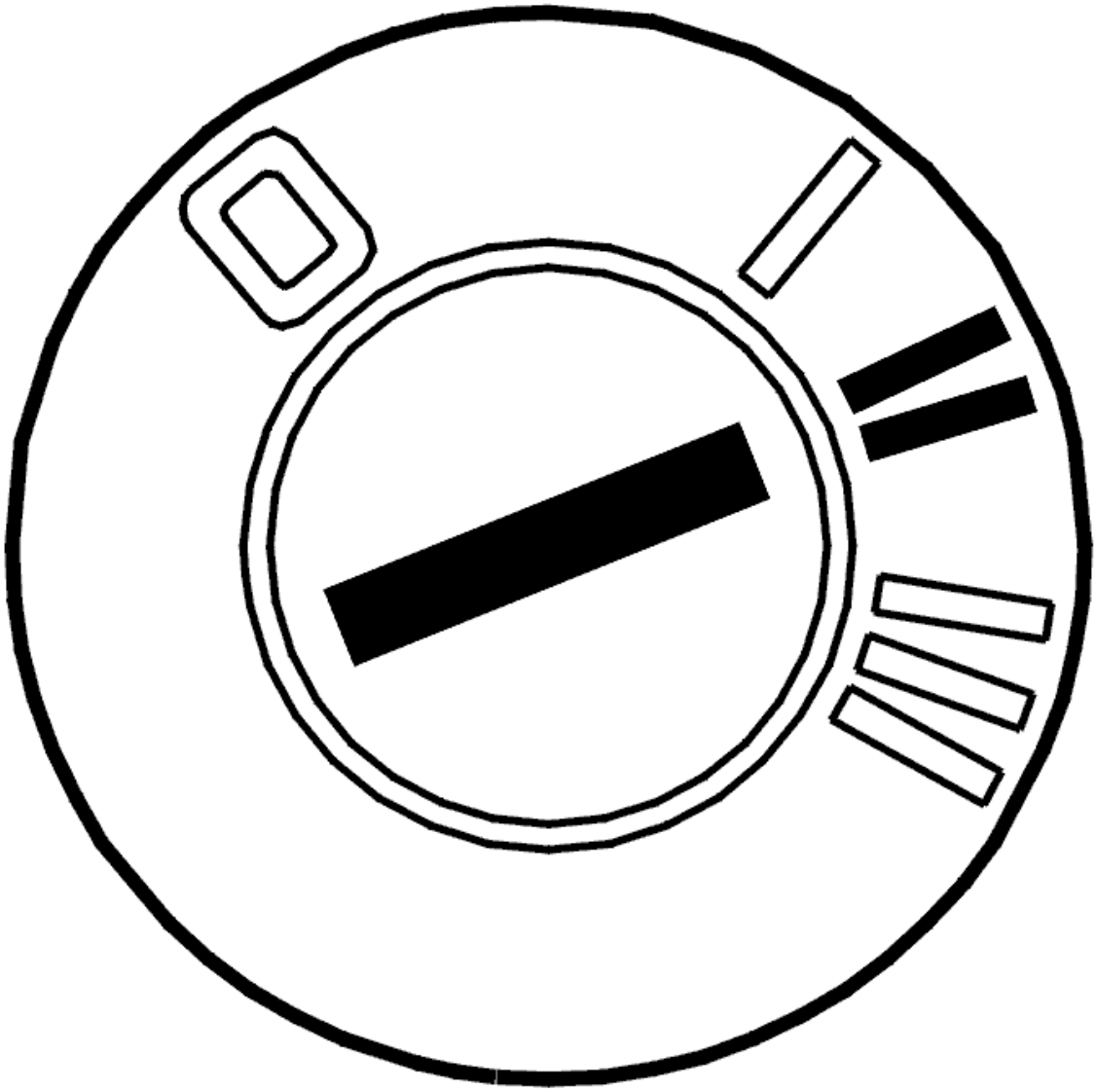


Fig. 69: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil's temperature.

  Check the transmission's oil level. If it is low, check the transmission for leaks and then top off the oil.

  Check the oil's quality.

  If the oil smells burnt, change transmission oil.

  Other information

  - see **OIL LEVEL, CHECKING**

- see **OIL GRADE, CHECKING (2007-2011)**
- see **TRANSMISSION FLUID, CHANGING**

Select an alternative below

1. No defect found.

   Refer to **CHECKING THE WIRING AND COMPONENT**

2. Transmission oil changed, level low or quality poor.

   Refer to **RESETTING ADAPTATION**

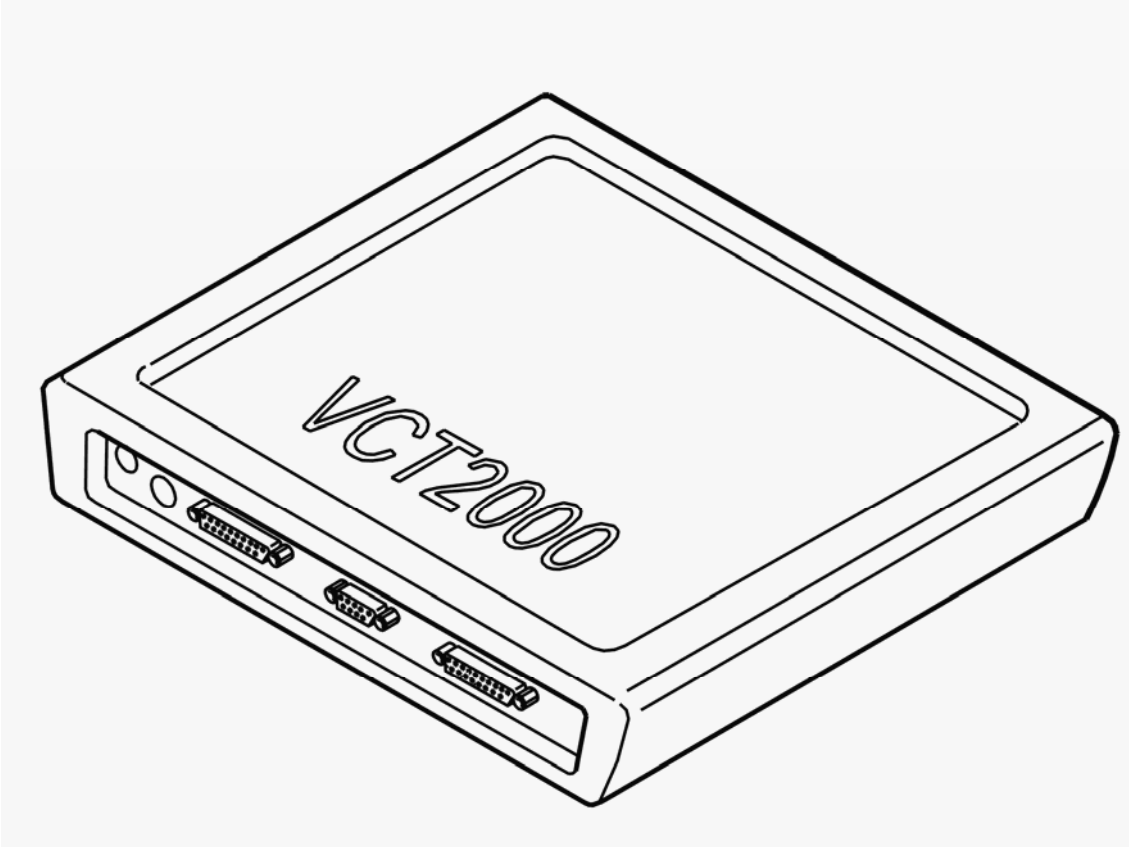


Fig. 70: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

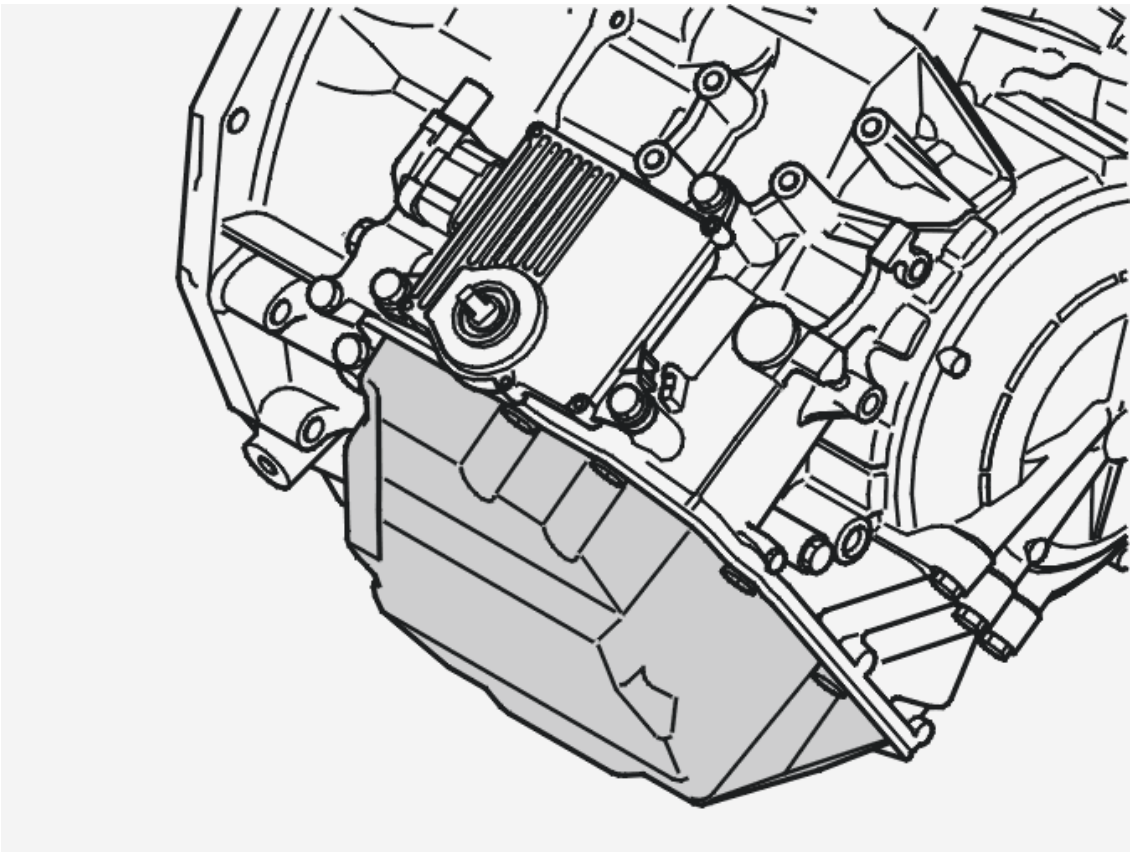


Fig. 71: Identifying Transmission Oil Pan
Courtesy of VOLVO CARS CORPORATION

CHECKING THE WIRING AND COMPONENT

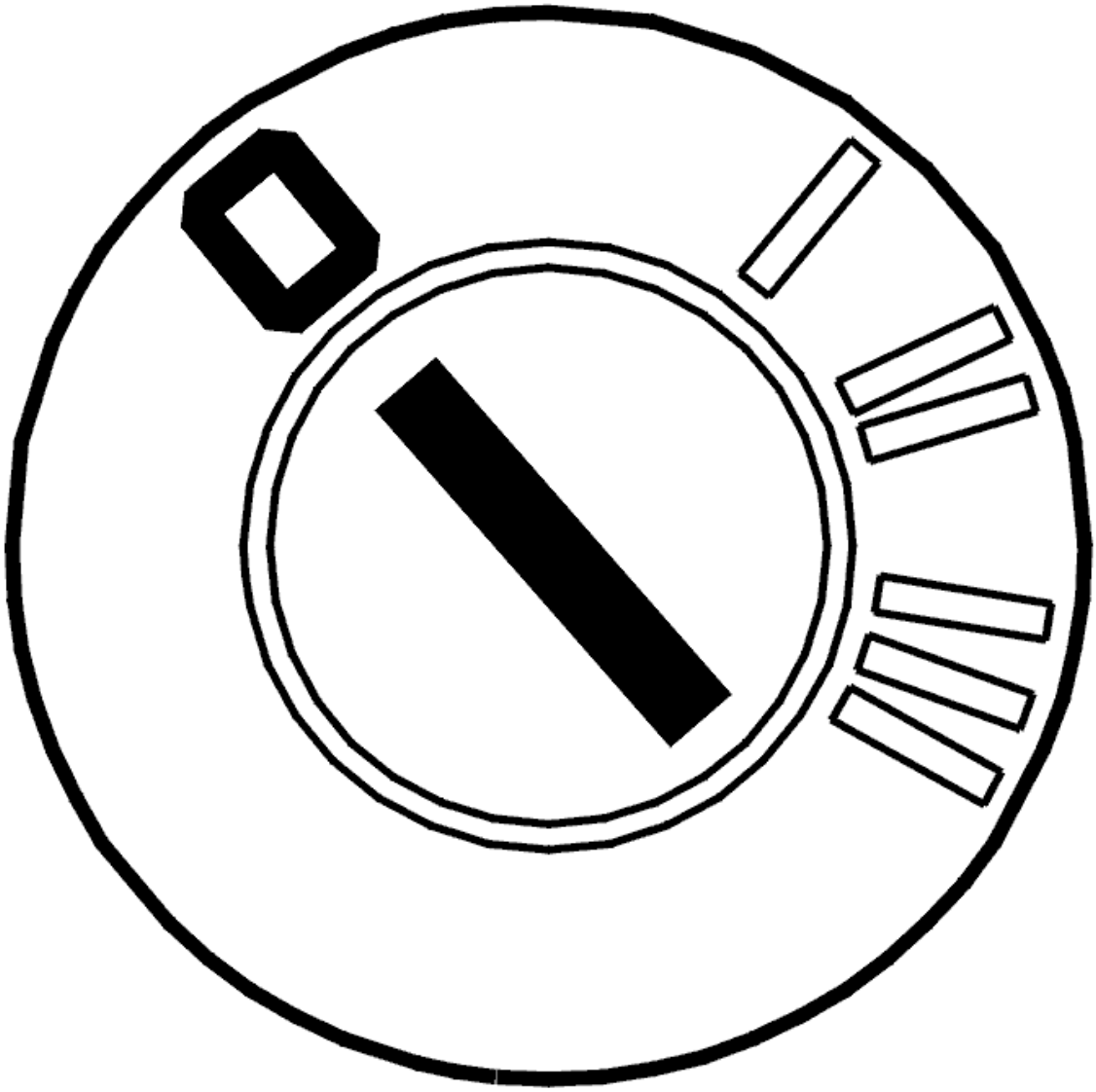


Fig. 72: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

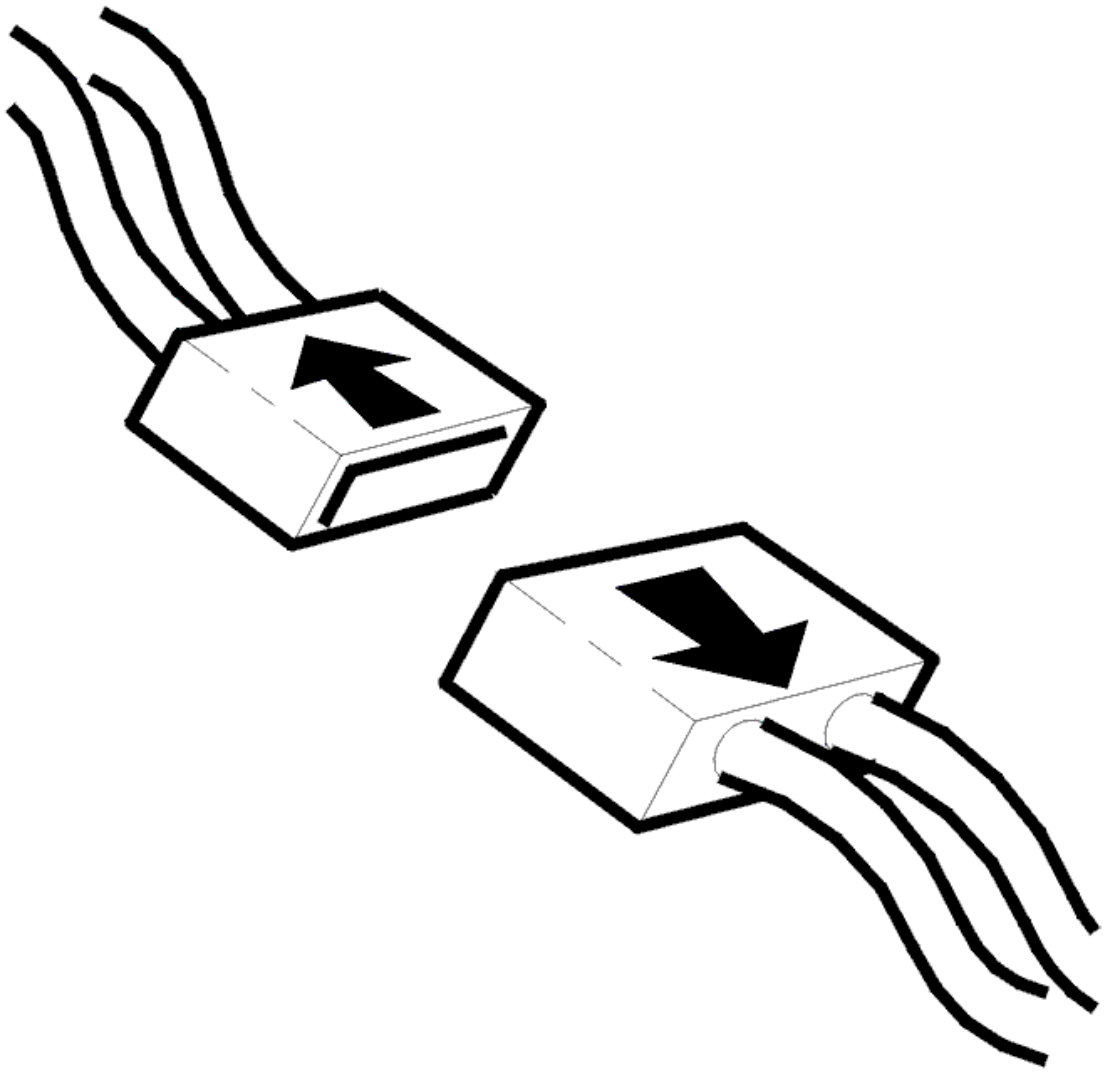


Fig. 73: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

HINT: Check solenoid SLT, SLC1, SLC2, SLC3 and SLB1 according to: CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

Gear selector position/diagnostic trouble code	Solenoid
D/TCM-P073000	SLT, SLC2, SLC3, SLB1

R/TCM-P073600	SLT, SLC1, SLC2, SLC3, SLB1

If no defects were found on connectors or cables, replace the transmission.

Remedy as necessary.

Other information

- see **REPLACING THE GEARBOX**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- see **CONTENTS**

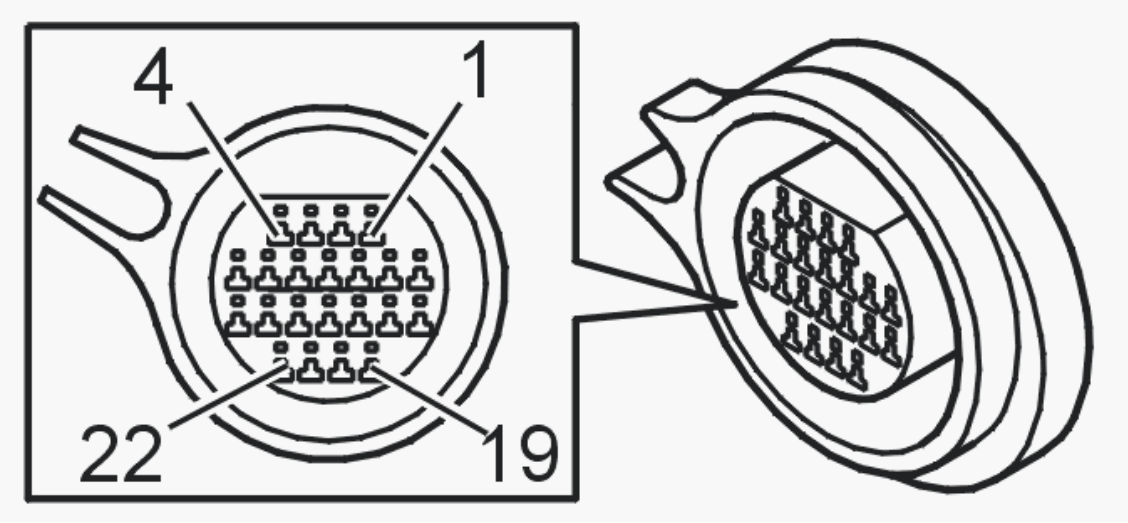


Fig. 74: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

REPLACING THE TRANSMISSION

Previous tests indicate an internal malfunction in the transmission.

Other information

- see **REPLACING THE GEARBOX**

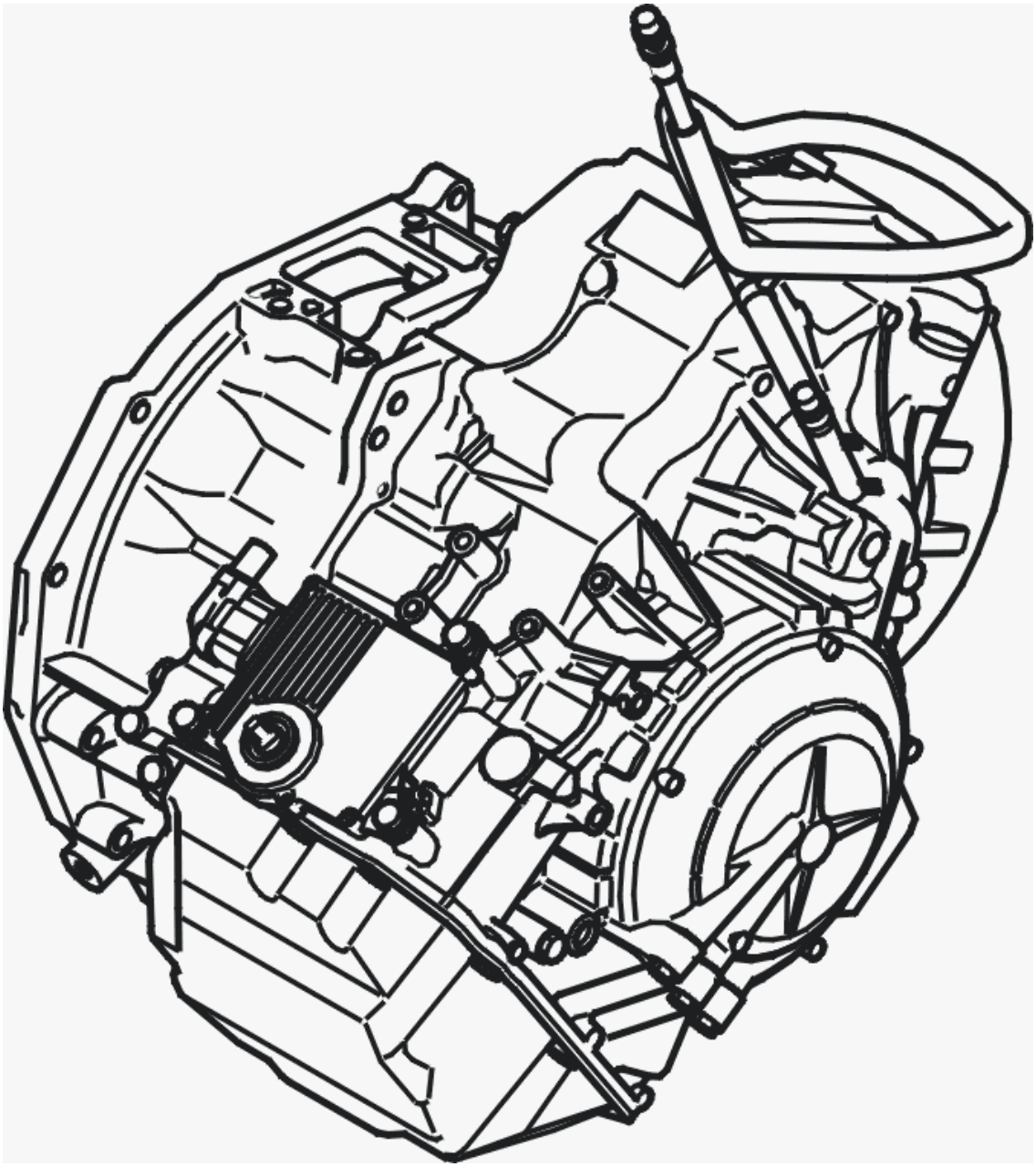


Fig. 75: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means

that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

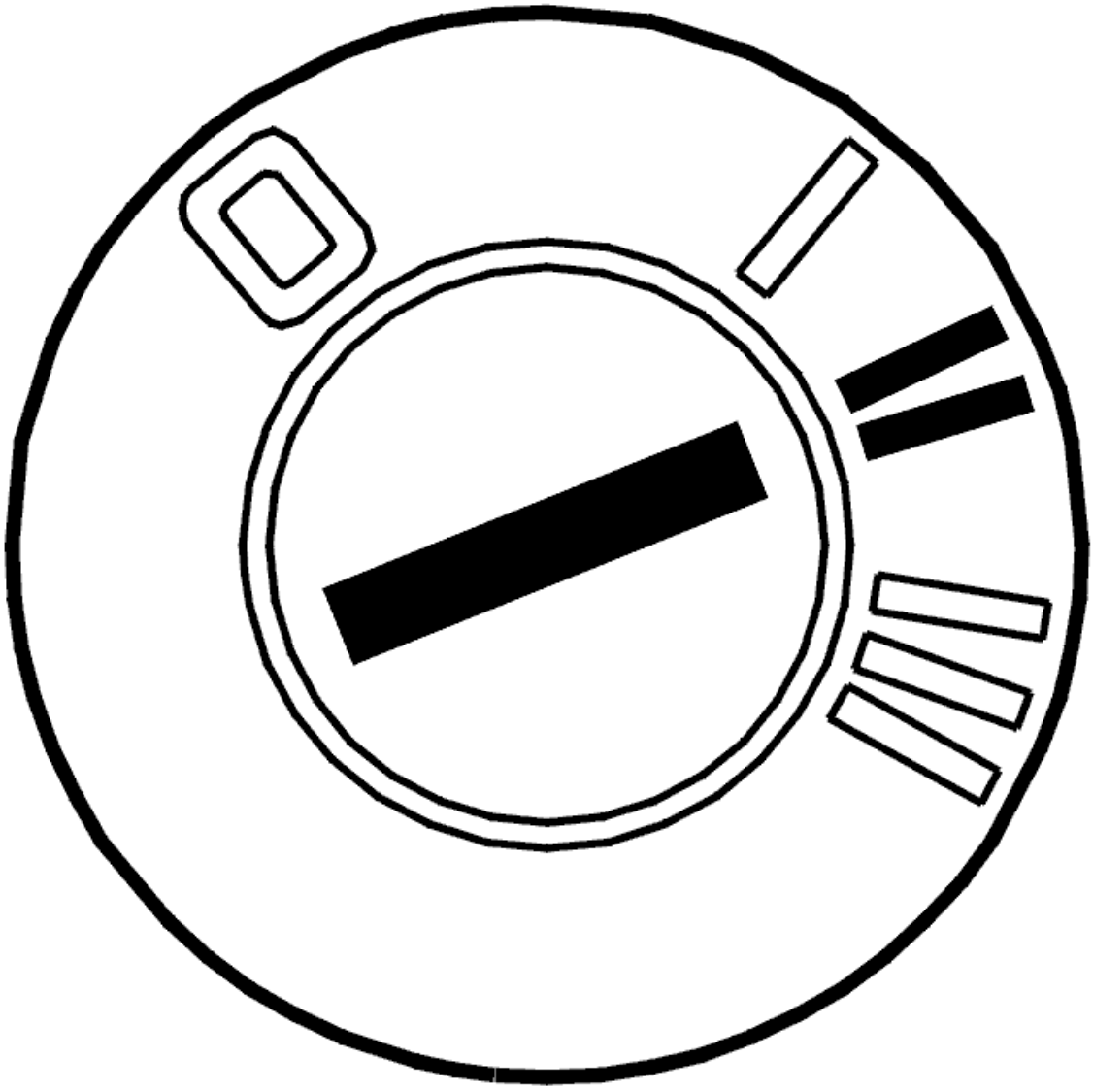


Fig. 76: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

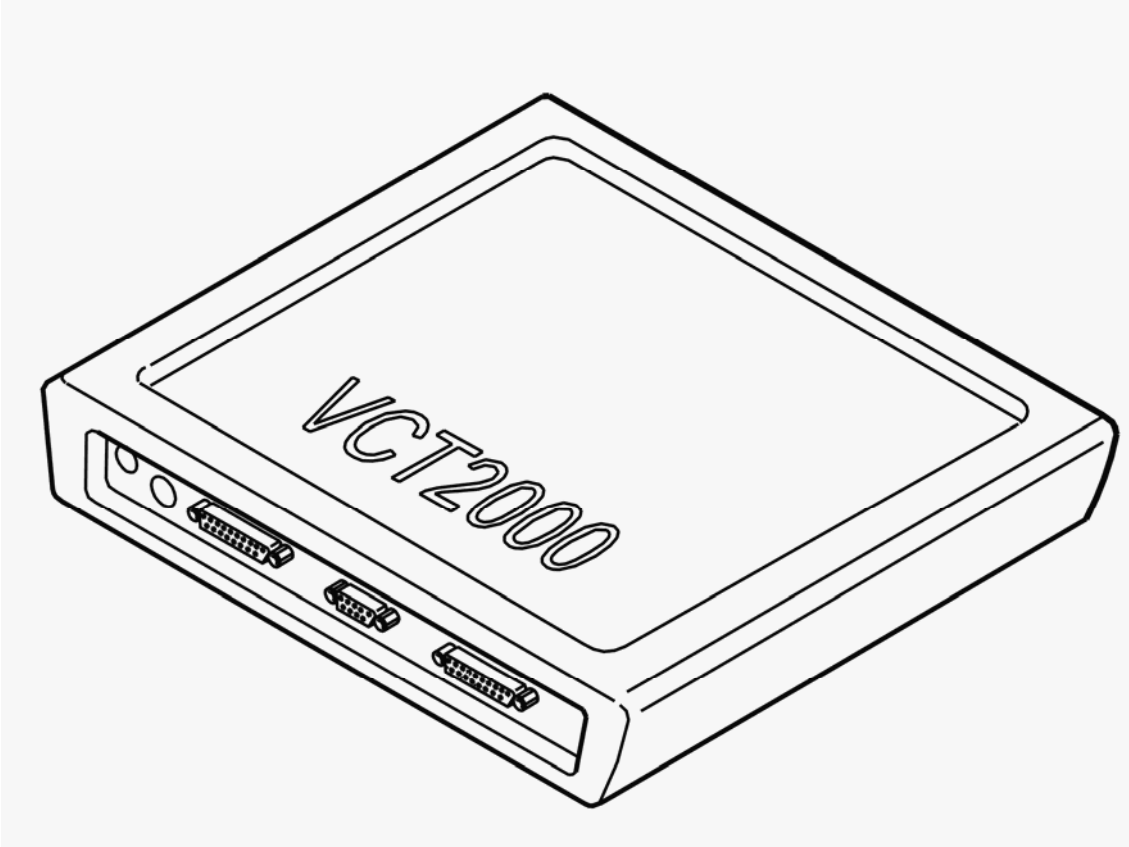


Fig. 77: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

NOTE: When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select "Pause" and save a bookmark, then select Vehicle communication

HINT: After carrying out the repair, check that the fault has been remedied.

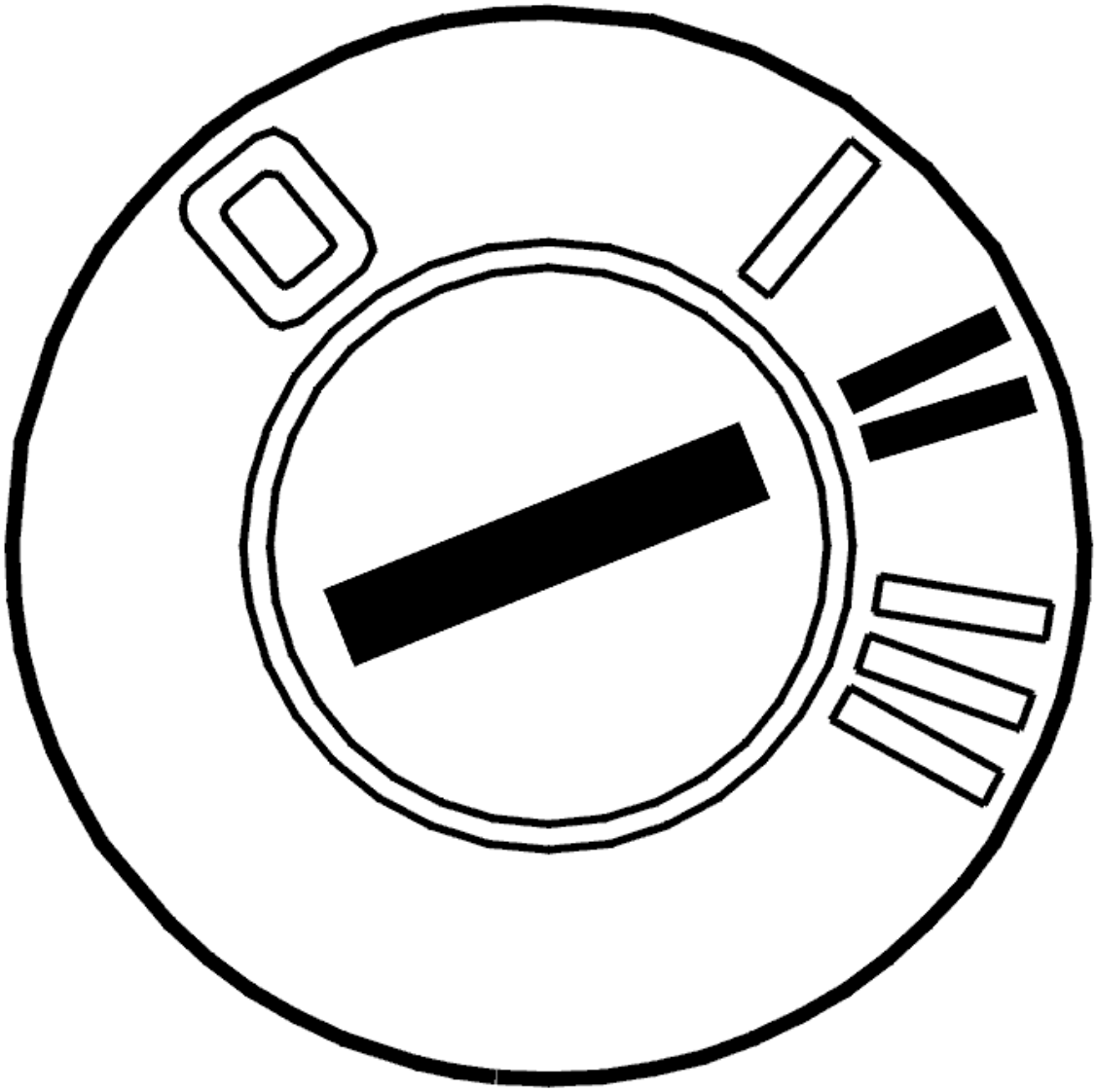


Fig. 78: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

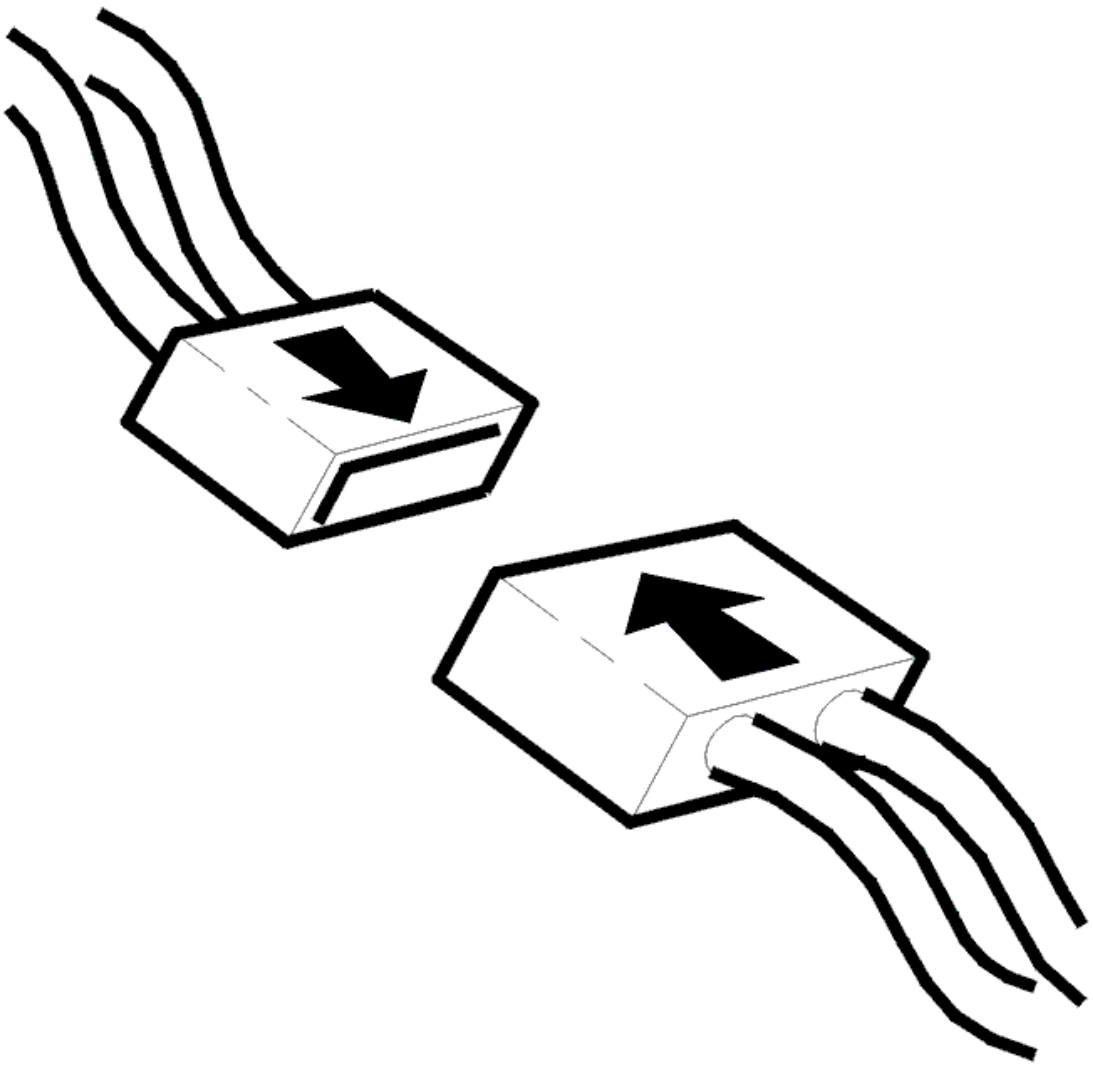


Fig. 79: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.

  Test drive the vehicle following: **TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P073600: REVERSE INCORRECT RATIO. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073600

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P073600**

FAULT TRACING

see **FAULT TRACING TCM-P073600**

TCM-P073F00 UNABLE TO ENGAGE GEAR 1. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

The transmission control module (TCM) receives a signal about input and output speed from the transmission's two speed sensors. There is a determined ratio for each gear and the signals help calculate the transmission control module (TCM) gear ratio.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Gear ratio for the gear selected by the control module is close to (4%) another gear's ratio.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Transmission fluid temperature over +20 °C (68 °F).
- Approx. 4% outside of current gear's normal work area.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

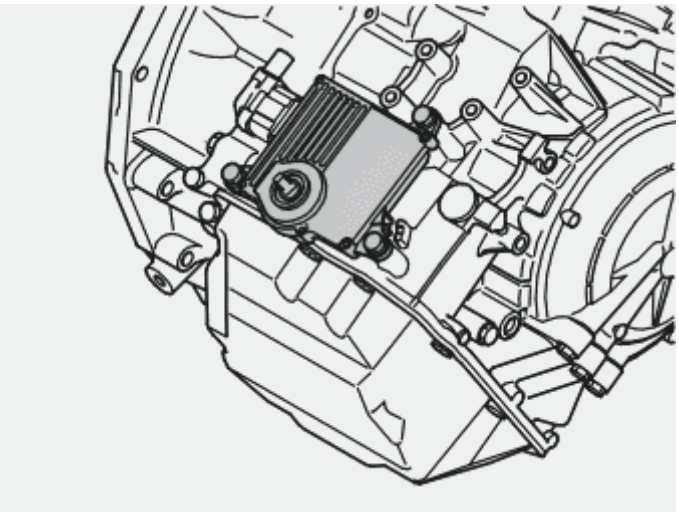


Fig. 80: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 2** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance or one of the solenoids has stuck in OFF or ON position.
- Mechanical fault in the transmission.

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- Abnormal slipping gearshifts
- No gear shift

FAULT-TRACING

CHECKING SOLENOIDS

Fig. 81: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between approx. 100 and 950 mA.

  Solenoid SLT, SLC2, SLC3, SLB1.

Fig. 82: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  Refer to **CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION**

- **NO**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

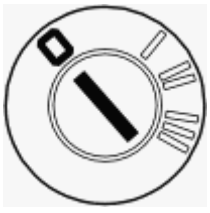


Fig. 83: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

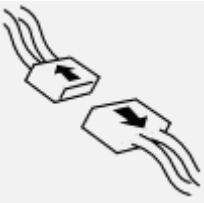


Fig. 84: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

HINT: Check solenoids SLT, SLC2, SLC3, SLB1 as described in:CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no defects were found on connectors or cables, replace the control system. If this does not help, replace the transmission.

Remedy as necessary.

Other information

- see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
- see **VALVE HOUSING** .
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access connector B, see **TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

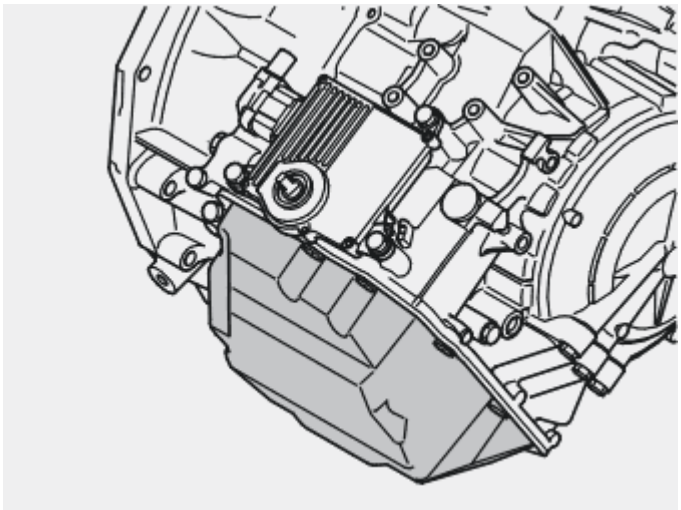


Fig. 85: Identifying Transmission Fluid Pan

Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

Fig. 86: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check the transmission oil level. If the oil level is low, check the transmission for leakage, then top up with oil.

  Check the quality of the oil.

  Replace the transmission fluid if the fluid smells burnt.

  Other information

  - see **TRANSMISSION OIL LEVEL - CHECKING**
  - see **OIL GRADE, CHECKING**
  - see **TRANSAXLE OIL**

  Select an alternative below

  1. No fault detected.

     Refer to **CHECKING THE COMPONENTS AND WIRING**

  2. Transmission fluid replaced, low level or poor quality.

     Refer to **RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER**

Fig. 87: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

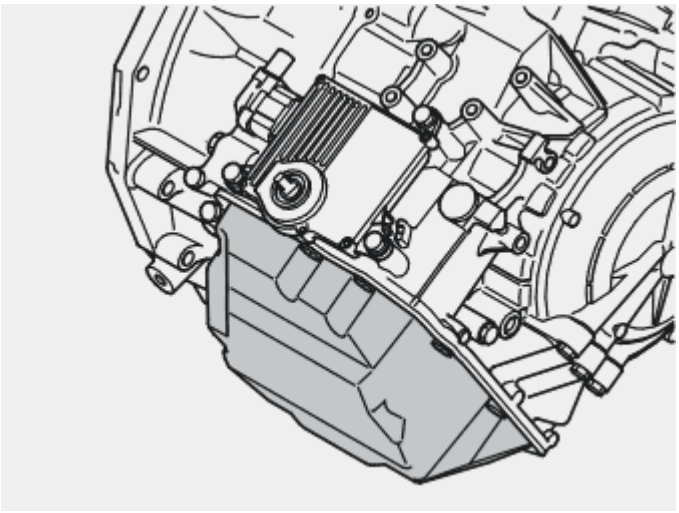


Fig. 88: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

VERIFICATION

VERIFICATION

NOTE: When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select Pause and create a bookmark. Then select Vehicle communication.

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 89: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

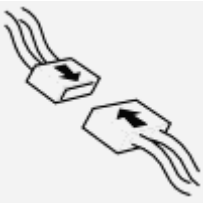


Fig. 90: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 91: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

  Fig. 92: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
  Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER

CHECKING THE FUNCTION

HINT: The transmission control module (TCM) has a counter for fluid quality that counts the number of times the transmission is subjected to too hard a load or too high an ambient temperature. If the counter is not reset during draining/replacement, there is a risk that a diagnostic trouble code will be set under the wrong conditions. Thus, it is important that the counter for transmission fluid change be reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

Fig. 93: Identifying Ignition ON

Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the counter.

Fig. 94: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P073F00 UNABLE TO ENGAGE GEAR 1. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P073F00 UNABLE TO SELECT GEAR 1. GENERAL MALFUNCTION INFORMATION. NO INFORMATION ON MALFUNCTION TYPE (B8444S, TF-80SC AWD; 2007-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

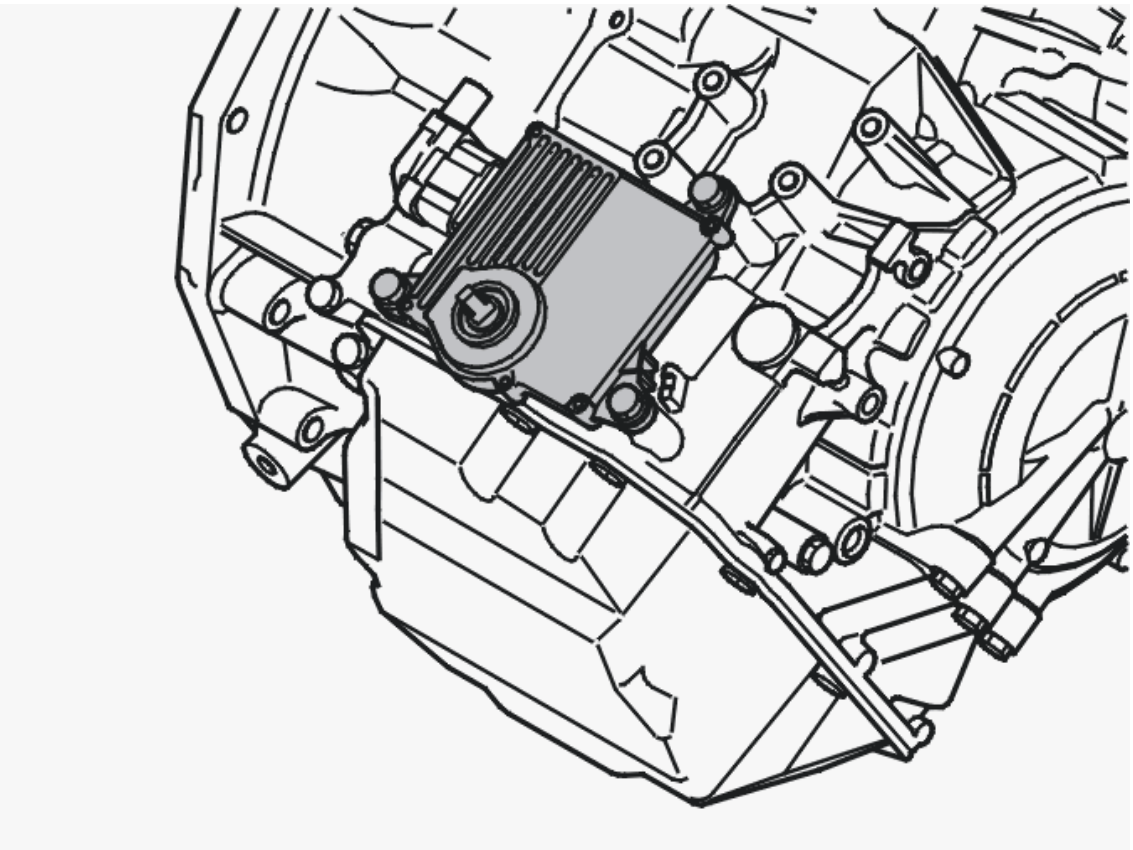


Fig. 95: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) receives signal about input and output rpm from the transmission's two rpm sensors. For each gear there is a determined ratio and, using the signals, the control module calculates the transmission's gear ratio. If the transmission control module (TCM) registers that the gear ratio is in a gear ratio that is near (4%) that of any other gear than the gear selected by the control module, then diagnostic trouble code TCM-P073F00 is generated, or any of the diagnostic trouble codes TCM-P074x00, depending on the cause of the malfunction.

The diagnostic trouble code can be diagnosed at an oil temperature above +20 °C in the transmission as well as approx. 4% outside normal operating range of the gear in question.

Substitute Value

- Auxiliary program **Emergency mode 2** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance or one of the solenoids has stuck in OFF or ON position.
- Mechanical faults in gearbox.

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- Abnormally slipping gears.
- No gear changing.

FAULT TRACING

CHECKING SOLENOIDS

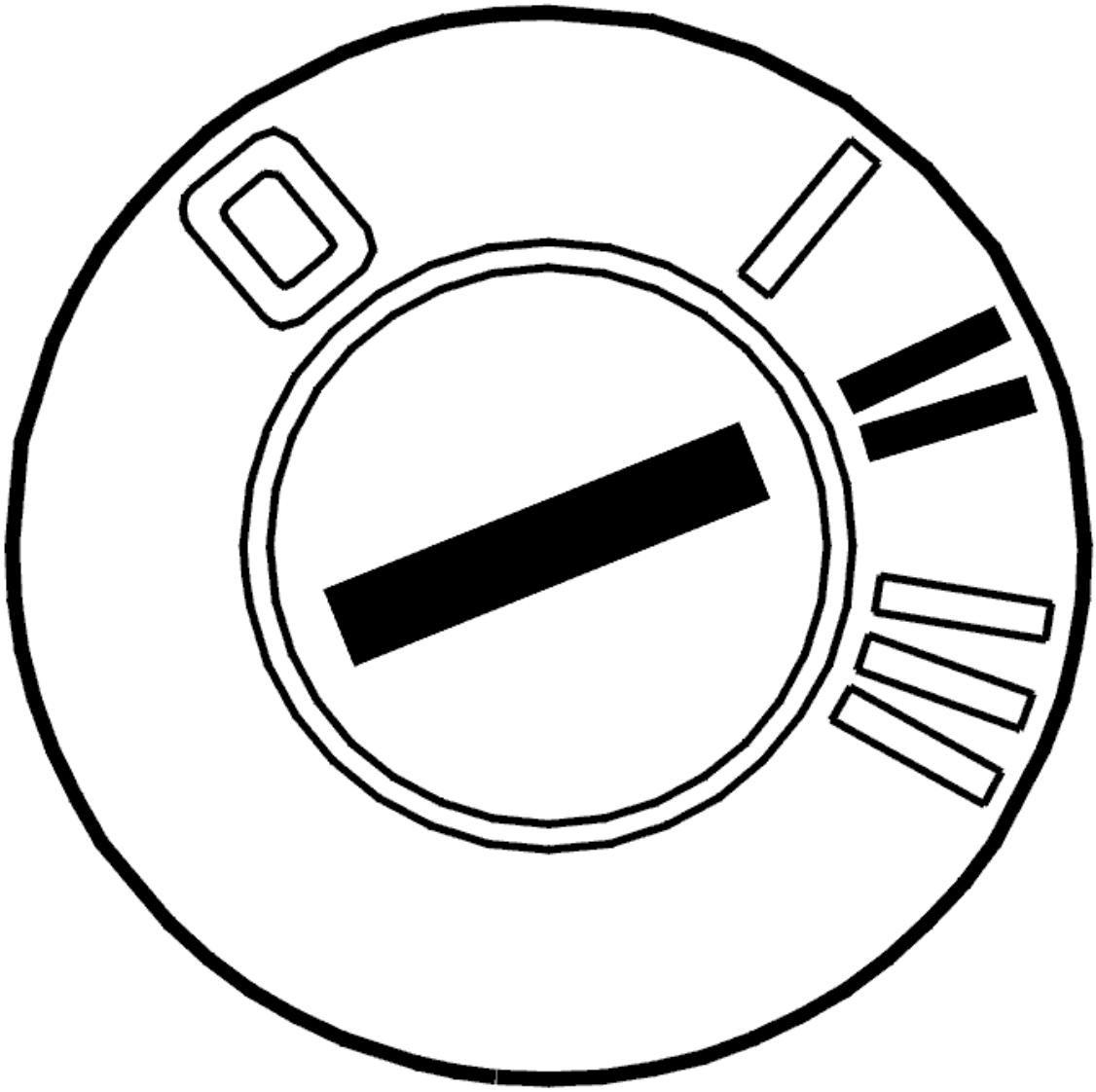


Fig. 96: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between approx. 0 and 1000 mA.

Gear/DTC	Solenoid
1/TCM-P073F00	SLT, SLC2, SLC3, SLB1
2/TCM-P074A00	SLT, SLC2, SLC3
3/TCM-P074B00	SLT, SLC2, SLB1
4/TCM-P074C00	SLT, SLC3, SLB1
5/TCM-P074D00	SLT, SLC1, SLB1
6/TCM-P074E00	SLT, SLC3

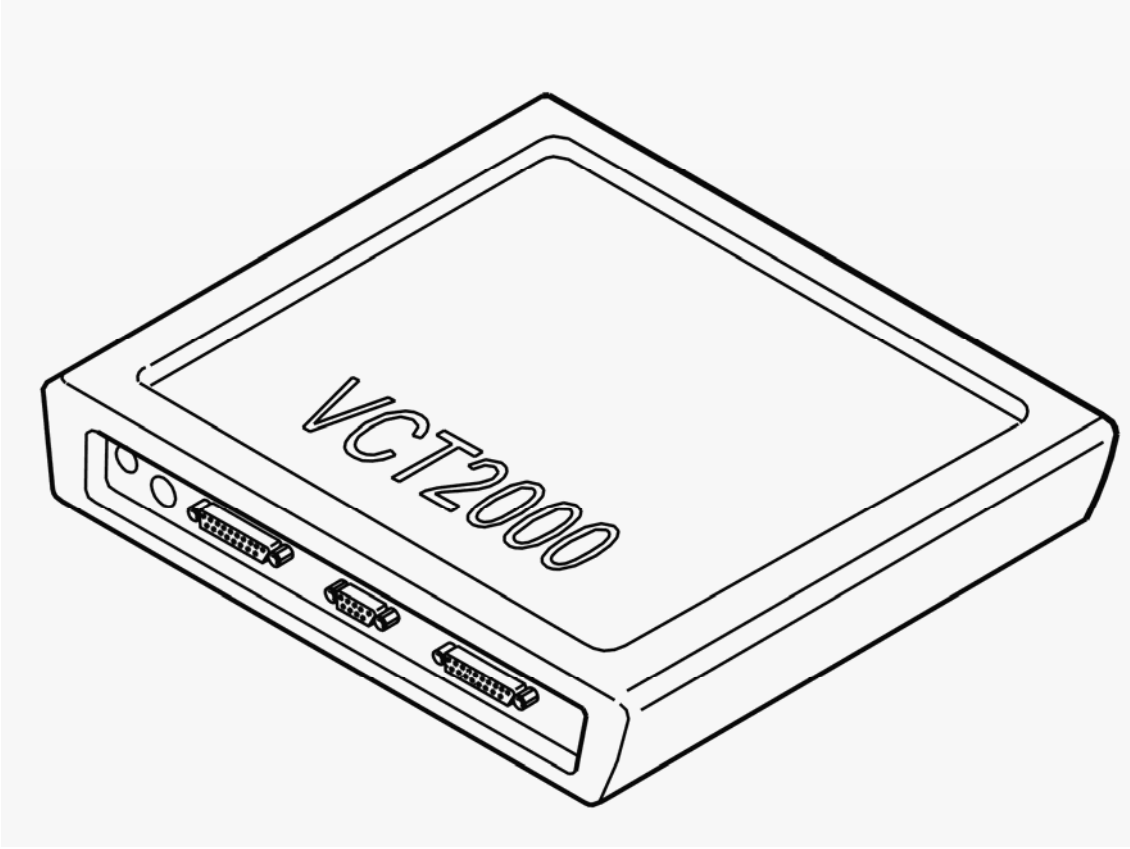


Fig. 97: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  Refer to **CHECKING OIL QUALITY AND OIL LEVEL IN TRANSMISSION**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING OIL QUALITY AND OIL LEVEL IN TRANSMISSION

NOTE: The transmission oil's quality and level are extremely important for the function of the transmission. Therefore it is important that these values are correct. In addition, the oil level is dependent on oil temperature.

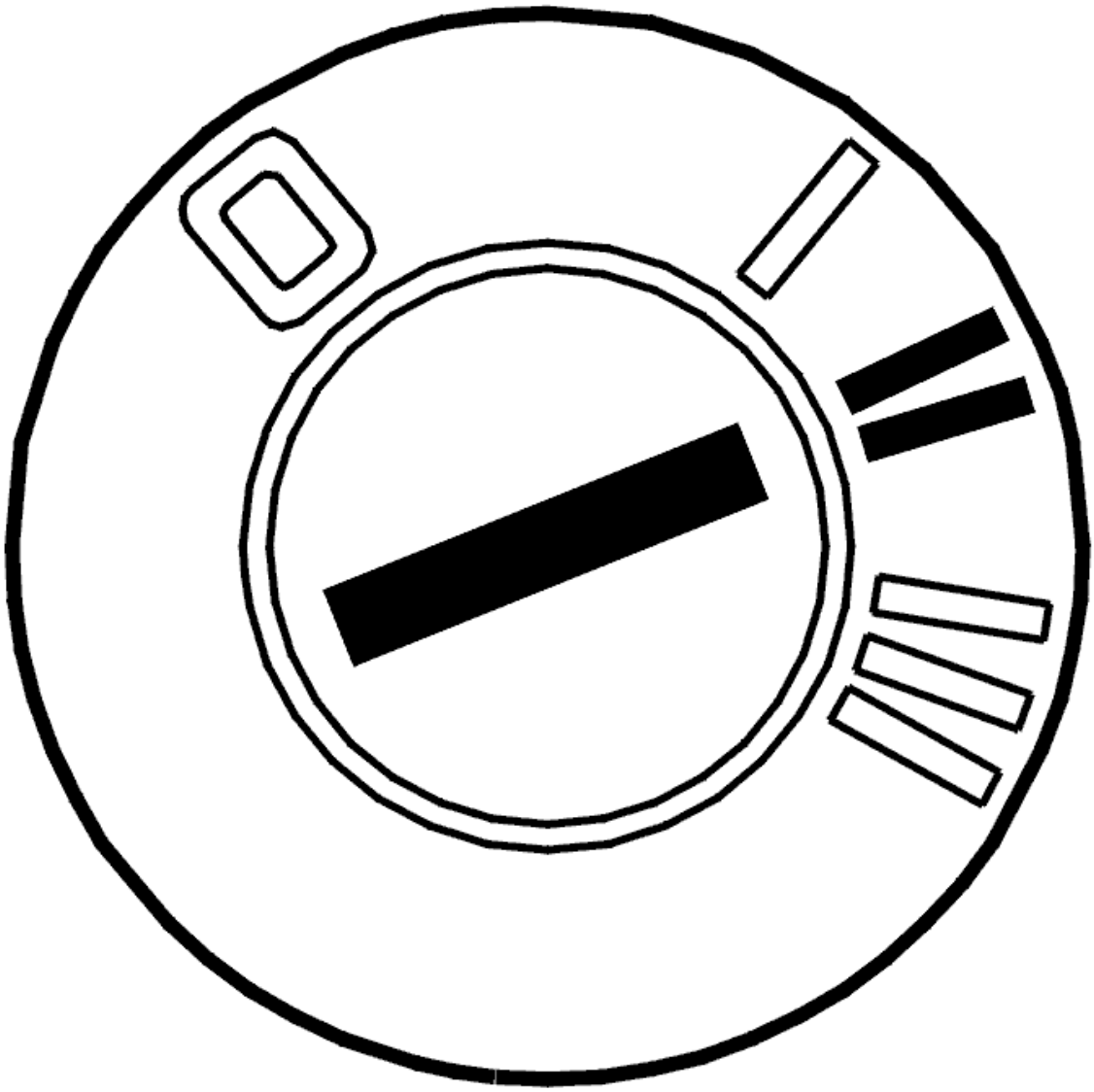


Fig. 98: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil's temperature.

Check the transmission's oil level. If it is low, check the transmission for leaks and then top off the oil.

Check the oil's quality.

If the oil smells burnt, change transmission oil.

Other information

- see **OIL LEVEL, CHECKING**
- see **OIL GRADE, CHECKING (2007-2011)**
- see **TRANSMISSION FLUID, CHANGING**

Select an alternative below

1. No defect found.

   Refer to **CHECKING THE WIRING AND COMPONENT**

2. Transmission oil changed, level low or quality poor.

   Refer to **RESETTING ADAPTATION**

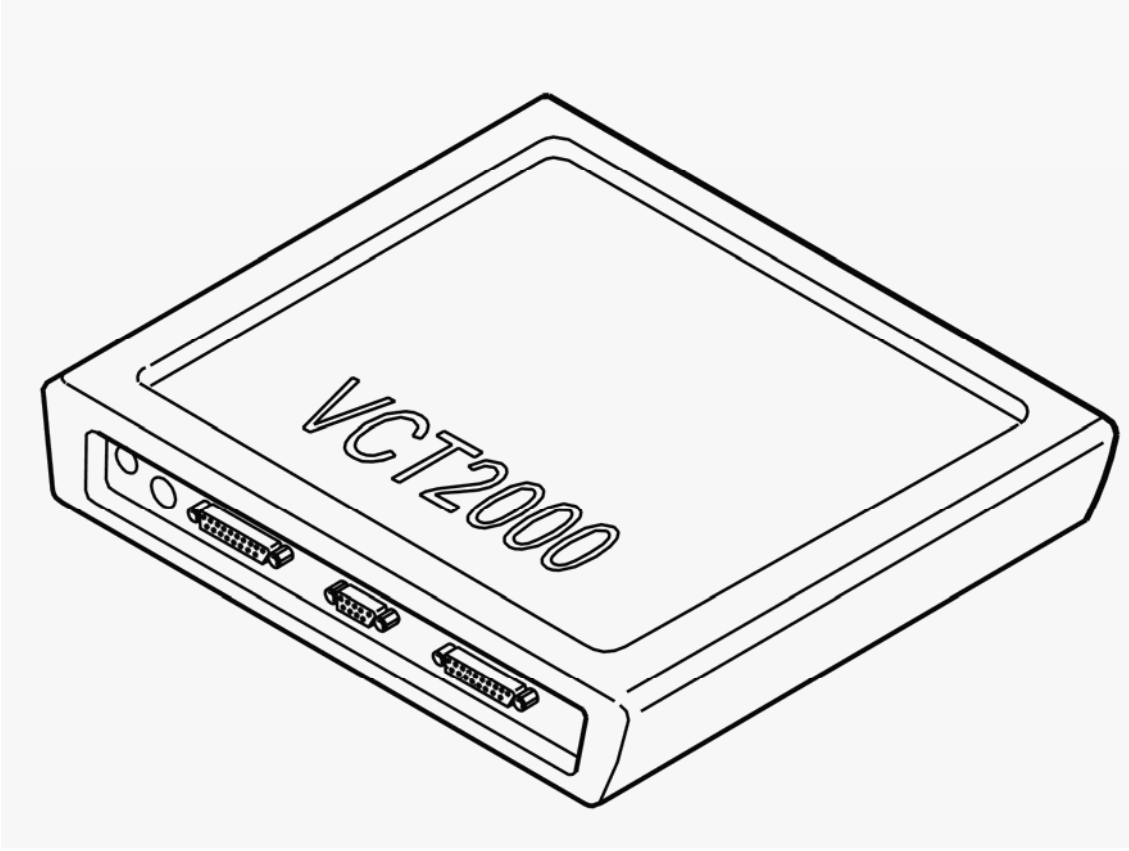


Fig. 99: Identifying VCT2000 Diagnostic Tool Symbol In VIDA

Courtesy of VOLVO CARS CORPORATION

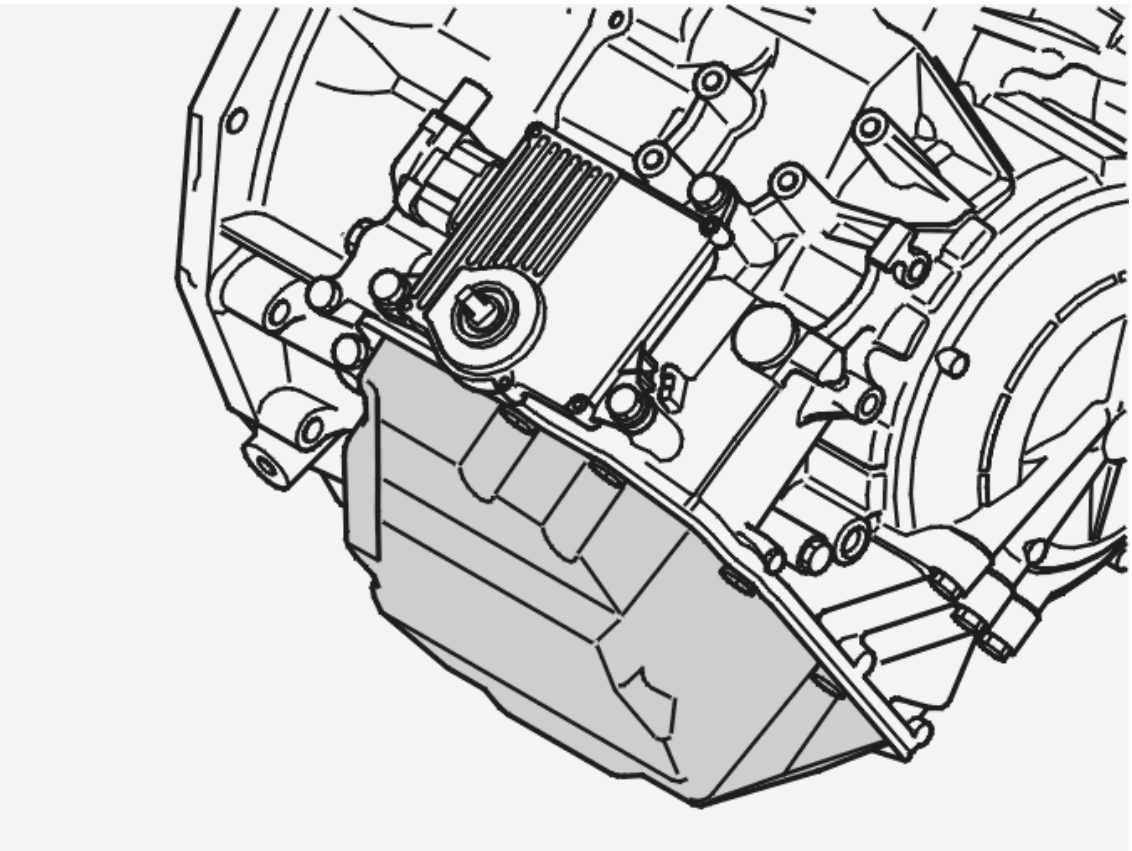


Fig. 100: Identifying Transmission Oil Pan
Courtesy of VOLVO CARS CORPORATION

CHECKING THE WIRING AND COMPONENT

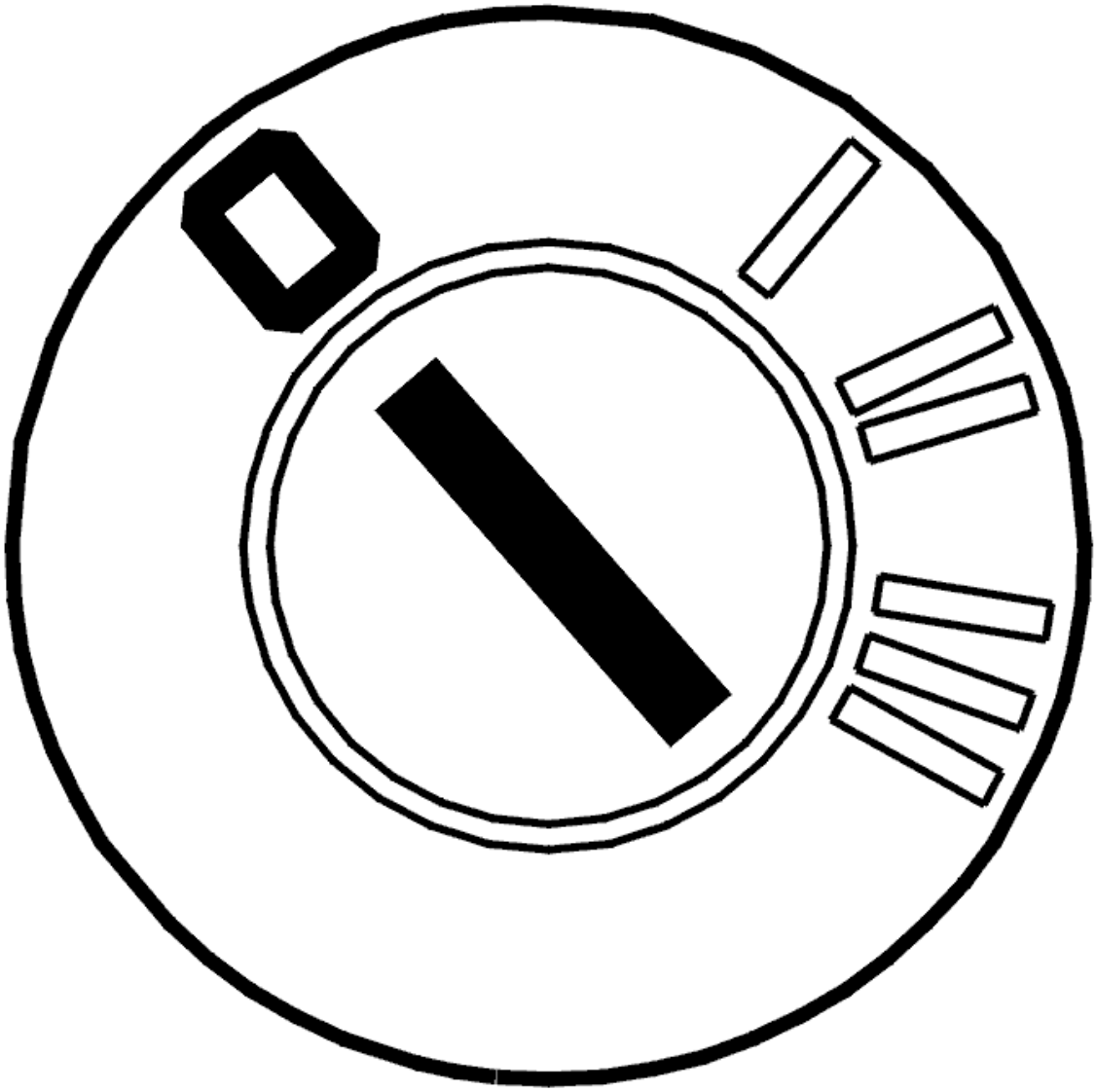


Fig. 101: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

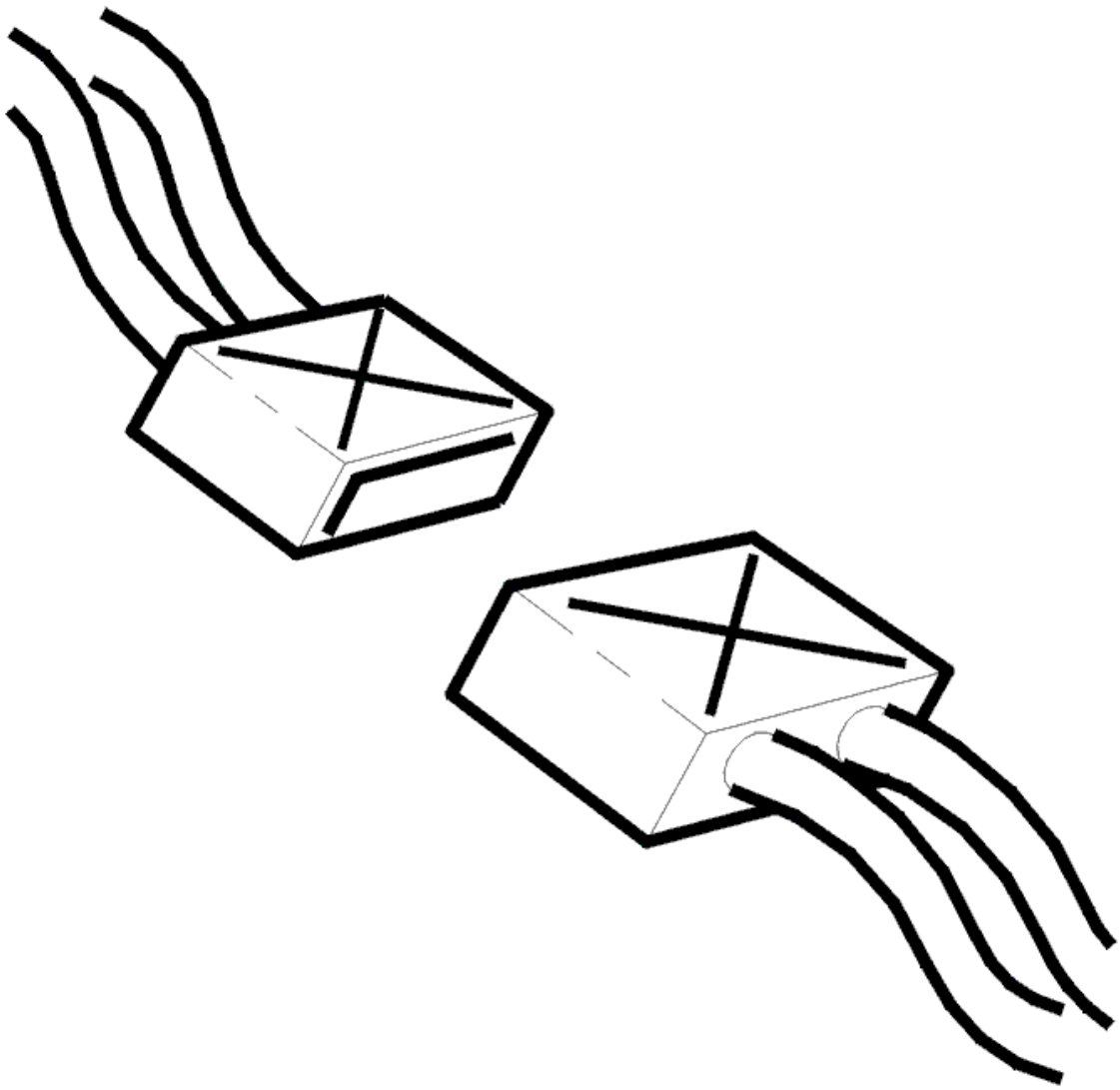


Fig. 102: Identifying Connector
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

HINT: Check solenoid SLT, SLC1, SLC2, SLC3 and SLB1 according to: CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

Gear/DTC	Solenoid
1/TCM-P073F00	SLT, SLC2, SLC3, SLB1
2/TCM-P074A00	SLT, SLC2, SLC3

3/TCM-P074B00	SLT, SLC2, SLB1
4/TCM-P074C00	SLT, SLC3, SLB1
5/TCM-P074D00	SLT, SLC1, SLB1
6/TCM-P074E00	SLT, SLC3

If no defects were found on connectors or cables, replace the control system. If this does not help, replace transmission.

Remedy as necessary.

Other information

- see **REPLACING THE GEARBOX**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- For access to connector B: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- see **CONTENTS**

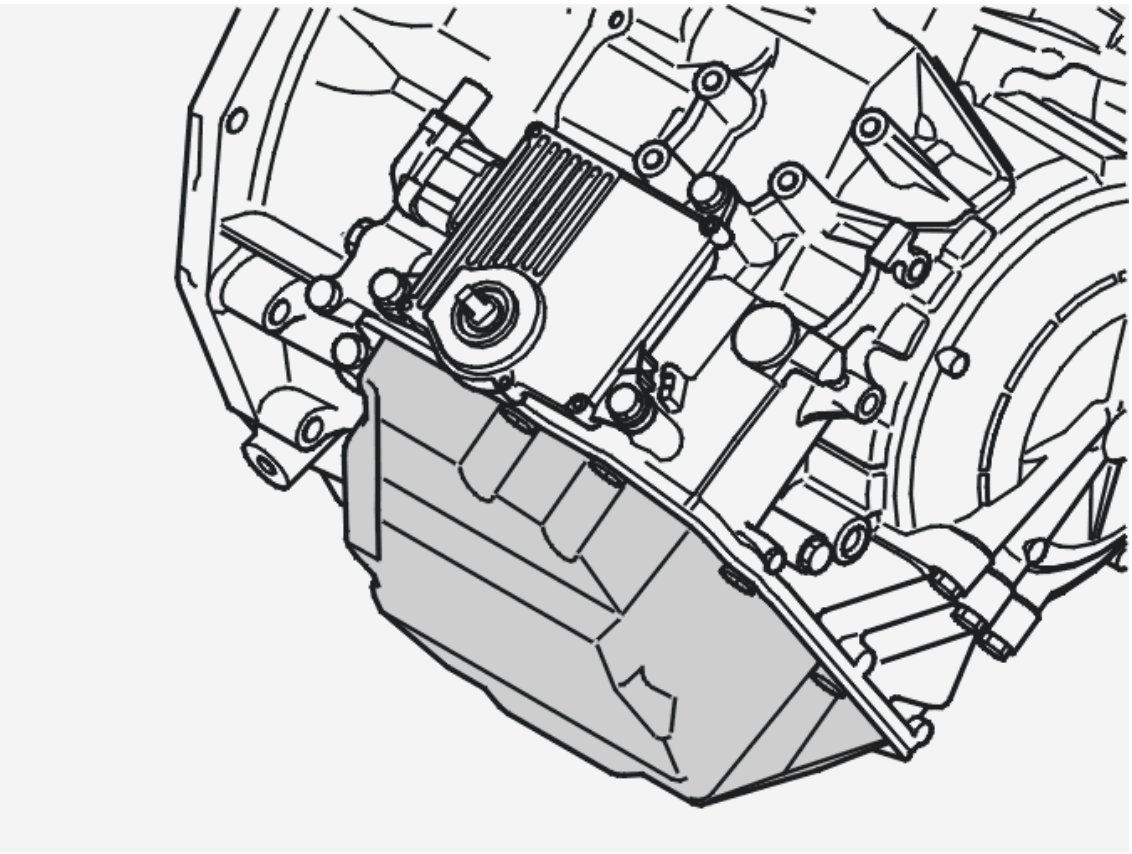


Fig. 103: Identifying Transmission Oil Pan
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING ADAPTATION**

REPLACING THE TRANSMISSION

Previous tests indicate an internal malfunction in the transmission.

Other information

- see **REPLACING THE GEARBOX**

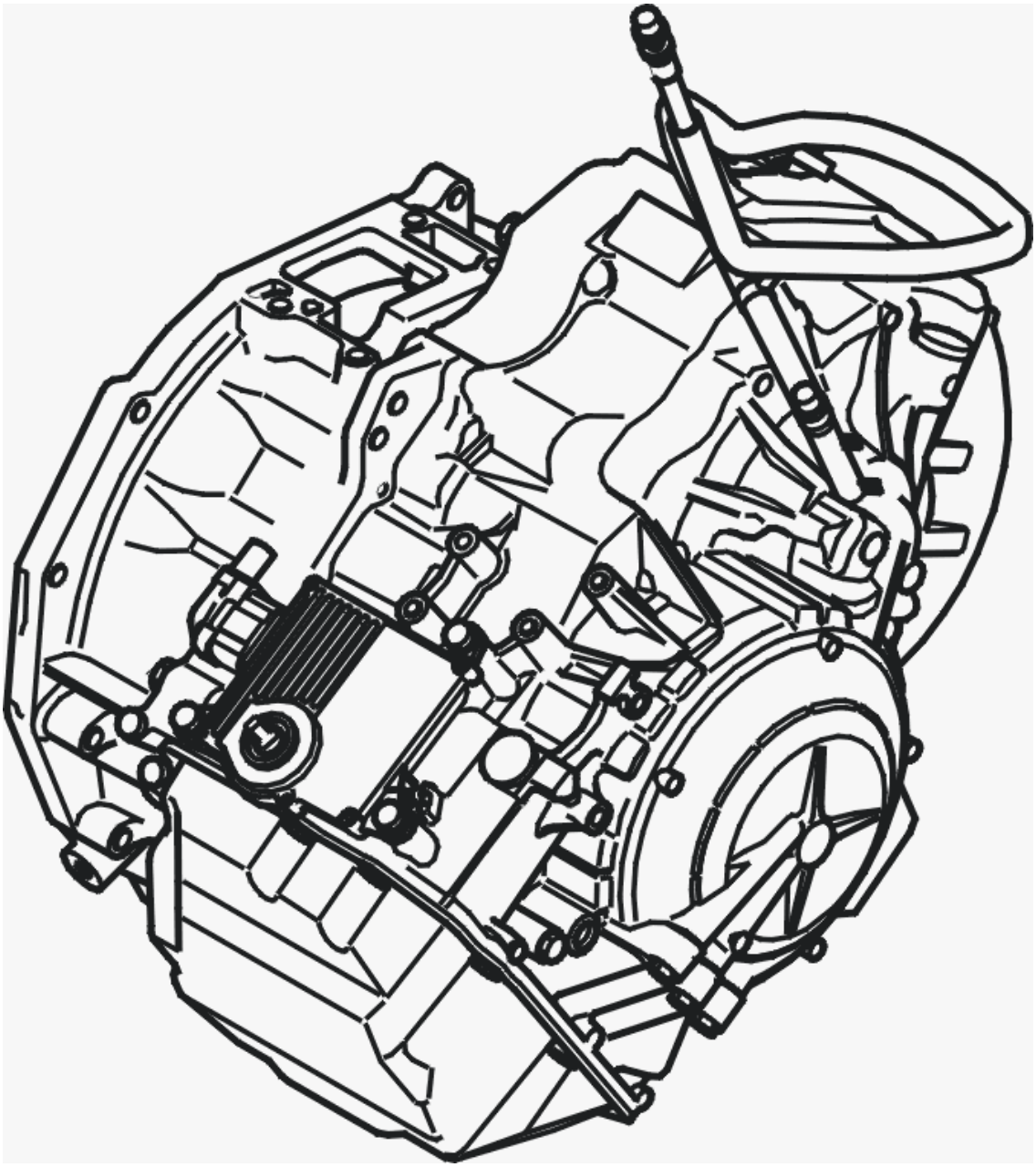


Fig. 104: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

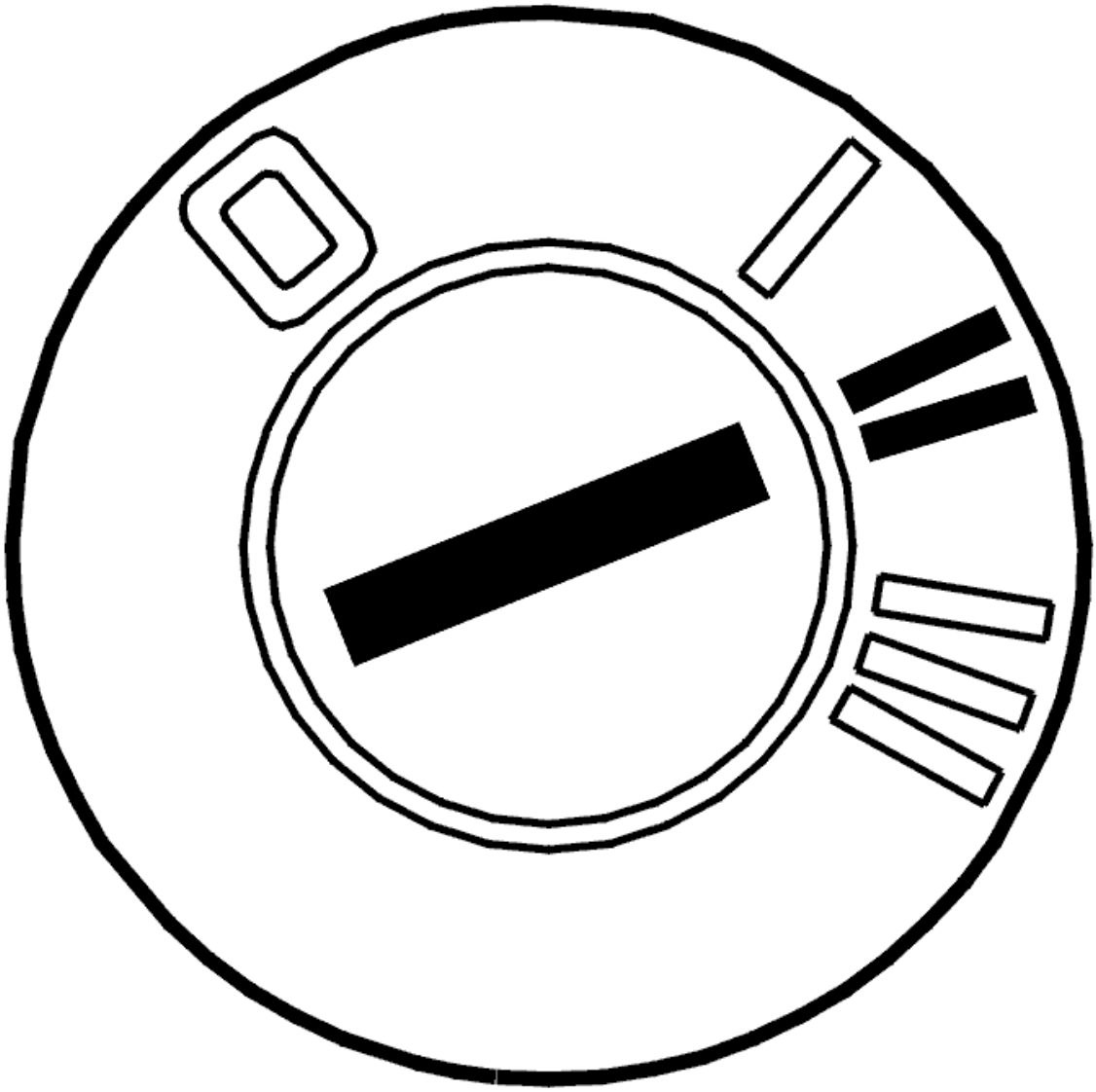


Fig. 105: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

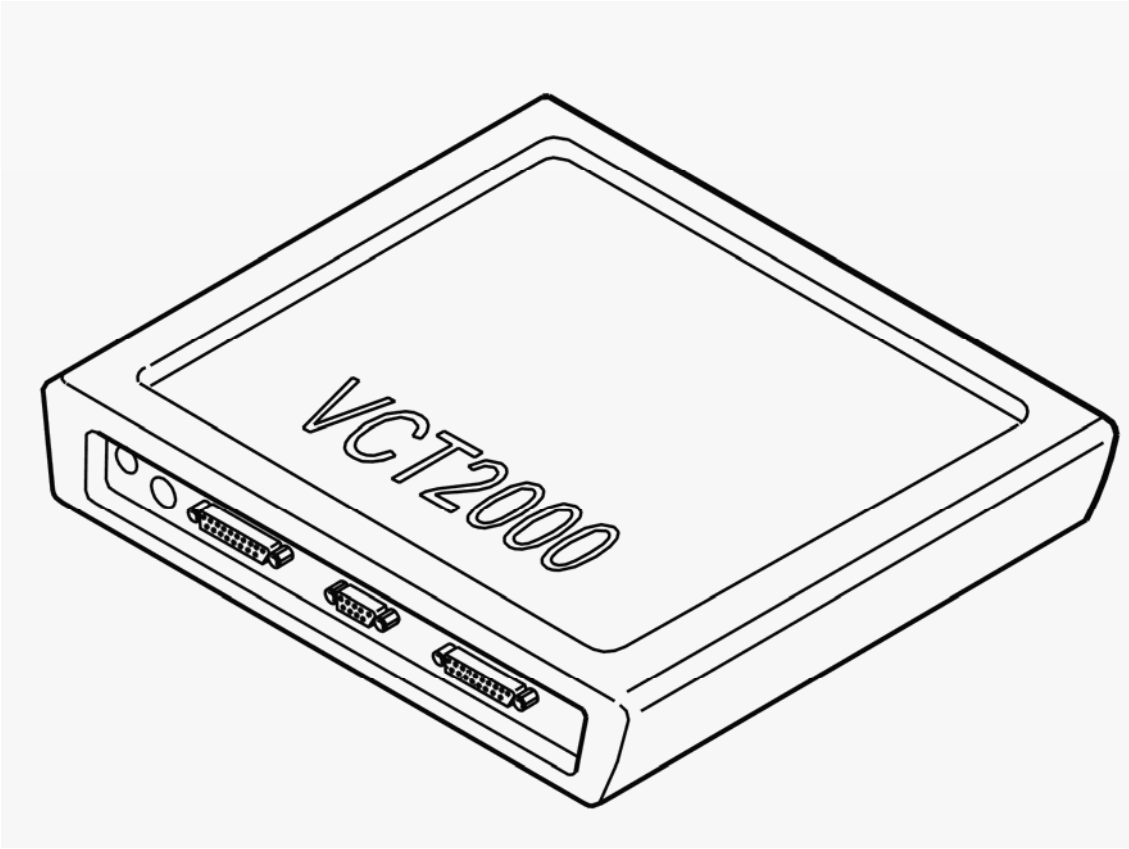


Fig. 106: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

NOTE: When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select "Pause" and save a bookmark, then select Vehicle communication

HINT: After carrying out the repair, check that the fault has been remedied.

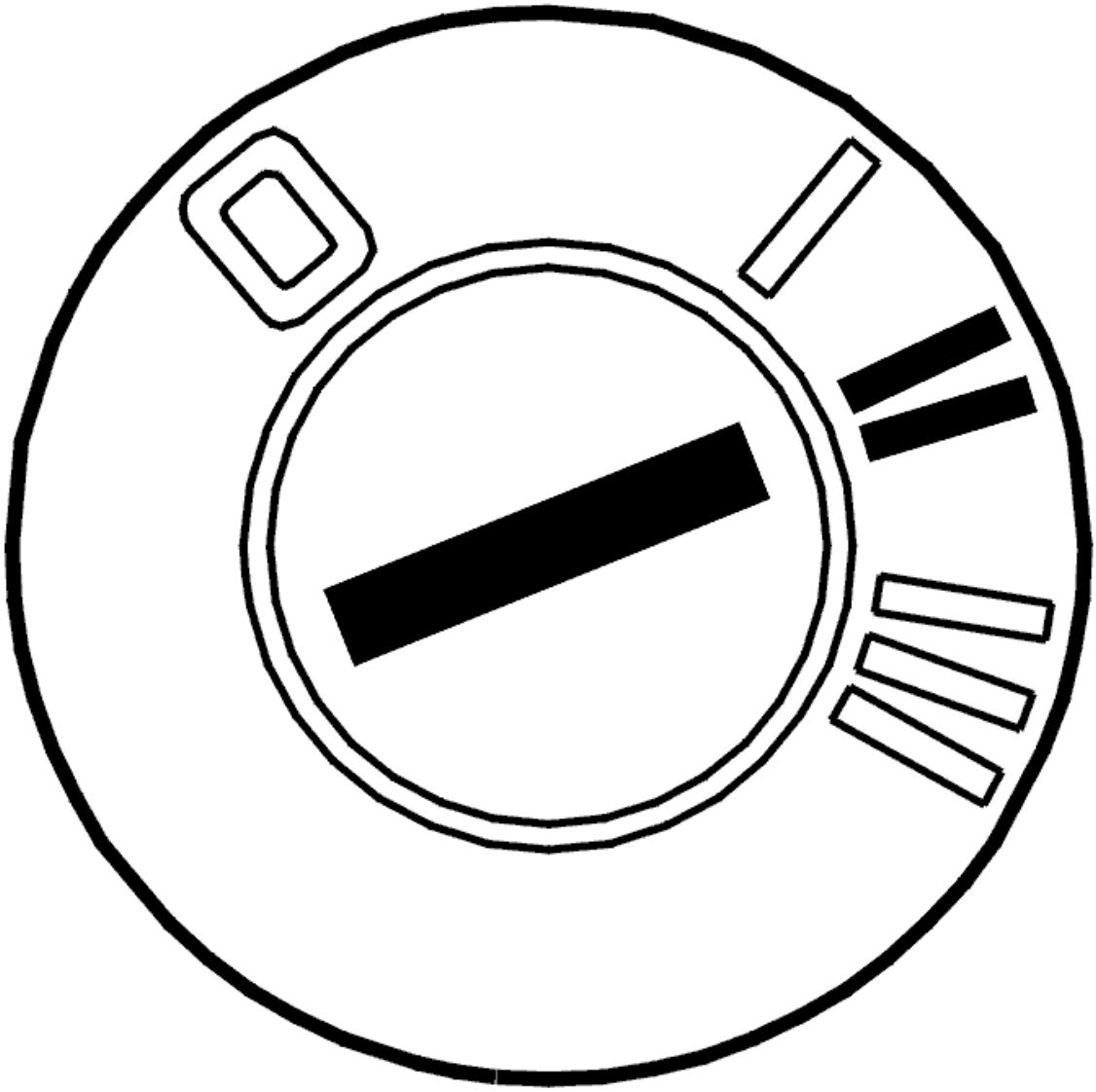


Fig. 107: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

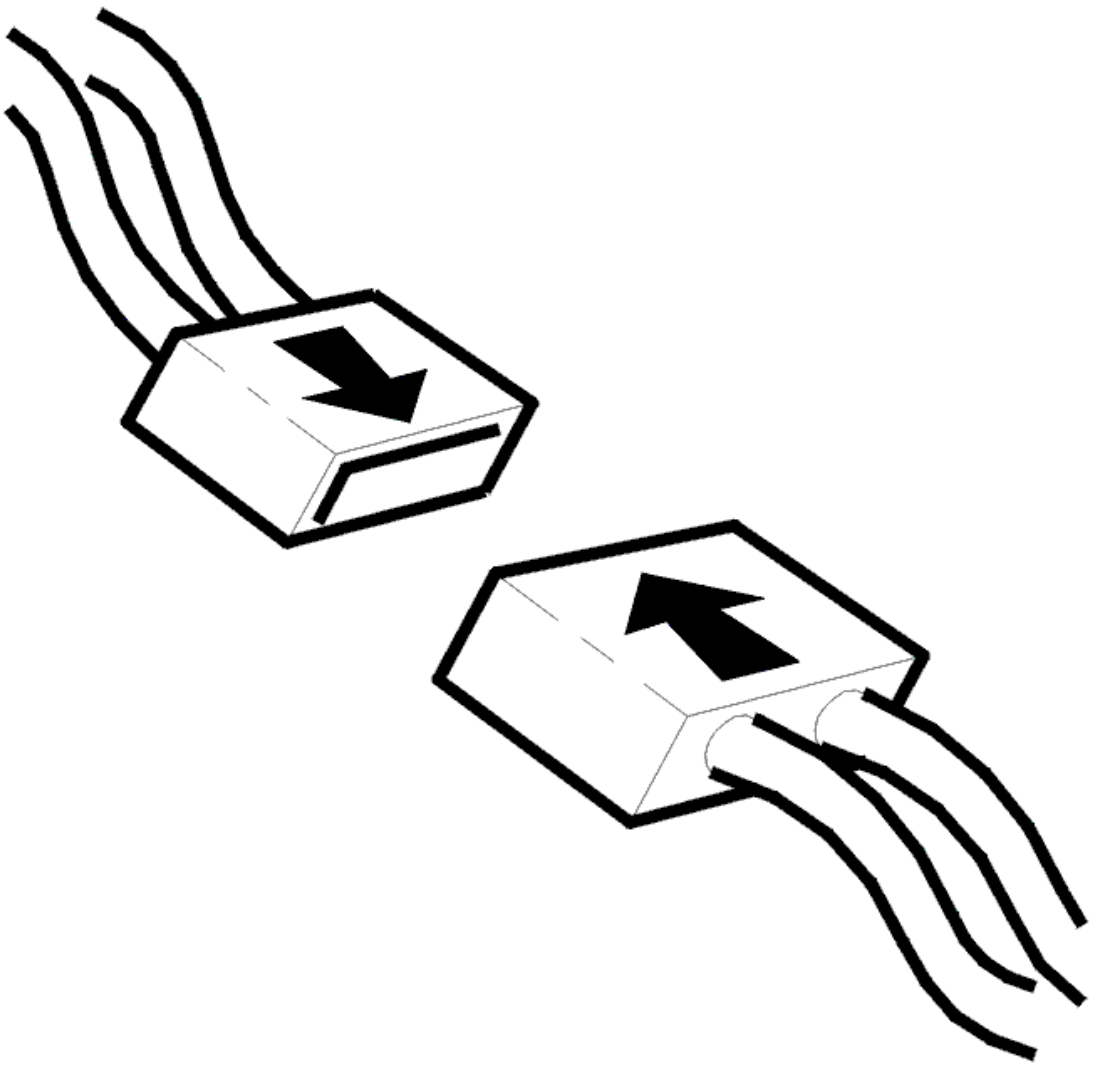


Fig. 108: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.

  Test drive the vehicle following: **TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P073F00 UNABLE TO SELECT GEAR 1. GENERAL MALFUNCTION INFORMATION. NO INFORMATION ON MALFUNCTION TYPE (B8444S, TF-80SC AWD; 2006)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

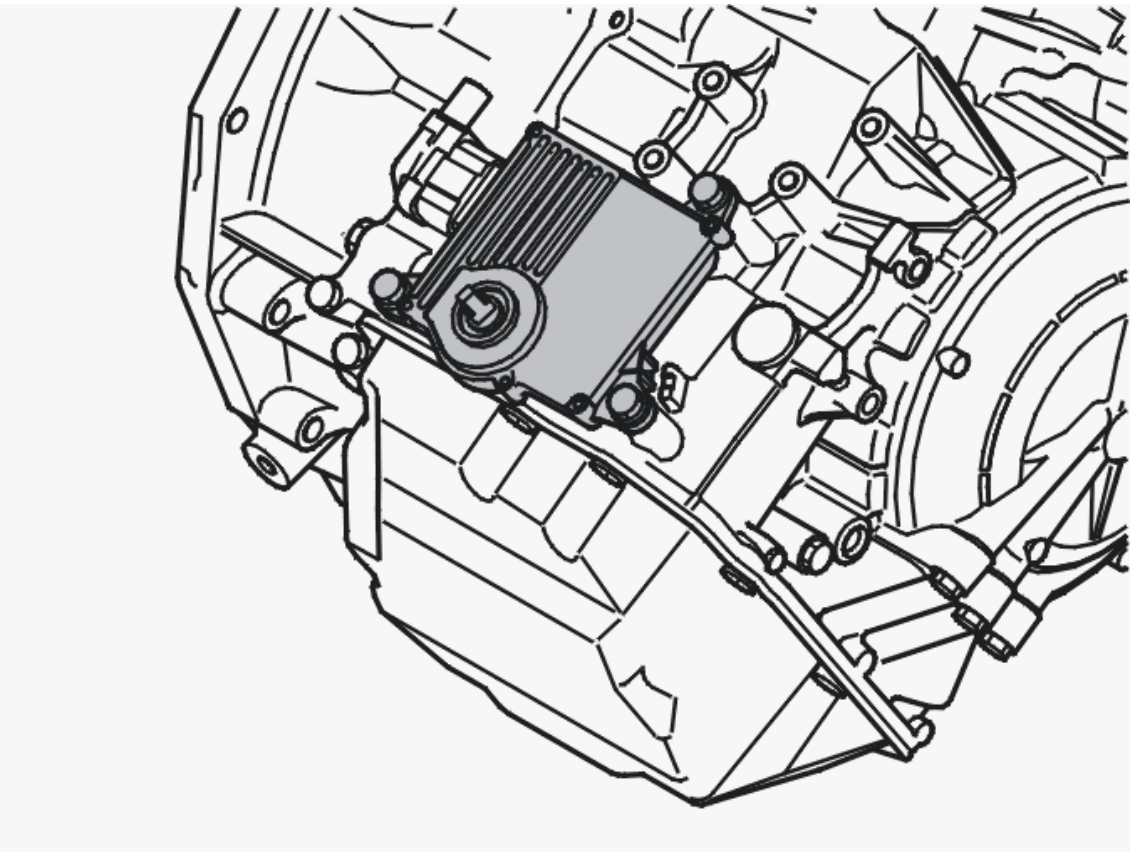


Fig. 109: Identifying Transmission Control Module (TCM)

Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) receives signal about input and output rpm from the transmission's two rpm sensors. For each gear there is a determined ratio and, using the signals, the control module calculates the transmission's gear ratio. If the transmission control module (TCM) registers that the gear ratio is in a gear ratio that is near (4%) that of any other gear than the gear selected by the control module, then diagnostic trouble code TCM-P073F00 is generated, or any of the diagnostic trouble codes TCM-P074x00, depending on the cause of the malfunction.

The diagnostic trouble code can be diagnosed at an oil temperature above +20 °C in the transmission as well as approx. 4% outside normal operating range of the gear in question.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance or one of the solenoids has stuck in OFF or ON position.
- Mechanical faults in gearbox.

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- Abnormally slipping gears.
- No gear changing.

FAULT TRACING

see **FAULT TRACING**

TCM-P073F00 UNABLE TO SELECT GEAR 1. GENERAL MALFUNCTION INFORMATION. NO INFORMATION ON MALFUNCTION TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT TRACING

see **FAULT TRACING**

TCM-P074100: TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT PERFORMANCE OR STUCK OFF. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074100

Condition

The transmission control module (TCM) checks the function of the lock-up solenoid by comparing the speed signal from the transmission speed sensor with the speed (rpm) signal from the transmission speed (rpm) sensor. The signals must then "show" the same calculated speed (rpm). The transmission control module (TCM) also compares the speed from the transmission speed sensor with the engine speed (RPM). Rpm should be greater than or less than transmission speed depending on which gear is engaged.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Speed and rpm signals do not match calculated values. This indicates that the lock-up solenoid (SLU) is spinning or is not engaged.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Normal driving.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code is stored when the conditions are met.

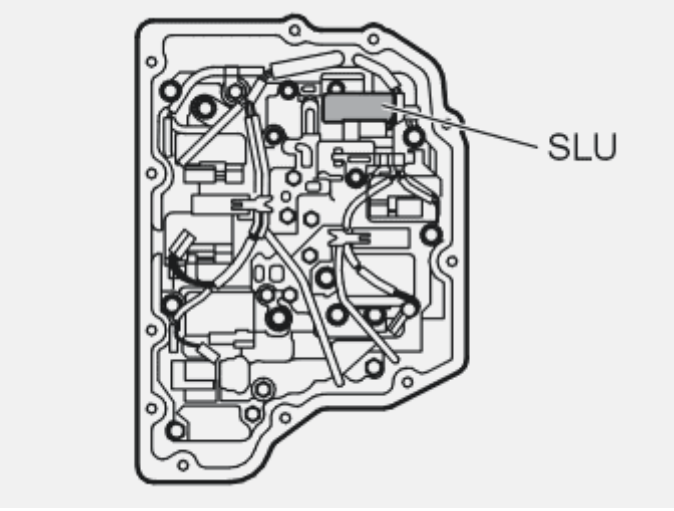


Fig. 110: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Adaptation function is blocked.
- function is blocked.
- Slip lock-up function is blocked.

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the cable for the control signal or signal ground.
- Solenoid not working.
- Solenoid stuck in closed position.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- Rough gear shift
- No gear shift
- Abnormal slipping gearshifts

FAULT-TRACING

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

Fig. 111: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check the transmission oil level. If the oil level is low, check the transmission for leakage, then top up with oil.

  Check the quality of the oil.

Replace the transmission fluid if the fluid smells burnt.

Other information

- see **TRANSMISSION OIL LEVEL - CHECKING**
- see **OIL GRADE, CHECKING**
- see **TRANSAXLE OIL**

Select an alternative below

1. No fault detected.

   Refer to **CHECKING THE COMPONENTS AND WIRING**

2. Transmission fluid replaced, low level or poor quality.

   Refer to **RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER**

Fig. 112: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING THE COMPONENTS AND WIRING

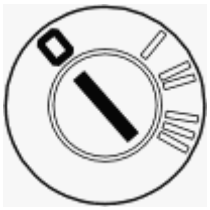


Fig. 113: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

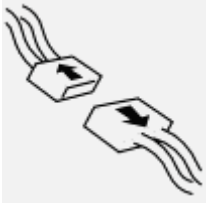


Fig. 114: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  HINT: Check solenoids SLT, SLC3 as described in:CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

  If no defects were found on connectors or cables, replace the transmission.

  Remedy as necessary.

  Other information

  - see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
  - see **VALVE HOUSING** .
  - see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
  - To access connector B: **TRANSMISSION CONTROL MODULE (TCM)**
  - see **CHECKING WIRING AND TERMINALS**

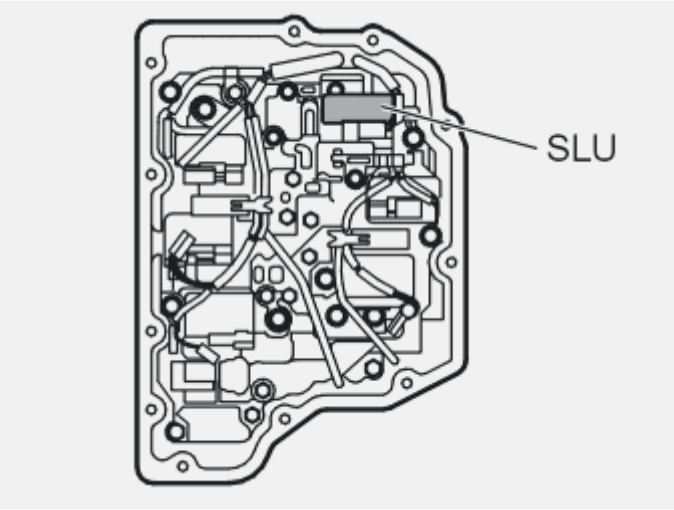


Fig. 115: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

NOTE: When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select Pause and create a bookmark. Then select Vehicle communication.

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 116: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

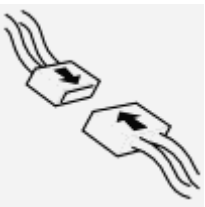


Fig. 117: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 118: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 119: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER

CHECKING THE FUNCTION

HINT: The transmission control module (TCM) has a counter for fluid quality that counts the number of

times the transmission is subjected to too hard a load or too high an ambient temperature. If the counter is not reset during draining/replacement, there is a risk that a diagnostic trouble code will be set under the wrong conditions. Thus, it is important that the counter for transmission fluid change be reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

Fig. 120: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the counter.

Fig. 121: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P074100: TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT PERFORMANCE OR STUCK OFF. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074100**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P074100: TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT PERFORMANCE OR STUCK IN OFF POSITION. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074100

Condition

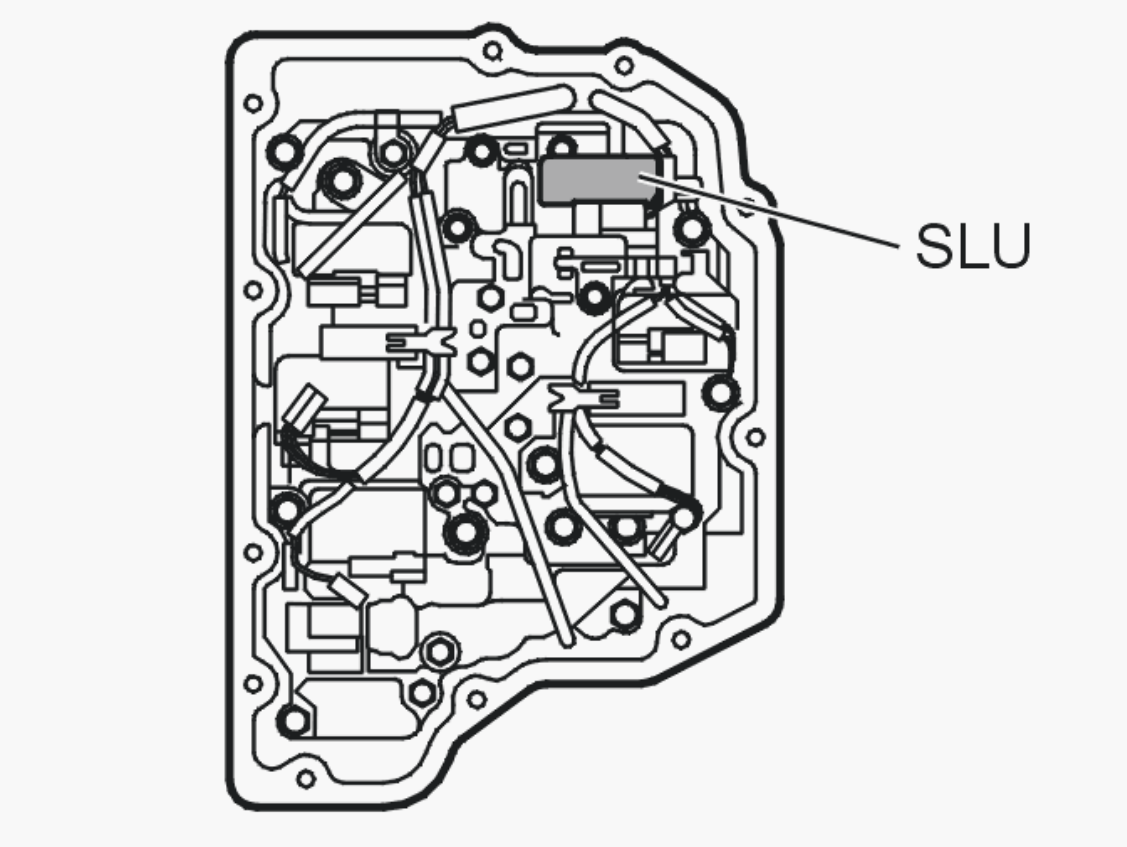


Fig. 122: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) checks the lockup solenoid function by comparing the speed signal from the gearbox speed sensor with the rpm signal from the gearbox rpm sensor. The signals should then "show" the same calculated rpm. The transmission control module (TCM) also compares the rpm from the gearbox speed sensor with the engine rpm. The rpm should then be greater or lower than the gearbox speed depending on the gear that is selected. If the transmission control module (TCM) detects that the speed and rpm signals do not agree with the calculated values, it means that the lock-up solenoid SLU is slipping or is not engaged and the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code (DTC) can be diagnosed when driving normally.

Substitute Value

- Adaptation function is blocked.
- Lock-up function is blocked.
- Slip lock-up function is blocked.

Possible Source

- Contact resistance in the terminals
- Open circuit in lead for control signal or signal ground.
- Solenoid not working.
- Solenoid stuck in closed position.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Harsh gear changing
- No gear changing.
- Abnormally slipping gears.

FAULT TRACING

CHECKING OIL QUALITY AND OIL LEVEL IN TRANSMISSION

NOTE: The transmission oil's quality and level are extremely important for the function of the transmission. Therefore it is important that these are correct. In addition, the oil level is dependent on oil temperature.

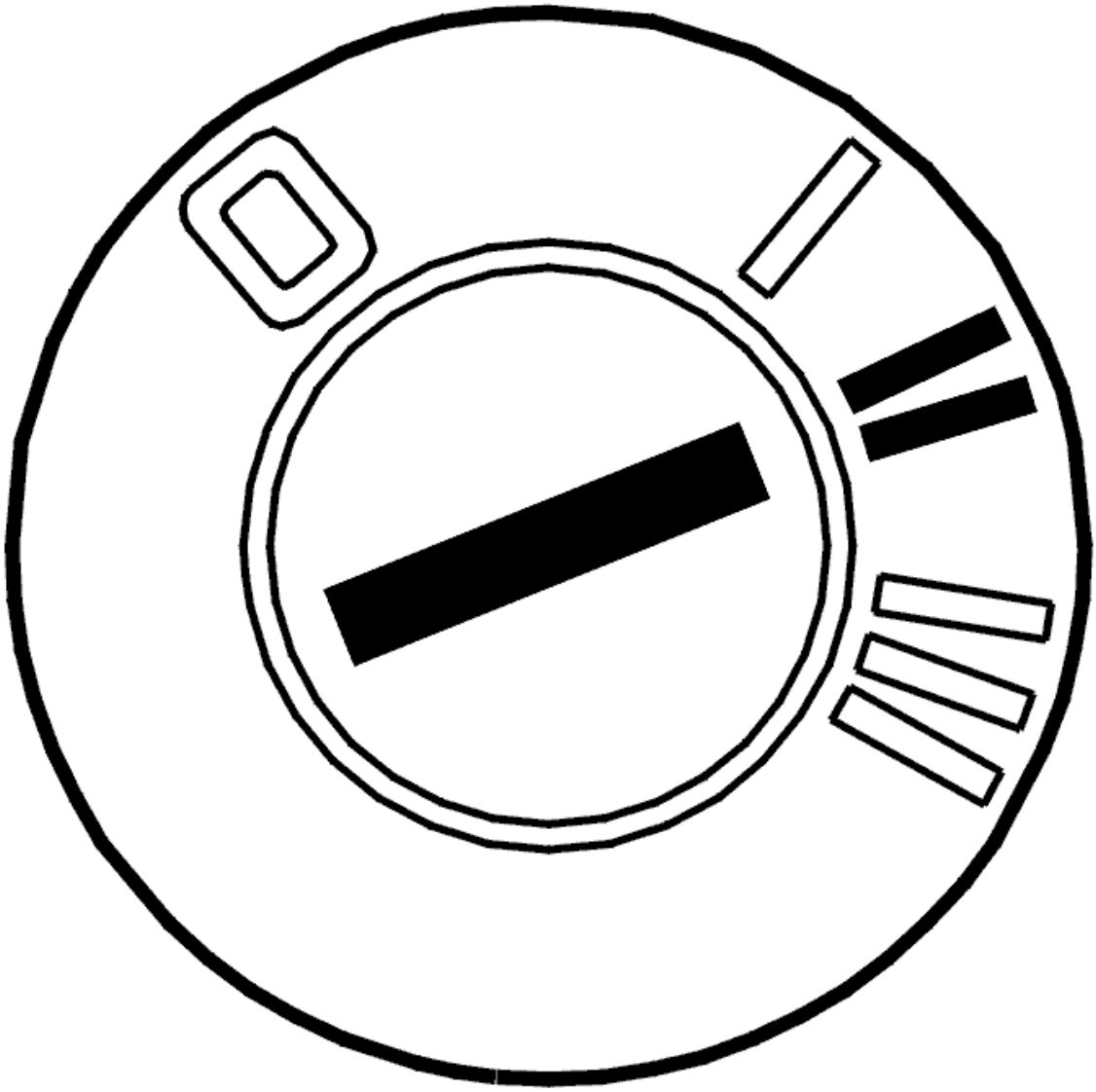


Fig. 123: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil's temperature.

  Check the transmission's oil level. If it is low, check the transmission for leaks and then top off the oil.

  Check the oil's quality.

  If the oil smells burnt, change transmission oil.

  Other information

  - see **OIL LEVEL, CHECKING**

- see **OIL GRADE, CHECKING (2007-2011)**
- see **TRANSMISSION FLUID, CHANGING**

Select an alternative below

1. No defect found.

   Refer to **CHECKING THE WIRING AND COMPONENT**

2. Transmission oil changed, level low or quality poor.

   Refer to **RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE**

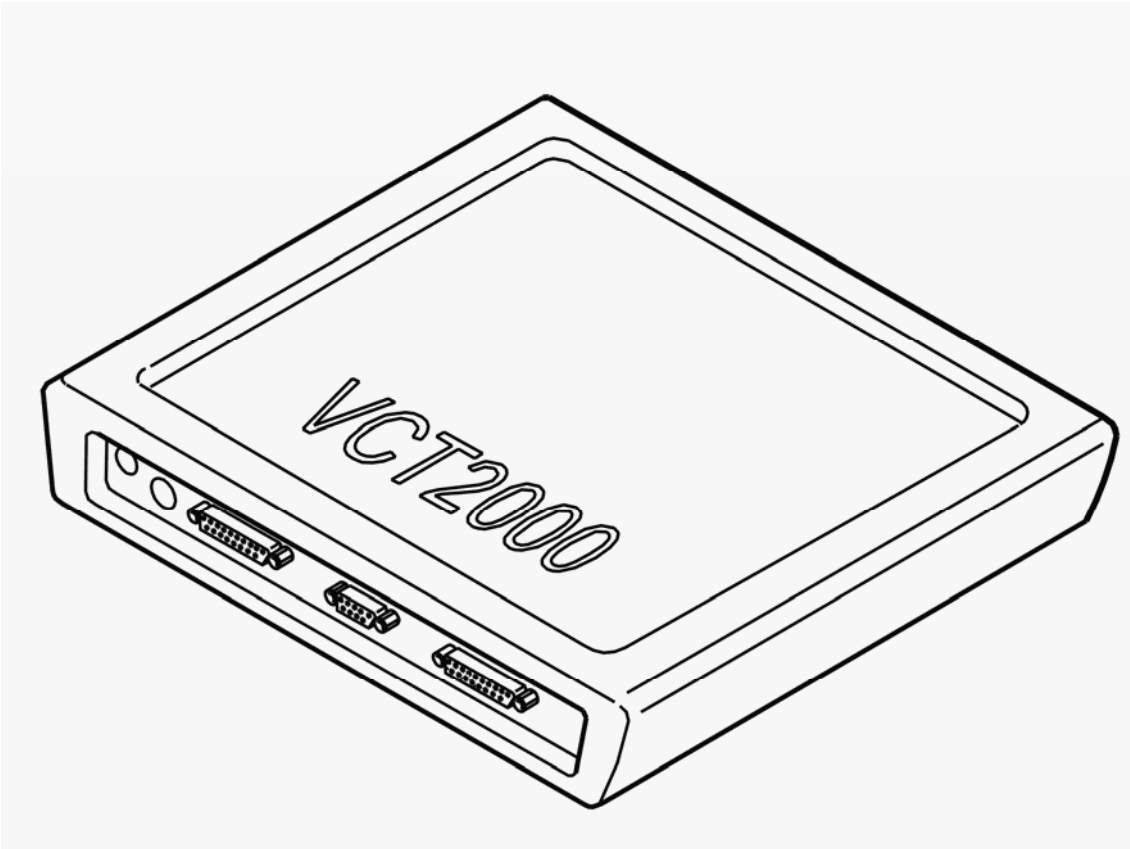


Fig. 124: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING THE WIRING AND COMPONENT

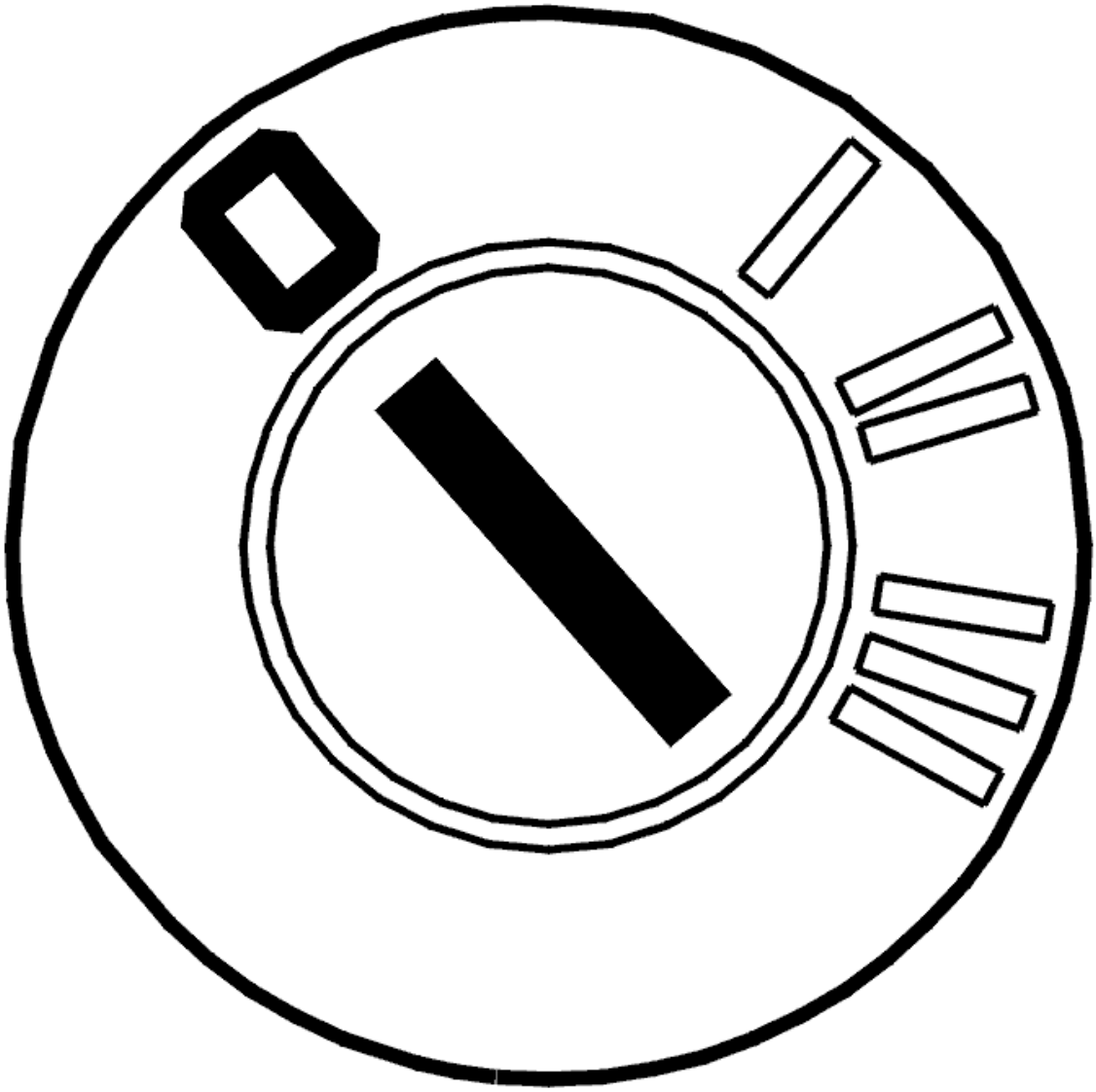


Fig. 125: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

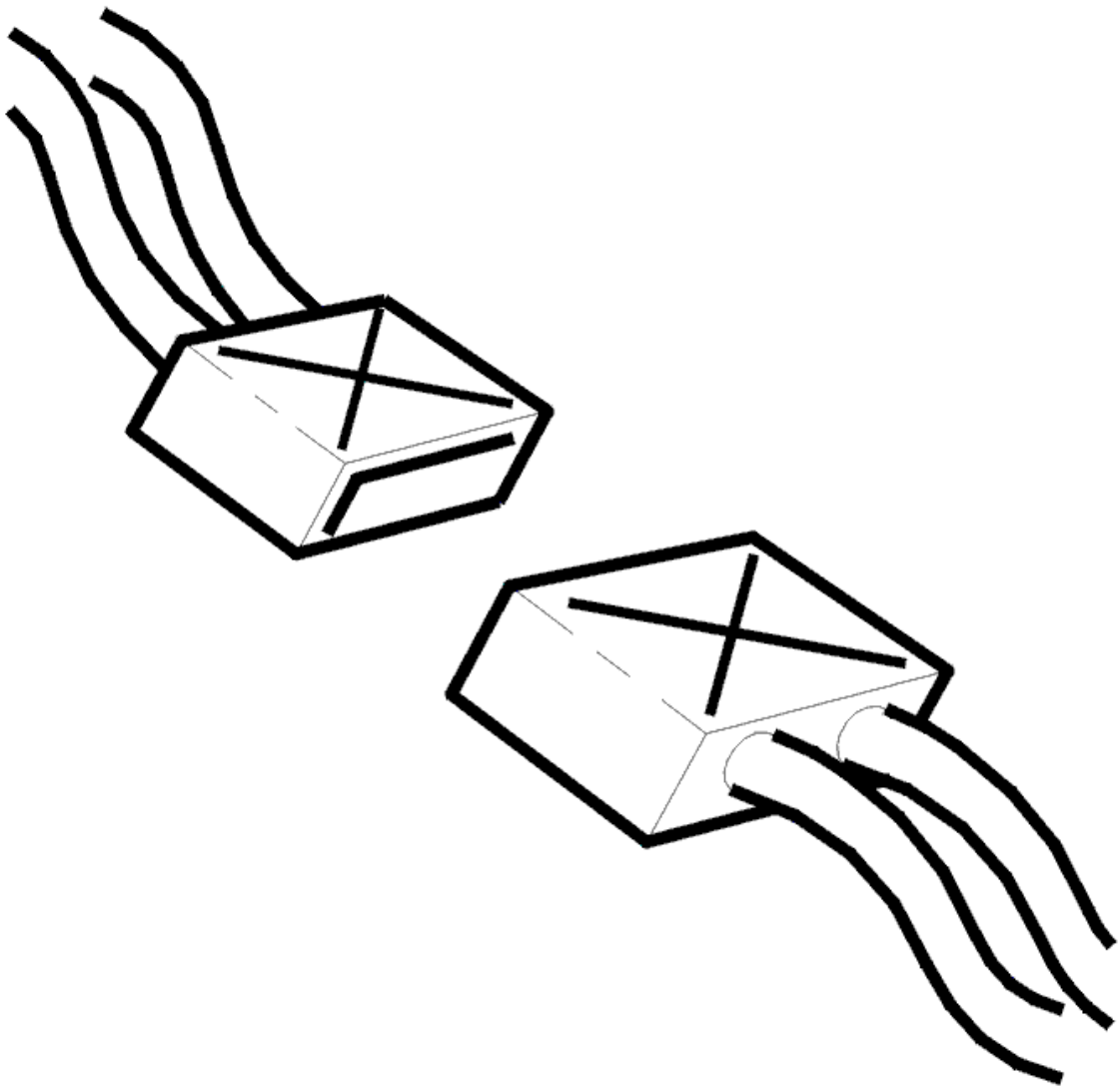


Fig. 126: Identifying Connector
Courtesy of VOLVO CARS CORPORATION

- Ignition off

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  Check the cables between the transmission's and the solenoid's connector for open circuit

  HINT: Check linear pressure solenoid SLU according to: CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

  If no defects were found on connectors or cables, replace the transmission.

  Remedy as necessary.

Other information

- see **REPLACING THE GEARBOX**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- see **CONTENTS**

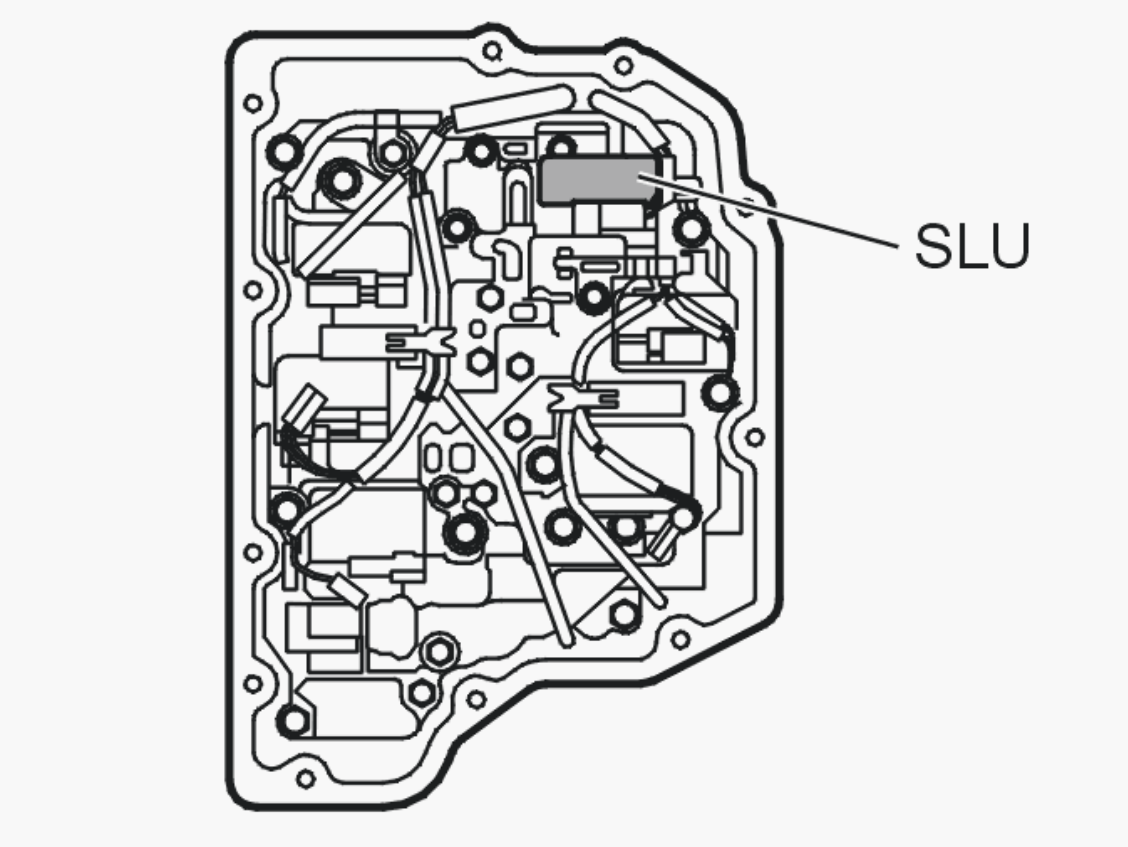


Fig. 127: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

REPLACING THE TRANSMISSION

Previous tests indicate an internal malfunction in the transmission.

Other information

- see **REPLACING THE GEARBOX**

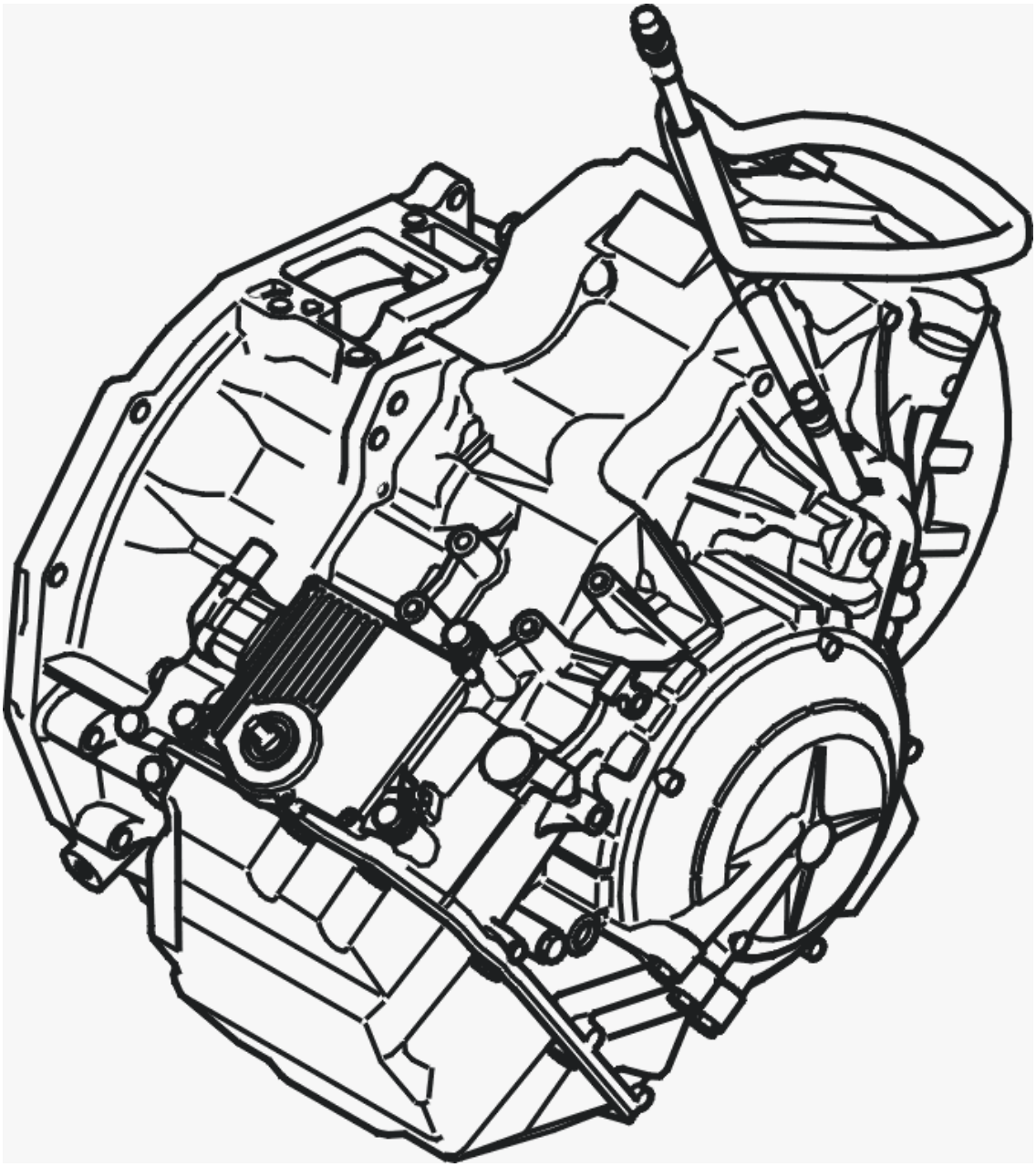


Fig. 128: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE

RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE

HINT: The transmission control module (TCM) has a counter for the oil's quality that counts up when

the transmission is exposed to very heavy loads or high ambient temperature. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions. That is why it is important that the counter for Transmission oil, change is reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

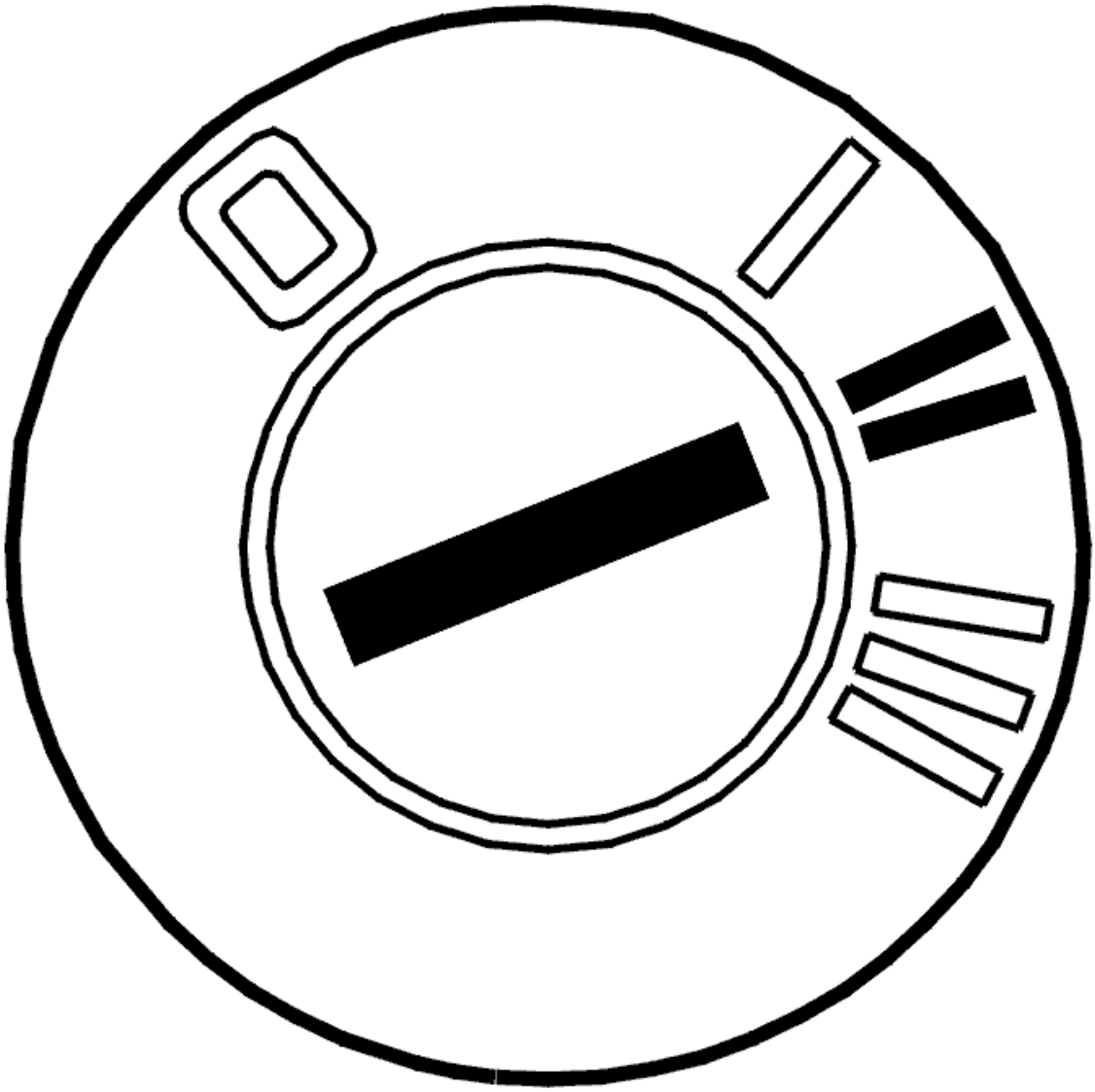


Fig. 129: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the counter by clicking on the symbol for VCT2000.

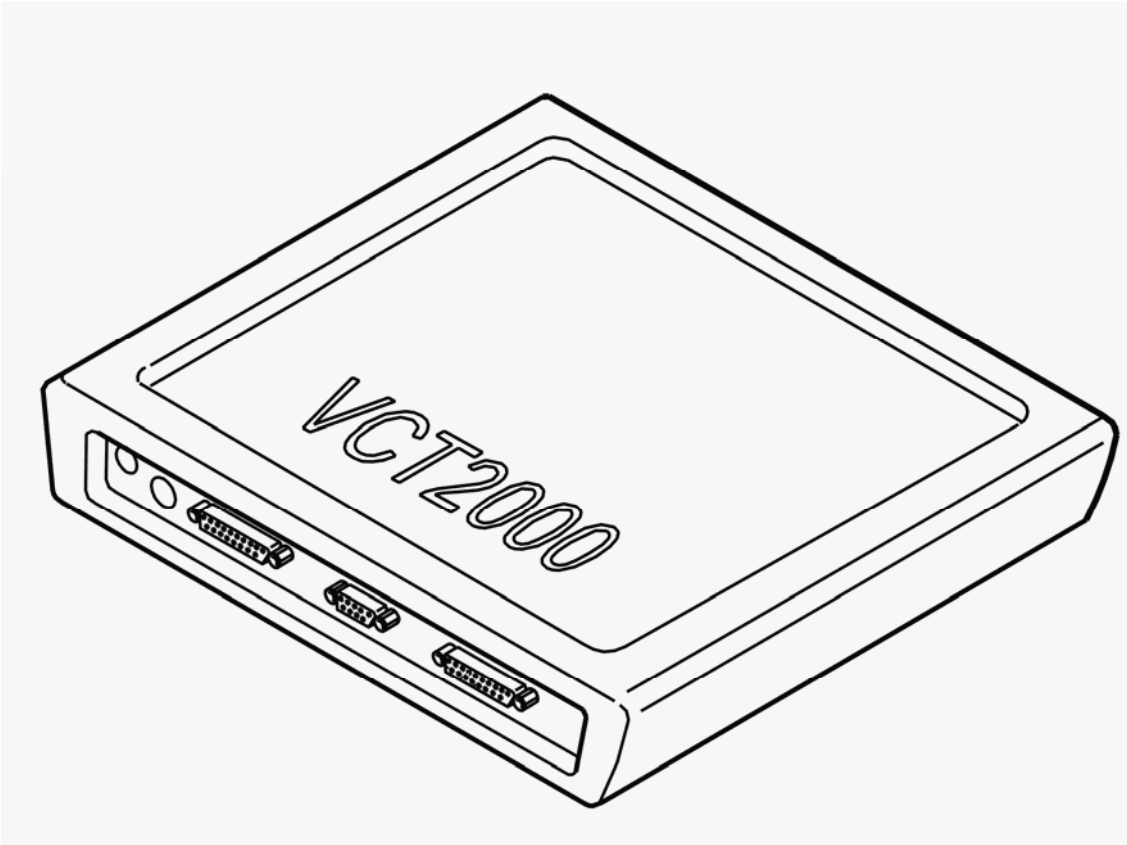


Fig. 130: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

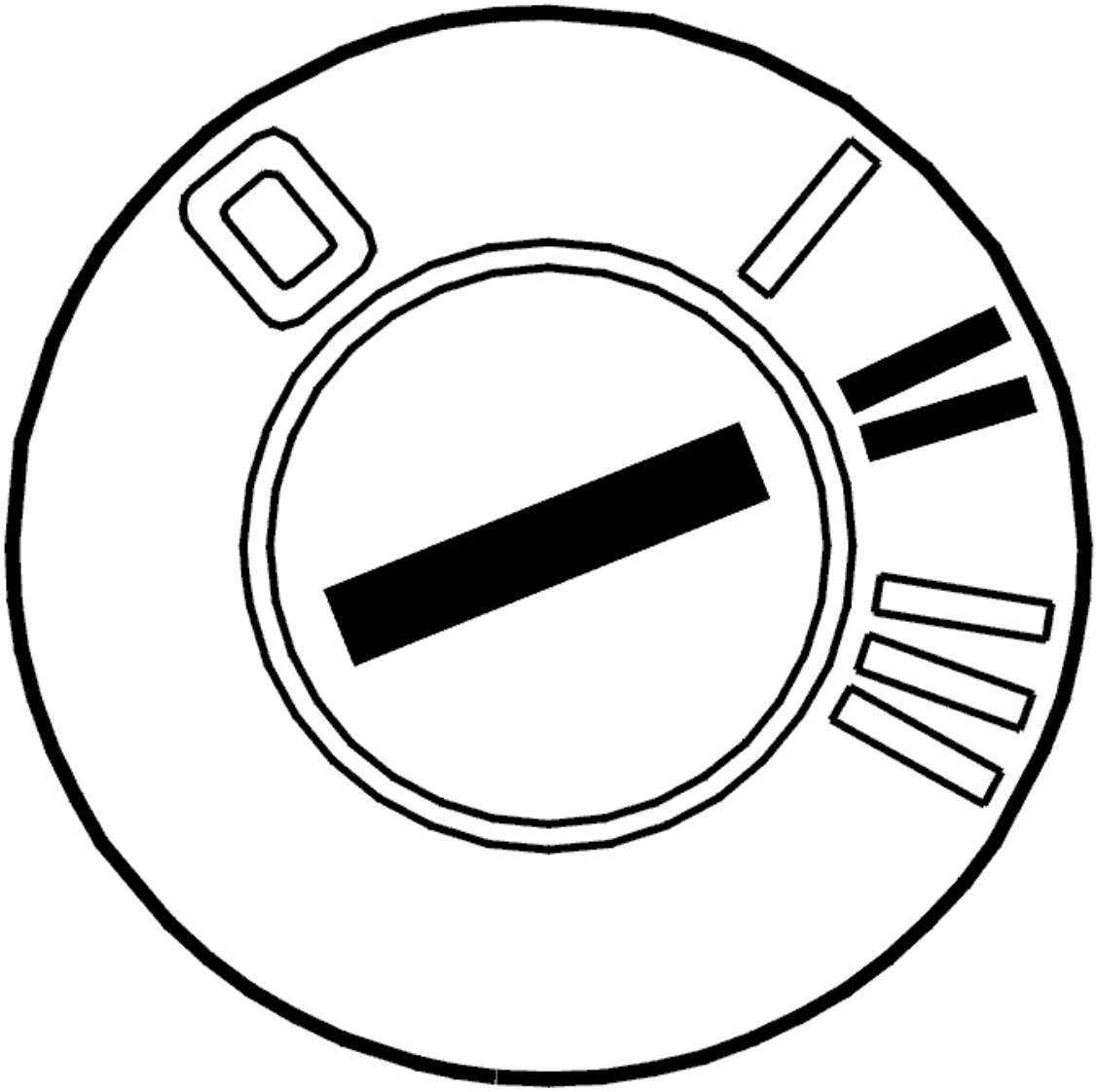


Fig. 131: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

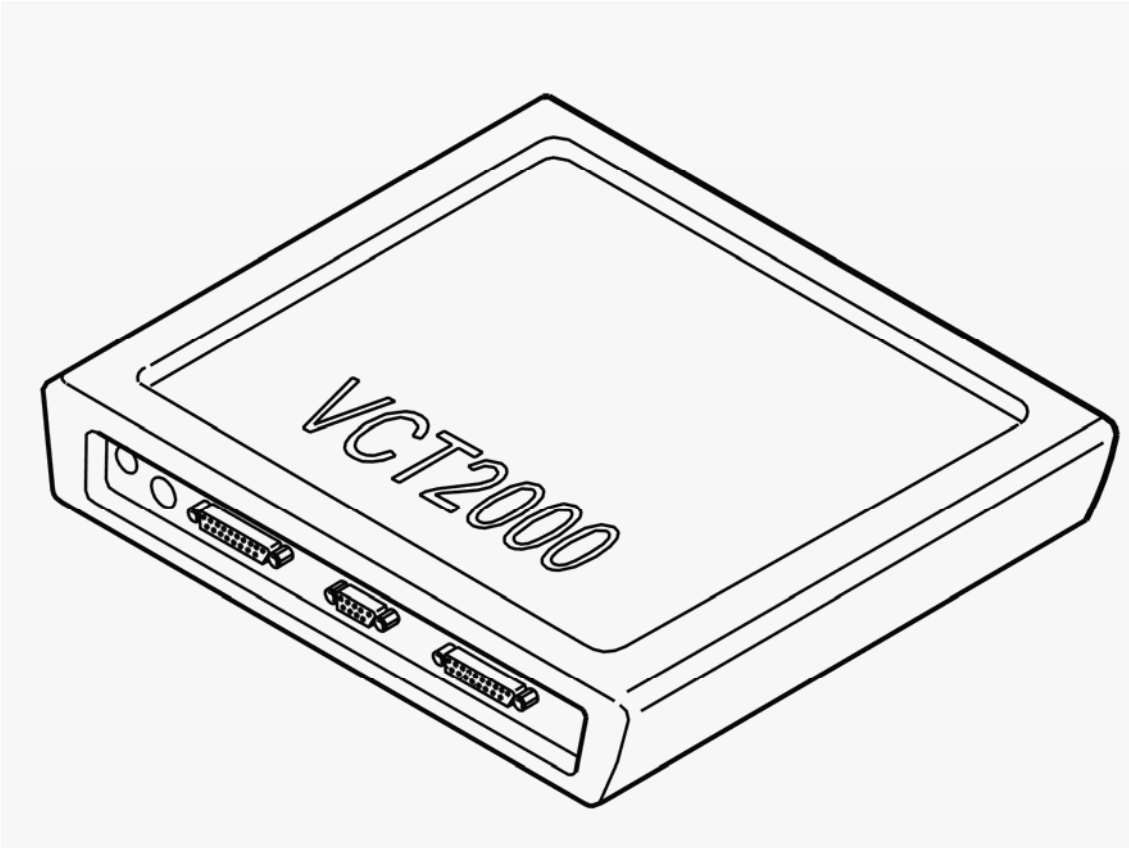


Fig. 132: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

NOTE: When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select "Pause" and save a bookmark, then select Vehicle communication

HINT: After carrying out the repair, check that the fault has been remedied.

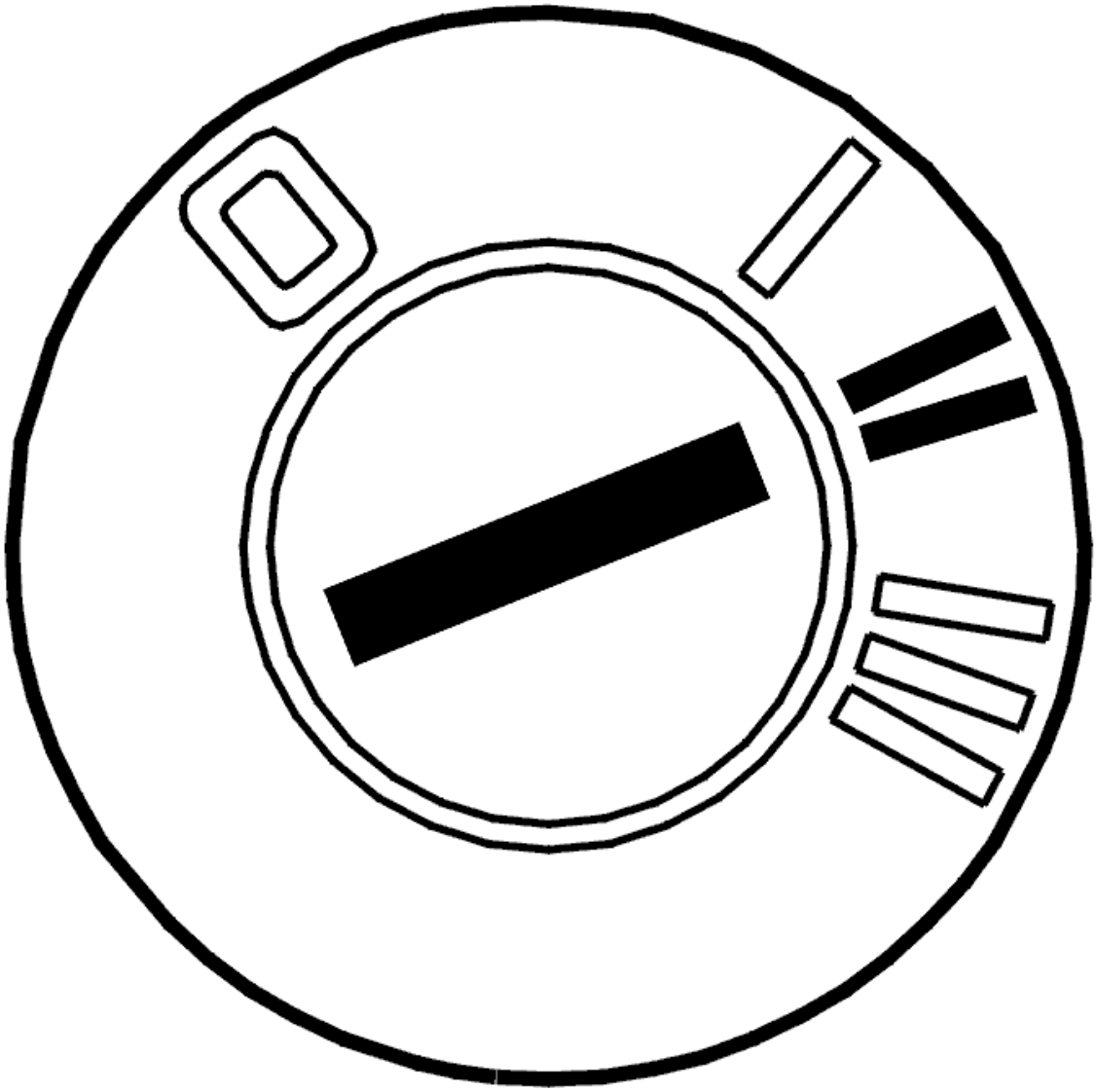


Fig. 133: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

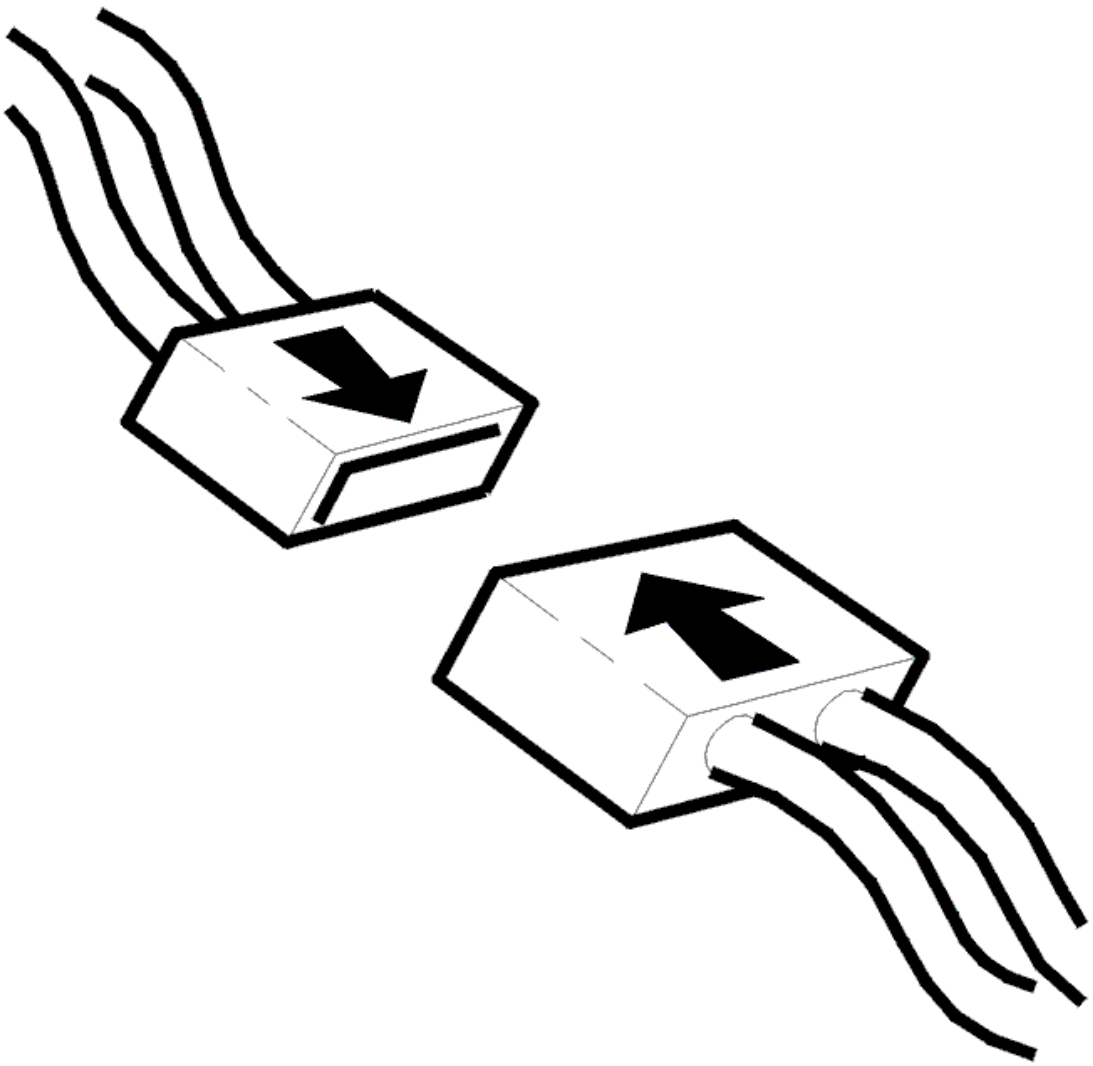


Fig. 134: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.

  Test drive the vehicle following: **TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P074100: TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT PERFORMANCE OR STUCK IN OFF POSITION. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074100**

FAULT TRACING

see **FAULT TRACING**

TCM-P074200: TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT STUCK ON. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074200

Condition

The transmission control module (TCM) checks the function of the lock-up solenoid by comparing the speed signal from the transmission speed sensor with the speed (rpm) signal from the transmission speed (rpm) sensor. The signals must then show the same calculated speed (rpm). The transmission control module (TCM) also compares the speed from the transmission speed sensor with the engine speed (RPM). The RPM should then be greater or less than the transmission output RPM or speed depending on the gear selected.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Lock-up function is constantly engaged or if the transmission jerks at lock-up.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Normal driving.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code is stored when the conditions are met.

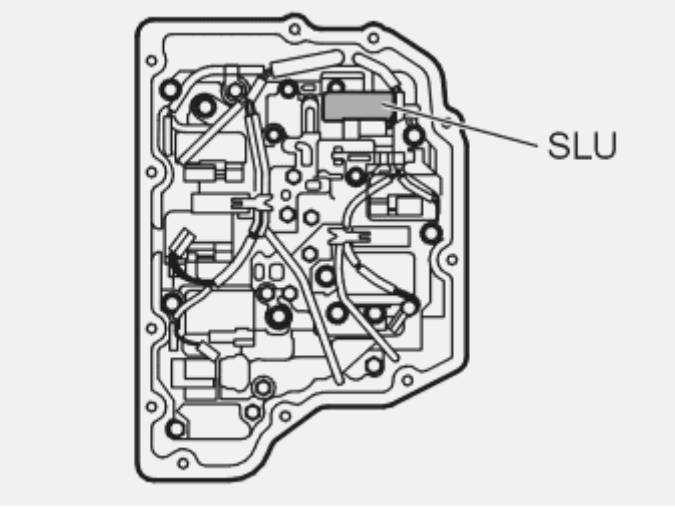


Fig. 135: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Adaptation function is blocked.
- function is blocked.
- Slip lock-up function is blocked.

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the cable for the control signal or signal ground.
- Solenoid not working.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- Rough gear shift
- No gear shift
- Abnormal slipping gearshifts

FAULT-TRACING

see **FAULT-TRACING**

TCM-P074200: TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT STUCK ON. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074200

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074200**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P074200: TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT STUCK IN ON POSITION. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074200

Condition

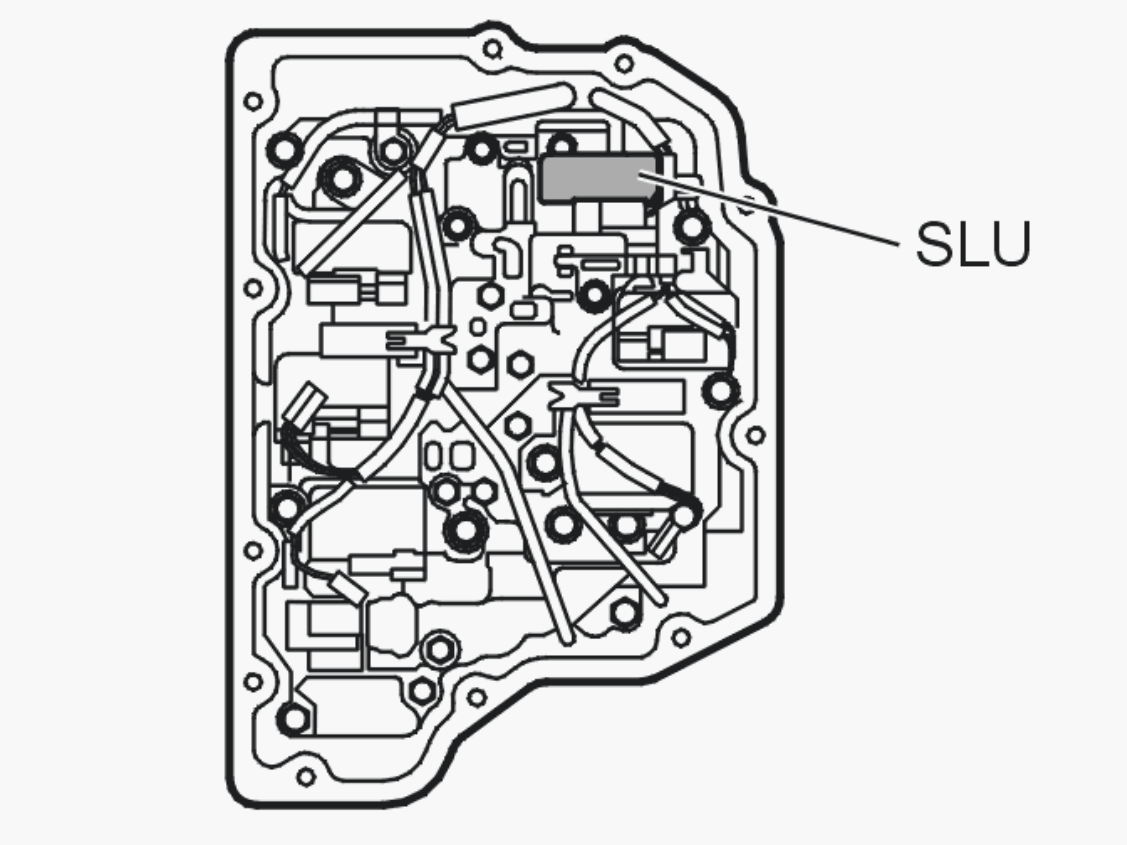


Fig. 136: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) checks the lockup solenoid function by comparing the speed signal from the gearbox speed sensor with the rpm signal from the gearbox rpm sensor. When lockup is engaged, the signals should "show" the same calculated rpm. The transmission control module (TCM) also compares the rpm from the gearbox speed sensor with the engine rpm. The rpm should then be greater or lower than the gearbox output rpm or speed depending on the gear that is selected. If the control module registers that the lock-up function is engaged constantly or if the transmission is jerky when lock-up is engaged, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code (DTC) can be diagnosed when driving normally.

Substitute Value

- Adaptation function is blocked.
- Lock-up function is blocked.
- Slip lock-up function is blocked.

Possible Source

- Contact resistance in the terminals
- Open circuit in lead for control signal or signal ground.
- Solenoid not working.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Harsh gear changing
- No gear changing.
- Abnormally slipping gears.

FAULT TRACING

see **FAULT TRACING**

TCM-P074200: TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT STUCK IN ON POSITION. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074200

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074200**

FAULT TRACING

see **FAULT TRACING**

TCM-P074400: TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT INTERMITTENT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074400

Condition

The transmission control module (TCM) checks the function of the lock-up solenoid by comparing the speed signal from the transmission speed sensor with the speed (rpm) signal from the transmission speed (rpm) sensor. The signals must then "show" the same calculated speed (rpm). The transmission control module (TCM) also compares the speed from the transmission speed sensor with the engine speed (RPM). The RPM should then be greater or less than the transmission output RPM or speed depending on the gear selected.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Engine suddenly stopped because lock-up function was engaged, but no error registered in lock-up solenoid circuit.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Normal driving.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

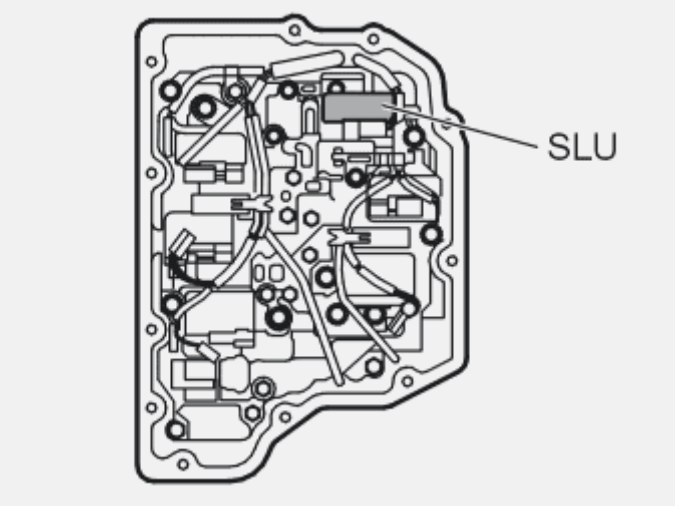


Fig. 137: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Adaptation function is blocked.
- Neutral check function is blocked.

Possible Source

- Engine stopped due to lack of gasoline.
- Mechanical fault in engine.
- Lock-up function incorrectly engaged when the vehicle is stopped.

Fault symptom[s]

- Automatic gear shift; Delayed; From 1:st to 2:nd
- Drive ability, engine; Stops/not running; When braking
- No lock-up

FAULT-TRACING

FAULT-TRACING INFORMATION

The diagnostic trouble code indicates that the malfunction is in the engine management system.

Read the diagnostic trouble codes from the engine control module (ECM) and troubleshoot as described in relevant information.

TCM-P074400: TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT INTERMITTENT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074400

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074400**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P074400: TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT INTERMITTENT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074400

Condition

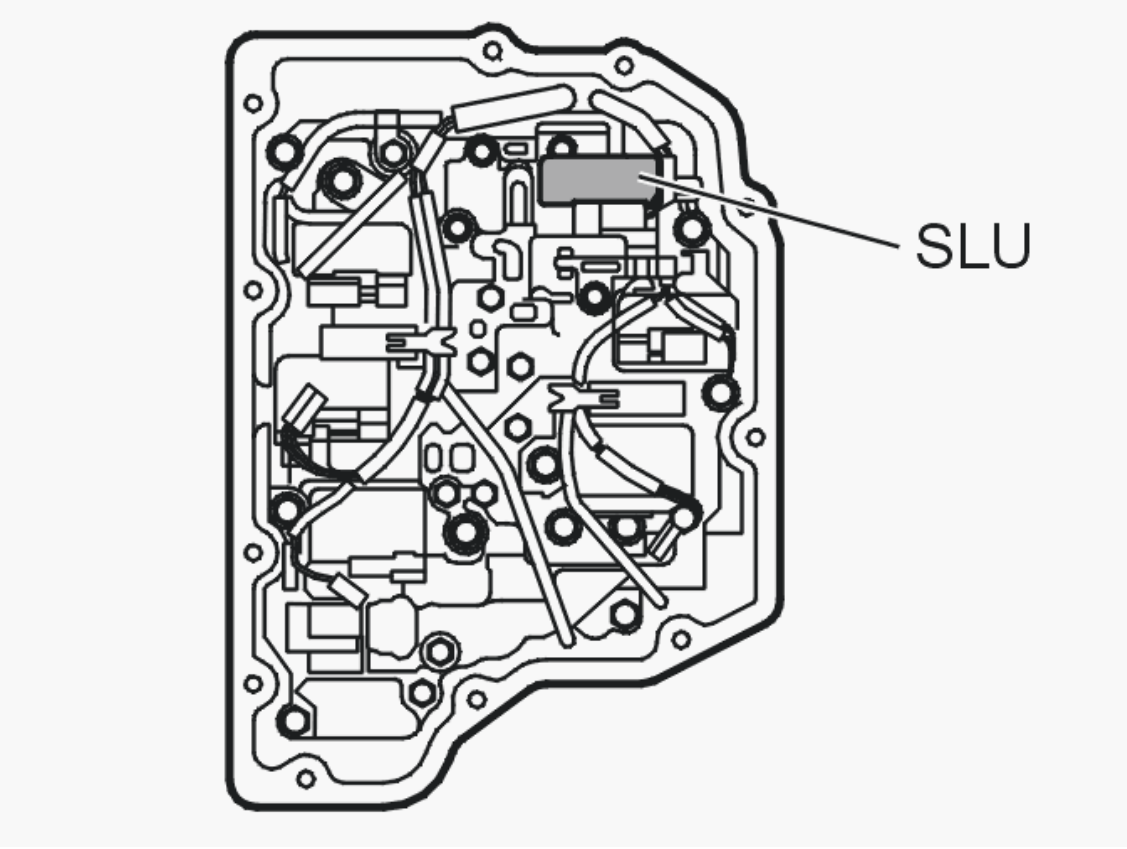


Fig. 138: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) checks the lockup solenoid function by comparing the speed signal from the gearbox speed sensor with the rpm signal from the gearbox rpm sensor. The signals should then "show" the same calculated rpm. The transmission control module (TCM) also compares the rpm from the gearbox speed sensor with the engine rpm. The rpm should then be greater or lower than the gearbox output rpm or speed depending on the gear that is selected. If the control module registers that the engine has suddenly stopped when the lock-up function was engaged but not registered a fault in the lock-up solenoid circuit, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code (DTC) can be diagnosed when driving normally.

Substitute Value

- Adaptation function is blocked.
- Neutral check function is blocked.

Possible Source

- Engine stopped due to lack of petrol.
- Mechanical fault in engine.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Harsh gear changing
- No gear changing.
- Abnormally slipping gears.

TROUBLESHOOTING INFORMATION TCM-074400

FAULT-TRACING INFORMATION

The diagnostic trouble code indicates that the malfunction is in the engine management system.

Read the diagnostic trouble codes from the engine control module (ECM) and troubleshoot as described in relevant information.

TCM-P074400: TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT INTERMITTENT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074400

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074400**

TROUBLESHOOTING INFORMATION TCM-074400

see **TROUBLESHOOTING INFORMATION TCM-074400**

TCM-P074468: TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT INTERMITTENT. ALGORITHM BASED FAILURES. EVENT INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074468

Condition

NOTE: This diagnostic trouble code (DTC) status is an event controlled diagnostic trouble code (DTC). An event controlled diagnostic trouble code (DTC) does not mean that there is a fault in the control module when it is active, but is designed as information.

The transmission control module (TCM) checks the function of the lock-up solenoid by comparing the speed signal from the transmission speed sensor with the speed (rpm) signal from the transmission speed (rpm) sensor. The signals must then "show" the same calculated speed (rpm). The transmission control module (TCM) also compares the speed from the transmission speed sensor with the engine speed (RPM). The RPM should then be greater or less than the transmission output RPM or speed depending on the gear selected.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The engine has suddenly stopped when the lock-up function was engaged, without an electrical fault being registered in the lock-up solenoid's circuit.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Normal driving.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

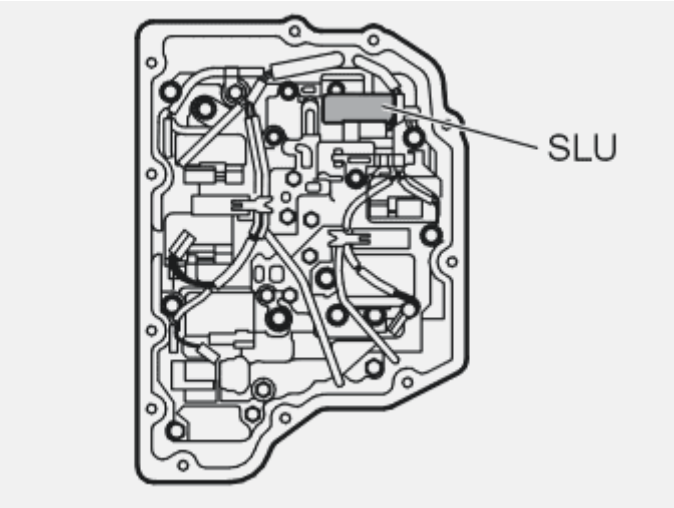


Fig. 139: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- The lock-up function is blocked until the Transmission control module (TCM) has registered there are no longer any electrical faults stored for the function.

Possible Source

- Engine stopped due to lack of gasoline.
- Mechanical fault in engine.
- Lock-up function incorrectly engaged when the vehicle is stopped.

Fault symptom[s]

- Automatic gear shift; Delayed; From 1:st to 2:nd
- Drive ability, engine; Stops/not running; When braking
- No lock-up

FAULT-TRACING INFORMATION

INFORMATION

There is no fault-tracing for this diagnostic fault code (DTC).

For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

TCM-P074468: TORQUE CONVERTER CLUTCH SOLENOID CIRCUIT INTERMITTENT. ALGORITHM BASED FAILURES. EVENT INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074468

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P074468**

FAULT-TRACING INFORMATION

see **FAULT-TRACING INFORMATION**

TCM-P074A00 UNABLE TO ENGAGE GEAR 2. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT-TRACING

CHECKING SOLENOIDS

Fig. 140: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between approx. 100 and 950 mA.

  Solenoid SLT, SLC2, SLC3.

Fig. 141: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  Refer to **CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION**

- **NO**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

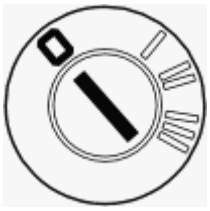


Fig. 142: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

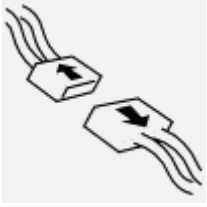


Fig. 143: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

HINT: Check solenoids SLT, SLC2, SLC3 as described in:CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no defects were found on connectors or cables, replace the control system. If this does not help, replace the transmission.

Remedy as necessary.

Other information

- see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
- see **VALVE HOUSING** .
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

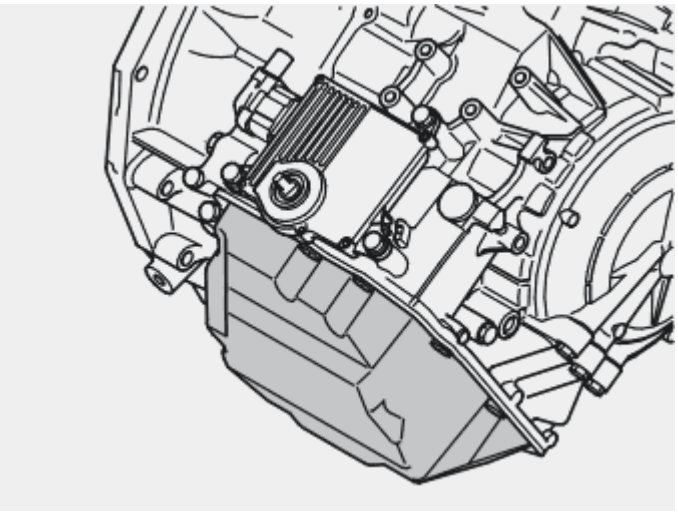


Fig. 144: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING ADAPTATION**

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

Fig. 145: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check the transmission oil level. If the oil level is low, check the transmission for leakage, then top up with oil.

  Check the quality of the oil.

  Replace the transmission fluid if the fluid smells burnt.

  Other information

  - see **TRANSMISSION OIL LEVEL - CHECKING**
  - see **OIL GRADE, CHECKING**
  - see **TRANSAXLE OIL**

  Select an alternative below

  1. No fault detected.

     Refer to **CHECKING THE COMPONENTS AND WIRING**

  2. Transmission fluid replaced, low level or poor quality.

     Refer to **RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER**

Fig. 146: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

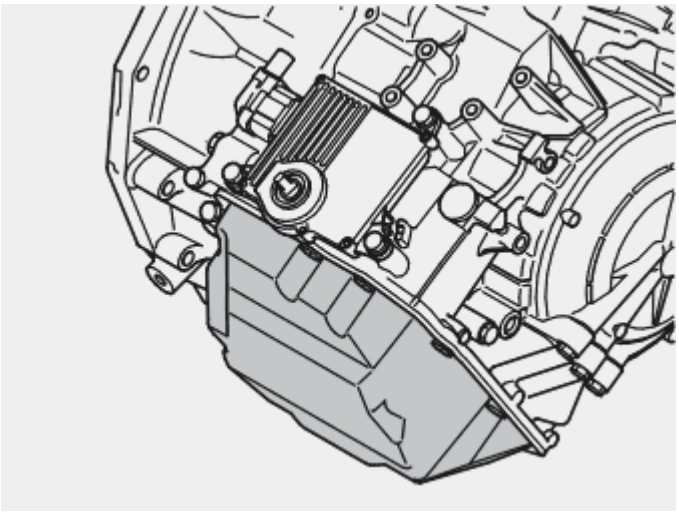


Fig. 147: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

VERIFICATION

VERIFICATION

NOTE: When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select Pause and create a bookmark. Then select Vehicle communication.

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 148: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

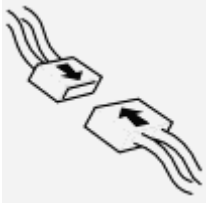


Fig. 149: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.

- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 150: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 151: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER

CHECKING THE FUNCTION

HINT: The transmission control module (TCM) has a counter for fluid quality that counts the number of times the transmission is subjected to too hard a load or too high an ambient temperature. If the counter is not reset during draining/replacement, there is a risk that a diagnostic trouble code will be set under the wrong conditions. Thus, it is important that the counter for transmission fluid change be reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

Fig. 152: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the counter.

Fig. 153: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P074A00 UNABLE TO ENGAGE GEAR 2. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P074B00 UNABLE TO ENGAGE GEAR 3. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT-TRACING

CHECKING SOLENOIDS

Fig. 154: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between approx. 100 and 950 mA.

Solenoid SLT, SLC2, SLB1.

Fig. 155: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  Refer to **CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION**

- **NO**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

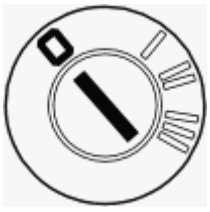


Fig. 156: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

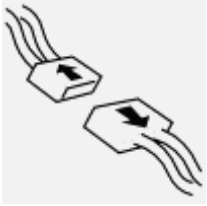


Fig. 157: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  HINT: Check solenoids SLT, SLC2, SLB1 as described in:CHECKING INTERNAL

COMPONENTS OF THE TRANSMISSION

If no defects were found on connectors or cables, replace the control system. If this does not help, replace the transmission.

Remedy as necessary.

Other information

- see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
- see **VALVE HOUSING** .
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

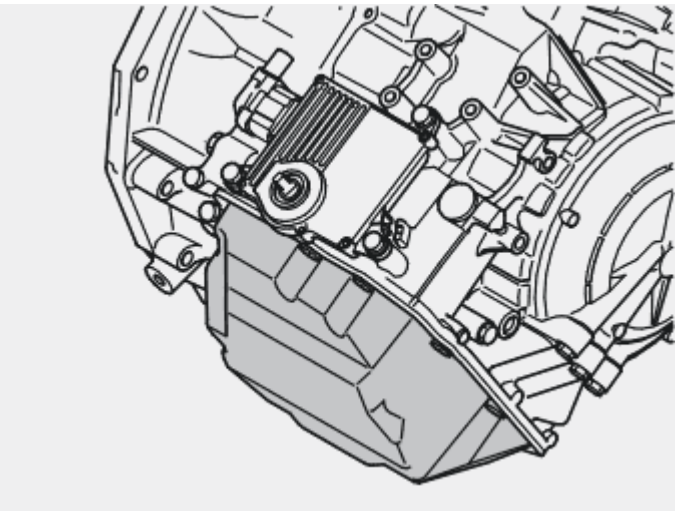


Fig. 158: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING ADAPTATION**

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

Fig. 159: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check the transmission oil level. If the oil level is low, check the transmission for leakage, then top up with oil.

  Check the quality of the oil.

  Replace the transmission fluid if the fluid smells burnt.

  Other information

  - see **TRANSMISSION OIL LEVEL - CHECKING**
  - see **OIL GRADE, CHECKING**
  - see **TRANSAXLE OIL**

  Select an alternative below

  1. No fault detected.

     Refer to **CHECKING THE COMPONENTS AND WIRING**

  2. Transmission fluid replaced, low level or poor quality.

     Refer to **RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER**

Fig. 160: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

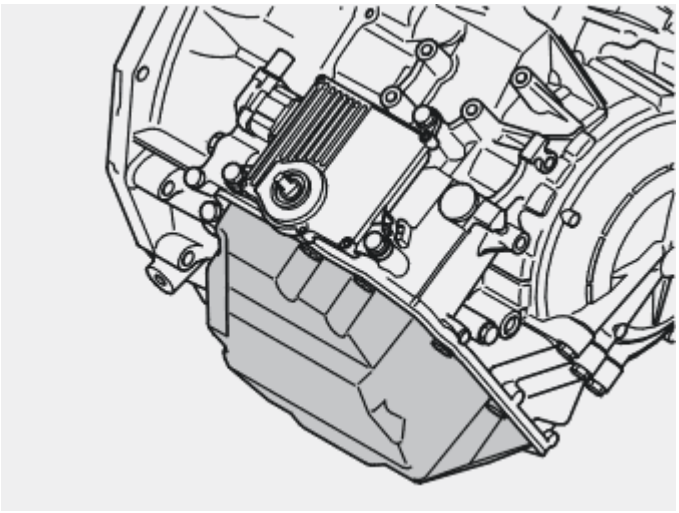


Fig. 161: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

VERIFICATION

VERIFICATION

NOTE: **When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select Pause and create a bookmark. Then select Vehicle communication.**

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 162: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

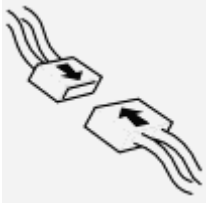


Fig. 163: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.

- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 164: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 165: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER

CHECKING THE FUNCTION

HINT: The transmission control module (TCM) has a counter for fluid quality that counts the number of times the transmission is subjected to too hard a load or too high an ambient temperature. If the counter is not reset during draining/replacement, there is a risk that a diagnostic trouble code will be set under the wrong conditions. Thus, it is important that the counter for transmission fluid change be reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

Fig. 166: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the counter.

Fig. 167: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P074B00 UNABLE TO ENGAGE GEAR 3. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P074C00 UNABLE TO ENGAGE GEAR 4. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT-TRACING

CHECKING SOLENOIDS

Fig. 168: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between approx. 100 and 950 mA.

Solenoid SLT, SLC3, SLB1.

Fig. 169: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  Refer to **CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION**

- **NO**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

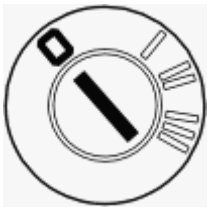


Fig. 170: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

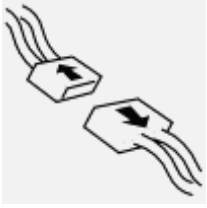


Fig. 171: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  HINT: Check solenoids SLT, SLC3, SLB1 as described in:CHECKING INTERNAL

COMPONENTS OF THE TRANSMISSION

If no defects were found on connectors or cables, replace the control system. If this does not help, replace the transmission.

Remedy as necessary.

Other information

- see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
- see **VALVE HOUSING** .
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

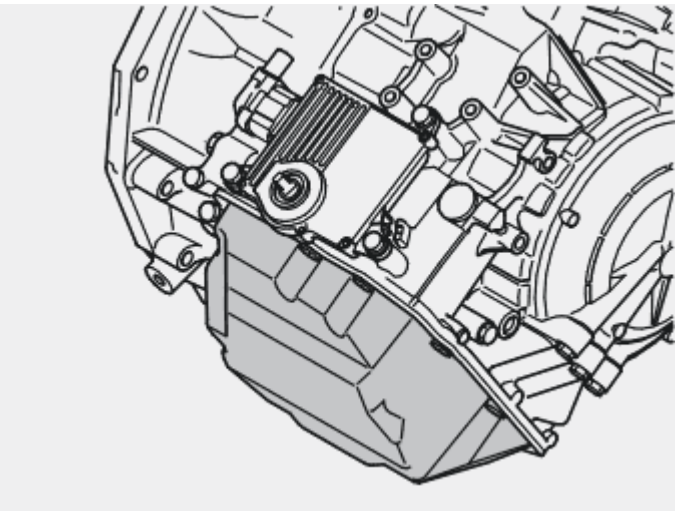


Fig. 172: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING ADAPTATION**

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

Fig. 173: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check the transmission oil level. If the oil level is low, check the transmission for leakage, then top up with oil.

  Check the quality of the oil.

  Replace the transmission fluid if the fluid smells burnt.

  Other information

  - see **TRANSMISSION OIL LEVEL - CHECKING**
  - see **OIL GRADE, CHECKING**
  - see **TRANSAXLE OIL**

  Select an alternative below

  1. No fault detected.

     Refer to **CHECKING THE COMPONENTS AND WIRING**

  2. Transmission fluid replaced, low level or poor quality.

     Refer to **RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER**

Fig. 174: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

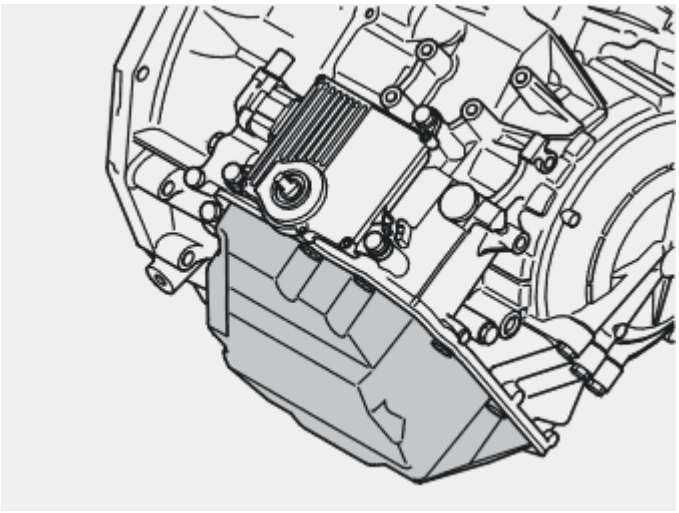


Fig. 175: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

VERIFICATION

VERIFICATION

NOTE: **When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select Pause and create a bookmark. Then select Vehicle communication.**

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 176: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

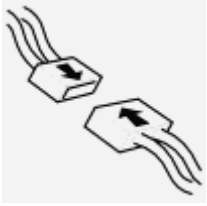


Fig. 177: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.

- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 178: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 179: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER

CHECKING THE FUNCTION

HINT: The transmission control module (TCM) has a counter for fluid quality that counts the number of times the transmission is subjected to too hard a load or too high an ambient temperature. If the counter is not reset during draining/replacement, there is a risk that a diagnostic trouble code will be set under the wrong conditions. Thus, it is important that the counter for transmission fluid change be reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

Fig. 180: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the counter.

Fig. 181: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P074C00 UNABLE TO ENGAGE GEAR 4. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P074D00 UNABLE TO ENGAGE GEAR 5. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT-TRACING

CHECKING SOLENOIDS

Fig. 182: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between approx. 100 and 950 mA.

Solenoid SLT, SLC1, SLB1.

Fig. 183: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  Refer to **CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION**

- **NO**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

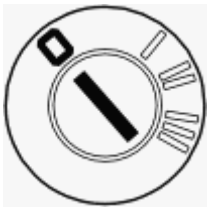


Fig. 184: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

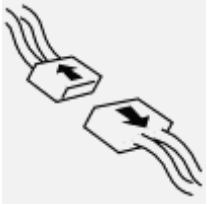


Fig. 185: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  HINT: Check solenoids SLT, SLC1, SLB1 as described in:CHECKING INTERNAL

COMPONENTS OF THE TRANSMISSION

If no defects were found on connectors or cables, replace the control system. If this does not help, replace the transmission.

Remedy as necessary.

Other information

- see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
- see **VALVE HOUSING** .
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

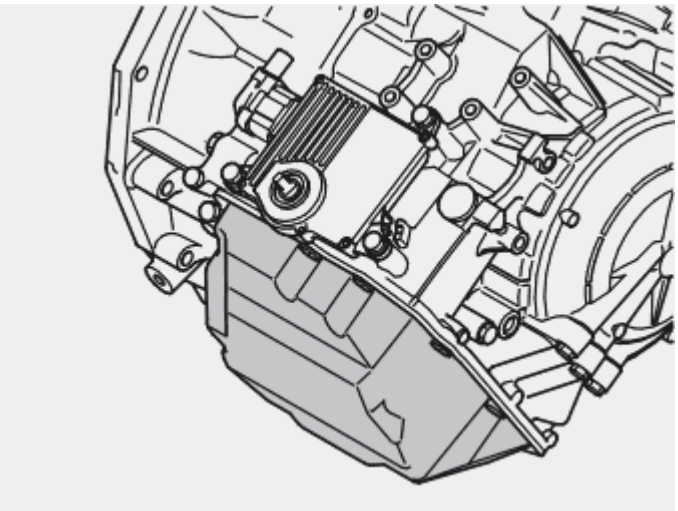


Fig. 186: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING ADAPTATION**

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

Fig. 187: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check the transmission oil level. If the oil level is low, check the transmission for leakage, then top up with oil.

  Check the quality of the oil.

  Replace the transmission fluid if the fluid smells burnt.

  Other information

  - see **TRANSMISSION OIL LEVEL - CHECKING**
  - see **OIL GRADE, CHECKING**
  - see **TRANSAXLE OIL**

  Select an alternative below

  1. No fault detected.

     Refer to **CHECKING THE COMPONENTS AND WIRING**

  2. Transmission fluid replaced, low level or poor quality.

     Refer to **RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER**

Fig. 188: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

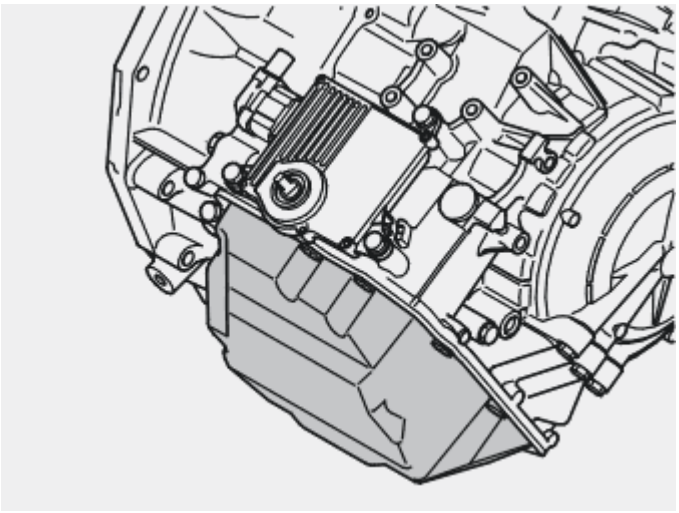


Fig. 189: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

VERIFICATION

VERIFICATION

NOTE: **When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select Pause and create a bookmark. Then select Vehicle communication.**

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 190: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

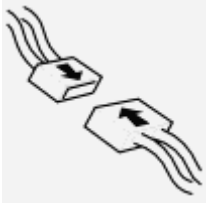


Fig. 191: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.

- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 192: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 193: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER

CHECKING THE FUNCTION

HINT: The transmission control module (TCM) has a counter for fluid quality that counts the number of times the transmission is subjected to too hard a load or too high an ambient temperature. If the counter is not reset during draining/replacement, there is a risk that a diagnostic trouble code will be set under the wrong conditions. Thus, it is important that the counter for transmission fluid change be reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

Fig. 194: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the counter.

Fig. 195: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P074D00 UNABLE TO ENGAGE GEAR 5. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P074E00 UNABLE TO ENGAGE GEAR 6. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT-TRACING

CHECKING SOLENOIDS

Fig. 196: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate the solenoids by clicking on the symbol for VCT2000.

  Select a solenoid and read off the current through the solenoid's circuit. The current should shift between approx. 100 and 950 mA.

Solenoid SLT, SLC3.

Fig. 197: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  Refer to **CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION**

- **NO**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

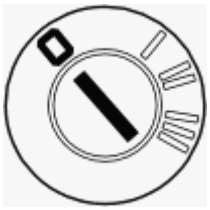


Fig. 198: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

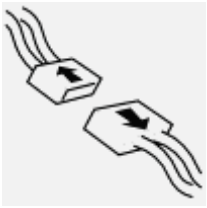


Fig. 199: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  HINT: Check solenoids SLT, SLC3 as described in:CHECKING INTERNAL COMPONENTS OF

THE TRANSMISSION

If no defects were found on connectors or cables, replace the control system. If this does not help, replace the transmission.

Remedy as necessary.

Other information

- see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
- see **VALVE HOUSING** .
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access connector B: **TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

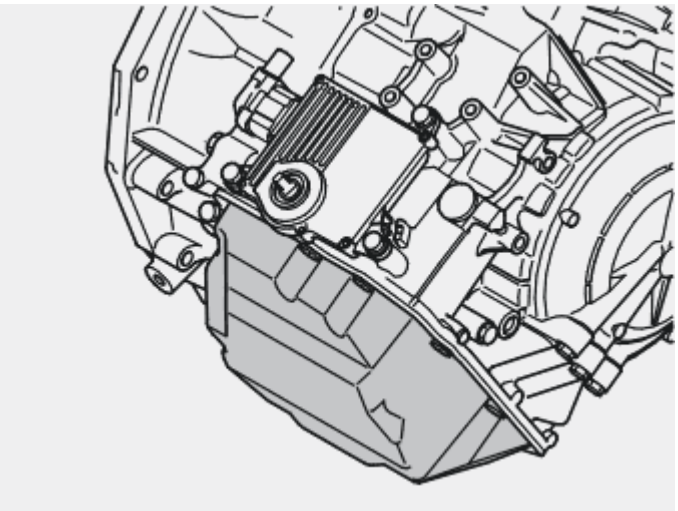


Fig. 200: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING ADAPTATION**

CHECKING THE OIL QUALITY AND THE OIL LEVEL IN THE TRANSMISSION

NOTE: Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.

Fig. 201: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check the transmission oil level. If the oil level is low, check the transmission for leakage, then top up with oil.

  Check the quality of the oil.

  Replace the transmission fluid if the fluid smells burnt.

  Other information

  - see **TRANSMISSION OIL LEVEL - CHECKING**
  - see **OIL GRADE, CHECKING**
  - see **TRANSAXLE OIL**

  Select an alternative below

  1. No fault detected.

     Refer to **CHECKING THE COMPONENTS AND WIRING**

  2. Transmission fluid replaced, low level or poor quality.

     Refer to **RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER**

Fig. 202: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

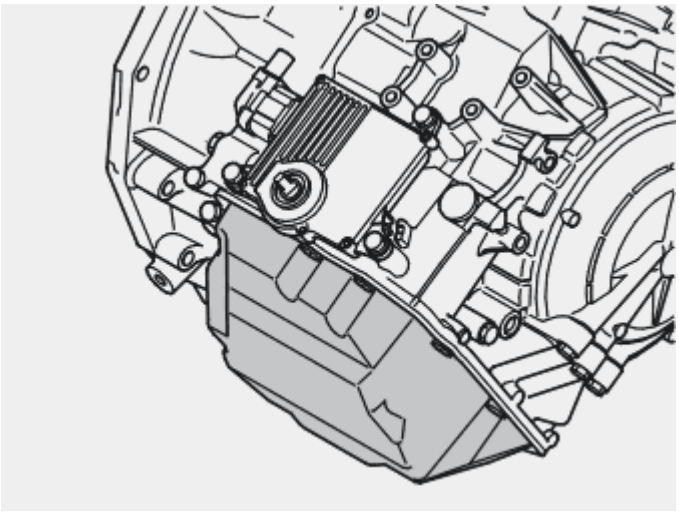


Fig. 203: Identifying Transmission Fluid Pan
Courtesy of VOLVO CARS CORPORATION

VERIFICATION

VERIFICATION

NOTE: When the transmission's control module has been removed and reinstalled, it is important that the gear position sensor is calibrated. Select Pause and create a bookmark. Then select Vehicle communication.

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 204: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

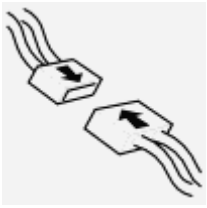


Fig. 205: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.

- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 206: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 207: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER

CHECKING THE FUNCTION

HINT: The transmission control module (TCM) has a counter for fluid quality that counts the number of times the transmission is subjected to too hard a load or too high an ambient temperature. If the counter is not reset during draining/replacement, there is a risk that a diagnostic trouble code will be set under the wrong conditions. Thus, it is important that the counter for transmission fluid change be reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

Fig. 208: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the counter.

Fig. 209: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P074E00 UNABLE TO ENGAGE GEAR 6. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P077700: PRESSURE CONTROL SOLENOID B STUCK ON. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P077700

Condition

Transmission control module (TCM) activates solenoids S1 and S2 when 1st gear is engaged and at engine braking.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The wheels lock when downshifting from 4th to 3rd gear.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Normal driving.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

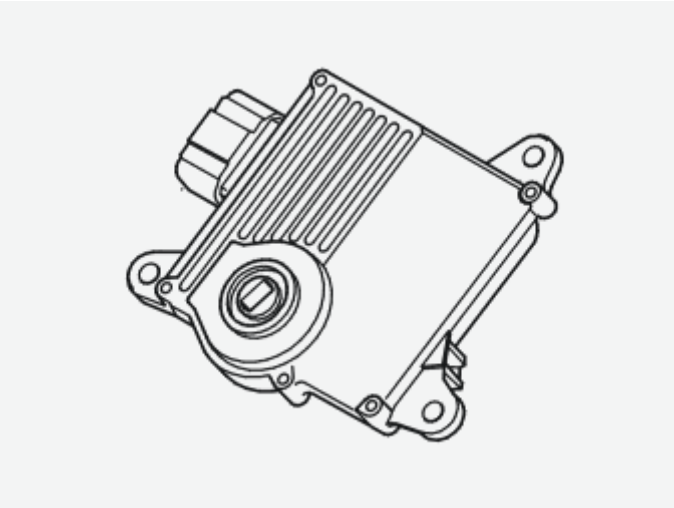


Fig. 210: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Solenoid S2 has jammed in the ON position.
- Hydraulic fault in the transmission.

Fault symptom[s]

- General warning lamp lit

FAULT-TRACING

TEST DRIVING THE TRANSMISSION

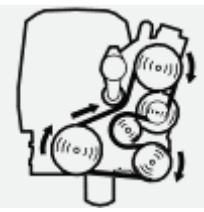


Fig. 211: Identifying Drive Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine.
- Activate the service gear indication.

Test drive the vehicle and especially check the downshift from 3rd to 2nd gear.

- Move the gear selector to position D.
- Accelerate until 3rd gear is activated.
- Release the accelerator pedal so that it is unaffected.

If the front wheels lock-up slightly when downshifting from 3rd to 2nd, the fault is permanent and currently active.

If the transmission function is Ok, this indicates an intermittent fault, i. e. the fault was present previously but is not active at the moment.

Fig. 212: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

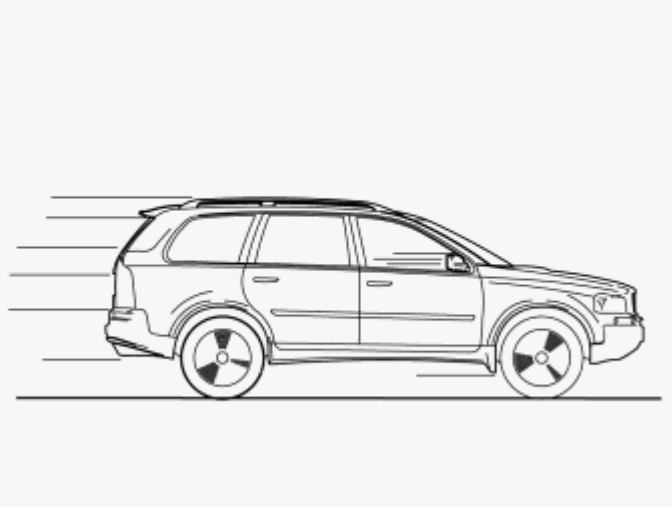


Fig. 213: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING THE STATUS**

CHECKING THE STATUS

Fig. 214: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid S2.

  Check the status for solenoid S2. The status must switch between OFF and ON.

  The valve must click. Listen using a stethoscope or a screwdriver pressed to your ear.

  There is a mechanical fault if the solenoid does not click. Replace solenoid S2.

  If the solenoid clicks clearly, this means that there is an internal fault in the transmission.

  Replace the transmission.

  Other information

  - see **TRANSMISSION CONTROL UNIT SOLENOIDS**
  - see **TRANSMISSION** or **TRANSMISSION** (AWD)

Fig. 215: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

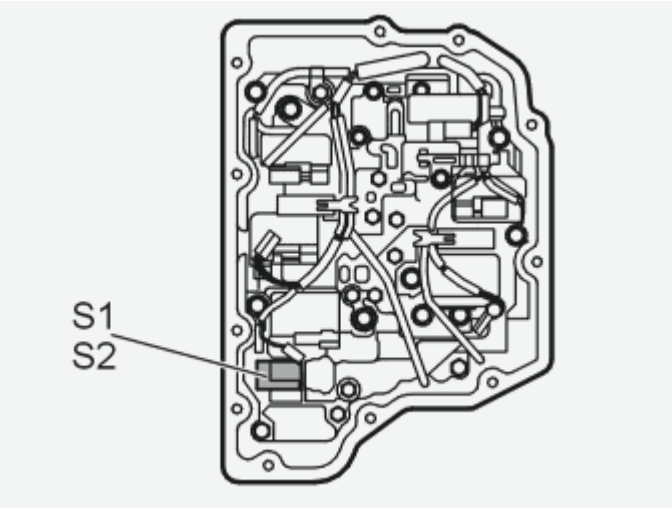


Fig. 216: Locating S1 And S2 Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

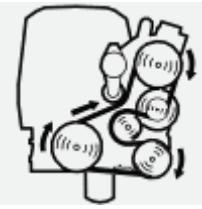


Fig. 217: Identifying Drive Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Especially check the downshift from 3rd to 2nd gear.

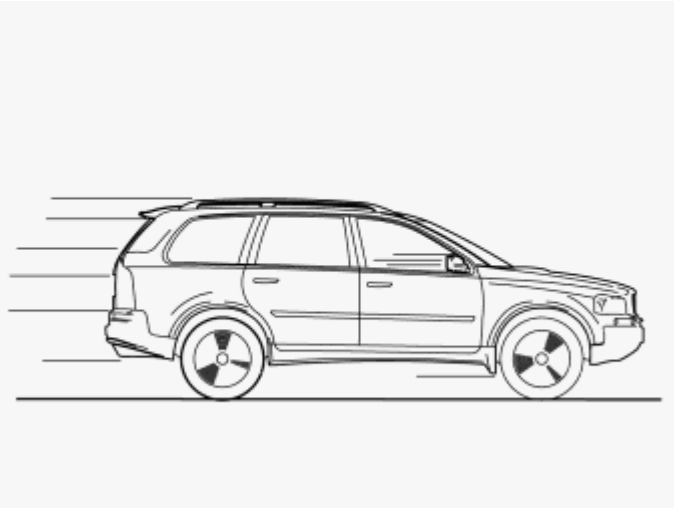


Fig. 218: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Was the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 219: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

  Fig. 220: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
  Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P077700: PRESSURE CONTROL SOLENOID B STUCK ON. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P077700

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P077700**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P081711: STARTER DISABLE CIRCUIT. GENERAL ELECTRICAL FAILURES. CIRCUIT SHORT TO GROUND (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P081711

Condition

To prevent the engine from starting with a gear engaged, which would cause the vehicle to move as soon as it starts, the vehicle is equipped with a immobilizer function. Two Hall sensors integrated in the transmission control module (TCM) detect whether the selector lever is in position. Start is permitted in transmission position P or N. The transmission control module (TCM) has a directly connected signal cable to the engine control module (ECM). The signal notifies the engine control module (ECM) whether it is possible to start the engine or not. When the voltage level on the signal cable is grounded it is permitted to start.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Signal is always grounded.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

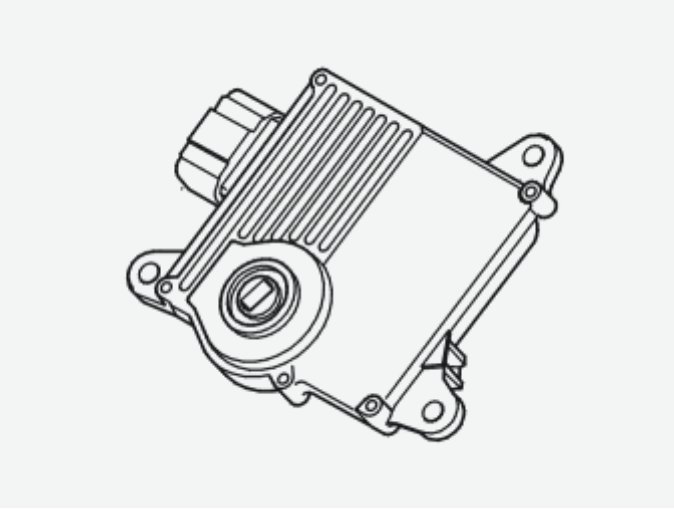


Fig. 221: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- None.

Possible Source

- Contact resistance in the terminals.
- Short-circuit to ground in the signal cable.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- Engine fails to start
- Engine starts with gear lever in position R and D

FAULT-TRACING

CHECKING THE START INHIBITOR STATUS

Fig. 222: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Depress the brake pedal.
- Read off the status of the start inhibitor.

  Move the gear selector between the positions P, R, N and D.

  In positions P and N, the status must be "Start permitted"; in other positions the status must be "Start not permitted".

  If the function is correct, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 223: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Fig. 224: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE WIRING AND SENSORS**

CHECKING THE WIRING AND SENSORS

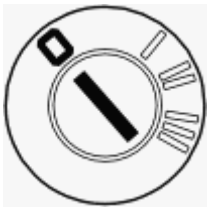


Fig. 225: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check connector A (16-pin) for the transmission control module (TCM). Check for contact resistance and oxidation.

  Check the cable for short-circuit to ground.

  Take readings between:

  - Transmission control module (TCM) terminal #A5 (#A35) and engine control module (ECM) terminal #B15.

  Remedy as necessary.

  Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- To access connector A:**TRANSMISSION CONTROL MODULE (TCM)**
- see **CHECKING WIRING AND TERMINALS**

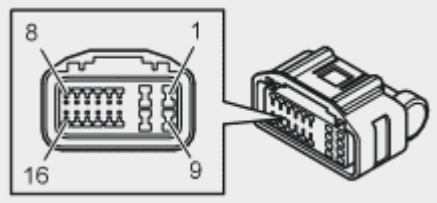


Fig. 226: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 227: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

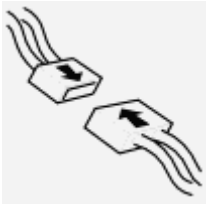


Fig. 228: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the status of the start inhibitor.

Move the gear selector between the positions P, R, N and D.

In positions P and N, the status must be "Start permitted"; in other positions the status must be "Start not permitted".

Fig. 229: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P081711: STARTER DISABLE CIRCUIT. GENERAL ELECTRICAL FAILURES. CIRCUIT SHORT TO GROUND (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P081711

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P081711**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P081711: STARTER INHIBITOR CIRCUIT. GENERAL ELECTRIC FAULT. SHORT-CIRCUIT TO GROUND (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P081711

Condition

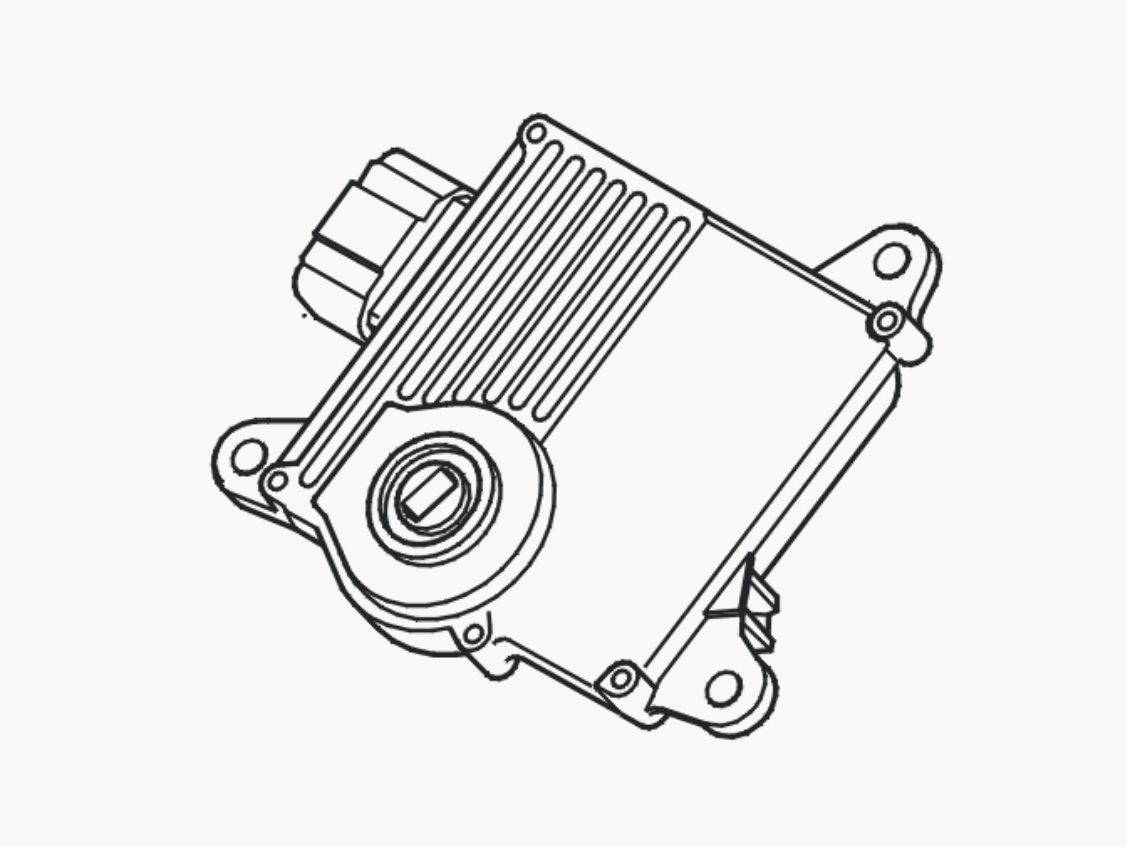


Fig. 230: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

To prevent the engine being started when a gear is engaged, which could cause the vehicle to move immediately it is started, the vehicle is equipped with a starter inhibitor function. Integrated in the transmission control module (TCM) are two Hall sensors used to detect whether the gear selector is in position. Starting is allowed in gear positions P or N. The transmission control module (TCM) has a signal lead connected directly to the engine control module (ECM). This signal informs the engine control module (ECM) whether or not it is possible to start the engine. When the voltage level of the signal lead is grounded, it will be possible to start. If the transmission control module (TCM) detects that the signal is constantly grounded, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Nothing.

Possible Source

- Contact resistance in the terminals
- The signal cable is short-circuited to ground.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- The engine does not start.
- Engine starts with gear selector in positions R and D.

FAULT TRACING TCM-P081711

CHECK THE PARK NEUTRAL POSITION (PNP) SWITCH STATUS

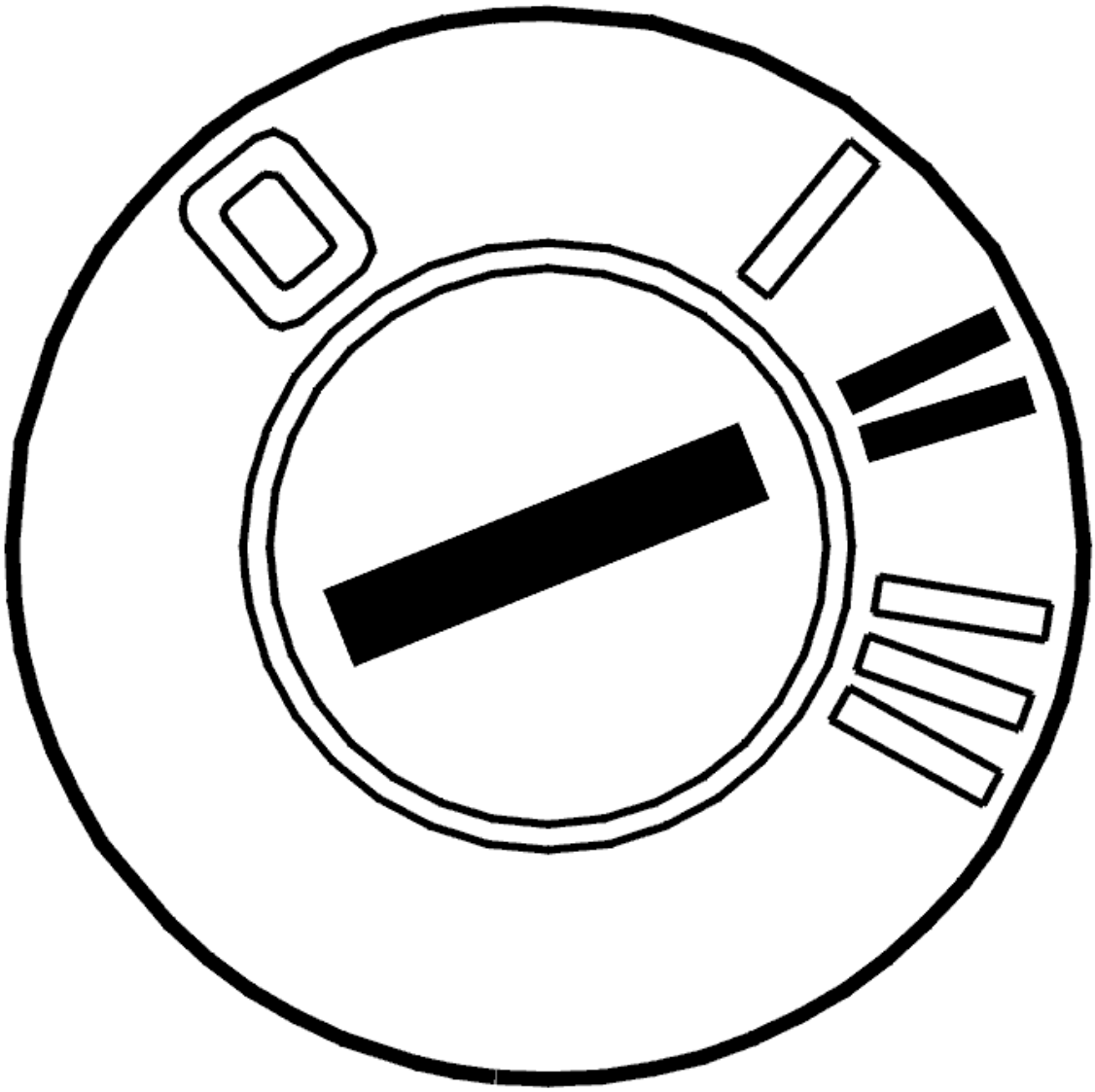


Fig. 231: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Push down the brake pedal.
- Read off the park neutral position (PNP) switch status

Move the gear selector lever between positions P, R, N and D.

In positions P and N the status must be "Start permitted", in other positions the status must be "Start not permitted".

When the function is not correct this indicates that the fault is permanent.

When the function is correct it means that the fault was present previously but is not active now. There is an intermittent fault.

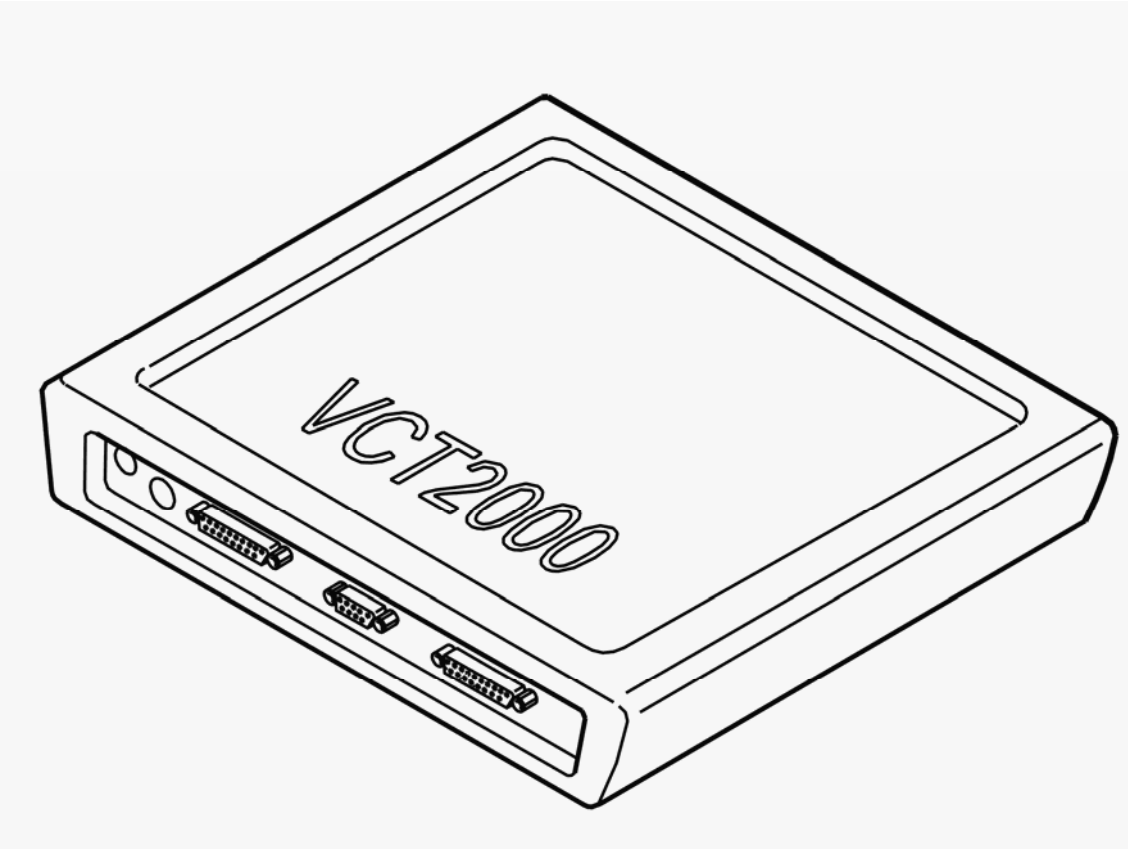


Fig. 232: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Fig. 233: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

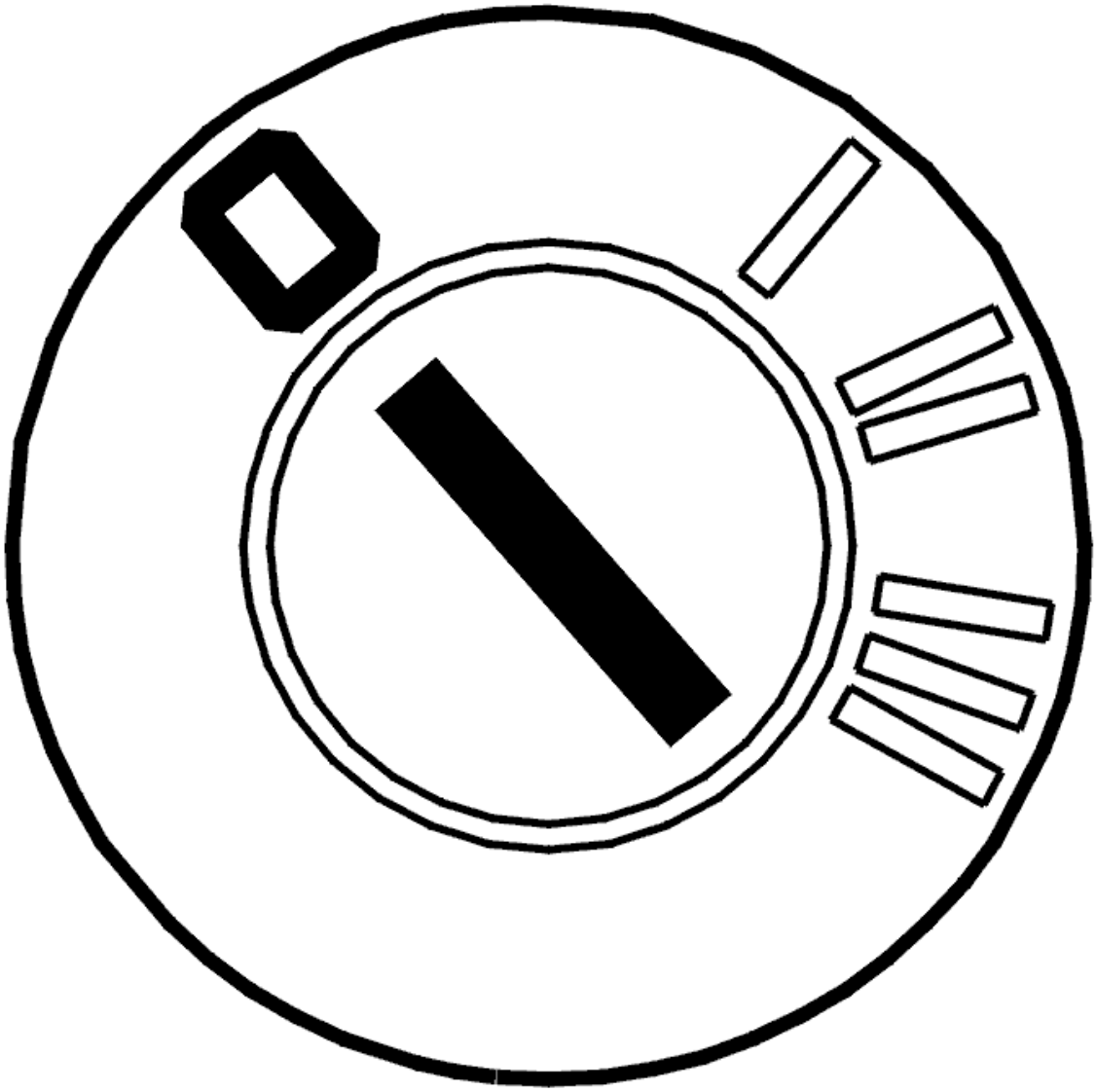


Fig. 234: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off

  Check connector A (16-pin) for the transmission control module (TCM). Check for contact resistance and oxidation.

  Check the cable between the transmission control module (TCM) terminal #A5 (#A35) and engine control module (ECM) terminal #B15. Check for a short circuit to ground.

  Remedy as necessary.

  Other information

  - see **CONNECTING THE BREAKOUT BOX**

- see **SIGNAL DESCRIPTION**
- For access to connector A: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**
- see **CONTENTS**

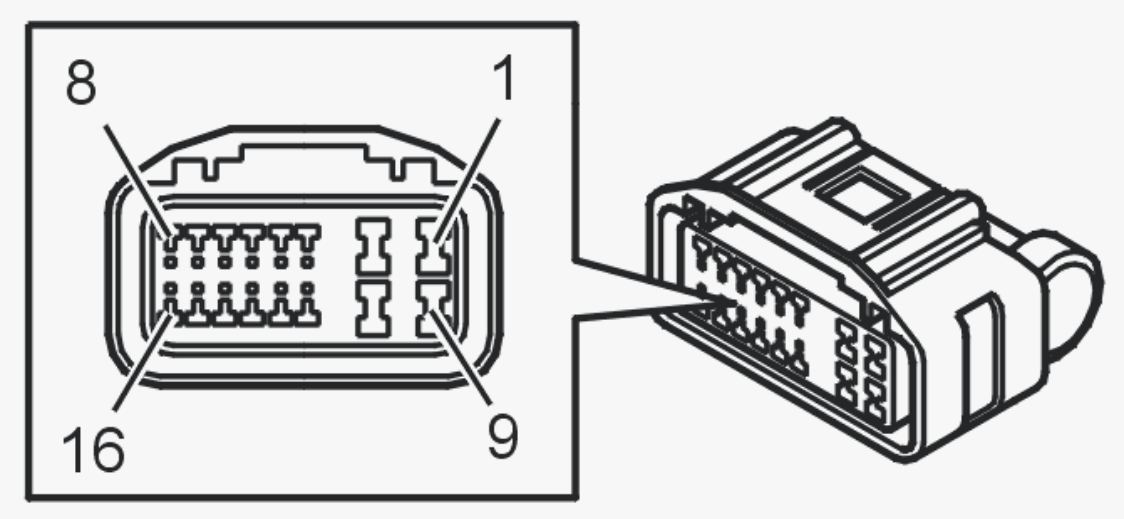


Fig. 235: Identifying Connector A Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

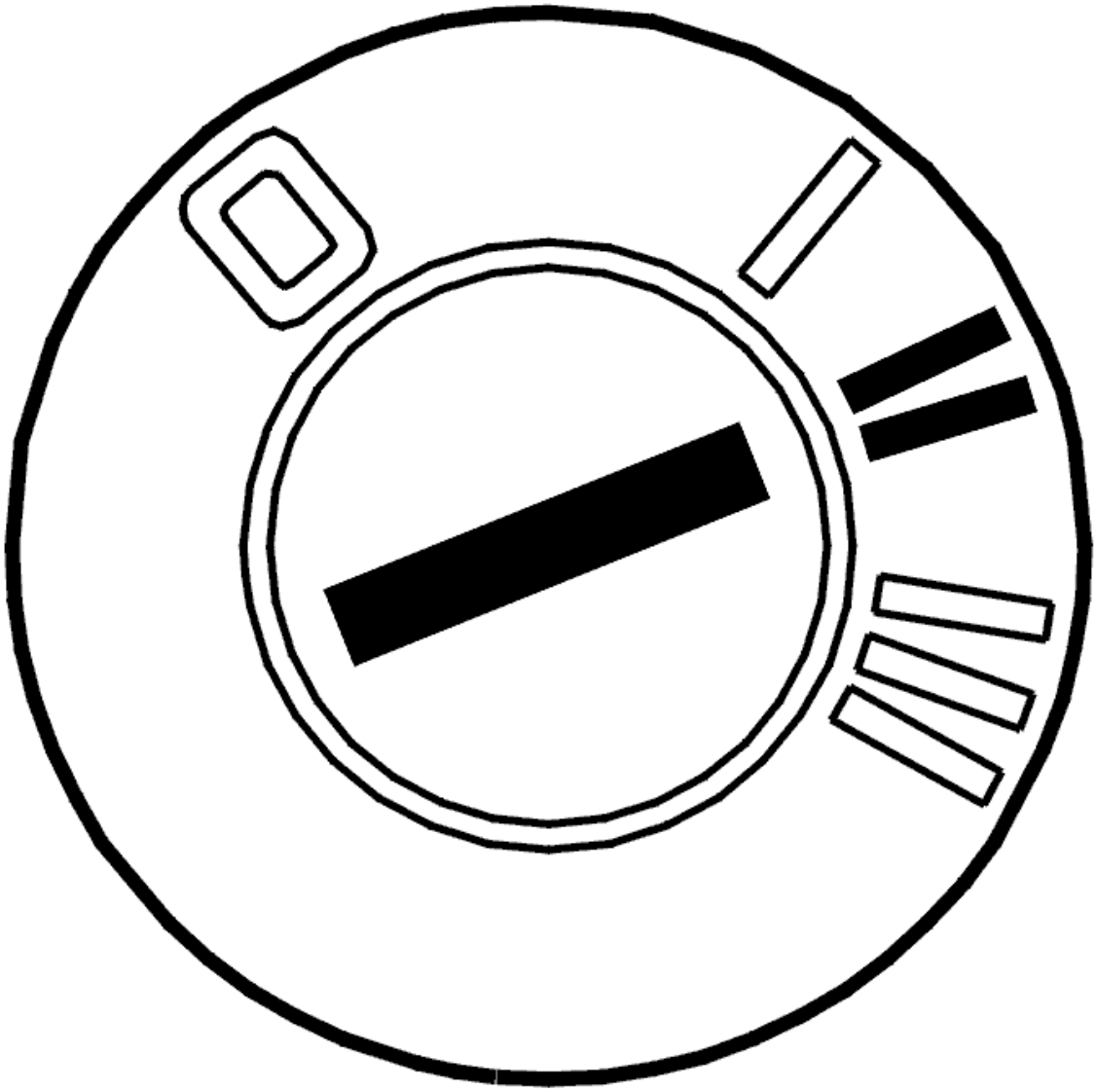


Fig. 236: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

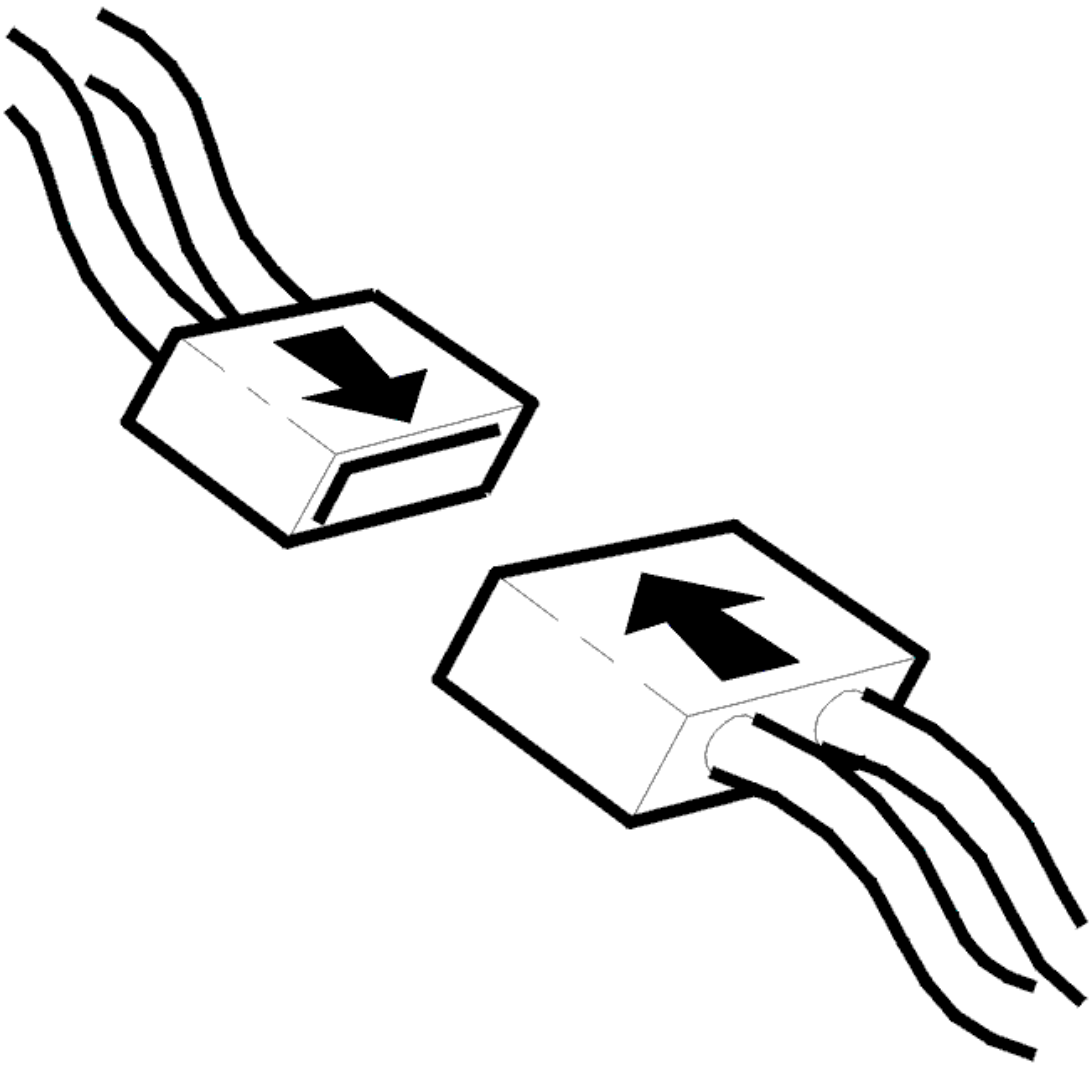


Fig. 237: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the park neutral position (PNP) switch status

  Move the gear selector lever between positions P, R, N and D.

  In positions P and N the status must be "Start permitted", in other positions the status must be "Start not permitted".

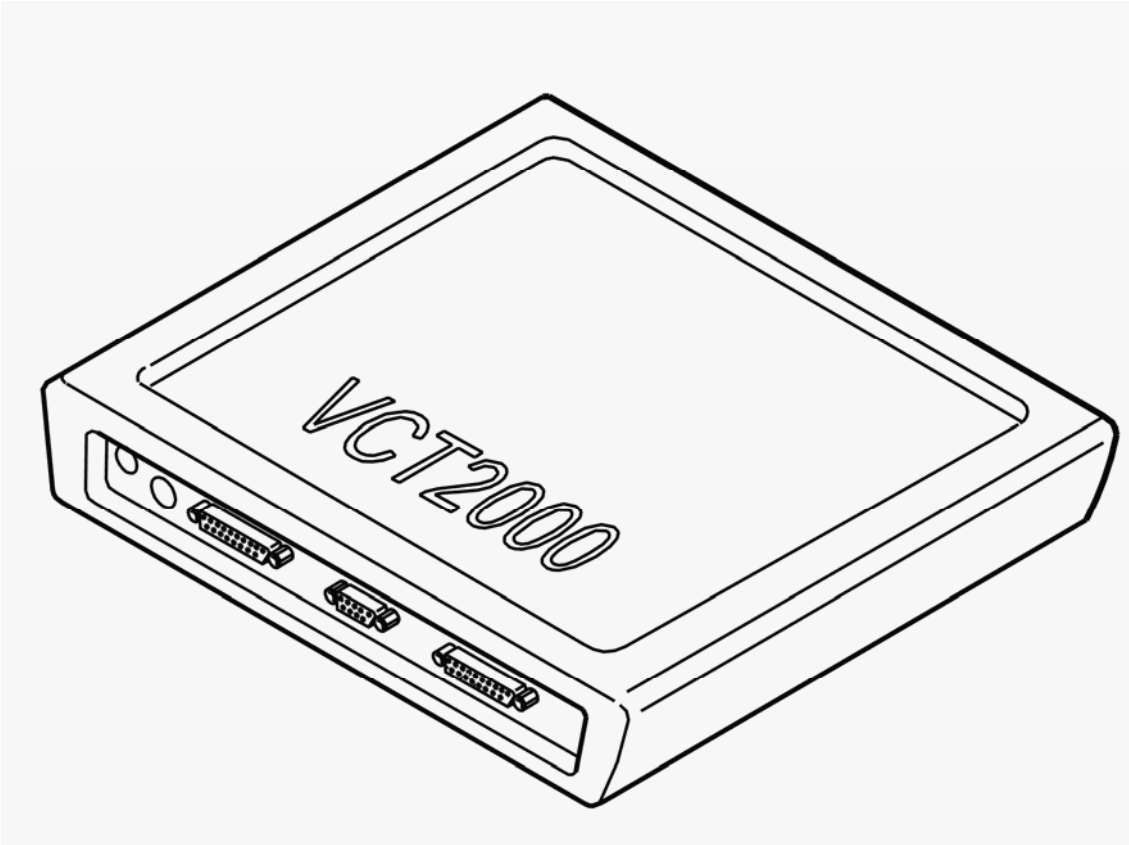


Fig. 238: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P081711: STARTER INHIBITOR CIRCUIT. GENERAL ELECTRIC FAULT. SHORT-CIRCUIT TO GROUND (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P081711

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P081711**

FAULT TRACING TCM-P081711

see **FAULT TRACING TCM-P081711**

TCM-P081712: STARTER DISABLE CIRCUIT. GENERAL ELECTRICAL FAILURES. CIRCUIT SHORT TO BATTERY (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P081712

Condition

To prevent the engine from starting with a gear engaged, which would cause the vehicle to move as soon as it starts, the vehicle is equipped with a immobilizer function. Two Hall sensors integrated in the transmission control module (TCM) detect whether the selector lever is in position. Start is permitted in transmission position P or N. The transmission control module (TCM) has a directly connected signal cable to the engine control module (ECM). The signal notifies the engine control module (ECM) whether it is possible to start the engine or not. When the voltage level on the signal cable is grounded it is permitted to start.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Signal cannot be grounded.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

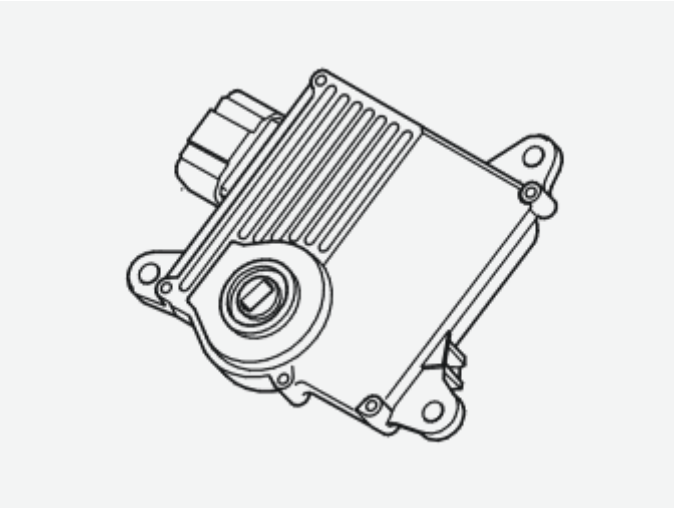


Fig. 239: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- None.

Possible Source

- Short-circuit to supply voltage in the signal cable.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- Engine fails to start

FAULT-TRACING

CHECKING THE START INHIBITOR STATUS

Fig. 240: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Depress the brake pedal.
- Read off the status of the start inhibitor.

Move the gear selector between the positions P, R, N and D.

In positions P and N, the status must be "Start permitted"; in other positions the status must be "Start not permitted".

The fault is permanent if the function is faulty.

If the function is correct, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 241: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Fig. 242: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE WIRING AND SENSORS**

CHECKING THE WIRING AND SENSORS

Fig. 243: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the cable for a short-circuit to supply voltage.

  Take readings between:

  - Transmission control module (TCM) terminal #A5 (#A35) and engine control module (ECM) terminal #B15.

  Remedy as necessary.

  Other information

  - see **CONNECTING THE BREAKOUT BOX**
  - see **SIGNAL SPECIFICATION**
  - To access connector A:**TRANSMISSION CONTROL MODULE (TCM)**
  - see **CHECKING WIRING AND TERMINALS**

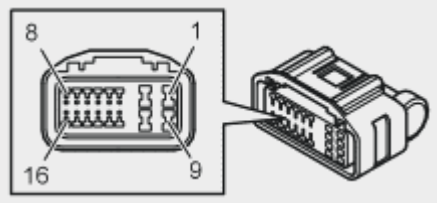


Fig. 244: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 245: Identifying Ignition ON

Courtesy of VOLVO CARS CORPORATION

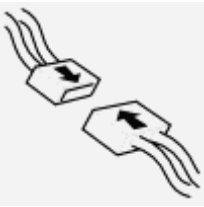


Fig. 246: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the status of the start inhibitor.

  Move the gear selector between the positions P, R, N and D.

  In positions P and N, the status must be "Start permitted"; in other positions the status must be "Start not permitted".

  Fig. 247: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
  Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P081712: STARTER DISABLE CIRCUIT. GENERAL ELECTRICAL FAILURES. CIRCUIT SHORT TO BATTERY (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P081712

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P081712**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P081712: STARTER INHIBITOR CIRCUIT. GENERAL ELECTRICAL FAULT. SHORT-CIRCUIT TO VOLTAGE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P081712

Condition

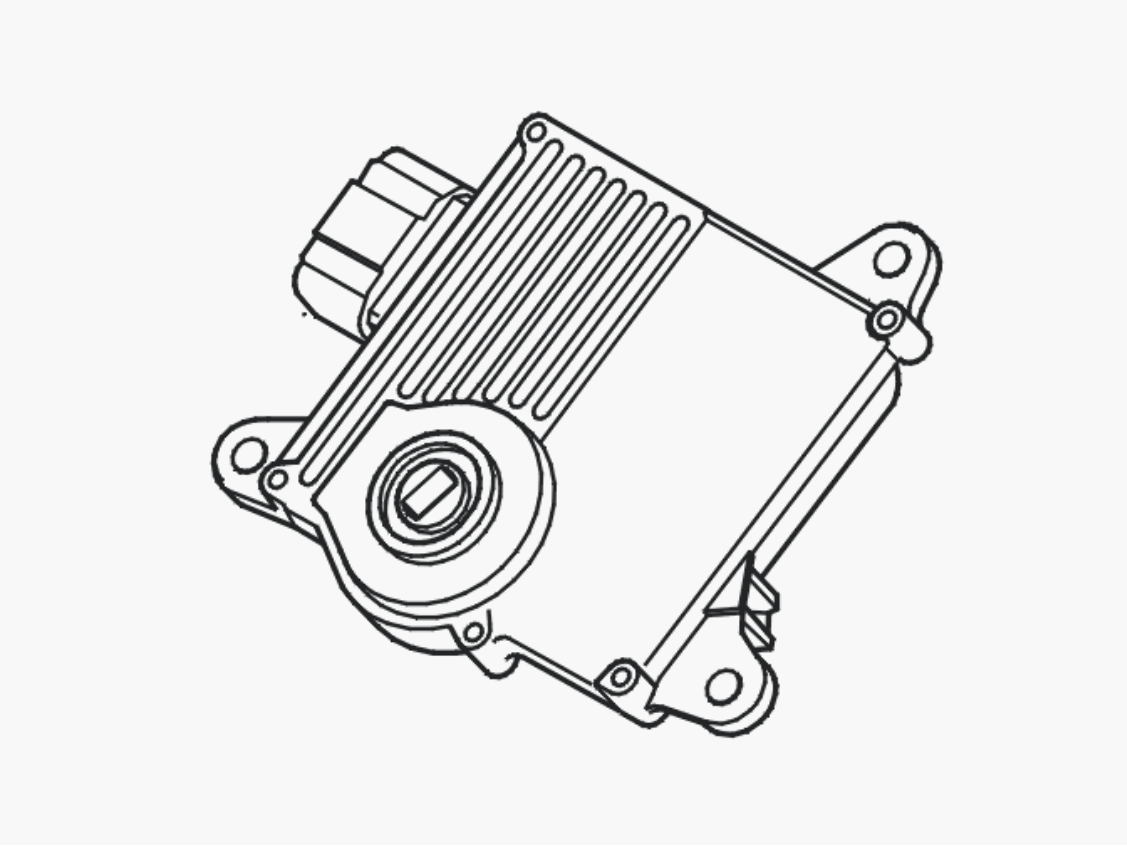


Fig. 248: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

To prevent the engine being started when a gear is engaged, which could cause the vehicle to move immediately it is started, the vehicle is equipped with a starter inhibitor function. Integrated in the transmission control module (TCM) are two Hall sensors used to detect whether the gear selector is in position. Starting is allowed in gear positions P or N. The transmission control module (TCM) has a signal lead connected directly to the engine control module (ECM). This signal informs the engine control module (ECM) whether or not it is possible to start the engine. When the voltage level of the signal lead is grounded, it will be possible to start. If the transmission control module (TCM) detects that the signal cannot be grounded, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Nothing.

Possible Source

- The signal cable is short-circuited to voltage.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- The engine does not start.

FAULT TRACING TCM-P081712

CHECK THE PARK NEUTRAL POSITION (PNP) SWITCH STATUS

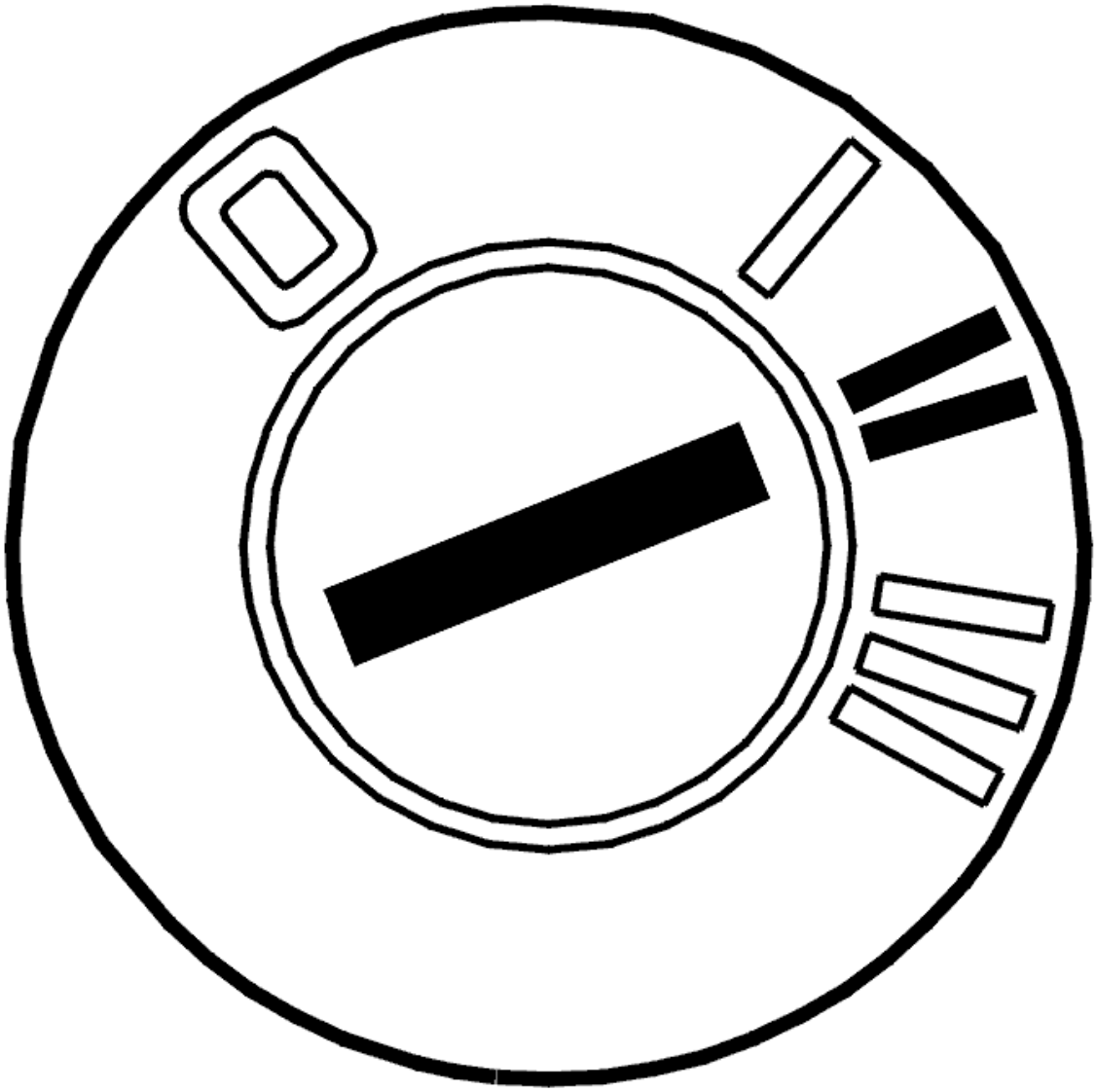


Fig. 249: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Push down the brake pedal.
- Read off the park neutral position (PNP) switch status

  Move the gear selector lever between positions P, R, N and D.

  In positions P and N the status must be "Start permitted", in other positions the status must be "Start not permitted".

  When the function is not correct this indicates that the fault is permanent.

  When the function is correct it means that the fault was present previously but is not active now. There is

an intermittent fault.

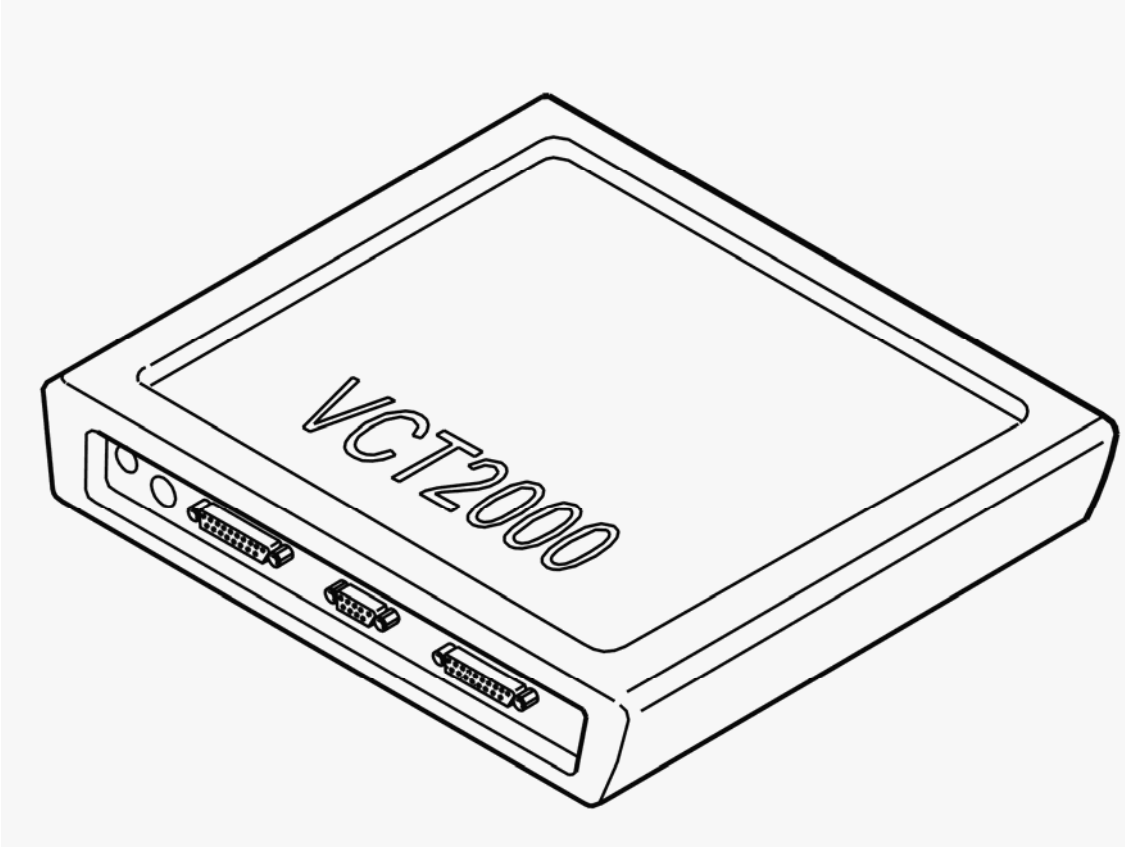


Fig. 250: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Fig. 251: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING WIRING AND SENSORS**

CHECKING WIRING AND SENSORS

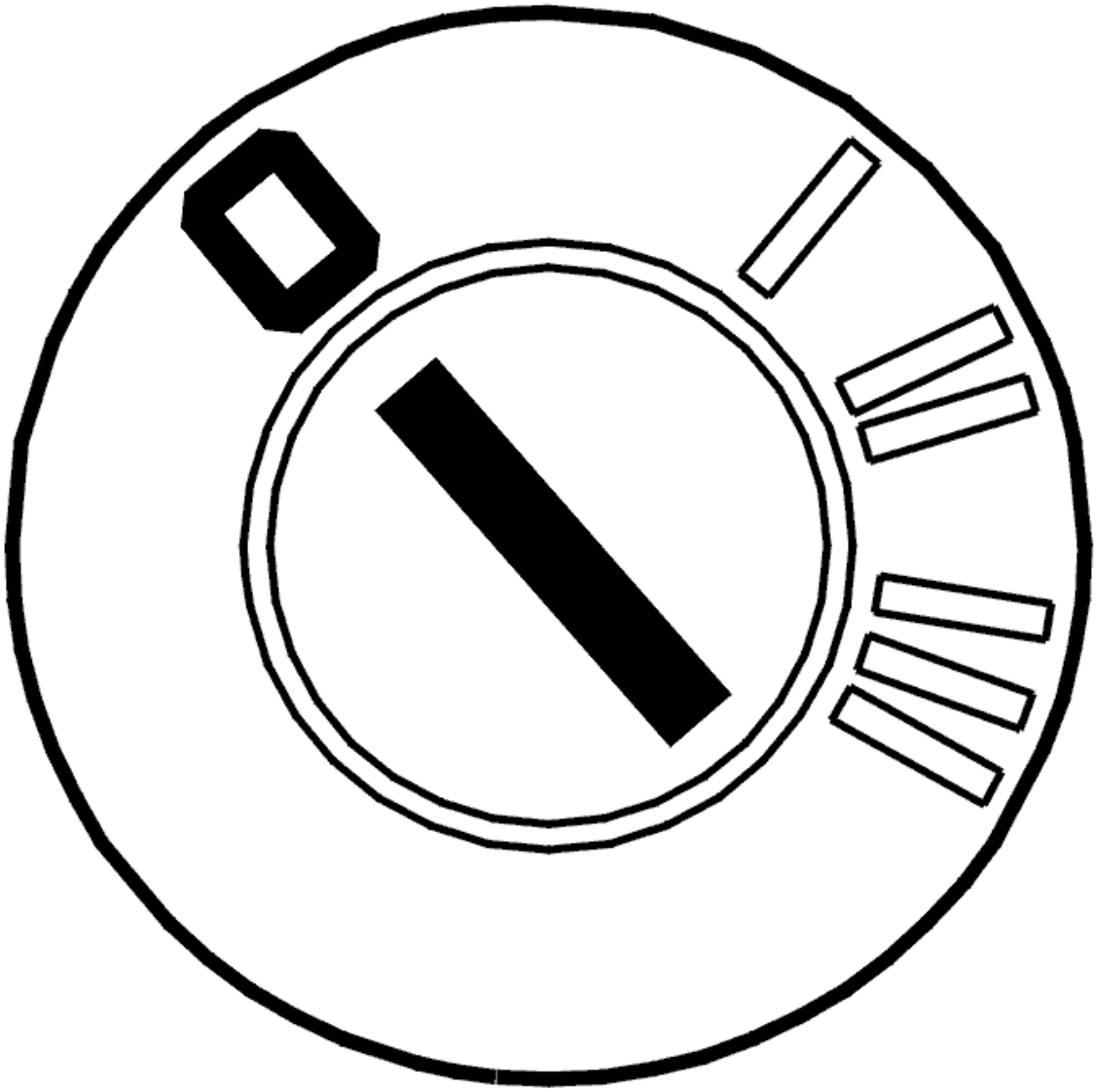


Fig. 252: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off

  Check the cable between the transmission control module (TCM) terminal #A5 (#A35) and engine control module (ECM) terminal #B15. Check for a short circuit to supply.

  Remedy as necessary.

  Other information

  - see **CONNECTING THE BREAKOUT BOX**
  - see **SIGNAL DESCRIPTION**
  - For access to connector A: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**

- see **CONTENTS**

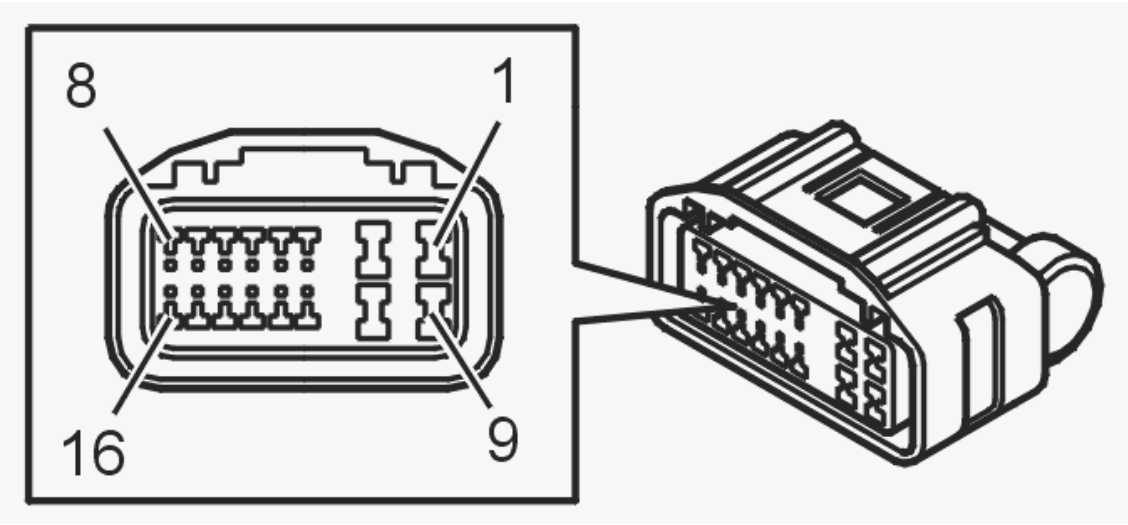


Fig. 253: Identifying Connector A Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

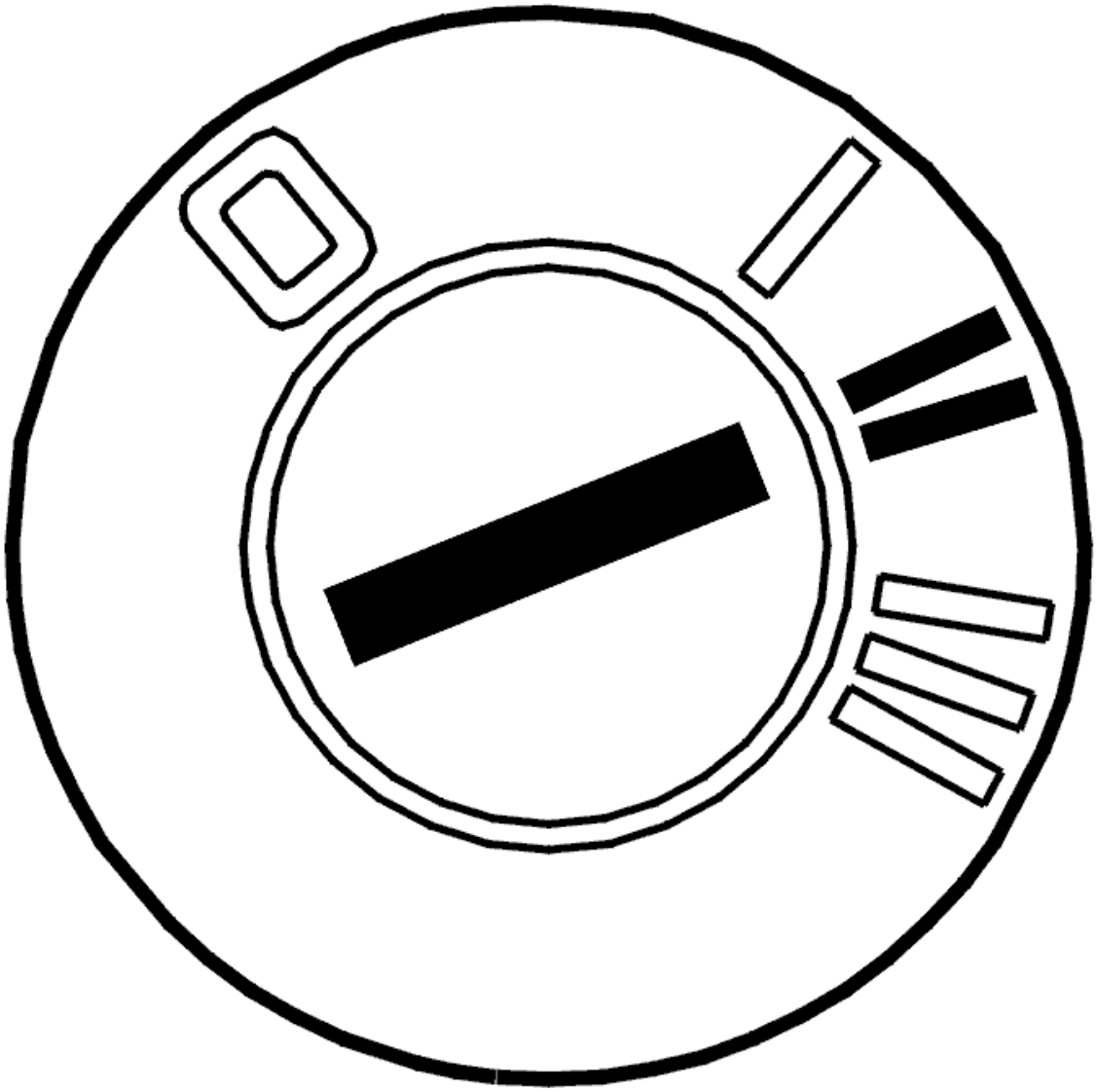


Fig. 254: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

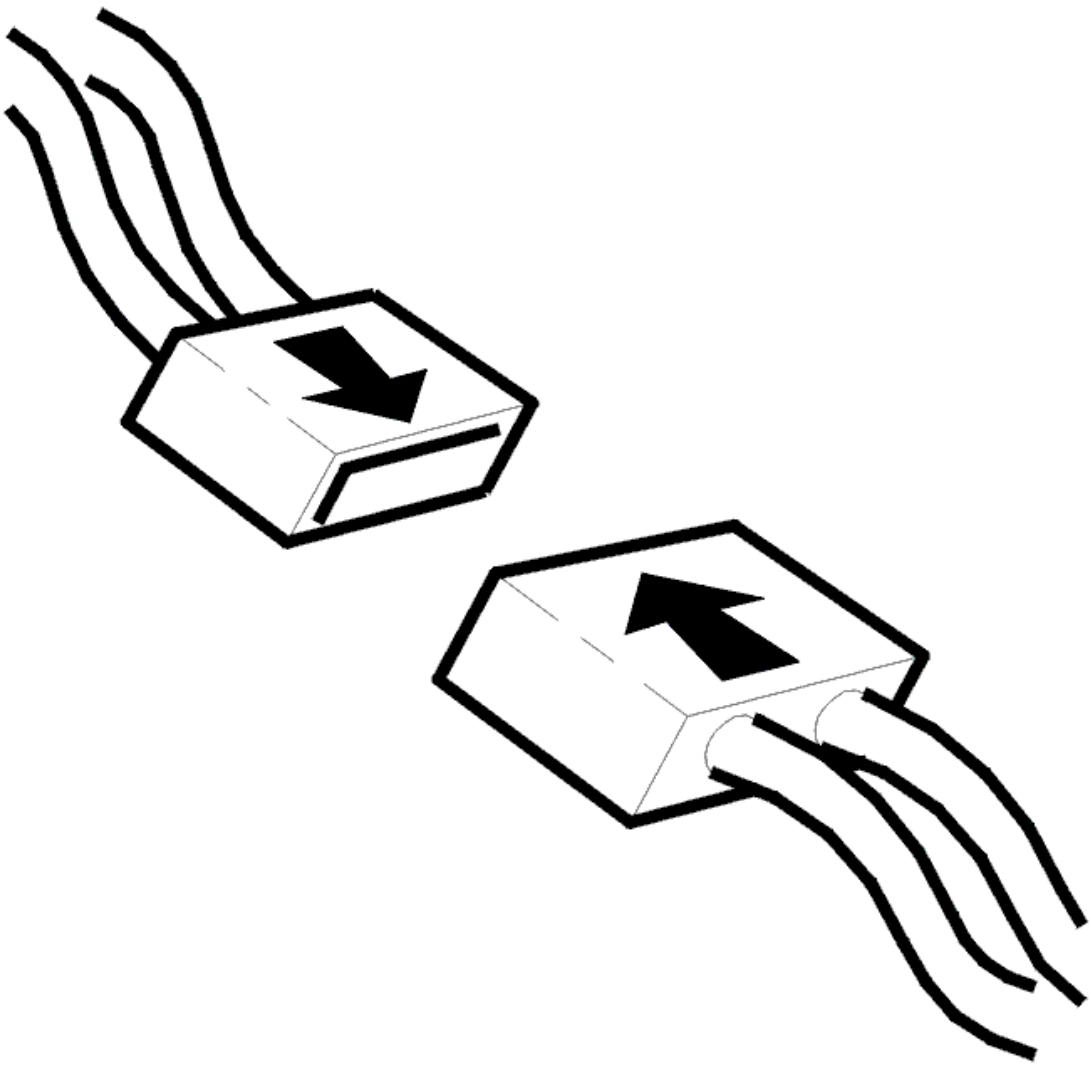


Fig. 255: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the park neutral position (PNP) switch status

  Move the gear selector lever between positions P, R, N and D.

  In positions P and N the status must be "Start permitted", in other positions the status must be "Start not permitted".

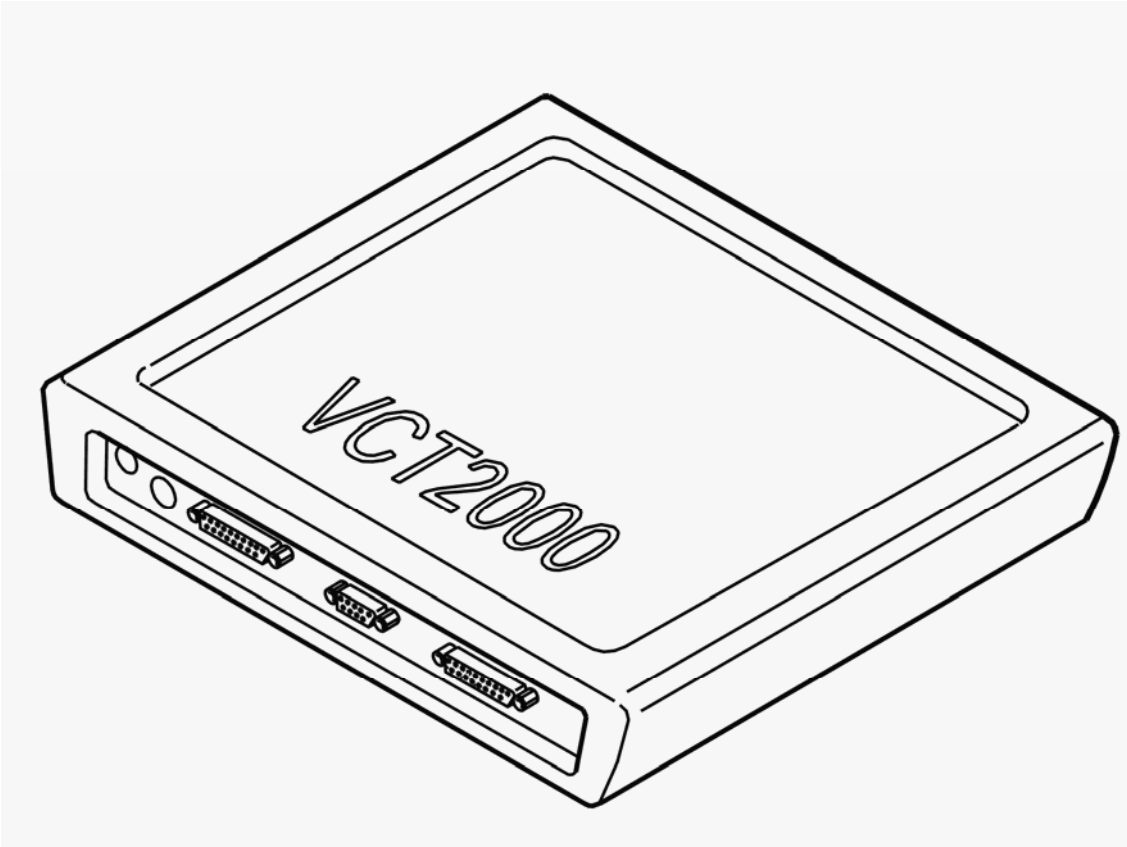


Fig. 256: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P081712: STARTER INHIBITOR CIRCUIT. GENERAL ELECTRICAL FAULT. SHORT-CIRCUIT TO VOLTAGE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P081712

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P081712**

FAULT TRACING TCM-P081712

see **FAULT TRACING TCM-P081712**

TCM-P082601: UP AND DOWN SWITCH INPUT CIRCUIT. GENERAL FAILURE INFORMATION. GENERAL ELECTRICAL FAILURE (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P082601

Condition

The circuit board of the gear selector module (GSM) houses three Hall sensors. A permanent magnet on the gear selector lever influences the output signals from the sensors to the gear selector module (GSM). The automatic transmission remains in position D hydraulically when the gear selector is moved to the manual shifting position (+/-). When the gear selector is moved up (+), the gear selector module (GSM) sends a signal to the transmission control module (TCM) to upshift. If the manual selector lever is moved down (-), the gear selector module (GSM) sends a signal to the transmission control module (TCM) to downshift.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The signals from the gear selector are not accurate for manual mode (+/-).

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

Fig. 257: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- No manual gear shift

Possible Source

- Gear selector module (GSM) not working.

Fault symptom[s]

- Changes gear as in position D in position MAN
- No gear shift

FAULT-TRACING

CHECKING FUNCTION OF THE GEAR POSITION SENSOR

Fig. 258: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the Geartronic status by clicking on the VCT2000 symbol.
- Depress the brake pedal. Move the gear selector to the position for manual shifting and check that the status changes.

- Move the gear selector lever to +. Check that gear selection is updated in the display in the diagnostic tool as well as the display in the combined instrument panel.
- Then move the gearshift selector toward both + and -, and check that the value has been updated in the driver information module's display window.

  If the value is updated in the driver information module display, the fault is intermittent. That is to say, it occurred earlier but is not active right now.

  If gear selector position is not updated, replace the gear selector module (GSM).

  Other information

  - see **TOP PANEL GEARTRONIC, REPLACING**

Fig. 259: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

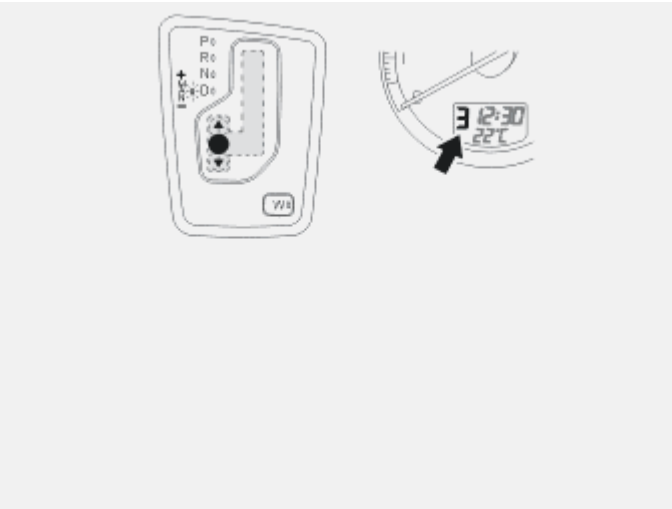


Fig. 260: Identifying Geartronic Operation
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 261: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

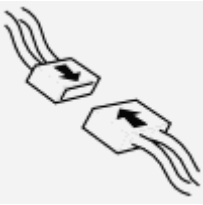


Fig. 262: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Depress the brake pedal. Move the gear selector to the position for manual shifting and check that the status changes.
- Move the gear selector to + and check that the gear selection is updated in the display on the driver information module (DIM).
- Move the gear selector to -. Check that the gear selection is updated.

Fig. 263: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

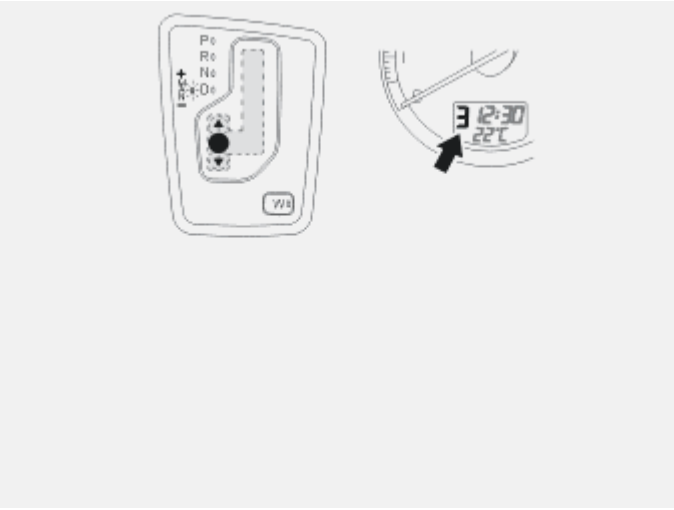


Fig. 264: Identifying Geartronic Operation
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P082601: UP AND DOWN SWITCH INPUT CIRCUIT. GENERAL FAILURE INFORMATION. GENERAL ELECTRICAL FAILURE (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P082601

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P082601**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P082601: UP AND DOWN SWITCH INPUT CIRCUIT. GENERAL FAULT INFORMATION. GENERAL ELECTRICAL FAULT (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P082601

Condition

Fig. 265: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

On the circuit board for the gear selector module (GSM) three Hall sensors. A permanent magnet on the gear lever affects the sensor output signals to the gear selector module (GSM). When the gear selector is moved to manual position "**Man** ", the automatic transmission will still be hydraulic in position D, but by moving the gear selector upwards (+) the gear selector module (GSM) will send a signal to the transmission control module (TCM) to engage a higher gear. Moving the gear selector downwards (-) sends a signal from the gear selector module (GSM) to the transmission control module (TCM) to engage a lower gear. If the gear selector module (GSM) registers that the signals from the gear selector do not agree with the "**Man** " position, the diagnostic travel code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- No manual "**Man** " gear changing.

Possible Source

- Gear selector module (GSM) not working.

Fault symptom[s]

- Changes gear according to D in "**Man** " position.
- No gear changing.

FAULT TRACING TCM-P082601

CHECKING THE FUNCTION OF THE GEAR-SHIFT POSITION SENSOR

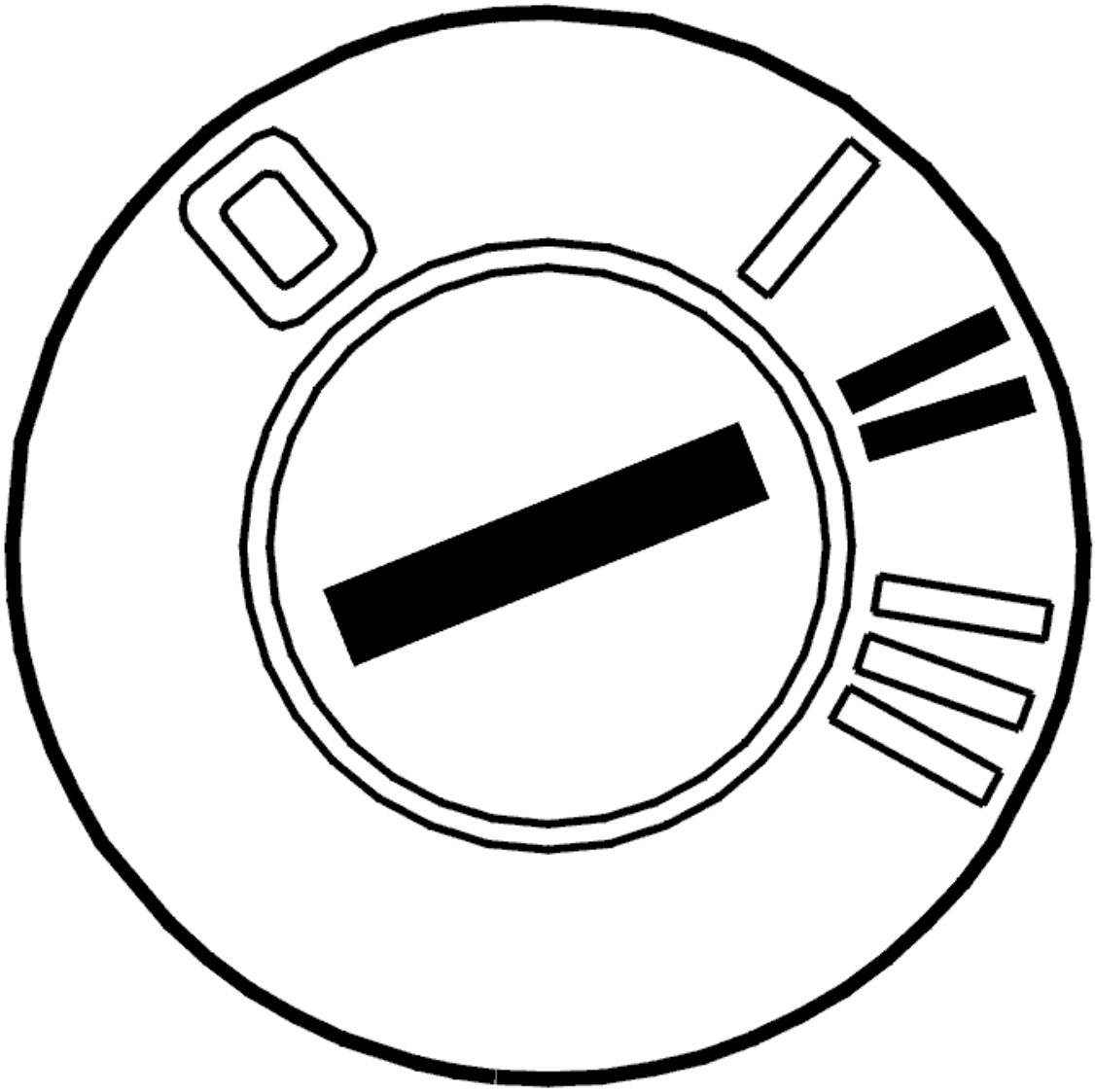


Fig. 266: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read Geartronic status by clicking on the symbol for VCT2000.
- Depress the brake pedal. Move the gear selector lever to "**MAN** " (manual) and check that the status changes.
- Move the gear selector lever to +. Check that gear selection is updated in the display in the diagnostic tool as well as the display in the combined instrument panel.
- Move the gear selector lever to -. Check that the gear selection is updated.

If the gear selector lever position is not updated, replace the gear selector module (GSM).

Other information

- see **TOP PANEL GEARTRONIC, REPLACING**

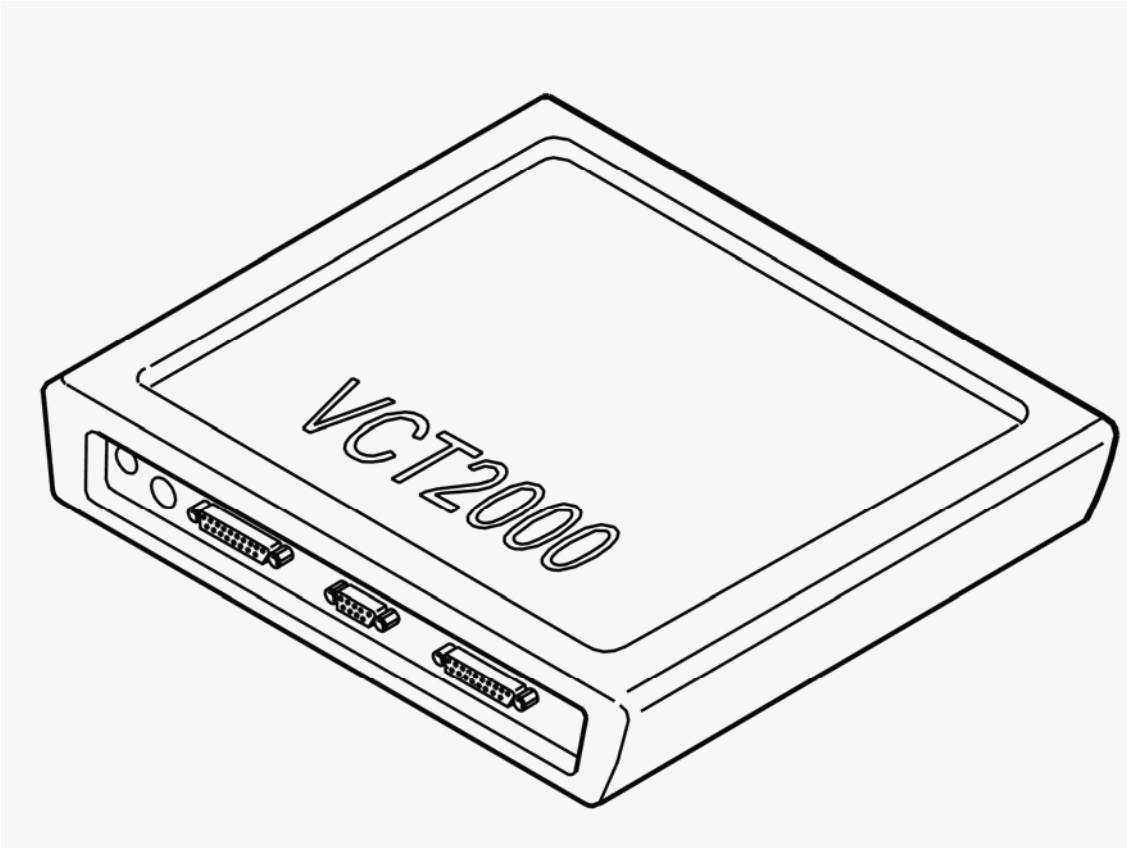


Fig. 267: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

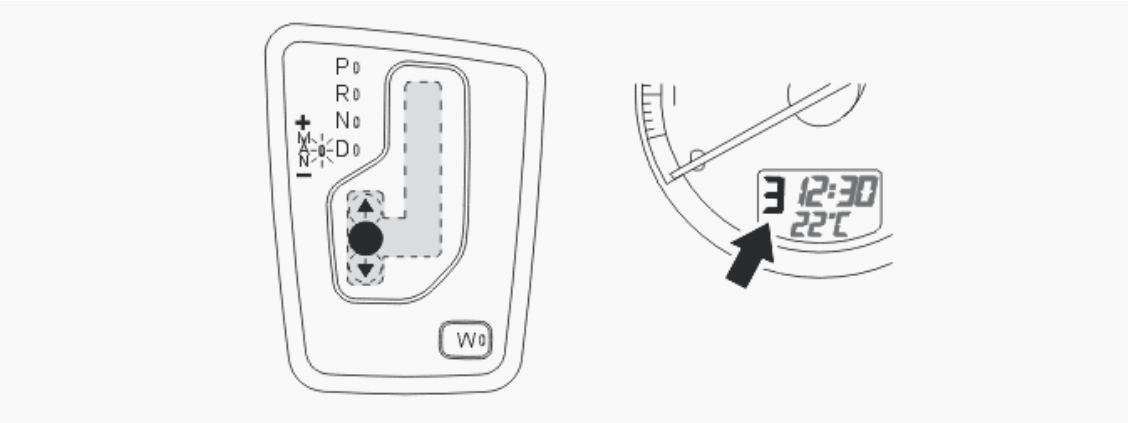


Fig. 268: Locating Geartronic Gearshift Indicator
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

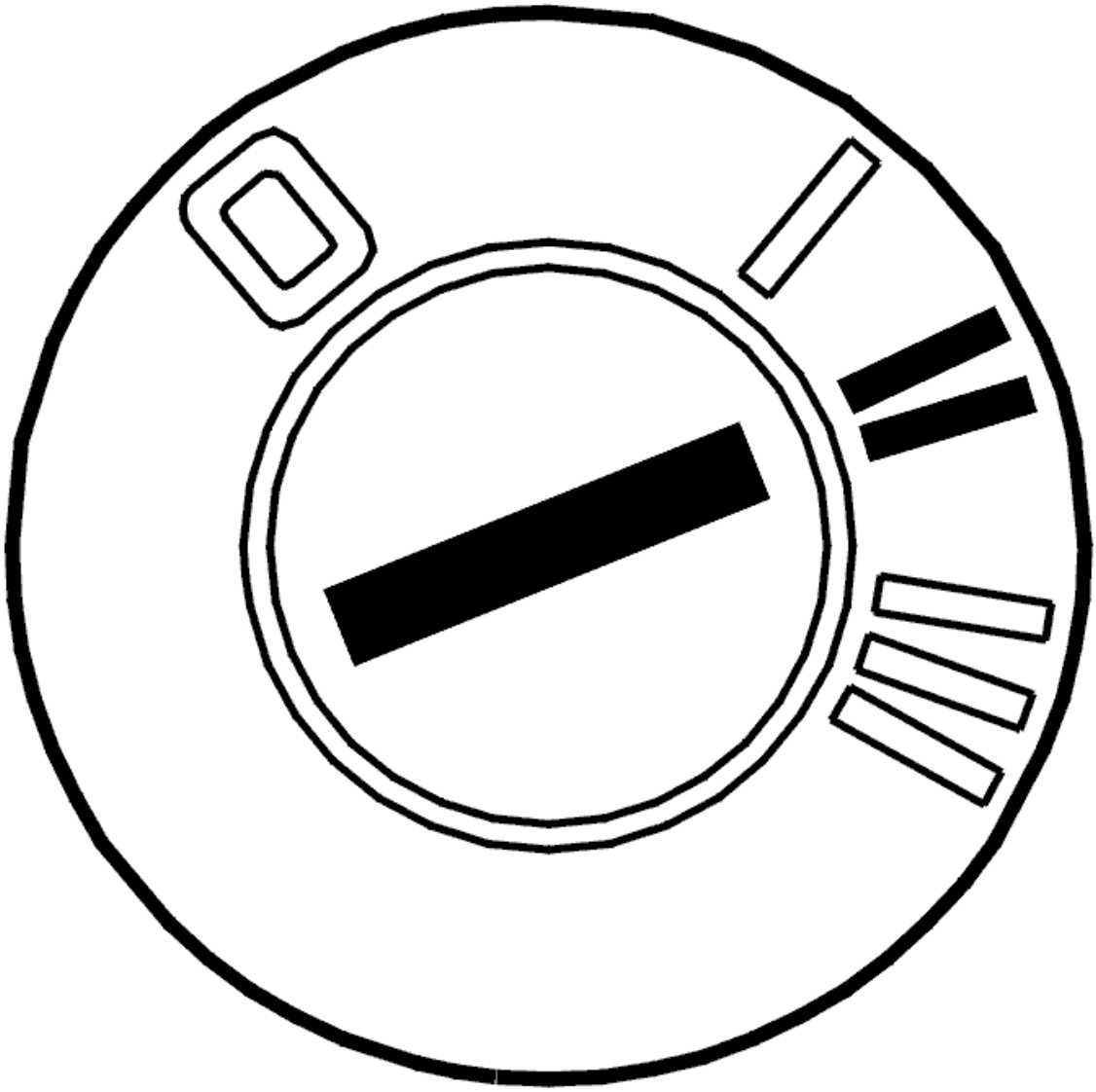


Fig. 269: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

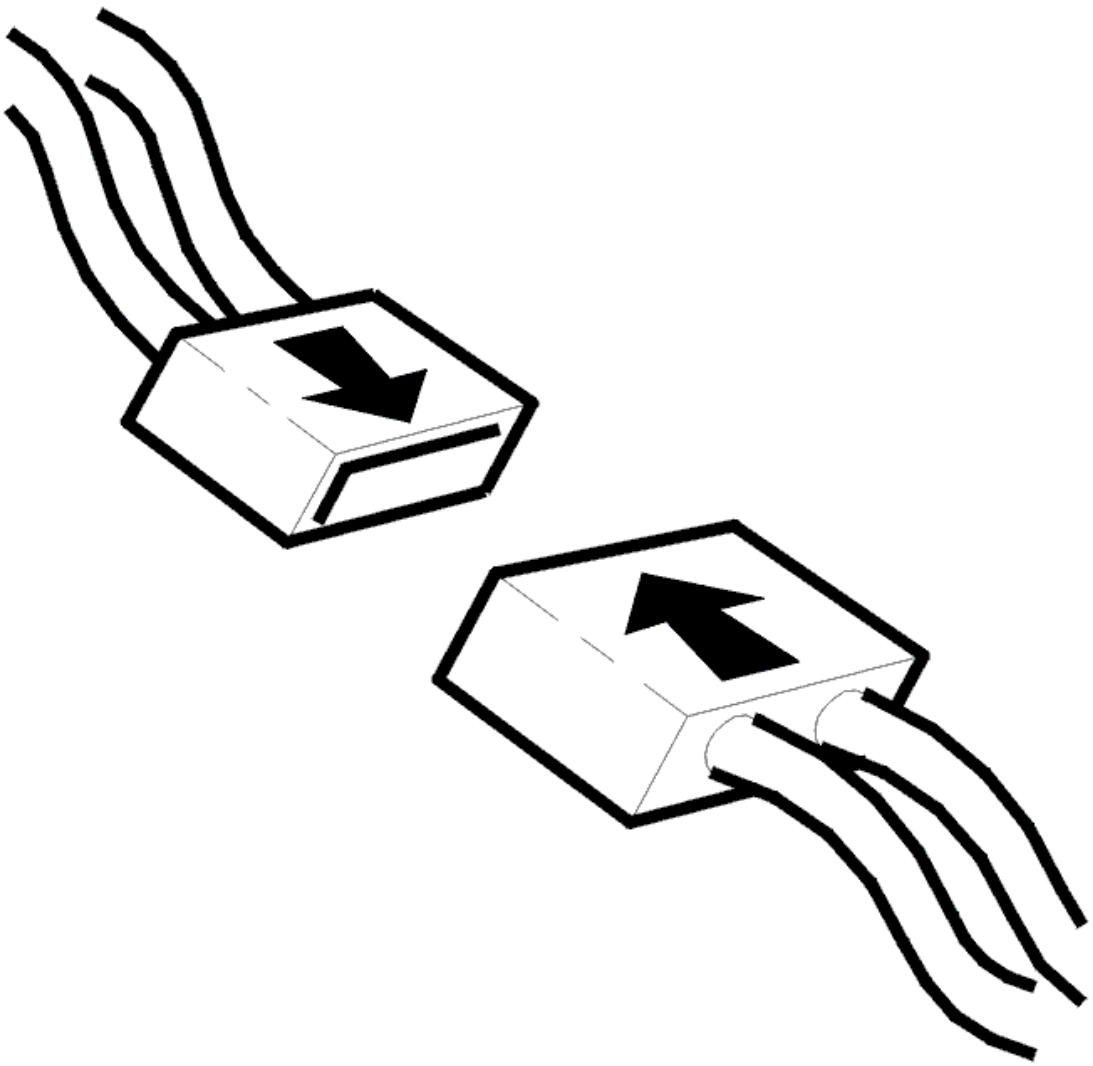


Fig. 270: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Depress the brake pedal. Move the gear selector lever to "**MAN** " (manual).
- Move the gear selector lever to +. Check that gear selection is updated in the display in the combined instrument panel.
- Move the gear selector lever to -. Check that the gear selection is updated.

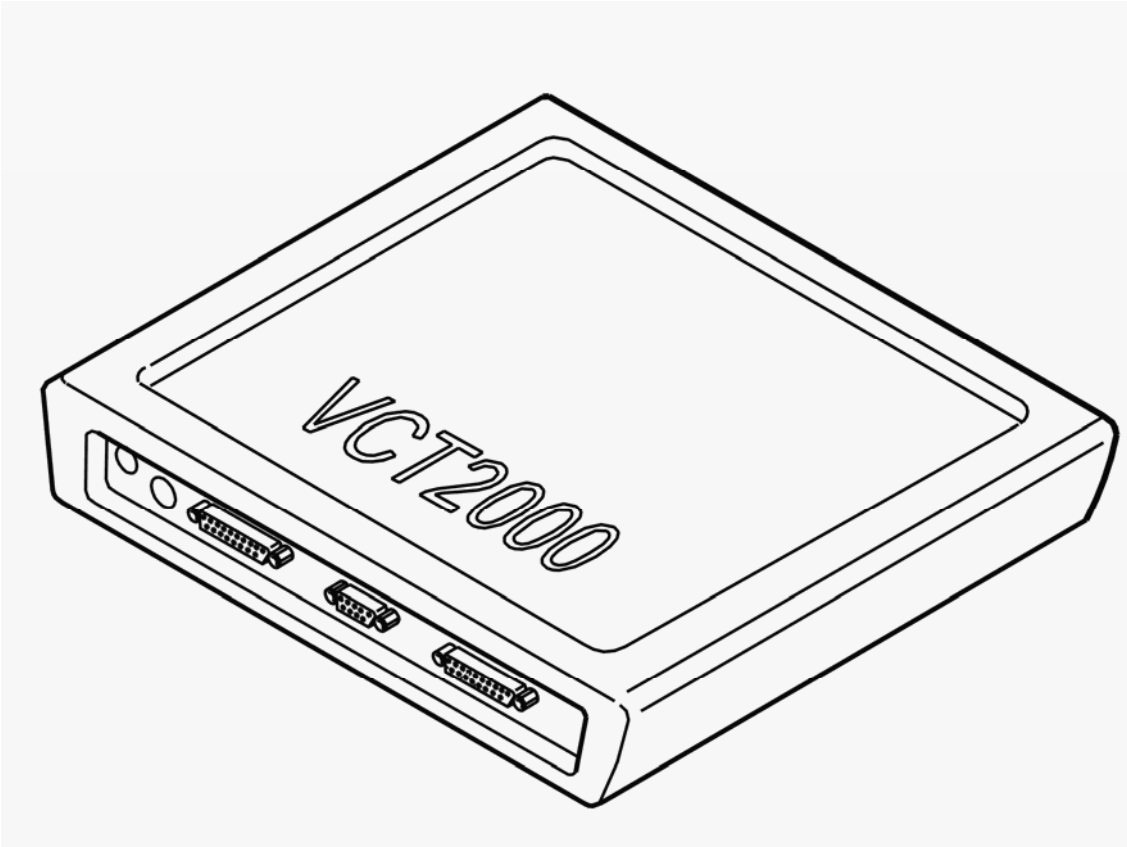


Fig. 271: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

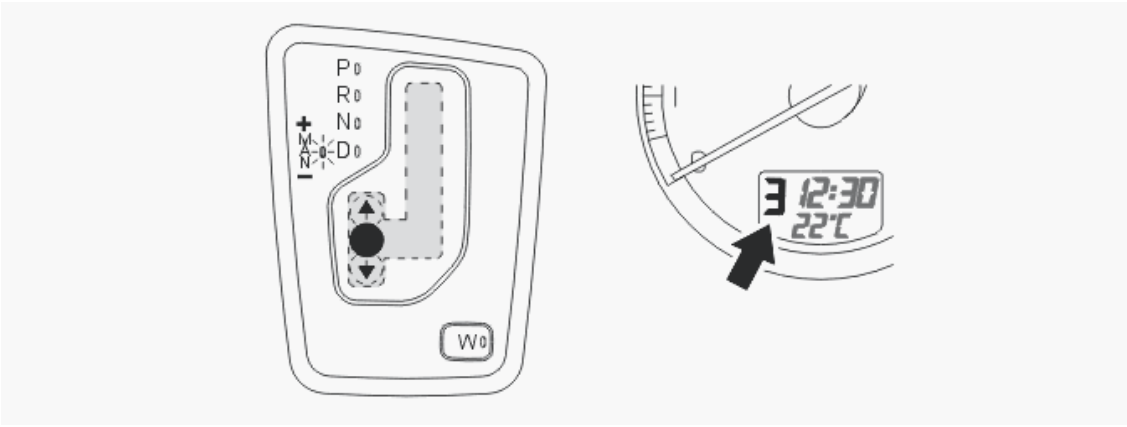


Fig. 272: Locating Geartronic Gearshift Indicator
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P082601: UP AND DOWN SWITCH INPUT CIRCUIT. GENERAL FAULT INFORMATION. GENERAL ELECTRICAL FAULT (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P082601

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P082601**

FAULT TRACING TCM-P082601

see **FAULT TRACING TCM-P082601**

TCM-P086011: GEAR SHIFT MODULE A COMMUNICATION CIRCUIT. GENERAL ELECTRICAL FAILURES. CIRCUIT SHORT TO GROUND (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086011

Condition

The transmission control module (TCM) and gear selector module (GSM) communicate with each other in a network via standardized serial communication - local interconnect network (LIN). The control modules transmit and receive information.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The signal from the Gear selector module (GSM) is too low.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

Fig. 273: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Manual gear shift position (+/-) function is blocked.

Possible Source

- Short-circuit to ground in the communication cable.

Fault symptom[s]

- General warning lamp lit
- Gear selector indicator does not function

FAULT-TRACING

CHECKING COMMUNICATION WITH THE GEAR SELECTOR MODULE (GSM)

Fig. 274: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the position of the gear selector.
- Depress the brake pedal. Move the gear selector to the position for manual shifting and check that the status changes.

- Then move the gearshift selector toward both + and -, and check that the value has been updated in the driver information module's display window.

  If the value is updated in the driver information module display, the fault is intermittent. That is to say, it occurred earlier but is not active right now.

Fig. 275: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

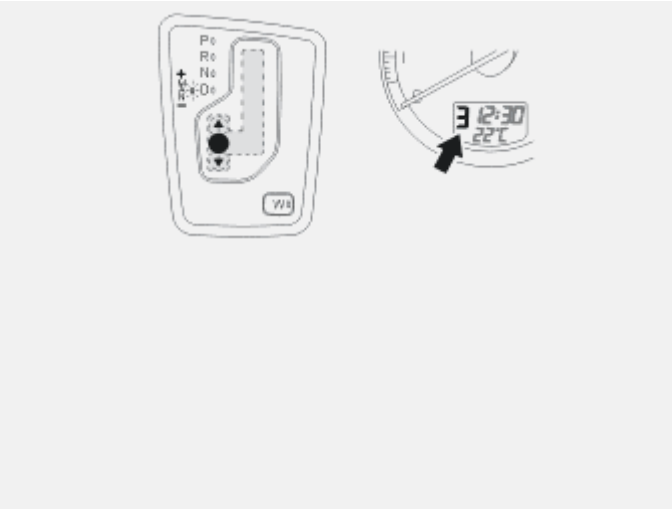


Fig. 276: Identifying Geartronic Operation
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

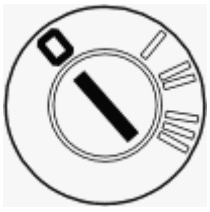


Fig. 277: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check if there are any external sources of interference near the communication cable (LIN) between the transmission control module (TCM) terminal #A7 and gear selector module (GSM) terminal #2 which can disturb communication.

  Check the communication cable (LIN) for intermittent short circuits or open circuit.

  Take readings between:

  - Transmission control module (TCM) terminal #A7 and gear selector module (GSM) terminal #2.

  Other information

  - see **CONNECTING THE BREAKOUT BOX**
  - see **SIGNAL SPECIFICATION**
  - For access to connector:**TOP PANEL GEARTRONIC, REPLACING**
  - For access to connector:**TRANSMISSION CONTROL MODULE (TCM)**
  - see **CHECKING WIRING AND TERMINALS**

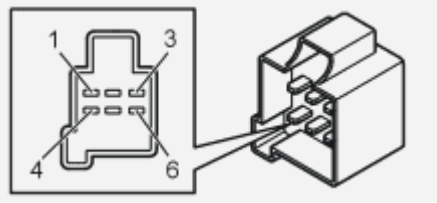


Fig. 278: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

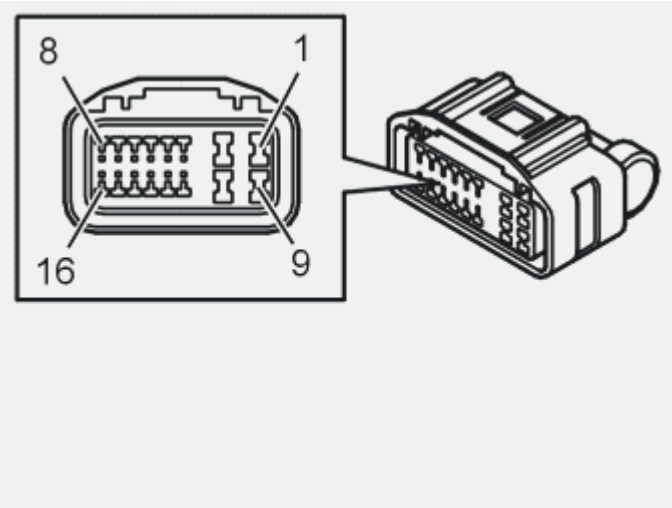


Fig. 279: Identifying Connector A Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 280: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

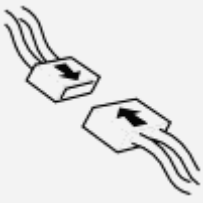


Fig. 281: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the position of the gear selector.
- Depress the brake pedal. Move the gear selector to the position for manual shifting and check that the status changes.
- Then move the gearshift selector toward both + and -, and check that the value has been updated in the driver information module's display window.

Fig. 282: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

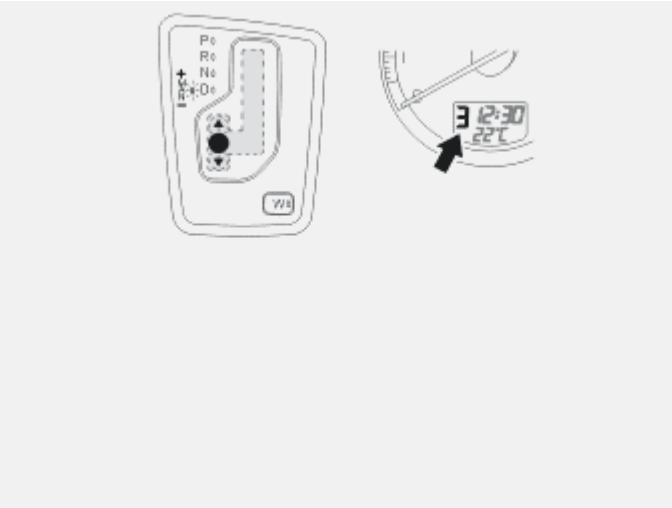


Fig. 283: Identifying Geartronic Operation
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P086011: GEAR SHIFT MODULE A COMMUNICATION CIRCUIT. GENERAL ELECTRICAL FAILURES. CIRCUIT SHORT TO GROUND (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086011

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086011**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P086011: TRANSMISSION CONTROL MODULE A COMMUNICATION CIRCUIT. GENERAL ELECTRICAL FAULT. SHORT-CIRCUIT TO GROUND (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086011

Condition

Fig. 284: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) and the gear selector module (GSM) communicate with each other over a network via a standardized serial communication protocol, Local Interconnect Network (LIN), to exchange information. The control modules both send and receive information.

If the transmission control module (TCM) registers the signal from the gear selector module (GSM) is too high or too low, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Manual gearchange "**Man** " function block.

- The winter program "**W** " function blocked.

Possible Source

- The communication lead between the gear selector module (GSM) and the transmission control module (TCM) short-circuited to voltage or ground.

Fault symptom[s]

- General warning lamp lit
- Gear selector indicator not working.

FAULT TRACING TCM-P086011

CHECKING COMMUNICATION WITH THE GEAR SELECTOR (GSM)

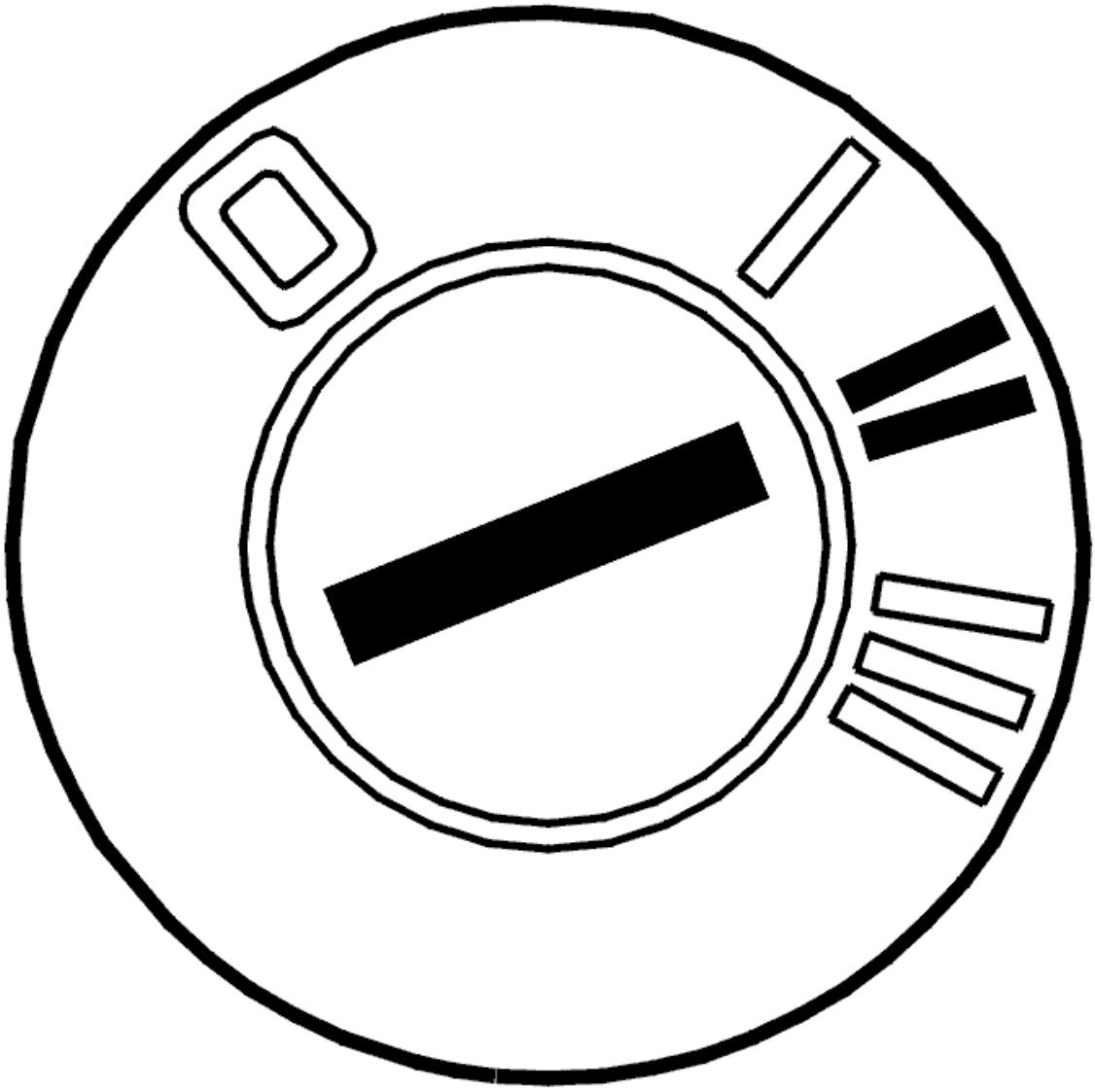


Fig. 285: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Check if communication with the gear selector module (GSM) functions by reading the status for the Winter program selector (**W**).
- Activate and deactivate the function by pressing the switch. The status must change.

  The fault is permanent if the value does not change.

  If the value changes it means that the fault was present previously but is not active now. There is an intermittent fault.

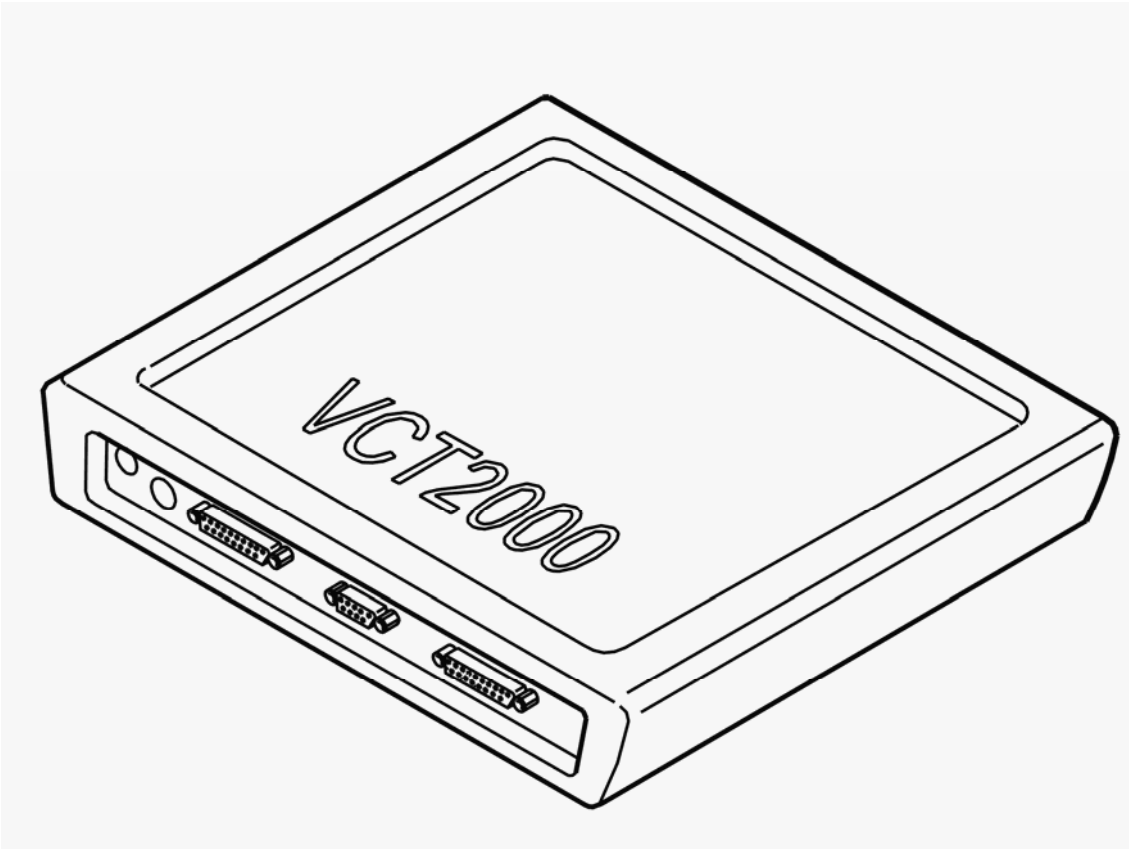


Fig. 286: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Fig. 287: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

Check if there are any external sources of interference near the communication cable (LIN) between the transmission control module (TCM) terminal #A7 and gear selector module (GSM) terminal #2 which can disturb communication.

Check the communication cable (LIN) between the transmission control module (TCM) terminal #A7 and gear selector module (GSM) terminal #2. Check for intermittent short circuits. Check for intermittent open-circuits.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- For access to connector: **TOP PANEL GEARTRONIC, REPLACING**
- see **CONTENTS**

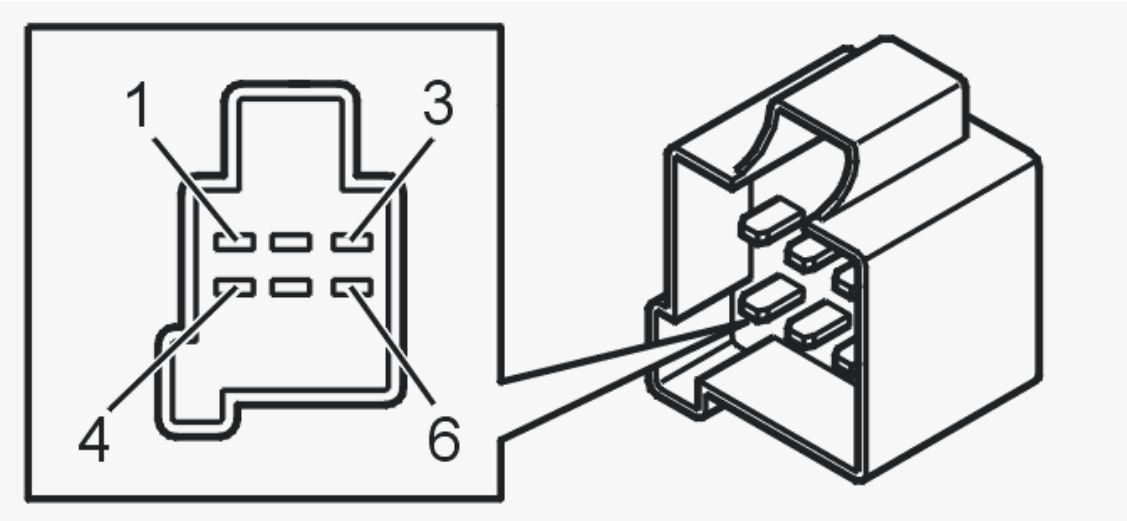


Fig. 288: Identifying Transmission Control Module (TCM) Connector Terminals
Courtesy of VOLVO CARS CORPORATION

Fig. 289: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

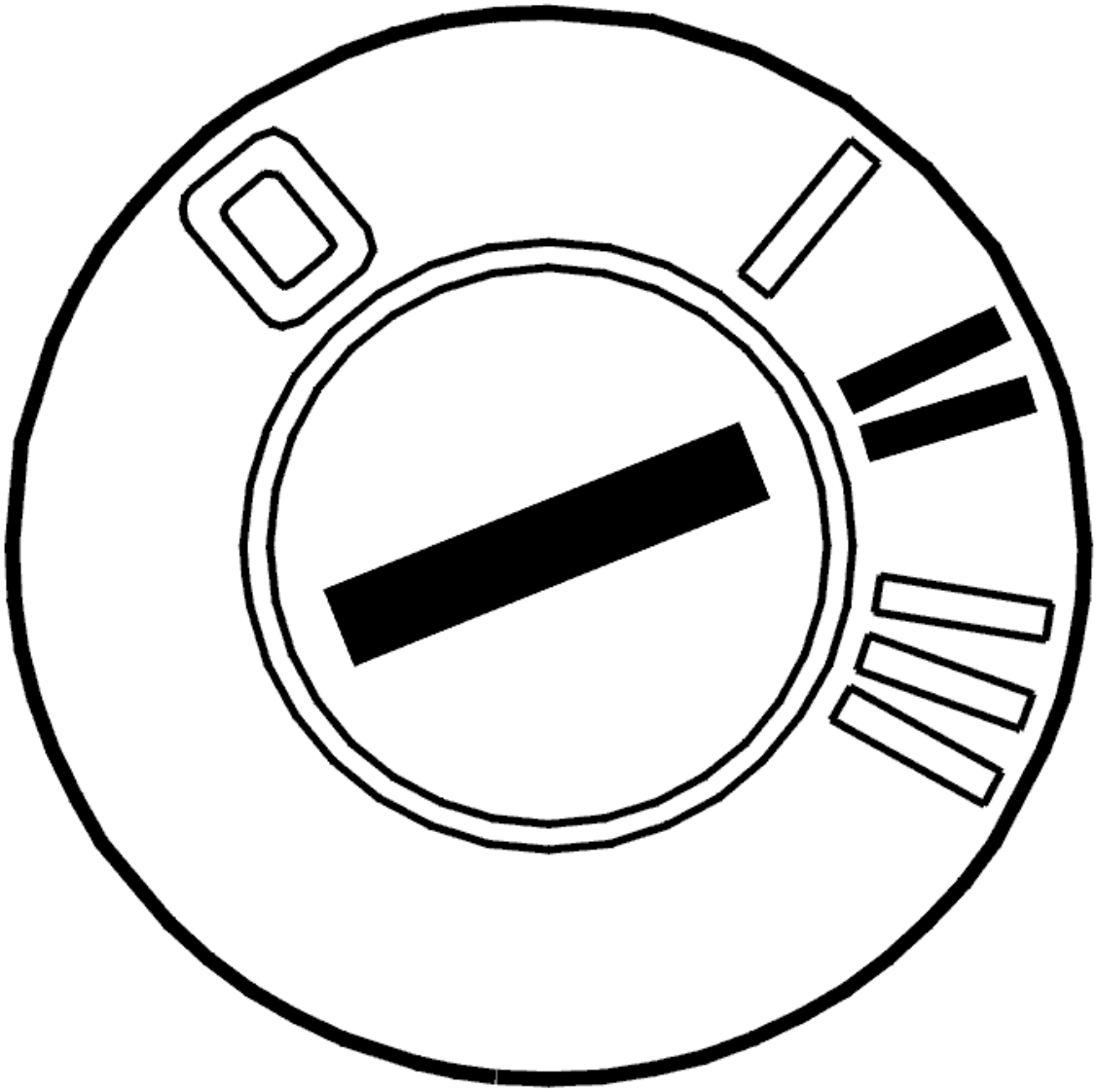


Fig. 290: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

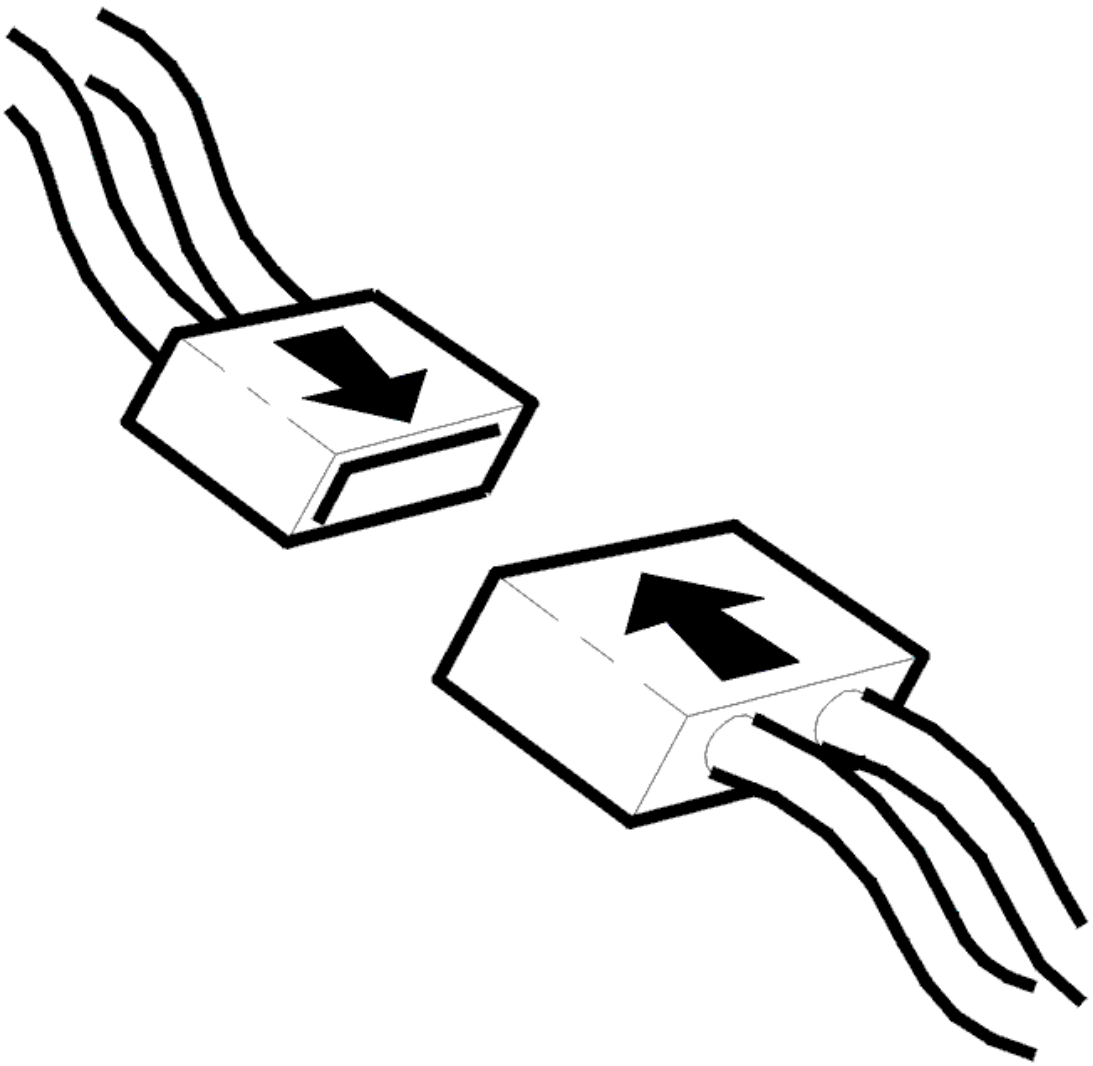


Fig. 291: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Gear selector in position P.
- Check whether communication with the gear selector module (GSM) works by reading off the winter mode selector (W) status.

  Connect and disconnect the function by pressing the switch. The status should change.

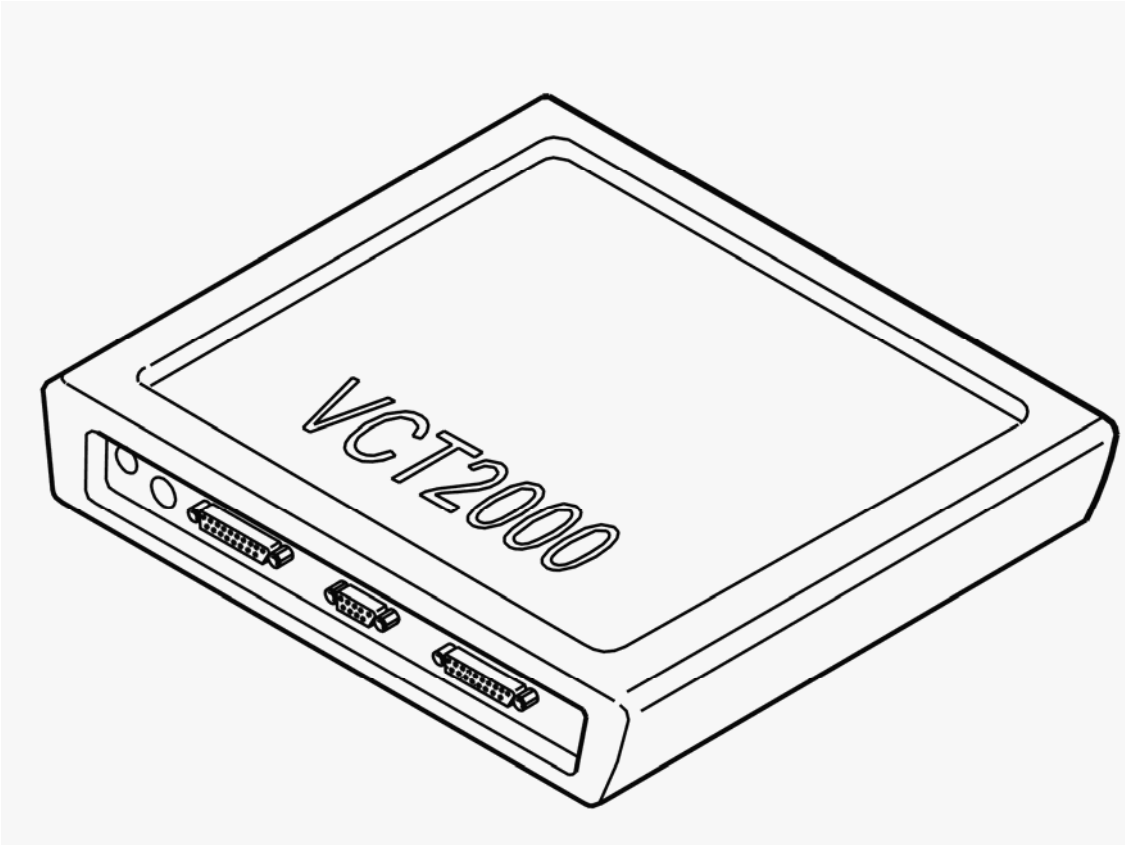


Fig. 292: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the status change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P086011: TRANSMISSION CONTROL MODULE A COMMUNICATION CIRCUIT. GENERAL ELECTRICAL FAULT. SHORT-CIRCUIT TO GROUND

(TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086011

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086011**

FAULT TRACING TCM-P086011

see **FAULT TRACING TCM-P086011**

TCM-P086012: GEAR SHIFT MODULE A COMMUNICATION CIRCUIT. GENERAL ELECTRICAL FAILURES. CIRCUIT SHORT TO BATTERY (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086012

Condition

The transmission control module (TCM) and gear selector module (GSM) communicate with each other in a network via standardized serial communication - local interconnect network (LIN). The control modules transmit and receive information.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The signal from the Gear selector module (GSM) is too high.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

Fig. 293: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Manual gear shift position (+/-) function is blocked.

Possible Source

- Short-circuit to supply voltage in the communication cable.

Fault symptom[s]

- General warning lamp lit
- Gear selector indicator does not function

FAULT-TRACING

CHECKING COMMUNICATION WITH THE GEAR SELECTOR MODULE (GSM)

Fig. 294: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the position of the gear selector.
- Depress the brake pedal. Move the gear selector to the position for manual shifting and check that the status changes.

- Then move the gearshift selector toward both + and -, and check that the value has been updated in the driver information module's display window.

  If the value is updated in the driver information module display, the fault is intermittent. That is to say, it occurred earlier but is not active right now.

Fig. 295: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

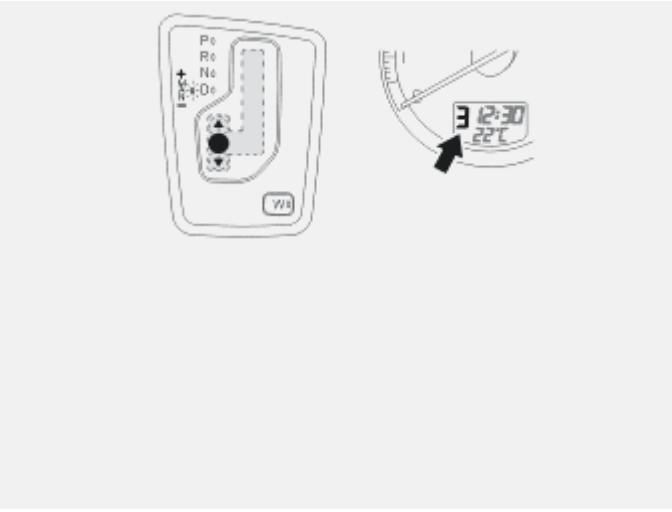


Fig. 296: Identifying Geartronic Operation
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE WIRING**

CHECKING THE WIRING

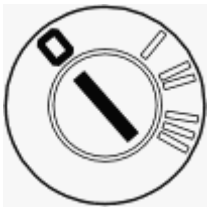


Fig. 297: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the communication cable (LIN) for short circuit to supply voltage.

  Take readings between:

  - Transmission control module (TCM) terminal #A7 and gear selector module (GSM) terminal #2.

  If no fault can be found, replace the gear selector module (GSM).

  Other information

  - see **CONNECTING THE BREAKOUT BOX**
  - see **SIGNAL SPECIFICATION**
  - see **CHECKING WIRING AND TERMINALS**
  - For access to connector:**TOP PANEL GEARTRONIC, REPLACING**
  - For access to connector:**TRANSMISSION CONTROL MODULE (TCM)**

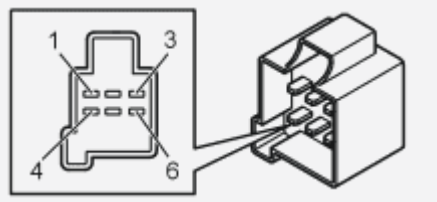


Fig. 298: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

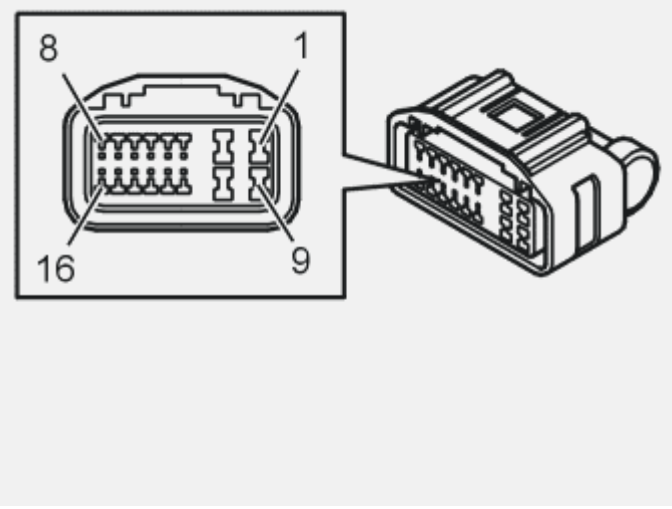


Fig. 299: Identifying Connector A Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 300: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

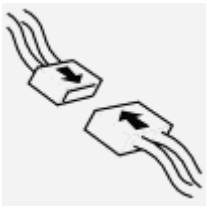


Fig. 301: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the position of the gear selector.
- Depress the brake pedal. Move the gear selector to the position for manual shifting and check that the status changes.
- Then move the gearshift selector toward both + and -, and check that the value has been updated in the driver information module's display window.

Fig. 302: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

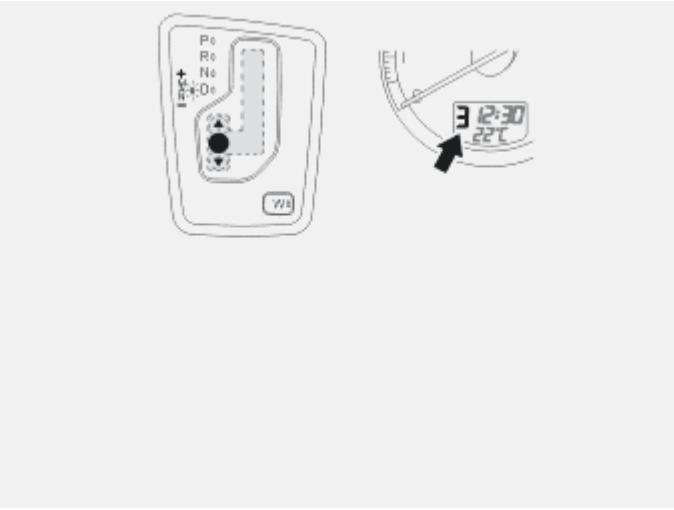


Fig. 303: Identifying Geartronic Operation
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P086012: GEAR SHIFT MODULE A COMMUNICATION CIRCUIT. GENERAL ELECTRICAL FAILURES. CIRCUIT SHORT TO BATTERY (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086012

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086012**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P086012: TRANSMISSION CONTROL MODULE A COMMUNICATION CIRCUIT. GENERAL ELECTRICAL FAULT. SHORT CIRCUIT TO VOLTAGE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086012

Condition

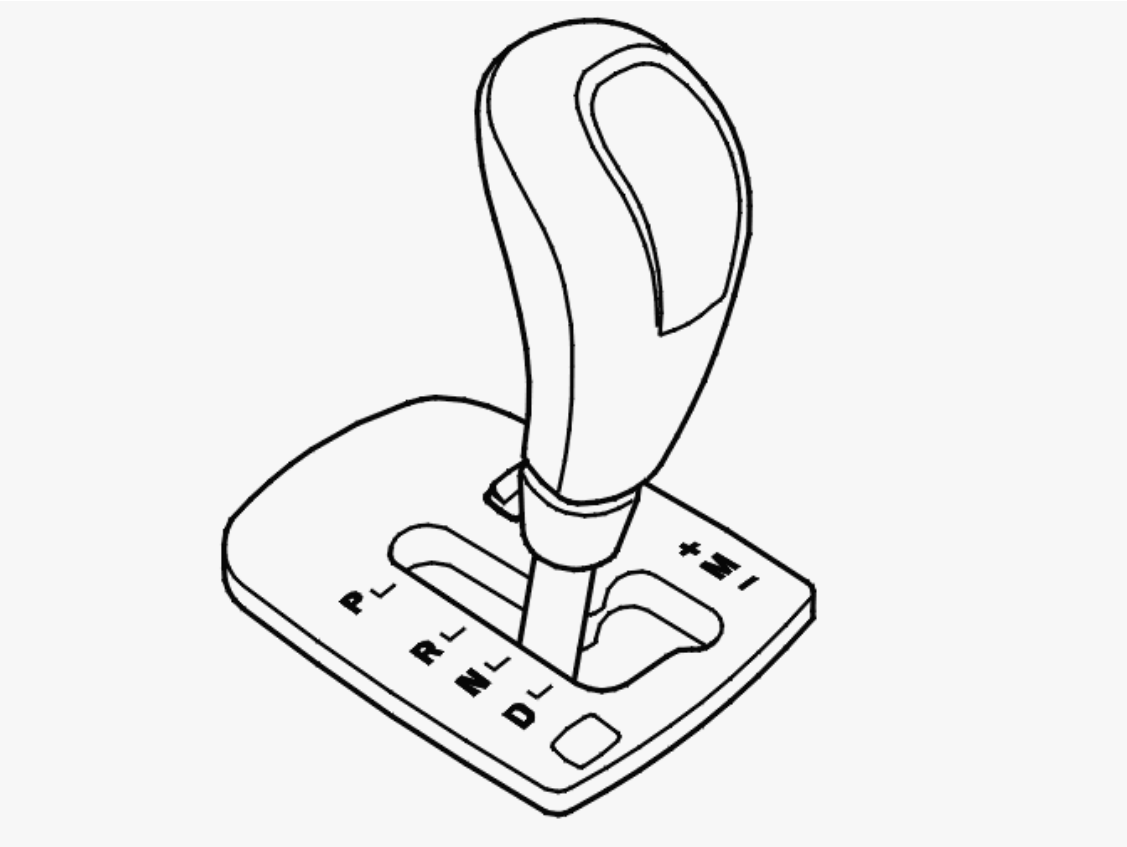


Fig. 304: Identifying Shifter
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) and the gear selector module (GSM) communicate with each other over a network via a standardized serial communication protocol, Local Interconnect Network (LIN), to exchange information. The control modules both send and receive information.

If the transmission control module (TCM) registers the signal from the gear selector module (GSM) is too high, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Manual gearchange "**Man** " function block.

- The winter program "**W** " function blocked.

Possible Source

- The communication lead between the gear selector module (GSM) and the transmission control module (TCM) short-circuited to voltage or ground.

Fault symptom[s]

- General warning lamp lit
- Gear selector indicator not working.

FAULT TRACING TCM-P086012

CHECKING COMMUNICATION WITH THE GEAR SELECTOR (GSM)

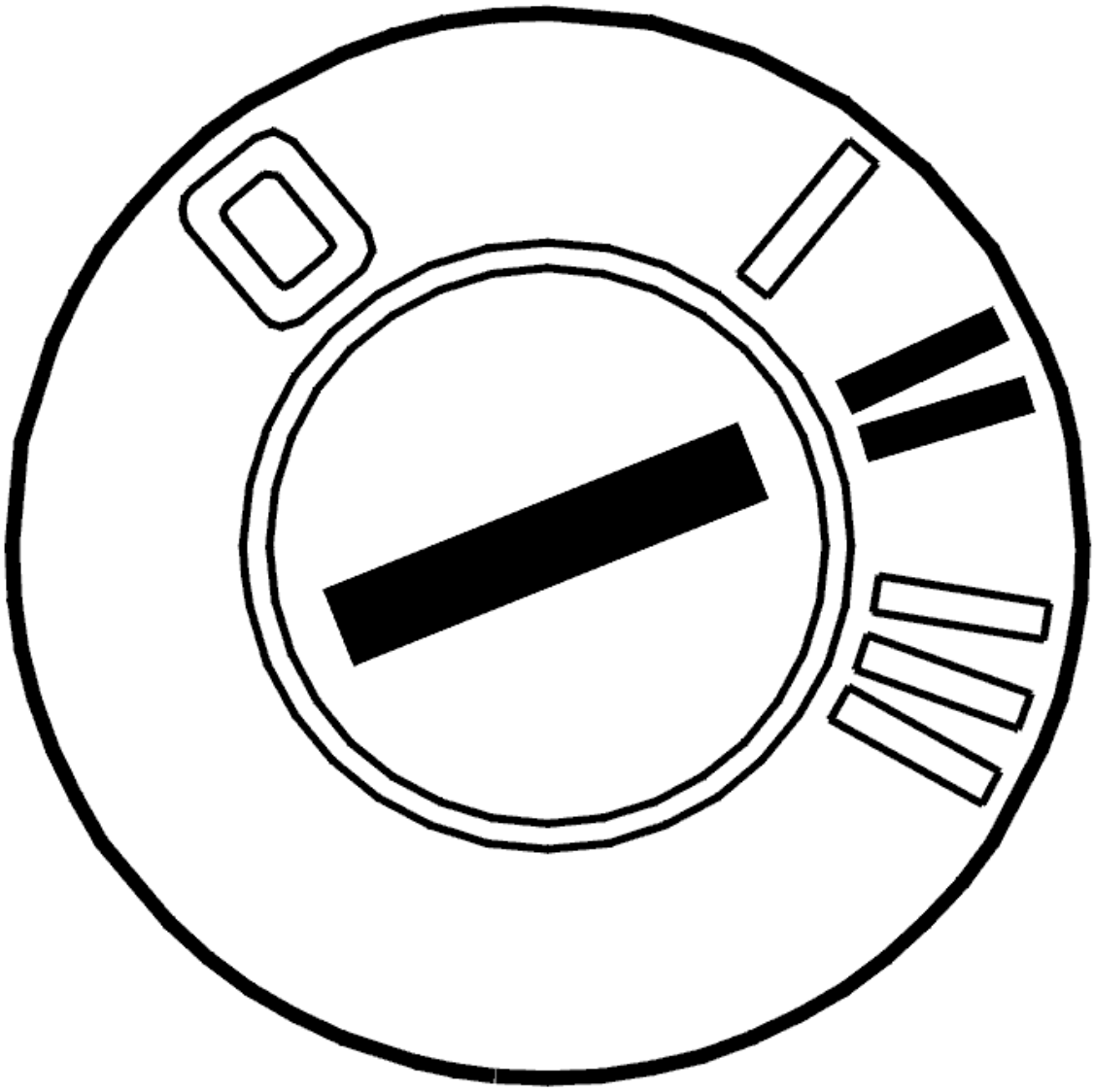


Fig. 305: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Check if communication with the gear selector module (GSM) functions by reading the status for the Winter program selector (**W**).
- Activate and deactivate the function by pressing the switch. The status must change.

  The fault is permanent if the value does not change.

  If the status switches it means that the fault was present previously but is not active now. There is an intermittent fault.

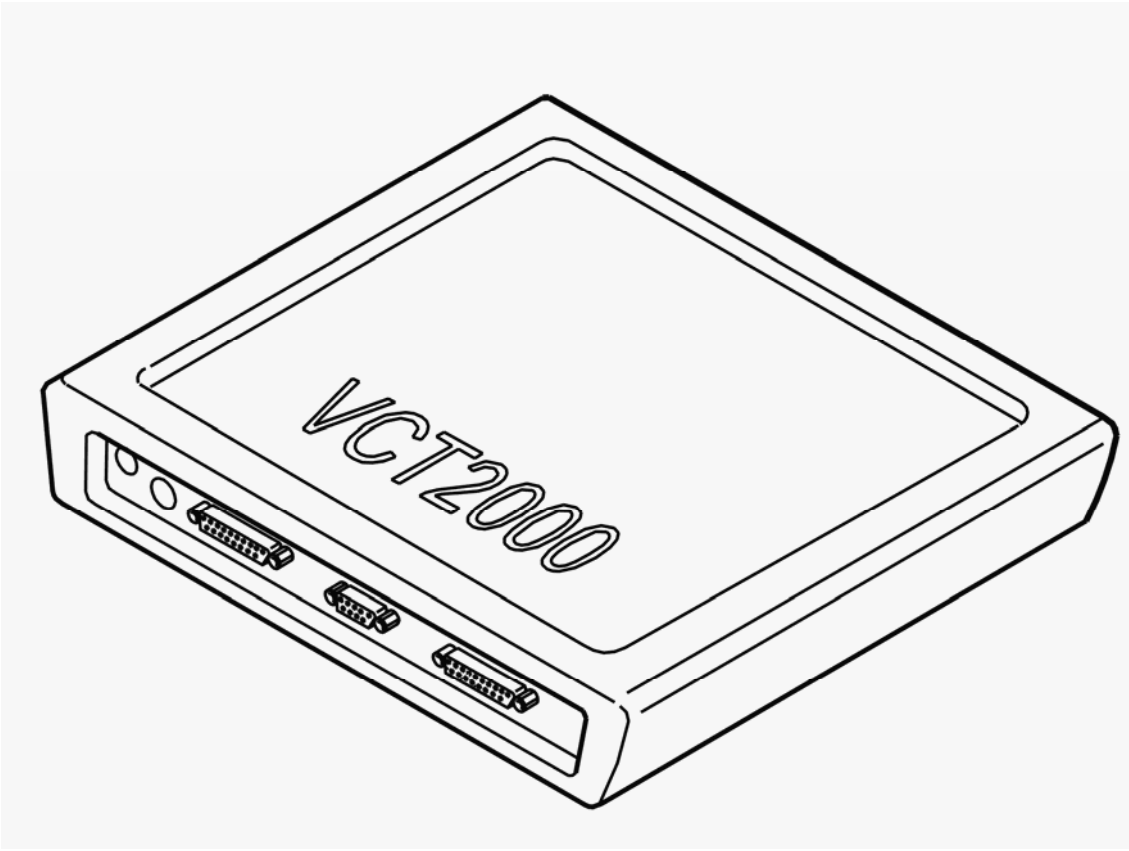


Fig. 306: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Fig. 307: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

Check the communication cable (LIN) between the transmission control module (TCM) terminal #A7 and gear selector module (GSM) terminal #2. Check for a short circuit to supply voltage.

If no fault can be found in the cable and the fault remains try replacing the printed circuit board (gear selector module (GSM).

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- To access the connector/replace the printed circuit board:**TOP PANEL GEARTRONIC, REPLACING**
- see **CONTENTS**

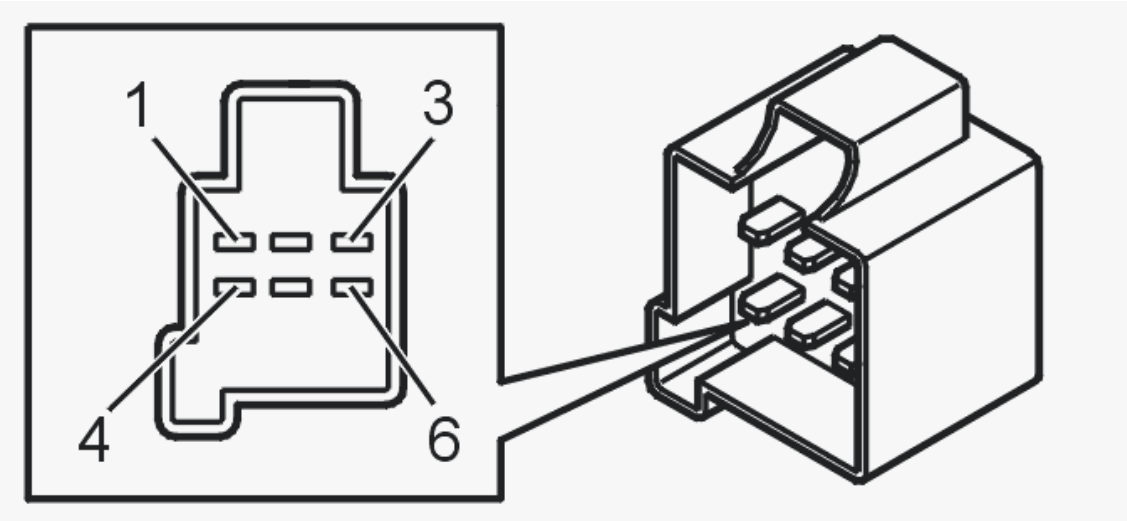


Fig. 308: Identifying Transmission Control Module (TCM) Connector Terminals
Courtesy of VOLVO CARS CORPORATION

Fig. 309: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

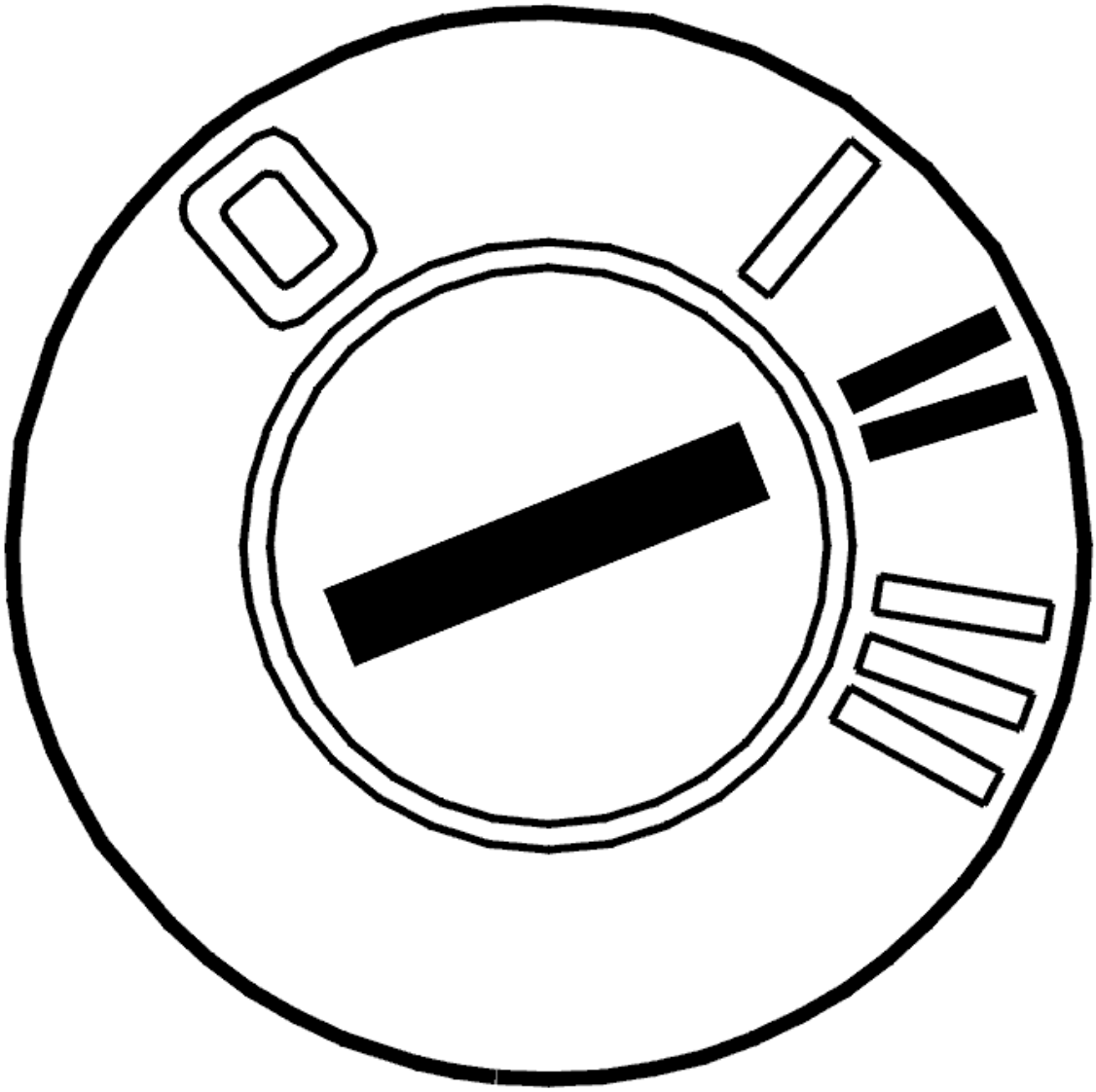


Fig. 310: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

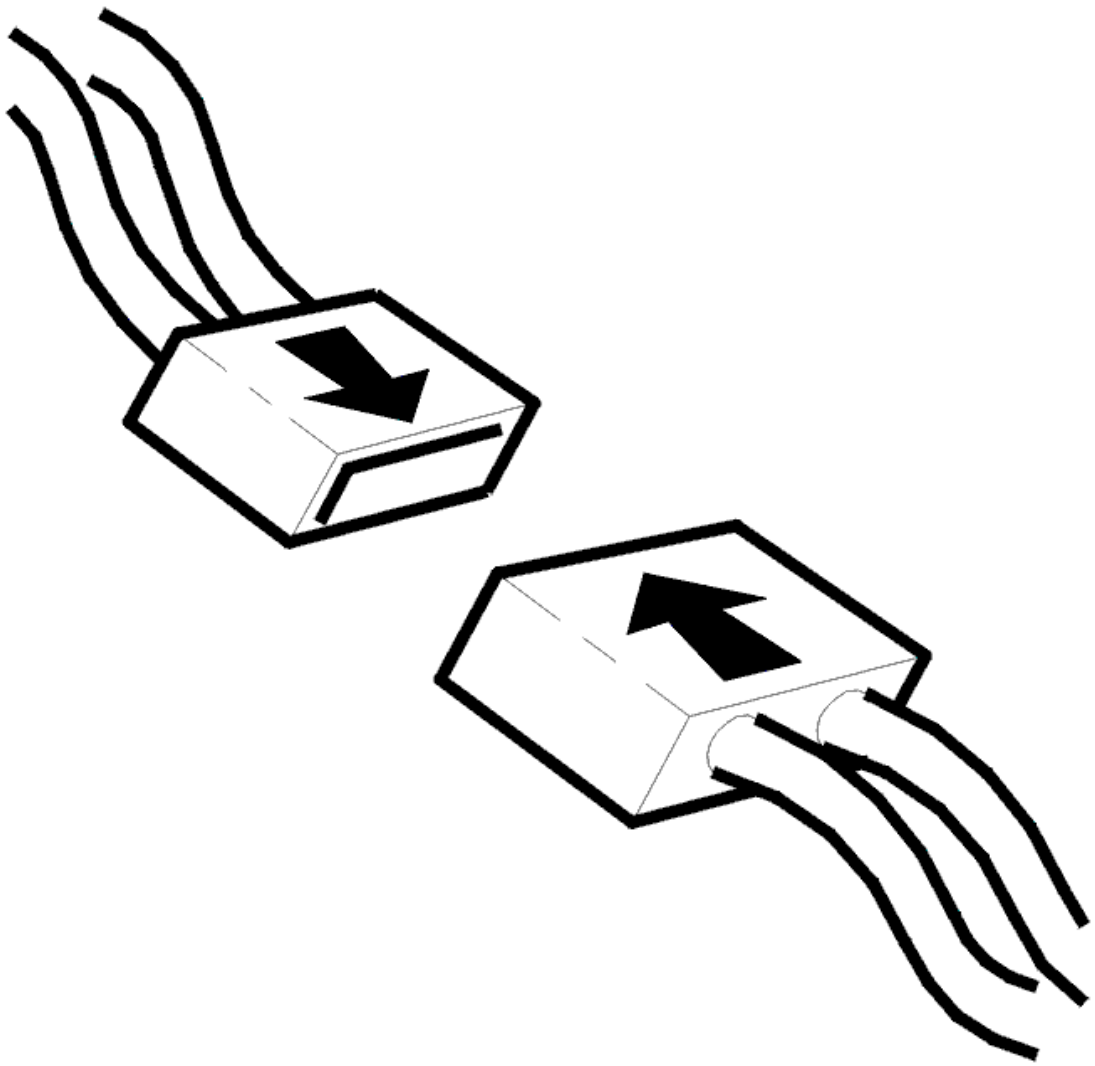


Fig. 311: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Gear selector in position P.
- Check whether communication with the gear selector module (GSM) works by reading off the winter mode selector (W) status.

  Connect and disconnect the function by pressing the switch. The status should change.

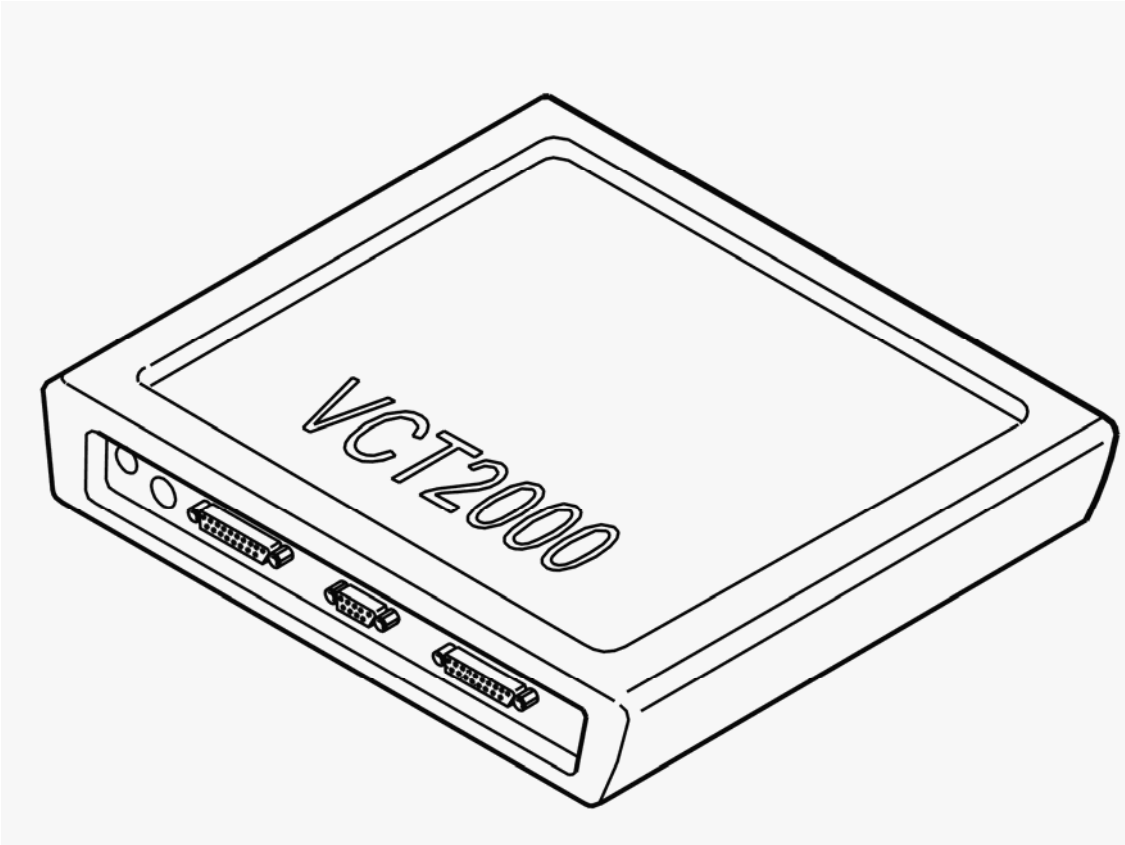


Fig. 312: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the status change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P086012: TRANSMISSION CONTROL MODULE A COMMUNICATION CIRCUIT. GENERAL ELECTRICAL FAULT. SHORT CIRCUIT TO VOLTAGE

(TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086012

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086012**

FAULT TRACING TCM-P086012

see **FAULT TRACING TCM-P086012**

TCM-P086013: GEAR SHIFT MODULE A COMMUNICATION CIRCUIT. GENERAL ELECTRICAL FAILURES. CIRCUIT OPEN (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086013

Condition

The transmission control module (TCM) and gear selector module (GSM) communicate with each other in a network via standardized serial communication - local interconnect network (LIN). The control modules transmit and receive information.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- No signal from the Gear selector module (GSM).

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

Fig. 313: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Manual gear shift position (+/-) function is blocked.

Possible Source

- Contact resistance and oxidation in the terminals.
- Open circuit on the lead for the power supply or the ground lead to the gear selector module (GSM).
- Internal fault in gear selector module (GSM).

Fault symptom[s]

- General warning lamp lit
- Gear selector indicator does not function

FAULT-TRACING

CHECKING COMMUNICATION WITH THE GEAR SELECTOR MODULE (GSM)

Fig. 314: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

- Read off the position of the gear selector.
- Depress the brake pedal. Move the gear selector to the position for manual shifting and check that the status changes.
- Then move the gearshift selector toward both + and -, and check that the value has been updated in the driver information module's display window.

  If the value is updated in the driver information module display, the fault is intermittent. That is to say, it occurred earlier but is not active right now.

Fig. 315: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Fig. 316: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

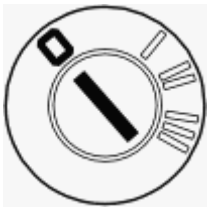


Fig. 317: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check connector (16 pin) for the transmission control module (TCM) and gear selector module (GSM). Check for contact resistance and oxidation.

  Check the communication cable (LIN) for open circuit.

  Take readings between:

  - Transmission control module (TCM) terminal #A7 and gear selector module (GSM) terminal #2.

  Check for open circuit.

  Take readings between:

  - Transmission control module (TCM) terminal #A16 and gear selector module (GSM) terminal #1.

  HINT: The gear selector module (GSM) is supplied power from the transmission control module (TCM).

  Check the ground lead. Check for an open-circuit.

  Take readings between:

  - Gear selector module (GSM) terminal #6 and the ground connection.

  If no fault can be found, replace the gear selector module (GSM).

  Other information

  - see **CONNECTING THE BREAKOUT BOX**
  - see **SIGNAL SPECIFICATION**
  - see **CHECKING WIRING AND TERMINALS**
  - For access to connector:**TOP PANEL GEARTRONIC, REPLACING**
  - For access to connector:**TRANSMISSION CONTROL MODULE (TCM)**

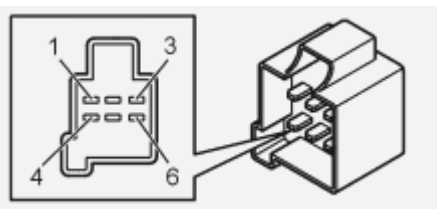


Fig. 318: Identifying Connector Terminals

Courtesy of VOLVO CARS CORPORATION

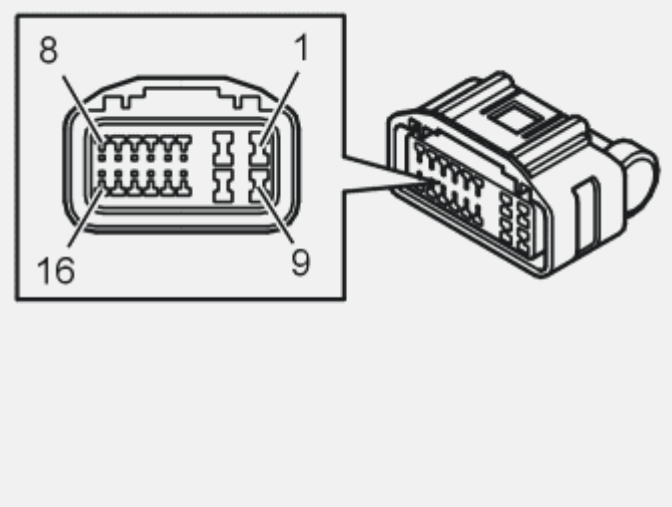


Fig. 319: Identifying Connector A Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 320: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

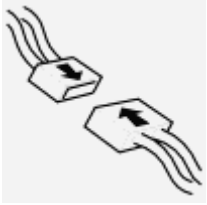


Fig. 321: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

- Reinstall the connectors, components etc.
- Ignition on.
- Read off the position of the gear selector.
- Depress the brake pedal. Move the gear selector to the position for manual shifting and check that the status changes.
- Then move the gearshift selector toward both + and -, and check that the value has been updated in the driver information module's display window.

Fig. 322: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Fig. 323: Identifying Geartronic Operation
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P086013: GEAR SHIFT MODULE A COMMUNICATION CIRCUIT. GENERAL ELECTRICAL FAILURES. CIRCUIT OPEN (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086013

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086013**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P086013: SHIFTING CONTROL MODULE A COMMUNICATION CIRCUIT. GENERAL ELECTRICAL MALFUNCTION. OPEN CIRCUIT (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086013

Condition

Fig. 324: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) and the gear selector module (GSM) communicate with each other over a network via a standardized serial communication protocol, Local Interconnect Network (LIN), to exchange information. The control modules both send and receive information.

If the transmission control module (TCM) registers that the signal from the gear selector module (GSM) is incorrect, the diagnostic trouble code is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Manual gearchange "**Man** " function block.
- The winter program "**W** " function blocked.

Possible Source

- The communication lead between the gear selector module (GSM) and the transmission control module (TCM) short-circuited to voltage or ground.

Fault symptom[s]

- General warning lamp lit
- Gear selector indicator not working.

FAULT TRACING TCM-P086013

CHECKING COMMUNICATION WITH THE GEAR SELECTOR (GSM)

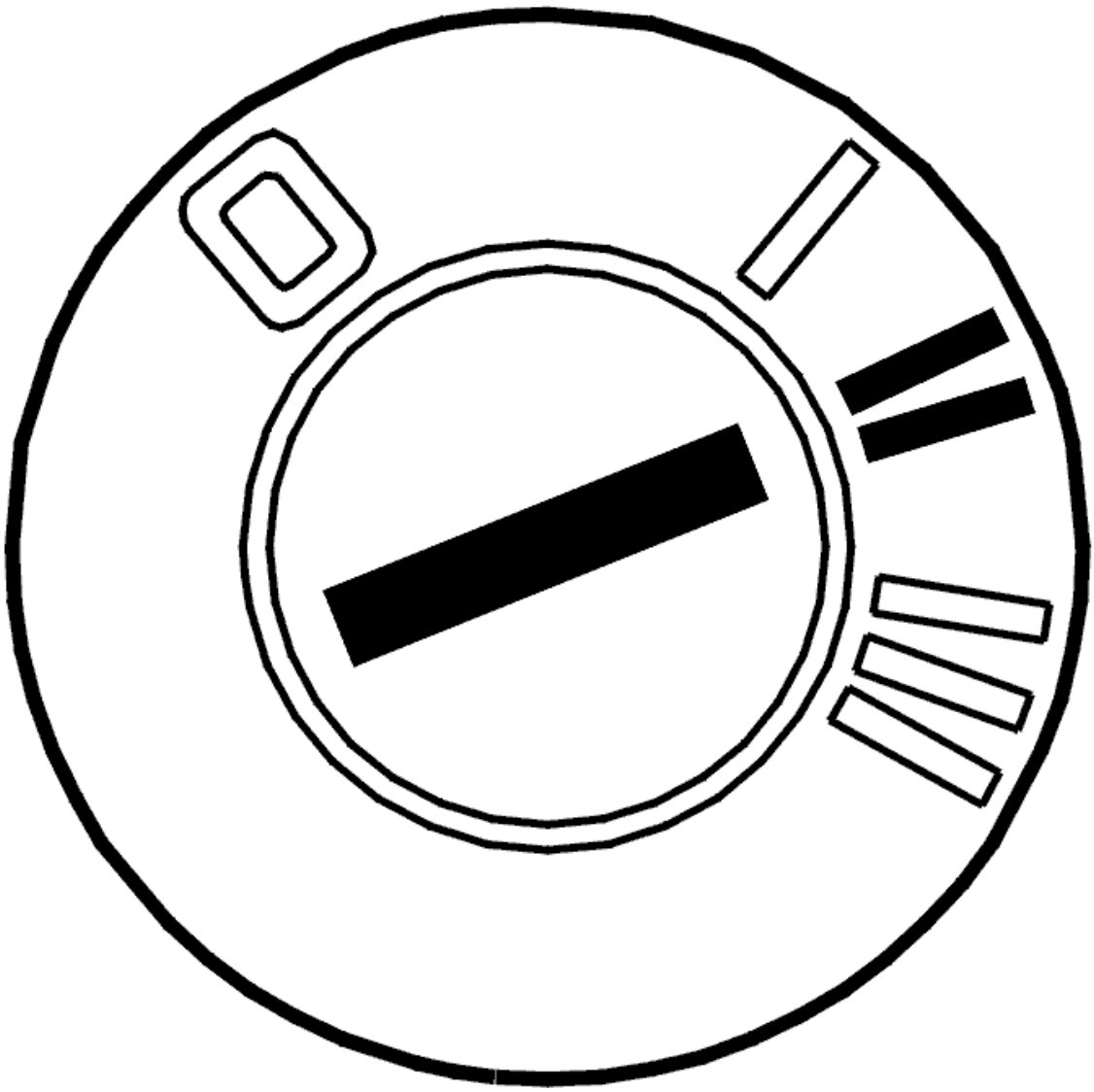


Fig. 325: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Check if communication with the gear selector module (GSM) functions by reading the status for the Winter program selector (**W**).
- Activate and deactivate the function by pressing the switch. The status must change.

The fault is permanent if the value does not change.

If the status switches it means that the fault was present previously but is not active now. There is an intermittent fault.

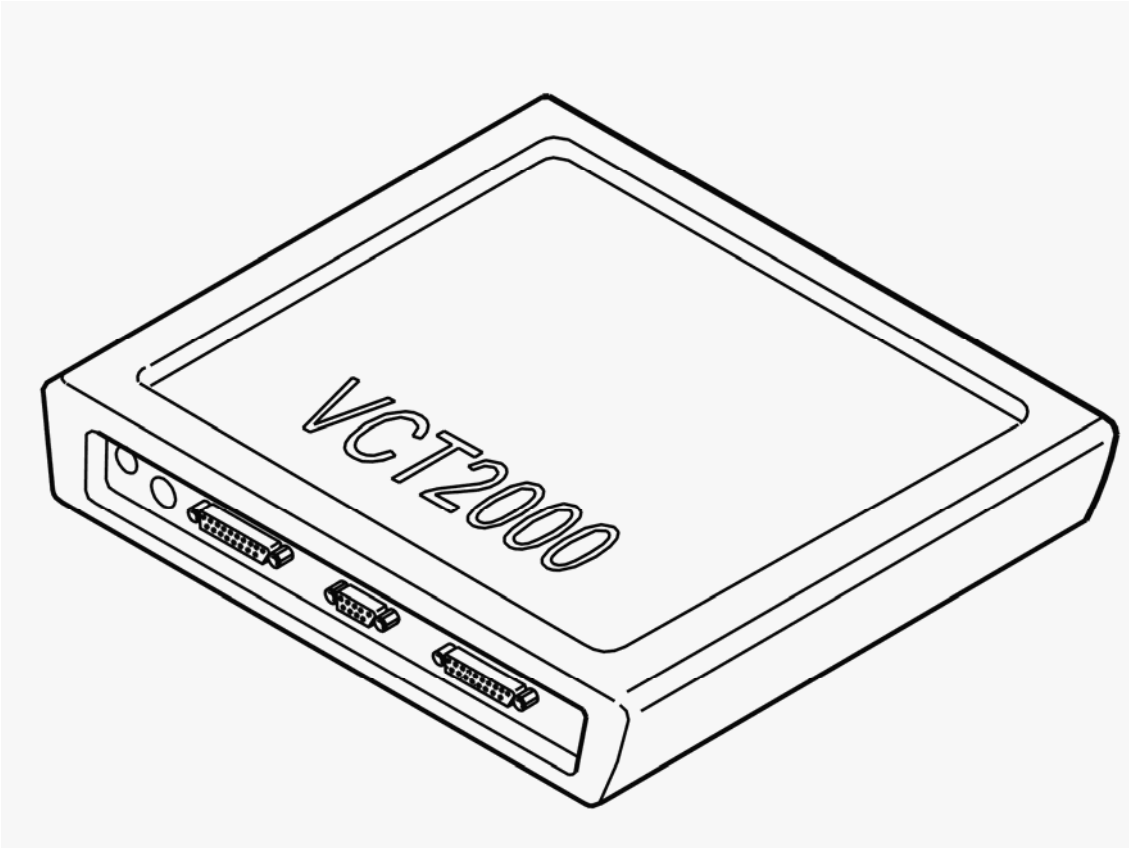


Fig. 326: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Fig. 327: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

Check the communication cable (LIN) between transmission control module (TCM) #A7 and gear selector module (GSM) #2 for open circuit and short-circuit to ground or voltage.

If no fault can be found in the cable and the fault remains try replacing the printed circuit board (gear selector module (GSM).

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- For access to connector: **TOP PANEL GEARTRONIC, REPLACING**
- see **CONTENTS**

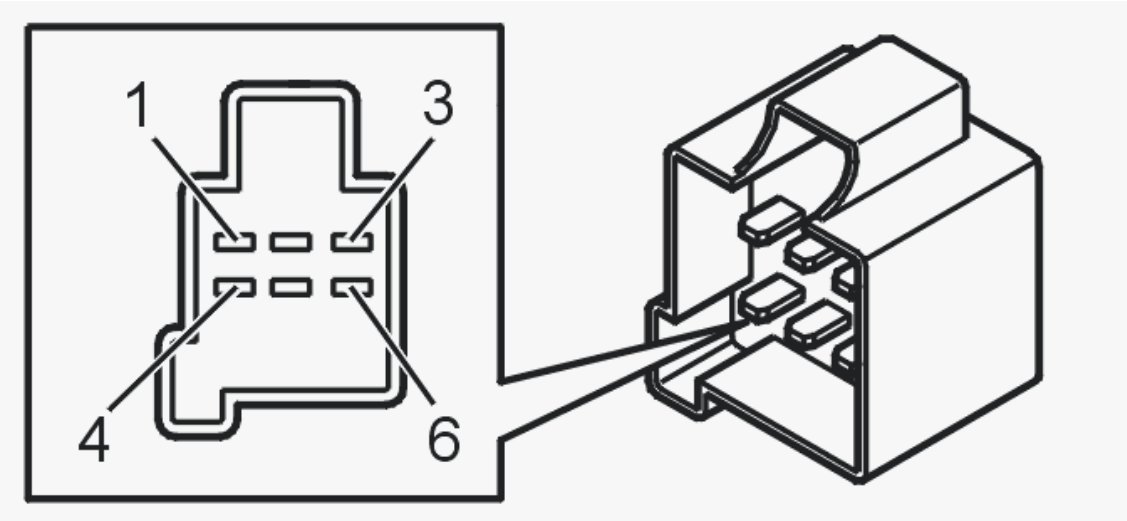


Fig. 328: Identifying Transmission Control Module (TCM) Connector Terminals
Courtesy of VOLVO CARS CORPORATION

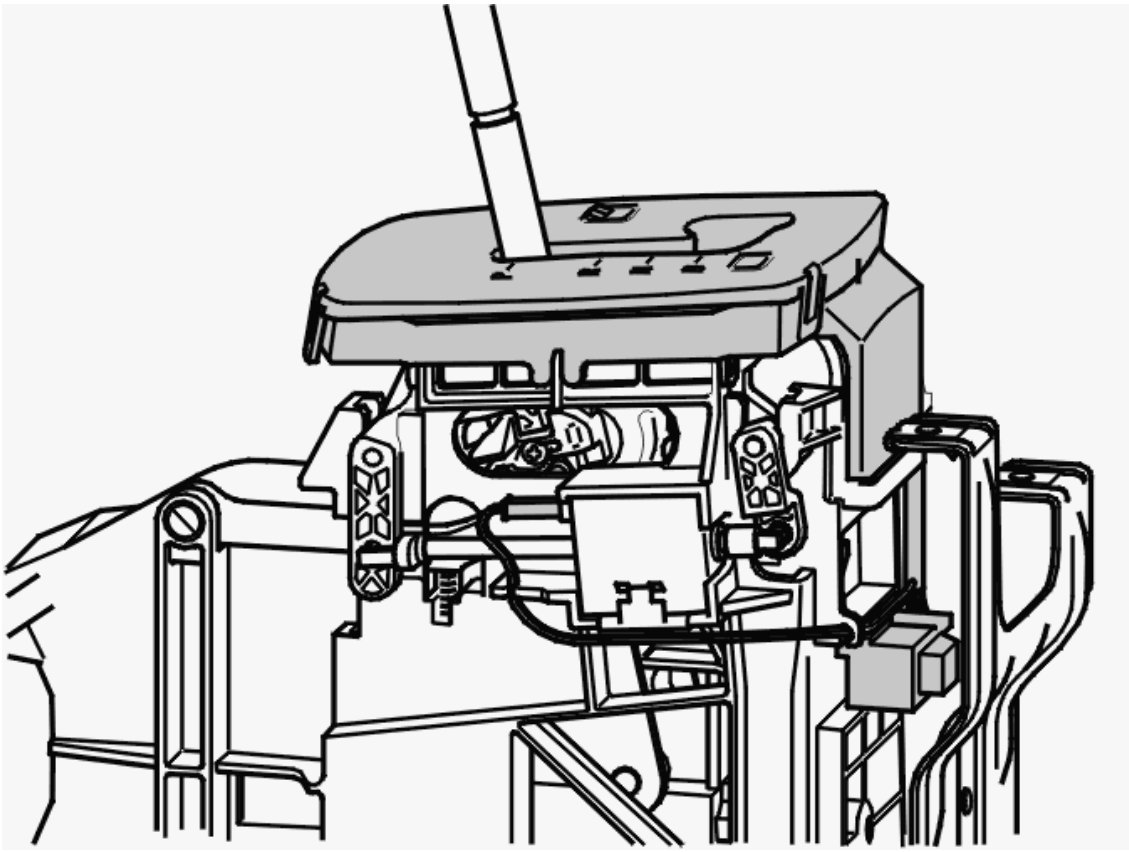


Fig. 329: Identifying Gear Selector Module (GSM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

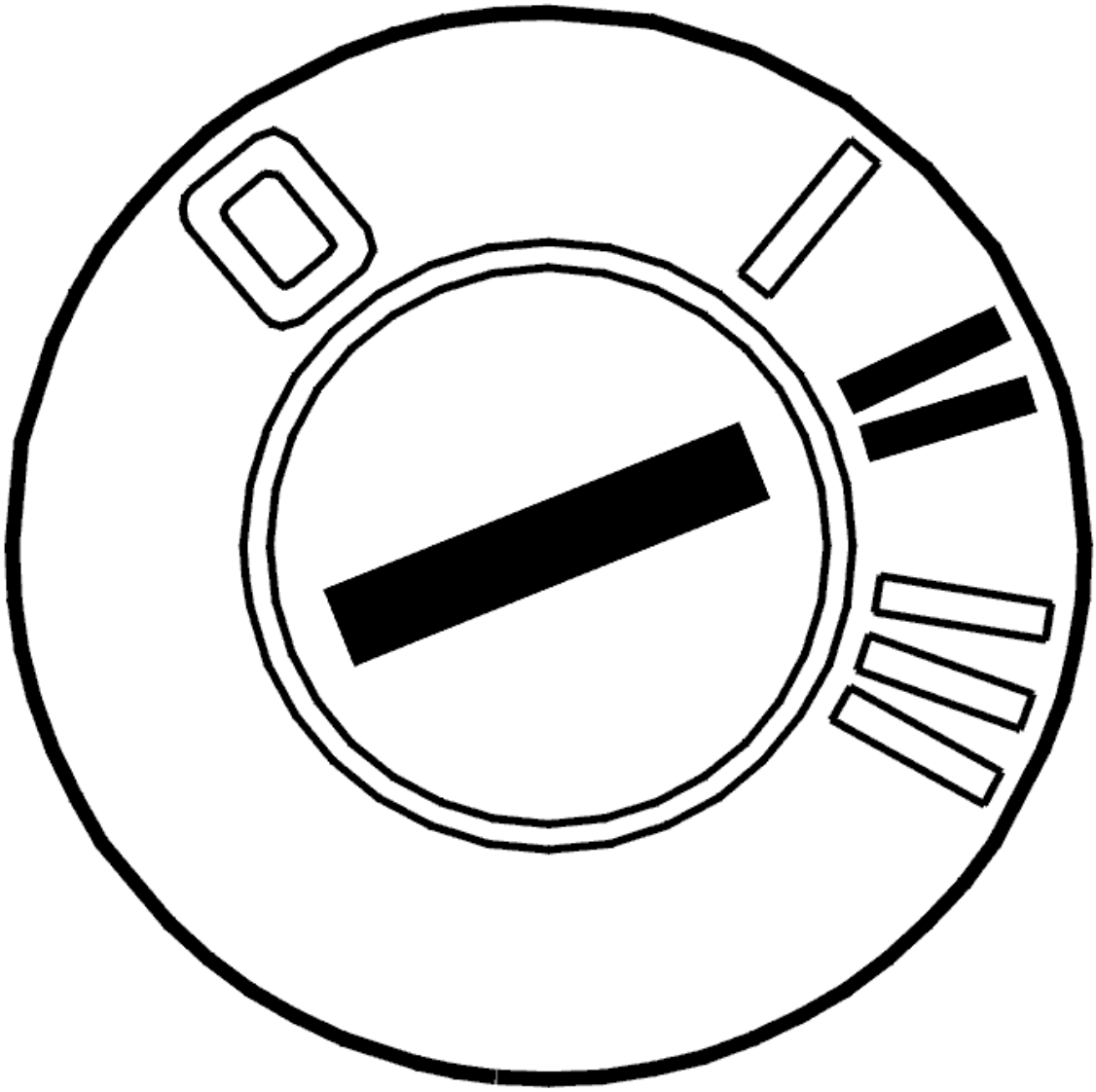


Fig. 330: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

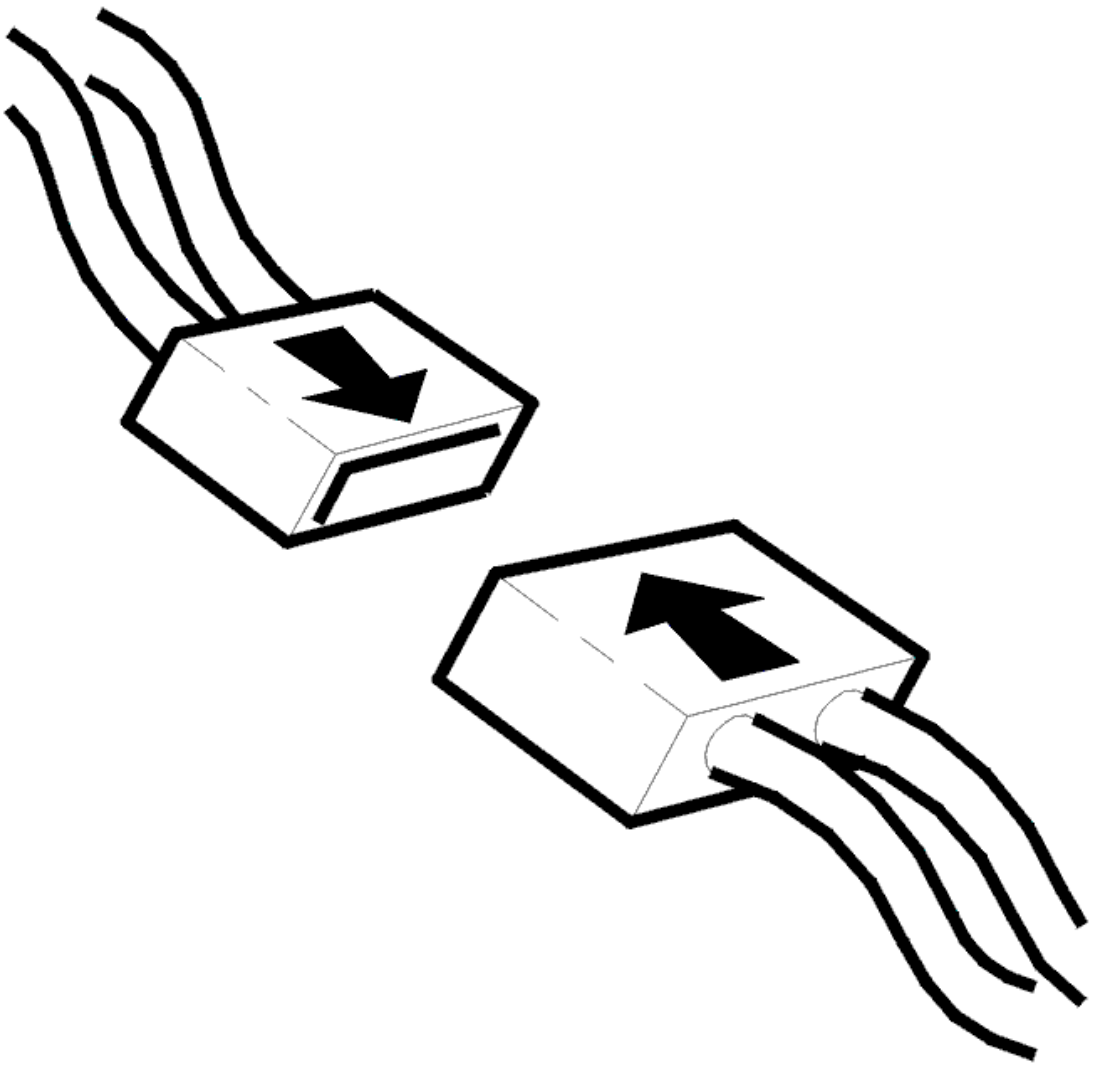


Fig. 331: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Gear selector in position P.
- Check whether communication with the gear selector module (GSM) works by reading off the winter mode selector (W) status.

  Connect and disconnect the function by pressing the switch. The status should change.

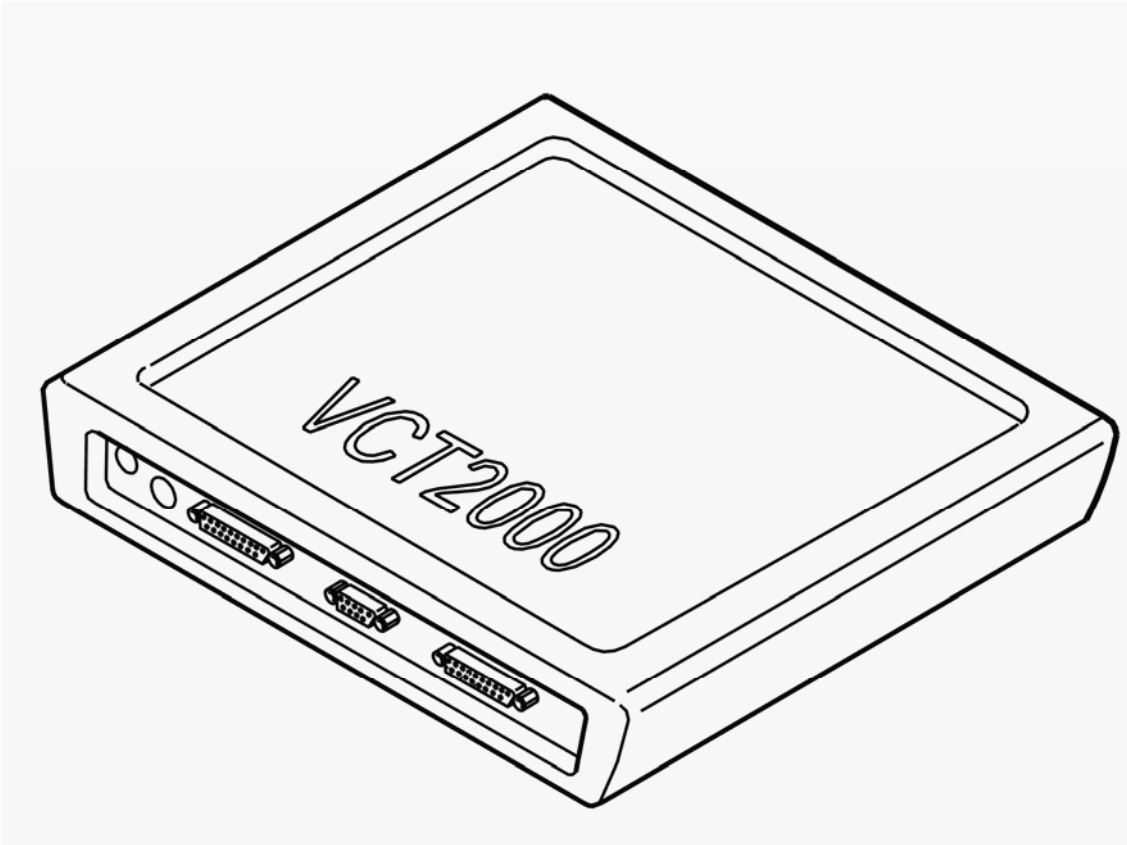


Fig. 332: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the status change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P086013: SHIFTING CONTROL MODULE A COMMUNICATION CIRCUIT. GENERAL ELECTRICAL MALFUNCTION. OPEN CIRCUIT (TF-

80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086013

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086013**

FAULT TRACING TCM-P086013

see **FAULT TRACING TCM-P086013**

TCM-P086087: GEAR SHIFT MODULE A COMMUNICATION CIRCUIT. BUS SIGNAL / MESSAGE FAILURES. MISSING MESSAGE (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086087

Condition

The transmission control module (TCM) and gear selector module (GSM) communicate with each other in a network via standardized serial communication - local interconnect network (LIN). The control modules transmit and receive information.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- No signal from the Gear selector module (GSM).

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

Fig. 333: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Manual gear shift position (+/-) function is blocked.

Possible Source

- Open-circuit in the communication cable.
- Internal fault in gear selector module (GSM).

Fault symptom[s]

- General warning lamp lit
- Gear selector indicator does not function

FAULT-TRACING

CHECKING COMMUNICATION WITH THE GEAR SELECTOR MODULE (GSM)

Fig. 334: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the position of the gear selector.

- Depress the brake pedal. Move the gear selector to the position for manual shifting and check that the status changes.
- Then move the gearshift selector toward both + and -, and check that the value has been updated in the driver information module's display window.

  If the value is updated in the driver information module display, the fault is intermittent. That is to say, it occurred earlier but is not active right now.

Fig. 335: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Fig. 336: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

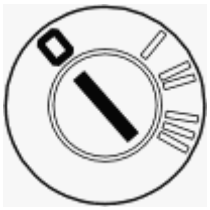


Fig. 337: Identifying Ignition OFF

Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Remove the gear selector connector.

Check the communication cable (LIN) for open circuit.

Take readings between:

- Transmission control module (TCM) terminal #A7 and gear selector module (GSM) terminal #2.

If no fault can be found, replace the gear selector module (GSM).

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **CHECKING WIRING AND TERMINALS**
- For access to connector:**TOP PANEL GEARTRONIC, REPLACING**
- For access to connector:**TRANSMISSION CONTROL MODULE (TCM)**
- see **TOP PANEL GEARTRONIC, REPLACING**

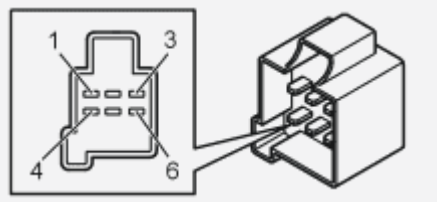


Fig. 338: Identifying Connector Terminals
Courtesy of VOLVO CARS CORPORATION

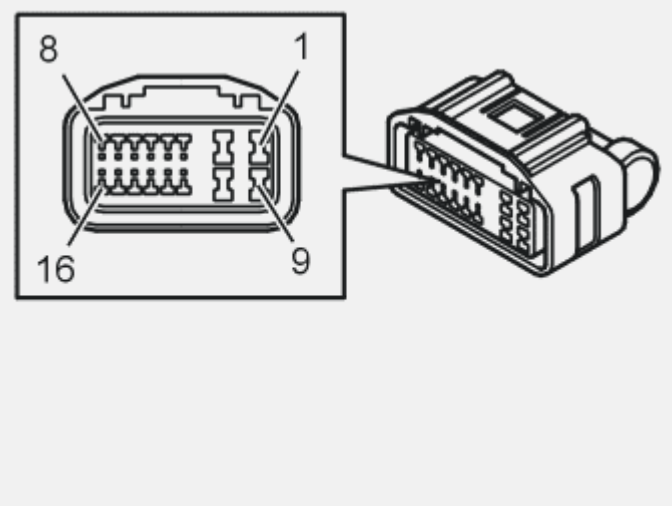


Fig. 339: Identifying Connector A Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 340: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

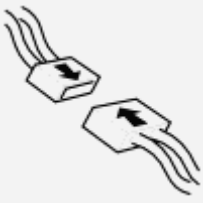


Fig. 341: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the position of the gear selector.
- Depress the brake pedal. Move the gear selector to the position for manual shifting and check that the status changes.
- Then move the gearshift selector toward both + and -, and check that the value has been updated in the driver information module's display window.

Fig. 342: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

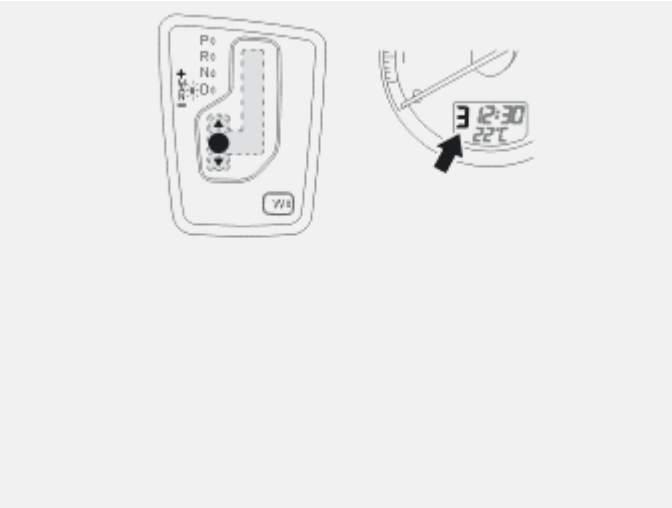


Fig. 343: Identifying Geartronic Operation
Courtesy of VOLVO CARS CORPORATION

Does the value change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P086087: GEAR SHIFT MODULE A COMMUNICATION CIRCUIT. BUS SIGNAL / MESSAGE FAILURES. MISSING MESSAGE (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086087

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P086087**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P086087: TRANSMISSION CONTROL MODULE A COMMUNICATION CIRCUIT. BUS/MESSAGE ERROR. MESSAGE MISSING (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-086087

Condition

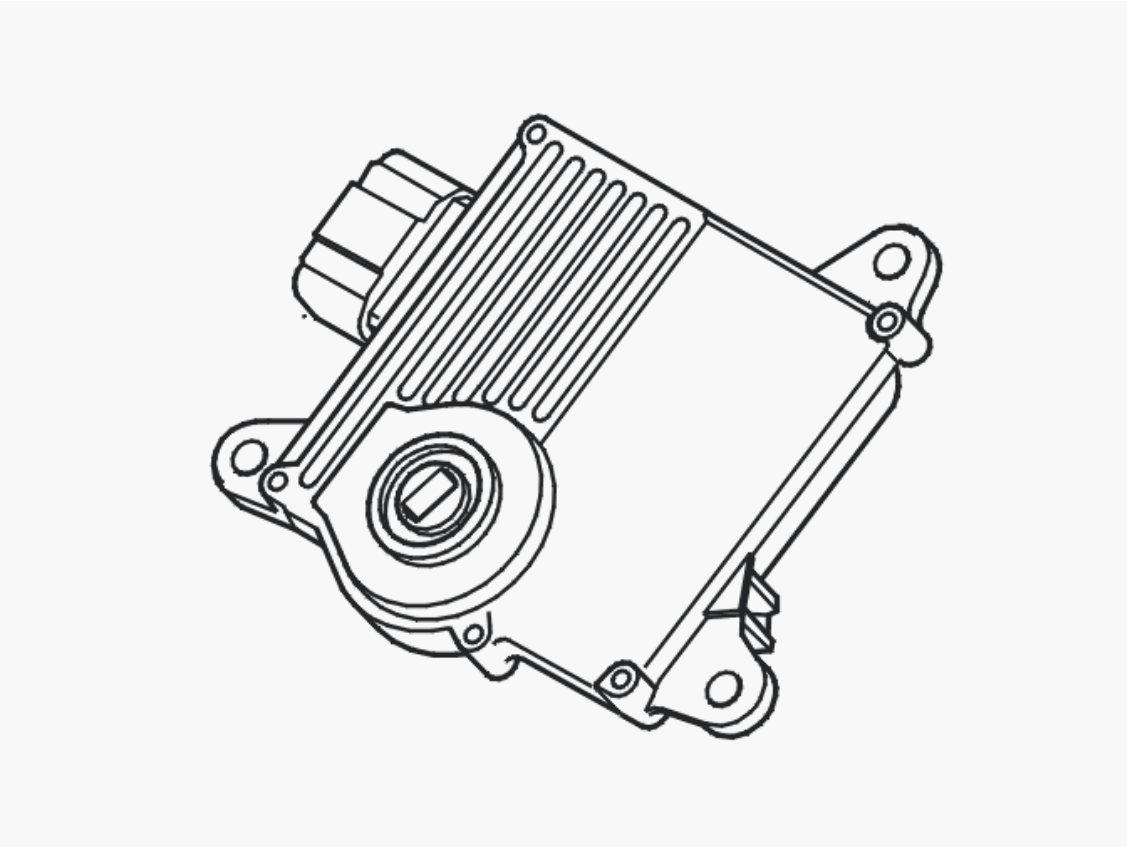


Fig. 344: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) and the gear selector module (GSM) communicate with each other over a network via a standardized serial communication protocol, Local Interconnect Network (LIN), to exchange information. The control modules both send and receive information.

If the transmission control module (TCM) registers that the signal from the gear selector module (GSM) is missing, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Manual gearchange "**Man** " function block.

- The winter program "**W** " function blocked.

Possible Source

- Contact resistance or oxidation on connections
- Open circuit on the communication lead (LIN) between the gear selector module (GSM) and the transmission control module (TCM).
- Open circuit on the lead for the power supply or the ground lead to the gear selector module (GSM).
- Internal fault in gear selector module (GSM).

Fault symptom[s]

- General warning lamp lit
- Gear selector indicator not working.

FAULT TRACING TCM-P086087

CHECKING COMMUNICATION WITH THE GEAR SELECTOR MODULE (GSM)

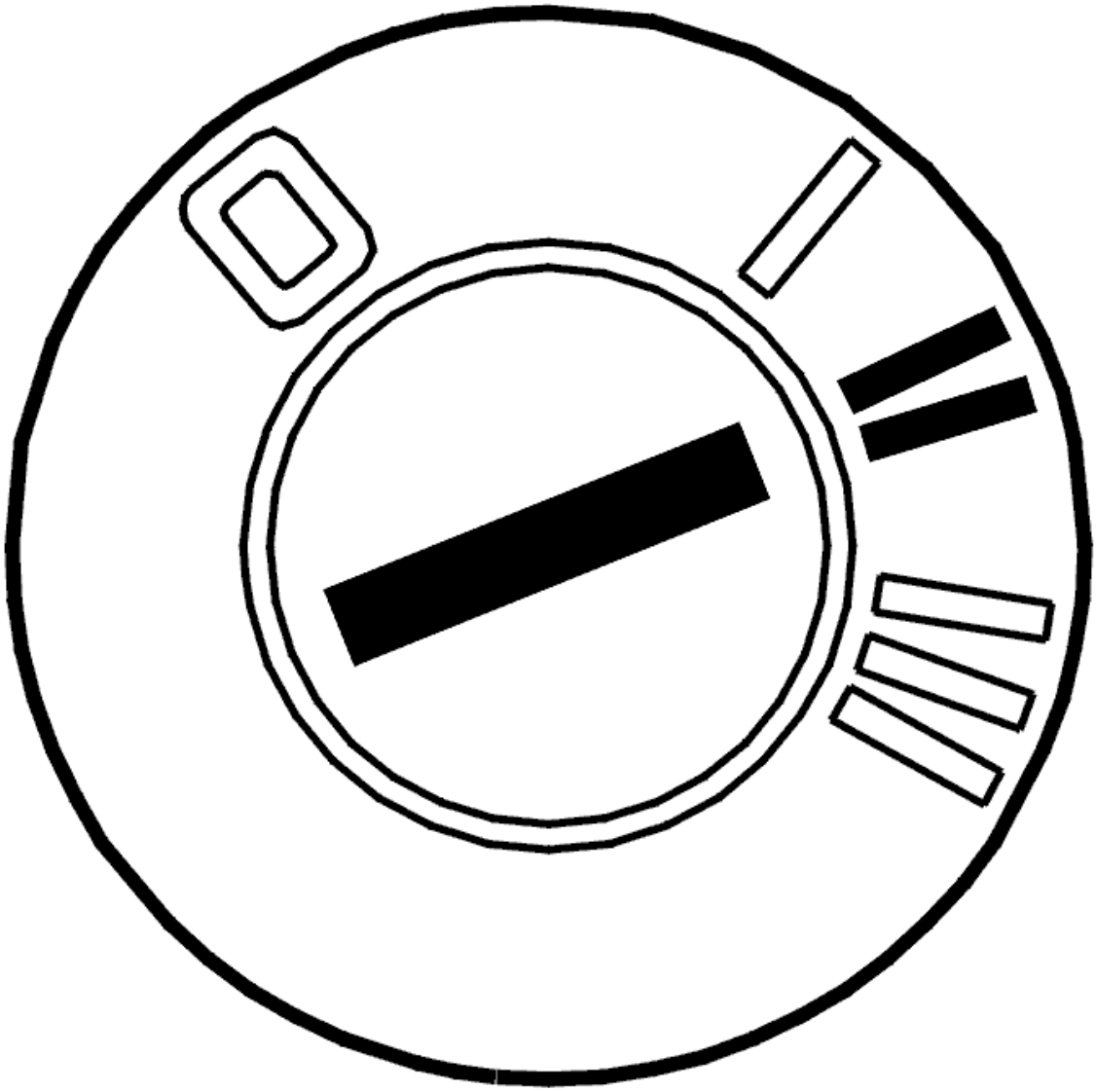


Fig. 345: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P
- Check if communication with the gear selector module (GSM) functions by reading the status for the Winter program selector (**W**).
- Activate and deactivate the function by pressing the switch. The status must change.

  The fault is permanent if the value does not change.

  If the status switches it means that the fault was present previously but is not active now. There is an intermittent fault.

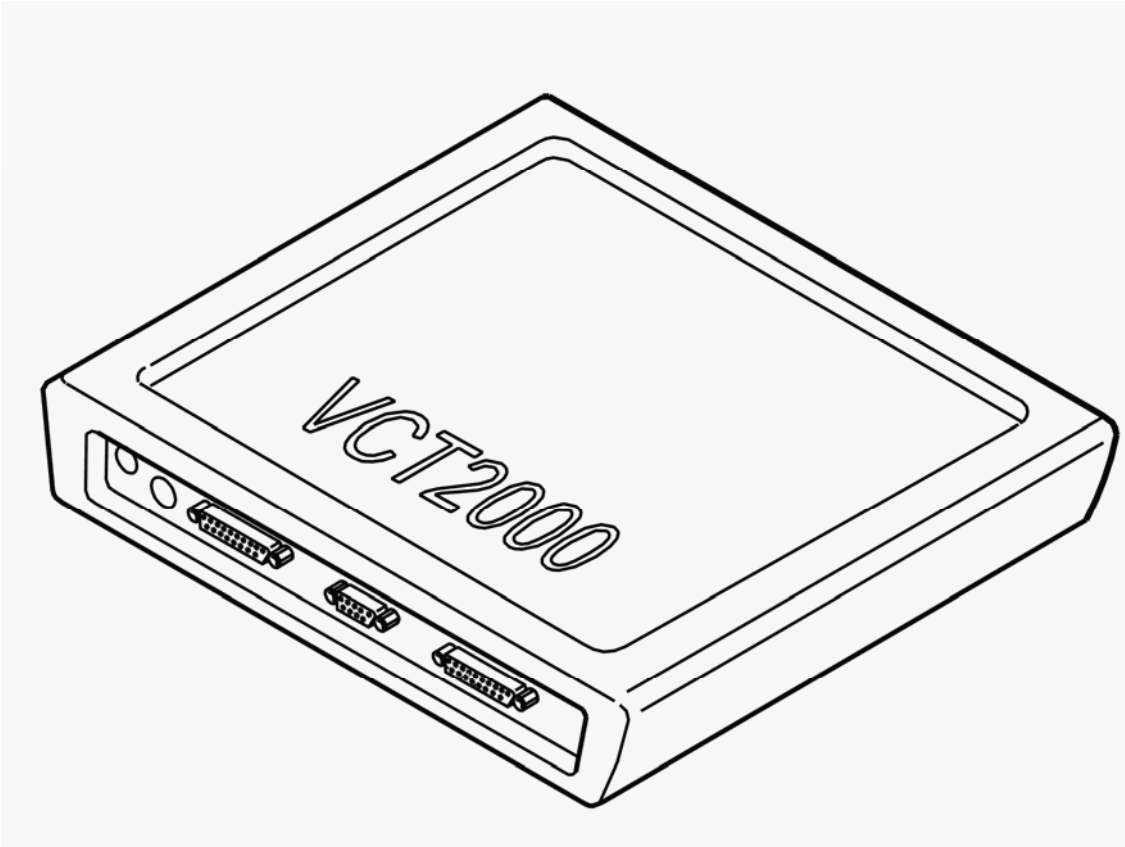


Fig. 346: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Fig. 347: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

Check connector (16 pin) for the transmission control module (TCM) and gear selector module (GSM). Check for contact resistance and oxidation.

Check the communication cable (LIN) between the transmission control module (TCM) terminal #A7 and gear selector module (GSM) terminal #2. Check for an open-circuit.

Check the voltage supply cable between the transmission control module (TCM) terminal #A16 and the gear selector model (GSM) terminal #1. Check for an open circuit.

HINT: The gear selector module (GSM) is supplied with power by the transmission control module (TCM).

Check the ground cable between the gear selector module (GSM) terminal #6 and ground. Check for an open circuit. Check the ground terminal for the ground cable.

If no fault can be found in the cable and the fault remains try replacing the printed circuit board (gear selector module (GSM).

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- To access the connector/replace the printed circuit board:**TOP PANEL GEARTRONIC, REPLACING**
- see **CONTENTS**

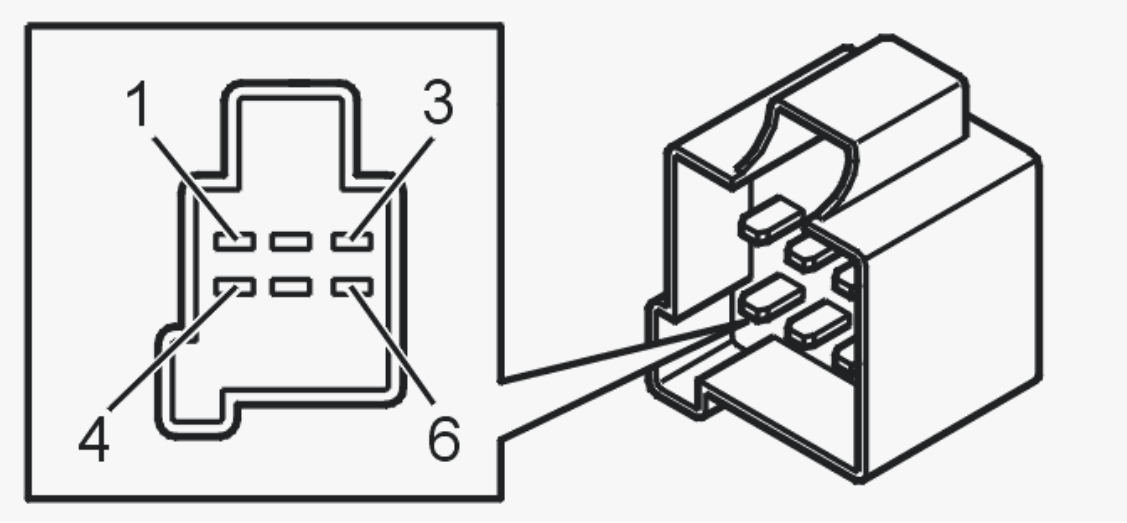


Fig. 348: Identifying Transmission Control Module (TCM) Connector Terminals
Courtesy of VOLVO CARS CORPORATION

Fig. 349: Identifying Automatic Transmission Gear Shifter With Manual Gear Changer
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

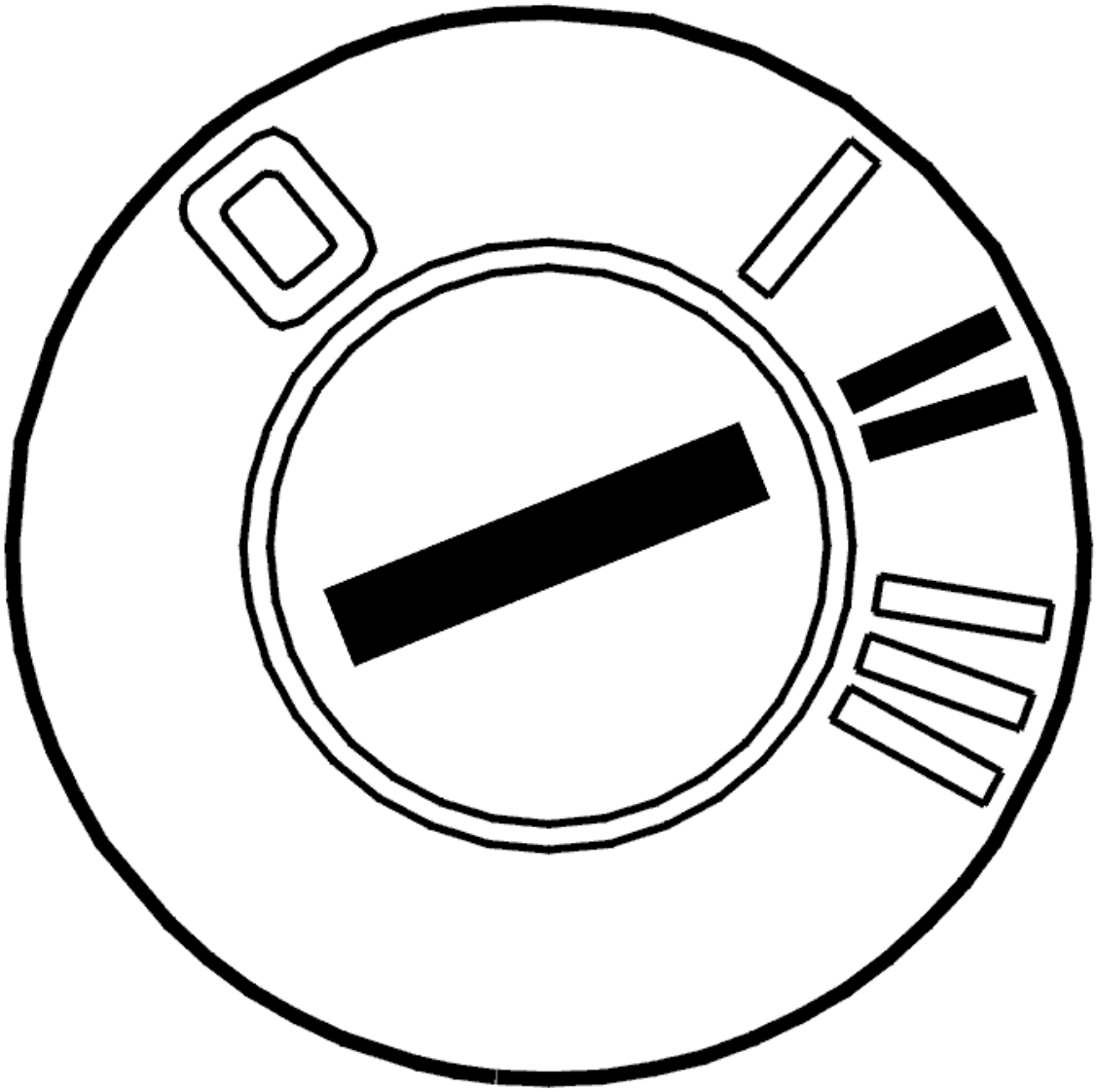


Fig. 350: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

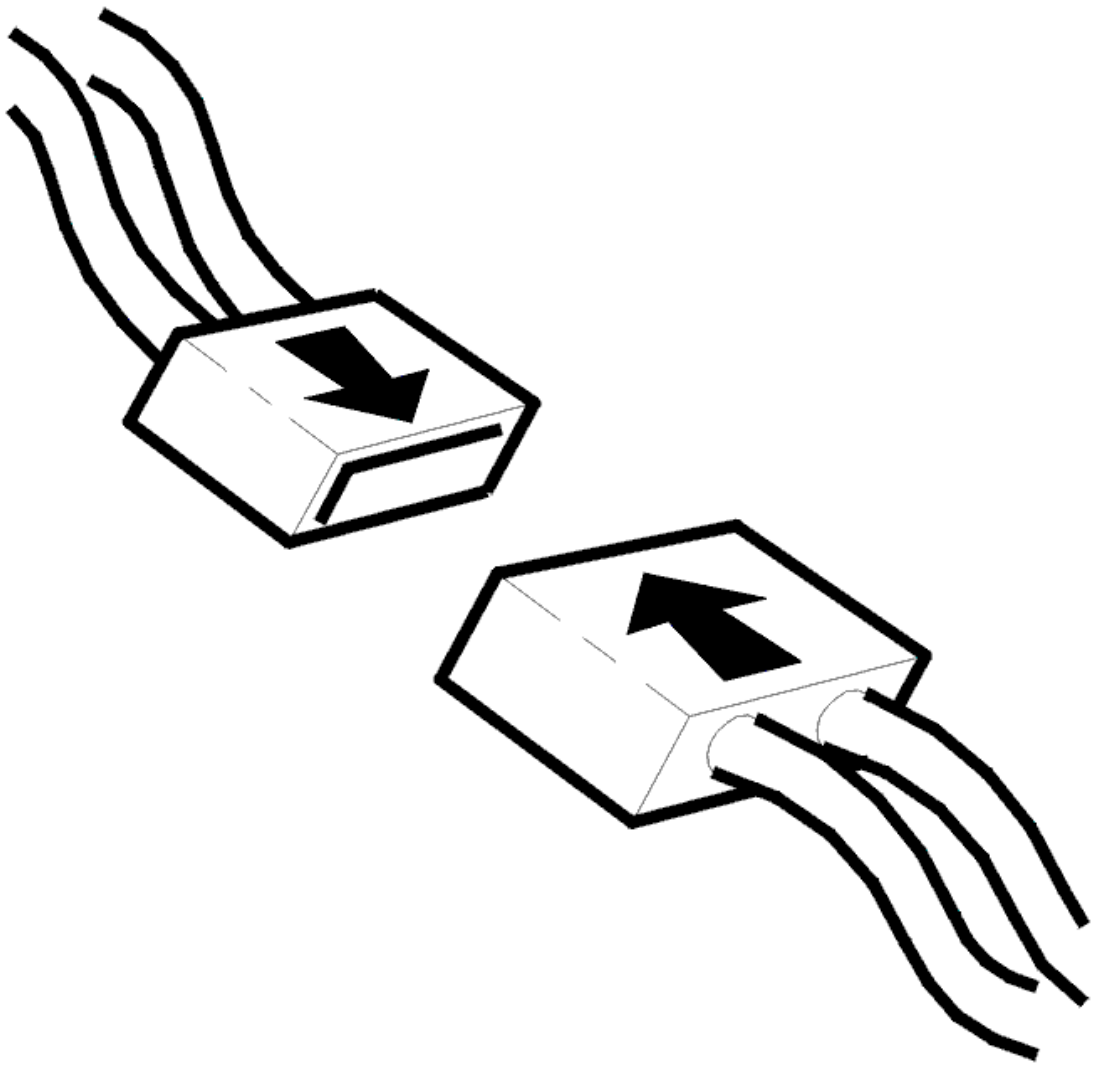


Fig. 351: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Gear selector in position P.
- Check whether communication with the gear selector module (GSM) works by reading off the winter mode selector (W) status.

  Connect and disconnect the function by pressing the switch. The status should change.

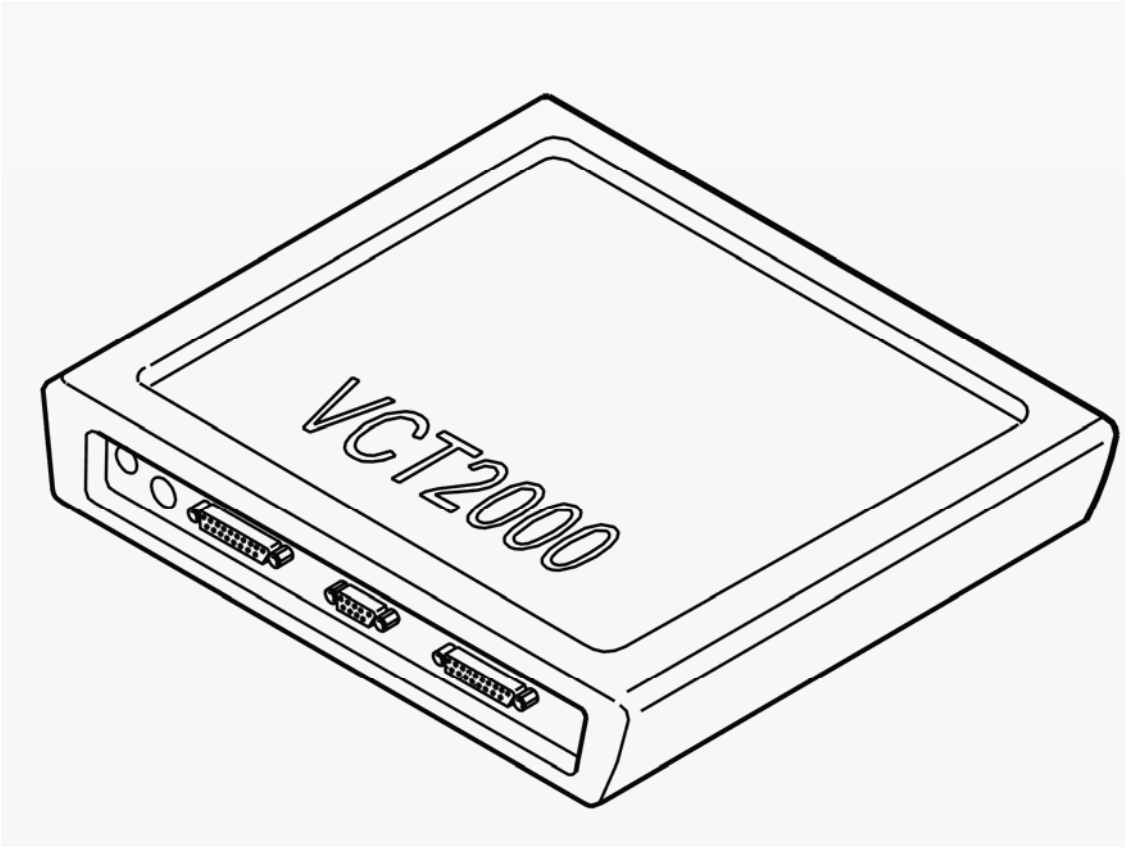


Fig. 352: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the status change?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TRANSMISSION

Transmission - Diagnostic Trouble Codes and Associated Procedures

TCM-P086087: TRANSMISSION CONTROL MODULE A COMMUNICATION CIRCUIT. BUS/MESSAGE ERROR. MESSAGE MISSING (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-086087

Condition

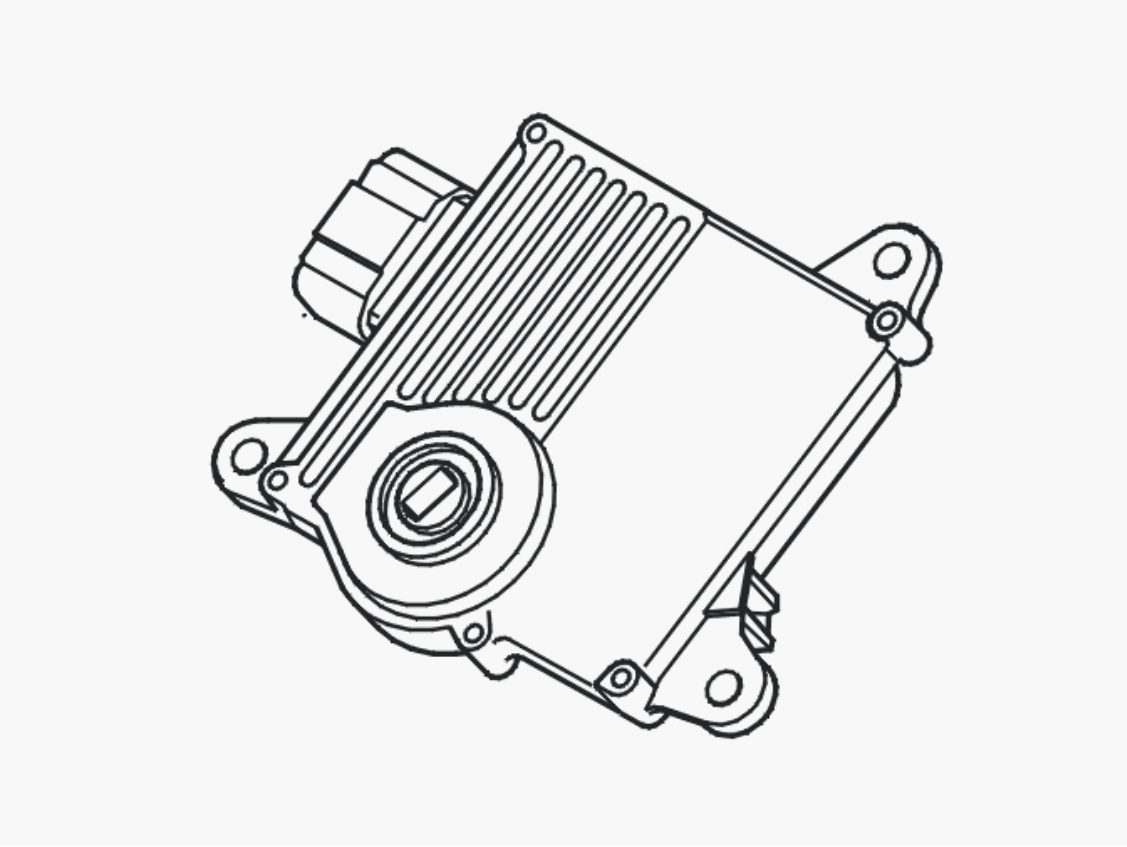


Fig. 1: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The transmission control module (TCM) and the gear selector module (GSM) communicate with each other over a network via a standardized serial communication protocol, Local Interconnect Network (LIN), to exchange information. The control modules both send and receive information.

If the transmission control module (TCM) registers that the signal from the gear selector module (GSM) is missing, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Manual gearchange "**Man** " function block.
- The winter program "**W** " function blocked.

Possible Source

- Contact resistance or oxidation on connections
- Open circuit on the communication lead (LIN) between the gear selector module (GSM) and the transmission control module (TCM).
- Open circuit on the lead for the power supply or the ground lead to the gear selector module (GSM).
- Internal fault in gear selector module (GSM).

Fault symptom[s]

- General warning lamp lit
- Gear selector indicator not working.

FAULT TRACING TCM-P086087

see **FAULT TRACING TCM-P086087**

TCM-P089500: SHIFT TIME TOO SHORT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089500

Condition

Transmission shifting and the lock-up function are controlled by the transmission control module (TCM) activating the solenoids in a specific pattern. Shift solenoids S1-S2 are activated depending on which gear the control module has chosen. The control module then adjusts how engagement occurs by controlling the hydraulic pressure linearly via linear solenoids SLT, SLU, SLC1, SLC2, SLC3 and SLB1. The basic parameters for the various gear shifting points are the position of the accelerator pedal (AP) and the vehicle speed, while the shifting quality is determined with the aid of the torque control. By reading off the changes in engine speed (RPM) on the transmission input shaft during the shifting process and comparing with the values calculated in the transmission control module (TCM), the pressurization of clutches and brakes can be adapted.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Too little time between shifts.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Normal driving.

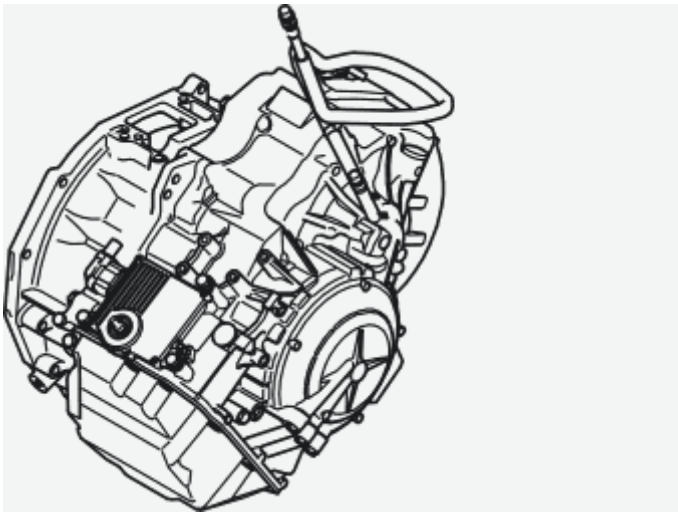


Fig. 2: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Mechanical fault in the transmission.
- Hydraulic fault in the transmission.

Fault symptom[s]

- General warning lamp lit
- Vibration and jerking when shifting
- Rough gear shift
- Abnormal slipping gearshifts

FAULT-TRACING

CHECKS

CHECKING THE DIAGNOSTIC TROUBLE CODES (DTCS)

Any other diagnostic trouble codes for the transmission control module (TCM) must be remedied first because one of them may have caused diagnostic trouble code TCM-089500 or TCM-P089600 to be stored.

Are other diagnostic trouble codes stored?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **FAULT-TRACING INFORMATION**

CHECKING FOR CONTACT RESISTANCE AND OXIDATION

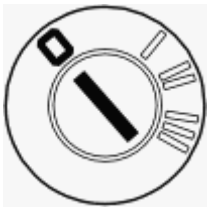


Fig. 3: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Check the connectors of the transmission and the connector for the transmission control module (TCM). Check for contact resistance and oxidation.
- Reconnect the connectors, reinstall components etc.
- Calibrate the gear shift position sensor for the transmission.

  HINT: Select Diagnostics/car communication in VIDA (Volvo scan tool).

- Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check for any clearly audible noises from the transmission. Check for malfunctions.

  Other information

  - To access transmission connectors, see **TRANSMISSION CONTROL MODULE (TCM)**

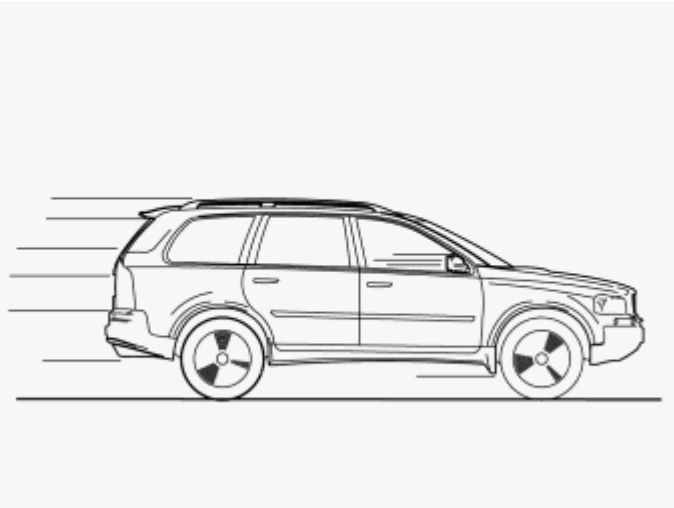


Fig. 4: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the function of the transmission OK?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **REPLACING THE CONTROL SYSTEM**

REPLACING THE CONTROL SYSTEM

Troubleshooting indicates an internal fault in the transmission.

Other information

- see **VALVE HOUSING**
- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed

during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 5: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 6: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 7: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

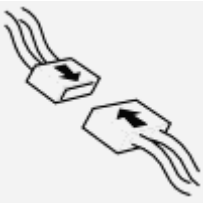


Fig. 8: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- The gear shift position sensor for the transmission must be calibrated if the control module has been disconnected.

  HINT: Select Diagnostics/car communication in VIDA (Volvo scan tool).

- Start the engine.

  Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

  Check that the transmission does not display any **obvious** function faults.

  NOTE: When test driving, the oil temperature must be above 20 °C.

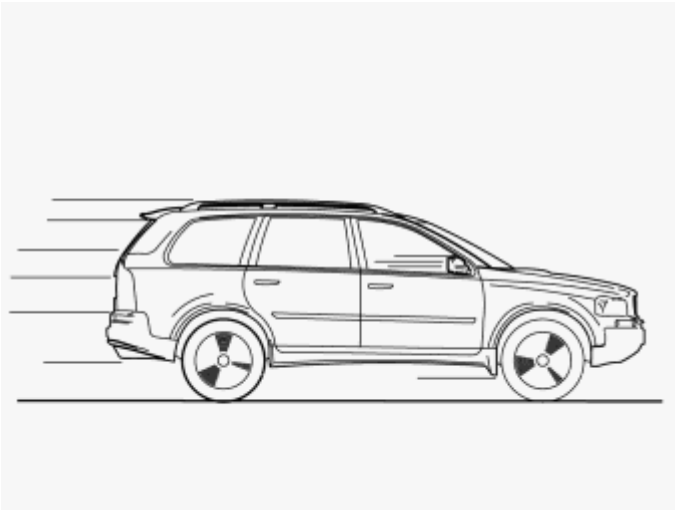


Fig. 9: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

FAULT-TRACING INFORMATION

CHECKING THE GEAR SYSTEM

Problems that the customer may experience are hard shifts or slipping shifts. The following test-drive contains several different driving situations that may provoke these symptoms if the transmission is damaged.

NOTE: It is important that the transmission oil is above 70 °C before the test-drive starts

Test 1

1. Driving at 100 km/h, 6th gear.
2. Perform a kickdown to 4th gear.
3. Let the transmission automatically shift up to 5th gear.
4. Let up the accelerator pedal and let the transmission shift up to 6th gear.

Test 2

1. Driving at 100 km/h, 6th gear.
2. Slight uphill grade, press accelerator pedal until you obtain shifting 6-5, not kickdown.

Test 3

1. Driving at 80 km/h.
2. Move the gear selector to position M and engage 6th gear.
3. Perform a kickdown and shift 6-5, 5-4, 4-3 at the same time.
4. Then upshift immediately to 6th gear.

Test 4

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position R.

2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

Test 5

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position D.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

If the symptoms hard shifts or slipping shifts arise during the test-drive, the transmission's control system must be replaced.

Other information

- see **CONTROL SYSTEMS**

Is the function OK?

- **YES**

  Refer to **CHECKING FOR CONTACT RESISTANCE AND OXIDATION**

- **NO**

  Refer to **REPLACING THE CONTROL SYSTEM**

TCM-P089500: SHIFT TIME TOO SHORT. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089500

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089500**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P089500: GEAR CHANGE TIME TOO SHORT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089500

Condition

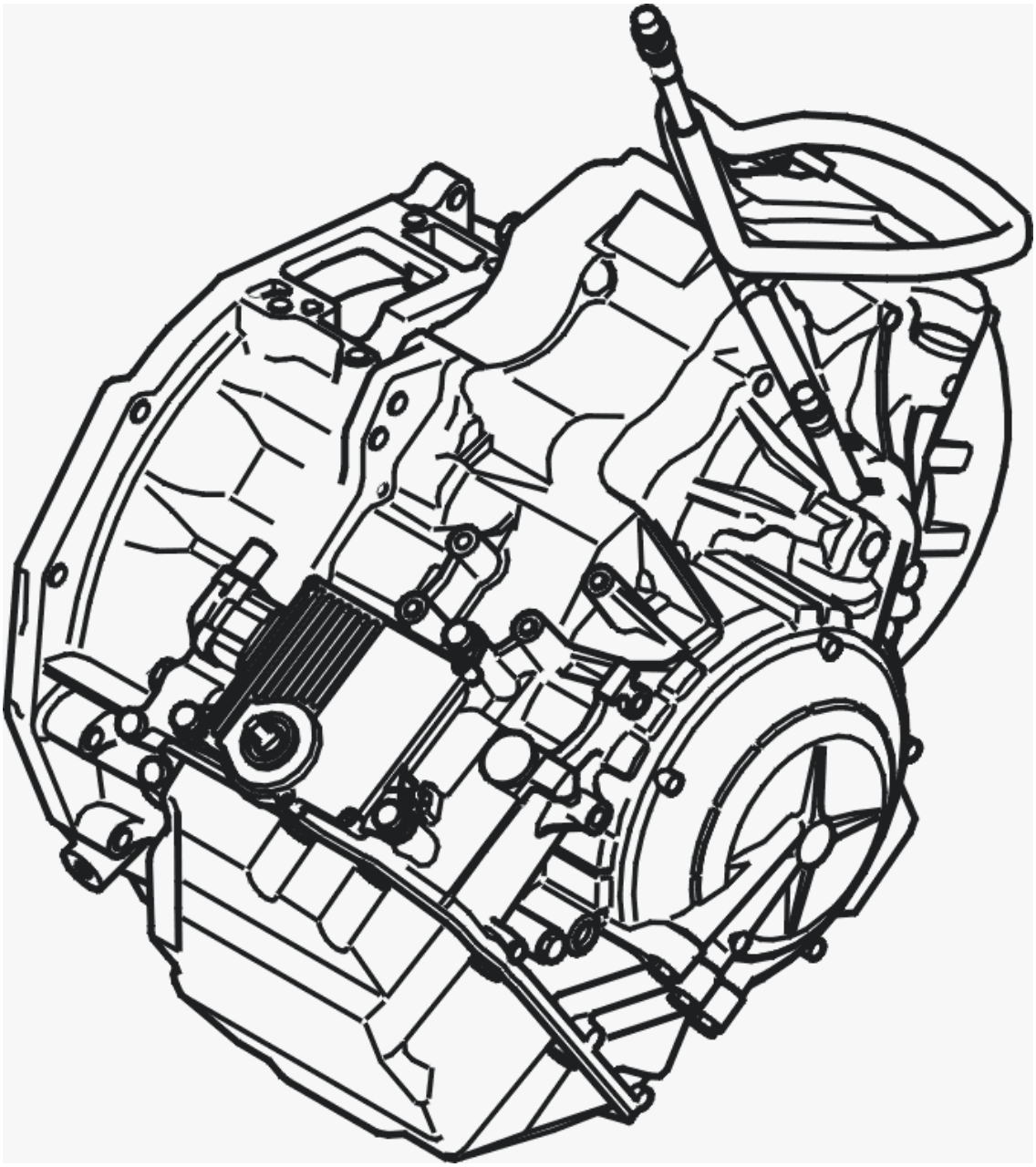


Fig. 10: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

The transmission gear changes and the lock-up function are regulated by the transmission control module (TCM) activating solenoids in specific patterns. Depending on the gear the control module has selected, the shift solenoids S1-S2activated. The control module then adapts the engagement by controlling the hydraulic pressure linearly using the linear solenoids SLT, SLU, SLC1, SLC2, SLC3 and SLB1. The basic parameters for the different shifting points are the accelerator pedal position and the vehicle speed, while the shifting quality is

determined by the torque control. By reading off the changes in gearbox input shafts speed while the gear is being changed and compared with the calculated values in the transmission control module (TCM), the pressure application of the clutches and breaks can be adapted.

If the transmission control module (TCM) registers that the time between gear changes is too short, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code (DTC) can be diagnosed when driving normally.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Mechanical fault in gearbox.
- Hydraulic fault in gearbox.

Fault symptom[s]

- General warning lamp lit
- Vibration or jerkiness when changing gear.
- Harsh gear changing
- Abnormal slipping gearshifts

FAULT TRACING

CHECKS

CHECKING THE DIAGNOSTIC TROUBLE CODES (DTCS)

Any other diagnostic trouble codes (DTCs) for the transmission control module (TCM) must be remedied first because one of them may have caused diagnostic trouble code (DTC) TCM-089500 or TCM-P089600 to be stored.

Were other diagnostic trouble codes (DTCs) stored?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **FAULT-TRACING INFORMATION**

CHECK CONTACT RESISTANCE AND OXIDATION

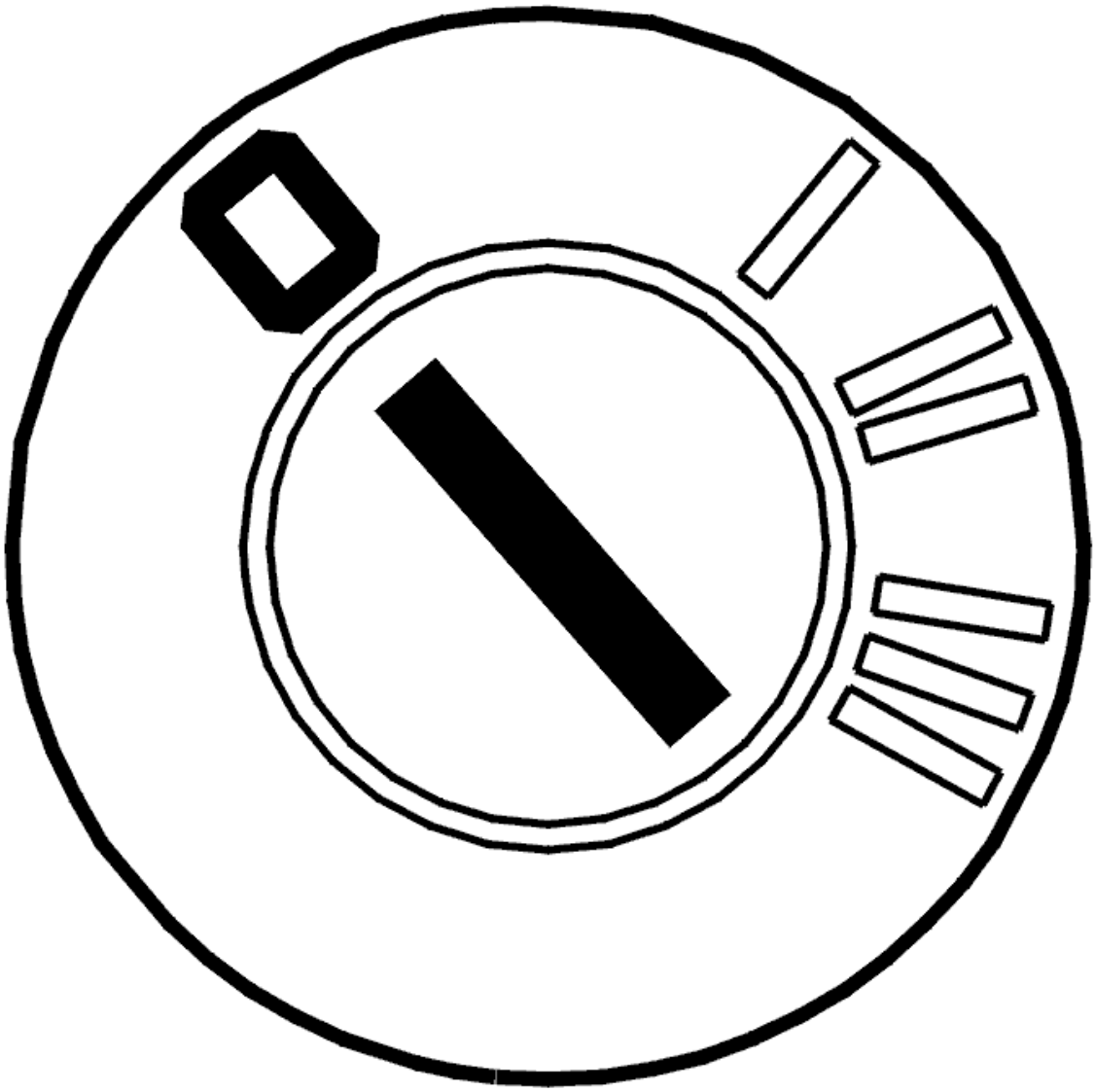


Fig. 11: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the connectors of the transmission and the connector for the transmission control module (TCM). Check for contact resistance and oxidation.
- Reconnect the connectors, components, etc.
- Calibrate the gear shift position sensor for the transmission.

  HINT: Save a bookmark. Cancel fault-tracing and select car communication in VIDA (Volvo scan tool).

- Test drive the vehicle following: **TEST DRIVE SCHEDULE, DESCRIPTION**

Check for any clearly audible noises from the gearbox. Check for malfunctions.

Other information

- To access transmission connectors: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**

Is the transmission function OK?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **REPLACING THE CONTROL SYSTEM**

REPLACING THE CONTROL SYSTEM

Fault-tracing indicates an internal fault in the transmission.

Other information

- see **CONTROL SYSTEM, REPLACING**
- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

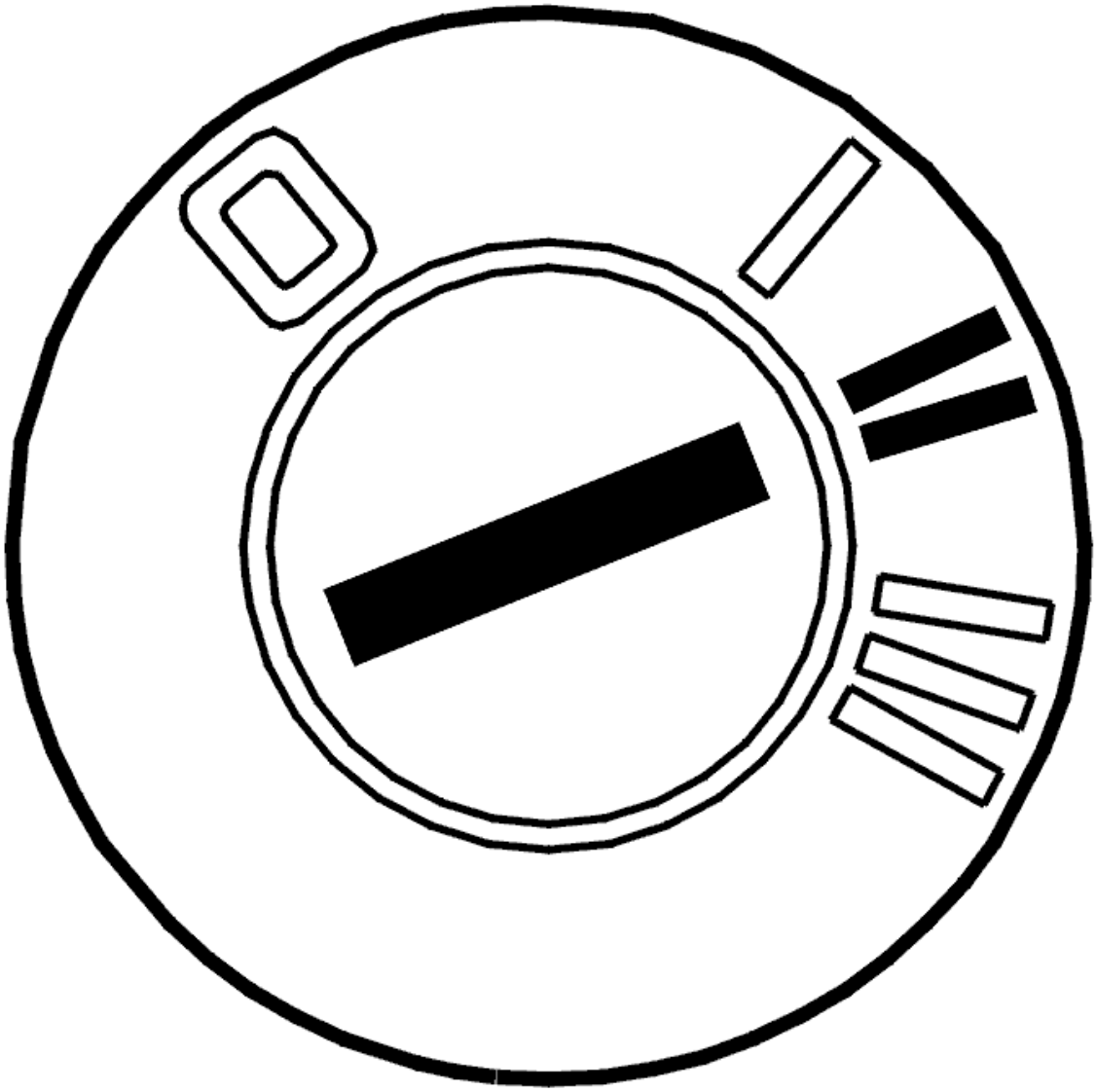


Fig. 12: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

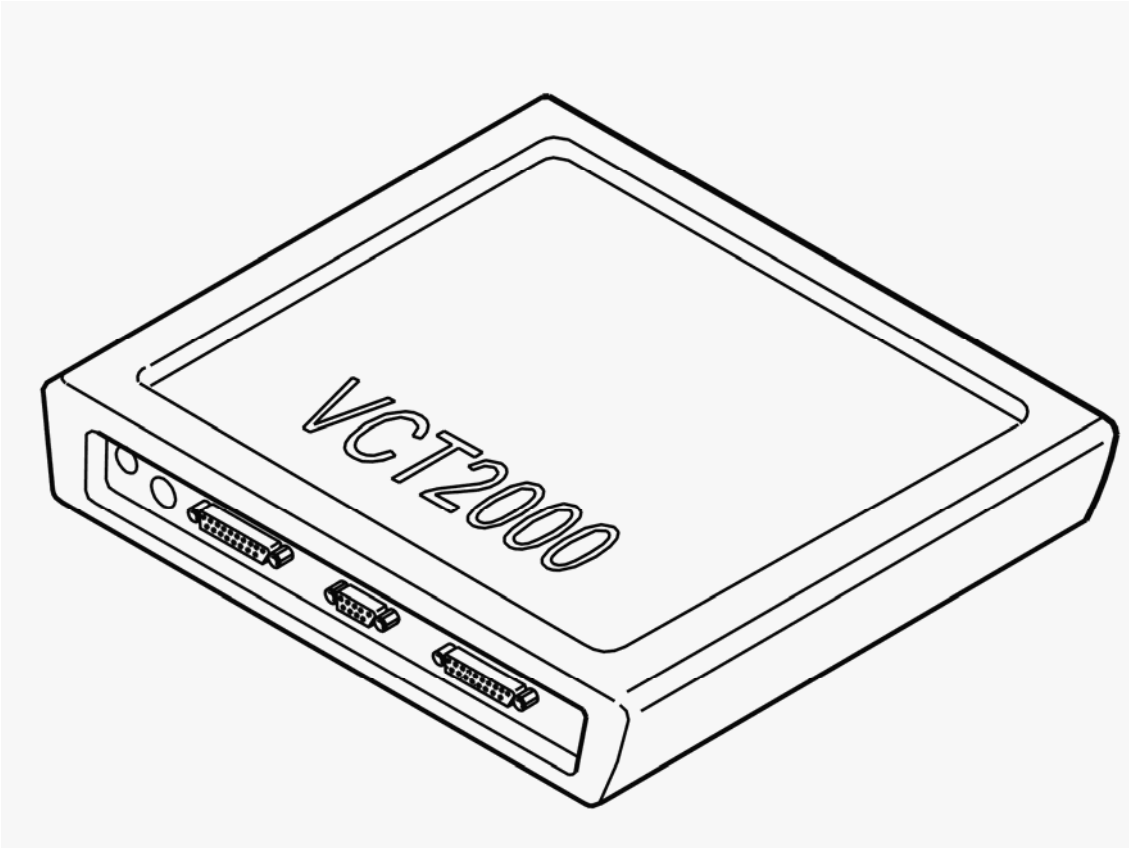


Fig. 13: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

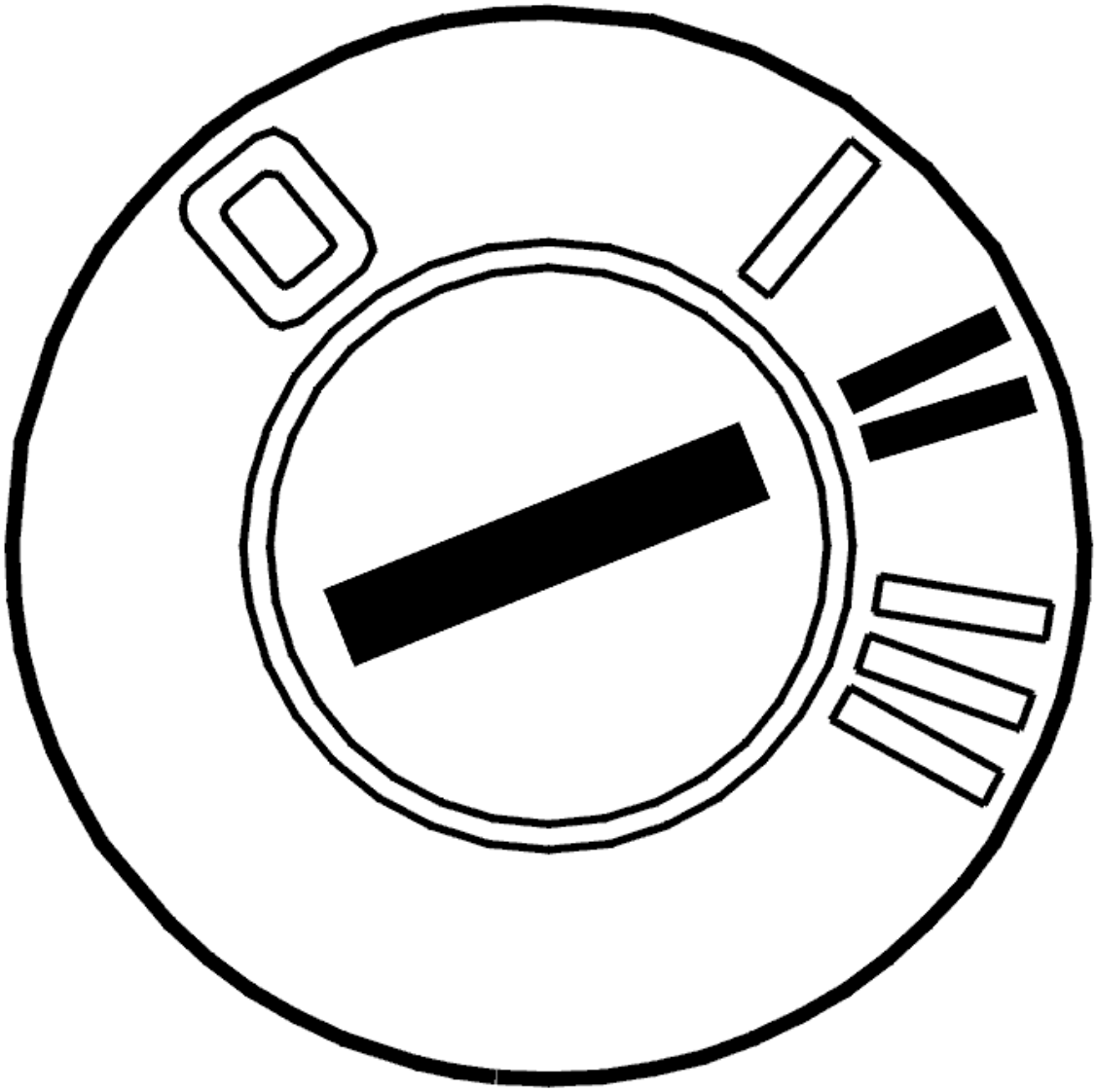


Fig. 14: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

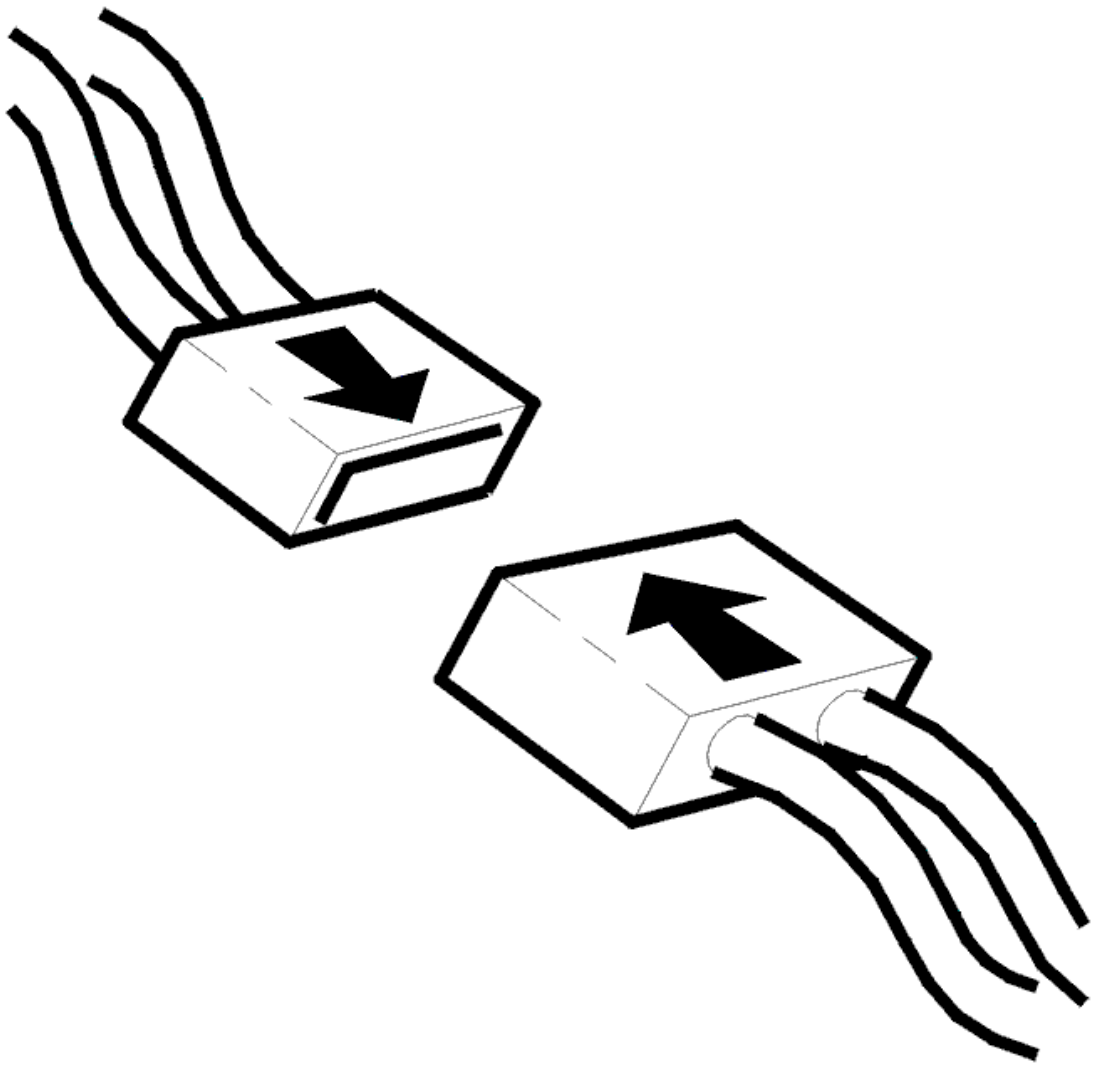


Fig. 15: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- The gear shift position sensor for the transmission must be calibrated if the control module has been disconnected.

  HINT: Save a bookmark. Cancel fault-tracing and select Vehicle communication in VIDA (Volvo scan tool).

- Start the engine.

  Test drive the vehicle following: **TEST DRIVE SCHEDULE, DESCRIPTION**

Check that the transmission does not display any **obvious** function faults.

NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

FAULT-TRACING INFORMATION

CHECKING THE GEAR SYSTEM

Problems that the customer may experience are hard shifts or slipping shifts. The following test-drive contains several different driving situations that may provoke these symptoms if the transmission is damaged.

NOTE: It is important that the transmission oil is above 70 °C before the test-drive starts

Test 1

1. Driving at 100 km/h, 6th gear.
2. Perform a kickdown to 4th gear.
3. Let the transmission automatically shift up to 5th gear.
4. Let up the accelerator pedal and let the transmission shift up to 6th gear.

Test 2

1. Driving at 100 km/h, 6th gear.
2. Slight uphill grade, press accelerator pedal until you obtain shifting 6-5, not kickdown.

Test 3

1. Driving at 80 km/h.
2. Move the gear selector to position M and engage 6th gear.
3. Perform a kickdown and shift 6-5, 5-4, 4-3 at the same time.
4. Then upshift immediately to 6th gear.

Test 4

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position R.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

Test 5

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position D.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

If the symptoms hard shifts or slipping shifts arise during the test-drive, the transmission's control system must be replaced.

Other information

- see **CONTROL SYSTEM, REPLACING**

Is the function OK?

- **YES**

  Refer to **CHECK CONTACT RESISTANCE AND OXIDATION**

- **NO**

  Refer to **REPLACING THE CONTROL SYSTEM**

TCM-P089500: GEAR CHANGE TIME TOO SHORT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089500

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089500**

FAULT TRACING

see **FAULT TRACING**

TCM-P089600: SHIFT TIME TOO LONG. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089600

Condition

Transmission shifting and the lock-up function are controlled by the transmission control module (TCM) activating the solenoids in a specific pattern. Shift solenoids S1-S2 are activated depending on which gear the control module has chosen. The control module then adjusts how engagement occurs by controlling the hydraulic pressure linearly via linear solenoids SLT, SLU, SLC1, SLC2, SLC3 and SLB1. The basic parameters for the various gear shifting points are the position of the accelerator pedal (AP) and the vehicle speed, while the shifting quality is determined with the aid of the torque control. By reading off the changes in engine speed (RPM) on the transmission input shaft during the shifting process and comparing with the values calculated in the transmission control module (TCM), the pressurization of clutches and brakes can be adapted.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Too much time between shifts.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Normal driving.

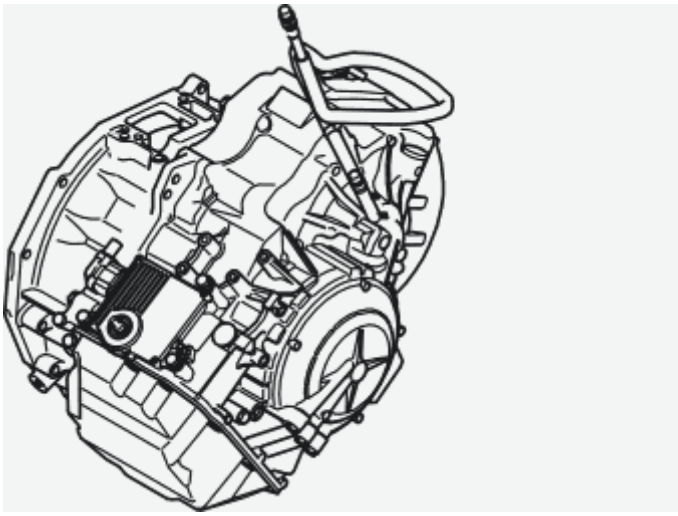


Fig. 16: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Mechanical fault in the transmission.
- Hydraulic fault in the transmission.

Fault symptom[s]

- General warning lamp lit
- Vibration and jerking when shifting
- Rough gear shift
- Abnormal slipping gearshifts

FAULT-TRACING

see **FAULT-TRACING**

TCM-P089600: SHIFT TIME TOO LONG. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089600

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089600**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P089600: GEAR CHANGE TIMES TOO LONG. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089600

Condition

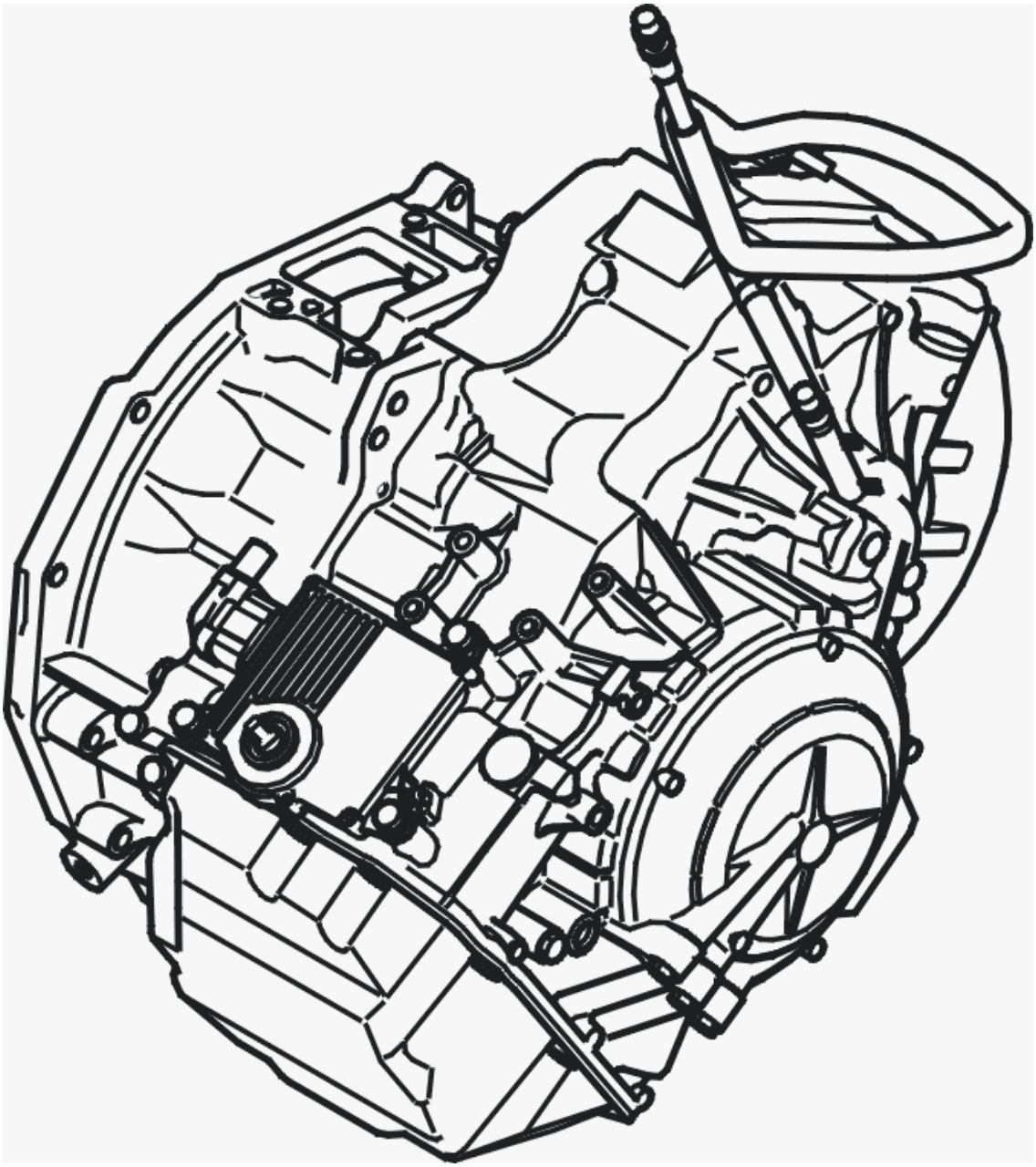


Fig. 17: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

The transmission gear changes and the lock-up function are regulated by the transmission control module (TCM) activating solenoids in specific patterns. Depending on the gear the control module has selected, the shift solenoids S1-S2activated. The control module then adapts the engagement by controlling the hydraulic pressure linearly using the linear solenoids SLT, SLU, SLC1, SLC2, SLC3 and SLB1. The basic parameters for the different shifting points are the accelerator pedal position and the vehicle speed, while the shifting quality is determined by the torque control. By reading off the changes in gearbox input shafts speed while the gear is being changed and compared with the calculated values in the transmission control module (TCM), the pressure application of the clutches and breaks can be adapted.

If the transmission control module (TCM) registers that the time between gear changes is too long, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code (DTC) can be diagnosed when driving normally.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Mechanical fault in gearbox.
- Hydraulic fault in gearbox.

Fault symptom[s]

- General warning lamp lit
- Vibration or jerkiness when changing gear.
- Harsh gear changing
- Abnormal slipping gearshifts

FAULT TRACING

see **FAULT TRACING**

TCM-P089600: GEAR CHANGE TIMES TOO LONG. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089600

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089600**

FAULT TRACING

see **FAULT TRACING**

TCM-P089709: TRANSMISSION FLUID DETERIORATED. GENERAL FAILURE INFORMATION. COMPONENT FAILURES (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089709

Condition

The oil temperature sensor provides the Transmission control module (TCM) with a signal that is used, among other things, for the temperature controlled lock-up and engagement high temperature program functions. The sensor has an NTC (negative temperature coefficient) resistor. The signal (voltage) decreases with increasing oil temperature.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The transmission is subjected to a very hard load for a long period of time.

The time that is required to store the diagnostic trouble code (DTC) is greatly temperature-dependent, and only oil temperatures above 100 °C will affect this diagnostic trouble code (DTC).

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

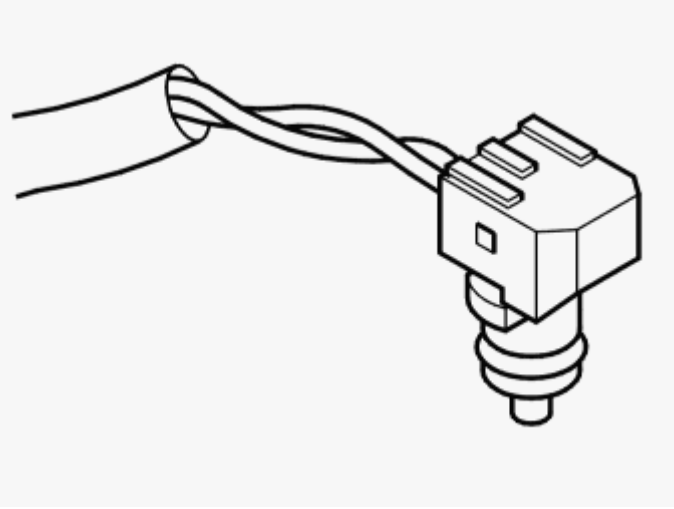


Fig. 18: Identifying The Transmission Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Transmission control module (TCM) assumes an oil temperature of 80 °C.

Possible Source

- Short-circuit to ground in the signal cable.
- Transmission fluid temperature sensor not working.
- The transmission has been exposed to extreme load and high ambient temperature.

Fault symptom[s]

- General warning lamp lit

FAULT-TRACING

CHECKS

CHECKING OIL TEMPERATURE

Fig. 19: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the oil temperature.

  Check that the oil temperature is within its permitted range. Compare it to the automatic transmission temperature.

  NOTE: The transmission temperature sensor is inside the control system and may be affected by the heat given off by the solenoids.

Fig. 20: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

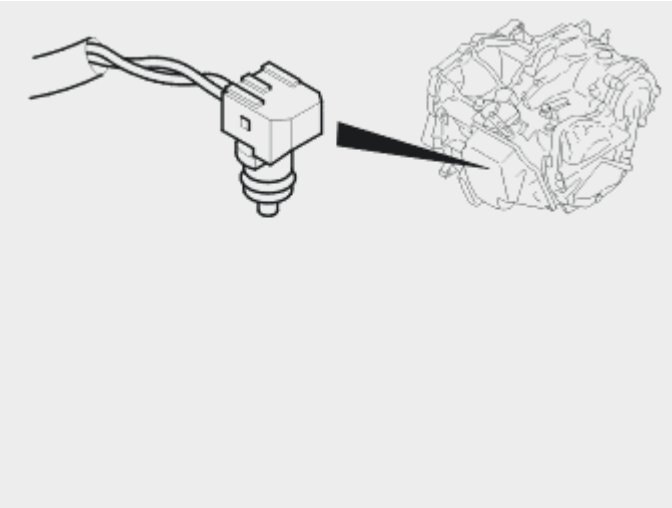


Fig. 21: Locating Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Is the temperature reading OK?

- **YES**

  Refer to **CHECKING THE WIRING AND COMPONENT**

- **NO**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

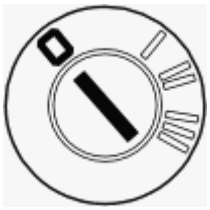


Fig. 22: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Open the transmission control system.

  Check the signal cable between the oil temperature sensor in the transmission and transmission control module (TCM) terminal #B8 (#B8). Check for a short circuit to ground.

  Remedy as necessary.

  Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **COVER CONTROL SYSTEM, REPLACING**
- see **CHECKING WIRING AND TERMINALS**

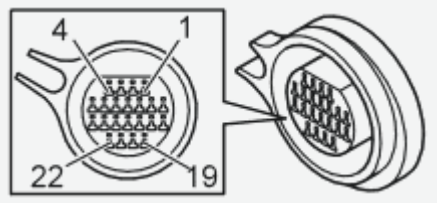


Fig. 23: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

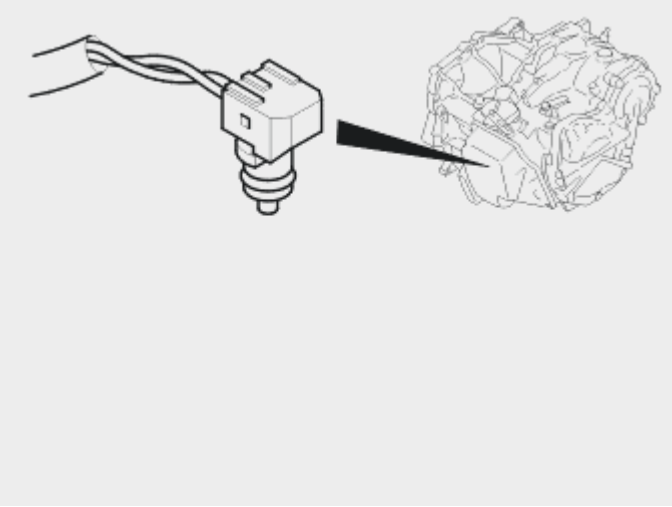


Fig. 24: Locating Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

CHECKING THE WIRING AND COMPONENT

The probable cause of the diagnostic trouble code (DTC) was the transmission being subjected to high loads and high temperatures. It is therefore important to change transmission fluid and to check the function of the transmission.

HINT: If no fault is found check the oil temperature sensor. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

Other information

- see **TRANSAXLE OIL**

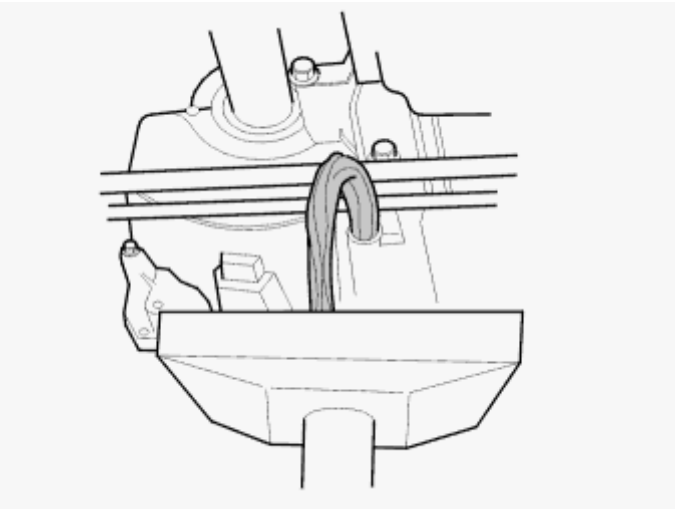


Fig. 25: Draining Off Oil
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER**

TEST DRIVING

Test drive the vehicle following:**TEST DRIVE SCHEDULE, DESCRIPTION**

Are there any mechanical faults in the transmission?

- **YES**

  Refer to **FAULT-TRACING INFORMATION**

- **NO**

  OKAY: Troubleshooting has been completed.

FAULT-TRACING INFORMATION

Exit the current fault-tracing. Add mechanical symptoms to the symptoms list. Fault-trace the symptoms.

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 26: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

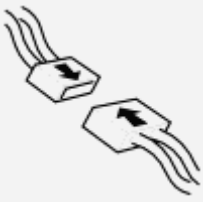


Fig. 27: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Start the engine. Allow the engine to idle.
- Read off the oil temperature.

Check that the oil temperature is within its permitted range. Compare it to the automatic transmission temperature.

NOTE: The transmission temperature sensor is inside the control system and may be affected by the heat given off by the solenoids.

Fig. 28: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

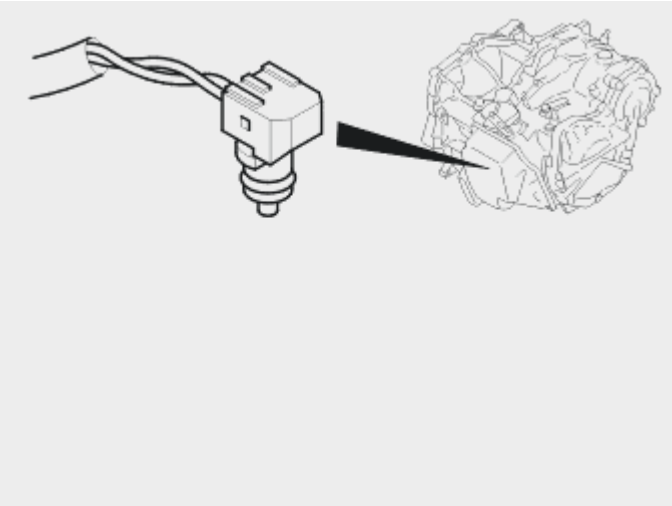


Fig. 29: Locating Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Is the temperature reading OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING THE "TRANSMISSION FLUID CHANGE" COUNTER

CHECKING THE FUNCTION

HINT: The transmission control module (TCM) has a counter for fluid quality that counts the number of times the transmission is subjected to too hard a load or too high an ambient temperature. If the counter is not reset during draining/replacement, there is a risk that a diagnostic trouble code will be set under the wrong conditions. Thus, it is important that the counter for transmission fluid change be reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

Fig. 30: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the counter.

  Fig. 31: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
  Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)

The temperature sensor is a part of the control system's cable harness.

Replace the control system's wiring harness. See **TRANSMISSION CONTROL UNIT WIRING HARNESS** .

To install, reverse the removal procedure

TCM-P089709: TRANSMISSION FLUID DETERIORATED. GENERAL FAILURE INFORMATION. COMPONENT FAILURES (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089709

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089709**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P089709: TRANSMISSION FLUID EXPENDED. GENERAL FAULT INFORMATION. COMPONENT DEFECT (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089709

Condition

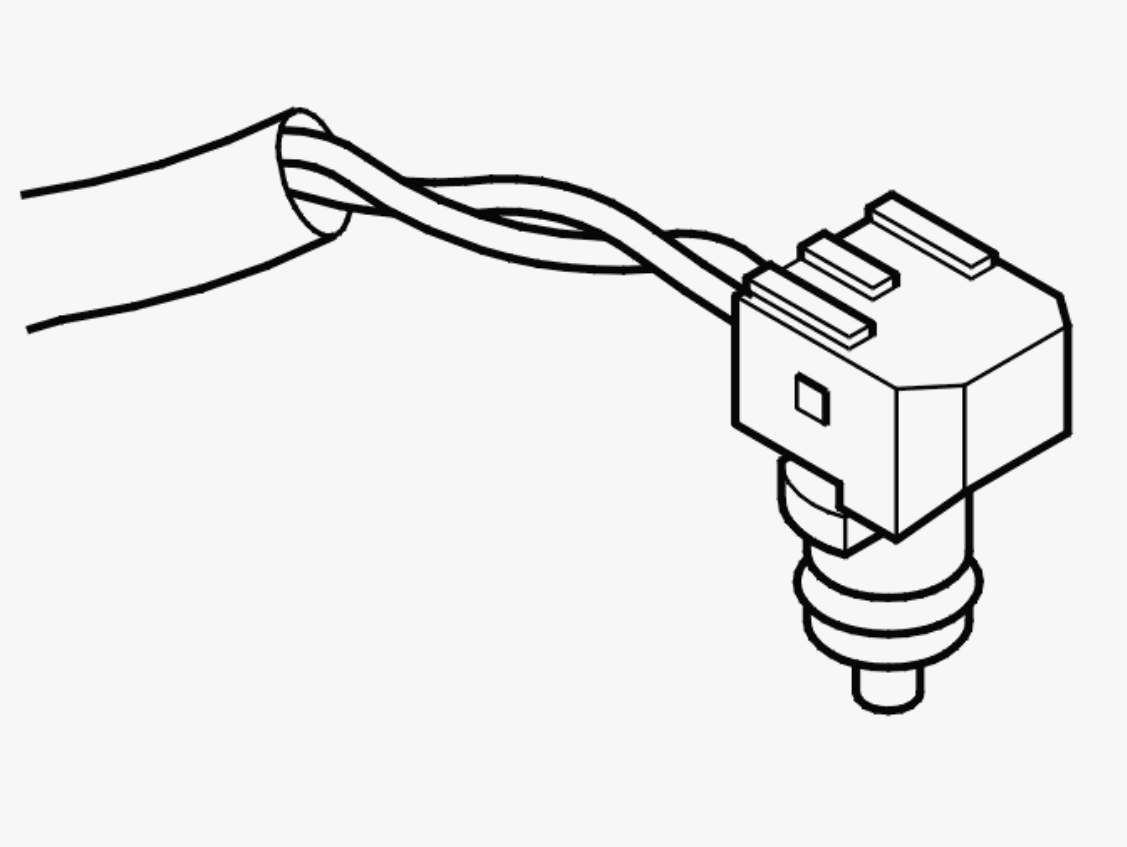


Fig. 32: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

The oil temperature sensor gives the transmission control module (TCM) a signal used for the temperature controlled lock-up function and for engaging the high-temperature program. The sensor has a temperature sensitive resistor with negative temperature coefficient (NTC). The signal (voltage) drops as the oil temperature increases.

If the transmission is exerted to very hard strain for long periods, the diagnostic trouble code (DTC) is generated. The time it takes to generate the diagnostic trouble code (DTC) is greatly temperature dependent and only a fluid temperature above 100 °C will have an impact on the quality of the transmission fluid.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Transmission control module (TCM) assumes an oil temperature of 80 °C.

Possible Source

- The signal cable is short-circuited to ground.
- Transmission fluid temperature sensor not working.
- The transmission has been exerted to very hard strain and high ambient temperatures.

Fault symptom[s]

- General warning lamp lit

FAULT TRACING TCM-P089709

CHECKS

CHECKING THE OIL TEMPERATURE

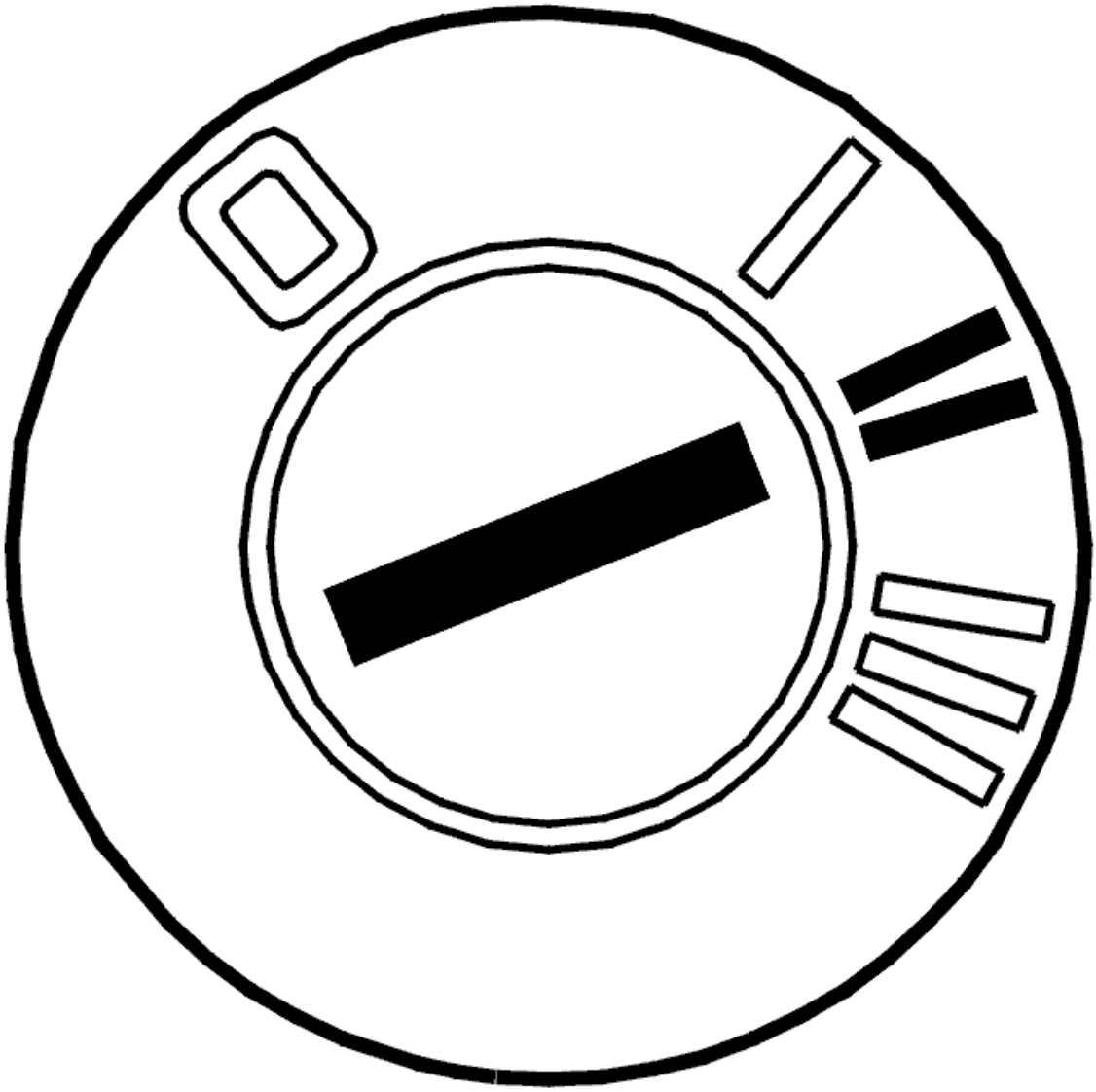


Fig. 33: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

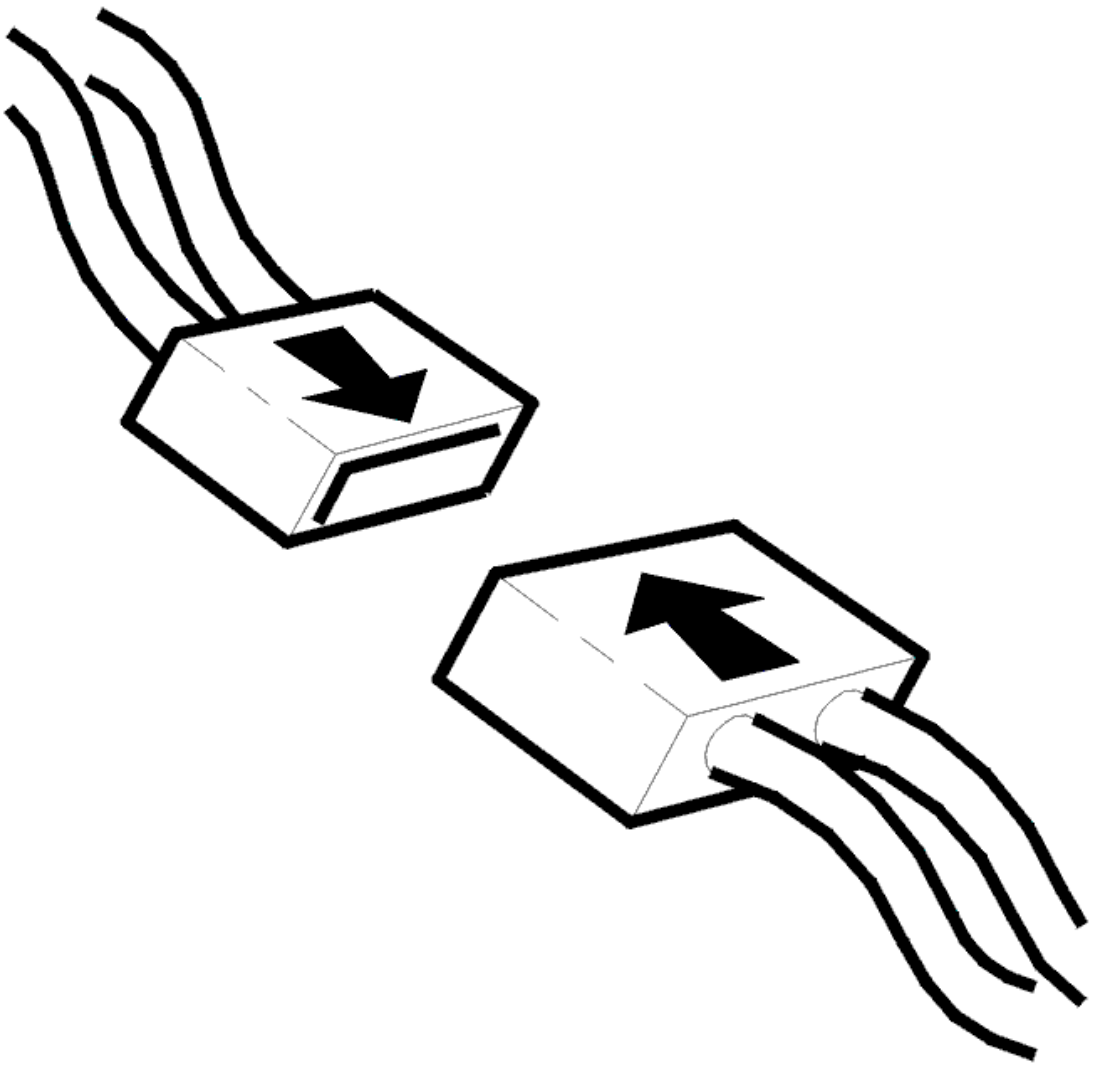


Fig. 34: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read the oil temperature for the transmission control module (TCM).

  Check that oil temperature is within the permitted range. Compare with the temperature of the automatic transmission.

NOTE: The transmission temperature sensor is located inside the control system and may be affected by the heat given off by the solenoids.

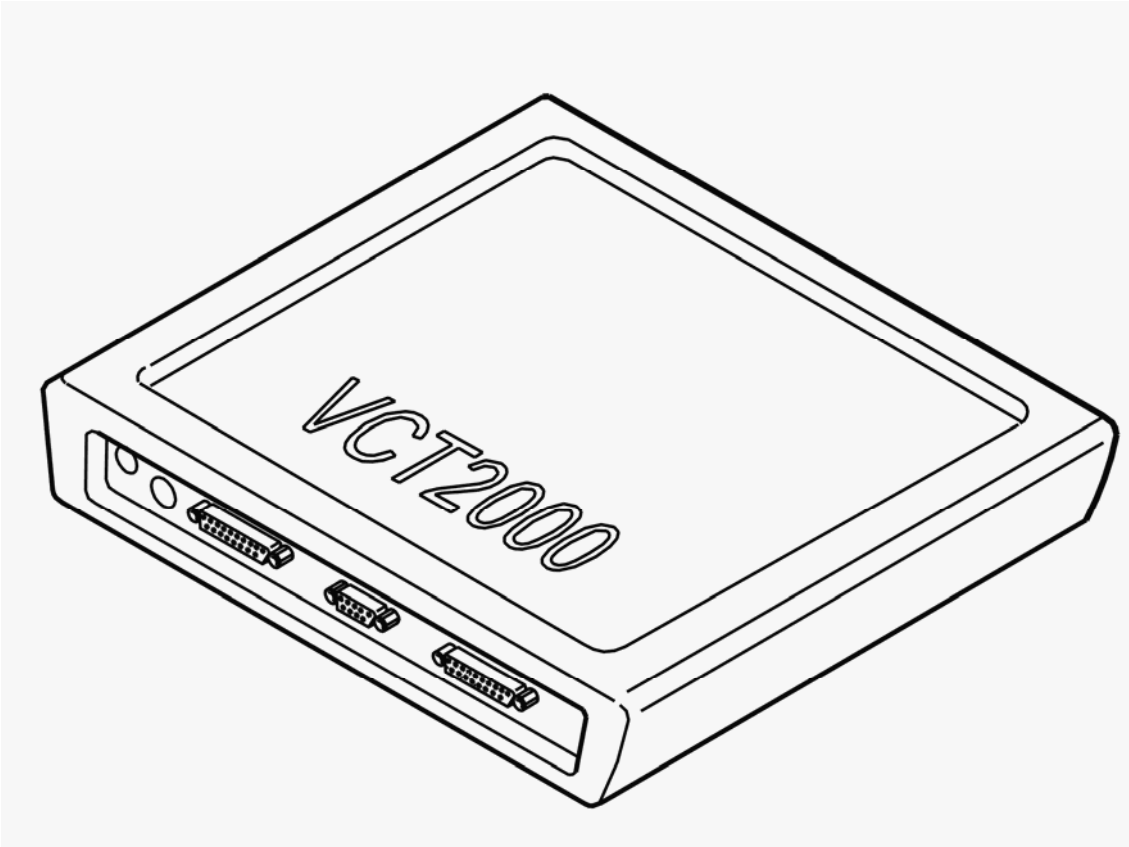


Fig. 35: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

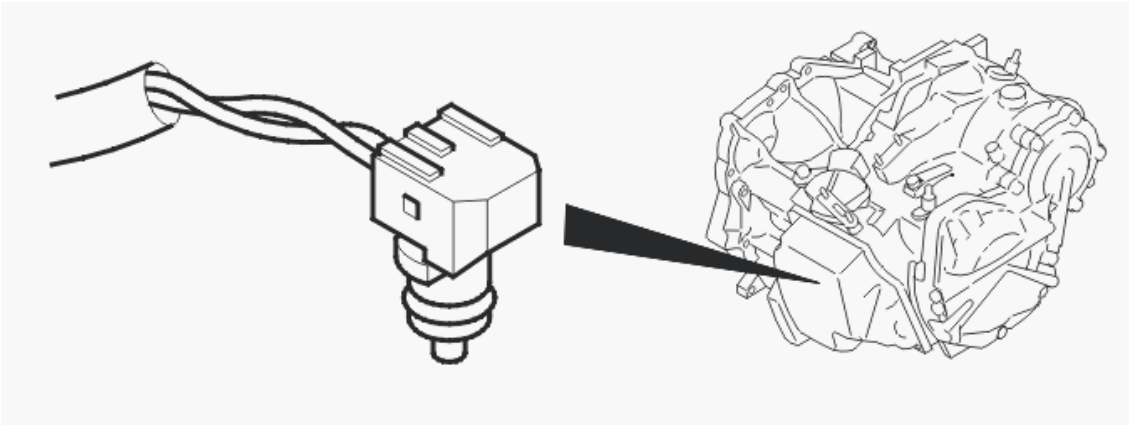


Fig. 36: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Is the temperature OK?

- **YES**

  Refer to **CHECKING THE WIRING AND COMPONENT**

- **NO**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

The diagnostic trouble code (DTC) has probably been caused by the transmission being put under very high load and high ambient temperature. It is important that the oil is replaced and that the transmission function is tested.

HINT: If no fault is found check the oil temperature sensor. See CHECKING THE OIL TEMPERATURE SENSOR

Other information

- see **TRANSMISSION FLUID, CHANGING**

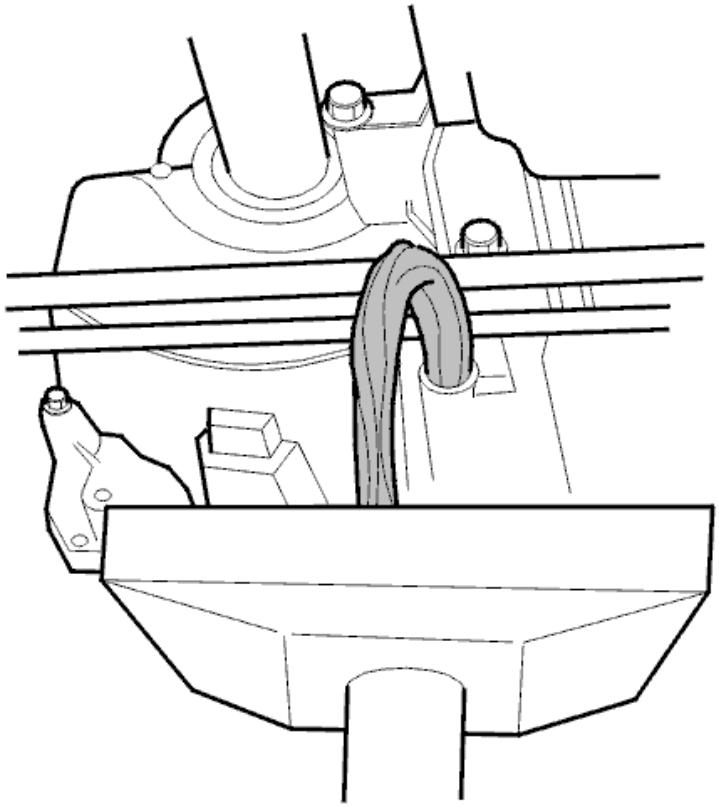


Fig. 37: Draining Off Oil
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE**

TEST DRIVING

Test drive the vehicle following: **TEST DRIVE SCHEDULE, DESCRIPTION**

Fig. 38: Identifying Transmission Control Module
Courtesy of VOLVO CARS CORPORATION

Has the transmission displayed any mechanical faults?

- **YES**

  Refer to **FAULT-TRACING INFORMATION**

- **NO**

  OKAY: Troubleshooting has been completed.

FAULT-TRACING INFORMATION

Cancel the fault tracing in progress. Add the mechanical symptoms to the symptom list and fault trace the symptoms.

CHECKING THE WIRING AND COMPONENT

- Open the gearbox control system

  Check the signal cable between the oil temperature sensor in the transmission and transmission control module (TCM) terminal #B8 (#B8). Check for a short circuit to ground.

  Remedy as necessary

  Other information:

  - see **CONNECTING THE BREAKOUT BOX**
  - see **SIGNAL DESCRIPTION**
  - see **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
  - see **CONTENTS**

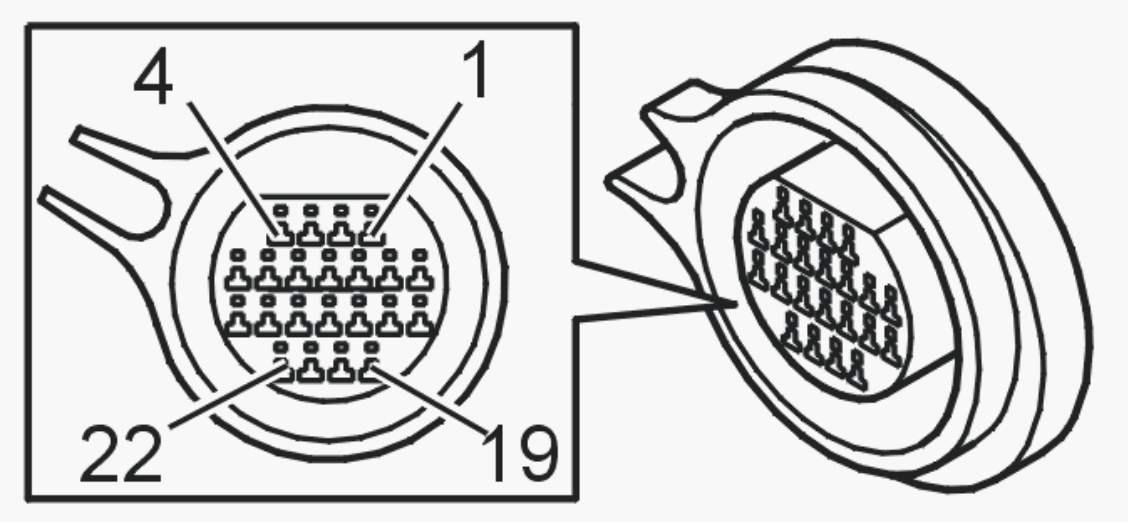


Fig. 39: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

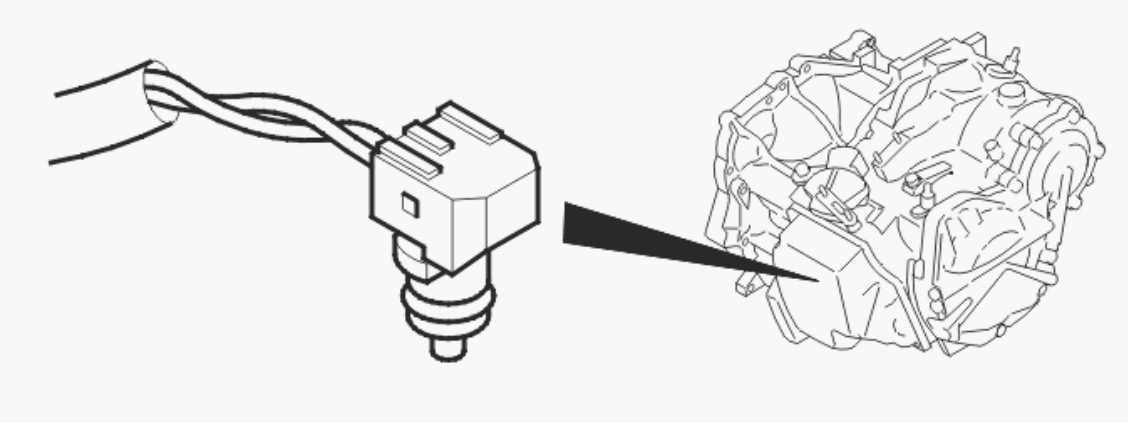


Fig. 40: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE

RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE

HINT: The transmission control module (TCM) has a counter for the oil's quality that counts up when the transmission is exposed to very heavy loads or high ambient temperature. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions. That is why it is important that the counter for Transmission oil, change is reset.

NOTE: This only applies when the transmission oil is changed and when the oil is changed during repairs to the transmission's temperature sensor.

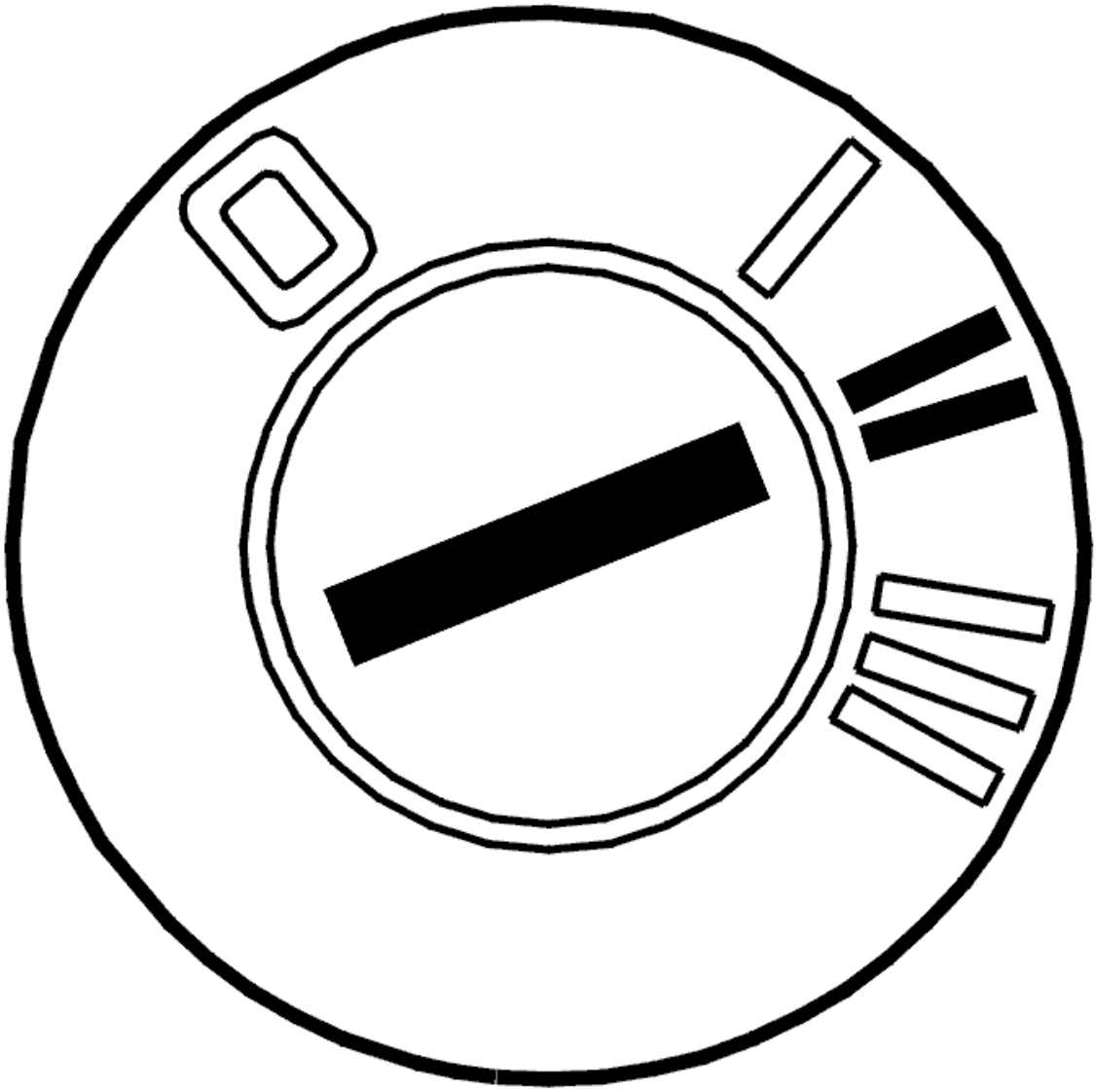


Fig. 41: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the counter by clicking on the symbol for VCT2000.

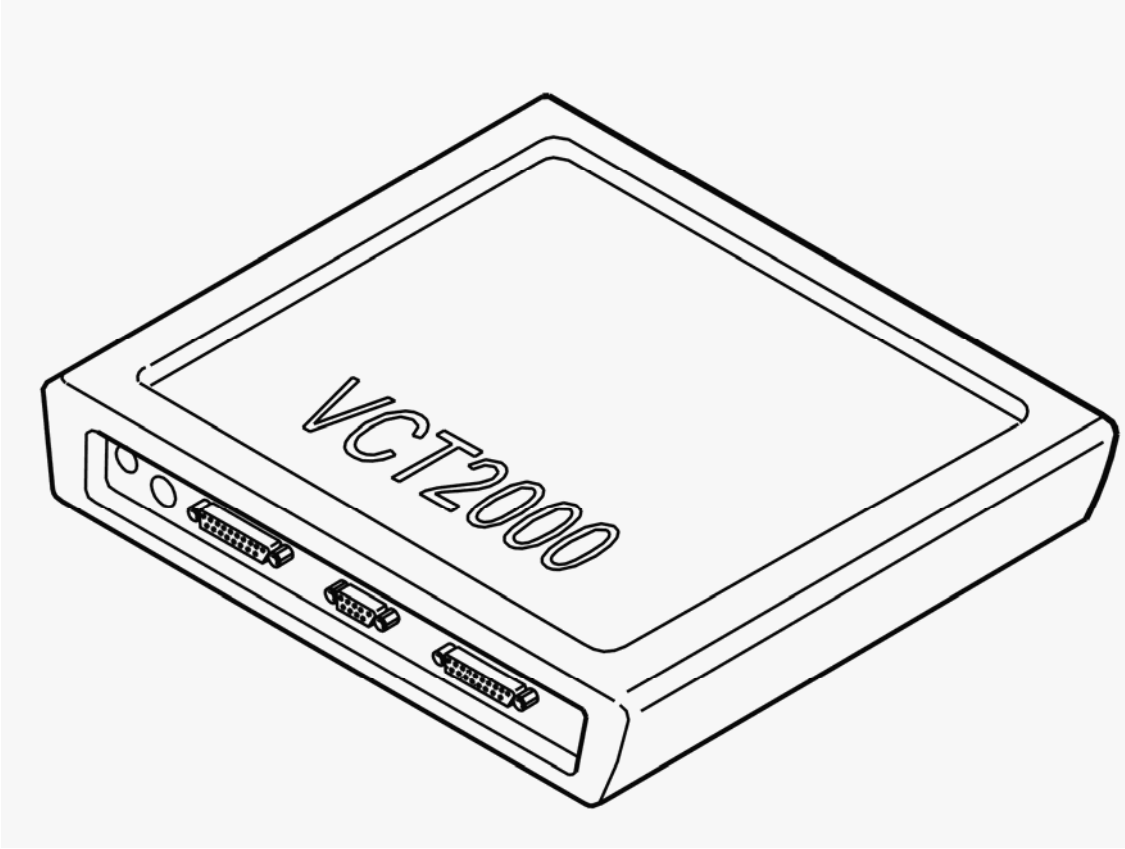


Fig. 42: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

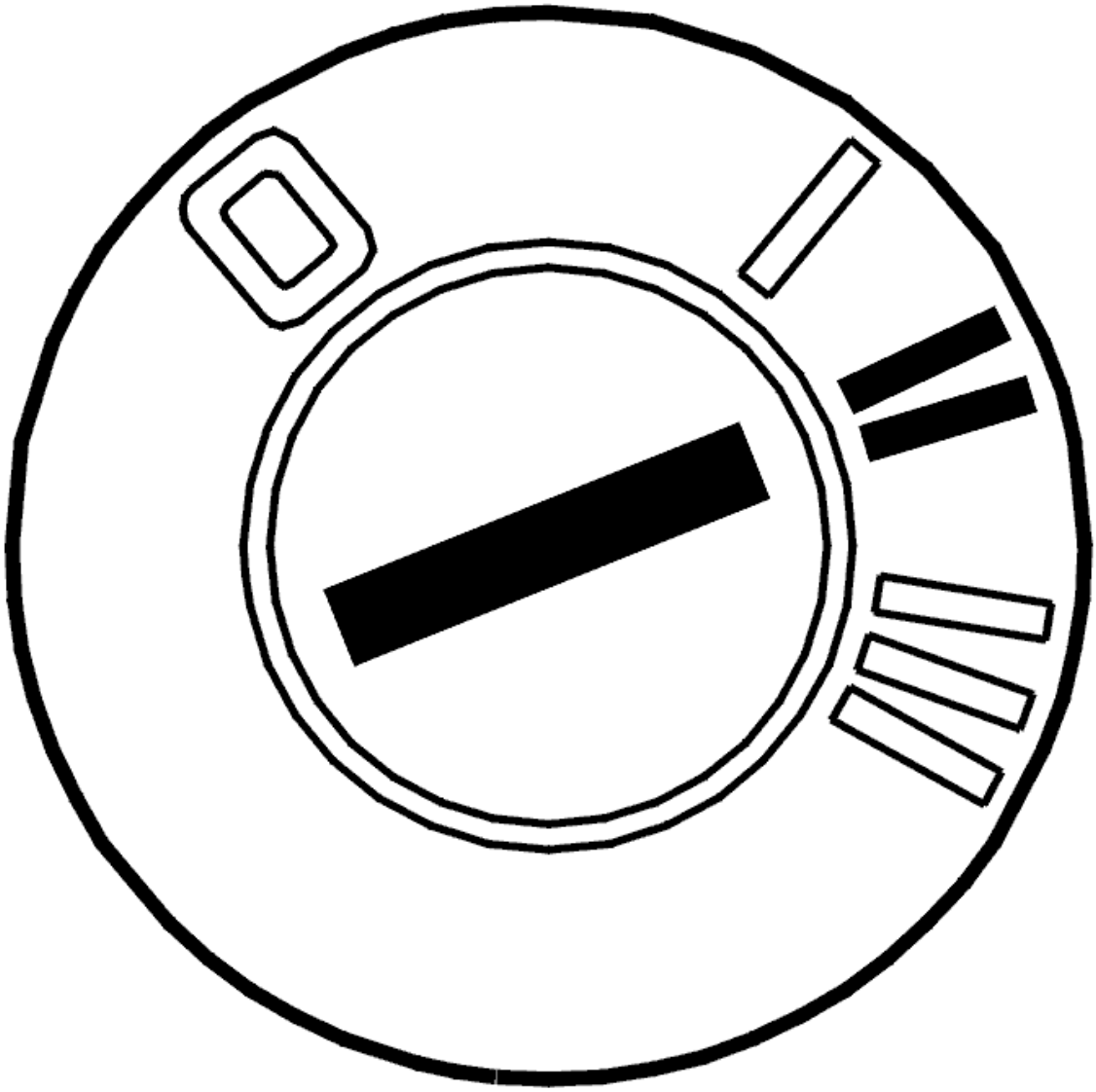


Fig. 43: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

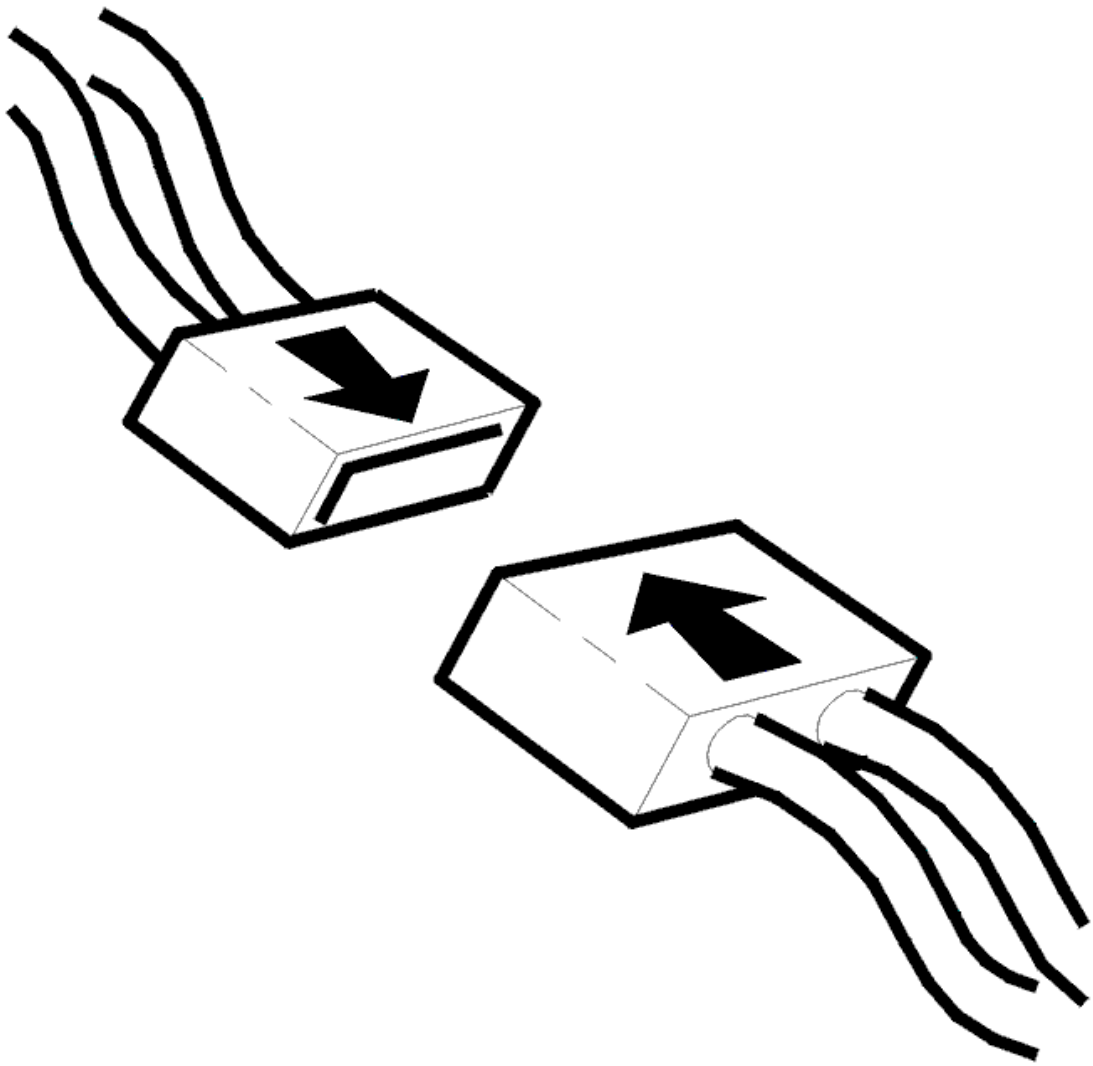


Fig. 44: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Start the engine and allow it to idle.
- Read the oil temperature for the transmission control module (TCM).

Check that oil temperature is within the permitted range. Compare with the external temperature of the transmission.

NOTE: The transmission temperature sensor is located inside the control system and may be affected by the heat given off by the solenoids.

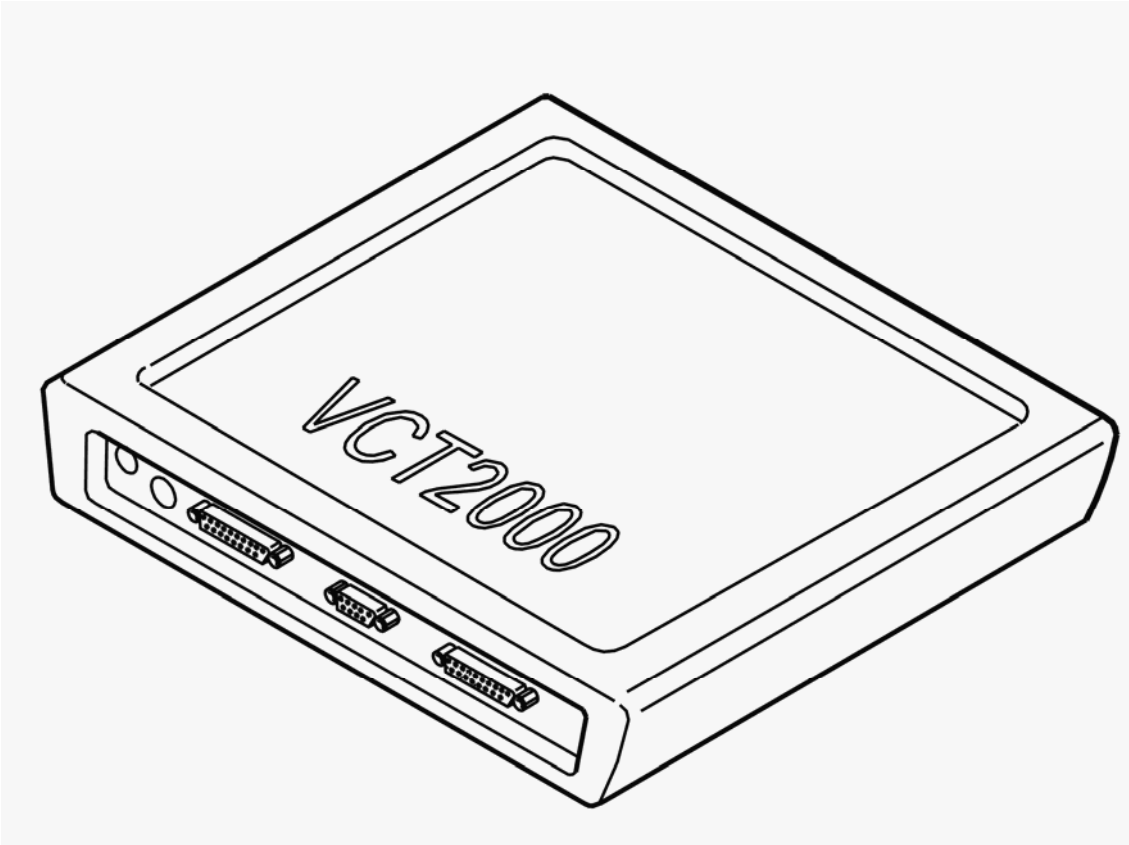


Fig. 45: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

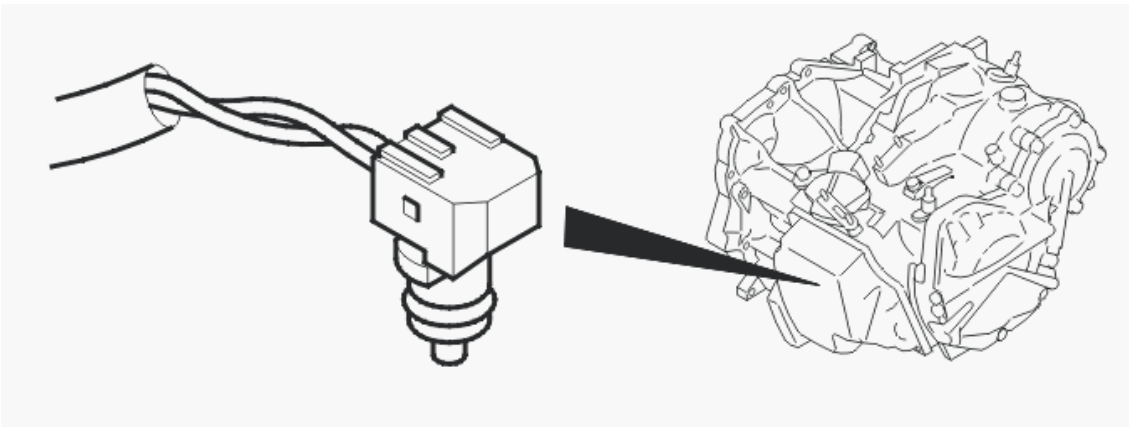


Fig. 46: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Is the temperature OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P089709: TRANSMISSION FLUID EXPENDED. GENERAL FAULT INFORMATION. COMPONENT DEFECT (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089709

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P089709**

FAULT TRACING TCM-P089709

see **FAULT TRACING TCM-P089709**

TCM-P092813: GEAR SHIFT LOCK SOLENOID CIRCUIT / OPEN. GENERAL ELECTRICAL FAILURES. CIRCUIT OPEN (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P092813

Condition

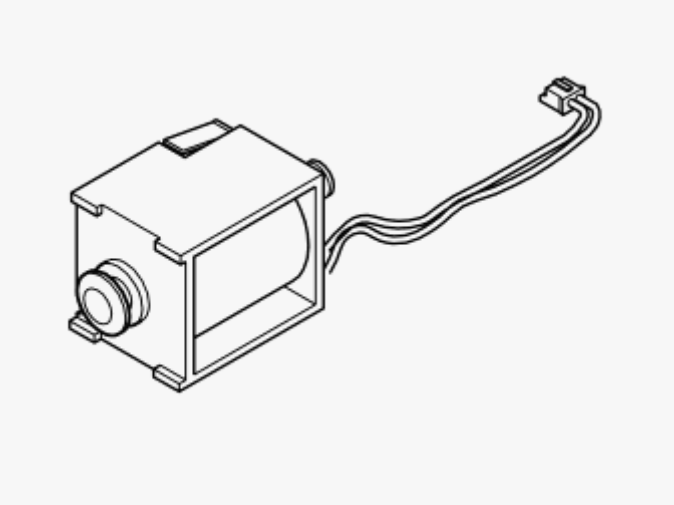


Fig. 47: Identifying Gear Selector Module (GSM)

Courtesy of VOLVO CARS CORPORATION

The gear selector module (GSM) is located at the rear edge of the gear shift assembly's left side. The Gear selector module (GSM) communicates with the Transmission control module (TCM) via an internal network, Local Interconnect Network (LIN), to activate the shift-lock function among other things.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The circuit to solenoid P-position inhibitor is open when the output on the solenoid's drive step is active.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

Substitute Value

- Gear selector blocked.

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the signal cable.
- Open-circuit in the ground lead.
- Internal fault in gear selector module (GSM).

Fault symptom[s]

- Gear selector stuck in position P

FAULT-TRACING

CHECKS

CHECKING THE STATUS

Fig. 48: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Gear selector in position P.

  Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.

  Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

  If the gear selector function is OK, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

- **Continue**

  Refer to **CHECKING THE COMPONENT**

CHECKING THE COMPONENT

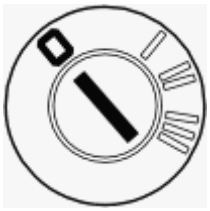


Fig. 49: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

Check the cable for short-circuit to ground.

Take readings between:

- Solenoid for P-position lockout and Gear selector module (GSM).

Check the solenoid's resistance by connecting an ohmmeter between terminals #1 and #2 on the solenoid's connector.

For the resistance values, see below. Replace the solenoid if the resistance is incorrect.

Other information

- see **CHECKING WIRING AND TERMINALS**
- see **SOLENOID SHIFT LOCK, REPLACE**
- see **COMPONENT SPECIFICATIONS**

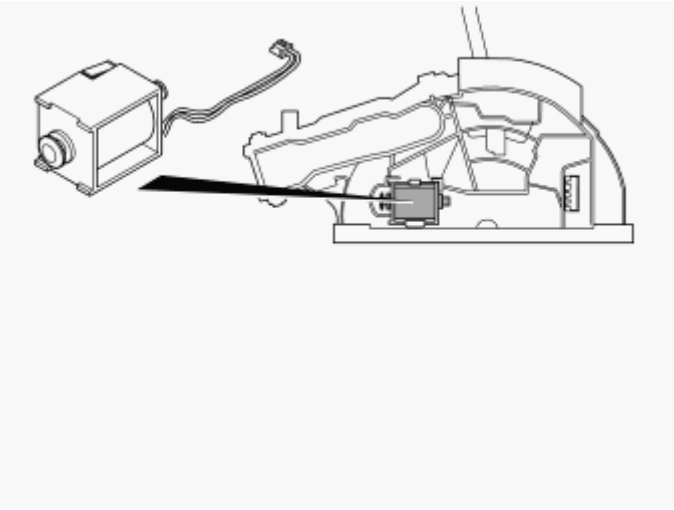


Fig. 50: Locating Gear Selector Module (GSM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 51: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

- Gear selector in position P.

  Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.

  Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-P092813: GEAR SHIFT LOCK SOLENOID CIRCUIT / OPEN. GENERAL ELECTRICAL FAILURES. CIRCUIT OPEN (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P092813

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P092813**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P092813: GEAR SHIFT LOCK SOLENOID CIRCUIT / OPEN. GENERAL ELECTRICAL FAILURES. CIRCUIT OPEN (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P092813

Condition

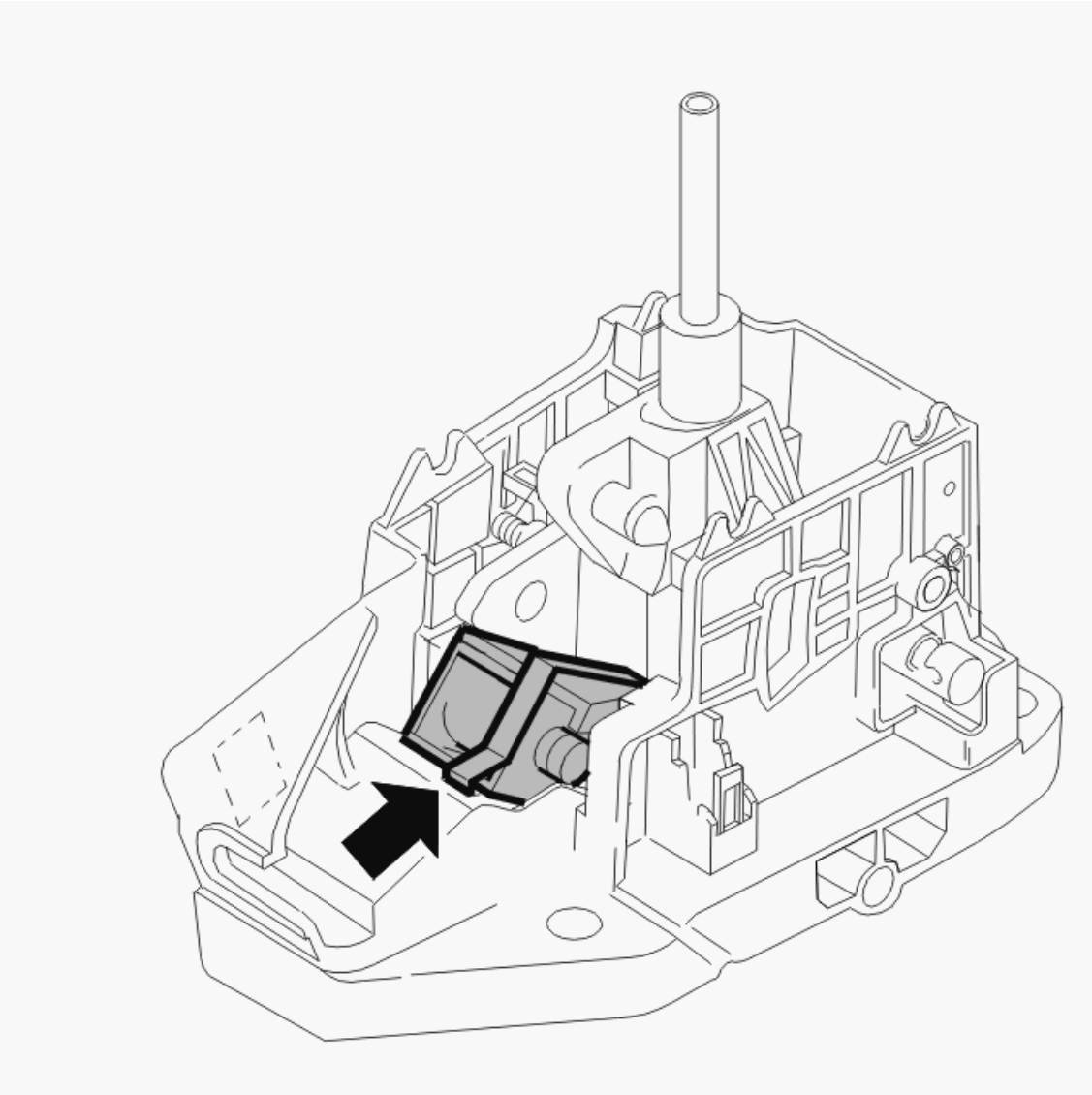


Fig. 52: Identifying Shift-Lock
Courtesy of VOLVO CARS CORPORATION

The gear selector module (GSM) is located under the top panel of the lever carrier. The gear selector module (GSM) communicates with the transmission control module (TCM) via an internal network, Local Interconnect Network (LIN), for activating the gear inhibitor function (shift lock). If the gear selector module (GSM) registers that the circuit to solenoid P-detent is open when the output on the solenoid power stage is inactive, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Gear selector blocked.

Possible Source

- Contact resistance in the terminals
- Open circuit in signal or ground lead.
- Internal fault in gear selector module (GSM).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- Gear selector stuck in position P.

FAULT-TRACING TCM-P092813

CHECKS

CHECK THE FUNCTION SOLENOID FOR THE SHIFT LOCK

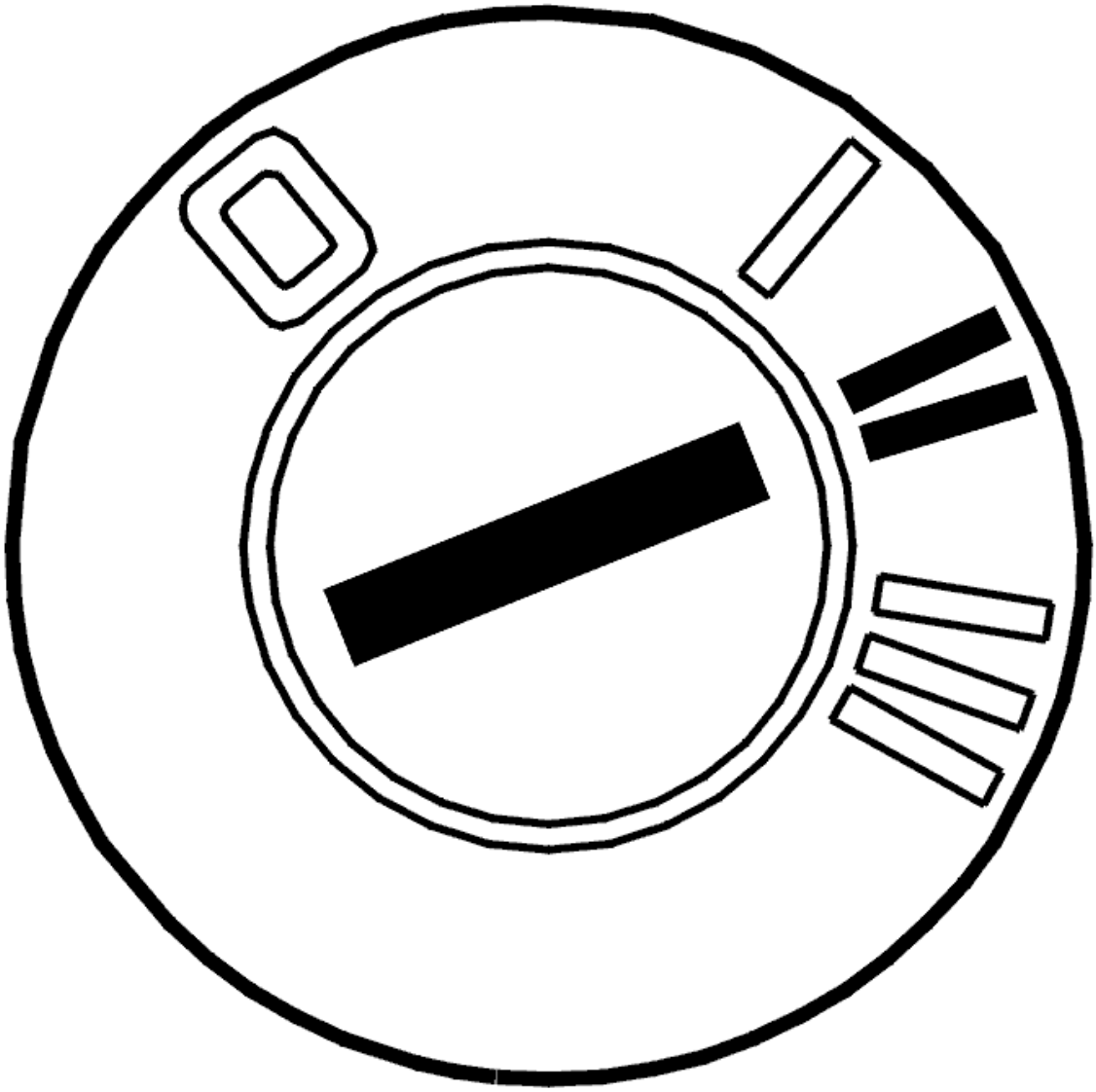


Fig. 53: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P.
- Try to move the gear selector lever without depressing the brake pedal. It should not be possible to move the gear selector lever.
- Try to move the gear selector lever with the brake pedal depressed. It should now be possible to move the gear selector lever.

If the gear selector lever function is **not** OK it indicates that the fault is permanent.

If the gear selector lever function is OK it means that the fault was present previously but is not active now. There is an intermittent fault.

- **Continue**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

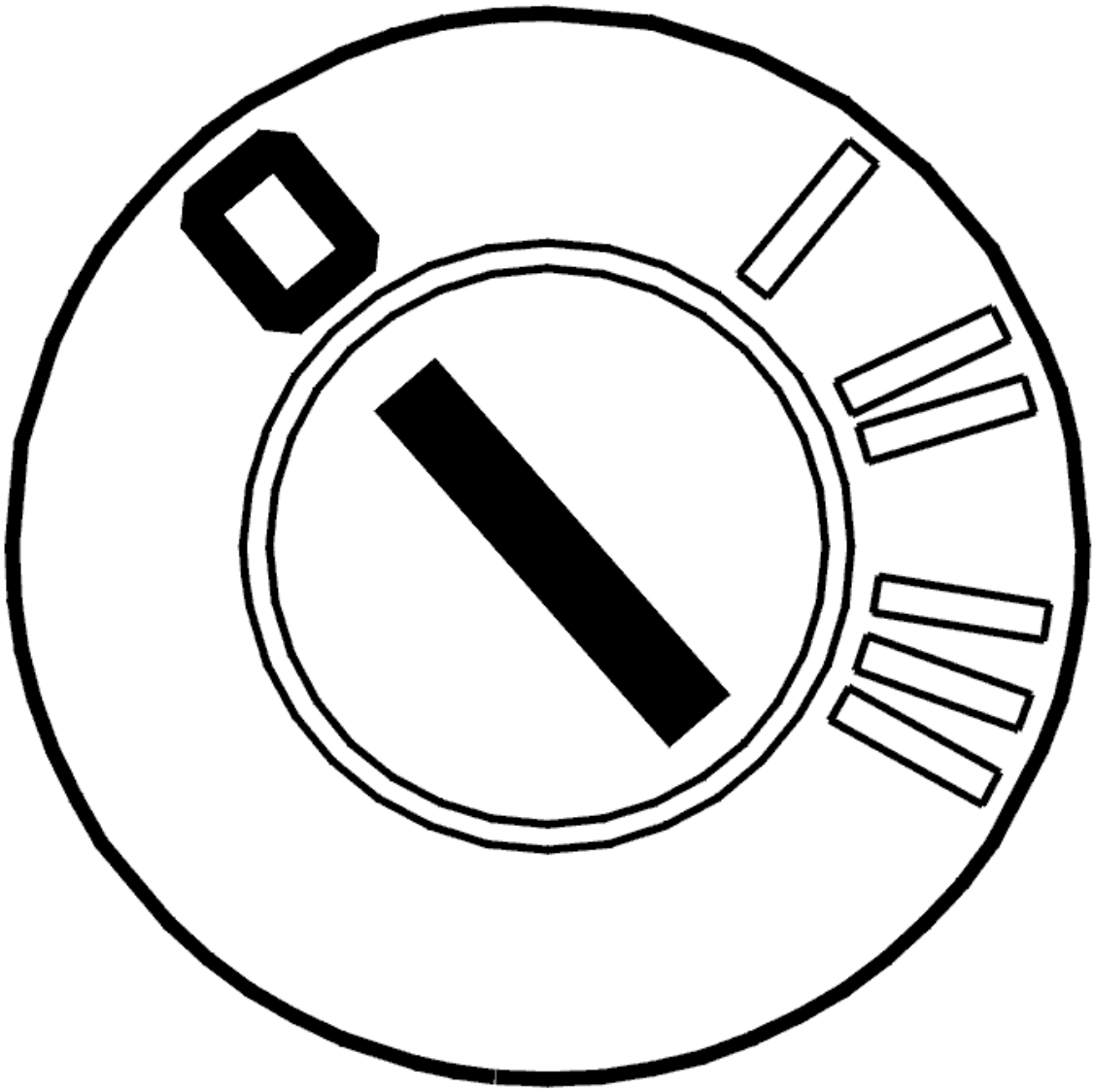


Fig. 54: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

Check the cable between the connector on the transmission control module (TCM) #13 (#A43), gear selector module (GSM) terminal #3 and the shift lock solenoid connector terminal #2. Check for an open circuit.

Remedy as necessary.

Check the resistance of the solenoid between terminals #1 and #2 on the connector. If the resistance is not correct, replace the solenoid.

Other information

- see **SOLENOID SHIFT LOCK, REPLACE**
- For resistance values: **COMPONENT SPECIFICATIONS**
- see **CONTENTS**

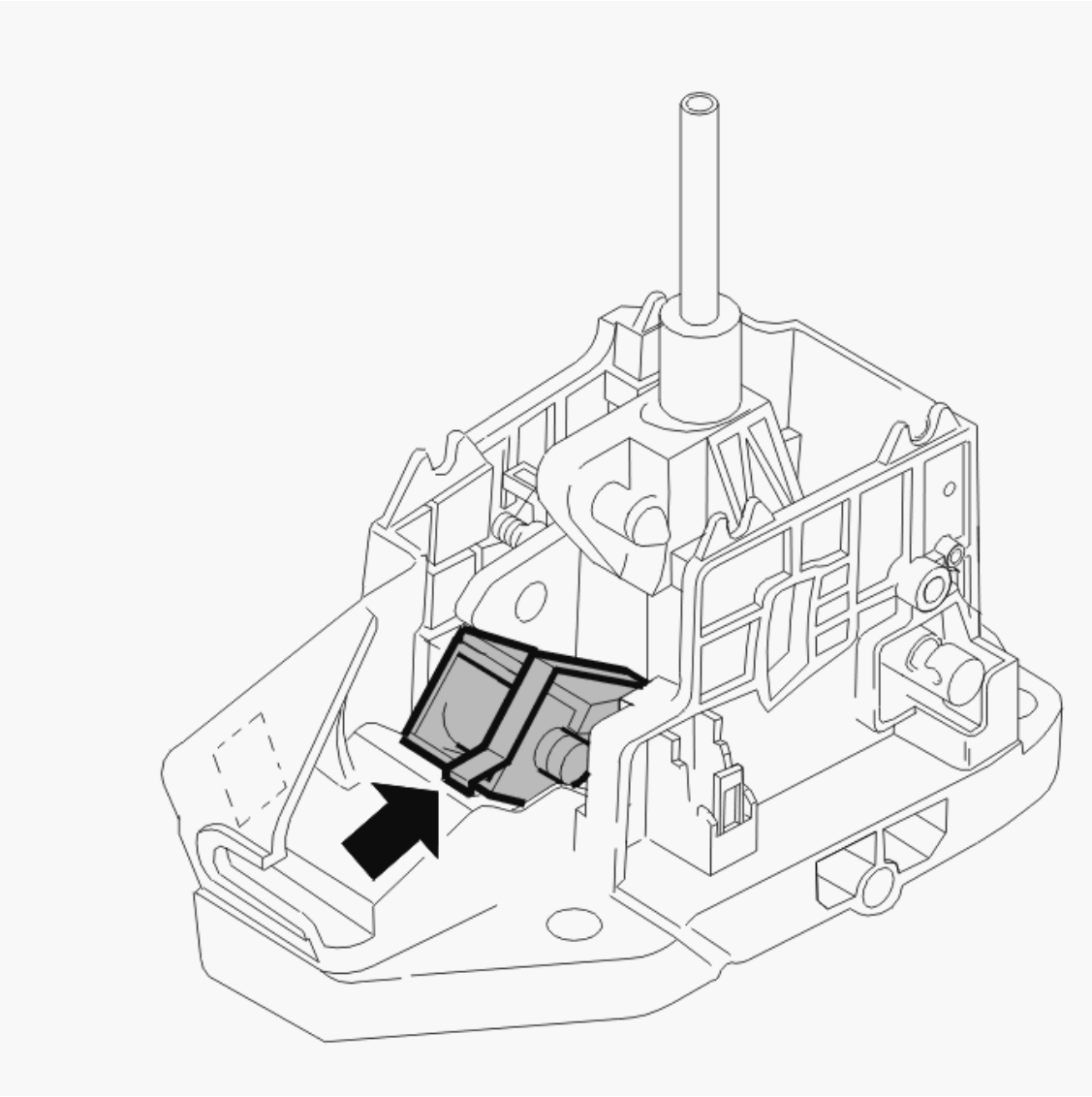


Fig. 55: Identifying Shift-Lock
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

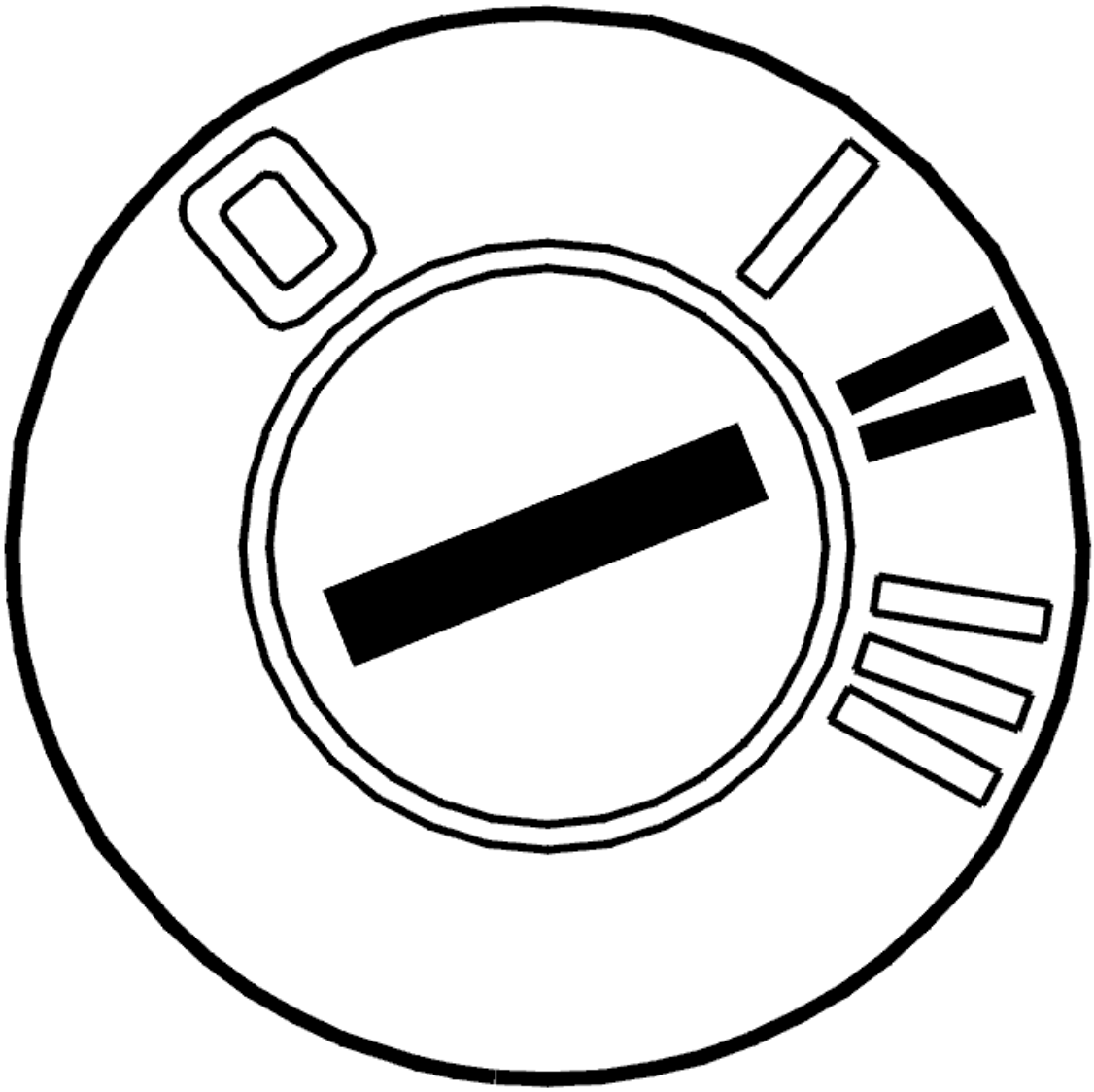


Fig. 56: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

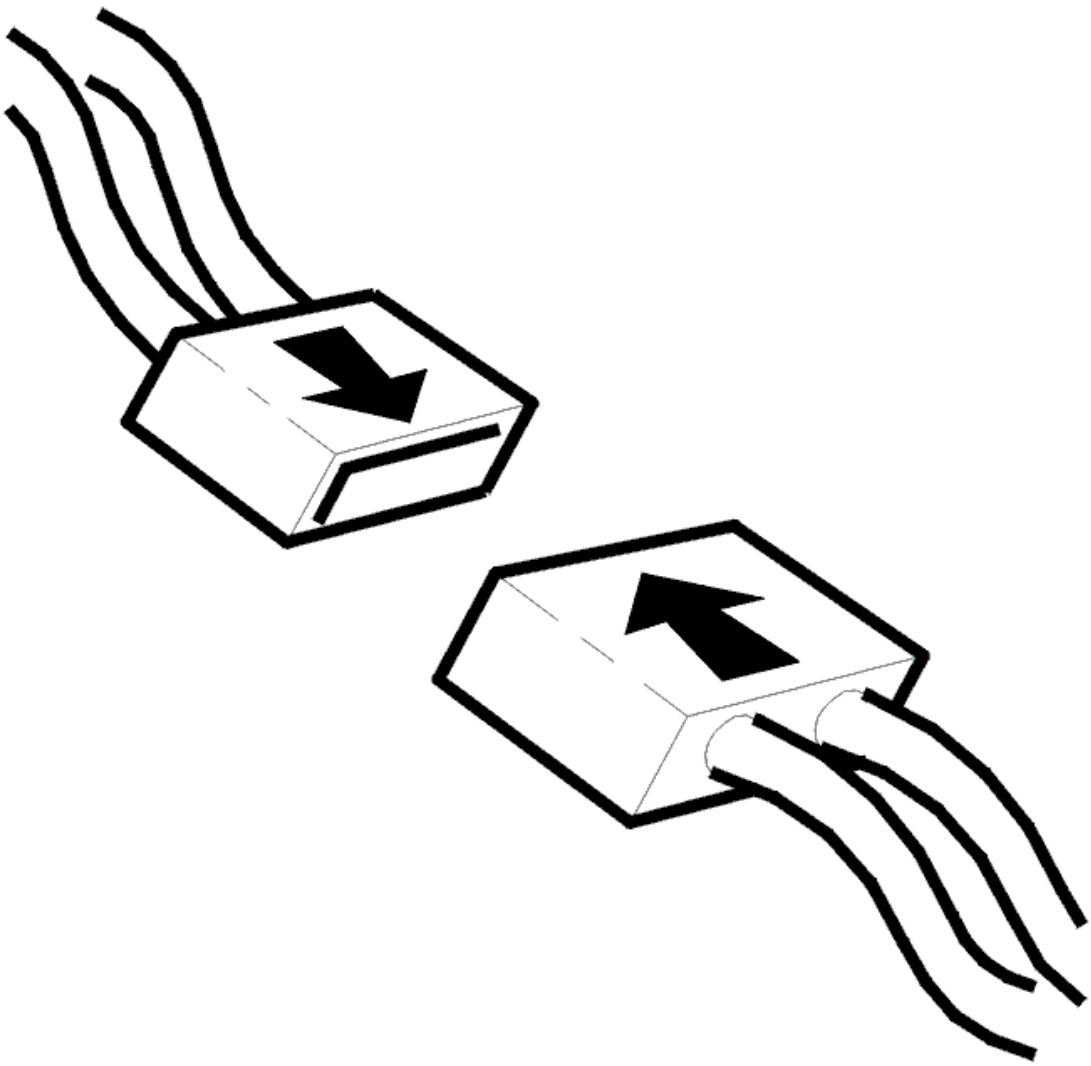


Fig. 57: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Gear selector in position P.
- Try to move the gear selector lever without depressing the brake pedal. It should not be possible to move the gear selector lever.
- Try to move the gear selector lever with the brake pedal depressed. It should now be possible to move the gear selector lever.

Is the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P092813: GEAR SHIFT LOCK SOLENOID CIRCUIT / OPEN. GENERAL ELECTRICAL FAILURES. CIRCUIT OPEN (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P092813

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P092813**

FAULT-TRACING TCM-P092813

see **FAULT-TRACING TCM-P092813**

TCM-P093011: GEAR SHIFT LOCK SOLENOID CIRCUIT LOW. GENERAL ELECTRICAL FAILURES. CIRCUIT SHORT TO GROUND (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P093011

Condition

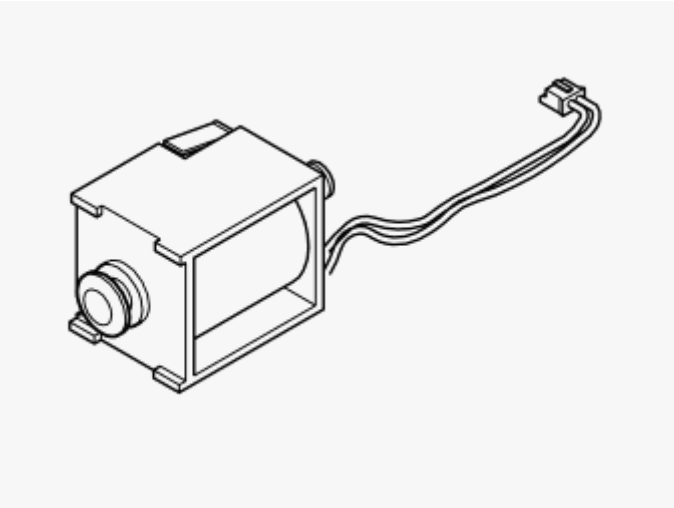


Fig. 58: Identifying Gear Selector Module (GSM)
Courtesy of VOLVO CARS CORPORATION

The gear selector module (GSM) is located at the rear edge of the gear shift assembly's left side. The Gear selector module (GSM) communicates with the Transmission control module (TCM) via an internal network, Local Interconnect Network (LIN), to activate the shift-lock function among other things.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Too great a current through the shift lock solenoid when the output on the solenoid's diver stage is active.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

Substitute Value

- Gear selector blocked.

Possible Source

- Short-circuit to ground in the signal cable.
- Shift-lock solenoid does not work.
- Internal fault in gear selector module (GSM).

Fault symptom[s]

- Gear selector cannot be moved

FAULT-TRACING

see **FAULT-TRACING**

TCM-P093011: GEAR SHIFT LOCK SOLENOID CIRCUIT LOW. GENERAL ELECTRICAL FAILURES. CIRCUIT SHORT TO GROUND (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P093011

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P093011**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P093011: GEAR SHIFT LOCK SOLENOID CIRCUIT LOW. GENERAL ELECTRICAL FAILURES. CIRCUIT SHORT TO GROUND (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P093011

Condition

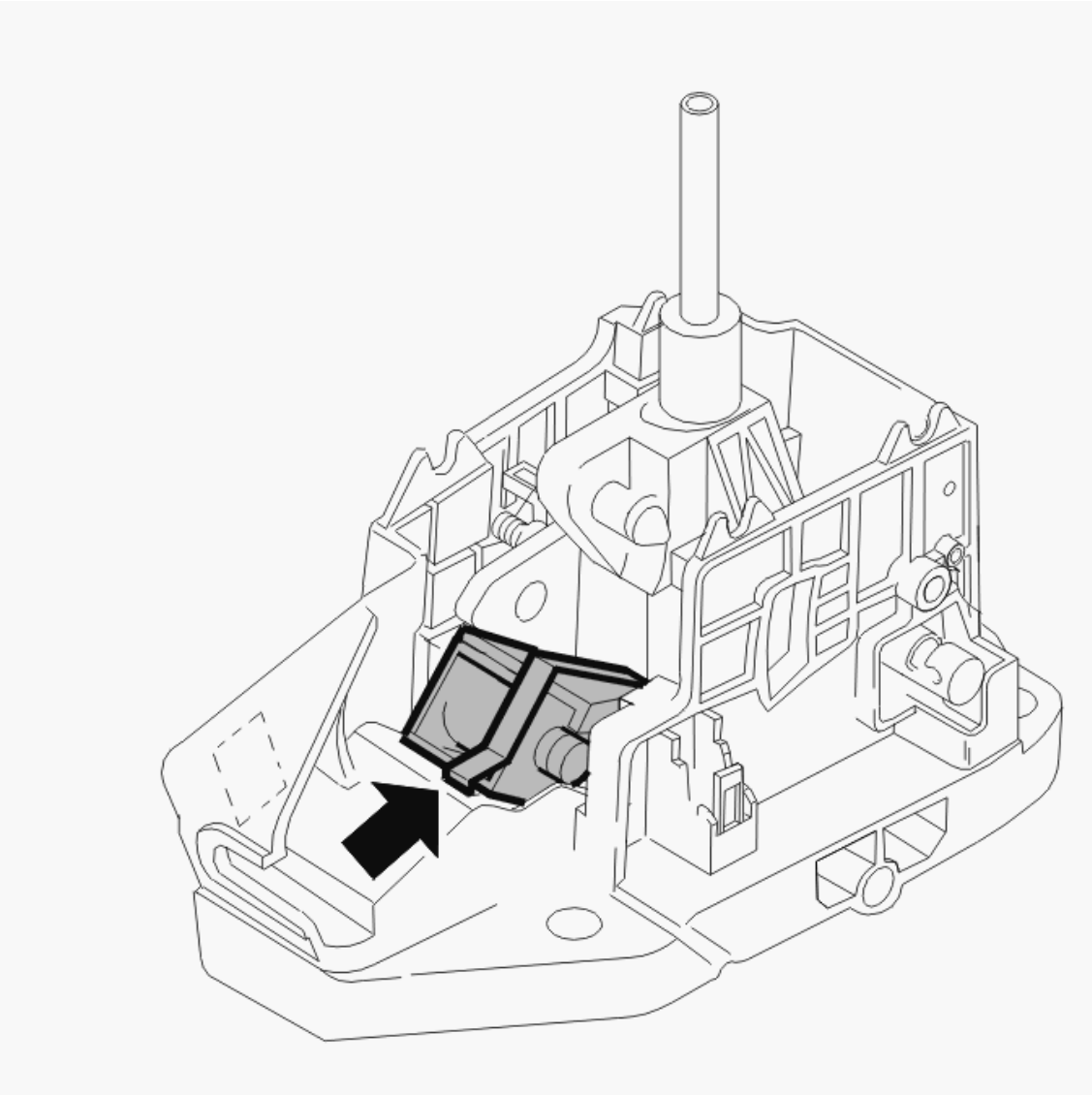


Fig. 59: Identifying Shift-Lock
Courtesy of VOLVO CARS CORPORATION

The gear selector module (GSM) is located under the top panel of the lever carrier. The gear selector module (GSM) communicates with the transmission control module (TCM) via an internal network, Local Interconnect Network (LIN), for activating the gear inhibitor function (shift lock).

If the gear selector module (GSM) registers that the current passing through the solenoid for the P-detent is too high when the output on the solenoid power stage is active, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Gear selector blocked.

Possible Source

- Contact resistance in the terminals
- The signal cable is short-circuited to ground.
- Solenoid for P-detent not working.
- Internal fault in gear selector module (GSM).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- Gear selector cannot be moved.

FAULT-TRACING TCM-P093011

CHECKS

CHECK THE FUNCTION SOLENOID FOR THE SHIFT LOCK

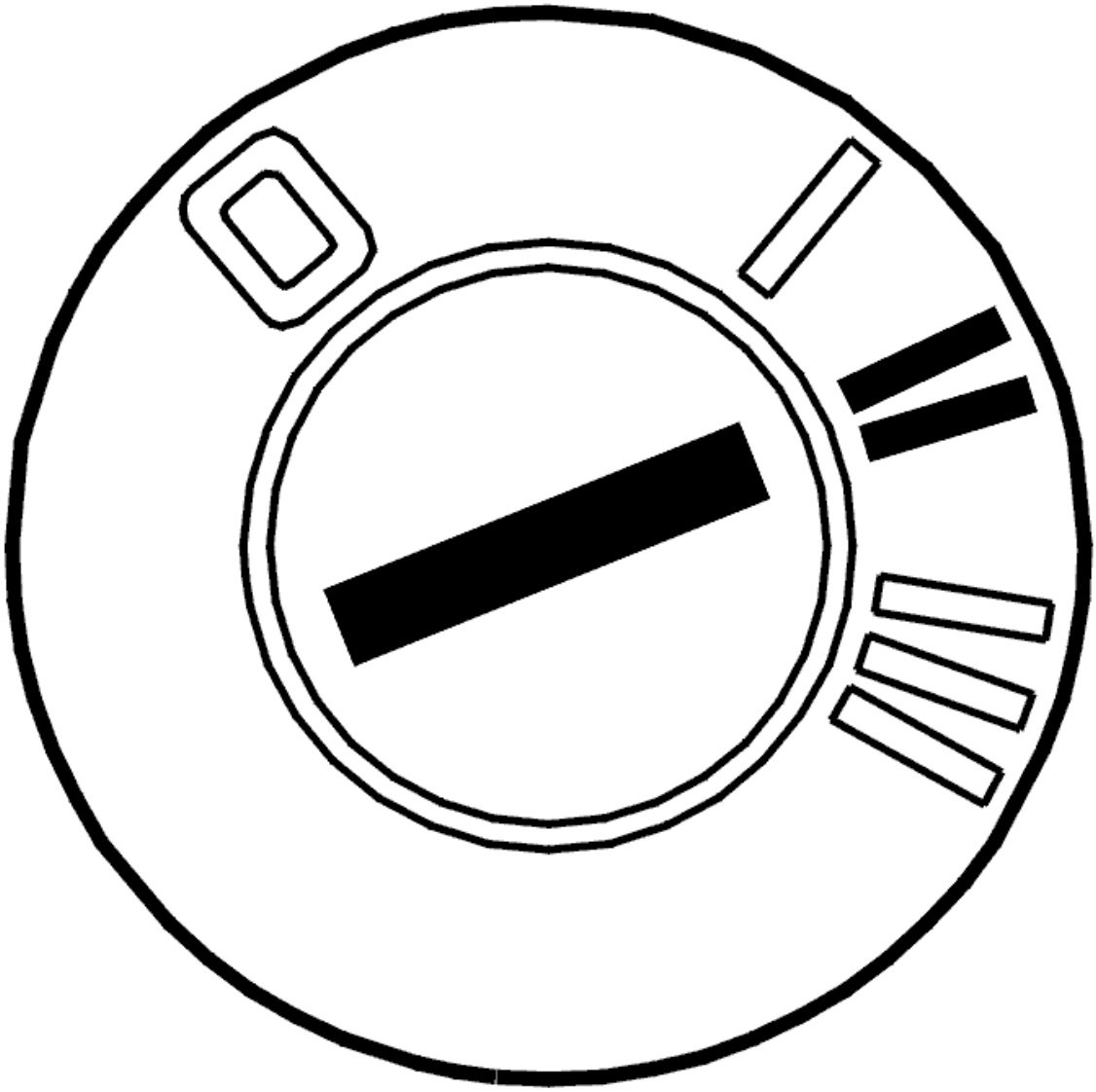


Fig. 60: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P.
- Try to move the gear selector lever without depressing the brake pedal. It should not be possible to move the gear selector lever.
- Try to move the gear selector lever with the brake pedal depressed. It should now be possible to move the gear selector lever.

If the gear selector lever function is **not** OK it indicates that the fault is permanent.

If the gear selector lever function is OK it means that the fault was present previously but is not active now. There is an intermittent fault.

- **Continue**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

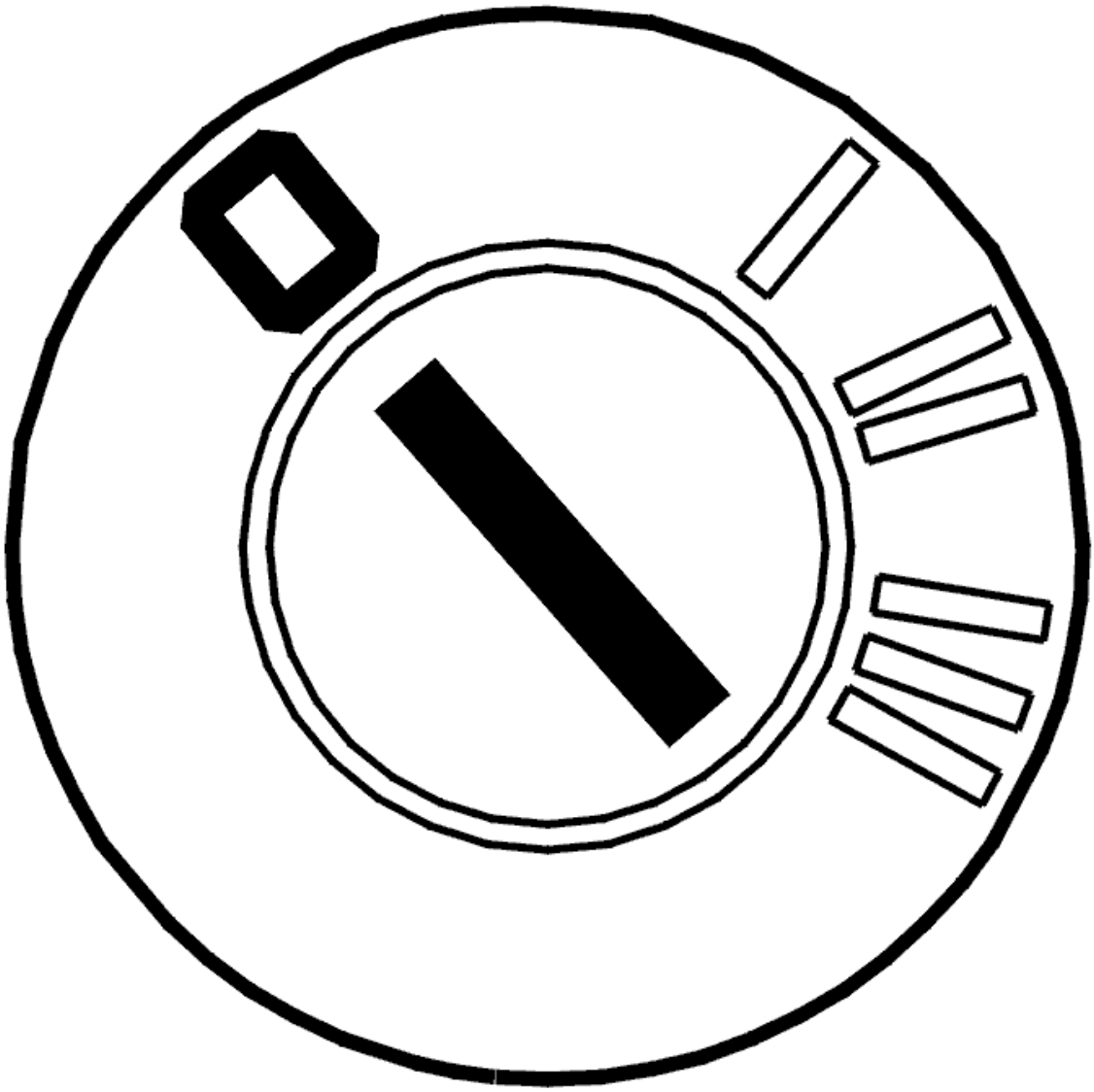


Fig. 61: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

Check the cable between the connector on the transmission control module (TCM) # 13 (#A43), gear selector module (GSM) #3 and the solenoid for P-lockout connector #2 for short-circuit to ground.

Check the resistance of the solenoid between terminals #1 and #2 on the connector. If the resistance is not correct, replace the solenoid.

Remedy as necessary.

Other information

- see **SOLENOID SHIFT LOCK, REPLACE**
- For resistance values: **COMPONENT SPECIFICATIONS**
- see **CONTENTS**

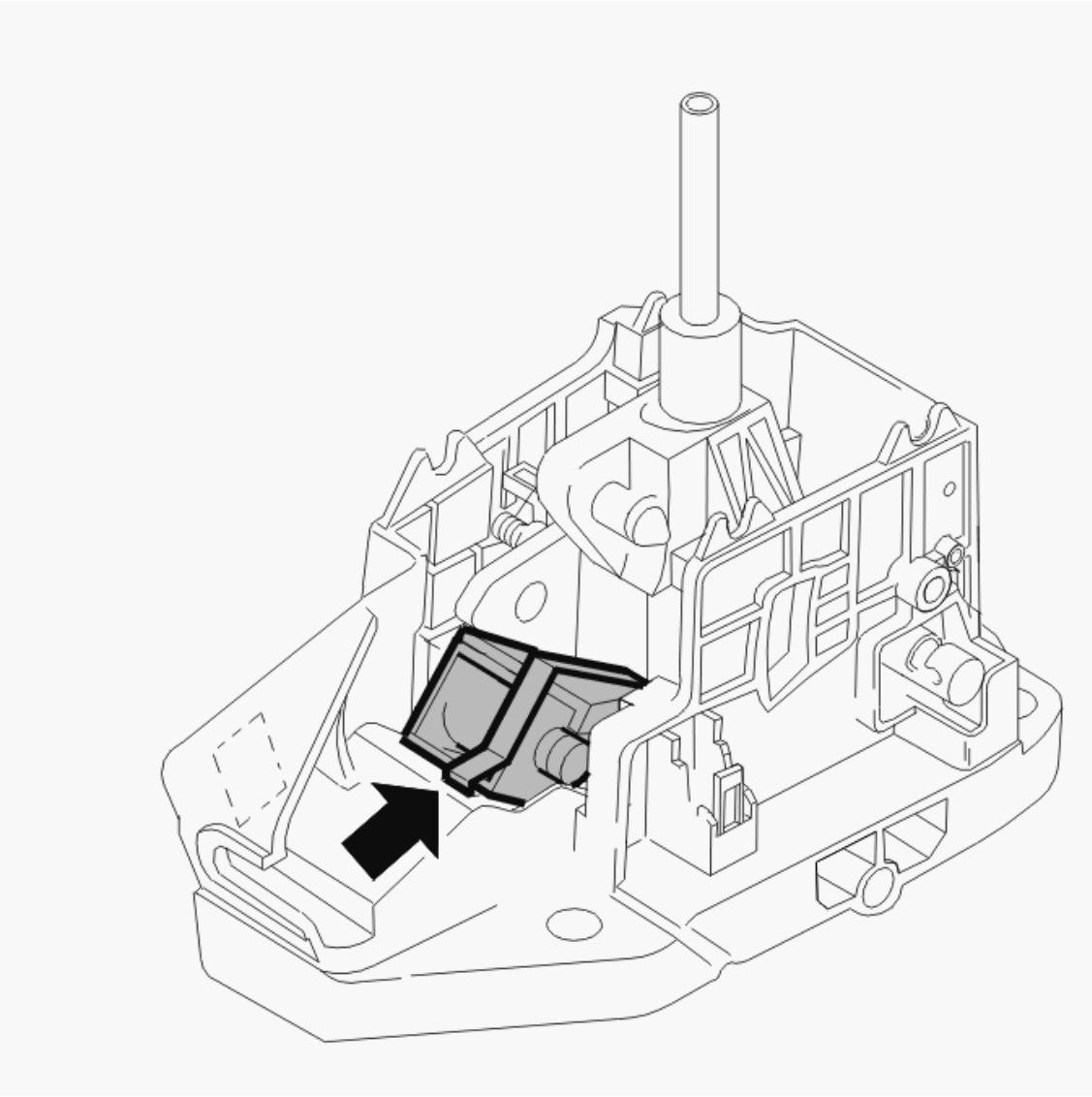


Fig. 62: Identifying Shift-Lock
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

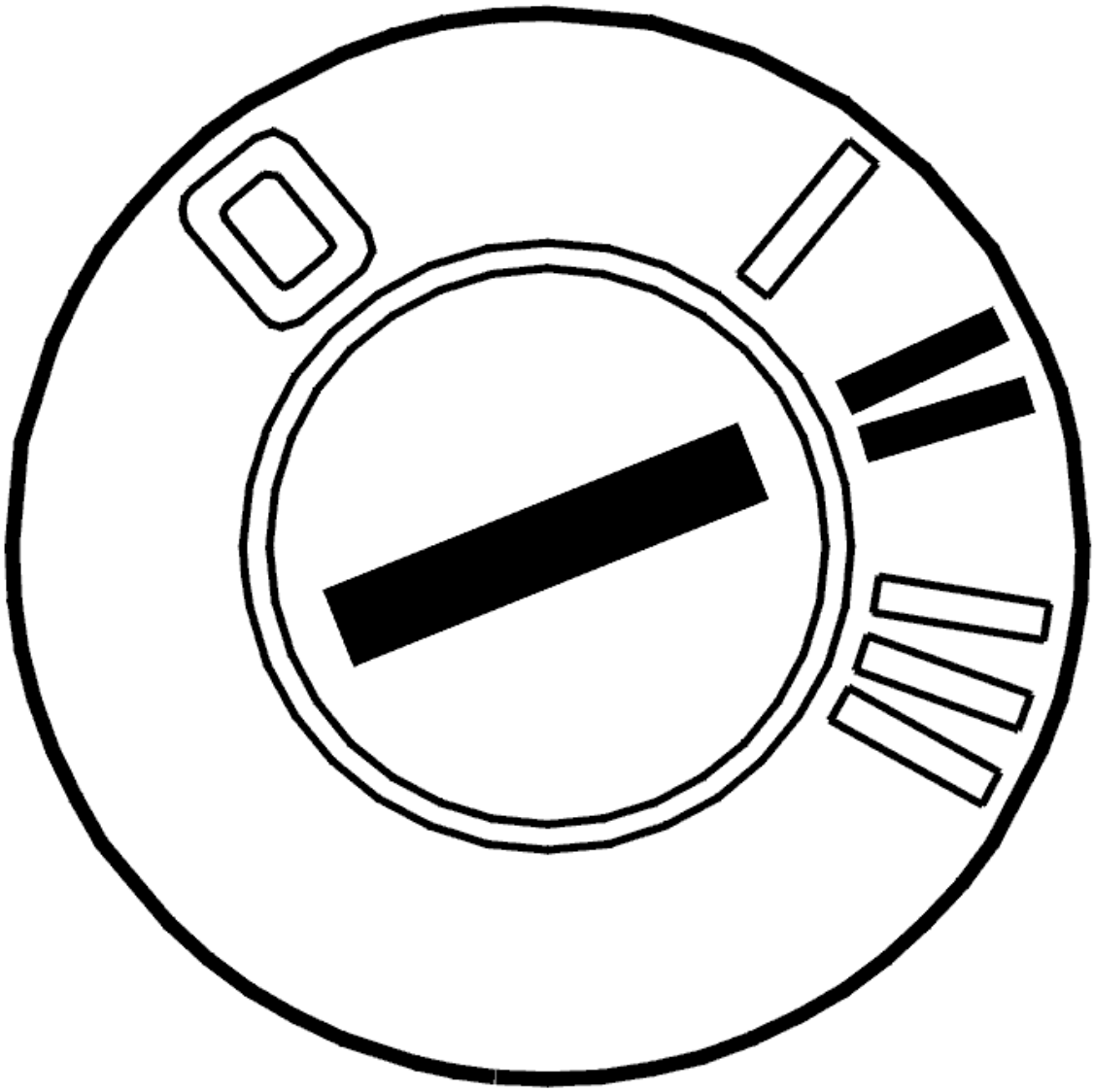


Fig. 63: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

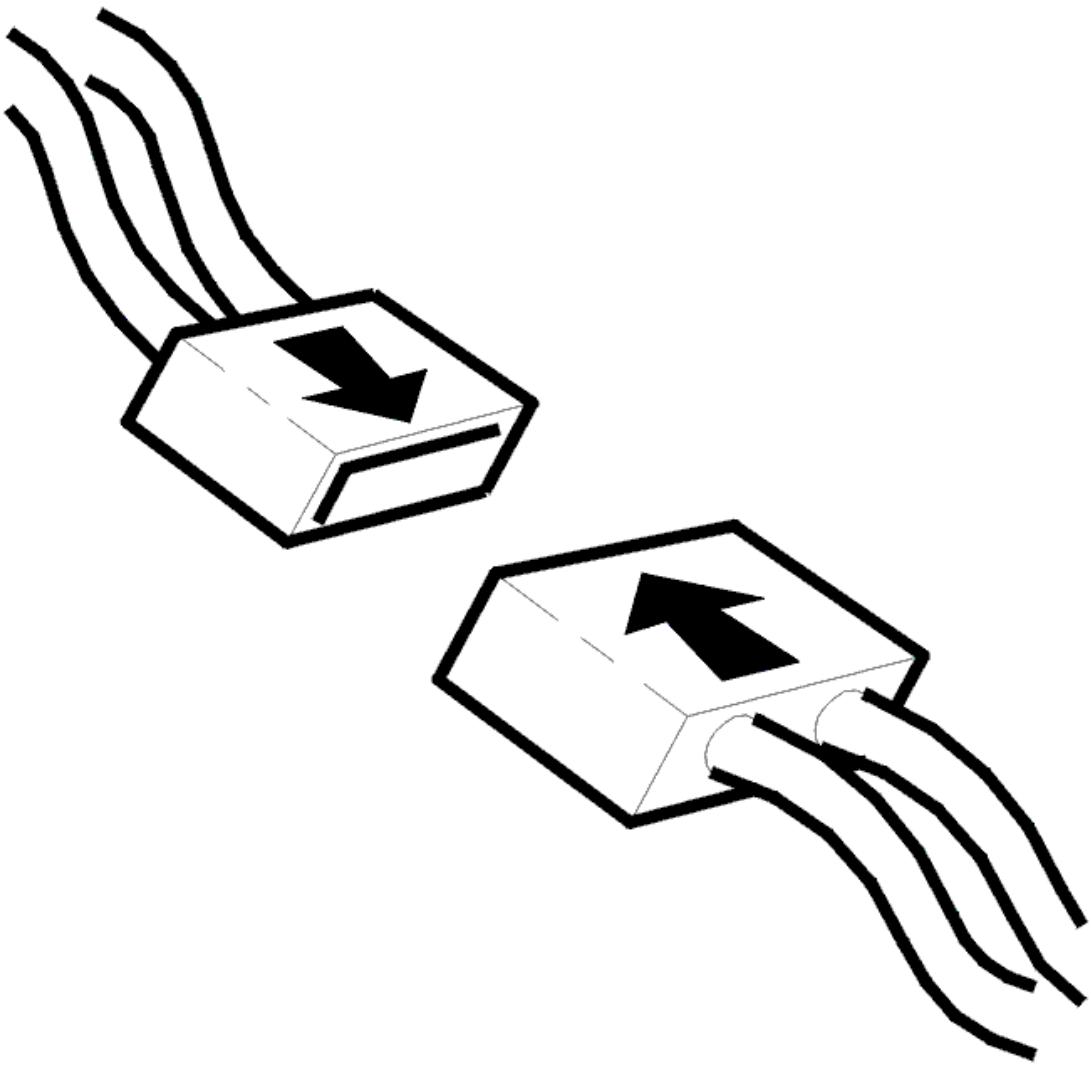


Fig. 64: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Gear selector in position P.
- Try to move the gear selector lever without depressing the brake pedal. It should not be possible to move the gear selector lever.
- Try to move the gear selector lever with the brake pedal depressed. It should now be possible to move the gear selector lever.

Is the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P093011: GEAR SHIFT LOCK SOLENOID CIRCUIT LOW. GENERAL ELECTRICAL FAILURES. CIRCUIT SHORT TO GROUND (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P093011

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P093011**

FAULT-TRACING TCM-P093011

see **FAULT-TRACING TCM-P093011**

TCM-P093112: GEAR SHIFT LOCK SOLENOID CIRCUIT HIGH. GENERAL ELECTRICAL FAILURES. CIRCUIT SHORT TO BATTERY (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P093112

Condition

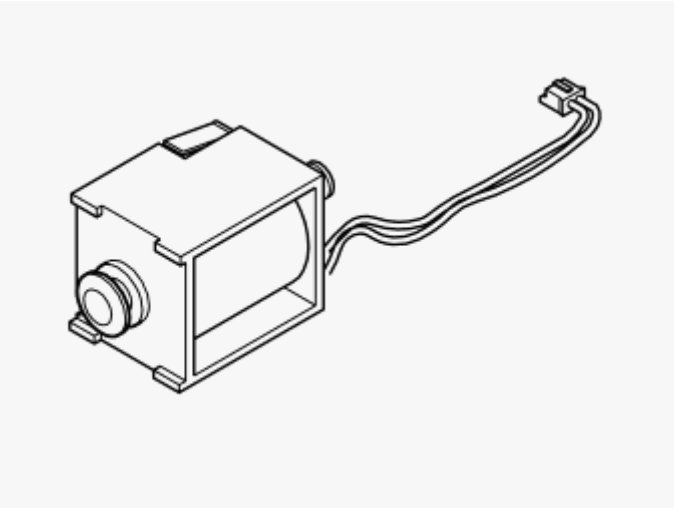


Fig. 65: Identifying Gear Selector Module (GSM)
Courtesy of VOLVO CARS CORPORATION

The gear selector module (GSM) is located at the rear edge of the gear shift assembly's left side. The Gear selector module (GSM) communicates with the Transmission control module (TCM) via an internal network, Local Interconnect Network (LIN), to activate the shift-lock function among other things.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The solenoid's driver stage is active when it should be inactive.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

Substitute Value

- No blocking of the gear selector.

Possible Source

- Short-circuit to ground in the signal cable.
- Internal fault in gear selector module (GSM).

Fault symptom[s]

- Gear lever movable with ignition off

FAULT-TRACING

CHECKS

CHECKING THE STATUS

Fig. 66: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Gear selector in position P.

  Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.

  Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

  If the gear selector function is OK, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

- **Continue**

  Refer to **CHECKING THE COMPONENT**

CHECKING THE COMPONENT

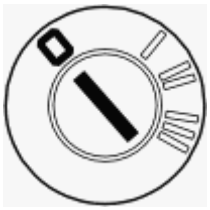


Fig. 67: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

Check the cable for a short-circuit to supply voltage.

Take readings between:

- Transmission control module (TCM) #A13 (#A43) and gear selector module (GSM) #3.

Check the solenoid's resistance by connecting an ohmmeter between terminals #1 and #2 on the solenoid's connector.

For the resistance values, see below. Replace the solenoid if the resistance is incorrect.

Other information

- see **CHECKING WIRING AND TERMINALS**
- see **SOLENOID SHIFT LOCK, REPLACE**
- see **COMPONENT SPECIFICATIONS**

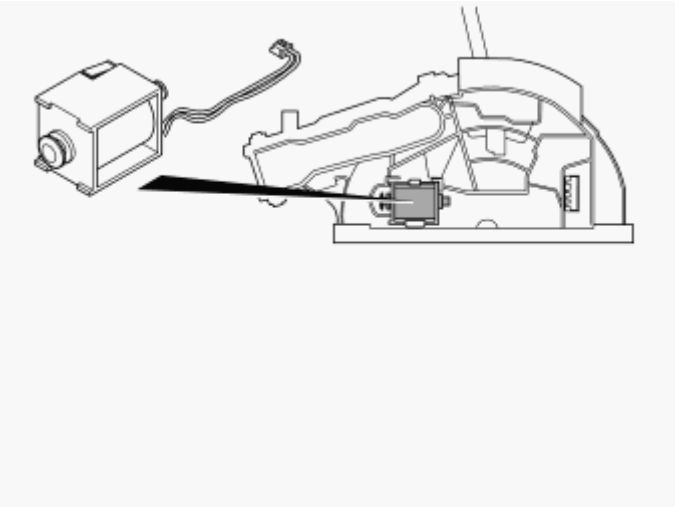


Fig. 68: Locating Gear Selector Module (GSM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 69: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Gear selector in position P.

  Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.

  Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-P093112: GEAR SHIFT LOCK SOLENOID CIRCUIT HIGH. GENERAL ELECTRICAL FAILURES. CIRCUIT SHORT TO BATTERY (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P093112

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P093112**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P093112: GEAR SHIFT LOCK SOLENOID CIRCUIT HIGH. GENERAL ELECTRICAL FAILURES. CIRCUIT SHORT TO BATTERY (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P093112

Condition

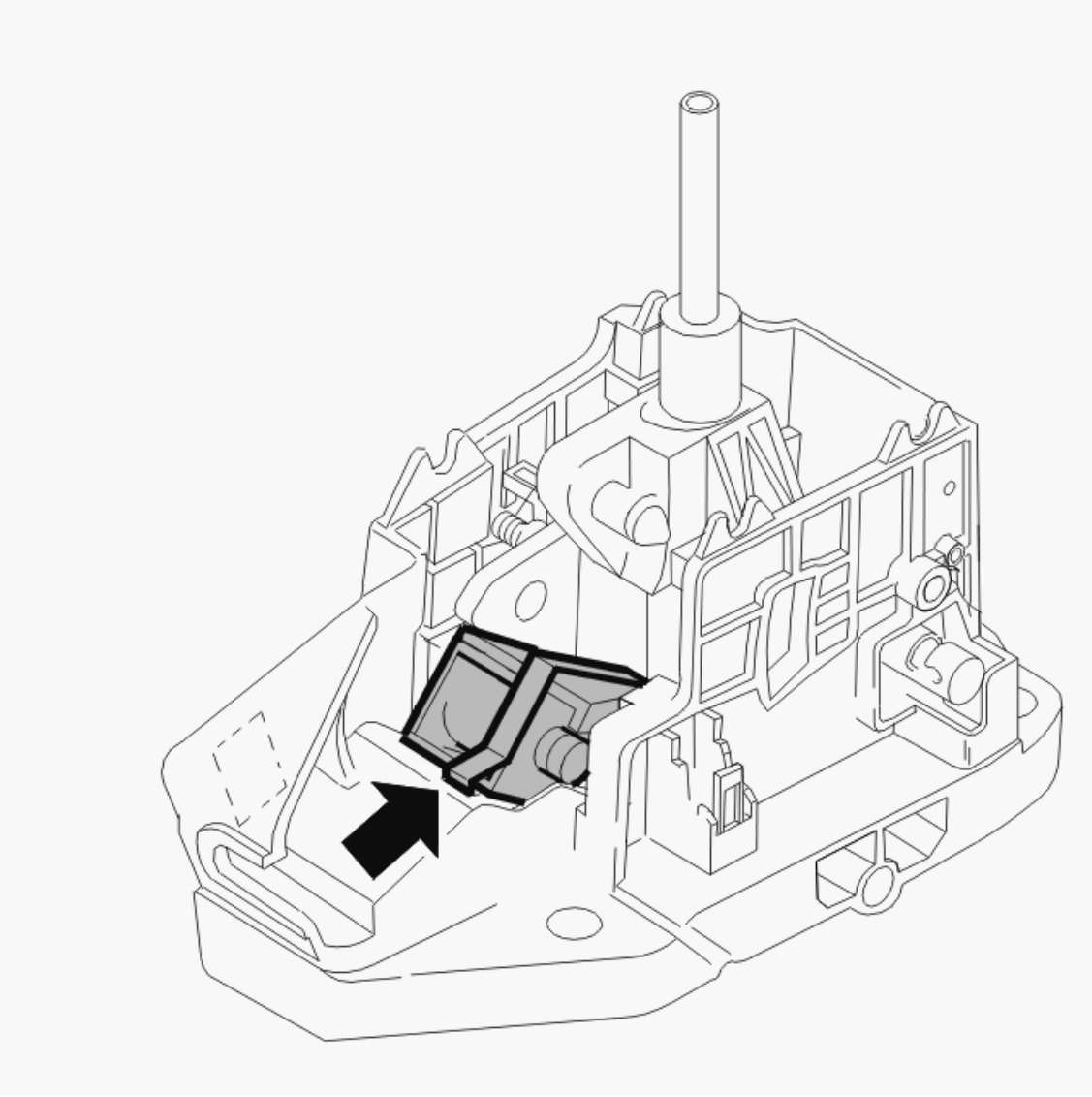


Fig. 70: Identifying Shift-Lock
Courtesy of VOLVO CARS CORPORATION

The gear selector module (GSM) is located under the top panel of the lever carrier. The gear selector module (GSM) communicates with the transmission control module (TCM) via an internal network, Local Interconnect Network (LIN), for activating the gear inhibitor function (shift lock).

If the gear selector module (GSM) registers that the solenoid power stage is active when it should be inactive, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Gear selector not blocked.

Possible Source

- The signal cable is short-circuited to voltage.
- Solenoid not working.
- Internal fault in gear selector module (GSM).

Fault symptom[s]

- General warning lamp lit
- Gear selector can be moved when ignition off.

FAULT-TRACING TCM-P093112

CHECKS

CHECK THE FUNCTION SOLENOID FOR THE SHIFT LOCK

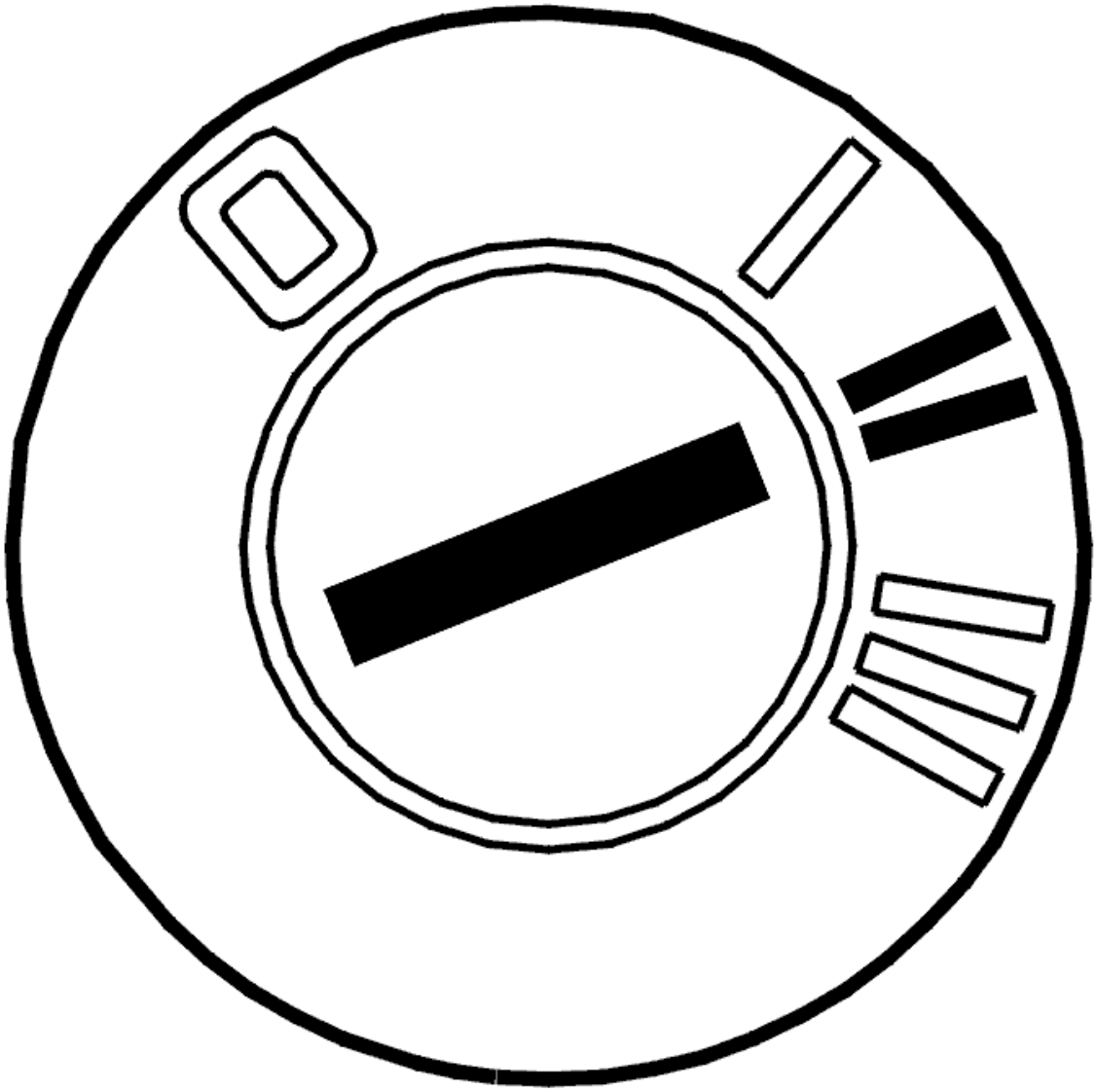


Fig. 71: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P.
- Try to move the gear selector lever without depressing the brake pedal. It should not be possible to move the gear selector lever.
- Press down the brake pedal and try to move the gear selector to another position. Now it shall be possible to move the gear selector.

  If the gear selector lever function is **not** OK it indicates that the fault is permanent.

  If the gear selector lever function is OK it means that the fault was present previously but is not active now. There is an intermittent fault.

- **Continue**

  Refer to **CHECKING THE WIRING AND COMPONENT**

CHECKING THE WIRING AND COMPONENT

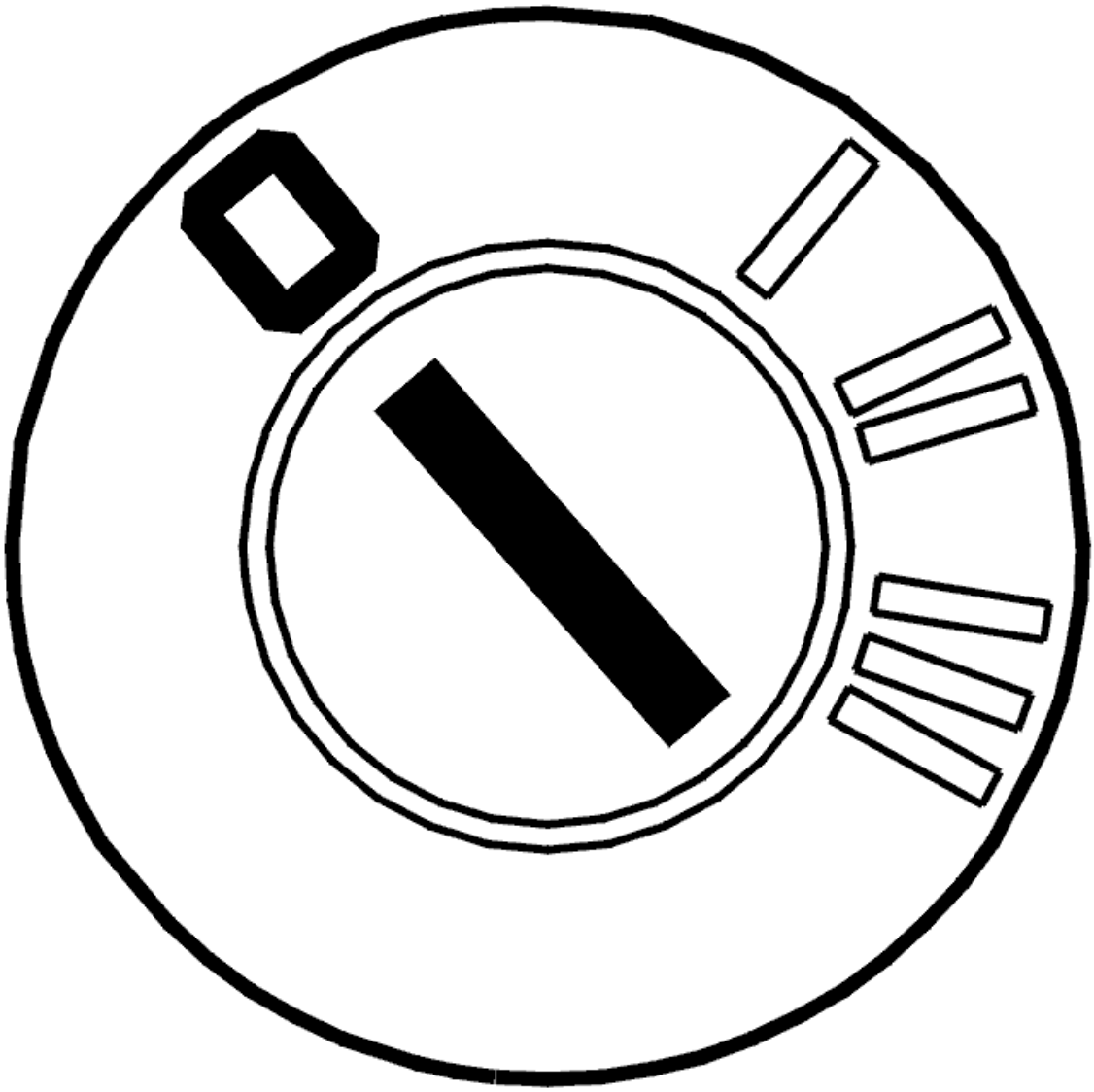


Fig. 72: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

Check the cable between the connector on the transmission control module (TCM) #13 (#A43), gear selector module (GSM) #3 and the solenoid for P-lockout connector #2 for short-circuit to voltage.

Remedy as necessary.

Check the resistance of the solenoid between terminals #1 and #2 on the connector. If the resistance is not correct, replace the solenoid.

Other information

- see **SOLENOID SHIFT LOCK, REPLACE**
- For resistance values: **COMPONENT SPECIFICATIONS**
- see **CONTENTS**

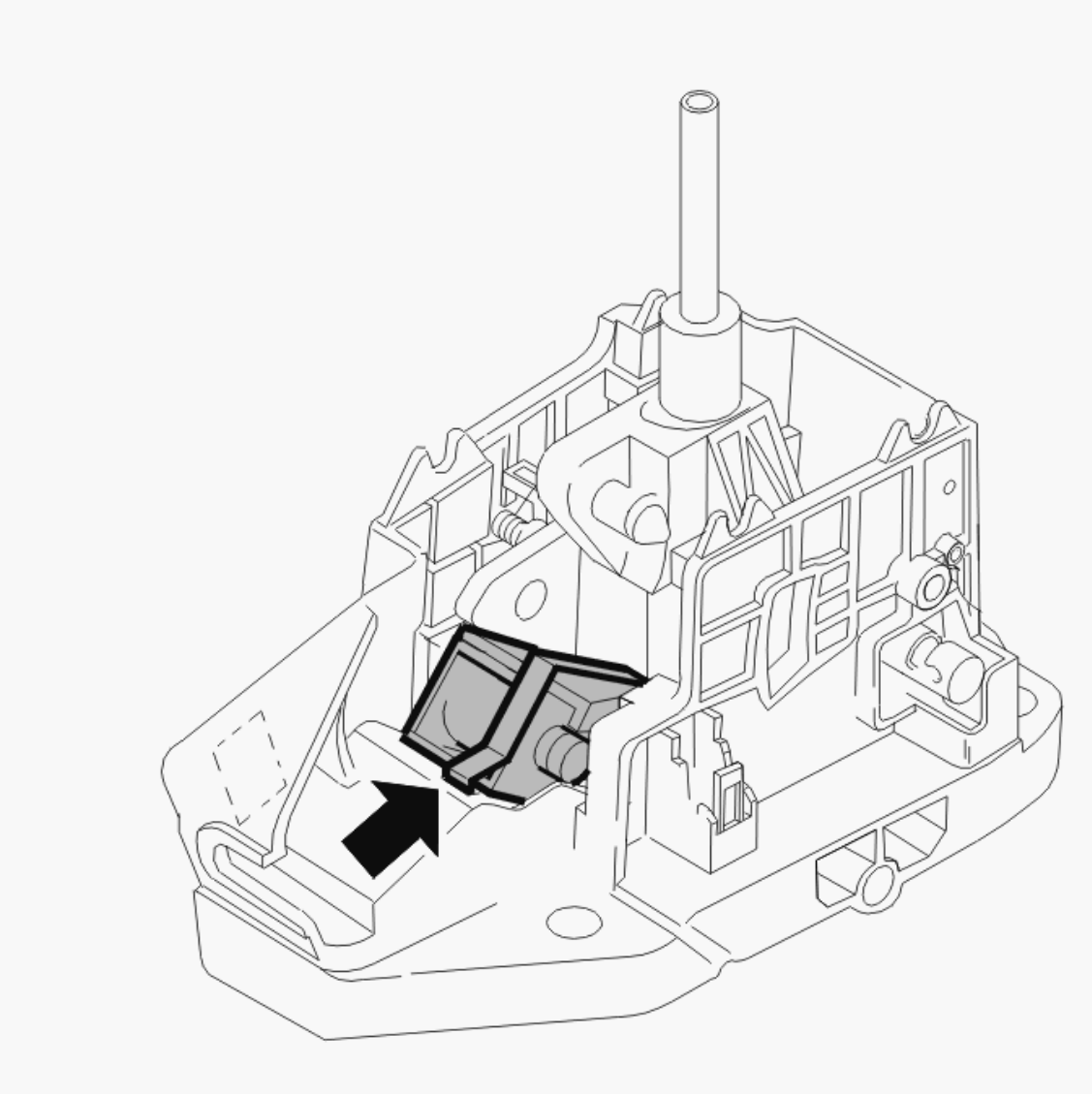


Fig. 73: Identifying Shift-Lock
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

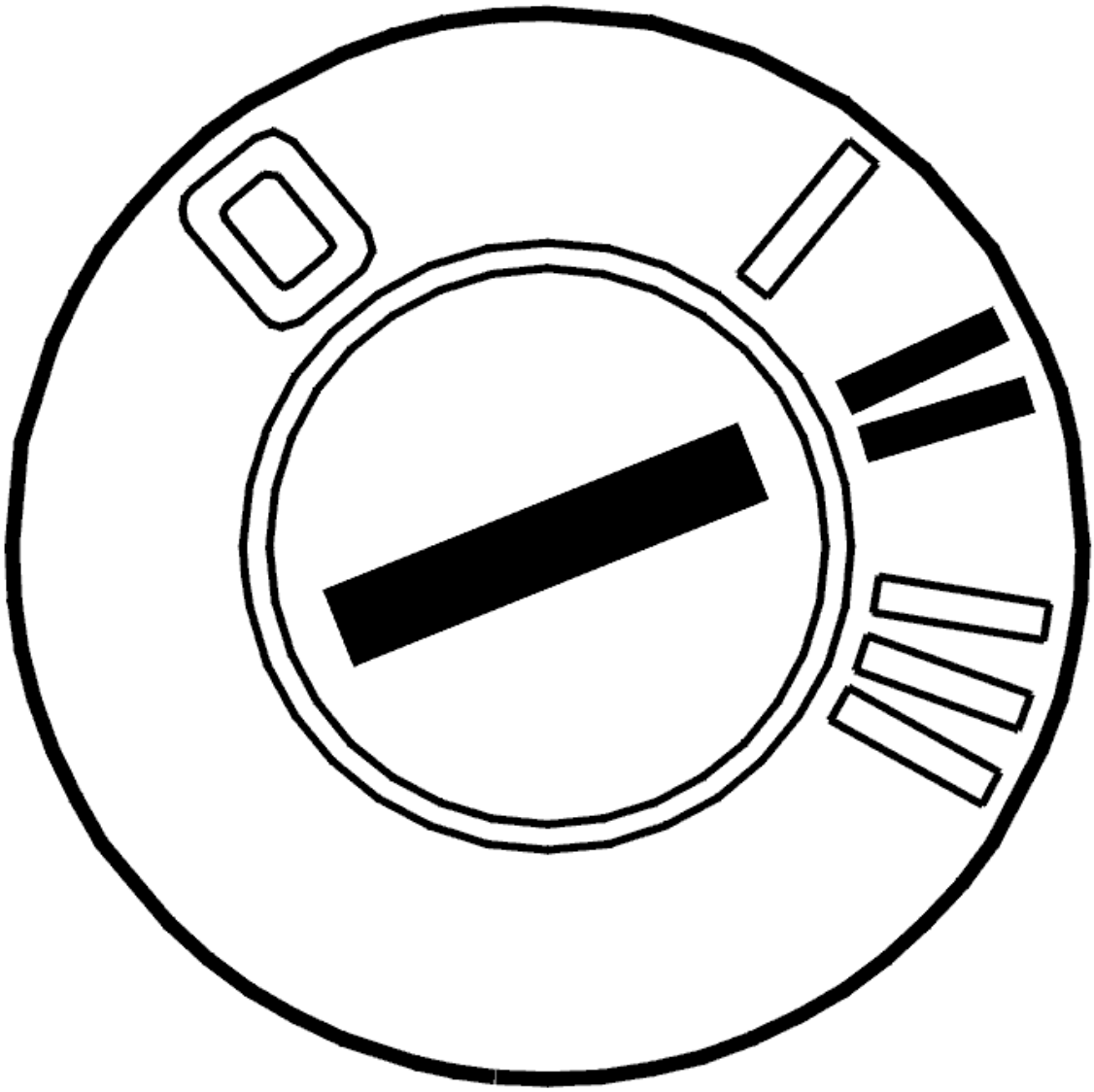


Fig. 74: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

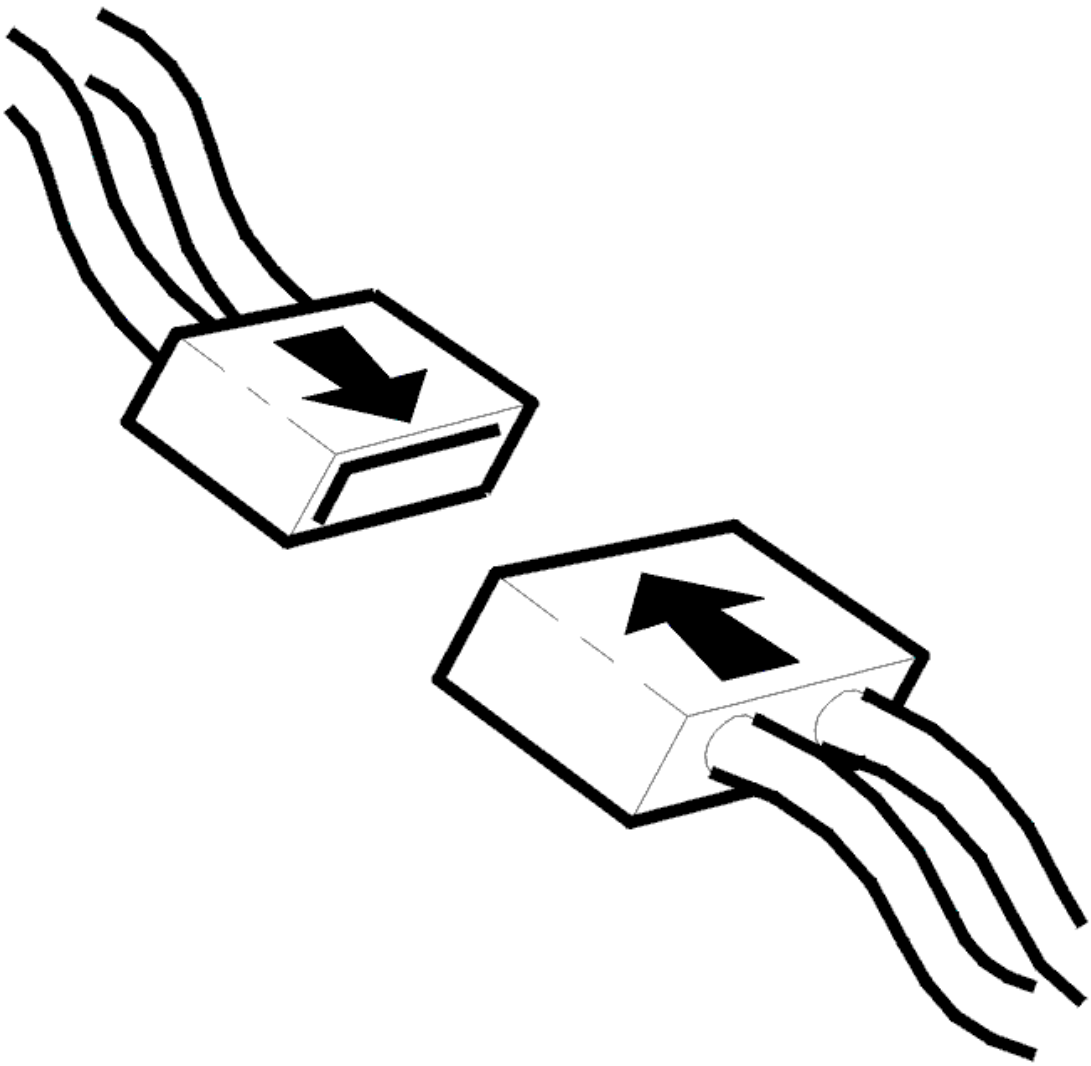


Fig. 75: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Gear selector in position P.
- Try to move the gear selector lever without depressing the brake pedal. It should not be possible to move the gear selector lever.
- Try to move the gear selector lever with the brake pedal depressed. It should now be possible to move the gear selector lever.

Is the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P093112: GEAR SHIFT LOCK SOLENOID CIRCUIT HIGH. GENERAL ELECTRICAL FAILURES. CIRCUIT SHORT TO BATTERY (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P093112

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P093112**

FAULT-TRACING TCM-P093112

see **FAULT-TRACING TCM-P093112**

TCM-P096000: PRESSURE CONTROL SOLENOID A CONTROL CIRCUIT / OPEN. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096000

Condition

Linear pressure solenoid SLT controls system pressure in the transmission. The solenoid is controlled by power stages at the output of the transmission control module (TCM).

The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Open circuit in solenoid SLT circuit.

Solenoid SLT cannot then control the line pressure.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

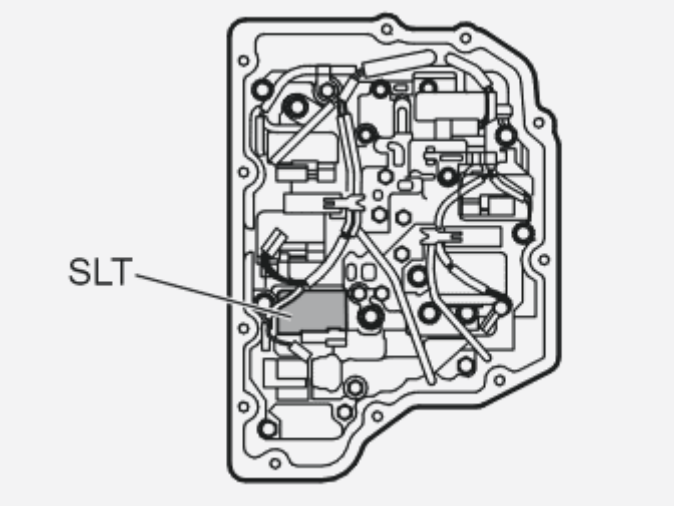


Fig. 76: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started. See **EMERGENCY MODE IN THE EVENT OF A FAULT**

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the cable for the control signal or signal ground.
- Linear pressure solenoid SLT not working.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- No lock-up
- Rough gear shift

FAULT-TRACING

CHECKS

CHECKING LINE PRESSURE SOLENOID SLT

Fig. 77: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLT by clicking on the VCT2000 symbol.

  Read off the current through the solenoid SLT circuit. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 78: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

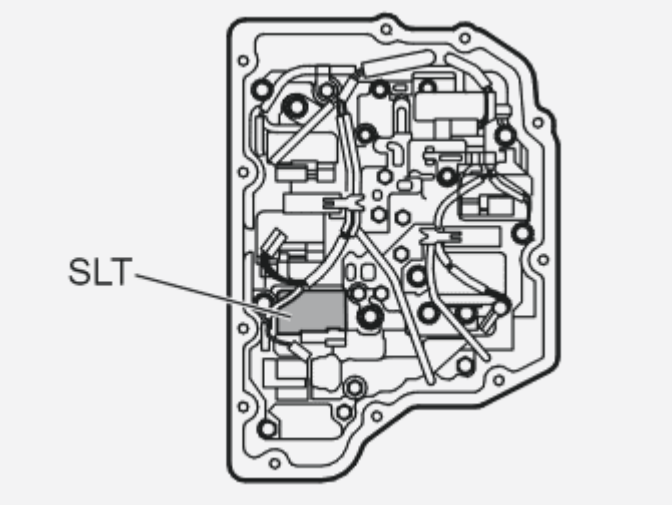


Fig. 79: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

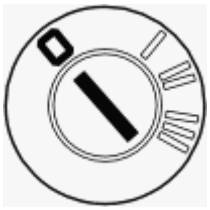


Fig. 80: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  Check the cables for open circuit and short circuit to ground.

  Take readings between:

  - Transmission connector #B3 and the connector for solenoid SLT #1.
  - Transmission connector #B1 and the connector for solenoid SLT #2.

  HINT: If no fault is found in the wiring, check solenoid SLT. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

  If no fault is found in the wiring or the component replace the control system.

  Remedy as necessary.

  Other information

  - see **CONNECTING THE BREAKOUT BOX**
  - see **SIGNAL SPECIFICATION**
  - see **VALVE HOUSING**
  - see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
  - To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
  - see **CHECKING WIRING AND TERMINALS**

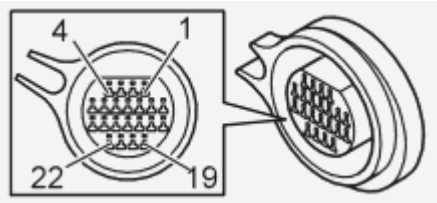


Fig. 81: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

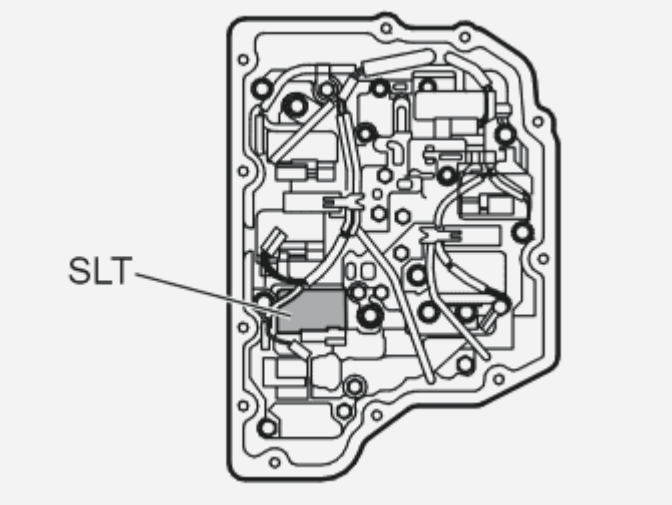


Fig. 82: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 83: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

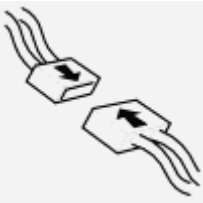


Fig. 84: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Activate solenoid SLT by clicking on the VCT2000 symbol.

  Read off the current through the solenoid SLT circuit. The current should oscillate between 100 and 950 mA.

Fig. 85: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

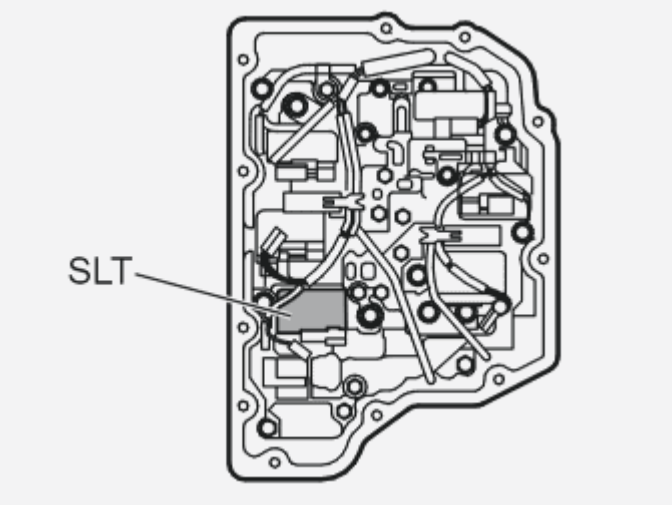


Fig. 86: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 87: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 88: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P096000: PRESSURE CONTROL SOLENOID A CONTROL CIRCUIT / OPEN. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096000**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P096000: PRESSURE REGULATOR SOLENOID A CONTROL CIRCUIT/BROKEN CIRCUIT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096000

Condition

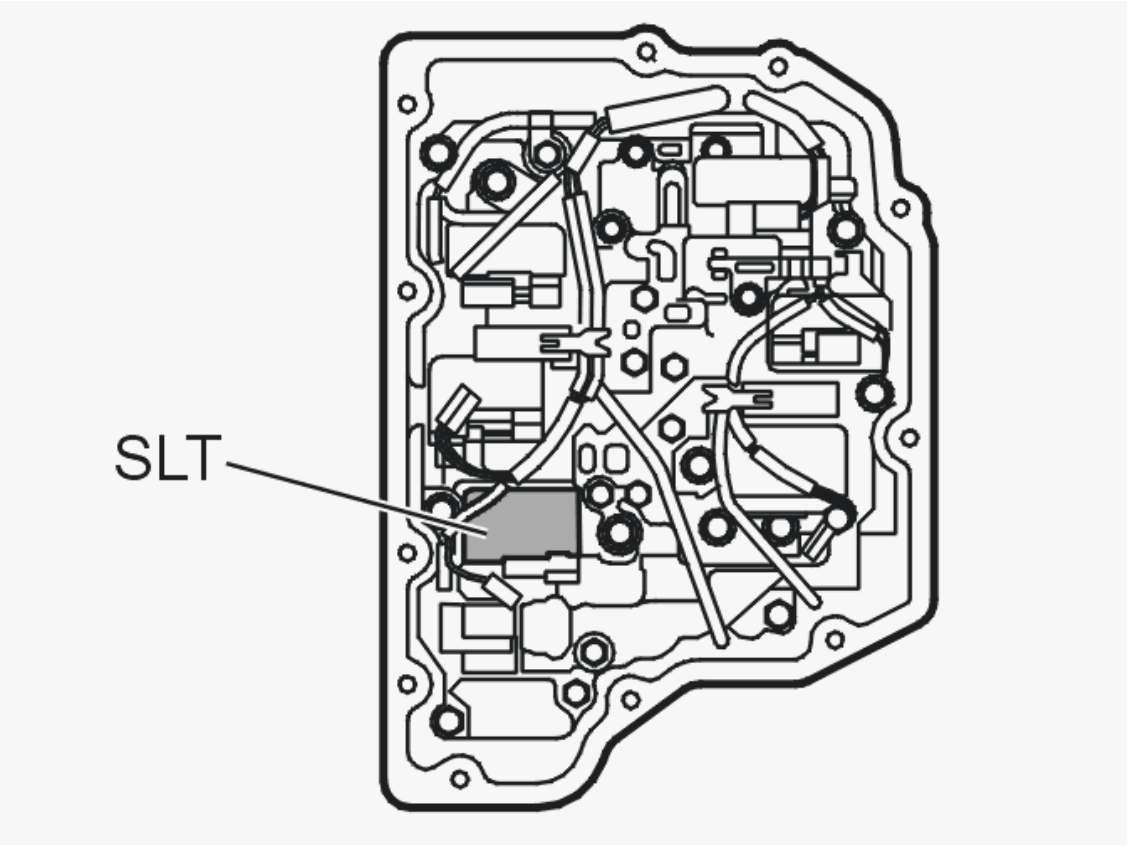


Fig. 89: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

Linear pressure solenoid SLT regulates the system pressure in the gearbox. The solenoid is controlled using a power stage on the output of the transmission control module (TCM).

The transmission control module (TCM) regulates the current to the solenoid with the help of the power stage. Low current gives high system pressure and high current (approx. 1A) gives low system pressure. The current strength is affected principally by the position of the accelerator throttle.

If they transmission control module (TCM) registers that there is a break in the circuit to the SLT solenoid, the diagnostic trouble code (DTC) is generated.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals
- Open circuit in lead for control signal or signal ground.

- Linear pressure solenoid SLT not working.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear changing

FAULT TRACING TCM-P096000

CHECKS

CHECKING THE LINE PRESSURE SOLENOID SLT

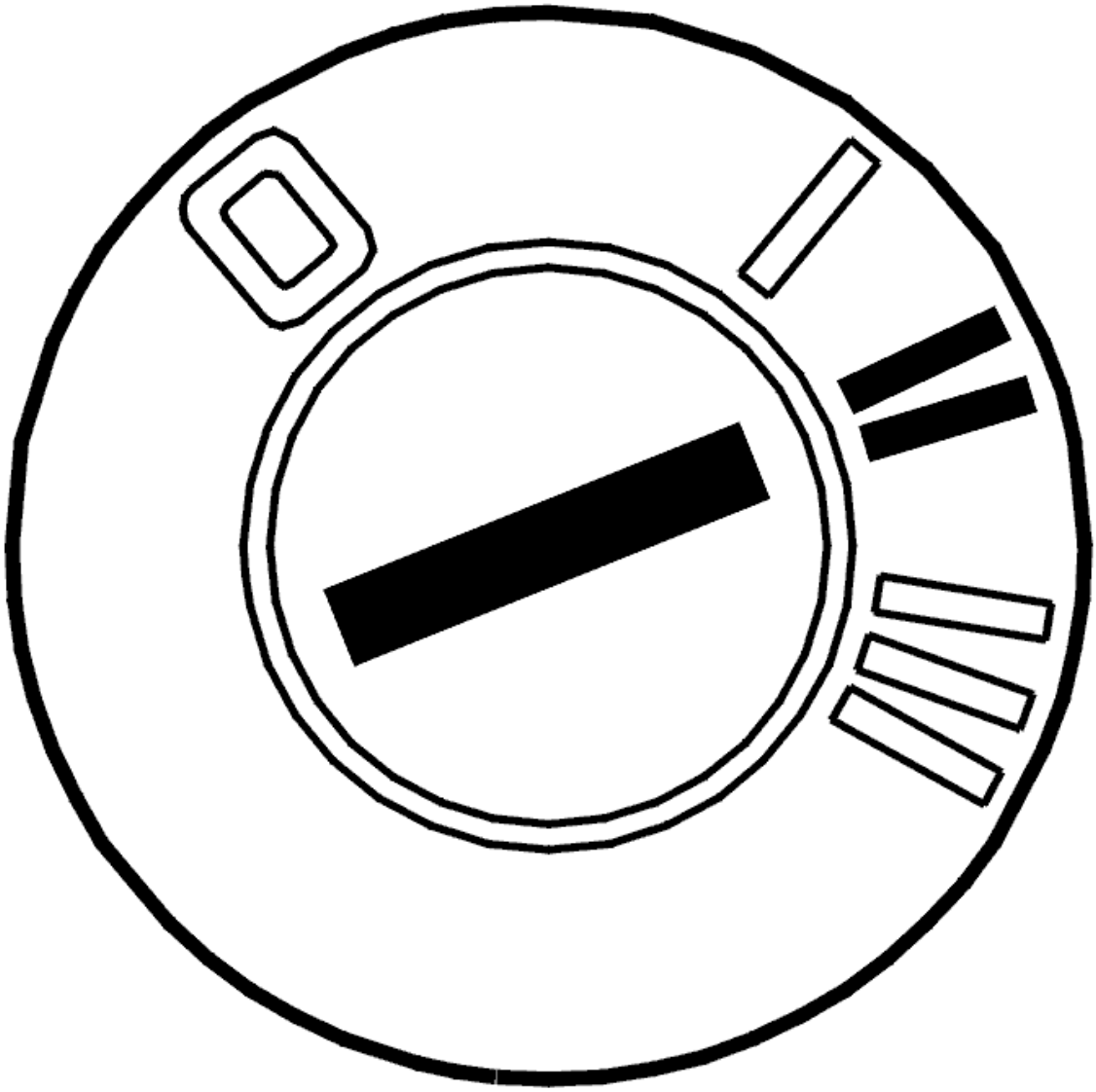


Fig. 90: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLT by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLT. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

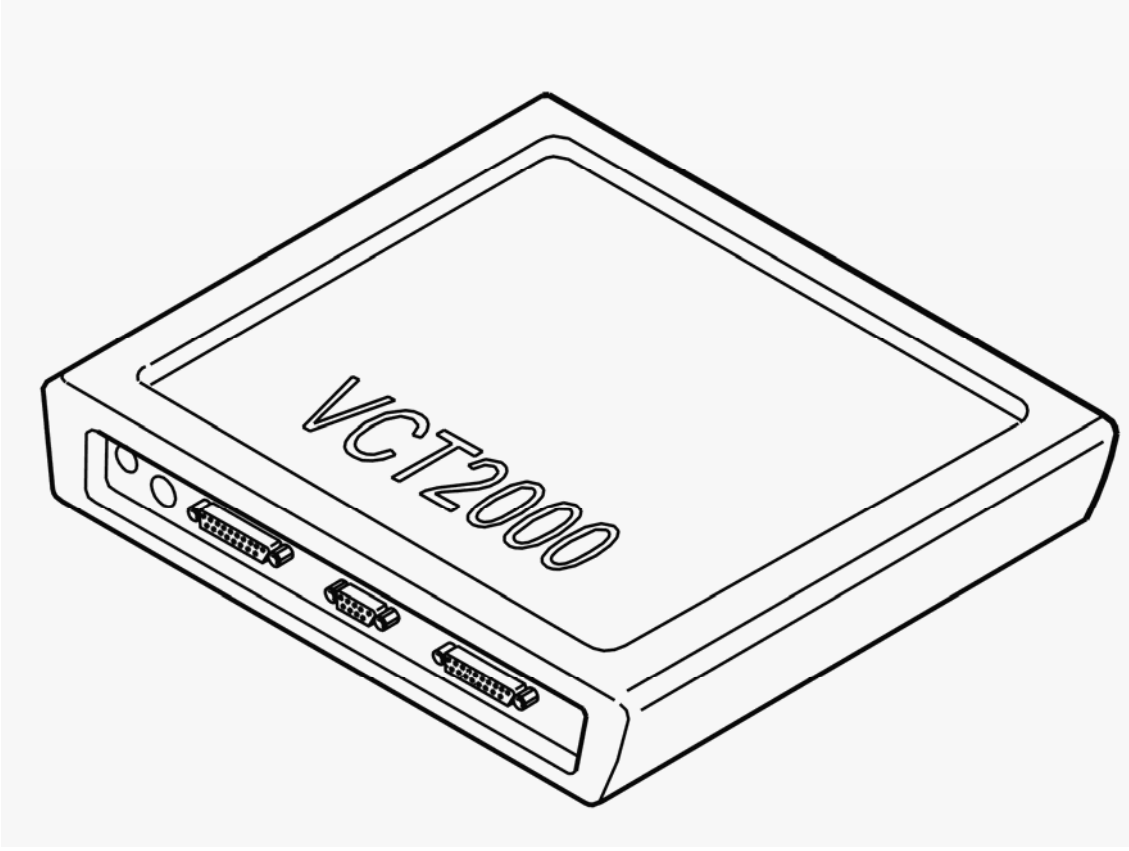


Fig. 91: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

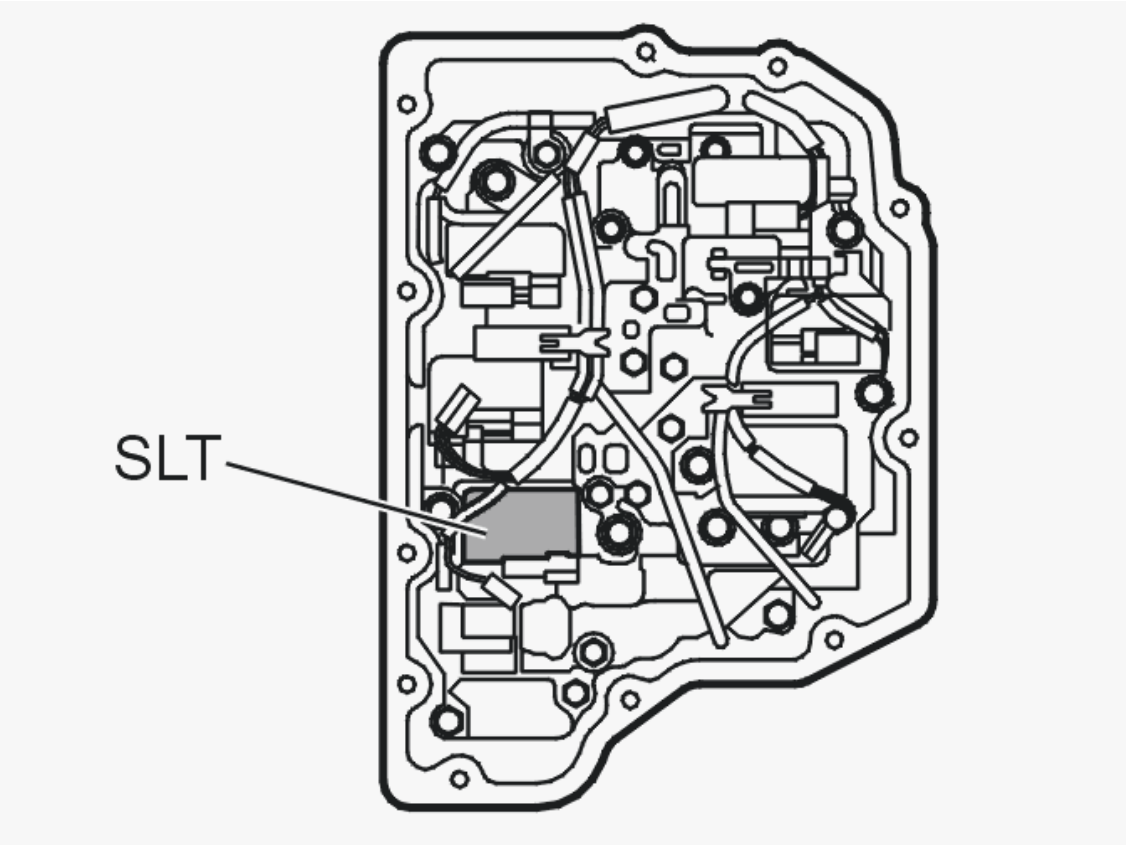


Fig. 92: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

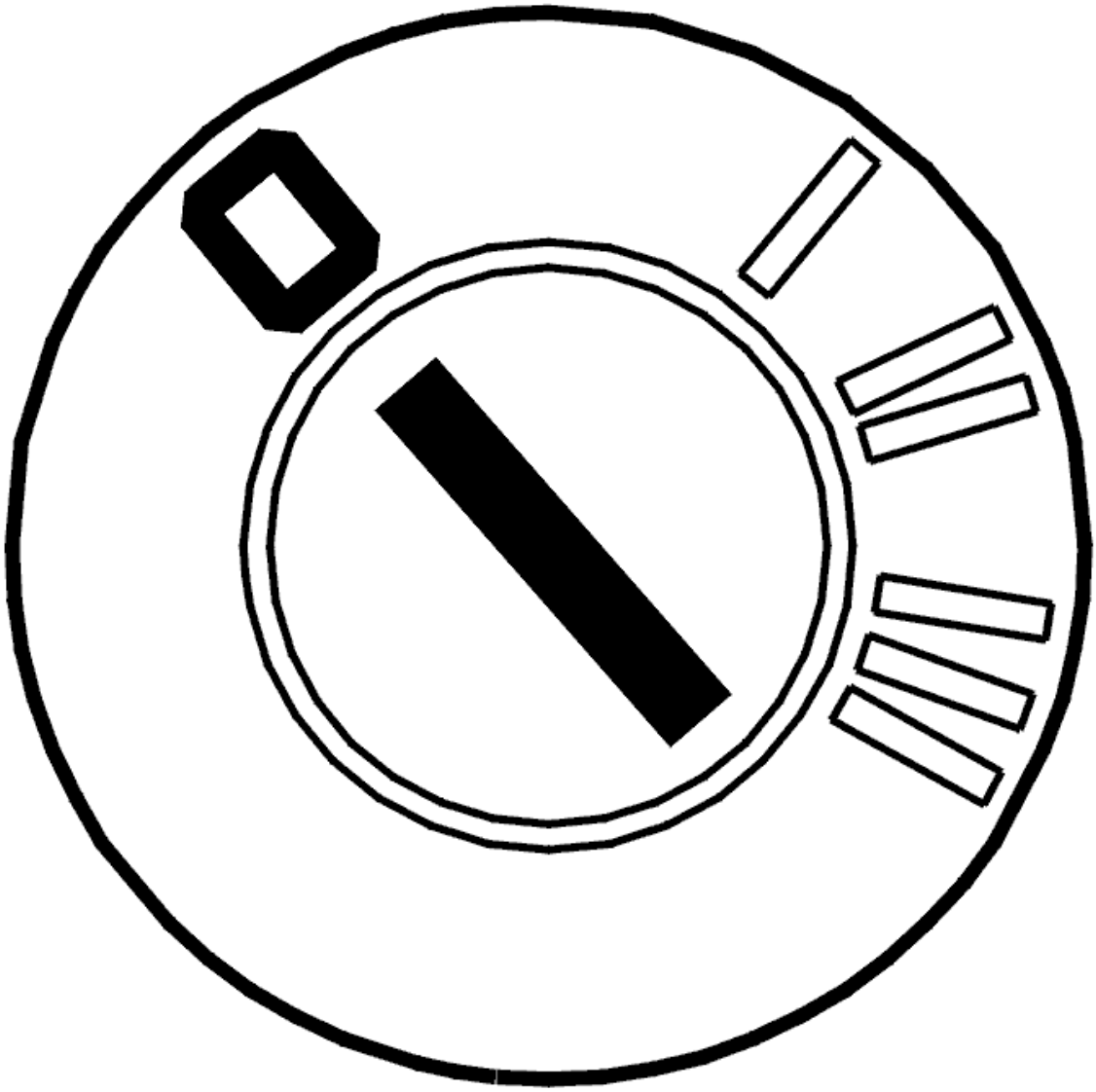


Fig. 93: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

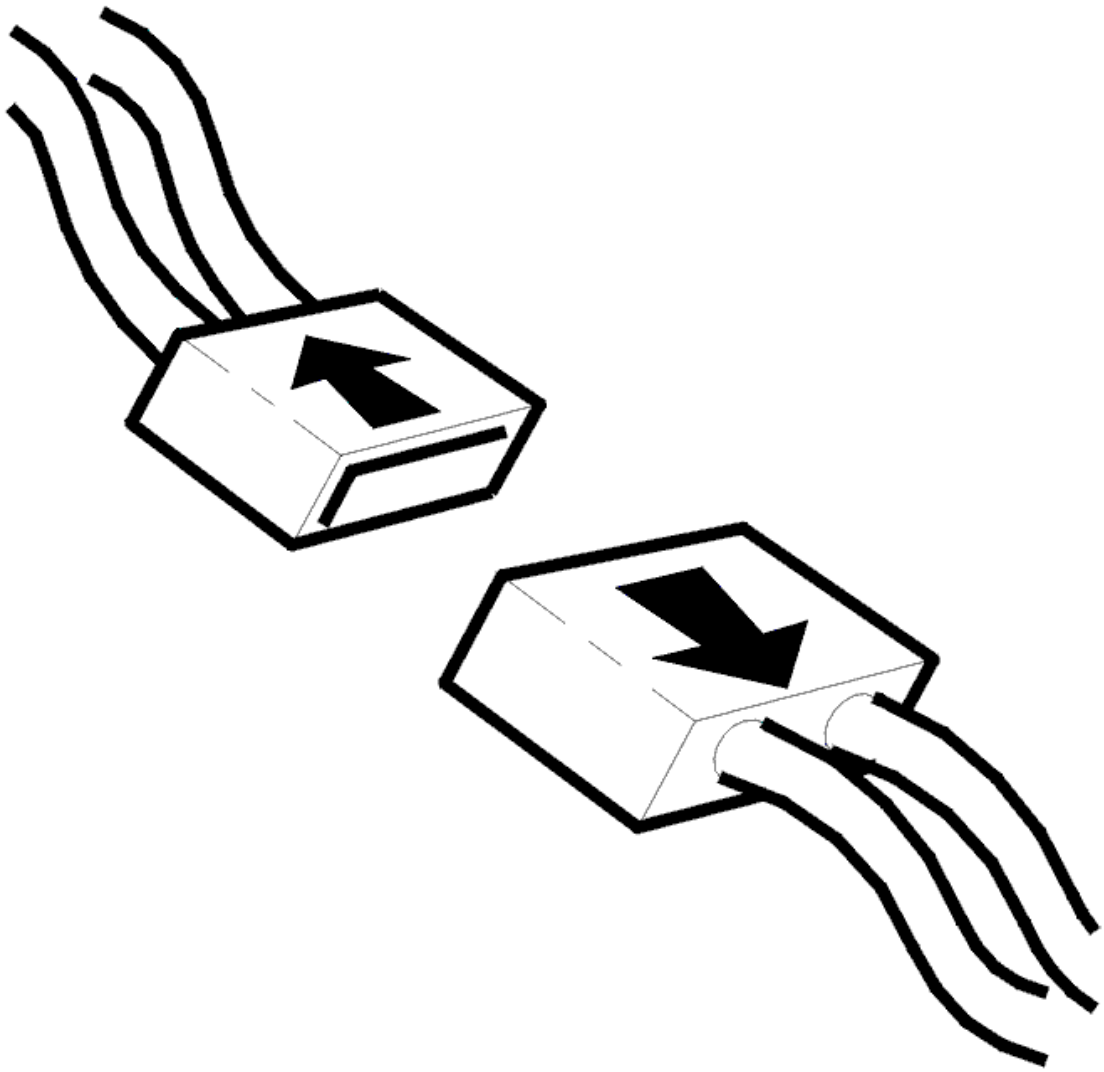


Fig. 94: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check connector B (22-pin) for the transmission control module (TCM). Check for damage and pressed in terminal pins. Check for contact resistance and oxidation.

Check the wiring between the transmission connector terminal #B3 and the connector for solenoid SLT terminal #1. Check the wiring between the transmission connector terminal #B1 and the connector for solenoid SLT terminal #2. Check for an open circuit. Check for a short-circuit to ground.

HINT: If no fault is found in the wiring check solenoid SLT. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **SIGNAL DESCRIPTION**
- see **CONNECTING THE BREAKOUT BOX**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

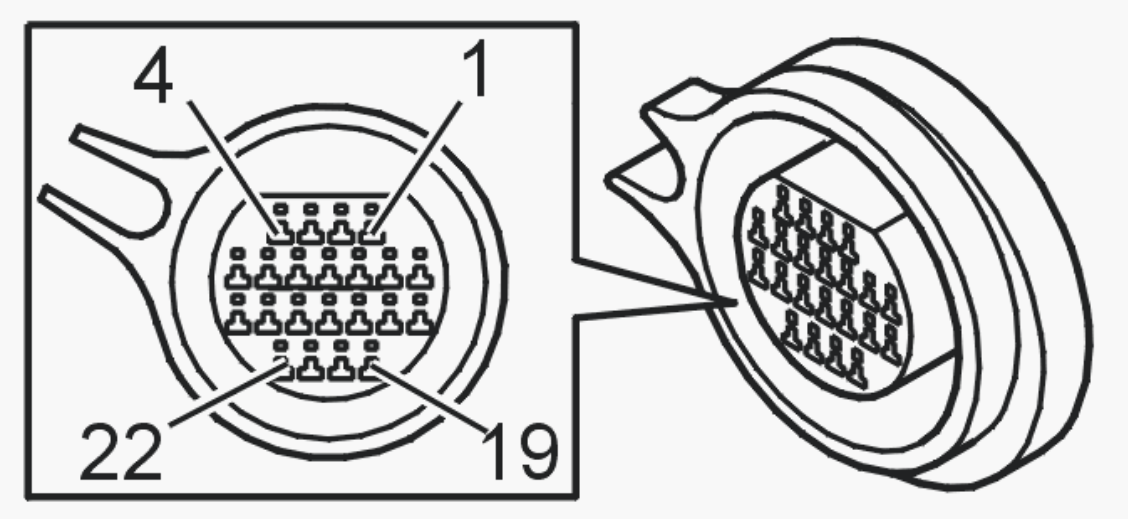


Fig. 95: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

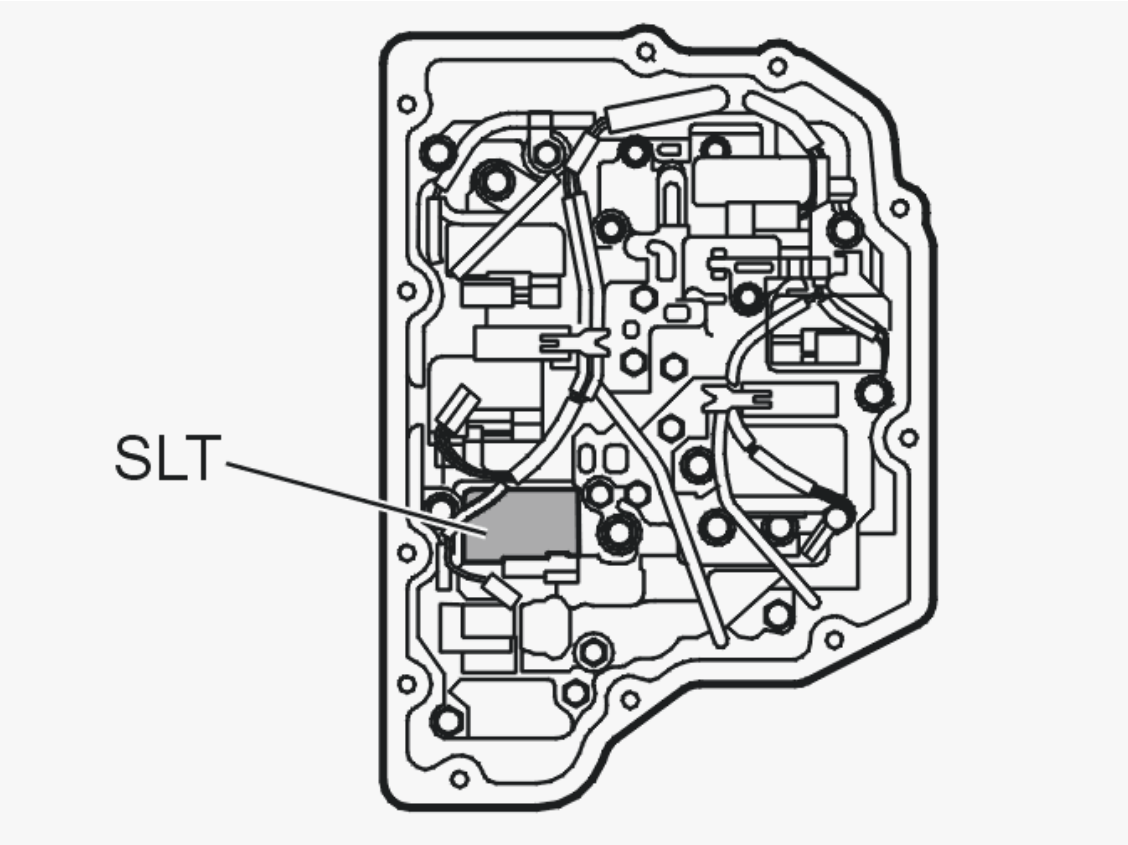


Fig. 96: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

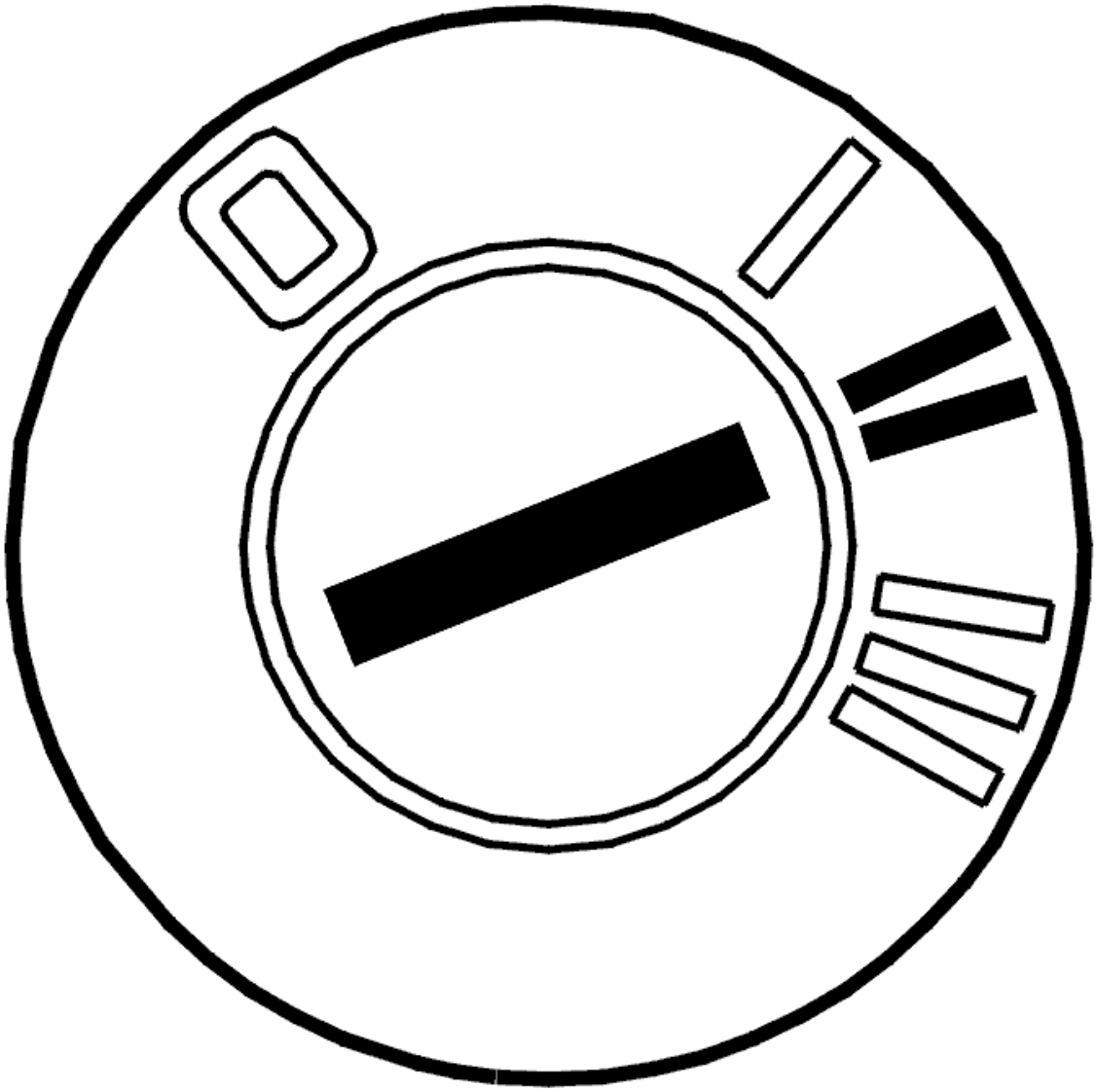


Fig. 97: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

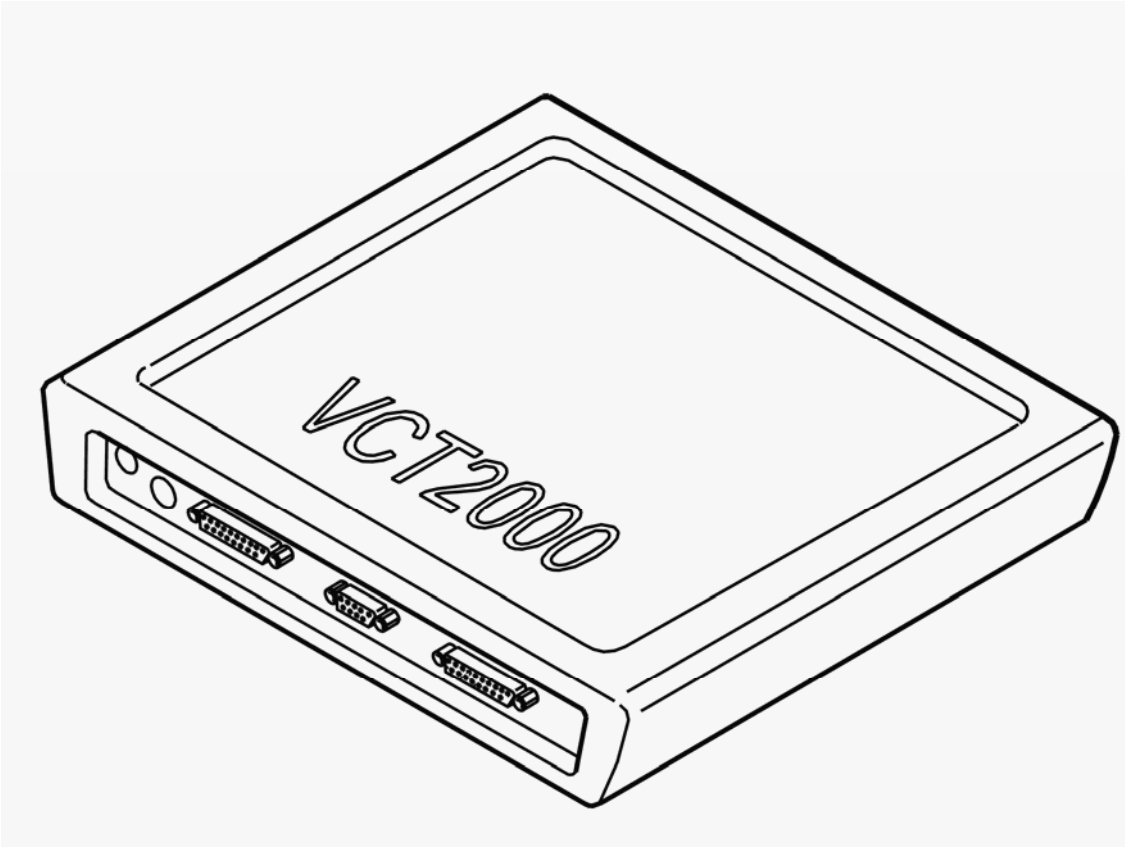


Fig. 98: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

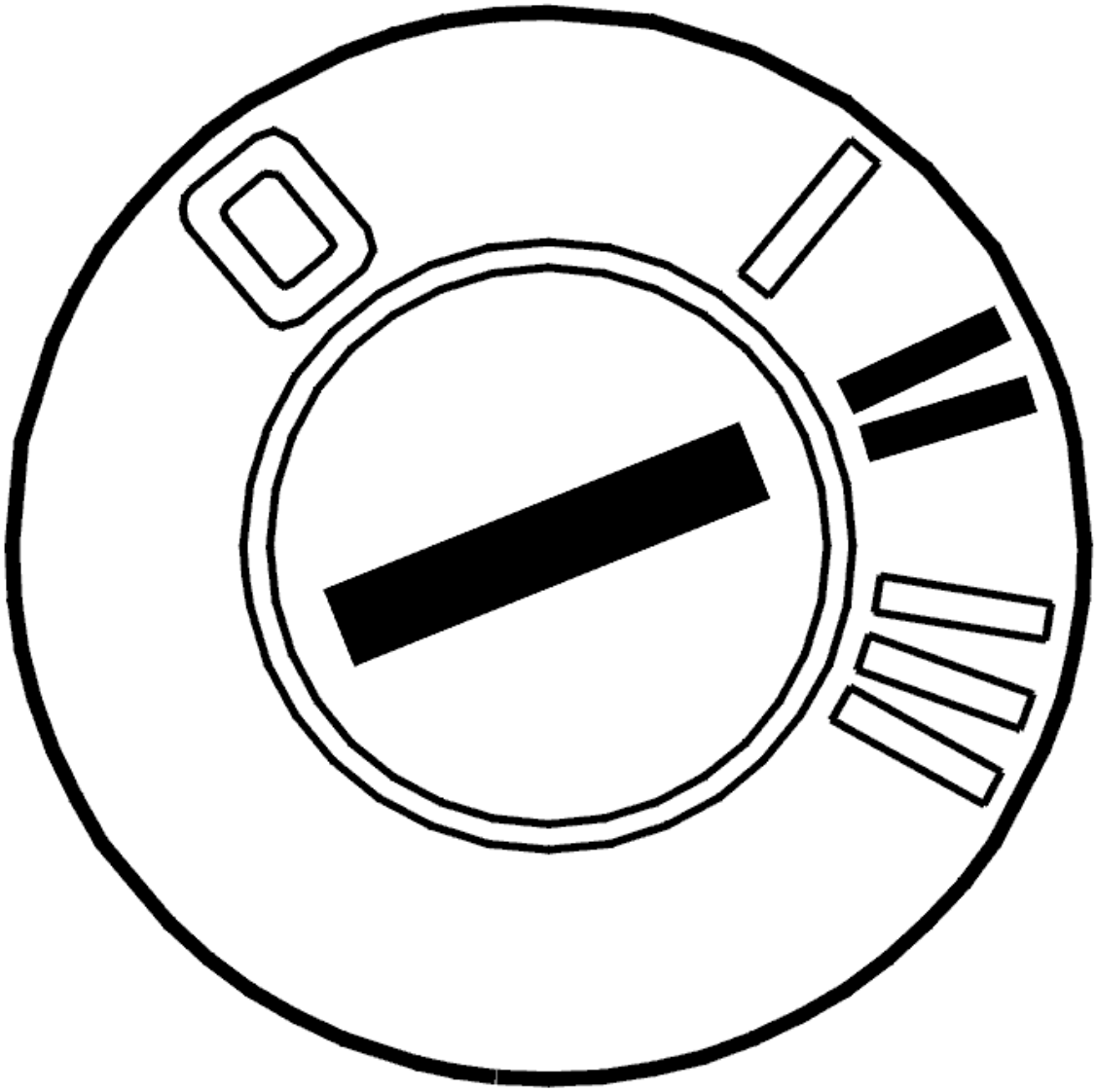


Fig. 99: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

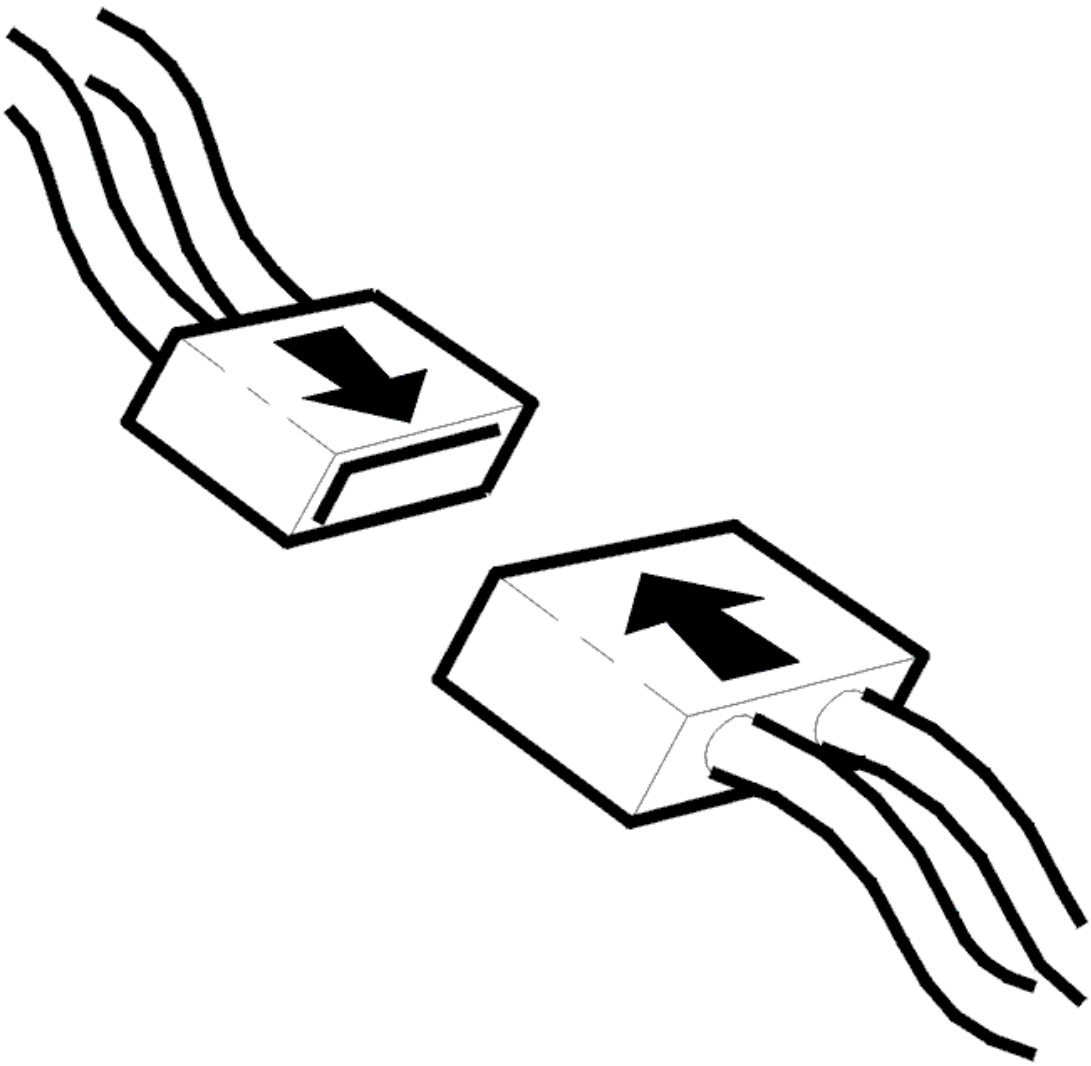


Fig. 100: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLT by clicking the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLT. The current must oscillate between approximately 0 and 1000 mA.

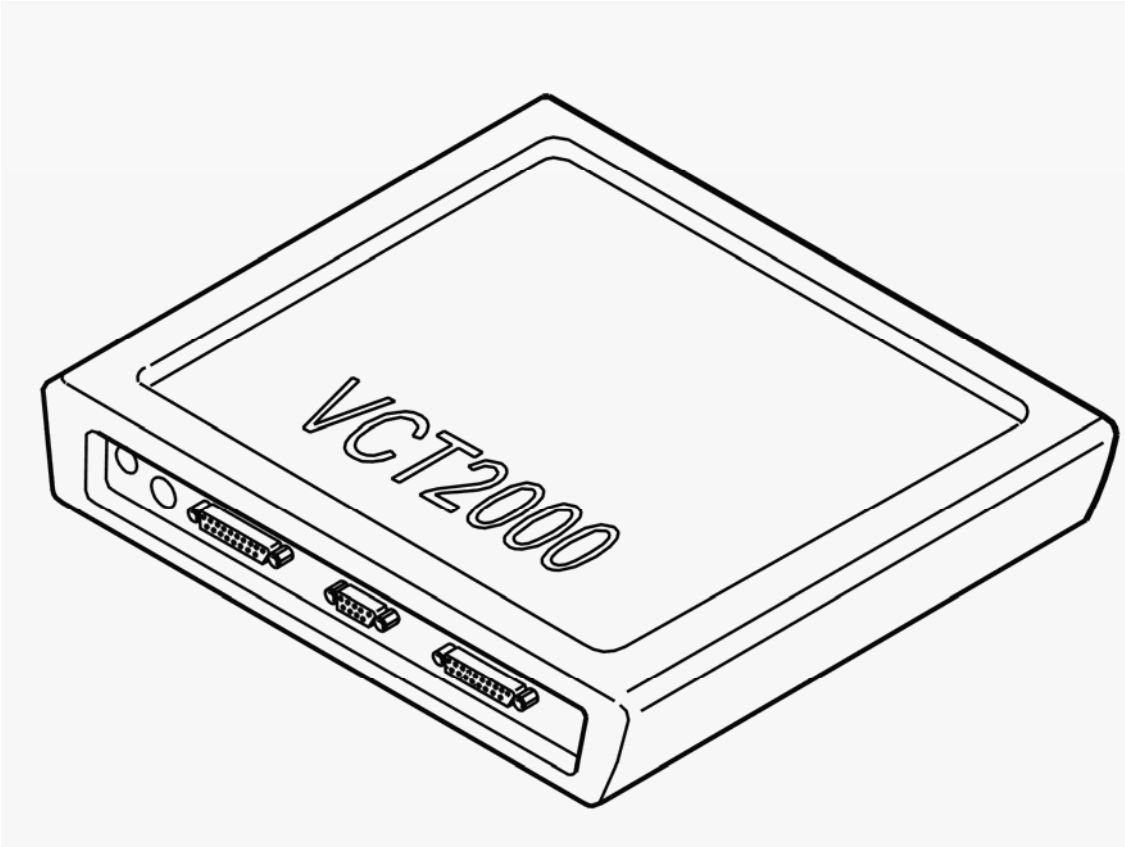


Fig. 101: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

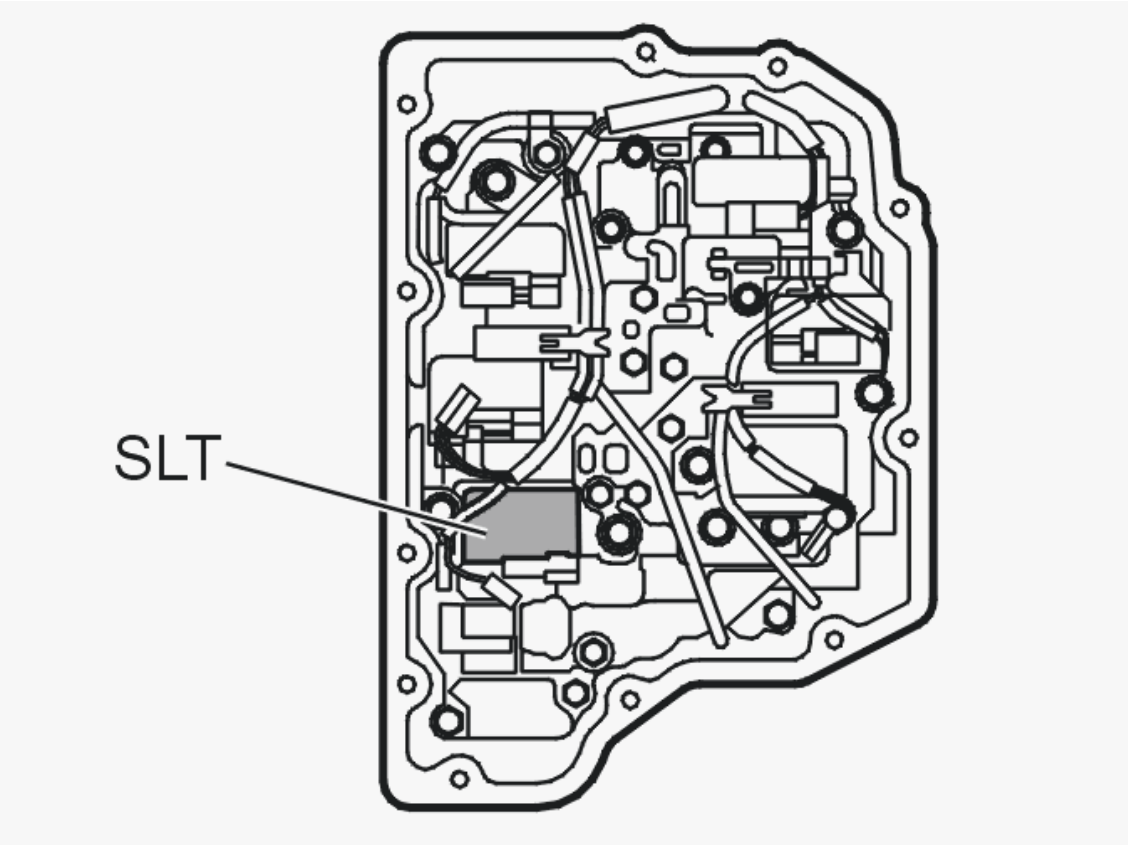


Fig. 102: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P096000: PRESSURE REGULATOR SOLENOID A CONTROL CIRCUIT/BROKEN CIRCUIT. GENERAL FAULT INFORMATION. NO

INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096000**

FAULT TRACING TCM-P096000

see **FAULT TRACING TCM-P096000**

TCM-P096100: PRESSURE CONTROL SOLENOID A CONTROL CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096100

Condition

Linear pressure solenoid SLT controls system pressure in the transmission. The solenoid is controlled by power stages at the output of the transmission control module (TCM).

The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The measured current in the solenoid circuit is incorrect.

Solenoid SLT cannot then control the line pressure.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

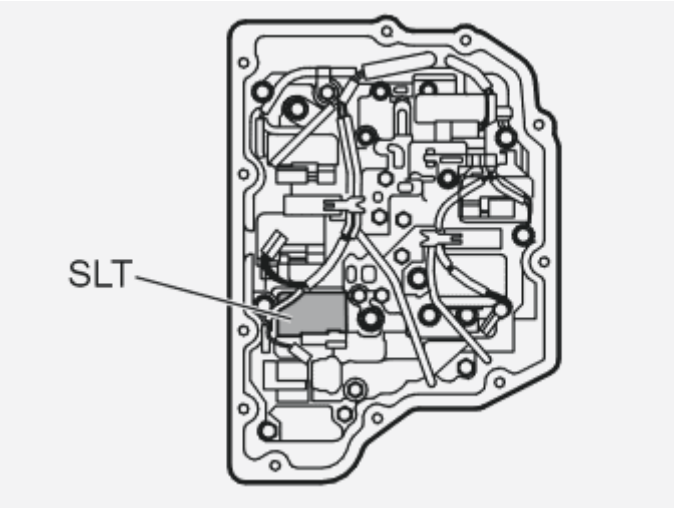


Fig. 103: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started. See **EMERGENCY MODE IN THE EVENT OF A FAULT**

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the cable for the control signal or signal ground.
- Linear pressure solenoid SLT is stuck.
- Linear pressure solenoid SLT not working.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- No lock-up
- Rough gear shift

FAULT-TRACING TCM-P096000

CHECKS

CHECKING LINE PRESSURE SOLENOID SLT

Fig. 104: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLT by clicking on the VCT2000 symbol.

  Read off the current through the solenoid SLT circuit. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 105: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

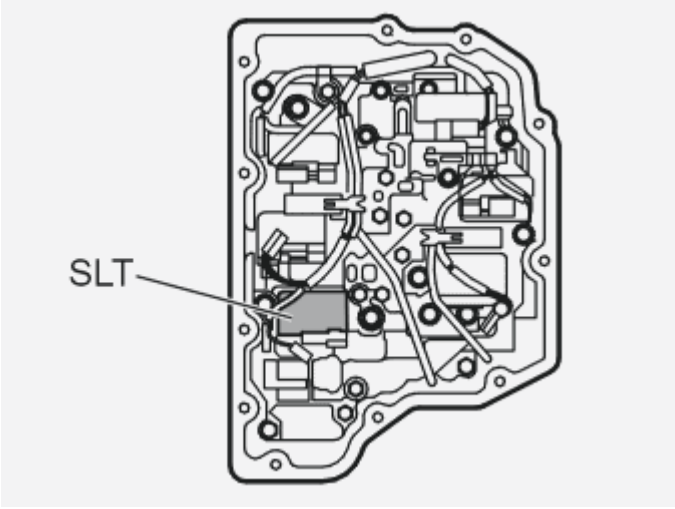


Fig. 106: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

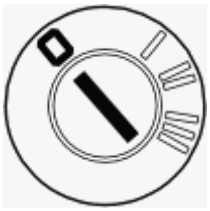


Fig. 107: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

Check the cables for open circuit, short circuit to ground and short circuit to supply voltage.

Take readings between:

- Transmission connector #B3 and the connector for solenoid SLT #1.
- Transmission connector #B1 and the connector for solenoid SLT #2.

HINT: If no fault is found in the wiring, check solenoid SLT. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **VALVE HOUSING**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

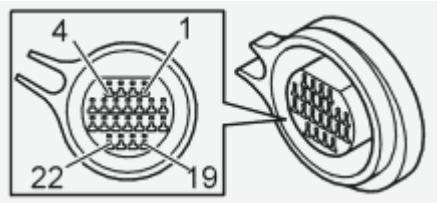


Fig. 108: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

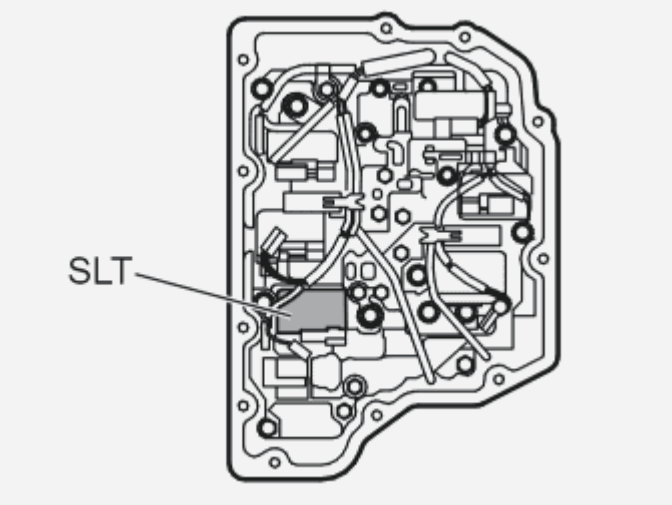


Fig. 109: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 110: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

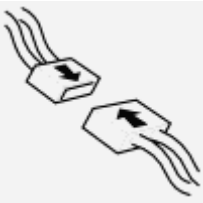


Fig. 111: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Activate solenoid SLT by clicking on the VCT2000 symbol.

  Read off the current through the solenoid SLT circuit. The current should oscillate between 100 and 950 mA.

Fig. 112: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

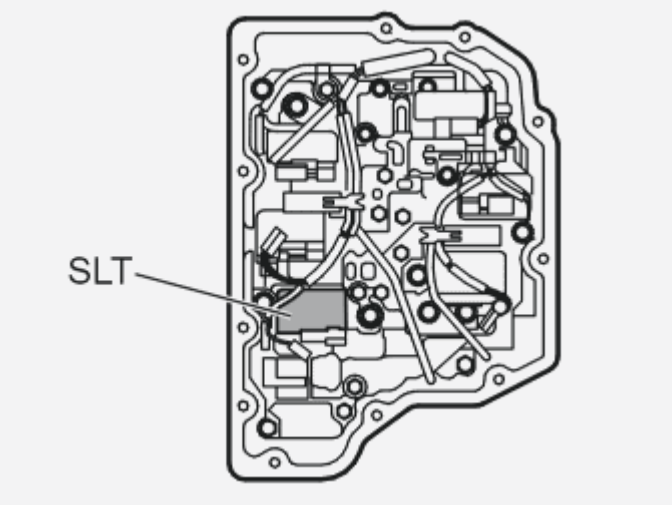


Fig. 113: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 114: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 115: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P096100: PRESSURE CONTROL SOLENOID A CONTROL CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096100**

FAULT-TRACING TCM-P096000

see **FAULT-TRACING TCM-P096000**

TCM-P096100: PRESSURE REGULATOR SOLENOID A CONTROL CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096100

Condition

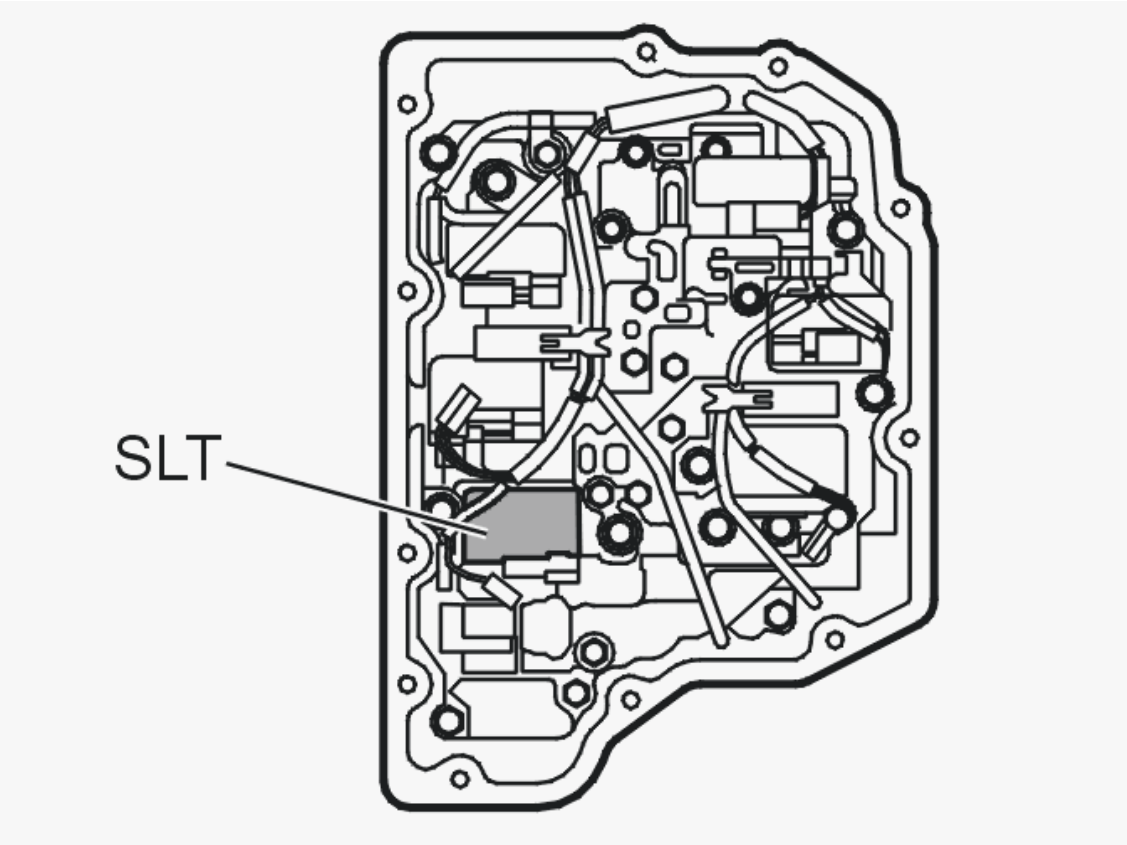


Fig. 116: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

Linear pressure solenoid SLT regulates the system pressure in the gearbox. The solenoid is controlled using a power stage on the output of the transmission control module (TCM).

The transmission control module (TCM) regulates the current to the solenoid with the help of the power stage. Low current gives high system pressure and high current (approx. 1A) gives low system pressure. The current strength is affected principally by the position of the accelerator pedal.

If the transmission control module (TCM) registers that the measured current in the solenoid circuit is incorrect, the diagnostic trouble code (DTC) is generated. The SLT solenoid is then not able to regulate the system pressure.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals

- Open circuit in lead for control signal or signal ground.
- Linear pressure solenoid SLT stuck.
- Linear pressure solenoid SLT not working.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear changing

FAULT TRACING TCM-P096100

CHECKS

CHECKING THE LINE PRESSURE SOLENOID SLT

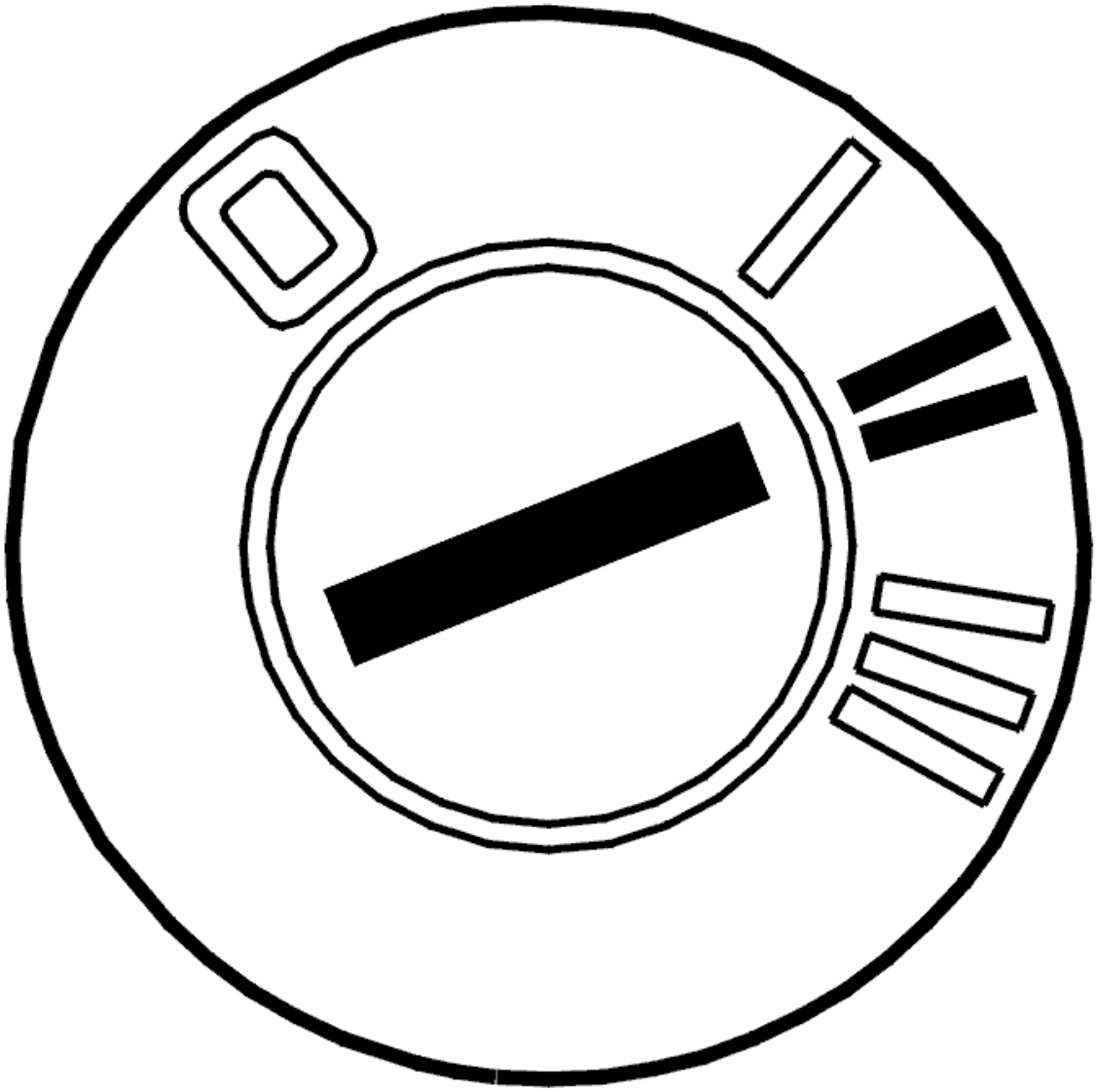


Fig. 117: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLT by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLT. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

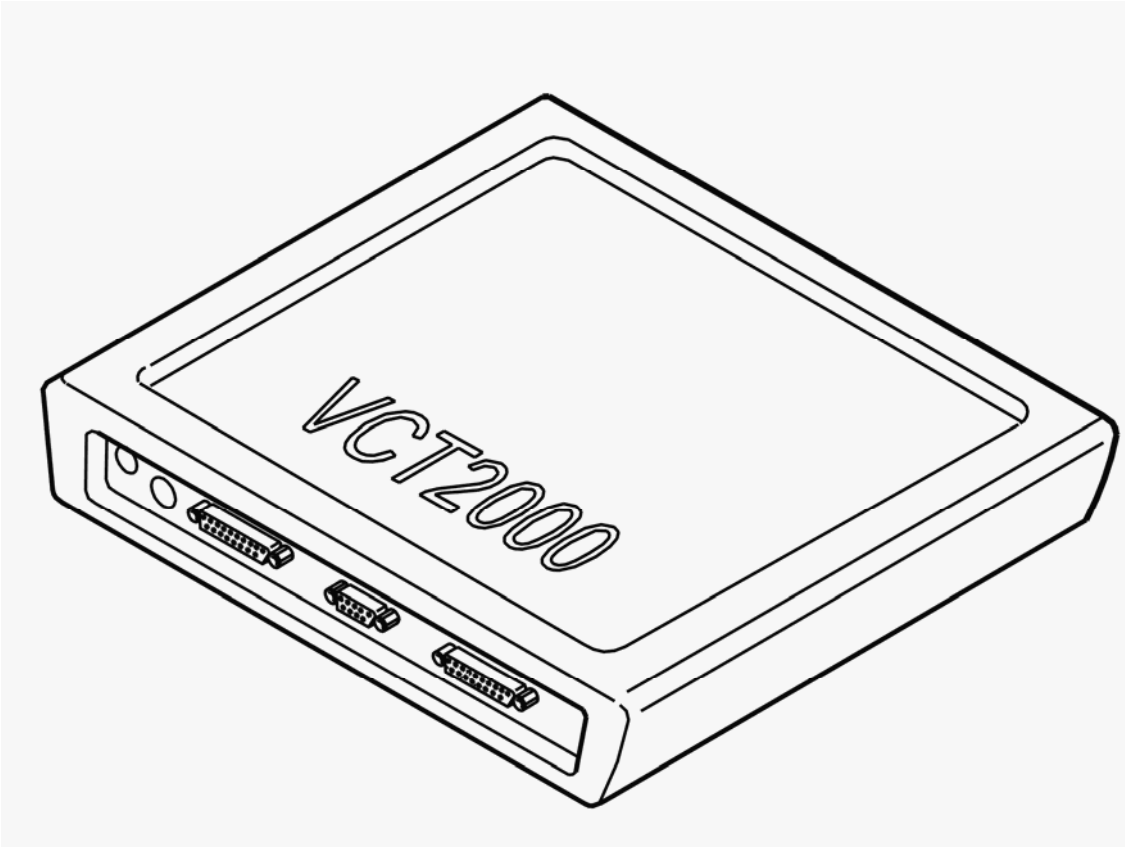


Fig. 118: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

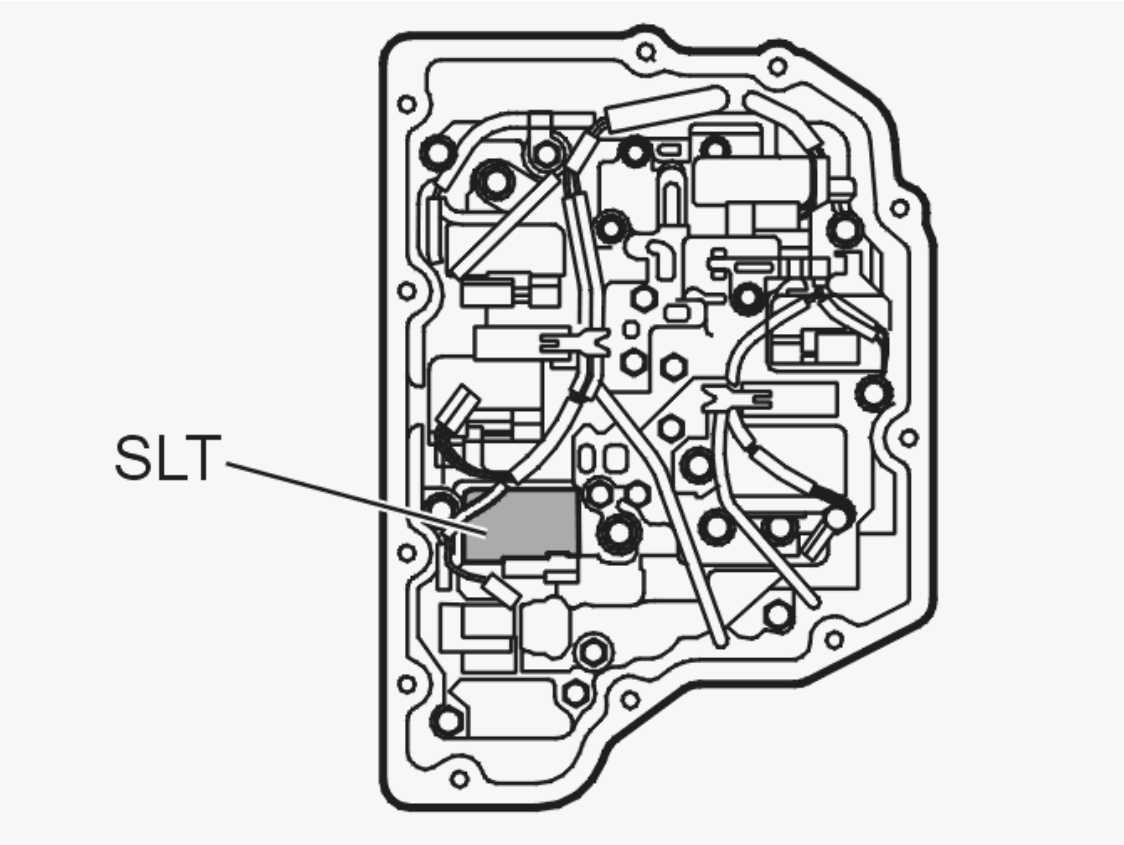


Fig. 119: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

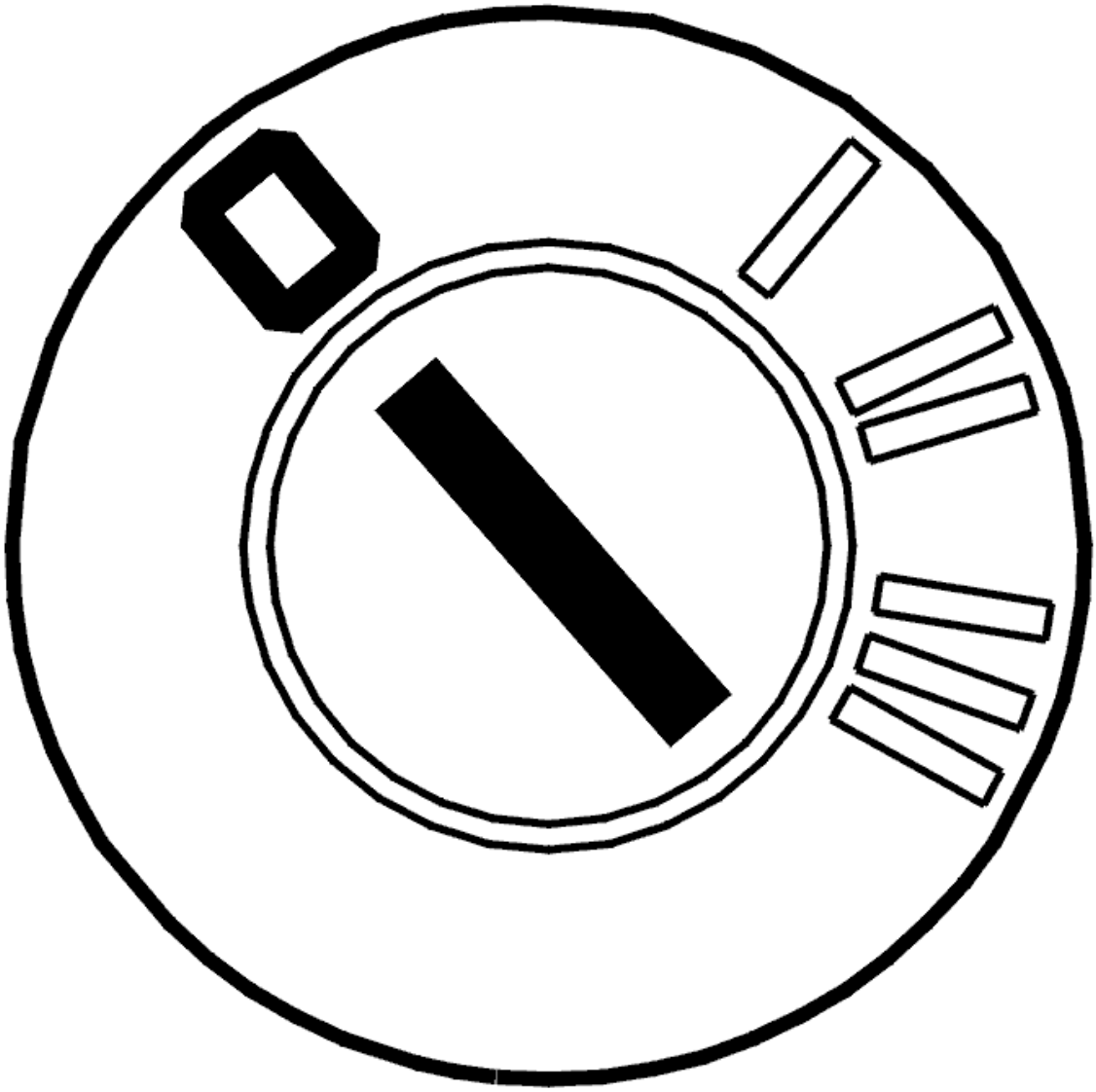


Fig. 120: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

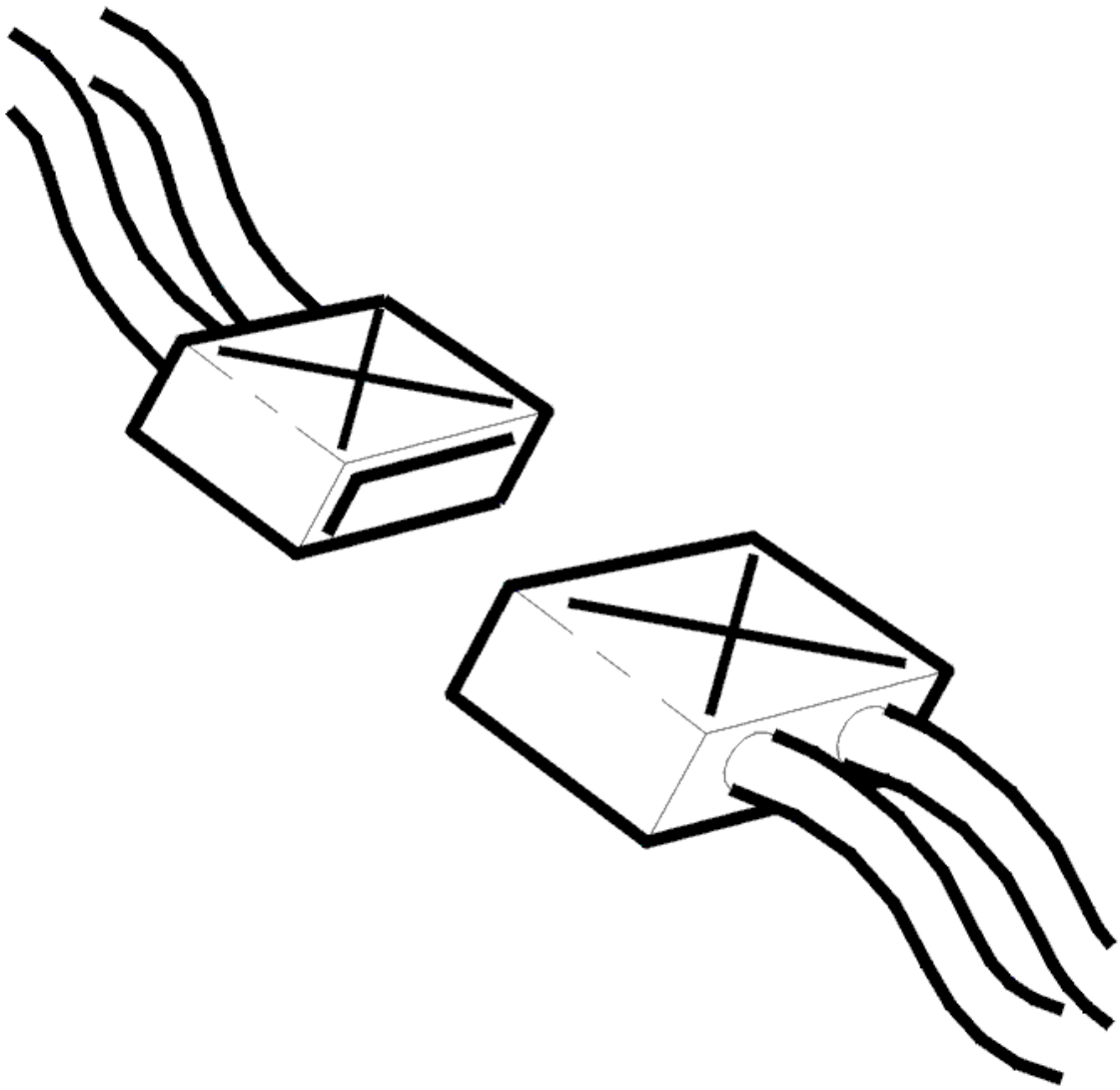


Fig. 121: Identifying Connector
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check connector B (22-pin) for the transmission control module (TCM). Check for damage and pressed in terminal pins. Check for contact resistance and oxidation.

Check the wiring between the transmission connector terminal #B3 and the connector for solenoid SLT terminal #1. Check the wiring between the transmission connector terminal #B1 and the connector for solenoid SLT terminal #2. Check for an open circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.

HINT: If no fault is found in the wiring check solenoid SLT. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

Remedy as necessary.

Other information

- see **SIGNAL DESCRIPTION**
- see **CONNECTING THE BREAKOUT BOX**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

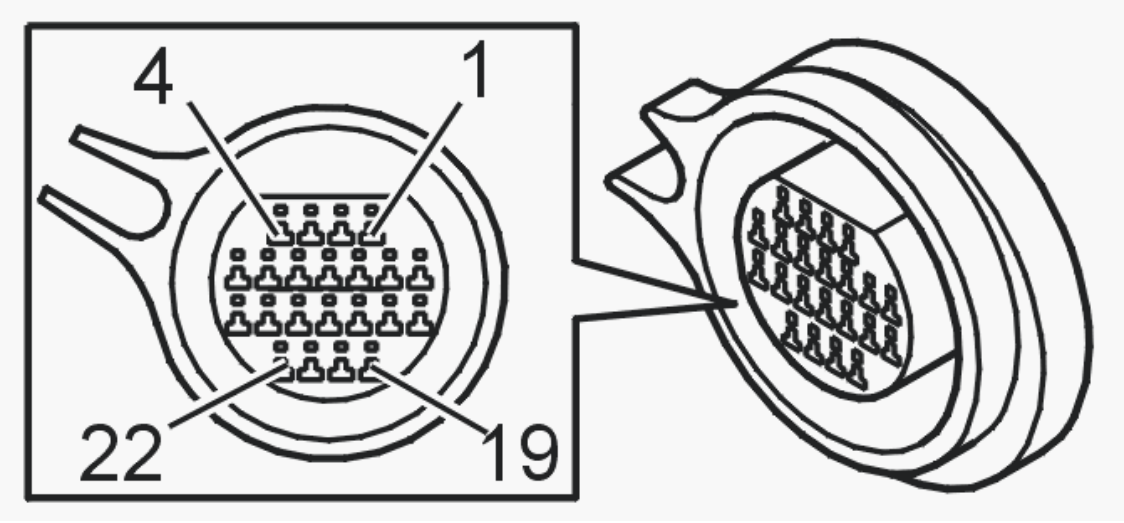


Fig. 122: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

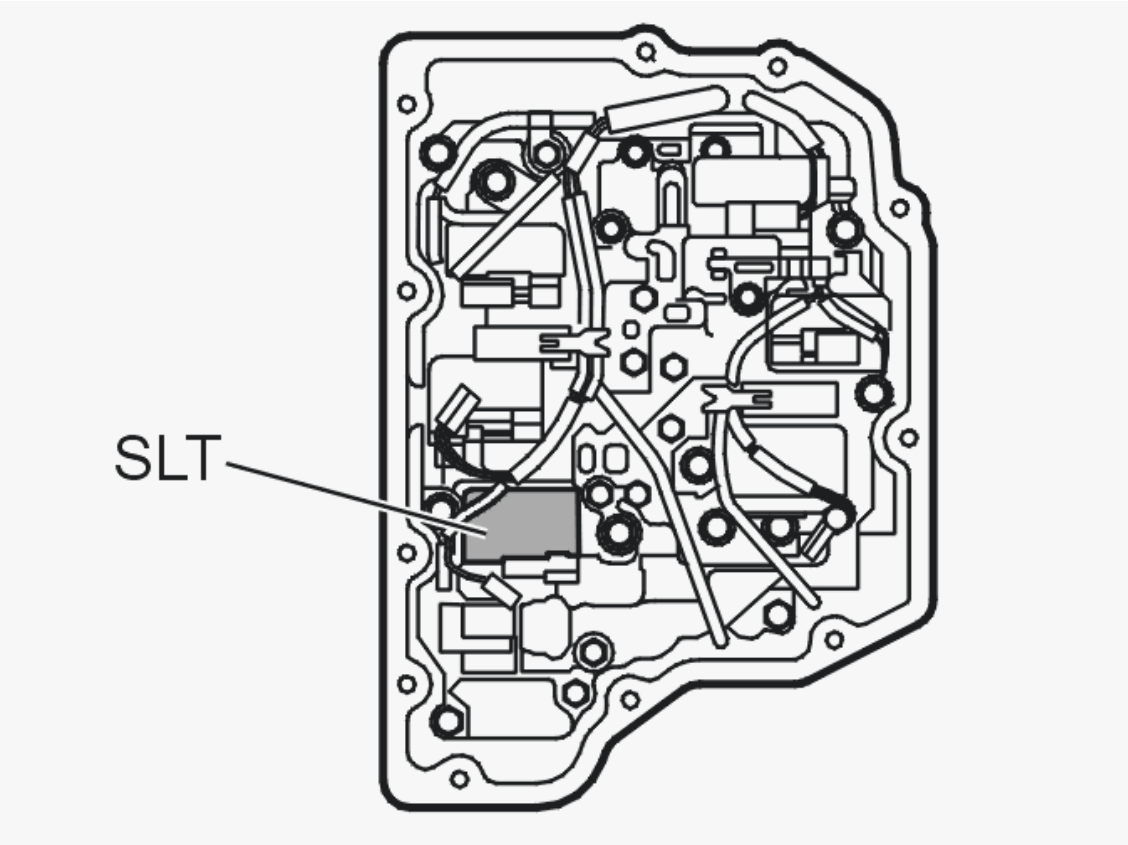


Fig. 123: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

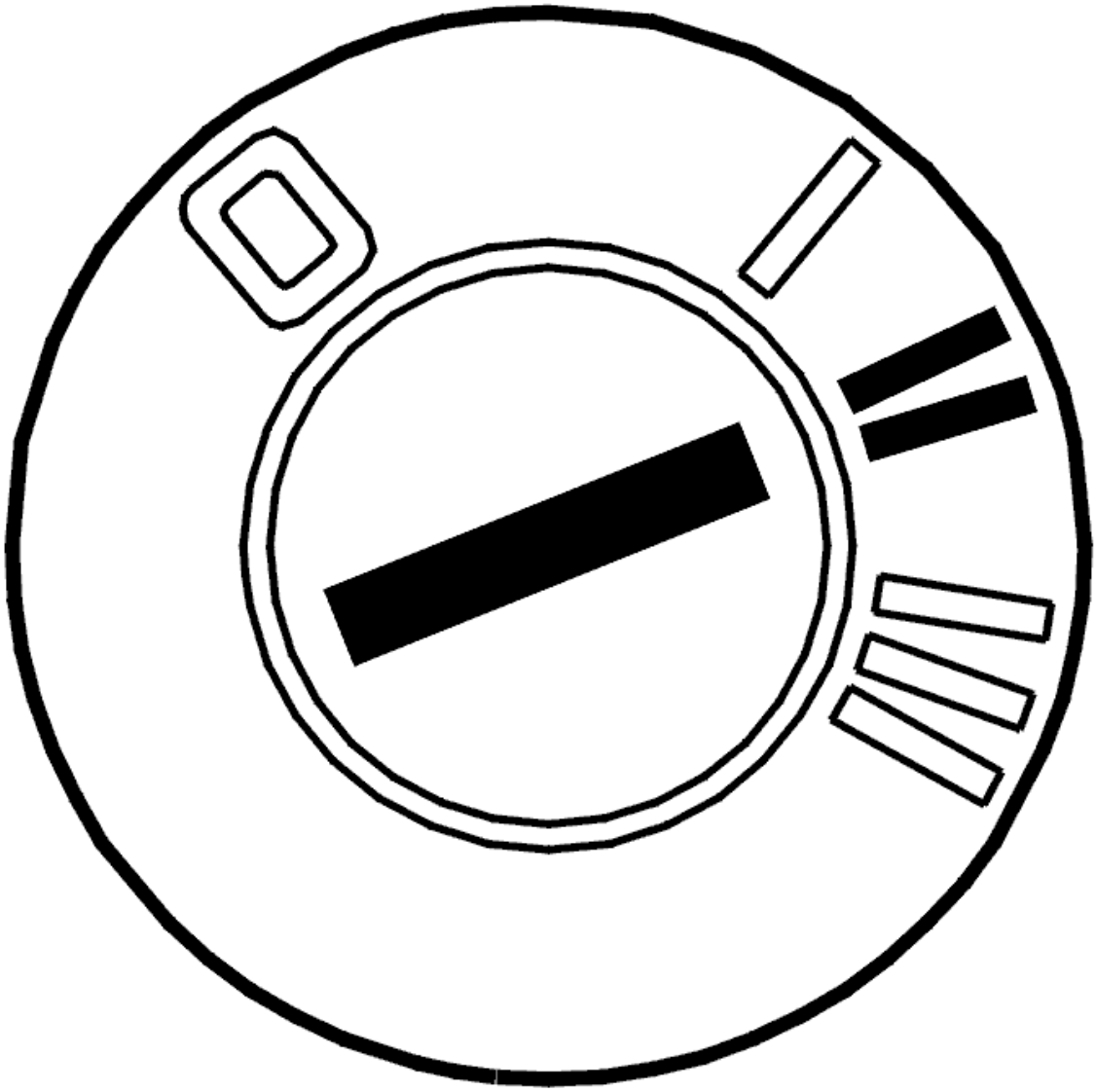


Fig. 124: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

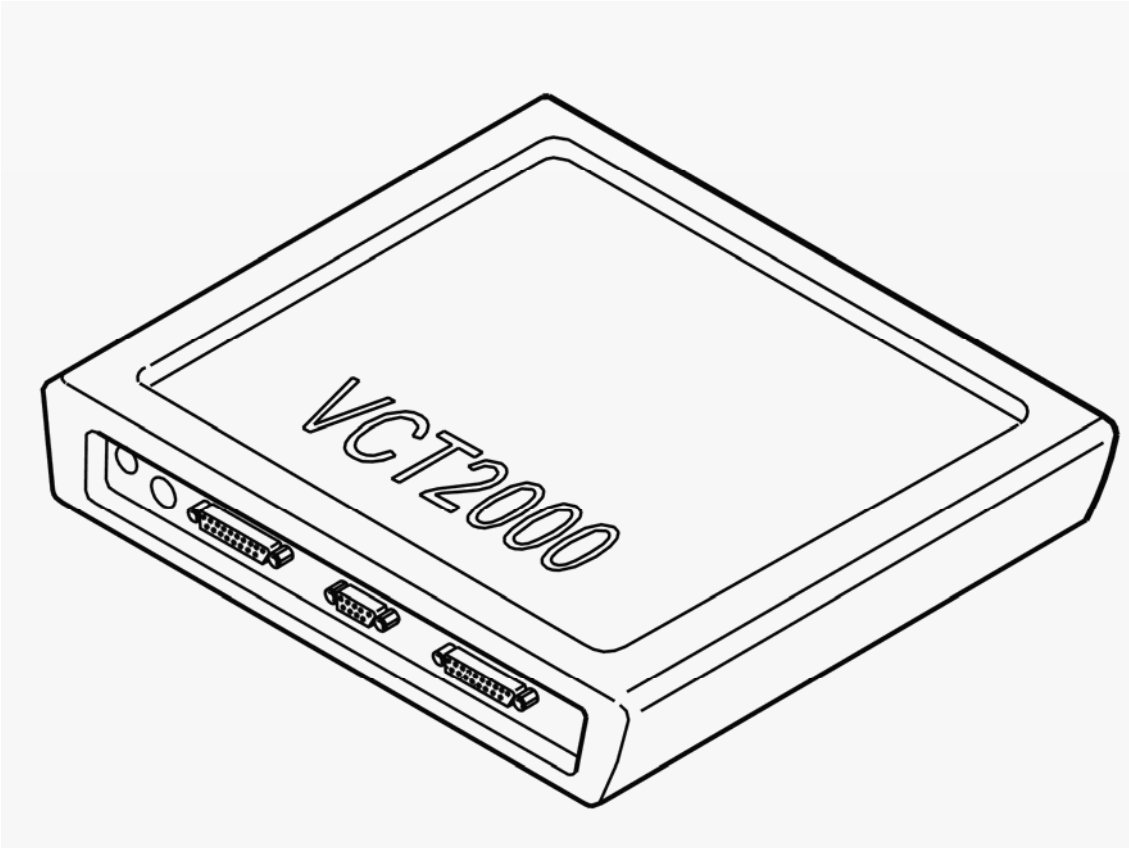


Fig. 125: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

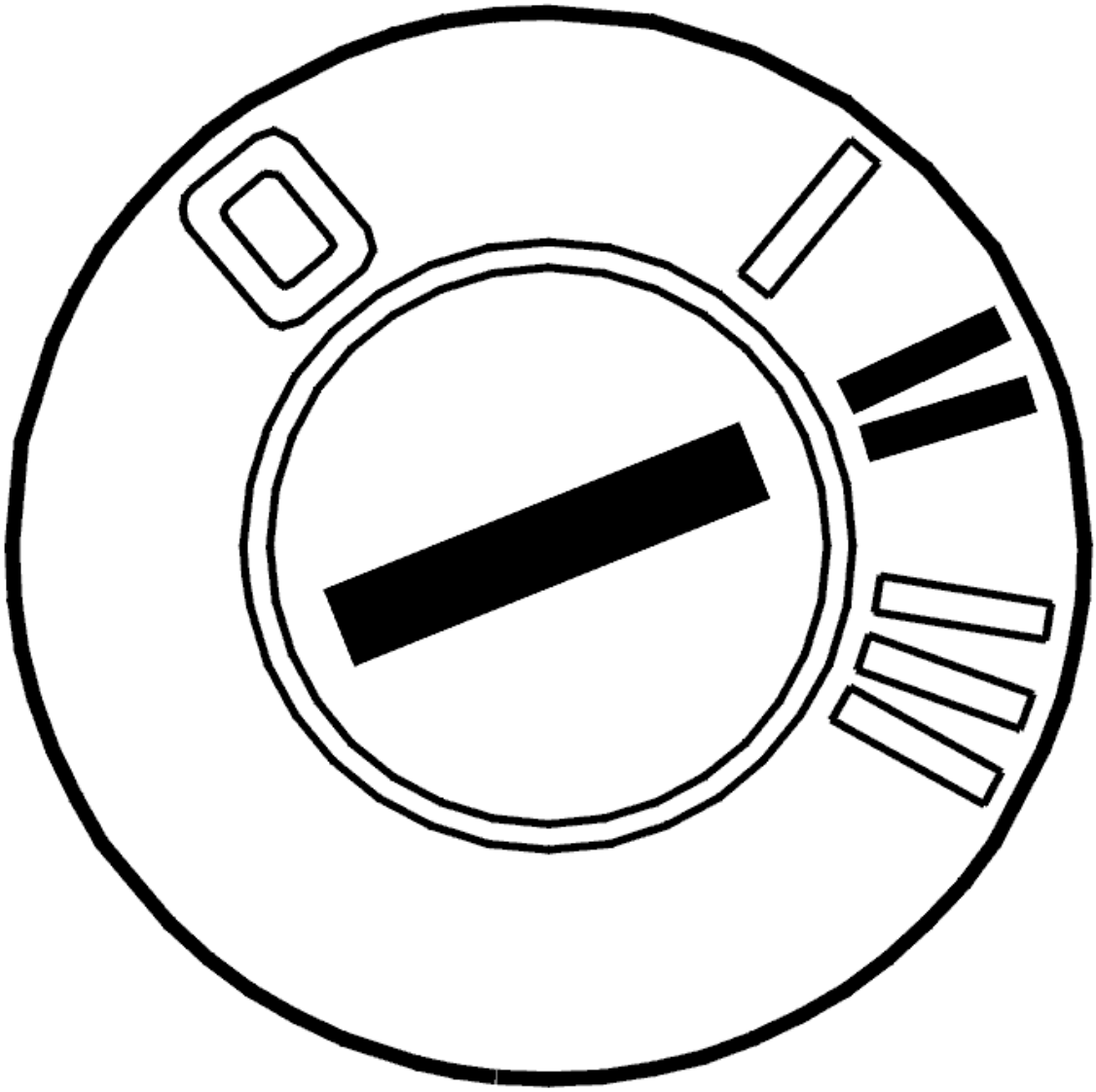


Fig. 126: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

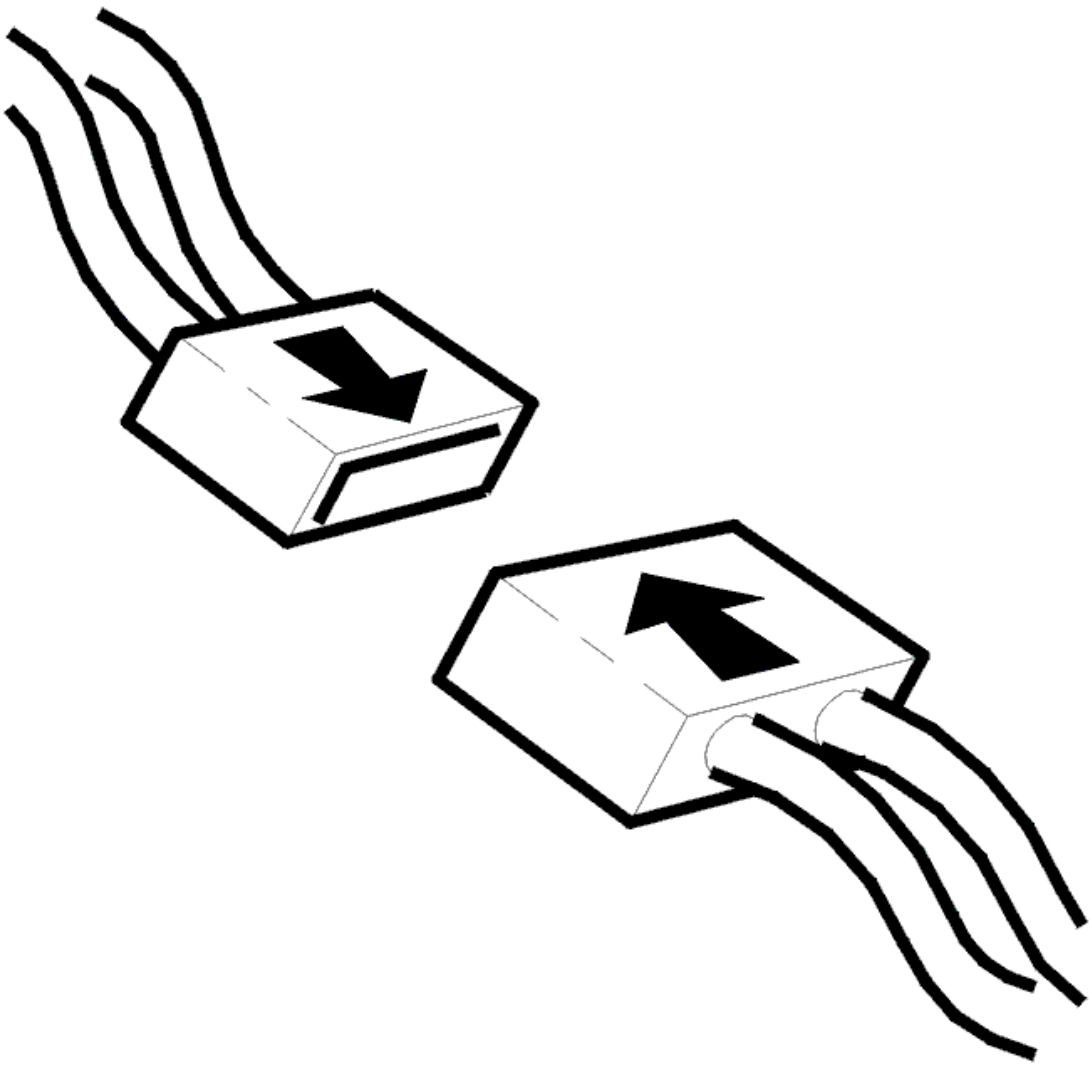


Fig. 127: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLT by clicking the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLT. The current must oscillate between approximately 0 and 1000 mA.

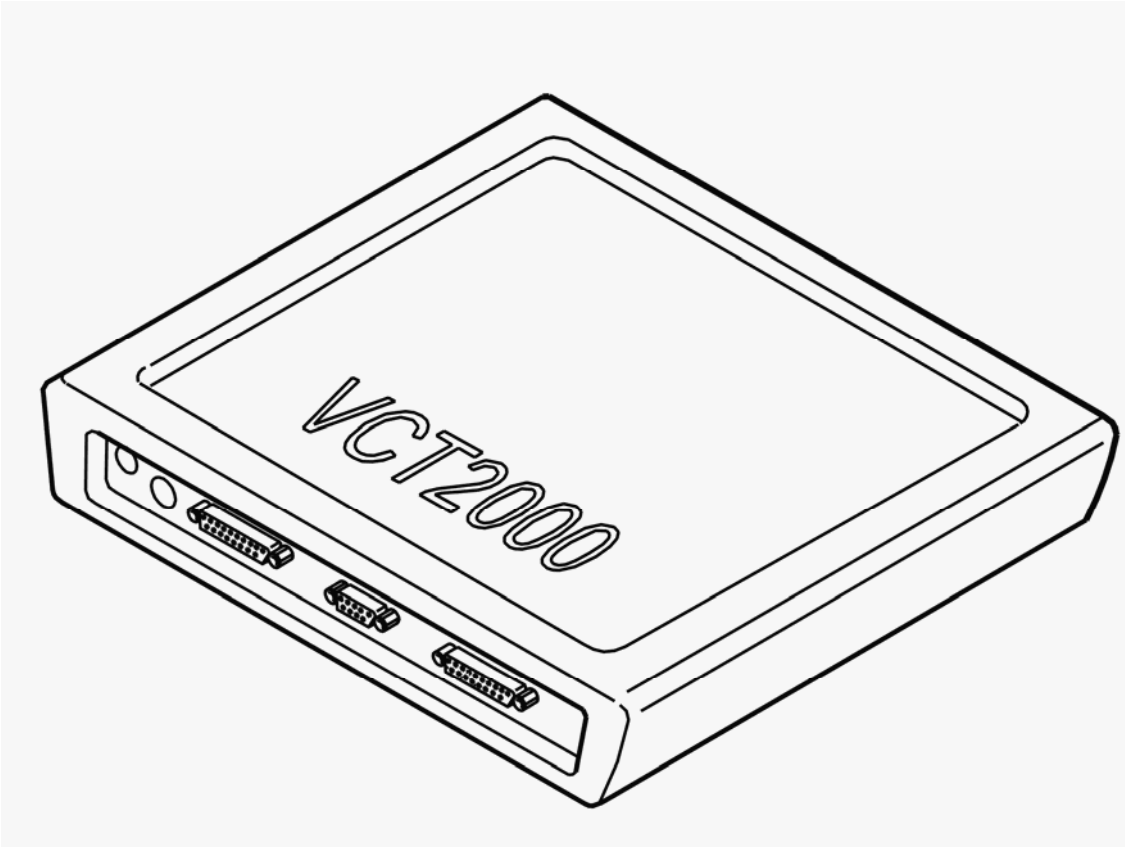


Fig. 128: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

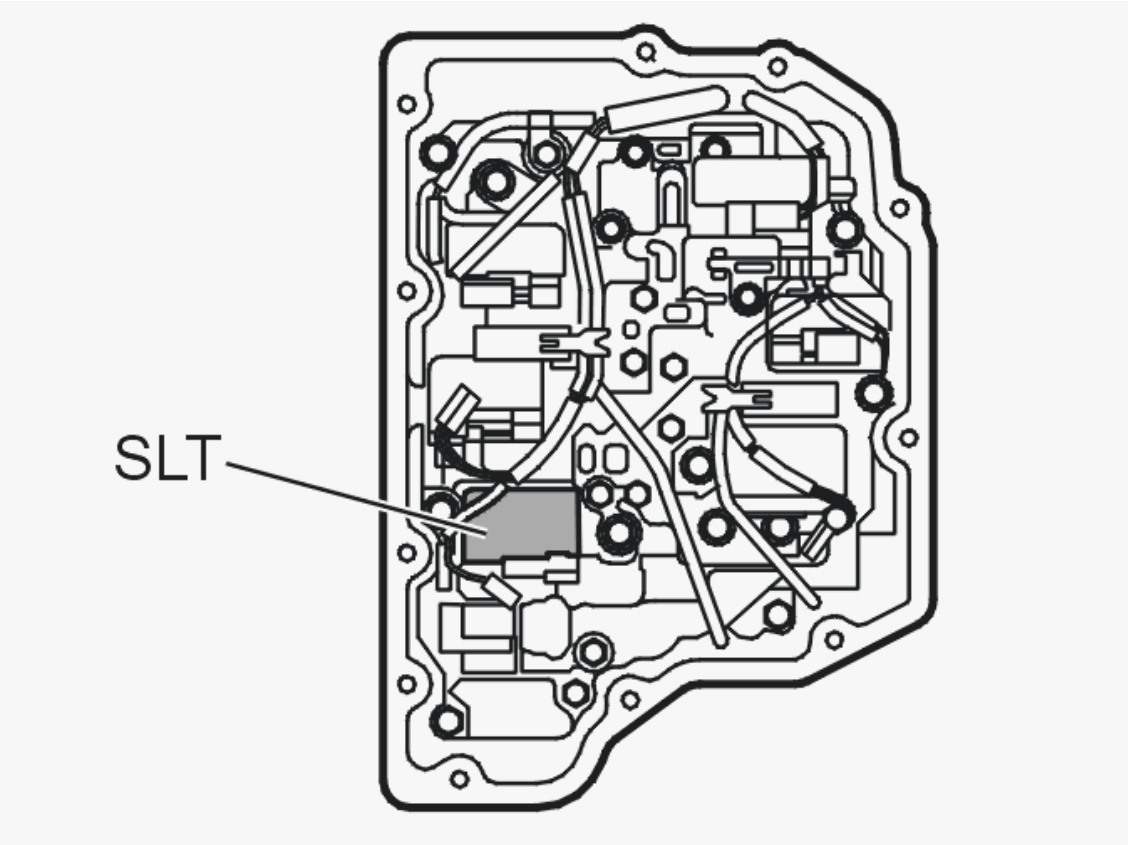


Fig. 129: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P096100: PRESSURE REGULATOR SOLENOID A CONTROL CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO

INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096100**

FAULT TRACING TCM-P096100

see **FAULT TRACING TCM-P096100**

TCM-P096300: PRESSURE CONTROL SOLENOID A CONTROL CIRCUIT HIGH. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096300

Condition

The solenoid is controlled by power stages at the output of the transmission control module (TCM).

The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The measured current value is higher than permitted in the circuit for solenoid SLT.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

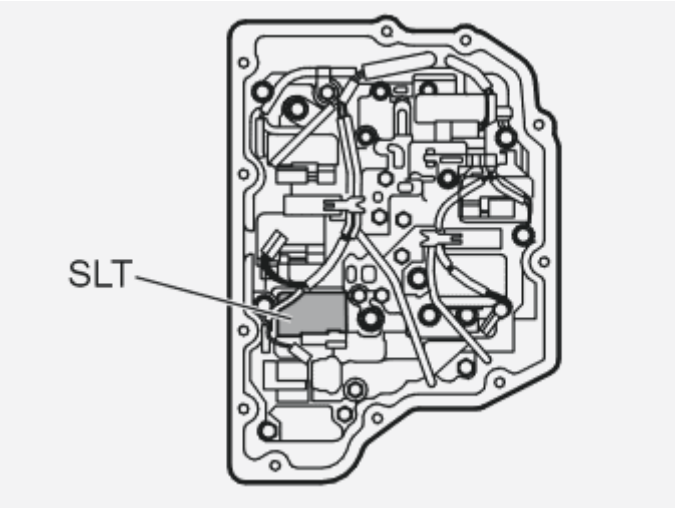


Fig. 130: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started. See **EMERGENCY MODE IN THE EVENT OF A FAULT**

Possible Source

- Control signal lead short-circuited to voltage.
- Linear pressure solenoid not working.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Abnormal slipping gearshifts
- Rough gear shift
- No gear shift

FAULT-TRACING

CHECKS

CHECKING LINE PRESSURE SOLENOID SLT

Fig. 131: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLT by clicking on the VCT2000 symbol.

  Read off the current through the solenoid SLT circuit. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 132: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

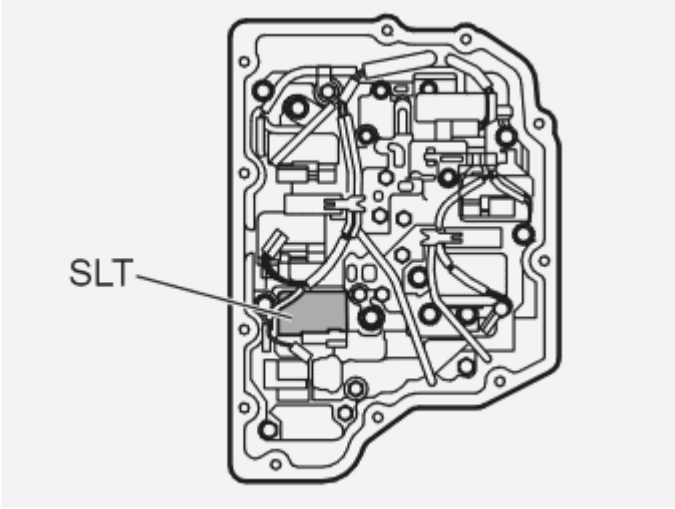


Fig. 133: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

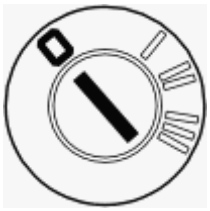


Fig. 134: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check the cables for short-circuit to voltage, short-circuit to ground and open circuit.

Take readings between:

- Transmission connector #B3 and the connector for solenoid SLT #1.
- Transmission connector #B1 and the connector for solenoid SLT #2.

Also check the cables for a short-circuit to each other.

HINT: If no fault is found in the wiring, check solenoid SLT. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no fault is found in the wiring replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **VALVE HOUSING**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

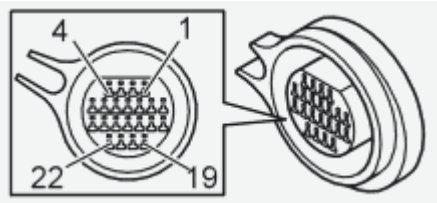


Fig. 135: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

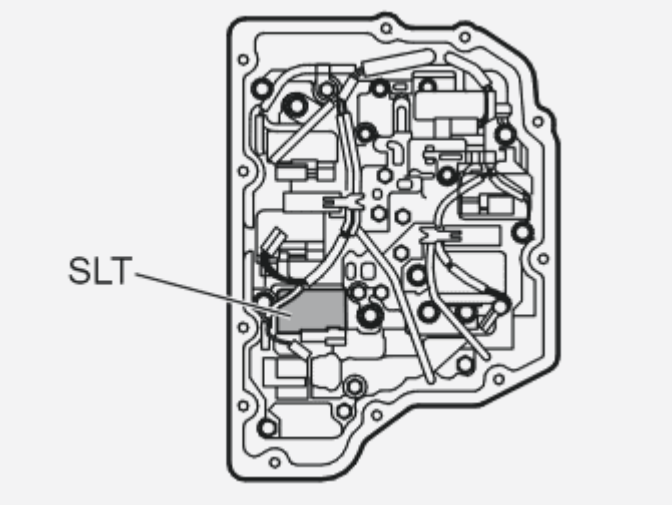


Fig. 136: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 137: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

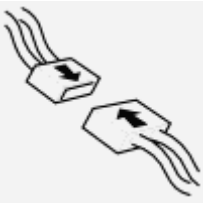


Fig. 138: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Activate solenoid SLT by clicking on the VCT2000 symbol.

  Read off the current through the solenoid SLT circuit. The current should oscillate between 100 and 950 mA.

Fig. 139: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

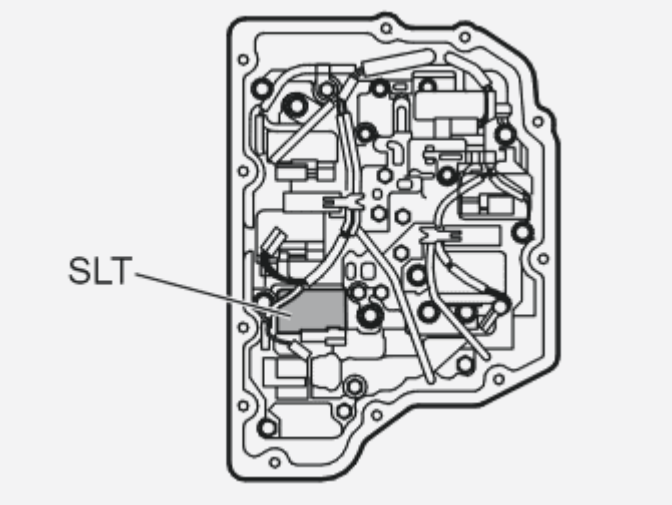


Fig. 140: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 141: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 142: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P096300: PRESSURE CONTROL SOLENOID A CONTROL CIRCUIT HIGH. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096300

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096300**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P096300: PRESSURE REGULATOR SOLENOID A CONTROL CIRCUIT HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096300

Condition

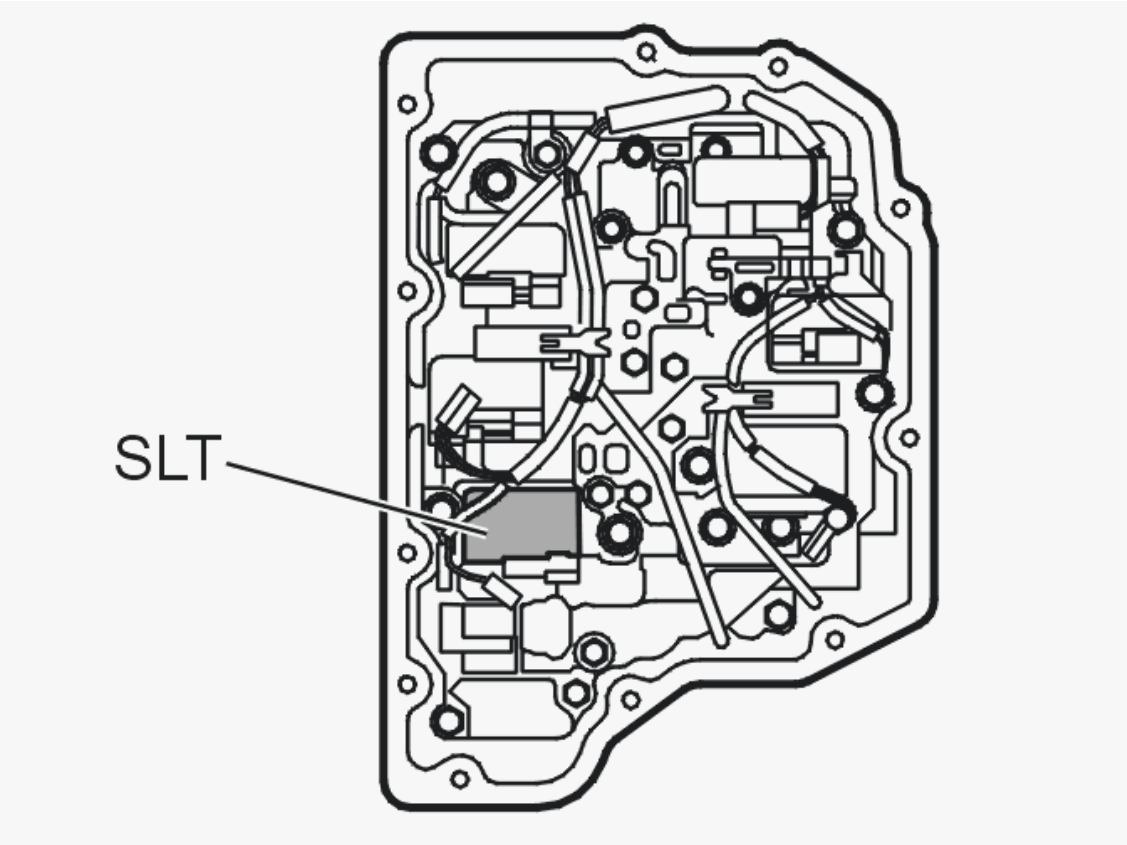


Fig. 143: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

The solenoids are controlled using the power stage in the transmission control module (TCM). The transmission control module (TCM) opens the power stage when the solenoids are to be activated so that the circuit receives a voltage.

If the transmission control module (TCM) registers that the measured current is higher than the circuit for the SLT solenoid allows, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Control signal lead short-circuited to voltage.
- Linear pressure solenoid not working.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Abnormally slipping gears.
- Harsh gear changing
- No gear changing.

FAULT TRACING TCM-P096300

CHECKS

CHECKING THE LINE PRESSURE SOLENOID SLT

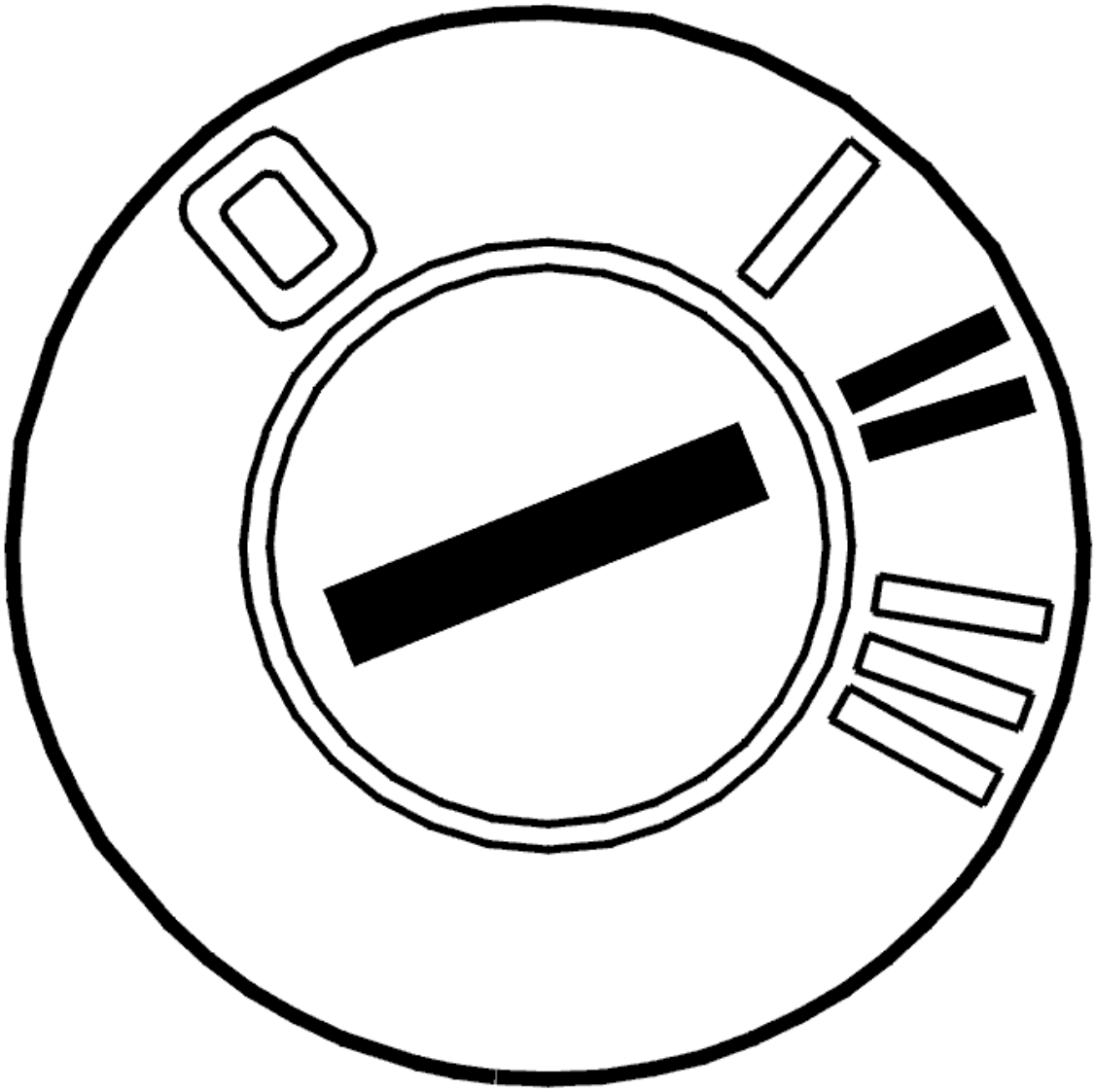


Fig. 144: Identifying Ignition ON

Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLT by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLT. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

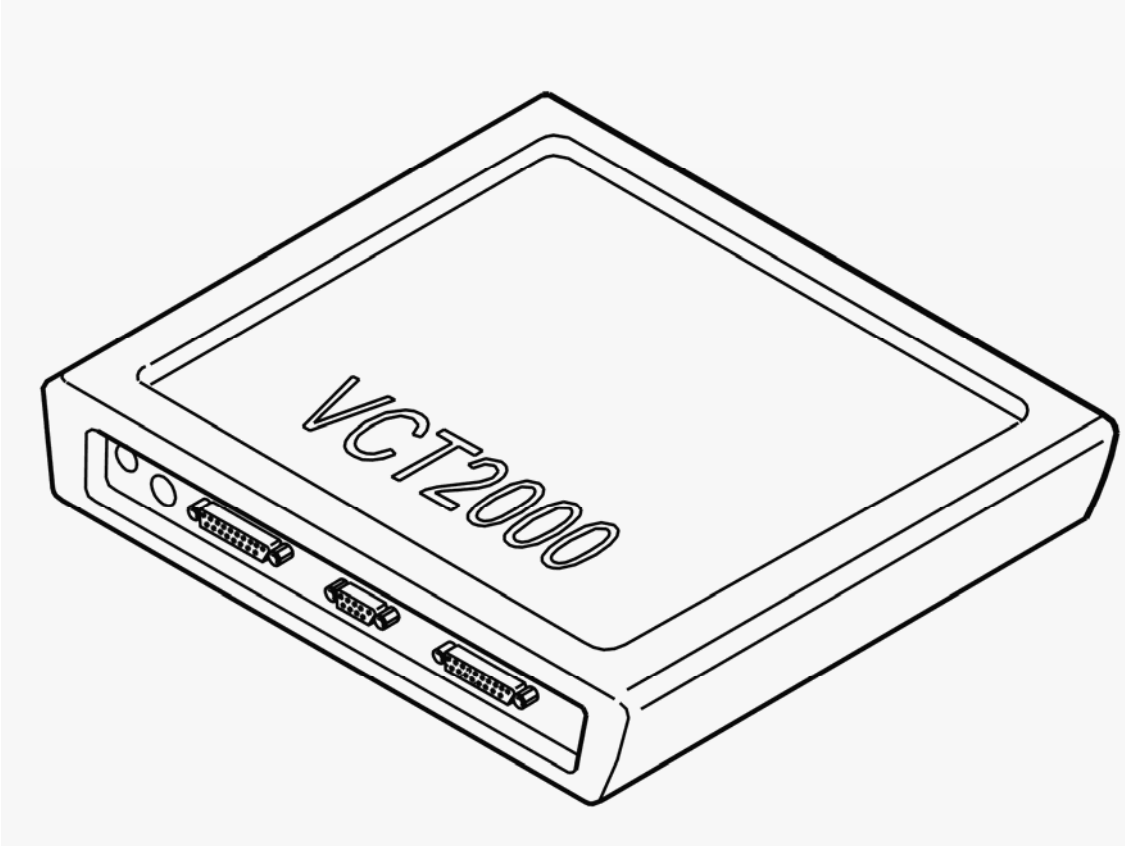


Fig. 145: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

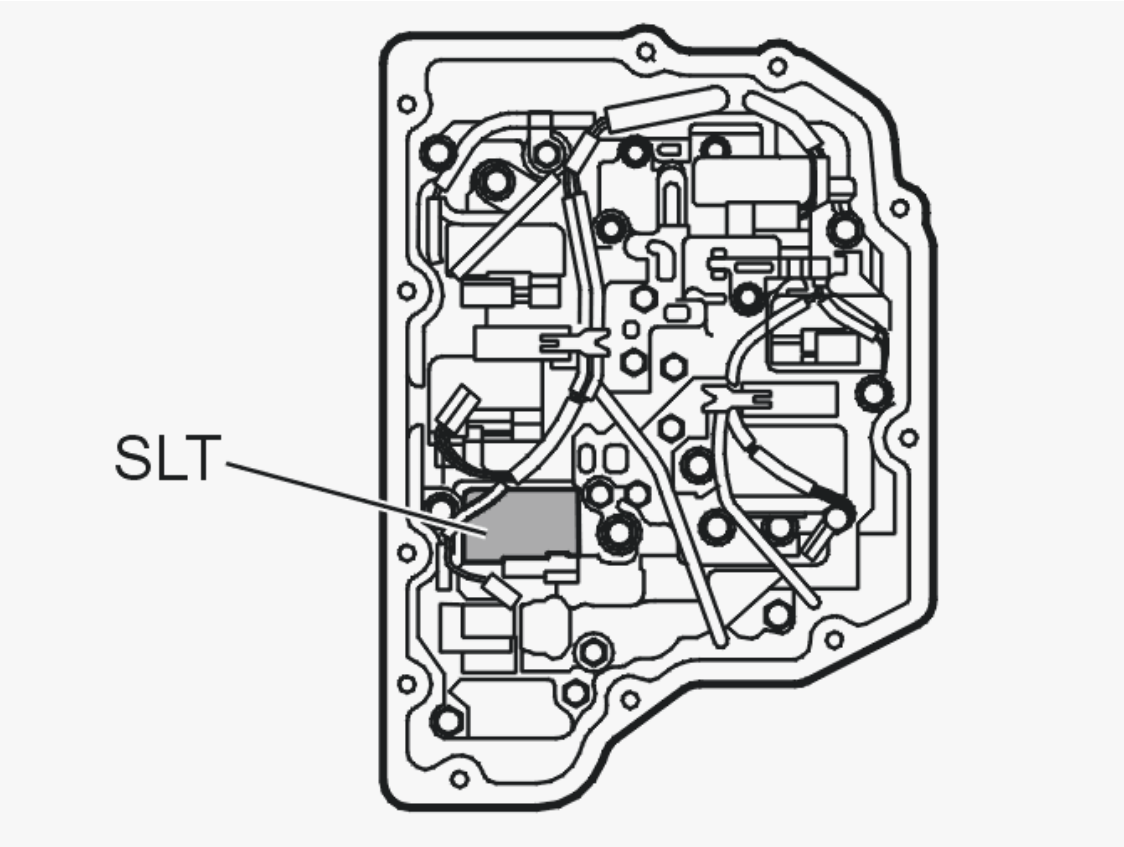


Fig. 146: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

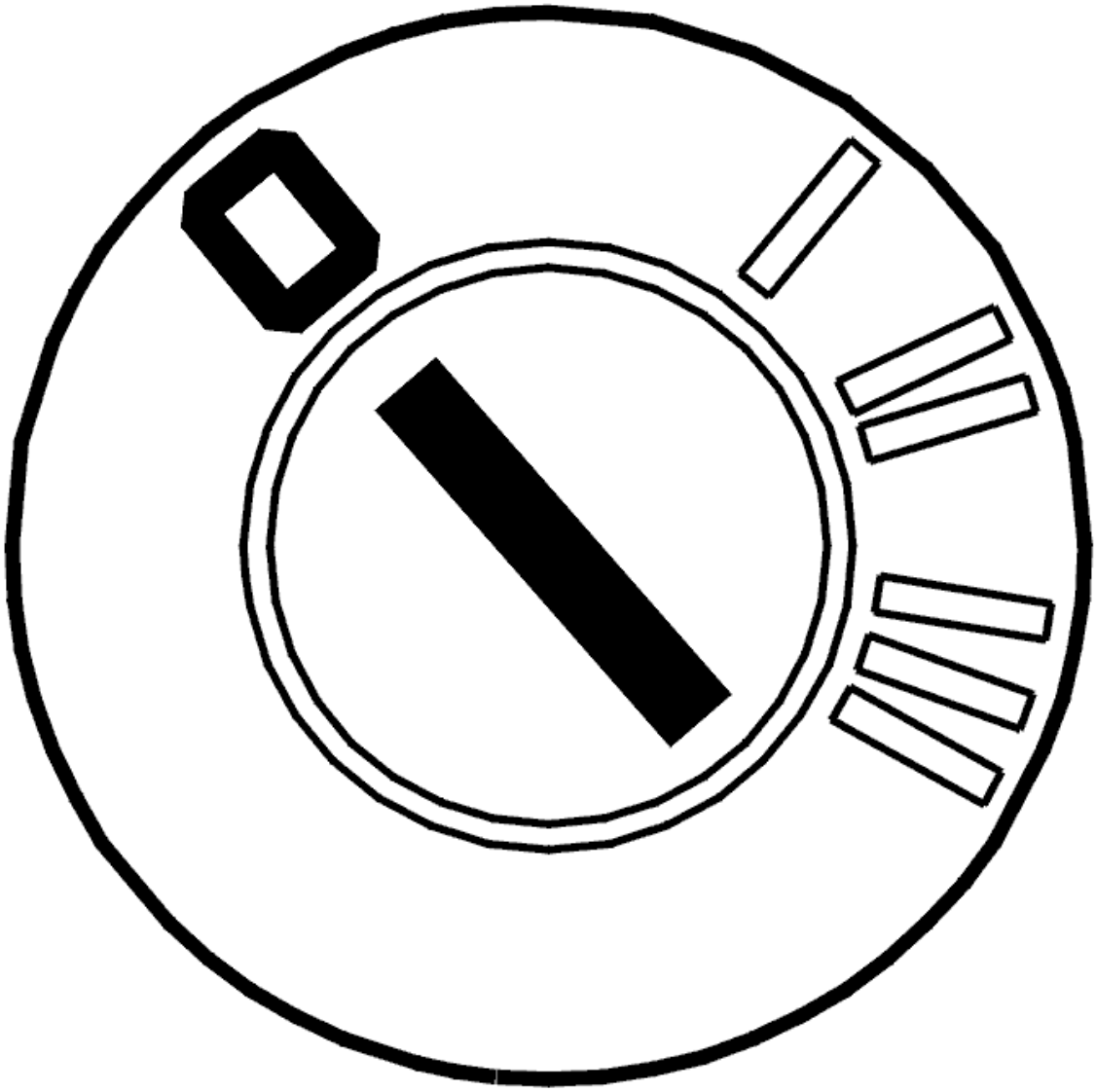


Fig. 147: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

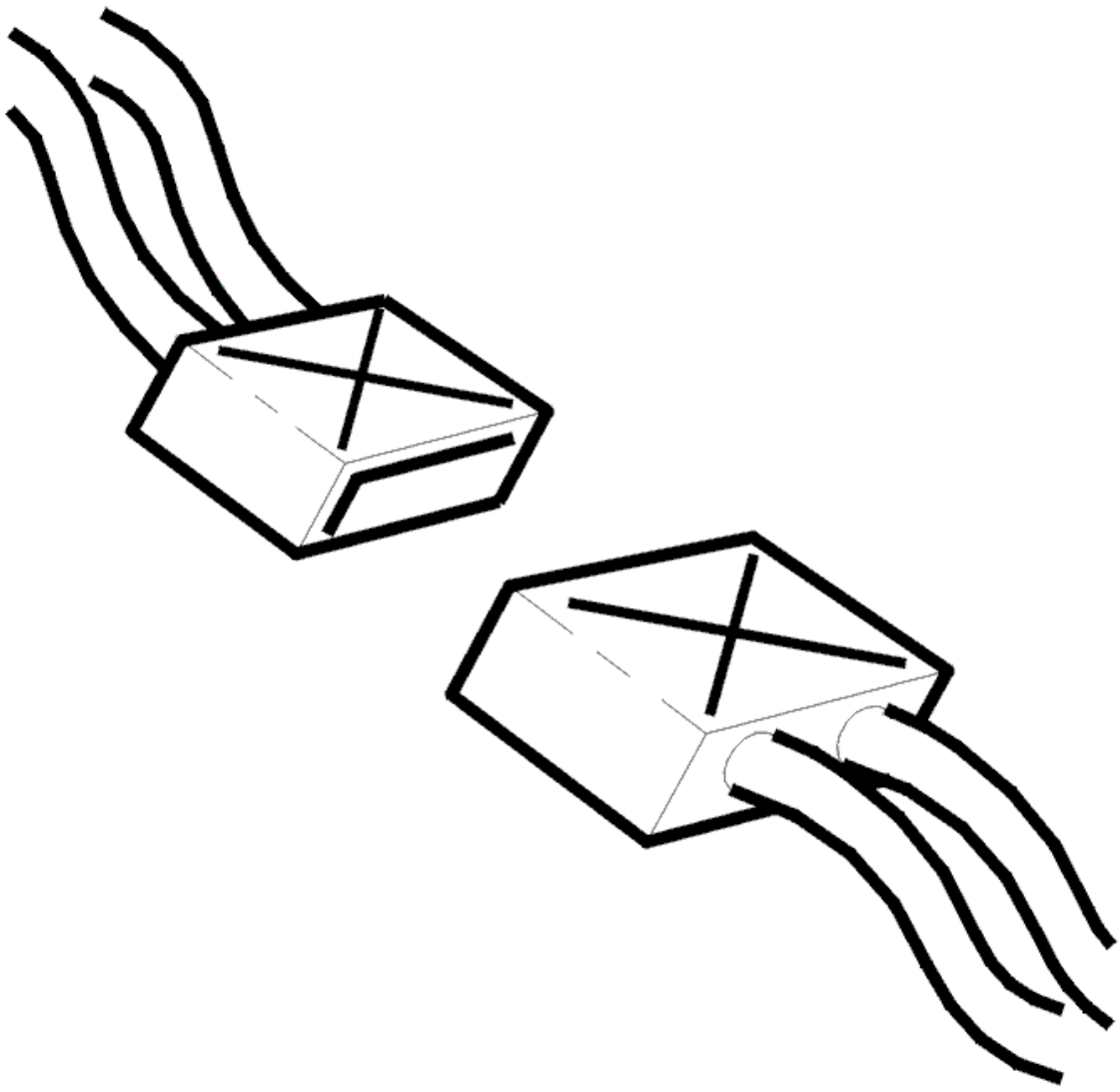


Fig. 148: Identifying Connector
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check the wiring between transmission connector terminal #B3 and solenoid SLT connector terminal #1. Check the wiring between transmission connector terminal #B1 and solenoid SLT connector terminal #2. Check for a short-circuit to supply voltage. Check the wiring for short-circuits to each other.

HINT: If no fault is found in the wiring check solenoid SLT. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

If no fault is found in the wiring replace the control system.

Remedy as necessary.

Other information

- see **SIGNAL DESCRIPTION**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

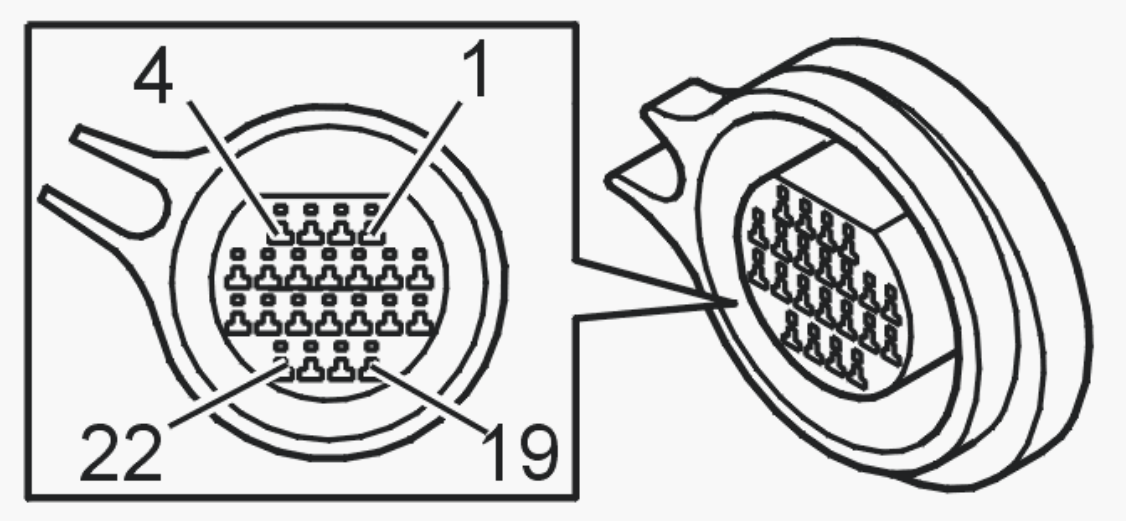


Fig. 149: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

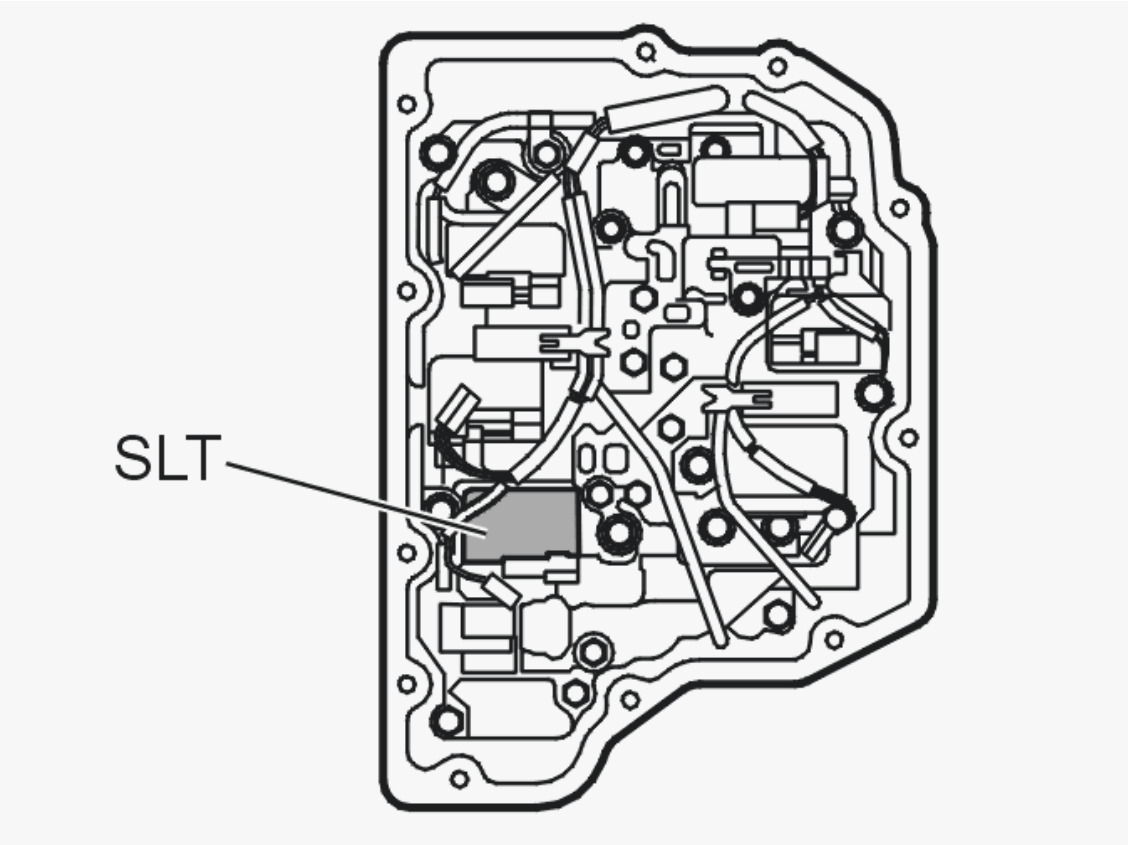


Fig. 150: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

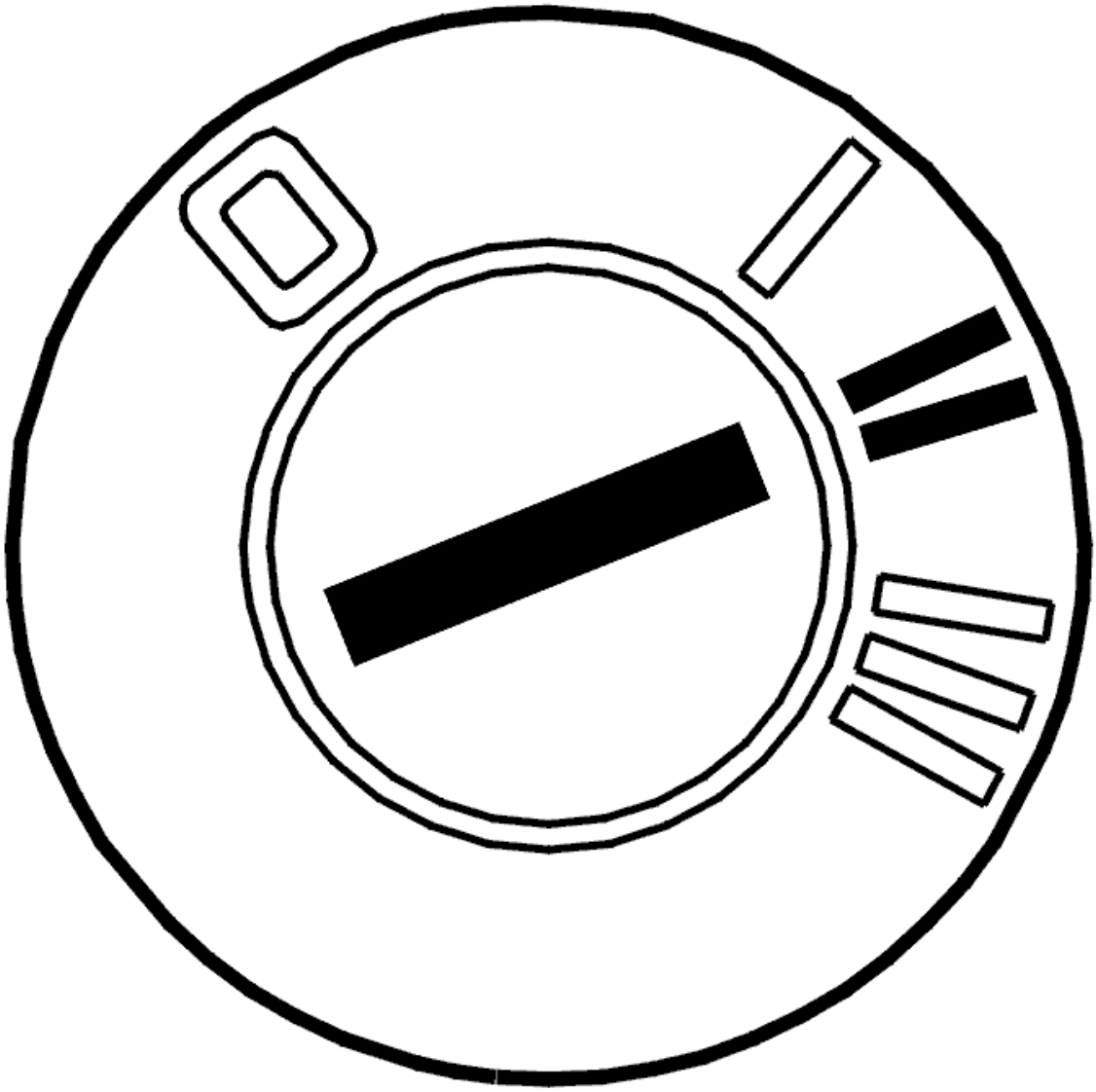


Fig. 151: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

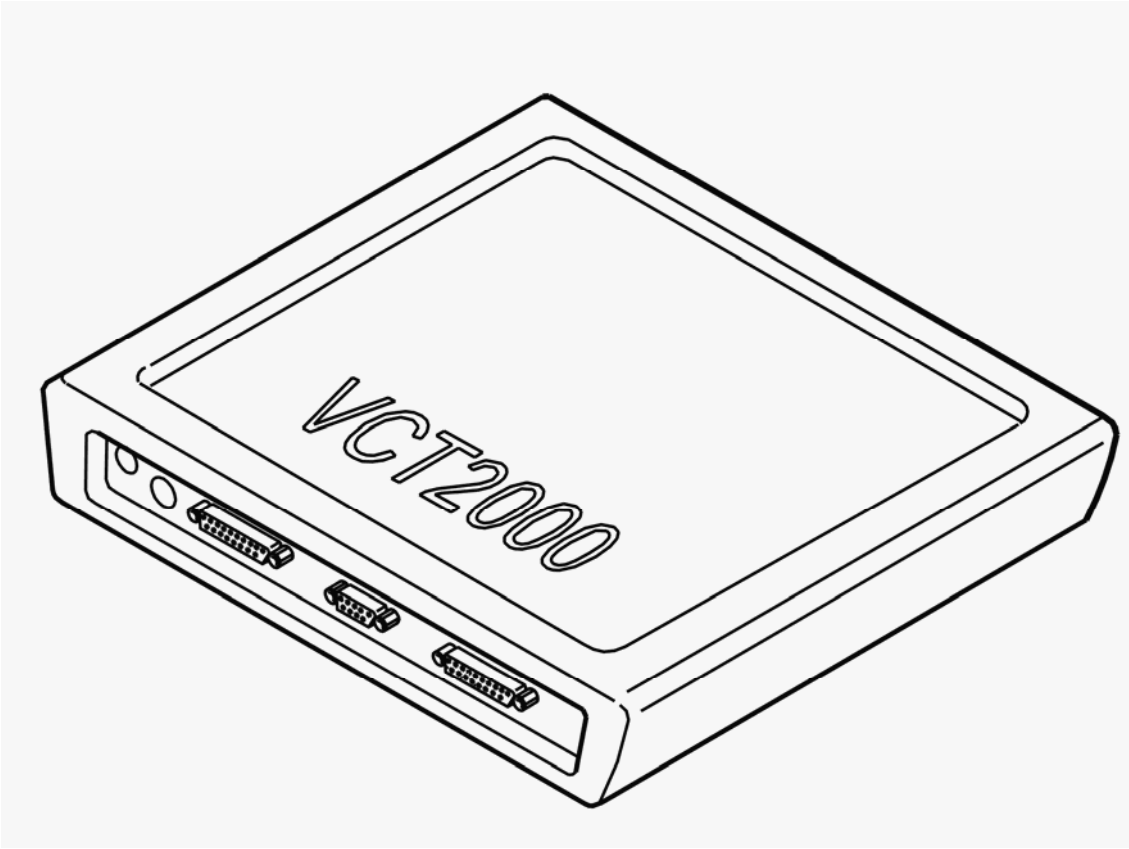


Fig. 152: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

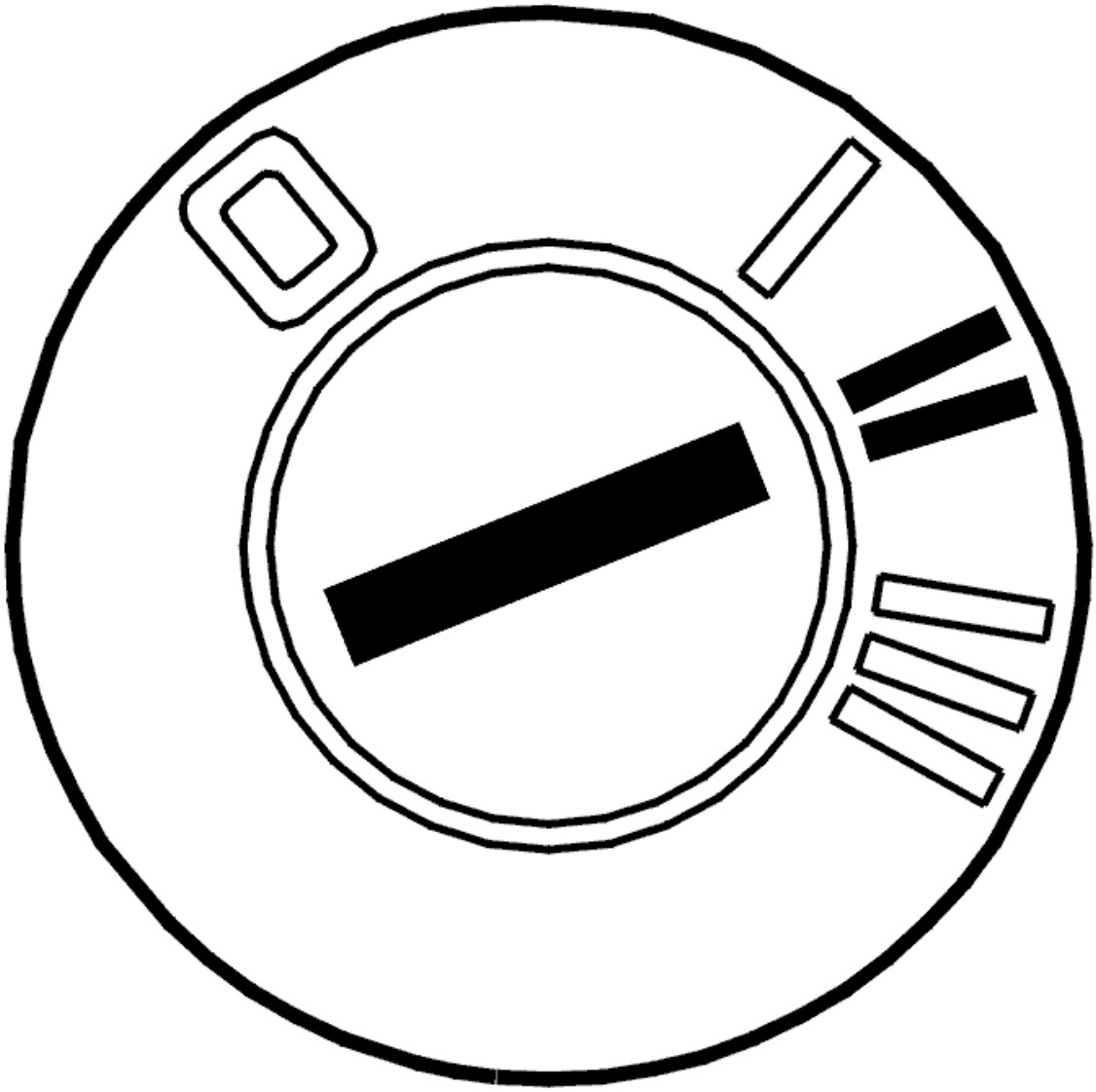


Fig. 153: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

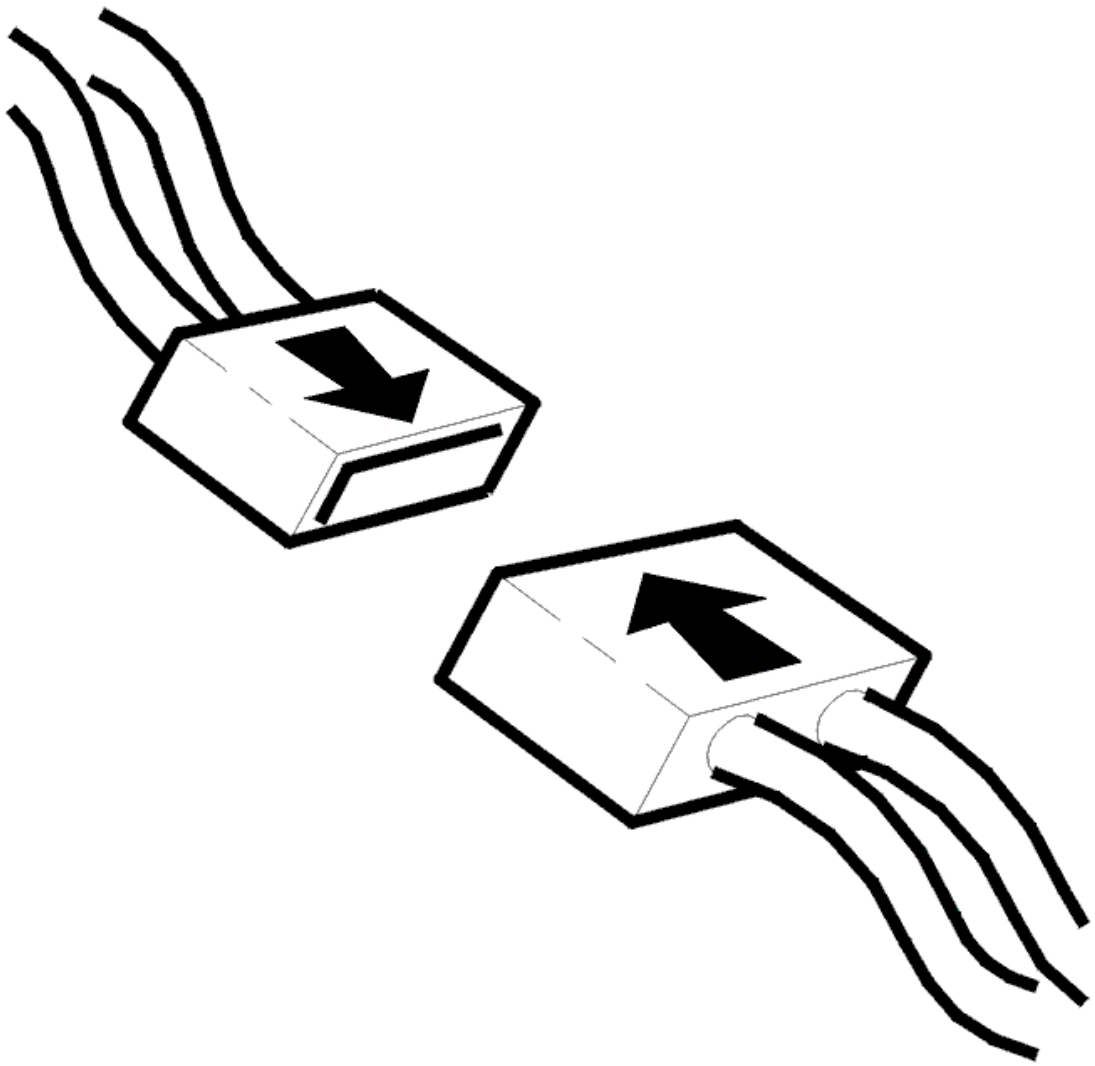


Fig. 154: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLT by clicking the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLT. The current must oscillate between approximately 0 and 1000 mA.

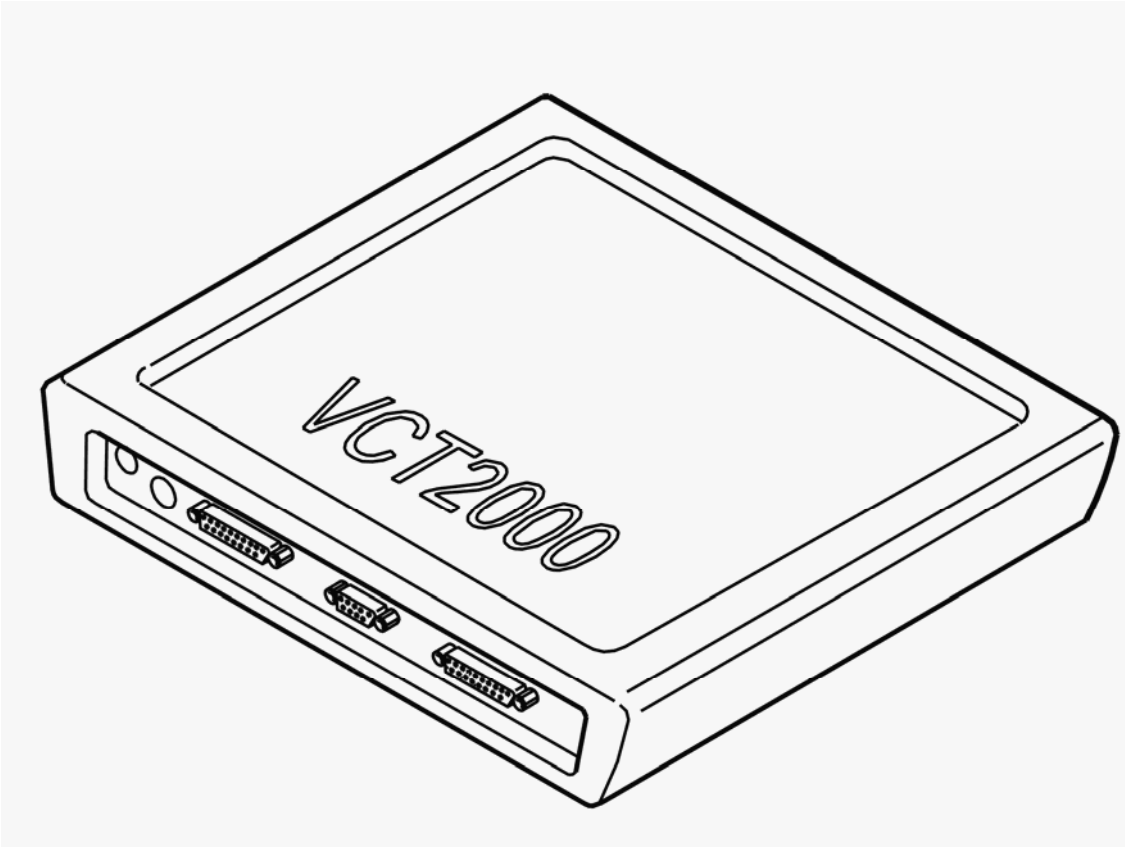


Fig. 155: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

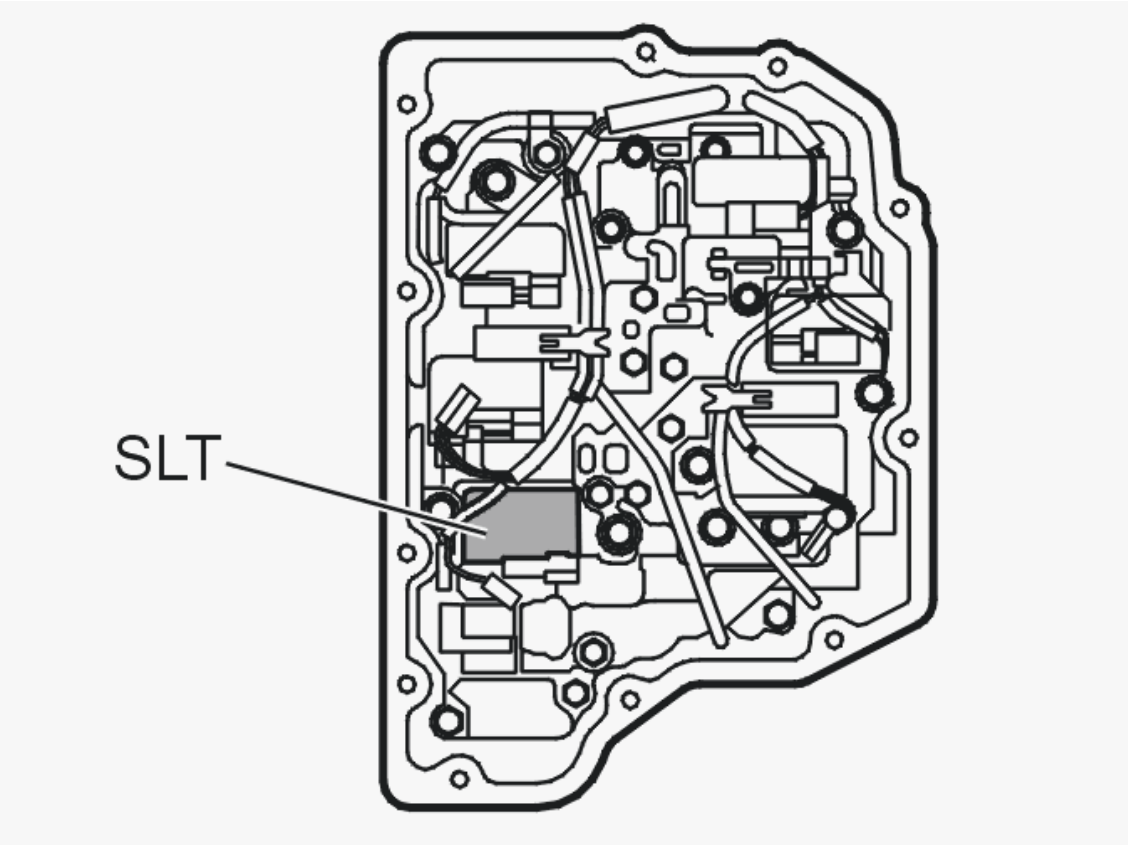


Fig. 156: Identifying Solenoid SLT
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P096300: PRESSURE REGULATOR SOLENOID A CONTROL CIRCUIT HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT

TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096300

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096300**

FAULT TRACING TCM-P096300

see **FAULT TRACING TCM-P096300**

TCM-P096400: PRESSURE CONTROL SOLENOID B CONTROL CIRCUIT / OPEN. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096400

Condition

Lock-up solenoid SLU controls the transmission lock-up function. Solenoid SLU works when it receives voltage from the transmission control module (TCM). The solenoid is activated during various driving conditions based on speed, throttle position and set driving program.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The current through the circuit of solenoid SLU is too low when the solenoid is being activated.

Solenoid SLU cannot then be activated.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Shifting when the lock-up function is activated.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

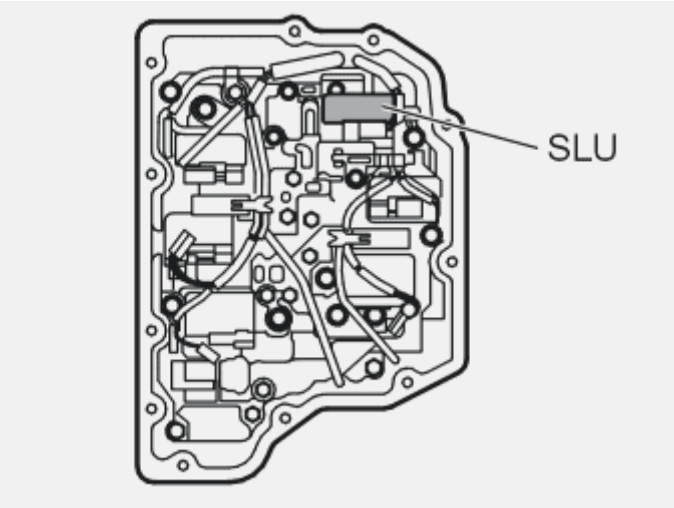


Fig. 157: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Blocking adaptation.
- Blocking of lock-up function.

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the cable for the control signal or signal ground.
- Solenoid does not function.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Abnormal slipping gearshifts
- No lock-up

FAULT-TRACING

CHECKS

CHECKING LOCK-UP SOLENOID SLU

Fig. 158: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLU by clicking on the VCT2000 symbol.

  Read off the current through the solenoid SLU circuit. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 159: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

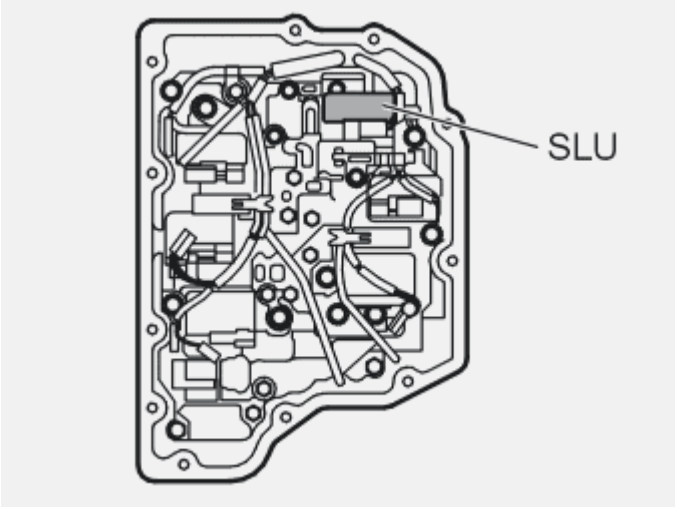


Fig. 160: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

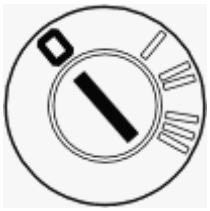


Fig. 161: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

Check the cables for open circuit and short circuit to ground.

Take readings between:

- Transmission connector #B9 and the connector for solenoid SLU #1.
- Transmission connector #B4 and the connector for solenoid SLU #2.

HINT: If no fault is found in the wiring, check solenoid SLU. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system see: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

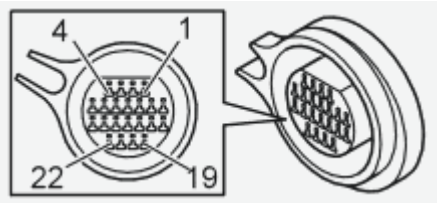


Fig. 162: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

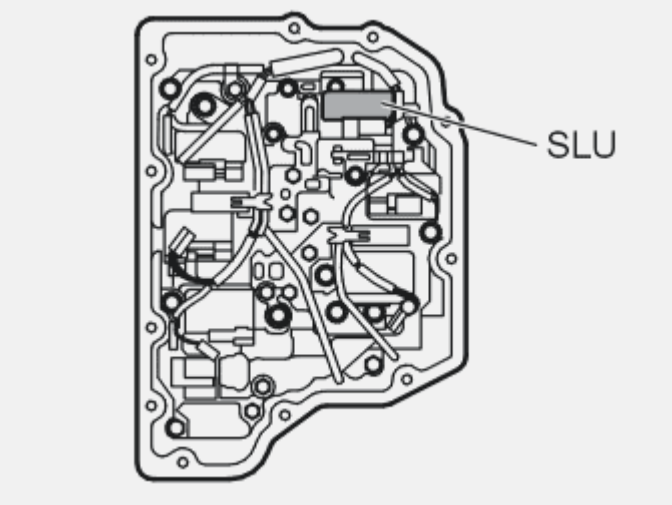


Fig. 163: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 164: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

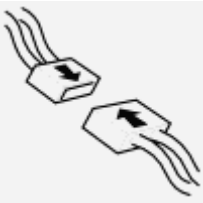


Fig. 165: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Activate solenoid SLU by clicking on the VCT2000 symbol.

  Read off the current through the solenoid SLU circuit. The current should oscillate between 100 and 950 mA.

Fig. 166: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

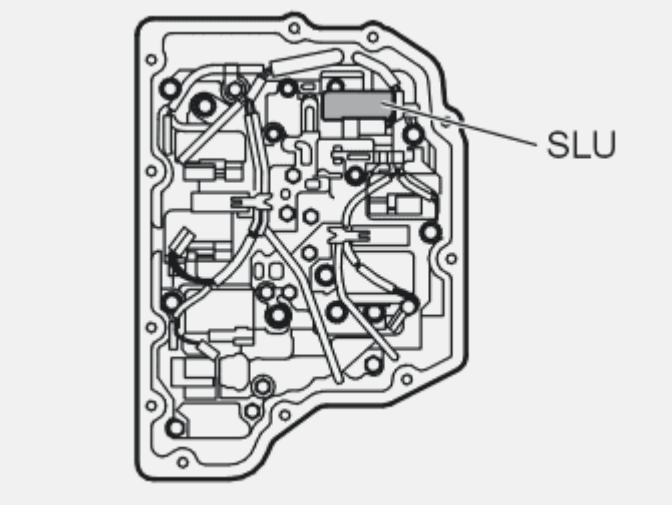


Fig. 167: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 168: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 169: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P096400: PRESSURE CONTROL SOLENOID B CONTROL CIRCUIT / OPEN. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096400

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096400**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P096400: PRESSURE REGULATOR SOLENOID B CONTROL CIRCUIT/BROKEN CIRCUIT. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096400

Condition

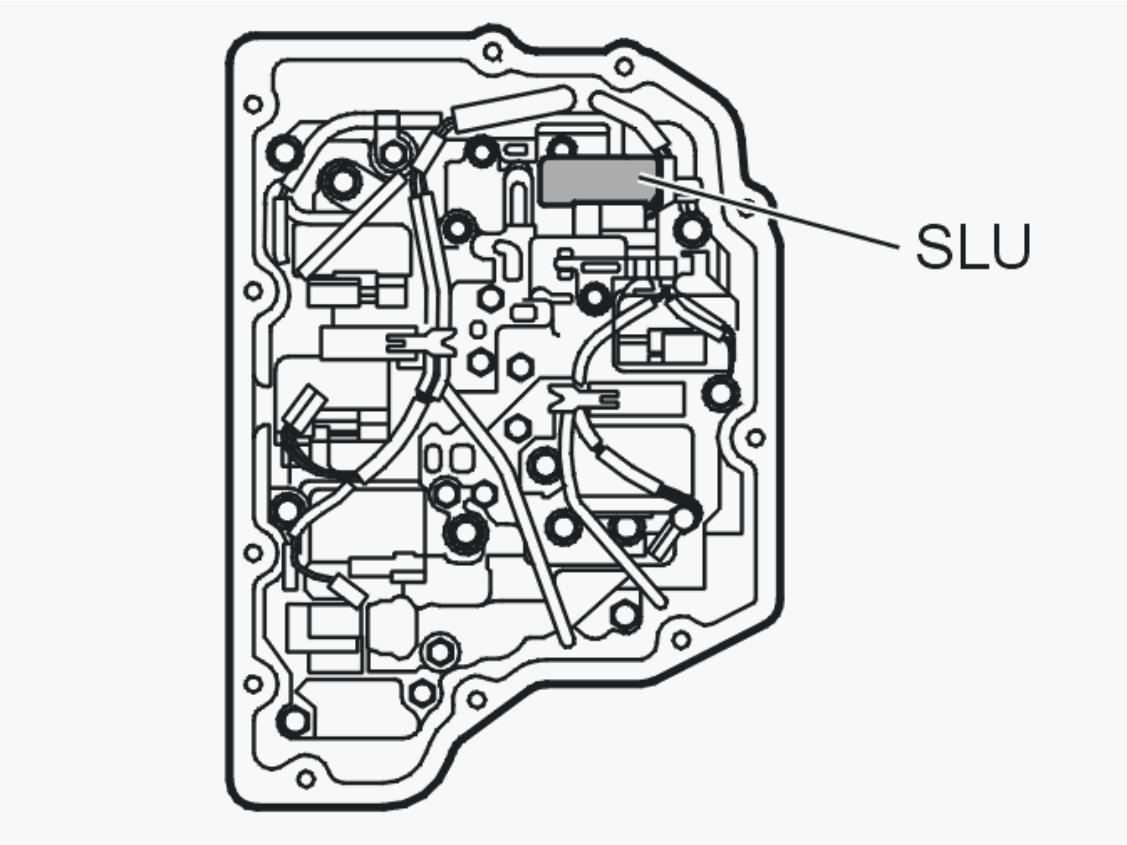


Fig. 170: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

The lock-up solenoid SLU controls the lock-up function in the gearbox. The SLU solenoid works when it receives power from the transmission control module (TCM) and depending on the speed, accelerator position and driving program setting, the solenoid will be activated for different driving conditions.

If the transmission control module (TCM) registers that the current through the circuit to the SLU solenoid is too low when the solenoid should be activated, the diagnostic trouble code (DTC) is generated. The SLU solenoid can then not be activated.

The diagnostic trouble code (DTC) can be diagnosed when changing gear while the lock-up function is activated.

Substitute Value

- Blocking an adaptation.
- Blocking of lock-up function.

Possible Source

- Contact resistance in the terminals
- Open circuit in lead for control signal or signal ground.

- Solenoid not working.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Abnormally slipping gears.
- No lock-up function.

FAULT TRACING TCM-P096400

CHECKS

CHECKING THE LOCK-UP SOLENOID SLU

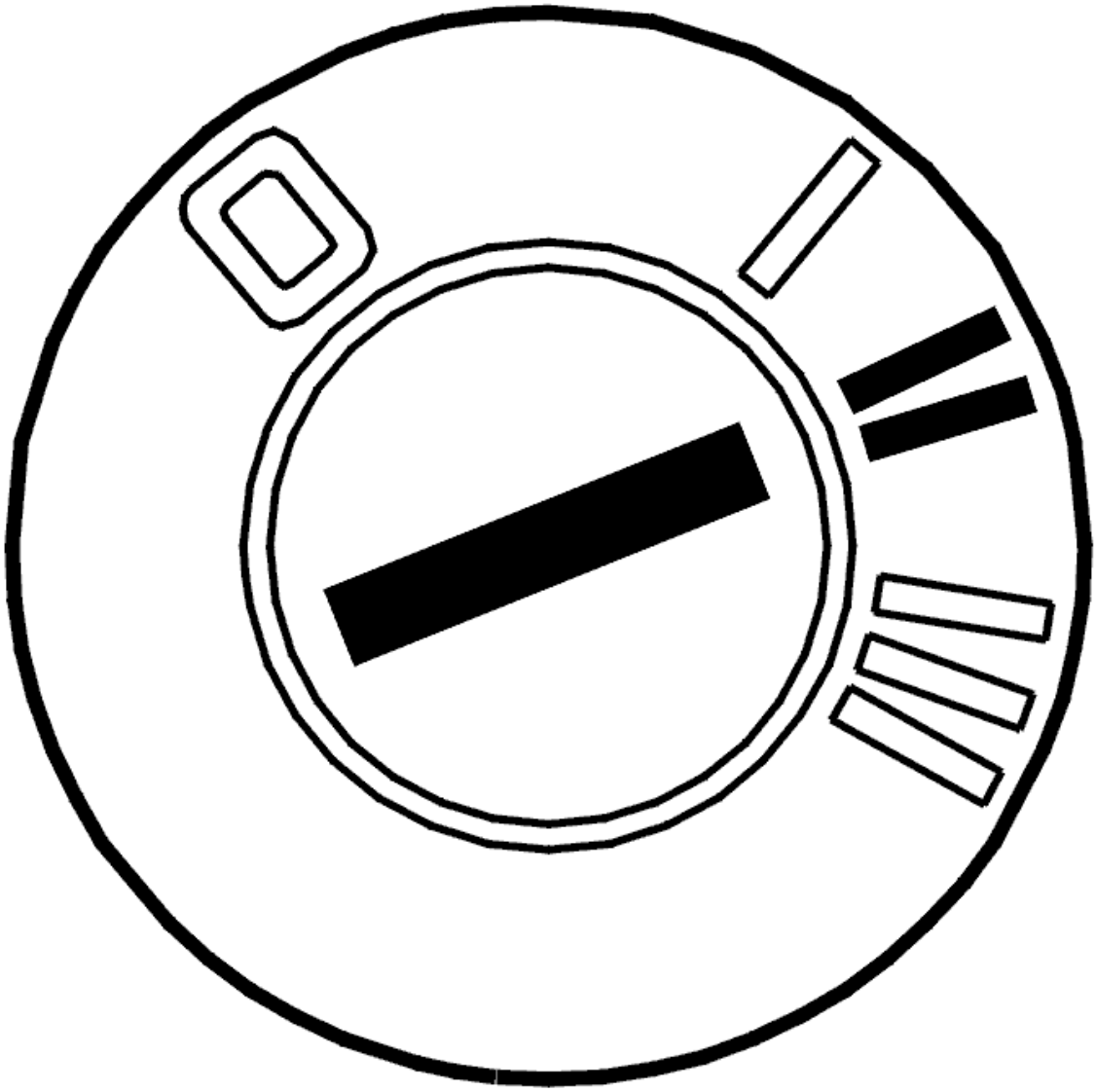


Fig. 171: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLU by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLU. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

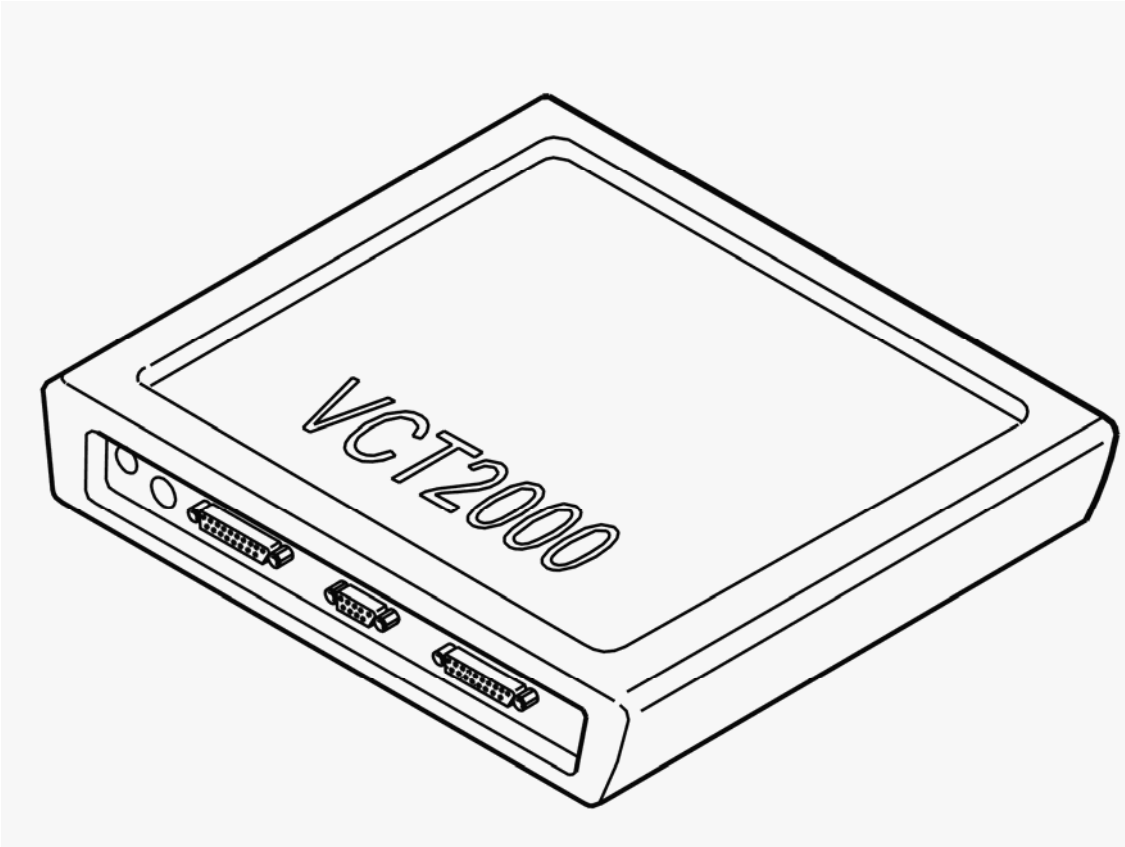


Fig. 172: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

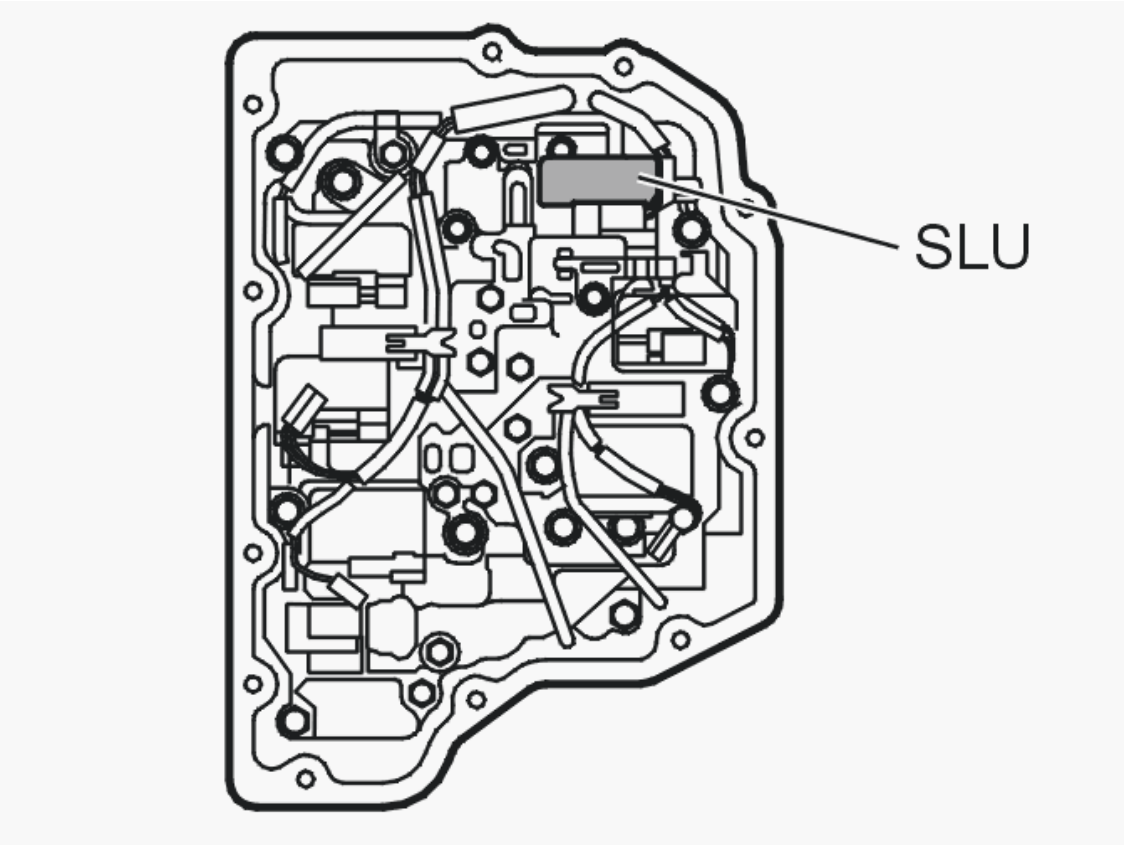


Fig. 173: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

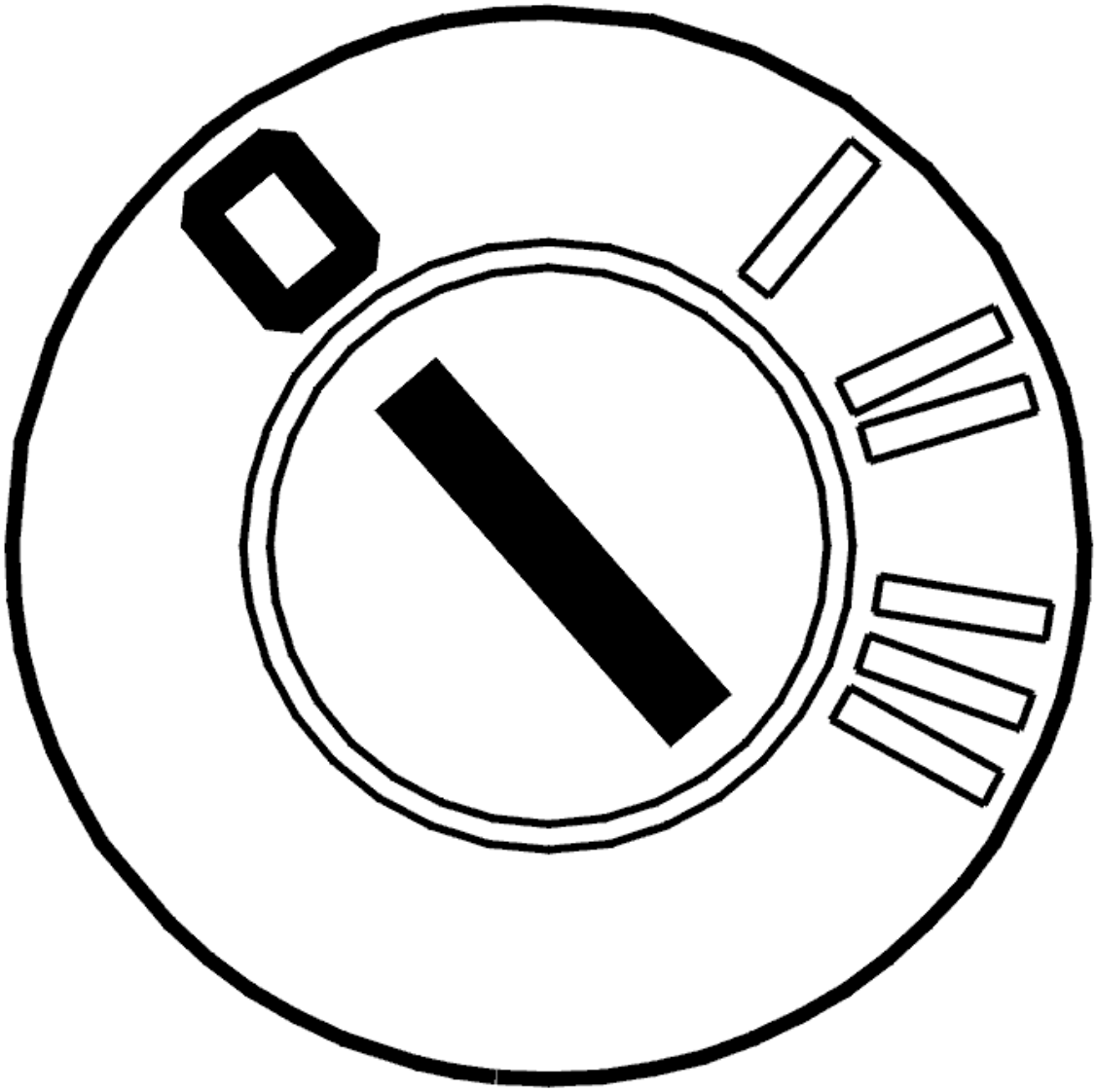


Fig. 174: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

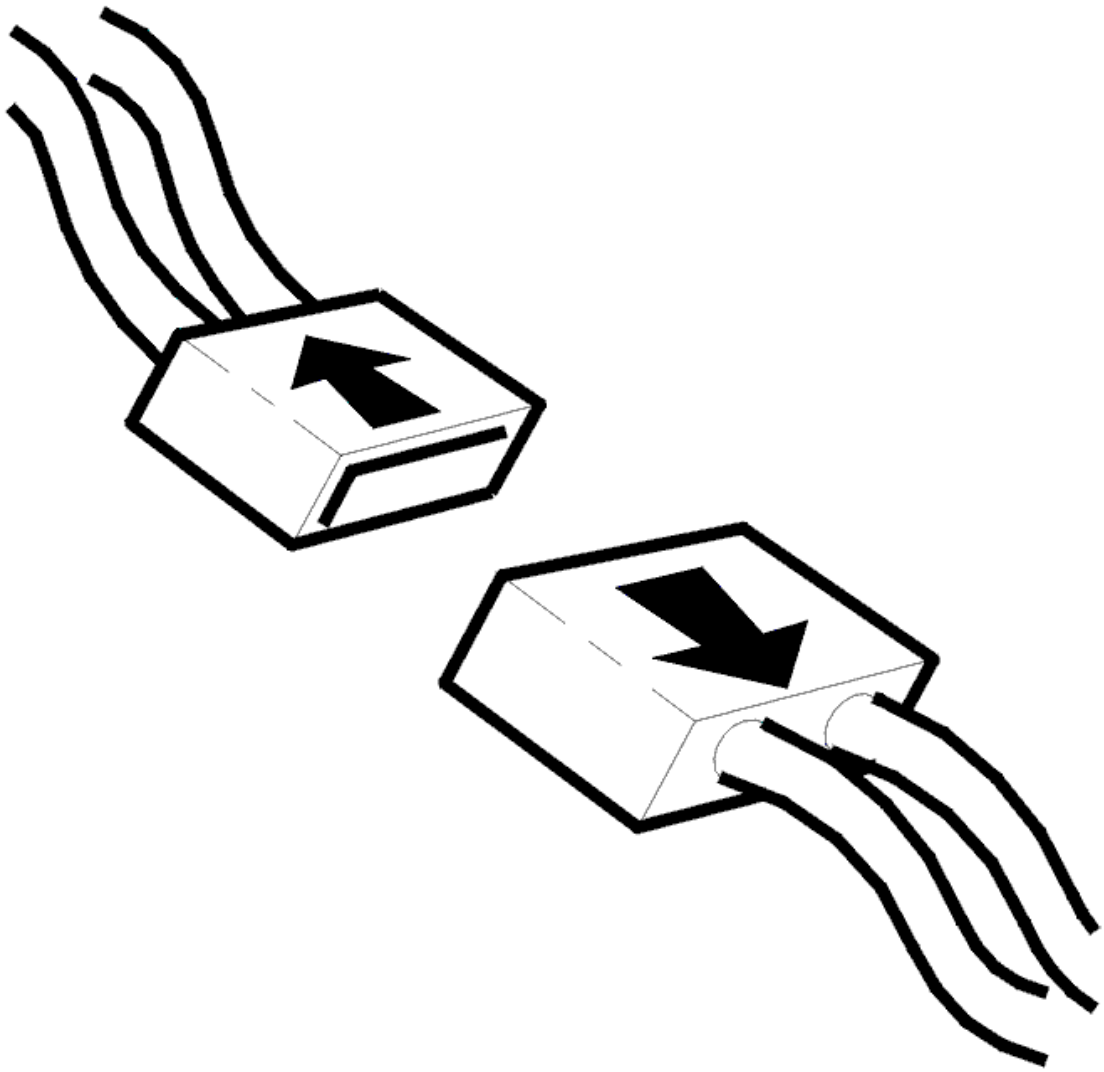


Fig. 175: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check connector B (22-pin) for the transmission control module (TCM). Check for damage and pressed in terminal pins. Check for contact resistance and oxidation.

Check the wiring between transmission connector terminal #B9 and solenoid SLU connector terminal #1. Check the wiring between transmission connector terminal #B4 and solenoid SLT connector terminal #2. Check for an open circuit. Check for a short-circuit to ground.

HINT: If no fault is found in the wiring check solenoid SLU. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

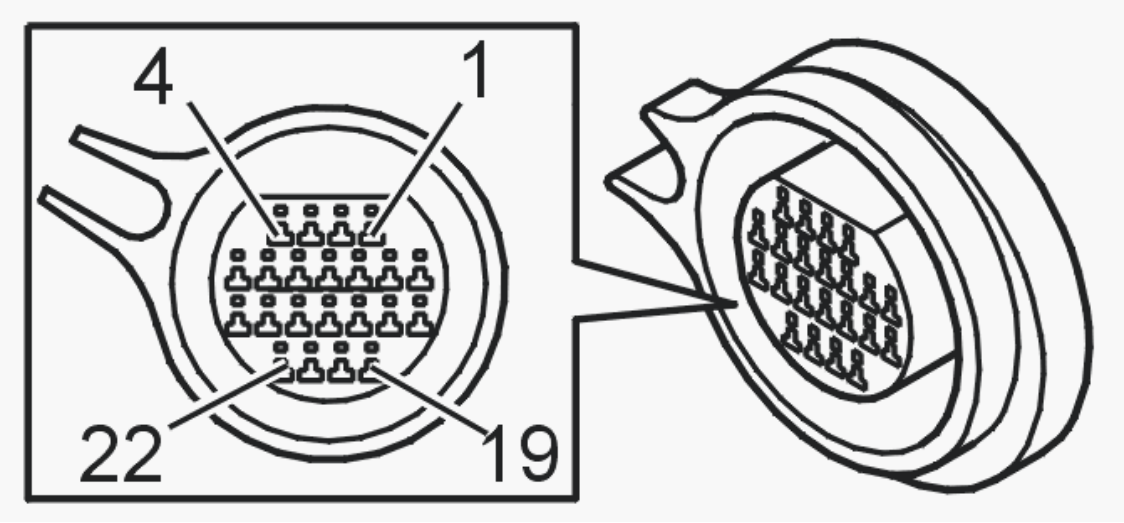


Fig. 176: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

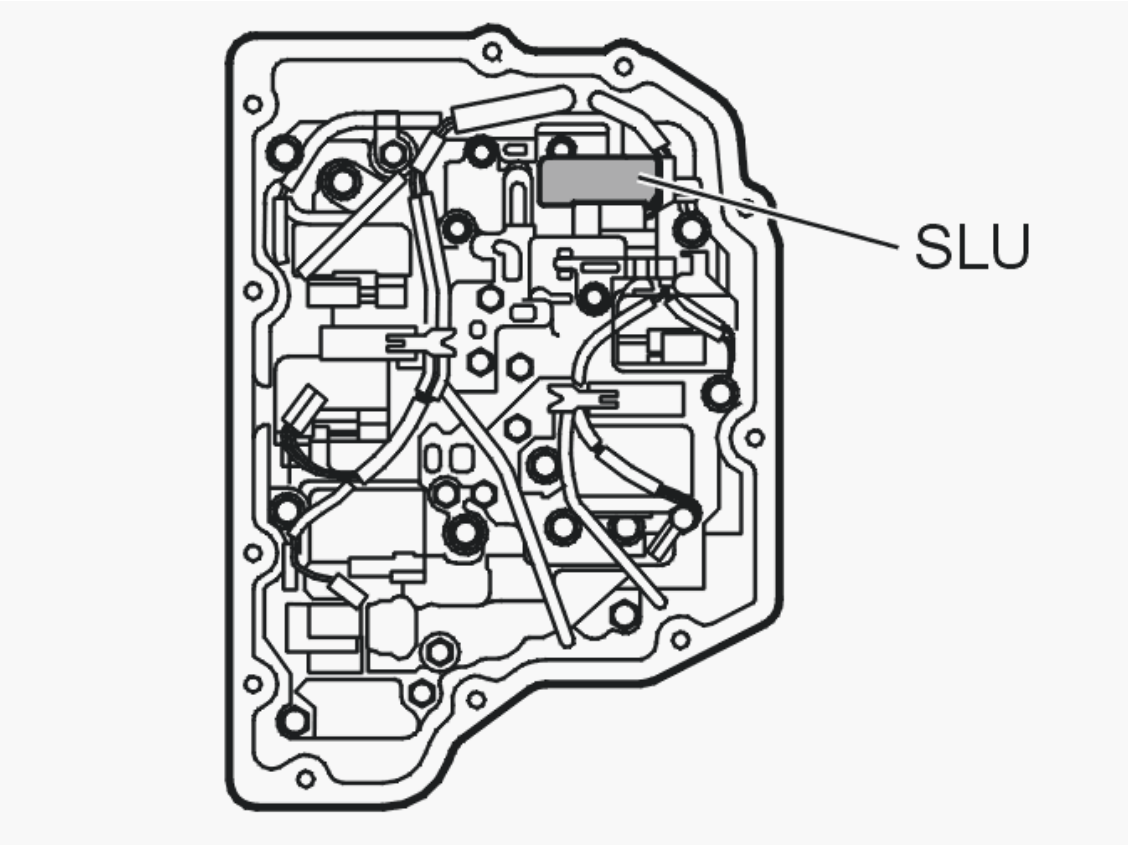


Fig. 177: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

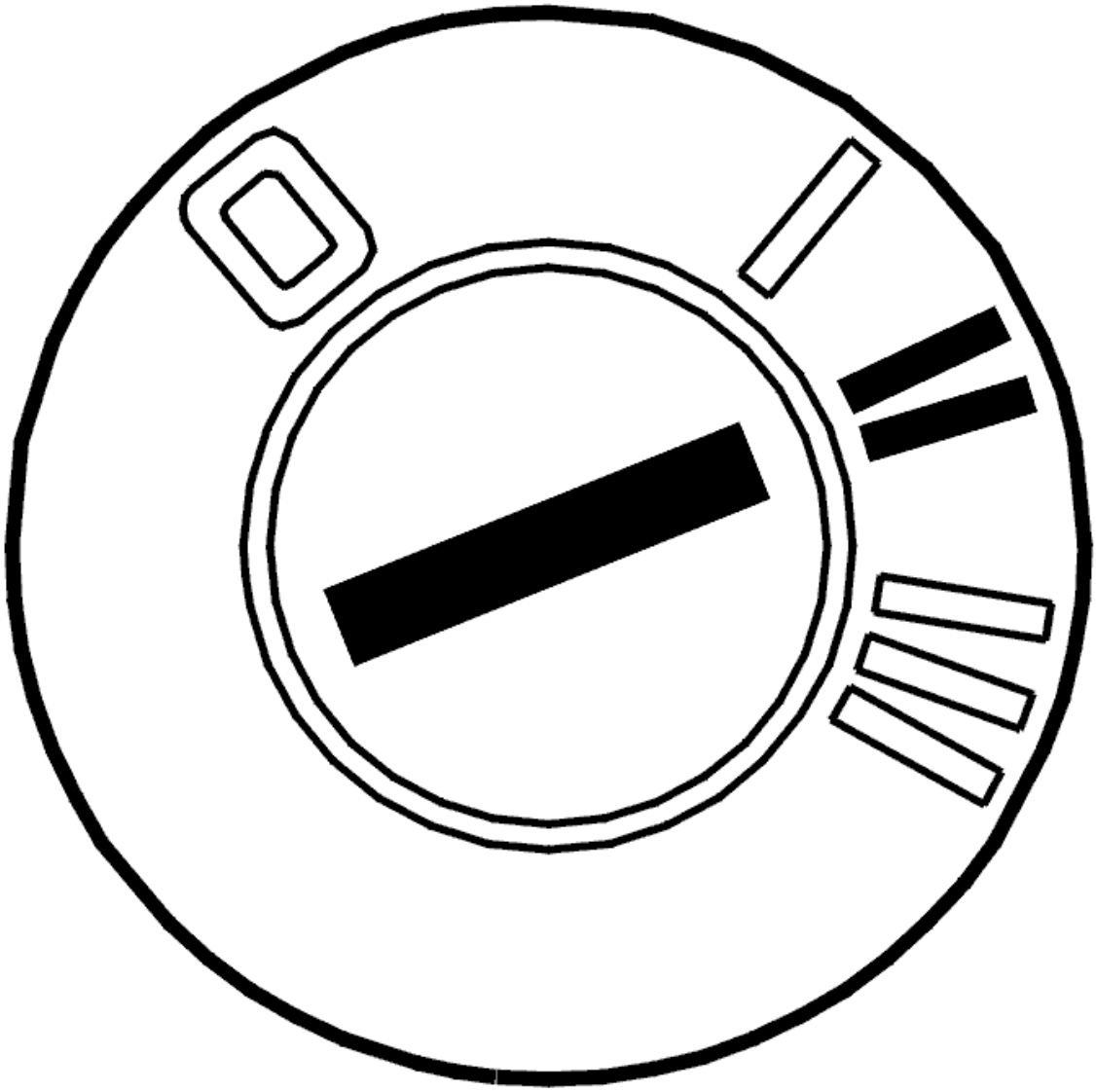


Fig. 178: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

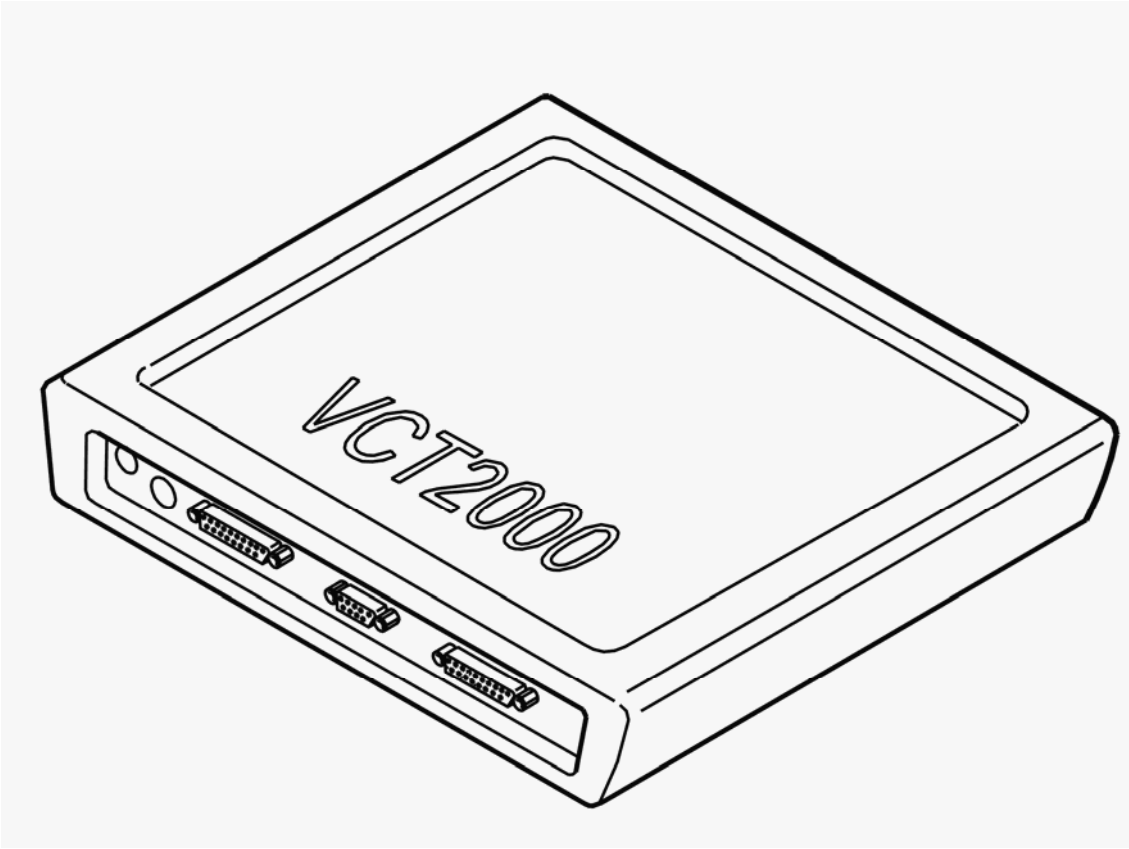


Fig. 179: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

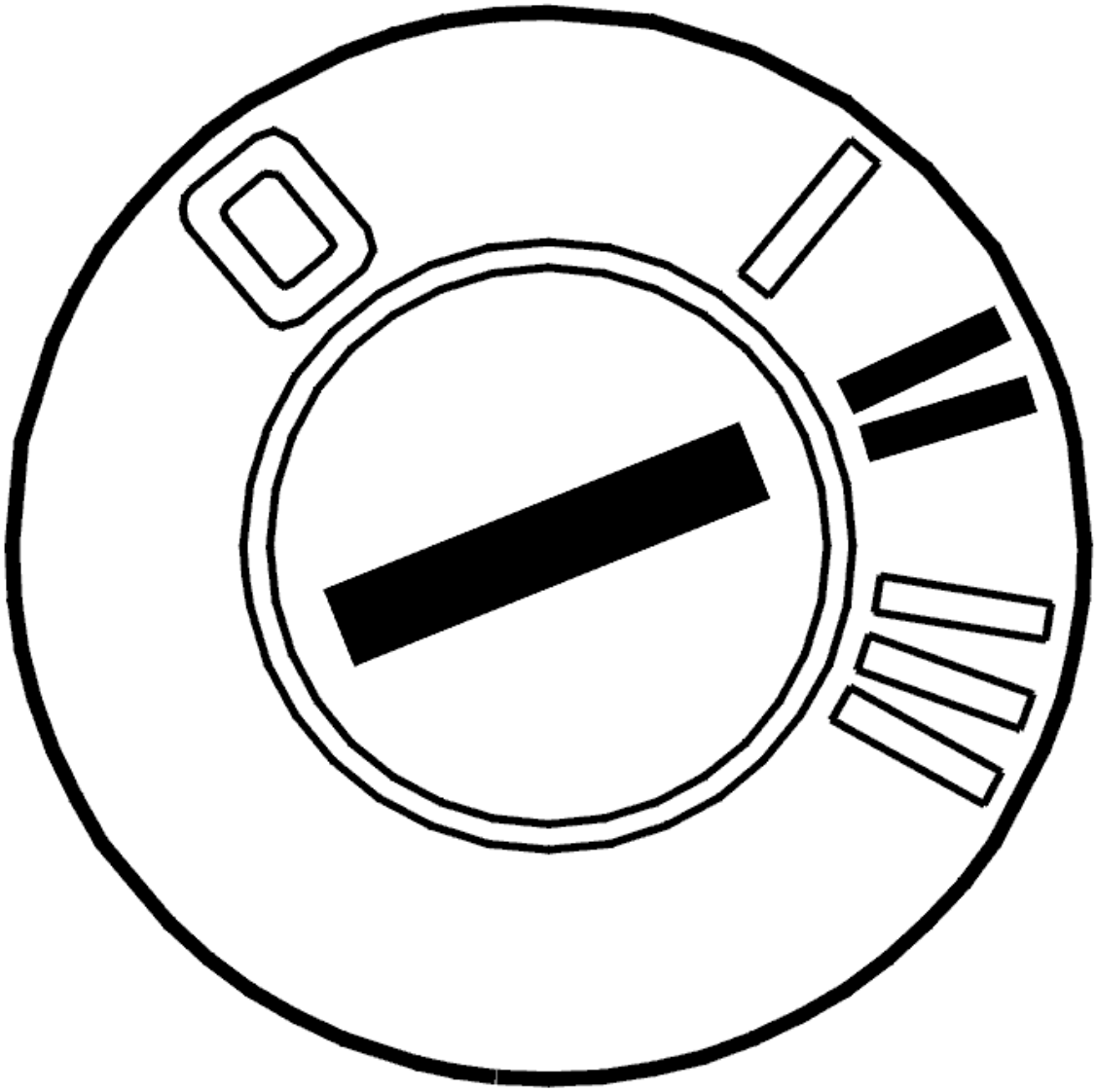


Fig. 180: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

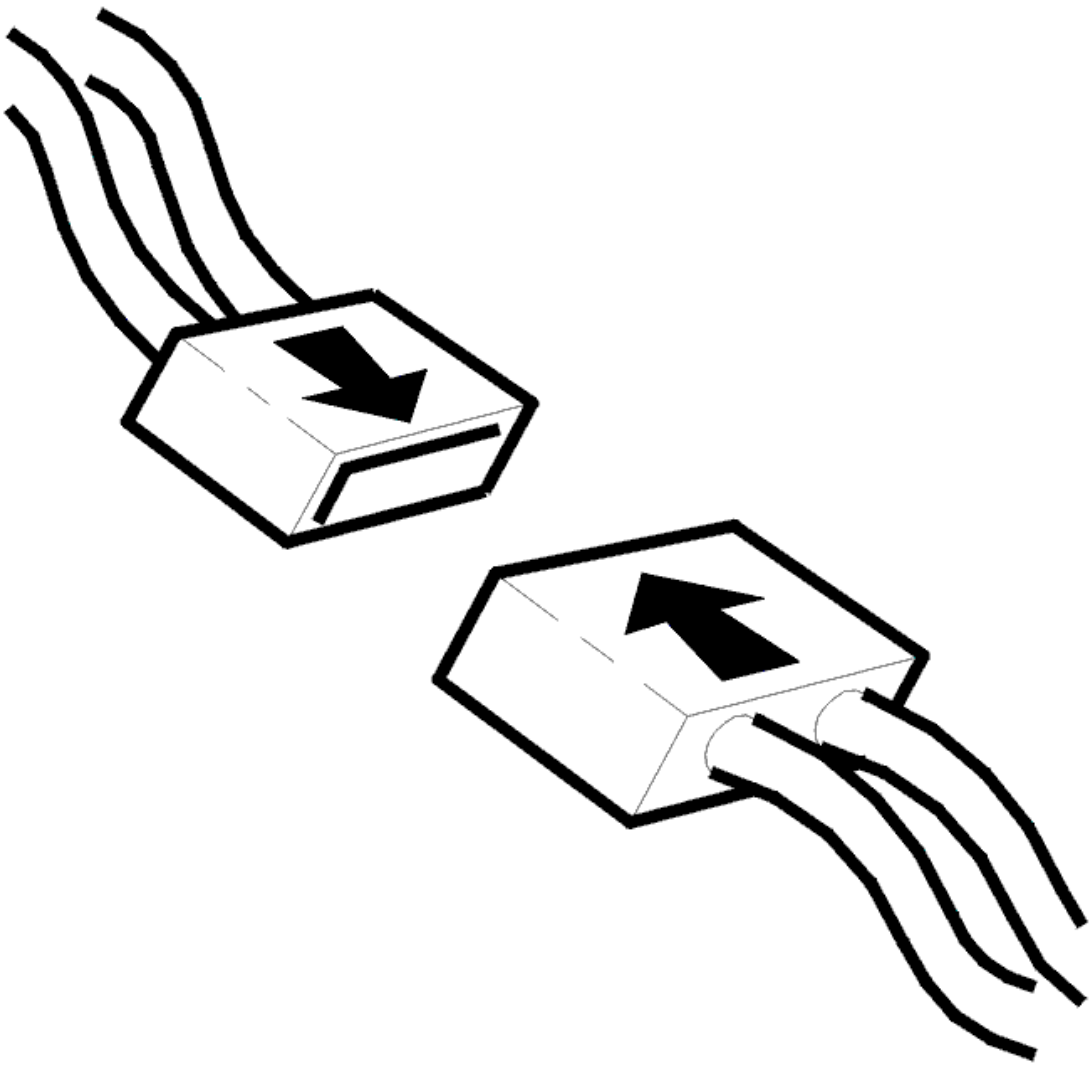


Fig. 181: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLU by clicking the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLU. The current must oscillate between approximately 0 and 1000 mA.

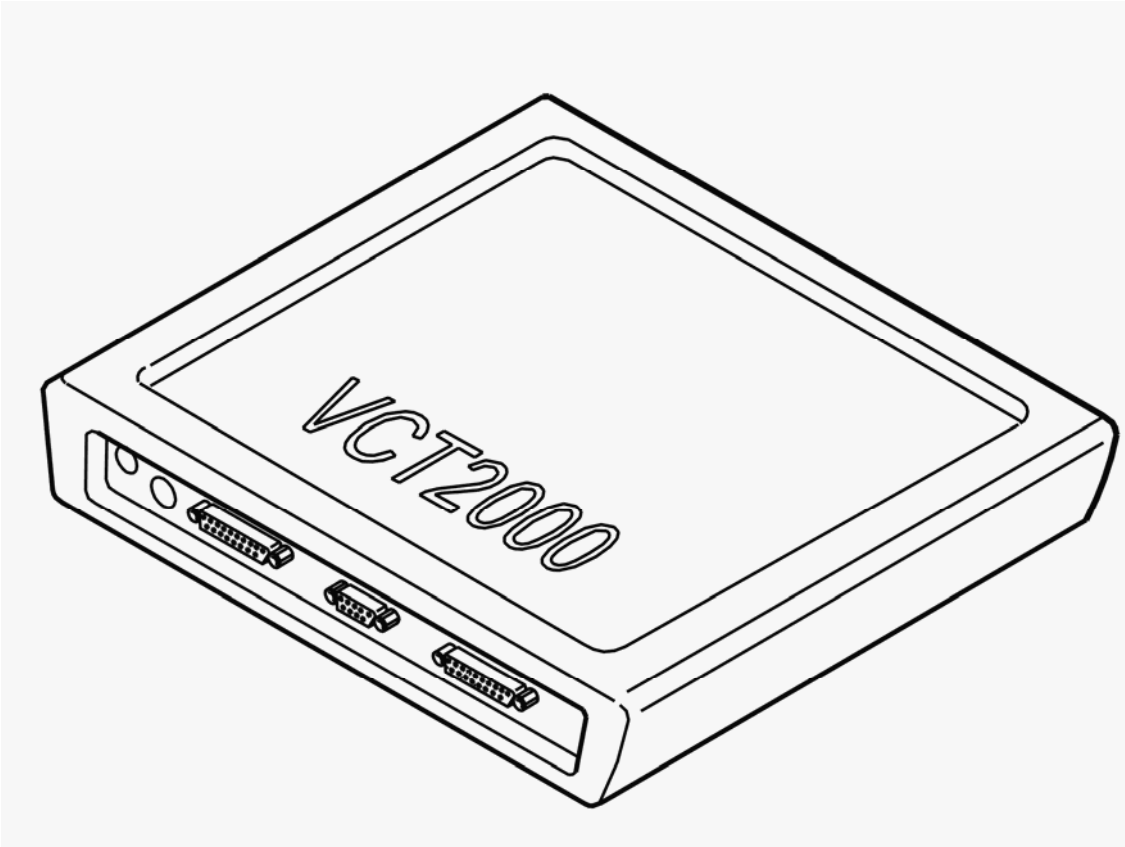


Fig. 182: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

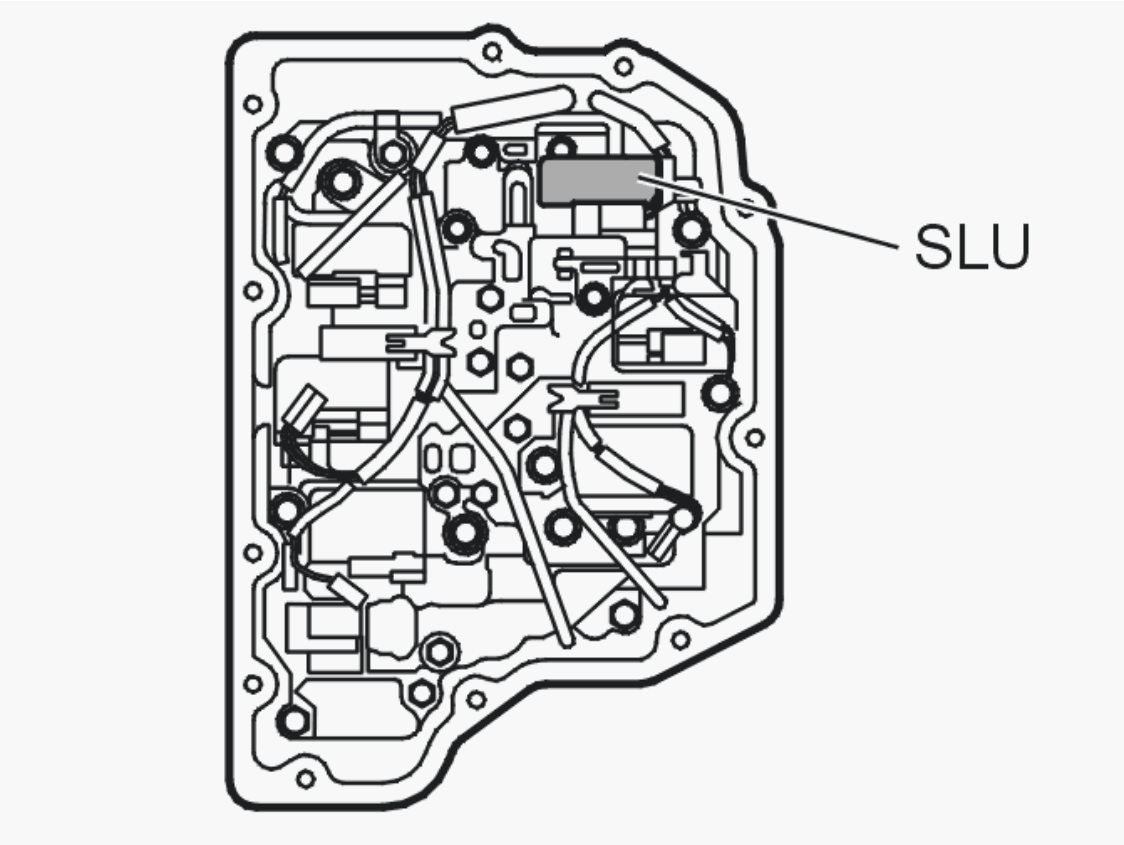


Fig. 183: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P096400: PRESSURE REGULATOR SOLENOID B CONTROL CIRCUIT/BROKEN CIRCUIT. GENERAL FAULT INFORMATION. NO

INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096400

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096400**

FAULT TRACING TCM-P096400

see **FAULT TRACING TCM-P096400**

TCM-P096500: PRESSURE CONTROL SOLENOID B CONTROL CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096500

Condition

Lock-up solenoid SLU controls the transmission lock-up function. Solenoid SLU works when it receives voltage from the transmission control module (TCM). The solenoid is activated during various driving conditions based on speed, throttle position and set driving program.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The measured current in the solenoid circuit is incorrect.

Solenoid SLU can then not regulate system pressure.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Shifting when the lock-up function is activated.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

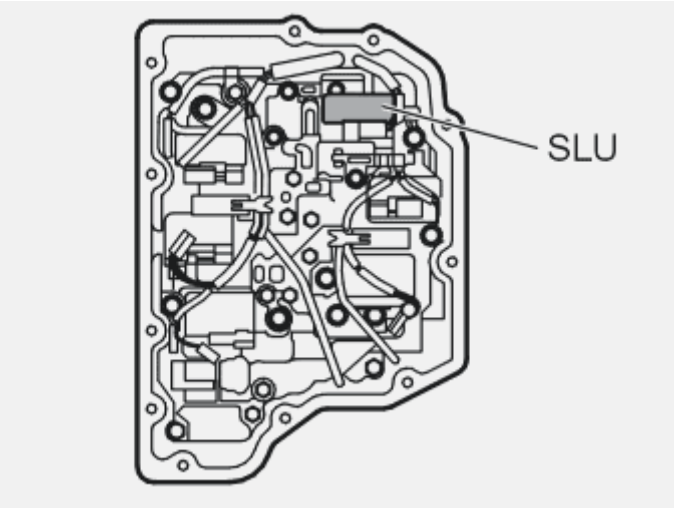


Fig. 184: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the cable for the control signal or signal ground.
- Lock-up solenoid SLU is stuck.
- Lock-up solenoid SLU not working.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Rough gear shift
- No gear shift
- Abnormal slipping gearshifts

FAULT-TRACING

CHECKS

CHECKING LOCK-UP SOLENOID SLU

Fig. 185: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLU by clicking on the VCT2000 symbol.

  Read off the current through the solenoid SLU circuit. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 186: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

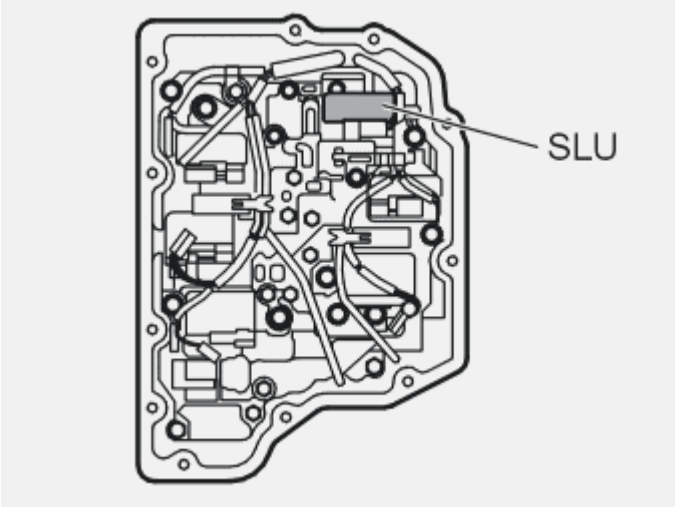


Fig. 187: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

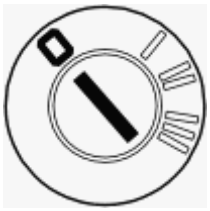


Fig. 188: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

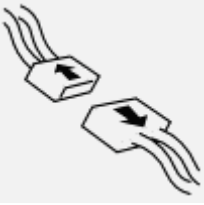


Fig. 189: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

Check the cables for open circuit and short circuit to ground.

Take readings between:

- Transmission connector #B9 and the connector for solenoid SLU #1.
- Transmission connector #B4 and the connector for solenoid SLU #2.

HINT: If no fault is found in the wiring, check solenoid SLU. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**

- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

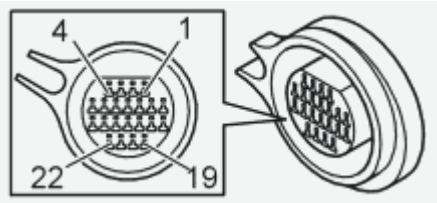


Fig. 190: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

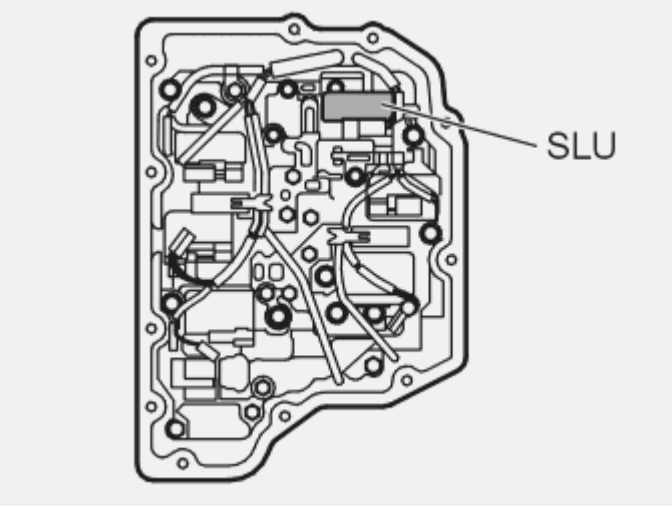


Fig. 191: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 192: Identifying Ignition ON

Courtesy of VOLVO CARS CORPORATION

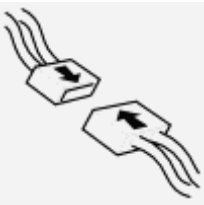


Fig. 193: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Activate solenoid SLU by clicking on the VCT2000 symbol.

  Read off the current through the solenoid SLU circuit. The current should oscillate between 100 and 950 mA.

Fig. 194: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

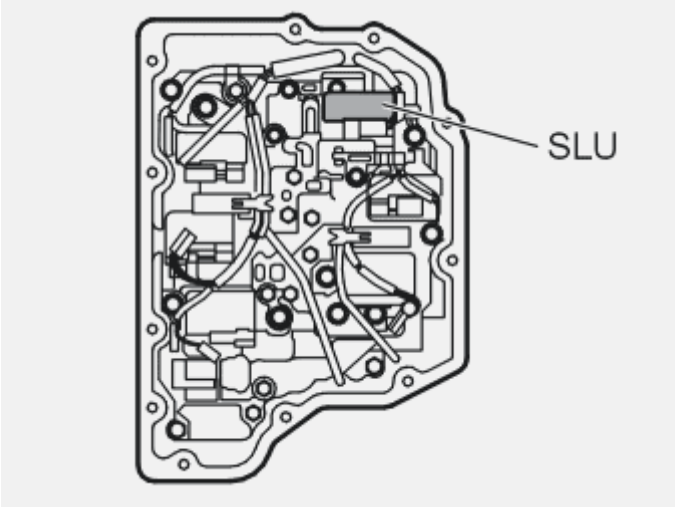


Fig. 195: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 196: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 197: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P096500: PRESSURE CONTROL SOLENOID B CONTROL CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096500

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096500**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P096500: PRESSURE REGULATOR SOLENOID B CONTROL CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096500

Condition

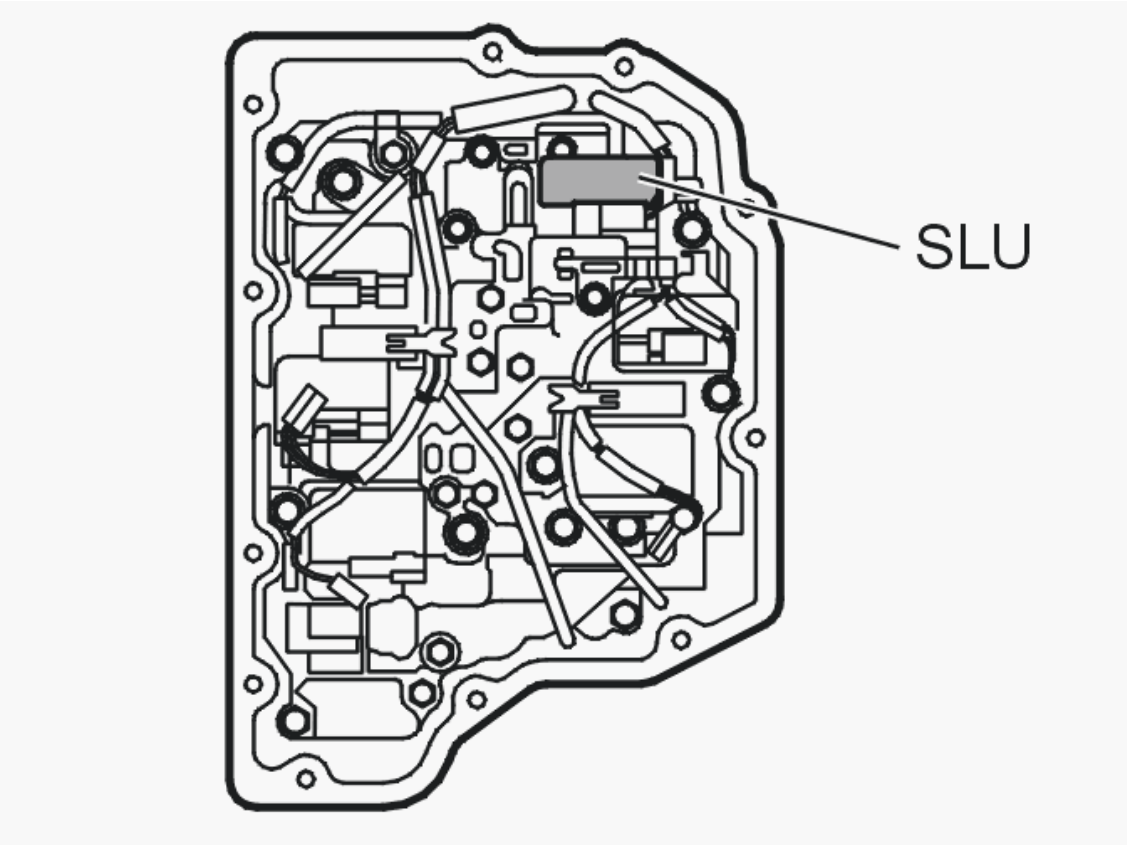


Fig. 198: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

The lock-up solenoid SLU controls the lock-up function in the gearbox. The SLU solenoid works when it receives power from the transmission control module (TCM) and depending on the speed, accelerator position and driving program setting, the solenoid will be activated for different driving conditions.

If the transmission control module (TCM) registers that the measured current in the solenoid circuit is incorrect, the diagnostic trouble code (DTC) is generated. The SLU solenoid is then not able to regulate system pressure.

The diagnostic trouble code (DTC) can be diagnosed when changing gear while the lock-up function is activated.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals
- Open circuit in lead for control signal or signal ground.

- Lock-up solenoid SLU stuck.
- Lock-up solenoid SLU not working.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Harsh gear changing
- No gear changing.
- Abnormally slipping gears.

FAULT TRACING TCM-P096500

CHECKS

CHECKING THE LOCK-UP SOLENOID SLU

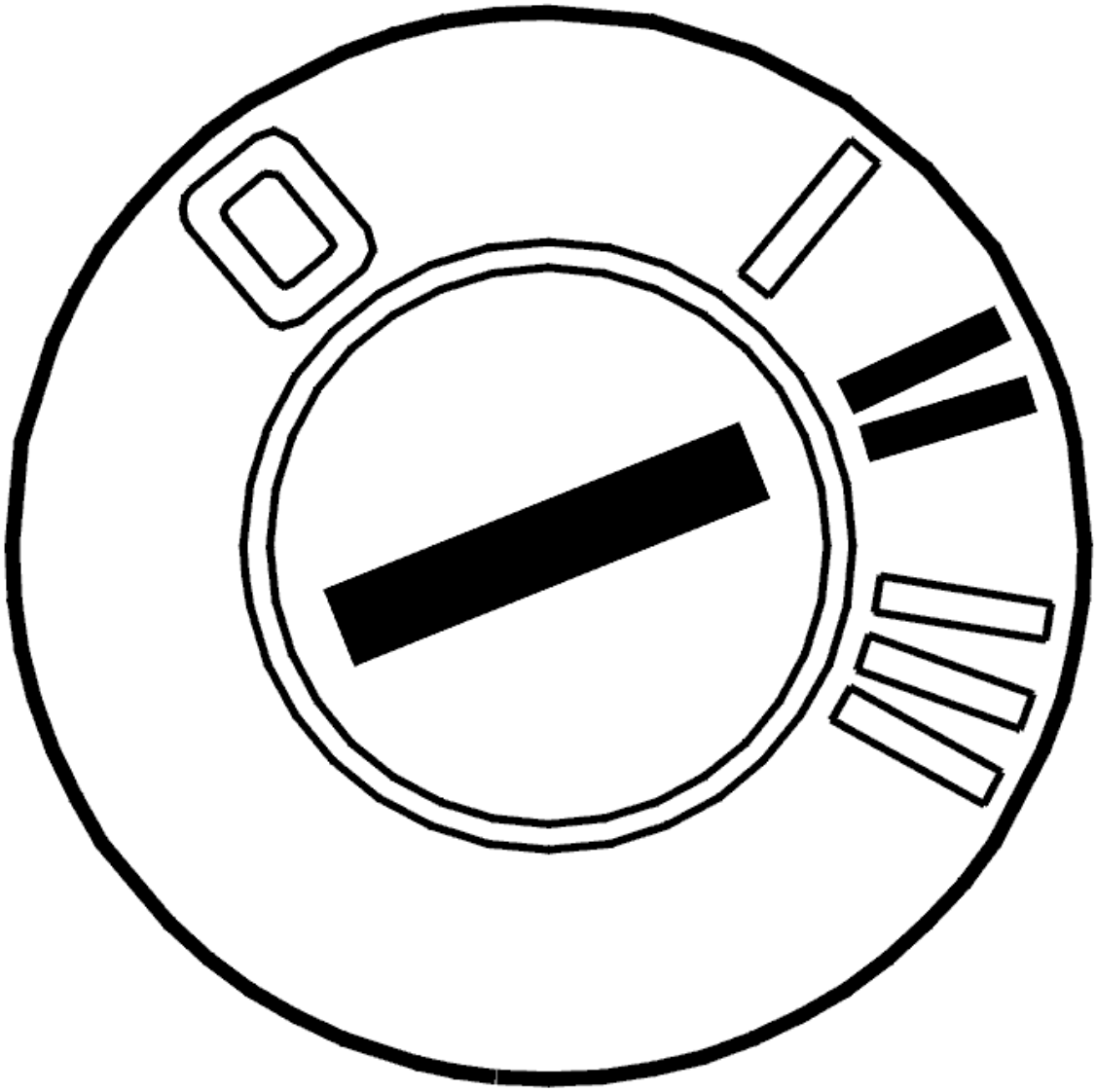


Fig. 199: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLU by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLU. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

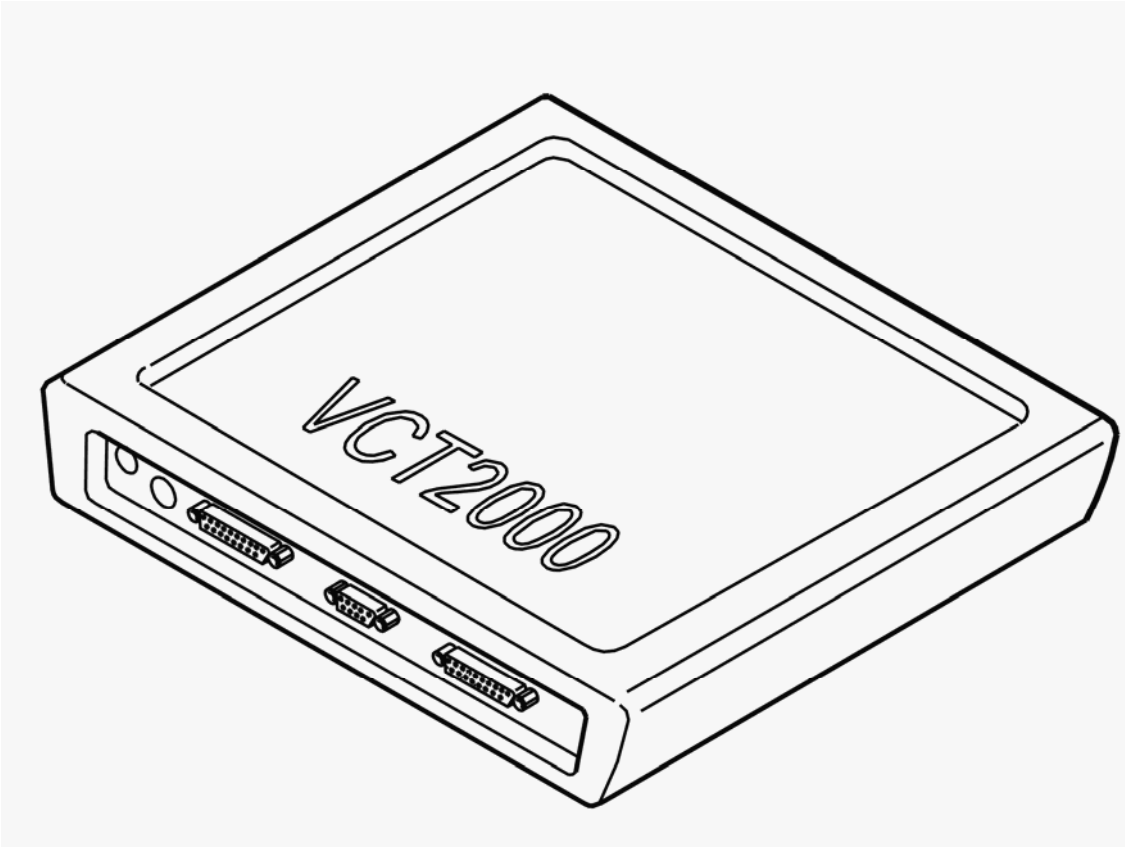


Fig. 200: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

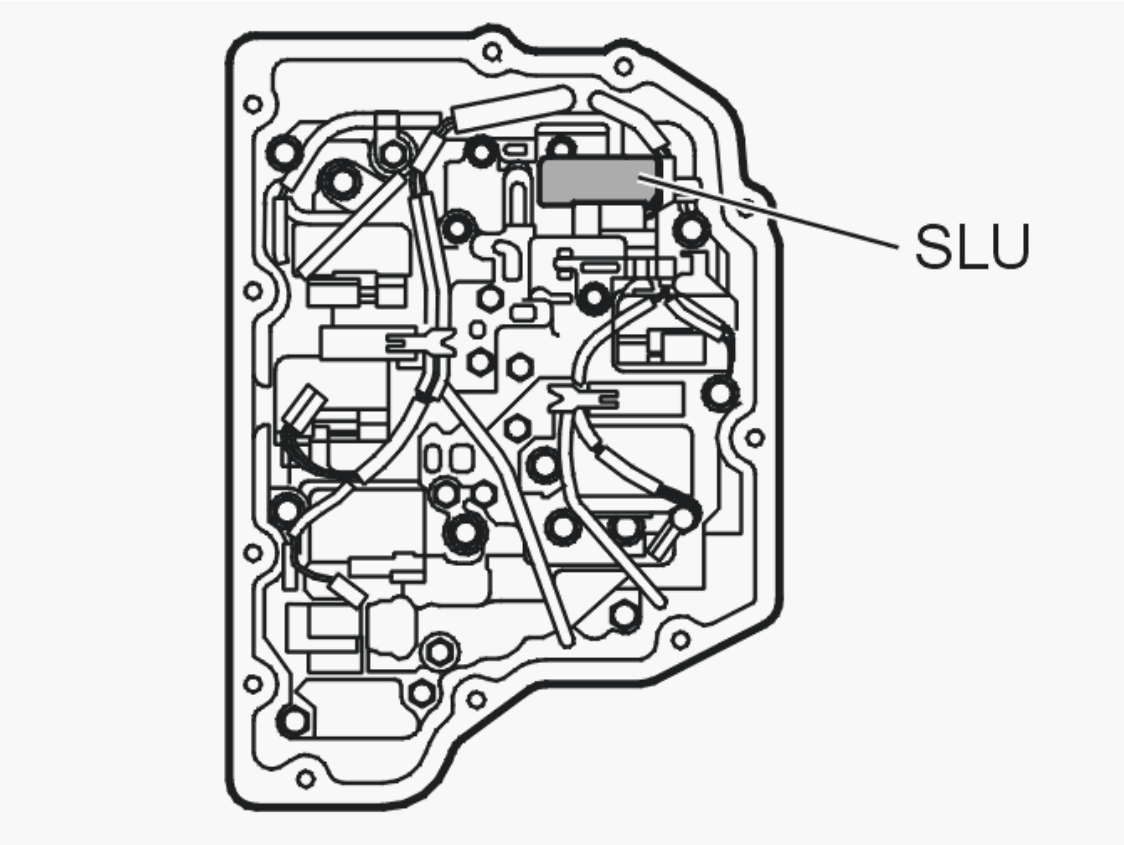


Fig. 201: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

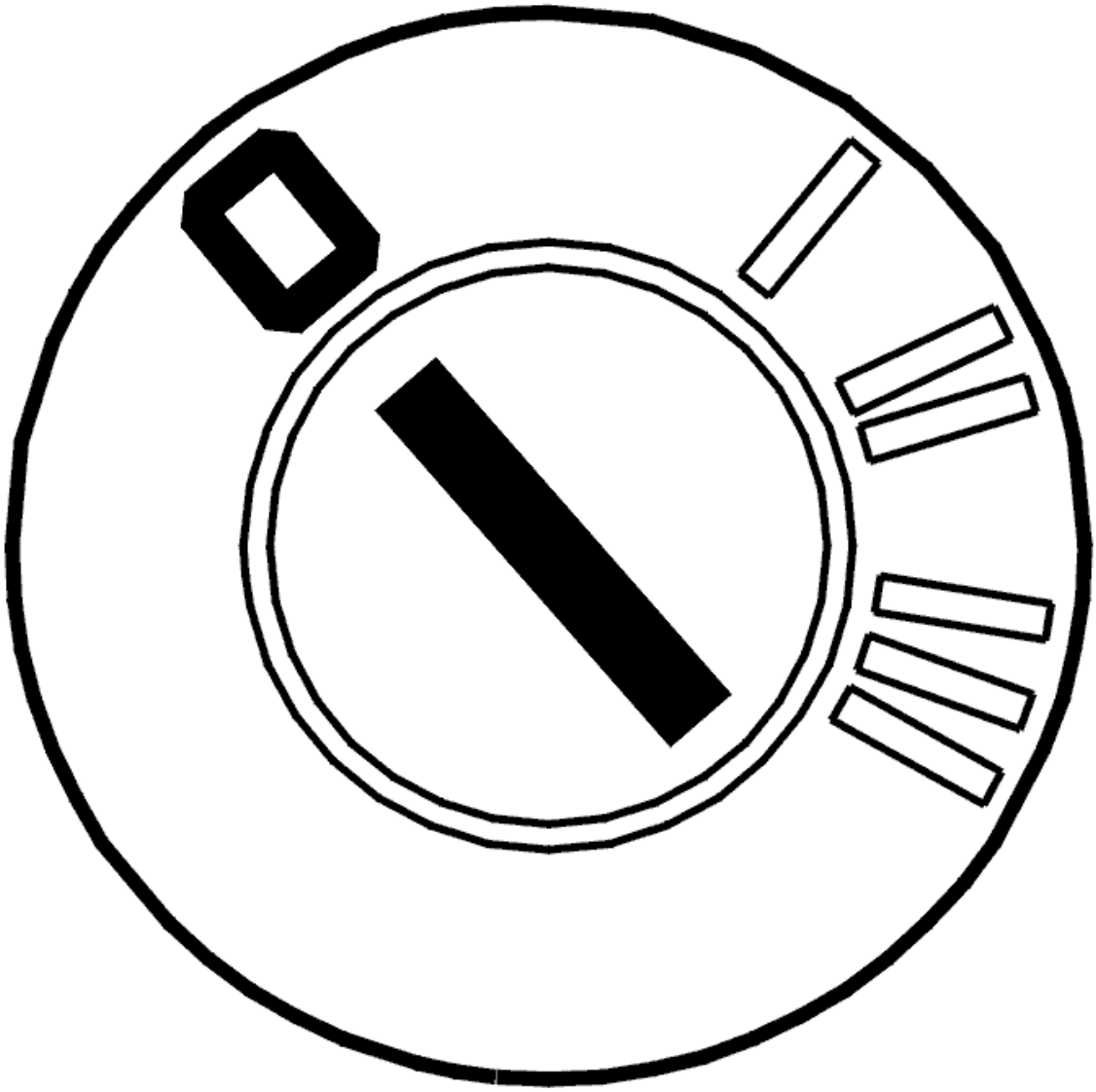


Fig. 202: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

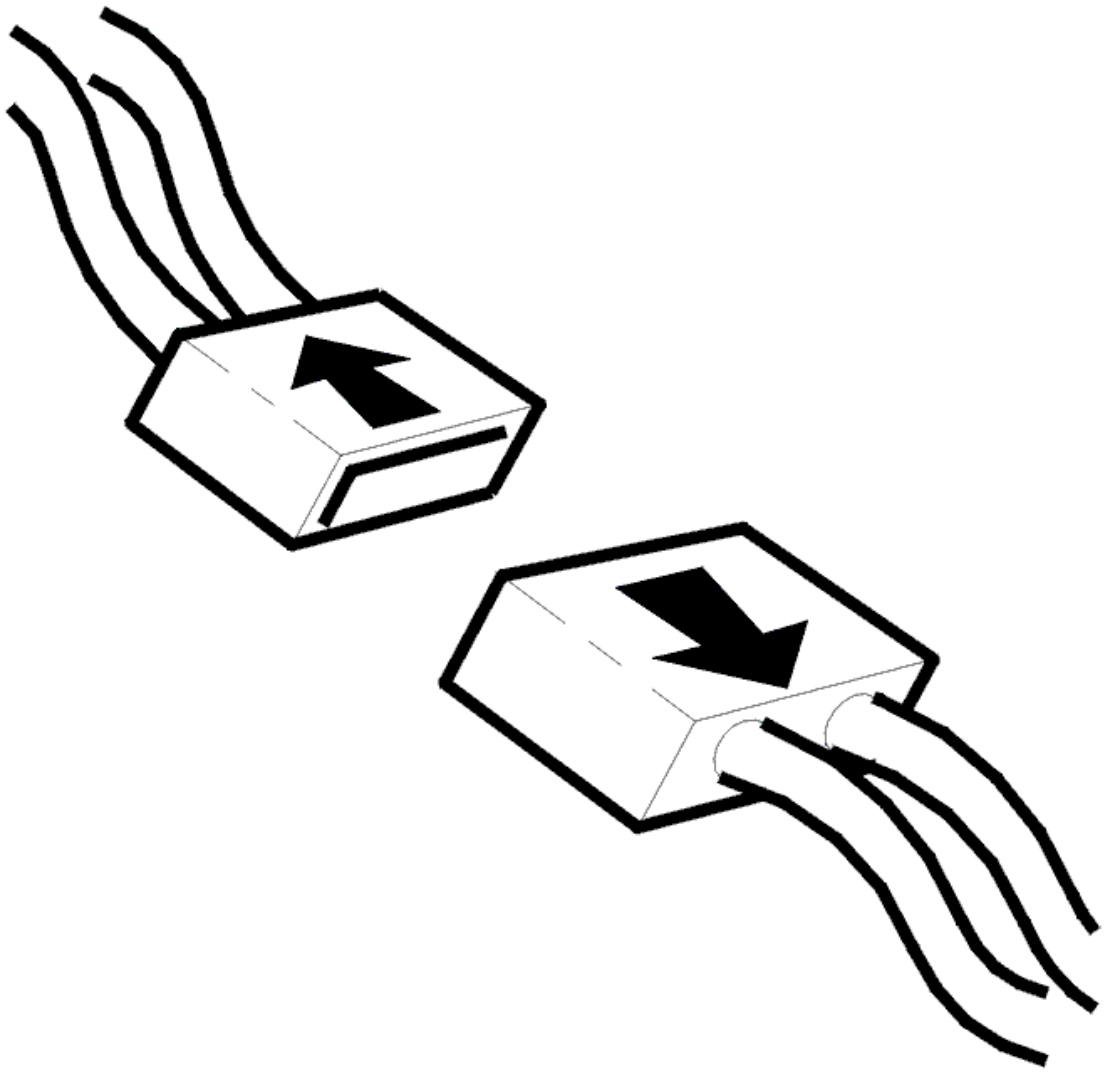


Fig. 203: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check connector B (22-pin) for the transmission control module (TCM). Check for damage and pressed in terminal pins. Check for contact resistance and oxidation.

Check the wiring between the transmission connector terminal #B9 and the connector for solenoid SLU terminal #1. Check the wiring between the transmission connector terminal #B4 and the connector for solenoid SLU terminal #2. Check for an open circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.

HINT: If no fault is found in the wiring check solenoid SLU. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

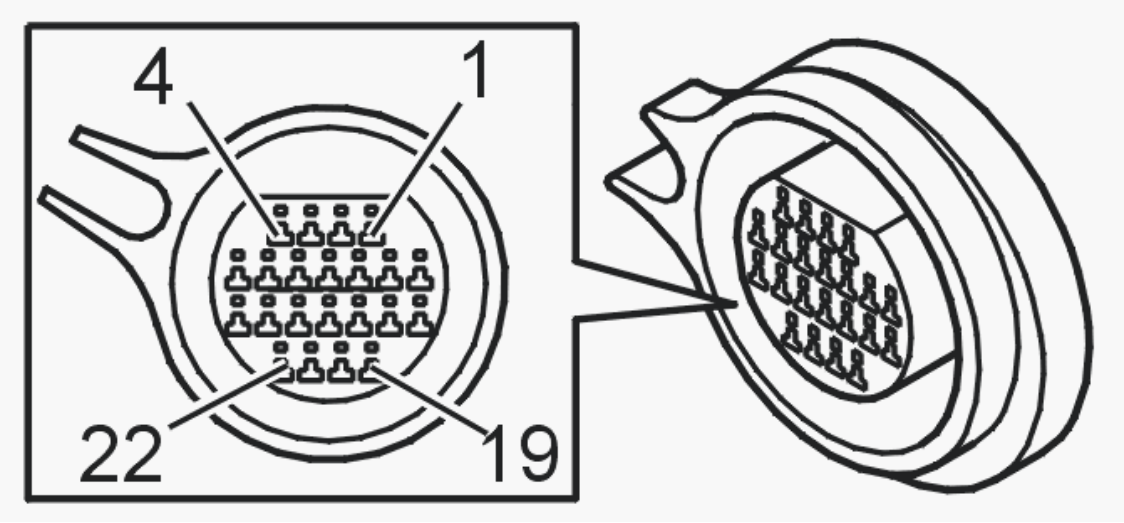


Fig. 204: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

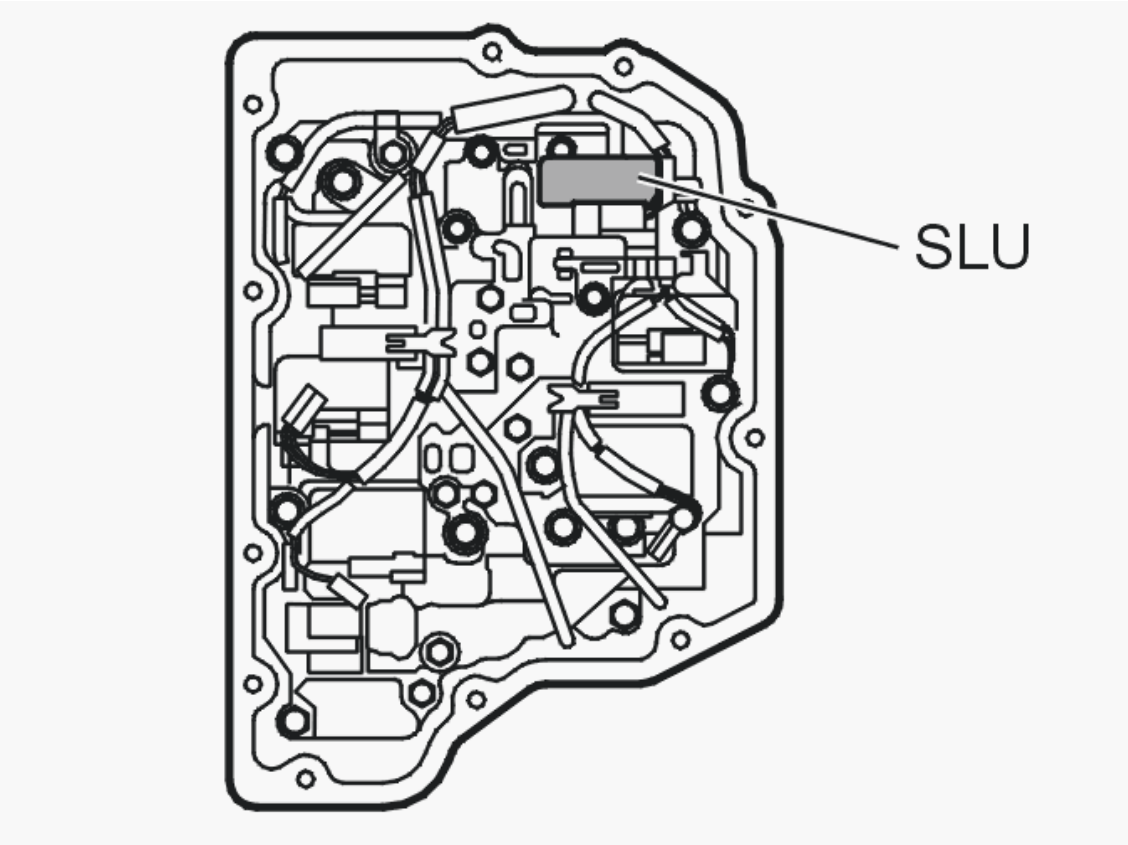


Fig. 205: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

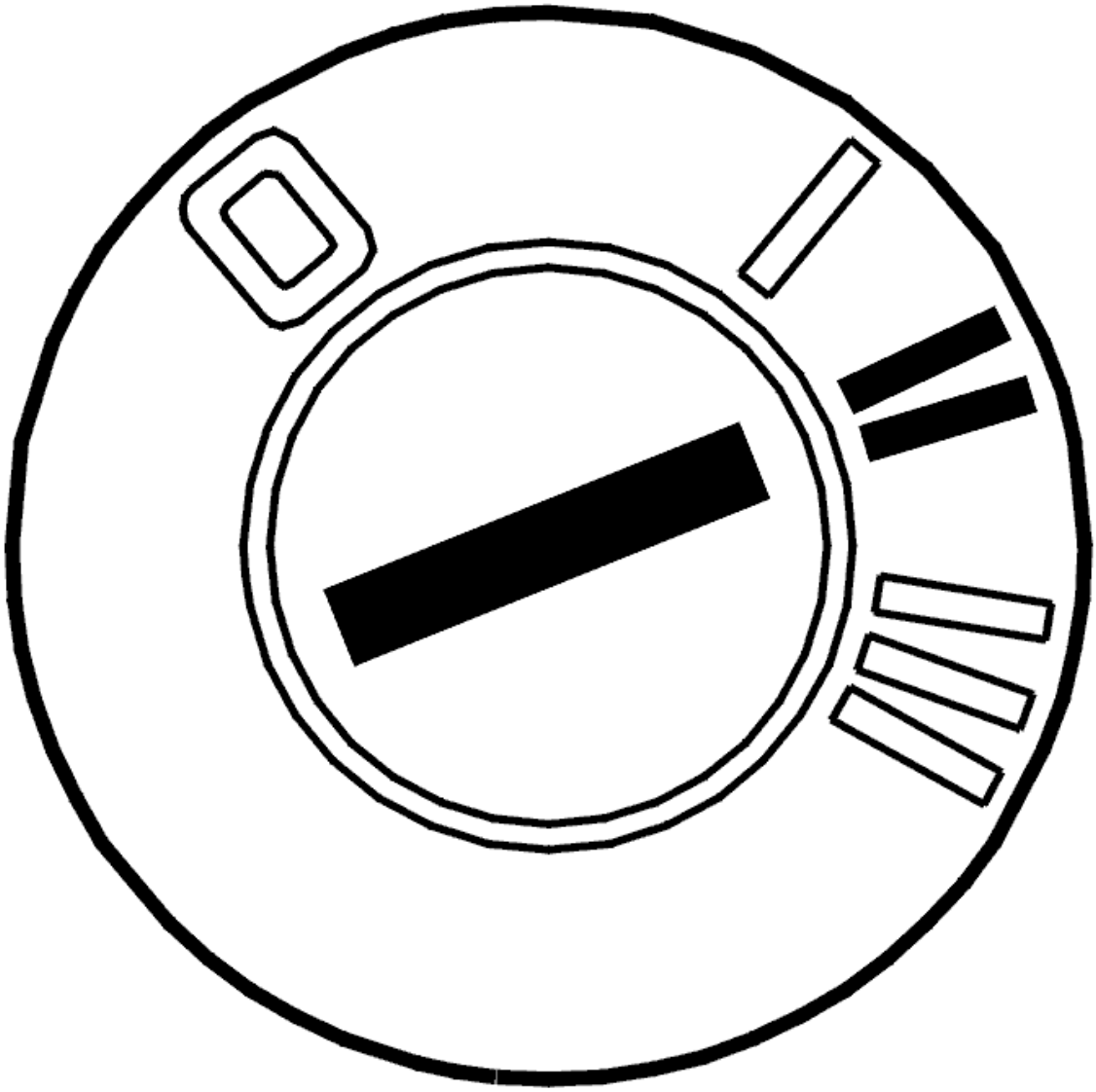


Fig. 206: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

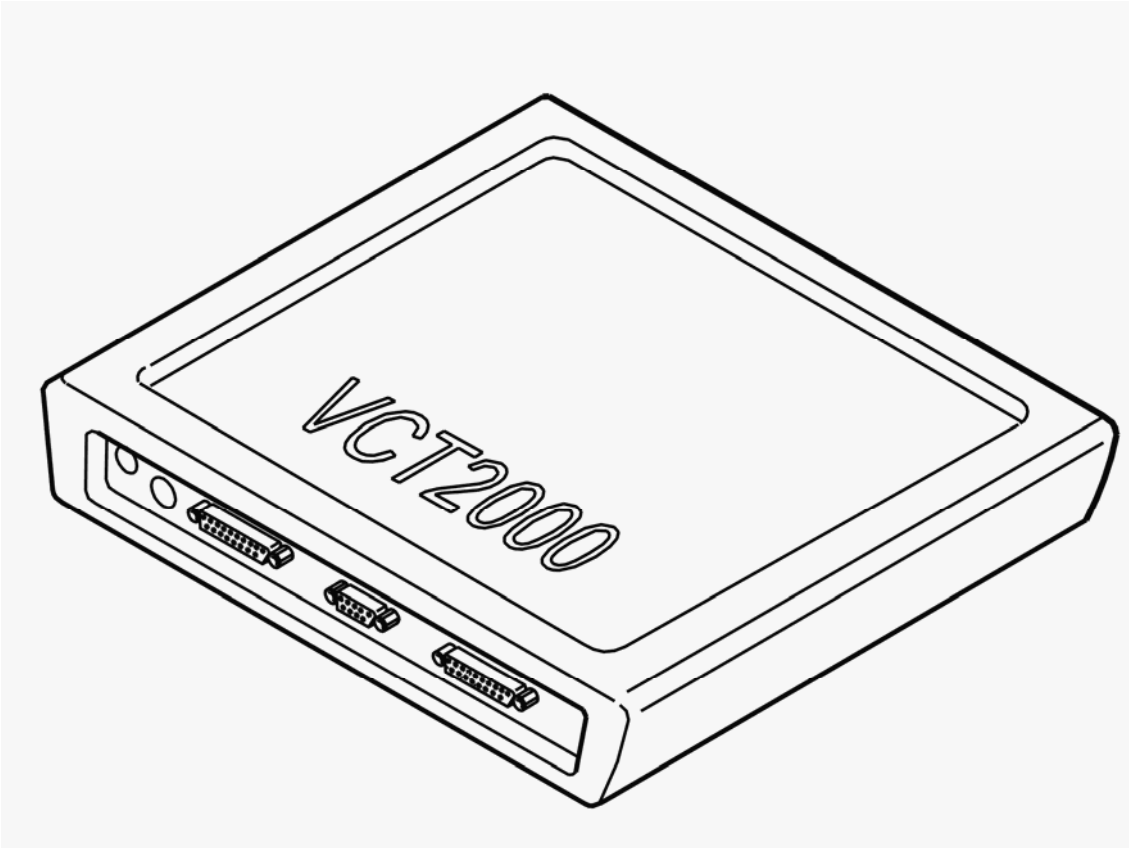


Fig. 207: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

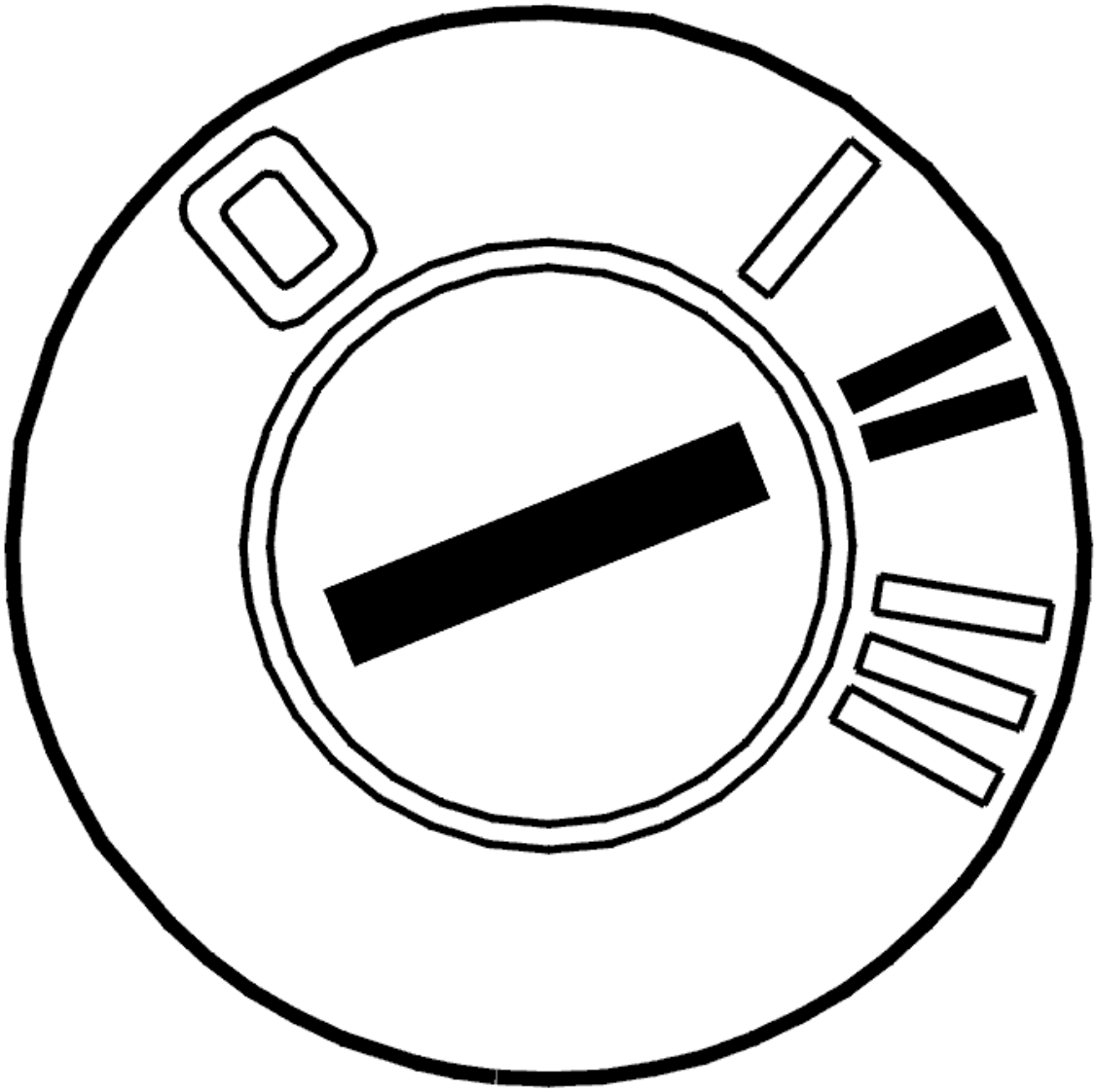


Fig. 208: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

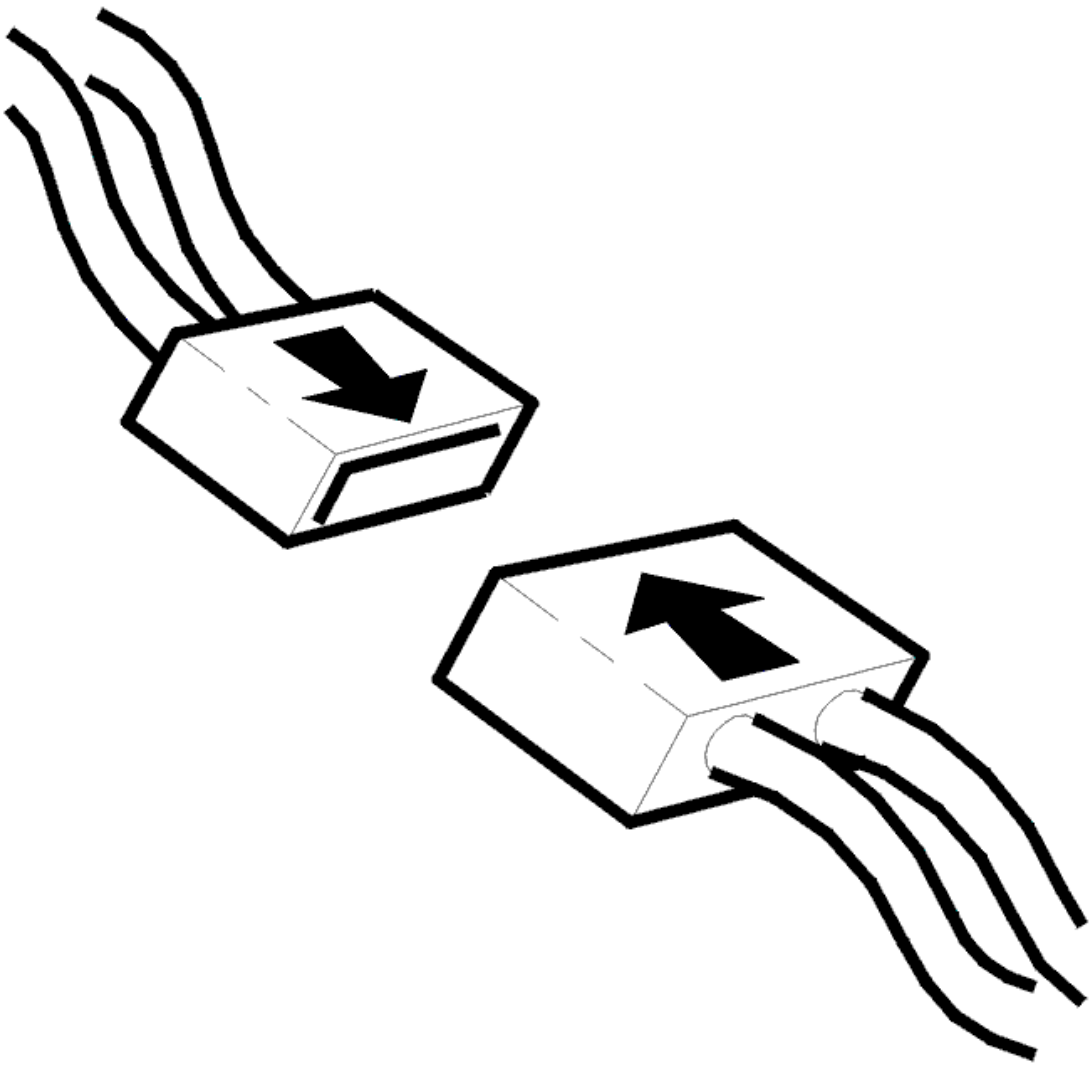


Fig. 209: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLU by clicking the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLU. The current must oscillate between approximately 0 and 1000 mA.

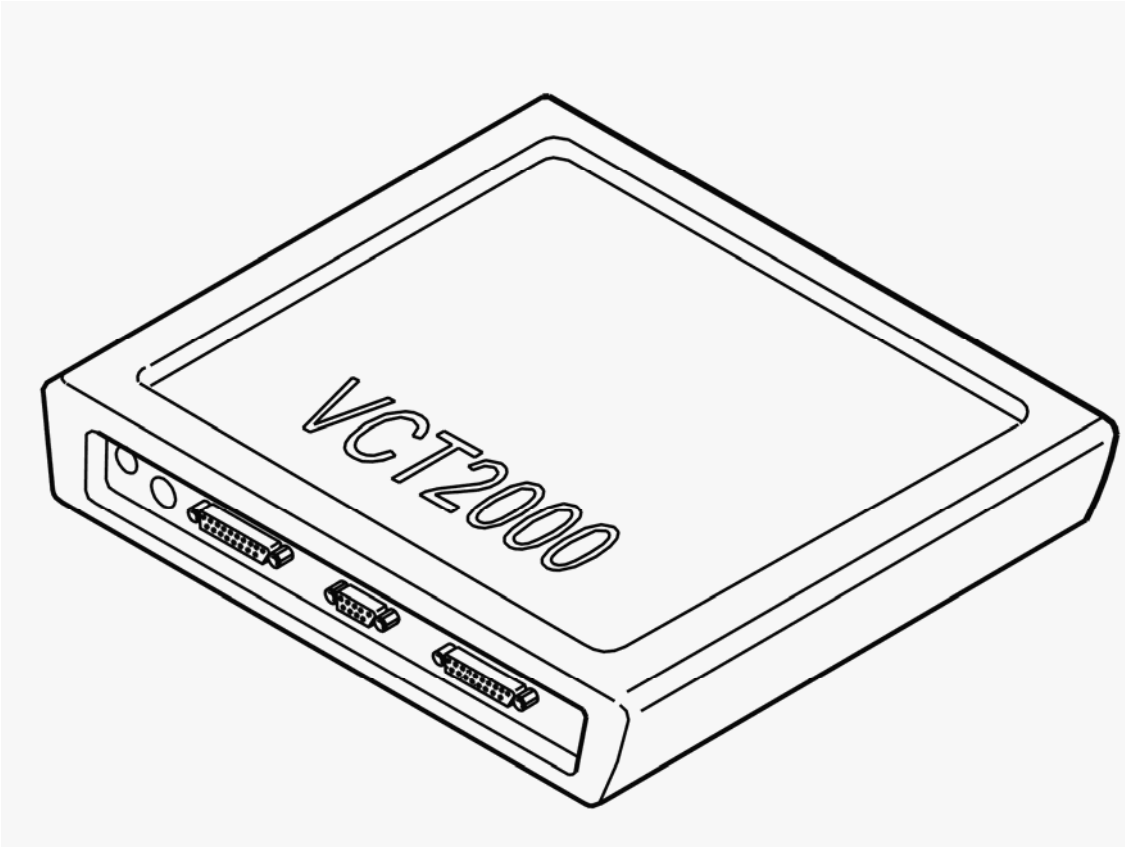


Fig. 210: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

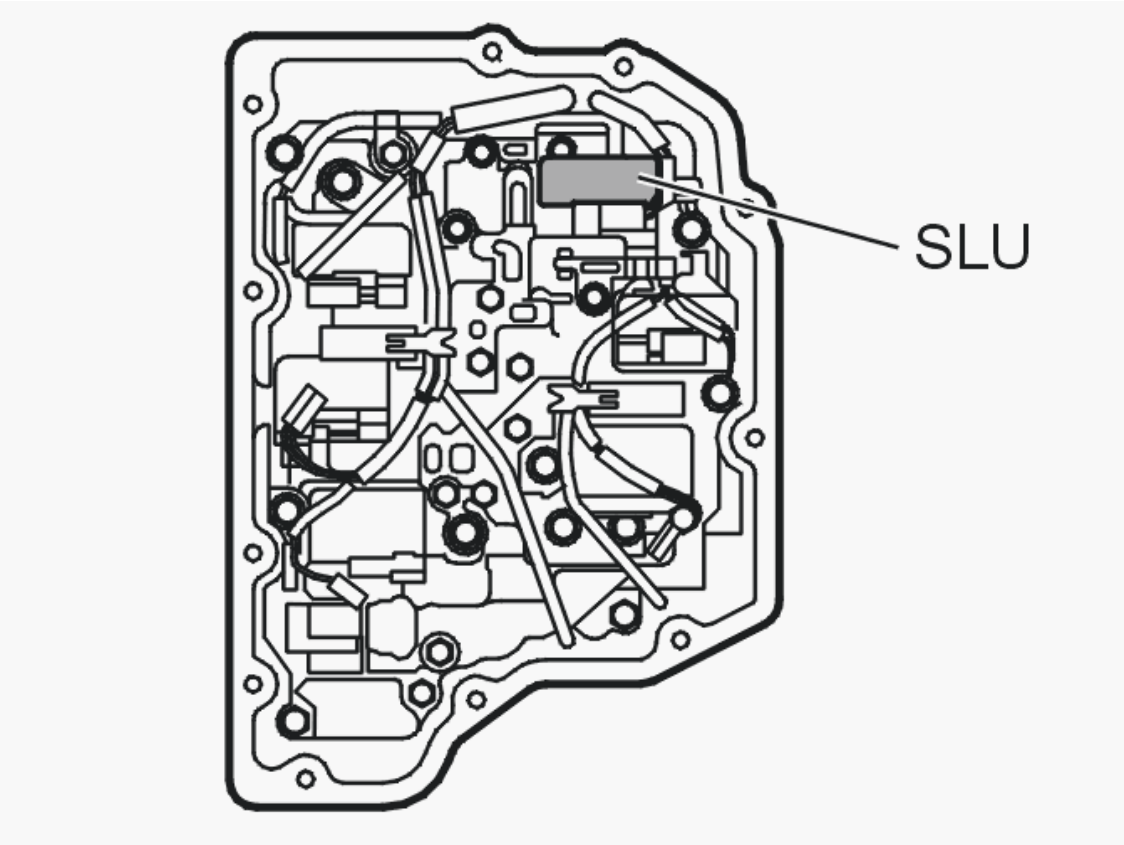


Fig. 211: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P096500: PRESSURE REGULATOR SOLENOID B CONTROL CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO

INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096500

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096500**

FAULT TRACING TCM-P096500

see **FAULT TRACING TCM-P096500**

TCM-P096700: PRESSURE CONTROL SOLENOID B CONTROL CIRCUIT HIGH. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096700

Condition

The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The measured current value is higher than permitted in the circuit for solenoid SLU.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

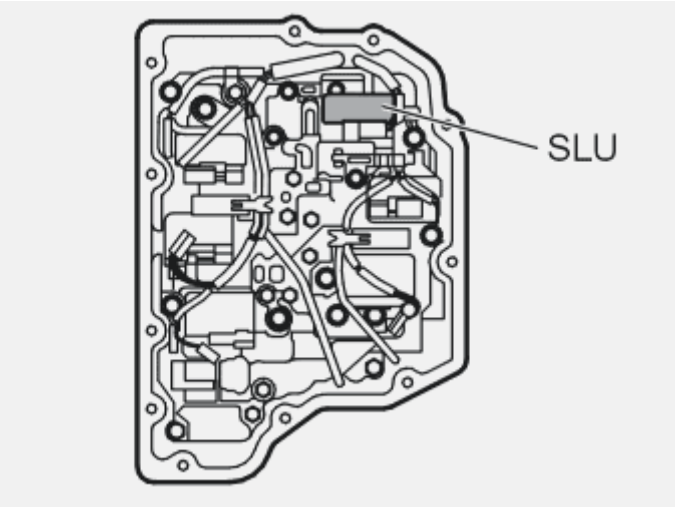


Fig. 212: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Control signal lead short-circuited to voltage.
- Linear pressure solenoid not working.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Abnormal slipping gearshifts
- Rough gear shift
- No gear shift

FAULT-TRACING

CHECKS

CHECKING LOCK-UP SOLENOID SLU

Fig. 213: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLU by clicking on the VCT2000 symbol.

  Read off the current through the solenoid SLU circuit. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 214: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

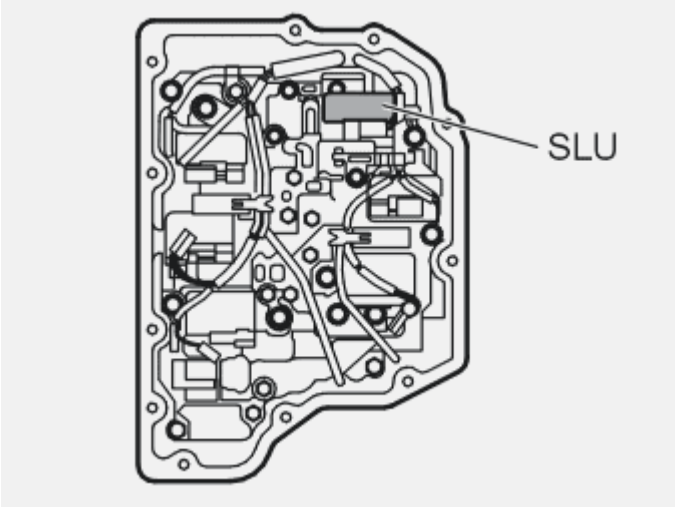


Fig. 215: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

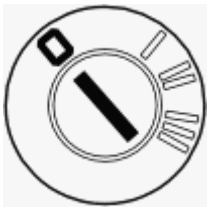


Fig. 216: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check the cables for short circuit to voltage.

Take readings between:

- Transmission connector #B9 and the connector for solenoid SLU #1.
- Transmission connector #B4 and the connector for solenoid SLU #2.

Also check the cables for a short-circuit to each other.

HINT: If no fault is found in the wiring, check solenoid SLU. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **VALVE HOUSING**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

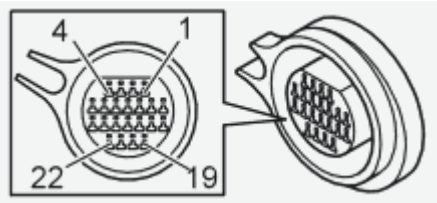


Fig. 217: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

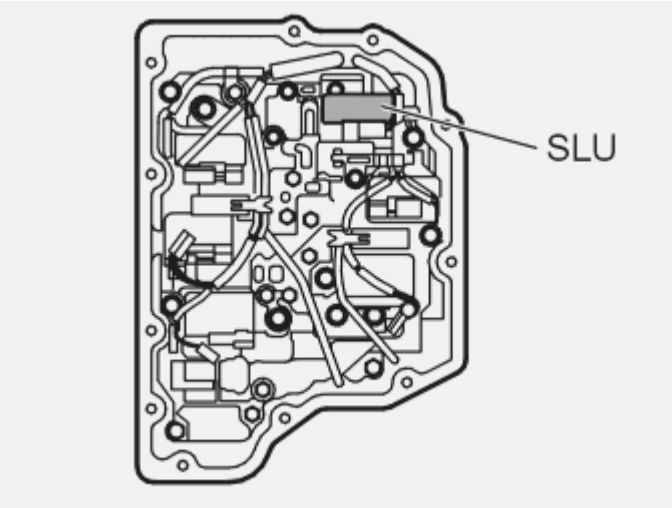


Fig. 218: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 219: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

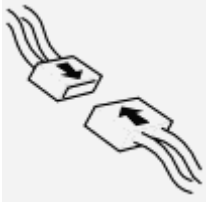


Fig. 220: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.

- Ignition on.
- Activate solenoid SLU by clicking on the VCT2000 symbol.

  Read off the current through the solenoid SLU circuit. The current should oscillate between 100 and 950 mA.

Fig. 221: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

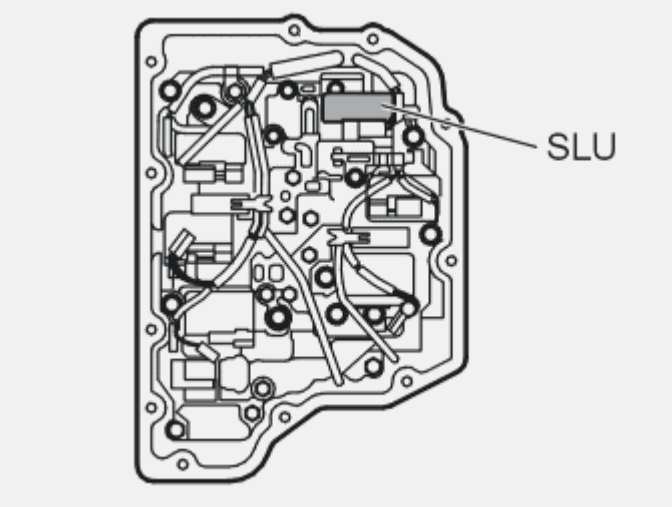


Fig. 222: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 223: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 224: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P096700: PRESSURE CONTROL SOLENOID B CONTROL CIRCUIT HIGH. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096700

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096700**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P096700: PRESSURE REGULATOR SOLENOID B CONTROL CIRCUIT HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096700

Condition

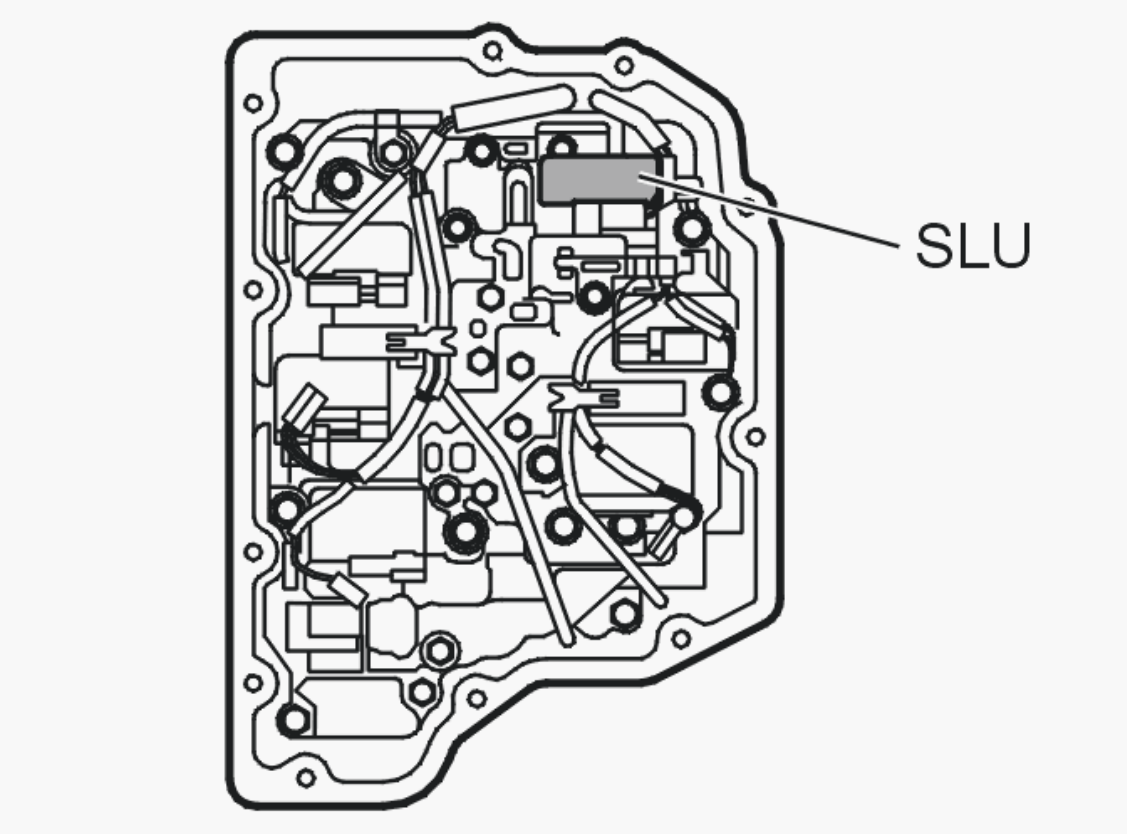


Fig. 225: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

The solenoids are controlled using the power stage in the transmission control module (TCM). The transmission control module (TCM) opens the power stage when the solenoids are to be activated so that the circuit receives a voltage.

If the transmission control module (TCM) registers that the measured current is higher than the circuit for the SLU solenoid allows, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Control signal lead short-circuited to voltage.
- Linear pressure solenoid not working.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Abnormally slipping gears.
- Harsh gear changing
- No gear changing.

FAULT TRACING TCM-P096700

CHECKS

CHECKING THE LOCK-UP SOLENOID SLU

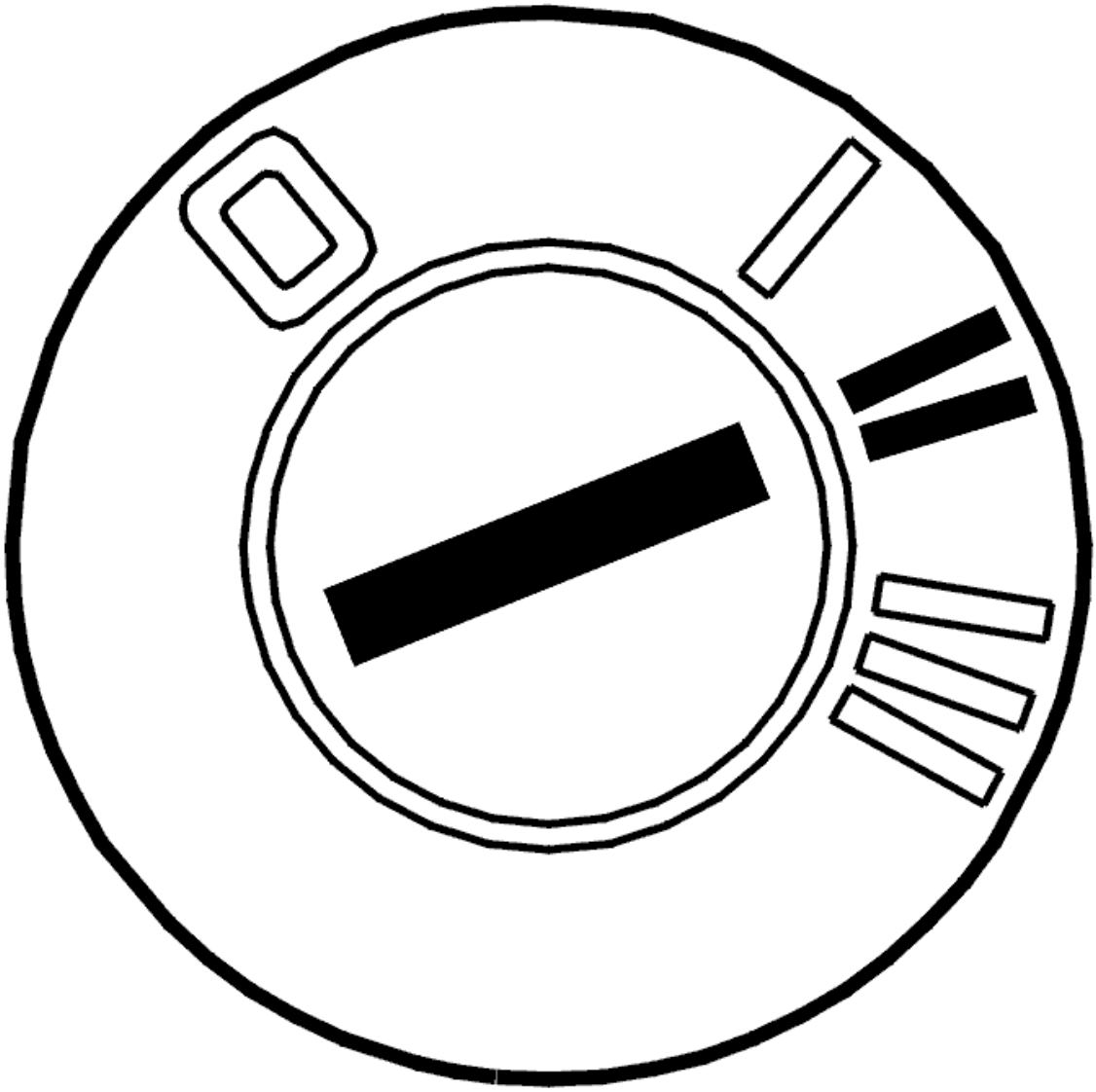


Fig. 226: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLU by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLU. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

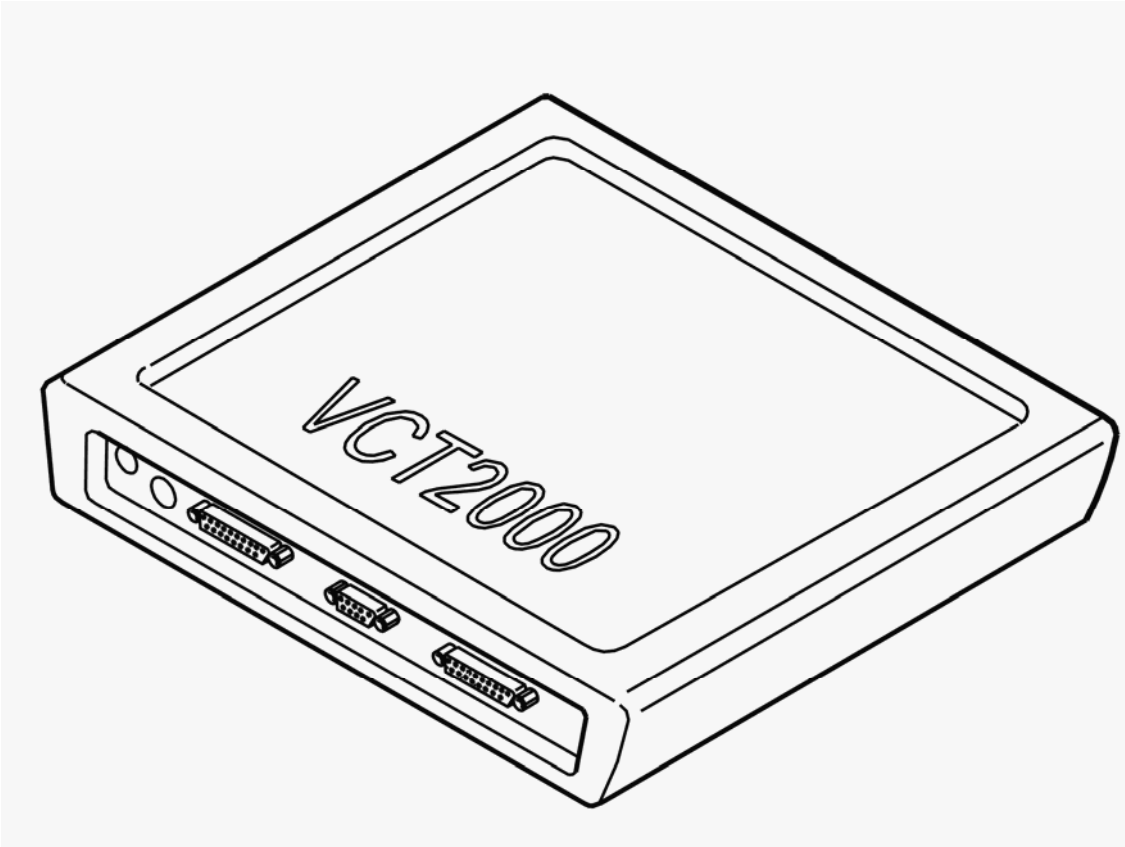


Fig. 227: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

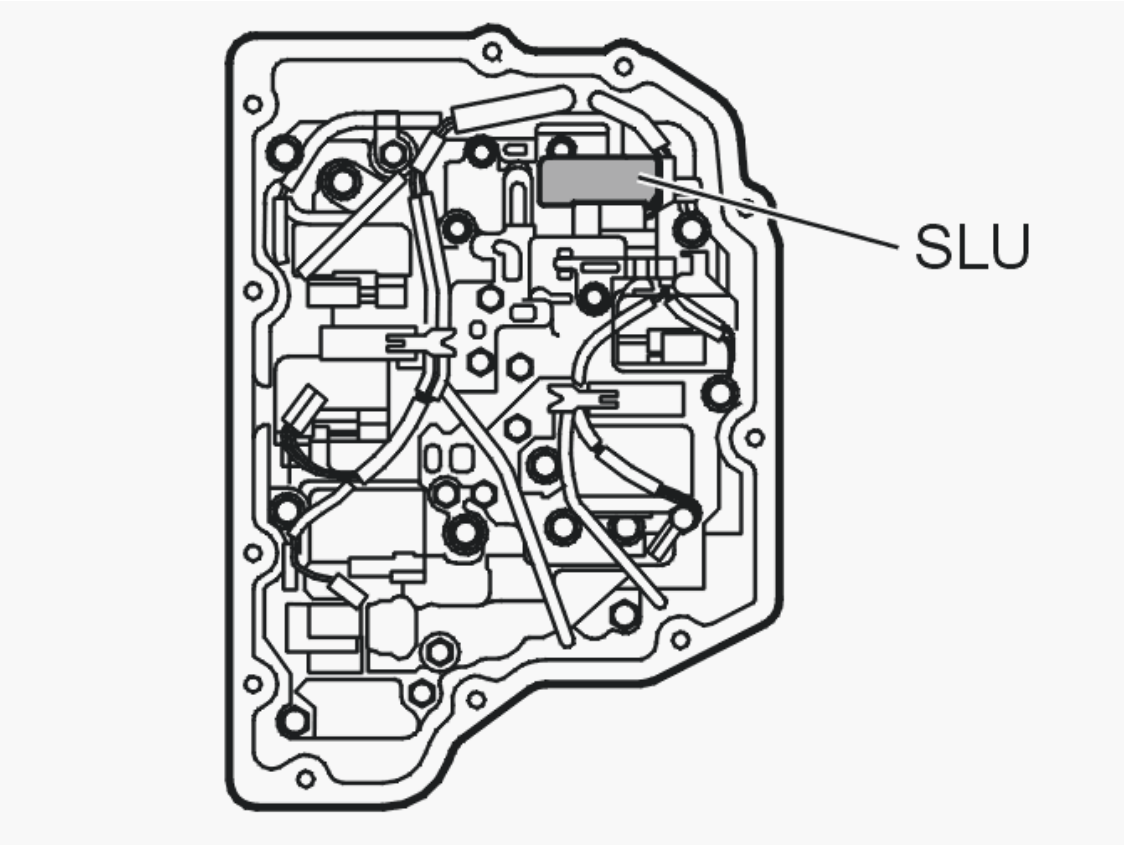


Fig. 228: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

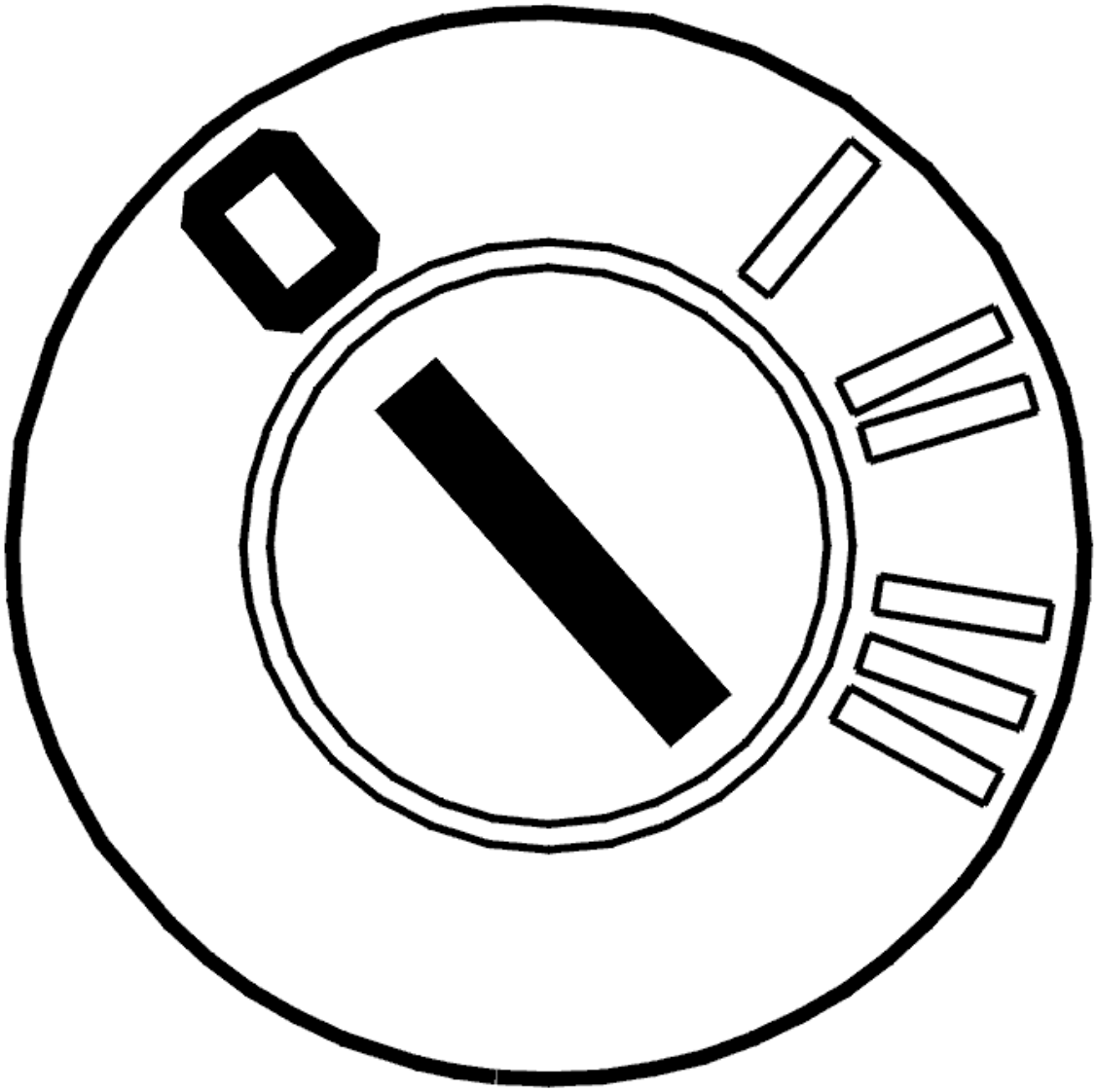


Fig. 229: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

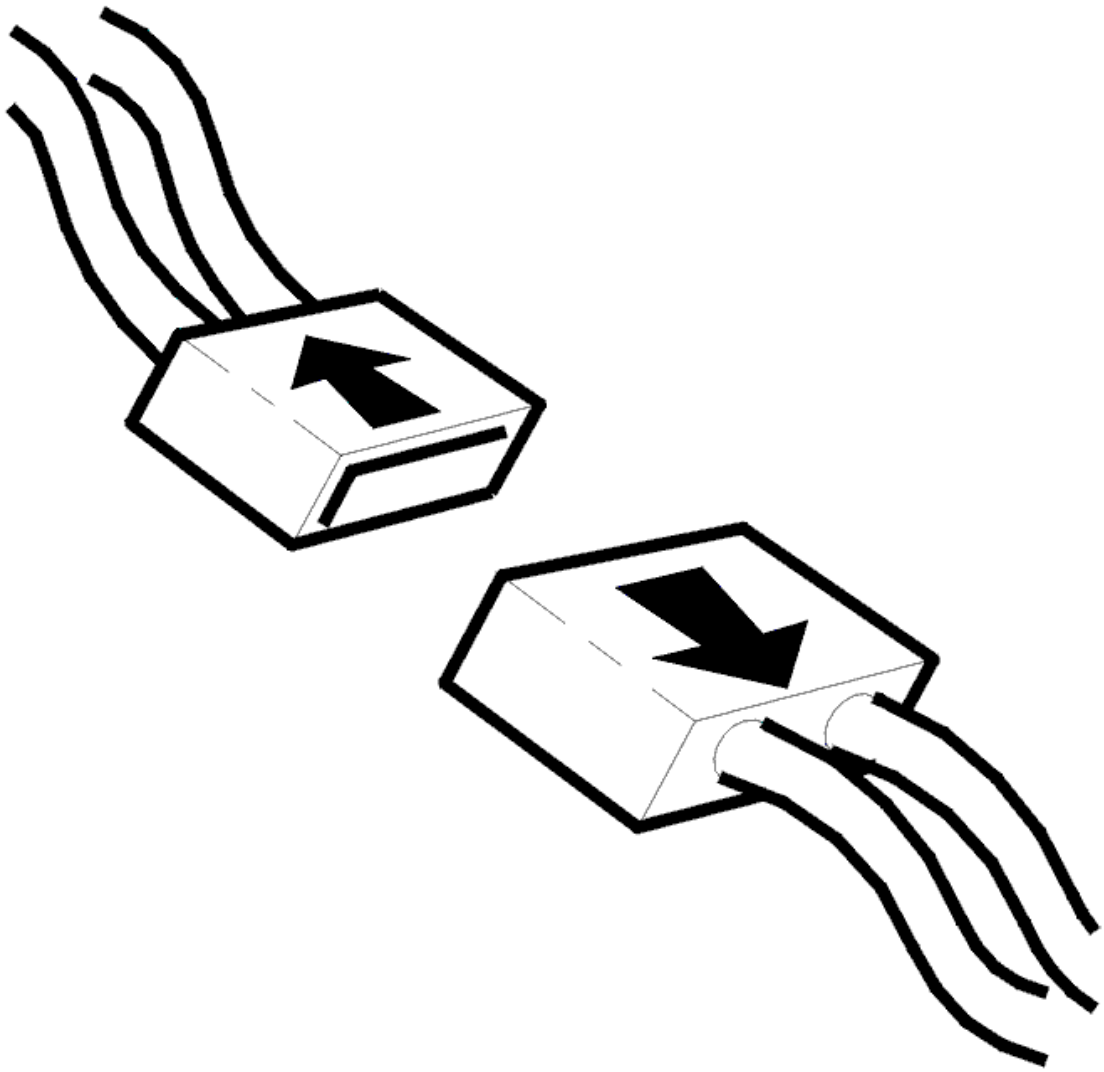


Fig. 230: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check the wiring between transmission connector terminal #B9 and solenoid SLU connector terminal #1. Check the wiring between transmission connector terminal #B4 and solenoid SLU connector terminal #2. Check for a short-circuit to supply voltage. Check the wiring for short-circuits to each other.

HINT: If no fault is found in the wiring check solenoid SLU. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

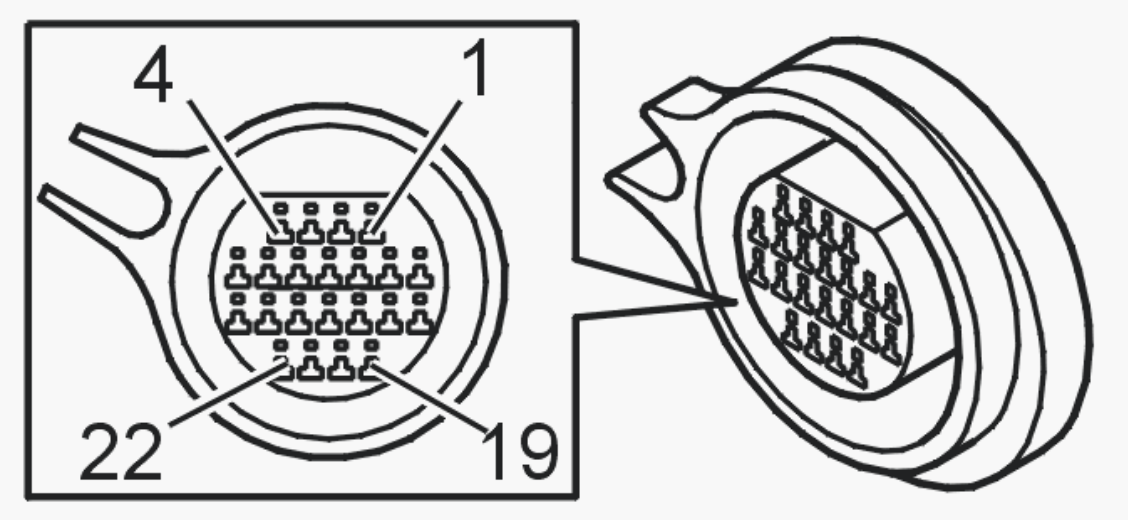


Fig. 231: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

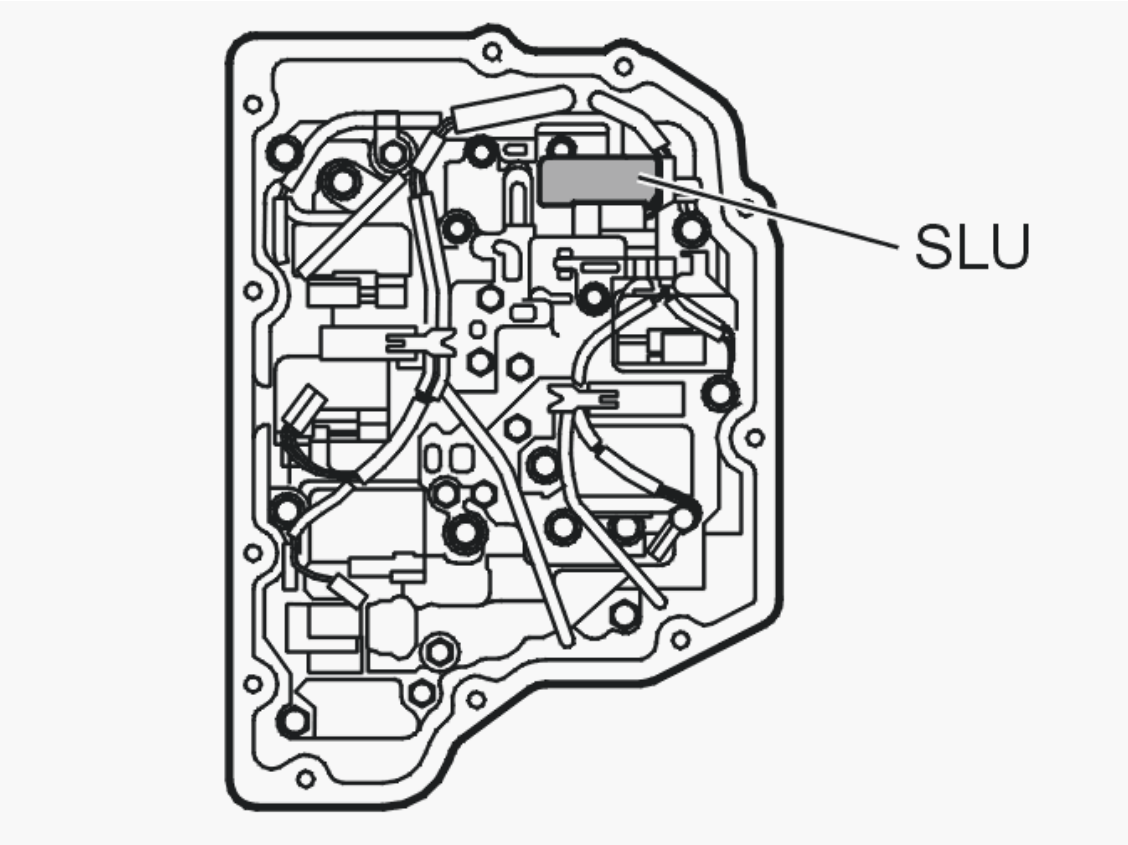


Fig. 232: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

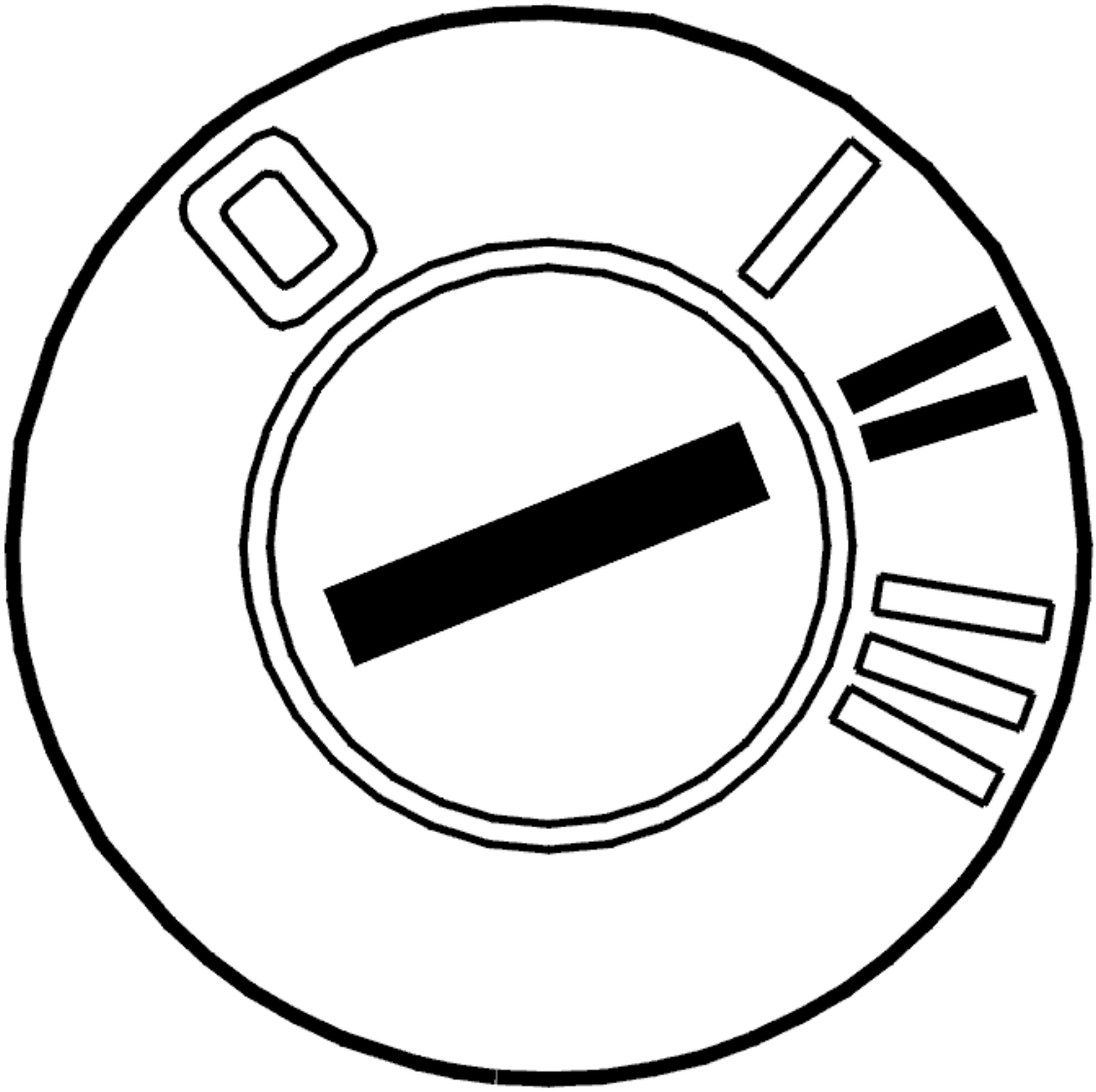


Fig. 233: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

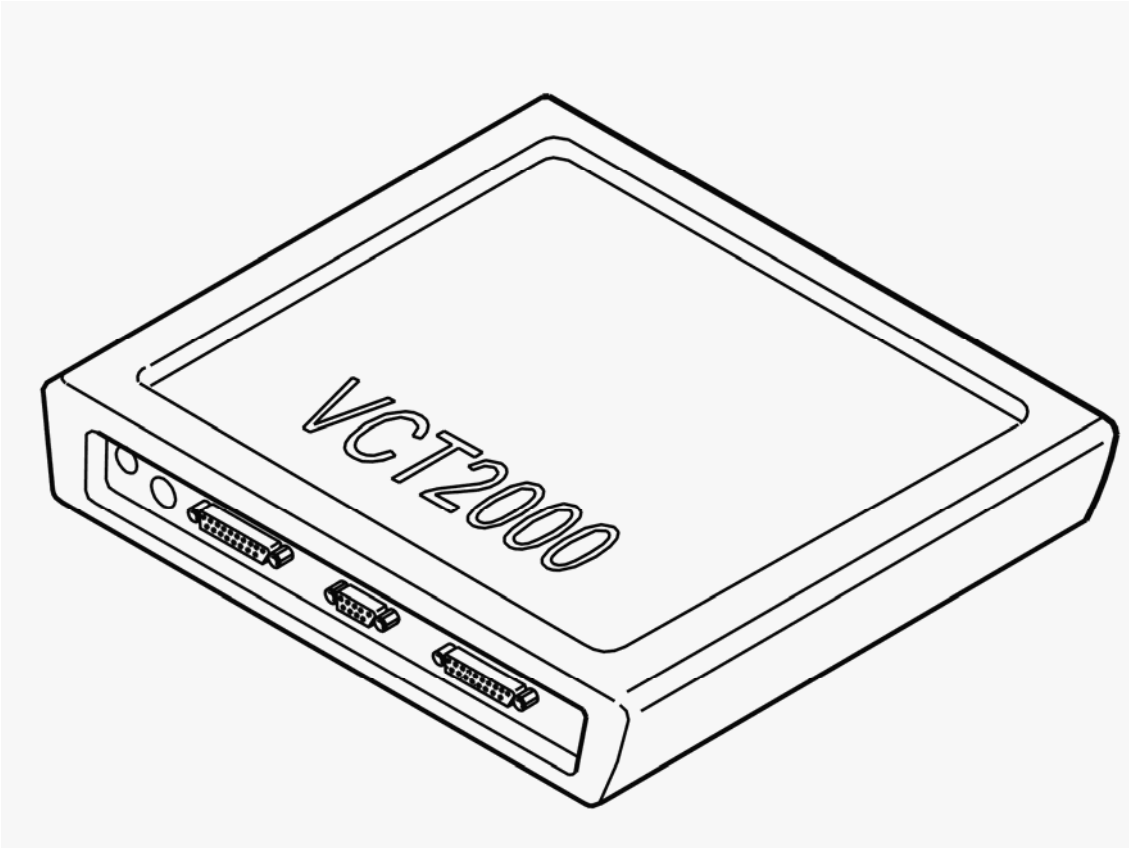


Fig. 234: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

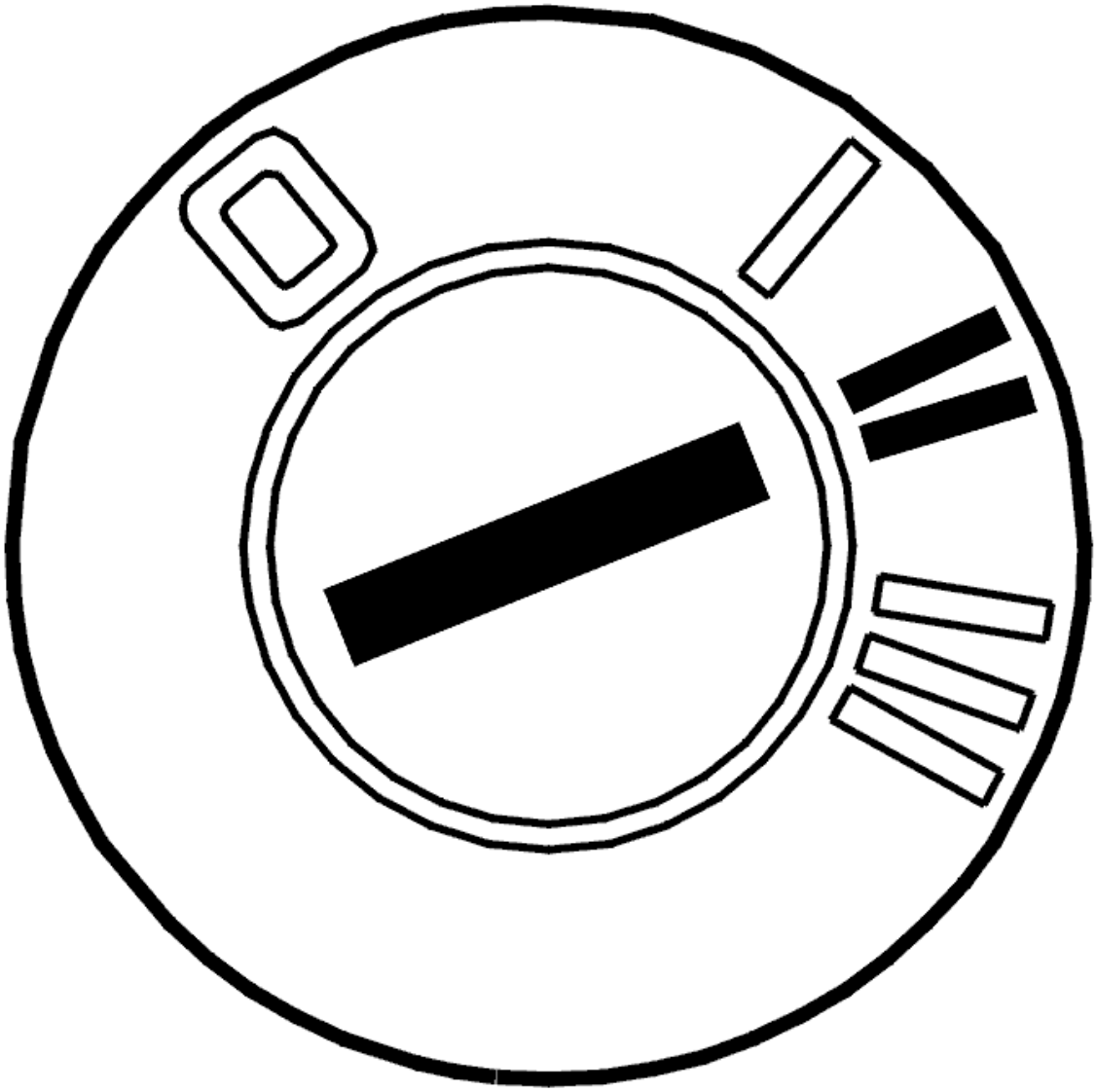


Fig. 235: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

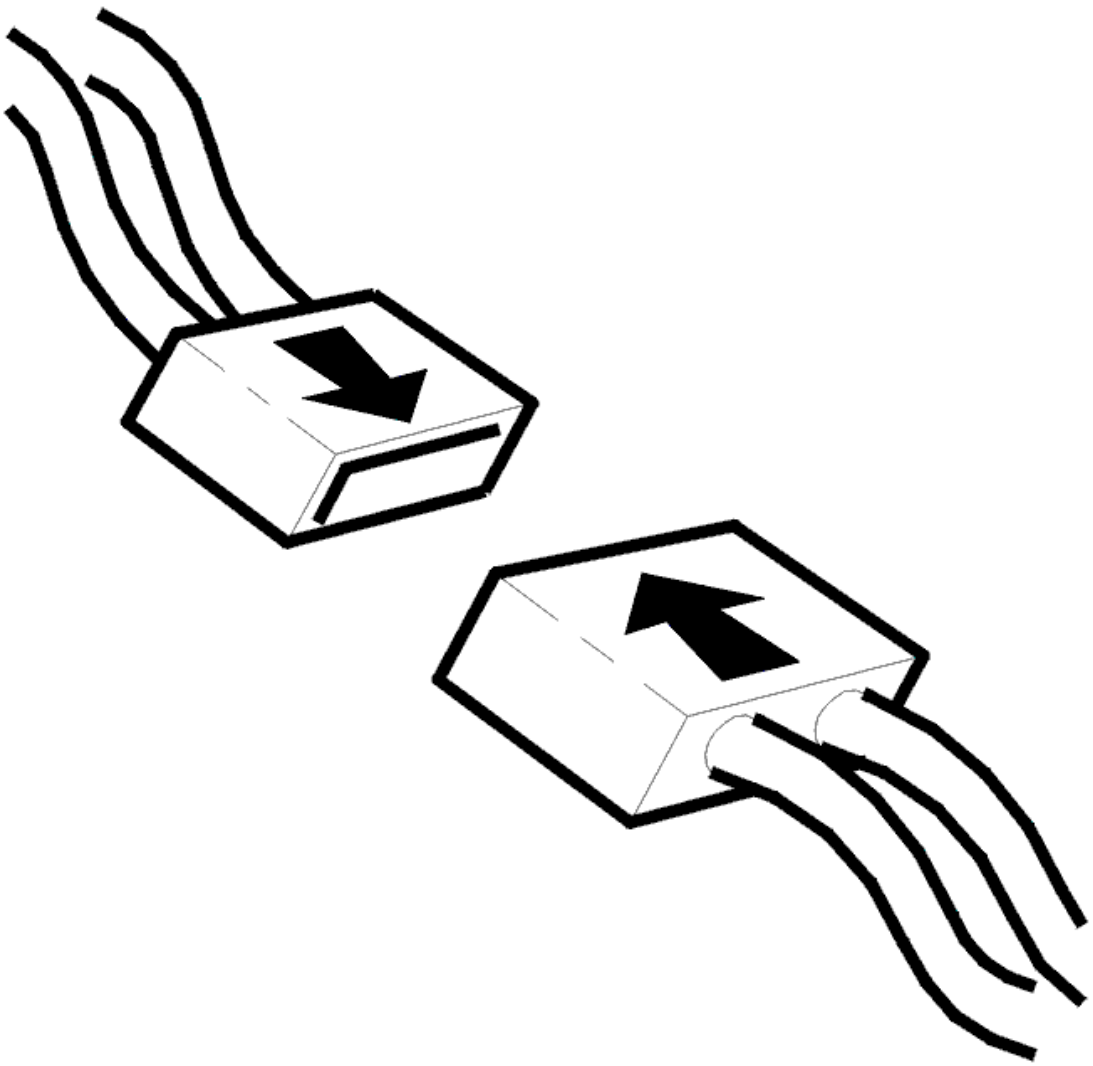


Fig. 236: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLU by clicking the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLU. The current must oscillate between approximately 0 and 1000 mA.

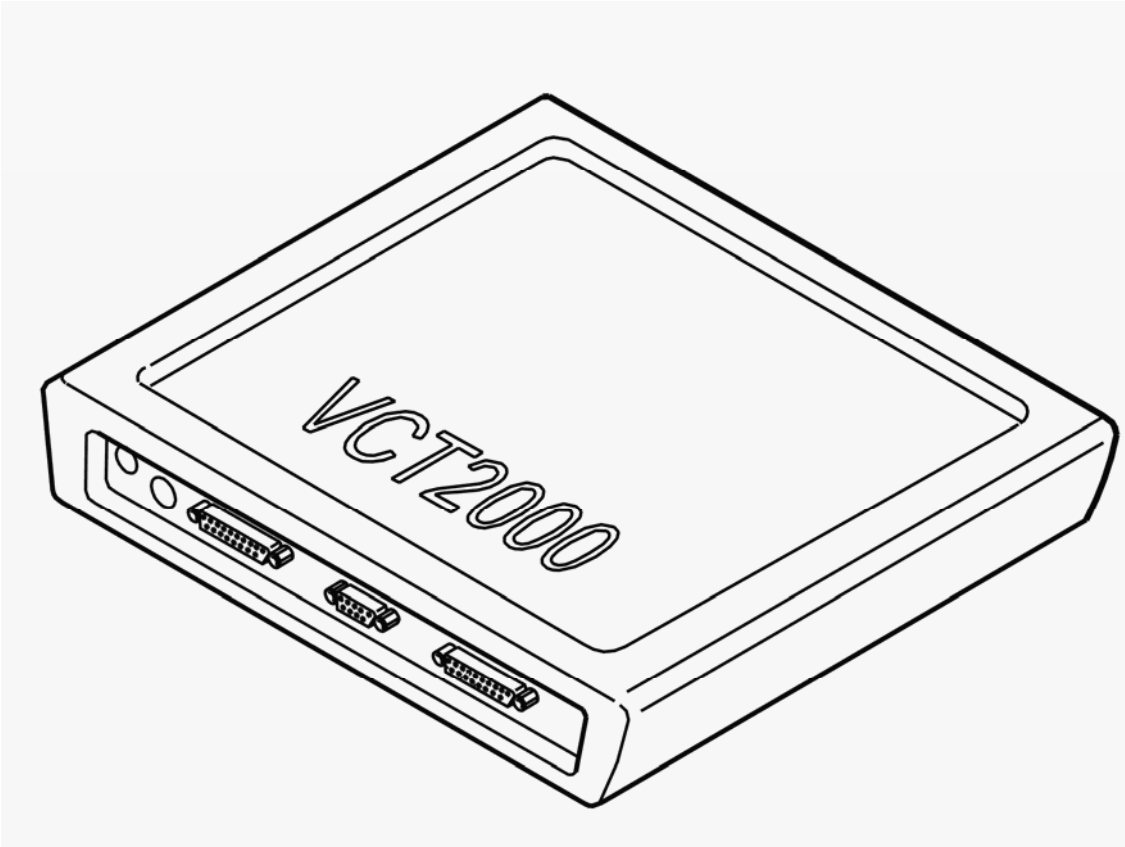


Fig. 237: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

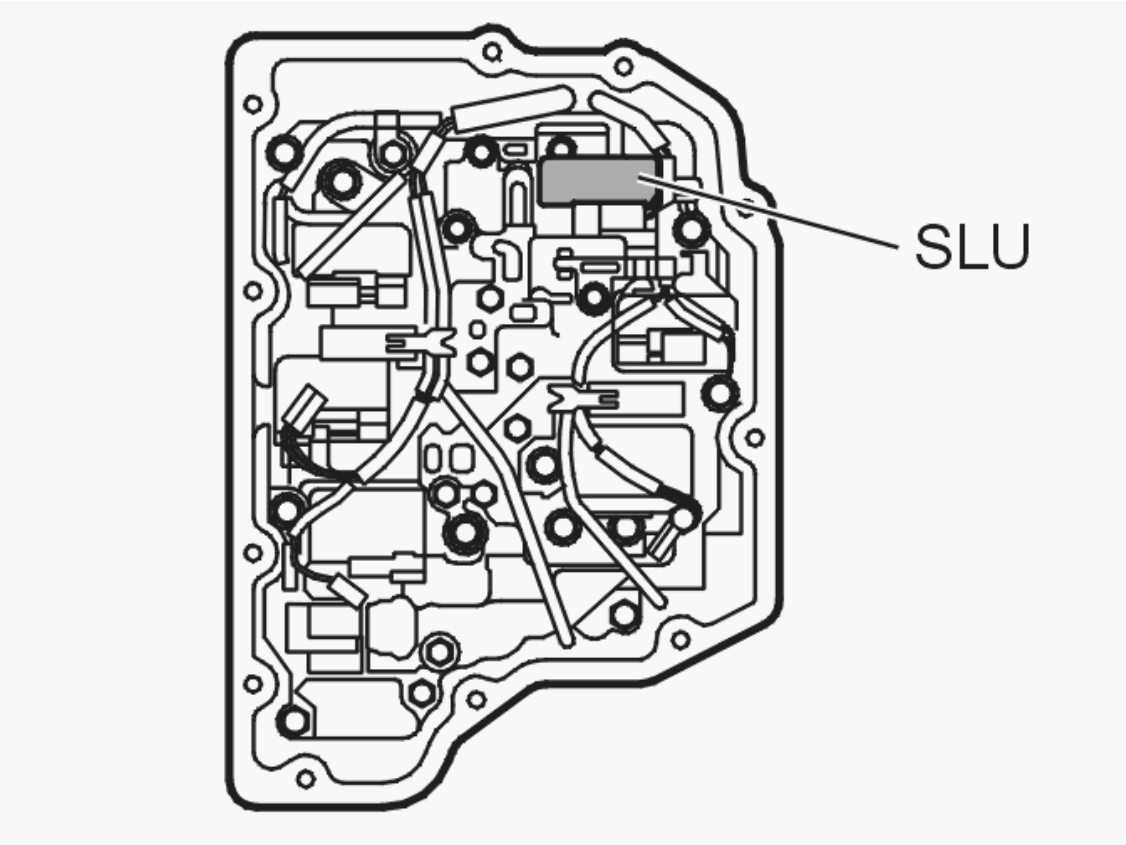


Fig. 238: Identifying Solenoid SLU
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P096700: PRESSURE REGULATOR SOLENOID B CONTROL CIRCUIT HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT

TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096700

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096700**

FAULT TRACING TCM-P096700

see **FAULT TRACING TCM-P096700**

TCM-P096900: PRESSURE CONTROL SOLENOID C CONTROL CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096900

Condition

Linear pressure solenoid SLC2 controls shifting in the transmission. Solenoid SLC2 works when it receives voltage from the transmission control module (TCM). The solenoid is activated during various driving conditions based on speed, throttle position and set driving program.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The measured current in the solenoid circuit is incorrect.

Solenoid SLC2 can then not regulate system pressure.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Shifting when linear pressure solenoid SLC2 is activated.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

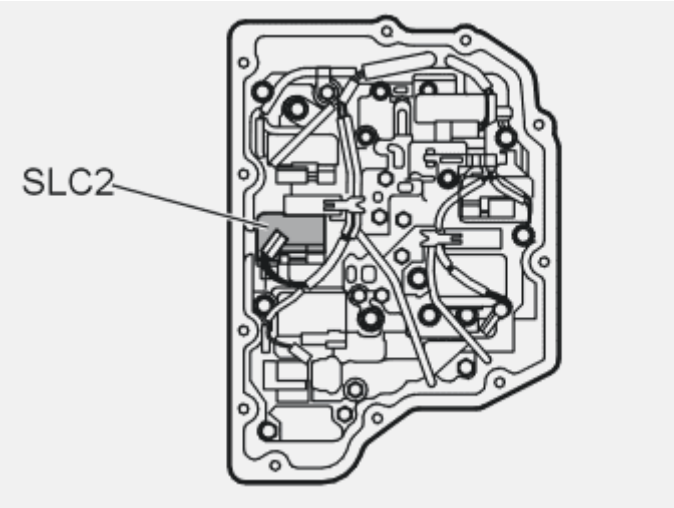


Fig. 239: Identifying SLC2 Solenoid
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the cable for the control signal or signal ground.
- Linear pressure solenoid SLC2 is stuck.
- Linear pressure solenoid SLC2 not working.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Rough gear shift
- No gear shift
- Abnormal slipping gearshifts

FAULT-TRACING

CHECKS

CHECKING LINEAR PRESSURE SOLENOID SLC2

Fig. 240: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLC2 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLC2. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 241: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

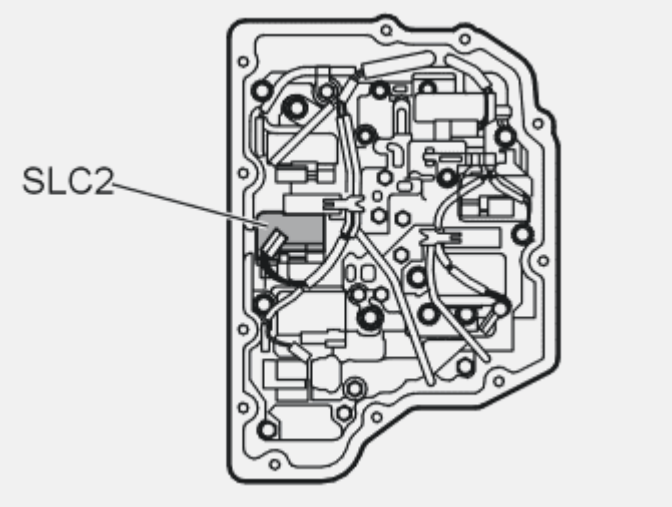


Fig. 242: Identifying SLC2 Solenoid
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

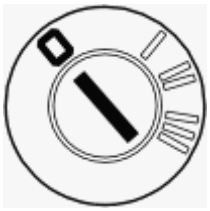


Fig. 243: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

Check the cables for open circuit, short circuit to ground and short circuit to supply voltage.

Take readings between:

- Transmission connector #B17 and the connector for solenoid SLC2 #1.
- Transmission connector #B18 and the connector for solenoid SLC2 #2.

HINT: If no fault is found in the wiring, check solenoid SLC2. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **VALVE HOUSING**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

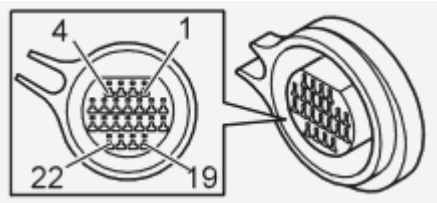


Fig. 244: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

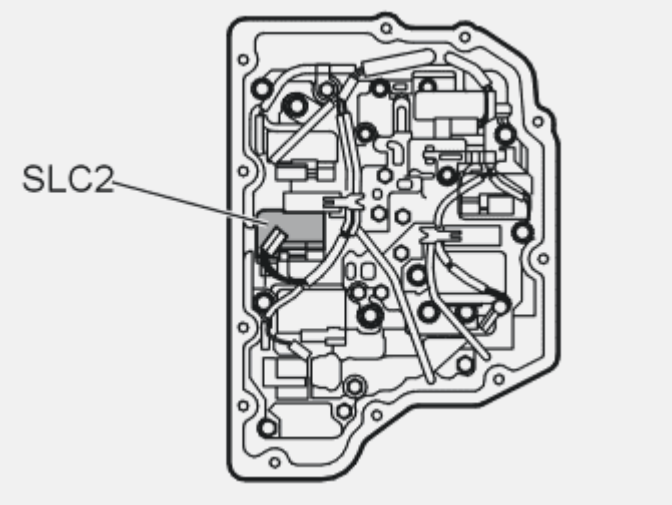


Fig. 245: Identifying SLC2 Solenoid
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 246: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

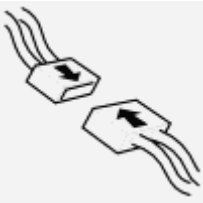


Fig. 247: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Activate solenoid SLC2 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLC2. The current should oscillate between 100 and 950 mA.

Fig. 248: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

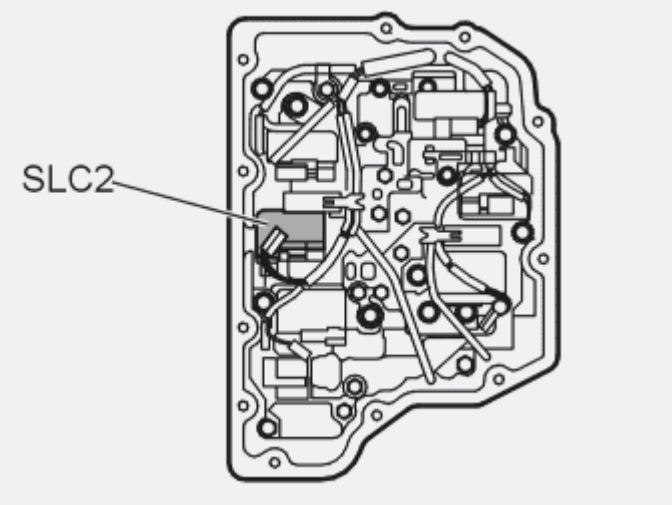


Fig. 249: Identifying SLC2 Solenoid
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 250: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 251: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P096900: PRESSURE CONTROL SOLENOID C CONTROL CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096900

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096900**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P096900: PRESSURE REGULATOR SOLENOID B CONTROL CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096900

Condition

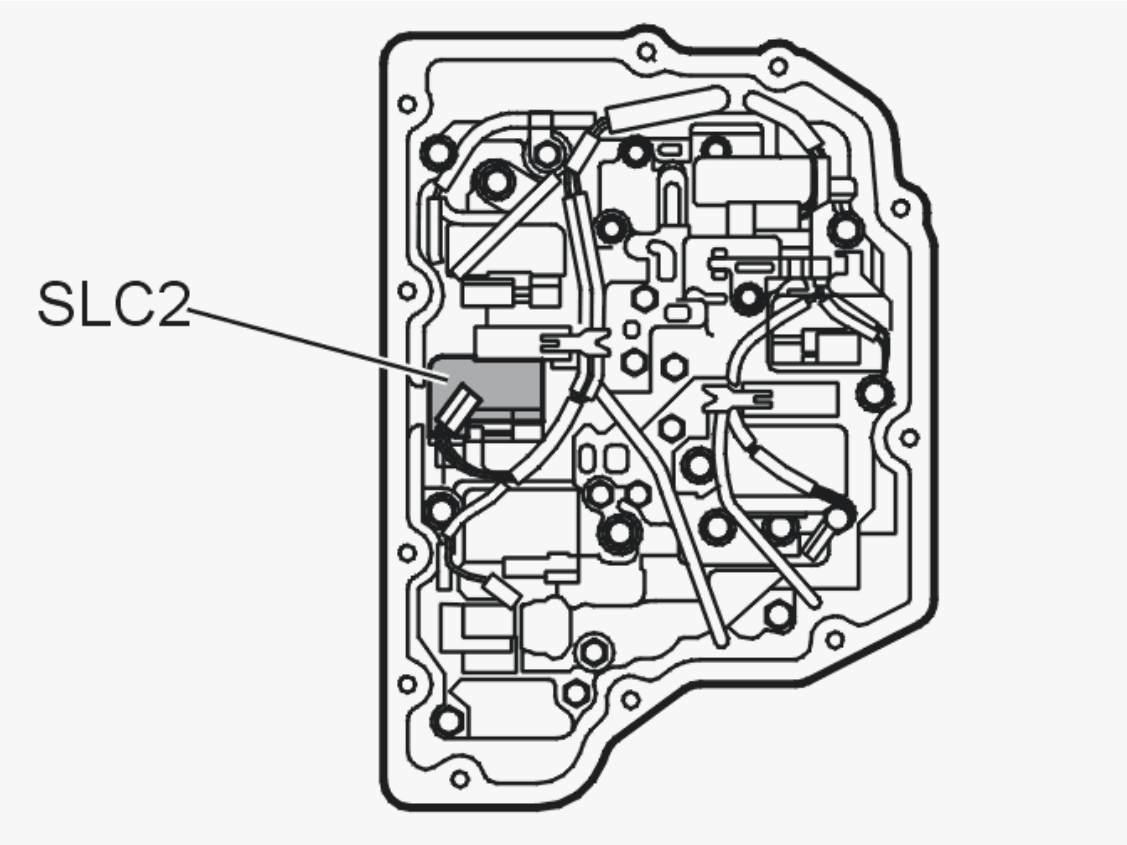


Fig. 252: Identifying Solenoid SLC2
Courtesy of VOLVO CARS CORPORATION

The lock-up solenoid SLC2 controls the lock-up function in the gearbox. The SLC2 solenoid works when it receives power from the transmission control module (TCM) and depending on the speed, accelerator position and driving program setting, the solenoid will be activated for different driving conditions.

If the transmission control module (TCM) registers that the measured current in the solenoid circuit is incorrect, the diagnostic trouble code (DTC) is generated. The SLC2 solenoid is then not able to regulate system pressure.

The diagnostic trouble code (DTC) can be diagnosed when changing gear while the linear pressure solenoid SLC2 is activated.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals
- Open circuit in lead for control signal or signal ground.

- Linear pressure solenoid SLC2 stuck.
- Linear pressure solenoid SLC2 not working.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Harsh gear changing
- No gear changing.
- Abnormally slipping gears.

FAULT TRACING TCM-P096900

CHECKS

CHECKING THE LINE PRESSURE SOLENOID SLC2

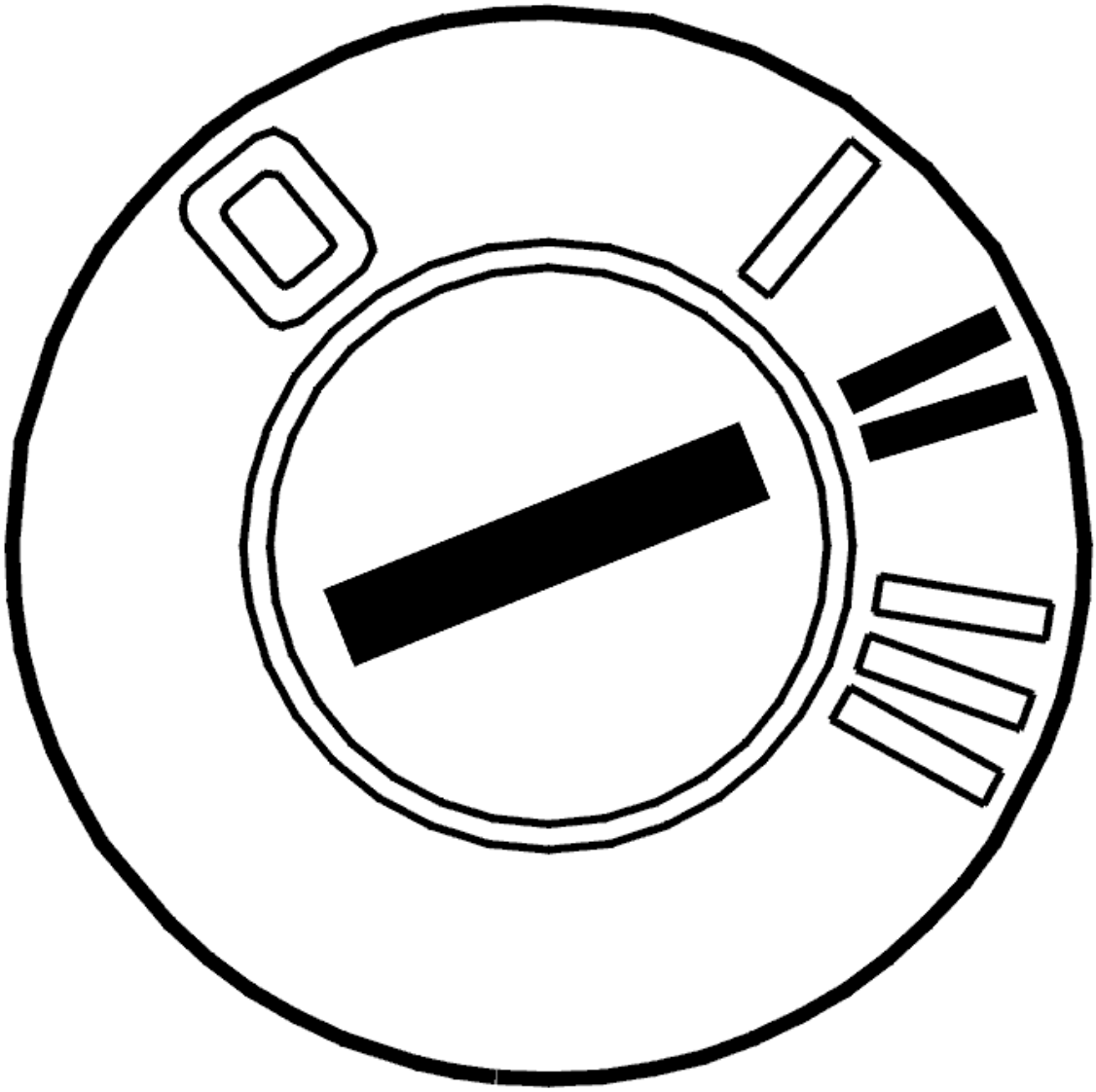


Fig. 253: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLC2 by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLC2. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

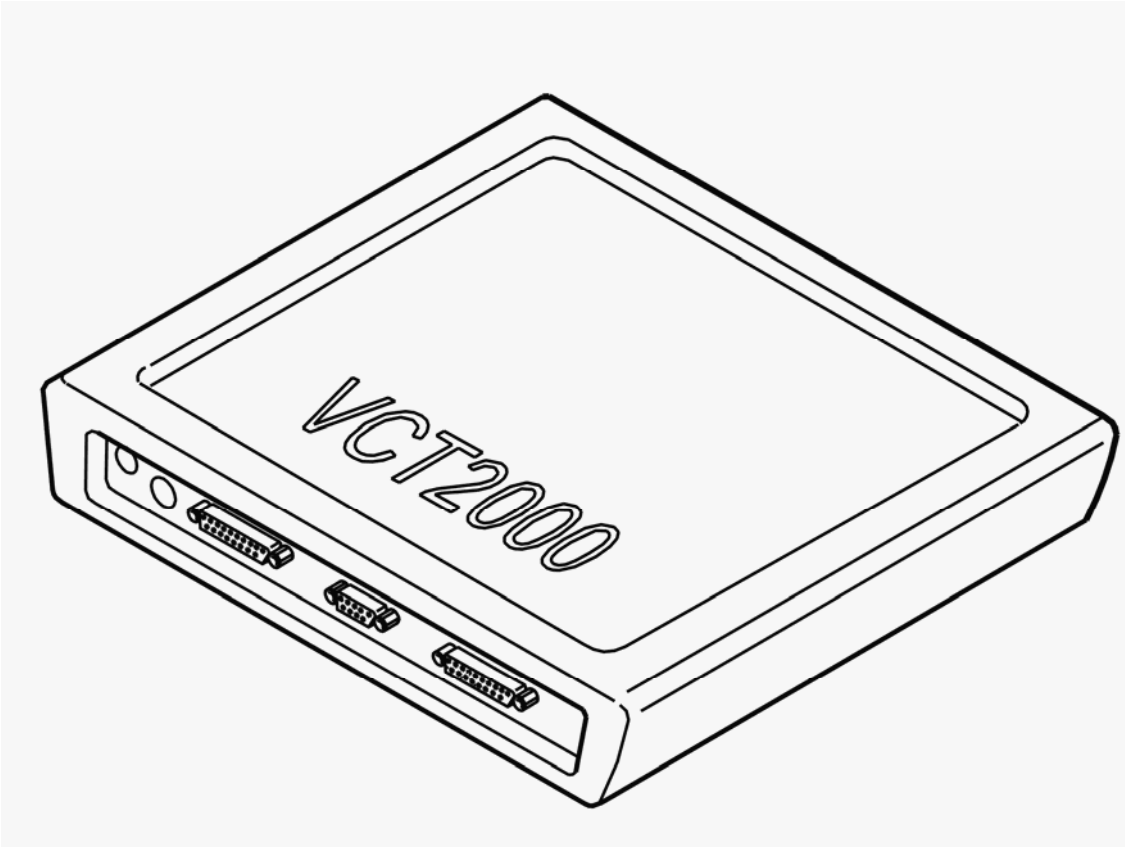


Fig. 254: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

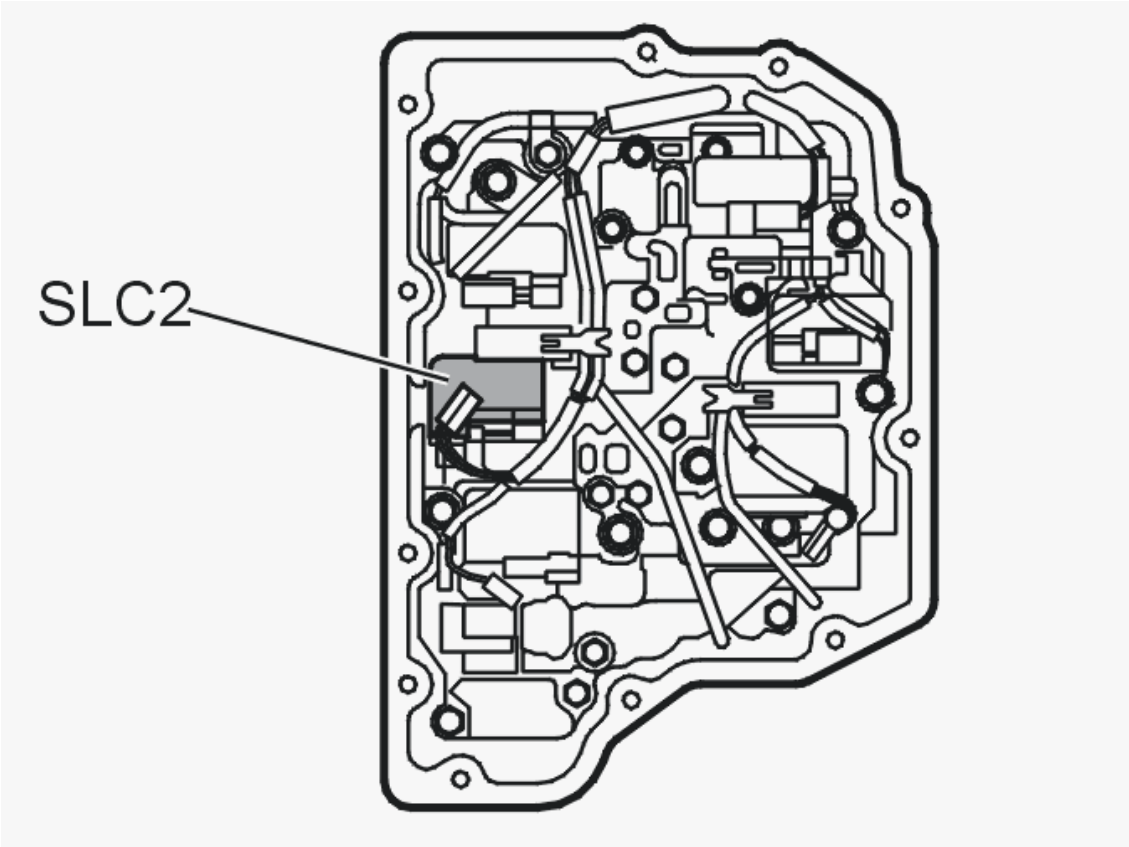


Fig. 255: Identifying Solenoid SLC2
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

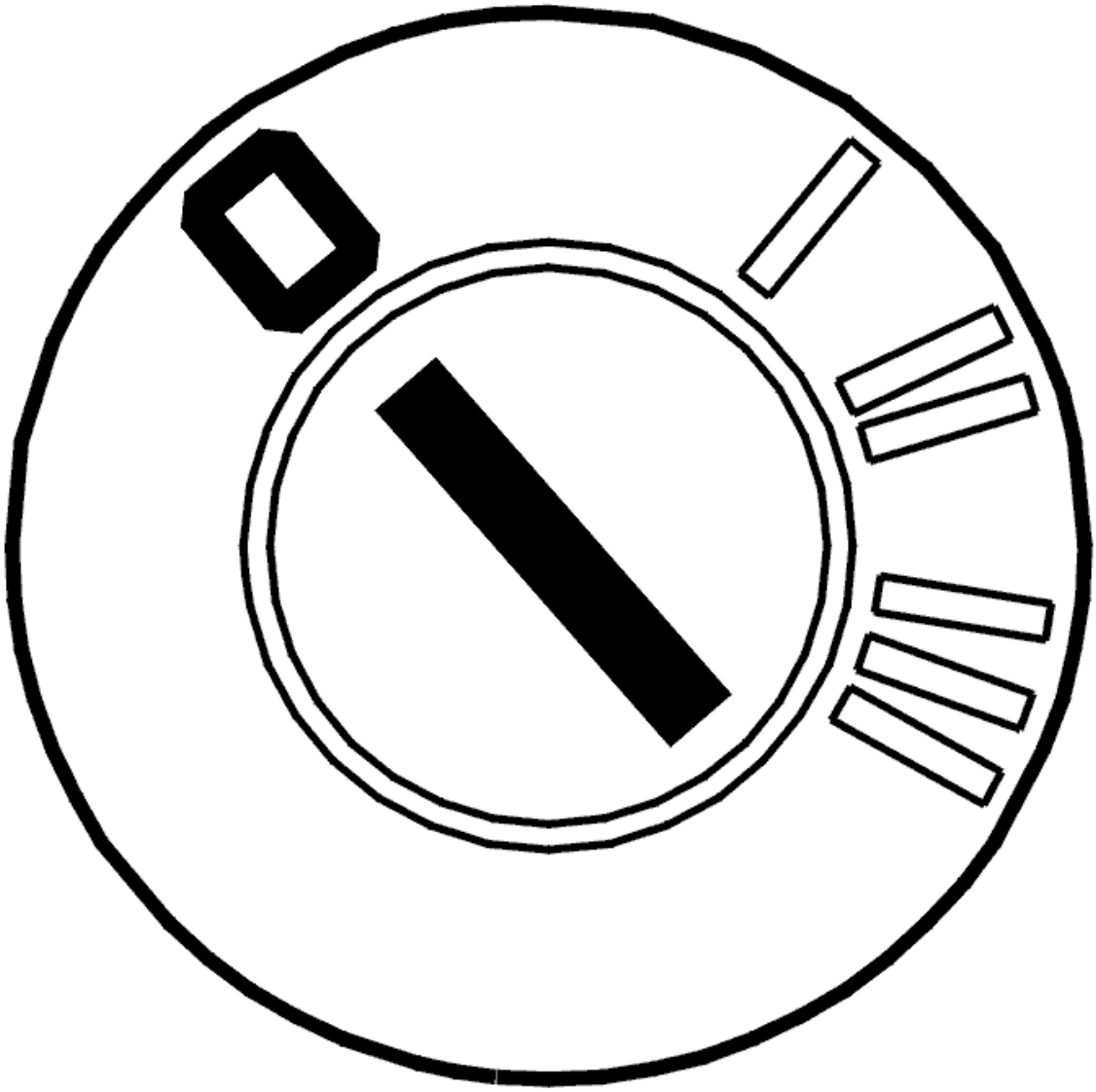


Fig. 256: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

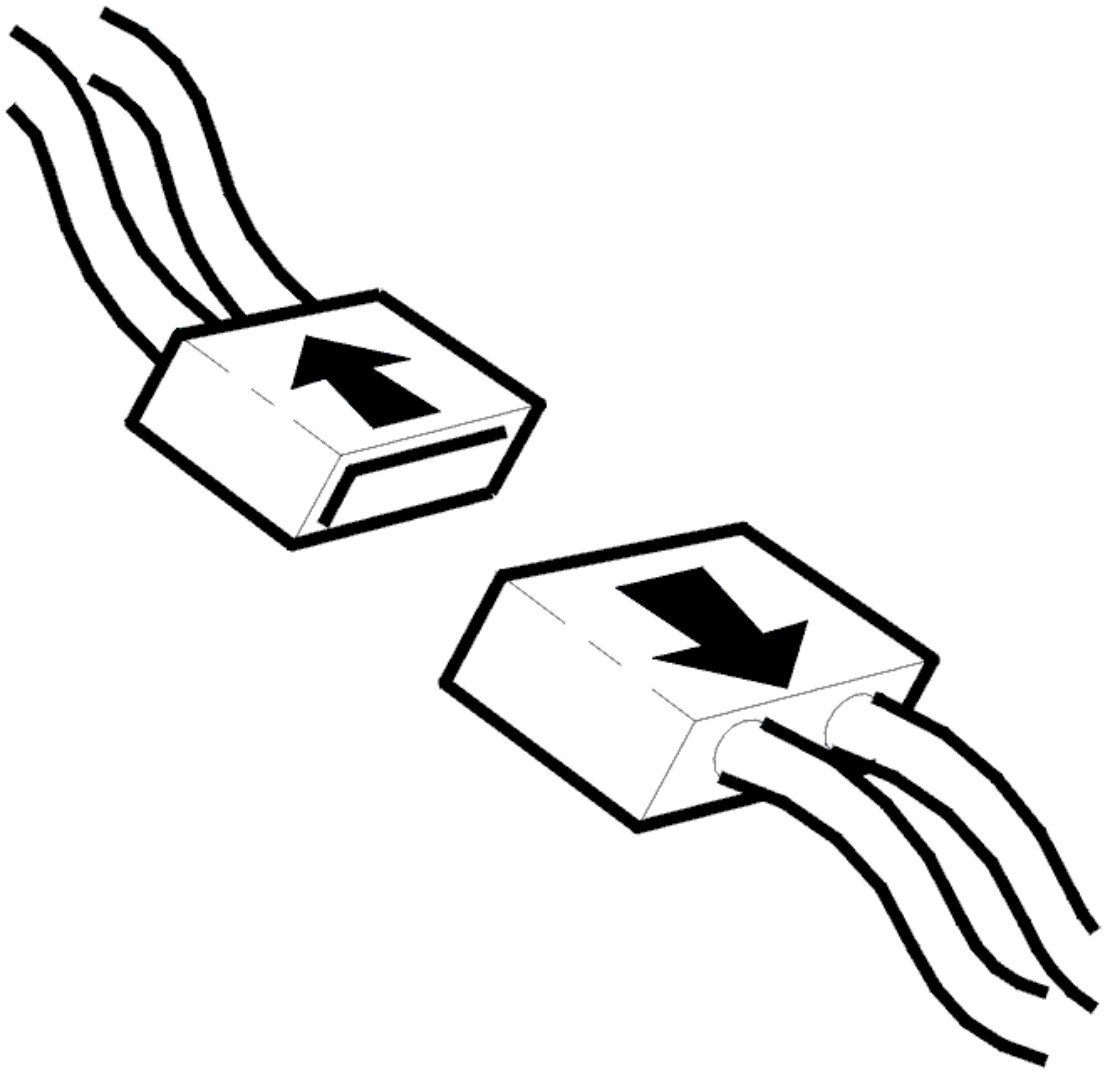


Fig. 257: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check connector B (22-pin) for the transmission control module (TCM). Check for damage and pressed in terminal pins. Check for contact resistance and oxidation.

Check the wiring between the transmission connector terminal #B17 and the connector for solenoid SLC2 terminal #1. Check the wiring between the transmission connector terminal #B18 and the connector for solenoid SLC2 terminal #2. Check for an open circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.

HINT: If no fault is found in the wiring check solenoid SLC2. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

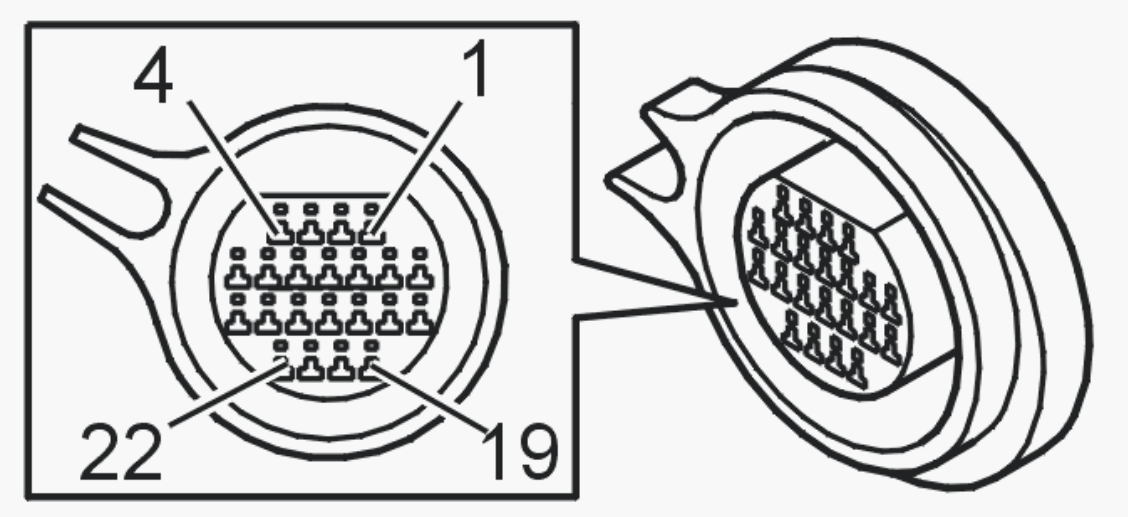


Fig. 258: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

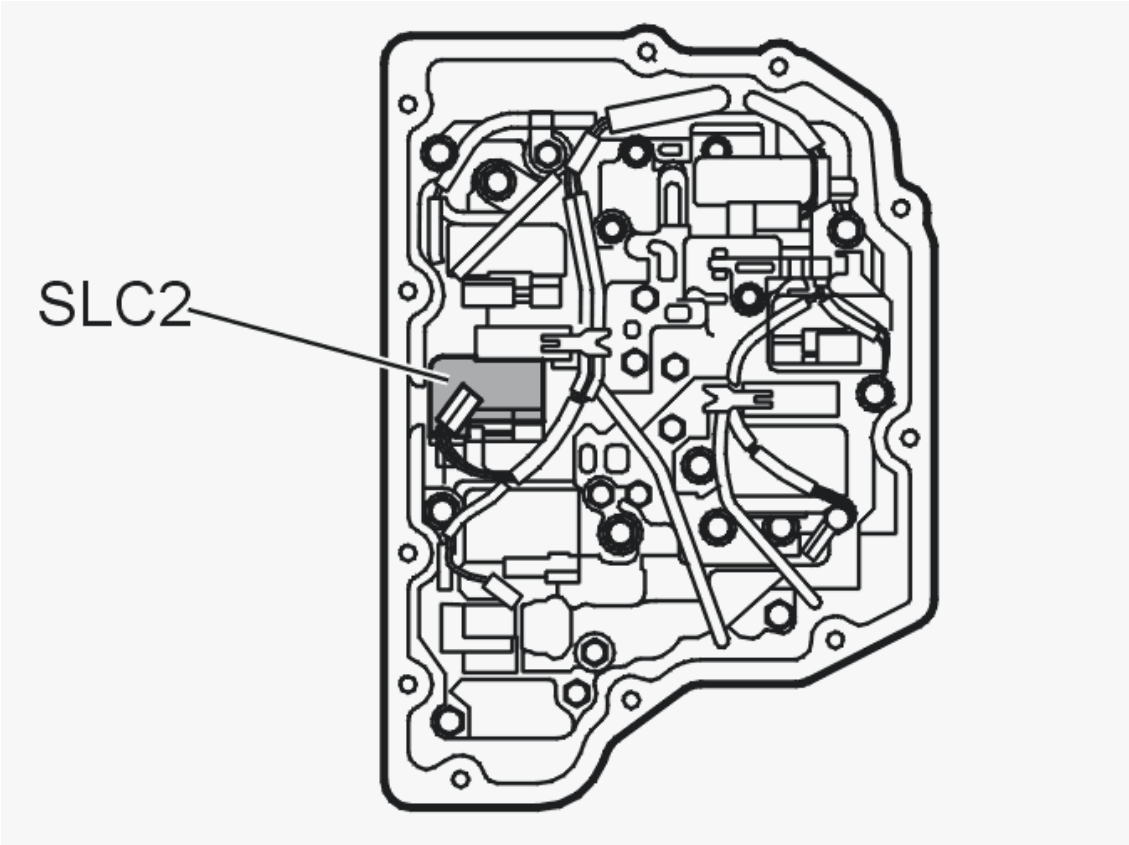


Fig. 259: Identifying Solenoid SLC2
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

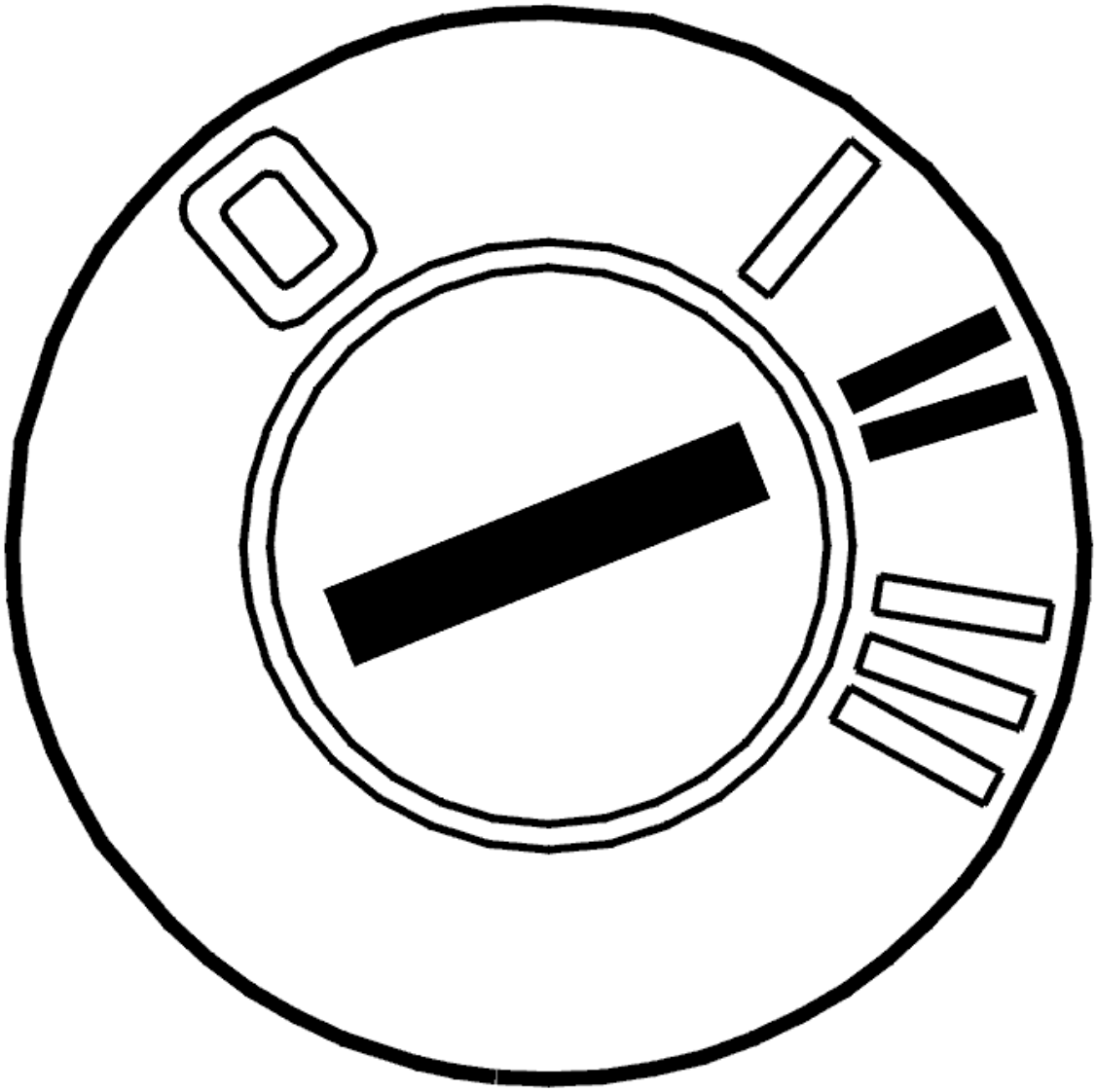


Fig. 260: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

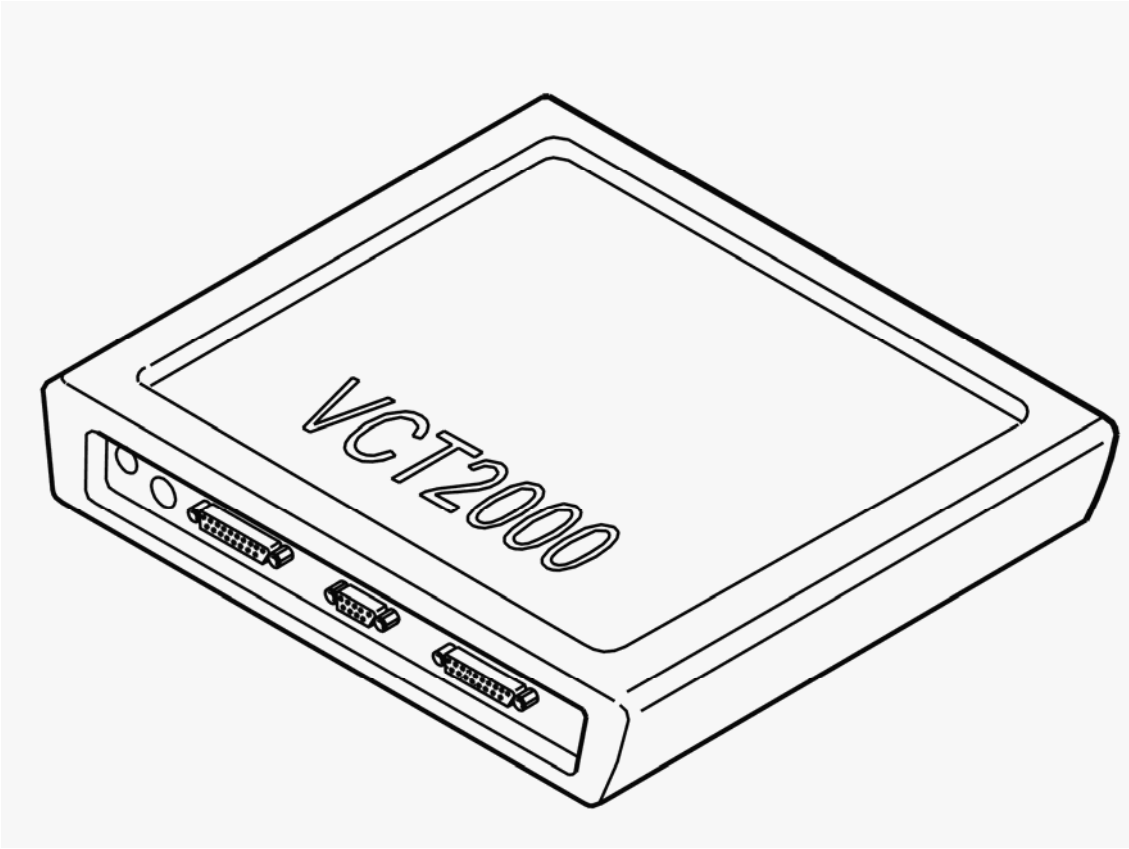


Fig. 261: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

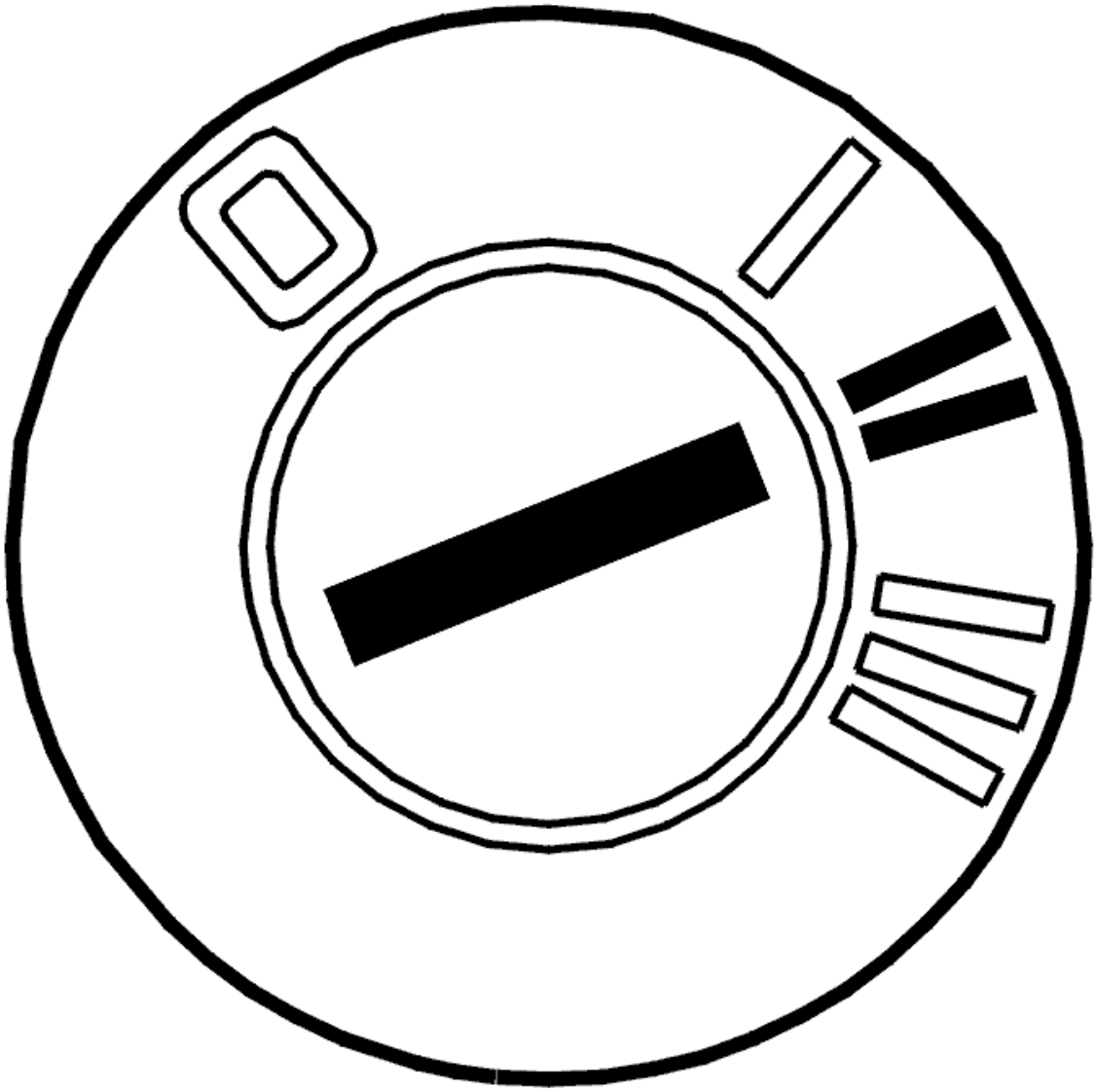


Fig. 262: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

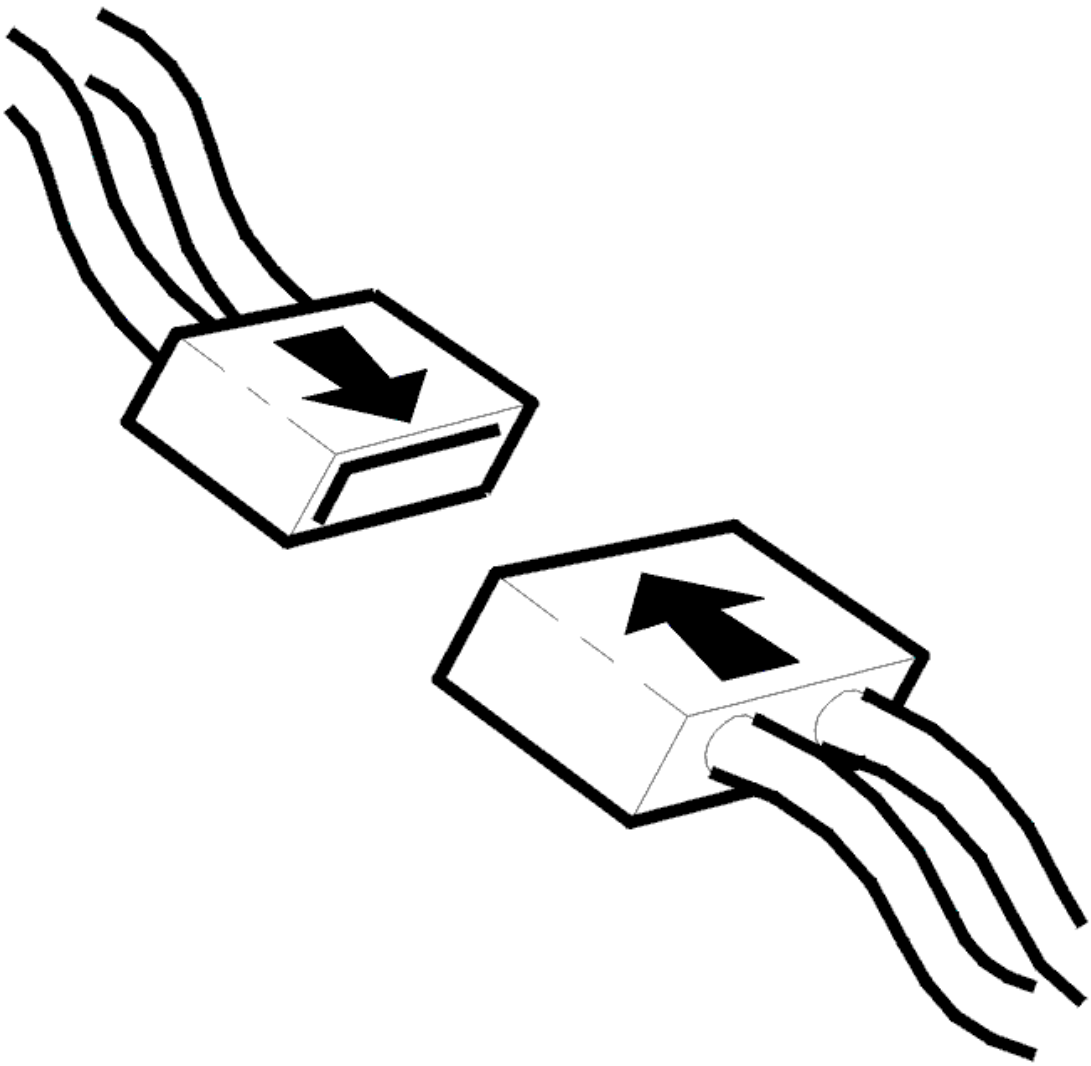


Fig. 263: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLC2 by clicking on the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLC2. The current must oscillate between approximately 0 and 1000 mA.

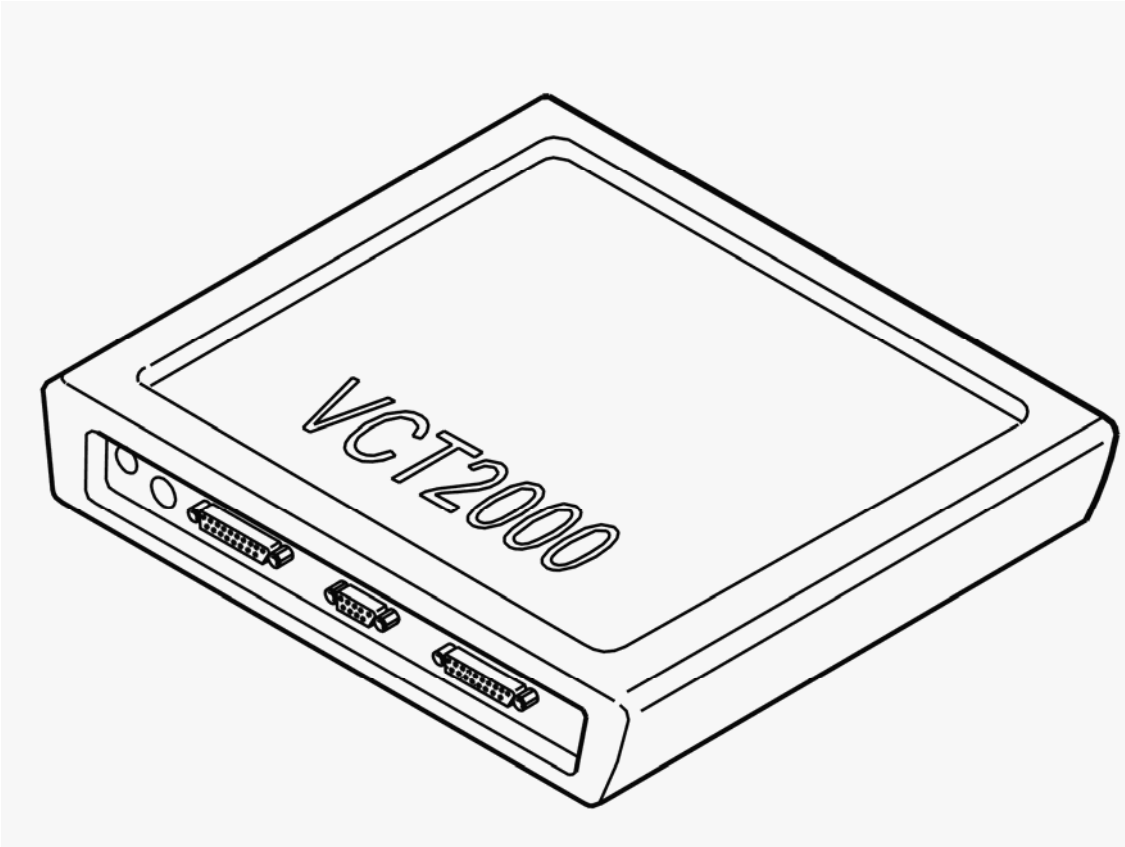


Fig. 264: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

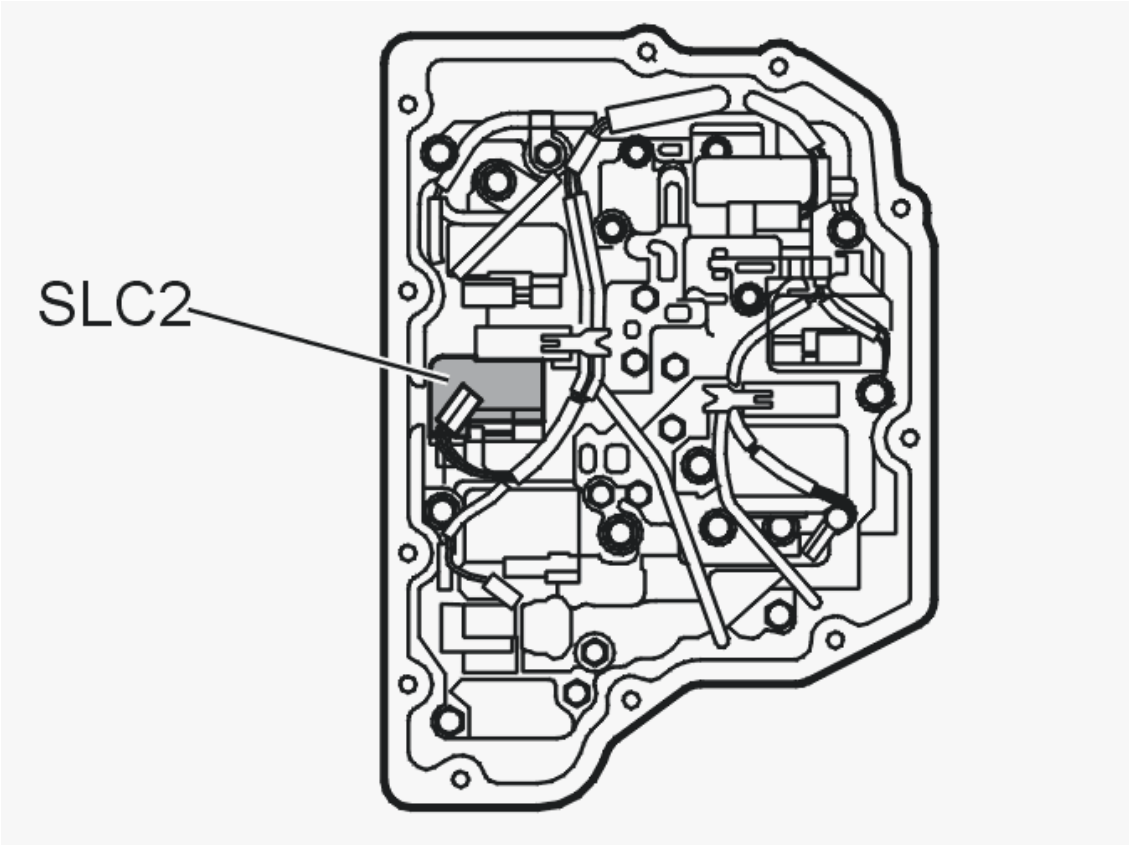


Fig. 265: Identifying Solenoid SLC2
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P096900: PRESSURE REGULATOR SOLENOID B CONTROL CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO

INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096900

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P096900**

FAULT TRACING TCM-P096900

see **FAULT TRACING TCM-P096900**

TCM-P097000: PRESSURE CONTROL SOLENOID C CONTROL CIRCUIT LOW. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P097000

Condition

The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The measured current value is higher than permitted in the circuit for solenoid SLC2.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

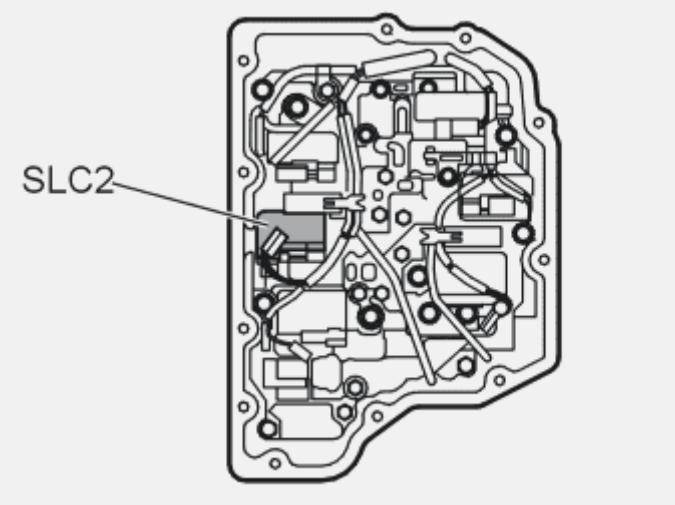


Fig. 266: Identifying SLC2 Solenoid
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Control signal lead short-circuited to voltage.
- Linear pressure solenoid not working.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Abnormal slipping gearshifts
- Rough gear shift
- No gear shift

FAULT-TRACING

CHECKS

CHECKING LINEAR PRESSURE SOLENOID SLC2

Fig. 267: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLC2 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLC2. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 268: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

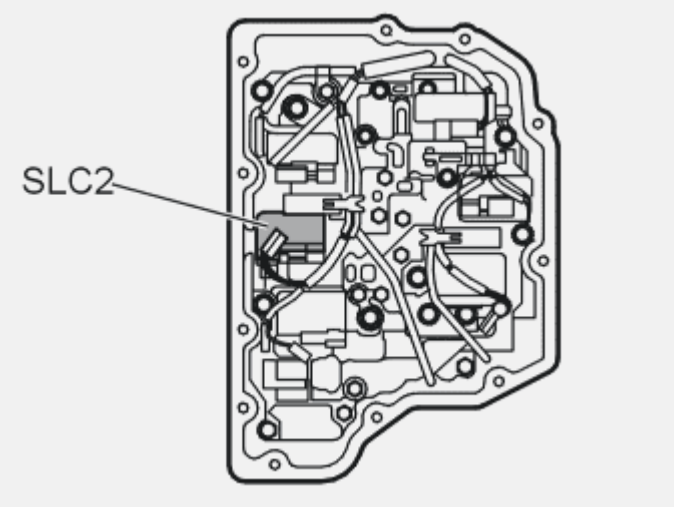


Fig. 269: Identifying SLC2 Solenoid
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

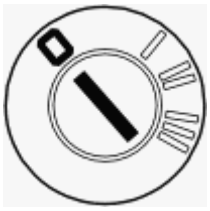


Fig. 270: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

Check the cables for open circuit and short circuit to ground.

Take readings between:

- Transmission connector #B17 and the connector for solenoid SLC2 #1.
- Transmission connector #B18 and the connector for solenoid SLC2 #2.

HINT: If no fault is found in the wiring, check solenoid SLC2. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

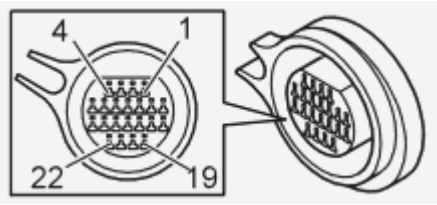


Fig. 271: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

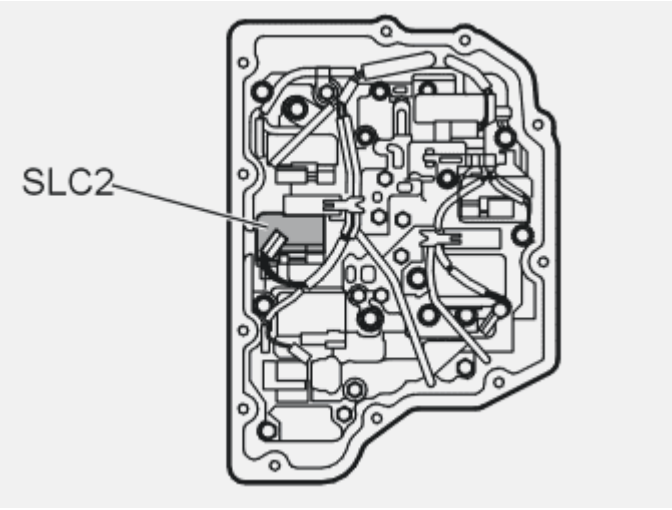


Fig. 272: Identifying SLC2 Solenoid
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 273: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

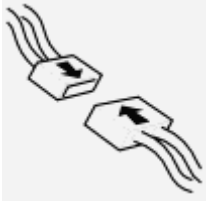


Fig. 274: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.

- Ignition on.
- Activate solenoid SLC2 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLC2. The current should oscillate between 100 and 950 mA.

Fig. 275: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

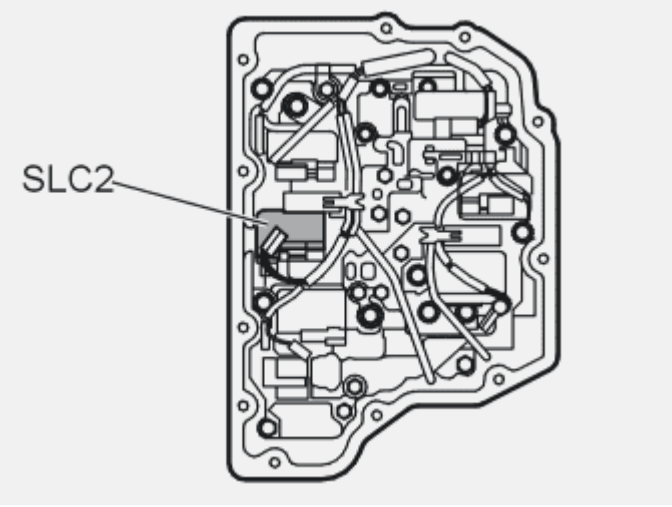


Fig. 276: Identifying SLC2 Solenoid
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 277: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 278: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P097000: PRESSURE CONTROL SOLENOID C CONTROL CIRCUIT LOW. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P097000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P097000**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P097000: PRESSURE REGULATOR SOLENOID C CONTROL CIRCUIT LOW. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P097000

Condition

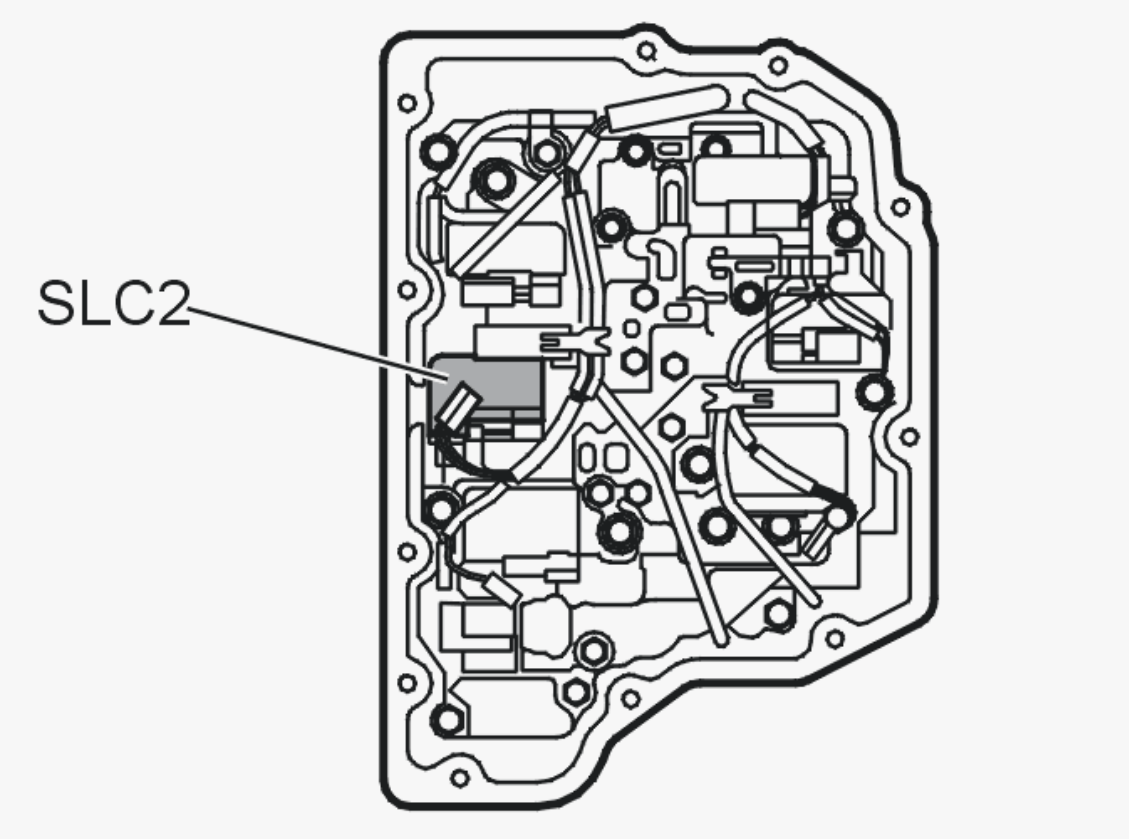


Fig. 279: Identifying Solenoid SLC2
Courtesy of VOLVO CARS CORPORATION

The solenoids are controlled using the power stage in the transmission control module (TCM). The transmission control module (TCM) opens the power stage when the solenoids are to be activated so that the circuit receives a voltage.

If the transmission control module (TCM) registers that the measured current is higher than the circuit for the SLC2 solenoid allows, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Control signal lead short-circuited to voltage.
- Linear pressure solenoid not working.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Abnormally slipping gears.
- Harsh gear changing
- No gear changing.

FAULT TRACING TCM-P097000

CHECKS

CHECKING THE LOCK-UP SOLENOID SLC2

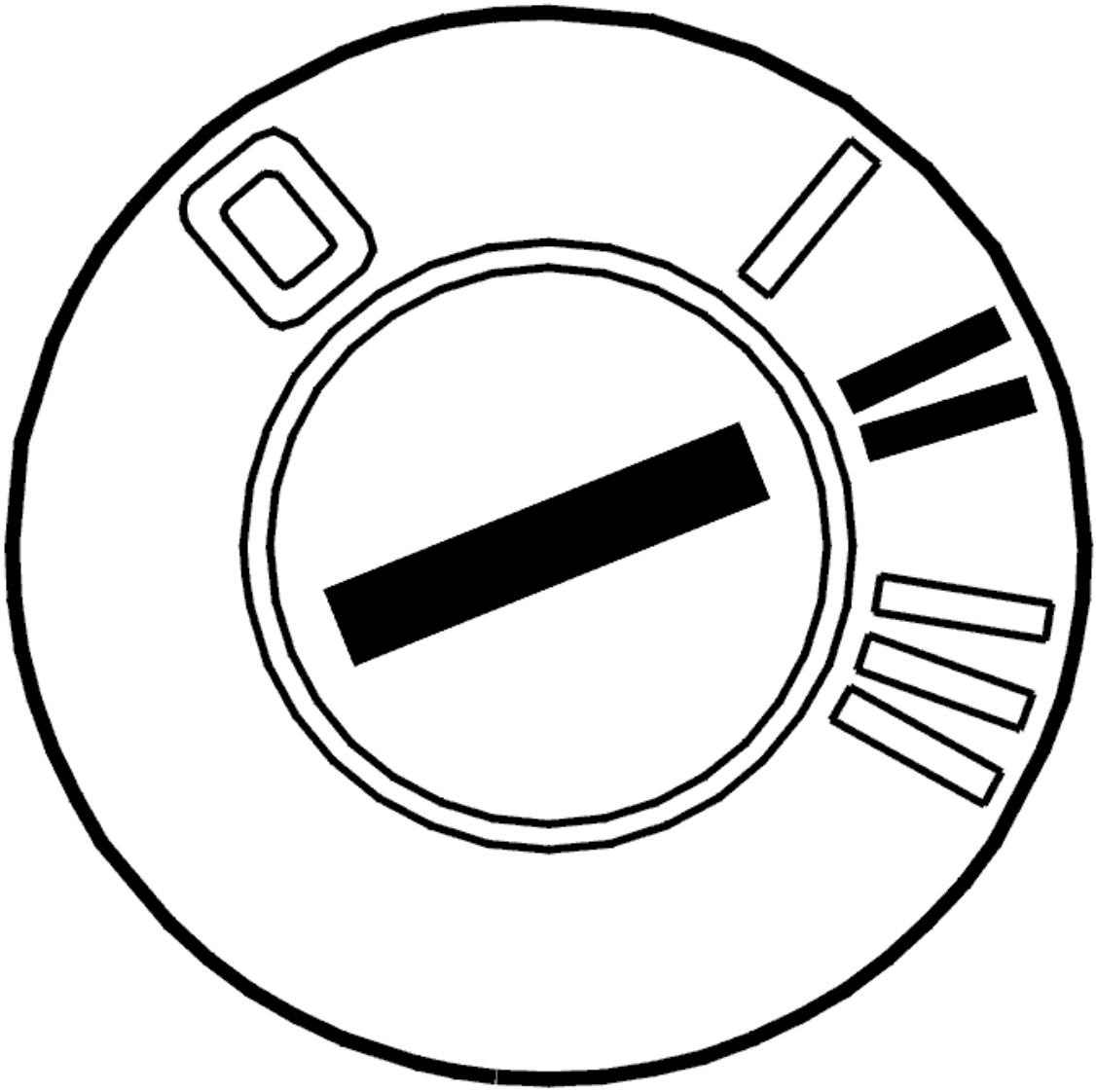


Fig. 280: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLC2 by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLC2. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

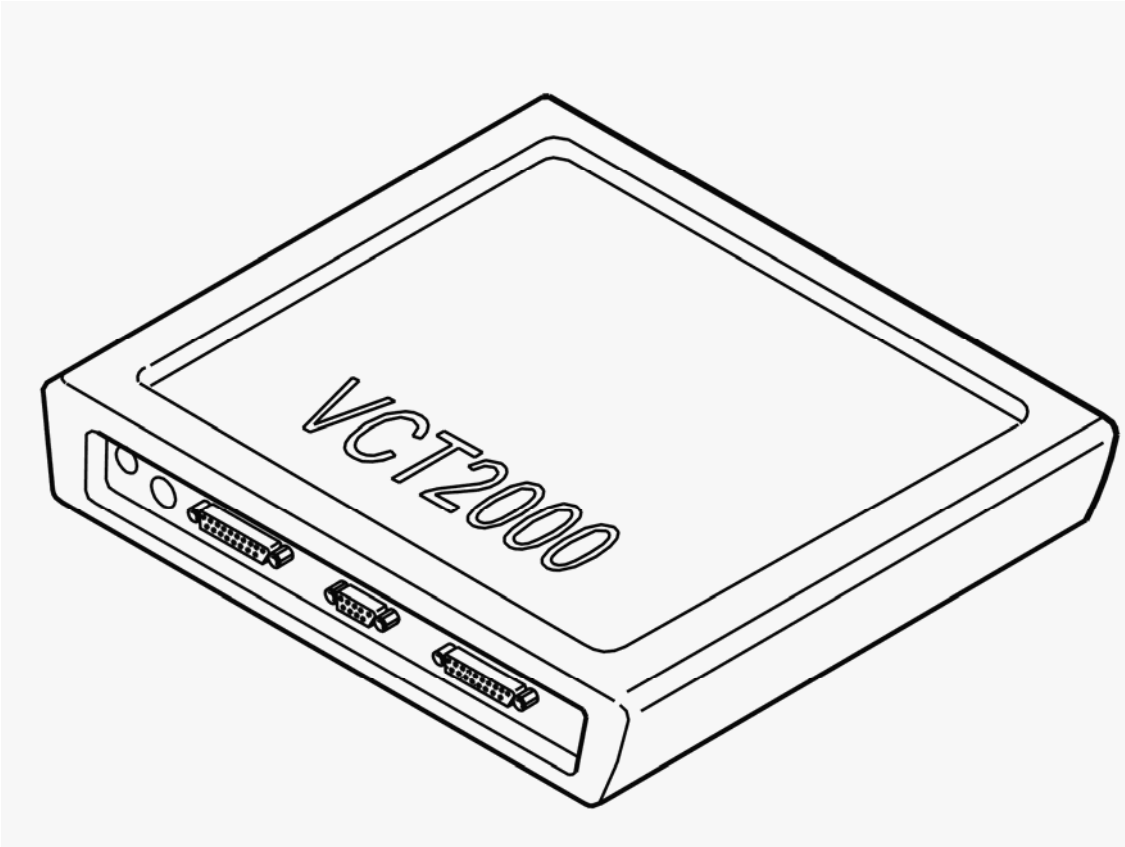


Fig. 281: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

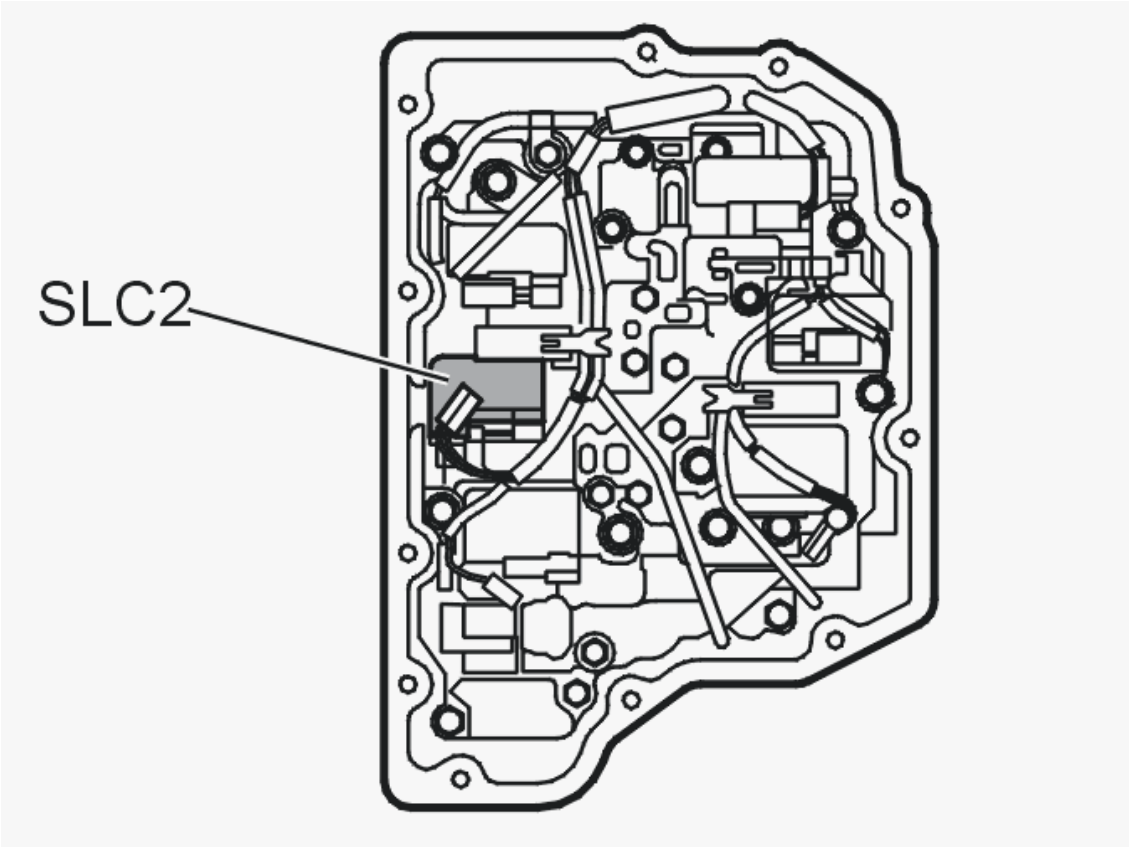


Fig. 282: Identifying Solenoid SLC2
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

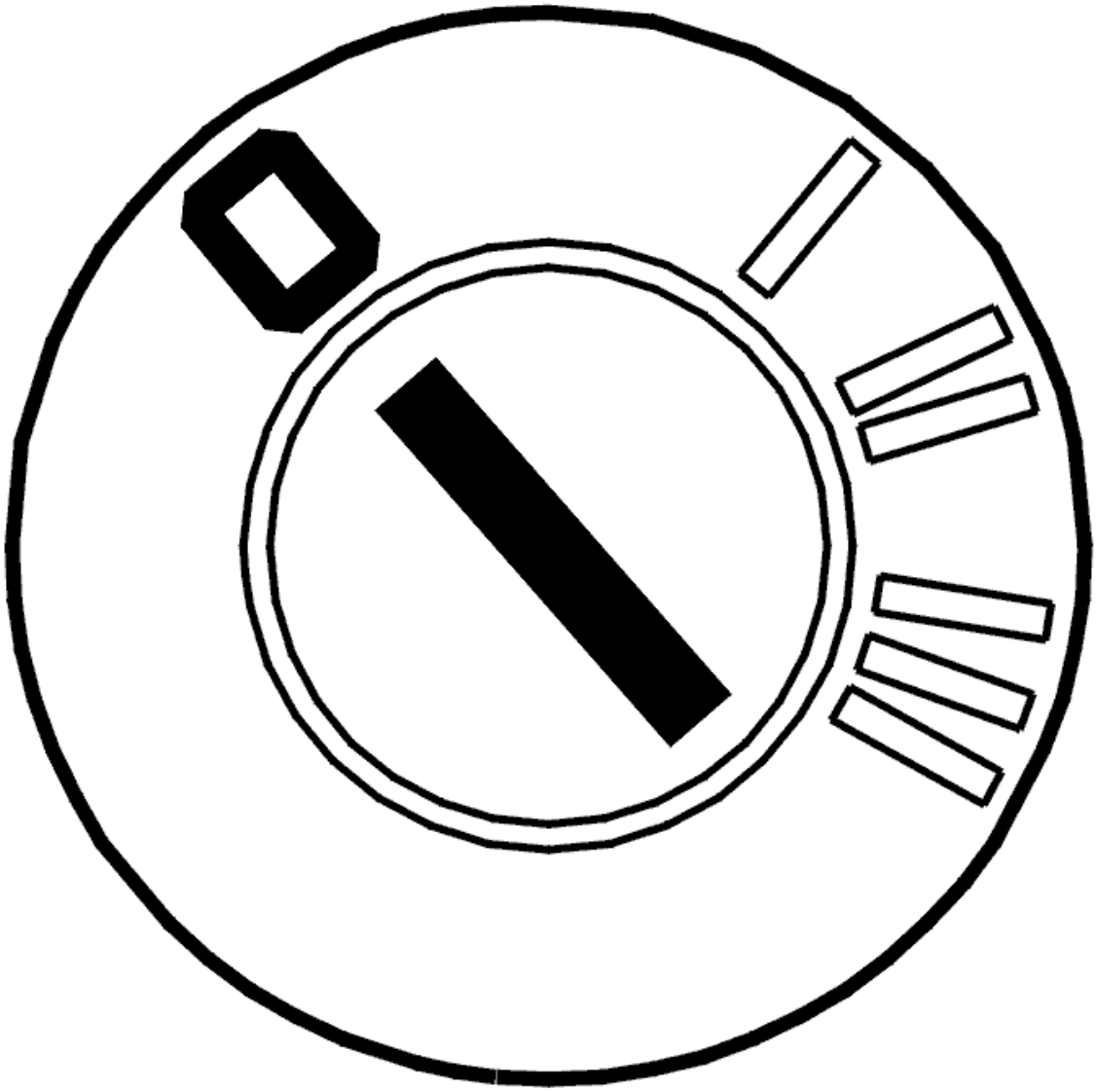


Fig. 283: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

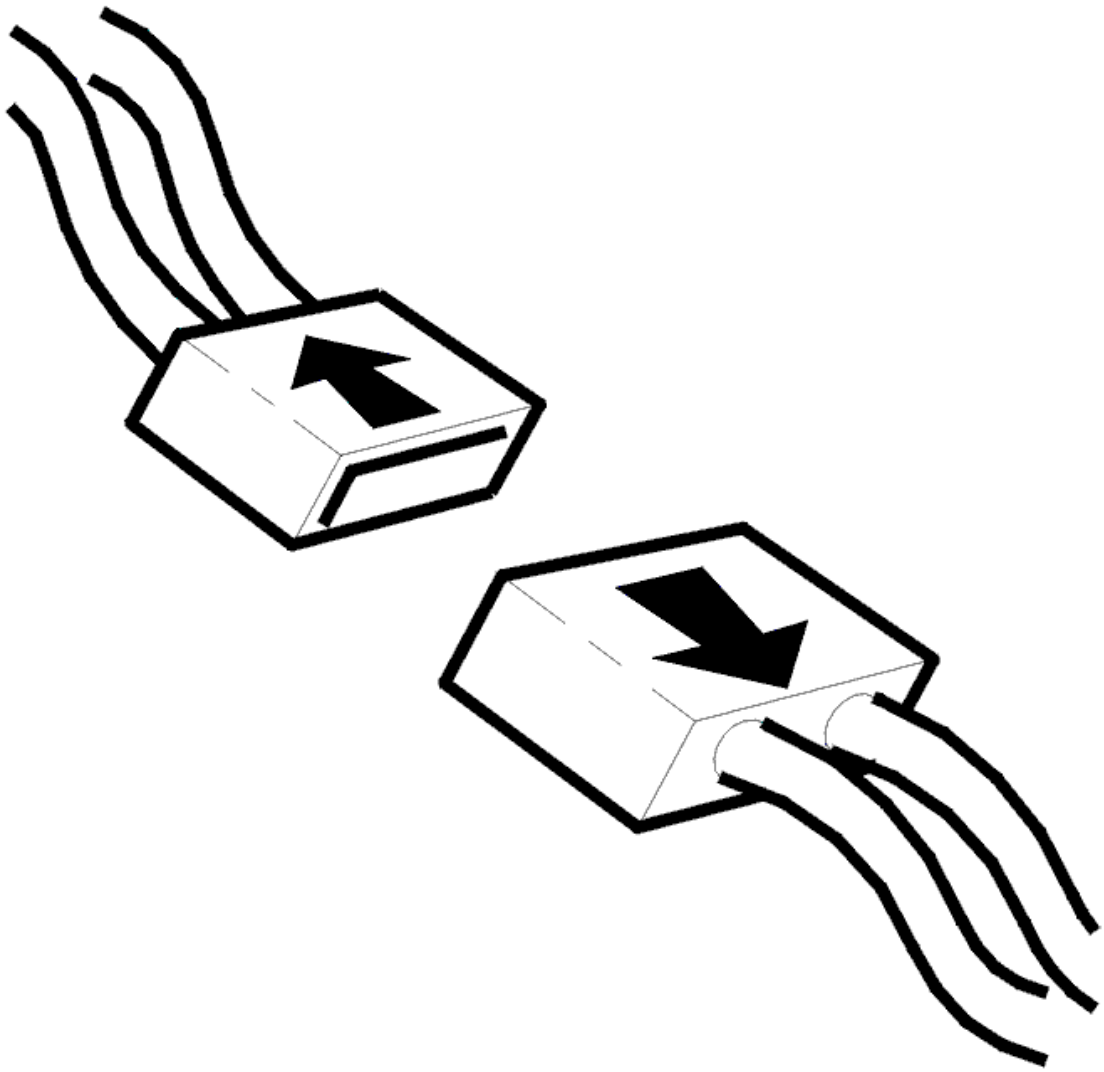


Fig. 284: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check connector B (22-pin) for the transmission control module (TCM). Check for damage and pressed in terminal pins. Check for contact resistance and oxidation.

Check the wiring between the transmission connector terminal #B17 and the connector for solenoid SLC2 terminal #1. Check the wiring between the transmission connector terminal #B18 and the connector for solenoid SLC2 terminal #2. Check for an open circuit. Check for a short-circuit to ground.

HINT: If no fault is found in the wiring check solenoid SLC2. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

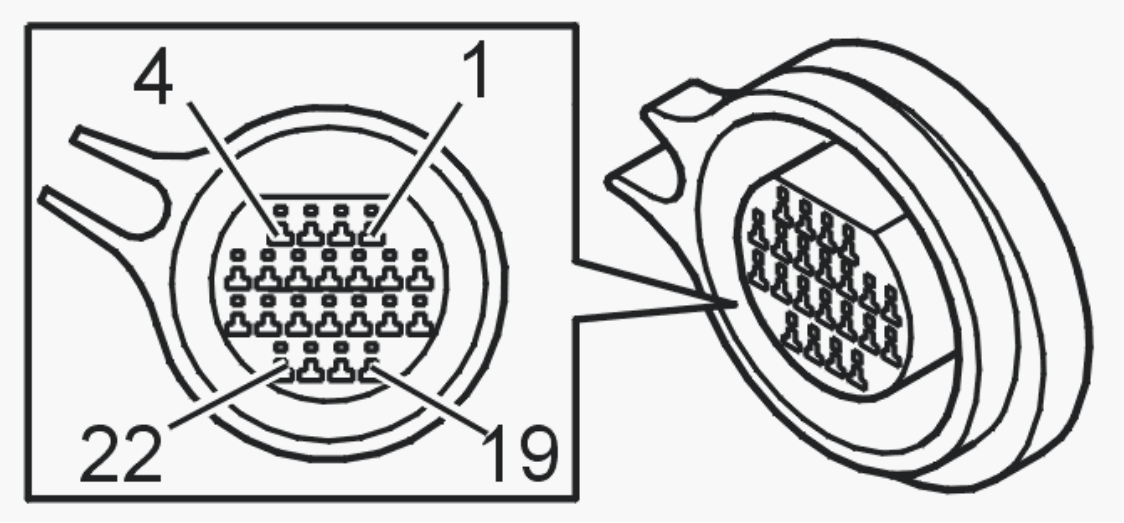


Fig. 285: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

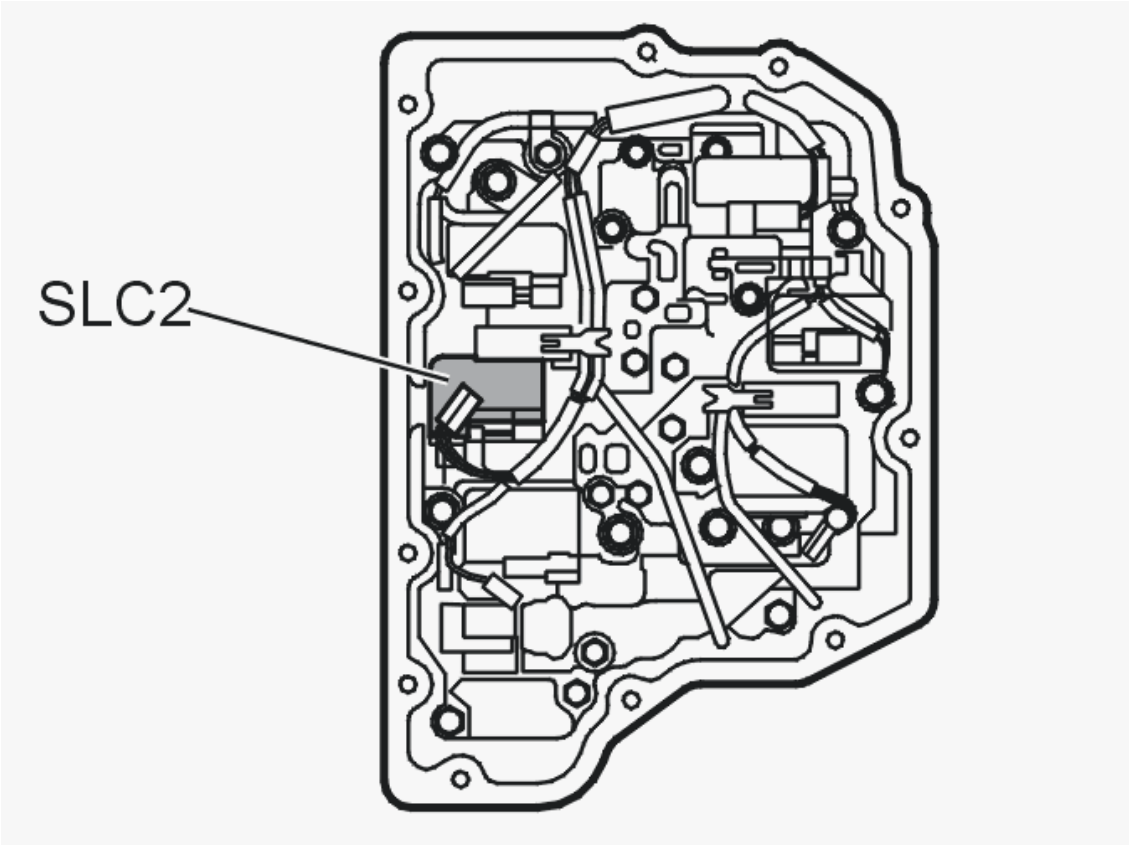


Fig. 286: Identifying Solenoid SLC2
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

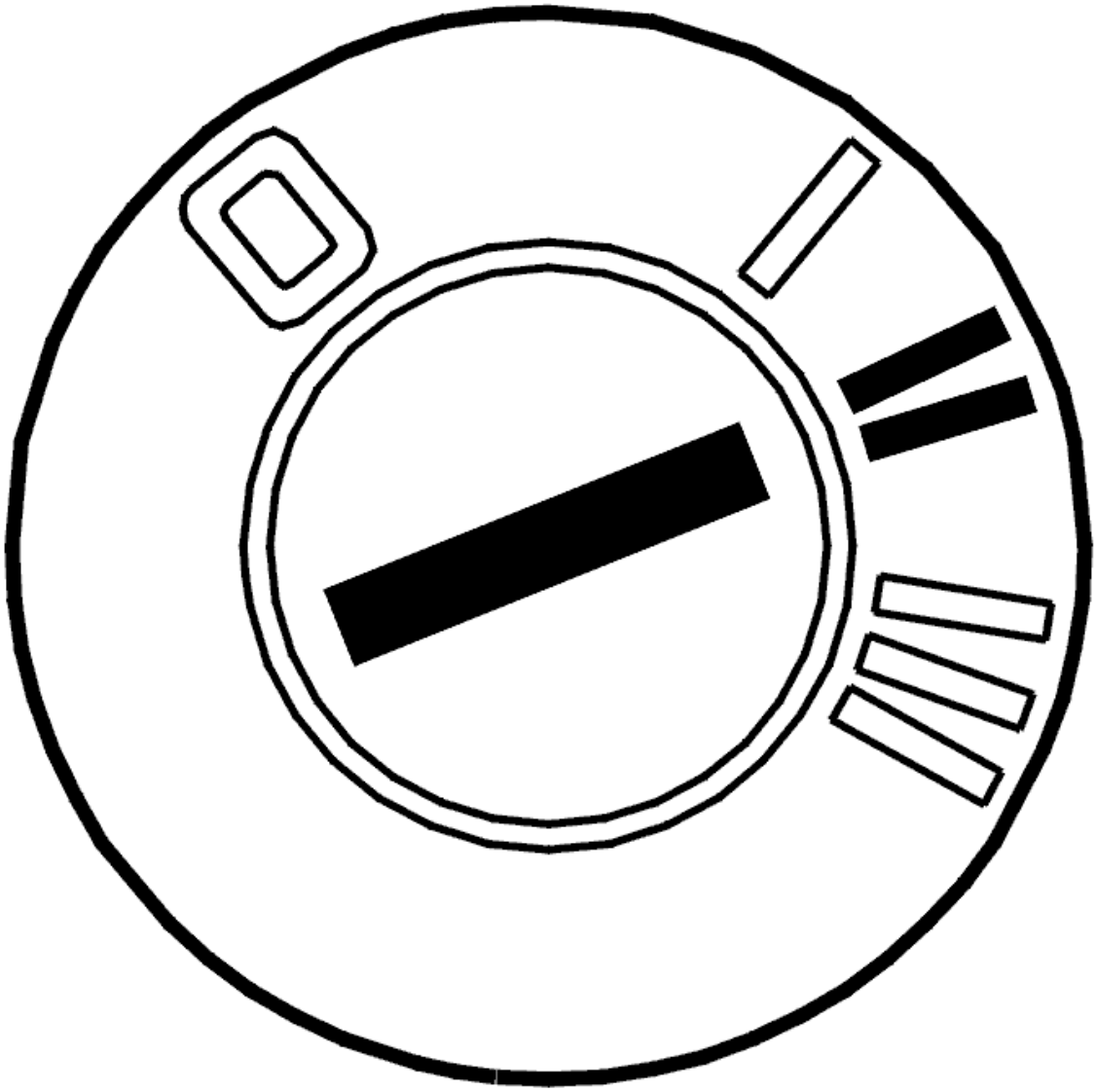


Fig. 287: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

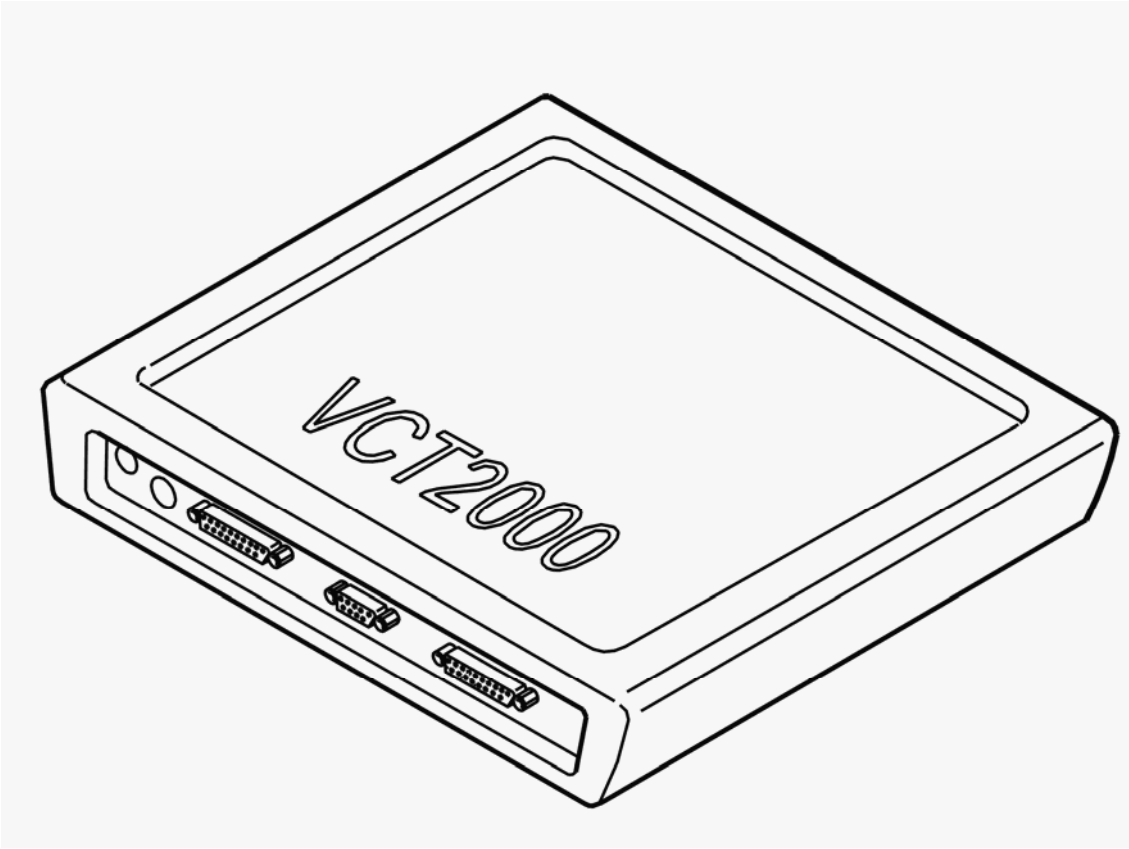


Fig. 288: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

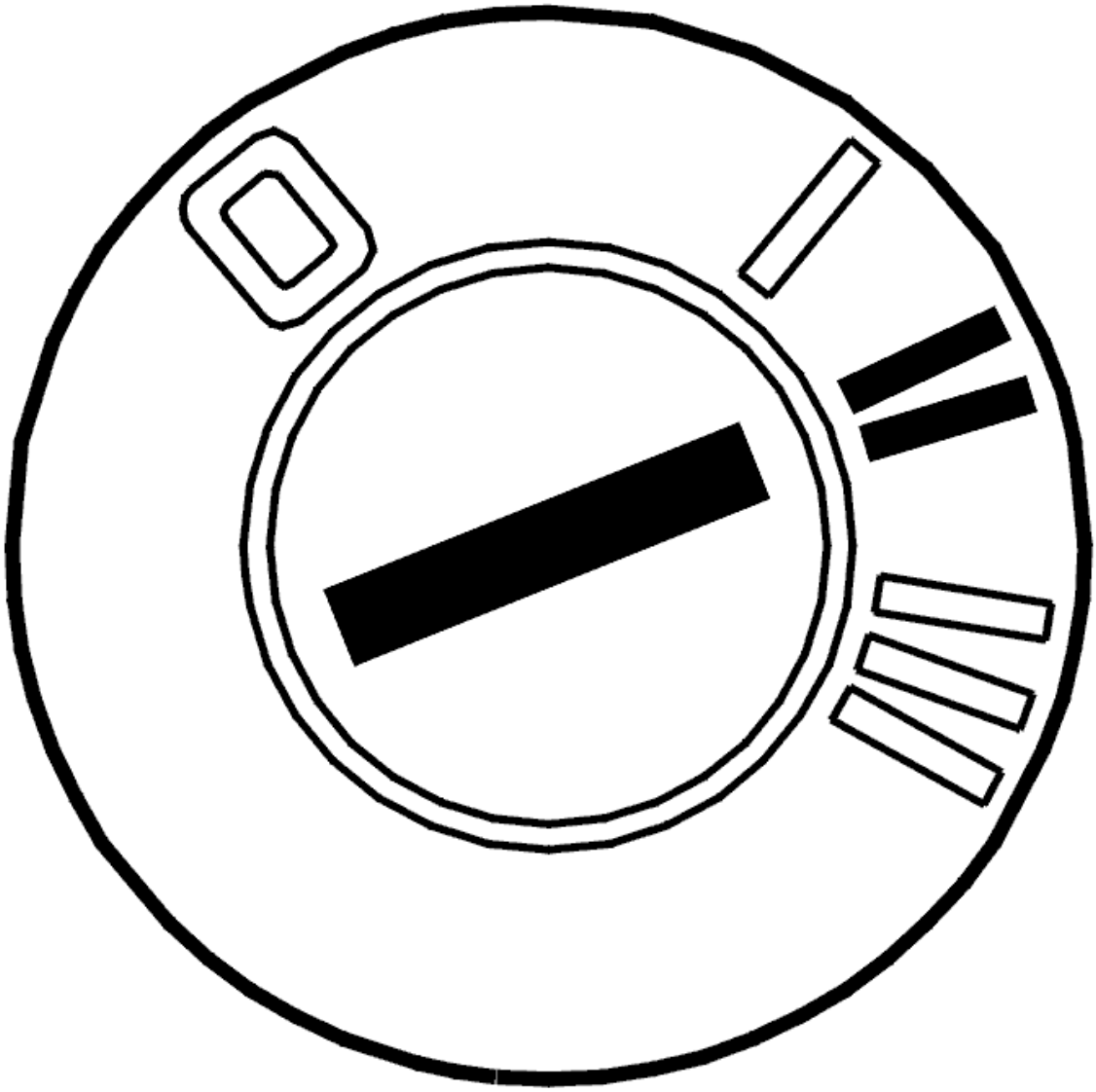


Fig. 289: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

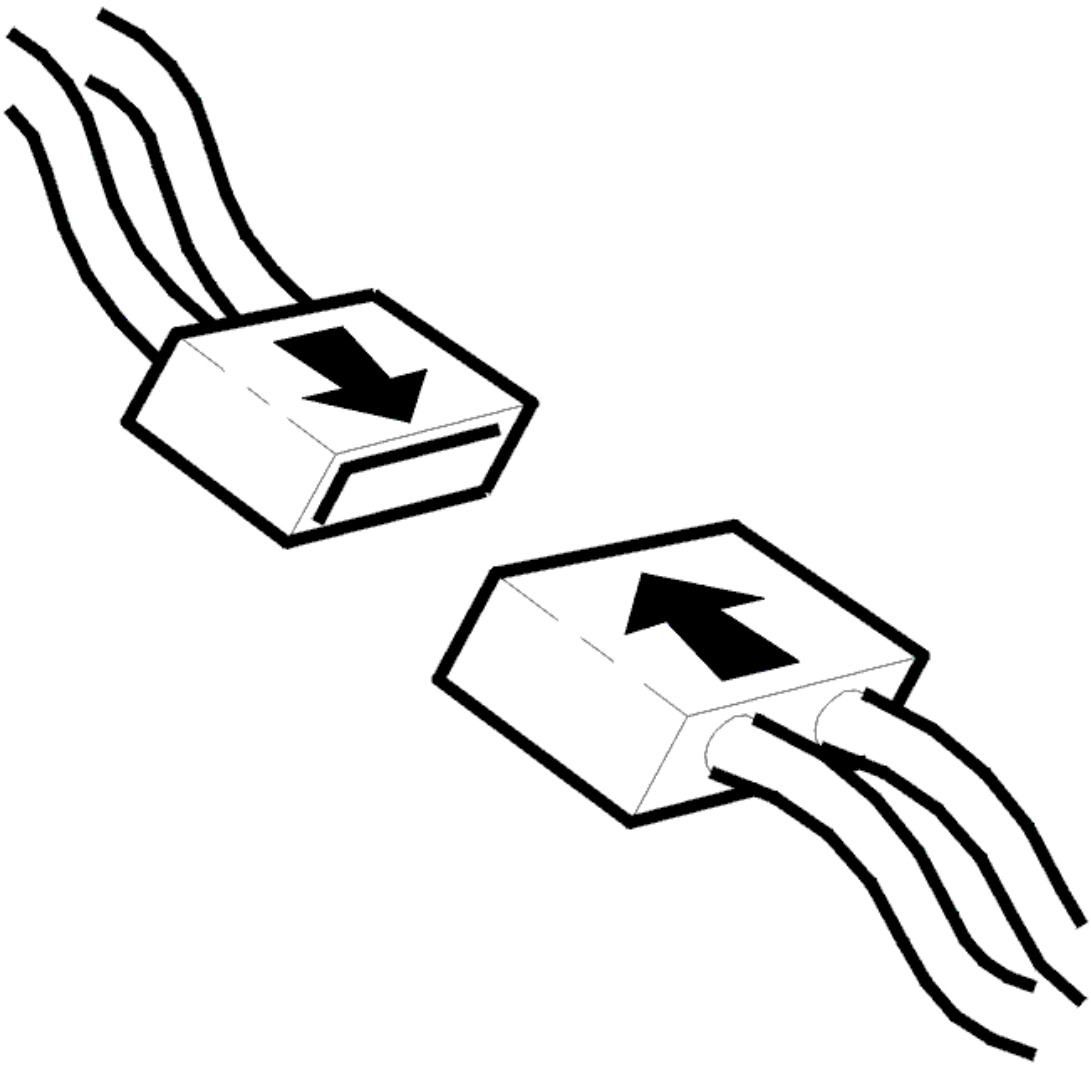


Fig. 290: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLC2 by clicking on the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLC2. The current must oscillate between approximately 0 and 1000 mA.

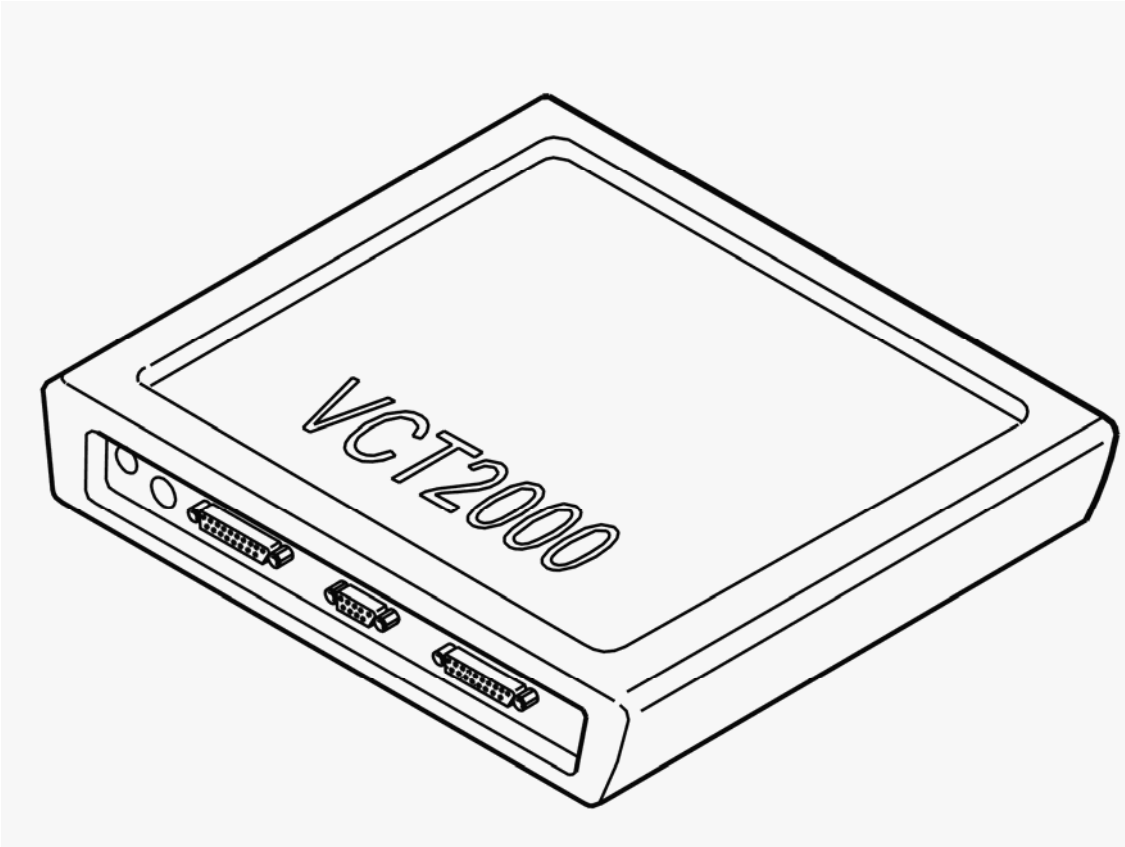


Fig. 291: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

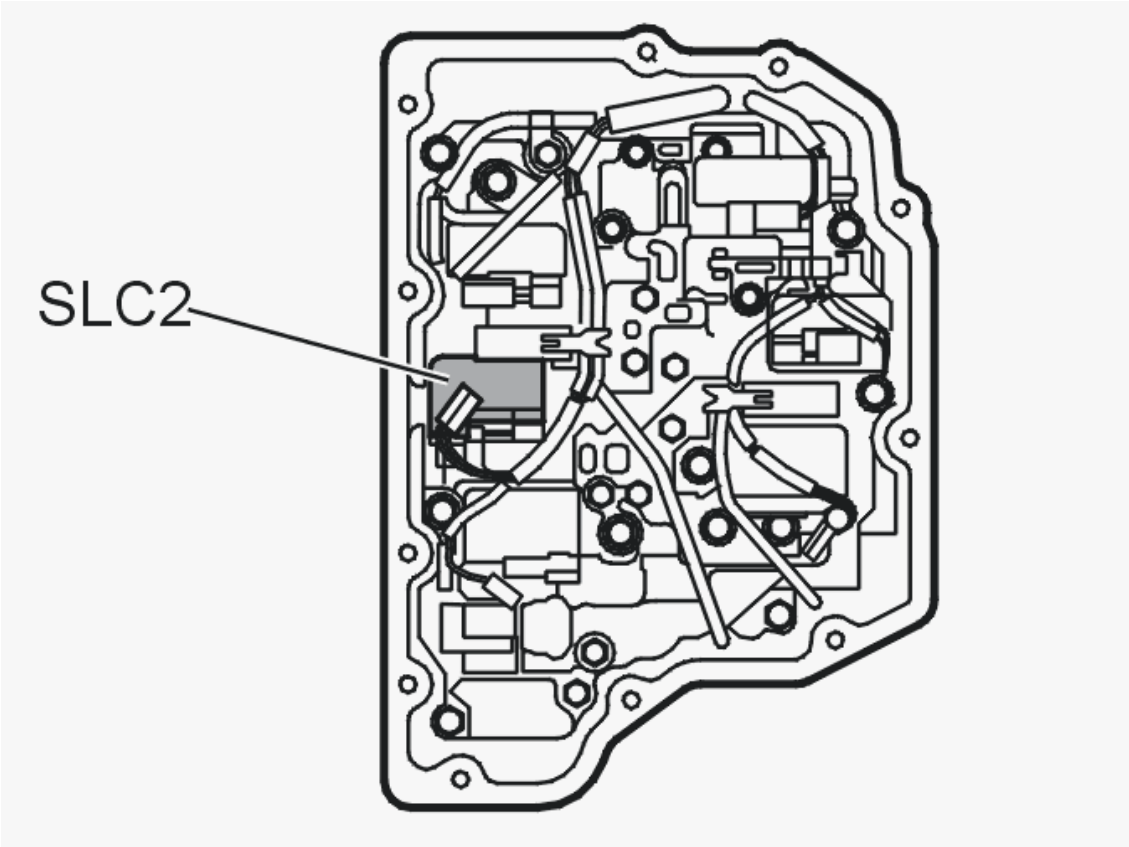


Fig. 292: Identifying Solenoid SLC2
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P097000: PRESSURE REGULATOR SOLENOID C CONTROL CIRCUIT LOW. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT

TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P097000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P097000**

FAULT TRACING TCM-P097000

see **FAULT TRACING TCM-P097000**

TCM-P097100: PRESSURE CONTROL SOLENOID C CONTROL CIRCUIT HIGH. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P097100

Condition

The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The measured current value is higher than permitted in the circuit for solenoid SLC2.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

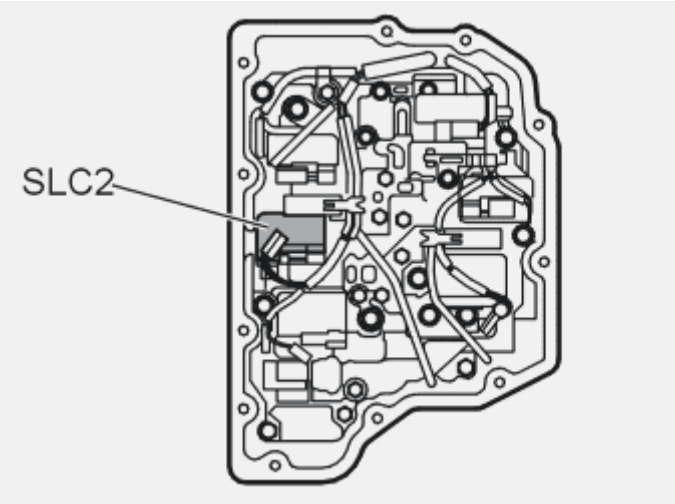


Fig. 293: Identifying SLC2 Solenoid
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Short-circuit to supply voltage in the signal cable.
- Linear pressure solenoid not working.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Abnormal slipping gearshifts
- Rough gear shift
- No gear shift

FAULT-TRACING

CHECKS

CHECKING LINEAR PRESSURE SOLENOID SLC2

Fig. 294: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLC2 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLC2. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 295: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

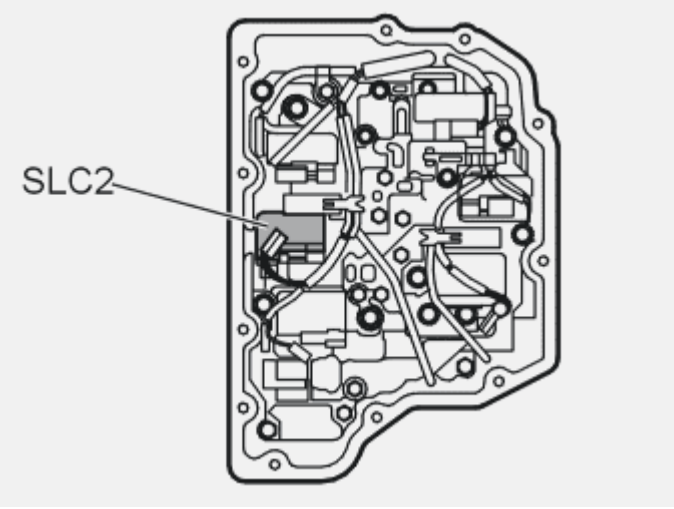


Fig. 296: Identifying SLC2 Solenoid
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

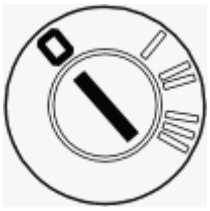


Fig. 297: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check the cable for a short-circuit to supply voltage.

Take readings between:

- Transmission connector #B17 and the connector for solenoid SLC2 #1.
- Transmission connector #B18 and the connector for solenoid SLC2 #2.

Also check the cables for a short-circuit to each other.

HINT: If no fault is found in the wiring, check solenoid SLC2. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **VALVE HOUSING**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

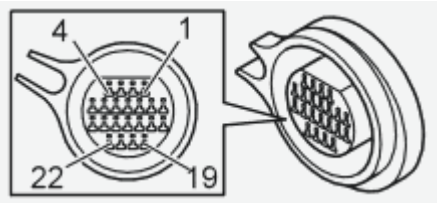


Fig. 298: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

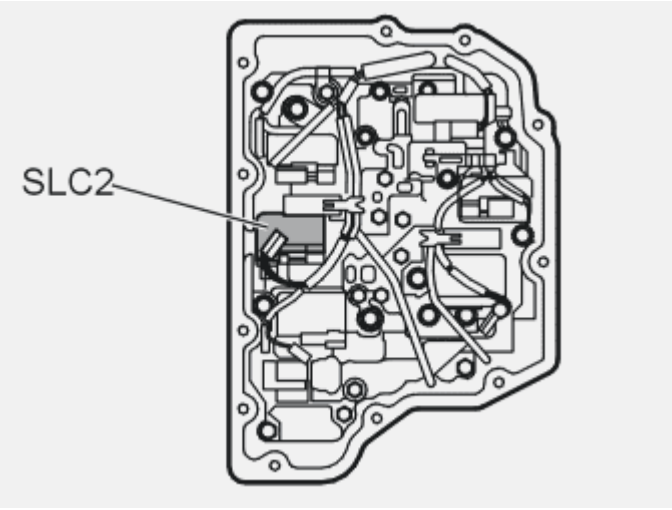


Fig. 299: Identifying SLC2 Solenoid
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 300: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

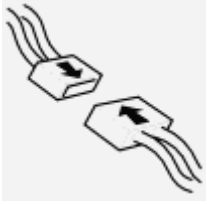


Fig. 301: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.

- Ignition on.
- Activate solenoid SLC2 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLC2. The current should oscillate between 100 and 950 mA.

Fig. 302: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

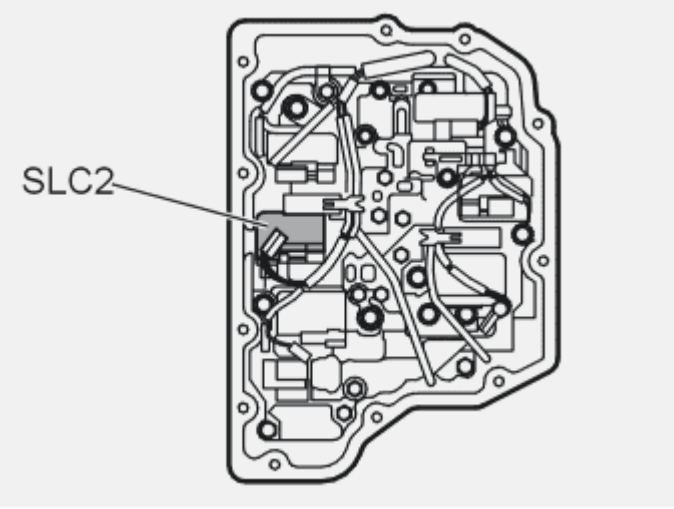


Fig. 303: Identifying SLC2 Solenoid
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 304: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 305: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P097100: PRESSURE CONTROL SOLENOID C CONTROL CIRCUIT HIGH. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P097100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P097100**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P097100: PRESSURE REGULATOR SOLENOID C CONTROL CIRCUIT HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P097100

Condition

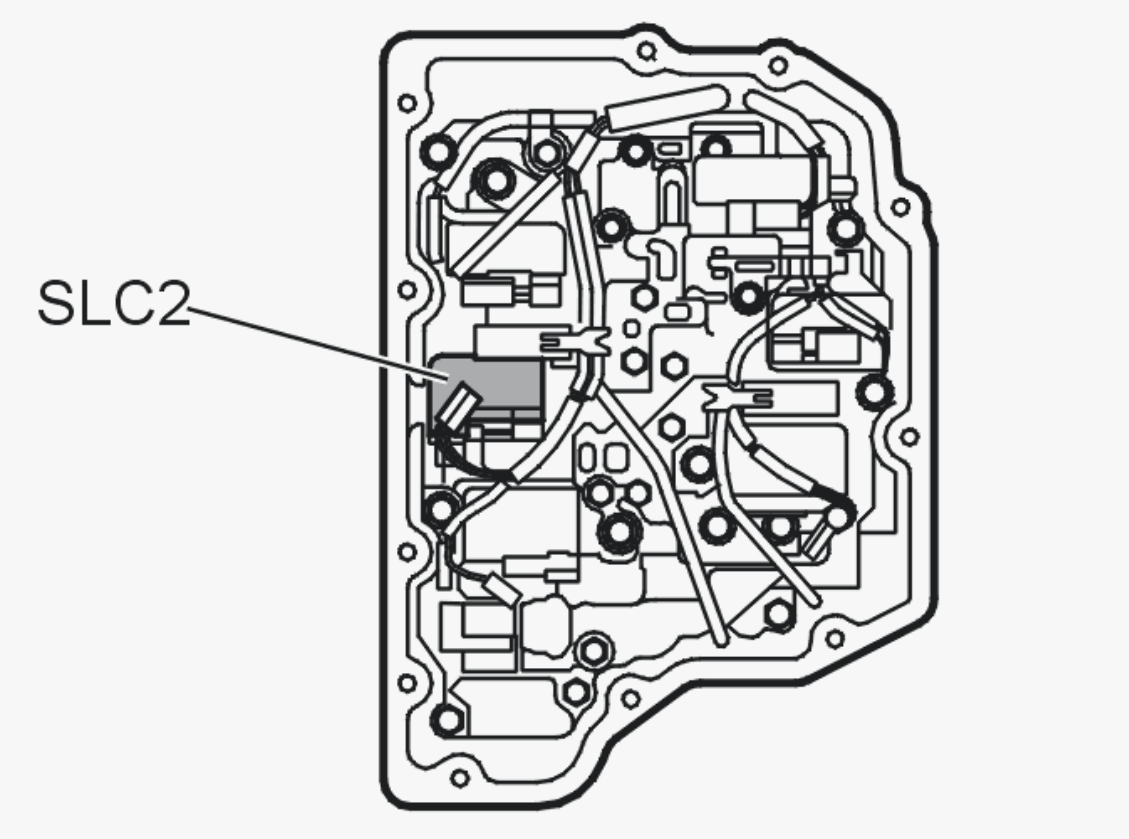


Fig. 306: Identifying Solenoid SLC2
Courtesy of VOLVO CARS CORPORATION

The solenoids are controlled using the power stage in the transmission control module (TCM). The transmission control module (TCM) opens the power stage when the solenoids are to be activated so that the circuit receives a voltage.

If the transmission control module (TCM) registers that the measured current is higher than the circuit for the SLC2 solenoid allows, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- The signal cable is short-circuited to voltage.
- Linear pressure solenoid not working.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Abnormally slipping gears.
- Harsh gear changing
- No gear changing.

FAULT TRACING TCM-P097100

CHECKS

CHECKING THE LOCK-UP SOLENOID SLC2

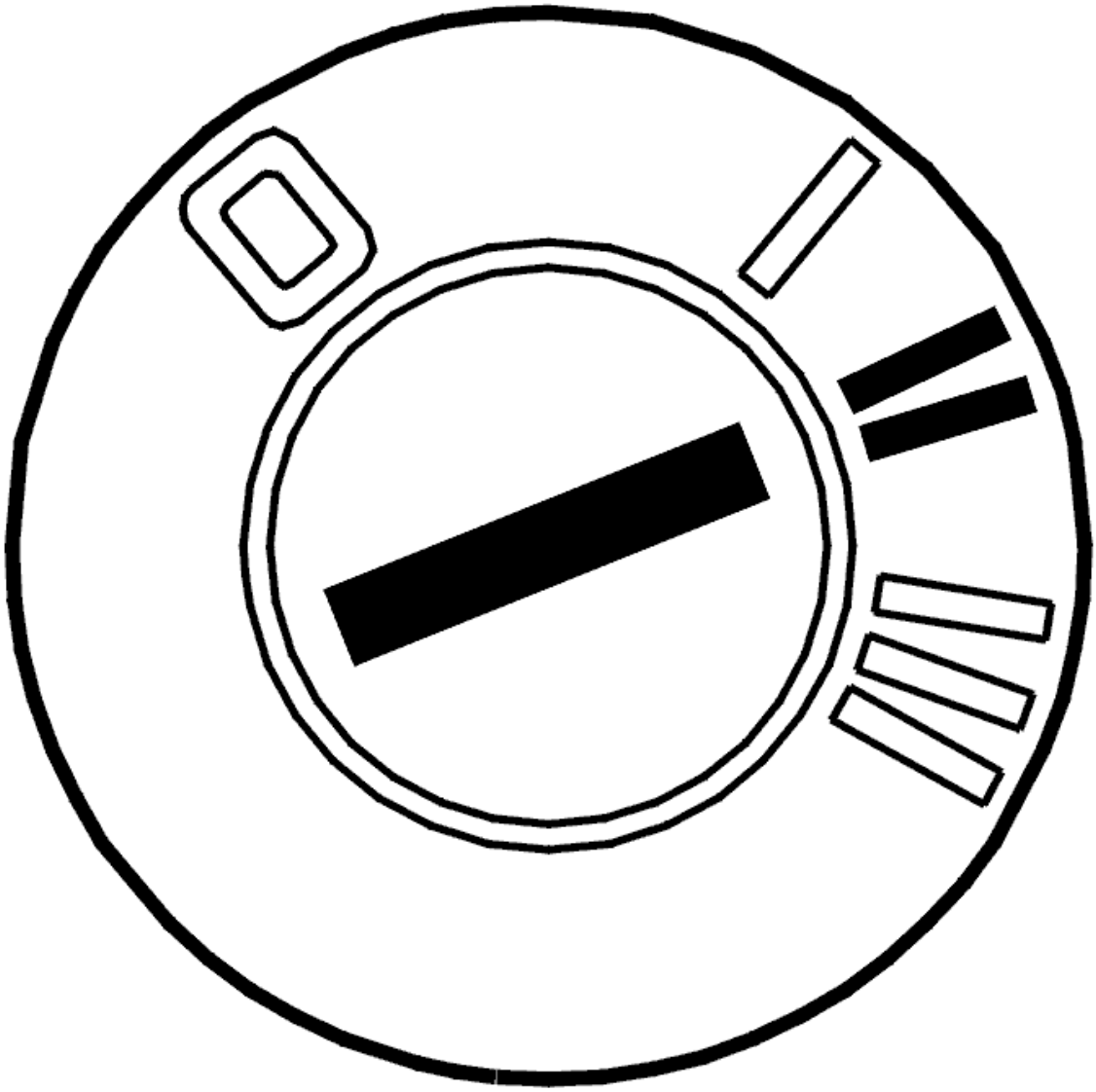


Fig. 307: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLC2 by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLC2. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

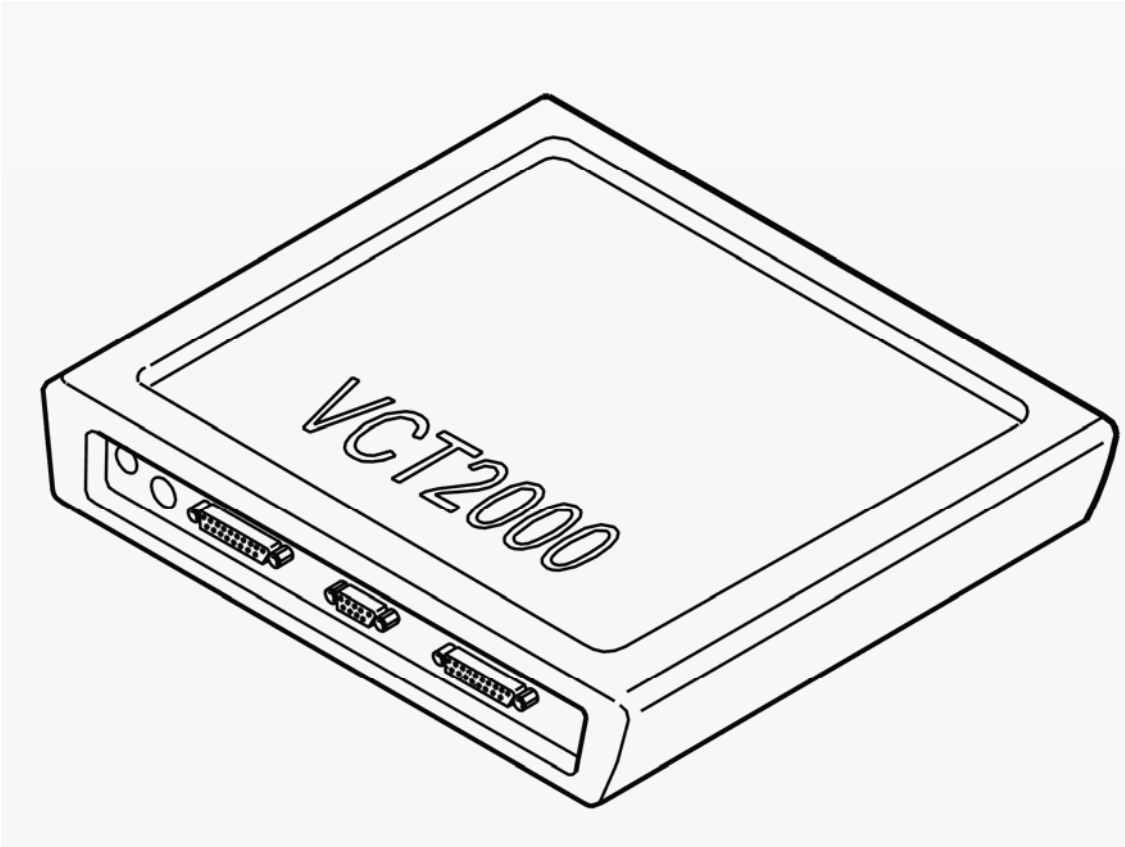


Fig. 308: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

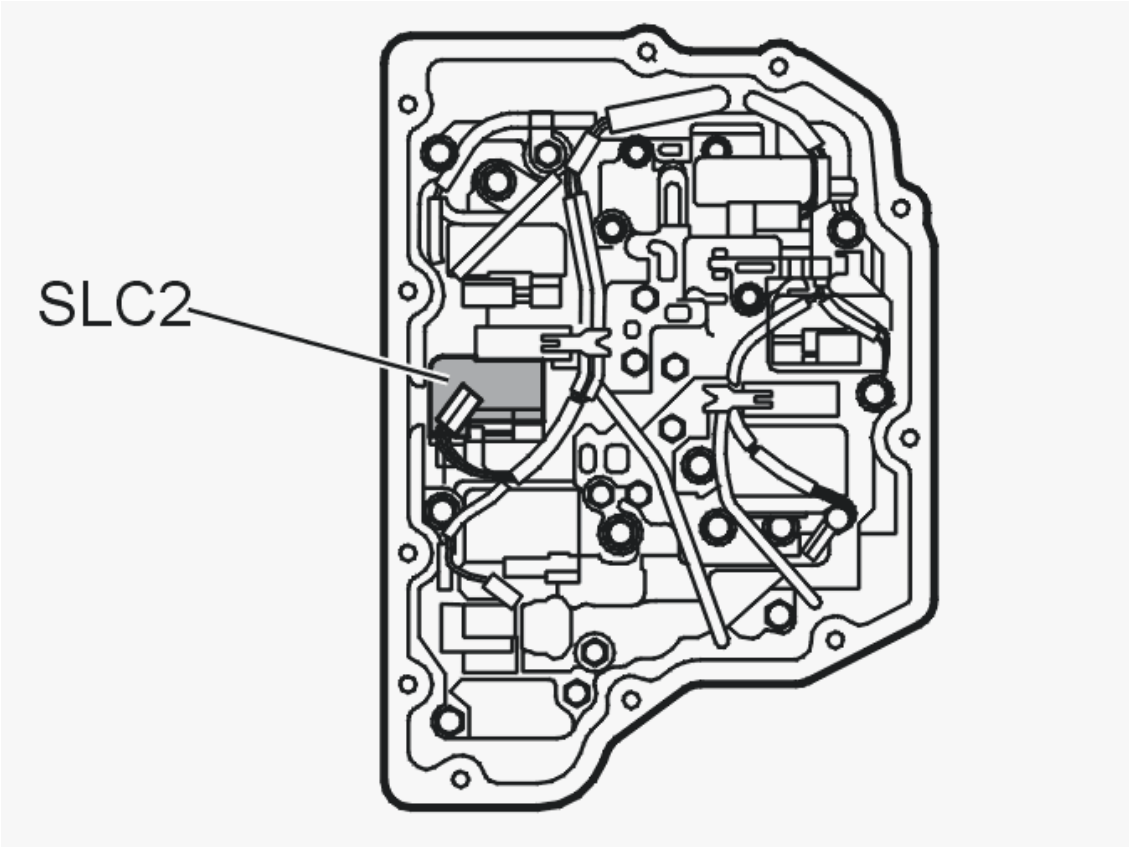


Fig. 309: Identifying Solenoid SLC2
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

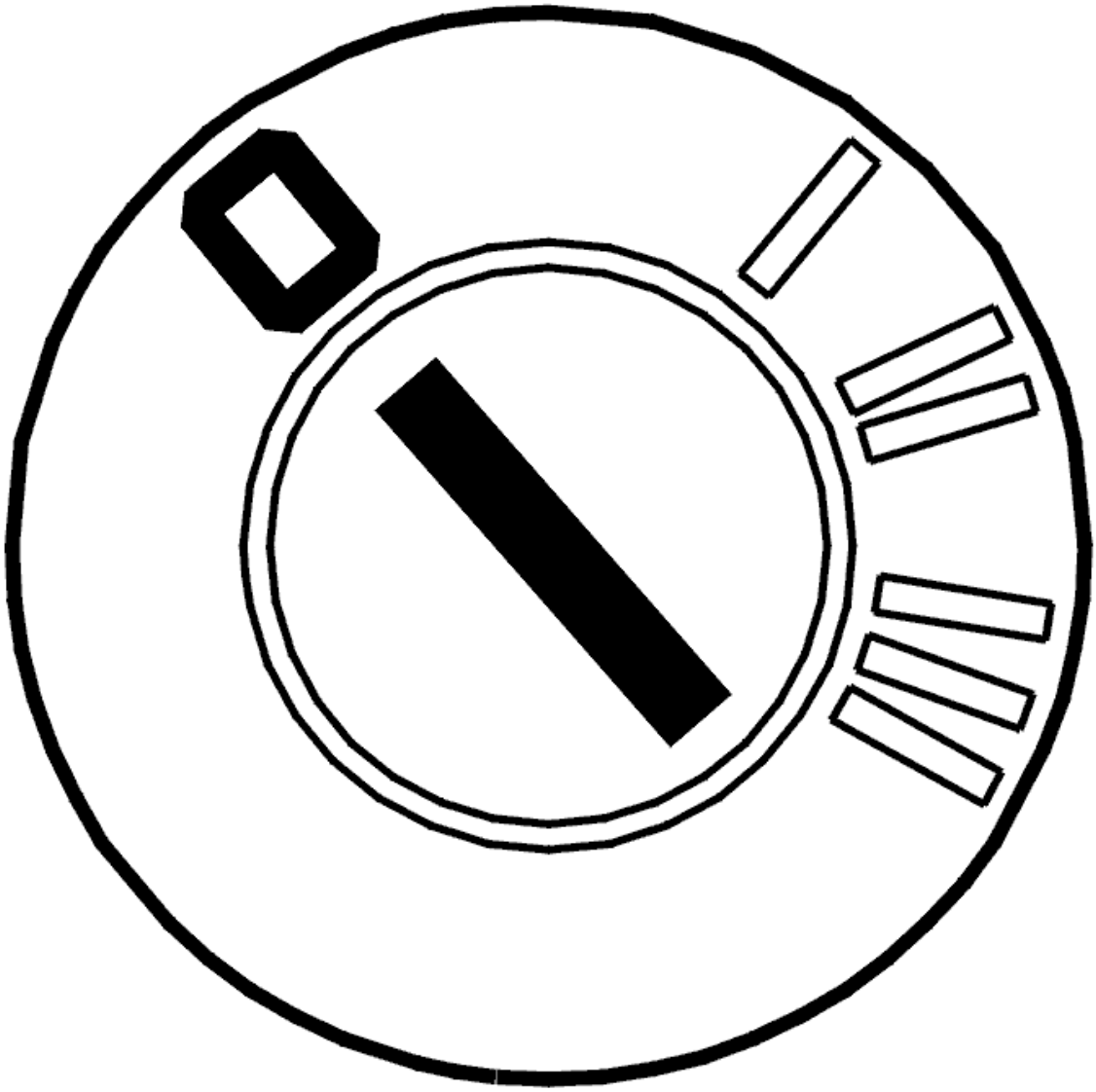


Fig. 310: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

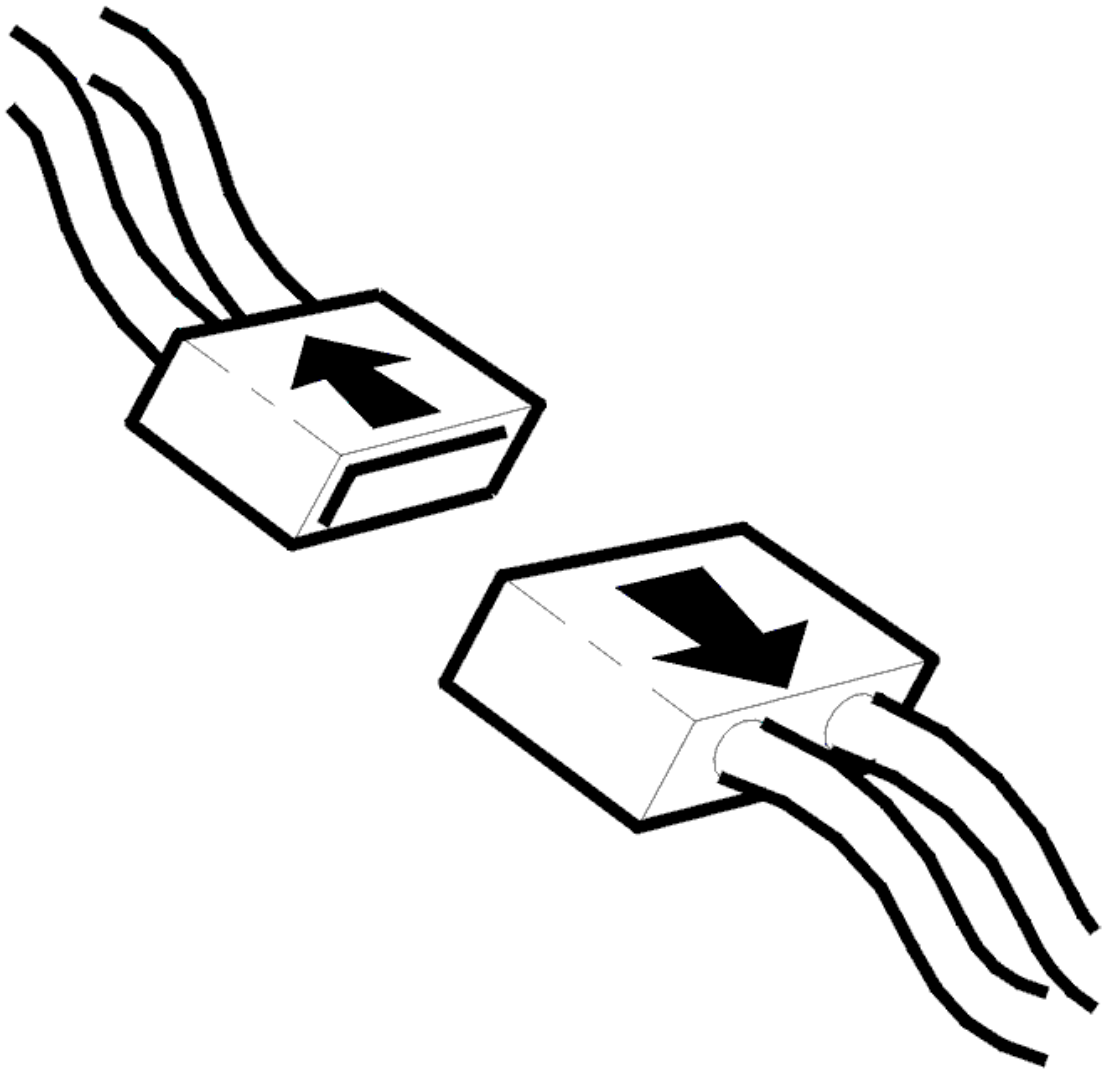


Fig. 311: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check the wiring between transmission connector terminal #B17 and solenoid SLC2 connector terminal #1. Check the wiring between transmission connector terminal #B18 and solenoid SLC2 connector terminal #2. Check for a short-circuit to supply voltage. Check the wiring for short-circuits to each other.

HINT: If no fault is found in the wiring check solenoid SLC2. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

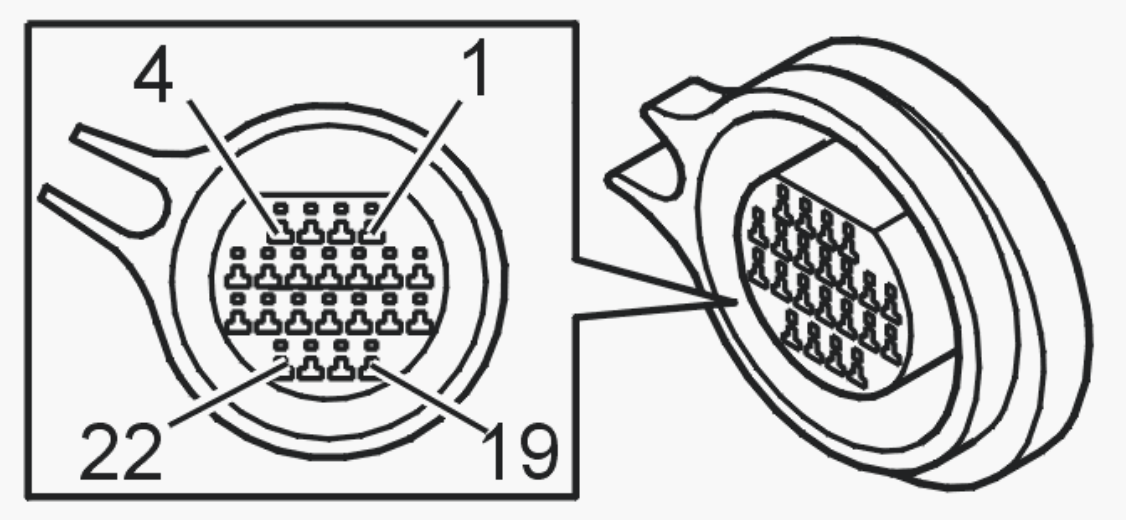


Fig. 312: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

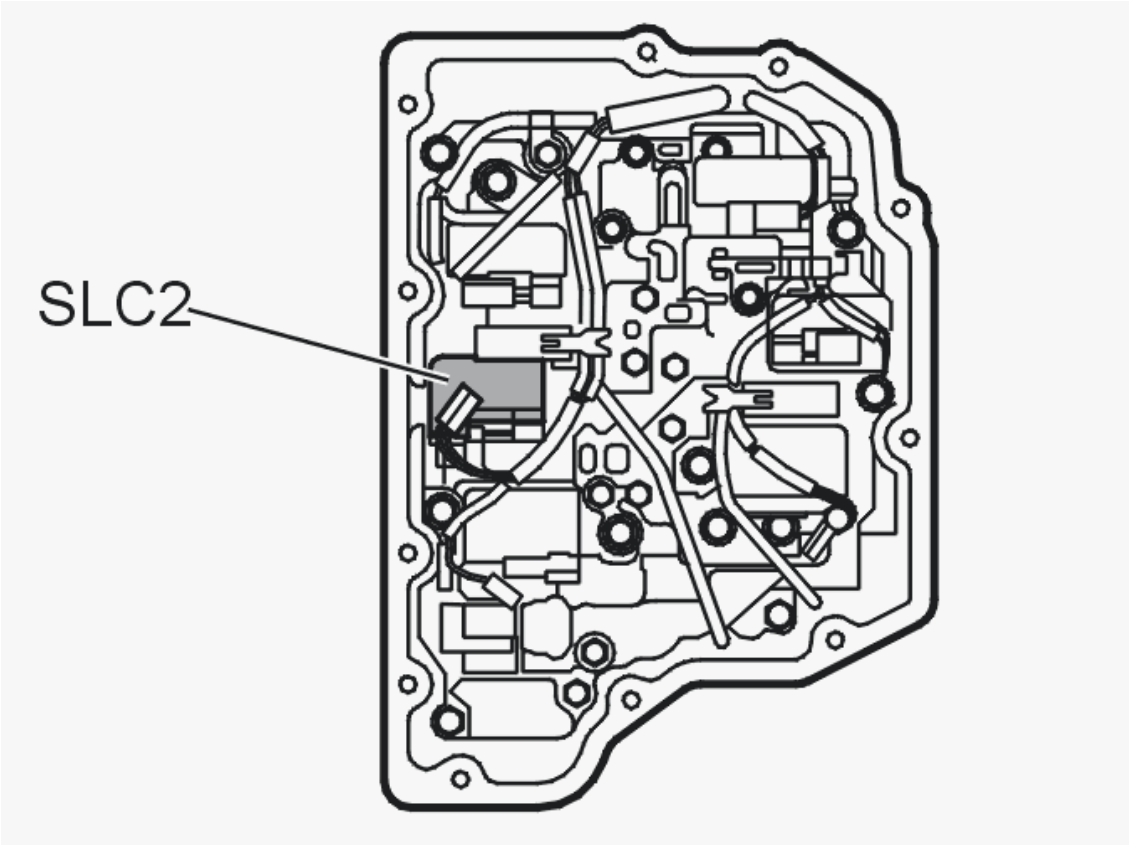


Fig. 313: Identifying Solenoid SLC2
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

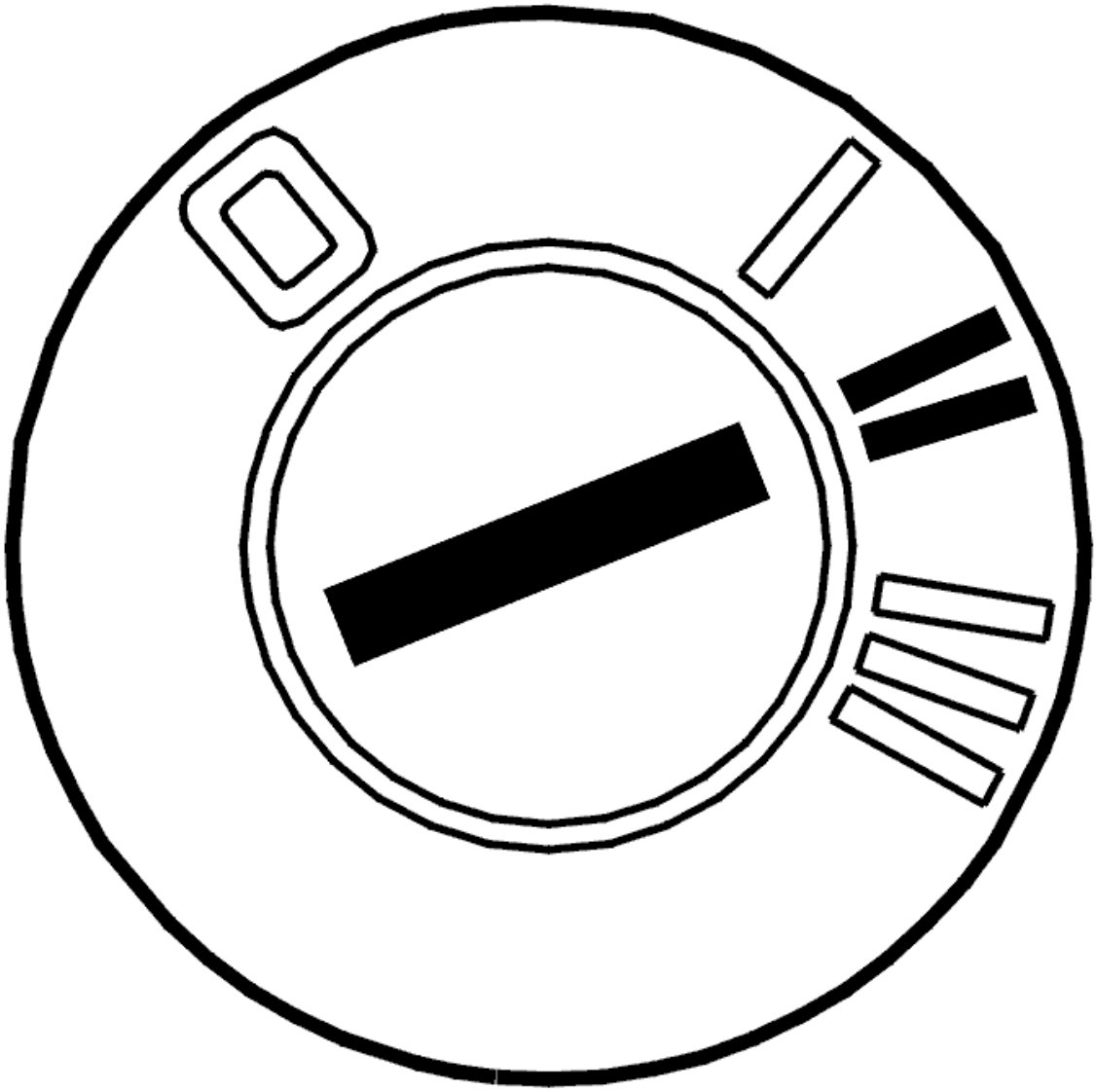


Fig. 314: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

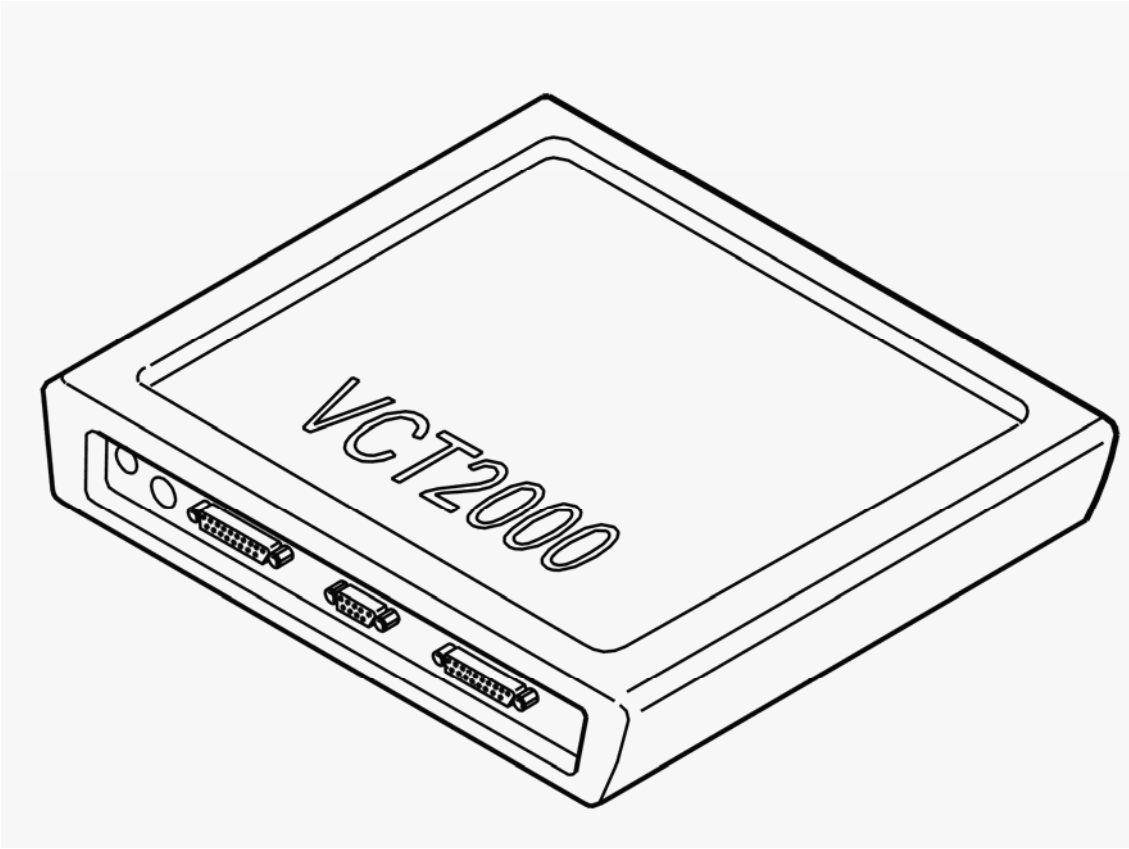


Fig. 315: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

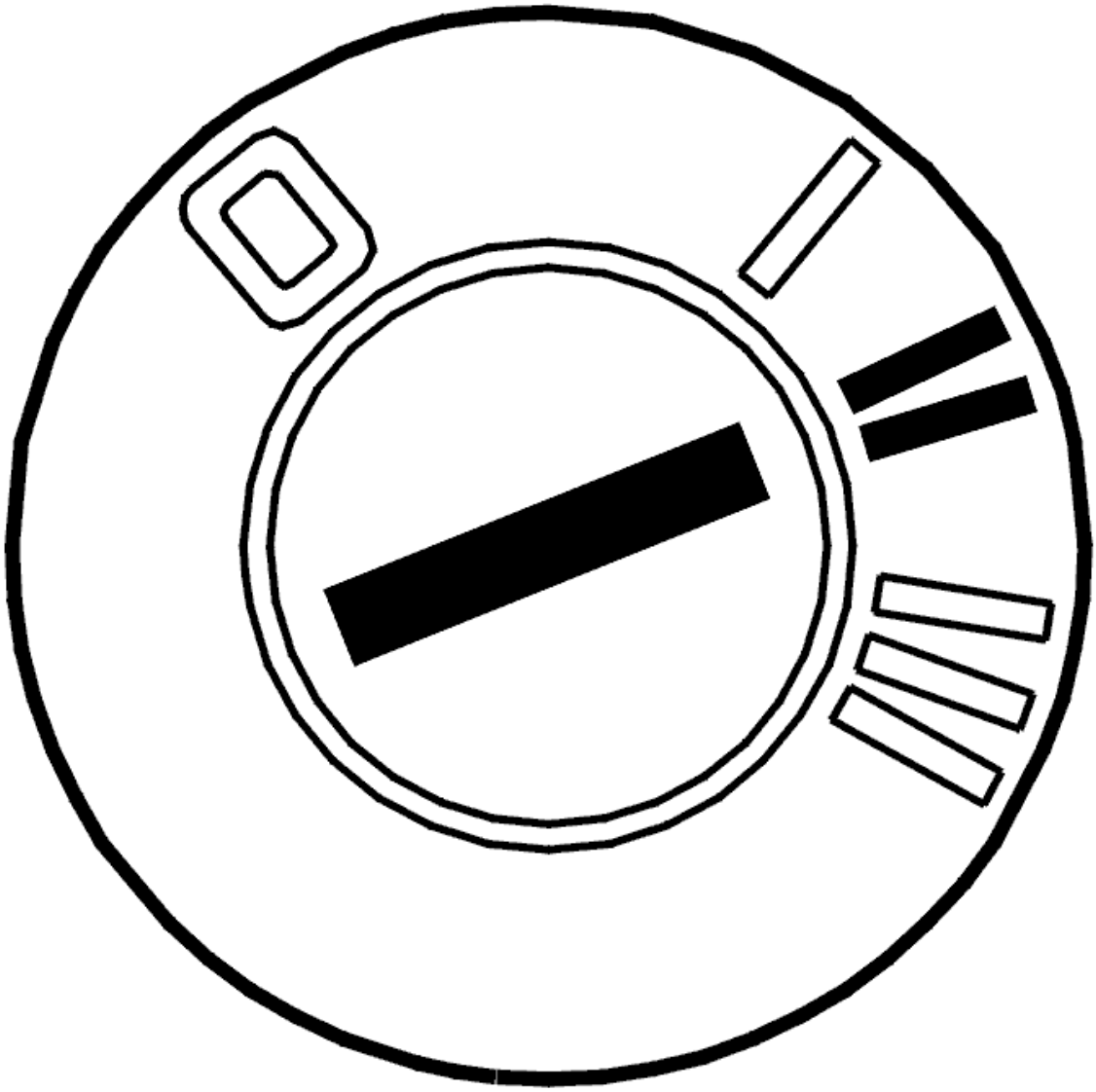


Fig. 316: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

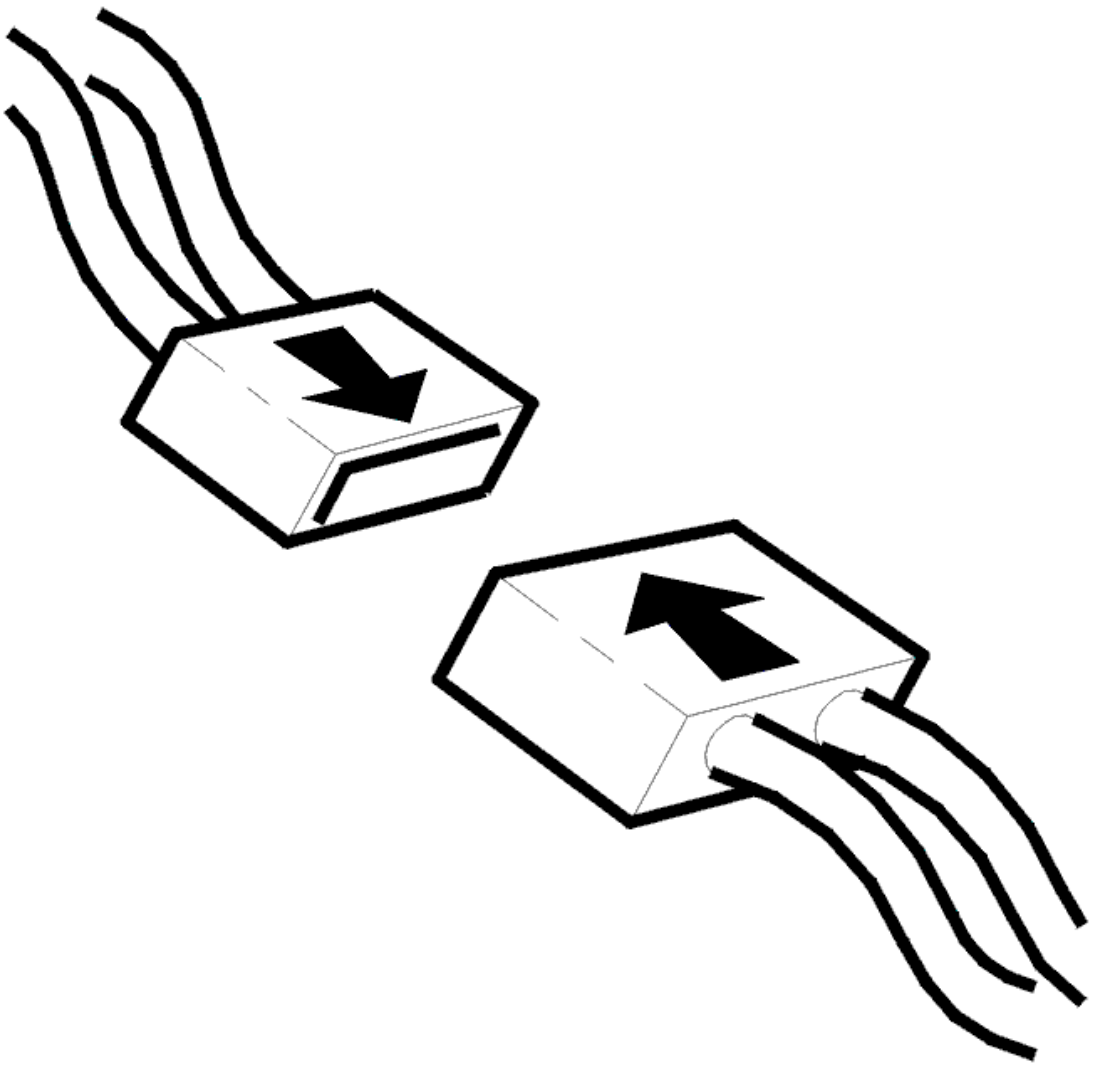


Fig. 317: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLC2 by clicking on the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLC2. The current must oscillate between approximately 0 and 1000 mA.

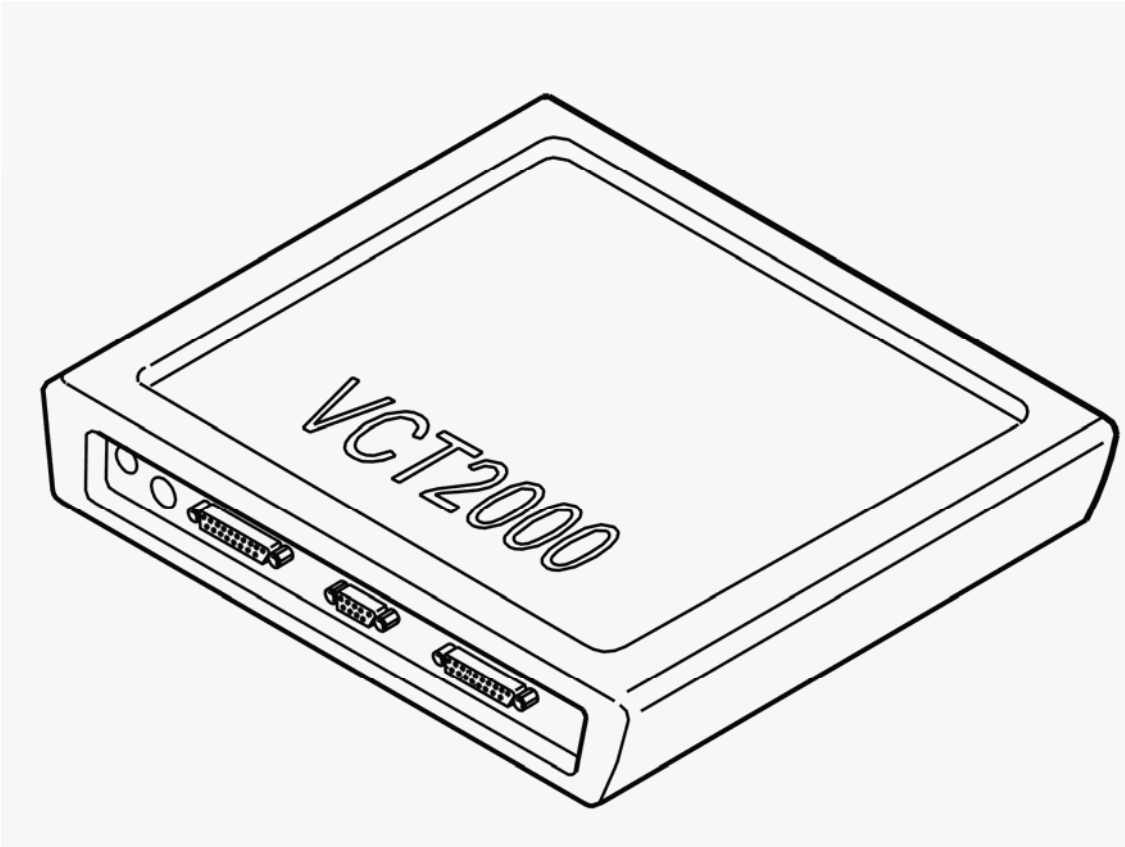


Fig. 318: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

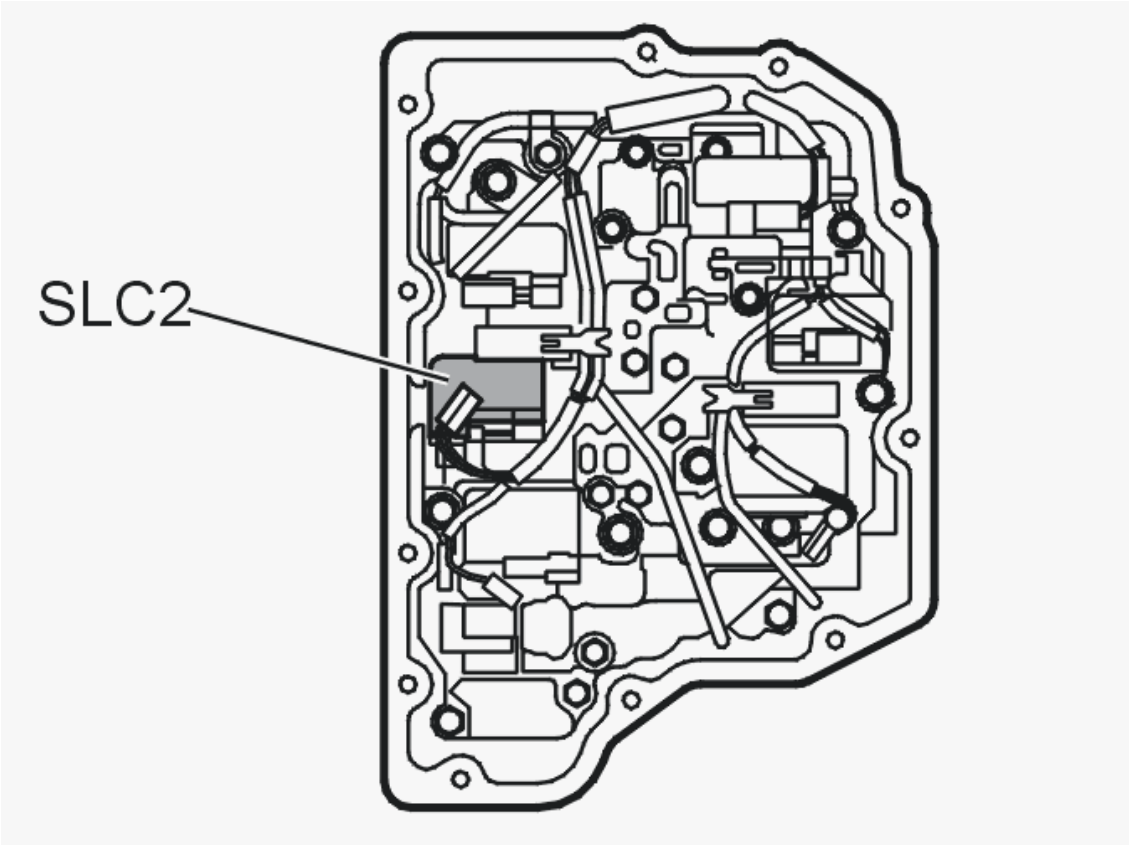


Fig. 319: Identifying Solenoid SLC2
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P097100: PRESSURE REGULATOR SOLENOID C CONTROL CIRCUIT HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT

TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P097100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P097100**

FAULT TRACING TCM-P097100

see **FAULT TRACING TCM-P097100**

TCM-P097300: SHIFT SOLENOID A CONTROL CIRCUIT LOW. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

Shift solenoids S1 and S2 work with the linear solenoids to handle shifting in the transmission. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The circuit of solenoid S1 receives too low of a signal when the solenoid is activated.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

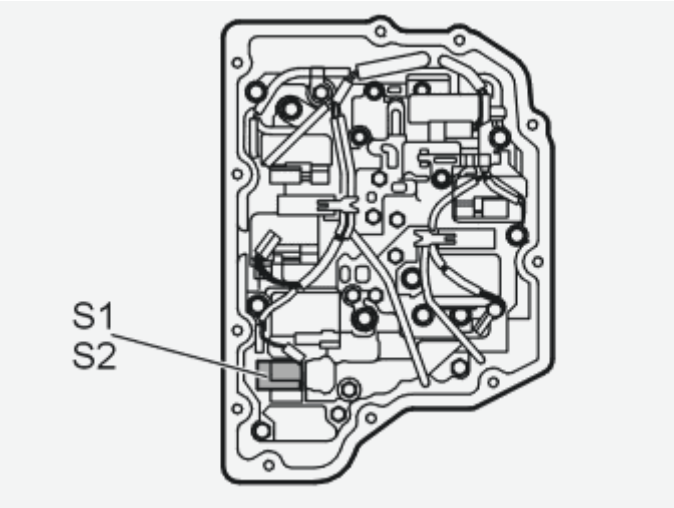


Fig. 320: Identifying S1 And S2 Solenoids
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Short-circuit to ground in the signal cable.
- Solenoid not working.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Rough gear shift
- No gear shift

FAULT-TRACING

CHECKS

CHECKING SHIFT SOLENOID S1

Fig. 321: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid S1.

  Check the status for solenoid S1. The status must switch between OFF and ON.

  The fault is permanent if the status does not change.

  If the status switches it means that the fault was present previously but is not active now. There is an intermittent fault.

Fig. 322: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

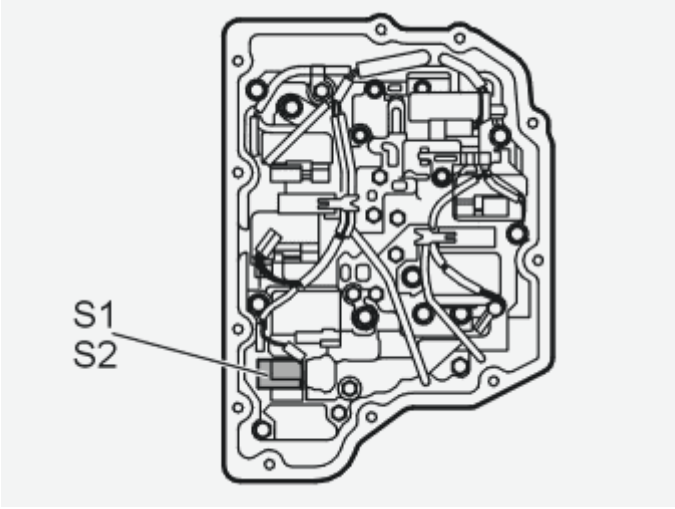


Fig. 323: Identifying S1 And S2 Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

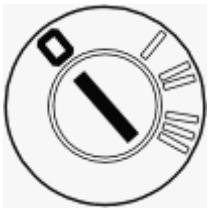


Fig. 324: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

Check the cable for short-circuit to ground.

Take readings between:

- Transmission connector #B5 and the connector for solenoid S1.

HINT: If no fault is found in the wiring check solenoid S1. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- To access connector B/replace the solenoid:**TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
- see **CHECKING WIRING AND TERMINALS**

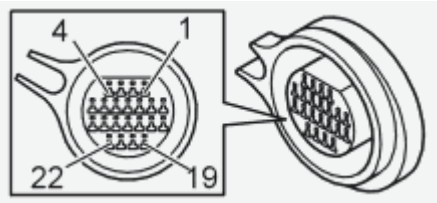


Fig. 325: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

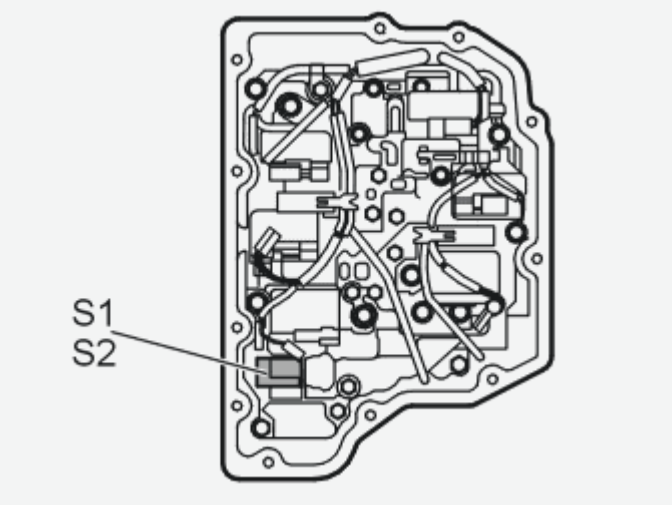


Fig. 326: Identifying S1 And S2 Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 327: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

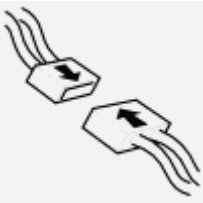


Fig. 328: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Activate solenoid S1 by clicking the symbol for VCT2000.

  Read the status of solenoid S1. The status must switch between OFF and ON.

Fig. 329: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

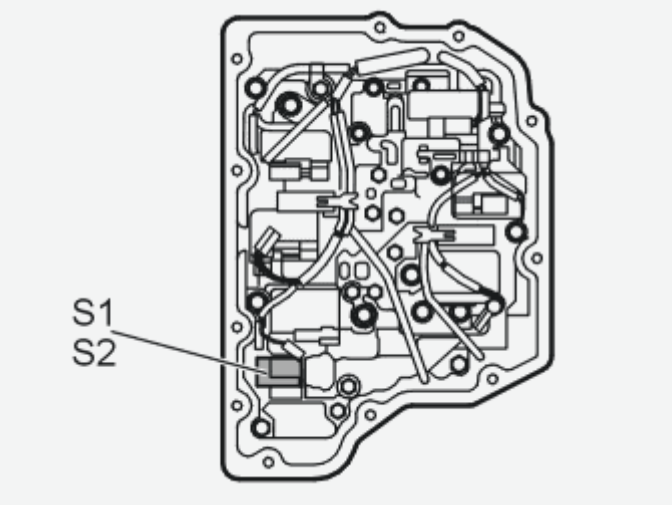


Fig. 330: Identifying S1 And S2 Solenoids
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 331: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 332: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P097300: SHIFT SOLENOID A CONTROL CIRCUIT LOW. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P097300: SHIFT SOLENOID A CONTROL CIRCUIT LOW. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

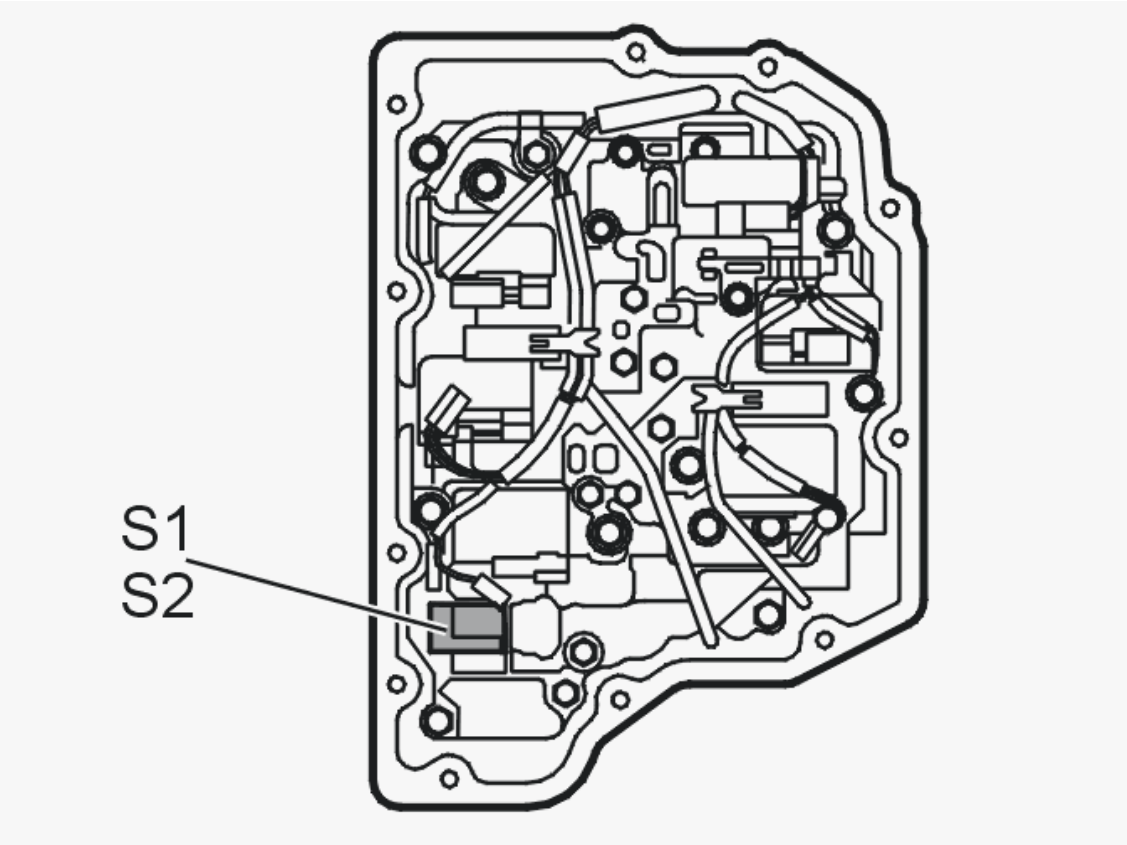


Fig. 333: Locating Shift Solenoids S1 & S2
Courtesy of VOLVO CARS CORPORATION

The shift solenoids S1, S2 manage the gear changing in the gearbox together with the linear solenoids. The solenoids are controlled using the power stage in the transmission control module (TCM). The control unit activates the power stage when the solenoids are to be activated and the circuit receives power.

If the transmission control module (TCM) registers that the circuit to solenoid S1 or S2 receives a signal that is too low while the solenoid is activated, diagnostic trouble code (DTC) TCM-P097300 or TCM-P097600will be activated. The diagnostic trouble code (DTC) that is generated depends on which circuit is defective.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- The signal cable is short-circuited to ground.
- Solenoid not working.

- Internal fault in transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Harsh gear changing
- No gear changing.

FAULT TRACING TCM-P097300

CHECKS

CHECKING SHIFT SOLENOID S1

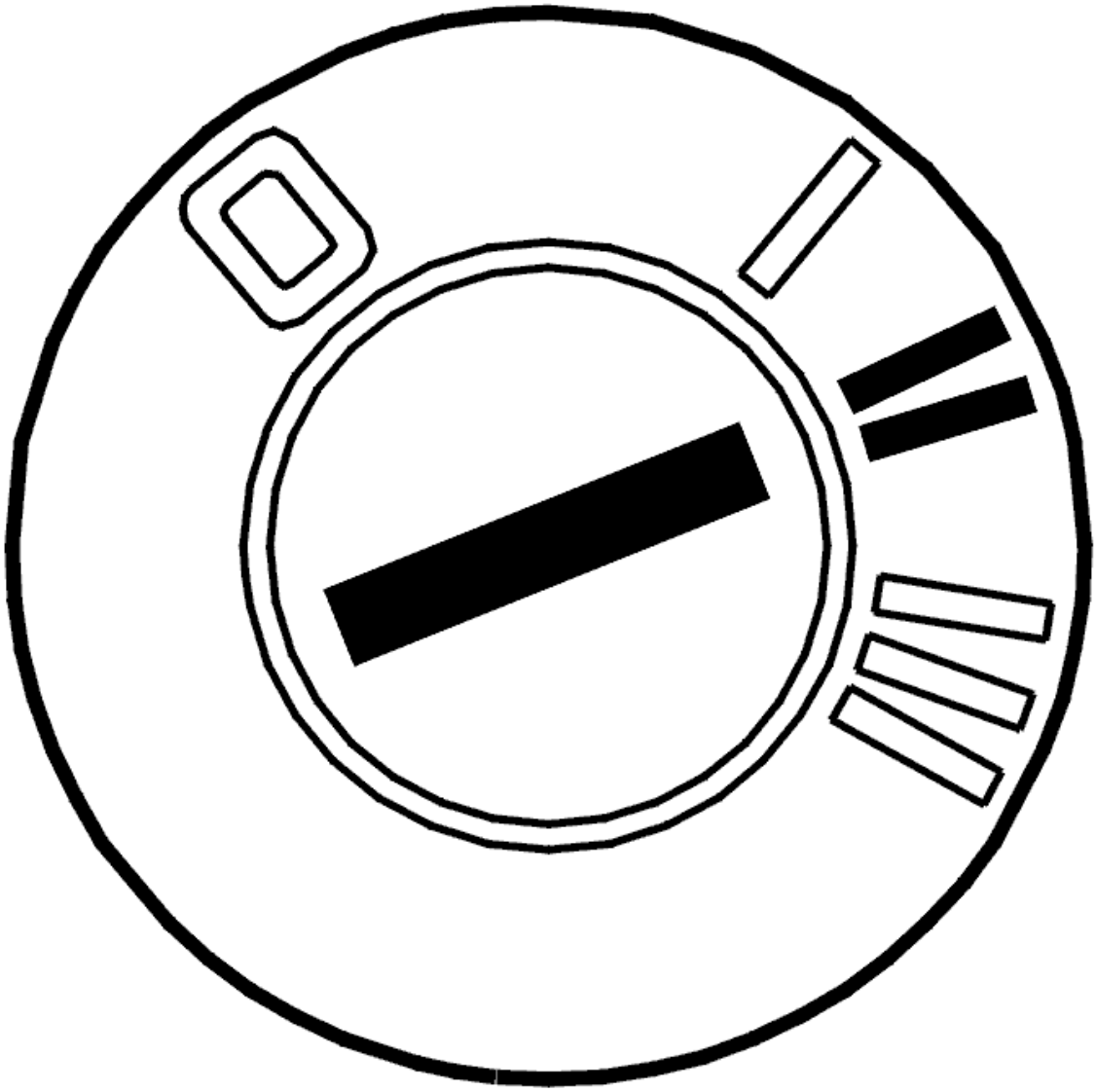


Fig. 334: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid S1.

  Check the status of solenoid S1. The status must switch between OFF and ON.

  The fault is permanent if the status does not change.

  If the status switches it means that the fault was present previously but is not active now. There is an intermittent fault.

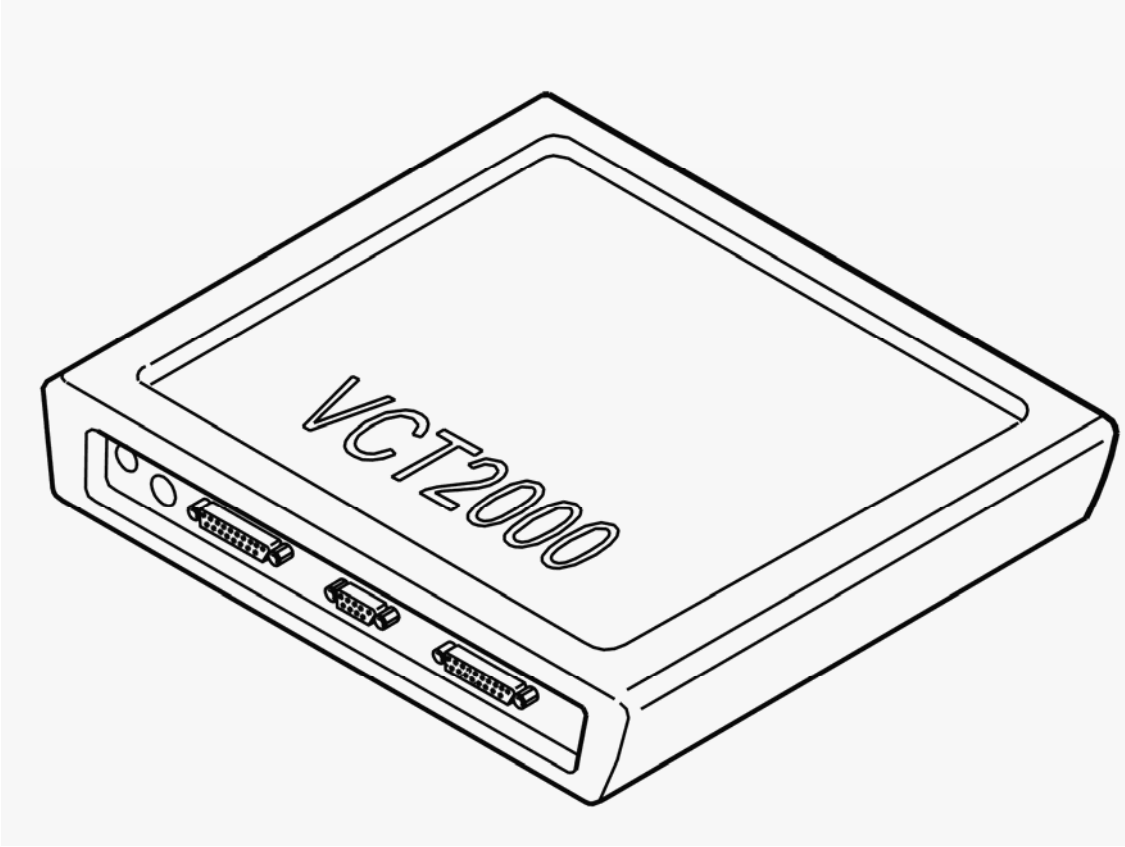


Fig. 335: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

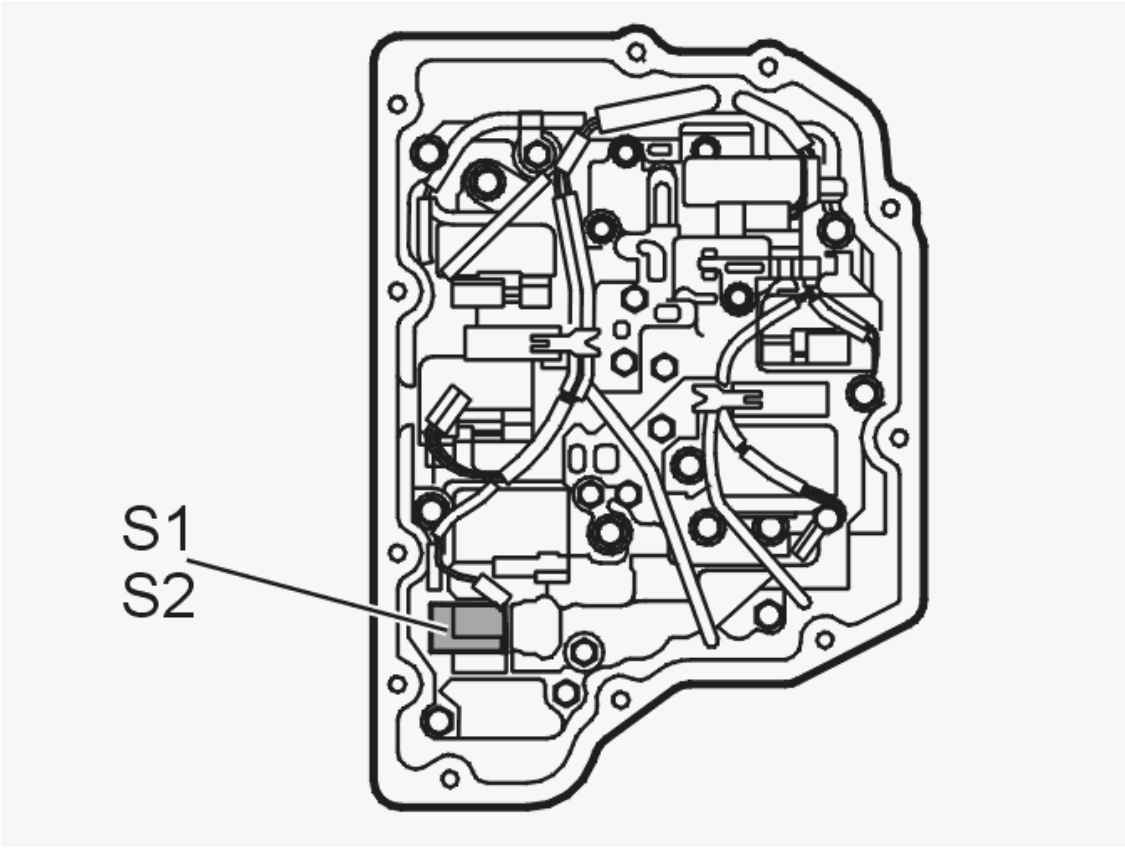


Fig. 336: Locating Shift Solenoids S1 & S2
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

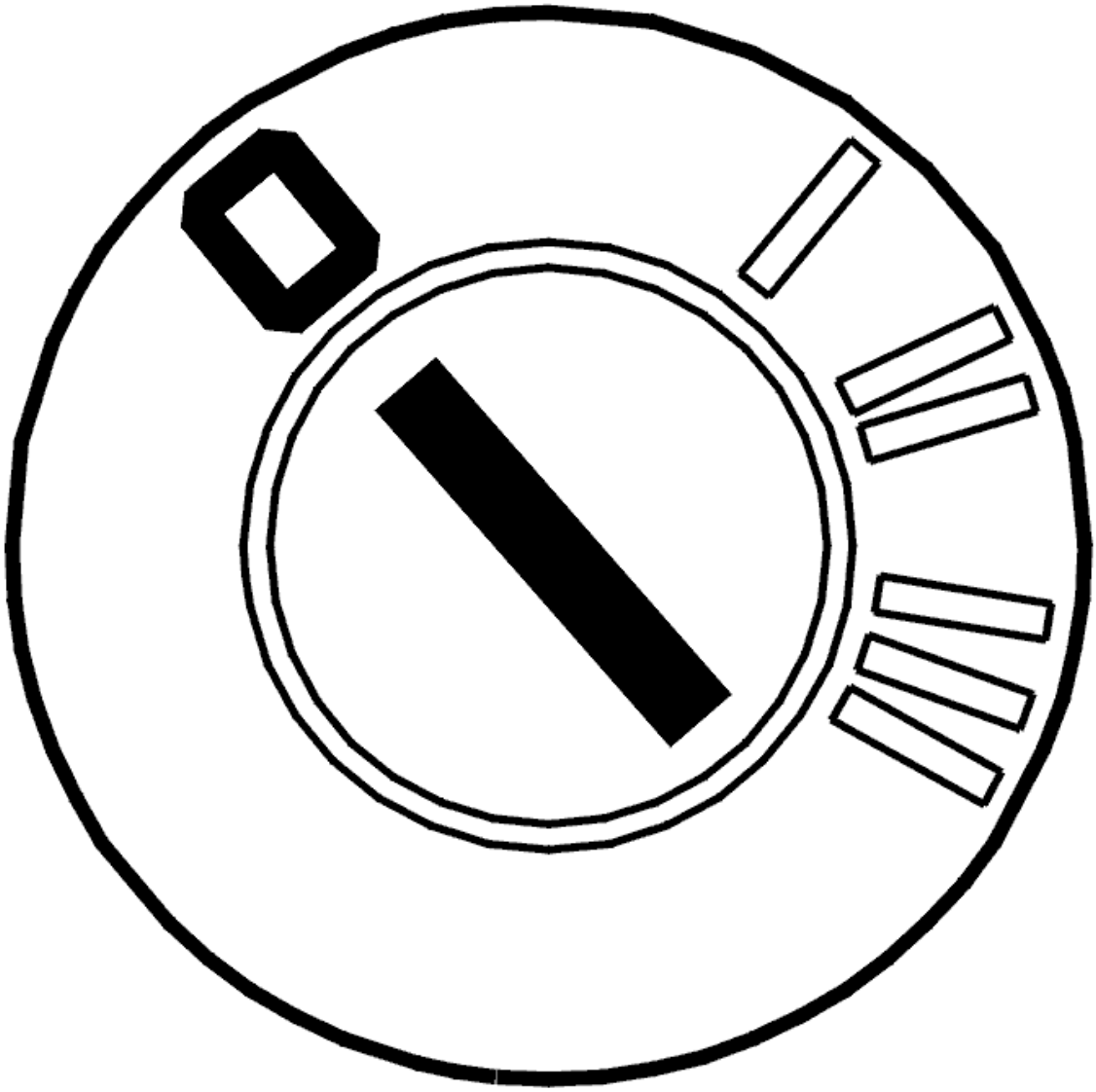


Fig. 337: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

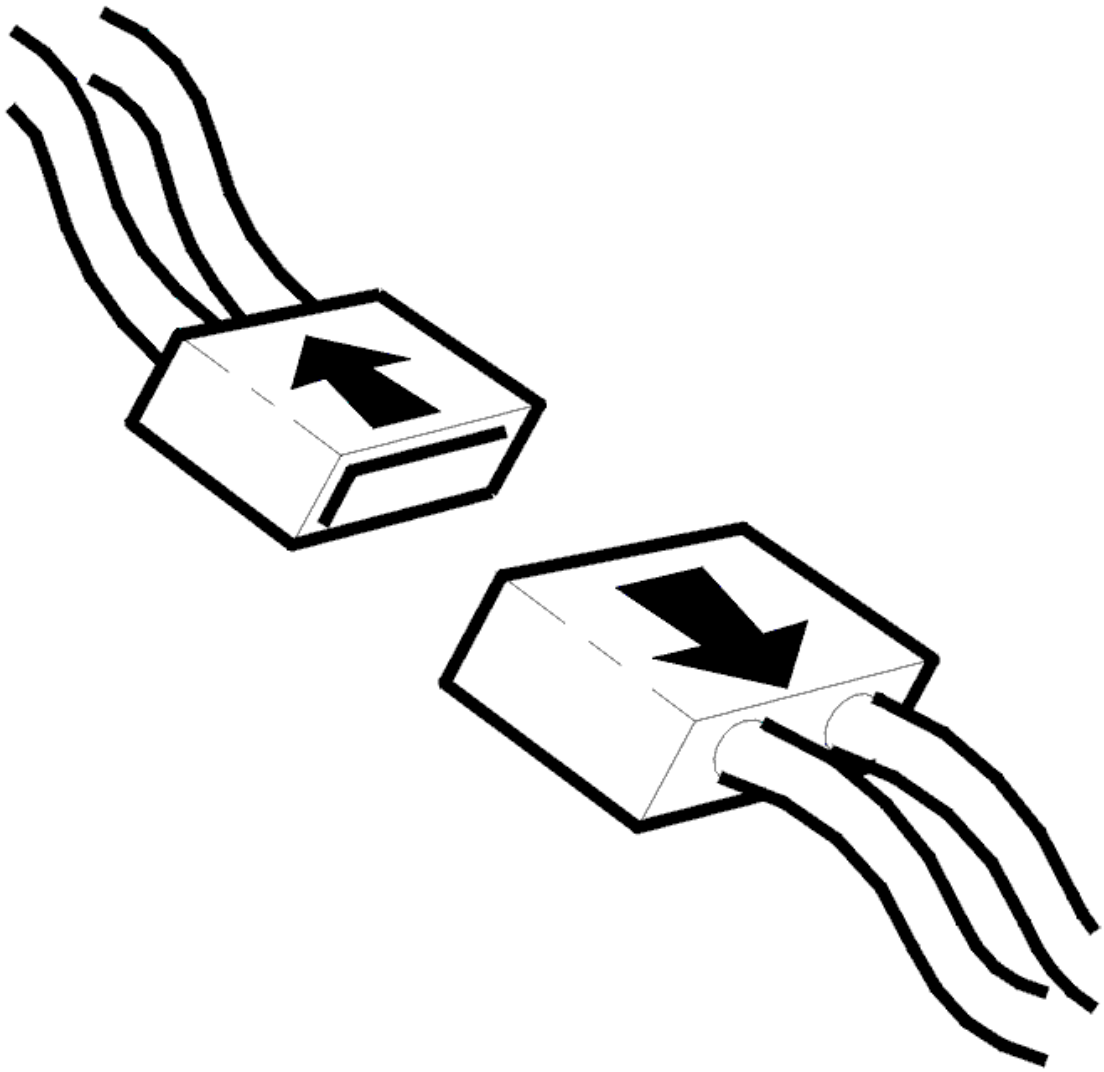


Fig. 338: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

Check the cable between transmission connector terminal #B5 and the connector for solenoid S1. Check for a short-circuit to ground.

HINT: If no fault is found in the wiring check solenoid S1. See CHECKING SHIFT SOLENOIDS

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- To access connector B/replace the solenoid: **SOLENOID CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

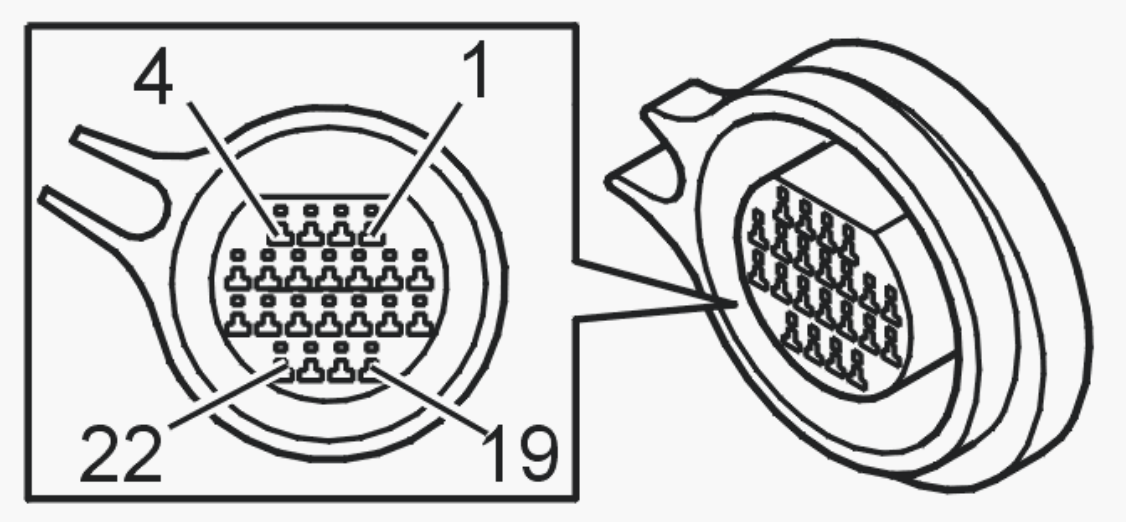


Fig. 339: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

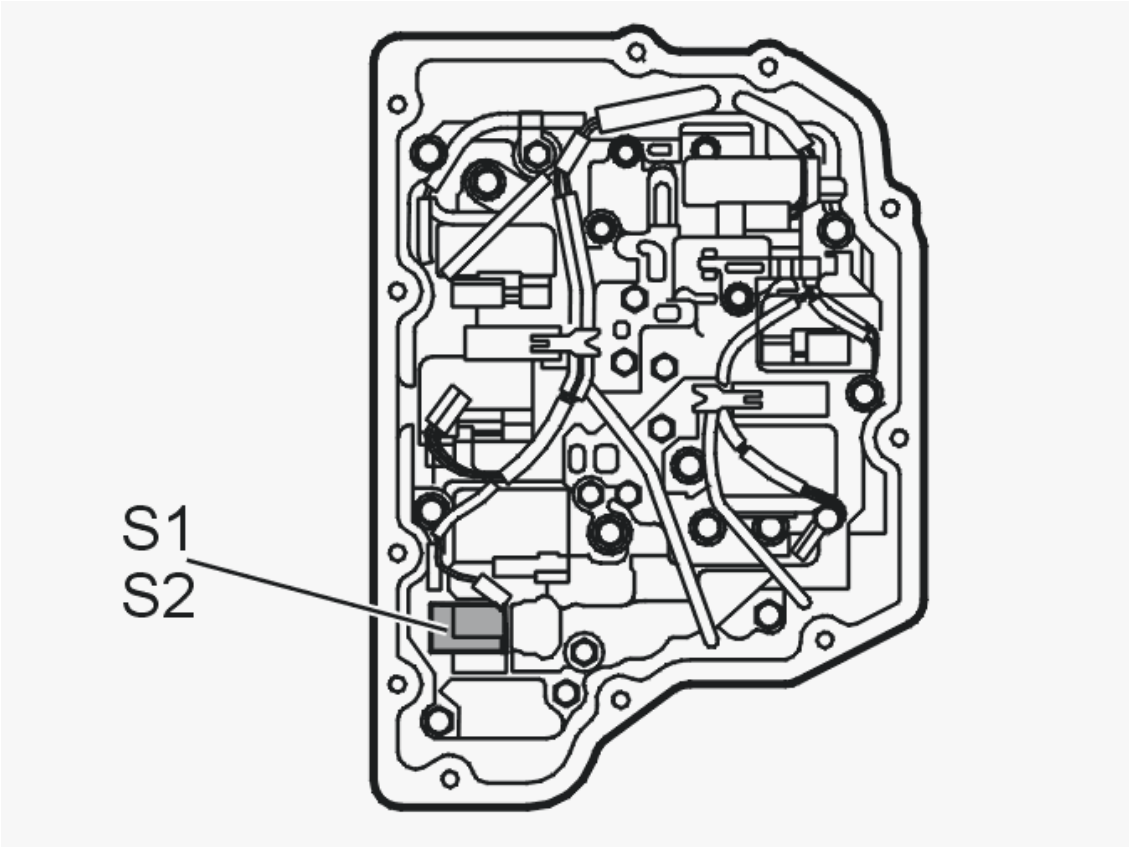


Fig. 340: Locating Shift Solenoids S1 & S2
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

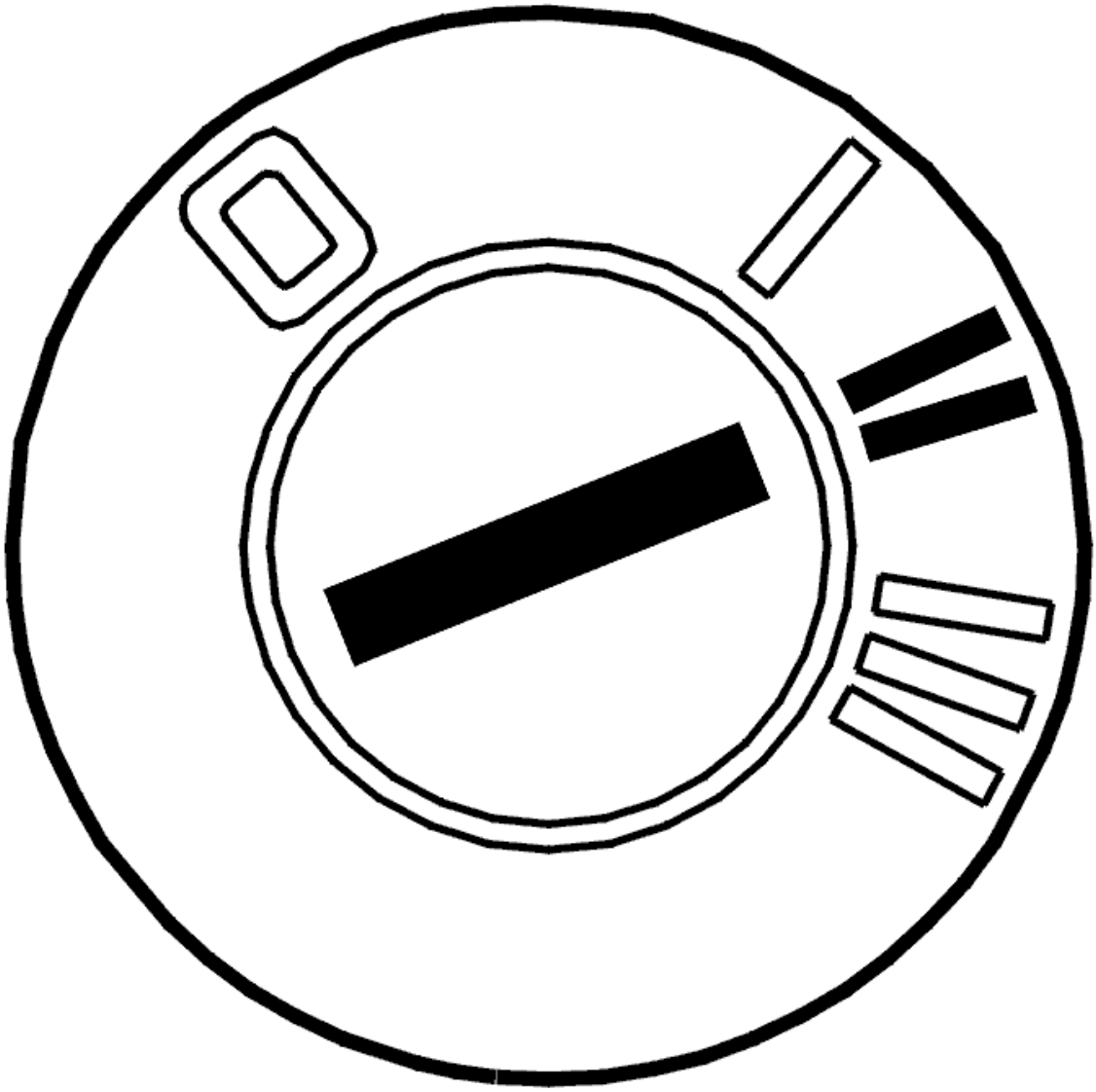


Fig. 341: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

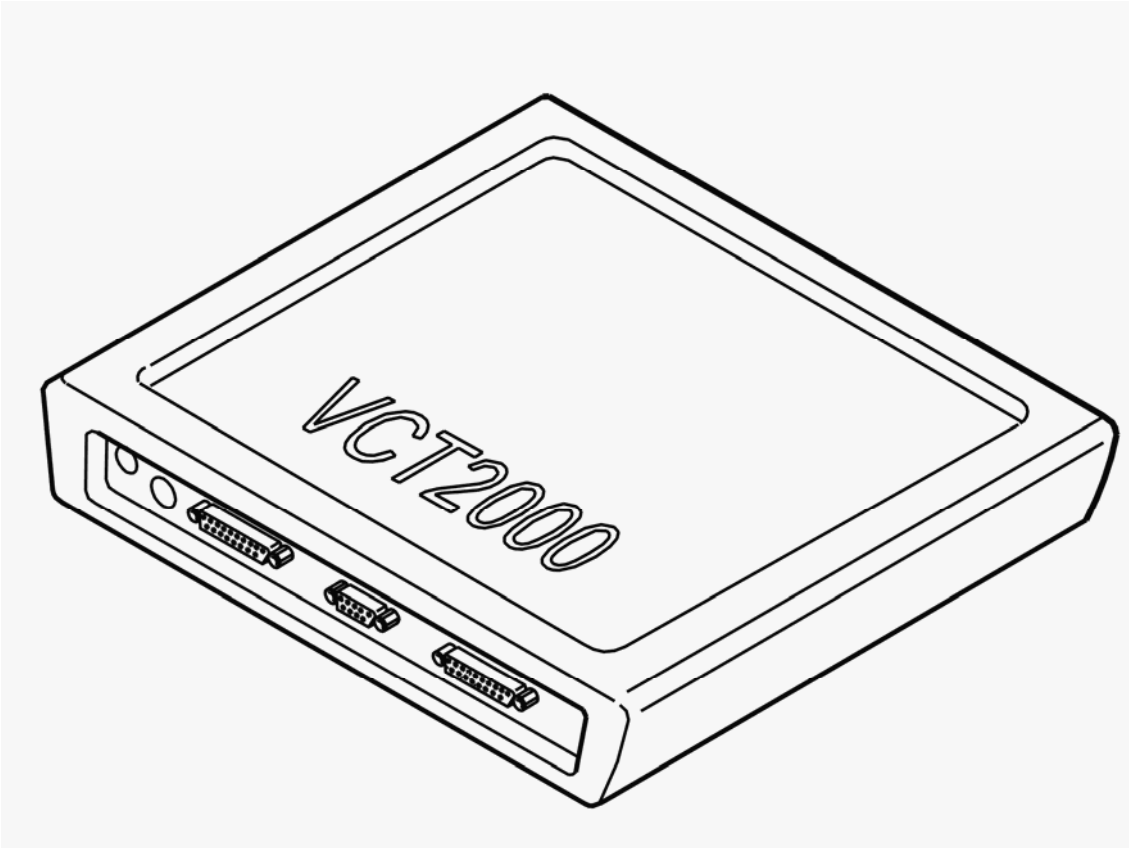


Fig. 342: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

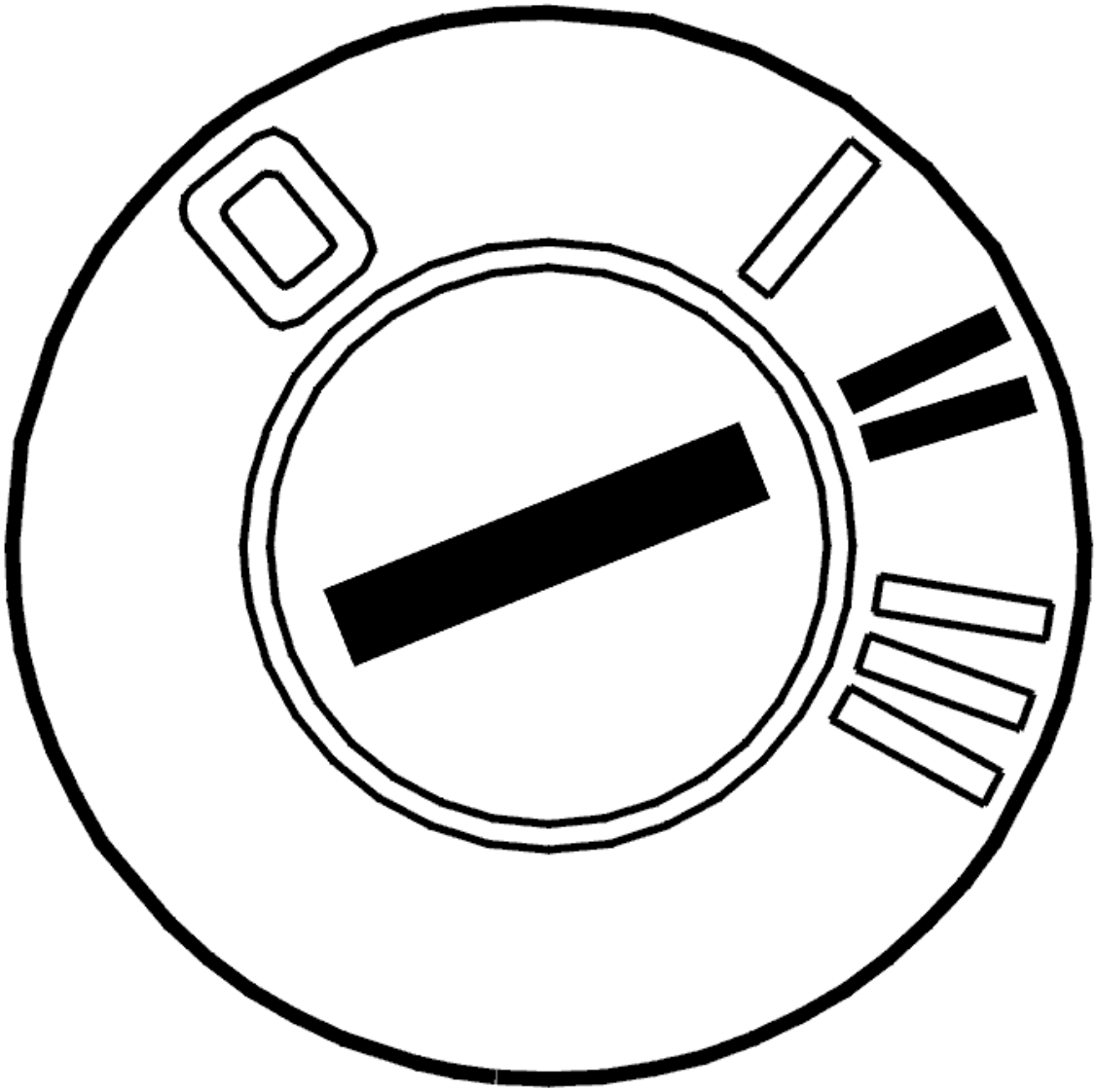


Fig. 343: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

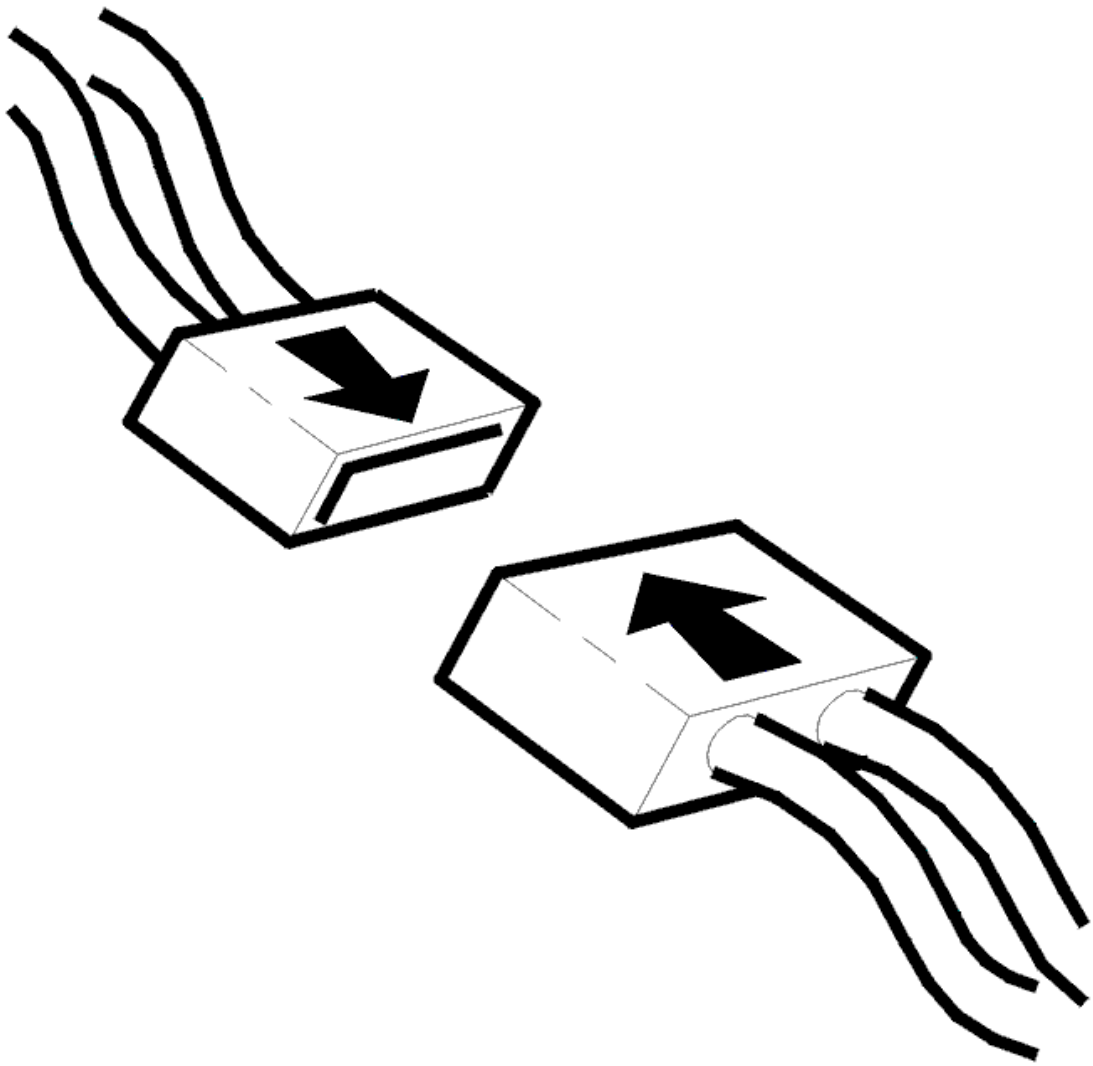


Fig. 344: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid S1 by clicking the symbol for VCT2000.

  Read the status of solenoid S1. The status must switch between OFF and ON.

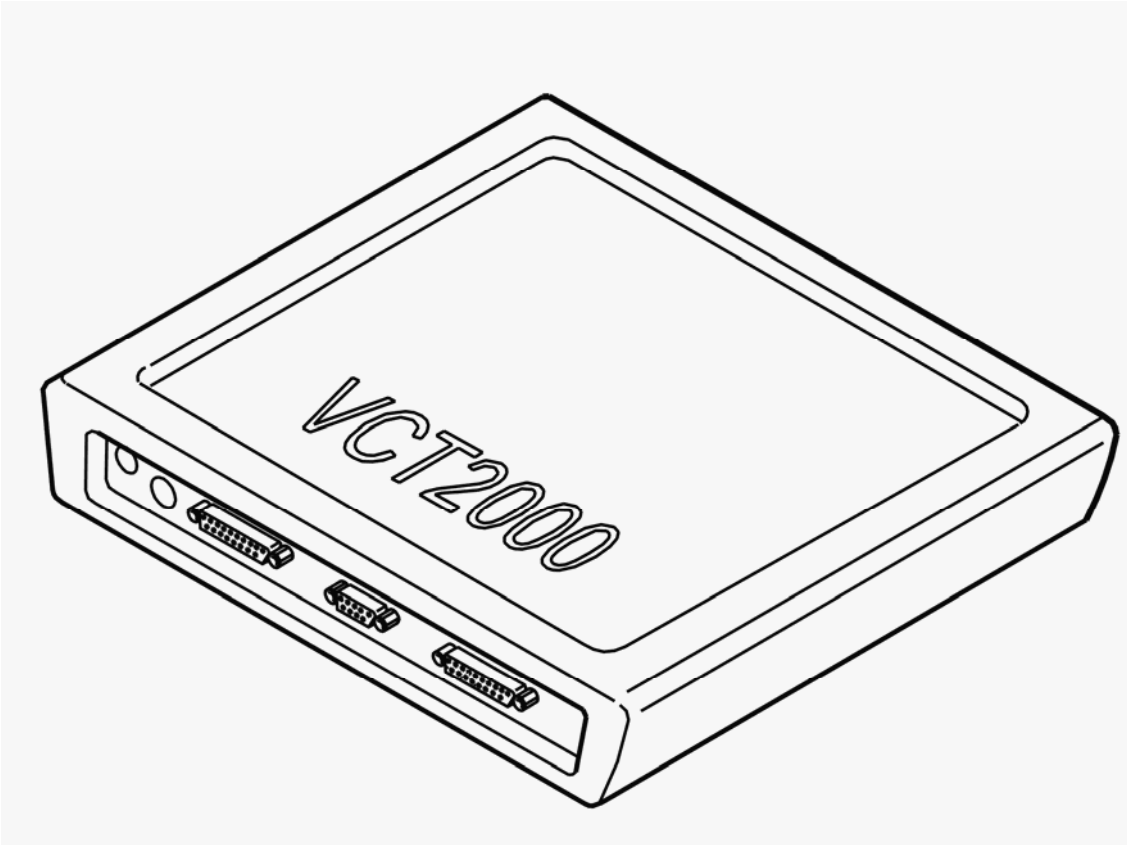


Fig. 345: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P097300: SHIFT SOLENOID A CONTROL CIRCUIT LOW. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD;

2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT TRACING TCM-P097300

see **FAULT TRACING TCM-P097300**

TCM-P097400: SHIFT SOLENOID A CONTROL CIRCUIT HIGH. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

Shift solenoids S1 and S2 work with the linear solenoids to handle shifting in the transmission. The solenoids are controlled by power stages in the transmission control module (TCM). The control module activates the power stages to activate the solenoids and sends voltage through the circuit. The control module checks the function of the circuit by sending out a control current when the solenoid is not activated.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- No signal in the circuit of solenoid S1 when the solenoid is not activated.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

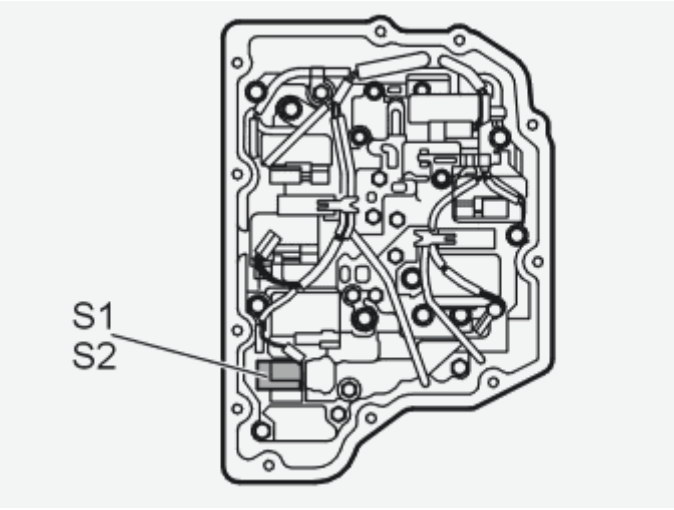


Fig. 346: Identifying S1 And S2 Solenoids
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance in the terminals.
- Open circuit on control signal lead.
- Shift solenoid not working.
- Short-circuit to supply voltage in the signal cable.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Rough gear shift
- No gear shift

FAULT-TRACING

CHECKS

CHECKING SHIFT SOLENOID S1

Fig. 347: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid S1.

  Check the status for solenoid S1. The status must switch between OFF and ON.

  The fault is permanent if the status does not change.

  If the status switches it means that the fault was present previously but is not active now. There is an intermittent fault.

Fig. 348: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

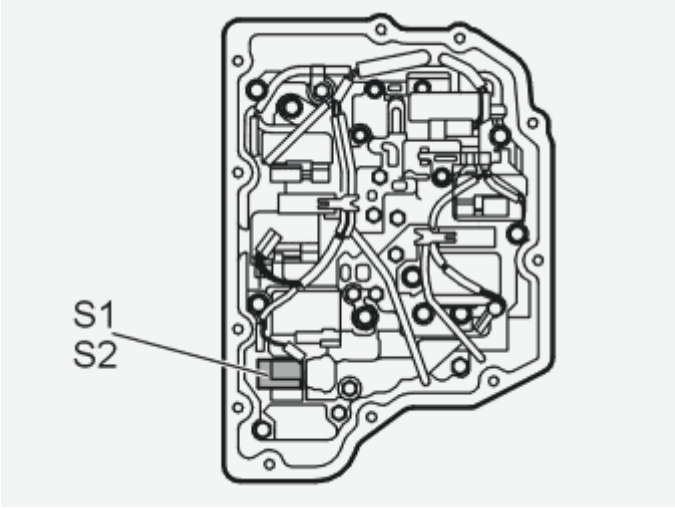


Fig. 349: Identifying S1 And S2 Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

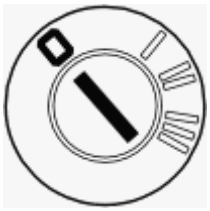


Fig. 350: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

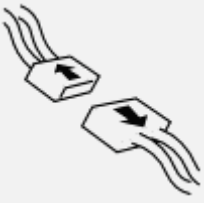


Fig. 351: Identifying Connectors
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check the cable. Check for an open-circuit. Check for a short-circuit to supply voltage.

Take readings between:

- Transmission connector #B5 and the connector for solenoid S1.

HINT: If no fault is found in the wiring check solenoid S1. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- To access connector B/replace the solenoid:**TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
- see **CHECKING WIRING AND TERMINALS**

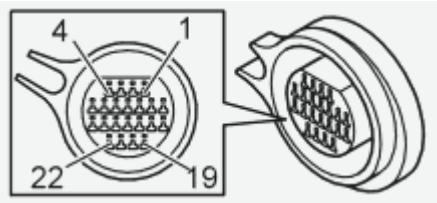


Fig. 352: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

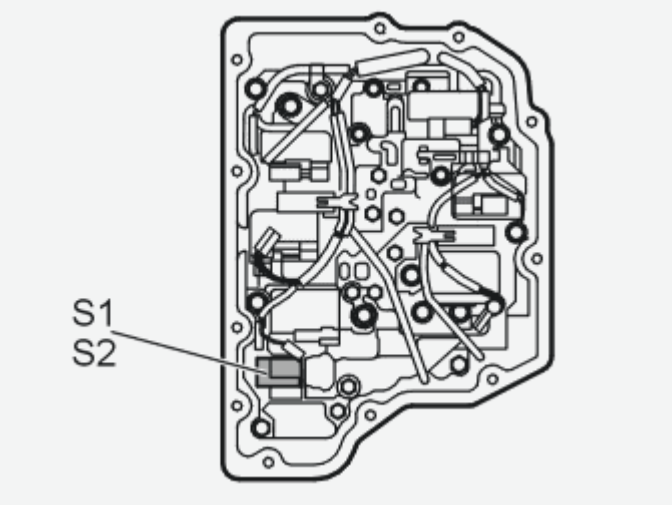


Fig. 353: Identifying S1 And S2 Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 354: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

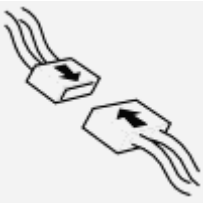


Fig. 355: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Activate solenoid S1 by clicking the symbol for VCT2000.

  Read the status of solenoid S1. The status must switch between OFF and ON.

Fig. 356: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

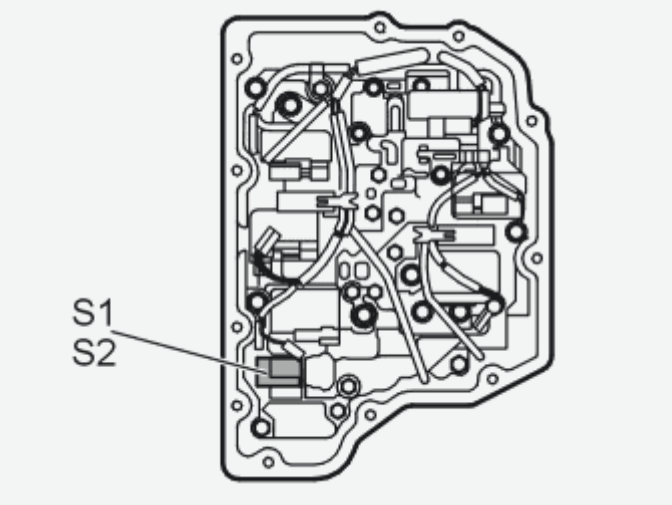


Fig. 357: Identifying S1 And S2 Solenoids
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 358: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 359: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P097400: SHIFT SOLENOID A CONTROL CIRCUIT HIGH. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P097400: SHIFT SOLENOID A CONTROL CIRCUIT HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

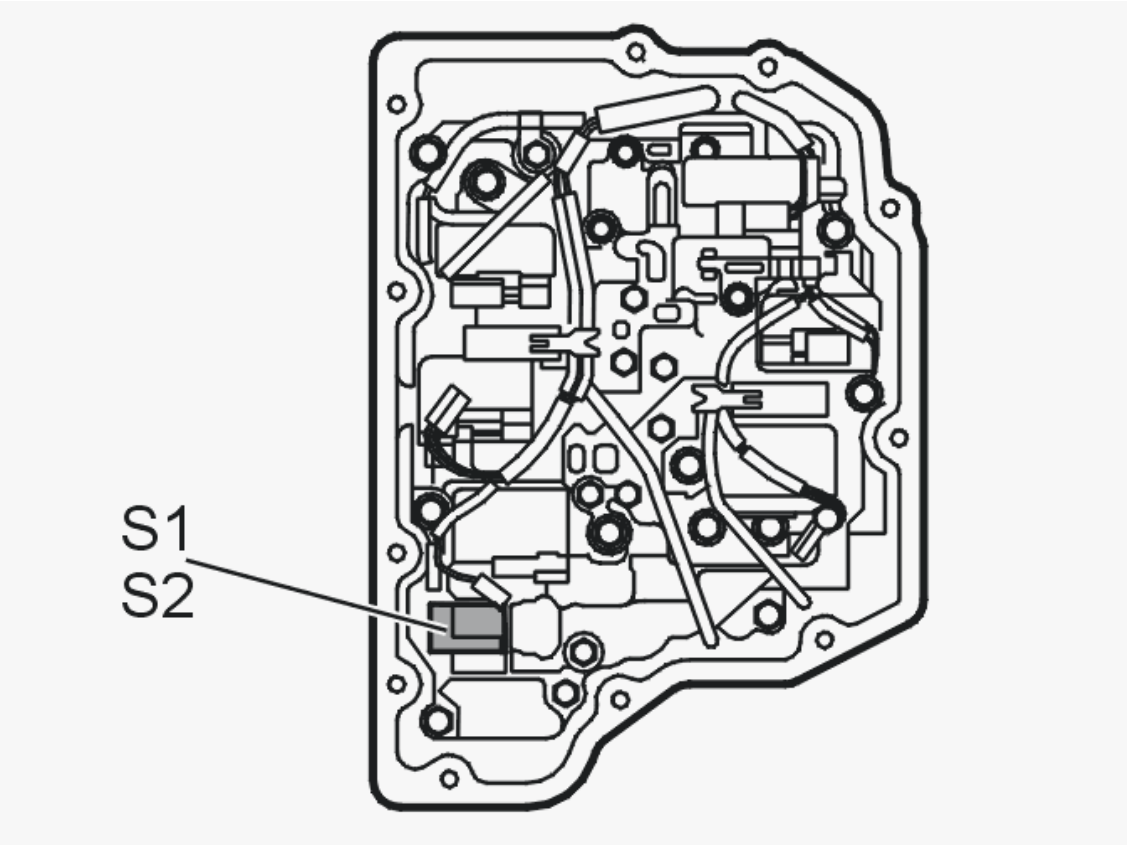


Fig. 360: Locating Shift Solenoids S1 & S2
Courtesy of VOLVO CARS CORPORATION

The shift solenoids S1, S2 manage the gear changing in the gearbox together with the linear solenoids. The solenoids are controlled using the power stage in the transmission control module (TCM). The control unit activates the power stage when the solenoids are to be activated and the circuit receives power. The control module checks the function of the circuit by sending a check current while the solenoid is not activated.

If the transmission control module (TCM) registers that the signal is missing in the circuit to solenoids S1, S2, while the solenoid is not activated, diagnostic trouble code (DTC) TCM-P097400 or TCM-P097700 will be generated. The diagnostic trouble code (DTC) that is generated depends on which circuit is defective.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals

- Open circuit on control signal lead.
- Shift solenoid not working.
- The signal cable is short-circuited to voltage.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Harsh gear changing
- No gear changing.

FAULT TRACING TCM-P097400

CHECKS

CHECKING SHIFT SOLENOID S1

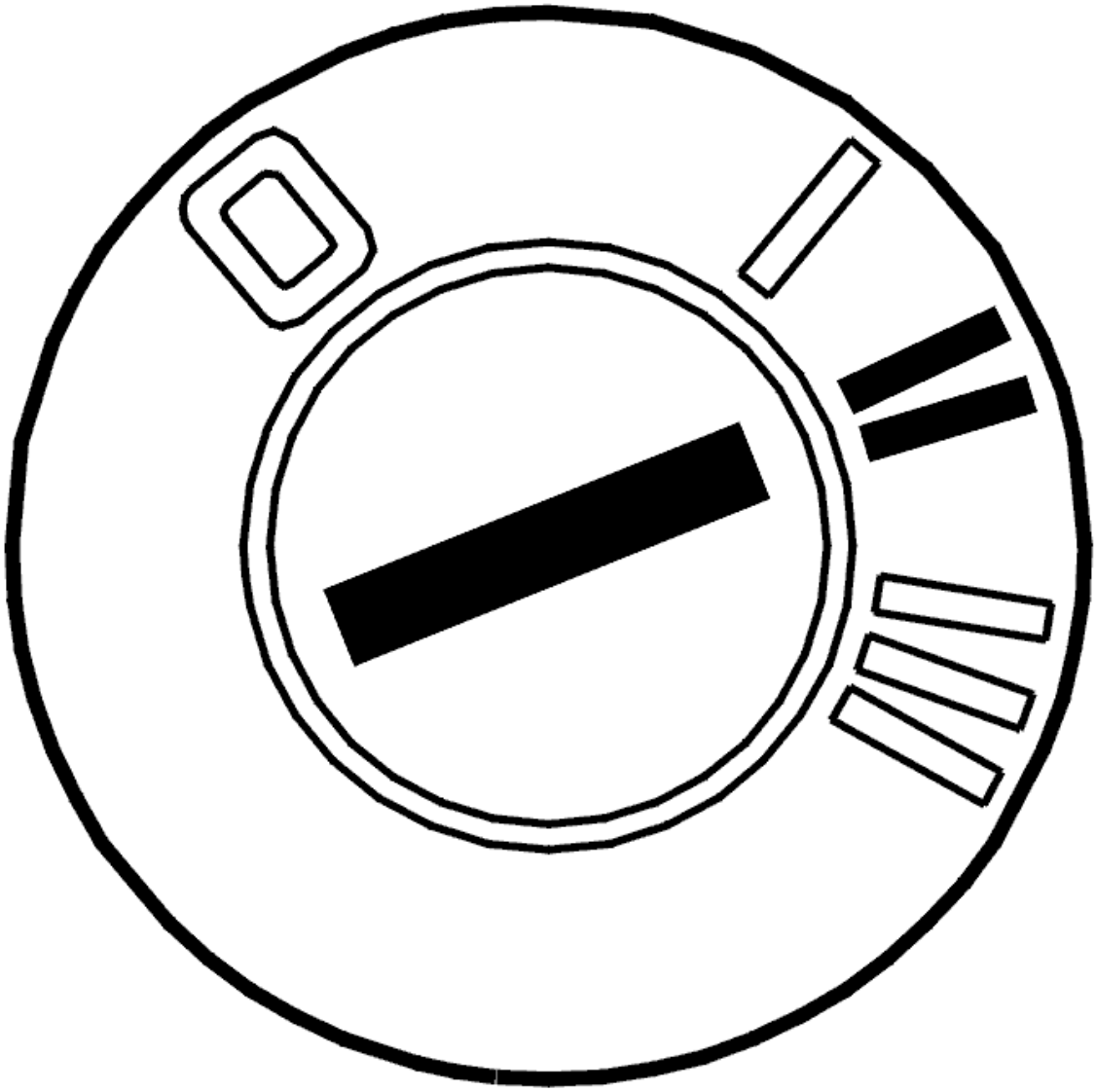


Fig. 361: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid S1.

  Check the status of solenoid S1. The status must switch between OFF and ON.

  The fault is permanent if the status does not change.

  If the status switches it means that the fault was present previously but is not active now. There is an intermittent fault.

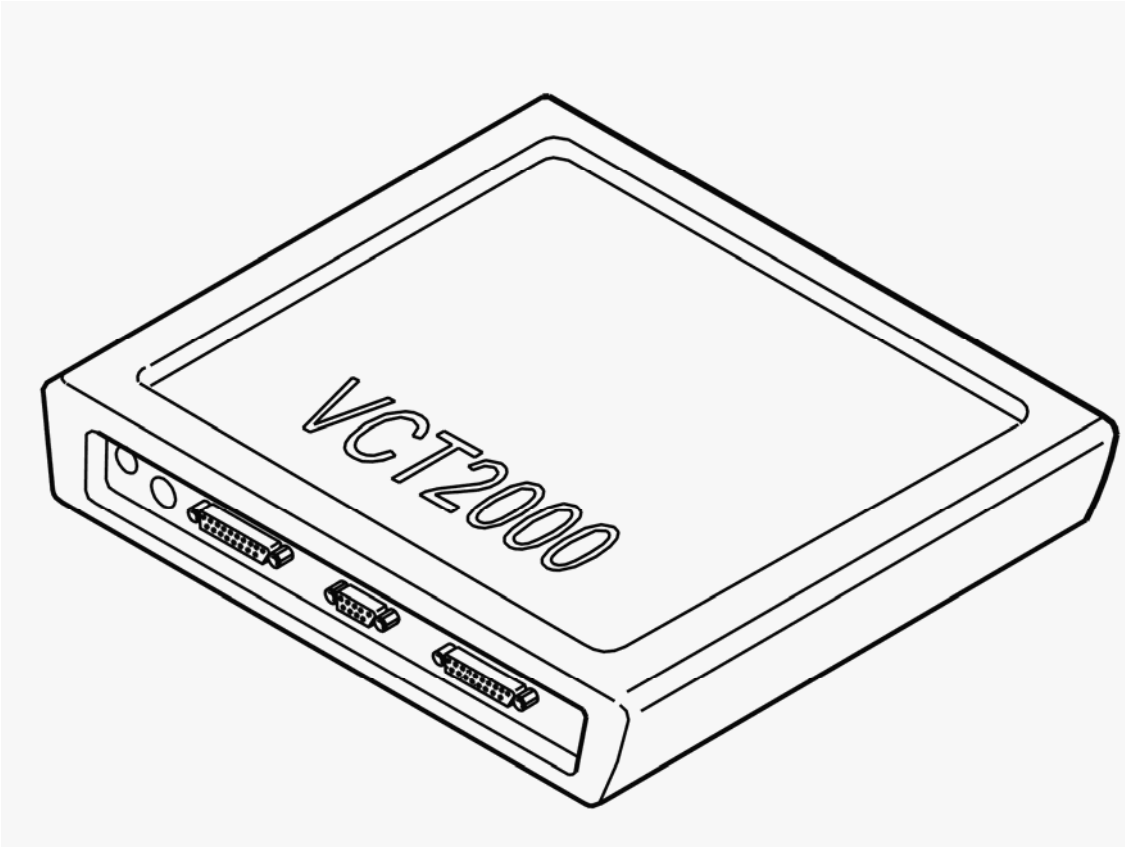


Fig. 362: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

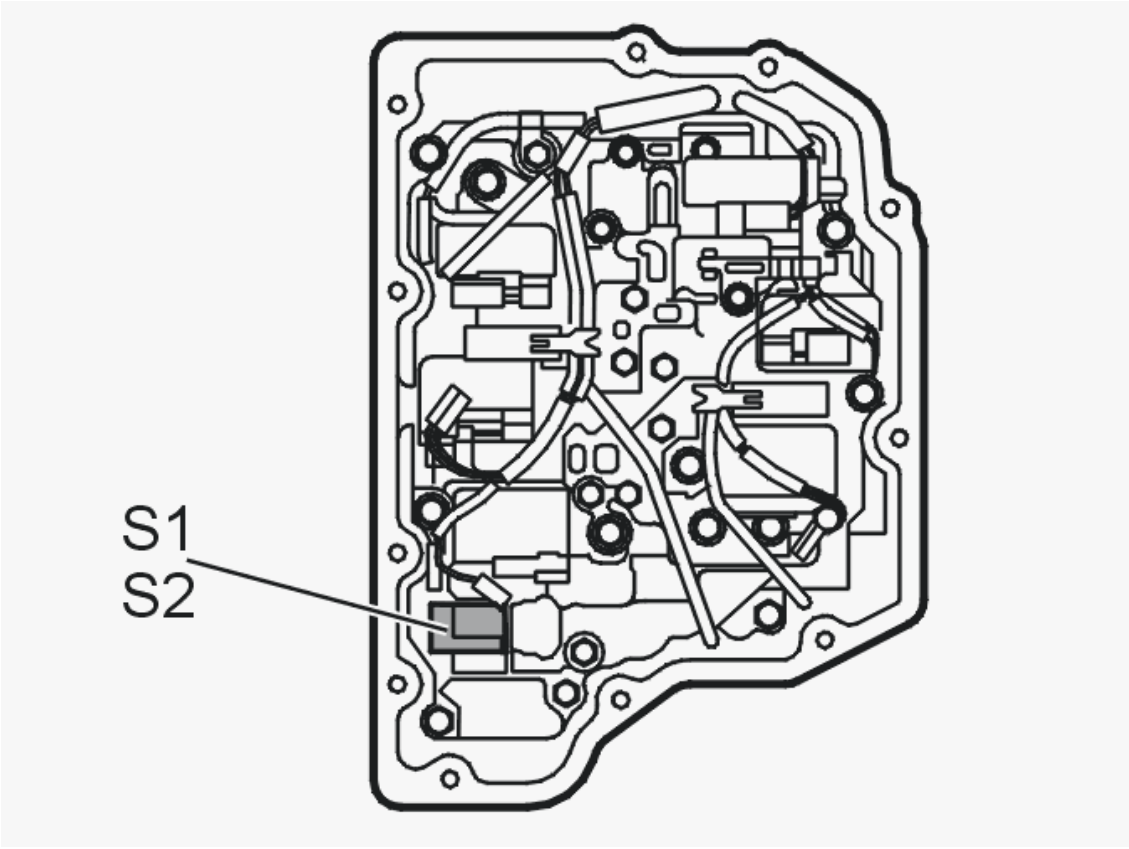


Fig. 363: Locating Shift Solenoids S1 & S2
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

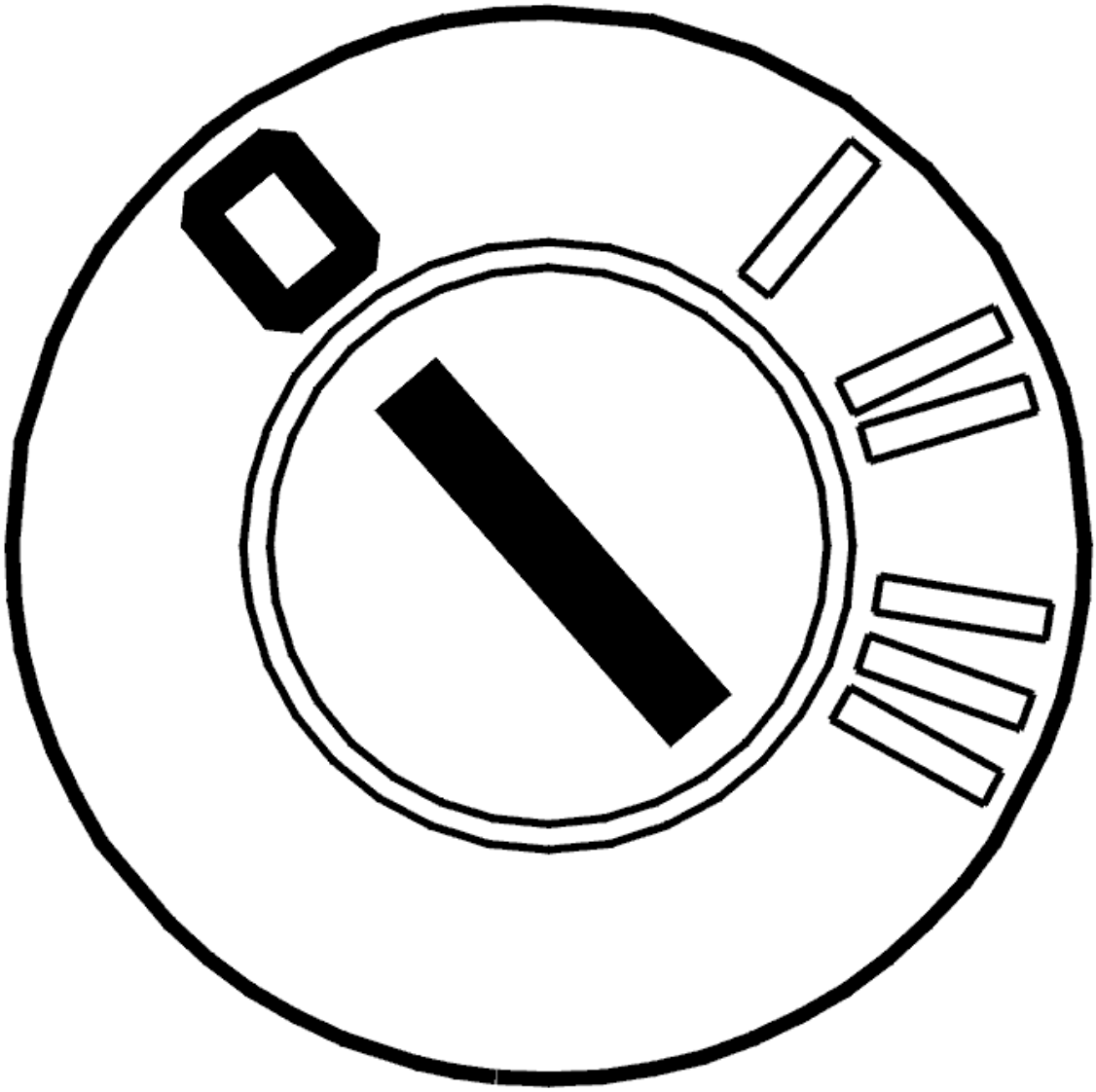


Fig. 364: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

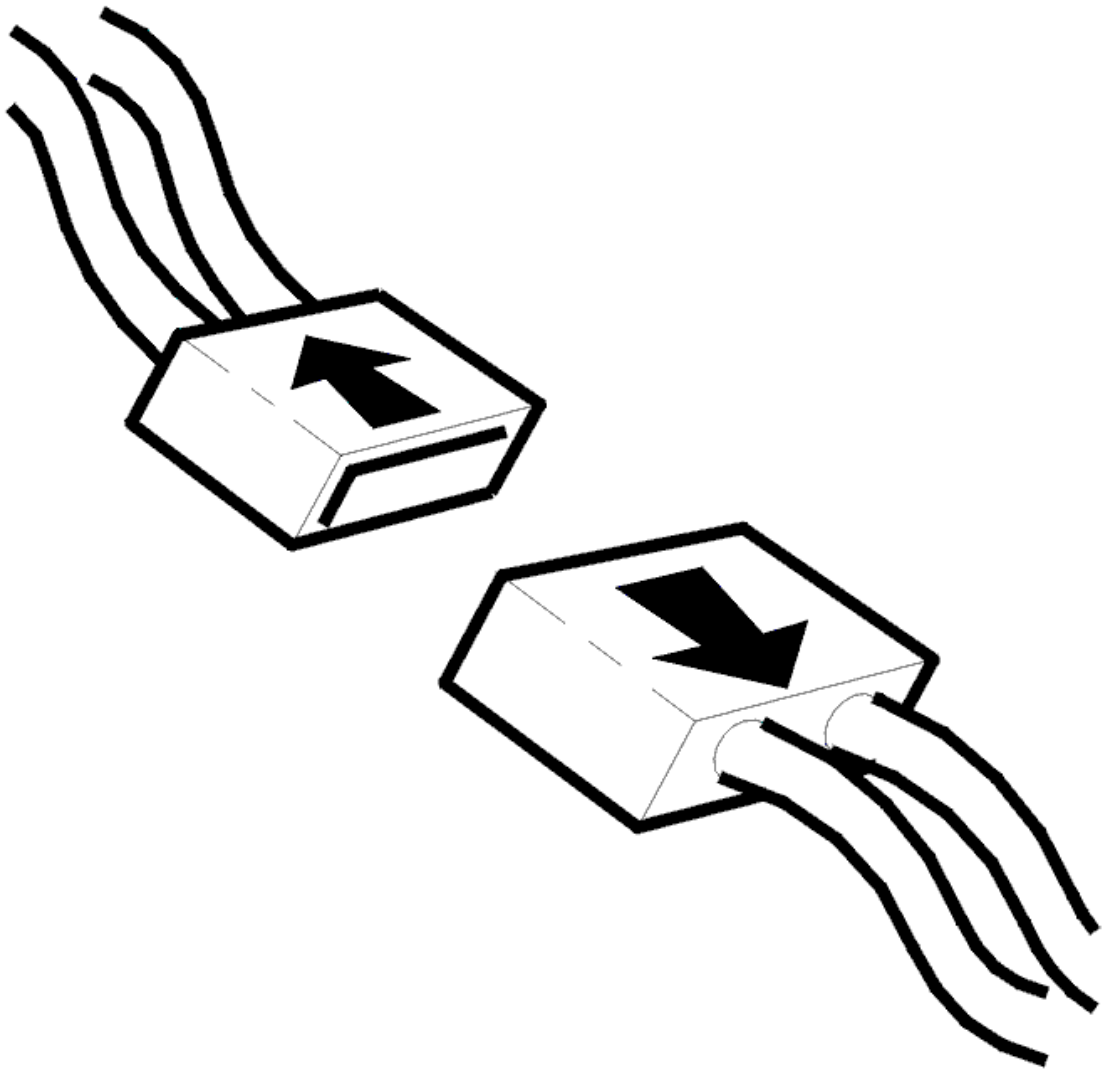


Fig. 365: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check the cable between transmission connector terminal #B5 and the connector for solenoid S1. Check for an open-circuit. Check for a short-circuit to supply voltage.

HINT: If no fault is found in the wiring check solenoid S1. See CHECKING SHIFT SOLENOIDS

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**

- see **SIGNAL DESCRIPTION**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- To access connector B/replace the solenoid: **SOLENOID CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

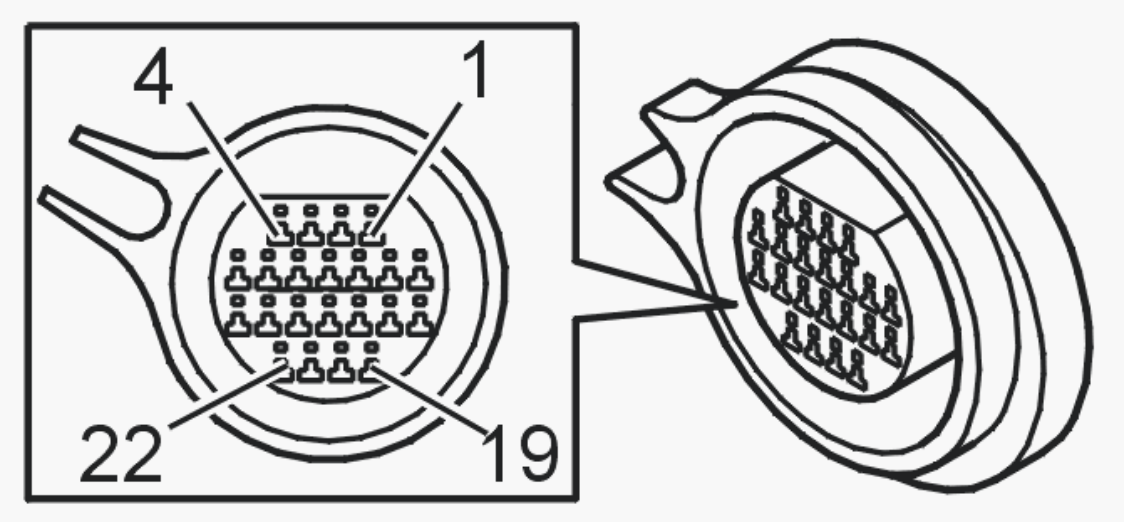


Fig. 366: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

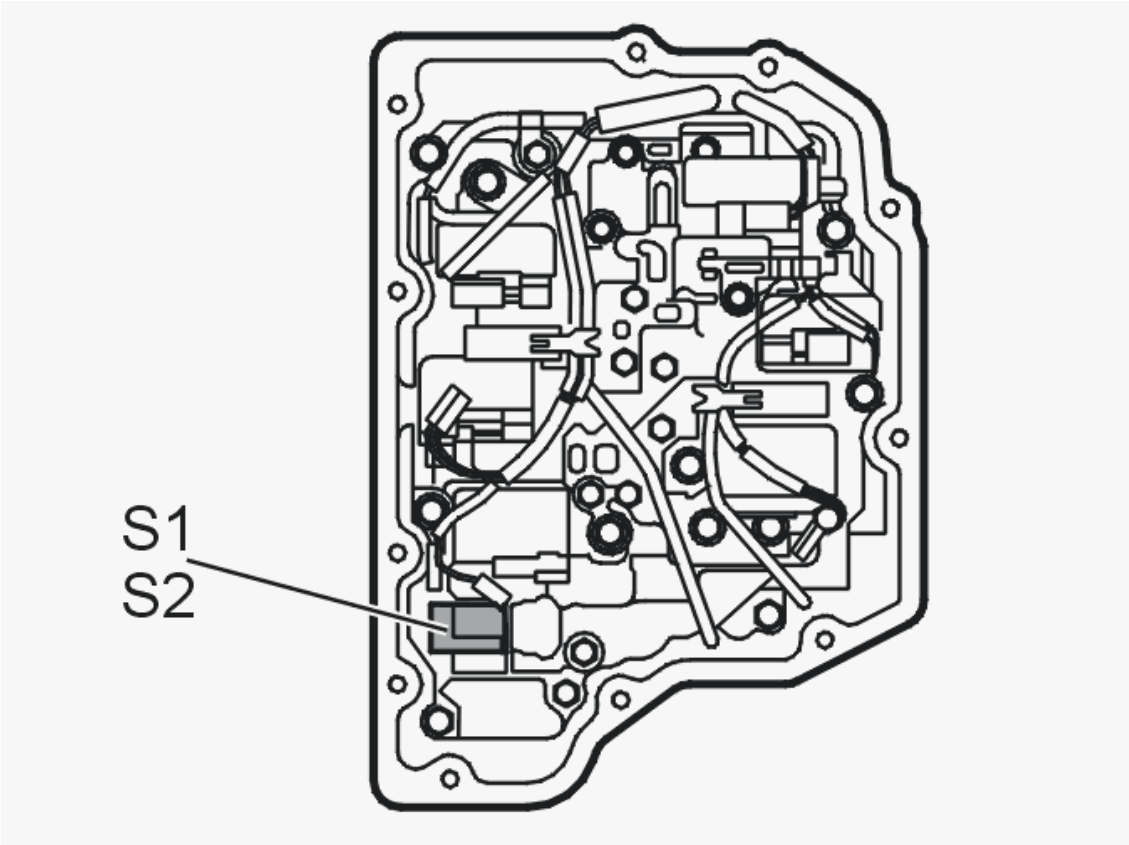


Fig. 367: Locating Shift Solenoids S1 & S2
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

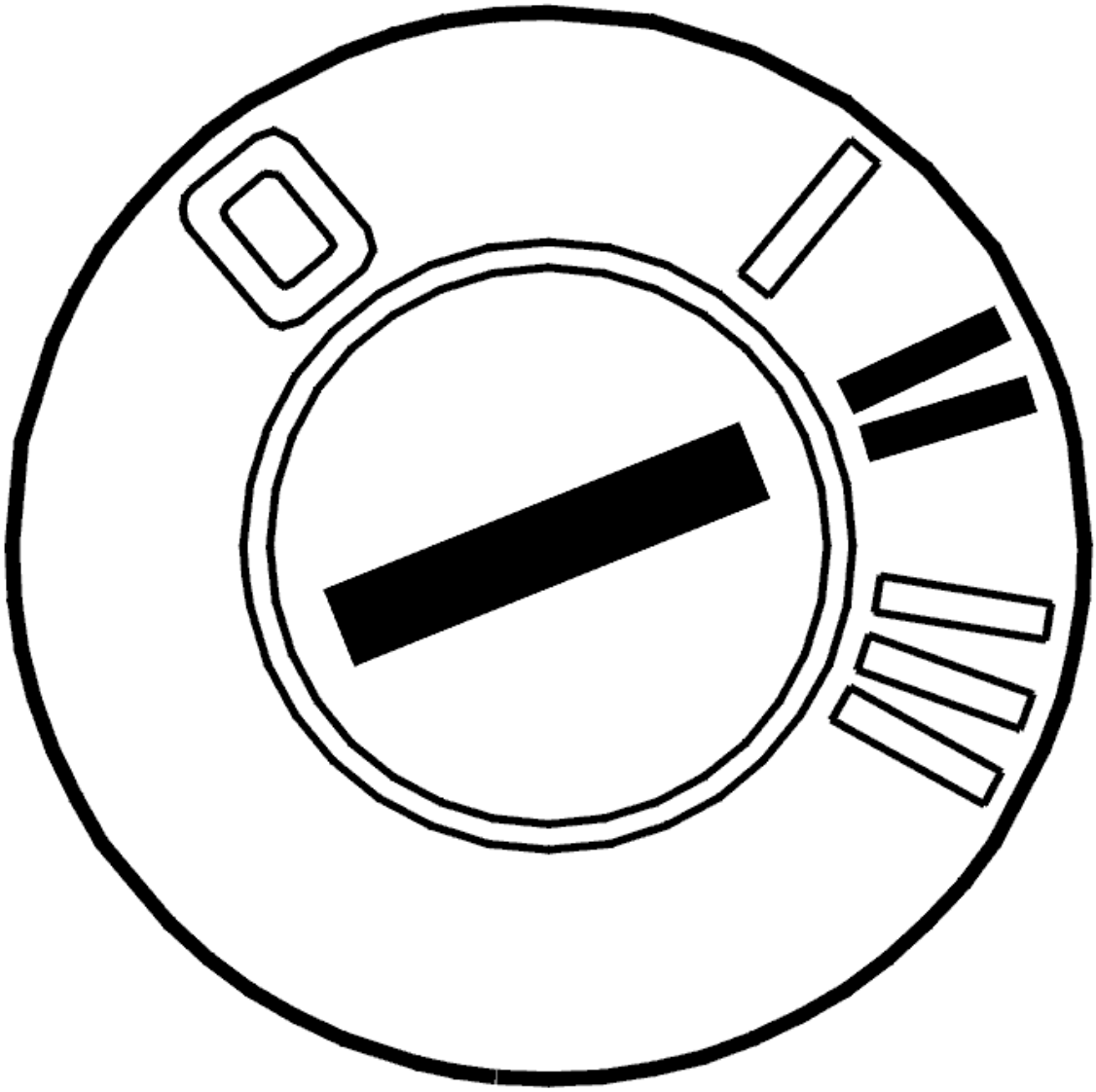


Fig. 368: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

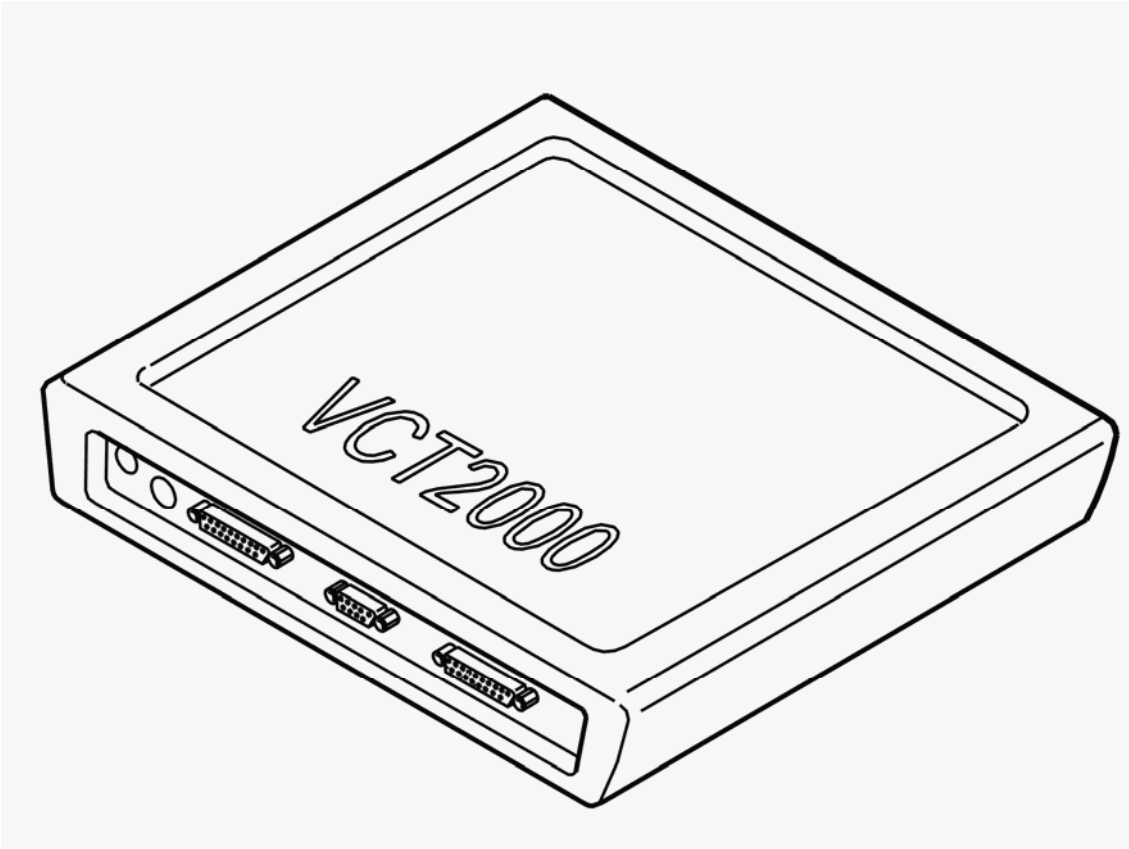


Fig. 369: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

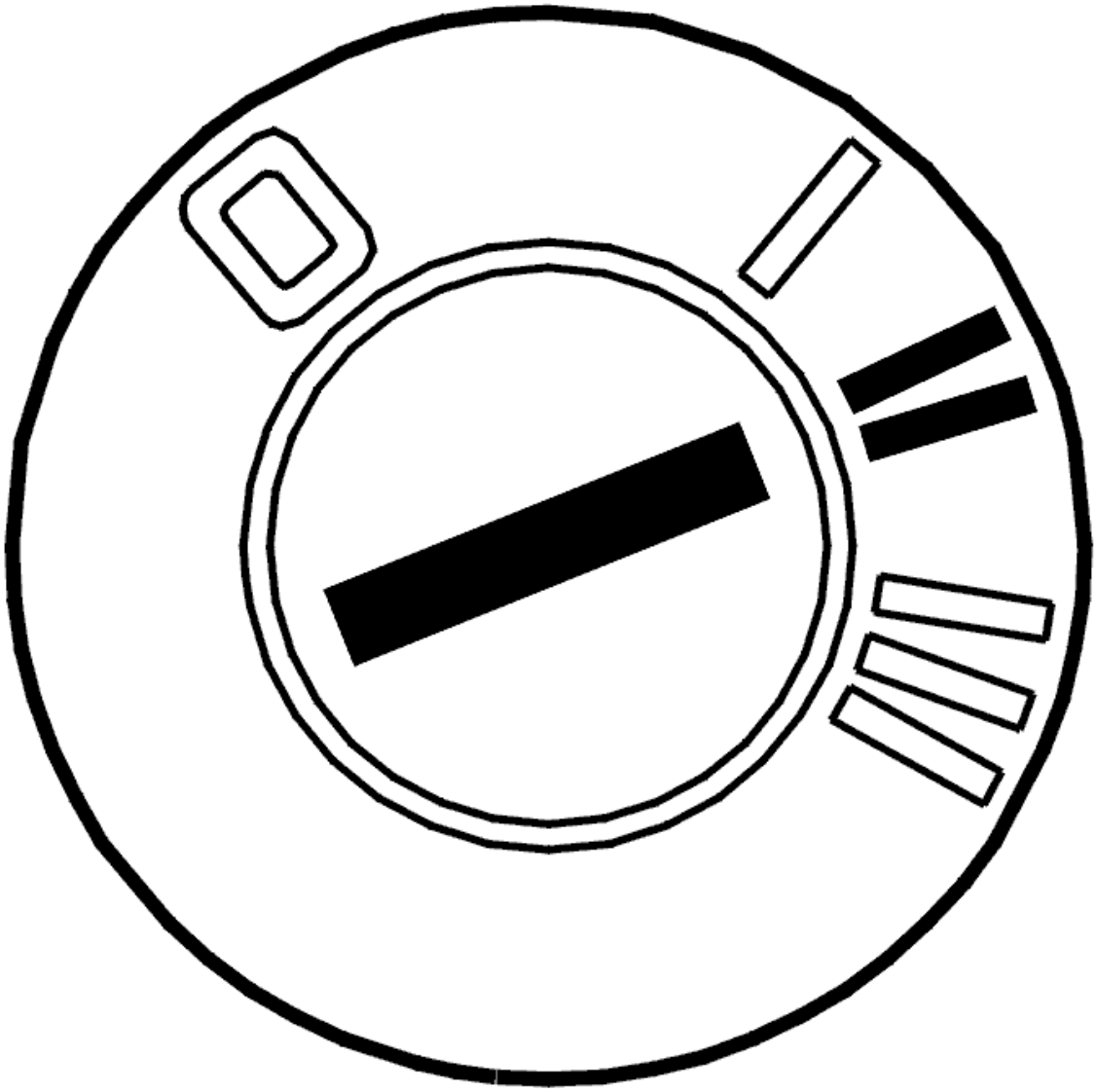


Fig. 370: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

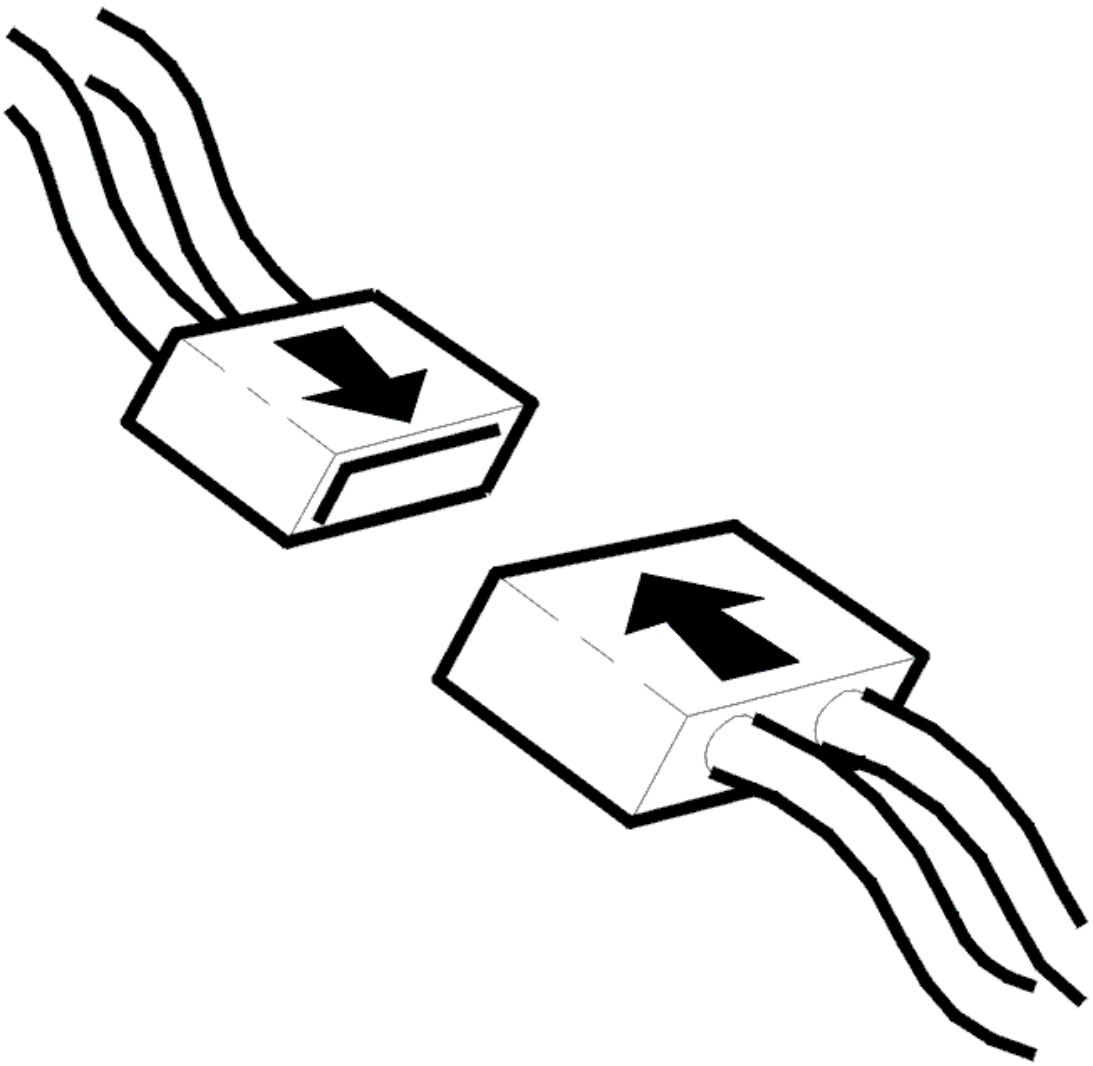


Fig. 371: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid S1 by clicking the symbol for VCT2000.

  Read the status of solenoid S1. The status must switch between OFF and ON.

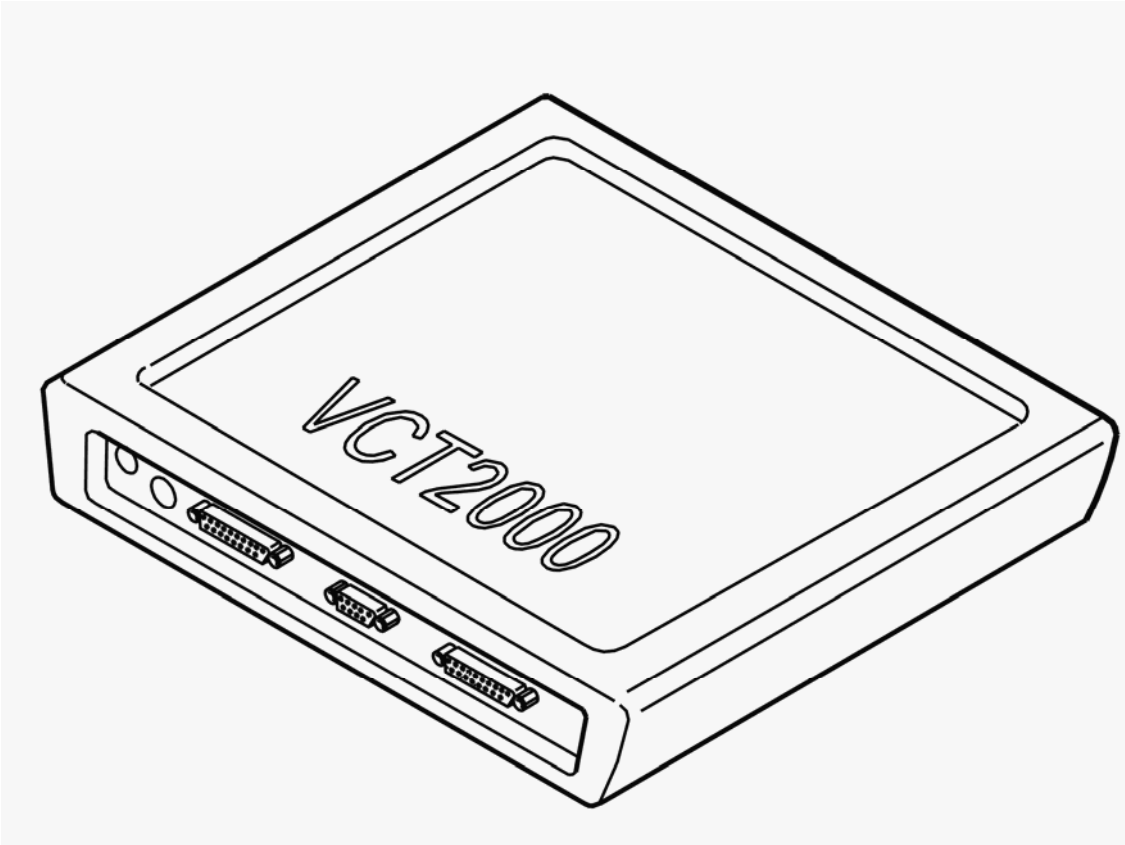


Fig. 372: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P097400: SHIFT SOLENOID A CONTROL CIRCUIT HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD;

2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT TRACING TCM-P097400

see **FAULT TRACING TCM-P097400**

TCM-P097600: SHIFT SOLENOID B CONTROL CIRCUIT LOW. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

Shift solenoids S1 and S2 work with the linear solenoids to handle shifting in the transmission. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The circuit of solenoid S2 receives too low of a signal when the solenoid is activated.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

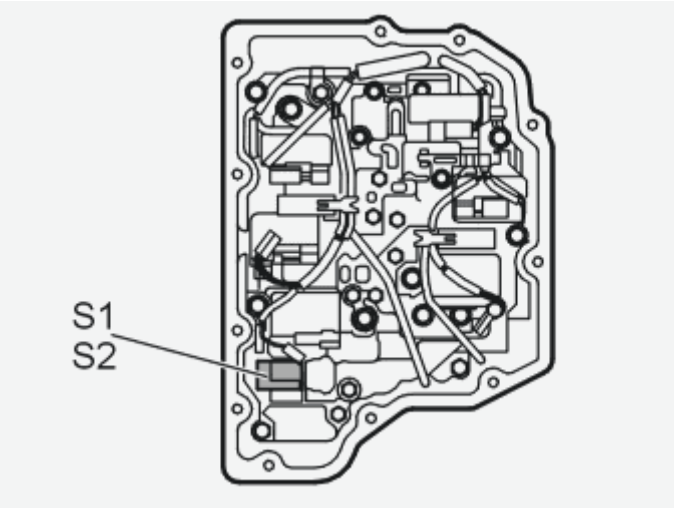


Fig. 373: Identifying S1 And S2 Solenoids
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Short-circuit to ground in the signal cable.
- Solenoid not working.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Rough gear shift
- No gear shift

FAULT-TRACING

CHECKS

CHECKING SHIFT SOLENOID S2

Fig. 374: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid S2.

  Check the status for solenoid S2. The status must switch between OFF and ON.

  The fault is permanent if the status does not change.

  If the status switches it means that the fault was present previously but is not active now. There is an intermittent fault.

Fig. 375: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

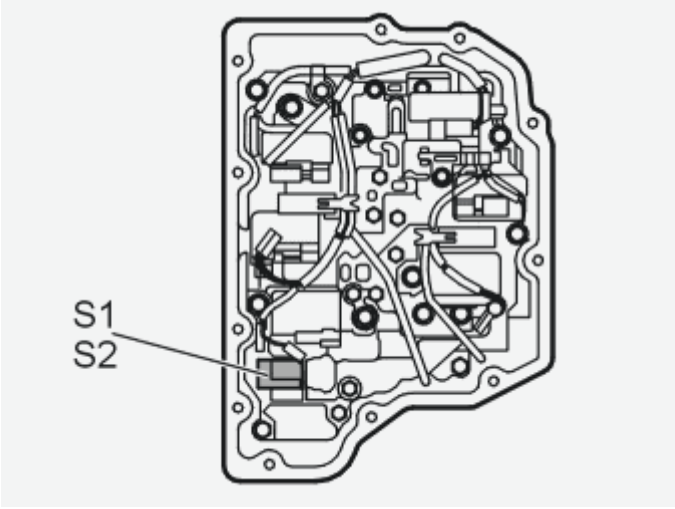


Fig. 376: Identifying S1 And S2 Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

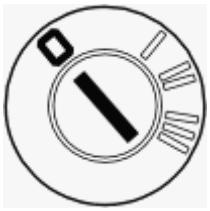


Fig. 377: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

Check the cable for short-circuit to ground.

Take readings between:

- Transmission connector #B2 and the connector for solenoid S2.

HINT: If no fault is found in the wiring check solenoid S2. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- To access connector B/replace the solenoid:**TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
- see **CHECKING WIRING AND TERMINALS**

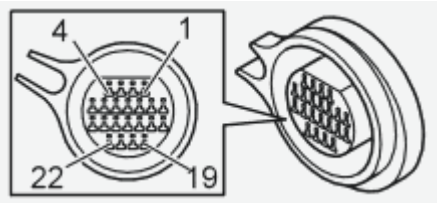


Fig. 378: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

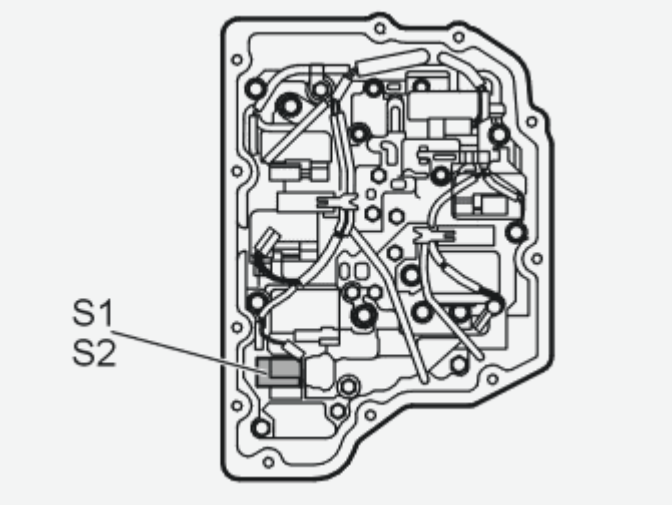


Fig. 379: Identifying S1 And S2 Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 380: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

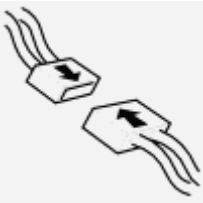


Fig. 381: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Activate solenoid S2 by clicking the symbol for VCT2000.

  Read the status of solenoid S2. The status must switch between OFF and ON.

Fig. 382: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 383: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 384: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P097600: SHIFT SOLENOID B CONTROL CIRCUIT LOW. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P097600: SHIFT SOLENOID B CONTROL CIRCUIT LOW. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT TRACING TCM-P097600

CHECKS

CHECKING SHIFT SOLENOID S2

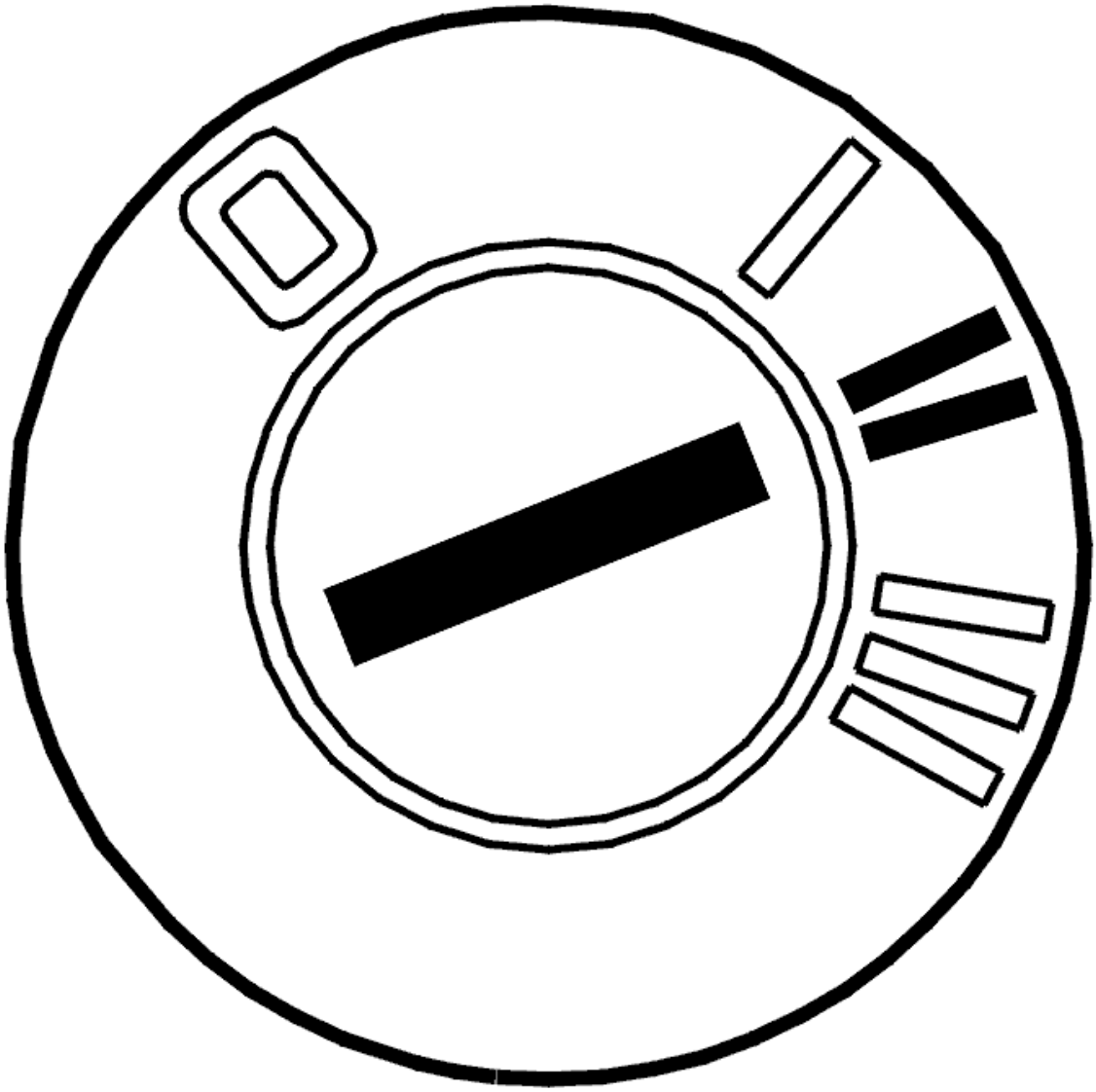


Fig. 385: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid S2.

  Check the status of solenoid S2. The status must switch between OFF and ON.

  The fault is permanent if the status does not change.

  If the status switches it means that the fault was present previously but is not active now. There is an intermittent fault.

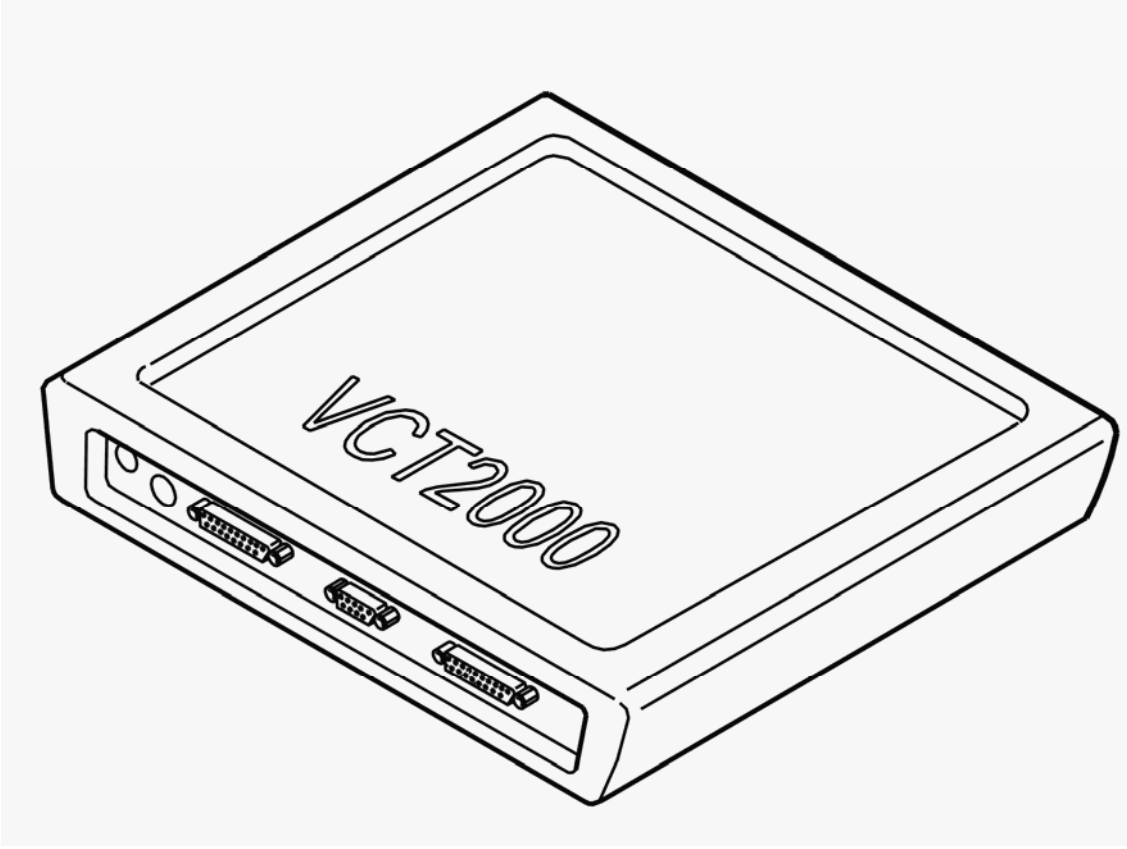


Fig. 386: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

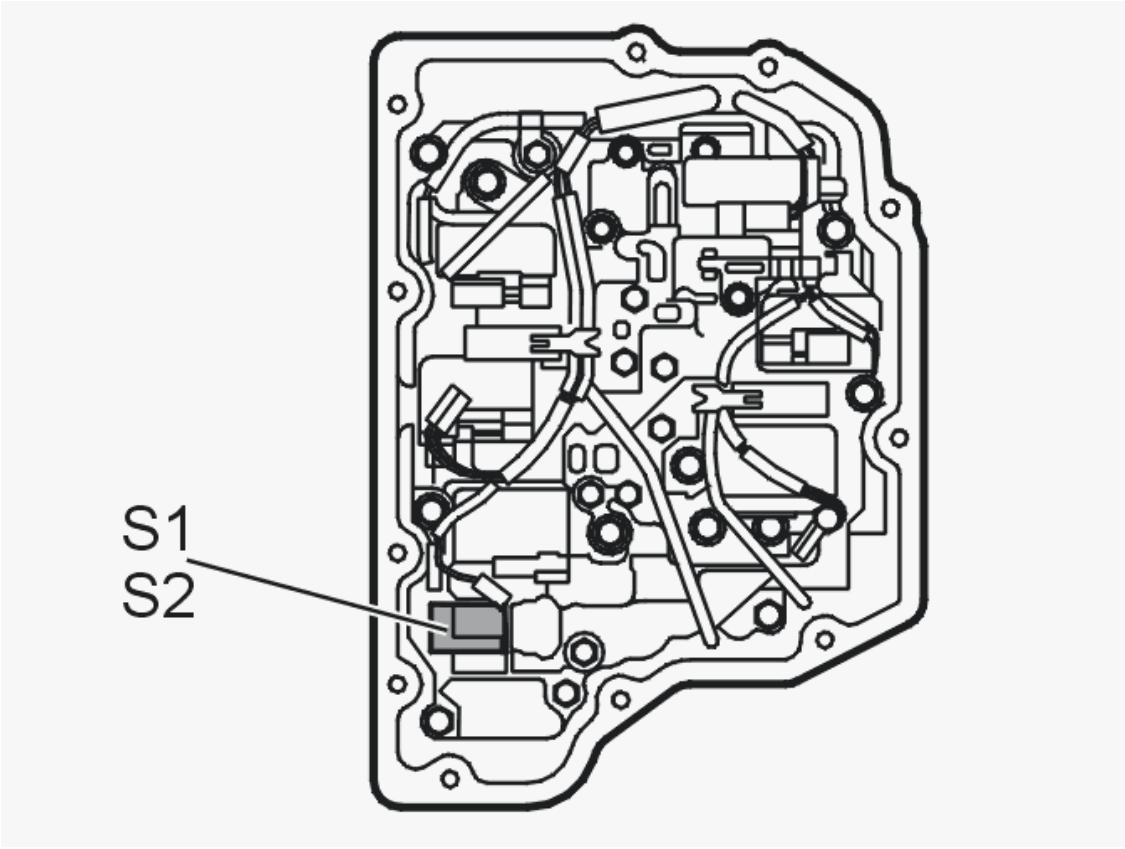


Fig. 387: Locating Shift Solenoids S1 & S2
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

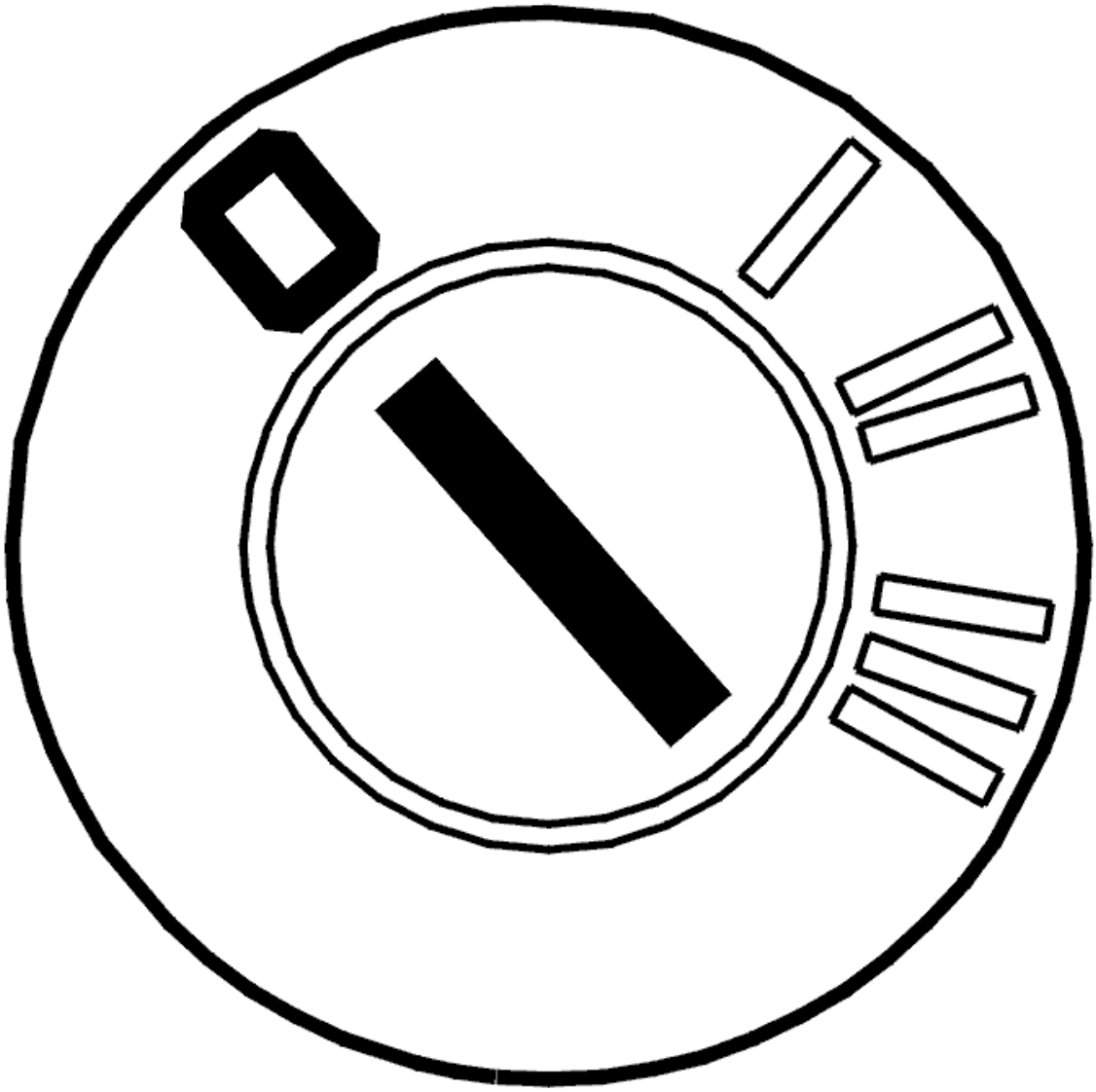


Fig. 388: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

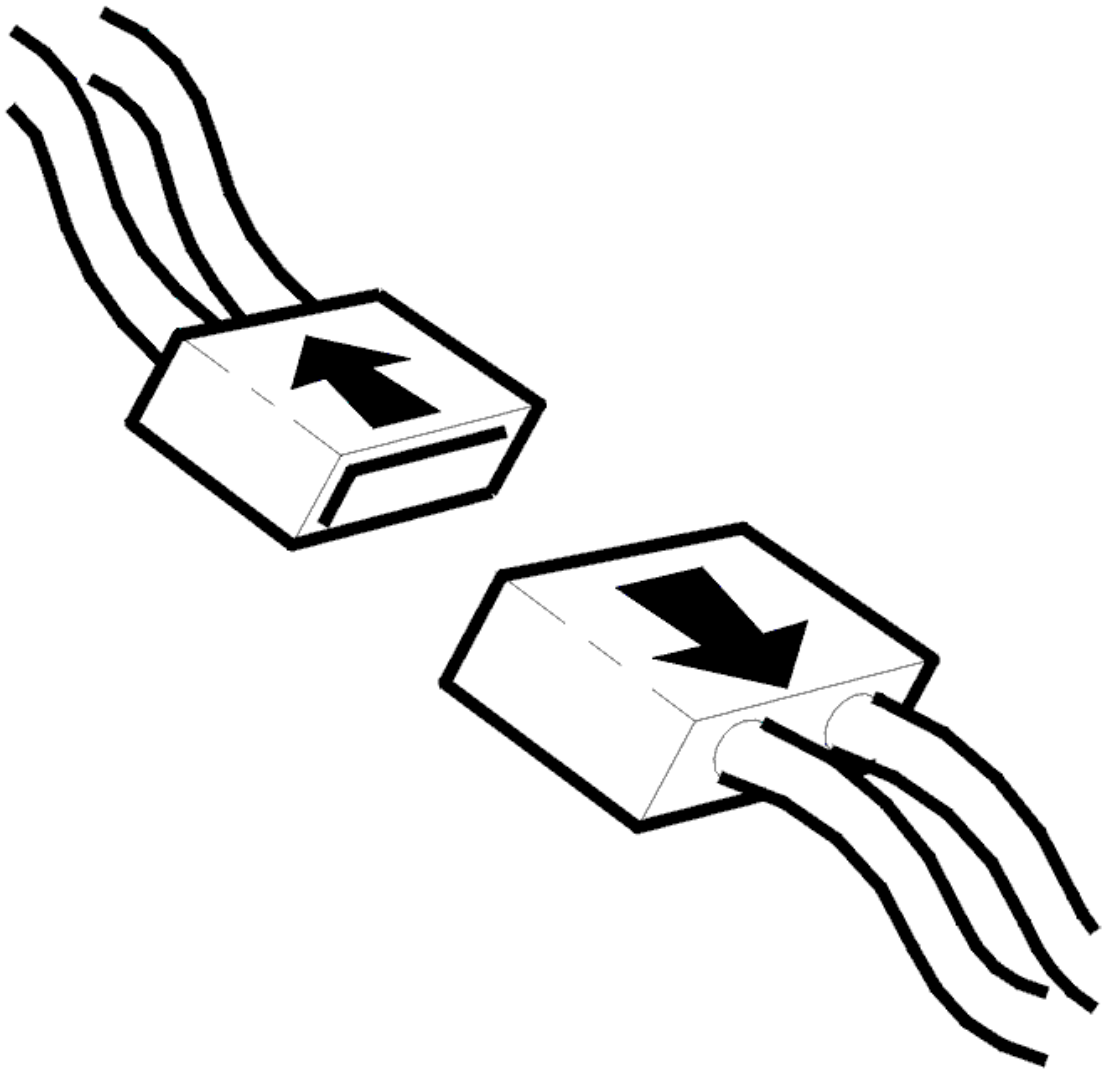


Fig. 389: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  Check the cable between transmission connector terminal #B2 and the connector for solenoid S2. Check for a short-circuit to ground.

  If no fault is found in the wiring check solenoid S2. See **CHECKING SHIFT SOLENOIDS**

  Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- To access connector B/replace the solenoid: **SOLENOID CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

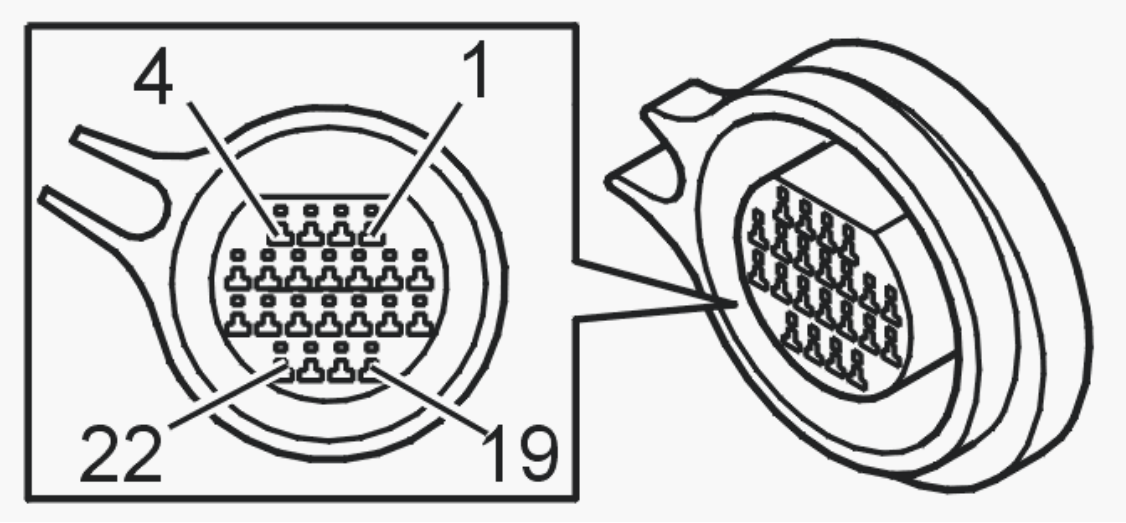


Fig. 390: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

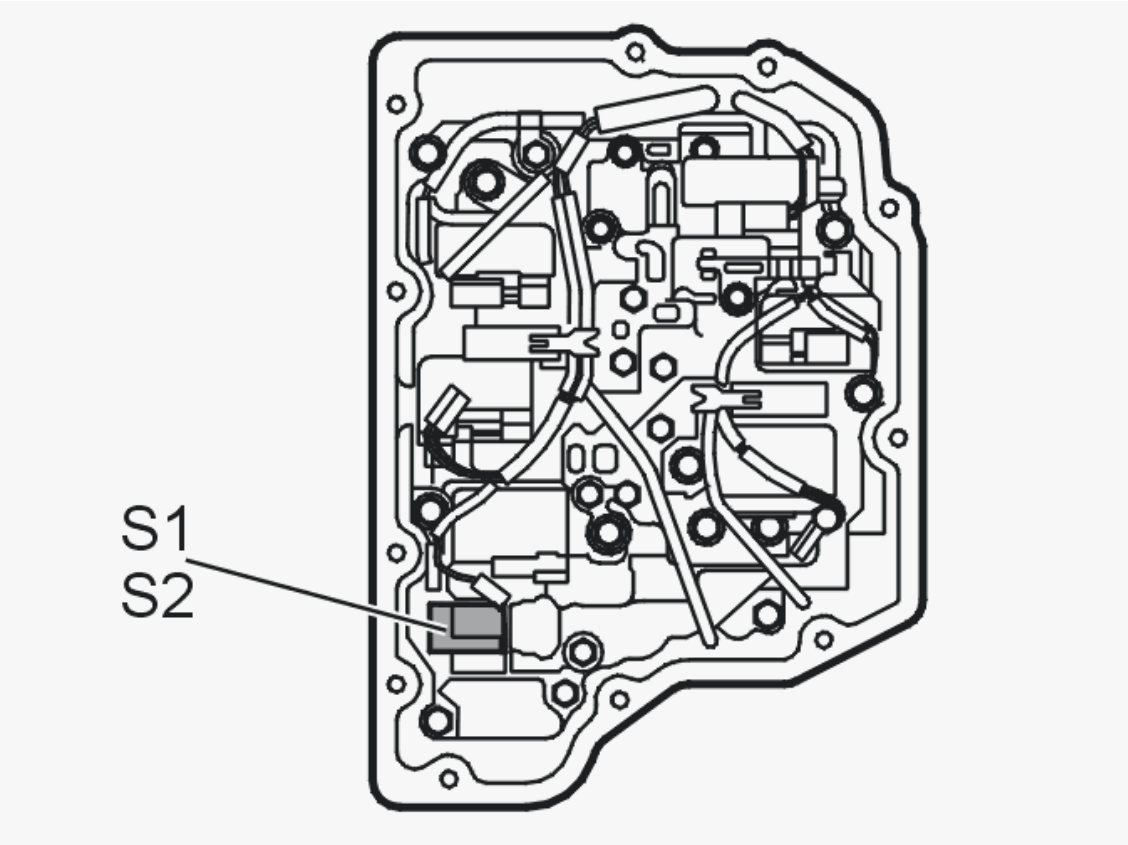


Fig. 391: Locating Shift Solenoids S1 & S2
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

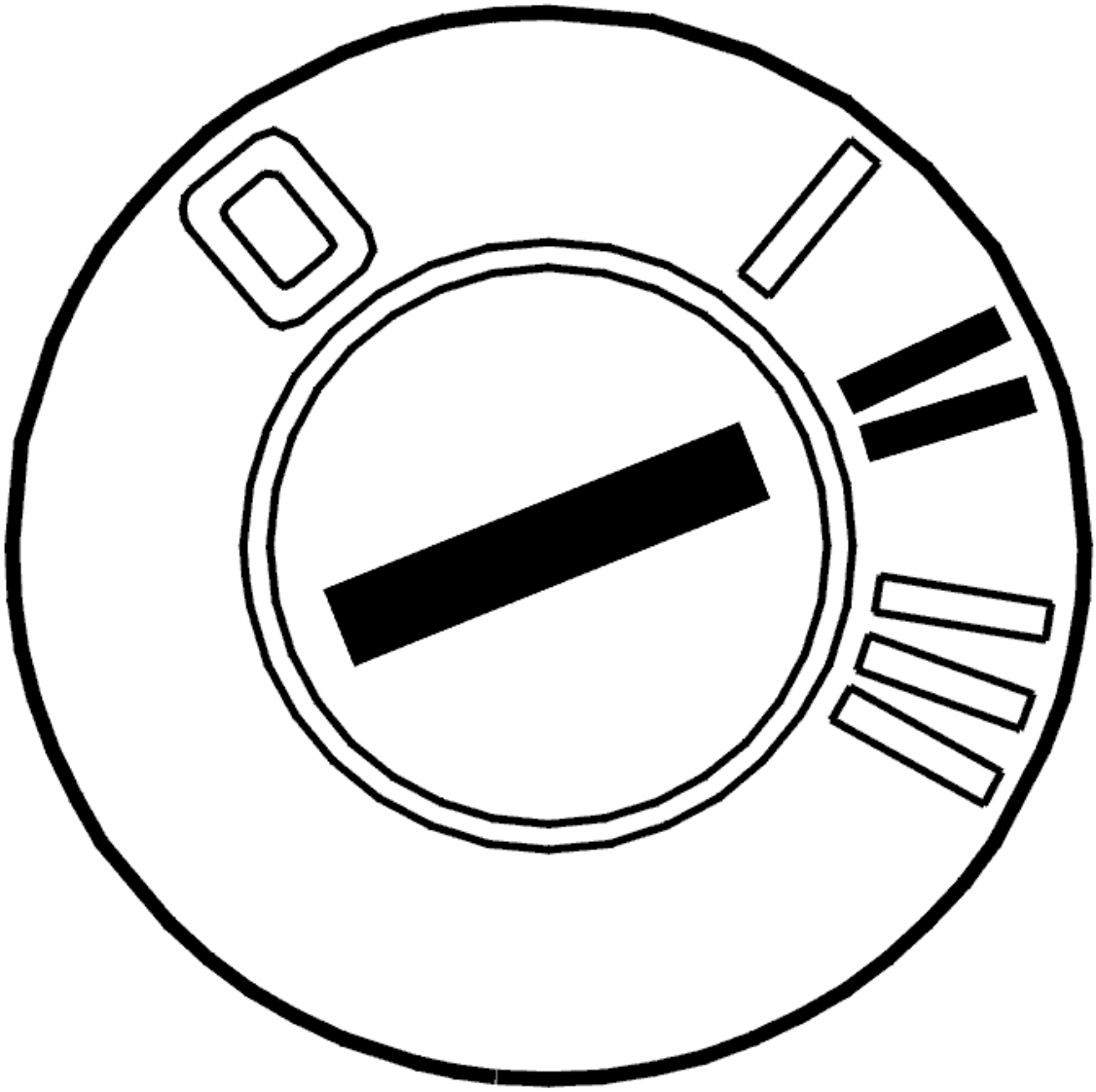


Fig. 392: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

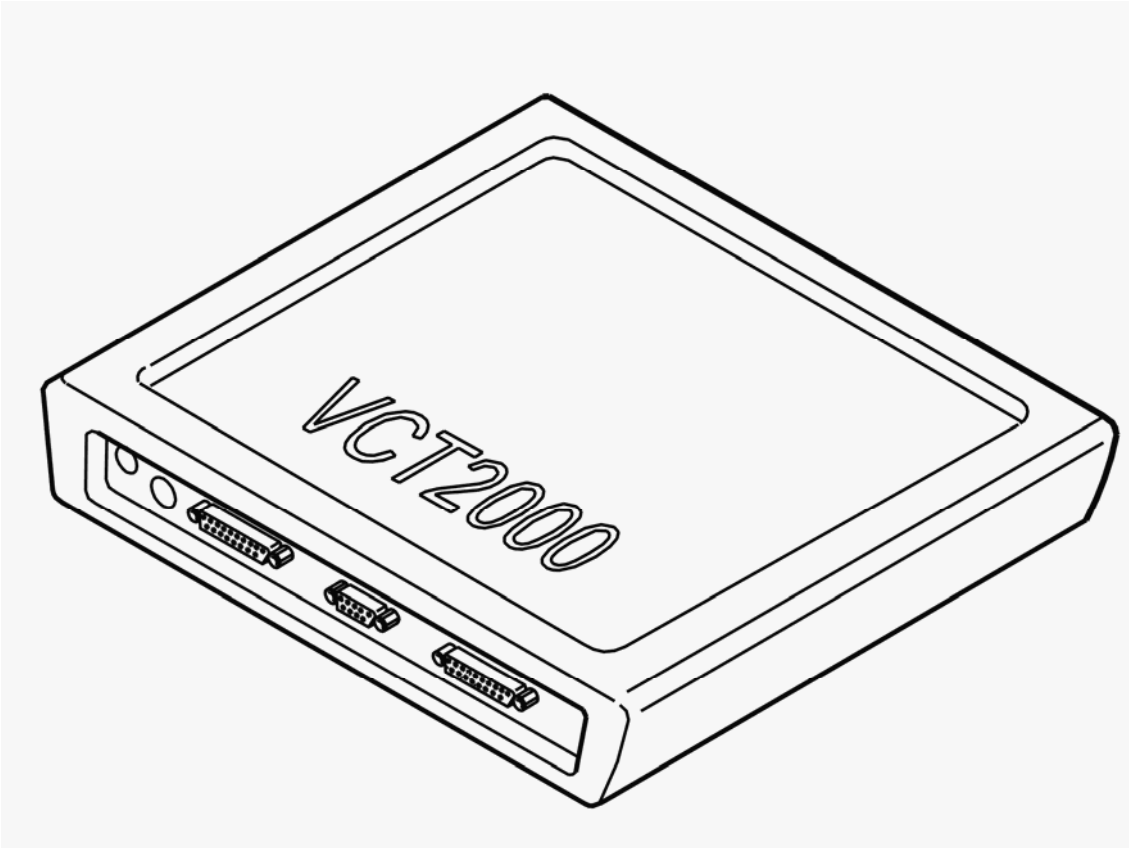


Fig. 393: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

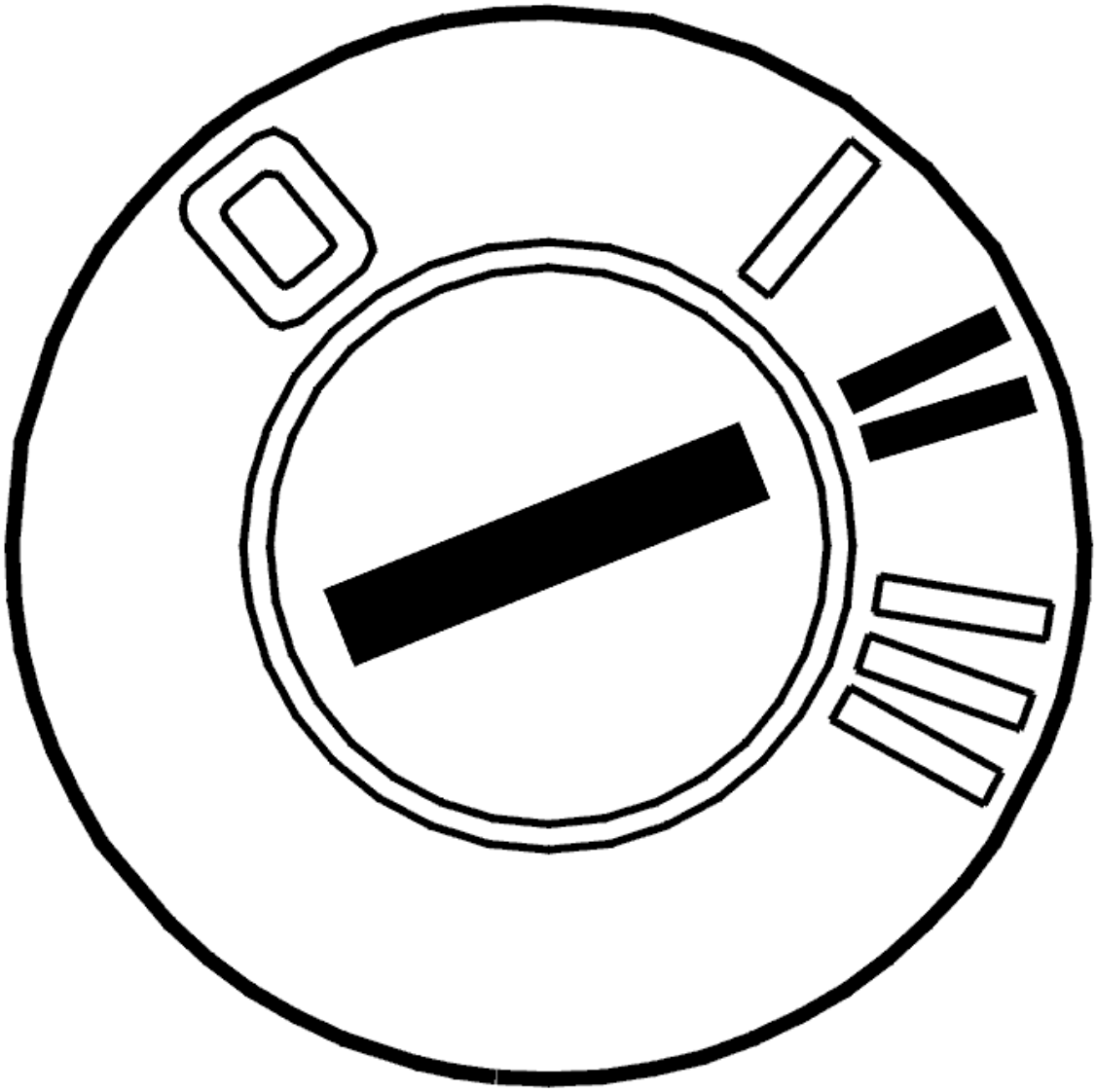


Fig. 394: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

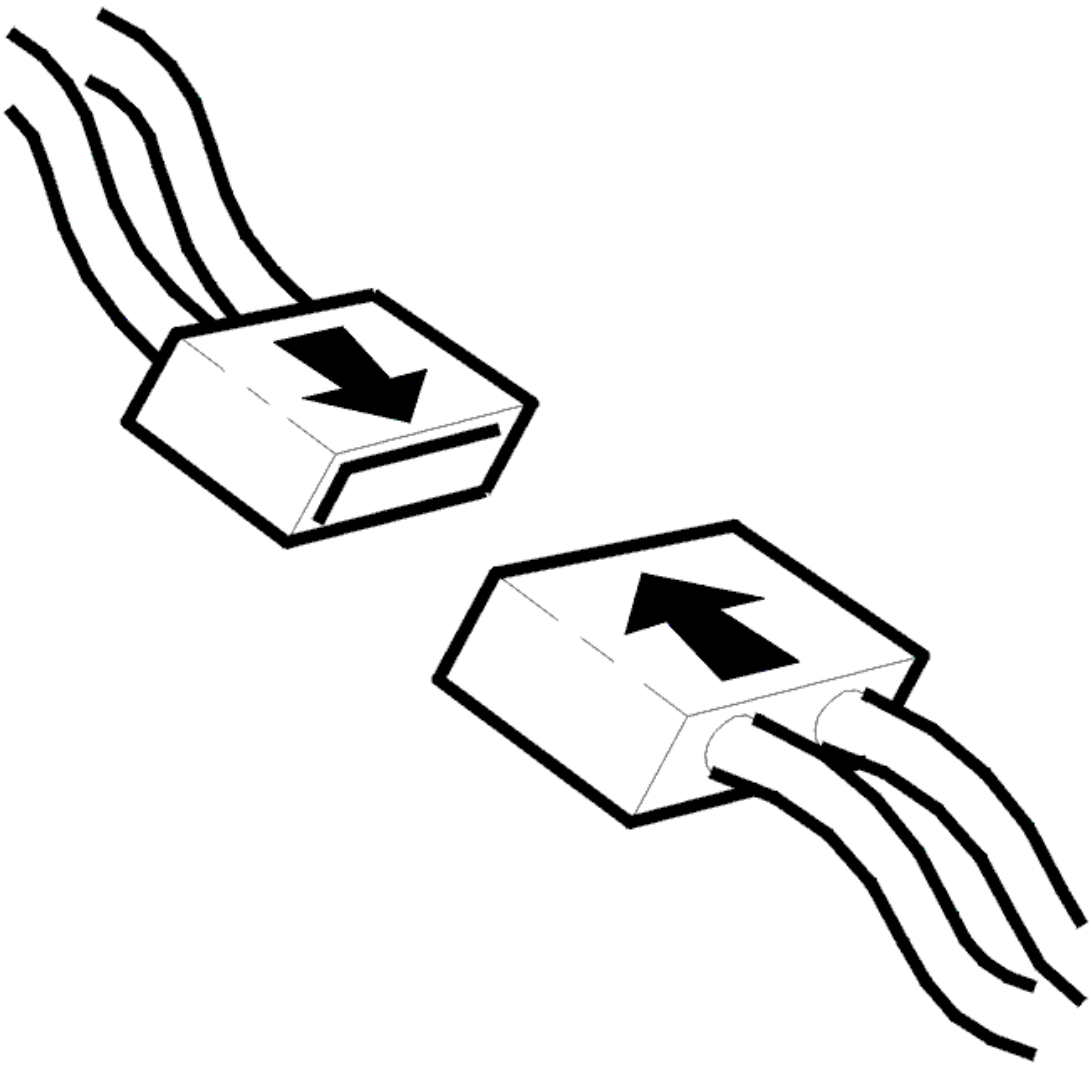


Fig. 395: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid S2 by clicking the symbol for VCT2000.

  Read the status of solenoid S2. The status must switch between OFF and ON.

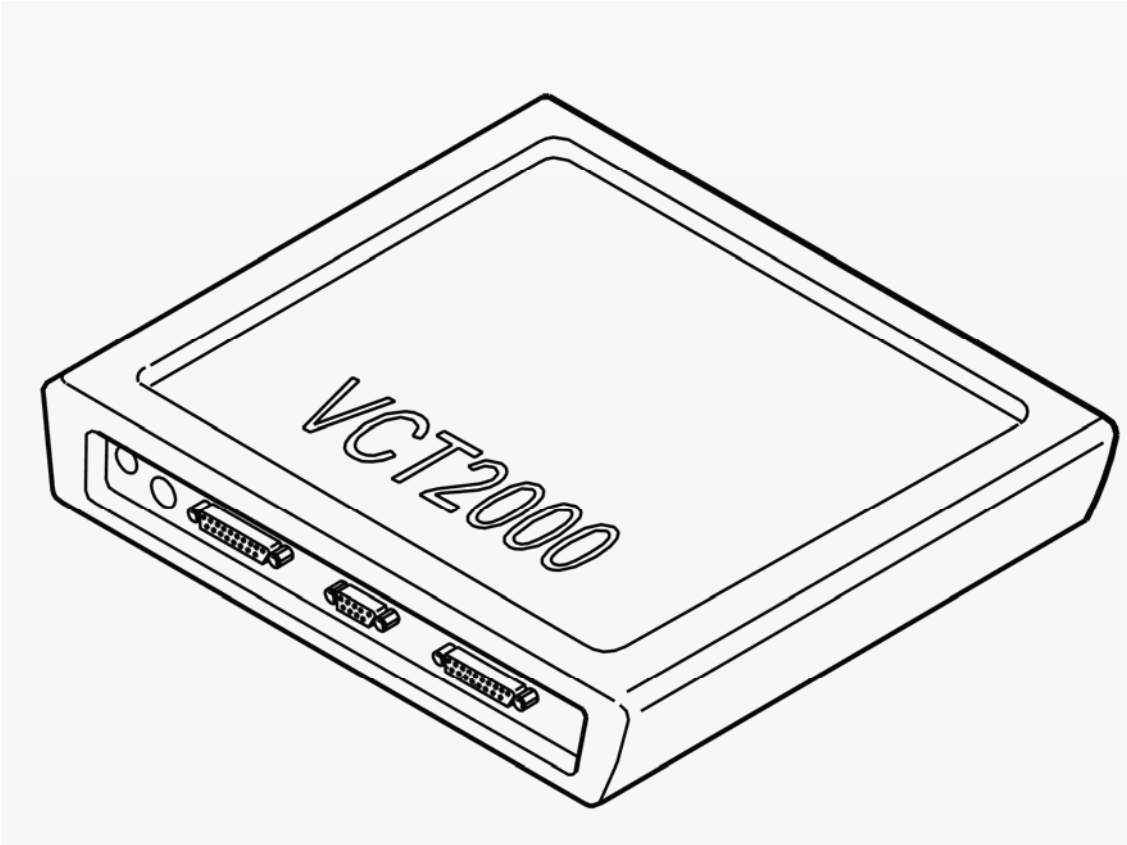


Fig. 396: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P097600: SHIFT SOLENOID B CONTROL CIRCUIT LOW. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD;

2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT TRACING TCM-P097600

see **FAULT TRACING TCM-P097600**

TCM-P097700: SHIFT SOLENOID B CONTROL CIRCUIT HIGH. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

Condition

Shift solenoids S1 and S2 work with the linear solenoids to handle shifting in the transmission. The solenoids are controlled by power stages in the transmission control module (TCM). The control module activates the power stages to activate the solenoids and sends voltage through the circuit. The control module checks the function of the circuit by sending out a control current when the solenoid is not activated.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- No signal in the circuit of solenoid S2 when the solenoid is not activated.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

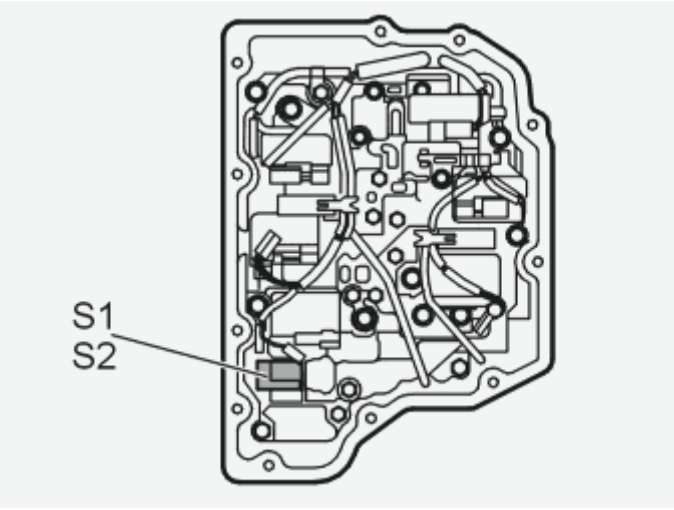


Fig. 397: Identifying S1 And S2 Solenoids
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance in the terminals.
- Open circuit on control signal lead.
- Shift solenoid not working.
- Short-circuit to supply voltage in the signal cable.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Rough gear shift
- No gear shift

FAULT-TRACING

CHECKS

CHECKING SHIFT SOLENOID S2

Fig. 398: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid S2.

  Check the status for solenoid S2. The status must switch between OFF and ON.

  The fault is permanent if the status does not change.

  If the status switches it means that the fault was present previously but is not active now. There is an intermittent fault.

Fig. 399: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

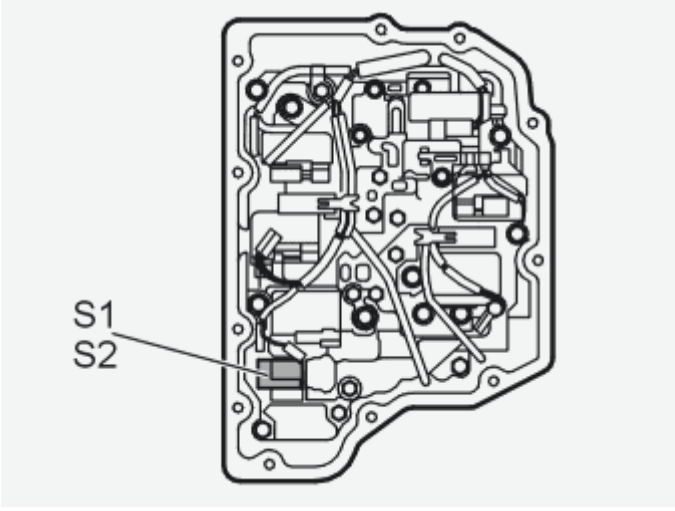


Fig. 400: Identifying S1 And S2 Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

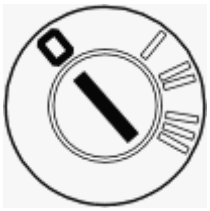


Fig. 401: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check the cable. Check for an open-circuit. Check for a short-circuit to supply voltage.

Take readings between:

- Transmission connector #B2 and the connector for solenoid S2.

HINT: If no fault is found in the wiring check solenoid S2. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- To access connector B/replace the solenoid:**TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
- see **CHECKING WIRING AND TERMINALS**

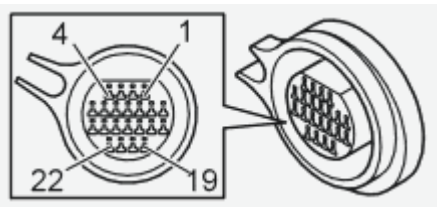


Fig. 402: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

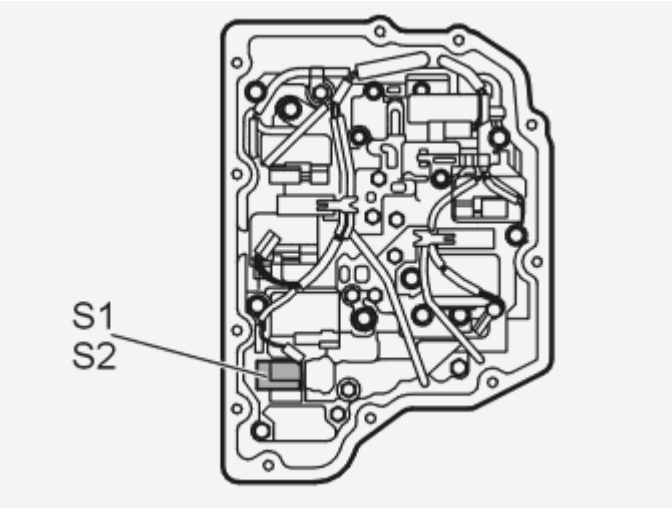


Fig. 403: Identifying S1 And S2 Solenoids
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 404: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

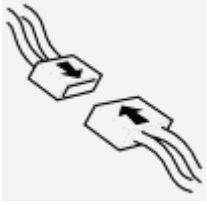


Fig. 405: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.

- Ignition on.
- Activate solenoid S2 by clicking the symbol for VCT2000.

  Read the status of solenoid S2. The status must switch between OFF and ON.

Fig. 406: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 407: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

  Fig. 408: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
  Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P097700: SHIFT SOLENOID B CONTROL CIRCUIT HIGH. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P097700: SHIFT SOLENOID B CONTROL CIRCUIT HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT TRACING TCM-P097700

CHECKS

CHECKING SHIFT SOLENOID S2

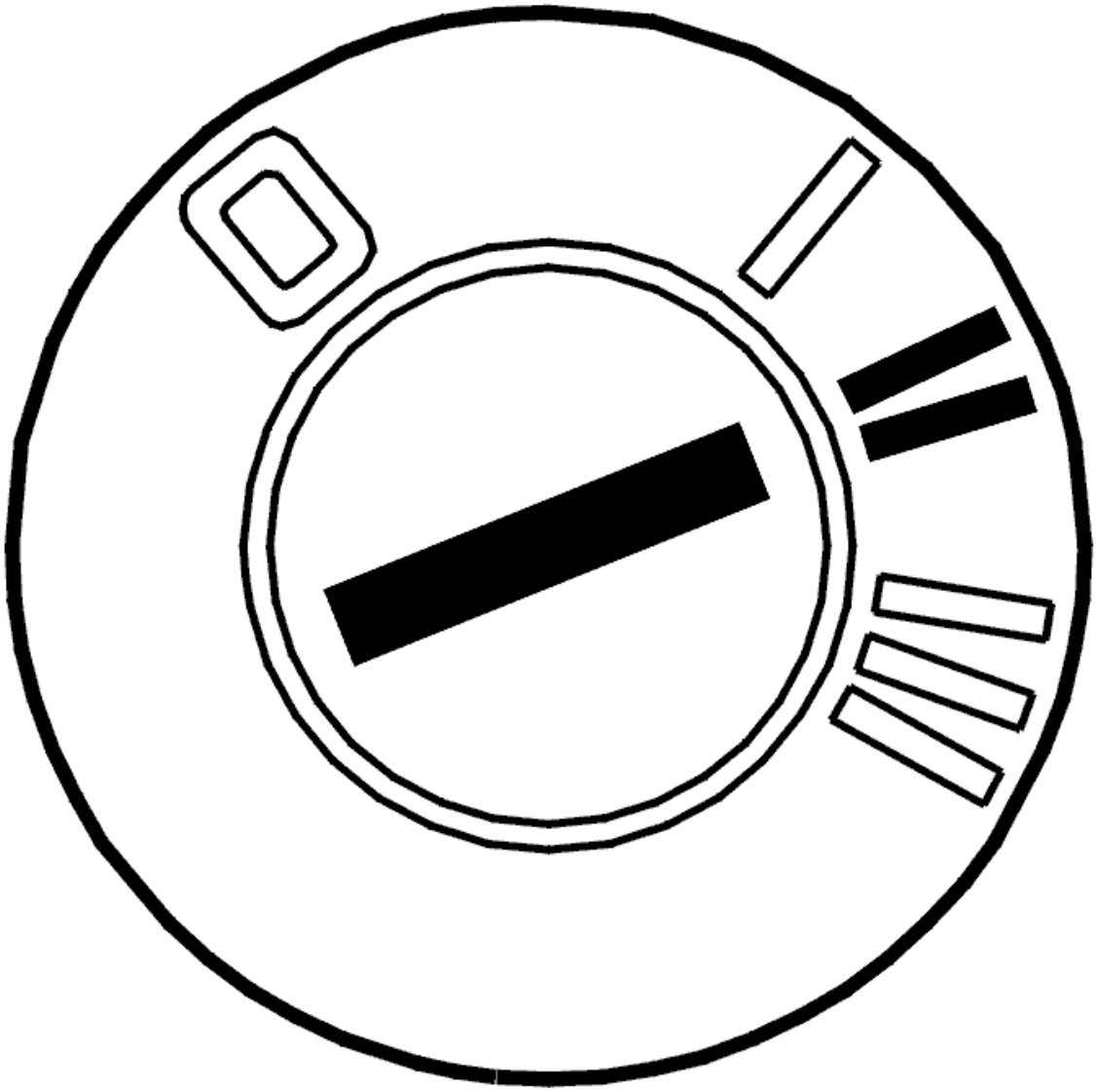


Fig. 409: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid S2.

  Check the status of solenoid S2. The status must switch between OFF and ON.

  The fault is permanent if the status does not change.

If the status switches it means that the fault was present previously but is not active now. There is an intermittent fault.

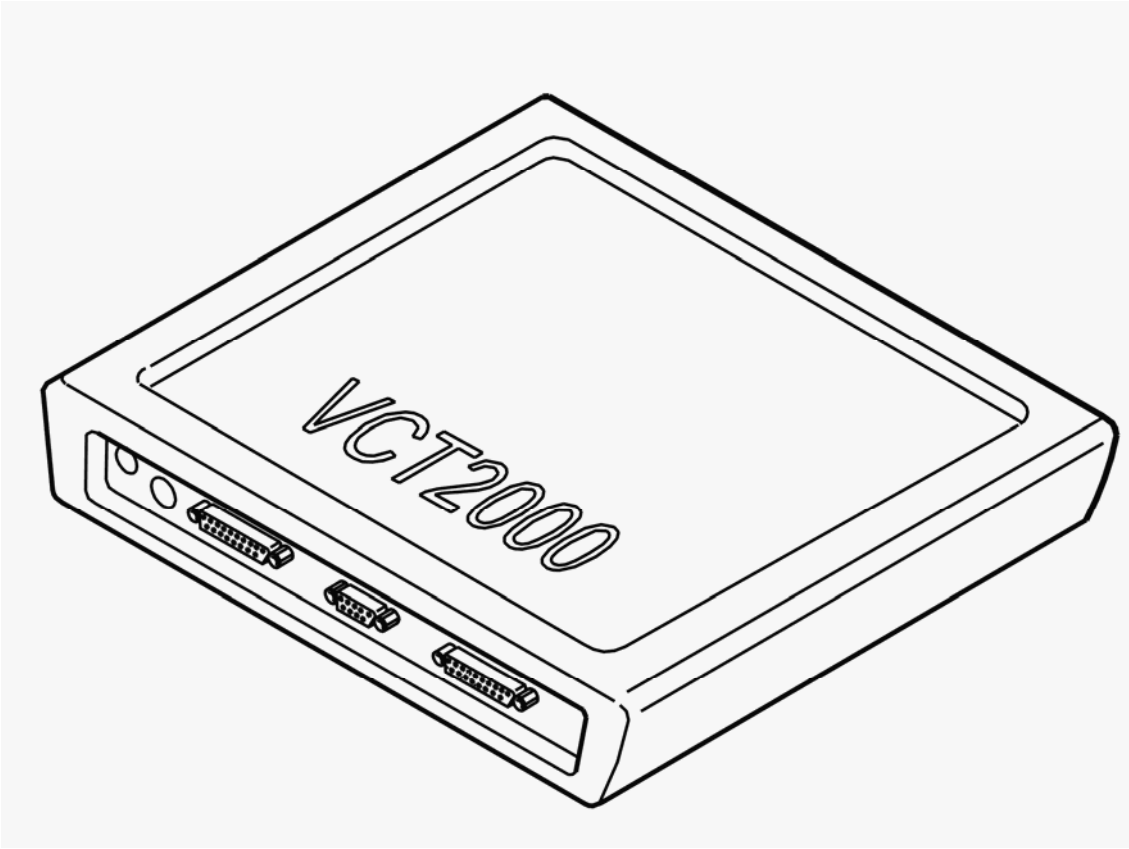


Fig. 410: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

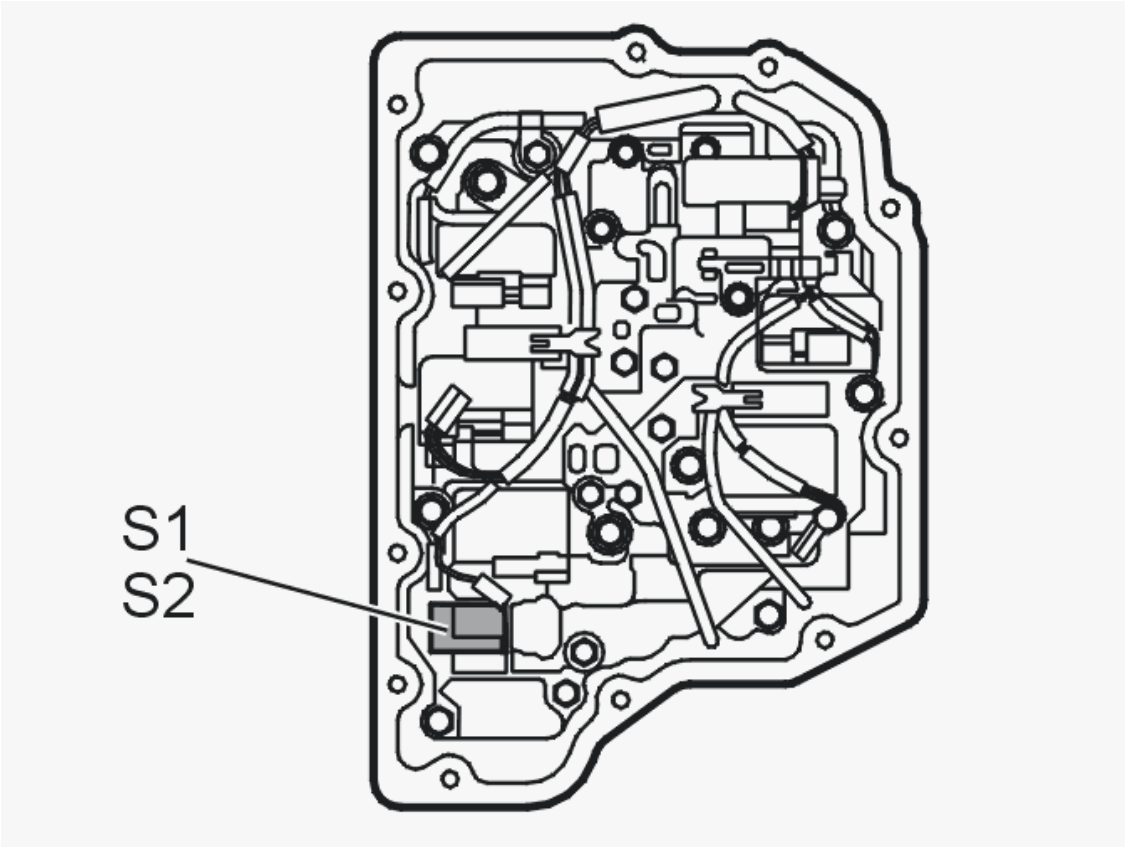


Fig. 411: Locating Shift Solenoids S1 & S2
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

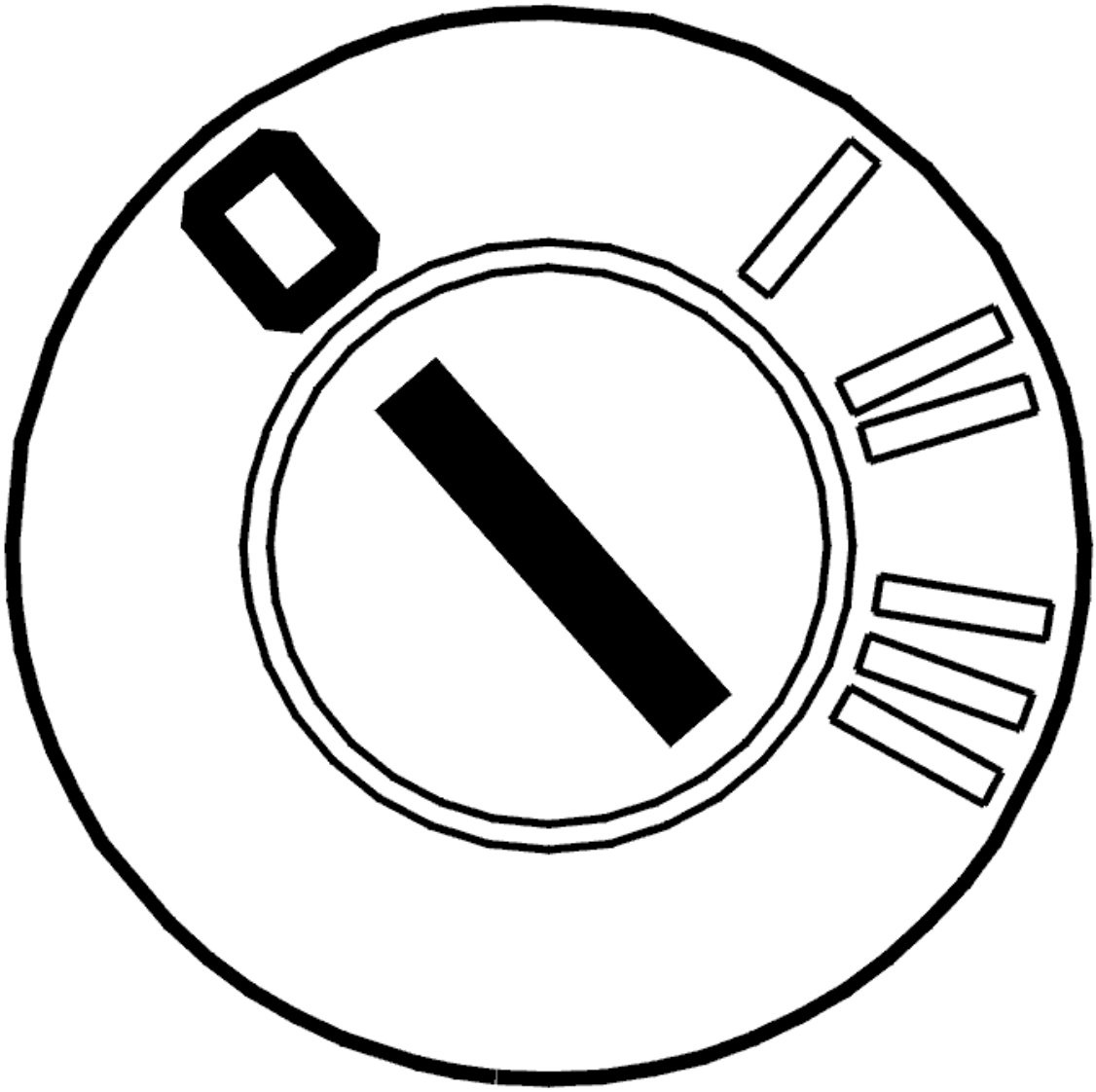


Fig. 412: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

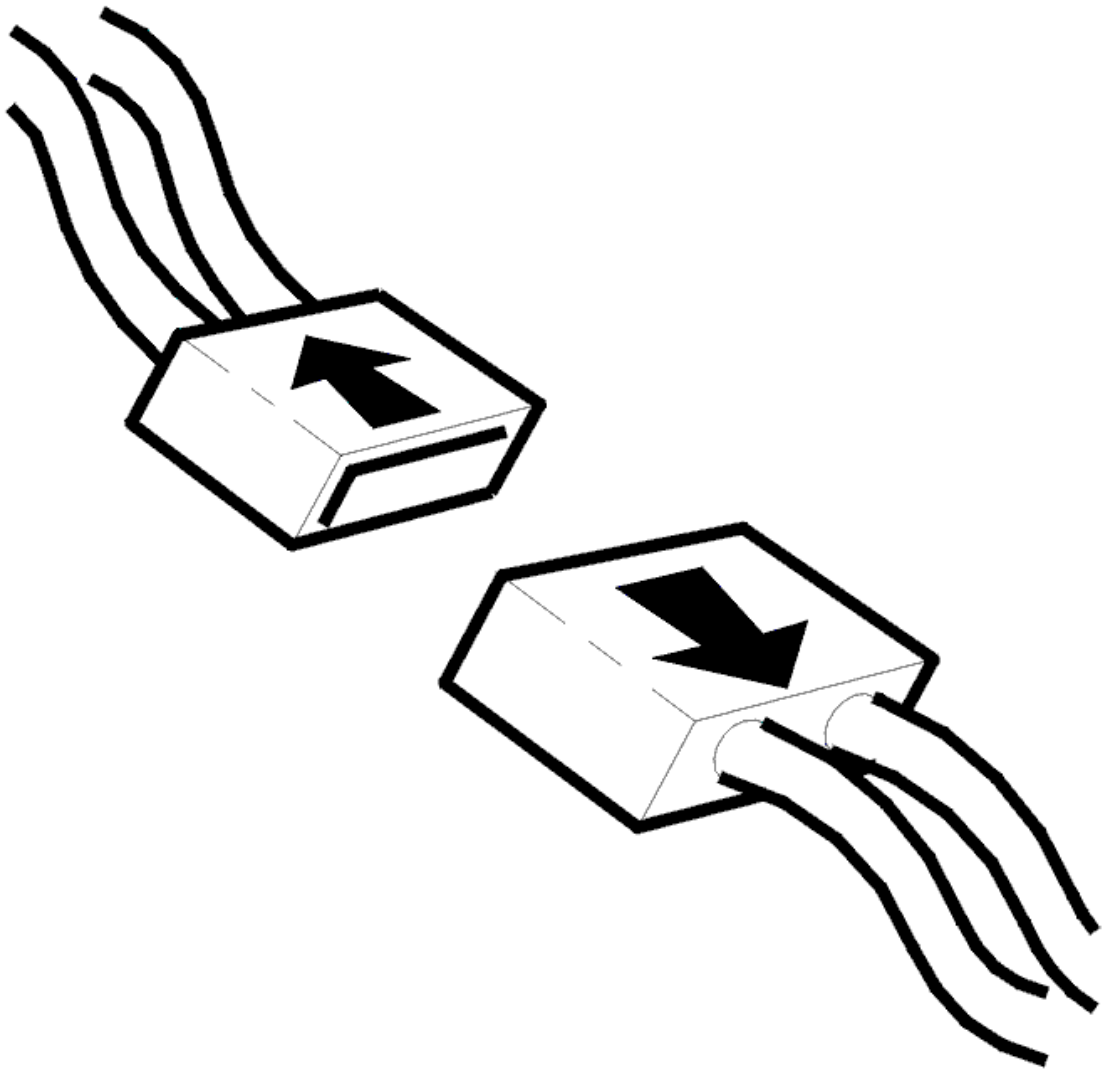


Fig. 413: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check the cable between transmission connector terminal #B2 and the connector for solenoid S2. Check for a short-circuit to supply voltage.

HINT: If no fault is found in the wiring check solenoid S2. See CHECKING SHIFT SOLENOIDS

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**

- see **SIGNAL DESCRIPTION**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- To access connector B/replace the solenoid: **SOLENOID CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

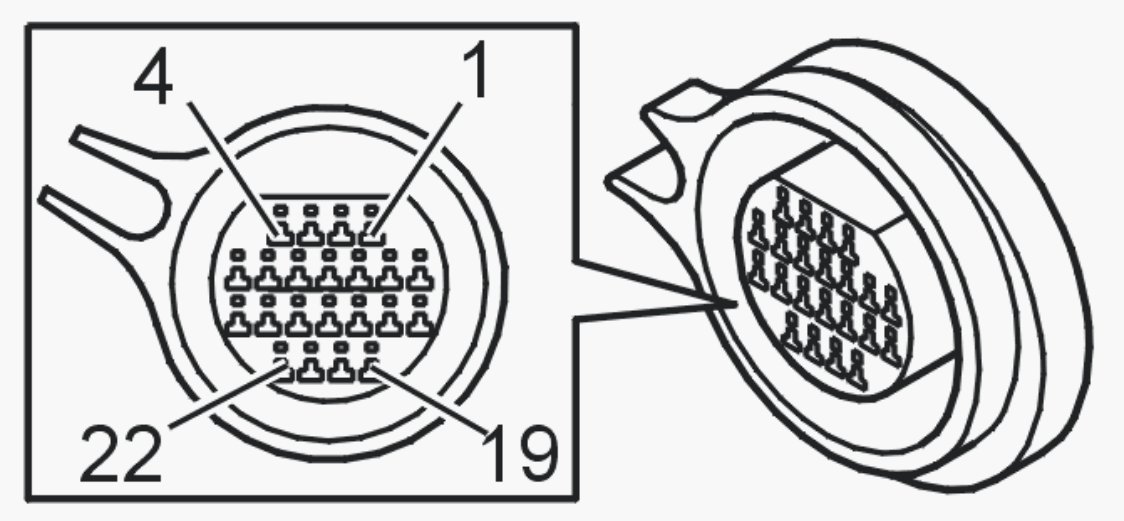


Fig. 414: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

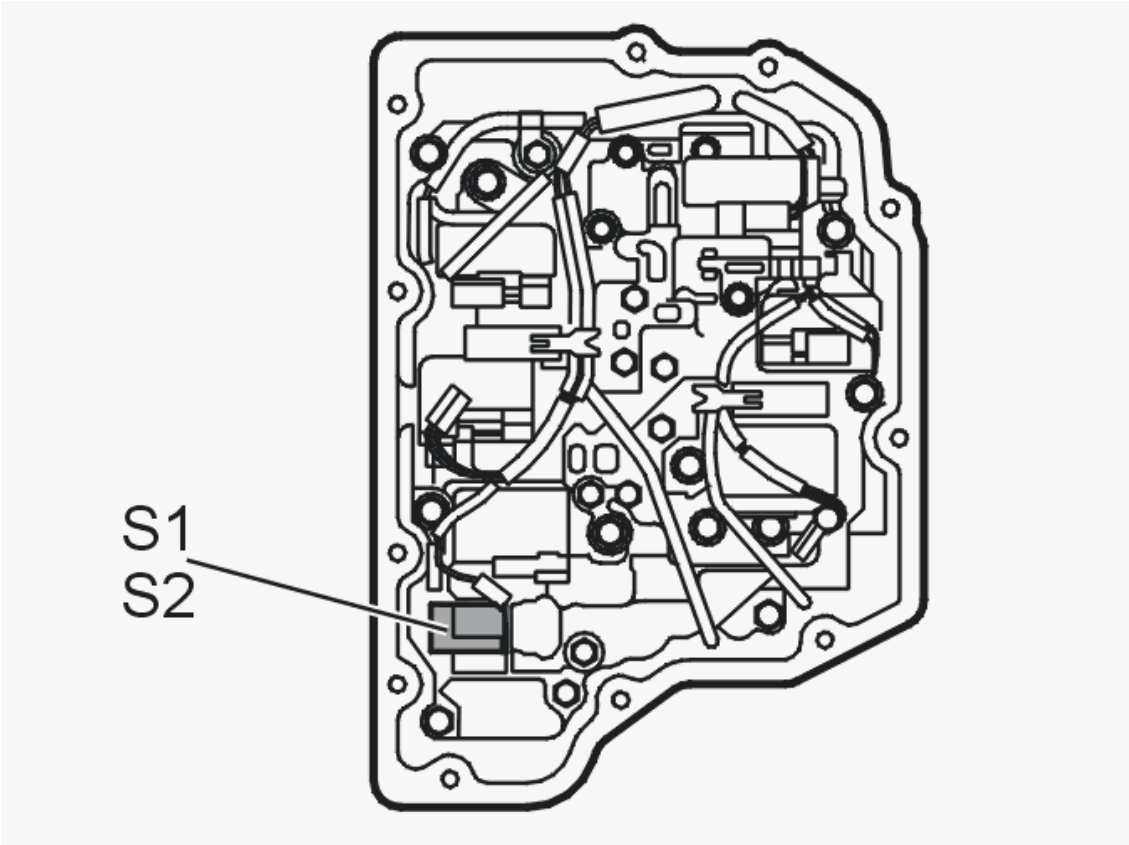


Fig. 415: Locating Shift Solenoids S1 & S2
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

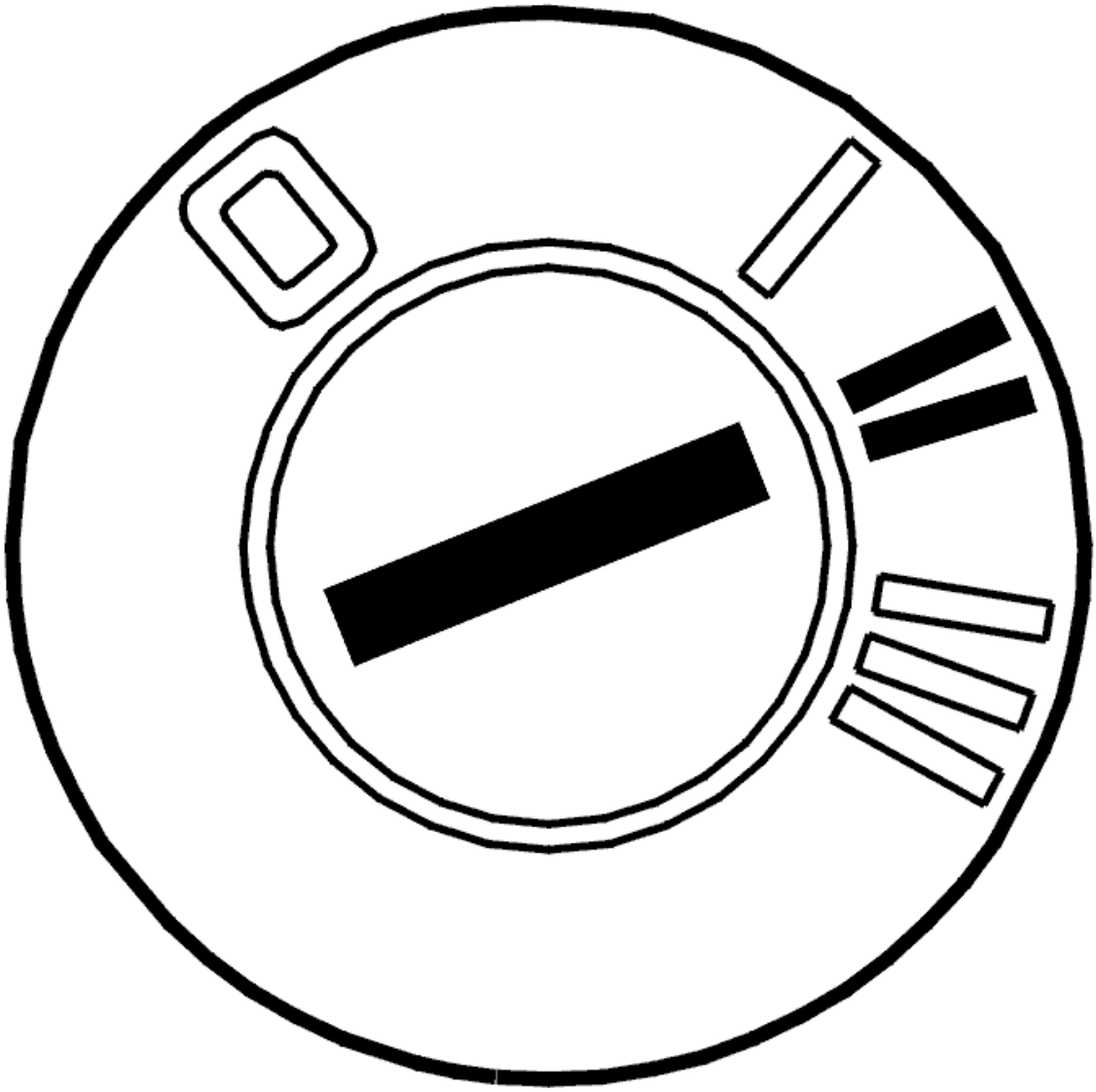


Fig. 416: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

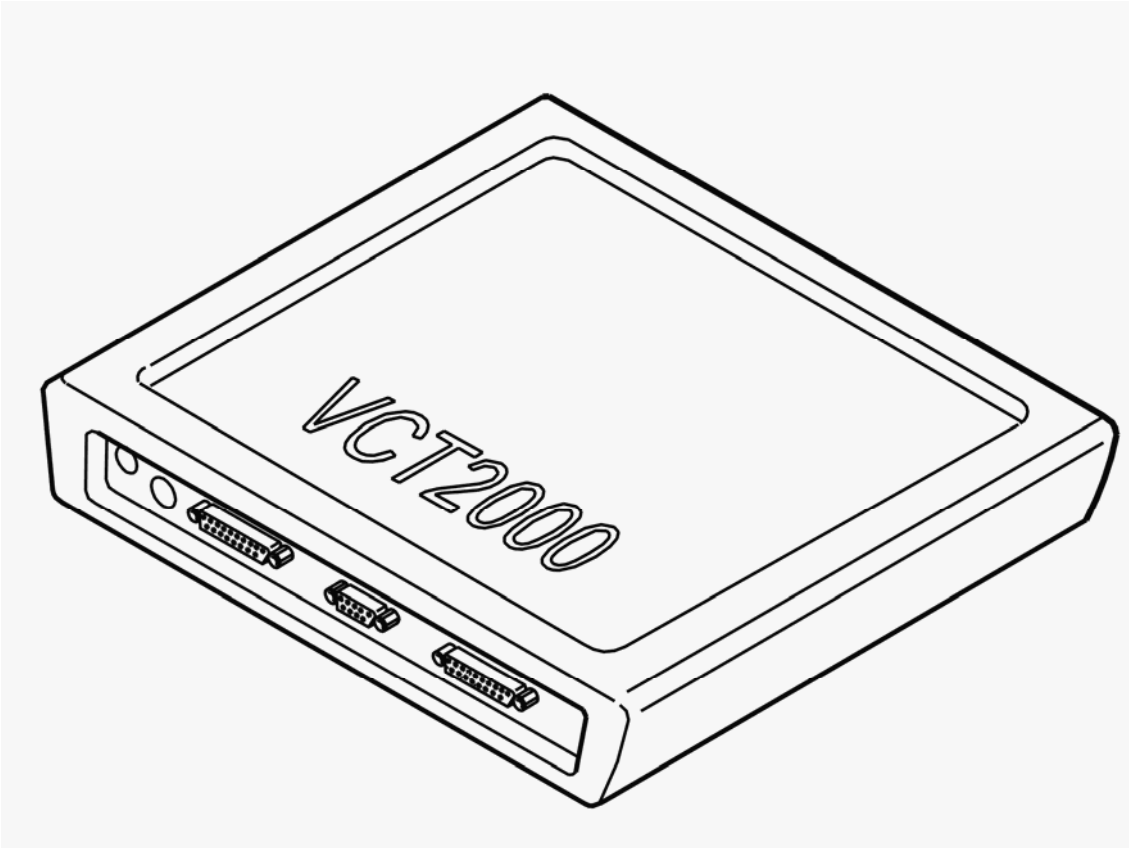


Fig. 417: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

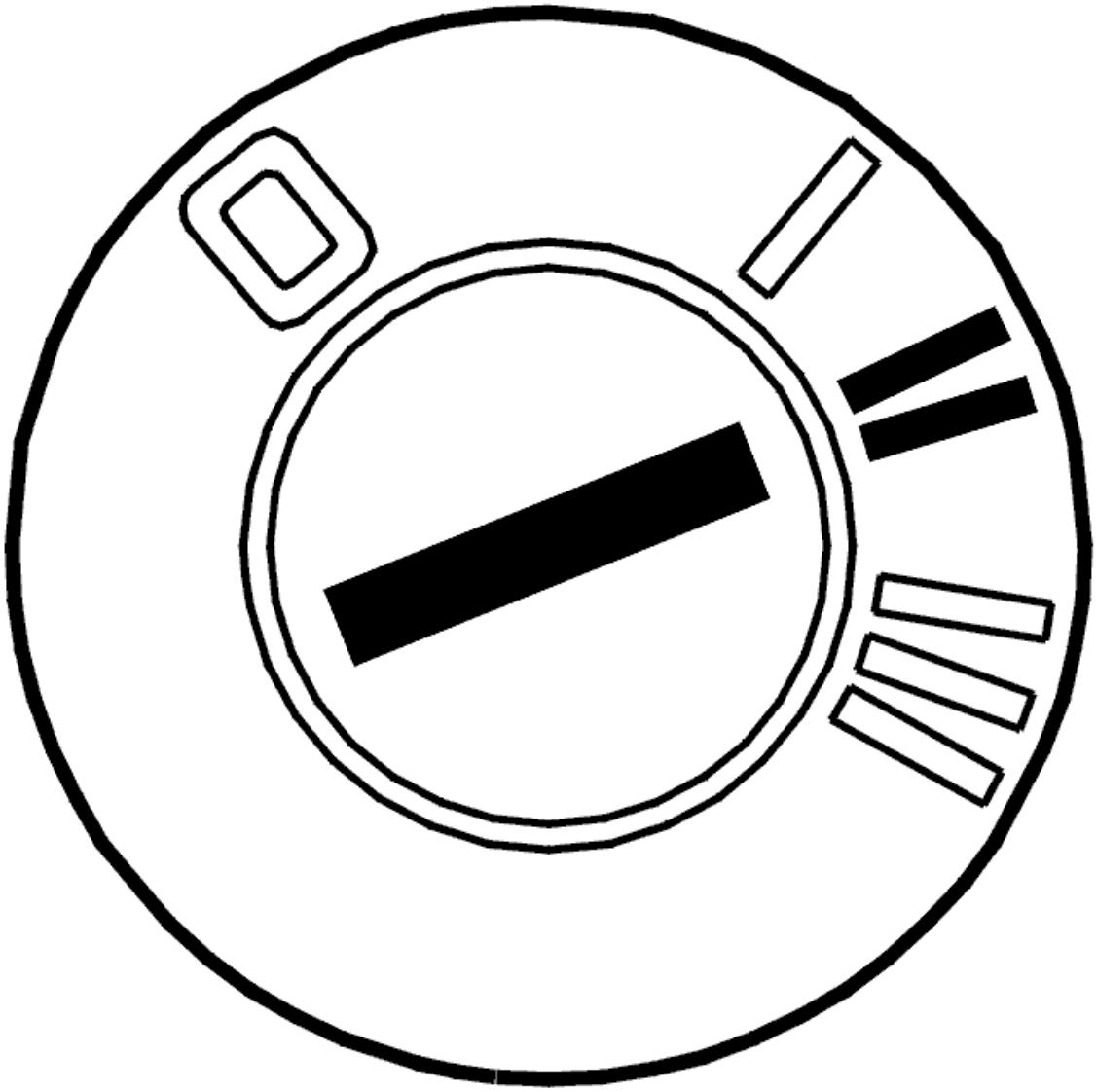


Fig. 418: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

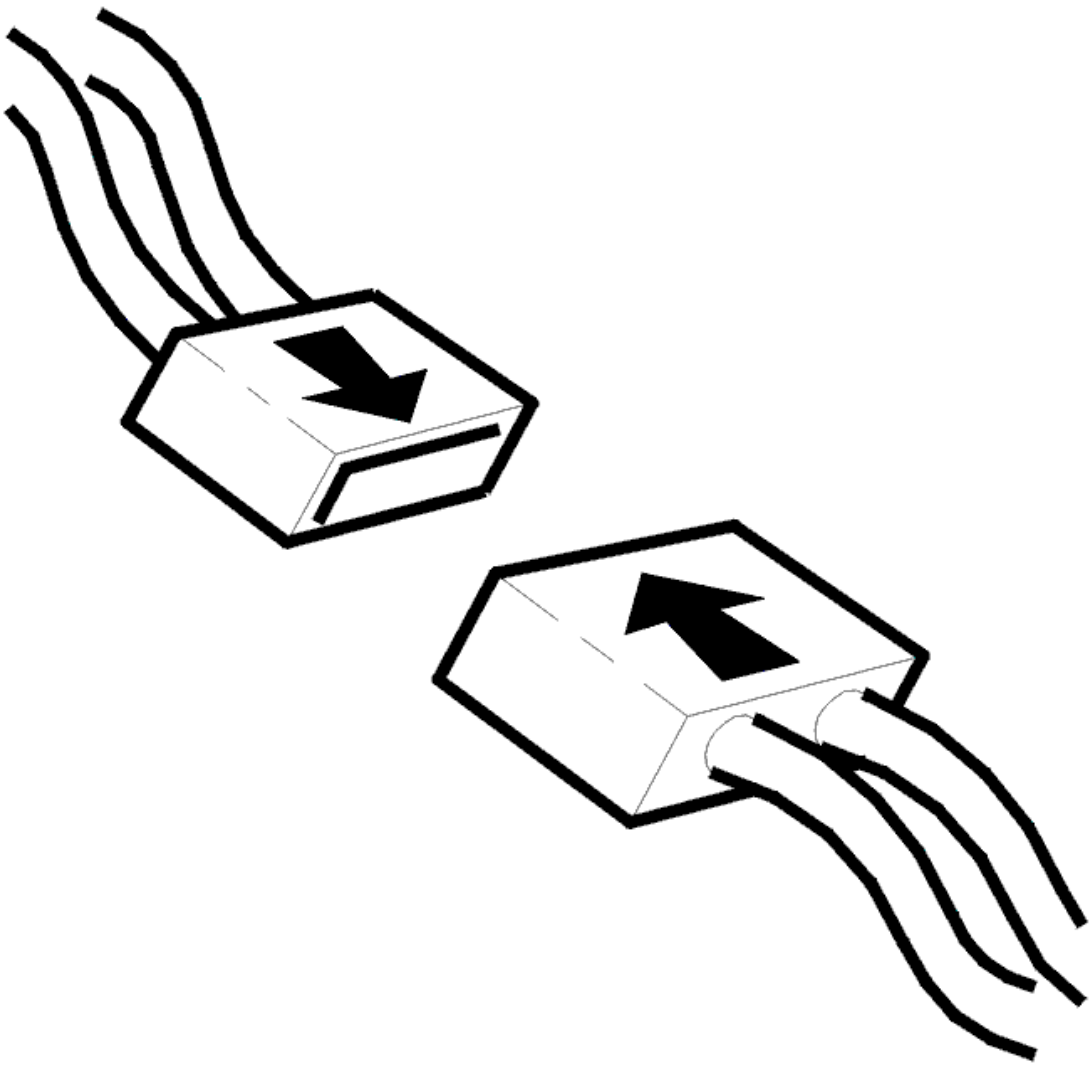


Fig. 419: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid S2 by clicking the symbol for VCT2000.

  Read the status of solenoid S2. The status must switch between OFF and ON.

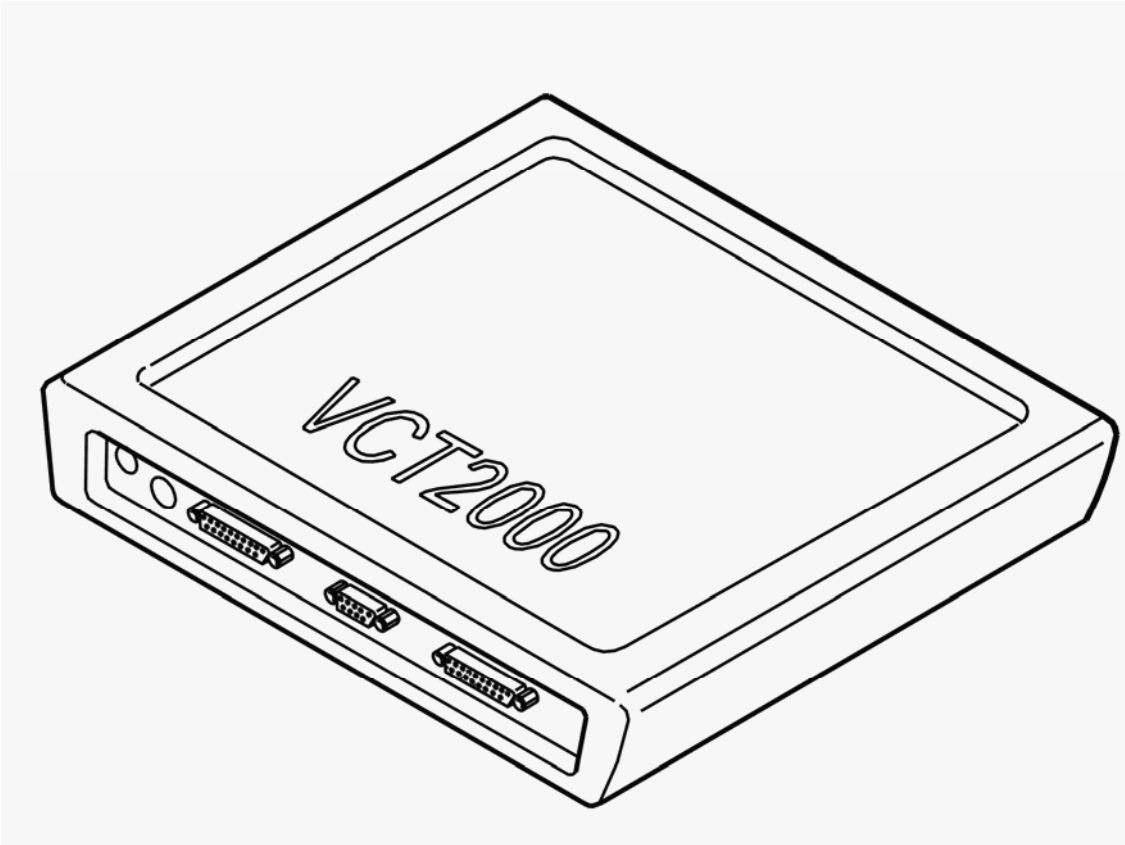


Fig. 420: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P097700: SHIFT SOLENOID B CONTROL CIRCUIT HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD;

2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

FAULT TRACING TCM-P097700

see **FAULT TRACING TCM-P097700**

TCM-P170100: REVERSE ENGAGEMENT ERROR. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P170100

Condition

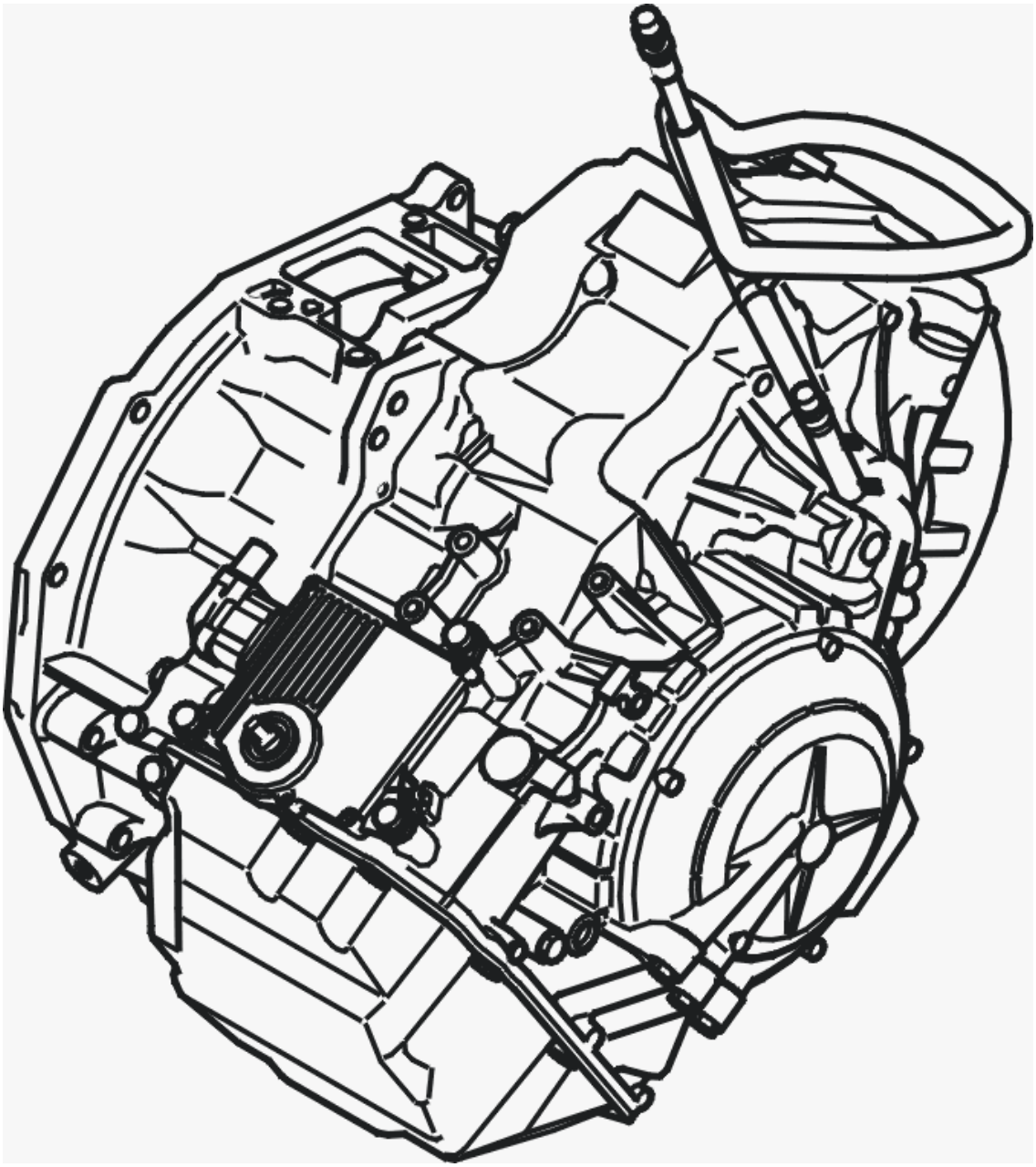


Fig. 421: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

If the transmission control module (TCM) registers that reverse or forward drive is not engaged when the gear selector is moved to position R or D, diagnostic trouble code (DTC) TCM-P170100 or TCM-P073000 depending on the cause of the fault.

The diagnostic trouble code can be diagnosed when the engine is running.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in connections or one of the solenoids has stuck in OFF or ON position.
- Mechanical faults in gearbox.

Fault symptom[s]

- Warning lights and chimes/Malfunction Indicator Light ("Check engine" light) indication/no indication
- Text window and warning symbol/Red symbol and text message
- Automatic transmission/No automatic gearshift

FAULT TRACING

see **FAULT TRACING**

TCM-P170100: REVERSE ENGAGEMENT ERROR. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P170100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P170100**

FAULT TRACING

see **FAULT TRACING**

TCM-P170164: REVERSE ENGAGEMENT ERROR. ALGORITHM BASED FAILURES. SIGNAL PLAUSIBILITY FAILURE (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P170164

Condition

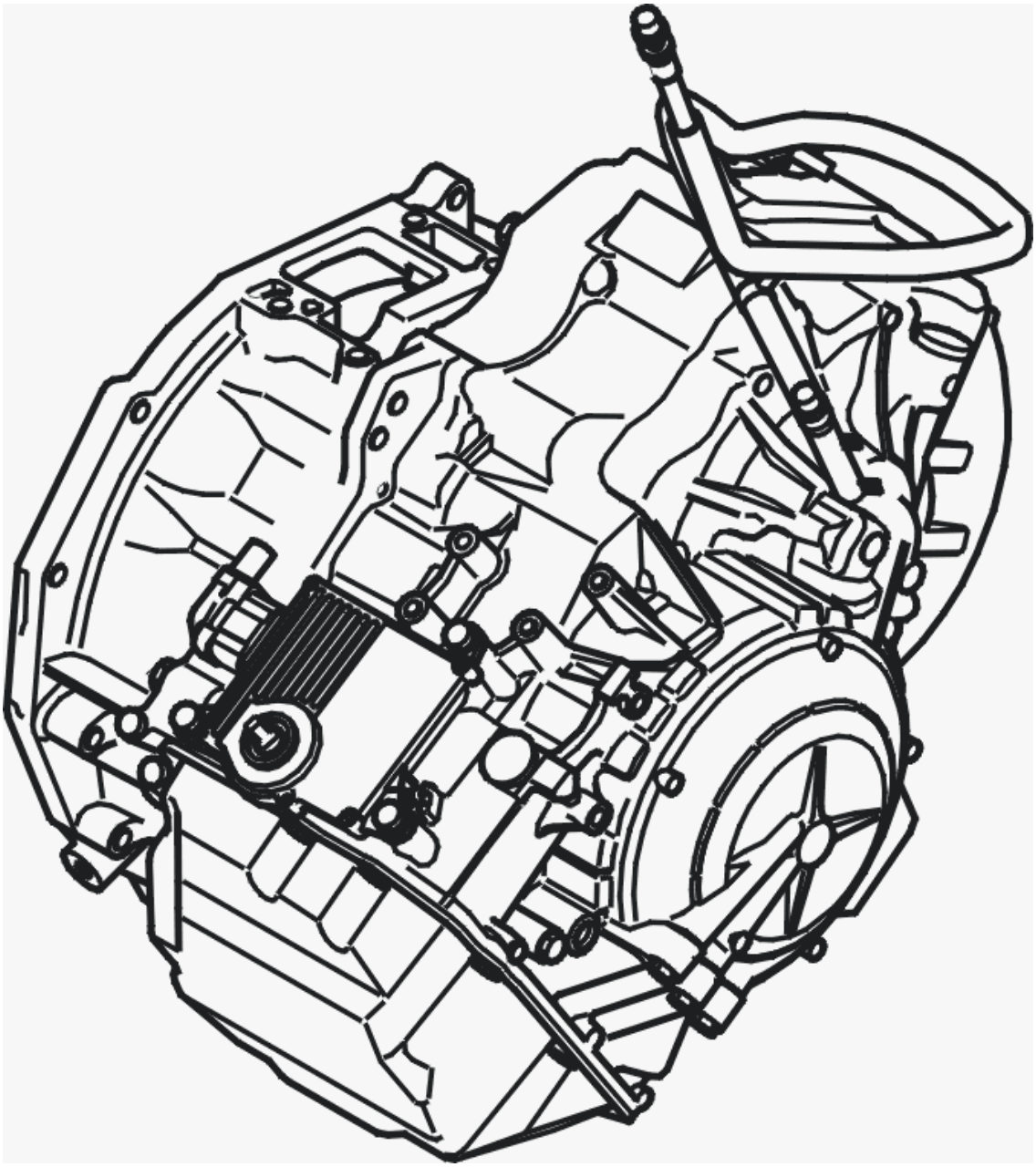


Fig. 422: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

If the transmission control module (TCM) registers that reverse or forward drive is not engaged when the gear selector is moved to position R or D, diagnostic trouble code (DTC) TCM-P170164 or TCM-P073000 depending on the cause of the fault.

The diagnostic trouble code can be diagnosed when the engine is running.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in connections or one of the solenoids has stuck in OFF or ON position.
- Mechanical faults in gearbox.

Fault symptom[s]

- Warning lights and chimes/Malfunction Indicator Light ("Check engine" light) indication/no indication
- Text window and warning symbol/Red symbol and text message
- Automatic transmission/No automatic gearshift

FAULT TRACING

FAULT-TRACING INFORMATION

CHECKING THE GEAR SYSTEM

Problems that the customer may experience are hard shifts or slipping shifts. The following test-drive contains several different driving situations that may provoke these symptoms if the transmission is damaged.

NOTE: It is important that the transmission oil is above 70 °C before the test-drive starts

Test 1

1. Driving at 100 km/h, 6th gear.
2. Perform a kickdown to 4th gear.
3. Let the transmission automatically shift up to 5th gear.
4. Let up the accelerator pedal and let the transmission shift up to 6th gear.

Test 2

1. Driving at 100 km/h, 6th gear.
2. Slight uphill grade, press accelerator pedal until you obtain shifting 6-5, not kickdown.

Test 3

1. Driving at 80 km/h.
2. Move the gear selector to position M and engage 6th gear.
3. Perform a kickdown and shift 6-5, 5-4, 4-3 at the same time.
4. Then upshift immediately to 6th gear.

Test 4

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position R.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

Test 5

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position D.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

If the symptoms hard shifts or slipping shifts arise during the test-drive, the transmission's control system must be replaced.

Other information

- see **CONTROL SYSTEMS**

Is the function OK?

- **YES**

  Refer to **CHECKING SOLENOID SLC1**

- **NO**

  Refer to **REPLACING THE CONTROL SYSTEM**

CHECKING SOLENOID SLC1

Fig. 423: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLC1 by clicking the VCT2000 symbol.

Read the current through the circuit for solenoid SLC1. The current should oscillate between 100 and 950 mA.

The fault is in the control system if the current does not oscillate. If the current varies and a clicking noise is heard, the control signal from the Transmission control module (TCM) and the solenoid's function is OK.

NOTE: Depending on the transaxle and oil temperature, the noise level from the solenoids may vary considerably. When the transaxle is hot or extremely cold, the noise level may be extremely low. Use a stethoscope.

HINT: To obtain a "click" more easily, move the gear selector to different positions and then try to activate the solenoid again.

Fig. 424: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

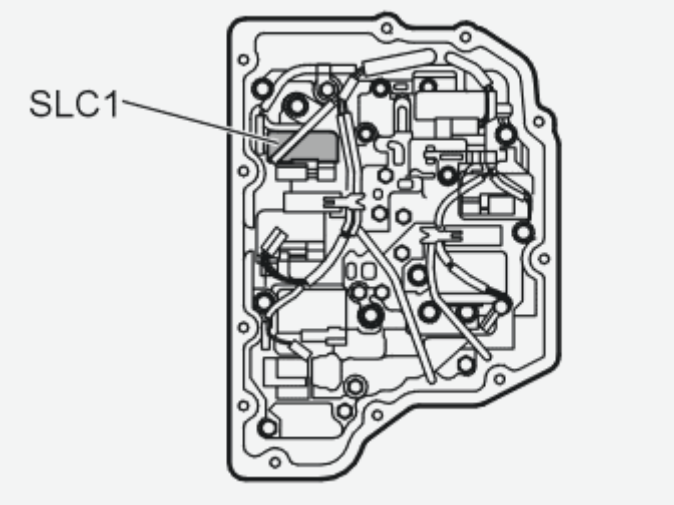


Fig. 425: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

Is the control signal of the solenoid OK?

- **YES**

  Refer to **REPLACING THE TRANSMISSION**

- **NO**

  Refer to **REPLACING THE CONTROL SYSTEM**

REPLACING THE TRANSMISSION

The transmission control module (TCM) has registered an internal malfunction in the transmission. Replace the transmission.

Other information

- see **TRANSMISSION** (B6324S, TF-80SC; 2007-2010)**TRANSMISSION** (B6324S, TF-80SC AWD; 2007-2010)

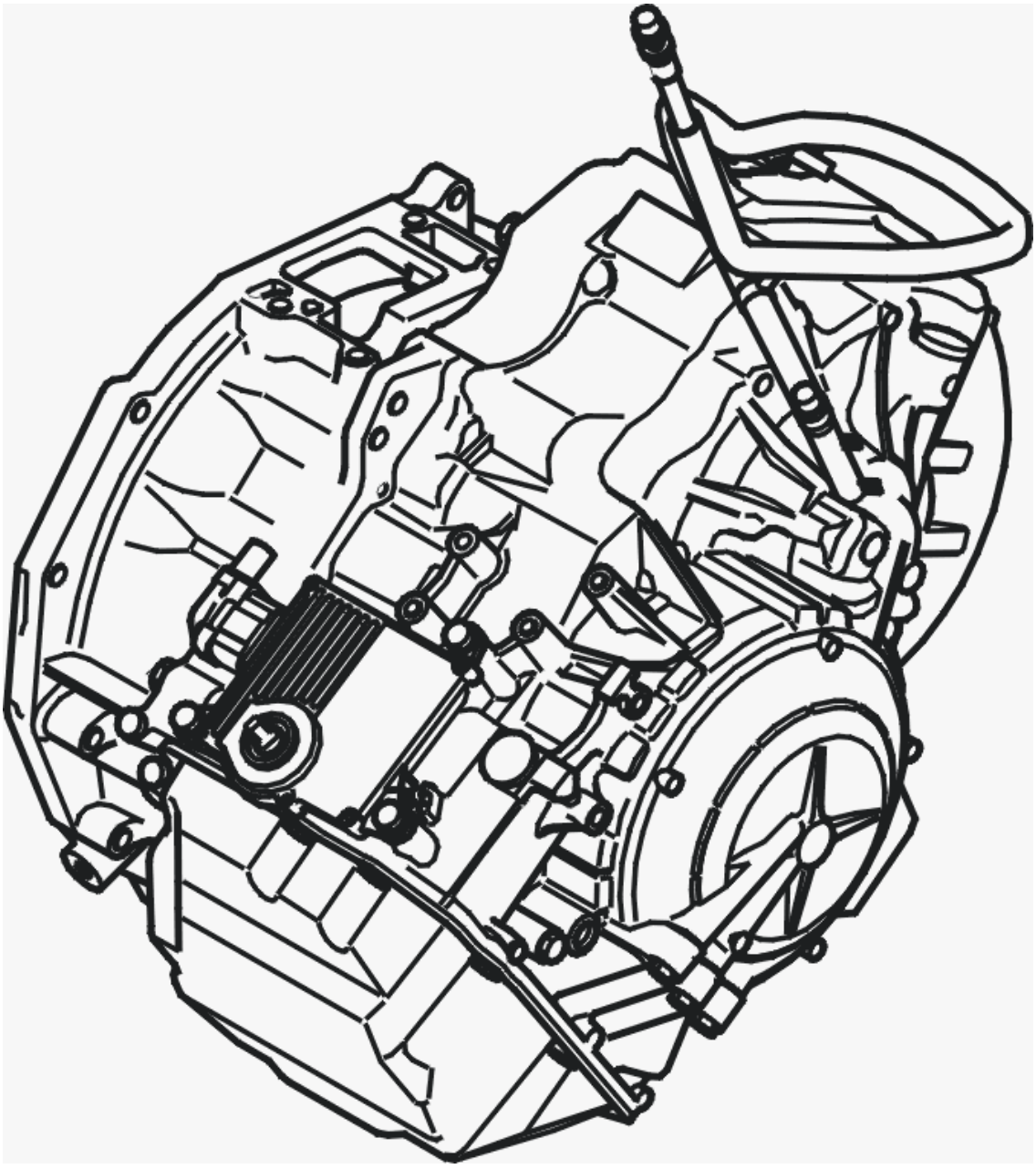


Fig. 426: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING ADAPTATION**

REPLACING THE CONTROL SYSTEM

Replace control system as follows:**CONTROL SYSTEMS**

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

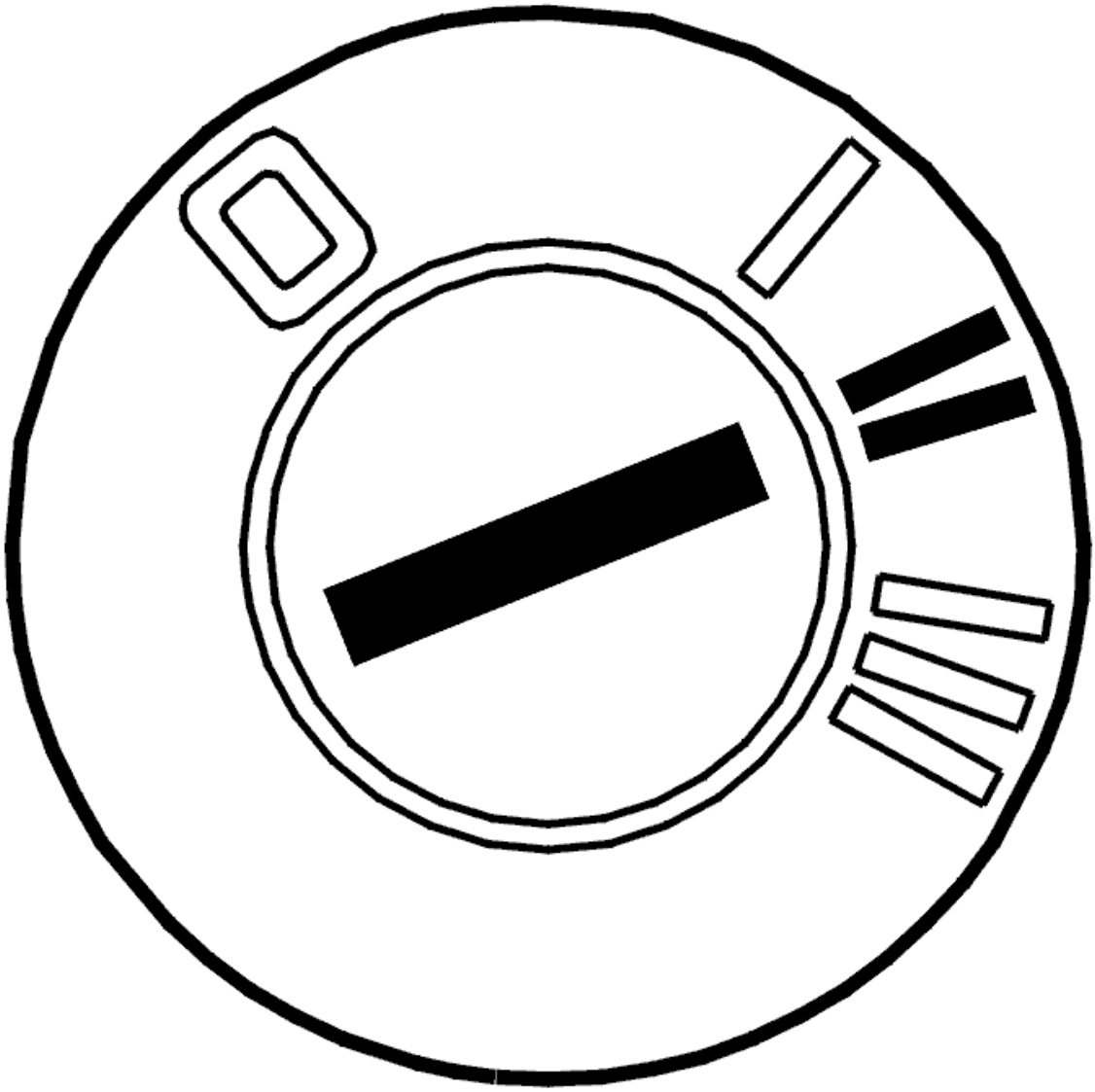


Fig. 427: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

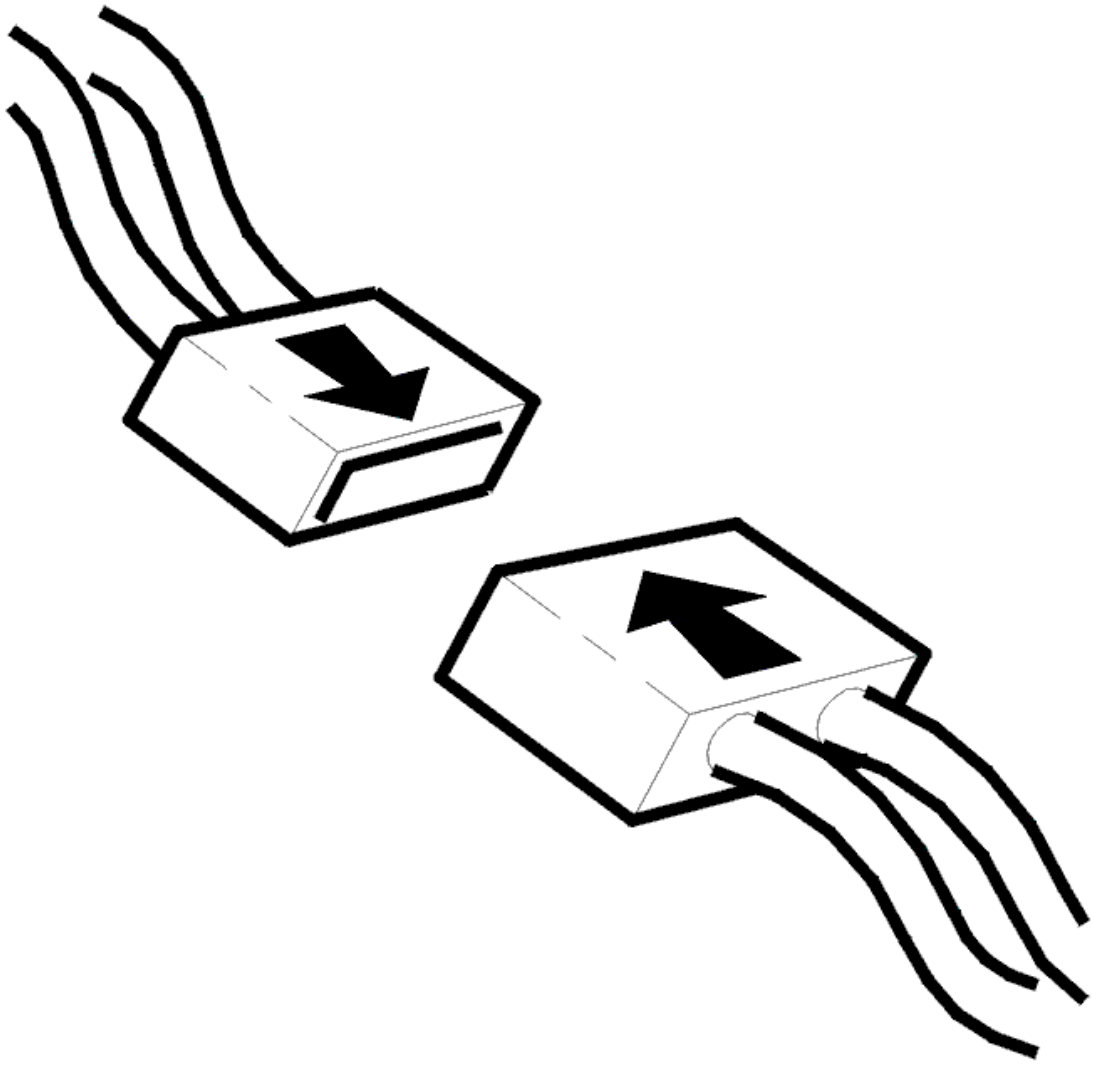


Fig. 428: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- The gear shift position sensor for the transmission must be calibrated if the control module has been disconnected.

  HINT: Save a bookmark. Cancel fault-tracing and select Vehicle communication in VIDA (Volvo scan tool).

- Start the engine.

Test drive the vehicle following: **TEST DRIVE SCHEDULE, DESCRIPTION**

Check that the transmission does not display any **obvious** function faults.

NOTE: When test driving, the oil temperature must be above 20 °C.

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 429: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 430: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TRANSMISSION

Transmission - Diagnostic Trouble Codes and Associated Procedures

TCM-P170164: REVERSE ENGAGEMENT ERROR. ALGORITHM3 BASED FAILURES. SIGNAL PLAUSIBILITY FAILURE (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P170164

Condition

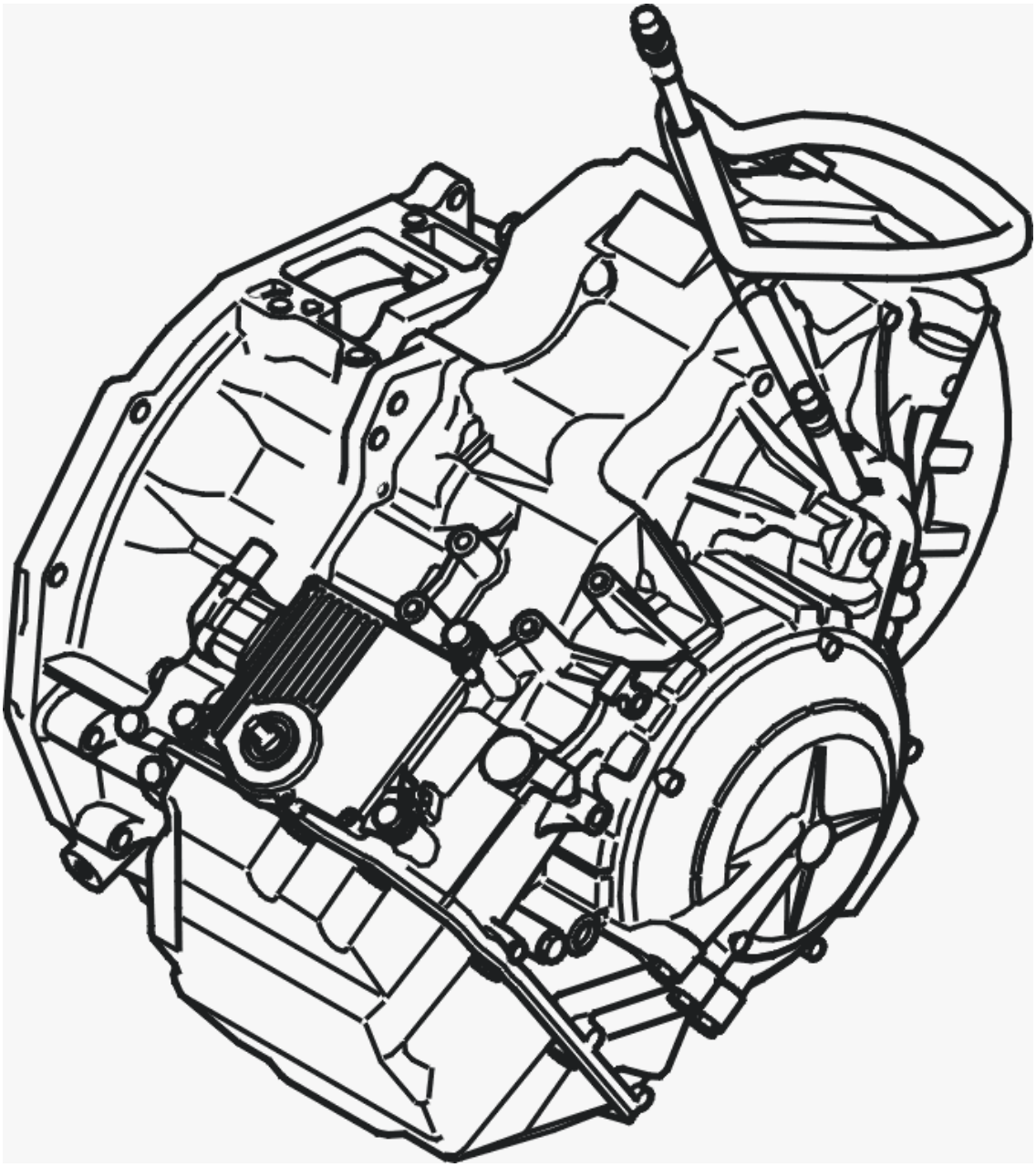


Fig. 1: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

If the transmission control module (TCM) registers that reverse or forward drive is not engaged when the gear selector is moved to position R or D, diagnostic trouble code (DTC) TCM-P170164 or TCM-P073000 depending on the cause of the fault.

The diagnostic trouble code can be diagnosed when the engine is running.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in connections or one of the solenoids has stuck in OFF or ON position.
- Mechanical faults in gearbox.

Fault symptom[s]

- Warning lights and chimes/Malfunction Indicator Light ("Check engine" light) indication/no indication
- Text window and warning symbol/Red symbol and text message
- Automatic transmission/No automatic gearshift

FAULT TRACING

see **FAULT TRACING**

TCM-P171900: ENGINE TORQUE SIGNAL. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P171900

Condition

The engine control module (ECM) puts a signal about the present torque on the control area network (CAN). The transmission control module (TCM) uses the signal to determine shift points and to adjust system pressure in the transmission.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- There is no torque signal from the engine control module (ECM) or the signal is faulty.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on and CAN network OK.

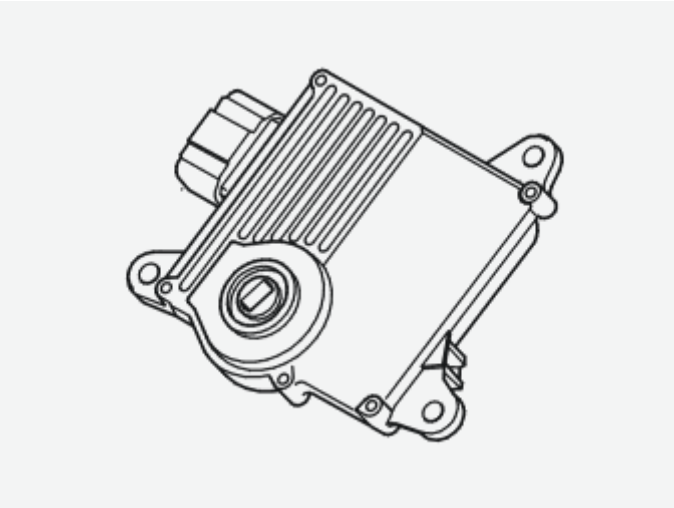


Fig. 2: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Fault-trace the central electronic module (CEM).
- Locate the cause of the fault in the engine control module (ECM).
- Intermittent open circuit or short-circuit on the CAN lead between the engine control module (ECM) and the transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Rough gear shift
- No gear shift
- No lock-up

FAULT-TRACING

INFORMATION

No fault-tracing has been developed for this diagnostic trouble code (DTC).

A diagnostic trouble code for CAN communication can be stored in the central electronic module (CEM). IN some cases, a diagnostic trouble code is stored in other affected control modules. This diagnostic trouble code is not to be erased until any CAN communication trouble codes in the central electronic module (CEM) or engine

control module (ECM) are remedied and erased.

Therefore, first read the diagnostic trouble codes in the central electronic module (CEM) and the engine control module (ECM), perform troubleshooting and remedy as necessary. If no diagnostic trouble codes (DTCs) are stored, fault-trace the controller area network (CAN) as follows. This diagnostic trouble code (DTC) can then be erased.

For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Other information

- see **GENERAL INFORMATION ABOUT FAULT-TRACING IN THE CAN NETWORK**

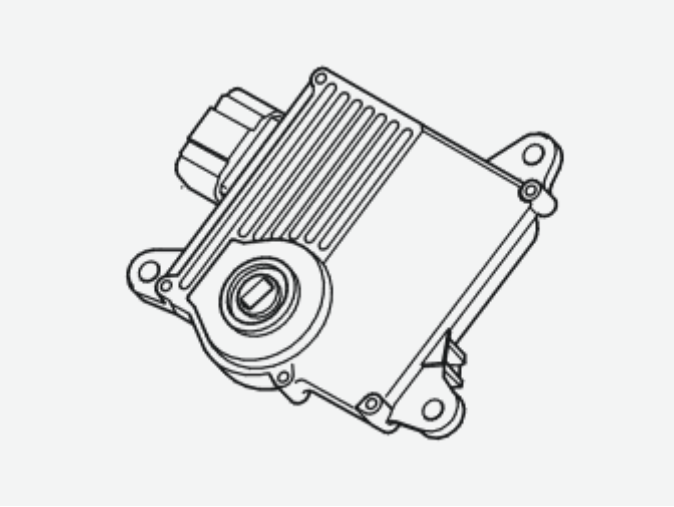


Fig. 3: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

TCM-P171900: ENGINE TORQUE SIGNAL. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P171900

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P171900**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P171900: ENGINE TORQUE SIGNAL. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P171900

Condition

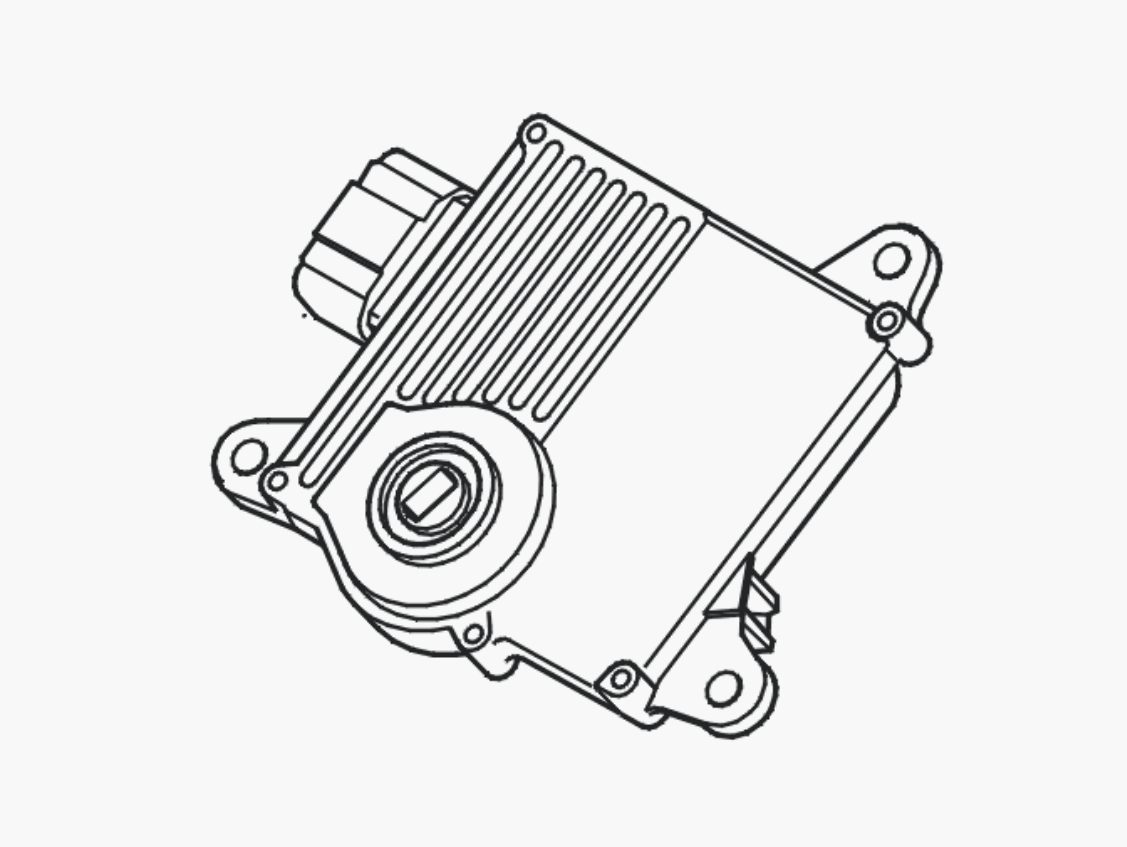


Fig. 4: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The engine control module (ECM) puts the signal for the current torque on the CAN network. The transmission control module (TCM) uses the signal to determine the shifting points and to adjust the system pressure in the gearbox.

If the transmission control module (TCM) registers that the torque signal from the engine control module (ECM) is missing or is indicated as incorrect, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code (DTC) can be diagnosed when the ignition is turned on and the CAN network is OK.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Seek cause of fault in central electronic module (CEM).
- Locate the cause of the fault in the engine control module (ECM).
- Intermittent open circuit or short-circuit on the CAN lead between the engine control module (ECM) and the transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Harsh gear changing
- No gear changing.
- No lock-up function.

TROUBLESHOOTING INFORMATION TCM-P171900

INFORMATION

No troubleshooting has been developed for this diagnostic trouble code.

The diagnostic trouble code (DTC) for CAN communication can also be stored in the Central Electronic module (CEM). In certain instances the diagnostic trouble code (DTC) is also set in other affected control modules. This diagnostic trouble code (DTC) must not be erased before any diagnostic trouble codes (DTC) in the Central Electronic Module (CEM), for CAN communication, and in the Engine Control Module (ECM) have first been remedied and erased.

First read off the diagnostic trouble codes (DTCs) in the central electronic module (CEM) and the engine control module (ECM). Fault-trace and remedy as necessary. If no diagnostic trouble codes (DTCs) are stored, fault-trace the controller area network (CAN) as follows. This diagnostic trouble code (DTC) can then be erased.

For more information about the diagnostic trouble code (DTC) see diagnostic trouble code (DTC) information.

Other information

- see **TROUBLESHOOTING**

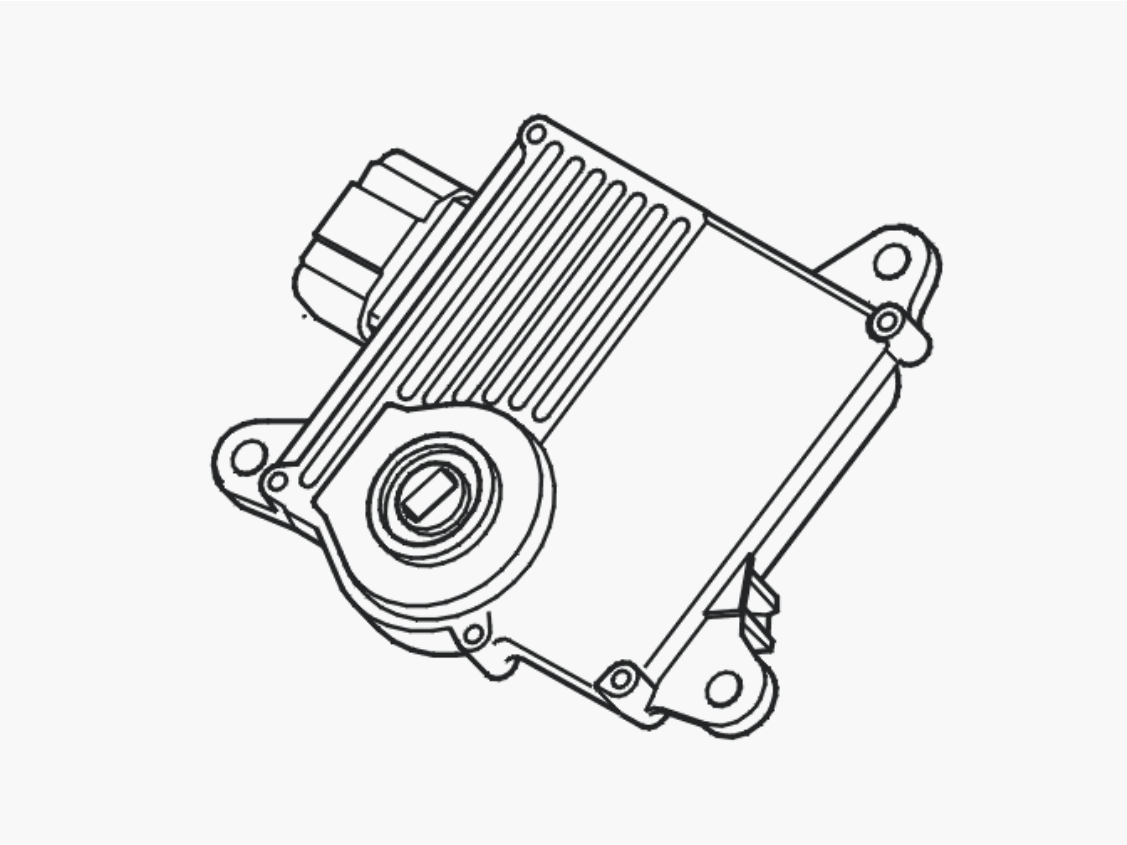


Fig. 5: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

TCM-P171900: ENGINE TORQUE SIGNAL. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P171900

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P171900**

TROUBLESHOOTING INFORMATION TCM-P171900

see **TROUBLESHOOTING INFORMATION TCM-P171900**

TCM-P178368: TRANSMISSION OVERTEMPERATURE CONDITION. ALGORITHM BASED FAILURES. EVENT INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P178368

Condition

NOTE: This diagnostic trouble code (DTC) status is an event controlled diagnostic trouble code (DTC). An event controlled diagnostic trouble code (DTC) does not mean that there is a fault in the control module when it is active, but is designed as information.

The oil temperature sensor provides the Transmission control module (TCM) with a signal that is used, among other things, for the temperature controlled lock-up and engagement high temperature program functions. If the Transmission control module (TCM) registers that oil temperature in the transmission is too high, a signal is transmitted to the Engine control module (ECM) to reduce the engine's torque. This is to protect the gear box from too high load, which can result in internal mechanical faults.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The gear box oil temperature has been greater than 150 °C.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Normal driving.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

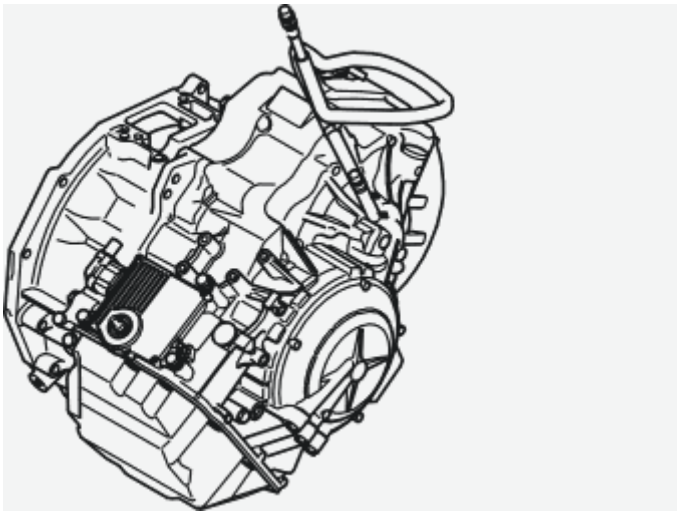


Fig. 6: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- The engine limits the torque until the gear box oil temperature has dropped below a certain level.

Possible Source

- The gear box oil has had too high a temperature for too long.

Fault symptom[s]

- Message in information display
- Poor performance

FAULT-TRACING INFORMATION

There is no fault-tracing for this diagnostic fault code (DTC).

For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

TCM-P178368: TRANSMISSION OVERTEMPERATURE CONDITION. ALGORITHM BASED FAILURES. EVENT INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P178368

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P178368**

FAULT-TRACING INFORMATION

There is no fault-tracing for this diagnostic fault code (DTC).

For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

TCM-P179900: CAN TCM/ABS CIRCUIT MALFUNCTION. BUS SIGNAL / MESSAGE FAILURES. MISSING MESSAGE (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P179900

Condition

The brake control module (BCM) transmits a vehicle speed signal on the CAN network. The transmission control module (TCM) uses the signal to diagnose the transmission input and output speed sensor.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- There is no signal from the brake control module (BCM) or the signal is faulty.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Engine running.

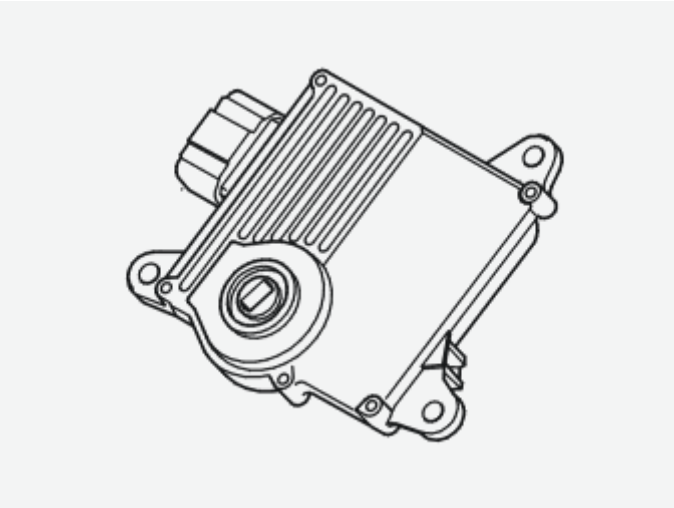


Fig. 7: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- None.

Possible Source

- Internal fault in the brake control module (BCM).
- Fault in the control area network (CAN).

Fault symptom[s]

- General warning lamp lit

FAULT-TRACING

INFORMATION

No fault-tracing has been developed for this diagnostic trouble code (DTC).

A diagnostic trouble code for CAN communication can be stored in the central electronic module (CEM). IN some cases, a diagnostic trouble code is stored in other affected control modules. This diagnostic trouble code is not to be erased until any CAN communication trouble codes in the central electronic module (CEM) and any trouble codes in the brake control module (BCM) are remedied and erased.

Therefore, first read the diagnostic trouble codes in the central electronic module (CEM) and the brake control module (BCM), perform troubleshooting and remedy as necessary. If no diagnostic trouble codes (DTCs) are stored, fault-trace the controller area network (CAN) as follows. This diagnostic trouble code (DTC) can then be erased.

For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Other information

- see **GENERAL INFORMATION ABOUT FAULT-TRACING IN THE CAN NETWORK**

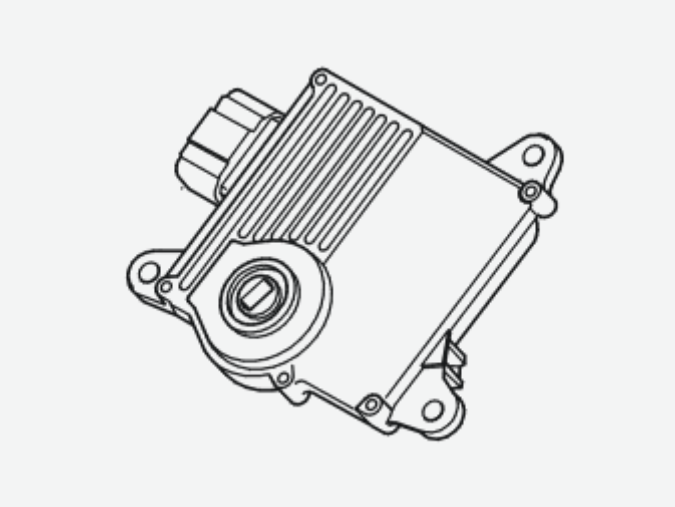


Fig. 8: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

TCM-P179900: CAN TCM/ABS CIRCUIT MALFUNCTION. BUS SIGNAL / MESSAGE FAILURES. MISSING MESSAGE (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P179900

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P179900**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P179900: CAN TCM/ABS CIRCUIT MALFUNCTION. BUS/MESSAGE ERROR. MESSAGE MISSING (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P179900

Condition

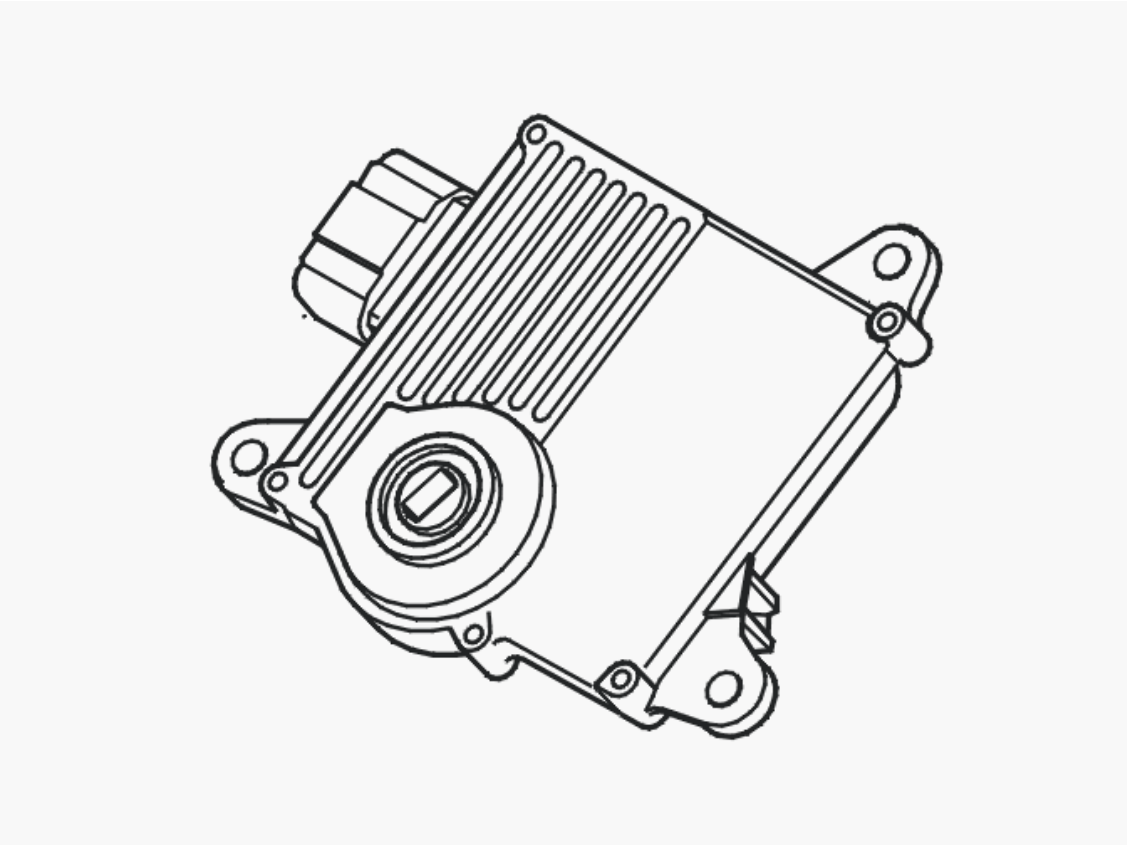


Fig. 9: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The brake control module (BCM) puts a signal for the vehicle speed on the CAN network. The transmission control module (TCM) uses the signal to diagnose the gearbox input and output speed sensors.

If the transmission control module (TCM) registers that the signal from the brake control module (BCM) is missing or indicated as incorrect, the diagnostic trouble code (DTC) is generated.

Substitute Value

- Nothing.

Possible Source

- Internal fault in brake control module (BCM).
- Fault on CAN network.

Fault symptom[s]

- General warning lamp lit

FAULT TRACING TCM-P179900

INFORMATION

No troubleshooting has been developed for this diagnostic trouble code.

The diagnostic trouble code (DTC) for CAN communication can also be stored in the Central Electronic module (CEM). In certain instances the diagnostic trouble code (DTC) is also set in other affected control modules. This diagnostic trouble code (DTC) must not be erased before any diagnostic trouble codes (DTC) in the Central Electronic Module (CEM), for CAN communication, and in the brake control (BCM) have first been remedied and erased.

First read off the diagnostic trouble codes (DTCs) in the central electronic module (CEM) and the brake control module (BCM). Troubleshoot and remedy as necessary. If no diagnostic trouble codes (DTCs) are stored, troubleshoot the controller area network (CAN) as follows. Then this diagnostic trouble code (DTC) can be erased.

For more information about the diagnostic trouble code (DTC) see diagnostic trouble code (DTC) information.

Other information

- see **TROUBLESHOOTING**

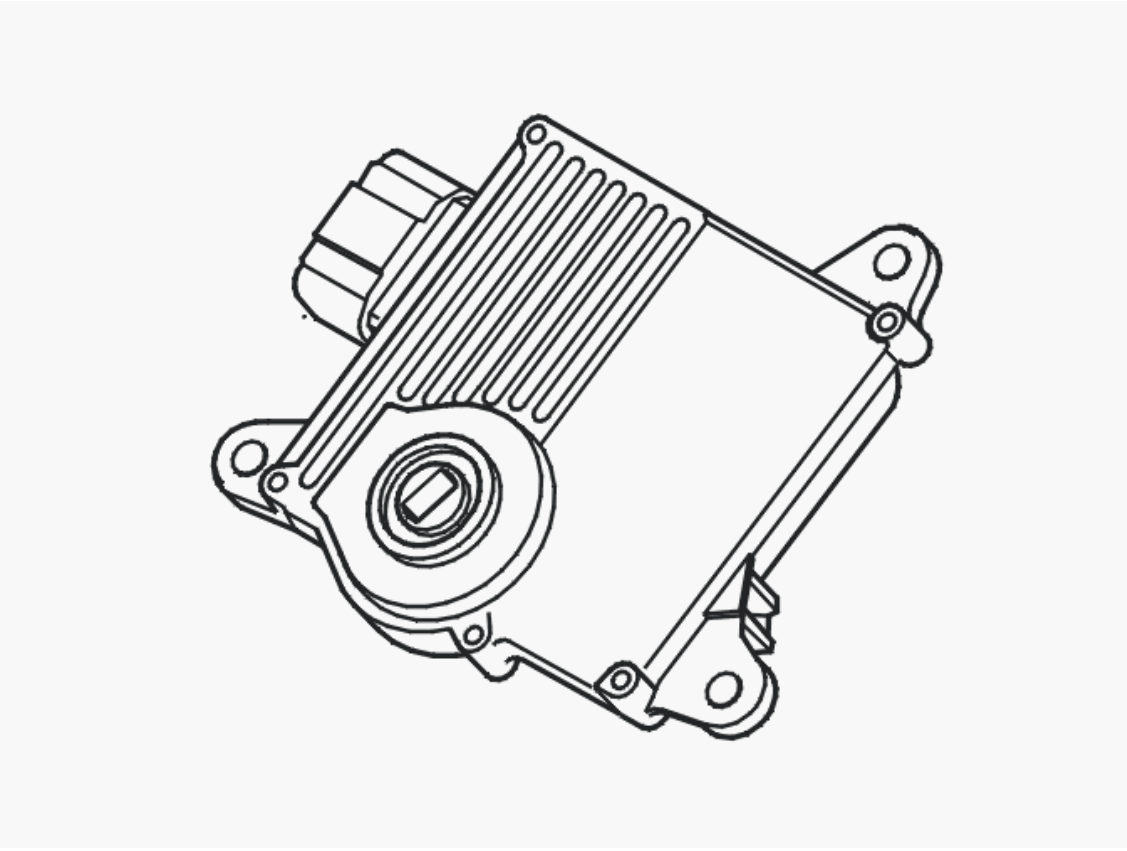


Fig. 10: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

TCM-P179900: CAN TCM/ABS CIRCUIT MALFUNCTION. BUS/MESSAGE ERROR. MESSAGE MISSING (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P179900

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P179900**

FAULT TRACING TCM-P179900

see **FAULT TRACING TCM-P179900**

TCM-P215800: VEHICLE SPEED SENSOR B. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P215800

Condition

The signal for input speed comes from a sensor within the transmission control system. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare transmission speed and vehicle speed. The transmission control module uses this comparison to calculate the gear-shift timing. The rpm and vehicle speed data are also used to adjust system pressure and reduce engine torque when shifting. The result is smooth gear-shifting. The information is also used to control the function.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The circuit to the transmission's speed sensor input speed is missing.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

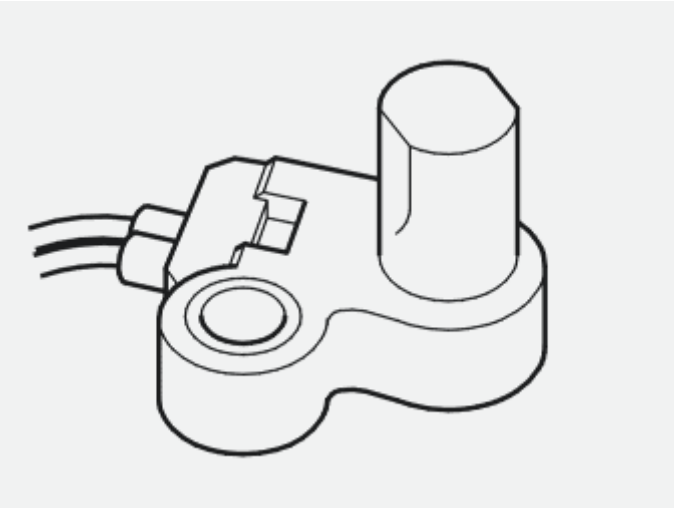


Fig. 11: Identifying Vehicle Speed Sensor
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Open circuit in power supply or signal lead.
- Short-circuit to ground in the signal cable.
- Transmission input speed sensor not working.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- No lock-up
- Rough gear shift
- No gear shift

FAULT-TRACING

see **FAULT-TRACING**

TCM-P215800: VEHICLE SPEED SENSOR B. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC;

B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P215800

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P215800**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P215800: SPEED SENSOR B. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P215800

Condition

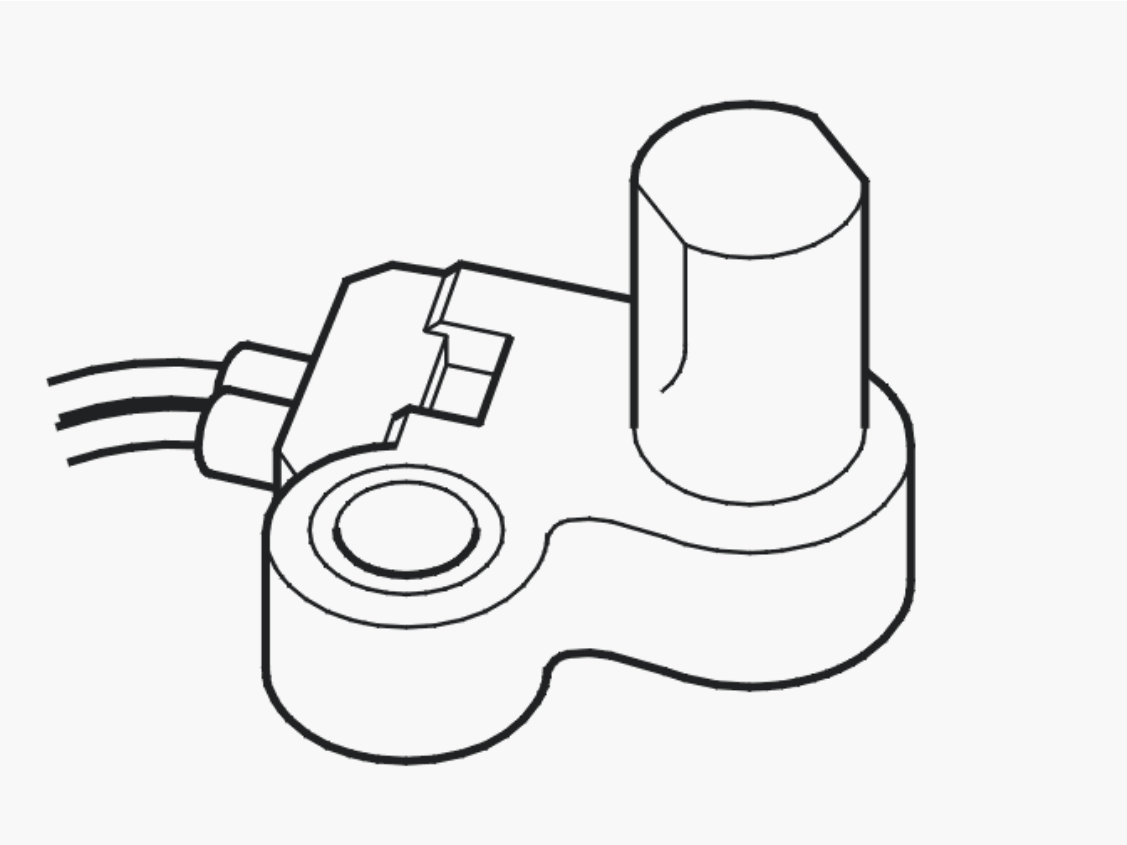


Fig. 12: Identifying Transmission Speed Sensor
Courtesy of VOLVO CARS CORPORATION

The signal for the input speed comes from a sensor inside the transmission control system. The transmission control module (TCM) bases its calculation of the speed of the input shaft after the torque converter on this signal. The signal is used to compare the speed of the gearbox with the vehicle speed. Using this comparison,

the control module can calculate the gear shifting points. The information on RPM and speed affects the adjustment of the system pressure and the reduction of the engine torque when changing gear. This results in smoother gear changes. The information is also used to control the lock-up function.

If the transmission control module (TCM) registers that the circuit to the gearbox input speed sensor is missing, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code (DTC) can be diagnosed when driving normally.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Open circuit in power supply or signal lead.
- The signal cable is short-circuited to ground.
- Gearbox input speed sensor not working.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- No lock-up function.
- Harsh gear changing
- No gear changing.

FAULT TRACING

see **FAULT TRACING**

TCM-P215800: SPEED SENSOR B. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P215800

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P215800**

FAULT TRACING

see **FAULT TRACING**

TCM-P271900: PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P271900

Condition

Linear pressure solenoid SLC3 controls shifting in the transmission. Solenoid SLC3 works when it receives voltage from the transmission control module (TCM). The solenoid is activated during various driving conditions based on speed, throttle position and set driving program.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The measured current in the solenoid circuit is incorrect.

Solenoid SLC3 can then not regulate system pressure.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Shifting when linear pressure solenoid SLC3 is activated.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

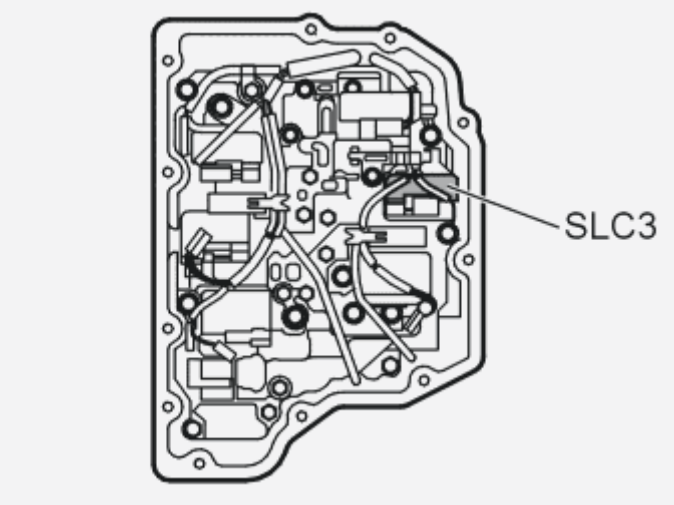


Fig. 13: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the cable for the control signal or signal ground.
- Linear pressure solenoid SLC3 is stuck.
- Linear pressure solenoid SLC3 not working.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Rough gear shift
- No gear shift
- Abnormal slipping gearshifts

FAULT-TRACING

CHECKS

CHECKING LINEAR PRESSURE SOLENOID SLC3

Fig. 14: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLC3 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLC3. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 15: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

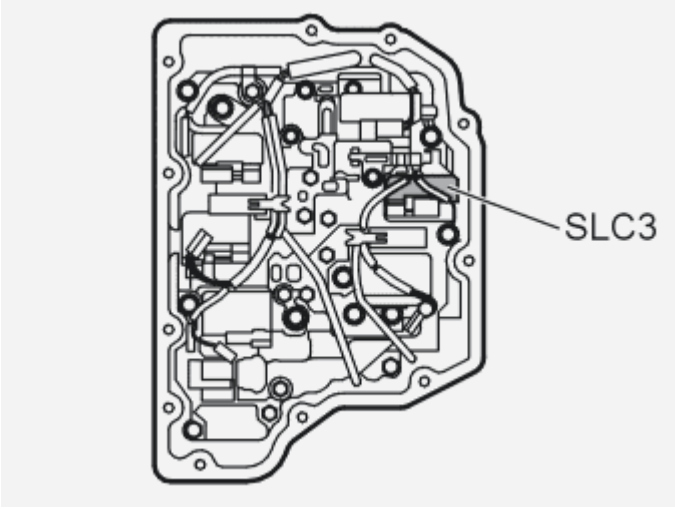


Fig. 16: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

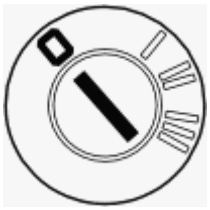


Fig. 17: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

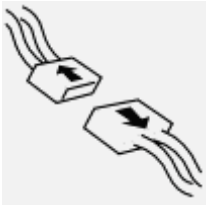


Fig. 18: Identifying Connectors Disconnected

Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

Check the cables for open circuit, short circuit to ground and short circuit to supply voltage.

Take readings between:

- Transmission connector #B14 and the connector for solenoid SLC3 #1.
- Transmission connector #B22 and the connector for solenoid SLC3 #2.

HINT: If no fault is found in the wiring, check solenoid SLC3. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **VALVE HOUSING**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

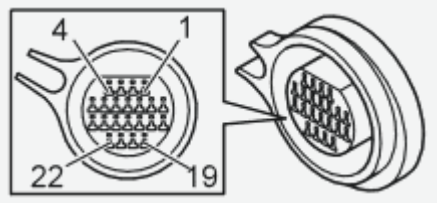


Fig. 19: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

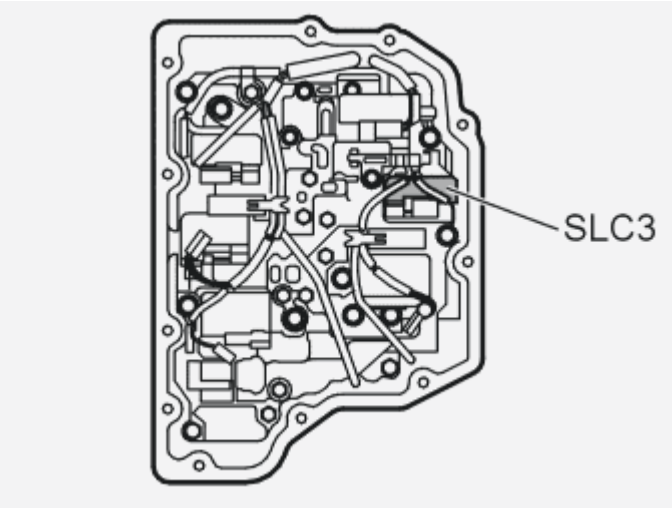


Fig. 20: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 21: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

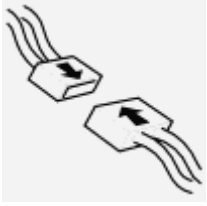


Fig. 22: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.

- Ignition on.
- Activate solenoid SLC3 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLC3. The current should oscillate between 100 and 950 mA.

Fig. 23: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

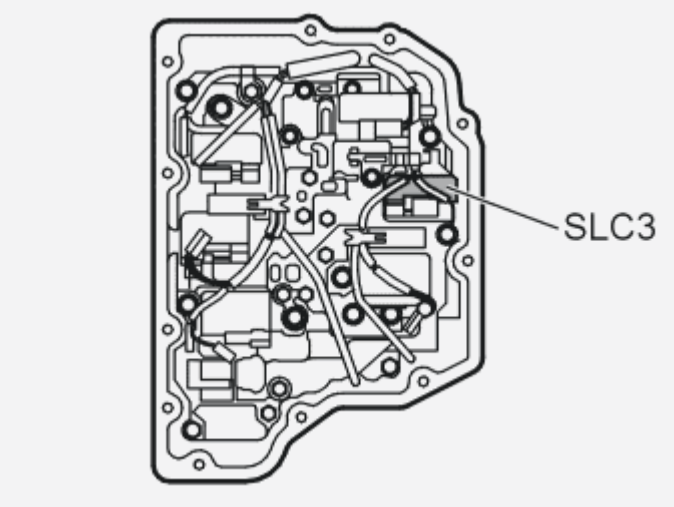


Fig. 24: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 25: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 26: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P271900: PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P271900

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P271900**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P271900: PRESSURE REGULATOR SOLENOID D CONTROL CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO INFORMATION ON FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P271900

Condition

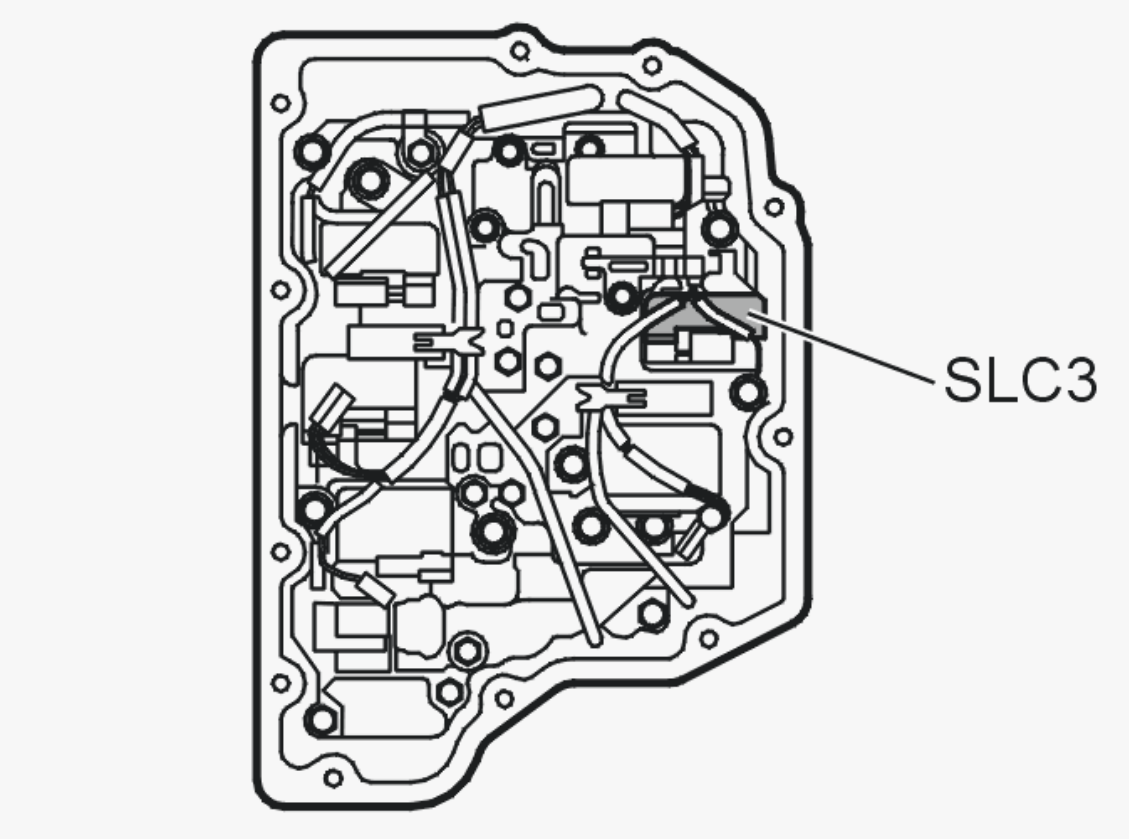


Fig. 27: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

The lock-up solenoid SLC3 controls the lock-up function in the gearbox. The SLC3 solenoid works when it receives power from the transmission control module (TCM) and depending on the speed, accelerator position and driving program setting, the solenoid will be activated for different driving conditions.

If the transmission control module (TCM) registers that the measured current in the solenoid circuit is incorrect, the diagnostic trouble code (DTC) is generated. The SLC3 solenoid is then not able to regulate the system pressure.

The diagnostic trouble code (DTC) can be diagnosed when changing gear while the linear pressure solenoid SLC3 is activated.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals
- Open circuit in lead for control signal or signal ground.
- Linear pressure solenoid SLC3 stuck.
- Linear pressure solenoid SLC3 not working.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Harsh gear changing
- No gear changing.
- Abnormally slipping gears.

FAULT TRACING TCM-P271900

CHECKS

CHECKING THE LOCK-UP SOLENOID SLC3

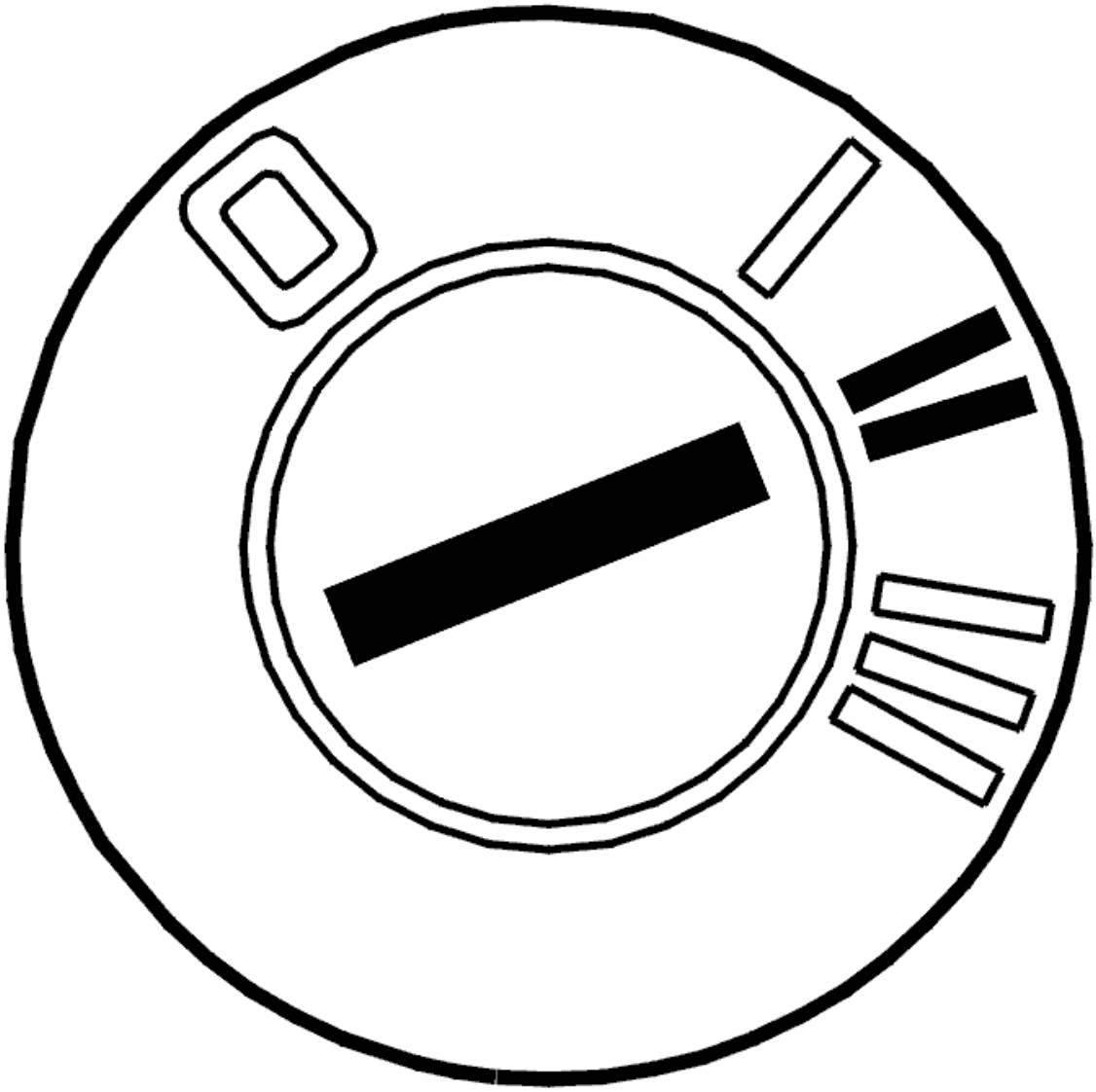


Fig. 28: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLC3 by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLC3. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

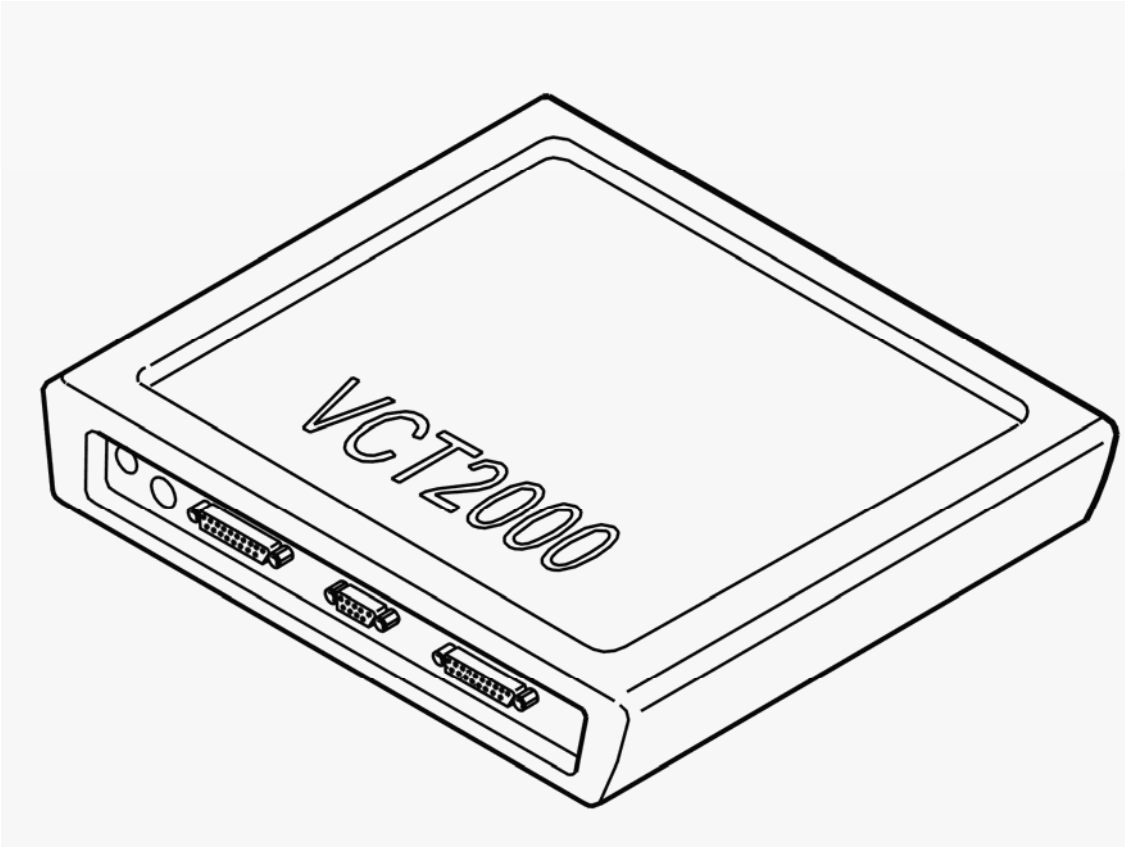


Fig. 29: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

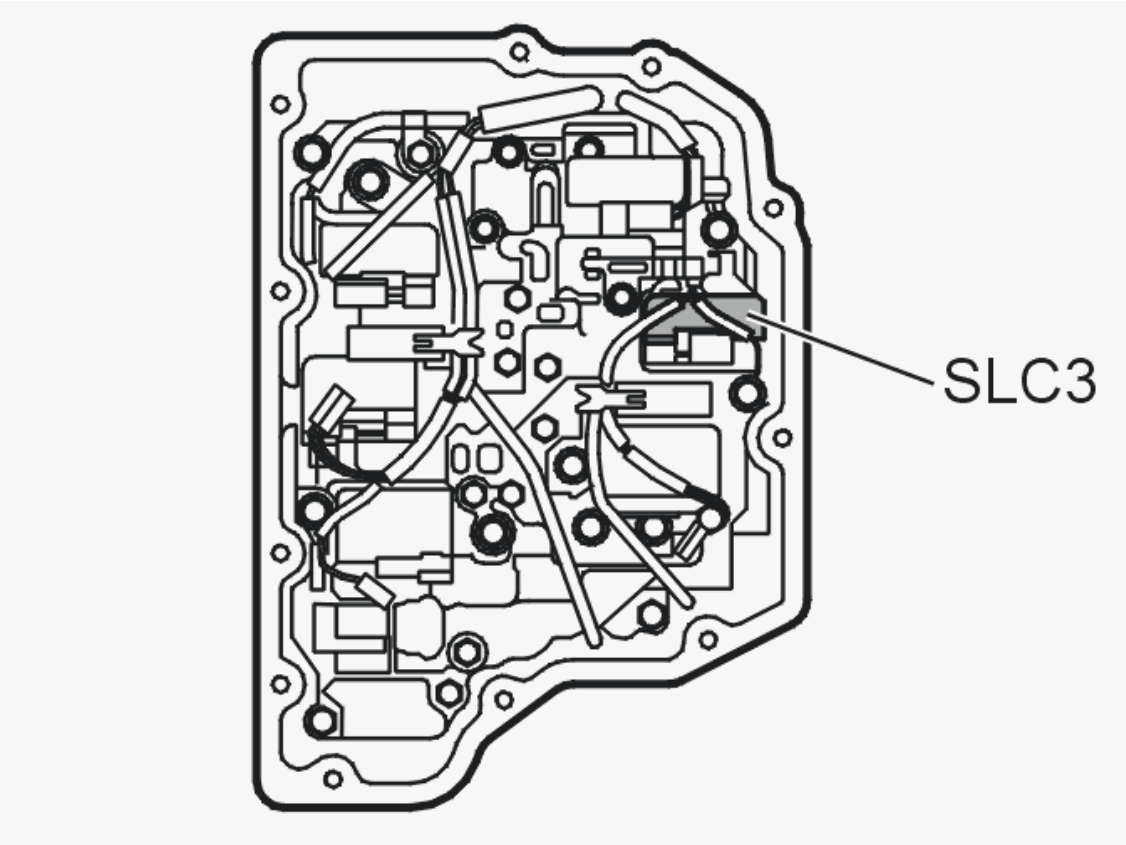


Fig. 30: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

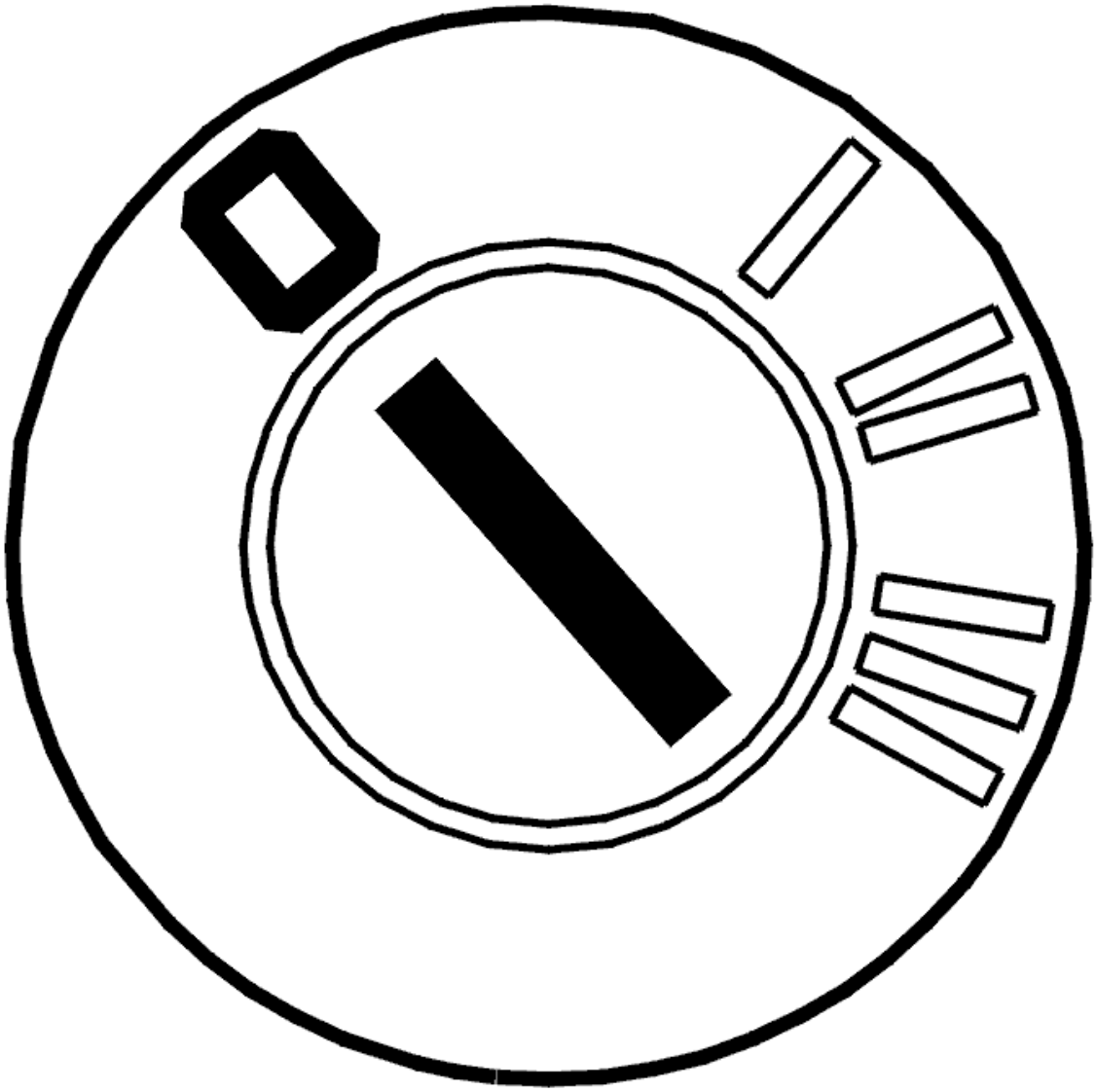


Fig. 31: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

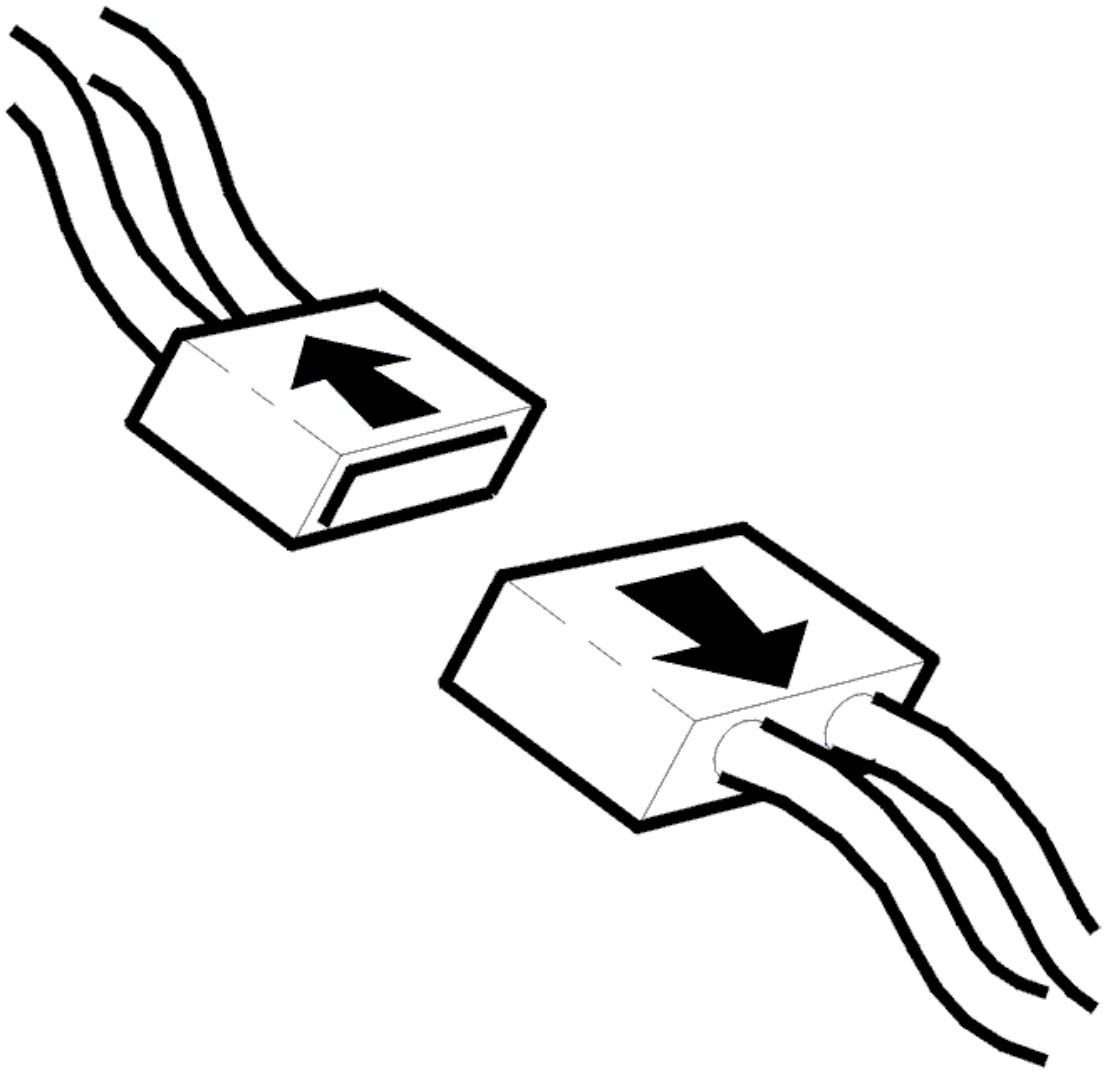


Fig. 32: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check connector B (22-pin) for the transmission control module (TCM). Check for damage and pressed in terminal pins. Check for contact resistance and oxidation.

Check the wiring between the transmission connector terminal #B14 and the connector for solenoid SLC3 terminal #1. Check the wiring between the transmission connector terminal #B22 and the connector for solenoid SLC3 terminal #2. Check for an open circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.

HINT: If no fault is found in the wiring check solenoid SLC3. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

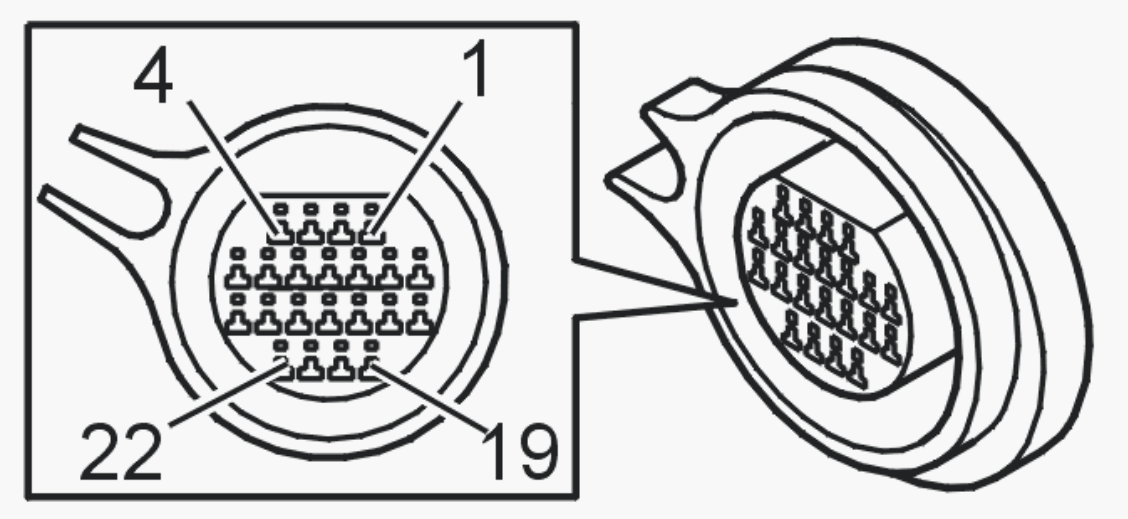


Fig. 33: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

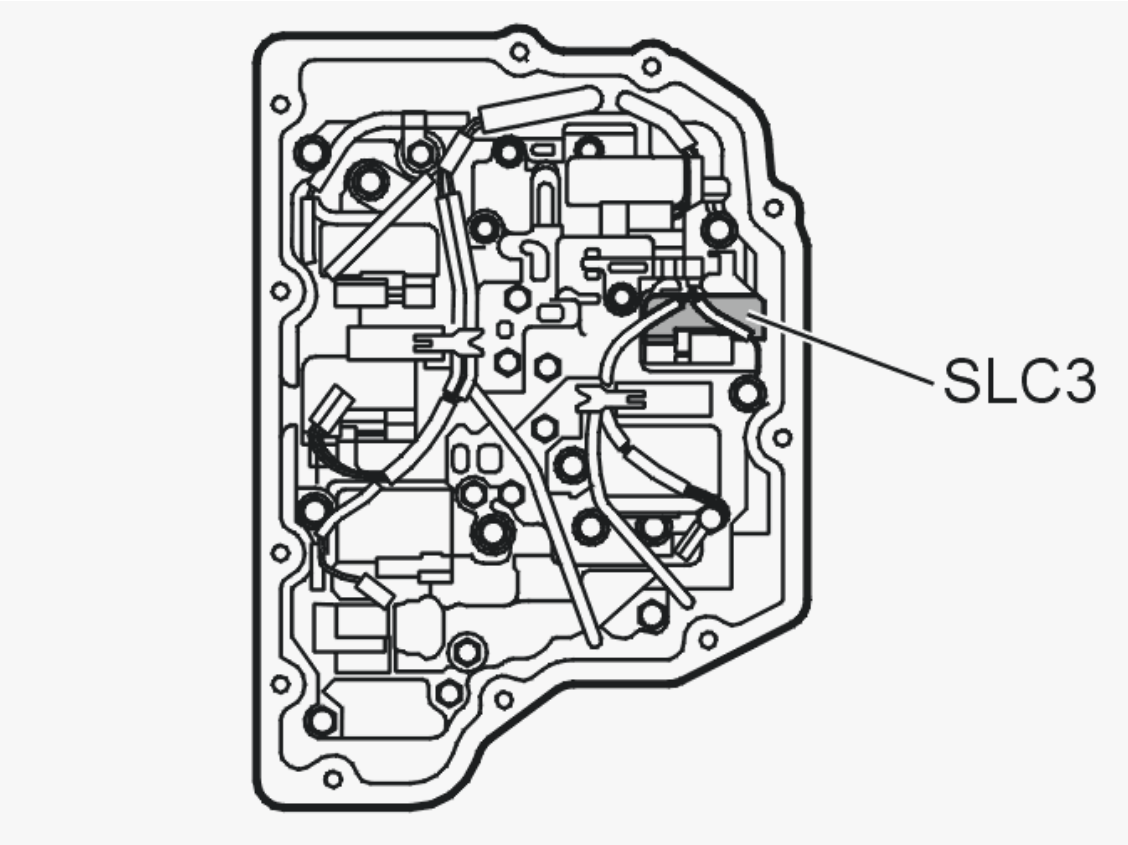


Fig. 34: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

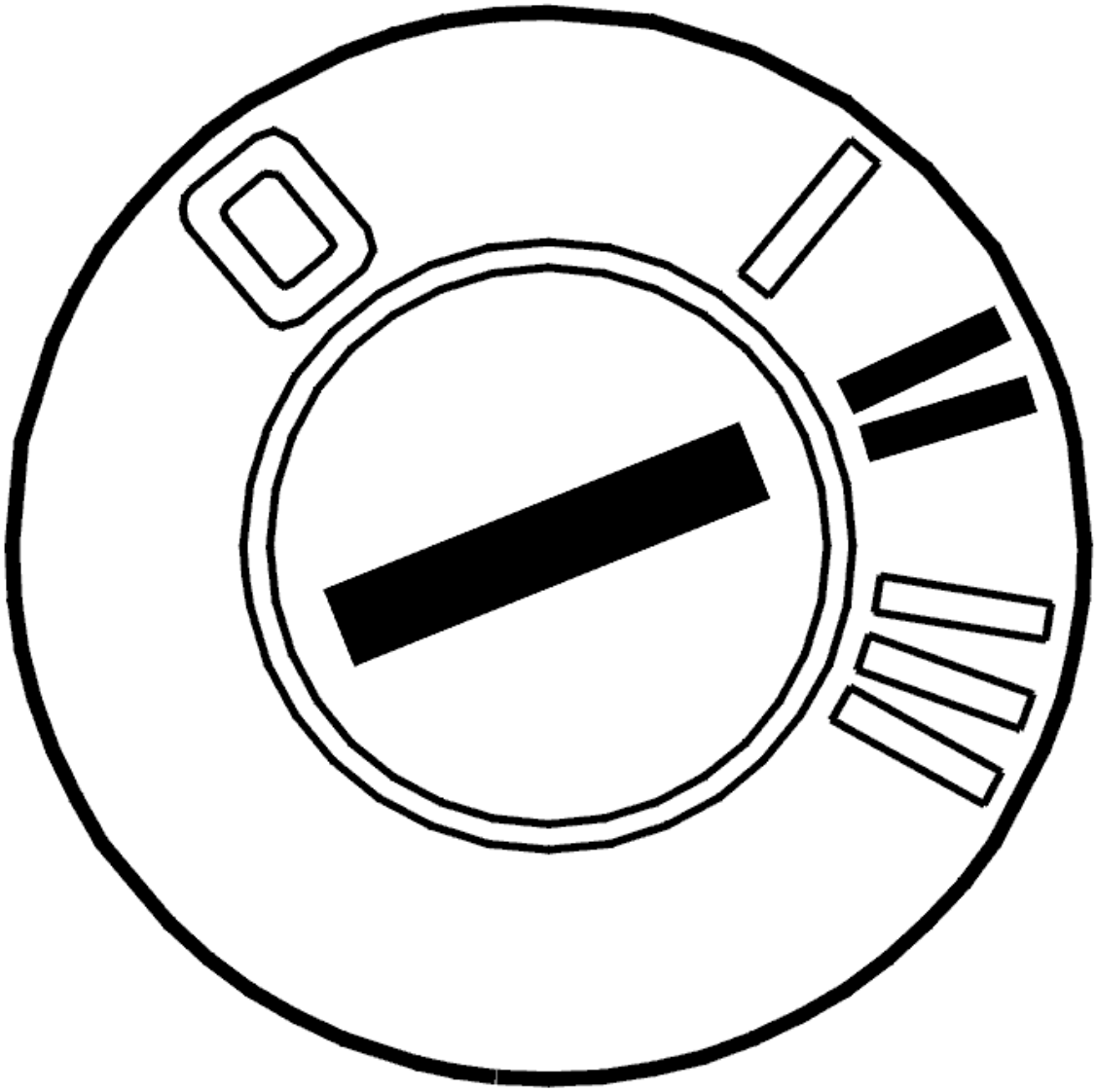


Fig. 35: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

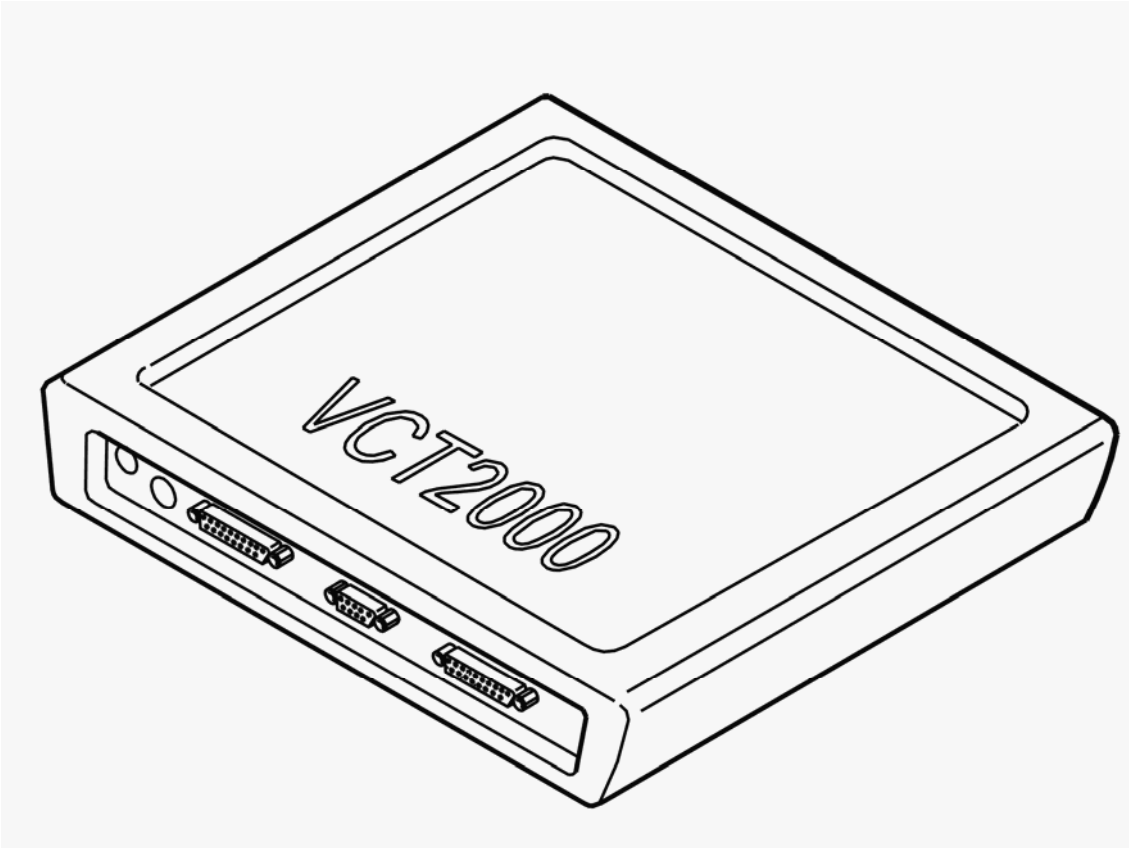


Fig. 36: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

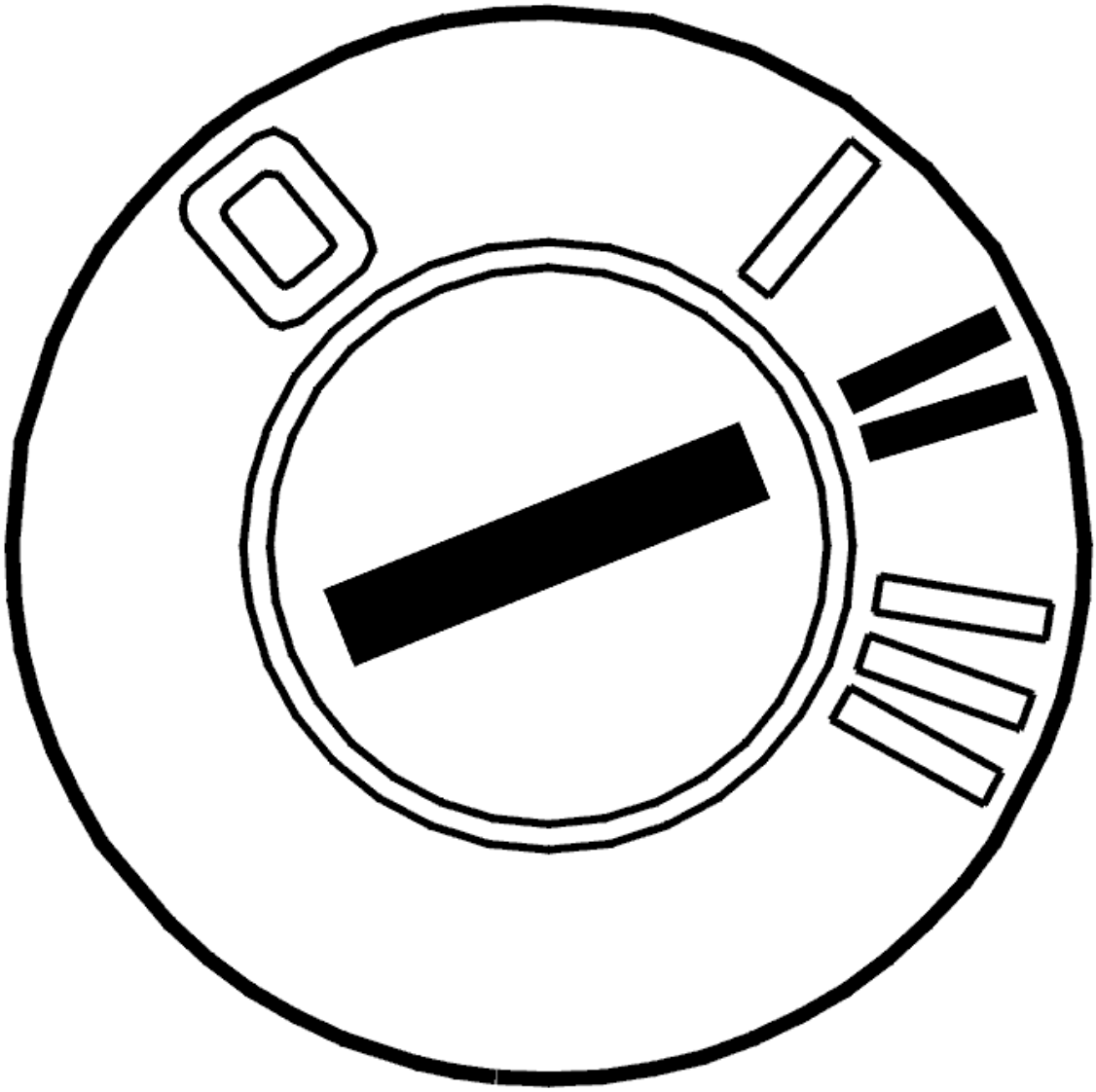


Fig. 37: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

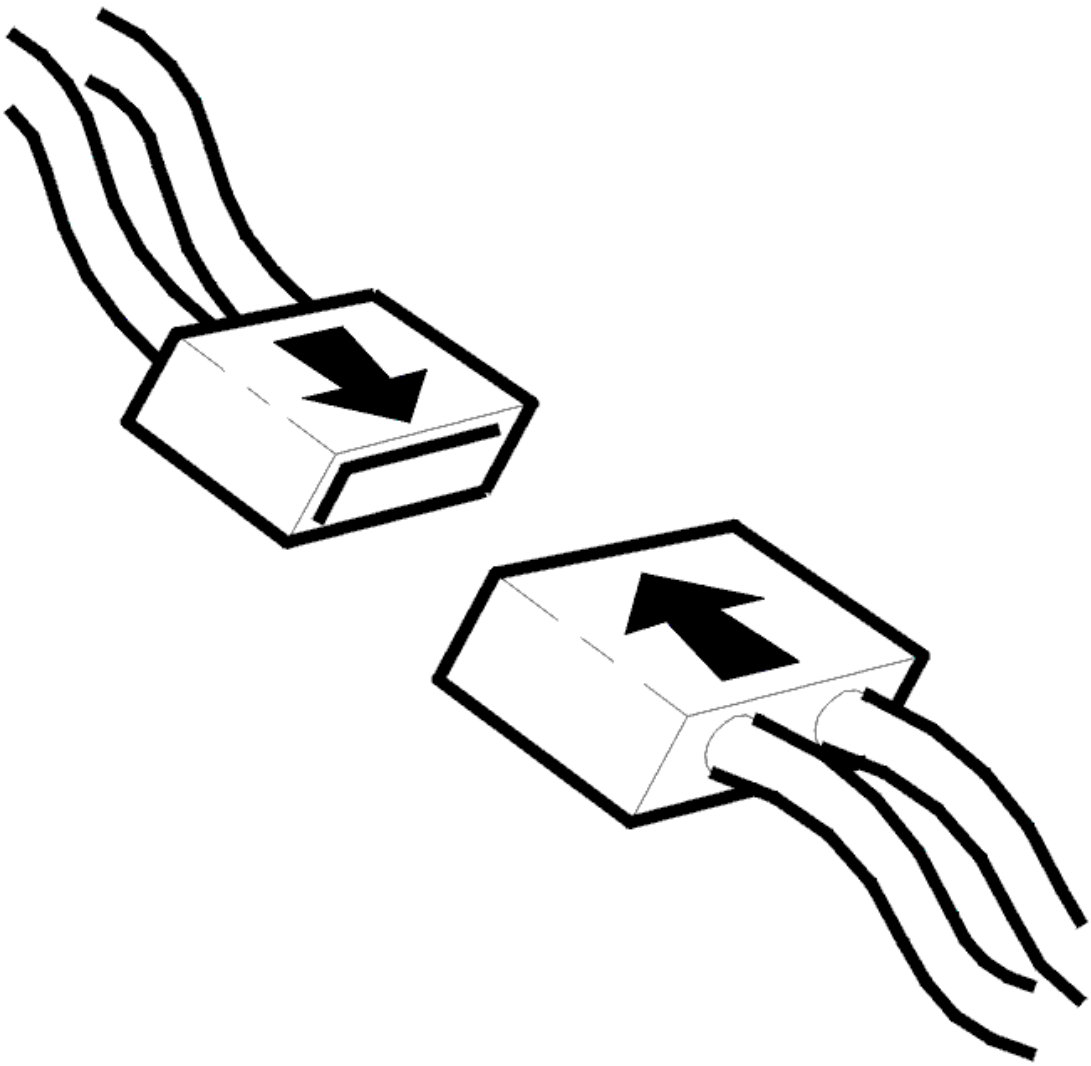


Fig. 38: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLC3 by clicking on the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLC3. The current must oscillate between approximately 0 and 1000 mA.

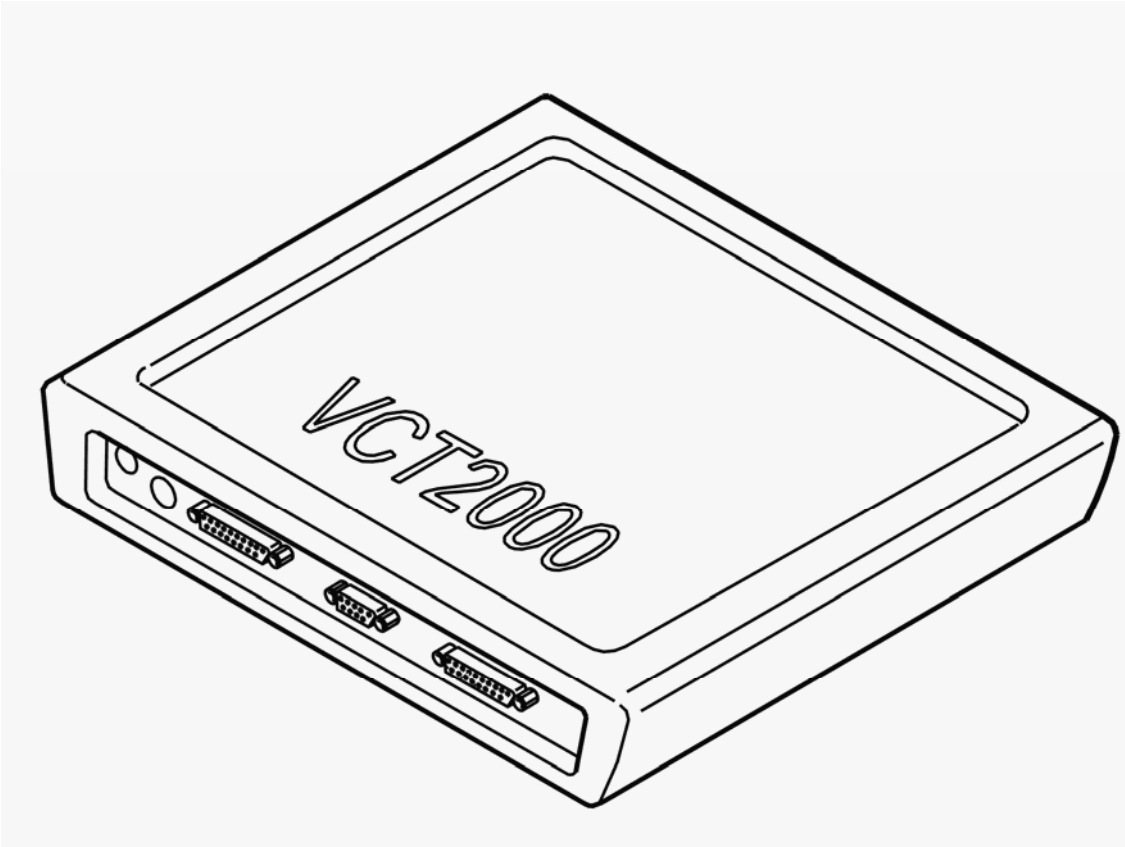


Fig. 39: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

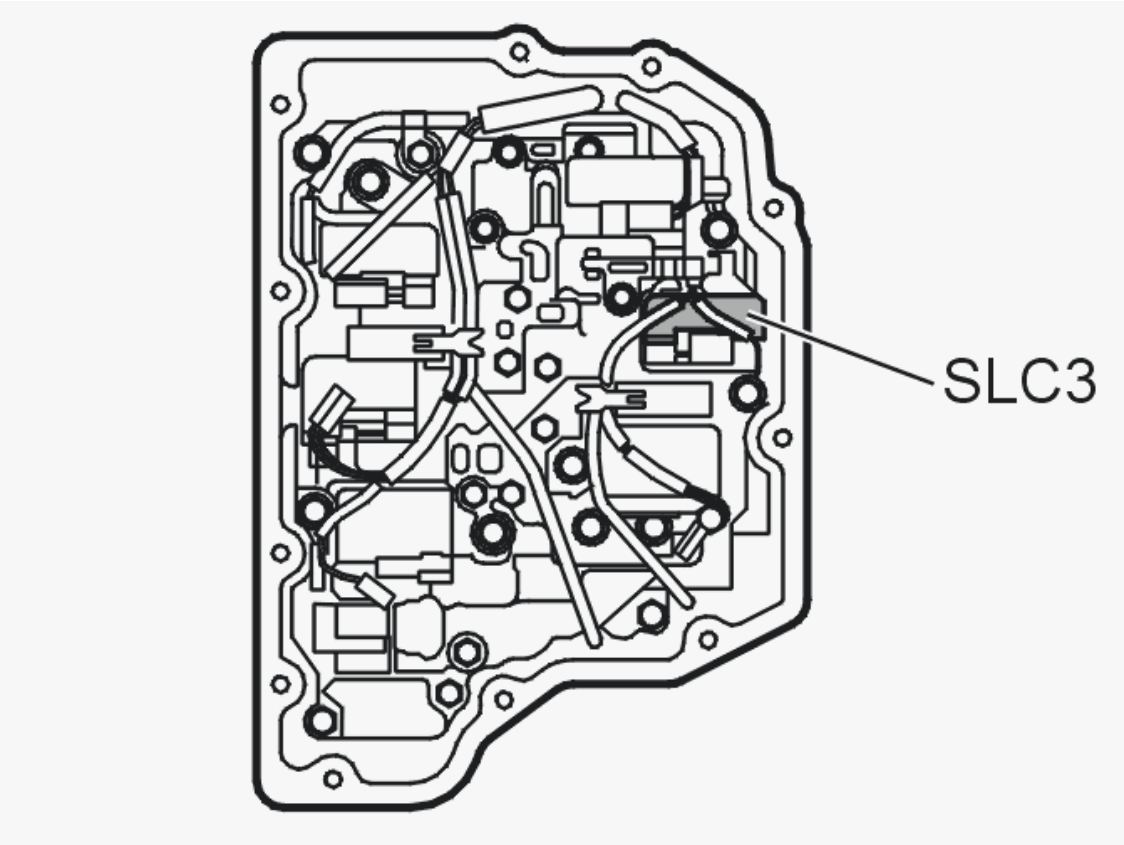


Fig. 40: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P271900: PRESSURE REGULATOR SOLENOID D CONTROL CIRCUIT INSIDE/OUTSIDE TOLERANCE. GENERAL FAULT INFORMATION. NO

INFORMATION ON FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P271900

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P271900**

FAULT TRACING TCM-P271900

see **FAULT TRACING TCM-P271900**

TCM-P272000: PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT LOW. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272000

Condition

Linear pressure solenoid SLC3 controls system pressure in the transmission. The solenoid is controlled by a power amplifier at the output of the transmission control module (TCM). The control module uses the power stage to control the current to the solenoid. A low amperage results in a high system pressure. A high amperage (approximately 1A) results in a low system pressure. The amperage is primarily affected by the throttle position.

The diagnostic trouble code is stored if the control module detects:

- An open circuit in solenoid SLC3 circuit.

Solenoid SLC3 can then not regulate system pressure.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Normal driving.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

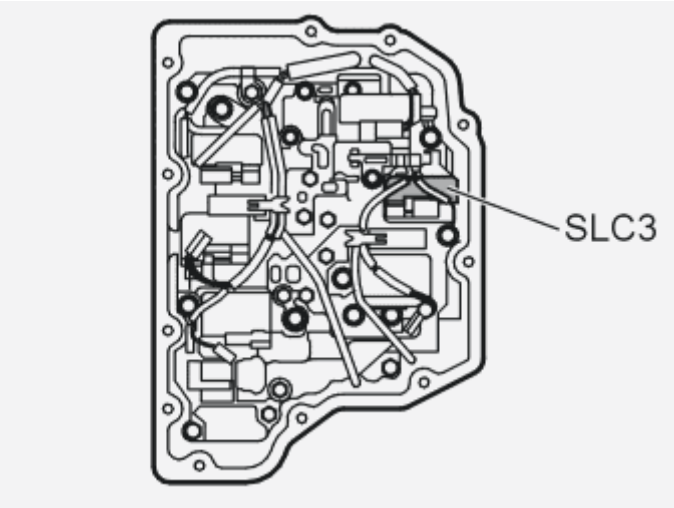


Fig. 41: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the cable for the control signal or signal ground.
- Solenoid not working.
- The transmission control module (TCM) does not function.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- No lock-up
- Rough gear shift

FAULT-TRACING

CHECKS

CHECKING LINEAR PRESSURE SOLENOID SLC3

Fig. 42: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLC3 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLC3. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 43: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

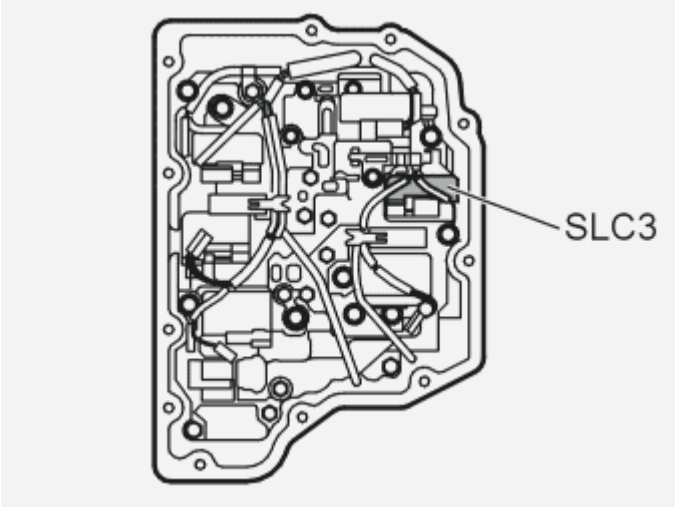


Fig. 44: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

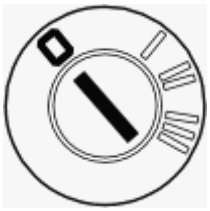


Fig. 45: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

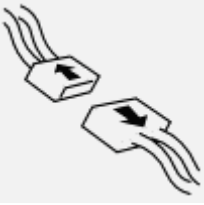


Fig. 46: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

Check the cables for open circuit and short circuit to ground.

Take readings between:

- Transmission connector #B14 and the connector for solenoid SLC3 #1.
- Transmission connector #B22 and the connector for solenoid SLC3 #2.

HINT: If no fault is found in the wiring, check solenoid SLC3. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **VALVE HOUSING**

- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

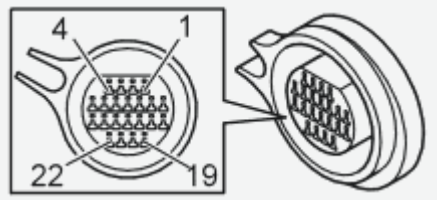


Fig. 47: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

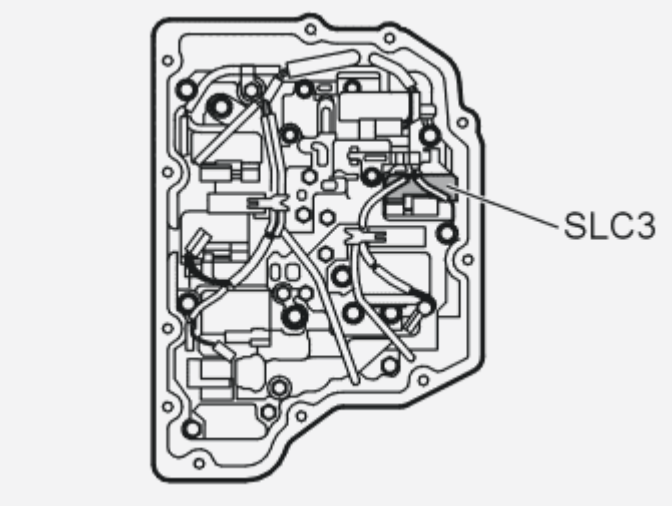


Fig. 48: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 49: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

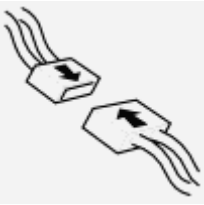


Fig. 50: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Activate solenoid SLC3 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLC3. The current should oscillate between 100 and 950 mA.

Fig. 51: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

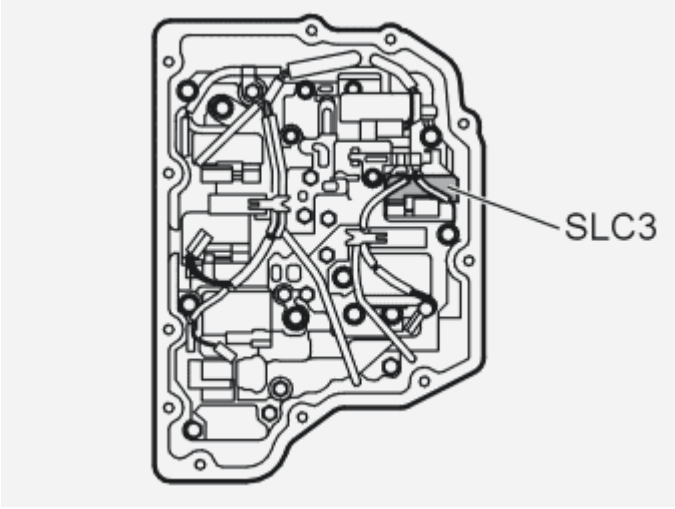


Fig. 52: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 53: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 54: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P272000: PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT LOW. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272000**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P272000: PRESSURE REGULATING SOLENOID D CONTROL CIRCUIT LOW. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272000

Condition

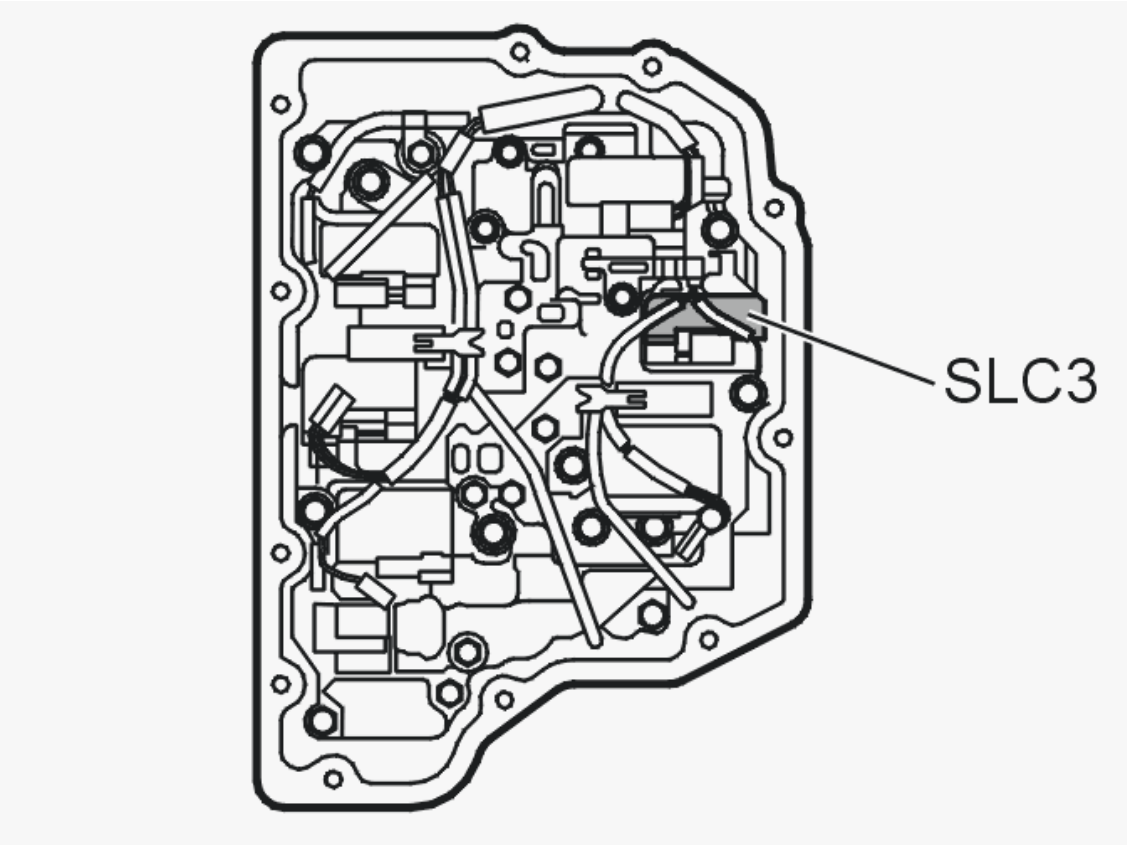


Fig. 55: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

System pressure solenoid SLC3 controls the line pressure in the transmission. The solenoid is controlled by a power stage located on the output of the transmission control module (TCM). The control module uses the power stage to control the current to the solenoid. Low current gives high line pressure and high current (approximately 1A) gives a low line pressure. The current strength is affected by the throttle position.

The diagnostic trouble code (DTC) is stored if the transmission control module (TCM) registers an open circuit in the circuit for solenoid SLC3. Solenoid SLC3 cannot control the line pressure.

The diagnostic trouble code (DTC) can be diagnosed when driving normally.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals
- Open circuit in lead for control signal or signal ground.

- Solenoid not working.
- The transmission control module (TCM) does not function.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear changing

FAULT TRACING TCM-P272000

CHECKS

CHECKING THE LOCK-UP SOLENOID SLC3

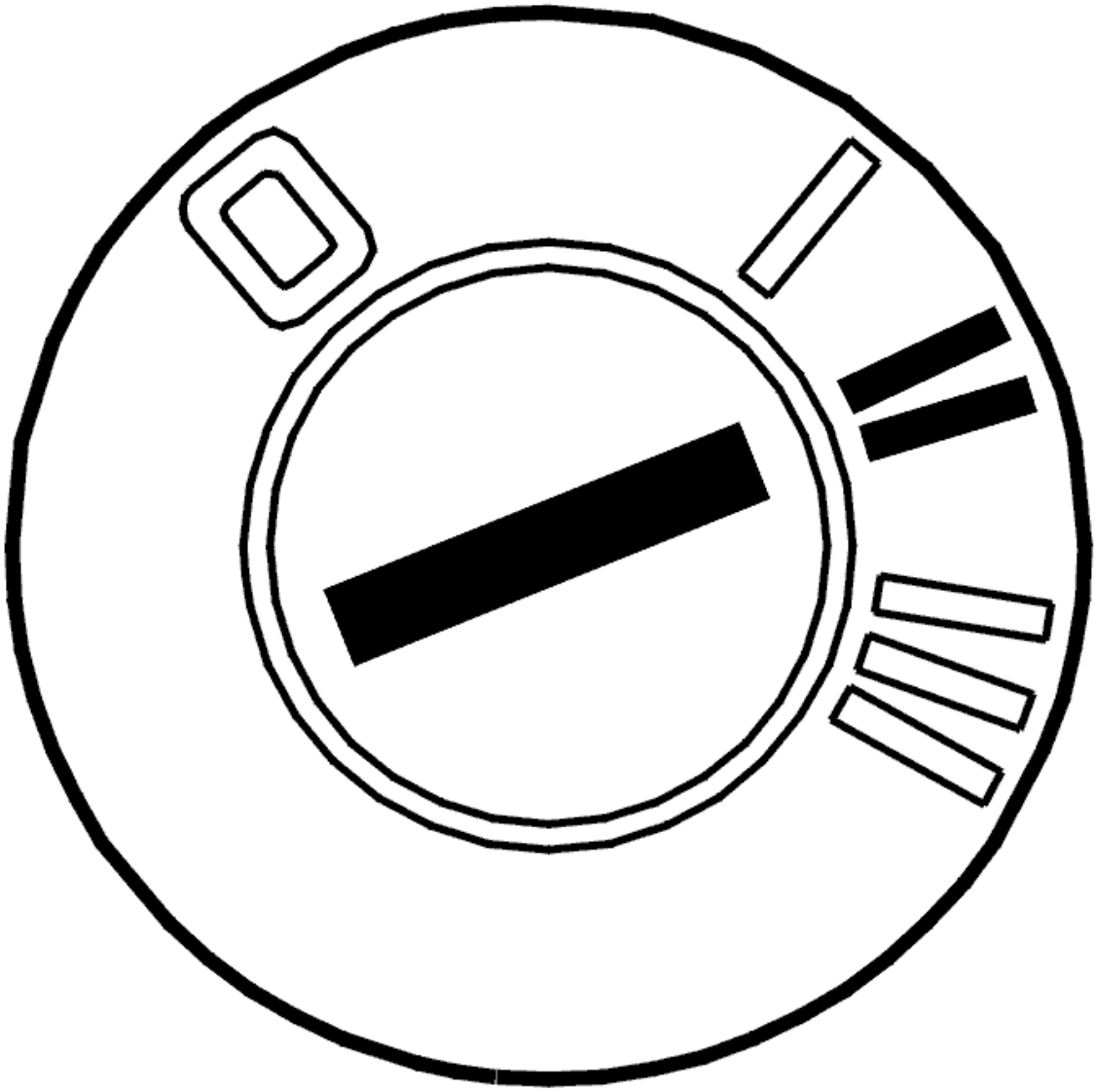


Fig. 56: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLC3 by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLC3. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

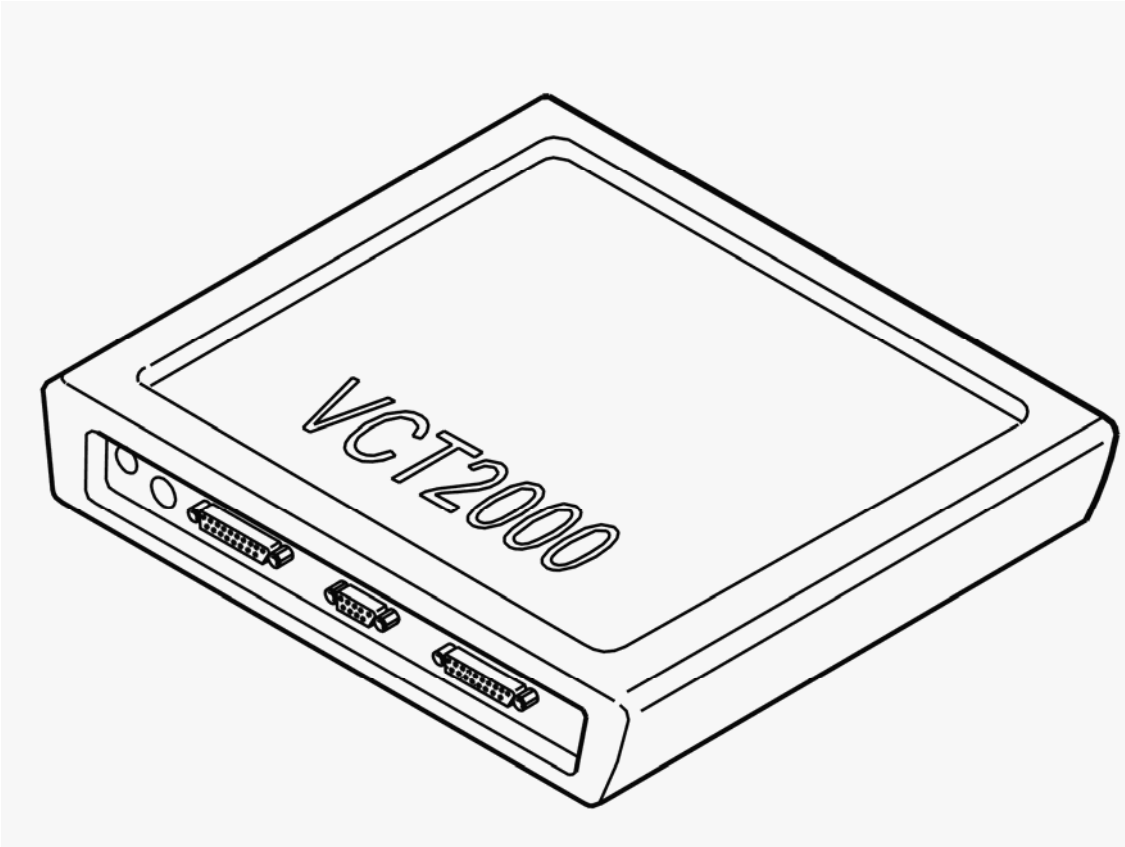


Fig. 57: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

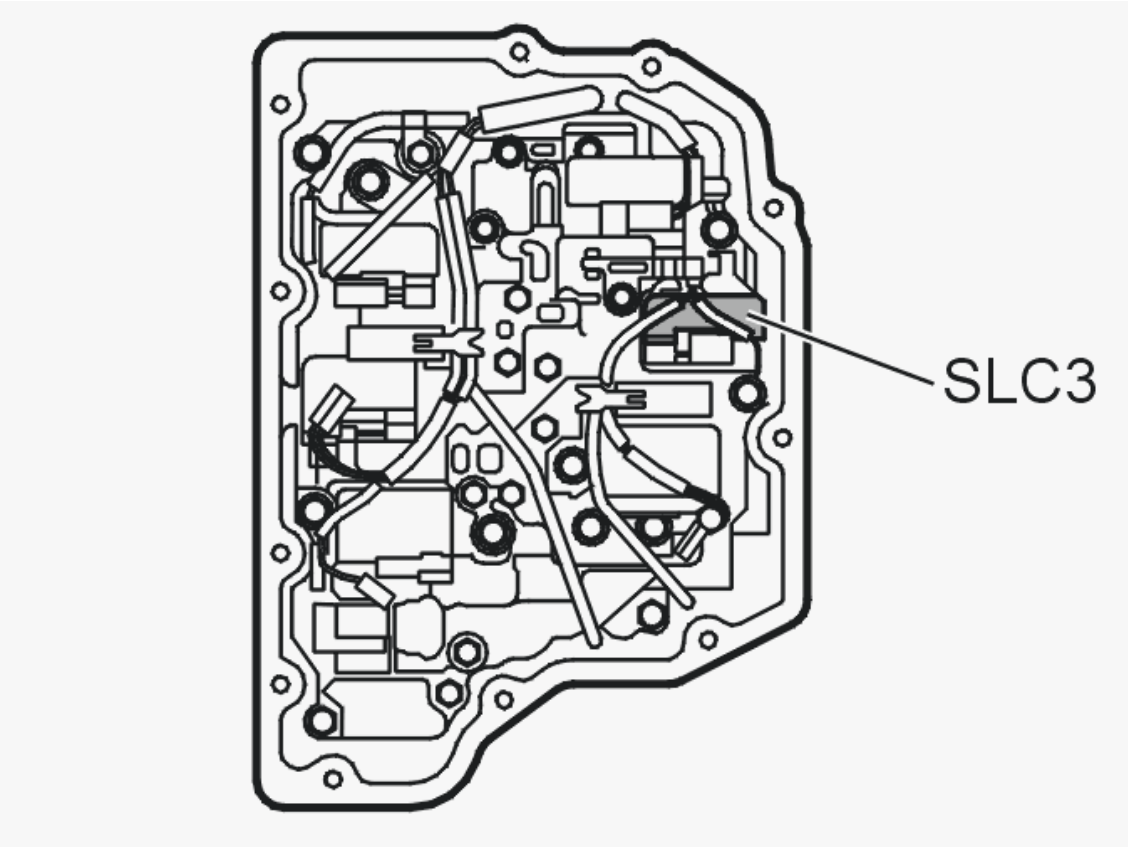


Fig. 58: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

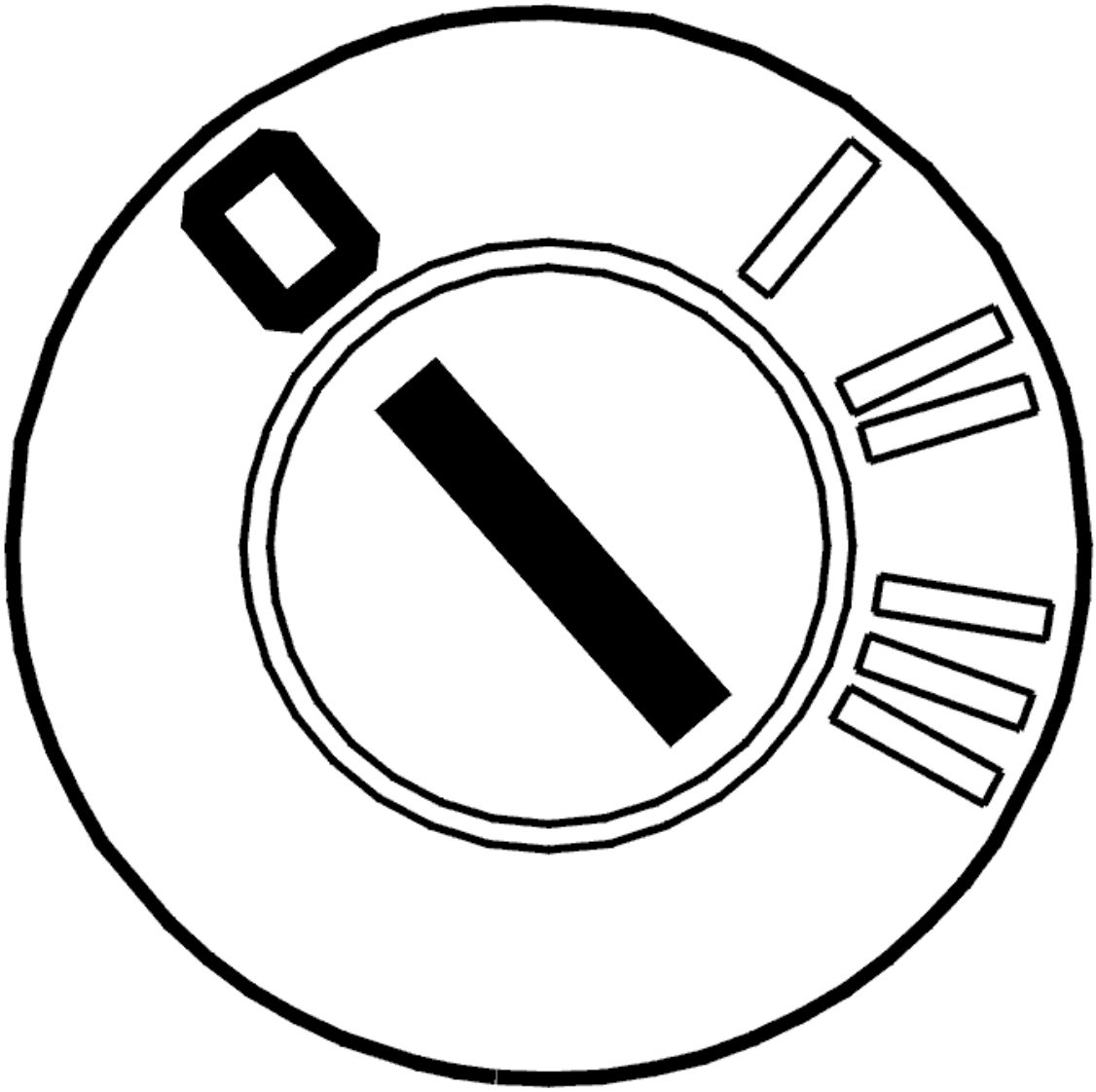


Fig. 59: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

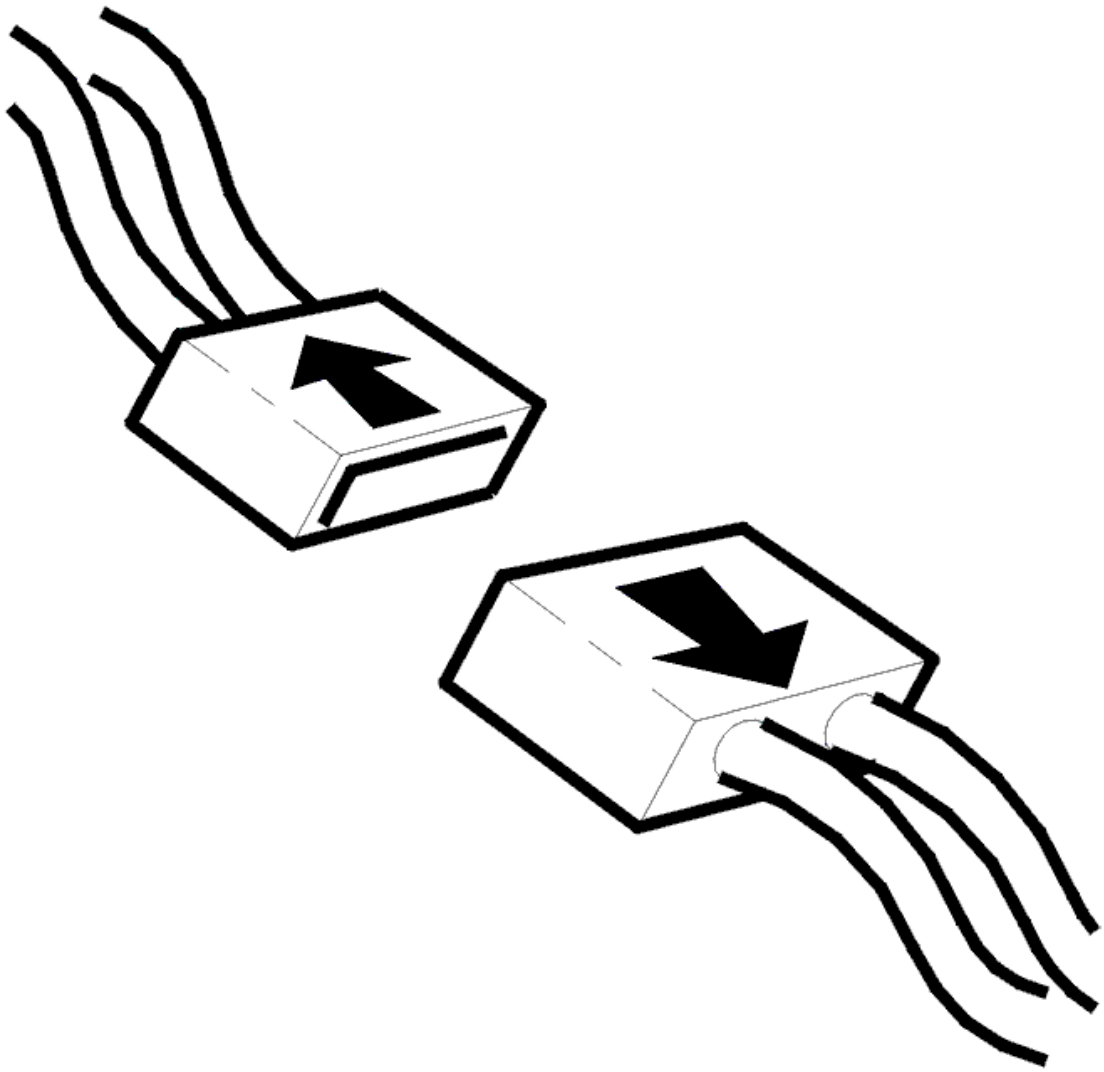


Fig. 60: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check connector B (22-pin) for the transmission control module (TCM). Check for damage and pressed in terminal pins. Check for contact resistance and oxidation.

Check the wiring between the transmission connector terminal #B14 and the connector for solenoid SLC3 terminal #1. Check the wiring between the transmission connector terminal #B22 and the connector for solenoid SLC3 terminal #2. Check for an open circuit. Check for a short-circuit to ground.

HINT: If no fault is found in the wiring check solenoid SLC3. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

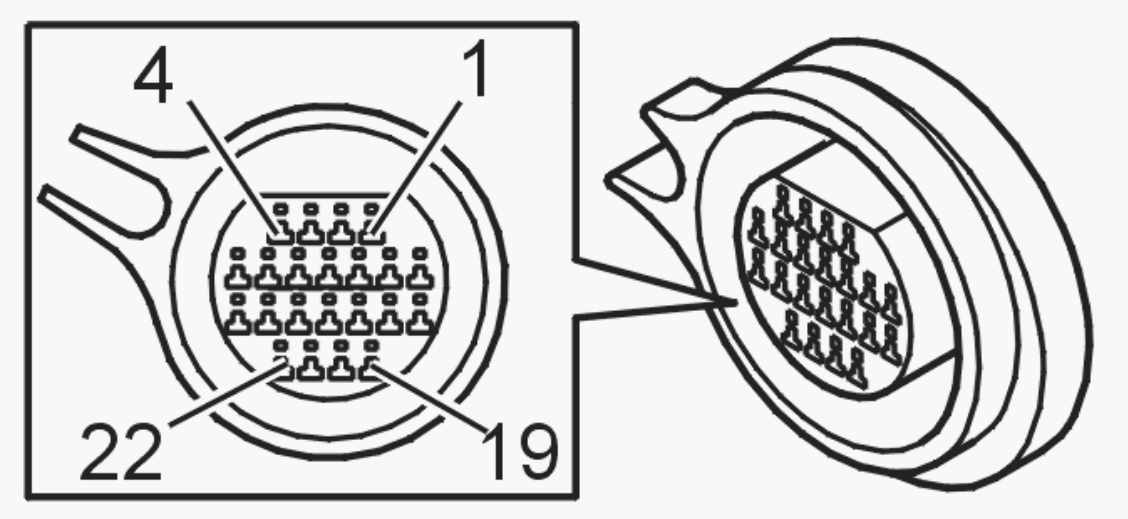


Fig. 61: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

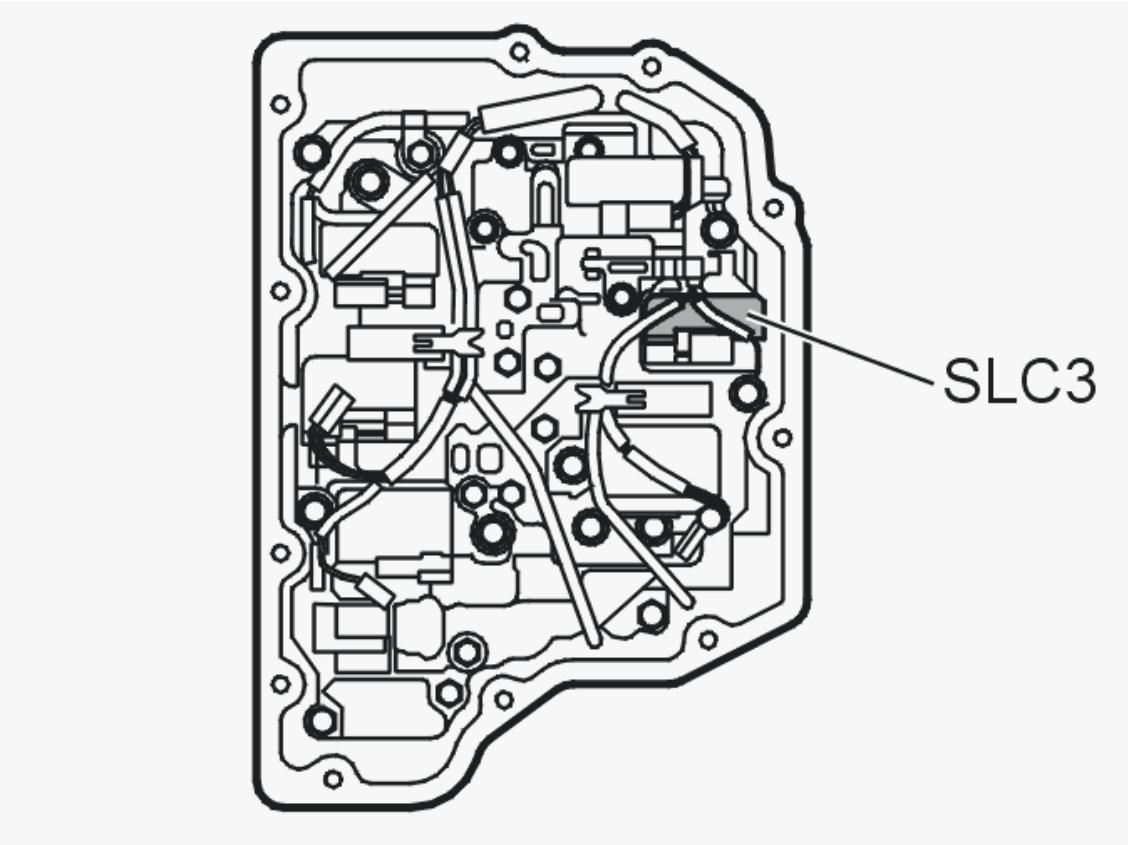


Fig. 62: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

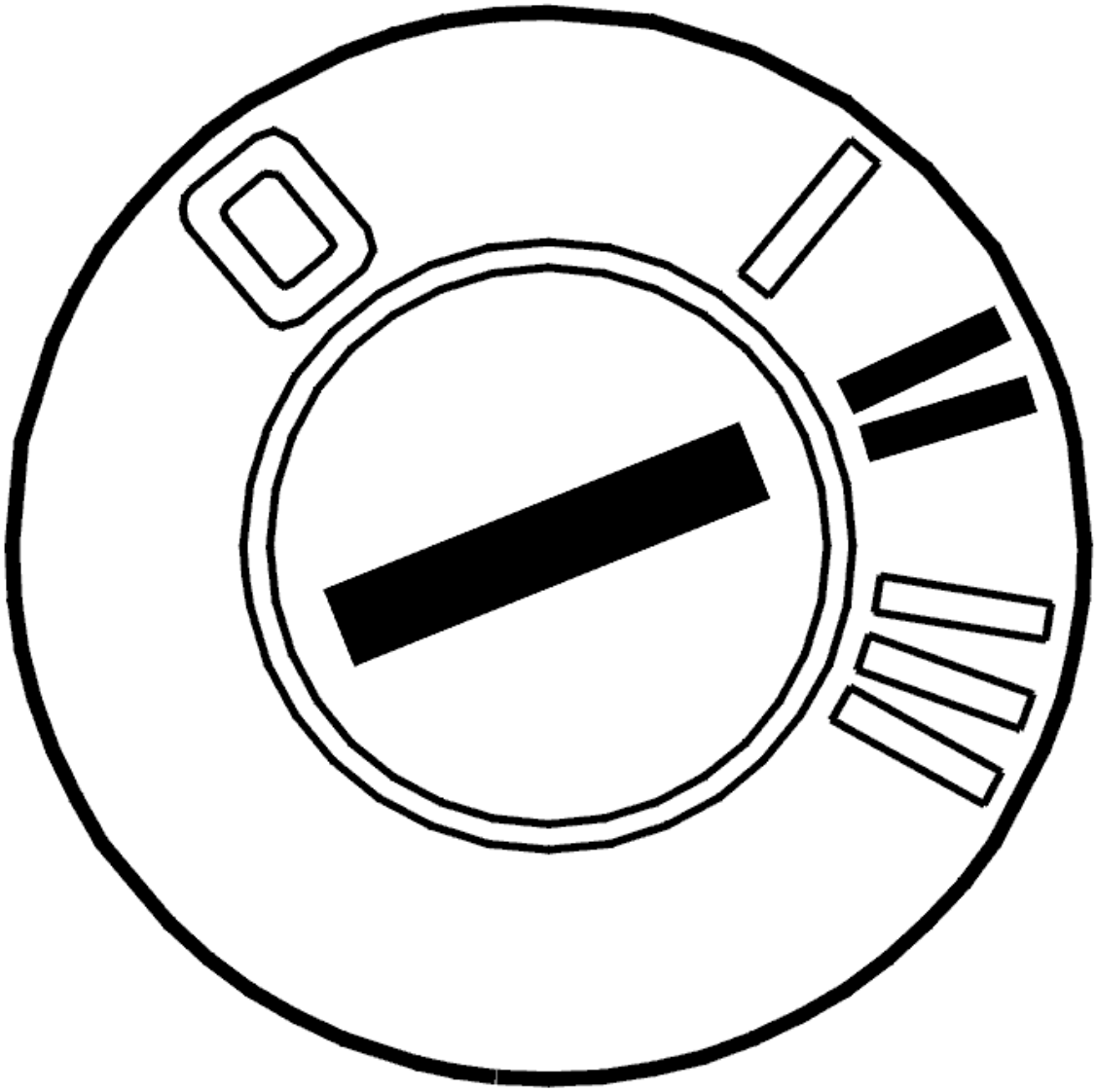


Fig. 63: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

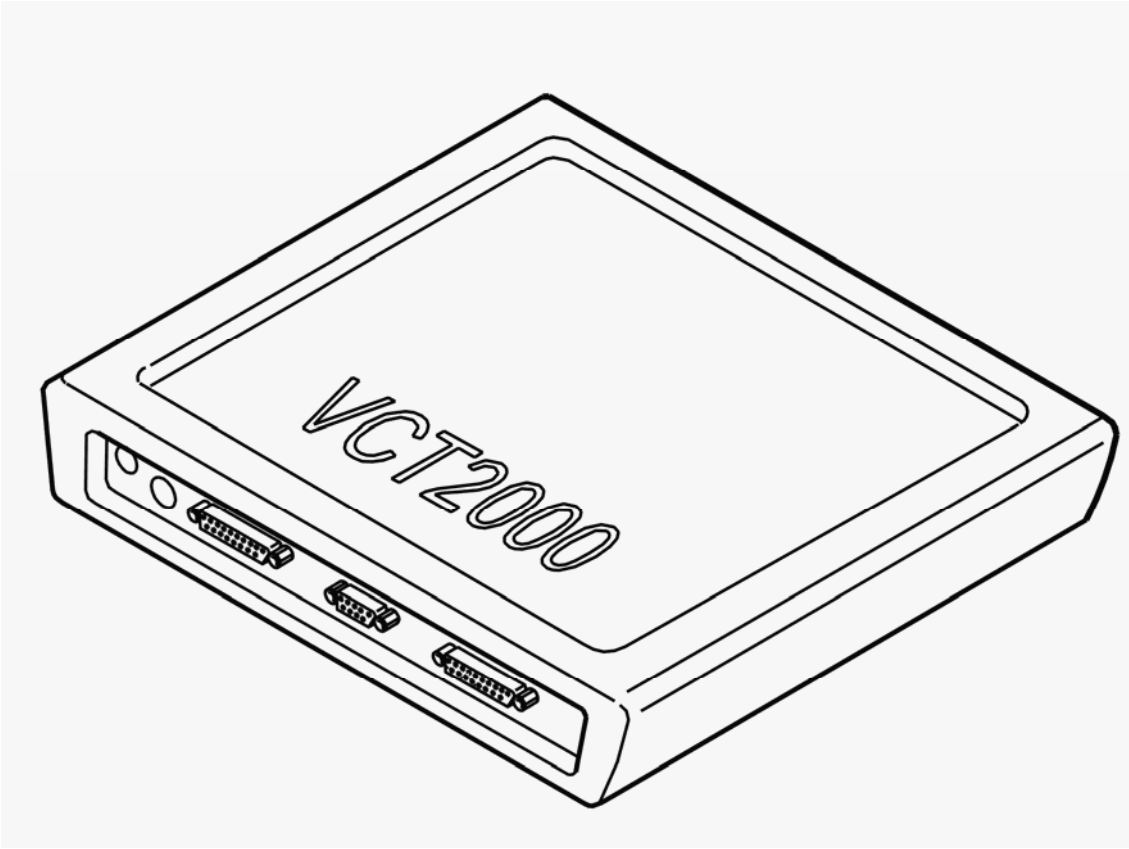


Fig. 64: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

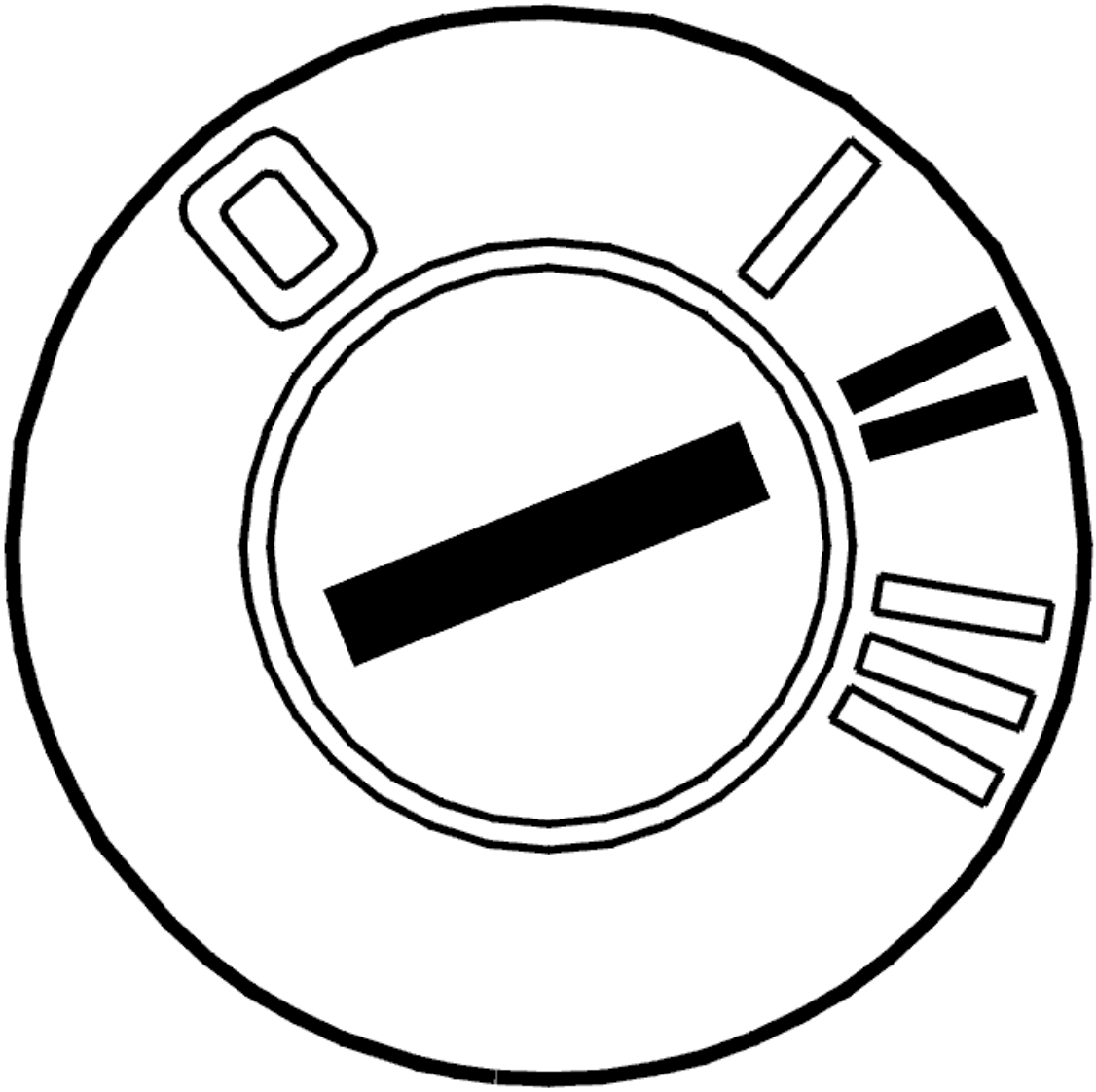


Fig. 65: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

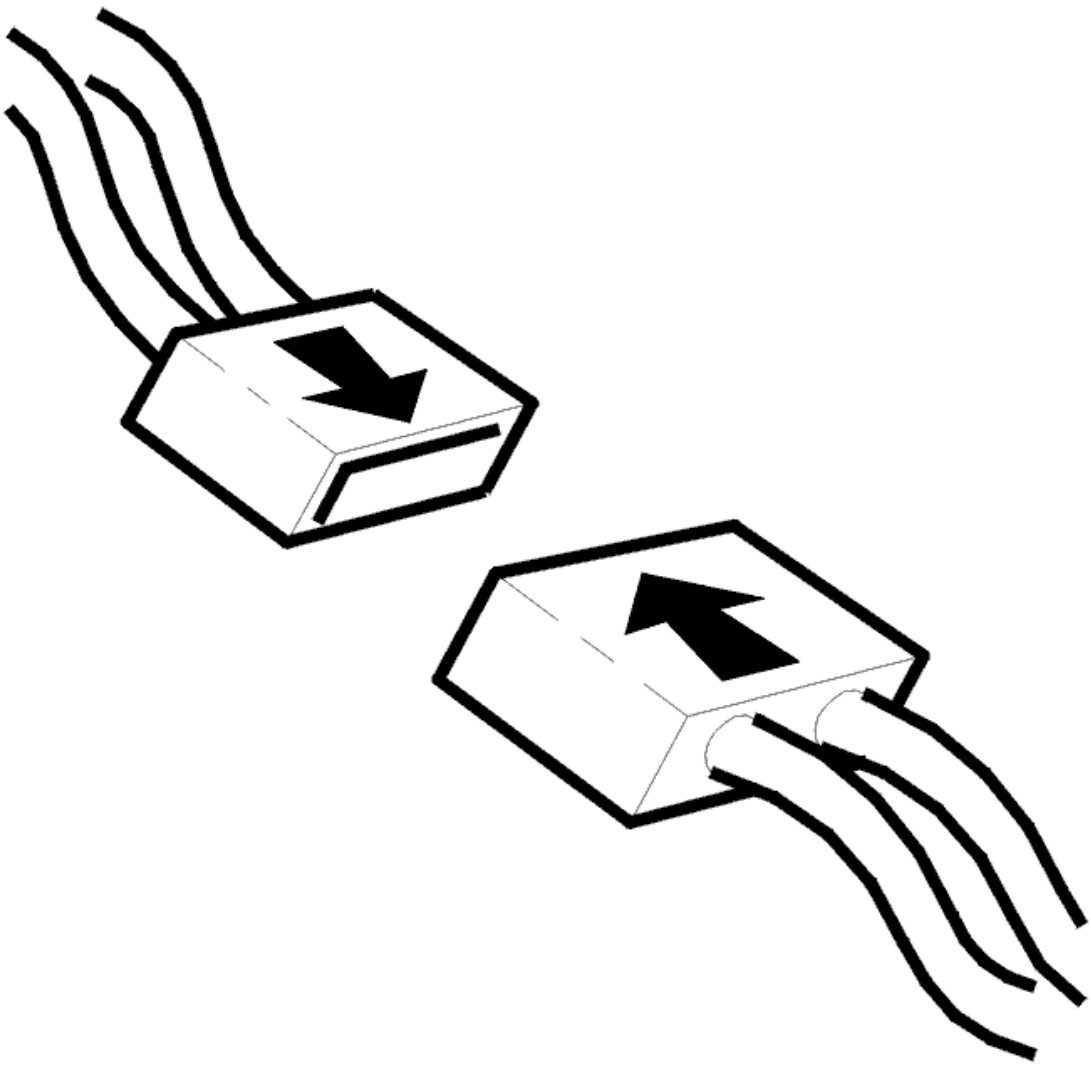


Fig. 66: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLC3 by clicking on the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLC3. The current must oscillate between approximately 0 and 1000 mA.

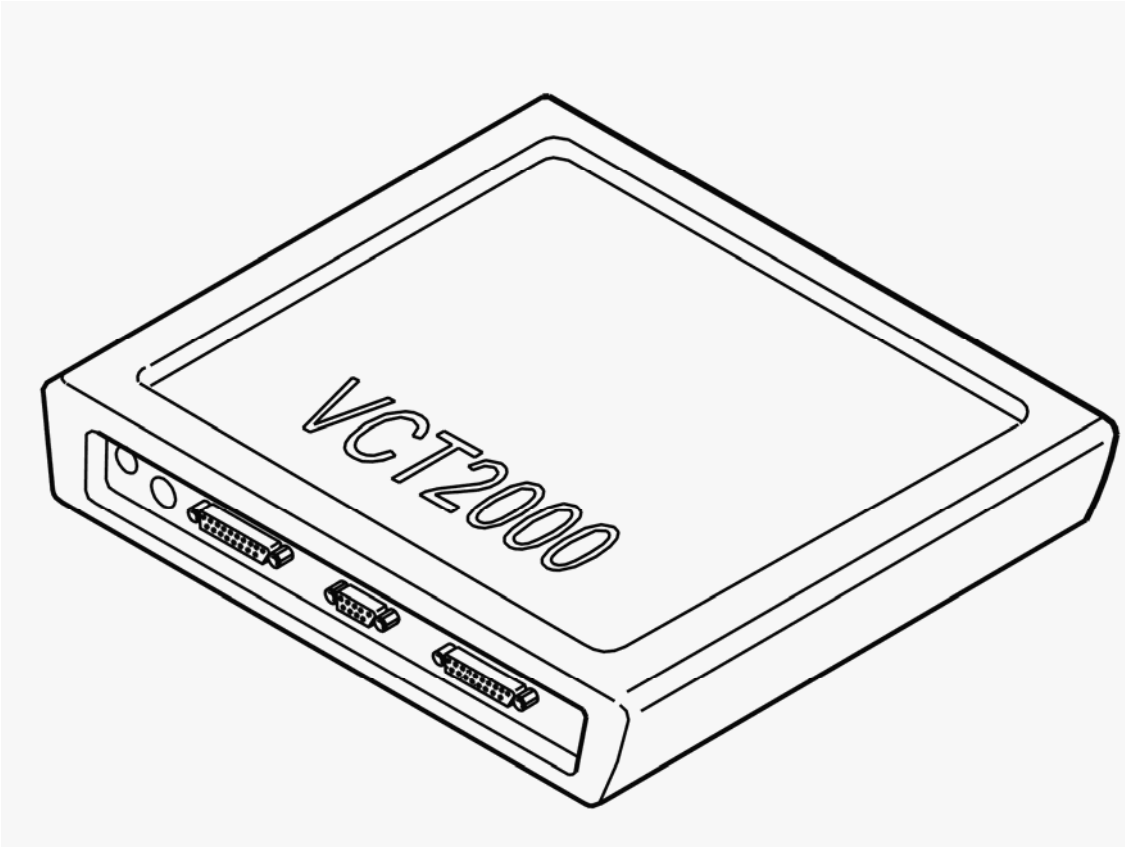


Fig. 67: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

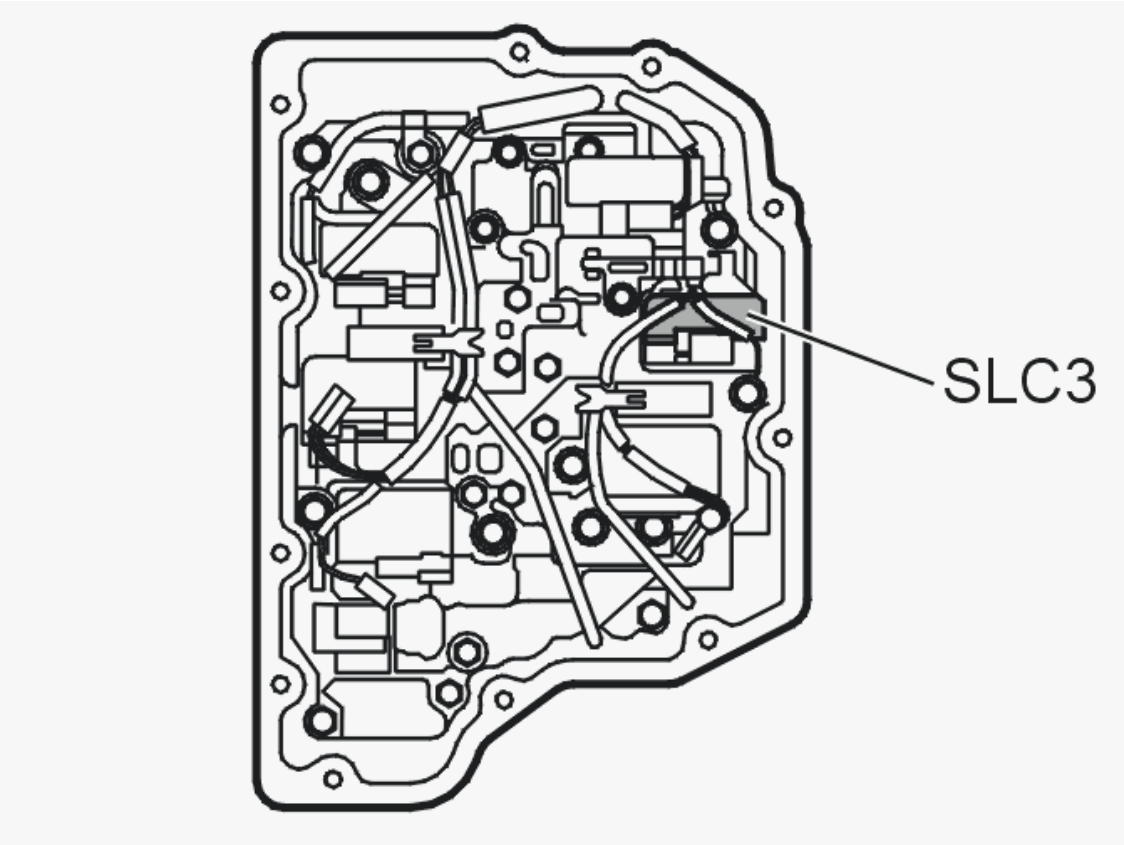


Fig. 68: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P272000: PRESSURE REGULATING SOLENOID D CONTROL CIRCUIT LOW. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT

TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272000**

FAULT TRACING TCM-P272000

see **FAULT TRACING TCM-P272000**

TCM-P272100: PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT HIGH. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272100

Condition

The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The measured current value is higher than permitted in the circuit for solenoid SLC3.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

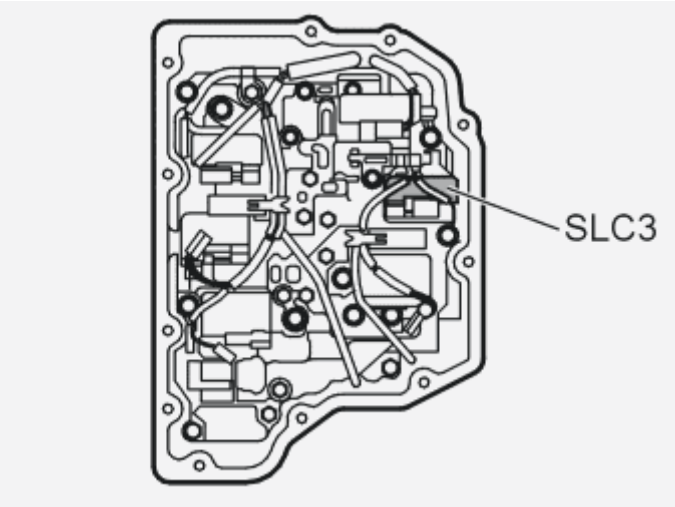


Fig. 69: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Control signal lead short-circuited to voltage.
- Linear pressure solenoid not working.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Abnormal slipping gearshifts
- Rough gear shift
- No gear shift

FAULT-TRACING

CHECKS

CHECKING LINEAR PRESSURE SOLENOID SLC3

Fig. 70: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLC3 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLC3. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 71: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

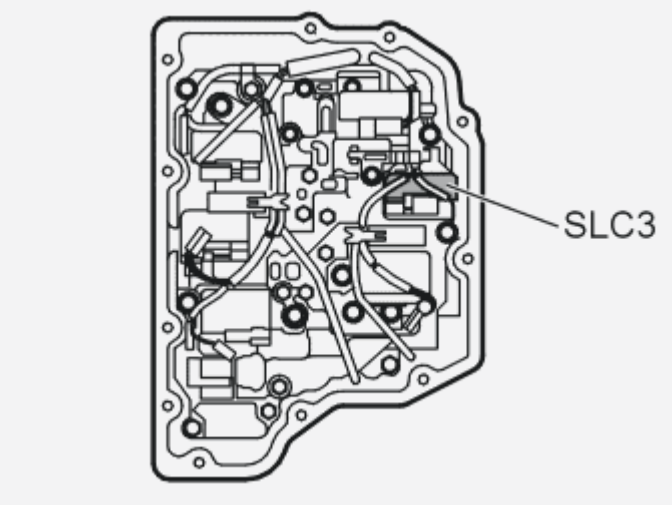


Fig. 72: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

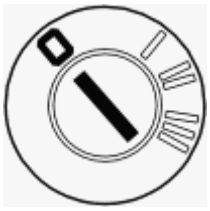


Fig. 73: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

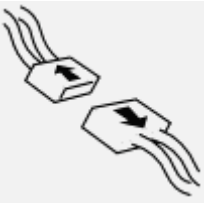


Fig. 74: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  Check the cables for short circuit to voltage.

  Take readings between:

  - Transmission connector #B14 and the connector for solenoid SLC3 #1.
  - Transmission connector #B22 and the connector for solenoid SLC3 #2.

  Also check the cables for a short-circuit to each other.

  HINT: If no fault is found in the wiring, check solenoid SLC3. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

  If no fault is found in the wiring or the component replace the control system.

  Remedy as necessary.

  Other information

  - see **SIGNAL SPECIFICATION**
  - see **CONNECTING THE BREAKOUT BOX**
  - see **VALVE HOUSING**
  - see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
  - To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
  - see **CHECKING WIRING AND TERMINALS**

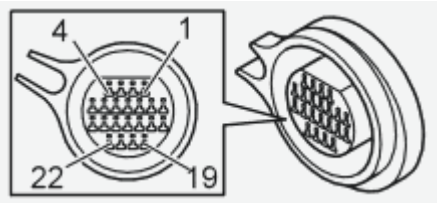


Fig. 75: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

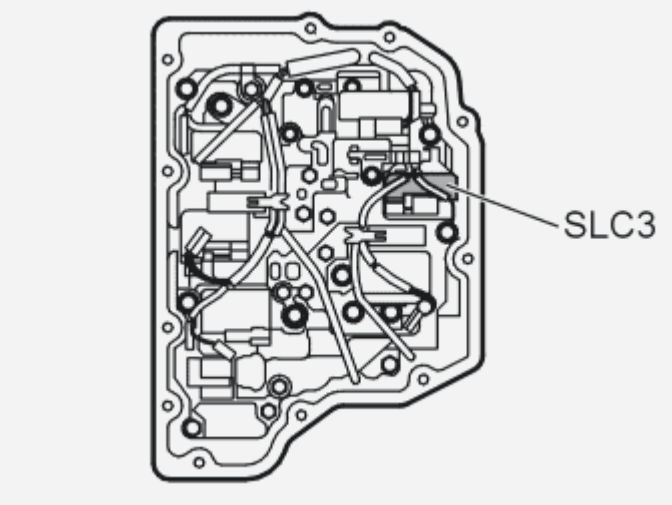


Fig. 76: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 77: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

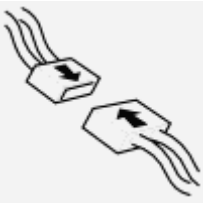


Fig. 78: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Activate solenoid SLC3 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLC3. The current should oscillate between 100 and 950 mA.

Fig. 79: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

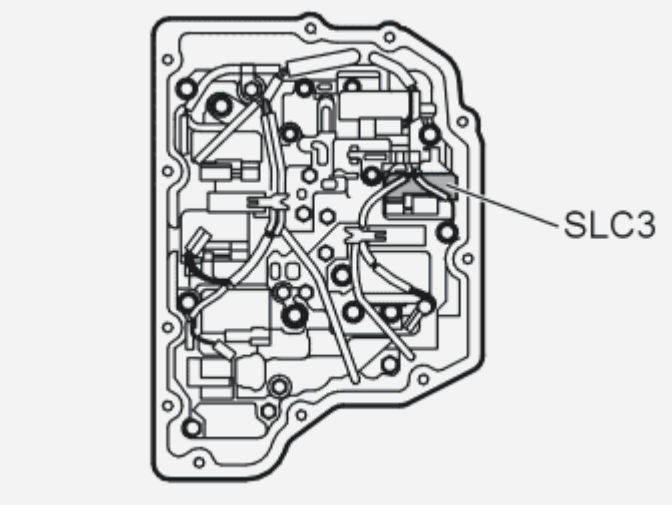


Fig. 80: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 81: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 82: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P272100: PRESSURE CONTROL SOLENOID D CONTROL CIRCUIT HIGH. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272100**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P272100: PRESSURE REGULATING SOLENOID D CONTROL CIRCUIT HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272100

Condition

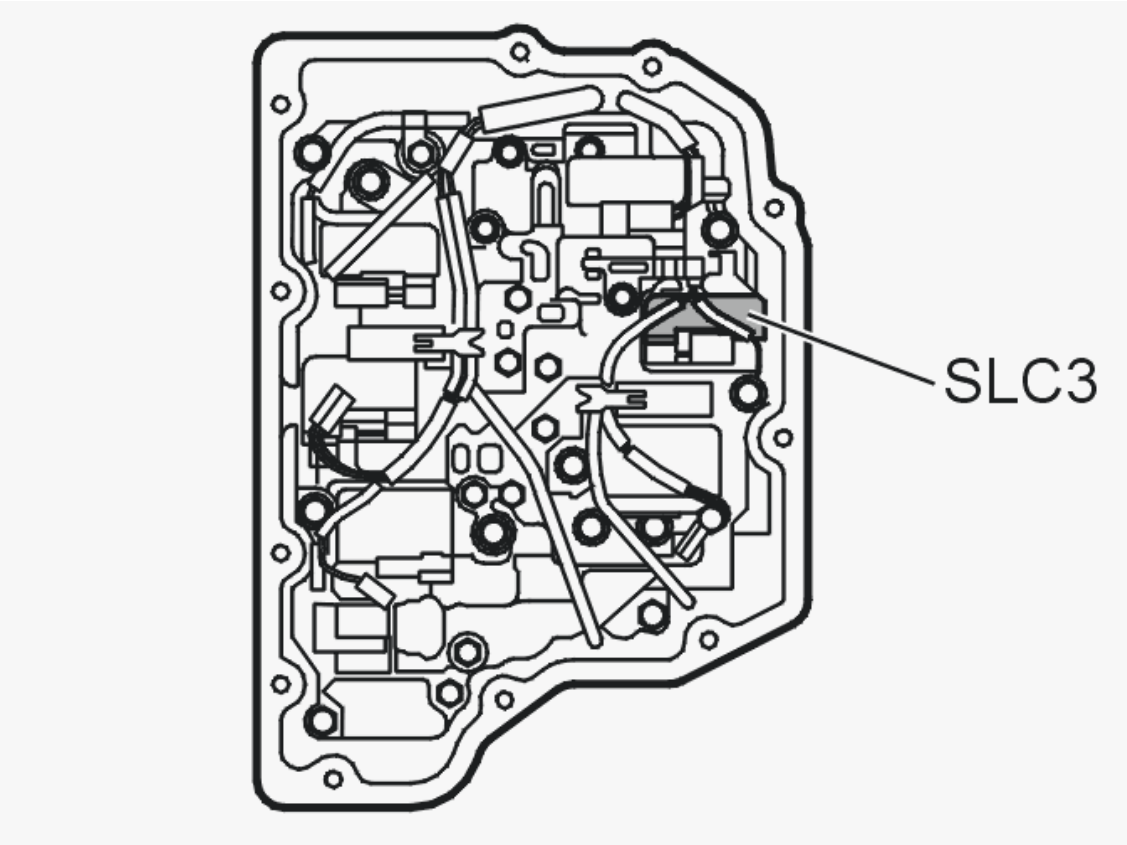


Fig. 83: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

The solenoids are controlled using the power stage in the transmission control module (TCM). The transmission control module (TCM) opens the power stage when the solenoids are to be activated so that the circuit receives a voltage.

If the transmission control module (TCM) registers that the measured current is higher than the circuit for the SLC3 solenoid allows, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Control signal lead short-circuited to voltage.
- Linear pressure solenoid not working.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Abnormally slipping gears.
- Harsh gear changing
- No gear changing.

FAULT TRACING TCM-P272100

CHECKS

CHECKING THE LOCK-UP SOLENOID SLC3

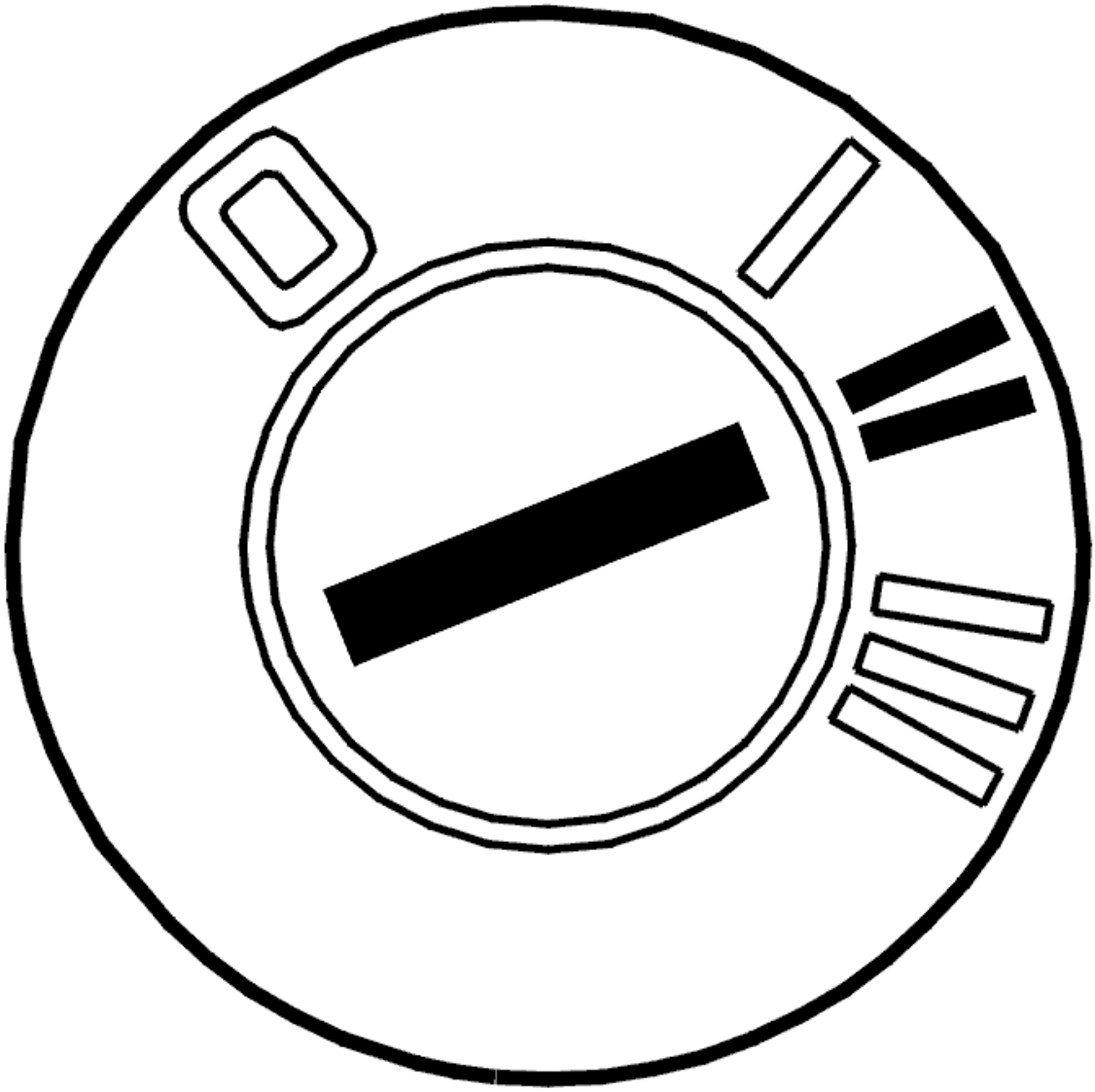


Fig. 84: Identifying Ignition ON

Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLC3 by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLC3. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

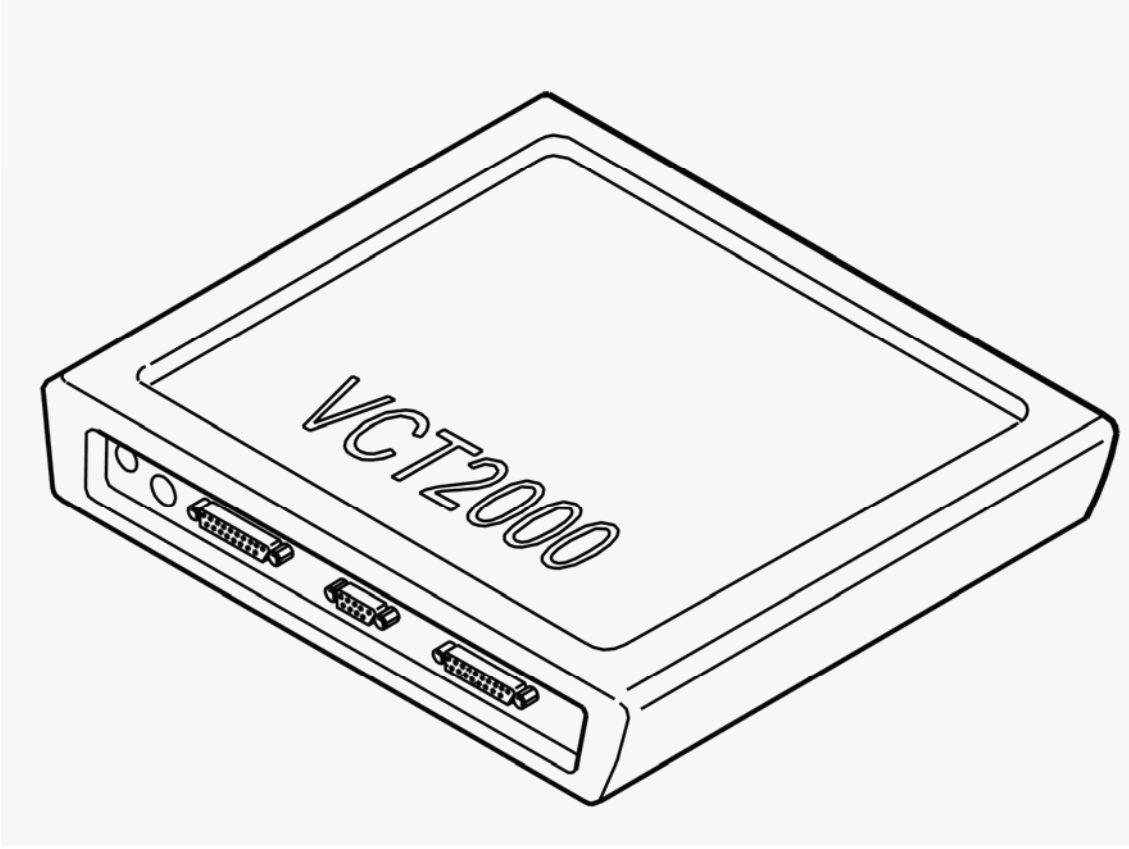


Fig. 85: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

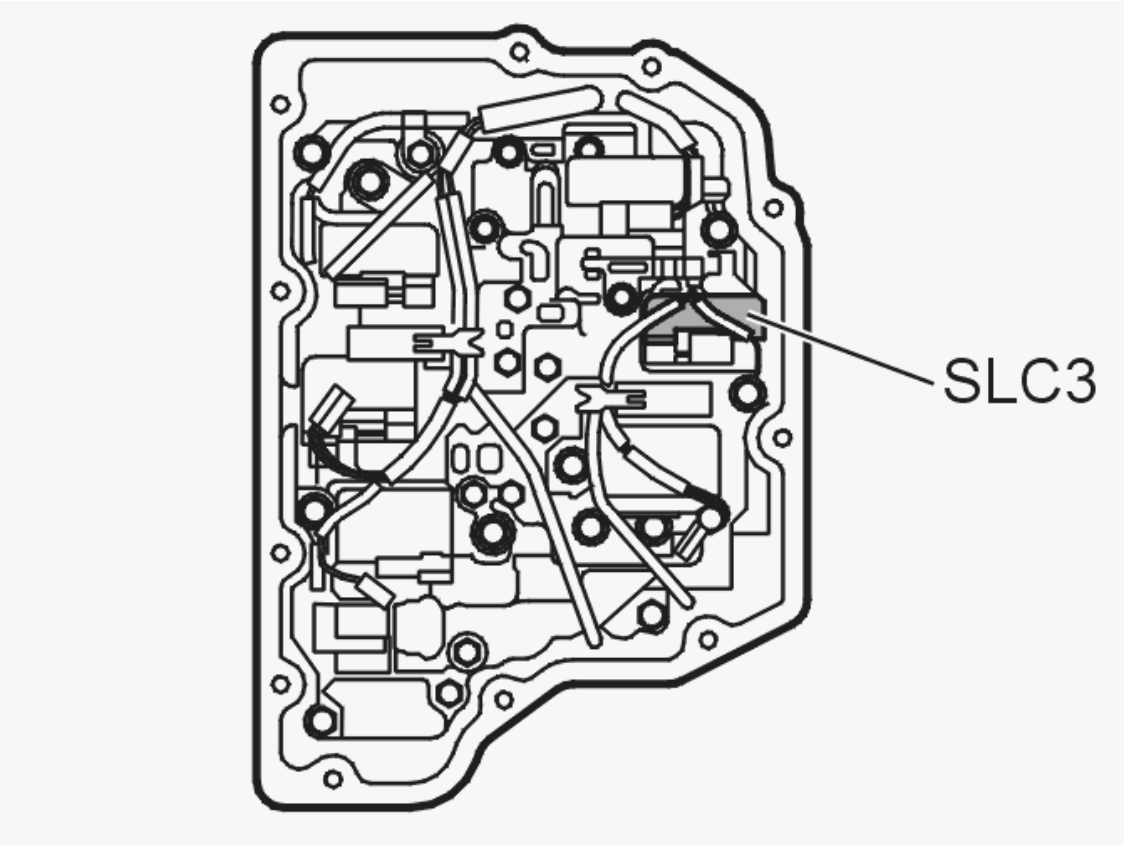


Fig. 86: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

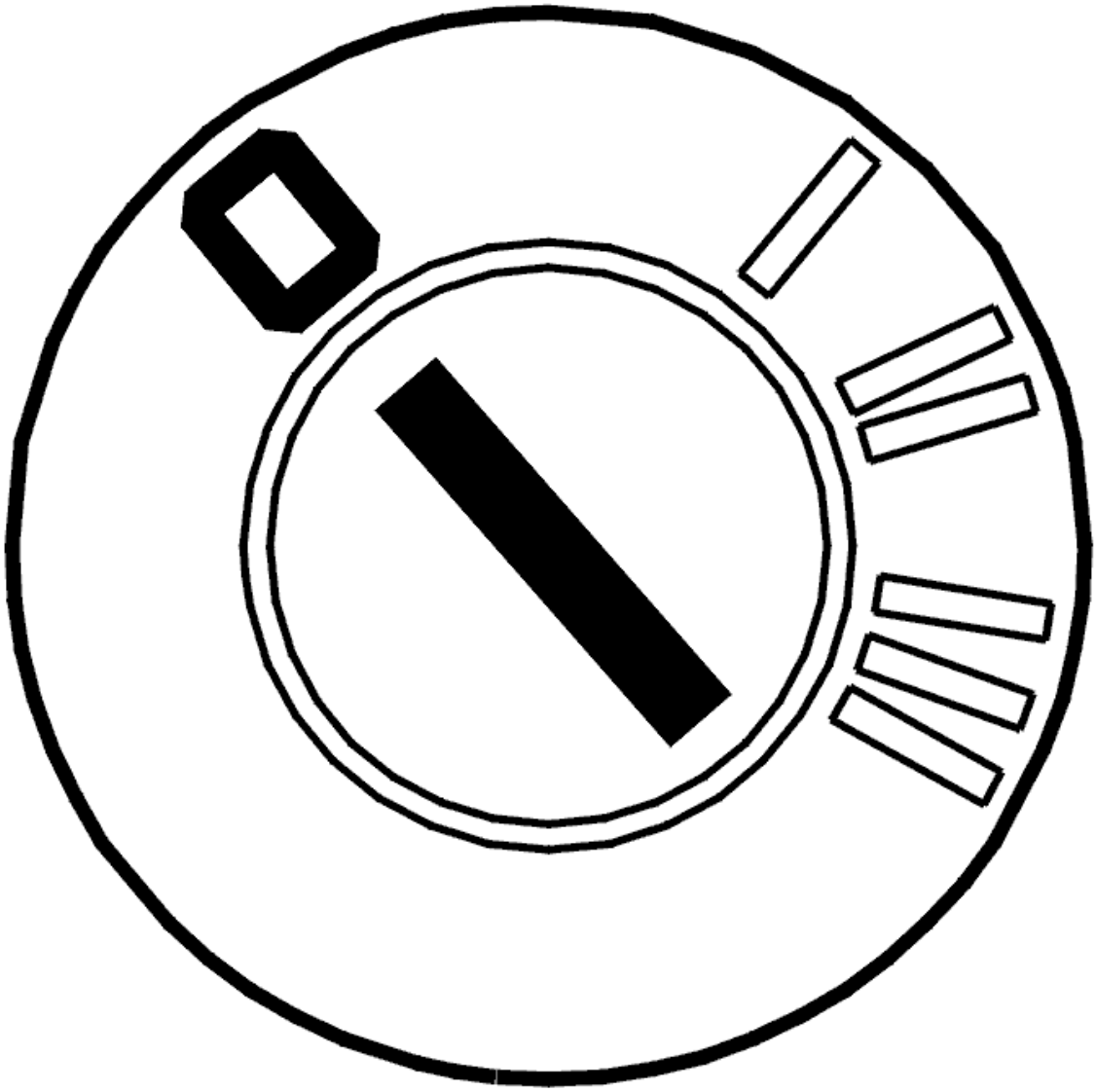


Fig. 87: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

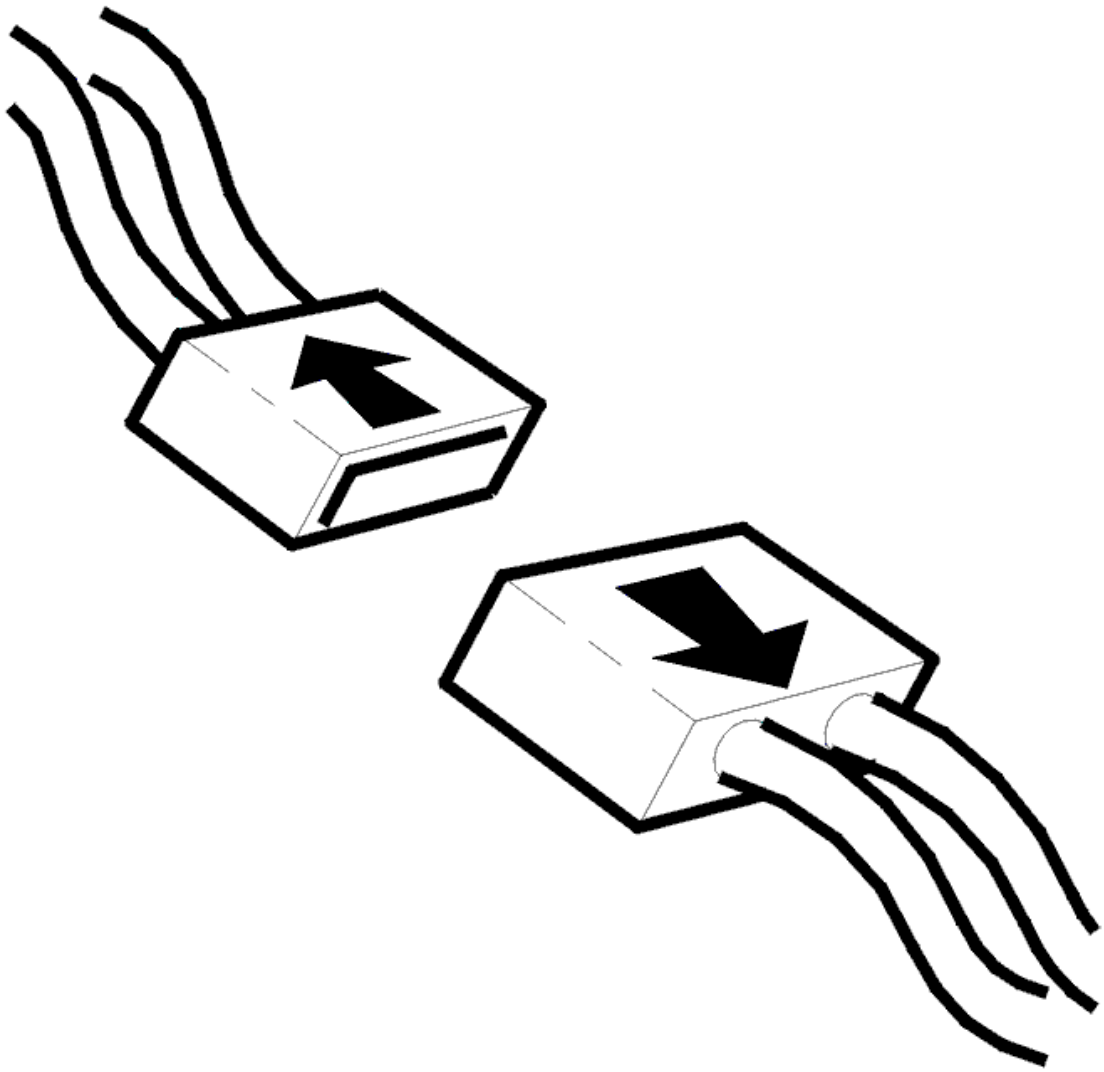


Fig. 88: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check the wiring between transmission connector terminal #B14 and solenoid SLC3 connector terminal #1. Check the wiring between transmission connector terminal #B22 and solenoid SLC3 connector terminal #2. Check for a short-circuit to supply voltage. Check the wiring for short-circuits to each other.

HINT: If no fault is found in the wiring check solenoid SLC3. See CHECKING SHIFT SOLENOIDS

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

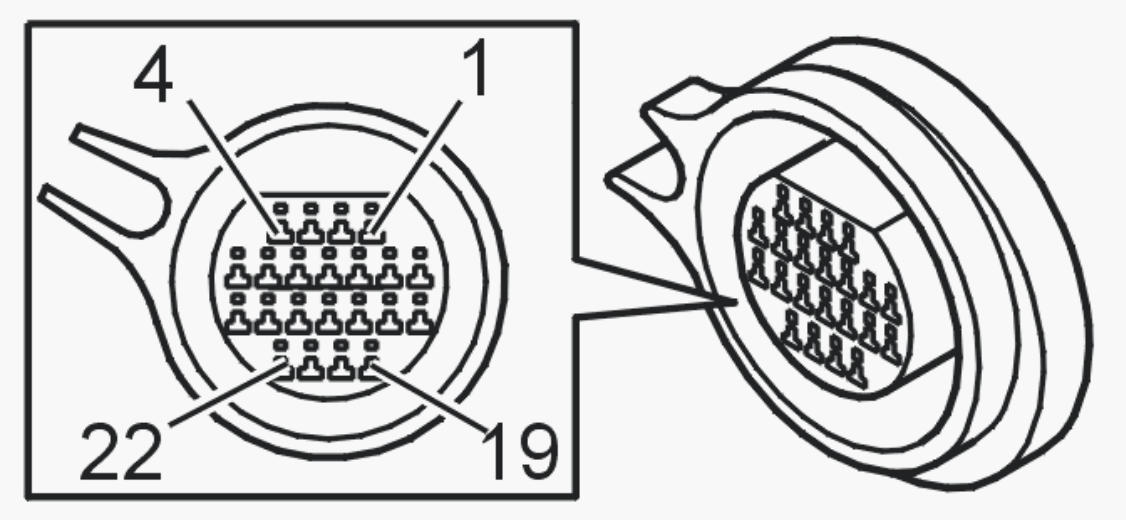


Fig. 89: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

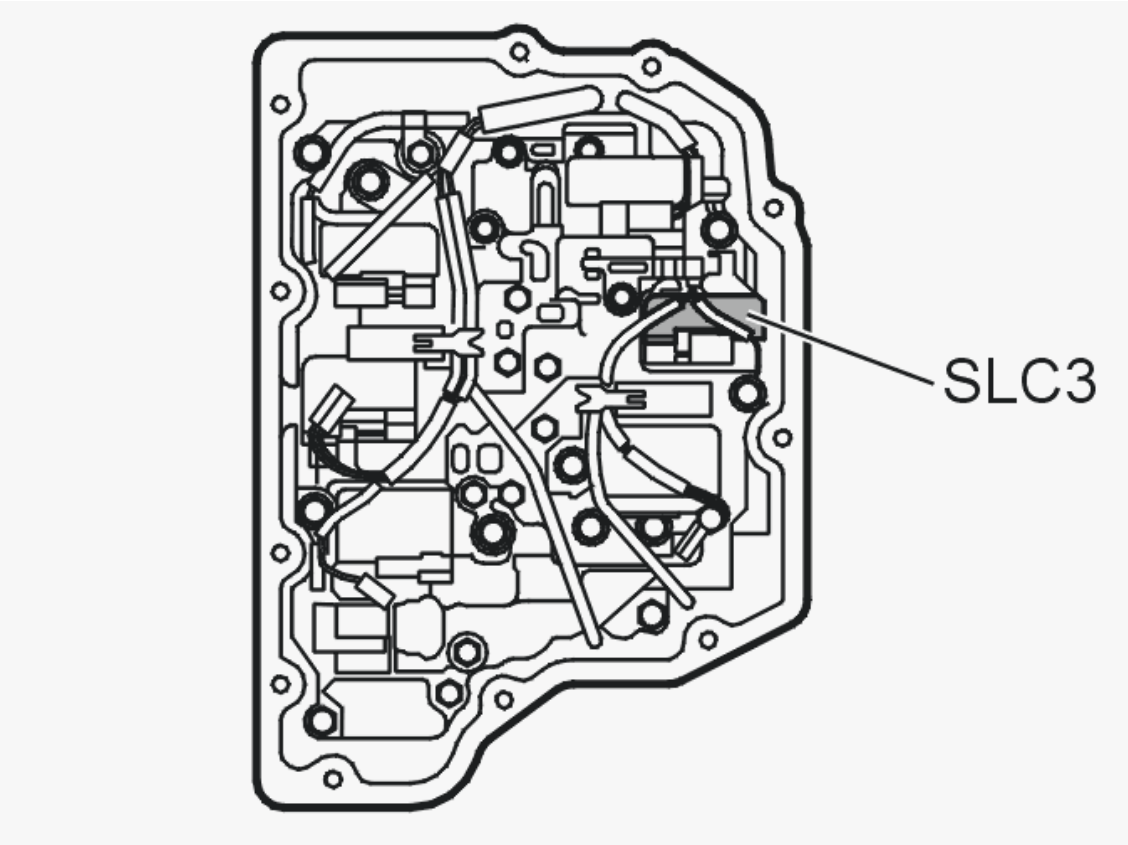


Fig. 90: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

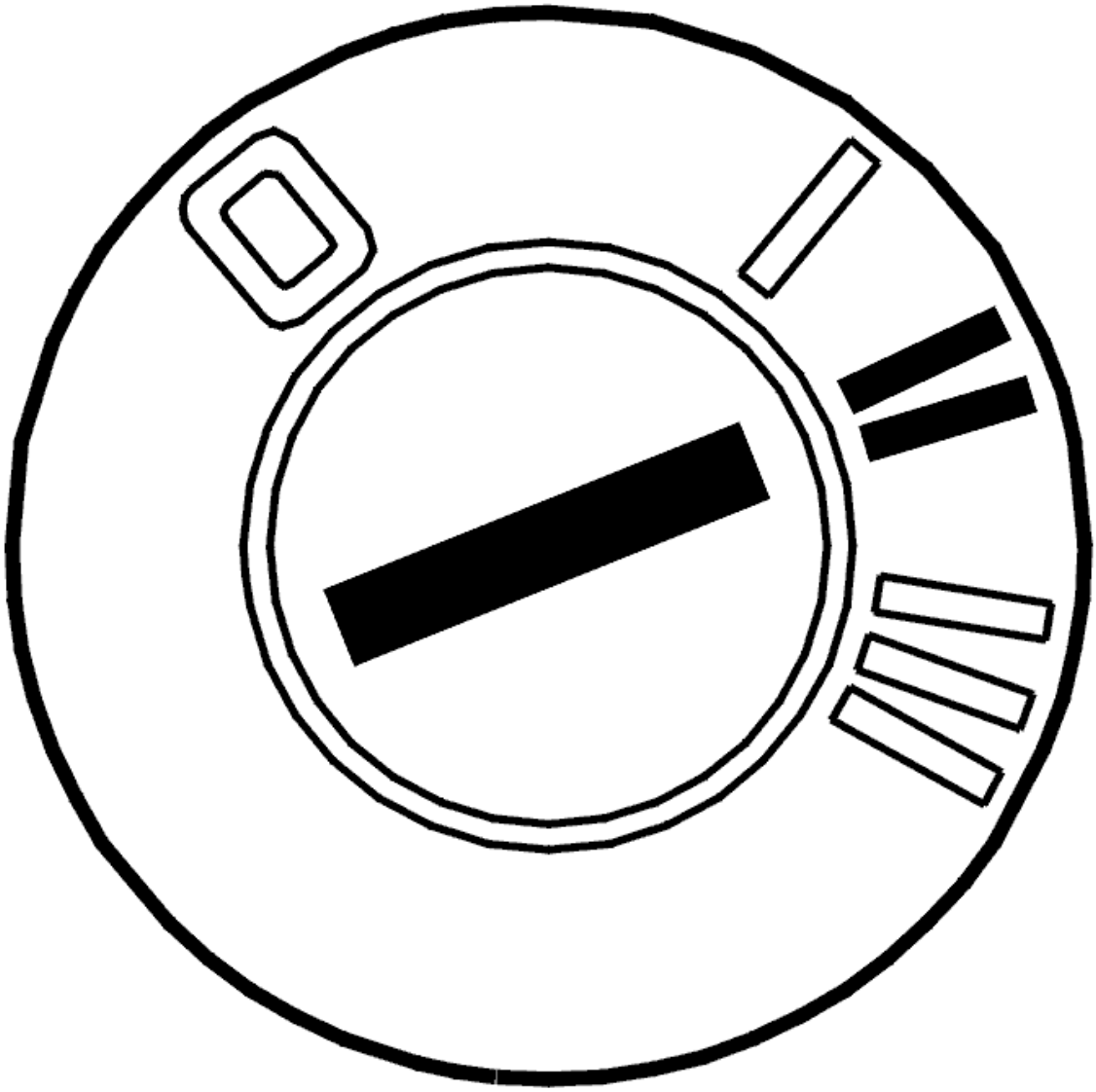


Fig. 91: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

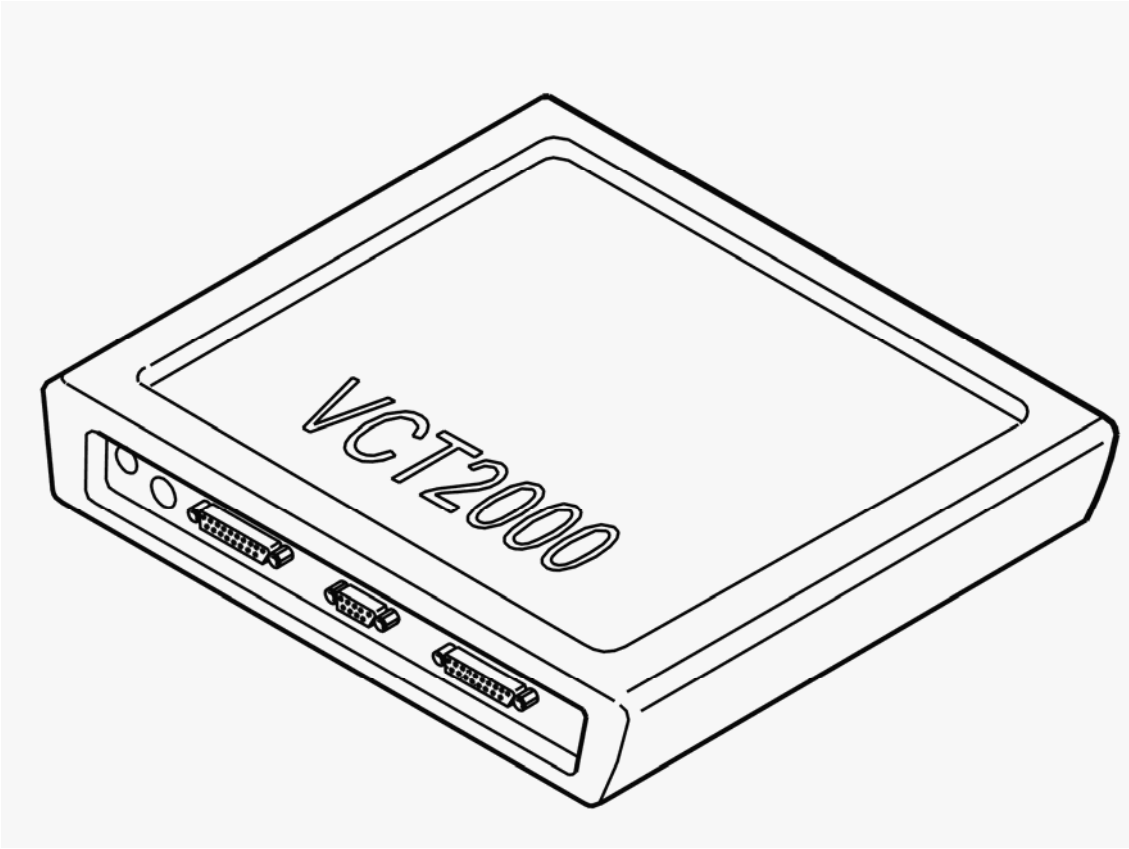


Fig. 92: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

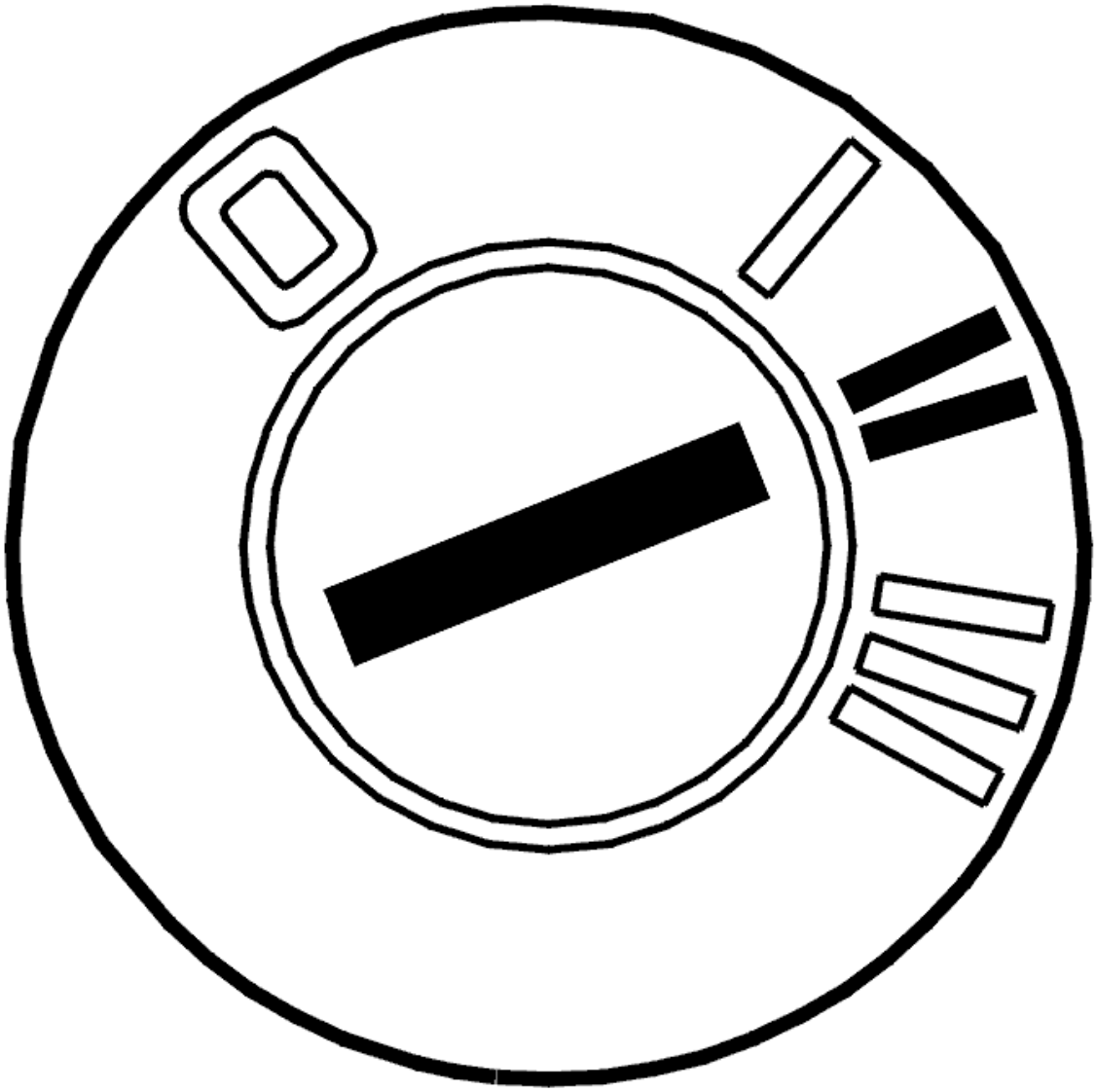


Fig. 93: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

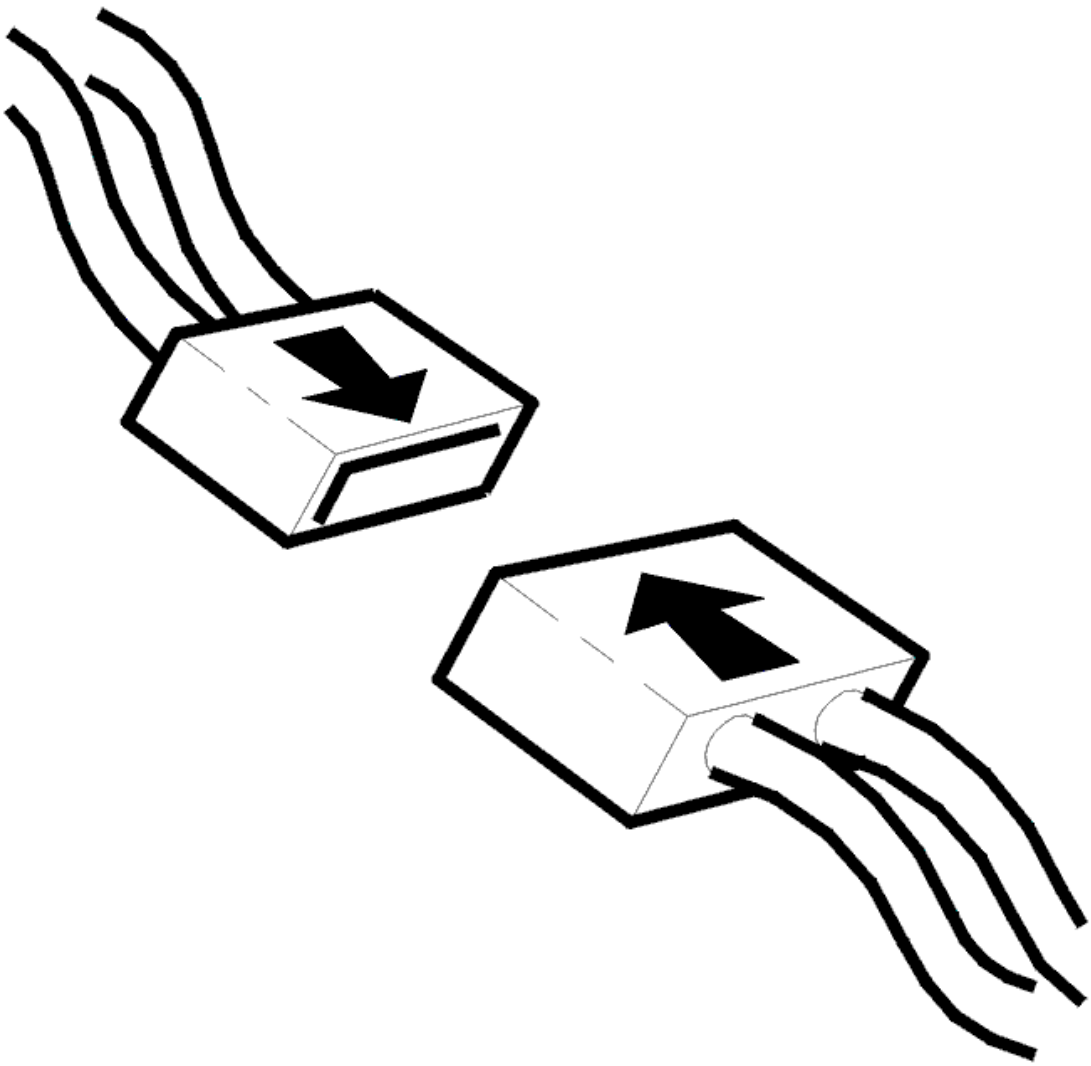


Fig. 94: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLC3 by clicking on the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLC3. The current must oscillate between approximately 0 and 1000 mA.

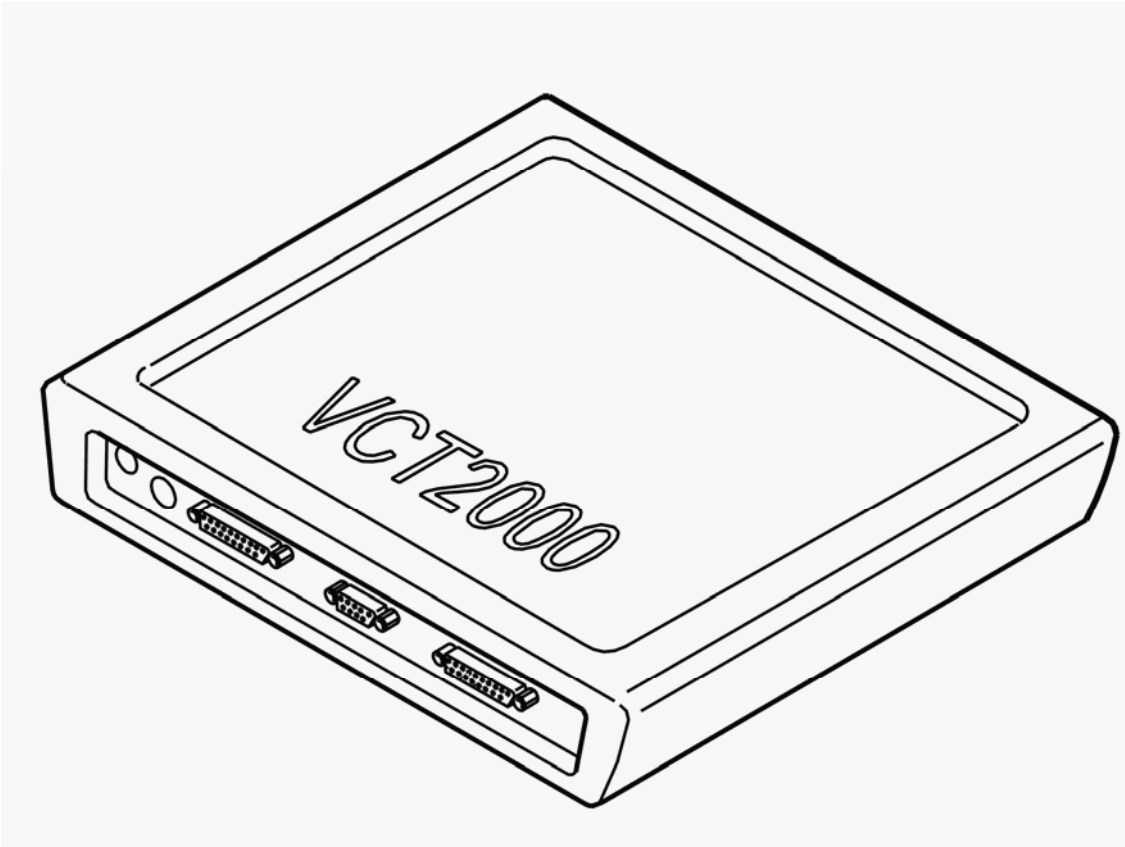


Fig. 95: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

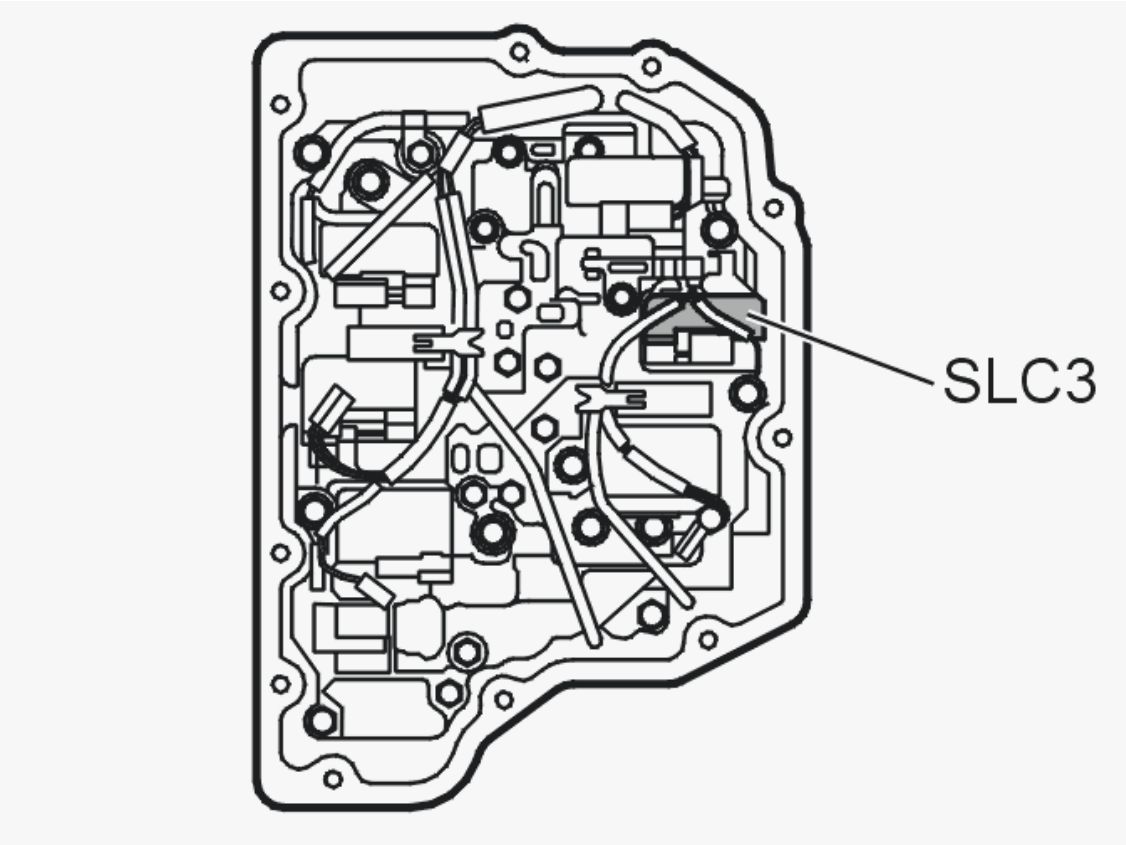


Fig. 96: Identifying Solenoid SLC3
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P272100: PRESSURE REGULATING SOLENOID D CONTROL CIRCUIT HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT

TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272100**

FAULT TRACING TCM-P272100

see **FAULT TRACING TCM-P272100**

TCM-P272800: PRESSURE CONTROL SOLENOID E CONTROL CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272800

Condition

Linear pressure solenoid SLB1 controls shifting in the transmission. Solenoid SLB1 works when it receives voltage from the transmission control module (TCM). The solenoid is activated during various driving conditions based on speed, throttle position and set driving program.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The measured current in the solenoid circuit is incorrect.

Then Solenoid SLB1 cannot control the system pressure.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Shifting when linear pressure solenoid SLB1 is activated.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

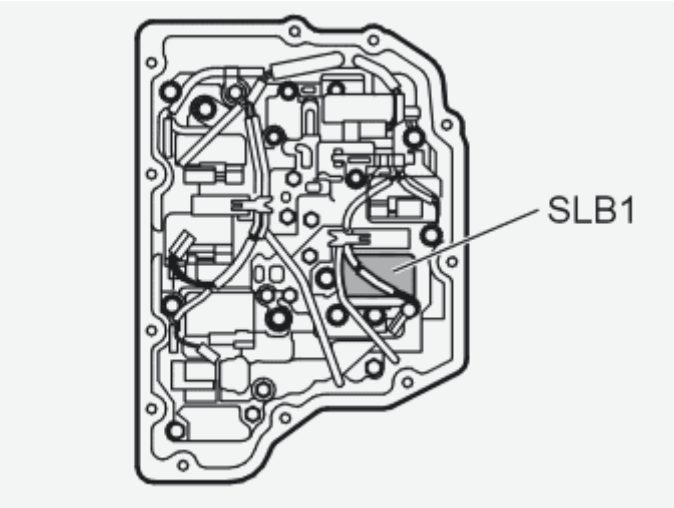


Fig. 97: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the cable for the control signal or signal ground.
- Line pressure solenoid SLB1 has jammed.
- Line pressure solenoid SLB1 does not work.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Rough gear shift
- No gear shift
- Abnormal slipping gearshifts

FAULT-TRACING

CHECKS

CHECK LINE PRESSURE SOLENOID SLB1

Fig. 98: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLB1 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLB1. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 99: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

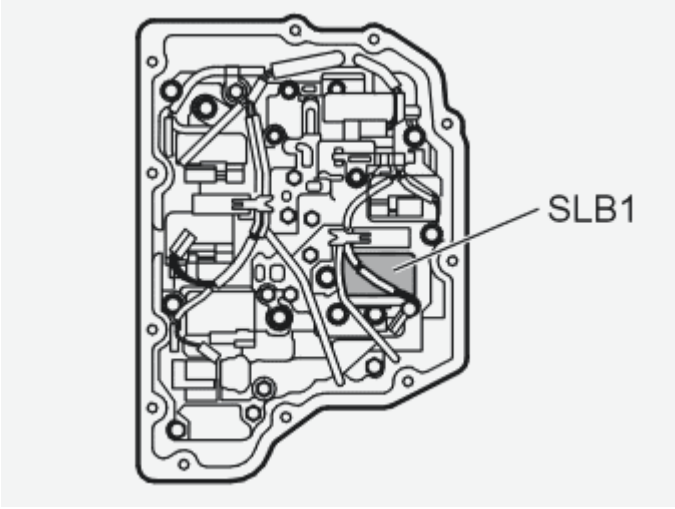


Fig. 100: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

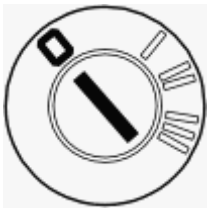


Fig. 101: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

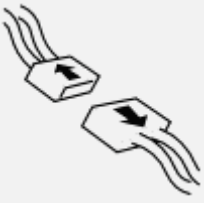


Fig. 102: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

Check the cables for short-circuit to voltage, short-circuit to ground and open circuit.

Take readings between:

- Transmission connector #B21 and the connector for solenoid SLB1 #1.
- Transmission connector #B16 and the connector for solenoid SLB1 #2.

HINT: If no fault is found in the wiring, check solenoid SLB1. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **VALVE HOUSING**

- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

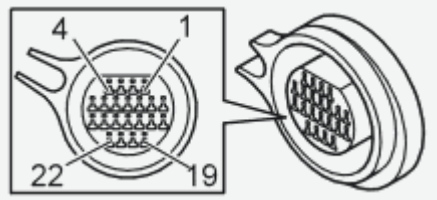


Fig. 103: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

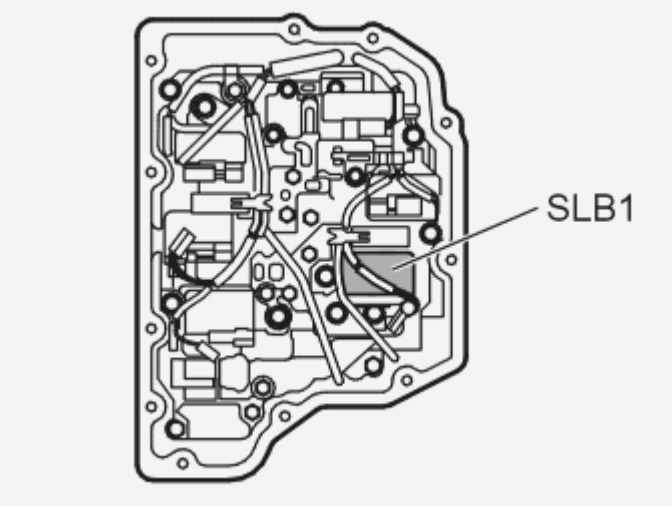


Fig. 104: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 105: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

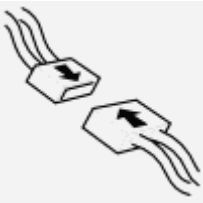


Fig. 106: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Activate solenoid SLB1 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLB1. The current should oscillate between 100 and 950 mA.

Fig. 107: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

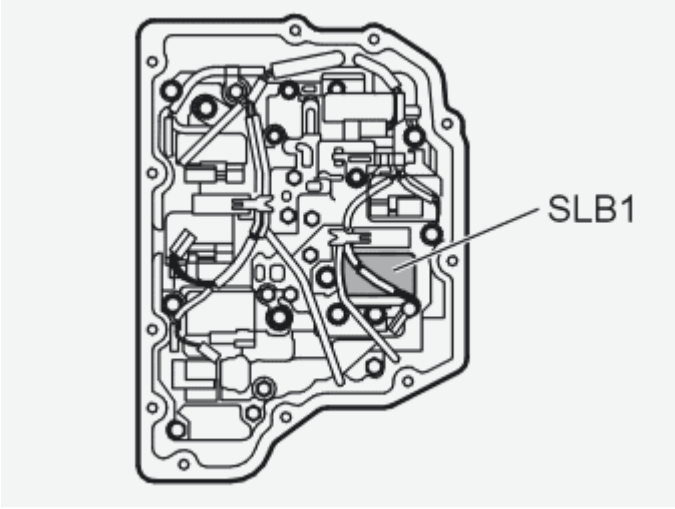


Fig. 108: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 109: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 110: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P272800: PRESSURE CONTROL SOLENOID E CONTROL CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272800

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272800**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P272800: PRESSURE REGULATING SOLENOID E CONTROL CIRCUIT INSIDE/OUTSIDE PARAMETER VALUES. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272800

Condition

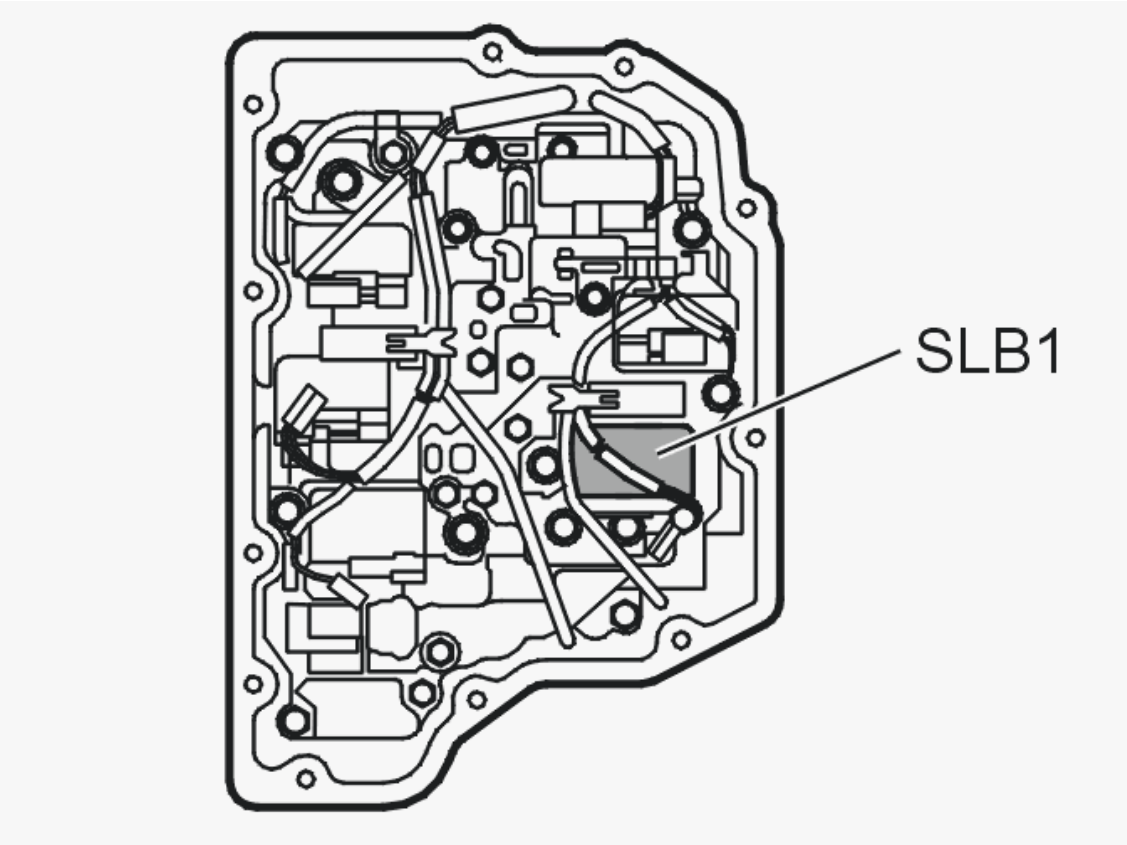


Fig. 111: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

Linear pressure solenoid SLB1 controls the shifts in the transmission. Solenoid SLB1 operates when it receives power from the transmission control module (TCM). Depending on the vehicle speed, throttle position and selected driving program the solenoid is operated in different driving conditions.

If the transmission control module (TCM) registers that the measured current in the solenoid circuit is incorrect, the diagnostic trouble code (DTC) is generated. The SLB1 solenoid is then not able to regulate the system pressure.

The diagnostic trouble codes (DTCs) can be diagnosed during shifting when the line pressure solenoid SLB1 is activated.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals

- Open circuit in lead for control signal or signal ground.
- Line pressure solenoid SLB1 jammed.
- Line pressure solenoid SLB1 does not work.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Harsh gear changing
- No gear changing.
- Abnormally slipping gears.

FAULT TRACING TCM-P272800

CHECKS

CHECKING THE LOCK-UP SOLENOID SLB1

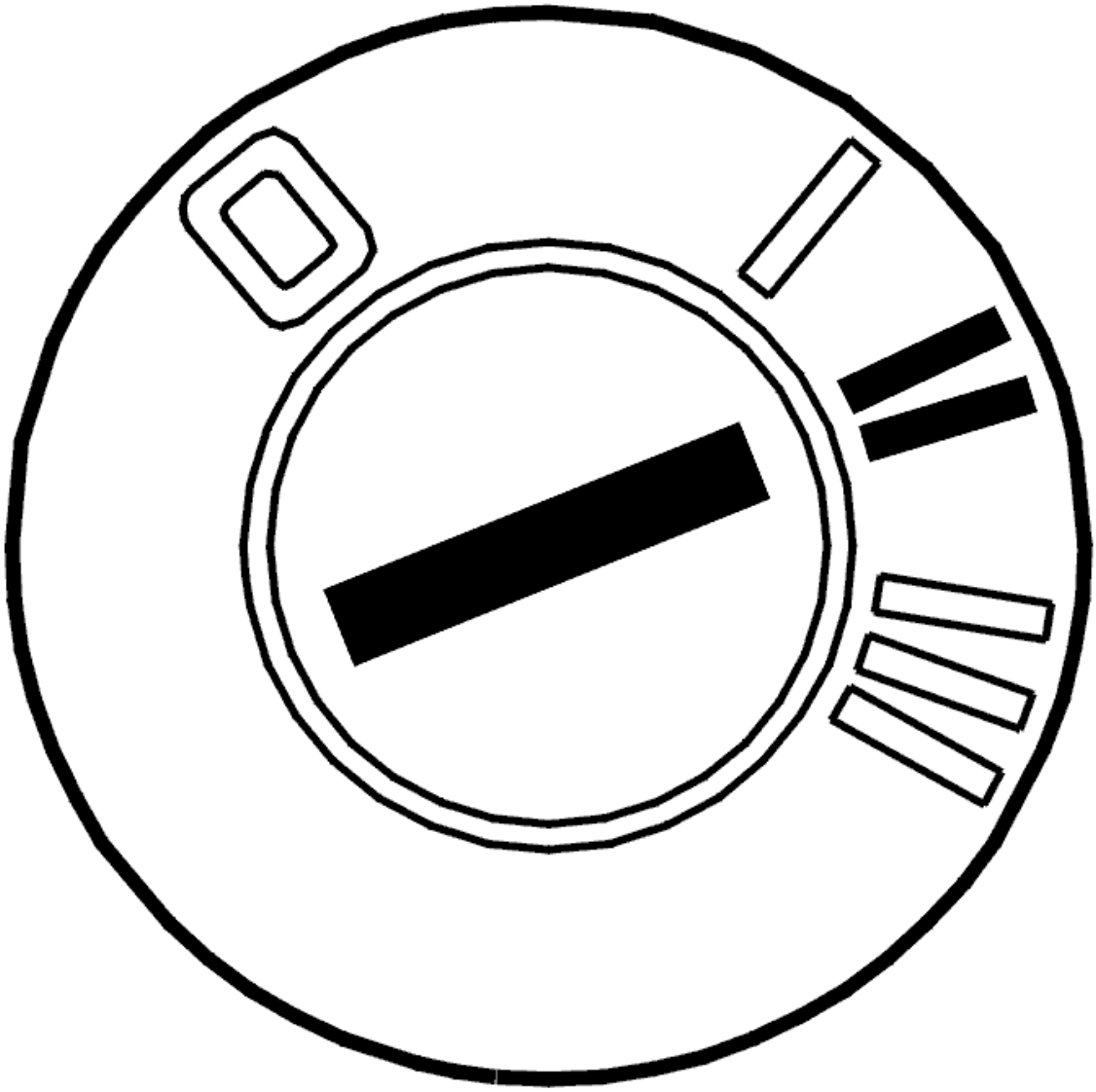


Fig. 112: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLB1 by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLB1. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

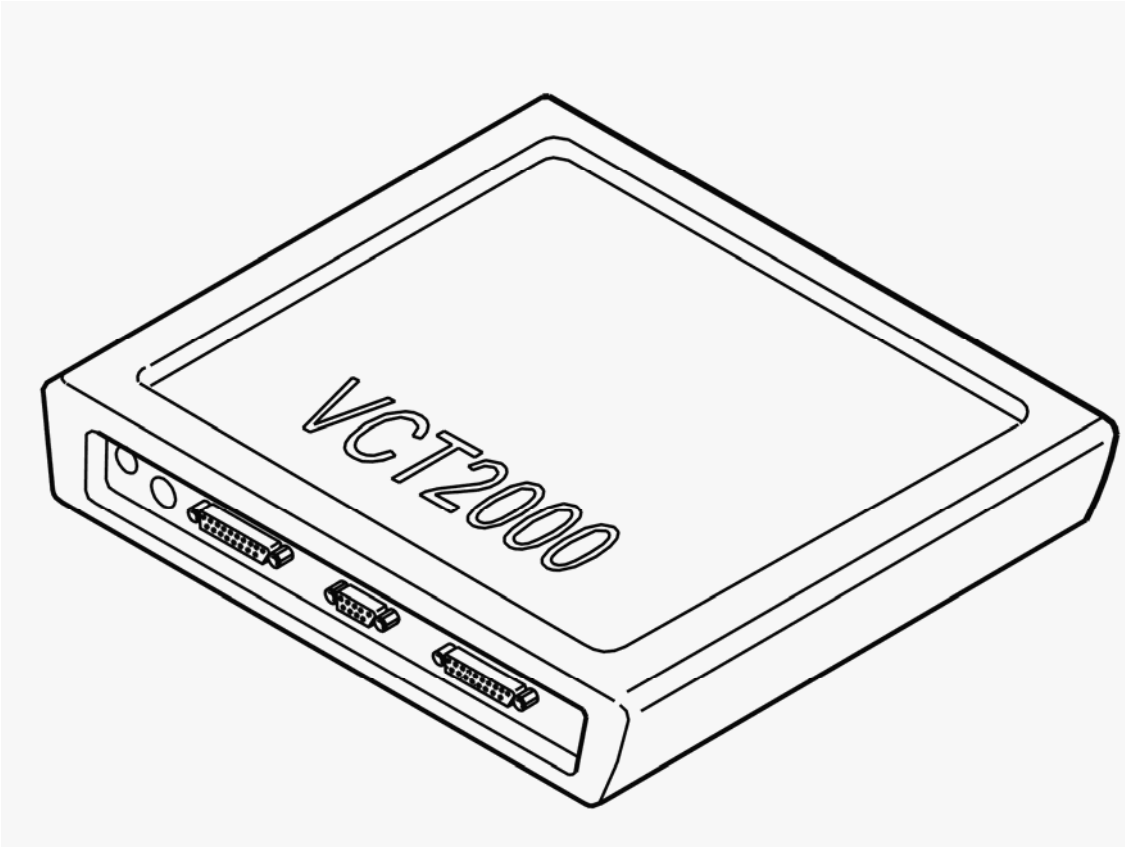


Fig. 113: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

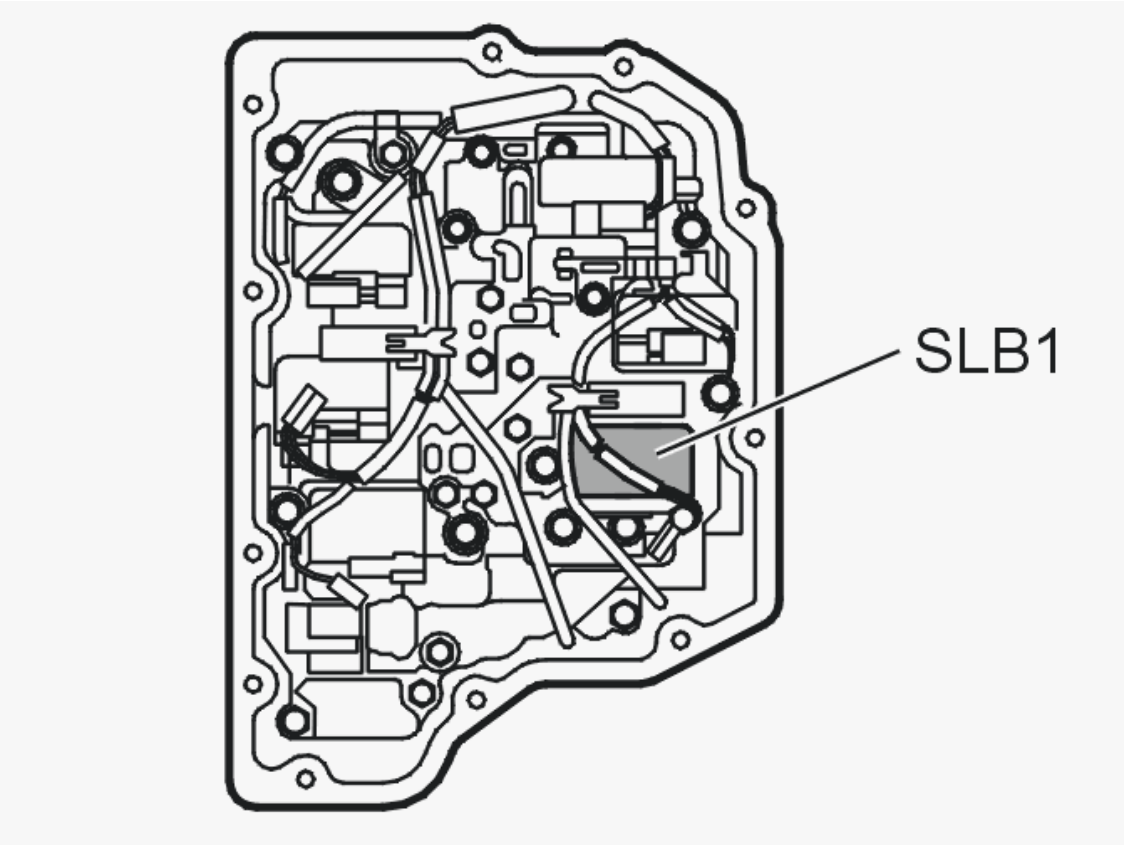


Fig. 114: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

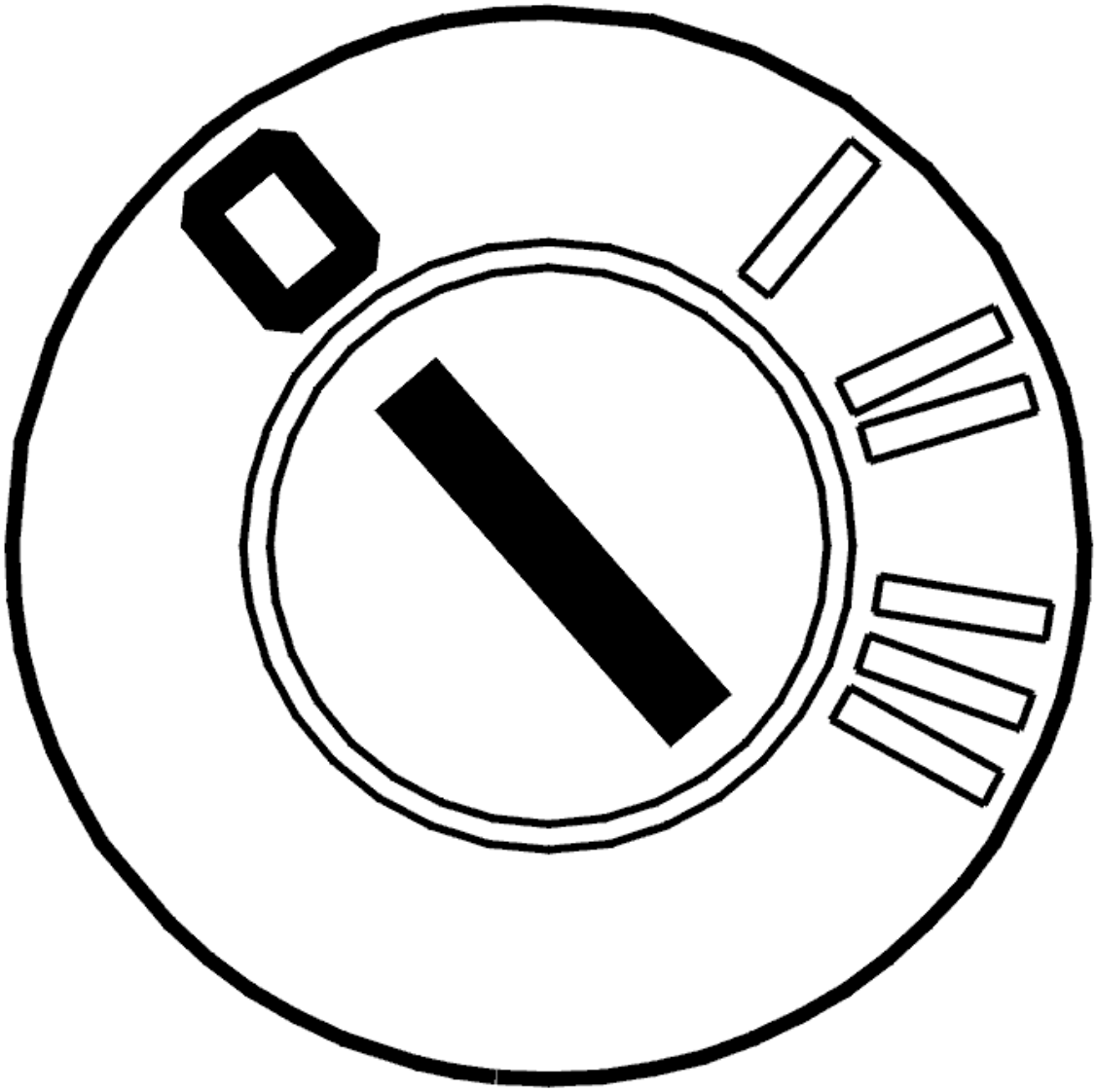


Fig. 115: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

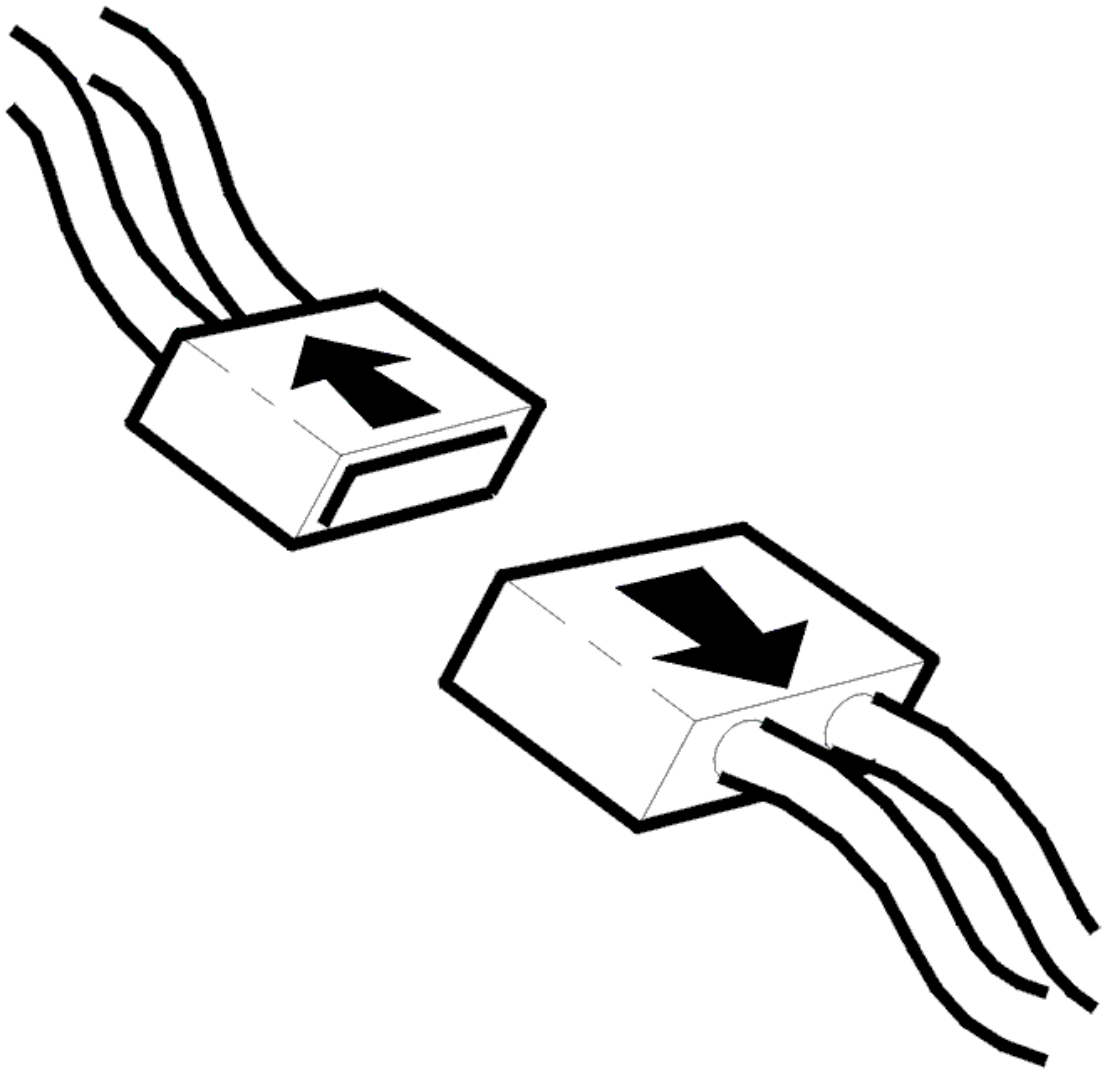


Fig. 116: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check connector B (22-pin) for the transmission control module (TCM). Check for damage and pressed in terminal pins. Check for contact resistance and oxidation.

Check the wiring between the transmission connector terminal #B21 and the connector for solenoid SLB1 terminal #1. Check the wiring between the transmission connector terminal #B16 and the connector for solenoid SLB1 terminal #2. Check for an open circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.

HINT: If no fault is found in the wiring check solenoid SLB1. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

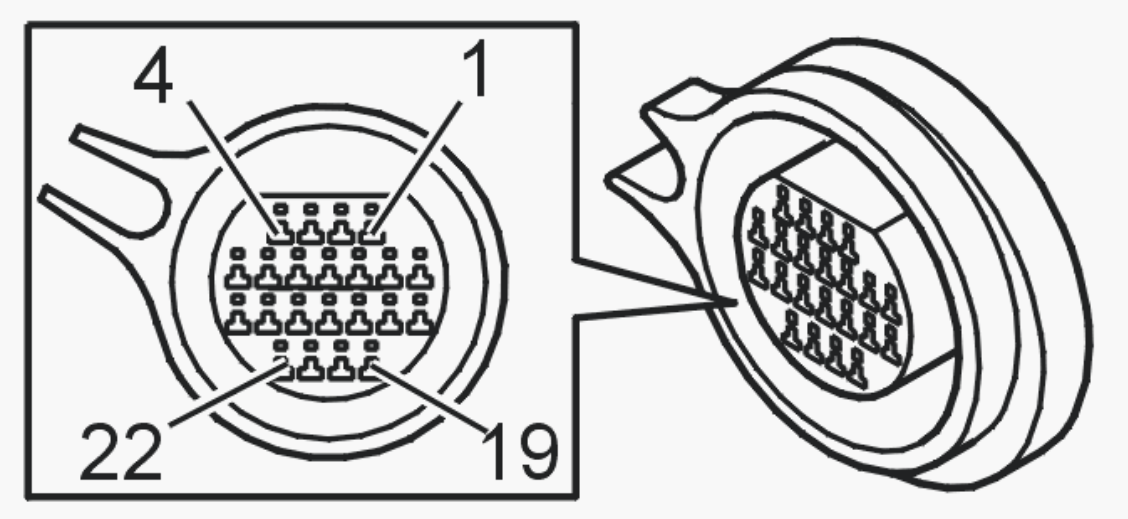


Fig. 117: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

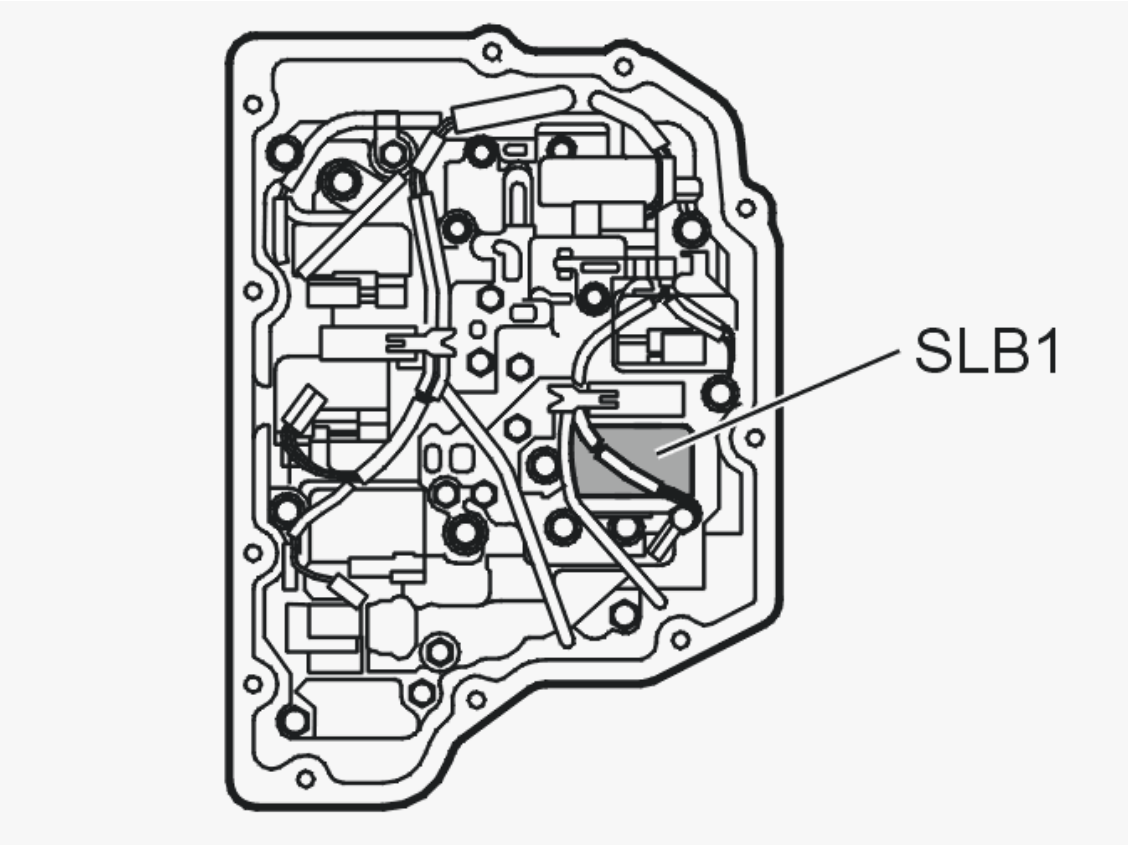


Fig. 118: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

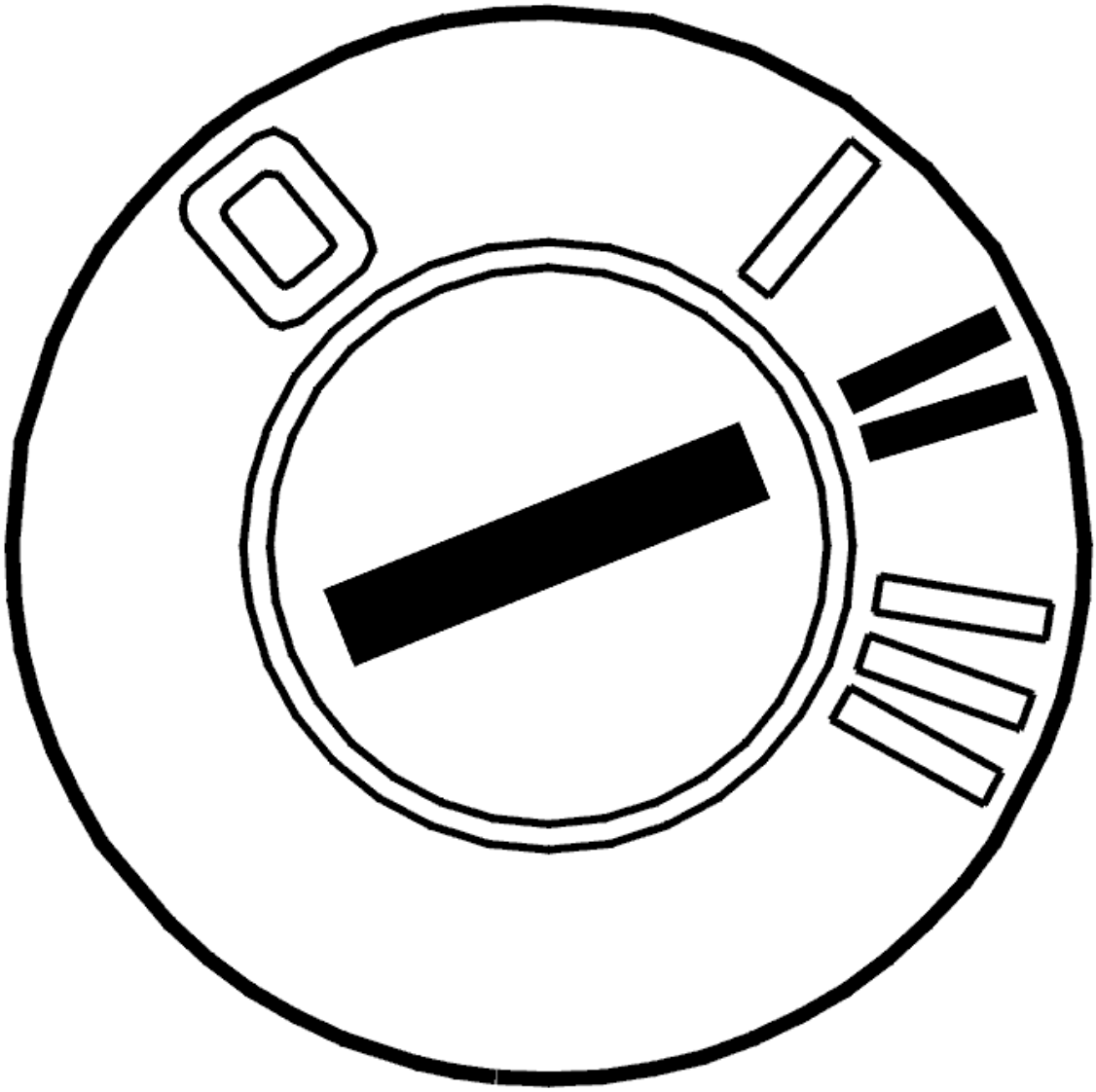


Fig. 119: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

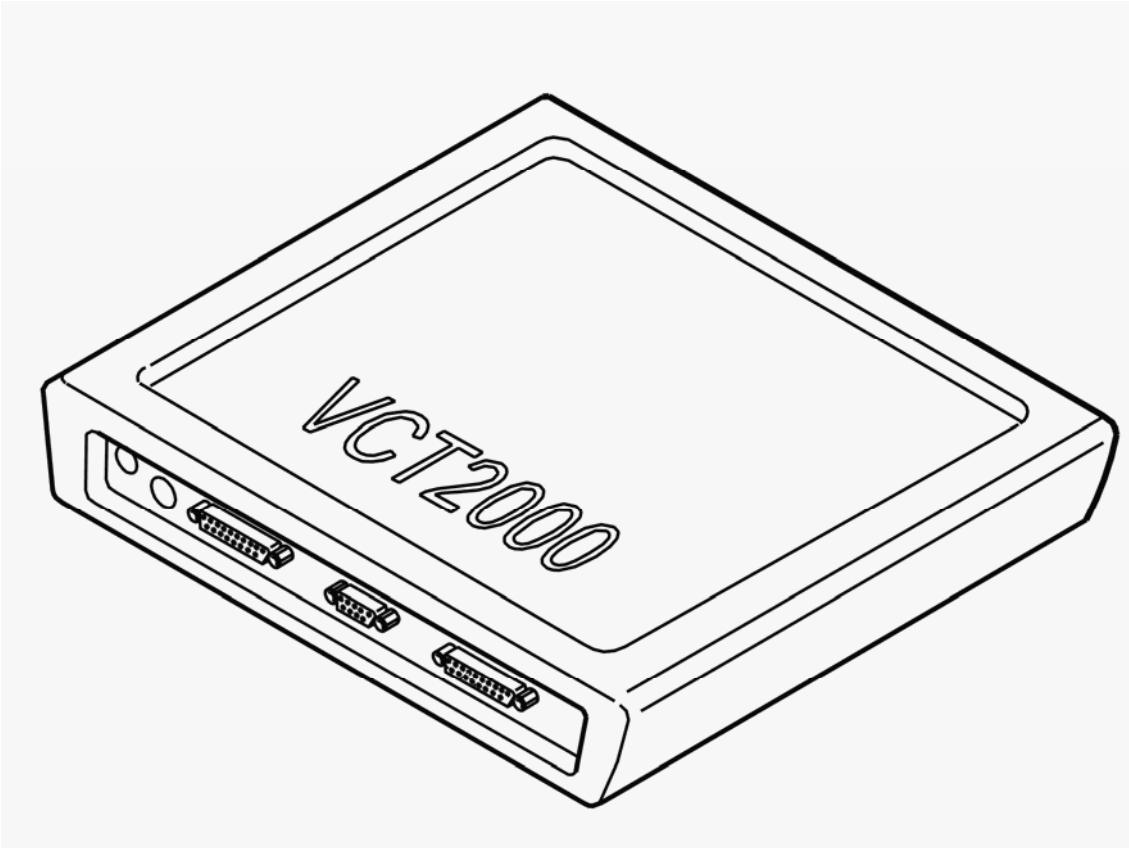


Fig. 120: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

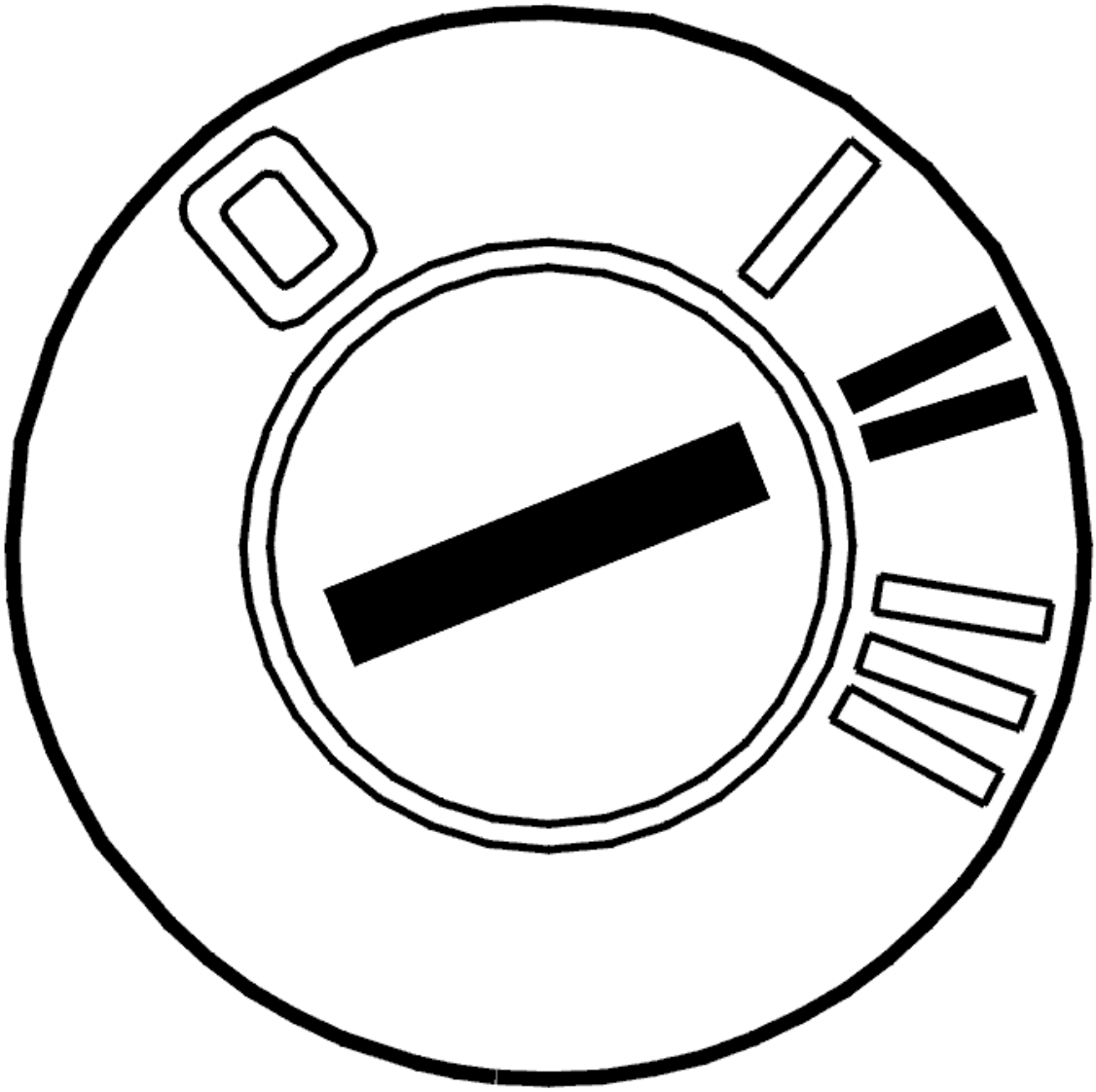


Fig. 121: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

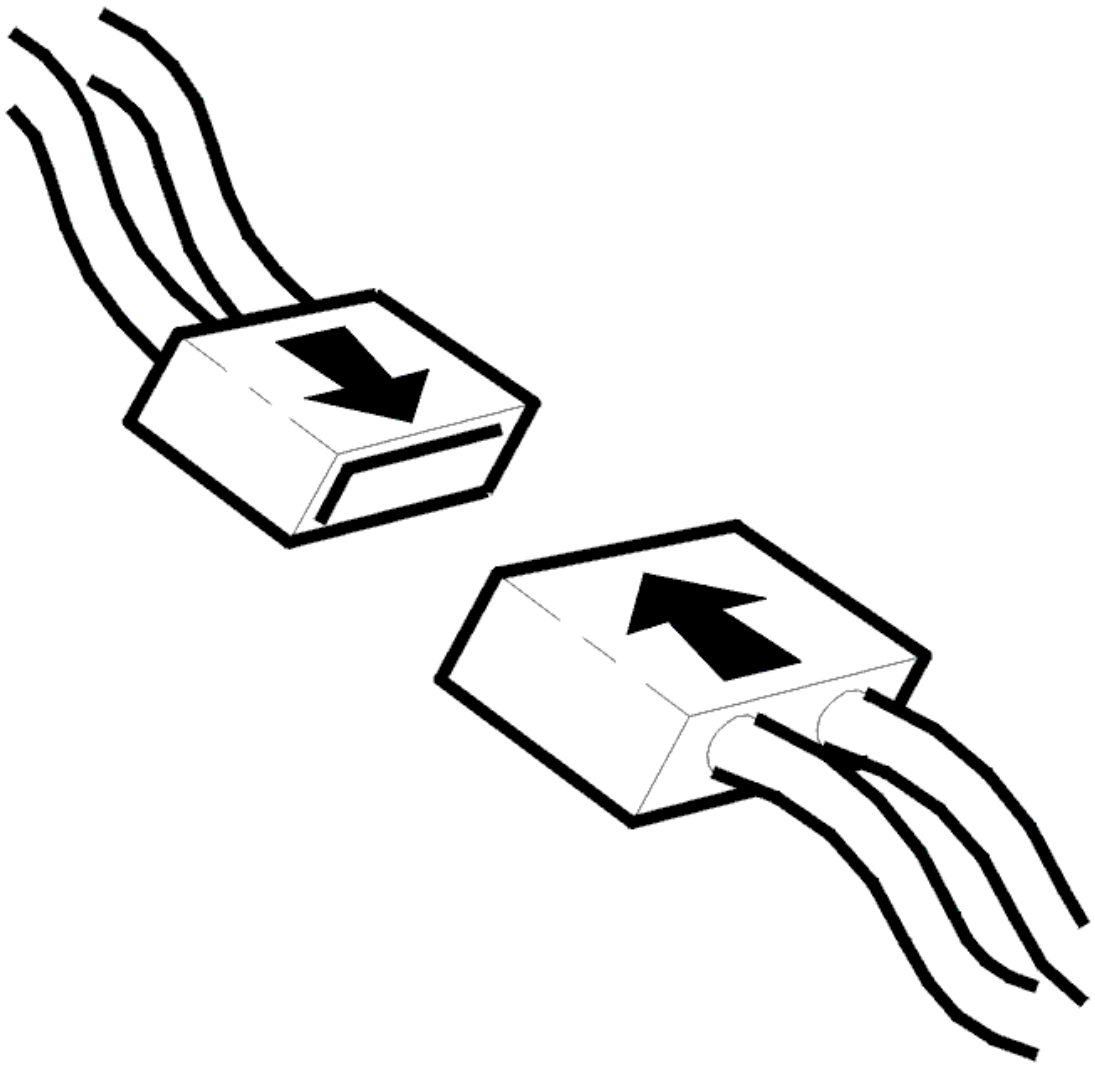


Fig. 122: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLB1 by clicking the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLB1. The current must oscillate between approximately 0 and 1000 mA.

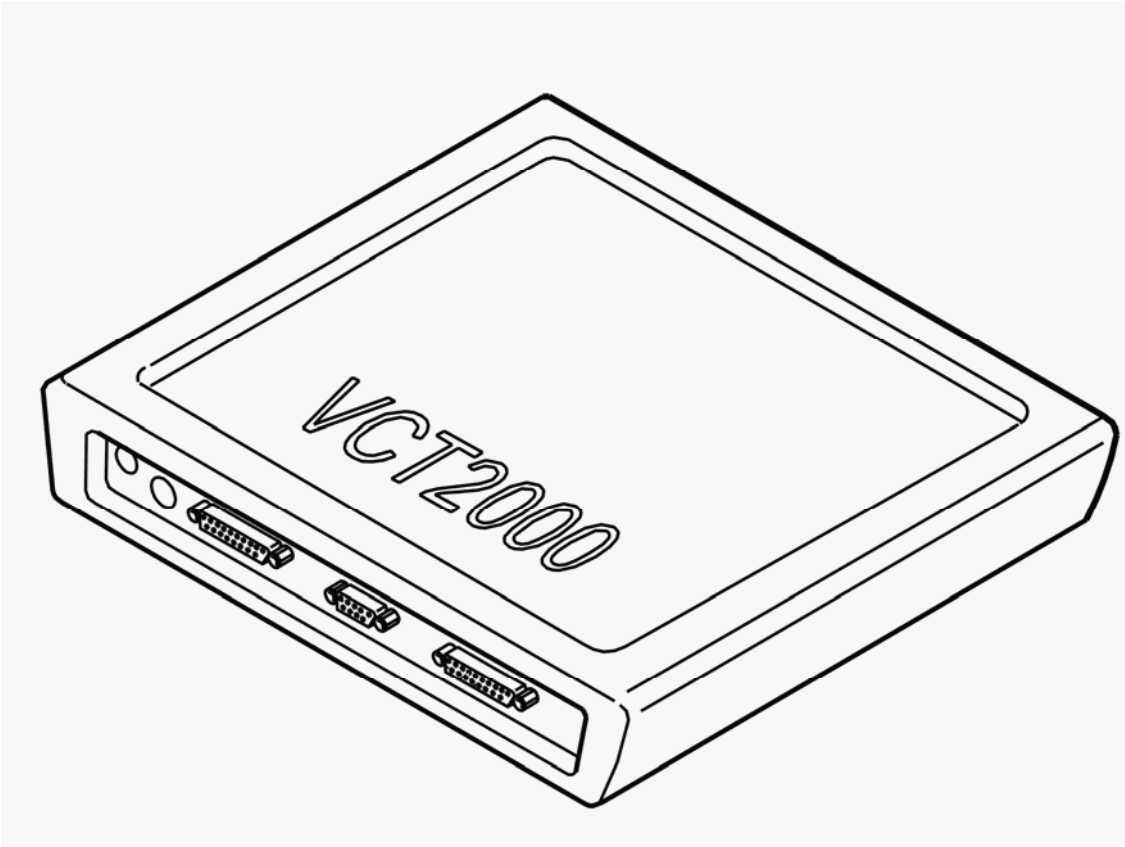


Fig. 123: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

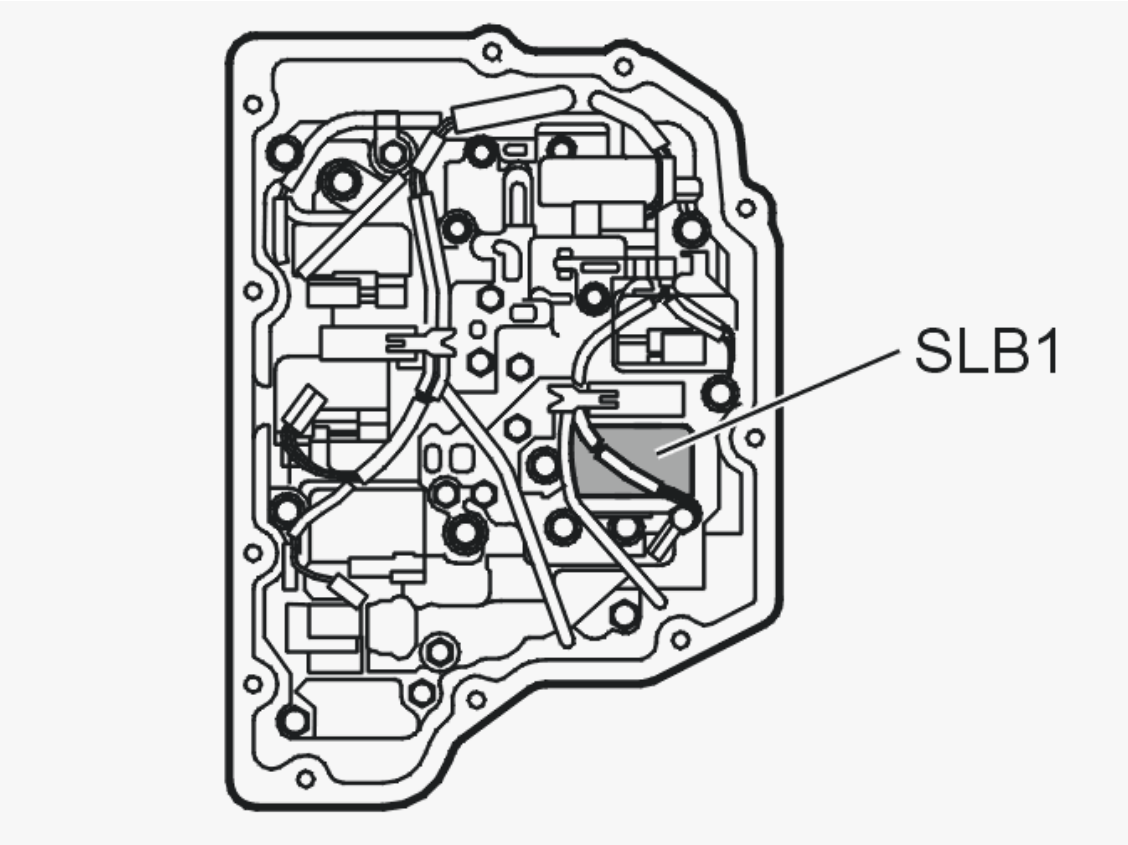


Fig. 124: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P272800: PRESSURE REGULATING SOLENOID E CONTROL CIRCUIT INSIDE/OUTSIDE PARAMETER VALUES. GENERAL FAULT INFORMATION.

NO INFORMATION ABOUT FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272800

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272800**

FAULT TRACING TCM-P272800

see **FAULT TRACING TCM-P272800**

TCM-P272900: PRESSURE CONTROL SOLENOID E CONTROL CIRCUIT LOW. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272900

Condition

Linear pressure solenoid SLB1 controls system pressure in the transmission. The solenoid is controlled by a power stage located on the output of the transmission control module (TCM). The control module uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1A) results in a low line pressure. The amperage is primarily affected by the throttle position.

The diagnostic trouble code is stored if the control module detects:

- An open circuit in solenoid SLB1 circuit.

Then Solenoid SLB1 cannot control the system pressure.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Shifting when linear pressure solenoid SLB1 is activated.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

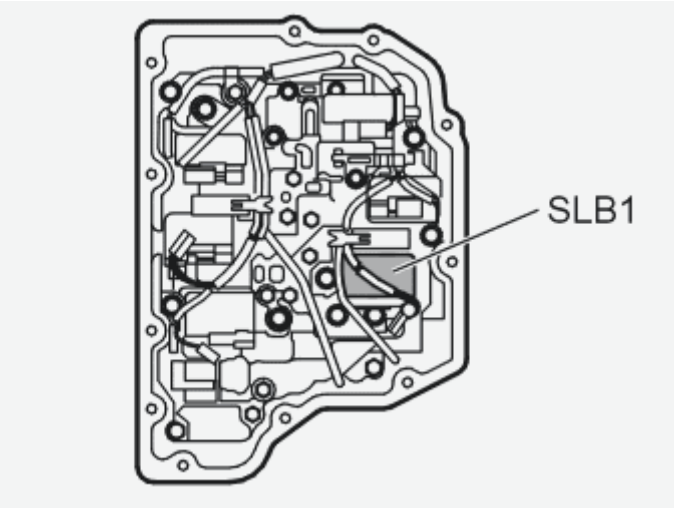


Fig. 125: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the cable for the control signal or signal ground.
- Line pressure solenoid SLB1 does not work.
- The transmission control module (TCM) does not function.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- No lock-up
- Rough gear shift

FAULT-TRACING

CHECKS

CHECK LINE PRESSURE SOLENOID SLB1

Fig. 126: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLB1 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLB1. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 127: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

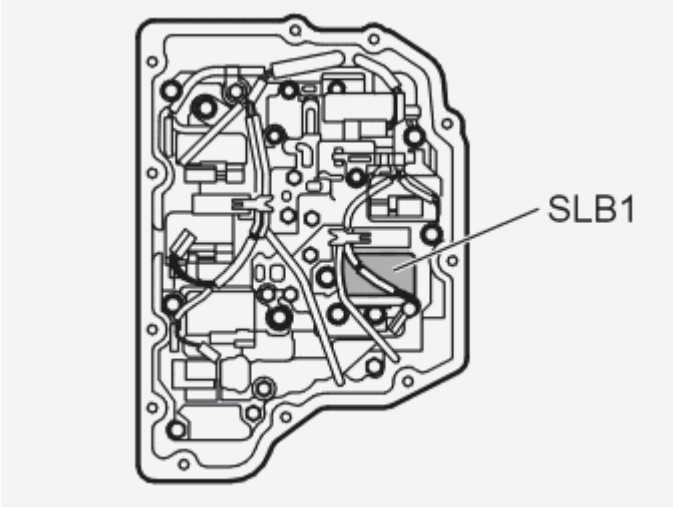


Fig. 128: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

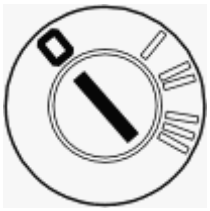


Fig. 129: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

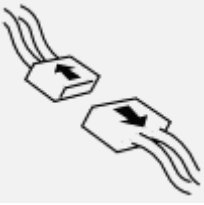


Fig. 130: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

Check the cables for open circuit and short circuit to ground.

Take readings between:

- Transmission connector #B21 and the connector for solenoid SLB1 #1.
- Transmission connector #B16 and the connector for solenoid SLB1 #2.

HINT: If no fault is found in the wiring, check solenoid SLB1. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **VALVE HOUSING**

- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

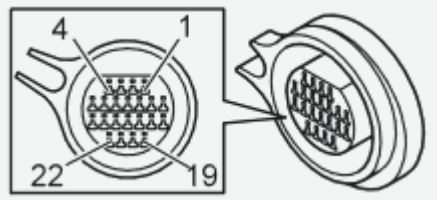


Fig. 131: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

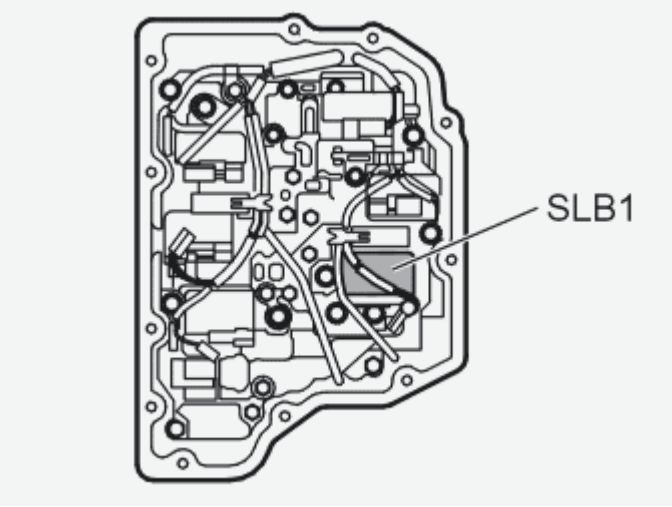


Fig. 132: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 133: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

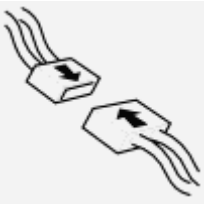


Fig. 134: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Activate solenoid SLB1 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLB1. The current should oscillate between 100 and 950 mA.

Fig. 135: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

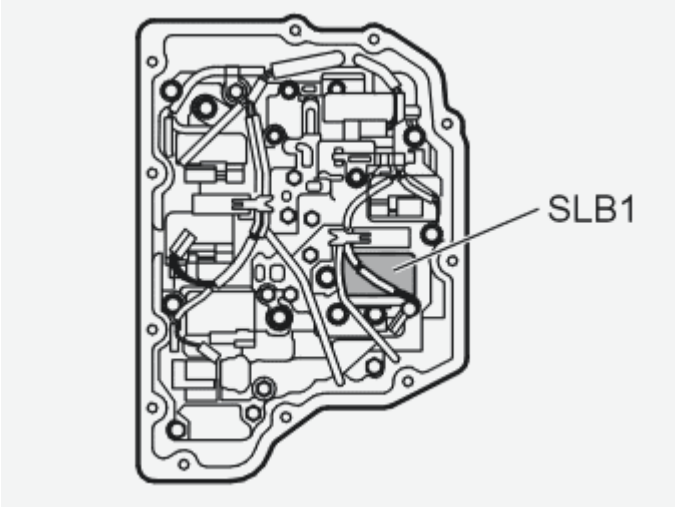


Fig. 136: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 137: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 138: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P272900: PRESSURE CONTROL SOLENOID E CONTROL CIRCUIT LOW. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272900

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272900**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P272900: PRESSURE REGULATING SOLENOID E CONTROL CIRCUIT LOW. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272900

Condition

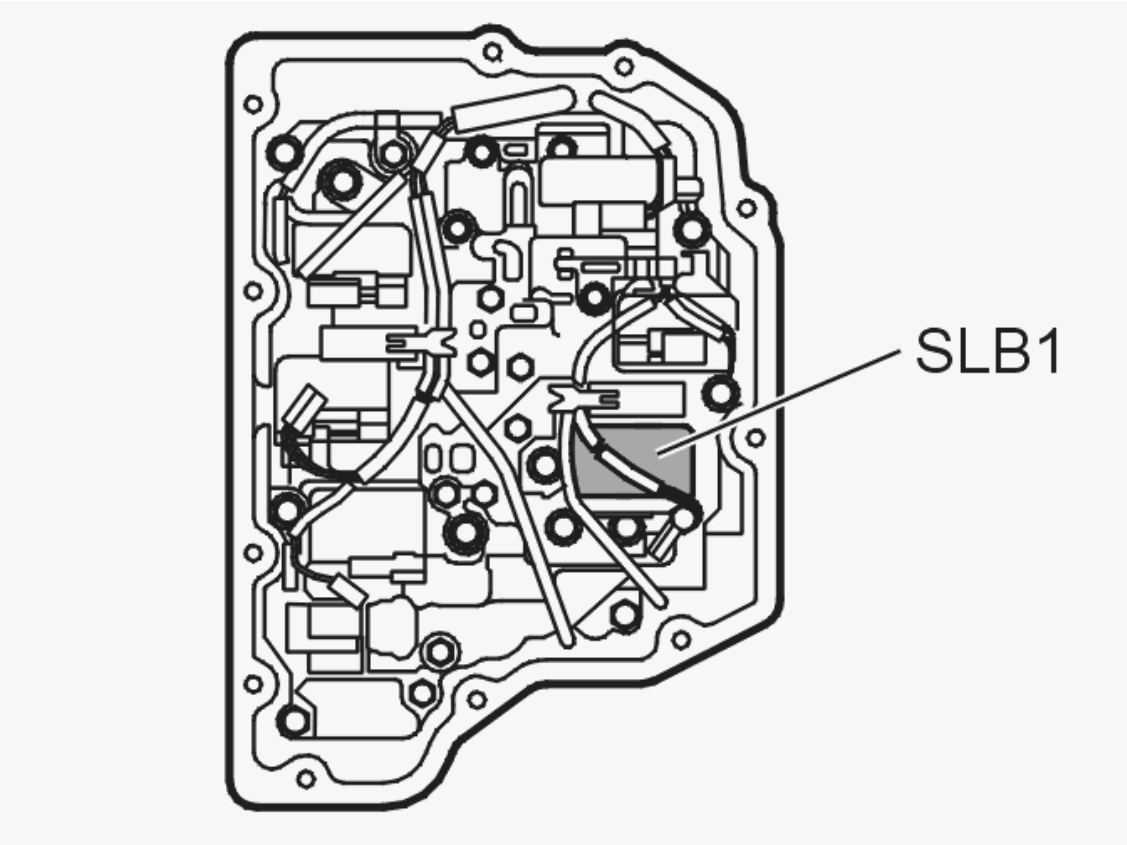


Fig. 139: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

Line pressure solenoid SLB1 controls the line pressure in the transmission. The solenoid is controlled by a power stage located on the output of the transmission control module (TCM). The control module uses the power stage to control the current to the solenoid. Low current gives high line pressure and high current (approximately 1 A) gives a low line pressure. The current strength is affected by the throttle position.

The diagnostic trouble code (DTC) is stored if the transmission control module (TCM) registers an open circuit in the circuit for solenoid SLB1. Solenoid SLB1 cannot control the line pressure.

The diagnostic trouble codes (DTCs) can be diagnosed during shifting when the line pressure solenoid SLB1 is activated.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals

- Open circuit in lead for control signal or signal ground.
- Line pressure solenoid SLB1 does not work.
- The transmission control module (TCM) does not function.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear changing

FAULT TRACING TCM-P272900

CHECKS

CHECKING THE LOCK-UP SOLENOID SLB1

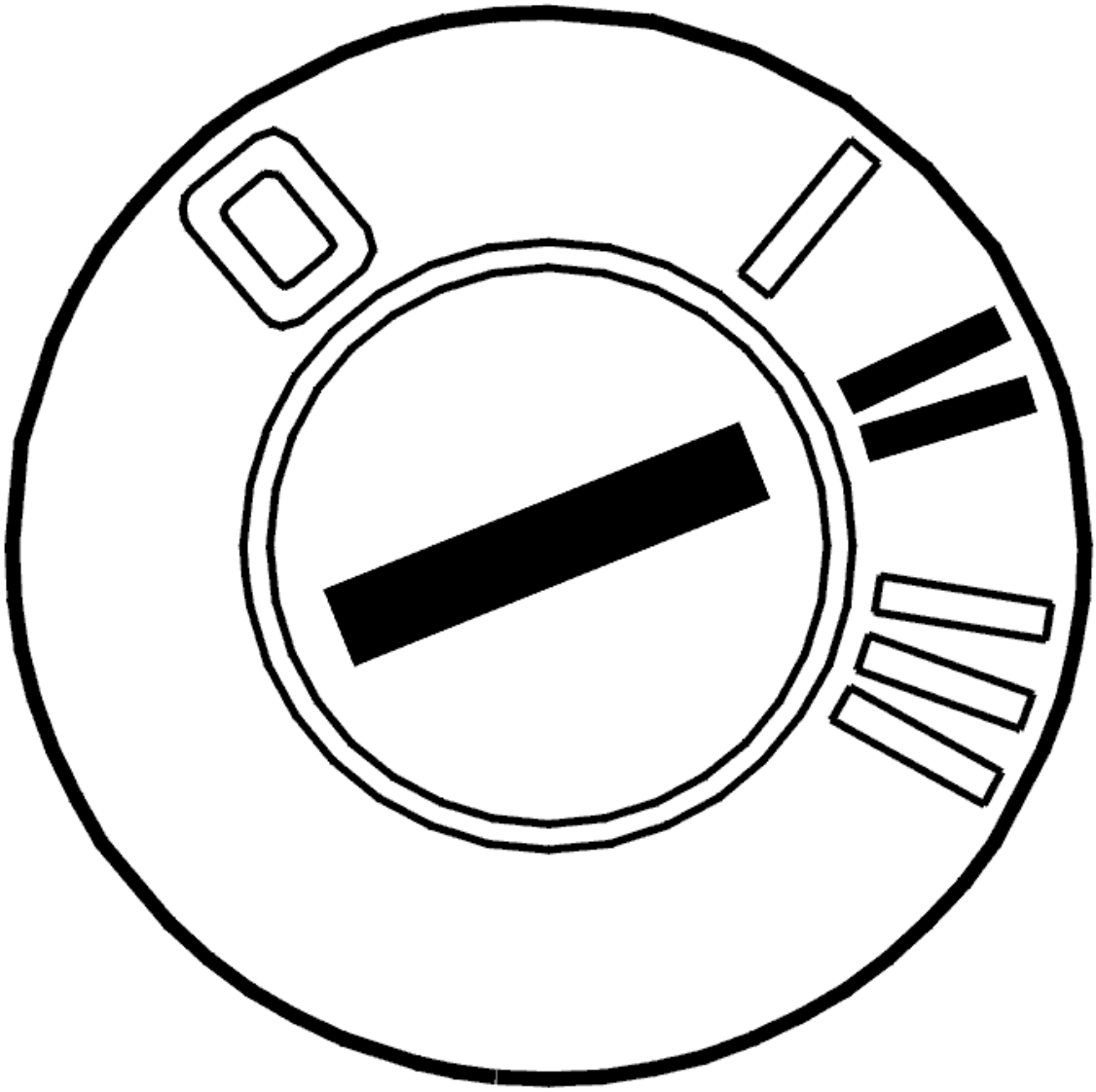


Fig. 140: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLB1 by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLB1. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

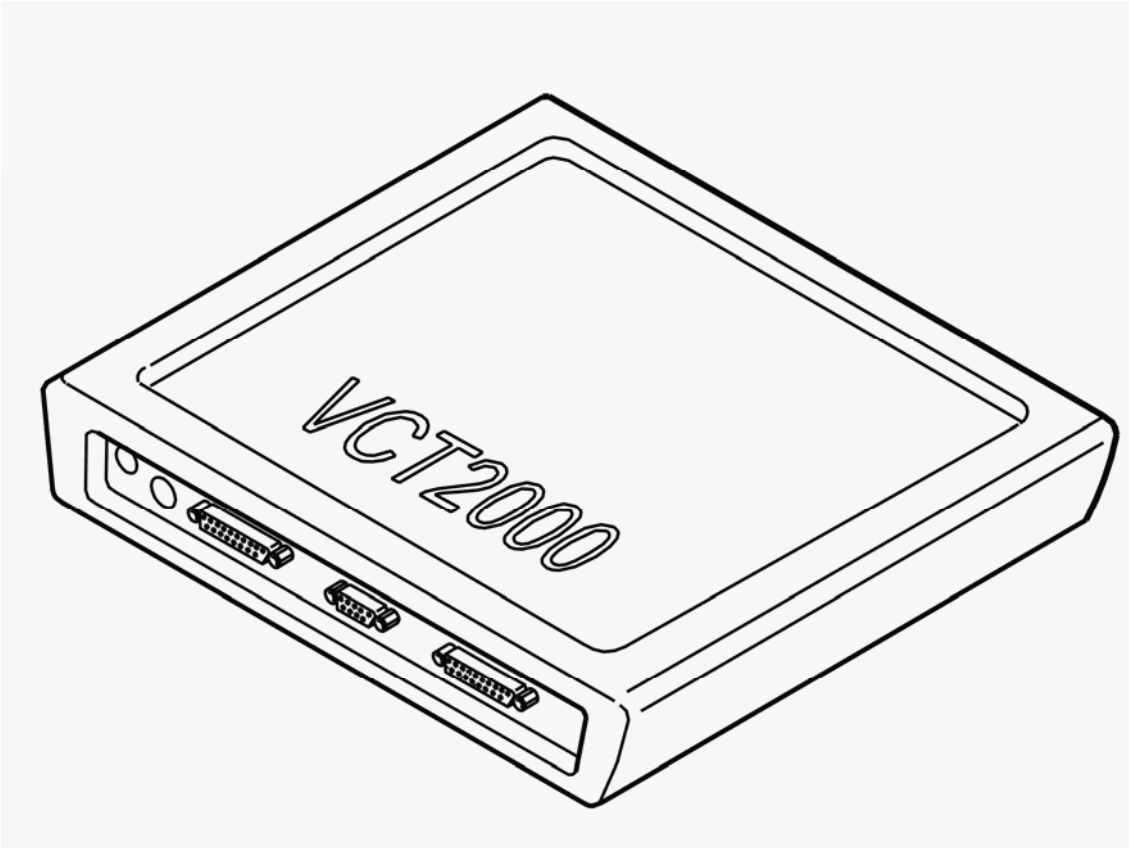


Fig. 141: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

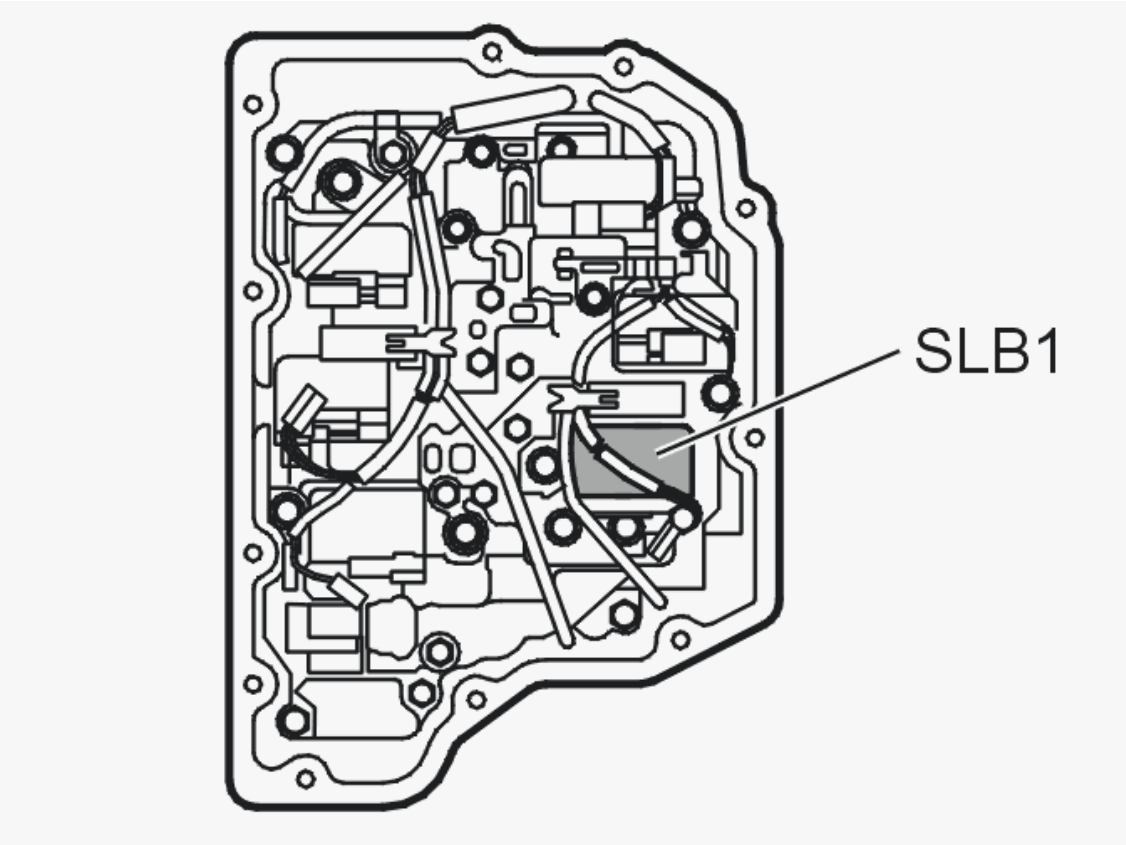


Fig. 142: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

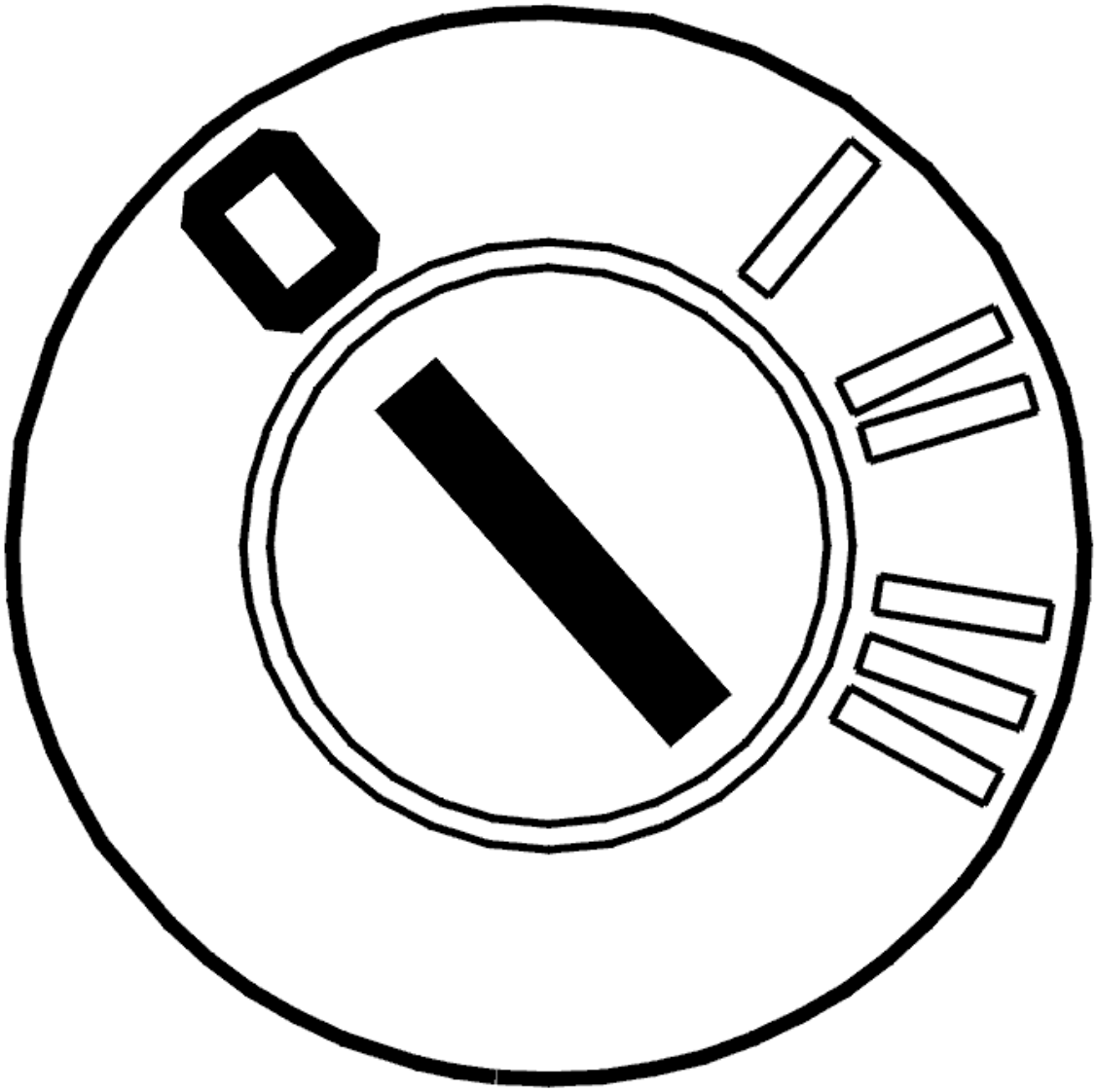


Fig. 143: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

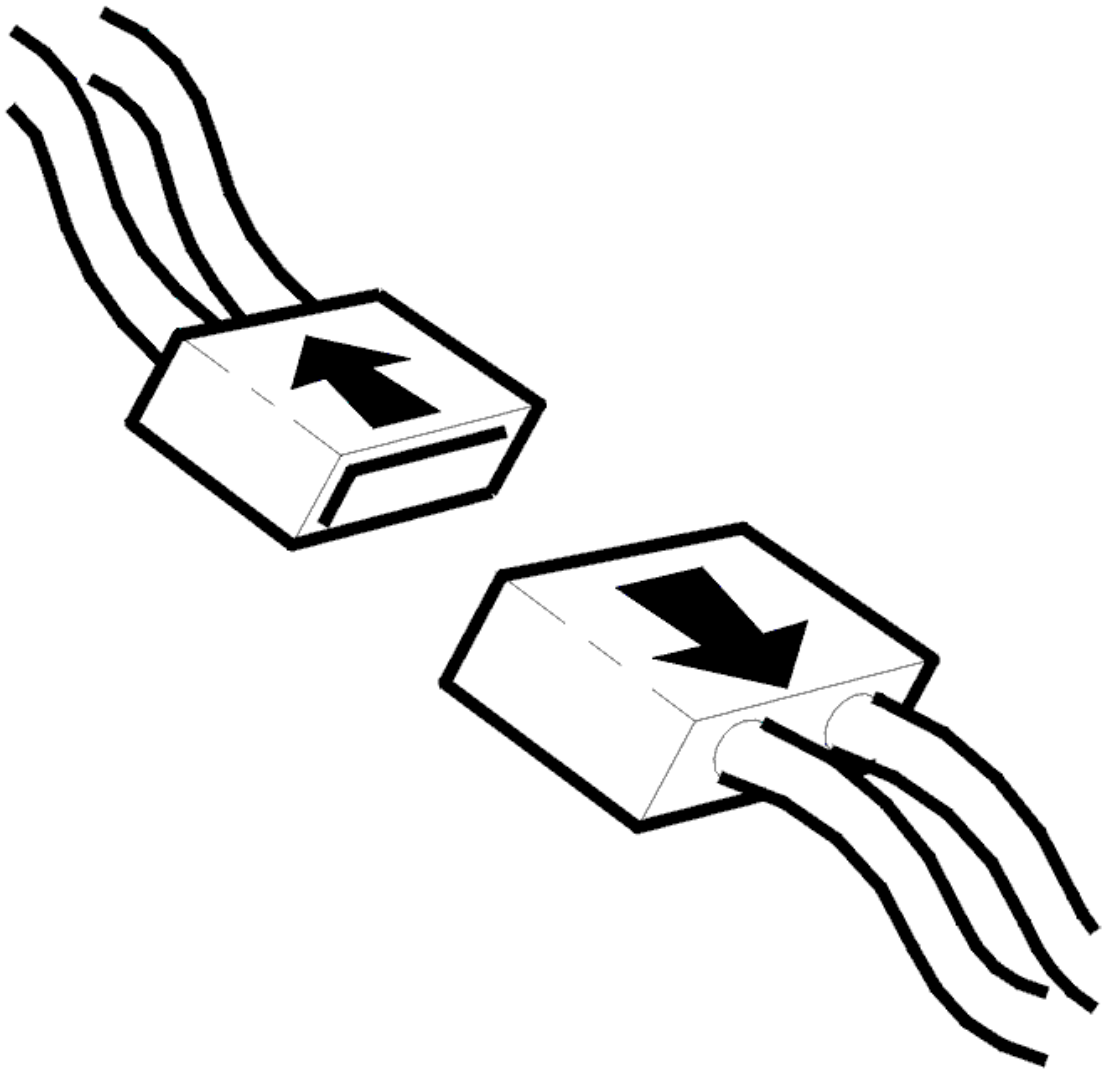


Fig. 144: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check connector B (22-pin) for the transmission control module (TCM). Check for damage and pressed in terminal pins. Check for contact resistance and oxidation.

Check the wiring between the transmission connector #B21 and the connector for solenoid SLB1 #1. Check the wiring between the transmission connector #B16 and the connector for solenoid SLB1 #2. Check for an open circuit. Check for a short-circuit to ground.

HINT: If no fault is found in the wiring check solenoid SLB1. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

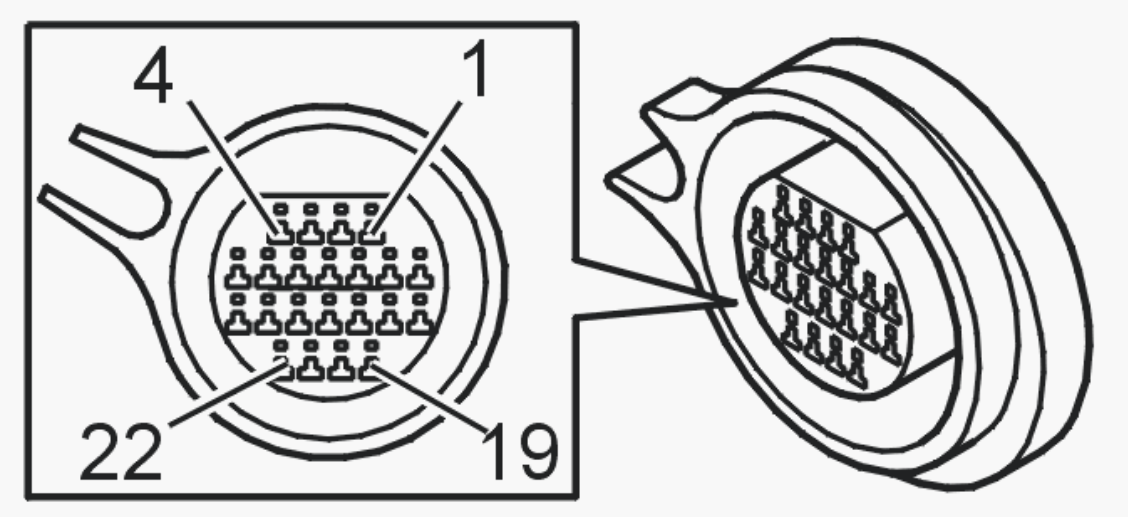


Fig. 145: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

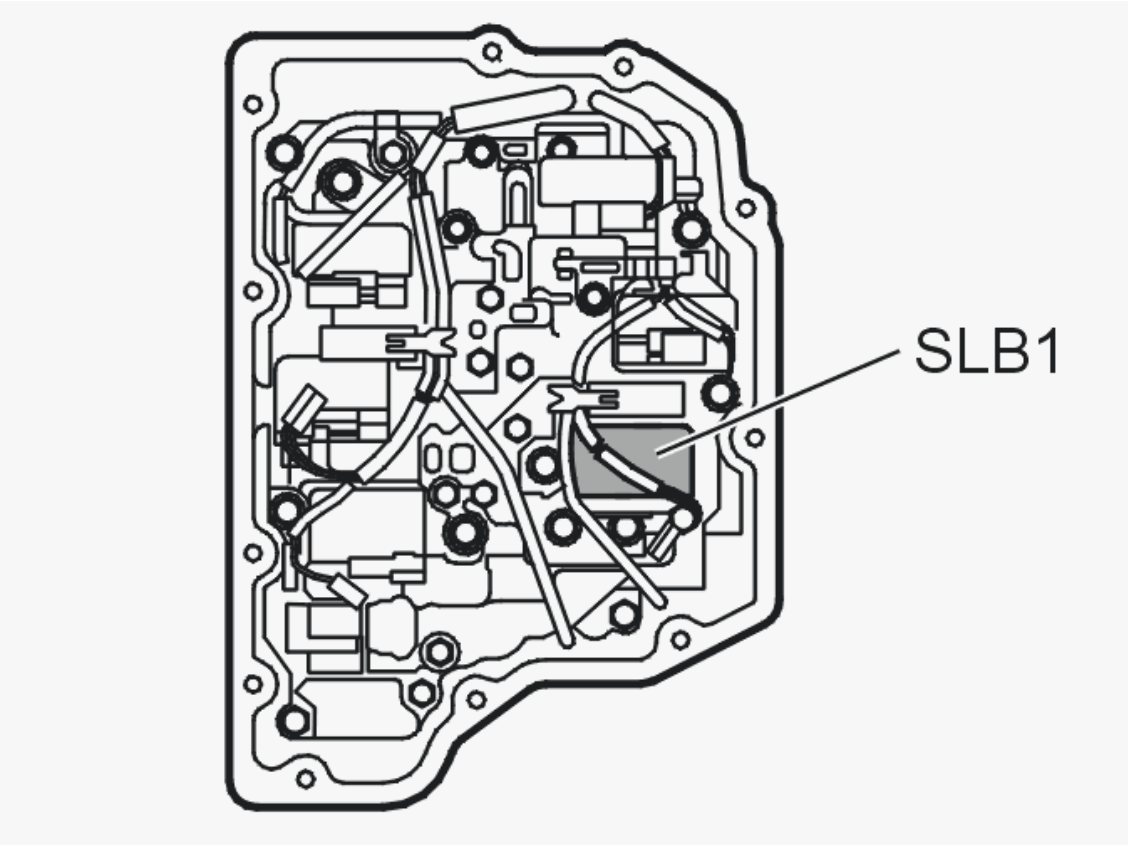


Fig. 146: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

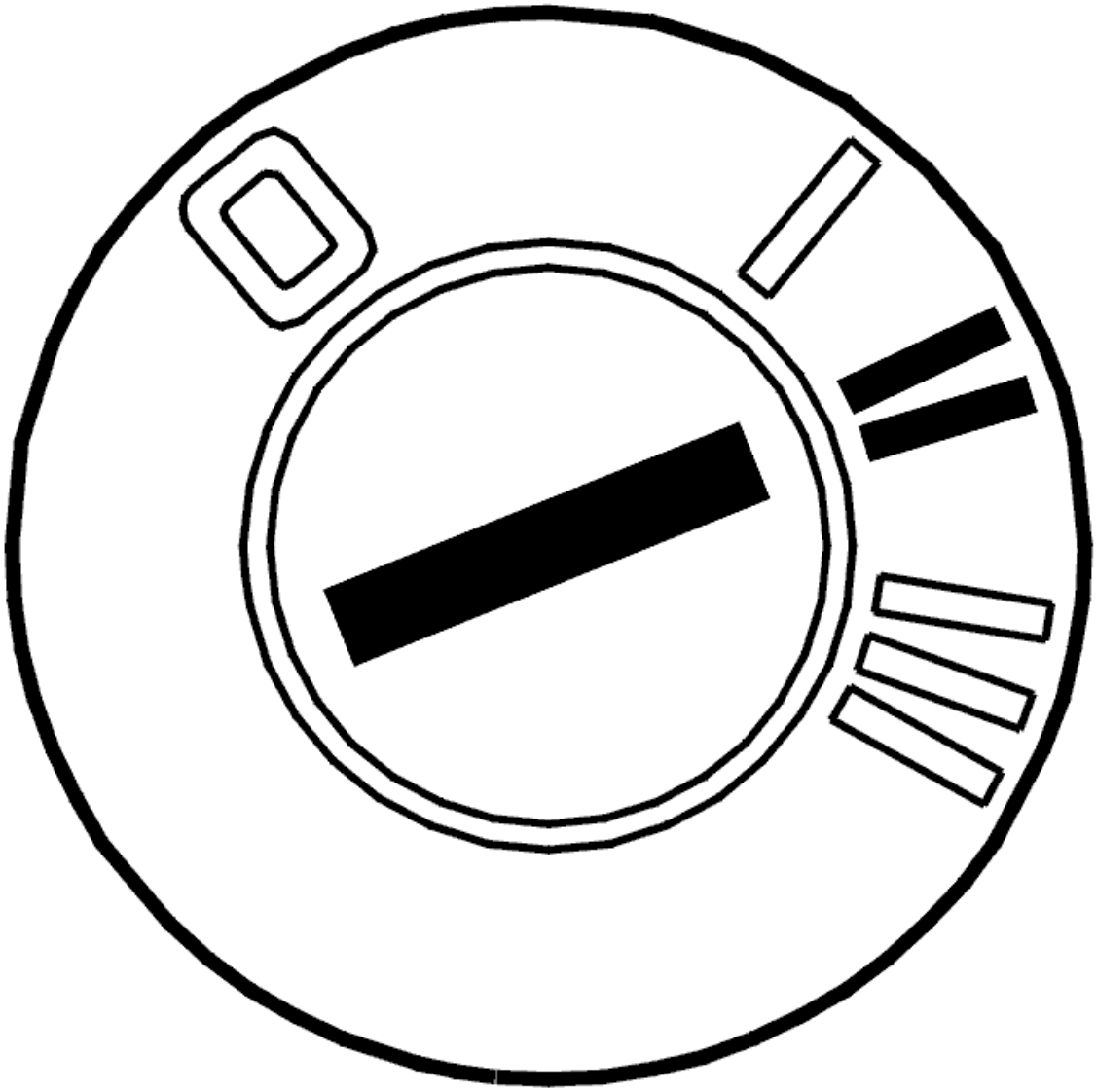


Fig. 147: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

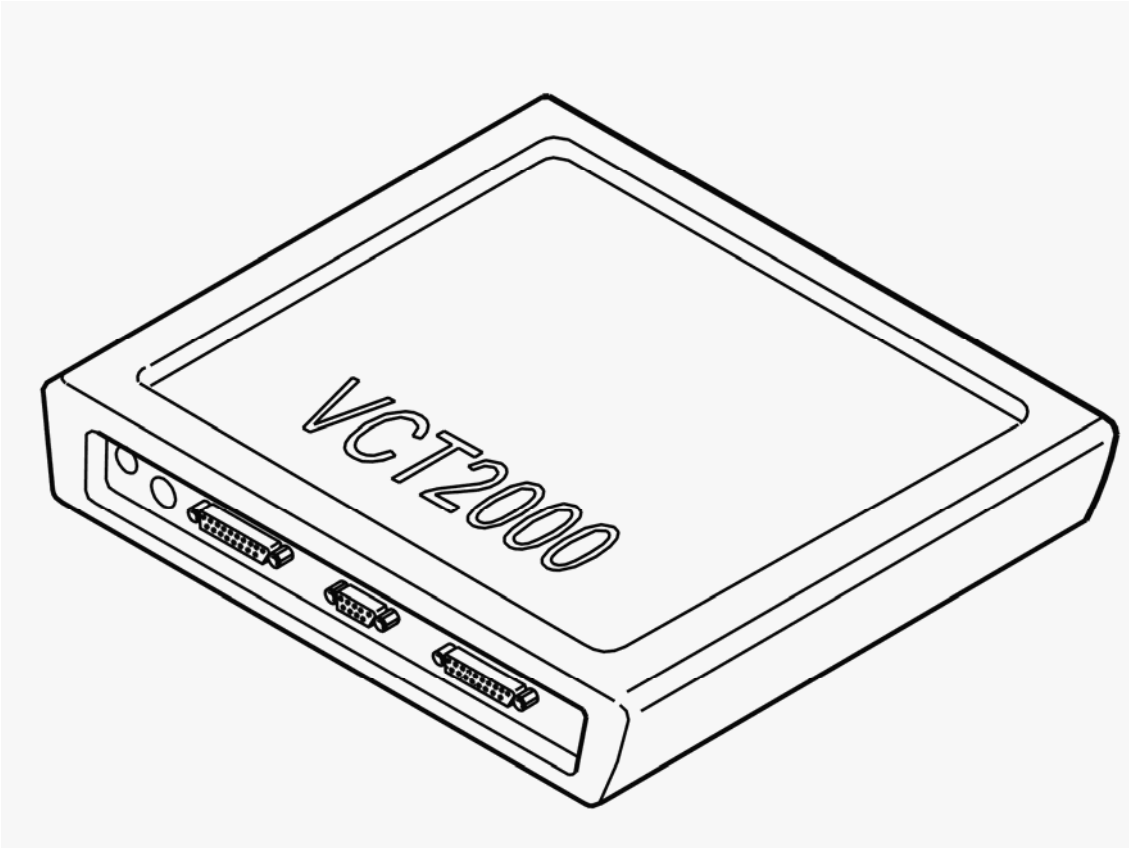


Fig. 148: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

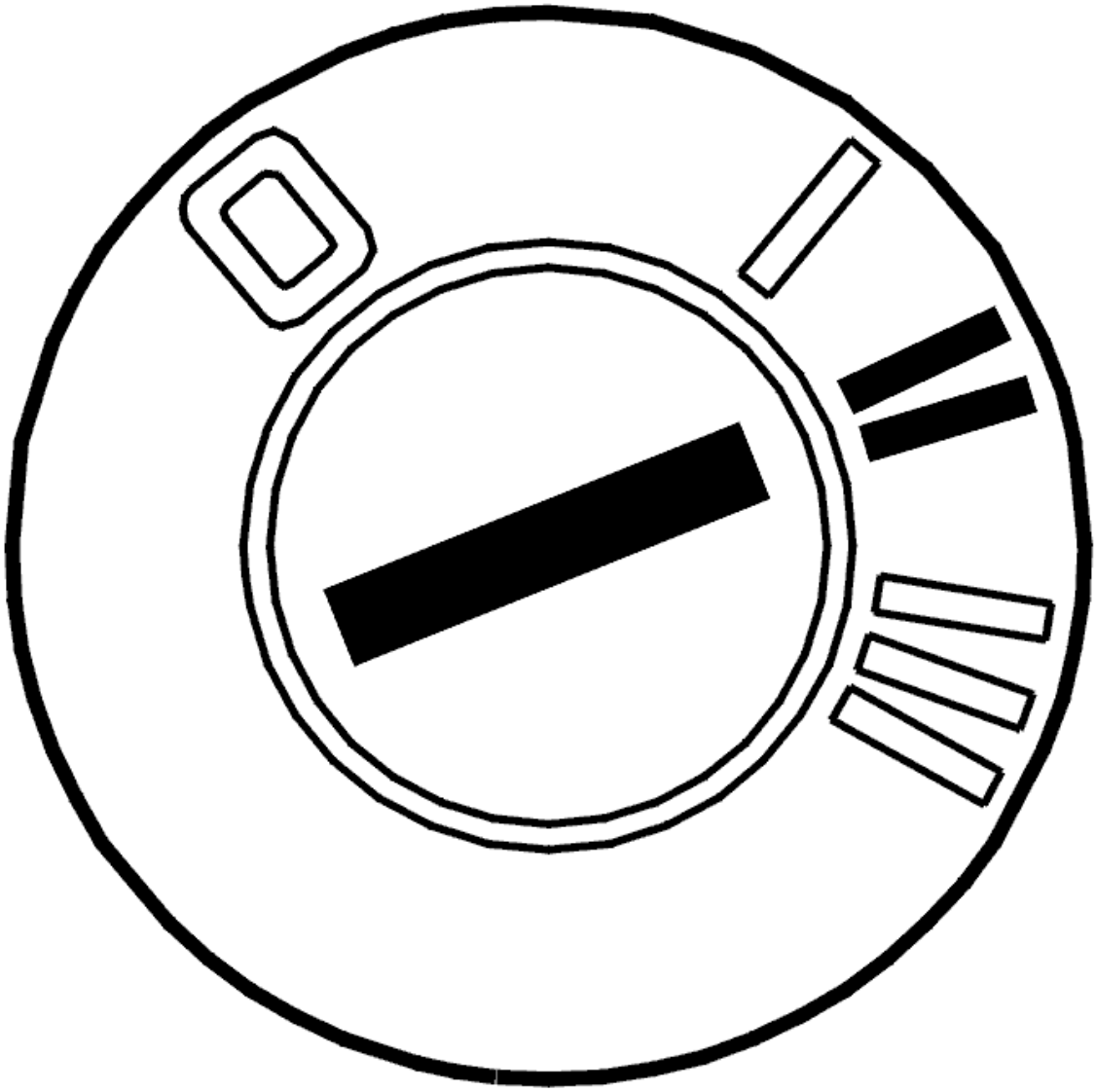


Fig. 149: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

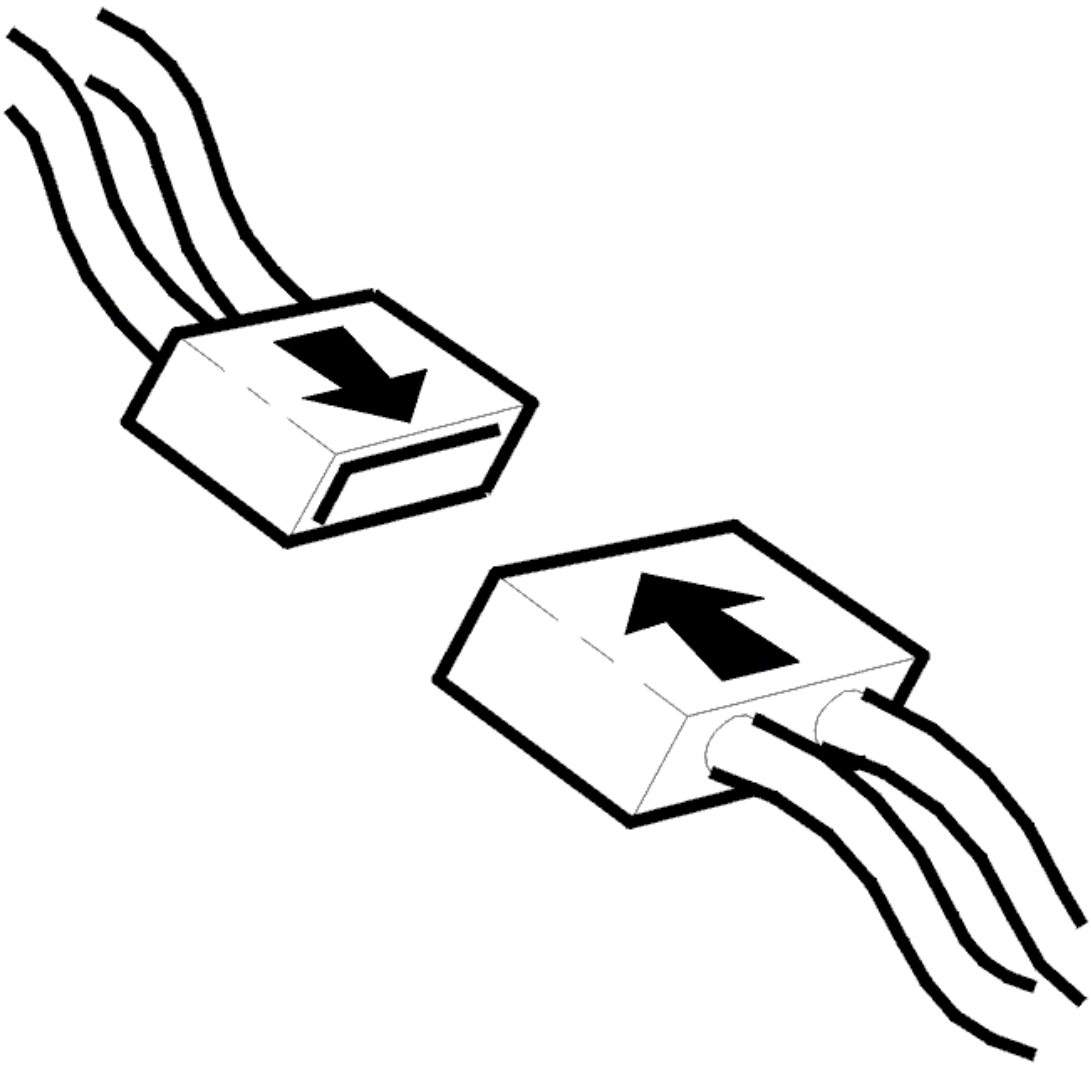


Fig. 150: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLB1 by clicking the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLB1. The current must oscillate between approximately 0 and 1000 mA.

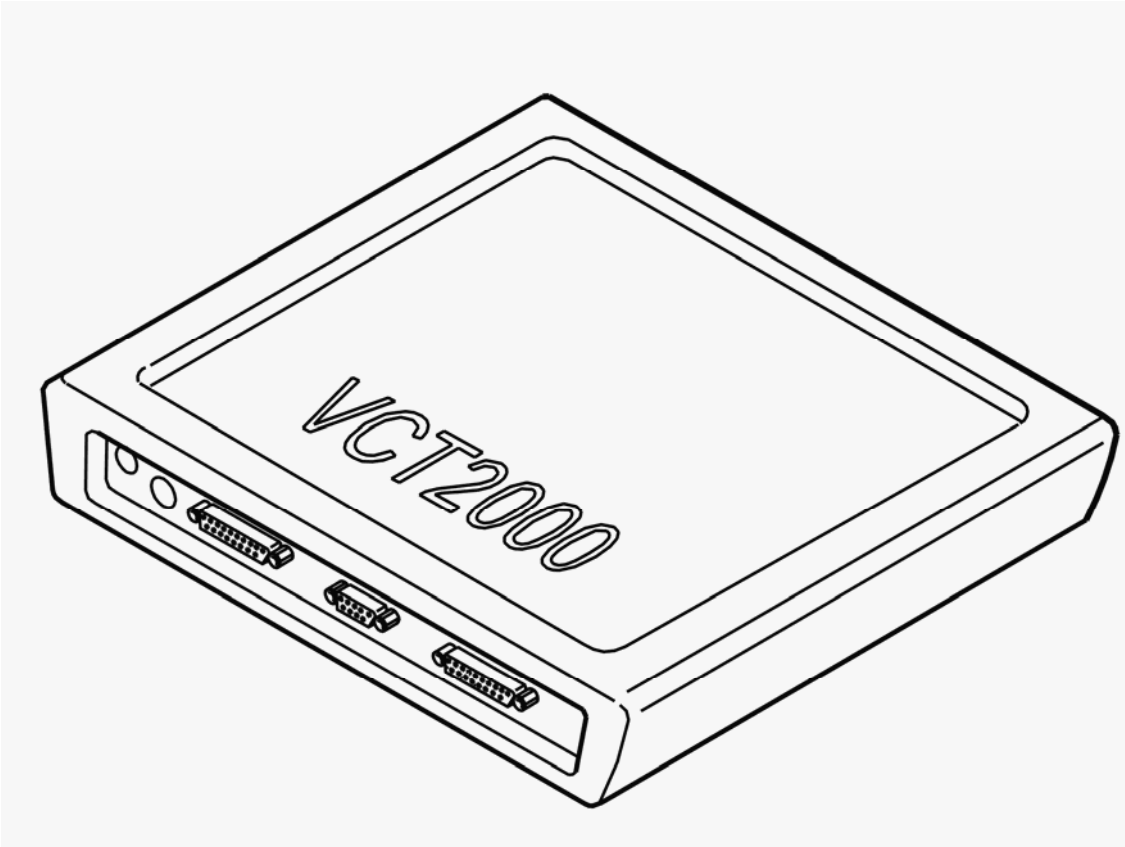


Fig. 151: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

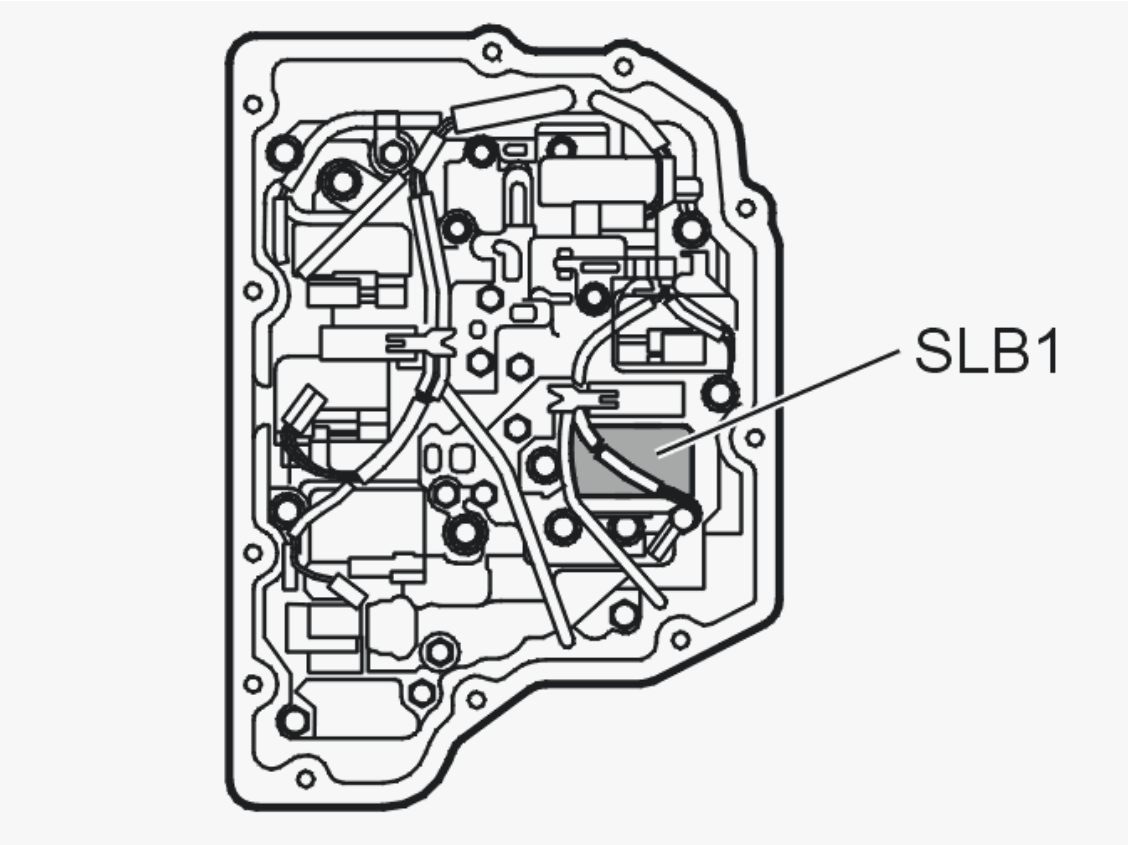


Fig. 152: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P272900: PRESSURE REGULATING SOLENOID E CONTROL CIRCUIT LOW. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT

TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272900

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P272900**

FAULT TRACING TCM-P272900

see **FAULT TRACING TCM-P272900**

TCM-P273000: PRESSURE CONTROL SOLENOID E CONTROL CIRCUIT HIGH. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273000

Condition

The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The measured current value is higher than permitted in the circuit for solenoid SLB1.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

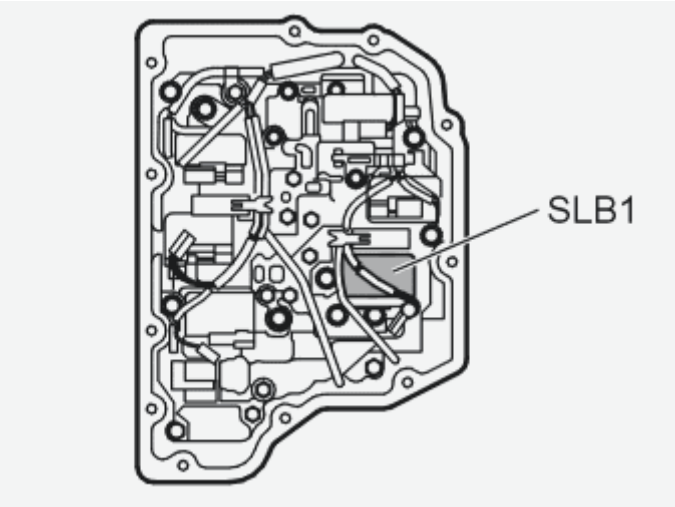


Fig. 153: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Control signal lead short-circuited to voltage.
- Line pressure solenoid SLB1 does not work.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Abnormal slipping gearshifts
- Rough gear shift
- No gear shift

FAULT-TRACING

CHECKS

CHECK LINE PRESSURE SOLENOID SLB1

Fig. 154: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLB1 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLB1. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 155: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

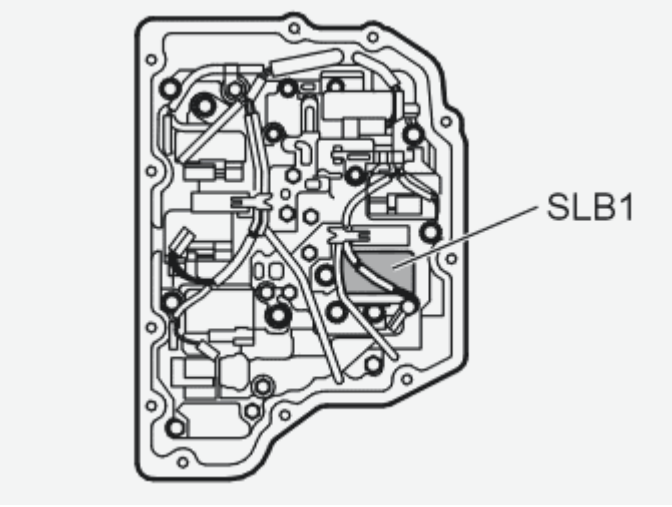


Fig. 156: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

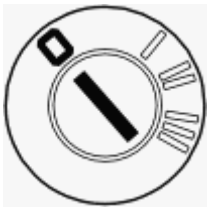


Fig. 157: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

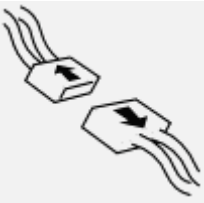


Fig. 158: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check the cables for short circuit to voltage.

Take readings between:

- Transmission connector #B21 and the connector for solenoid SLB1 #1.
- Transmission connector #B16 and the connector for solenoid SLB1 #2.

Also check the cables for a short-circuit to each other.

HINT: If no fault is found in the wiring, check solenoid SLB1. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **VALVE HOUSING**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

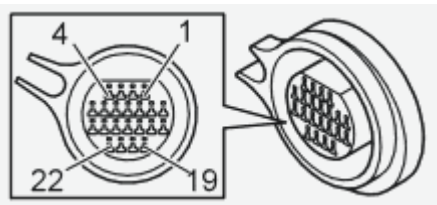


Fig. 159: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

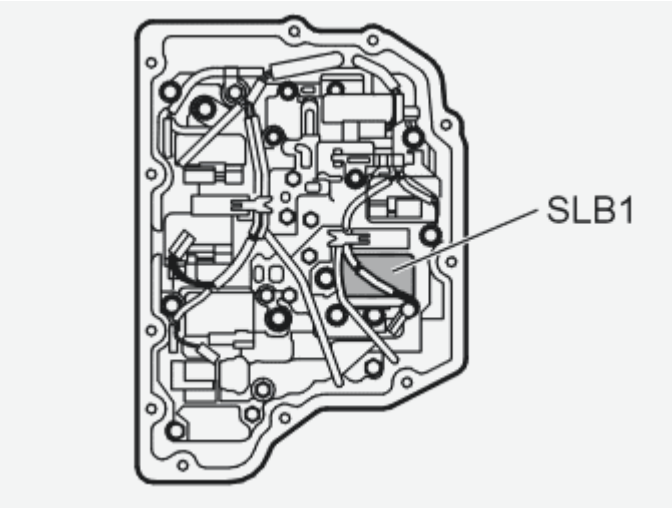


Fig. 160: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 161: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

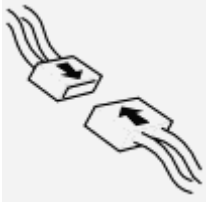


Fig. 162: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.

- Ignition on.
- Activate solenoid SLB1 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLB1. The current should oscillate between 100 and 950 mA.

Fig. 163: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

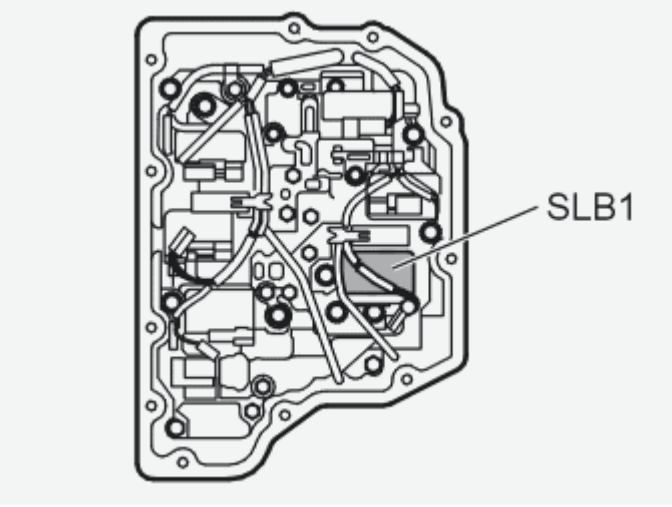


Fig. 164: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 165: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 166: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P273000: PRESSURE CONTROL SOLENOID E CONTROL CIRCUIT HIGH. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273000**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P273000: PRESSURE REGULATING SOLENOID E CONTROL CIRCUIT HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273000

Condition

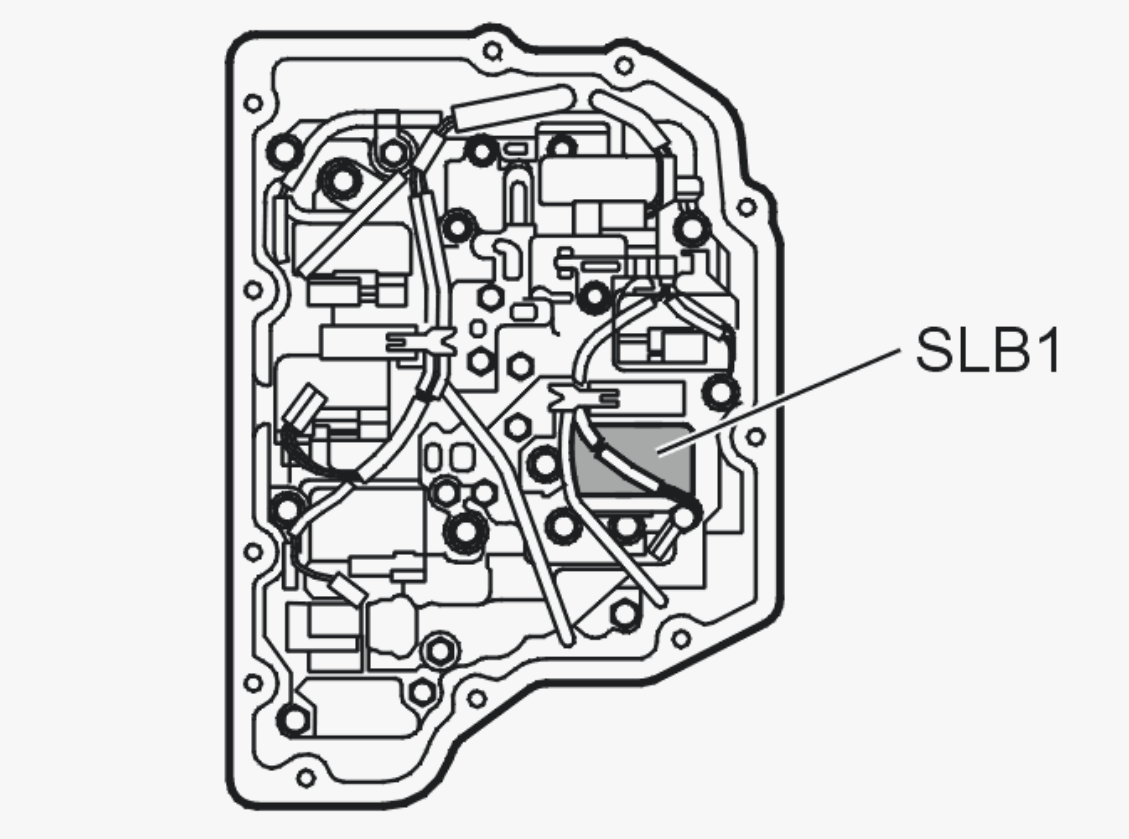


Fig. 167: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

The solenoids are controlled using the power stage in the transmission control module (TCM). The transmission control module (TCM) opens the power stage when the solenoids are to be activated so that the circuit receives a voltage.

If the transmission control module (TCM) registers that the measured current is higher than the circuit for the SLB1 solenoid allows, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Control signal lead short-circuited to voltage.
- Line pressure solenoid does not work.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Abnormally slipping gears.
- Harsh gear changing
- No gear changing.

FAULT TRACING TCM-P273000

CHECKS

CHECKING THE LOCK-UP SOLENOID SLB1

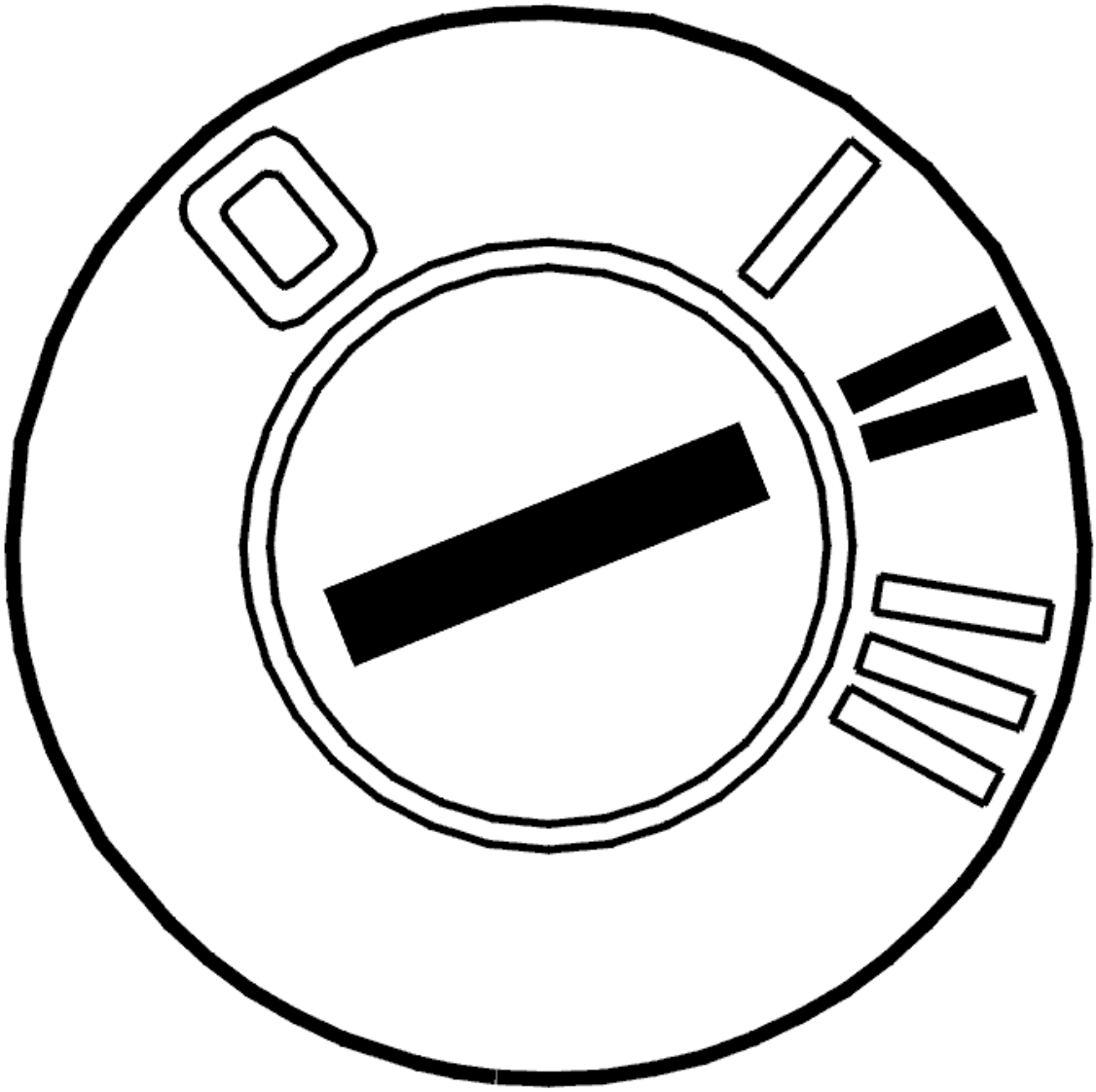


Fig. 168: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLB1 by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLB1. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

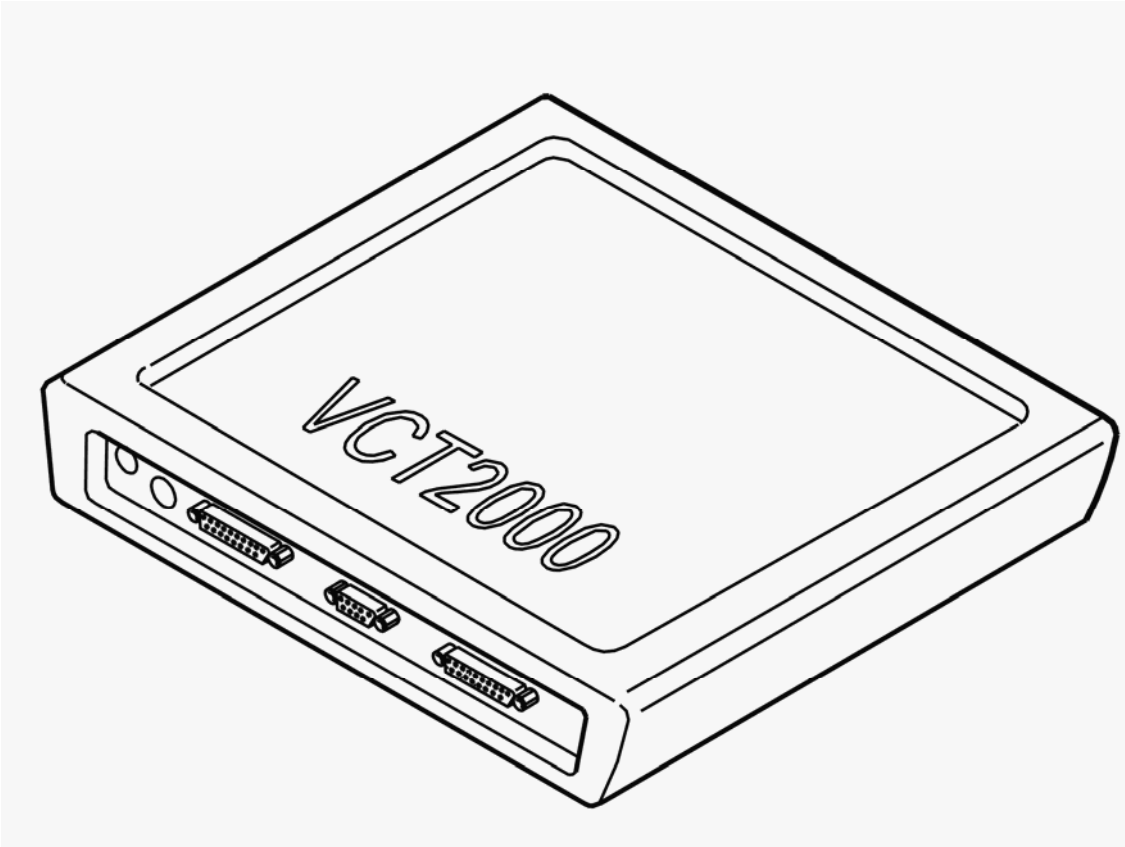


Fig. 169: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

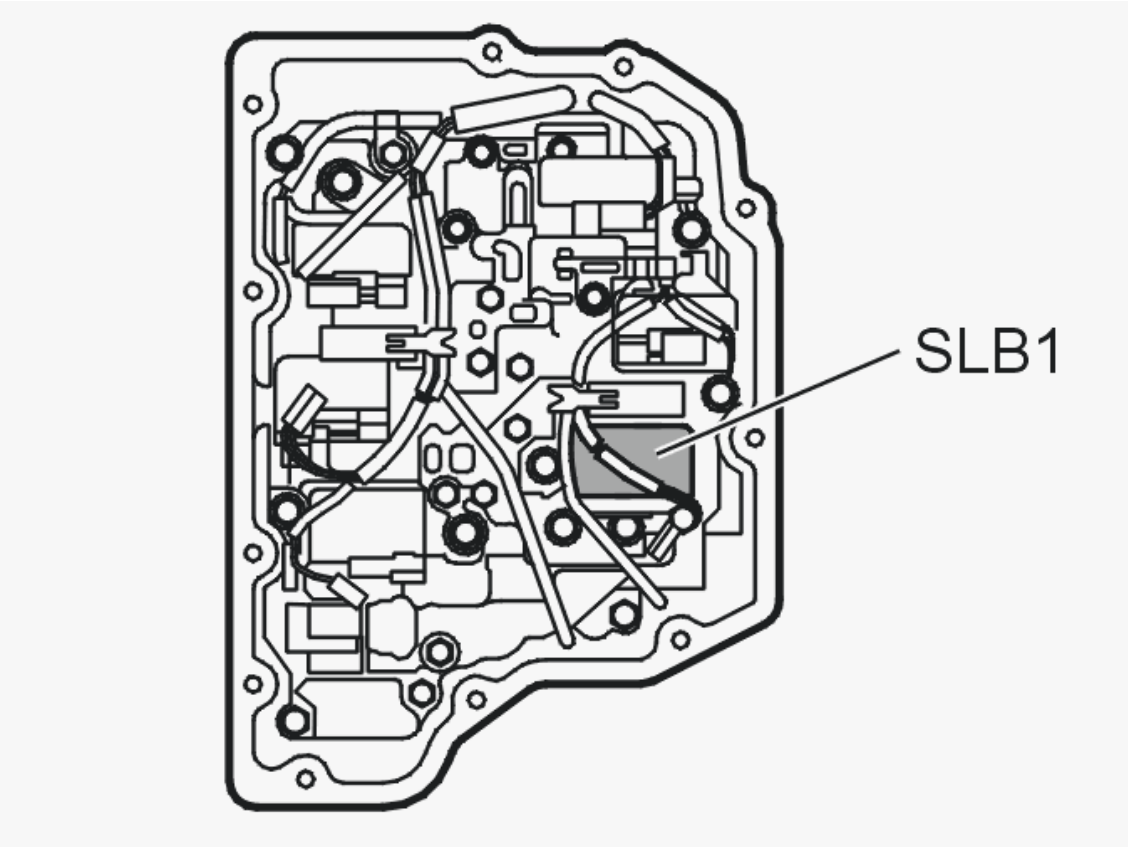


Fig. 170: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

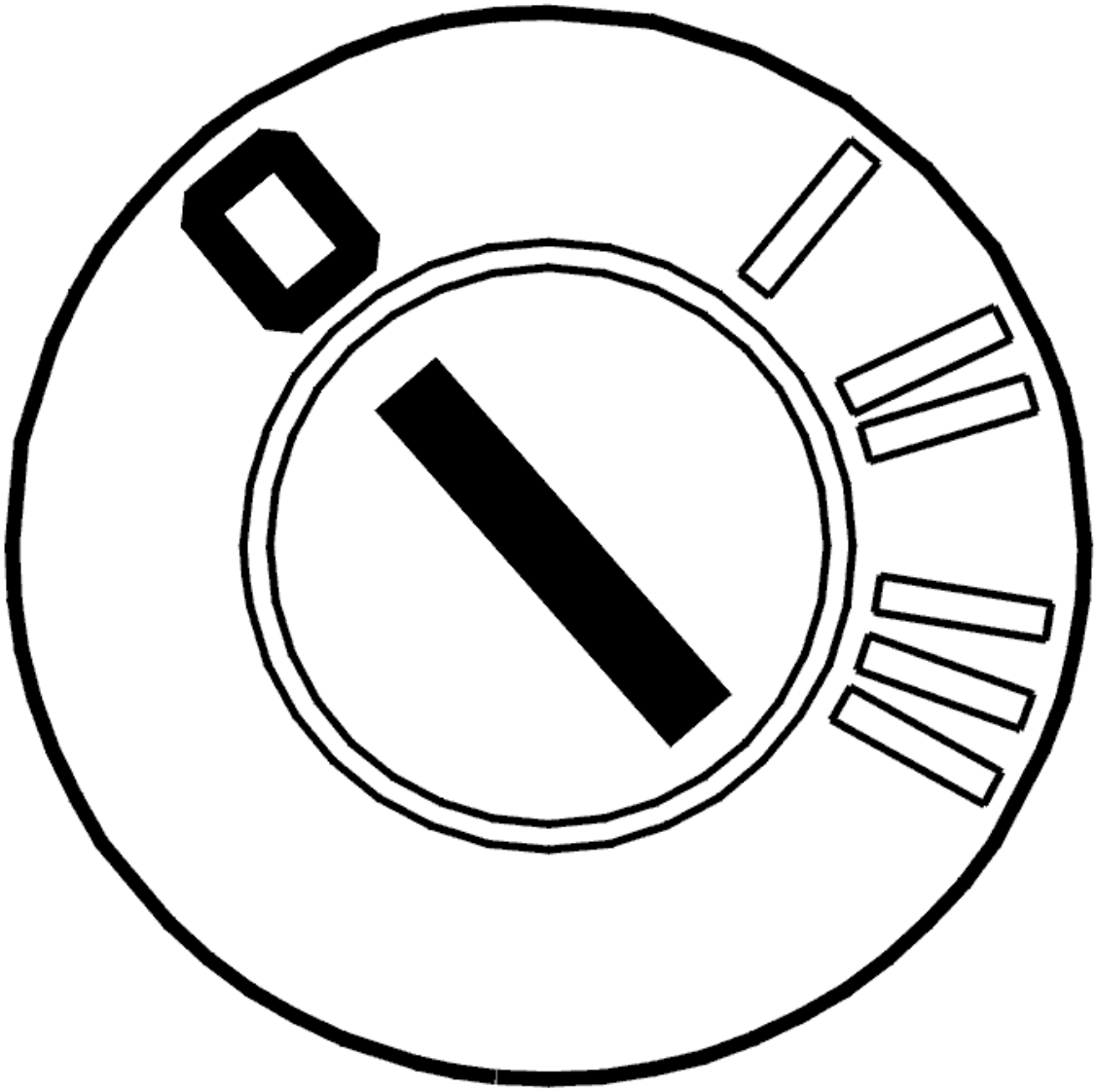


Fig. 171: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

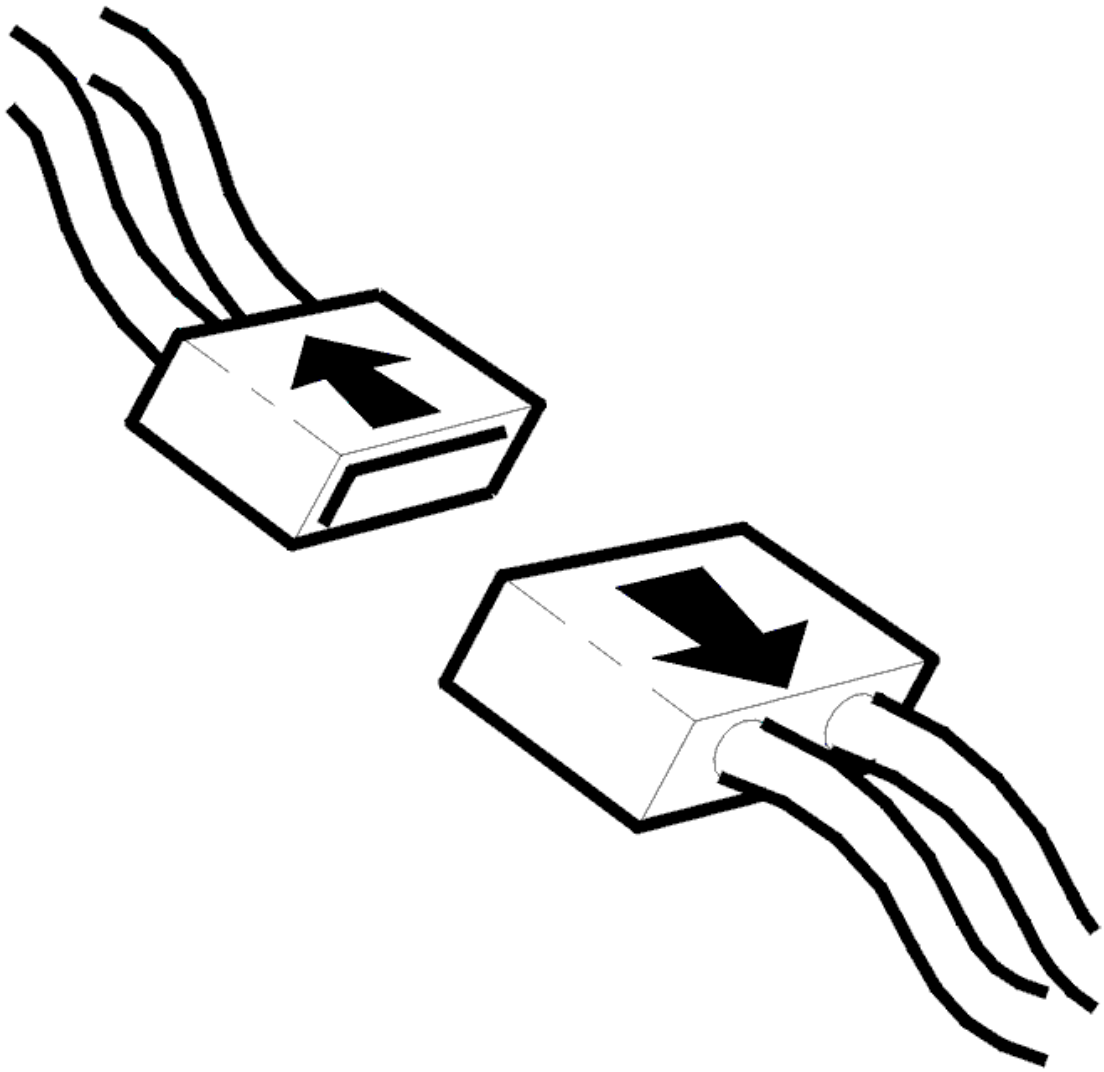


Fig. 172: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check the wiring between transmission connector terminal #B21 and solenoid SLB1 connector terminal #1. Check the wiring between transmission connector terminal #B16 and solenoid SLB1 connector terminal #2. Check for a short-circuit to supply voltage. Check the wiring for short-circuits to each other.

HINT: If no fault is found in the wiring check solenoid SLB1. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

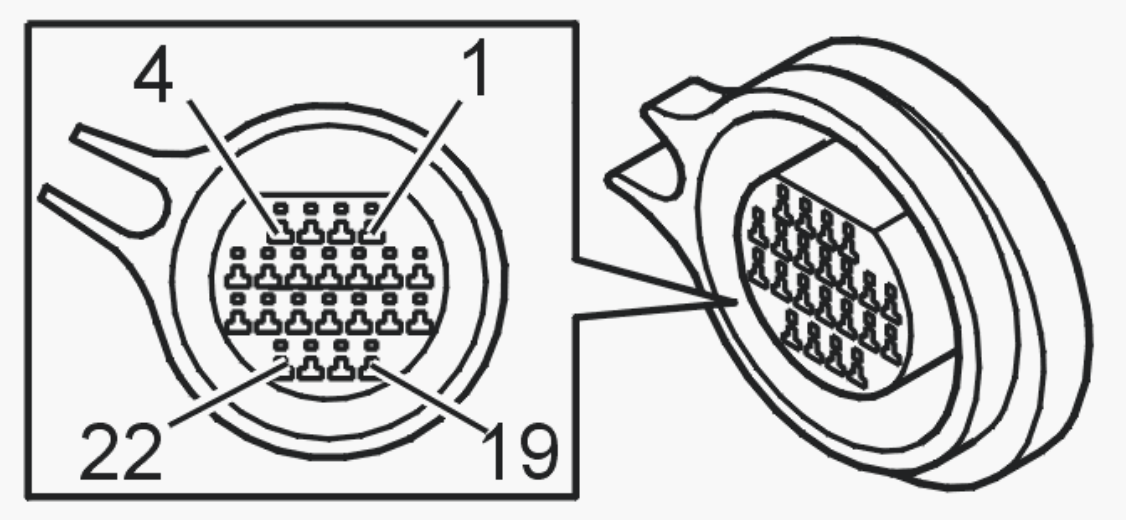


Fig. 173: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

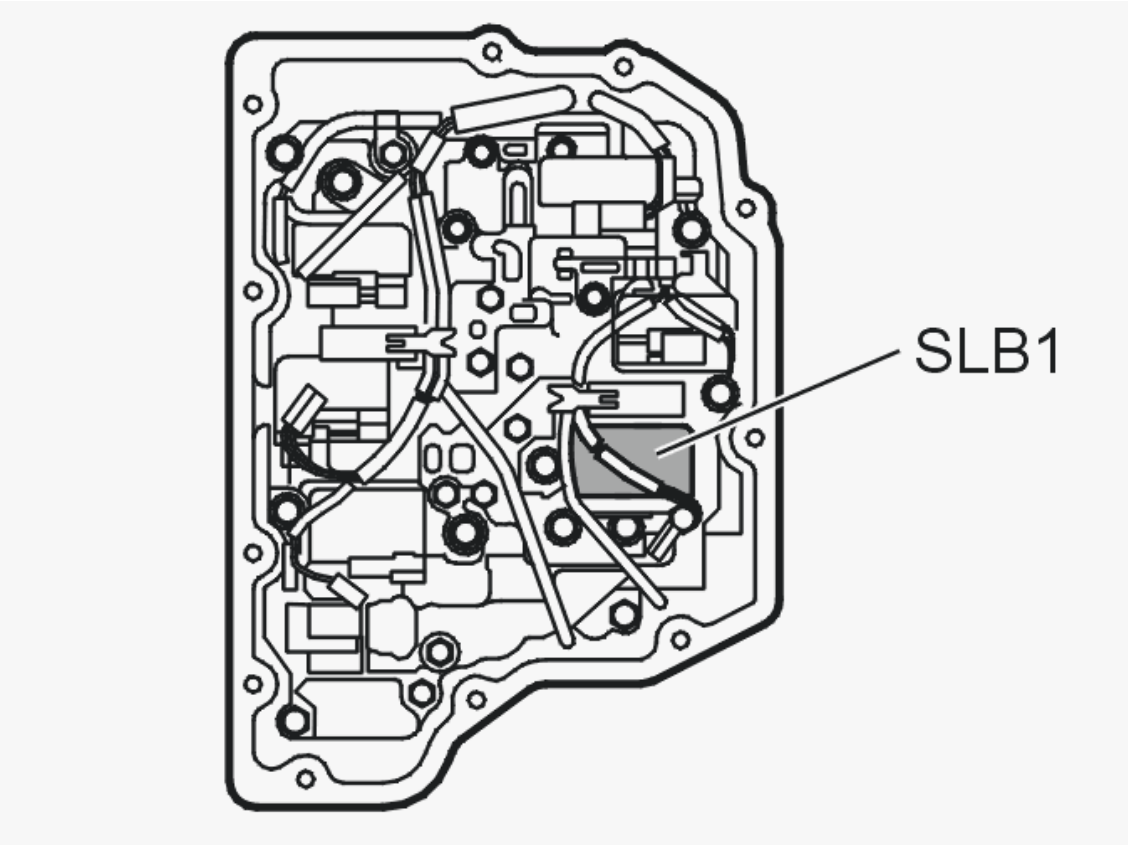


Fig. 174: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

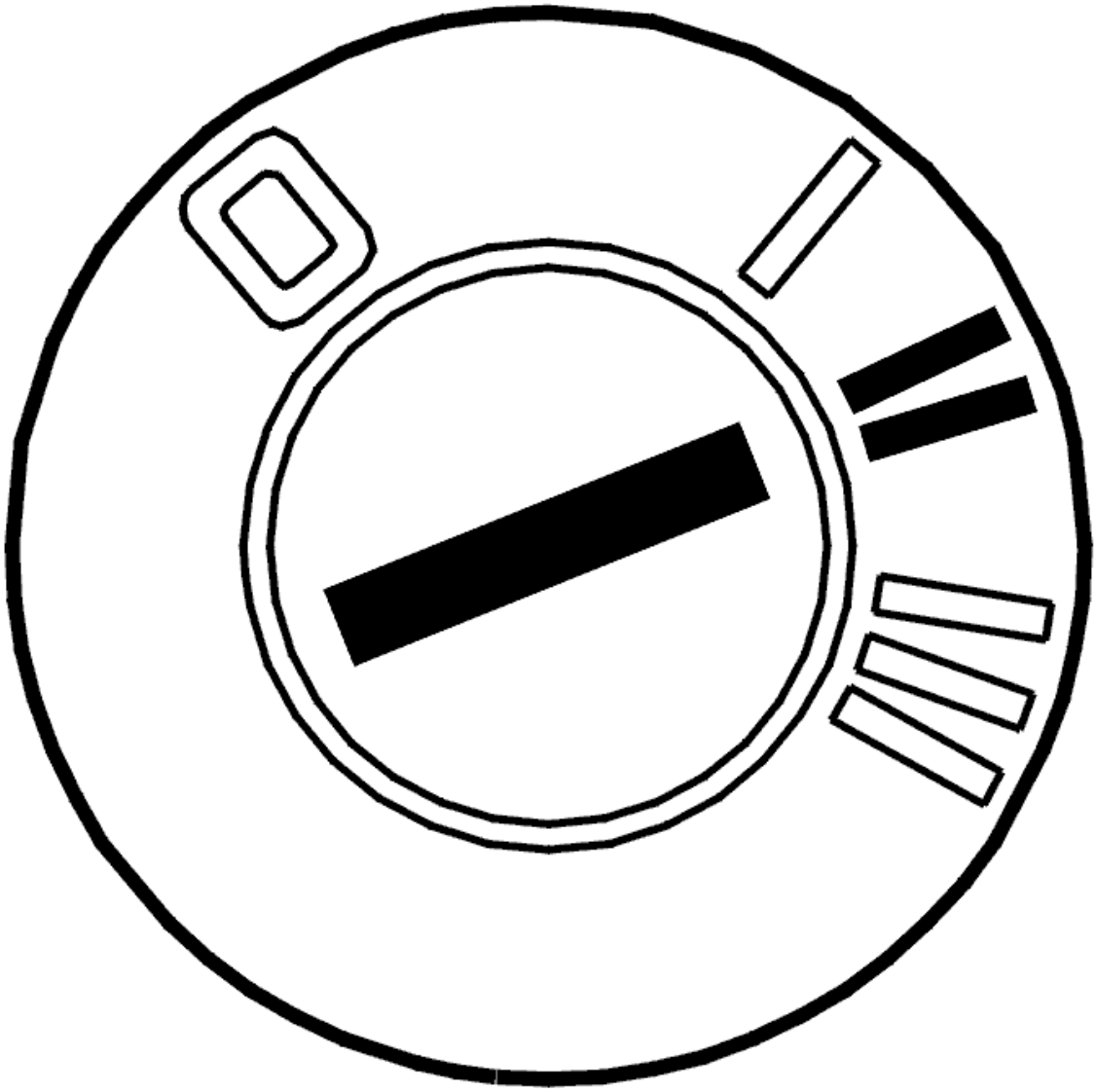


Fig. 175: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

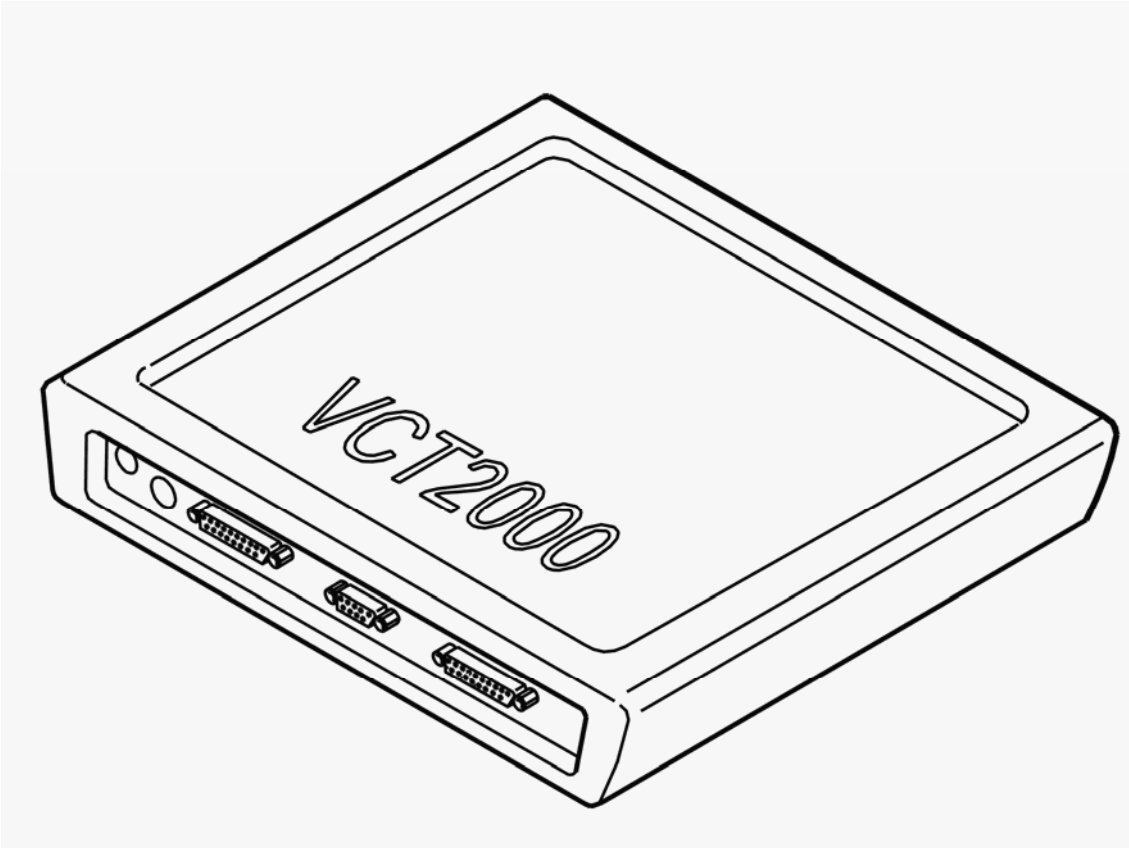


Fig. 176: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

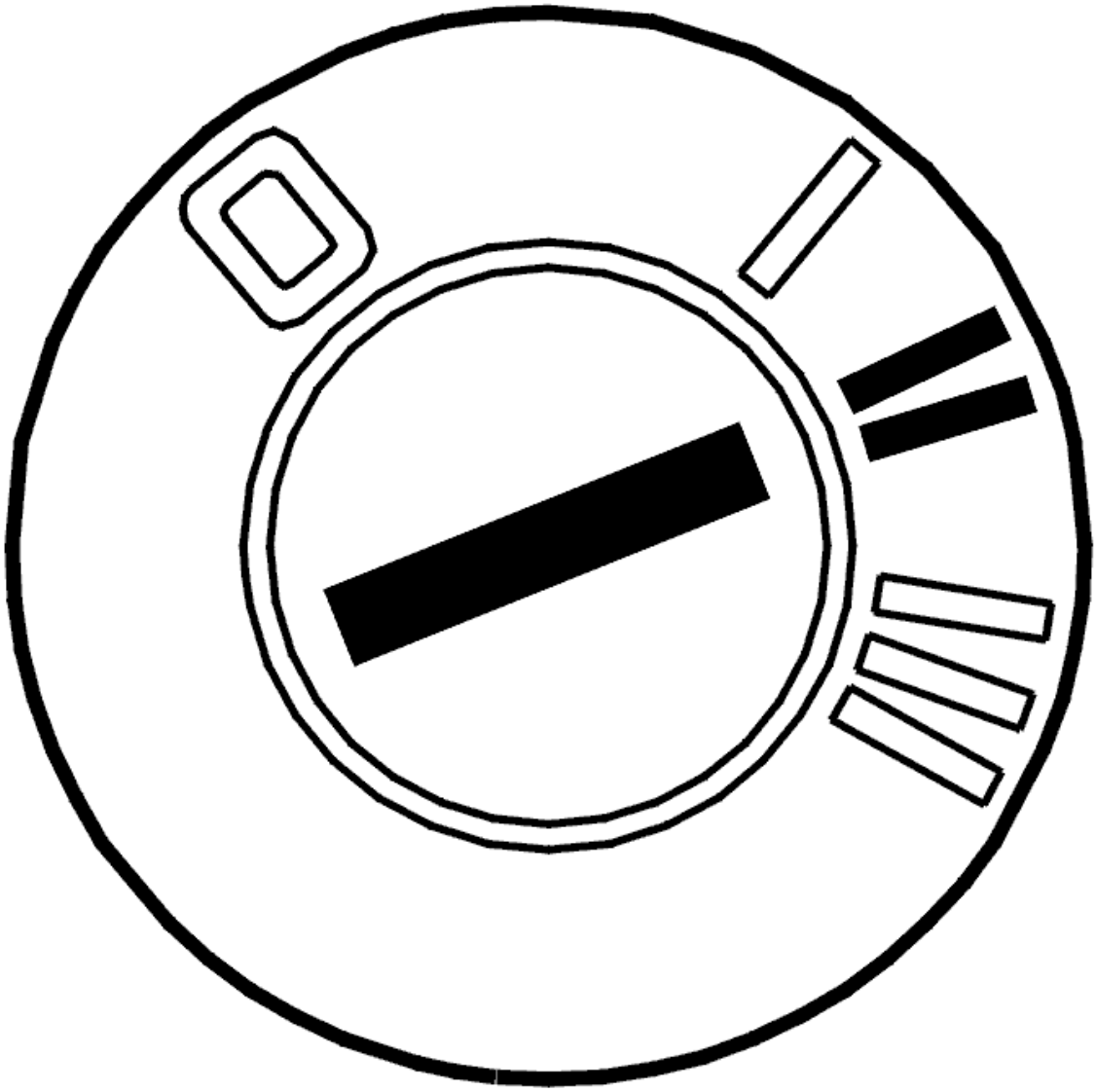


Fig. 177: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

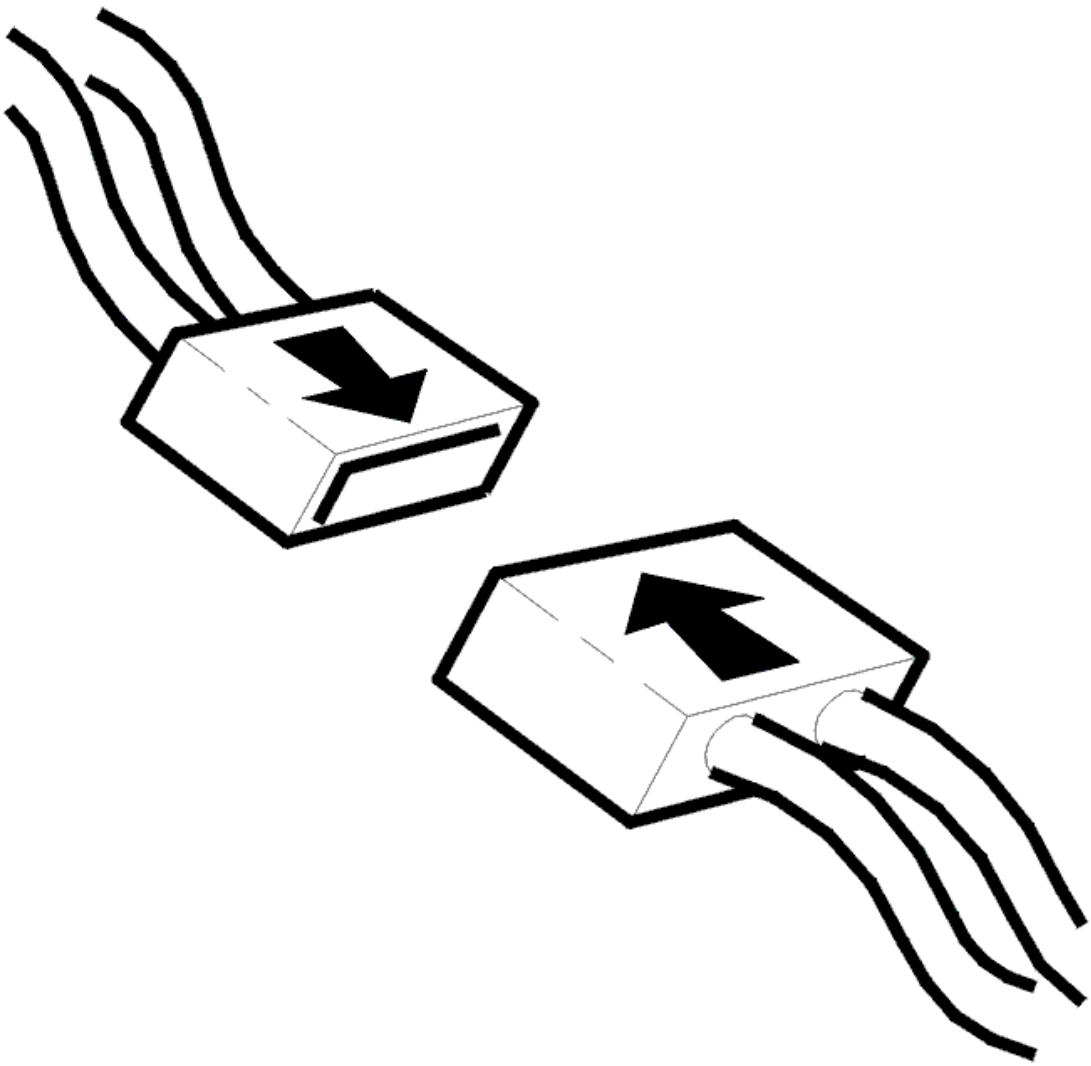


Fig. 178: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLB1 by clicking the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLB1. The current must oscillate between approximately 0 and 1000 mA.

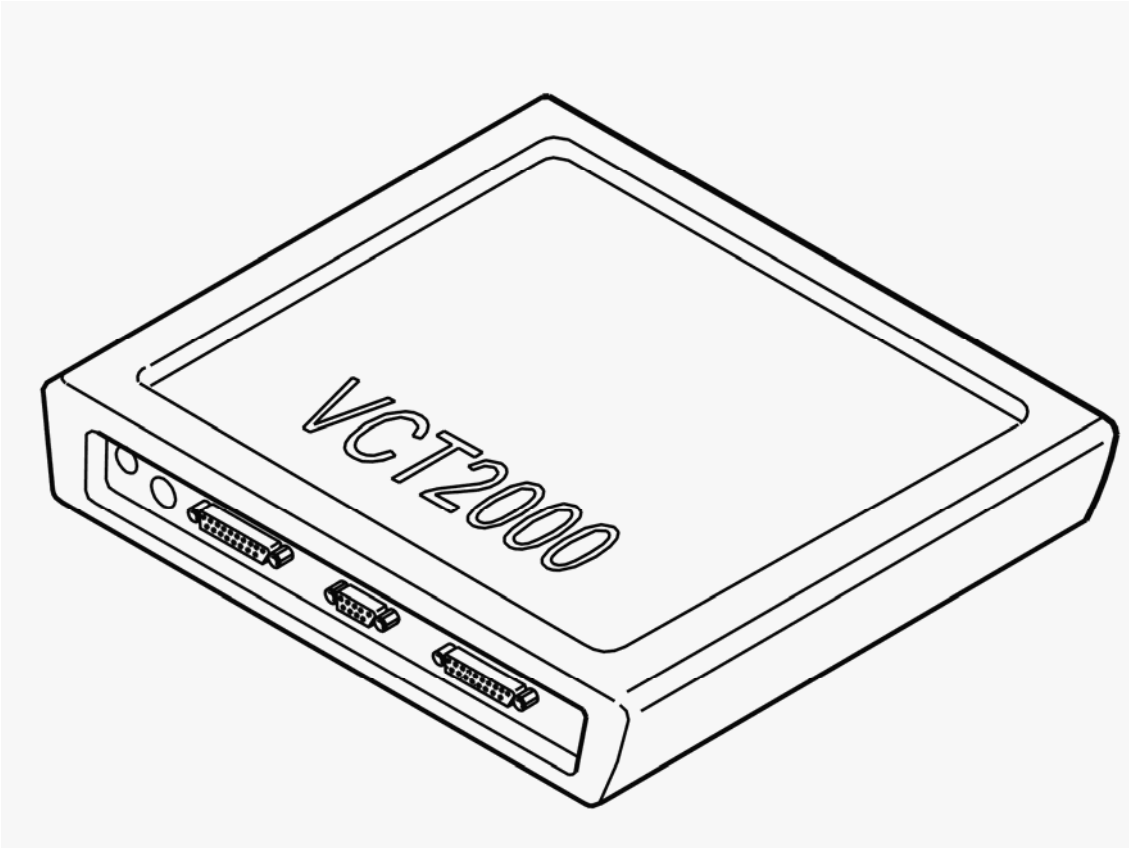


Fig. 179: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

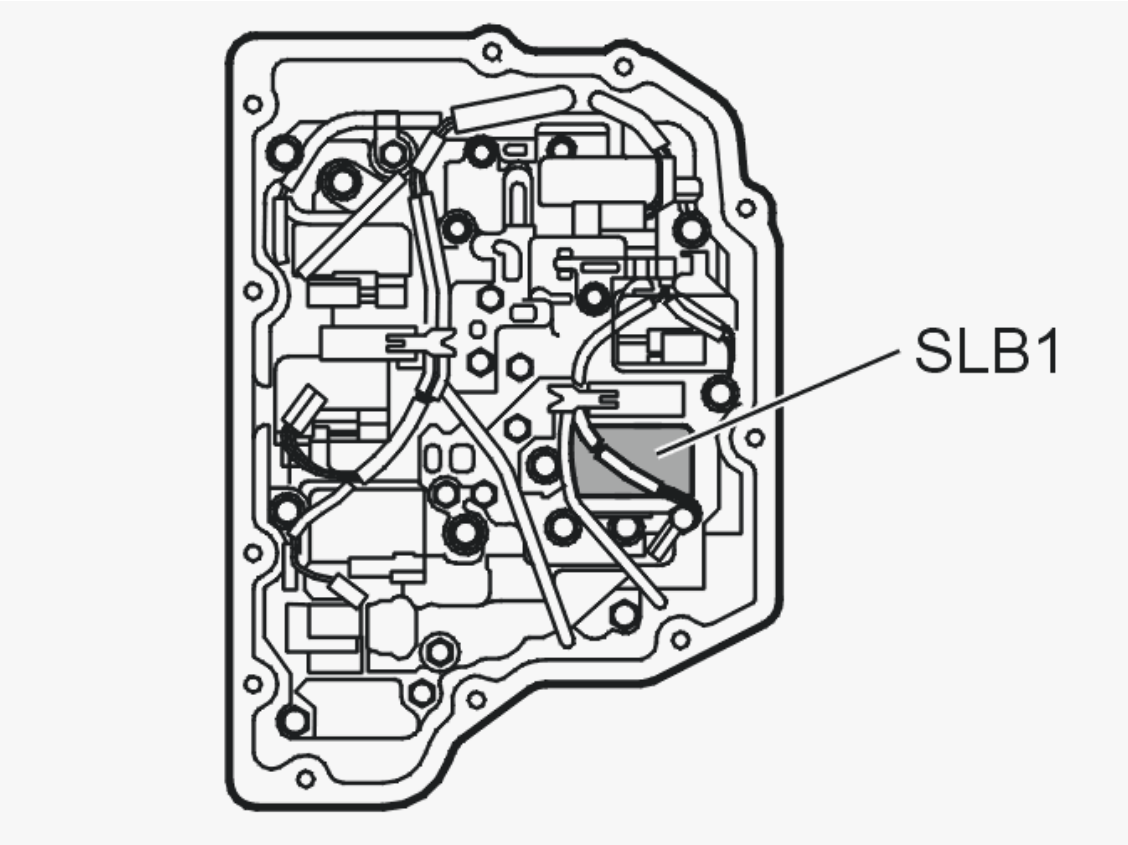


Fig. 180: Identifying Solenoid SLB1
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P273000: PRESSURE REGULATING SOLENOID E CONTROL CIRCUIT HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT

TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273000**

FAULT TRACING TCM-P273000

see **FAULT TRACING TCM-P273000**

TCM-P273300: PRESSURE CONTROL SOLENOID F STUCK ON. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273300

Condition

The driving part of the transmission (clutch C1) is disengaged when the following conditions are fulfilled:

- The vehicle is stationary.
- The engine is idling.
- The brake pedal depressed.
- Gear selector is in position D.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Transmission does not have drive in gear 1, 2, 3, or 4.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Normal driving.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

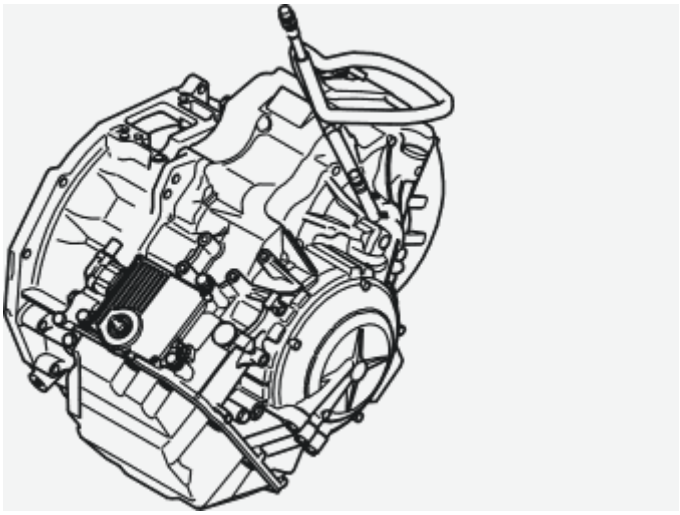


Fig. 181: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- None.

Possible Source

- Solenoid SLC1 has jammed.
- Mechanical fault in the transmission.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- No lock-up

FAULT-TRACING

CHECKS

CHECKING THE LINE PRESSURE SOLENOID SLC1

Fig. 182: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLC1 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLC1. The current should oscillate between 100 and 950 mA.

  If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 183: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

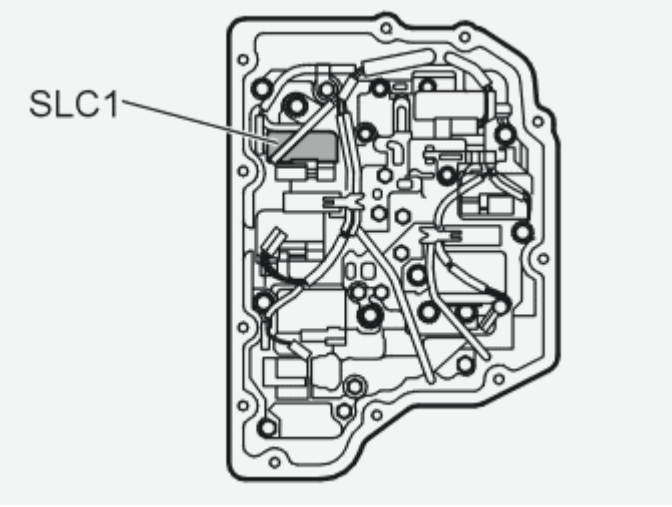


Fig. 184: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

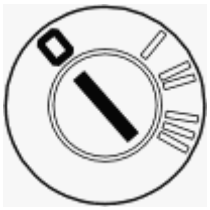


Fig. 185: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

  Check solenoid SLC1, see **CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION**

  No fault detected. Replace the transmission control system.

  Other information

  - see **CONNECTING THE BREAKOUT BOX**
  - see **SIGNAL SPECIFICATION**
  - see **CHECKING WIRING AND TERMINALS**
  - see **CONTROL SYSTEMS**

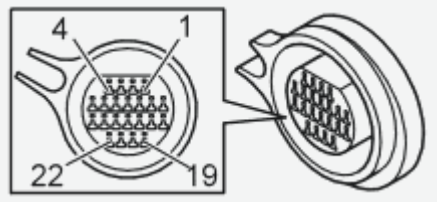


Fig. 186: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

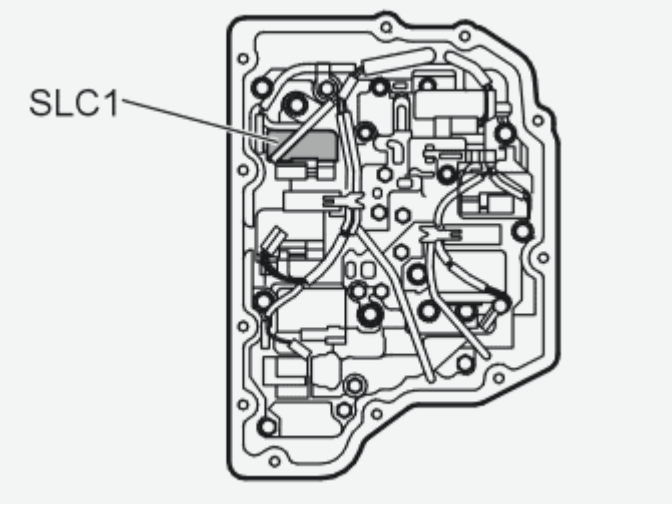


Fig. 187: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 188: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

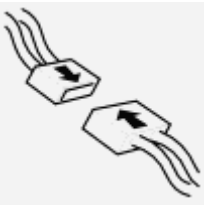


Fig. 189: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Activate solenoid SLC1 by clicking the VCT2000 symbol.

  The current should oscillate between 100 and 950 mA.

Fig. 190: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

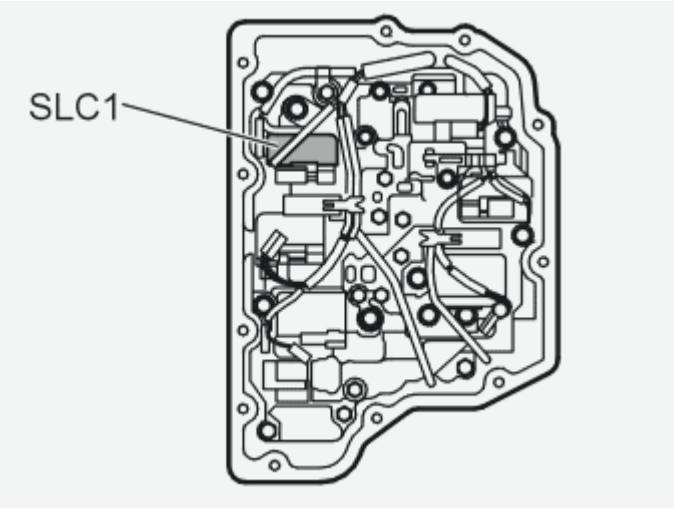


Fig. 191: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P273300: PRESSURE CONTROL SOLENOID F STUCK ON. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273300

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273300**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P273700: PRESSURE CONTROL SOLENOID F CONTROL CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273700

Condition

Linear pressure solenoid SLC1 controls shifting in the transmission. Solenoid SLC1 works when it receives voltage from the transmission control module (TCM). The solenoid is activated during various driving conditions based on speed, throttle position and set driving program.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The measured current in the solenoid circuit is incorrect.

Then Solenoid SLC1 cannot control the system pressure.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Shifting when linear pressure solenoid SLC1 is activated.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

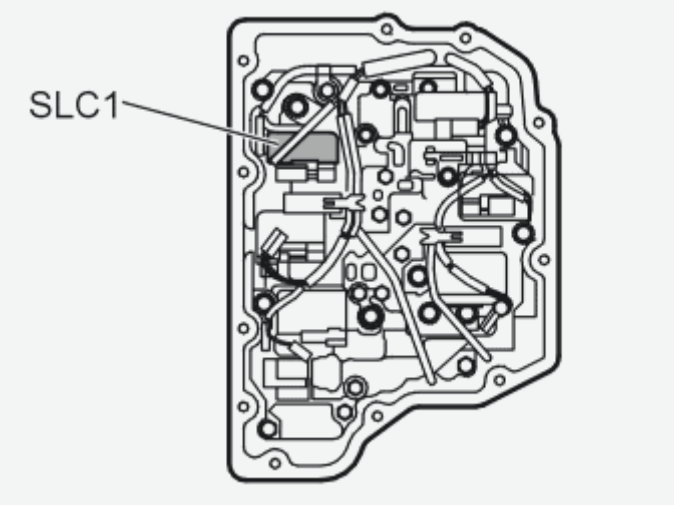


Fig. 192: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the cable for the control signal or signal ground.
- Linear pressure solenoid SLC1 has jammed.
- Linear pressure solenoid SLC1 not working.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Rough gear shift
- No gear shift
- Abnormal slipping gearshifts

FAULT-TRACING

CHECKS

CHECKING THE LINE PRESSURE SOLENOID SLC1

Fig. 193: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLC1 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLC1. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 194: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

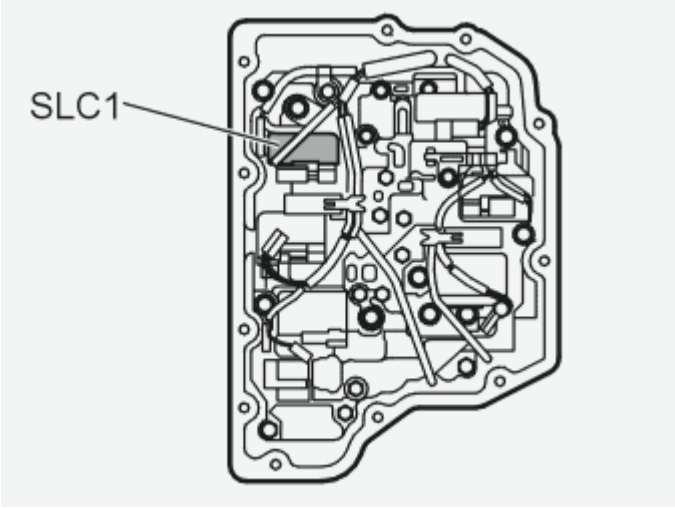


Fig. 195: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

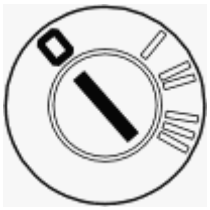


Fig. 196: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

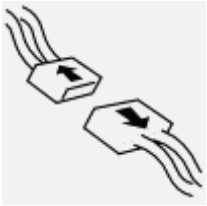


Fig. 197: Identifying Connectors Disconnected

Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

Check the cables for short-circuit to voltage, short-circuit to ground and open circuit.

Take readings between:

- Transmission connector #B11 and the connector for solenoid SLC1 #1.
- Transmission connector #B10 and the connector for solenoid SLC1 #1.

HINT: If no fault is found in the wiring, check solenoid SLC1. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **VALVE HOUSING**
- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

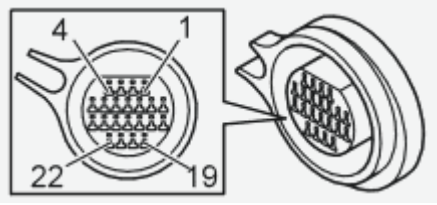


Fig. 198: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

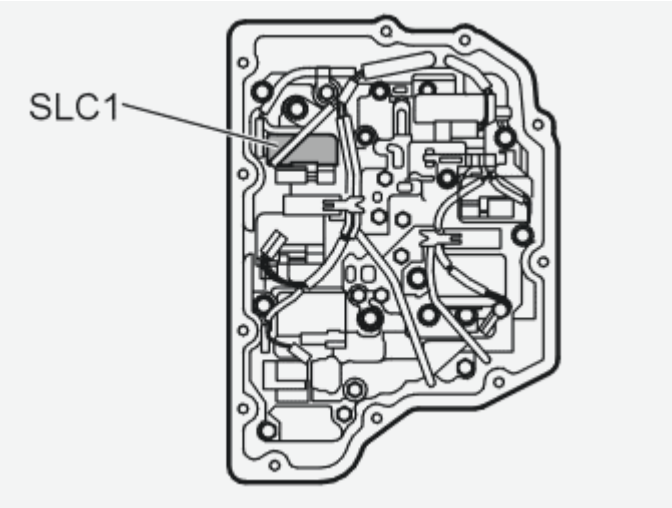


Fig. 199: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 200: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

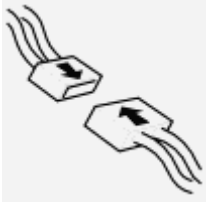


Fig. 201: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.

- Ignition on.
- Activate solenoid SLC1 by clicking the VCT2000 symbol.

  The current should oscillate between 100 and 950 mA.

Fig. 202: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

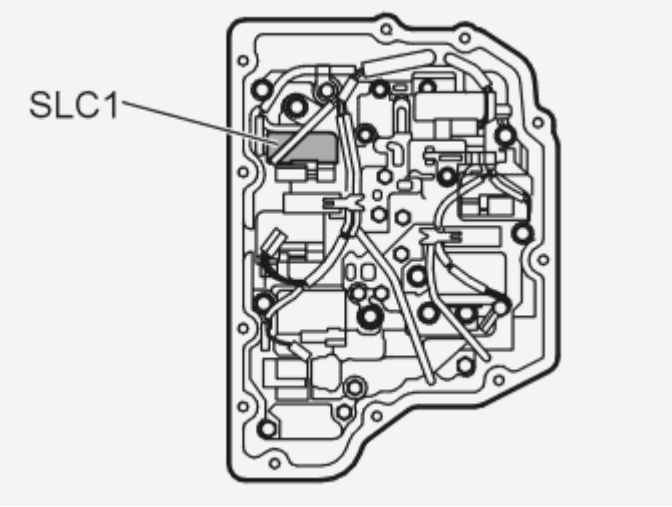


Fig. 203: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 204: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 205: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P273700: PRESSURE CONTROL SOLENOID F CONTROL CIRCUIT RANGE/PERFORMANCE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273700

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273700**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P273700: PRESSURE REGULATING SOLENOID F CONTROL CIRCUIT INSIDE/OUTSIDE PARAMETER VALUES. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273700

Condition

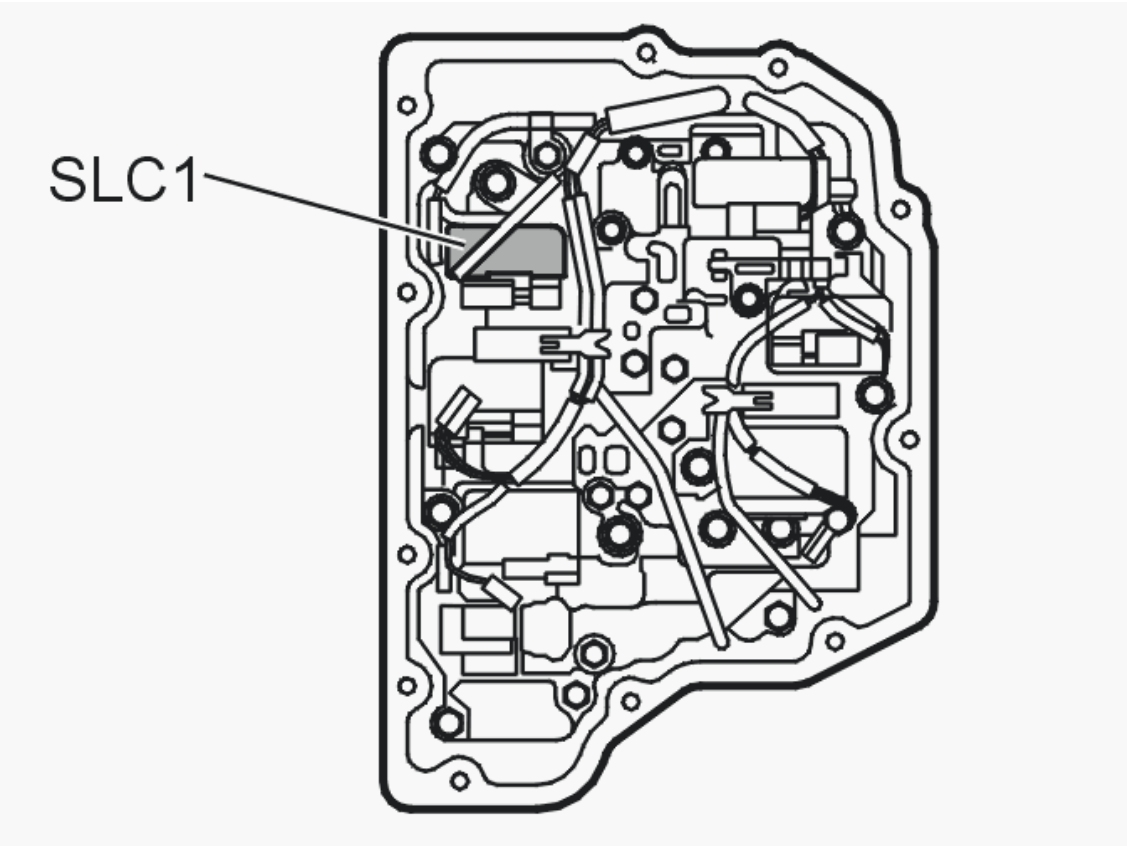


Fig. 206: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

The lock-up solenoid SLC1 controls the lock-up function in the gearbox. The SLC1 solenoid works when it receives power from the transmission control module (TCM) and depending on the speed, accelerator position and driving program setting, the solenoid will be activated for different driving conditions.

If the transmission control module (TCM) registers that the measured current in the solenoid circuit is incorrect, the diagnostic trouble code (DTC) is generated. The SLC1 solenoid is then not able to regulate the system pressure.

The diagnostic trouble codes (DTCs) can be diagnosed during shifting when the line pressure solenoid SLC1 is activated.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals
- Open circuit in lead for control signal or signal ground.
- Linear pressure solenoid SLC1 stuck.
- Linear pressure solenoid SLC1 not working.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Harsh gear changing
- No gear changing.
- Abnormally slipping gears.

FAULT TRACING TCM-P273700

CHECKS

CHECKING THE LOCK-UP SOLENOID SLC1

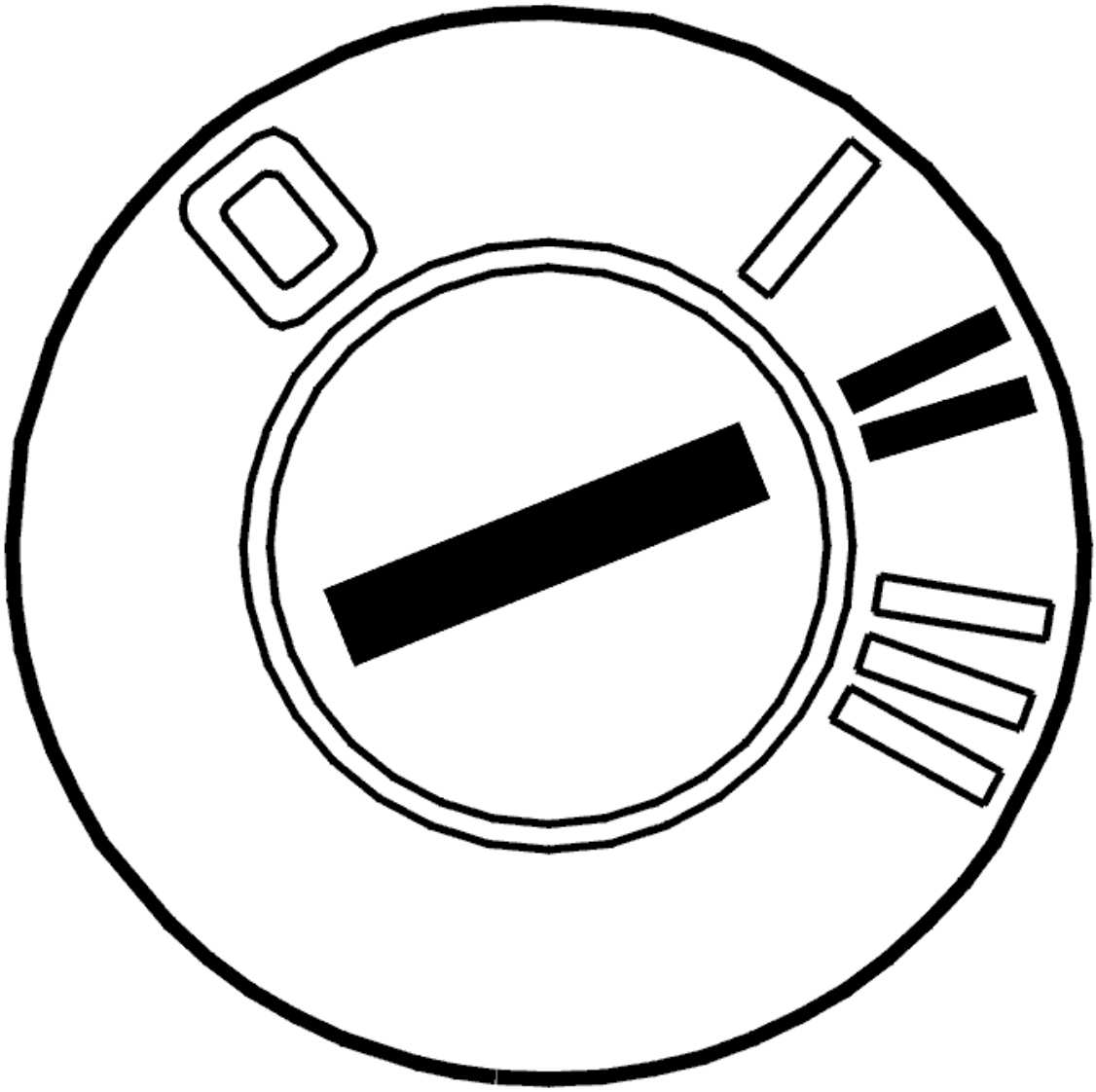


Fig. 207: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLC1 by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLC1. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

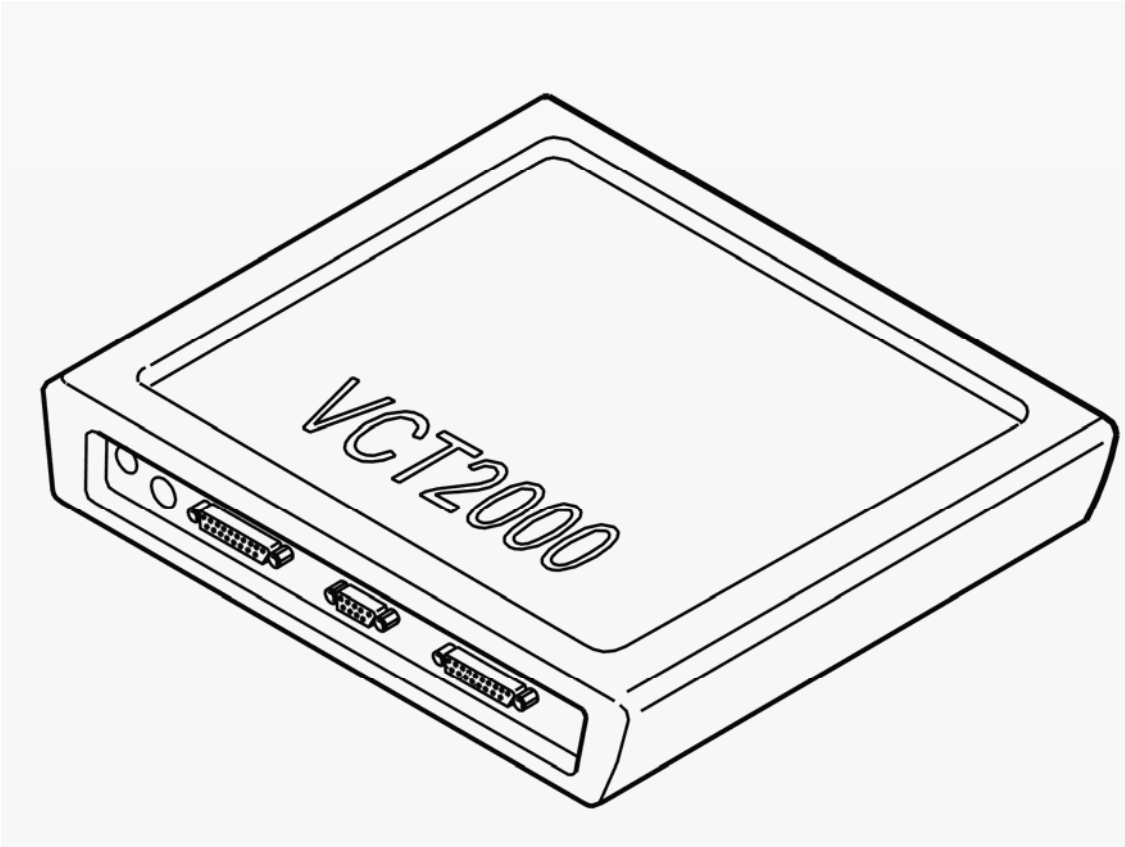


Fig. 208: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

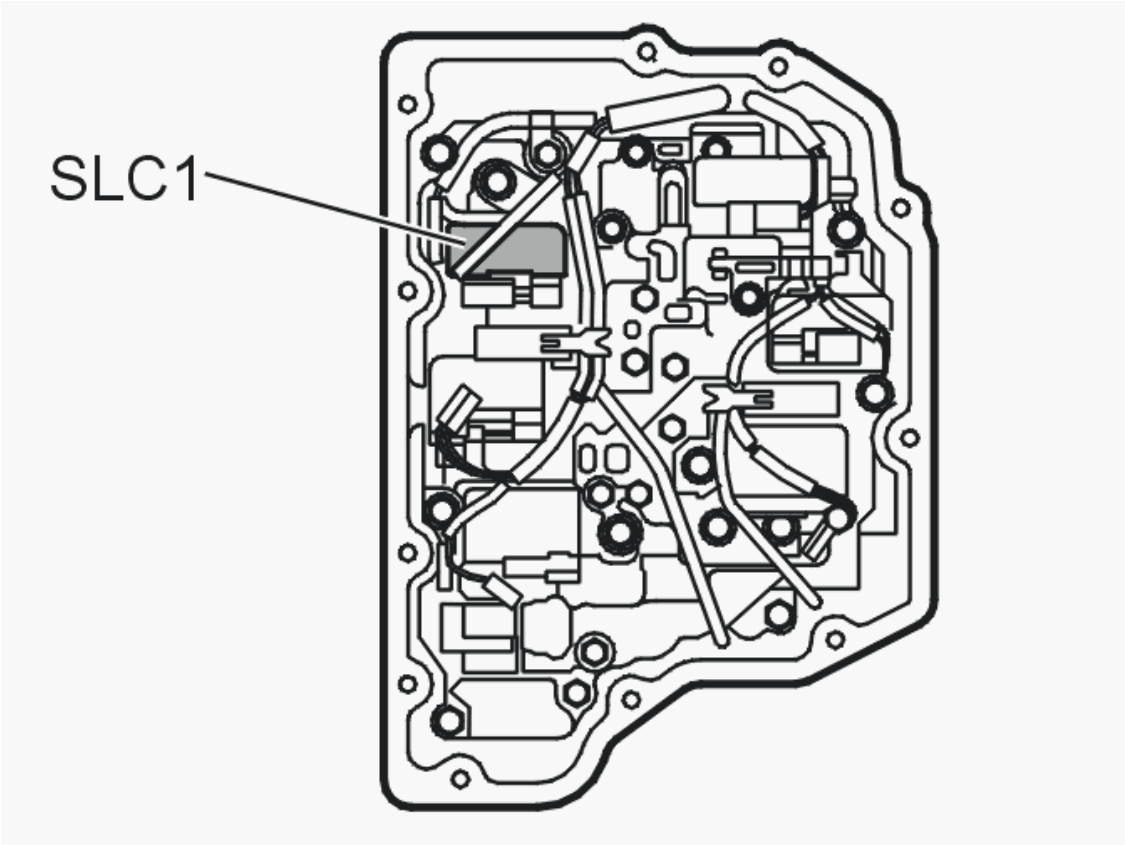


Fig. 209: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

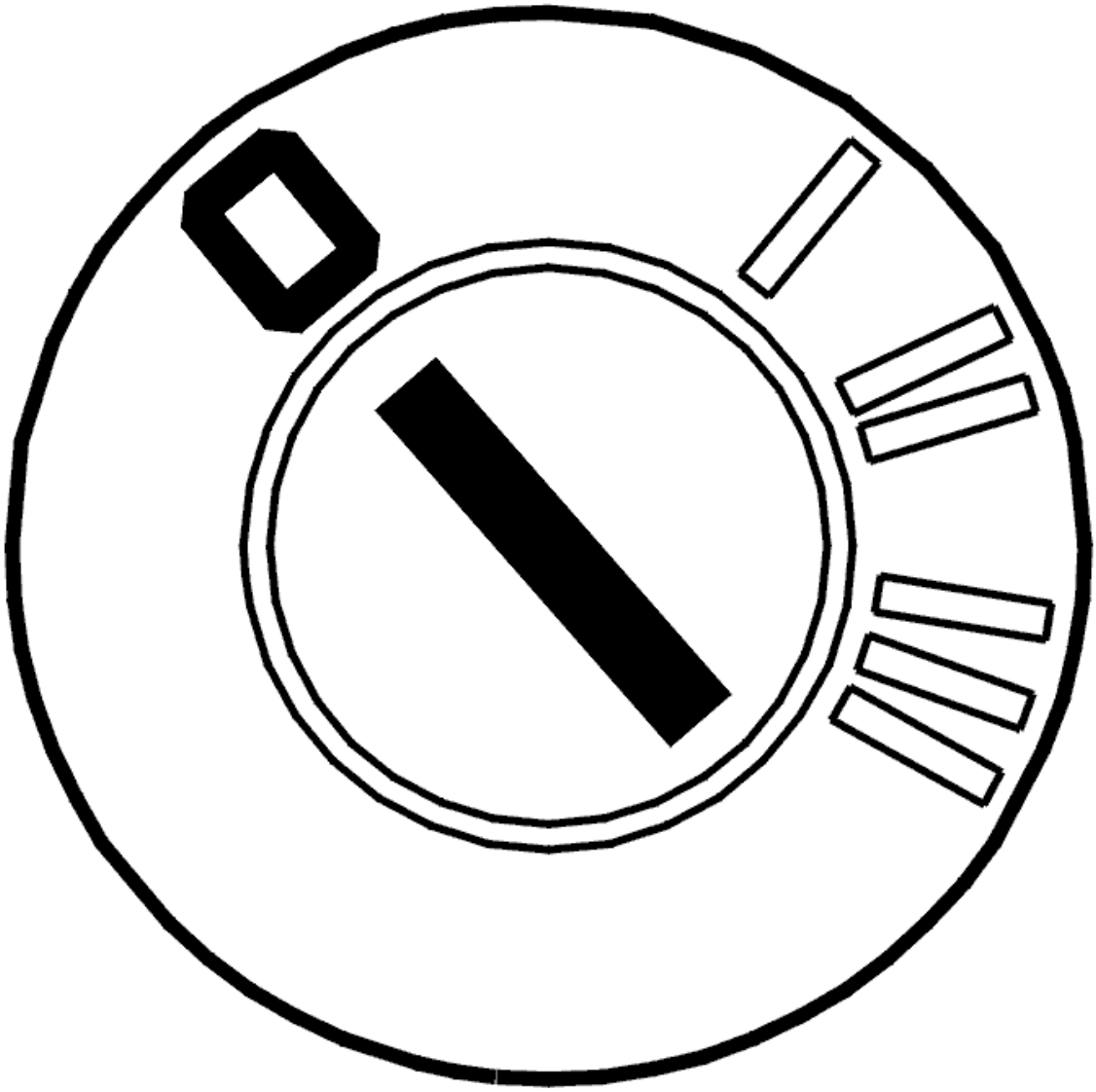


Fig. 210: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

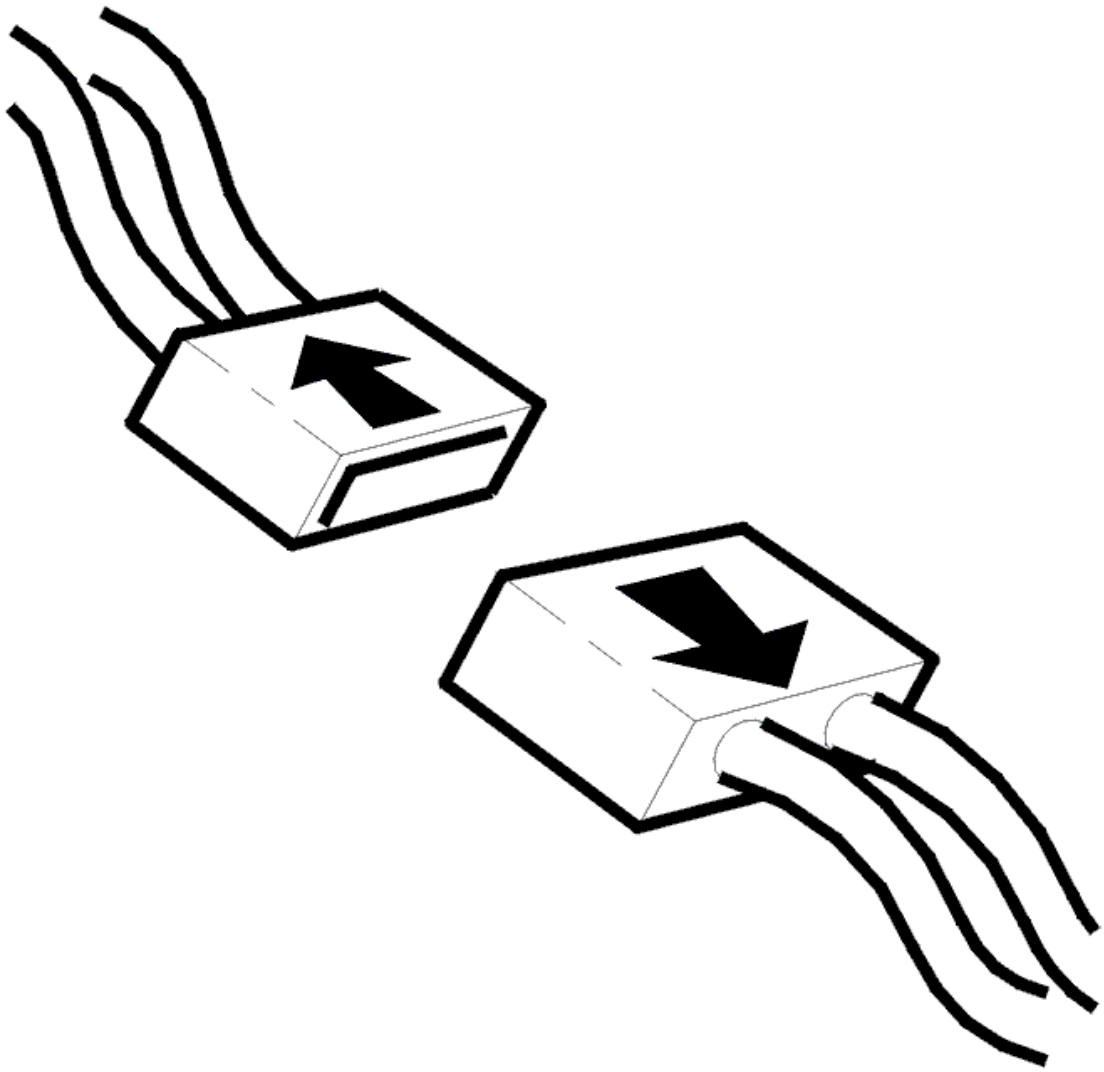


Fig. 211: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check connector B (22-pin) for the transmission control module (TCM). Check for damage and pressed in terminal pins. Check for contact resistance and oxidation.

Check the wiring between the transmission connector terminal #B11 and the connector for solenoid SLC1 terminal #1. Check the wiring between the transmission connector terminal #B10 and the connector for solenoid SLC1 terminal #2. Check for an open circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.

HINT: If no fault is found in the wiring check solenoid SLC1. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

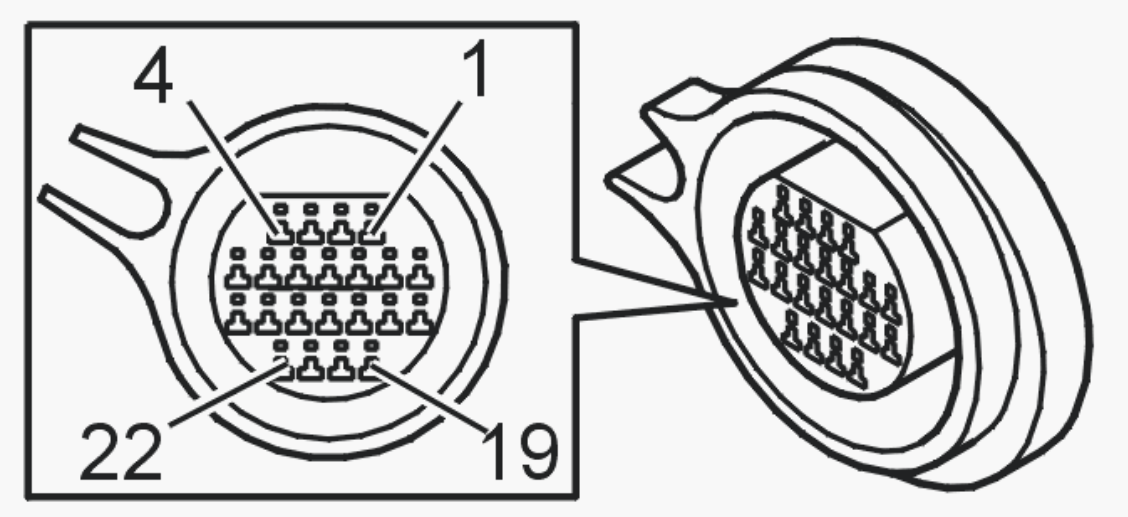


Fig. 212: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

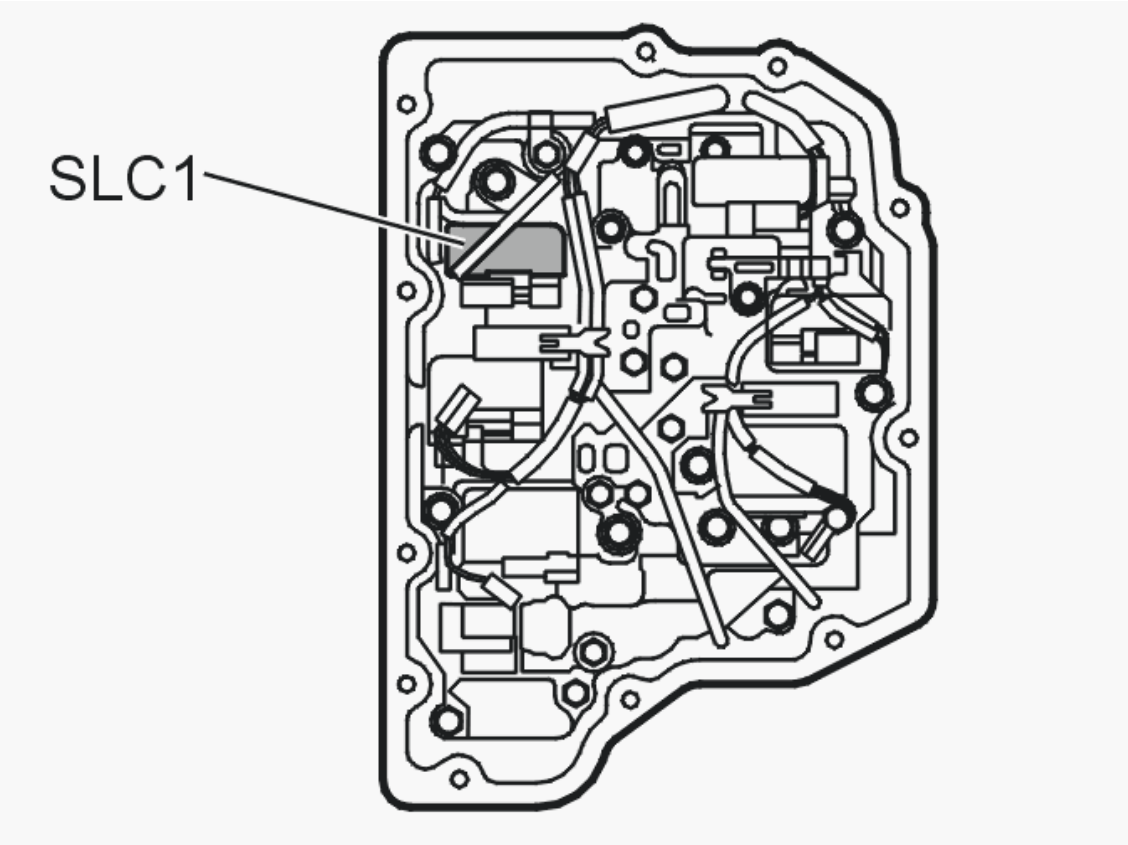


Fig. 213: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

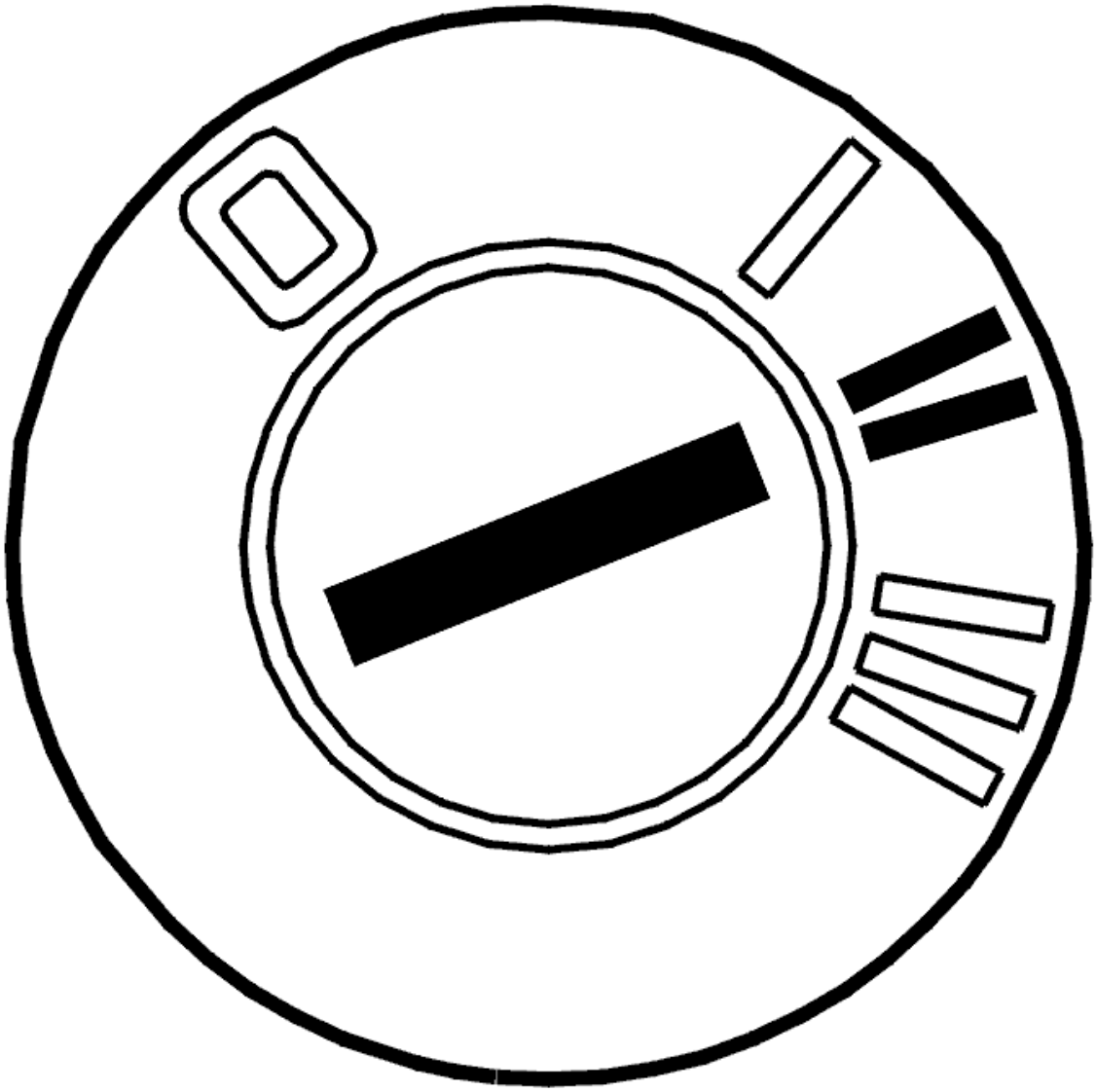


Fig. 214: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

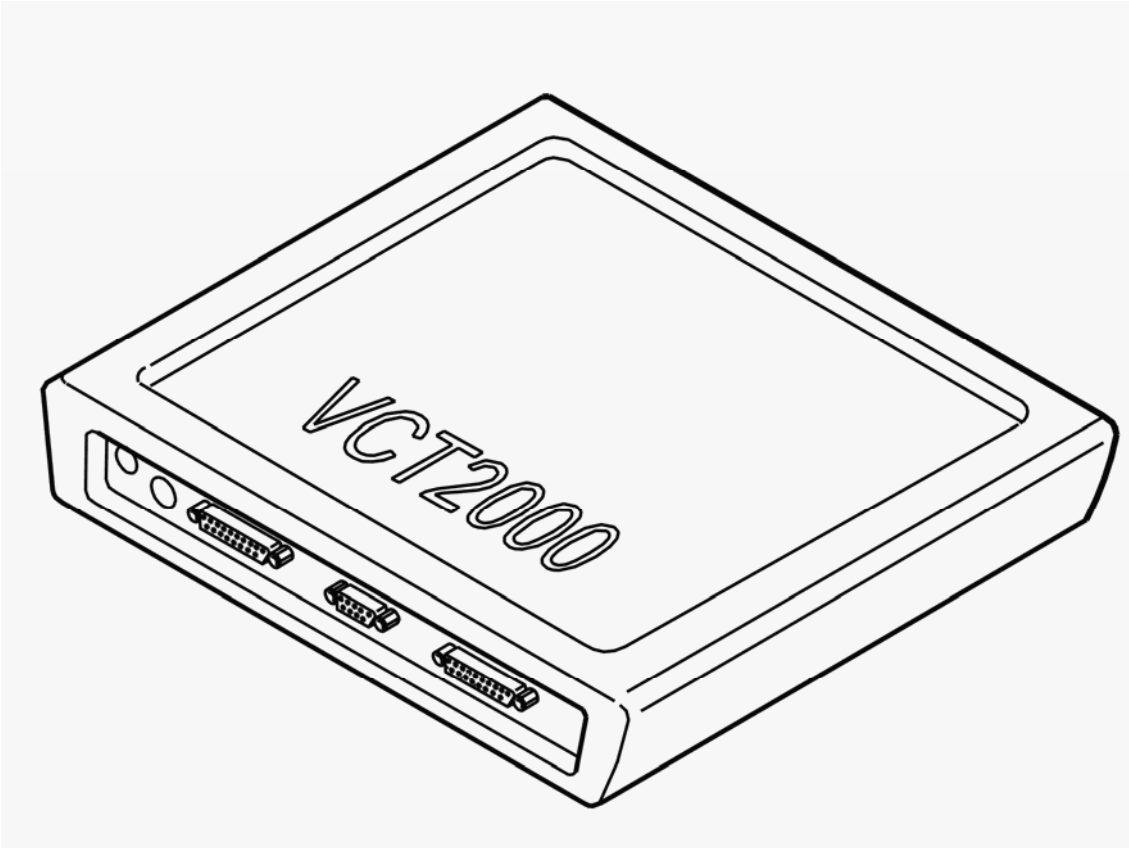


Fig. 215: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

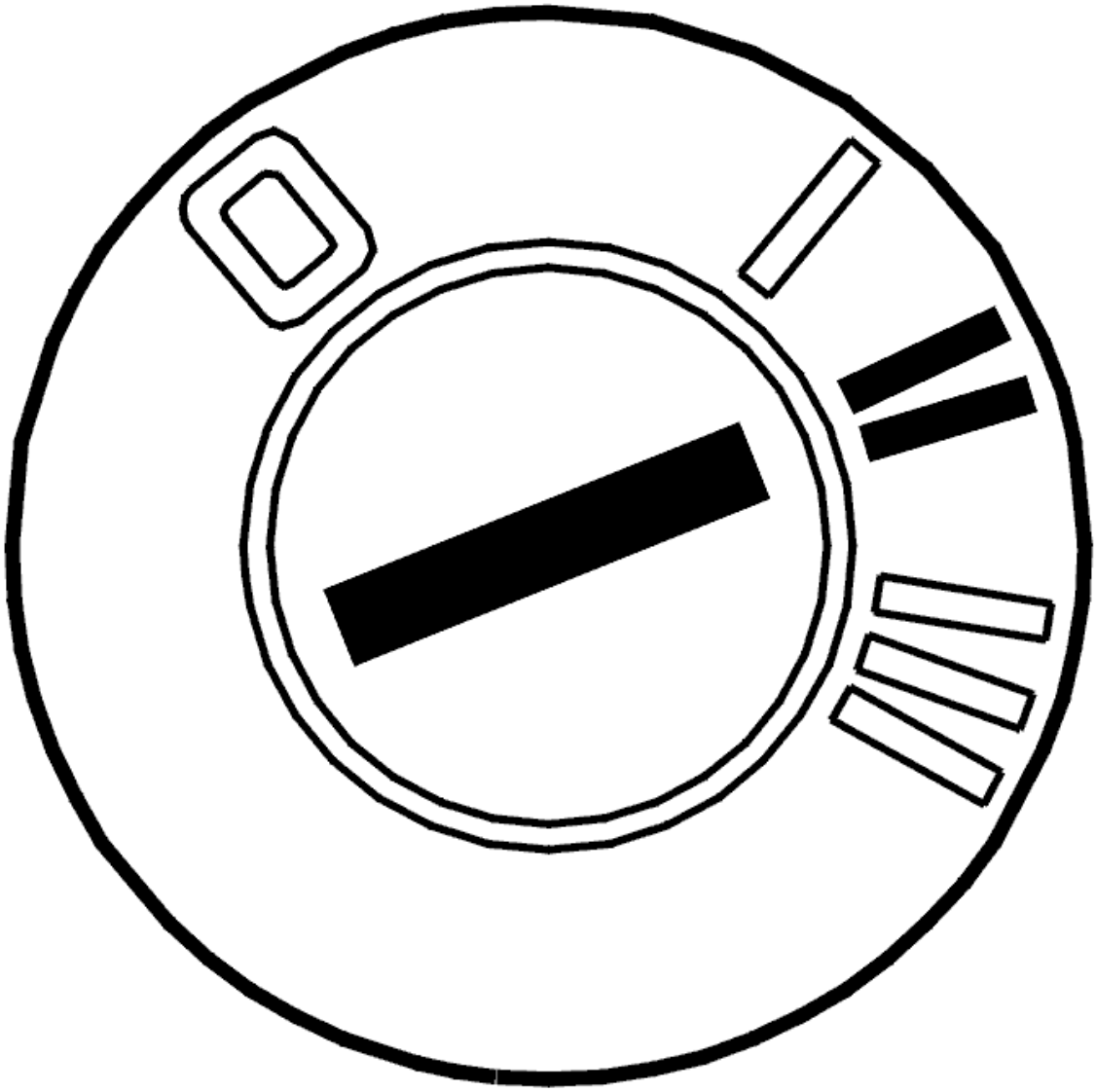


Fig. 216: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

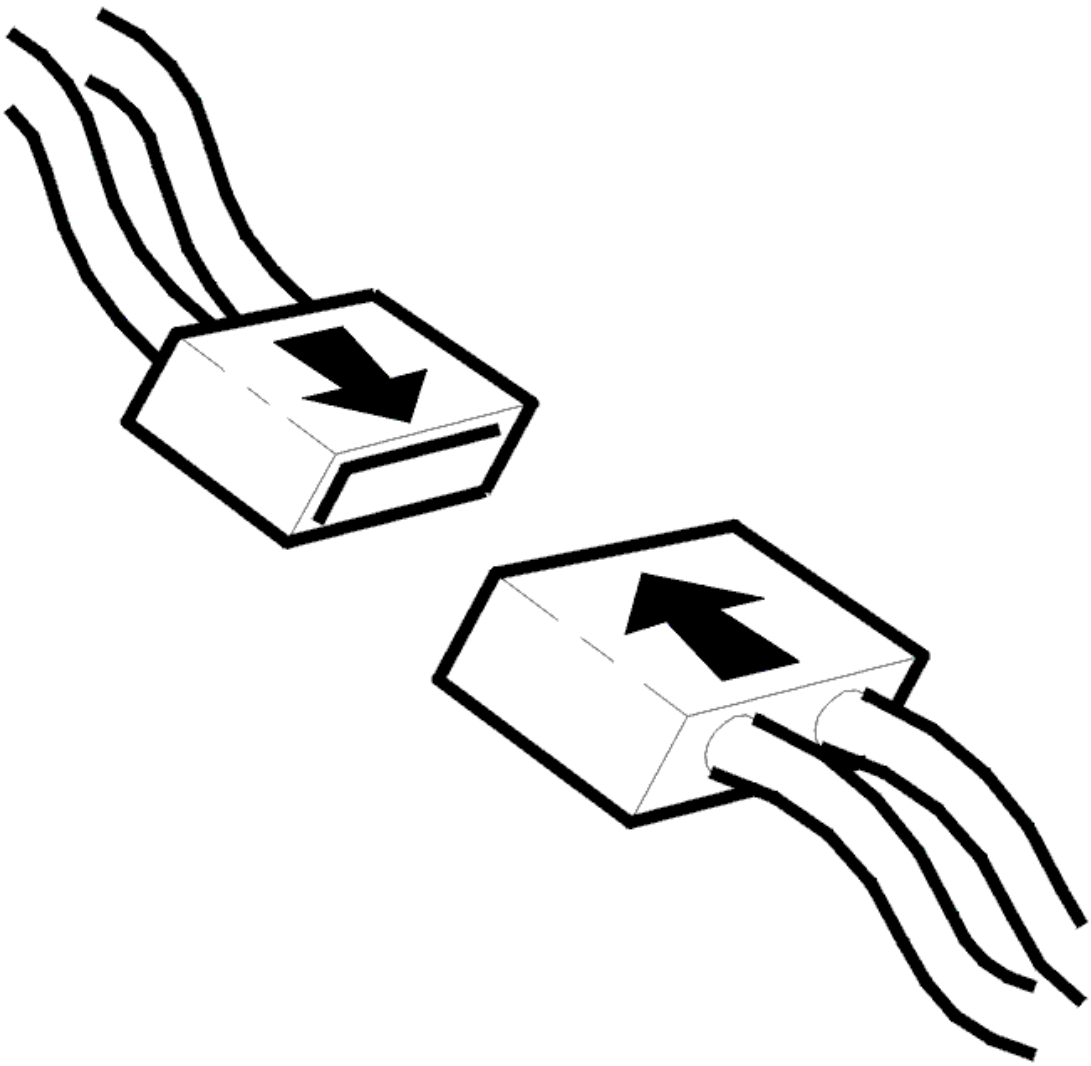


Fig. 217: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLC1 by clicking on the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLC1. The current must oscillate between approximately 0 and 1000 mA.

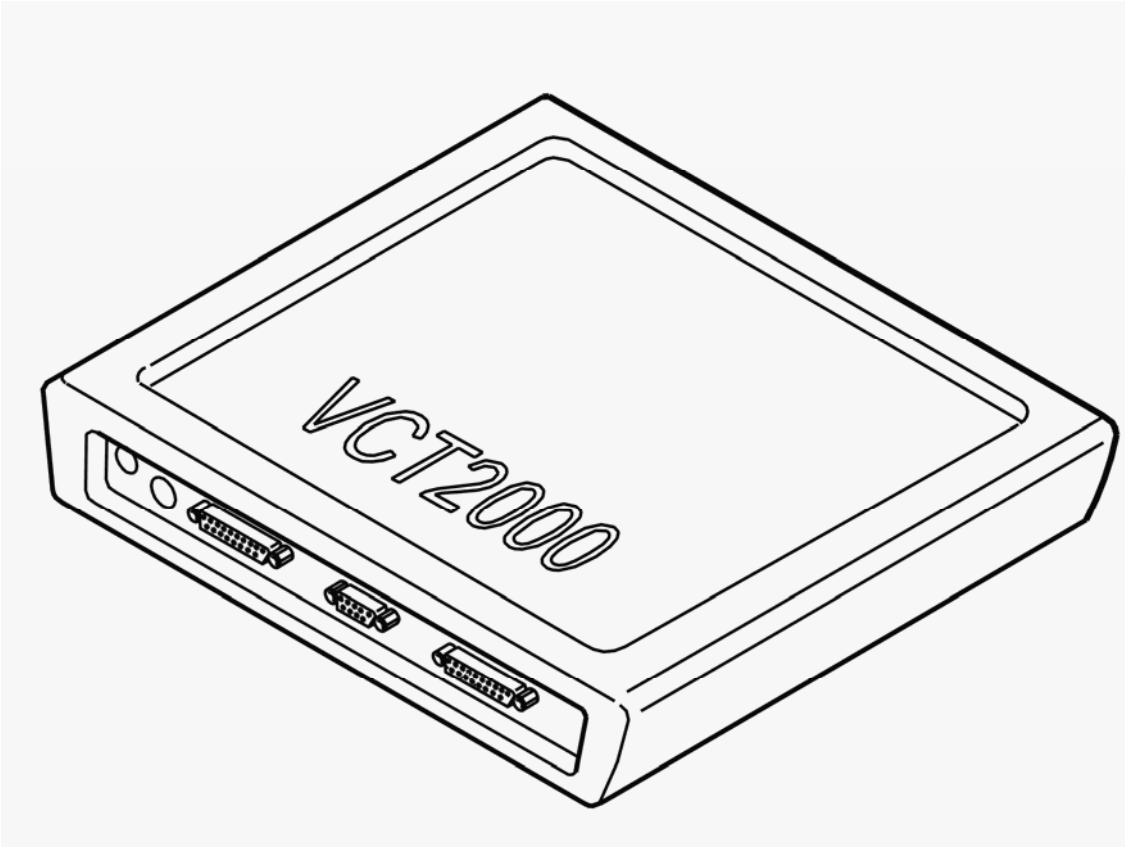


Fig. 218: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

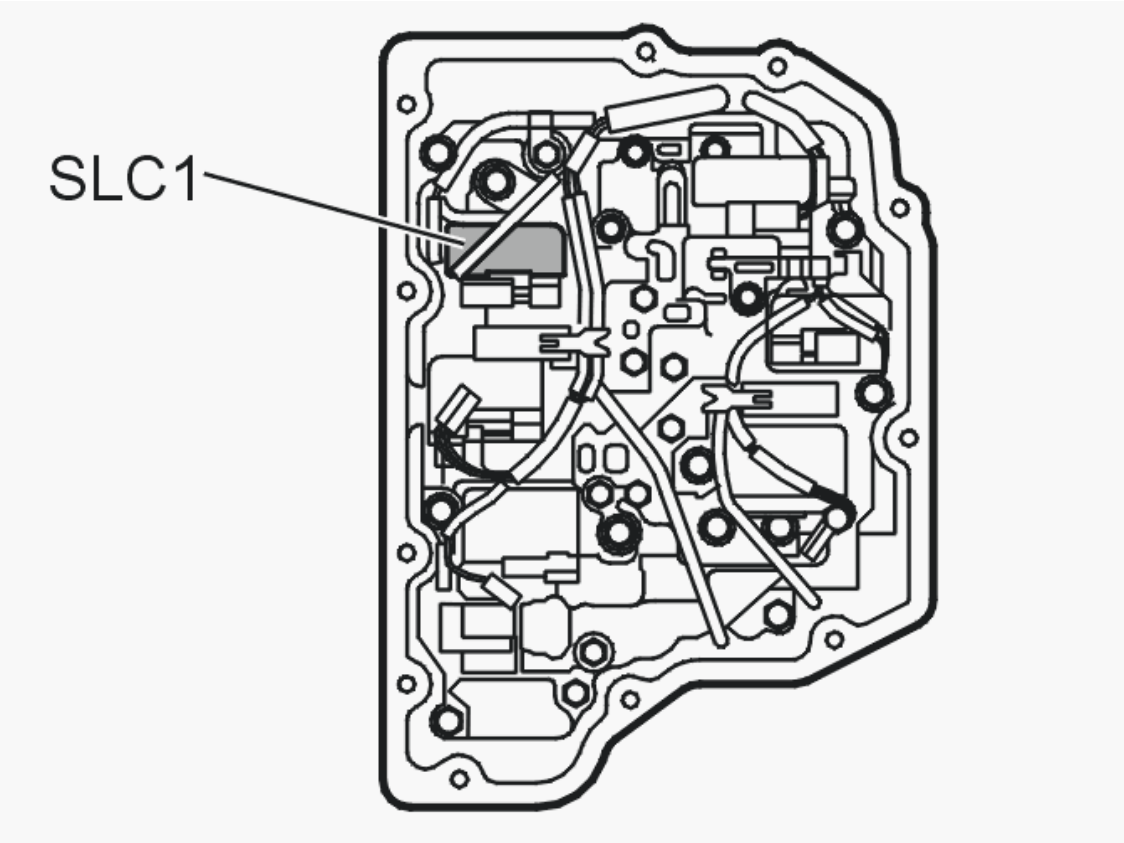


Fig. 219: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P273700: PRESSURE REGULATING SOLENOID F CONTROL CIRCUIT INSIDE/OUTSIDE PARAMETER VALUES. GENERAL FAULT INFORMATION.

NO INFORMATION ABOUT FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273700

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273700**

FAULT TRACING TCM-P273700

see **FAULT TRACING TCM-P273700**

TCM-P273800: PRESSURE CONTROL SOLENOID F CONTROL CIRCUIT LOW. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273800

Condition

Linear pressure solenoid SLC1 controls system pressure in the transmission. The solenoid is controlled by power stages at the output of the transmission control module (TCM). The control module uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1A) results in a low line pressure. The amperage is primarily affected by the throttle position.

The diagnostic trouble code is stored if the control module detects:

- An open circuit in solenoid SLC1 circuit.

Then Solenoid SLC1 cannot control the system pressure.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Shifting when linear pressure solenoid SLC1 is activated.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

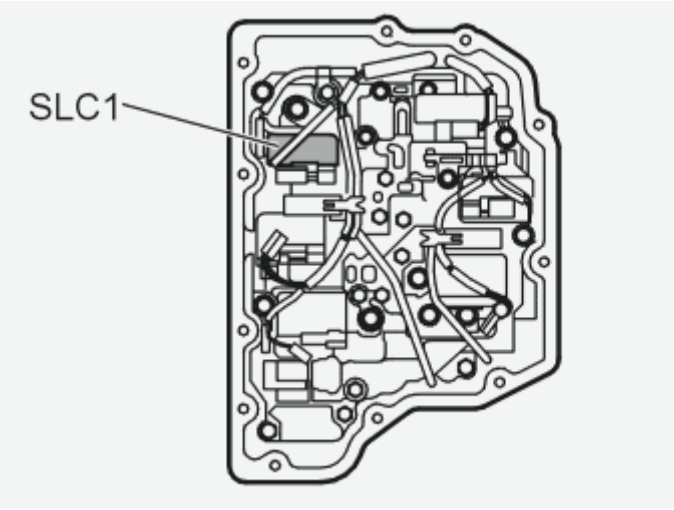


Fig. 220: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Contact resistance in the terminals.
- Open-circuit in the cable for the control signal or signal ground.
- Linear pressure solenoid SLC1 not working.
- The transmission control module (TCM) does not function.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Rough gear shift
- No gear shift

FAULT-TRACING

CHECKS

CHECKING THE LINE PRESSURE SOLENOID SLC1

Fig. 221: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLC1 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLC1. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 222: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

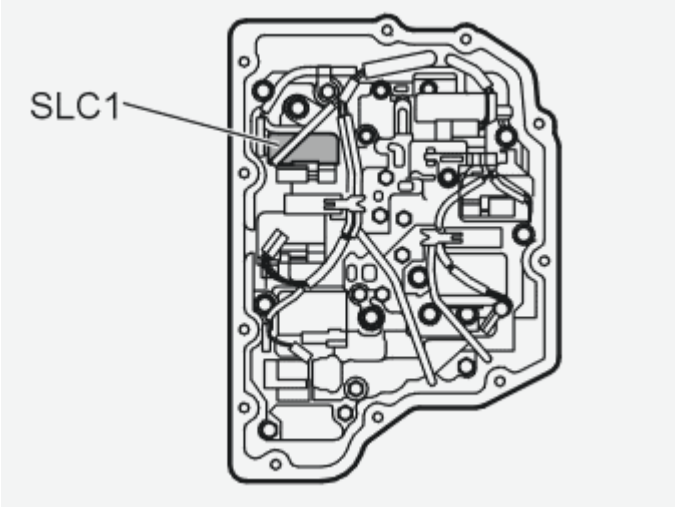


Fig. 223: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

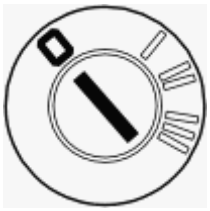


Fig. 224: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

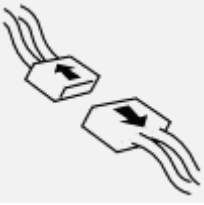


Fig. 225: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check connector B (22-pin) for the transmission control module (TCM). Check for damaged or pressed in pins. Check for contact resistance and oxidation.

Check the cables for open circuit and short circuit to ground.

Take readings between:

- Transmission connector #B11 and the connector for solenoid SLC1 #1.
- Transmission connector #B10 and the connector for solenoid SLC1 #1.

HINT: If no fault is found in the wiring, check solenoid SLC1. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **VALVE HOUSING**

- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

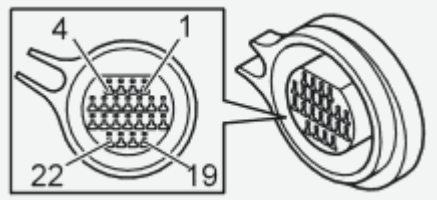


Fig. 226: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

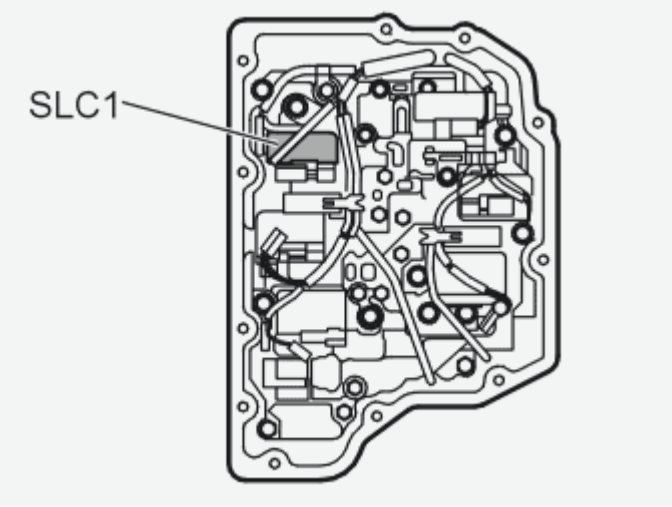


Fig. 227: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 228: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

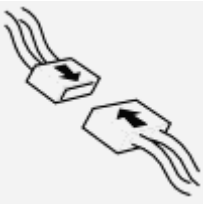


Fig. 229: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Activate solenoid SLC1 by clicking the VCT2000 symbol.

  The current should oscillate between 100 and 950 mA.

Fig. 230: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

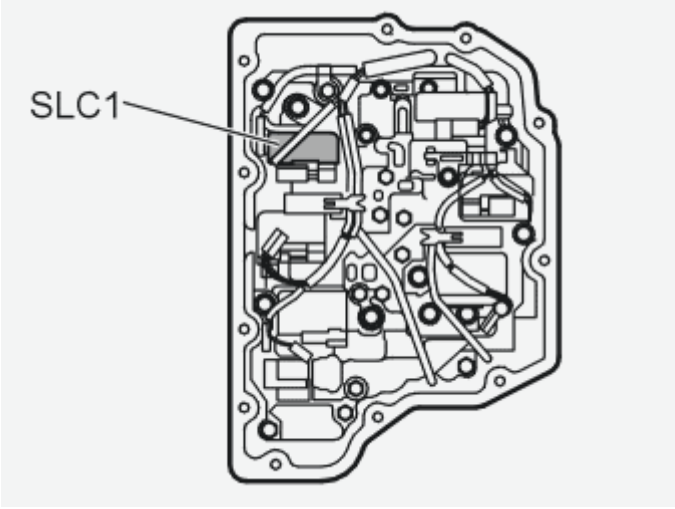


Fig. 231: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 232: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 233: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P273800: PRESSURE CONTROL SOLENOID F CONTROL CIRCUIT LOW. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273800

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273800**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P273800: PRESSURE REGULATING SOLENOID F CONTROL CIRCUIT LOW. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

FAULT TRACING TCM-P273800

CHECKS

CHECKING THE LINE PRESSURE SOLENOID SLC1

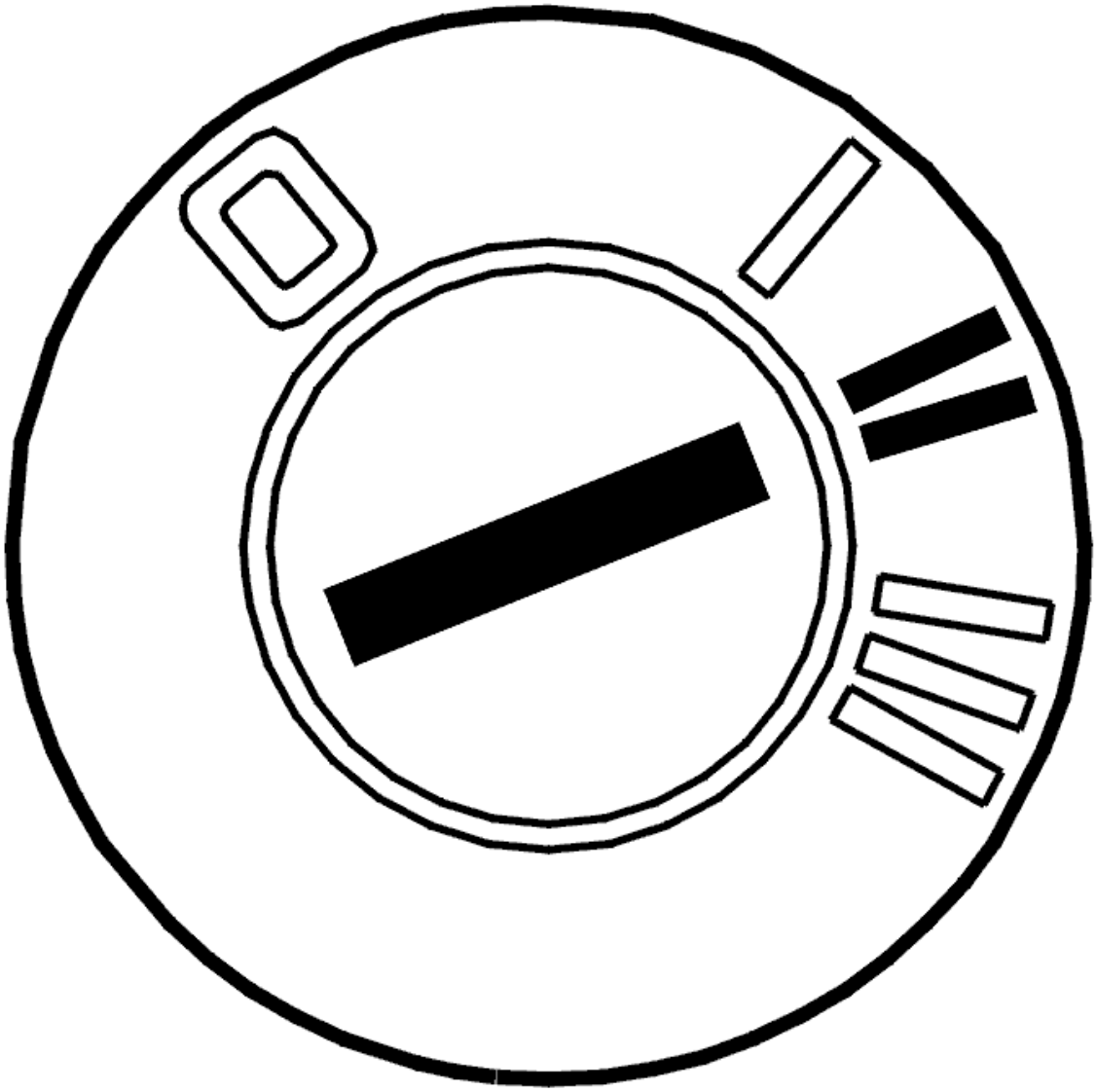


Fig. 234: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLC1 by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLC1. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

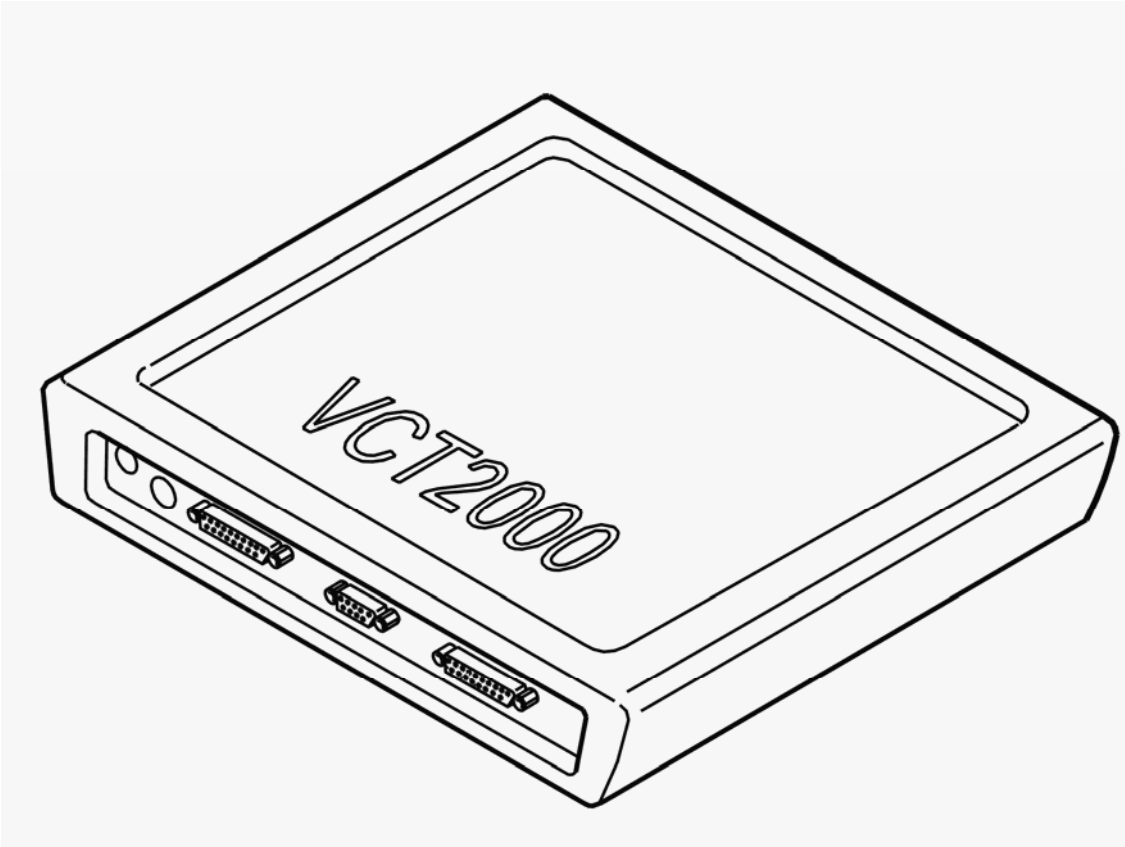


Fig. 235: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

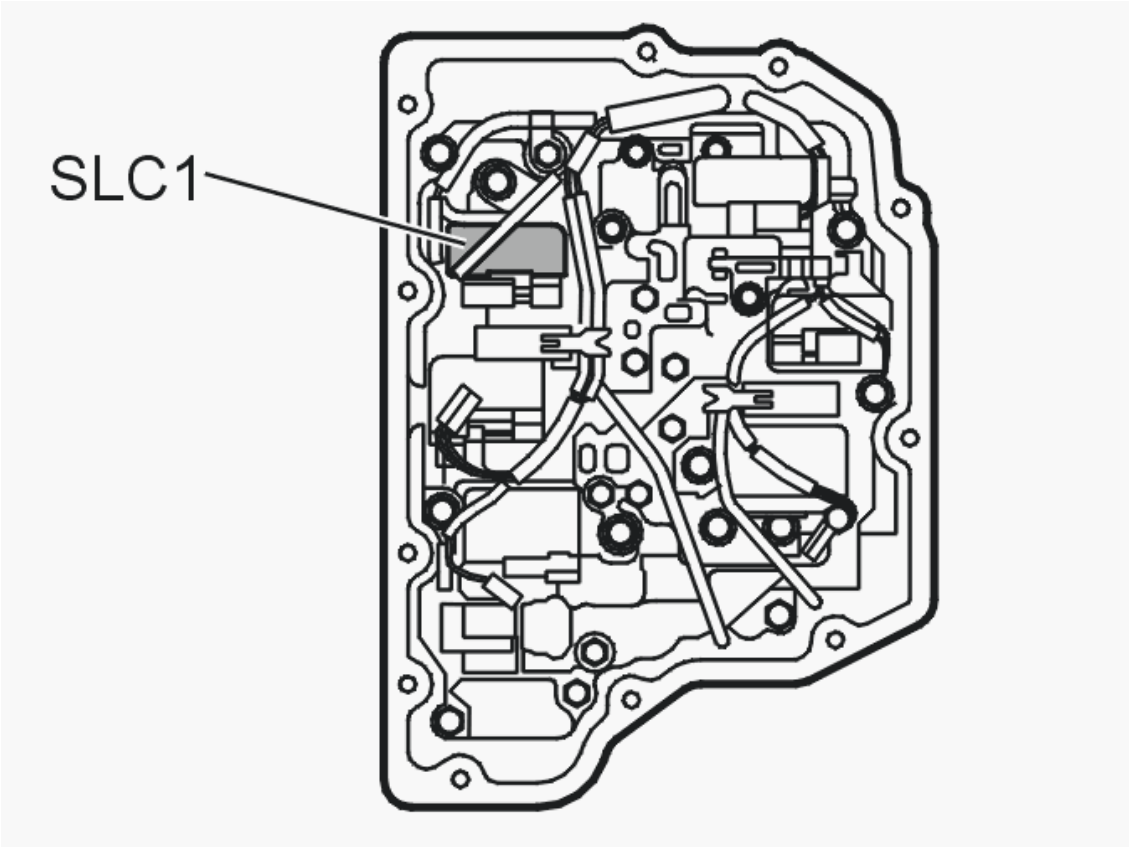


Fig. 236: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

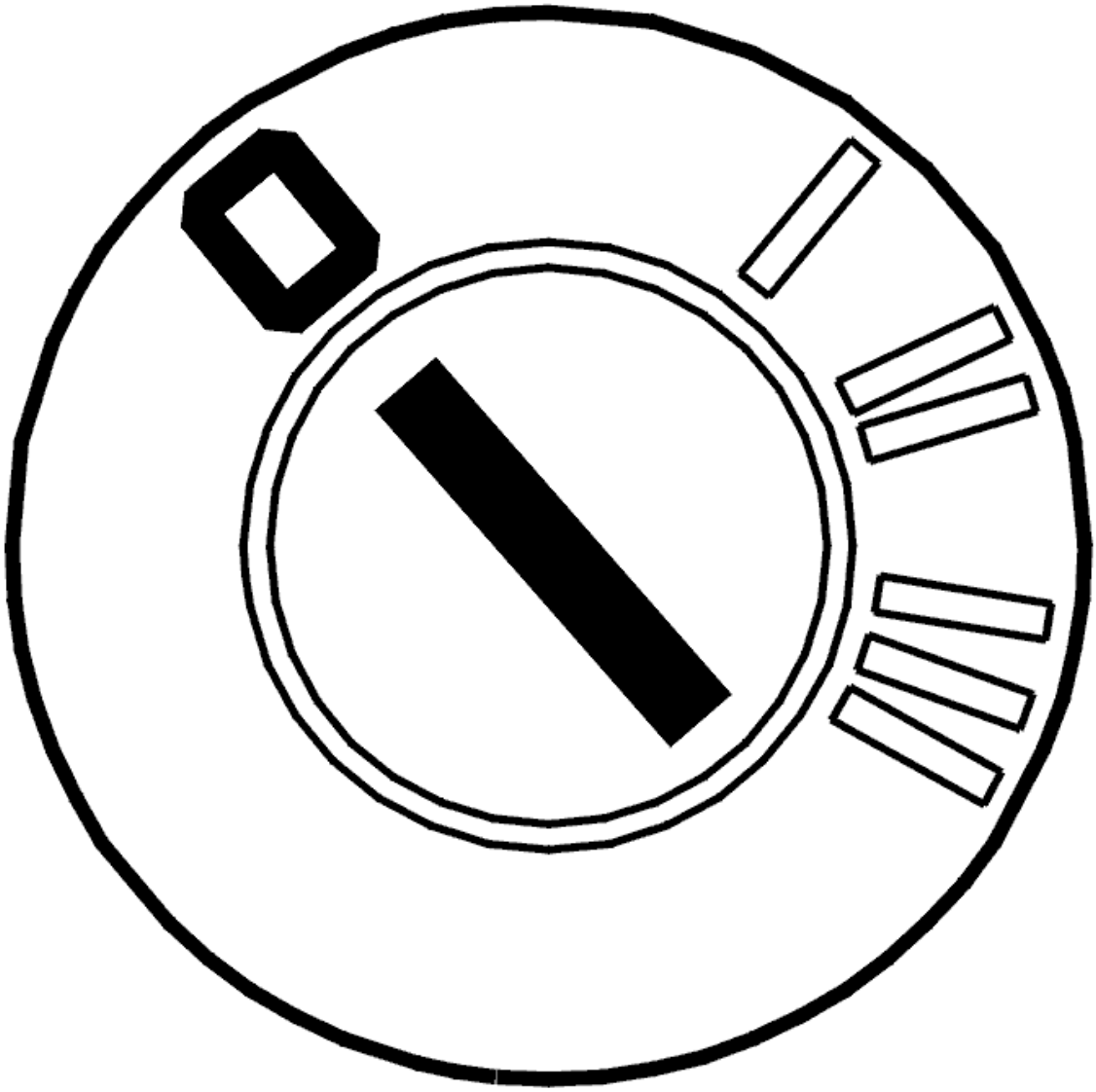


Fig. 237: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

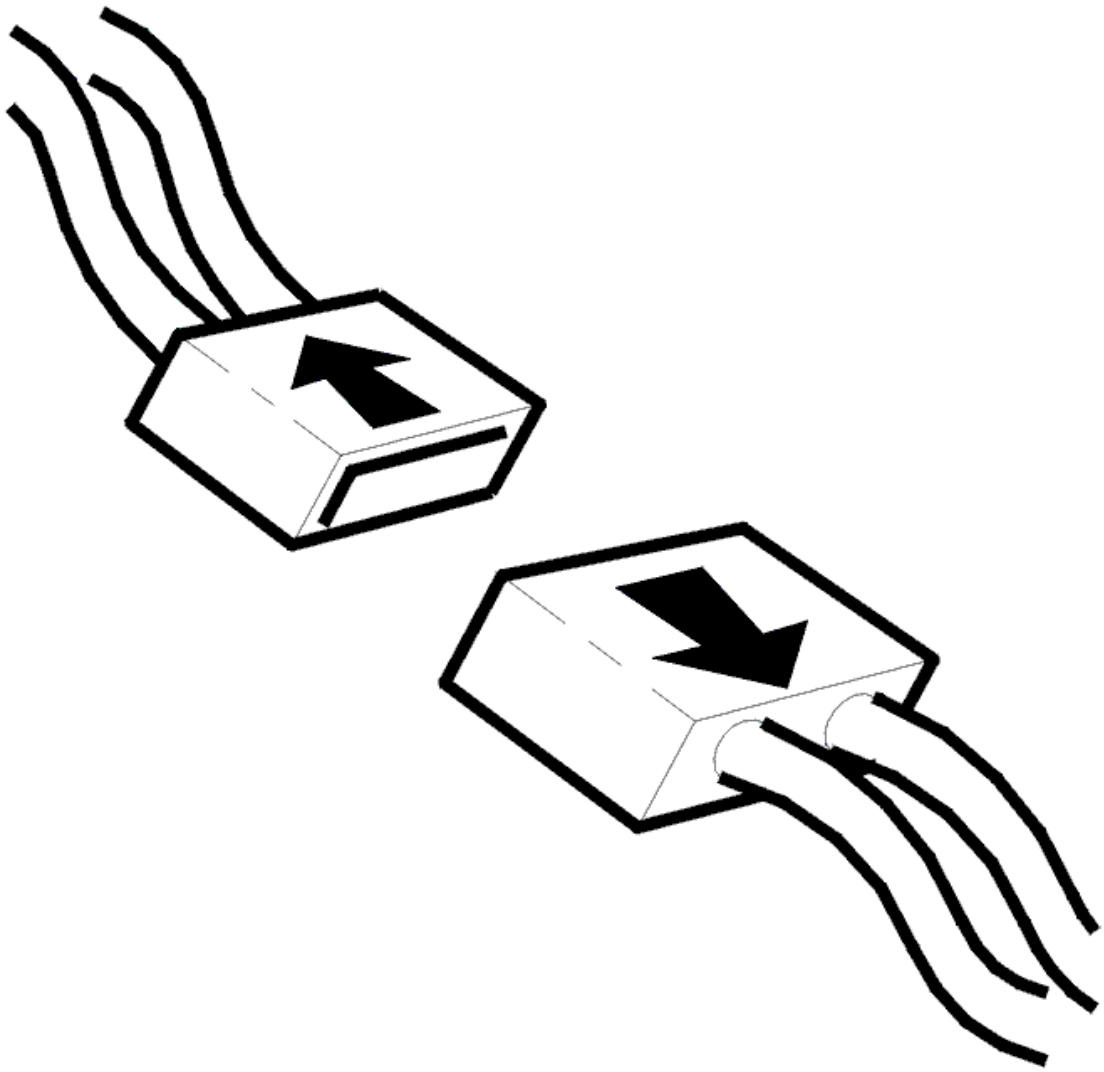


Fig. 238: Identifying Connector(s) Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check connector B (22-pin) for the transmission control module (TCM). Check for damage and pressed in terminal pins. Check for contact resistance and oxidation.

Check the wiring between the transmission connector terminal #B11 and the connector for solenoid SLC1 terminal #1. Check the wiring between the transmission connector terminal #B10 and the connector for solenoid SLC1 terminal #2. Check for an open circuit. Check for a short-circuit to ground.

HINT: If no fault is found in the wiring check solenoid SLC1. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

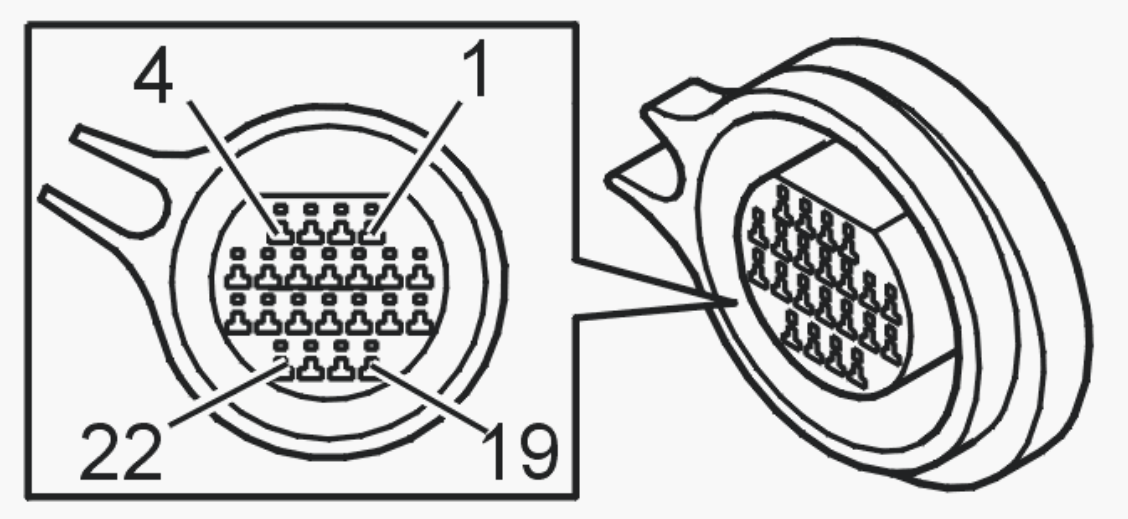


Fig. 239: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

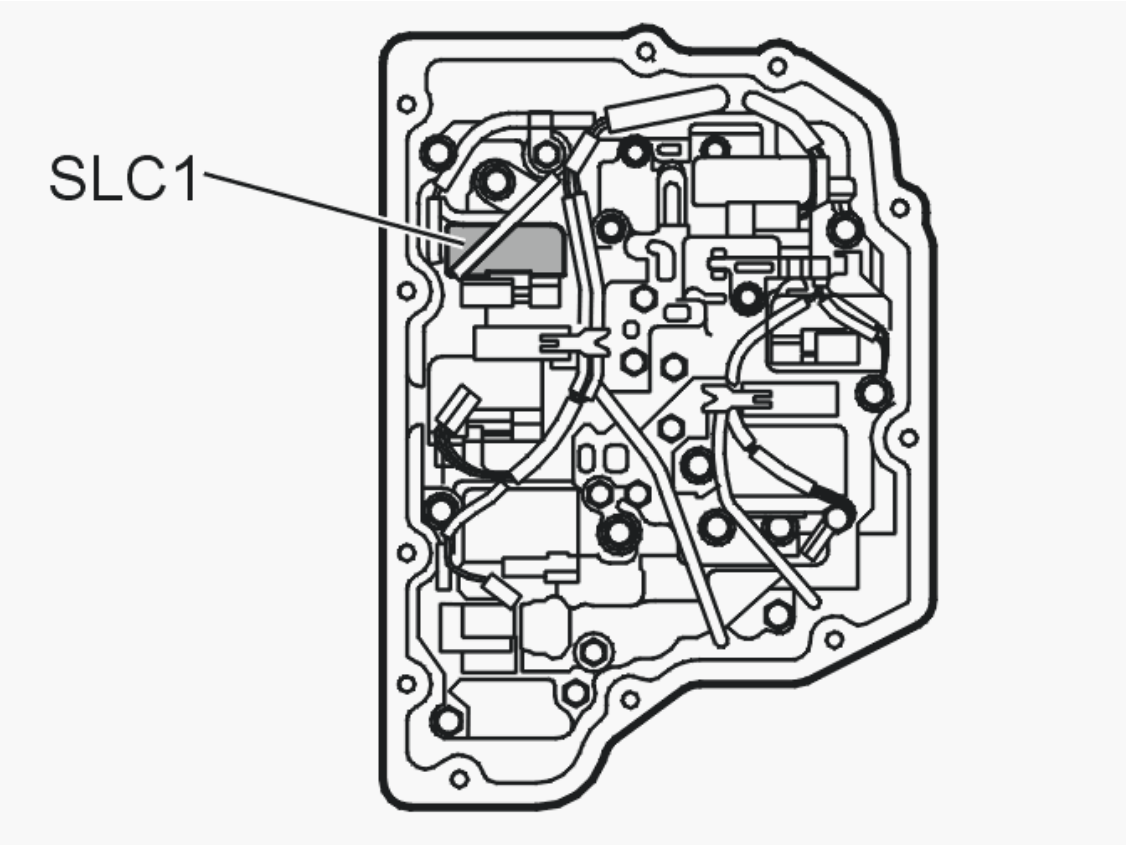


Fig. 240: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

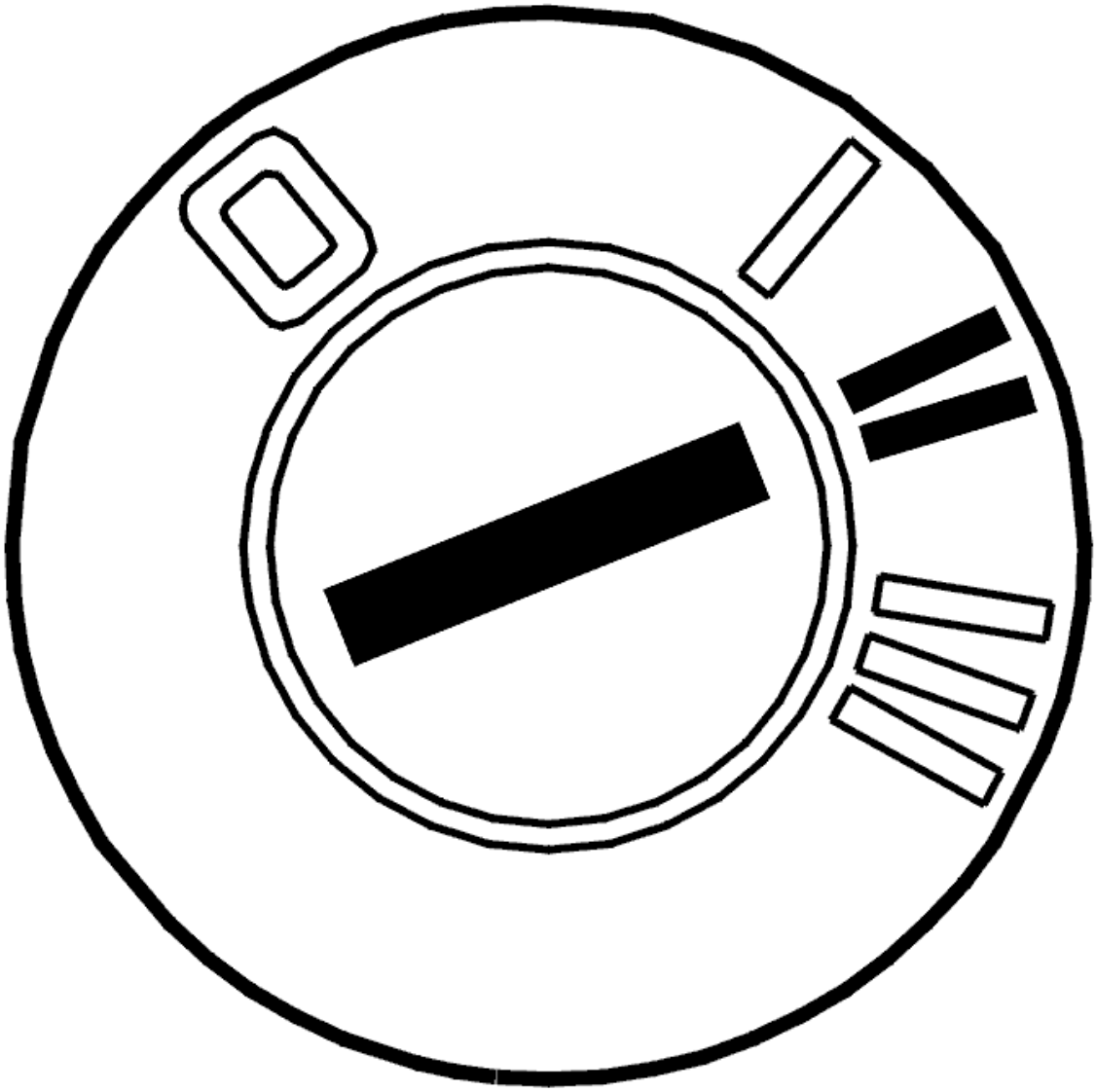


Fig. 241: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

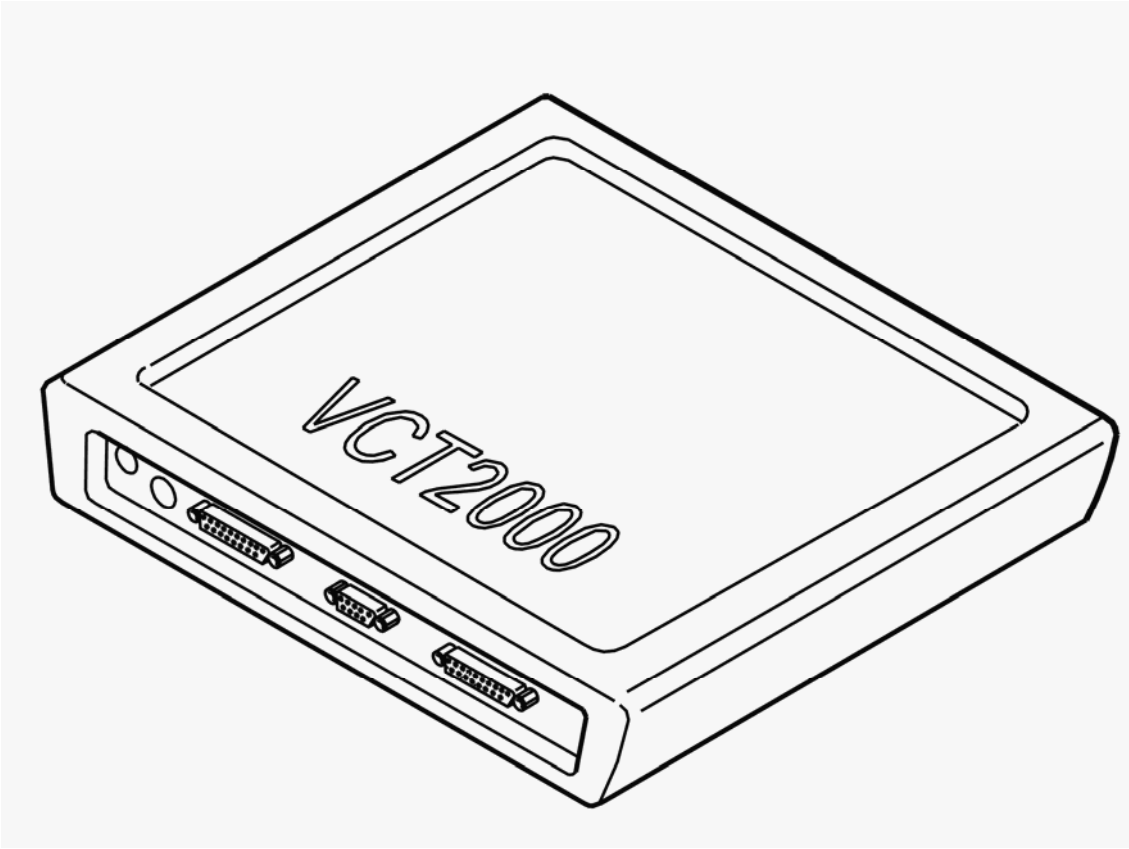


Fig. 242: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

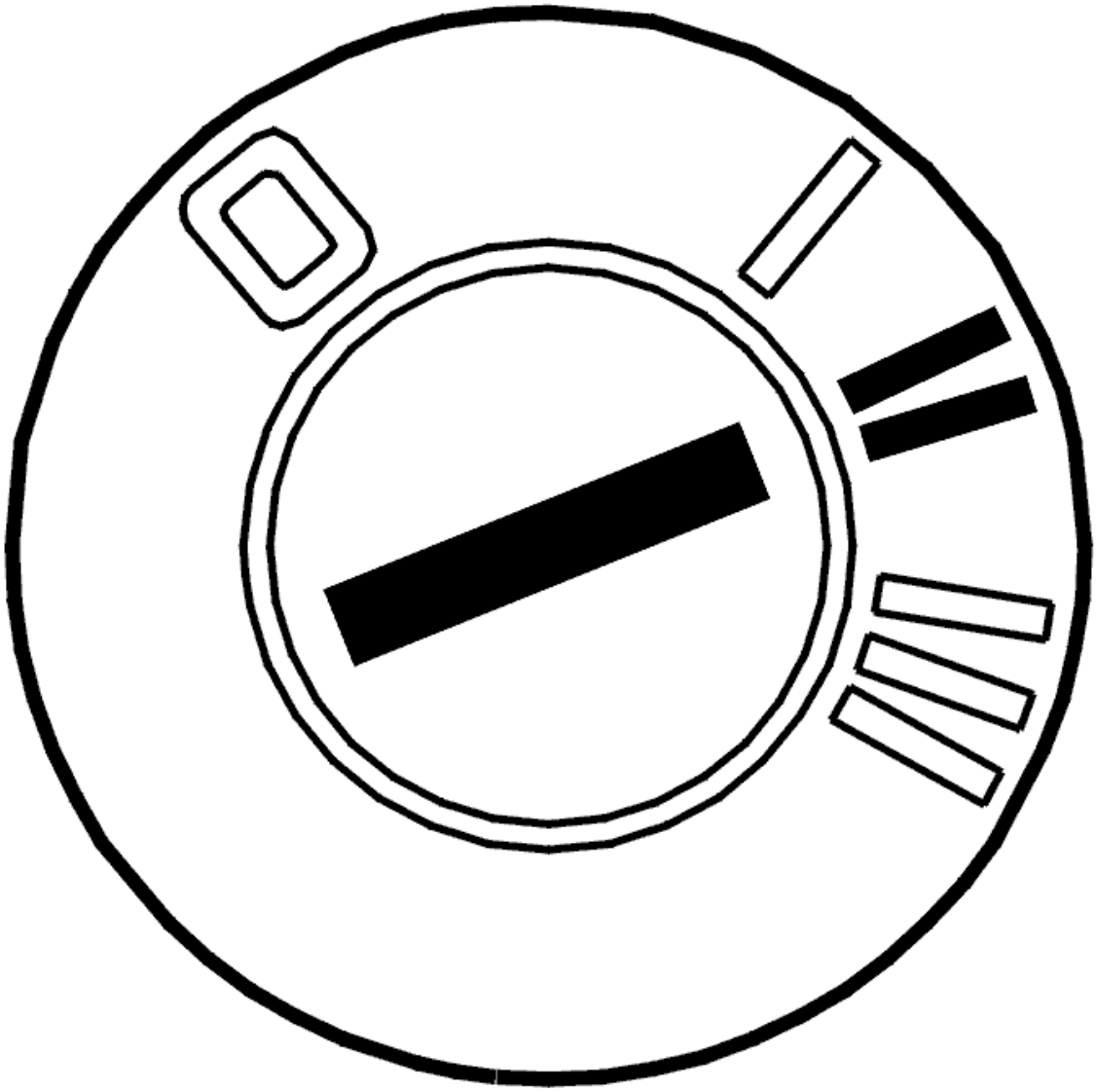


Fig. 243: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

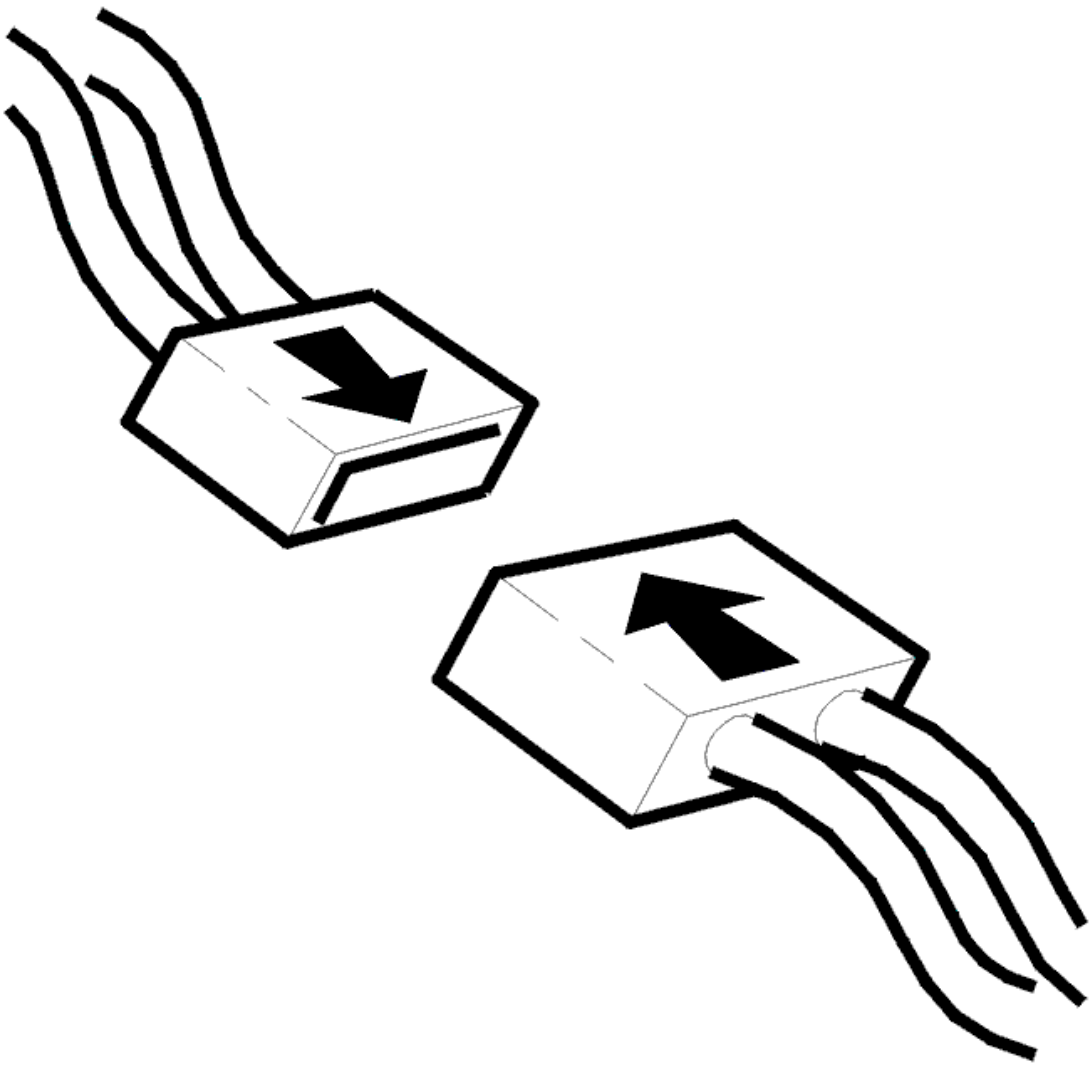


Fig. 244: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLC1 by clicking on the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLC1. The current must oscillate between approximately 0 and 1000 mA.

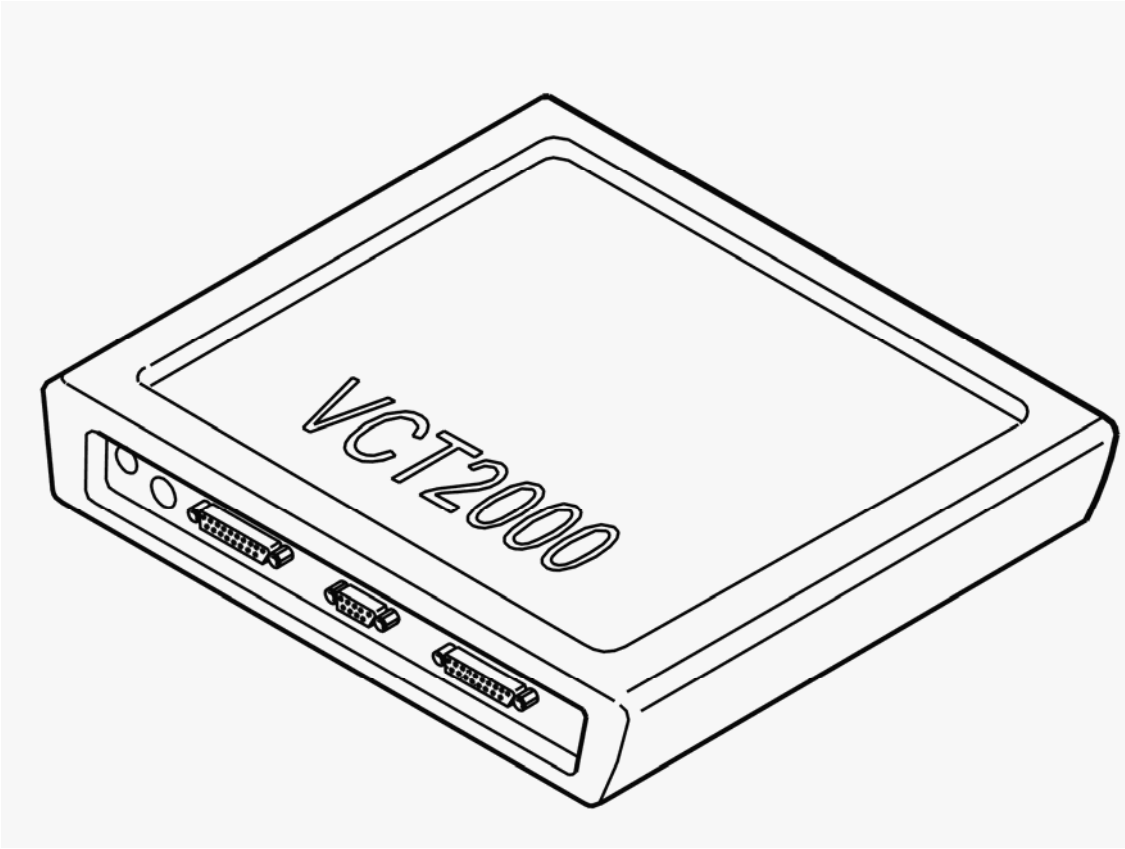


Fig. 245: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

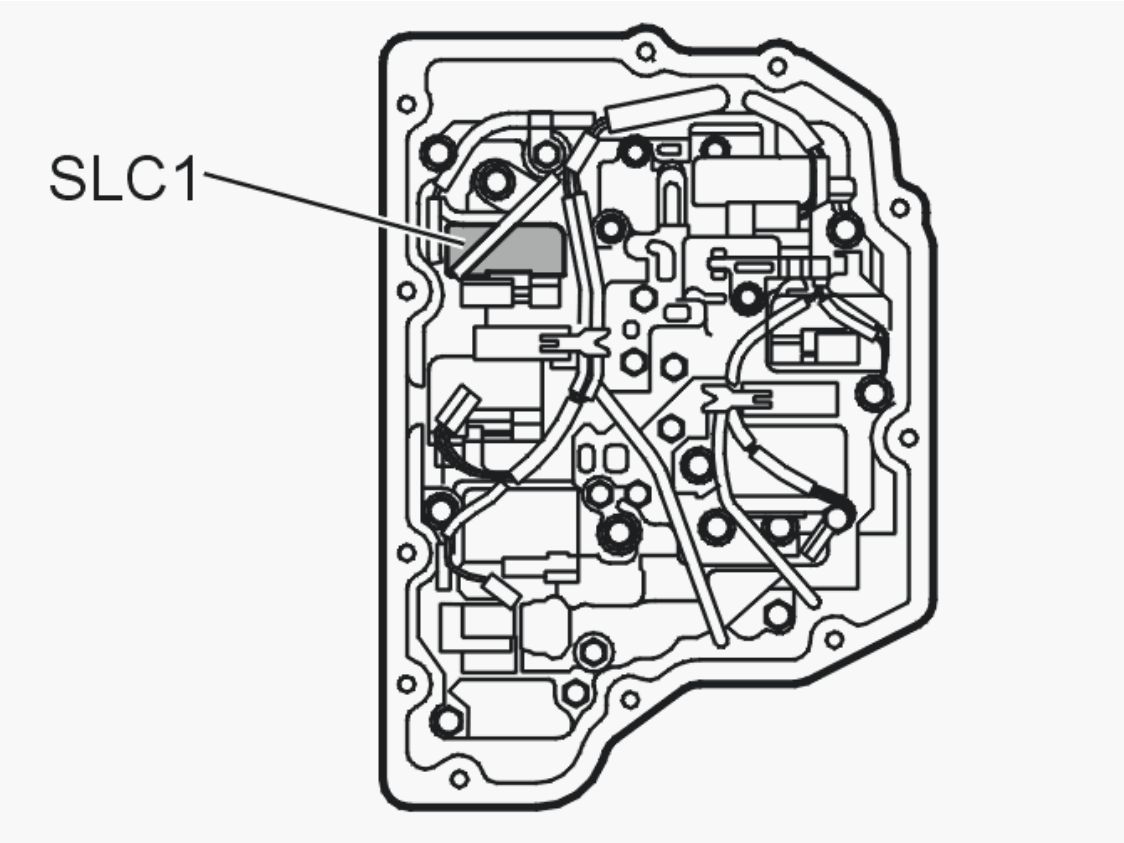


Fig. 246: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P273800: PRESSURE REGULATING SOLENOID F CONTROL CIRCUIT LOW. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT

TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273800

Condition

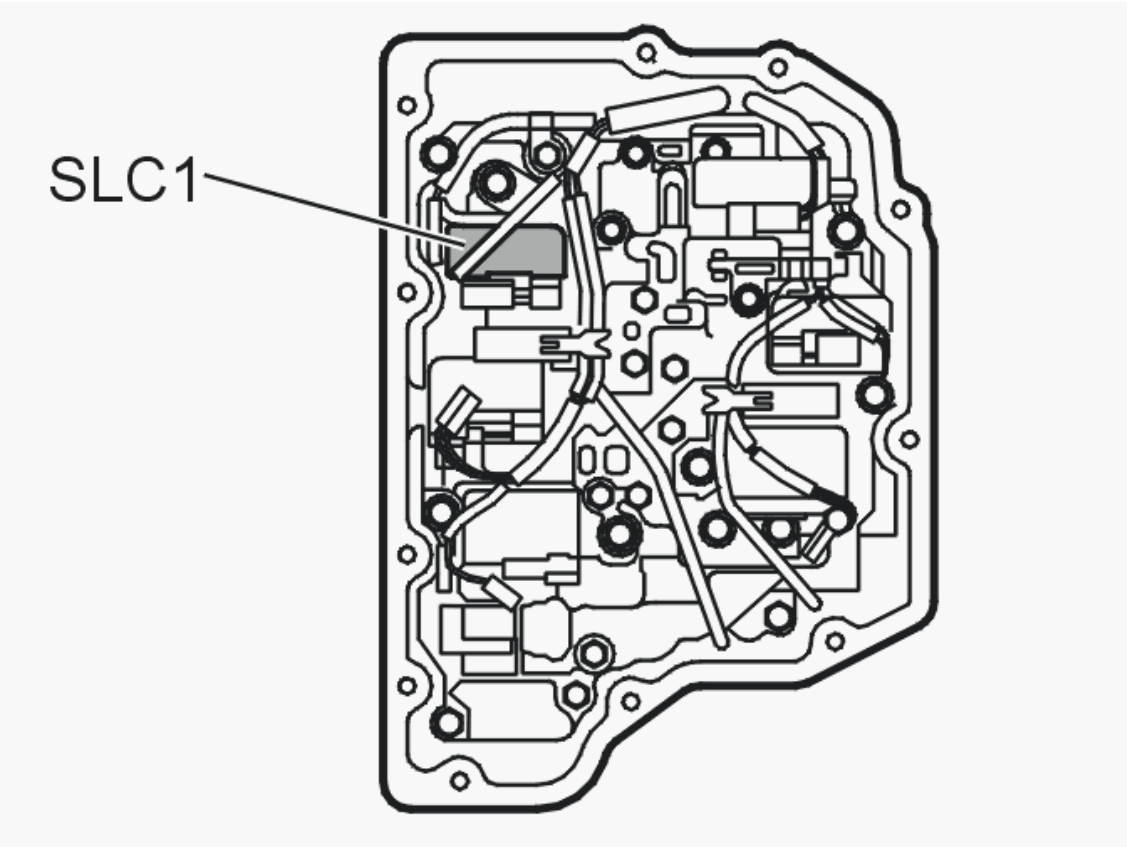


Fig. 247: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

Line pressure solenoid SLC1 controls the line pressure in the transmission. The solenoid is controlled by a power stage located on the output of the transmission control module (TCM). The control module uses the power stage to control the current to the solenoid. Low current gives high line pressure and high current (approximately 1 A) gives a low line pressure. The current strength is affected by the throttle position.

The diagnostic trouble code (DTC) is stored if the transmission control module (TCM) registers an open circuit in the circuit to solenoid SLC1. Solenoid SLC1 cannot control the line pressure.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Contact resistance in the terminals
- Open circuit in lead for control signal or signal ground.
- Solenoid not working.
- The transmission control module (TCM) does not function.

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear changing

FAULT TRACING TCM-P273800

see **FAULT TRACING TCM-P273800**

TCM-P273900: PRESSURE CONTROL SOLENOID F CONTROL CIRCUIT HIGH. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273900

Condition

The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The measured current value is higher than permitted in the circuit for solenoid SLC1.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

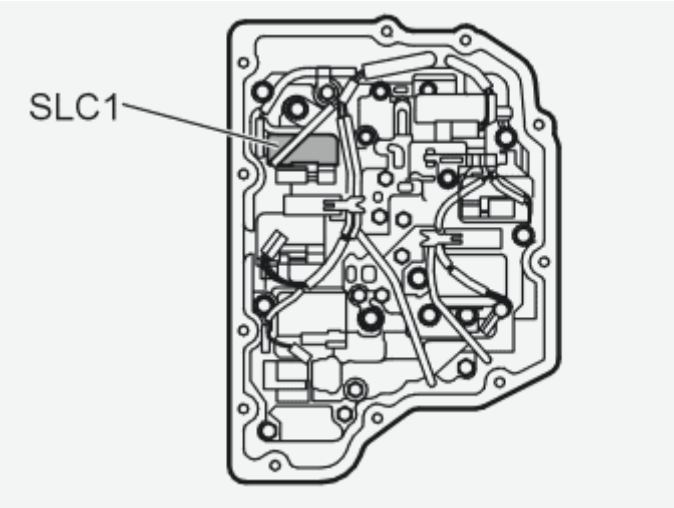


Fig. 248: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

Possible Source

- Control signal lead short-circuited to voltage.
- Linear pressure solenoid SLC1 not working.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator light (MIL), on
- Abnormal slipping gearshifts
- Rough gear shift
- No gear shift

FAULT-TRACING

CHECKS

CHECKING THE LINE PRESSURE SOLENOID SLC1

Fig. 249: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Activate solenoid SLC1 by clicking the VCT2000 symbol.

  Read the current through the circuit for solenoid SLC1. The current should oscillate between 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current changes, this is an indication that the fault was present previously but is not active at the moment, i. e. an intermittent fault.

Fig. 250: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

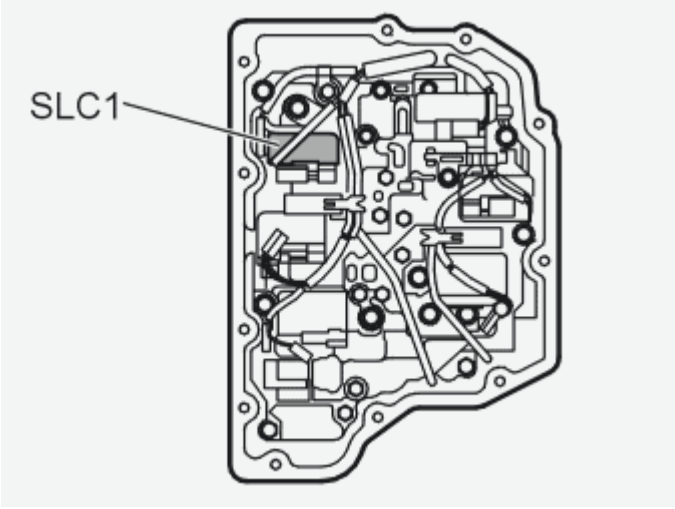


Fig. 251: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

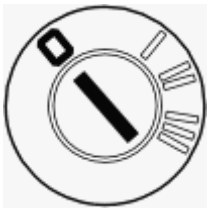


Fig. 252: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

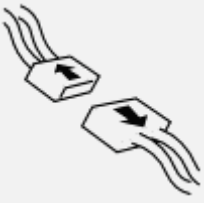


Fig. 253: Identifying Connectors Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Open the transmission control system.

Check the cables for short circuit to voltage.

Take readings between:

- Transmission connector #B11 and the connector for solenoid SLC1 #1.
- Transmission connector #B10 and the connector for solenoid SLC1 #1.

Also check the cables for a short-circuit to each other.

HINT: If no fault is found in the wiring, check solenoid SLC1. See CHECKING INTERNAL COMPONENTS OF THE TRANSMISSION

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **VALVE HOUSING**

- see **TRANSMISSION CONTROL UNIT WIRING HARNESS**
- To access the transmission control system:**COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CHECKING WIRING AND TERMINALS**

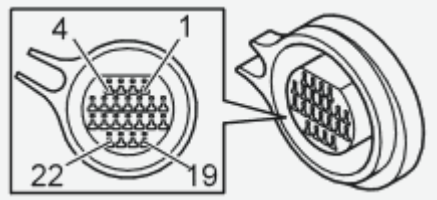


Fig. 254: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

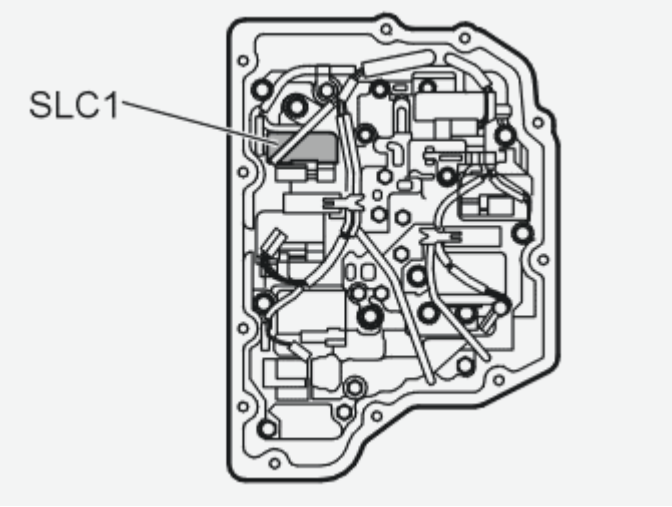


Fig. 255: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 256: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

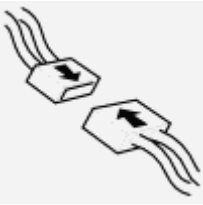


Fig. 257: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Activate solenoid SLC1 by clicking the VCT2000 symbol.

  The current should oscillate between 100 and 950 mA.

Fig. 258: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

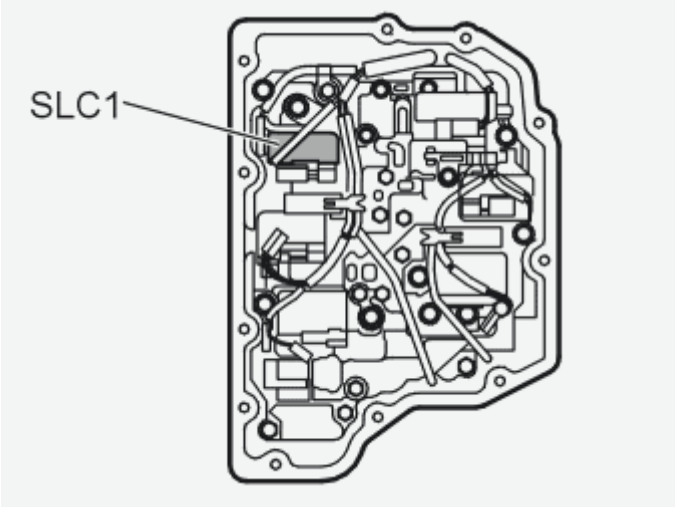


Fig. 259: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING ADAPTATION

RESETTING THE ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL, REPLACE"

HINT: The transmission has torque-regulated, adaptive pressure regulation. The pressure regulator enables the transmission to regulate pressure during each shift to prevent hard shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory. This makes it possible to compensate for transmission and clutch wear. It is important that the adaptation in the memory is reset so that the transmission works normally after the repair. Because the fluid was changed during the repair, the counter for transmission fluid change must also be reset. If the counter is not reset during draining/replacement, a diagnostic trouble code may be generated under the wrong conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

Fig. 260: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

Fig. 261: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

TCM-P273900: PRESSURE CONTROL SOLENOID F CONTROL CIRCUIT HIGH. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273900

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273900**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P273900: PRESSURE REGULATING SOLENOID F CONTROL CIRCUIT HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273900

Condition

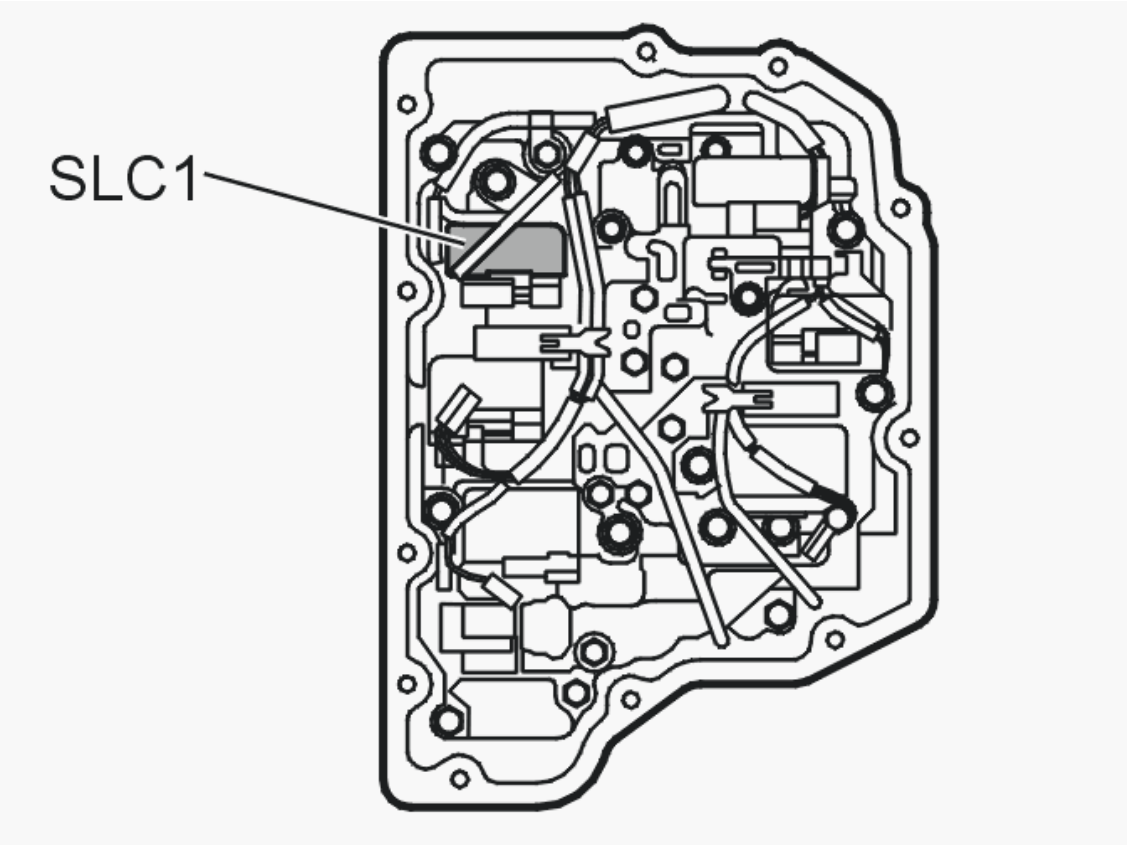


Fig. 262: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

The solenoids are controlled using the power stage in the transmission control module (TCM). The transmission control module (TCM) opens the power stage when the solenoids are to be activated so that the circuit receives a voltage.

If the transmission control module (TCM) registers that the measured current is higher than the circuit for the SLC1 solenoid allows, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Auxiliary program **Emergency mode 1** in the transmission control module (TCM) has started.

  HINT: EMERGENCY MODE IN CASE OF MALFUNCTION

Possible Source

- Control signal lead short-circuited to voltage.
- Line pressure solenoid does not work.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- General warning lamp lit
- Malfunction indicator lamp (MIL) lit.
- Abnormally slipping gears.
- Harsh gear changing
- No gear changing.

FAULT TRACING TCM-P273900

CHECKS

CHECKING THE LOCK-UP SOLENOID SLC1

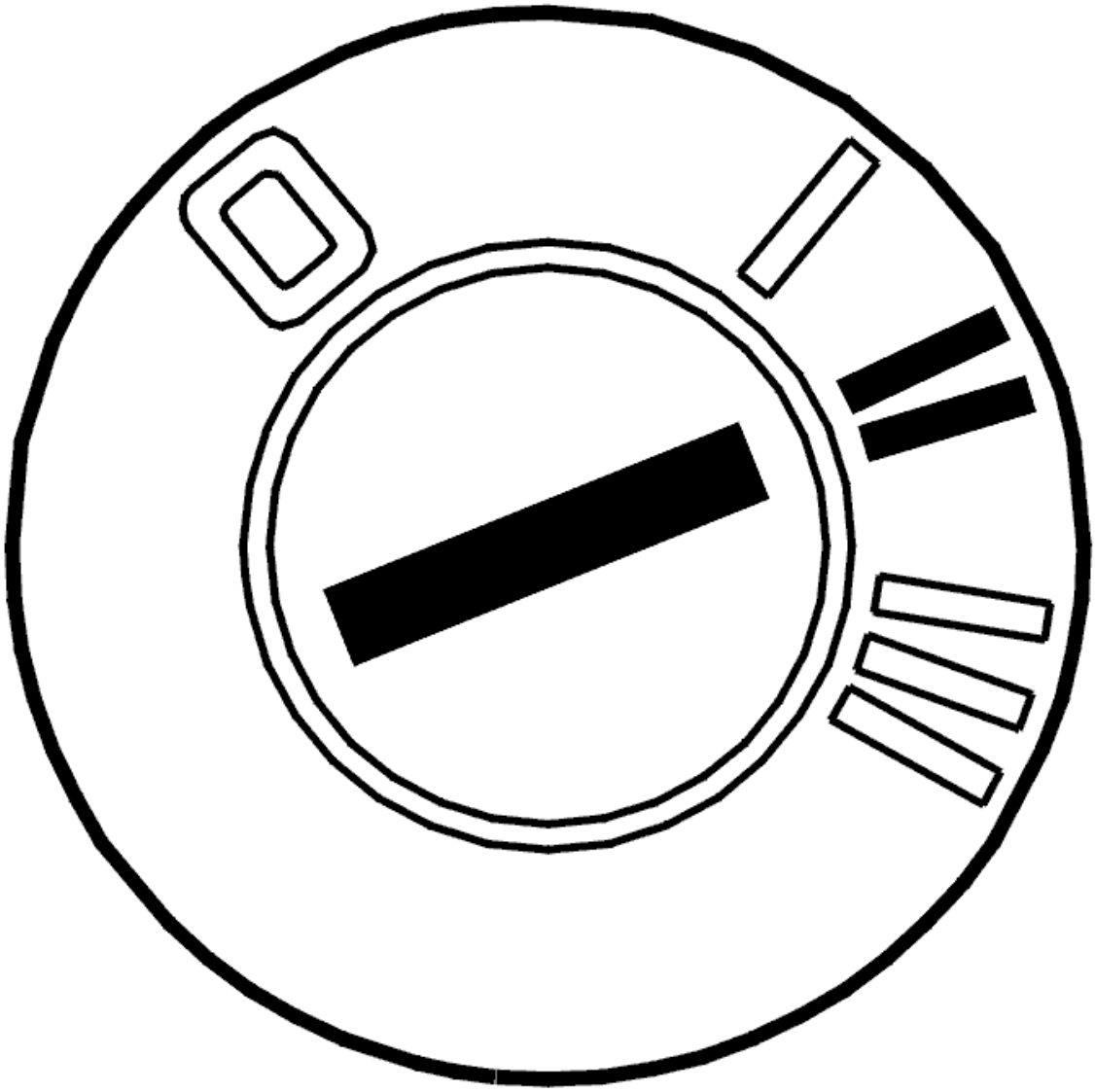


Fig. 263: Identifying Ignition ON

Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Activate solenoid SLC1 by clicking the VCT2000 symbol.

  Read the current though the circuit for solenoid SLC1. The current must oscillate between approximately 100 and 950 mA.

  The fault is permanent if the current does not change.

  If the current oscillates then this would suggest that the fault has previously been present but is no longer active. The fault is intermittent.

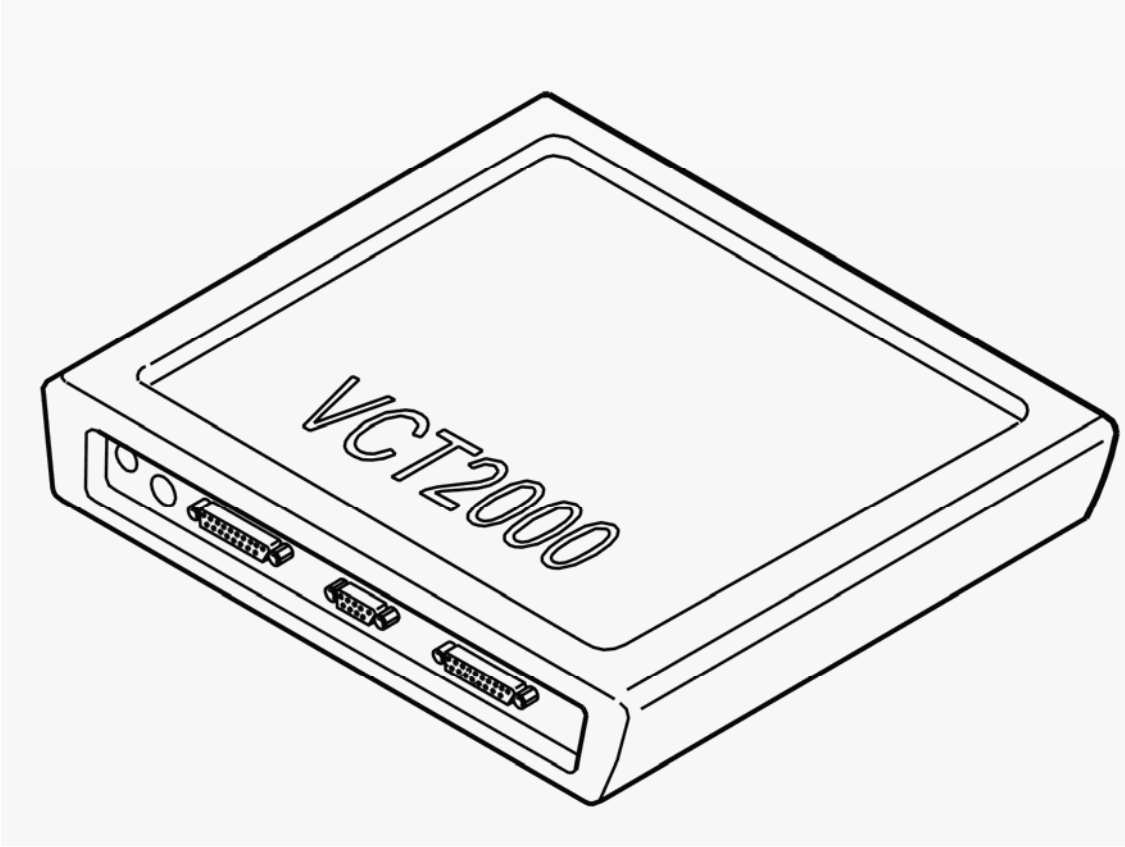


Fig. 264: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

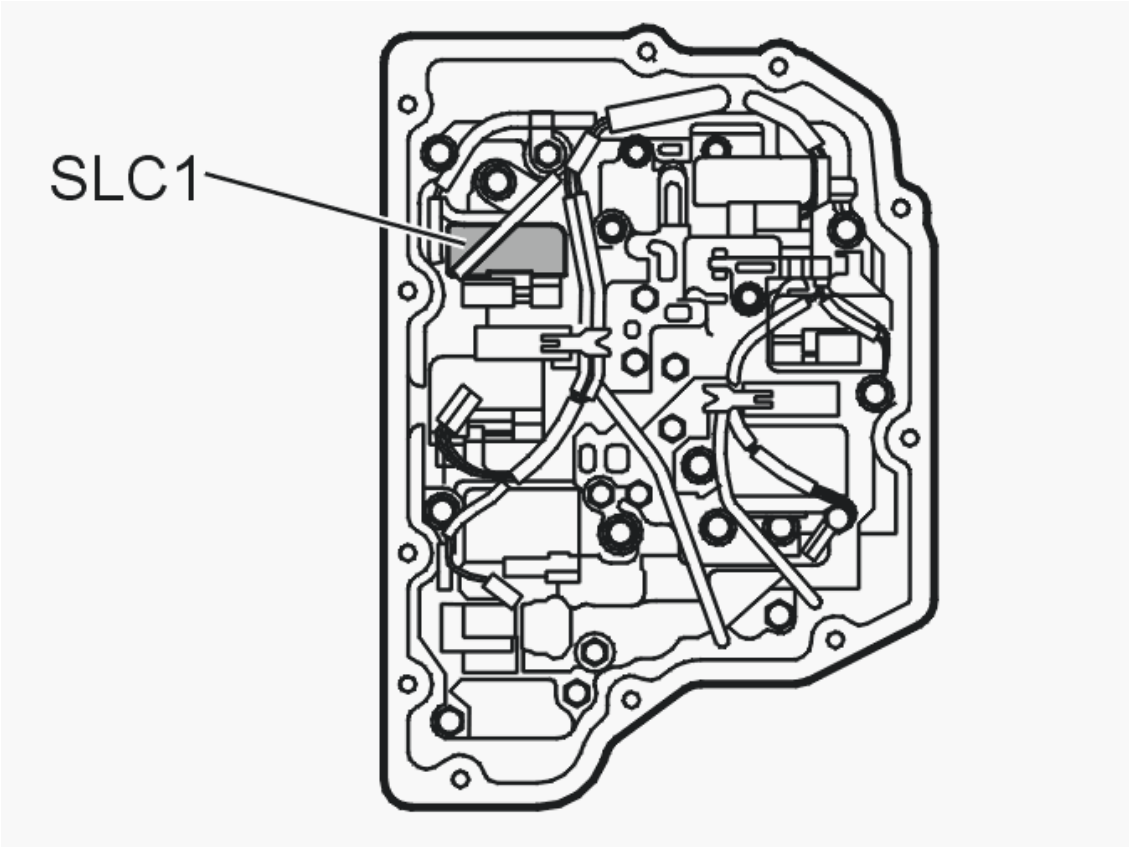


Fig. 265: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE COMPONENTS AND WIRING**

CHECKING THE COMPONENTS AND WIRING

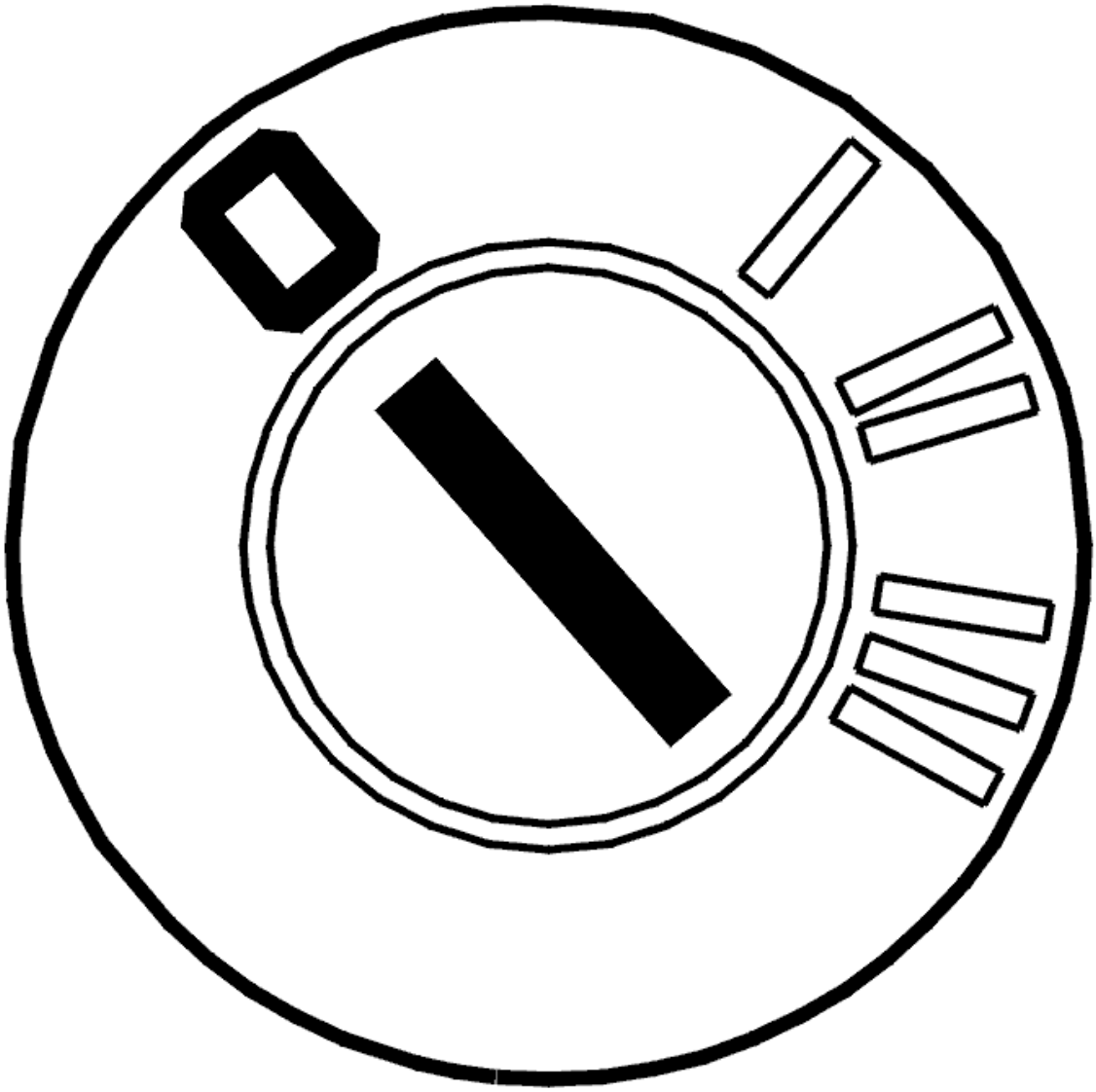


Fig. 266: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

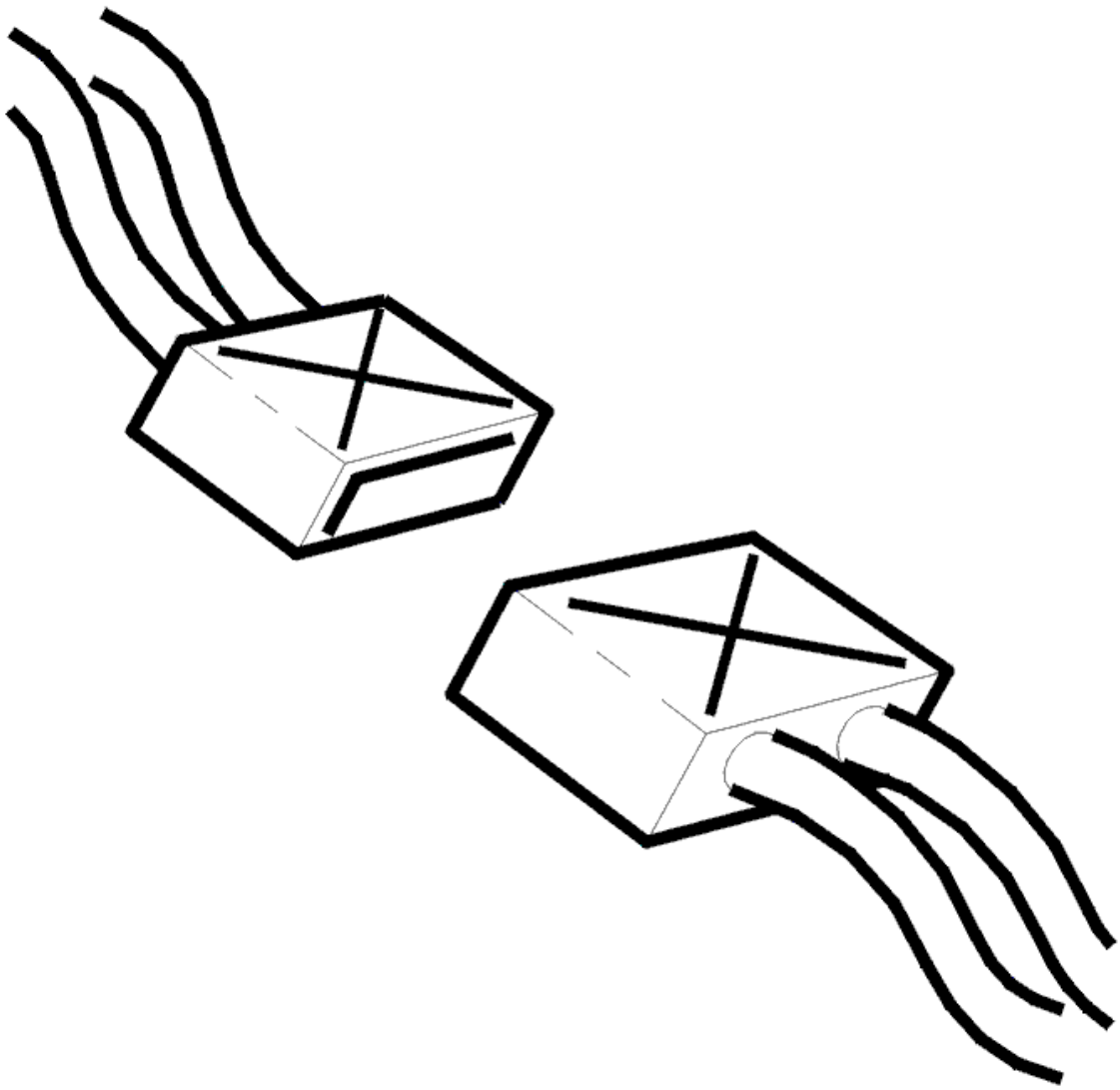


Fig. 267: Identifying Connector
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the gearbox control system

Check the wiring between transmission connector terminal #B11 and solenoid SLC1 connector terminal #1. Check the wiring between transmission connector terminal #B10 and solenoid SLC1 connector terminal #2. Check for a short-circuit to supply voltage. Check the wiring for short-circuits to each other.

HINT: If no fault is found in the wiring check solenoid SLC1. See CHECKING THE LINE PRESSURE SOLENOID SLT, SLC1, SLC2, SLC3, SLB1 AND LOCK-UP SOLENOID SLU

If no fault is found in the wiring or the component replace the control system.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CONTROL SYSTEM, REPLACING**
- see **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING**
- To access the transmission control system: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**
- see **CONTENTS**

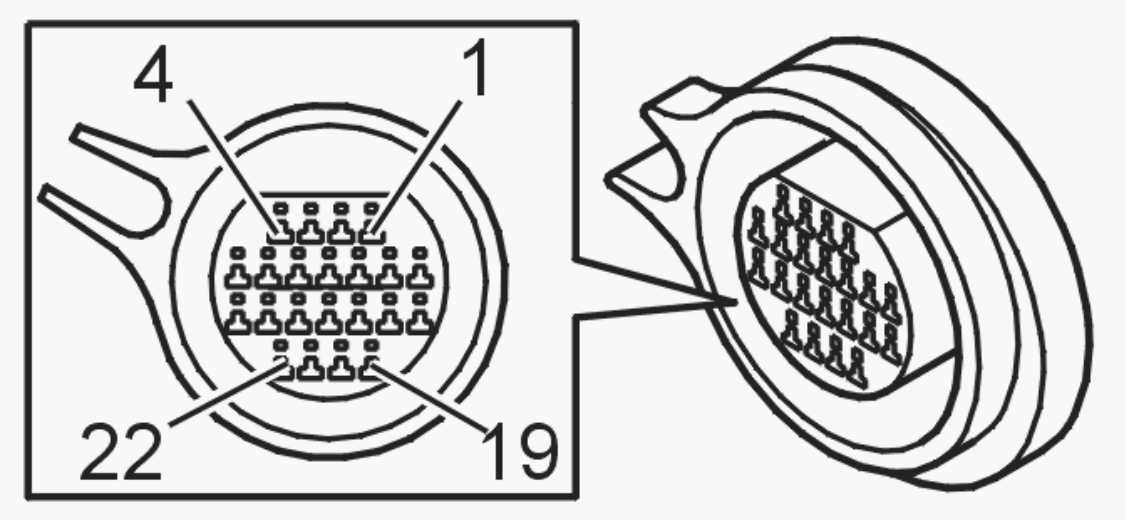


Fig. 268: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

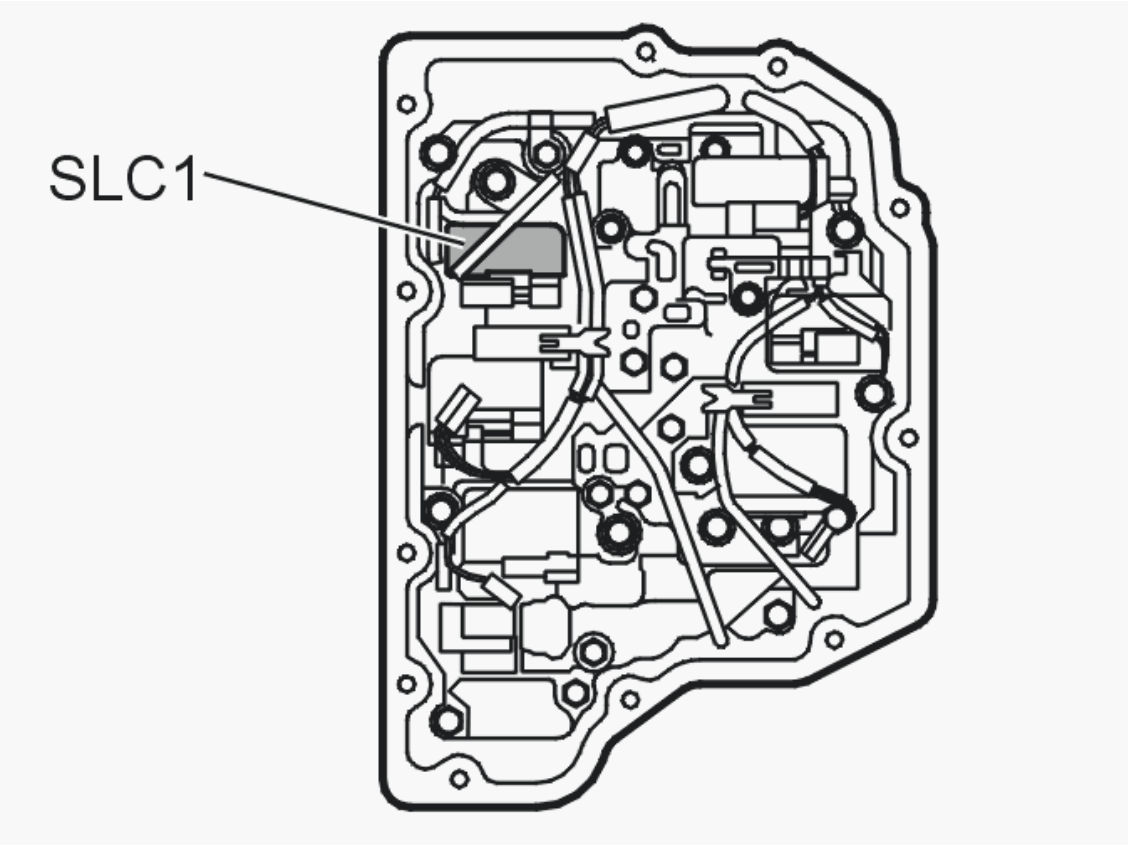


Fig. 269: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING ADAPTATION**

RESETTING ADAPTATION

RESETTING ADAPTATION AND COUNTER FOR "TRANSMISSION OIL, CHANGING"

HINT: The transmission has torque-controlled, adaptive pressure control. The pressure control means that the transmission itself controls the pressure during each shift sequence in order to avoid harsh shifting. Each shift is assessed by the transmission control module (TCM) and is stored in the internal memory, which results in compensation for wear in the transmission and clutch. In order for the transmission to function correctly after repair, it is important to reset the adaptation in the memory. Since the oil is changed during the repair, the counter for "Transmission oil, change" shall also be reset. If the counter is not reset when draining/changing oil, there is a risk that a diagnostic trouble code may be generated under incorrect conditions.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

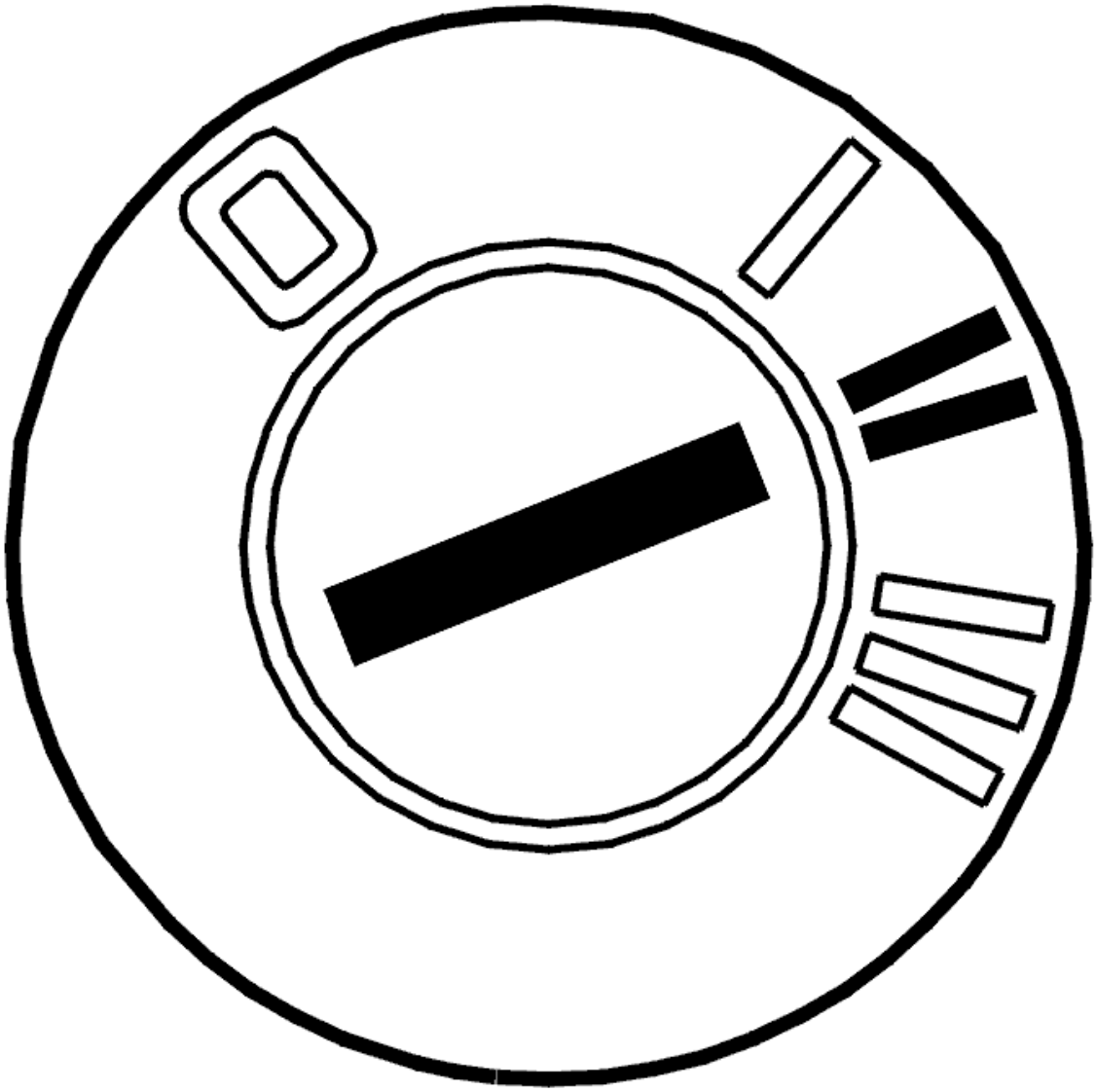


Fig. 270: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Activate reset of the adaptation and the counter by clicking on the symbol for VCT2000.

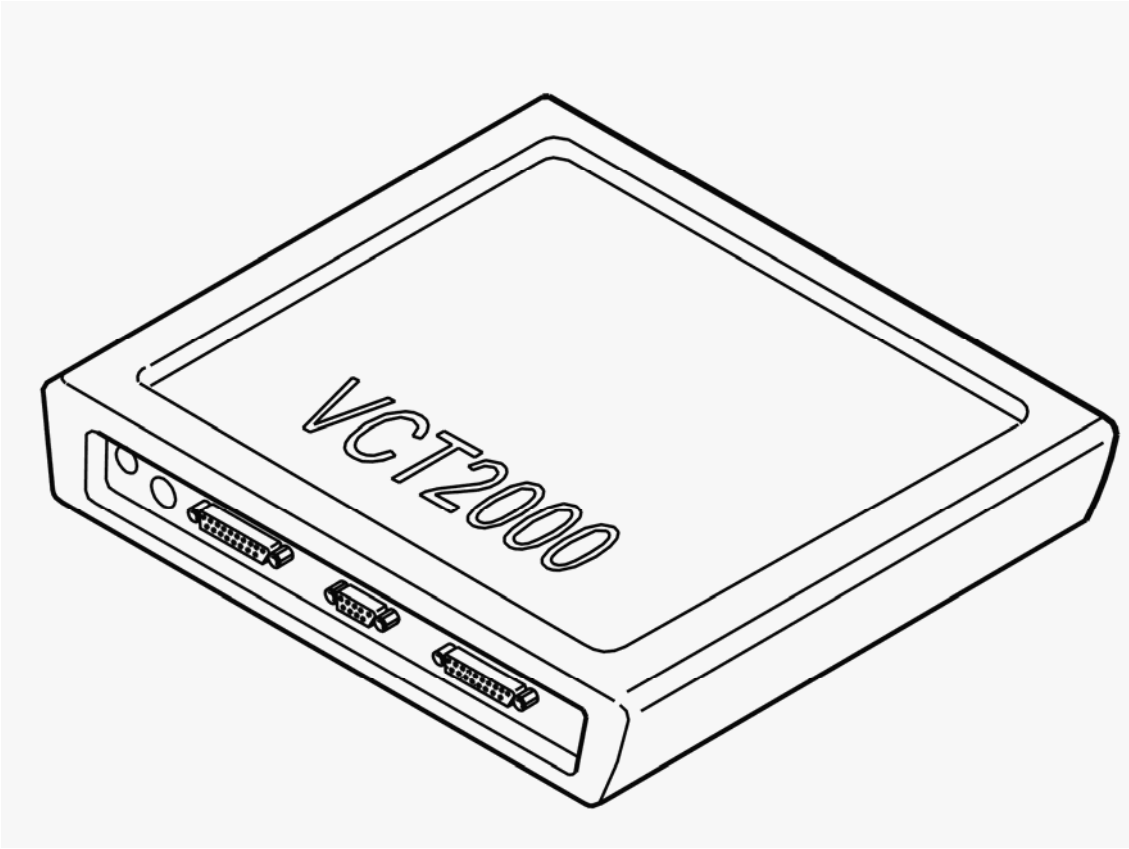


Fig. 271: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

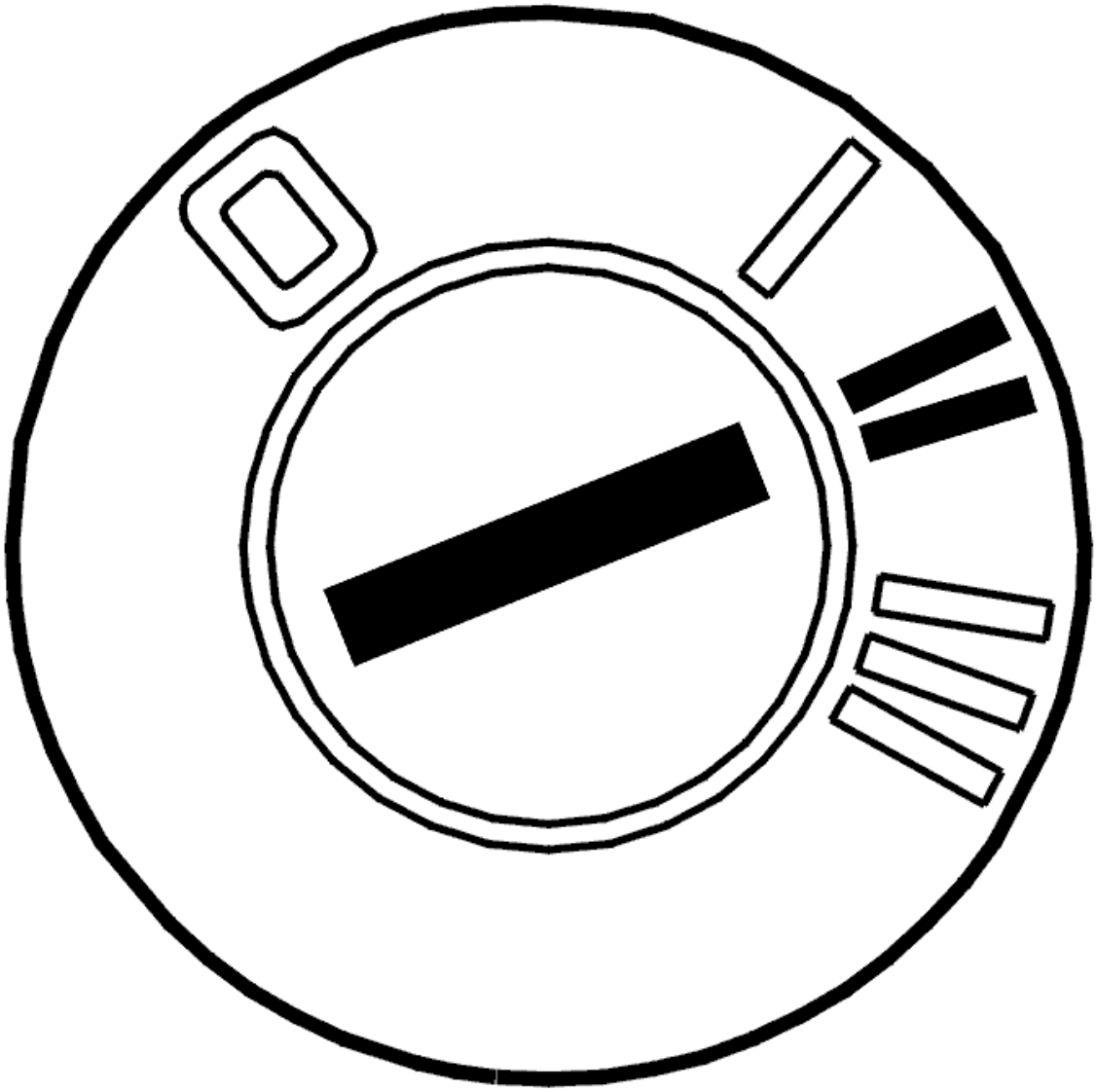


Fig. 272: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

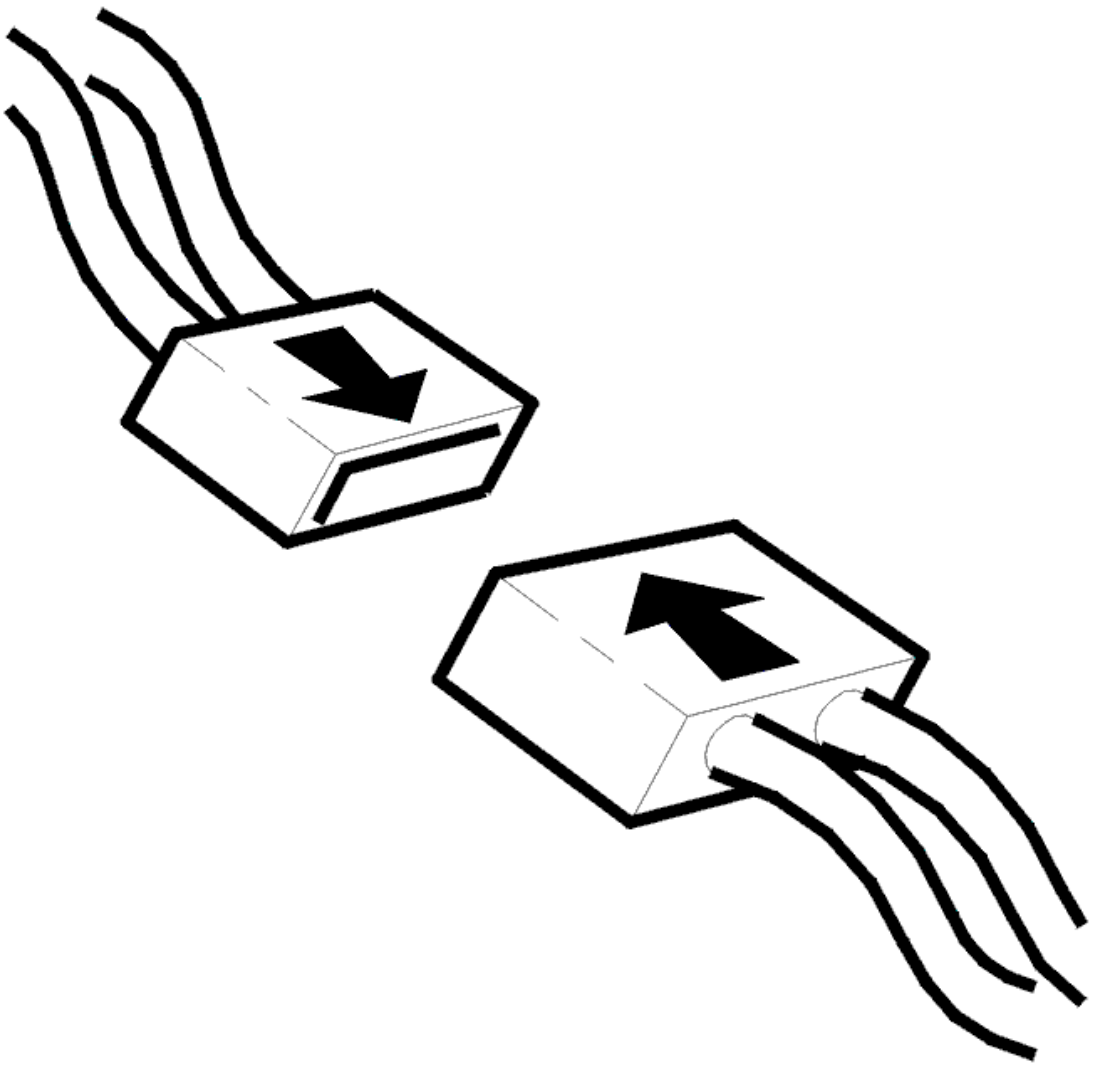


Fig. 273: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLC1 by clicking on the symbol for VCT2000.

  Read off the current through the circuit for solenoid SLC1. The current must oscillate between approximately 0 and 1000 mA.

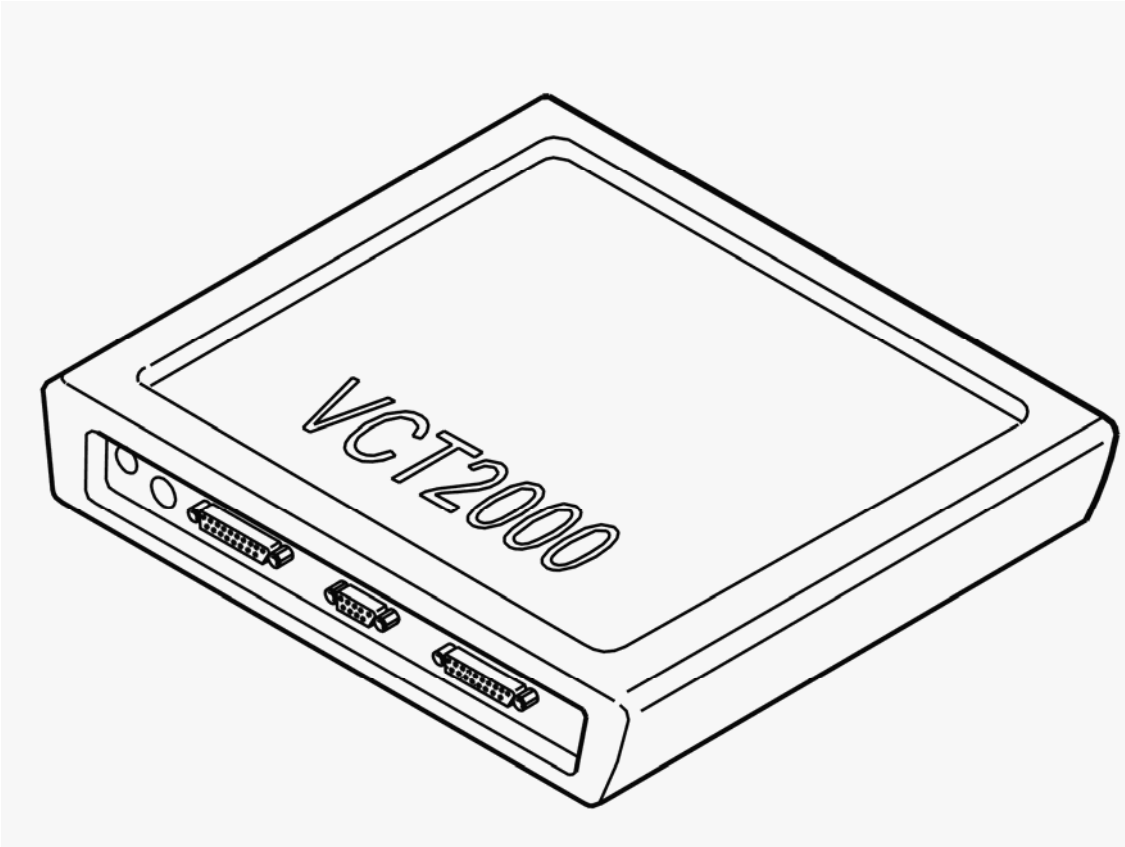


Fig. 274: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

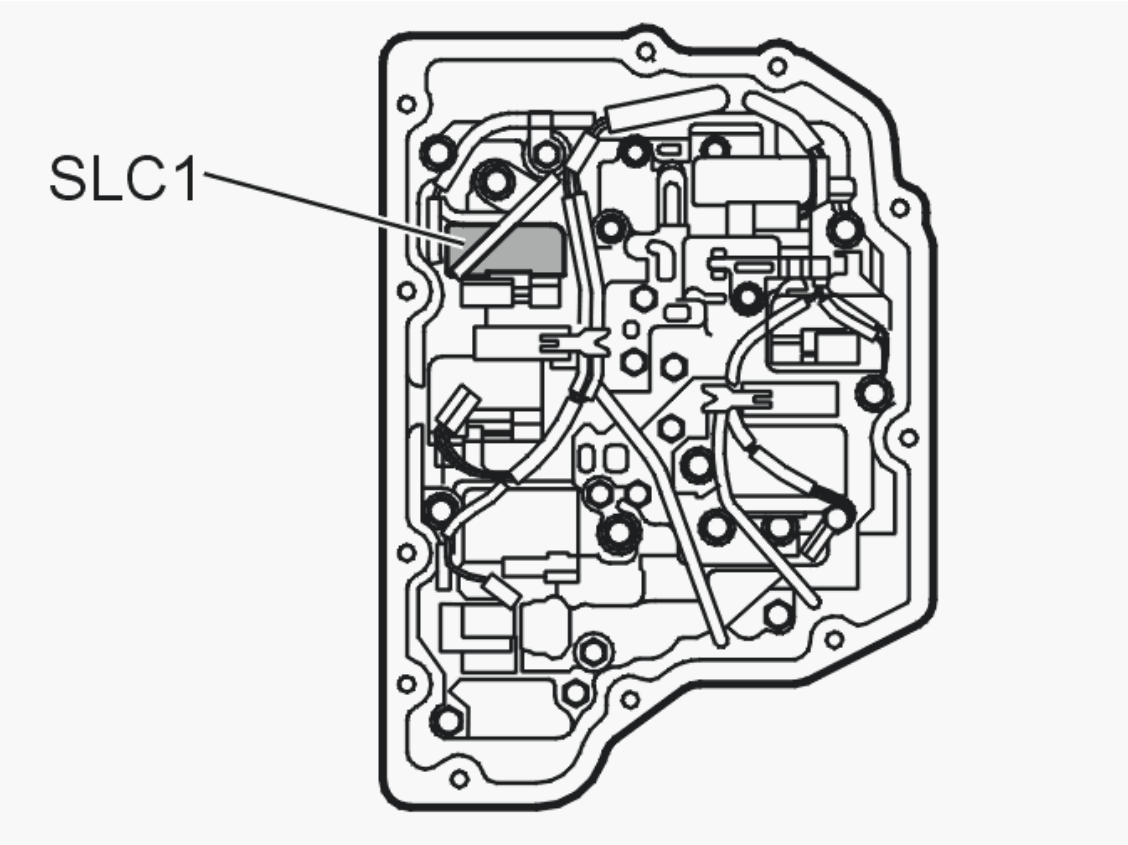


Fig. 275: Identifying Solenoid SLC1
Courtesy of VOLVO CARS CORPORATION

Is the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-P273900: PRESSURE REGULATING SOLENOID F CONTROL CIRCUIT HIGH. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT

TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273900

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P273900**

FAULT TRACING TCM-P273900

see **FAULT TRACING TCM-P273900**

TCM-P278368: TORQUE CONVERTER TEMPERATURE TOO HIGH. ALGORITHM BASED FAILURES. EVENT INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P278368

Condition

NOTE: This diagnostic trouble code (DTC) status is an event controlled diagnostic trouble code (DTC). An event controlled diagnostic trouble code (DTC) does not mean that there is a fault in the control module when it is active, but is designed as information.

The Transmission control module (TCM) calculates the temperature of the gear box oil in the torque converter. If the calculated temperature of the gear box oil in the torque converter is too high, the Transmission control module (TCM) transmits a signal to the Engine control module (ECM) to reduce the engine's torque. This is to protect the gear box from too high load, which can result in internal mechanical faults.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The calculated oil temperature in the torque converter exceeds 170 °C.
- The speed from the incoming speed sensor for the gear box exceeds 800 rpm.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Normal driving.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

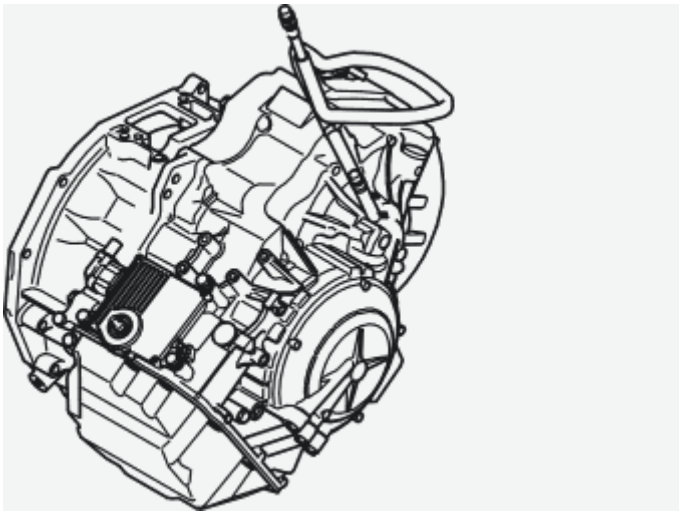


Fig. 276: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- The engine limits the torque until the gear box oil temperature has dropped below a certain level.

Possible Source

- The transmission has been exposed to extreme load and high ambient temperature.

Fault symptom[s]

- Message in information display
- Poor performance

FAULT-TRACING INFORMATION

There is no fault-tracing for this diagnostic fault code (DTC).

For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

TCM-P278368: TORQUE CONVERTER TEMPERATURE TOO HIGH. ALGORITHM BASED FAILURES. EVENT INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P278368

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P278368**

FAULT-TRACING INFORMATION

There is no fault-tracing for this diagnostic fault code (DTC).

For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

TCM-P278768: CLUTCH TEMPERATURE TOO HIGH. ALGORITHM BASED FAILURES. EVENT INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P278768

Condition

NOTE: This diagnostic trouble code (DTC) status is an event controlled diagnostic trouble code (DTC). An event controlled diagnostic trouble code (DTC) does not mean that there is a fault in the control module when it is active, but is designed as information.

If the Transmission control module (TCM) registers that oil temperature in the transmission is too high, a signal is transmitted to the Engine control module (ECM) to reduce the engine's torque. This is to protect the gear box from too high load, which can result in internal mechanical faults.

The diagnostic trouble code (DTC) is stored if the control module detects that:

- The brake pedal depressed.
- The gear box oil temperature is the same as, or greater than, 120 °C for longer than 5 seconds.
- The gear box oil temperature is greater than 120 °C and lower than 150 °C for longer than 4 seconds.
- The gear box oil temperature is greater than 150 °C for longer than 3 seconds.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition switch position II.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

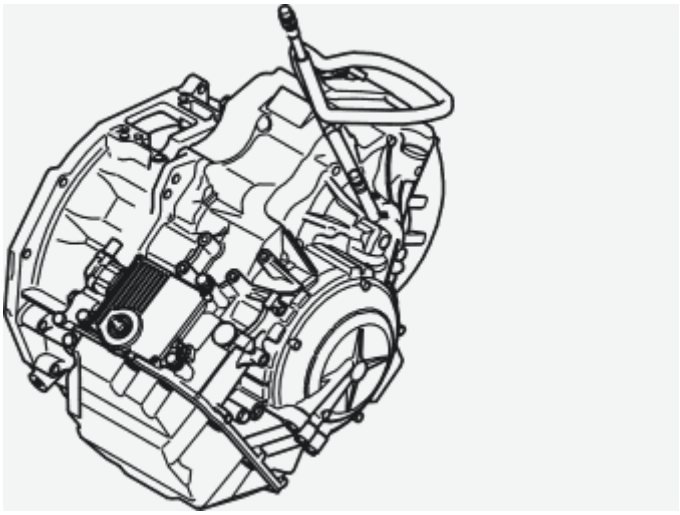


Fig. 277: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- The engine limits the torque until the gear box oil temperature has dropped below a certain level.

Possible Source

- The gear box oil has had too high a temperature for too long.
- Brake signal incorrect (shows brake active) while the vehicle is driven with high load with slipping lock-up.
- Long term revving of the engine with gear selector in position **D** and the brake pedal depressed.

Fault symptom[s]

- Message in information display
- Poor performance

FAULT-TRACING INFORMATION

There is no fault-tracing for this diagnostic fault code (DTC).

For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

TCM-P278768: CLUTCH TEMPERATURE TOO HIGH. ALGORITHM BASED FAILURES. EVENT INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P278768

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P278768**

FAULT-TRACING INFORMATION

There is no fault-tracing for this diagnostic fault code (DTC).

For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

TCM-P280000: TRANSMISSION RANGE SENSOR B CIRCUIT (PRNDL INPUT). GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P280000

Condition

The gear position sensor is integrated in the transmission control module (TCM) and provides information about the selected gear position. Two Hall sensors in the transmission control module (TCM) detect whether the selector lever is in position. For diagnostics, there is a parallel hall sensor (2) that gives a reversed signal characteristic, so that the sum of the signal voltages from hall sensor (1) and (2) are constant. The signal voltage (0 and 5 V) corresponds to the current gear selector position.

The diagnostic trouble code (DTC) is stored if the control module detects:

- Incorrect signal from Hall sensor 2.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

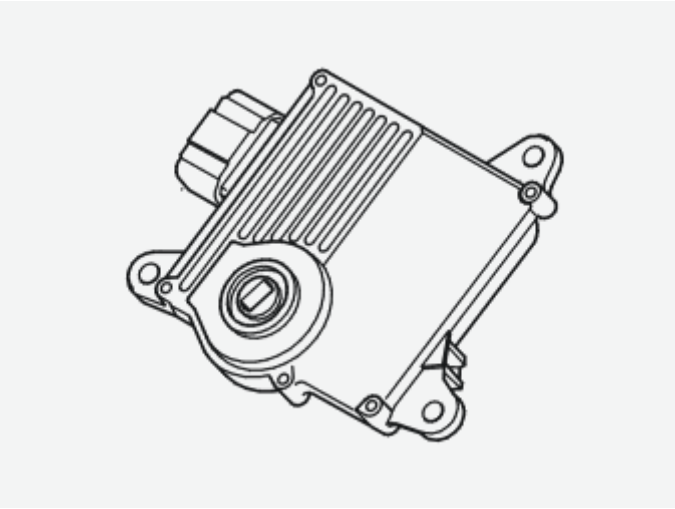


Fig. 278: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Adaption is blocked.
- The transmission control module (TCM) uses the last selected gear position.

Possible Source

- Incorrectly adjusted gear-shift position sensor.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- Engine fails to start

FAULT-TRACING

see **FAULT-TRACING**

TCM-P280000: TRANSMISSION RANGE SENSOR B CIRCUIT (PRNDL INPUT). GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P280000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P280000**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P280000: TRANSMISSION AREA SENSOR B CIRCUIT (PRNDL INPUT). GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P280000

Condition

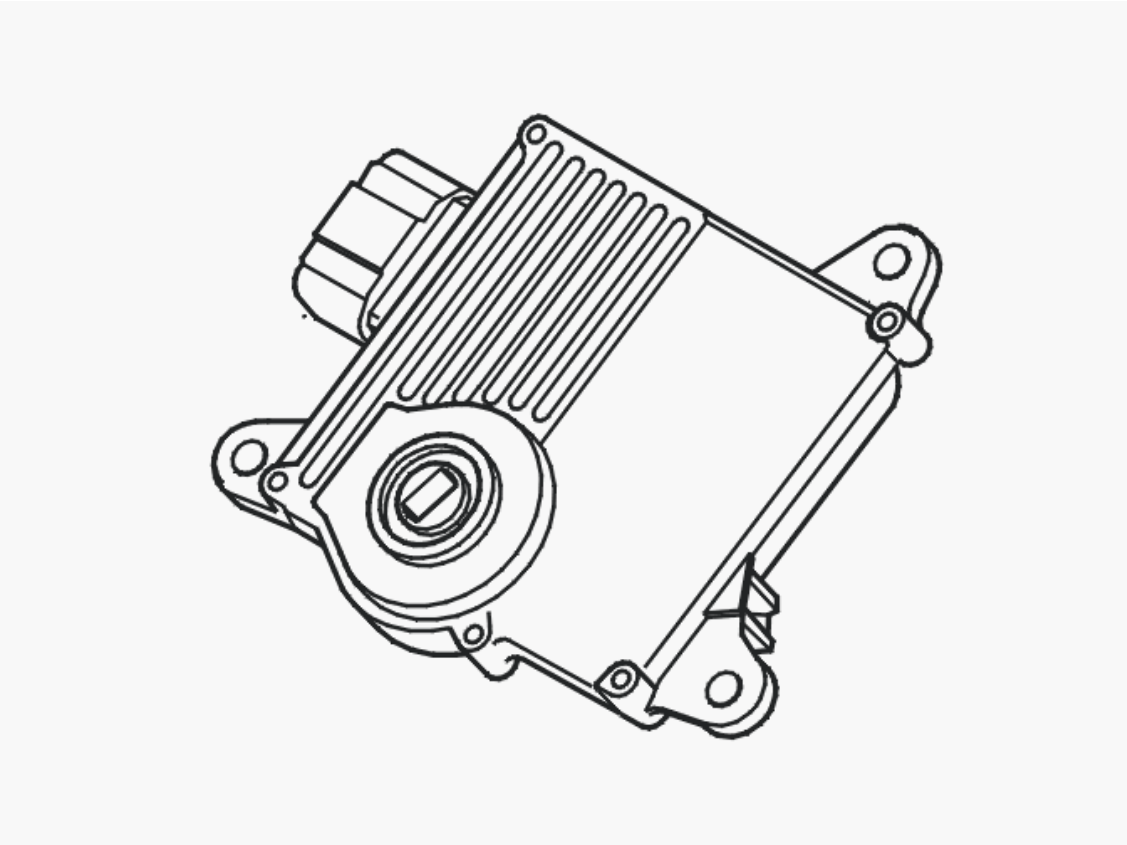


Fig. 279: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The gear shift position sensor is integrated into the transmission control module (TCM) and provides information about the selected gear. Inside the transmission control module (TCM) are two hall sensors which have the task of detecting when the gear selector lever is in position. For diagnostics, there is a parallel hall sensor (2) which gives an inverted signal characteristic, so that the sum of the signal voltages from the hall sensors (1) and (2) is constant. The signal voltage (0 and 5 V) corresponds to the present position of gear selector lever.

If the transmission control module (TCM) registers an incorrect signal from Hall sensor 2, the diagnostic trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Adaption is blocked.
- The transmission control module (TCM) uses the last selected gear position.

Possible Source

- Incorrect adjustment of gear position sensor.

- Internal fault in transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- The engine does not start.

FAULT TRACING

see **FAULT TRACING**

TCM-P280000: TRANSMISSION AREA SENSOR B CIRCUIT (PRNDL INPUT). GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P280000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P280000**

FAULT TRACING

see **FAULT TRACING**

TCM-P280500: TRANSMISSION RANGE SENSOR A/B CORRELATION. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P280500

Condition

The gear position sensor is integrated in the transmission control module (TCM) and provides information about the selected gear position. Two Hall sensors in the transmission control module (TCM) detect whether the selector lever is in position. For diagnostics, there is a parallel hall sensor (2) that gives a reversed signal characteristic, so that the sum of the signal voltages from hall sensor (1) and (2) are constant. The signal voltage (0 and 5 V) corresponds to the current gear selector position.

The diagnostic trouble code (DTC) is stored if the control module detects:

- Incorrect signal from Hall sensor 1.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

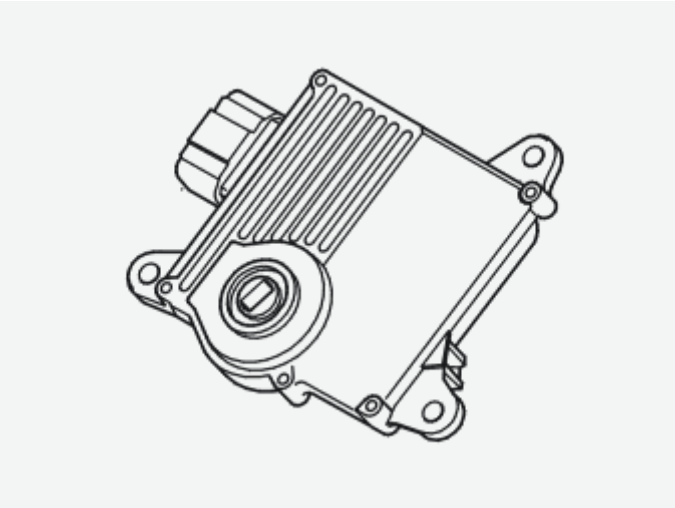


Fig. 280: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Adaption is blocked.
- The transmission control module (TCM) uses the last selected gear position.

Possible Source

- Incorrectly adjusted gear-shift position sensor.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator light (MIL), on
- General warning lamp lit
- Engine fails to start

FAULT-TRACING

see **FAULT-TRACING**

TCM-P280500: TRANSMISSION RANGE SENSOR A/B CORRELATION. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P280500

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P280500**

FAULT-TRACING

see **FAULT-TRACING**

TCM-P280500: TRANSMISSION AREA SENSOR A/B CO-OPERATION. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT TYPE (B8444S, TF-80SC AWD; 2006-2011)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P280500

Condition

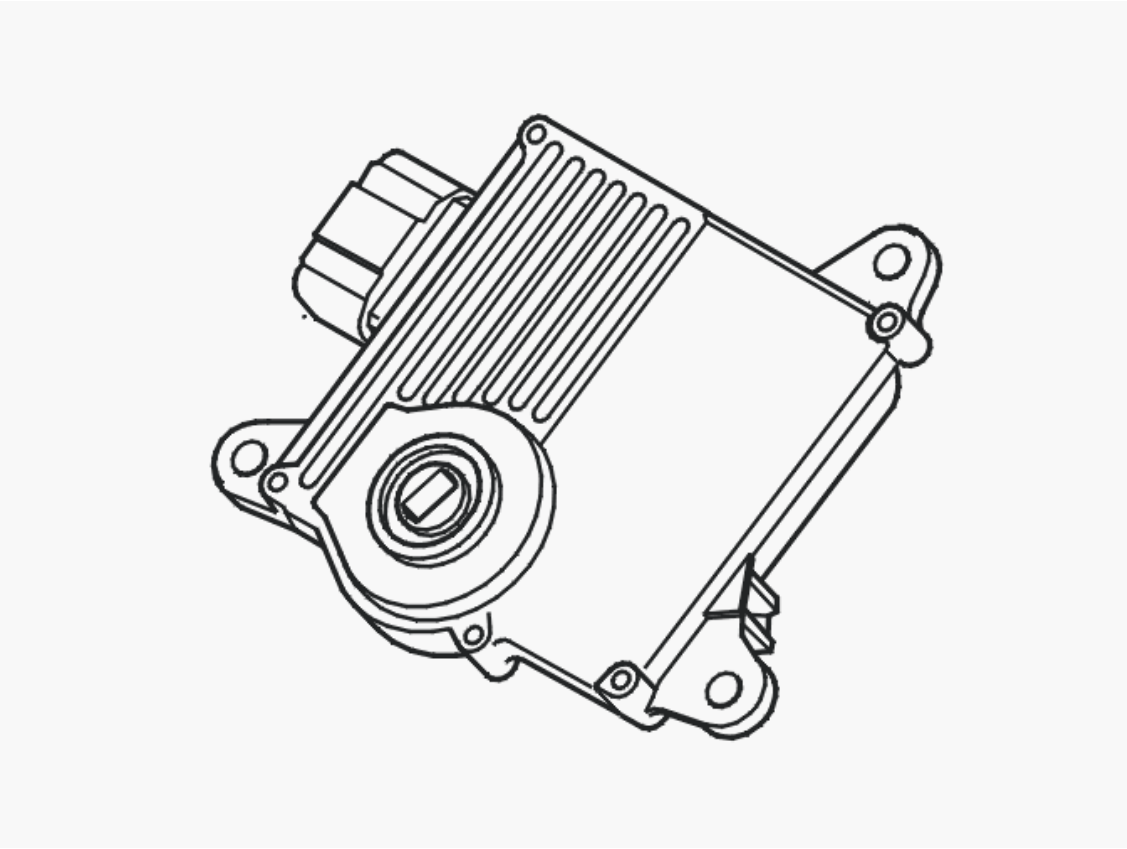


Fig. 281: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

The gear shift position sensor is integrated into the transmission control module (TCM) and provides information about the selected gear. Inside the transmission control module (TCM) are two hall sensors which have the task of detecting when the gear selector lever is in position. For diagnostics, there is a parallel hall sensor (2) which gives an inverted signal characteristic, so that the sum of the signal voltages from the hall sensors (1) and (2) is constant. The signal voltage (0 and 5 Volts) corresponds to the present position of gear selector lever.

If the transmission control module (TCM) registers an incorrect signal from Hall sensor 1, the diagnostic

trouble code (DTC) is generated.

The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute Value

- Adaption is blocked.
- The transmission control module (TCM) uses the last selected gear position.

Possible Source

- Incorrect adjustment of gear position sensor.
- Internal fault in transmission control module (TCM).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.
- General warning lamp lit
- The engine does not start.

FAULT TRACING

see **FAULT TRACING**

TCM-P280500: TRANSMISSION AREA SENSOR A/B CO-OPERATION. GENERAL FAULT INFORMATION. NO INFORMATION ABOUT FAULT TYPE (TF-80SC AWD; 2005)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P280500

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-P280500**

FAULT TRACING

see **FAULT TRACING**

TCM-U000100: HIGH SPEED CAN COMMUNICATION BUS. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-U000100

Condition

The control modules transmit and receive information via a standardized serial communication method - CAN

(Control Area Network).

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Communication on the CAN network affected by another control module.
- The control module's internal messages cause interference on the controller area network (CAN).

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Starting the control module's CAN communication.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met. In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the fault if it is intermittent.

HINT: EMERGENCY MODE IN THE EVENT OF A FAULT

HINT: The control module is off until the power supply has been broken. When the power supply is connected the control module will make a new attempt to communicate.

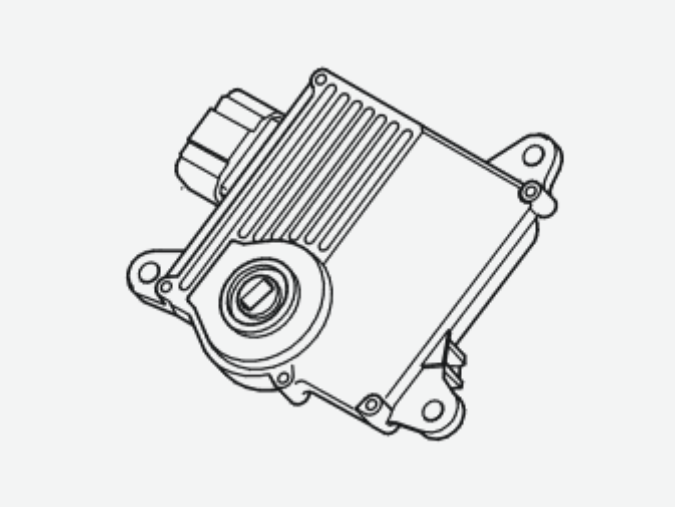


Fig. 282: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- Control module shuts itself off ("bus-off").

Possible Source

- Short-circuit between the control area network (CAN) wiring.

- Open-circuit in the control area network (CAN) wiring.
- Internal fault in another control module in the same part of the control area network (CAN).
- Internal fault in the control module.

Fault symptom[s]

- General warning lamp lit

TCM-U000100: HIGH SPEED CAN COMMUNICATION BUS. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-U000100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-U000100**

TCM-U210000: CONTROL MODULE NOT CONFIGURED. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-U210000

Condition

The Transmission control module (TCM) receives information about current vehicle configuration from Central electronic module (CEM).

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Vehicle configuration from central electronic module (CEM) is lost.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition switch position II.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

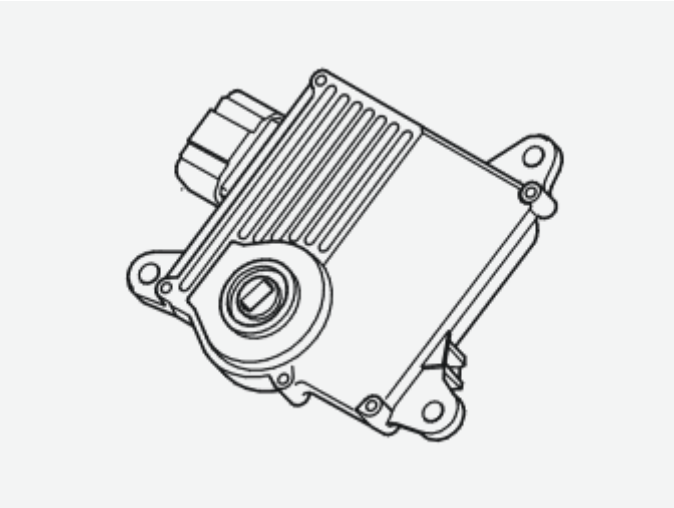


Fig. 283: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- None.

Possible Source

- The diagnostic trouble code (DTC) may be stored after downloading software.
- Fault-trace the central electronic module (CEM).

Fault symptom[s]

- None.

FAULT-TRACING

INFORMATION

The diagnostic trouble code (DTC) may be stored after downloading software. If this is the case, select CONTINUE and erase the diagnostic trouble code (DTC).

If the diagnostic trouble code (DTC) is **not** stored when software is downloaded, the cause is probably in the software for the Central electronic module (CEM). Fault-trace the central electronic module (CEM).

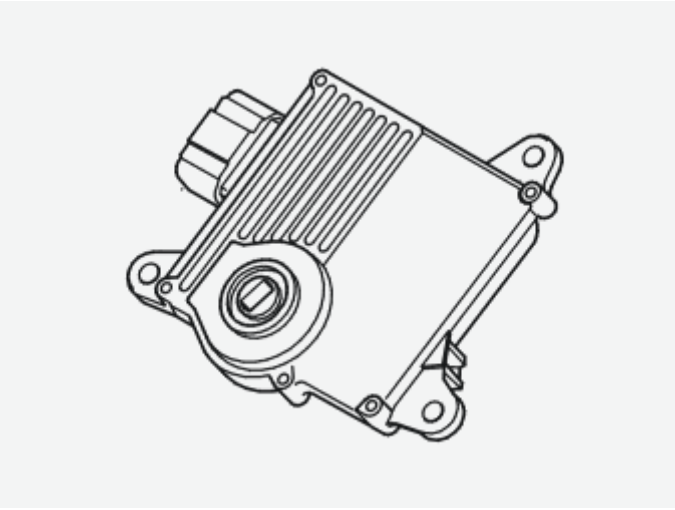


Fig. 284: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **ERASING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING THE DIAGNOSTIC TROUBLE CODES (DTCS)

Fig. 285: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off for 10 seconds and then on again.
- Read off diagnostic trouble codes (DTCs).

Fig. 286: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

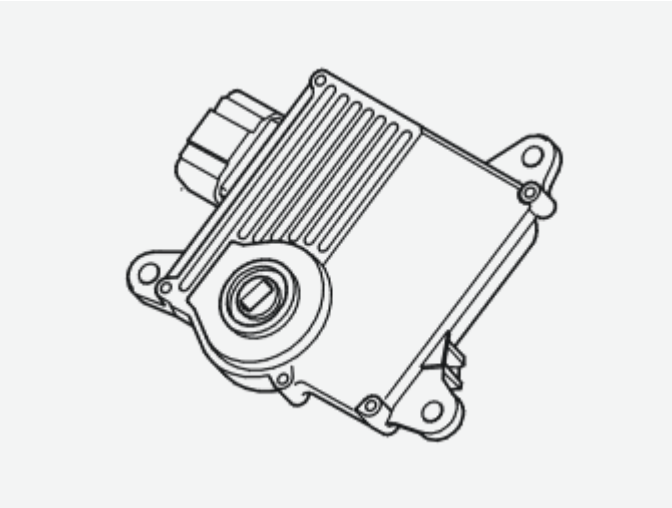


Fig. 287: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Was the relevant diagnostic trouble code (DTC) still stored?

- **YES**

  Refer to **INFORMATION**

- **NO**

  OKAY: Troubleshooting has been completed.

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

Fig. 288: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Erase diagnostic trouble codes (DTCs).

Fig. 289: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE DIAGNOSTIC TROUBLE CODES (DTCS)**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-U210000: CONTROL MODULE NOT CONFIGURED. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-U210000

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-U210000**

FAULT-TRACING

see **FAULT-TRACING**

TCM-U210100: CONTROL MODULE CONFIGURATION INCOMPATIBLE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-U210100

Condition

The Transmission control module (TCM) receives information about current vehicle configuration from Central electronic module (CEM).

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Vehicle configuration from Central electronic module (CEM) is incorrect.
- The vehicle configuration from Central electronic module (CEM) is not the same as the one stored in the control module.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition switch position II.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

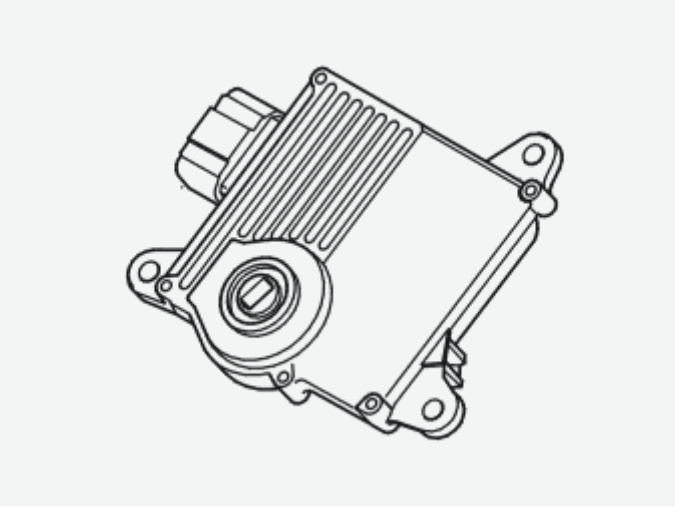


Fig. 290: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- None.

Possible Source

- The control module from another vehicle has been installed.
- Fault trace the central electronic module (CEM).

Fault symptom[s]

- None.

FAULT-TRACING

INFORMATION

Select the DIAGNOSTICS/COMPONENTS tab and check that the vehicle's configuration data corresponds with the vehicle's configuration.

If the vehicle's configuration data corresponds with the vehicle's configuration, this means that the Transmission control module (TCM) may have incorrect configuration data. Select the SOFTWARE tab and reprogram the Transmission control module (TCM) with the latest software.

If the vehicle's configuration data does **not** correspond with the vehicle's configuration, this means that the Central electronic module (CEM) may have the incorrect configuration data. Select the SOFTWARE tab and reprogram the Central electronic module (CEM) with the latest software.

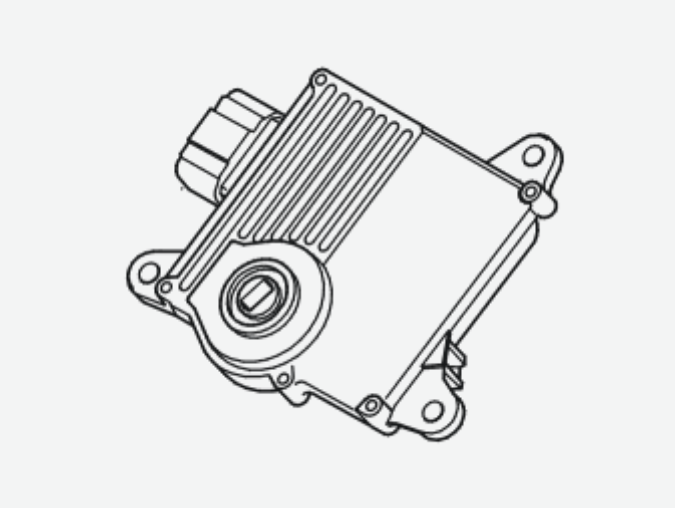


Fig. 291: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING THE DIAGNOSTIC TROUBLE CODES (DTCS)

Fig. 292: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off for 10 seconds and then on again.
- Read off diagnostic trouble codes (DTCs).

Fig. 293: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

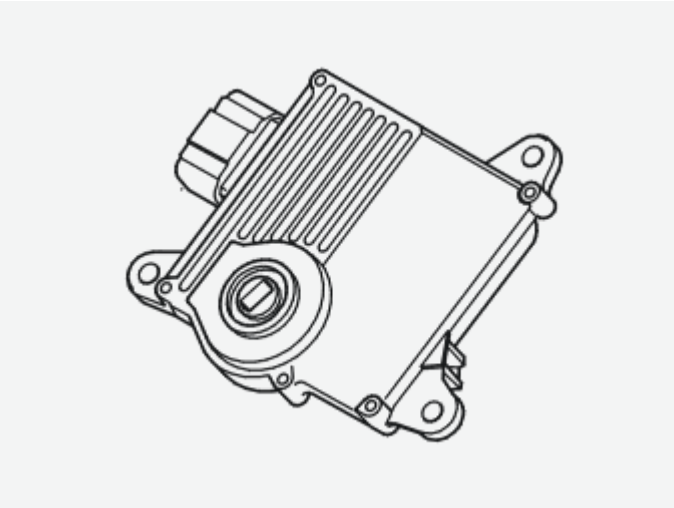


Fig. 294: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

Was the relevant diagnostic trouble code (DTC) still stored?

- **YES**

  Refer to **INFORMATION**

- **NO**

  OKAY: Troubleshooting has been completed.

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

TCM-U210100: CONTROL MODULE CONFIGURATION INCOMPATIBLE. GENERAL FAILURE INFORMATION. NO SUB TYPE INFORMATION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-U210100

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-U210100**

FAULT-TRACING

see **FAULT-TRACING**

TCM-U300362: BATTERY VOLTAGE. ALGORITHM BASED FAILURES. SIGNAL COMPARE FAILURE (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-U300362

Condition

NOTE: This trouble code is only relevant for troubleshooting and action in the following cases:

- The trouble code is active in the present driving cycle and has been active for a longer period of time.
- The customer experiences malfunction that can be attributed to the trouble code.

The control modules communicate with each other for exchange of information in a network via a standardized serial communication procedure - CAN (Controller Area Network). The Central electronic module (CEM) regularly transmits messages on the CAN network. The Brake control module (BCM) compares the voltage with the Central electronic module (CEM).

The diagnostic trouble code (DTC) is stored if the control module detects that:

- Voltage is 2 V lower than the voltage signal from the Central electronic module (CEM) for 10 seconds.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition on.

NOTE: The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

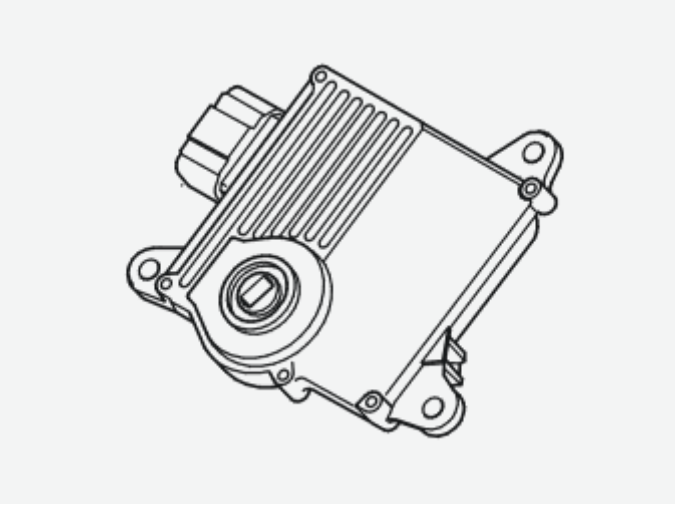


Fig. 295: Identifying Transmission Control Module (TCM)

Courtesy of VOLVO CARS CORPORATION

Substitute Value

- None.

Possible Source

- Contact resistance and oxidation in the terminals.
- Internal fault in the transmission control module (TCM).

Fault symptom[s]

- None.

FAULT-TRACING

INFORMATION

NOTE: This trouble code is only relevant for troubleshooting and action in the following cases:

- The trouble code is active in the present driving cycle and has been active for a longer period of time.
- The customer experiences malfunction that can be attributed to the trouble code.

In other cases, the DTC does not indicate a fault and must therefore be ignored and only erased.

- **CONTINUE**

  Refer to **CHECKING THE BATTERY VOLTAGE**

CHECKING THE BATTERY VOLTAGE

Fig. 296: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Read off the voltage for the transmission control module (TCM) and the central electronic module (CEM).

The voltage supply for the transmission control module (TCM) and central electronic module (CEM) must be approximately the same.

If the voltage supply to the transmission control module (TCM) differs by more than 2.0 V from that of the central electronic module (CEM), a permanent fault is indicated.

If the voltage is approximately the same, this indicates an intermittent fault, i. e. the fault was present previously but is not active at the moment.

Fig. 297: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING THE POWER SUPPLY**

CHECKING THE POWER SUPPLY

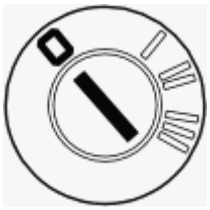


Fig. 298: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the connector of the transmission control module (TCM) for contact resistance and oxidation.

  Check the power supply cable between the transmission control module (TCM) fuse in the engine compartment relay/fuse box and connection #A1 (#31) for short circuit to ground.

  HINT: With the ignition on and the voltmeter connected between terminals #A1 (#31) and #A9 (#A39) on the breakout box, the voltmeter should read battery voltage.

  Other information

  - see **CONNECTING THE BREAKOUT BOX**
  - see **SIGNAL SPECIFICATION**

- see **CHECKING WIRING AND TERMINALS**

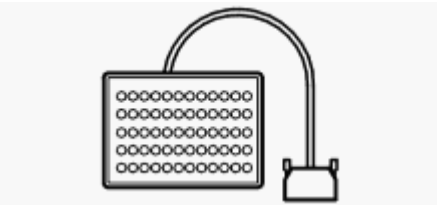


Fig. 299: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

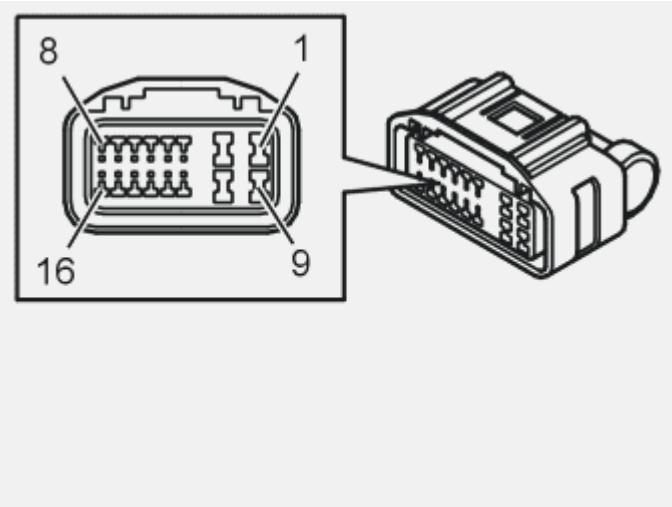


Fig. 300: Identifying Connector A Terminals
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

Fig. 301: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read the voltage supply for the transmission control module (TCM) and central electronic module (CEM).

  The voltage must be approximately battery voltage.

Fig. 302: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the voltage OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

TCM-U300362: BATTERY VOLTAGE. ALGORITHM BASED FAILURES. SIGNAL COMPARE FAILURE (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-U300362

see **DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION TCM-U300362**

FAULT-TRACING

see **FAULT-TRACING**

TCM-XXXX: UNKNOWN DIAGNOSTIC TROUBLE CODE (DTC) FOR THE CURRENT CONTROL MODULE VERSION (4T65 AWD; 2003-2006)

UNKNOWN DIAGNOSTIC TROUBLE CODE (DTC) FOR THE CURRENT CONTROL MODULE VERSION

READING OFF DIAGNOSTIC TROUBLE CODES (DTCS)

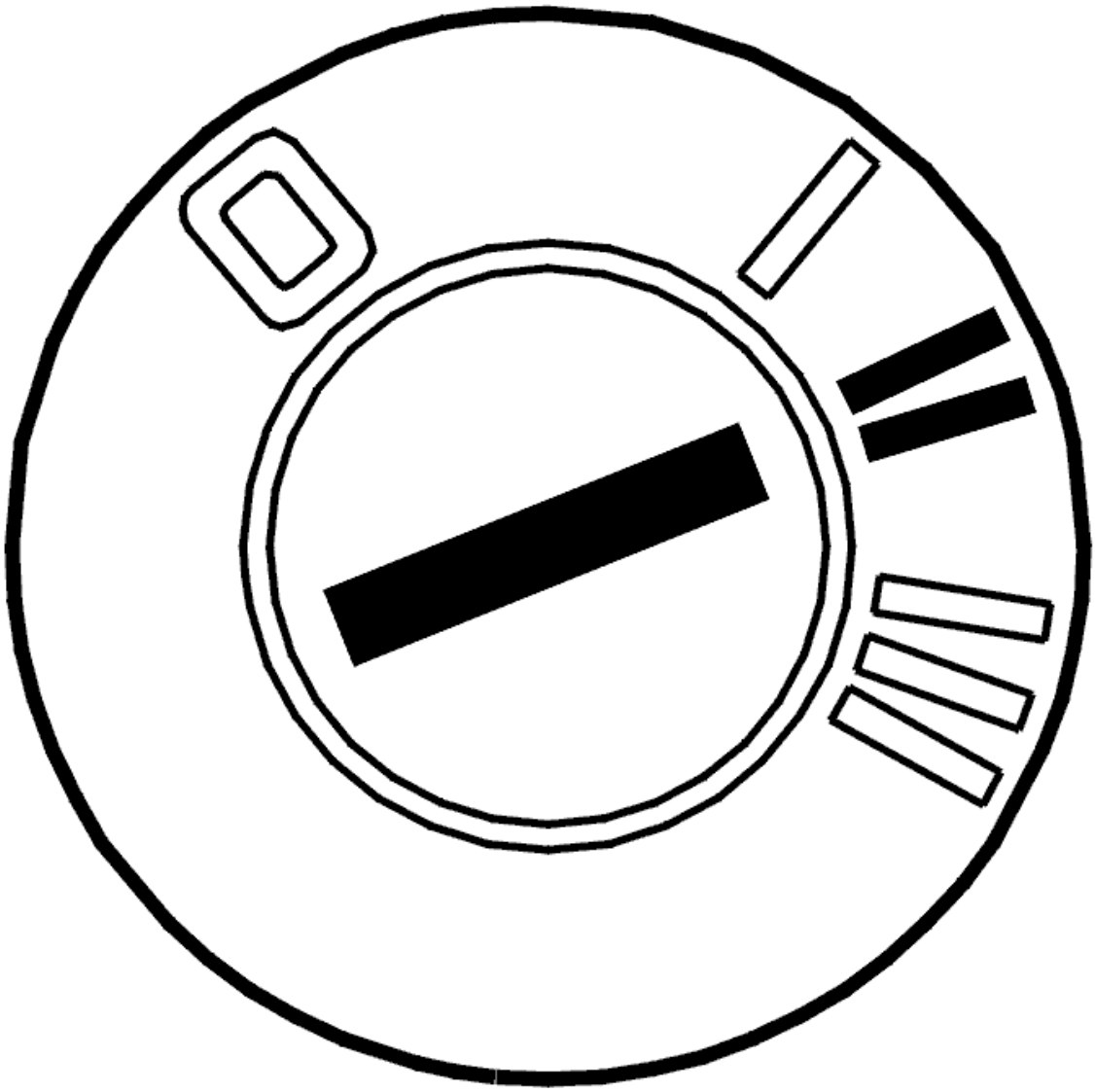


Fig. 303: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

Read off the diagnostic trouble code (DTC) that is stored in the car.

Make a note of the code. Report the code to VIDA customer support.

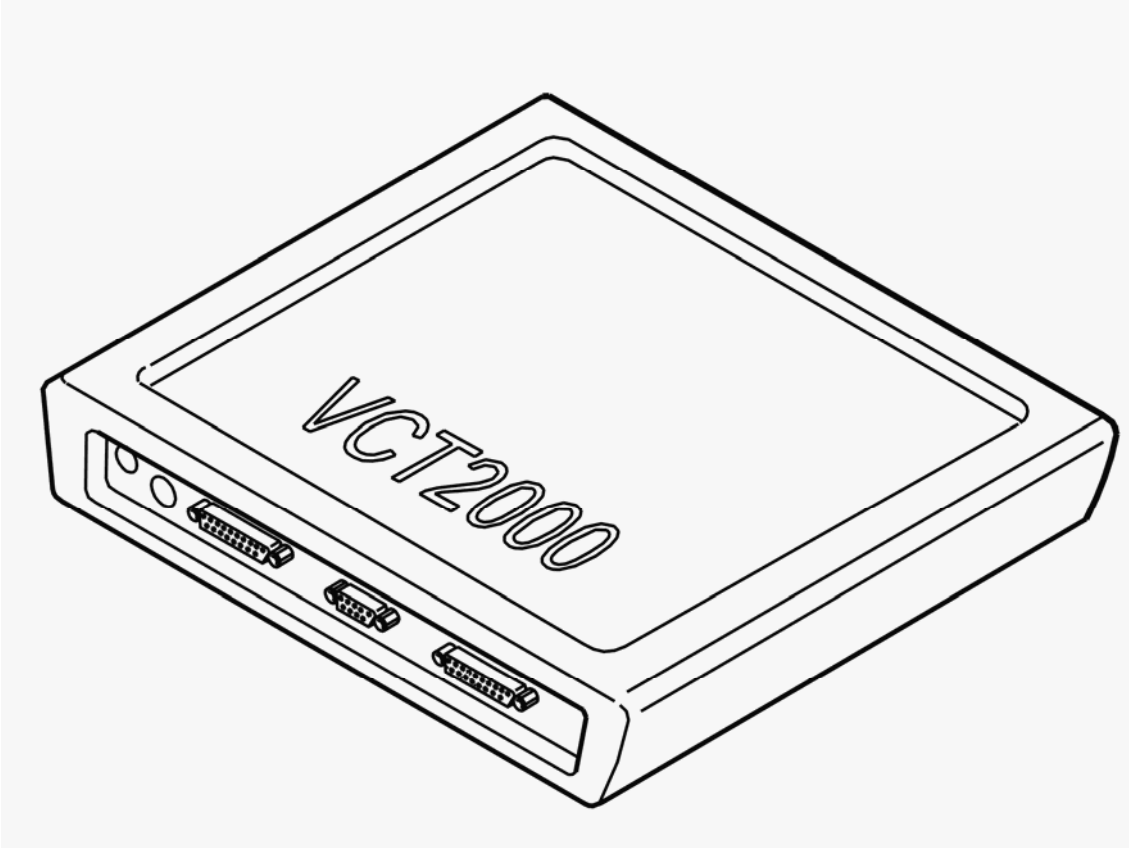


Fig. 304: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

TCM-XXXX: UNKNOWN DIAGNOSTIC TROUBLE CODE (DTC) FOR THE CURRENT CONTROL MODULE VERSION (AW50/51 AWD; AW55-50/51SN; 2003-2007)

UNKNOWN DIAGNOSTIC TROUBLE CODE (DTC) FOR THE CURRENT CONTROL MODULE VERSION

see **UNKNOWN DIAGNOSTIC TROUBLE CODE (DTC) FOR THE CURRENT CONTROL MODULE VERSION**

TCM-XXXXXX: UNKNOWN DIAGNOSTIC TROUBLE CODE (DTC) FOR THE CURRENT CONTROL MODULE VERSION (B8444S, TF-80SC AWD; 2006-2011)

UNKNOWN DIAGNOSTIC TROUBLE CODE (DTC) FOR THE CURRENT CONTROL MODULE

VERSION

READING OUT DIAGNOSTIC TROUBLE CODES (DTC)

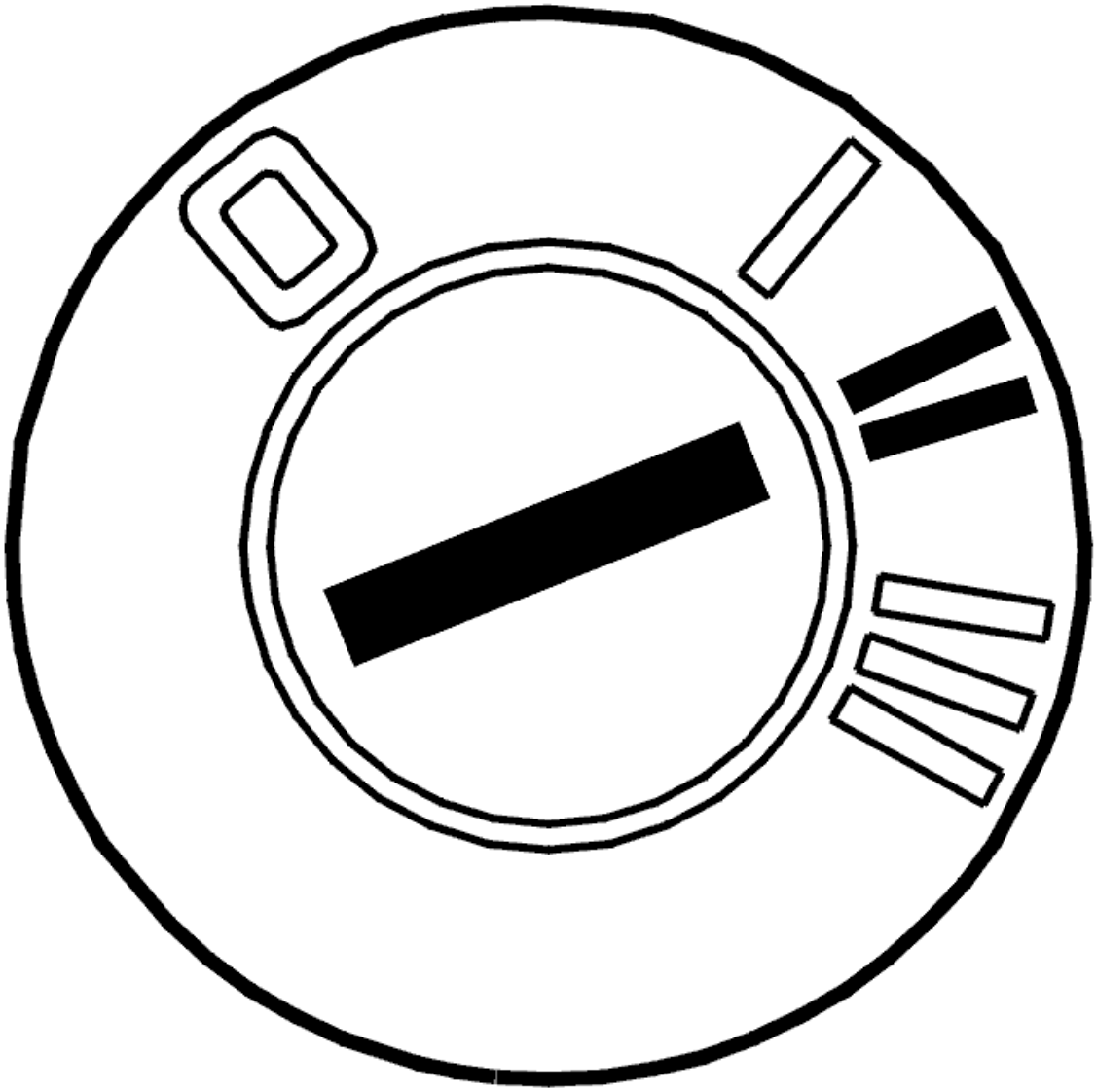


Fig. 305: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on

  Read out the diagnostic trouble code (DTC) stored in the vehicle.

  Note and report the number combination to customer support.

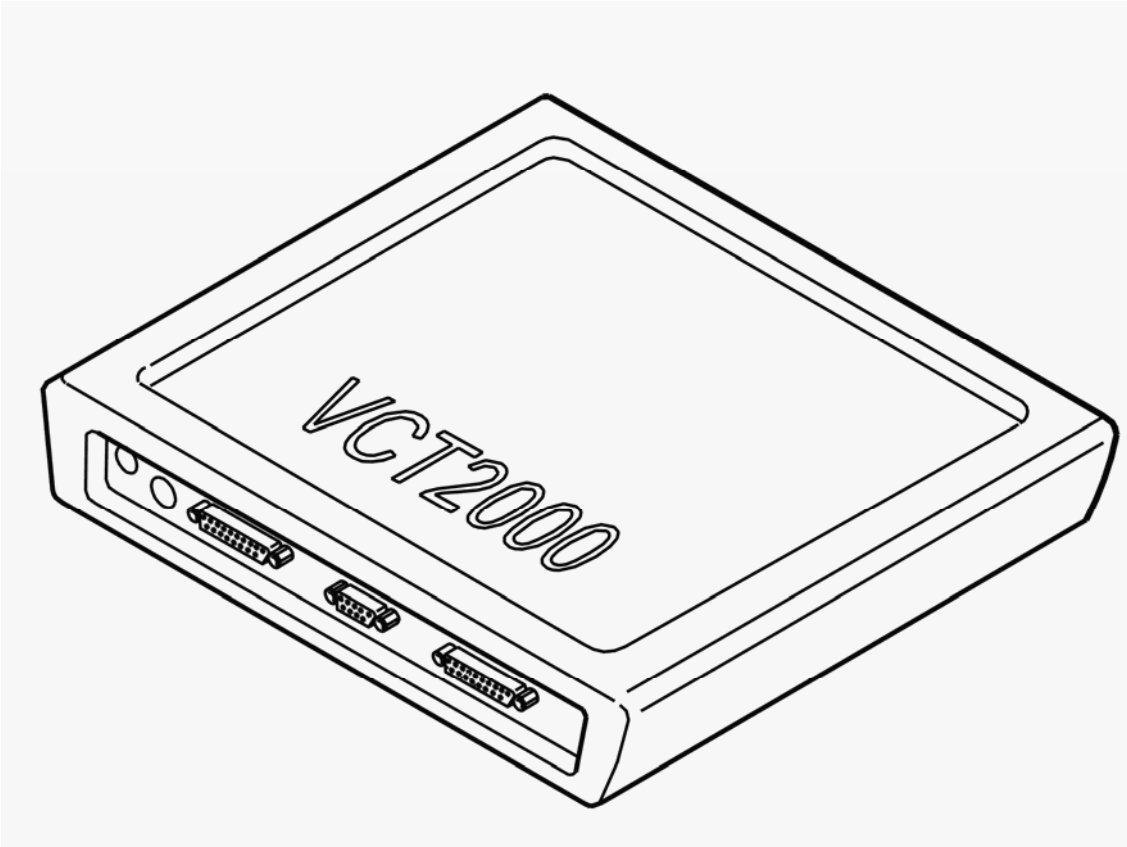


Fig. 306: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

TCM-XXXXXX: UNKNOWN DIAGNOSTIC TROUBLE CODE (DTC) FOR THE CURRENT CONTROL MODULE VERSION (TF-80SC AWD; 2005)

UNKNOWN DIAGNOSTIC TROUBLE CODE (DTC) FOR THE CURRENT CONTROL MODULE VERSION

see **UNKNOWN DIAGNOSTIC TROUBLE CODE (DTC) FOR THE CURRENT CONTROL MODULE VERSION**

TRANSMISSION

Transmission - General Diagnostics and Tests

CHECKING THE POWER SUPPLY AND GROUND TERMINALS FOR THE CONTROL MODULE (AW50/51 AWD; AW55-50/51SN; 2003-2007)

CHECKING THE POWER SUPPLY AND GROUND TERMINALS

CHECKING THE GROUND TERMINALS

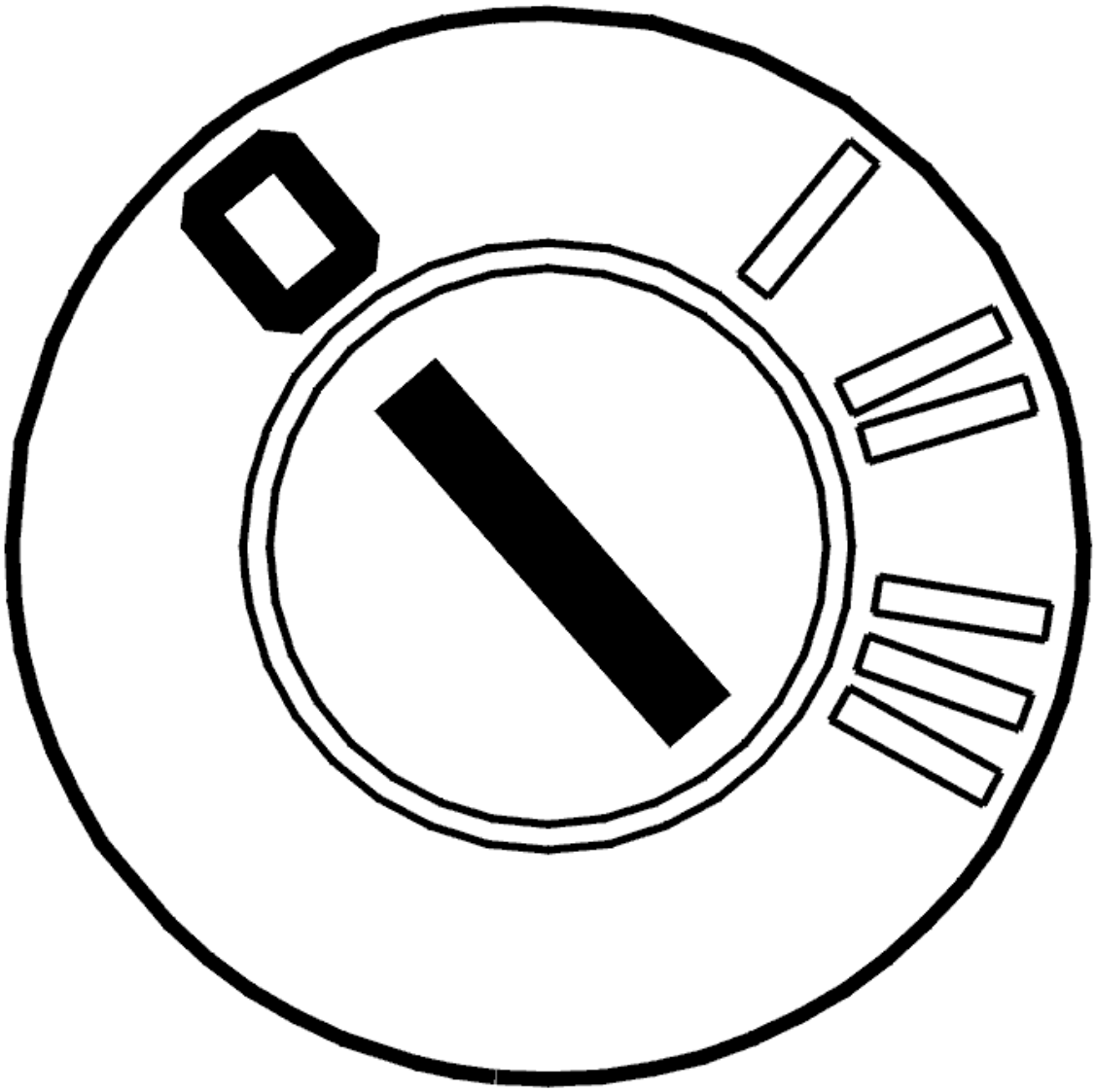


Fig. 1: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

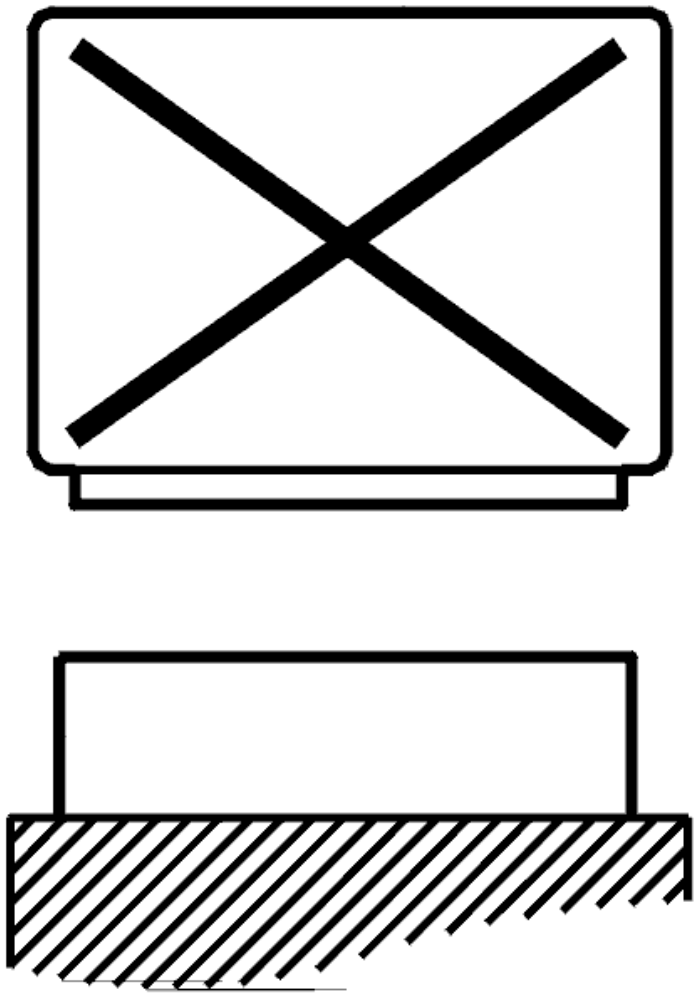


Fig. 2: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Transmission control module (TCM) disconnected.
- Turn of all equipment in the car that takes power from the battery (the interior lighting and radio etc).

Connect an ohmmeter between the battery negative terminal and:

terminal #A53 (#A53) on the breakout box.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX** .

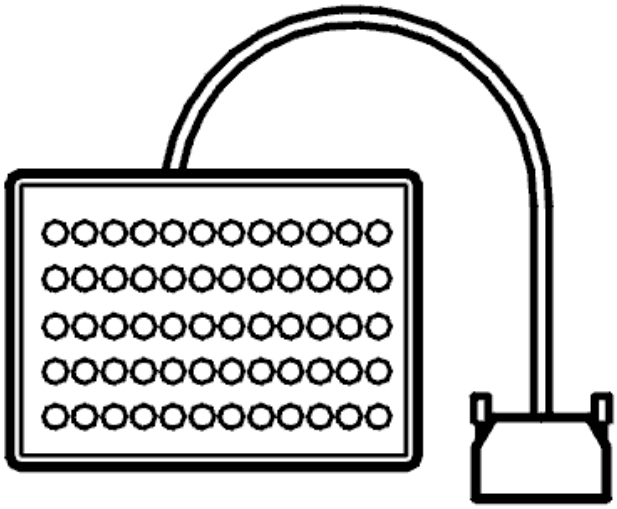


Fig. 3: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

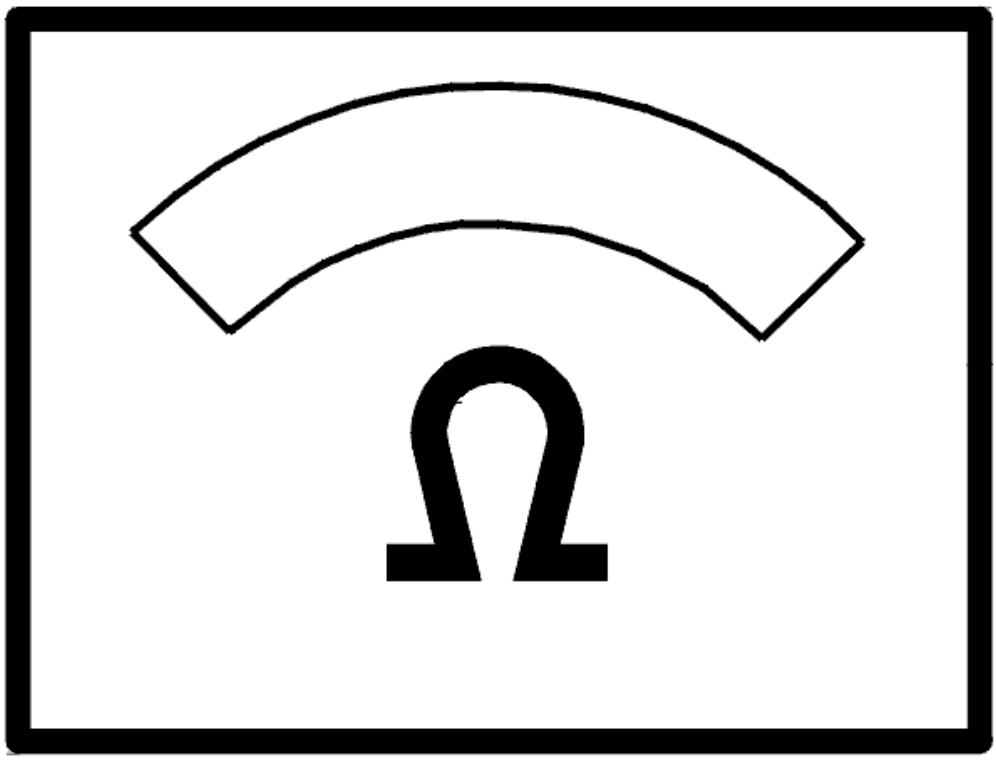


Fig. 4: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

The ohmmeter should read approximately 0 ohms.

- **OK**

  Refer to **CHECKING THE POWER SUPPLY TO THE CONTROL MODULE**

- **NOT OK**

  Refer to **CHECKING FOR OPEN-CIRCUITS, CONTACT RESISTANCE AND OXIDATION**

CHECKING FOR OPEN-CIRCUITS, CONTACT RESISTANCE AND OXIDATION

Check ground terminal 31/96 and the cable between the ground terminal and transmission control module

(TCM) terminal #A53 (#A53). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

Check the ground lead between the battery and the body. Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for contact resistance and oxidation according to **CONTACT RESISTANCE AND OXIDATION** .

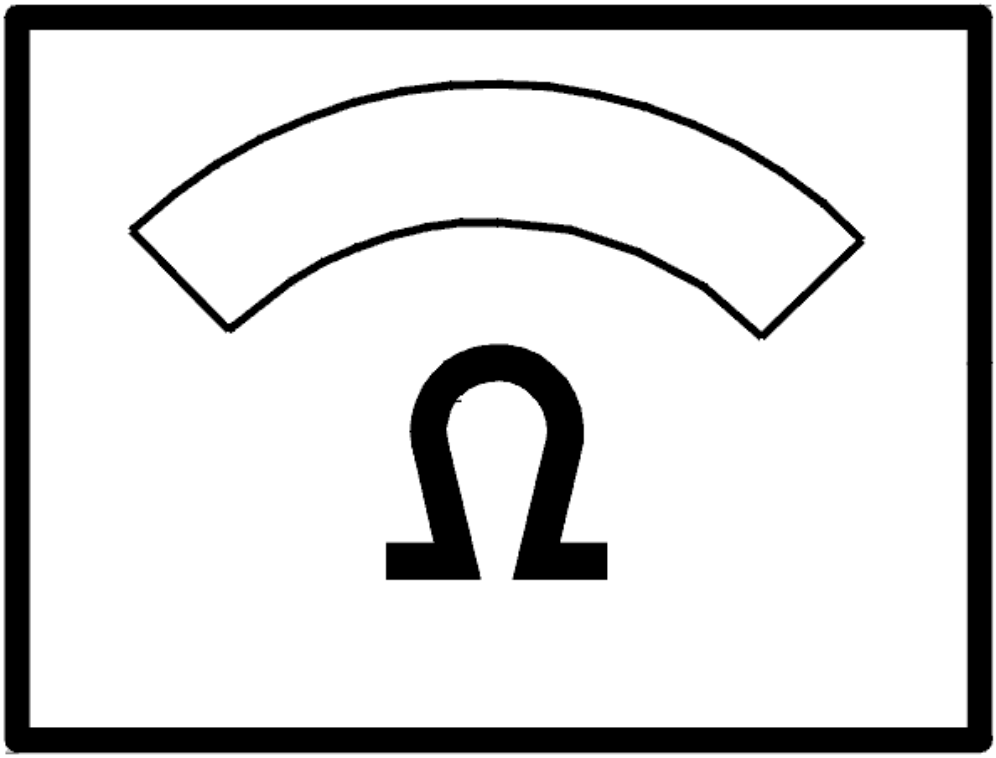


Fig. 5: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

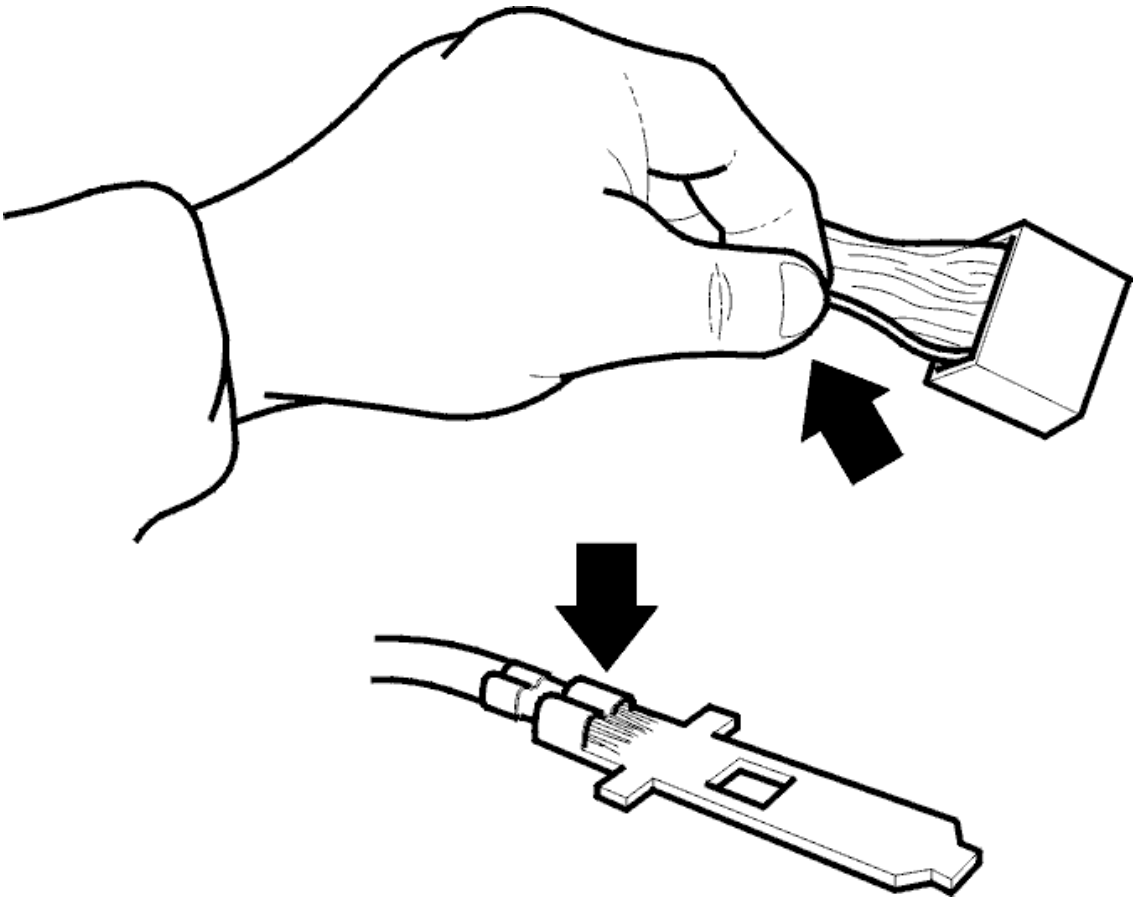


Fig. 6: Checking Contact Resistance And Oxidation
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

CHECKING THE POWER SUPPLY TO THE CONTROL MODULE

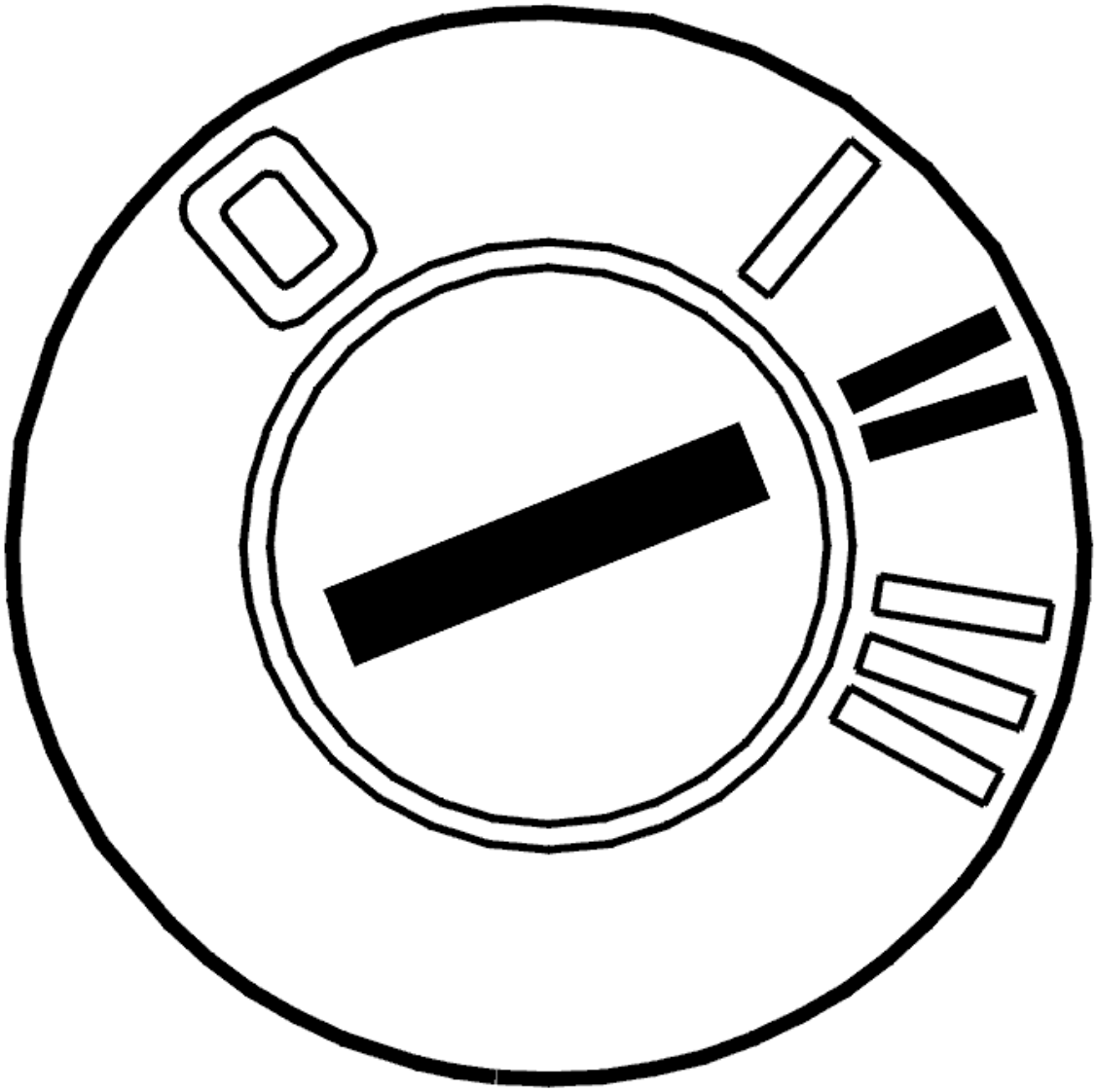


Fig. 7: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

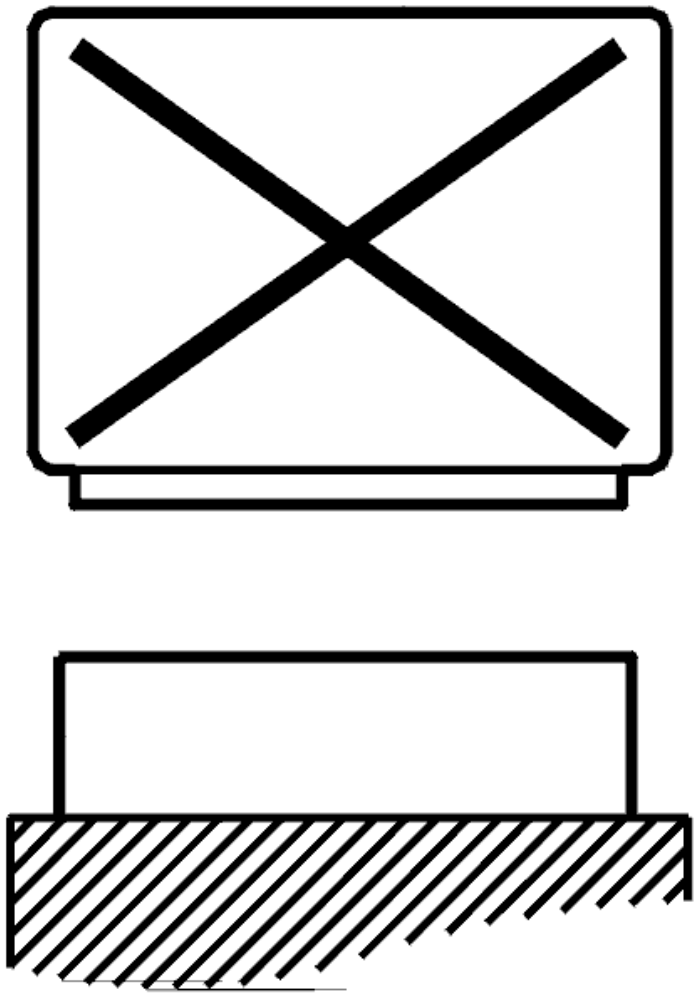


Fig. 8: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Control module disconnected.
- Ignition on.

Connect a voltmeter between terminals #A35 (#A35) and #A53 (#A53) on the breakout box.

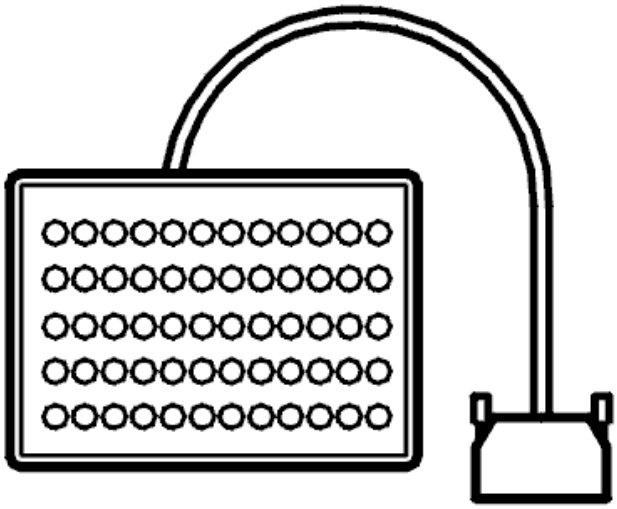


Fig. 9: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

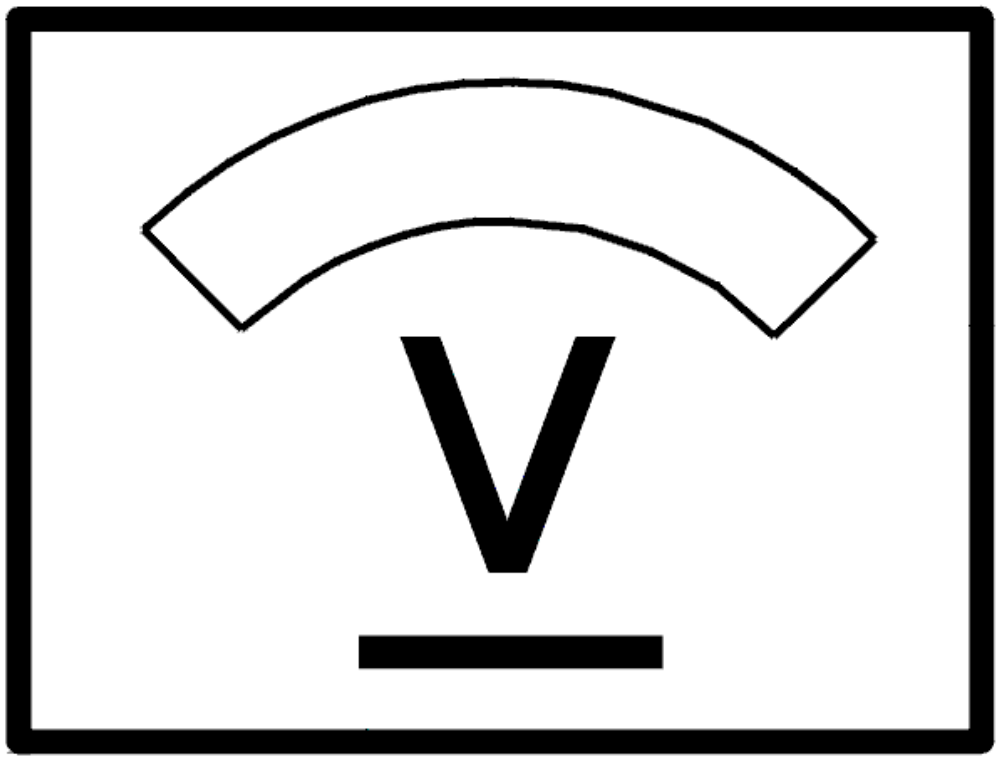


Fig. 10: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

The voltmeter should read battery voltage.

- **OK**

  OKAY: Troubleshooting has been completed.

- **NOT OK**

  Refer to **CHECKING THE FUSE AND RELAY**

CHECKING THE FUSE AND RELAY

Check that fuse 20 in the fusebox in the passenger compartment is intact.

If the fuse has blown, check the cable between control module terminal #A35 (#A35) and the relay for extended X-supply 2/101 terminal #1 (located on the central electronic module (CEM)). Check for a short-circuit to ground.

Other information:

- To connect the breakout box and access the relay, For -2004, see **CENTRAL ELECTRONIC MODULE (CEM), REPLACING** or For 2005-, see **CENTRAL ELECTRONIC MODULE (CEM), REPLACING** .
- see **CHECKING WIRING AND TERMINALS**

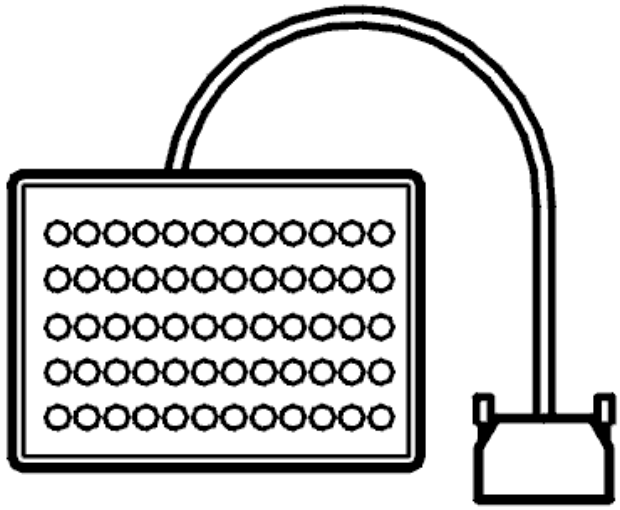


Fig. 11: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

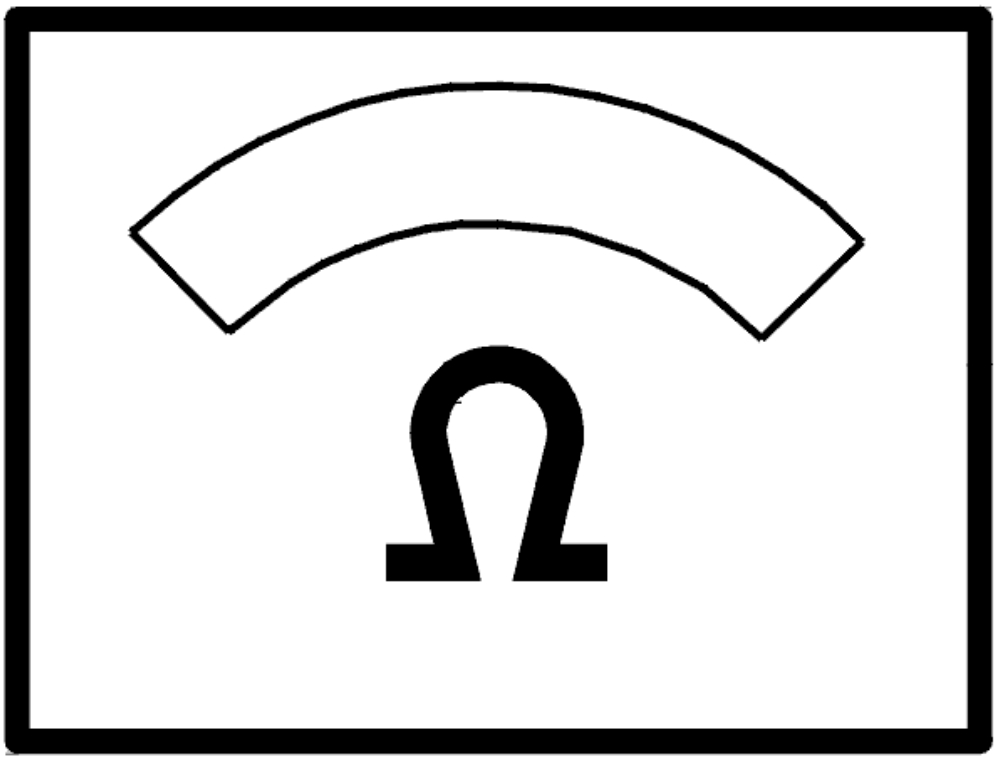


Fig. 12: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING THE VOLTAGE BEFORE THE FUSE**

CHECKING THE VOLTAGE BEFORE THE FUSE

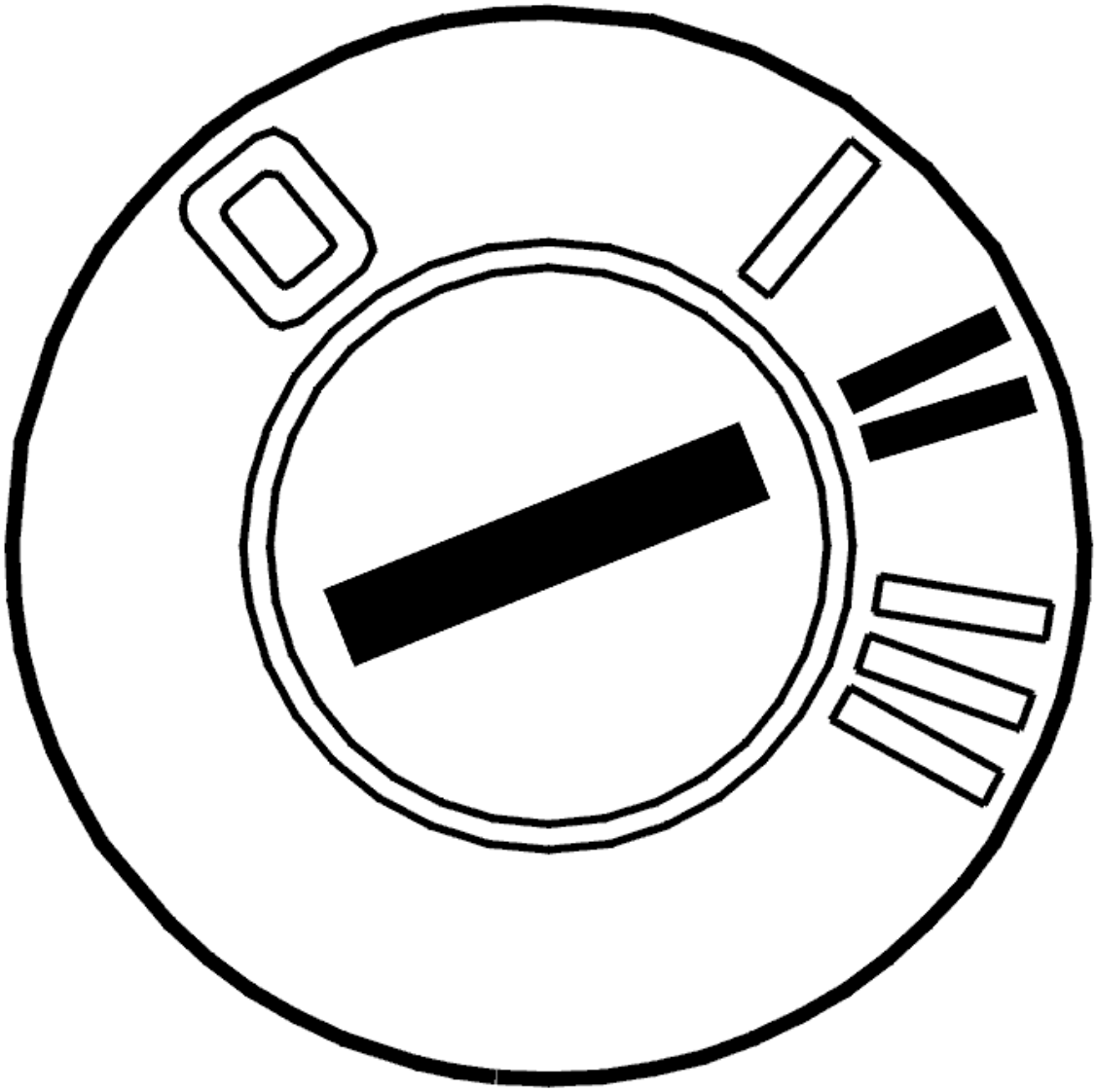


Fig. 13: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Connect a voltmeter between fuse 20 in the fusebox in the passenger compartment and the left socket on the fuse holder for fuse 20 and ground.

  Check the following cables if the voltage is approximately 12 V. Check the cable between the fuse and relay for extended power supply 2/101 (located on the central electronic module (CEM)). Check the cable between the relay and transmission control module (TCM) terminal #A35 (#A35). Check these cables for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** .

  If no faults were detected, try a new relay.

  Other information:

- To access the relay, For -2004, see **CENTRAL ELECTRONIC MODULE (CEM), REPLACING** or For 2005-, see **CENTRAL ELECTRONIC MODULE (CEM), REPLACING** .

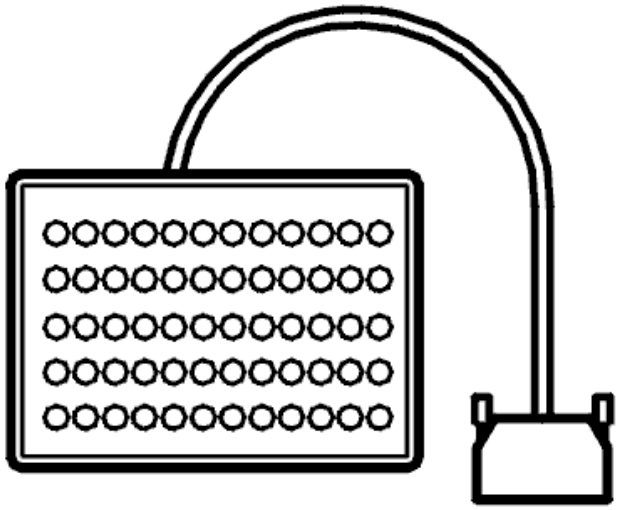


Fig. 14: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

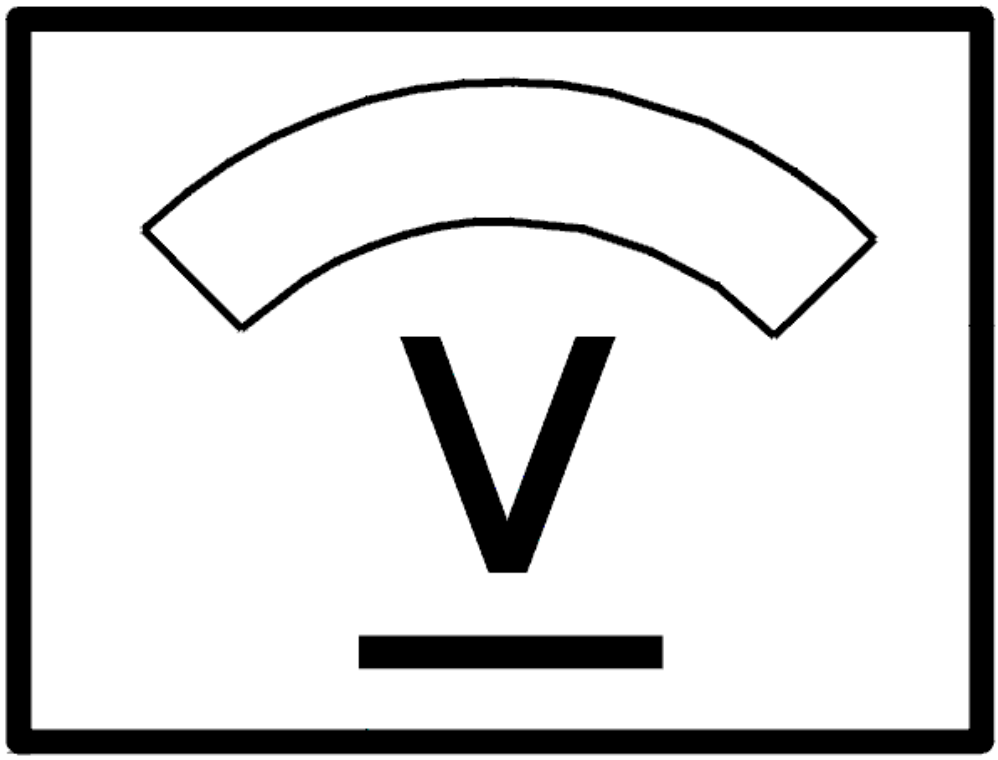


Fig. 15: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

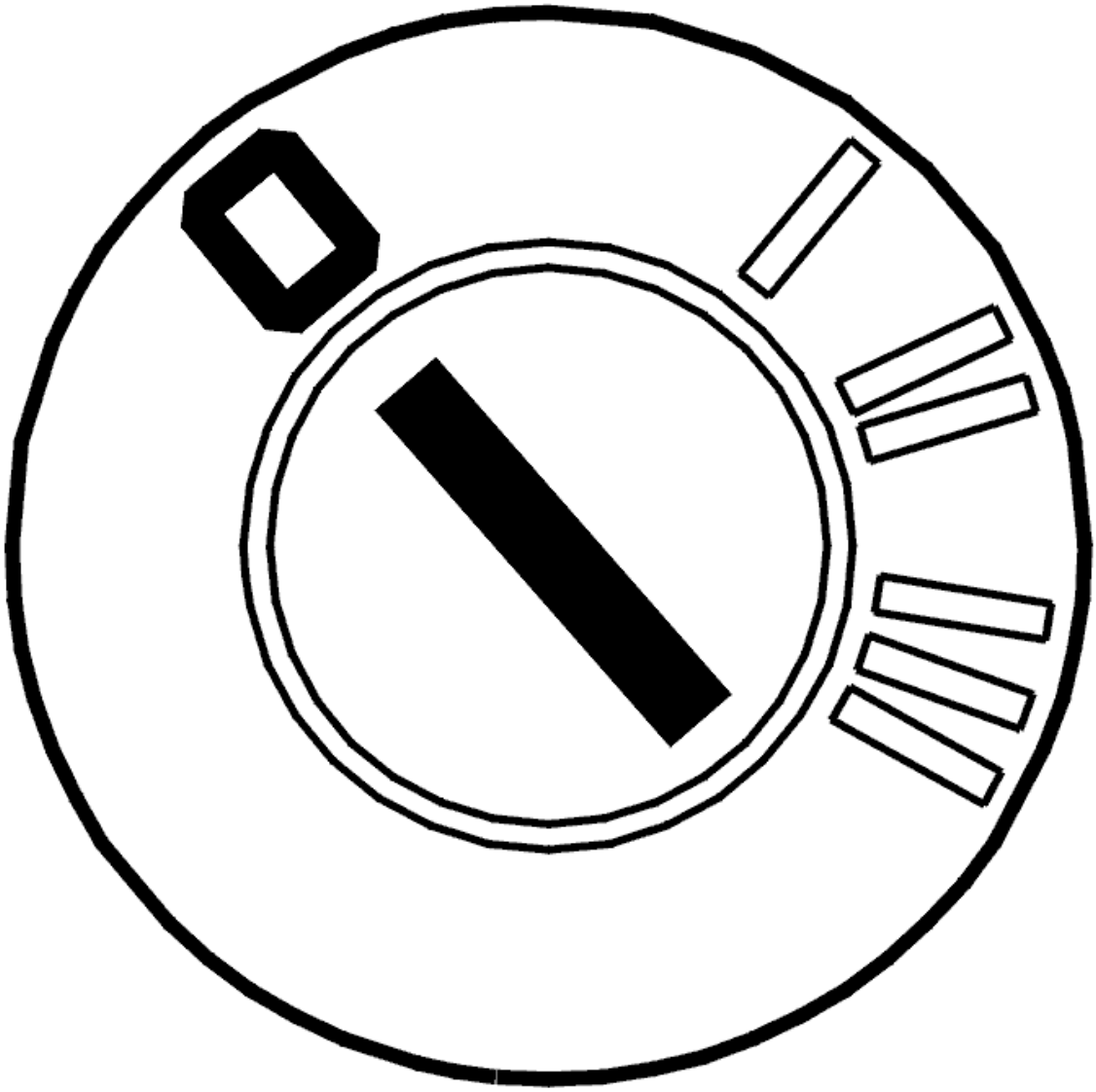


Fig. 16: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

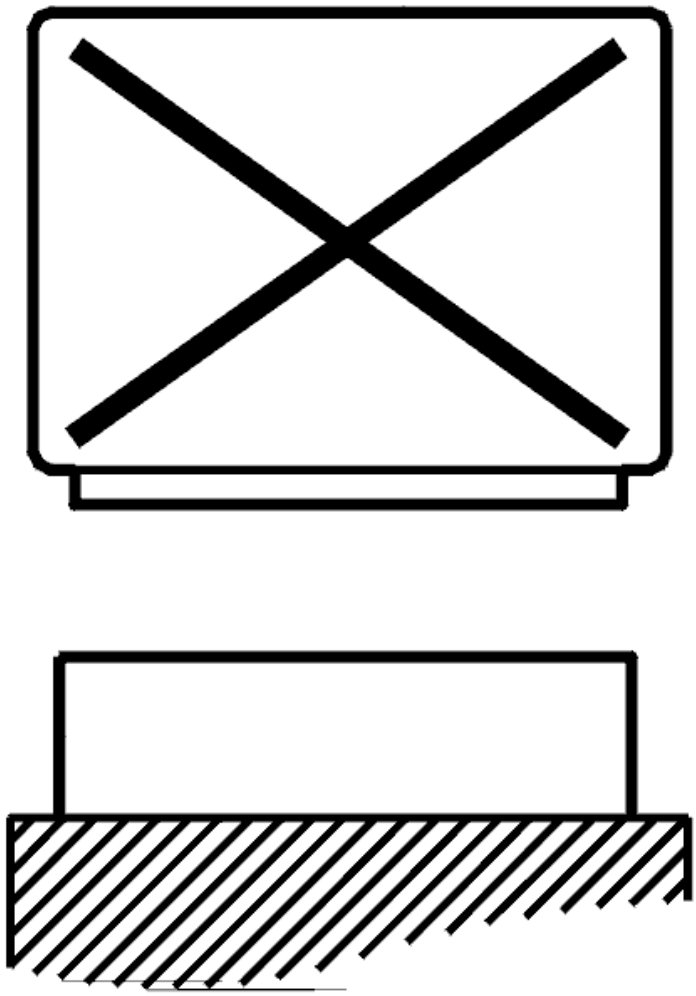


Fig. 17: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Turn of all equipment in the car that takes power from the battery (the interior lighting and radio etc).
- Control module disconnected.

Connect an ohmmeter between the battery negative terminal and terminal #A53 (#A53) on the breakout box.

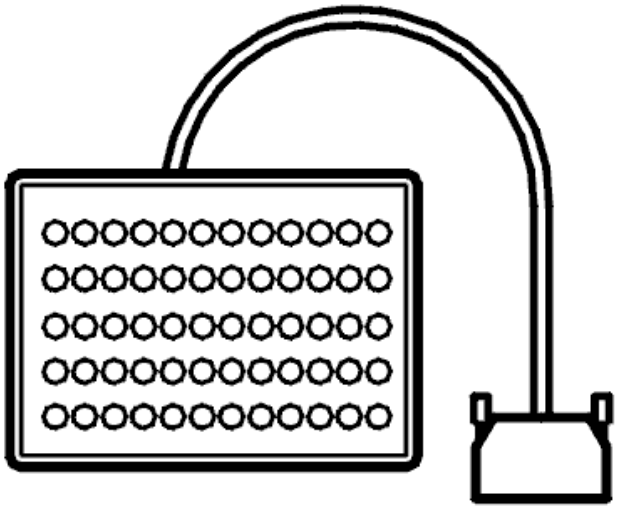


Fig. 18: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

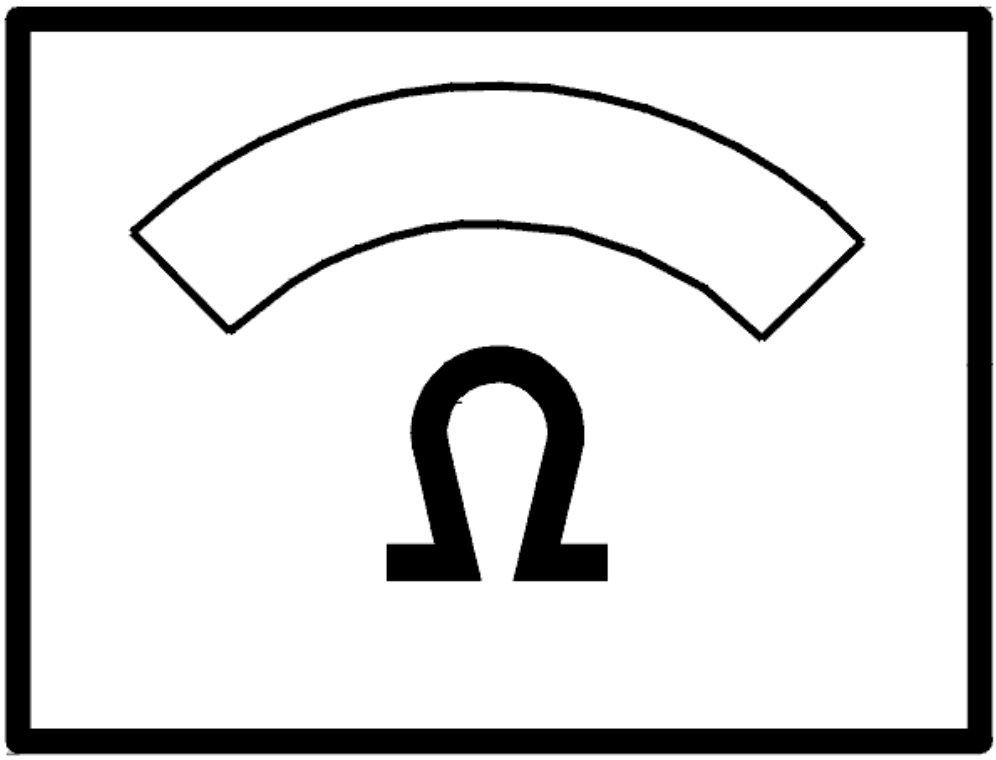


Fig. 19: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

The ohmmeter should read approximately 0 ohms.

- **OK**

  Refer to **VERIFICATION, CONTINUED**

- **NOT OK**

  Refer to **INFORMATION**

VERIFICATION, CONTINUED

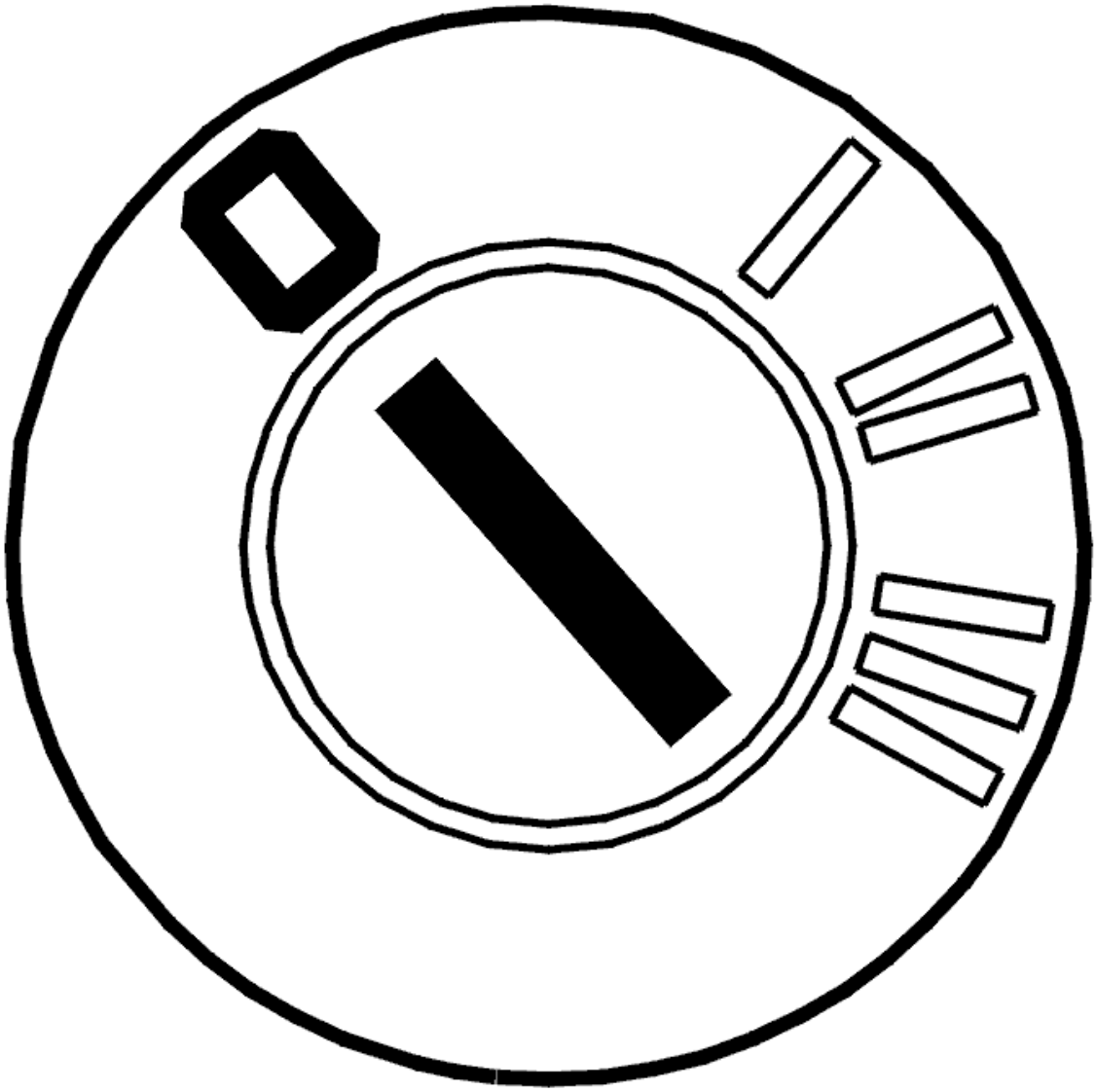


Fig. 20: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

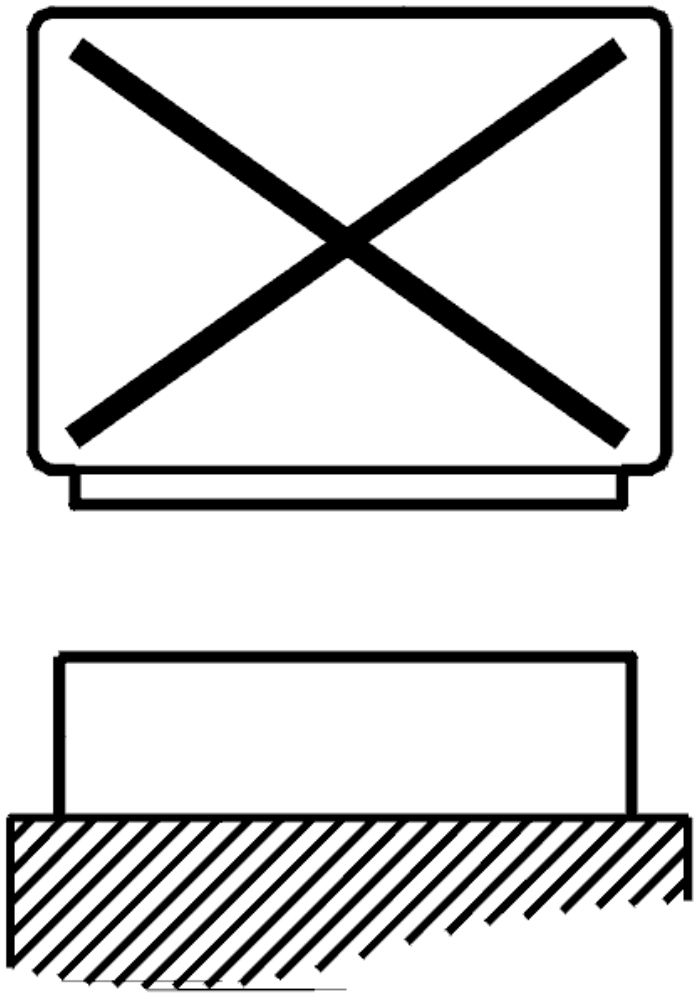


Fig. 21: Identifying Control Module Disconnected
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Turn of all equipment in the car that takes power from the battery (the interior lighting and radio etc).
- Control module disconnected.

Connect a voltmeter between terminals #A35 (#A35) and #A53 (#A53) on the breakout box. The voltmeter should read battery voltage.

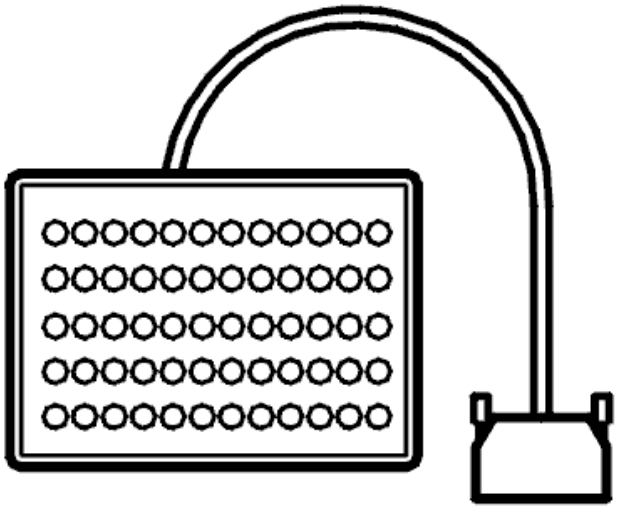


Fig. 22: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

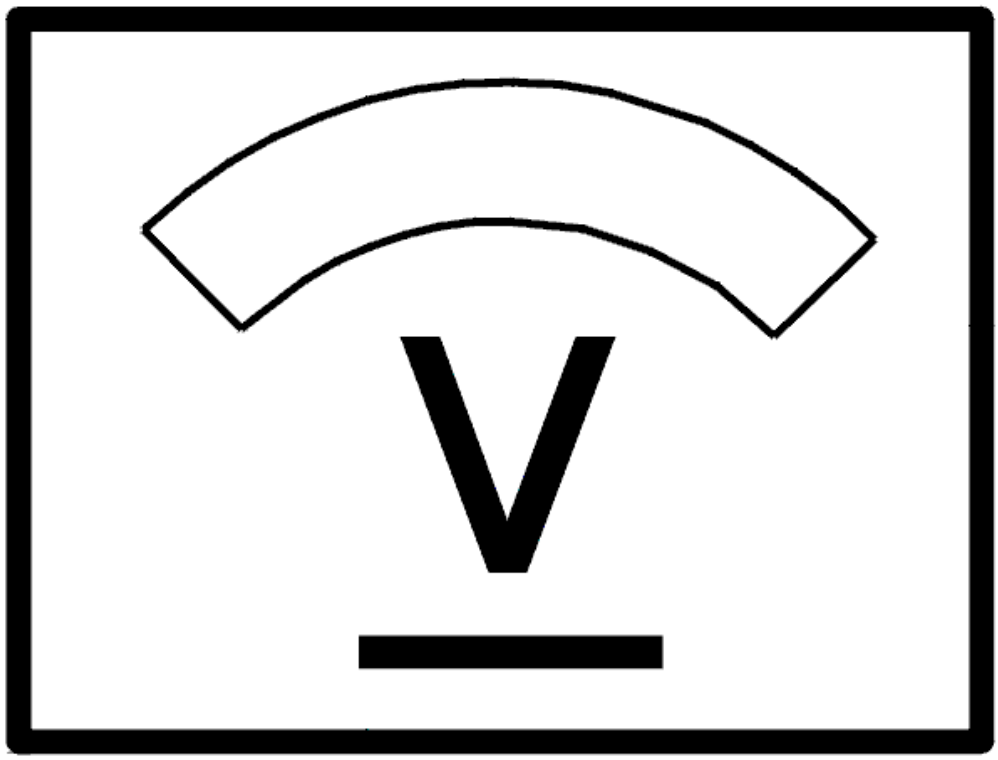


Fig. 23: Identifying Voltage Display
Courtesy of VOLVO CARS CORPORATION

Were the ground terminal and power supply OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should be diagnosed and remedied. Since this is not the case the fault-tracing process has failed.

Complete the fault-tracing for those fault or try again.

CHECKING VOLTAGE/GROUNDING POINT, TRANSMISSION CONTROL MODULE (TCM) (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

CHECKING THE SUPPLY VOLTAGE/GROUND TERMINAL

CHECKING THE POWER SUPPLY AND GROUND TERMINAL

Power supply to the transmission control module (TCM)

The transmission control module (TCM) is supplied power via two voltage inputs.

When the ignition is on, the two voltage inputs are supplied with voltage and the transmission control module (TCM) is in active mode.

1. Voltage input 1 (#A11(#A41)) is supplied power from the ignition switch, position II (KL15, "wake up") via the central electronic module (CEM). This power input is used to activate the transmission control module (TCM). When the power input is supplied with power, the system relay will be activated and power input 11 will be supplied power. The transmission control module (TCM) will not be activated if there is an open circuit.
2. Voltage input 2 #A1(#A31) is supplied power via a fuse from the relay and the engine compartment fuse box. This power input governs the supply of power to the transmission control module (TCM). The transmission control module (TCM) will not be activated if there is an open circuit.

Checking the power supply

Check the power supply cable from the ignition switch to transmission control module (TCM) terminal #A11 (#A41) for open circuit, loose connection, contact resistance and oxidation. Check the fuse. The voltage must be approximately battery voltage when the ignition is on.

Check the power supply from the system relay to transmission control module (TCM) terminal #A1(#A31) for open circuit, loose connection, contact resistance and oxidation. Check the fuse. The voltage must be approximately battery voltage when the ignition is on.

Ground terminal, transmission control module (TCM)

The transmission control module (TCM) has a ground connection.

1. The ground input (#A9 (#A39)) is power ground and is connected to the ground connection in the body.

Checking the ground terminal

Check the ground cable between transmission control module (TCM) terminal #A9 (#A39) and the ground connection in the body for open circuit, loose connection, contact resistance and oxidation. With the ignition on,

the voltage drop between the transmission control module (TCM) ground connection and chassis connection may not be greater than 0.5 V.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

CHECKING VOLTAGE/GROUNDING POINT, TRANSMISSION CONTROL MODULE (TCM) (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

CHECKING THE SUPPLY VOLTAGE/GROUND TERMINAL

see **CHECKING THE SUPPLY VOLTAGE/GROUND TERMINAL**

CHECKING VOLTAGE/GROUNDING POINT, TRANSMISSION CONTROL MODULE (TCM) (B8444S, TF-80SC AWD; 2006-2011)

CHECKING THE VOLTAGE FEED AND GROUND CONNECTION

CHECKING THE VOLTAGE FEED AND GROUND CONNECTION

Voltage feed transmission control module (TCM)

The transmission control module (TCM) is supplied with voltage via two voltage inputs.

When the ignition is on, the two voltage inputs are supplied with voltage and the transmission control module (TCM) is in active mode.

1. Voltage input 1 (#A11(#A41)) is supplied with voltage from the ignition, ignition position II (KL15, "wake up") via central electronic module (CEM). This voltage input is used to activate the transmission control module (TCM). When the voltage input is supplied with voltage, the system relay will be activated and voltage input 11 is supplied with voltage. In case of open circuit, the transmission control module (TCM) will not be activated.
2. Voltage input 2 (#A1(#A31) is supplied with voltage via a fuse from relay and the fuse box in the engine compartment. This voltage input handles voltage supply to the transmission control module (TCM). In case of open circuit, the transmission control module (TCM) will not be activated.

Checking the power supply

Check the voltage feed cable from the ignition to the transmission control module (TCM) #A11(#A41) for open circuit, loose connection, contact resistance and oxidation. Also check the fuse. The voltage shall be approx. battery voltage when the ignition is on.

Check the voltage feed from the system relay to the transmission control module (TCM) #A1(#A31) for open circuit, loose connection, contact resistance and oxidation. Also check the fuse. The voltage shall be approx. battery voltage when the ignition is on.

Ground connection transmission control module (TCM)

The transmission control module (TCM) has a ground connection.

1. The ground input (#A9 (#A39)) is power ground and is connected to the ground connection in the body.

Checking the ground terminal

Check the ground cable between the transmission control module (TCM) #A9 (#A39) and the ground connection in the body for open circuit, loose connection, contact resistance and oxidation. When the ignition is on, the voltage-drop between the transmission control module (TCM) ground connection and the ground connection may not be greater than 0.5 V.

Remedy as necessary.

Other information

- see **CONNECTING THE BREAKOUT BOX**
- see **SIGNAL DESCRIPTION**
- see **CONTENTS**

CHECKING VOLTAGE/GROUNDING POINT, TRANSMISSION CONTROL MODULE (TCM) (TF-80SC AWD; 2005)

CHECKING THE VOLTAGE FEED AND GROUND CONNECTION

see **CHECKING THE VOLTAGE FEED AND GROUND CONNECTION**

CONNECTING BREAKOUT BOX, TRANSMISSION CONTROL MODULE (TCM) (B8444S, TF-80SC AWD; 2006-2011)

CONNECTING THE BREAKOUT BOX

Special tools:

see **9512904**

see **9511428**

see **9512975**

CONNECTING THE BREAKOUT BOX

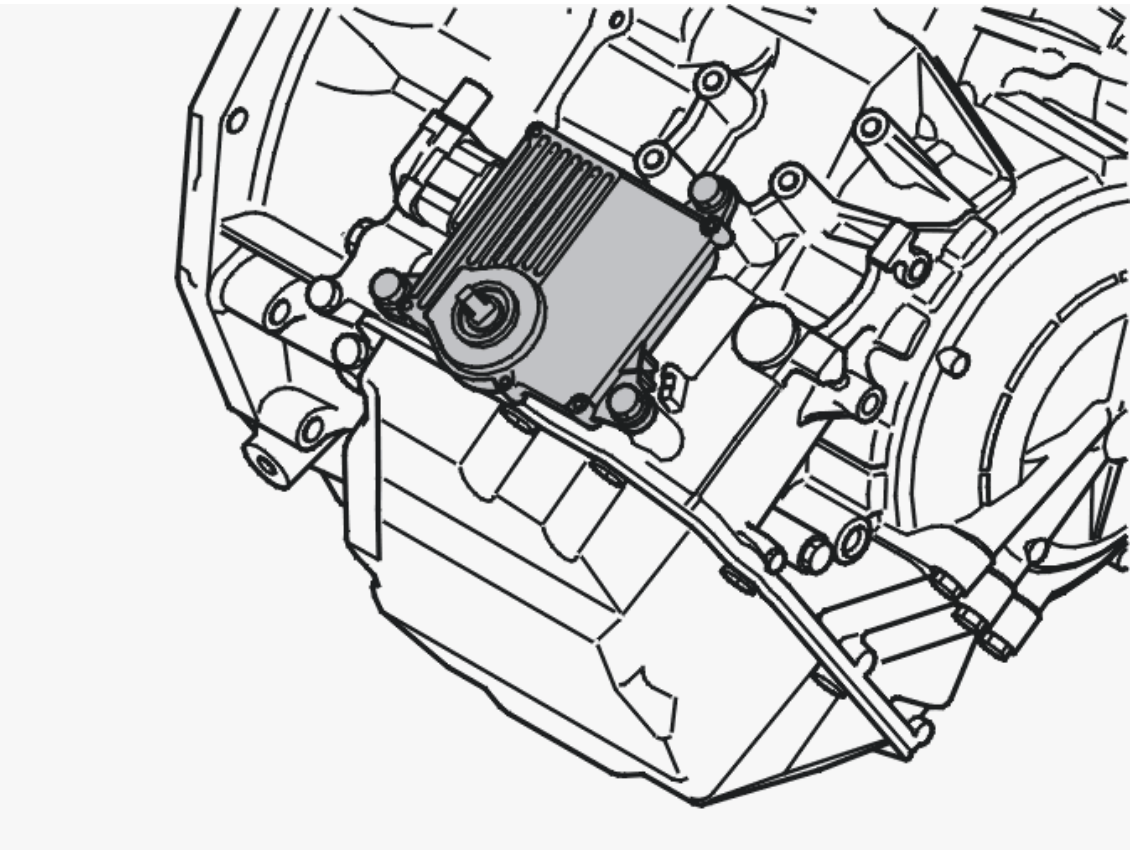


Fig. 24: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- Ignition off. Wait until the gear selector's indication or lighting goes off (normally takes approx. 7 seconds). If the gear selector's indication or lighting is not on from the beginning due to some malfunction, wait for 3 minutes from the time that the ignition is turned off.
- Expose the transmission control module (TCM) according to: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**

NOTE: When measuring on the connector A (not against the transmission itself), then the transmission control module (TCM) does not have to be disconnected from the transmission. If the control module is not disconnected, no calibration is needed.

- Remove the connectors from the transmission control module (TCM).
- Check that the male and female pins on the control module, the control module's connectors and on the transmission are intact and securely in place (cannot be pressed in). Check that the cables to the female pins are connected securely.
- Especially check the pins that are in question for the diagnostic trouble code/symptom. See also: **SIGNAL DESCRIPTION**
- Connect adapter see **9512904** to connector A and adapter see **9512975** to connector B on the transmission control module (TCM) or transmission, and connect breakout box see **9511428** to the adapter.

- The breakout box is designed to facilitate the reading of control module input and output signals when the control module is connected as well as the resistance of cables and components when the control module is disconnected. Using the breakout box reduces the risk of unintentionally short-circuiting cables or damaging pins in the connectors.

CAUTION: When taking readings with the ignition on, first connect the engine control module (ECM) and its connectors, then switch on the ignition. After taking readings, check diagnostic trouble codes (DTCs) for systems connected to the high speed section.

CONNECTING BREAKOUT BOX, TRANSMISSION CONTROL MODULE (TCM) (TF-80SC AWD; 2005)

CONNECTING THE BREAKOUT BOX

see **CONNECTING THE BREAKOUT BOX**

CONNECTING THE BREAKOUT BOX (4T65 AWD; 2003-2006)

CONNECTING THE BREAKOUT BOX

Special tools:

see **9511504**

see **9511428**

see **9995722**

REMOVING THE CONTROL MODULE

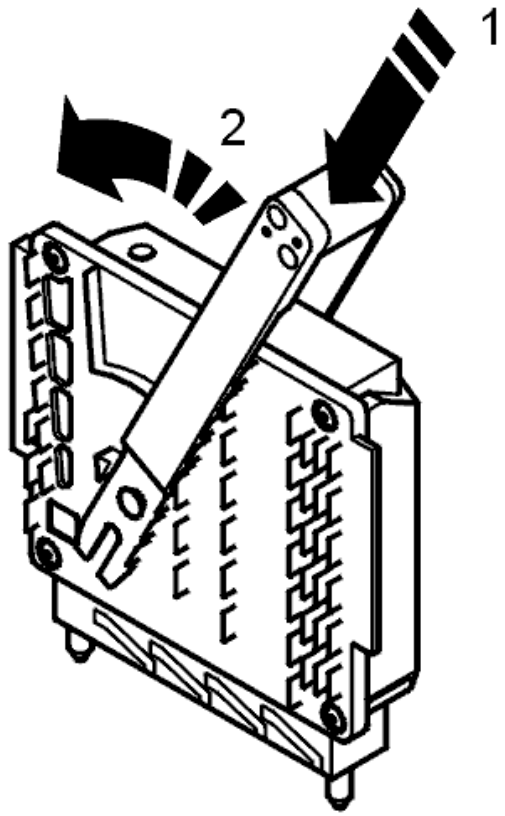


Fig. 25: Identifying Engine Control Module
Courtesy of VOLVO CARS CORPORATION

- Wait 2 minutes after the ignition has been switched off. The main relay must be voltage free **before** the control module can be removed from the car. If the engine cooling fan (FC) runs on after the ignition has been switched off, wait until it stops and then a further 2 minutes.
- Remove control module box cover and put to one side.

NOTE: Do not touch the control module terminal pins with your fingers. Static electricity can damage control module components.

- Insert tool see **9995722** around the control module.
- Move the upper section of the tool backwards as far as it will go and pull up the tool.
- Carefully pull up the control module.

ADAPTER CONNECTION

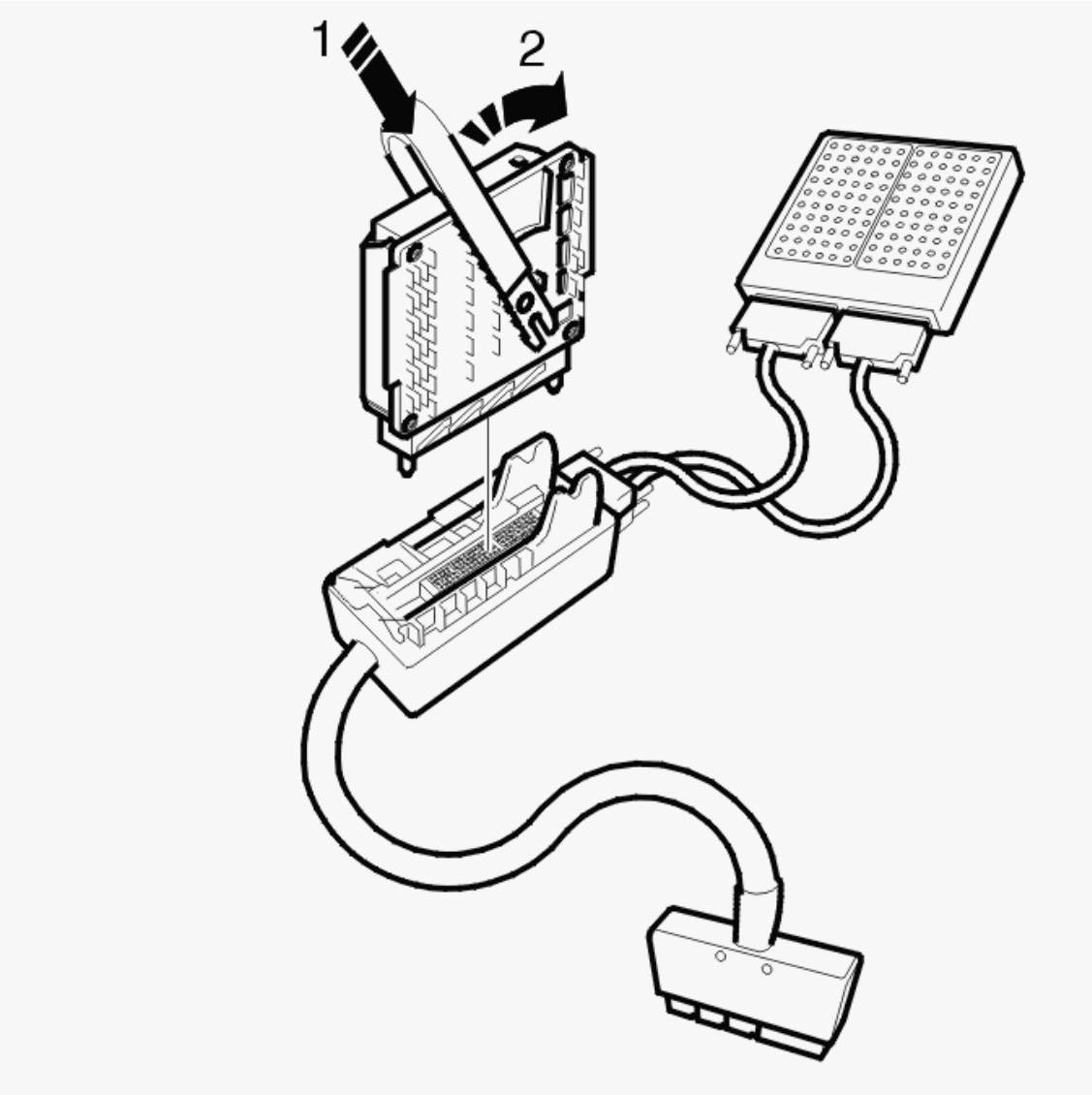


Fig. 26: Identifying Adapter
Courtesy of VOLVO CARS CORPORATION

- Check that no pins or sockets are damaged on the connector.
- Gently press adapter see **9511504** down into the grooves inside the control module box. Press to the limit position!
- Insert tool see **9995722** around the adapter.
- Move the upper section of the tool forwards as far as it will go. Pull the tool up.

CONNECTING THE BREAKOUT BOX

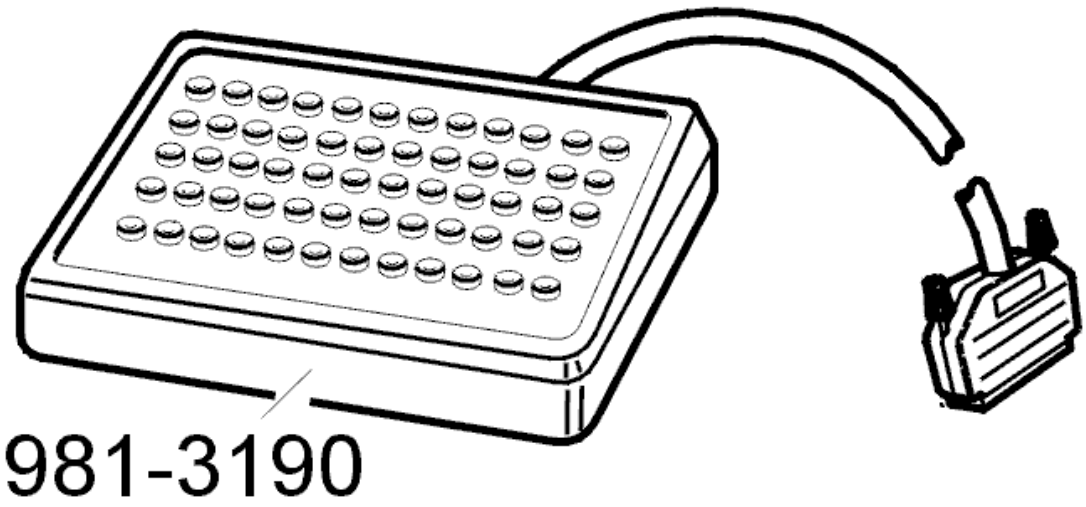


Fig. 27: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

- Check the control module and control module connectors to make sure that the male and female terminals are undamaged and secure (cannot be pressed in). Check that the cables to the female terminals are secured to the terminal pins.
- Connect adapter see **9511504** to the control module connector (wiring side). Connect breakout box see **9511428** to the adapter.
- The breakout box is designed to facilitate reading off the control module input and output signals when the control module is connected; and the cable and component resistance when the control module is disconnected. The use of a breakout box reduces the risk of accidental short-circuits and damage to the connector pins.

REMOVING THE ADAPTER

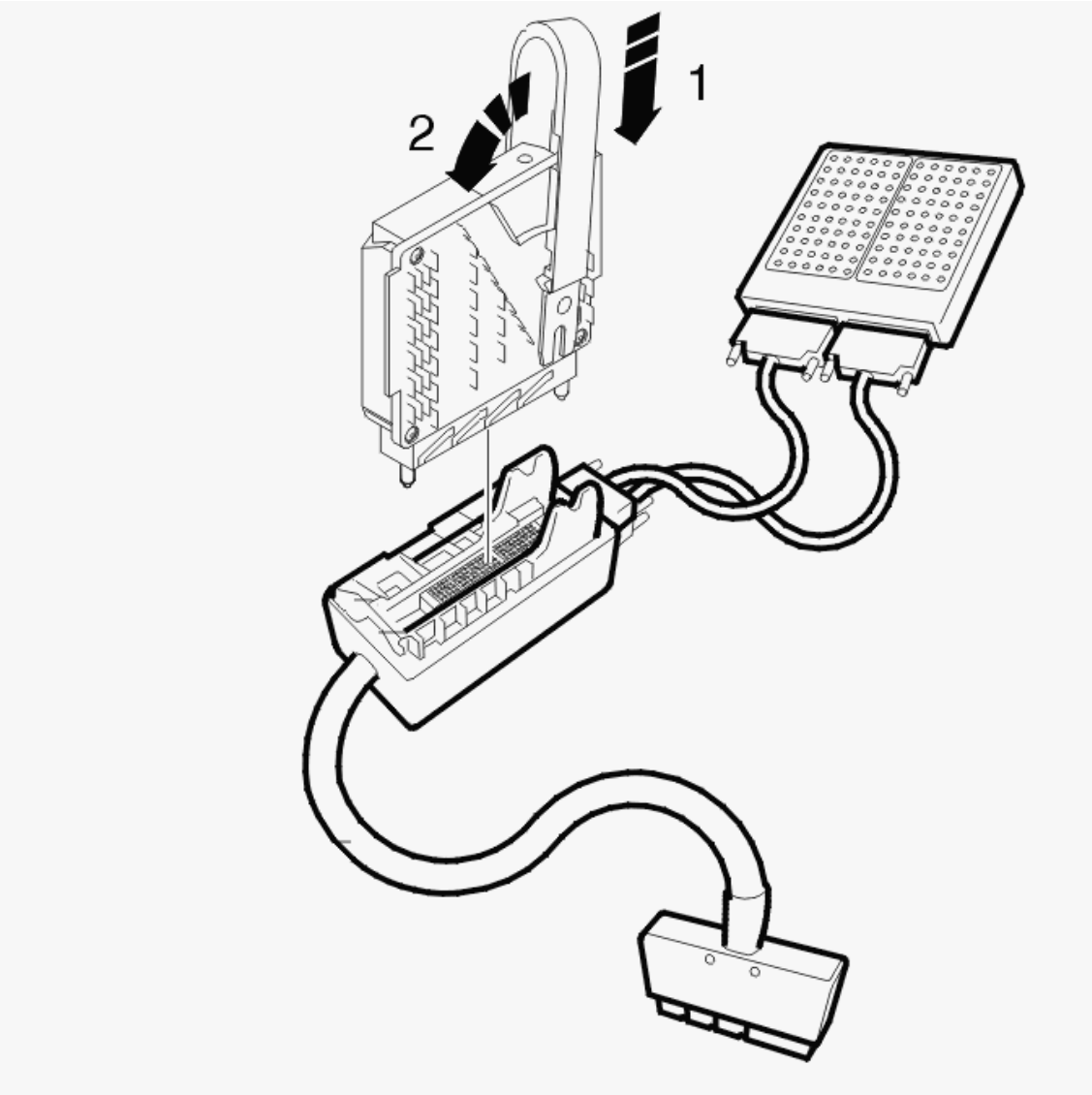


Fig. 28: Identifying Adapter
Courtesy of VOLVO CARS CORPORATION

- Wait 2 minutes after the ignition has been switched off. The main relay must be voltage free **before** the control module can be removed from the car. If the engine cooling fan (FC) runs on after the ignition has been switched off, wait until it stops and then a further 2 minutes.

NOTE: Do not touch the control module terminal pins with your fingers. Static electricity can damage control module components.

-
- Insert tool see **9995722** around the adapter.
- Move the upper section of the tool backwards as far as it will go and pull up the tool.
- Carefully pull up the adapter.

INSTALLING THE CONTROL MODULE

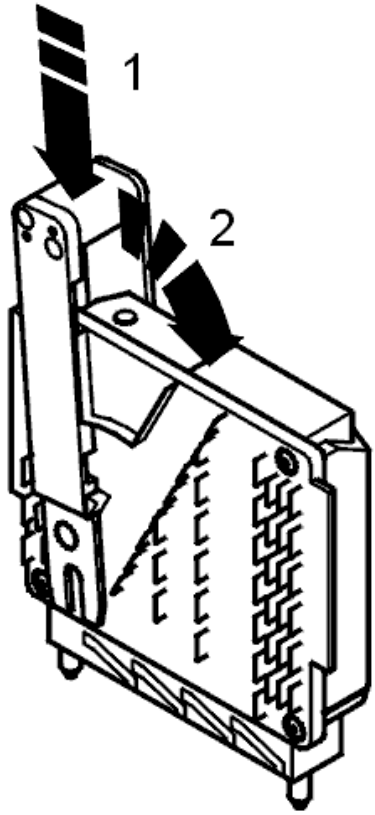


Fig. 29: Identifying Engine Control Module Installation
Courtesy of VOLVO CARS CORPORATION

- Check that no pins or sockets are damaged on the connector.
- Gently press the control module down into the grooves inside the control module box. Press to the limit position!
- Insert tool see **9995722** around the control module.
- Move the upper section of the tool forwards as far as it will go. Pull the tool up.
- Press the cover over the control modules.
- Check that the air ducts are correctly positioned.

CONNECTING THE BREAKOUT BOX (4T65 AWD; 2003-2006)

CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS

Special tools:

see **9511505**

see **9813190**

CONNECTING THE BREAKOUT BOX TO THE AUTOMATIC TRANSMISSION CONNECTOR

- Ignition off
- Remove the air cleaner (ACL) housing. See **BRAKE PIPE MASTER CYLINDER/ABS UNIT, REPLACING** .

  Disconnect the automatic transmission connector by pressing the sides of the connector

- Carefully pull the connector straight out
- Check that the male and female terminals are undamaged and secure (cannot be pressed in). Check that the cables to the female terminals are secured to the terminal pins
- In particular, check the terminal pins relevant to the diagnostic trouble code (DTC) / symptom. See **SIGNAL SPECIFICATION**
- Connect adapter see **9511505** to the automatic transmission connector (transmission side). Connect breakout box see **9813190** to the adapter
- The breakout box is designed to facilitate reading off the control module input and output signals when the control module is connected; and the cable and component resistance when the control module is disconnected. The use of a breakout box reduces the risk of accidental short-circuits and damage to the connector pins.

CONNECTING THE TEST BOX (AW50/51 AWD; AW55-50/51SN; 2003-2004)

CONNECTING THE BREAKOUT BOX

see **CONNECTING THE BREAKOUT BOX**

CONNECTING THE TEST BOX (B5254T2; 2003-2007)

CONNECTING THE BREAKOUT BOX

see **CONNECTING THE BREAKOUT BOX**

CONNECTING THE TEST BOX (B6294T; 2003-2006)

CONNECTING THE BREAKOUT BOX

see **CONNECTING THE BREAKOUT BOX**

CONNECTION OF THE BREAKOUT BOX, TRANSMISSION CONTROL MODULE (TCM) (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

CONNECTING THE BREAKOUT BOX

Special tools:

see **9512904**

see **9511428**

see **9512975**

CONNECTING THE BREAKOUT BOX

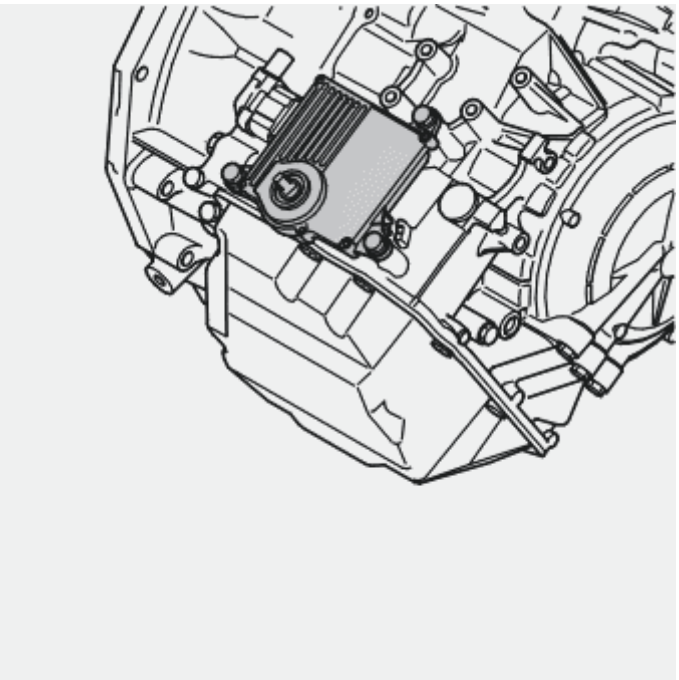


Fig. 30: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- Ignition off. Wait until the gear selector's indication or lighting goes off (normally takes approx. 7 seconds). If the gear selector's indication or lighting is not on from the beginning due to some malfunction, wait for 3 minutes from the time that the ignition is turned off.
- Expose the transmission control module (TCM) according to: **TRANSMISSION**

NOTE: When measuring on the connector A (not against the transmission itself), then the transmission control module (TCM) does not have to be disconnected from the transmission. If the control module is not disconnected, no calibration is needed.

- Remove the connectors from the transmission control module (TCM).
- Check that the male and female pins on the control module, the control module's connectors and on the transmission are intact and securely in place (cannot be pressed in). Check that the cables to the female pins are connected securely.
- Especially check the pins that are in question for the diagnostic trouble code/symptom. See also: **SIGNAL SPECIFICATION**

- Connect adapter see **9512904** to connector A and adapter see **9512975** to connector B on the Transmission Control Module (TCM) or transmission, and connect breakout box see **9511428** to the adapter.
- The breakout box is designed to facilitate reading off the control module input and output signals when the control module is connected; and the resistance of the cable and component when the control module is disconnected. The use of a breakout box reduces the risk of accidental short-circuits and damage to the connector pins.

CAUTION: When taking readings with the ignition on, first connect the engine control module (ECM) and its connectors, then switch on the ignition. After taking readings, check diagnostic trouble codes (DTCs) for systems connected to the high speed section.

CONNECTION OF THE BREAKOUT BOX, TRANSMISSION CONTROL MODULE (TCM) (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011)

CONNECTING THE BREAKOUT BOX

see **CONNECTING THE BREAKOUT BOX**

CONVERSION TABLES STANDARDIZED DIAGNOSTIC TROUBLE CODES (DTCS)/VOLVO DIAGNOSTIC TROUBLE CODES (DTCS) (AW55-50/51SN; 2003-2007)

CONVERSION TABLE STANDARDIZED DIAGNOSTIC TROUBLE CODES/VOLVO DIAGNOSTIC TROUBLE CODES

INFORMATION

Background

OBD II is a diagnostics system designed to meet statutory requirements. A standardized instrument for fault-tracing can be plugged in to the data link connector (DLC) (OBD II socket) to read diagnostic trouble codes (DTCs) and system parameters. OBD II contains only emissions related diagnostic trouble codes (DTCs) and parameters. It cannot provide the comprehensive range of information available from the Volvo On-board diagnostics system.

Volvo has its own diagnostic trouble code (DTC) designations that adhere to the in-house Volvo On-board Diagnostics protocol (called DII from model year 1999).

Table explanations

The table below is a conversion table between standardized diagnostic trouble codes (DTCs) (SAE/ISO) and the equivalent Volvo diagnostic trouble codes (DTCs) (DII).

SAE/ISO DTC: Standardized diagnostic trouble code as per SAE J2011/ISO 15031-6. The DTC can be read out from the vehicle using a standardized diagnostics system for emission-related faults certified as per OBD II. The readout is taken with a generic scantool, a fault tracing instrument standardized as per SAE J1978/ISO 15031-4.

Volvo DII DTC: Volvo-specific diagnostic trouble code as per Volvo Onboard Diagnostics protocol. Can be read out using VIDA in vehicles from model year 1999.

DTC designation: Volvo DTC designation. Used in VIDA (Volvo scan tool).

Fault type: Volvo's method of specifying the fault. Used in VIDA (Volvo scan tool).

NOTE: An SAE/ISO diagnostic trouble code can correspond to several DII diagnostic trouble codes. All of these must therefore by rectified in order for the corresponding SAE/ISO diagnostic trouble code to disappear.

Several SAE/ISO diagnostic trouble codes may also refer to the same DII diagnostic trouble code.

There are DII diagnostic trouble codes for non emissions-related faults that do not correspond to any SAE/ISO diagnostic trouble code.

NOTE: SAE/ISO diagnostic trouble codes in bold text apply from model year 2005 and onward.

TABLE

SAE/ISO diagnostic trouble code (DTC)	Volvo DII diagnostic trouble code (DTC)	Diagnostic trouble code (DTC) designation	Fault type
P0218	TCM-0046	Oil temperature	Too high oil temperature
P0560 **P0561**	TCM-009A	Battery voltage	Signal too low
P0600	TCM-E000	Communication control module	Incorrect communication
P0602 **P0614**	TCM-0048	Control module	Defective software
P0605 **P0601**	TCM-0049	Control module	Internal error. Intermittent error
P0605 **P0601**	TCM-0049	Control module	Internal error. Permanent error
P0605 **P062F**	TCM-0099	Control module	Internal error
P0610	TCM-E003	Configuration error	Incorrect configuration. Intermittent error

P0610	TCM-E003	Configuration error	Incorrect configuration. Permanent error
P0702	TCM-0060	Control module	Internal error
P0702	TCM-0120	Control module	Internal error
P0702	TCM-0121	Control module	Internal error
P0702	TCM-0122	Control module	Internal error
P0702	TCM-0123	Control module	Internal error
P0702	TCM-0124	Control module	Internal error
P0705	TCM-0039	Gear-shift position sensor	Faulty signal
P0711	TCM-0045	Oil temperature sensor	Faulty signal
P0712	TCM-0043	Oil temperature sensor	Signal too low
P0713	TCM-0044	Oil temperature sensor	Signal too high
P0715	TCM-0087	Gearbox input speed sensor	Signal too high
P0715 **P2160**	TCM-0089	Gearbox input speed sensor	Signal too low
P0716	TCM-0024	Gearbox input speed sensor	Incorrect signal. Intermittent error
P0716	TCM-0024	Gearbox input speed sensor	Incorrect signal. Permanent error
P0717	TCM-0023	Gearbox input speed sensor	Signal missing. Intermittent error
P0717	TCM-0023	Gearbox input speed sensor	Signal missing. Permanent error
P0720 **P0502**	TCM-0081	Vehicle speed sensor (VSS)	Signal too high
P720 **P0503**	TCM-0083	Vehicle speed sensor (VSS)	Signal too low
P0721 **P0501**	TCM-0020	Vehicle speed sensor (VSS)	Incorrect signal. Intermittent error
P0721 **P0501**	TCM-0020	Vehicle speed sensor (VSS)	Incorrect signal. Permanent error
P0722 **P0500**	TCM-001F	Vehicle speed sensor (VSS)	Signal missing. Intermittent error
P0722 **P0500**	TCM-001F	Vehicle speed sensor (VSS)	Signal missing. Permanent error
P0731	TCM-0028	Gear 1	Incorrect gear ratio
P0732	TCM-0029	Gear 2	Incorrect gear ratio
P0733	TCM-002A	Gear 3	Incorrect gear ratio
P0734	TCM-002B	Gear 4	Incorrect gear ratio
P0735	TCM-002C	Gear 5	Incorrect gear ratio
P0736	TCM-0027	Reverse gear	Incorrect gear ratio
P0740 **P0811**	TCM-002F	Lock-up function	Slipping or not engaged

P0744	TCM-002E	Lock-up	The transmission jerks when lock-up engages
P0748 **P0963**	TCM-0116	Throttle solenoid SLT	Signal too high. Permanent error
P0749 **P0963**	TCM-0116	Throttle solenoid SLT	Signal too high. Intermittent error
P0750 **P0960**	TCM-0117	Throttle solenoid SLT	Signal missing. Permanent error
P0751 **P0960**	TCM-0117	Throttle solenoid SLT	Signal missing. Intermittent error
P0751	TCM-000B	Shift solenoid S1	Hydraulic malfunction
P0752 **P0962**	TCM-0118	Throttle solenoid SLT	Signal too low. Permanent error
P0753 **P0974**	TCM-0001	Shift solenoid S1	Signal too high
P0753	TCM-0002	Shift solenoid S1	Signal missing
P0753 **P0973**	TCM-0003	Shift solenoid S1	Signal too low
P0753 **P0962**	TCM-0118	Throttle solenoid SLT	Signal too low. Intermittent error
P0756	TCM-000C	Shift solenoid S2	Hydraulic malfunction
P0758 **P0977**	TCM-0007	Shift solenoid S2	Signal too high
P0758	TCM-0008	Shift solenoid S2	Signal missing
P0758	TCM-0009	Shift solenoid S2	Signal too low
P0762	TCM-0115	Shift solenoid S3	Hydraulic malfunction
P0763 **P0980**	TCM-0101	Shift solenoid S3	Signal too high
P0763	TCM-0102	Shift solenoid S3	Signal missing
P0763 **P0979**	TCM-0103	Shift solenoid S3	Signal too low
P0768 **P0983**	TCM-0107	Shift solenoid S4	Signal too high
P0768	TCM-0108	Shift solenoid S4	Signal missing
P0768 **P0982**	TCM-0109	Shift solenoid S4	Signal too low
P0773 **P0986**	TCM-010A	Shift solenoid S5	Signal too high
P0773	TCM-010B	Shift solenoid S5	Signal missing
P0773 **P0985**	TCM-010C	Shift solenoid S5	Signal too low
P0778 **P0967**	TCM-010D	Lock-up solenoid SLU	Signal too high. Intermittent error
P0778			Signal too high. Permanent

P0967	TCM-010D	Lock-up solenoid SLU	error
P0778 **P0964**	TCM-010F	Lock-up solenoid SLU	Signal missing. Intermittent error
P0778 **P0964**	TCM-010F	Lock-up solenoid SLU	Signal missing. Permanent error
P0778 **P0966**	TCM-0110	Lock-up solenoid SLU	Signal too low. Intermittent error
P0778 **P0966**	TCM-0110	Lock-up solenoid SLU	Signal too low. Permanent error
P0785 **P0780**	TCM-0100	Poor gearshifting quality	.
P0798 **P0971**	TCM-0112	System pressure solenoid SLS	Signal too high. Permanent error
P0799 **P0971**	TCM-0112	System pressure solenoid SLS	Signal too high. Intermittent error
P0800 **P0968**	TCM-0113	System pressure solenoid SLS	Signal missing. Permanent error
P0801 **P0968**	TCM-0113	System pressure solenoid SLS	Signal missing. Intermittent error
P0802 **P0970**	TCM-0114	System pressure solenoid SLS	Signal too low. Permanent error
P0803 **P0970**	TCM-0114	System pressure solenoid SLS	Signal too low. Intermittent error
P0810 **P1700**	TCM-012A	Neutral check	Incorrect connection
P0810 **P1516**	TCM-012B	Neutral check	No neutral check
P0811 **P0894**	TCM-012C	Neutral check	The engine rpm oscillates
P0826	TCM-0096	Quickshift sensor	Faulty signal
P0860	TCM-0093	Communication control module gear lever	Signal too high
P0860	TCM-0094	Communication control module gear lever	Signal missing
P0860	TCM-0095	Communication control module gear lever	Signal too low
P0928	TCM-0091	Solenoid P-position shift-lock	Signal missing
P0930	TCM-0092	Solenoid P-position shift-lock	Signal too low
P0931	TCM-0090	Solenoid P-position shift-lock	Signal too high

TRANSMISSION

Transmission - Installation instructions, accessories

GEARSHIFT KNOB, AUTOMATIC (2007-2012)

GEARSHIFT KNOB, AUTOMATIC

REMOVAL

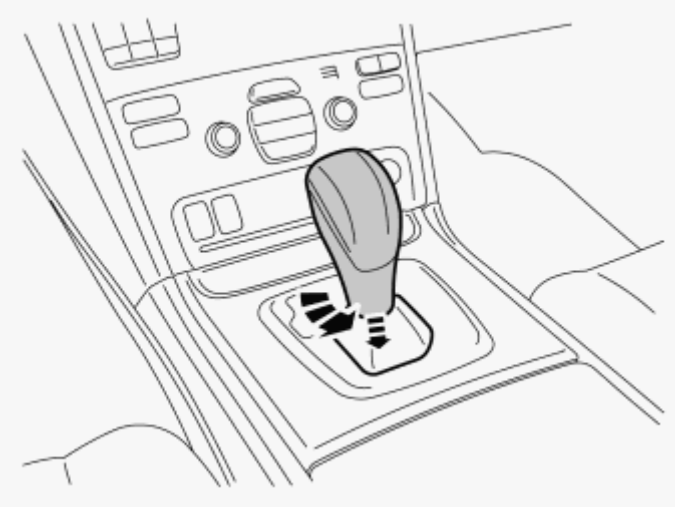


Fig. 1: Removing Gaiter
Courtesy of VOLVO CARS CORPORATION

- Loosen the gaiter from the gear lever knob by turning the lock ring on the inside 1/4 -turn, and pull down the gaiter.

Fig. 2: Pulling Up On The Knob
Courtesy of VOLVO CARS CORPORATION

- Pull loose the gear lever knob by forcefully pulling it straight upward.

NOTE: A lot of force is required to pull it loose.

INSTALLATION

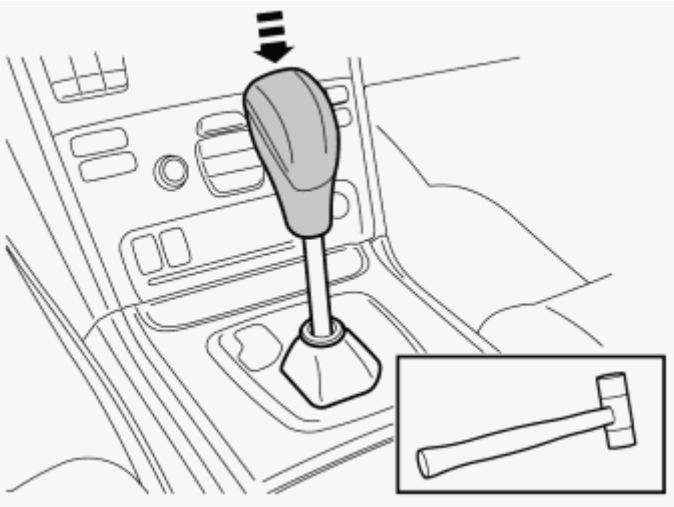


Fig. 3: Installing Knob
Courtesy of VOLVO CARS CORPORATION

- Place the new knob in the correct position on the gear lever.
- Drive down the knob in position.

HINT: Use, e. g., a plastic hammer and a spacer between the knob and hammer to avoid damaging the gear lever knob.

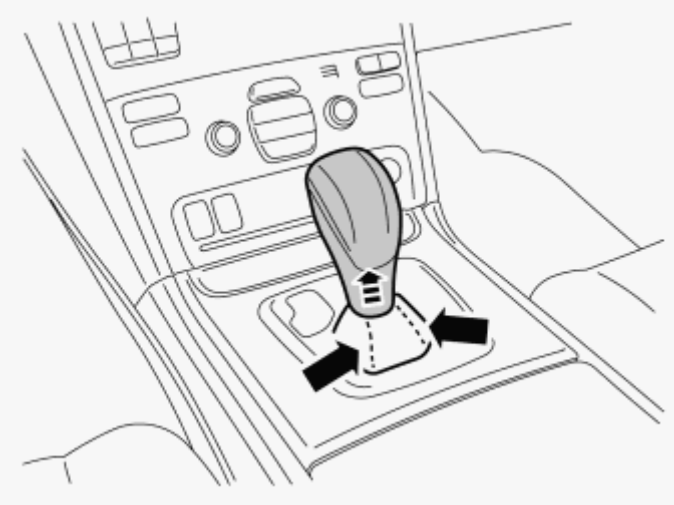


Fig. 4: Installing Gaiter
Courtesy of VOLVO CARS CORPORATION

- Check that the gaiter's seams are straight. Then fix the lock ring by pulling it down and the gaiter straight up against the knob, and secure it by pressing it into place.
- Check that the gear lever knob is fastened securely by pulling on it. Also check that the lockout function works in all its positions.

TRANSMISSION

Transmission - Removal, replacement and installation

AUXILIARY TRANSMISSION, BEVEL GEAR AND OVERDRIVE (B5254T2, AW50/51 AWD; 2003-2007)

BEVEL GEAR, REPLACING

Special tools:

9997057

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

REMOVAL

PREPARATIONS

To remove the drive shaft from the wheel hub, see **REPLACING THE FRONT RIGHT DRIVE SHAFT** .

REMOVING THE SPLASH GUARD

Fig. 1: Identifying Under Engine Splash Guard
Courtesy of VOLVO CARS CORPORATION

Remove the engine splash guard.

REMOVING THE DRIVE SHAFT BEARING CAP

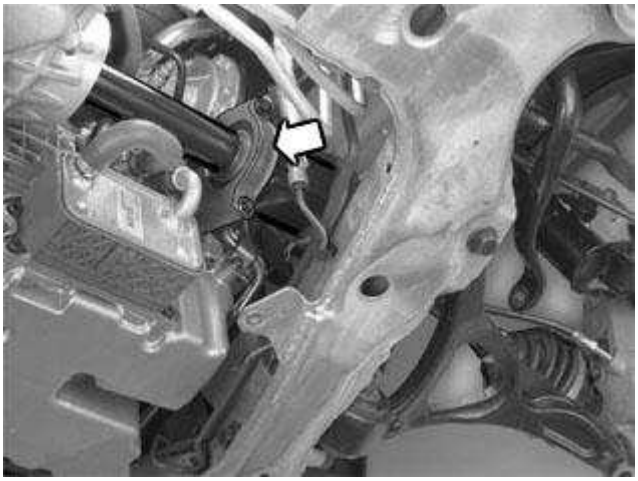


Fig. 2: Drive Shaft Support Bearing Cap
Courtesy of VOLVO CARS CORPORATION

Remove the bearing cap for the drive shaft.

Hold down the spring strut. Pull out the drive shaft.

REMOVING THE PROPELLER SHAFT

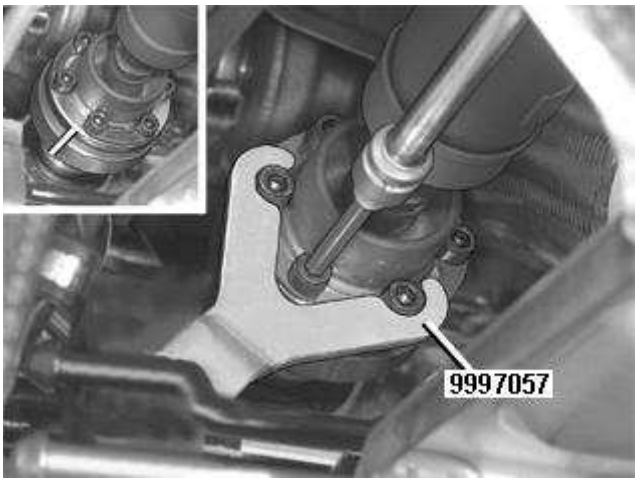


Fig. 3: Identifying Matchmark On Propeller Shaft CV Joint And Special Tool 999 7057
Courtesy of VOLVO CARS CORPORATION

When removing the bevel gear but not replacing:

Mark the propeller shaft CV joint in relation to the bevel gear flange.

Remove the propeller shaft screws. Use counterhold **9997057** .

REMOVING THE MOUNTING FOR THE CENTER BEARING FOR THE PROPELLER SHAFT

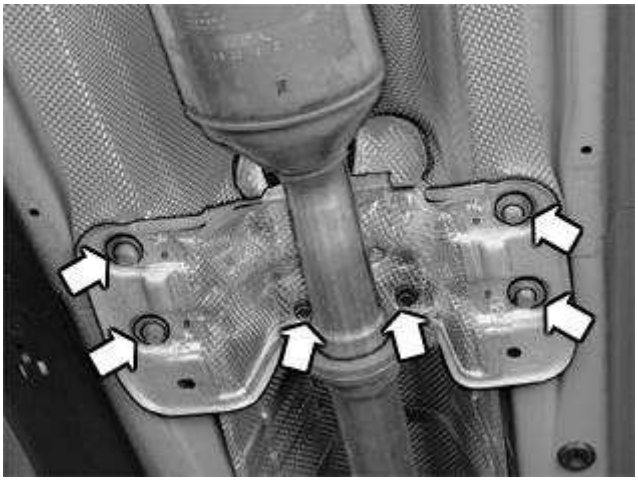


Fig. 4: Identifying Center Bearing Member
Courtesy of VOLVO CARS CORPORATION

Remove:

- the screws for the bearing for the propeller shaft in the center bearing member
- the screws for the center bearing member. Let the member rest on the exhaust system.

Press the propeller shaft CV joints together. Angle the axle so that it can be removed from the bevel gear.

REMOVING BEVEL GEAR

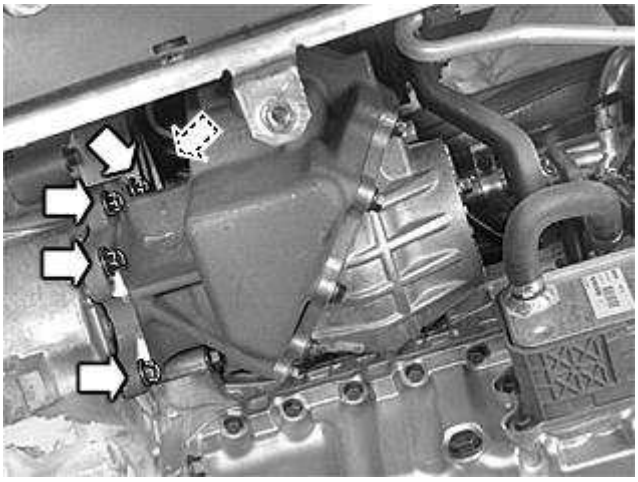


Fig. 5: Angle Gear Screws
Courtesy of VOLVO CARS CORPORATION

Fold down the tab on the sub-frame to create a space to remove the bevel gear.

Remove the 5 bolts holding the bevel gear and pull it straight out from the transmission.

TRANSFERRING COMPONENTS

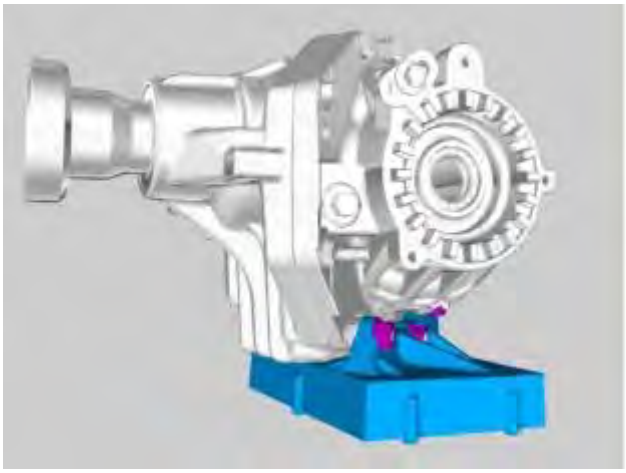


Fig. 6: Identifying Vibration Damper (1 Of 2)
Courtesy of VOLVO CARS CORPORATION

There are two different types of vibration damper (see this and the next step).

When replacing the bevel gear, transfer the vibration damper to the new bevel gear.

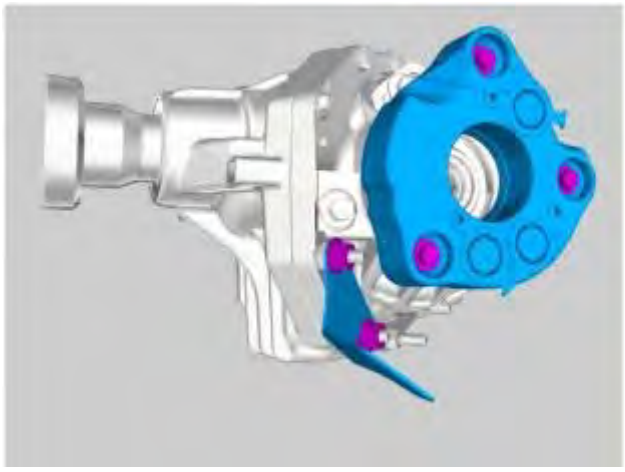


Fig. 7: Identifying Vibration Damper (2 Of 2)
Courtesy of VOLVO CARS CORPORATION

When replacing the bevel gear, transfer the vibration damper to the new bevel gear. In certain markets there is a bracket for an engine block heater. This bracket must also be transferred.

Install two washers between the bevel gear and bracket on the lower stud (see spare parts catalogue).

INSTALLATION

NOTE: For tightening torques, see: TIGHTENING TORQUE .

NOTE: Before installing the bevel gear, lubricate the spline joint between the transmission and the bevel gear using grease. See: SPLINES GREASING .

INSTALLING THE BEVEL GEAR

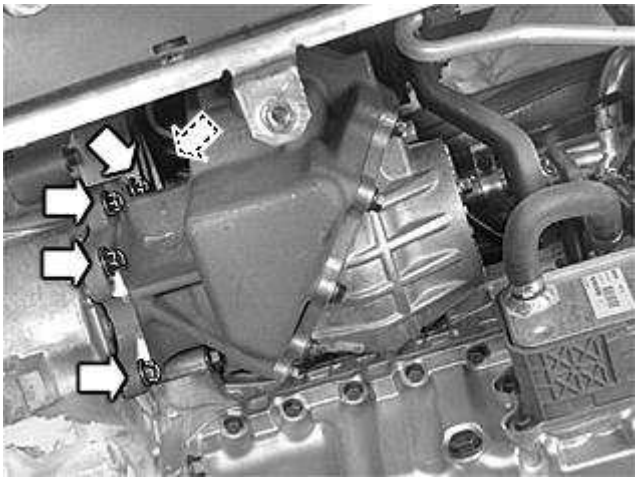


Fig. 8: Angle Gear Screws
Courtesy of VOLVO CARS CORPORATION

Check that there is no oil leakage between the bevel gear's connecting sleeve and the sealing ring on the transmission, and that the sleeve is not generally damaged and is seated correctly.

To replace the connecting sleeve and seal, see: **SEALING RING, CONNECTING SOCKET, DRIVE SHAFT/DIFFERENTIAL, REPLACING** .

Make sure that the mating surfaces on the transmission and bevel gear are clean and not damaged.

Install the bevel gear. Use **new** screws. Tighten the screws alternately to light contact. See **TIGHTENING TORQUE** .

Fold the tab back into place on the sub-frame.

INSTALLING THE PROPELLER SHAFT ON THE BEVEL GEAR

Fig. 9: Drive Flange Front Joint

Courtesy of VOLVO CARS CORPORATION

Check carefully that the mating surfaces on the propeller shaft CV joint and flange are clean.

Install the propeller shaft according to the previous marking, only if the bevel gear has been removed for any reason other than for replacement.

Tightening the propeller shaft CV joint

Use new screws. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS**

Use a counterhold **9997057** .

INSTALLING THE CENTER BEARING AND MEMBER FOR THE PROPELLER SHAFT

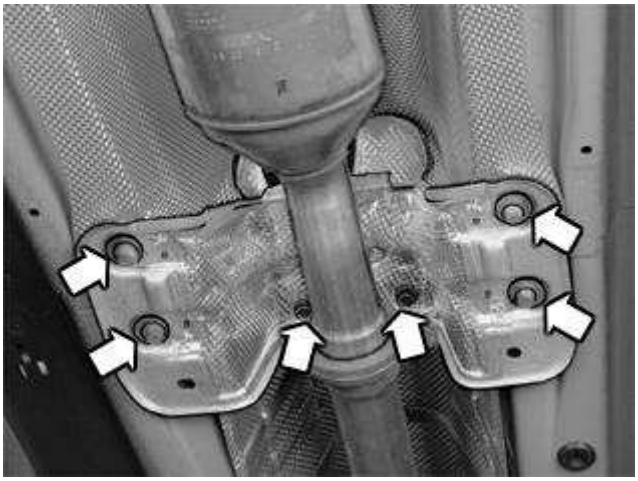


Fig. 10: Identifying Center Bearing Member
Courtesy of VOLVO CARS CORPORATION

Install:

- the 4 M8 screws for the support for the center bearing. Tighten
- the 2 M8 screws for the propeller shaft bearing in the support for the center bearing. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** .

INSTALLING THE DRIVE SHAFT

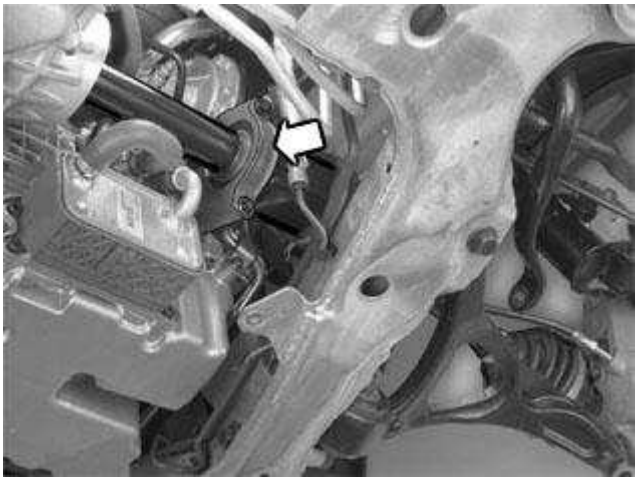


Fig. 11: Drive Shaft Support Bearing Cap
Courtesy of VOLVO CARS CORPORATION

Install the drive shaft on the bevel gear and on the support bearing with the cap, 2 M8 screws. Tighten.

FINISHING

Install the drive shaft to the wheel hub. See **REPLACING THE FRONT RIGHT DRIVE SHAFT** .

Fill the transmission with oil. See **TRANSMISSION FLUID, REPLACING** .

CHECKING THE OIL LEVEL IN THE BEVEL GEAR

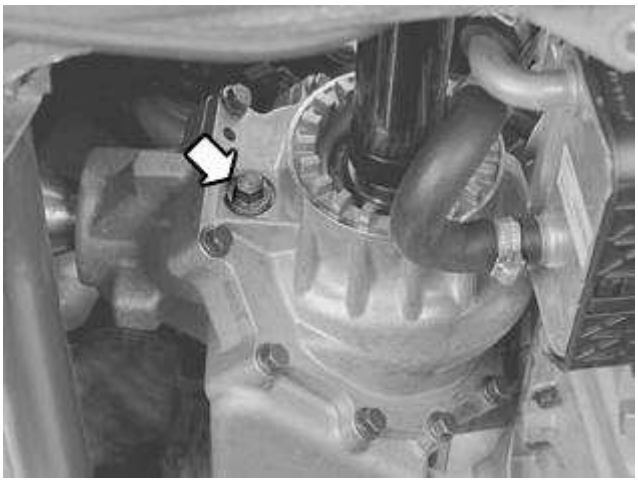


Fig. 12: Bevel Gear Filler Plug
Courtesy of VOLVO CARS CORPORATION

Check the oil level in the bevel gear

Use the right oil. See: **LUBRICATION TRANSMISSION** .

Correct volume 650 ml.

Fill with oil up to the filling plug. Draw out 0.1 l oil.

Tighten the filling plug. See **TIGHTENING TORQUE** .

INSTALLING THE SPLASH GUARD

Fig. 13: Identifying Under Engine Splash Guard
Courtesy of VOLVO CARS CORPORATION

Install the splashguard under the engine.

FITTING THE WHEEL

Install the wheel. See **INSTALLING WHEELS** .

BLEED VALVE BEVEL GEAR, REPLACING

REMOVING THE BRASS PIPE

Remove the bevel gear. See: **BEVEL GEAR, REPLACING**.

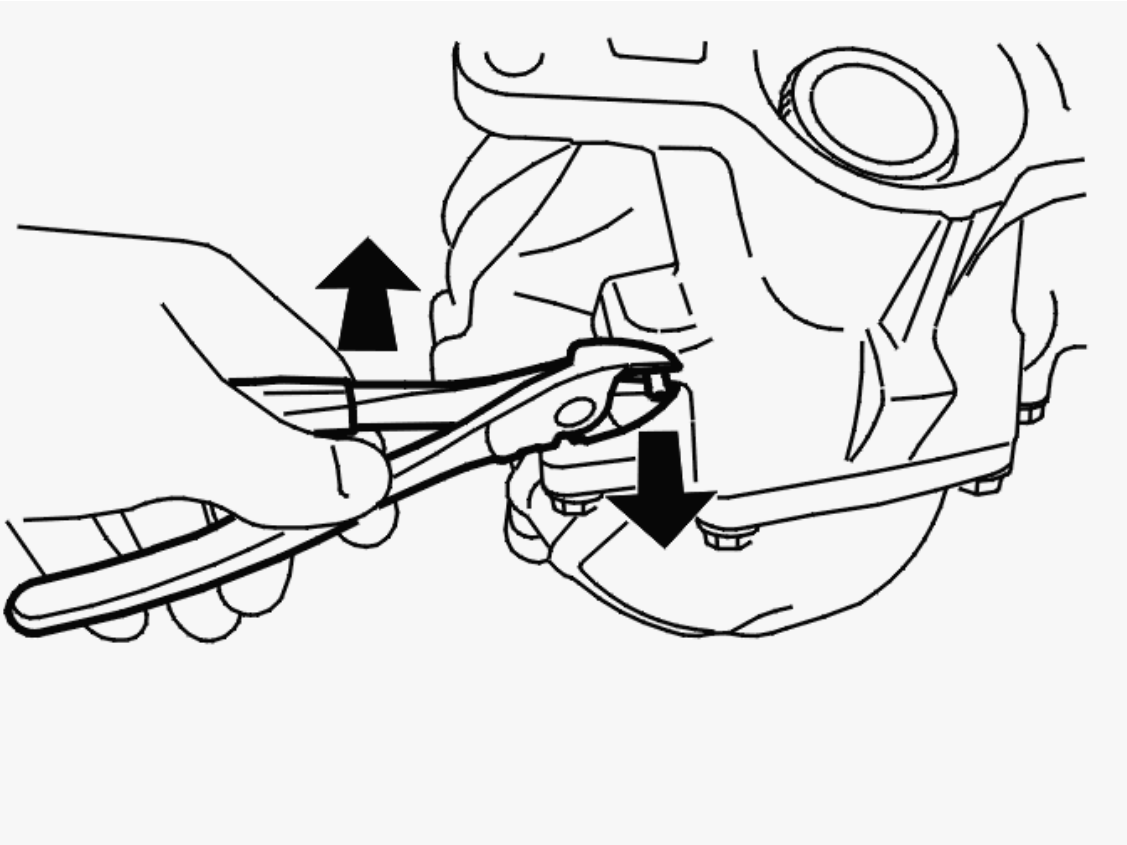


Fig. 14: Removing/Installing Brass Pipe Using Cutting Nippers
Courtesy of VOLVO CARS CORPORATION

Pull out the brass pipe using cutting nippers.

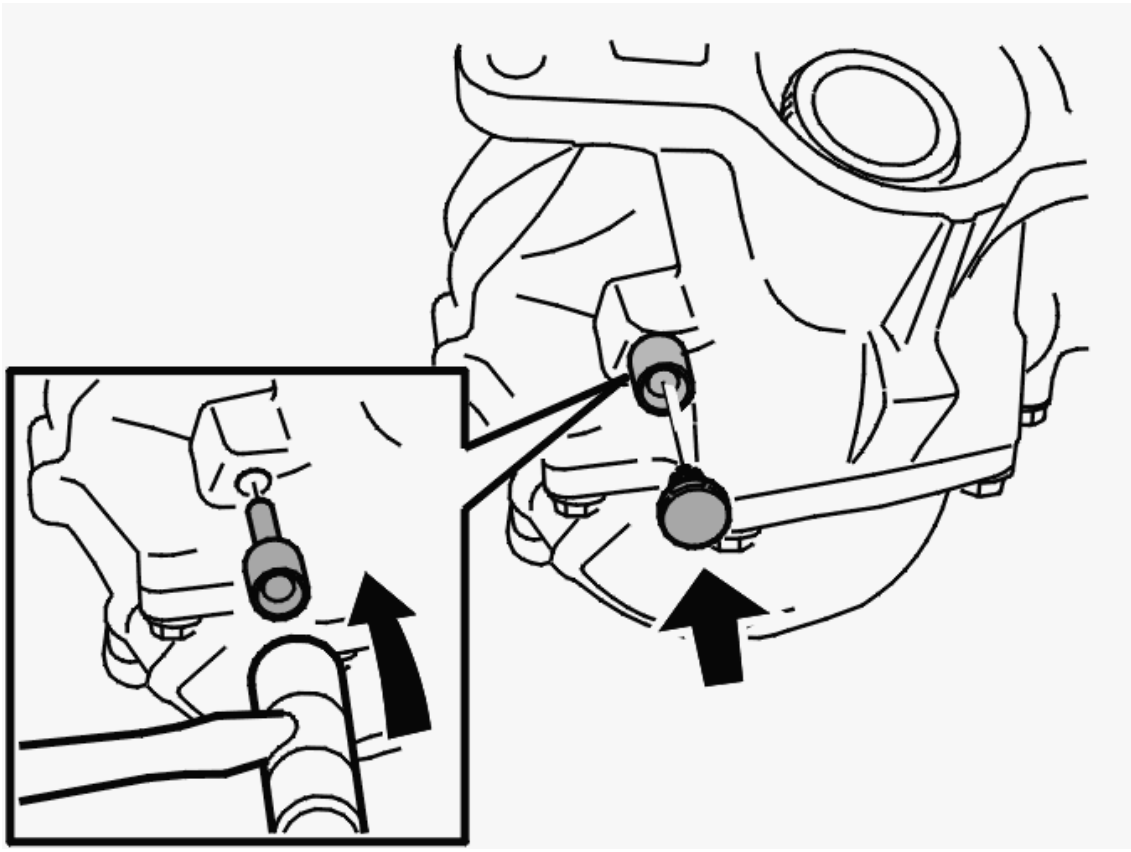


Fig. 15: Identifying Tapping In Nipple Using A Rubber Mallet And Installing Filter
Courtesy of VOLVO CARS CORPORATION

Tap in the nipple using a rubber mallet.

Install the filter on the nipple.

FILLING WITH OIL

Position the bevel gear so that it is standing on the oil pan (as it is located in the car).

Remove the level plug. Fill with oil (P/N 1161648) until the oil runs out of the level plug hole.

CAUTION: Then drain 0.2 l of oil.

Install the level plug. Tighten to: **TIGHTENING TORQUE** .

Install the bevel gear. See: **BEVEL GEAR, REPLACING**.

REPLACING THE PINION SEAL FOR THE BEVEL GEAR

Special tools:

9995069

9995504

9995652

9995653

9995682

9995893

9997057

9997058

NOTE: **As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.**

NOTE: **Check that the parking brake is not applied or that a gear/position P is engaged.**

REMOVAL

REMOVING THE THREE-WAY CATALYTIC CONVERTER (TWC)

Remove the catalytic converter. See **THREE-WAY CATALYTIC CONVERTER (TWC), REPLACING** .

NOTE: **The rear pipe must be supported at the front.**

Tensioner band 9995682 can be used to support the pipe.

MARKING THE PROPELLER SHAFT / CARRIER PLATE

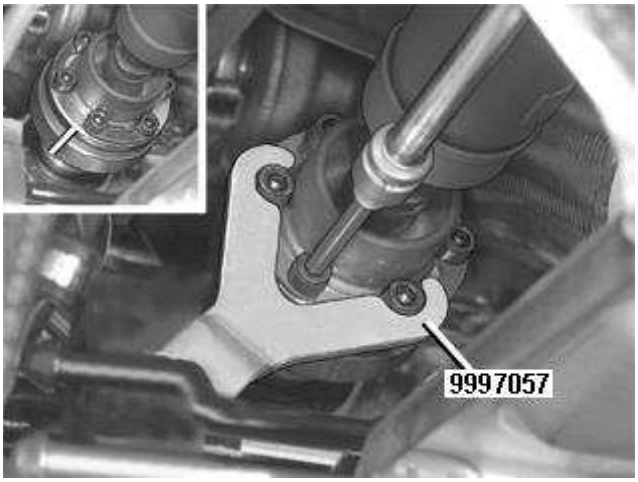


Fig. 16: Identifying Matchmark On Propeller Shaft CV Joint And Special Tool 999 7057
Courtesy of VOLVO CARS CORPORATION

Mark the propeller shaft CV joint in relation to the bevel gear flange

Remove the screws from the propeller shaft.

Use counterhold **9997057** .

REMOVING THE PROPELLER SHAFT

Fig. 17: Identifying Propeller Shaft And Exhaust Secured Using Strap
Courtesy of VOLVO CARS CORPORATION

Slacken off the support for the centre bearing from the propeller shaft and body.Turn the support upside down. Let the propeller shaft rest on the support.

Press the shaft nuts together. Move the shaft to one side and tie it up.

REMOVING THE NUTS FOR THE BEVEL GEAR FLANGE

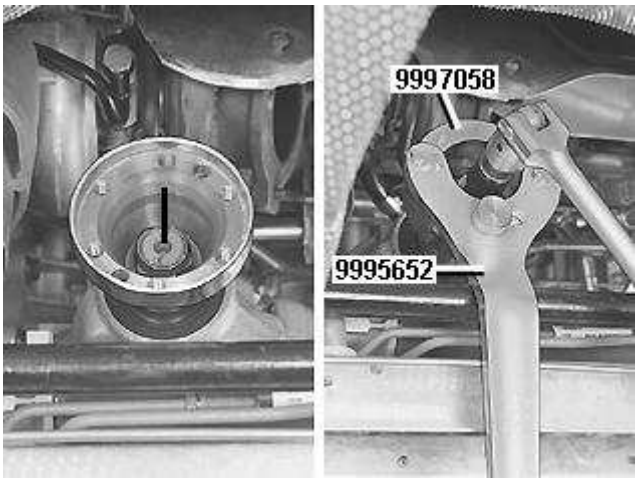


Fig. 18: Identifying Flange Position & Nut Marked In Relation To Pinion Shaft End And Bevel Gear Flange Nuts, Tool 9995652 & Tool 9997058
Courtesy of VOLVO CARS CORPORATION

Mark the position of the flange and nut in relation to the pinion shaft end

Remove the nut.

Use counterhold **9995652** with adapter **9997058** .

REMOVING THE FLANGE

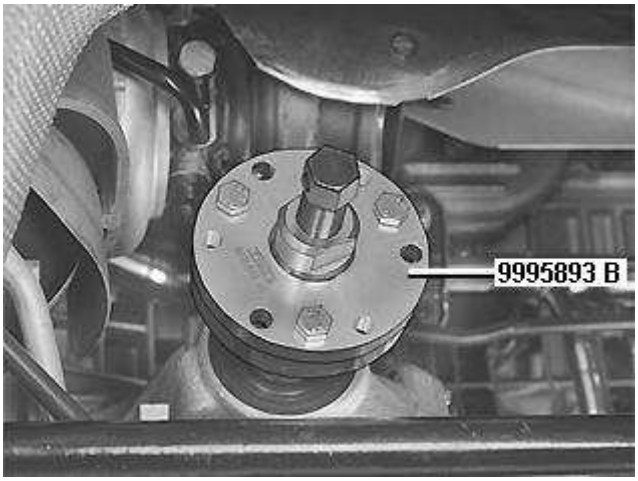


Fig. 19: Identifying Flange Removed Using Puller 999 5893
Courtesy of VOLVO CARS CORPORATION

Remove the flange. Use puller **9995893** .

Check the seal face on the flange.

Replace the flange if it is damaged.

REMOVING THE SEAL

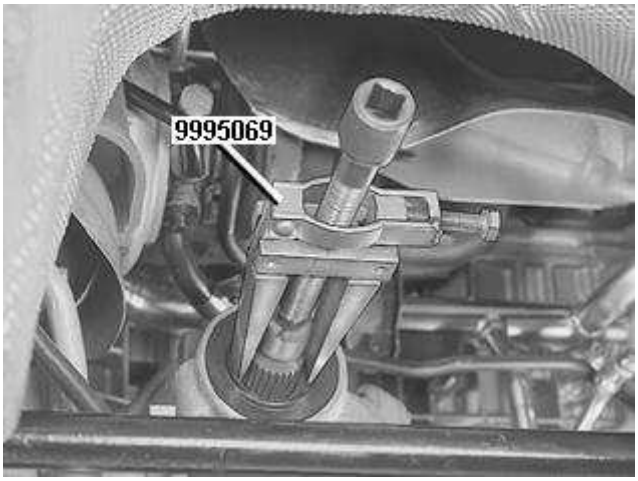


Fig. 20: Identifying Pinion Seal Removed Using Puller 999 5069
Courtesy of VOLVO CARS CORPORATION

Remove the seal.

Use puller **9995069** .

NOTE: Carefully check that no seal residue is left.

INSTALLATION

INSTALLING THE SEAL

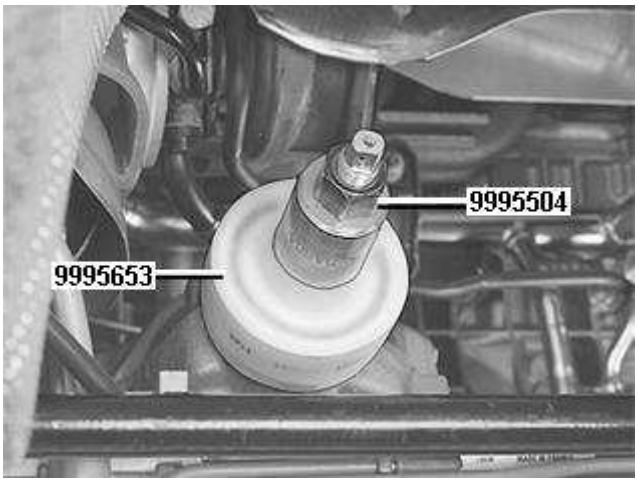


Fig. 21: Identifying Pressing In Seal Using 999 5653 And 999 5504
Courtesy of VOLVO CARS CORPORATION

Install the seal.

Lubricate the lip of the sealing ring with wheel bearing grease, P/N 116 1241-3. Install the seal on drift **9995653** against the side of the tool marked 1155.

Press in the seal.

Use press tool **9995504** .

INSTALLING THE FLANGE ON THE PINION

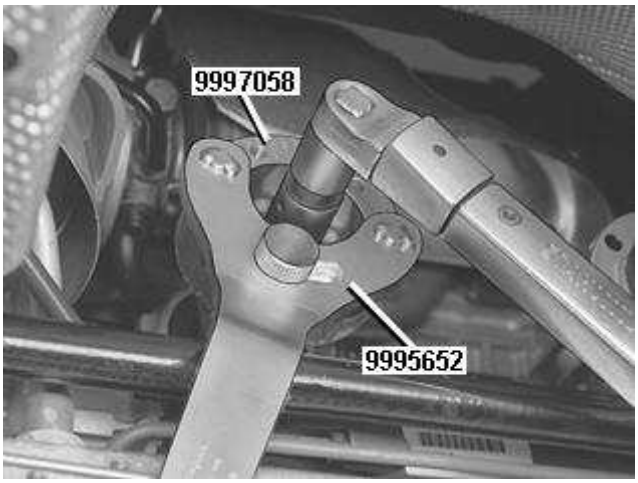


Fig. 22: Identifying Pinion Flange, Tool 999 7058 And 999 5652
Courtesy of VOLVO CARS CORPORATION

Install the flange as marked, see **REMOVING THE NUTS FOR THE BEVEL GEAR FLANGE**.

If necessary, use press tool **9995504** .

Installing a new nut in the carrier

Install a **new lubricated nut** .

NOTE: There must be no axial play.

Tighten to **180-200 Nm** . Use counterhold **9995652** with adapter **9997058** .

NOTE: Do not exceed a tightening torque of 200Nm. The forces on the pinion bearing may become too great, causing it to seize.

INSTALLING THE PROPELLER SHAFT

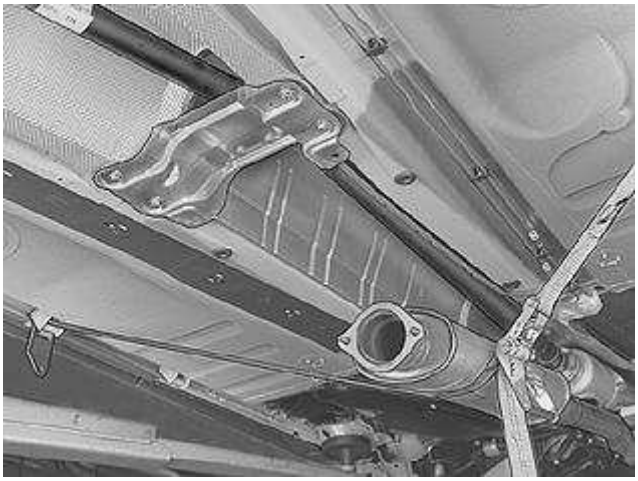


Fig. 23: Center Bearing Support
Courtesy of VOLVO CARS CORPORATION

Check that the mating surfaces on the propeller shaft CV joint and flange are clean.

Align the propeller shaft CV joint against the flange.

Install the screws loosely in the support for the centre bearing and the propeller shaft.

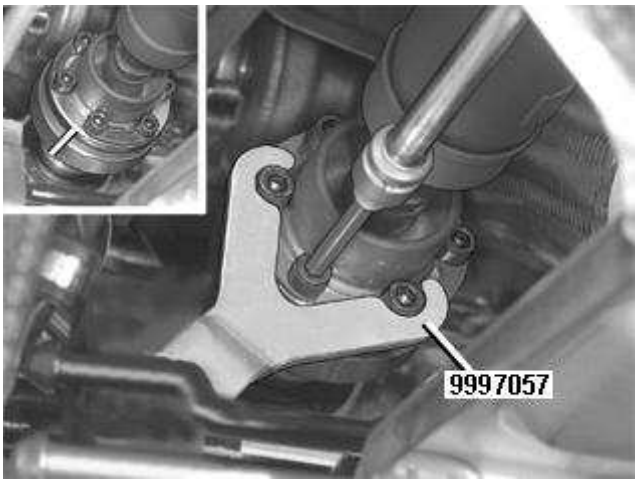


Fig. 24: Identifying Matchmark On Propeller Shaft CV Joint And Special Tool 999 7057
Courtesy of VOLVO CARS CORPORATION

Install the propeller shaft using the marking made earlier

Tightening the propeller shaft CV joint

Use **new** screws.

First tighten the screws crosswise. Tighten to **8 Nm** . Then tighten to **30 Nm** .

Use counterhold **9997057** .

Tighten the screws for the support for the center bearing. Tighten to **25 Nm** .

Tighten the screws for the propeller shaft center bearing. Tighten to **25 Nm** .

INSTALLING THE THREE-WAY CATALYTIC CONVERTER (TWC)

Install the catalytic converter, see **THREE-WAY CATALYTIC CONVERTER (TWC), REPLACING** .

CHECKING THE OIL LEVEL IN THE BEVEL GEAR

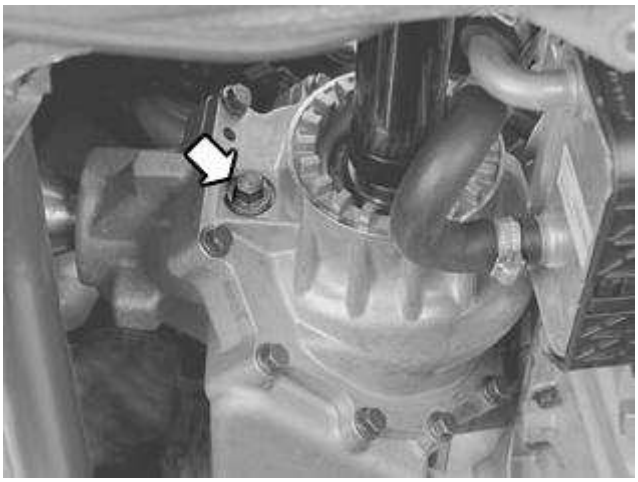


Fig. 25: Bevel Gear Filler Plug
Courtesy of VOLVO CARS CORPORATION

The bevel gear is supplied filled with oil, however, always check the oil level.

Use the right oil. See: **LUBRICANT TRANSMISSION** .

Correct volume 650 ml

Fill with oil up to the filling plug. Draw out 0.1 l oil.

Tighten the level plug. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** .

SEALING RING, CROWN WHEEL SHAFT, LEFT-HAND SIDE, REPLACE

Special tools:

9997086

9997087

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information

is always correct.

PREPARATORY WORK

REMOVING BEVEL GEAR

Remove the bevel gear. See **BEVEL GEAR, REPLACING**.

REMOVAL

REMOVING THE SEALING RING

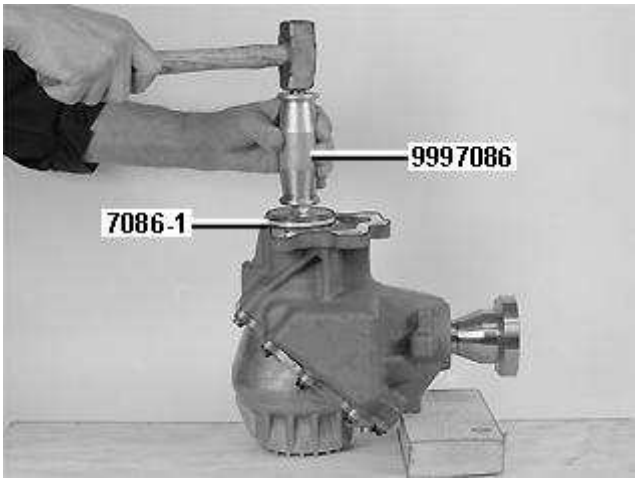


Fig. 26: Removing Left-Hand Side Crown Wheel Shaft Sealing Ring
Courtesy of VOLVO CARS CORPORATION

Position the bevel gear on a workbench. Support the gear using a wooden block.

Use extractor **9997086** together with spacer ring 7086-1. Knock the seal towards the housing using the extractor sleeve.

Remove the seal using the impact driver handle of the extractor.

Check thoroughly that no seal residue remains.

DRAINING THE BEVEL GEAR OIL

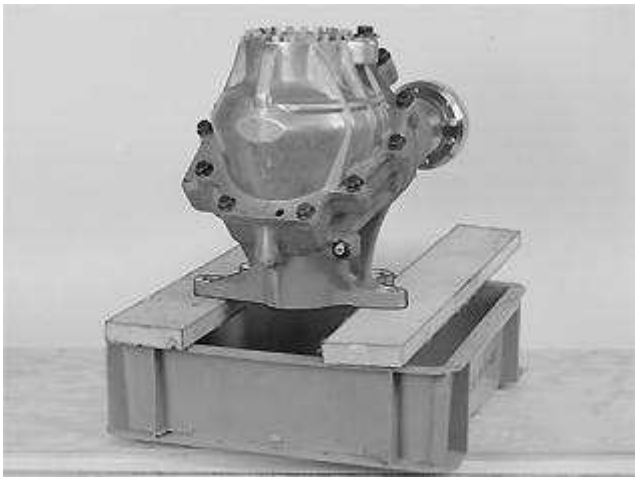


Fig. 27: Identifying Bevel Gear
Courtesy of VOLVO CARS CORPORATION

Position the bevel gear over a container. Remove the level plug. Allow the oil to run out through the bearing. Wipe away spilt oil from the sealing ring seat on the bevel gear. Use a lint-free rag.

INSTALLATION

INSTALLING THE SEALING RING

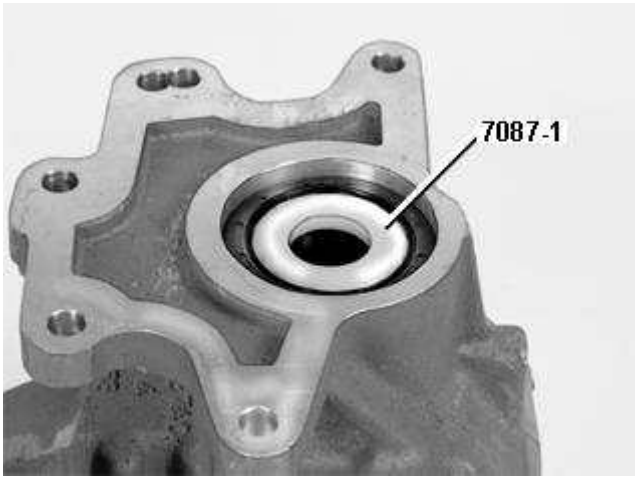


Fig. 28: Identifying Sleeve 7087-1 Installed In End Of Shaft
Courtesy of VOLVO CARS CORPORATION

Install sleeve 7087-1 in the end of the shaft. Lubricate the lip of the new sealing ring. Use grease 116 1241-3 (80g). Position the seal on the sleeve.

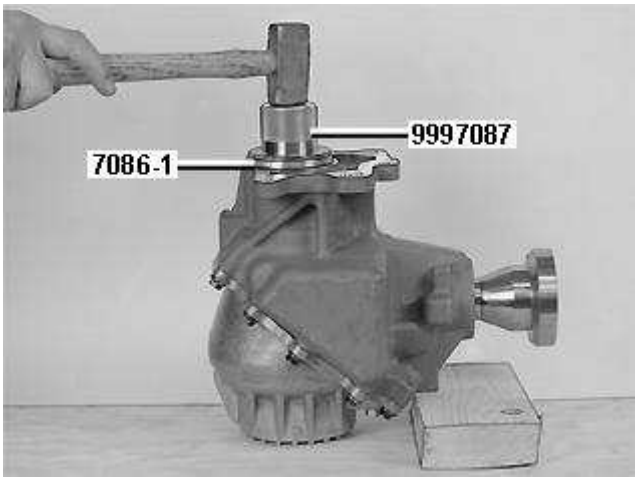


Fig. 29: Installing The Seal Into The Bevel Gear Using Drift 999 7087 Together With Spacer Ring 7086-1
Courtesy of VOLVO CARS CORPORATION

Knock the seal into the bevel gear. Use drift **9997087** together with spacer ring 7086-1. Ensure that the tool goes towards the bevel gear housing. Check that sleeve 7087-1 is removed with the tool.

FINISHING

INSTALLING THE BEVEL GEAR

Install the bevel gear. See **BEVEL GEAR, REPLACING**.

FILLING WITH OIL

Top up with new oil. See **REPLACING THE PINION SEAL FOR THE BEVEL GEAR**.

SEALING RINGS BEVEL GEAR, REPLACING

Special tools:

9995371

9995654

9995655

NOTE: To remove the drive shaft, see REPLACING THE FRONT RIGHT DRIVE SHAFT .

SEALING RING FOR DRIVE SHAFT FRONT RIGHT SIDE, REPLACING

REMOVING THE SEALING RING

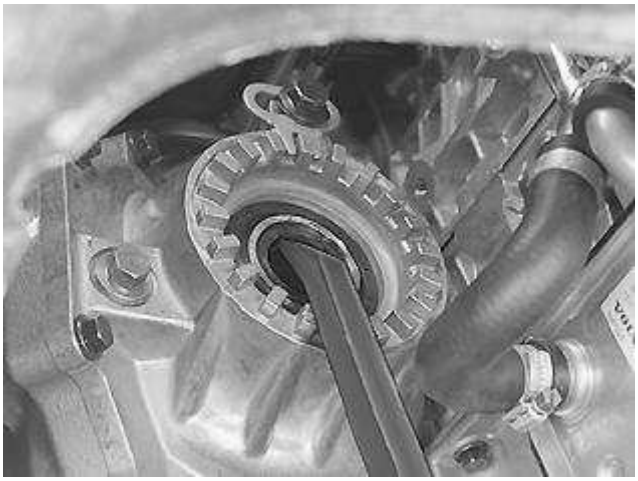


Fig. 30: Identifying Removing The Sealing Ring
Courtesy of VOLVO CARS CORPORATION

Lever the sealing ring off the crown wheel shaft.

Use a screwdriver or a jimmy bar.

INSTALLING A NEW SEALING RING

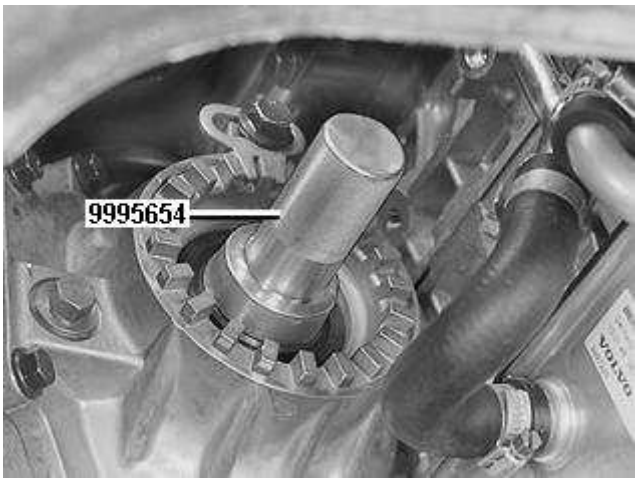


Fig. 31: Identifying Installing A New Sealing Ring
Courtesy of VOLVO CARS CORPORATION

Install the new sealing ring for the drive shaft.

Lubricate the seal using wheel bearing grease, P/N 116 1241-3.

Use drift **9995654** . Tap in sealing ring to its stop.

If also replacing the seal for the crown wheel shaft, proceed to **SEALING RING FOR CROWN WHEEL SHAFT FOR BEVEL GEAR, REPLACING**.

NOTE: To install the drive shaft, see REPLACING THE FRONT RIGHT DRIVE SHAFT .

SEALING RING FOR CROWN WHEEL SHAFT FOR BEVEL GEAR, REPLACING

MARKING THE POSITION OF THE ADJUSTMENT NUT

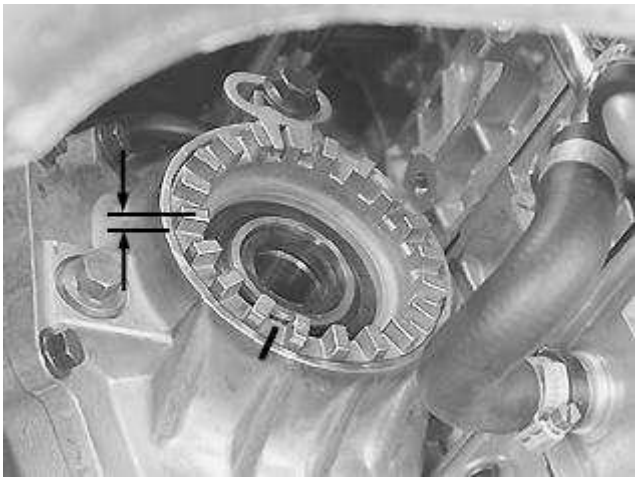


Fig. 32: Identifying Position Of The Adjustment Nut Mark
Courtesy of VOLVO CARS CORPORATION

Mark the position of the adjustment nut in relation to the housing with a scriber.

Measure the height between the nut and housing. Make a note of the measurement.

Remove screw and split pin.

REMOVING THE ADJUSTMENT NUT

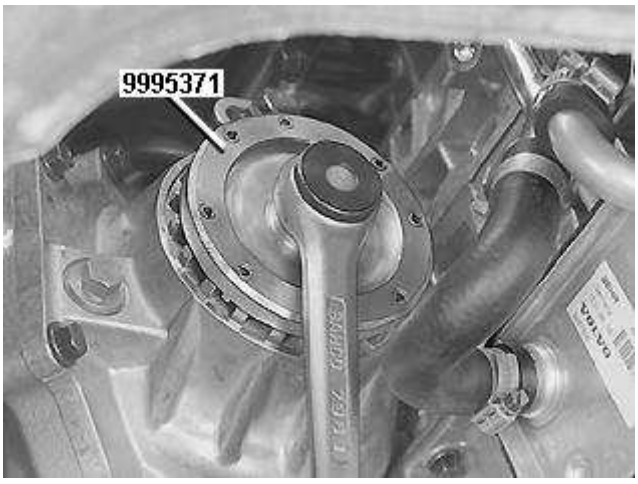


Fig. 33: Identifying Removing/Installing Adjustment Nut
Courtesy of VOLVO CARS CORPORATION

Remove the adjustment nut.

Use wrench **9995371** .

REMOVING THE SEALING RING

Fig. 34: Identifying Sealing Ring
Courtesy of VOLVO CARS CORPORATION

Tap out the sealing ring.

Use a screwdriver.

INSTALLING THE SEALING RING

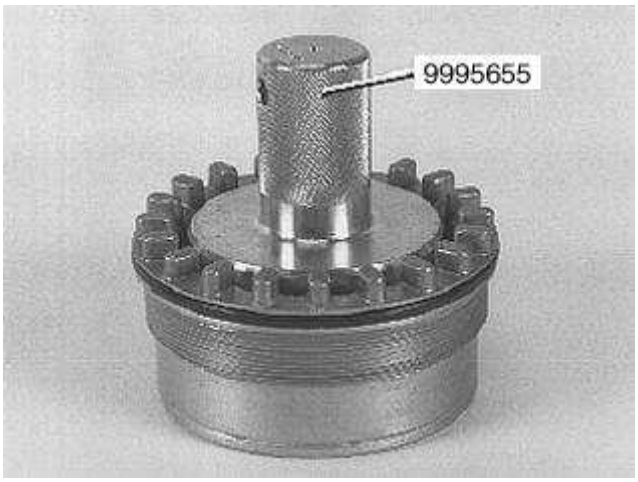


Fig. 35: Identifying Installation Of Sealing Ring
Courtesy of VOLVO CARS CORPORATION

Install the sealing ring for the adjustment nut.

Lubricate the sealing ring lip using wheel bearing grease, P/N 116 1241-3.

Use drift **9995655** . Tap in the seal until the drift bottoms on its stop against the nut.

Install a new O-ring on the nut. Lubricate the O-ring and threads with wheel bearing grease as above.

INSTALLING THE ADJUSTMENT NUT

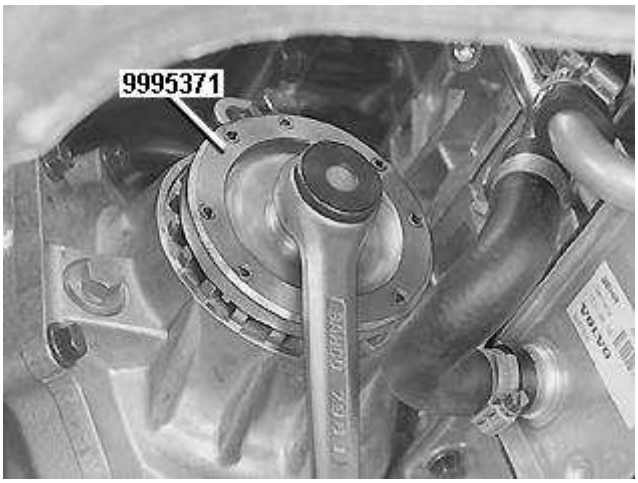


Fig. 36: Identifying Removing/Installing Adjustment Nut
Courtesy of VOLVO CARS CORPORATION

Install the adjustment nut.

Use wrench **9995371** Turn the propeller shaft when the nut is tightened to its previously measured position.

CHECKING THE MARKING

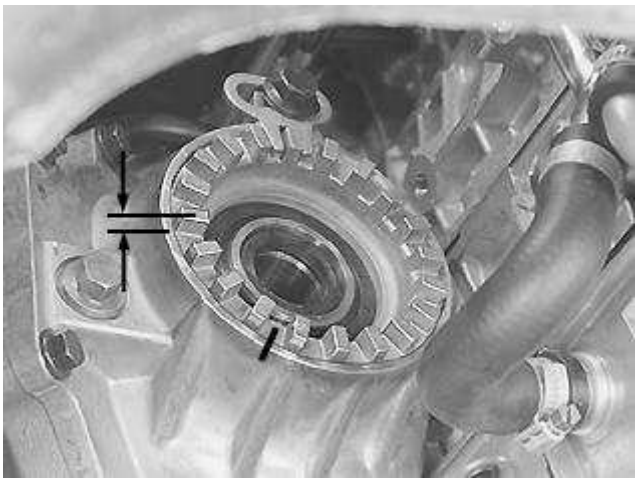


Fig. 37: Identifying Position Of The Adjustment Nut Mark
Courtesy of VOLVO CARS CORPORATION

Check that the marking corresponds exactly. Check the height. See **MARKING THE POSITION OF THE ADJUSTMENT NUT**.

Install the split pin. Tighten the screw. Tighten to **50 Nm** .

Checking the oil level in the bevel gear

Check the oil level in the bevel gear. See **CHECKING THE OIL LEVEL IN THE BEVEL GEAR**

NOTE: To install the drive shaft, see REPLACING THE FRONT RIGHT DRIVE SHAFT .

AUXILIARY TRANSMISSION, BEVEL GEAR AND OVERDRIVE (B6294T; 2003-2006)

REPLACING THE BEVEL GEAR/CHAIN HOUSING

Special tools:

9995462

9997057

9997063

NOTE: Since illustrations in this service information are used for different model years and/or models, some variation may occur. However, the essential information is always correct.

REMOVAL

PREPARATIONS

Fig. 38: Identifying Dip Stick Pipe & Oil Suction Device
Courtesy of VOLVO CARS CORPORATION

Drain the gearbox fluid.

Use an oil suction device to drain approximately 4 liters of gearbox fluid.

Remove the sub-frame. See: **SUB-FRAME FRONT, REPLACING** .

REMOVING THE RIGHT DRIVE SHAFT

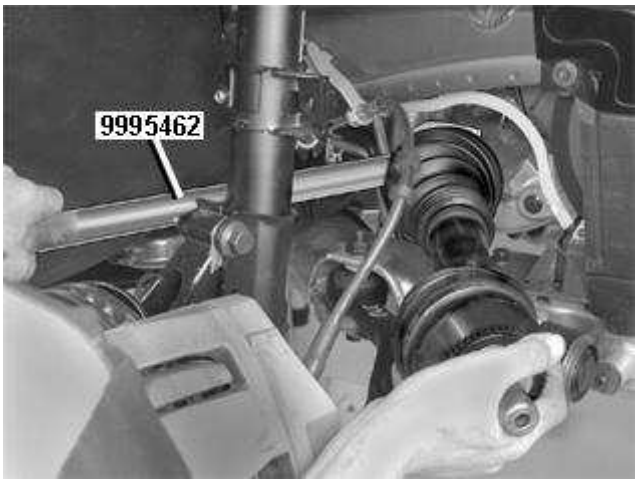


Fig. 39: Detach The Drive Shaft With Jimmy Bar
Courtesy of VOLVO CARS CORPORATION

Angle the wheel hub out. Remove the drive shaft from the hub. Use a tensioner band to pull the stub axle - wheel hub backwards.

Remove the drive shaft from the gearbox. Use Jimmy bar B **9995462**

Install sealing plug **9997063** .

PAY ATTENTION TO THE FOLLOWING WHEN REMOVING PROPELLER SHAFT

Follow instructions. **PROPELLER SHAFT, SPECIAL INFORMATION**

REMOVING THE PROPELLER SHAFT

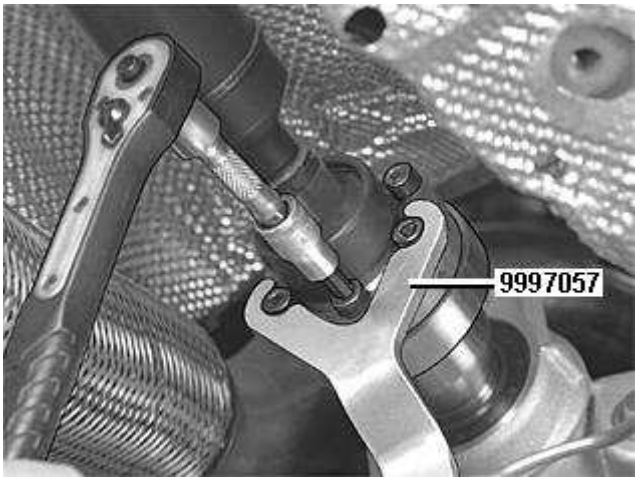


Fig. 40: Identifying Removal Of Propeller Shaft Using Counterhold

Courtesy of VOLVO CARS CORPORATION

Mark the propeller shaft CV joint in relation to the bevel gear flange.

Remove:

- the 2 screws for the centre bearing mounting
- the propeller shaft screws. Use counterhold **9997057** . Press the propeller shaft joints together. Move the propeller shaft to one side and tie it up.

DISCONNECTING THE STEERING GEAR FROM THE ENGINE PAD

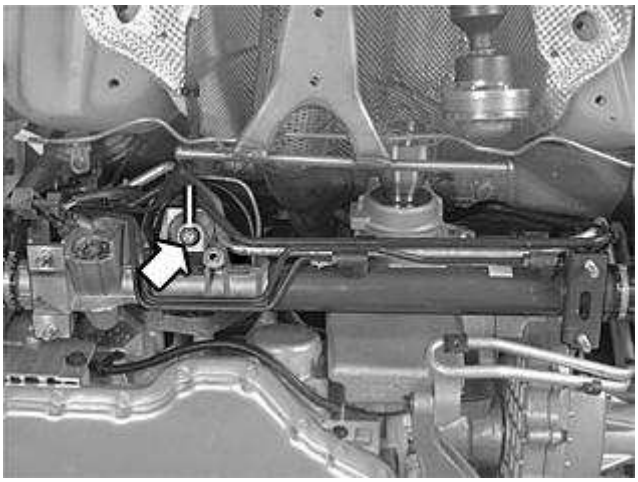


Fig. 41: Identifying Mark For Steering Gear Position
Courtesy of VOLVO CARS CORPORATION

Mark up the position of the steering gear in relation to the engine pad.

Remove the screw for the steering gear and engine pad.

Move the steering gear towards the bulkhead. Hold it up using tie straps.

REMOVING THE CHAIN HOUSING BRACKET

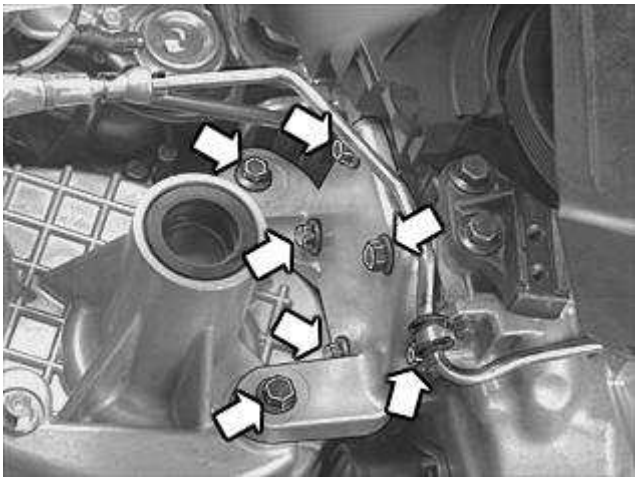


Fig. 42: Identifying Chain Housing Bracket Screws
Courtesy of VOLVO CARS CORPORATION

Remove:

- the screw in the clamp for the fuel line
- the bracket for the chain housing/engine.

REMOVING THE BEVEL GEAR/CHAIN HOUSING

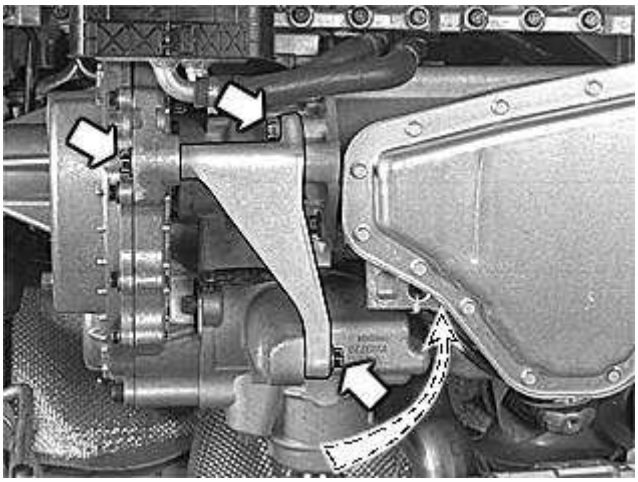


Fig. 43: Locating Screw For The Bevel Gear/Engine
Courtesy of VOLVO CARS CORPORATION

Remove:

- the screw for the bevel gear/engine. The screw is positioned on top of the bevel gear. The screw can be accessed from the centre
- the screw between the chain housing/bracket and the other screws in the bracket.

Pull the chain housing/bevel gear 5-10 mm out from the gearbox. Then remove the bracket. The bracket is

upturned with a guide sleeve in the gearbox end.

NOTE: Two people are required to carry out the following procedure as the bevel gear - chain housing is relatively large.

Remove the bevel gear/chain housing by first pulling it straight out from the gearbox.

NOTE: Do not damage the seal ring in the transmission end.

Then turn the unit so that it can be removed to the side and downwards.

CHECKING THE SEALING RING

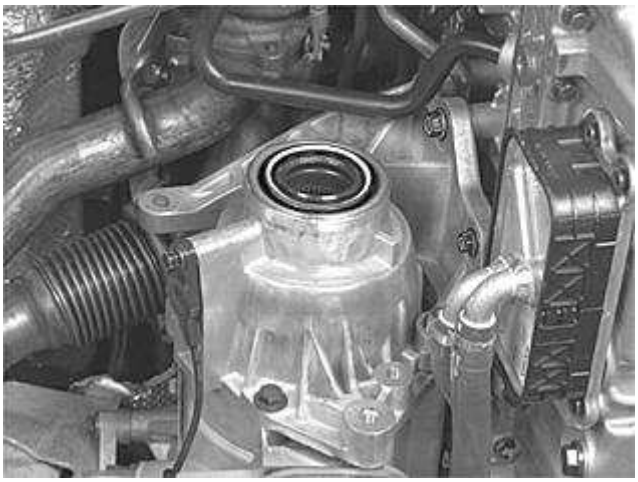


Fig. 44: Identifying The Sealing Ring
Courtesy of VOLVO CARS CORPORATION

Check that the sealing ring in the gearbox end is undamaged.

Replace the sealing ring with a new sealing ring if damaged, see **REMOVE THE DRIVE SHAFT SEAL** and /or **INSTALL THE DRIVE SHAFT SEAL**.

SEPARATING THE BEVEL GEAR/CHAIN HOUSING

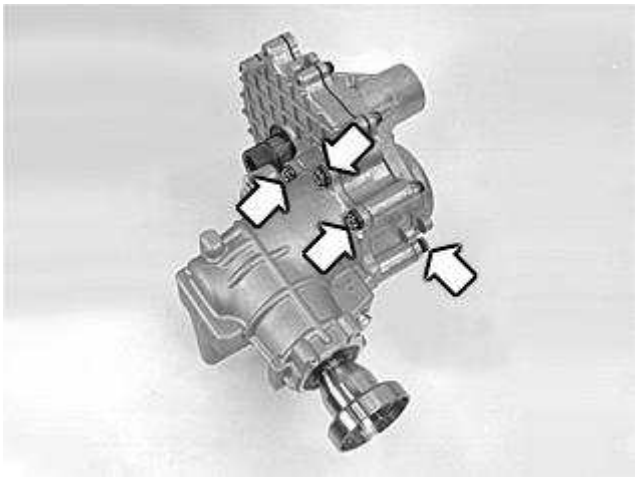


Fig. 45: Identifying Chain Housing Screws
Courtesy of VOLVO CARS CORPORATION

Remove the 4 screws. Pull the chain housing straight out from the bevel gear.

NOTE: Do not place the chain housing with the opening for the bevel gear facing down, oil will run out.

CHECKING THE CHAIN HOUSING

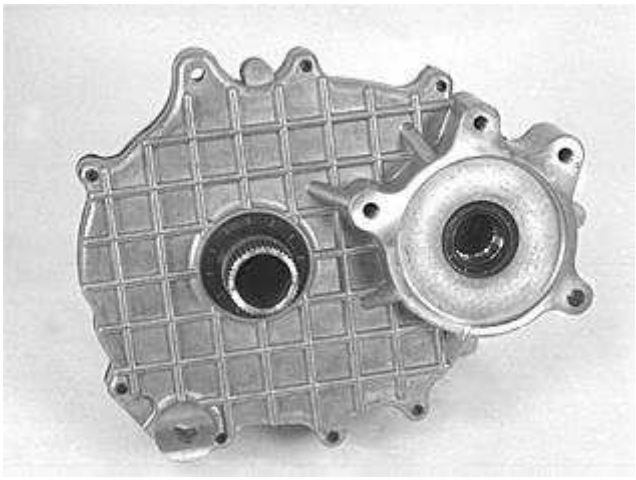


Fig. 46: Checking The Chain Housing
Courtesy of VOLVO CARS CORPORATION

Check that the sealing rings and mating surfaces are not damaged. Check for leakage. Replace the chain housing in the event of leakage.

HINT: A new chain housing is not filled with oil.

CHECKING THE BEVEL GEAR

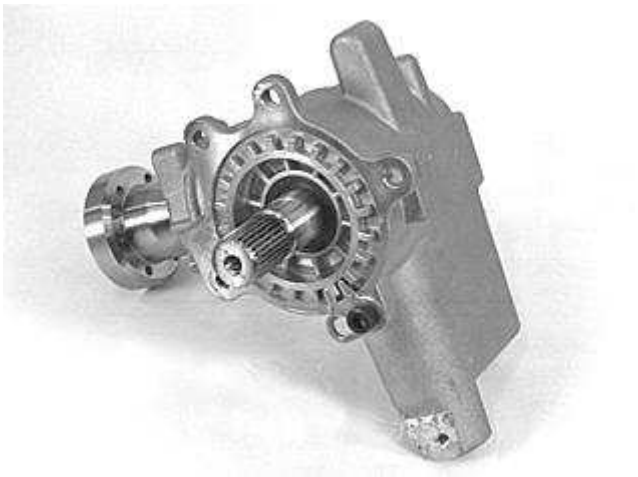


Fig. 47: Identifying The Sealing Rings And Mating Surfaces
Courtesy of VOLVO CARS CORPORATION

Check that the sealing rings and mating surfaces are not damaged. Check for leakage. Replace the bevel gear in the event of leakage or damage.

HINT: A new bevel gear is filled with oil, however, always check the oil level before test driving.

REMOVE THE DRIVE SHAFT SEAL

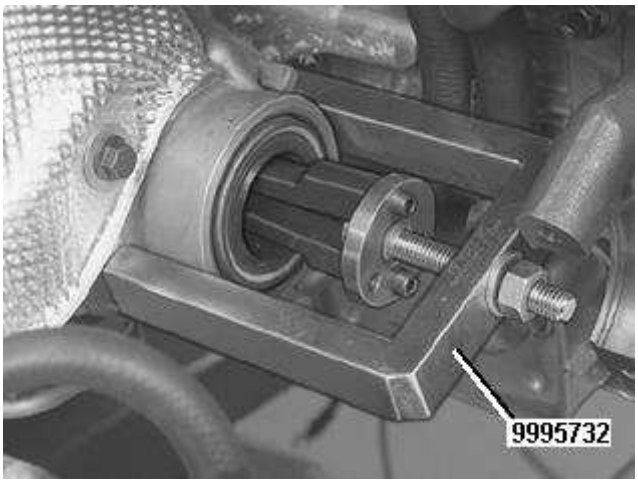


Fig. 48: Removing Drive Shaft Seal Using Puller 999 5732

Use puller **9995732** .

Unscrew the puller. Install a hook gradually between the shaft and sealing ring.

Secure the hooks to the puller. Tighten them using the screws.

Install the mounting bracket and the nut.

Extract the sealing ring.

INSTALL THE DRIVE SHAFT SEAL

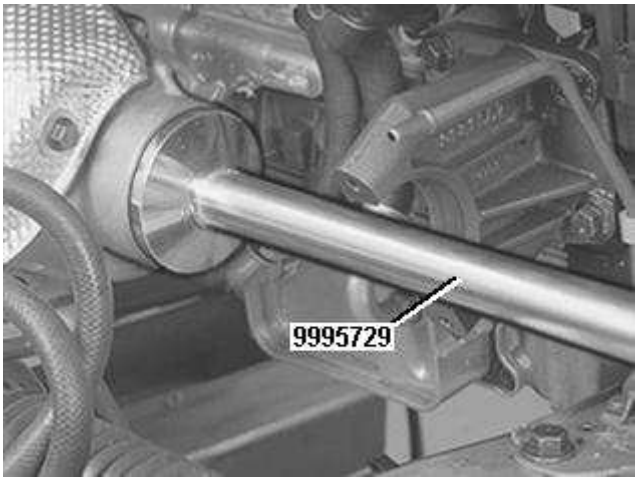


Fig. 49: Installing Drive Shaft Seal Using Drift 999 5729

NOTE: Clean thoroughly before installing the new seal

Apply a small amount of grease to the sealing lip.

Use drift **9995729** .

Carefully tap the drive shaft seal in until the drift is in contact with the transmission housing.

INSTALLATION

NOTE: For tightening torques, see TIGHTENING TORQUE .

ASSEMBLING THE BEVEL GEAR/CHAIN HOUSING

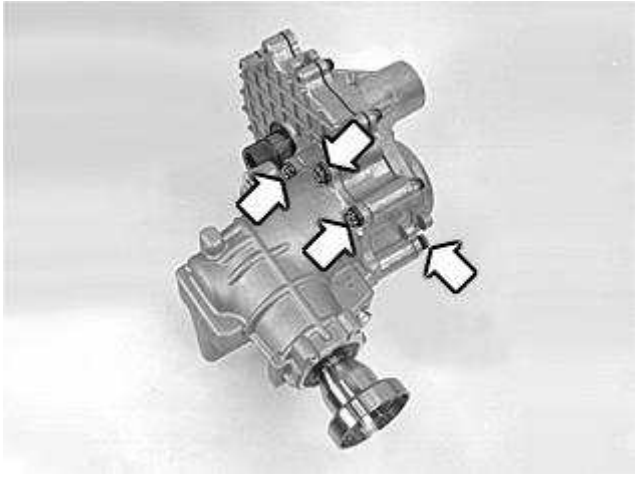


Fig. 50: Identifying Chain Housing Screws
Courtesy of VOLVO CARS CORPORATION

Lubricate the seal using gearbox fluid, P/N 116 1745-3 (1 liter container) when replacing the chain housing.

Do not damage the sealing ring when installing the chain housing on the bevel gear.

Install the 4x M10 screws. Tighten crosswise lightly. Then tighten the screws.

INSTALLING THE BEVEL GEAR / CHAIN HOUSING

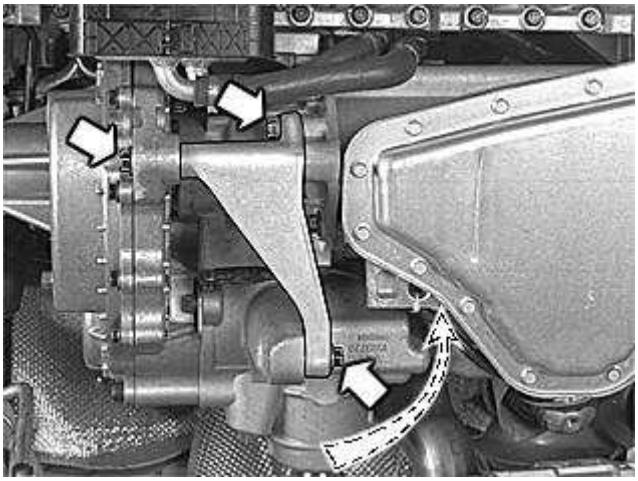


Fig. 51: Locating Screw For The Bevel Gear/Engine
Courtesy of VOLVO CARS CORPORATION

NOTE: Two people are required to carry out the following procedure as the bevel gear/chain housing is relatively large.

NOTE: Make sure that the chain housing's shaft journal does not damage the seal in the transmission end.

Lift up the unit and align the shaft journal in the gearbox. Do not press the unit end in.

Install the bracket and guide sleeve in the gearbox. Press in the unit.

Install all 4x M10 screws loosely. Tighten crosswise lightly. Then tighten the screws.

INSTALLING THE BRACKET

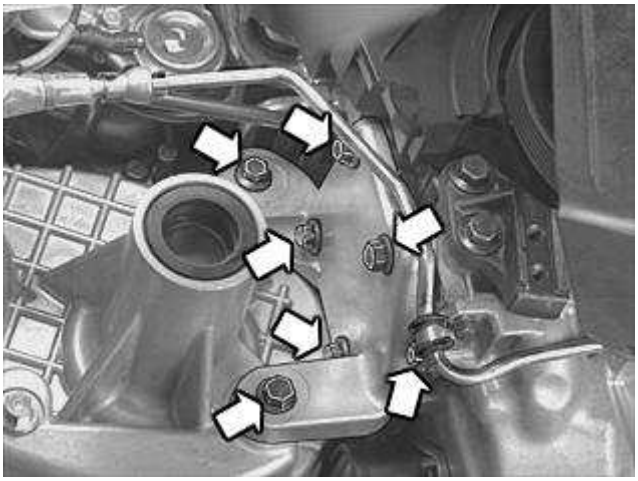


Fig. 52: Identifying Chain Housing Bracket Screws
Courtesy of VOLVO CARS CORPORATION

Install the bracket on the cylinder block and chain housing using 6x M10 screws.

First tighten the screws for the bracket/cylinder block so that the bracket can moves slightly.

Then tighten the two screws to the bracket - chain housing alternately lightly.

Then tighten all the screws.

Install the screws for the fuel line clamp. Tighten.

INSTALLING THE PROPELLER SHAFT

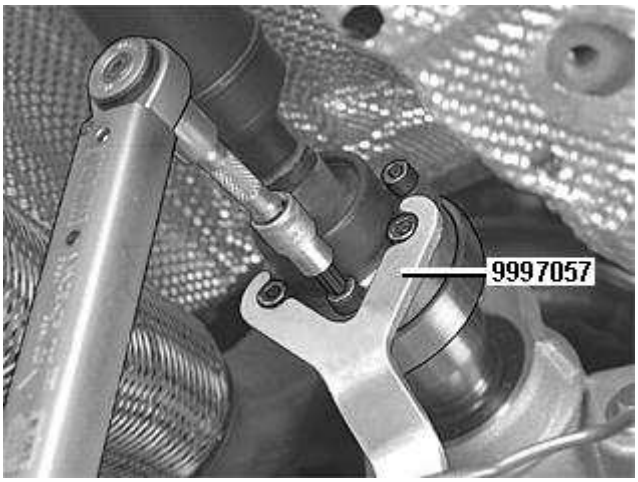


Fig. 53: Identifying Front Propeller Shaft And Special Tool 999 7057
Courtesy of VOLVO CARS CORPORATION

Install the propeller shaft using the marking made earlier.

Check carefully that the mating surfaces on the propeller shaft and flange are clean. Install the 6x M8 screws

and washers. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** . Use counterhold **9997057** .

Install the 2x M8 screws to the propeller shaft centre bearing. Tighten.

INSTALLING THE STEERING GEAR TO THE ENGINE PAD

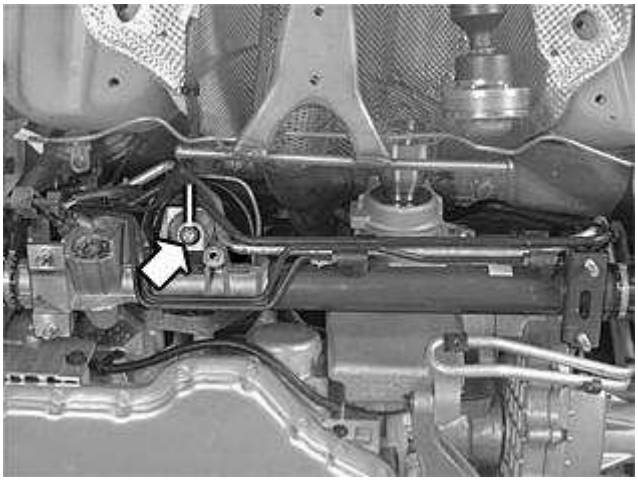


Fig. 54: Identifying Mark For Steering Gear Position
Courtesy of VOLVO CARS CORPORATION

Install the 1 M10 screw for the steering gear and engine pad. Align the steering gear in relation to the engine pad, using the marking made earlier. Tighten.

INSTALLING THE RIGHT DRIVE SHAFT

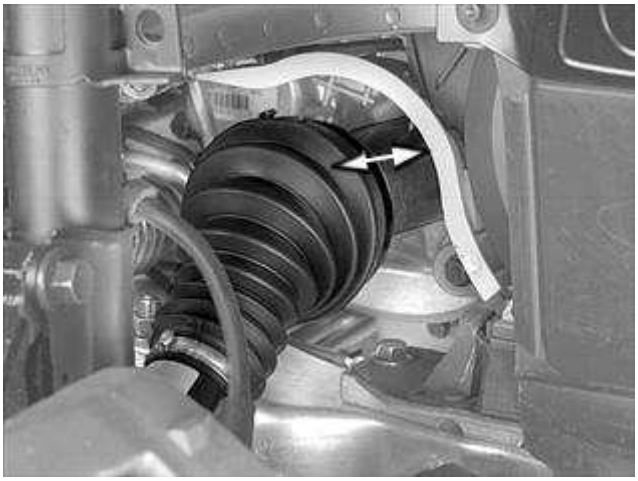


Fig. 55: Identifying Mating Surface Of The Drive Shaft
Courtesy of VOLVO CARS CORPORATION

Lubricate the seal using gearbox fluid, P/N 116 1745-3 (1 liter container) if the chain housing or its sealing ring has been replaced.

Press the drive shaft into the gearbox. Check that the snap ring is in its groove by carefully pulling it in the inner constant velocity joint.

Locate the drive shaft in the wheel hub.

FILLING AND CHECKING OIL

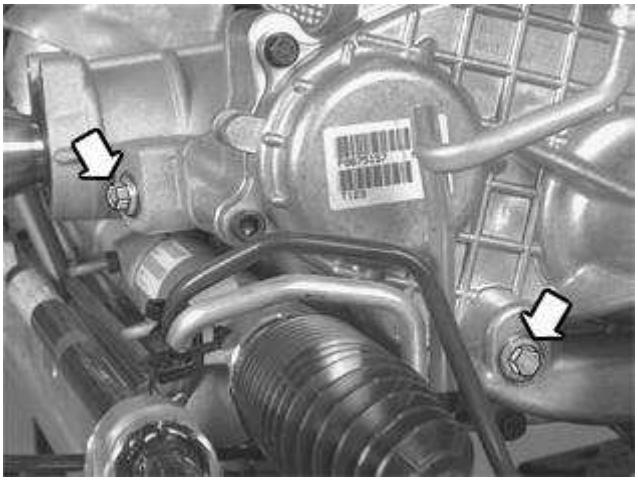


Fig. 56: Locating Chain Housing Bolts
Courtesy of VOLVO CARS CORPORATION

Fill and check the oil in:

- bevel gear. Use the right oil. See: **LUBRICATION TRANSMISSION** .

  Correct volume 650 ml.

  Fill with oil up to the filling plug. Draw out 0.1 l oil.

  Tighten the filling plug. See **TIGHTENING TORQUE** .

- chain housing. Only use oil with P/N 116 1745-3 (1 liter). Tighten according to **TIGHTENING TORQUE**

FINISHING

Install the sub-frame. See **SUB-FRAME FRONT, REPLACING** .

Fill the gearbox with exactly the same amount of new oil as was drained off. Only use automatic gearbox fluid, P/N 116 1521 (1 liter container) or 116 1621 (4-litre container).

Check the gearbox oil. See **OIL LEVEL, CHECKING** .

SEAL, DRIVE SHAFT, REPLACING

Special tools:

9991801

9995729

9995730

9995731

9995732

LEFT-HAND SIDE

PREPARATIONS

See **REAR AXLE, DRIVE SHAFTS - REMOVAL, REPLACEMENT AND INSTALLATION**

REMOVE THE DRIVE SHAFT SEAL

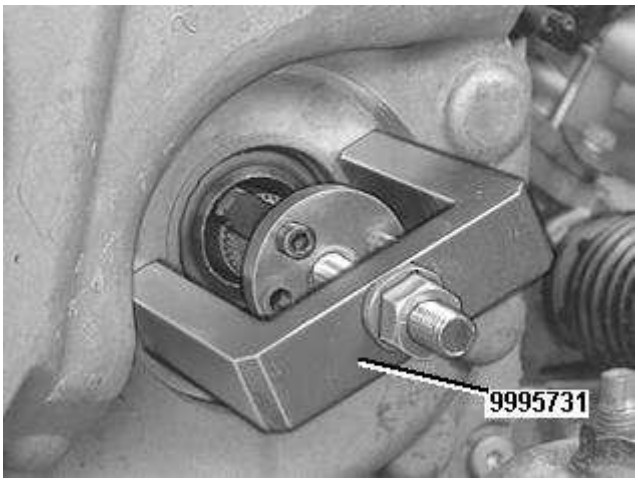


Fig. 57: Removing Drive Shaft Seal Using Puller 999 5731
Courtesy of VOLVO CARS CORPORATION

Use puller **9995731** .

Unscrew the puller. Install a hook gradually between the shaft and sealing ring.

Secure the hooks to the puller. Tighten them using the screws.

Install the mounting bracket and the nut.

Extract the sealing ring.

INSTALL THE DRIVE SHAFT SEAL

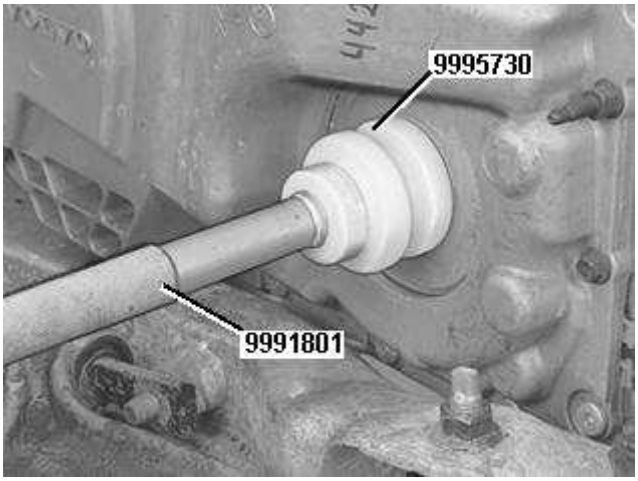


Fig. 58: Installing Drive Shaft Seal Using Drift 999 5730 And Shaft 999 1801
Courtesy of VOLVO CARS CORPORATION

NOTE: Clean thoroughly before installing the new seal

Apply a small amount of grease to the sealing lip.

Use drift **9995730** and shaft **9991801** .

Carefully tap the drive shaft seal in until the drift is in contact with the transmission housing.

INSTALL THE DRIVE SHAFT IN THE TRANSMISSION

See **REAR AXLE, DRIVE SHAFTS - REMOVAL, REPLACEMENT AND INSTALLATION**

RIGHT-HAND SIDE

PREPARATIONS

See **REAR AXLE, DRIVE SHAFTS - REMOVAL, REPLACEMENT AND INSTALLATION**

REMOVE THE DRIVE SHAFT SEAL

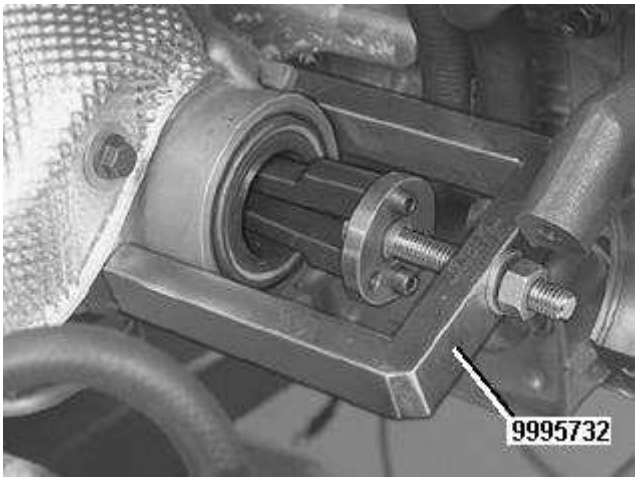


Fig. 59: Removing Drive Shaft Seal Using Puller 999 5732
Courtesy of VOLVO CARS CORPORATION

Use puller **9995732** .

Unscrew the puller. Install a hook gradually between the shaft and sealing ring.

Secure the hooks to the puller. Tighten them using the screws.

Install the mounting bracket and the nut.

Extract the sealing ring.

INSTALL THE DRIVE SHAFT SEAL

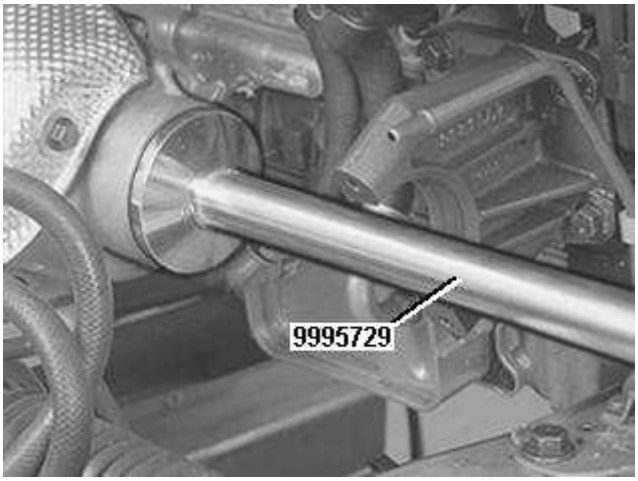


Fig. 60: Installing Drive Shaft Seal Using Drift 999 5729
Courtesy of VOLVO CARS CORPORATION

NOTE: Clean thoroughly before installing the new seal

Apply a small amount of grease to the sealing lip.

Use drift **9995729** .

Carefully tap the drive shaft seal in until the drift is in contact with the transmission housing.

INSTALL THE DRIVE SHAFT IN THE TRANSMISSION

See **REAR AXLE, DRIVE SHAFTS - REMOVAL, REPLACEMENT AND INSTALLATION** .

AUXILIARY TRANSMISSION, BEVEL GEAR AND OVERDRIVE (B6294T, L.H.D; 2003-2006)

PINION SEAL BEVEL GEAR, REPLACING

Special tools:

9995069

9995504

9995652

9995653

9995893

9997058

NOTE: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

PREPARATORY WORK

Remove the propeller shaft see **PROPELLER SHAFT, REPLACING** .

REMOVAL

REMOVING THE NUTS FOR THE BEVEL GEAR FLANGE

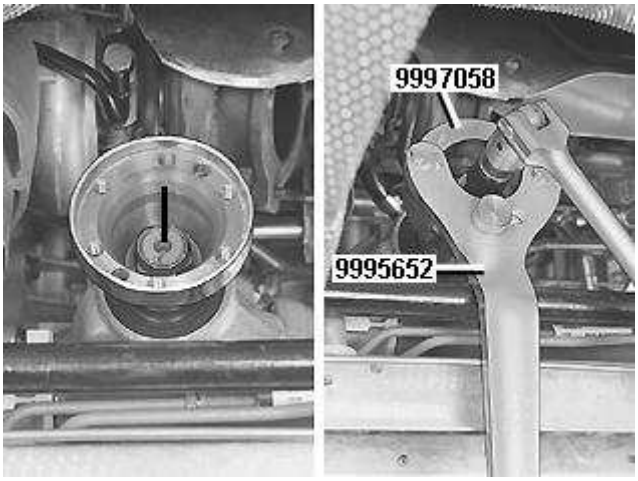


Fig. 61: Identifying Flange Position & Nut Marked In Relation To Pinion Shaft End And Bevel Gear Flange Nuts, Tool 9995652 & Tool 9997058
Courtesy of VOLVO CARS CORPORATION

Mark the position of the flange and nut in relation to the pinion shaft's end.

Remove the nut.

Use counterhold: **9995652** together with adapter: **9997058** .

REMOVING THE FLANGE

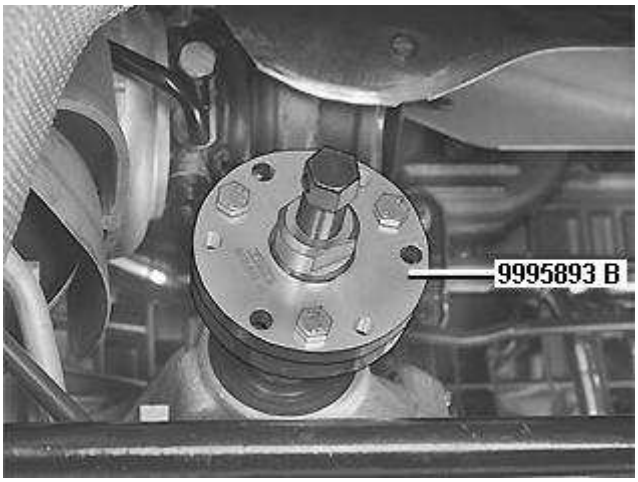


Fig. 62: Identifying Flange Removed Using Puller 999 5893
Courtesy of VOLVO CARS CORPORATION

Remove the flange. Use: **9995893** .

Check the seal face on the flange.

Replace the flange if it is damaged.

REMOVING THE SEAL

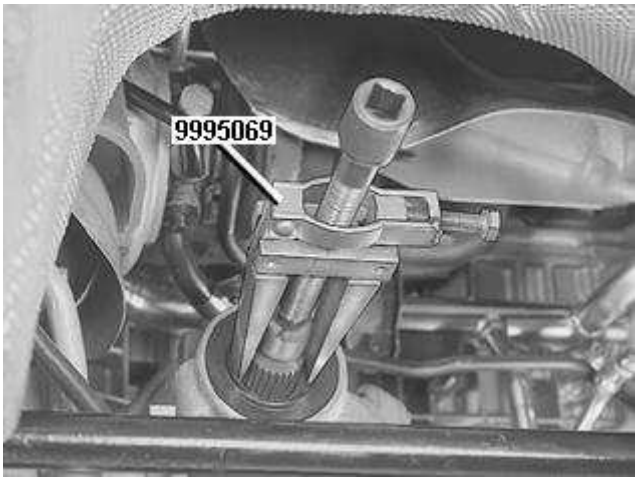


Fig. 63: Identifying Pinion Seal Removed Using Puller 999 5069
Courtesy of VOLVO CARS CORPORATION

CAUTION: Check thoroughly that there are no remains of the old seal.

Remove the seal.

Use: **9995069** .

INSTALLATION

NOTE: For tightening torques, see: TIGHTENING TORQUE .

INSTALLING THE SEAL

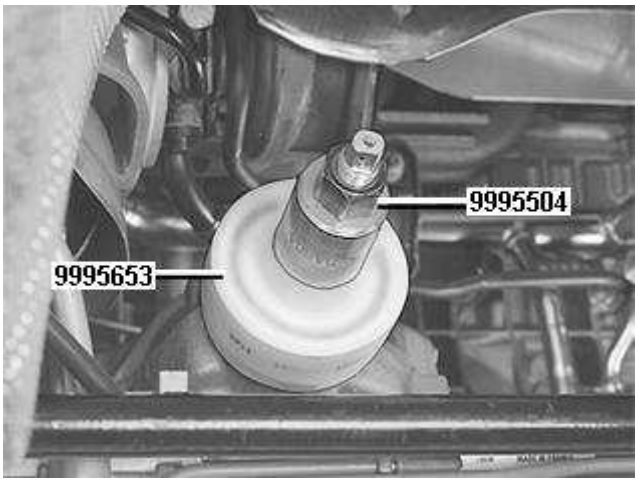


Fig. 64: Identifying Pressing In Seal Using 999 5653 And 999 5504
Courtesy of VOLVO CARS CORPORATION

Install the seal.

Lubricate the lip of the seal ring. Use wheel bearing grease, part number 116 1241-3. Install the seal on drift: **9995653** against the side of the tool marked 1155.

Press in the seal.

Use press tool: **9995504** .

INSTALLING THE FLANGE ON THE PINION

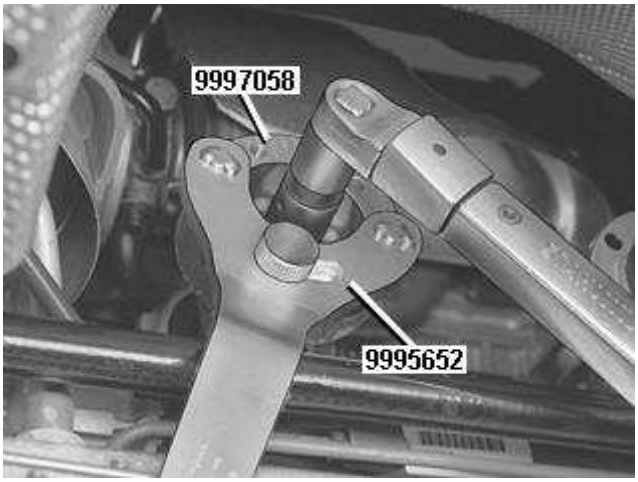


Fig. 65: Identifying Pinion Flange, Tool 999 7058 And 999 5652
Courtesy of VOLVO CARS CORPORATION

Install the flange according to earlier marking, see: **REMOVING THE NUTS FOR THE BEVEL GEAR FLANGE**.

If necessary, use press tool: **9995504** .

Installing a new nut in the carrier

Install a **new lubricated nut** .

NOTE: There must be no axial play.

CAUTION: 200 Nm must not be exceeded. The forces on the pinion bearing may become too great, causing it to seize.

Tighten to **180-200 Nm** . Use counterhold: **9995652** together with adapter: **9997058** .

FILLING AND CHECKING OIL

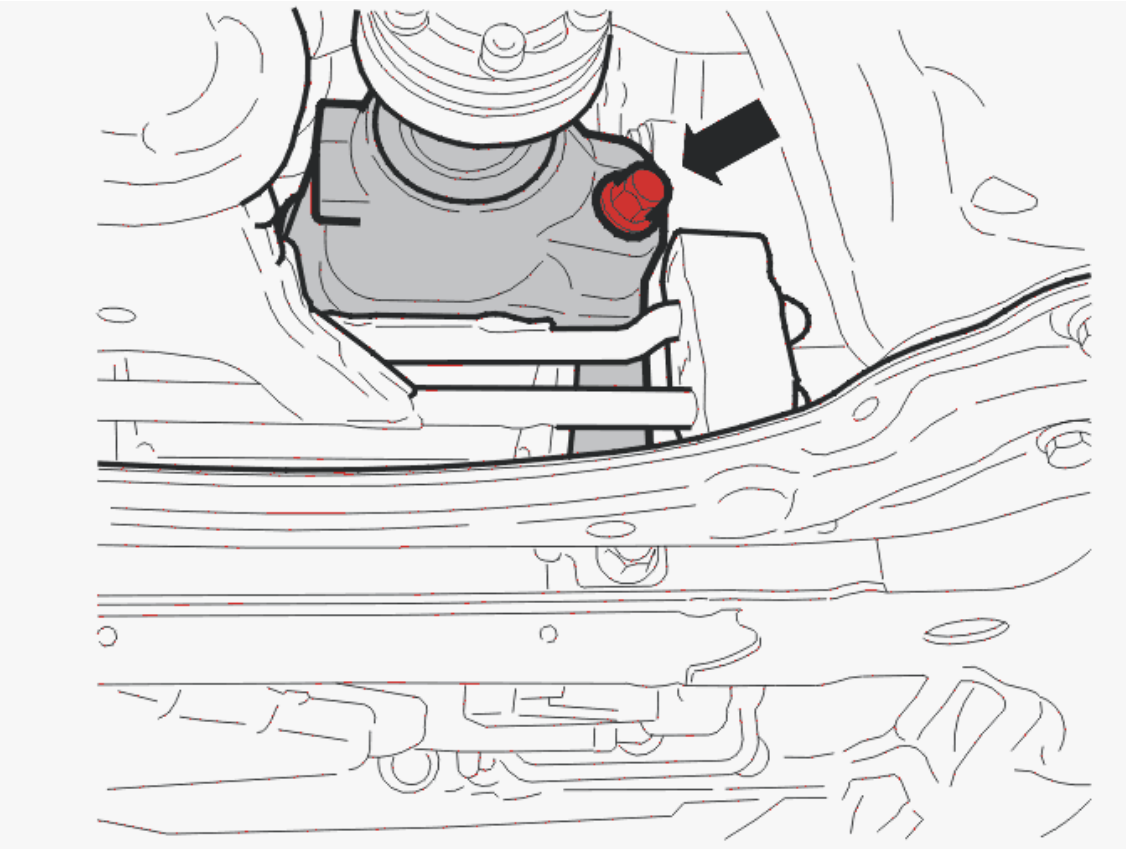


Fig. 66: Locating Fill Plug
Courtesy of VOLVO CARS CORPORATION

Fill and check the oil level in the bevel gear.

Use transmission oil 1161648 (1 liter).

Tighten the level plug see **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** .

FINISHING

Install the propeller shaft, see **PROPELLER SHAFT, REPLACING** .

SEALS BEVEL GEAR/CHAIN HOUSING, REPLACING

Special tools	
	T9997290 WRENCH **Tool number:** T9997290 **Tool description:** WRENCH **Tool boards:**
	T9997289 DRIFT **Tool number:** T9997289 **Tool description:** DRIFT

	Tool boards:
	T9997286 DRIFT **Tool number:** T9997286 **Tool description:** DRIFT **Tool boards:**
	T9991801 STANDARD SHAFT **Tool number:** T9991801 **Tool description:** STANDARD SHAFT **Tool boards:**
	T9997291 PLUG **Tool number:** T9997291 **Tool description:** PLUG **Tool boards:**
	T9997287 DRIFT **Tool number:** T9997287 **Tool description:** DRIFT **Tool boards:**
	T9997288 DRIFT **Tool number:** T9997288 **Tool description:** DRIFT **Tool boards:**

Materials:	
Designation	**Part number**
Wheel bearing grease	1161241-3

NOTE: Removal steps in this procedure may contain installation details.

Remove the angle gear/chain housing and separate them. See **REPLACING THE BEVEL GEAR/CHAIN HOUSING**

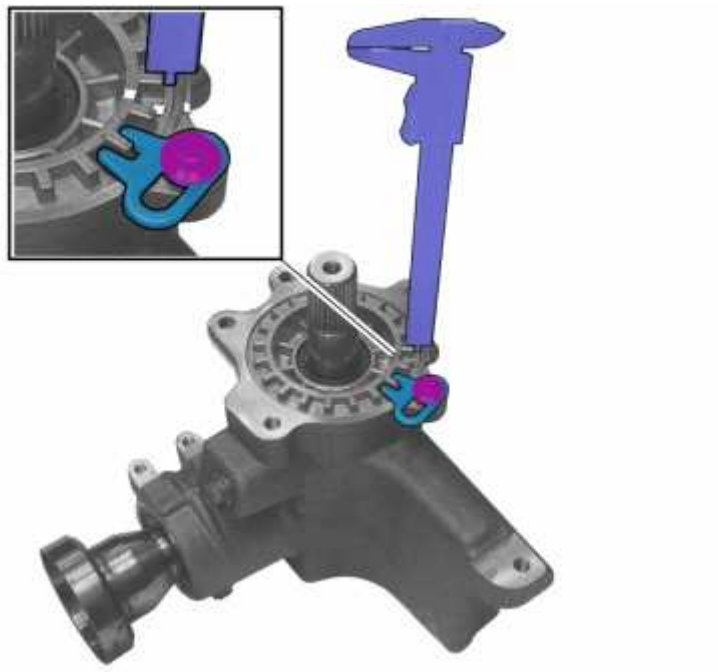


Fig. 67: Measuring The Height Of The Setting Nut
Courtesy of VOLVO CARS CORPORATION

Mark up the position of the setting nut in relation to the housing with a scriber.

Measure and note the height between the nut and the housing.

Remove the screw and catch of the nut.

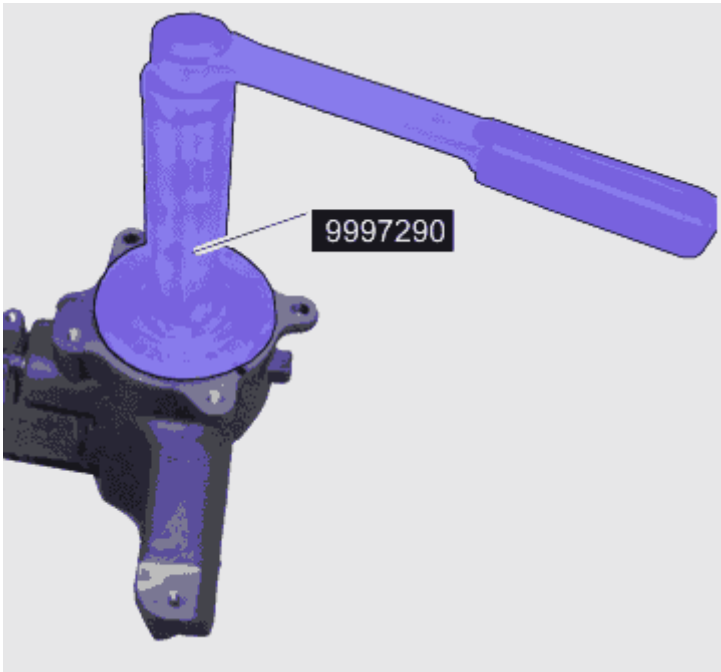


Fig. 68: Identifying Tool 9997290

Courtesy of VOLVO CARS CORPORATION

Remove the setting nut. **9997290**

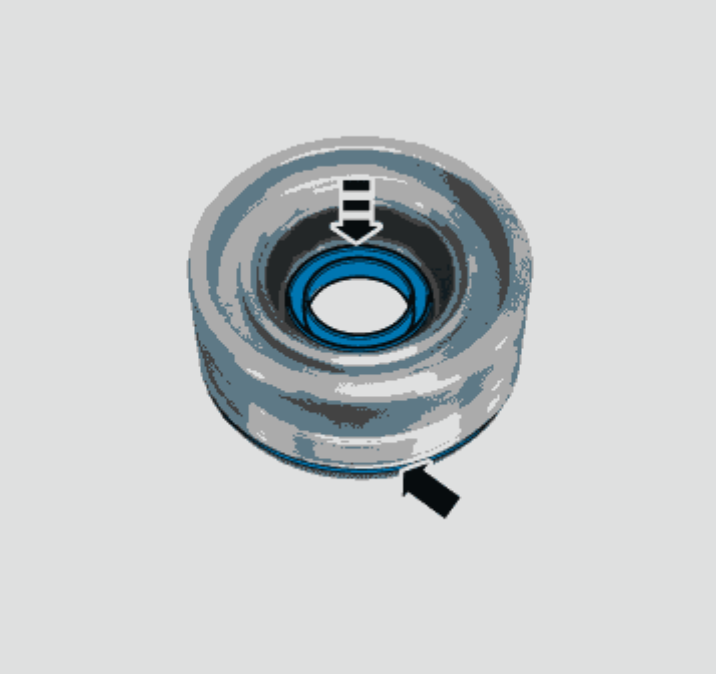


Fig. 69: Removing The O-Ring and The Seal Ring
Courtesy of VOLVO CARS CORPORATION

Tap out the seal ring.

Use a screwdriver.

Remove the O-ring.

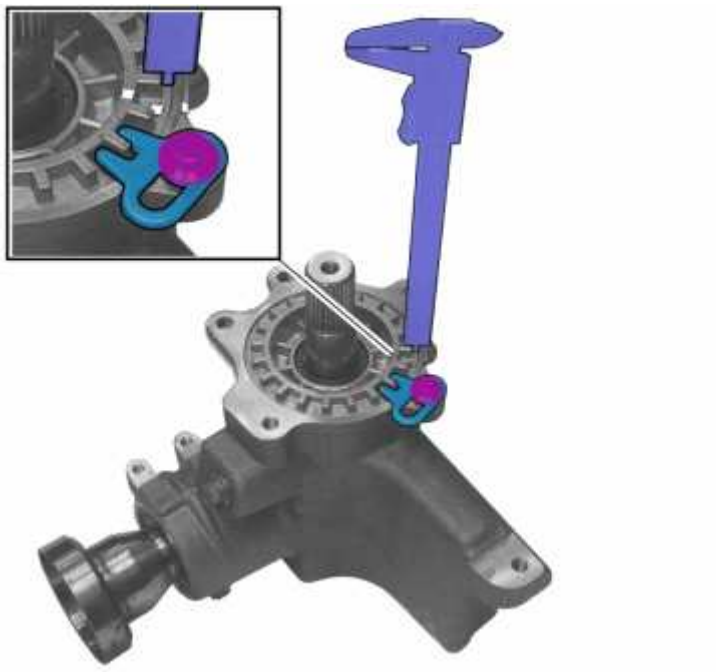


Fig. 70: Measuring The Height Of The Setting Nut
Courtesy of VOLVO CARS CORPORATION

Insert a new O-ring on the setting nut. Lubricate the O-ring and threads with wheel bearing grease.

Install the setting nut to the previously marked position. Fit the lock.

Tightening torque M10, 50 Nm.

Turn the pinion on the bevel gear when the nut is drawn in to its previously marked position. **9997290**

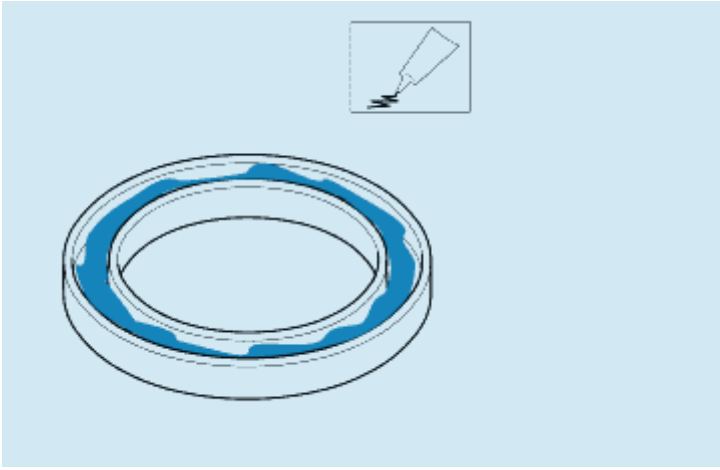


Fig. 71: Wheel bearing grease, 1161241-3
Courtesy of VOLVO CARS CORPORATION

NOTE: Applies to all sealing rings.

Lubricates the lips of the sealing rings. **Use:** Wheel bearing grease, 1161241-3 Also apply grease to the spring.

Fig. 72: Identifying Tool 9997289
Courtesy of VOLVO CARS CORPORATION

Knock in the sealing ring until the punch rests against the nut. **9997289**

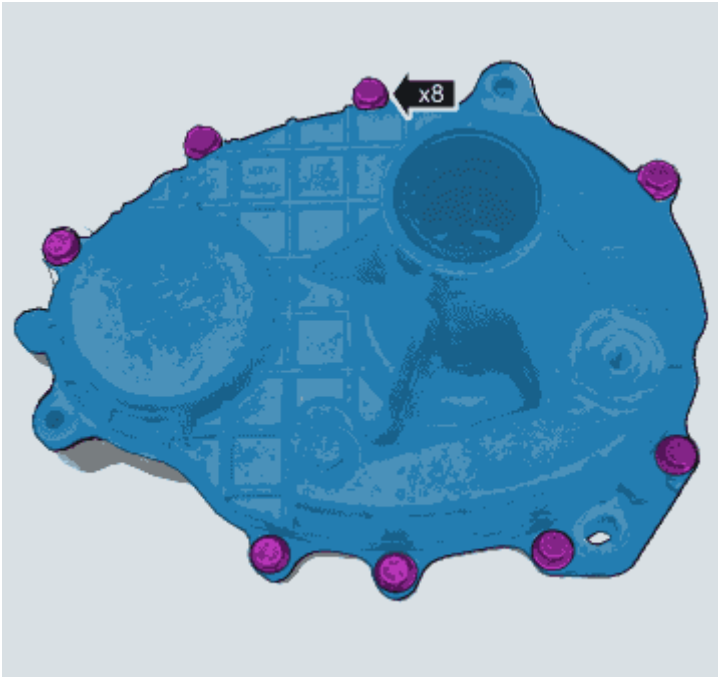


Fig. 73: Identifying Cover Screws
Courtesy of VOLVO CARS CORPORATION

Remove the screws and cover on the chain housing.

Fig. 74: Identifying the Side Up
Courtesy of VOLVO CARS CORPORATION

NOTE: Note which side should be up on the chain.

Remove the wheel and chain.

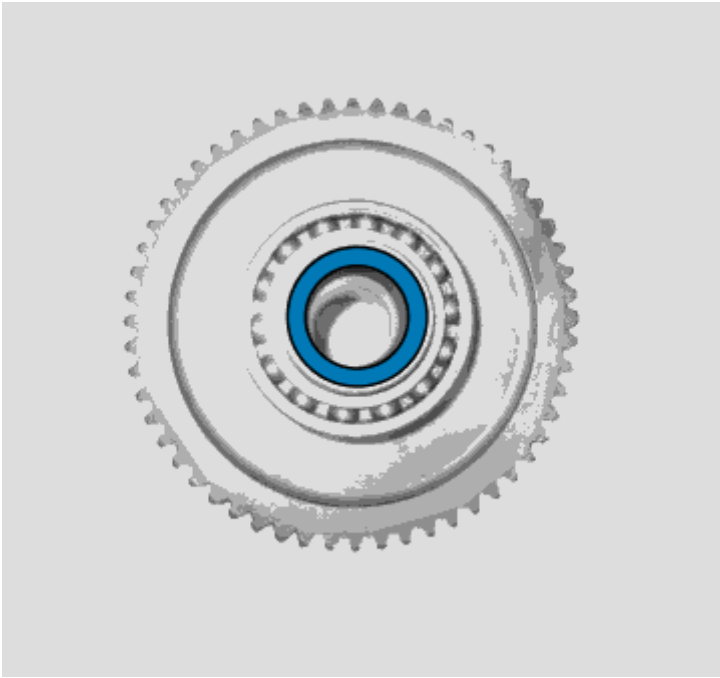


Fig. 75: Removing The Sealing Ring
Courtesy of VOLVO CARS CORPORATION

Remove the sealing ring.

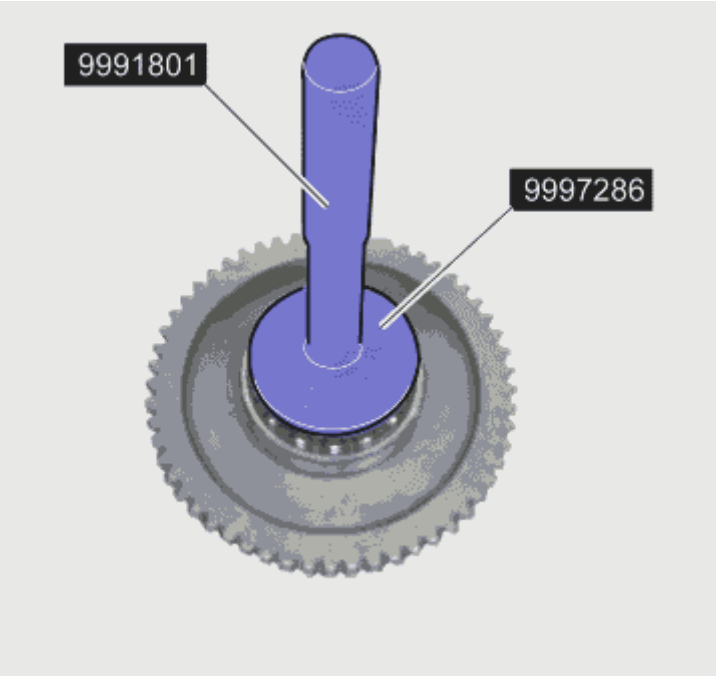


Fig. 76: Installing The Seal With Tools 9997286, 9991801
Courtesy of VOLVO CARS CORPORATION

Install the seal.

9997286

9991801

Fig. 77: Identifying The Seals
Courtesy of VOLVO CARS CORPORATION

Remove the sealing rings.

Fig. 78: Identifying the Side Up
Courtesy of VOLVO CARS CORPORATION

Fit the wheel in the bevel gear.

NOTE: Make sure the chain is positioned with the same side upward as earlier.

Install a new seal.

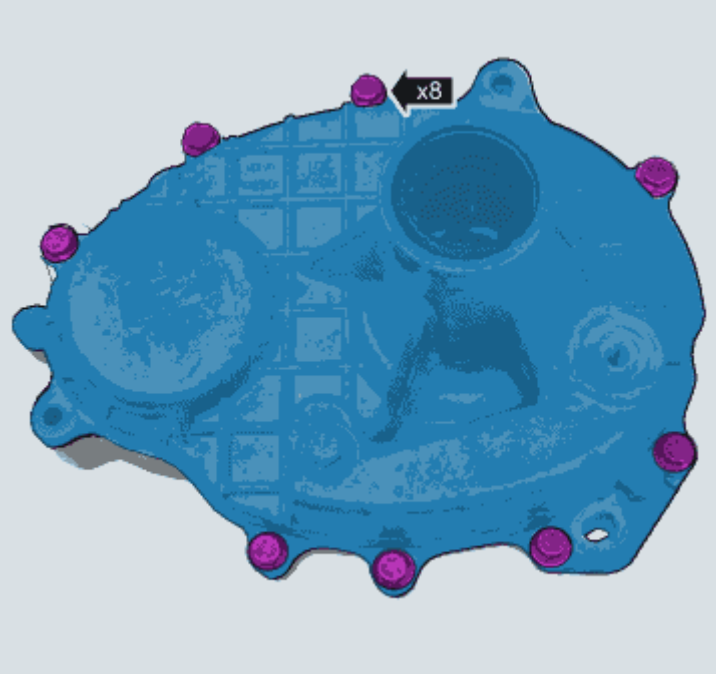


Fig. 79: Identifying Cover Screws
Courtesy of VOLVO CARS CORPORATION

Install the cover.

Torque: M8

24 Nm

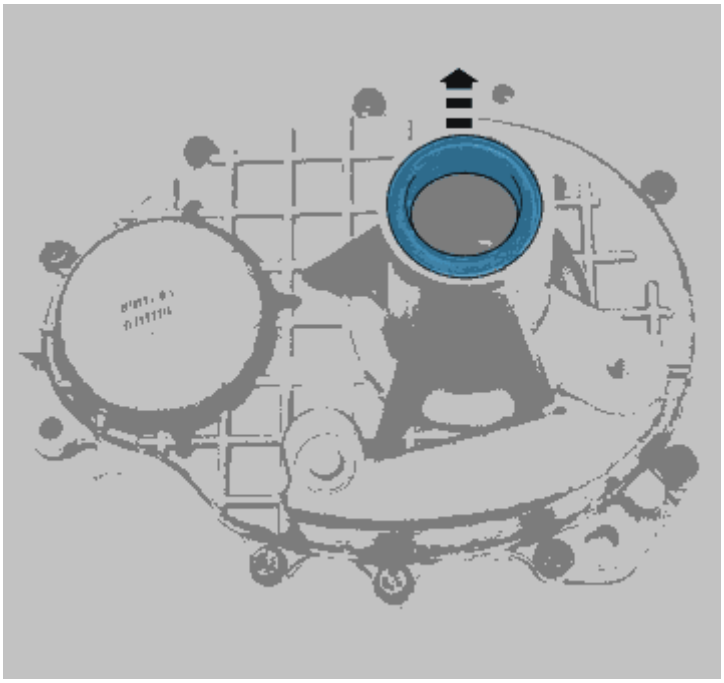


Fig. 80: Removing The Sealing Ring
Courtesy of VOLVO CARS CORPORATION

Remove the sealing ring.

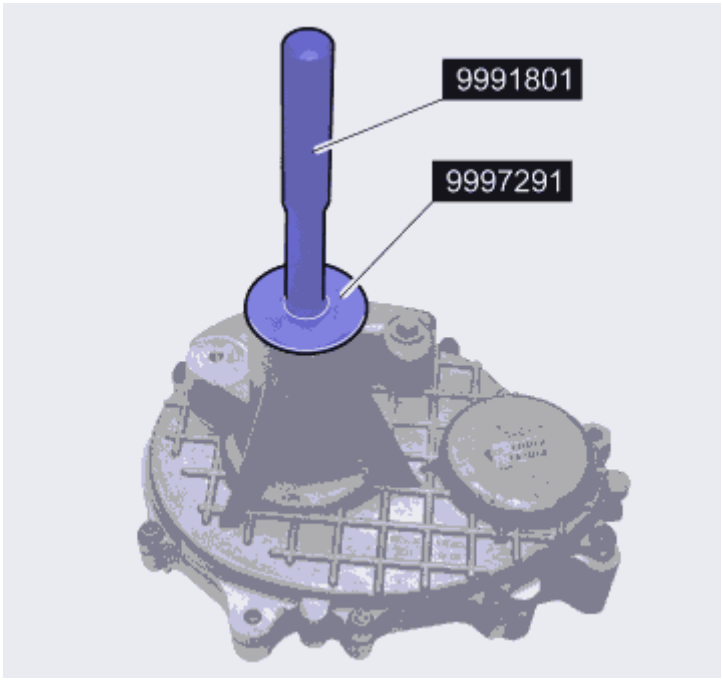


Fig. 81: Installing The Seal With Tools 9997291, 9991801
Courtesy of VOLVO CARS CORPORATION

Install the sealing ring.

9997291

9991801

Fig. 82: Identifying Installer 9997287
Courtesy of VOLVO CARS CORPORATION

Install the sealing ring.

9997287

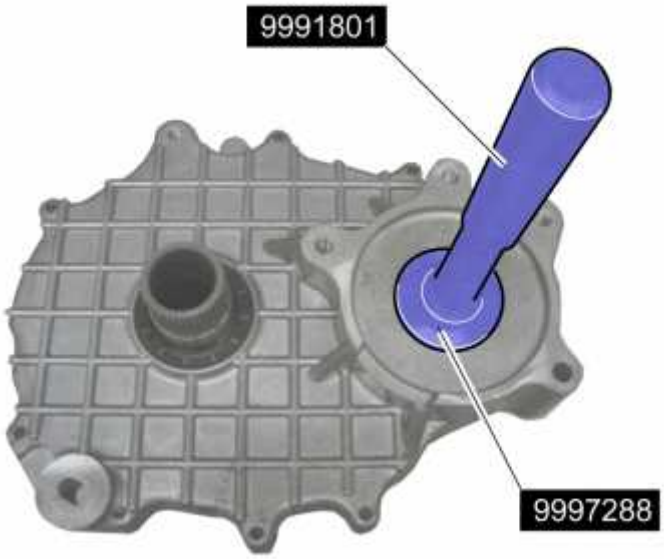


Fig. 83: Identifying Installer 9997288, 9991801
Courtesy of VOLVO CARS CORPORATION

Install the sealing ring.

9997288

9991801

Install the bevel gear/chain housing **REPLACING THE BEVEL GEAR/CHAIN HOUSING**.

AUXILIARY TRANSMISSION, BEVEL GEAR AND OVERDRIVE (B8444S, TF-80SC AWD; 2009-2011)

SEALING RING, BEVEL GEAR, RIGHT

Special tools:

9995919

9992943

9997190

9991801

REMOVAL

REMOVING DRIVE SHAFT RIGHT-HAND SIDE

Remove the right drive shaft. See: **DRIVE SHAFT RIGHT, REPLACING** .

REMOVING THE SEALING RING

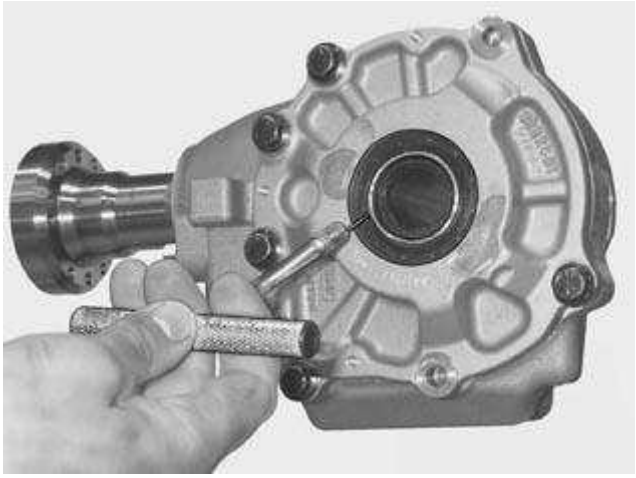


Fig. 84: Removing The Seal With Tool 9995919
Courtesy of VOLVO CARS CORPORATION

Outer sealing ring. Use: **9995919** .

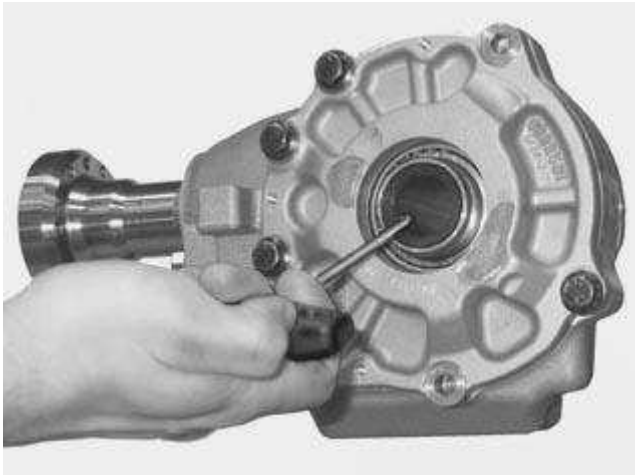


Fig. 85: Using Puller 9992943
Courtesy of VOLVO CARS CORPORATION

Use: **9992943** .

INSTALLATION

INSTALLING A NEW SEALING RING

Fig. 86: Installing A New Seal with Tools 9997190, 9991801
Courtesy of VOLVO CARS CORPORATION

Use **9997190** , extend if necessary using **9991801** .

Fig. 87: Identifying Installing
Courtesy of VOLVO CARS CORPORATION

Use **9997190** , extend if necessary using **9991801** .

FINISHING

CHECKING THE OIL LEVEL IN THE BEVEL GEAR

Check the oil level in the bevel gear. See **REPLACING THE PINION SEAL FOR THE BEVEL GEAR**.

Install the right driveshaft. See **DRIVE SHAFT RIGHT, REPLACING** .

AUXILIARY TRANSMISSION, BEVEL GEAR AND OVERDRIVE (B8444S, TF-80SC AWD; 2007-2008)

SEALING RING, BEVEL GEAR, RIGHT

SEALING RING, BEVEL GEAR, RIGHT

AUXILIARY TRANSMISSION, BEVEL GEAR AND OVERDRIVE (TF-80SC AWD; 2009-2012)

BEVEL GEAR, REPLACING

REMOVAL

REMOVE:

- the front manifold. See **EXHAUST MANIFOLD/GASKET, CYLINDER 1, 3, 5 AND 7 (BANK 1), REPLACING**
- the rear manifold. See **EXHAUST MANIFOLD/GASKET, CYLINDER 2, 4, 6 AND 8 (BANK 2), REPLACING**
- the propeller shaft from the bevel gear's drive flange. See **PROPELLER SHAFT, REPLACING**

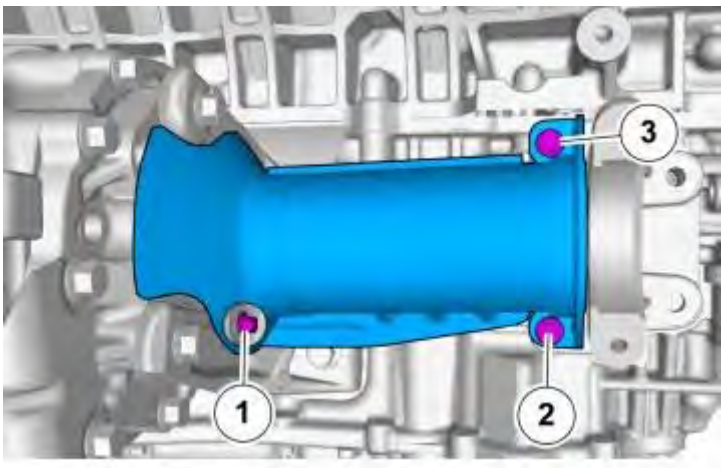


Fig. 88: Identifying Cover
Courtesy of VOLVO CARS CORPORATION

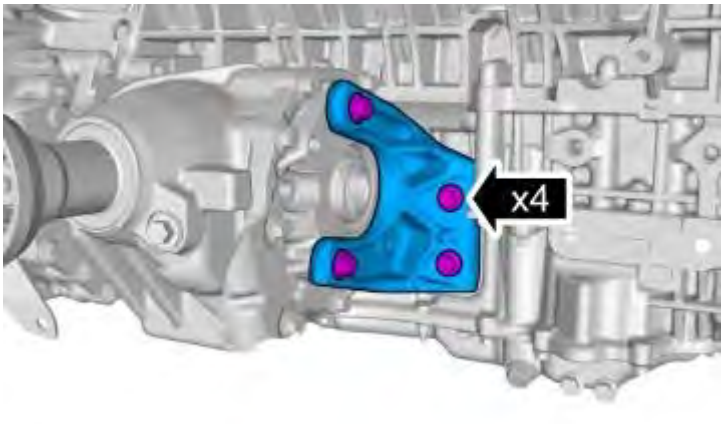


Fig. 89: Locating 4 Bolts
Courtesy of VOLVO CARS CORPORATION

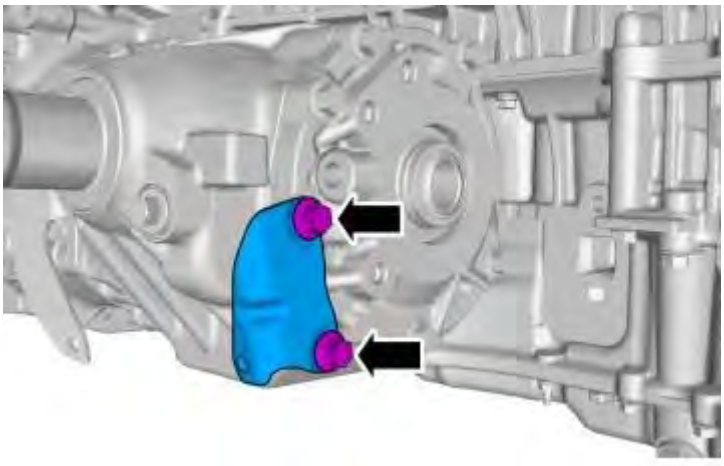


Fig. 90: Identifying Bracket Bolts
Courtesy of VOLVO CARS CORPORATION

When changing to new bevel gear, this part shall be transferred.

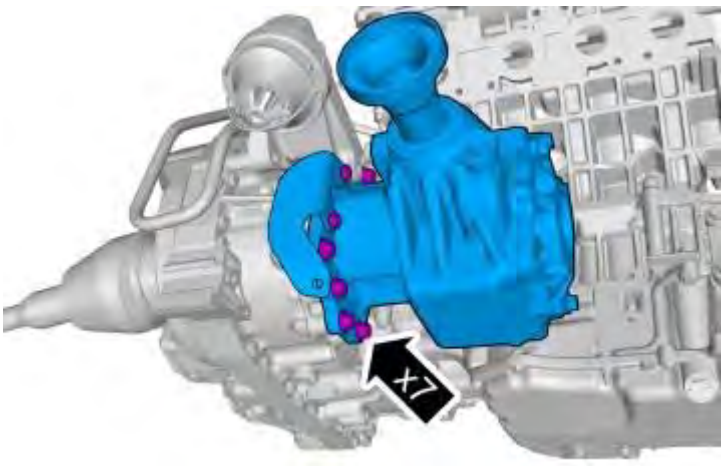


Fig. 91: Locating Bolts
Courtesy of VOLVO CARS CORPORATION

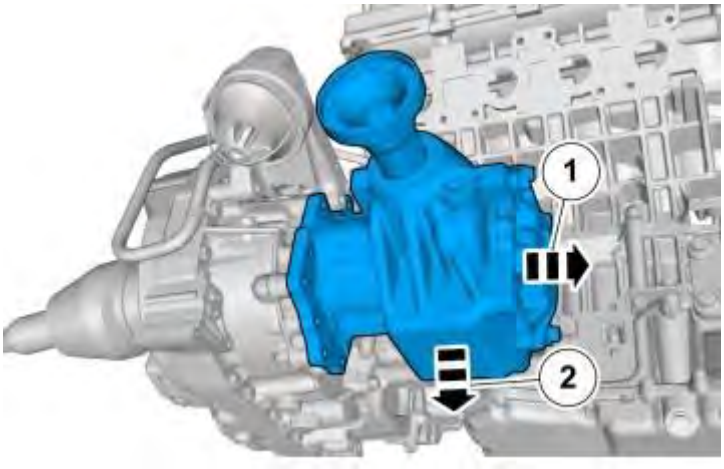


Fig. 92: Remoing Gear Housing
Courtesy of VOLVO CARS CORPORATION

INSTALLATION

Grease according to **SPLINES GREASING**

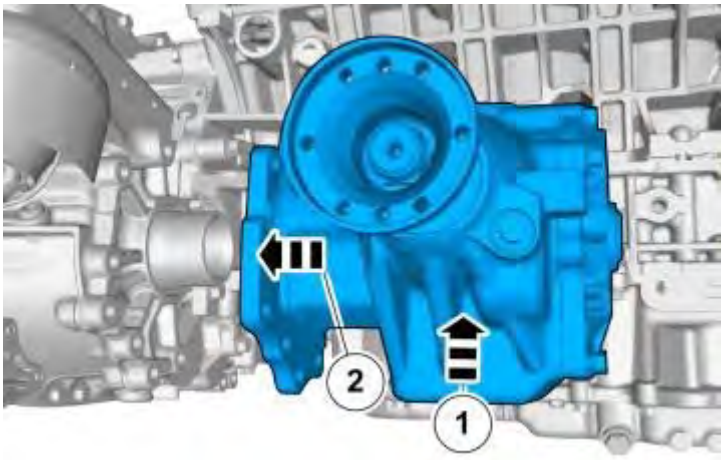


Fig. 93: Installing Gear Housing
Courtesy of VOLVO CARS CORPORATION

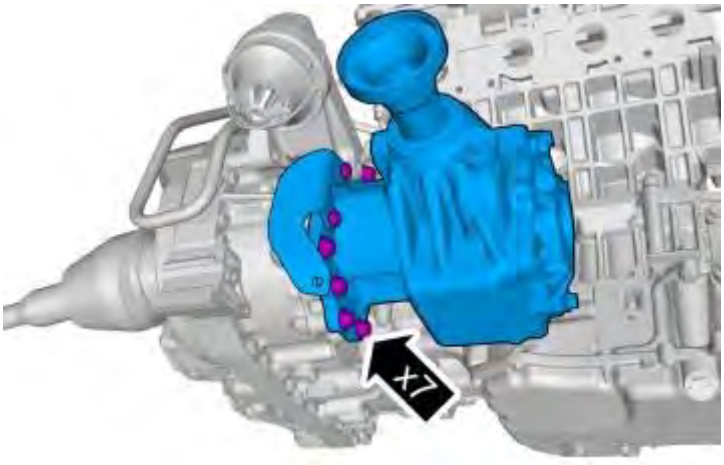


Fig. 94: Locating Bolts
Courtesy of VOLVO CARS CORPORATION

Tighten bevel gear to transmission acc. to **TIGHTENING TORQUE**

ONLY APPLIES WHEN CHANGING TO NEW PART

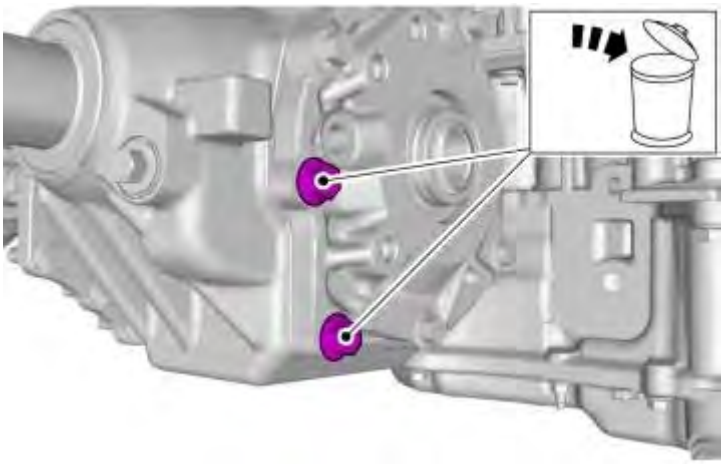


Fig. 95: Identifying Screws
Courtesy of VOLVO CARS CORPORATION

When changing to new bevel gear, these screws shall be removed and discarded.

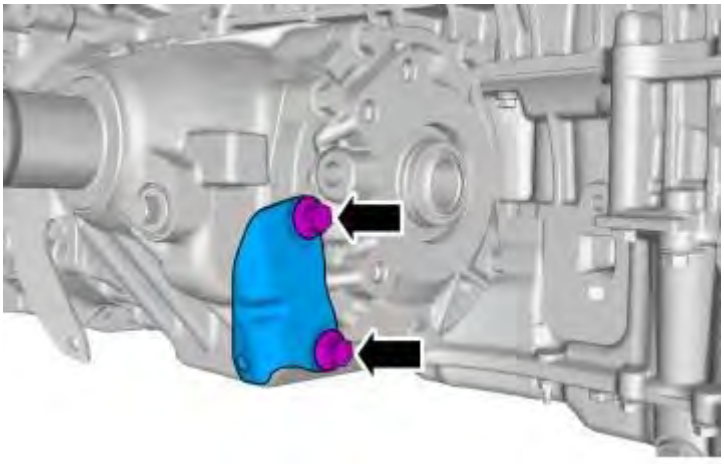


Fig. 96: Identifying Bracket Bolts
Courtesy of VOLVO CARS CORPORATION

Tighten manifold bracket for bevel gear acc. to **TIGHTENING TORQUE**

APPLIES TO ALL

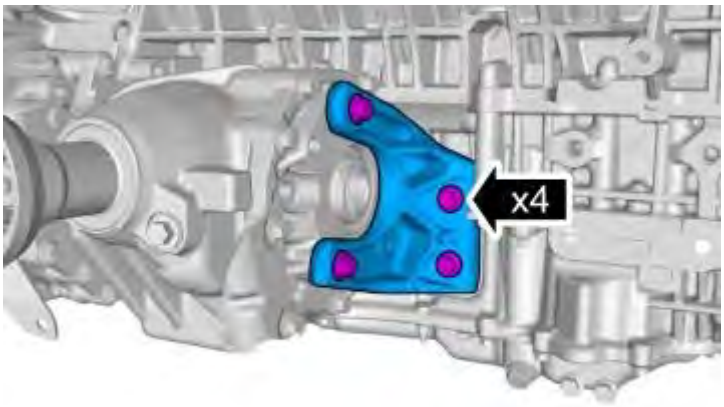


Fig. 97: Locating 4 Bolts
Courtesy of VOLVO CARS CORPORATION

Tighten bracket bevel gear acc. to **TIGHTENING TORQUE**

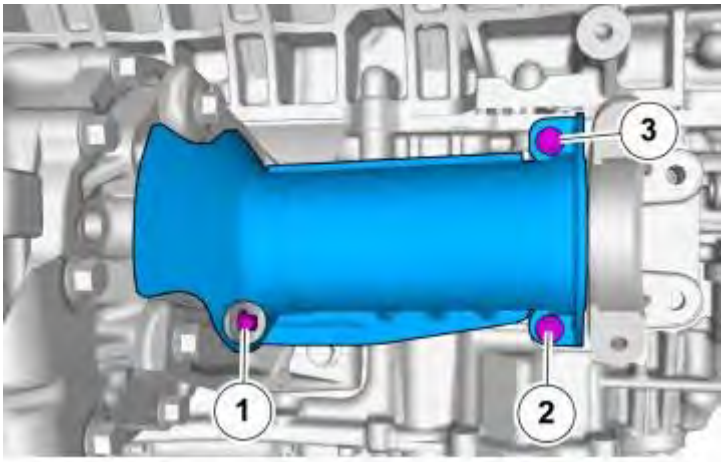


Fig. 98: Identifying Cover
Courtesy of VOLVO CARS CORPORATION

Tightening torque: M6 acc. to **TIGHTENING TORQUE**

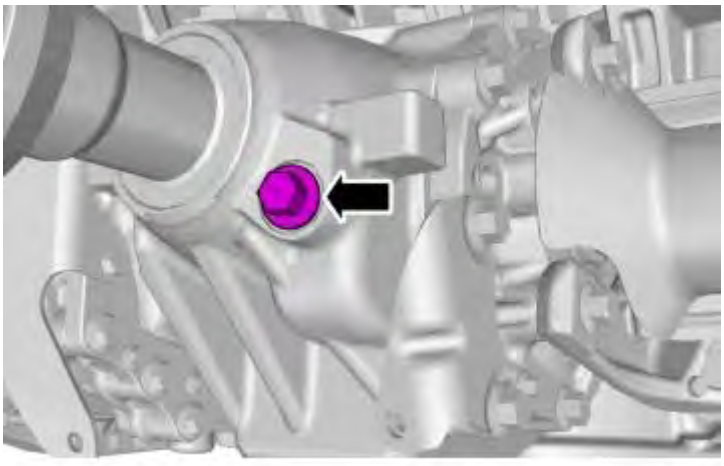


Fig. 99: Identifying Fill Plug
Courtesy of VOLVO CARS CORPORATION

The bevel gear is supplied filled with oil, however, always check the oil level.

Warning. Be prepared to collect draining fluid.

Check the oil level. See **TRANSMISSION, AUTOMATIC**

Tightening torque: level plug acc. to **TIGHTENING TORQUE**

TO INSTALL, REVERSE THE REMOVAL PROCEDURE

AUXILIARY TRANSMISSION, BEVEL GEAR AND OVERDRIVE (TF-80SC AWD; 2005-2006)

BEVEL GEAR, REPLACING

REMOVAL

REMOVE:

- the front manifold. See **EXHAUST MANIFOLD/GASKET, CYLINDER 1, 3, 5 AND 7 (BANK 1), REPLACING**
- the rear manifold See **EXHAUST MANIFOLD/GASKET, CYLINDER 2, 4, 6 AND 8 (BANK 2), REPLACING**
- the propeller shaft from the bevel gear's drive flange. See **PROPELLER SHAFT, REPLACING**

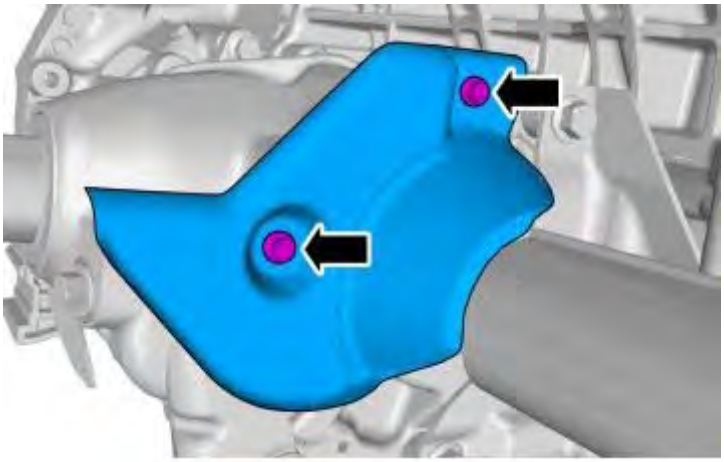


Fig. 100: Removing Cover
Courtesy of VOLVO CARS CORPORATION

When changing to new bevel gear, this part shall be scrapped.

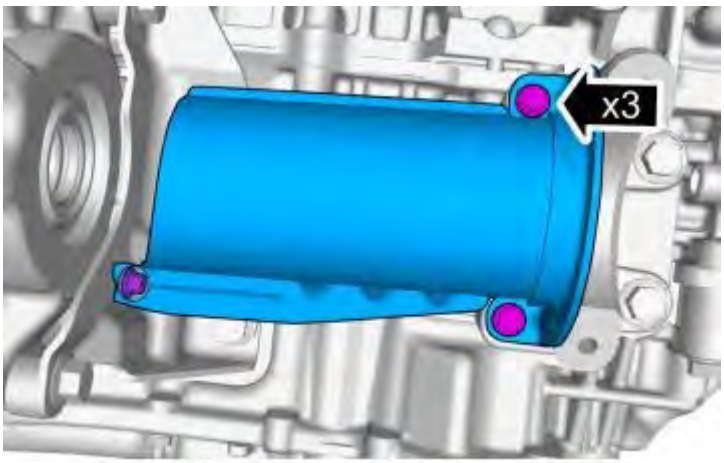


Fig. 101: Removing Cover
Courtesy of VOLVO CARS CORPORATION

When changing to new bevel gear, this part shall be scrapped.

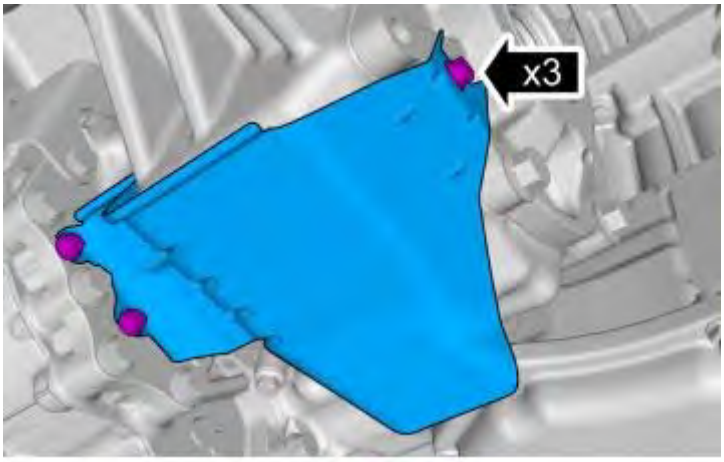


Fig. 102: Removing Cover
Courtesy of VOLVO CARS CORPORATION

When changing to new bevel gear, this part shall be scrapped.

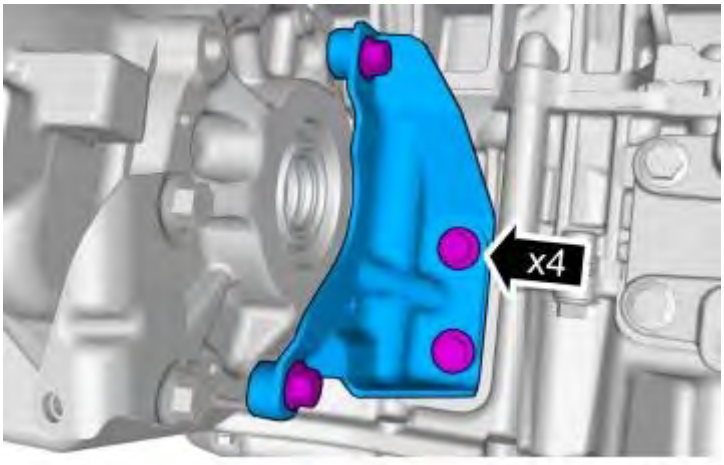


Fig. 103: Removing Brace
Courtesy of VOLVO CARS CORPORATION

When changing to new bevel gear, this part shall be scrapped.

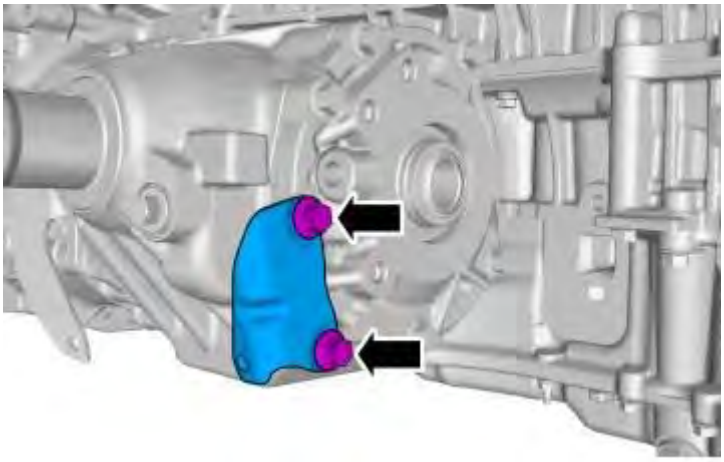


Fig. 104: Identifying Bracket Bolts
Courtesy of VOLVO CARS CORPORATION

When changing to new bevel gear, this part shall be transferred.

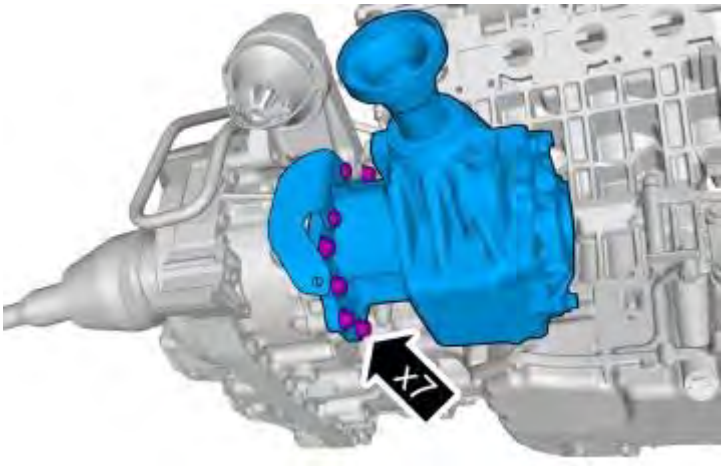


Fig. 105: Locating Bolts
Courtesy of VOLVO CARS CORPORATION

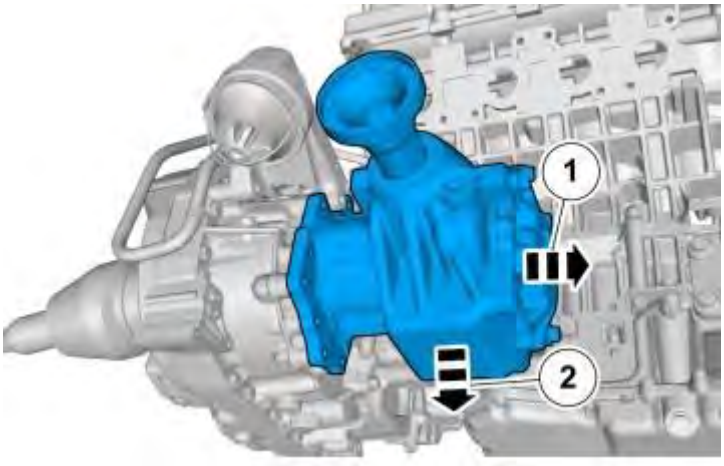


Fig. 106: Remoing Gear Housing
Courtesy of VOLVO CARS CORPORATION

INSTALLATION

Grease according to **GREASING THE SPLINES**

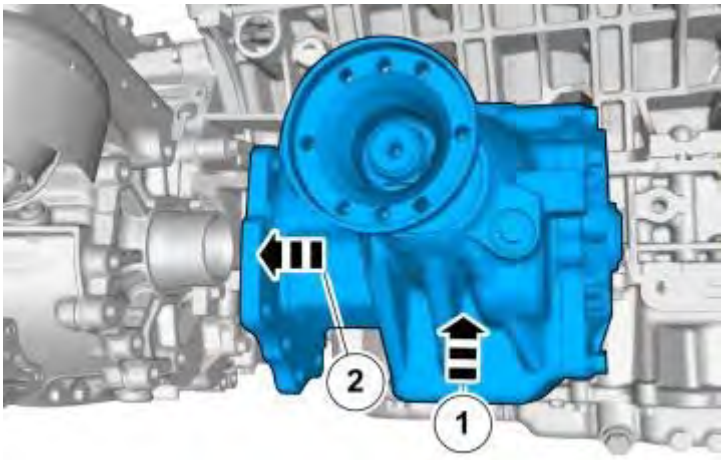


Fig. 107: Installing Gear Housing
Courtesy of VOLVO CARS CORPORATION

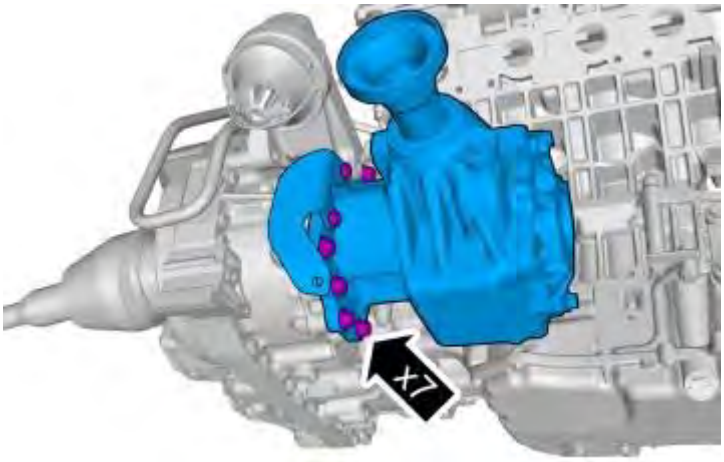


Fig. 108: Locating Bolts
Courtesy of VOLVO CARS CORPORATION

Tighten bevel gear to transmission acc. to **TIGHTENING TORQUE**

ONLY APPLIES WHEN CHANGING TO NEW PART

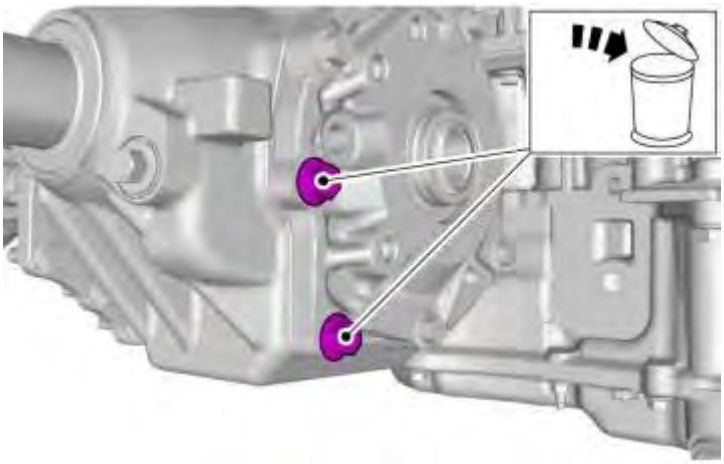


Fig. 109: Identifying Screws
Courtesy of VOLVO CARS CORPORATION

Discard bolts.

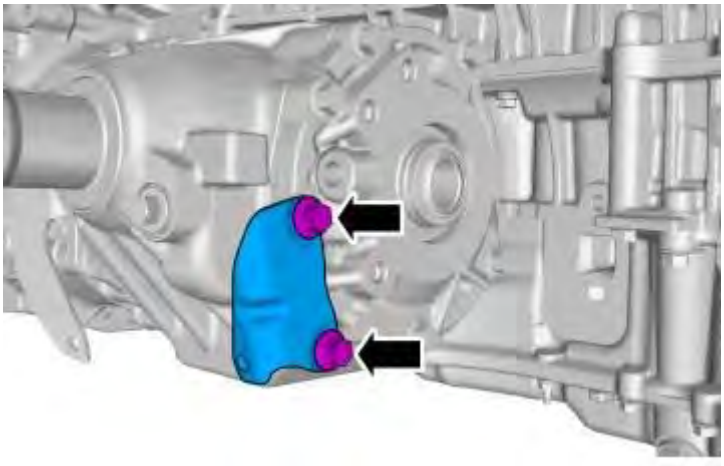


Fig. 110: Identifying Bracket Bolts
Courtesy of VOLVO CARS CORPORATION

Tighten manifold bracket for bevel gear acc. to **TIGHTENING TORQUE**

Important. Use new screws.

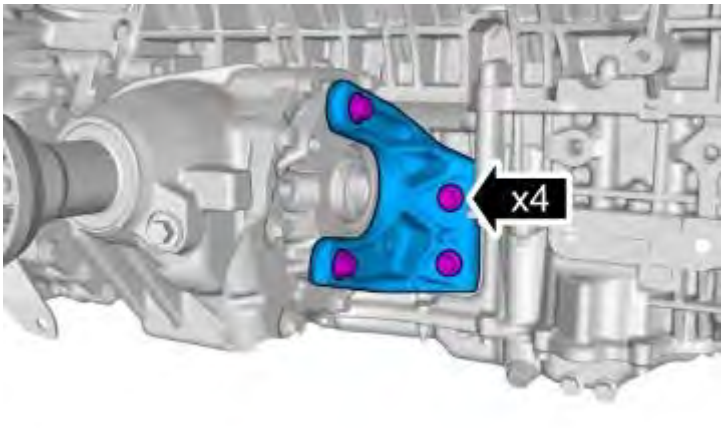


Fig. 111: Locating 4 Bolts
Courtesy of VOLVO CARS CORPORATION

Tighten bracket bevel gear acc. to **TIGHTENING TORQUE**

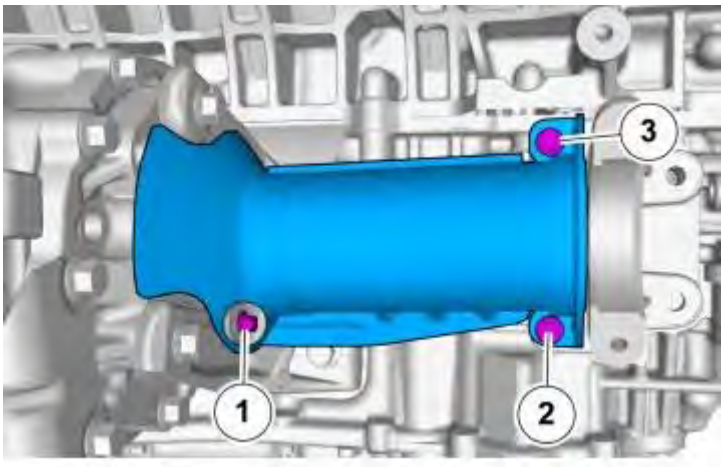


Fig. 112: Identifying Cover
Courtesy of VOLVO CARS CORPORATION

Tightening torque: M6 acc. to **TIGHTENING TORQUE**

ONLY APPLIES IF THE ORIGINAL PART IS TO BE REUSED

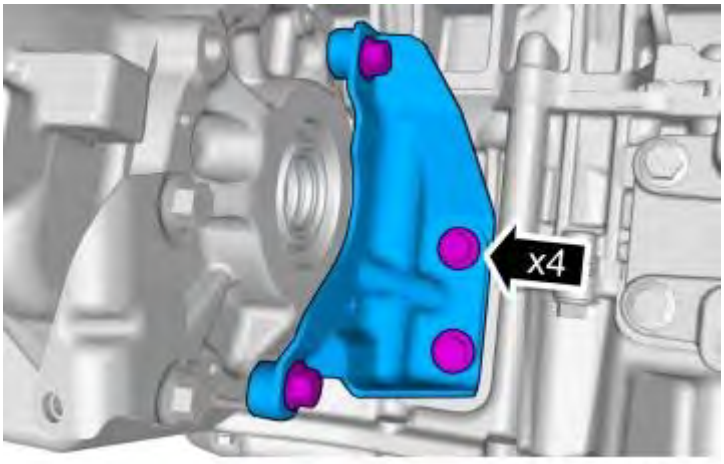


Fig. 113: Removing Brace
Courtesy of VOLVO CARS CORPORATION

Tightening torque: bracket bevel gear acc. to **TIGHTENING TORQUE**

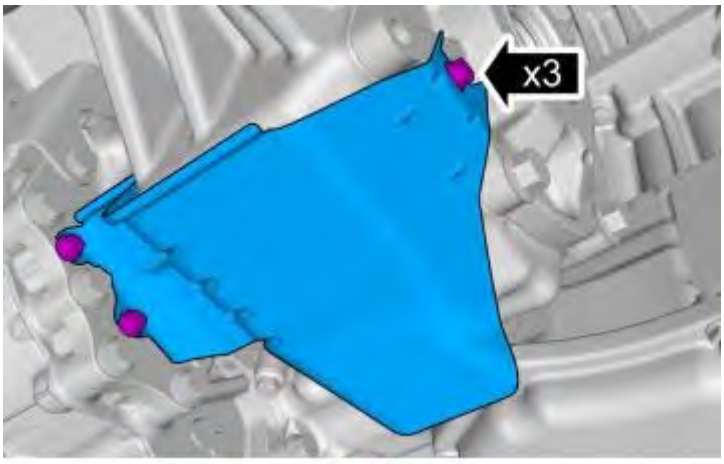


Fig. 114: Removing Cover
Courtesy of VOLVO CARS CORPORATION

Tightening torque: M6 acc. to **TIGHTENING TORQUE**

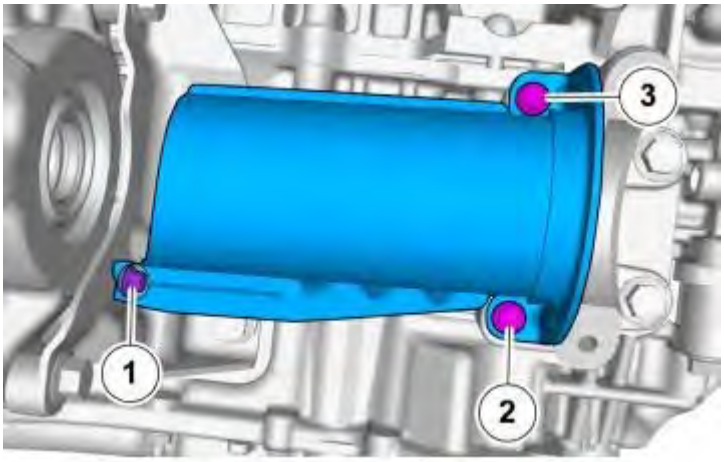


Fig. 115: Remove/Install Cover
Courtesy of VOLVO CARS CORPORATION

Tightening torque: M6 acc. to **TIGHTENING TORQUE**

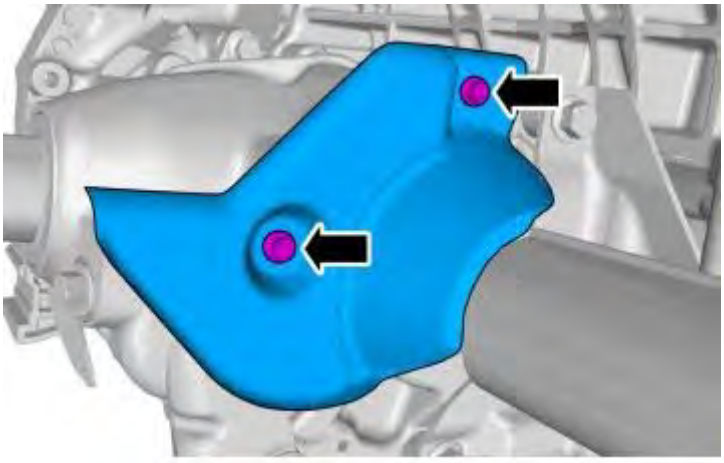


Fig. 116: Removing Cover
Courtesy of VOLVO CARS CORPORATION

Tightening torque: M6 acc. to **TIGHTENING TORQUE**

APPLIES TO ALL

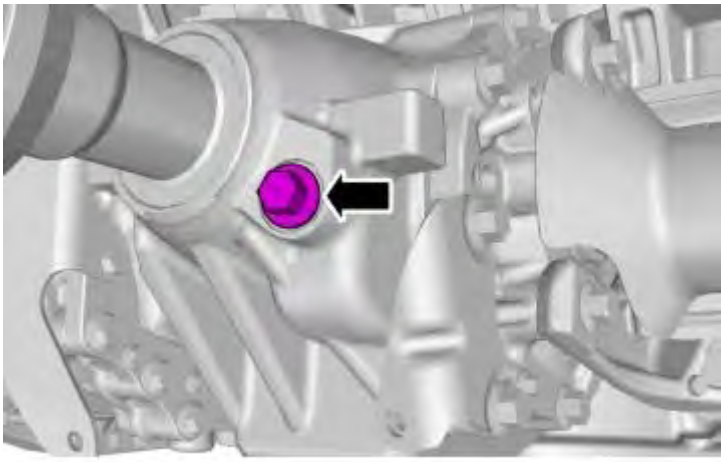


Fig. 117: Identifying Fill Plug
Courtesy of VOLVO CARS CORPORATION

The bevel gear is supplied filled with oil, however, always check the oil level.

Warning. Be prepared to collect draining fluid.

Check the oil level. See **LUBRICANT TRANSMISSION**

Tightening torque: level plug acc. to **TIGHTENING TORQUE**

INSTALL IN THE REVERSE ORDER.

BLEED VALVE BEVEL GEAR, REPLACING

NOTE: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

PREPARATORY WORK

Remove the bevel gear. See: **BEVEL GEAR, REPLACING** (TF-80SC AWD; 2005-2006) or **BEVEL GEAR, REPLACING** (TF-80SC AWD; 2009-2012).

REMOVING/INSTALLING

Fig. 118: Replacing Vent Nipple
Courtesy of VOLVO CARS CORPORATION

Pull out the brass pipe using cutting nippers.

Tap in the nipple using a rubber mallet.

REPLACING THE PINION SEAL FOR THE BEVEL GEAR

Special tools:

9995893

9995069

9995653

9995504

NOTE: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

REMOVAL

NOTE: Move the gear shift lever to the P-position.

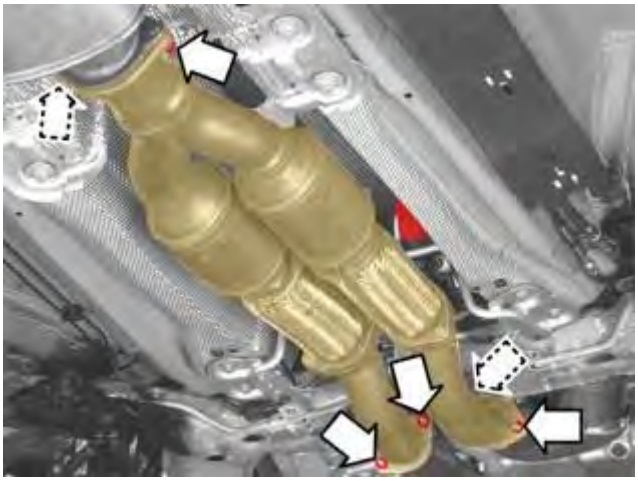


Fig. 119: Locating Exhaust Fasteners
Courtesy of VOLVO CARS CORPORATION

Fig. 120: Identifying The Position Of The Propeller/Flange
Courtesy of VOLVO CARS CORPORATION

NOTE: Mark the position of the flange against the propeller shaft.

Fig. 121: Identifying The Position Of The Flange/Pinion
Courtesy of VOLVO CARS CORPORATION

NOTE: Mark the position of the flange against the pinion shaft end.

Fig. 122: Identifying Puller 9995893
Courtesy of VOLVO CARS CORPORATION

Use **9995893** .

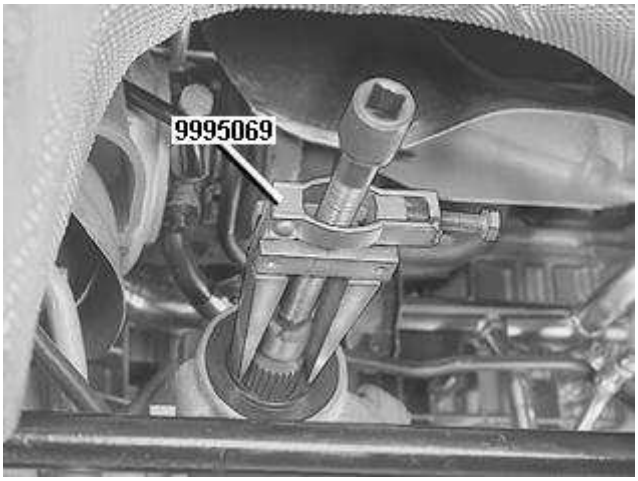


Fig. 123: Identifying Pinion Seal Removed Using Puller 999 5069
Courtesy of VOLVO CARS CORPORATION

NOTE: Place a container under the bevel gear.

Use: **9995069** .

INSTALLATION

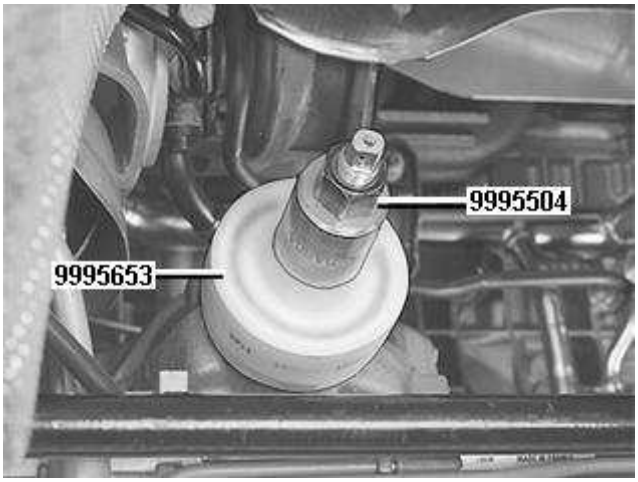


Fig. 124: Identifying Pressing In Seal Using 999 5653 And 999 5504
Courtesy of VOLVO CARS CORPORATION

Use: **9995653** , the end marked 1155. Also use: **9995504** .

Fig. 125: Installing Flange (Observe Marking)
Courtesy of VOLVO CARS CORPORATION

CAUTION: There must be no axial play.

Install the flange according to the previous marking. If necessary use: **9995504** .

Install a **new** lubricated nut. Tighten. See: **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** .

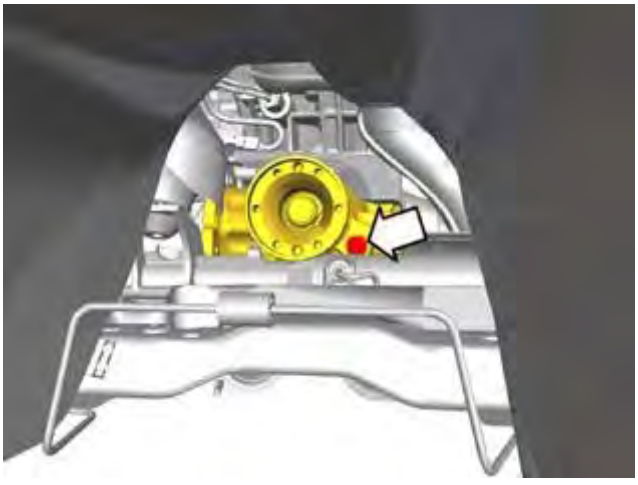


Fig. 126: Tunnel View of Filler
Courtesy of VOLVO CARS CORPORATION

Check the fluid level in the bevel gear. Lubricate. See: **LUBRICATION TRANSMISSION** .

Fig. 127: Identifying The Position Of The Flange
Courtesy of VOLVO CARS CORPORATION

Install the propeller shaft according to the previous mark. Use **new** screws. Tighten. See: **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** .

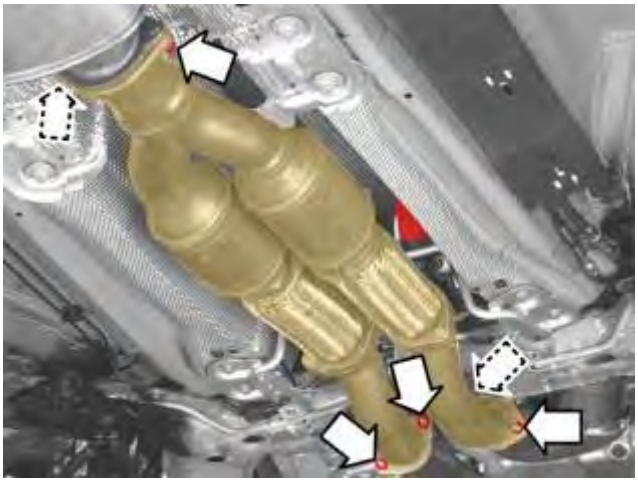


Fig. 128: Locating Exhaust Fasteners
Courtesy of VOLVO CARS CORPORATION

NOTE: To ensure that there is no exhaust leakage, see: FLANGED JOINT, ASSEMBLING .

Tighten. See: **TIGHTENING TORQUE** .

SEALING RING, BEVEL GEAR, RIGHT

SEALING RING, BEVEL GEAR, RIGHT

SEALING RING, CROWN WHEEL SHAFT, LEFT SIDE, REPLACE

Special tools:

9997086

9997189

NOTE: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

REMOVAL

REMOVING BEVEL GEAR

Remove the bevel gear see **BEVEL GEAR, REPLACING** (TF-80SC AWD; 2005-2006) or **BEVEL GEAR, REPLACING** (TF-80SC AWD; 2009-2012).

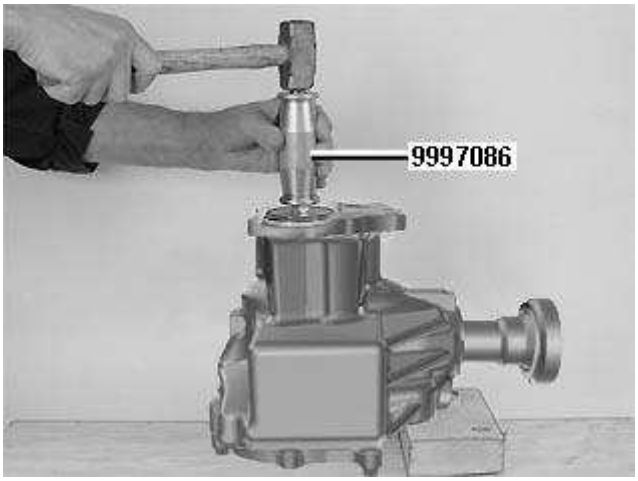


Fig. 129: Identifying Tool 9997086
Courtesy of VOLVO CARS CORPORATION

Use: .

NOTE: Thoroughly check that no seal residue remains.

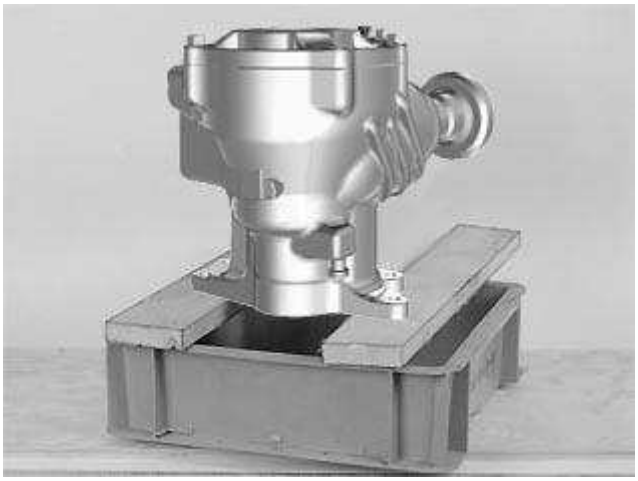


Fig. 130: Draining Oil
Courtesy of VOLVO CARS CORPORATION

Position the bevel gear over a receptacle.

Allow the oil to run out through the bearing.

Clean any spilled oil from the seal ring seat in the bevel gear using a lint-free cloth.

INSTALLATION

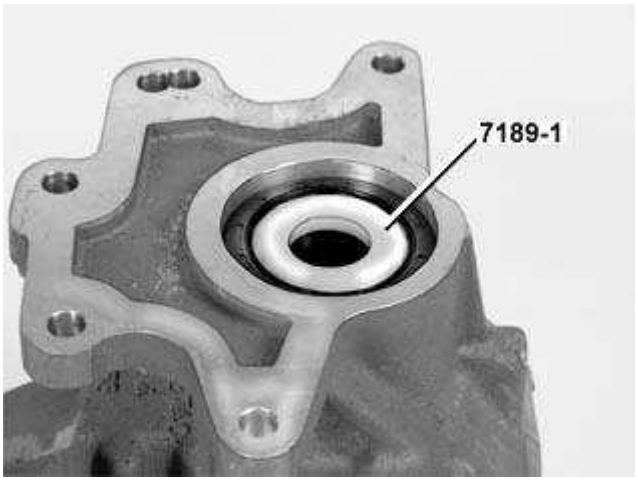


Fig. 131: Identifying Seal Installation Tool 9997086
Courtesy of VOLVO CARS CORPORATION

Install:

- **9997189**
- the gasket.

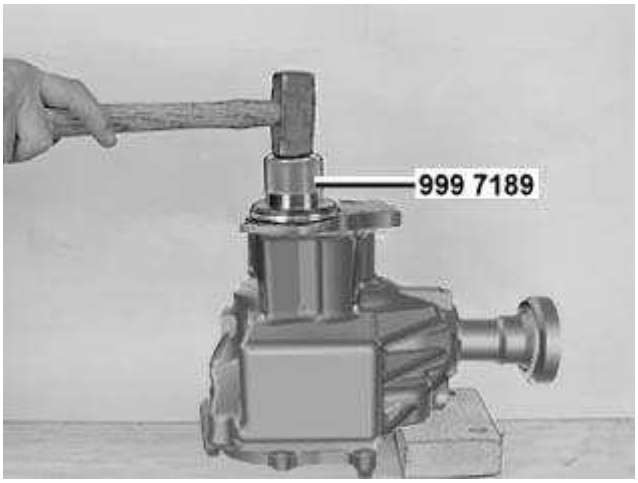


Fig. 132: Driving the Seal
Courtesy of VOLVO CARS CORPORATION

Use: **9997189** .

NOTE: When the tool is removed, check that 9997189 was removed with it.

INSTALLING THE BEVEL GEAR

Fit the bevel gear see **BEVEL GEAR, REPLACING** (TF-80SC AWD; 2005-2006) or **BEVEL GEAR, REPLACING** (TF-80SC AWD; 2009-2012)

FINISHING

CHECKING THE OIL LEVEL

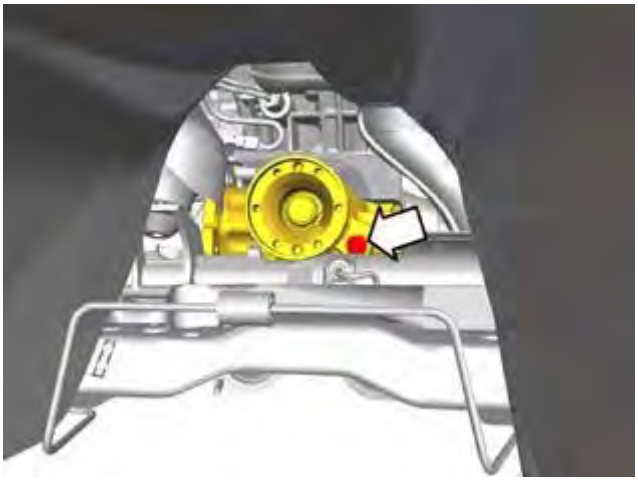


Fig. 133: Tunnel View of Filler
Courtesy of VOLVO CARS CORPORATION

Check the oil level in the bevel gear.

Lubricate. See: **LUBRICATION TRANSMISSION** .

GEAR SELECTOR ASSEMBLY, GEAR SELECTOR (B5254T2, AW50/51 AWD; 2003-2007)

BOOT, GEAR SELECTOR, REPLACING

REMOVAL

REMOVE THE BOOT AND THE GEAR SELECTOR KNOB

See **REMOVING THE BOOT FROM THE GEAR SELECTOR KNOB**.

REMOVE THE PANEL WITH THE GEAR SELECTOR BOOT

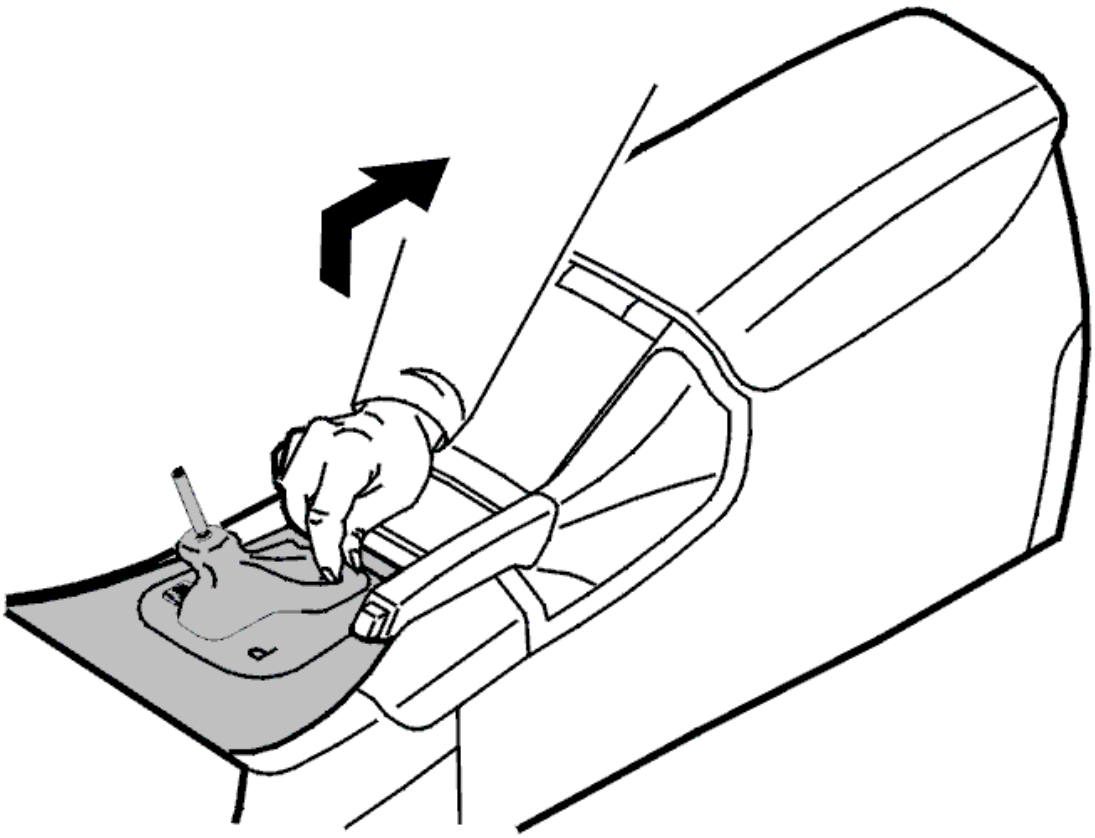


Fig. 134: Removing Panel With Gear Selector Boot
Courtesy of VOLVO CARS CORPORATION

Hold the boot and lift it straight up so the panel releases.

Work the front edge of panel loose. Pull backward.

REPLACE THE GEAR SELECTOR BOOT

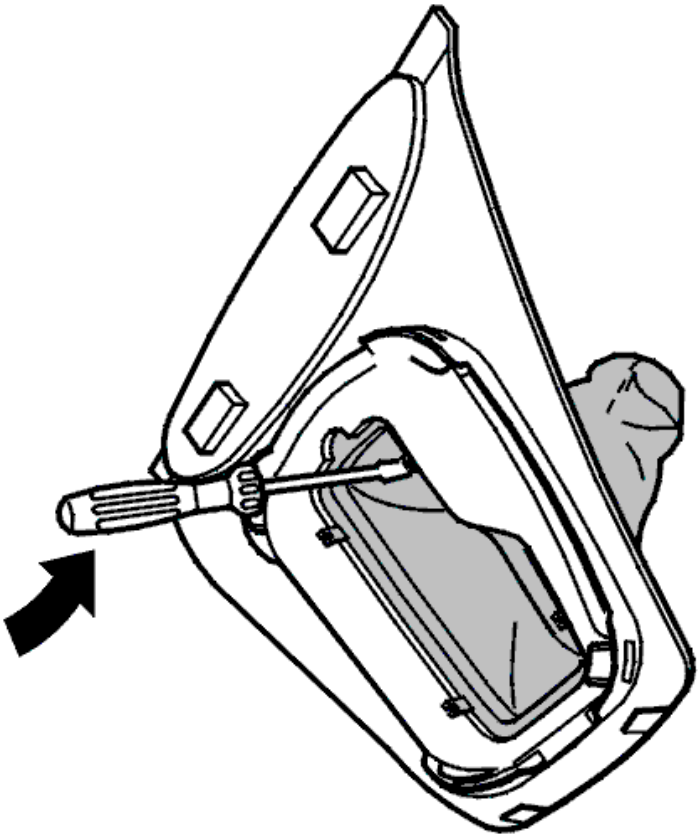


Fig. 135: Pressing Out Catches
Courtesy of VOLVO CARS CORPORATION

Press out catches (4) from the top panel. Remove the boot.

Install the new boot

Press the catches for the boot into place in the top panel.

REINSTALL THE PANEL ON THE CENTRE CONSOLE

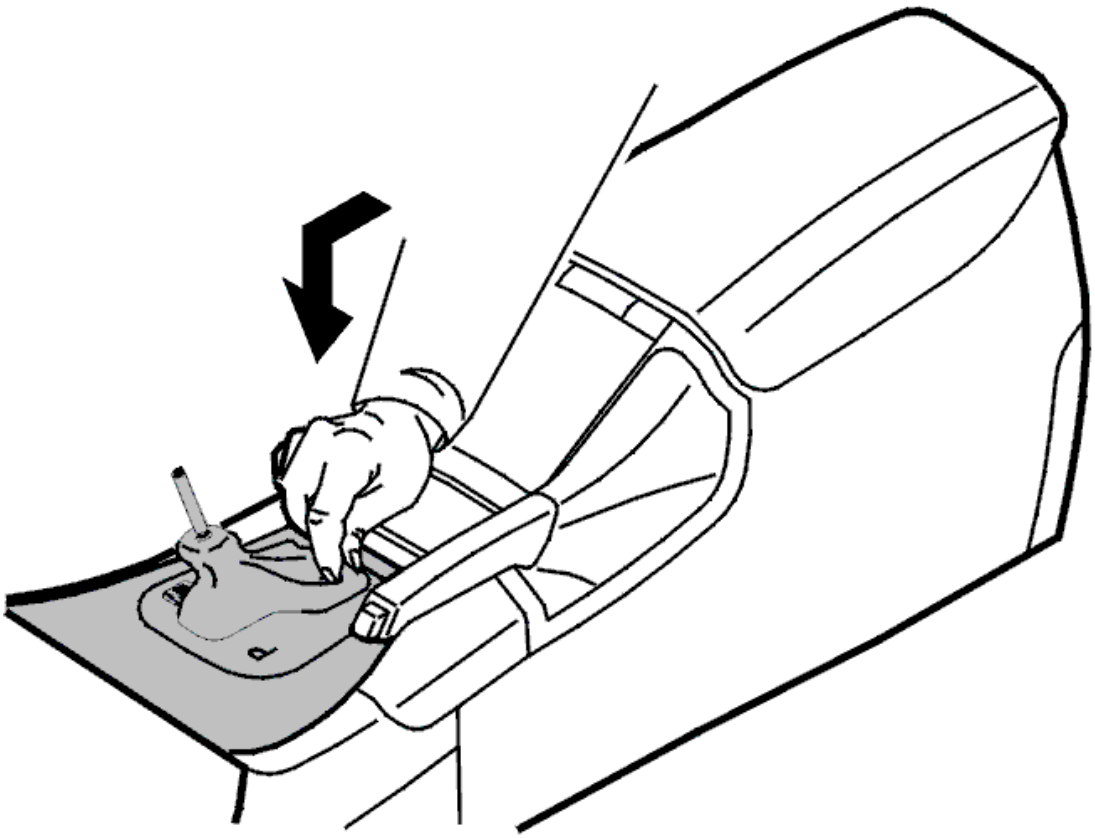


Fig. 136: Installing Center Console Panel
Courtesy of VOLVO CARS CORPORATION

Press down the panel until it locks.

Install the gear selector knob and the boot

See **INSTALLING THE GEAR SELECTOR KNOB**.

CABLE KEY INTERLOCK, REPLACING

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

REMOVAL

PREPARATIONS

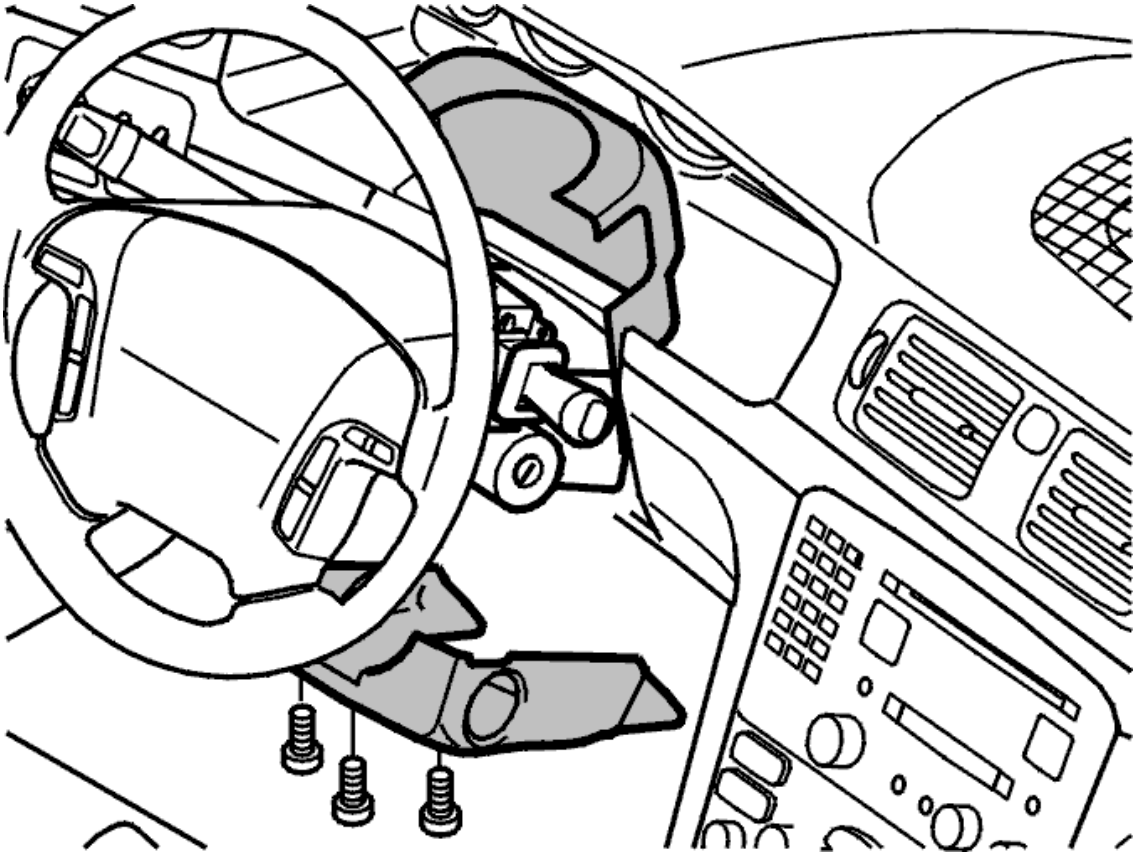


Fig. 137: Identifying Steering Column Covers
Courtesy of VOLVO CARS CORPORATION

Remove:

- the centre console. See **CENTER CONSOLE, REPLACING**
- the steering column covers
- the soundproofing panel. See **REMOVE THE DRIVER'S SIDE SOUNDPROOFING PANEL** .

REMOVING THE GEAR SELECTOR CABLE FROM THE IGNITION SWITCH

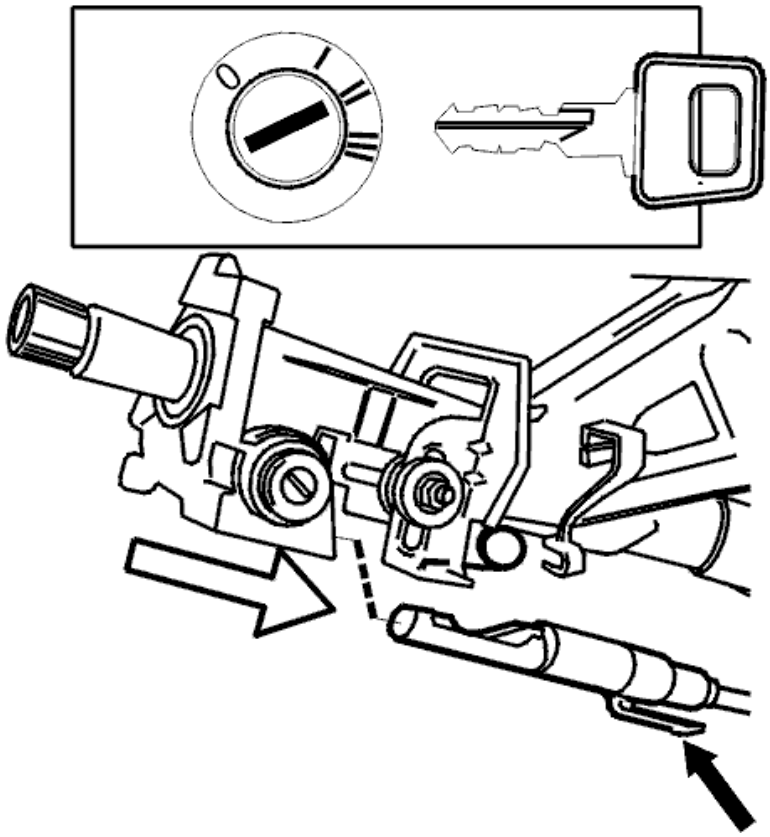


Fig. 138: Identifying Removing/Installing Mechanical Cable From The Ignition Switch
Courtesy of VOLVO CARS CORPORATION

Move the gear shift lever to position P.

Turn the ignition key to position I or II.

Press the lock button and pull the gear selector cable out of the ignition switch.

REMOVING THE GEAR SELECTOR CABLE FROM THE GEAR SELECTOR ASSEMBLY

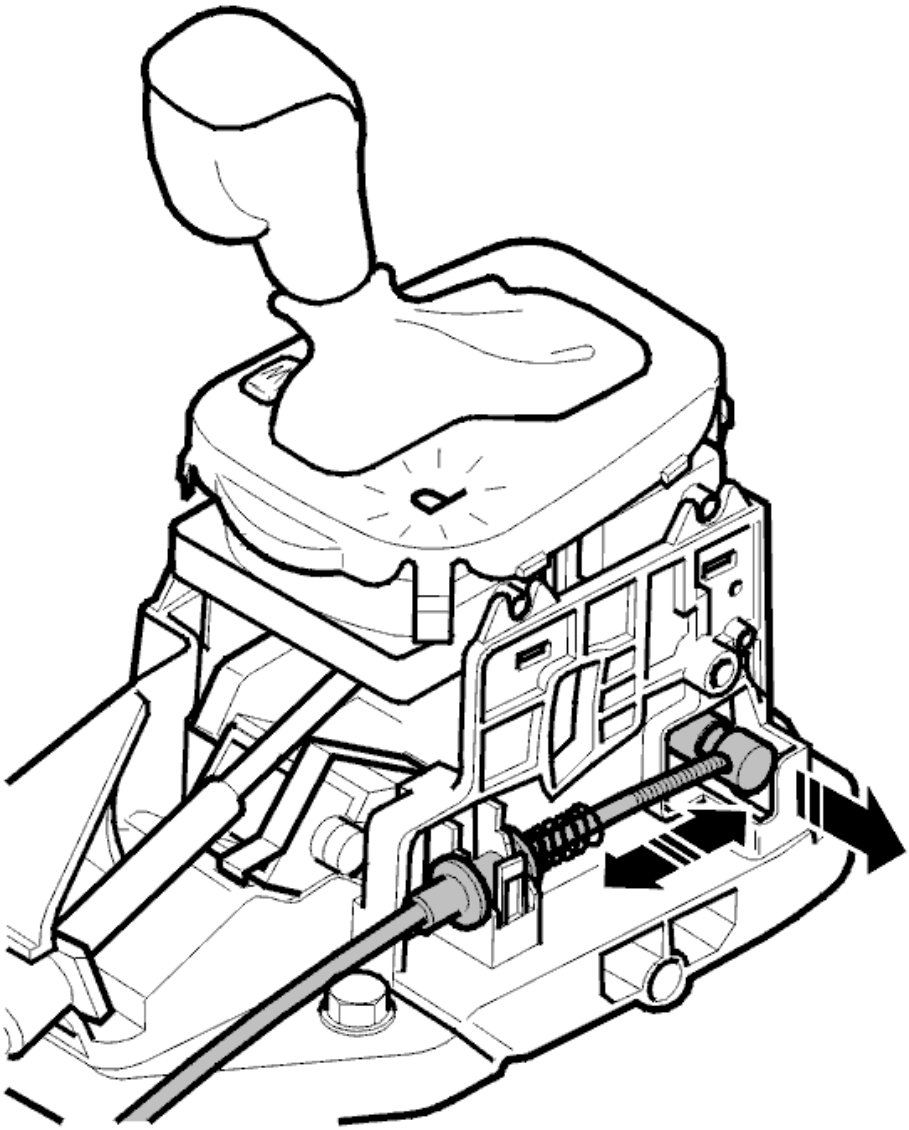


Fig. 139: Identifying Removal Of Mechanical Cable From Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Detach the yellow locking sleeve slightly (use a screwdriver).

NOTE: The yellow locking sleeve must not be reused. A new locking sleeve must be used at installation.

Lift the gear selector cable off the gear selector assembly.

REMOVING THE GEAR SELECTOR CABLE FROM THE STEERING COLUMN

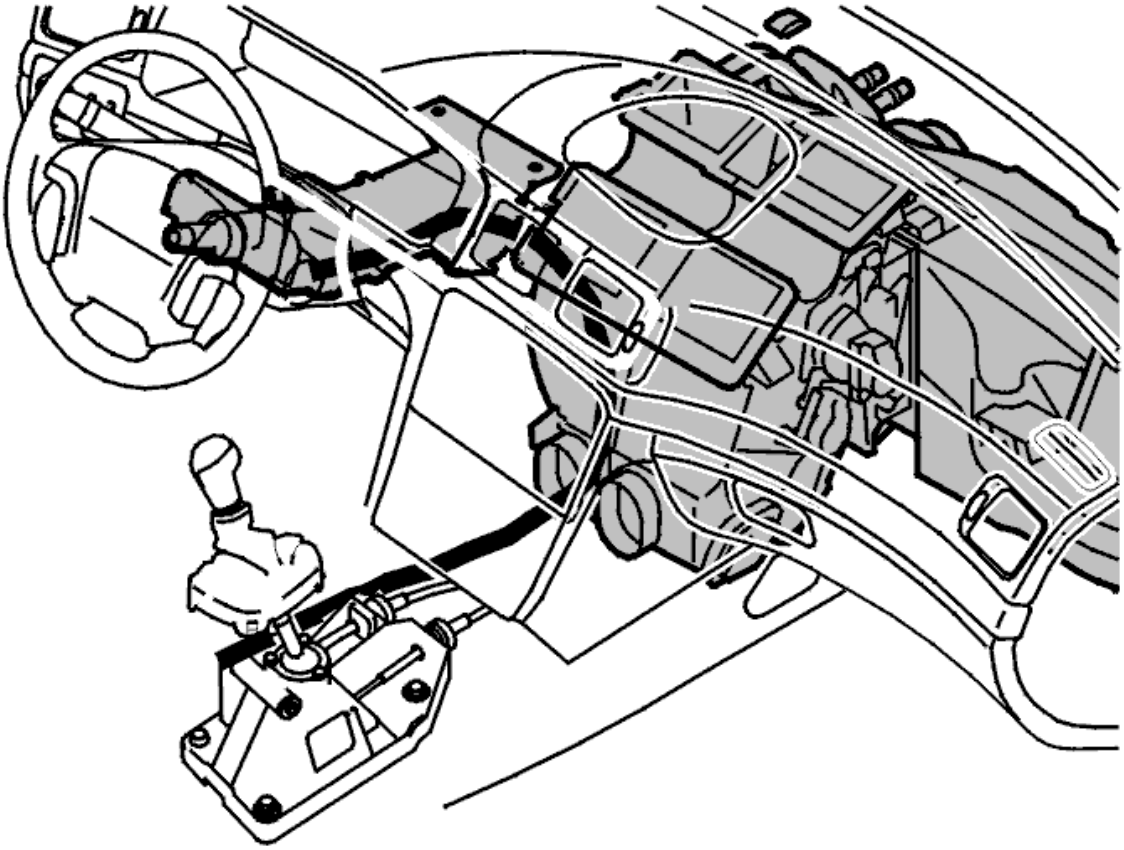


Fig. 140: Identifying Steering Column Mechanical Cable
Courtesy of VOLVO CARS CORPORATION

Disconnect the clip from the bracket located by the steering column. Also disconnect the clip located by the climate control system.

INSTALLATION

INSTALLING THE GEARBOX CABLE

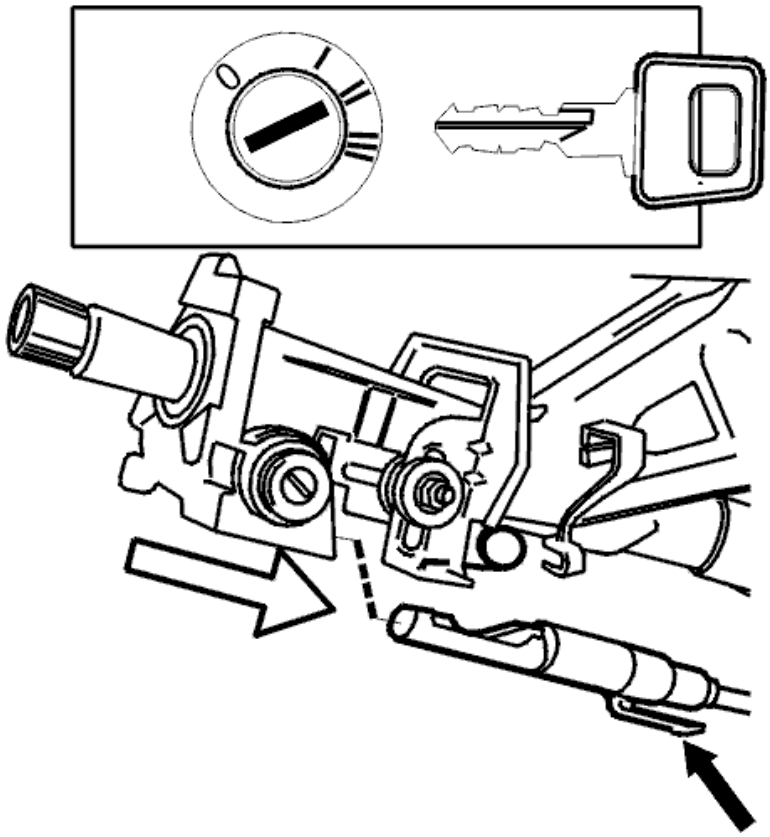


Fig. 141: Identifying Removing/Installing Mechanical Cable From The Ignition Switch
Courtesy of VOLVO CARS CORPORATION

NOTE: Start installation from the ignition switch.

Route the gear selector cable down along the steering wheel bracket and under the climate control unit.

Secure the gear selector cable in its clips at the bracket and climate control unit.

Press the end of the gear selector cable into place in the ignition switch. Ensure that the locking tabs for the gear selector cable are engaged and locked.

CONNECT THE GEAR SELECTOR CABLE TO THE MOUNTING FOR THE GEAR SELECTOR ASSEMBLY

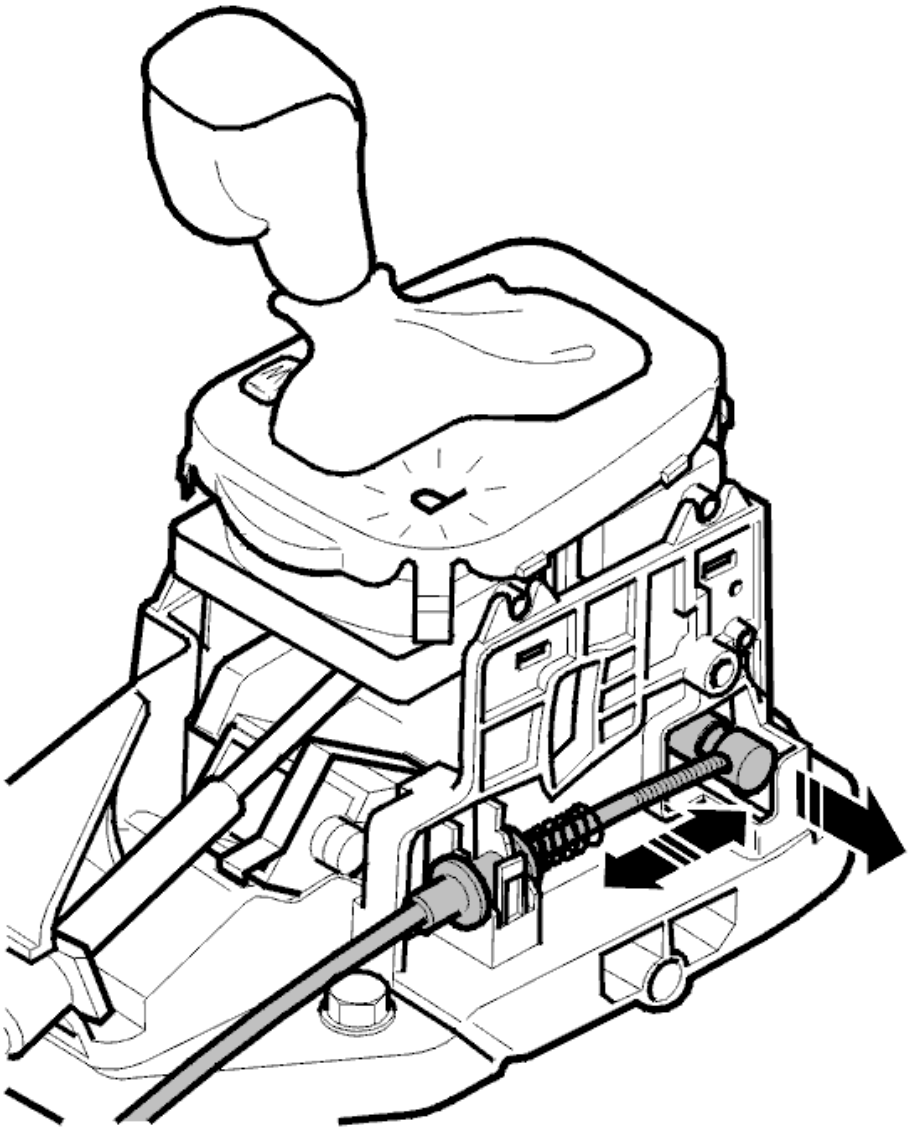


Fig. 142: Identifying Removal Of Mechanical Cable From Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Route the gear selector cable along the gear selector cable to the gear selector assembly.

Connect the cable to the gear selector mounting.

If the guide sleeve on the key interlock wire breaks during removal/installation of the wire to the gear selector assembly, the guide sleeve must be replaced. **GUIDE SLEEVE KEY LOCK CABLE** , and

For connection to the lever adjustment see: **KEY INTERLOCK CABLE, INITIAL SETTING AND ADJUSTMENT** .

INITIAL SETTING OF THE KEY LOCK CABLE (ADJUSTING)

See **INITIAL SETTING OF THE KEY LOCK CABLE (ADJUSTMENT)**.

FINISHING WORK

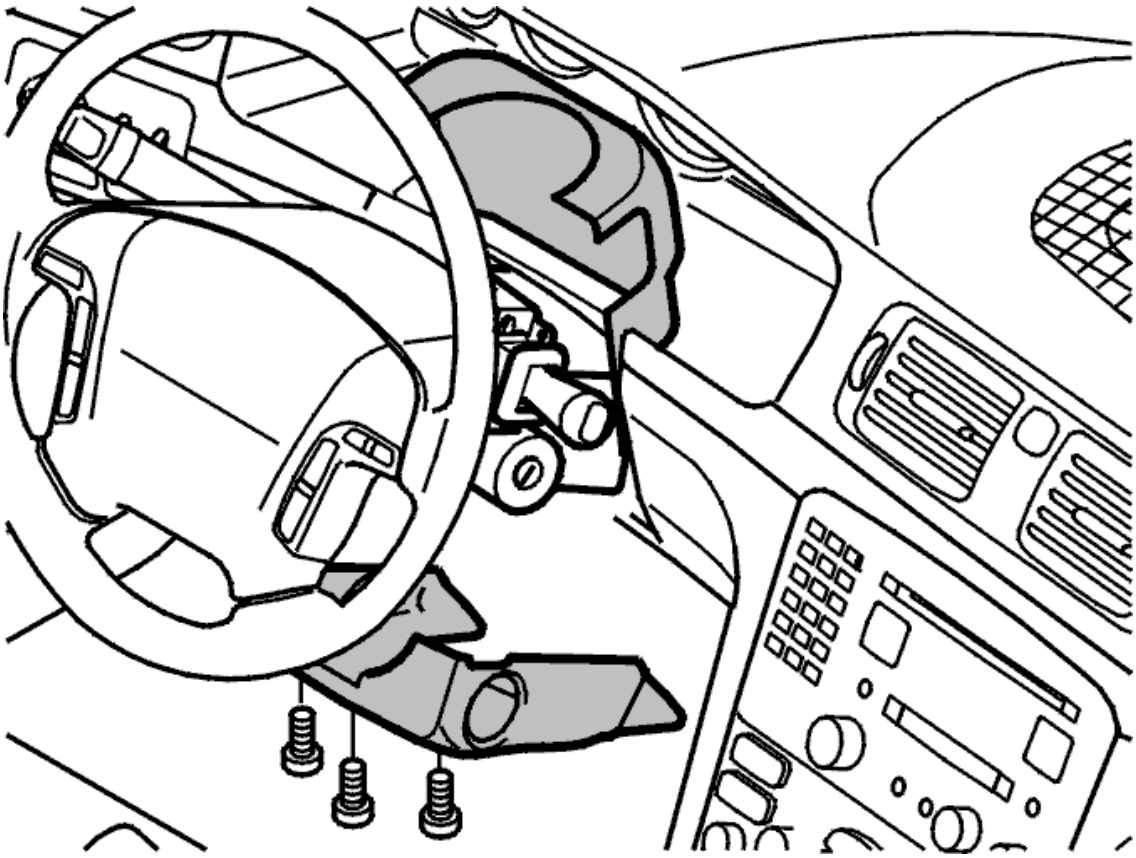


Fig. 143: Identifying Steering Column Covers
Courtesy of VOLVO CARS CORPORATION

Install:

- the steering shaft covers
- the centre console. See **CENTER CONSOLE, REPLACING**
- the soundproofing panel.

BUSHING, BRAKE PEDAL, REPLACING

REMOVE THE DRIVER'S SIDE SOUNDPROOFING PANEL

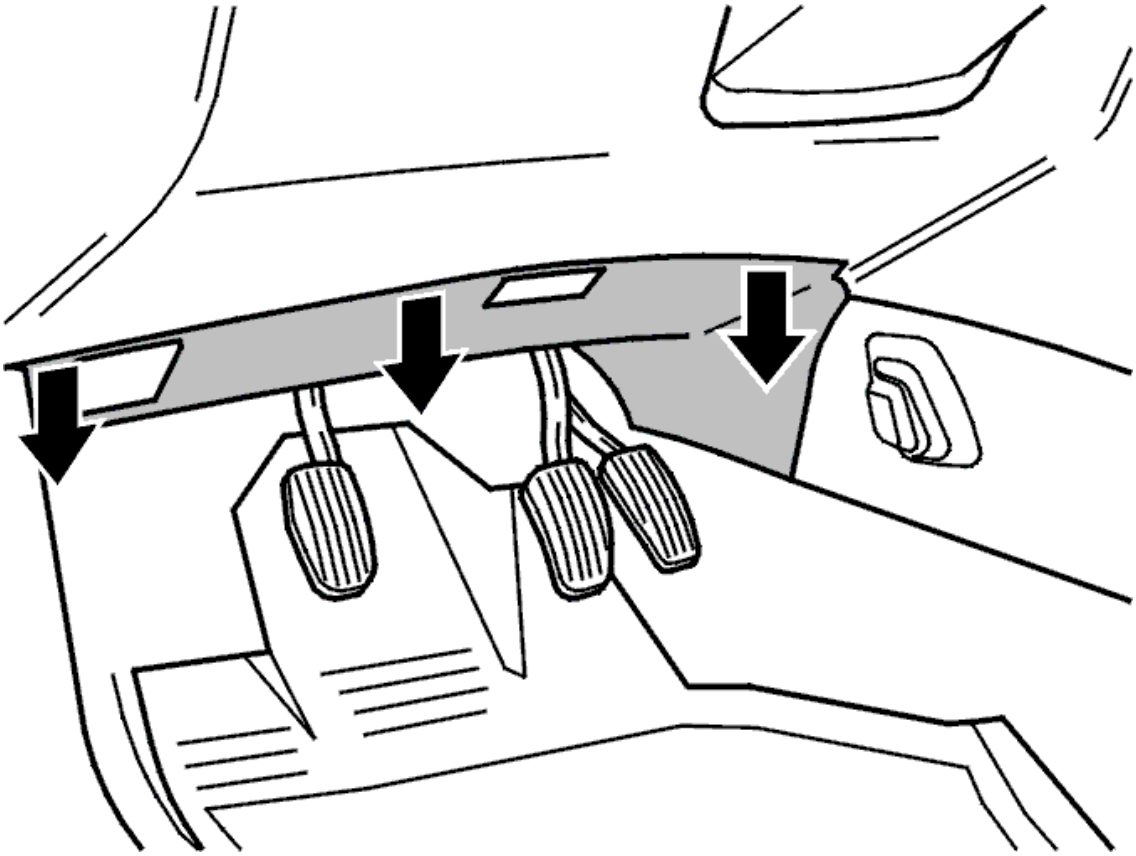


Fig. 144: Identifying Driver Side Soundproofing Panel
Courtesy of VOLVO CARS CORPORATION

Grip the upper edge of the soundproofing panel. Pull down out of its clips.

Remove the soundproofing panel.

PREPARE TO REMOVE THE BRAKE AND CLUTCH PEDALS

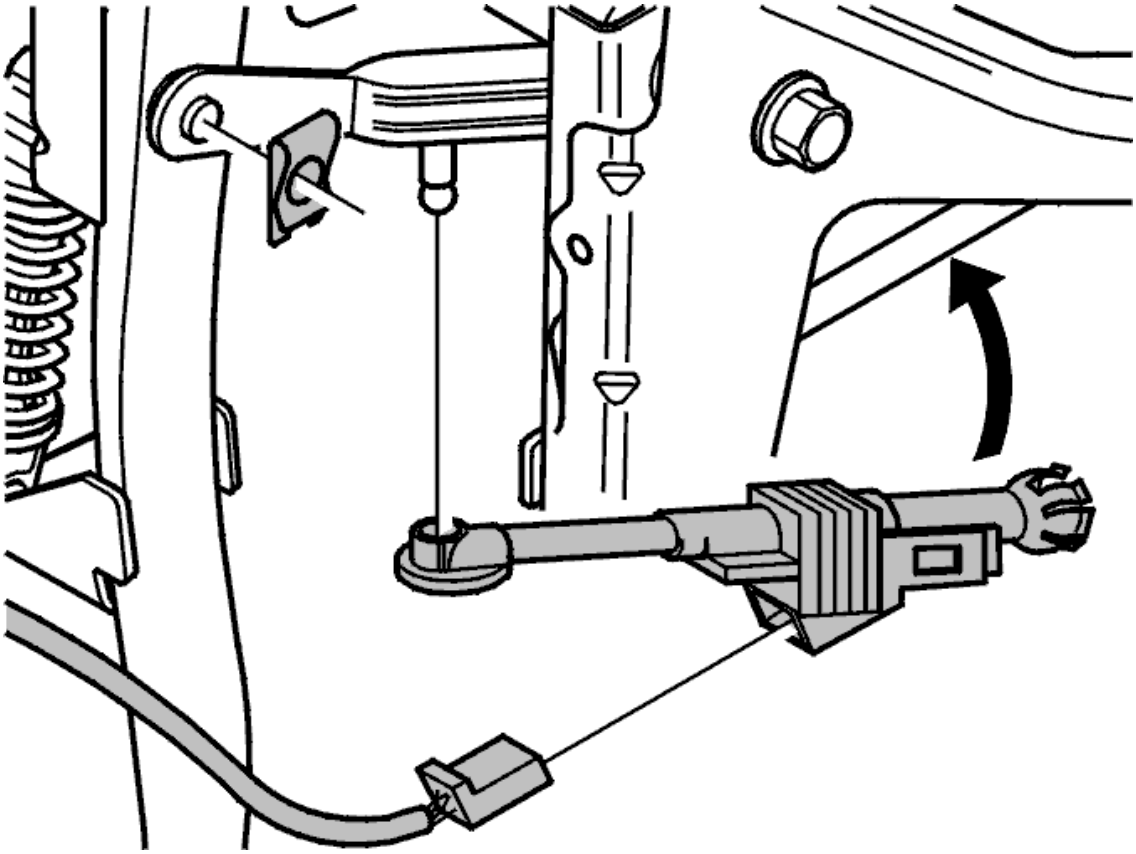


Fig. 145: Identifying Clutch Pedal Push Rod
Courtesy of VOLVO CARS CORPORATION

Remove:

- the clips for the brake and clutch pedal
- the pedal position sensor from the clutch pedal. Disconnect the connector
- the pedal position sensor from the mounting and firewall. Pull it straight out.

CONTINUE DISCONNECTING THE BRAKE AND CLUTCH COMPONENTS

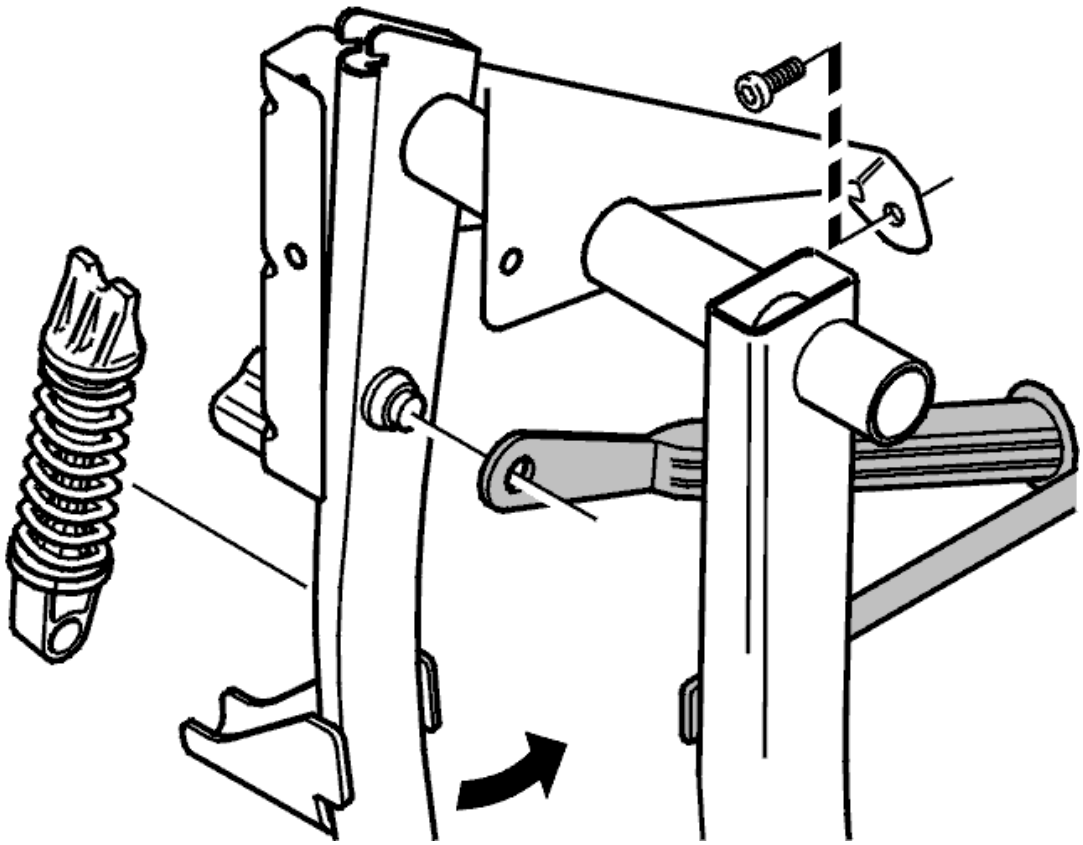


Fig. 146: Clutch Push Rod And Auxiliary Spring
Courtesy of VOLVO CARS CORPORATION

Disconnect the push rod for the clutch and brake pedal.

Depress the clutch pedal. Remove the auxiliary spring.

Remove the screw holding the clutch pedal bracket down at the firewall (Torx).

REMOVE THE CLUTCH PEDAL WITH BRACKET

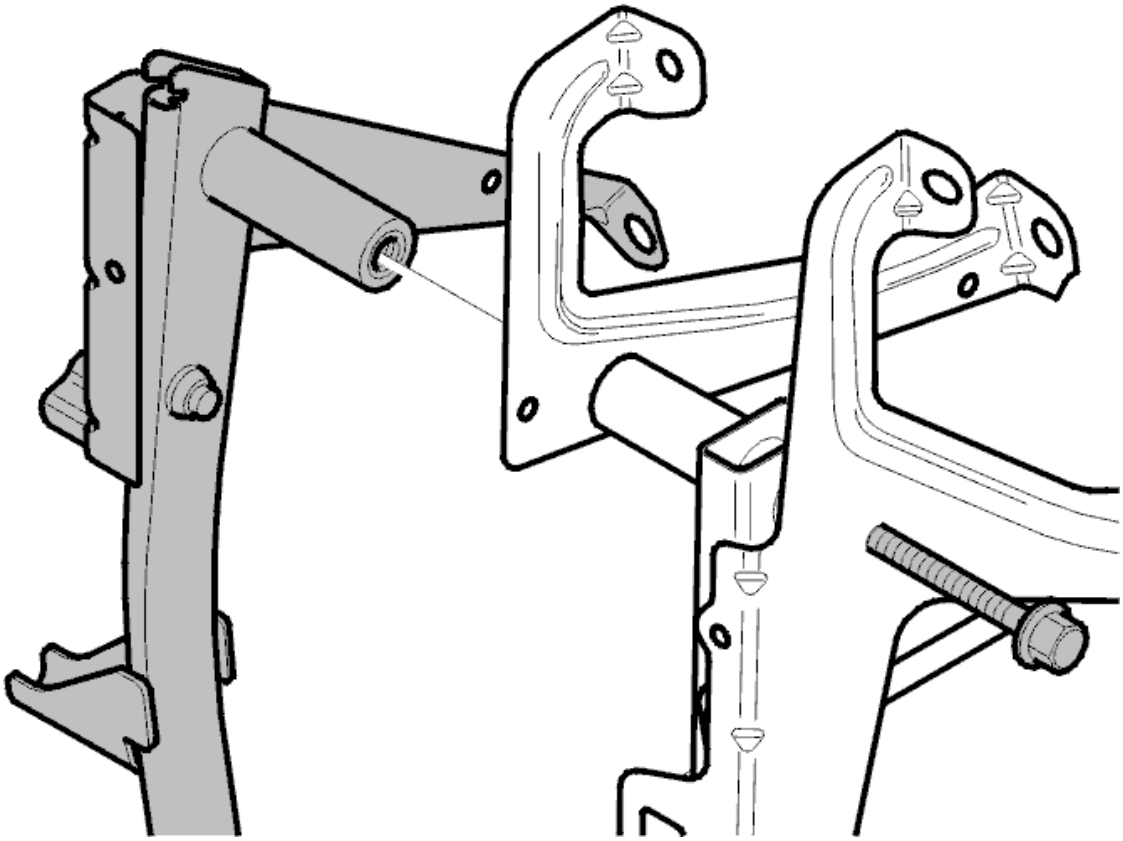


Fig. 147: Clutch Pedal Screw
Courtesy of VOLVO CARS CORPORATION

Remove the screw holding the brake and clutch pedal in bracket.

Remove the clutch pedal with the bracket.

REMOVE THE BRAKE PEDAL

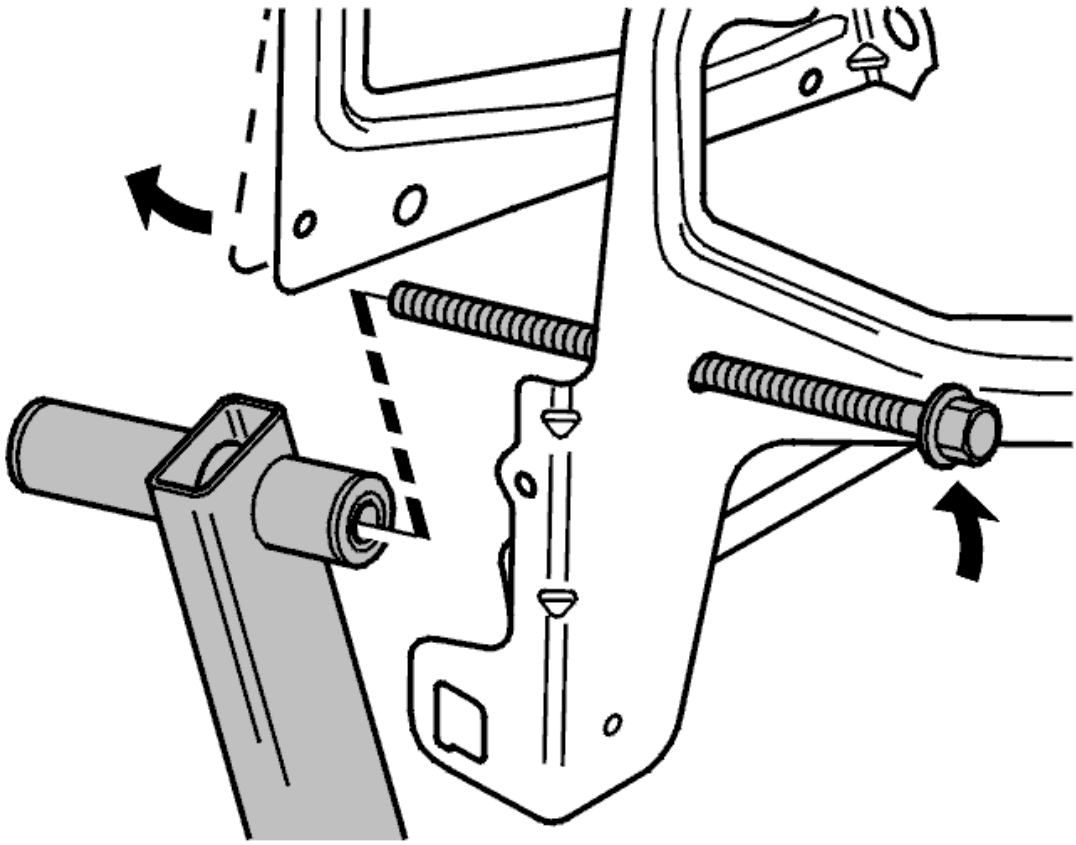


Fig. 148: Identifying Brake Pedal Removal
Courtesy of VOLVO CARS CORPORATION

Pull out the brake pedal screw as far as possible.

Press out the brake pedal bracket a little. Turn the pedal downwards and pull out the screw. The screw remains in the bracket.

NOTE: Take care that the stop lamp switch is not damaged when removing the brake pedal.

Check stop lamp switch

See **REMOVING THE BRAKE LAMP SWITCH** .

REMOVE THE BUSHINGS FROM THE BRAKE PEDAL

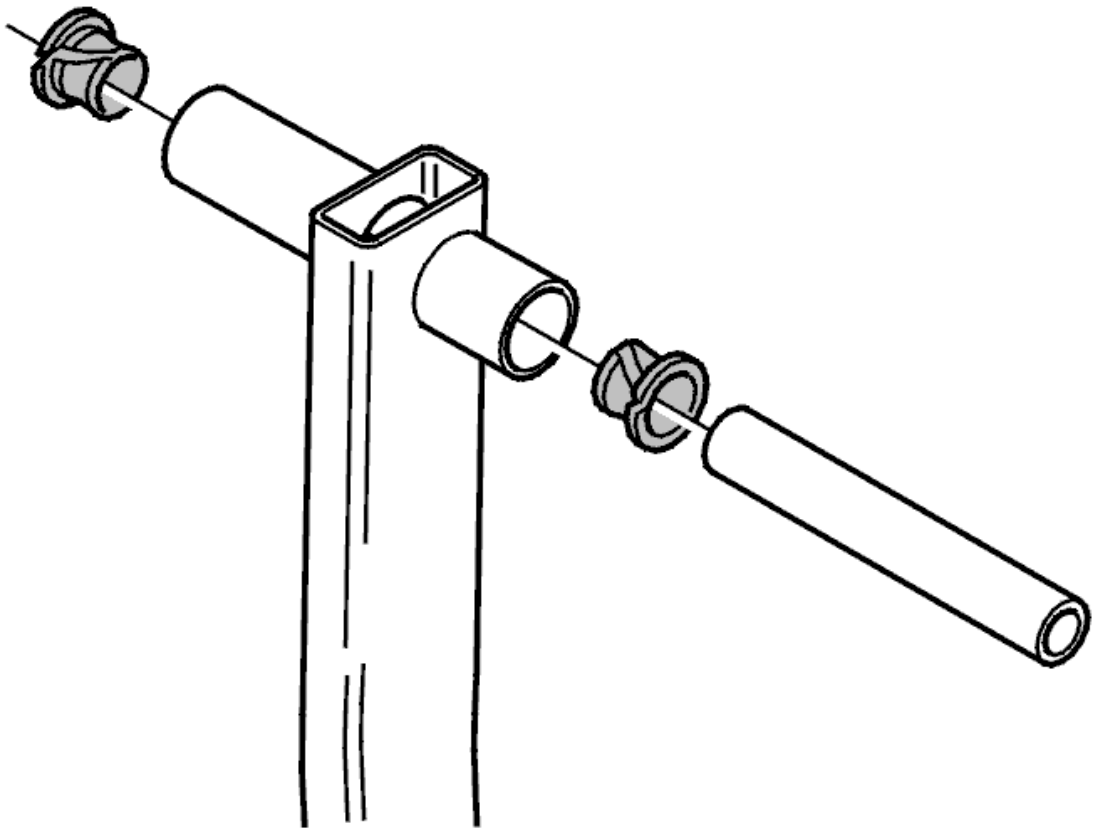


Fig. 149: Brake Pedal Bushings
Courtesy of VOLVO CARS CORPORATION

Push the guide sleeve out of the brake pedal.

Remove the bushings.

INSTALL THE BUSHINGS IN THE BRAKE PEDAL

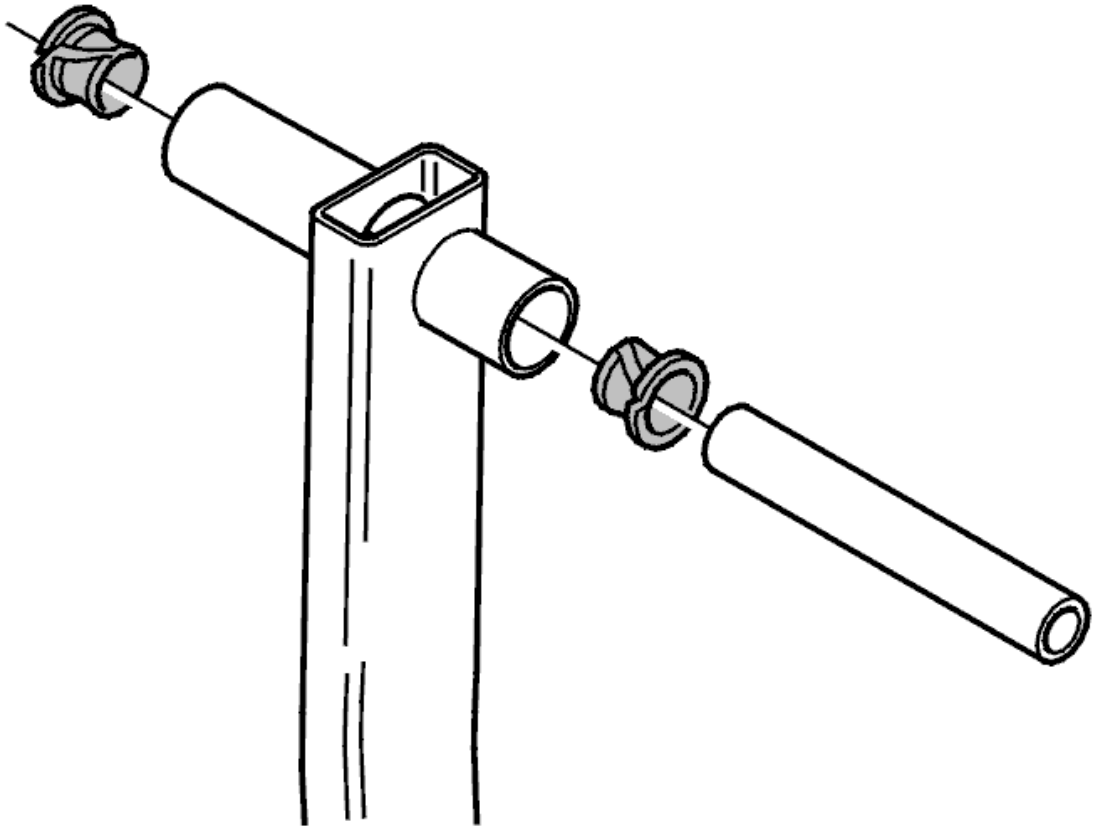


Fig. 150: Brake Pedal Bushings
Courtesy of VOLVO CARS CORPORATION

Lubricate the new bushings using grease, P/N 1161241-3.

Install the bushings and the guide sleeve in the brake pedal.

INSTALL THE BRAKE PEDAL

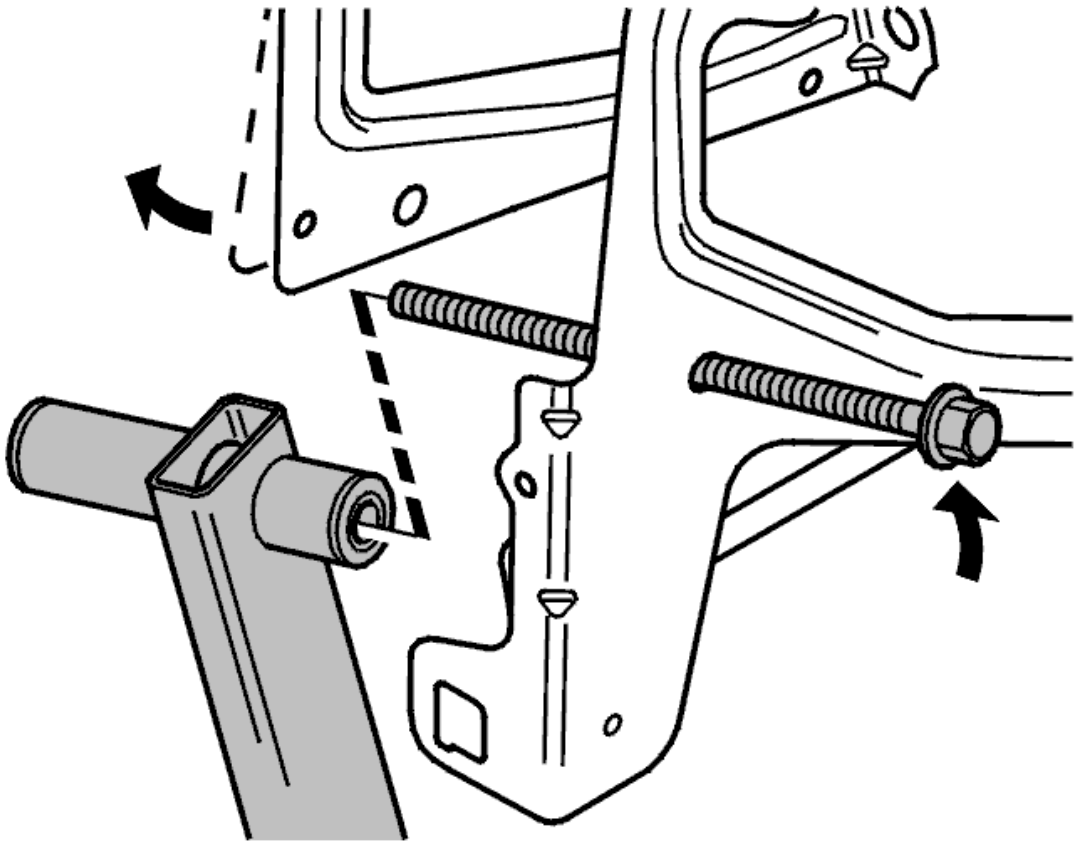


Fig. 151: Identifying Brake Pedal Removal
Courtesy of VOLVO CARS CORPORATION

Angle the screw upwards in the bracket.

Install the brake pedal on the screw. Push the bracket slightly to one side. Fold up the brake pedal in the bracket.

Press the screw into the brake pedal.

INSTALL THE CLUTCH COMPONENTS

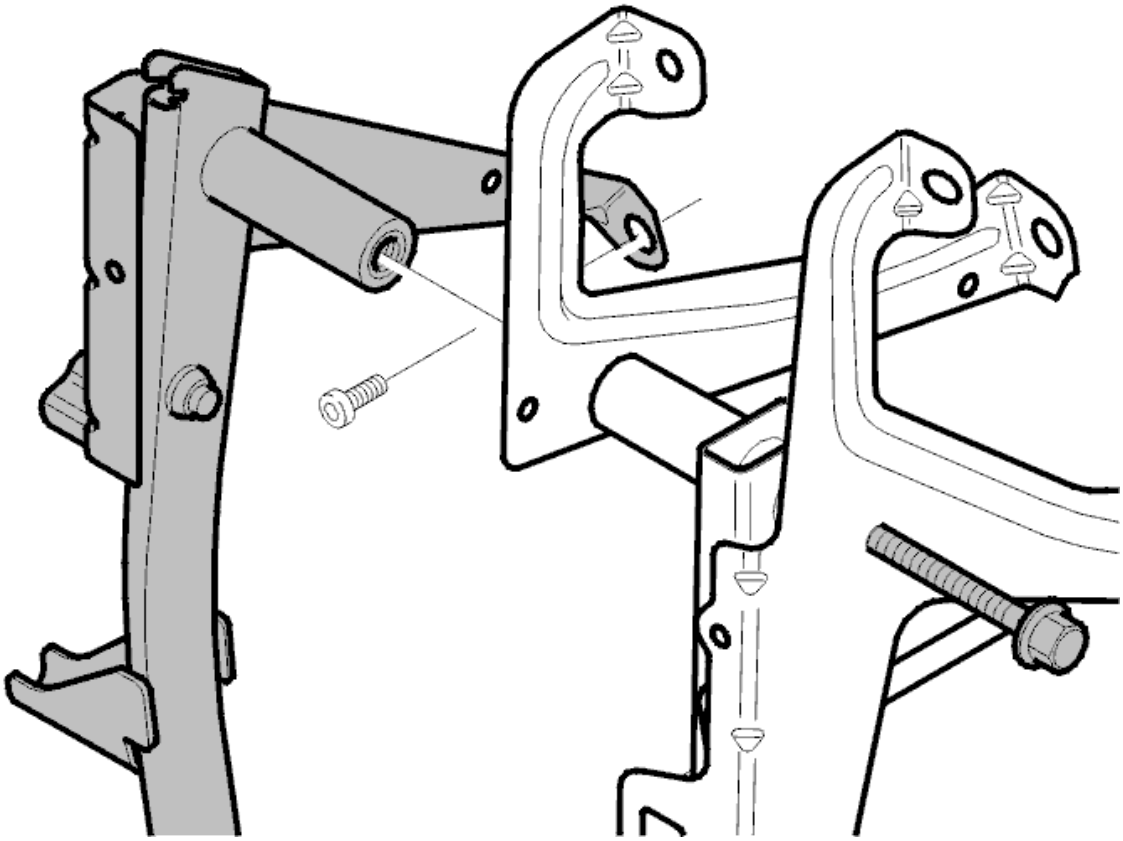


Fig. 152: Clutch Pedal And Mounting Screw
Courtesy of VOLVO CARS CORPORATION

Install:

- the clutch pedal with bracket
- torx screw. Tighten to **10 Nm** .

Tighten the mounting screw. Tighten to **40 Nm** .

INSTALL THE BRAKE AND CLUTCH COMPONENTS

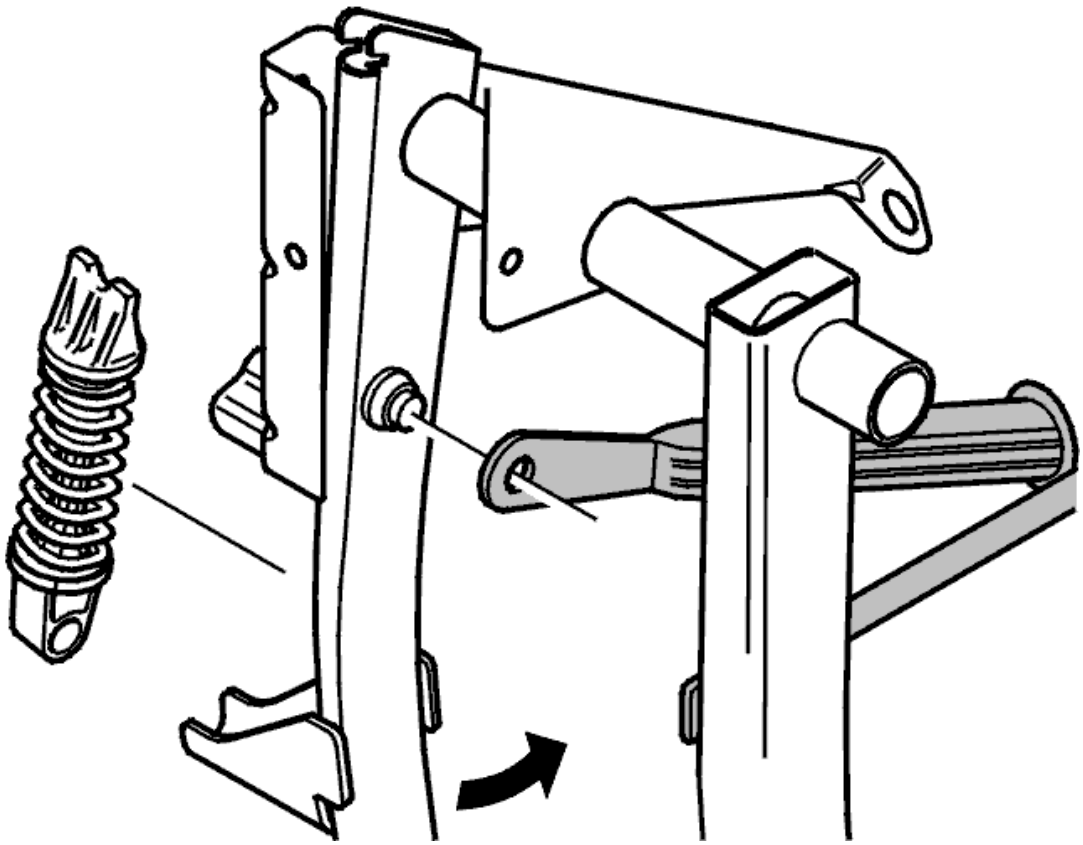


Fig. 153: Identifying Clutch Auxiliary Spring And Push Rod
Courtesy of VOLVO CARS CORPORATION

Install:

- the auxiliary spring for the clutch pedal. Press down the clutch pedal and install the spring
- the push rod on the clutch pedal. Secure it using the retaining clip
- the push rod on the brake pedal. Lock it using the retaining clip.

CONTINUE INSTALLING THE BRAKE AND CLUTCH COMPONENTS

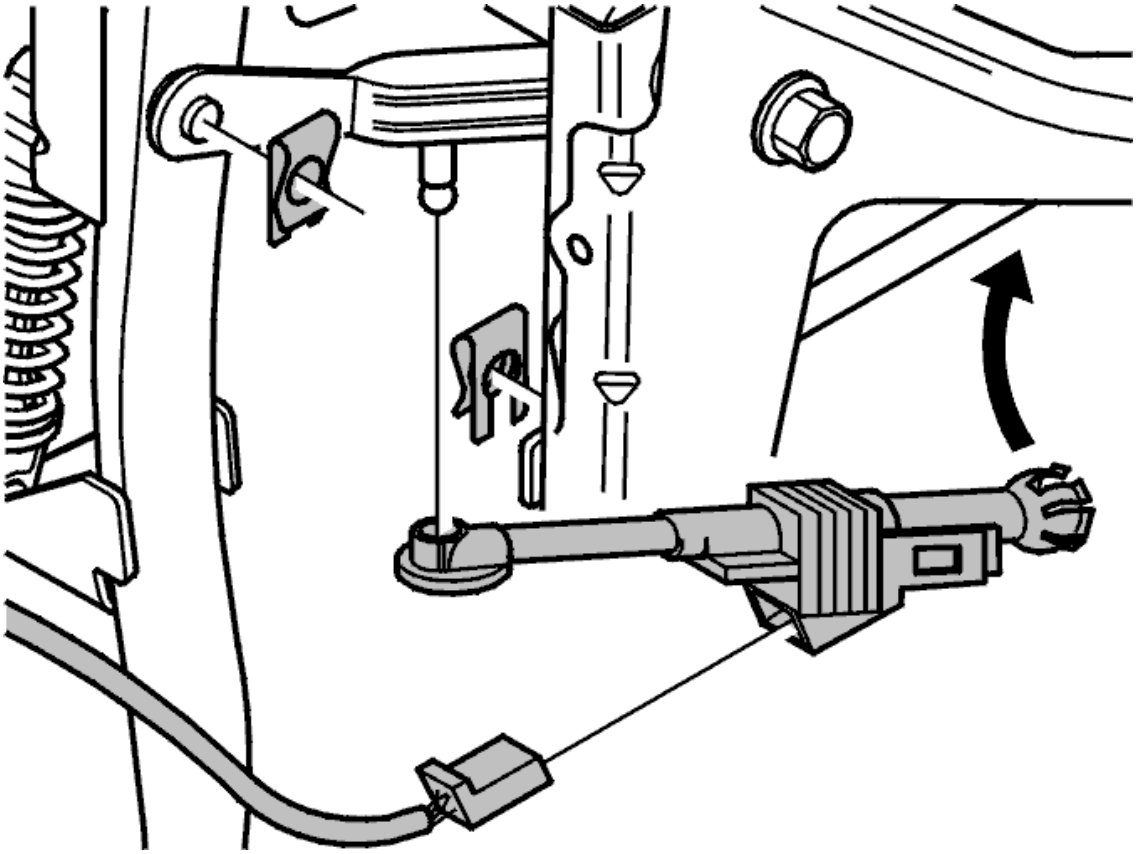


Fig. 154: Identifying Pedal Position Sensor
Courtesy of VOLVO CARS CORPORATION

Install:

- the pedal position sensor (between the clutch pedal and the firewall)
- the clips for brake and the clutch pedal.

Check the function of the brake and clutch pedal and pedal position sensor.

Reinstall the soundproofing panel.

GUIDE SLEEVE KEY LOCK CABLE

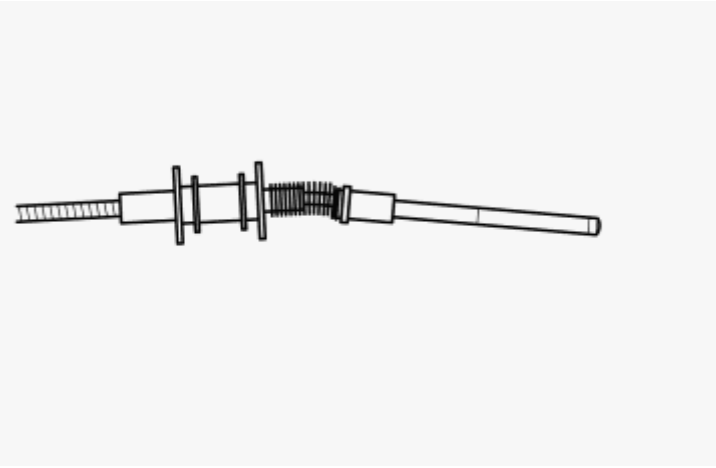


Fig. 155: Center Console Assembly
Courtesy of VOLVO CARS CORPORATION

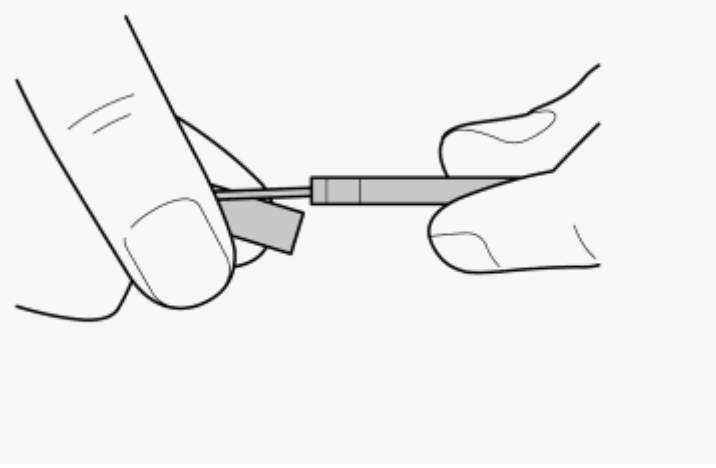


Fig. 156: Identifying Cable Pulled Out Of Cable Sleeve
Courtesy of VOLVO CARS CORPORATION

Press the spring towards the cable sleeve.

Pull the cable out of the cable sleeve (approximately 10 mm).

Remove the guide sleeve.

Remove the spring. Ensure that the broken section of the guide sleeve is removed from the cable sleeve.

Install a new guide sleeve in reverse order.

GEAR SELECTOR CABLES, REPLACE

Special tools:

9997077

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

REMOVAL

REMOVING THE AIR CLEANER (ACL) HOUSING

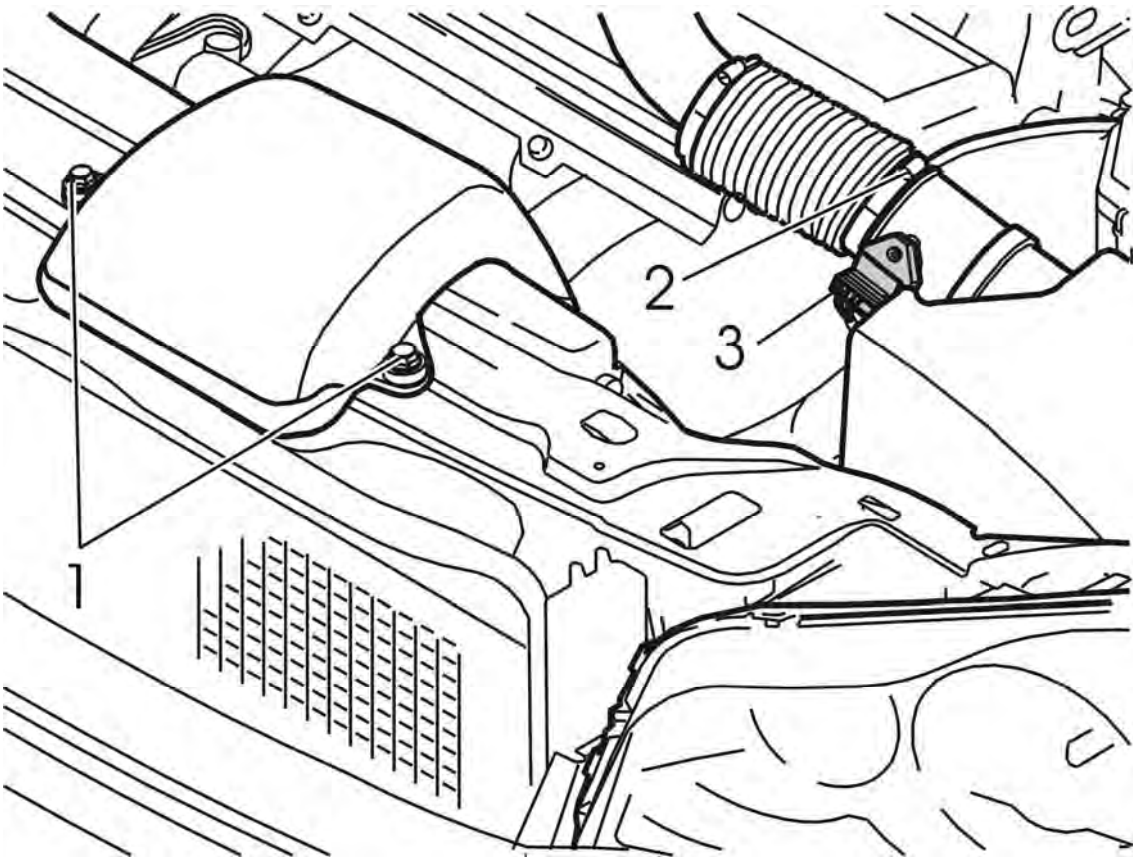


Fig. 157: Air Cleaner (ACL) Housing
Courtesy of VOLVO CARS CORPORATION

Remove the air cleaner (ACL) housing. See **GEAR SELECTOR CABLES, REPLACING**.

REMOVING THE GEAR SELECTOR CABLE FROM THE BRACKET

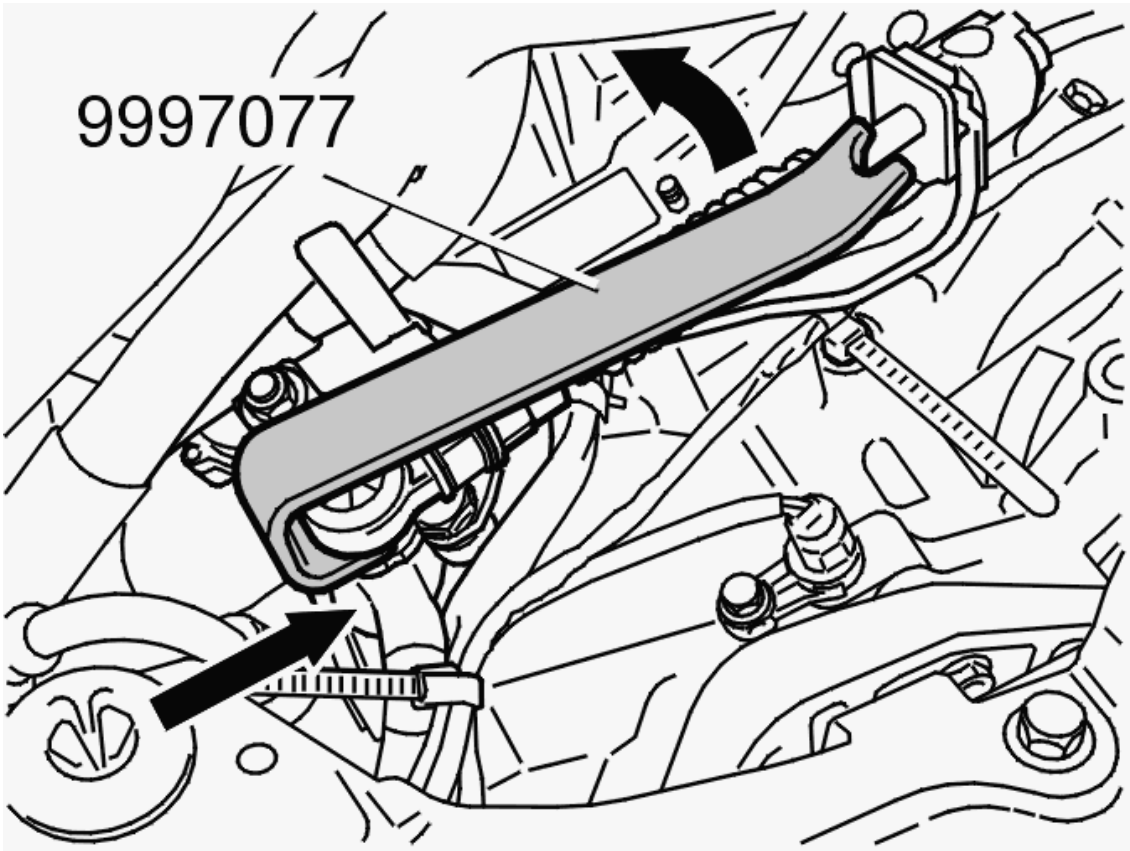


Fig. 158: Detaching Cable From Lever Using Special Tool
Courtesy of VOLVO CARS CORPORATION

Remove the gear selector cable from the bracket on the transaxle. Use special tool **9997077** . Do not damage the ball.

REMOVING SIDE PANELS

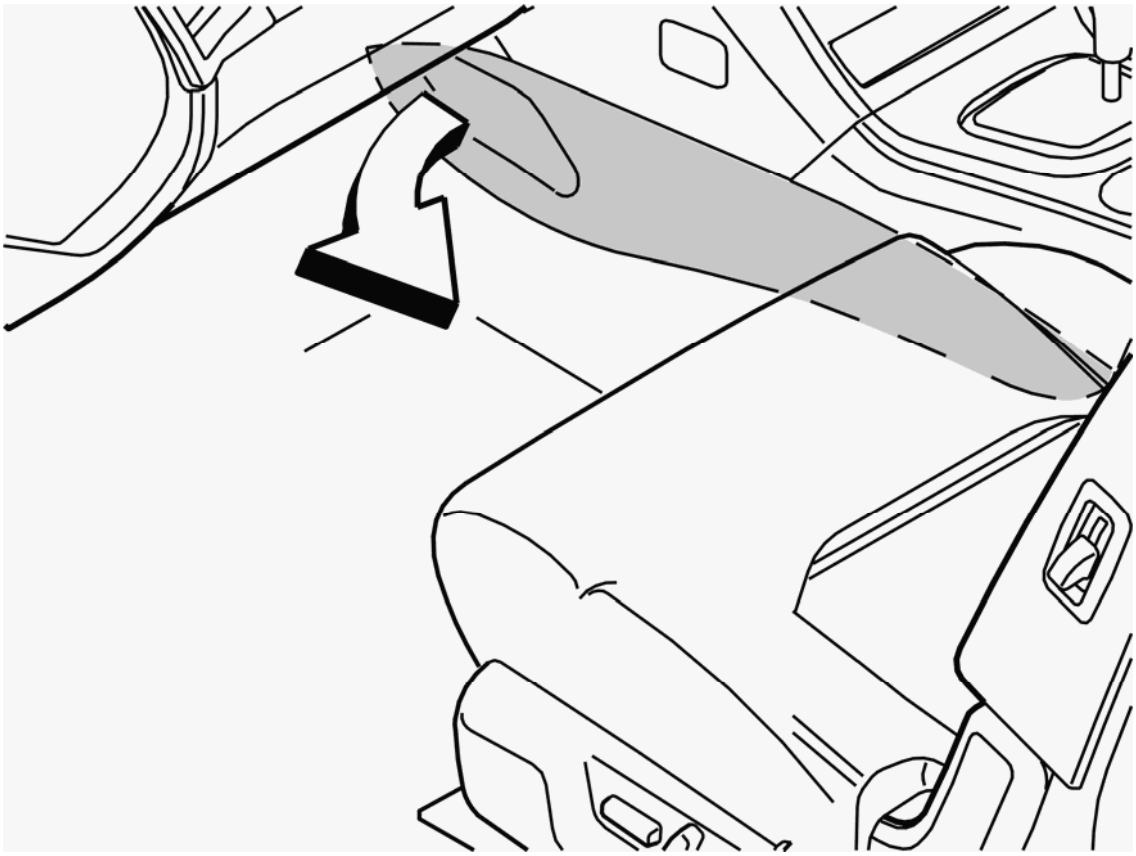


Fig. 159: Identifying Removal Of Center Console Side Panels
Courtesy of VOLVO CARS CORPORATION

Remove the side panels from the centre console.

REMOVING THE PANEL

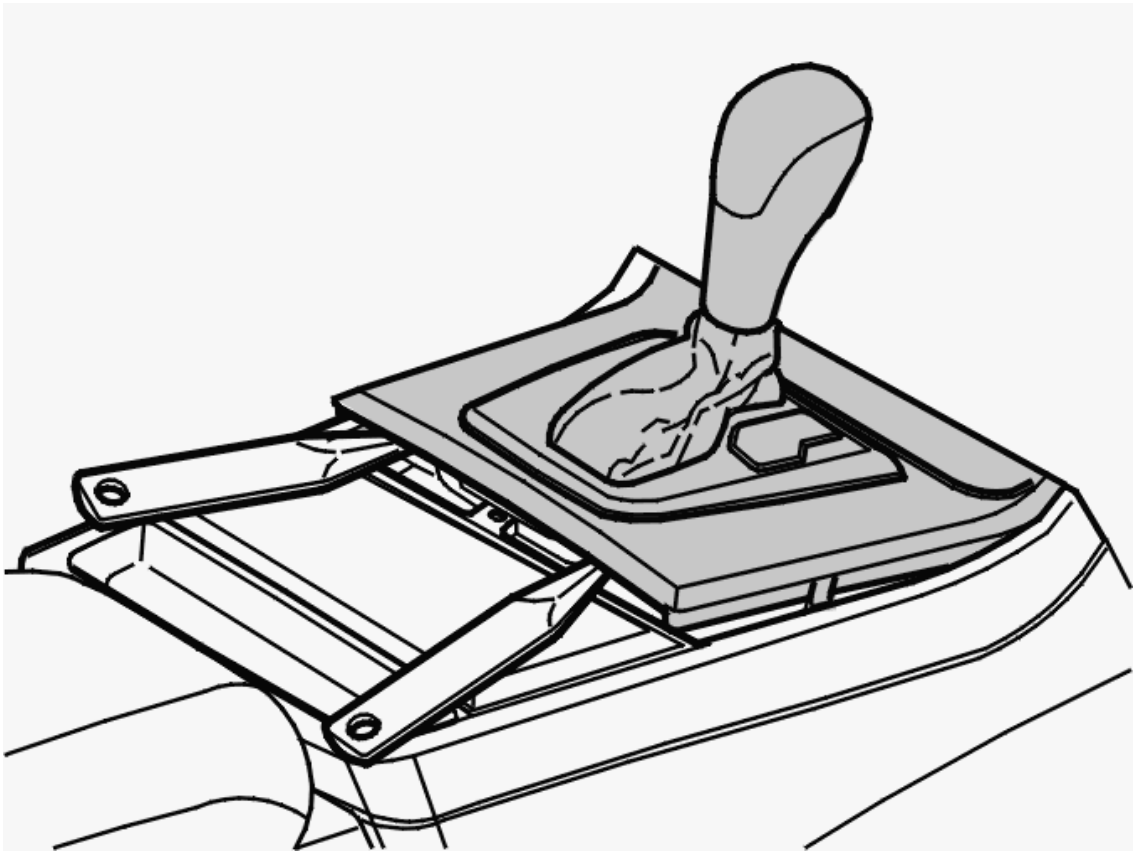


Fig. 160: Lifting Straight Up At The Rear
Courtesy of VOLVO CARS CORPORATION

Detach the panel around the gear selector lever by lifting straight up at the rear edge.

REMOVING THE MECHANICAL CABLE

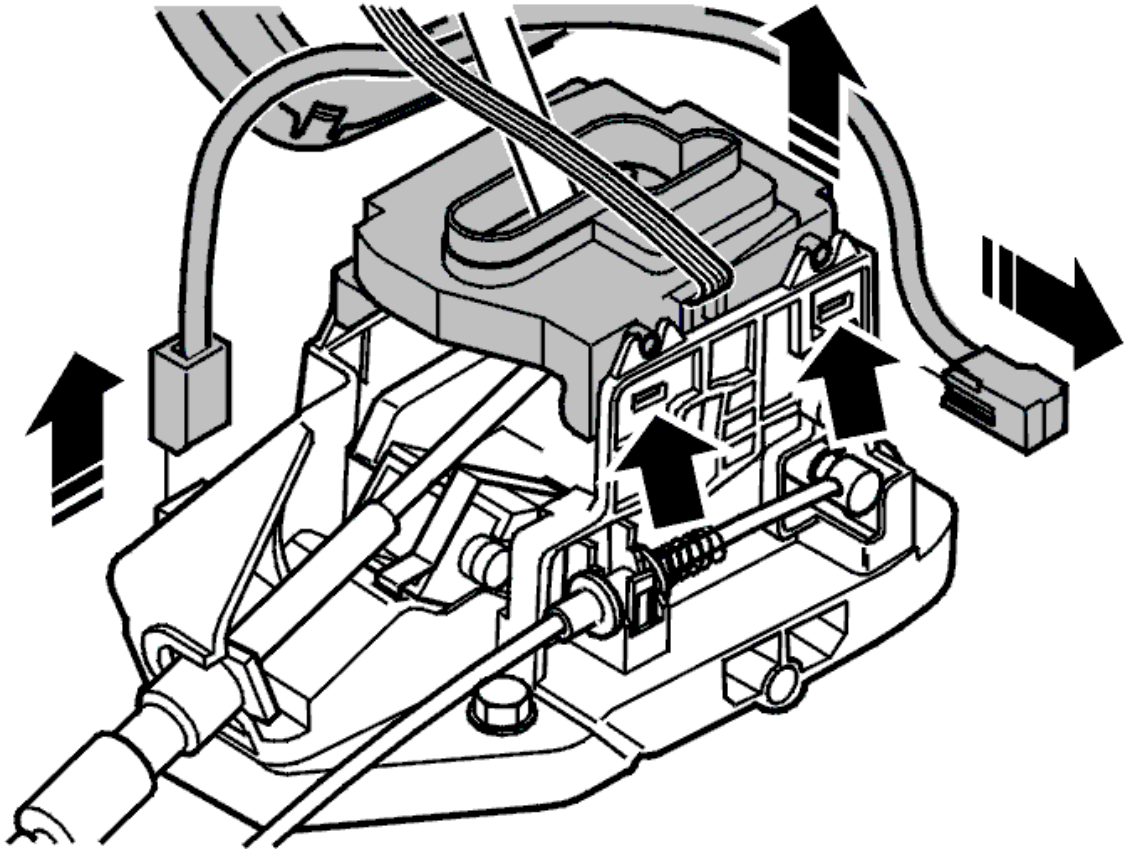


Fig. 161: Removing Stop For Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Detach the gear selector lever stop. See **GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC, REPLACING**.

Remove:

- the catch for the cable on the gear selector
- the cable from the end of the gear selector assembly by pressing the lock facing. Use a screwdriver
- the cable.

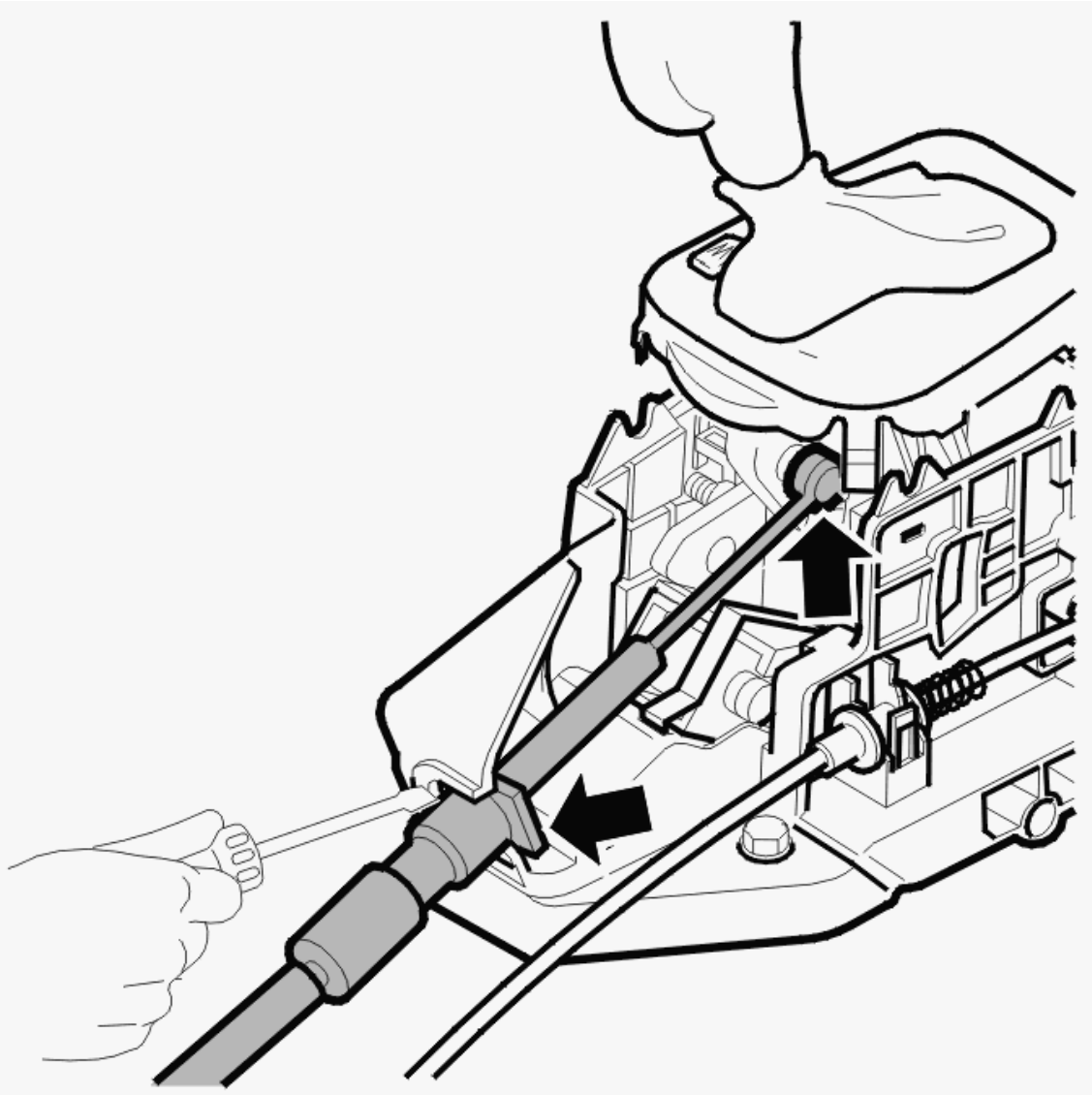


Fig. 162: Removing Gear Selector Cable
Courtesy of VOLVO CARS CORPORATION

REMOVING THE CABLE AT THE FIREWALL

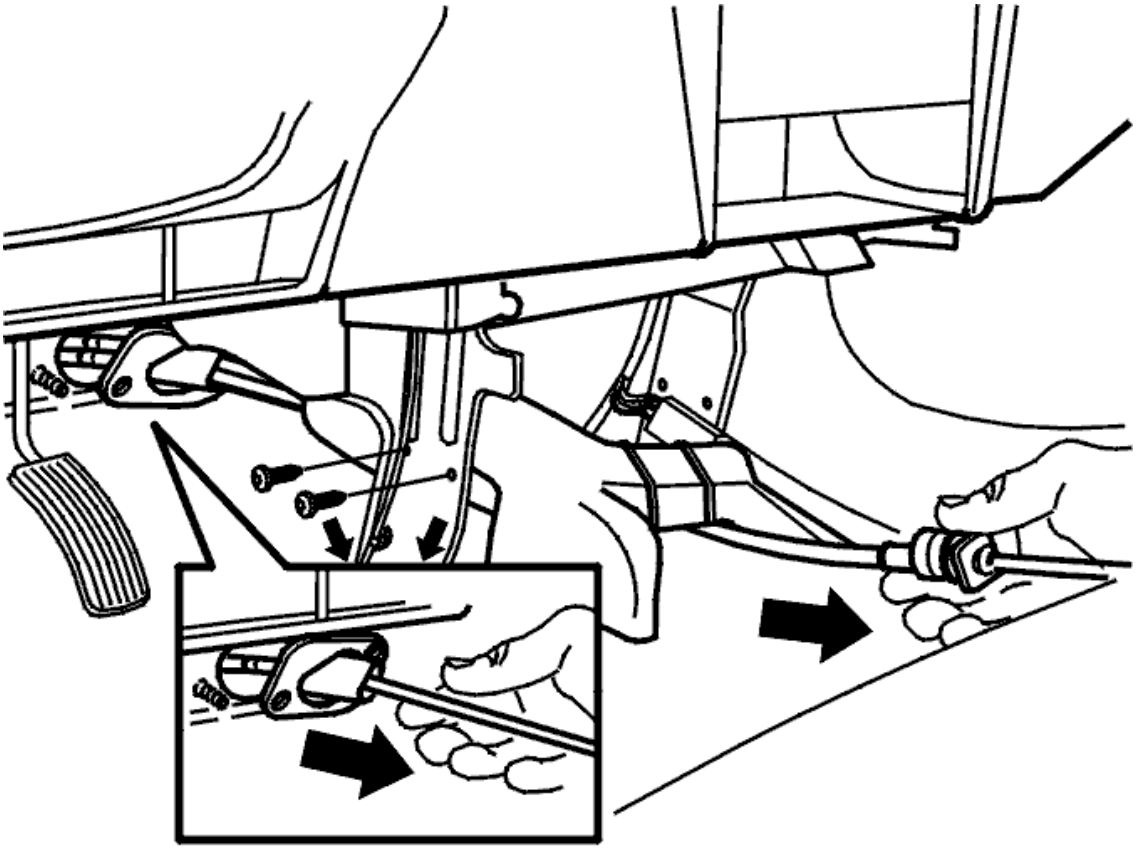


Fig. 163: Identifying Cable At Firewall
Courtesy of VOLVO CARS CORPORATION

Remove:

- the 2 air ducts
- the 4 screws for the stay in the dashboard
- the cable. Pull it inwards into the passenger compartment.

HINT: Secure a cable using tape at the end of the engine compartment on the mechanical cable before pulling it out to make reinstallation easier. Route the cable correctly in the engine compartment with someone to assist you.

INSTALLATION

NOTE: For tightening torques, see TIGHTENING TORQUE .

PREPARATIONS FOR INSTALLATION

Tape the cable to the new cable

NOTE: When installing the mechanical cable: Make sure that there are no sharp bends or kinks, especially in the cable's ends between the inner cable and outer

casing.

HINT: Route the cable correctly in the engine compartment with someone to assist you.

INSTALLING THE CABLE FROM THE INSIDE OF THE PASSENGER COMPARTMENT

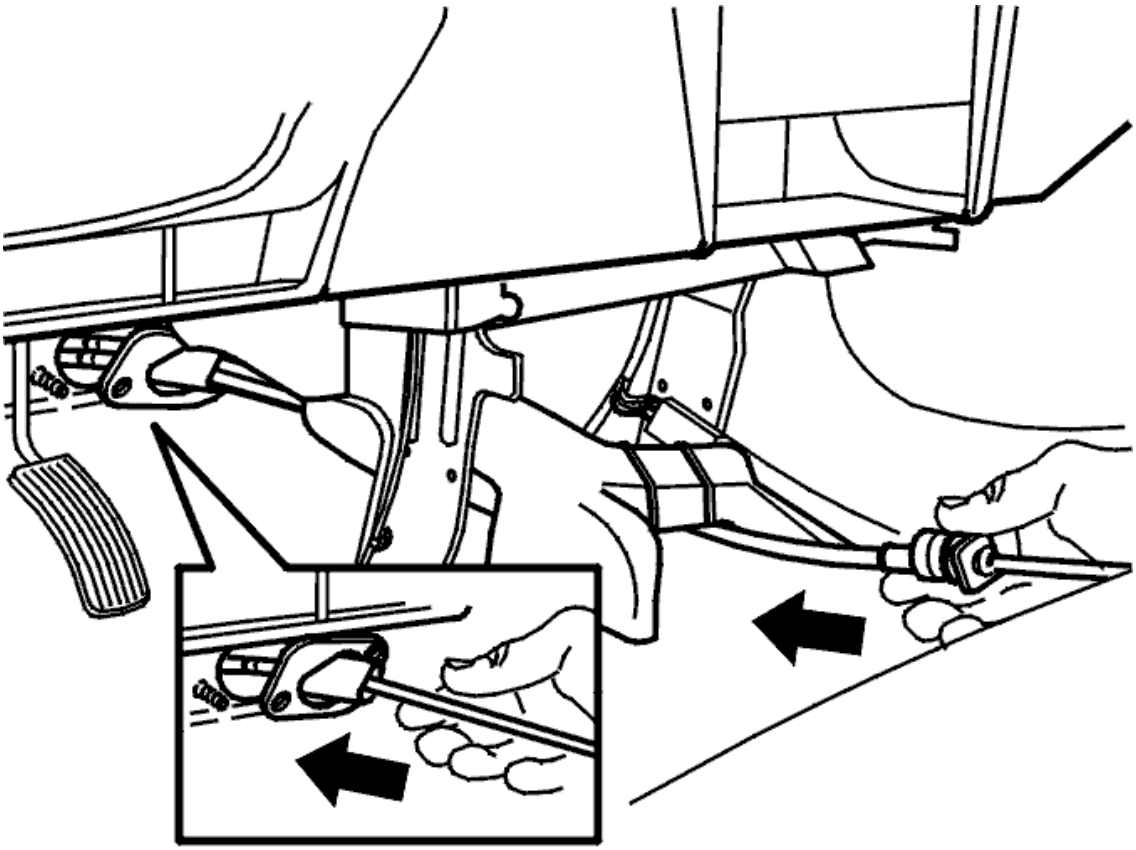


Fig. 164: Identifying Cable At Firewall
Courtesy of VOLVO CARS CORPORATION

Install the cable under the heater unit on left side, down towards the hole.

NOTE: Take great care when running the rubber bellow for the cable through the hole in the firewall. The cable must not be damaged.

Feed a small amount of cable through the hole.

HINT: Route the cable correctly in the engine compartment with someone to assist you.

Locate the grommet on the studs

Install:

- the nuts. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC**

COMPONENTS

- the air ducts
- the stay and the M6 screws. Tighten.

INSTALLING THE CABLE ON THE GEAR SELECTOR

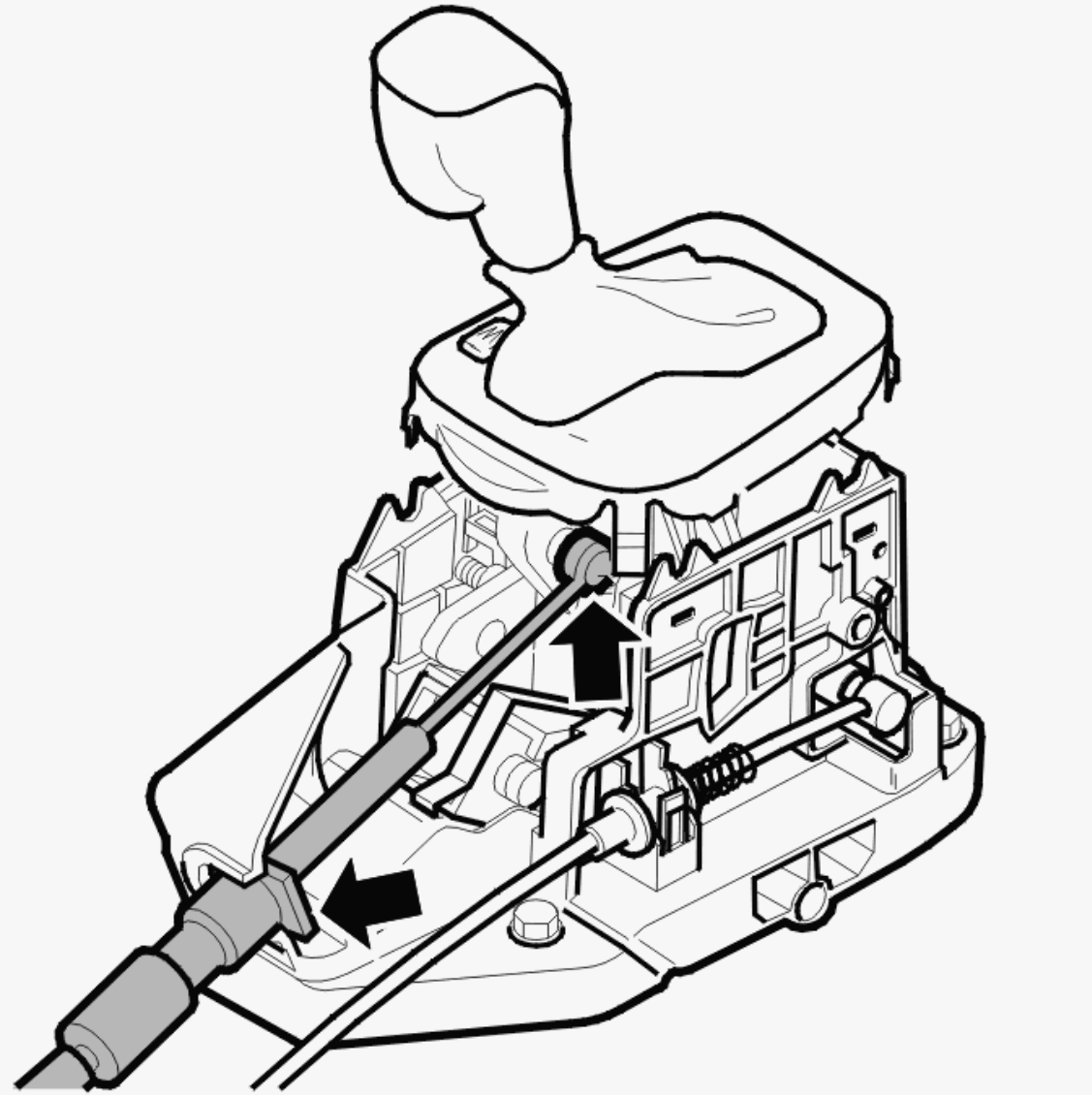


Fig. 165: Installing Gear Selector Cable On Gear Selector
Courtesy of VOLVO CARS CORPORATION

Install:

- the cable on the gear selector. Secure the cable with the catch
- the cable to the end of the gear selector assembly.

Reinstall the gear selector lever stop. See **GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC,**

REPLACING.

INSTALLING SERVICE CLIPS

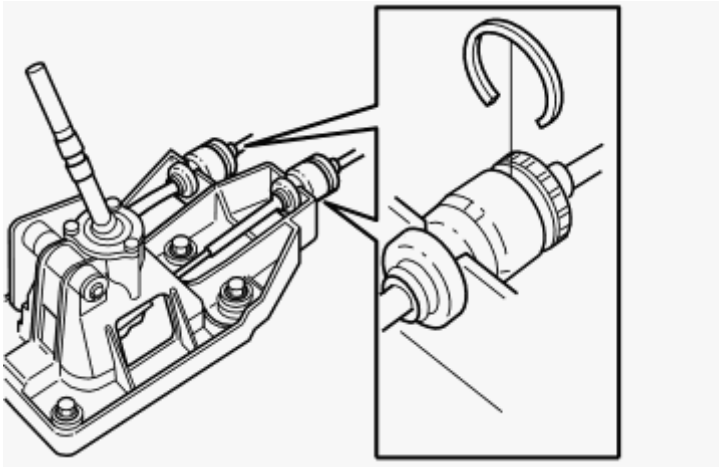


Fig. 166: Gear Selector And Clip
Courtesy of VOLVO CARS CORPORATION

NOTE: The automatic transmission has a gear selector cable while the manual transmission has two gear selector cables.

Ensure that the gear selector cable is engaged before fitting the blue clip. Press the clip into position as illustrated.

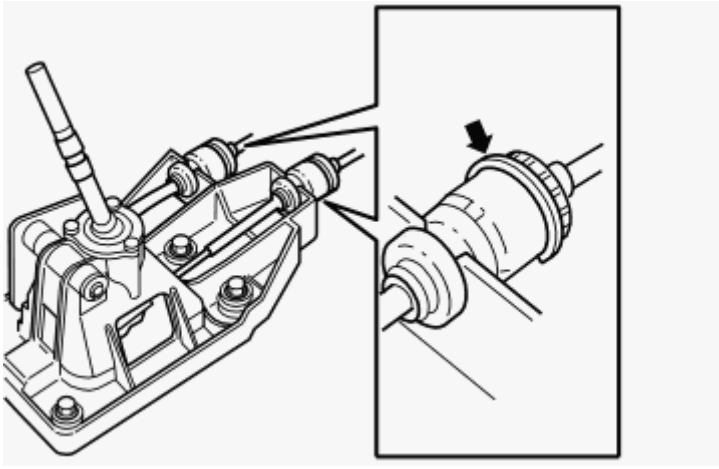


Fig. 167: Clip Positioned In Groove
Courtesy of VOLVO CARS CORPORATION

Check that the clip is positioned in the groove as illustrated.

INSTALLING THE GEAR SELECTOR CABLE ON THE GEARBOX

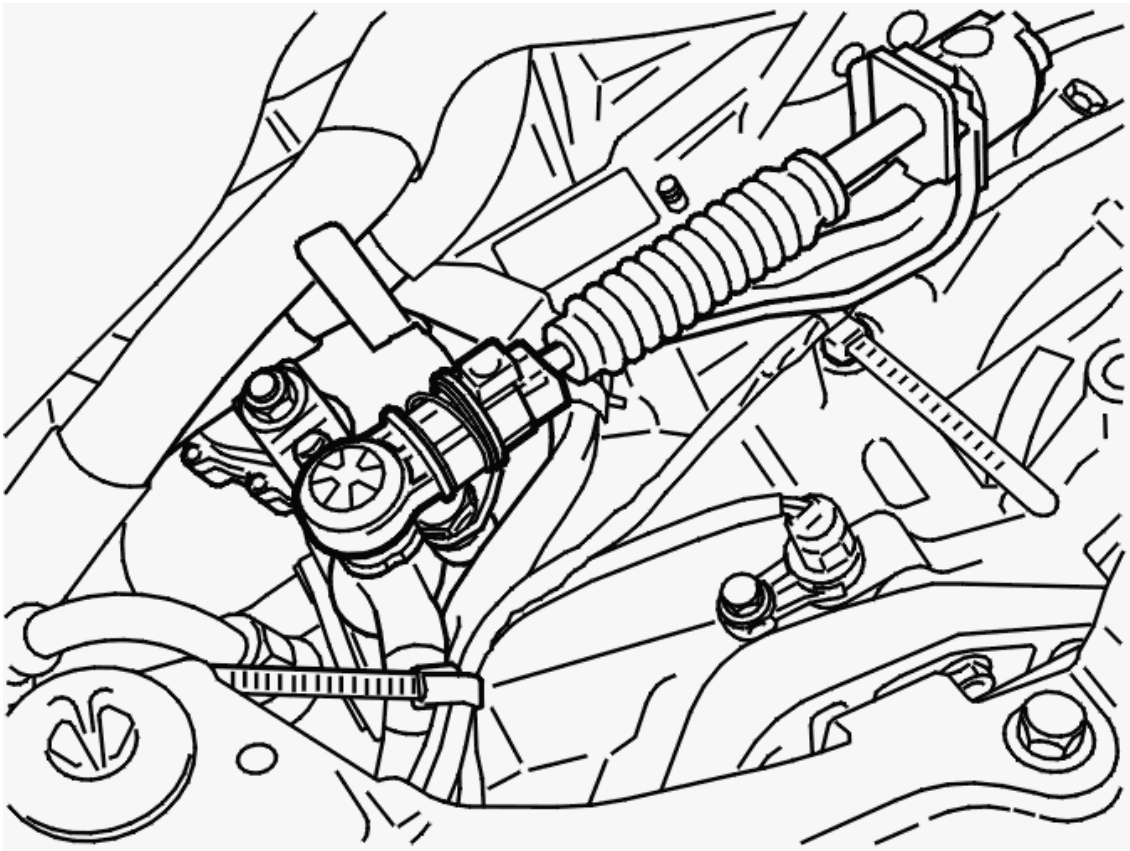


Fig. 168: Identifying The Ball Joint For The Cable
Courtesy of VOLVO CARS CORPORATION

Install:

- the cable on the bracket. Press it so that it locks
- the ball joint for the cable on the lever. Press into place by hand.

NOTE: The cable must be adjusted after replacement. See GEAR SELECTOR CABLES, ADJUSTING .

INSTALLING SERVICE CLIPS

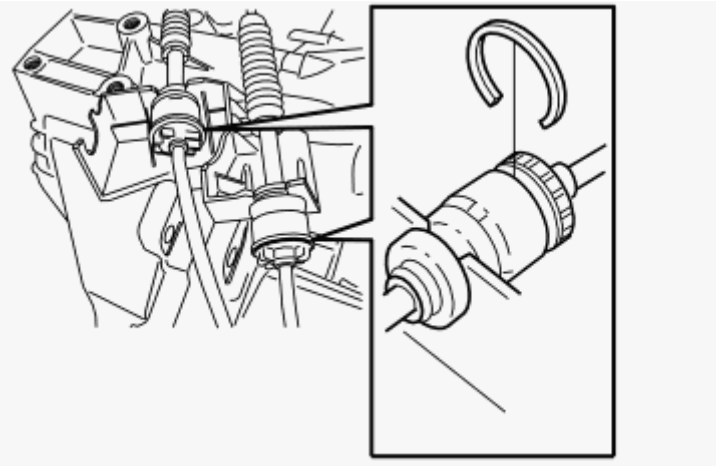


Fig. 169: Gear Selector Cable And Clip
Courtesy of VOLVO CARS CORPORATION

NOTE: The automatic transmission has a gear selector cable while the manual transmission has two gear selector cables.

Ensure that the gear selector cable is engaged before fitting the blue clip. Press the clip into position as illustrated.

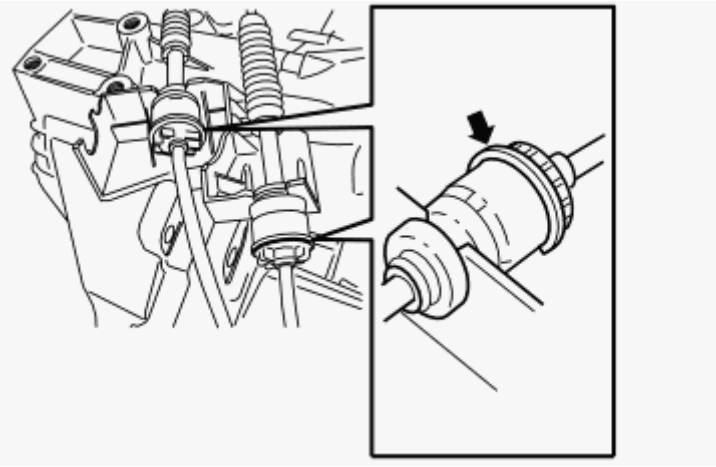


Fig. 170: Clip Positioned In Groove
Courtesy of VOLVO CARS CORPORATION

Check that the clip is positioned in the groove as illustrated.

GEAR SELECTOR KNOB, GEARTRONIC, REPLACING

REMOVAL

REMOVING THE BOOT FROM THE GEAR SELECTOR KNOB

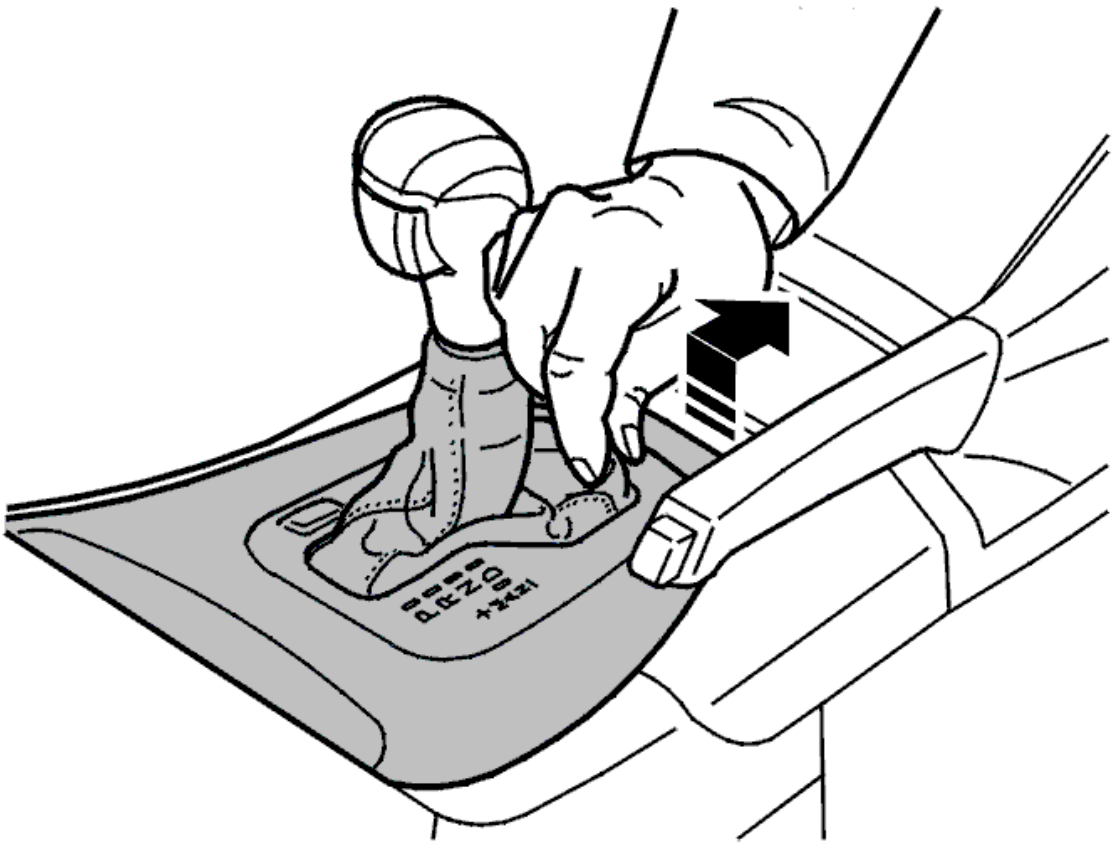


Fig. 171: Removing Boot From Gear Selector Knob
Courtesy of VOLVO CARS CORPORATION

Remove the top panel from the center console.

Grip the boot. Pull the boot upwards.

REMOVING THE LOCK BRACKET FROM THE GEAR SELECTOR KNOB

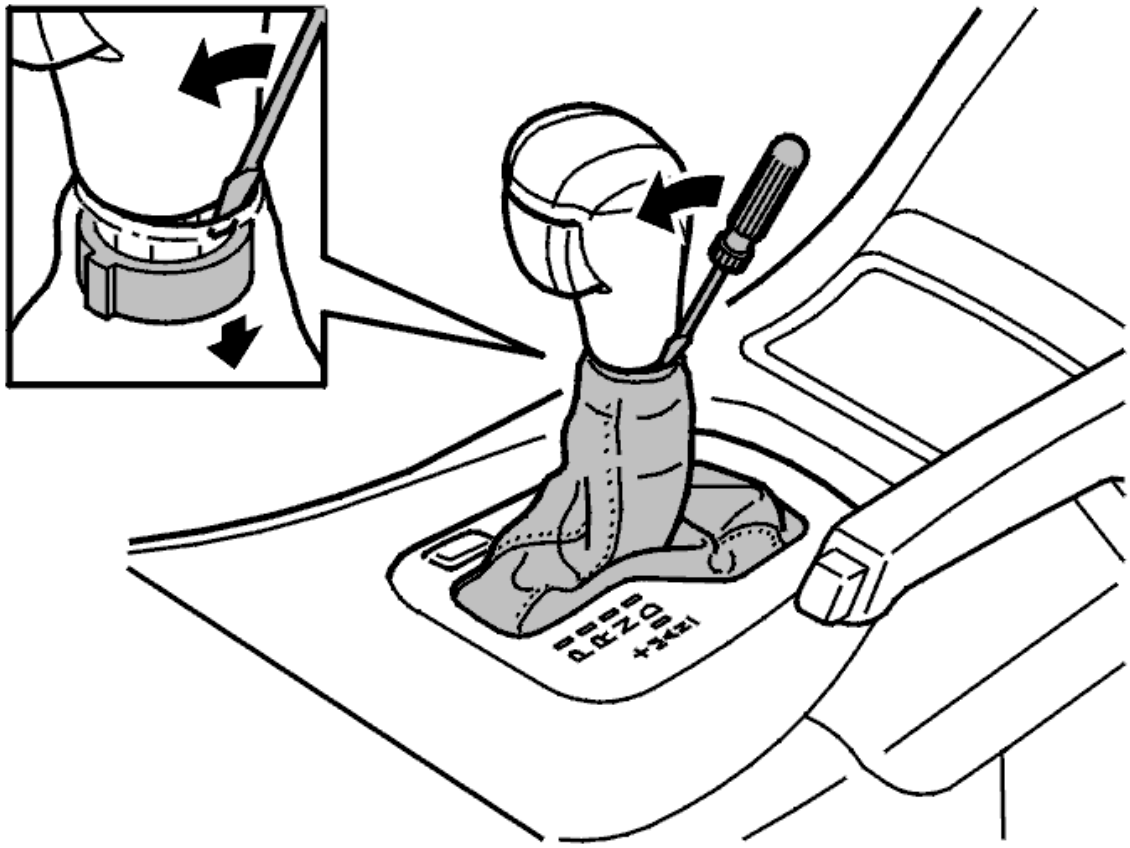


Fig. 172: Identifying Lock Bracket & Gear Selector Knob
Courtesy of VOLVO CARS CORPORATION

Insert a small screwdriver between the boot and the gear selector lever knob to access the lock bracket.

Carefully pry the screwdriver forward so that the lock bracket detaches from the gear selector lever knob.

NOTE: Only undamaged lock brackets can be reused.

REMOVING THE GEAR SELECTOR KNOB

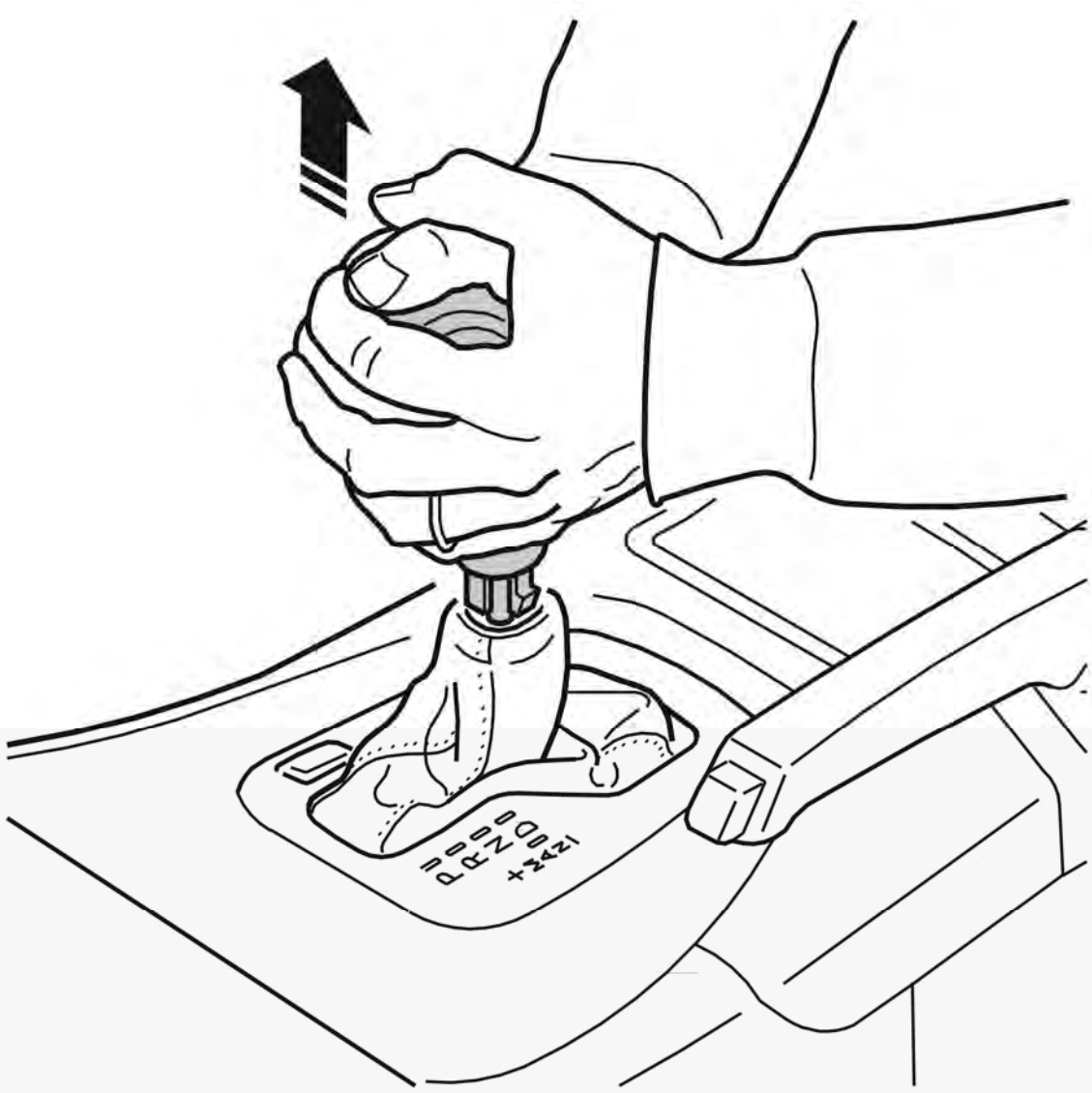


Fig. 173: Removing Gear Selector Knob
Courtesy of VOLVO CARS CORPORATION

Remove the gear selector knob as follows:

Stand astride the center console. Grasp the gear selector lever knob with both hands. Pull it straight upwards with a hard jerk.

INSTALLATION

INSTALLING THE GEAR SELECTOR KNOB

NOTE: The gear selector knob may be reused a maximum of four times

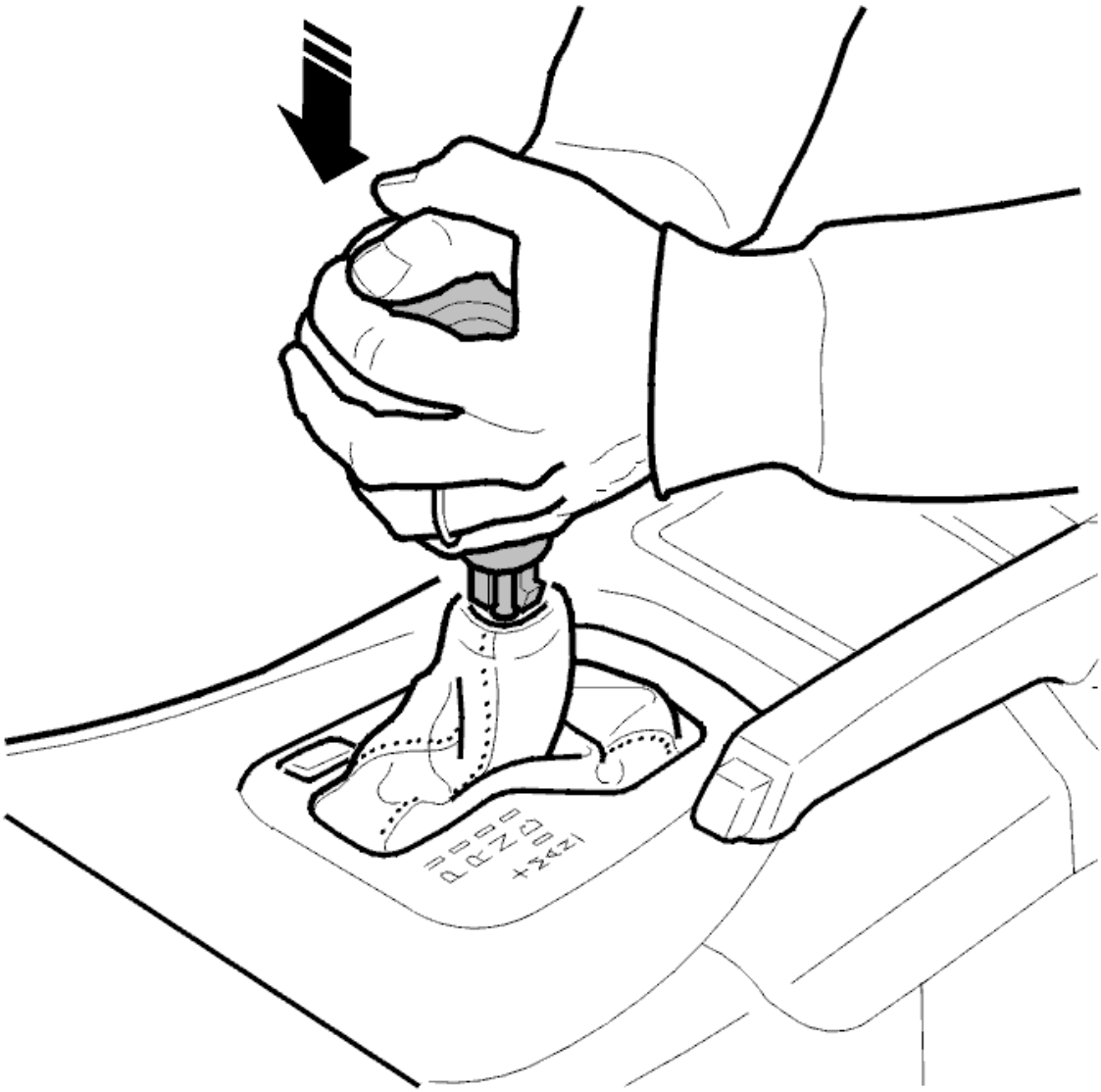


Fig. 174: Installing Gear Selector Knob
Courtesy of VOLVO CARS CORPORATION

Press the gear selector knob so that it locks in the lever.

If necessary: Use a sheet metal hammer and a shim to carefully hit the knob down on to the gear selector lever.

Check

Pull the gear selector knob.

Check that the lock function operates in its positions.

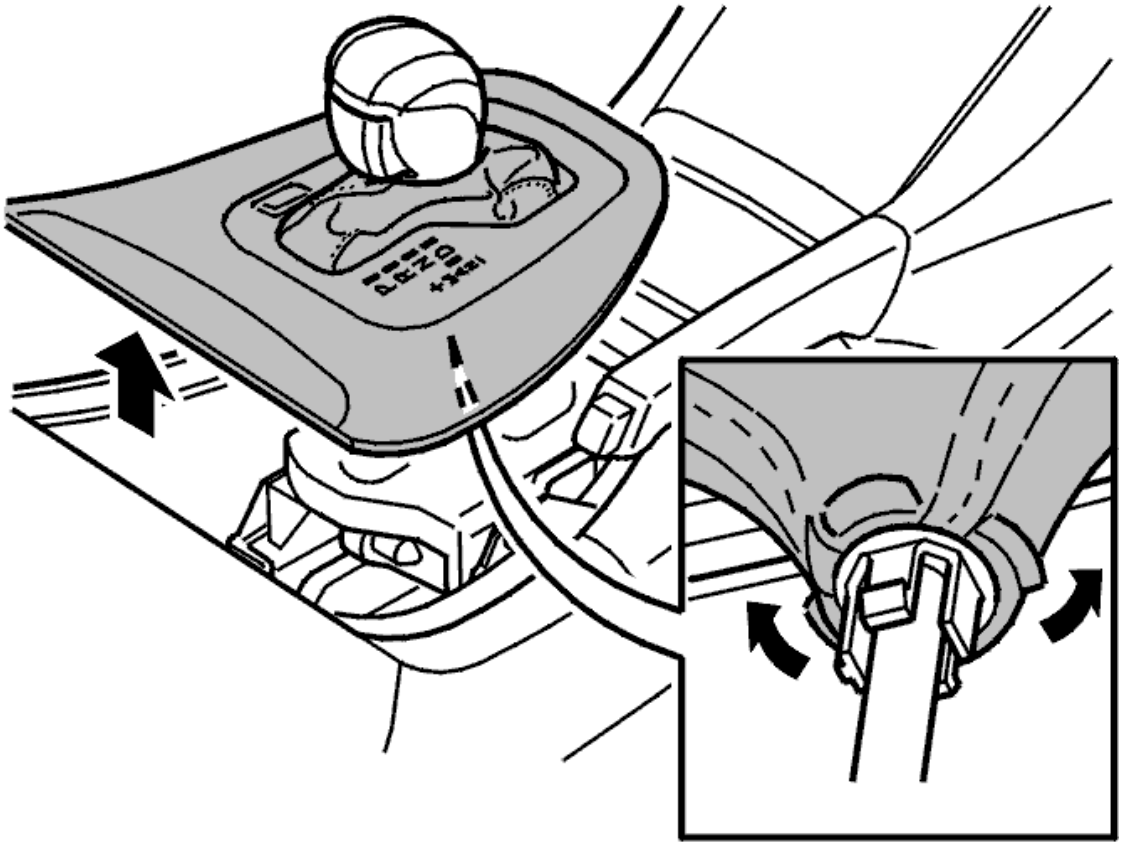


Fig. 175: Identifying Selector Boot Installation
Courtesy of VOLVO CARS CORPORATION

Pull the top panel and the boot up towards the gear selector knob.

Pull the boot down from below so that the locking for gear selector knob is completely free.

INSTALLING THE LOCK BRACKET ON THE GEAR SELECTOR KNOB

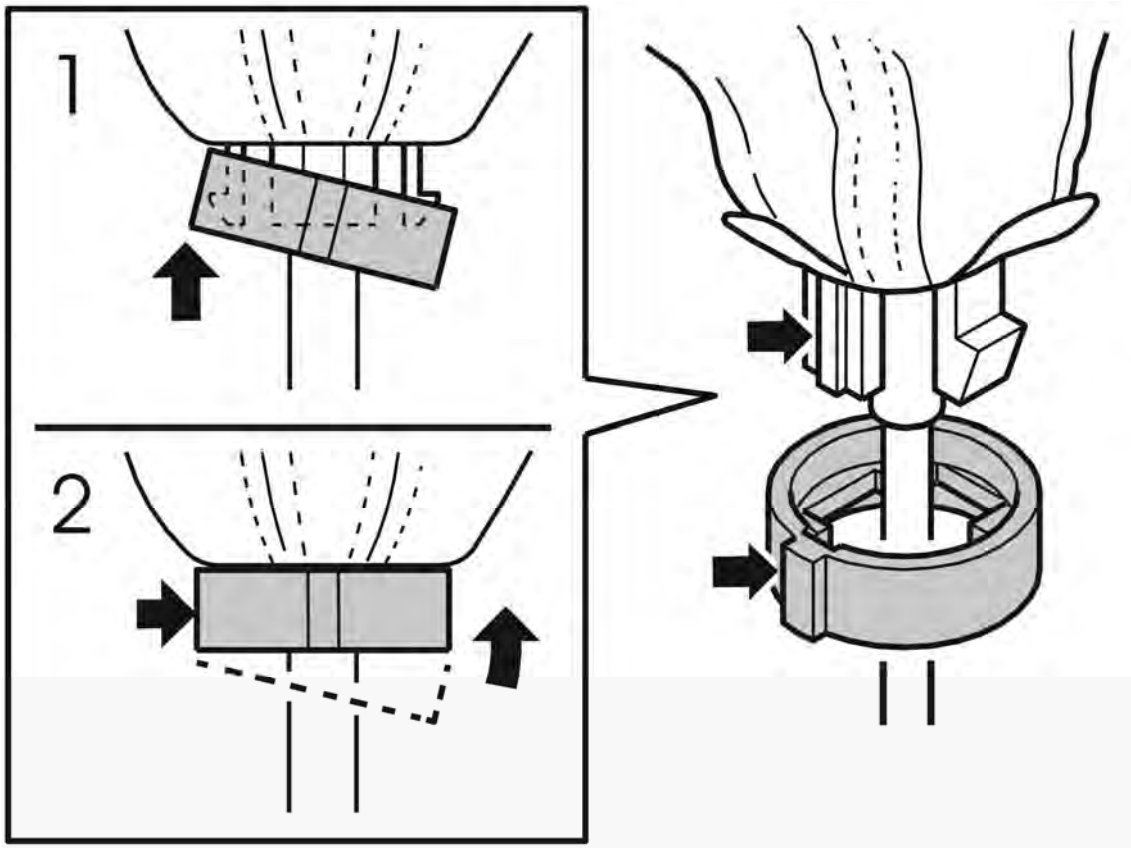


Fig. 176: Identifying Lock Bracket & Gear Selector Knob
Courtesy of VOLVO CARS CORPORATION

NOTE: The locking sleeve cut-out must be forwards so that it passes into the gear selector knob guide.

Slide the locking sleeve and boot up to the knob guide.

Pull up the sleeve so that it locks on one side (1).

Press **hard** on the lock side of the locking sleeve (2). At the same time, pull the locking sleeve up towards the boot so that it locks.

NOTE: Check that the boot is correctly positioned. Adjust if necessary.

INSTALLING THE TOP PANEL

Fig. 177: Identifying Top Panel Installation
Courtesy of VOLVO CARS CORPORATION

Bend the panel downwards. Press the gear selector boot into place in the center console.

Install the panel (the pen holder) between the center console and the dashboard.

GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC, REPLACING

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

REMOVAL

REMOVING CENTRE TUNNEL CONSOLE

See **CENTER CONSOLE, REPLACING** .

DETACHING THE BOOT AND REMOVING THE GEAR SELECTOR KNOB

Detach the boot from the gear selector. Remove the gear selector knob. See **GEAR SELECTOR KNOB, GEARTRONIC, REPLACING**.

Angle the top panel with the boot away from the gear selector lever.

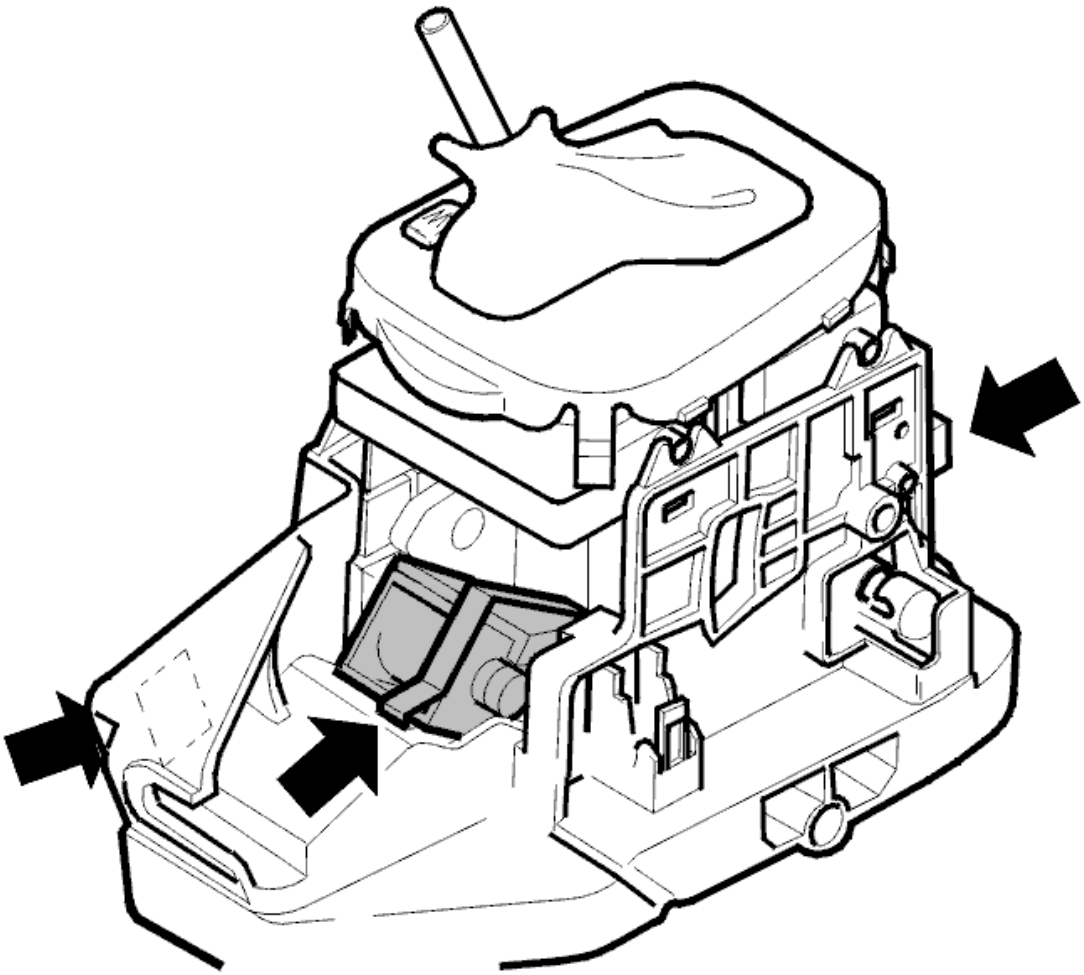


Fig. 178: Folding Top Panel With Boot Away From Gear Selector Lever
Courtesy of VOLVO CARS CORPORATION

Remove the wiring from the clips.

Disconnect the connector from the gear selector assembly.

REMOVING THE GEAR SELECTOR ASSEMBLY STOP

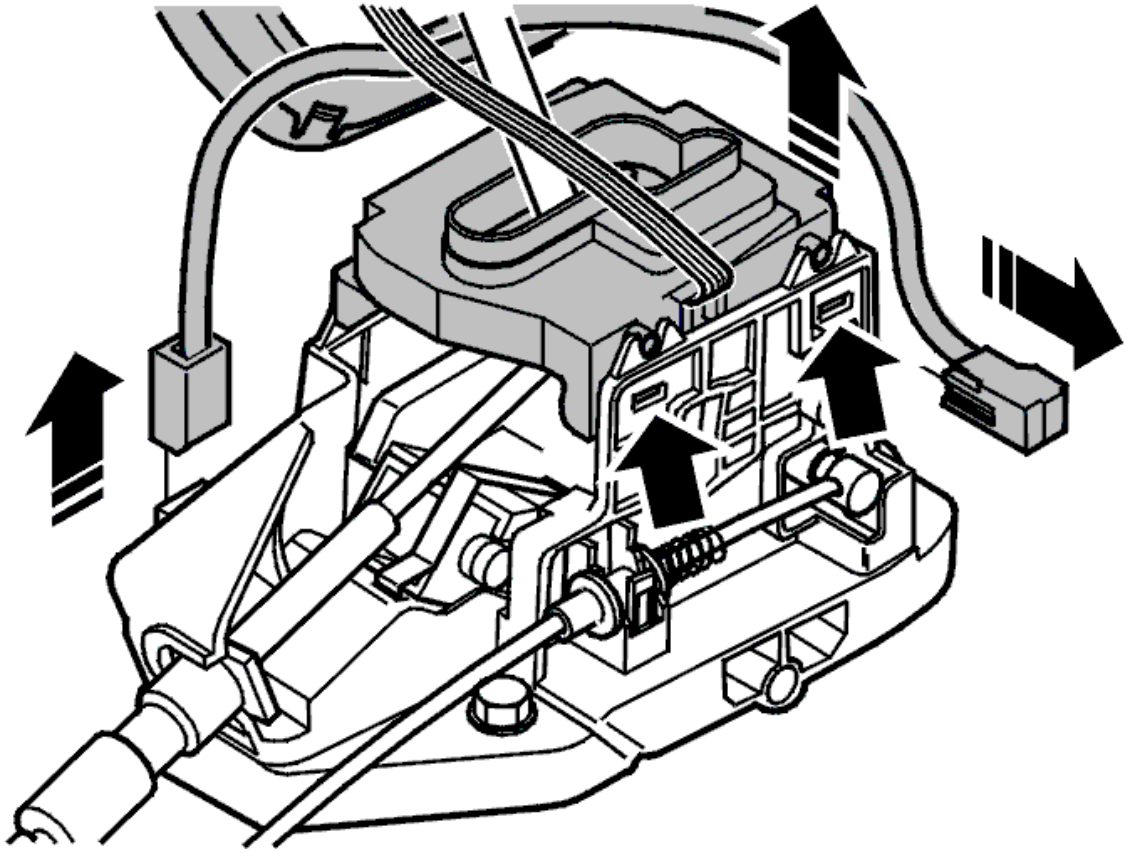


Fig. 179: Removing Stop For Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Press in the 4 catches on the sides. Pull the stop straight up out of the gear selector assembly.

REMOVAL THE GEAR SELECTOR ASSEMBLY AND MECHANICAL CABLES

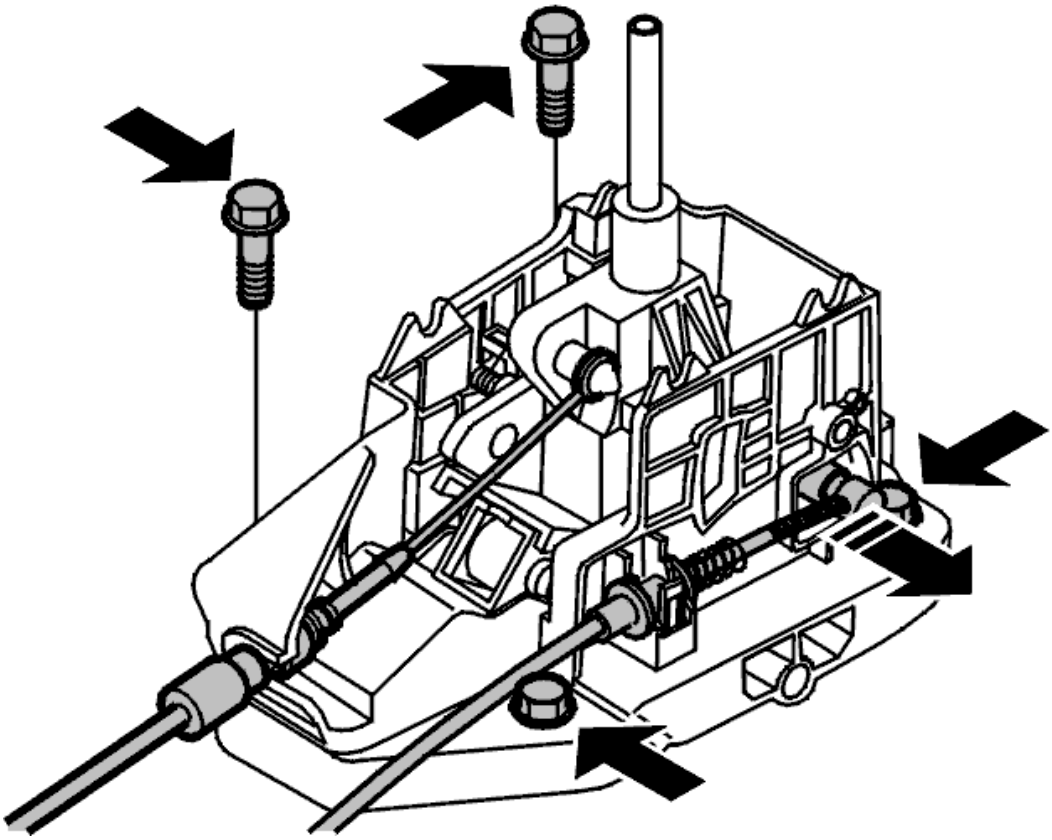


Fig. 180: Gear Selector Assembly Bolts
Courtesy of VOLVO CARS CORPORATION

Remove:

- the catch for the cable at the gear selector lever
- the cable from the end of the gear selector assembly
- the key lock cable. Pry out the locking sleeve slightly and lift up the cable from the gear selector assembly
- the 4 screws for the gear selector assembly.

INSTALLATION

NOTE: For tightening torques, see TIGHTENING TORQUE .

INSTALLING THE GEAR SELECTOR ASSEMBLY AND MECHANICAL CABLES

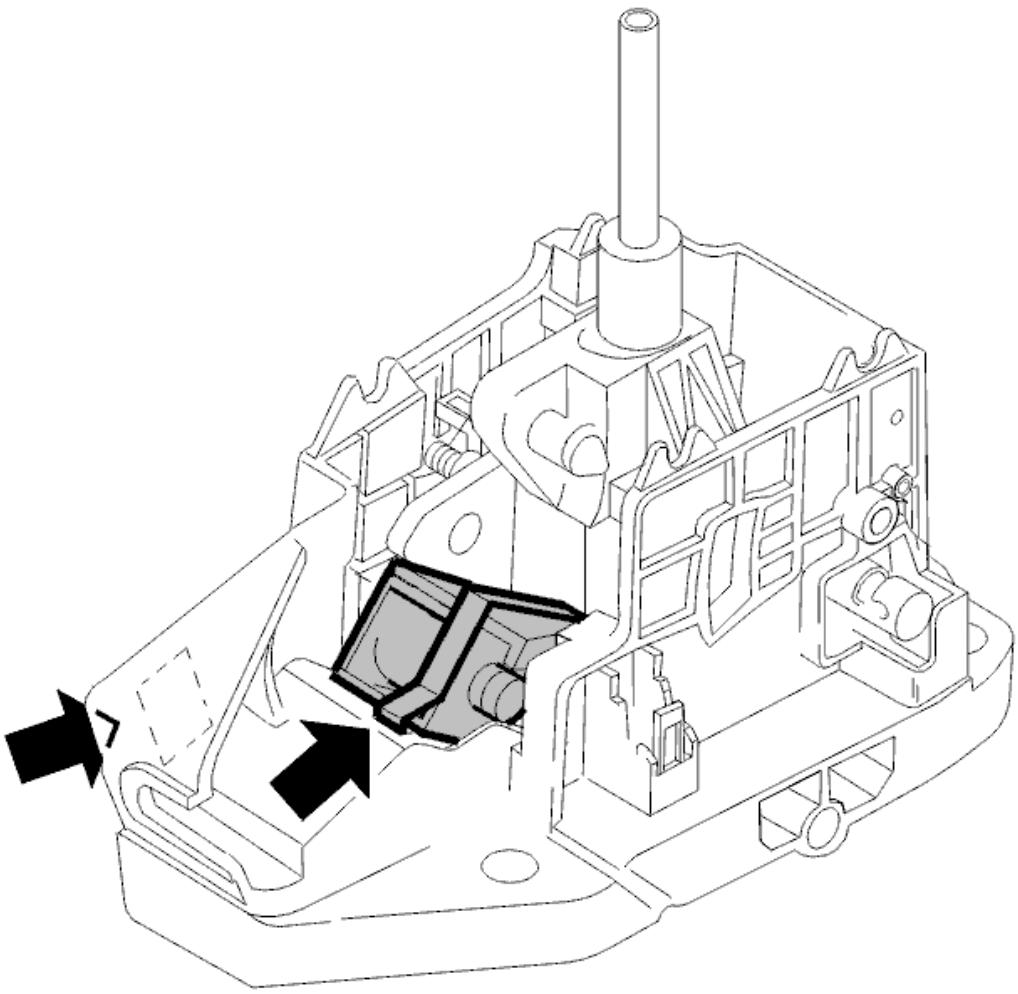


Fig. 181: Identifying Solenoid And Connector
Courtesy of VOLVO CARS CORPORATION

Install:

- the gear selector assembly to the bodywork. Tighten to **25 Nm**
- the cable to the gear selector. Secure the cable with the catch
- cable on the gear selector nose
- the key lock cable to the gear selector assembly. Place the cable in the extracted locking sleeve.

INSTALLING THE GEAR SELECTOR ASSEMBLY STOP

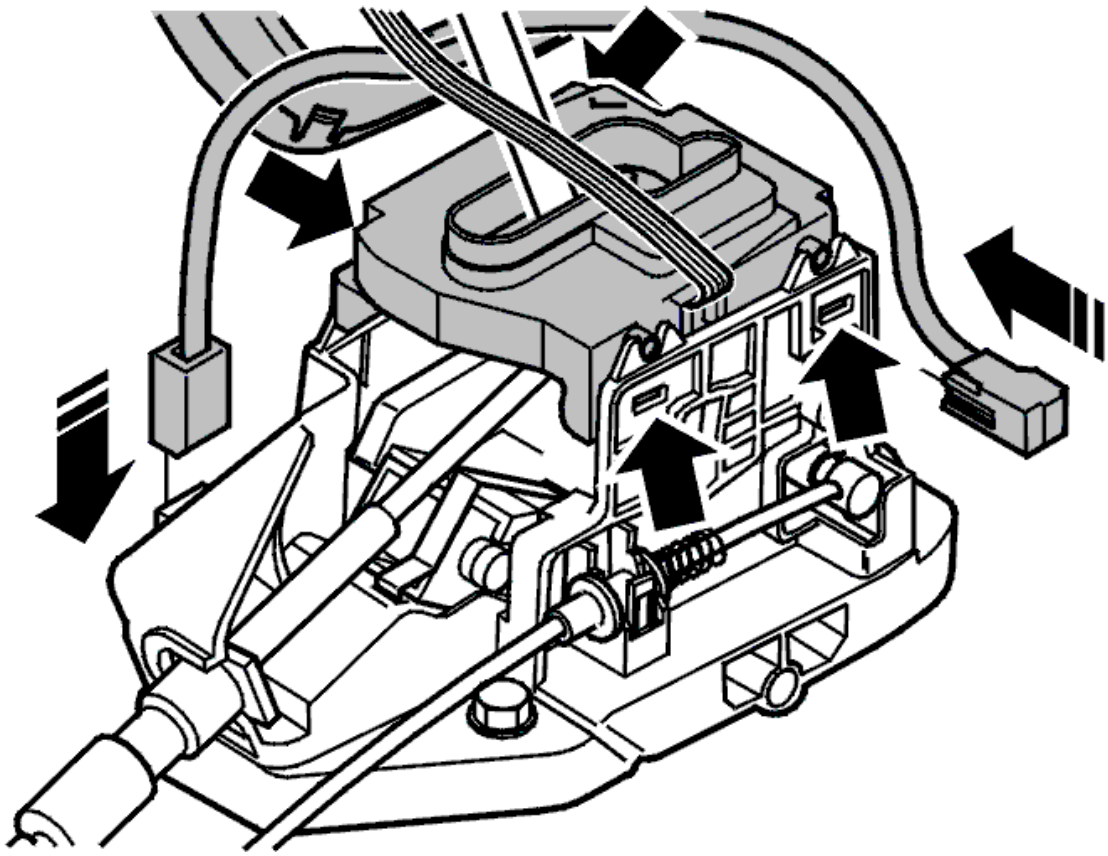


Fig. 182: Installing Stop For Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Install the gear selector assembly stop on the gear selector assembly. Lock it into place in the gear selector assembly.

Secure the rear connector in the gear selector assembly.

INSTALLING GEAR SELECTOR KNOB AND BOOT

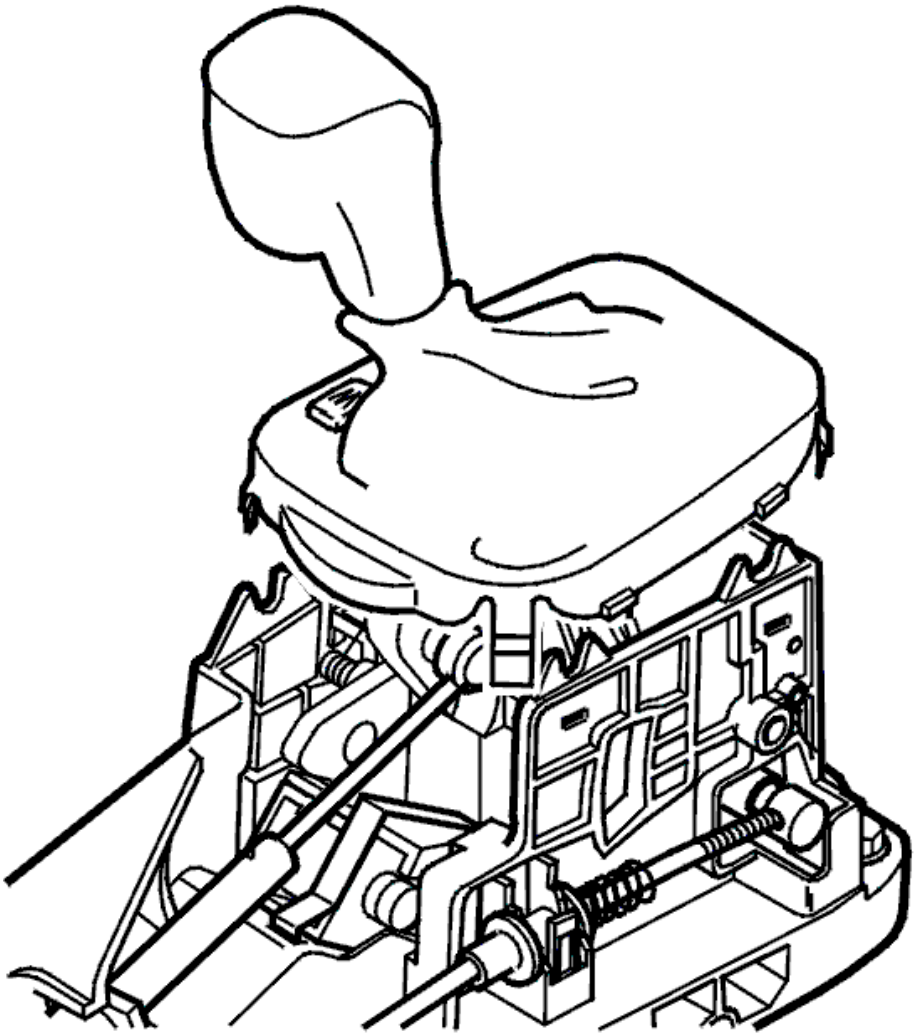


Fig. 183: Installing Gear Selector Knob And Boot
Courtesy of VOLVO CARS CORPORATION

Install:

- the boot and the top panel over the gear selector
- the gear selector knob Press it so that it locks in the gear selector.

Check that the lock function operates in its positions.

INSTALLING THE LOCKING SLEEVE FOR THE BOOT

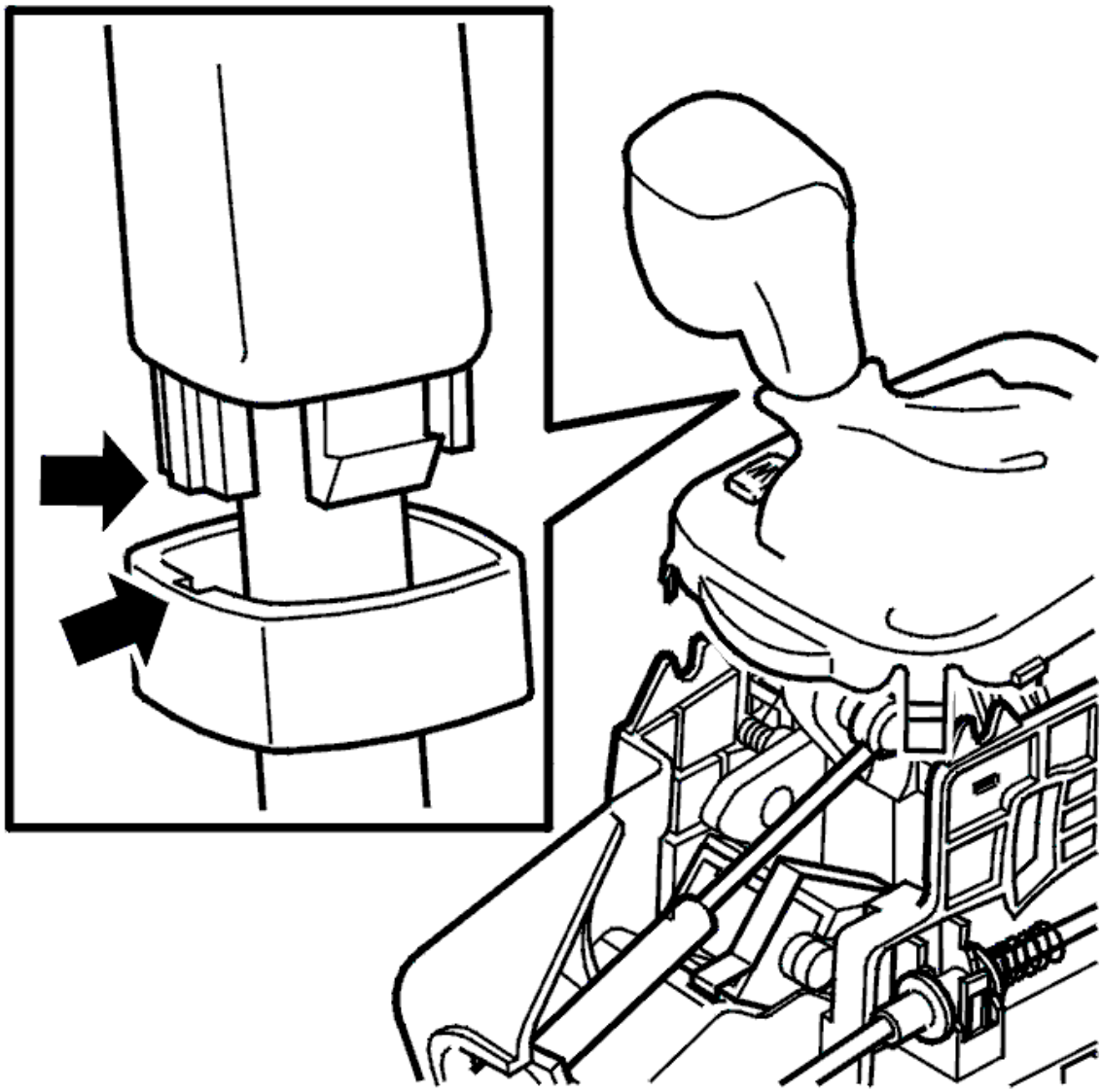


Fig. 184: Installing Locking Sleeve For Boot
Courtesy of VOLVO CARS CORPORATION

NOTE: The locking sleeve cut-out must be forwards so that it passes into the guide for the gear selector knob.

Slide the locking sleeve and boot up to the knob guide. Pull up the sleeve so that it locks the boot.

INITIAL SETTING OF THE KEY LOCK CABLE (ADJUSTMENT)

Adjust the key lock cable. See: **KEY INTERLOCK CABLE, INITIAL SETTING AND ADJUSTMENT** .

INSTALLING THE CENTRE TUNNEL CONSOLE

See **CENTER CONSOLE, REPLACING** .

SOLENOID SHIFT LOCK, REPLACE

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

REMOVAL

REMOVING THE CENTER CONSOLE

Remove the center console. See **REMOVING CENTER TUNNEL CONSOLE** .

REMOVING MECHANICAL CABLE FROM GEAR SELECTOR ASSEMBLY

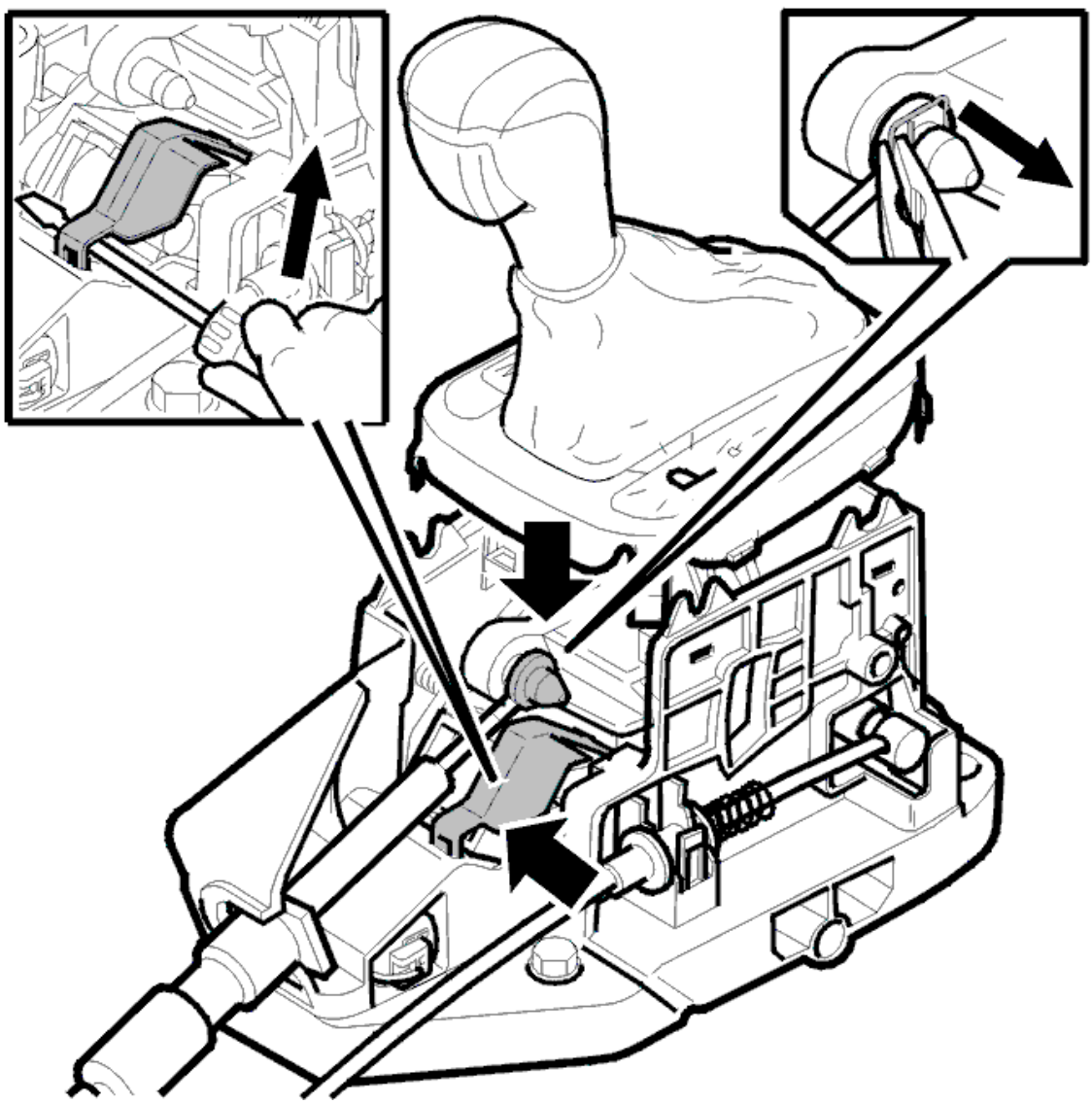


Fig. 185: Removing Mechanical Cable Lock From Gear Selector Lever Using Pliers
Courtesy of VOLVO CARS CORPORATION

Move the gear selector to position P. This is to access the cable locking.

Remove the mechanical cable lock from the gear selector lever, use pliers and pull the lock off bushing. Pull the striker plate straight up out of the mounting which secures the solenoid.

REMOVING THE SOLENOID

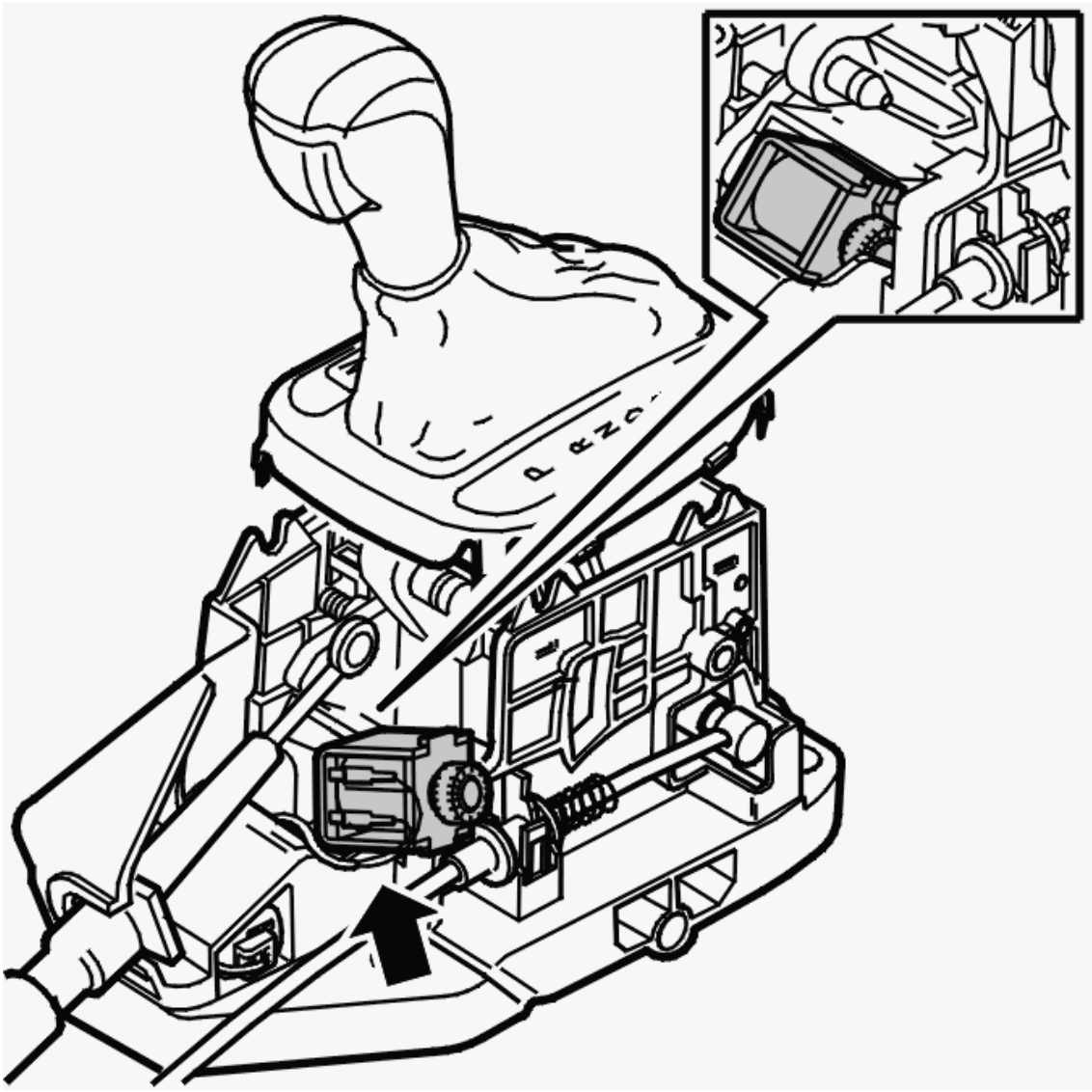


Fig. 186: Locating Solenoid
Courtesy of VOLVO CARS CORPORATION

Carefully pull the solenoid, with its wiring, out of the gear selector assembly.

Disconnect the tab terminals.

HINT: Check that the blade terminal plus (+) and minus (-) are correctly positioned on the solenoid.

INSTALLATION

INSTALLING THE SOLENOID

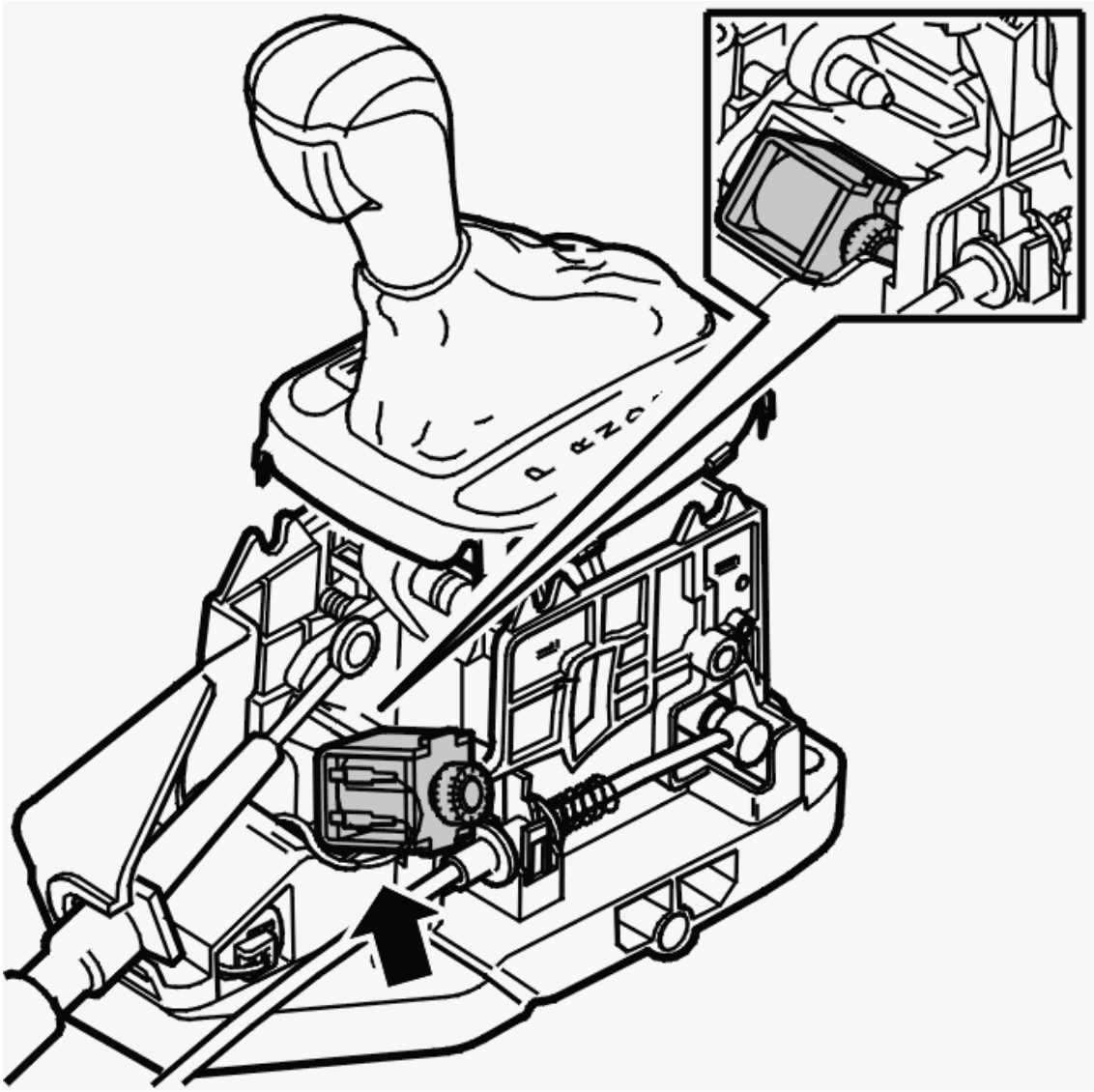


Fig. 187: Locating Solenoid
Courtesy of VOLVO CARS CORPORATION

Connect the tab terminals.

Install the solenoid in the gear selector assembly cut-out. The blade terminal and the cable should be upwards in the gear selector assembly.

Secure the solenoid with the bracket.

INSTALLING MECHANICAL CABLE FOR GEAR SELECTOR ASSEMBLY

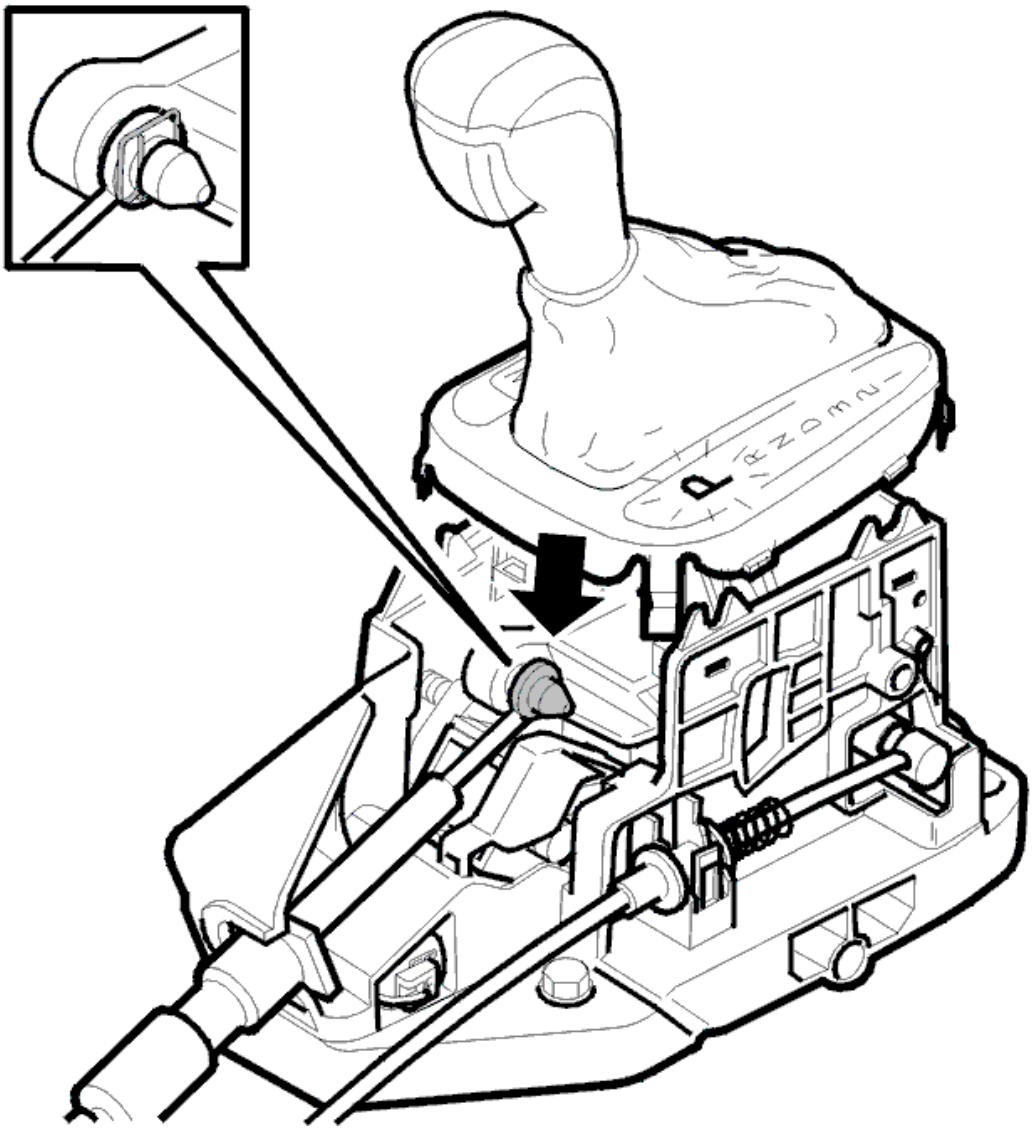


Fig. 188: Identifying Mechanical Cable Lock Installed Onto Bushing On Mechanical Cable
Courtesy of VOLVO CARS CORPORATION

Install the mechanical cable lock onto the bushing on the mechanical cable.

Press the mechanical cable into place on the gear selector assembly.

NOTE: Check that the mechanical cable is secure.

Function test

Move the gear selector to position P.

Ignition on.

Press the brake pedal and check that the solenoid releases the gear selector lever and other gear positions can be selected.

INSTALLING THE CENTER CONSOLE

Install the center console. See **REMOVING CENTER TUNNEL CONSOLE** .

GEAR SELECTOR ASSEMBLY, GEAR SELECTOR (B5254T2, AW55-50/51SN; 2004-2007)

BOOT, GEAR SELECTOR, REPLACING

BOOT, GEAR SELECTOR, REPLACING

CABLE KEY INTERLOCK, REPLACING

CABLE KEY INTERLOCK, REPLACING

GEAR SELECTOR CABLES, REPLACE

GEAR SELECTOR CABLES, REPLACE

GEAR SELECTOR KNOB, GEARTRONIC, REPLACING

GEAR SELECTOR KNOB, GEARTRONIC, REPLACING

GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC, REPLACING

GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC, REPLACING

SOLENOID SHIFT LOCK, REPLACE

SOLENOID SHIFT LOCK, REPLACE

GEAR SELECTOR ASSEMBLY, GEAR SELECTOR (B6294T, 4T65 AWD; 2003-2006)

BOOT, GEAR SELECTOR, REPLACING

BOOT, GEAR SELECTOR, REPLACING

CABLE KEY INTERLOCK, REPLACING

CABLE KEY INTERLOCK, REPLACING

GEAR SELECTOR CABLES, REPLACING

Special tools:

9997077

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

REMOVAL

REMOVING THE AIR CLEANER (ACL) HOUSING

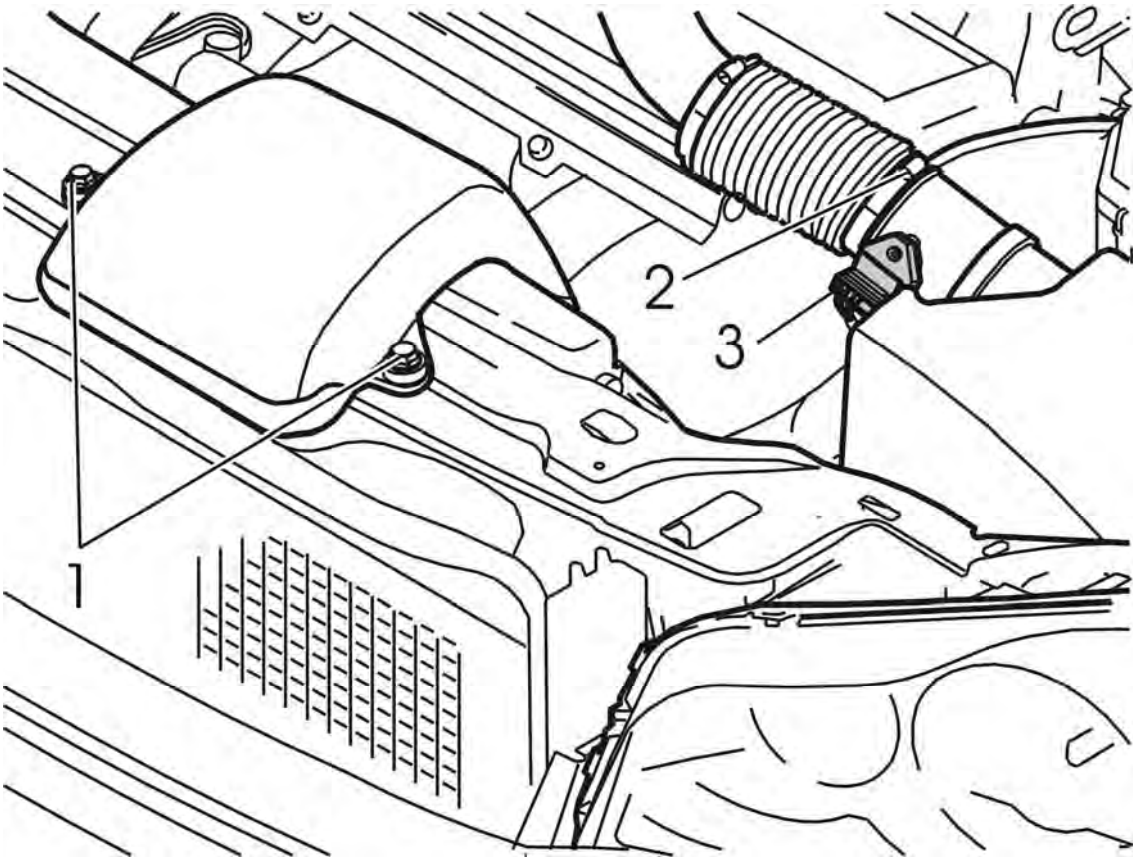


Fig. 189: Air Cleaner (ACL) Housing
Courtesy of VOLVO CARS CORPORATION

Remove the screws (1) for the intake manifold.

Disconnect the hose clamp (2) for the air hose.

Remove the connector (3) from the mass air flow (MAF) sensor.

Remove the air cleaner (ACL) housing from its mountings. Pull it straight up.

REMOVING THE GEAR SELECTOR CABLE AND BALL JOINT

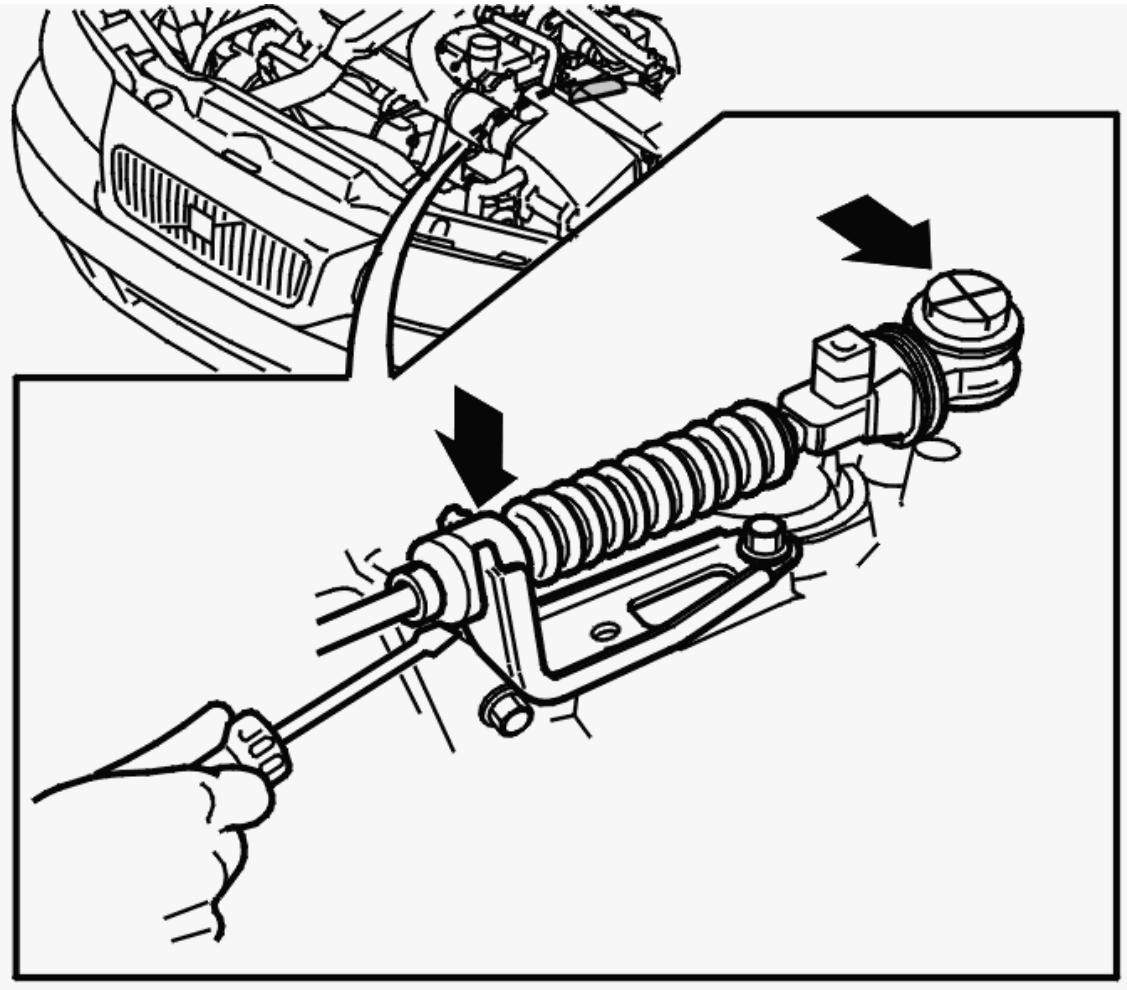


Fig. 190: Removing Gear Selector Cable
Courtesy of VOLVO CARS CORPORATION

Remove the gear selector cable from the bracket on the transmission by pressing the retaining clip in the hole under the gear selector cable. Use jimmy bar **9997077** to detach the ball joint for the gear selector cable from the lever.

REMOVING THE LEFT FRONT WHEEL

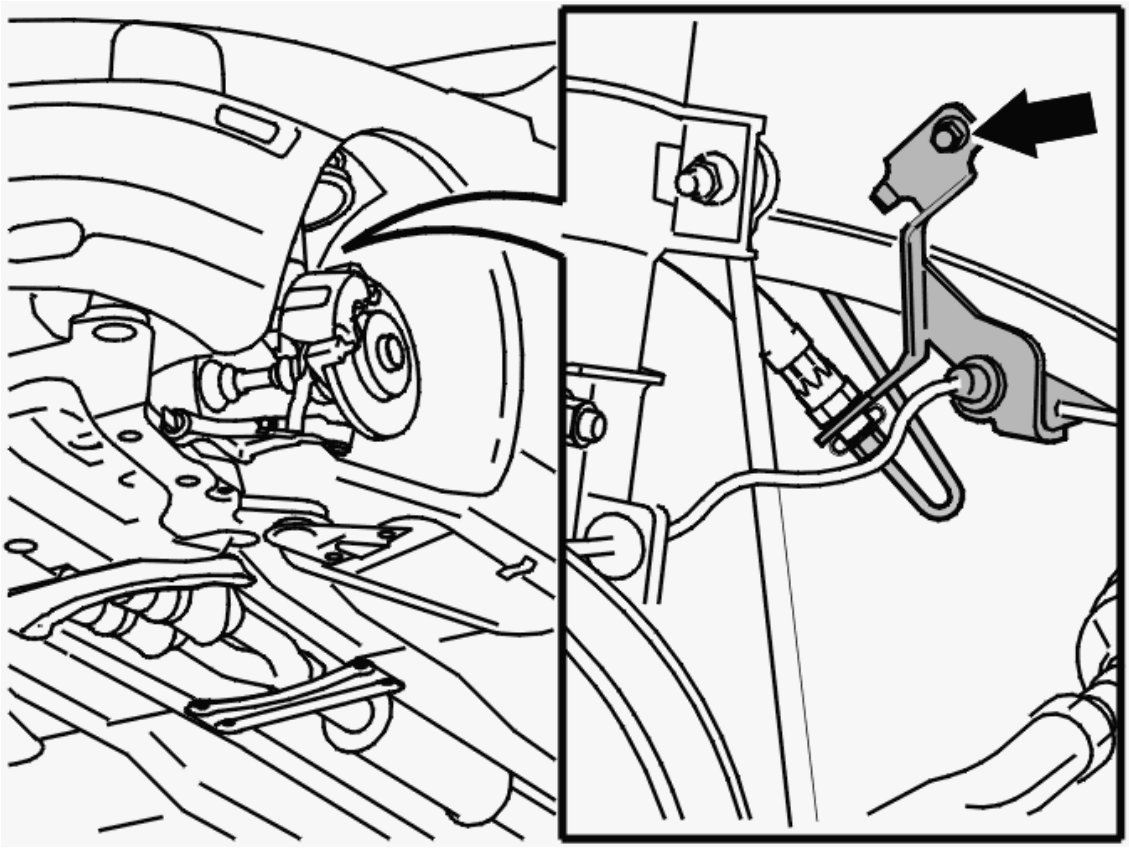


Fig. 191: Identifying Mounting For Brake Hose And Pipe
Courtesy of VOLVO CARS CORPORATION

Remove the left front wheel. Pry the clips apart. Remove the gear selector cable from the clips on the side member.

Remove the mounting for the brake hose and brake pipe.

REMOVING SIDE PANELS

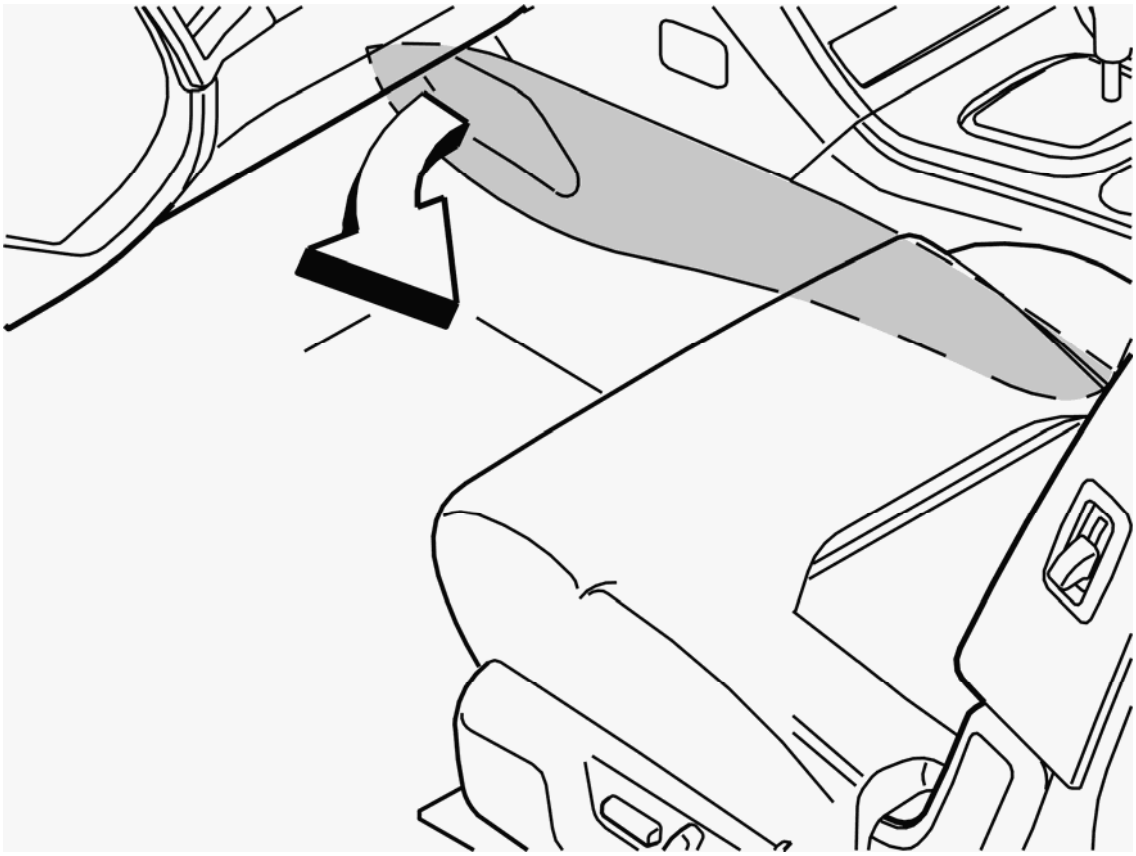


Fig. 192: Identifying Removal Of Center Console Side Panels
Courtesy of VOLVO CARS CORPORATION

Remove the side panels from the center console.

Remove the center console. See **CENTER CONSOLE, REPLACING** .

REMOVING THE GEAR SELECTOR CABLE

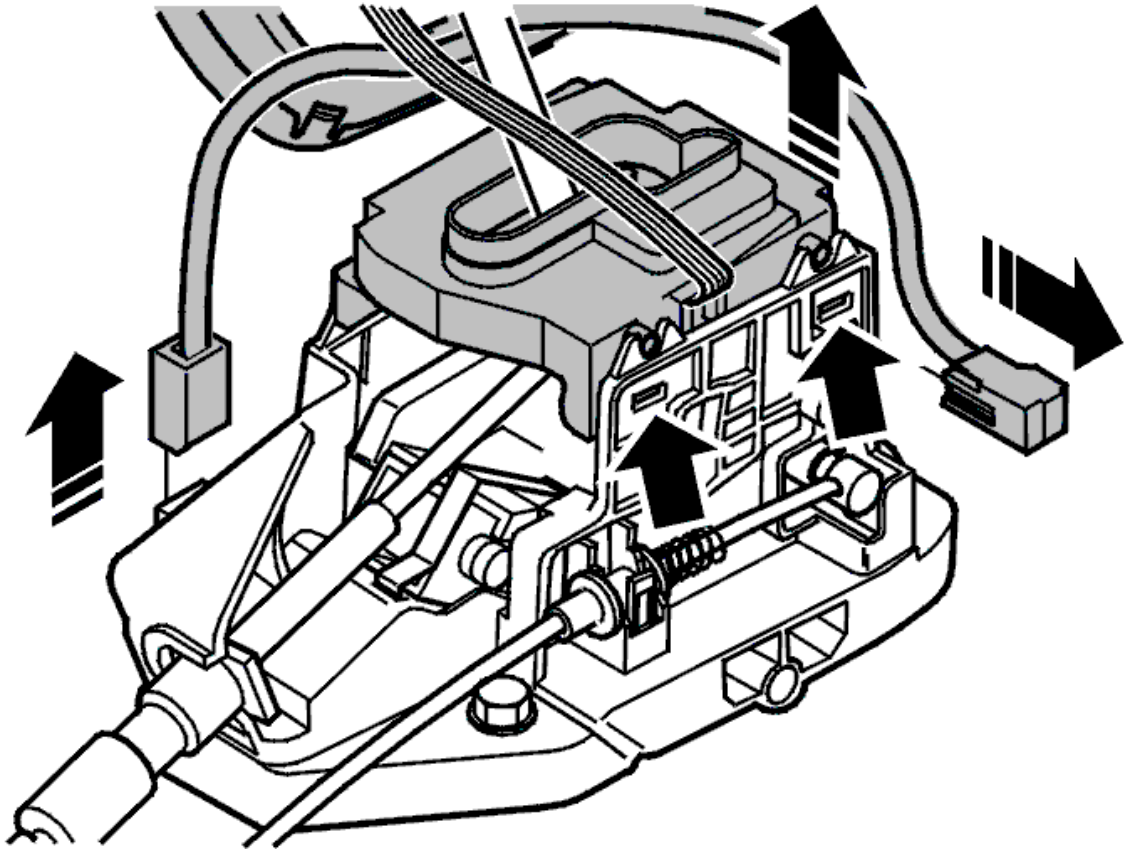


Fig. 193: Removing Stop For Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Detach the gear selector lever stop. See **GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC, REPLACING**.

Remove:

- the catch for the gear selector cable on the gear selector.

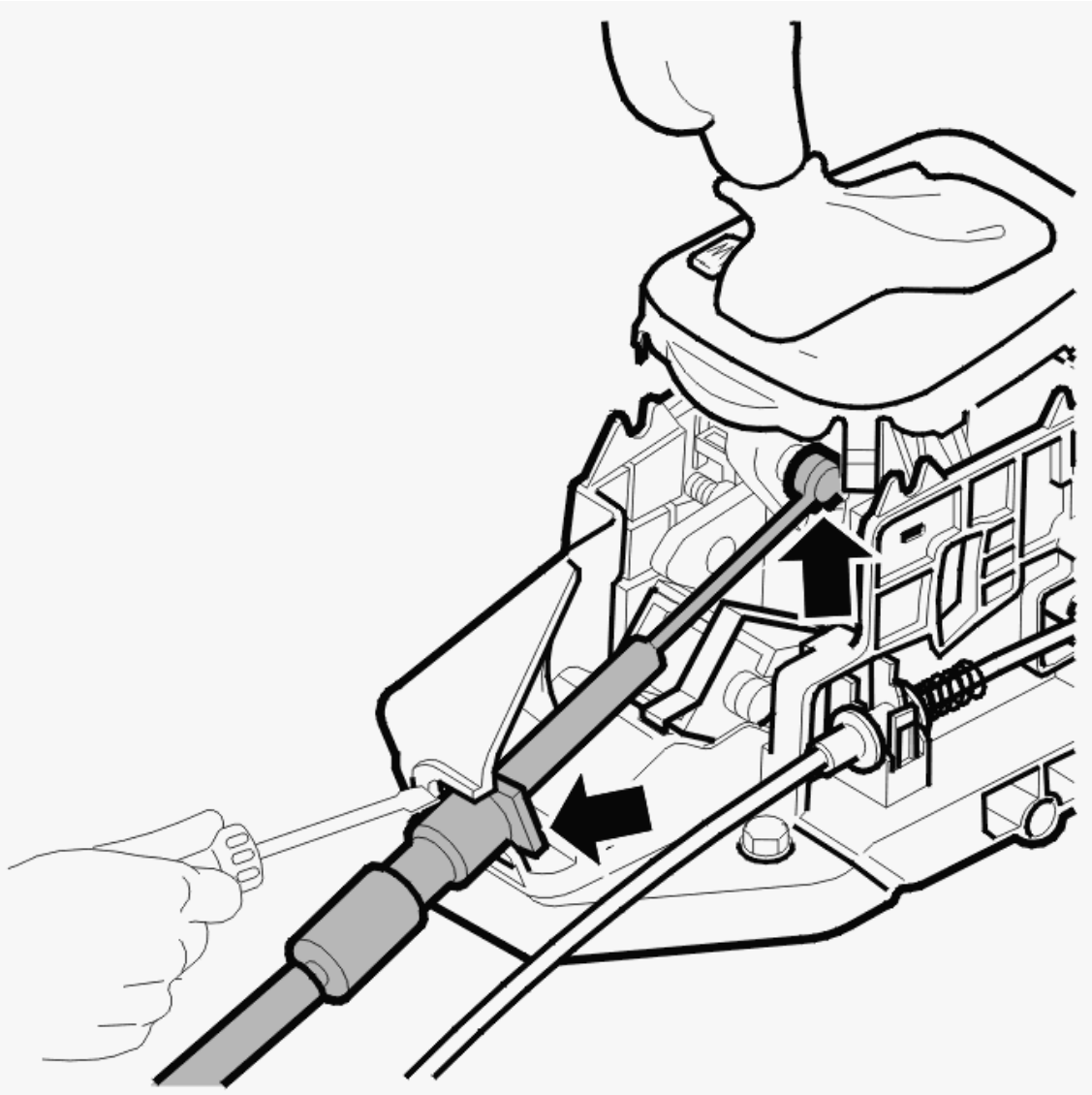


Fig. 194: Removing Gear Selector Cable
Courtesy of VOLVO CARS CORPORATION

- the mechanical transmission cable from the gear selector assembly nose. Press the catches. Use a screwdriver
- the mechanical gear selector cable.

REMOVING THE GEAR SELECTOR CABLE AT THE FIREWALL

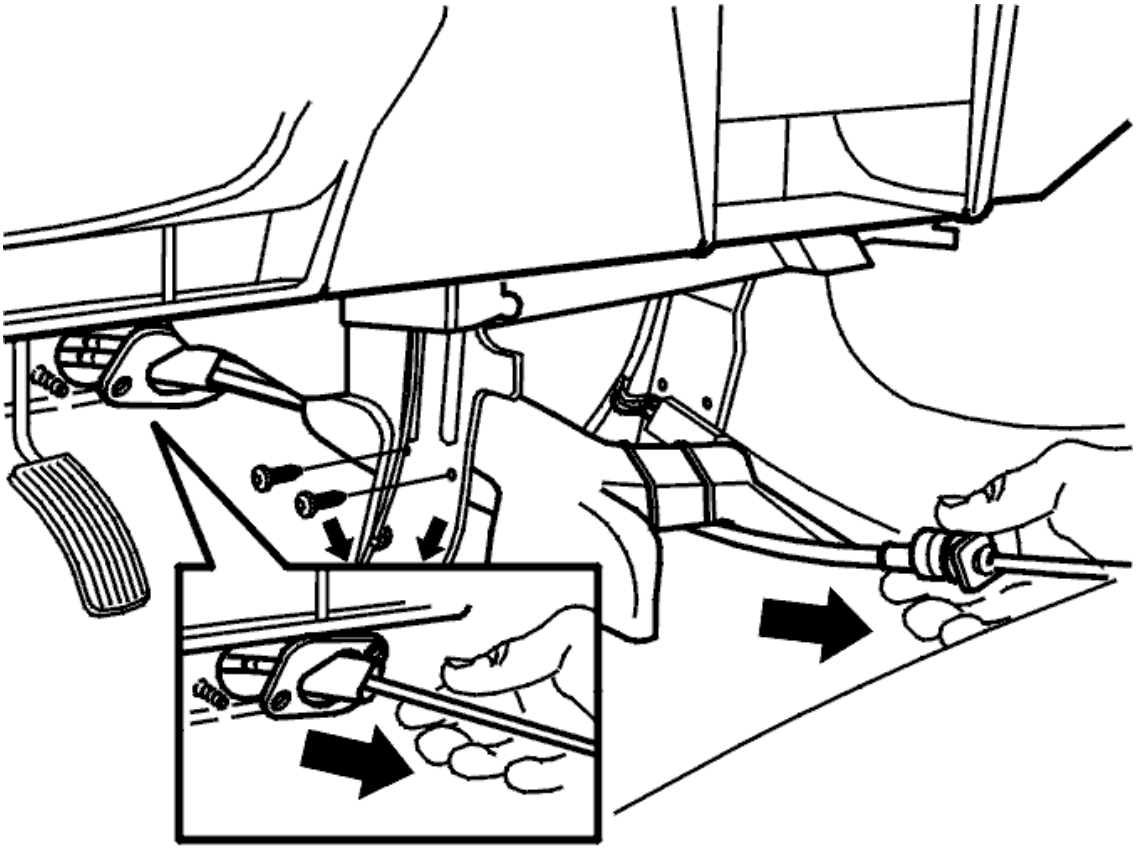


Fig. 195: Identifying Cable At Firewall
Courtesy of VOLVO CARS CORPORATION

Remove:

- the 2 air ducts
- the 4 screws for the strut in the dashboard. Push the carpet to one side
- the 2 nuts for the gear selector cable grommet at the firewall
- the gear selector cable by pulling it inwards into the passenger compartment.

HINT: Secure a cable using tape at the end of the engine compartment on the gear selector cable before pulling it out to make reinstallation easier. Route the gear selector cable correctly in the engine compartment with someone to assist you.

INSTALLATION

NOTE: For tightening torques, see TIGHTENING TORQUE .

PREPARATIONS FOR INSTALLATION

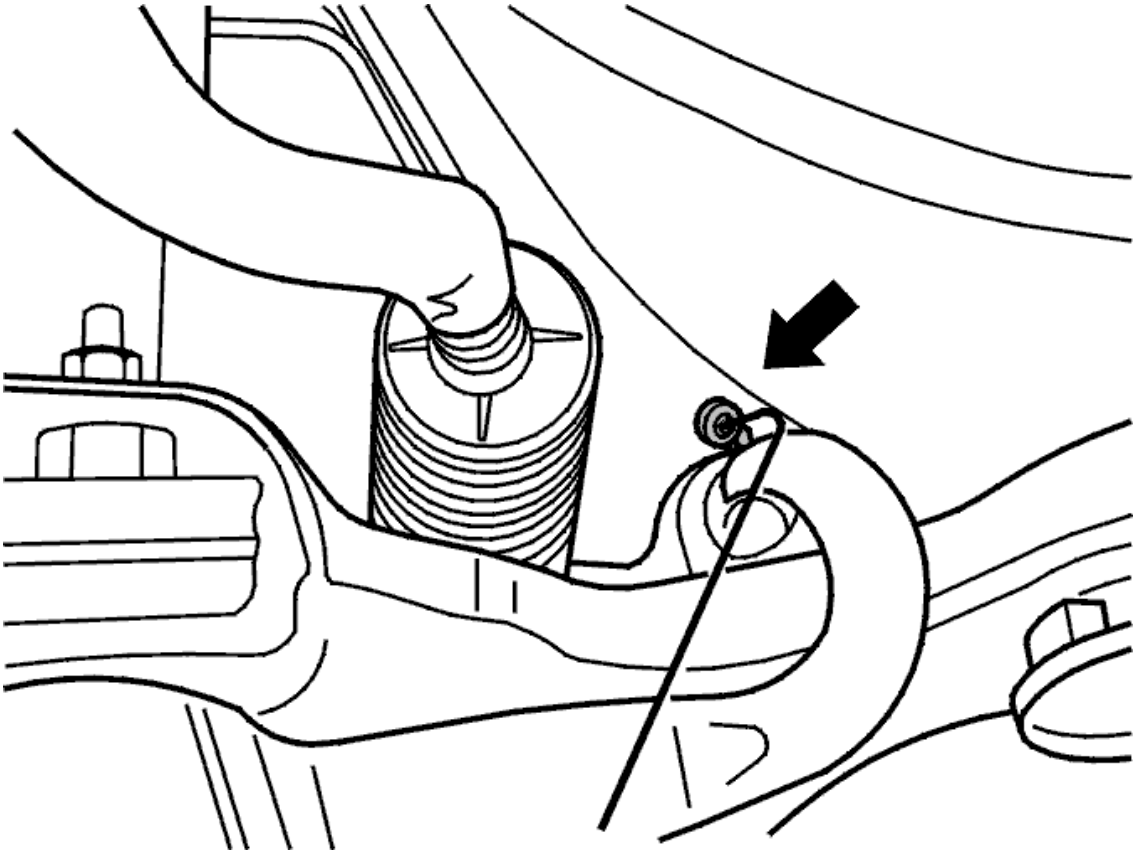


Fig. 196: Identifying Bent Heavy Welding Rod In Engine Compartment
Courtesy of VOLVO CARS CORPORATION

Tape the cable to the new gear selector cable.

NOTE: When installing the gear selector cable: Be extremely careful to ensure that there are no sharp bends or kinks in the gear selector cable, especially between the inner cable and outer sleeve.

HINT: Route the gear selector cable correctly in the engine compartment with someone to assist you.

INSTALLING THE GEAR SELECTOR CABLE FROM THE INSIDE OF THE PASSENGER COMPARTMENT

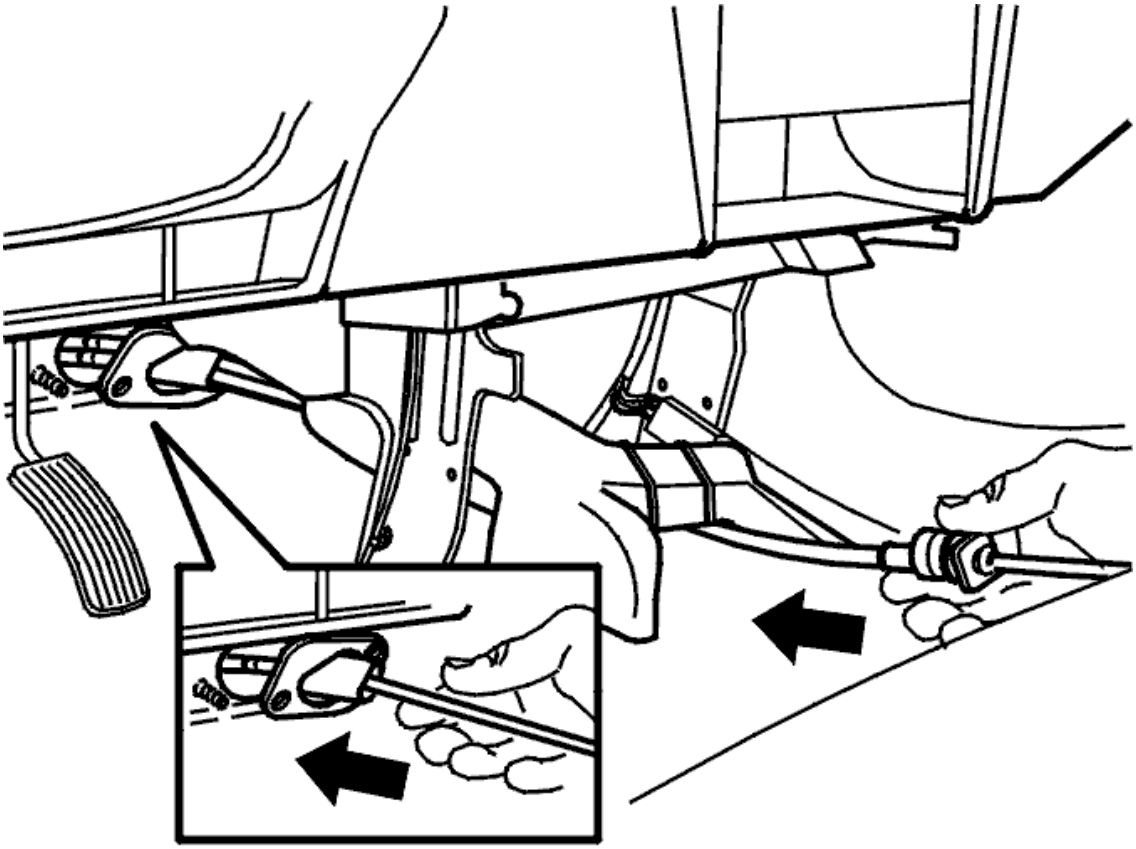


Fig. 197: Identifying Cable At Firewall
Courtesy of VOLVO CARS CORPORATION

Install the gear selector cable under the heater unit on the left side, down towards the hole.

NOTE: Be very careful when inserting the rubber bellow for the gear selector cable through the hole in the firewall to prevent damage to the cable.

Feed the gear selector cable through the hole slightly.

HINT: Route the gear selector cable correctly in the engine compartment with someone to assist you.

Locate the grommet on the studs

Install:

- the nuts. Tighten
- the air ducts
- the stay and the screws. Tighten.

FEEDING IN THE GEAR SELECTOR CABLE FROM THE INSIDE

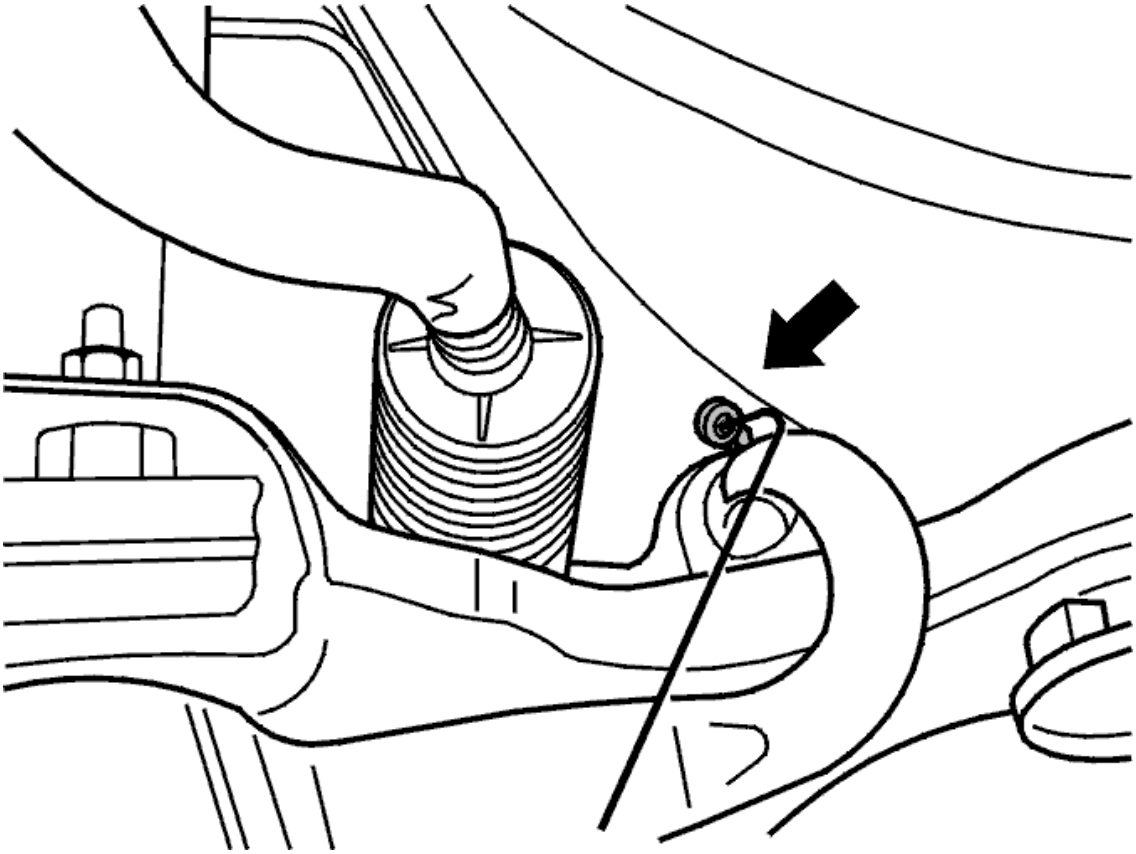


Fig. 198: Identifying Bent Heavy Welding Rod In Engine Compartment
Courtesy of VOLVO CARS CORPORATION

Pull the cable while feeding the gear selector cable in from the inside.

The gear selector cable must be routed past the steering gear and up to the transmission bracket.

Secure the gear selector cable in the clips on the side member.

INSTALLING THE GEAR SELECTOR CABLE ON THE GEAR SELECTOR

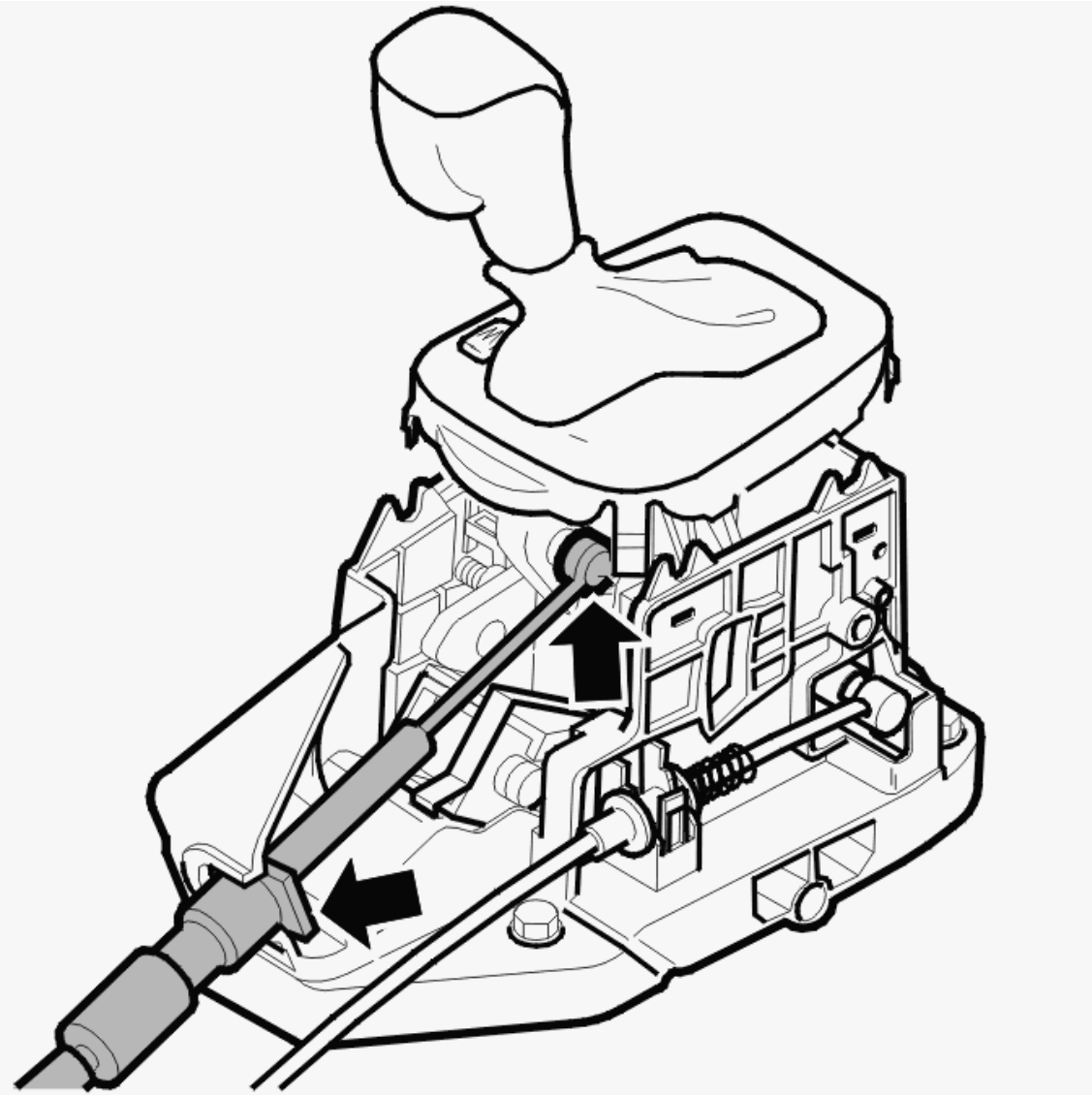


Fig. 199: Installing Gear Selector Cable On Gear Selector
Courtesy of VOLVO CARS CORPORATION

Install:

- the gear selector cable on the gear selector. Secure the cable using the catch
- the gear selector cable on the end of the gear selector assembly.

Reinstall the gear selector lever stop. See **GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC, REPLACING**.

INSTALLING THE GEAR SELECTOR CABLE ON THE TRANSMISSION

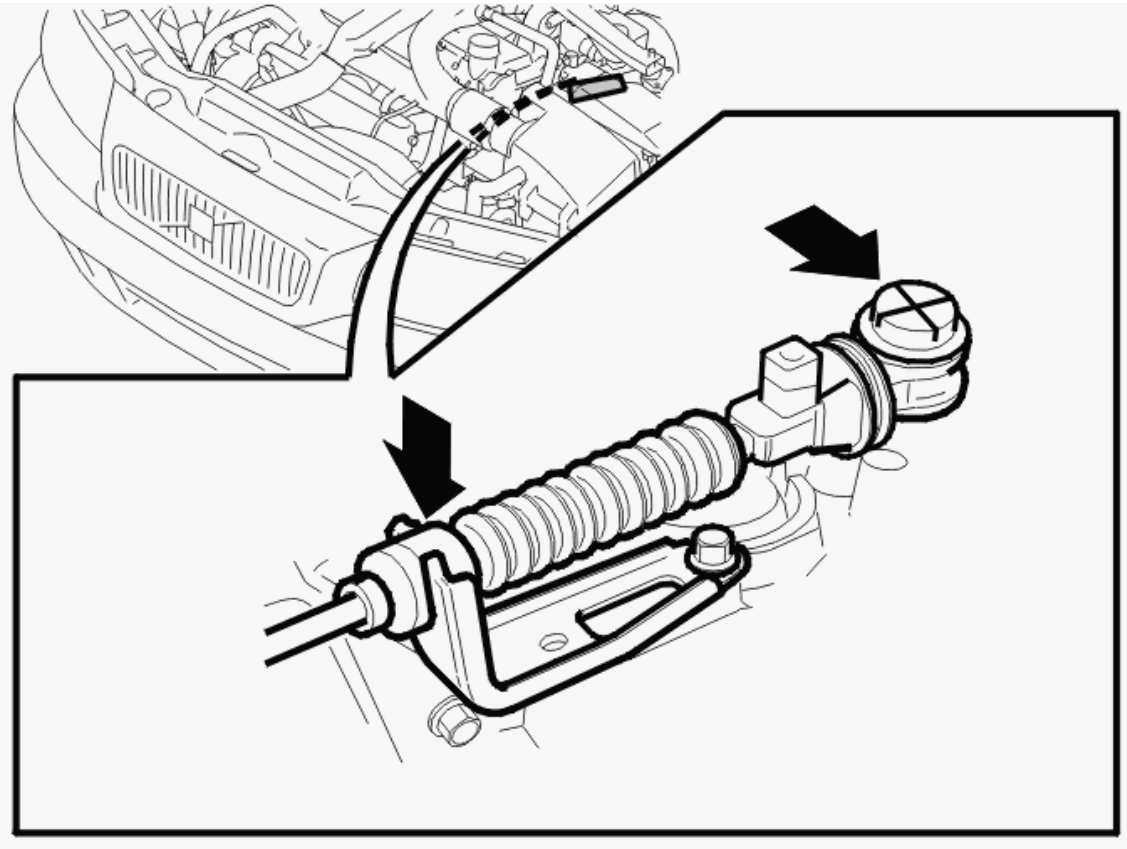


Fig. 200: Installing Gear Selector Cable On Transmission
Courtesy of VOLVO CARS CORPORATION

Install:

- the gear selector cable in the bracket. Press it so that it locks
- the gear selector cable on the lever. Press the ball joint for the gear selector cable into place on the throttle spindle.

NOTE: After the gear selector cable is replaced, it must be adjusted. See GEAR SELECTOR CABLE, ADJUSTING .

GEAR SELECTOR KNOB, GEARTRONIC, REPLACING

GEAR SELECTOR KNOB, GEARTRONIC, REPLACING

GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC, REPLACING

GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC, REPLACING

SOLENOID SHIFT LOCK, REPLACE

SOLENOID SHIFT LOCK, REPLACE

STOP GEAR SELECTOR LEVER ASSEMBLY, REPLACING

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

REMOVAL

REMOVING THE CENTER CONSOLE

Remove the center console. See **REMOVING CENTER TUNNEL CONSOLE** .

DETACHING THE BOOT AND REMOVING THE GEAR SELECTOR KNOB

Detach the boot from the gear selector. Remove the gear selector knob. See **GEAR SELECTOR KNOB, GEARTRONIC, REPLACING**.

Angle the top panel with the boot away from the gear selector lever.

REMOVING THE GEAR SELECTOR ASSEMBLY STOP

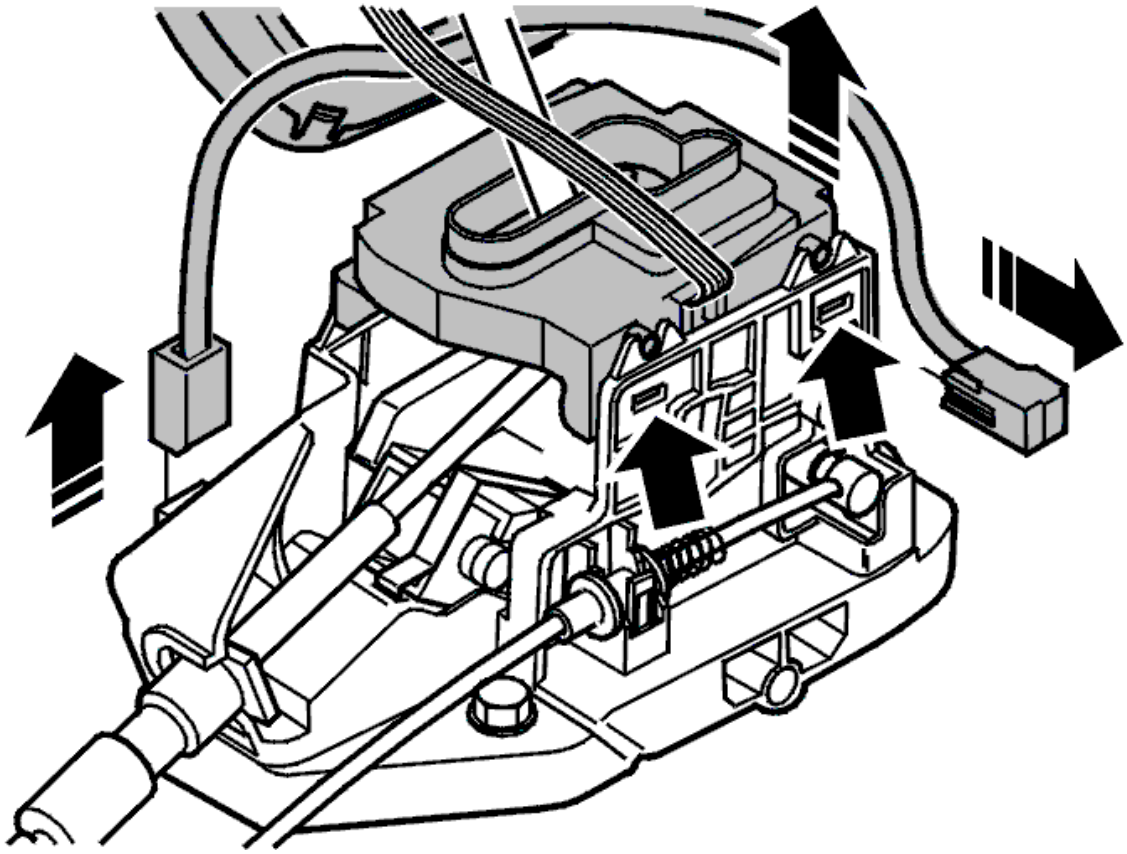


Fig. 201: Removing Stop For Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Press in the 4 catches on the sides. Pull the stop straight up out of the gear selector assembly.

Angle the gear selector assembly stop over the gear selector.

REMOVING THE PRINTED CIRCUIT BOARD FOR THE GEAR SELECTOR ASSEMBLY STOP

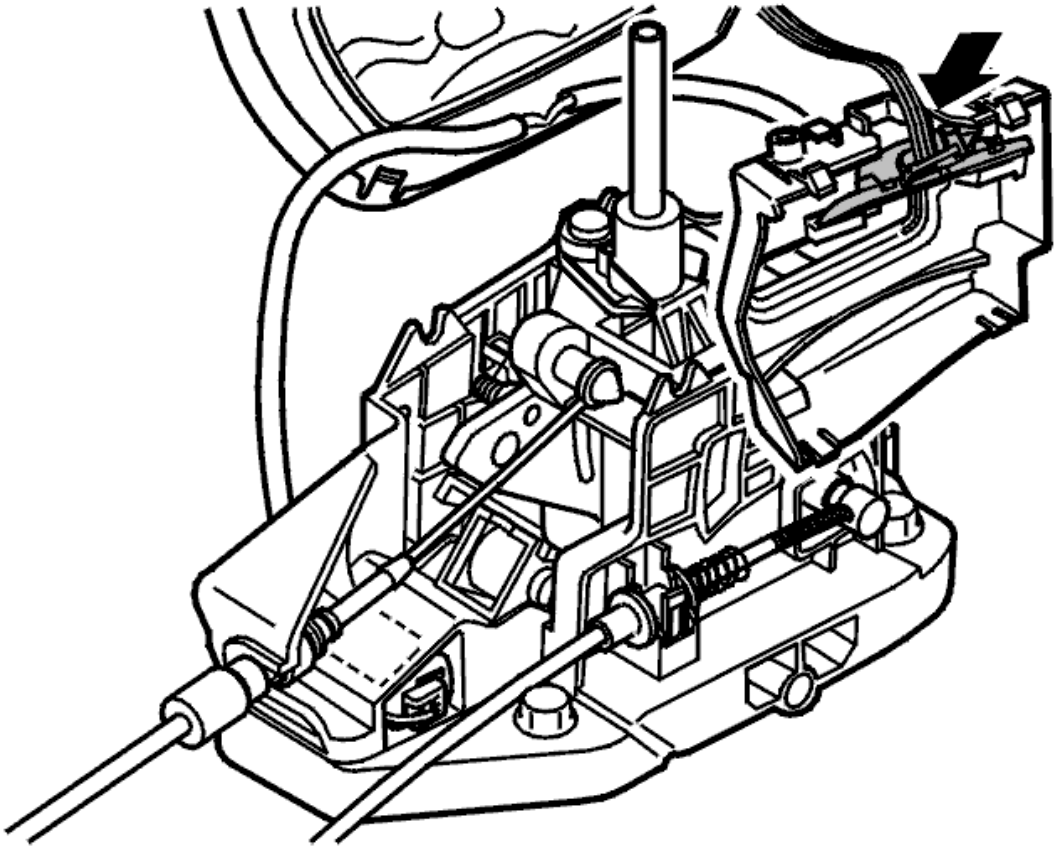


Fig. 202: Removing Printed Circuit Board From Gear Selector Assembly Stop
Courtesy of VOLVO CARS CORPORATION

Press the catches locking the holder for the printed circuit board.

Angle the holder out of the gear selector assembly stop. Transfer the holder to the new gear selector assembly stop (P/N 977 0855).

INSTALLATION

INSTALLING THE GEAR SELECTOR ASSEMBLY STOP

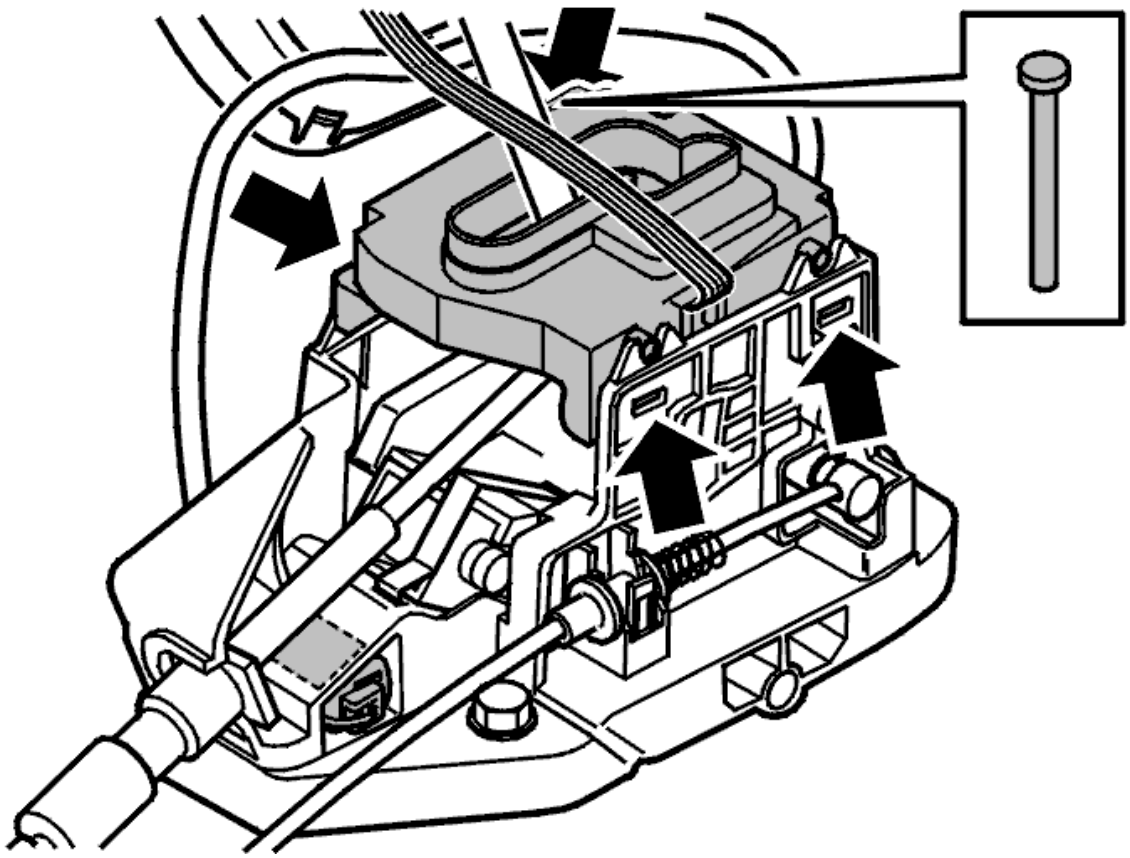


Fig. 203: Installing Gear Selector Assembly Stop On Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Install:

- the stop on the gear selector assembly. Lock into place in the gear selector assembly
- the yellow lock pin.

INSTALLING GEAR SELECTOR KNOB AND BOOT

Install the gear selector knob and boot. See **GEAR SELECTOR KNOB, GEARTRONIC, REPLACING**.

INSTALLING THE CENTER CONSOLE

Install the center console. See **REMOVING CENTER TUNNEL CONSOLE** .

TOP PANEL GEARTRONIC, REPLACING

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

REMOVAL

REMOVING THE TOP PANEL

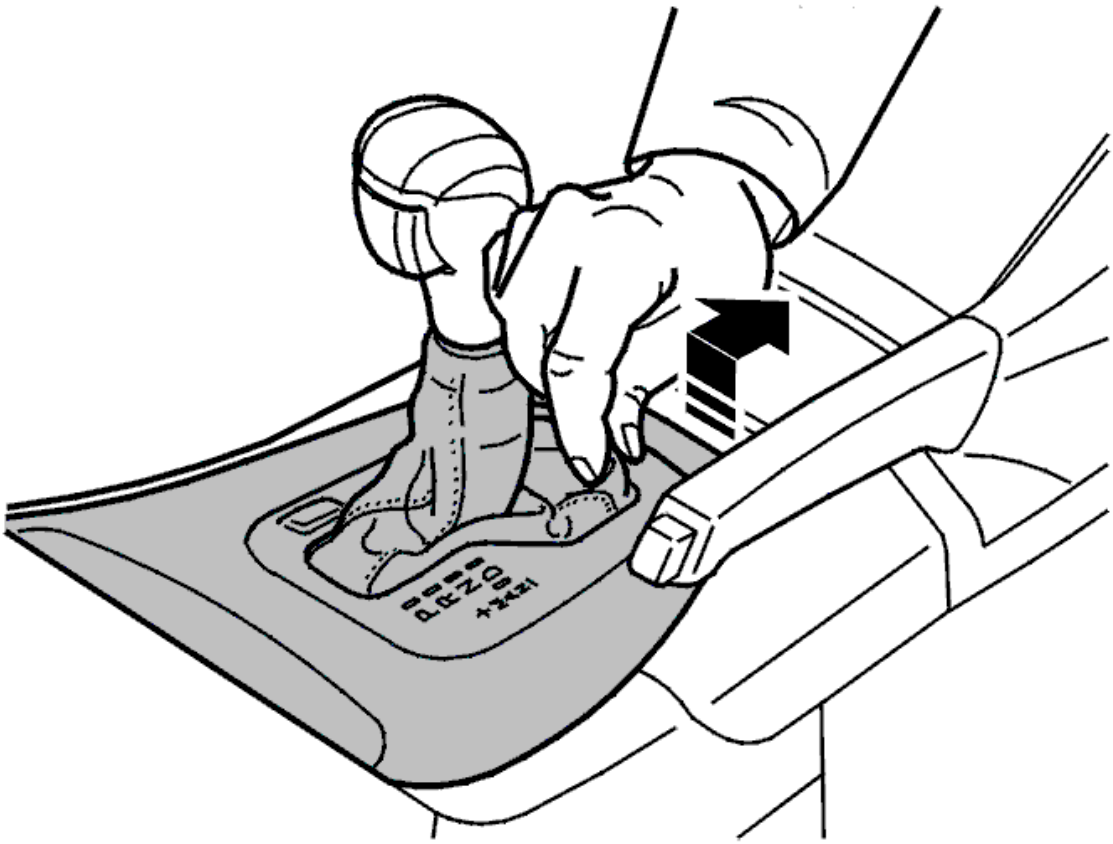


Fig. 204: Removing Boot From Gear Selector Knob
Courtesy of VOLVO CARS CORPORATION

Hold the boot and pull it straight up. Angle the boot backwards.

REMOVING THE GEAR SELECTOR KNOB

Remove the gear selector knob. See **GEAR SELECTOR KNOB, GEARTRONIC, REPLACING**.

REMOVING THE CENTER CONSOLE

Remove the center console. See **REMOVING CENTER TUNNEL CONSOLE** .

REMOVING THE GEAR SELECTOR ASSEMBLY STOP

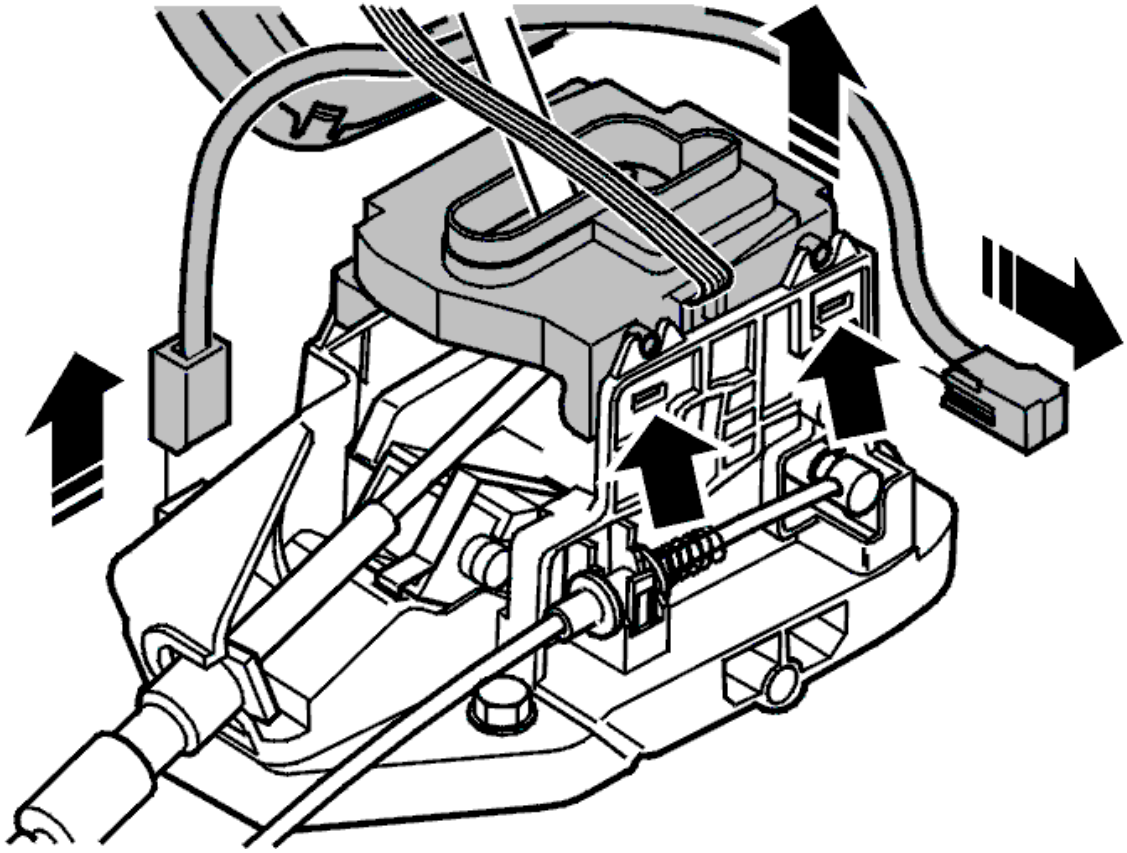


Fig. 205: Removing Stop For Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Press in the four catches on the side. Pull the gear selector assembly stop straight up.

REMOVING THE PRINTED CIRCUIT BOARD FROM THE GEAR SELECTOR ASSEMBLY STOP

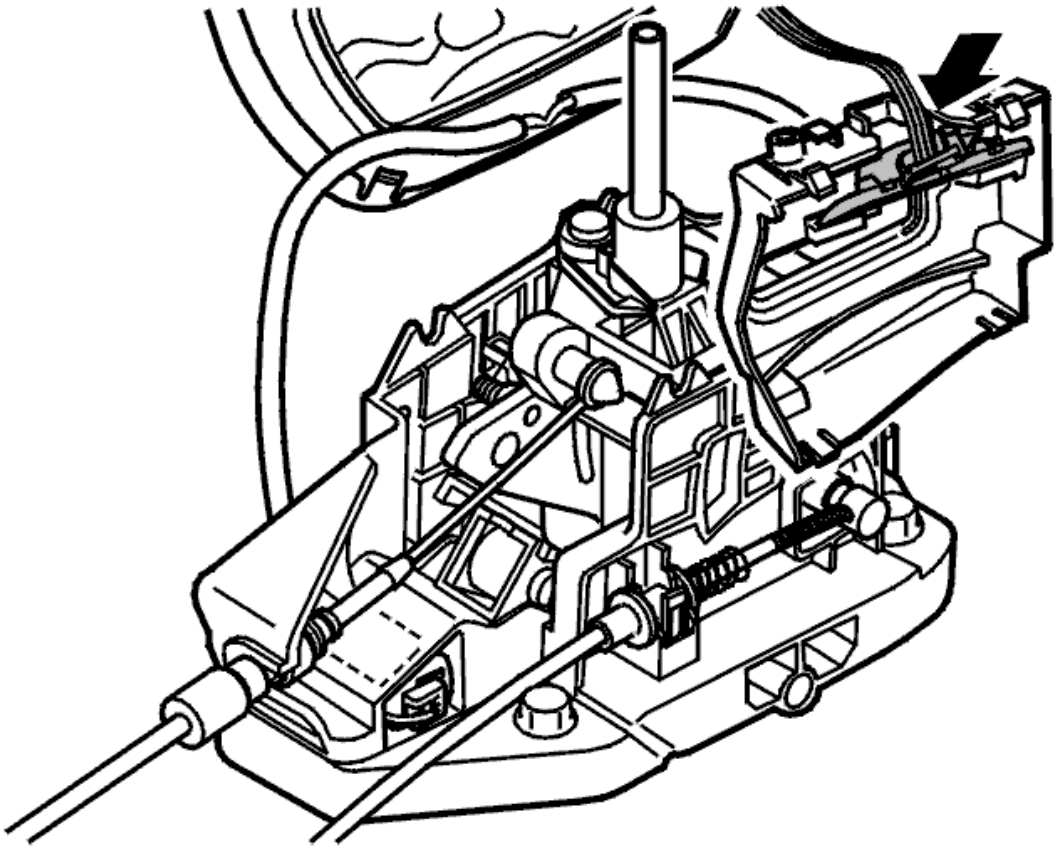


Fig. 206: Removing Printed Circuit Board From Gear Selector Assembly Stop
Courtesy of VOLVO CARS CORPORATION

Press the catches locking the holder for the printed circuit board.

Angle out the holder and the printed circuit board.

Transfer the entire holder when replacing the gear selector assembly stop.

Alternatively: Detach the printed circuit board from the 2 catches on the holder and pull the printed circuit board straight up.

REMOVING THE BOOT AND THE SWITCHES FROM THE GEAR SELECTOR ASSEMBLY

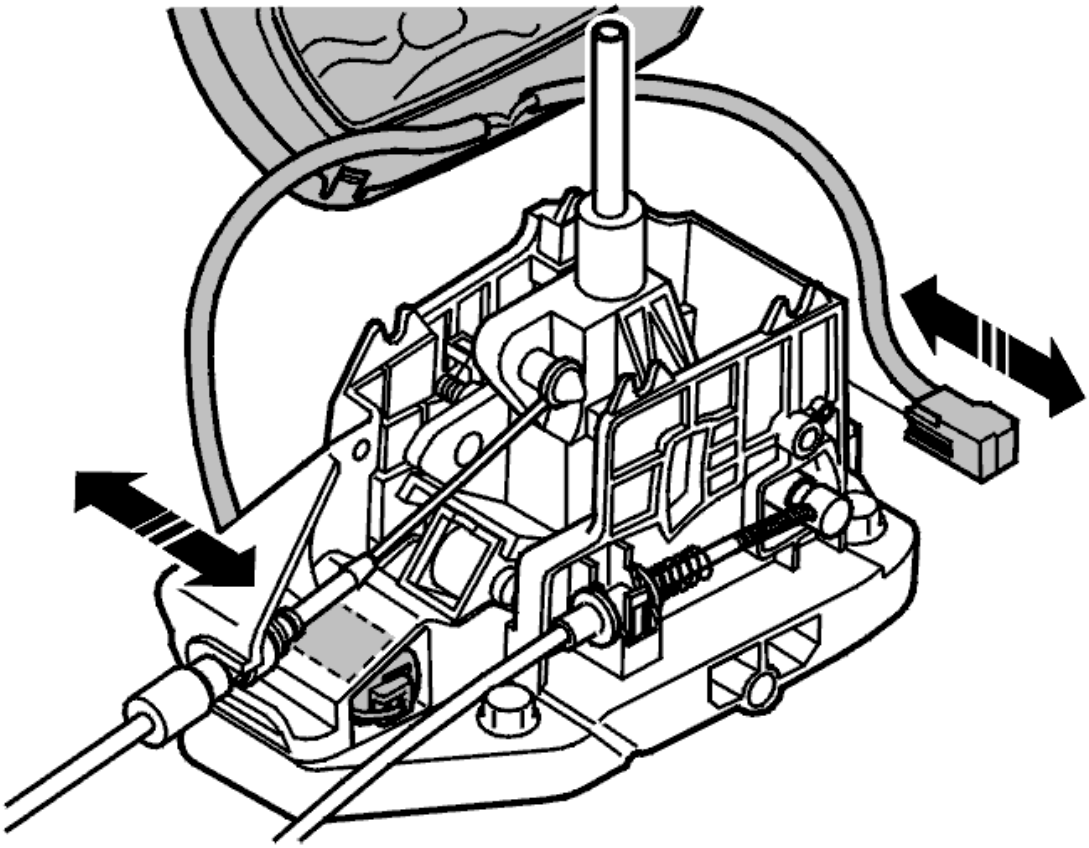


Fig. 207: Removing Boot And Switches From Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Remove the wiring from the clips.

Disconnect the rear connector from the gear selector assembly.

Pull the front connector out of the gear selector assembly.

Separate the connectors.

Angle off the top panel and the boot.

REMOVING AND TRANSFERRING THE BOOT FROM THE TOP PANEL

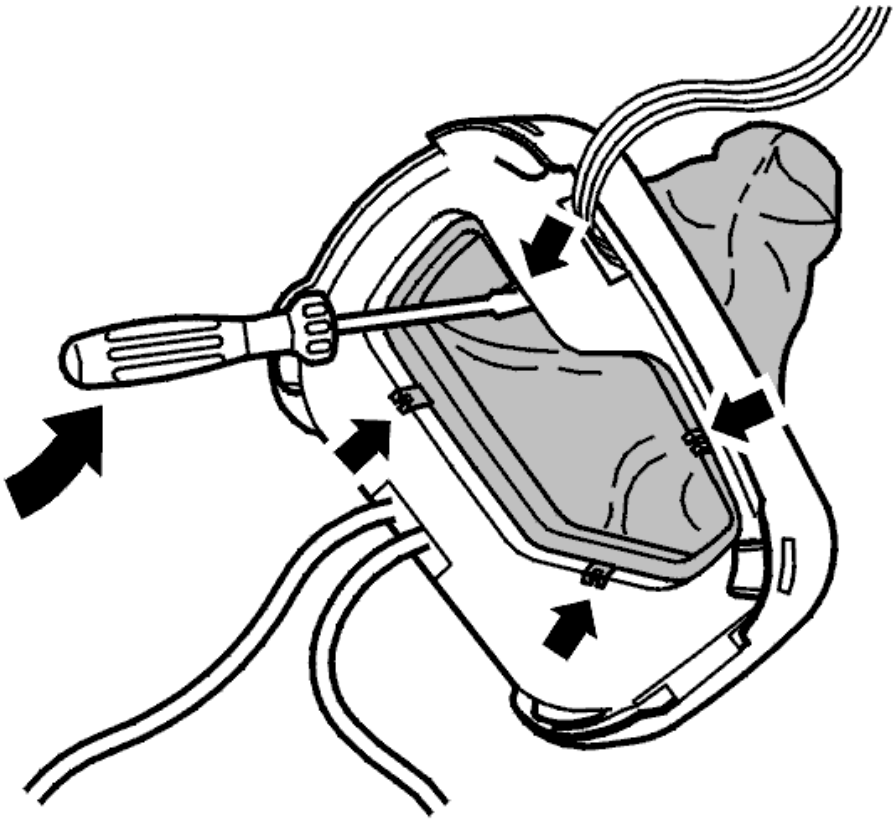


Fig. 208: Removing And Transferring Boot From Top Panel
Courtesy of VOLVO CARS CORPORATION

Press the catches with a screwdriver. At the same time press the top of the boot.

Replace the top panel assembly .

INSTALLATION

INSTALLING THE BOOT

Install the boot on the top panel and press it into place.

INSTALLING THE PRINTED CIRCUIT BOARD ON THE GEAR SELECTOR ASSEMBLY STOP

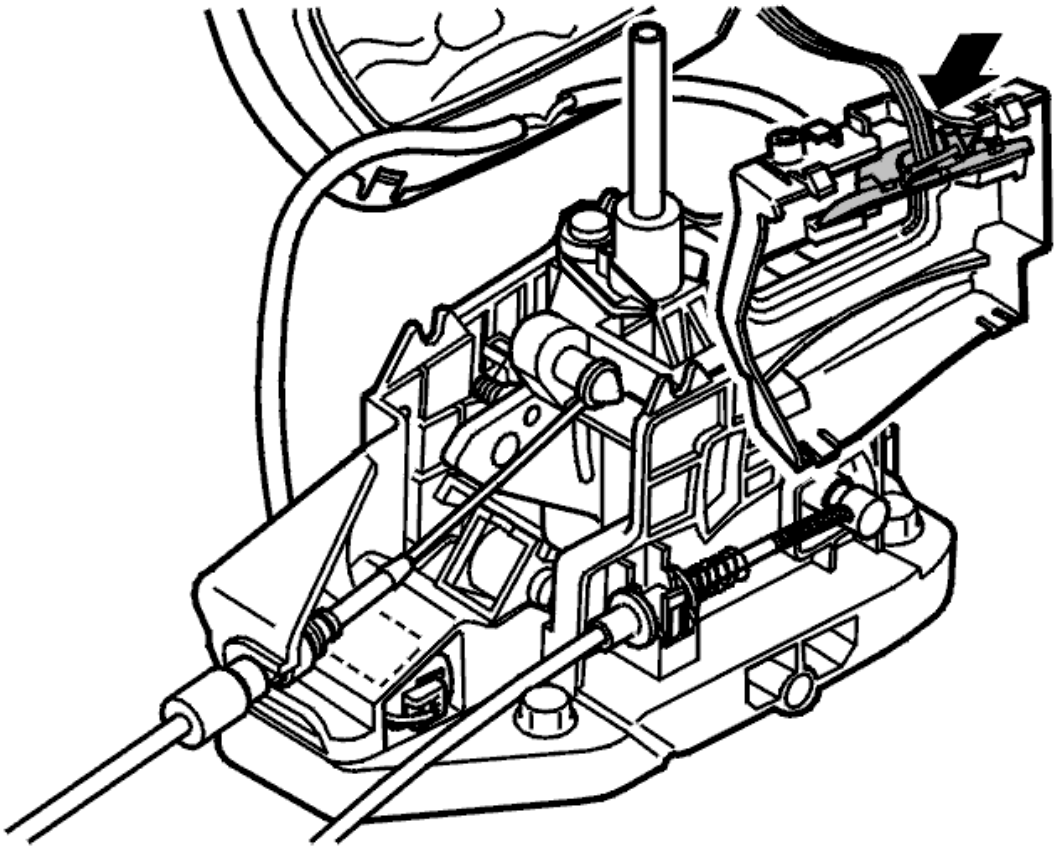


Fig. 209: Removing Printed Circuit Board From Gear Selector Assembly Stop
Courtesy of VOLVO CARS CORPORATION

Angle the holder into the gear selector assembly stop. Lock it into place.

Alternatively: Install the printed circuit board in the cut-out in the holder and lock it into place. Reinstall the holder.

INSTALLING THE GEAR SELECTOR ASSEMBLY STOP ON THE GEAR SELECTOR ASSEMBLY

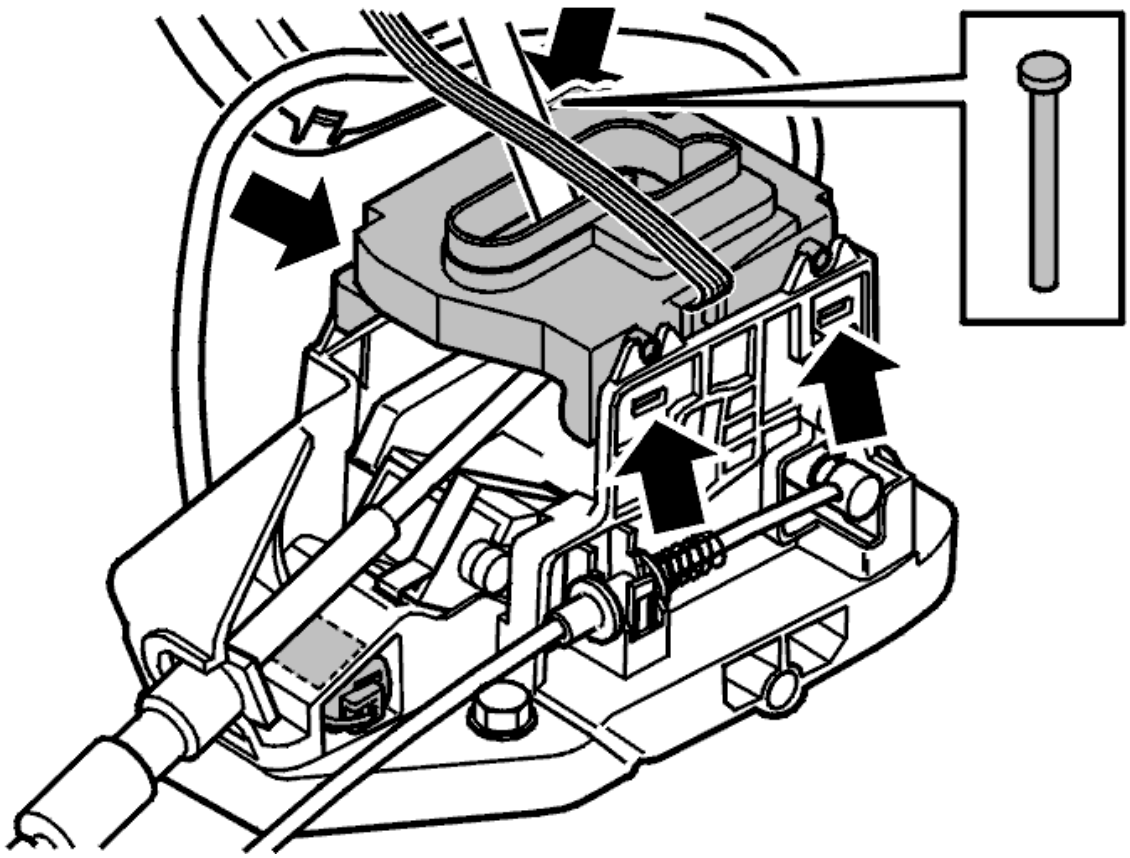


Fig. 210: Installing Gear Selector Assembly Stop On Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Install:

- the gear selector assembly stop and press it into place in the gear selector assembly
- the yellow lock pin.

Check that the gear selector assembly stop is securely in place.

Connect the connectors.

Connect the rear connector to the gear selector assembly. Angle the front connector into the gear selector assembly.

Secure the wiring to the gear selector assembly.

INSTALLING THE TOP PANEL

Install:

- the locking sleeve for the boot above the gear selector
- the top panel.

INSTALLING THE GEAR SELECTOR KNOB AND LOCK BRACKET

Install the gear selector knob. See **INSTALLING THE GEAR SELECTOR KNOB**. Install the lock bracket, and see:**INSTALLING THE LOCK BRACKET ON THE GEAR SELECTOR KNOB**.

INSTALLING THE CENTER CONSOLE

Install the center console. See **REMOVING CENTER TUNNEL CONSOLE** .

GEAR SELECTOR ASSEMBLY, GEAR SELECTOR, AUTOMATIC (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

BOOT, GEAR SELECTOR, REPLACING

BOOT, GEAR SELECTOR, REPLACING

GEAR SELECTOR CABLE

Operation Number(s):

Special tools	
	T9997077 JIMMY BAR **Tool number:** T9997077 **Tool description:** JIMMY BAR **Tool boards:**

Remove the air filter housing. See **AIR CLEANER HOUSING**

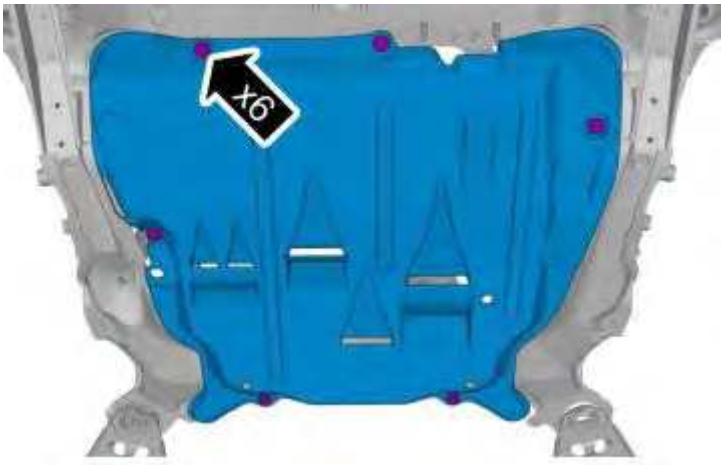


Fig. 211: Removing Splash Panel
Courtesy of VOLVO CARS CORPORATION

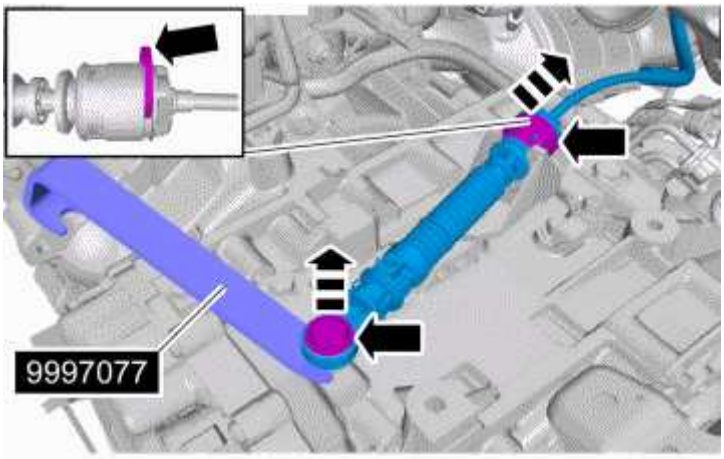


Fig. 212: Using Pry Tool 9997077
Courtesy of VOLVO CARS CORPORATION

Use: **9997077**

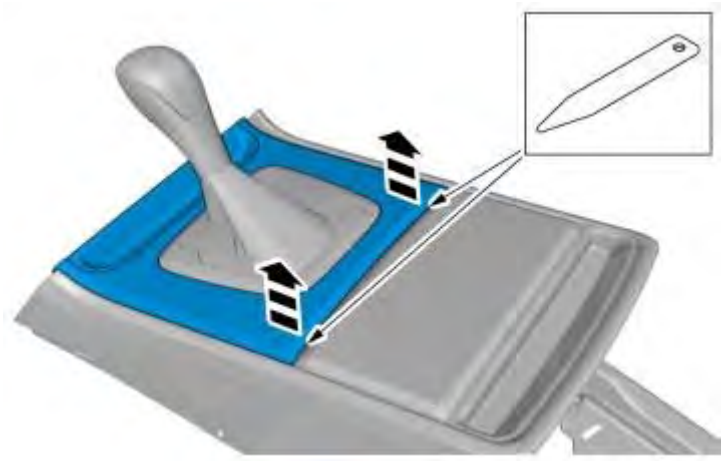


Fig. 213: Removing Shifter Console
Courtesy of VOLVO CARS CORPORATION

Fig. 214: Identifying Cover Catches
Courtesy of VOLVO CARS CORPORATION

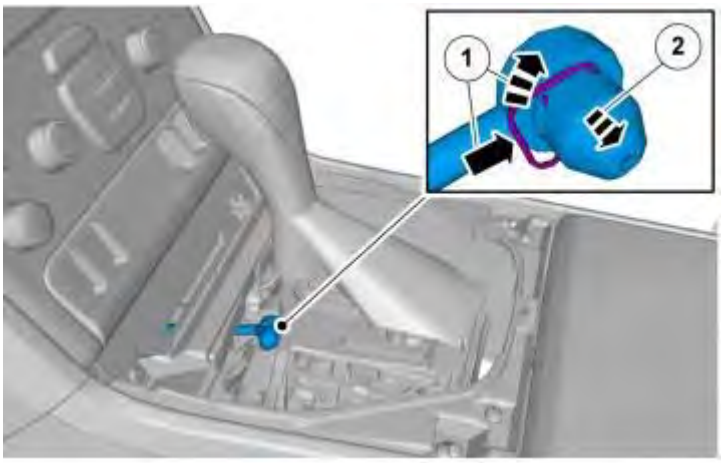


Fig. 215: Identifying Cable End
Courtesy of VOLVO CARS CORPORATION

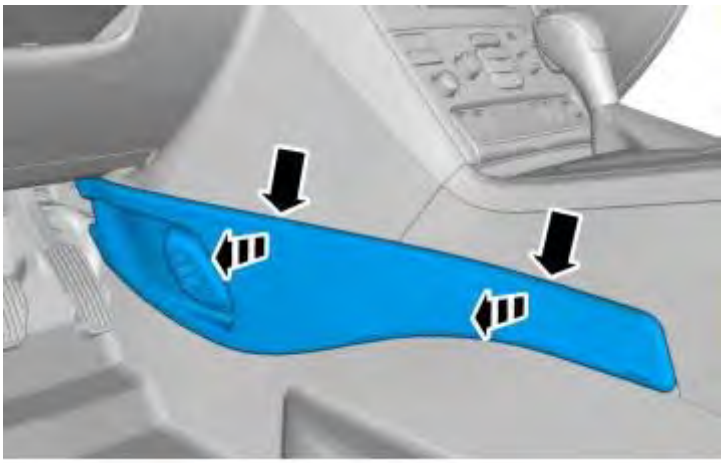


Fig. 216: Removing Left Side Panel
Courtesy of VOLVO CARS CORPORATION

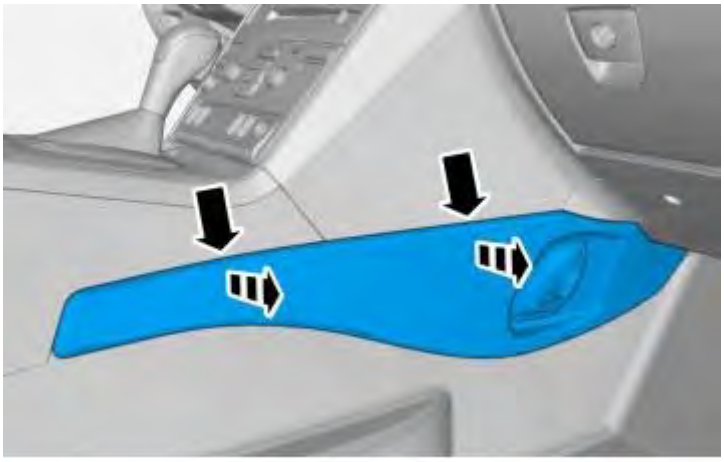


Fig. 217: Removing Right Side Panel
Courtesy of VOLVO CARS CORPORATION

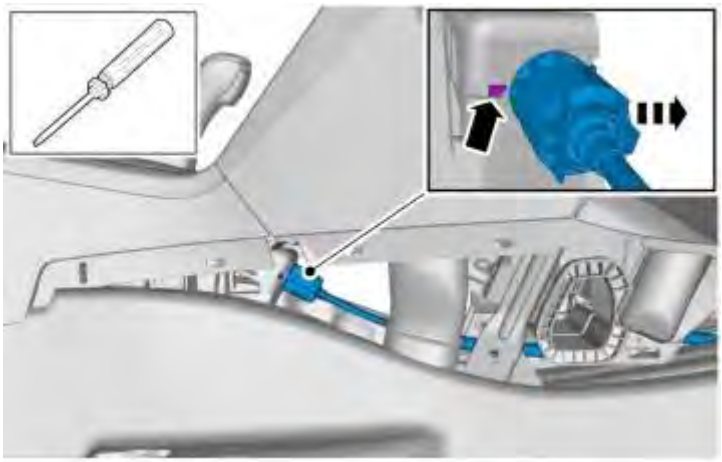


Fig. 218: Identifying Cable Clip
Courtesy of VOLVO CARS CORPORATION

VEHICLE WITHOUT REAR AC

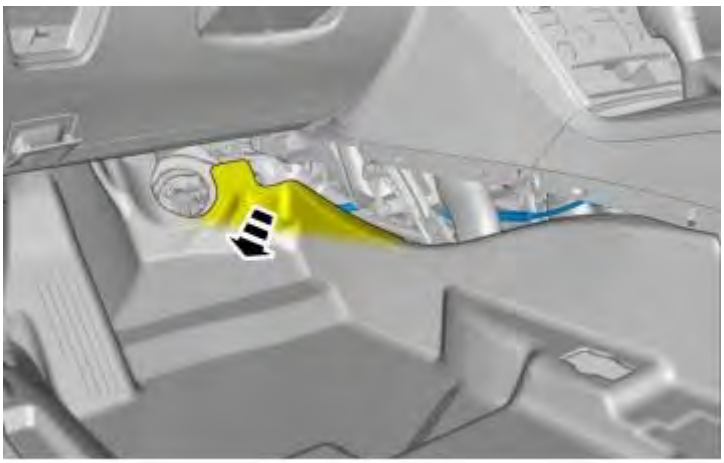


Fig. 219: Folding Back The Floor Covering
Courtesy of VOLVO CARS CORPORATION

Detach and fold back the floor covering.

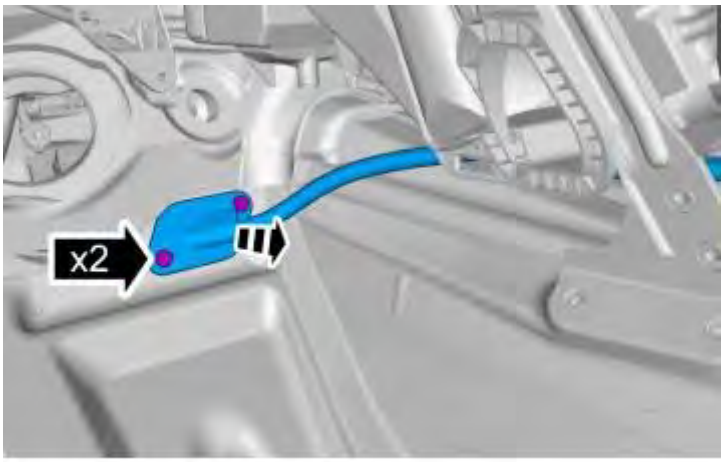


Fig. 220: Remove/Install Screws
Courtesy of VOLVO CARS CORPORATION

Torque: M6

10 Nm

VEHICLE WITH REAR AC

Fig. 221: Removing Floor Covering
Courtesy of VOLVO CARS CORPORATION

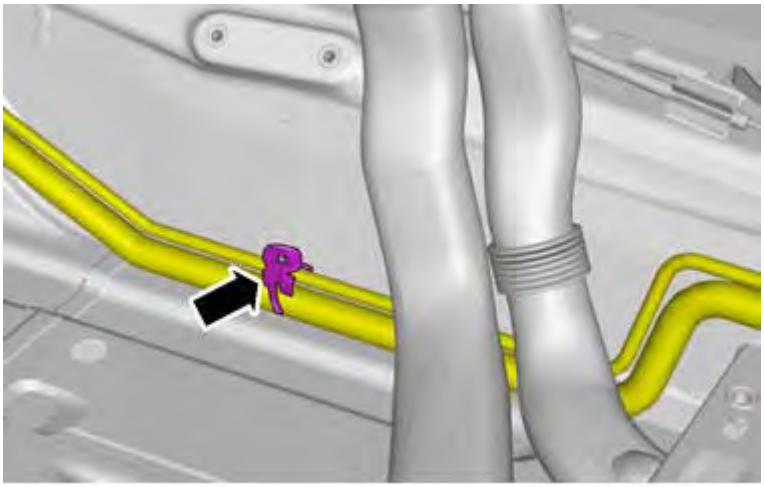


Fig. 222: Identifying Tubing Clip
Courtesy of VOLVO CARS CORPORATION

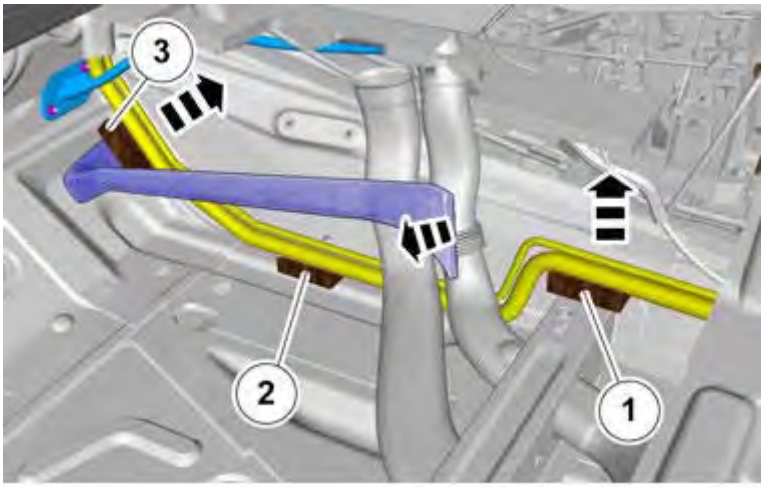


Fig. 223: Repositioning Tubes
Courtesy of VOLVO CARS CORPORATION

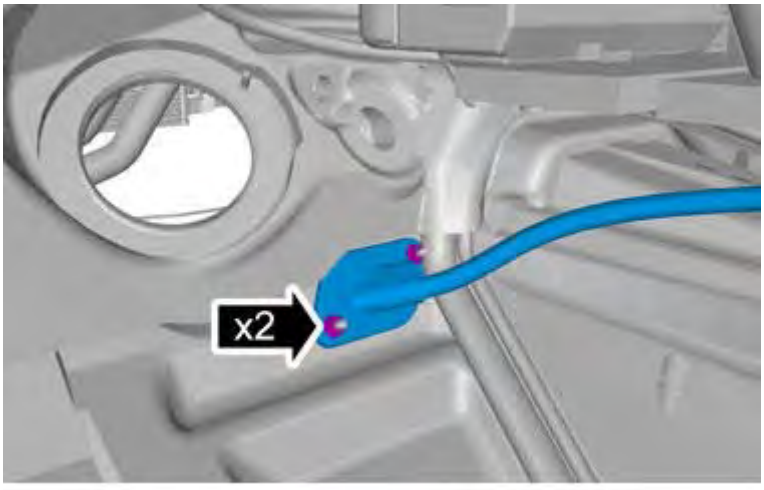


Fig. 224: Remove/Install Fasteners
Courtesy of VOLVO CARS CORPORATION

Torque: M6

10 Nm

To install, reverse the removal procedure.

NOTE: Take extra care when handling selector lever cable.

GEAR SELECTOR KNOB, GEARTRONIC, REPLACING

GEAR SELECTOR KNOB, GEARTRONIC, REPLACING

GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC, REPLACING

GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC, REPLACING

SOLENOID SHIFT LOCK, REPLACE

SOLENOID SHIFT LOCK, REPLACE

TOP PANEL GEARTRONIC, REPLACING

TOP PANEL GEARTRONIC, REPLACING

GEAR SELECTOR ASSEMBLY, GEAR SELECTOR, AUTOMATIC (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

BOOT, GEAR SELECTOR, REPLACING

BOOT, GEAR SELECTOR, REPLACING

GEAR SELECTOR CABLE

GEAR SELECTOR CABLE

GEAR SELECTOR KNOB, GEARTRONIC, REPLACING

GEAR SELECTOR KNOB, GEARTRONIC, REPLACING

GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC, REPLACING

GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC, REPLACING

SOLENOID SHIFT LOCK, REPLACE

SOLENOID SHIFT LOCK, REPLACE

TOP PANEL GEARTRONIC, REPLACING

TOP PANEL GEARTRONIC, REPLACING

GEAR SELECTOR ASSEMBLY, GEAR SELECTOR, AUTOMATIC (B8444S, TF-80SC AWD; 2005-2011)

BOOT, GEAR SELECTOR, REPLACING

BOOT, GEAR SELECTOR, REPLACING

CABLE KEY INTERLOCK, REPLACING

CABLE KEY INTERLOCK, REPLACING

GEAR SELECTOR CABLES, REPLACING

Special tools:

9997077

NOTE: Since the illustrations in this service information are used for different model years and/or models, some variation may occur. However, the essential information is always correct.

REMOVAL

REMOVING THE AIR CLEANER (ACL) HOUSING

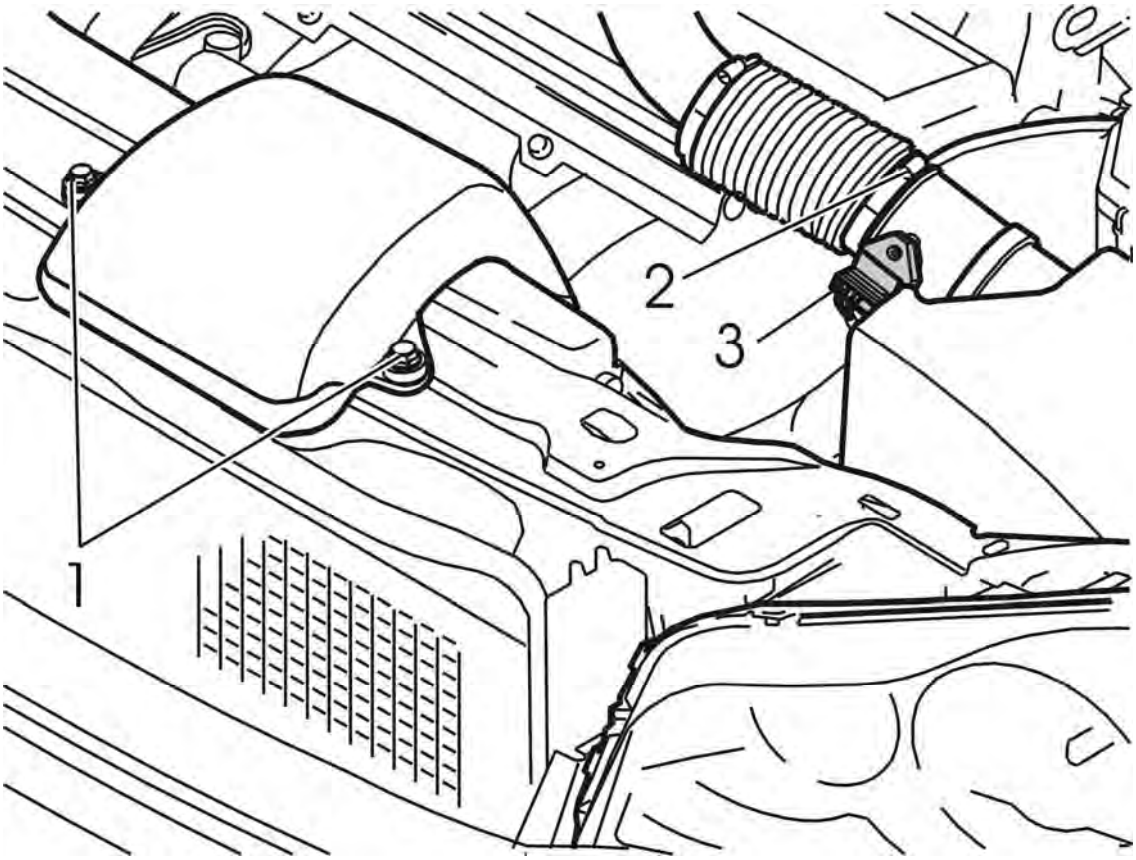


Fig. 225: Air Cleaner (ACL) Housing
Courtesy of VOLVO CARS CORPORATION

Remove the screws (1) for the intake manifold.

Disconnect the hose clamp (2) for the air hose.

Remove the connector (3) from the mass air flow (MAF) sensor.

Remove the air cleaner (ACL) housing from its mountings. Pull it straight up.

REMOVING THE GEAR SELECTOR CABLE AND BALL JOINT

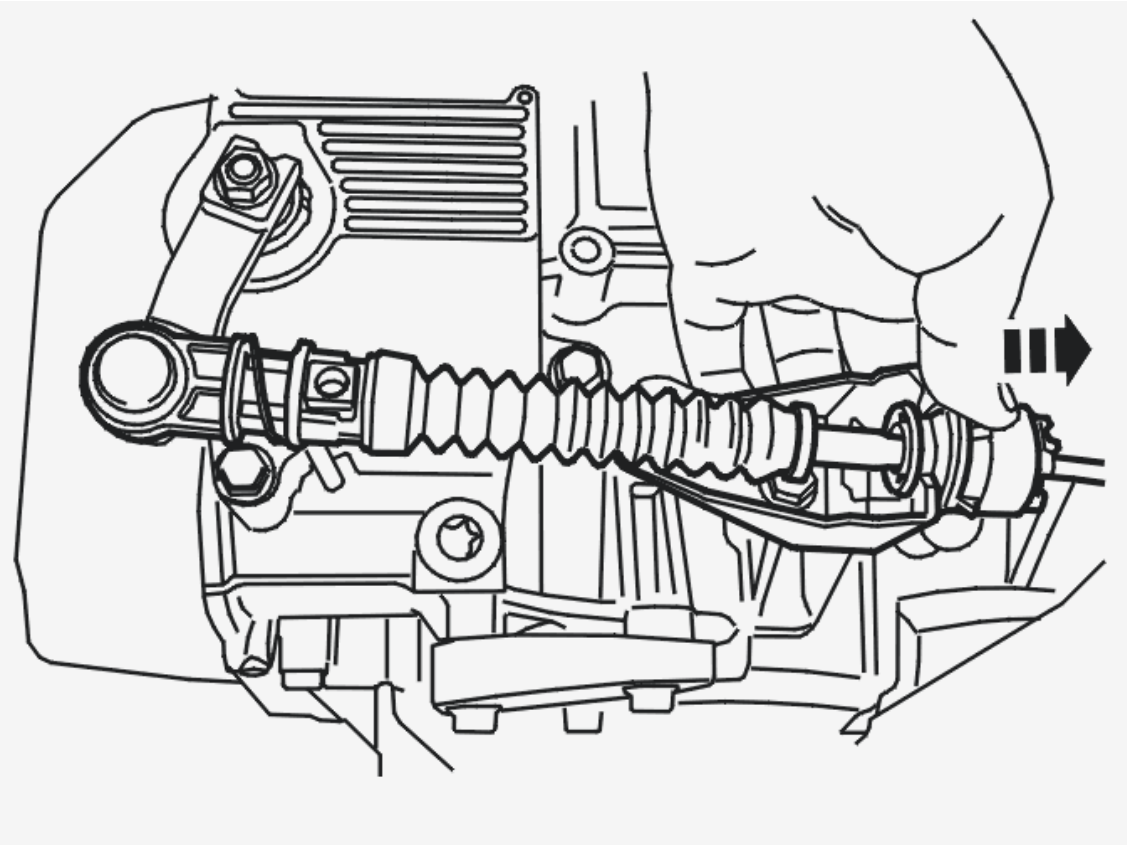


Fig. 226: Removing The Gear Selector Cable
Courtesy of VOLVO CARS CORPORATION

Remove the gear selector cable from the bracket on the transmission by pressing back the lock sleeve around the gear selector cable and lifting upwards. Use: **9997077** to release the ball joint for the gear selector cable from the lever.

REMOVING THE LEFT FRONT WHEEL

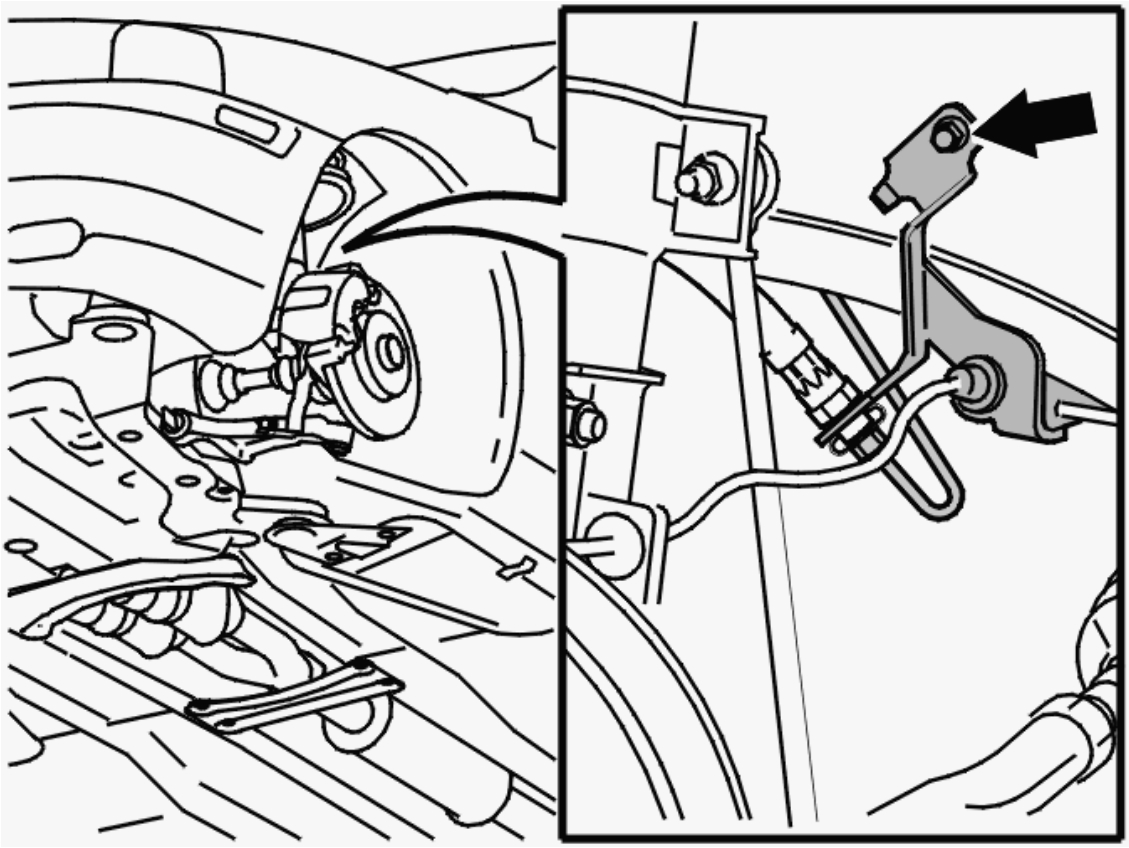


Fig. 227: Identifying Mounting For Brake Hose And Pipe
Courtesy of VOLVO CARS CORPORATION

Remove the left front wheel. Pry the clips apart. Remove the gear selector cable from the clips on the side member.

Remove the mounting for the brake hose and brake pipe.

REMOVING SIDE PANELS

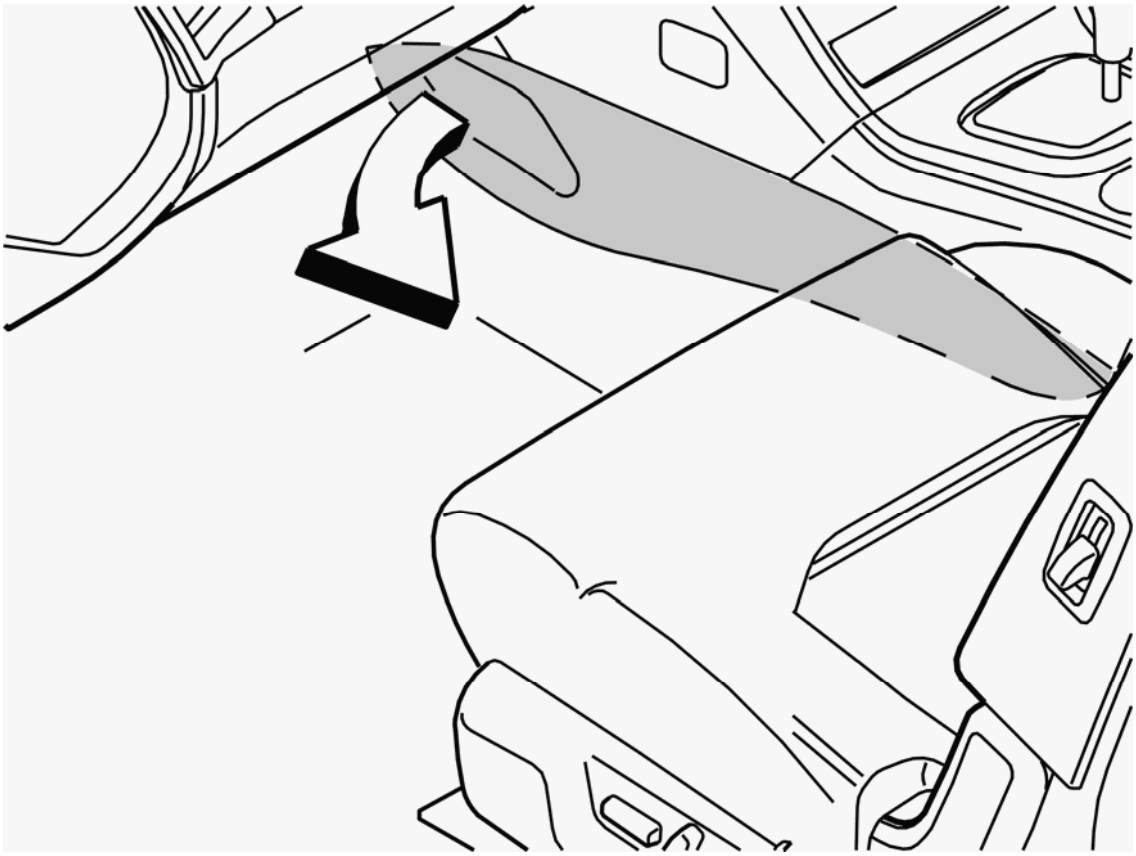


Fig. 228: Identifying Removal Of Center Console Side Panels
Courtesy of VOLVO CARS CORPORATION

Remove the side panels from the centre console.

Remove the center console. See **CENTER CONSOLE, REPLACING** .

REMOVING THE GEAR SELECTOR CABLE

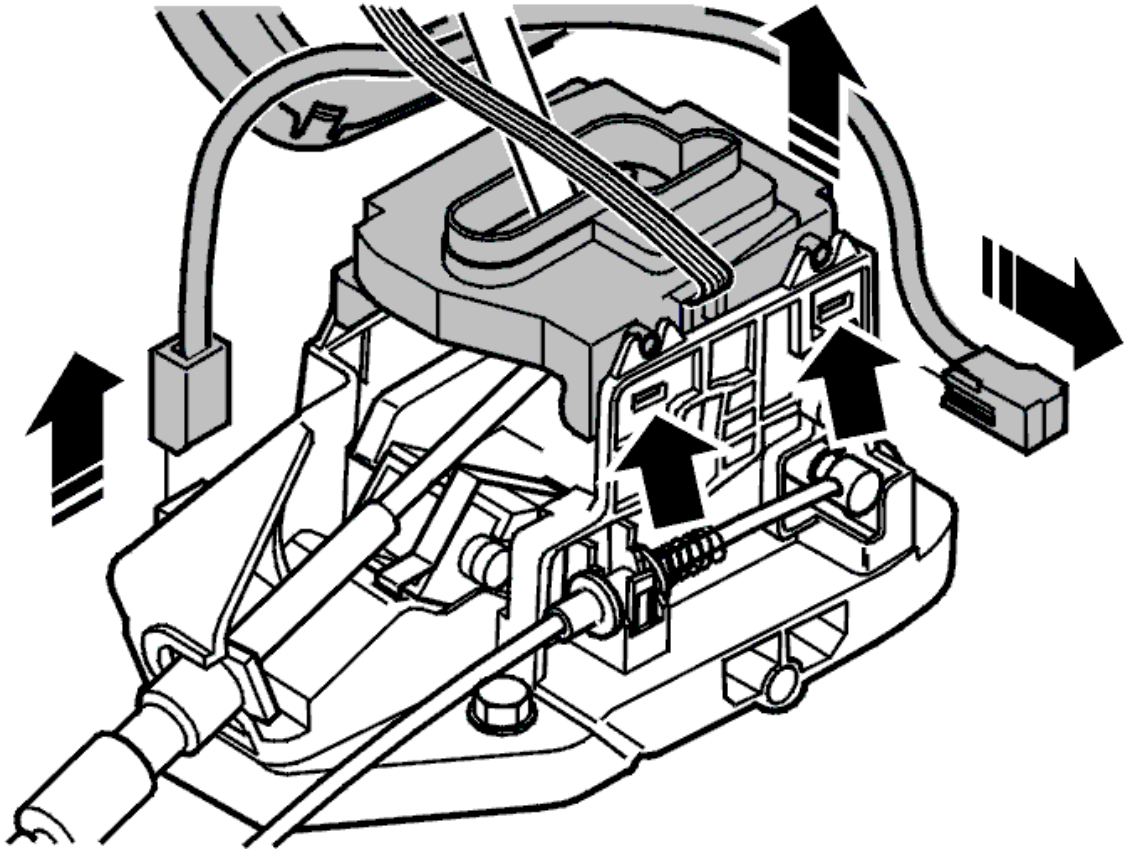


Fig. 229: Removing Stop For Gear Selector Assembly
Courtesy of VOLVO CARS CORPORATION

Detach the gear selector lever stop. See **GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC, REPLACING**.

Remove:

- the catch for the gear selector cable on the gear selector.

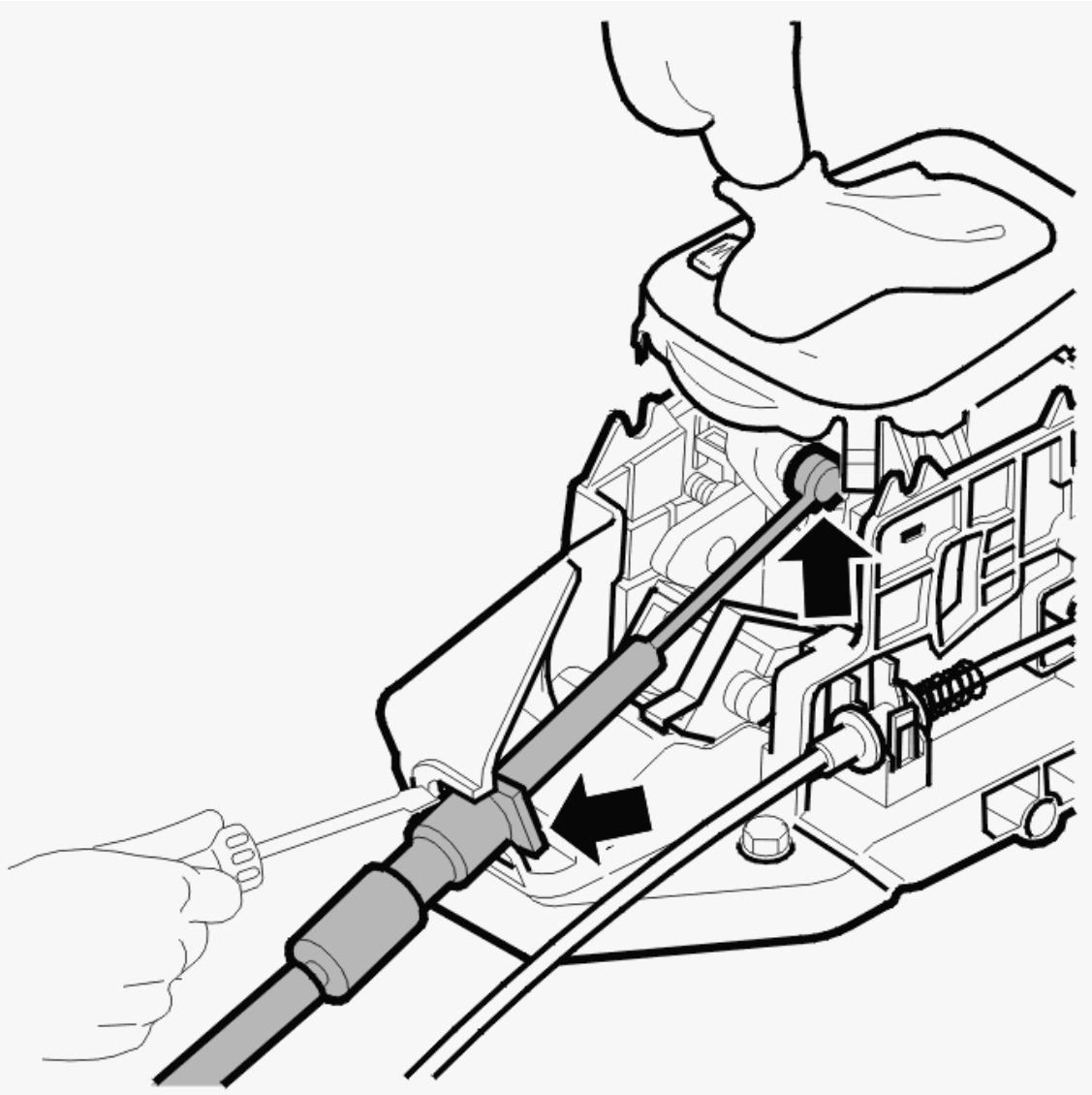


Fig. 230: Removing Gear Selector Cable
Courtesy of VOLVO CARS CORPORATION

- the mechanical gearbox cable from the gear selector assembly nose. Press the catches. Use a screwdriver
- the mechanical gear selector cable.

VEHICLE WITH REAR A/C

Loosen left front seat and move it back. To remove seat, see: **FRONT SEAT, REPLACING**

Fig. 231: Removing Floor Covering
Courtesy of VOLVO CARS CORPORATION

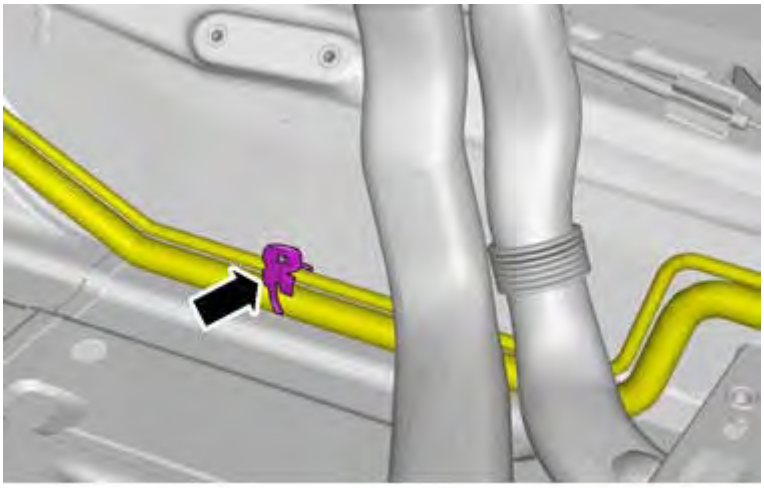


Fig. 232: Identifying Tubing Clip
Courtesy of VOLVO CARS CORPORATION

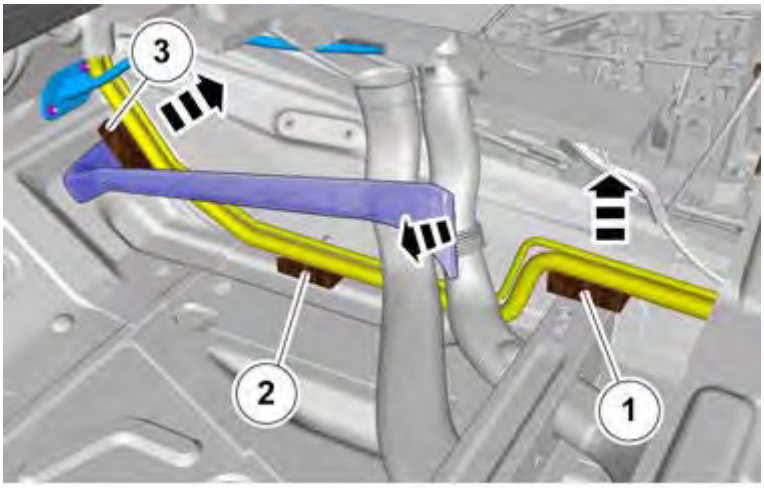


Fig. 233: Repositioning Tubes
Courtesy of VOLVO CARS CORPORATION

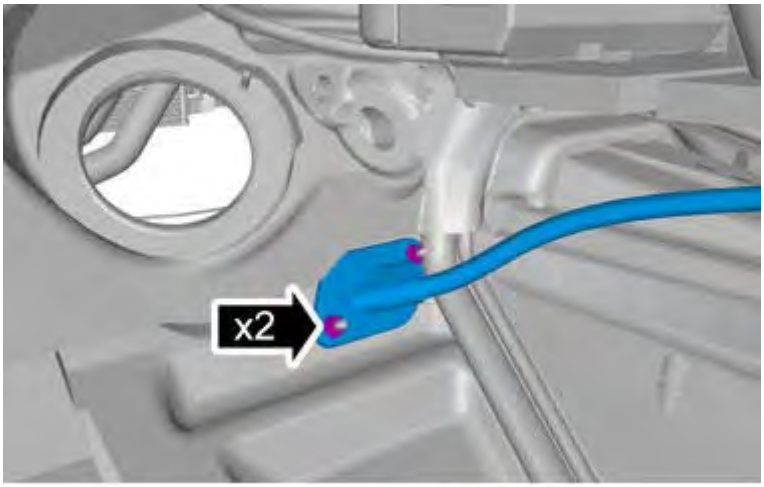


Fig. 234: Remove/Install Fasteners
Courtesy of VOLVO CARS CORPORATION

APPLIES TO ALL VEHICLES.

REMOVING THE GEAR SELECTOR CABLE AT THE BULKHEAD

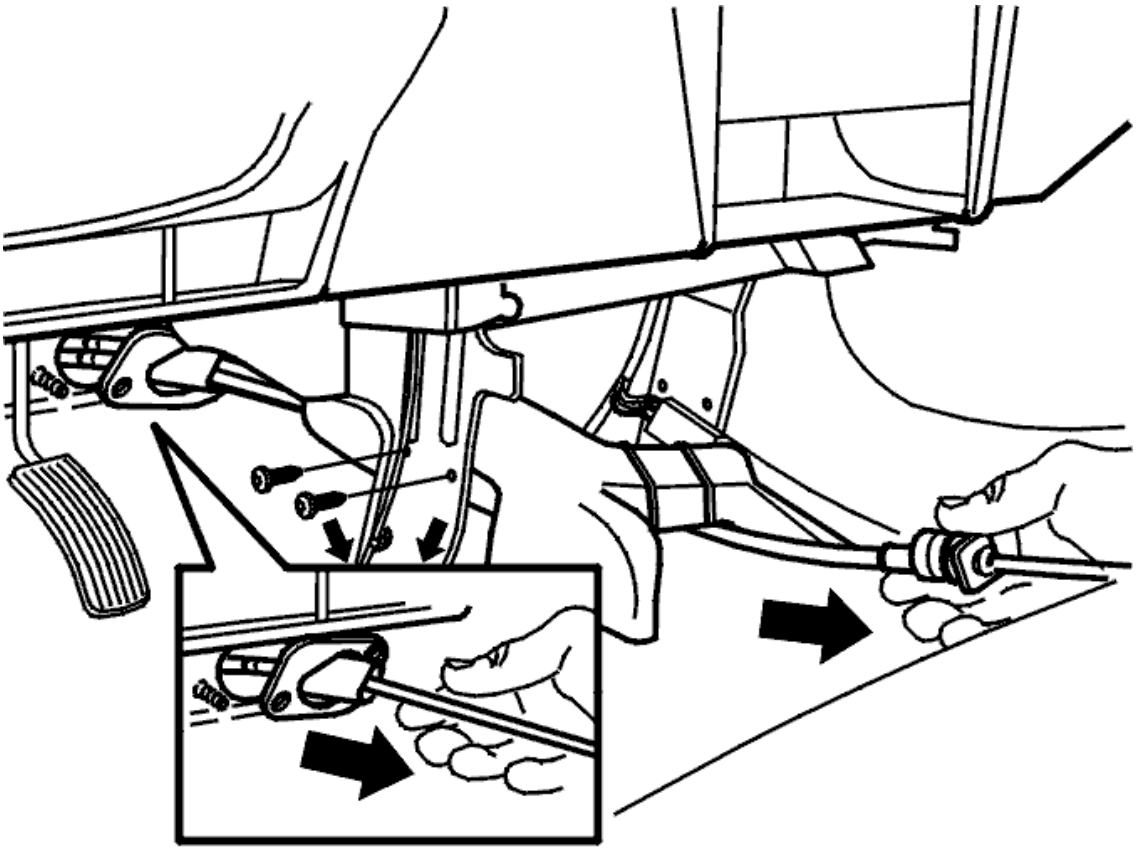


Fig. 235: Identifying Cable At Firewall
Courtesy of VOLVO CARS CORPORATION

Remove:

- the 2 air ducts
- the 4 screws for the strut in the dashboard. Push the carpet to one side
- the 2 nuts for the gear selector cable grommet at the bulkhead
- the gear selector cable by pulling it inwards into the passenger compartment.

HINT: Secure a cable using tape at the end of the engine compartment on the gear selector cable before pulling it out to make reinstallation easier. Route the gear selector cable correctly in the engine compartment with someone to assist you.

INSTALLATION

NOTE: For tightening torques, see: TIGHTENING TORQUE .

PREPARATIONS FOR INSTALLATION

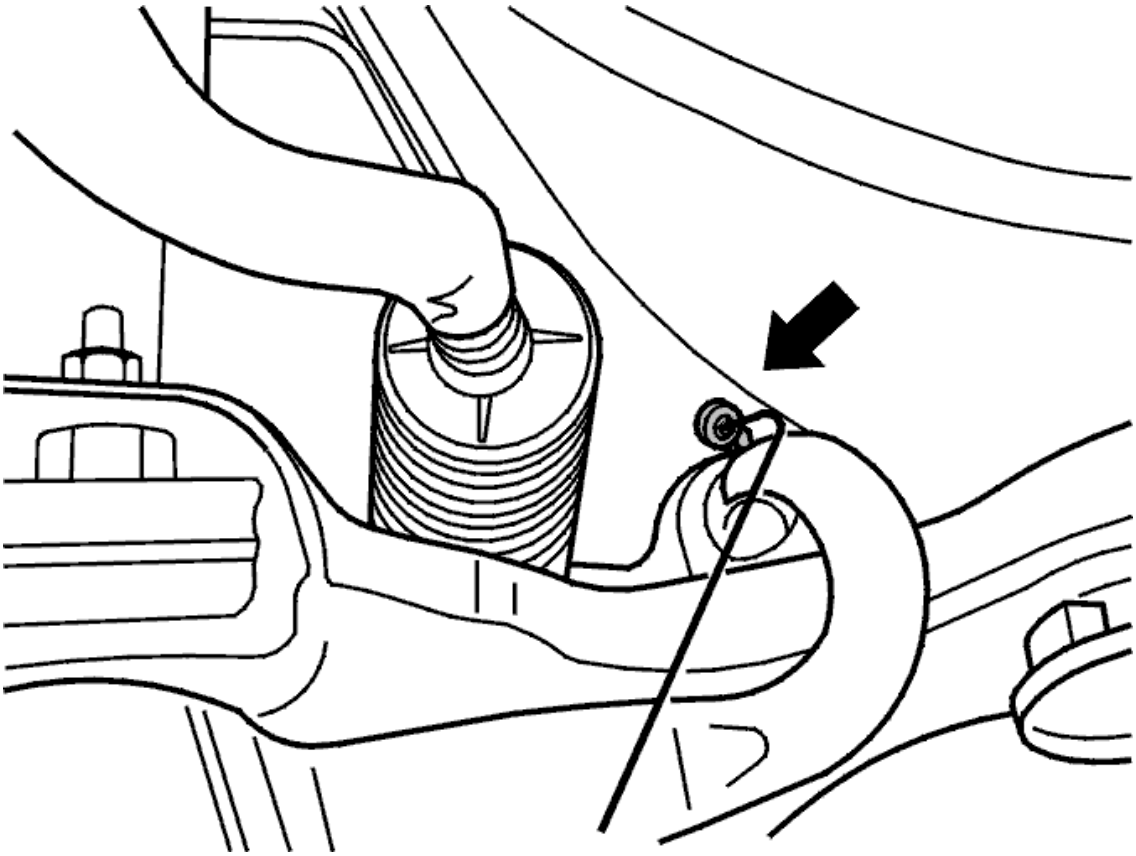


Fig. 236: Identifying Bent Heavy Welding Rod In Engine Compartment
Courtesy of VOLVO CARS CORPORATION

Tape the cable to the new gear selector cable.

CAUTION: Take great care when installing the gear selector cables so that no sharp bends or breaks occur, especially in the ends of the gear selector cables between the inner cable and the outer casing.

HINT: Route the gear selector cable correctly in the engine compartment with someone to assist you.

INSTALLING THE GEAR SELECTOR CABLE FROM THE INSIDE OF THE PASSENGER COMPARTMENT

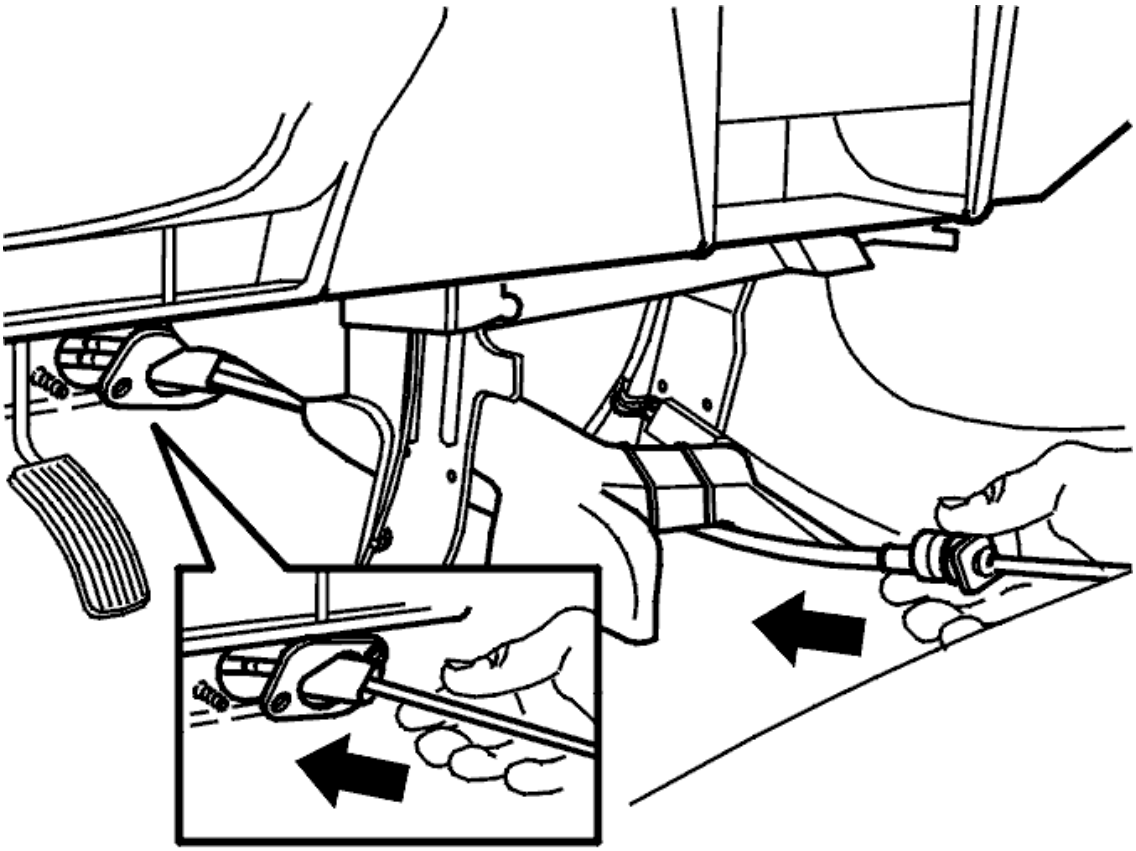


Fig. 237: Identifying Cable At Firewall
Courtesy of VOLVO CARS CORPORATION

Install the gear selector cable under the heater unit on the left side, down towards the hole.

CAUTION: Be very careful when inserting the rubber bellow for the gear selector cable through the hole in the bulkhead. Do not damage the cable.

Feed the gear selector cable through the hole slightly.

HINT: Route the gear selector cable correctly in the engine compartment with someone to assist you.

Locate the lead-in on the studs.

Install:

- the nuts. Tighten
- the air ducts
- the stay and the screws. Tighten.

FEEDING IN THE GEAR SELECTOR CABLE FROM THE INSIDE

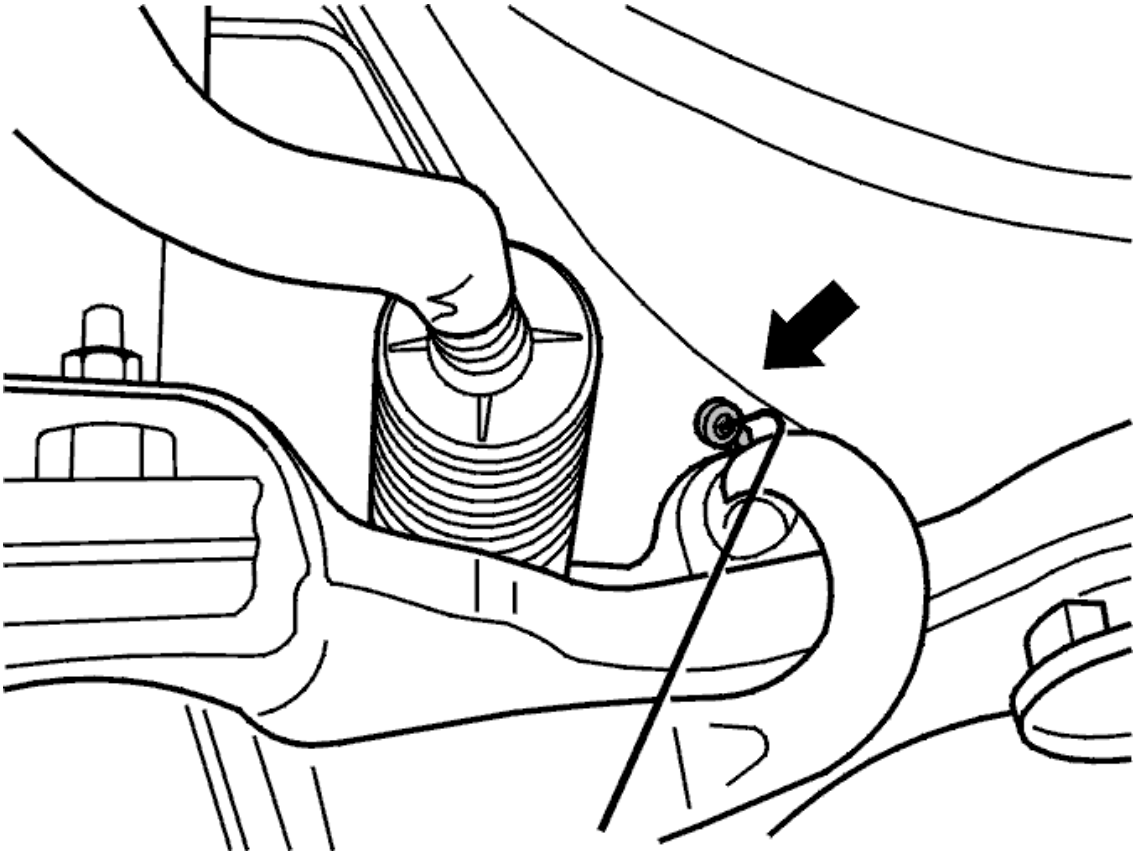


Fig. 238: Identifying Bent Heavy Welding Rod In Engine Compartment
Courtesy of VOLVO CARS CORPORATION

Pull the cable while feeding the gear selector cable in from the inside.

The gear selector cable must be routed past the steering gear and up to the gearbox bracket.

Secure the gear selector cable in the clips on the side member.

INSTALLING THE GEAR SELECTOR CABLE ON THE GEAR SELECTOR

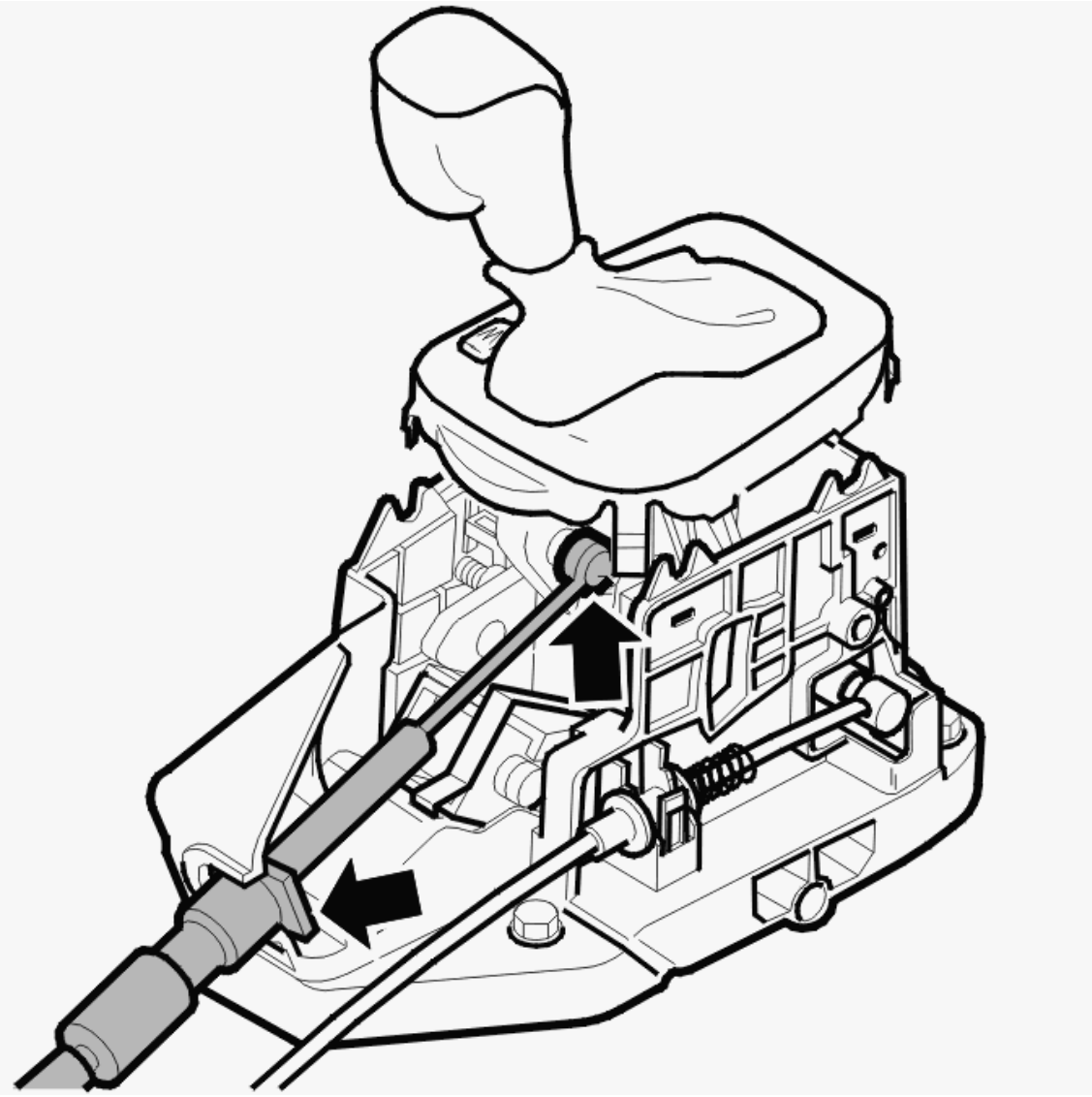


Fig. 239: Installing Gear Selector Cable On Gear Selector
Courtesy of VOLVO CARS CORPORATION

Install:

- the gear selector cable on the gear selector, lock using the snap ring
- the gear selector cable on the end of the gear selector assembly.

Reinstall the gear selector lever stop. See **GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC, REPLACING**.

INSTALLING THE GEAR SELECTOR CABLE ON THE GEARBOX

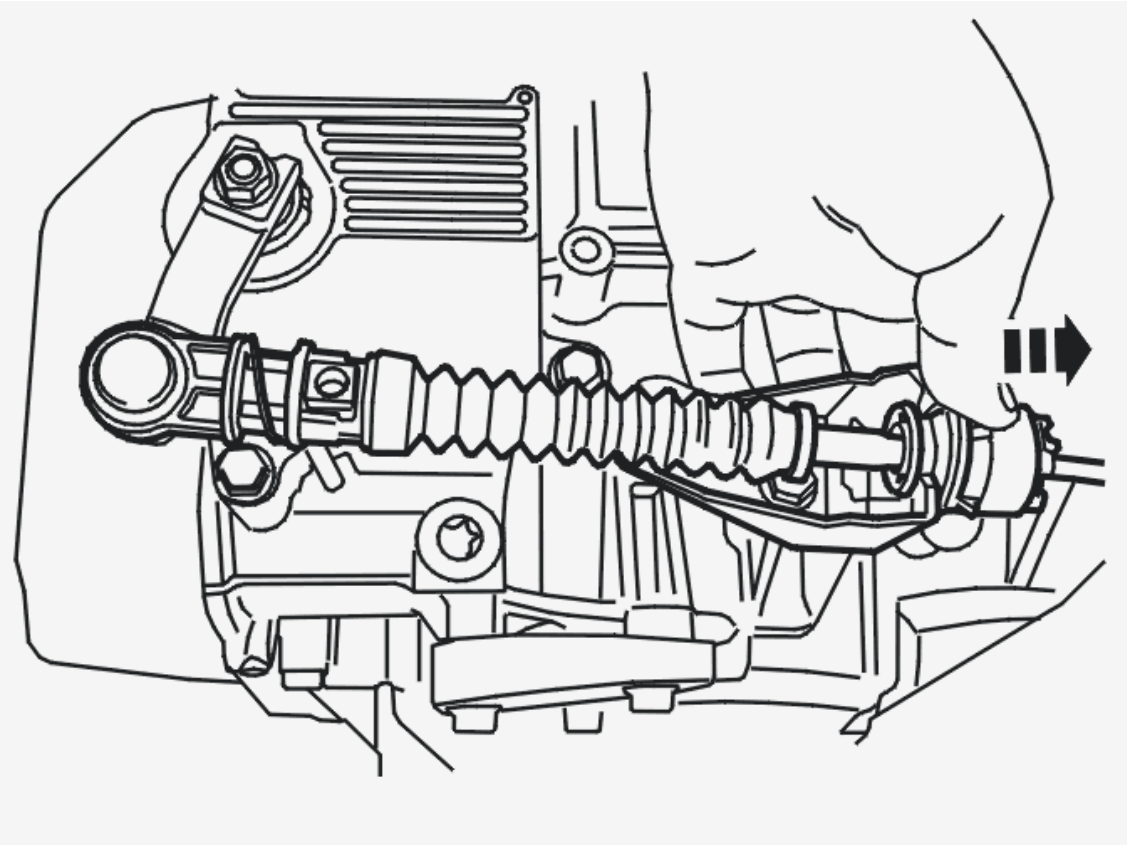


Fig. 240: Removing The Gear Selector Cable
Courtesy of VOLVO CARS CORPORATION

Install:

- the gear selector cable to the bracket by pressing the locking sleeve back around the gear selector cable and inserting the cable in the bottom of the bracket.
- the gear selector cable on the lever. Press the ball joint for the gear selector cable into place on the throttle spindle.

NOTE: After the gear selector cable is replaced, it must be adjusted acc. to: GEAR SELECTOR CABLE, ADJUSTING .

INSTALLING THE AIR CLEANER (ACL) HOUSING

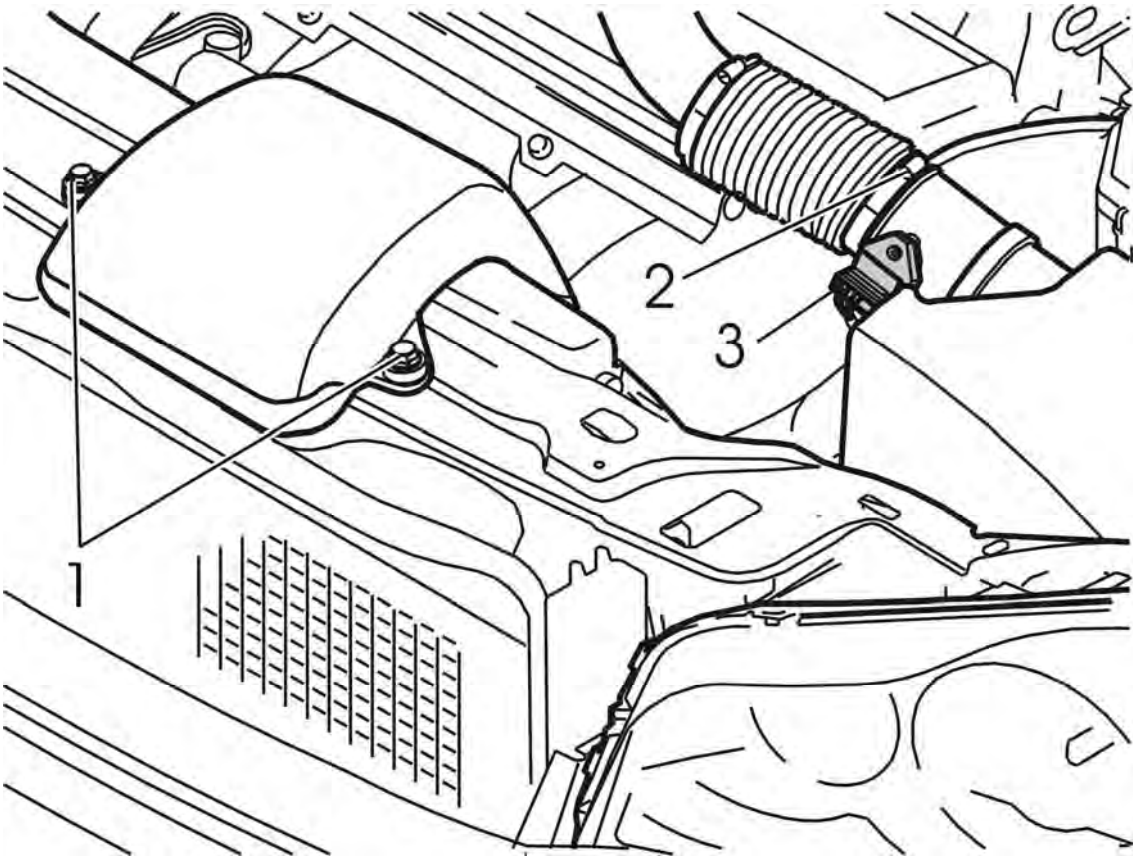


Fig. 241: Air Cleaner (ACL) Housing
Courtesy of VOLVO CARS CORPORATION

Install:

- The air cleaner (ACL) housing
- the connector (3) for the mass air flow (MAF) sensor.
- the hose clamp (2) for the air hose
- the screws (1) for the intake manifold.

GEAR SELECTOR KNOB, GEARTRONIC, REPLACING

GEAR SELECTOR KNOB, GEARTRONIC, REPLACING

GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC, REPLACING

GEAR SELECTOR LEVER ASSEMBLY GEARTRONIC, REPLACING

SOLENOID SHIFT LOCK, REPLACE

SOLENOID SHIFT LOCK, REPLACE

TOP PANEL GEARTRONIC, REPLACING

TOP PANEL GEARTRONIC, REPLACING

TRANSMISSION, AUTOMATIC (B5254T2, AW50/51 AWD; 2003-2007)

CONNECTING SLEEVE

Remove and install connecting sleeve. **SEALING RING CONNECTING SOCKET DRIVE SHAFT/DIFFERENTIAL, REPLACING**

COVER BRAKE CYLINDER B4 AUTOMATIC TRANSMISSION, REPLACING

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

PREPARATORY WORK

REMOVING COMPONENTS

Allow the transmission to cool. It is easier to remove the cover if the transmission is cold.

Remove:

- the left front wheel
- the splash guard under the engine.

CLEANING THE COVER

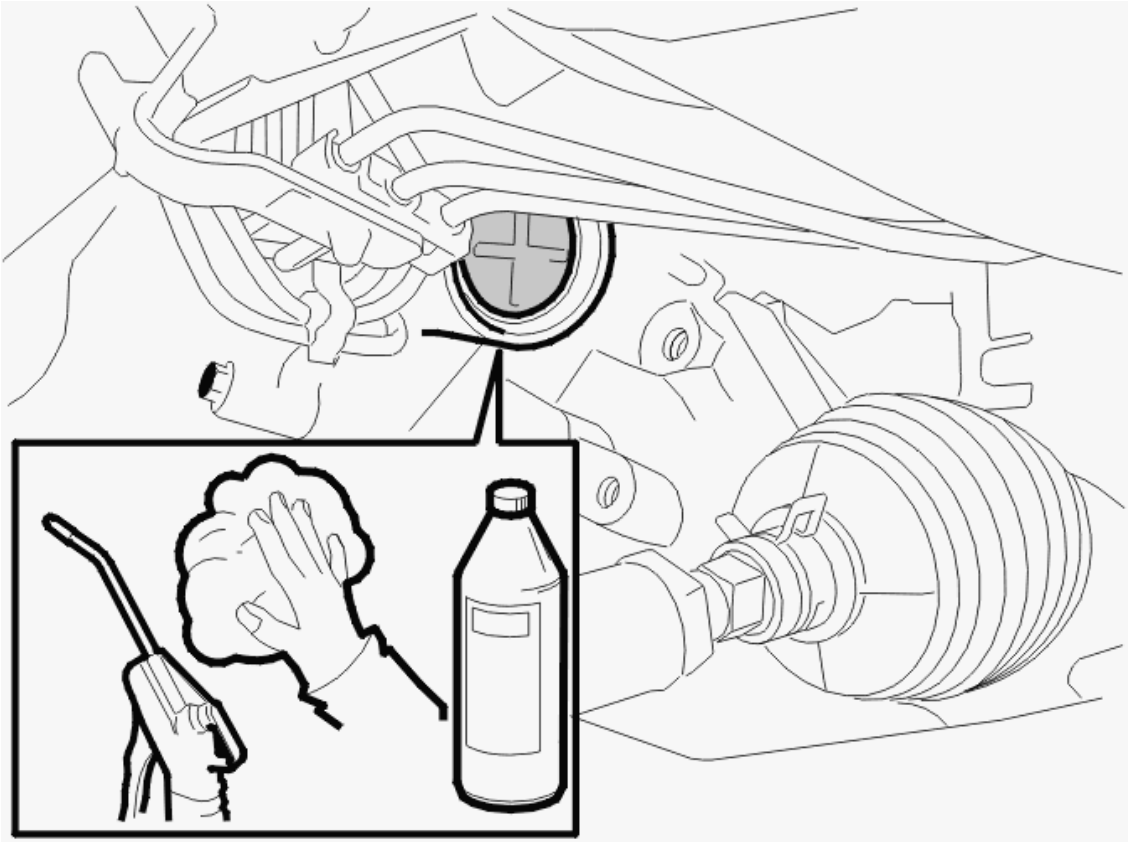


Fig. 242: Identifying Cleaning B4 Brake Cover
Courtesy of VOLVO CARS CORPORATION

Locate the cover for the B4 brake.

Thoroughly wash and blow dry the area around the cover. Use cleaning agent, P/N 116 1721.

REMOVAL

REMOVING COVER

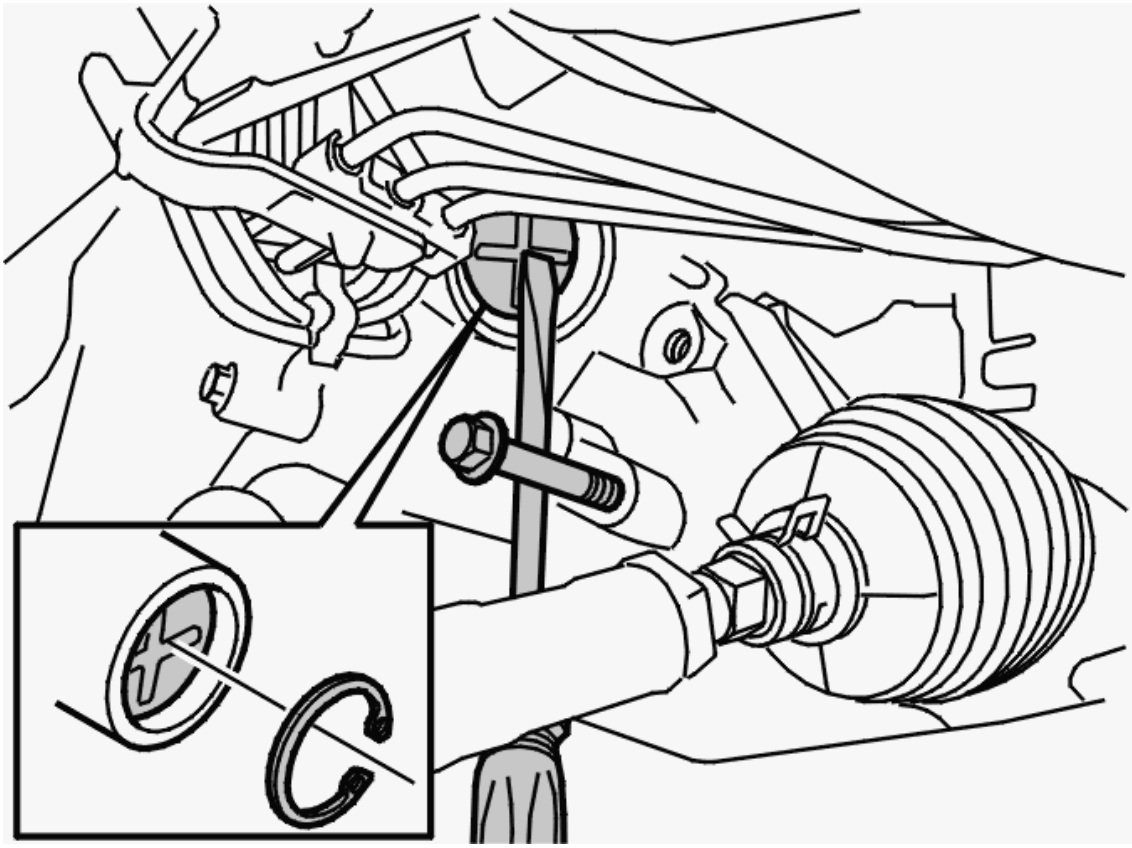


Fig. 243: Identifying Cover Snap Ring
Courtesy of VOLVO CARS CORPORATION

Install a screw (M10x80) as illustrated.

Use a heavy duty screwdriver and the screw as a lever to press the cover in a few times.

Remove the snap ring.

REMOVING COVER, CONTINUED

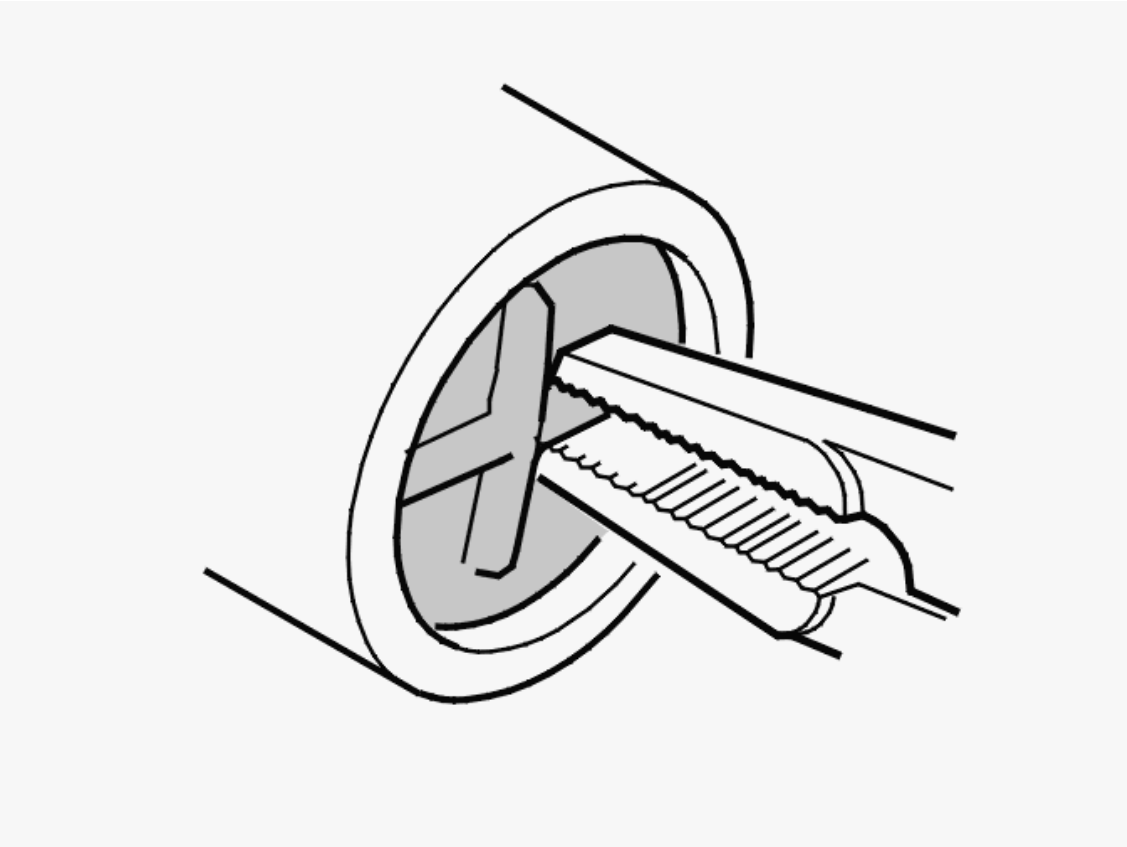


Fig. 244: Identifying Cover & Plier Tip
Courtesy of VOLVO CARS CORPORATION

Place paper on the sub-frame under the cover to absorb any oil and to catch the piston if it slides out of the transmission.

Remove the cover. Carefully work it out using pliers.

NOTE: Take great care when removing the cover so that the piston does not fall out. Then extract the piston.

Check the groove for the snap-ring to ensure that there are no burrs which could damage the O-rings. Remove any burrs using a fine sandpaper. Clean the cylinder thoroughly.

CHECKING THE COVER

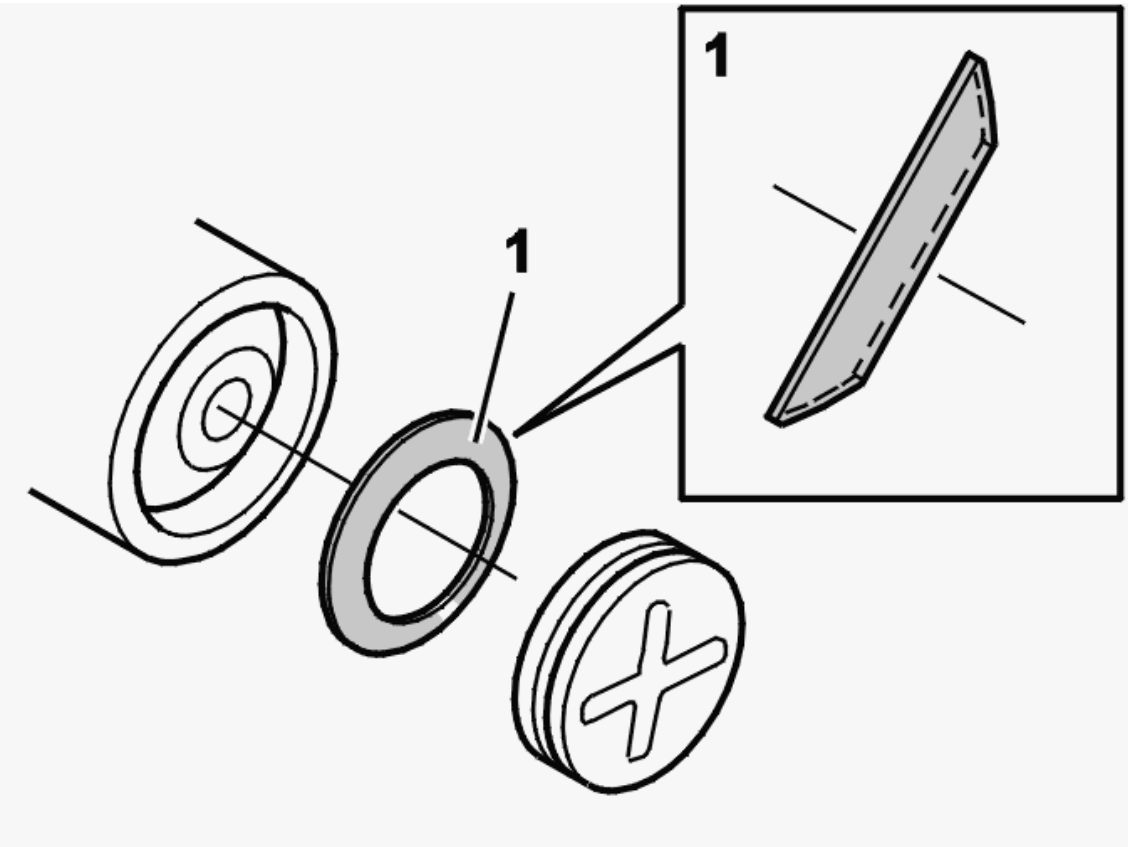


Fig. 245: Identifying Cover Washer
Courtesy of VOLVO CARS CORPORATION

If the washer (1) has come away from the cover, this accounts for the symptoms outlined in the background section.

INSTALLATION

REPLACING THE COVER

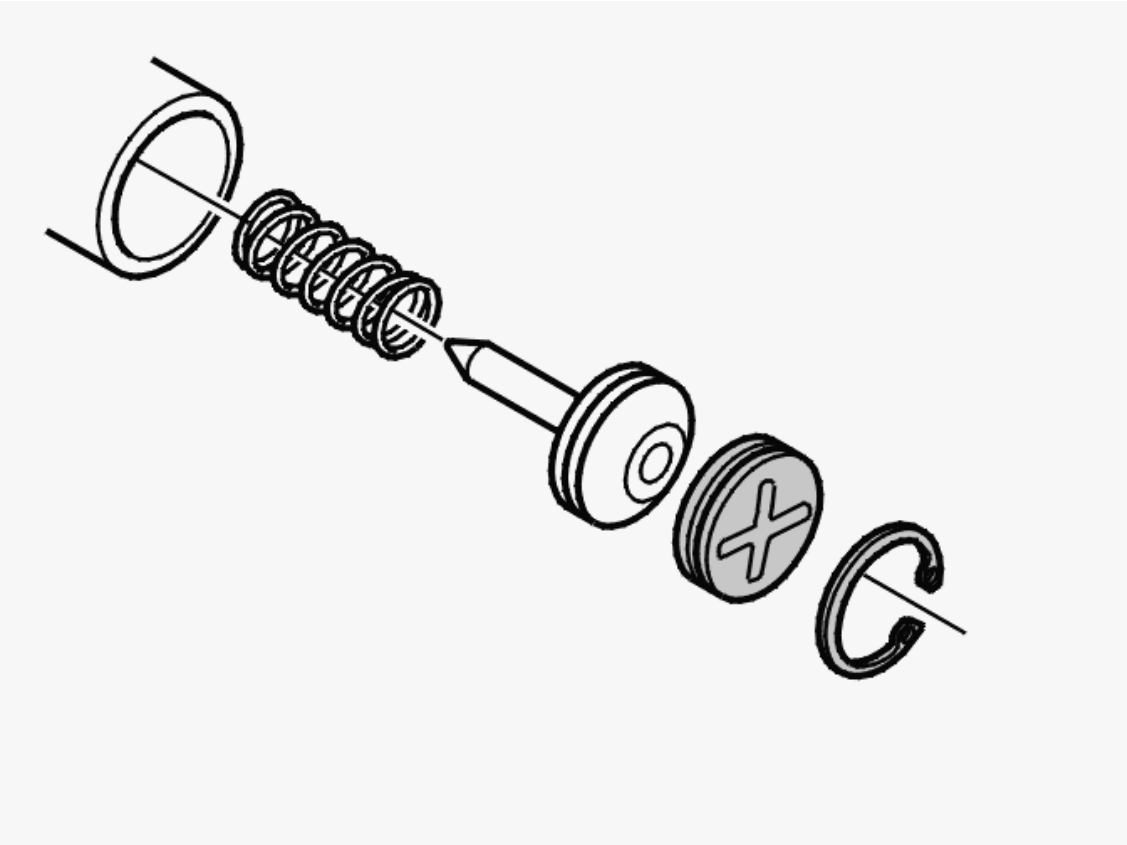


Fig. 246: Identifying Cover & Piston O-Rings
Courtesy of VOLVO CARS CORPORATION

Replace the O-ring on the piston

Install the O-rings on the cover.

The illustration shows the order of installation.

NOTE: Do not let the piston fall to the floor. If the piston falls to the floor, it must be checked thoroughly for damage.

CAUTION: The piston cannot be replaced. The transmission is calibrated using this piston. A piston from another transmission cannot be used. The entire transmission must be replaced if the piston is damaged.

INSTALLING THE SNAP RING

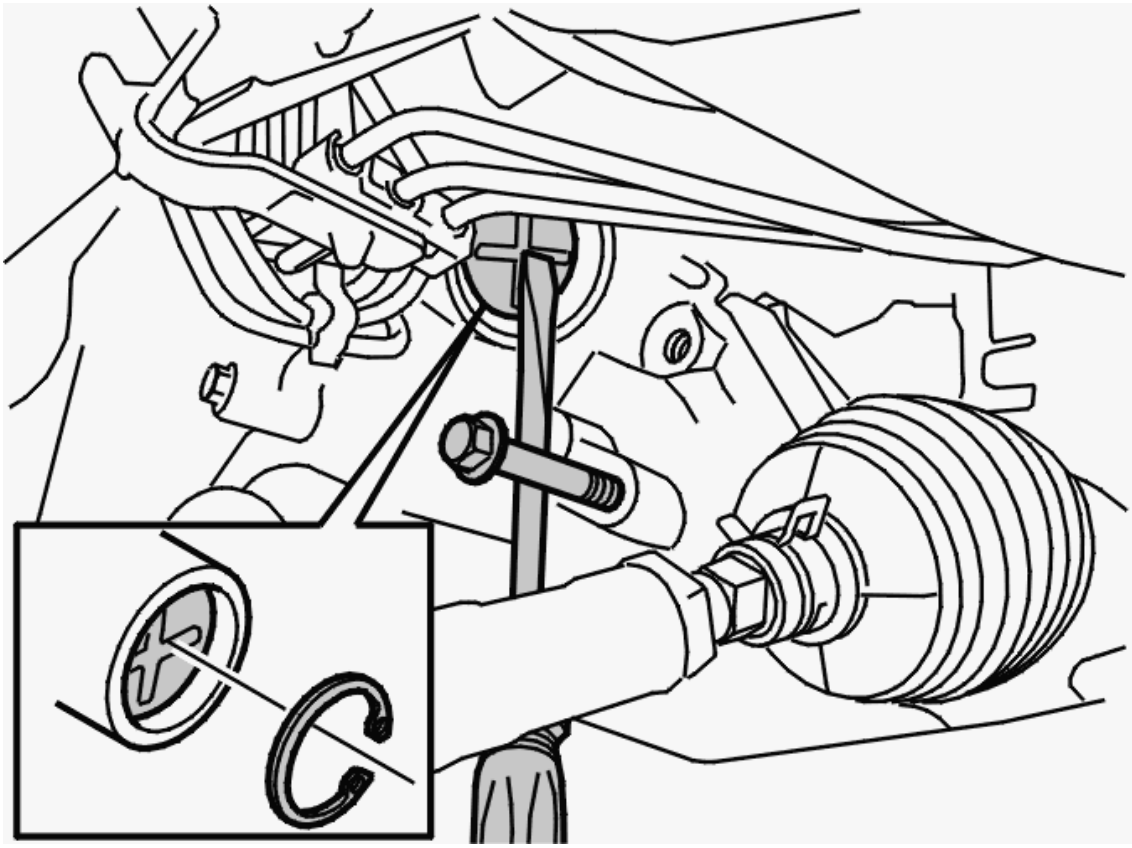


Fig. 247: Identifying Cover Snap Ring
Courtesy of VOLVO CARS CORPORATION

Press in the cover so that it passes the groove for the snap ring.

Install the snap ring.

Check that the snap ring is seated in its groove.

Remove the screw.

ADAPTING THE CONTROL MODULE

Connect VIDA (Volvo Scan Tool) to the car.

Adaptation: Because this repair only affects 3rd and 4th gears, the adaptation does not need to be reset.

Start the engine. Allow the engine to idle.

Activate Adaptation Mode. Ignore the instruction to warm up the transmission first. When "Adaptation Mode" is activated, "Function run" will be displayed in the gray window in VIDA.

NOTE: Do not switch off the engine.

Disconnect VIDA (Volvo Scan Tool). Test drive the car as described below.

"Transmission fluid temperature too high" will not be displayed and the general warning lamp will not light until the temperature has reached 65°C.

FINISHING

CHECKING THE FUNCTION OF THE TRANSMISSION

Start the test drive immediately. Drive at a steady speed, even while the transmission is cold.

Shift from 2nd to 3rd gear at different engine speeds until the quality of the gear shift is satisfactory. This may be difficult in the beginning, because air will have entered the system during the repair work.

Then shift from 4th to 3rd at a steady speed until the shift quality is satisfactory.

To speed up the adaptation, the shifts from 2-3, 3-4, 4-3, 3-2 can be made with the pedal depressed further.

When the transmission temperature reaches 65°C, the warning triangle in the combined instrument panel will light each time an "approved" shift is made.

Check the oil level. Check that there are no oil leaks.

GEAR-SHIFT POSITION SENSOR, POSITION

Special tools:

9997077

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

REMOVAL

REMOVING THE AIR CLEANER (ACL) HOUSING

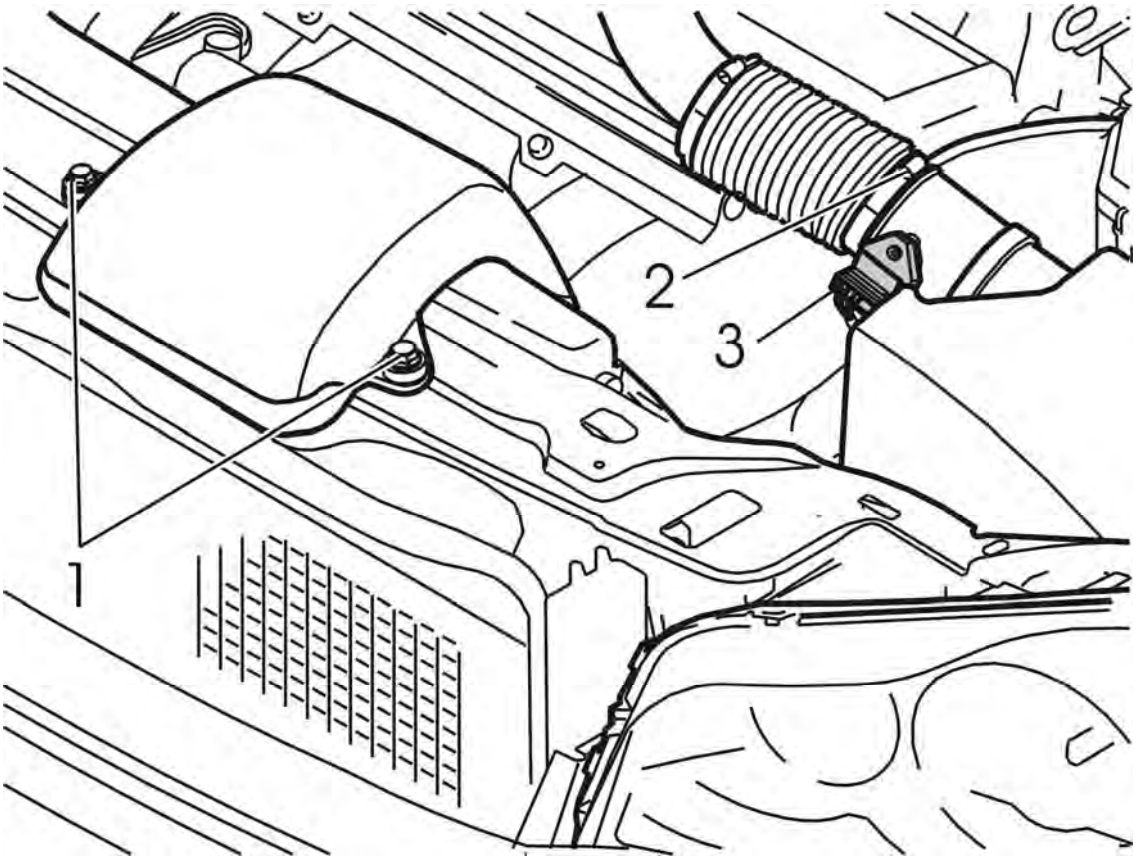


Fig. 248: Air Cleaner (ACL) Housing
Courtesy of VOLVO CARS CORPORATION

Ignition off.

Remove the air cleaner housing ACL assembly with the intake pipe.

REMOVING THE GEAR SELECTOR CABLE AND CONNECTOR

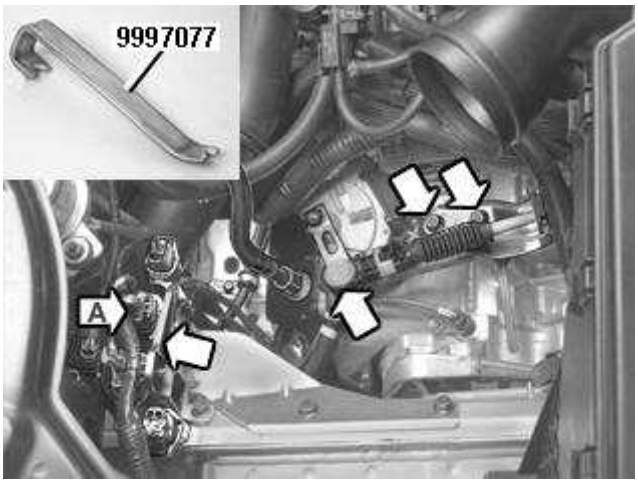


Fig. 249: Identifying Jimmy Bar 9997077

Courtesy of VOLVO CARS CORPORATION

Remove the transmission cable from the lever. Use jimmy bar **9997077** and the cable mounting from the transmission.

Unhook the mounting and the connector for the transmission from the bracket.

Remove the tie straps for the cable harness and the mounting in the cover for the control system.

Separate connector A for the gear-shift position sensor. Remove the gear-shift position sensor from the mounting.

REMOVING THE GEAR-SHIFT POSITION SENSOR

Fig. 250: Gear-Shift Position Sensor Screws
Courtesy of VOLVO CARS CORPORATION

Remove:

- the lever for the gear shift linkage rod
- the nut, locking washer and rubber seal securing the gear-shift position sensor to the gear shift linkage rod
- the 2 screws
- the gear-shift position sensor.

INSTALLATION

NOTE: For tightening torques, see TIGHTENING TORQUE .

INSTALLING THE GEAR-SHIFT POSITION SENSOR

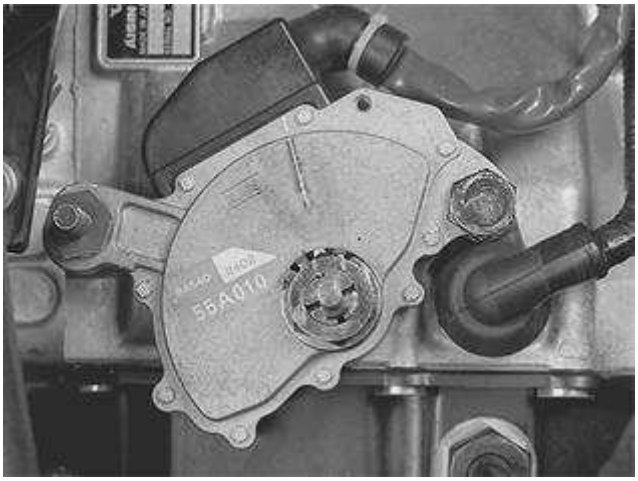


Fig. 251: Gear-Shift Position Sensor
Courtesy of VOLVO CARS CORPORATION

Install:

- the sensor. Lightly tighten the 2 screws
- the rubber washer, the lock washer and the nut on the sensor.

Tighten the nut. Lock the nut with the locking washer.

ADJUSTING THE GEAR-SHIFT POSITION SENSOR

Adjust the gear-shift position sensor. See **GEAR-SHIFT POSITION SENSOR, CHECKING/ADJUSTING** .

INSTALLING THE LEVER AND THE GEAR-SHIFT POSITION SENSOR

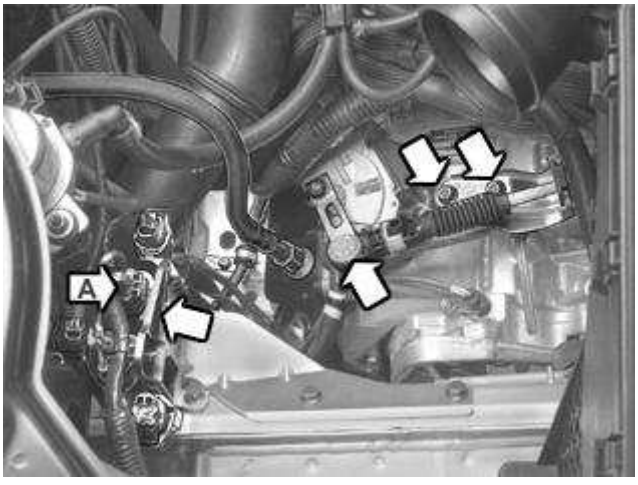


Fig. 252: Gear Selector Cables And Oil Line
Courtesy of VOLVO CARS CORPORATION

Install:

- the lever for the gear shift linkage rod. Tighten the nut. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS**
- the gear selector cable to the transmission. Use 2 M8 screws. Tighten. Press the ball joint for the cable into place on the lever
- the connector for the gear-shift position sensor on the mounting. Connect the connector.

Assemble the cable harness with tie straps.

Press the mounting for the cable harness into place in the cover for the control system. Install the mounting for the connectors on the bracket.

INSTALLING THE AIR CLEANER (ACL) HOUSING

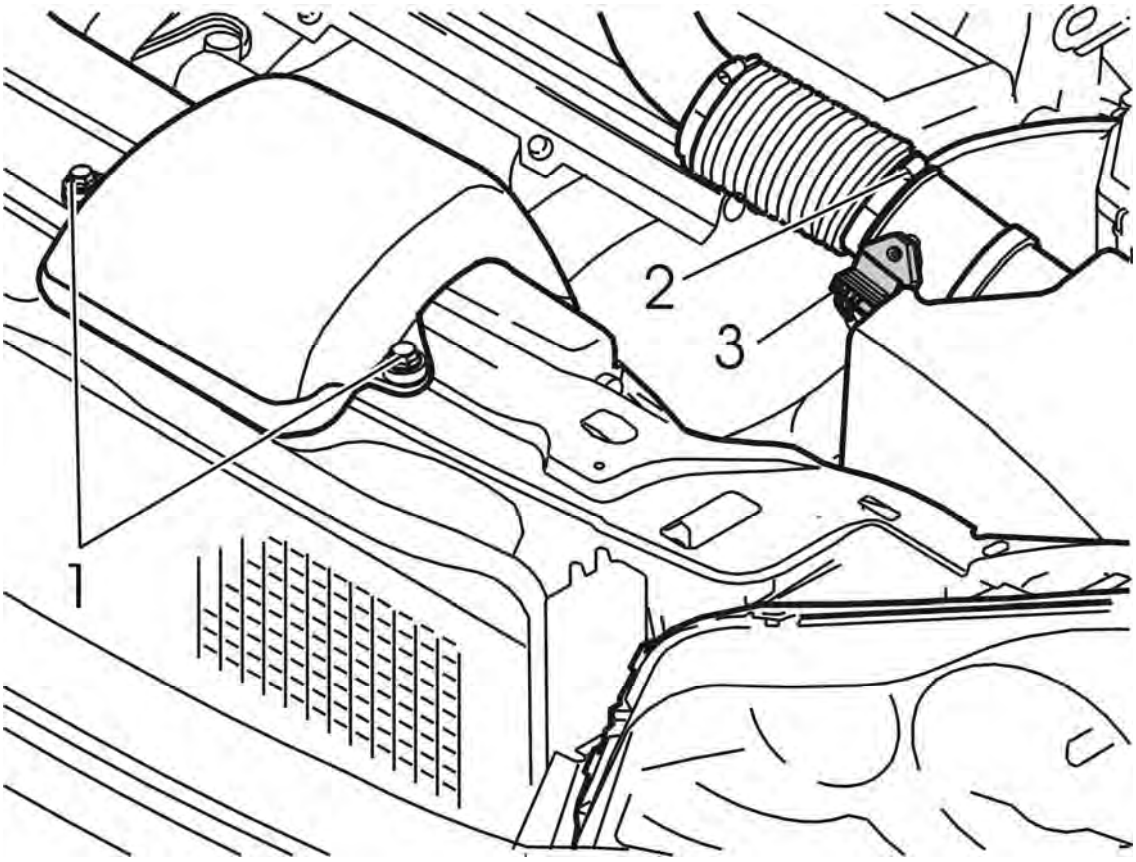


Fig. 253: Air Cleaner (ACL) Housing
Courtesy of VOLVO CARS CORPORATION

Install the air cleaner (ACL) housing with connections.

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

Check and erase any diagnostic trouble codes (DTCs).

Check the gear-shift position sensor positions: Use the on-board diagnostic (OBD) system.

SEALING RING GEAR SHIFT LINKAGE ROD, REPLACING

Special tools:

9995476

9997077

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

REMOVAL

REMOVING ENGINE COMPARTMENT COMPONENTS

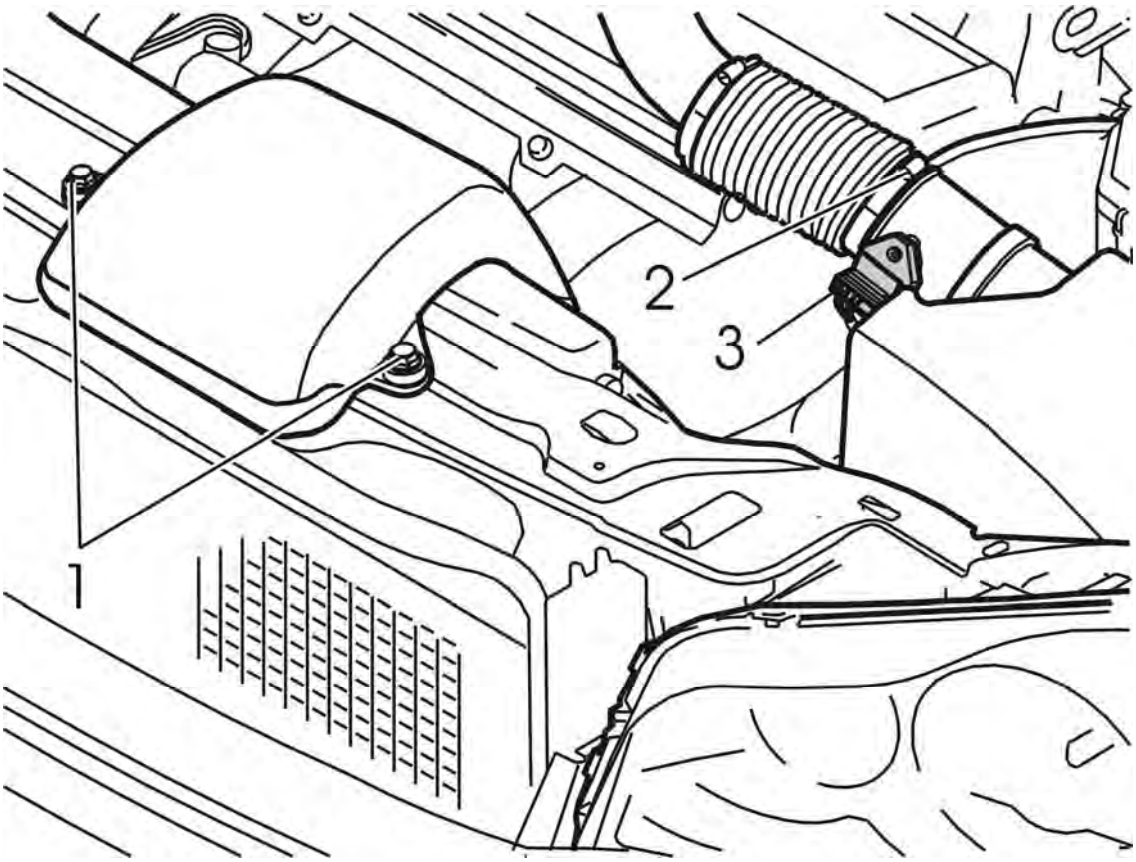


Fig. 254: Air Cleaner (ACL) Housing
Courtesy of VOLVO CARS CORPORATION

Ignition off.

Remove the air cleaner housing ACL assembly with the intake pipe. Pull the air cleaner (ACL) housing out of its mountings.

REMOVING THE GEAR SELECTOR CABLE

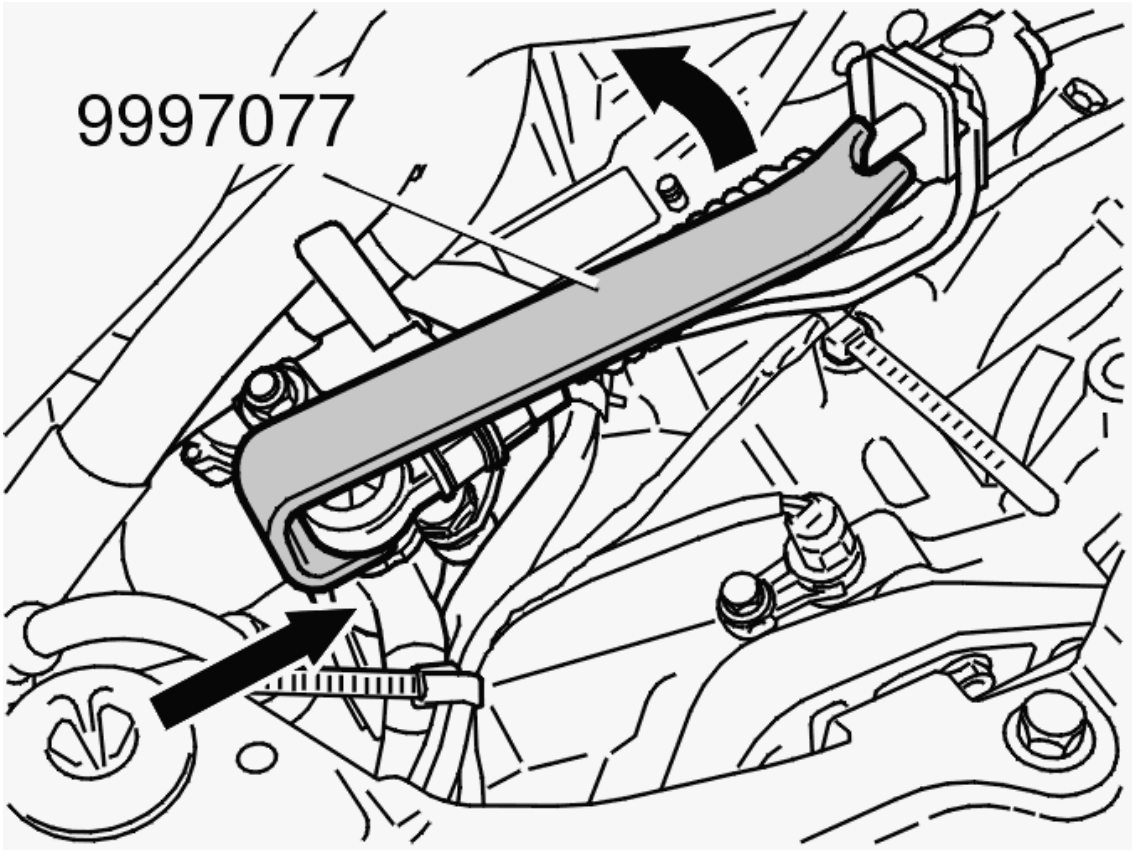


Fig. 255: Detaching Cable From Lever Using Special Tool
Courtesy of VOLVO CARS CORPORATION

Remove:

- the screws from the bracket for the gear selector cable
- the cable from the lever. Use special tool **9997077** . Move the cable to one side.

REMOVING THE GEAR-SHIFT POSITION SENSOR FROM THE GEAR SHIFT LINKAGE ROD

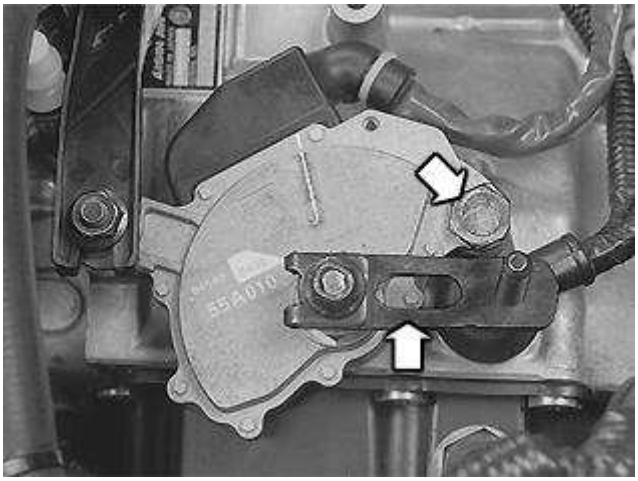


Fig. 256: Gear-Shift Position Sensor
Courtesy of VOLVO CARS CORPORATION

Remove:

- the lever
- the nut, lock washer and rubber seal from the gear-shift position sensor
- the 2 screws for the gear-shift position sensor.

Carefully lift the sensor off the gear shift linkage rod.

INSTALLATION

NOTE: For tightening torques, see TIGHTENING TORQUE .

REPLACING THE SEALING RING FOR THE GEAR-SHIFT LINKAGE ROD

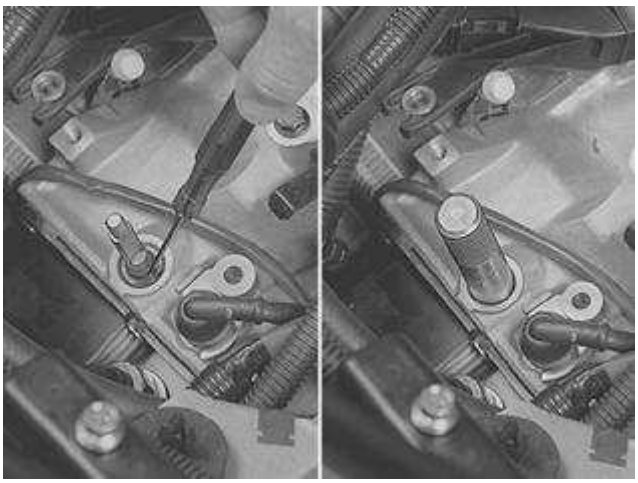


Fig. 257: Identifying Removal Of Sealing Ring Using Small Rounded Off Screwdriver
Courtesy of VOLVO CARS CORPORATION

Remove the old sealing ring. Use a small rounded off screwdriver.

Take care not to damage the rod.

Smear a little automatic transmission fluid on the new sealing ring. Install the ring. Use drift **9995476** .

INSTALLING THE GEAR-SHIFT POSITION SENSOR

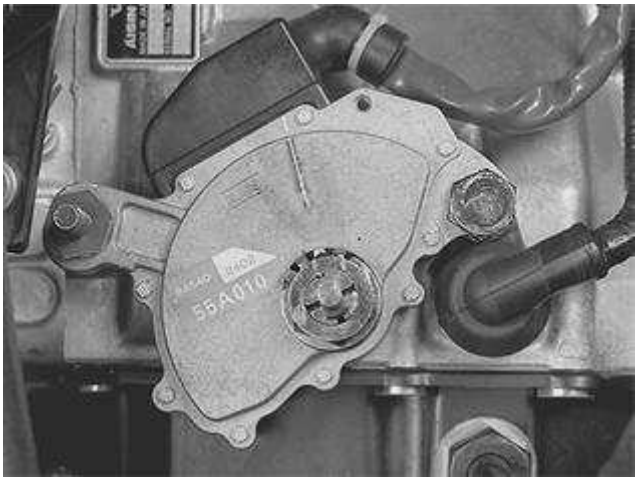


Fig. 258: Gear-Shift Position Sensor
Courtesy of VOLVO CARS CORPORATION

Tighten the sensor screws lightly.

Install the rubber washer, lock washer and the nut on the gear shift linkage rod connection.

Tighten the nut.

Lock the nut with the lock washer.

ADJUSTING GEAR-SHIFT POSITION SENSOR

Adjust the gear-shift position sensor. See **GEAR-SHIFT POSITION SENSOR, CHECKING/ADJUSTING** .

INSTALLING THE GEAR-SHIFT POSITION SENSOR, CONTINUED

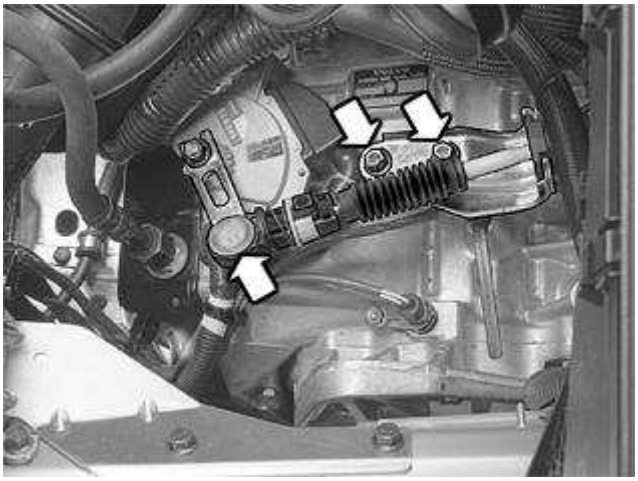


Fig. 259: Identifying Gear Selector Cable And Bracket
Courtesy of VOLVO CARS CORPORATION

Install:

- the lever on the gear shift linkage rod. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS**
- the gear selector cable and bracket on the transmission using 2 M8 screws. Tighten
- the ball joint for the gear selector cable on the lever. Press into place by hand.

INSTALLING ENGINE COMPARTMENT COMPONENTS

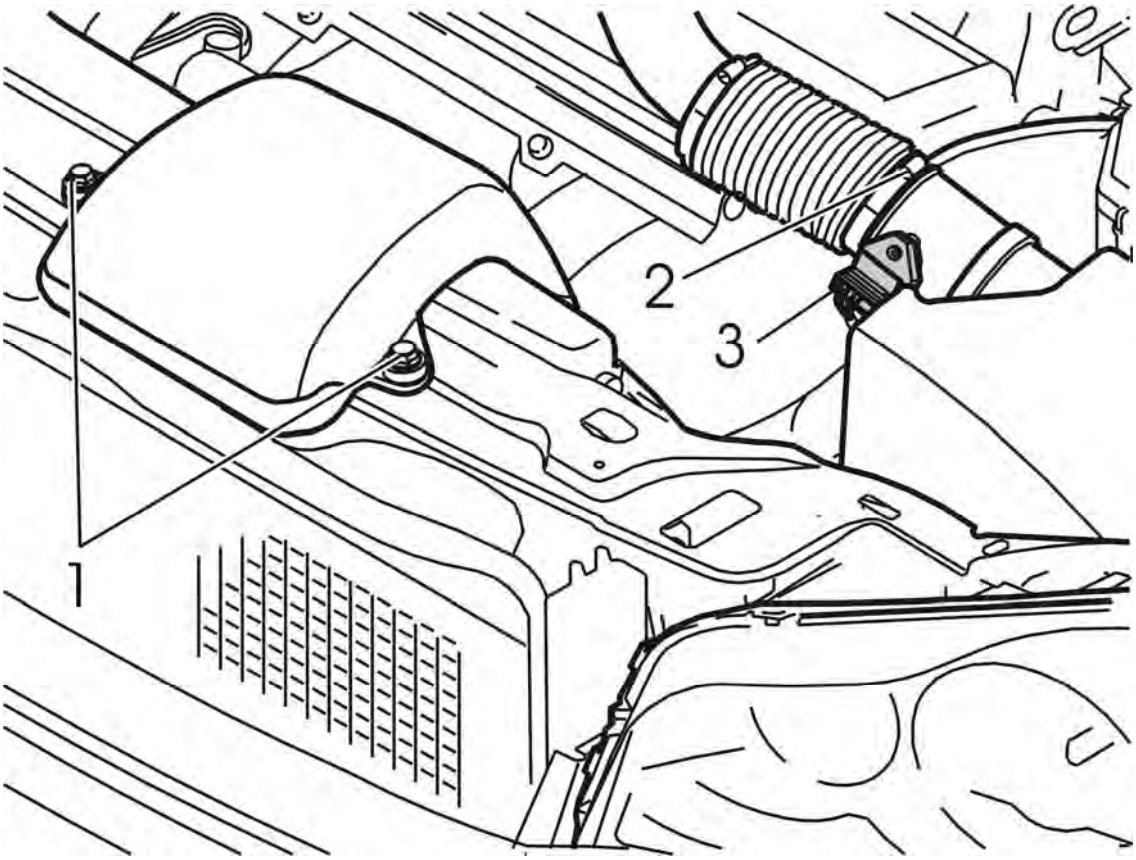


Fig. 260: Air Cleaner (ACL) Housing
Courtesy of VOLVO CARS CORPORATION

Install the air cleaner (ACL) housing, including all hoses and electrical terminals.

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

Check and erase any diagnostic trouble codes (DTCs).

SEALING RING OIL PUMP, REPLACING

Special tools:

9995069

9995117

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

REMOVAL

REMOVING THE TRANSMISSION

FWD

- for gasoline engines, see **TRANSMISSION, REMOVING**.

AWD

- for gasoline engines, see **TRANSMISSION, REMOVING**

REMOVING THE TORQUE CONVERTER

Pull the torque converter straight out of the transmission. Check the torque converter throat for damage.

REMOVING THE SEALING RING FROM THE OIL PUMP

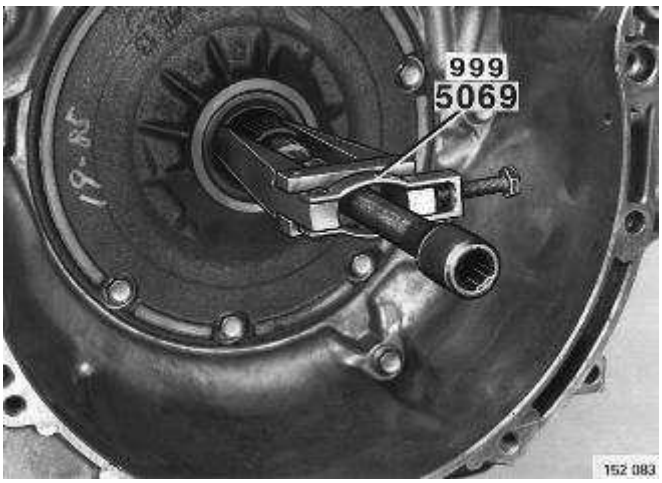


Fig. 261: Identifying Oil Pump Sealing Ring
Courtesy of VOLVO CARS CORPORATION

Use extractor **9995069** .

INSTALLATION

INSTALLING A NEW SEALING RING ON THE OIL PUMP

Fig. 262: Identifying Oil Pump Sealing Ring & Drift Tool 9995117
Courtesy of VOLVO CARS CORPORATION

Use drift **9995117** .

NOTE: Drift 999 5117 modified according to Tool Bulletin.

INSTALLING THE TORQUE CONVERTER

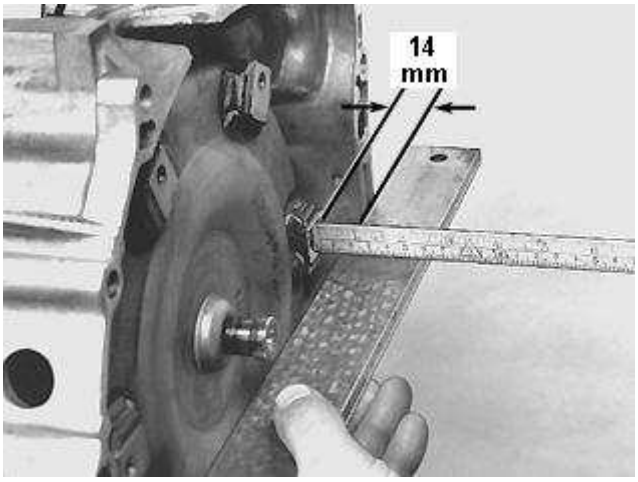


Fig. 263: Checking Distance Between Cover And Mounting Lugs Using Ruler
Courtesy of VOLVO CARS CORPORATION

Lubricate the torque converter throat with ATF oil.

NOTE: Take care not to damage the oil pump during installation.

Make sure torque converter is as far into the transmission as possible. Check with a ruler. The distance between the cover and retaining tabs must be **approximately 14 mm** .

INSTALLING THE TRANSMISSION

FWD

- for gasoline engines, see **TRANSMISSION, INSTALLING**.

AWD

- for gasoline engines, see **TRANSMISSION, INSTALLING**

SOLENOID CONTROL SYSTEM, REPLACING

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

REPLACING AND CHECKING SOLENOIDS

PREPARATIONS

NOTE: The operations which affect the cable harness and connectors and mountings for the control system solenoids must not be carried out when replacing the solenoids or the control system.

Remove. See **REMOVAL** .

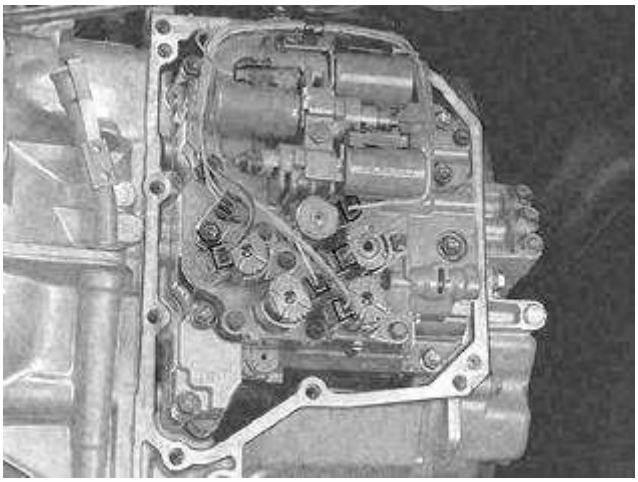


Fig. 264: Disconnecting/Connecting Solenoids Connectors
Courtesy of VOLVO CARS CORPORATION

Disconnect the connectors from the solenoids.

CHECK THE RESISTANCE IN S1-S5

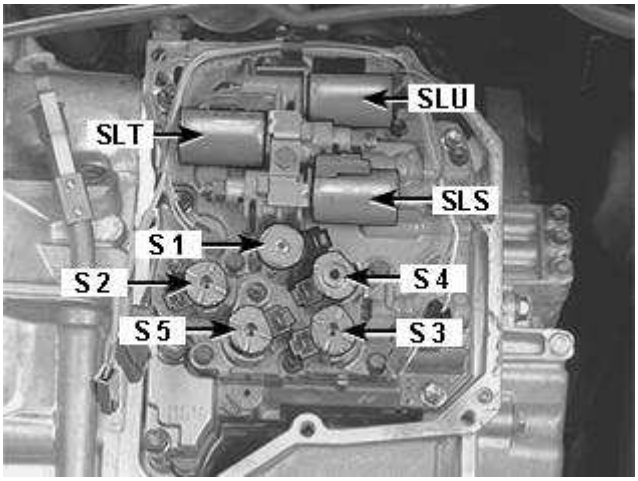


Fig. 265: Checking Resistance In S1-S5
Courtesy of VOLVO CARS CORPORATION

NOTE: Readings should be taken at approximately 20°C.

Solenoid S1

Measure the resistance between the pin in the solenoid connector and the transmission ground terminal.

Correct value: 12-16 ohms.

Solenoids S2-S5

Measure the resistance between the pin in the solenoid connector and the transmission ground terminal.

Correct value: 11-15 ohms.

If the resistance of any of solenoids S1-S5 is incorrect

Replace the solenoid. See **REPLACING SOLENOIDS S1-S5**.

CHECKING THE RESISTANCE OF SLT, SLS AND SLU

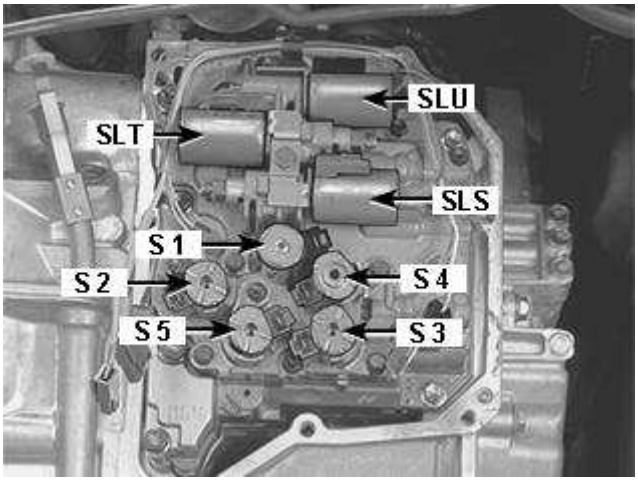


Fig. 266: Checking Resistance In S1-S5
Courtesy of VOLVO CARS CORPORATION

NOTE: Readings should be taken at approximately 20°C.

Solenoid SLT, SLS and SLU

Measure the resistance between both the pins in the solenoid connector.

Correct value: 5.0-5.6 ohms.

If the value of any of solenoids SLT, SLS and SLU is incorrect

Replace the control system. See **REPLACING THE CONTROL SYSTEM**.

The control system is calibrated together with the solenoids.

REPLACING SOLENOIDS S1-S5

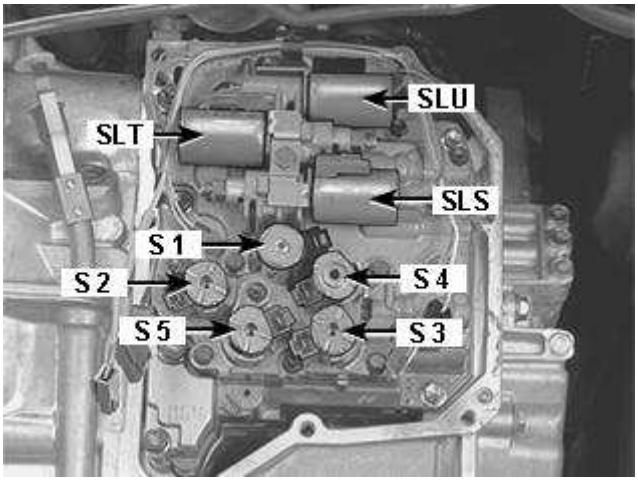


Fig. 267: Checking Resistance In S1-S5
Courtesy of VOLVO CARS CORPORATION

Remove the screw from the solenoid. Remove the solenoid from the control system.

Lubricate the O-ring on the new solenoid. Use automatic transmission fluid.

Install the solenoid. Tighten the screw. Tighten to **7 Nm** .

FINISHING

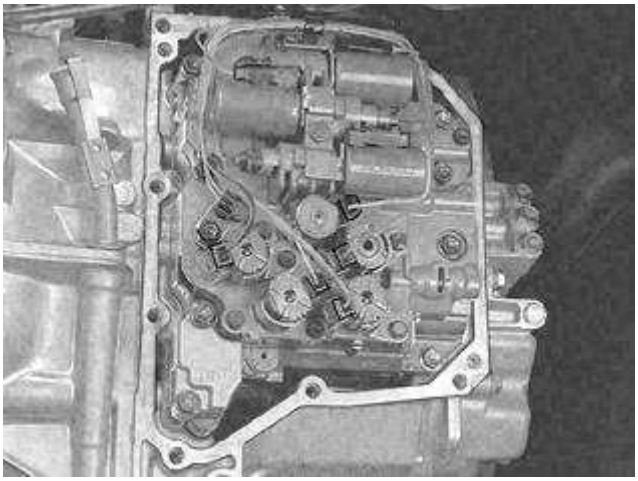


Fig. 268: Disconnecting/Connecting Solenoids Connectors
Courtesy of VOLVO CARS CORPORATION

Connect the connectors to the solenoids.

Reinstall. See **INSTALLATION** .

REPLACING THE CONTROL SYSTEM

PREPARATIONS

Remove. See **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)** .

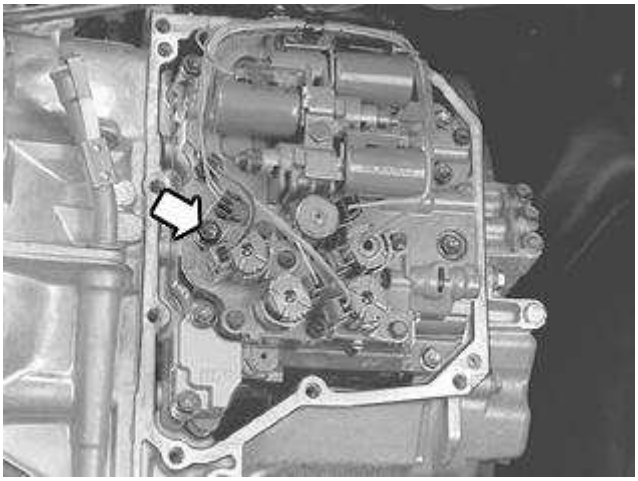


Fig. 269: Identifying Oil Temperature Sensor And Holder Screw
Courtesy of VOLVO CARS CORPORATION

Remove:

- the connectors for the solenoid valves
- the screw for the oil temperature sensor holder. Remove the sensor from the control system
- the cable harness from the holders on the control system.

Push the cable harness to one side.

REMOVING THE CONTROL SYSTEM

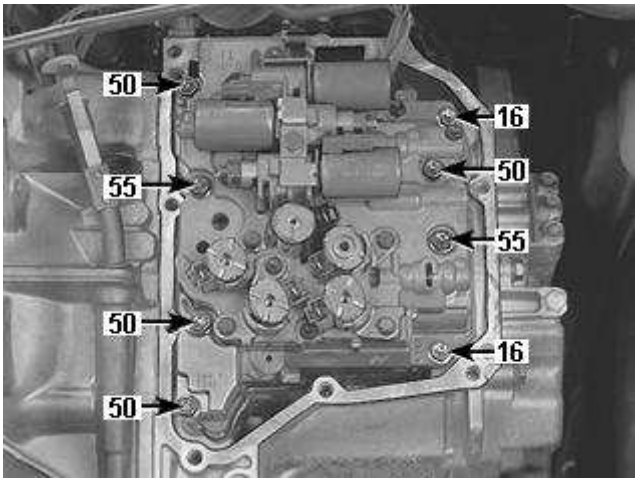


Fig. 270: Control System Screws
Courtesy of VOLVO CARS CORPORATION

Remove the screws from the control system. Remove the cover from the transmission.

NOTE: Ensure that there are no cracks on the top of the lever for the gear selector slider.

REPLACING SEALING RINGS

Fig. 271: Control System Sealing Rings
Courtesy of VOLVO CARS CORPORATION

Remove the sealing rings from the transmission.

NOTE: Ensure that no debris enters the transmission.

Install **new** sealing rings in the transmission

Use petroleum jelly to hold the seals in position.

CHECKING THE GEAR SELECTOR SLIDER

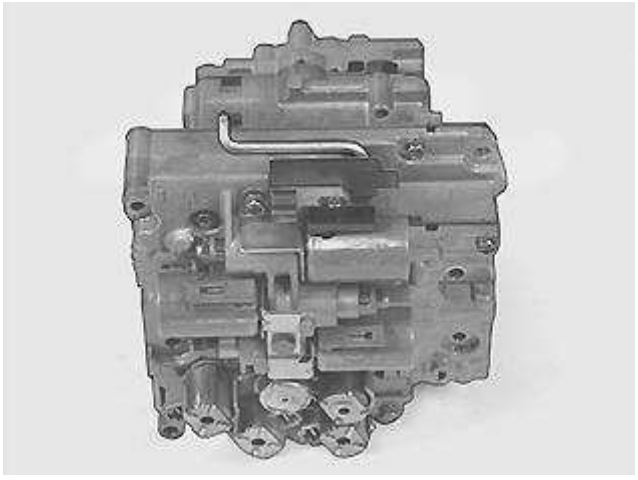


Fig. 272: Checking Gear Selector Slider
Courtesy of VOLVO CARS CORPORATION

Check that the lever for the gear selector slider is correctly positioned.

INSTALLING THE CONTROL SYSTEM

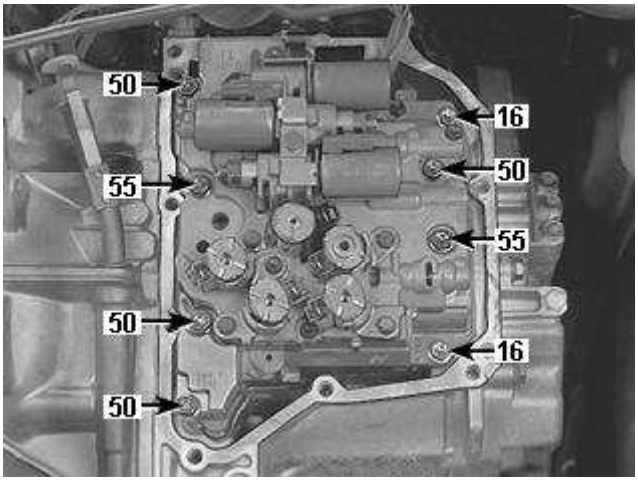


Fig. 273: Control System Screws
Courtesy of VOLVO CARS CORPORATION

NOTE: Ensure the lever for the gear selector is set to neutral.

Align the control system on the lever for the gear selector.

Install:

- the screws for the control system
- a new gasket for the cover on the control system. Note that the screws are of different lengths (measured in mm).

Tighten the screws alternately to light contact. Then tighten alternately. Tighten to **10 Nm** .

FINISHING

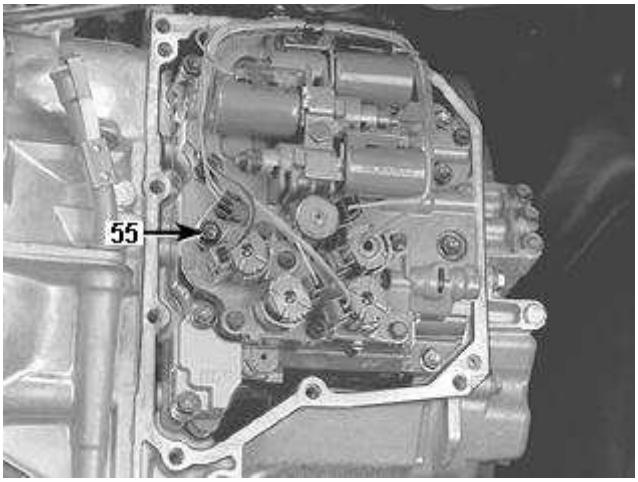


Fig. 274: Identifying Oil Temperature Sensor Screw
Courtesy of VOLVO CARS CORPORATION

Install the cable harness. Connect the connectors to the solenoids.

Install the oil temperature sensor with the holder and the screw. Note that the length of the screw is given in mm. Tighten to **10 Nm** .

Install the cable harness on the holder. Check that the cable harness is correctly positioned.

Reinstall. See **INSTALLATION** .

TRANSMISSION CONTROL MODULE (TCM), REPLACING

POINTS TO OBSERVE WHEN REPLACING THE CONTROL MODULE

CAUTION: Software can only be ordered when the control module is installed in the vehicle. VIDA reads off the new control module identity which is required to order the correct software.

CAUTION: Wait two minutes after the ignition has been switched off. The main relay must be voltage-free before the control module can be removed from the car. If the engine cooling fan runs on after the ignition has been switched off, wait until it stops. Then wait another two minutes.

CAUTION: Always check that the control module and control module box connector pins and sleeves are not bent or damaged. This may have caused the fault.

PREPARATIONS FOR REPLACEMENT

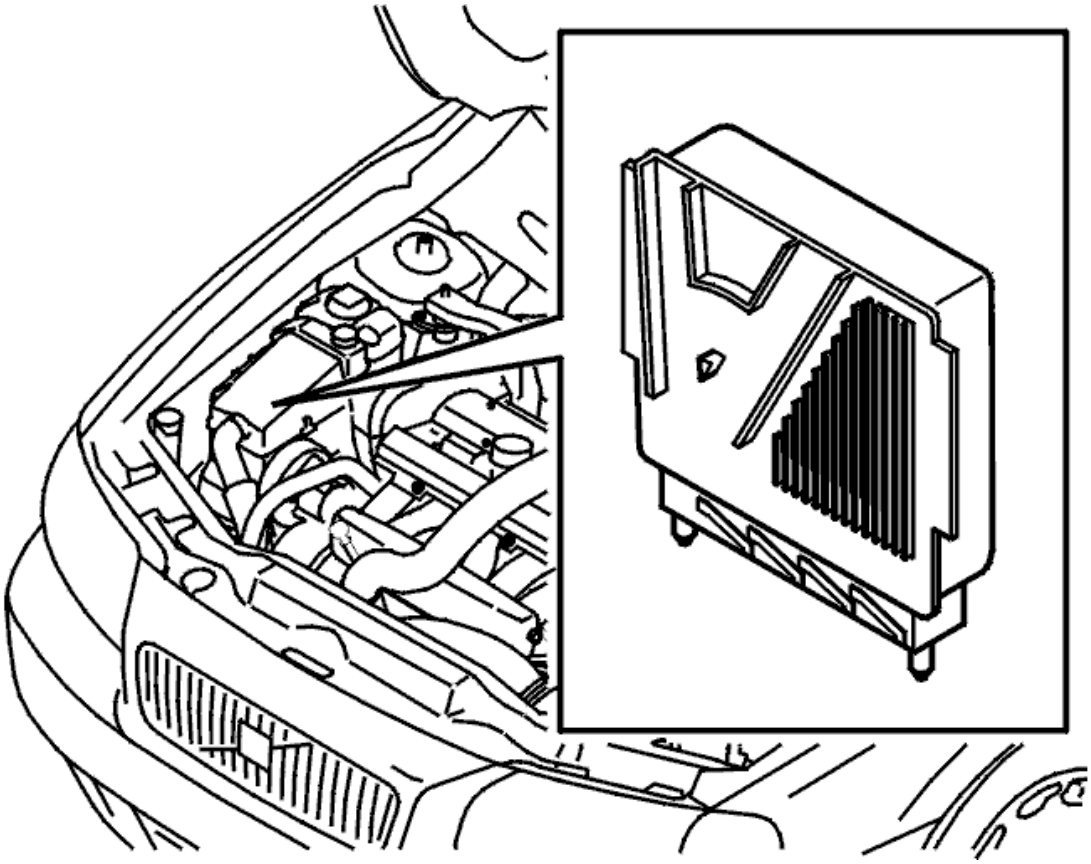


Fig. 275: Identifying Transmission Control Module
Courtesy of VOLVO CARS CORPORATION

Remove:

- the cable from the battery negative terminal. See **BATTERY, DISCONNECTING**
- the cover over the control module.

REMOVING THE CONTROL MODULE

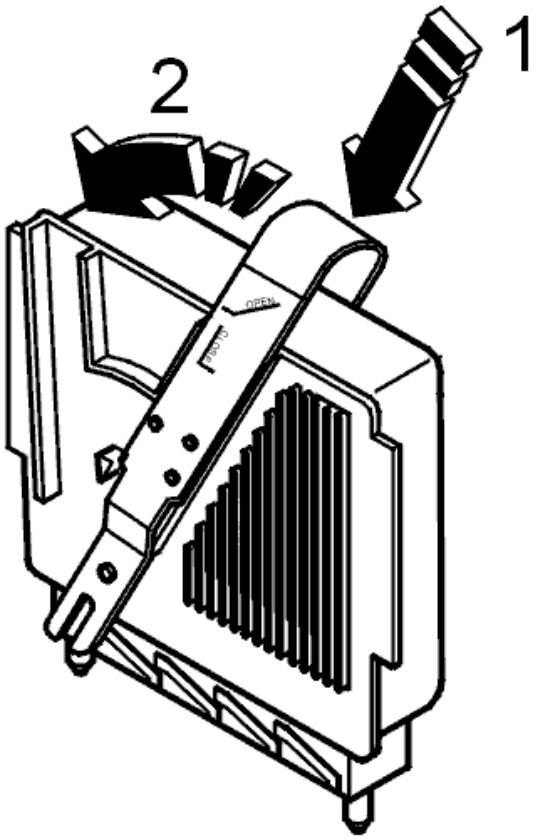


Fig. 276: Identifying Control Module Removal
Courtesy of VOLVO CARS CORPORATION

NOTE: Do not touch the control module terminal pins with your fingers. Static electricity may damage components in the control module.

Insert tool **9995722** (1) in the car around the control module. Move the upper section of the tool backwards as far as it will go (2). Pull up the tool.

Carefully pull up the control module.

INSTALLING THE CONTROL MODULE

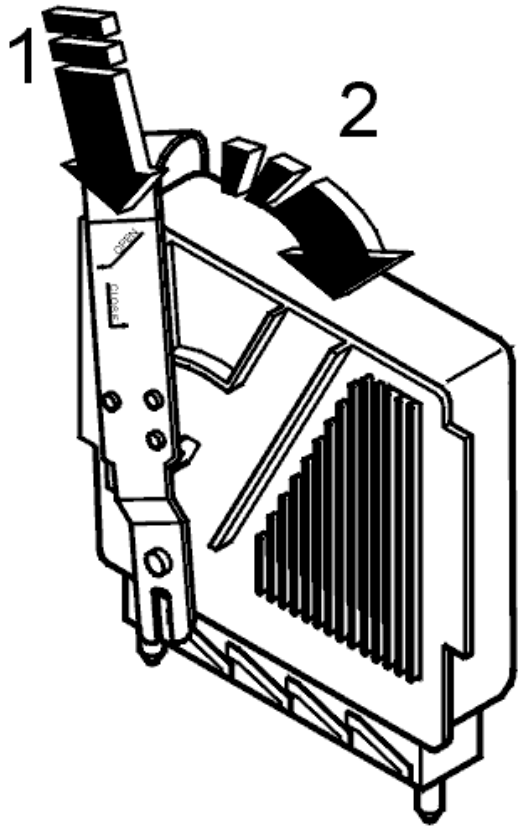


Fig. 277: Identifying Control Module Installation
Courtesy of VOLVO CARS CORPORATION

Carefully press the control module down into the grooves on the inside of the control module box. Press down all the way.

Insert tool **9995722** around the control module.

Move the upper section of the tool forwards to stop and pull it up.

Press the cover into place over the control modules.

Check that the air ducts are correctly positioned.

Connect the battery negative lead. First read **BATTERY, DISCONNECTING** .

ORDERING SOFTWARE

Order software 9438291

FINISHING

Check that no diagnostic trouble codes have been stored during the repair.

TRANSMISSION FLUID, REPLACING

WARNING: Avoid skin contact with the transmission fluid.

NOTE: Use only transmission oil, Volvo P/N 116 1540-8 (1 liter container), 116 1640-6 (4 liter container).

CONDITIONS

The oil should be replaced only in the two following instances:

Where diagnostic trouble codes (DTCs) TCM 0042 and TCM 0046 are stored, in which case the diagnostic function activates the warning lamp in the following circumstances.

The transmission control module (TCM) receives data about the operating temperature of the transmission fluid while the car is being driven. TCM 0042 is stored after an accumulated amount of time.

Diagnostic trouble code (DTC) TCM 0046 is stored if the transmission fluid temperature exceeds 150° C for more than two minutes.

In cars used in continuous taxi service or used for towing a trailer or caravan for most of its mileage, the oil must be replaced at a service interval of 75, 000 km ± 5000 km. This is to conform to the regular service program.

WARNING: The oil may be very hot if the car has just been driven. Avoid skin contact.

DRAINING

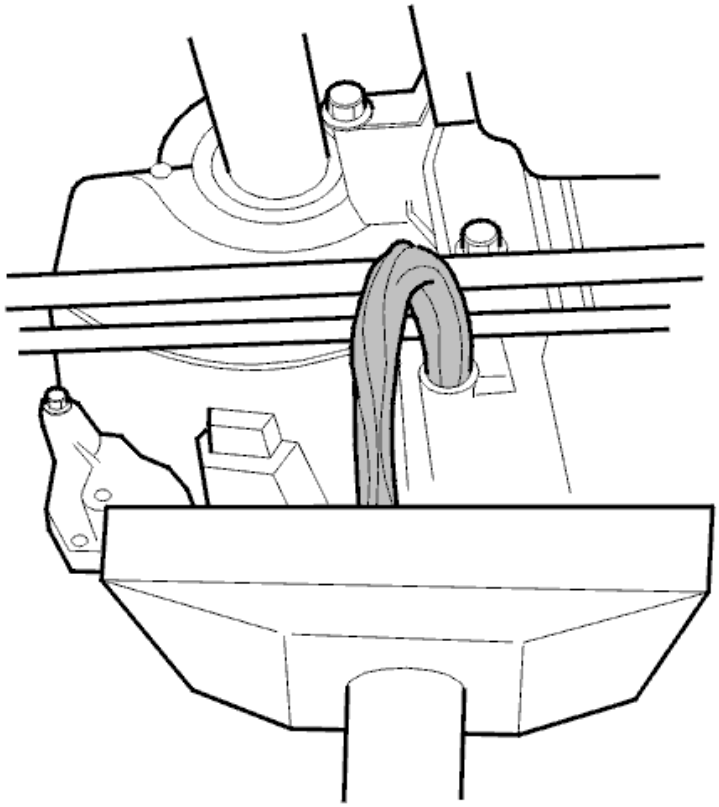


Fig. 278: Draining Off Oil
Courtesy of VOLVO CARS CORPORATION

Remove:

- the splash guard under the engine
- the oil plug. Drain the transmission oil.

INSTALLING THE OIL PLUG

Use a new gasket.

Tighten the plug. Tighten to **40 Nm** .

Install the protective cover.

DRAINING OIL

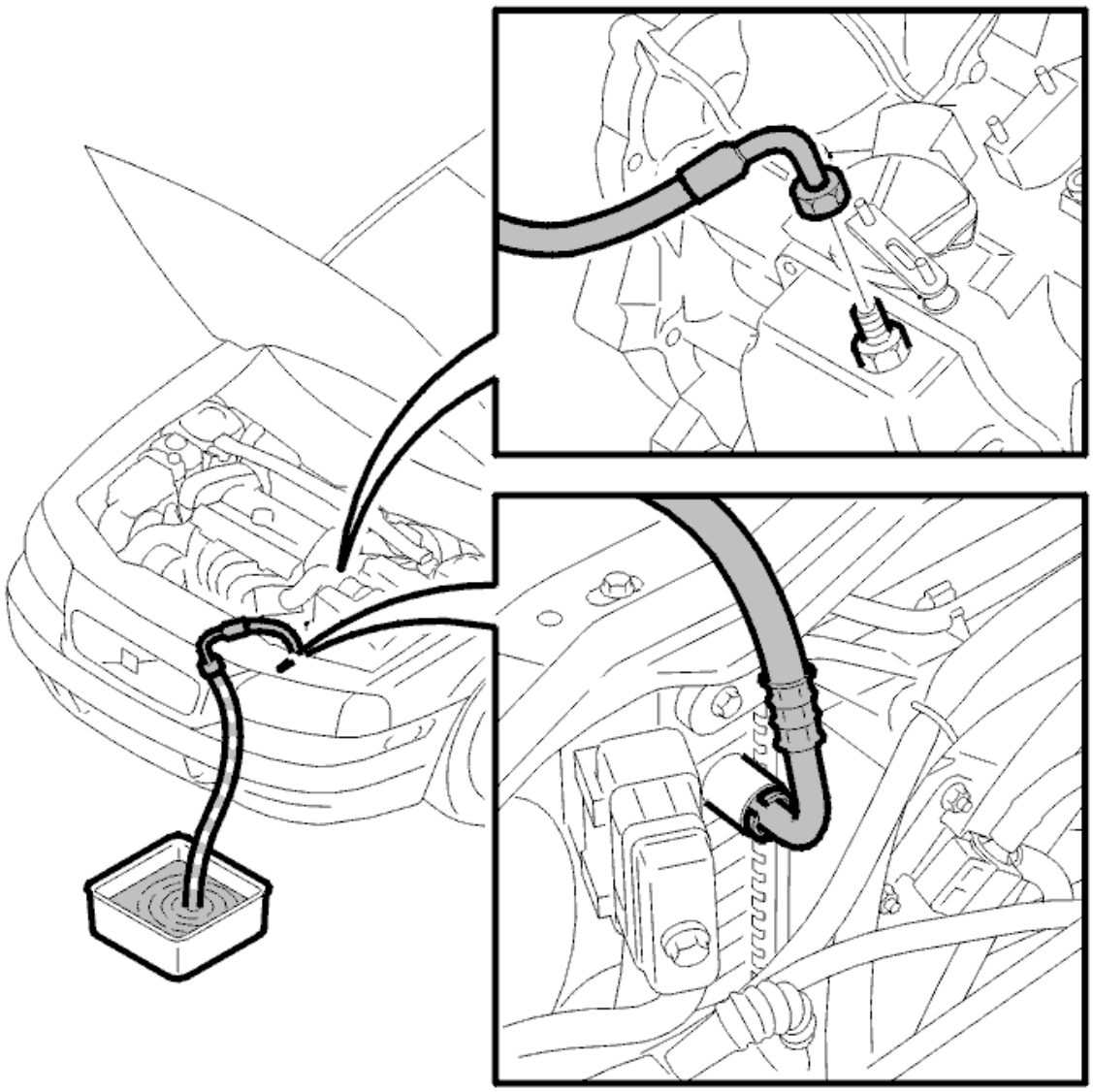


Fig. 279: Draining Cooler
Courtesy of VOLVO CARS CORPORATION

Remove the return hose on the control system cover.

Install a plastic plug in the connection on the cover.

Detach the return hose in the cooler. Align the hose upwards and reconnect it to the cooler.

Install a transparent plastic hose on the oil return hose connection.

Place a container beneath the hose to catch the oil.

REFILLING

Apply the parking brake. Move the gear selector lever to position P.

Fill with approximately 2 liters of oil.

Start the engine. Allow the engine to idle.

Turn the engine off when air bubbles start to become visible in the hose.

Fill with approximately 2 liters of oil.

Start the engine again and let it idle.

Turn the engine off when air bubbles start to become visible in the hose.

Remove the hose from the oil cooler hose. Detach it from the connection to the cooler. Install the hose in the normal position on the cooler and the transmission.

FURTHER FILLING

Fill with approximately 2 liters of oil.

Apply the parking brake.

Start the engine. Allow the engine to idle. Move the gear selector through all the gear positions. Wait 4-5 seconds in each gear.

CHECKING THE OIL LEVEL

See **OIL LEVEL, CHECKING** .

The capacity of the transmission is 7.1± 0.25 liters. (MAX, MIN).

NOTE: After replacing the transmission oil, the "Transmission oil change" counter must be reset. See RESETTING TRANSMISSION FLUID CHANGE COUNTER .

TRANSMISSION, INSTALLING

Special tools:

9512050

9997057

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

INSTALLATION

NOTE: For tightening torques, see: TIGHTENING TORQUE .

INSTALLING THE TRANSMISSION

Before installing the transmission it is very important that the checks and cleaning have been carried out. See **TRANSMISSION, PREPARATIONS BEFORE INSTALLING** .

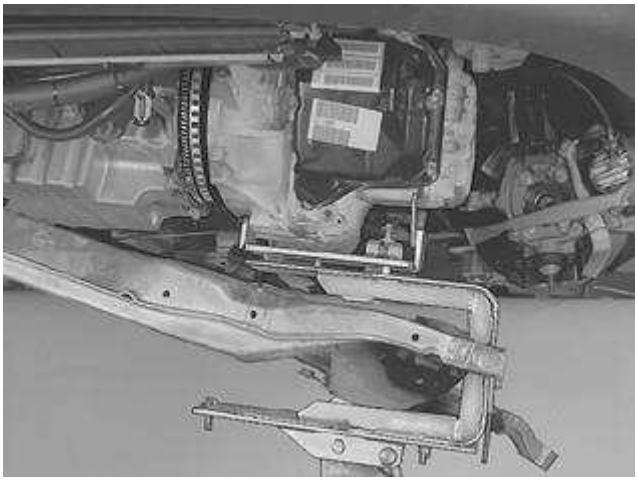


Fig. 280: Adjusting Height & Angle Using Mobile Jack And Gearbox Fixture
Courtesy of VOLVO CARS CORPORATION

Adjust height and angle with the mobile jack and the transmission fixture.

Locate the transmission on the engine.

Ensure that the transmission goes straight in, in relation to the engine, and that the guide sleeves and guide pin for the starter motor align in the guide holes on the transmission.

INSTALLING AND TIGHTENING THE SCREWS FOR THE TRANSMISSION

Fig. 281: Gearbox And Engine Screws
Courtesy of VOLVO CARS CORPORATION

Install all 7 x M10 screws securing the transmission to the engine.

First tighten alternately and crosswise to light contact.

At the same time, check that the whole of the transmission is in contact with the engine.

Then tighten the screws crosswise.

Remove the fixture from the transmission.

INSTALLING THE TORQUE CONVERTER SCREWS

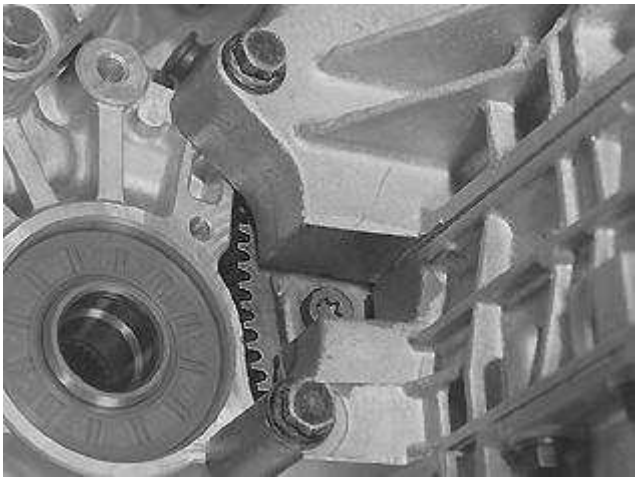


Fig. 282: Identifying Torque Converter Screws
Courtesy of VOLVO CARS CORPORATION

NOTE: Use new screws.

Align the torque converter against the carrier plate. Do this by turning the engine with the nut for the crankshaft pulley and turning the torque converter.

Install all 6 screws loosely. Tighten the screws. Tighten until the heads are almost in contact with the carrier plate. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** . Use a Torx socket TX50.

NOTE: Remove the socket wrench from the crankshaft.

LIFTING THE ENGINE AND TRANSMISSION

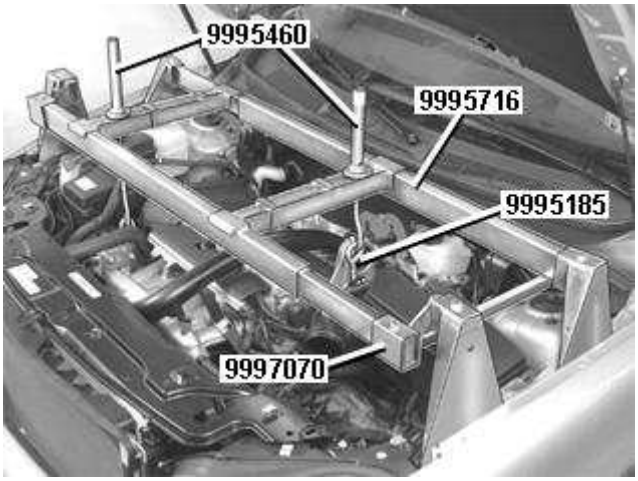


Fig. 283: Identifying Fixture Kit, Lifting Beam And Lifting Hooks
Courtesy of VOLVO CARS CORPORATION

Lift the engine to slightly above the horizontal position to provide better access to the rear engine mounting and engine pad.

NOTE: Check that the connection on the hose for the heater is not trapped between the engine and firewall when the engine is lifted.

Raise the car.

INSTALLING THE REAR ENGINE MOUNTING

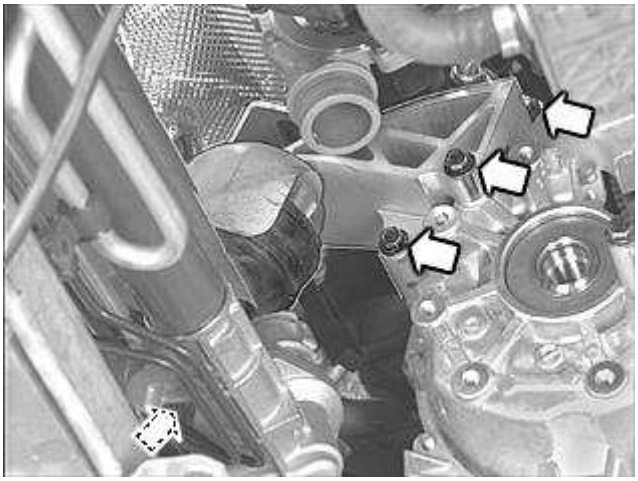


Fig. 284: Identifying Rear Engine Mounting
Courtesy of VOLVO CARS CORPORATION

Install:

- the rear engine mounting on the transmission
- the 3 x M10 screws for the engine mounting. Tighten.

INSTALLING THE BEVEL GEAR

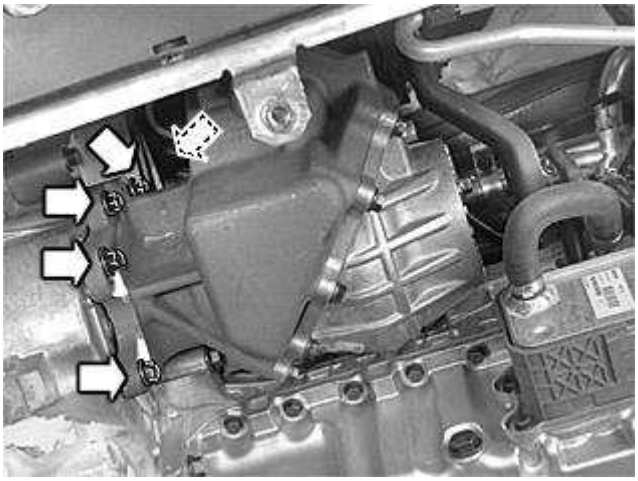


Fig. 285: Angle Gear Screws
Courtesy of VOLVO CARS CORPORATION

NOTE: Before installing the bevel gear, lubricate the spline joint between the transmission and the bevel gear using grease. See: SPLINES GREASING .

Ensure that the mating surfaces on the transmission and bevel gear are clean and not damaged.

Install the bevel gear. Use **new** screws. Tighten the screws alternately to light contact. **TIGHTENING TORQUE** .

INSTALLING THE LOWER OIL PIPE ON THE TRANSMISSION

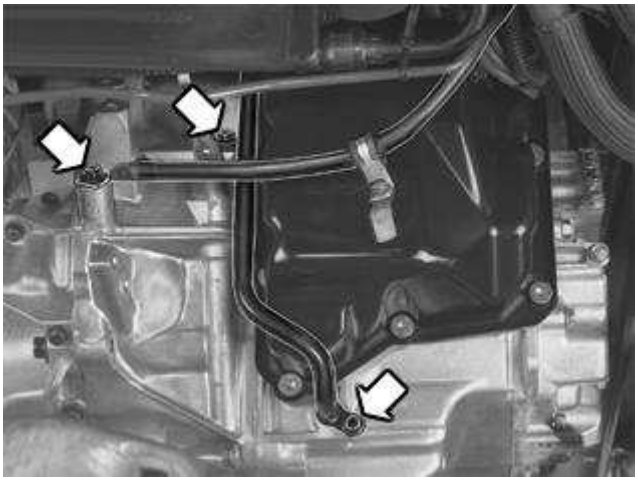


Fig. 286: Identifying Oil Pipe
Courtesy of VOLVO CARS CORPORATION

Use a new O-ring.

Install:

- the oil pipe and dip stick pipe. Use both the screws. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS**
- a tie strap for the cable harness for the oil pipe
- the ground lead to the engine.

INSTALLING THE LEFT DRIVE SHAFT ON THE TRANSMISSION AND THE WHEEL SPINDLE

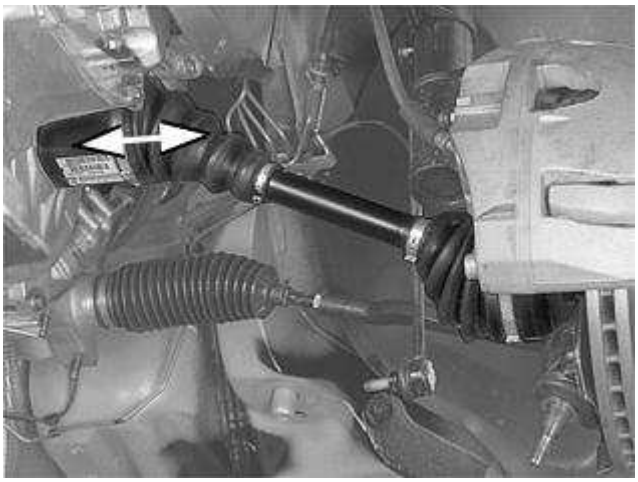


Fig. 287: Identifying Left Drive Shaft On Transmission And Wheel Spindle
Courtesy of VOLVO CARS CORPORATION

Press in the constant velocity joint housing firmly so that the snap ring engages in its groove in the transmission. Pull the constant velocity joint to check that the drive shaft is secure.

Lubricate the drive shaft splines. Use a small amount of thin oil. Locate the drive shaft in the wheel hub.

Install a new screw loosely in the drive shaft.

INSTALLING THE SUB-FRAME ON THE BODYWORK

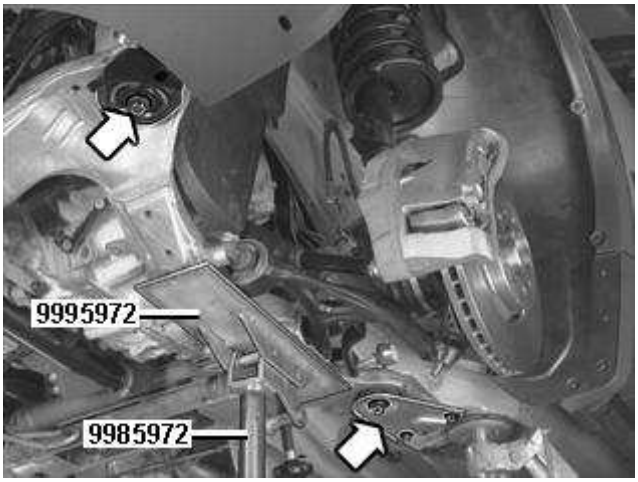


Fig. 288: Identifying Mobile Jack & Sub-Frame

Courtesy of VOLVO CARS CORPORATION

NOTE: Use new screws. Lubricate the screw threads.

Lift up the sub-frame until it is about **150 mm** from the side member.

Secure the power steering pipe at the front edge of the upper side of the sub-frame. Use the rubber covered clamp. Install the screw loosely. Apply a small amount of soap solution so that it glides into the clamp easily.

NOTE: Ensure the following when lifting the sub-frame:

- ensure that the brake pipe passes the bracket for the exhaust pipe
- ensure that the ball joint pinion for the spring strut aligns in the control arm.

Install:

- the new screws and the support bracket at the rear edge
- the screws for the bracket loosely.

Applies only to cars with fuel driven parking heaters:

Align the washer with the mounting lug following the marking on the sub-frame.

Tighten the sub-frame screws. Tighten to light contact.

Remove the mobile jack.

INSTALLING THE RIGHT DRIVE SHAFT ON THE TRANSMISSION, WHEEL SPINDLE AND CONTROL ARM

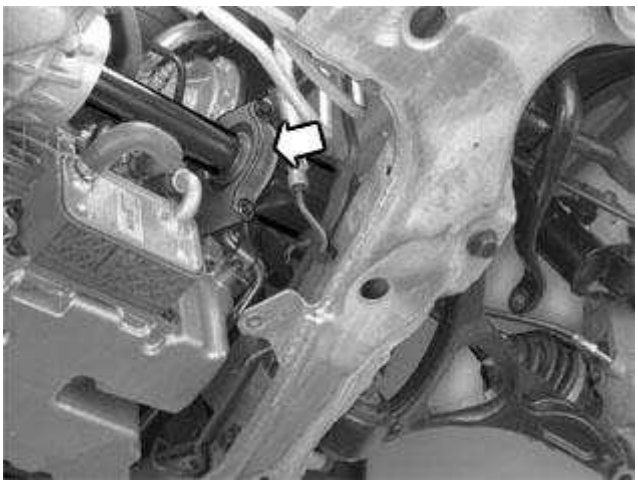


Fig. 289: Drive Shaft Support Bearing Cap
Courtesy of VOLVO CARS CORPORATION

Install the cap for the drive shaft pilot bearing. Use 2 x M8 screws. Tighten.

Lubricate the drive shaft splines. Use a small amount of thin oil. Locate the drive shaft in the wheel hub.

Install a new screw loosely in the drive shaft.

Press down the control arm. Locate the spring strut in the ball joint pinion for the spring strut in the control arm.

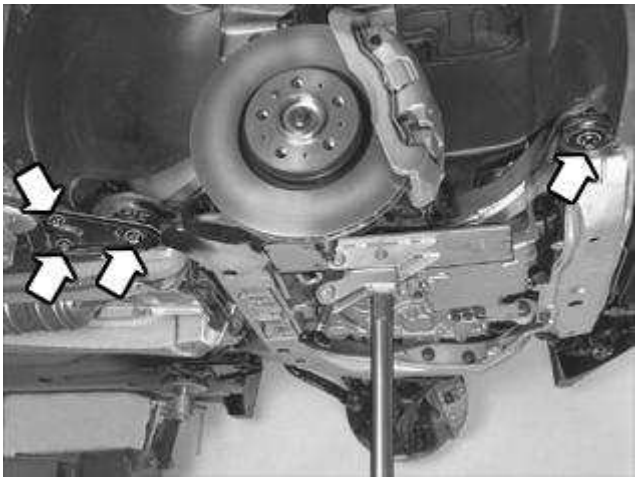


Fig. 290: Identifying Drive Shaft, Wheel Hub And Screws
Courtesy of VOLVO CARS CORPORATION

Position the mobile jack lightly applied under the right side of the sub-frame.

Install:

- new screws in the sub-frame.

  NOTE: Lubricate the screw threads.

- the screws loosely at the rear edge of the support plate.

Tighten the sub-frame screws. Tighten to light contact.

Remove the mobile jack.

Install the four subframe screws together with the subframe brackets and engine heater where appropriate.

Tighten. See **TIGHTENING TORQUE** . First tighten the screws on the left side of the subframe followed by those on the right.

Tighten the bracket screws M10.

INSTALLING COMPONENTS ON THE ENGINE AND SUB-FRAME

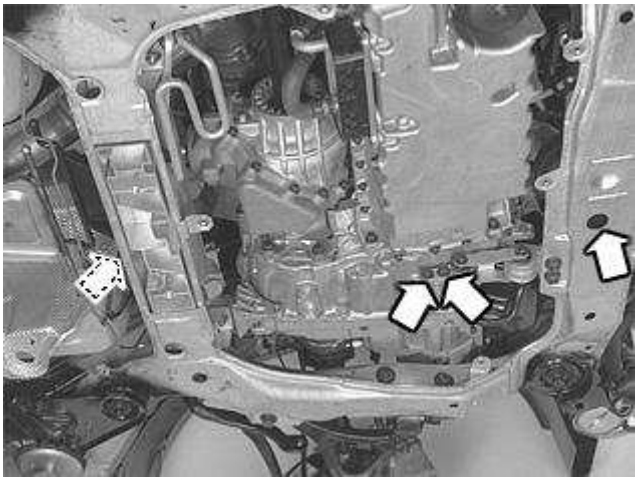


Fig. 291: Engine Pads And Screws
Courtesy of VOLVO CARS CORPORATION

Install the 1 x M10 screw for the front engine pad. Tighten.

Loosely install the screw for the engine pad/steering gear.

Tighten the M10 screw for the rear engine pad.

Install the mounting for the engine stabilizer brace to the transmission. Use new screws. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** .

INSTALLING THE COLLISION PROTECTION SYSTEM OVER THE STEERING GEAR

NOTE: For tightening torques, see: TIGHTENING TORQUE .

Fig. 292: Collision Protection Over Steering Gear
Courtesy of VOLVO CARS CORPORATION

Applies only to right-hand drive cars

Install the 2 screws. Tighten.

CHECKING THE POSITION OF THE TIE ROD IN THE STEERING GEAR

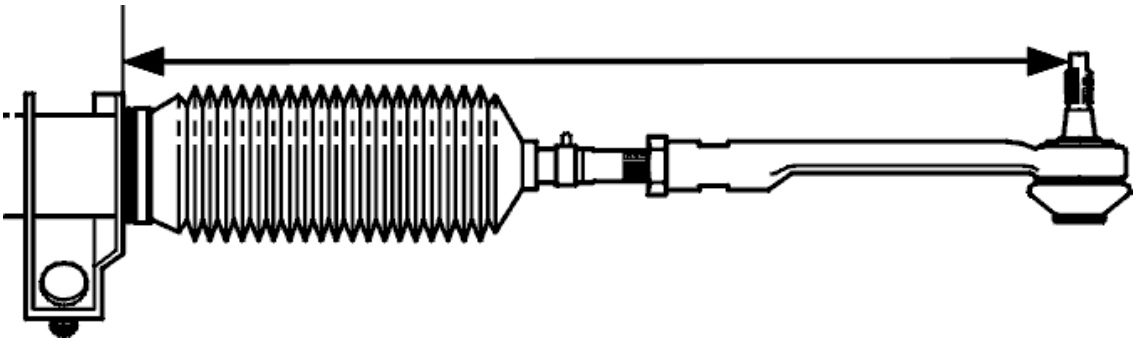


Fig. 293: Identifying Length Of Track Rod In Relation To Steering Gear Housing
Courtesy of VOLVO CARS CORPORATION

Check that tie rod is in the same position as when it was removed.

ASSEMBLING THE LOWER STEERING SHAFT

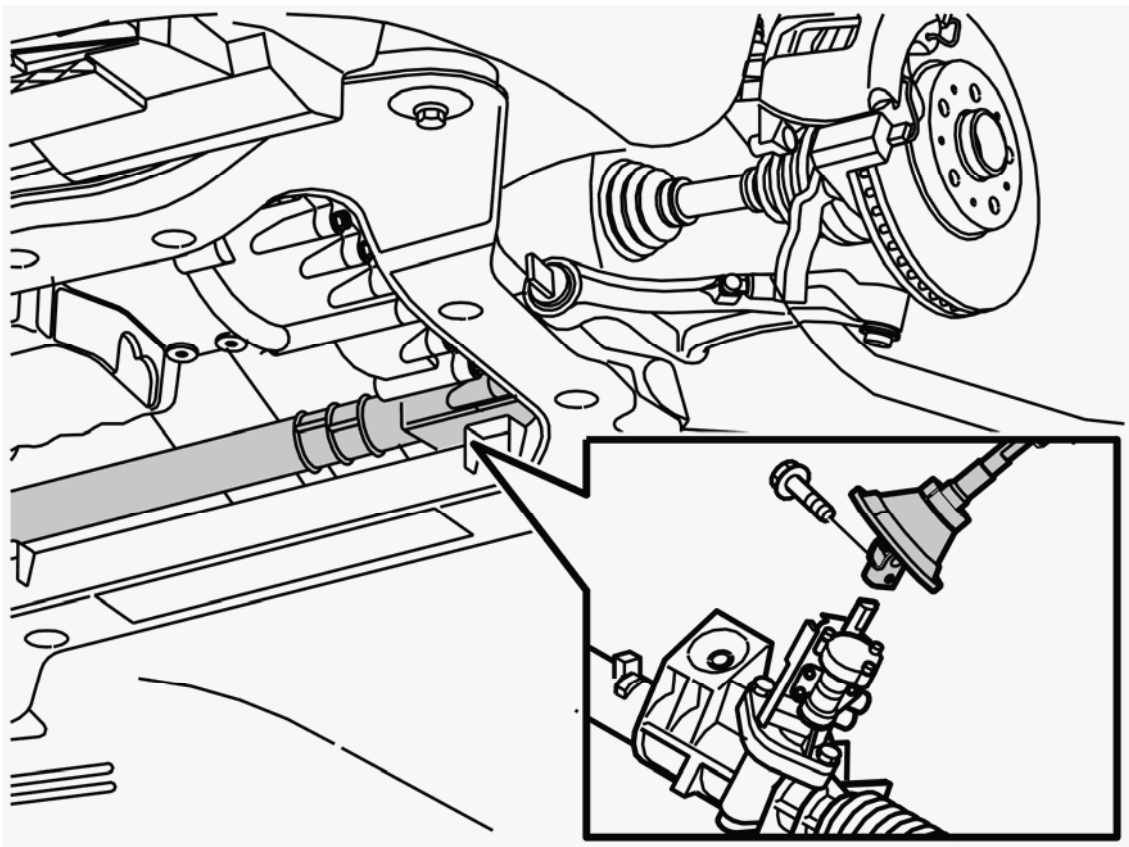


Fig. 294: Identifying Screw For Joint Between Steering Gear And Steering Shaft
Courtesy of VOLVO CARS CORPORATION

Tighten the lower screw on the steering shaft joint mounting in the steering gear from the engine compartment.

Use a **new** screw. Tighten. See: **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** .

INSTALLING THE CROSS MEMBERS ON THE BODY

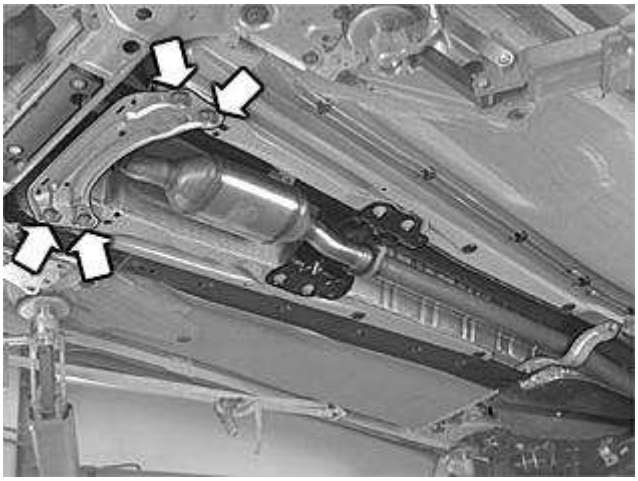


Fig. 295: Identifying Cross Members And Screws
Courtesy of VOLVO CARS CORPORATION

Install:

- the M8 screws for the front member
- the brake pipe in the holders on the member
- the clamp with the heated oxygen sensor (HO2S) cable on the front cross member.

INSTALLING FRONT SUSPENSION COMPONENTS

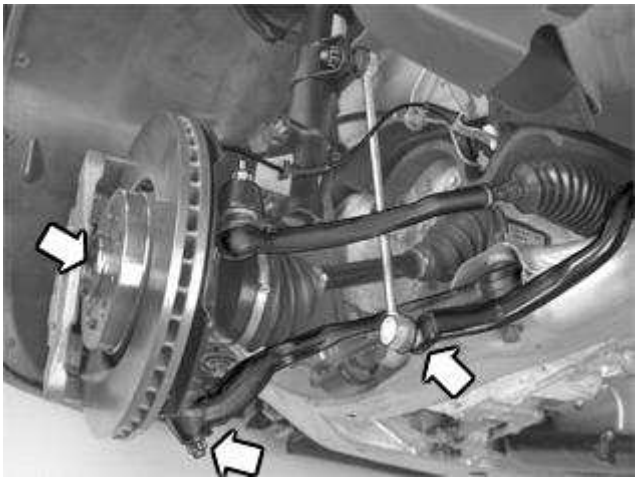


Fig. 296: Front Suspension Components
Courtesy of VOLVO CARS CORPORATION

HINT: Applies when installing front suspension components on both sides.

Install:

- a new M12 lock nut on the ball joint pinion. Counterhold the ball joint pinion while tightening so that the boot cannot turn. Tighten
- the anti-roll bar link. Use a new M10 lock nut. Counterhold the ball joint pinion while tightening so that the boot cannot turn. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** . Tighten the drive shaft screw. Counterhold using a screwdriver in the brake disc vents. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS**
- the soundproofing over the drive shaft (applies to certain versions).

INSTALLING COMPONENTS FOR THE FENDER LINER

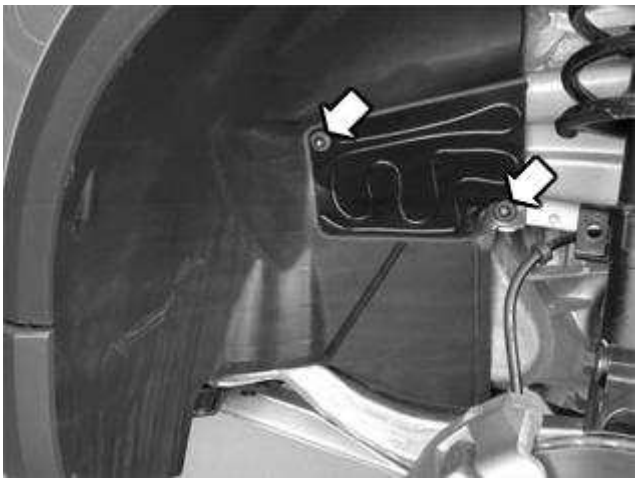


Fig. 297: Identifying Support Plate And Nuts
Courtesy of VOLVO CARS CORPORATION

Install the support plate and the nuts on both sides.

INSTALLING THE CABLE DUCT

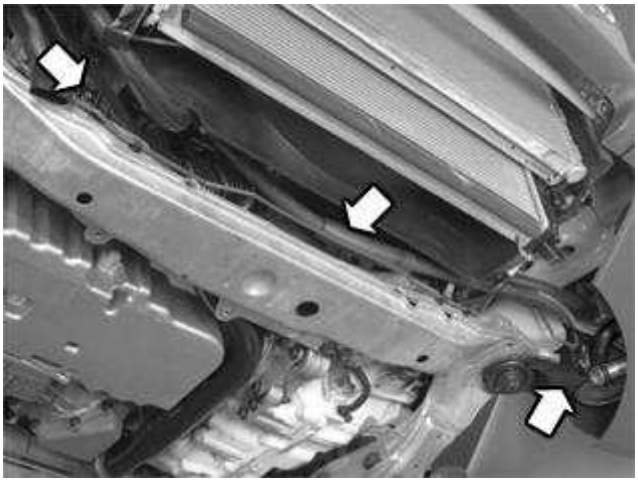


Fig. 298: Cable Duct
Courtesy of VOLVO CARS CORPORATION

Install:

- the cable duct on the sub-frame
- any parking or additional heaters in the mounting in the sub-frame and the fuel line in the mountings.

INSTALLING THE FRONT SPLASH GUARD

Fig. 299: Front Splash Guard
Courtesy of VOLVO CARS CORPORATION

Install:

- the splash guard under the engine
- the wheels. See **INSTALLING WHEELS** .

REMOVING THE LIFTING BEAMS

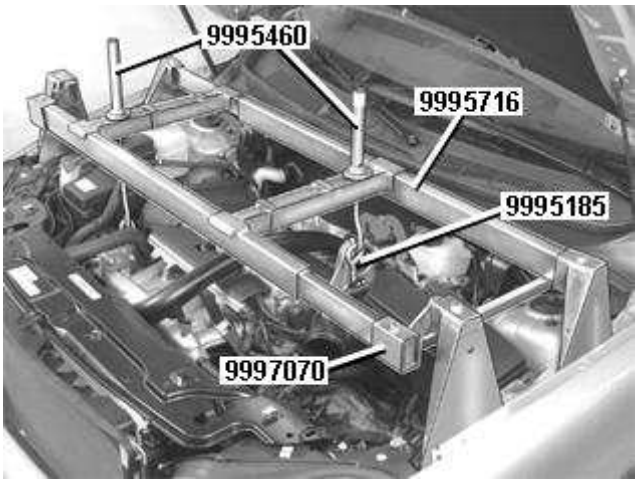


Fig. 300: Identifying Fixture Kit, Lifting Beam And Lifting Hooks
Courtesy of VOLVO CARS CORPORATION

Lower the car.

Remove the lifting beams and hooks from the engine.

INSTALLING THE COOLANT HOSE

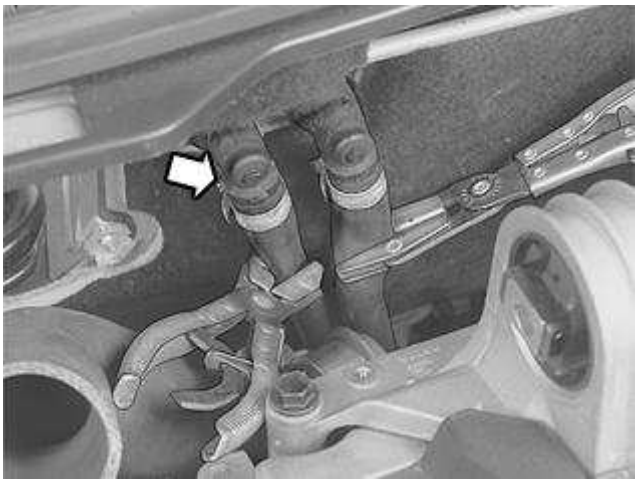


Fig. 301: Coolant Hose In Passenger Compartment
Courtesy of VOLVO CARS CORPORATION

Install the connector securing the engine coolant hose to the heater.

Remove the hose clips.

INSTALLING THE REMAINING SCREWS FOR THE TRANSMISSION AND STARTER MOTOR

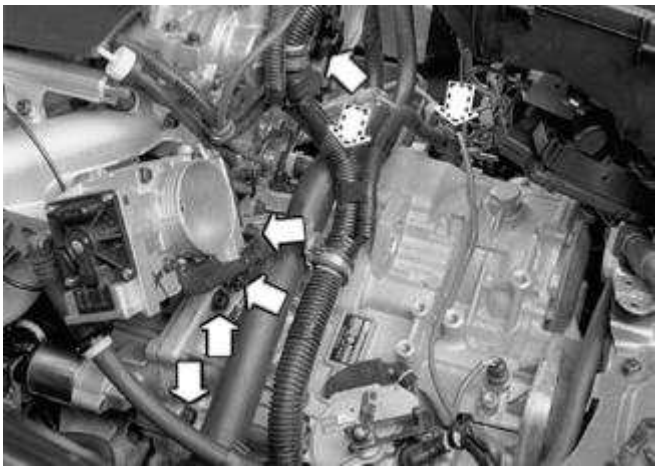


Fig. 302: Identifying Screws
Courtesy of VOLVO CARS CORPORATION

Install:

- the 3 x M10 screws for the transmission and engine. Tighten
- the 2 x M10 screws for the starter motor. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS**

- the bracket for the engine coolant hose and cable harness
- the bracket for the cable harness clamp and the mounting for the heated oxygen sensor (HO2S) connector at the rear edge of the transmission
- the clamp for the cable harness at the rear edge of the engine.

INSTALLING THE GEAR SELECTOR CABLE AND OIL PIPE

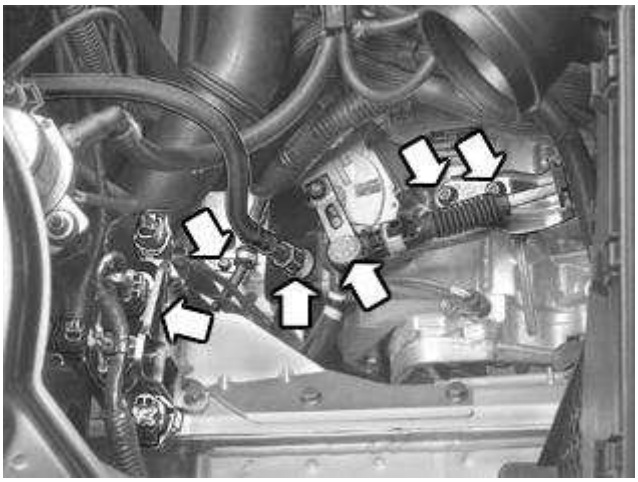


Fig. 303: Identifying Gear Selector Cable, Bracket, Oil Pipe And Connectors
Courtesy of VOLVO CARS CORPORATION

Install:

- the ground lead and mounting on the sub-frame
- the oil pipe on the transmission
- the gear selector cable and bracket. Use 2 x M8 screws. Tighten.

Connect the cable to the lever. Connect the transmission connectors and the mounting for the air cleaner (ACL) housing bracket. Press the cable harness mounting into place on the control system cover.

NOTE: Check that the transmission bleed hose / valve is not trapped. There is a risk of overpressure in the transmission.

INSTALLING THE SERVICE CLIPS

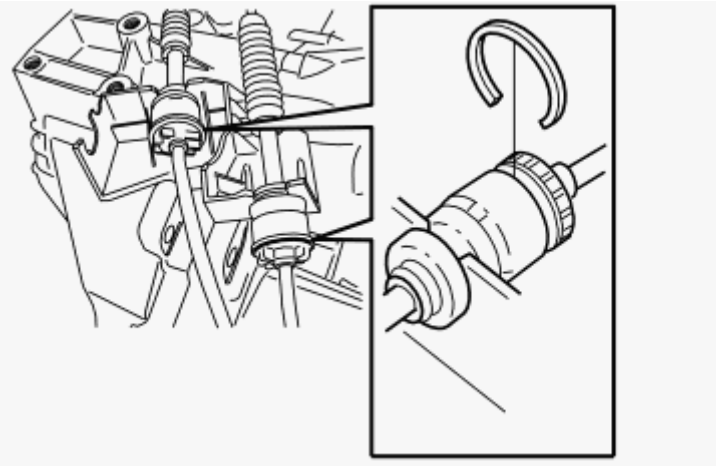


Fig. 304: Gear Selector Cable And Clip
Courtesy of VOLVO CARS CORPORATION

NOTE: The automatic transmission has one gear selector cable while the manual transmission has two cables.

Ensure that the gear selector cable is locked in position before installing the blue clip. Press the clip into place as illustrated.

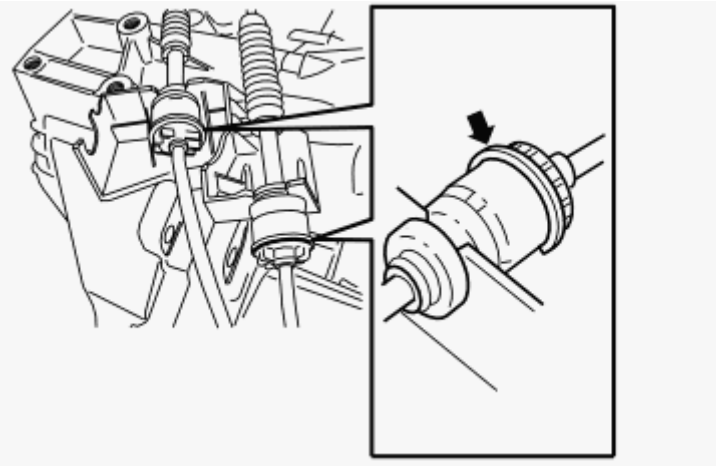


Fig. 305: Clip Positioned In Groove
Courtesy of VOLVO CARS CORPORATION

Check that the clip is positioned in the groove as illustrated.

INSTALLING ENGINE COMPARTMENT COMPONENTS

Fig. 306: Identifying Underhood Components
Courtesy of VOLVO CARS CORPORATION

Install:

- the air cleaner (ACL) housing assembly with the intake manifold and connections
- hook the turbocharger (TC) control valve into place in the air cleaner (ACL)
- the upper engine stabilizer brace between the wheel arches. Use 4 x M10 screws. Tighten
- 1 x M12 screw for the engine stabilizer brace/engine mounting. Tighten
- the tie strap for the power steering return line in the mounting lug for the engine stabilizer brace on the right side.

Fill with coolant. Carefully check while reaching operating temperature or test driving that the level remains the same and that there is no leakage.

Also see **TRANSMISSION REPLACEMENT, POST-CHECKING** .

INSTALLING THE BATTERY LEAD

Connect the battery lead.

First read **BATTERY, DISCONNECTING** .

FINISHING

Carry out checks after working on the transmission. See **TRANSMISSION REPLACEMENT, POST-CHECKING** .

TRANSMISSION, REMOVING

Special tools:

9985972

9995185

9995460

9995463

9995562

9995681

9995716

9995972

9997070

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

REMOVAL

DISCONNECTING THE BATTERY LEAD

Disconnect the battery lead. See: **BATTERY, DISCONNECTING** .

REMOVING ENGINE COMPARTMENT COMPONENTS

Fig. 307: Identifying Underhood Components
Courtesy of VOLVO CARS CORPORATION

Remove:

- the engine stabilizer brace between the suspension turrets and the engine

- the air cleaner (ACL) housing assembly with the intake pipe.

Unhook the turbocharger (TC) control valve from the air cleaner (ACL) housing.

Pull the air cleaner (ACL) housing out of its mountings.

REMOVING COMPONENTS FROM THE TRANSMISSION

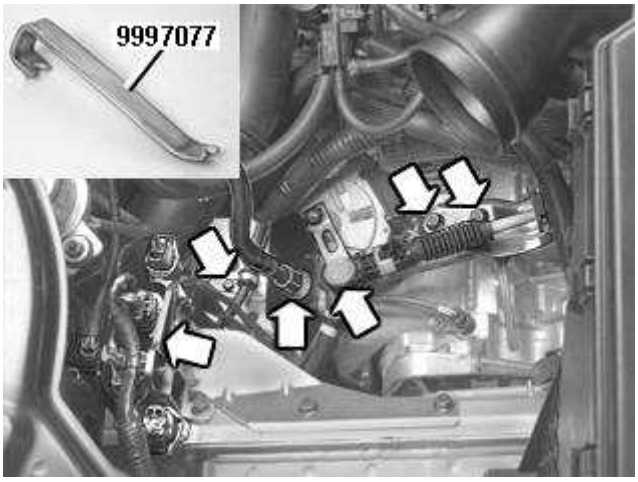


Fig. 308: Gear Selector Cable And 999 7077
Courtesy of VOLVO CARS CORPORATION

Remove:

- the gear selector cable. Use jimmy tool **9997077** to detach the ball joint for the cable from the lever
- the cable mounting from the transmission
- the oil line from the transmission. Plug the line and the connection on the transmission cover
- unhook the mounting with the connector for the transmission from the bracket. Separate all the connectors.

REMOVING THE MOUNTING SCREWS FROM THE TRANSMISSION

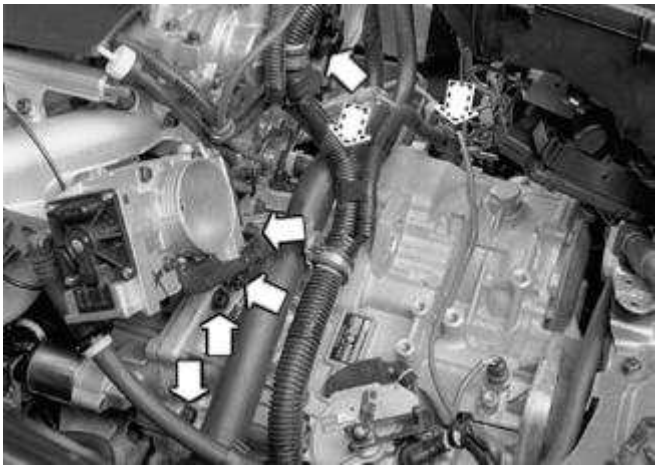


Fig. 309: Identifying Screws
Courtesy of VOLVO CARS CORPORATION

Remove the bracket with the connectors for the heated oxygen sensors (HO2S) and the clamp for the cable harness from the transmission.

Remove:

- the screws for the clamp securing the cable harness at the rear edge of the engine
- the nut for the bracket for the cable harness and the engine coolant hose
- the 3 screws for the transmission and engine and the 2 screws for the starter motor. Tie up the cable harness.

REMOVING THE COOLANT HOSE FROM THE PASSENGER COMPARTMENT HEATER

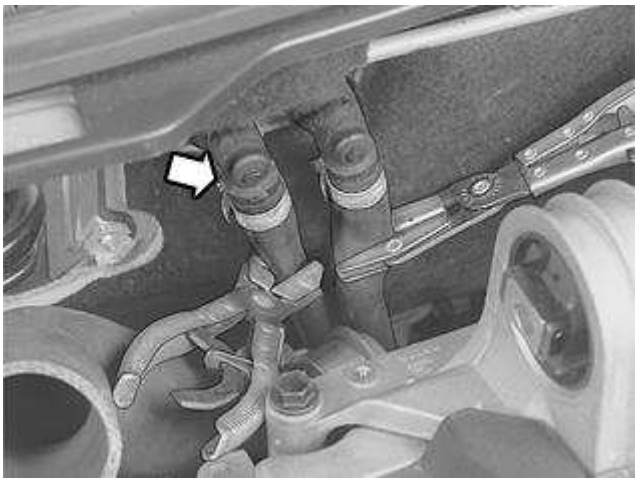


Fig. 310: Coolant Hose In Passenger Compartment
Courtesy of VOLVO CARS CORPORATION

Clamp the hoses with hose clips.

Place some paper under the inner hose connection to collect any spilled coolant.

Turn the quick-release connector (the inner of the 2 hoses) slightly in the direction of the arrow so that the lock opens. At the same time, pull the coolant hose straight out of the coolant pipe.

NOTE: Tie the hose up to the engine so that it does not fall down and trap the hose connector between the firewall during installation.

INSTALLING THE LIFTING BEAMS AND LIFTING HOOKS ON THE ENGINE LIFTING LUGS

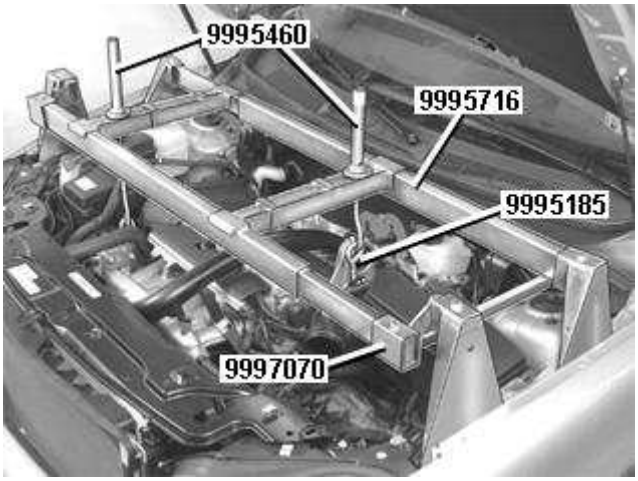


Fig. 311: Identifying Fixture Kit, Lifting Beam And Lifting Hooks
Courtesy of VOLVO CARS CORPORATION

NOTE: The front lifting beam must be equipped with fixture kit 9997070 as illustrated.

Position lifting beam **9995716** on the wheel arch and directly above the engine lifting eyelets on the left and right sides.

Connect the lifting hooks **9995460** on the engine lifting lugs.

On the right side of the engine, the hook must have a clearance of **10 mm** . Also use lifting lug **9995185** on the left side of the engine. Tighten to light contact on the left hand side.

Raise the car

REMOVING BOTH THE FRONT WHEELS

Fig. 312: Front Splash Guard
Courtesy of VOLVO CARS CORPORATION

Remove:

- the front splash guard. See **SUB-FRAME FRONT, REPLACING**
- the splash guard under the engine.

REMOVING COMPONENTS FROM THE SUB-FRAME

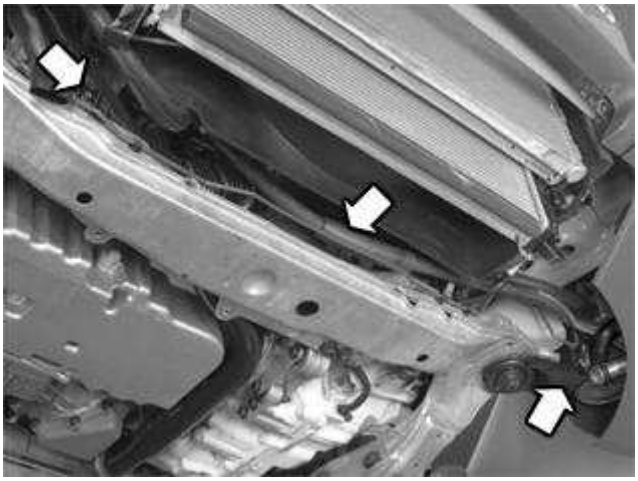


Fig. 313: Cable Duct
Courtesy of VOLVO CARS CORPORATION

Remove the screw for the cable duct. Unhook the cable duct from the sub-frame.

For cars with fuel powered parking heaters:

Remove the 2 screws for the heater.

Unhook the heater from the mounting. Leaving it hanging in its upper mounting.

Detach the fuel line for the heater from the holders on the sub-frame.

REMOVING THE CROSS MEMBERS FROM THE BODY

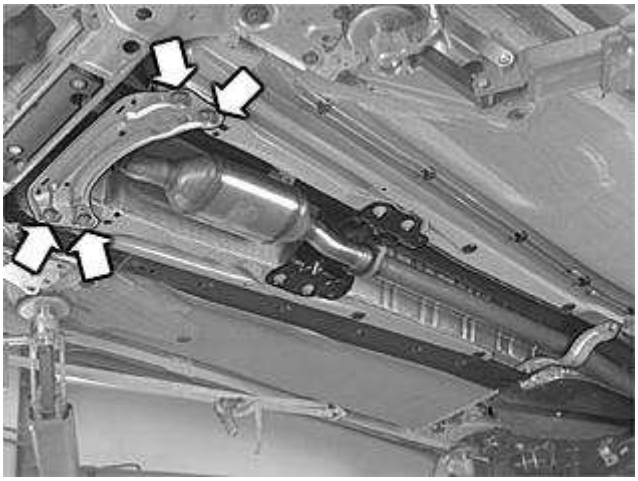


Fig. 314: Identifying Cross Members And Screws

Courtesy of VOLVO CARS CORPORATION

Remove:

- the clamp for the heated oxygen sensor (HO2S) cable and the screws for the front member
- the brake pipe from the holders on the member.

Turn the member to the side so that the exhaust pipe is exposed.

REMOVING THE SCREWS AND NUTS FOR THE ENGINE PAD, ENGINE STABILIZER BRACE AND STEERING GEAR

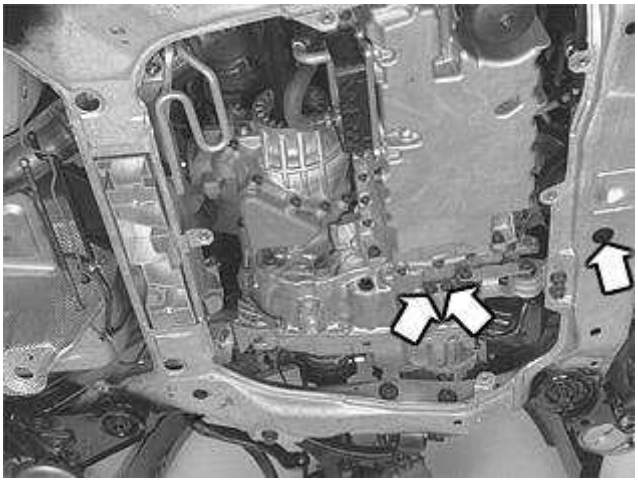


Fig. 315: Identifying Screws
Courtesy of VOLVO CARS CORPORATION

Remove:

- the screw for the engine pad/steering gear
- the screw for the front engine pad
- the screws for the engine stabilizer brace.

MEASURING THE POSITION OF THE TIE ROD IN THE STEERING GEAR

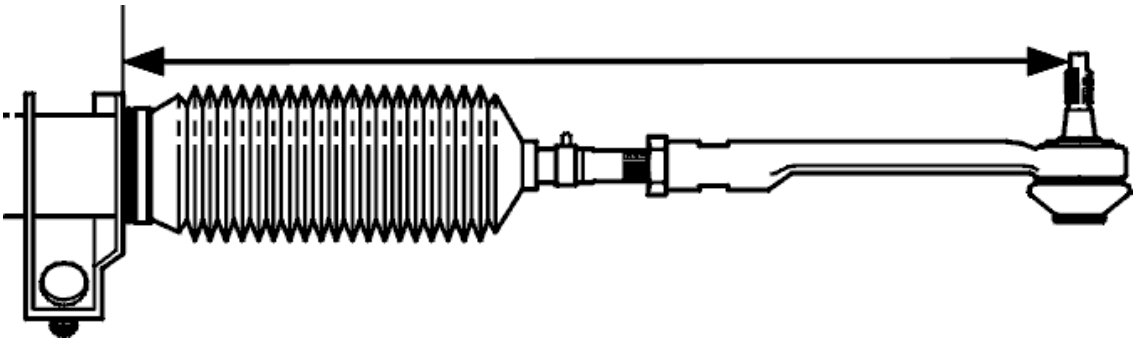


Fig. 316: Identifying Length Of Track Rod In Relation To Steering Gear Housing
Courtesy of VOLVO CARS CORPORATION

Set the front wheels to the straight ahead position.

Lock the steering wheel. On one side, measure the length of the tie rod in relation to the steering gear housing.

Note the measurement.

DISCONNECTING THE STEERING GEAR

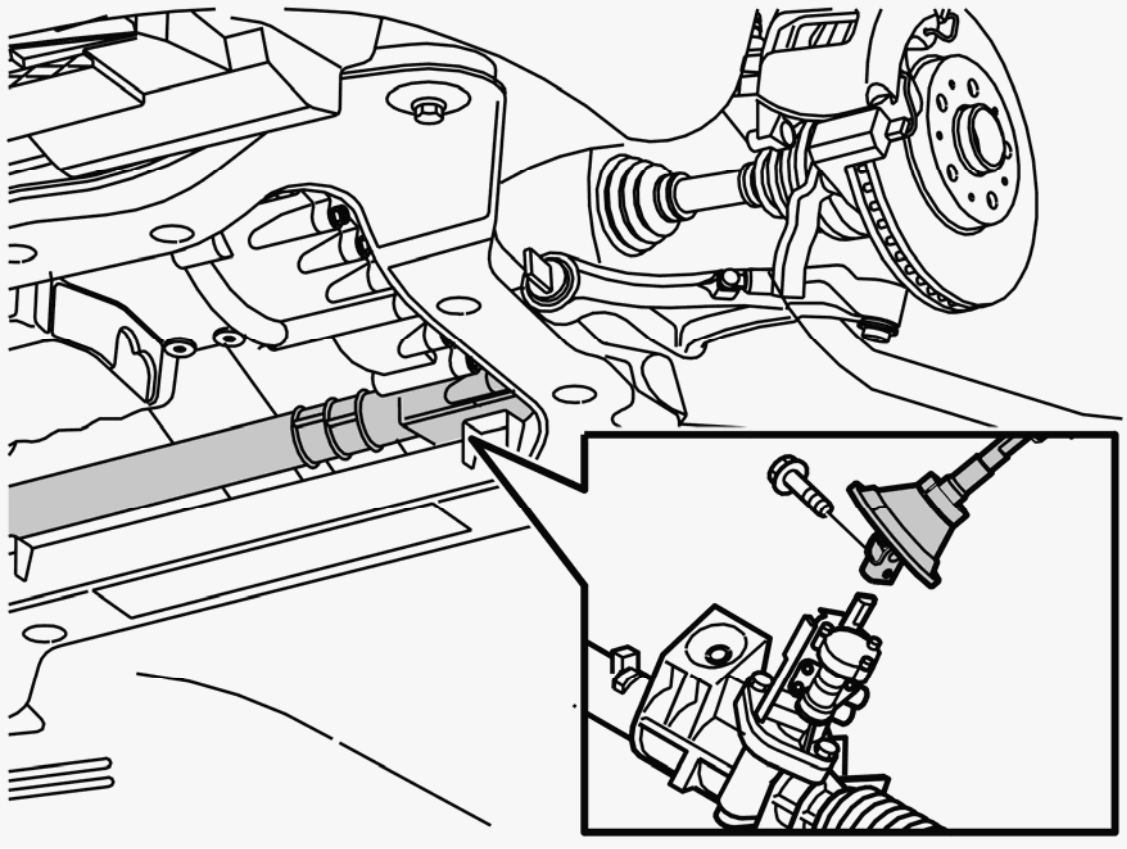


Fig. 317: Identifying Screw For Joint Between Steering Gear And Steering Shaft
Courtesy of VOLVO CARS CORPORATION

Remove the screw for the joint between the steering gear and the steering shaft.

Press up the joint from the steering gear.

REMOVING FRONT SUSPENSION COMPONENTS (BOTH SIDES)

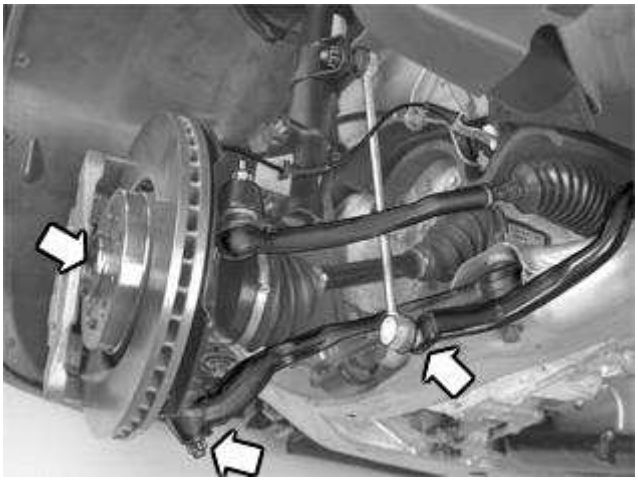


Fig. 318: Front Suspension Components
Courtesy of VOLVO CARS CORPORATION

Remove:

- the soundproofing over the drive shaft (applies to certain versions)
- the screw for the drive shaft. Counterhold using a screwdriver in the brake disc vents. Tap in the end of the drive shaft approximately **20 mm** into the wheel hub
- the link from the anti-roll bar. Counterhold using a Torx wrench in the ball joint pinion to prevent the boot from turning. (Applies to the left side only.)
- the nut for the ball joint / link arm. Clean the exposed threads outside the nut. Spray using rust solvent before removing the nut.

DISCONNECTING THE BALL JOINT PINION FROM THE CONTROL ARM (BOTH SIDES)

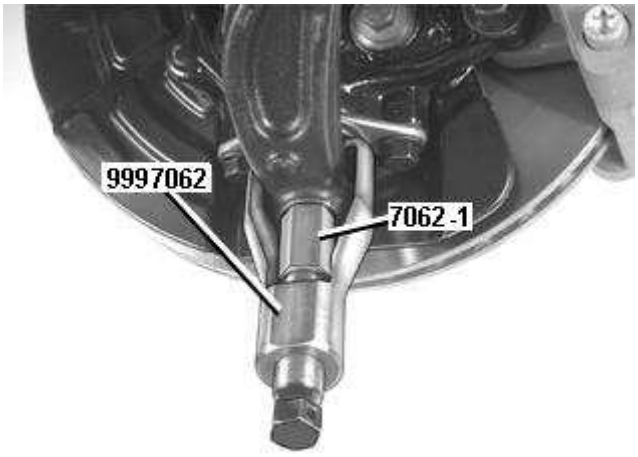


Fig. 319: Disconnecting Ball Joint Pinion From Control Arm Using 999 7062
Courtesy of VOLVO CARS CORPORATION

Use tool **9997062** . Install cap nut **9997062** for the ball joint pinion. Tighten the nut to the control arm. Then slacken off 1 to 2 turns so that there is clearance between the cap nut and the control arm.

Position puller **9997062** on the control arm and detach the ball joint from the control arm.

Remove the tools.

REMOVING FENDER LINER COMPONENTS (BOTH SIDES)

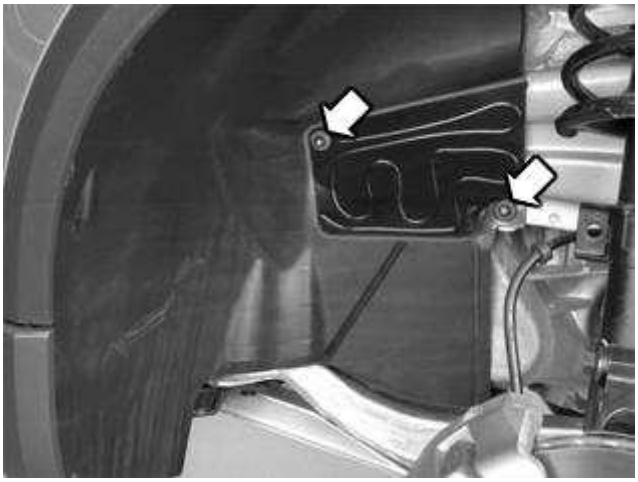


Fig. 320: Identifying Support Plate And Nuts
Courtesy of VOLVO CARS CORPORATION

Slacken off the 2 nuts for the fender liner and the support plate on both sides so that the fender liner can be folded out.

REMOVING THE SCREWS FOR THE SUB-FRAME SUPPORT PLATES (BOTH SIDES)

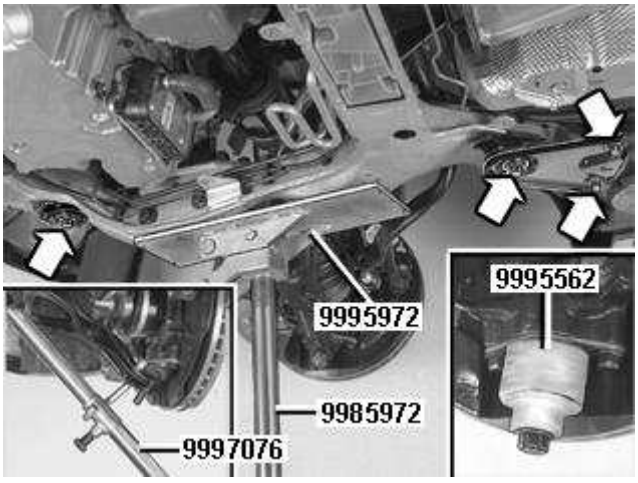


Fig. 321: Identifying Screws And Sub-Frame Support Plates
Courtesy of VOLVO CARS CORPORATION

Remove the screws for the sub-frame support plates in the body (both sides).

Position mobile jack **9985972** with universal plate **9995972** , so that the plate is in light contact under the right side of the sub-frame.

Slacken off the screws for the sub-frame on the right hand side. Ensure that the nuts are still secured by at least 5 threads.

Remove the jack.

Unhook the control arm from the ball joint. Install protective sleeve **9995562** . Hold the sleeve in place using the nut for the ball joint.

Work out the spring strut. Detach the drive shaft from the wheel hub. Do not damage the boot. Hold the spring strut to one side using a retaining strap for more space when removing the drive shaft.

REMOVING THE RIGHT DRIVE SHAFT

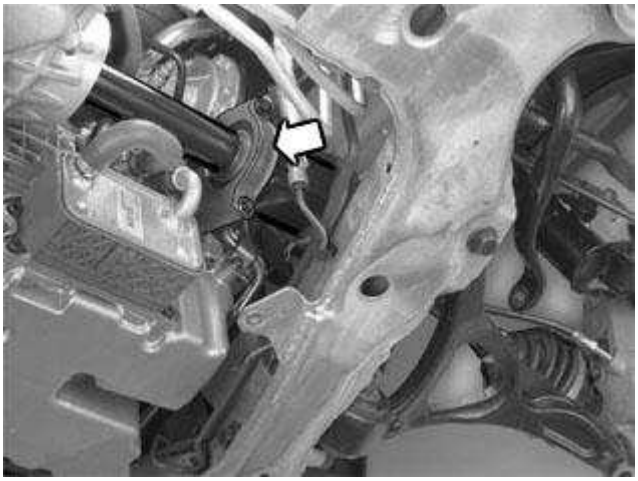


Fig. 322: Drive Shaft Support Bearing Cap
Courtesy of VOLVO CARS CORPORATION

Remove:

- the support bearing cap for the drive shaft
- the drive shaft by pulling it straight out of the transmission.

REMOVING THE COLLISION PROTECTION SYSTEM OVER THE STEERING GEAR

Fig. 323: Collision Protection Over Steering Gear
Courtesy of VOLVO CARS CORPORATION

NOTE: Only applies to right-hand drive cars.

Remove the 2 screws for the collision protection system.

Leave the collision protection system in place on the steering gear.

LOWERING THE SUB-FRAME

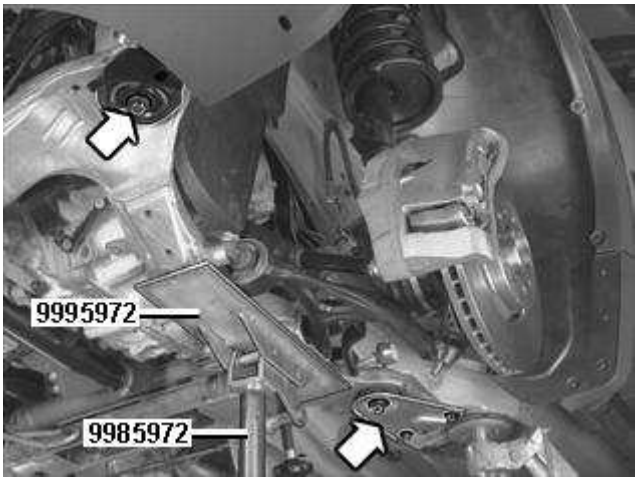


Fig. 324: Identifying Mobile Jack & Sub-Frame
Courtesy of VOLVO CARS CORPORATION

NOTE: Applies only to right-hand drive cars.

Position the mobile jack lightly applied under the left side of the sub-frame. Remove the sub-frame screws.

NOTE: Ensure the following when lowering the sub-frame:

- **that the brake pipe does not catch in the bracket for the exhaust pipe mounting**
- **that the ball joint pinion releases from the control arm.**

Remove the mobile jack and let the frame hang loose.

REMOVING THE DRIVE SHAFT FROM THE WHEEL HUB

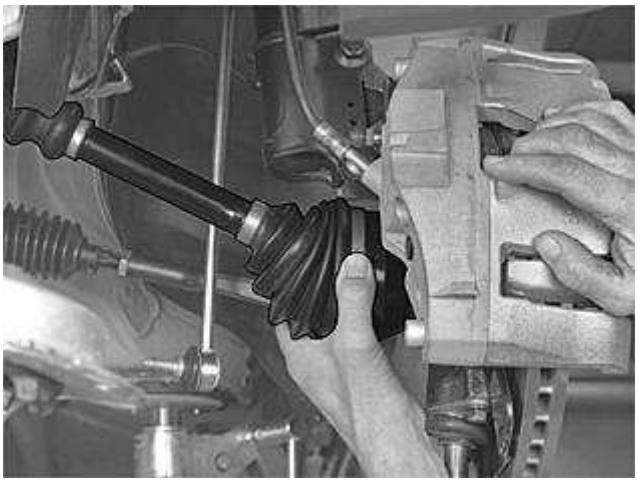


Fig. 325: Identifying Drive Shaft And Wheel Hub
Courtesy of VOLVO CARS CORPORATION

Work out the spring strut. Detach the drive shaft from the wheel hub. Hold the spring strut to one side using a retaining strap to obtain more space when removing the transmission.

REMOVING THE DRIVE SHAFT FROM THE TRANSMISSION

Fig. 326: Identifying Drive Shaft At Gearbox & Tool 999 5681
Courtesy of VOLVO CARS CORPORATION

Remove the drive shaft from the transmission. Use jimmy bar **9995681** .

REMOVING BEVEL GEAR

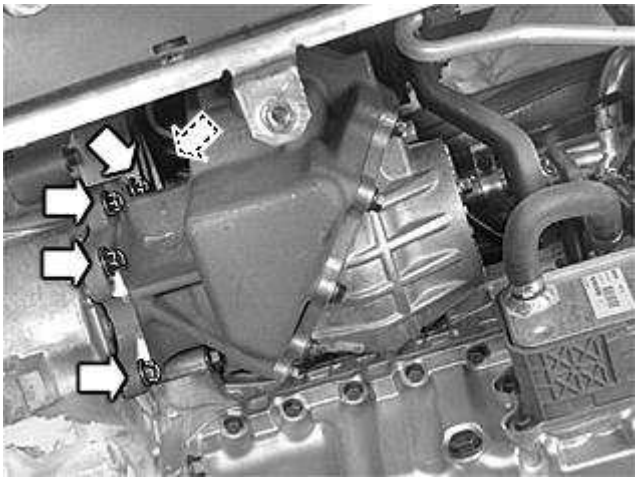


Fig. 327: Angle Gear Screws
Courtesy of VOLVO CARS CORPORATION

Remove the angle gear screws, 5. Pull the angle gear straight out from the gearbox.

Hang the bevel gear from, e.g., an oil pipe for the turbocharger or similar.

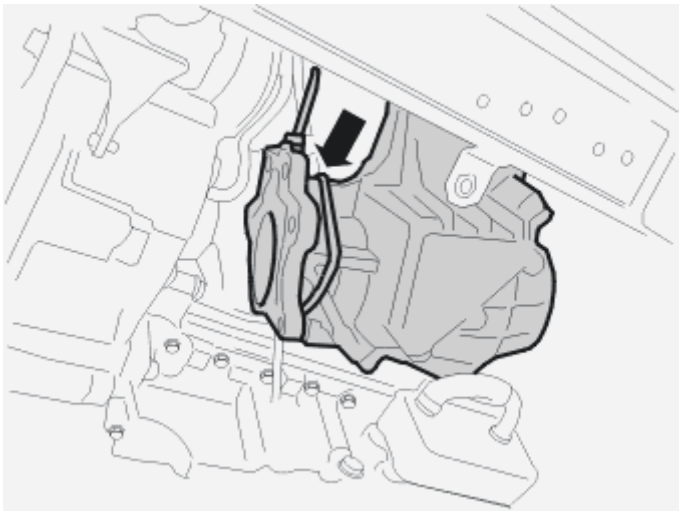


Fig. 328: Bevel Gear Hung Up With A Cable
Courtesy of VOLVO CARS CORPORATION

REMOVING THE REAR ENGINE MOUNTING

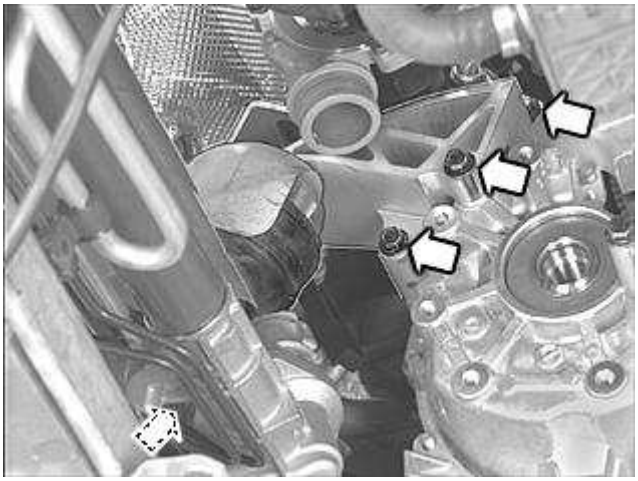


Fig. 329: Identifying Rear Engine Mounting
Courtesy of VOLVO CARS CORPORATION

Remove:

- the 3 x screws
- the mounting and the engine pad.

REMOVING THE SCREWS FROM THE TORQUE CONVERTER

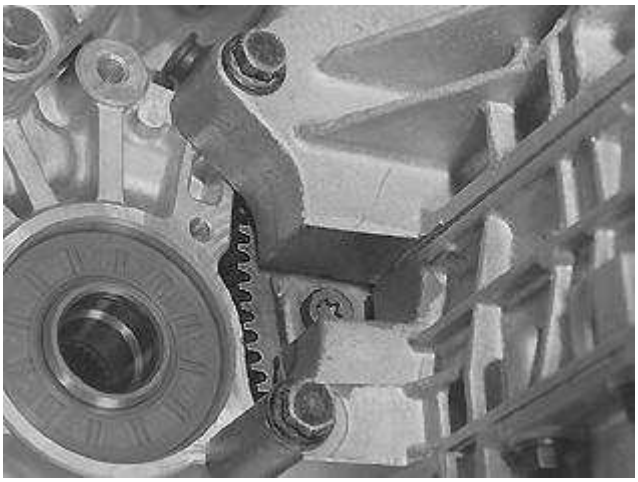


Fig. 330: Identifying Torque Converter Screws
Courtesy of VOLVO CARS CORPORATION

Remove the 6 screws for the torque converter. Turn the engine with a ratchet and socket. Fold out the right fender liner so that the crankshaft nut can be accessed.

Use a Torx TX50 socket on the torque converter screws.

REMOVING THE OIL PIPE FROM THE TRANSMISSION

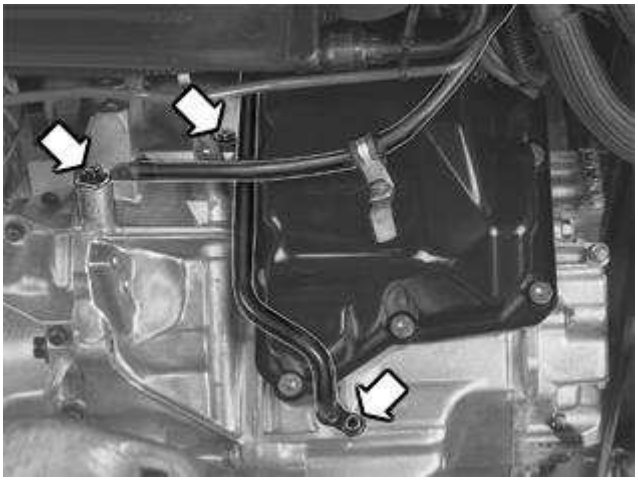


Fig. 331: Identifying Oil Pipe
Courtesy of VOLVO CARS CORPORATION

Position a container under the pipe terminal.

Remove:

- the 2 screws holding the pipe. Disconnect the pipe from the transmission. Install sealing plugs in the pipe and transmission. Carefully fold the hose out of the way
- the ground lead from the transmission.

LOWERING THE ENGINE AND THE TRANSMISSION

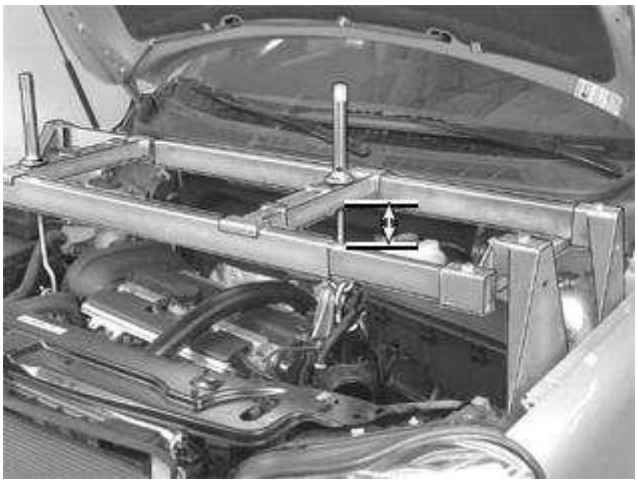


Fig. 332: Identifying Free Threads On Lifting Hook
Courtesy of VOLVO CARS CORPORATION

Lower the engine and transmission on the left side. Use the hook.

Check that no hoses or cables are being stretched or trapped when the engine is lowered.

Lower the engine so that **90-100 mm** of the free threads on the lifting hook can be seen.

Raise the car.

INSTALLING THE FIXTURE ON THE MOBILE JACK AND TRANSMISSION

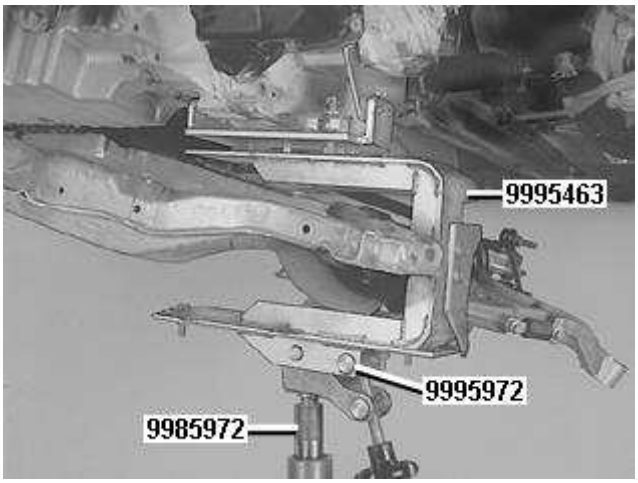


Fig. 333: Fixture Installed On Mobile Jack And Gearbox
Courtesy of VOLVO CARS CORPORATION

Raise the car.

Install fixture **9995463** on fixture **9995972** . Use the fixture and plate together with mobile jack **9985972** . Align support plate 999 5463-2 against the fixture and the transmission.

NOTE: The support plate is installed on the inside of the fixture mounting lug (see the illustration). Tighten the fixture with the two torque rod screws. Apply the mobile jack lightly against the transmission.

REMOVING ALL THE SCREWS FOR THE TRANSMISSION AND ENGINE

Fig. 334: Gearbox And Engine Screws
Courtesy of VOLVO CARS CORPORATION

Remove the remaining 7 screws for the transmission and engine.

REMOVING THE TRANSMISSION

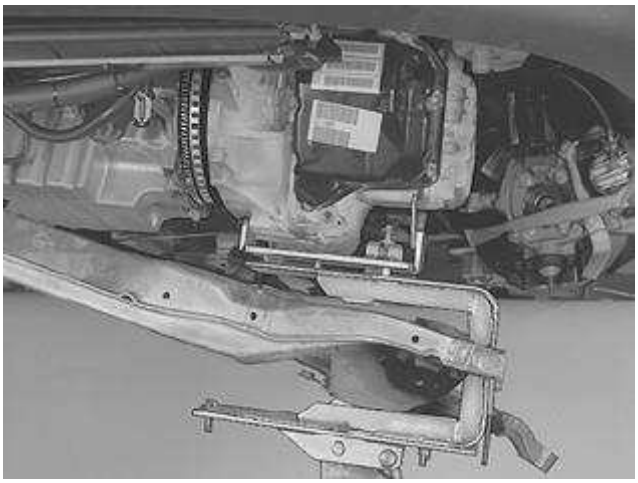


Fig. 335: Adjusting Height & Angle Using Mobile Jack And Gearbox Fixture
Courtesy of VOLVO CARS CORPORATION

Ensure that the transmission is taken straight out in relation to the engine.

Ensure that the torque converter is removed with the transmission and does not slide off the stator shaft.

Press a screwdriver through one of the screw holes in the carrier plate.

NOTE: Do not pry toward the carrier plate rim for the flywheel sensor.

NOTE: Lower the transmission slightly when it is being removed so that it will pass the side member.

Remove the transmission.

TRANSMISSION, AUTOMATIC (B5254T2, AW55-50/51SN; 2004-2007)

GEAR-SHIFT POSITION SENSOR, POSITION

GEAR-SHIFT POSITION SENSOR, POSITION

SEALING RING GEAR SHIFT LINKAGE ROD, REPLACING

SEALING RING GEAR SHIFT LINKAGE ROD, REPLACING

SEALING RING OIL PUMP, REPLACING

SEALING RING OIL PUMP, REPLACING

SOLENOID CONTROL SYSTEM, REPLACING

SOLENOID CONTROL SYSTEM, REPLACING

TRANSMISSION CONTROL MODULE (TCM), REPLACING

TRANSMISSION CONTROL MODULE (TCM), REPLACING

TRANSMISSION FLUID, REPLACING

TRANSMISSION FLUID, REPLACING

TRANSMISSION, INSTALLING

Special tools:

9512050

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

INSTALLATION

NOTE: For tightening torques, see TIGHTENING TORQUE .

INSTALLING THE TRANSMISSION

Before installing the transmission it is very important that the checks and cleaning have been carried out. See **TRANSMISSION, PREPARATIONS BEFORE INSTALLING** .

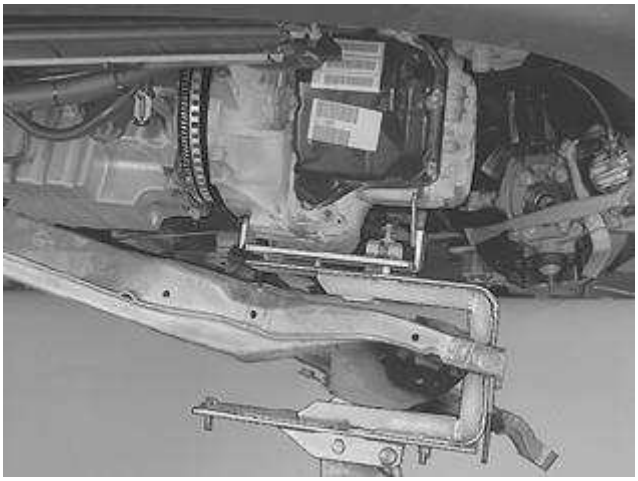


Fig. 336: Adjusting Height & Angle Using Mobile Jack And Gearbox Fixture
Courtesy of VOLVO CARS CORPORATION

Adjust height and angle with the mobile jack and the transmission fixture.

Locate the transmission on the engine.

Ensure that the transmission goes straight in, in relation to the engine, and that the guide sleeves and guide pin for the starter motor align in the guide holes on the transmission.

INSTALLING AND TIGHTENING THE SCREWS FOR THE TRANSMISSION

Fig. 337: Gearbox And Engine Screws
Courtesy of VOLVO CARS CORPORATION

Install all 7 x M10 screws securing the transmission to the engine.

First tighten alternately and crosswise to light contact.

At the same time, check that the whole of the transmission is in contact with the engine.

Then tighten the screws crosswise.

Remove the fixture from the transmission.

INSTALLING THE TORQUE CONVERTER SCREWS

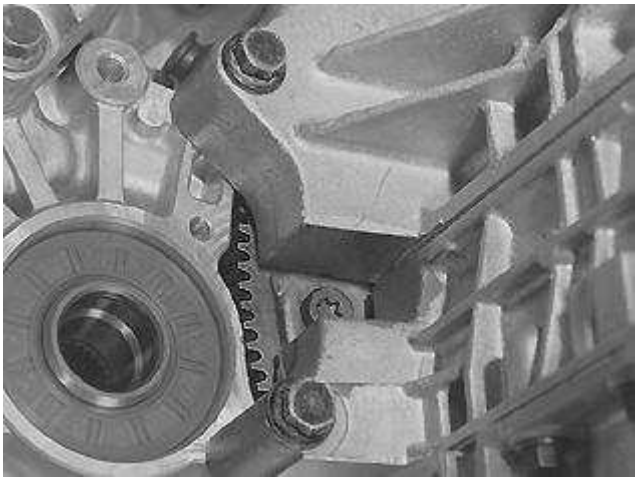


Fig. 338: Identifying Torque Converter Screws
Courtesy of VOLVO CARS CORPORATION

NOTE: Use new screws.

Align the torque converter against the carrier plate. Do this by turning the engine with the nut for the crankshaft pulley and turning the torque converter.

Install all 6 screws loosely. Tighten the screws. Tighten until the heads are almost in contact with the carrier plate. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** . Use a Torx socket TX50.

NOTE: Remove the socket wrench from the crankshaft.

LIFTING THE ENGINE AND TRANSMISSION

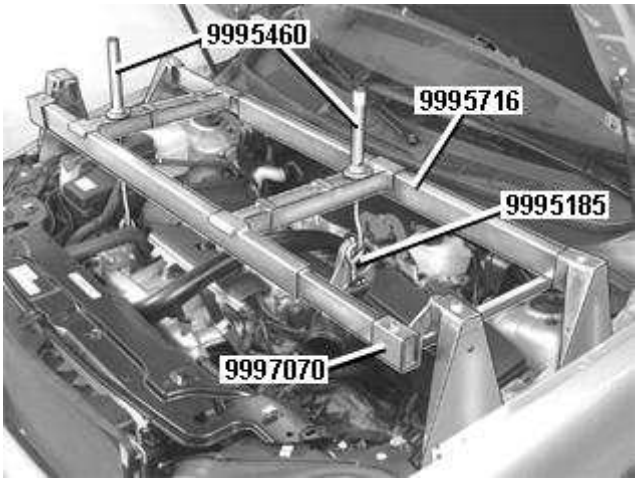


Fig. 339: Identifying Fixture Kit, Lifting Beam And Lifting Hooks
Courtesy of VOLVO CARS CORPORATION

Lift the engine to slightly above the horizontal position to provide better access to the rear engine mounting and

engine pad.

NOTE: Check that the connection on the hose for the heater is not trapped between the engine and firewall when the engine is lifted.

Raise the car.

INSTALLING THE REAR ENGINE MOUNTING

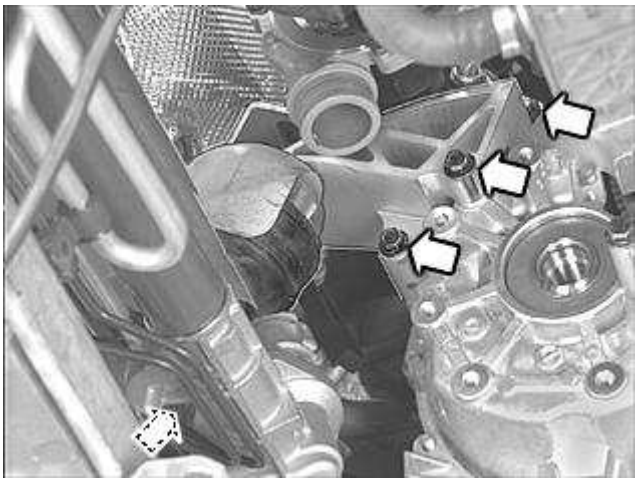


Fig. 340: Identifying Rear Engine Mounting
Courtesy of VOLVO CARS CORPORATION

Remove the tie strap temporarily holding the steering gear.

Install:

- the rear engine mounting on the transmission
- the 3 x M10 screws for the engine mounting. Tighten
- the screw for the steering gear and engine pad loosely.

Check and if necessary align the bearing for the steering shaft in the boot when installing the steering gear. Also see **CHECKING THE BOOT FOR THE STEERING SHAFT/FIREWALL**.

INSTALLING THE LOWER OIL PIPE ON THE TRANSMISSION

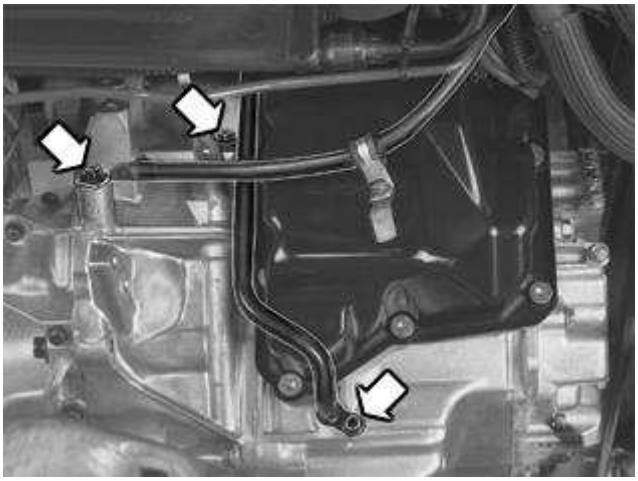


Fig. 341: Identifying Oil Pipe
Courtesy of VOLVO CARS CORPORATION

Use a new O-ring.

Install:

- the oil pipe and dip stick pipe. Use both the screws. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS**
- a tie strap for the cable harness for the oil pipe
- the ground lead to the engine.

INSTALLING THE LEFT DRIVE SHAFT ON THE TRANSMISSION AND THE WHEEL SPINDLE

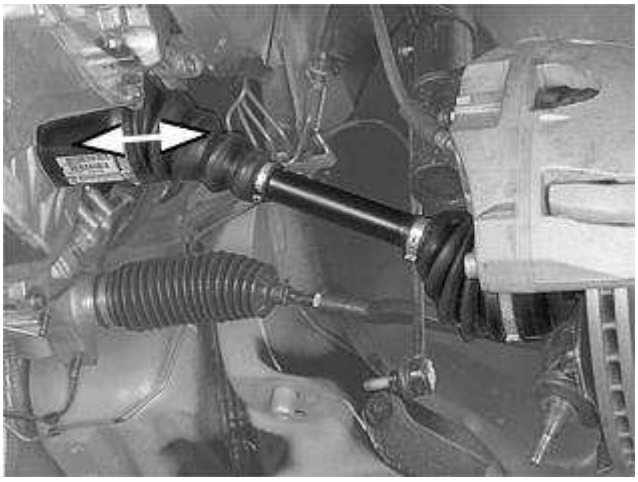


Fig. 342: Identifying Left Drive Shaft On Transmission And Wheel Spindle
Courtesy of VOLVO CARS CORPORATION

Press in the constant velocity joint housing firmly so that the snap ring engages in its groove in the transmission. Pull the constant velocity joint to check that the drive shaft is secure.

Lubricate the drive shaft splines. Use a small amount of thin oil. Locate the drive shaft in the wheel hub.

Install a new screw loosely in the drive shaft.

INSTALLING THE SUBFRAME ON THE BODYWORK

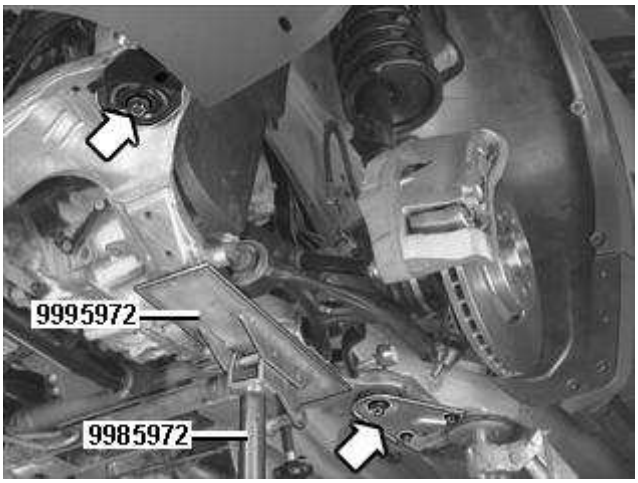


Fig. 343: Identifying Mobile Jack & Sub-Frame
Courtesy of VOLVO CARS CORPORATION

NOTE: Use new screws. Lubricate the screw threads.

Lift the subframe until it is about 150 mm from the side member.

Secure the power steering pipe at the front edge of the upper side of the subframe. Use the rubber covered clamp. Install the screw loosely. Apply a small amount of soap solution so that it glides into the clamp easily. Check the steering gear bearing in the boot at the firewall.

NOTE: Ensure the following when lifting the subframe:

- ensure that the steering gear screws align in the frame
- ensure that the brake pipe passes the bracket for the exhaust pipe
- ensure that the ball joint pinion for the spring strut aligns in the control arm.

Install:

- the new screws and the support bracket at the rear edge
- the screws for the bracket loosely.

Applies only to cars with fuel driven parking heaters:

Align the washer with the mounting lug following the marking on the subframe.

Tighten the subframe screws. Tighten to light contact.

Remove the mobile jack.

INSTALLING THE RIGHT DRIVE SHAFT ON THE TRANSMISSION, WHEEL SPINDLE AND CONTROL ARM

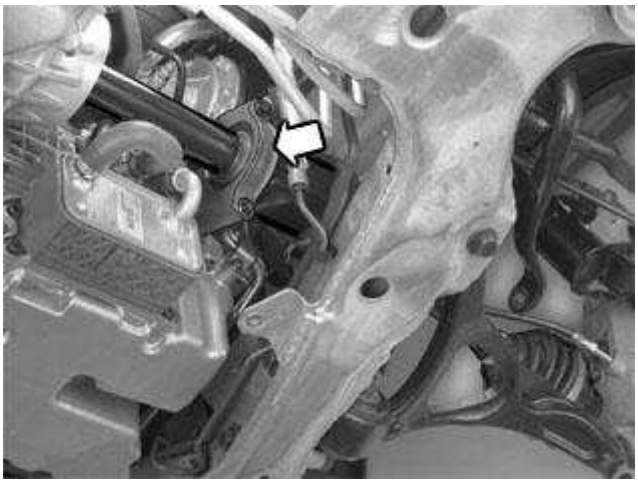


Fig. 344: Drive Shaft Support Bearing Cap
Courtesy of VOLVO CARS CORPORATION

Install the cap for the drive shaft pilot bearing. Use 2 x M8 screws. Tighten.

Lubricate the drive shaft splines. Use a small amount of thin oil. Locate the drive shaft in the wheel hub.

Install a new screw loosely in the drive shaft.

Press down the control arm. Locate the spring strut in the ball joint pinion for the spring strut in the control arm.

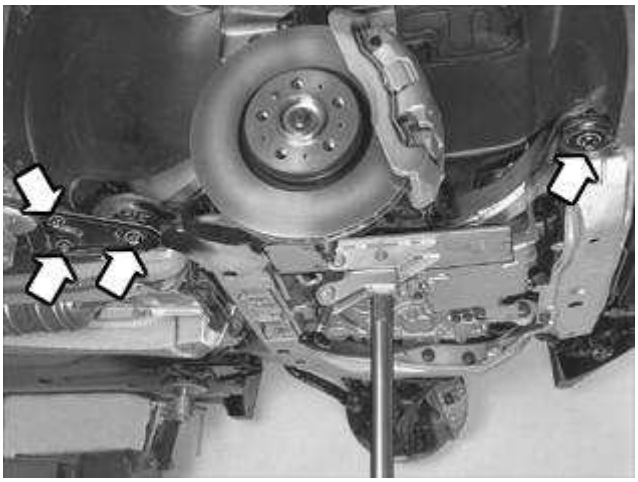


Fig. 345: Identifying Drive Shaft, Wheel Hub And Screws
Courtesy of VOLVO CARS CORPORATION

Position the mobile jack lightly applied under the right side of the subframe.

Install:

- new screws in the subframe

NOTE: Lubricate the screw threads.

- the screws loosely at the rear edge of the support plate.

Tighten the subframe screws. Tighten to light contact.

Remove the mobile jack.

Install the sub-frame's four screws together with the sub-frame's brackets and engine heater, if installed.

Tighten acc. to: **TIGHTENING TORQUE** . First tighten the screws on the sub-frame's left side, then on the right.

Tighten the screws for the brackets M10.

INSTALLING COMPONENTS ON THE ENGINE AND SUBFRAME

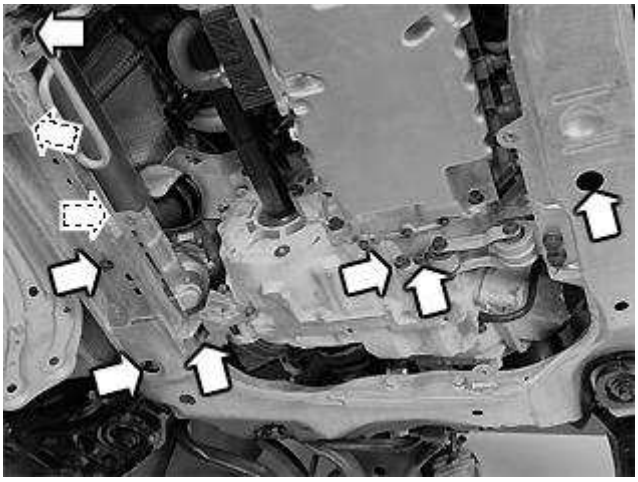


Fig. 346: Identifying Screws And Lock Nuts
Courtesy of VOLVO CARS CORPORATION

Install:

- 4 new M10 lock nuts for the steering gear and 1 M10 screw. Tighten
- 1 M10 screw for the front engine pad. Tighten.

Tighten the M10 screw for the rear engine pad.

Install the mounting for the engine stabilizer brace to the transmission. Use new screws. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** .

INSTALLING THE COLLISION PROTECTION SYSTEM OVER THE STEERING GEAR

Fig. 347: Collision Protection Over Steering Gear
Courtesy of VOLVO CARS CORPORATION

Applies only to right-hand drive cars

Install the 2 screws. Tighten.

INSTALLING THE SERVO PIPE IN THE HOLDERS

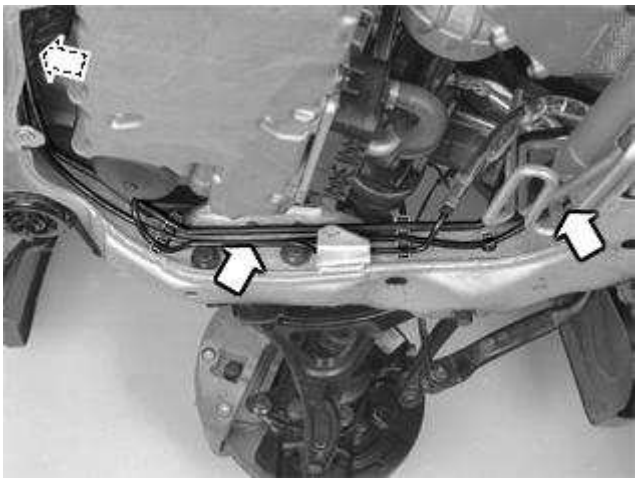


Fig. 348: Identifying Power Steering Line
Courtesy of VOLVO CARS CORPORATION

Press the power steering pipe and the evaporator pipe into the holders on the subframe. (If there is a parking heater, also press its fuel line and the evaporator cable into place)

Install and tighten the clamps for the power steering pipe at the rear of the frame. Tighten the clamp and the clamp for the power steering line at the front edge of the top of the subframe.

INSTALLING THE FRONT MOUNTING FOR THE EXHAUST PIPE

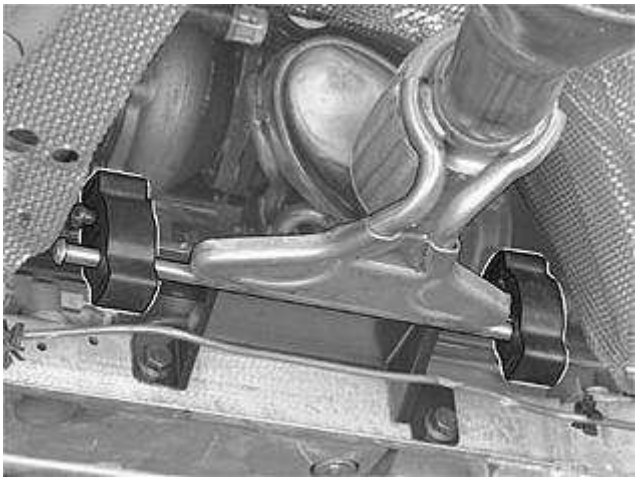


Fig. 349: Identifying Rubber Mounting For The Three-Way Catalytic Converter
Courtesy of VOLVO CARS CORPORATION

Install the rubber mountings for the exhaust system on the brackets on the subframe.

INSTALLING THE CROSS MEMBERS ON THE BODY

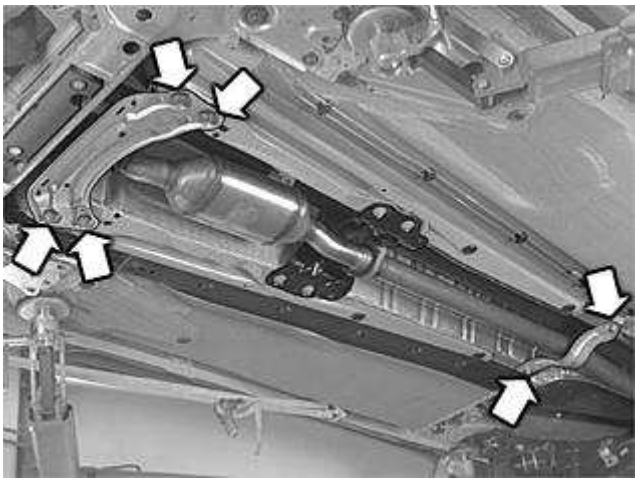


Fig. 350: Identifying Cross Members
Courtesy of VOLVO CARS CORPORATION

Install:

- the M8 screws for the front member
- the brake pipe in the holders on the member
- the M8 screws for the rear member
- the clamp with the heated oxygen sensor (HO2S) cable on the front cross member.

INSTALLING FRONT SUSPENSION COMPONENTS

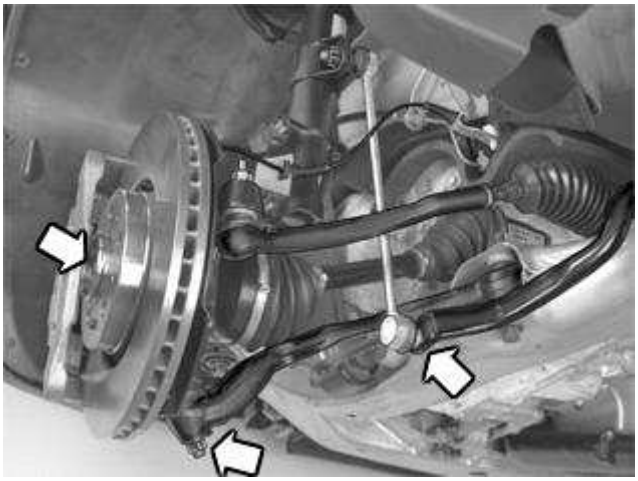


Fig. 351: Front Suspension Components
Courtesy of VOLVO CARS CORPORATION

HINT: Applies when installing front suspension components on both sides.

Install:

- a new M12 lock nut on the ball joint pinion. Counterhold the ball joint pinion while tightening so that the boot cannot turn. Tighten
- the anti-roll bar link. Use a new M10 lock nut. Counterhold the ball joint pinion while tightening so that the boot cannot turn. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** . Tighten the drive shaft screw. Counterhold using a screwdriver in the brake disc vents. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS**
- the soundproofing over the drive shaft (applies to certain versions).

INSTALLING COMPONENTS FOR THE FENDER LINER

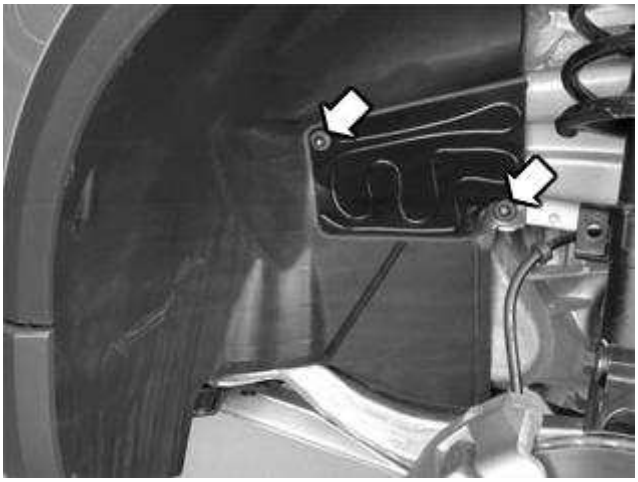


Fig. 352: Identifying Support Plate And Nuts
Courtesy of VOLVO CARS CORPORATION

Install the support plate and the nuts on both sides.

INSTALLING THE CABLE DUCT

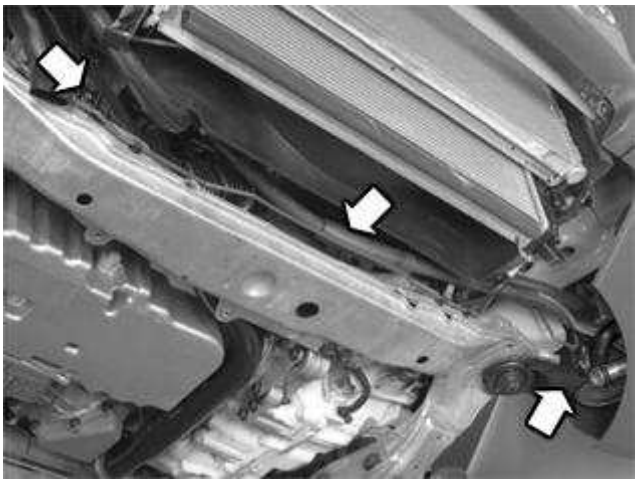


Fig. 353: Cable Duct
Courtesy of VOLVO CARS CORPORATION

Install:

- the cable duct on the subframe
- any parking or additional heaters in the mounting in the subframe and the fuel line in the mountings.

INSTALLING THE FRONT SPLASH GUARD

Fig. 354: Front Splash Guard
Courtesy of VOLVO CARS CORPORATION

Install:

- the splash guard under the engine
- the wheels. See **INSTALLING WHEELS** .

REMOVING THE LIFTING BEAMS

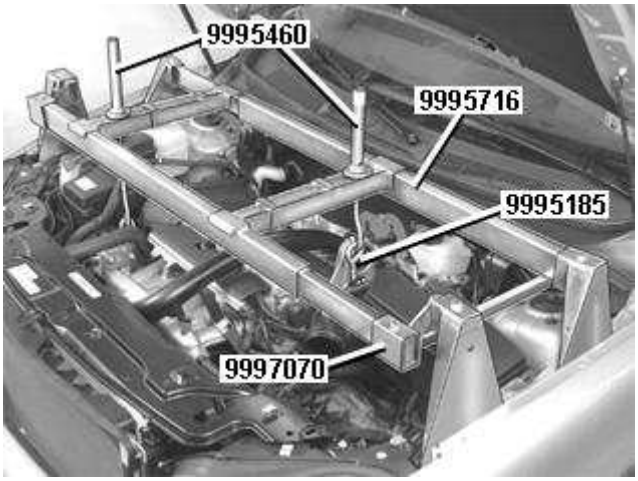


Fig. 355: Identifying Fixture Kit, Lifting Beam And Lifting Hooks
Courtesy of VOLVO CARS CORPORATION

Lower the car.

Remove the lifting beams and hooks from the engine.

INSTALLING THE COOLANT HOSE

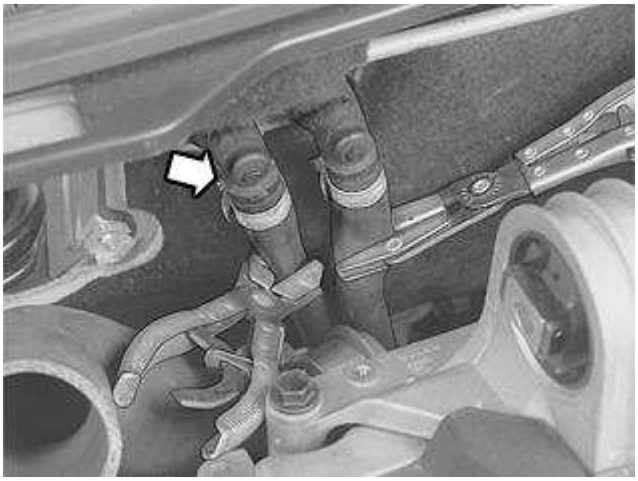


Fig. 356: Coolant Hose In Passenger Compartment
Courtesy of VOLVO CARS CORPORATION

Install the connector securing the engine coolant hose to the heater.

Remove the hose clips.

INSTALLING THE REMAINING SCREWS FOR THE TRANSMISSION AND STARTER MOTOR

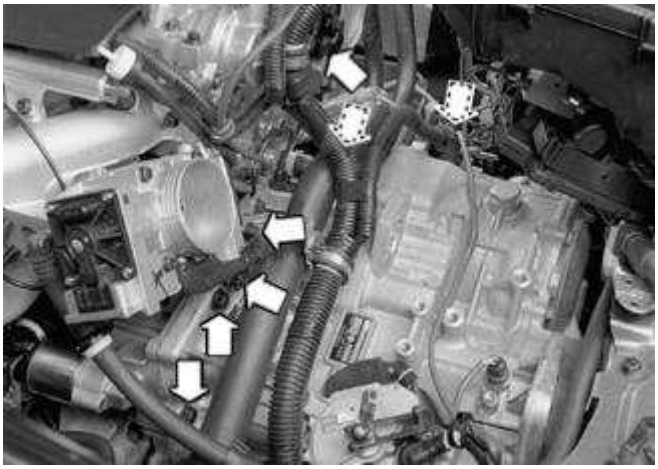


Fig. 357: Identifying Screws
Courtesy of VOLVO CARS CORPORATION

Install:

- the 3 x M10 screws for the transmission and engine. Tighten
- the 2 x M10 screws for the starter motor. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS**
- the bracket for the engine coolant hose and cable harness
- the bracket for the cable harness clamp and the mounting for the heated oxygen sensor (HO2S) connector at the rear edge of the transmission
- the clamp for the cable harness at the rear edge of the engine.

INSTALLING THE GEAR SELECTOR CABLE AND OIL PIPE

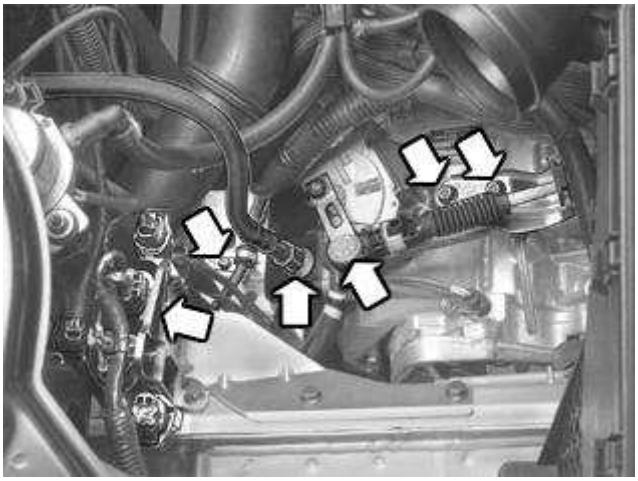


Fig. 358: Identifying Gear Selector Cable, Bracket, Oil Pipe And Connectors
Courtesy of VOLVO CARS CORPORATION

Install:

- the ground lead and mounting on the subframe
- the oil pipe on the transmission
- the gear selector cable and bracket. Use 2 x M8 screws. Tighten.

Connect the cable to the lever. Connect the transmission connectors and the mounting for the air cleaner (ACL) housing bracket. Press the cable harness mounting into place on the control system cover.

NOTE: Check that the transmission bleed hose / valve is not trapped. There is a risk of overpressure in the transmission.

INSTALLING SERVICE CLIPS

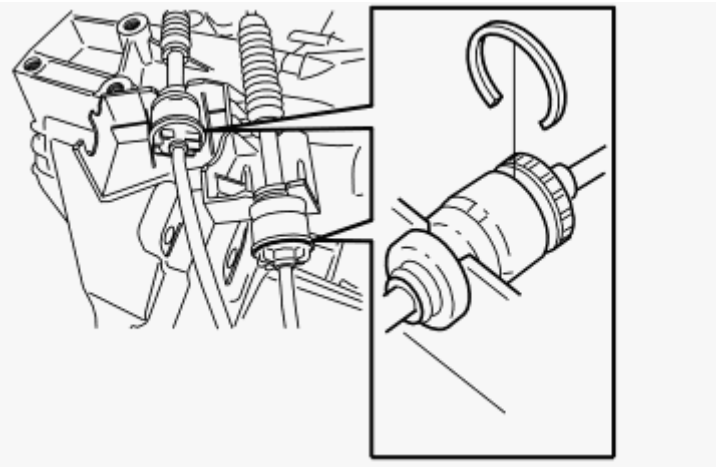


Fig. 359: Gear Selector Cable And Clip
Courtesy of VOLVO CARS CORPORATION

NOTE: The automatic transmission has a gear selector cable while the manual transmission has two gear selector cables.

Ensure that the gear selector cable is engaged before fitting the blue clip. Press the clip into position as illustrated.

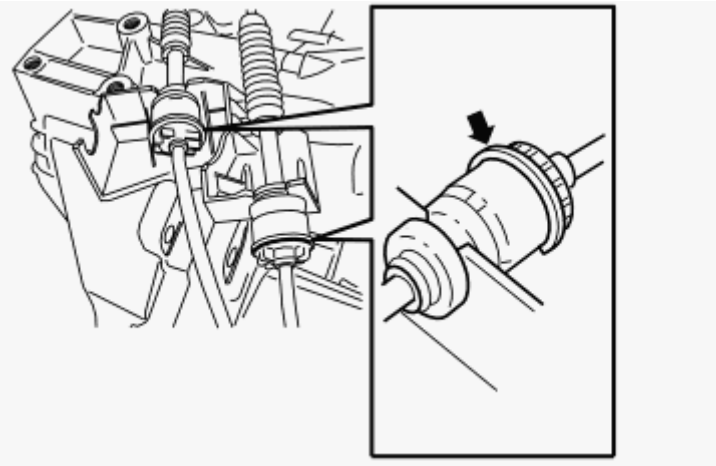


Fig. 360: Clip Positioned In Groove
Courtesy of VOLVO CARS CORPORATION

Check that the clip is positioned in the groove as illustrated.

INSTALLING ENGINE COMPARTMENT COMPONENTS

Fig. 361: Identifying Underhood Components
Courtesy of VOLVO CARS CORPORATION

Install:

- the charge air pipe to the charge air cooler (CAC)
- the air cleaner (ACL) housing assembly with the intake manifold and connections
- hook the turbocharger (TC) control valve into place in the air cleaner (ACL)
- the upper engine stabilizer brace between the wheel arches. Use 4 x M10 screws. Tighten
- 1 x M12 screw for the engine stabilizer brace/engine mounting. Tighten
- the tie strap for the power steering return line in the mounting lug for the engine stabilizer brace on the right side.

Fill with coolant. Carefully check while reaching operating temperature or test driving that the level remains the same and that there is no leakage.

Also see **TRANSMISSION REPLACEMENT, POST-CHECKING** .

CHECKING THE BOOT FOR THE STEERING SHAFT/FIREWALL

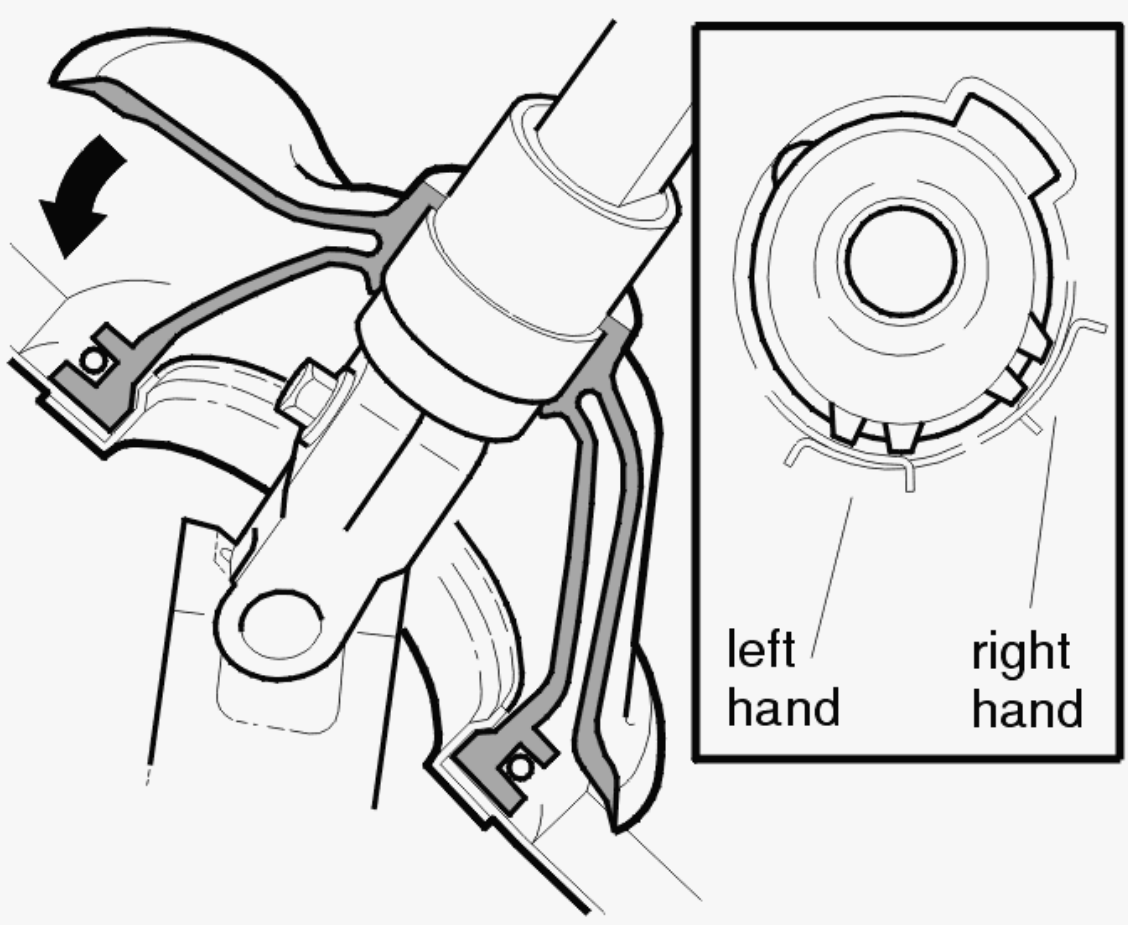


Fig. 362: Identifying Bearing In Boot
Courtesy of VOLVO CARS CORPORATION

Check that the bearing in the boot is in position.

If it has become detached apply a little grease to the edge of the boot (around the hole). Press the bearing back down into the boot.

Check that the boot is correctly positioned against the firewall and that the snap ring is correctly positioned. Adjust if necessary.

NOTE: It is essential that the above checks are carried out. Otherwise there may be noise from the transmission/engine and road noise in the passenger compartment.

INSTALLING THE BATTERY LEAD

Connect the battery lead.

First read **BATTERY, DISCONNECTING** .

FINISHING

Carry out checks after working on the transmission. See **TRANSMISSION REPLACEMENT, POST-CHECKING** .

TRANSMISSION, REMOVING

Special tools:

9985972

9995185

9995460

9995463

9995562

9995681

9995716

9995972

9997070

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

NOTE: Before replacing the transmission, fill in DIAGNOSTICS/CHECK LIST and enclose in the returns box.

REMOVAL

DISCONNECTING THE BATTERY LEAD

Disconnect the battery lead. See **BATTERY, DISCONNECTING** .

REMOVING ENGINE COMPARTMENT COMPONENTS

Fig. 363: Identifying Underhood Components
Courtesy of VOLVO CARS CORPORATION

Remove:

- the engine stabilizer brace between the suspension turrets and the engine
- the air cleaner (ACL) housing assembly with the intake pipe.

Unhook the turbocharger (TC) control valve from the air cleaner (ACL) housing.

Pull the air cleaner (ACL) housing out of its mountings.

REMOVING THE CHARGE AIR PIPE

Fig. 364: Heating Around Pipe At Charge Air Cooler
Courtesy of VOLVO CARS CORPORATION

Detach the charge air pipe from the charge air cooler (CAC).

Carefully heat around the pipe at the charge air cooler (CAC). Use a hot air gun. Loosen and remove the pipe.

REMOVING COMPONENTS FROM THE TRANSMISSION

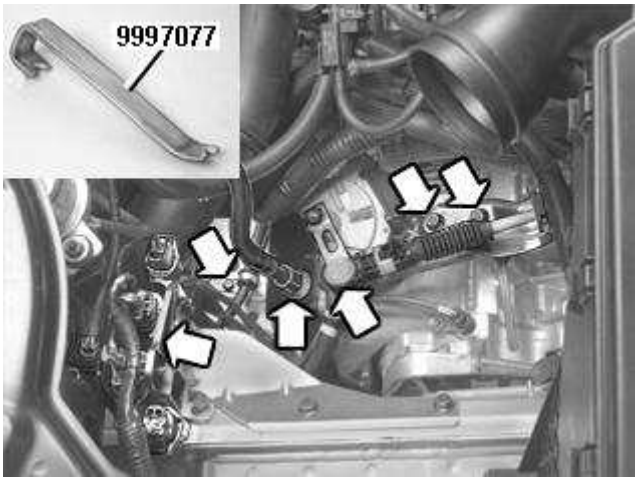


Fig. 365: Gear Selector Cable And 999 7077
Courtesy of VOLVO CARS CORPORATION

Remove:

- the gear selector cable. Use jimmy tool **9997077** to detach the ball joint for the cable from the lever
- the cable mounting from the transmission
- the oil line from the transmission. Plug the line and the connection on the transmission cover
- unhook the mounting with the connector for the transmission from the bracket. Separate all the connectors.

REMOVING THE TRANSMISSION MOUNTING SCREWS

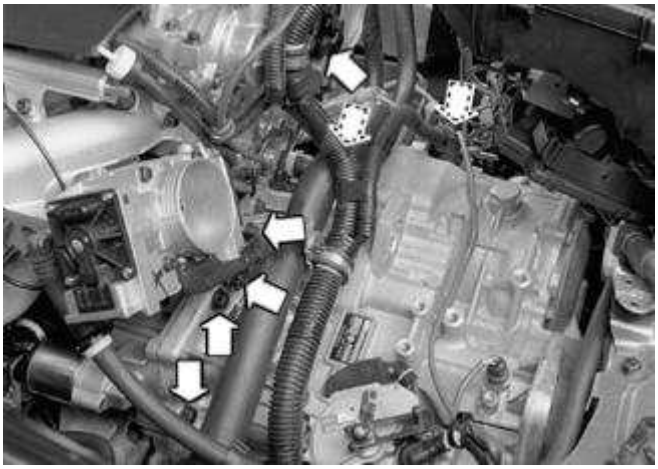


Fig. 366: Identifying Screws
Courtesy of VOLVO CARS CORPORATION

Remove the bracket with the connectors for the heated oxygen sensors (HO2S) and the clamp for the cable harness from the transmission.

Remove:

- the screws for the clamp securing the cable harness at the rear edge of the engine
- the nut for the bracket for the cable harness and the engine coolant hose
- the 3 screws for the transmission and engine and the 2 screws for the starter motor. Tie up the cable harness.

REMOVING THE COOLANT HOSE FROM THE PASSENGER COMPARTMENT HEATER

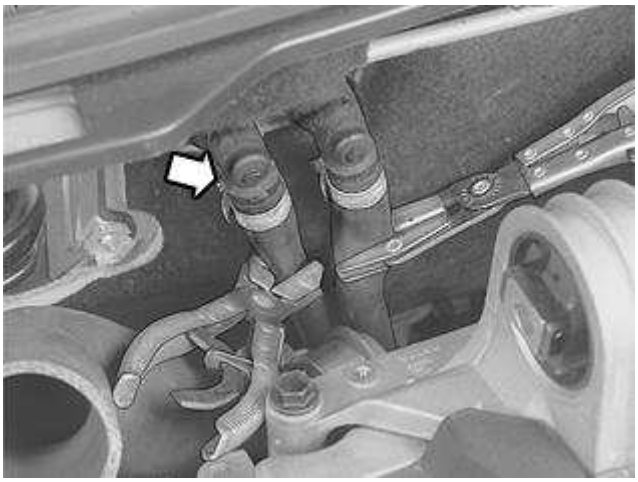


Fig. 367: Coolant Hose In Passenger Compartment
Courtesy of VOLVO CARS CORPORATION

Clamp the hoses with hose clips.

Place some paper under the inner hose connection to collect any spilled coolant.

Turn the quick-release connector (the inner of the two hoses) slightly in the direction of the arrow so that the lock opens. At the same time, pull the coolant hose straight out of the coolant pipe.

NOTE: Tie the hose up to the engine so that it does not fall down and trap the hose connector between the firewall during installation.

INSTALLING THE LIFTING BEAMS AND LIFTING HOOKS ON THE ENGINE LIFTING LUGS

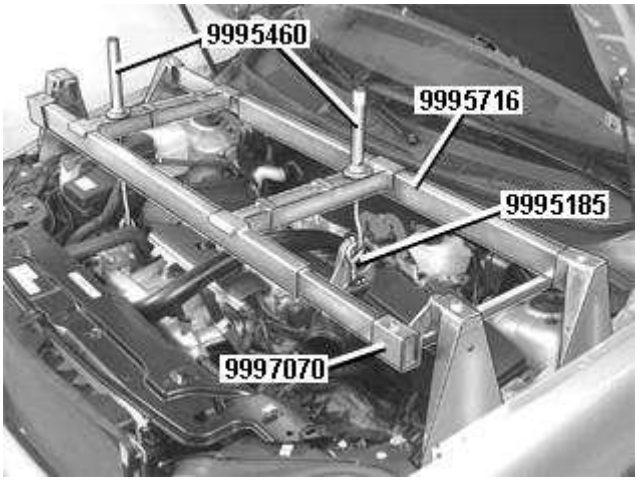


Fig. 368: Identifying Fixture Kit, Lifting Beam And Lifting Hooks
Courtesy of VOLVO CARS CORPORATION

NOTE: The front lifting beam must be equipped with fixture kit 9997070 as illustrated.

Position lifting beam **9995716** on the wheel arch and directly above the engine lifting eyelets on the left and right sides.

Connect the lifting hooks **9995460** on the engine lifting lugs.

On the right side of the engine, the hook must have a clearance of **10 mm** . Also use lifting lug **9995185** on the left side of the engine. Tighten to light contact on the left hand side.

Raise the car

REMOVING BOTH THE FRONT WHEELS

Fig. 369: Front Splash Guard
Courtesy of VOLVO CARS CORPORATION

Remove:

- the front splash guard. See **SUB-FRAME FRONT, REPLACING (2007)** or **SUB-FRAME FRONT, REPLACING (2003-2006)**
- the splash guard under the engine.

REMOVING COMPONENTS FROM THE SUB-FRAME

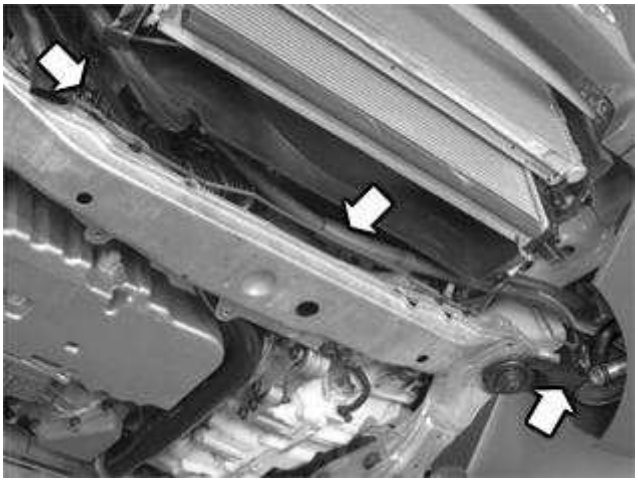


Fig. 370: Cable Duct
Courtesy of VOLVO CARS CORPORATION

Remove the screw for the cable duct. Unhook the cable duct from the sub-frame.

For cars with fuel powered parking heaters:

Remove the 2 screws for the heater.

Unhook the heater from the mounting. Leaving it hanging in its upper mounting.

Detach the fuel line for the heater from the holders on the sub-frame.

REMOVING THE CROSS MEMBERS FROM THE BODY

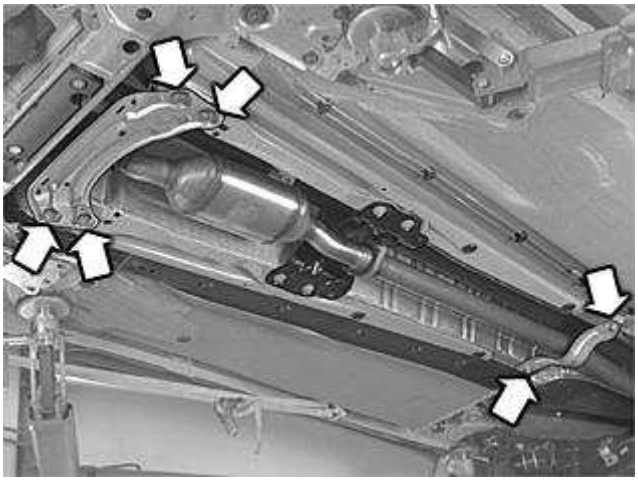


Fig. 371: Identifying Cross Members
Courtesy of VOLVO CARS CORPORATION

Remove:

- the clamp for the heated oxygen sensor (HO2S) cable and the screws for the front member
- the brake pipe from the holders on the member
- the rear member. Remove one screw and slacken off the other.

Turn the member to the side so that the exhaust pipe is exposed.

REMOVING THE FRONT MOUNTING FOR THE EXHAUST PIPE

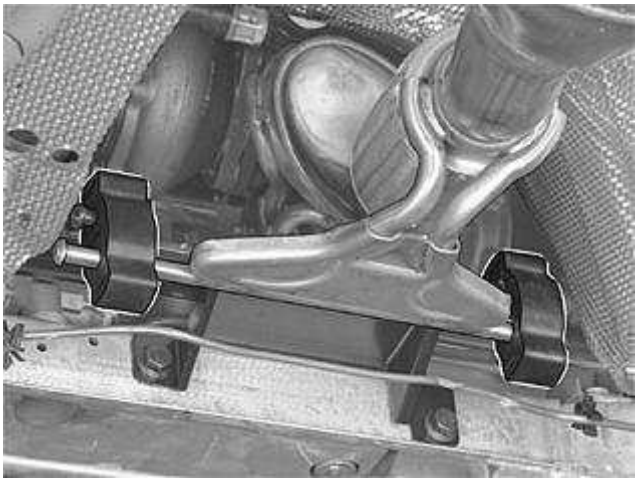


Fig. 372: Identifying Rubber Mounting For The Three-Way Catalytic Converter
Courtesy of VOLVO CARS CORPORATION

Remove rubber mounting for the exhaust system from the brackets.

REMOVING THE SCREWS AND NUTS FOR THE ENGINE PAD, ENGINE STABILIZER BRACE AND STEERING GEAR

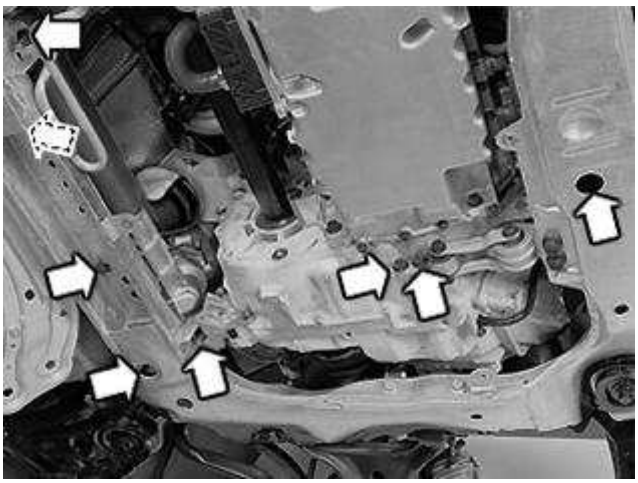


Fig. 373: Identifying Engine Pad And Screws

Courtesy of VOLVO CARS CORPORATION

Remove:

- the screw for the front engine pad
- the screws for the torque rod
- the screw and nuts for the steering gear.

DETACHING THE POWER STEERING LINE

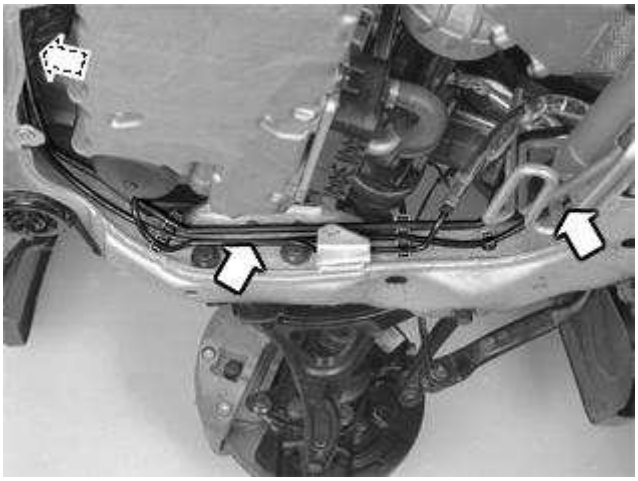


Fig. 374: Identifying Power Steering Line
Courtesy of VOLVO CARS CORPORATION

Remove:

- the screw for the clamp for the power steering line at the front edge of the top of the sub-frame
- the screw for the clamp for the power steering line on the right side at the rear edge of the frame.

Unhook the servo and the evaporator lines from the holders on the right side of the sub-frame.

REMOVING FRONT SUSPENSION COMPONENTS (BOTH SIDES)

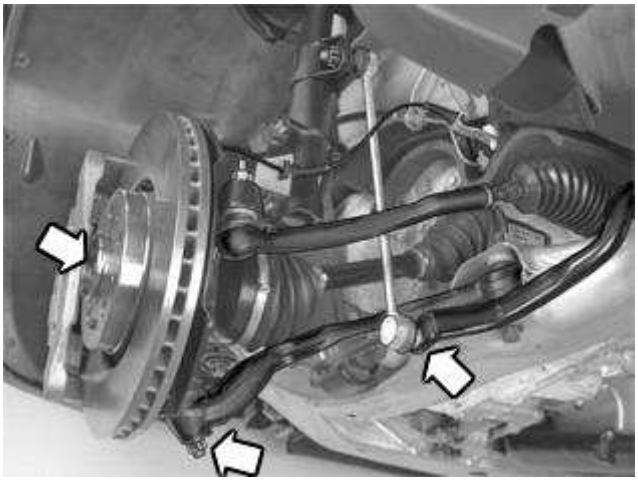


Fig. 375: Front Suspension Components
Courtesy of VOLVO CARS CORPORATION

Remove:

- the soundproofing over the drive shaft (applies to certain versions)
- the screw for the drive shaft. Counterhold using a screwdriver in the brake disc vents. Tap in the end of the drive shaft approximately **20 mm** into the wheel hub
- the link from the anti-roll bar. Counterhold using a Torx wrench in the ball joint pinion to prevent the boot from turning
- the nut for the ball joint / link arm. Clean the exposed threads outside the nut. Spray using rust solvent before removing the nut.

DISCONNECTING THE BALL JOINT PINION FROM THE CONTROL ARM (BOTH SIDES)

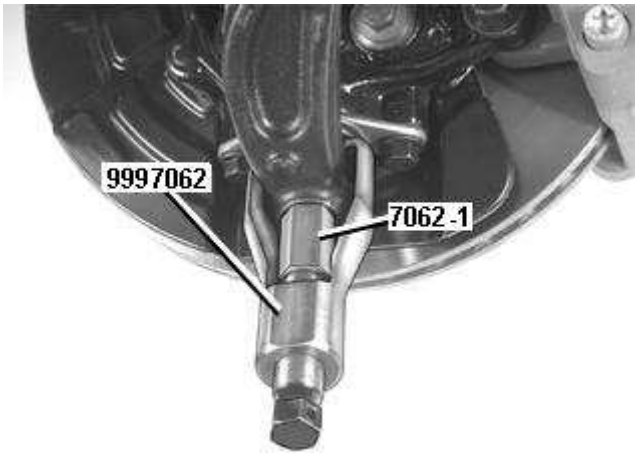


Fig. 376: Disconnecting Ball Joint Pinion From Control Arm Using 999 7062
Courtesy of VOLVO CARS CORPORATION

Use tool **9997062** . Install cap nut **9997062** for the ball joint pinion. Tighten the nut to the control arm. Then slacken off 1 to 2 turns so that there is clearance between the cap nut and the control arm.

Position puller **9997062** on the control arm and detach the ball joint from the control arm.

Remove the tools.

REMOVING FENDER LINER COMPONENTS (BOTH SIDES)

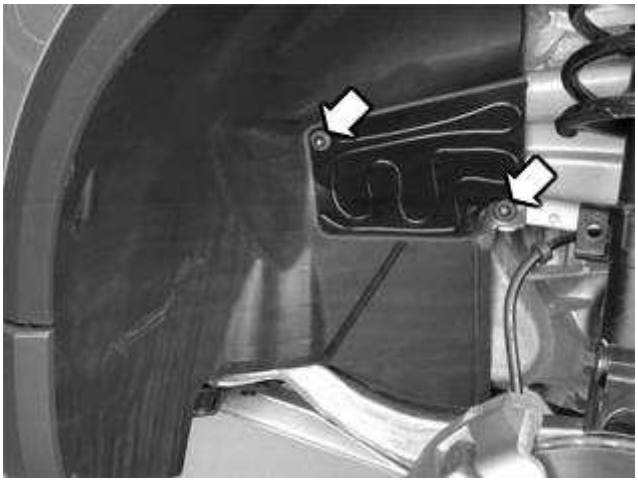


Fig. 377: Identifying Support Plate And Nuts
Courtesy of VOLVO CARS CORPORATION

Slacken off the 2 nuts for the fender liner and the support plate on both sides so that the fender liner can be folded out.

REMOVING THE SCREWS FOR THE SUB-FRAME SUPPORT PLATES (BOTH SIDES)

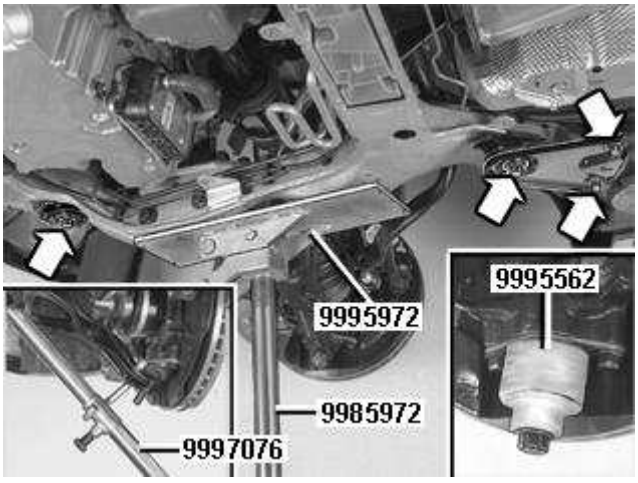


Fig. 378: Identifying Screws And Sub-Frame Support Plates
Courtesy of VOLVO CARS CORPORATION

Remove the screws for the sub-frame support plates in the body (both sides).

Position mobile jack **9985972** with universal plate **9995972** , so that the plate is in light contact under the right side of the sub-frame.

Slacken off the screws for the sub-frame on the right hand side. Ensure that the nuts are still secured by at least 5 threads.

Remove the jack.

Unhook the control arm from the ball joint. Install protective sleeve **9995562** . Hold the sleeve in place using the nut for the ball joint.

Work out the spring strut. Detach the drive shaft from the wheel hub. Do not damage the boot. Hold the spring strut to one side using a retaining strap for more space when removing the drive shaft.

REMOVING THE RIGHT DRIVE SHAFT

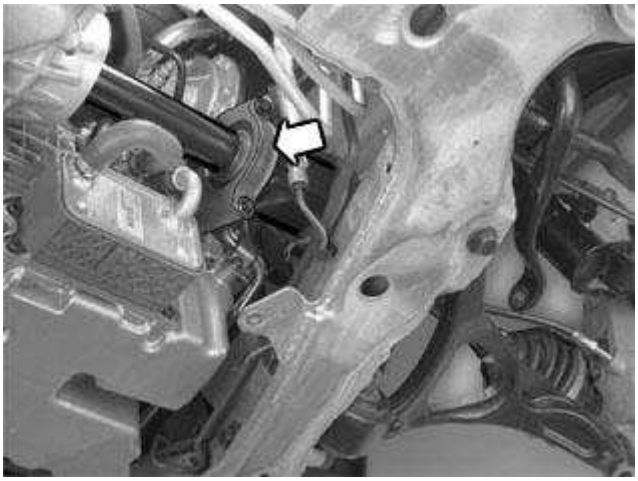


Fig. 379: Drive Shaft Support Bearing Cap
Courtesy of VOLVO CARS CORPORATION

Remove:

- the support bearing cap for the drive shaft
- the drive shaft by pulling it straight out of the transmission.

REMOVING THE COLLISION PROTECTION SYSTEM OVER THE STEERING GEAR

Fig. 380: Collision Protection Over Steering Gear
Courtesy of VOLVO CARS CORPORATION

NOTE: Applies only to right-hand drive cars.

Remove the 2 screws for the collision protection system.

Leave the collision protection system in place on the steering gear.

LOWERING THE SUB-FRAME

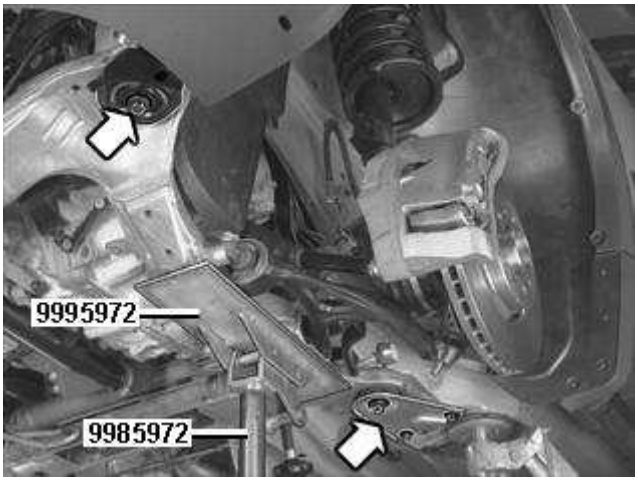


Fig. 381: Identifying Mobile Jack & Sub-Frame
Courtesy of VOLVO CARS CORPORATION

NOTE: For cars with fuel powered parking heaters: mark up the position of the mounting in relation to the sub-frame.

Position the mobile jack lightly applied under the left side of the sub-frame. Remove the sub-frame screws.

NOTE: Ensure the following when lowering the sub-frame:

- **that the steering gear screws release from the sub-frame**
- **that the brake pipe does not catch in the bracket for the exhaust pipe mounting**
- **that the ball joint pinion releases from the control arm.**

Remove the mobile jack and let the frame hang loose.

REMOVING THE DRIVE SHAFT FROM THE WHEEL HUB

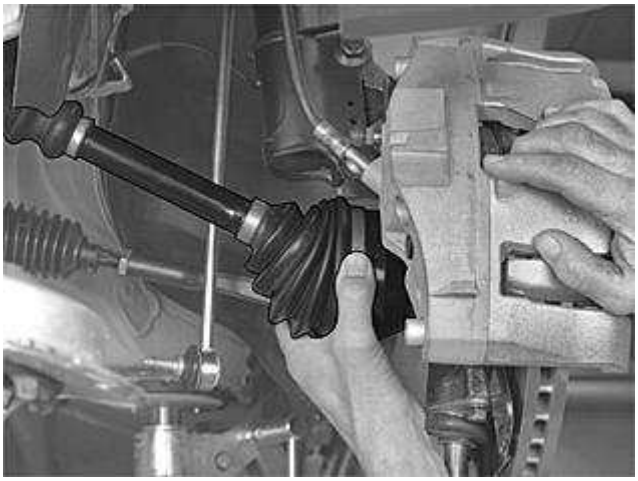


Fig. 382: Identifying Drive Shaft And Wheel Hub
Courtesy of VOLVO CARS CORPORATION

Work out the spring strut. Detach the drive shaft from the wheel hub. Hold the spring strut to one side using a retaining strap to obtain more space when removing the transmission.

REMOVING THE DRIVE SHAFT FROM THE TRANSMISSION

Fig. 383: Identifying Drive Shaft At Gearbox & Tool 999 5681
Courtesy of VOLVO CARS CORPORATION

Remove the drive shaft from the transmission. Use jimmy bar **9995681** .

REMOVING THE REAR ENGINE MOUNTING

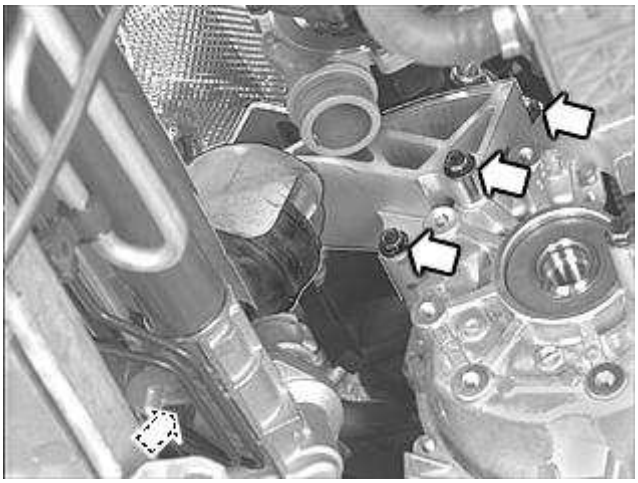


Fig. 384: Identifying Rear Engine Mounting
Courtesy of VOLVO CARS CORPORATION

Remove:

- the screw for the engine pad/steering gear
- the 3 screws
- the mounting and the engine pad.

HANGING UP THE STEERING GEAR

Fig. 385: Identifying Steering Gear & Tie Strap
Courtesy of VOLVO CARS CORPORATION

Hang up the steering gear in a tie strap. Use the hole in the body.

REMOVING THE SCREWS FROM THE TORQUE CONVERTER

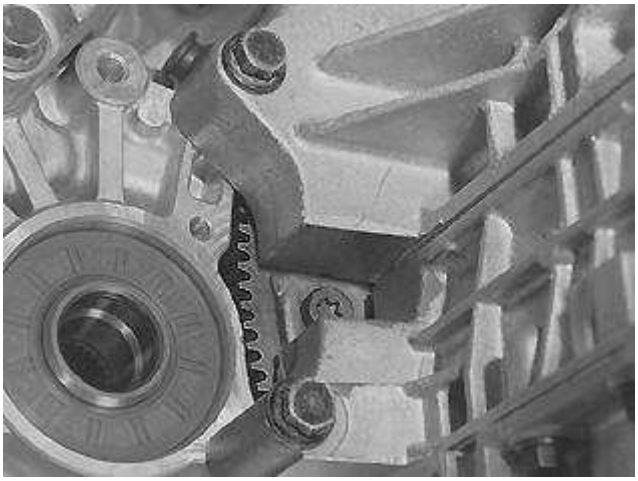


Fig. 386: Identifying Torque Converter Screws
Courtesy of VOLVO CARS CORPORATION

Remove the 6 screws for the torque converter. Turn the engine with a ratchet and socket. Fold out the right fender liner so that the crankshaft nut can be accessed.

Use a Torx TX50 socket on the torque converter screws.

REMOVING THE OIL PIPE FROM THE TRANSMISSION

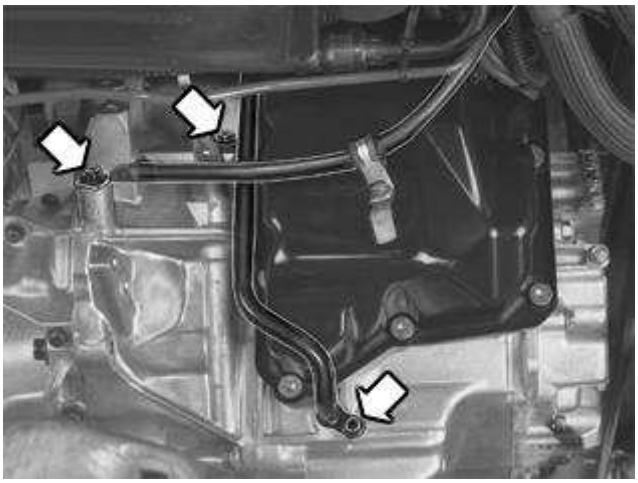


Fig. 387: Identifying Oil Pipe
Courtesy of VOLVO CARS CORPORATION

Position a container under the pipe terminal.

Remove:

- the 2 screws holding the pipe. Disconnect the pipe from the transmission. Install sealing plugs in the pipe and transmission. Carefully fold the hose out of the way
- the ground lead from the transmission.

LOWERING THE ENGINE AND THE TRANSMISSION

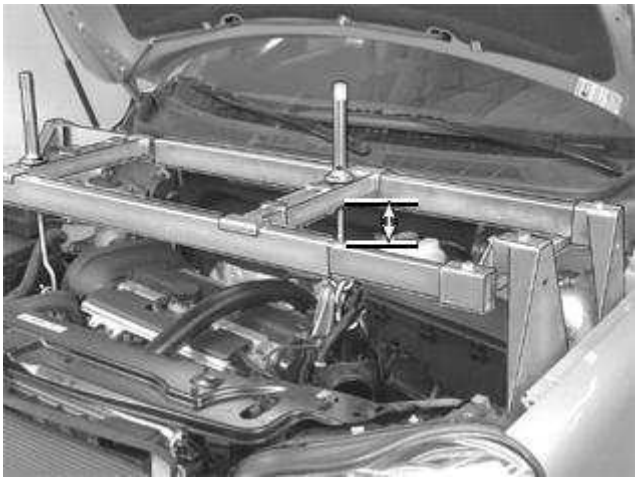


Fig. 388: Identifying Free Threads On Lifting Hook
Courtesy of VOLVO CARS CORPORATION

Lower the engine and transmission on the left side using the hook.

Check that no hoses or cables are being stretched or trapped when the engine is lowered.

Lower the engine so that **90-100 mm** of the free threads on the lifting hook can be seen.

Raise the car.

INSTALLING THE FIXTURE ON THE MOBILE JACK AND TRANSMISSION

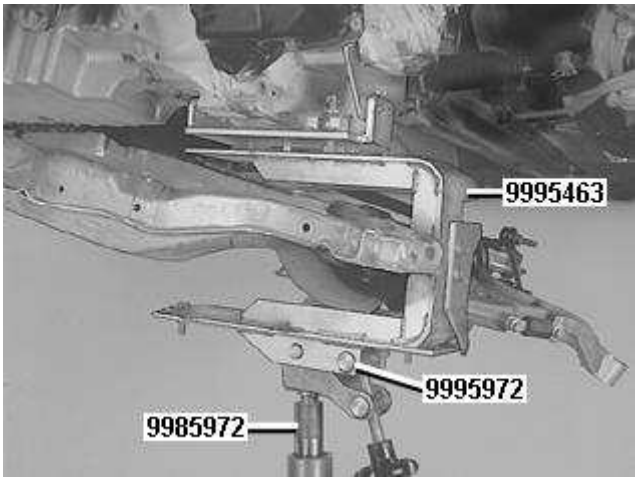


Fig. 389: Fixture Installed On Mobile Jack And Gearbox
Courtesy of VOLVO CARS CORPORATION

Raise the car.

Install fixture **9995463** on fixture **9995972** . Use the fixture and plate together with mobile jack **9985972** . Align

support plate 999 5463-2 against the fixture and the transmission.

NOTE: The support plate is installed on the inside of the fixture mounting lug (see the illustration). Tighten the fixture with the two torque rod screws. Apply the mobile jack lightly against the transmission.

REMOVING ALL THE SCREWS FOR THE TRANSMISSION AND ENGINE

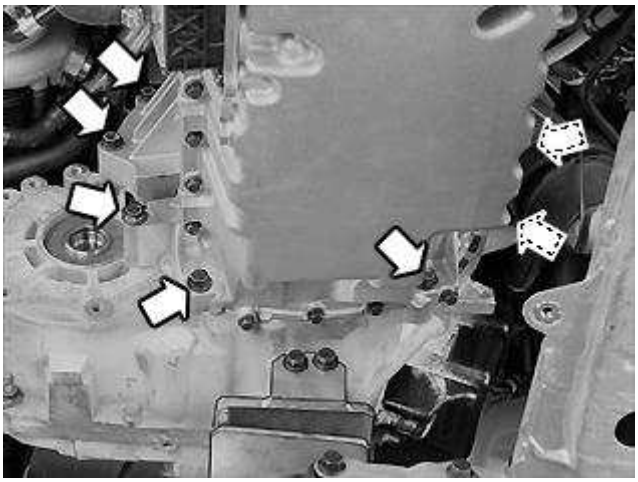


Fig. 390: Gearbox And Engine Screws
Courtesy of VOLVO CARS CORPORATION

Remove the remaining 7 screws for the transmission and engine.

REMOVING THE TRANSMISSION

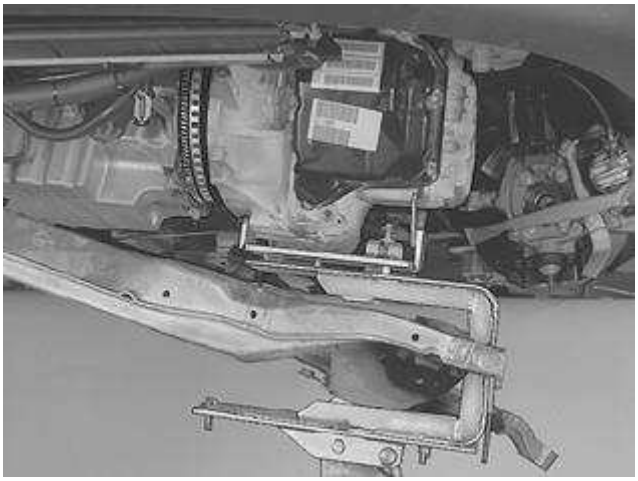


Fig. 391: Adjusting Height & Angle Using Mobile Jack And Gearbox Fixture
Courtesy of VOLVO CARS CORPORATION

Ensure that the transmission is taken straight out in relation to the engine.

Ensure that the torque converter is removed with the transmission and does not slide off the stator shaft.

Press a screwdriver through one of the screw holes in the carrier plate.

NOTE: Do not pry toward the carrier plate rim for the flywheel sensor.

NOTE: Lower the transmission slightly when it is being removed so that it will pass the side member.

Remove the transmission.

TRANSMISSION, AUTOMATIC (B6294T, 4T65 AWD; 2003-2006)

CONTROL SYSTEM / VALVE HOUSING, INSTALLING

TRANSFERRING THE BALLS TO THE NEW VALVE HOUSING

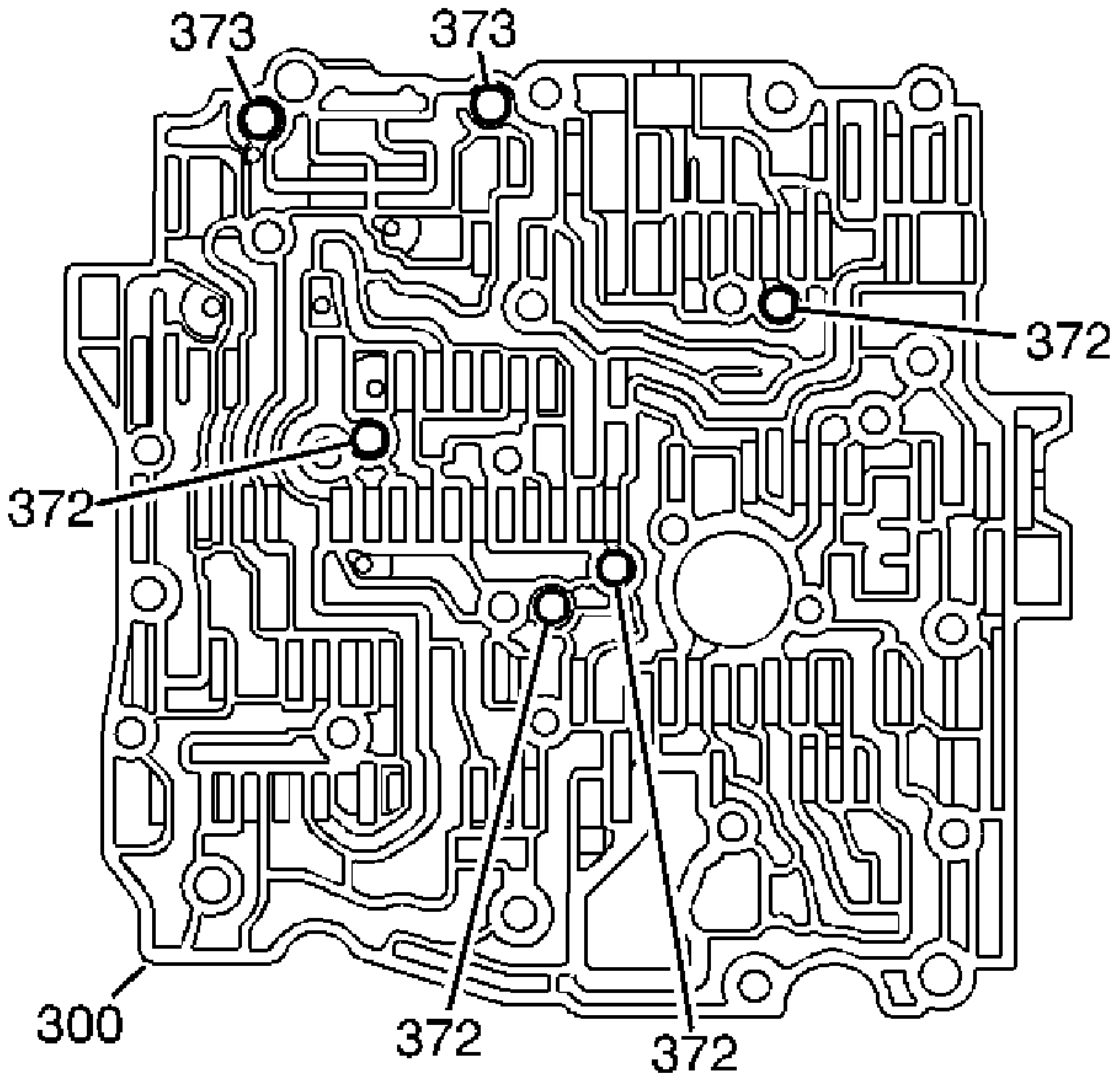


Fig. 392: Locating Balls In Valve Housing
Courtesy of VOLVO CARS CORPORATION

Use Volvo Genuine parts petroleum jelly P/N 116 11 51-4 so that the balls remain in the relevant ducts during the installation of the valve housing.

Transferring

Balls 373 (two). Apply petroleum jelly to each duct. Install the balls (the petroleum jelly should cover the balls).

Balls 372 (four). Apply petroleum jelly to each duct. Install the balls.

CHECKING THE BALLS IN THE VALVE HOUSING

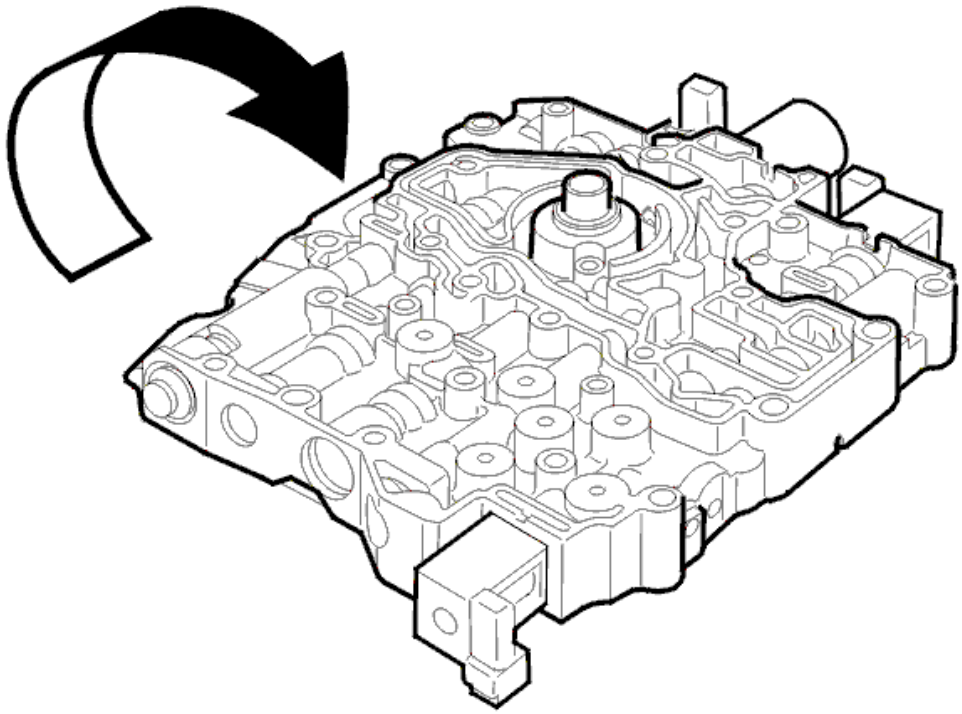


Fig. 393: Identifying Turning The Valve Housing
Courtesy of VOLVO CARS CORPORATION

Turn the valve housing so that the balls are upside down.

The balls should remain position. (If any of the balls fall out, use more petroleum jelly).

Turn the valve housing back again.

INSTALLING NEW GASKETS

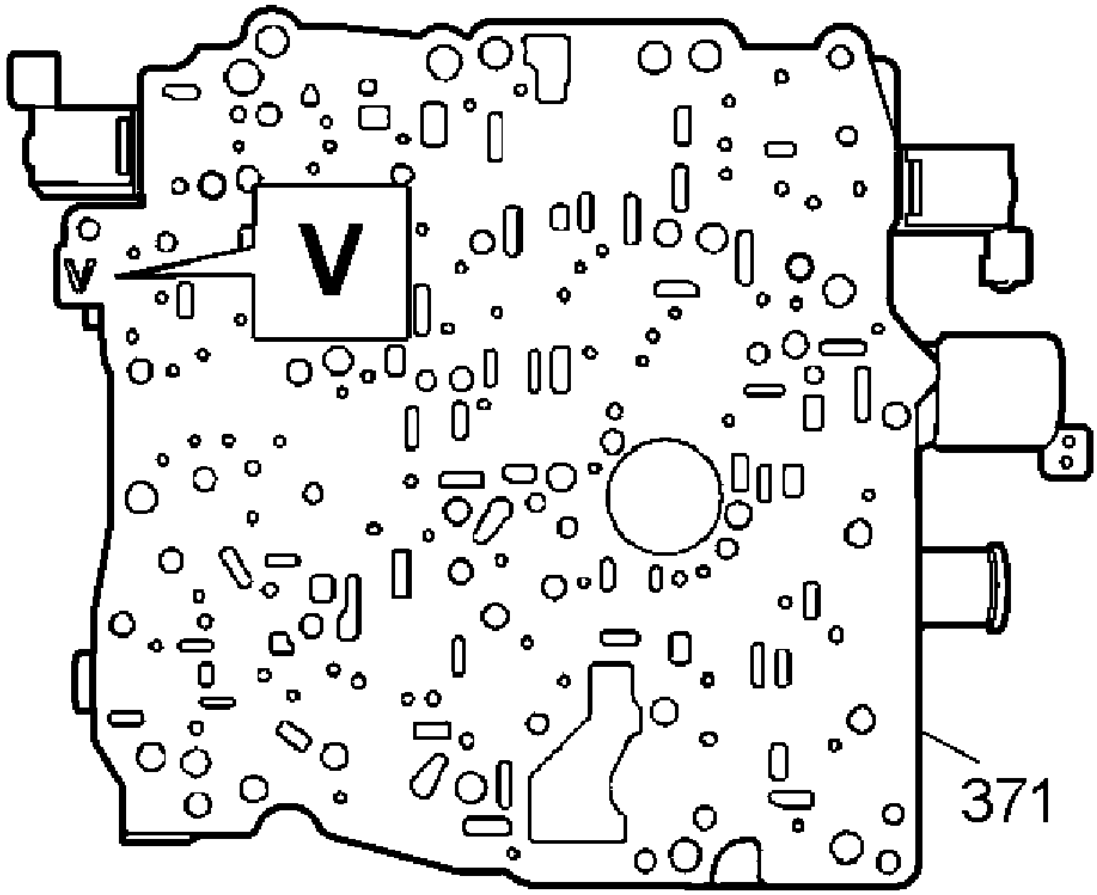


Fig. 394: Identifying Gasket 371
Courtesy of VOLVO CARS CORPORATION

CAUTION: Make sure that the gaskets are correctly positioned.

Install gasket 371 marked V on the valve housing.

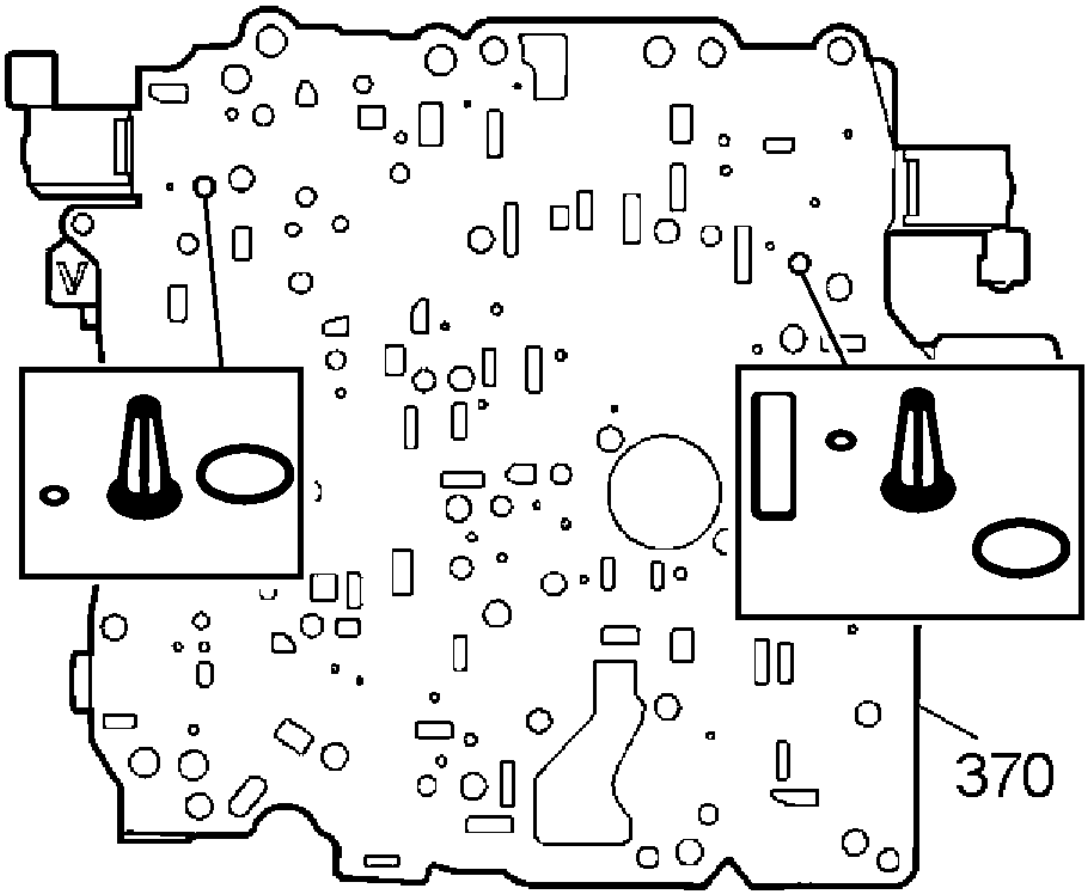


Fig. 395: Identifying Distribution Plate 370
Courtesy of VOLVO CARS CORPORATION

Install the distribution plate 370 on the gasket.

The strainers must be replaced if they are damaged. See the illustration for their positions.

Lock the gasket and the distribution plate in the valve housing using the two plastic plugs. Apply a little petroleum jelly to the outer ends of the distribution plate so that the gasket C does not slide.

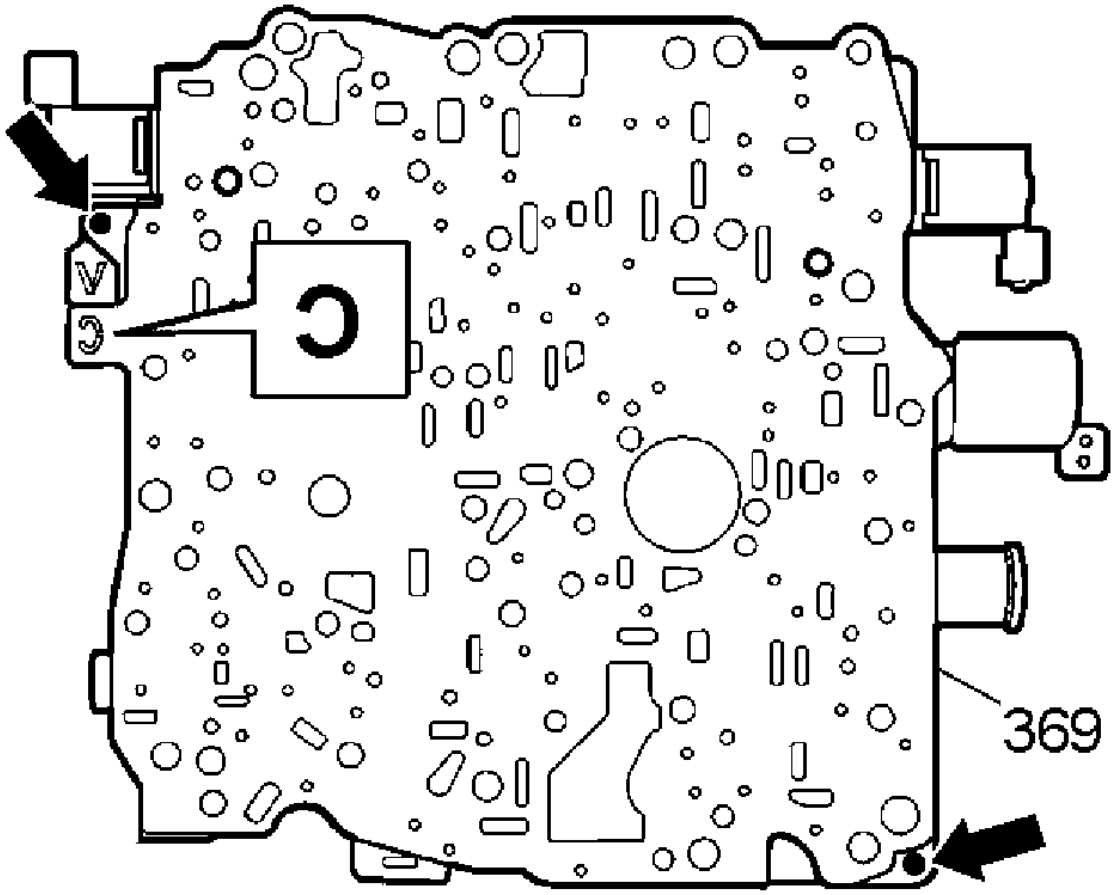


Fig. 396: Identifying Gasket 369
Courtesy of VOLVO CARS CORPORATION

Install gasket 369 marked C on the distribution plate.

REPLACING THE SEAL ON THE PUMP SHAFT

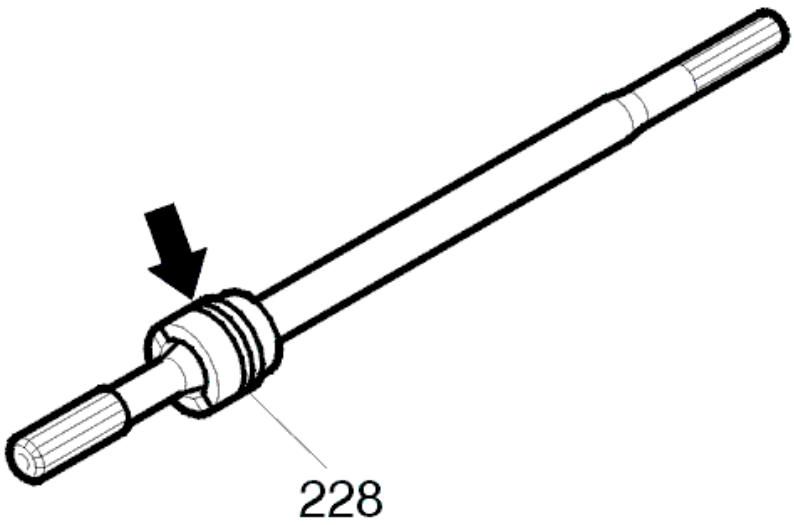


Fig. 397: Identifying Pump Shaft Seal
Courtesy of VOLVO CARS CORPORATION

Pull out the pump shaft.

Replace the seal around the shaft.

Reinstall the pump shaft.

INSTALLING THE BALLS FOR THE CONTROL SYSTEM HOUSING

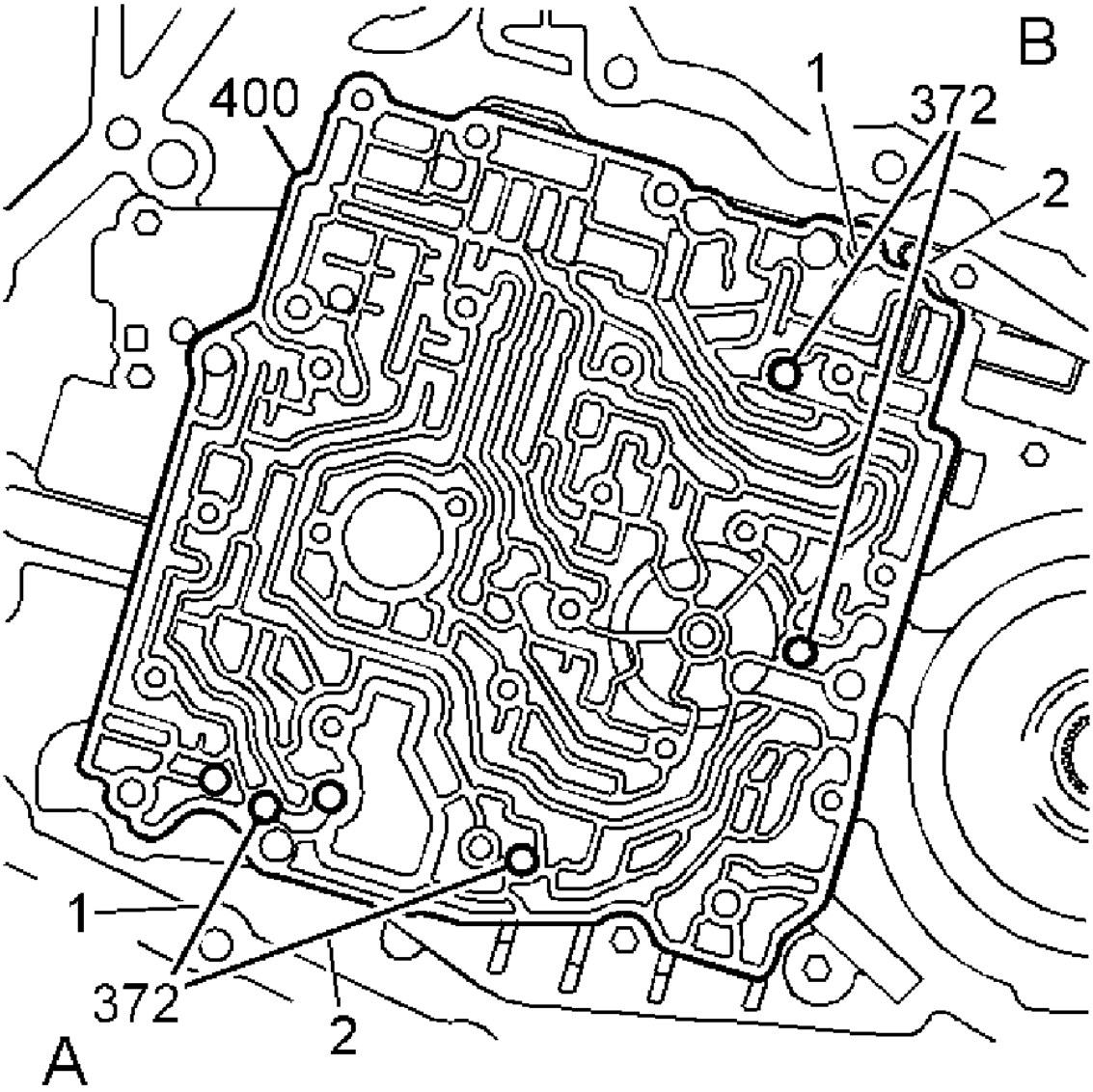


Fig. 398: Locating Control System Housing Balls
Courtesy of VOLVO CARS CORPORATION

Apply petroleum jelly (P/N 116 11 51-4) to each duct (372) for the balls.

Reinstall the balls. Ensure that the petroleum jelly holds the balls in place in the housing.

INSTALLING THE VALVE HOUSING ON THE CONTROL SYSTEM HOUSING

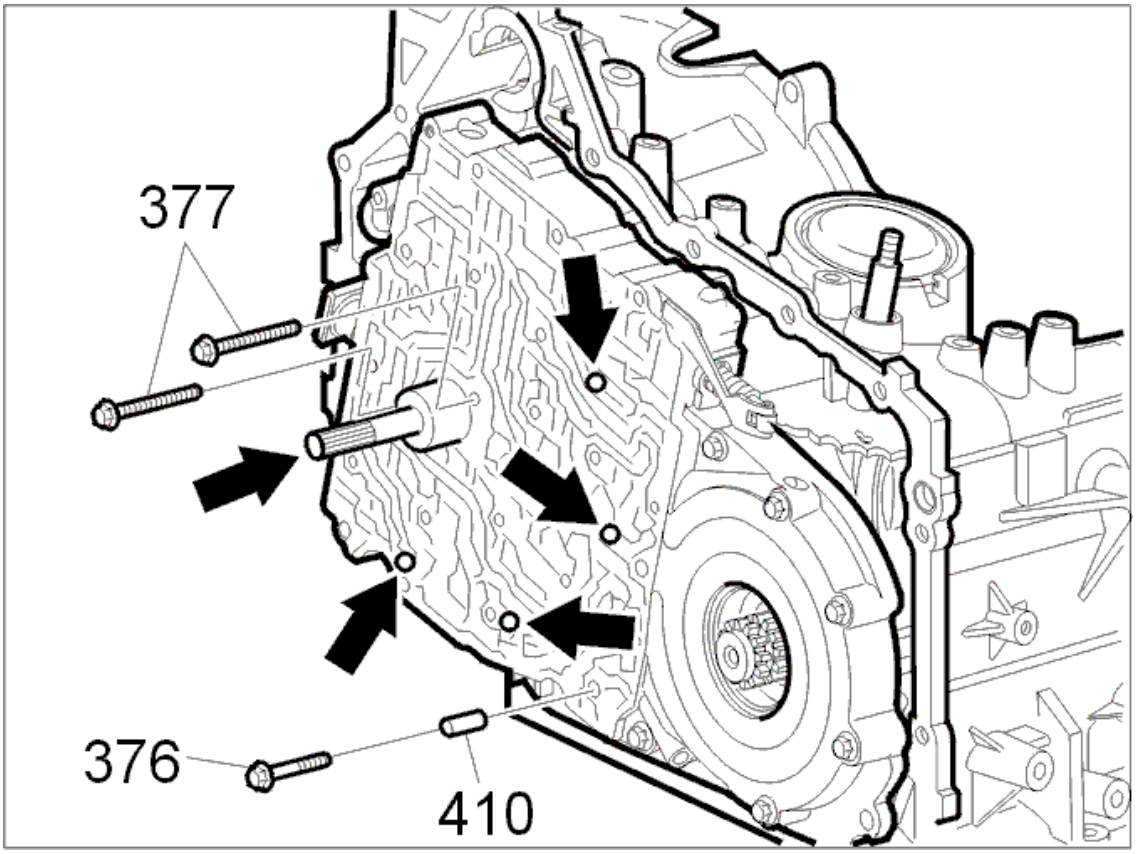


Fig. 399: Identifying Installing Valve Housing To Control System Housing
Courtesy of VOLVO CARS CORPORATION

Preparations

Check that:

- the surface of the valve housing is clean

NOTE: Use lint-free paper.

- the balls remain in the petroleum jelly
- the pump shaft is in position
- the screws 377 to secure the valve housing are to hand
- the screw 376 and guide sleeve 410 are to hand.

INSTALLING THE VALVE HOUSING

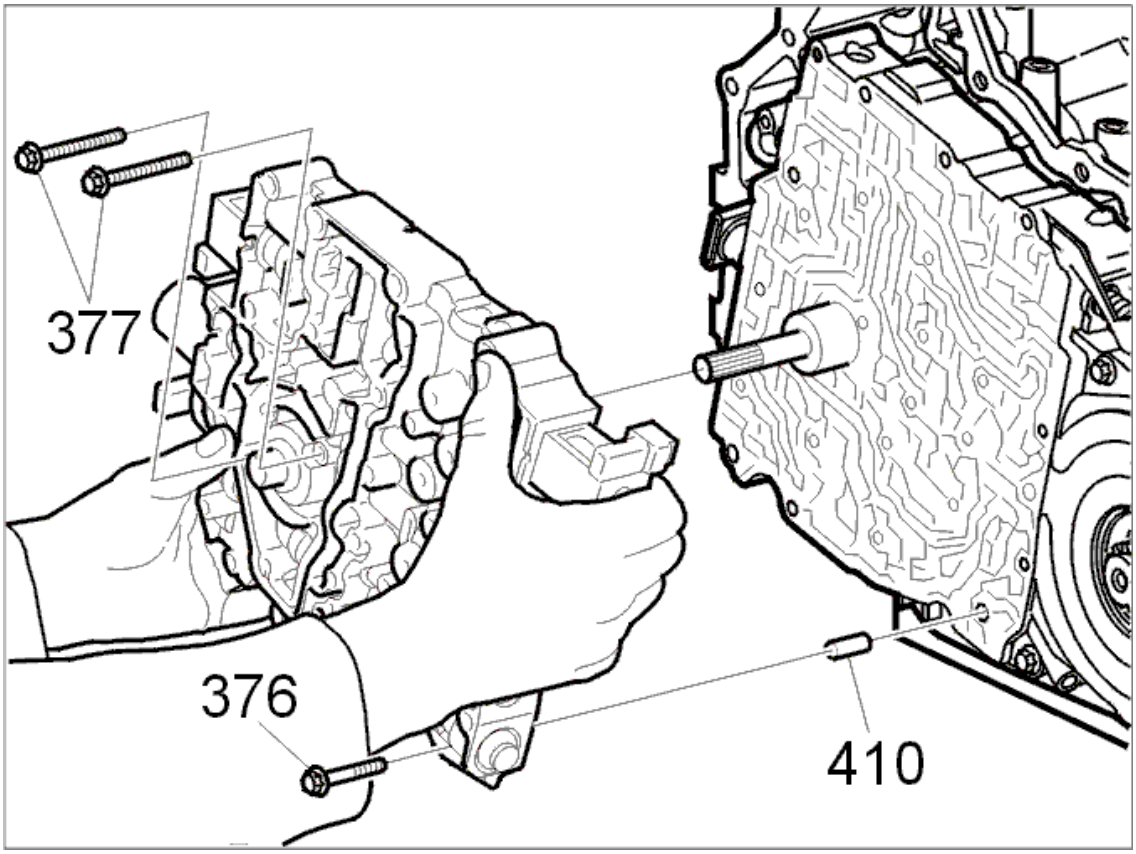


Fig. 400: Identifying Removing/Installing Valve Housing
Courtesy of VOLVO CARS CORPORATION

Carefully install the valve housing over the pump shaft (Be careful with the (2) strainers).

CAUTION: The valve housing may not be twisted.

Hold it in position against the housing and install the screws 377, lightly tightened.

Install **guide sleeve** 410 and the screw 376 on the valve housing tightened lightly.

NOTE: The guide sleeve ensures that the distribution plate/valve housing are positioned correctly.

TRANSFERRING

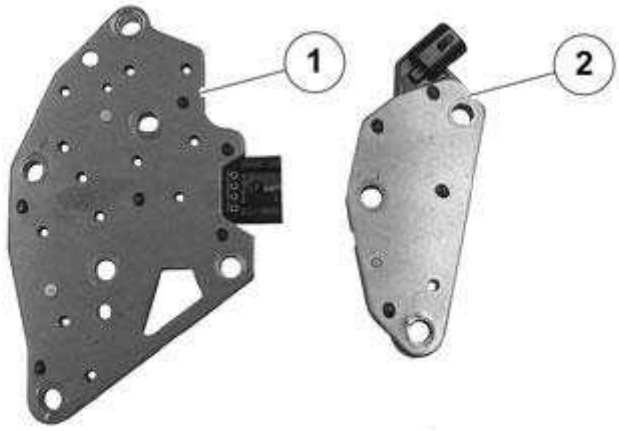


Fig. 401: Identifying Pressure Switch
Courtesy of VOLVO CARS CORPORATION

1. Pressure switch -2002
2. Pressure switch 2003-

CAUTION: The screws are of different lengths. It is important that the screws are installed in the right place.

CONTROL SYSTEM FOR CARS OF MODEL YEAR -2002

Transfer the pressure sensor to the new valve housing.

NOTE: Note the position of screws 381 in the illustration (the screws are self-tapping).

Install the remaining screws for the valve housing.

TIGHTENING TORQUE

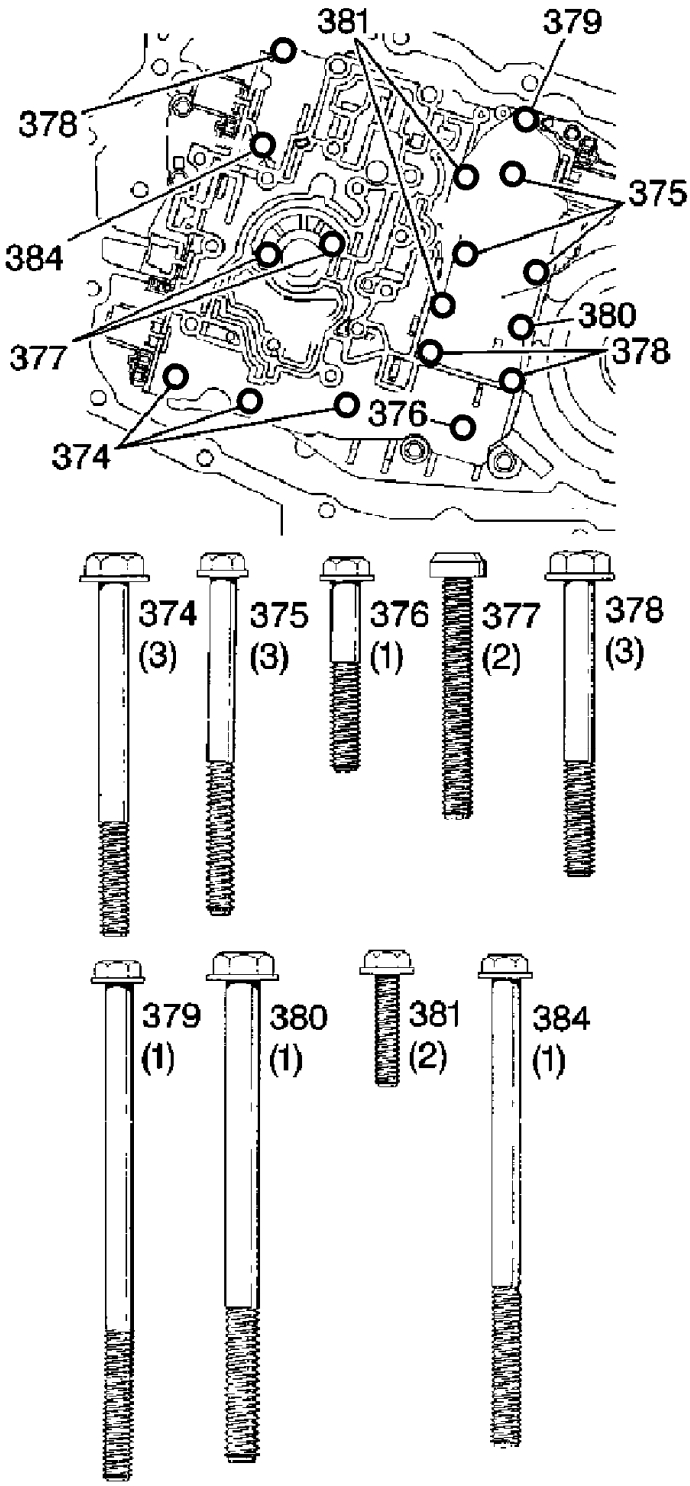


Fig. 402: Identifying Valve Housing And Pressure Sensor And Screws
Courtesy of VOLVO CARS CORPORATION

Tighten the screws in the following order:

- 381 to **8 Nm**
- 376 to **12 Nm**
- 377 to **12 Nm**
- 374 to **12 Nm**
- 375 to **12 Nm**
- 378 to **12 Nm**
- 384 to **12 Nm**
- 379 to **12 Nm**
- 380 to **25 Nm** .

Check tighten all the screws.

CONTROL SYSTEM FOR CARS OF MODEL YEAR 2003-

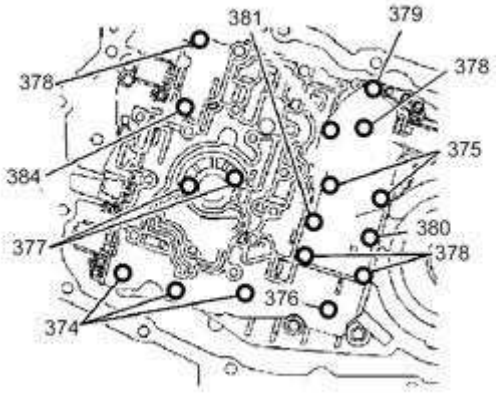


Fig. 403: Identifying Valve Housing And Pressure Sensor And Screws
Courtesy of VOLVO CARS CORPORATION

Tighten the screws in the following order:

- 381 to **8 Nm**
- 376 to **12 Nm**
- 377 to **12 Nm**
- 374 to **12 Nm**
- 375 to **12 Nm**
- 378 to **12 Nm**
- 384 to **12 Nm**
- 379 to **12 Nm**
- 380 to **25 Nm**

Check tighten all the screws.

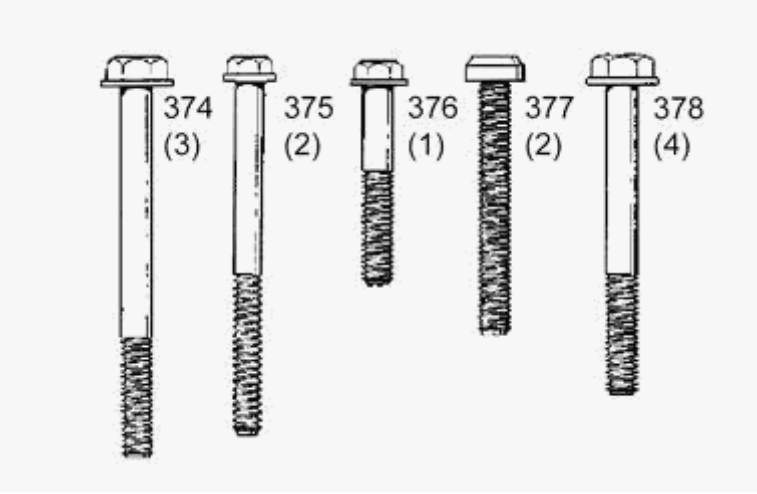


Fig. 404: Identifying Screws
Courtesy of VOLVO CARS CORPORATION

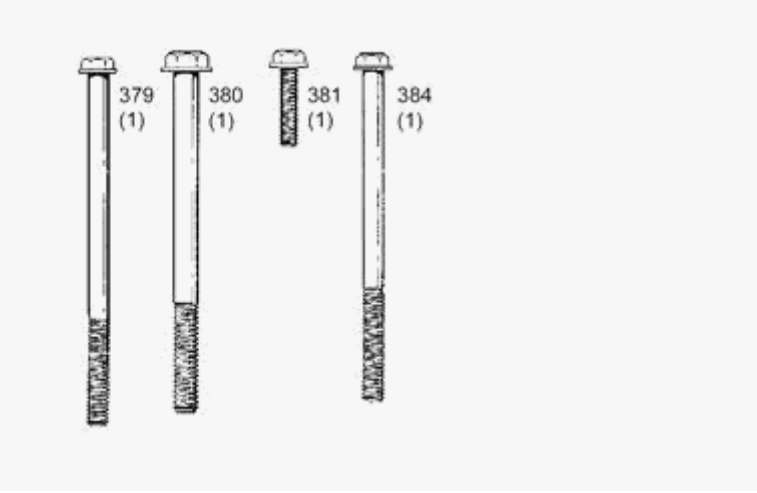


Fig. 405: Identifying Screws
Courtesy of VOLVO CARS CORPORATION

INSTALLING THE OIL PUMP

Install the oil pump according to **INSTALLING THE OIL PUMP**.

INSTALLING THE CABLE HARNESS

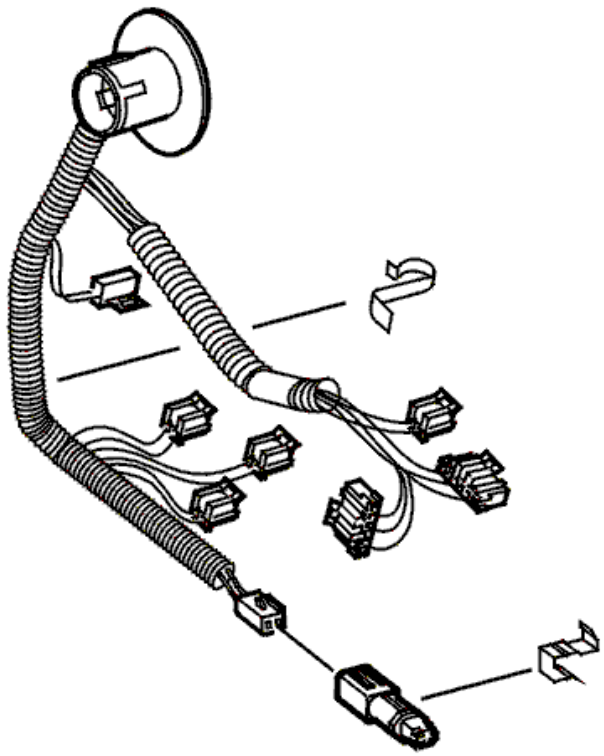


Fig. 406: Identifying Cable Harness
Courtesy of VOLVO CARS CORPORATION

Install:

- all the connectors on the solenoids
- the temperature sensor in the mounting
- the cable in the clamp.

Check that all components are installed correctly.

INSTALLING THE SIDE COVER

Install the side cover. See **SIDE COVER TRANSMISSION, INSTALLING**.

FILLING WITH GEARBOX FLUID

Fill with gearbox fluid. See **TRANSMISSION OIL / OIL FILTER, REPLACING**.

Carry out a road test.

CONTROL SYSTEM/VALVE HOUSING, REMOVING

NOTE: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

NOTE: Read through the instructions before beginning to work.

INFORMATION BEFORE REMOVAL

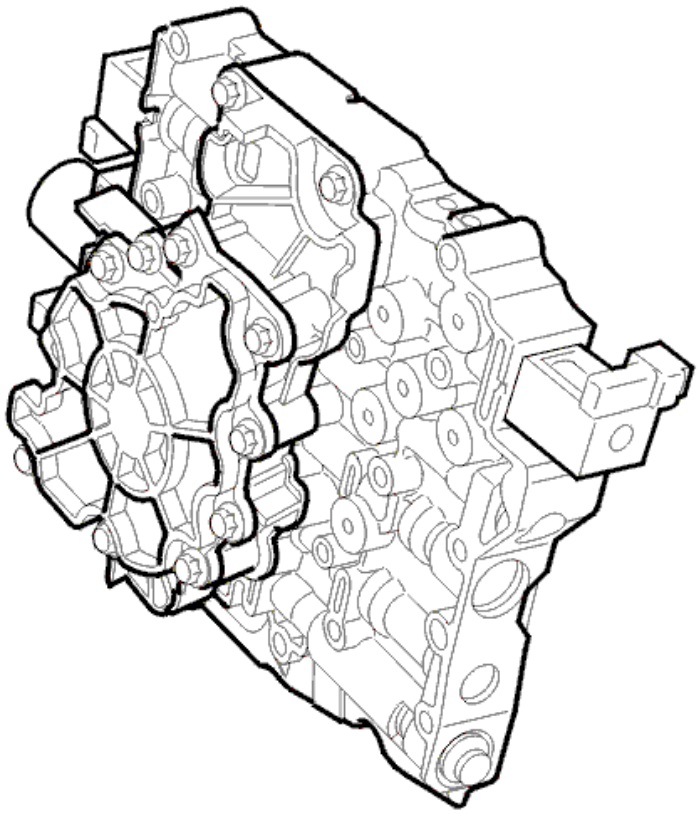


Fig. 407: Identifying Valve Housing
Courtesy of VOLVO CARS CORPORATION

When replacing the valve housing, the distribution plate and all 6 balls (if undamaged) should be transferred to the new valve housing. There are many screws of different lengths. It is important that the different screws are not mixed up. Checks are carried out when replacing the valve housing.

The new valve housing does not have any solenoids installed. The solenoids are loose in the kit and must be installed separately.

REMOVING THE SIDE COVER

Remove the side cover. See **SIDE COVER TRANSMISSION, REMOVING**.

PREPARATIONS FOR REMOVING THE VALVE HOUSING

Remove the cable harness. See **REMOVING THE CABLE HARNESS** .

Remove the oil pump. See **REMOVING THE OIL PUMP**.

AIR VENT HOUSING

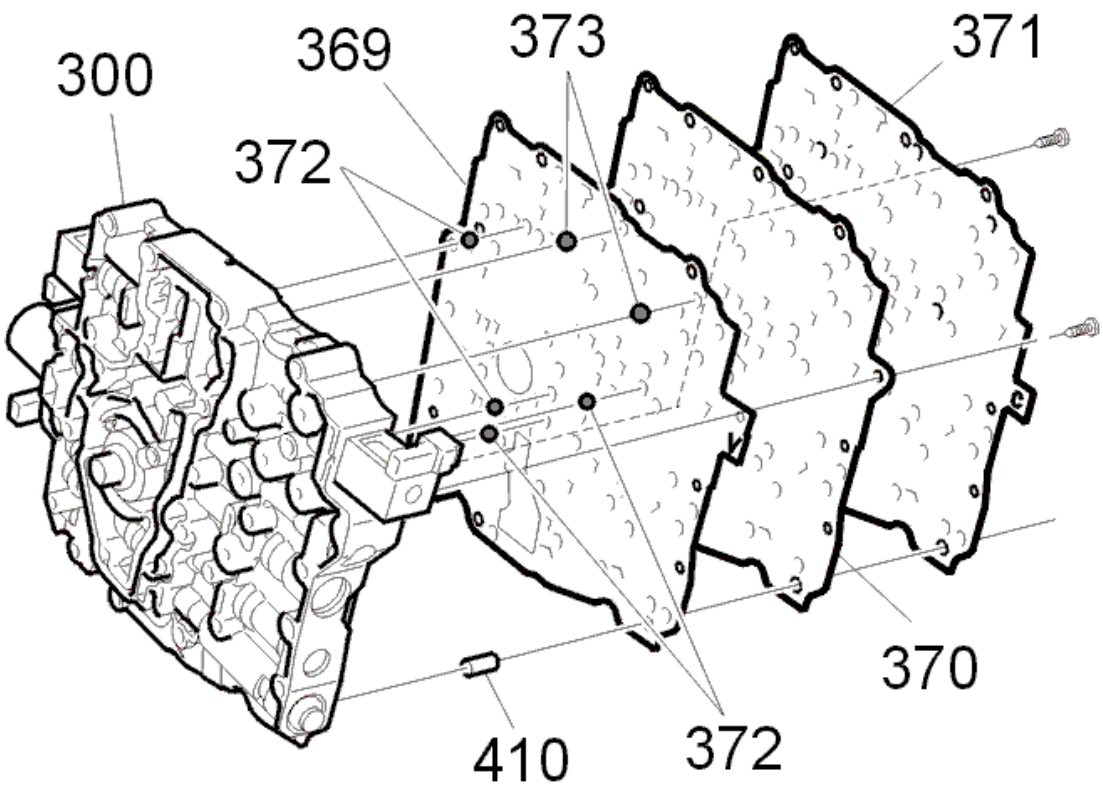


Fig. 408: Identifying Air Vent Housing
Courtesy of VOLVO CARS CORPORATION

The valve housing consists of:

- the valve housing (300)

  Gaskets:

  - 1 marked C (369)
  - 1 marked V (371).
- distribution plate (370)
- guide sleeve (410).

There are 6 balls in the valve housing. 4 small (372) and 2 larger (373).

When separating the valve housing from the control system housing: The gaskets and plate must remain in the

valve housing so that the balls do not fall out of their seats in the valve housing.

There are two small strainers (382) on the distribution plate.

2 plastic plugs (368) hold the gasket and plate in place.

CONTROL SYSTEM HOUSING

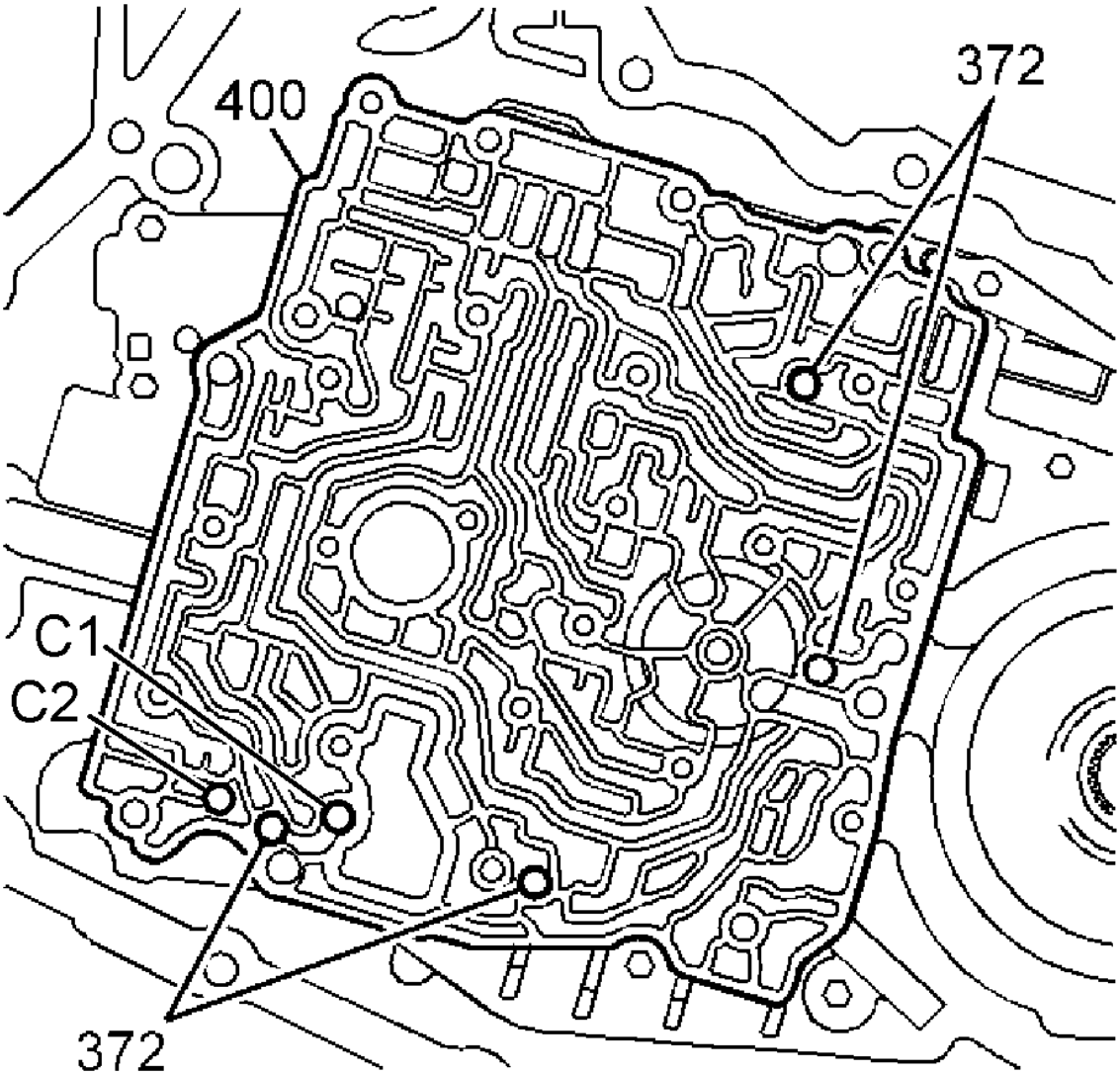


Fig. 409: Identifying Control System Housing
Courtesy of VOLVO CARS CORPORATION

There are 4 more balls in the control system housing. The balls will fall out when the valve housing is removed. Collect the balls in a clean container (the balls will be reinstalled later). There are 2 balls which do not fall out when the valve housing is removed (these are in the control system, C1 and C2).

REMOVING THE SCREWS FOR THE VALVE HOUSING AND PRESSURE SENSOR

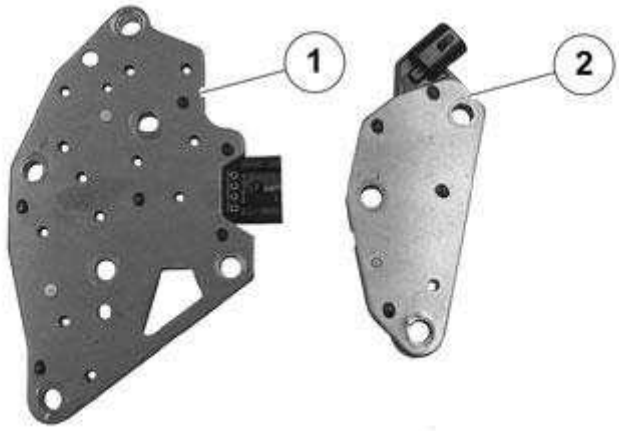


Fig. 410: Identifying Pressure Switch
Courtesy of VOLVO CARS CORPORATION

1. Pressure switch -2002
2. Pressure switch 2003-

CAUTION: The screws are of different length. It is important that the screws are installed in the right place.

CONTROL SYSTEM FOR CARS OF MODEL YEAR -2002

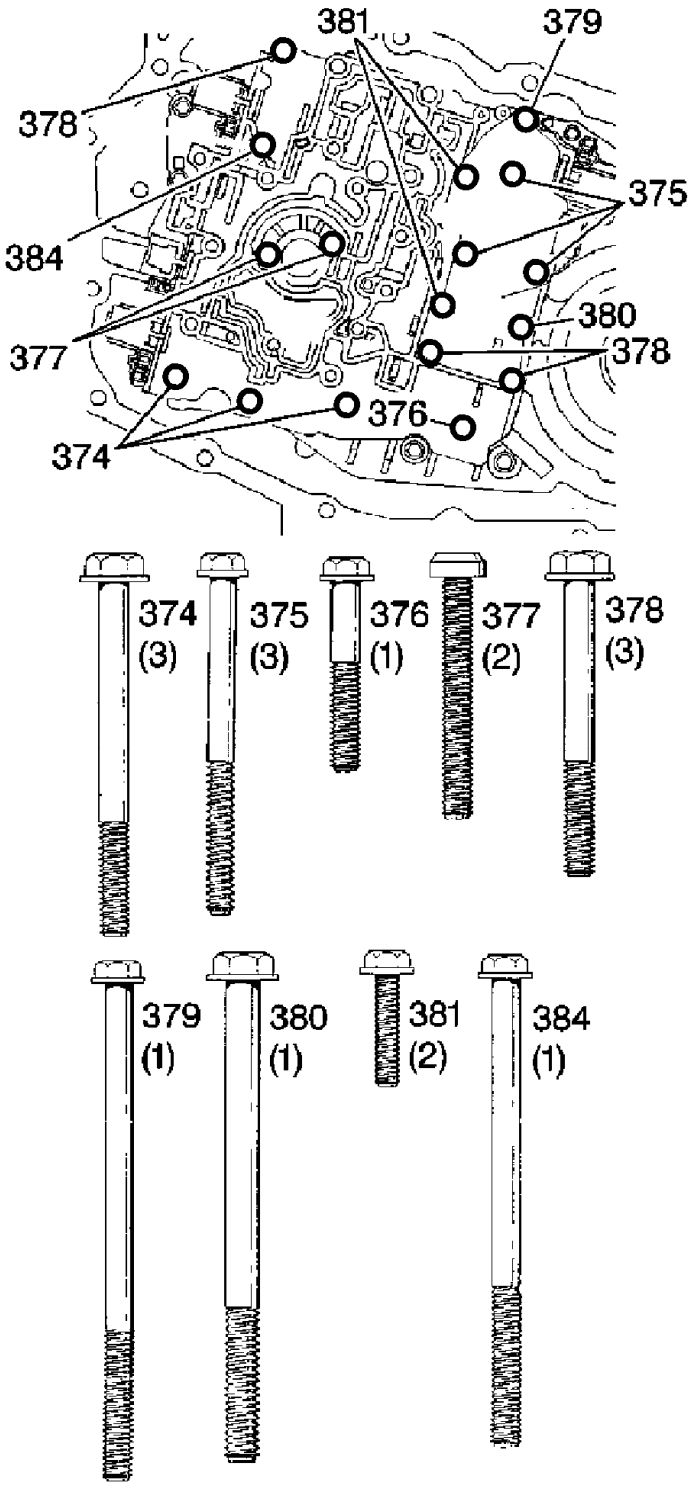


Fig. 411: Identifying Valve Housing And Pressure Sensor And Screws
Courtesy of VOLVO CARS CORPORATION

Remove the following screws:

- 3 screws numbered 374 (64 mm)
- 3 screws numbered 375 (60 mm)
- 1 screw numbered 376 (30 mm). Retain the guide sleeve on the screw or in the valve housing
- 3 screws numbered 378 (55 mm)
- 1 screws numbered 379 (15 mm)
- 1 screws numbered 380 (10 mm)
- 1 screw numbered 384 (85 mm).

Leave the screws numbered 377 (45 mm) in position for the time being.

CONTROL SYSTEM FOR CARS OF MODEL YEAR 2003-

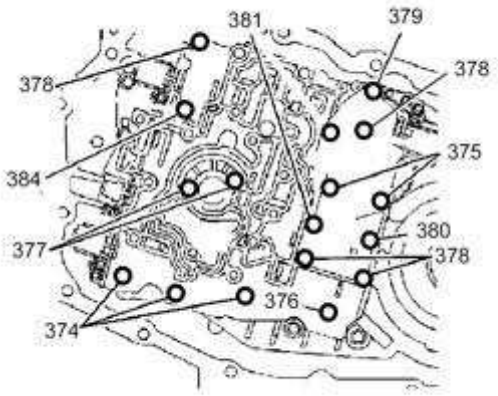


Fig. 412: Identifying Valve Housing And Pressure Sensor And Screws
Courtesy of VOLVO CARS CORPORATION

Remove the following screws:

- 3 screws numbered 374 (64 mm)
- 2 screws numbered 375 (60 mm)
- 1 pc. number 376 (30 mm). Retain the sleeves located on the screw or in the valve housing
- 4 screws numbered 378 (55 mm)
- 1 screws numbered 379 (15 mm)
- 1 screws numbered 380 (10 mm)
- 1 screw numbered 384 (85 mm).

Leave the screws numbered 377 (45 mm) in position for the time being.

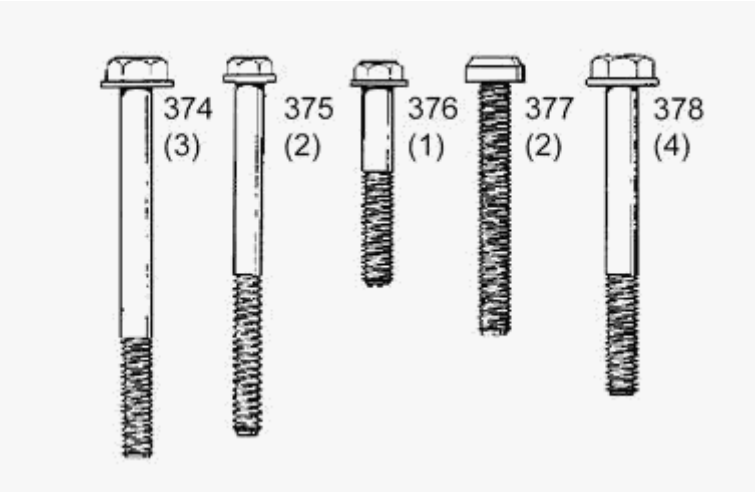


Fig. 413: Identifying Screws
Courtesy of VOLVO CARS CORPORATION

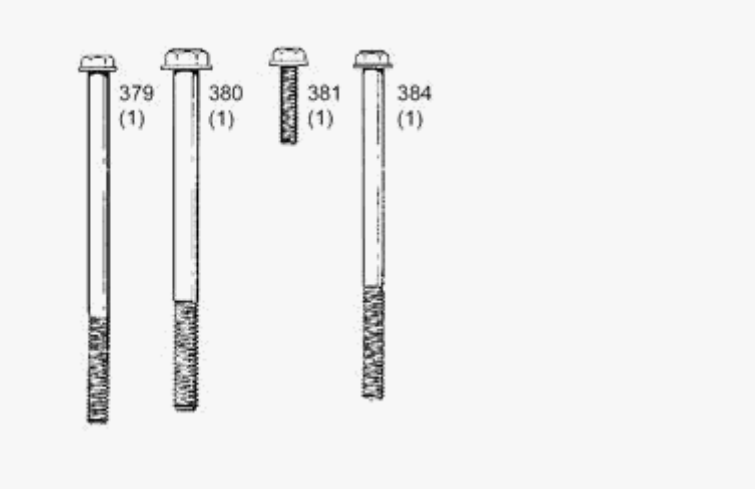


Fig. 414: Identifying Screws
Courtesy of VOLVO CARS CORPORATION

REMOVING AND SEPARATING THE VALVE HOUSING

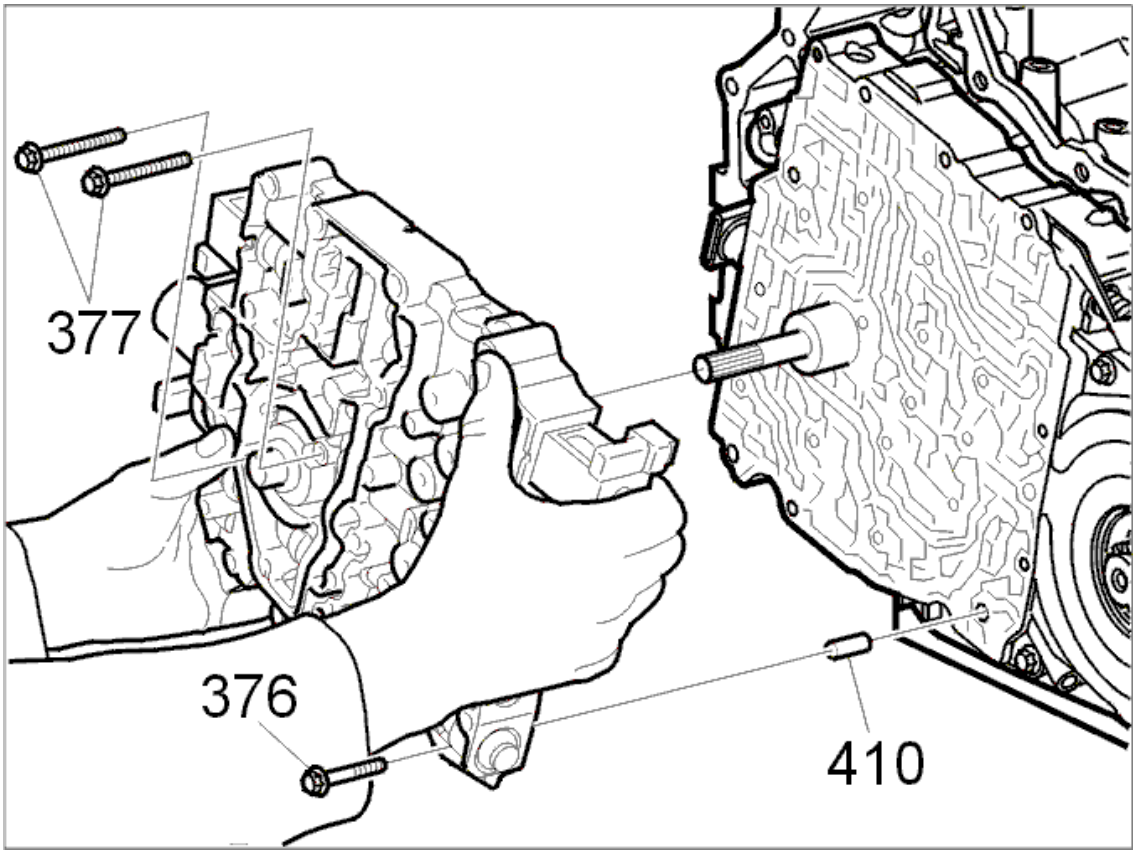


Fig. 415: Identifying Removing/Installing Valve Housing
Courtesy of VOLVO CARS CORPORATION

NOTE: Do not damage the 2 small strainers on the distribution plate. The valve housing must not be twisted during removal.

Position a clean container underneath the gearbox.

Slacken off the 2 torx screws numbered 377. Press the valve housing against the control system housing.

Grip the valve housing (diagonally). Pull it straight out a little (ensure that the gaskets and distribution plate move with it). Continue to withdraw the valve housing so that fingers can be inserted to hold the gaskets and distribution plate in position in the valve housing.

Pull the valve housing out from the control system housing until 4 balls fall out.

NOTE: The oil pump shaft follows slightly.

Place the valve housing on a bench with the gaskets upwards.

NOTE: Do not damage the 2 small strainers on the distribution plate.

Take the balls out of the container. Wipe the balls dry. Check that the balls are round and smooth. Replace any

defective balls.

CHECKING THE MARKINGS AND LOCATION OF THE GASKETS

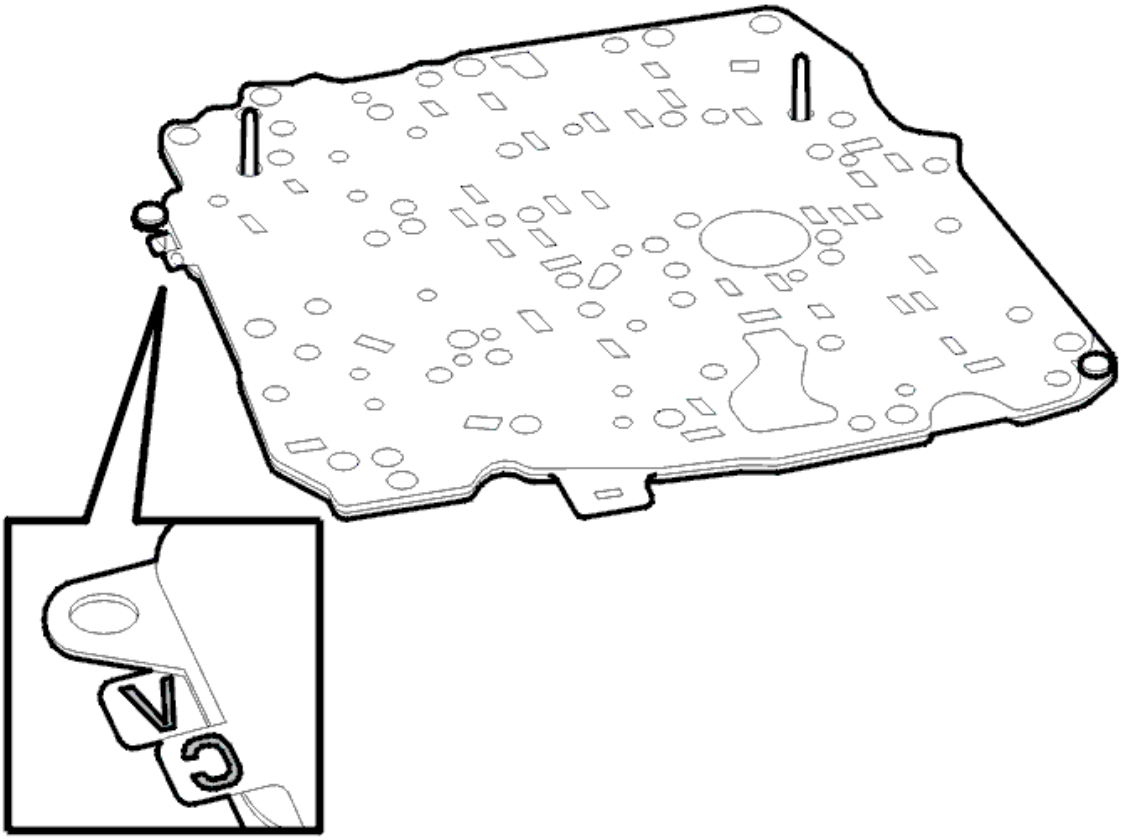


Fig. 416: Identifying Markings And Location Of Gaskets (1 Of 2)
Courtesy of VOLVO CARS CORPORATION

The gaskets are marked C and V.

Gasket C is against the control system housing.

Gasket V is against the valve housing.

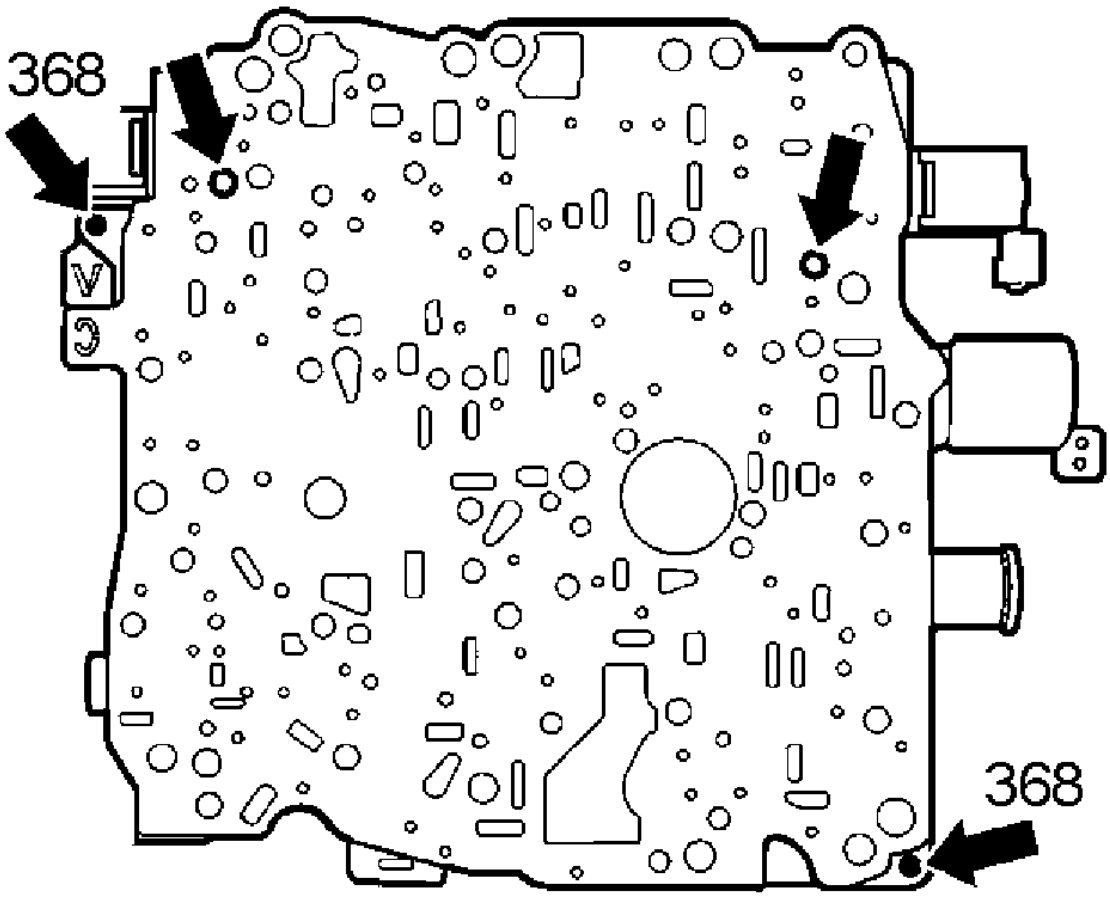


Fig. 417: Identifying Markings And Location Of Gaskets (2 Of 2)
Courtesy of VOLVO CARS CORPORATION

Distribution plate

Remove the locking pin (368) (can be reused).

Lift up the distribution plate together with gasket C.

NOTE: Do not damage the two small strainers on the distribution plate.

Lift out gasket V.

CHECKING AND REINSTALLING THE BALLS IN THE VALVE HOUSING

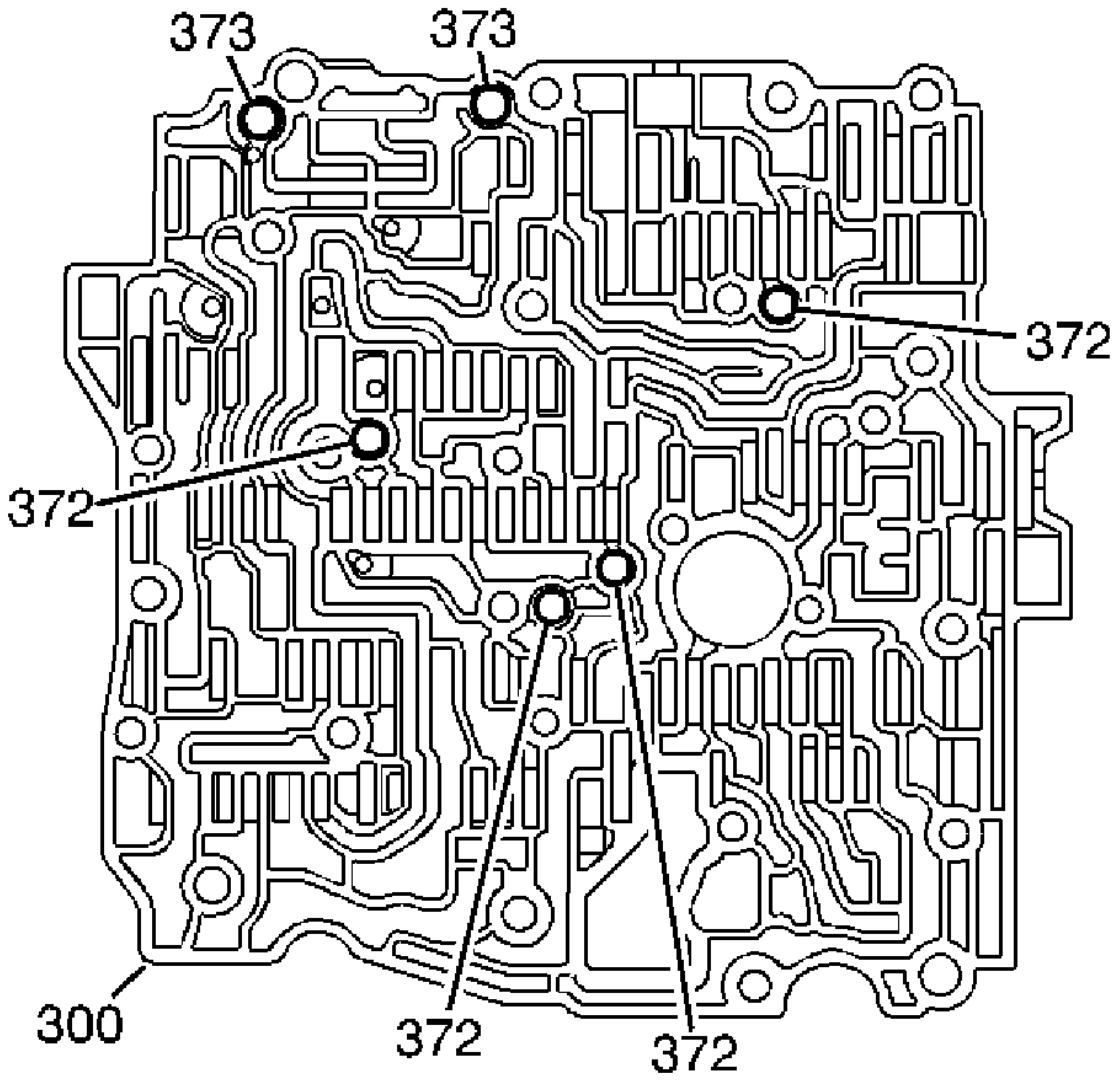


Fig. 418: Locating Balls In Valve Housing
Courtesy of VOLVO CARS CORPORATION

2 large balls (373).

4 smaller balls (372).

Inspect one ball at a time. Ensure that there is no dirt on the ball and that the surfaces are smooth and shiny.

Check the four balls in the control system housing. Follow the same procedure as above.

LOCATION OF BALLS FOR THE CONTROL SYSTEM HOUSING

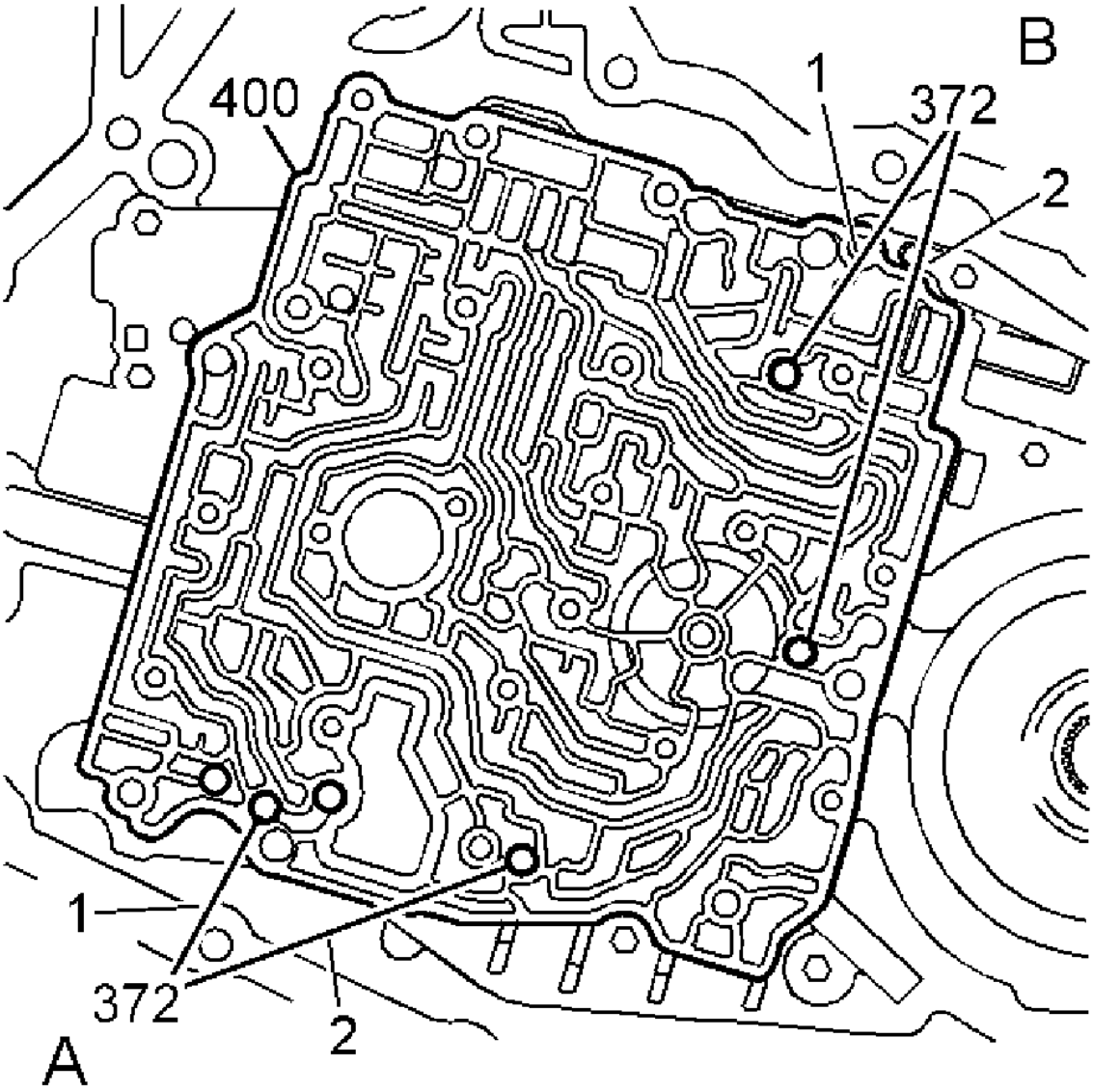


Fig. 419: Locating Control System Housing Balls
Courtesy of VOLVO CARS CORPORATION

Ball (372) A (1) is located between 2 existing balls in the housing (C1 and C2).

Ball (372) A (2) is located next to the hole.

Balls (372) B (1-2) are located in a seat with a holder to the right to prevent the ball moving to the side.

To install the balls, see **MARKING THE LOCATION OF THE CONTROL SYSTEM HOUSING BALLS IN RELATION TO THE DISTRIBUTION PLATE**.

MARKING THE LOCATION OF THE BALLS IN RELATION TO THE DISTRIBUTION PLATE

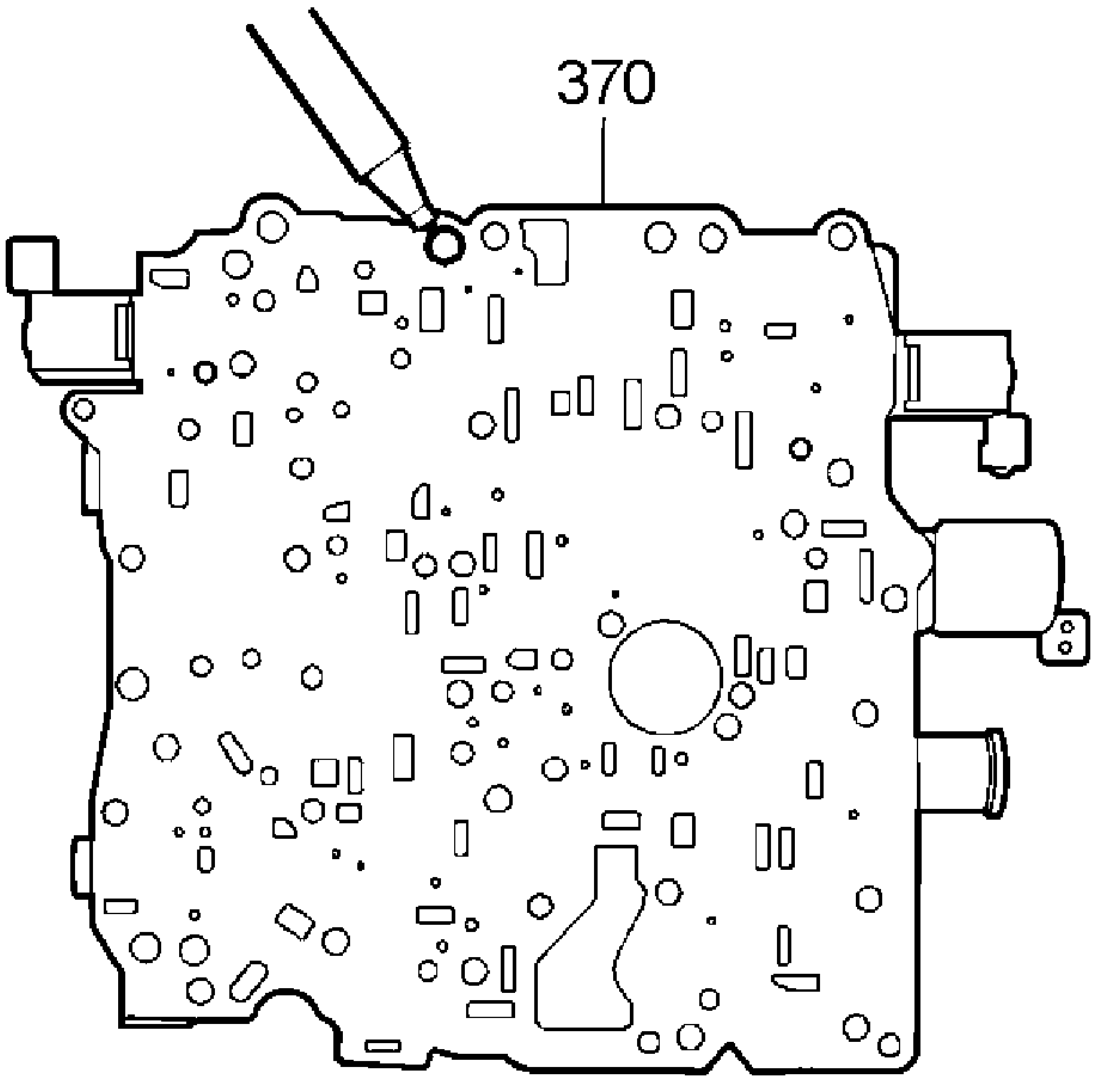


Fig. 420: Identifying Balls In Relation To Distribution Plate
Courtesy of VOLVO CARS CORPORATION

Position the distribution plate on the valve housing (strainers upwards) so that the balls can be seen. Mark the position of each ball beside the hole using a marker pen.

Turn the distribution plate and find each respective marking. Mark the hole. Check this side of the plate for leakage. See **CHECK THE SEALING OF THE BALLS AGAINST THE DISTRIBUTION PLATE**.

MARKING THE LOCATION OF THE CONTROL SYSTEM HOUSING BALLS IN RELATION TO THE DISTRIBUTION PLATE

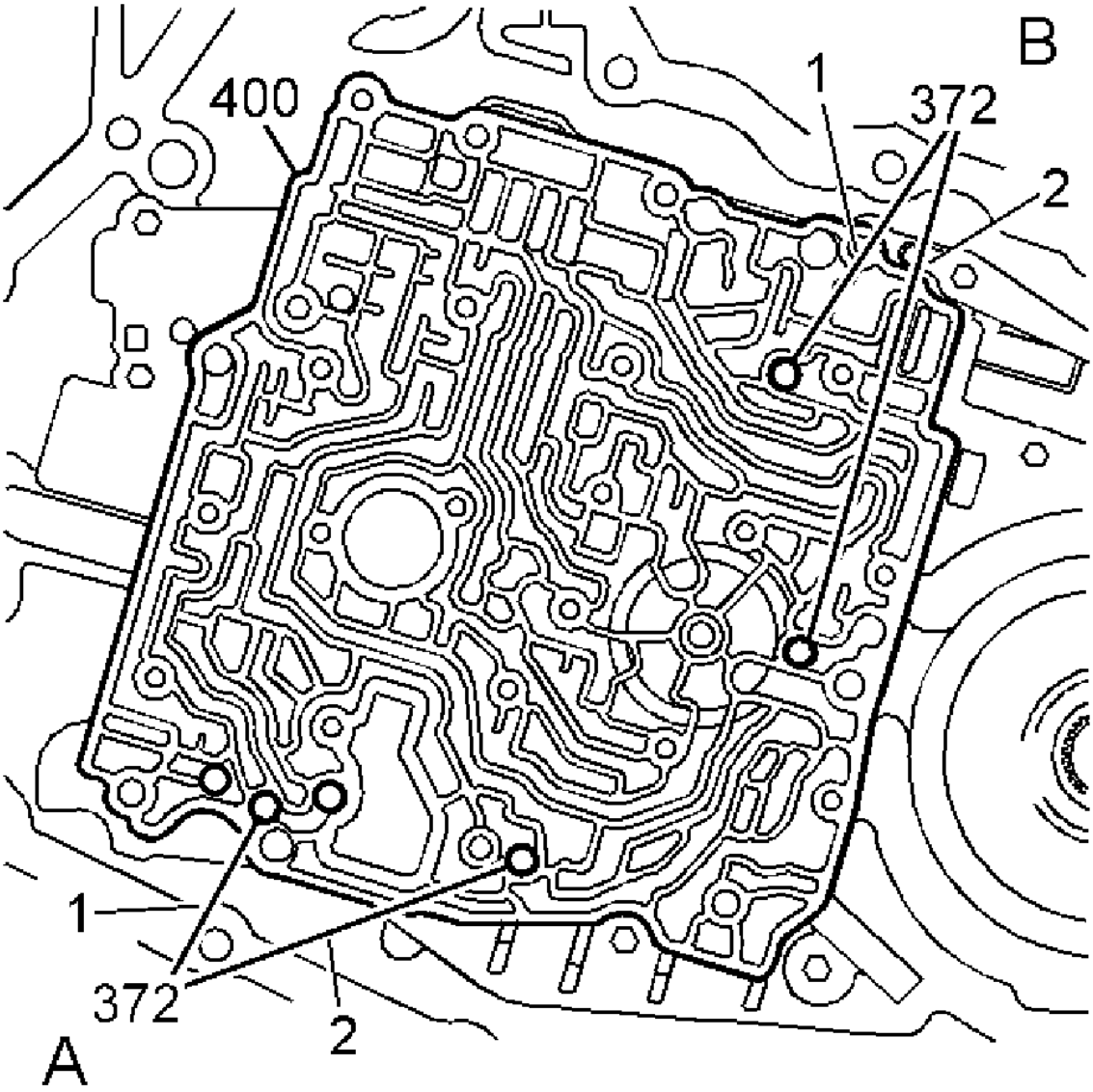


Fig. 421: Locating Control System Housing Balls
Courtesy of VOLVO CARS CORPORATION

Install the balls in the housing. Use Volvo Genuine parts petroleum jelly (P/N 116 1151-40).

Identify where the balls should be located. Press petroleum jelly into the relevant holes and position the balls (the petroleum jelly ensures that the balls stay in the housing). To mark the position of the balls in relation to the distribution plate, see **MARKING THE LOCATION OF THE BALLS IN RELATION TO THE DISTRIBUTION PLATE**.

CHECK THE SEALING OF THE BALLS AGAINST THE DISTRIBUTION PLATE

NOTE: Check that the balls are round and smooth. Replace any defective balls.

Feel the holes for the balls. Check that there is not a rough lip around the hole.

Turn each ball in turn in their hole (to remove dirt or burring).

Place the ball in the hole. Press the ball and turn the ball in the hole to see that the ball seals and that the holes in the plate are not oval.

Check the sealing of the balls against the control system housing

Carry out the same check as above for the 4 balls in the control system housing.

Remove the balls. Wipe off the petroleum jelly.

INSTALLING NEW SOLENOIDS ON THE NEW VALVE HOUSING

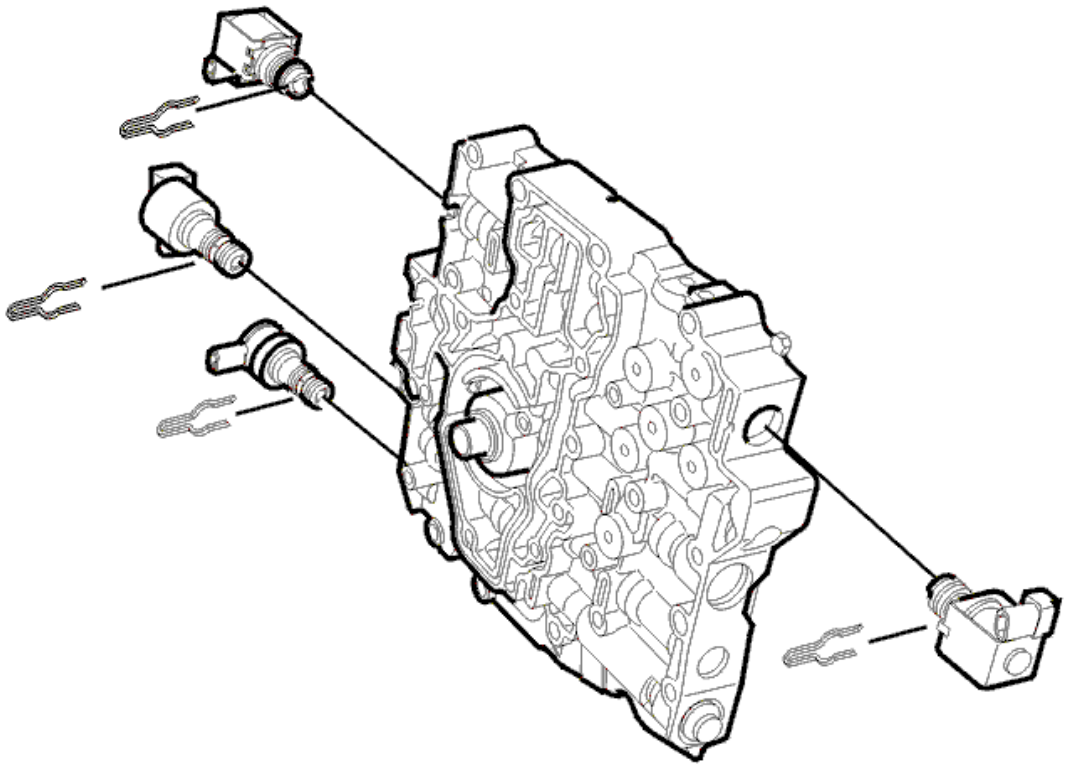


Fig. 422: Identifying Solenoids On Valve Housing
Courtesy of VOLVO CARS CORPORATION

Install the solenoids in the relevant positions on the valve housing.

NOTE: Make sure that the solenoids are secure.

COVER DIFFERENTIAL, REPLACING

NOTE: The illustrations in this service information are used for different model years

and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

PREPARATORY WORK

DRAINING THE COOLING SYSTEM

Drain the cooling system. See: **RADIATOR AND CONNECTIONS**.

REMOVING THE BEVEL GEAR/CHAIN HOUSING

Remove:

- the bevel gear/chain housing. See: **REPLACING THE PINION SEAL FOR THE BEVEL GEAR**

REMOVAL

DISCONNECTING THE PIPE FROM THE TURBOCHARGER (TC)

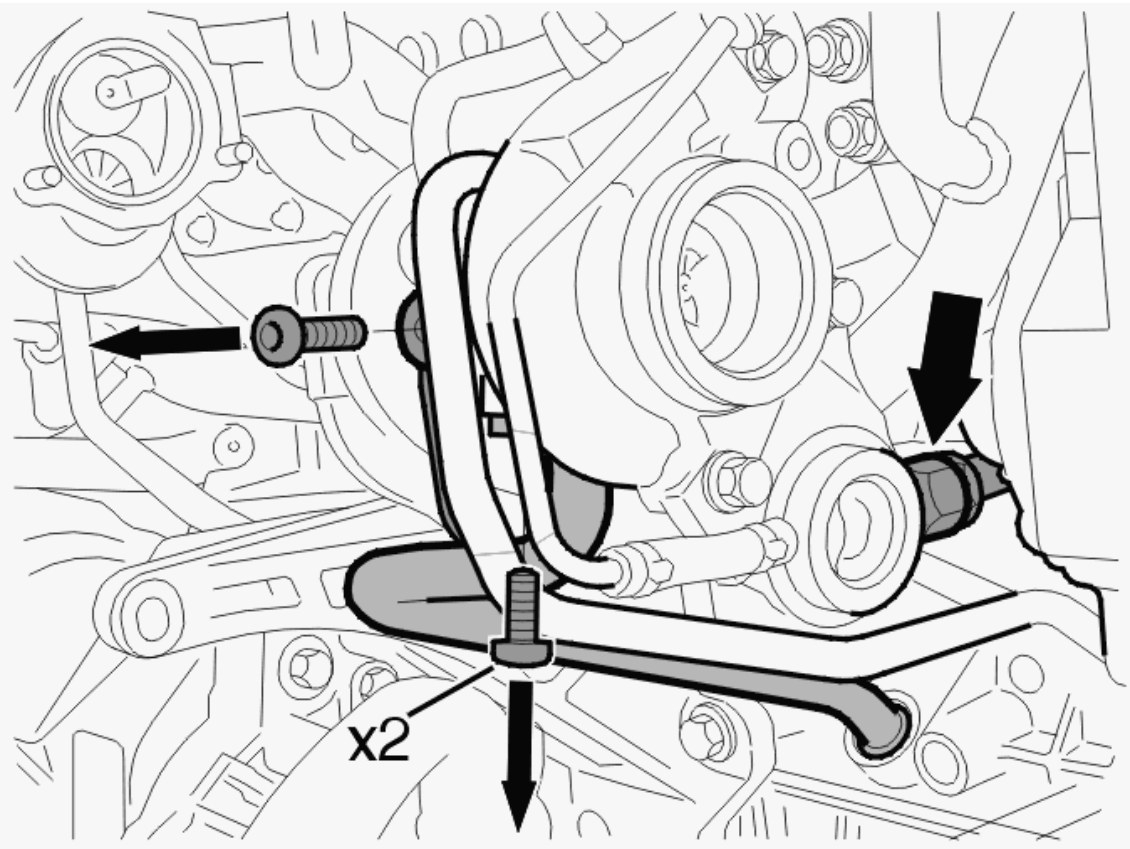


Fig. 423: Disconnecting Pipes From The Turbocharger
Courtesy of VOLVO CARS CORPORATION

Remove the lower of the 2 pipe screws for the turbocharger (TC) water cooling.

Slacken off the cap nut for the cooling pipe for the oil cooler. Remove the 2 screws for the flange on the oil return line for the turbocharger (TC). Remove the pipe and the sealing ring. Install a rubber plug as a seal in the cylinder block.

REMOVING THE BRACKET FOR THE BEVEL GEAR/CHAIN HOUSING

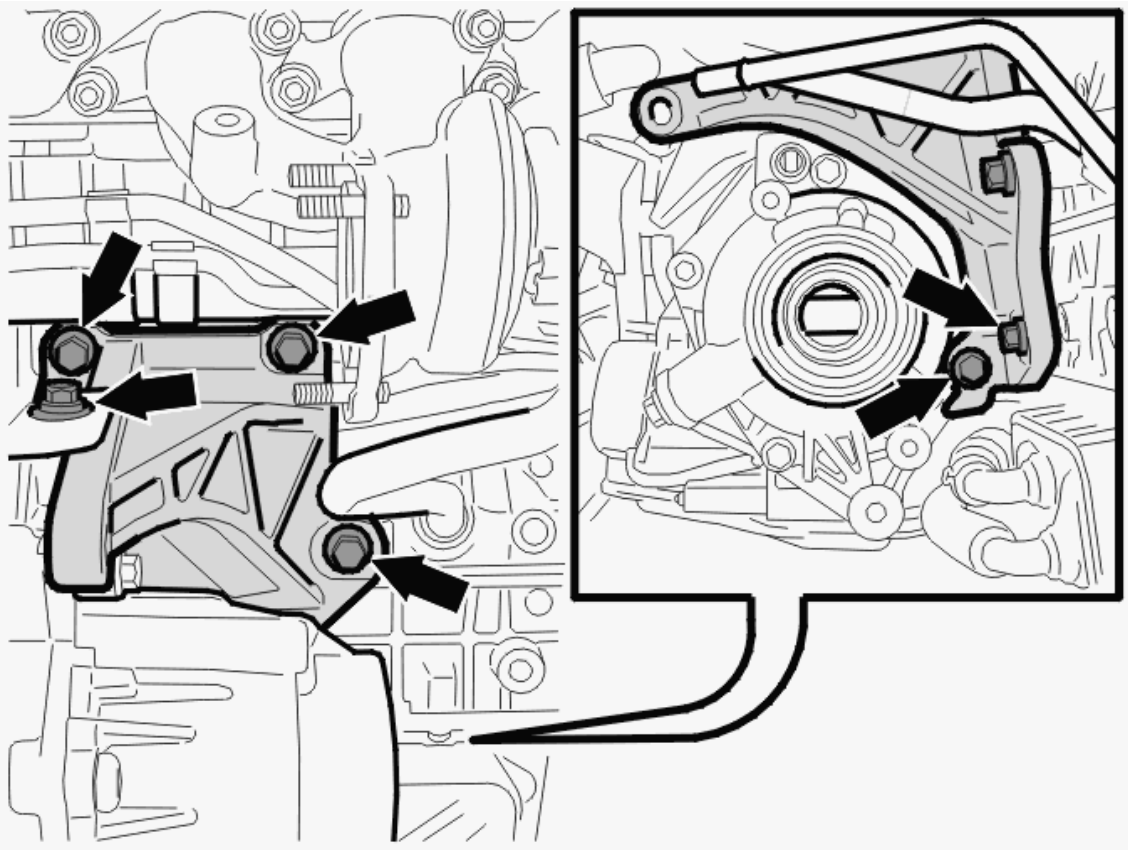


Fig. 424: Identifying Brackets
Courtesy of VOLVO CARS CORPORATION

Remove the bracket from the transmission and the engine.

REMOVING THE TRANSMISSION OUTPUT SPEED SENSOR FROM THE COVER ON THE TRANSMISSION

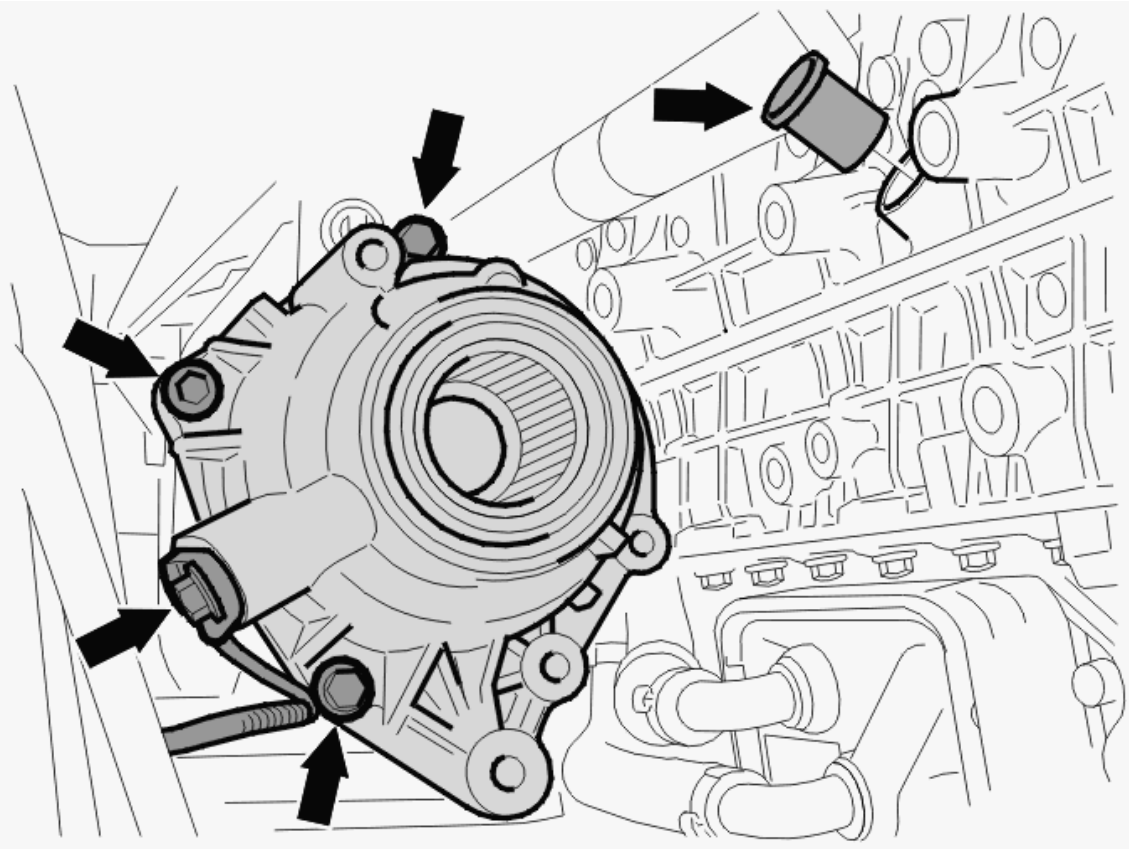


Fig. 425: Removing The Transmission Output Speed Sensor
Courtesy of VOLVO CARS CORPORATION

Place a container underneath the transmission.

Remove:

- the screw that holds the sensor and the tie strap for the cable for the sensor
- the sensor
- the screws for the cover
- the cover.

NOTE: Remove the throw-out bearing from the differential or the cover if it is still in place.

CHECKING THE BEARING SURFACE ON THE DIFFERENTIAL

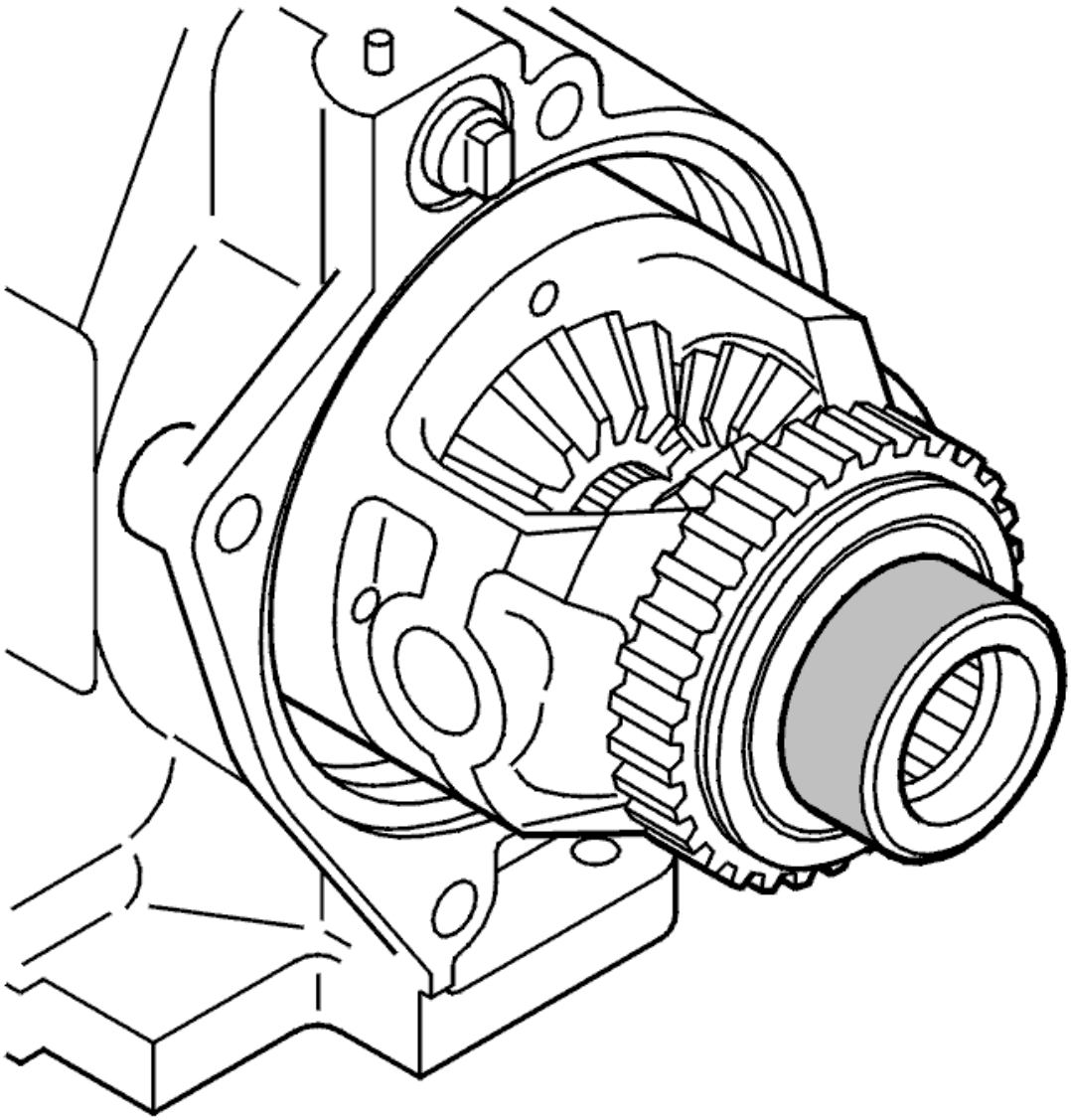


Fig. 426: Identifying Bearing Surface
Courtesy of VOLVO CARS CORPORATION

Check the bearing surface on the differential. There must not be any visible scratches or abnormal wear on the bearing surface.

INSTALLING THE SPACER WASHER AND THROW-OUT BEARING

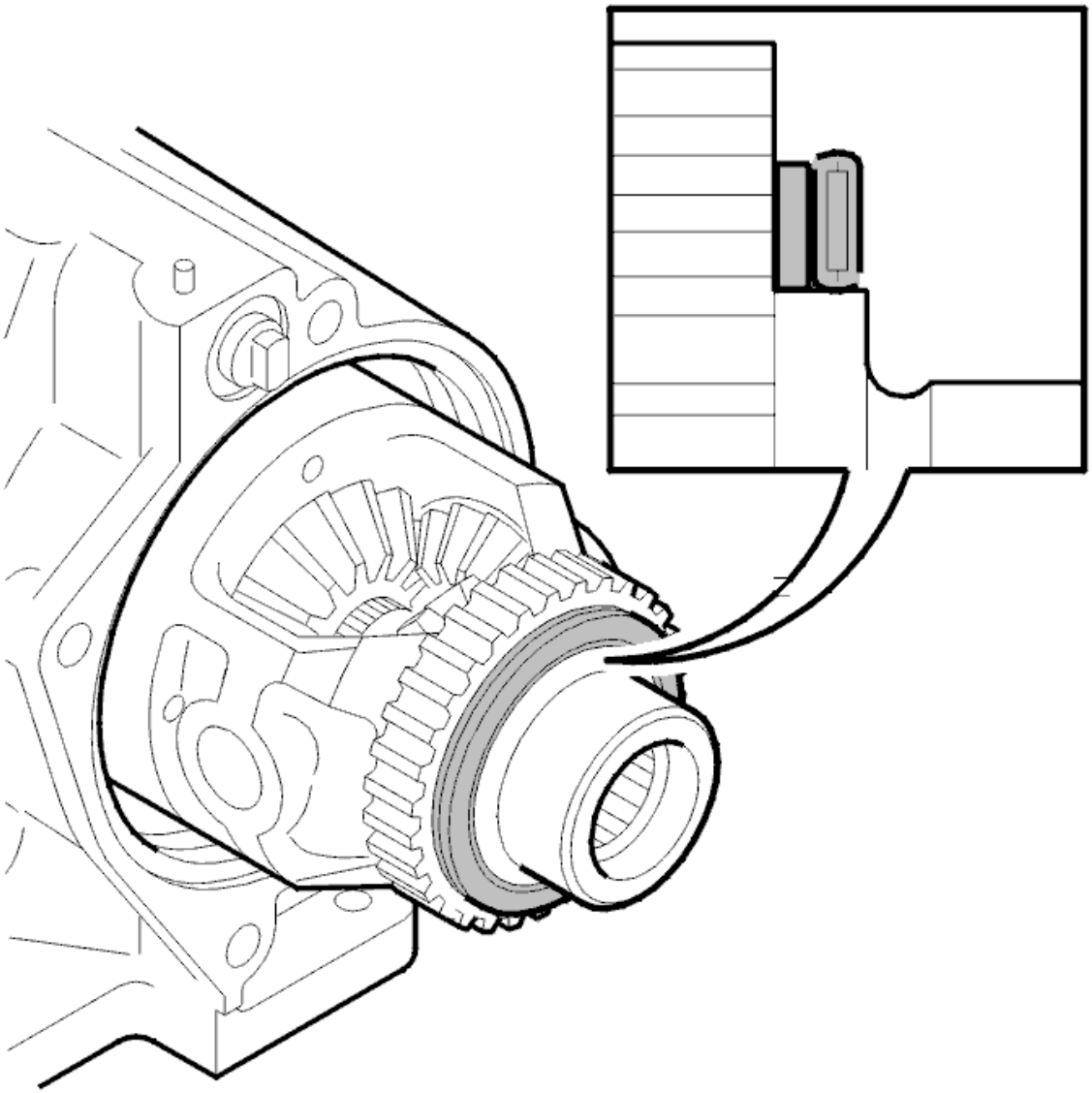


Fig. 427: Identifying Throw-Out (Thrust) Bearing
Courtesy of VOLVO CARS CORPORATION

Install the spacer washer and the throw-out bearing on the differential. Apply a little petroleum jelly on the throw-out bearing so that it secures against the spacer washer.

Install:

- the spacer washer against the pulse wheel
- the throw-out bearing, see the illustration.

INSTALLING THE DIFFERENTIAL HOUSING COVER

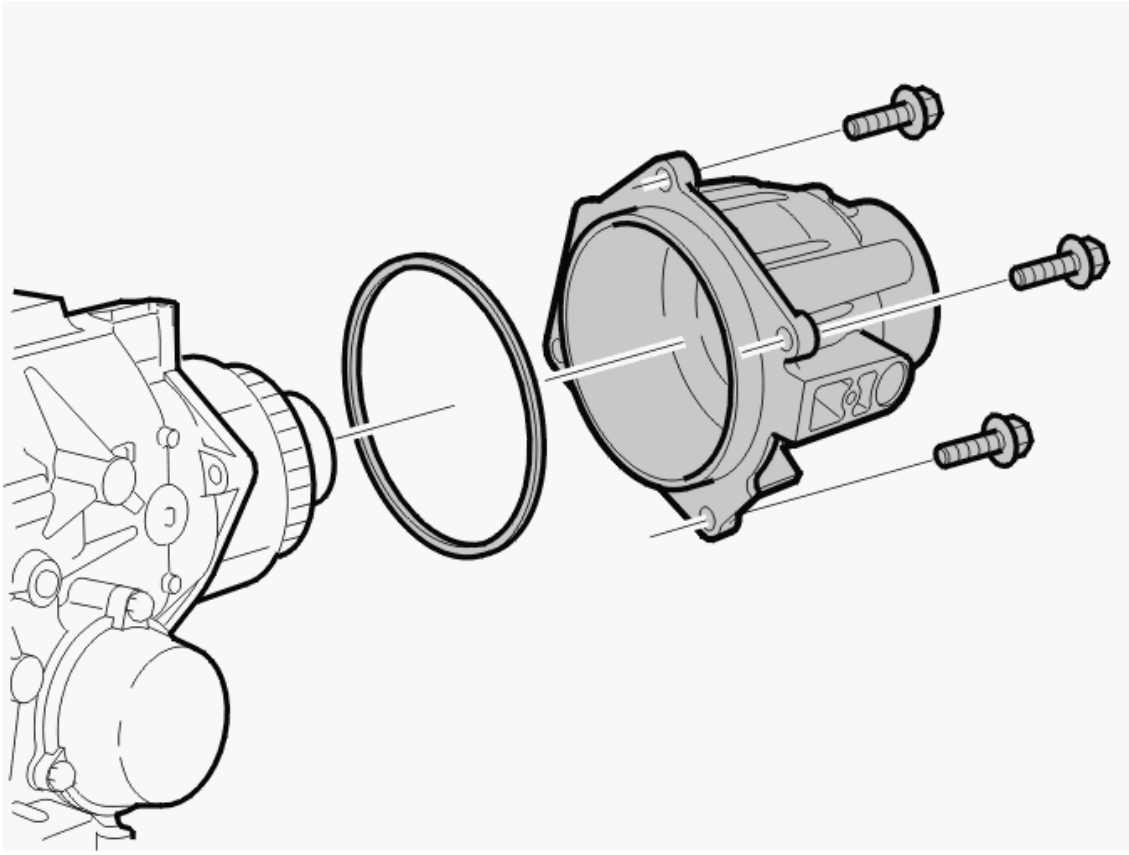


Fig. 428: Installing The Differential Housing Cover
Courtesy of VOLVO CARS CORPORATION

Reinstall the cover on the transmission.

Check that all mating surfaces are clean. Use a new sealing ring. Install the cover using 3 M10 screws. Tighten alternately to light contact. Tighten.

NOTE: There must be axial clearance of 0.12 mm - 0.67nbsp;mm between the differential and the differential housing cover.

INSTALLING THE TRANSMISSION OUTPUT SPEED SENSOR

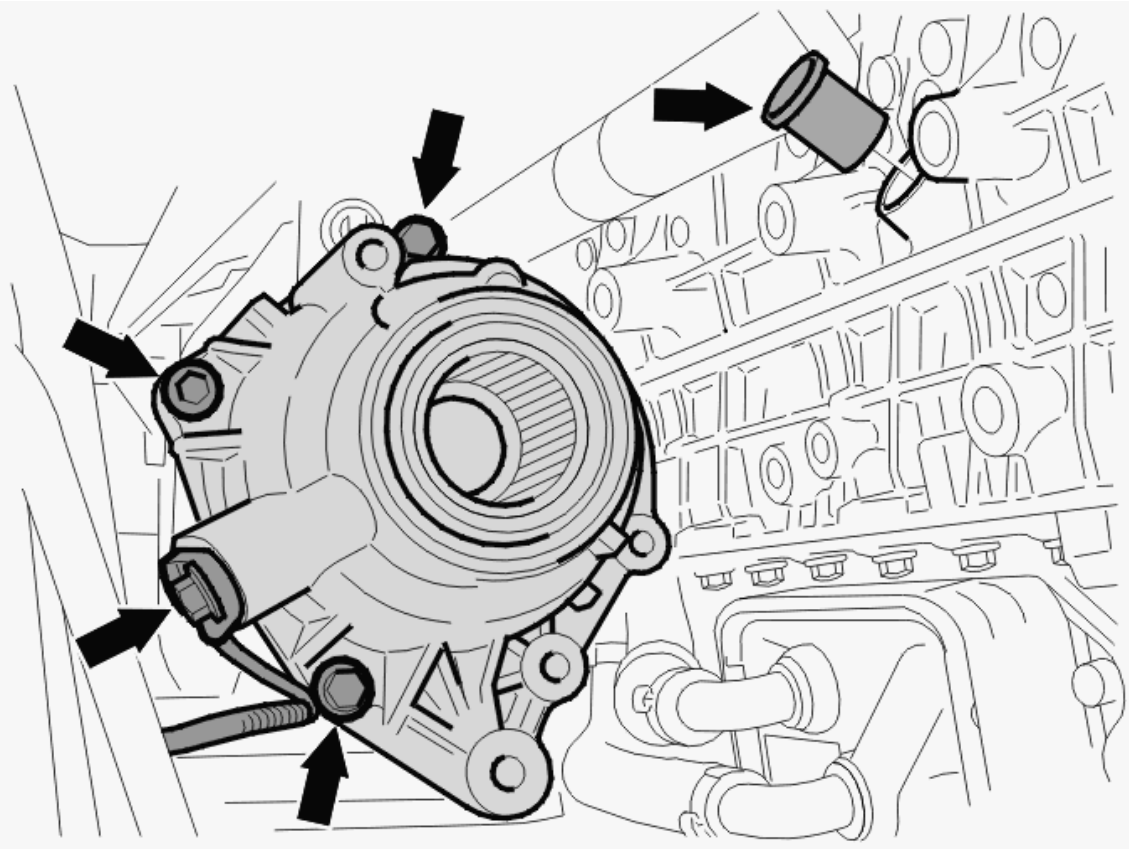


Fig. 429: Removing The Transmission Output Speed Sensor
Courtesy of VOLVO CARS CORPORATION

Check that the O-ring for the sensor is intact. Tighten the M6 screw. Clamp the cable for the sensor to the transmission housing using a tie strap.

INSTALLING THE BRACKET FOR THE BEVEL GEAR/CHAIN HOUSING

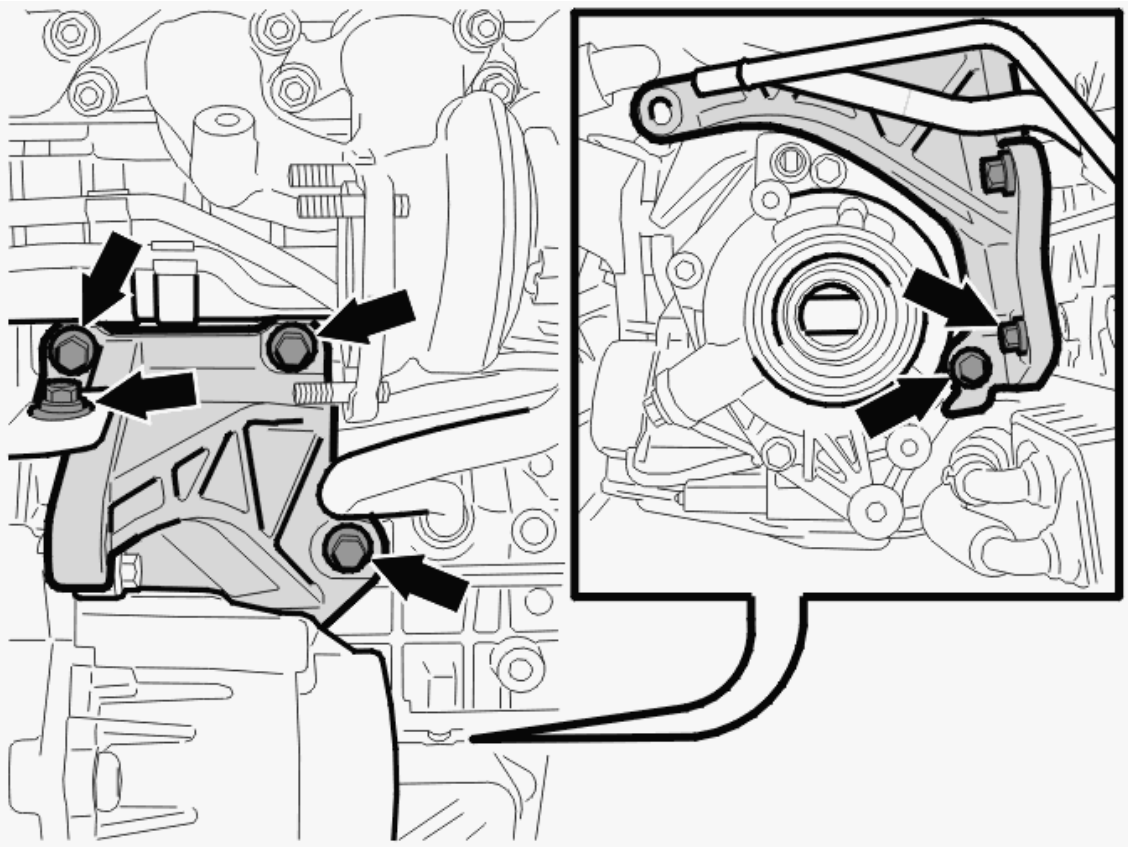


Fig. 430: Identifying Brackets
Courtesy of VOLVO CARS CORPORATION

Install the bracket on the cylinder block using 2 M10 screws and the M8 screw. Tighten the screw so that the bracket can just be moved.

Install the M10 screw for the bracket and transmission. Tighten. Tighten the screws for the bracket. Install the screw for the heat deflector plate

INSTALLING THE PIPE ON THE TURBOCHARGER (TC)

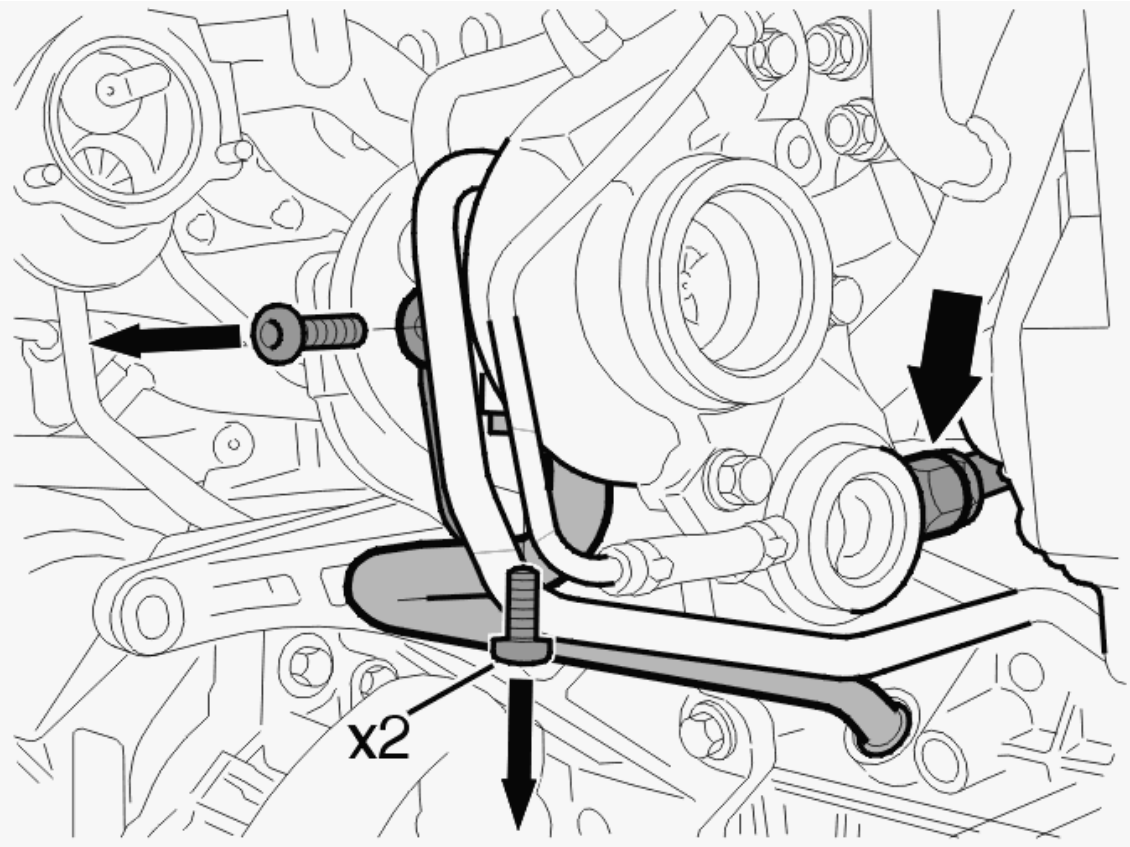


Fig. 431: Disconnecting Pipes From The Turbocharger
Courtesy of VOLVO CARS CORPORATION

Install a new O-ring on the oil return line and press it into the cylinder block. Install a new gasket for the pipe flange and the 2 M6 screws. Tighten.

Tighten the cap nut for the cooling pipe for the oil cooler.

Install the pipe screw and seal washers for the turbocharger (TC) water cooling. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** .

FINISHING

INSTALLING THE BEVEL GEAR / CHAIN HOUSING

Install:

- the bevel gear/chain housing. See: **REPLACING THE PINION SEAL FOR THE BEVEL GEAR**

FILLING THE COOLING SYSTEM

Fill the cooling system. See: **RADIATOR AND CONNECTIONS**.

BEVEL GEAR/CHAIN HOUSING, REPLACING

Special tools:

9995462

9997057

9997063

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

REMOVAL

PREPARATIONS

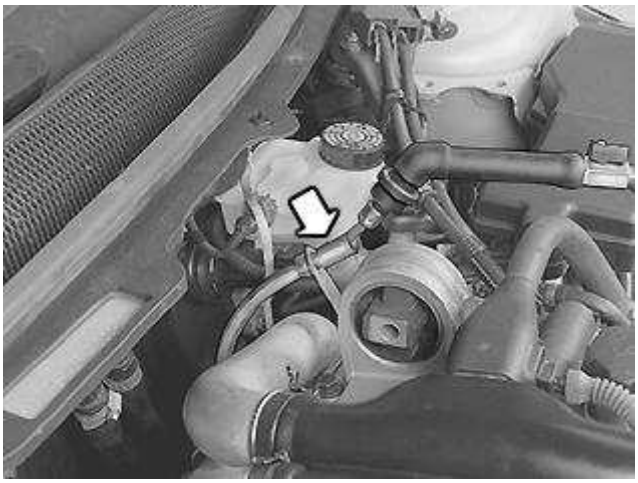


Fig. 432: Identifying Dip Stick Pipe & Oil Suction Device
Courtesy of VOLVO CARS CORPORATION

Drain the transmission fluid.

Use an oil suction device to drain approximately 4 liters of transmission fluid.

Remove the sub-frame. See: **SUB-FRAME FRONT, REPLACING** .

REMOVING THE RIGHT DRIVE SHAFT

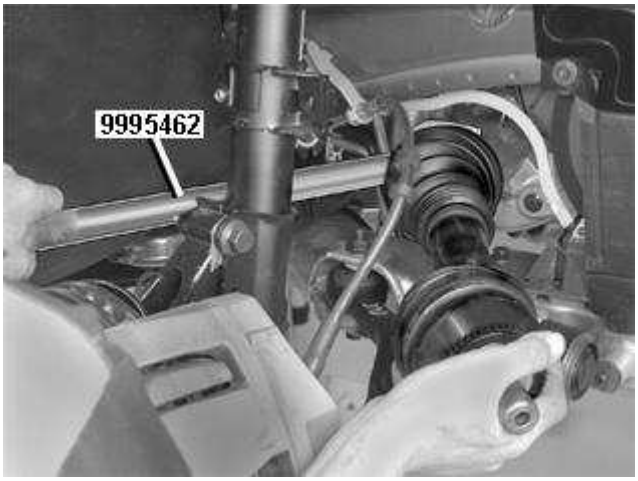


Fig. 433: Detach The Drive Shaft With Jimmy Bar
Courtesy of VOLVO CARS CORPORATION

Angle the wheel hub out. Remove the drive shaft from the hub. Use a tensioner band to pull the wheel spindle and wheel hub backwards.

Remove the drive shaft from the transmission. Use pry bar **9995462** B (modified according to the tool bulletin).

Install seal plug **9997063** .

REMOVING THE PROPELLER SHAFT

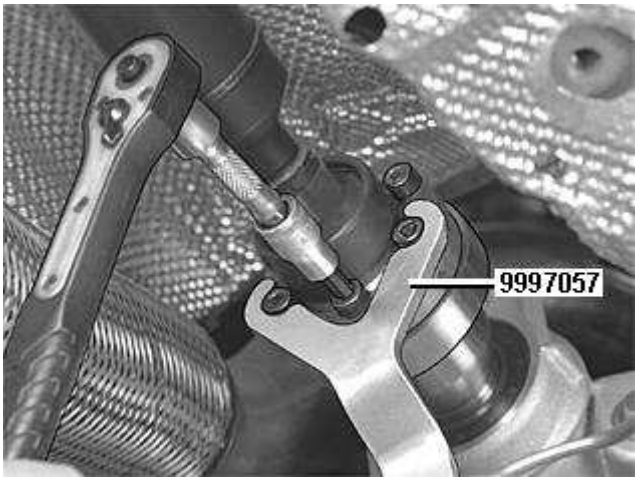


Fig. 434: Identifying Removal Of Propeller Shaft Using Counterhold
Courtesy of VOLVO CARS CORPORATION

HINT: Move the gear selector to position N.

Mark the propeller shaft CV joint in relation to the bevel gear flange.

Remove:

- the 2 screws for the center bearing mounting
- the propeller shaft screws. Use counterhold **9997057** . Press the propeller shaft joints together and move the propeller shaft to one side and tie it up.

DISCONNECTING THE STEERING GEAR FROM THE ENGINE PAD

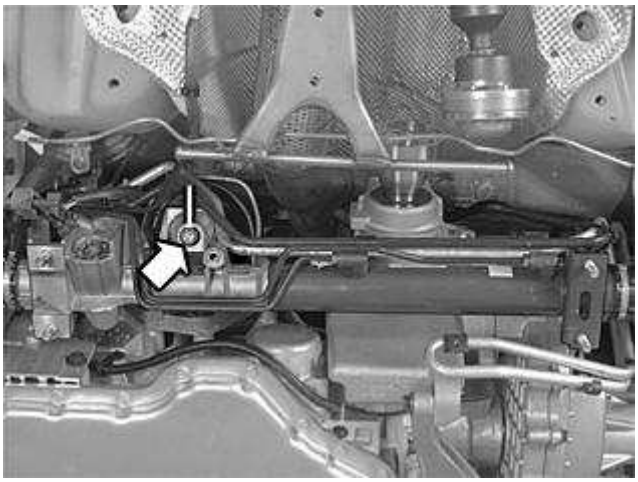


Fig. 435: Identifying Mark For Steering Gear Position
Courtesy of VOLVO CARS CORPORATION

Mark up the position of the steering gear in relation to the engine pad.

Remove the screw for the steering gear and engine pad.

REMOVING THE SCREW ON THE LOWER STEERING SHAFT

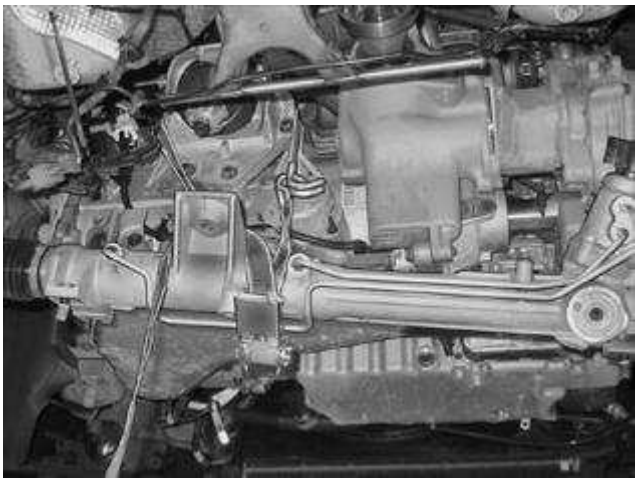


Fig. 436: Hanging The Steering Gear
Courtesy of VOLVO CARS CORPORATION

Set the steering wheel to the "straight ahead" position.

HINT: Turn the steering wheel a 1/2 turn to the right. Remove the key so that the steering wheel lock engages.

Remove the screw on the lower steering shaft. Hang the steering gear as low as the steering arms permit. Use a restraining strap.

REMOVING THE CHAIN HOUSING BRACKET

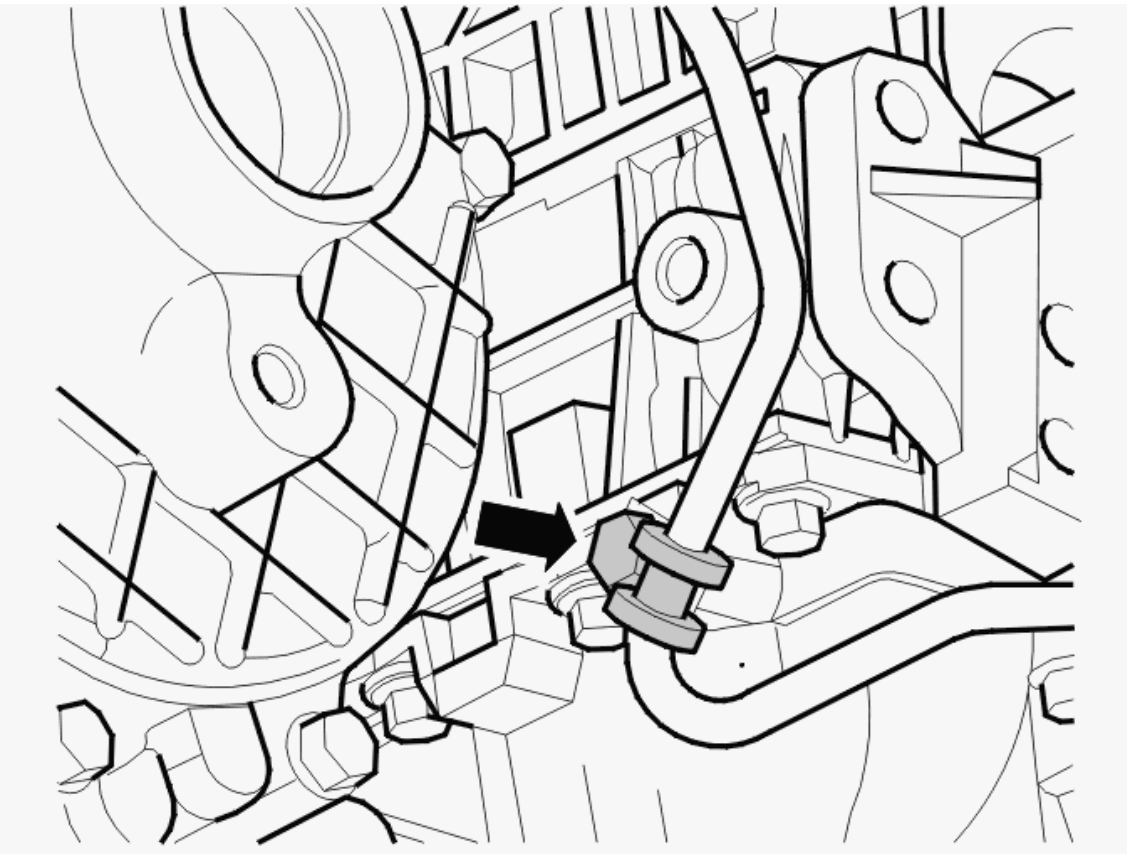


Fig. 437: Identifying Clamp For The Fuel Line
Courtesy of VOLVO CARS CORPORATION

Remove:

- the screw in the clamp for the fuel line.

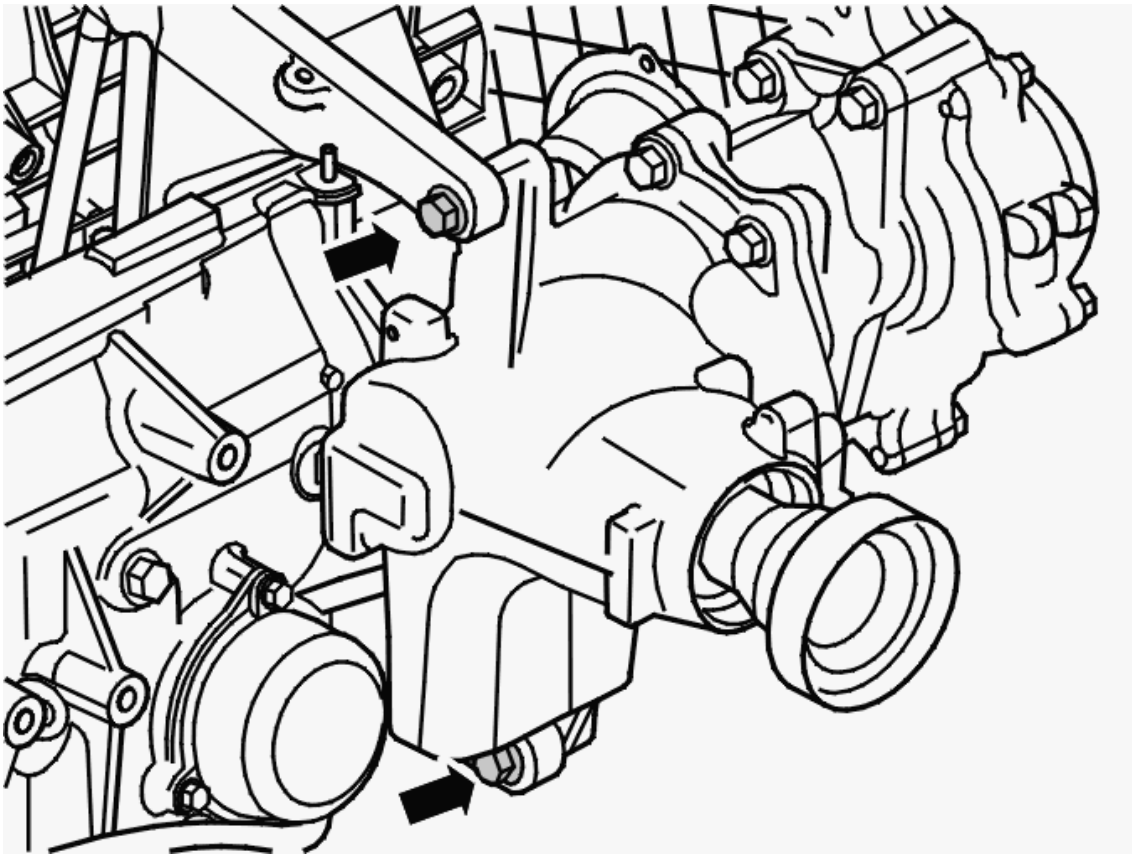


Fig. 438: Installing The Bevel Gear / Chain Housing
Courtesy of VOLVO CARS CORPORATION

- the screw for the bevel gear/engine. The screw is positioned on top of the bevel gear. The screw can be accessed from the center

NOTE: 2 people are required to carry out the following procedure as the bevel gear/chain housing unit is relatively heavy.

- the bevel gear/chain housing by first pulling it straight out from the transmission.

NOTE: Do not damage the seal ring in the transmission end.

Then turn the unit so that it can be removed to the side and downwards.

CHECKING THE SEALING RING

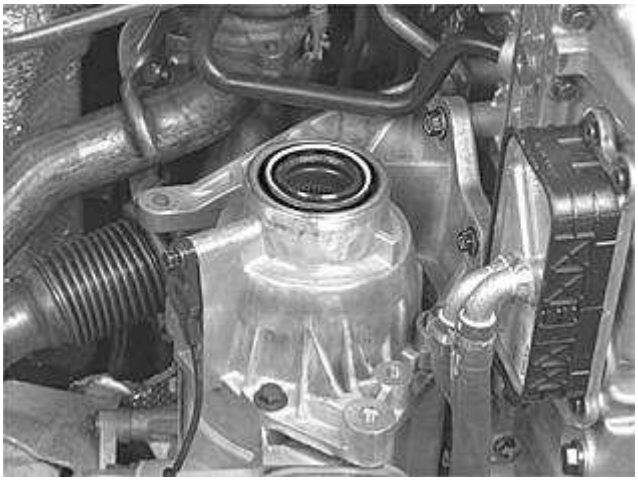


Fig. 439: Identifying The Sealing Ring
Courtesy of VOLVO CARS CORPORATION

Check that the sealing ring in the transmission end is undamaged.

Replace the sealing ring with a new one if it is damaged. See: **SEAL DRIVE SHAFT RIGHT, REPLACING** .

SEPARATING THE BEVEL GEAR/CHAIN HOUSING

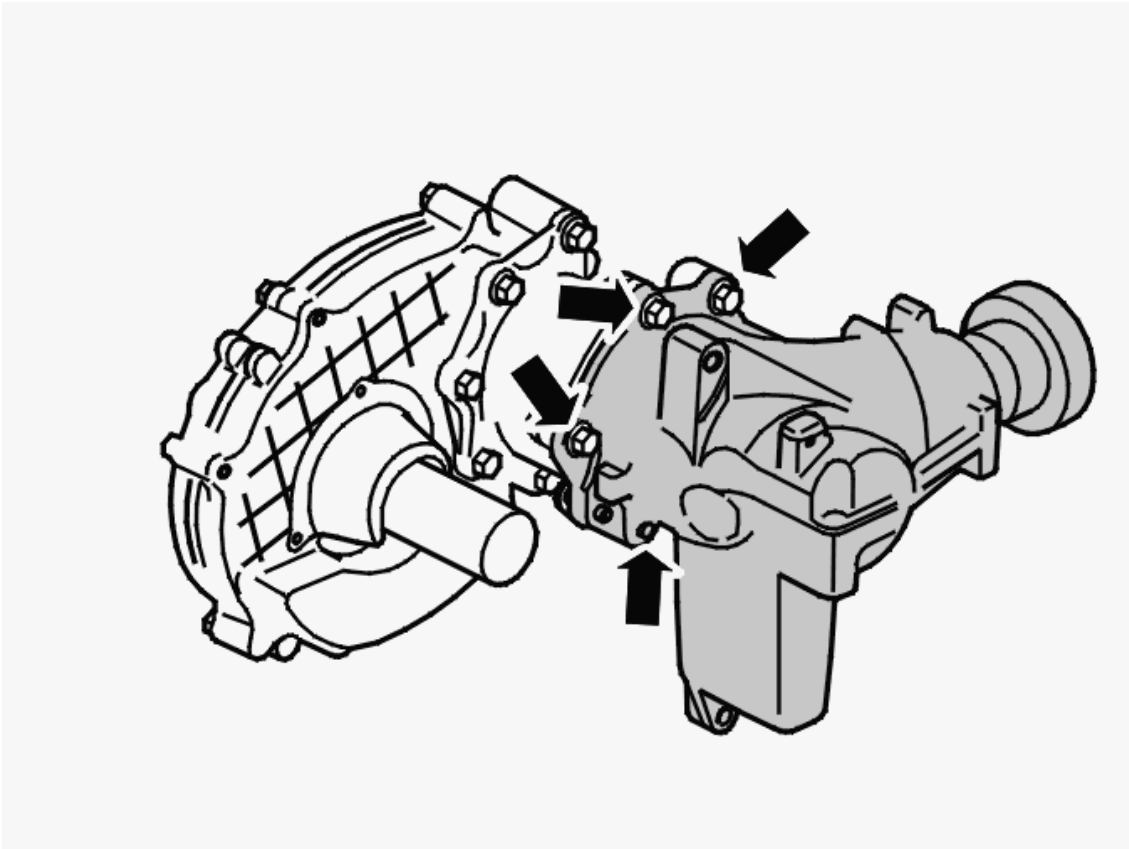


Fig. 440: Identifying Attaching Bolts
Courtesy of VOLVO CARS CORPORATION

Remove the 4 screws. Pull the chain housing straight out from the bevel gear/intermediate section.

NOTE: Do not place the chain housing with the opening for the bevel gear facing down, oil will drain out.

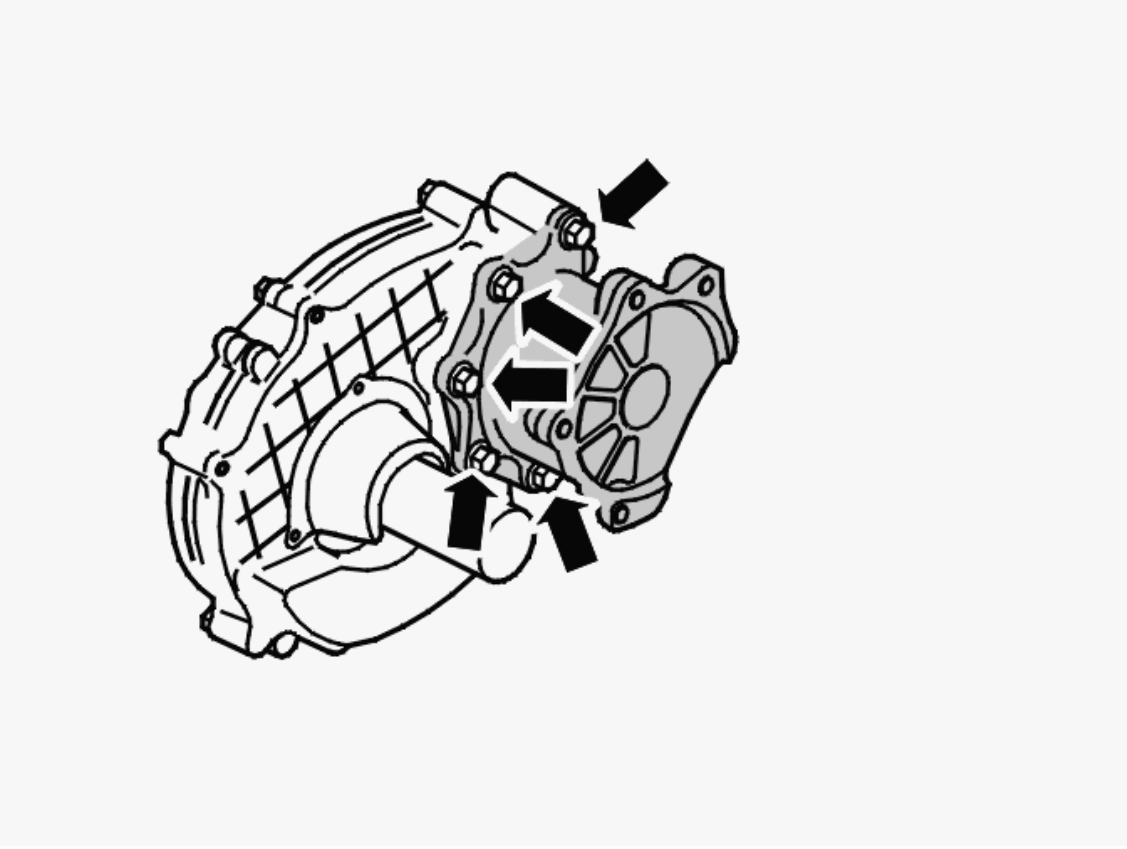


Fig. 441: Identifying Intermediate Section
Courtesy of VOLVO CARS CORPORATION

If necessary, detach and transfer the intermediate section to the new components.

CHECKING THE CHAIN HOUSING

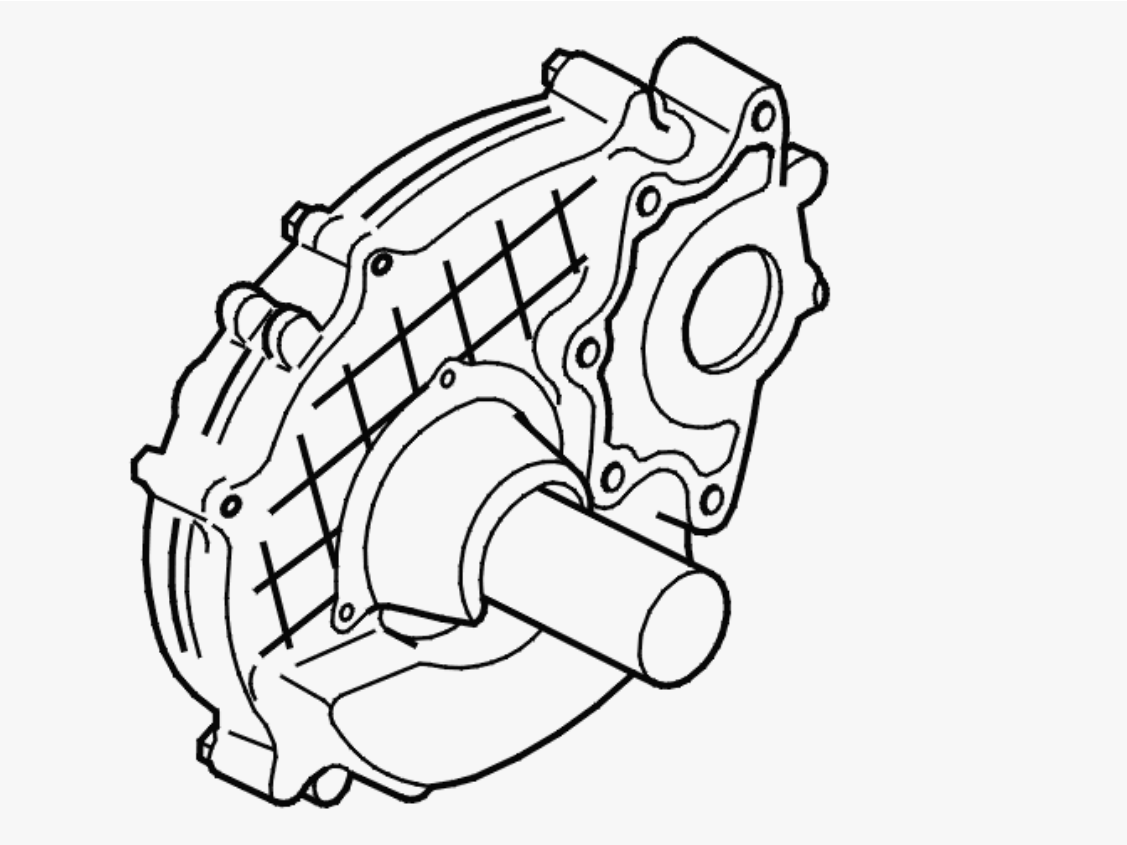


Fig. 442: Checking The Chain Housing
Courtesy of VOLVO CARS CORPORATION

Check that the sealing rings and mating surfaces are not damaged. Check for leakage. Replace the chain housing in the event of leakage.

HINT: A new chain housing is not filled with oil.

CHECKING THE BEVEL GEAR

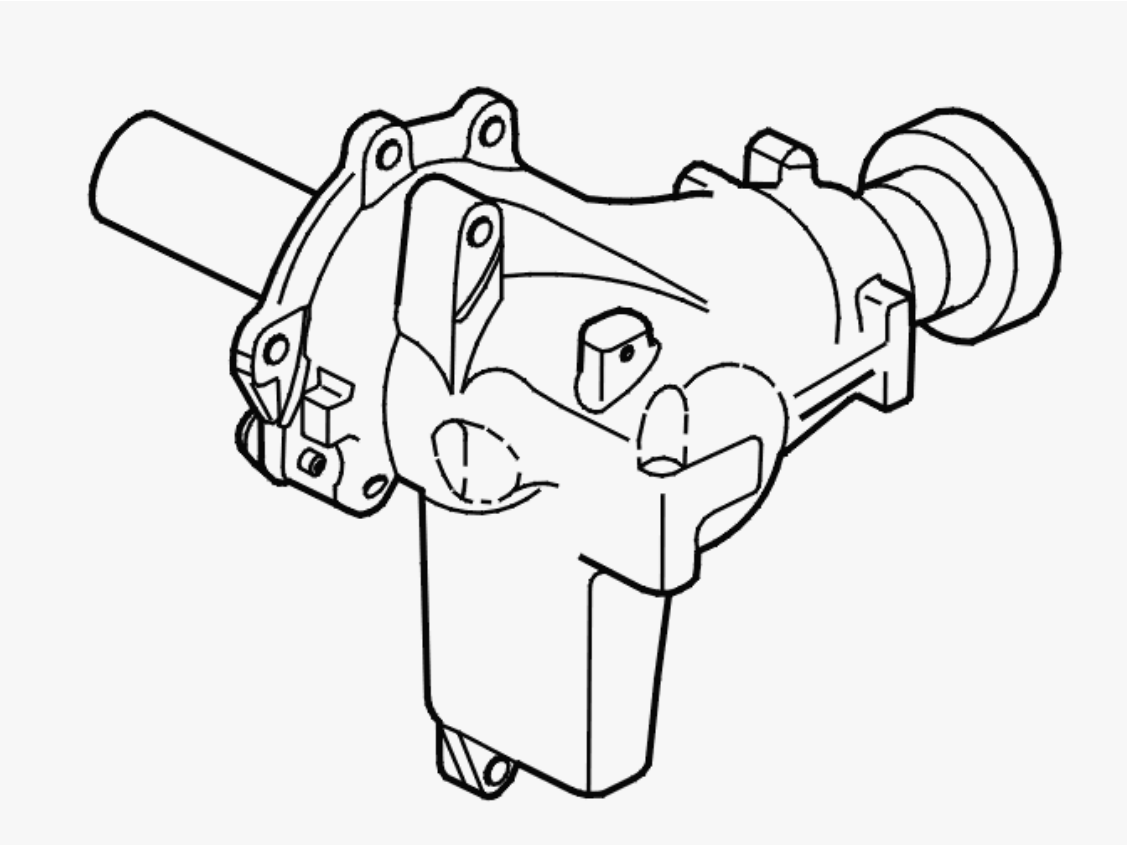


Fig. 443: Checking The Bevel Gear
Courtesy of VOLVO CARS CORPORATION

Check that the sealing rings and mating surfaces are not damaged. Check for leakage. Replace the bevel gear in the event of leakage or damage.

HINT: A new bevel gear is filled with oil, however, always check the oil level before test driving.

INSTALLATION

NOTE: For tightening torques, see: TIGHTENING TORQUE .

ASSEMBLING THE BEVEL GEAR/CHAIN HOUSING

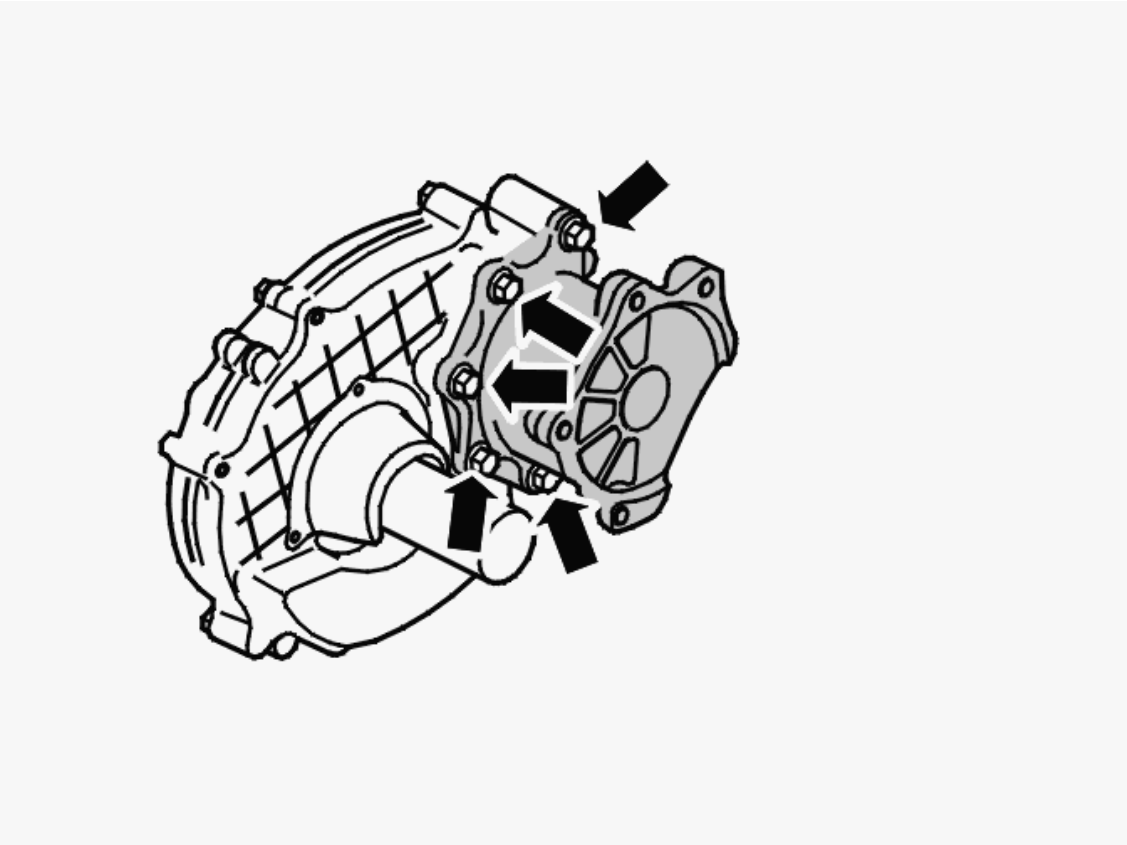


Fig. 444: Identifying Intermediate Section
Courtesy of VOLVO CARS CORPORATION

Lubricate the seal when replacing the chain housing. Use transmission fluid, P/N 116 1745-3 (1 liter).

Do not damage the sealing ring when installing the chain housing on the bevel gear.

If the intermediate section has been removed, first install the intermediate section on the chain gear housing. Use 4 x M10 screws. Tighten crosswise to light contact. Tighten.

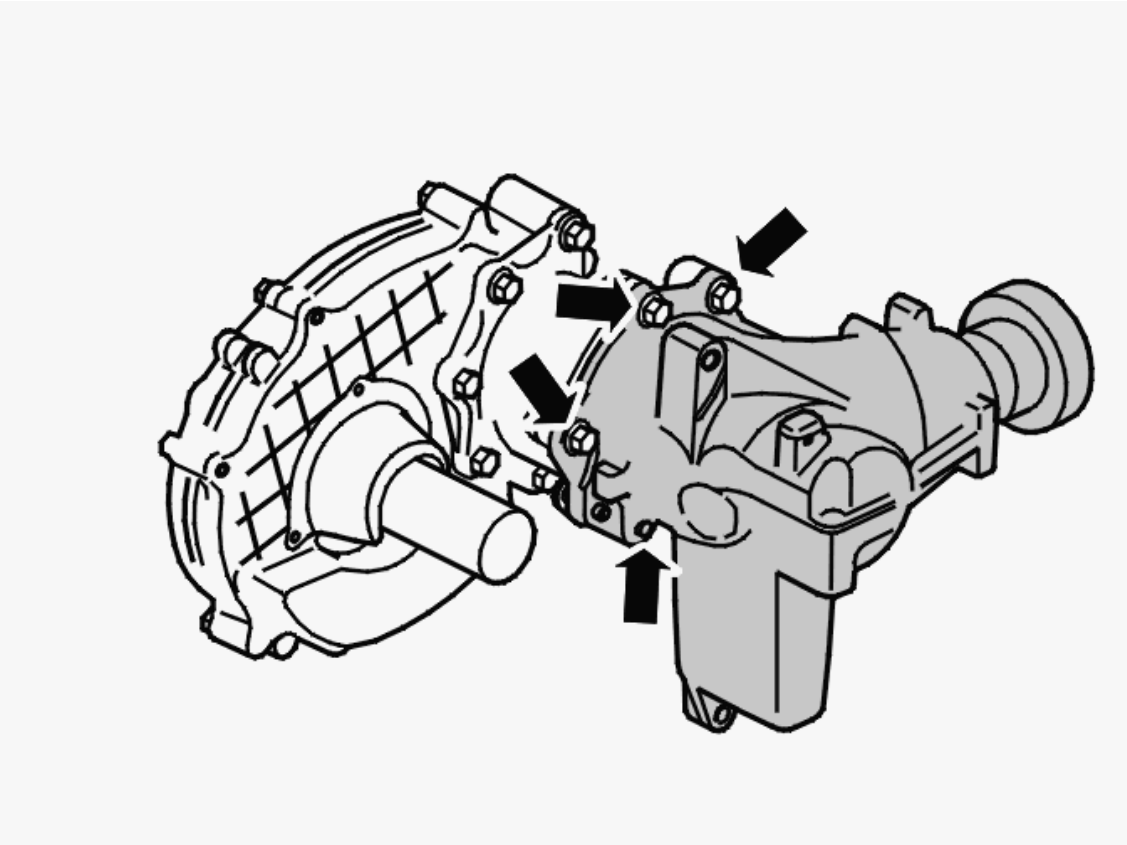


Fig. 445: Identifying Attaching Bolts
Courtesy of VOLVO CARS CORPORATION

Install the 4 x M10 screws. Tighten crosswise to light contact. Tighten.

INSTALLING THE BEVEL GEAR / CHAIN HOUSING

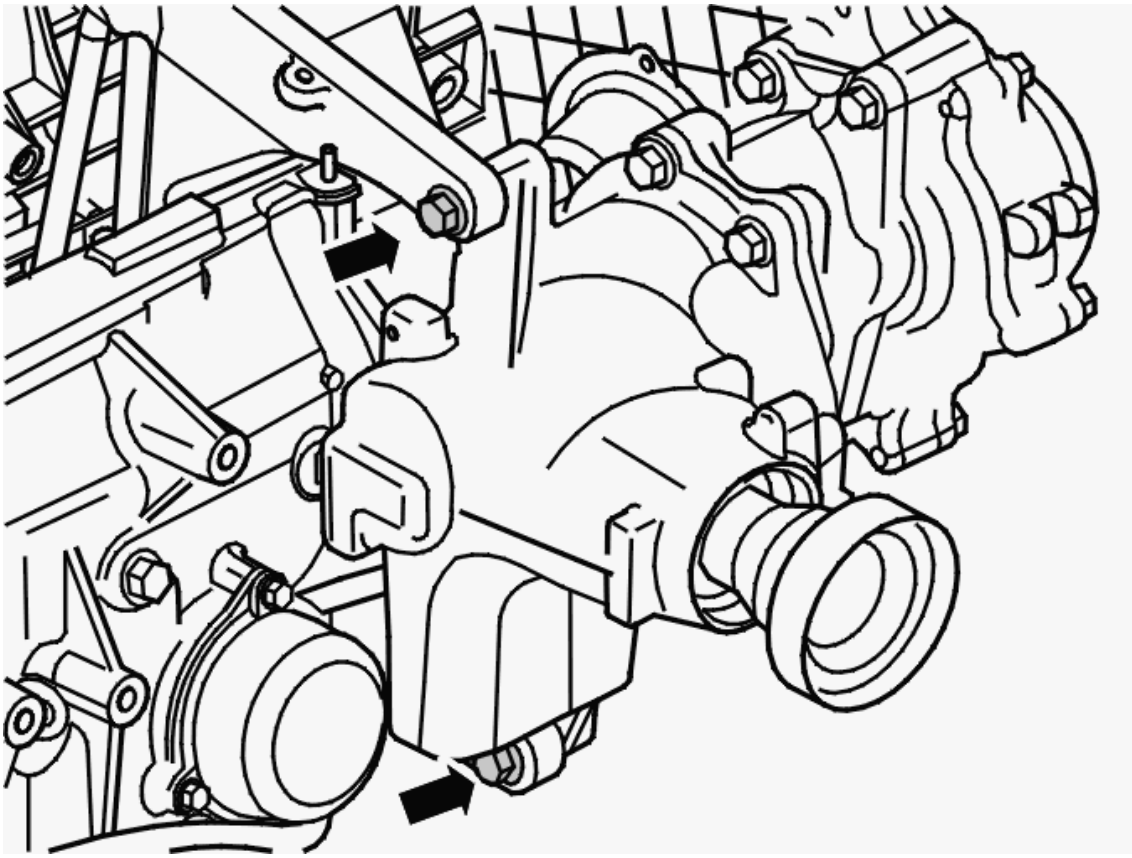


Fig. 446: Installing The Bevel Gear / Chain Housing
Courtesy of VOLVO CARS CORPORATION

NOTE: 2 people are required to carry out the following procedure as the bevel gear/chain housing unit is relatively heavy.

Lift up the unit and align the shaft journal in the transmission. Press the unit in.

NOTE: Make sure that the chain housing's shaft journal does not damage the seal in the transmission end.

Install the 2 x M10 screws loosely. Tighten crosswise to light contact. Tighten.

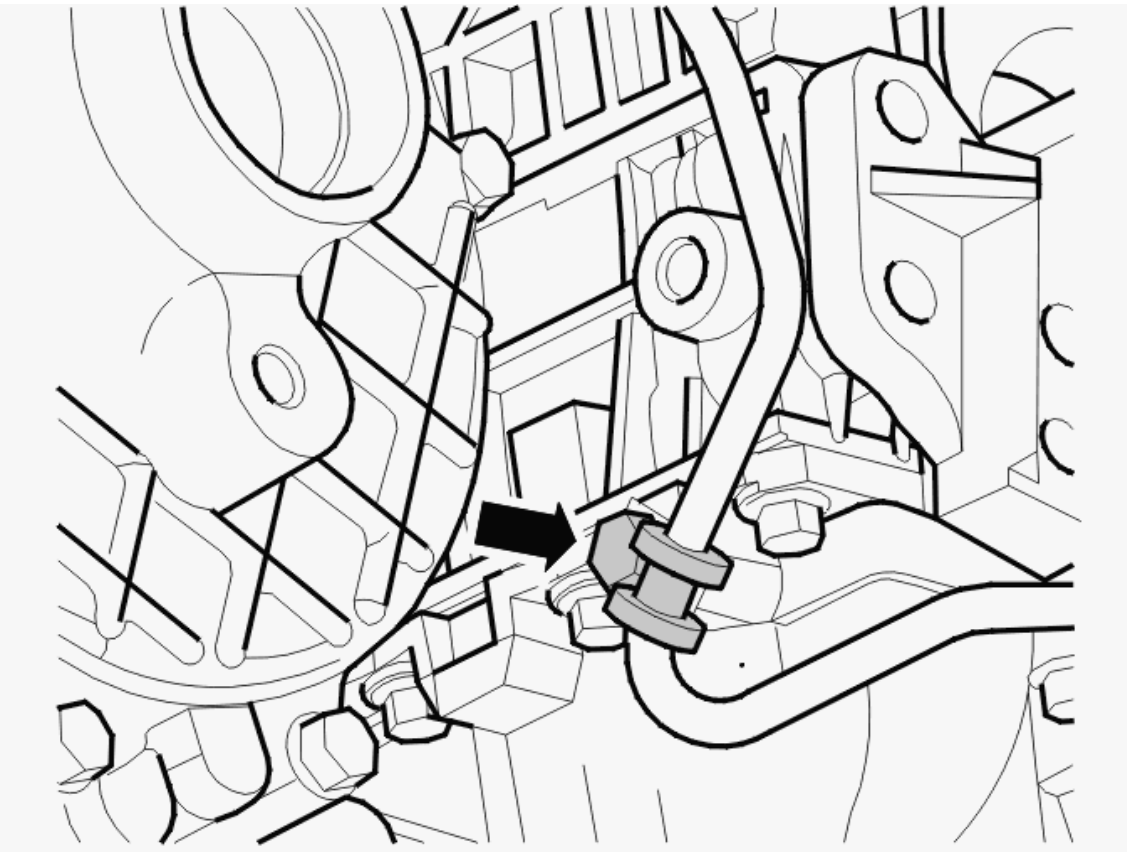


Fig. 447: Identifying Clamp For The Fuel Line
Courtesy of VOLVO CARS CORPORATION

Install the screws for the fuel line clamp. Tighten.

INSTALLING THE SCREW ON THE LOWER STEERING SHAFT

Align the steering gear with the lower steering shaft. Tighten the lower screw on the mounting for the steering shaft joint in the steering gear. Tighten. See: **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** . Use a **new** screw.

Release the steering wheel lock. Turn the steering wheel so that the screw in the mounting for the steering shaft joint points straight ahead. Check that the wheels are pointing straight ahead.

INSTALLING THE PROPELLER SHAFT

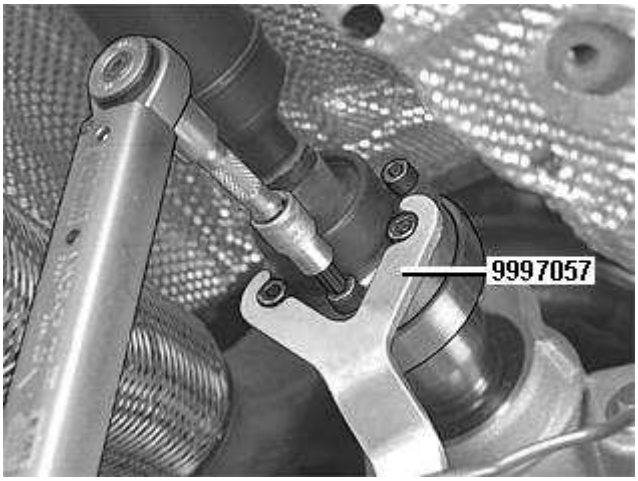


Fig. 448: Identifying Front Propeller Shaft And Special Tool 999 7057
Courtesy of VOLVO CARS CORPORATION

HINT: Move the gear selector to position N.

Install the propeller shaft using the marking made earlier.

Check carefully that the contact faces on the propeller shaft and flange are clean. Install the 6 x M8 screws, 6 pcs. M8, with washers. Tighten acc. to: **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** . Use counterhold **9997057** .

Install the 2 x M8 screws to the propeller shaft center bearing. Tighten.

INSTALLING THE STEERING GEAR TO THE ENGINE PAD

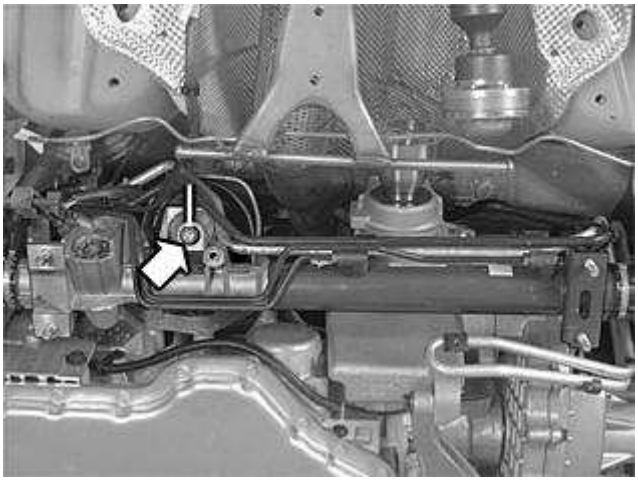


Fig. 449: Identifying Mark For Steering Gear Position
Courtesy of VOLVO CARS CORPORATION

Install the 1 x M10 screw for the steering gear and engine pad. Align the steering gear in relation to the engine pad, using the marking made earlier. Tighten.

INSTALLING THE RIGHT DRIVE SHAFT

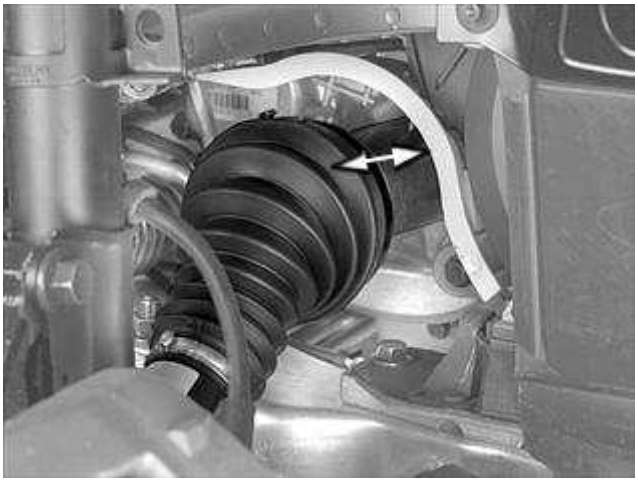


Fig. 450: Identifying Mating Surface Of The Drive Shaft
Courtesy of VOLVO CARS CORPORATION

Lubricate the seal. Use transmission fluid, P/N 116 1745-3 (1 liter container) if the chain housing or its sealing ring has been replaced.

Press the drive shaft into the transmission. Check that the snap ring is in its groove by carefully pulling it in the inner constant velocity joint.

Locate the drive shaft in the wheel hub.

FILLING AND CHECKING OIL

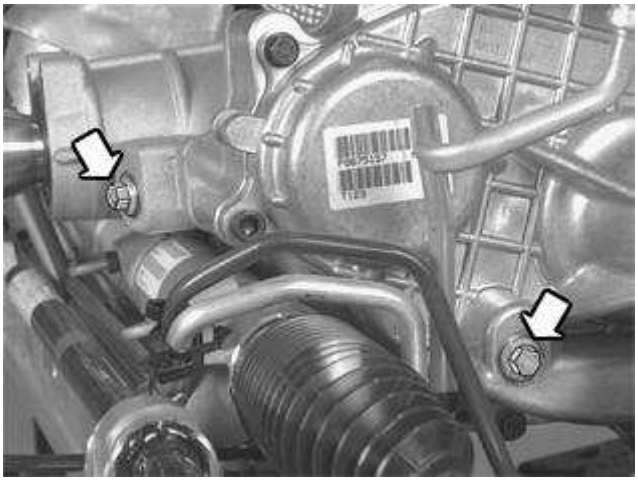


Fig. 451: Locating Chain Housing Bolts
Courtesy of VOLVO CARS CORPORATION

Fill and check the oil in:

- bevel gear. Use correct oil acc. to: **LUBRICANT TRANSMISSION**

Correct volume 650 ml.

oil to the filler plug. Suck out 0.1 l oil.

Tighten, see: **TIGHTENING TORQUE** .

- chain housing. Use only oil with part number 116 1745-3 (1 litre). Tighten acc. to **TIGHTENING TORQUE**

FINISHING

Install the sub-frame. See: **SUB-FRAME FRONT, REPLACING** .

Fill the transmission with exactly the same amount of new oil as was drained off. Only use automatic transmission fluid (ATF), P/N 116 1521 (1 liter container) or 116 1621 (4-liter container).

Check the transmission oil. See: **OIL LEVEL, CHECKING** .

RADIATOR AND CONNECTIONS

RADIATOR, REPLACING

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

PREPARATORY WORK

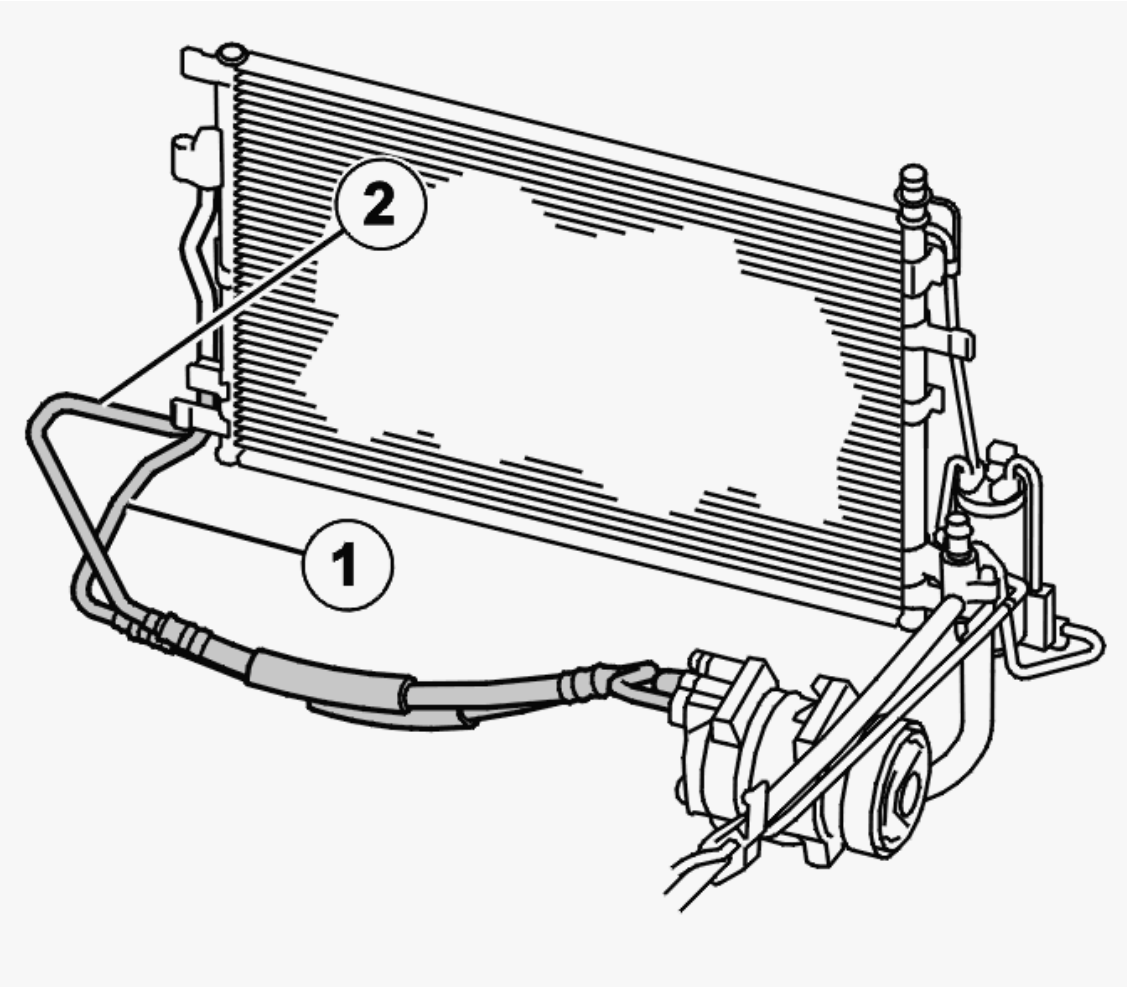


Fig. 452: Identifying Alternate Versions Of The Air Conditioning (AC) Hose
Courtesy of VOLVO CARS CORPORATION

CAUTION: If the car is equipped with an earlier version of the air conditioning (AC) hose (1), continue according to this method.

If the car is equipped with a later version of the air conditioning (AC) hose (2), proceed to the new method. See: RADIATOR, REPLACING.

Remove the battery lead. See **BATTERY, DISCONNECTING** .

Drain the A/C system. See **REFRIGERANT, DRAINING** .

REMOVING THE SKID PLATE

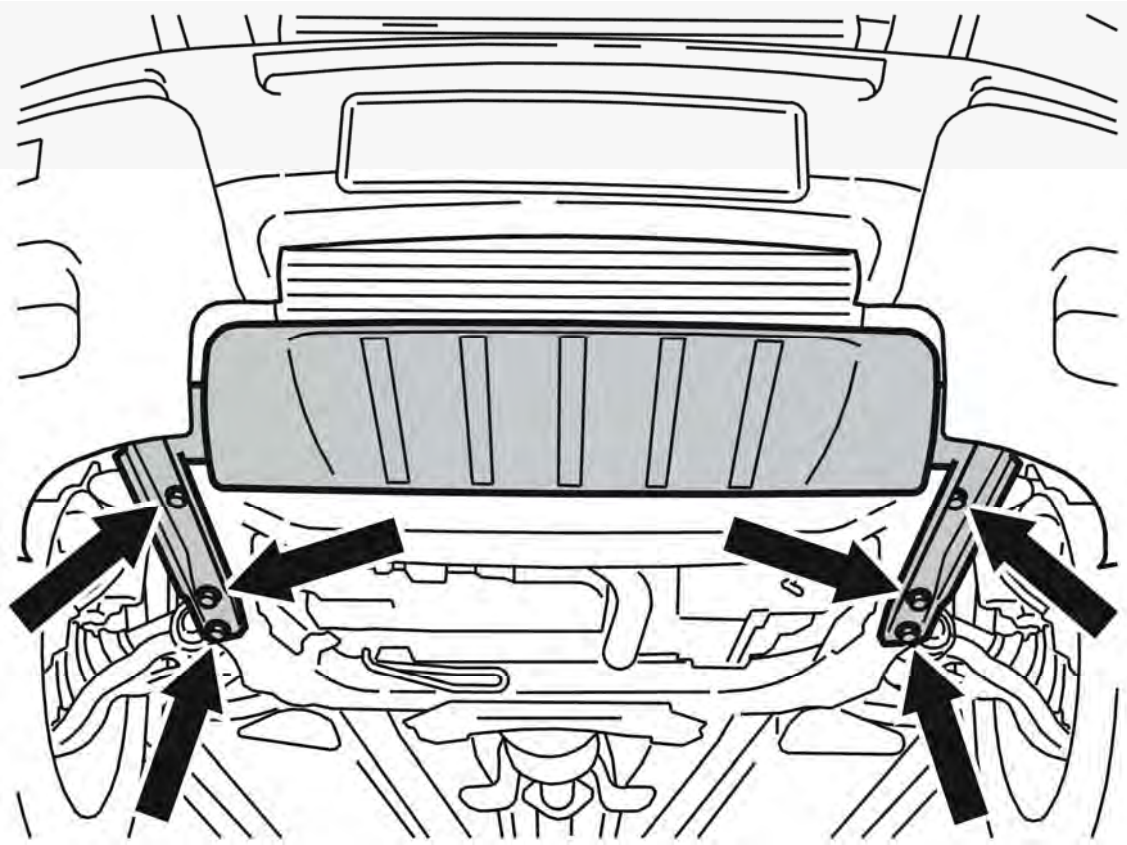


Fig. 453: Splash Guard. Protective Plate And Screws
Courtesy of VOLVO CARS CORPORATION

Remove the 6 screws.

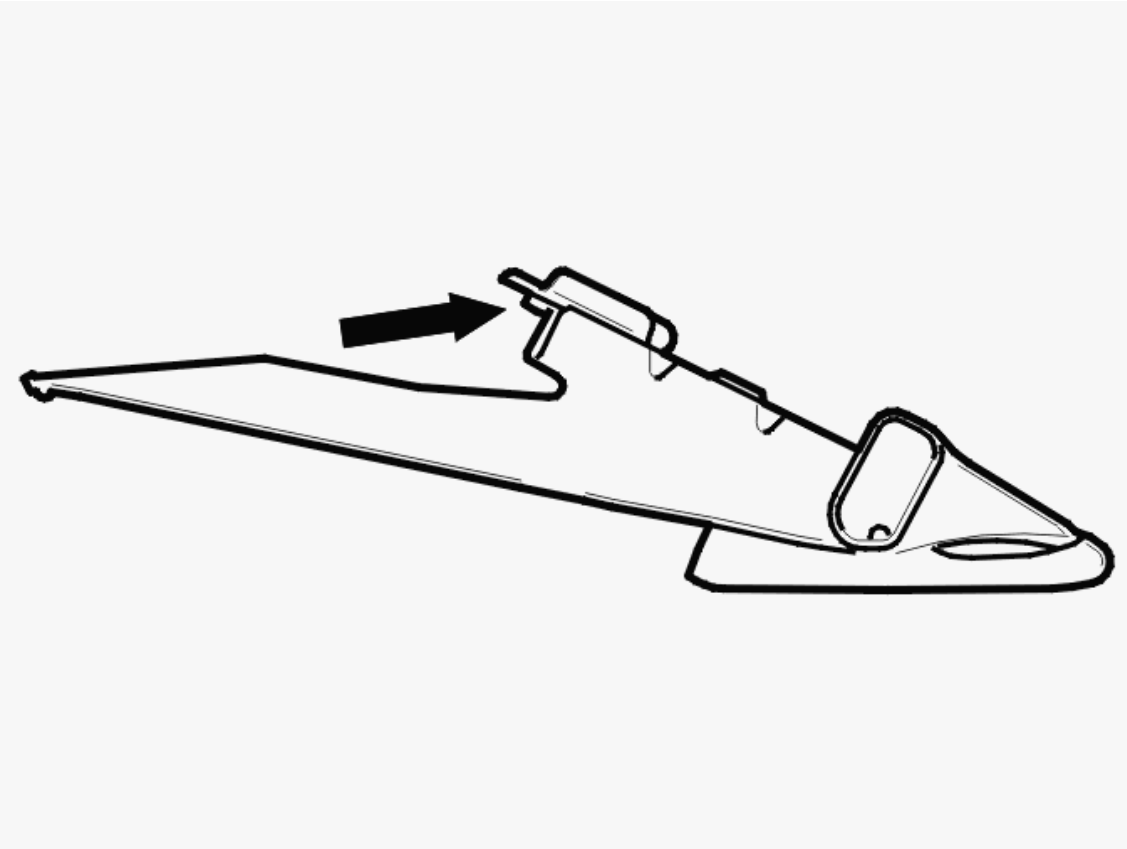


Fig. 454: Identifying Protective Plate
Courtesy of VOLVO CARS CORPORATION

Lift up and slide the plate forward.

Remove the protective plate.

NOTE: There is a guide sleeve on the upper mounting for the plate. This must be lifted slightly so that the panel can be slid forward.

DRAINING COOLANT

Block the lower hose with lock grip pliers.

Install a hose on the nipple at the radiator.

Feed the hose down to a container.

Open the nipple and drain off the coolant.

REMOVING THE CABLE DUCT AND AIR DUCT

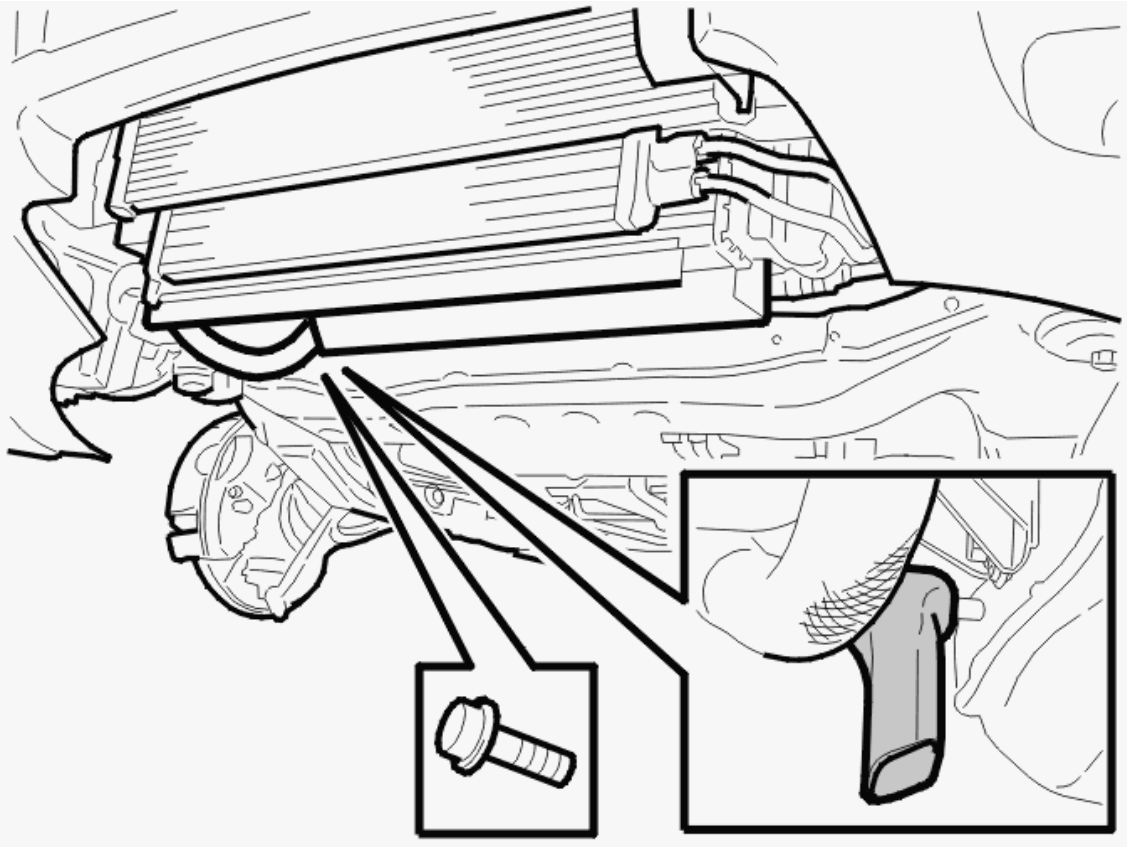


Fig. 455: Identifying Screw For The Cable Duct.
Courtesy of VOLVO CARS CORPORATION

Remove the screw for the cable duct. Place the cable duct on the sub-frame.

Pull the air duct from the clips on the sub-frame.

REMOVING THE OIL COOLER HOSES

Applies only to cars with automatic transmissions:

Remove the lower oil cooler hose from the cooler unit.

Plug the openings in the hose and radiator.

NOTE: Collect the oil from the oil cooler in a container.

Lower the car. Remove the upper oil cooler hose from the cooler unit.

Plug the openings in the hose and radiator.

REMOVING THE UPPER COOLANT HOSES

Remove:

- the evacuation hose from the expansion tank and clip mounting
- the upper radiator hose.

REMOVING THE CHARGE AIR PIPE/HOSE

Applies only to cars with a turbocharger (TC):

Disconnect the charge air pipe from the charge air cooler (CAC) on the left side. If necessary, use a hot air gun to make removal easier.

Remove the clamp. Remove the charge air hose on the right side from the charge air cooler (CAC).

REMOVING THE RIGHT HEADLAMP

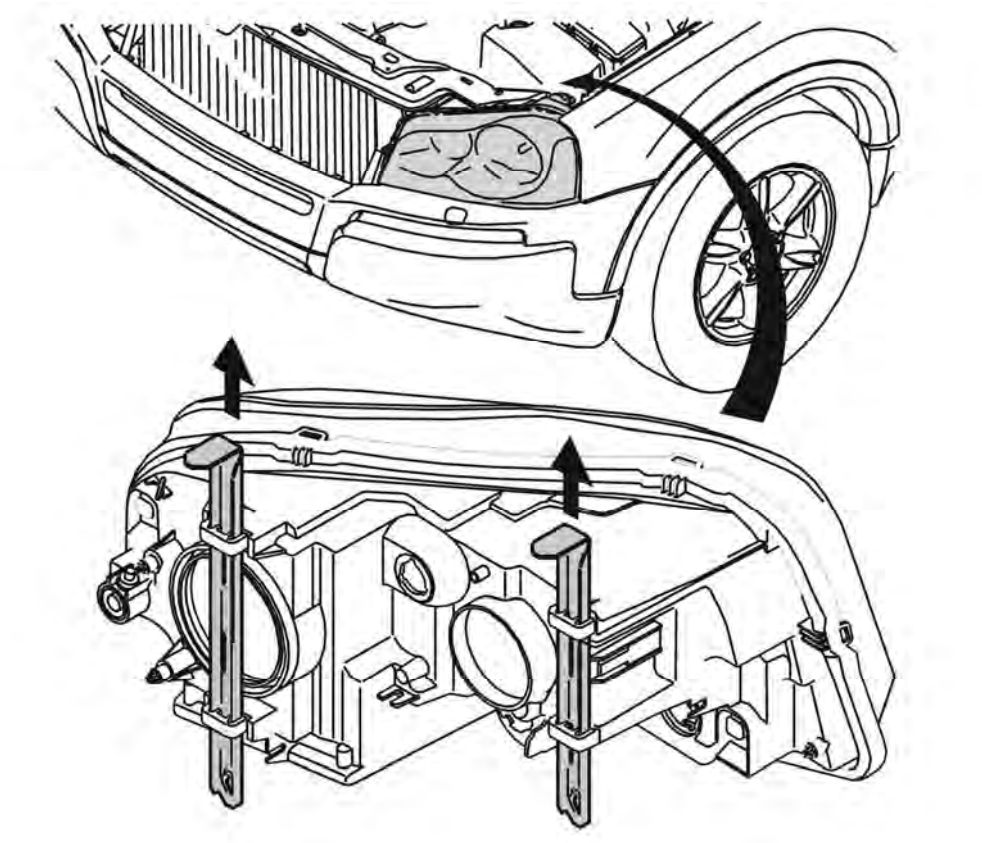


Fig. 456: Pulling Locking Plate Straight Up
Courtesy of VOLVO CARS CORPORATION

Headlamps removing.

Pull the locking plate straight up.

Disconnect the connector.

Remove the headlamp.

REMOVING THE AIR CONDITIONING (A/C) PIPE

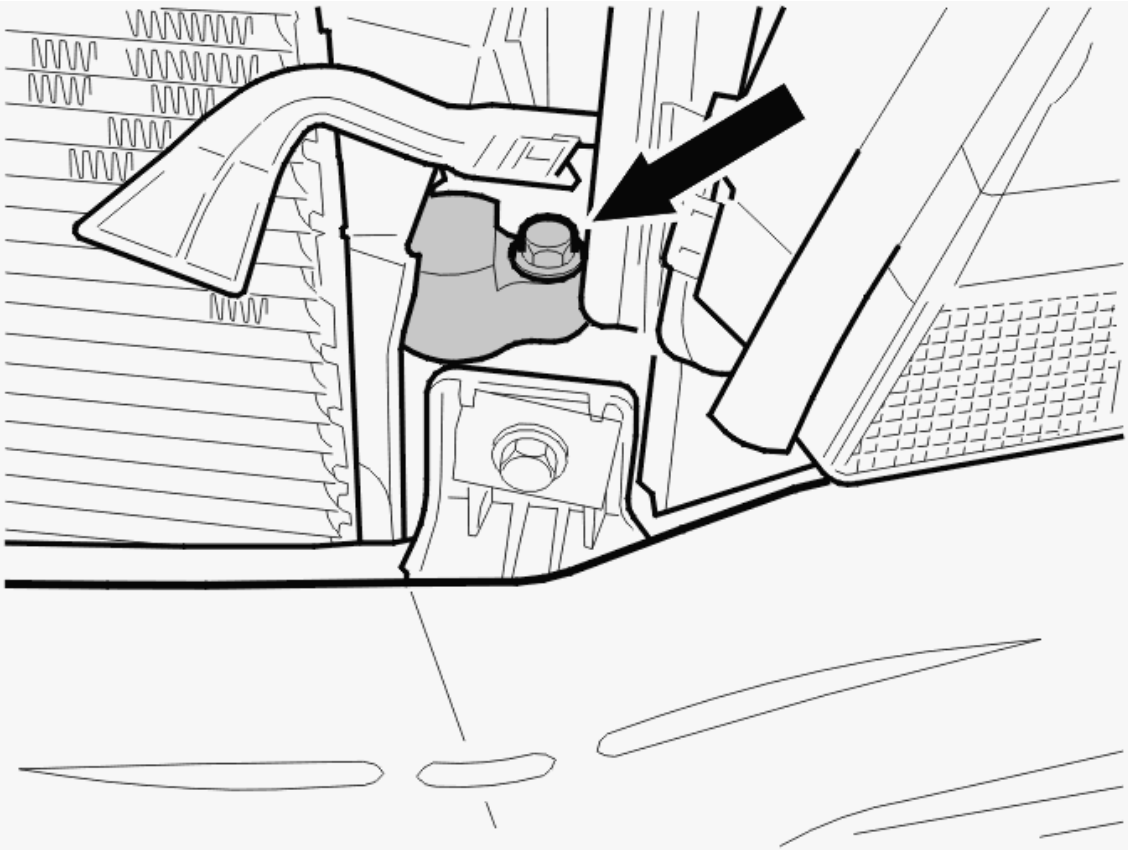


Fig. 457: Locating Air Conditioning Condenser Pipe
Courtesy of VOLVO CARS CORPORATION

Remove from the left side:

- the screw
- the air conditioning (A/C) pipe.

Seal the openings on the pipe and condenser.

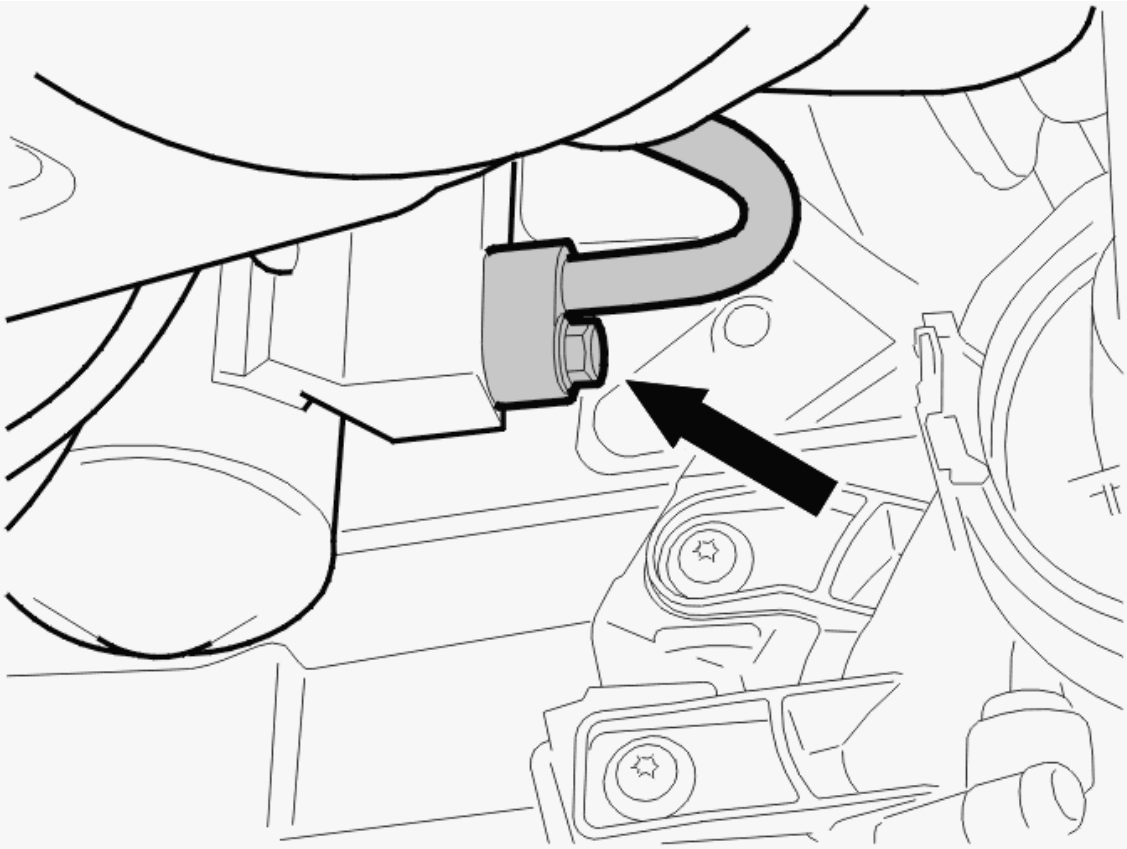


Fig. 458: Locating Air Conditioning Receiver Pipe
Courtesy of VOLVO CARS CORPORATION

Remove from the right side:

- the connector.

Raise the car.

Remove:

- the screw
- the air conditioning (A/C) pipe.

Seal the openings on the pipe and receiver.

HINT: Pull down and hang up the left pipe so that the hose is positioned above the sub-frame.

REMOVING THE LOWER ENGINE COOLANT HOSE

Slacken off the hose clamp. Remove the hose from the radiator.

Fold the hose out of the way.

REMOVING THE RADIATOR ASSEMBLY

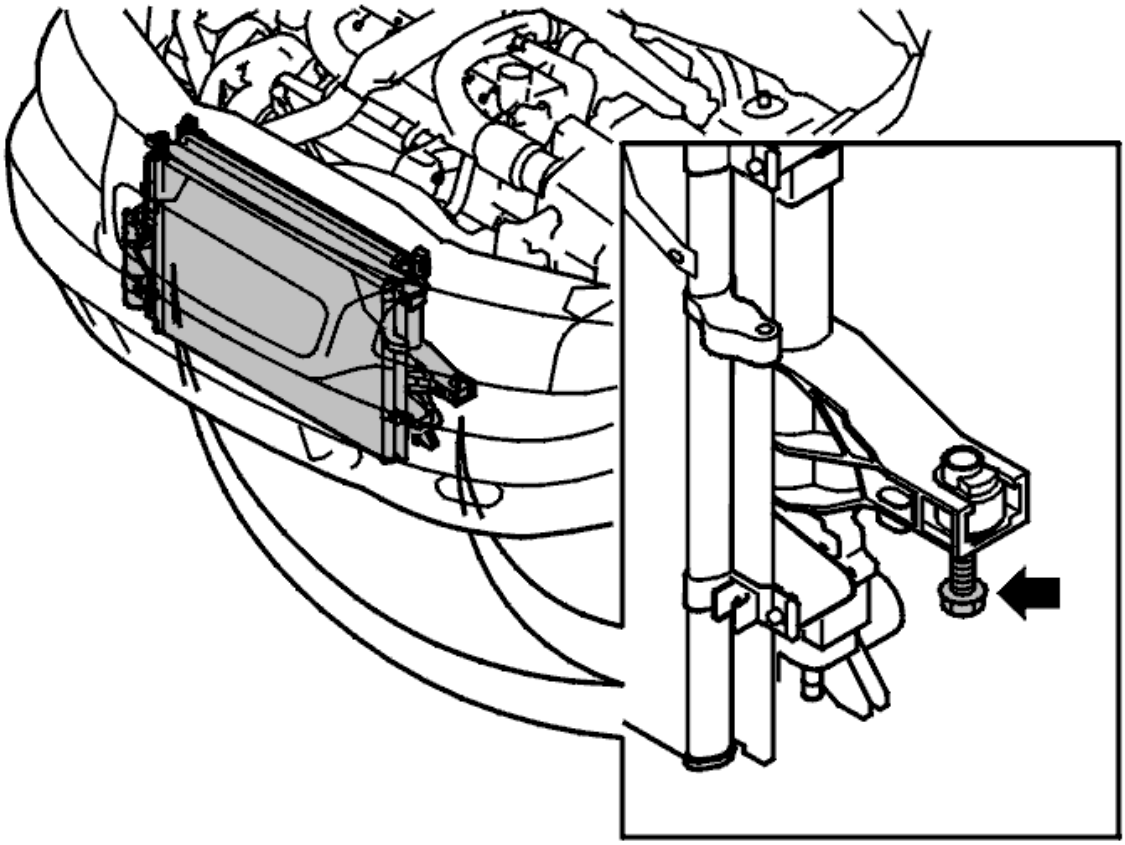


Fig. 459: Identifying Lower Mounting For Air Conditioning Aggregate
Courtesy of VOLVO CARS CORPORATION

NOTE: Two people are required for this procedure.

Hold up the air conditioning aggregate. Slacken off the two mounting screws.

Pull down the air conditioning aggregate carefully.

NOTE: Ensure that no hoses are trapped when removing the air conditioning aggregate.

REMOVING THE ENGINE COOLING FAN (FC)

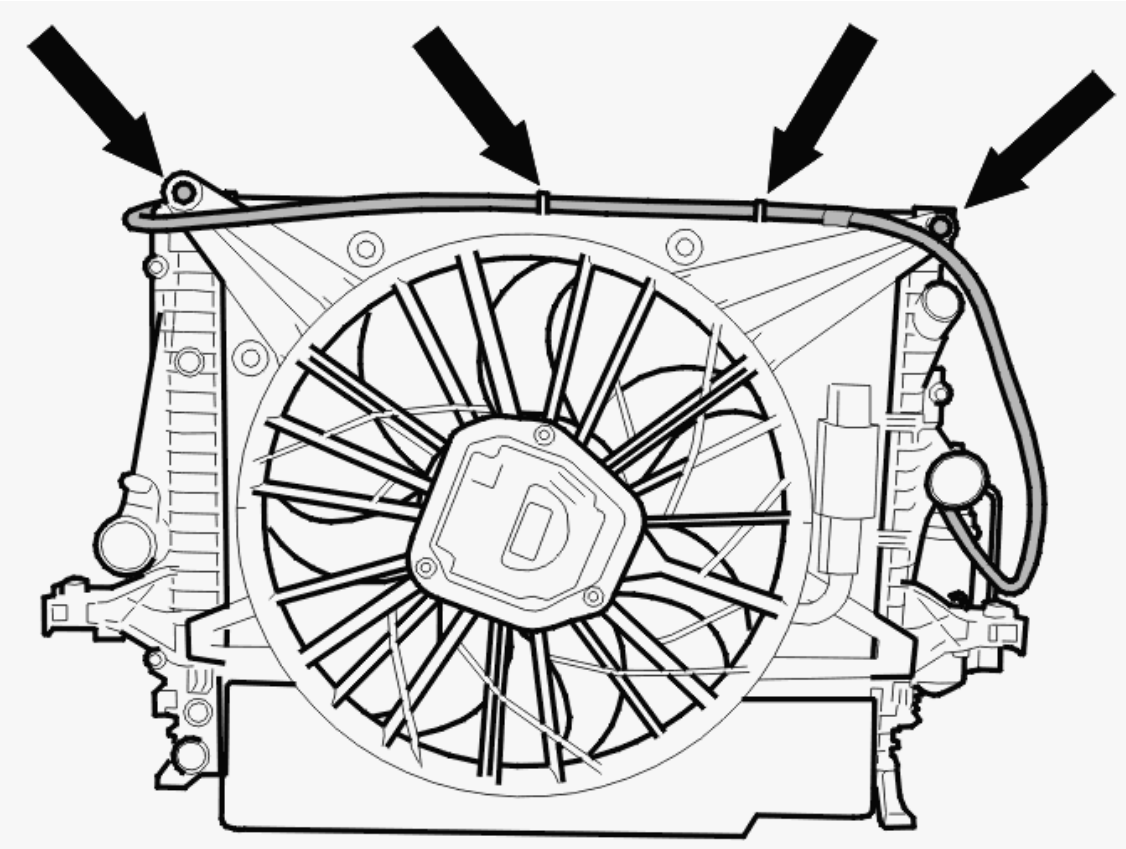


Fig. 460: Identifying Engine Cooling Fan
Courtesy of VOLVO CARS CORPORATION

Remove:

- the screws
- the evacuation hose from the clip mountings
- the engine cooling fan (FC).

REMOVING THE RADIATOR

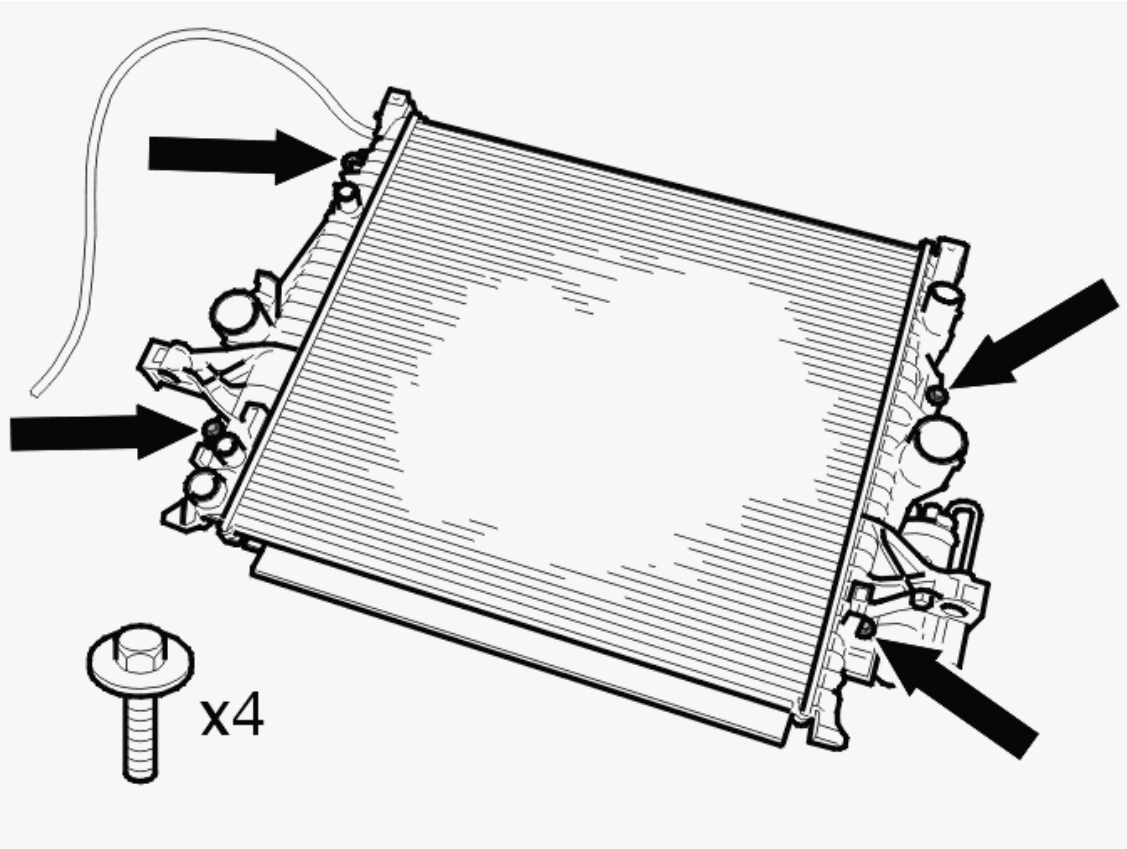


Fig. 461: Identifying The Air Conditioning Aggregate Screws
Courtesy of VOLVO CARS CORPORATION

Remove:

- the screws
- the radiator.

TRANSFERRING COMPONENTS

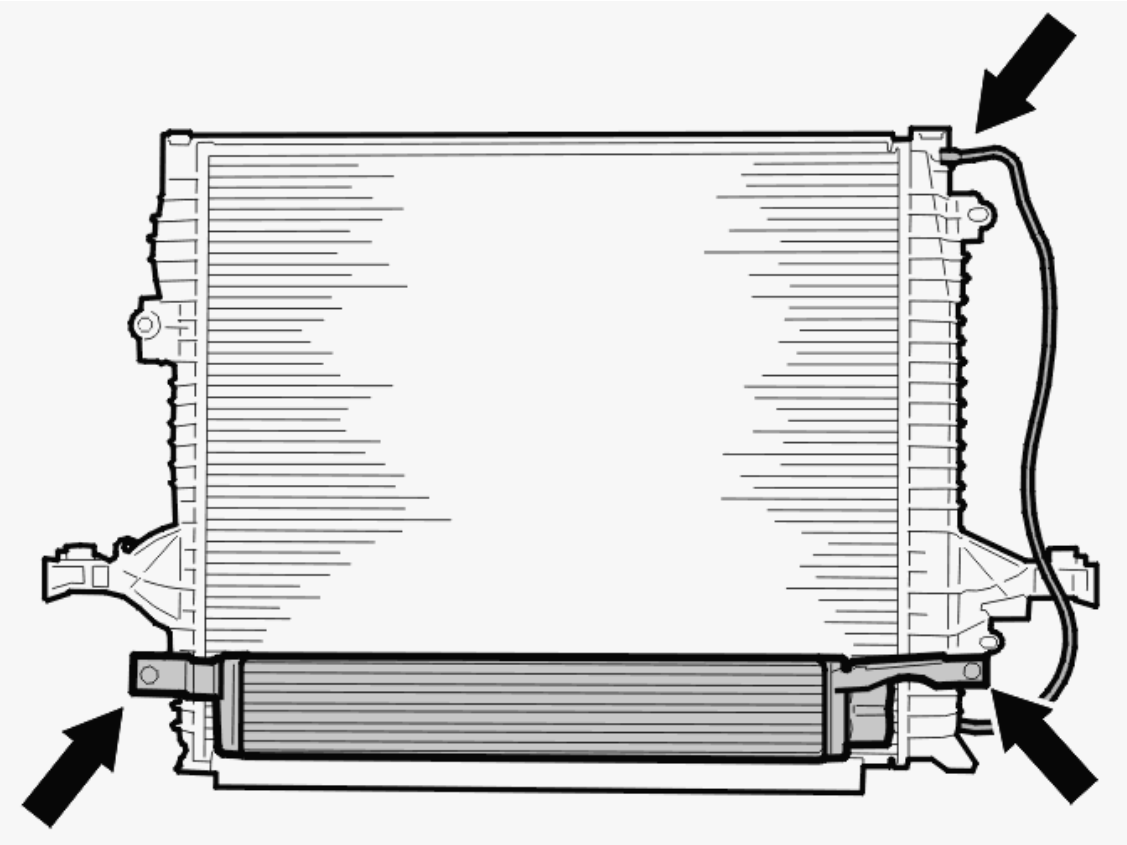


Fig. 462: Identifying Extra Oil Cooler
Courtesy of VOLVO CARS CORPORATION

Transfer the evacuation hose.

Applies to cars equipped with an extra oil cooler:

Transfer the oil cooler.

INSTALLING THE RADIATOR

Position the radiator over the condenser and the charge air cooler (CAC).

Install the screws. Tighten to **10 Nm** .

INSTALLING THE ENGINE COOLANT FAN (FC)

Install:

- the engine cooling fan (FC)
- the screws. Tighten to **10 Nm**
- the evacuation hose in the clip mountings.

INSTALLING THE COOLER UNIT

NOTE: Two people are required for this procedure.

Lift up the air conditioning aggregate. Install the two mounting screws. Tighten to **24 Nm** .

NOTE: Ensure that the air conditioning aggregate is positioned correctly in the locating pins on top of the aggregate.

NOTE: Ensure that no hoses are trapped when installing the air conditioning aggregate.

INSTALLING THE LOWER ENGINE COOLANT HOSE

Install the hose. Tighten the clamp.

Remove the lock grip pliers.

INSTALLING THE AIR CONDITIONING (A/C) PIPE

HINT: Lubricate the O-rings using compressor oil.

Install on the right side:

- the air conditioning (A/C) pipe. Use a new O-ring
- the screw. Tighten to **10 Nm** .

Lower the car.

Connect the connector to the receiver.

Install on the left side:

- the air conditioning (A/C) pipe. Use a new O-ring
- the screw. Tighten to **24 Nm** .

Vacuum pump the air conditioning (A/C) system. See **VACUUM PUMPING** .

INSTALLING THE RIGHT HEADLAMP

Install:

- the connector
- headlamps
- the locking plate.

INSTALLING THE UPPER ENGINE COOLANT HOSES

Install:

- the upper radiator hose
- the evacuation hose on the expansion tank and clip mounting.

INSTALLING THE CHARGE AIR PIPE/HOSE

Install:

- the charge air hose on the right side
- the charge air pipe on left side.

Tighten the clamps.

INSTALLING THE OIL COOLER HOSES

Applies only to cars with automatic transmissions:

Install the upper oil cooler hose.

Use a new O-ring. Raise the car.

Install the lower oil cooler hose.

Use a new O-ring.

INSTALLING THE CABLE DUCT AND AIR DUCT

Position the cable duct.

Install the screw. Tighten to **10 Nm** .

Install the air duct using the clip on the sub-frame.

INSTALLING THE SKID PLATE

Move the skid plate up into the bumper wraparound.

Press forwards until the mounting brackets engage in the sub frame.

Install the screws. Tighten to **50 Nm** .

FINISHING

Fill the A/C system. See **REFRIGERANT, FILLING** .

Check for leaks. See **LEAK TRACING, FLUORESCENT TRACING AGENT / UV LAMP** .

Install the battery lead.

Top up the coolant.

Install the cap on the expansion tank.

Run the engine until the thermostat has opened.

Stop the engine. Top up if necessary.

Check for leaks.

RADIATOR, REPLACING

NOTE: Since the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

REMOVAL

REMOVING THE ENGINE COOLING FAN (FC)

Remove the electric cooling fan. See **ENGINE COOLING FAN (FC), REPLACING** .

DRAINING COOLANT

Block lower hose with lock grip pliers.

Install a hose on the nipple at the radiator.

Feed the hose down to a container.

Open the nipple and drain off the coolant.

REMOVING THE RADIATOR

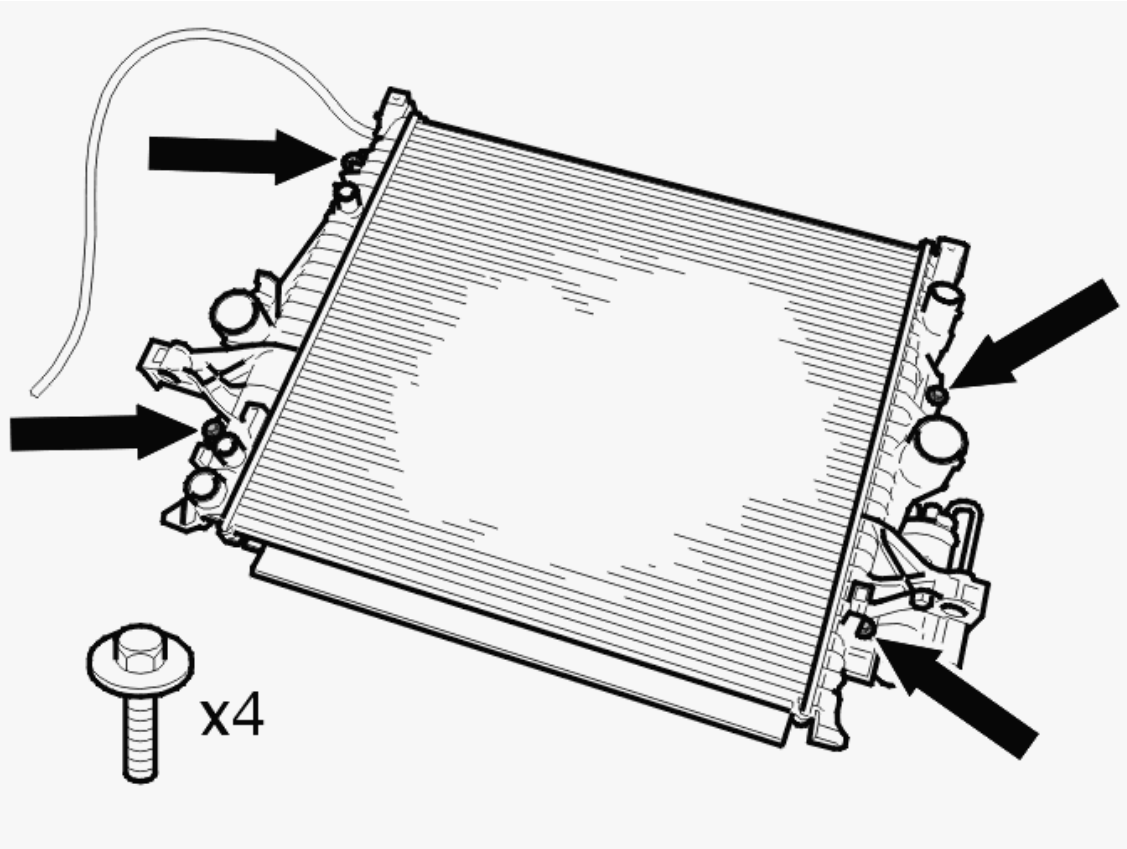


Fig. 463: Identifying The Air Conditioning Aggregate Screws
Courtesy of VOLVO CARS CORPORATION

Remove:

- the evacuation hose from the expansion tank
- the 4 bolts

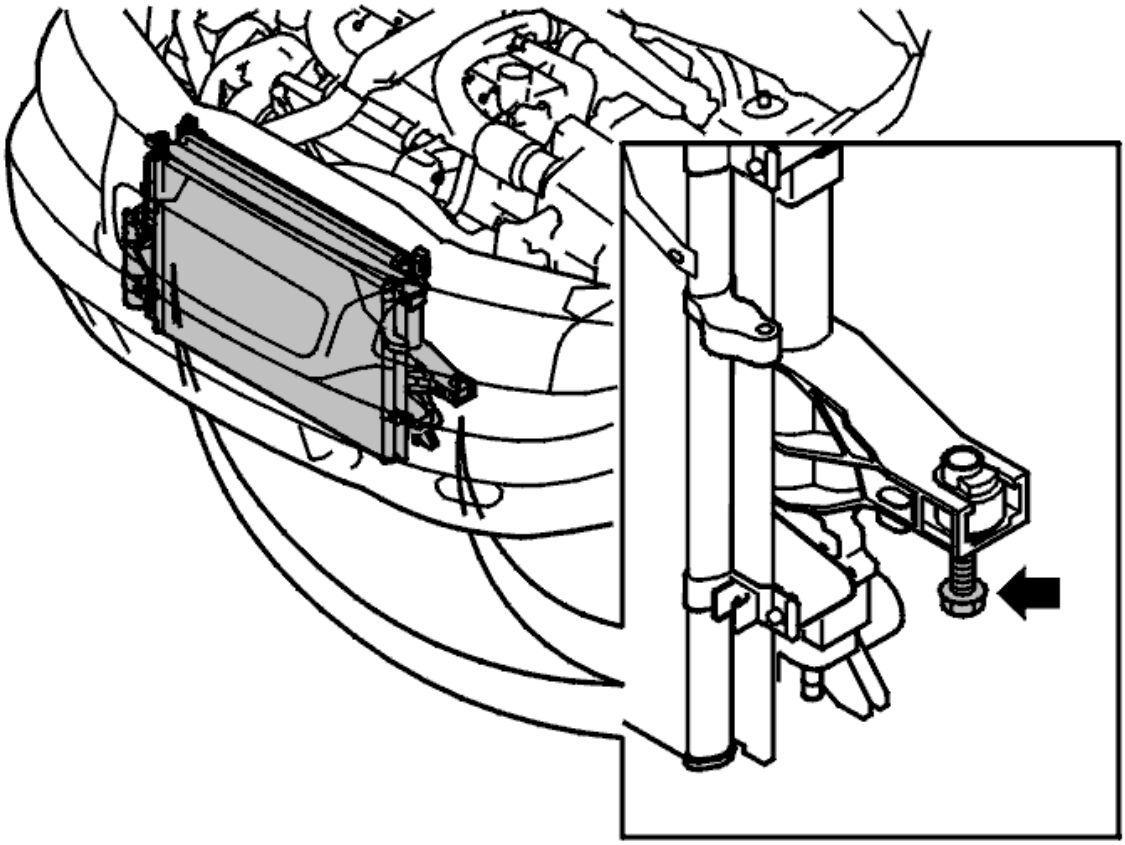


Fig. 464: Identifying Lower Mounting For Air Conditioning Aggregate
Courtesy of VOLVO CARS CORPORATION

Remove:

- the 2 mounting bolts
- the radiator.

INSTALLATION

INSTALLING THE RADIATOR

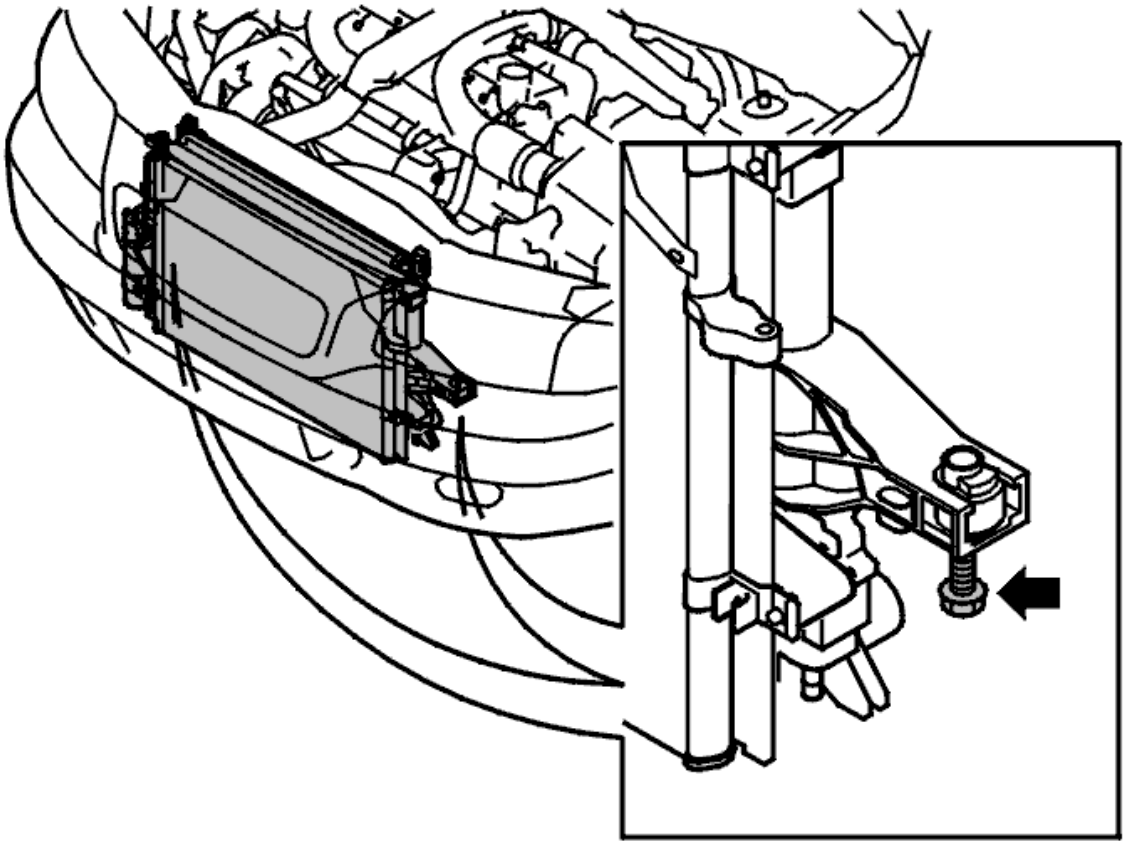


Fig. 465: Identifying Lower Mounting For Air Conditioning Aggregate
Courtesy of VOLVO CARS CORPORATION

Lift the radiator. Install the two M8 mounting bolts.

NOTE: Make sure that the radiator is positioned correctly in the guide pins on top of the unit.

NOTE: Make sure that no hoses are trapped when installing the radiator.

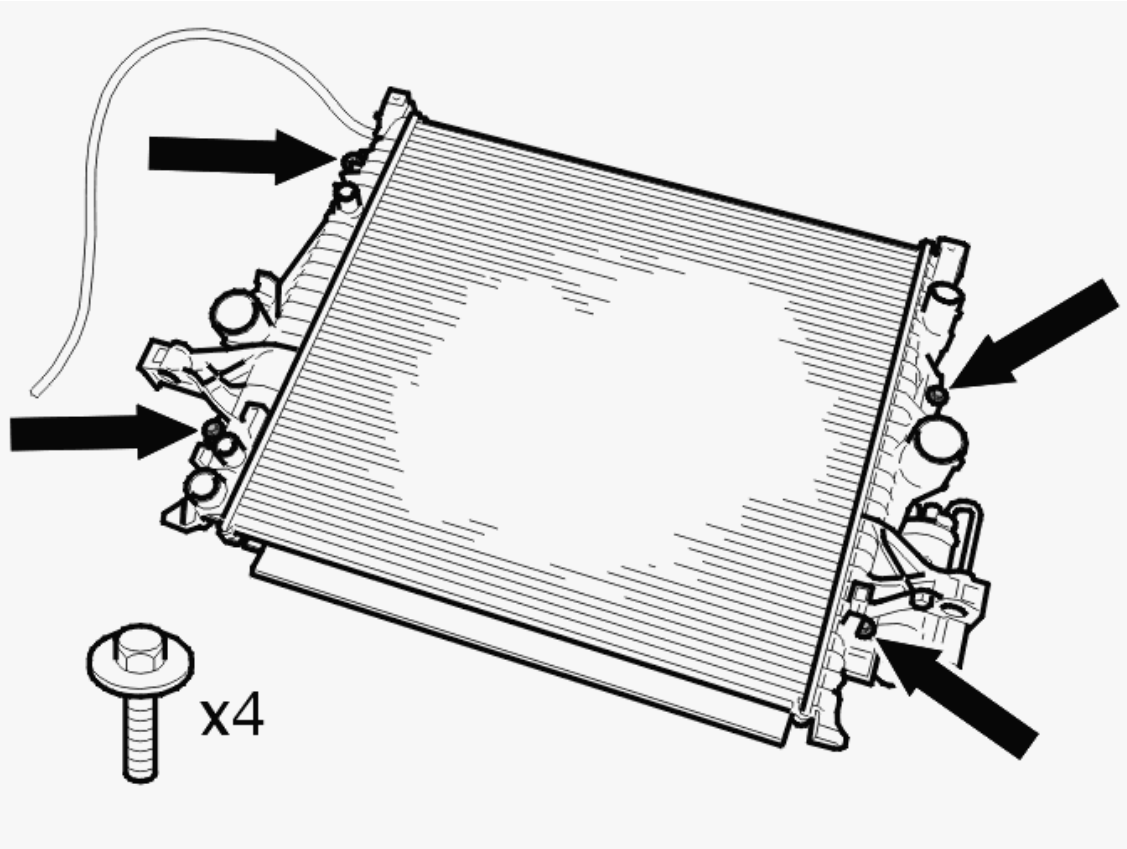


Fig. 466: Identifying The Air Conditioning Aggregate Screws
Courtesy of VOLVO CARS CORPORATION

Install:

- the evacuation hose from the expansion tank
- the 4 x M6 screws.

Install the electric cooling fan. See: **ENGINE COOLING FAN (FC), REPLACING** .

GASKET / PISTON ACCUMULATOR, REPLACING

NOTE: The accumulator housing is located in the transmission.

CAUTION: Cleanliness is extremely important when working on automatic transmissions. Use lint free paper or rags.

CAUTION: Read through the instructions before beginning work.

REMOVAL

PREPARATIONS

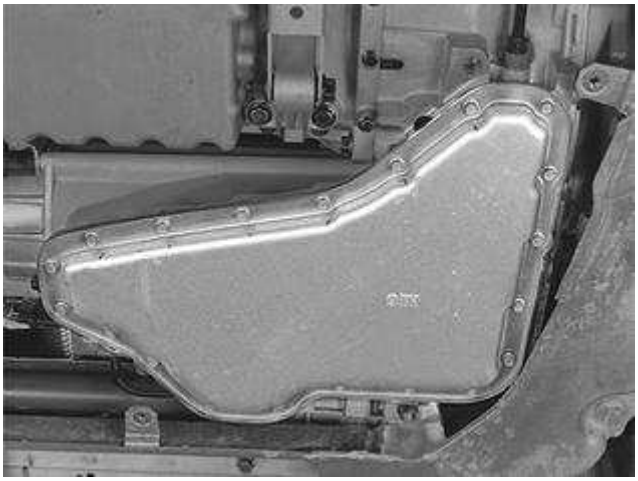


Fig. 467: Identifying Oil Pan
Courtesy of VOLVO CARS CORPORATION

Suck up the oil from the transmission using an oil suction device.

Take out a container for the oil.

Raise the car.

Remove:

- the splash guard under the engine. Blow and wipe clean around the transmission oil trough
- the transmission oil trough. See **REMOVE THE OIL PAN AND THE SEAL**.

REMOVING THE ACCUMULATOR HOUSING FROM THE TRANSMISSION

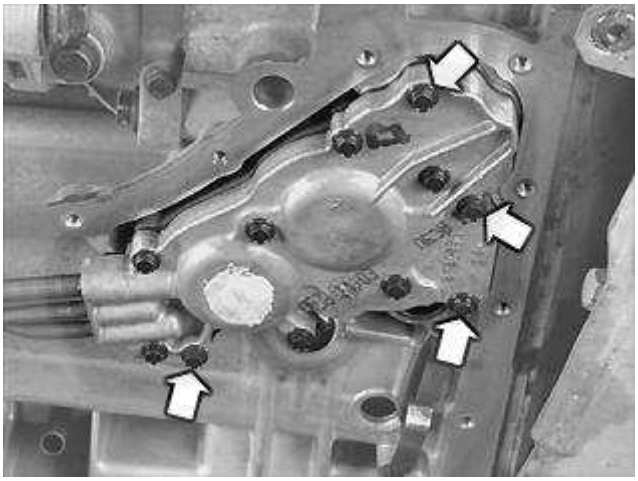


Fig. 468: Identifying Accumulator Housing
Courtesy of VOLVO CARS CORPORATION

NOTE: Check the routing of the oil pipe in the accumulator housing.

Remove the oil filter. See **REMOVE THE OIL FILTER**.

Slacken off the 4 screws holding the accumulator housing in the transmission.

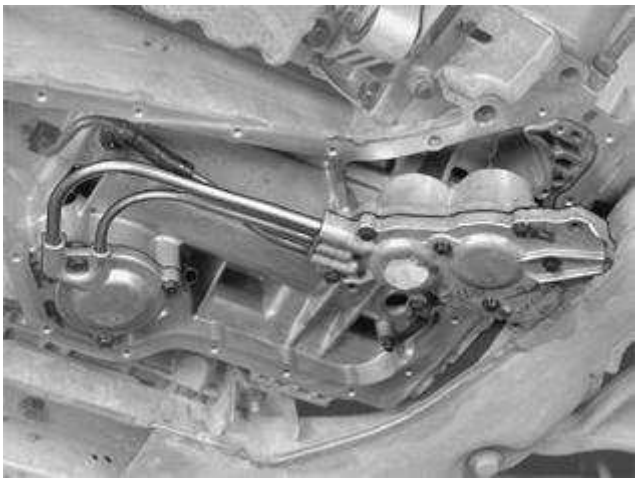


Fig. 469: Identifying Housing With Oil Pipes
Courtesy of VOLVO CARS CORPORATION

Fold down the housing with the oil pipes. Remove the oil pipes from the accumulator.

DISASSEMBLING THE ACCUMULATOR HOUSING

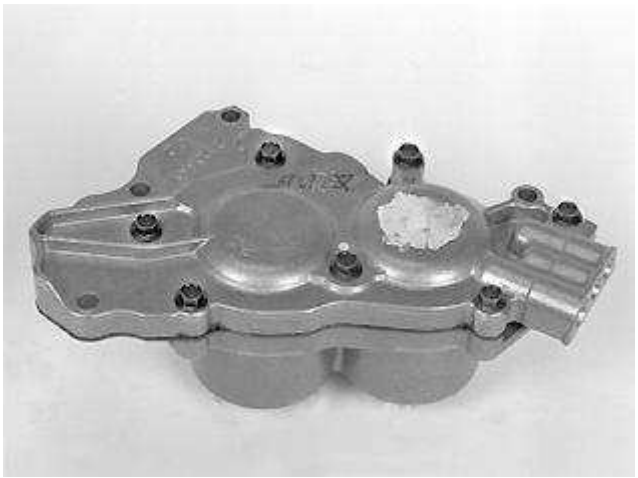


Fig. 470: Identifying Accumulator Housing
Courtesy of VOLVO CARS CORPORATION

CAUTION: Replace one piston at a time so that the springs are correctly installed during installation.

The thinnest spring should be against the terminal pipe.

Slacken off the remainder of the screws on the accumulator housing. Lift off the cover and the gasket.

REMOVING THE PISTONS FROM THE ACCUMULATOR HOUSING

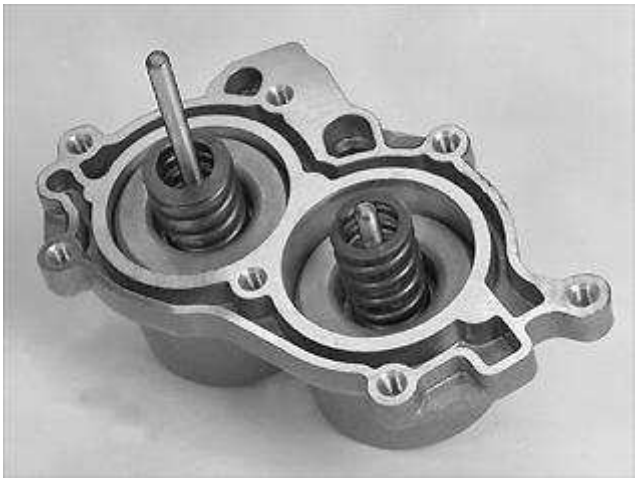


Fig. 471: Identifying Pistons And Accumulator Housing
Courtesy of VOLVO CARS CORPORATION

Press the piston down on the spring so that the locating pin can be gripped.

Pull up the locating pin a little so that it releases from the mounting in the housing.

Work the locating pin with the piston side to side while at the same time pulling the piston up from the housing.

Use the same method for the other piston. Remove the spring from the piston.

Check:

- that there is no dirt or other particles in the housing
- that the springs are intact.

Blow the housing clean.

INSTALLATION

INSTALLING NEW PISTONS FOR THE ACCUMULATOR HOUSING

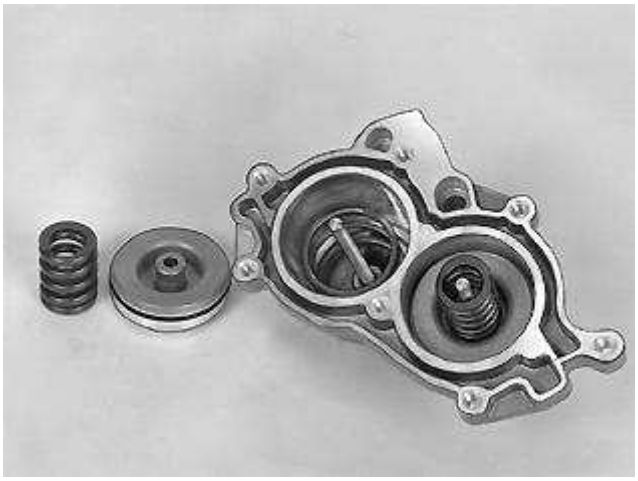


Fig. 472: Identifying Pistons And Accumulator Housing
Courtesy of VOLVO CARS CORPORATION

Install the locating pin and the spring in the housing.

Apply petroleum jelly to the piston gasket. Use Volvo Genuine parts petroleum jelly (P/N 116 1151-4).

Install:

- the piston over the locating pin. Carefully press the piston down into the housing
- the spring on the piston
- the cover and the screws. Tighten the screws. Tighten to **12 Nm** .

INSTALLING THE ACCUMULATOR HOUSING ON THE TRANSMISSION

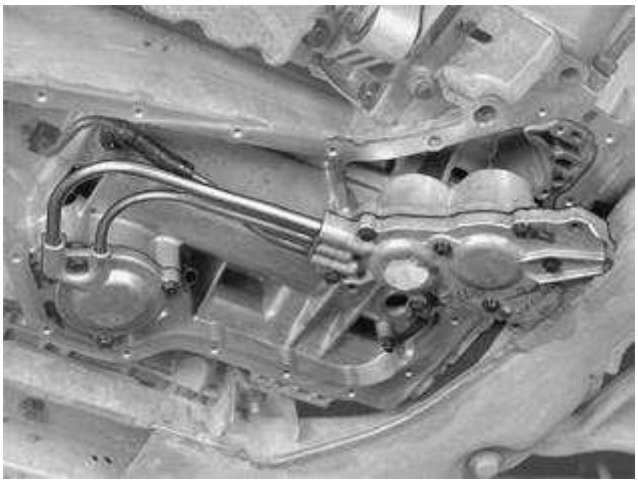


Fig. 473: Identifying Housing With Oil Pipes
Courtesy of VOLVO CARS CORPORATION

Install the oil pipes on the housing (start with the larger pipe).

Twist up the housing to the transmission. Install the screws. Finger tighten the screws. Adjust the oil pipe using the hose in the housing if any of the screws are stiff.

Tighten the screws. Tighten to **12 Nm** .

Install the oil filter. See **INSTALL THE OIL FILTER**. Alternatively: Replace the oil filter (see the mileage)

Check:

- the oil pipes
- that the screws are tightened
- that the oil filter is installed.

FINISHING

Install the oil trough. See **INSTALL THE OIL FILTER**.

Top up with oil. Check the oil level. See **TRANSMISSION OIL / OIL FILTER, REPLACING**.

Test drive the car.

GASKET/O RING SERVO CYLINDER, REPLACING

NOTE: The servo cylinder is located in the transmission.

CAUTION: Cleanliness is extremely important when working on automatic transmissions. Use lint free paper or rags.

CAUTION: Read through the instructions before beginning work.

REMOVAL

PREPARATIONS

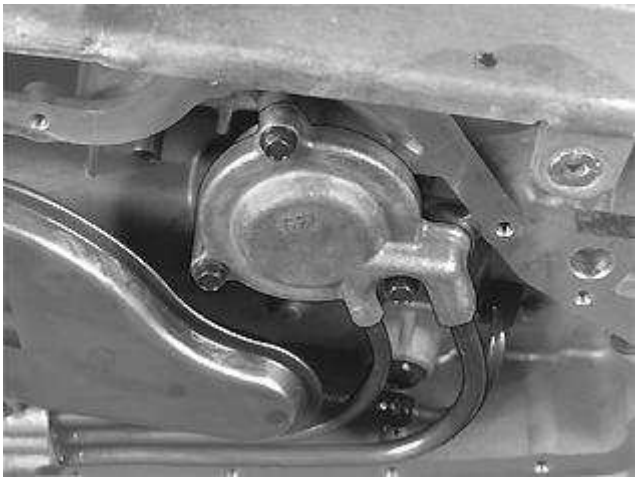


Fig. 474: Identifying Servo Cylinder Installed
Courtesy of VOLVO CARS CORPORATION

Suck up the oil from the transmission using an oil suction device.

Take out a container for the oil.

Raise the car.

Remove:

- the splash guard under the engine. Blow and wipe clean around the transmission oil trough
- the transmission oil trough. See **REMOVE THE OIL PAN AND THE SEAL**.

REMOVING THE SERVO CYLINDER (2-1)

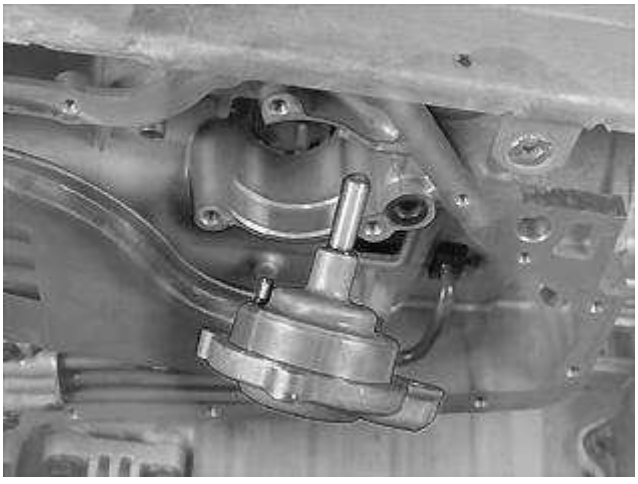


Fig. 475: Identifying Servo Cylinder Removed
Courtesy of VOLVO CARS CORPORATION

Slacken off the 3 screws.

Pull down the cover with the servo cylinder. Check the position of the small strainer on the cylinder.

CAUTION: Note the position of the strainer for reinstallation.

Lift the piston from the cover.

DISASSEMBLING SERVO CYLINDER

Fig. 476: Identifying Disassembling Servo Cylinder
Courtesy of VOLVO CARS CORPORATION

Open the catch on the push rod (press the piston towards the work surface).

Separate the cylinder.

Check:

- that there is no dirt or other particles in the cylinder
- that both the springs are intact.

Blow the cylinder clean.

REPLACING THE GASKET, O-RING AND STRAINER

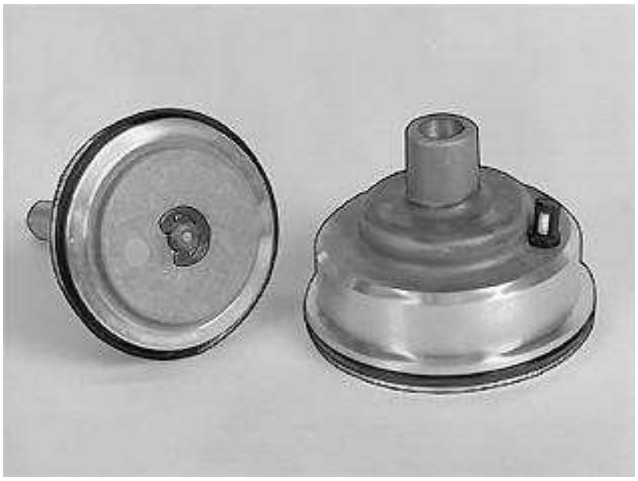


Fig. 477: Identifying Gasket, O-Ring And Strainer
Courtesy of VOLVO CARS CORPORATION

Replace the O-ring on the piston.

Replace the gasket on the inner piston.

NOTE: Check the position of the gasket on the piston.

Remove the strainer by pulling it straight up. Replace the strainer.

INSTALLATION

ASSEMBLING THE SERVO CYLINDER

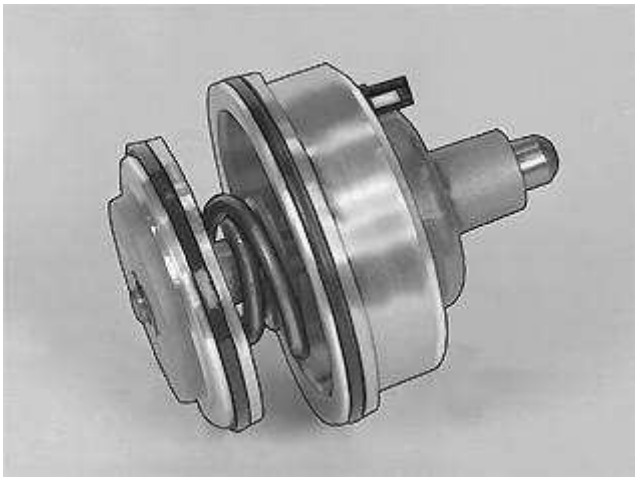


Fig. 478: Identifying Servo Cylinder
Courtesy of VOLVO CARS CORPORATION

Apply a little petroleum jelly to the inner piston gasket. Use Volvo Genuine parts petroleum jelly (P/N 116 1151-4).

Carefully press the piston up into the cylinder.

Install the catch on the push rod.

INSTALLING THE SERVO CYLINDER ON THE TRANSMISSION

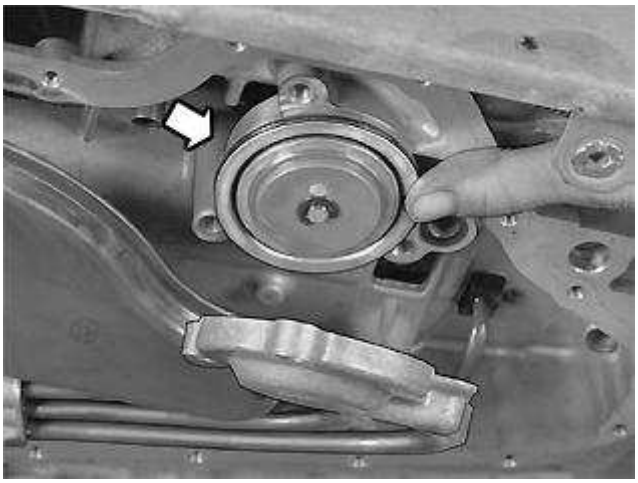


Fig. 479: Installing Servo Cylinder On Transmission
Courtesy of VOLVO CARS CORPORATION

NOTE: The strainer on the piston must come into the opening on the left in the transmission.

Apply petroleum jelly to the O-ring. Use Volvo Genuine parts petroleum jelly (P/N 116 1151-4).

Install the piston in the housing. Hold the piston in position by hand. Check that the strainer is opposite the opening on the left hand side.

Slide the cover up towards the piston. Lower the piston towards the cover. Press the piston down into the cover using your fingers so that the O-ring cannot be seen on the piston.

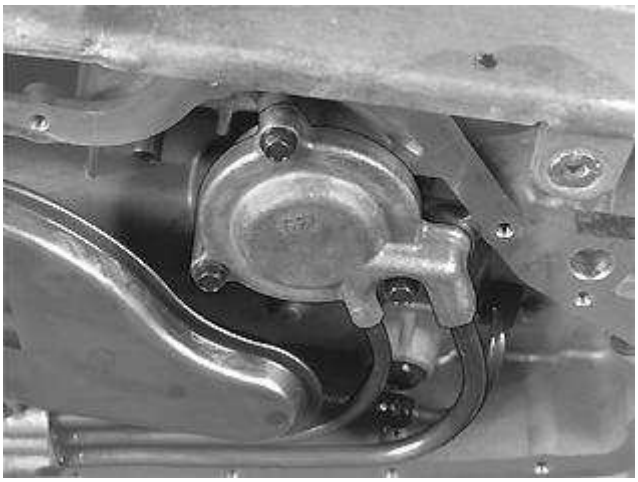


Fig. 480: Identifying Servo Cylinder Installed

Courtesy of VOLVO CARS CORPORATION

Install the screws and tighten by hand. Secure the cover so that all the screws are aligned.

Tighten the screws. Tighten to **25 Nm** .

FINISHING

Install the oil trough. See **INSTALL THE OIL FILTER**.

Top up with oil. Check the oil level. See **TRANSMISSION OIL / OIL FILTER, REPLACING**.

Test drive the car.

OIL PUMP, REPLACING

REMOVAL

REMOVING THE SIDE COVER FROM THE TRANSMISSION

Remove the side cover. See **SIDE COVER TRANSMISSION, REMOVING**.

REMOVING THE OIL PUMP

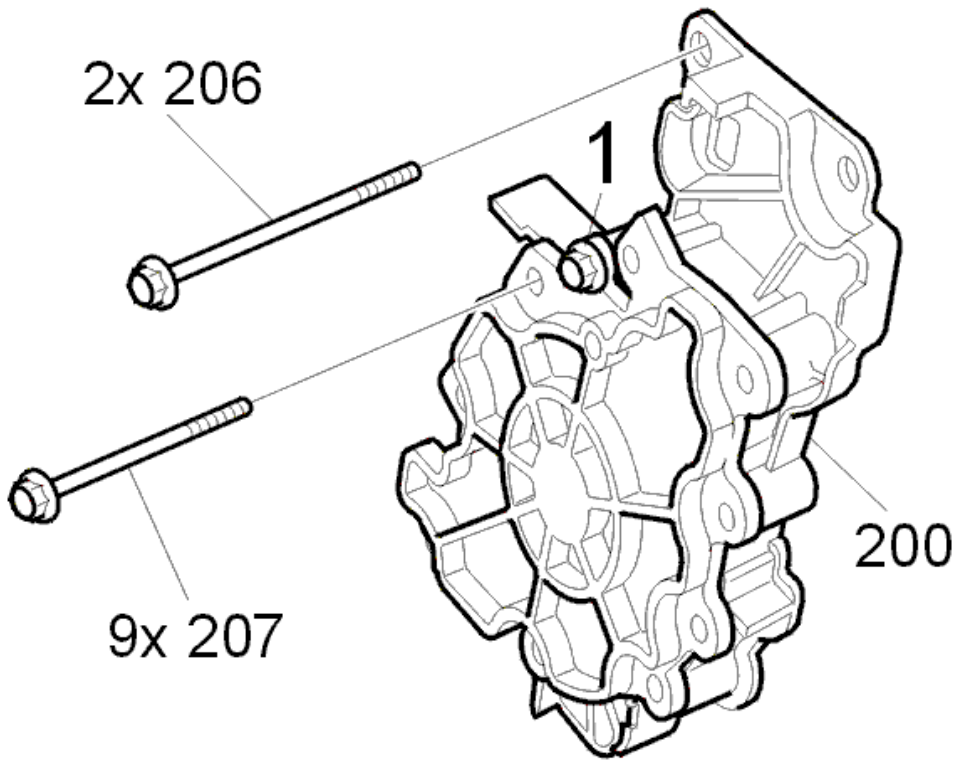


Fig. 481: Identifying Oil Pump Screws
Courtesy of VOLVO CARS CORPORATION

NOTE: In order to replace the lock-up solenoid, the oil pump must be removed from the control system. This is so that the spring clip holding the solenoid can be accessed.

The shiny screw (1) must not be removed, it holds the oil pump together.

Remove:

- the temperature sensor with the cable harness from the clip
- the connector from the solenoid. Fold the cable harness out of the way
- the screws,**not** the shiny screws (1).

NOTE: Note the dimension of the upper screws.

REMOVING THE OIL PUMP FROM THE PUMP SHAFT

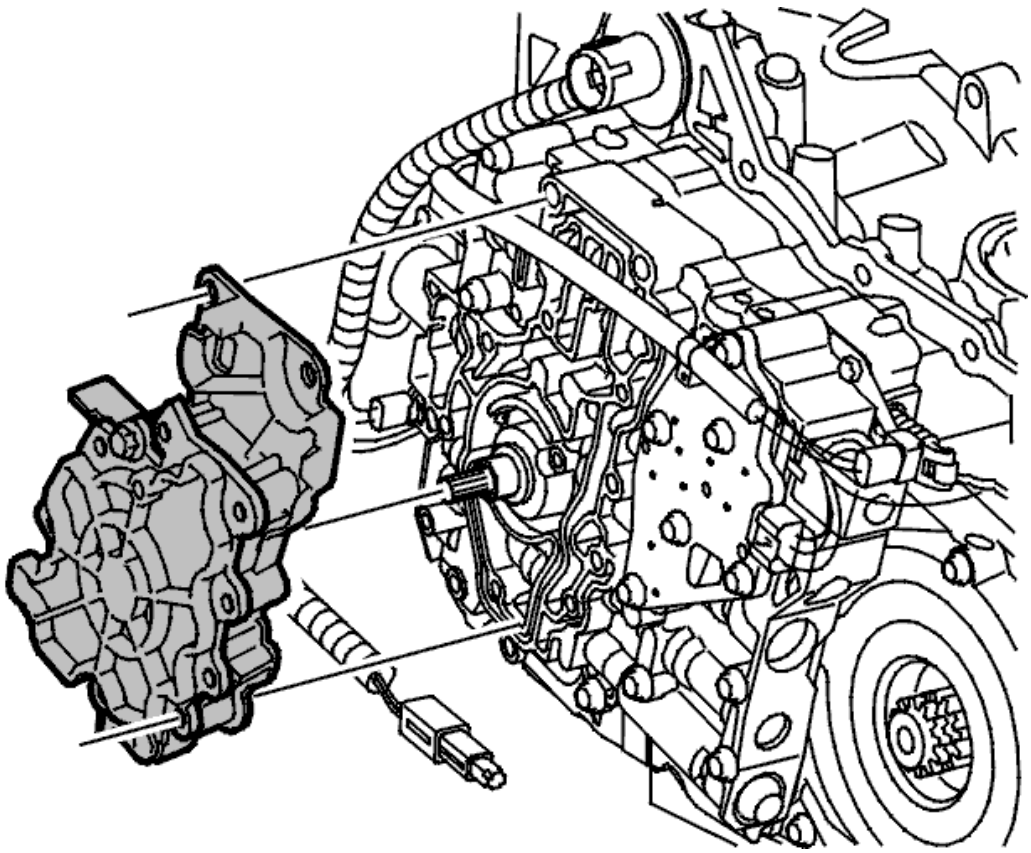


Fig. 482: Identifying Removing Oil Pump From Pump Shaft
Courtesy of VOLVO CARS CORPORATION

Pull the oil pump straight out.

Place the pump on clean paper.

INSTALLATION

INSTALLING THE OIL PUMP

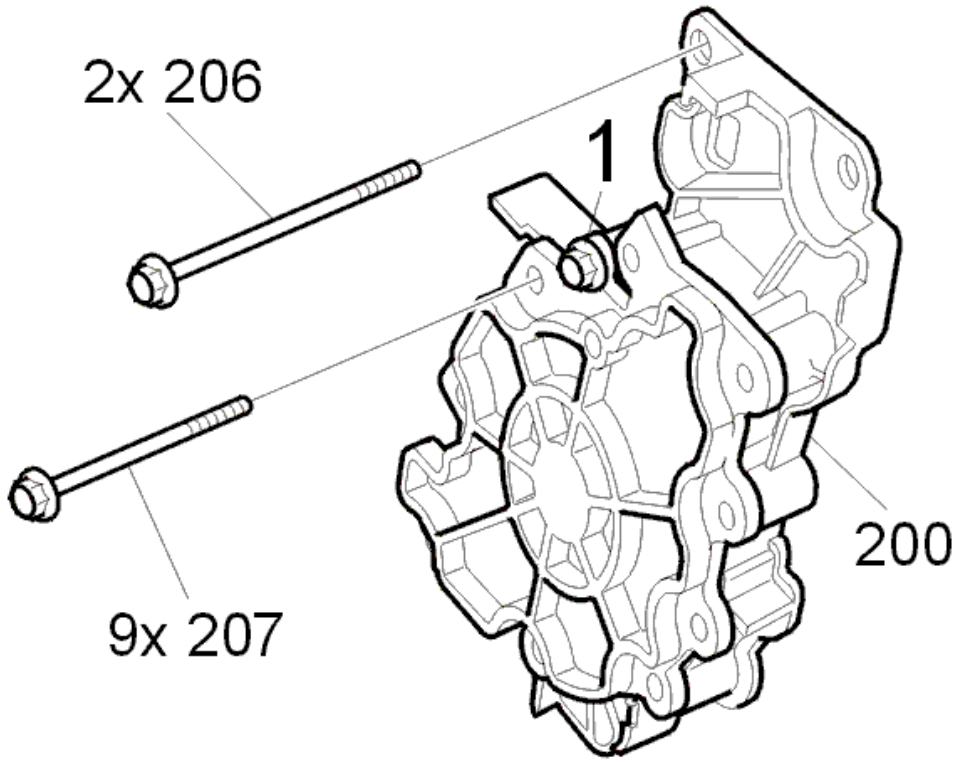


Fig. 483: Identifying Oil Pump Screws
Courtesy of VOLVO CARS CORPORATION

NOTE: Ensure that mating surfaces are clean.

NOTE: Use lint free paper.

Lift and turn the pump slightly so that it is centered on the pump shaft.

Finger-tighten the screws. The two upper screw heads (206) are sized 10 mm. The other screw heads (207) are 8 mm.

First tighten the screws crosswise to light contact.

Tighten the upper screws. Tighten to **16 Nm** . Tighten the other screws. Tighten to **12 Nm** .

INSTALLING THE SIDE COVER ON THE TRANSMISSION

Install the side cover. See **SIDE COVER TRANSMISSION, INSTALLING**.

FILLING WITH TRANSMISSION FLUID

Fill with transmission fluid. See **TRANSMISSION OIL / OIL FILTER, REPLACING**.

Test drive the car.

PISTON / COVER BACK-UP (REVERSE) SERVO, REPLACING

NOTE: The back-up (reverse) servo is located up on the transmission, under the fuel rail and the coolant hose. The transmission must be separated from the engine to access the back-up (reverse) servo.

NOTE: Read through the instructions before beginning work.

CAUTION: Cleanliness is extremely important when working on automatic transmissions. Use lint free paper or rags.

REMOVAL

REMOVING THE TRANSMISSION

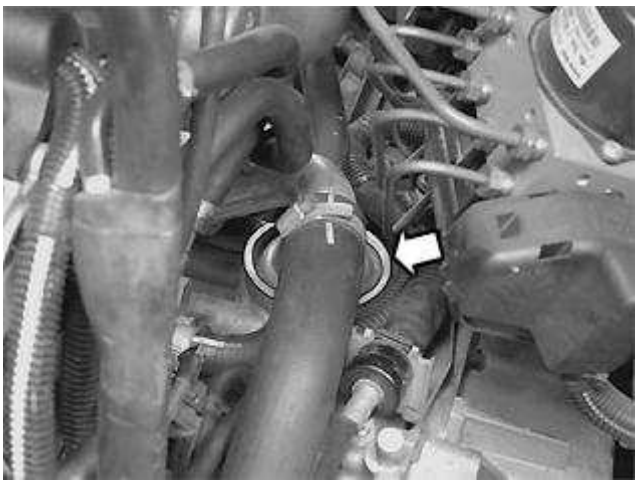


Fig. 484: Identifying Back-Up Servo
Courtesy of VOLVO CARS CORPORATION

Remove the transmission. See **TRANSMISSION, REMOVING**.

Wipe and blow clean around the cover for the back-up servo.

REMOVING THE BACK-UP SERVO

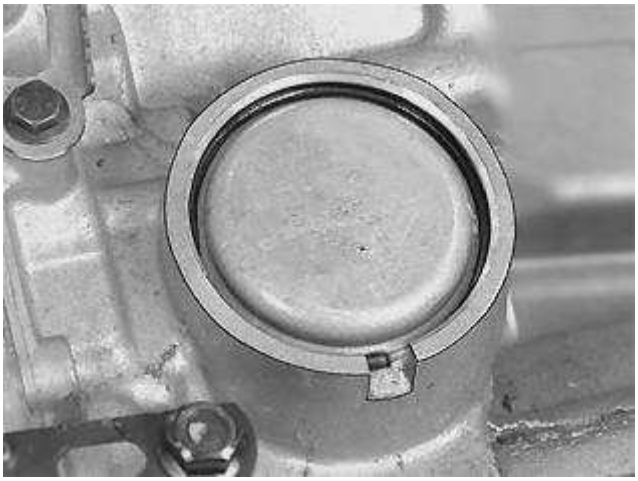


Fig. 485: Identifying Spring Clip And Cut-Out
Courtesy of VOLVO CARS CORPORATION

Push the spring clip (holding the cover) forward, so that the cut-out aligns with the cut-out in the transmission housing.

RELEASING THE SPRING CLIP

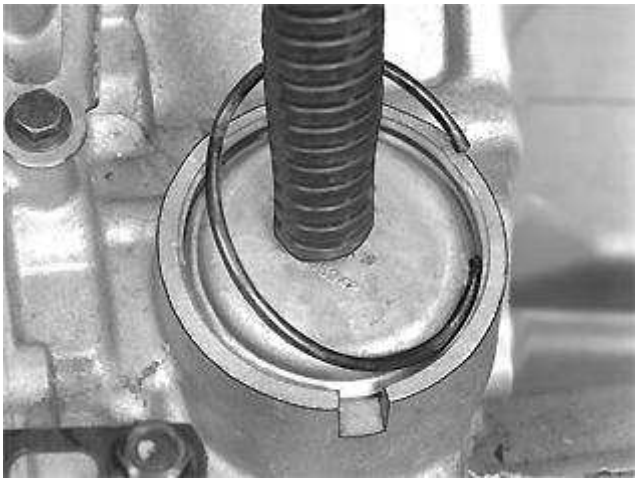


Fig. 486: Identifying Installing Spring Clip
Courtesy of VOLVO CARS CORPORATION

Press the piston down a little using a jointed socket wrench.

Pry up the locking catch using a screwdriver.

Pick up the cover and the piston.

REPLACING THE COVER

Fig. 487: Identifying Piston Cover
Courtesy of VOLVO CARS CORPORATION

Replace the cover.

Install a new O-ring.

INSTALLATION

INSTALLING THE COVER ON THE TRANSMISSION

Fig. 488: Identifying Piston Cover
Courtesy of VOLVO CARS CORPORATION

HINT: Two people are required to install the spring clip.

Apply a little petroleum jelly to the O-ring on the cover. Use Volvo Genuine parts petroleum jelly (P/N 116 1151-4).

Install the cover (carefully) and press it down towards the piston, as far as it will go.

INSTALLING THE SPRING CLIP

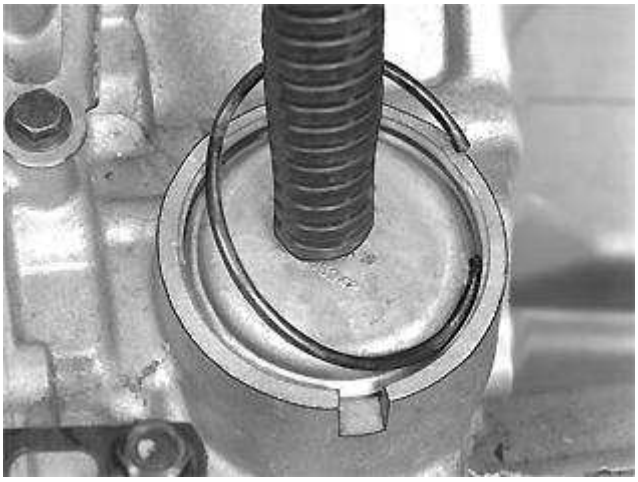


Fig. 489: Identifying Installing Spring Clip
Courtesy of VOLVO CARS CORPORATION

Hold the cover depressed. Install the spring clip end in the groove a little way outside the cut out.

Then press down the spring clip, so that it locks the cover.

INSTALLING THE TRANSMISSION ON THE ENGINE

Install the transmission. See **TRANSMISSION, INSTALLING (2005, 2006)**

PRESSURE SENSOR, REPLACING

REMOVING THE SIDE COVER FROM THE TRANSMISSION

See **SIDE COVER TRANSMISSION, REMOVING**.

DISCONNECTING THE PRESSURE SENSOR

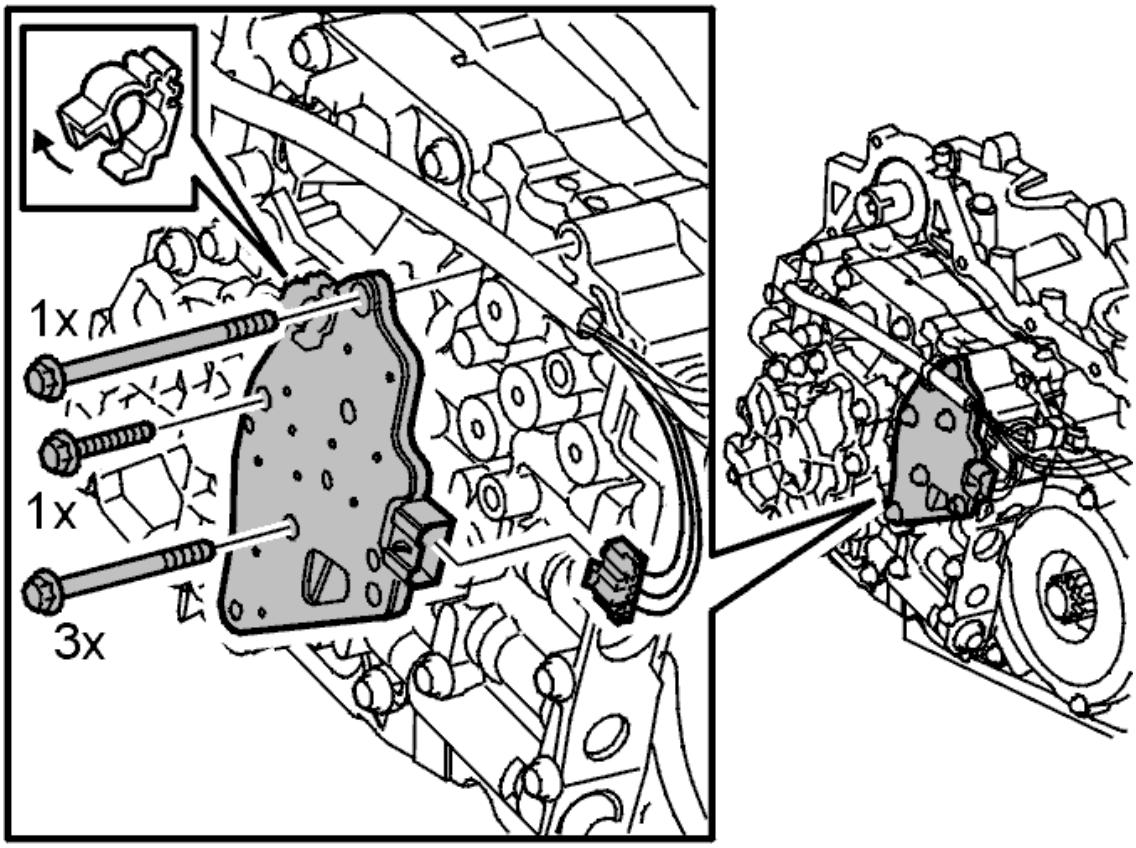


Fig. 490: Identifying Pressure Sensor
Courtesy of VOLVO CARS CORPORATION

Remove:

- the clip for the cable harness from the pressure sensor
- the connector
- the screws.

NOTE: The upper screw is M10. The two shiny screws are self tapping.

Disconnect the pressure sensor.

Check that all 6 O-rings remain on the pressure sensor.

INSTALLING THE PRESSURE SENSOR

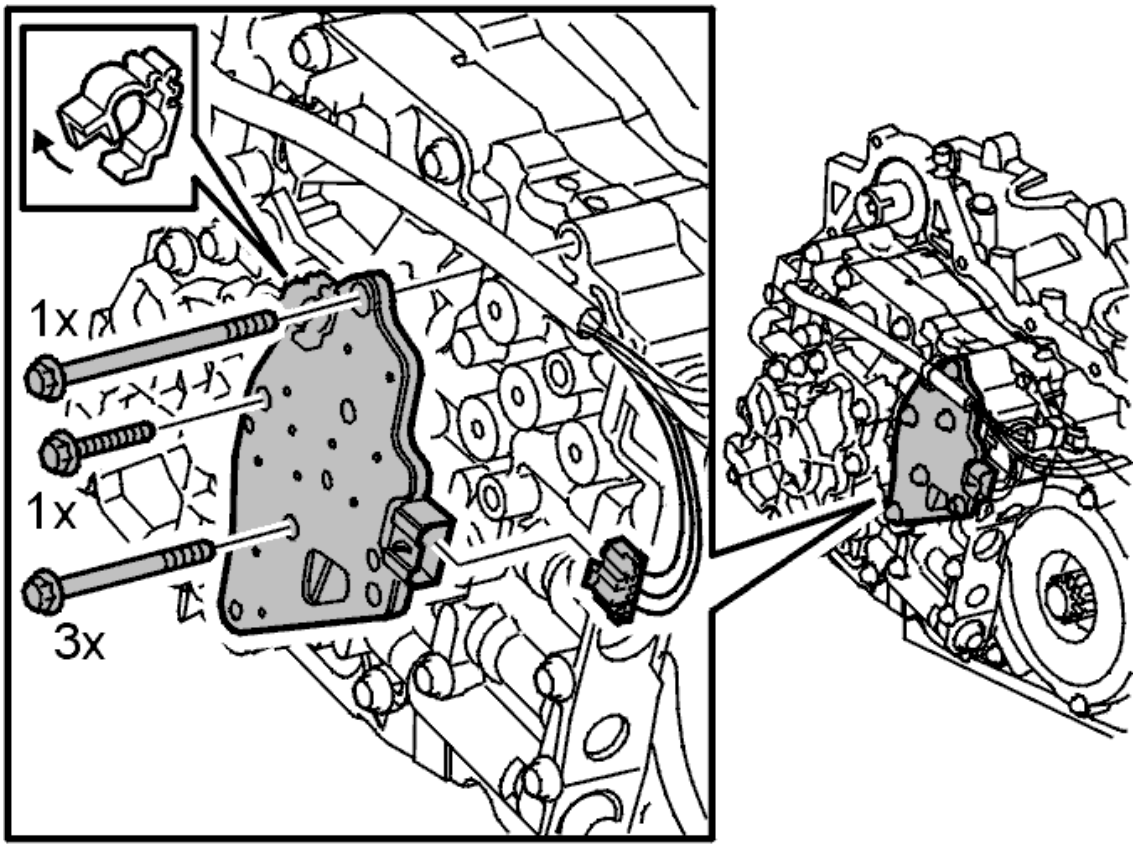


Fig. 491: Identifying Pressure Sensor
Courtesy of VOLVO CARS CORPORATION

Apply a little automatic transmission fluid to the sensor O-rings.

Install:

- the pressure sensor
- the screws loosely (finger tight).

NOTE: The upper screw is a M10 screw head. The three long screws are M8. The two shiny short screws are self tapping and should go into the same threads as before.

Tighten the screws lightly crosswise. Then tighten **the black screws** . Tighten to **12 Nm** .

Then tighten the two self tapping screws. Tighten to **8 Nm** .

Install:

- the connector
- the clip for the cable harness for the pressure sensor.

INSTALLING THE SIDE COVER ON THE TRANSMISSION

See **SIDE COVER TRANSMISSION, INSTALLING**.

SEALING RING AND PISTON WITH O-RING FOR FRONT SERVO, INSTALLING

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

INSTALLATION

INSTALLING THE PISTON IN THE TRANSMISSION

Fig. 492: Identifying Piston With O-Ring For Front Servo
Courtesy of VOLVO CARS CORPORATION

Apply a little petroleum jelly to the O-ring for the piston.

Use petroleum jelly, P/N 116 51-4.

Install the piston in the transmission.

INSTALLING THE SERVO CYLINDER COVER

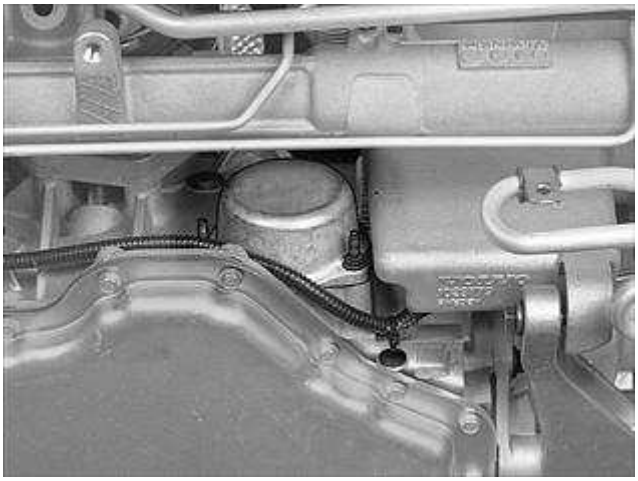


Fig. 493: Identifying Servo Cylinder Cover
Courtesy of VOLVO CARS CORPORATION

Align the servo cylinder cover with the piston and the transmission. Lightly tighten the 3 M6 screws alternately. Tighten.

Install the transmission output speed sensor cable on the transmission using a tie strap.

TIGHTENING THE SCREWS FOR THE BEVEL GEAR/CHAIN HOUSING

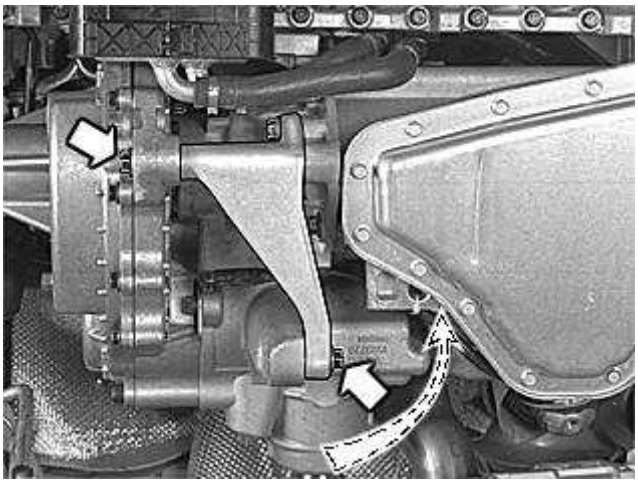


Fig. 494: Identifying Screws For The Bevel Gear/Chain House
Courtesy of VOLVO CARS CORPORATION

Lightly tighten the 3 M10 screws alternately. The screw for the bevel gear/bracket on the engine is on top of the bevel gear and can be accessed from the center. Tighten.

INSTALLING THE BRACKET

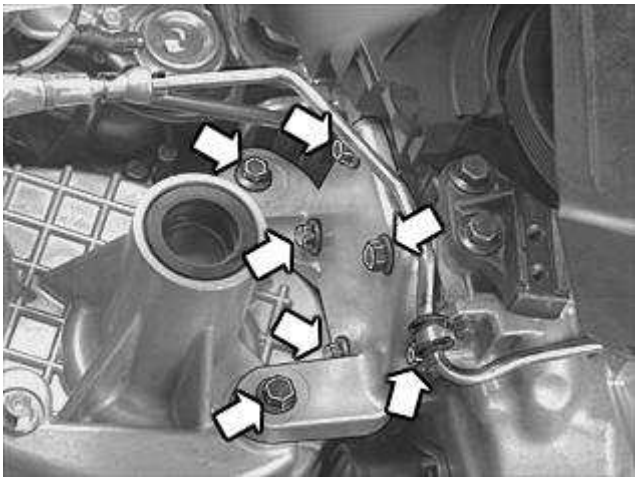


Fig. 495: Identifying Chain Housing Bracket Screws
Courtesy of VOLVO CARS CORPORATION

Install the bracket on the cylinder block and chain housing using 6 M10 screws.

First tighten the screws for the bracket and cylinder block so that the bracket can move slightly. Then tighten the 2 screws for the bracket and chain housing alternately to contact. Then tighten all the screws.

Install and tighten the screw for the fuel line clamp.

INSTALLING THE STEERING GEAR TO THE ENGINE PAD

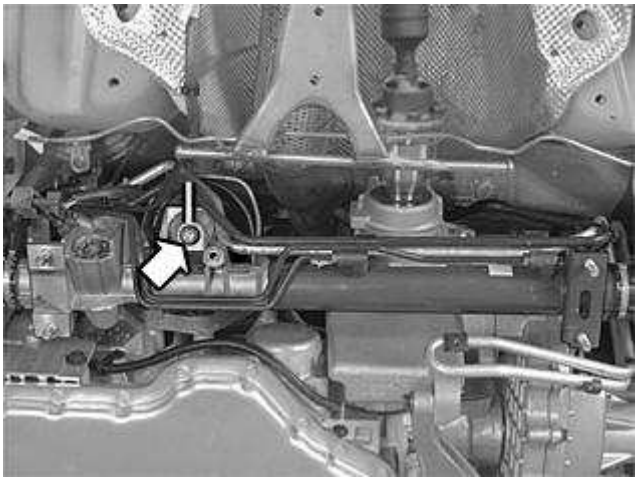


Fig. 496: Installing The Steering Gear To The Engine Pad
Courtesy of VOLVO CARS CORPORATION

Install the 1 M10 screw for the steering gear and engine pad. Align the steering gear in relation to the engine pad, using the marking made earlier. Tighten.

INSTALLING THE DRIVE SHAFT

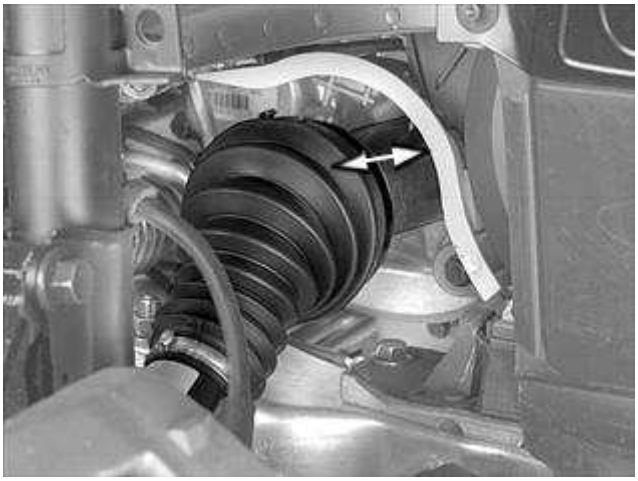


Fig. 497: Identifying Mating Surface Of The Drive Shaft
Courtesy of VOLVO CARS CORPORATION

Press the drive shaft into the transmission. Check that the snap ring is in its groove by carefully pulling it in the inner constant velocity joint. Locate the drive shaft in the wheel hub.

FINISHING

Install the sub-frame. See **SUB-FRAME FRONT, REPLACING** . Check the boot on the steering shaft/firewall. See **CHECKING THE BOOT FOR THE STEERING SHAFT/FIREWALL** .

Fill the same amount of transmission oil that was drained. Only use automatic transmission fluid P/N 116 1621 (1 liter container) or 116 1621 (4 liter container).

Check the transmission oil. See **OIL LEVEL, CHECKING** .

For information about test driving the car, see **TEST DRIVE FORM, DESCRIPTION** .

SEALING RING AND PISTON WITH O-RING FOR FRONT SERVO, REPLACING

Special tools:

9995462

9997063

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

REMOVAL

PREPARATIONS

Fig. 498: Identifying Dip Stick Pipe & Oil Suction Device
Courtesy of VOLVO CARS CORPORATION

Drain the transmission fluid. Use an oil suction device to drain approximately 6 liters of transmission fluid. Remove the sub-frame. See **SUB-FRAME FRONT, REPLACING** .

REMOVING THE RIGHT DRIVE SHAFT

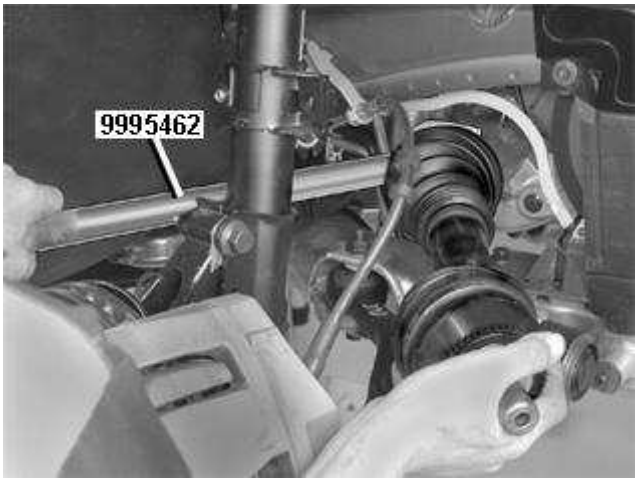


Fig. 499: Detach The Drive Shaft With Jimmy Bar
Courtesy of VOLVO CARS CORPORATION

Angle the wheel hub out. Remove the drive shaft from the hub. Use a tensioner band to pull the wheel spindle and wheel hub backwards. Remove the drive shaft from the transmission. Use jimmy bar **9995462** .

Install sealing plug **9997063** .

DISCONNECTING THE STEERING GEAR FROM THE ENGINE PAD

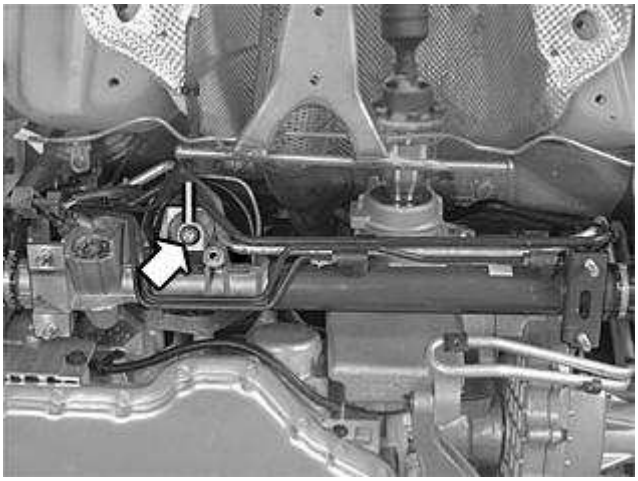


Fig. 500: Installing The Steering Gear To The Engine Pad
Courtesy of VOLVO CARS CORPORATION

Mark up the position of the steering gear in relation to the engine pad.

Remove the screw for the steering gear and engine pad. Move the steering gear towards the firewall. Hold it up using tie straps.

REMOVING THE CHAIN HOUSING BRACKET

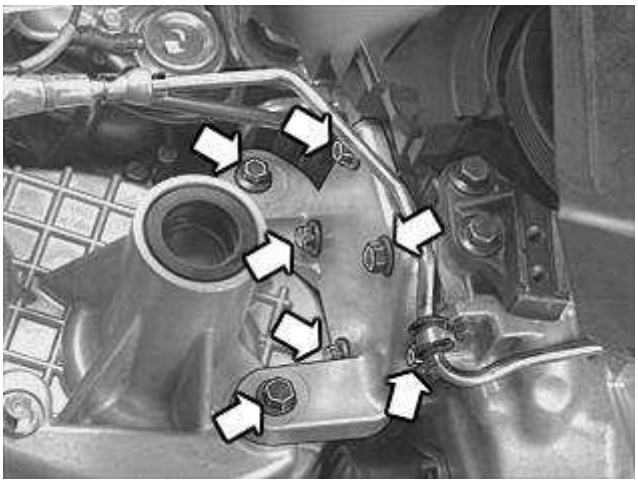


Fig. 501: Identifying Chain Housing Bracket Screws
Courtesy of VOLVO CARS CORPORATION

Remove:

- the screw in the clamp for the fuel line
- the bracket for the chain housing and engine.

REMOVING THE SCREWS FOR THE BEVEL GEAR/CHAIN HOUSING

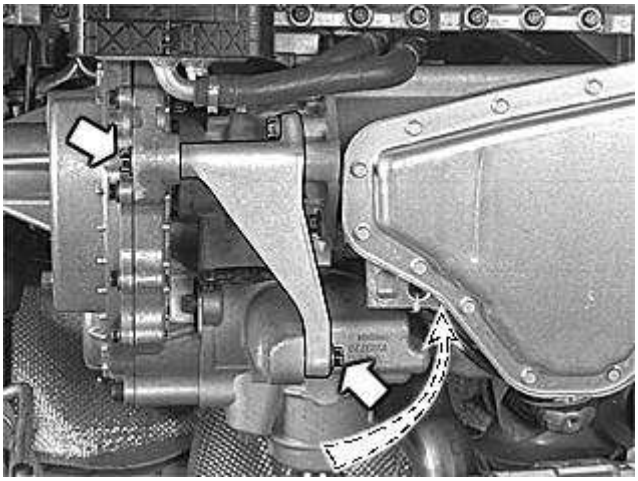


Fig. 502: Identifying Screws For The Bevel Gear/Chain House
Courtesy of VOLVO CARS CORPORATION

Slacken off the screws approximately **5 mm** . The screw for the bevel gear/bracket on the engine is on top of the bevel gear and can be accessed from the center.

Press out the bevel gear/chain housing towards the screw heads. This is done so that the servo cylinder cover can pass the bevel gear.

REMOVING THE SERVO CYLINDER COVER

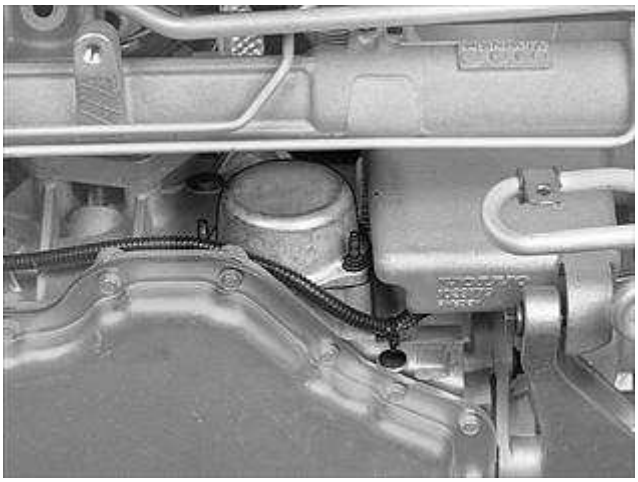


Fig. 503: Identifying Servo Cylinder Cover
Courtesy of VOLVO CARS CORPORATION

Detach the transmission output speed sensor cable from the tie strap on the transmission. Move the cable to one side.

Wipe and blow the servo cylinder cover clean. Take out a container for the oil. Remove the 3 screws. Pull the cover straight out.

REMOVING THE PISTON FROM THE TRANSMISSION

Fig. 504: Identifying Piston With O-Ring For Front Servo
Courtesy of VOLVO CARS CORPORATION

Pull the piston straight out of the transmission.

REPLACING THE PISTON WITH O-RING AND SEALING RING

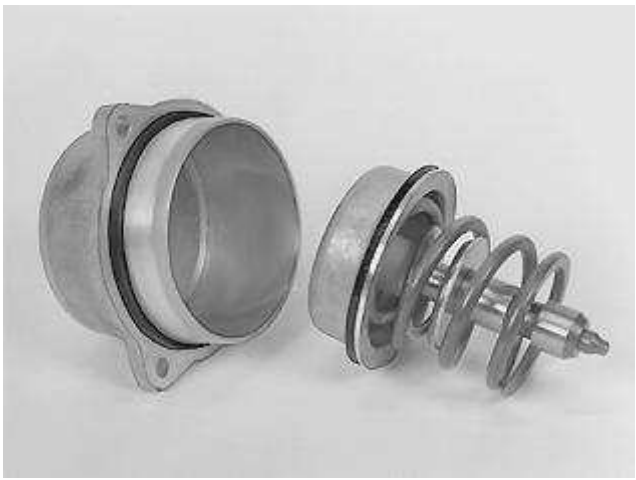


Fig. 505: Identifying Piston With O-Ring And Sealing Ring
Courtesy of VOLVO CARS CORPORATION

HINT: Press the piston against a bench so that the spring clip is easier to remove.

Replace the piston and the O-ring.

Replace the catch.

Replace the sealing ring for the servo cylinder cover.

SIDE COVER TRANSMISSION, INSTALLING

NOTE: As the illustrations in this service information are used for different model years

and / or models, some variation may occur. However, the essential information is always correct.

WARNING: Avoid skin contact with the transmission oil.

NOTE: Thoroughly clean the transmission and side cover's contact faces before installing the gasket. Paper must not be used for cleaning. Paper fragments can cause running problems. Check the marking on the side cover's gasket. The gasket can be reused once.

INSTALLATION

NOTE: For tightening torques, see TIGHTENING TORQUE .

CHECKING THE GASKET FOR THE SIDE COVER

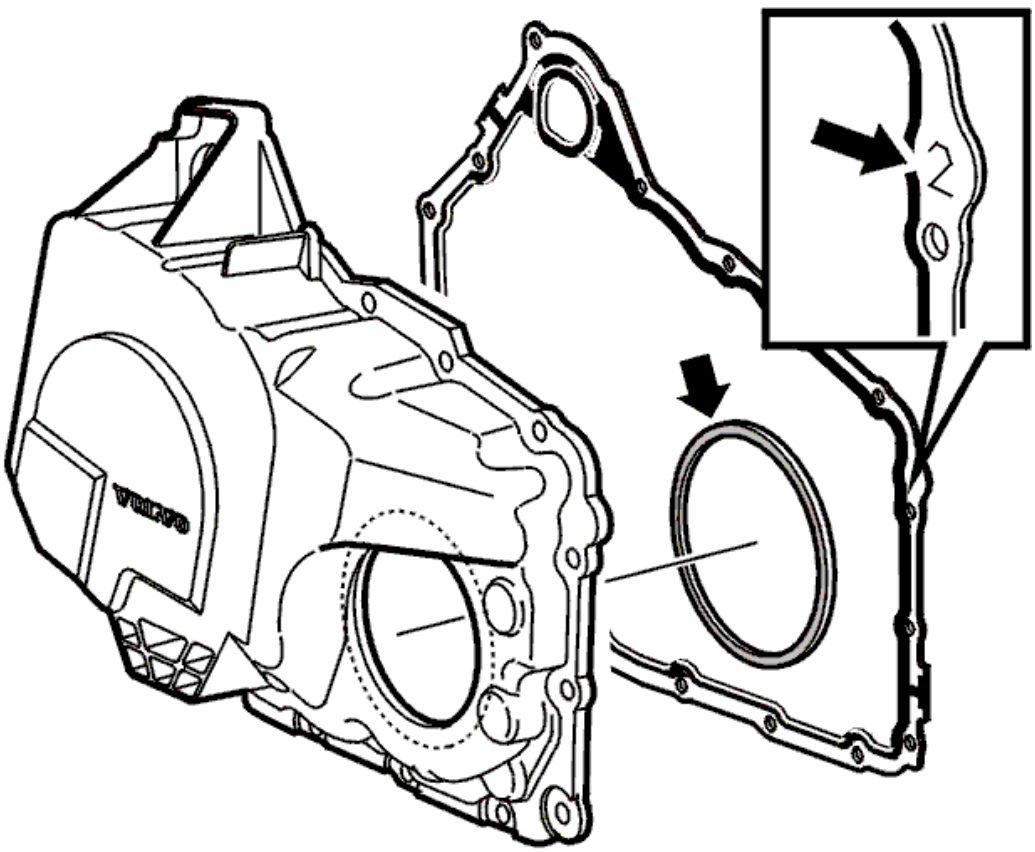


Fig. 506: Checking Side Cover Gasket
Courtesy of VOLVO CARS CORPORATION

NOTE: The gasket may be reused once.

Check whether there is a 2 at the top right corner of the gasket. The gasket must be replaced if there is a 2. If there is no number, mark a 2 on the gasket if it is intact.

The gasket has now been reused once and must be replaced the next time the side cover is removed. Make this mark to assist other mechanics.

Always replace the sealing ring which seals against the drive shaft outlet.

NOTE: Apply some vaseline to the new seal ring so that it remains in the groove in the side cover when installing.

INSTALLING COVER

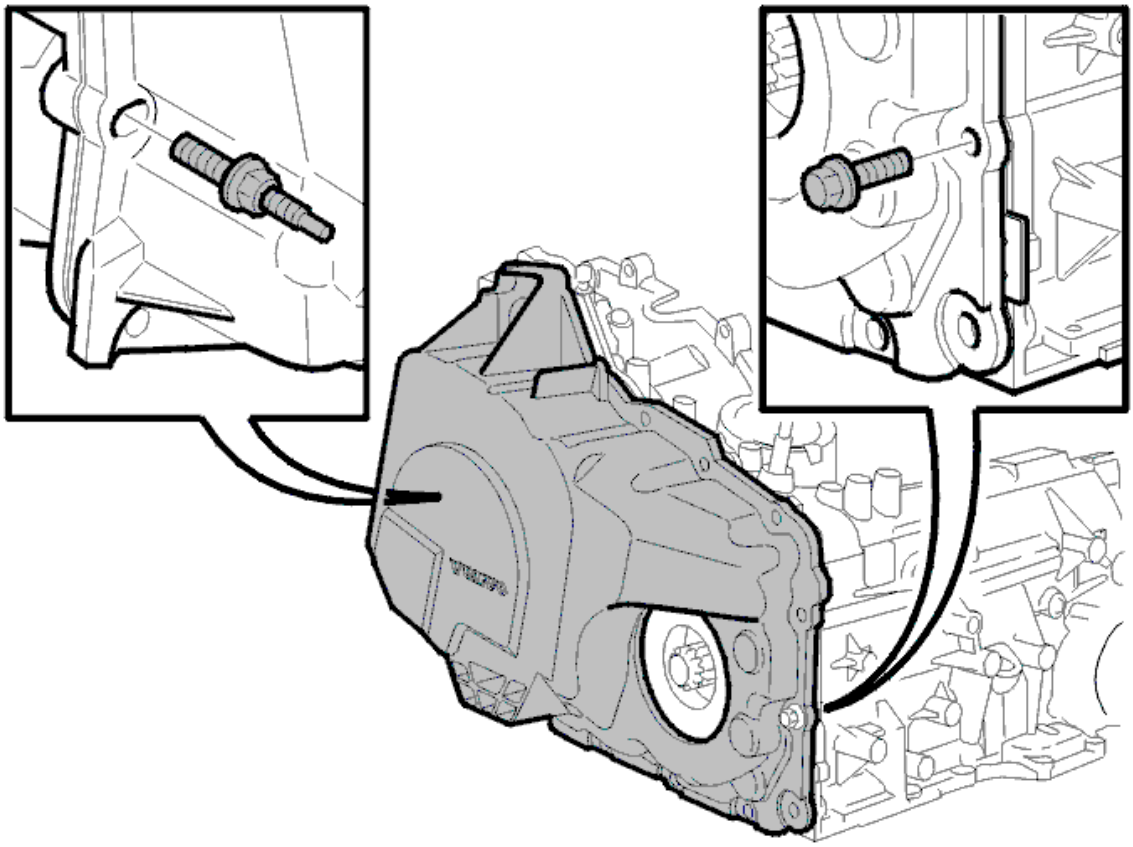


Fig. 507: Installing Side Cover Screws
Courtesy of VOLVO CARS CORPORATION

NOTE: The side cover has 2 different holes. The rear smaller hole and the front rectangular hole. These 2 holes are to guide the gasket for the cover into position during installation. Begin installing the cover by installing the two screws.

Apply a little petroleum jelly to the transmission mating surface.

Install:

- the side cover gasket
- the side cover with the sealing ring
- the remaining screws. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS**
- the bracket for the studs and the screw loosely on the bracket
- the clamp for the stud and the M8 nut. Tighten.

Clamp the wiring up on the bracket. Use new tie straps.

LIFTING THE ENGINE AND TRANSMISSION TO THE HORIZONTAL POSITION

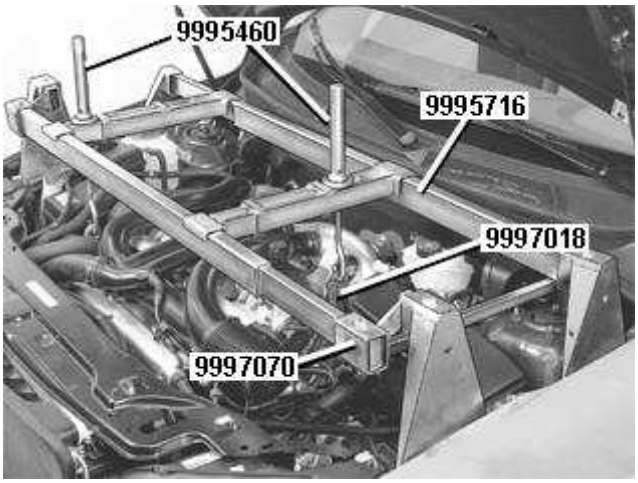


Fig. 508: Engine Lift Installed
Courtesy of VOLVO CARS CORPORATION

Lift the engine to the horizontal position. Check that no hoses or cables are trapped when lifting.

INSTALLING OIL PIPES

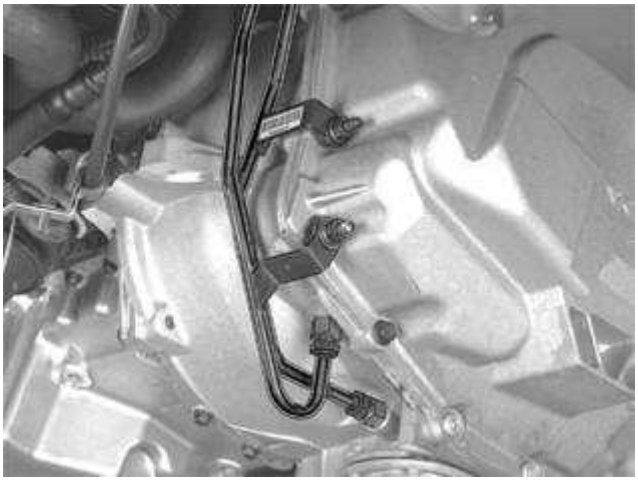


Fig. 509: Identifying Transmission Oil Pipes
Courtesy of VOLVO CARS CORPORATION

Install:

- the oil pipes to the connections on the transmission. Counterhold on the connections. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS**
- the M8 nut and the washers for the brackets for the oil pipes. Tighten
- the gear selector cable in the mountings on the side member.

INSTALLING THE LEFT DRIVE SHAFT ON THE TRANSMISSION AND THE WHEEL SPINDLE

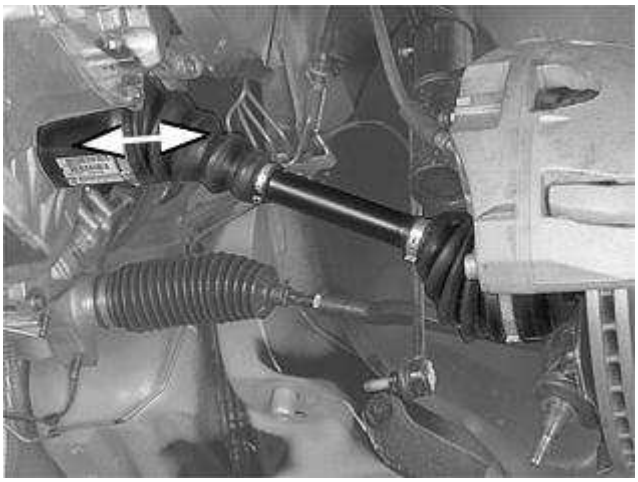


Fig. 510: Identifying Left Drive Shaft On Transmission And Wheel Spindle
Courtesy of VOLVO CARS CORPORATION

Press in the constant velocity joint housing firmly so that the snap ring engages in its groove in the transmission.

Pull the constant velocity joint to check that the drive shaft is secure. Lubricate the drive shaft splines. Use a small amount of thin oil. Locate the drive shaft in the wheel hub. Install a new screw loosely in the drive shaft.

INSTALLING THE SUB-FRAME ON THE BODYWORK

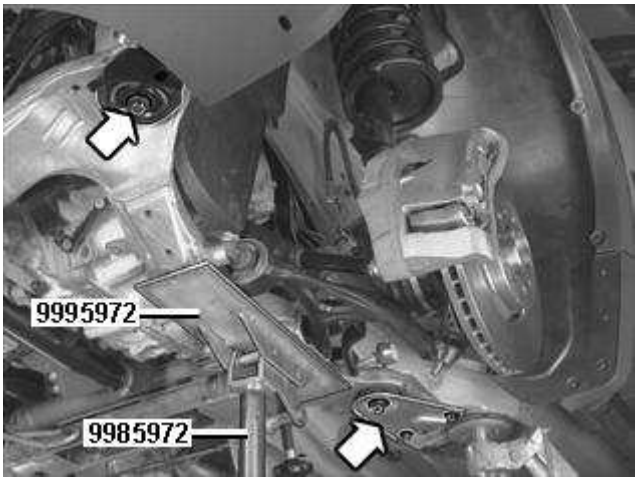


Fig. 511: Identifying Mobile Jack & Sub-Frame
Courtesy of VOLVO CARS CORPORATION

NOTE: Use new screws. Lubricate the screw threads.

Lift up the sub-frame until it is about **150 mm** from the side member. Secure the power steering pipe at the front edge of the upper side of the sub-frame. Use the rubber covered clamp. Install the screw loosely. Apply a small amount of soap solution so that it glides into the clamp easily.

NOTE: Make sure of the following when lifting the sub-frame:

- **that the steering shaft joint on the steering gear goes through the hole in the firewall**
- **that the brake pipe passes the bracket for the exhaust pipe**
- **that the ball joint pinion for the spring strut aligns in the link arm.**

Install the sub-frame's left side with two screws together with the sub-frame's brackets and engine heater, if installed, do not tighten yet.

Use new screws. Lube the screws with oil.

Install the screws for brackets M10, do not tighten yet.

Remove the mobile jack.

INSTALLING THE DRIVE SHAFT ON THE WHEEL HUB

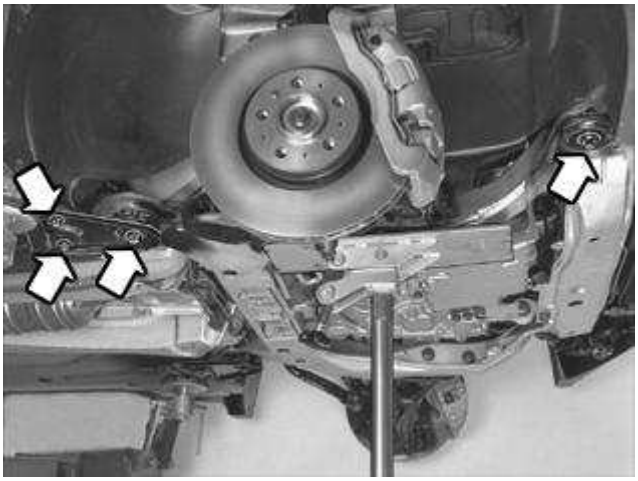


Fig. 512: Identifying Drive Shaft, Wheel Hub And Screws
Courtesy of VOLVO CARS CORPORATION

Lubricate the drive shaft splines. Use a small amount of thin oil.

Locate the drive shaft in the wheel hub.

Install a new screw loosely in the drive shaft.

Align the ball joint pinion for the spring strut in the control arm. If necessary use tools for removal, see **SIDE COVER TRANSMISSION, REMOVING** to hold the control arm down.

Position the mobile jack lightly applied under the right side of the sub-frame.

Install the sub-frame's right side together with the sub-frame's brackets.

Use new screws. Lube the screws with oil.

Tighten acc. to: **TIGHTENING TORQUE** . First tighten the screws on the sub-frame's left side, then on the right.

Tighten the screws for the brackets M10.

Remove the mobile jack.

INSTALLING THE CROSS MEMBERS ON THE BODYWORK

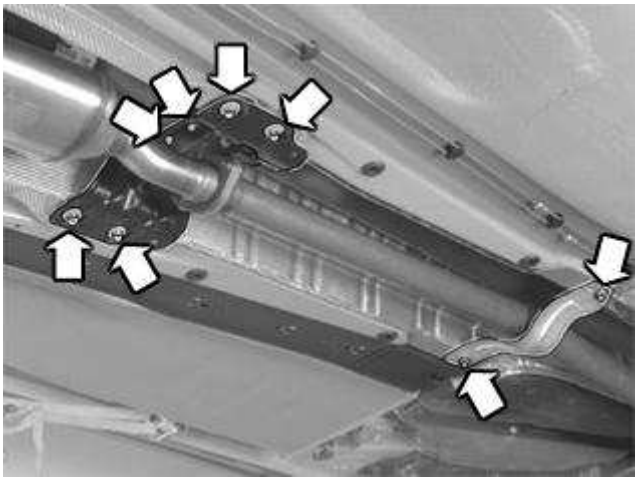


Fig. 513: Locating Cross Members And Bolts
Courtesy of VOLVO CARS CORPORATION

Install the 4 x M8 screws for the support for the center bearing. Tighten.

Tighten the 2 x M8 screws for the propeller shaft center bearing/member.

Install the 2 x M8 screws in the rear member. Tighten.

INSTALLING THE FRONT MOUNTING FOR THE EXHAUST PIPE AND THE CROSS MEMBER

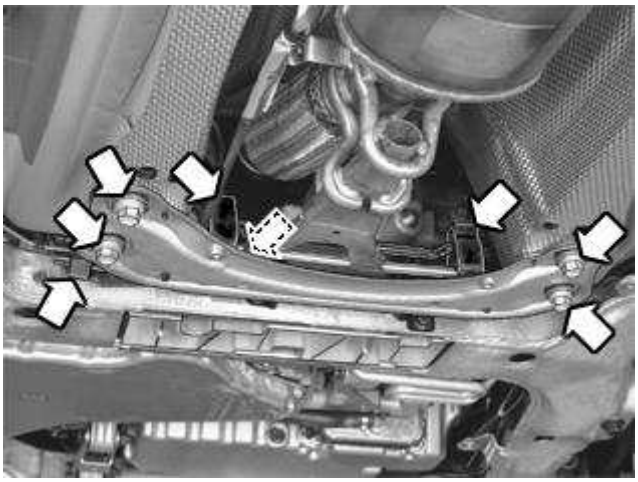


Fig. 514: Locating Front Cross Member And Bolts
Courtesy of VOLVO CARS CORPORATION

Install:

- the rubber mountings for the exhaust system on the bracket on the sub-frame and the exhaust pipe
- the connector for the heated oxygen sensors (HO2S) in the sub-frame
- the member. Use 4 x M8 screws. Tighten
- the brake pipe in the mountings in the member

- the clamp for the heated oxygen sensor (HO2S) wiring in the member.

INSTALLING THE POWER STEERING LINE

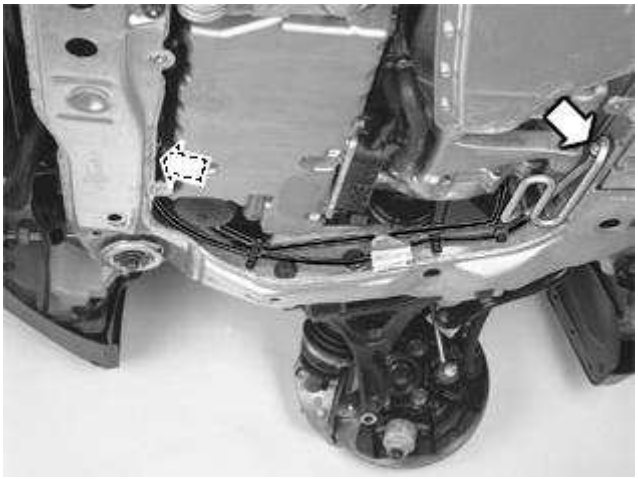


Fig. 515: Locating Power Steering Line
Courtesy of VOLVO CARS CORPORATION

Tighten the screw for the clamp for the power steering line at the front edge of the top of the sub-frame. The screw can be accessed from the front if the cable duct is lifted.

Install the screw for the clamp for the power steering line on the right side at the rear edge of the frame.

Press the power steering pipe and the evaporator pipe into the holders on the right side of the sub-frame.

For cars with fuel powered parking heaters

Press the fuel line into place in the holders.

INSTALLING THE SCREWS FOR THE ENGINE PADS AND ENGINE STABILIZER BRACE

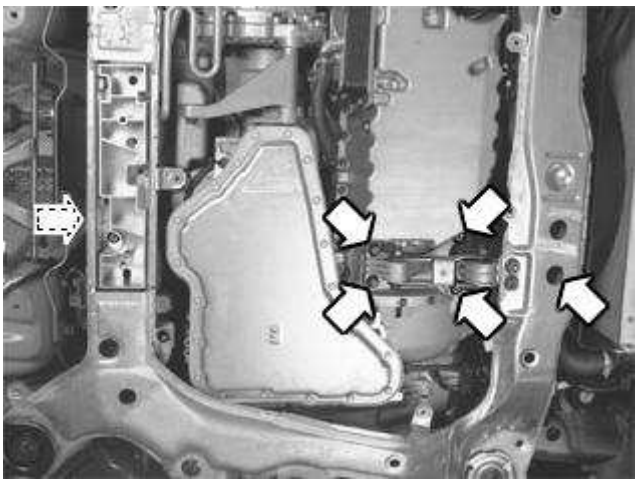


Fig. 516: Identifying Engine Pads And Engine Stabilizer Brace Bolts

Courtesy of VOLVO CARS CORPORATION

Install:

- the M10 screws for the front and rear engine pads. Tighten
- the 4 x M10 screws for the engine stabilizer brace. Tighten.

INSTALLING FRONT SUSPENSION COMPONENTS (BOTH SIDES)

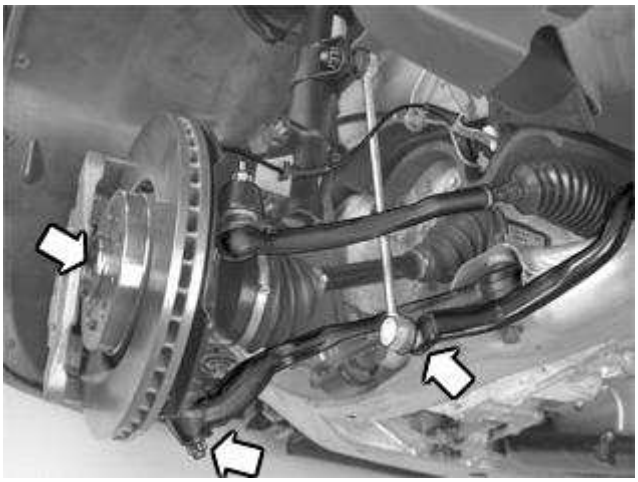


Fig. 517: Front Suspension Components
Courtesy of VOLVO CARS CORPORATION

Install:

- a new M14 lock nut (1 on each side) for the ball joint pinion. Counterhold the ball joint pinion while tightening so that the boot does not turn. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS**
- the link for the anti-roll bar. Use a new M10 lock nut (1 on each side). Counterhold the ball joint pinion while tightening so that the boot does not turn. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** . Tighten the drive shaft screw. Counterhold using a screwdriver in the brake disc vents. Tighten. See **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS**
- the soundproofing over the drive shaft (applies to certain versions)
- a new M12 lock nut for the tie rod/wheel spindle.

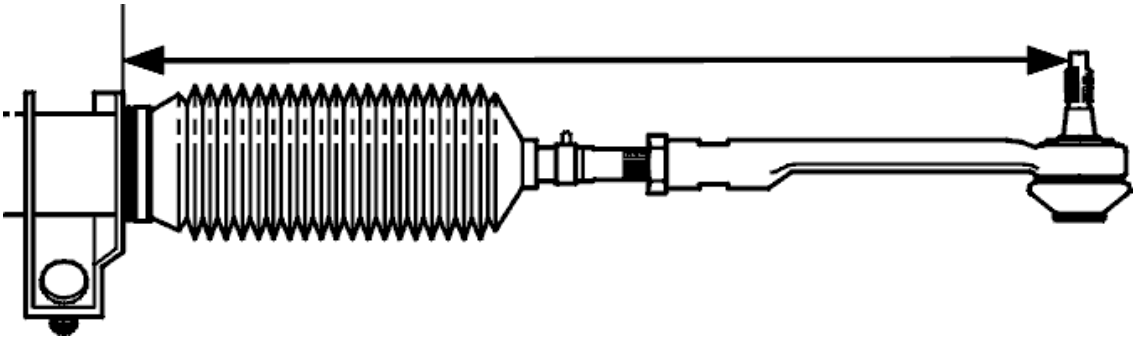


Fig. 518: Identifying Length Of Track Rod In Relation To Steering Gear Housing
Courtesy of VOLVO CARS CORPORATION

NOTE: Check when installing that the track rod is in the same position as noted earlier.

INSTALLING COMPONENTS FOR THE FENDER LINER

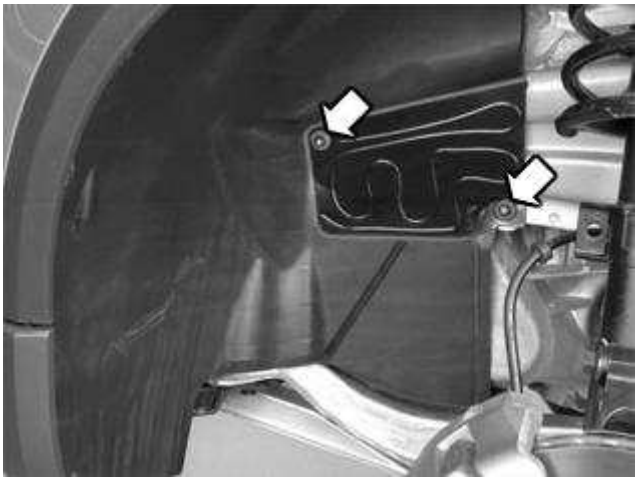


Fig. 519: Identifying Support Plate And Nuts
Courtesy of VOLVO CARS CORPORATION

Install:

- the support plate and nuts (both sides).

INSTALLING THE CABLE DUCT

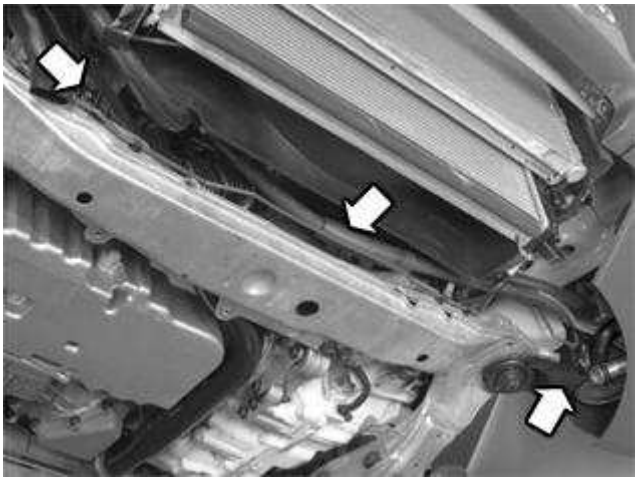


Fig. 520: Cable Duct
Courtesy of VOLVO CARS CORPORATION

Install:

- the cable duct on the sub-frame
- the parking heater (if applicable) in the mounting in the sub-frame and the fuel line in the mountings.

REMOVING THE LIFTING BEAMS

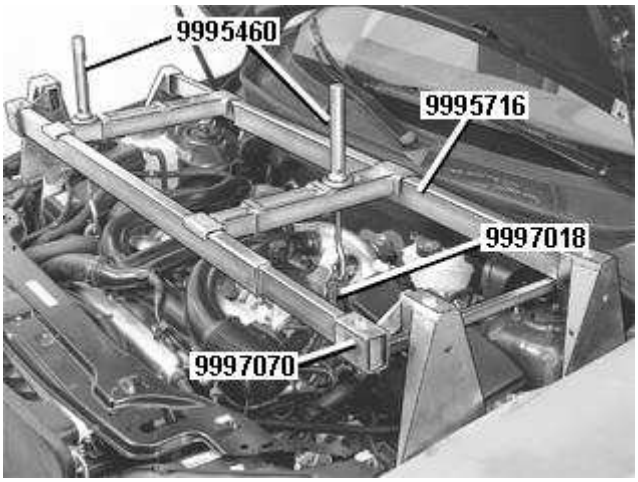


Fig. 521: Engine Lift Installed
Courtesy of VOLVO CARS CORPORATION

Lower the car.

Remove the lifting beams and hooks from the engine.

INSTALLING THE LOWER STEERING SHAFT ON THE STEERING SHAFT JOINT

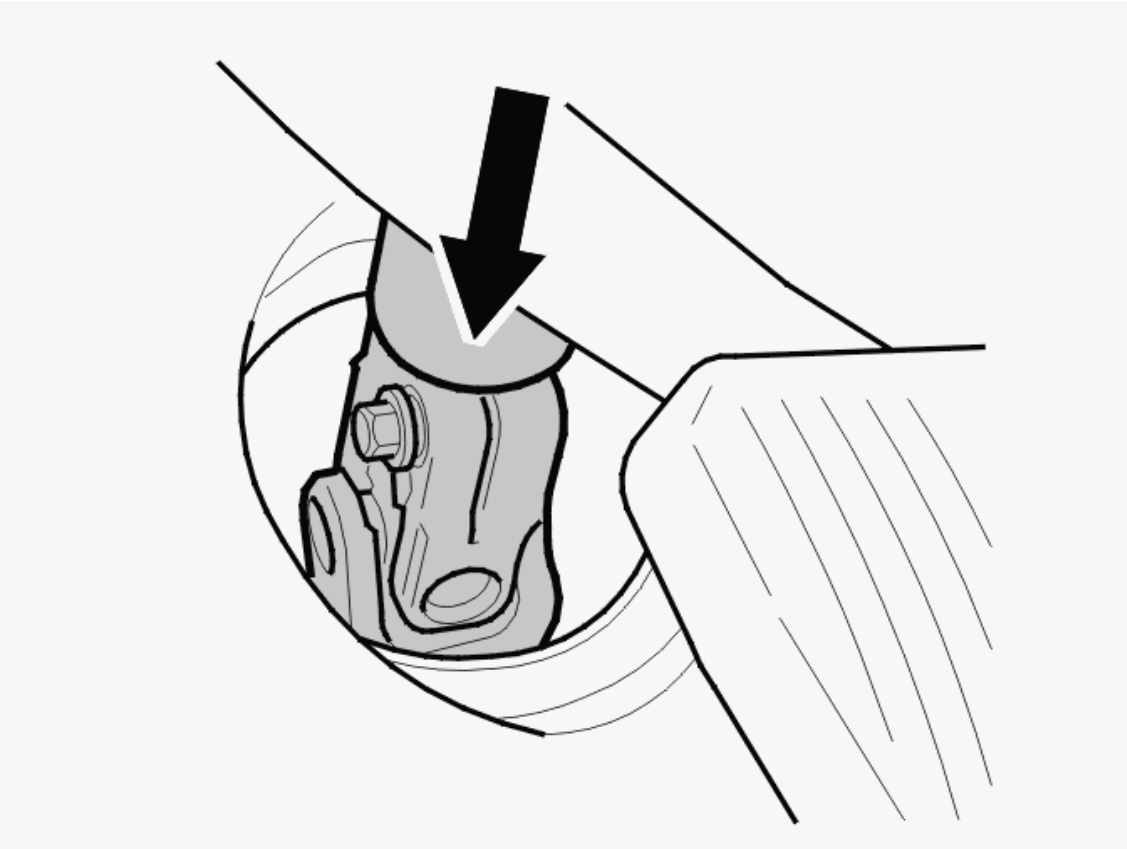


Fig. 522: Identifying Steering Shaft Joint
Courtesy of VOLVO CARS CORPORATION

Align the steering shaft in the joint on the steering gear. Install a new M8 screw. Tighten.

Install the boot and snap ring on the firewall. Check that the bearing in the boot comes into place against the steering shaft.

INSTALLING THE BOOT AND SNAP RING ON THE FIREWALL

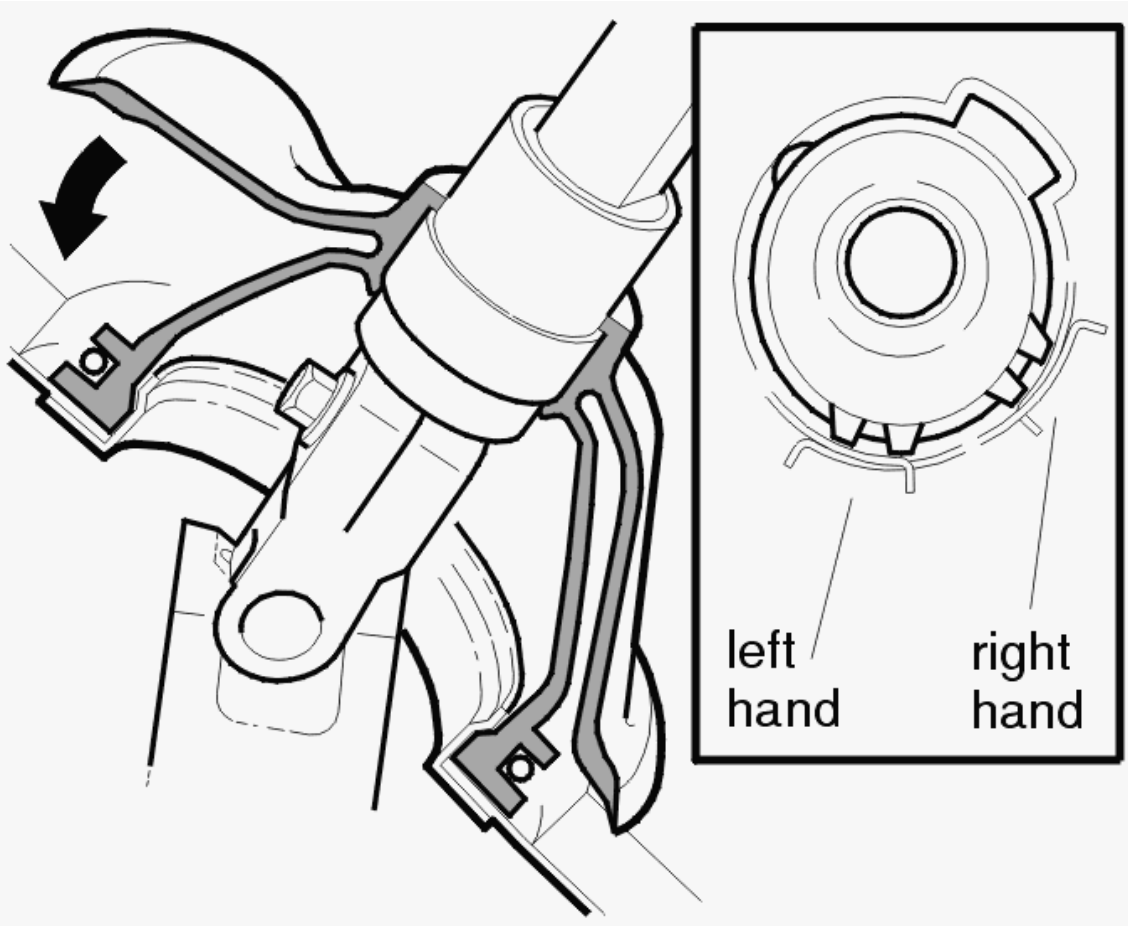


Fig. 523: Identifying Bearing In Boot
Courtesy of VOLVO CARS CORPORATION

Check that the bearing in the boot is in position. If it has become detached apply a little petroleum jelly or grease to the edge of the boot (around the hole). Press the bearing back down into the boot.

Install the boot on the firewall. Check carefully that the boot and snap ring go into the correct position. Adjust if necessary.

NOTE: It is essential that the above checks are carried out. Otherwise there may be noise from the transmission/engine and road noise in the passenger compartment.

INSTALLING THE COOLANT HOSE

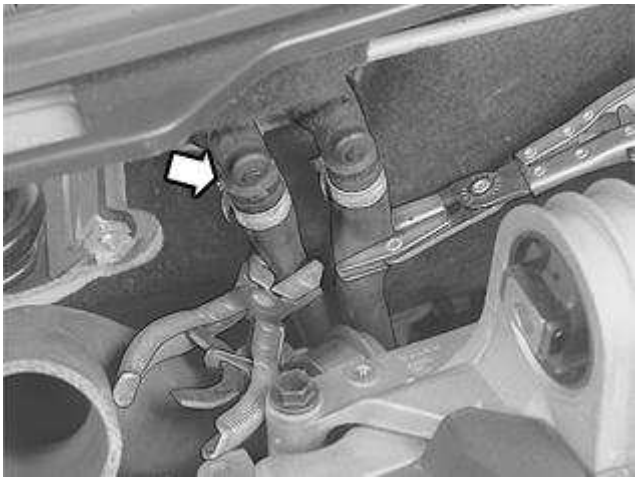


Fig. 524: Coolant Hose In Passenger Compartment
Courtesy of VOLVO CARS CORPORATION

Install the connector securing the engine coolant hose to the heater.

Remove the hose clips.

INSTALLING THE CONNECTOR ON THE TRANSMISSION

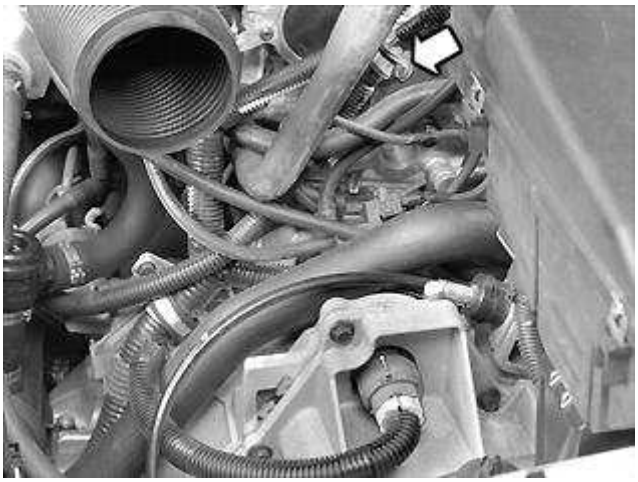


Fig. 525: Gearbox And Connector
Courtesy of VOLVO CARS CORPORATION

Install:

- the screw for the clamp holding the positive cable on the engine
- the connector from the transmission (press the connector together). Pull it from the transmission.

INSTALLING ENGINE COMPARTMENT COMPONENTS

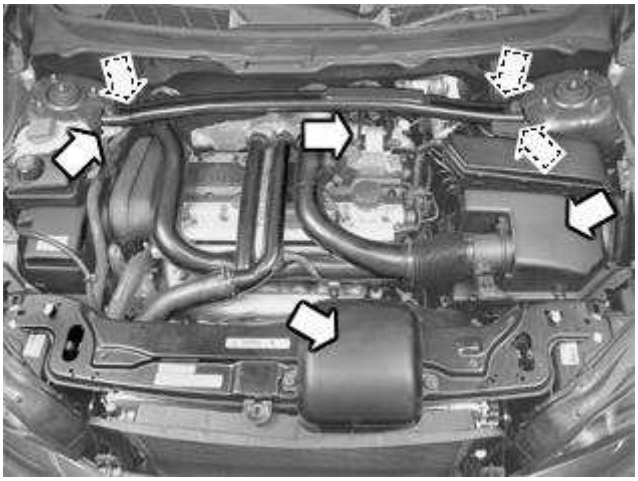


Fig. 526: Identifying Engine Compartment Components
Courtesy of VOLVO CARS CORPORATION

Install:

- the charge air pipe to the charge air cooler (CAC)
- the air cleaner (ACL) housing assembly with the intake manifold and connections
- hook the turbocharger (TC) control valve into place in the air cleaner (ACL)
- the upper engine stabilizer brace between the wheel arches. Use 4 x M10 screws. Tighten
- 1 x M12 screw for the engine stabilizer brace/engine mounting. Tighten
- The tie strap for the power steering return line in the mounting lug for the engine stabilizer brace on the right side.

Fill with coolant. Carefully check while reaching operating temperature or test driving that the level remains the same and that there is no leakage.

TOPPING UP THE TRANSMISSION FLUID

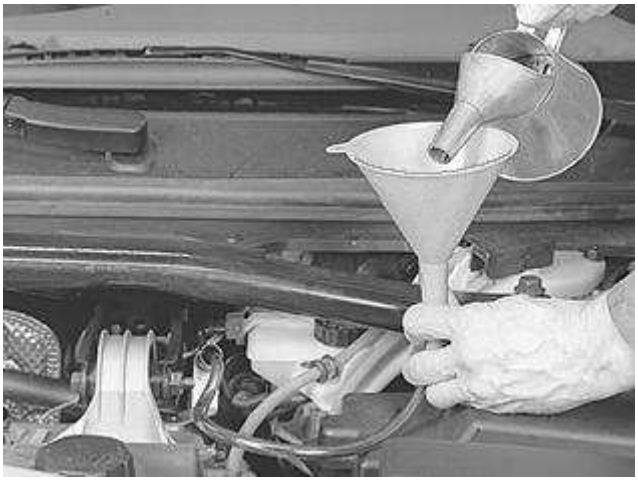


Fig. 527: Filling Transmission With Oil
Courtesy of VOLVO CARS CORPORATION

NOTE: Oil grade: Only ATF-fluid Dexron III (with G-license).

Transmission oil, Volvo part number 116 1521-8 (1litre), 116 1621-6 (4 litres).

There are 2 different methods when topping up the transmission fluid.

Method 1:

Start by filling with 5.5 liters of oil. Use a funnel with a plastic hose. Fill through the dipstick pipe. Clear up any oil spillage under the dip stick pipe.

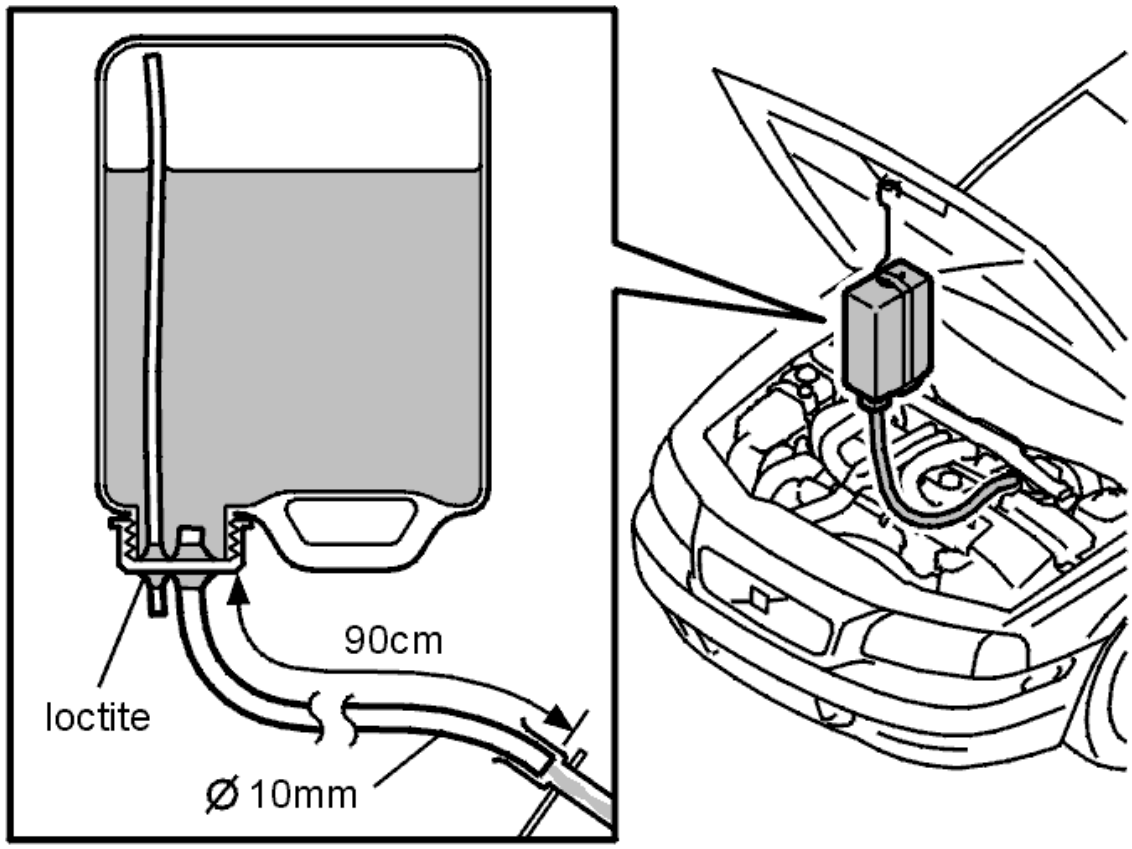


Fig. 528: Filling Transmission With Oil - Method 2
Courtesy of VOLVO CARS CORPORATION

Method 2:

Start by filling with 5.5 liters of oil. Use a converted five liter plastic can (see the illustration) This method avoids oil spillage. It also provides a more regular flow when filling.

NOTE: After changing transmission oil, the transmission's counter for "Transmission oil, change" shall be reset. Use VIDA (Volvo scan tool) Vehicle communication to reset the counter.

INSTALLING THE BATTERY LEAD

First read **BATTERY, DISCONNECTING** . Connect the battery lead.

CHECK AFTER ASSEMBLY

To check the oil level, see **OIL LEVEL, CHECKING** .

Fill with coolant. Carefully check while reaching operating temperature or test driving that the level remains the same and that there is no leakage.

Raise the car.

Check that there is no oil leakage at:

- the connections for the oil pipes on the transmission
- -the side cover
- the side cover around the drive shaft.

INSTALLING THE FRONT SPLASH GUARD

Fig. 529: Front Splash Guard
Courtesy of VOLVO CARS CORPORATION

See **SUB-FRAME FRONT, REPLACING** .

Install:

- the splash guard under the engine
- the wheels. See **INSTALLING WHEELS** .

TEST DRIVING THE CAR

NOTE: Test drive the car in the same way as before the repair. See TRANSMISSION

CHECKING/FAULT-TRACING .

For faults other than judder when test driving the car, see **TEST DRIVE FORM, DESCRIPTION** .

SIDE COVER TRANSMISSION, REMOVING

Special tools:

9985972

9995085

9995460

9995462

9995562

9995716

9995972

9997018

9997062

9997070

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

WARNING: Avoid skin contact with the transmission fluid.

REMOVAL

DISCONNECTING THE BATTERY LEAD

Remove the battery lead. See **BATTERY, DISCONNECTING** .

REMOVING ENGINE COMPARTMENT COMPONENTS

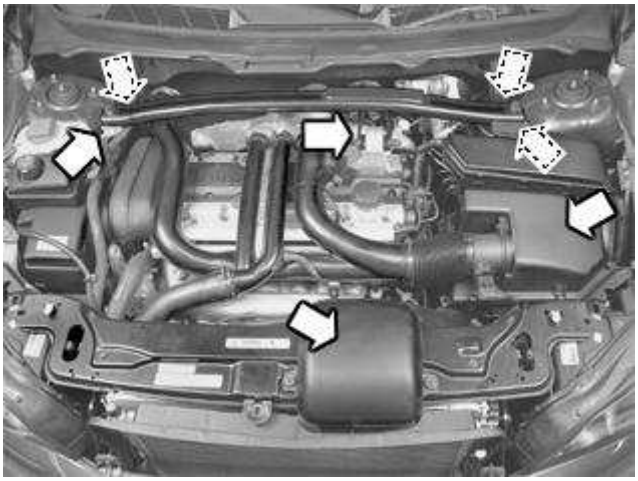


Fig. 530: Identifying Engine Compartment Components
Courtesy of VOLVO CARS CORPORATION

Remove:

- the engine stabilizer brace between the suspension turrets and the engine
- the air cleaner (ACL) housing assembly with the intake pipe.

Unhook the turbocharger (TC) control valve from the air cleaner (ACL) housing. Pull the air cleaner (ACL) housing out of its mountings.

DRAINING OIL

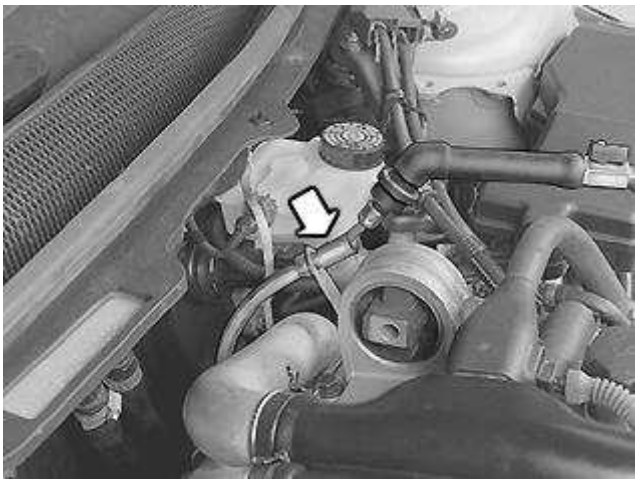


Fig. 531: Identifying Dip Stick Pipe & Oil Suction Device
Courtesy of VOLVO CARS CORPORATION

Use an oil suction unit.

Remove the dip stick. Ensure that the suction pipe reaches down into the transmission.

Extract all the fluid, approximately 6 liters.

REMOVING THE COOLANT HOSE FROM THE PASSENGER COMPARTMENT HEATER

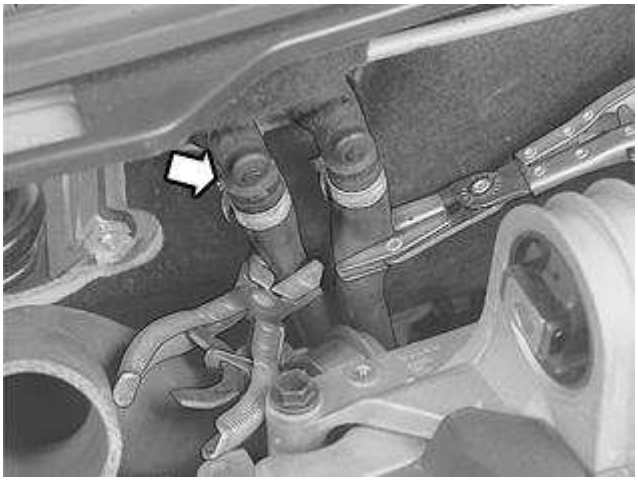


Fig. 532: Coolant Hose In Passenger Compartment
Courtesy of VOLVO CARS CORPORATION

Clamp the hoses with hose clips.

Place some paper under the inner hose connection to collect any spilled coolant.

Turn the quick-release connector (the inner of the 2 hoses) slightly in the direction of the arrow so that the lock opens. At the same time, pull the coolant hose straight out of the coolant pipe.

NOTE: Tie the hose up to the engine so that it does not fall down and trap the hose connector against the firewall during installation.

DISCONNECTING THE CHARGE AIR PIPE

Fig. 533: Heating Around Pipe At Charge Air Cooler
Courtesy of VOLVO CARS CORPORATION

Detach the charge air pipe from the charge air cooler (CAC).

Carefully heat around the pipe at the charge air cooler (CAC). Use a hot air gun. Loosen and remove the pipe.

REMOVING THE CONNECTOR FROM THE TRANSMISSION

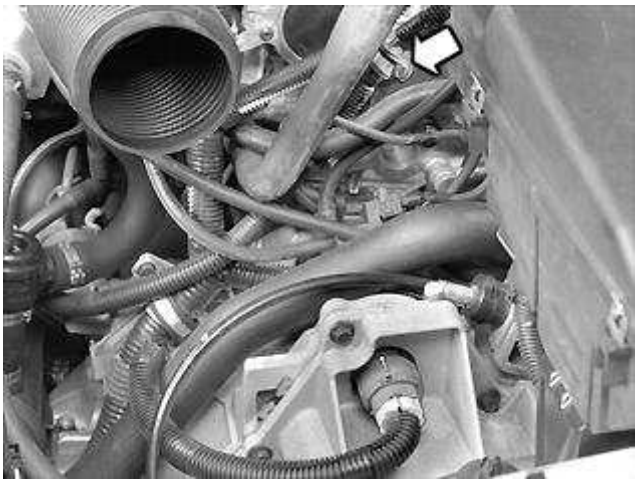


Fig. 534: Gearbox And Connector
Courtesy of VOLVO CARS CORPORATION

Remove:

- the screw for the clamp holding the positive cable on the engine
- the connector from the transmission (press the connector together). Pull it from the transmission.

INSTALLING THE LIFTING BEAMS AND LIFTING HOOKS ON THE ENGINE LIFTING LUGS

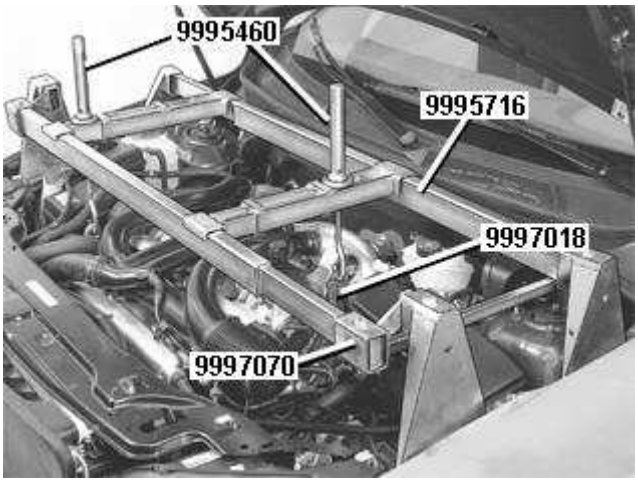


Fig. 535: Engine Lift Installed
Courtesy of VOLVO CARS CORPORATION

NOTE: The front lifting beam must be equipped with fixture kit 9997070 as illustrated.

Position lifting beams **9995716** on the wheel arch and directly above the engine lifting eyelets on the left and

right sides.

Connect the lifting hooks **9995460** on the engine lifting lugs.

On the right side of the engine, the hook must have a clearance of **10 mm** .

On the left side of the engine, lifting lug **9997018** must be used. Connect the tool to the 2 screws at the rear edge of the engine together with lifting hook **9995460** .

Tighten to light contact on the left hand side.

REMOVING THE LOWER STEERING SHAFT FROM THE STEERING SHAFT JOINT

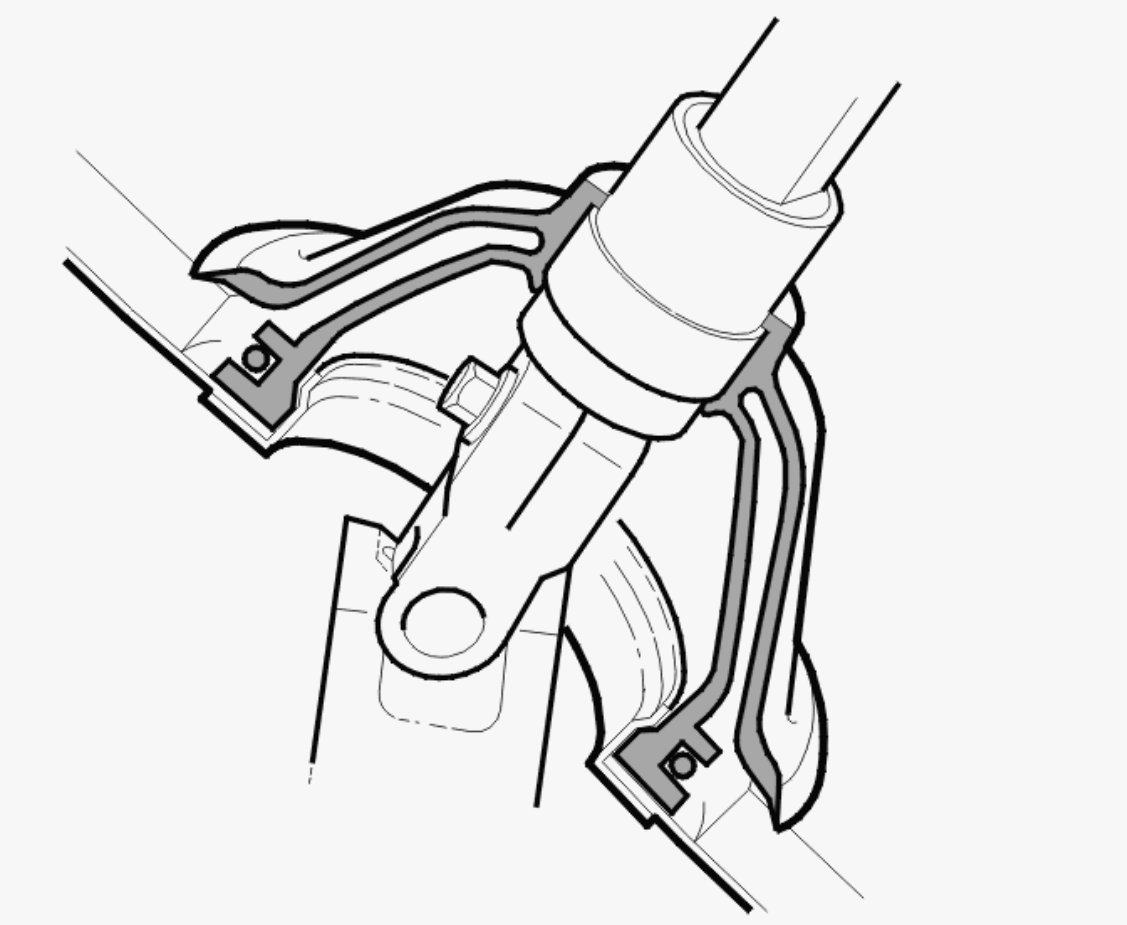


Fig. 536: Identifying Removing Lower Steering Shaft From Steering Shaft Joint
Courtesy of VOLVO CARS CORPORATION

Detach the boot from the firewall and slide it up on the steering shaft.

Turn the steering wheel so that the screw for the steering shaft joint is accessible but with the wheels as straight forward as possible.

Remove the ignition key. Do not turn the steering wheel now.

Remove the screw from the steering shaft joint and slide up the lower steering shaft.

Raise the car.

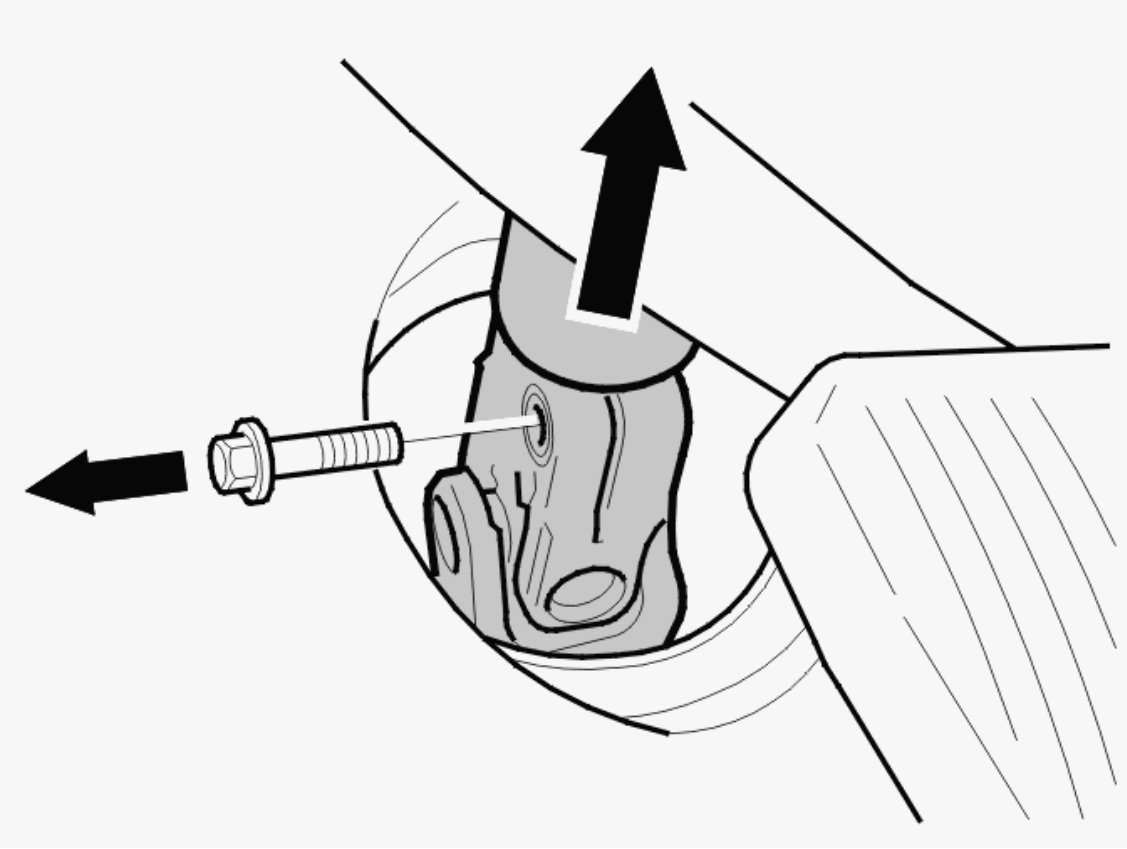


Fig. 537: Identifying Steering Shaft Joint Screw
Courtesy of VOLVO CARS CORPORATION

REMOVING BOTH THE FRONT WHEELS

Fig. 538: Front Splash Guard
Courtesy of VOLVO CARS CORPORATION

Remove:

- both the front wheels
- the front protective panel. See **SUB-FRAME FRONT, REPLACING**
- the splash guard under the engine.

REMOVING COMPONENTS FROM THE SUB-FRAME

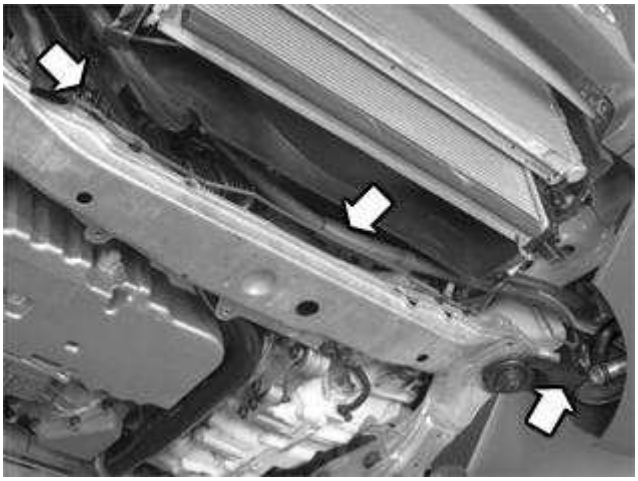


Fig. 539: Cable Duct
Courtesy of VOLVO CARS CORPORATION

Remove the screw for the cable duct. Unhook the cable duct from the sub-frame.

For cars with fuel powered parking heaters:

Remove the 2 screws for the heater.

Unhook the heater from the mounting. Leaving it hanging in its upper mounting.

Detach the fuel line for the heater from the holders on the sub-frame.

REMOVING THE CROSS MEMBERS FROM THE BODY

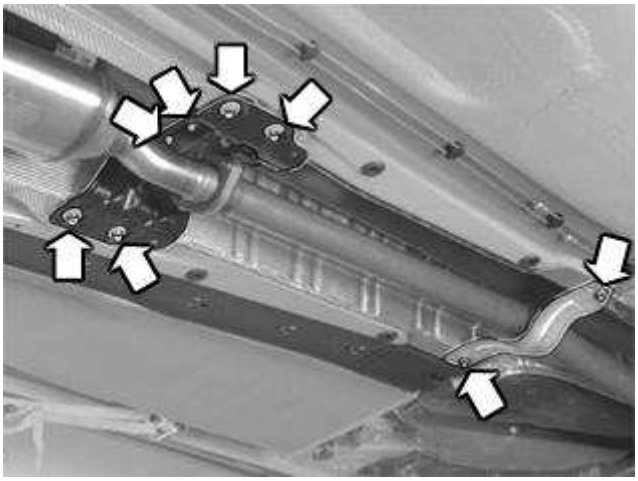


Fig. 540: Locating Cross Members And Bolts
Courtesy of VOLVO CARS CORPORATION

Slacken off the 2 screws in the center bearing/member for the propeller shaft

Remove:

- the screws for the support for the center bearing. Let the propeller shaft rest against the exhaust pipe
- one of the screws and slacken off the other for the rear member. Turn the member to the side so that the exhaust pipe is exposed.

REMOVING THE FRONT CROSS MEMBER

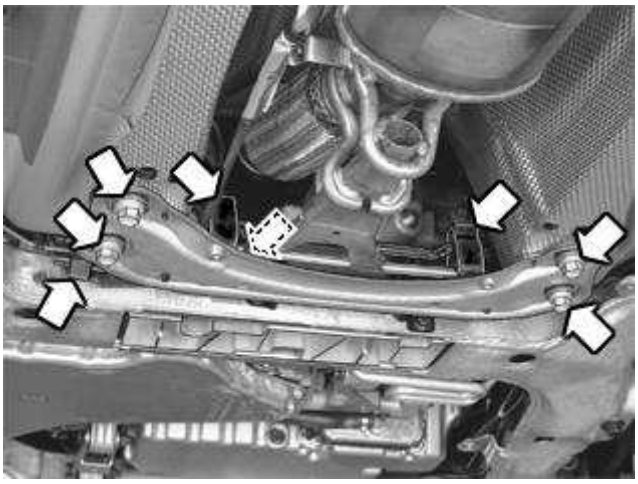


Fig. 541: Locating Front Cross Member And Bolts
Courtesy of VOLVO CARS CORPORATION

Remove:

- the clamp for the heated oxygen sensors (HO2S) from the member
- the member. Remove the brake pipe from the mountings in the member

- the connector for the heated oxygen sensors (HO2S) in the sub-frame
- the rubber mountings from the exhaust pipe and the mounting on the sub-frame.

REMOVING SCREWS AND NUTS FROM THE ENGINE PAD AND ENGINE STABILIZER BRACE

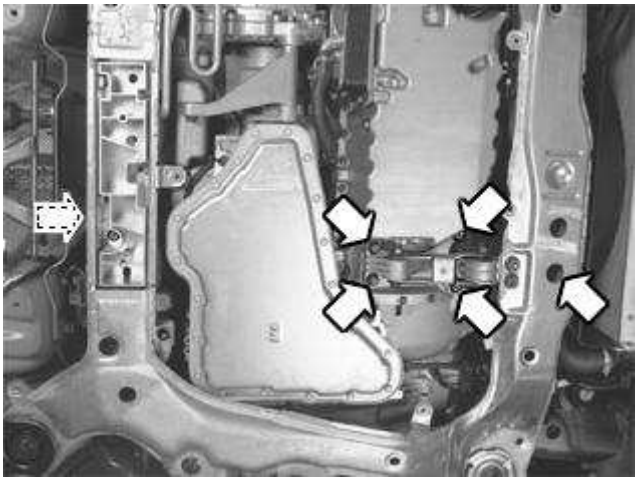


Fig. 542: Identifying Engine Pads And Engine Stabilizer Brace Bolts
Courtesy of VOLVO CARS CORPORATION

Remove:

- the screws for the front and rear engine pads
- the screws for the engine stabilizer brace.

DETACHING THE POWER STEERING LINE

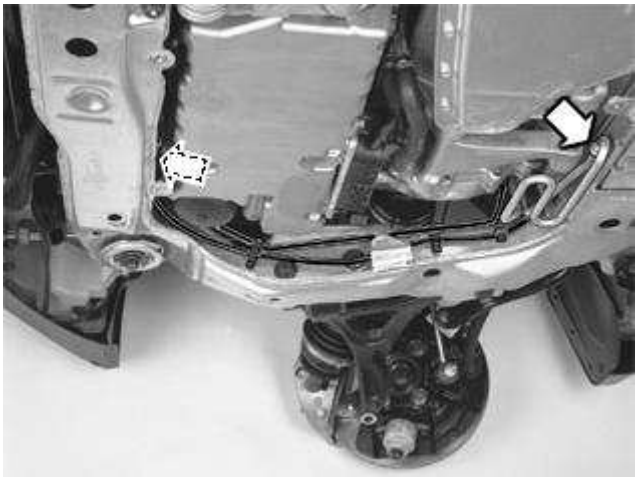


Fig. 543: Locating Power Steering Line
Courtesy of VOLVO CARS CORPORATION

Remove:

- the screw for the clamp for the power steering line at the front edge of the top of the sub-frame. The screw can be accessed from the front if the cable duct is lifted up
- the screw for the clamp for the power steering line on the right side at the rear edge of the frame.

Unhook the servo and the evaporator lines from the holders on the right side of the sub-frame.

For cars with fuel powered parking heaters

Unhook the fuel line from the holders.

REMOVING FRONT SUSPENSION COMPONENTS ON BOTH SIDES

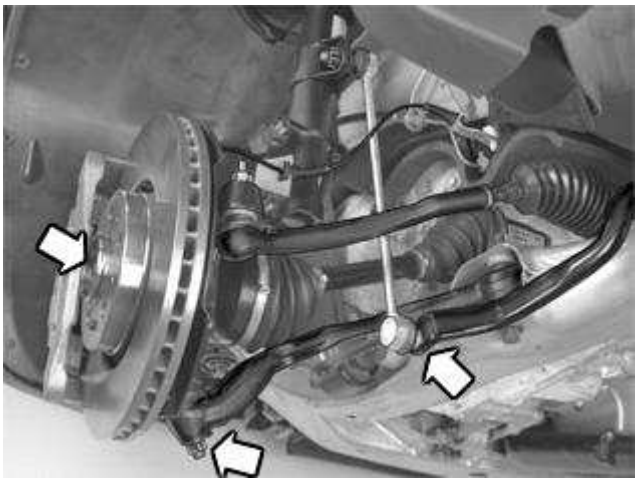


Fig. 544: Front Suspension Components
Courtesy of VOLVO CARS CORPORATION

Remove:

- the soundproofing over the drive shaft (applies to certain versions)
- the screw for the drive shaft. Counterhold using a screwdriver in the brake disc vents. Tap in the end of the drive shaft approximately **20 mm** into the wheel hub
- the link from the anti-roll bar. Counterhold using a Torx wrench in the ball joint pinion to prevent the boot from turning
- the nut for the ball joint / link arm. Clean the exposed threads outside the nut. Spray using rust solvent before removing the nut
- the nut for the tie rod from the wheel spindle.

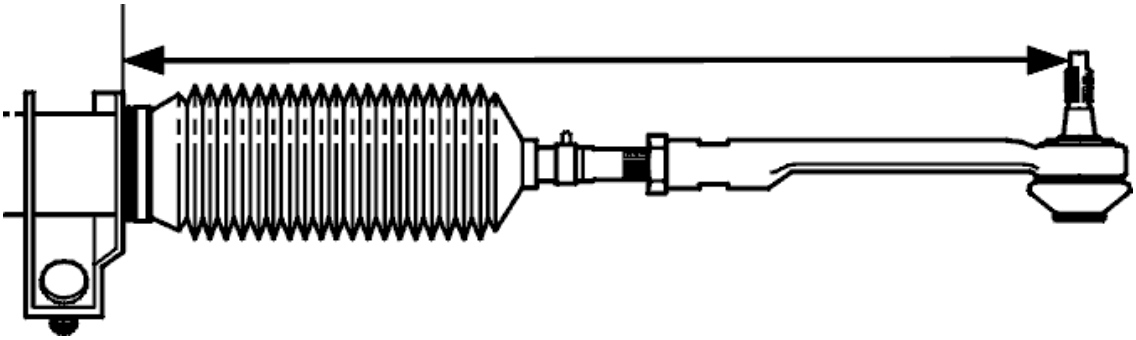


Fig. 545: Identifying Length Of Track Rod In Relation To Steering Gear Housing
Courtesy of VOLVO CARS CORPORATION

NOTE: Before detaching the tie rod, measure and note the distance as illustrated.

DISCONNECTING THE BALL JOINT PINION FROM THE CONTROL ARM (BOTH SIDES)

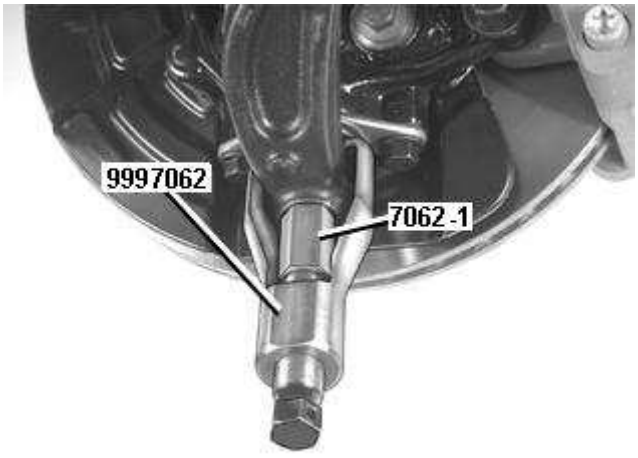


Fig. 546: Disconnecting Ball Joint Pinion From Control Arm Using 999 7062
Courtesy of VOLVO CARS CORPORATION

Use tool **9997062** .

Install cap nut **9997062** on the ball joint pinion. Tighten the nut against the control arm. Then slacken off 1 to 2 turns so that there is clearance between the cap nut and the control arm.

Position puller **9997062** on the control arm and detach the ball joint from the control arm.

Remove the tools.

UNHOOKS THE CONTROL ARM FROM THE BALL JOINT PINION (BOTH SIDES)

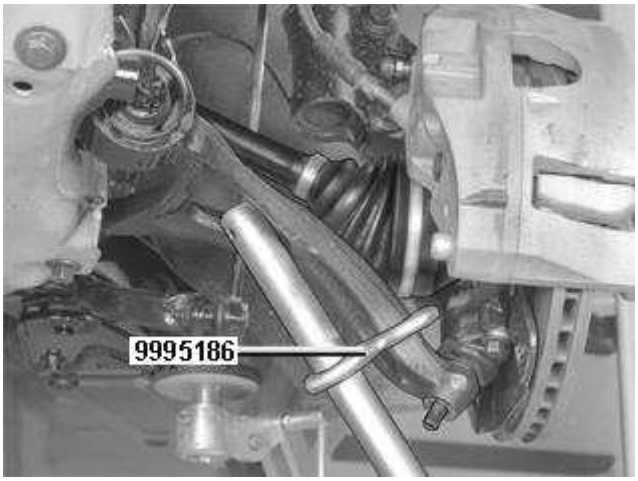


Fig. 547: Identifying Unhooking Control Arm From Ball Joint Pinion
Courtesy of VOLVO CARS CORPORATION

Use lifting lug **9995085** and a longer jimmy bar or the handle of jimmy bar **9995462** .

Position the lifting lug hook in the cast countersink on the control arm. Position a jimmy bar or handle of the jimmy bar through the lug on the hook and against the control arm as illustrated.

Press the control arm down and slide the wheel spindle to one side while installing protective socket **9995562** on the ball joint pinion. Hold it in place with the nut for the ball joint.

REMOVING THE DRIVE SHAFT FROM THE WHEEL HUB (BOTH SIDES)

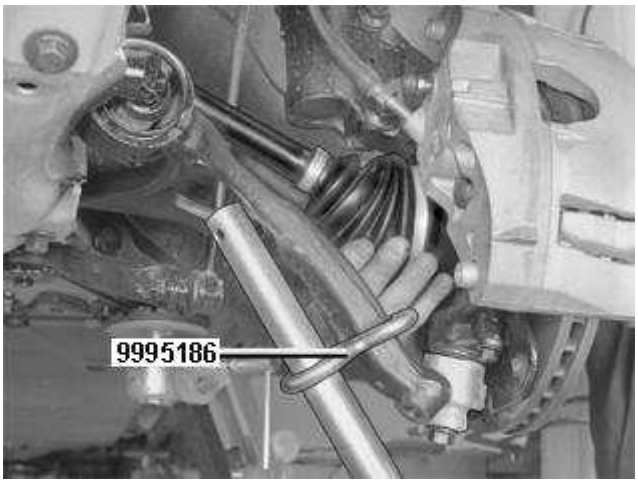


Fig. 548: Identifying Removing Drive Shaft From Wheel Hub
Courtesy of VOLVO CARS CORPORATION

Hold the control arm as above to facilitate removal of the drive shaft joint from the hub.

Release the control arm to the rest position.

REMOVING THE DRIVE SHAFT FROM THE TRANSMISSION (LEFT SIDE)

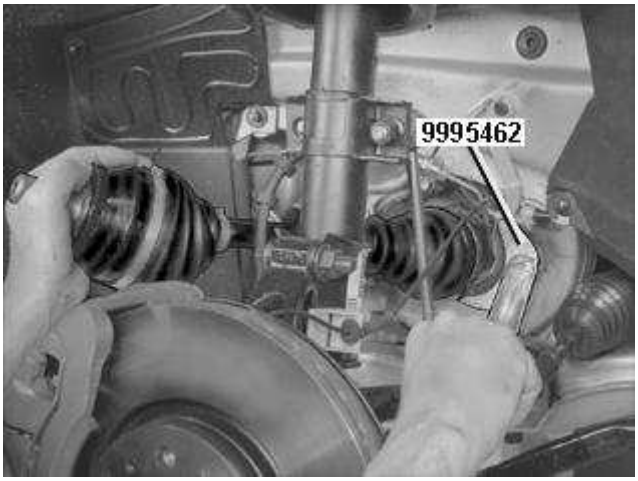


Fig. 549: Identifying Drive Shaft & Transmission
Courtesy of VOLVO CARS CORPORATION

Use counterhold **9995462**

Do not damage the drive shaft seal when removing the end of the drive shaft from the transmission.

Remove the drive shaft.

Hold the spring struts back on both side using a tensioning strap to give more space.

REMOVING THE FENDER LINER AND SUPPORT PLATE

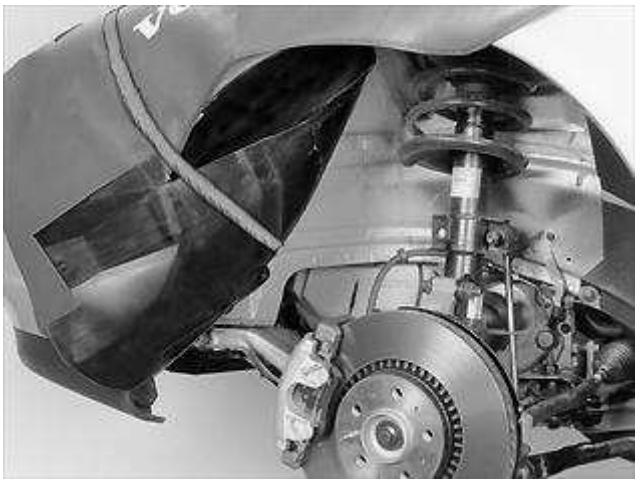


Fig. 550: Fender Liner Tied Up To Lifting Beam Using A Retaining Strap
Courtesy of VOLVO CARS CORPORATION

Remove the 2 nuts from the fender liner and the support plate.

Angle out and tie up the fender liner to the lifting beam. Use a retaining strap.

NOTE: Do not damage the front fender.

REMOVING THE SCREWS FROM THE SUB-FRAME SUPPORT PLATES (BOTH SIDES)

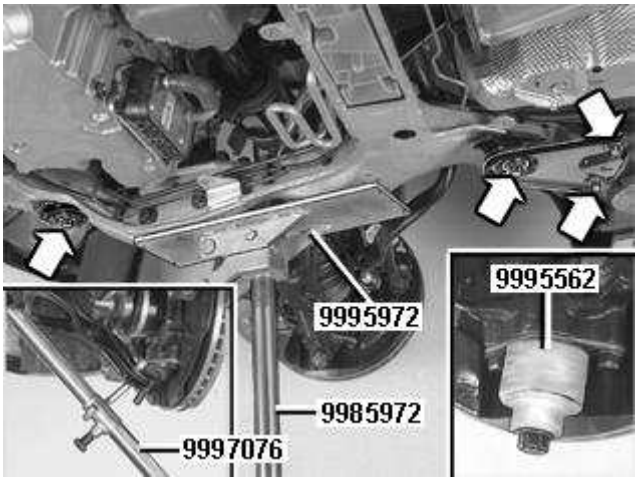


Fig. 551: Identifying Screws And Sub-Frame Support Plates
Courtesy of VOLVO CARS CORPORATION

Remove the screws from the sub-frame support plates (both sides).

Position mobile jack **9985972** with universal plate **9995972** , so that the plate is in light contact under the right side of the sub-frame. Slacken off the screws for the sub-frame on the right hand side. Ensure that the nuts are still secured by at least 5 threads.

Remove the jack.

LOWERING THE SUB-FRAME

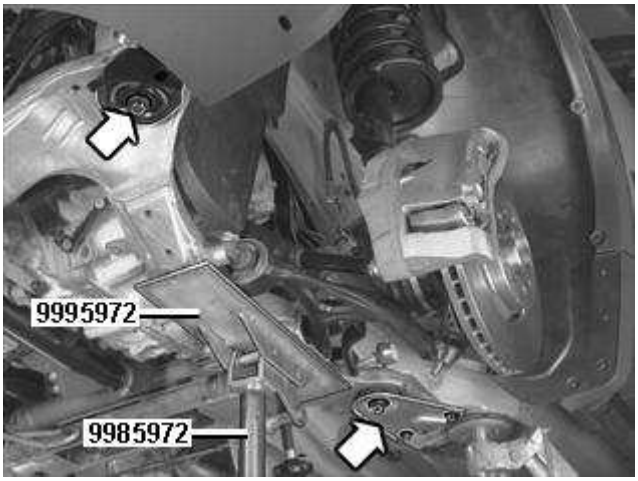


Fig. 552: Identifying Mobile Jack & Sub-Frame
Courtesy of VOLVO CARS CORPORATION

Position the mobile jack lightly applied under the left side of the sub-frame. Remove the sub-frame screws.

NOTE: Ensure the following when lowering the sub-frame:

- **the steering shaft joint on the steering gear runs freely in the bodywork grommet**
- **that the brake pipe does not catch in the bracket for the exhaust pipe mounting.**

Remove the mobile jack and let the frame hang loose.

REMOVING THE OIL PIPE FROM THE TRANSMISSION

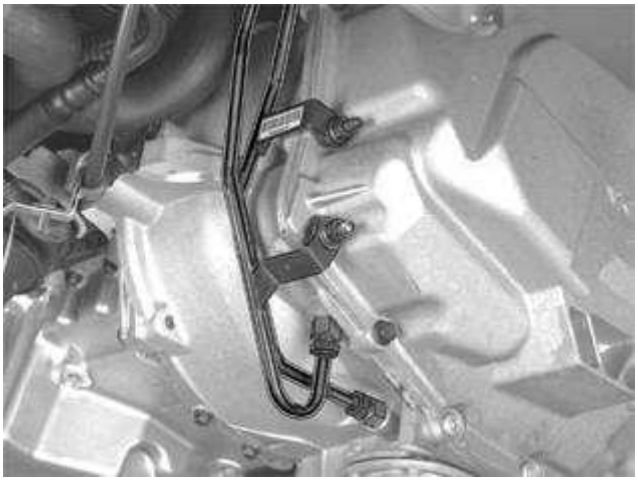


Fig. 553: Identifying Transmission Oil Pipes
Courtesy of VOLVO CARS CORPORATION

NOTE: Plug the oil pipes so that no dirt gets in.

Remove the nuts from the brackets for the oil pipes.

Remove the connection nuts from the pipes (counterhold at the connections). Pull out the oil pipes.

Move the oil pipes to one side.

LOWERING THE ENGINE AND TRANSMISSION

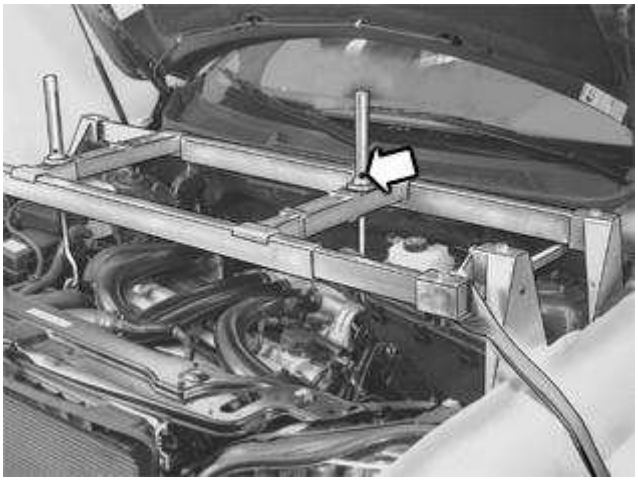


Fig. 554: Identifying Lowering Left Side
Courtesy of VOLVO CARS CORPORATION

Lower:

- the engine and transmission on the left side. Ensure that no cables and hoses are trapped or stretched while lowering
- as much as the lifting hook allows, check through the hole in the lifting hook to see when the stop becomes visible.

PREPARATIONS FOR REMOVAL OF THE TRANSMISSION SIDE COVER

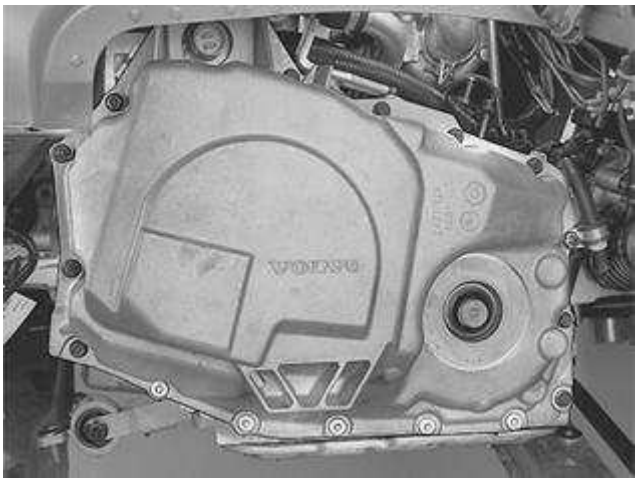


Fig. 555: Gearbox Side Cover
Courtesy of VOLVO CARS CORPORATION

Remove the gear selector cable from its clips on the side member.

Blow clean thoroughly around the cover.

Collect the oil spill when the side cover has been removed.

Remove the nut for the clamp and bracket holding the wiring. Cut off the tie straps holding the cable harness above the bracket. Move the wiring to one side. Remove the screw from the bracket. Unhook the bracket.

Remove all the screws from the side cover. Note the location of the different types of screws.

REMOVING THE SIDE COVER

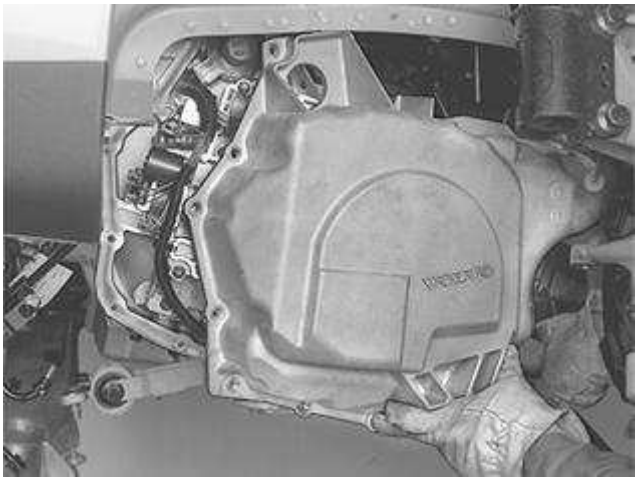


Fig. 556: Identifying Removing/Installing Gearbox Side Cover
Courtesy of VOLVO CARS CORPORATION

Pull out the side cover slightly from the transmission. Angle out the cover at the front on the left side quite a lot.

Pull the cover backwards to the steering gear. Pull out the cover at the bottom edge so that the upper section passes the side member. Keep the seal between the side cover and the transmission.

SOLENOID LINE PRESSURE, REPLACING

REMOVING THE SIDE COVER FROM THE TRANSMISSION

See **SIDE COVER TRANSMISSION, REMOVING**.

REMOVING THE LINE PRESSURE SOLENOID

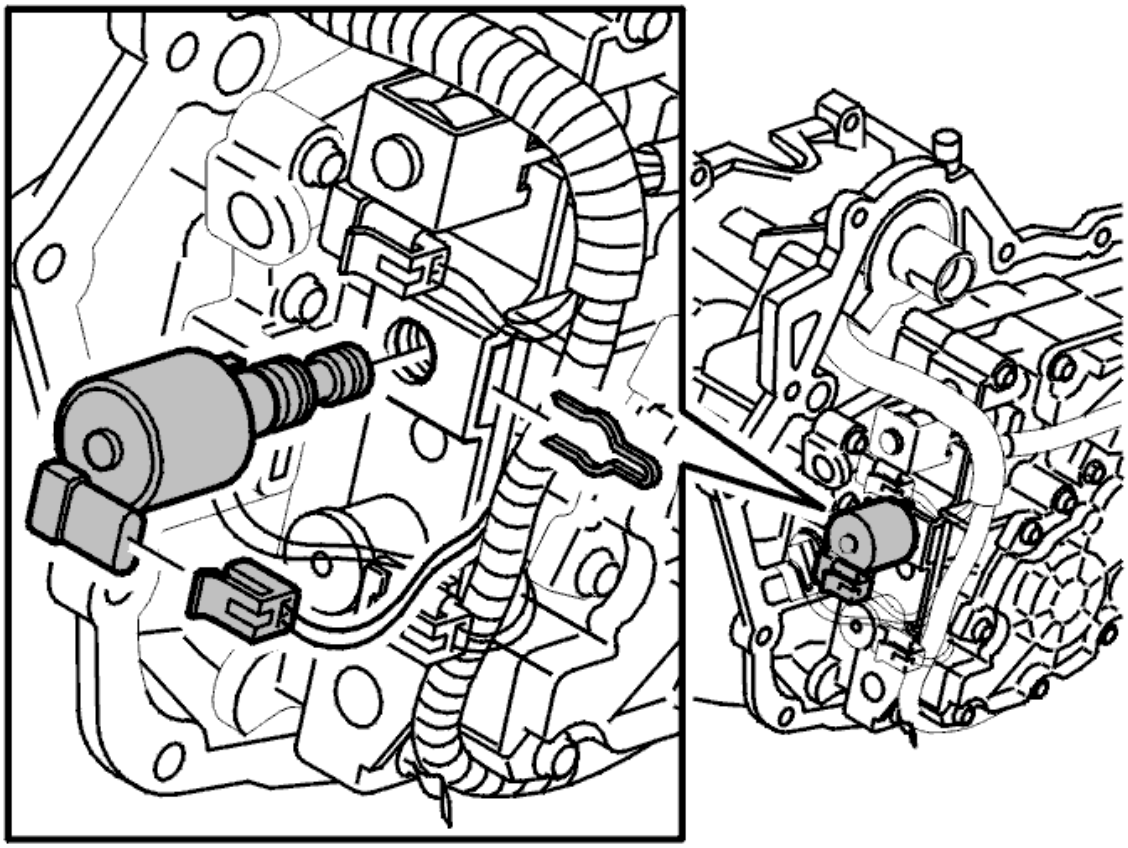


Fig. 557: Identifying Line Pressure Solenoid
Courtesy of VOLVO CARS CORPORATION

Remove:

- the connector
- the spring clamp. Pull it straight out. Use a small screwdriver to bend the clamp out slightly
- the solenoid from the control system. Use a screwdriver. Insert it between the solenoid and the control system. Carefully pry and pull on the solenoid at the same time. Check that the O-rings remain on the solenoid.

INSTALLING THE SOLENOID

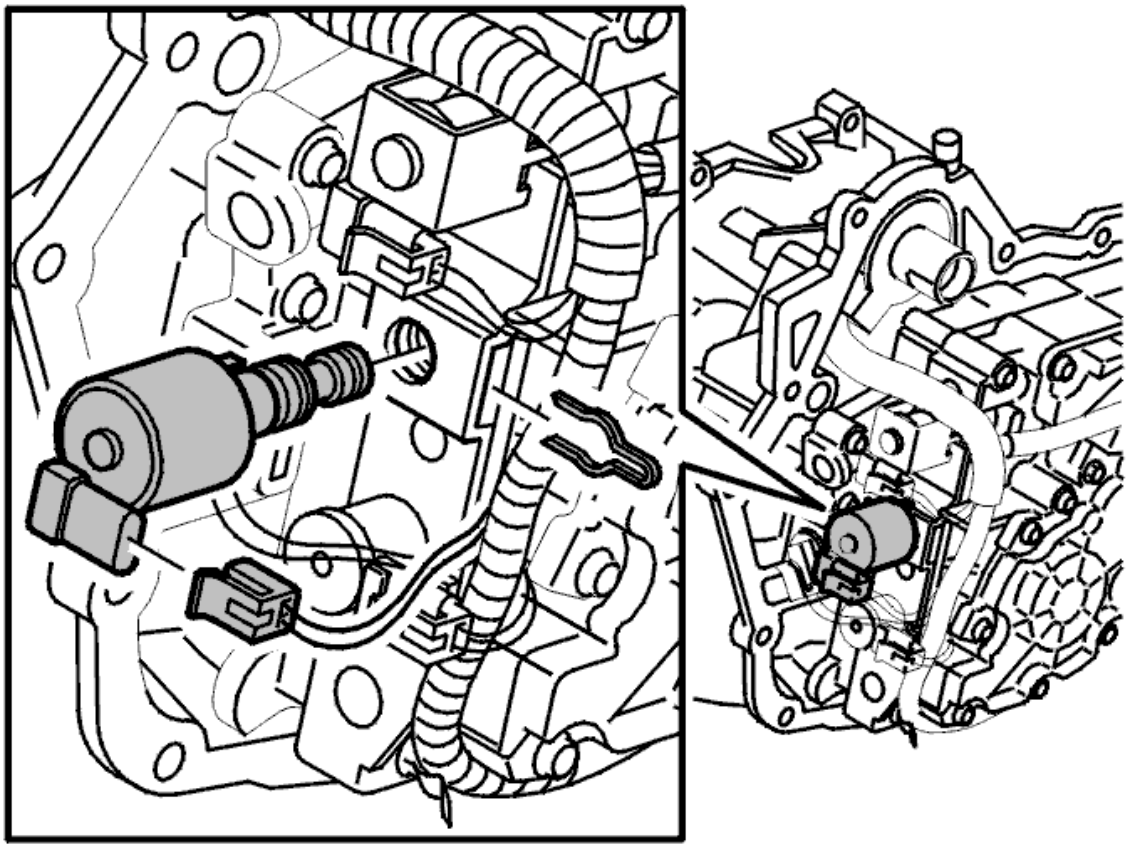


Fig. 558: Identifying Line Pressure Solenoid
Courtesy of VOLVO CARS CORPORATION

Apply a little petroleum jelly to the sensor O-rings.

Install the solenoid.

NOTE: The small guide lug on the solenoid should be upwards on installation.

Twist and press in the solenoid so that it bottoms in the control system.

Install:

- the spring clamp. Check that the spring clamp is locked
- the connector.

INSTALLING THE SIDE COVER ON THE TRANSMISSION

See **SIDE COVER TRANSMISSION, INSTALLING**.

SOLENOID LOCK-UP FUNCTION, REPLACING

NOTE: As the illustrations in this service information are used for different model years

and / or models, some variation may occur. However, the essential information is always correct.

REMOVAL

PREPARATORY WORK

See:**SIDE COVER TRANSMISSION, REMOVING**.

REMOVING THE LOCK-UP SOLENOID

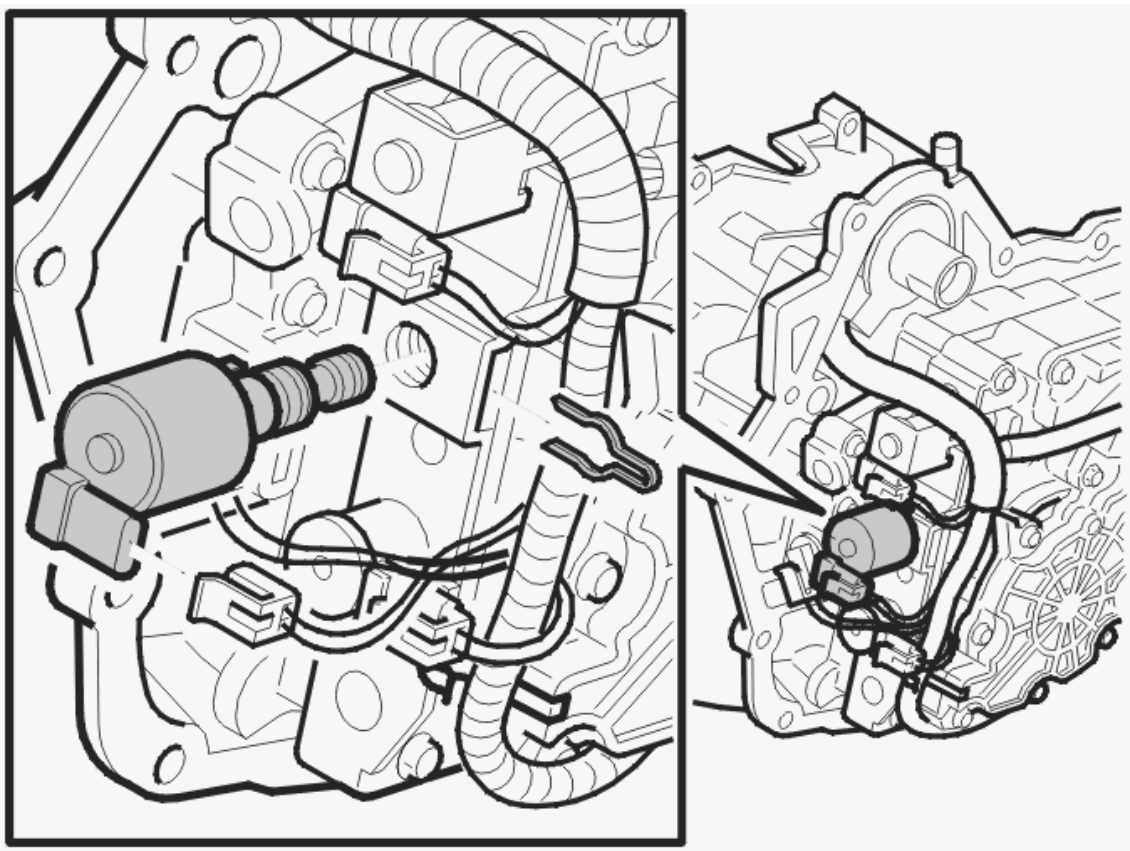


Fig. 559: Identifying Removing/Installing Lock-Up Solenoid
Courtesy of VOLVO CARS CORPORATION

Remove:

- the connector from the solenoid and the cable harness from the holder
- the spring clamp. Pull it straight out. Use a small screwdriver
- the solenoid. Use a screwdriver between the solenoid and the housing. Check that the O-rings remain on the solenoid.

INSTALLATION

INSTALLING THE LOCK-UP SOLENOID

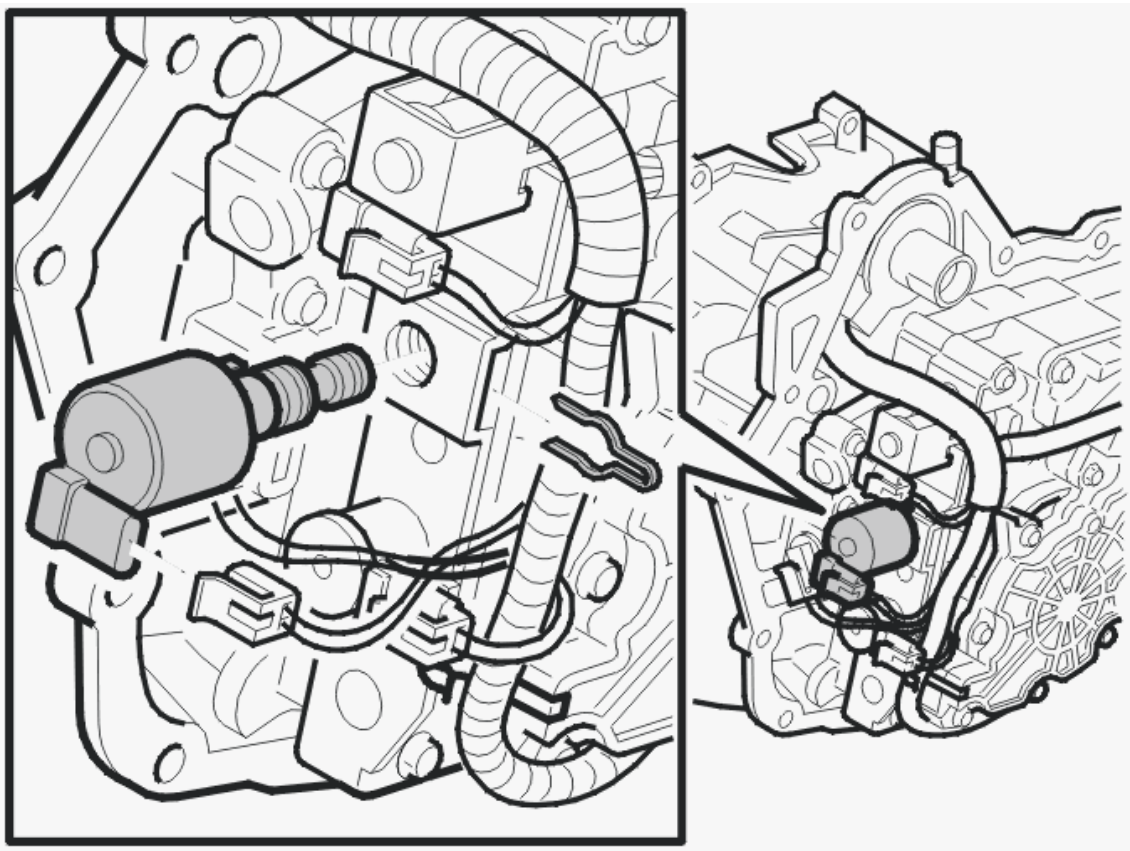


Fig. 560: Identifying Removing/Installing Lock-Up Solenoid
Courtesy of VOLVO CARS CORPORATION

Apply a little petroleum jelly to the O-rings.

Install:

- the solenoid. Turn and press in the solenoid a little so that it bottoms against the control system
- the spring clamp. Check that the spring clamp is locked
- the cable harness to the holder and the connector to the solenoid.

FINISHING

See **SIDE COVER TRANSMISSION, INSTALLING**.

SOLENOID SHIFTING 1-2 AND 3-4, REPLACING

REMOVING THE SIDE COVER FROM THE TRANSMISSION

See **SIDE COVER TRANSMISSION, REMOVING**.

REMOVING SOLENOID S1

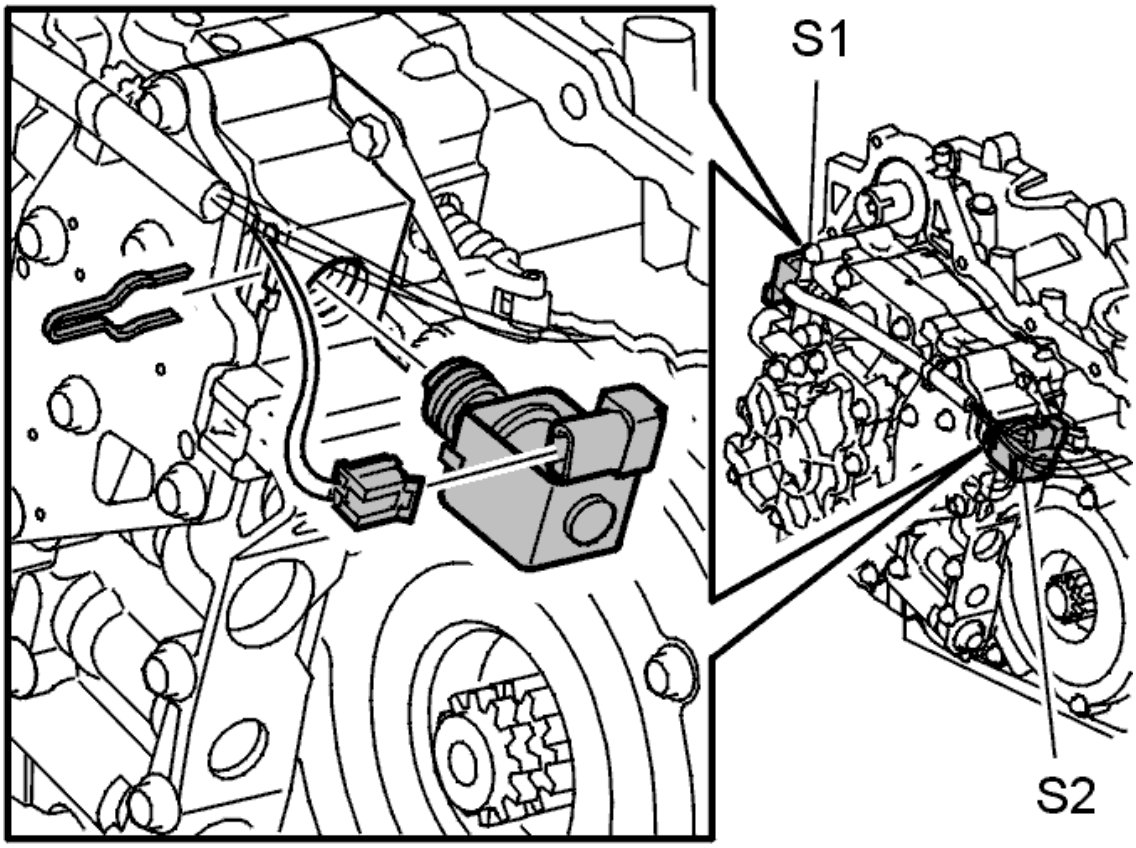


Fig. 561: Identifying Removing/Installing Solenoid S1
Courtesy of VOLVO CARS CORPORATION

Remove:

- the connector
- the spring clamp by pulling it straight out. Use a small screwdriver
- the solenoid. Use a screwdriver between the solenoid and the housing. Carefully pry and pull the solenoid at the same time.

Check that the O-ring remains on the solenoid.

INSTALLING SOLENOID S1

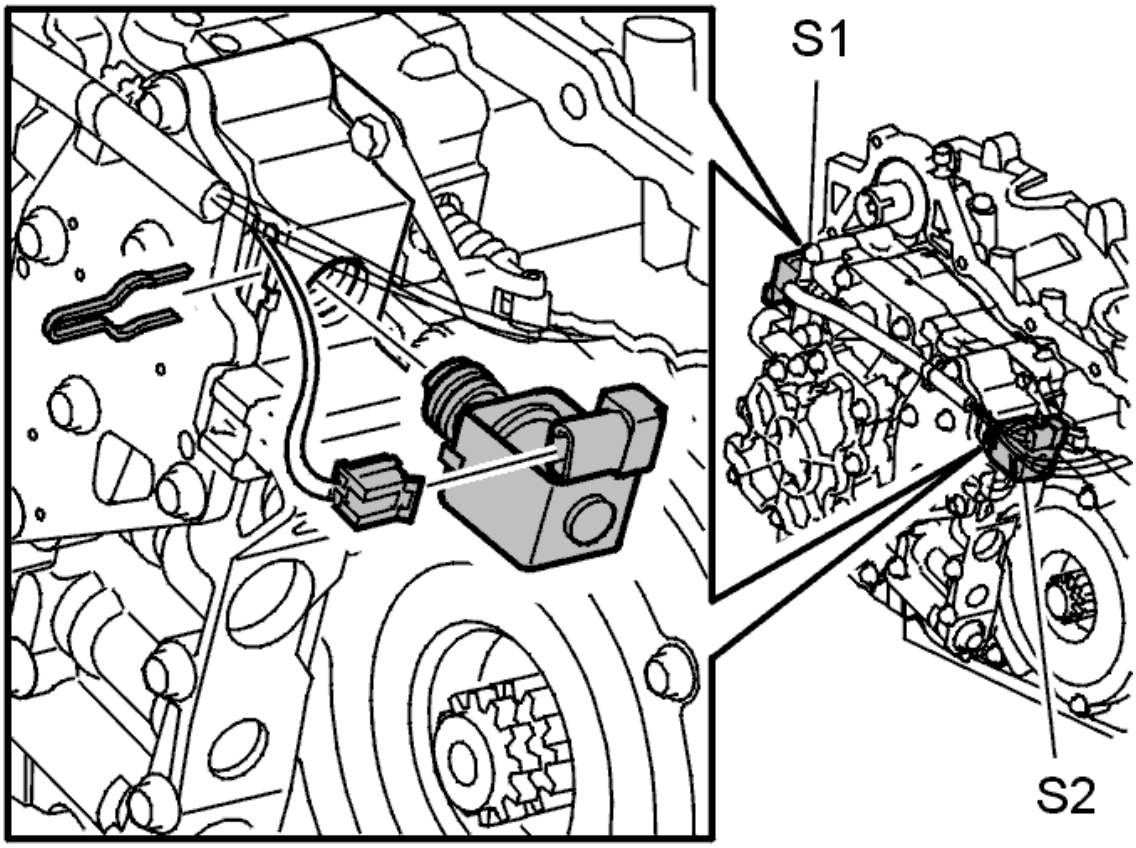


Fig. 562: Identifying Removing/Installing Solenoid S1
Courtesy of VOLVO CARS CORPORATION

Apply a little petroleum jelly to the solenoid O-ring.

Install:

- the solenoid by pressing it. Guide the solenoid in so that the locating pin on the side locates in the cut-out
- the spring clamp. Check that the spring clamp is locked
- the connector.

INSTALLING THE SIDE COVER ON THE TRANSMISSION

See **SIDE COVER TRANSMISSION, INSTALLING**.

SOLENOID SHIFTING 2-3, REPLACING

REMOVING THE SIDE COVER FROM THE TRANSMISSION

See **SIDE COVER TRANSMISSION, REMOVING**.

REMOVING SOLENOID S2

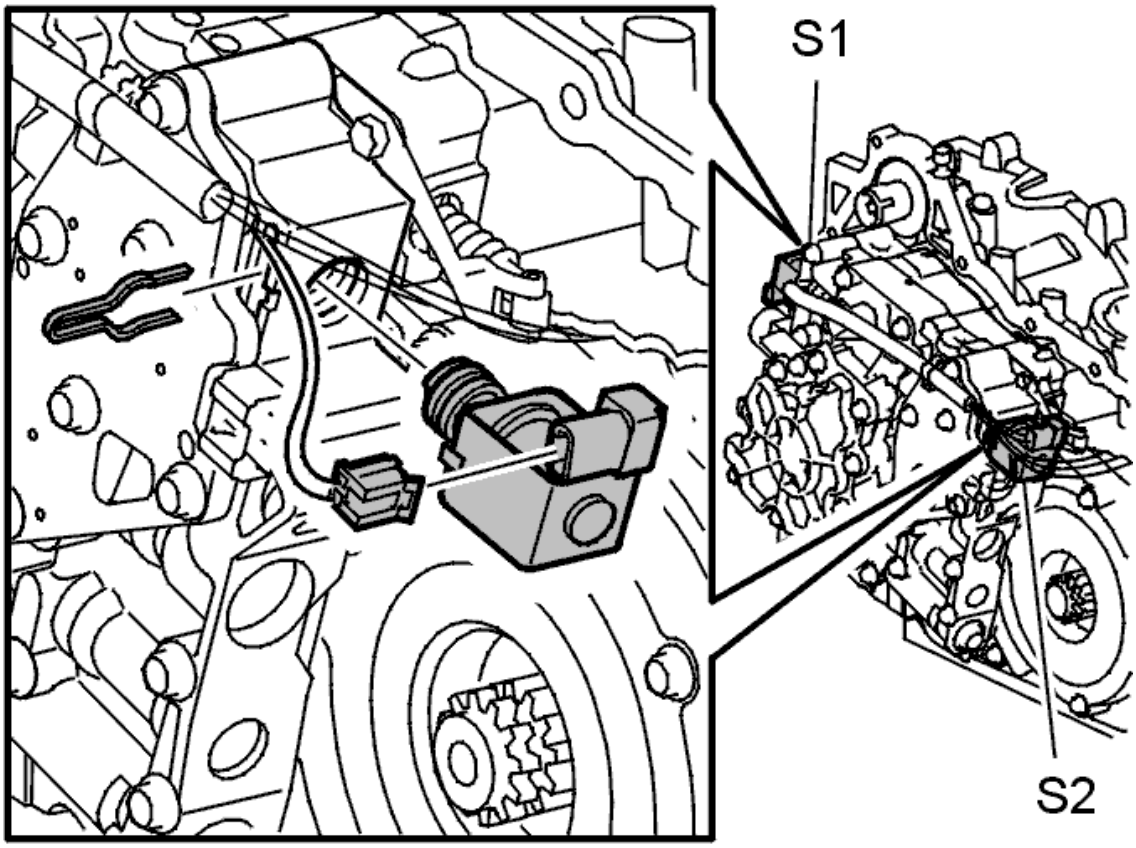


Fig. 563: Identifying Removing/Installing Solenoid S1
Courtesy of VOLVO CARS CORPORATION

Remove:

- the connector
- the spring clamp by pulling it straight out. Use a small screwdriver
- the solenoid. Use a screwdriver between the solenoid and the housing. Carefully pry and pull the solenoid at the same time.

Check that the O-ring remains on the solenoid

INSTALLING SOLENOID S2

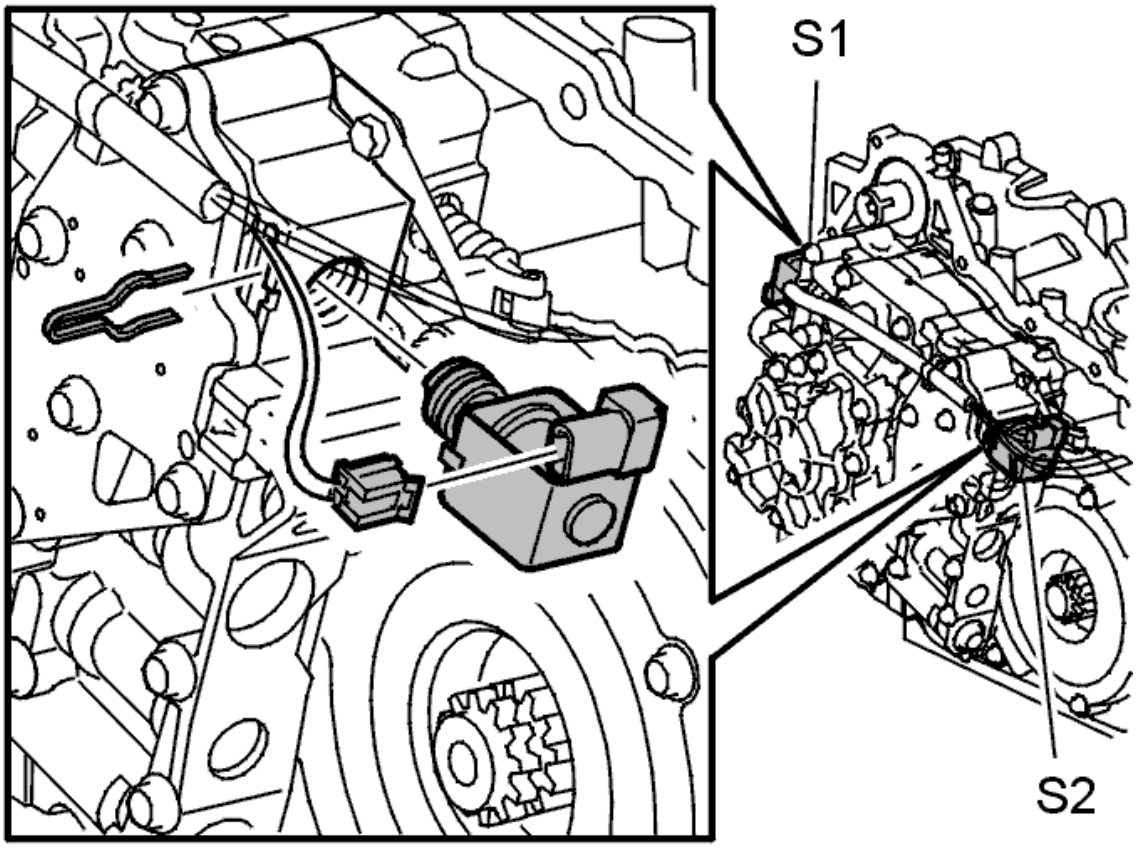


Fig. 564: Identifying Removing/Installing Solenoid S1
Courtesy of VOLVO CARS CORPORATION

Apply a little petroleum jelly to the solenoid O-ring.

Install:

- the solenoid by pressing it. Guide the solenoid in so that the locating pin on the side locates in the cut-out
- the spring clamp (check that it is locked)
- the connector.

INSTALLING THE SIDE COVER ON THE TRANSMISSION

See **SIDE COVER TRANSMISSION, INSTALLING**.

TORQUE CONVERTER/SEAL, REPLACING

Special tools:

9995762

9995763

REMOVAL

REMOVING THE TRANSMISSION

See **TRANSMISSION, REMOVING**.

REMOVING THE TORQUE CONVERTER

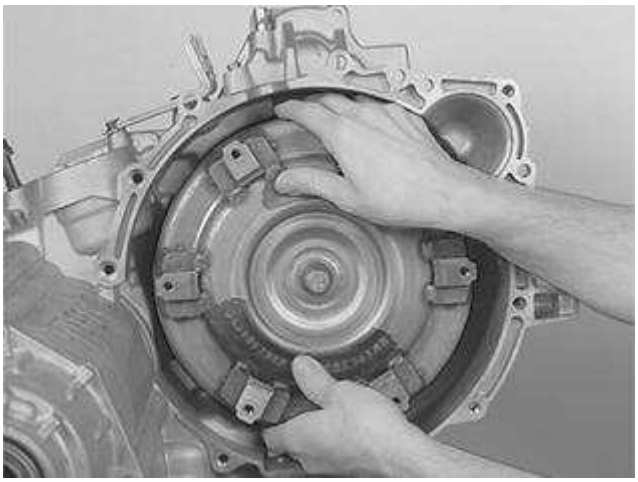


Fig. 565: Identifying Removing/Installing Torque Converter
Courtesy of VOLVO CARS CORPORATION

Grasp the torque converter (it is heavy). Pull it straight out of the transmission shaft.

NOTE: Store it so that the oil does not run out.

REMOVING THE SEALING RING FROM THE TRANSMISSION

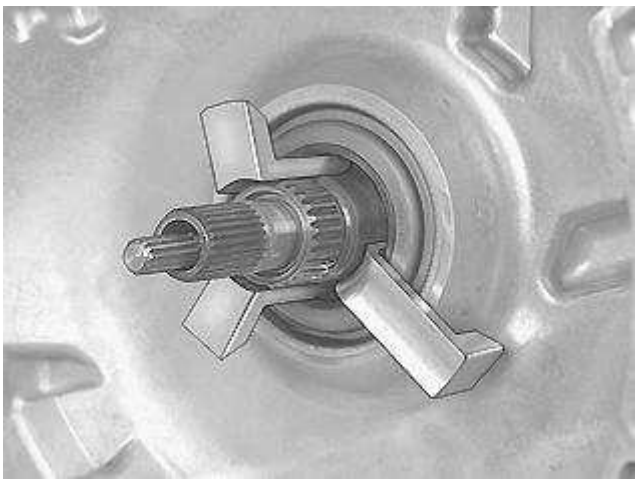


Fig. 566: Identifying Removing Sealing Ring From Transmission
Courtesy of VOLVO CARS CORPORATION

Use puller **9995762** .

Press the three hooks on puller 999 5762-1 into the sealing ring. Fold up the hooks in the sealing ring.

EXTRACTING THE SEALING RING

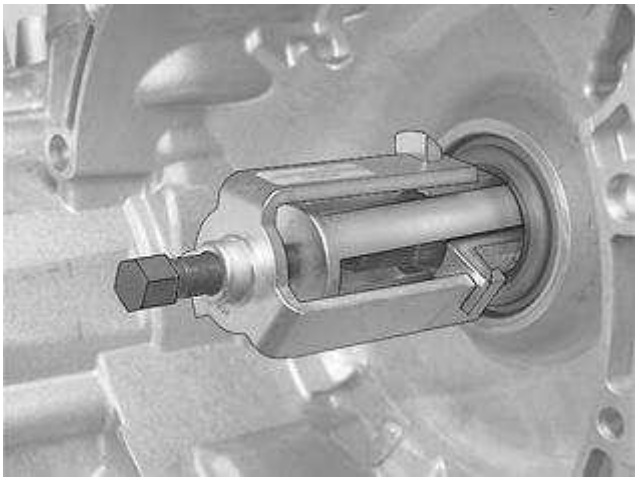


Fig. 567: Identifying Extracting Sealing Ring
Courtesy of VOLVO CARS CORPORATION

Install:

- the counterhold on puller 999 5762-2 between the hooks and in the sealing ring
- puller **9995762** on the hooks.

Extract the sealing ring. It may sit firmly.

INSTALLATION

INSTALLING THE SEALING RING

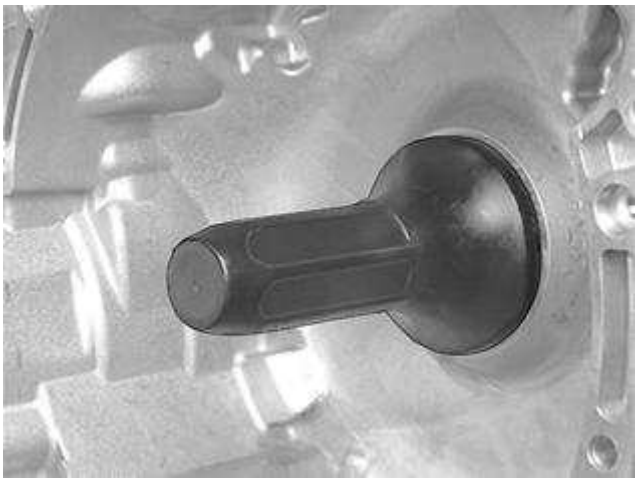


Fig. 568: Installing Sealing Ring
Courtesy of VOLVO CARS CORPORATION

NOTE: Blow clean before installation.

Use drift **9995763** on the sealing ring.

Tap in the sealing ring to the bottom position.

Check that the sealing ring is correctly positioned against the transmission housing.

INSTALLING THE TORQUE CONVERTER

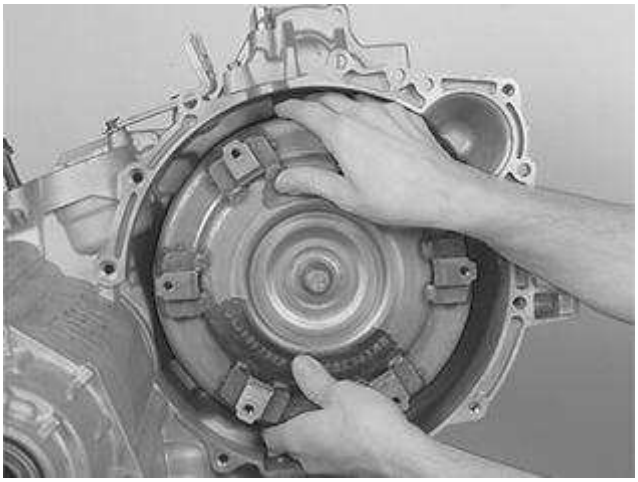


Fig. 569: Identifying Removing/Installing Torque Converter
Courtesy of VOLVO CARS CORPORATION

Install the torque converter on the shaft.

Lift and turn the torque converter slightly so that it positions correctly on the shaft and bottoms out in the transmission.

INSTALLING THE TRANSMISSION

See **TRANSMISSION, INSTALLING (2005, 2006)**.

TRANSMISSION CONTROL MODULE (TCM), REPLACING

TRANSMISSION CONTROL MODULE (TCM), REPLACING

TRANSMISSION OIL / OIL FILTER, REPLACING

Special tools:

9994090

WARNING: Avoid skin contact with the transmission fluid.

NOTE: **Oil grade: Only ATF fluid Dexron III (with G-license).**

Transmission oil, Volvo P/N 116 1521-8 (1 liter container), 116 1621-6 (4 liter container).

PREPARATION

CONDITIONS

Always replace the oil in the following instances:

Where diagnostic trouble codes (DTCs) TCM 0042 and TCM 0046 are stored, in which case the diagnostic function activates the warning lamp in the following circumstances.

The transmission control module (TCM) receives data about the operating temperature of the transmission fluid while the car is being driven. TCM 0042 is stored after an accumulated amount of time.

Diagnostic trouble code (DTC) TCM 0046 is stored if the transmission fluid temperature exceeds 150° C for more than 2 minutes.

On cars used in continuous taxi service and / or used for towing a trailer or caravan for most of its mileage, the oil must be replaced at a service interval of 75, 000 km ± 5000 km. This is to conform to the regular service program.

WARNING: **The oil may be very hot if the car has just been driven. Avoid skin contact.**

DRAIN THE OIL

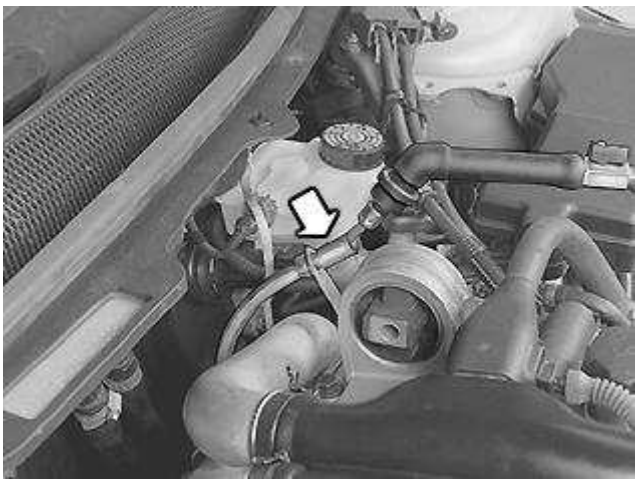


Fig. 570: Identifying Dip Stick Pipe & Oil Suction Device
Courtesy of VOLVO CARS CORPORATION

Suck up the oil through the dip stick pipe using an oil suction device. There is no drain plug.

SLACKEN OFF THE NUT ON THE RETURN LINE FOR THE OIL PIPE BRACKET A FEW TURNS

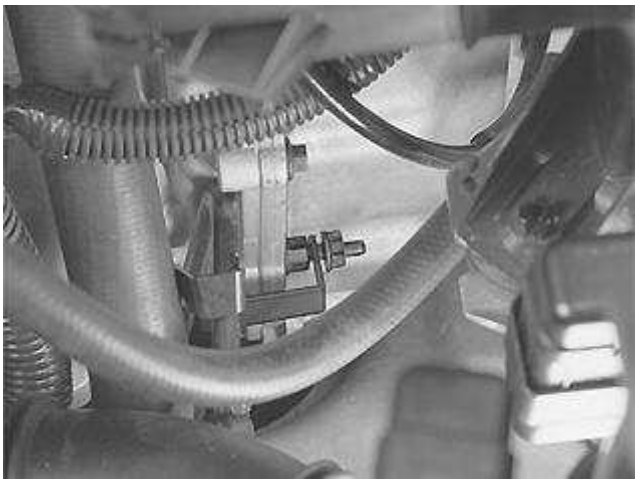


Fig. 571: Identifying Return Line Nut Slackened Off
Courtesy of VOLVO CARS CORPORATION

REMOVE THE SPLASH GUARD UNDER THE ENGINE

Fig. 572: Identifying Splash Guard
Courtesy of VOLVO CARS CORPORATION

Secured with 7 screws.

REMOVE THE OIL PAN AND THE SEAL

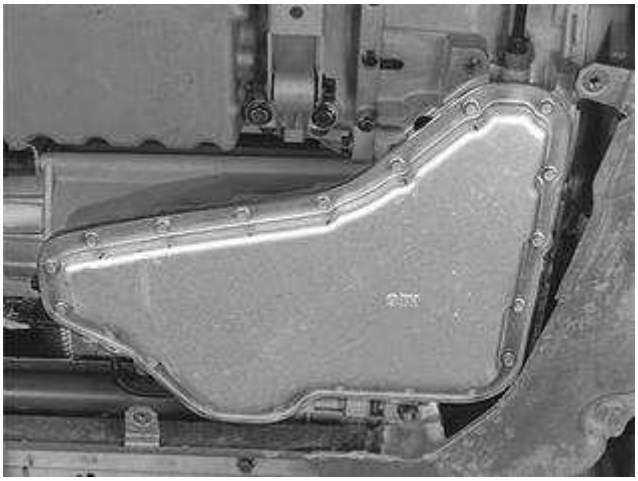


Fig. 573: Identifying Oil Pan
Courtesy of VOLVO CARS CORPORATION

WARNING: Avoid skin contact with the oil. There is a risk of burns.

Allow the remaining oil to run out into a container.

Clean the oil pan.

NOTE: The gasket can be reused once.

REMOVE THE OIL FILTER

Fig. 574: Identifying Oil Filter Removal
Courtesy of VOLVO CARS CORPORATION

The filter is only secured to the transmission by a plastic pipe and an O-ring.

Use a jimmy bar.

Position the jimmy bar by the pipe connecting the oil filter to the transmission.

Pry off the oil filter straight downward. Hold the filter.

NOTE: Use extractor 9994090 if the plastic pipe comes off. Pull out the pipe and the O-ring.

Replace the O-ring.

INSTALL THE OIL FILTER

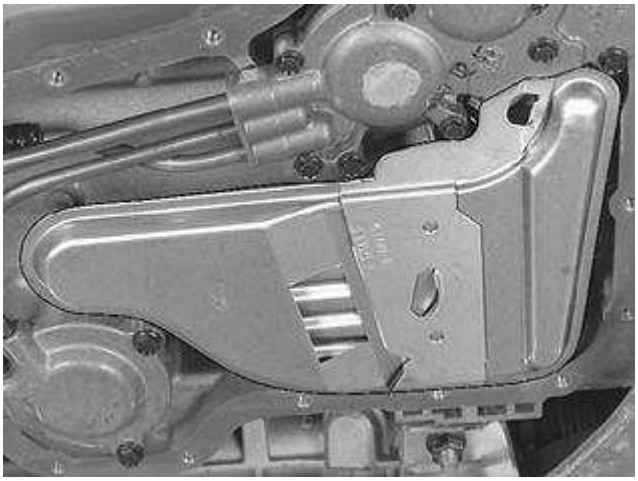


Fig. 575: Identifying Oil Filter Installed
Courtesy of VOLVO CARS CORPORATION

Apply a little oil to the oil filter pipe before installing it.

Press the filter into place in the transmission. **Check that it is secure** .

Install the oil pan

Install the screws. Tighten to **10 Nm** .

NOTE: The gasket can be reused once.

DRAIN OFF THE REMAINING OIL IN THE TORQUE CONVERTER AND THE OIL COOLER

NOTE: Disconnect the oil return line at the transmission and install a plastic hose. Drain off the old oil.

REMOVE THE SCREW NIPPLE ON THE OIL RETURN LINE FROM THE CONNECTION. COUNTERHOLD IN THE TRANSMISSION

Fig. 576: Gearbox Oil Pipe
Courtesy of VOLVO CARS CORPORATION

Pull out the oil pipe.

INSTALL A PLASTIC HOSE ON THE OIL RETURN LINE

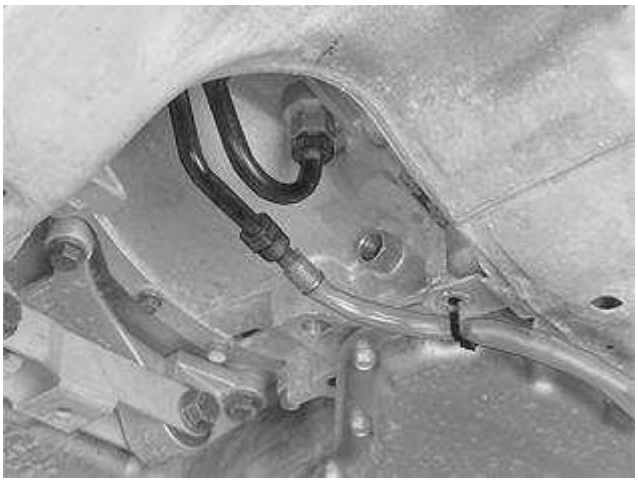


Fig. 577: Identifying Plastic Hose Installed On Oil Return Line
Courtesy of VOLVO CARS CORPORATION

Plug the connection in the transmission.

Install a transparent plastic hose on the oil return line. Clamp the hose into place in the sub-frame.

Place a container beneath the hose to catch the oil.

FILL THE TRANSMISSION WITH OIL. THERE ARE TWO DIFFERENT METHODS. METHOD 1

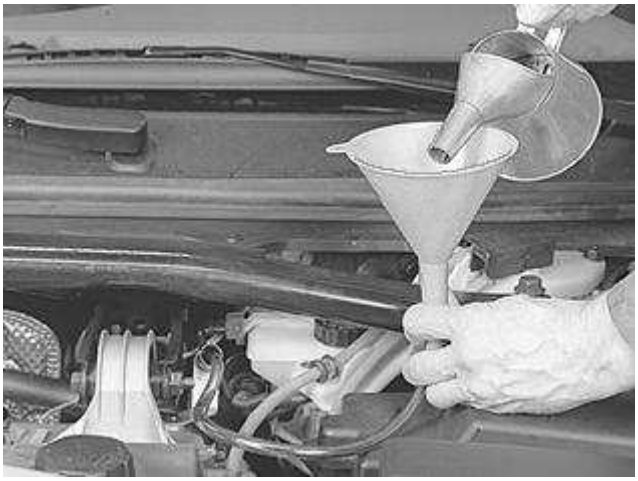


Fig. 578: Filling Transmission With Oil
Courtesy of VOLVO CARS CORPORATION

Fill the transmission with oil

Use a funnel with a plastic hose. Fill through the dipstick pipe.

Clear up any oil spillage under the dip stick pipe.

FILL THE TRANSMISSION WITH OIL. METHOD 2

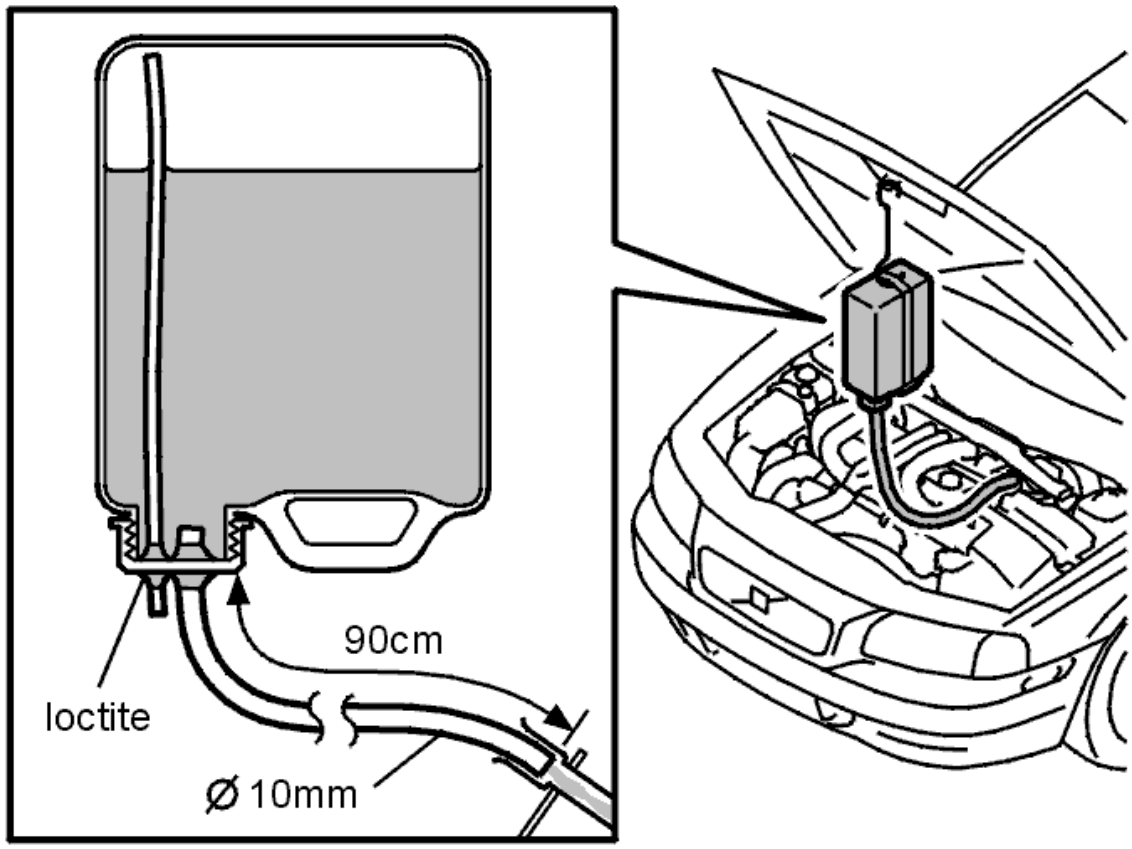


Fig. 579: Filling Transmission With Oil - Method 2
Courtesy of VOLVO CARS CORPORATION

Use a converted five liter plastic can (see the illustration).

This method avoids oil spillage. It also provides a more regular flow when filling.

WHEN FILLING (SELECT METHOD 1 OR 2)

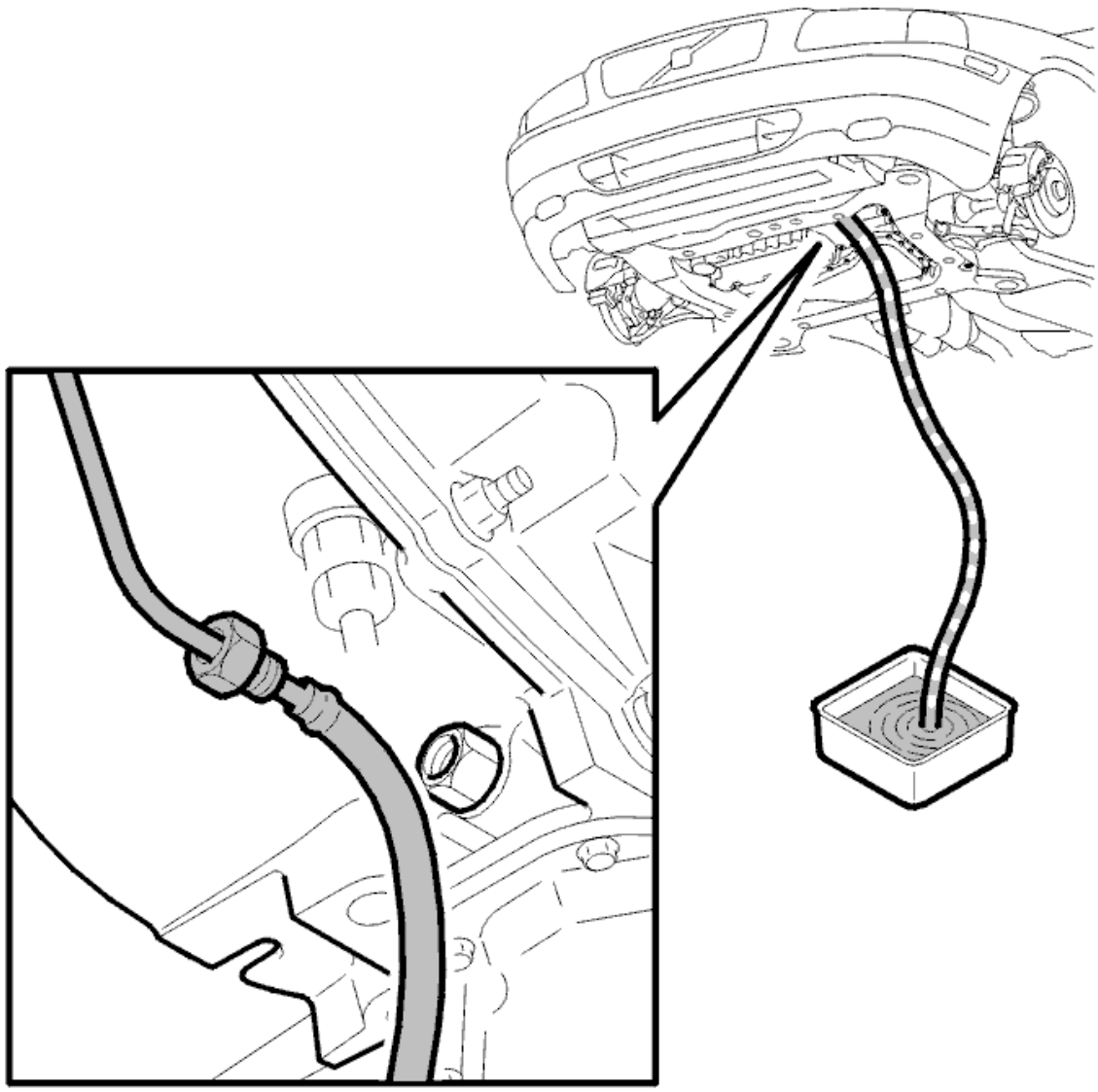


Fig. 580: Collecting Oil
Courtesy of VOLVO CARS CORPORATION

Apply the parking brake. Move the gear selector to position P. Add approximately 2 liters of oil.

Start the engine. Let it idle for a maximum of 40 seconds. Turn the engine off when air bubbles start to become visible in the hose.

Refill with approximately 2 liters of oil.

Start the engine. Let it idle for a maximum of 40 seconds. Turn the engine off when air bubbles start to become visible in the hose.

Remove the plastic hose.

INSTALL THE OIL RETURN LINE ON THE TRANSMISSION

Fig. 581: Gearbox Oil Pipe
Courtesy of VOLVO CARS CORPORATION

Install the oil pipe with the screw nipple on the connection.

Tighten to **30 Nm** .

LOWER THE CAR

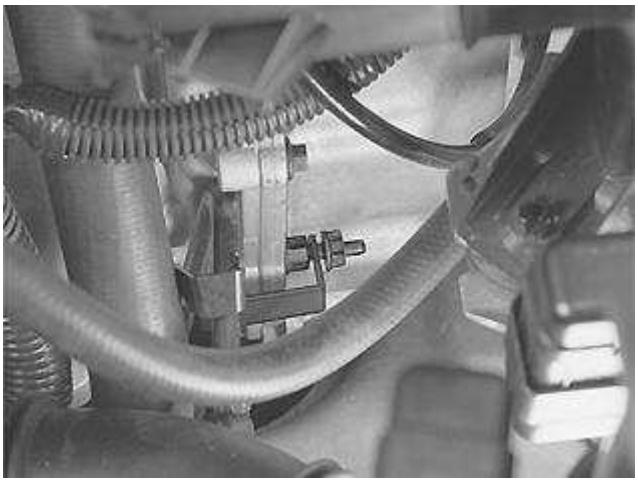


Fig. 582: Identifying Return Line Nut Slackened Off
Courtesy of VOLVO CARS CORPORATION

Tighten the nut for the oil pipe bracket. Tighten to **25 Nm** .

FINISHING WORK

POUR THE REST OF THE OIL INTO THE TRANSMISSION

NOTE: If the transmission is over filled with oil, there may be operational problems. The oil must be filled to the correct level.

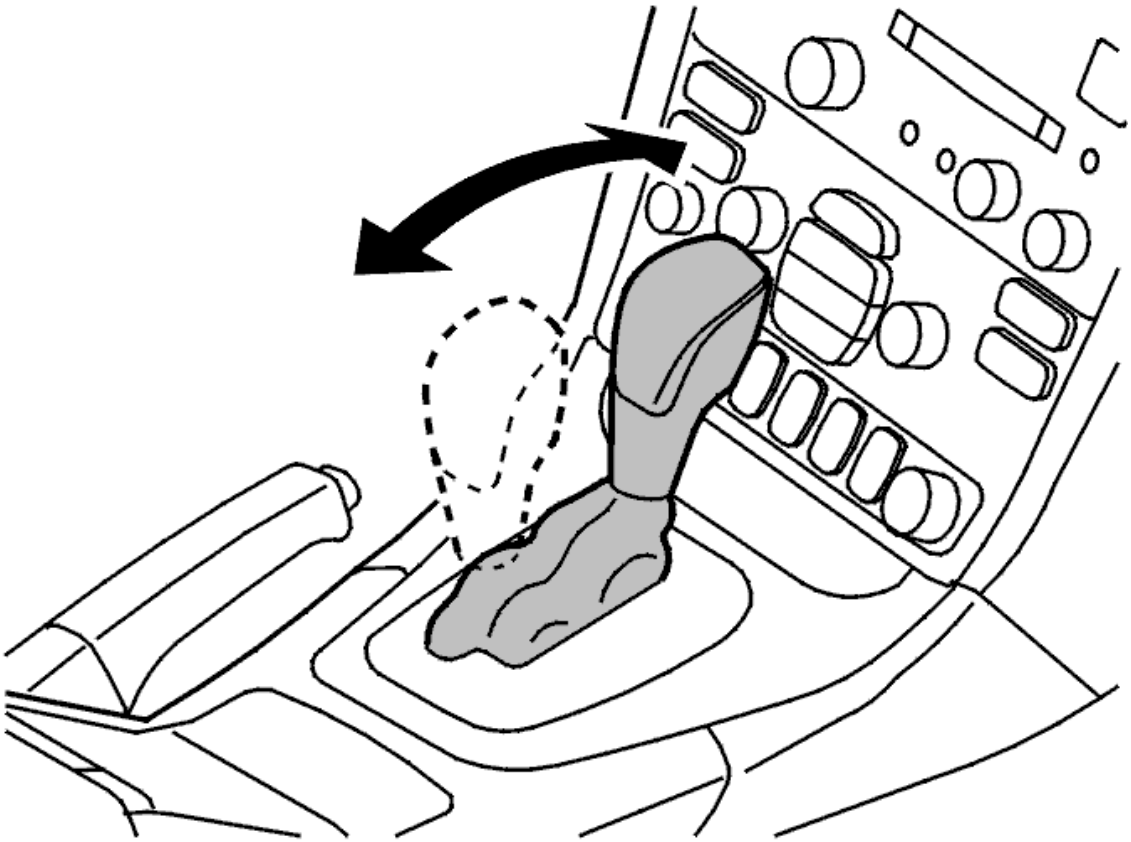


Fig. 583: Identifying Shifting Lever Positions
Courtesy of VOLVO CARS CORPORATION

The total oil volume of the transmission is 11.9 liters.

Measure the amount of oil that was drained. Refill with the same amount of new oil (approximately 11 liters).

Start the engine. Move the gear selector through all the gear positions. Then move the gear selector lever to position P.

NOTE: Carry out the following check at an oil temperature of 85° ± 5°C.

CHECK THE OIL LEVEL

Check the oil level according to **OIL LEVEL, CHECKING** .

Check that there is no oil leakage at the pipe couplings or oil pan

Install the splashguard under the engine

Tighten the screws. Tighten to **25 Nm** .

Test driving the car.

Checking the oil level.

NOTE: After replacing the transmission oil/filter, the "Transmission oil change" counter must be reset. Use VIDA (Volvo scan tool) vehicle communication to reset the counter.

TRANSMISSION, INSTALLING (2005, 2006)

Special tools:

9512050

9995395

9997057

9997076

NOTE: As the illustrations in this service information are used for different model years and/or models, some variation may occur. However, the essential information is always correct.

NOTE: For tightening torques, see: TIGHTENING TORQUE .

WHEN REPLACING WITH A NEW TRANSMISSION

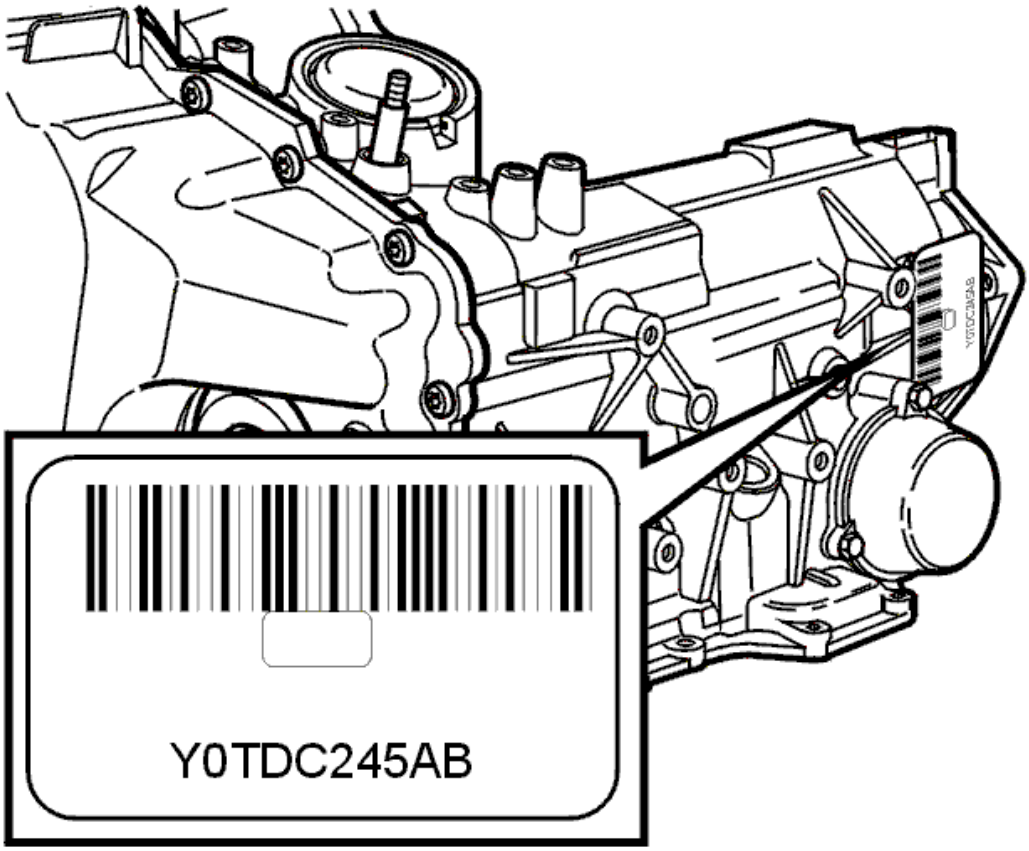


Fig. 584: Identification Plate On Transmission
Courtesy of VOLVO CARS CORPORATION

THESE SCREWS AND NUTS MUST BE REPLACED WHEN REPLACING THE TRANSMISSION

Dimension	Quantity	Designation
M8x12	6	Screw (the torque converter)
M14x100	4	Sems screw (sub-frame)
M14x15.9	2	Flanged lock nut (the ball joints)
M10x65	2	Sems nut (the drive shaft)
M8x8	1	Nut (the steering shaft)
M8x40	6	Allen screw (the propeller shaft)
		Nut, steering gear
		Nut, anti-roll bar link

CHECKING BEFORE INSTALLING

Flushing clean the oil cooler

When replacing the transmission, the oil cooler must always be flushed through because there may be particles in the oil cooler. See: **OIL COOLER, FLUSH CLEANING** .

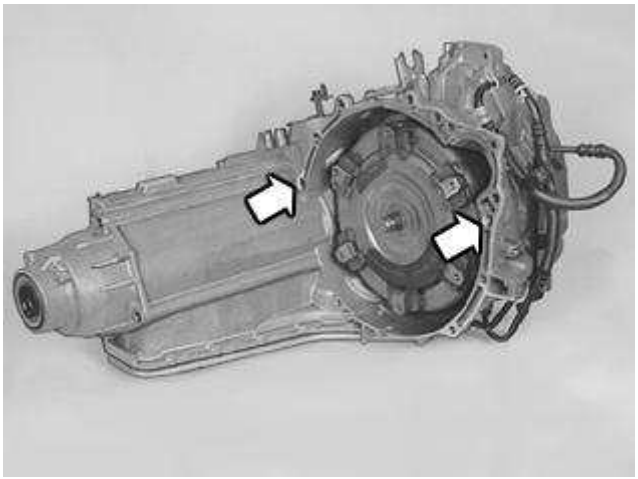


Fig. 585: Identifying Engine Mating Surface On Transmission
Courtesy of VOLVO CARS CORPORATION

Check that the transmission and engine mating surfaces are **absolutely** clean.

Also check that the guide sleeves towards the engine are in position and are free of faults.

Lubricate the holes in the transmission (for the guide pins). Use a little grease.

NOTE: This only applies if replacing the transmission.

Slacken off the bracket screws for the bevel gear - chain housing so that they can be moved slightly. The bracket is on the cylinder block.

ADJUSTING THE POSITION OF THE TRANSMISSION AND ENGINE

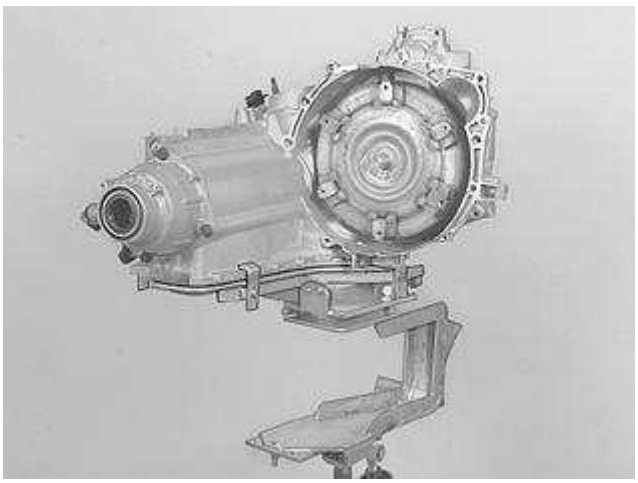


Fig. 586: Identifying Transmission On Mobile Jack
Courtesy of VOLVO CARS CORPORATION

Adjust height and angle with the mobile jack and the transmission fixture.

Locate the transmission on the engine.

Ensure that the transmission goes straight in relation to the engine and that the torque converter is in the correct location.

CHECKING / REPLACING THE TORQUE CONVERTER

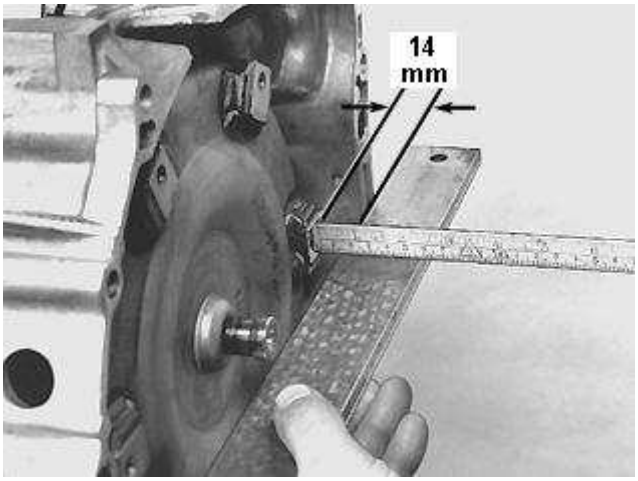


Fig. 587: Checking Distance Between Cover And Mounting Lugs Using Ruler
Courtesy of VOLVO CARS CORPORATION

Ensure that the mating surfaces on the torque converter are clean. Ensure that the torque converter is as far into the transmission as possible. Check with a ruler that the distance between the cover and mounting lugs is approximately 14 mm.

INSTALLING AND TIGHTENING THE SCREWS FOR THE TRANSMISSION

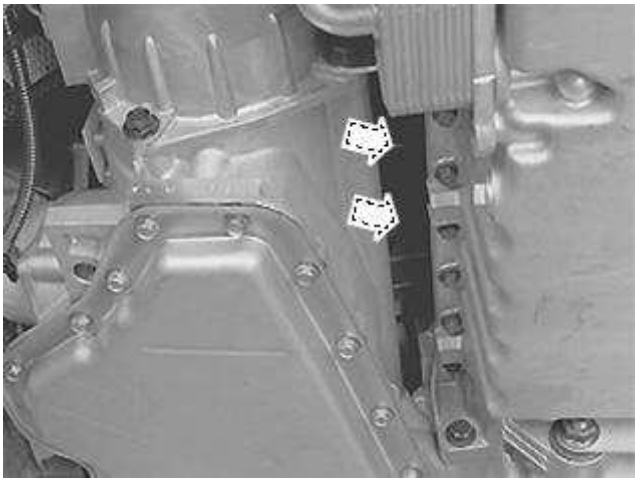


Fig. 588: Differential Housing Screws
Courtesy of VOLVO CARS CORPORATION

Install all 5 screws (apart from the screw for the bracket on the engine mounting) for the transmission / engine.

At the same time, check that the whole of the transmission is in contact with the engine.

Then tighten transmission / engine screws crosswise.

Remove the fixture from the transmission.

Install the 2 screws on the bracket at the cover for the differential housing.

Tighten.

INSTALLING THE BRACKET FOR THE TRANSMISSION END

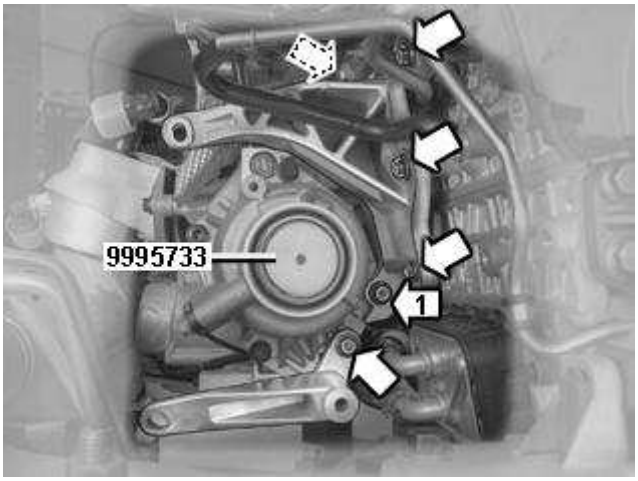


Fig. 589: Identifying Bracket
Courtesy of VOLVO CARS CORPORATION

Install:

- the bracket on the end of the transmission. Tighten
- the screw for the upper bracket. Tighten.

Tighten the screws for the bracket in the cylinder block: 4 x M10 and 1 x M8.

INSTALLING THE CHAIN HOSING AND BEVEL GEAR

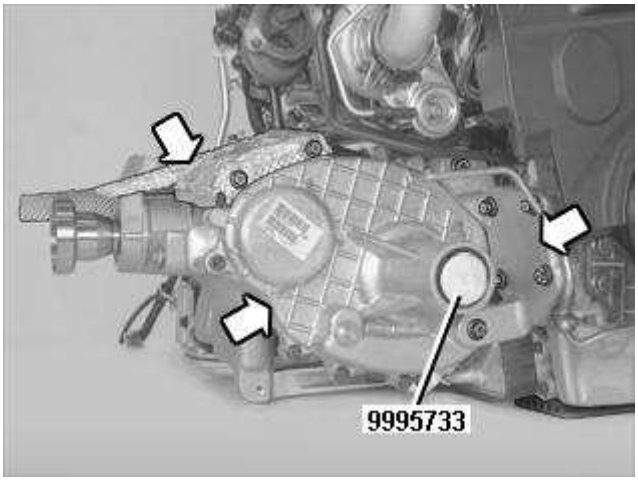


Fig. 590: Identifying Chain Housing
Courtesy of VOLVO CARS CORPORATION

Install:

- the bevel gear - chain housing on the transmission. Lightly tighten the 2 M10 screws alternately. Tighten
- the bracket between the engine and the chain housing. Lightly tighten the 4 M10 screws to the cylinder block
- the 2 M10 screws to the chain housing - bracket. Tighten.

Tighten the 4 M10 screws for the bracket - cylinder block. Tighten.

PAY ATTENTION TO THE FOLLOWING WHEN INSTALLING PROPELLER SHAFT

Follow instructions. **PROPELLER SHAFT, SPECIAL INFORMATION**

INSTALLING THE PROPELLER SHAFT

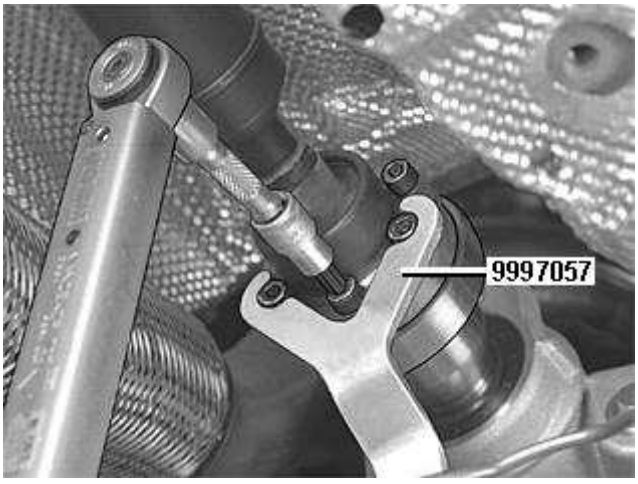


Fig. 591: Identifying Front Propeller Shaft And Special Tool 999 7057
Courtesy of VOLVO CARS CORPORATION

Install the propeller shaft using the marking made earlier. Check carefully that the mating surfaces on the propeller shaft and flange are clean. Install the 6 x M8 screws with washers. Tighten. See: **TIGHTENING TORQUE** . Use: **9997057** .

Install the 2x M8 screws to the propeller shaft center bearing. Tighten.

INSTALLING THE TORQUE CONVERTER SCREWS

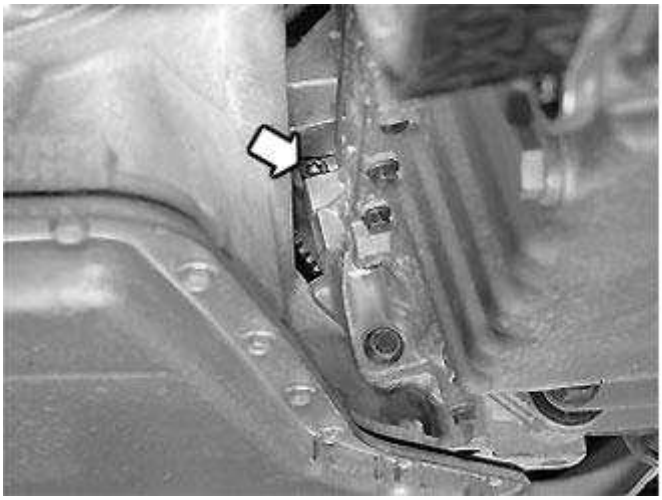


Fig. 592: Locating Torque Converter Screws
Courtesy of VOLVO CARS CORPORATION

NOTE: Always use new screws. The screws can also be installed at a later stage when the vehicle is lowered.

Insert a screw in the cut-out under the transmission and turn the engine.

Tighten the 6 screws. Tighten. See: **TIGHTENING TORQUE** . Use Torx TX50 (see the illustration).

INSTALLING THE HEATED OXYGEN SENSOR (HO2S) CONNECTORS TO THE BRACKET ON THE TRANSMISSION

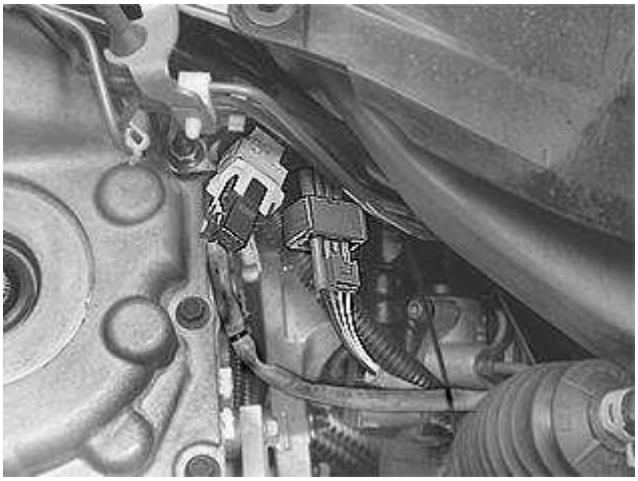


Fig. 593: Heated Oxygen Sensor
Courtesy of VOLVO CARS CORPORATION

Connect the connectors.

Secure the connectors on the bracket.

Install the clamp with the wiring on the transmission. Tighten the nut.

Lower the vehicle.

LIFTING THE ENGINE AND TRANSMISSION TO THE HORIZONTAL POSITION

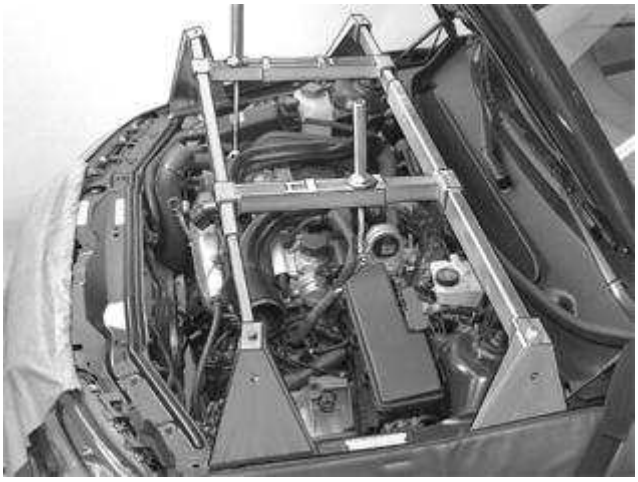


Fig. 594: Identifying Lifting Beam And Lifting Hook Installed
Courtesy of VOLVO CARS CORPORATION

Lift up the engine and transmission to the horizontal position.

Raise the vehicle.

INSTALLING THE OIL PIPE AT THE TRANSMISSION

Fig. 595: Gearbox Oil Pipe
Courtesy of VOLVO CARS CORPORATION

Tighten the screw nipples. Counterhold on the connections.

INSTALLING THE ENGINE MOUNTING TOGETHER WITH THE BRACKET AND THE SPLASH GUARD

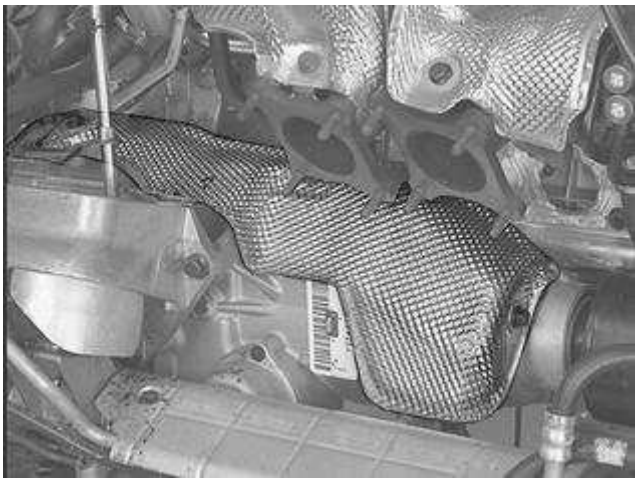


Fig. 596: Identifying Splash Guard Above Transmission
Courtesy of VOLVO CARS CORPORATION

Install:

- the engine mounting together with the splash guard
- the 4 screws for the engine mounting to the transmission
- the screw on the bracket that extends from the top of the engine mounting to the top of the transmission (not the nut on the top of the rubber mounting)
- the screw on the splash guard beside the right drive shaft.

Tighten.

PREPARATIONS FOR INSTALLING THE SUB-FRAME

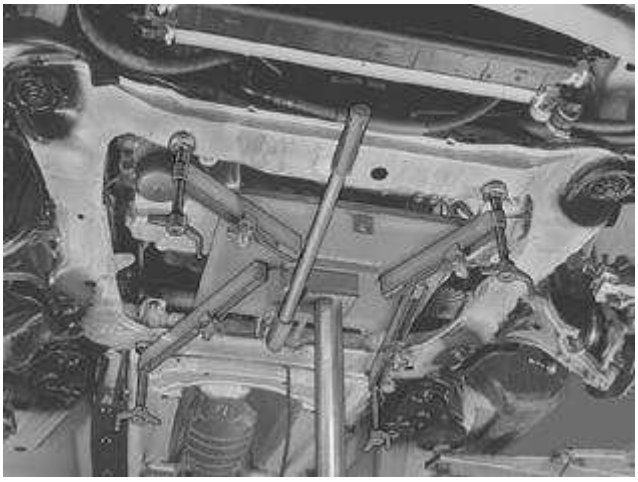


Fig. 597: Engine Supported with Lifting Table
Courtesy of VOLVO CARS CORPORATION

CAUTION: Ensure that no hoses, wiring or other components catch, or are trapped, when lifting the engine/transmission unit.

CAUTION: Do not damage the brake pipe running to the right front wheel.

Raise the engine / transmission unit. Use a lifting table.

Continue raising the unit until it is only approximately 50 mm from its correct position.

Move the fuel line into place.

Tighten

INSTALLING THE SUB-FRAME

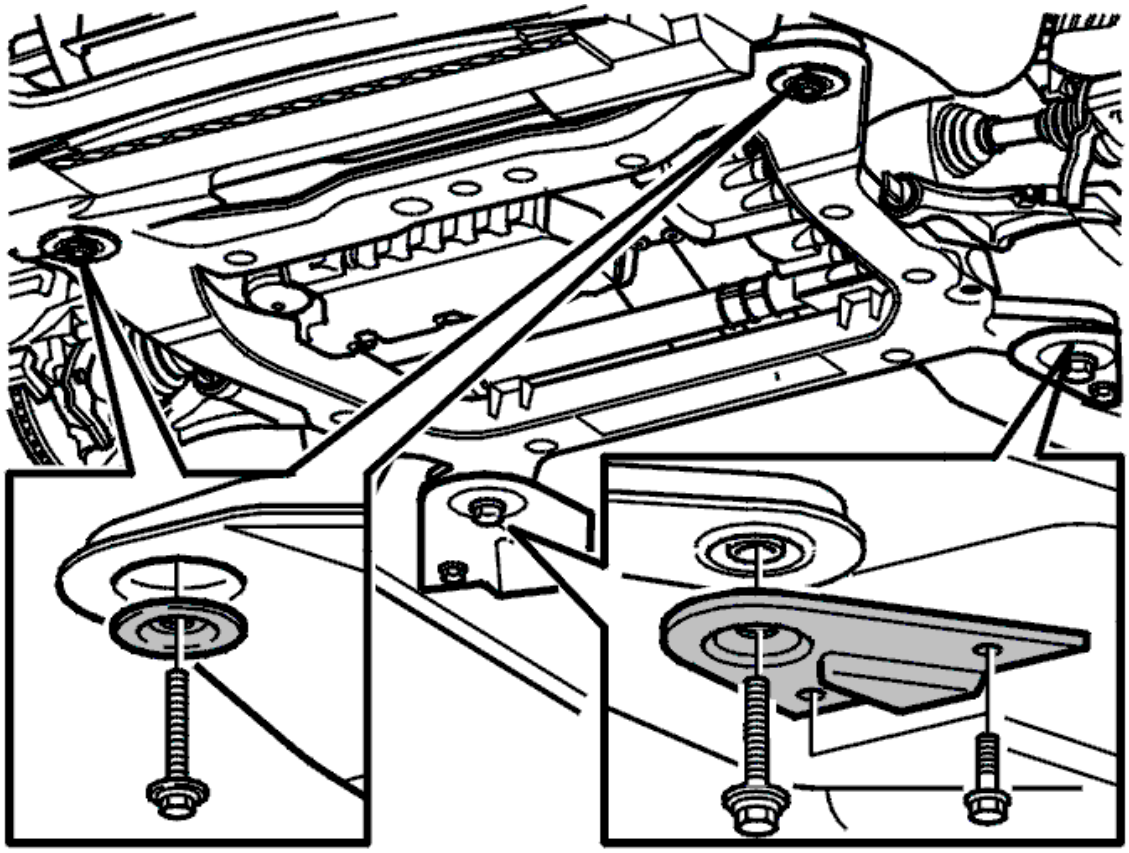


Fig. 598: Identifying Bolts, Washers And Brackets In Sub-Frame
Courtesy of VOLVO CARS CORPORATION

NOTE: Use new screws. Oil the screws.

Lift the sub-frame until it is against the frame members.

Install:

- new screws in the sub-frame
- Install the anti-roll bar
- the washers at the front edge and the support plates at the rear edge of the sub-frame
- the evaporator cable and the oil pipe into place in the sub-frame clips.

Install the four sub-frame screws together with the subframe brackets and engine heater where appropriate.

Tighten to: **TIGHTENING TORQUE** . First tighten the screws on the left side of the sub-frame followed by those on the right.

Tighten the bracket screws M10.

Cars with parking heaters

Install the parking heater in the bracket. Tighten the nuts.

INSTALLING THE RIGHT ENGINE PAD

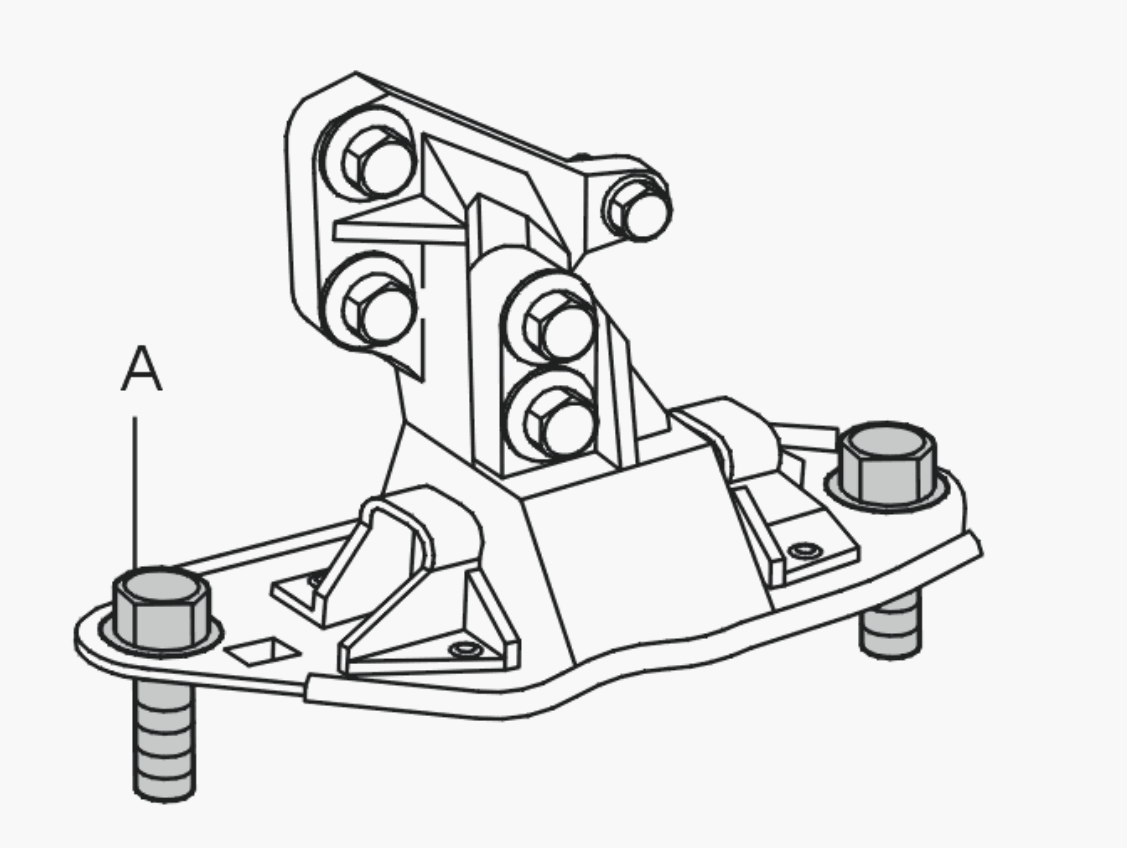


Fig. 599: Identifying Engine Pad And Screws
Courtesy of VOLVO CARS CORPORATION

Install the screws for the mounting in the sub-frame (A).

Tighten screws to the sub-frame. Tighten. See: **TIGHTENING TORQUE** . Use: **9512050** .

HINT: Tighten the screws to the sub-frame. Tighten to 65 Nm. Use a colored pen to mark one corner on the screw head and on the corner.

HINT: Then turn the screw to the next corner. This is equivalent to 60° angle-tightening.

INSTALLING THE SCREW FOR THE REAR ENGINE PAD THROUGH THE STEERING GEAR

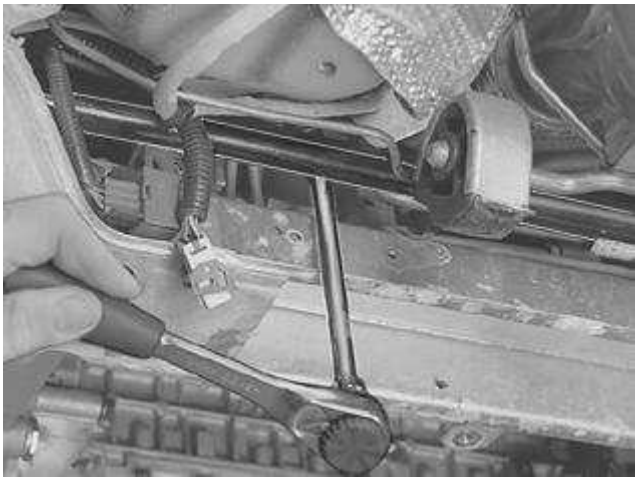


Fig. 600: Identifying Rear Engine Pad Screw Removal
Courtesy of VOLVO CARS CORPORATION

Install the screw. Tighten.

INSTALLING THE DRIVE SHAFT IN THE TRANSMISSION, BOTH SIDES

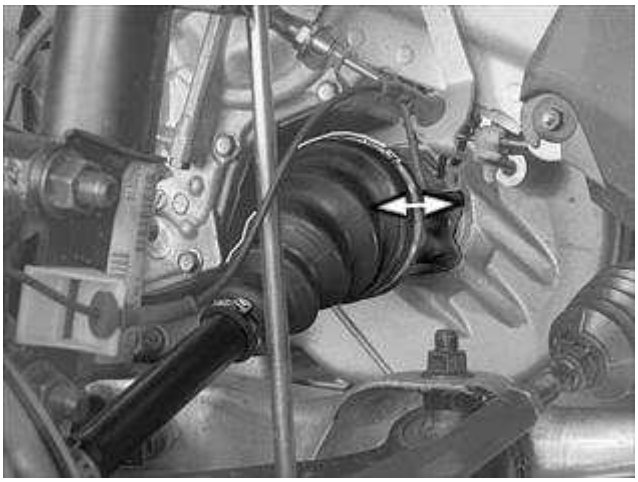


Fig. 601: Drive Shaft Mating Surface
Courtesy of VOLVO CARS CORPORATION

Lubricate the drive shaft mating surface.

Use oil, Volvo P/N 116 1521-8 (1 liter container).

Press the drive shaft into the transmission. Check that the snap ring is in the groove on the transmission by pulling the constant velocity joint.

NOTE: There is no snap ring on the right side.

NOTE: Do not pull the drive shaft as the axial stops cannot support large loads.

Fig. 602: Identifying The Frost Plug Is Fitted Correctly
Courtesy of VOLVO CARS CORPORATION

Applies to chassis no. 690-88951

Make sure that the frost plug is fitted correctly in the left drive shaft.

INSTALLING THE DRIVE SHAFT IN THE WHEEL HUB, BOTH SIDES

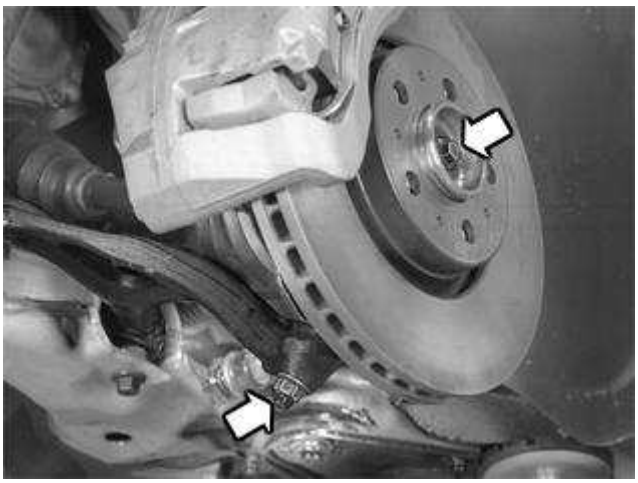


Fig. 603: Locating Drive Shaft Nut And Lower Ball Joint Nut
Courtesy of VOLVO CARS CORPORATION

Lubricate the drive shaft splines for the wheel hub using a small amount of oil.

Hold down the control arm. Align the drive shaft in the hub. Remove the guard from the ball joint. Align the ball joint lug in the control arm. Install a new lock nut on the ball joint. Tighten. See: **TIGHTENING TORQUE** .

NOTE: Counterhold the end of the ball joint whilst tightening so that the boot does not twist. Use a Torx wrench.

Install a new screw for the drive shaft / wheel hub. Tighten.

INSTALLING THE ANTI-ROLL BAR LINK TO THE SPRING STRUT

Install:

- the anti-roll bar link to the spring strut. Use a new M12 nut. Counterhold using a Torx wrench so that the boot is not damaged
- the steering arm on the wheel spindle. Use a new nut. Tighten. See **TIGHTENING TORQUE** .

INSTALLING THE SCREWS FOR THE BRACKET FOR THE HEATED OXYGEN SENSOR (HO2S) CABLE

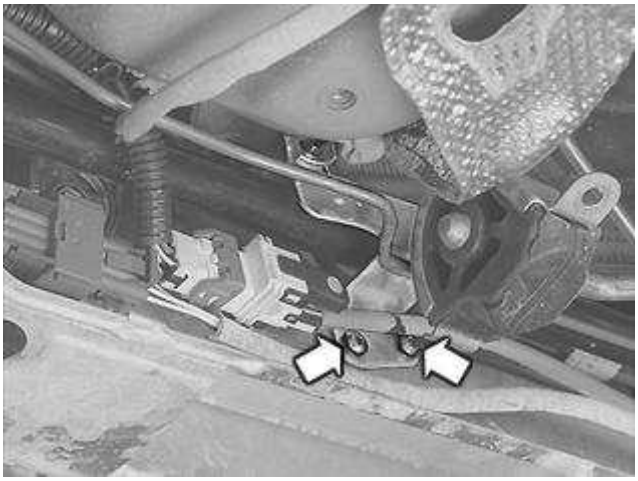


Fig. 604: Heated Oxygen Sensor Cable Bracket
Courtesy of VOLVO CARS CORPORATION

Install the connector for the bracket.

INSTALLING THE FRONT CROSS MEMBER

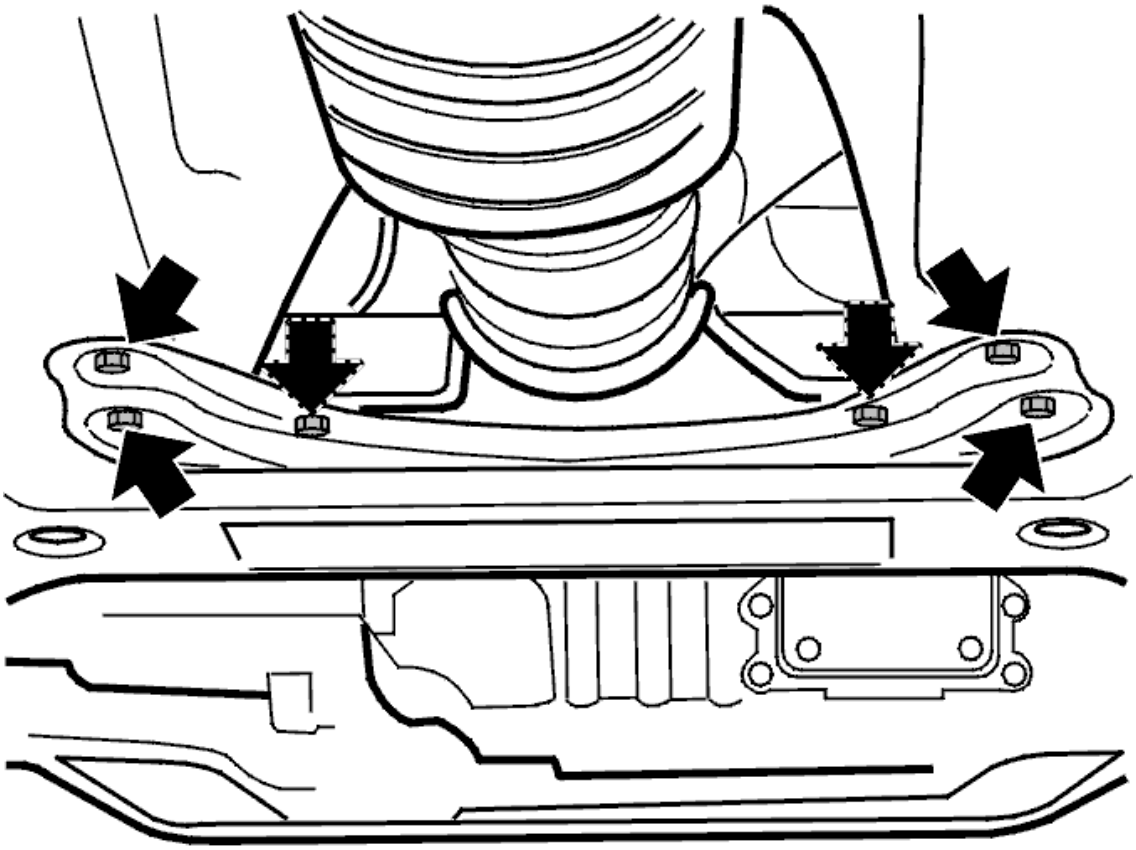


Fig. 605: Exhaust Pipe Bracket Screws
Courtesy of VOLVO CARS CORPORATION

Install the front SIPS member. Press the brake pipe into place in the member.

Install the rubber mounting for the three-way catalytic converter (TWC) in the bracket on the sub-frame.

Fig. 606: Identifying EVAP Cable
Courtesy of VOLVO CARS CORPORATION

Install the EVAP-cable acc. to earlier routing in the sub-frame's clips and press in the cable in the rubber

connection.

INSTALLING NEW LOCK NUTS ON THE STEERING GEAR

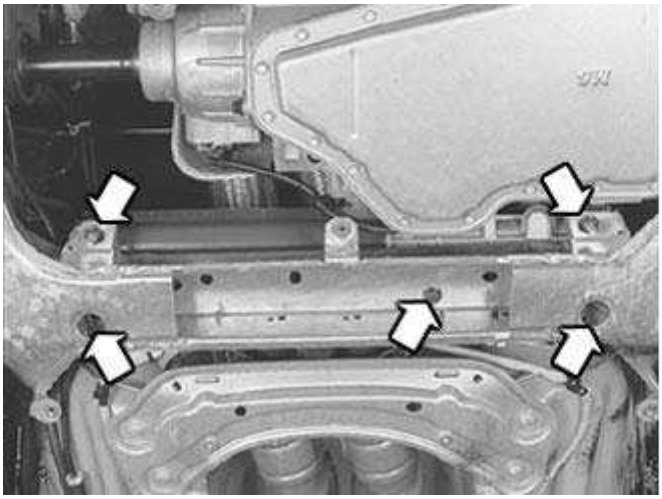


Fig. 607: Installing New Lock Nuts On The Steering Gear
Courtesy of VOLVO CARS CORPORATION

Tighten the nuts and screws. Tighten to **50 Nm** . Tighten the screw and the clamp for the oil pipe.

Remove the steering gear suspension

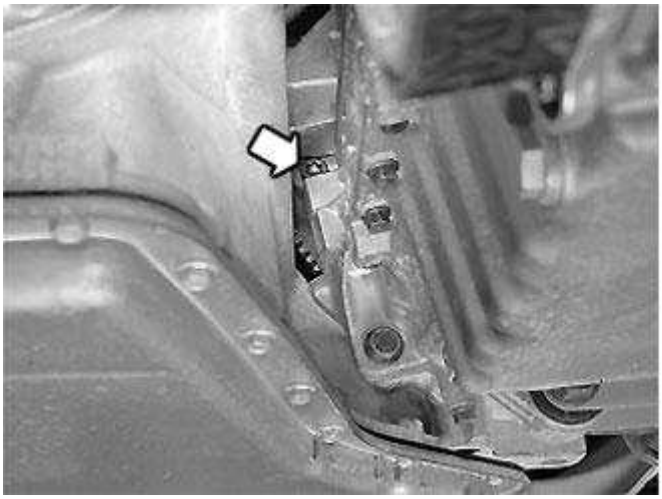


Fig. 608: Locating Torque Converter Screws
Courtesy of VOLVO CARS CORPORATION

NOTE: Use new screws

Insert a screw in the cut-out under the transmission and turn the engine. Tighten the 6 screws to **35 NM** . Use socket Torx TX50 (see the illustration).

INSTALLING THE SCREW FOR THE FRONT ENGINE PAD AND THE TORQUE ROD MOUNTING IN THE

TRANSMISSION

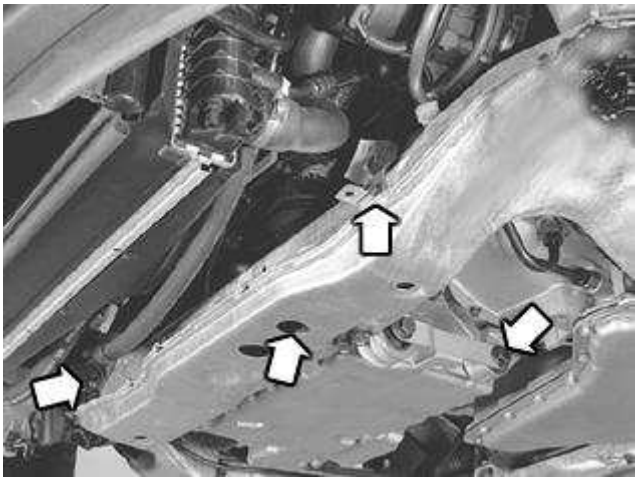


Fig. 609: Identifying Parking Heater Cable Conduit And Screws
Courtesy of VOLVO CARS CORPORATION

Install:

- the screw for the front engine pad. Tighten
- the torque rod mounting on the transmission. Use a new screw
- the screws for the cable duct and the ground lead bracket.

Cars with parking heaters

Install the heater in the bracket. Tighten the nuts.

Reinstall the fuel line in the clips on the sub-frame.

REMOVE THE LIFTING BEAM AND THE LIFTING HOOK FROM THE ENGINE AND THE VEHICLE

Fig. 610: Fixture 999 7018 Installed On Left Hand Side Of Engine At 2 Screws

Courtesy of VOLVO CARS CORPORATION

Lower the vehicle.

Remove the lifting fixture from the motor.

Install the ground strip. Tighten.

INSTALLING THE TORQUE CONVERTER SCREWS

INSTALLING THE CLAMP FOR THE OIL PIPE

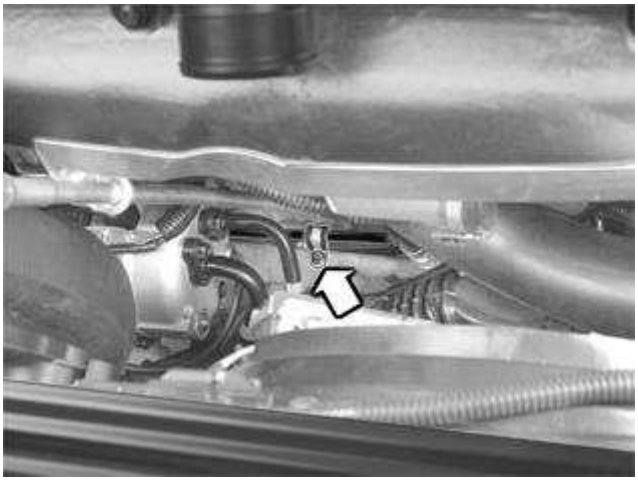


Fig. 611: Identifying Oil Pipe & Power Steering Screw
Courtesy of VOLVO CARS CORPORATION

Install the screw and clamp.

Tighten.

INSTALLING THE SCREWS IN THE TRANSMISSION AND ENGINE

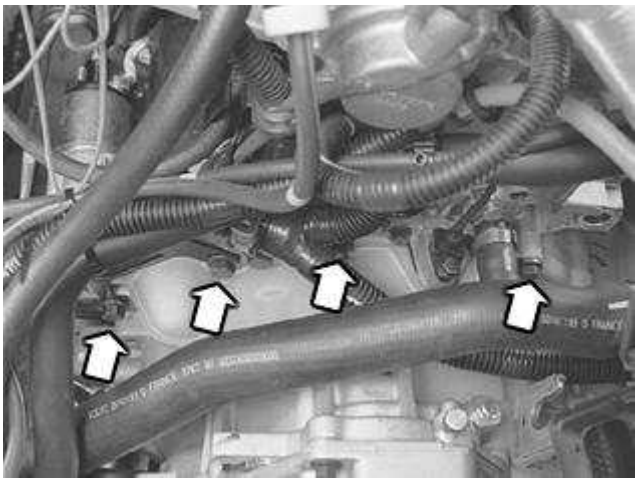


Fig. 612: Identifying Transmission, Starter Motor And Ground Lead Screws
Courtesy of VOLVO CARS CORPORATION

Install:

- the 3 screws for the transmission and engine. Tighten
- the ignition setting sender and the screw. Tighten
- Screws (x 2) to starter motor
- the screw for the clamp for the positive cable. Tighten.

INSTALLING THE DIP STICK PIPE IN THE TRANSMISSION

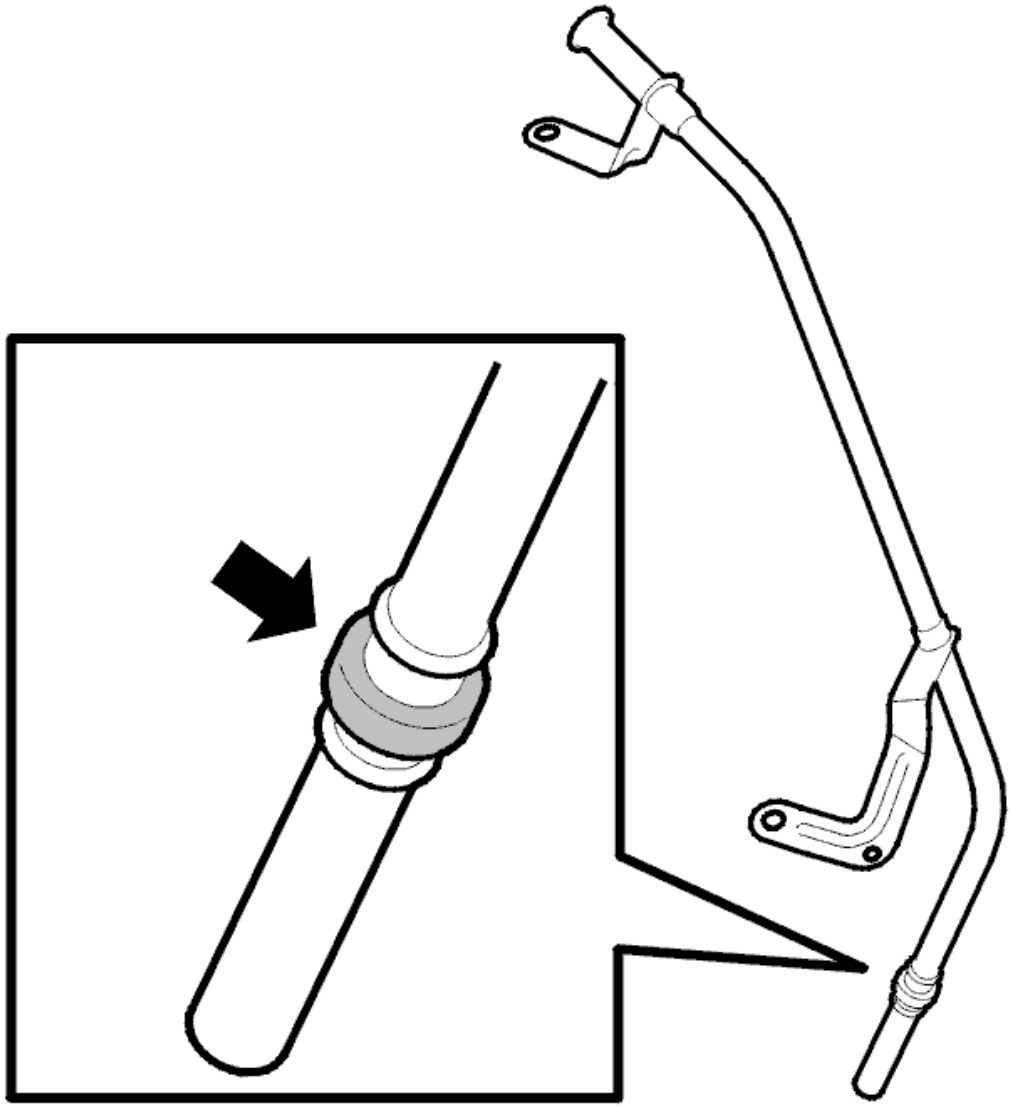


Fig. 613: Dipstick O-Ring
Courtesy of VOLVO CARS CORPORATION

Use a new rubber seal

Apply petroleum jelly on the rubber seal.

NOTE: Carefully check that the rubber seal is correctly positioned in the transmission. Failure to do so may result in leakage.

Tighten the screws.

INSTALLING THE HOSE FOR THE HEATER PIPE

Fig. 614: Heater Hoses And Clamp
Courtesy of VOLVO CARS CORPORATION

Install the hose on the heater pipe in the firewall.

Press the radiator hose quick-release connector into place on the heater pipe.

Check: Pull the hose.

INSTALLING THE GEAR SELECTOR CABLE ON THE TRANSMISSION AND LEVER

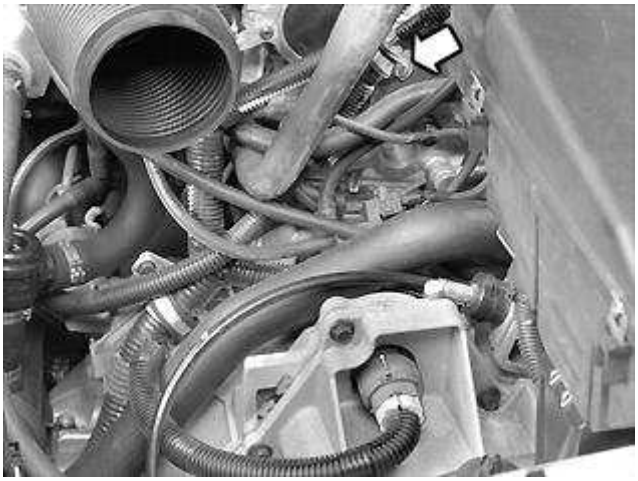


Fig. 615: Gearbox And Connector
Courtesy of VOLVO CARS CORPORATION

Install:

- the ball joint for the gear selector cable on the lever
- the gear selector cable in the bracket
- the connector for the transmission. Press the connector into place properly

CAUTION: It is important that the connector is pushed into place properly. If it is not correctly connected the gear shift function may stop.

- the connector for the ABS unit.

INSTALLING THE UPPER TORQUE ROD

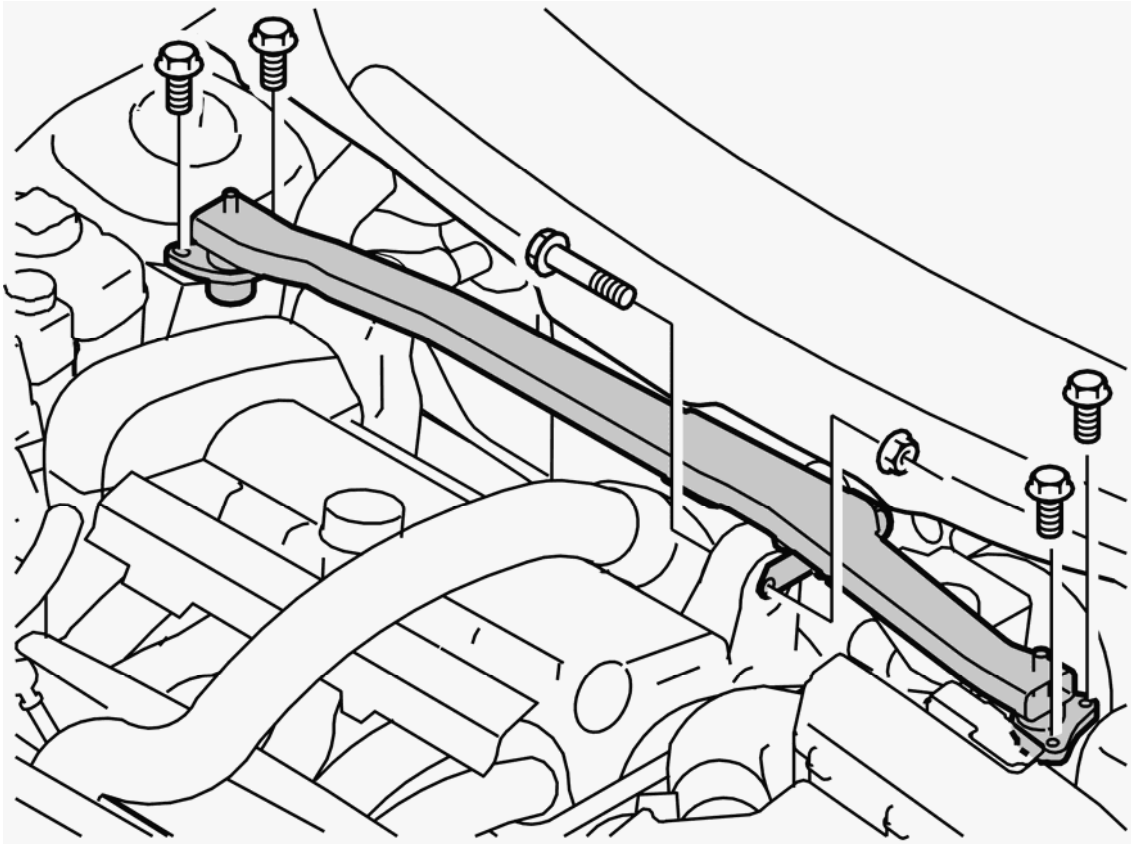


Fig. 616: Identifying Engine Stabilizer Brace And Mounting Screws
Courtesy of VOLVO CARS CORPORATION

Install:

- the engine stabilizer brace. Tighten the mounting screws
- the screw and a new nut for the engine mounting. Tighten
- the plastic guard over the spring strut (if applicable). Tighten the screws.

INSTALLING THE AIR CLEANER (ACL) HOUSING

Install the air cleaner (ACL) housing. See **INSTALL THE AIR CLEANER (ACL) HOUSING** .

FINISHING WORK

FILLING THE TRANSMISSION WITH FLUID

NOTE: Oil grade: Only ATF fluid Dexron III (with G-license).

Transmission oil, Volvo P/N 116 1521-8 (1-liter container), 116 1621-6 (4-liter container).

NOTE: Filling with oil: Start by filling with 5.5 liters of oil.

FILLING WITH TRANSMISSION OIL. THERE ARE 2 DIFFERENT METHODS. METHOD 1

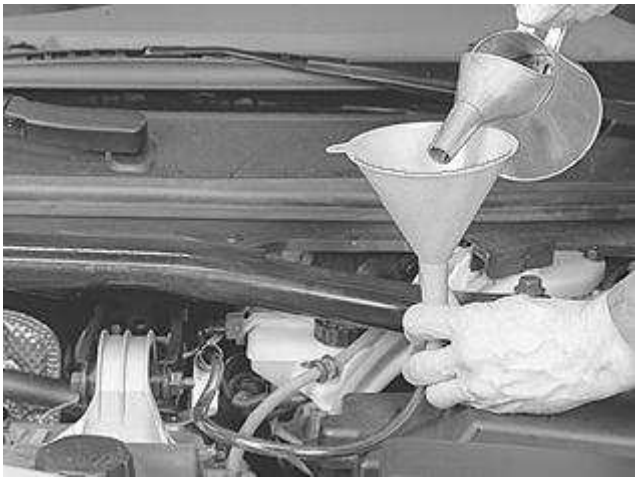


Fig. 617: Filling Transmission With Oil
Courtesy of VOLVO CARS CORPORATION

NOTE: Filling with oil: Start by filling with 5.5 liters of oil.

Fill the transmission with oil. Use a funnel with a plastic hose. Fill through the dipstick pipe.

Clear up any oil spillage under the dip stick pipe.

FILLING WITH TRANSMISSION OIL. METHOD 2

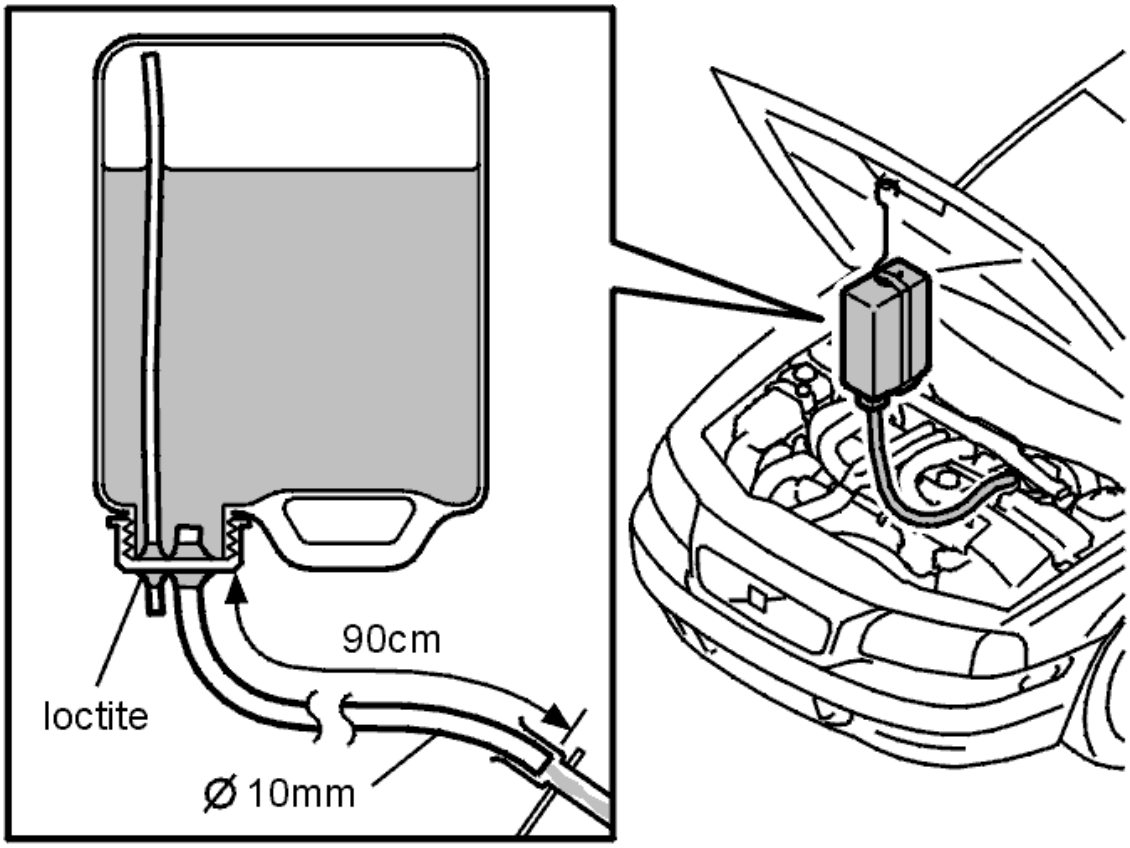


Fig. 618: Filling Transmission With Oil - Method 2
Courtesy of VOLVO CARS CORPORATION

NOTE: Filling with oil: Start by filling with 5.5 liters of oil.

Use a converted five liter plastic can (see the illustration).

This method avoids oil spillage. It also provides a more regular flow when filling.

To check the oil level , see: **OIL LEVEL, CHECKING** .

NOTE: After replacing the transmission, the transmission's adaption as well as the counter for "Transmission oil, change" shall be reset. Use VIDA (Volvo scan tool) Vehicle communication to reset the adaption and the counter.

CHECKING WATER LEVELS

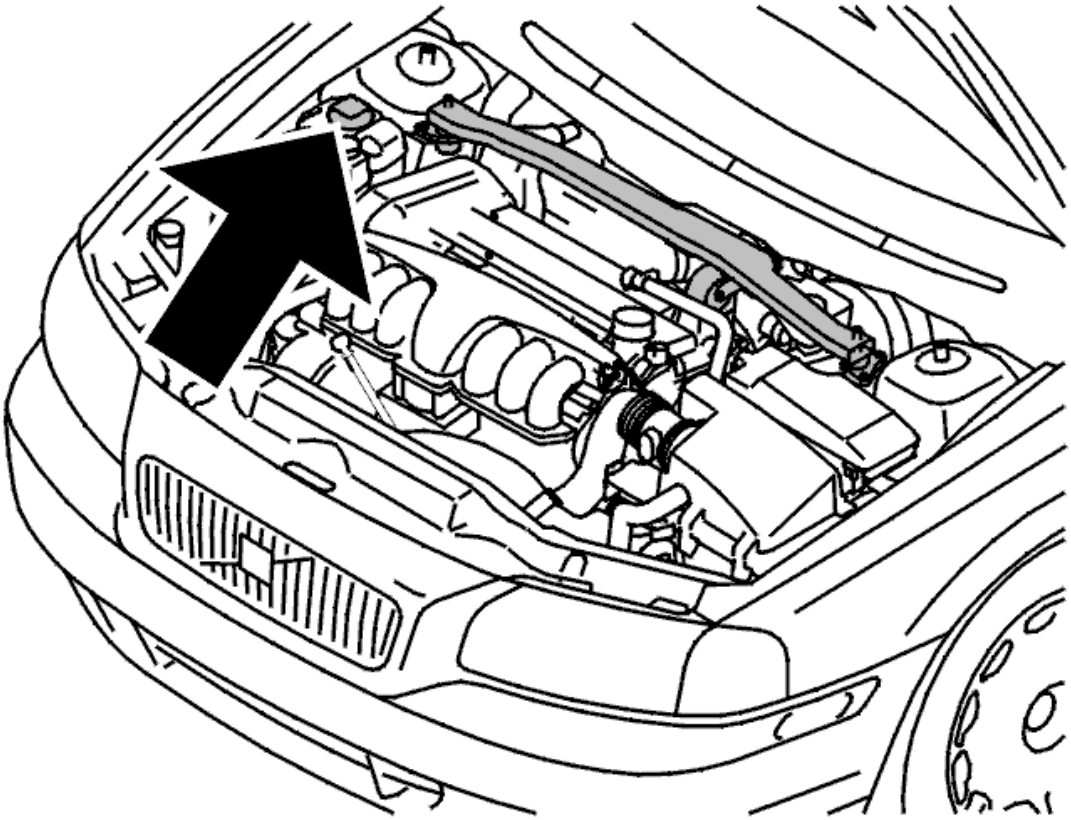


Fig. 619: Identifying Expansion Tank
Courtesy of VOLVO CARS CORPORATION

Top up with water and coolant as necessary (when the engine is at operating temperature).

Check the level in the servo oil reservoir and top up if necessary.

Raise the vehicle.

Check that there is no oil leakage at the transmission, the dip stick or at the steering gear.

INSTALLING THE SPLASH GUARDS AND THE FENDER LINER

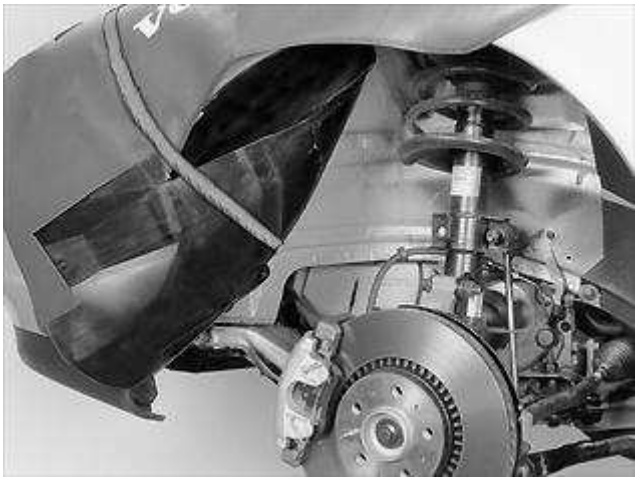


Fig. 620: Fender Liner Tied Up To Lifting Beam Using A Retaining Strap
Courtesy of VOLVO CARS CORPORATION

Install:

- The ABS-cable on the mounting
- the splash guard under the engine
- the front splash guard
- the nut for the left fender liner.

Lower the vehicle

INSTALL

- the wheels. See: **INSTALLING WHEELS**
- Lower the vehicle.

INSTALLING THE BATTERY LEAD

See: **BATTERY, DISCONNECTING** . It is essential that the instructions are followed.

PROGRAMMING THE TRANSMISSION CONTROL MODULE (TCM)

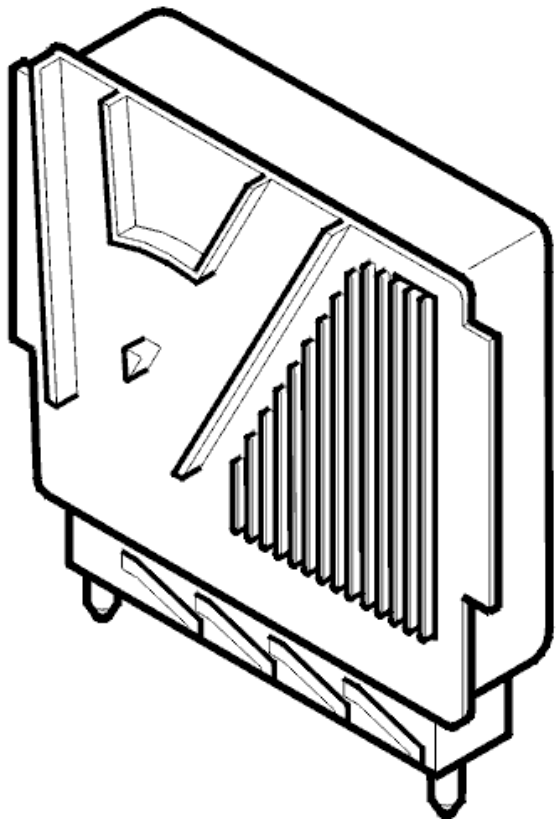


Fig. 621: Identifying Transmission Control Module
Courtesy of VOLVO CARS CORPORATION

After replacing the transmission the latest software must be programmed into the control module.

Top up the oil level in the servo reservoir. Bleed the system. **PRESSURE PIPE/HOSE, STEERING GEAR, REPLACEMENT**

TEST DRIVING THE VEHICLE

Test driving the vehicle, see: **TEST DRIVE FORM, DESCRIPTION** .

NOTE: When changing transmission oil, the transmission's counter for "Transmission oil, change" shall be reset. Use VIDA (Volvo scan tool) Vehicle communication to reset the counter.

NOTE: When changing to a new transmission, the transmission's adaption for "Transmission oil, change" shall be reset. Use VIDA (Volvo scan tool) Vehicle communication to reset the adaption.

PRESSURE PIPE/HOSE, STEERING GEAR, REPLACEMENT

NOTE: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

REMOVAL

PREPARATORY WORK

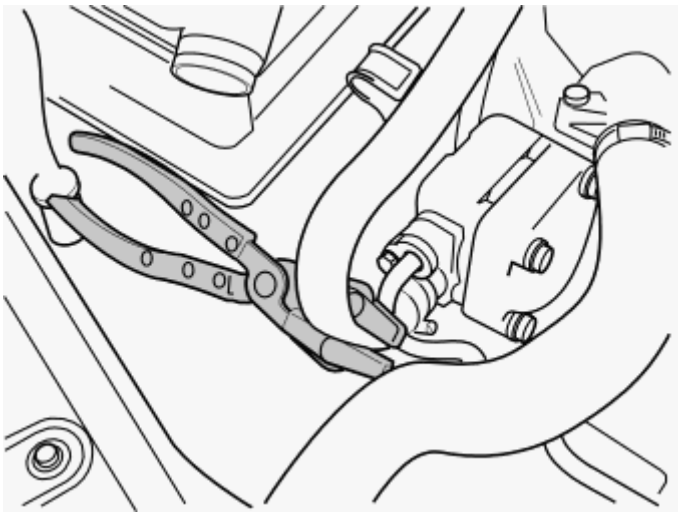


Fig. 622: Identifying Lock Grip / Hose Pliers On Power Steering Pump Feeder Hose
Courtesy of VOLVO CARS CORPORATION

Remove the battery lead. See **BATTERY, DISCONNECTING** .

HINT: Place paper or a rag under the supply pipe to absorb any oil spillage.

Install a hose clip on the feed hose for the power steering pump.

Remove the pressure line from the power steering pump.

REMOVING THE SUB-FRAME

Remove the sub-frame. See: **SUB-FRAME FRONT, REPLACING** .

REMOVING THE DELIVERY LINES

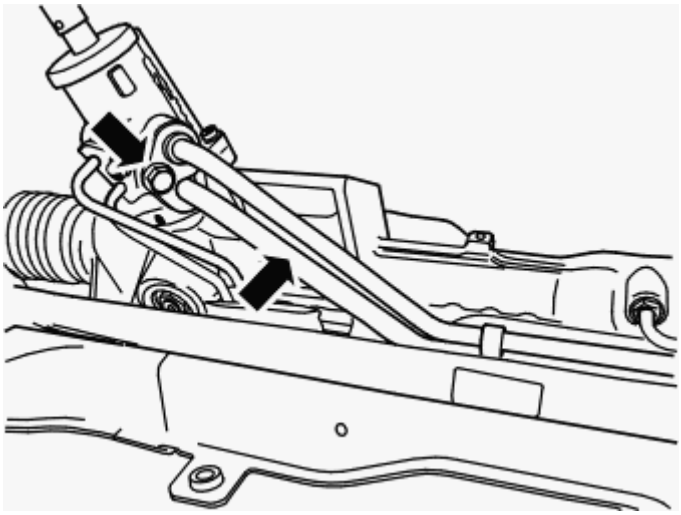


Fig. 623: Identifying Steering Gear Supply Pipe & Nut
Courtesy of VOLVO CARS CORPORATION

Position a container under the steering gear.

Remove:

- the supply pipe from the steering gear. Drain the oil
- release the supply pipe /hose from the clip
- the supply pipe.

NOTE: Note the routing of the supply pipe / hose.

INSTALLATION

NOTE: For tightening torques, see: TIGHTENING TORQUE .

INSTALLING THE SUPPLY PIPE / HOSE

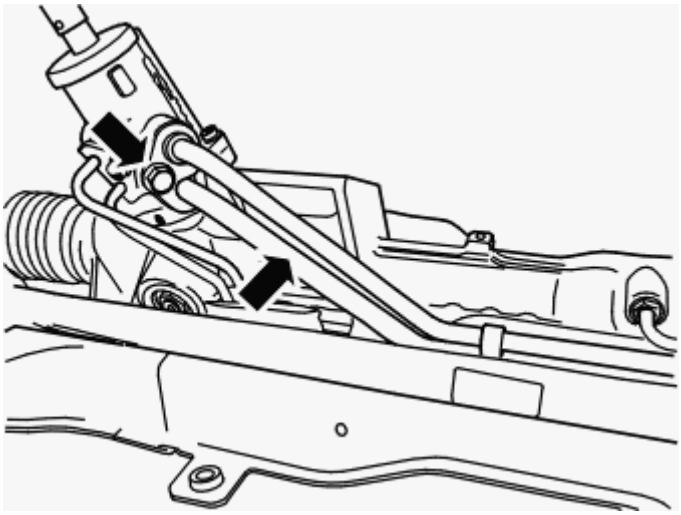


Fig. 624: Identifying Steering Gear Supply Pipe & Nut
Courtesy of VOLVO CARS CORPORATION

Install:

- the supply pipe and return pipe to the steering gear. Tighten
- the supply pipe / hose in the clip for the steering gear.

NOTE: Use a new O-ring.

INSTALLING THE SUB-FRAME

Install the sub-frame. See: **SUB-FRAME FRONT, REPLACING** .

INSTALLING DELIVERY LINES

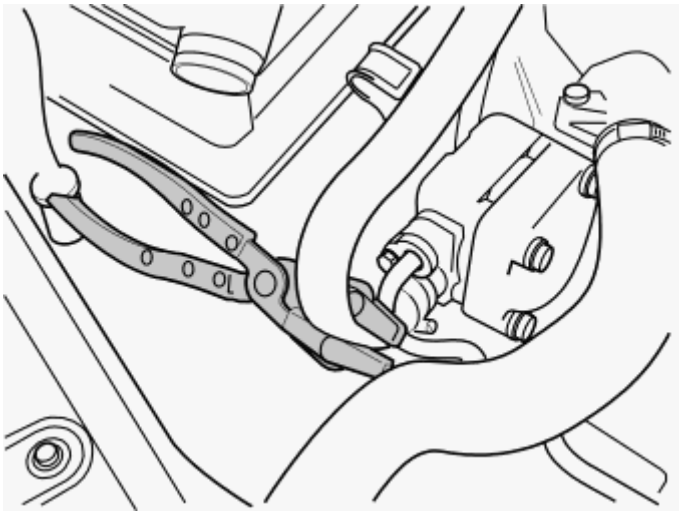


Fig. 625: Identifying Lock Grip / Hose Pliers On Power Steering Pump Feeder Hose
Courtesy of VOLVO CARS CORPORATION

Install the supply pipe on the power steering pump. Tighten to :**TIGHTENING TORQUE**

NOTE: Use a new O-ring.

Remove the hose pliers from the supply line.

FINISHING

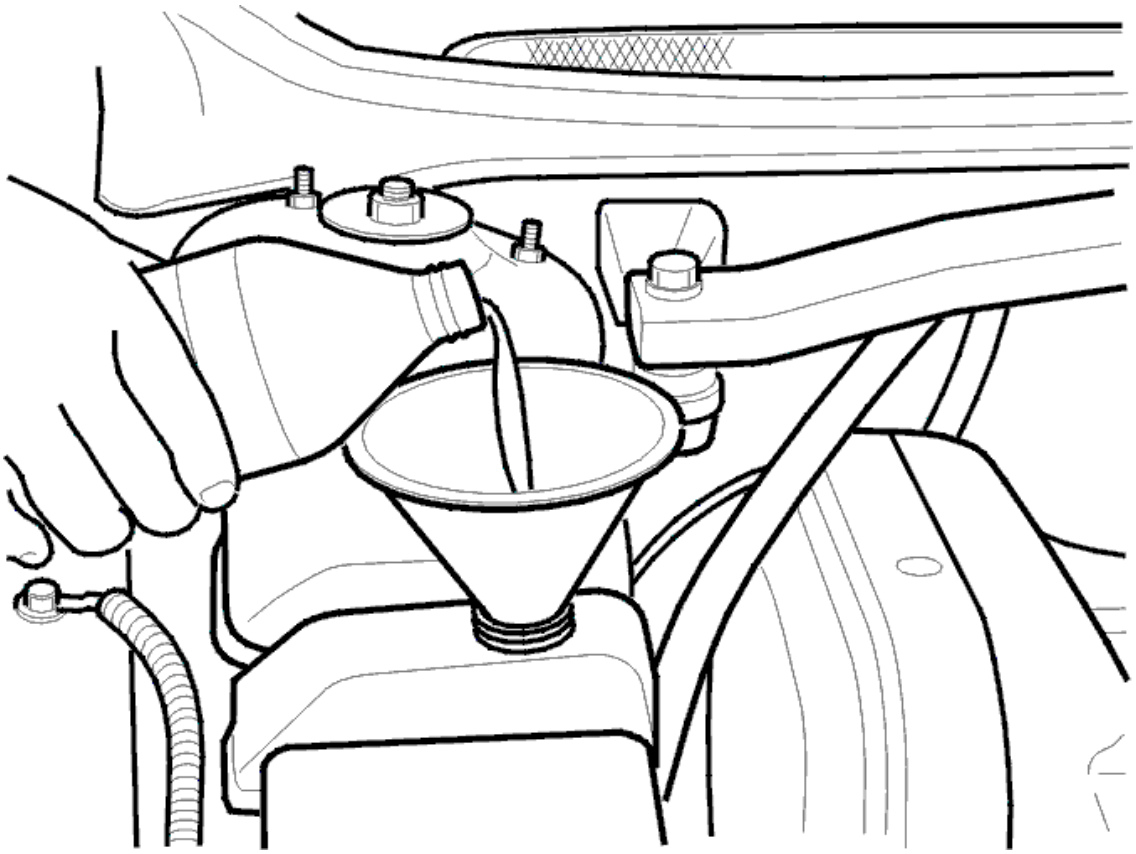


Fig. 626: Filling Servo Reservoir With Oil
Courtesy of VOLVO CARS CORPORATION

Connect the battery lead.

WARNING: Avoid skin contact with the oil.

NOTE: For the correct oil grade use Volvo power steering Fluid P/N 1161529.

Fill the power steering reservoir with oil. Bleed the system.

Turn the steering wheel from lock to lock several times. Top up with oil as necessary.

Lower the vehicle.

Apply the parking brake. Start the engine.

- **A** Turn the steering wheel slowly to the right, keep it at the limit position for two seconds.
- **B** Turn the steering wheel slowly to the left, keep it at the limit position for two seconds.

Repeat steps A and B ten times.

PRESSURE PIPE/HOSE, STEERING GEAR, REPLACEMENT

NOTE: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

REMOVAL

PREPARATORY WORK

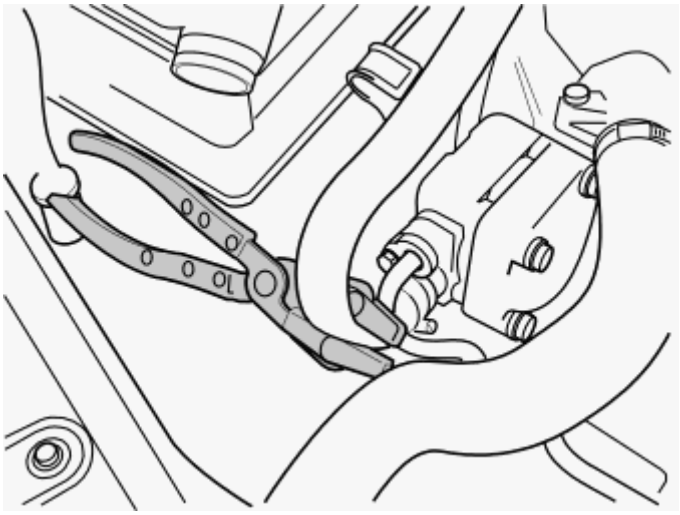


Fig. 627: Identifying Lock Grip / Hose Pliers On Power Steering Pump Feeder Hose
Courtesy of VOLVO CARS CORPORATION

Remove the battery lead. See **BATTERY, DISCONNECTING** .

HINT: Place paper or a rag under the supply pipe to absorb any oil spillage.

Install a hose clip on the feed hose for the power steering pump.

Remove the pressure line from the power steering pump.

REMOVING THE SUB-FRAME

Remove the sub-frame. See: **SUB-FRAME FRONT, REPLACING** .

REMOVING THE DELIVERY LINES

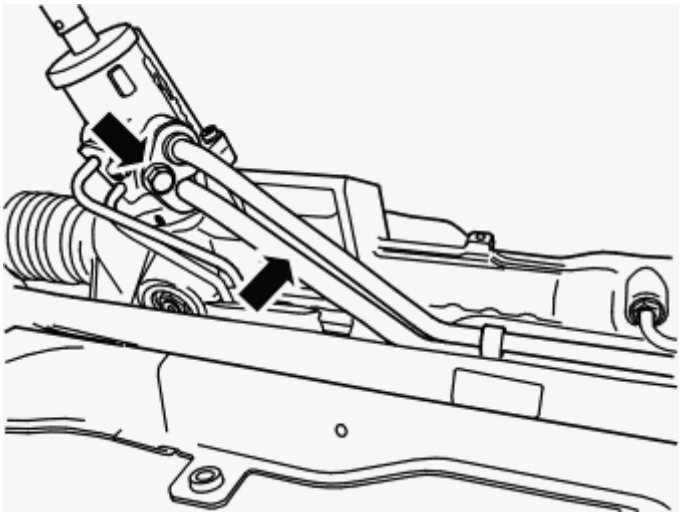


Fig. 628: Identifying Steering Gear Supply Pipe & Nut
Courtesy of VOLVO CARS CORPORATION

Position a container under the steering gear.

Remove:

- the supply pipe from the steering gear. Drain the oil
- release the supply pipe /hose from the clip
- the supply pipe.

NOTE: Note the routing of the supply pipe / hose.

INSTALLATION

NOTE: For tightening torques, see: TIGHTENING TORQUE .

INSTALLING THE SUPPLY PIPE / HOSE

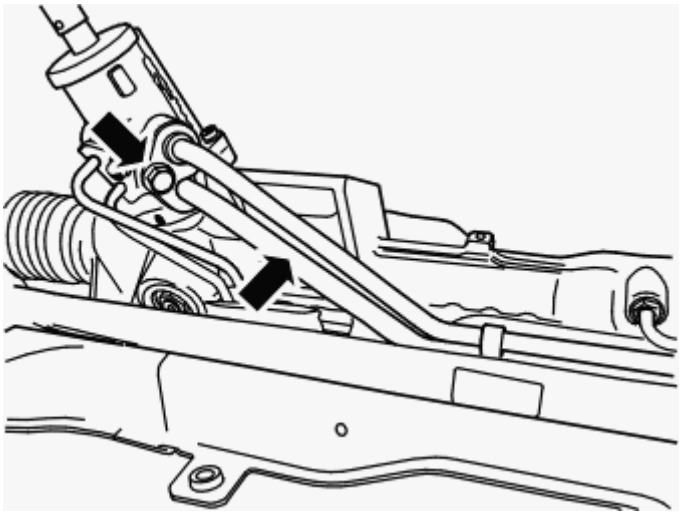


Fig. 629: Identifying Steering Gear Supply Pipe & Nut
Courtesy of VOLVO CARS CORPORATION

Install:

- the supply pipe and return pipe to the steering gear. Tighten
- the supply pipe / hose in the clip for the steering gear.

NOTE: Use a new O-ring.

INSTALLING THE SUB-FRAME

Install the sub-frame. See: **SUB-FRAME FRONT, REPLACING** .

INSTALLING DELIVERY LINES

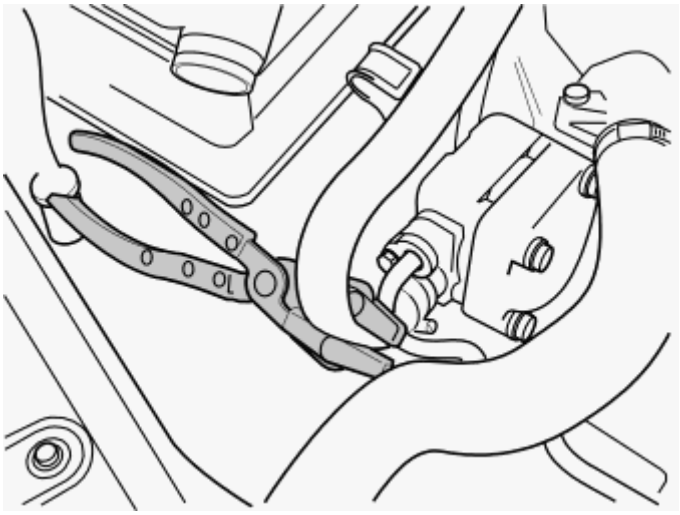


Fig. 630: Identifying Lock Grip / Hose Pliers On Power Steering Pump Feeder Hose
Courtesy of VOLVO CARS CORPORATION

Install the supply pipe on the power steering pump. Tighten to :**TIGHTENING TORQUE**

NOTE: Use a new O-ring.

Remove the hose pliers from the supply line.

FINISHING

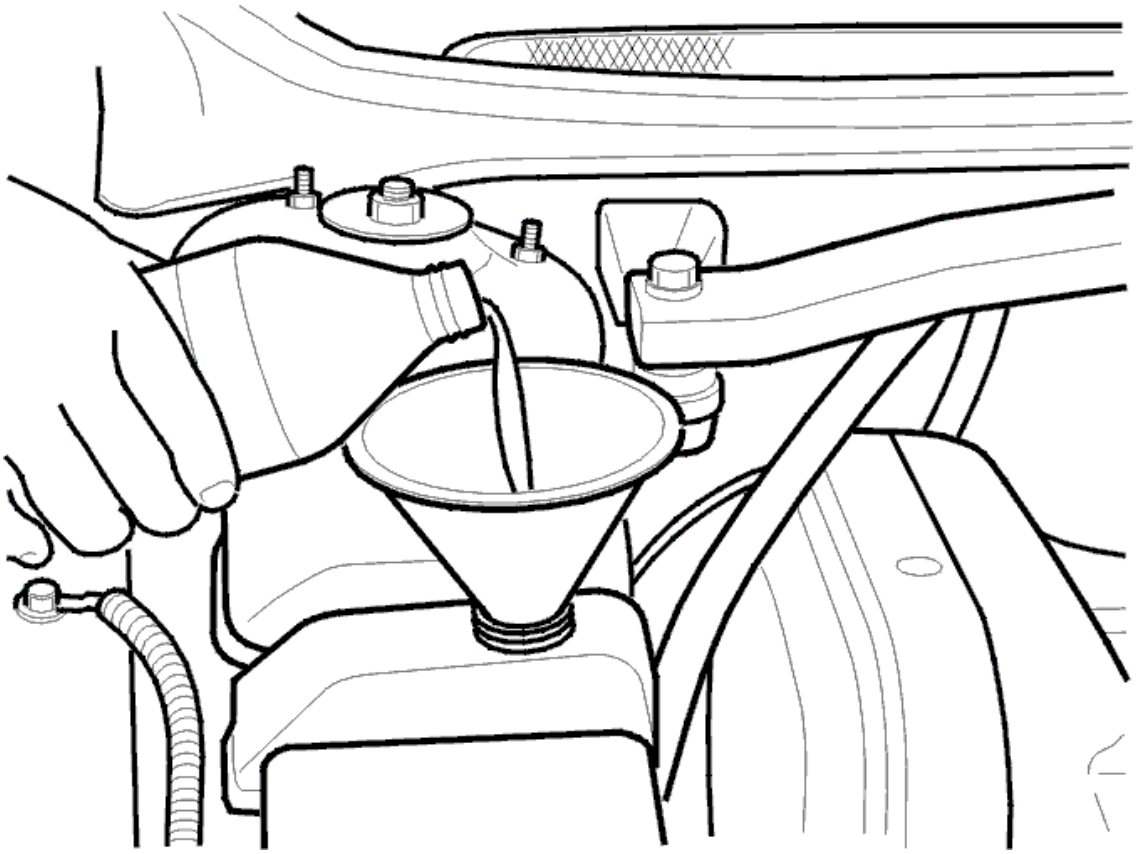


Fig. 631: Filling Servo Reservoir With Oil
Courtesy of VOLVO CARS CORPORATION

Connect the battery lead.

WARNING: Avoid skin contact with the oil.

NOTE: For the correct oil grade use Volvo power steering Fluid P/N 1161529.

Fill the power steering reservoir with oil. Bleed the system.

Turn the steering wheel from lock to lock several times. Top up with oil as necessary.

Lower the vehicle.

Apply the parking brake. Start the engine.

- **A** Turn the steering wheel slowly to the right, keep it at the limit position for two seconds.
- **B** Turn the steering wheel slowly to the left, keep it at the limit position for two seconds.

Repeat steps A and B ten times.

PRESSURE PIPE/HOSE, STEERING GEAR, REPLACEMENT

NOTE: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

REMOVAL

PREPARATORY WORK

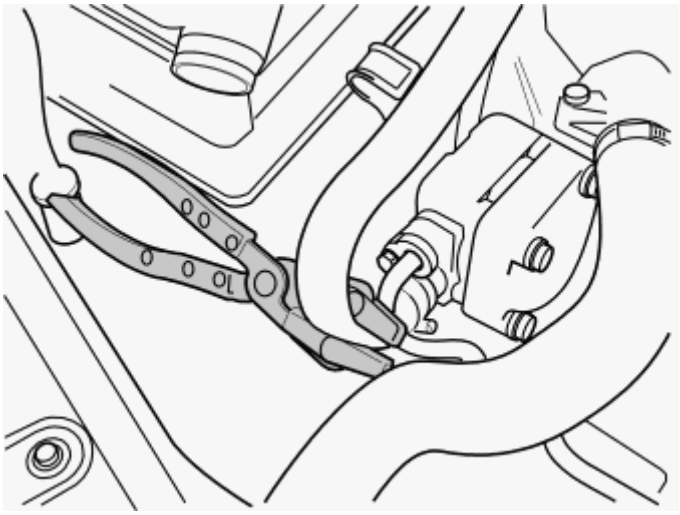


Fig. 632: Identifying Lock Grip / Hose Pliers On Power Steering Pump Feeder Hose
Courtesy of VOLVO CARS CORPORATION

Remove the battery lead. See **BATTERY, DISCONNECTING** .

HINT: Place paper or a rag under the supply pipe to absorb any oil spillage.

Install a hose clip on the feed hose for the power steering pump.

Remove the pressure line from the power steering pump.

REMOVING THE SUB-FRAME

Remove the sub-frame. See: **SUB-FRAME FRONT, REPLACING** .

REMOVING THE DELIVERY LINES

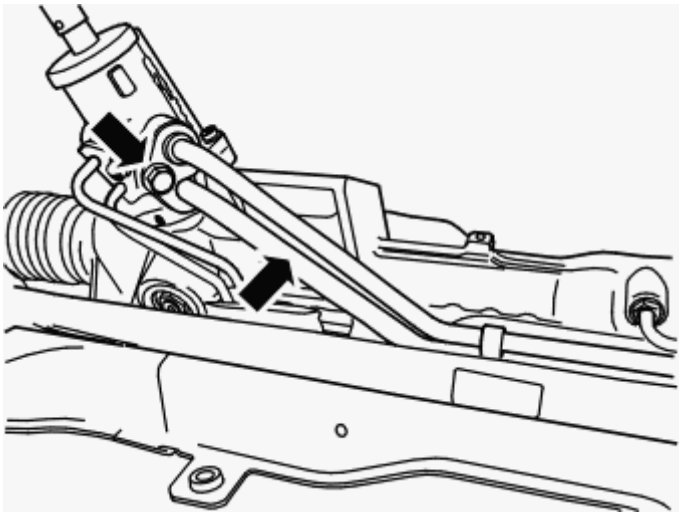


Fig. 633: Identifying Steering Gear Supply Pipe & Nut
Courtesy of VOLVO CARS CORPORATION

Position a container under the steering gear.

Remove:

- the supply pipe from the steering gear. Drain the oil
- release the supply pipe /hose from the clip
- the supply pipe.

NOTE: Note the routing of the supply pipe / hose.

INSTALLATION

NOTE: For tightening torques, see: TIGHTENING TORQUE .

INSTALLING THE SUPPLY PIPE / HOSE

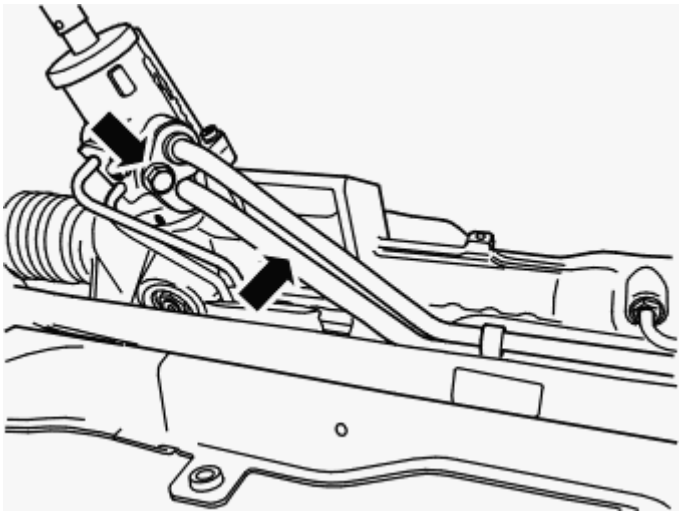


Fig. 634: Identifying Steering Gear Supply Pipe & Nut
Courtesy of VOLVO CARS CORPORATION

Install:

- the supply pipe and return pipe to the steering gear. Tighten
- the supply pipe / hose in the clip for the steering gear.

NOTE: Use a new O-ring.

INSTALLING THE SUB-FRAME

Install the sub-frame. See: **SUB-FRAME FRONT, REPLACING** .

INSTALLING DELIVERY LINES

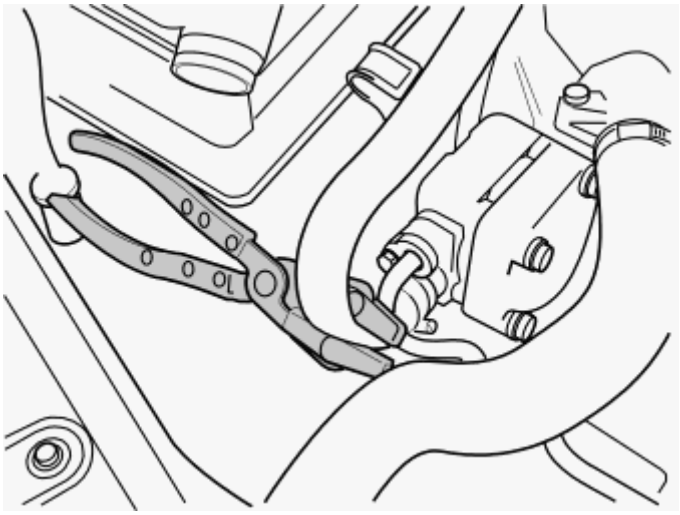


Fig. 635: Identifying Lock Grip / Hose Pliers On Power Steering Pump Feeder Hose
Courtesy of VOLVO CARS CORPORATION

Install the supply pipe on the power steering pump. Tighten to :**TIGHTENING TORQUE**

NOTE: Use a new O-ring.

Remove the hose pliers from the supply line.

FINISHING

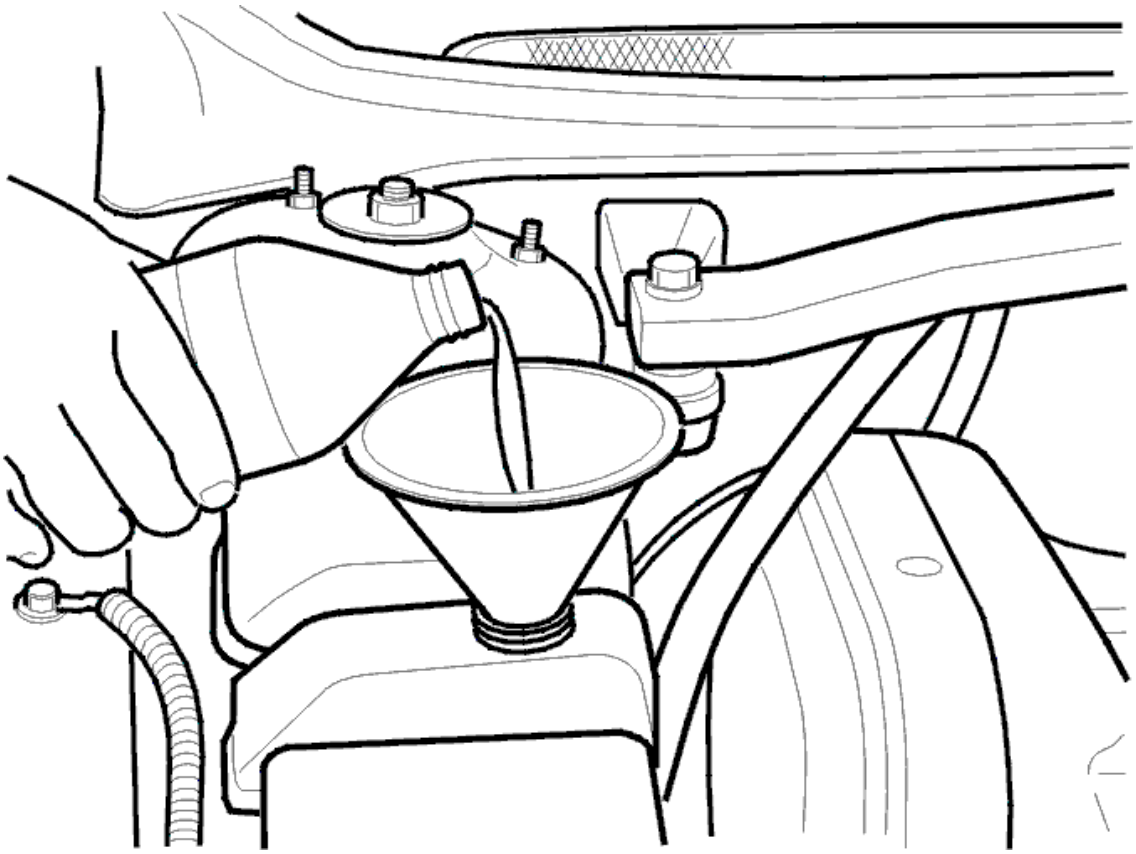


Fig. 636: Filling Servo Reservoir With Oil
Courtesy of VOLVO CARS CORPORATION

Connect the battery lead.

WARNING: Avoid skin contact with the oil.

NOTE: For the correct oil grade use Volvo power steering Fluid P/N 1161529.

Fill the power steering reservoir with oil. Bleed the system.

Turn the steering wheel from lock to lock several times. Top up with oil as necessary.

Lower the vehicle.

Apply the parking brake. Start the engine.

- **A** Turn the steering wheel slowly to the right, keep it at the limit position for two seconds.
- **B** Turn the steering wheel slowly to the left, keep it at the limit position for two seconds.

Repeat steps A and B ten times.

TRANSMISSION, INSTALLING (2003, 2004)

Special tools:

9512050

9995395

9997057

9997076

NOTE: As the illustrations in this service information are used for different model years and/or models, some variation may occur. However, the essential information is always correct.

NOTE: For tightening torques, see: TIGHTENING TORQUE .

WHEN REPLACING WITH A NEW TRANSMISSION

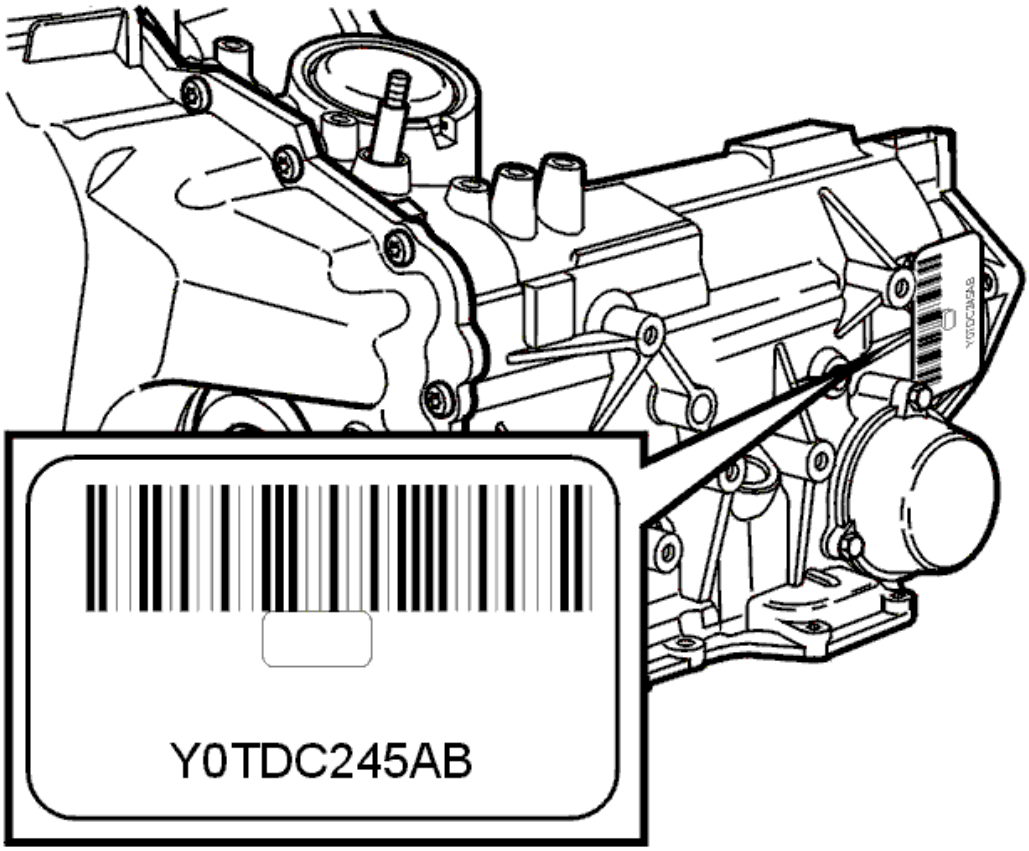


Fig. 637: Identification Plate On Transmission
Courtesy of VOLVO CARS CORPORATION

THESE SCREWS AND NUTS MUST BE REPLACED WHEN REPLACING THE TRANSMISSION

Dimension	Quantity	Designation
M8x12	6	Screw (the torque converter)
M14x100	4	Sems screw (sub-frame)
M14x15.9	2	Flanged lock nut (the ball joints)
M10x65	2	Sems nut (the drive shaft)
M8x8	1	Nut (the steering shaft)
M8x40	6	Allen screw (the propeller shaft)
		Nut, steering gear
		Nut, anti-roll bar link

CHECKING BEFORE INSTALLING

Flushing clean the oil cooler

When replacing the transmission, the oil cooler must always be flushed through because there may be particles in the oil cooler. See: **OIL COOLER, FLUSH CLEANING** .

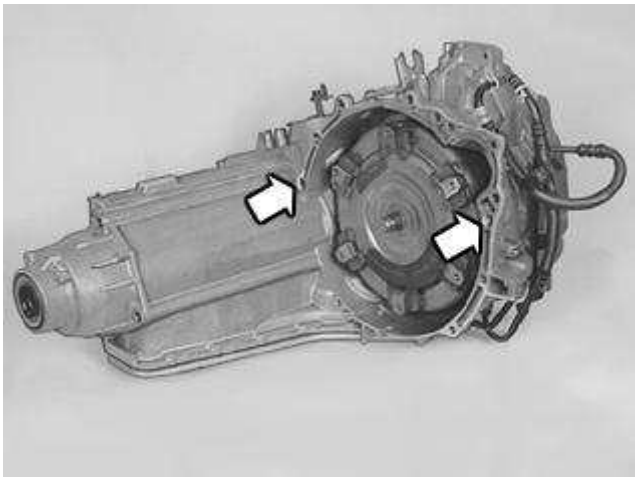


Fig. 638: Identifying Engine Mating Surface On Transmission
Courtesy of VOLVO CARS CORPORATION

Check that the transmission and engine mating surfaces are **absolutely** clean.

Also check that the guide sleeves towards the engine are in position and are free of faults.

Lubricate the holes in the transmission (for the guide pins). Use a little grease.

NOTE: This only applies if replacing the transmission.

Slacken off the bracket screws for the bevel gear - chain housing so that they can be moved slightly. The bracket is on the cylinder block.

ADJUSTING THE POSITION OF THE TRANSMISSION AND ENGINE

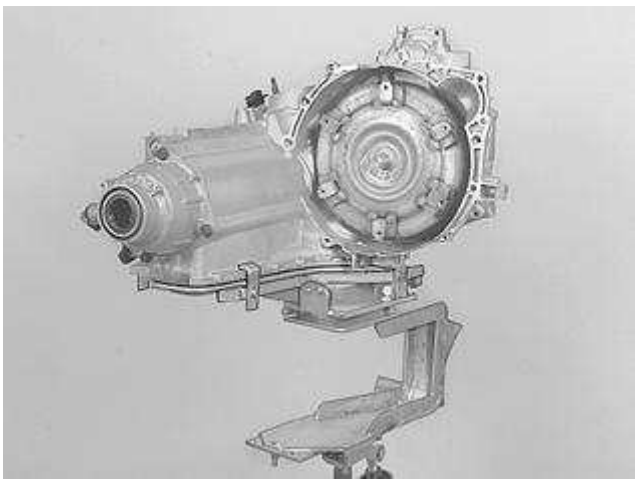


Fig. 639: Identifying Transmission On Mobile Jack
Courtesy of VOLVO CARS CORPORATION

Adjust height and angle with the mobile jack and the transmission fixture.

Locate the transmission on the engine.

Ensure that the transmission goes straight in relation to the engine and that the torque converter is in the correct location.

CHECKING / REPLACING THE TORQUE CONVERTER

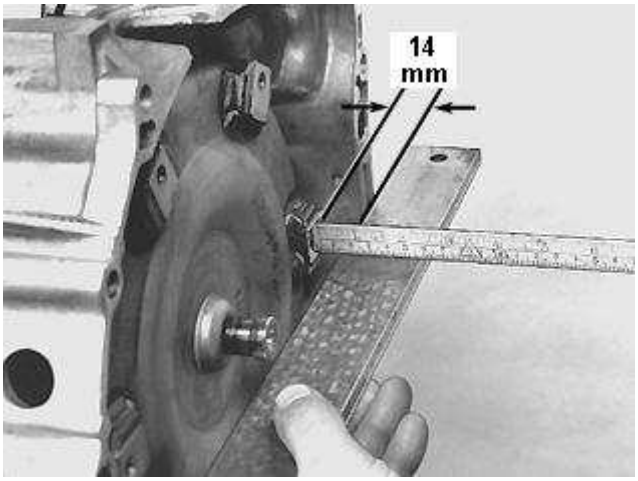


Fig. 640: Checking Distance Between Cover And Mounting Lugs Using Ruler
Courtesy of VOLVO CARS CORPORATION

Ensure that the mating surfaces on the torque converter are clean. Ensure that the torque converter is as far into the transmission as possible. Check with a ruler that the distance between the cover and mounting lugs is approximately 14 mm.

INSTALLING AND TIGHTENING THE SCREWS FOR THE TRANSMISSION

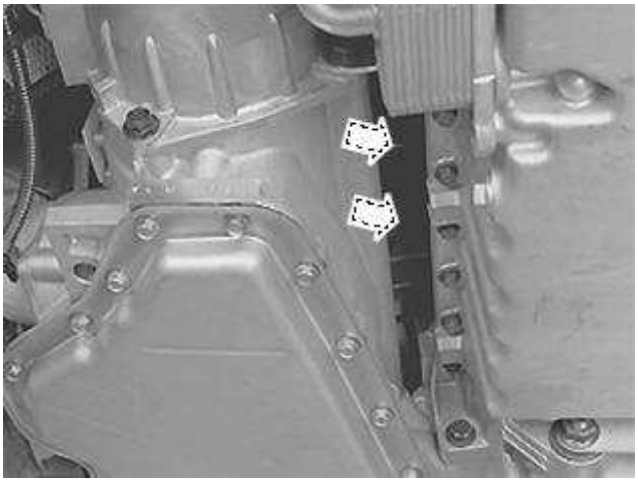


Fig. 641: Differential Housing Screws
Courtesy of VOLVO CARS CORPORATION

Install all 5 screws (apart from the screw for the bracket on the engine mounting) for the transmission / engine.

At the same time, check that the whole of the transmission is in contact with the engine.

Then tighten transmission / engine screws crosswise.

Remove the fixture from the transmission.

Install the 2 screws on the bracket at the cover for the differential housing.

Tighten.

INSTALLING THE BRACKET FOR THE TRANSMISSION END

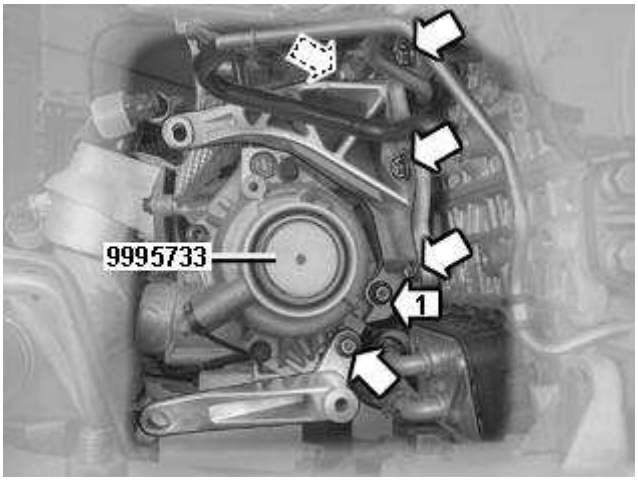


Fig. 642: Identifying Bracket
Courtesy of VOLVO CARS CORPORATION

Install:

- the bracket on the end of the transmission. Tighten
- the screw for the upper bracket. Tighten.

Tighten the screws for the bracket in the cylinder block: 4 x M10 and 1 x M8.

INSTALLING THE CHAIN HOSING AND BEVEL GEAR

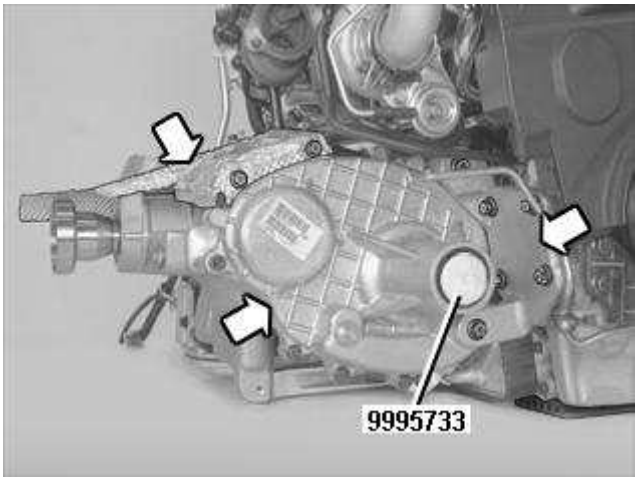


Fig. 643: Identifying Chain Housing
Courtesy of VOLVO CARS CORPORATION

Install:

- the bevel gear - chain housing on the transmission. Lightly tighten the 2 M10 screws alternately. Tighten
- the bracket between the engine and the chain housing. Lightly tighten the 4 M10 screws to the cylinder block
- the 2 M10 screws to the chain housing - bracket. Tighten.

Tighten the 4 M10 screws for the bracket - cylinder block. Tighten.

PAY ATTENTION TO THE FOLLOWING WHEN INSTALLING PROPELLER SHAFT

Follow instructions. See **PROPELLER SHAFT, SPECIAL INFORMATION** .

INSTALLING THE PROPELLER SHAFT

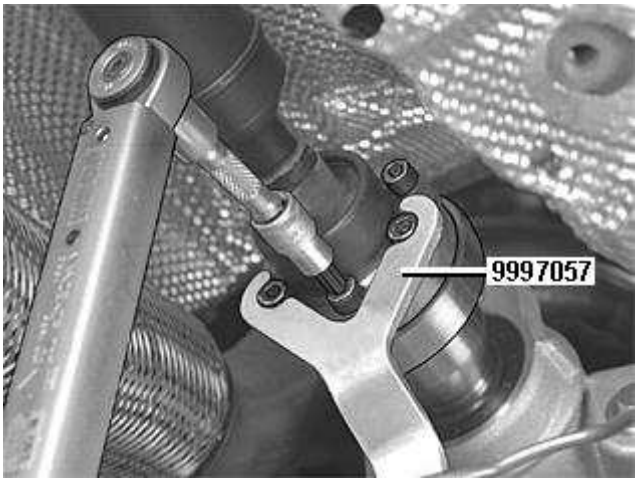


Fig. 644: Identifying Front Propeller Shaft And Special Tool 999 7057
Courtesy of VOLVO CARS CORPORATION

Install the propeller shaft using the marking made earlier. Check carefully that the mating surfaces on the propeller shaft and flange are clean. Install the 6 x M8 screws with washers. Tighten. See: **TIGHTENING TORQUE** . Use: **9997057** .

Install the 2x M8 screws to the propeller shaft center bearing. Tighten.

INSTALLING THE TORQUE CONVERTER SCREWS

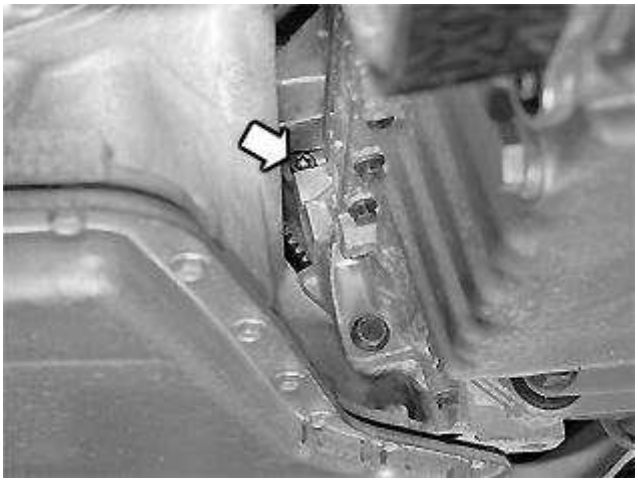


Fig. 645: Locating Screw In Cut-Out Between The Engine And The Transaxle
Courtesy of VOLVO CARS CORPORATION

NOTE: Always use new screws. The screws can also be installed at a later stage when the vehicle is lowered.

Insert a screw in the cut-out under the transmission and turn the engine.

Tighten the 6 screws. Tighten. See: **TIGHTENING TORQUE** . Use Torx TX50 (see the illustration).

INSTALLING THE HEATED OXYGEN SENSOR (HO2S) CONNECTORS TO THE BRACKET ON THE TRANSMISSION

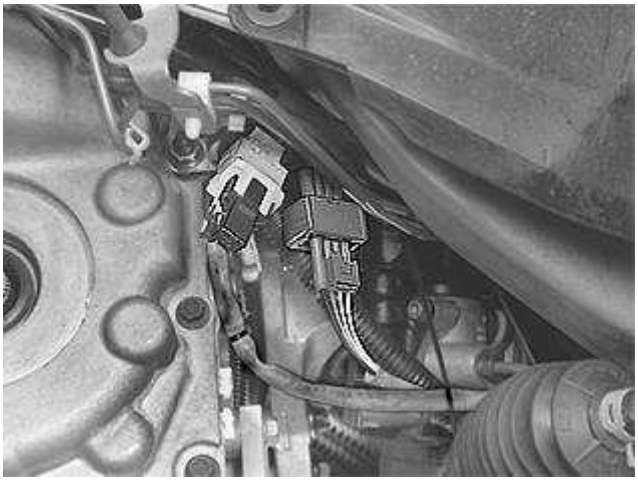


Fig. 646: Heated Oxygen Sensor
Courtesy of VOLVO CARS CORPORATION

Connect the connectors.

Secure the connectors on the bracket.

Install the clamp with the wiring on the transmission. Tighten the nut.

Lower the vehicle.

LIFTING THE ENGINE AND TRANSMISSION TO THE HORIZONTAL POSITION

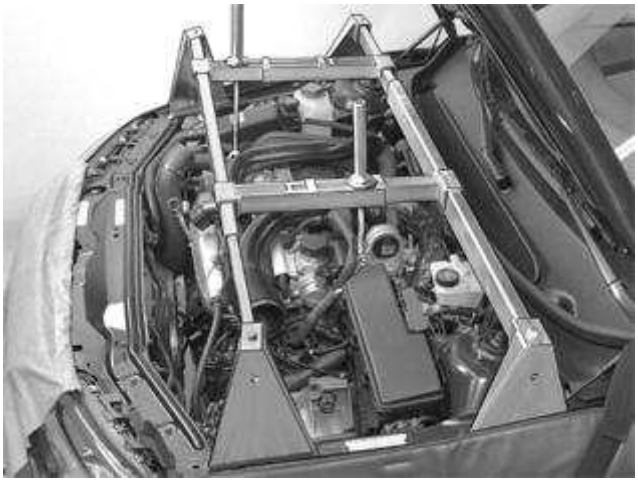


Fig. 647: Identifying Lifting Beam And Lifting Hook Installed
Courtesy of VOLVO CARS CORPORATION

Lift up the engine and transmission to the horizontal position.

Raise the vehicle.

INSTALLING THE OIL PIPE AT THE TRANSMISSION

Fig. 648: Gearbox Oil Pipe
Courtesy of VOLVO CARS CORPORATION

Tighten the screw nipples. Counterhold on the connections.

INSTALLING THE ENGINE MOUNTING TOGETHER WITH THE BRACKET AND THE SPLASH GUARD

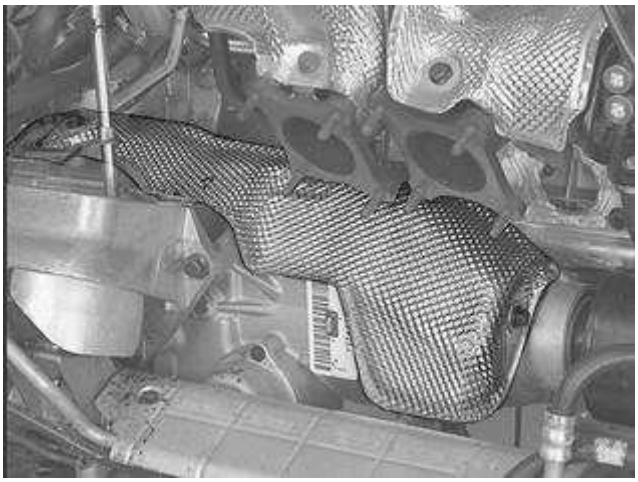


Fig. 649: Identifying Splash Guard Above Transmission
Courtesy of VOLVO CARS CORPORATION

Install:

- the engine mounting together with the splash guard
- the 4 screws for the engine mounting to the transmission
- the screw on the bracket that extends from the top of the engine mounting to the top of the transmission (not the nut on the top of the rubber mounting)
- the screw on the splash guard beside the right drive shaft.

Tighten.

PREPARATIONS FOR INSTALLING THE SUB-FRAME

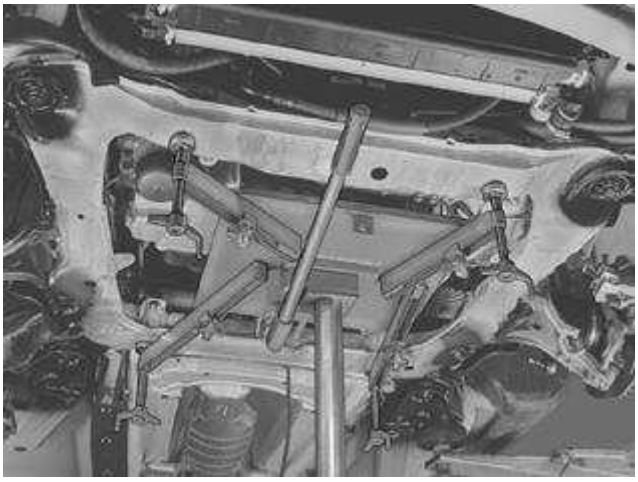


Fig. 650: Engine Supported with Lifting Table
Courtesy of VOLVO CARS CORPORATION

CAUTION: Ensure that no hoses, wiring or other components catch, or are trapped, when lifting the engine/transmission unit.

CAUTION: Do not damage the brake pipe running to the right front wheel.

Raise the engine / transmission unit. Use a lifting table.

Continue raising the unit until it is only approximately 50 mm from its correct position.

Move the fuel line into place.

Tighten

INSTALLING THE SUB-FRAME

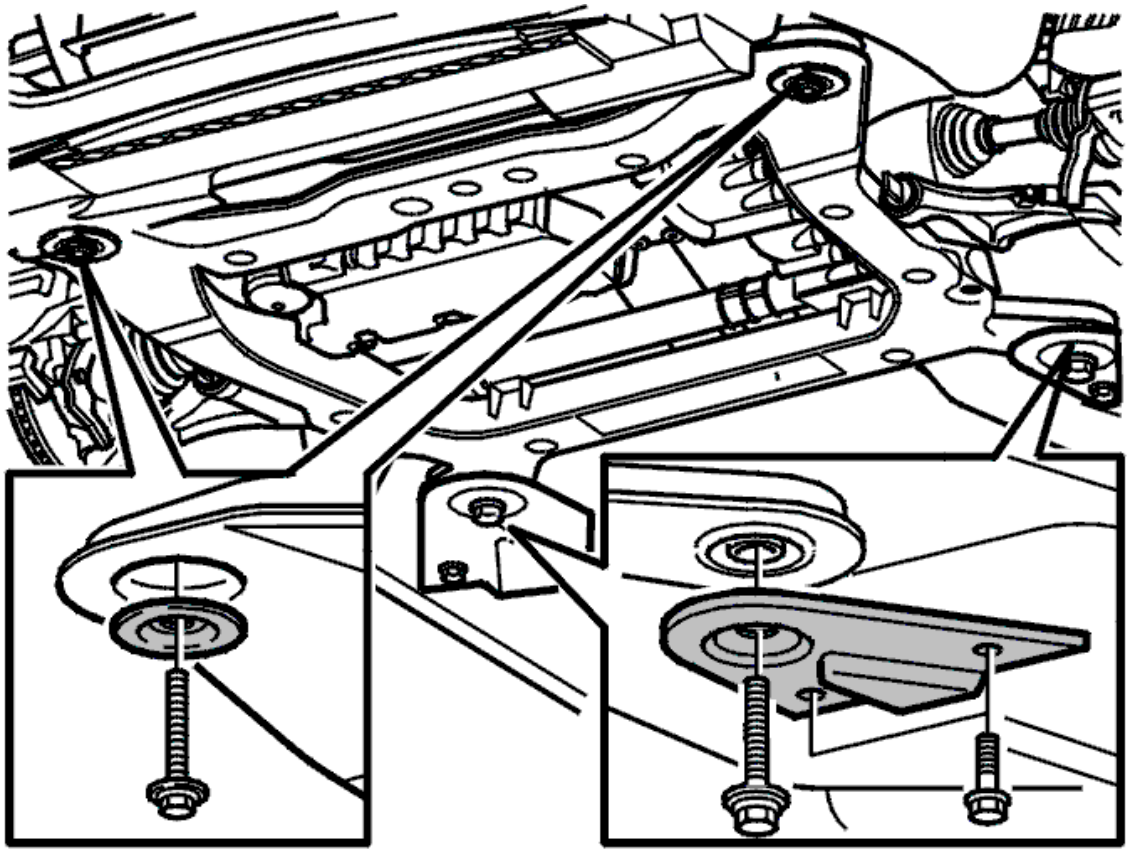


Fig. 651: Identifying Bolts, Washers And Brackets In Sub-Frame
Courtesy of VOLVO CARS CORPORATION

NOTE: Use new screws. Oil the screws.

Lift the sub-frame until it is against the frame members.

Install:

- new screws in the sub-frame
- Install the anti-roll bar
- the washers at the front edge and the support plates at the rear edge of the sub-frame
- the evaporator cable and the oil pipe into place in the sub-frame clips.

Install the four sub-frame screws together with the subframe brackets and engine heater where appropriate.

Tighten to: **TIGHTENING TORQUE** . First tighten the screws on the left side of the sub-frame followed by those on the right.

Tighten the bracket screws M10.

Cars with parking heaters

Install the parking heater in the bracket. Tighten the nuts.

INSTALLING THE RIGHT ENGINE PAD

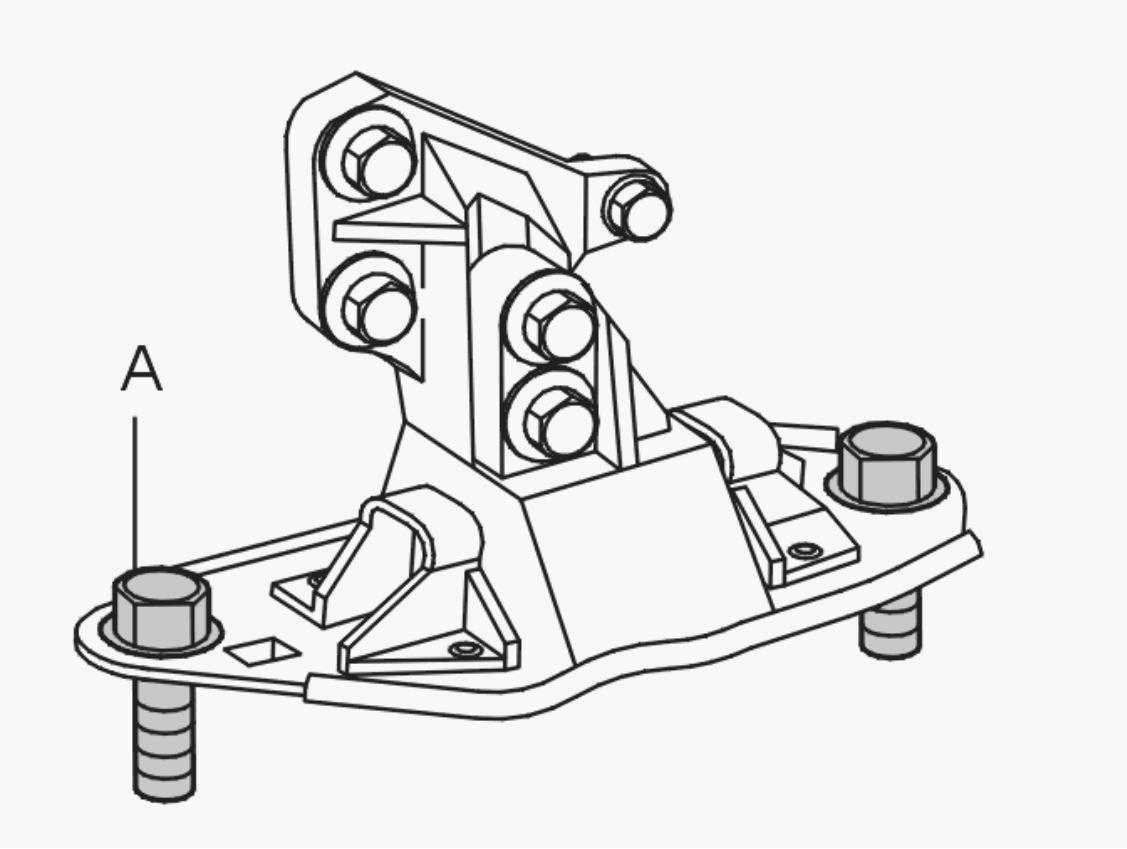


Fig. 652: Identifying Engine Pad And Screws
Courtesy of VOLVO CARS CORPORATION

Install the screws for the mounting in the sub-frame (A).

Tighten screws to the sub-frame. Tighten. See: **TIGHTENING TORQUE** . Use: **9512050** .

HINT: Tighten the screws to the sub-frame. Tighten to 65 Nm. Use a colored pen to mark one corner on the screw head and on the corner.

HINT: Then turn the screw to the next corner. This is equivalent to 60° angle-tightening.

INSTALLING THE SCREW FOR THE REAR ENGINE PAD THROUGH THE STEERING GEAR

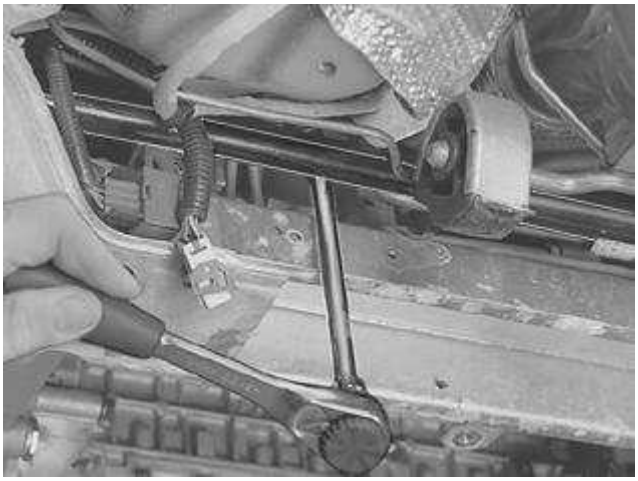


Fig. 653: Identifying Rear Engine Pad Screw Removal
Courtesy of VOLVO CARS CORPORATION

Install the screw. Tighten.

INSTALLING THE DRIVE SHAFT IN THE TRANSMISSION, BOTH SIDES

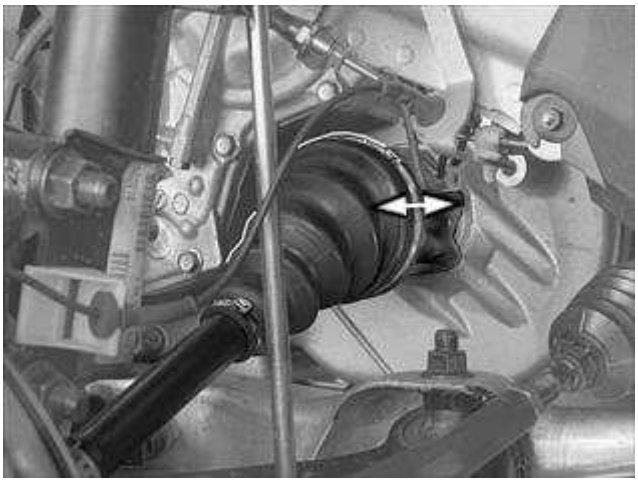


Fig. 654: Drive Shaft Mating Surface
Courtesy of VOLVO CARS CORPORATION

Lubricate the drive shaft mating surface.

Use oil, Volvo P/N 116 1521-8 (1 liter container).

Press the drive shaft into the transmission. Check that the snap ring is in the groove on the transmission by pulling the constant velocity joint.

NOTE: There is no snap ring on the right side.

NOTE: Do not pull the drive shaft as the axial stops cannot support large loads.

Fig. 655: Identifying The Frost Plug Is Fitted Correctly
Courtesy of VOLVO CARS CORPORATION

Applies to chassis no. 690-88951

Make sure that the frost plug is fitted correctly in the left drive shaft.

INSTALLING THE DRIVE SHAFT IN THE WHEEL HUB, BOTH SIDES

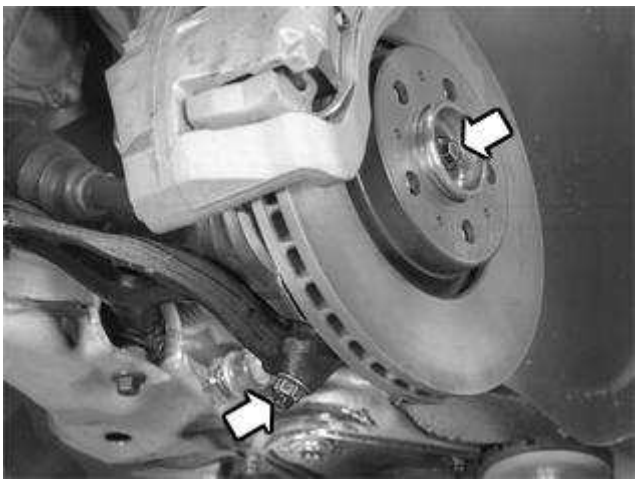


Fig. 656: Locating Drive Shaft Nut And Lower Ball Joint Nut
Courtesy of VOLVO CARS CORPORATION

Lubricate the drive shaft splines for the wheel hub using a small amount of oil.

Hold down the control arm. Align the drive shaft in the hub. Remove the guard from the ball joint. Align the ball joint lug in the control arm. Install a new lock nut on the ball joint. Tighten. See: **TIGHTENING TORQUE** .

NOTE: Counterhold the end of the ball joint whilst tightening so that the boot does not twist. Use a Torx wrench.

Install a new screw for the drive shaft / wheel hub. Tighten.

INSTALLING THE ANTI-ROLL BAR LINK TO THE SPRING STRUT

Install:

- the anti-roll bar link to the spring strut. Use a new M12 nut. Counterhold using a Torx wrench so that the boot is not damaged
- the steering arm on the wheel spindle. Use a new nut. Tighten. See **TIGHTENING TORQUE** .

INSTALLING THE SCREWS FOR THE BRACKET FOR THE HEATED OXYGEN SENSOR (HO2S) CABLE

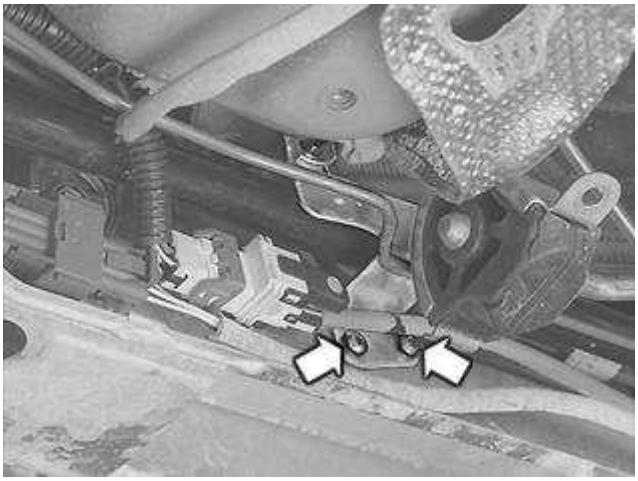


Fig. 657: Heated Oxygen Sensor Cable Bracket
Courtesy of VOLVO CARS CORPORATION

Install the connector for the bracket.

INSTALLING THE FRONT CROSS MEMBER

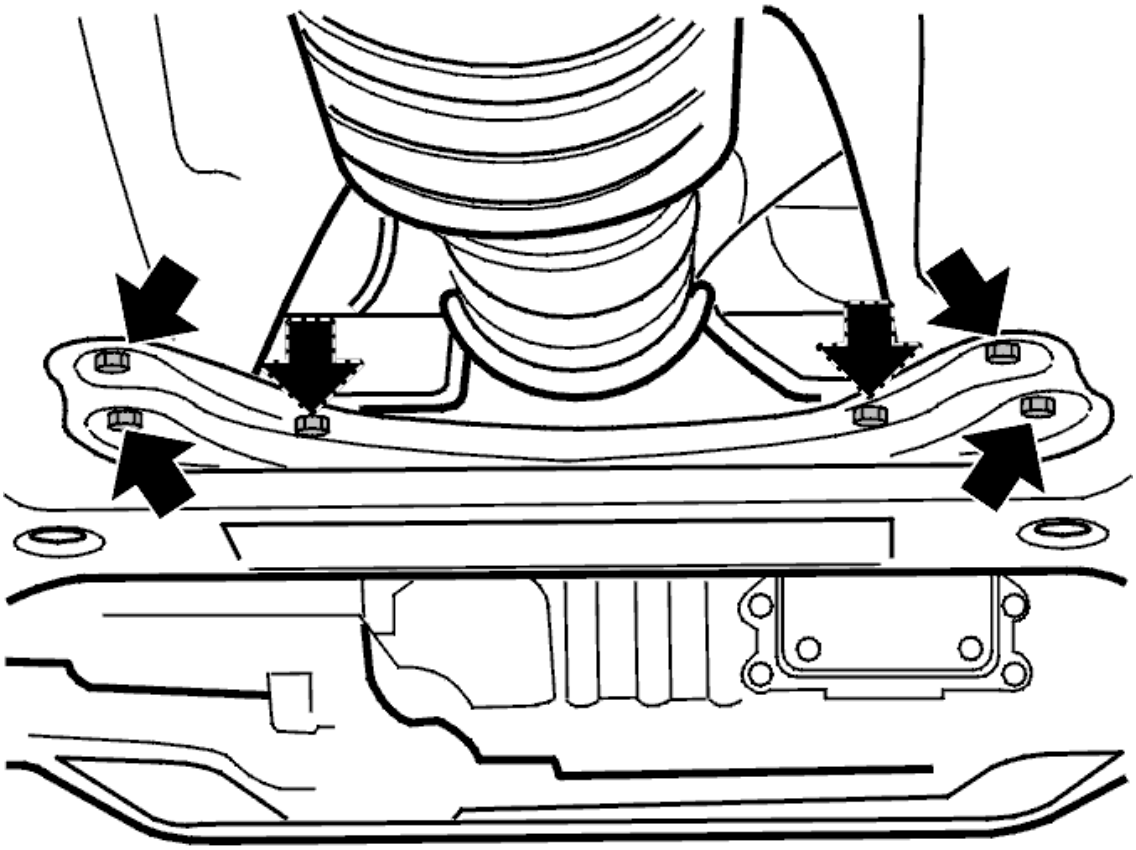


Fig. 658: Exhaust Pipe Bracket Screws
Courtesy of VOLVO CARS CORPORATION

Install the front SIPS member. Press the brake pipe into place in the member.

Install the rubber mounting for the three-way catalytic converter (TWC) in the bracket on the sub-frame.

Fig. 659: Identifying EVAP Cable
Courtesy of VOLVO CARS CORPORATION

Install the EVAP-cable acc. to earlier routing in the sub-frame's clips and press in the cable in the rubber

connection.

INSTALLING NEW LOCK NUTS ON THE STEERING GEAR

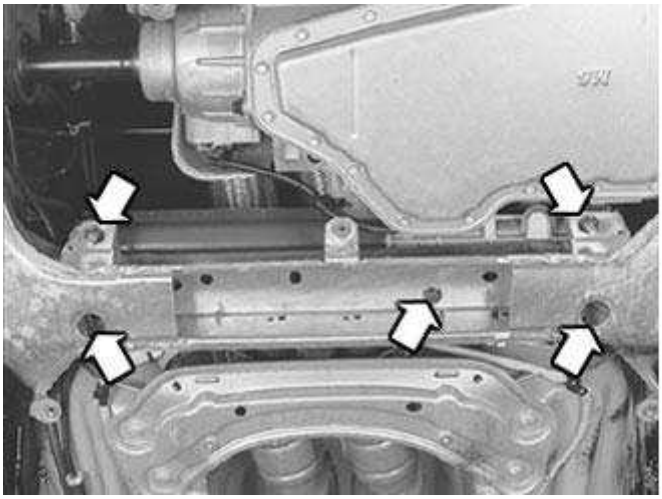


Fig. 660: Installing New Lock Nuts On The Steering Gear
Courtesy of VOLVO CARS CORPORATION

Tighten the nuts and screws. Tighten to **50 Nm** . Tighten the screw and the clamp for the oil pipe.

Remove the steering gear suspension

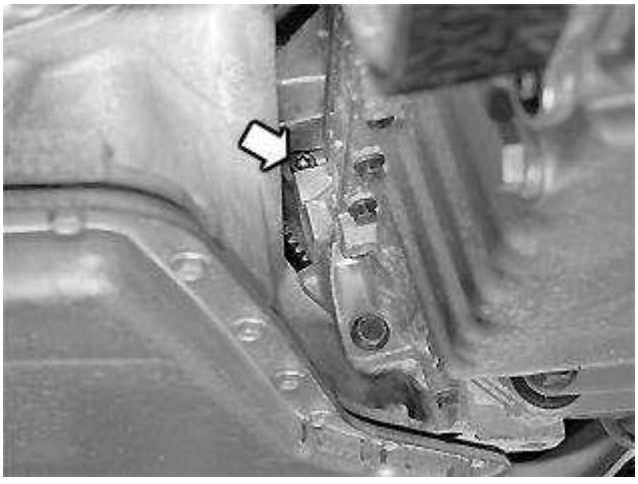


Fig. 661: Locating Screw In Cut-Out Between The Engine And The Transaxle
Courtesy of VOLVO CARS CORPORATION

NOTE: Use new screws

Insert a screw in the cut-out under the transmission and turn the engine. Tighten the 6 screws to **35 NM** . Use socket Torx TX50 (see the illustration).

INSTALLING THE SCREW FOR THE FRONT ENGINE PAD AND THE TORQUE ROD MOUNTING IN THE

TRANSMISSION

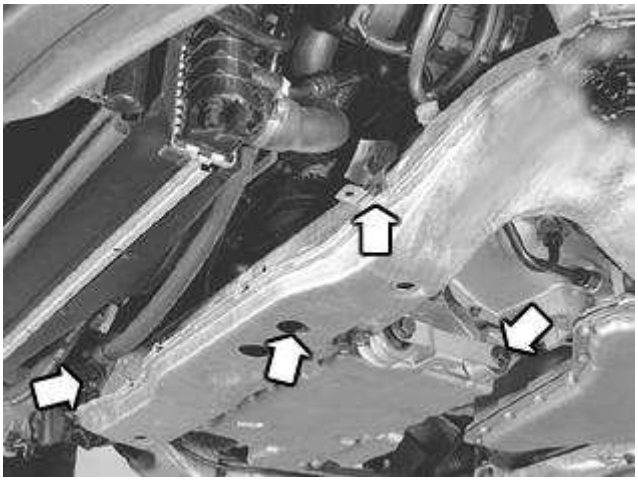


Fig. 662: Identifying Parking Heater Cable Conduit And Screws
Courtesy of VOLVO CARS CORPORATION

Install:

- the screw for the front engine pad. Tighten
- the torque rod mounting on the transmission. Use a new screw
- the screws for the cable duct and the ground lead bracket.

Cars with parking heaters

Install the heater in the bracket. Tighten the nuts.

Reinstall the fuel line in the clips on the sub-frame.

REMOVE THE LIFTING BEAM AND THE LIFTING HOOK FROM THE ENGINE AND THE VEHICLE

Fig. 663: Fixture 999 7018 Installed On Left Hand Side Of Engine At 2 Screws

Courtesy of VOLVO CARS CORPORATION

Lower the vehicle.

Remove the lifting fixture from the motor.

Install the ground strip. Tighten.

INSTALLING THE TORQUE CONVERTER SCREWS

INSTALLING THE CLAMP FOR THE OIL PIPE

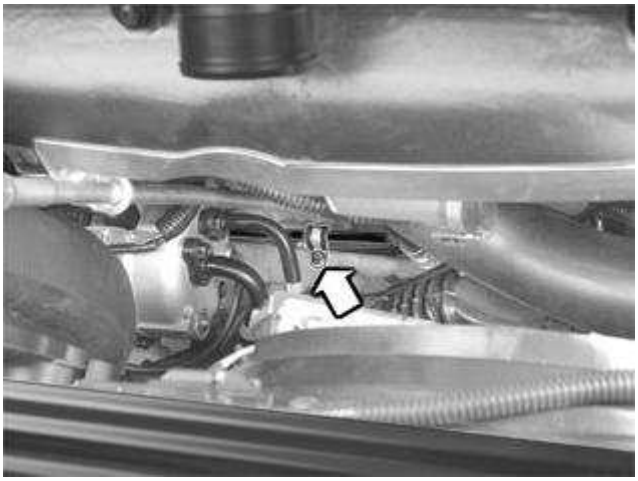


Fig. 664: Identifying Oil Pipe & Power Steering Screw
Courtesy of VOLVO CARS CORPORATION

Install the screw and clamp.

Tighten.

INSTALLING THE SCREWS IN THE TRANSMISSION AND ENGINE

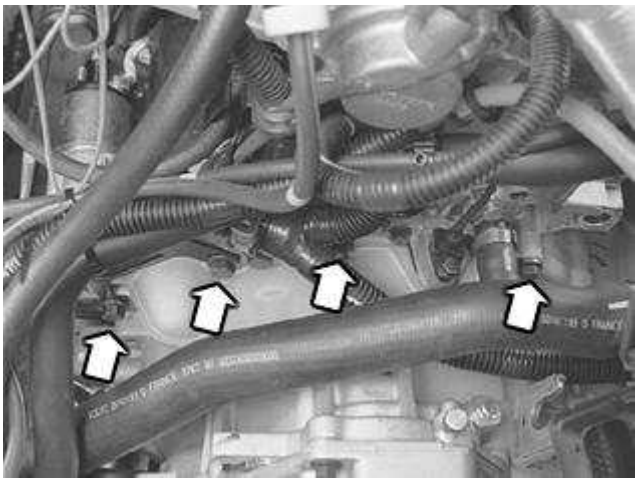


Fig. 665: Identifying Transmission, Starter Motor And Ground Lead Screws
Courtesy of VOLVO CARS CORPORATION

Install:

- the 3 screws for the transmission and engine. Tighten
- the ignition setting sender and the screw. Tighten
- Screws (x 2) to starter motor
- the screw for the clamp for the positive cable. Tighten.

INSTALLING THE DIP STICK PIPE IN THE TRANSMISSION

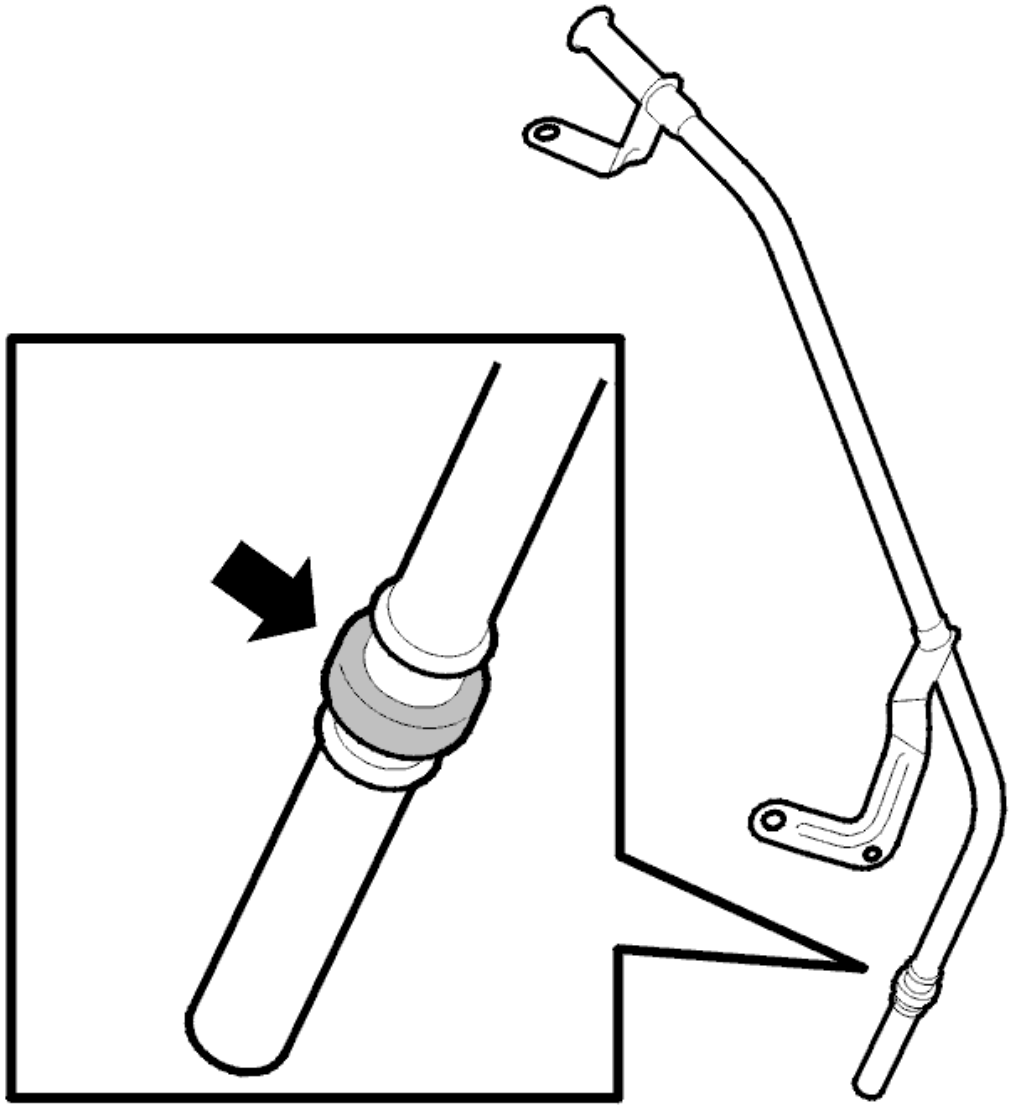


Fig. 666: Dipstick O-Ring
Courtesy of VOLVO CARS CORPORATION

Use a new rubber seal

Apply petroleum jelly on the rubber seal.

NOTE: Carefully check that the rubber seal is correctly positioned in the transmission. Failure to do so may result in leakage.

Tighten the screws.

INSTALLING THE HOSE FOR THE HEATER PIPE

Fig. 667: Heater Hoses And Clamp
Courtesy of VOLVO CARS CORPORATION

Install the hose on the heater pipe in the firewall.

Press the radiator hose quick-release connector into place on the heater pipe.

Check: Pull the hose.

INSTALLING THE GEAR SELECTOR CABLE ON THE TRANSMISSION AND LEVER

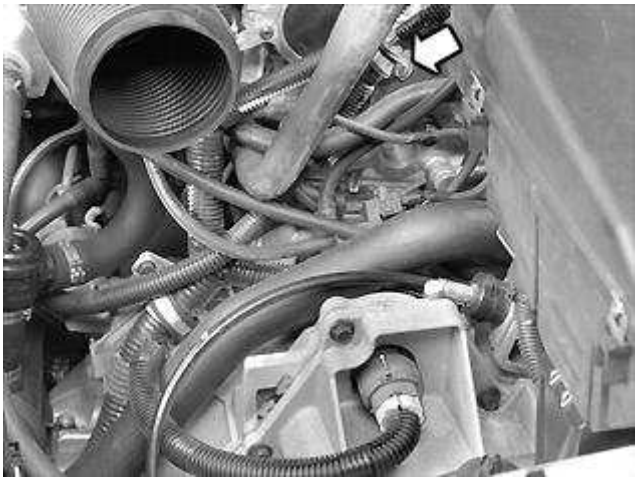


Fig. 668: Gearbox And Connector
Courtesy of VOLVO CARS CORPORATION

Install:

- the ball joint for the gear selector cable on the lever
- the gear selector cable in the bracket
- the connector for the transmission. Press the connector into place properly

CAUTION: It is important that the connector is pushed into place properly. If it is not correctly connected the gear shift function may stop.

- the connector for the ABS unit.

INSTALLING THE UPPER TORQUE ROD

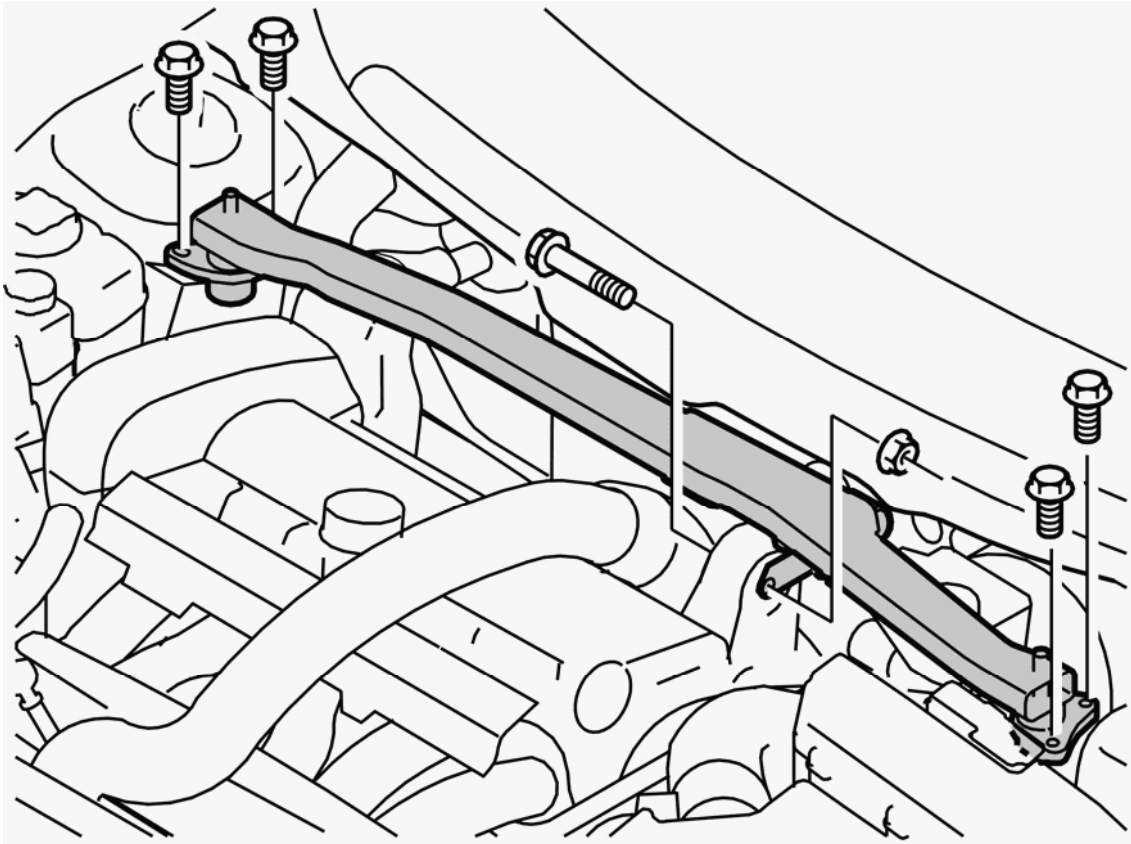


Fig. 669: Identifying Engine Stabilizer Brace And Mounting Screws
Courtesy of VOLVO CARS CORPORATION

Install:

- the engine stabilizer brace. Tighten the mounting screws
- the screw and a new nut for the engine mounting. Tighten
- the plastic guard over the spring strut (if applicable). Tighten the screws.

INSTALLING THE AIR CLEANER (ACL) HOUSING

Install the air cleaner (ACL) housing. See **INSTALL THE AIR CLEANER (ACL) HOUSING** .

FINISHING WORK

FILLING THE TRANSMISSION WITH FLUID

NOTE: Oil grade: Only ATF fluid Dexron III (with G-license).

Transmission oil, Volvo P/N 116 1521-8 (1-liter container), 116 1621-6 (4-liter container).

NOTE: Filling with oil: Start by filling with 5.5 liters of oil.

FILLING WITH TRANSMISSION OIL. THERE ARE 2 DIFFERENT METHODS. METHOD 1

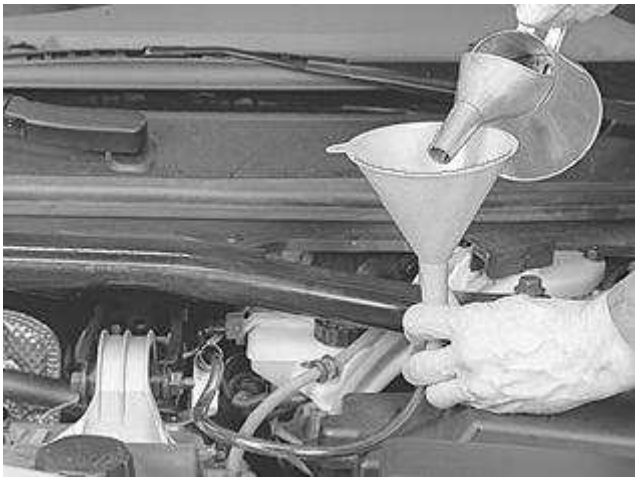


Fig. 670: Filling Transmission With Oil
Courtesy of VOLVO CARS CORPORATION

NOTE: Filling with oil: Start by filling with 5.5 liters of oil.

Fill the transmission with oil. Use a funnel with a plastic hose. Fill through the dipstick pipe.

Clear up any oil spillage under the dip stick pipe.

FILLING WITH TRANSMISSION OIL. METHOD 2

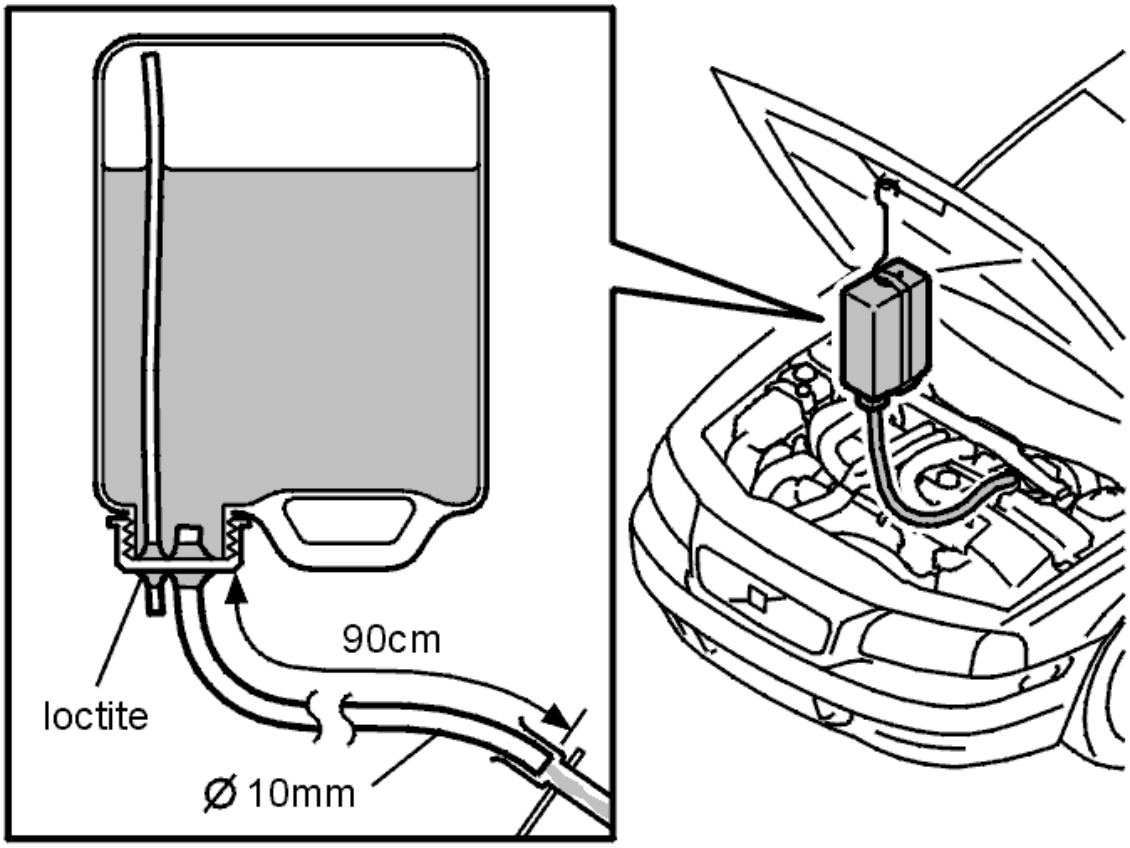


Fig. 671: Filling Transmission With Oil - Method 2
Courtesy of VOLVO CARS CORPORATION

NOTE: Filling with oil: Start by filling with 5.5 liters of oil.

Use a converted five liter plastic can (see the illustration).

This method avoids oil spillage. It also provides a more regular flow when filling.

To check the oil level , see: **OIL LEVEL, CHECKING** .

NOTE: After replacing the transmission, the transmission's adaption as well as the counter for "Transmission oil, change" shall be reset. Use VIDA (Volvo scan tool) Vehicle communication to reset the adaption and the counter.

CHECKING WATER LEVELS

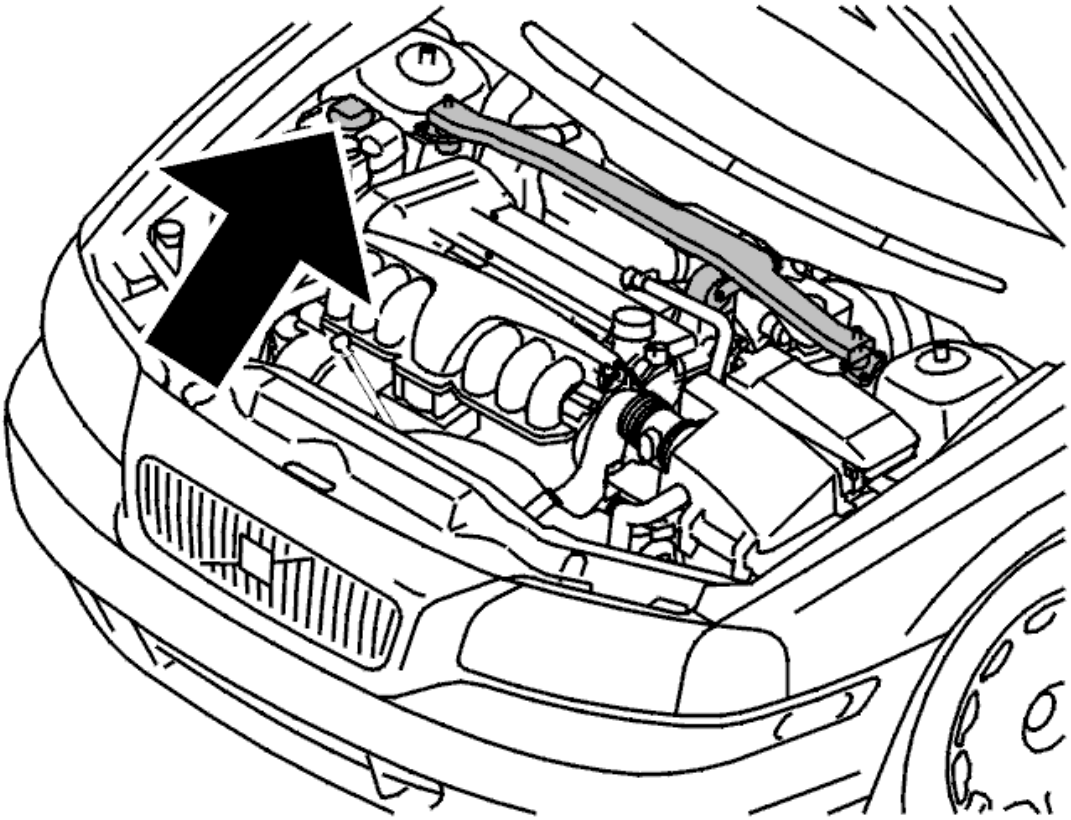


Fig. 672: Identifying Expansion Tank
Courtesy of VOLVO CARS CORPORATION

Top up with water and coolant as necessary (when the engine is at operating temperature).

Check the level in the servo oil reservoir and top up if necessary.

Raise the vehicle.

Check that there is no oil leakage at the transmission, the dip stick or at the steering gear.

INSTALLING THE SPLASH GUARDS AND THE FENDER LINER

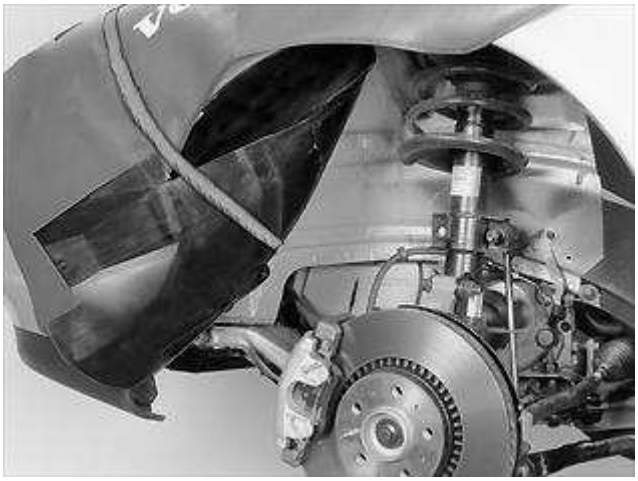


Fig. 673: Fender Liner Tied Up To Lifting Beam Using A Retaining Strap
Courtesy of VOLVO CARS CORPORATION

Install:

- The ABS-cable on the mounting
- the splash guard under the engine
- the front splash guard
- the nut for the left fender liner.

Lower the vehicle

INSTALL

- the wheels. See: **INSTALLING WHEELS**
- Lower the vehicle.

INSTALLING THE BATTERY LEAD

See: **BATTERY, DISCONNECTING** . It is essential that the instructions are followed.

PROGRAMMING THE TRANSMISSION CONTROL MODULE (TCM)

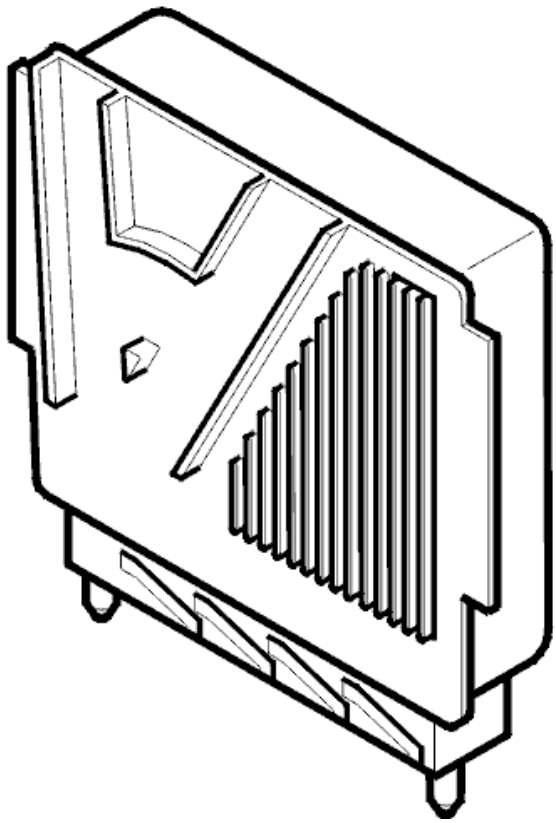


Fig. 674: Identifying Transmission Control Module
Courtesy of VOLVO CARS CORPORATION

After replacing the transmission the latest software must be programmed into the control module.

Top up the oil level in the servo reservoir. Bleed the system. See **HYDRAULIC PIPES/HOSES STEERING GEAR, REPLACING**

TEST DRIVING THE VEHICLE

Test driving the vehicle, see: **TEST DRIVE FORM, DESCRIPTION** .

NOTE: When changing transmission oil, the transmission's counter for "Transmission oil, change" shall be reset. Use VIDA (Volvo scan tool) Vehicle communication to reset the counter.

NOTE: When changing to a new transmission, the transmission's adaption for "Transmission oil, change" shall be reset. Use VIDA (Volvo scan tool) Vehicle communication to reset the adaption.

TRANSMISSION, REMOVING

Special tools:

9995259

9995395

9995460

9995462

9995463

9995562

9995716

9995734

9995735

9995736

9995972

9997077

9997070

9995185

9995463

9997057

9997018

9997063

NOTE: **As the illustrations in this service information are used for different model years and/or models, some variation may occur. However, the essential information is always correct.**

PREPARATORY WORK

CAUTION: Check for coolant in oil. See CHECKING FOR COOLANT IN THE OIL and check for metal particles in the oil pan before installing new transaxle. See the end of the method.

DISCONNECTING THE BATTERY LEAD

Disconnect the battery negative lead. See: **BATTERY, DISCONNECTING** .

REMOVING ENGINE COMPARTMENT COMPONENTS

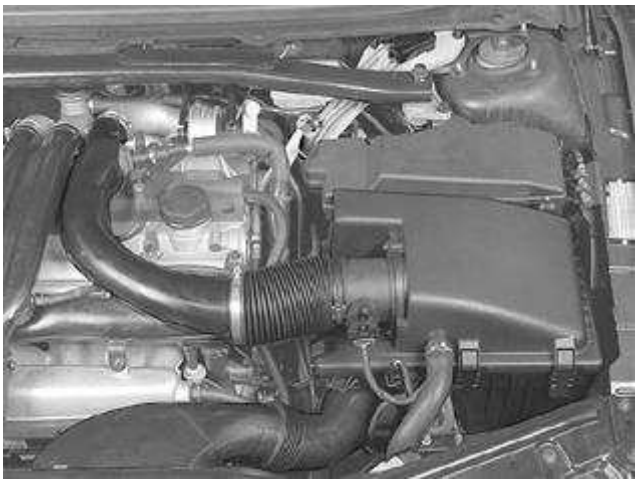


Fig. 675: Air Cleaner Housing Assembly
Courtesy of VOLVO CARS CORPORATION

Remove the air intake between the front plate and the air cleaner (ACL) housing.

Disconnect the hose and the connector from the mass air flow (MAF) sensor.

Slacken off the nut for the air cleaner (ACL) housing. Remove the air cleaner (ACL) housing from its mountings.

REMOVING THE TORQUE ROD

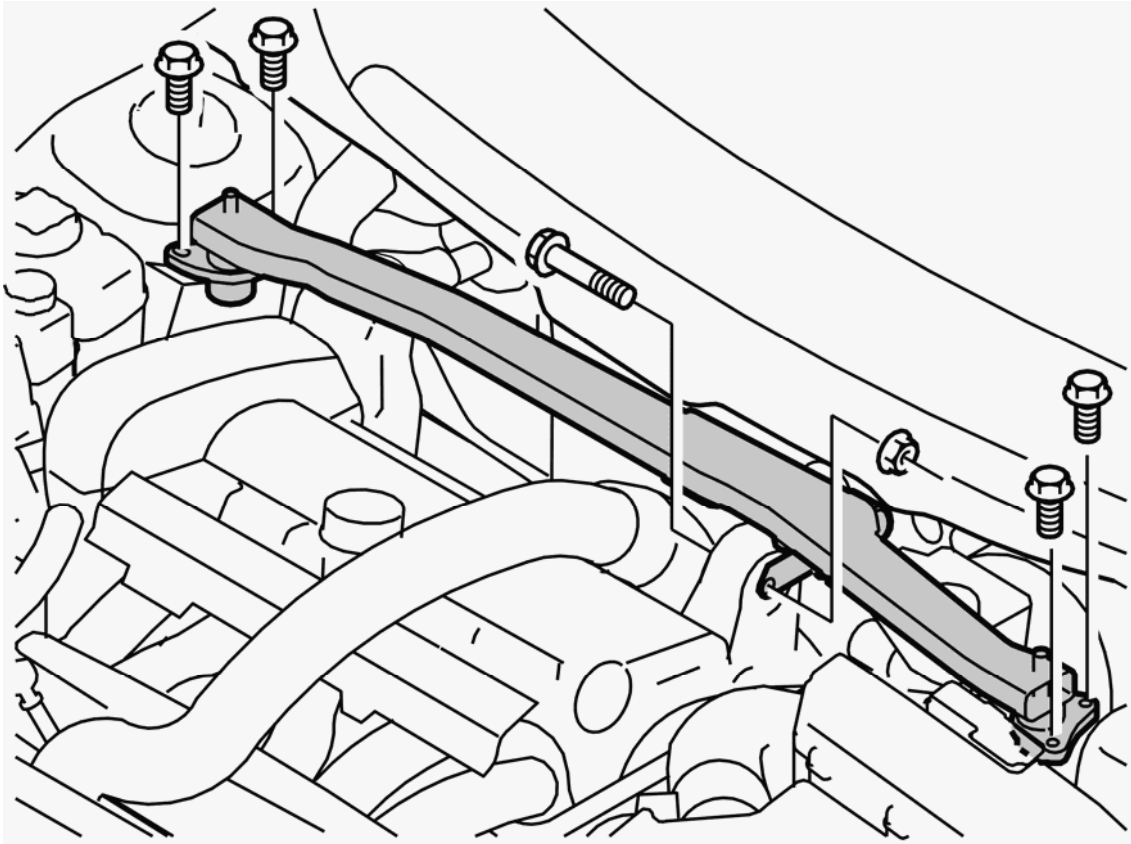


Fig. 676: Identifying Engine Stabilizer Brace And Mounting Screws
Courtesy of VOLVO CARS CORPORATION

Remove the upper torque rod. Remove the screw for the oil hose clamp on the cross member mounting (right side).

Remove:

- the plastic covers over the spring strut mountings (applies only to early versions)
- the screws
- the screw and nut for the engine mounting.

REMOVING THE GEAR SELECTOR CABLE AND LEVER ON THE TRANSMISSION

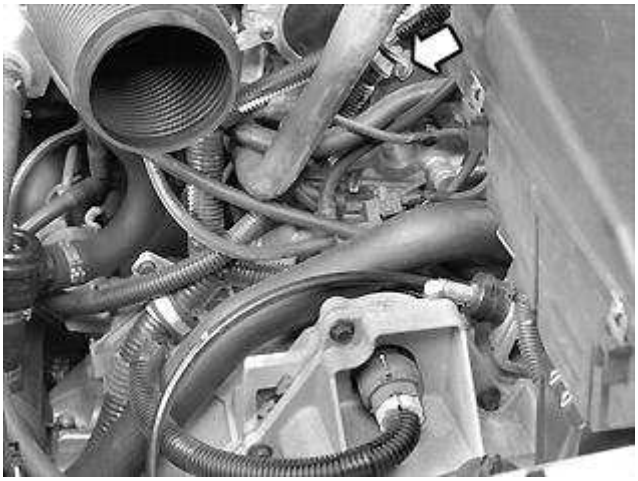


Fig. 677: Gearbox And Connector
Courtesy of VOLVO CARS CORPORATION

Use: **9997077** to disconnect the ball joint for the gear selector cable from the lever.

Remove:

- the gear selector cable from the bracket. Press the catch under the gear selector cable. Pull the gear selector cable out of the bracket
- the connector from the transmission (press the connector together). Pull it from the transmission.

HINT: Hang the gear selector cable from a tie strap around the brake pipes.

REMOVING THE HOSE FOR THE HEATER PIPE

Fig. 678: Heater Hoses And Clamp
Courtesy of VOLVO CARS CORPORATION

Disconnect the hose from the heater pipes at the firewall so that the pipe in the heater unit is not damaged when lowering the engine (the rubber hose is short).

Install hose clips on the hoses.

Twist the catch (see the arrow) on the hose connection. Pull the quick-release connector straight out.

A small amount of water should run out (tie the hose up).

Clean up any spilled glycol using paper.

NOTE: Avoid skin contact.

COLLECTING TRANSMISSION FLUID

Fig. 679: Identifying Dip Stick Pipe & Oil Suction Device
Courtesy of VOLVO CARS CORPORATION

Remove the dipstick from the dip stick pipe.

Suck up the oil using an oil suction device.

NOTE: The oil must be sucked out when the oil pipe is removed. Otherwise the oil will run out of the transmission.

REMOVING THE DIPSTICK

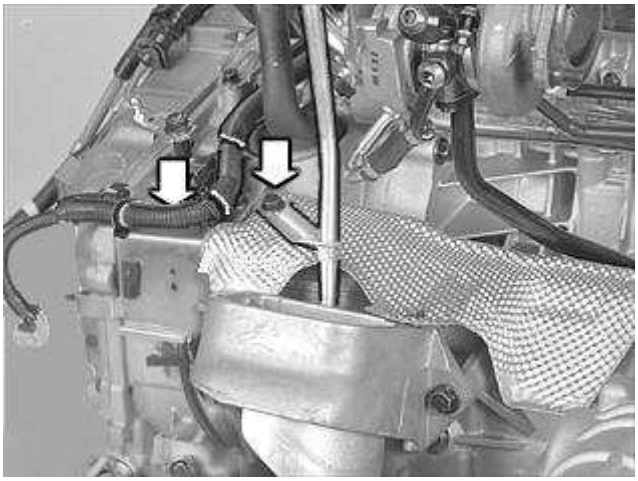


Fig. 680: Identifying Dip Stick Pipe Screws
Courtesy of VOLVO CARS CORPORATION

Remove the 2 screws for the dip stick pipe, one at the engine mounting and one lower down on the pipe.

Cut off the 4 tie straps holding the cable harness on the bracket.

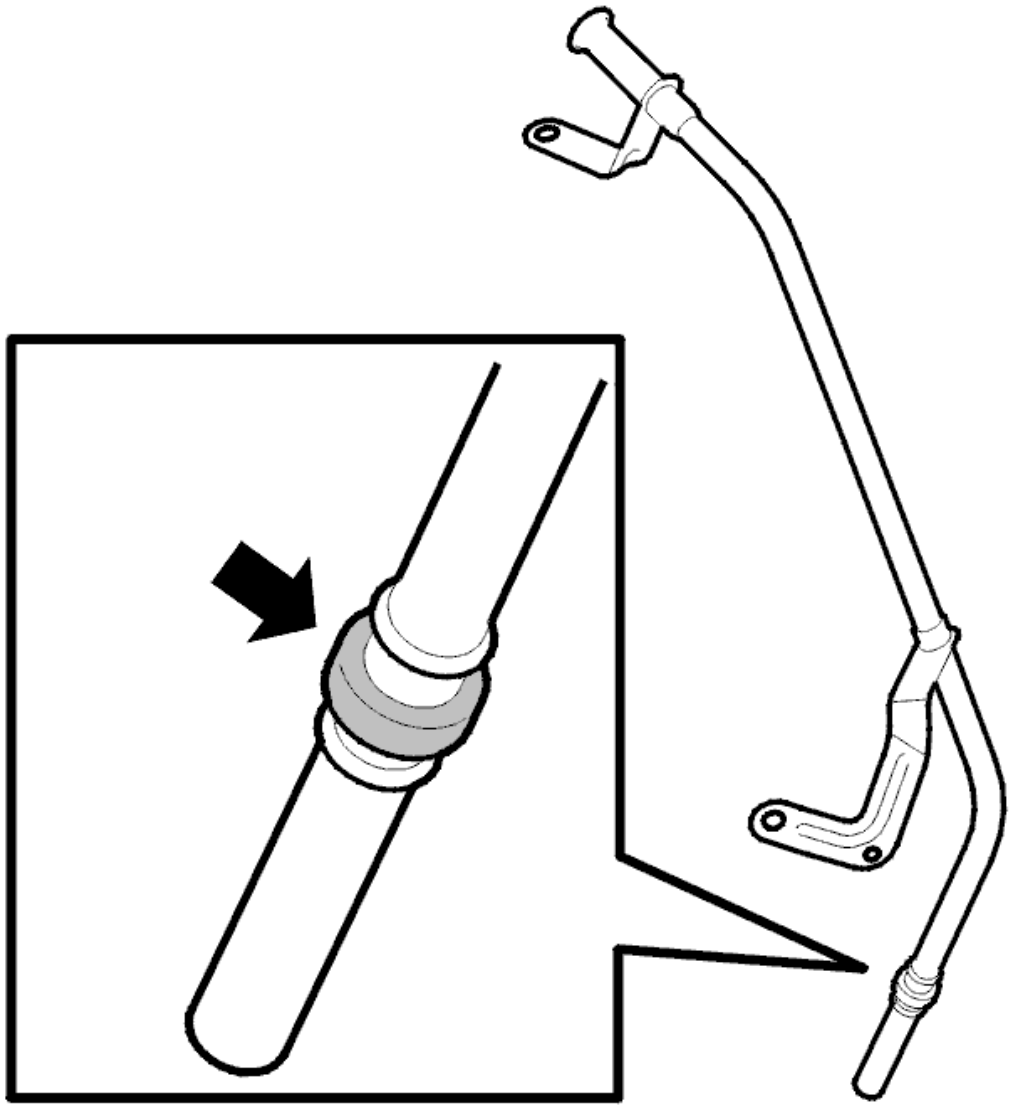


Fig. 681: Dipstick O-Ring
Courtesy of VOLVO CARS CORPORATION

Pull the pipe straight upward out of the transmission. Ensure that the O-ring stays in place on the pipe.

REMOVING THE SCREWS FOR THE TRANSMISSION AND STARTER MOTOR AND THE GROUND LEAD

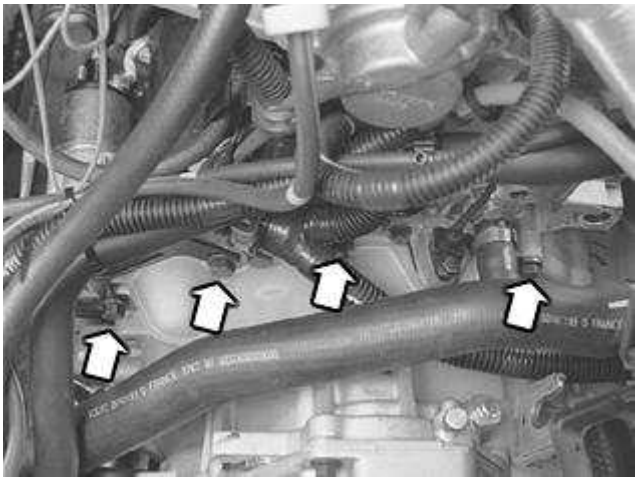


Fig. 682: Identifying Transmission, Starter Motor And Ground Lead Screws
Courtesy of VOLVO CARS CORPORATION

Remove:

- the 3 screws for the transmission/engine
- the screw for the ignition setting sender (lift up the ignition setting sender)
- the ground lead screw under the starter motor
- the screw for the clamp holding the positive cable on the engine.

Tie the hoses and the cable harness to the intake manifold.

Disconnect the speed sensor connector.

INSTALLING THE LIFTING FIXTURE

Fig. 683: Fixture 999 7018 Installed On Left Hand Side Of Engine At 2 Screws
Courtesy of VOLVO CARS CORPORATION

Install: **9997018** on the left side of the engine at the 2 screws.

Lock the fixture using the catch.

INSTALLING THE LIFTING BEAM AND LIFTING HOOK ON THE ENGINE LIFTING EYELET

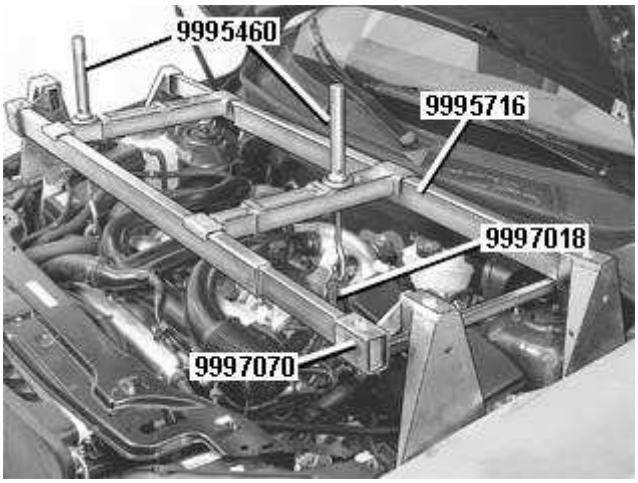


Fig. 684: Engine Lift Installed
Courtesy of VOLVO CARS CORPORATION

NOTE: The front lifting beam must be equipped with: 9997070 .

Position: **9995716** on the wheel arch and directly above the engine lifting eyes on the left and right sides.

Connect: **9995460** to the engine lifting eyelets.

On the right side of the engine, the hook must have a clearance of 10 mm.

On the left side of the engine: **9995185** must be used. Tighten to light contact on the left hand side.

DISCONNECTING THE FRONT SUSPENSION COMPONENTS

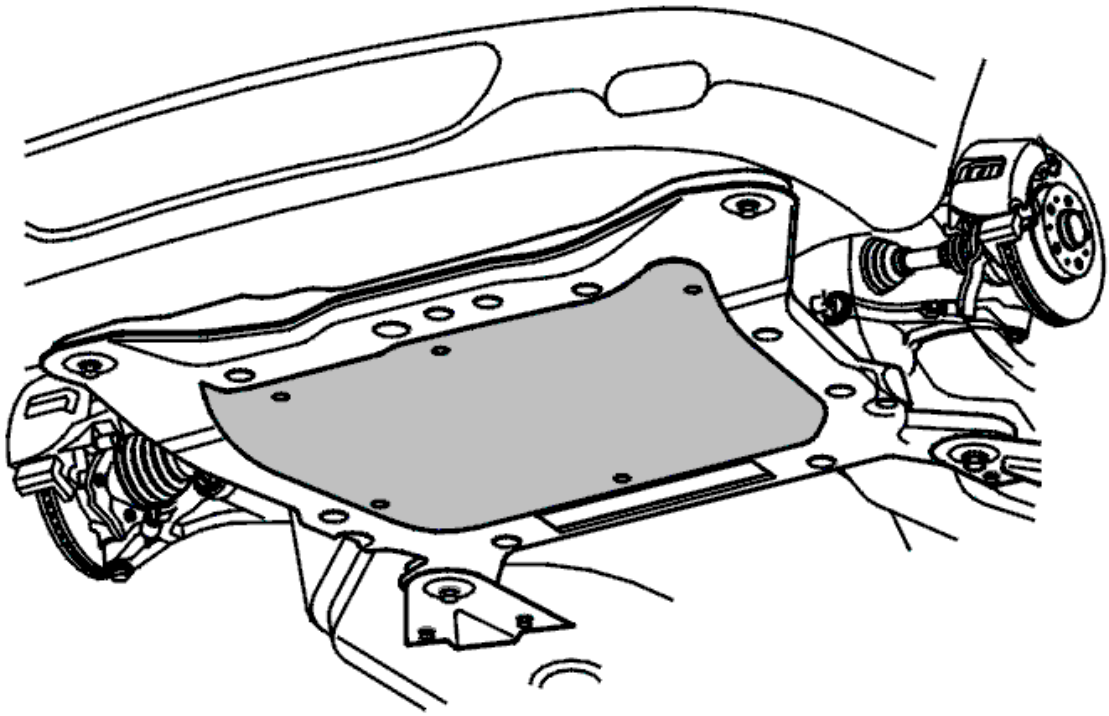


Fig. 685: Identifying Splash Guard Under Engine
Courtesy of VOLVO CARS CORPORATION

Raise the vehicle.

NOTE: Position the front lift arms so that they do not obstruct the sub-frame support plates.

Remove:

- the front wheels
- the splash guard under the engine.

REMOVING THE SCREWS FOR THE CABLE CONDUIT AND GROUND LEAD BRACKET ON THE SUB-FRAME

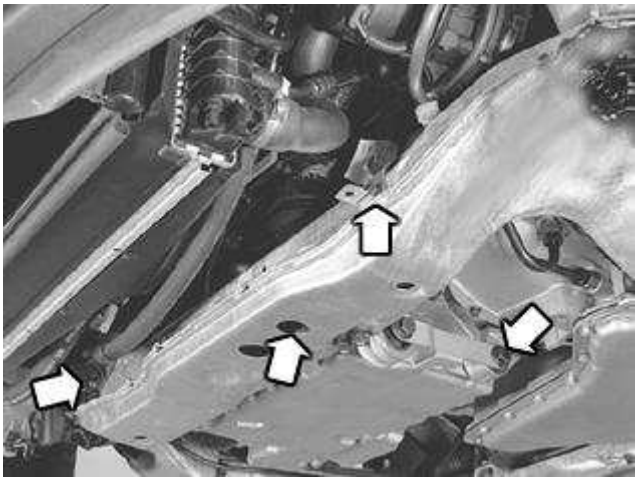


Fig. 686: Identifying Parking Heater Cable Conduit And Screws
Courtesy of VOLVO CARS CORPORATION

Remove:

- the screw for the front engine pad. See the arrow in the illustration
- the screw for the transmission torque rod
- the screw for the cable duct
- the screw for the ground lead.

Remove the nuts for the heater from the sub-frame.

Hang the heater on the left front mudguard.

NOTE: Only applies to cars with parking heater.

REMOVING THE EVAPORATOR LINE

Fig. 687: Identifying EVAP Cable
Courtesy of VOLVO CARS CORPORATION

Loosen EVAP-cable from the rubber connection and pull out the EVAP-cable from the clips on the sub-frame.

REMOVING THE SCREWS FROM THE TORQUE CONVERTER

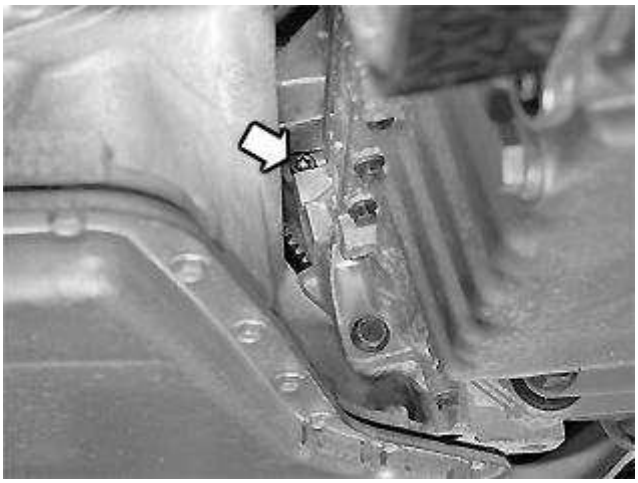


Fig. 688: Locating Screw In Cut-Out Between The Engine And The Transaxle
Courtesy of VOLVO CARS CORPORATION

NOTE: The screws for the torque converter are only removed if the screws have not been slackened off earlier when the vehicle was lowered.

Slacken off and remove the screws in the cut-out between the engine and the transmission.

Turn the engine using a screwdriver in the cut-out under the transmission.

REMOVING THE SIPS MEMBER

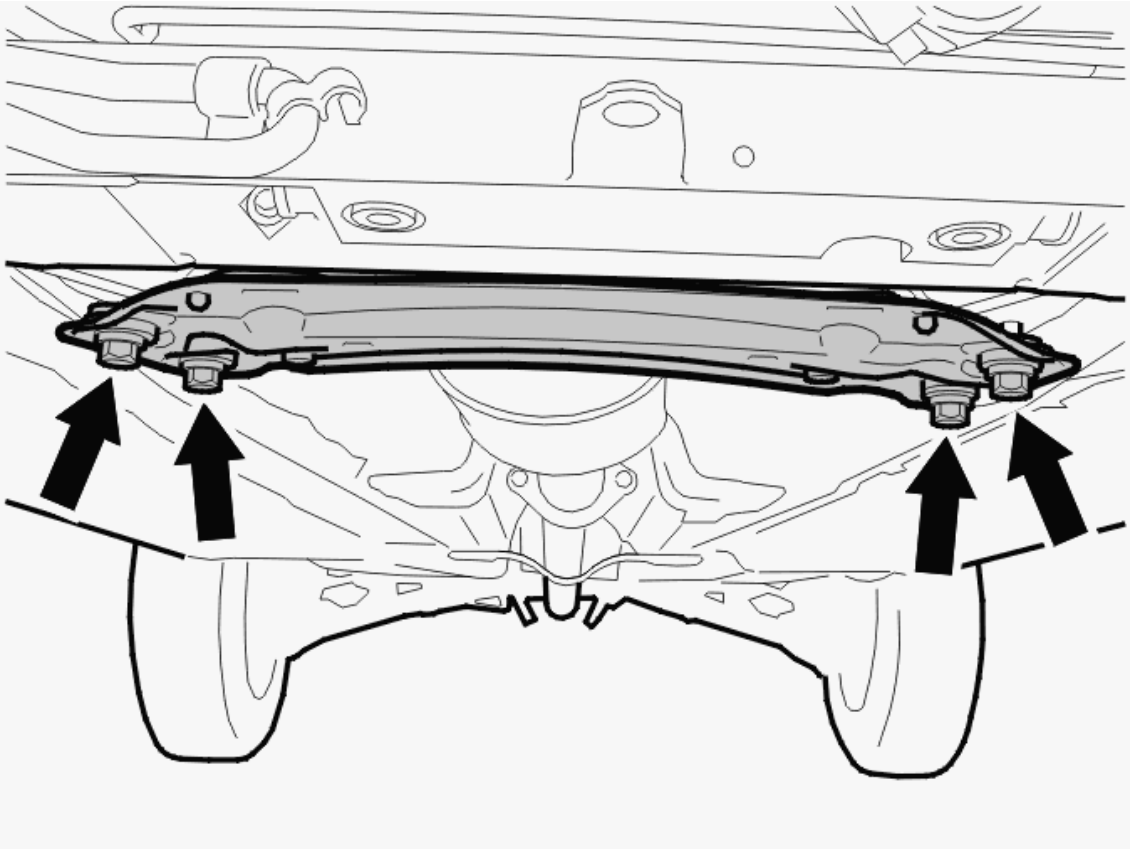


Fig. 689: Identifying SIPS Member
Courtesy of VOLVO CARS CORPORATION

Remove:

- the 4 screws for the SIPS (side impact protection system) member mounting
- the brake pipe from the snap fastener on the member
- The SIPS member.

REMOVING THE RUBBER MOUNTINGS FOR THE EXHAUST PIPE

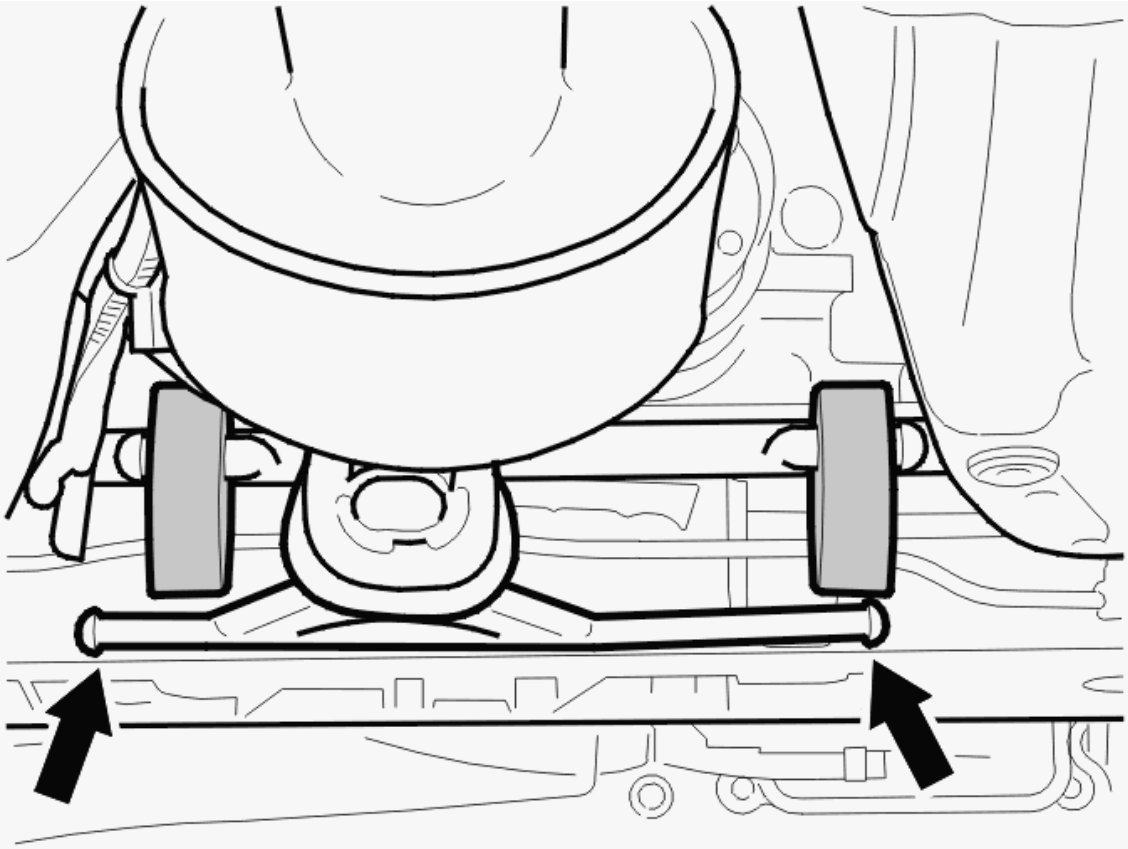


Fig. 690: Identifying Exhaust Pipe Rubber Mountings
Courtesy of VOLVO CARS CORPORATION

Remove the rubber mountings for the exhaust pipe.

REMOVING THE HEATED OXYGEN SENSORS (HO2S) CONNECTOR

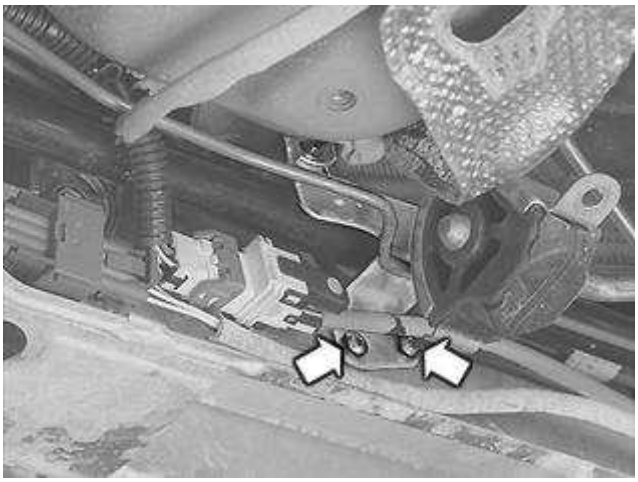


Fig. 691: Heated Oxygen Sensor Cable Bracket
Courtesy of VOLVO CARS CORPORATION

Disconnect the connector from the bracket.

REMOVING THE SCREW FOR THE REAR ENGINE MOUNTING

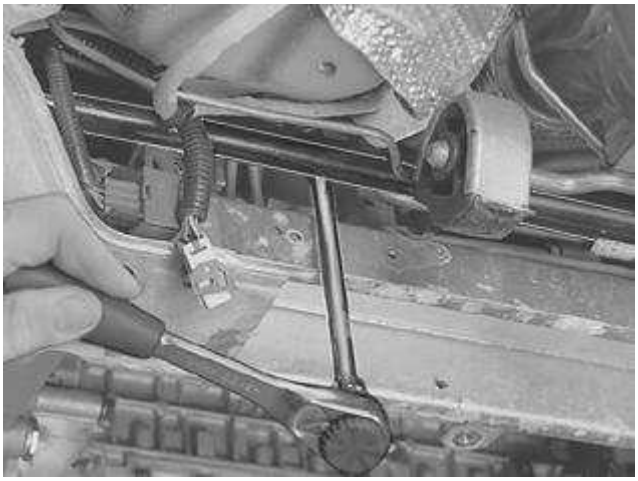


Fig. 692: Identifying Rear Engine Pad Screw Removal
Courtesy of VOLVO CARS CORPORATION

Remove 1 screw.

REMOVING THE SCREWS FOR THE RIGHT ENGINE PAD

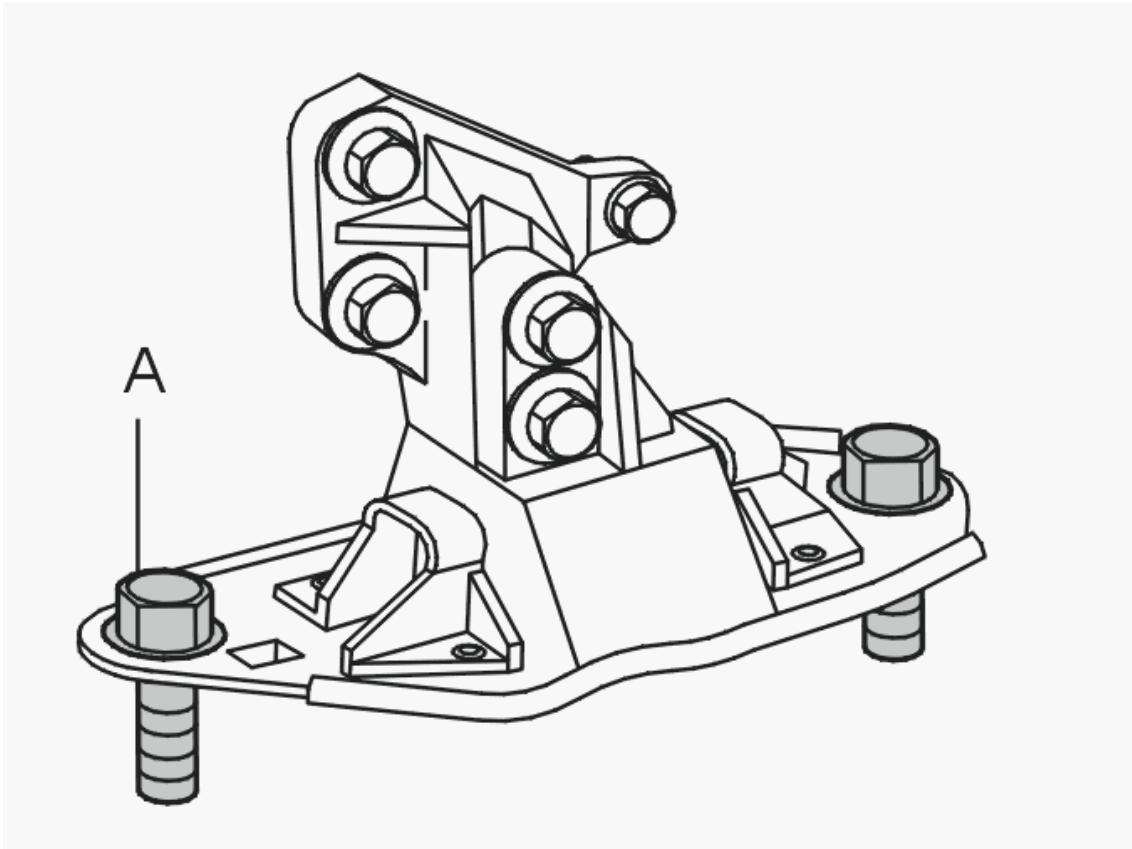


Fig. 693: Identifying Engine Pad And Screws
Courtesy of VOLVO CARS CORPORATION

Remove the 2 screws for the mounting in the sub-frame (A)

REMOVING THE NUT FROM THE BALL JOINT (BOTH SIDES)

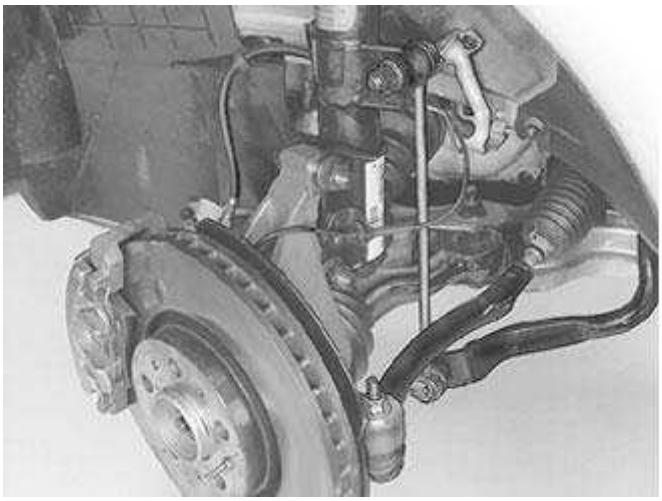


Fig. 694: Identifying Link For The Anti-Roll Bar
Courtesy of VOLVO CARS CORPORATION

See **BALL JOINT, REPLACING**

Removing the control arms for the anti-roll bar and the screw for the drive shaft on both sides

Remove

- The link for the anti-roll bar up on the spring strut. Hold with Torx 30. Do not twist the rubber boot.
- The screw for the drive shaft

REMOVING THE NUTS AND SCREWS FOR THE STEERING GEAR SUB-FRAME

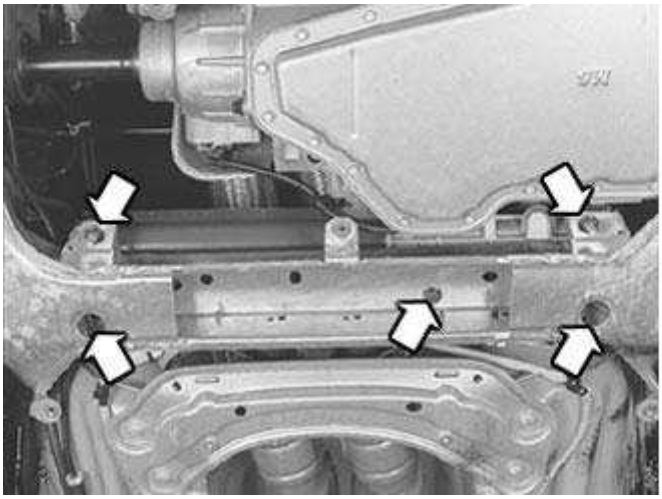


Fig. 695: Installing New Lock Nuts On The Steering Gear
Courtesy of VOLVO CARS CORPORATION

Remove the nuts and the screws from the steering gear sub-frame.

LOWERING THE SUB-FRAME

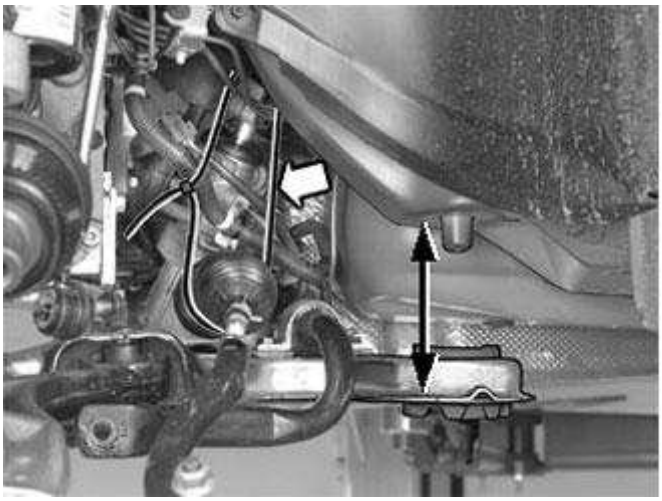


Fig. 696: Hanging The Steering Gear
Courtesy of VOLVO CARS CORPORATION

Hang up the steering gear in a tie strap on both sides

NOTE: Ensure that the screws for the steering gear release from the frame.

LOWERING THE SUB-FRAME WITH THE STEERING GEAR

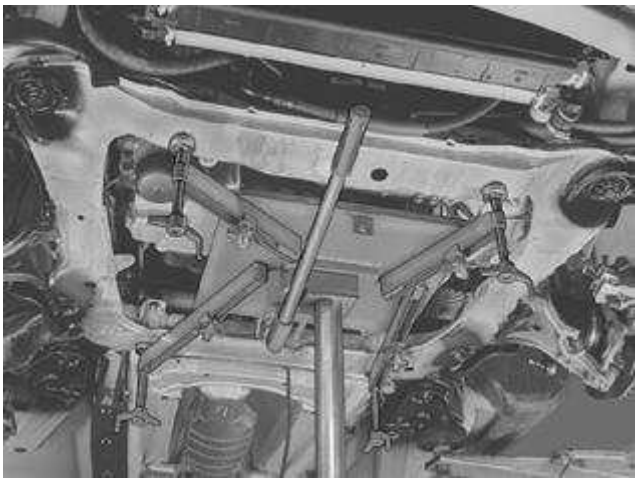


Fig. 697: Engine Supported with Lifting Table
Courtesy of VOLVO CARS CORPORATION

CAUTION: Ensure that the lifting table is centered under the engine.

Position a lifting table under the sub-frame. Secure the table against the sub-frame.

Slacken off and remove the screws for the sub-frame support plates and for the sub-frame.

Lower the sub-frame approximately 140 mm.

Remove the two screws on the right side of the anti-roll bar. Fold out the fuel line.

Carefully lower and remove the sub-frame.

NOTE: Ensure that the brake pipe clears the exhaust pipe mounting when lowering the frame.

REMOVING THE DRIVE SHAFTS FROM THE WHEEL SPINDLES

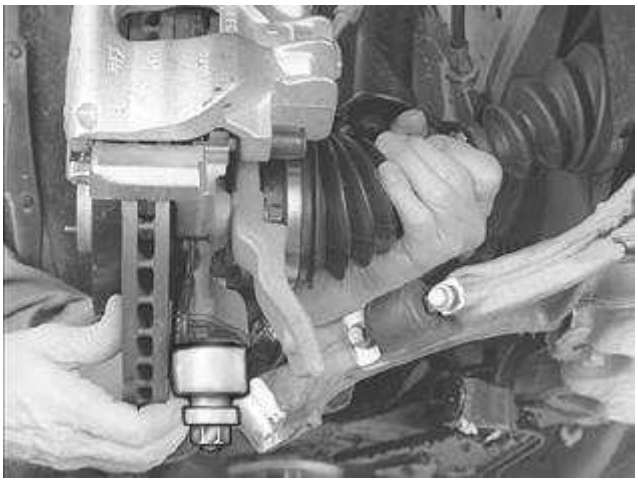


Fig. 698: Identifying Removal Of Wheel Spindle From Control Arm
Courtesy of VOLVO CARS CORPORATION

Grip the drive shafts.

Pull the brake disc outwards. At the same time, pull on the constant velocity joint towards the transmission so that the drive shaft loosens.

REMOVING THE LEFT DRIVE SHAFT FROM THE GEARBOX

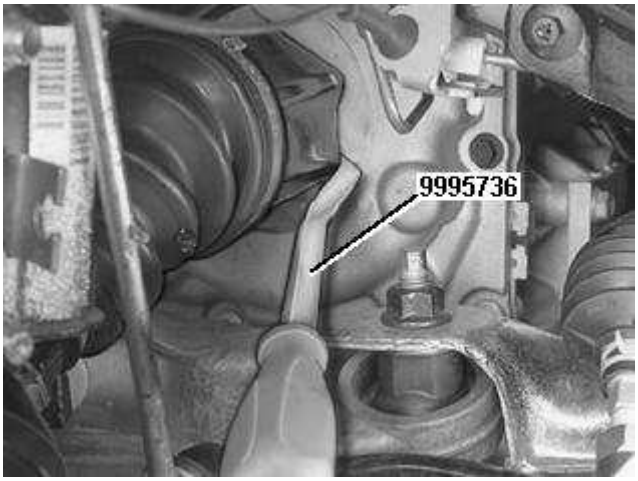


Fig. 699: Identifying Drive Shaft Removal From Transmission Using Jimmy Tool 999 5736
Courtesy of VOLVO CARS CORPORATION

Use: **9995736** .

NOTE: **Do not damage the seal.**

NOTE: **Do not pull the drive shaft in a way that could cause the joints to separate. The joints do not have axial stops.**

REMOVING THE DRIVE SHAFT

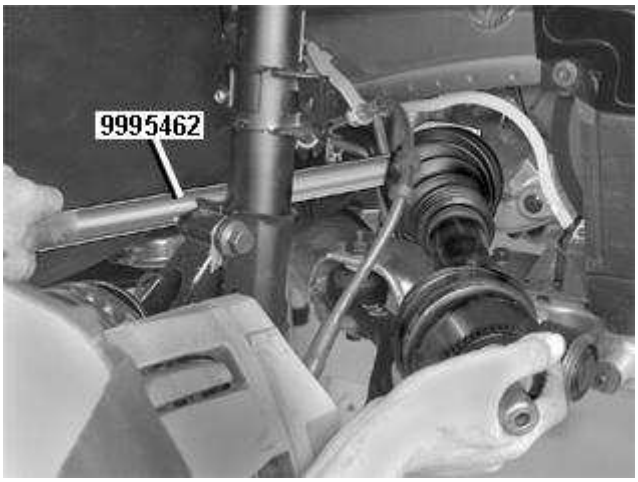


Fig. 700: Detach The Drive Shaft With Jimmy Bar
Courtesy of VOLVO CARS CORPORATION

See: **REMOVING THE GEARBOX**.

Angle the wheel hub out. Remove the drive shaft from the hub.

Use a tensioner band to pull the wheel spindle and wheel hub backwards.

Remove the drive shaft from the transmission. Use: **9995462** .

CAUTION: Do not damage the sealing ring in the chain housing when removing the drive shaft.

Install: **9997063** .

PAY ATTENTION TO THE FOLLOWING WHEN REMOVING PROPELLER SHAFT

Follow instructions. **PROPELLER SHAFT, SPECIAL INFORMATION**

REMOVING THE PROPELLER SHAFT

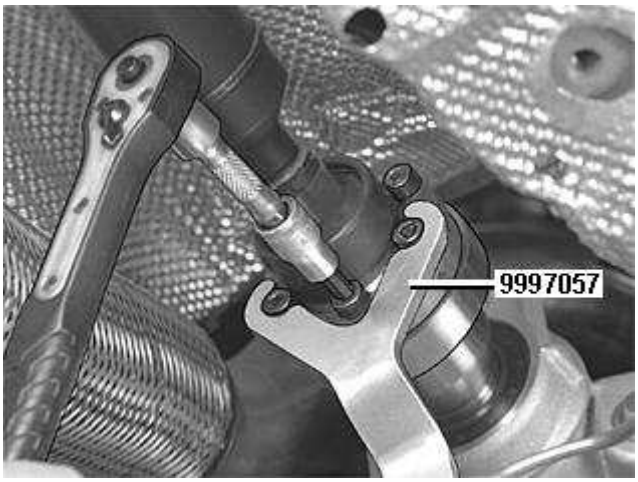


Fig. 701: Identifying Removal Of Propeller Shaft Using Counterhold
Courtesy of VOLVO CARS CORPORATION

Mark the propeller shaft CV joint in relation to the bevel gear flange.

Remove:

- the 2 screws for the center bearing mounting
- the propeller shaft screws. Use: **9997057** .

Press the propeller shaft joints together. Move the propeller shaft to one side and tie it up.

REMOVING THE ENGINE MOUNTING TOGETHER WITH THE BRACKET AND THE SPLASH GUARD

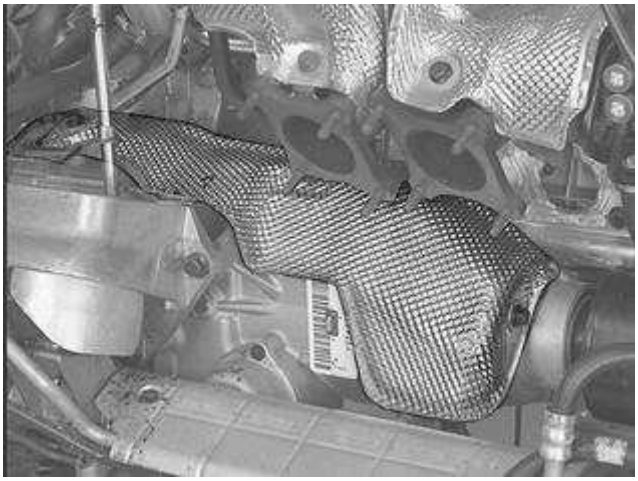


Fig. 702: Identifying Splash Guard Above Transmission
Courtesy of VOLVO CARS CORPORATION

Slacken off the 4 screws on the engine mounting to the transmission. Slacken off the screw on the bracket that extends from the top of the engine mounting to the top of the transmission (not the nut on the top of the rubber mounting).

Slacken off the screw on the splash guard beside the right drive shaft.

Remove the engine mounting together with the splash guard.

REMOVING THE OIL PIPE FROM THE GEARBOX

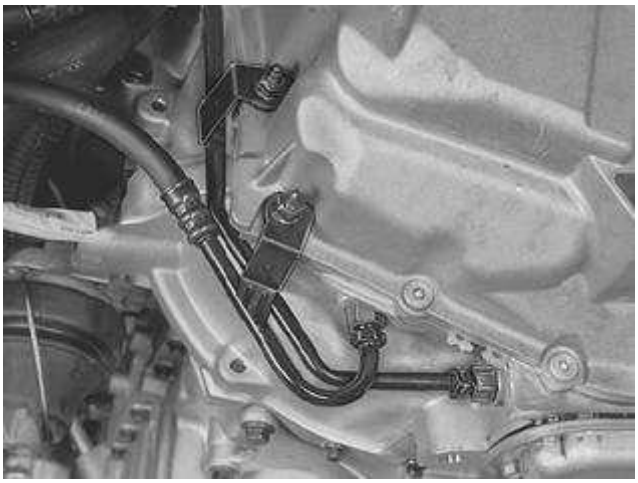


Fig. 703: Gearbox Oil Pipe
Courtesy of VOLVO CARS CORPORATION

NOTE: Plug the oil pipes so that no dirt gets in.

Remove the nuts from the brackets for the oil pipes.

Undo the screw nipples. Counterhold at the connections.

Pull out the oil pipes.

Move the oil pipes to one side.

Lower the vehicle.

LOWERING THE ENGINE AND TRANSMISSION

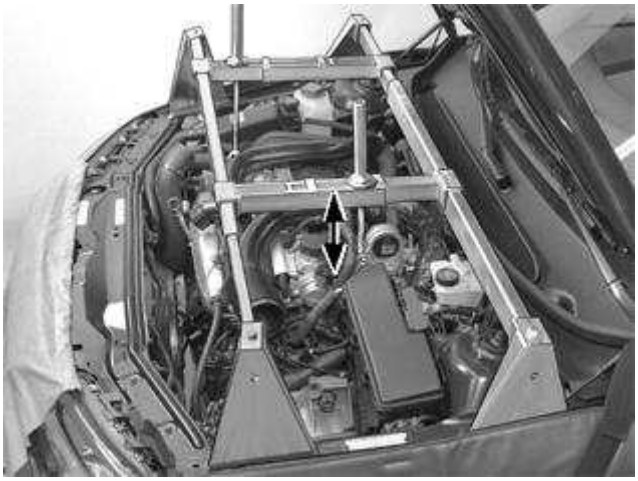


Fig. 704: Identifying Lowering Of Engine And Transmission
Courtesy of VOLVO CARS CORPORATION

Lower the engine / transmission on the left side using the hook.

Lower the engine so that the distance between the upper edge of the mounting bracket and the engine is approximately 350 mm, as illustrated.

Raise the vehicle.

REMOVING THE HEATED OXYGEN SENSOR (HO2S) CONNECTORS FROM THE BRACKET ON THE TRANSMISSION

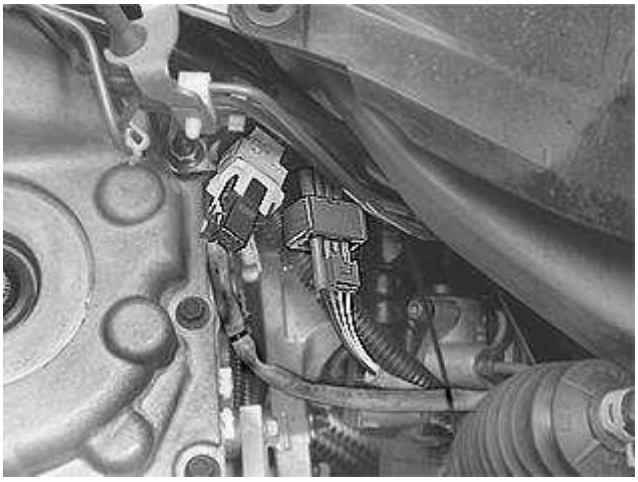


Fig. 705: Heated Oxygen Sensor

Courtesy of VOLVO CARS CORPORATION

Disconnect the connectors from the bracket.

Remove the nut on the bracket and the clamp holding the cable harness.

PREPARATIONS FOR REMOVAL OF THE TRANSMISSION

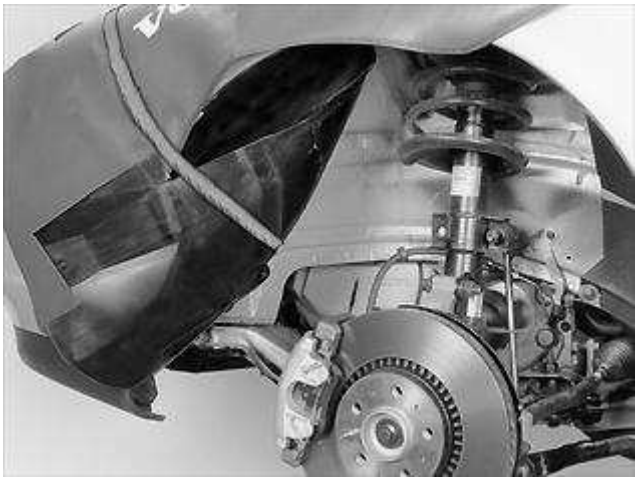


Fig. 706: Fender Liner Tied Up To Lifting Beam Using A Retaining Strap
Courtesy of VOLVO CARS CORPORATION

Remove:

- the 2 nuts for the wing liner. Angle out and tie up the wing liner to the lifting beam using a retaining strap
- the ABS line from the spring strut.

INSTALLING THE FIXTURE ON THE MOBILE JACK

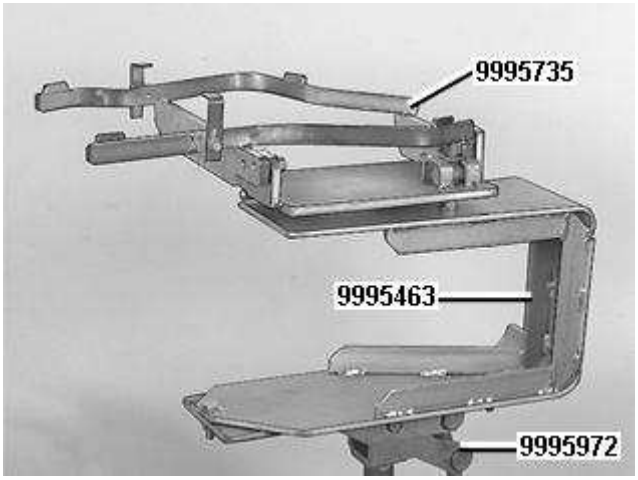


Fig. 707: Identifying Fixture Installed On Mobile Jack
Courtesy of VOLVO CARS CORPORATION

Install:

- **9995463** to **9995972** . Use the fixture and plate together with: **9985972**
- **9995735** to: **9995463** .

ALIGNING THE FIXTURE ON THE TRANSMISSION

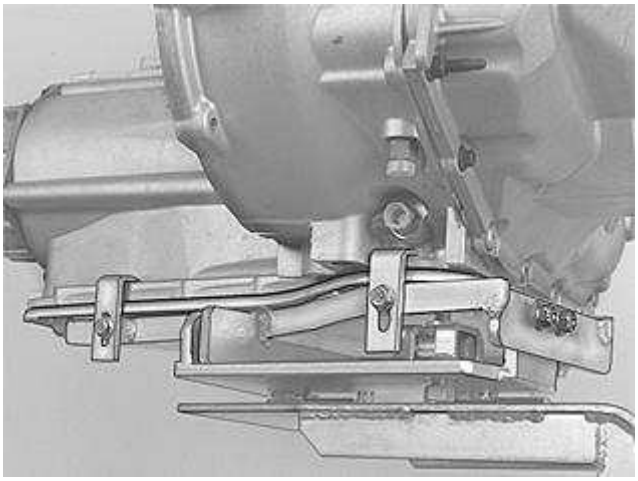


Fig. 708: Aligning Fixture On Transmission
Courtesy of VOLVO CARS CORPORATION

Align: **9995735** under the transmission.

Fold up the side mountings over the edge of the transmission and secure.

REMOVING THE CHAIN HOUSING BRACKET

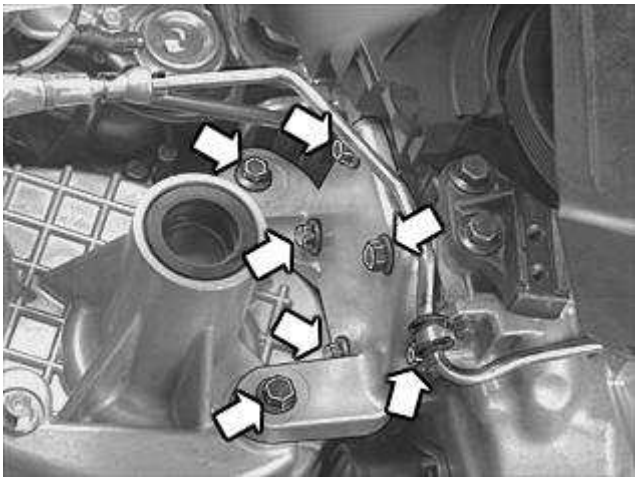


Fig. 709: Identifying Chain Housing Bracket Screws
Courtesy of VOLVO CARS CORPORATION

Remove:

- the screw in the clamp for the fuel line.
- the bracket for the chain housing/engine.

REMOVING THE BEVEL GEAR/CHAIN HOUSING

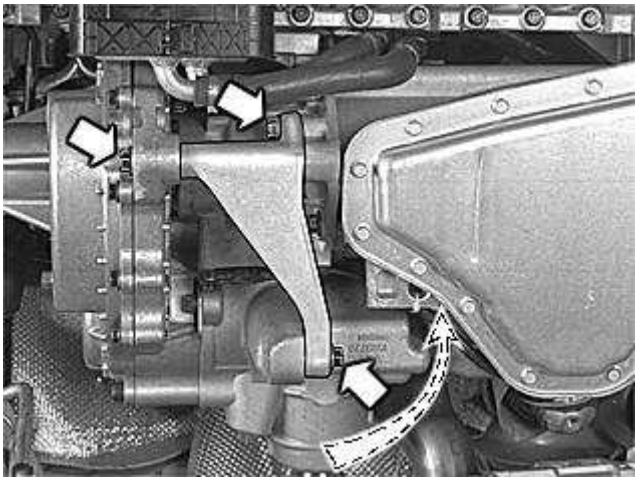


Fig. 710: Locating Screw For The Bevel Gear/Engine
Courtesy of VOLVO CARS CORPORATION

Drain the fluid from the transmission. Use an oil suction device to drain approximately 4 liters of transmission fluid.

Remove:

- the screw for the bevel gear/engine.

HINT: The screw is positioned on top of the bevel gear. The screw can be accessed from the center.

- the screw between the chain housing/bracket and the other screws in the bracket.

Pull the chain housing/bevel gear 5-10 mm out from the gearbox. Then remove the bracket. The bracket is upturned with a guide sleeve in the gearbox end.

NOTE: Two people are required to carry out the following procedure. The bevel gear/chain housing is relatively heavy.

Remove the bevel gear/chain housing by first pulling it straight out from the gearbox.

CAUTION: Do not damage the sealing ring in the transmission end.

Then turn the unit so that it can be removed to the side and downwards.

CHECKING THE SEALING RING

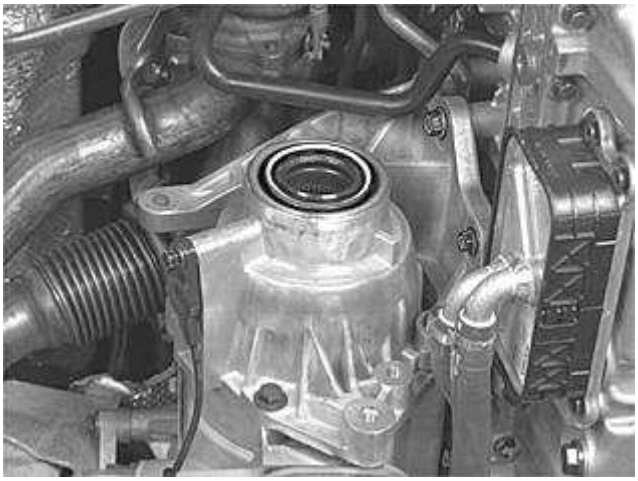


Fig. 711: Identifying The Sealing Ring
Courtesy of VOLVO CARS CORPORATION

Check that the sealing ring in the transmission end is undamaged.

NOTE: If the sealing ring is damaged, replace with a new one. See: SEAL DRIVE SHAFT RIGHT, REPLACING .

REMOVING THE GEARBOX

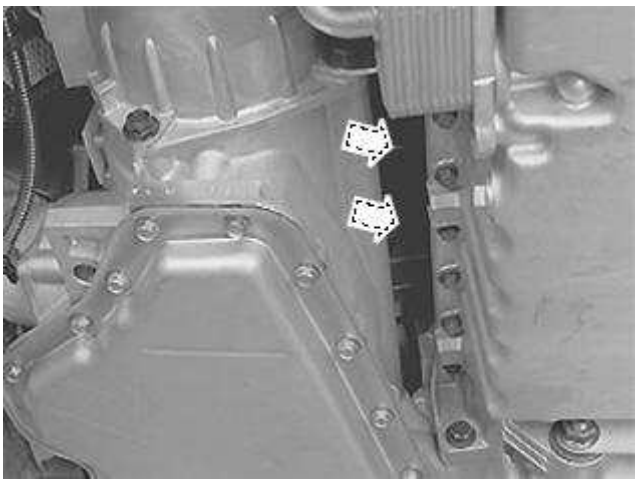


Fig. 712: Differential Housing Screws
Courtesy of VOLVO CARS CORPORATION

Remove:

- the 2 screws on the bracket at the differential housing
- the screw positioned furthest in and highest up at the engine/transmission
- the remaining 4 screws for the engine/transmission.

Pull the transmission straight out in relation to the engine.

NOTE: Lower the transmission slightly when it is being removed so that it will go past the side member.

Continue pulling the transmission straight out.

NOTE: Ensure that the torque converter is also removed.

FLUSHING THE OIL COOLER AND OIL HOSES

The oil cooler and hoses must always be flushed through when replacing the transmission.

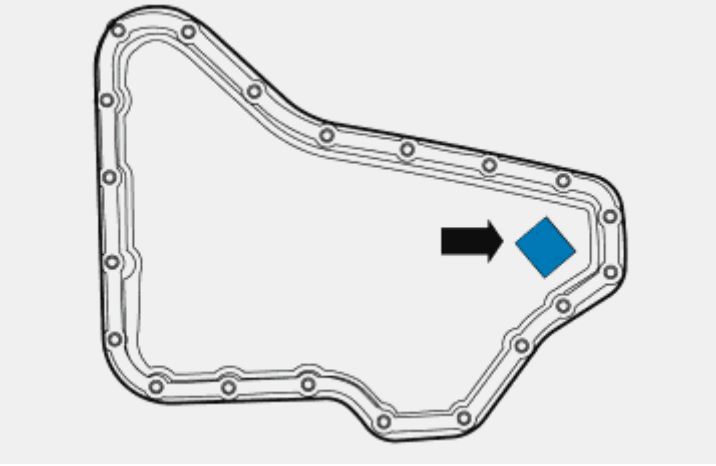


Fig. 713: Locating Magnet In Oil Pan
Courtesy of VOLVO CARS CORPORATION

Remove the oil pan. Check for metal particles on the magnet.

Replace the oil cooler and oil pipes if there is:

- Glycol in the transmission fluid
- Metal particles in the transmission fluid
- Burned or dirty oil.

TRANSMISSION, AUTOMATIC (B6324S, TF-80SC; 2007-2010)

CONTROL SYSTEMS

REMOVING THE CABLE HARNESS

Remove the wiring harness from the control system. **TRANSMISSION CONTROL UNIT WIRING HARNESS** .

Fig. 714: Identifying Cable Harness Protected With Tape
Courtesy of VOLVO CARS CORPORATION

NOTE: Protect the cable harness by taping it to the outside of the transmission.

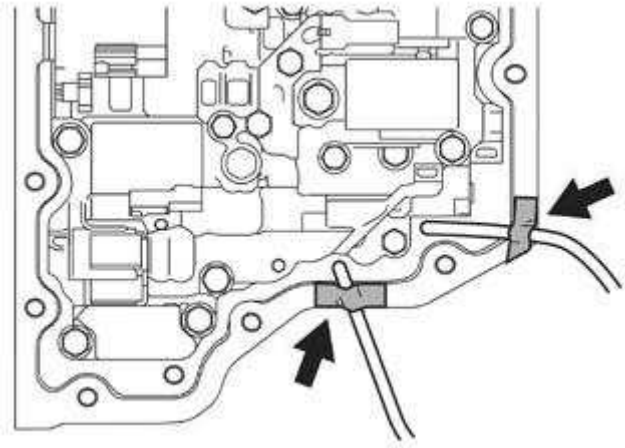


Fig. 715: Identifying Cable Harness Ends Secured To Transmission Case
Courtesy of VOLVO CARS CORPORATION

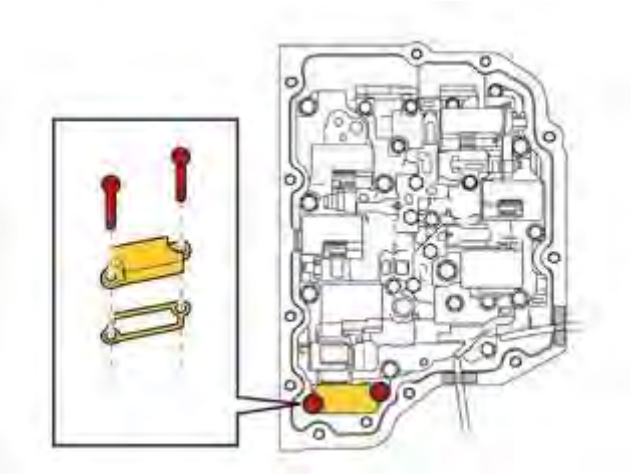


Fig. 716: Identifying Gasket & Bolts
Courtesy of VOLVO CARS CORPORATION

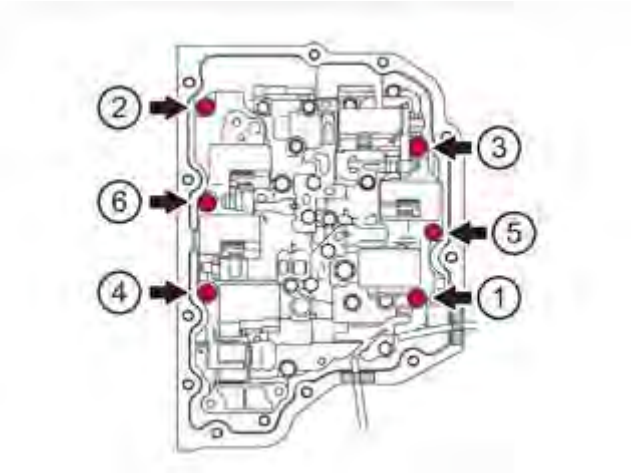


Fig. 717: Identifying Screw Removal Sequence
Courtesy of VOLVO CARS CORPORATION

Fig. 718: Identifying Control System Rod
Courtesy of VOLVO CARS CORPORATION

Fig. 719: Identifying Control System Rod
Courtesy of VOLVO CARS CORPORATION

CAUTION: Ensure that the cable harness is not trapped when the control system is positioned.

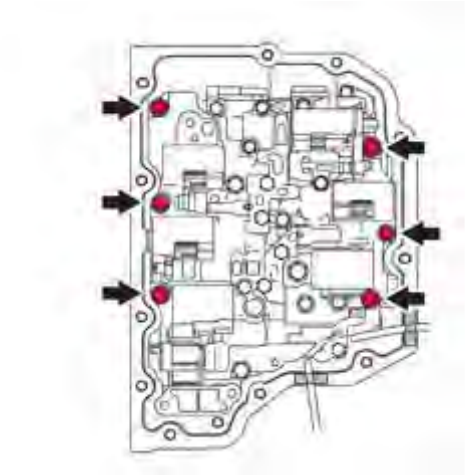


Fig. 720: Identifying Transmission Bolts
Courtesy of VOLVO CARS CORPORATION

Lightly tighten.

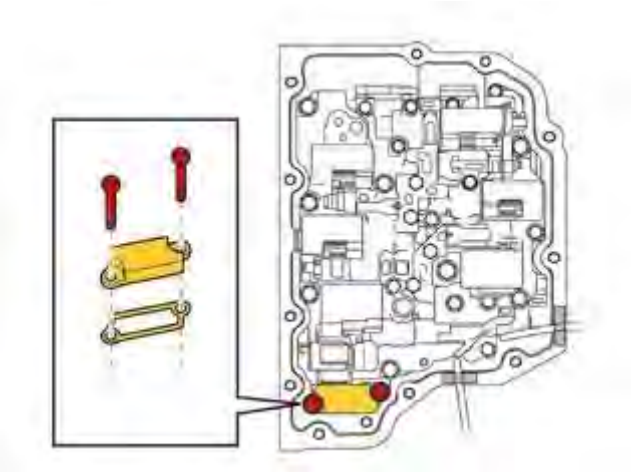


Fig. 721: Identifying Gasket & Bolts
Courtesy of VOLVO CARS CORPORATION

Use **new** screws and a **new** gasket.

Lightly tighten.

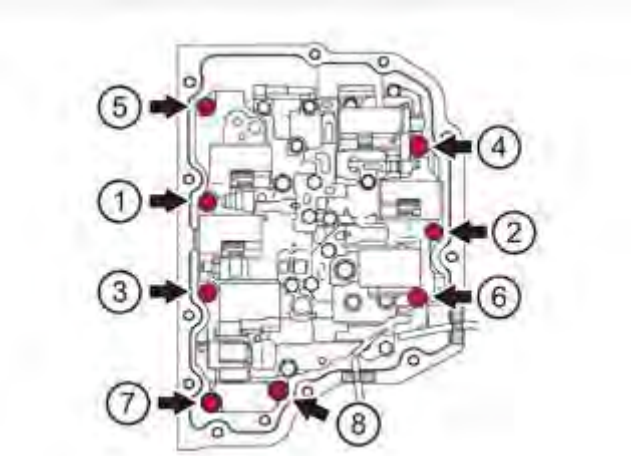


Fig. 722: Identifying Transmission Bolts Installation Sequence
Courtesy of VOLVO CARS CORPORATION

Tighten alternately, M6.

INSTALLING THE CABLE HARNESS

Install the wiring harness to the control system. **TRANSMISSION CONTROL UNIT WIRING HARNESS** .

COVER CONTROL SYSTEM, REPLACING

NOTE: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

REMOVAL

Remove the auxiliary brackets. See: **AUXILIARY BRACKETS**

Remove the subframe front. See: **SUB-FRAME FRONT, REPLACING** .

NOTE: Leave the container in place for the next few procedures relating to removal.

REMOVING LEVEL PLUG/DRAINING PLUG

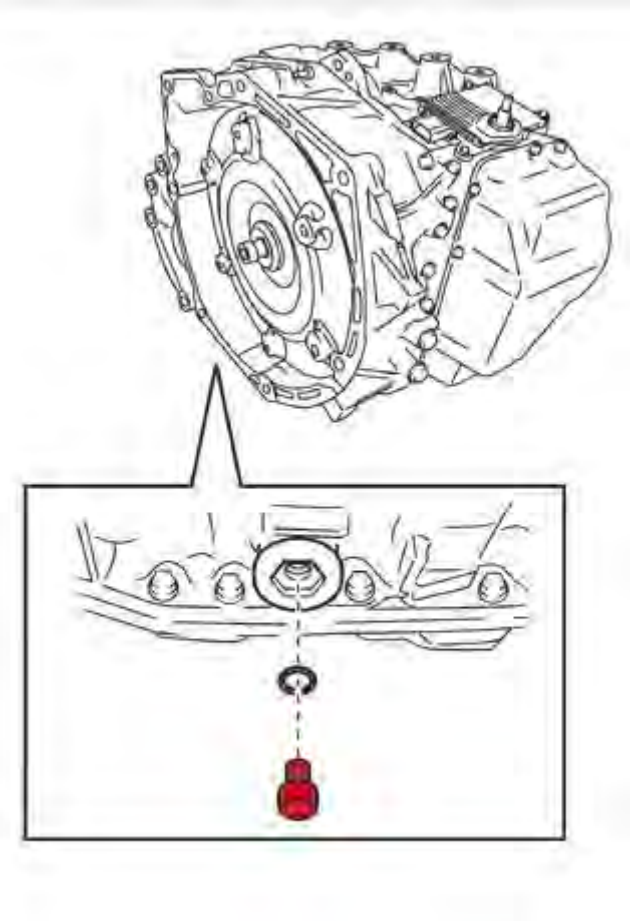


Fig. 723: Identifying Transmission Fluid Level Check
Courtesy of VOLVO CARS CORPORATION

Remove the integrated level plug/Torx.

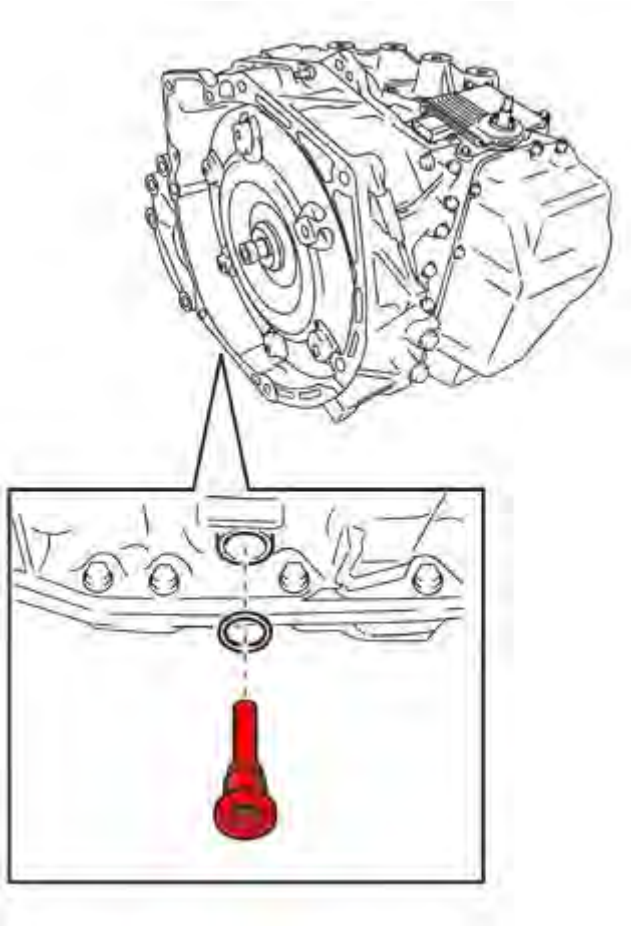


Fig. 724: Identifying Transmission Draining Plug
Courtesy of VOLVO CARS CORPORATION

Remove the draining plug.

When the transmission is empty:

- use **new** gaskets
- lubricate the gaskets. Use ATF-oil
- tighten both. See: **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** .

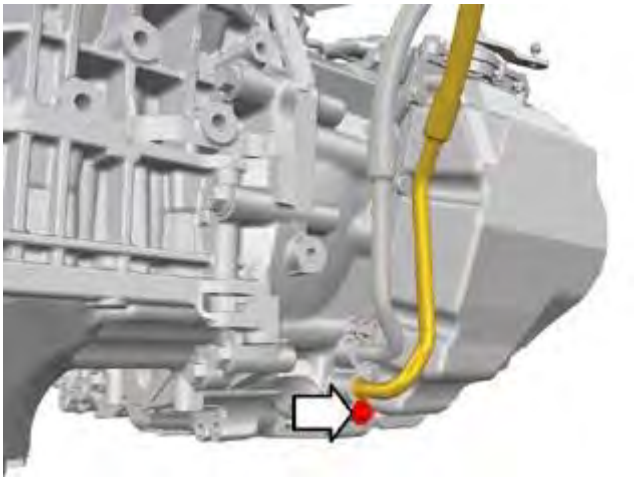


Fig. 725: Locating Plastic Plug In Drain Hole
Courtesy of VOLVO CARS CORPORATION

HINT: To prevent leakage, install a plastic plug in the hole.

REMOVING THE COVER

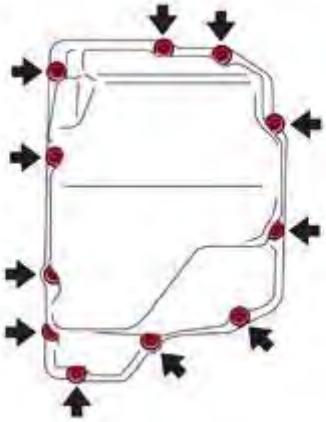


Fig. 726: Identifying Cover Bolts
Courtesy of VOLVO CARS CORPORATION

Remove torx TX40.

Clean off any sealant from the threads. Use thread tap M8 x 1.25.

REMOVING THE CONTROL SYSTEM COVER

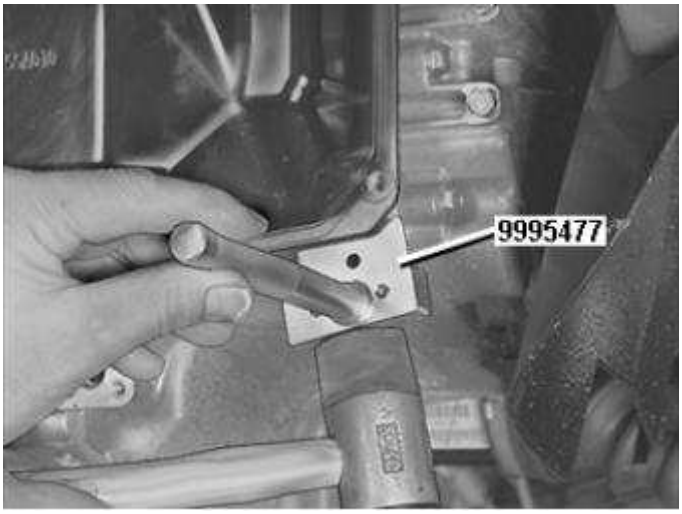


Fig. 727: Identifying Gasket Wedge Tapped Into Joint
Courtesy of VOLVO CARS CORPORATION

Remove the cover.

Use joint wedge **9995477** , which is carefully tapped in between the cover and transmission so that the cover's sealing flange is not warped.

CLEANING THE COVER

CAUTION: Ensure that no debris enters the transmission.

Clean gasket residue from the cover and transmission. Clean the cover thoroughly. Check that the contact surface of the cover is flat.

INSTALLATION

CLEANING COVER

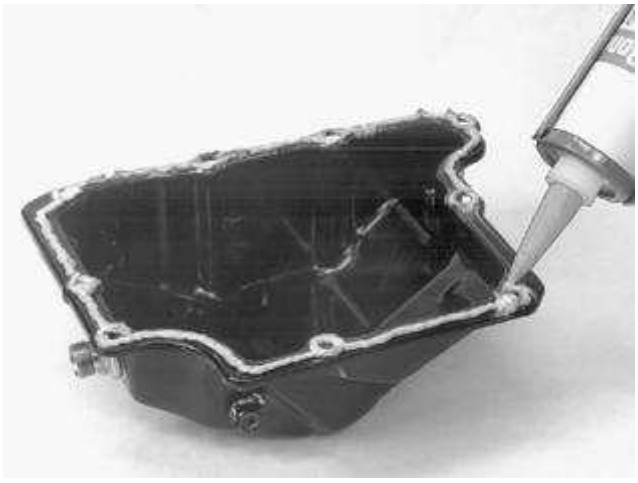


Fig. 728: Applying Sealant To Cover
Courtesy of VOLVO CARS CORPORATION

Wipe the cleaned mating surfaces of the cover and the transmission dry. Use Isopropanol

Apply a bead of sealant, P/N 116 1409-6, approximately 3 mm thick on the cover.

Also apply sealant around the screw holes.

INSTALLING COVER

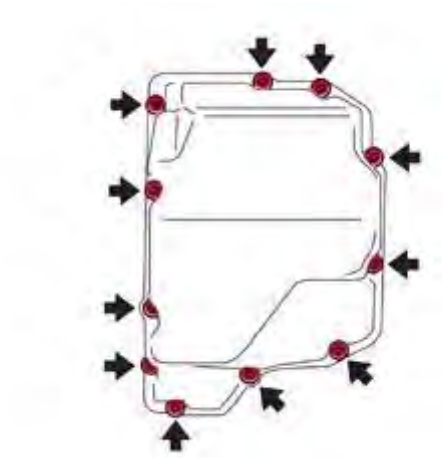


Fig. 729: Identifying Cover Bolts
Courtesy of VOLVO CARS CORPORATION

NOTE: Ensure that the sealant is not rubbed when the cover is installed.

Use **new** screws.

Tighten:

- alternately to light contact
- see: **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** .

INSTALLING THE SUBFRAME

Install the subframe front. See: **SUB-FRAME FRONT, REPLACING** .

Install the auxiliary brackets. See: **AUXILIARY BRACKETS**

FILLING OF OIL

Top up oil. See: **TRANSAXLE OIL**.

SEALING RING, GEAR SHIFT LINKAGE ROD

Special tools	
	T9995919 PULLER (SEAL-DRIVE PINION, CAM-CRANKSHAFT)B200-6304 **Tool number:** T9995919 **Tool description:** PULLER (SEAL-DRIVE PINION, CAM-CRANKSHAFT)B200-6304 **Tool boards:**
	T9995476 DRIFT (INSTALL-SEALING RING, GEAR SHIFT LINKAGE ROD) AW30-40, AW50-42 **Tool number:** T9995476 **Tool description:** DRIFT (INSTALL-SEALING RING, GEAR SHIFT LINKAGE ROD) AW30-40, AW50-42 **Tool boards:**

NOTE: Removal steps in this procedure may contain installation details.

Remove the transmission control module (TCM). **TRANSMISSION CONTROL MODULE (TCM)**.

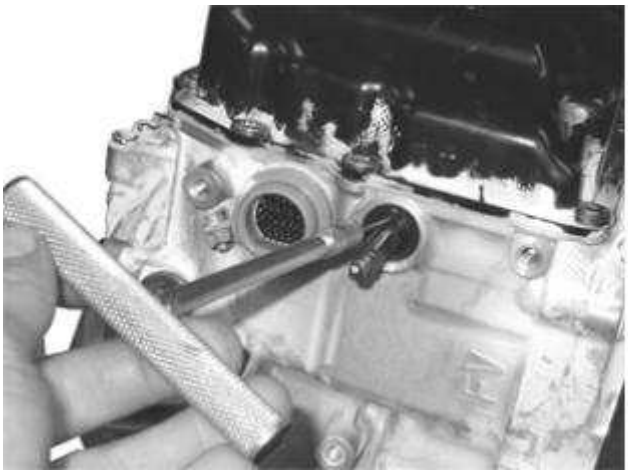


Fig. 730: Identifying Sealing Ring, Gear Shift Linkage Rod and Tool 9995919
Courtesy of VOLVO CARS CORPORATION

9995919 .

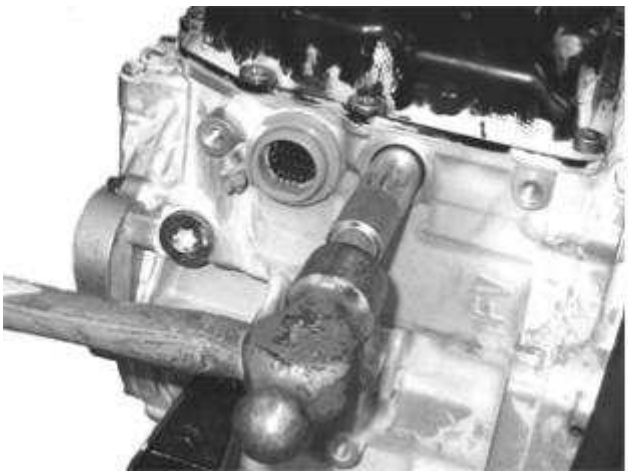


Fig. 731: Identifying Seal Installing Tool 9995476
Courtesy of VOLVO CARS CORPORATION

9995476 .

To install, reverse the removal procedure

SEALING RING, TORQUE CONVERTER

Special tools	
	T9995069 PULLER (SEALS) **Tool number:** T9995069 **Tool description:** PULLER (SEALS) **Tool boards:**
	T9997184 DRIFT **Tool number:** T9997184 **Tool description:** DRIFT **Tool boards:**

NOTE: Removal steps in this procedure may contain installation details.

Remove the transaxle. **TRANSMISSION** (B6324S5, TF-80SC AWD, B6324S, TF-80SC AWD; 2007-2012) or **TRANSMISSION** (B6324S5, TF-80SC; 2011-2012).

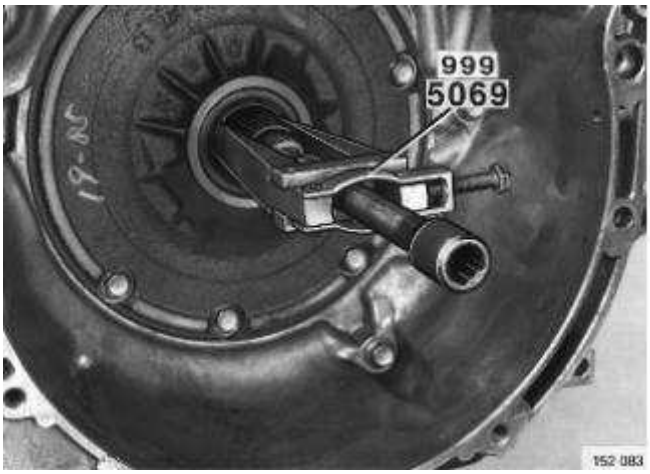


Fig. 732: Identifying Seal Puller 9995069
Courtesy of VOLVO CARS CORPORATION

9995069 .

Fig. 733: Identifying Seal Installer 9997184
Courtesy of VOLVO CARS CORPORATION

9997184 .

To install, reverse the removal procedure

Install the transaxle. **TRANSMISSION** (B6324S, TF-80SC; 2007-2010; B6324S5, TF-80SC; 2011-2010) or **TRANSMISSION** (B6324S5, TF-80SC AWD; B6324S, TF-80SC AWD; 2007-2012).

TRANSAXLE OIL

Special tools	
	T9997278 WRENCH **Tool number:** T9997278 **Tool description:** WRENCH **Tool boards:**
	T9997363 HOSE **Tool number:** T9997363 **Tool description:** HOSE **Tool boards:**

CHANGING TRANSMISSION FLUID

Fig. 734: Identifying Lower Engine Cover
Courtesy of VOLVO CARS CORPORATION

Remove the splash guard.

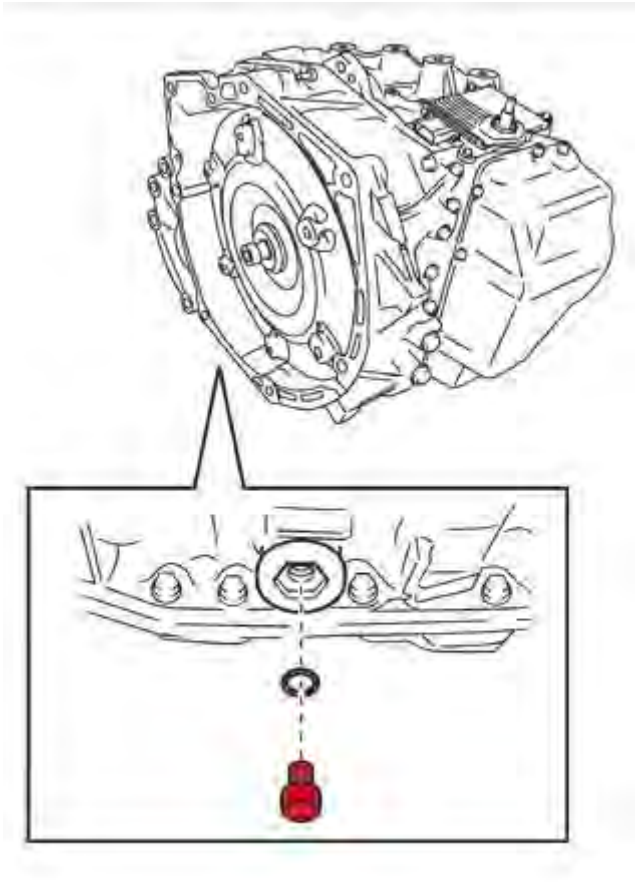


Fig. 735: Identifying Transmission Fluid Level Check
Courtesy of VOLVO CARS CORPORATION

WARNING: Avoid skin contact with the specified material.

WARNING: Be prepared to collect escaping fluid.

Integrated level plug/Torx.

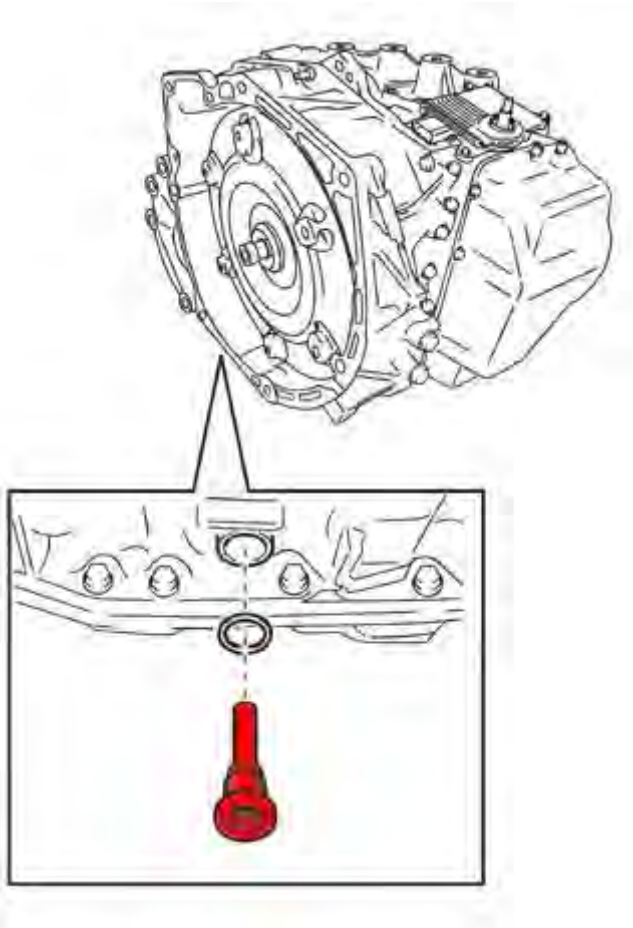


Fig. 736: Identifying Transmission Draining Plug
Courtesy of VOLVO CARS CORPORATION

Remove the draining plug.

Drain the transmission fluid.

Install the drain plug. Use a new gasket, lubricate it with ATF oil. Tighten to: **TIGHTENING TORQUE**

9997278

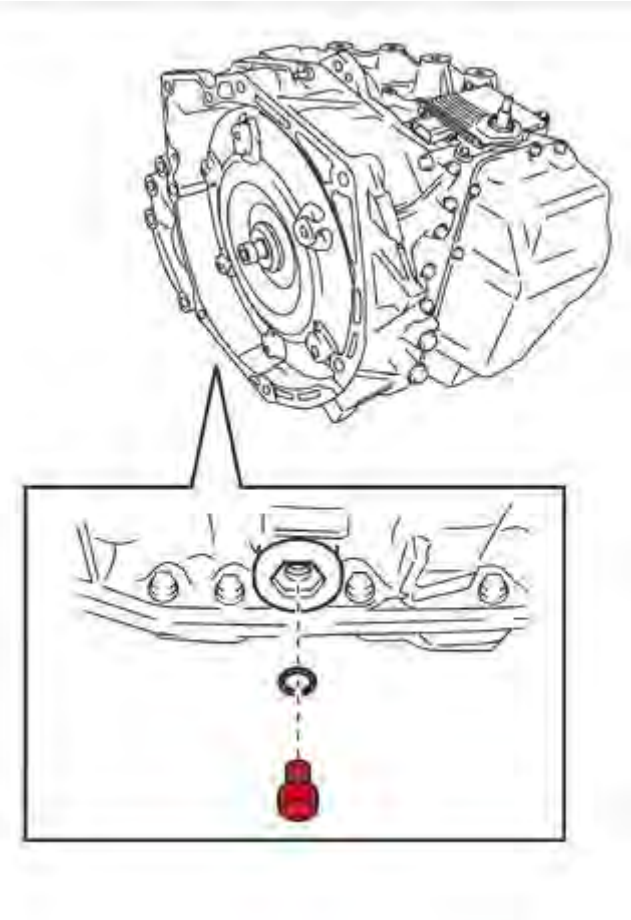


Fig. 737: Identifying Transmission Fluid Level Check
Courtesy of VOLVO CARS CORPORATION

Install the level plug by hand, Reuse the O-ring.

Remove the air cleaner (ACL) housing. **AIR CLEANER HOUSING**

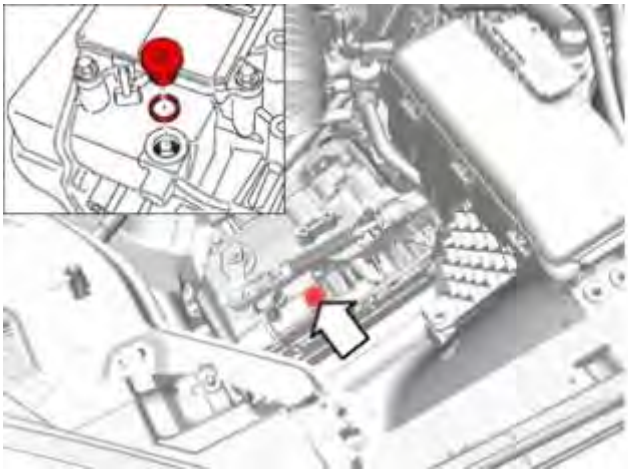


Fig. 738: Locating Transmission Filler Plug

Courtesy of VOLVO CARS CORPORATION

CAUTION: Make sure that tools and equipment are clean, free of foreign material and lubricant.

Remove the filler plug (Torx 55).

Lower a filler nozzle or a hose with funnel into the filler hole.

Install the air cleaner (ACL) housing. **AIR CLEANER HOUSING**

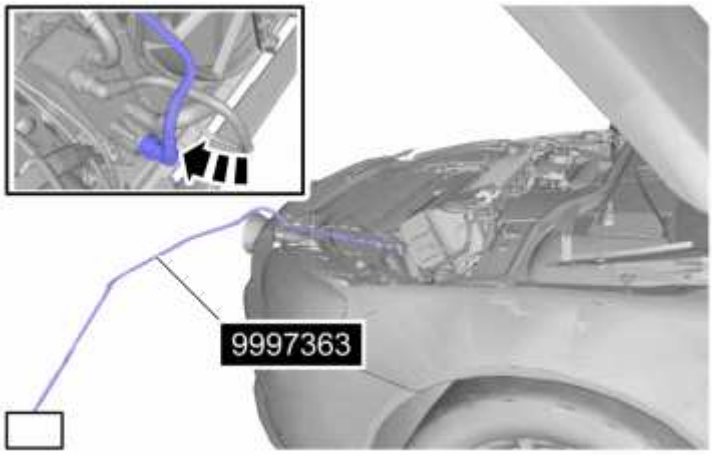


Fig. 739: Identifying Hose 9997363
Courtesy of VOLVO CARS CORPORATION

WARNING: Be prepared to collect escaping fluid.

9997363

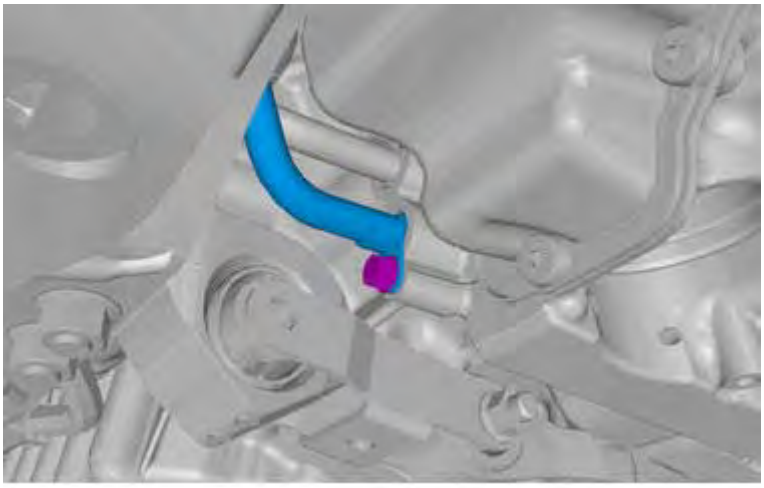


Fig. 740: Identifying Oil Cooler Return Line At Transmission
Courtesy of VOLVO CARS CORPORATION

Remove the oil cooler's return line from the transmission.

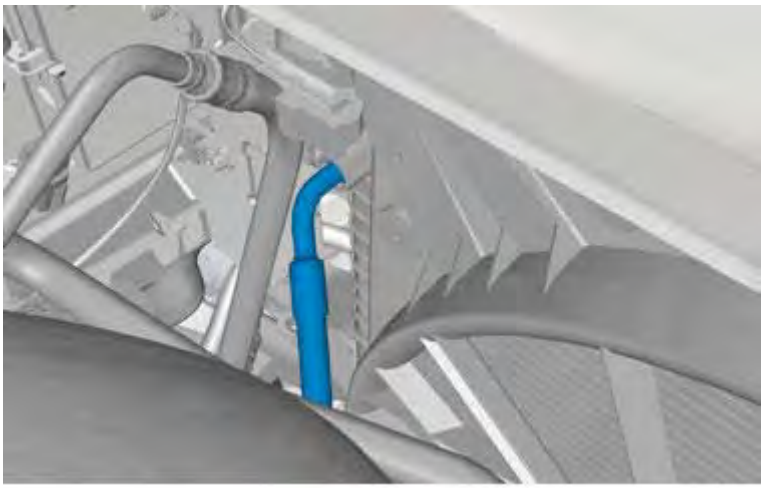


Fig. 741: Identifying Oil Cooler Return Hose At Oil Cooler
Courtesy of VOLVO CARS CORPORATION

Remove the oil cooler's return line from the oil cooler.

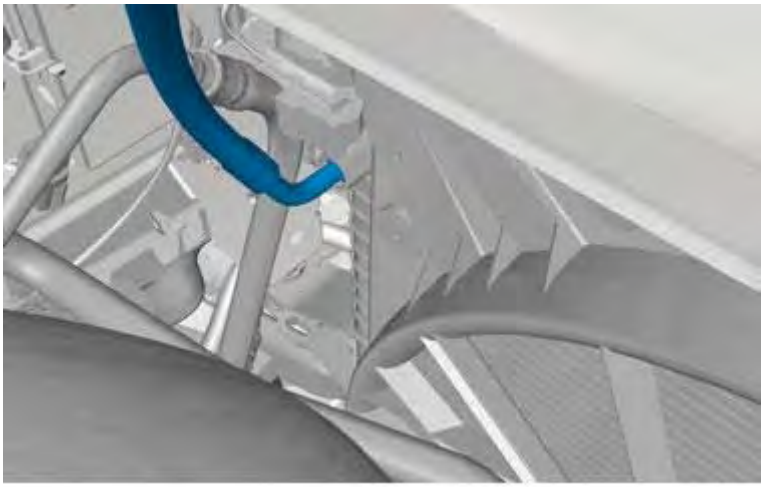


Fig. 742: Identifying Oil Cooler Return Line At Oil Cooler
Courtesy of VOLVO CARS CORPORATION

Install the return line on the oil cooler as shown.

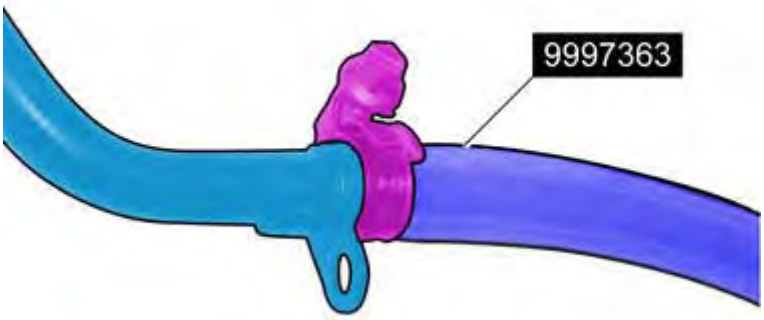


Fig. 743: Identifying Return Line, Hose 9997363, And Hose Clamp
Courtesy of VOLVO CARS CORPORATION

Install hose on the return line with a hose clamp. **9997363**

CAUTION: The plastic hose is quite hard. Tighten the hose clamp hard to avoid leakage in the connection.

WARNING: Be prepared to collect escaping fluid.

Fill with 4l of oil. Use transmission fluid. **LUBRICANT TRANSMISSION**

Apply the parking brake. Move the gear selector lever to position P.

Start and run the engine at idle.

Shift through all the positions between P and D on the gear selector. Stop for 2 seconds per position. Switch off when air bubbles are visible in the hose.

Fill with 2 liters of oil. Start the engine again and allow it to idle. Switch off when air bubbles are visible in the hose.

Fill with 2 liters of oil again. Start the engine and allow it to idle. Switch off when air bubbles are visible in the hose.

Install return hose to transmission and oil cooler.

Remove the integrated level plug.

Top up with oil until it starts to run out of the transmission.

Install the level plug by hand.

Check the oil level. **OIL LEVEL, CHECKING**

Reset the counter when replacing the transmission.

TRANSMISSION

NOTE: Removal steps in this procedure may contain installation details.

Remove the brackets for auxiliary equipment. **AUXILIARY BRACKETS**

Drain the cooling system. **COOLING SYSTEM - DRAINING, CHARGING AND BLEEDING** .

Fig. 744: Identifying Vent Hose Clip
Courtesy of VOLVO CARS CORPORATION

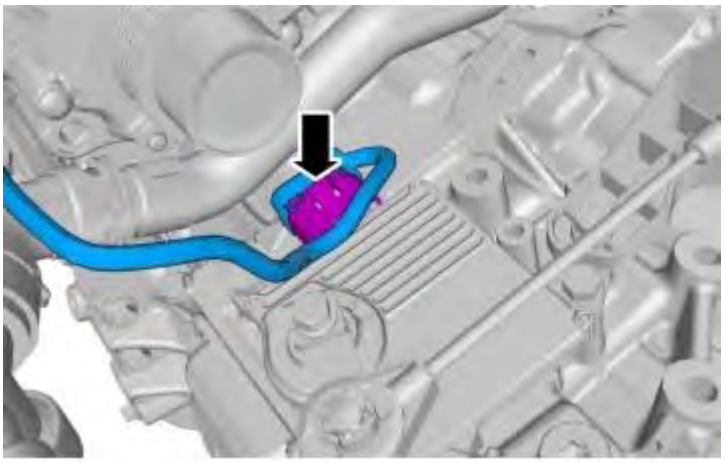


Fig. 745: Identifying Electrical Connector
Courtesy of VOLVO CARS CORPORATION

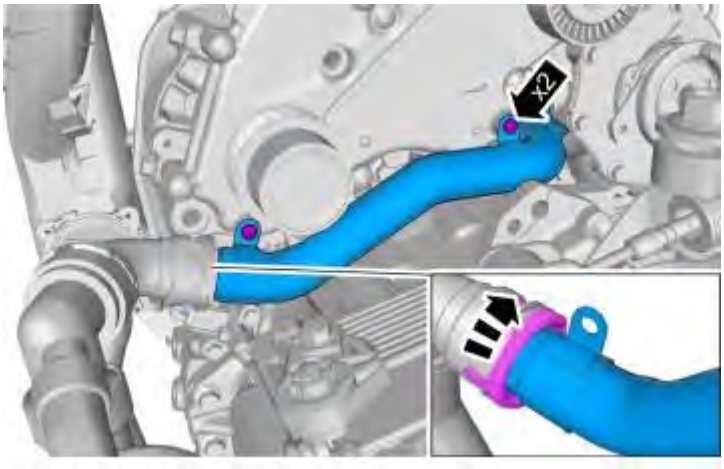


Fig. 746: Identifying Coolant Tube and Connectors
Courtesy of VOLVO CARS CORPORATION

Torque: M6

10 Nm

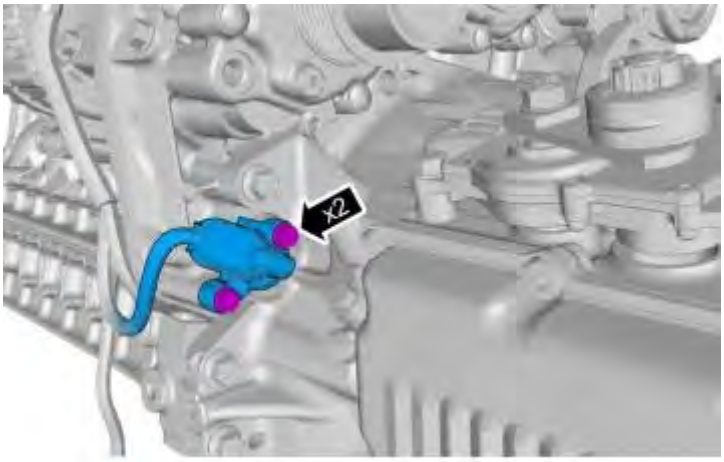


Fig. 747: Identifying Crank Sensor Connector
Courtesy of VOLVO CARS CORPORATION

Torque: M6

10 Nm

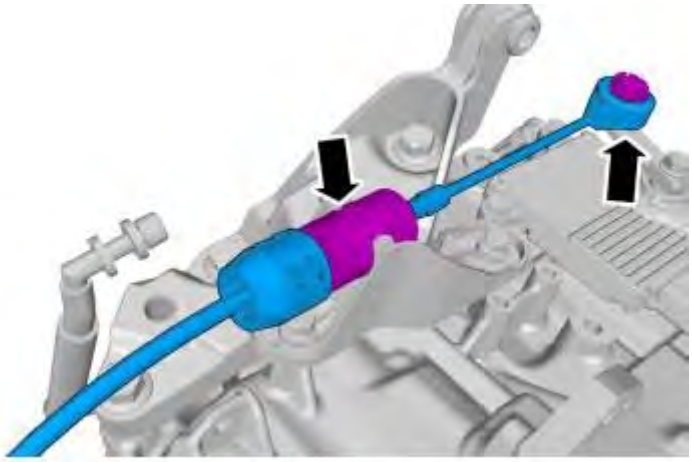


Fig. 748: Identifying Shift Cable And Bracket
Courtesy of VOLVO CARS CORPORATION

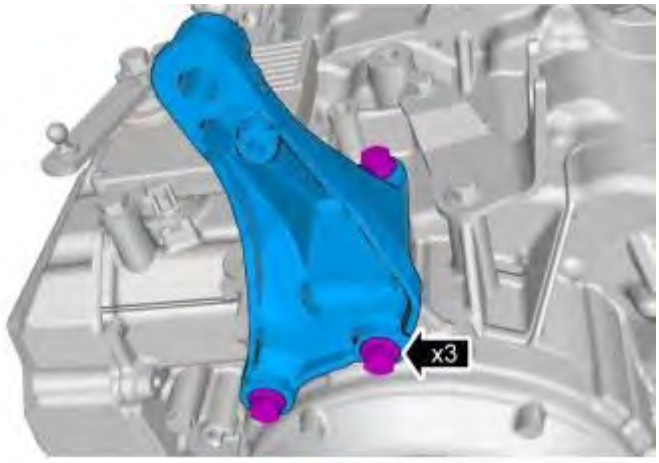


Fig. 749: Identifying 3 Mounting Bracket Bolts
Courtesy of VOLVO CARS CORPORATION

Torque: M8

24 Nm

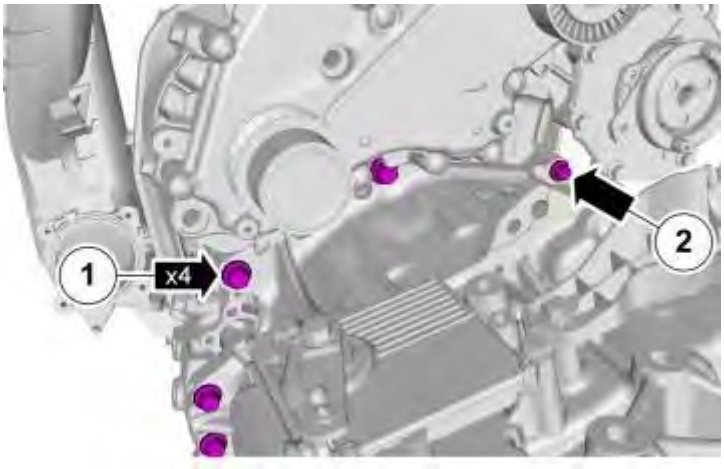


Fig. 750: Locating Upper Bellhouse Bolts
Courtesy of VOLVO CARS CORPORATION

Remove the following items:

1. **Torque:** M10

   50 Nm

2. **Torque:** M8

   24 Nm

Remove the following items:

- Front subframe. **SUB-FRAME FRONT, REPLACING**
- left driveshaft. **DRIVE SHAFT LEFT, REPLACING**
- **DRIVE SHAFT RIGHT, REPLACING** .

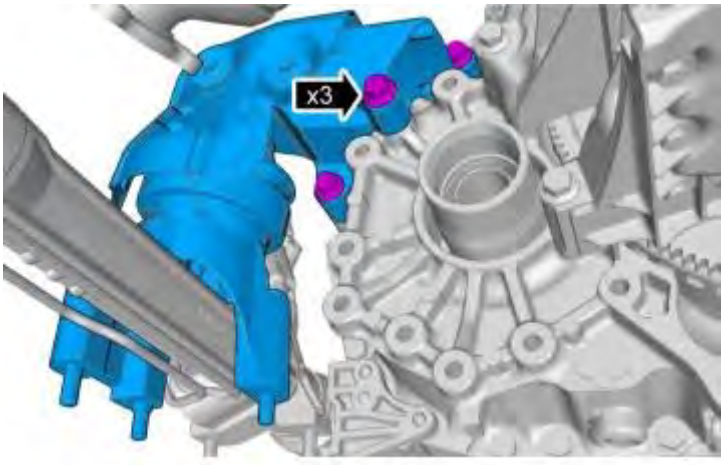


Fig. 751: Identifying Engine Mounting Bracket
Courtesy of VOLVO CARS CORPORATION

Torque: M10

50 Nm

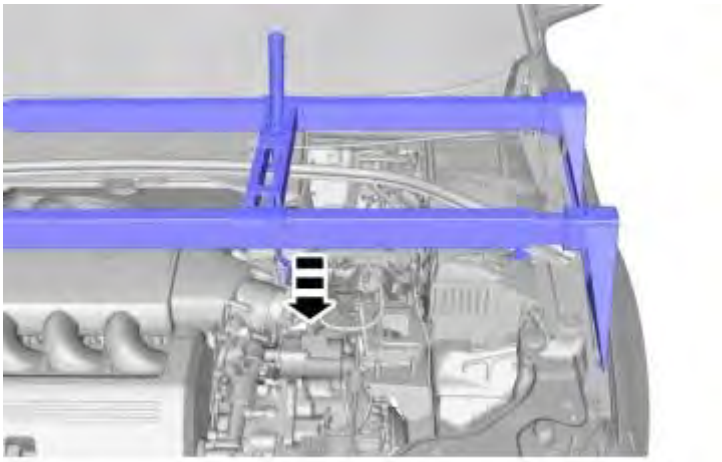


Fig. 752: Identifying Engine Support
Courtesy of VOLVO CARS CORPORATION

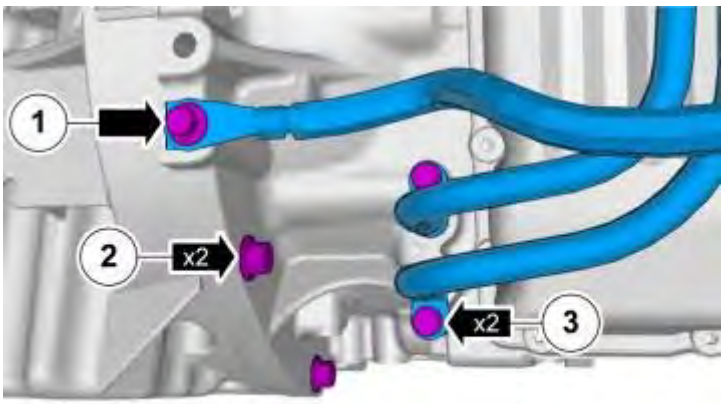


Fig. 753: Remove/Install Tubes and Ground Wire
Courtesy of VOLVO CARS CORPORATION

CAUTION: Make sure that all openings are sealed.

Remove the following items:

1. **Torque:** M8

   24 Nm

2. **Torque:** M10

50 Nm

3. **Torque:** M6

   10 Nm

Remove the following items:

- starter motor. **STARTER MOTOR**
- front crankshaft seal. **CRANKSHAFT FRONT SEAL** .

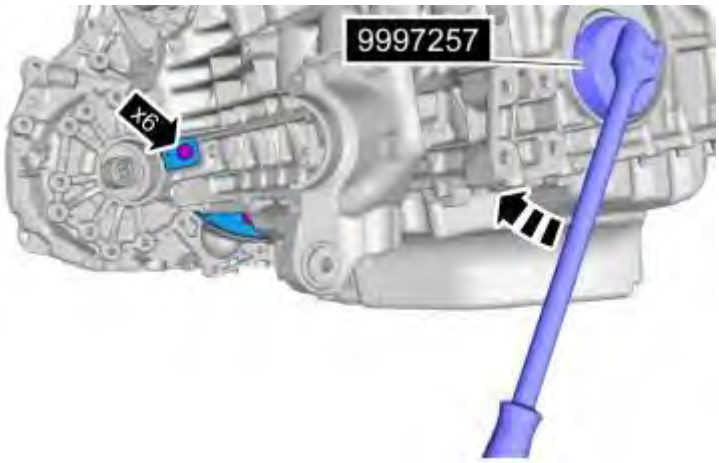


Fig. 754: Locating Torque Converter To Carrier Plate Bolts
Courtesy of VOLVO CARS CORPORATION

9997257 .

Tightening torque: Torque converter to carrier plate. **TIGHTENING TORQUE** .

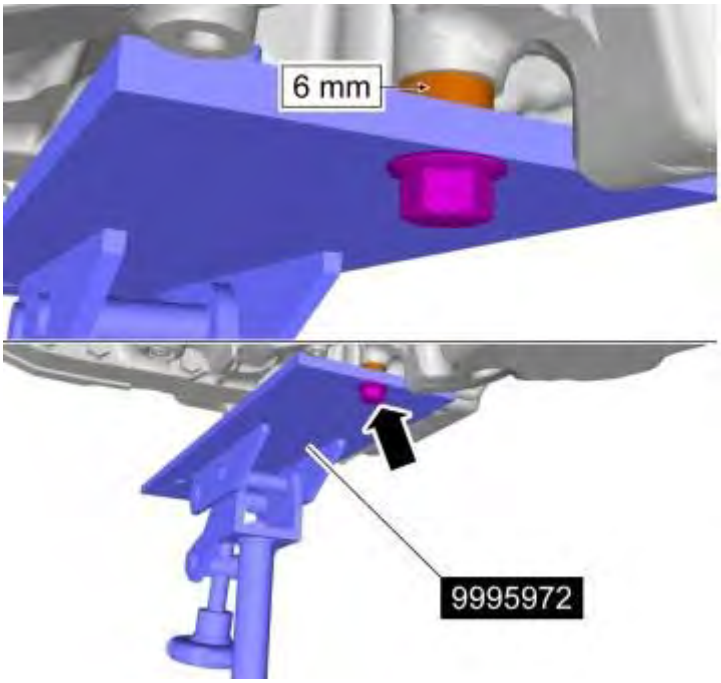


Fig. 755: Installing Transmission Lift
Courtesy of VOLVO CARS CORPORATION

9995972 .

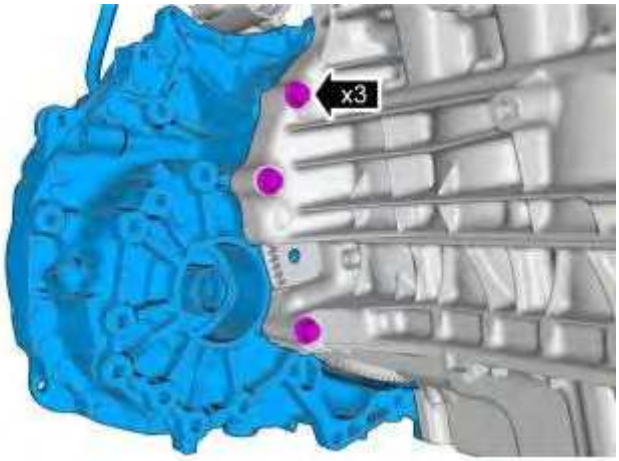


Fig. 756: Identifying Lower Bellhouse Bolts
Courtesy of VOLVO CARS CORPORATION

Torque: M10

50 Nm

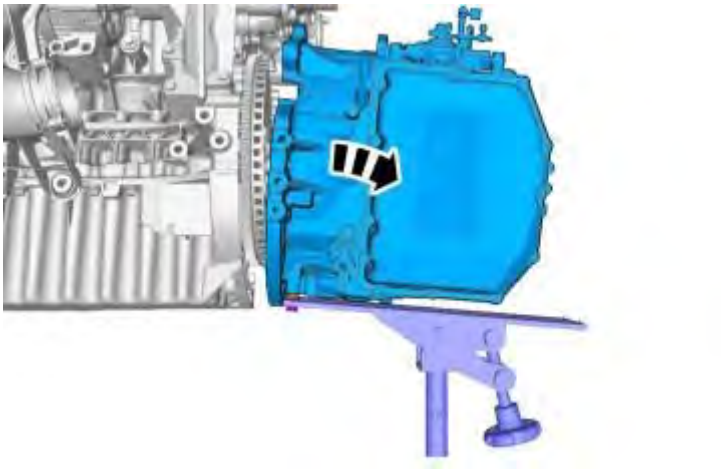


Fig. 757: Removing Transaxle
Courtesy of VOLVO CARS CORPORATION

Fig. 758: Transferring Bracket
Courtesy of VOLVO CARS CORPORATION

NOTE: This step is only necessary when installing a new component.

Torque: M8

24 Nm

Prepared transaxle. **TRANSMISSION, PREPARATIONS BEFORE INSTALLING** .

To install, reverse the removal procedure.

NOTE: This step is only necessary when installing a new component.

Order and download software 94382919438291

TRANSMISSION CONTROL MODULE (TCM)

NOTE: Removal steps in this procedure may contain installation details.

NOTE: Make sure that the selector lever is in the neutral (N) position.

Remove the following items:

- battery negative lead. **BATTERY, DISCONNECTING**
- auxiliary bracket. **AUXILIARY BRACKETS**

Fig. 759: Identifying Selector Cable And Arm
Courtesy of VOLVO CARS CORPORATION

CAUTION: Make sure that the terminals or pins/sockets of the transmission control module (TCM) and the connectors are not bent or damaged.

Tighten, gear selector mechanism (nut). **TIGHTENING TORQUE**

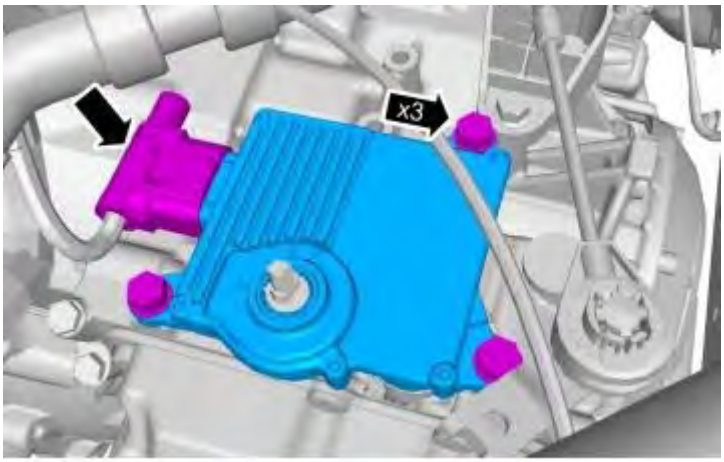


Fig. 760: Locating Transmission Control Module Connector And Bolts
Courtesy of VOLVO CARS CORPORATION

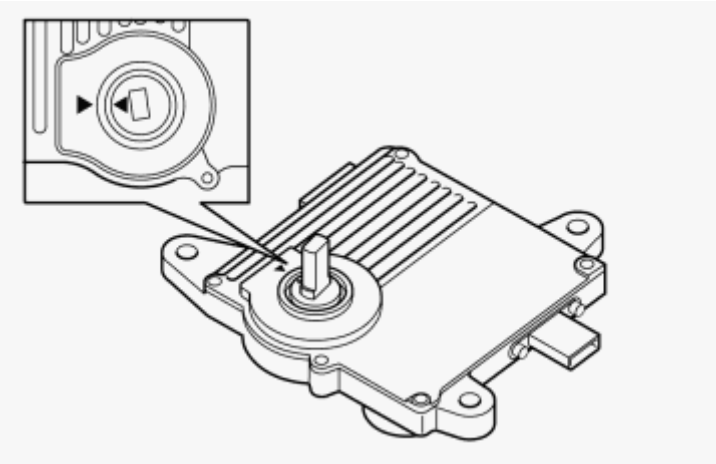


Fig. 761: Locating Installation Marks
Courtesy of VOLVO CARS CORPORATION

NOTE: Make sure that the installation marks are aligned.

To install, reverse the removal procedure.

Order software for the control module: 9438291 .

Calibrate the transmission range sensor. See: VIDA (Volvo scan tool) vehicle information, function group 4.

TRANSMISSION CONTROL UNIT SOLENOIDS

REMOVING COVER CONTROL SYSTEM

Remove the cover over the control system. **COVER CONTROL SYSTEM, REPLACING**.

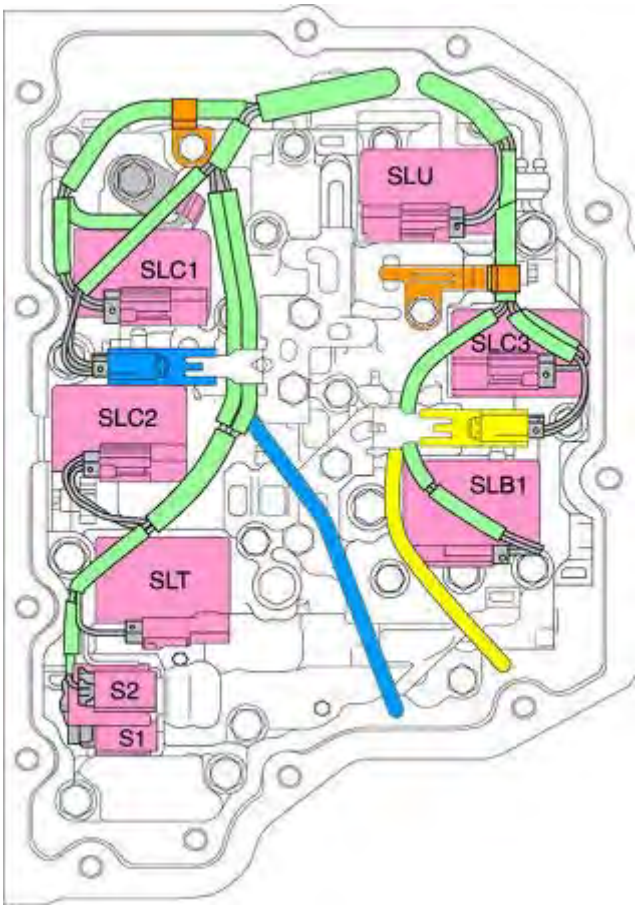


Fig. 762: Identifying Cable Harness
Courtesy of VOLVO CARS CORPORATION

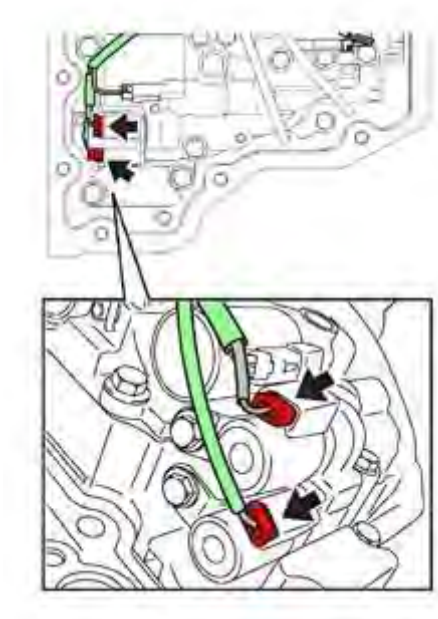


Fig. 763: Identifying Connector
Courtesy of VOLVO CARS CORPORATION

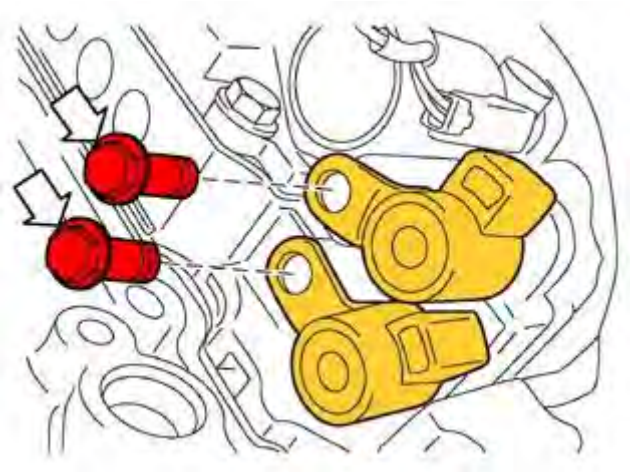


Fig. 764: Identifying Bolts
Courtesy of VOLVO CARS CORPORATION

S1, S2

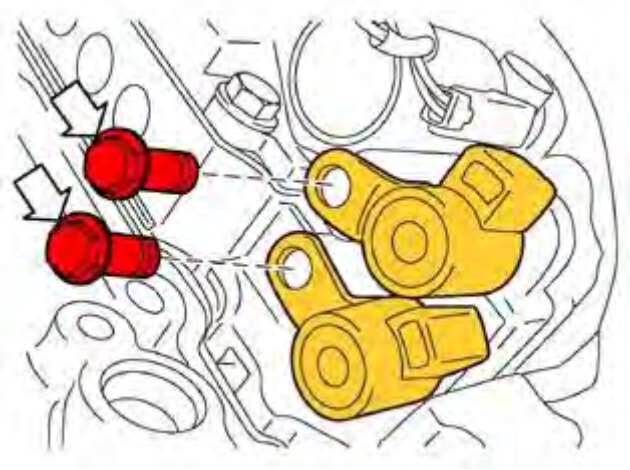


Fig. 765: Identifying Bolts
Courtesy of VOLVO CARS CORPORATION

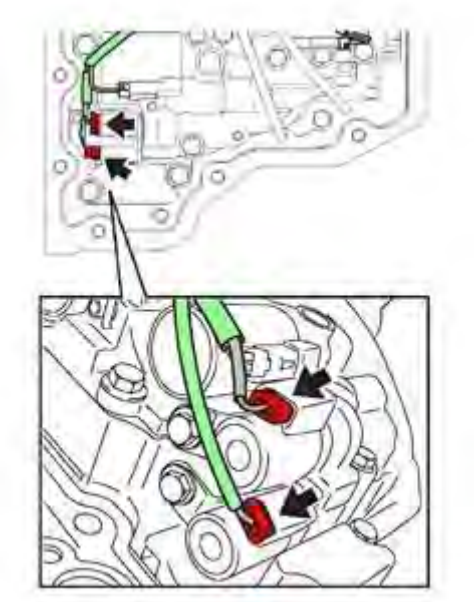


Fig. 766: Identifying Connector
Courtesy of VOLVO CARS CORPORATION

Torque: M6

10 Nm

Install the cover over the control system. **COVER CONTROL SYSTEM, REPLACING**.

TRANSMISSION, AUTOMATIC (B6324S, TF-80SC AWD; 2007-2012)

CONNECTING SLEEVE

Remove and install connecting sleeve. **SEALING RING, CONNECTING SOCKET**

CONTROL SYSTEMS

CONTROL SYSTEMS

COVER CONTROL SYSTEM, REPLACING

COVER CONTROL SYSTEM, REPLACING

SEALING RING, GEAR SHIFT LINKAGE ROD

SEALING RING, GEAR SHIFT LINKAGE ROD

SEALING RING, TORQUE CONVERTER

SEALING RING, TORQUE CONVERTER

TRANSAXLE OIL

TRANSAXLE OIL

TRANSMISSION

NOTE: Removal steps in this procedure may contain installation details.

Remove the brackets for auxiliary equipment. **AUXILIARY BRACKETS**

Drain the cooling system. **COOLING SYSTEM - DRAINING, CHARGING AND BLEEDING** .

Fig. 767: Identifying Vent Hose Clip
Courtesy of VOLVO CARS CORPORATION

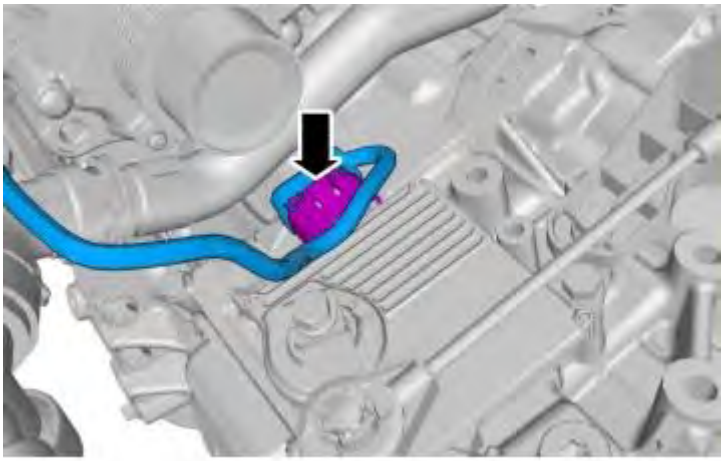


Fig. 768: Identifying Electrical Connector
Courtesy of VOLVO CARS CORPORATION

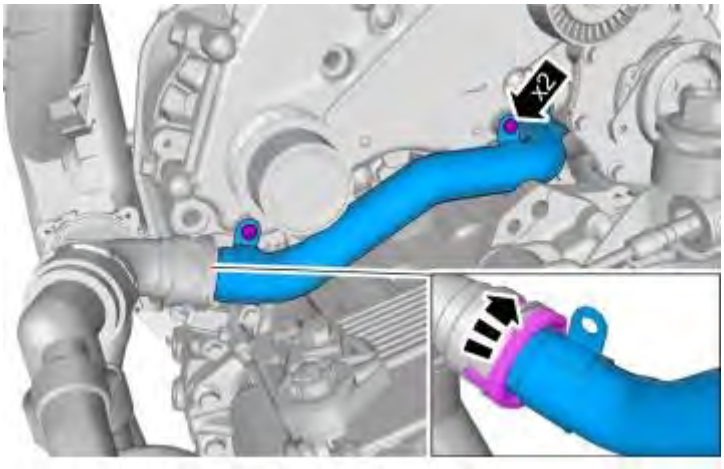


Fig. 769: Identifying Coolant Tube and Connectors
Courtesy of VOLVO CARS CORPORATION

Torque: M6

10 Nm

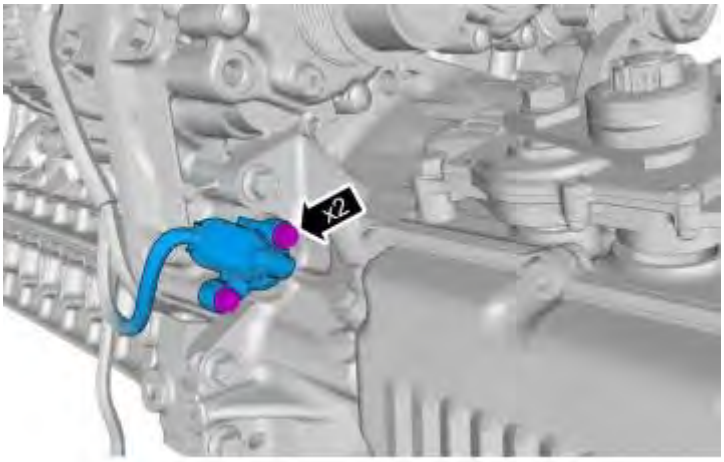


Fig. 770: Identifying Crank Sensor Connector
Courtesy of VOLVO CARS CORPORATION

Torque: M6

10 Nm

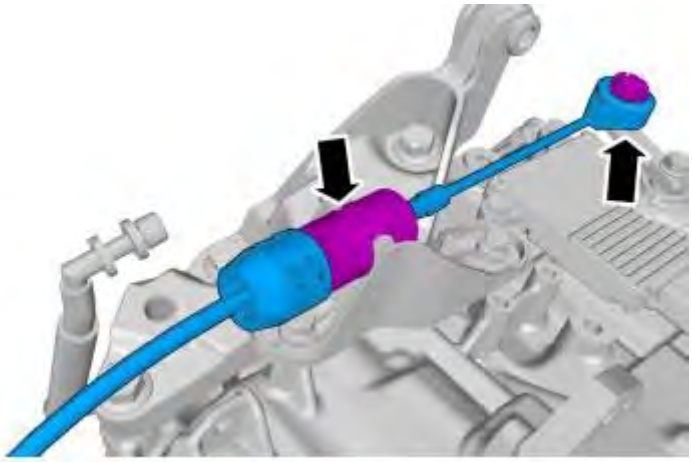


Fig. 771: Identifying Shift Cable And Bracket
Courtesy of VOLVO CARS CORPORATION

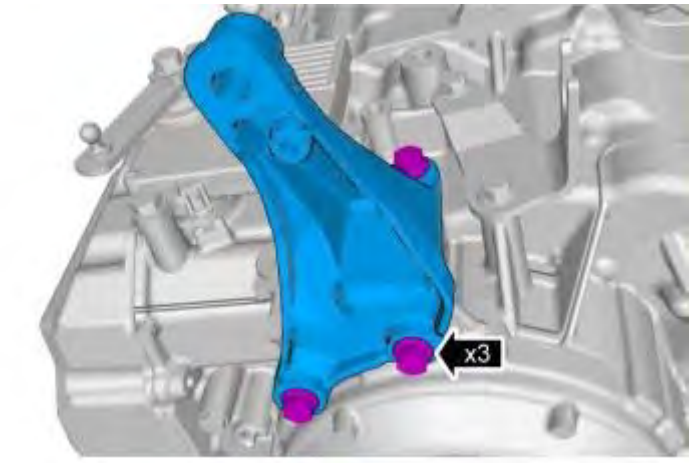


Fig. 772: Identifying 3 Mounting Bracket Bolts
Courtesy of VOLVO CARS CORPORATION

Torque: M8

24 Nm

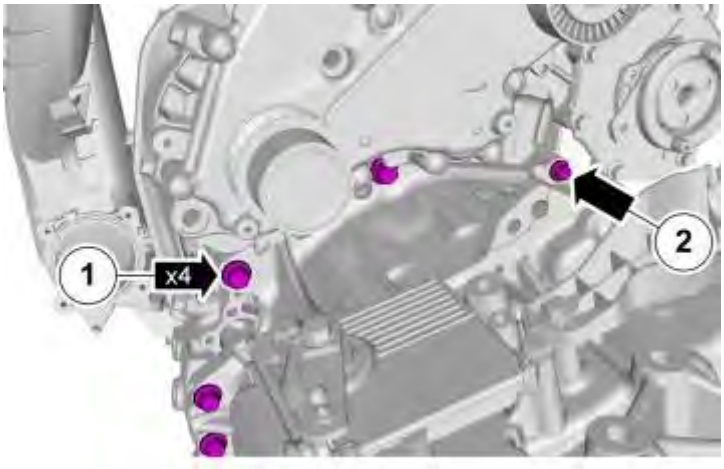


Fig. 773: Locating Upper Bellhouse Bolts
Courtesy of VOLVO CARS CORPORATION

Remove the following items:

1. **Torque:** M10

   50 Nm

2. **Torque:** M8

   24 Nm

Remove the following items:

- Front subframe. **SUB-FRAME FRONT, REPLACING**
- left driveshaft. **DRIVE SHAFT LEFT, REPLACING**
- **BEVEL GEAR**.

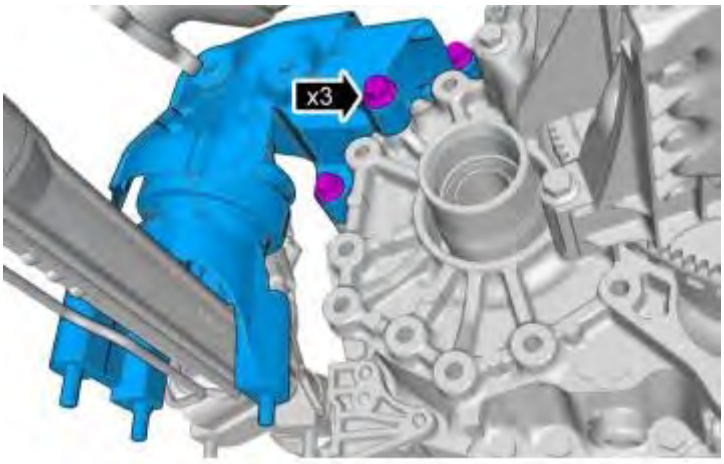


Fig. 774: Identifying Engine Mounting Bracket
Courtesy of VOLVO CARS CORPORATION

Torque: M10

50 Nm

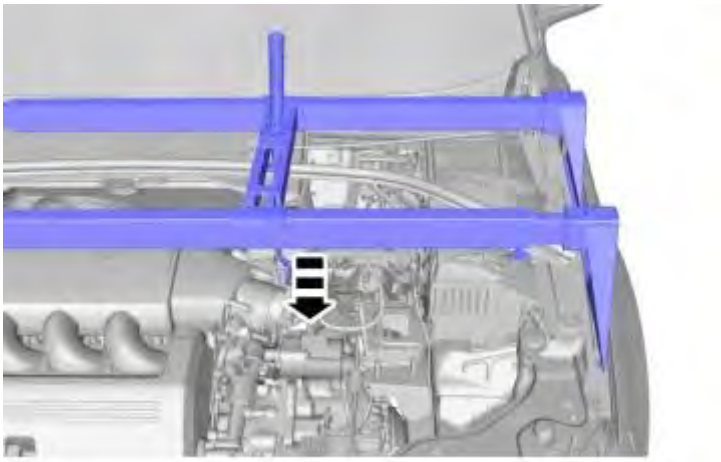


Fig. 775: Identifying Engine Support
Courtesy of VOLVO CARS CORPORATION

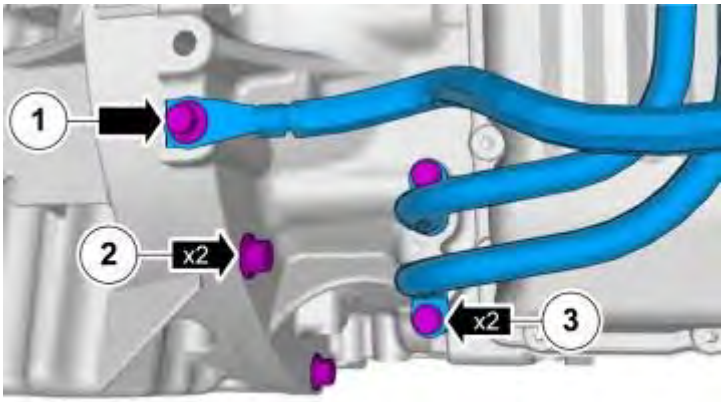


Fig. 776: Remove/Install Tubes and Ground Wire
Courtesy of VOLVO CARS CORPORATION

CAUTION: Make sure that all openings are sealed.

Remove the following items:

1. **Torque:** M8

   24 Nm

2. **Torque:** M10

50 Nm

3. **Torque:** M6

   10 Nm

Remove the following items:

- starter motor. See **STARTER MOTOR**
- front crankshaft seal. See **CRANKSHAFT FRONT SEAL** .

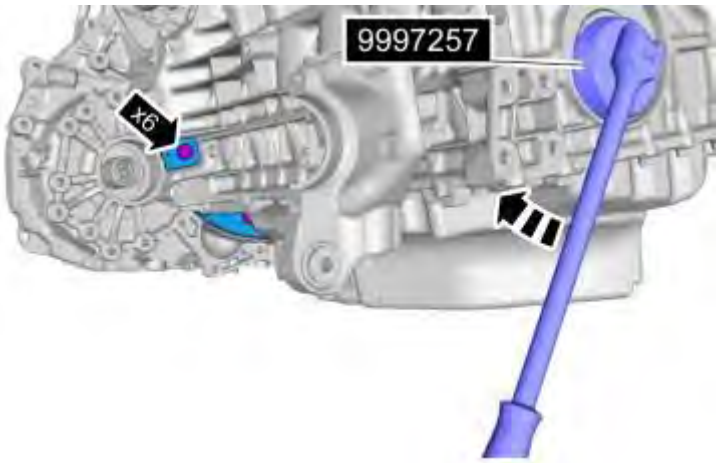


Fig. 777: Locating Torque Converter To Carrier Plate Bolts
Courtesy of VOLVO CARS CORPORATION

9997257 .

Tightening torque: Torque converter to carrier plate. **TIGHTENING TORQUE** .

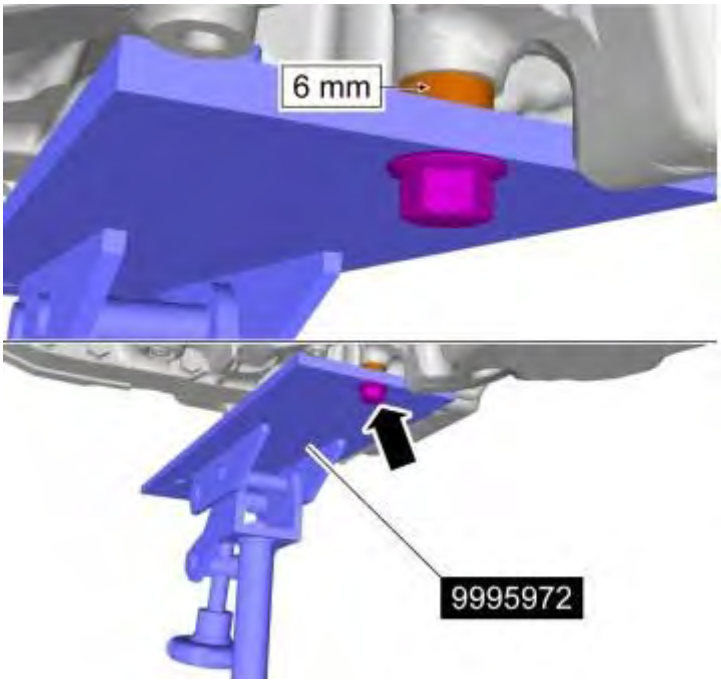


Fig. 778: Installing Transmission Lift
Courtesy of VOLVO CARS CORPORATION

9995972 .

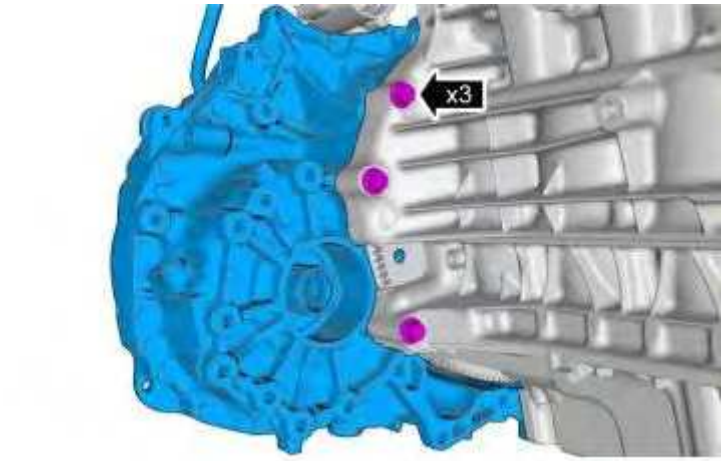


Fig. 779: Identifying Lower Bellhouse Bolts
Courtesy of VOLVO CARS CORPORATION

Torque: M10

50 Nm

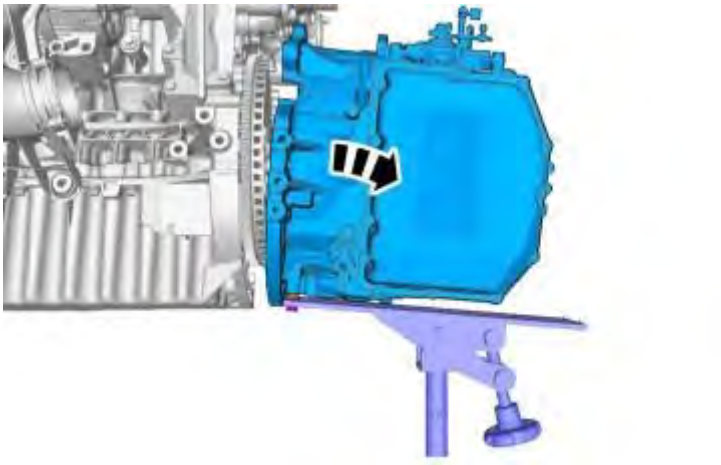


Fig. 780: Removing Transaxle
Courtesy of VOLVO CARS CORPORATION

Fig. 781: Transferring Bracket
Courtesy of VOLVO CARS CORPORATION

NOTE: This step is only necessary when installing a new component.

Torque: M8

24 Nm

Prepared transaxle. See **TRANSMISSION, PREPARATIONS BEFORE INSTALLING** .

To install, reverse the removal procedure.

NOTE: This step is only necessary when installing a new component.

Order and download software 94382919438291

TRANSMISSION CONTROL MODULE (TCM)

TRANSMISSION CONTROL MODULE (TCM)

TRANSMISSION CONTROL UNIT SOLENOIDS

TRANSMISSION CONTROL UNIT SOLENOIDS

TRANSMISSION, AUTOMATIC (B6324S5, TF-80SC; 2011-2010)

CONTROL SYSTEMS

CONTROL SYSTEMS

COVER CONTROL SYSTEM, REPLACING

COVER CONTROL SYSTEM, REPLACING

SEALING RING, GEAR SHIFT LINKAGE ROD

SEALING RING, GEAR SHIFT LINKAGE ROD

SEALING RING, TORQUE CONVERTER

SEALING RING, TORQUE CONVERTER

TRANSAXLE OIL

TRANSAXLE OIL

TRANSMISSION

TRANSMISSION

TRANSMISSION CONTROL MODULE (TCM)

TRANSMISSION CONTROL MODULE (TCM)

TRANSMISSION CONTROL UNIT SOLENOIDS

TRANSMISSION CONTROL UNIT SOLENOIDS

TRANSMISSION, AUTOMATIC (B6324S5, TF-80SC AWD; 2011-2012)

CONNECTING SLEEVE

CONNECTING SLEEVE

CONTROL SYSTEMS

CONTROL SYSTEMS

COVER CONTROL SYSTEM, REPLACING

COVER CONTROL SYSTEM, REPLACING

SEALING RING, GEAR SHIFT LINKAGE ROD

SEALING RING, GEAR SHIFT LINKAGE ROD

SEALING RING, TORQUE CONVERTER

SEALING RING, TORQUE CONVERTER

TRANSAXLE OIL

TRANSAXLE OIL

TRANSMISSION

TRANSMISSION

TRANSMISSION CONTROL MODULE (TCM)

TRANSMISSION CONTROL MODULE (TCM)

TRANSMISSION CONTROL UNIT SOLENOIDS

TRANSMISSION CONTROL UNIT SOLENOIDS

TRANSMISSION, AUTOMATIC (B8444S, TF-80SC AWD; 2005-2011)

CONNECTING SLEEVE

Remove and install connecting sleeve. See **TRANSFER CASE CONNECTING SLEEVE SEALS, REPLACING** .

CONTROL SYSTEM, REPLACING

NOTE: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

REMOVAL

REMOVING THE CABLE HARNESS

Remove the cable harness from the control system. See: **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING** .

Fig. 782: Identifying Cable Harness Protected With Tape
Courtesy of VOLVO CARS CORPORATION

NOTE: Protect the cable harness by taping it to the outside of the transmission.

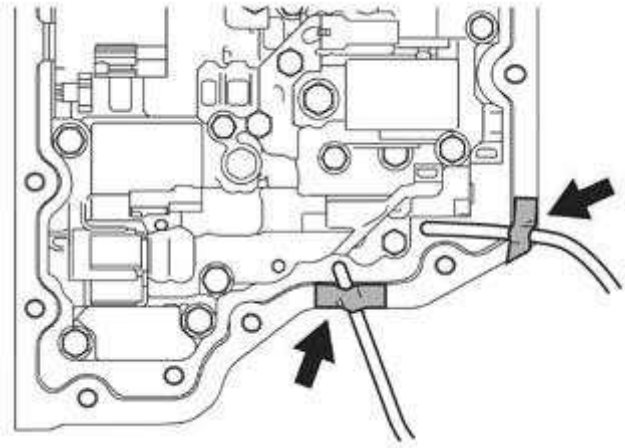


Fig. 783: Identifying Cable Harness Ends Secured To Transmission Case
Courtesy of VOLVO CARS CORPORATION

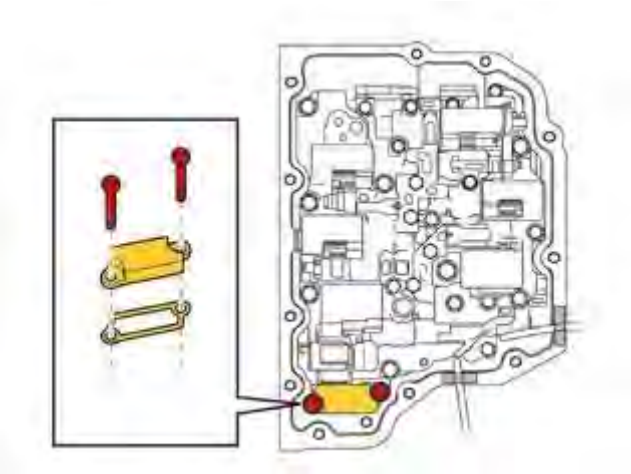


Fig. 784: Identifying Gasket & Bolts
Courtesy of VOLVO CARS CORPORATION

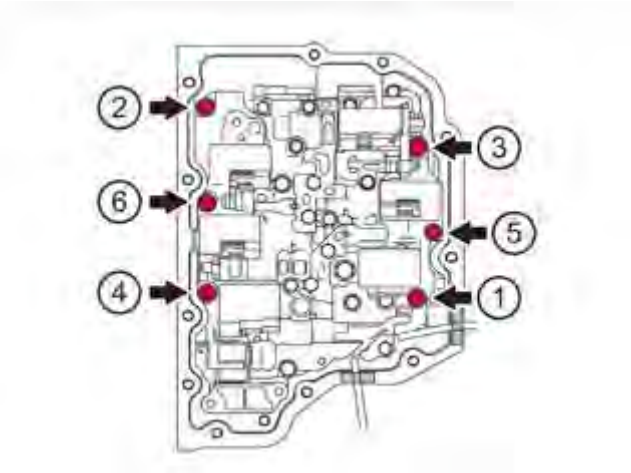


Fig. 785: Identifying Screw Removal Sequence
Courtesy of VOLVO CARS CORPORATION

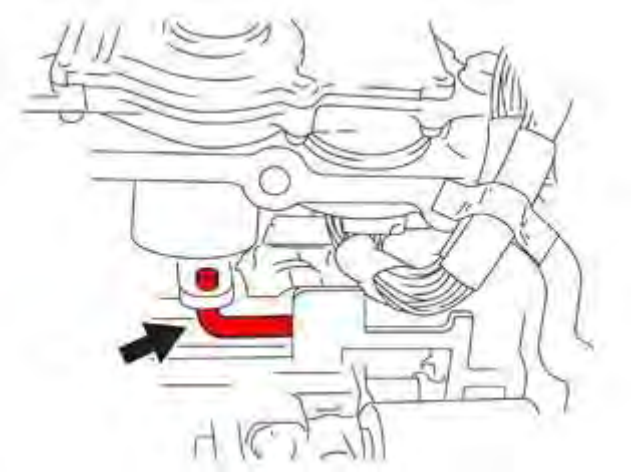


Fig. 786: Identifying Control System Rod
Courtesy of VOLVO CARS CORPORATION

INSTALLATION

NOTE: For tightening torques, see: TIGHTENING TORQUE .

Fig. 787: Identifying Control System Rod
Courtesy of VOLVO CARS CORPORATION

CAUTION: Ensure that the cable harness is not trapped when the control system is positioned.

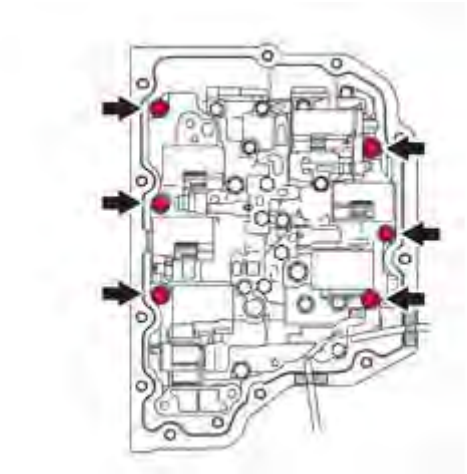


Fig. 788: Identifying Transmission Bolts
Courtesy of VOLVO CARS CORPORATION

Lightly tighten.

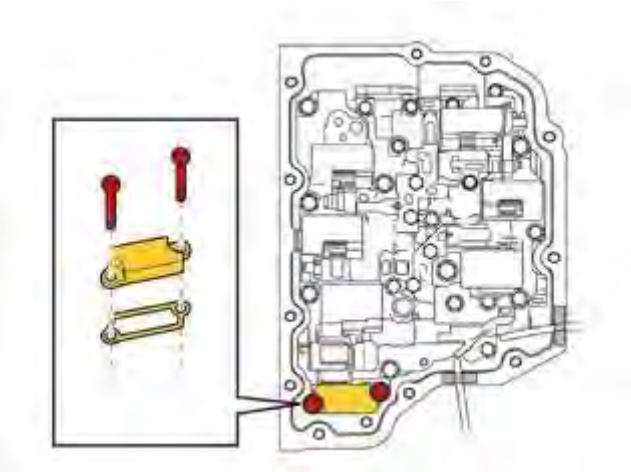


Fig. 789: Identifying Gasket & Bolts
Courtesy of VOLVO CARS CORPORATION

Use **new** screws and a **new** gasket.

Lightly tighten.

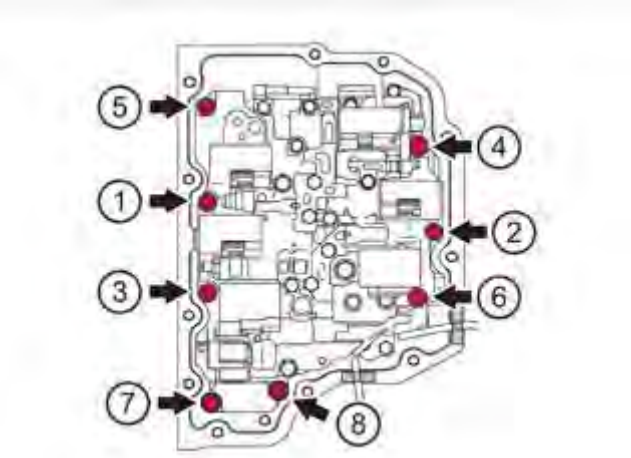


Fig. 790: Identifying Transmission Bolts Installation Sequence
Courtesy of VOLVO CARS CORPORATION

Tighten alternately, M6.

INSTALLING THE CABLE HARNESS

Install the cable harness for the control system. See: **CABLE HARNESS, CONTROL SYSTEM, GEARBOX, REPLACING** .

COVER CONTROL SYSTEM, REPLACING (2007-2011)

NOTE: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in

the illustrations is always correct.

REMOVAL

Remove the auxiliary brackets.

Remove the subframe front. See: **SUB-FRAME FRONT, REPLACING (2007, 2008)** or **SUB-FRAME FRONT, REPLACING (2005, 2006)** .

NOTE: Leave the container in place for the next few procedures relating to removal.

REMOVING LEVEL PLUG/DRAINING PLUG

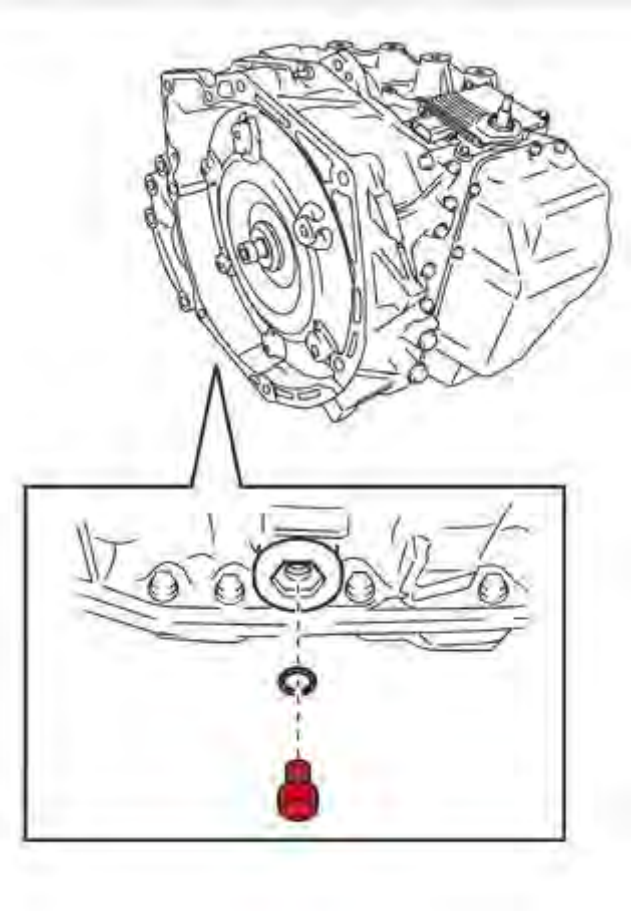


Fig. 791: Identifying Transmission Fluid Level Check
Courtesy of VOLVO CARS CORPORATION

Remove the integrated level plug/Torx.

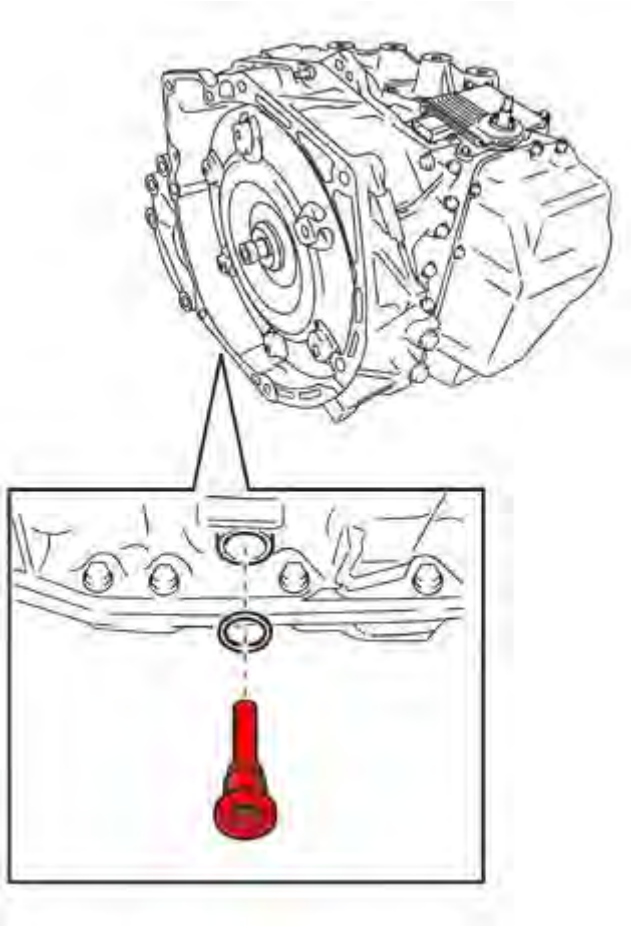


Fig. 792: Identifying Transmission Draining Plug
Courtesy of VOLVO CARS CORPORATION

Remove the draining plug.

When the transmission is empty:

- use **new** gaskets
- lubricate the gaskets. Use ATF-oil
- tighten both. See: **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** .

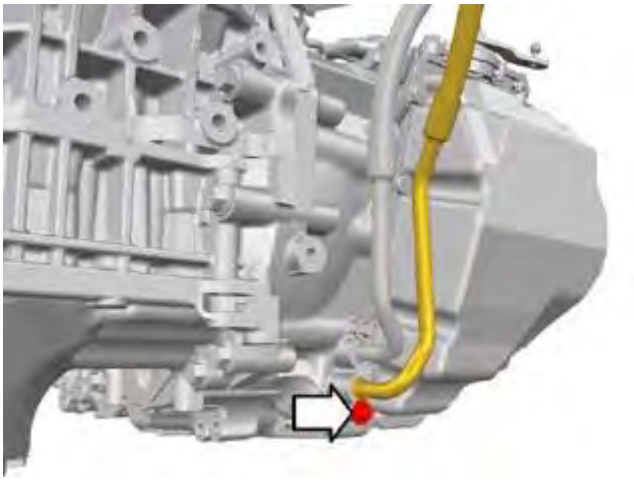


Fig. 793: Locating Plastic Plug In Drain Hole
Courtesy of VOLVO CARS CORPORATION

HINT: To prevent leakage, install a plastic plug in the hole.

REMOVING THE COVER

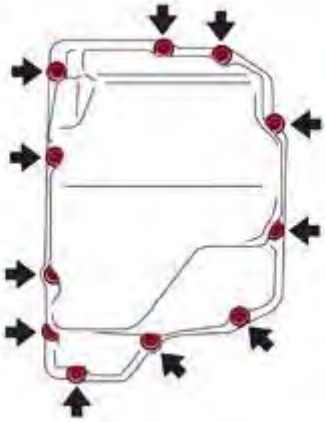


Fig. 794: Identifying Cover Bolts
Courtesy of VOLVO CARS CORPORATION

Remove torx TX40.

Clean off any sealant from the threads. Use thread tap M8 x 1.25.

REMOVING THE CONTROL SYSTEM COVER

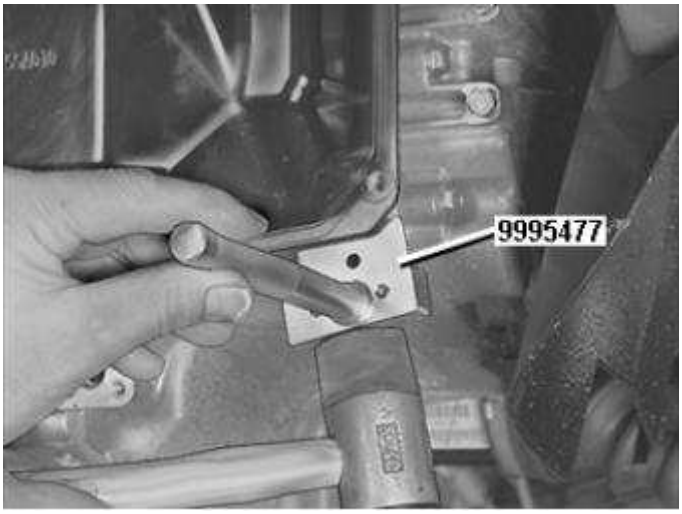


Fig. 795: Identifying Gasket Wedge Tapped Into Joint
Courtesy of VOLVO CARS CORPORATION

Remove the cover.

Use joint wedge **9995477** , which is carefully tapped in between the cover and transmission so that the cover's sealing flange is not warped.

CLEANING THE COVER

CAUTION: Ensure that no debris enters the transmission.

Clean gasket residue from the cover and transmission. Clean the cover thoroughly. Check that the contact surface of the cover is flat.

INSTALLATION

CLEANING COVER

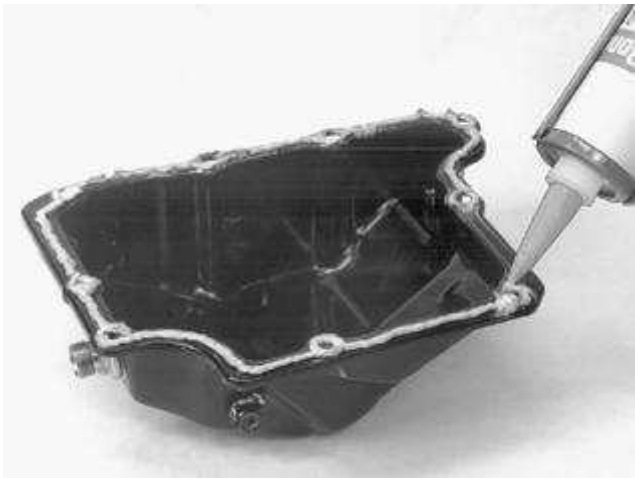


Fig. 796: Applying Sealant To Cover
Courtesy of VOLVO CARS CORPORATION

Wipe the cleaned mating surfaces of the cover and the transmission dry. Use Isopropanol

Apply a bead of sealant, P/N 116 1409-6, approximately 3 mm thick on the cover.

Also apply sealant around the screw holes.

INSTALLING COVER

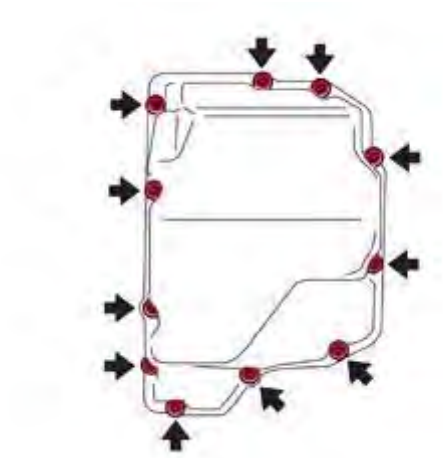


Fig. 797: Identifying Cover Bolts
Courtesy of VOLVO CARS CORPORATION

NOTE: Ensure that the sealant is not rubbed when the cover is installed.

Use **new** screws.

Tighten:

- alternately to light contact
- see: **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** .

INSTALLING THE SUBFRAME

Install the subframe front. See: **SUB-FRAME FRONT, REPLACING (2005, 2006)** or **SUB-FRAME FRONT, REPLACING (2007, 2008)** .

Install the auxiliary brackets.

FILLING OF OIL

Top up oil. See: **TRANSMISSION FLUID, CHANGING**.

REPLACING THE GEARBOX

Special tools:

9997077

9997185

REMOVAL

Remove the bevel gear. See: **BEVEL GEAR, REPLACING**

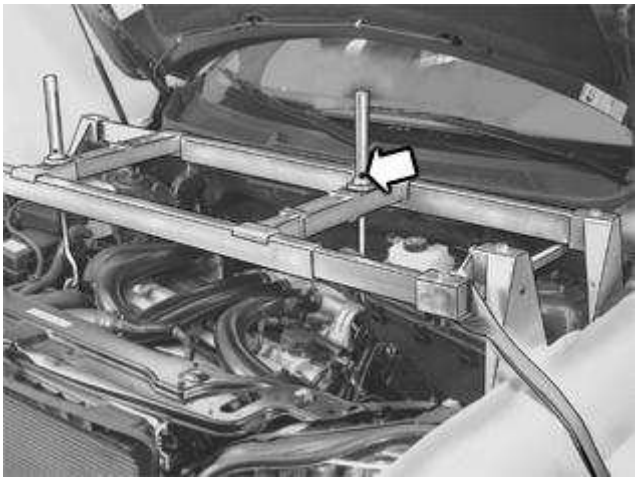


Fig. 798: Identifying Lowering Left Side
Courtesy of VOLVO CARS CORPORATION

Lower the left lifting beam **60 mm** .

HINT: Lower the lifting beam slowly when the end of the threaded joint is visible in the inspection hole.

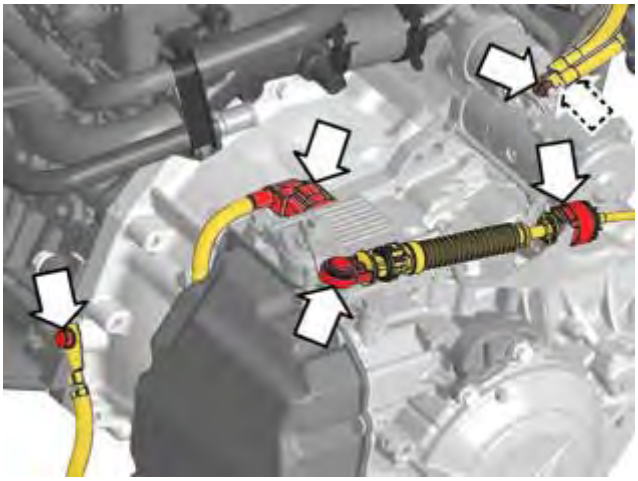


Fig. 799: Removing Identified Components
Courtesy of VOLVO CARS CORPORATION

Remove:

- the ground lead
- connection for transmission control module (TCM)
- the transmission cable. Use **9997077**
- both connections for the starter motor.

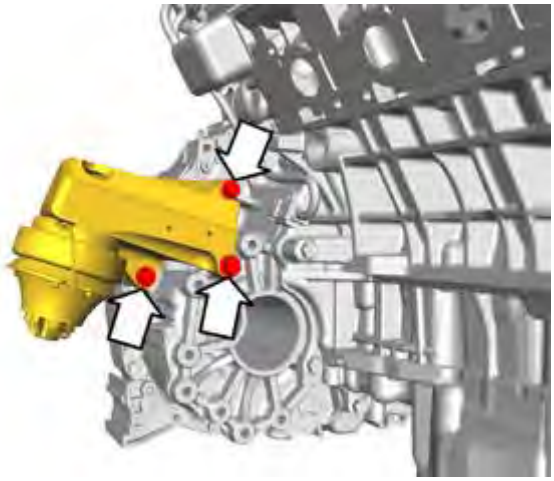


Fig. 800: Identifying Engine Mounting Bracket
Courtesy of VOLVO CARS CORPORATION

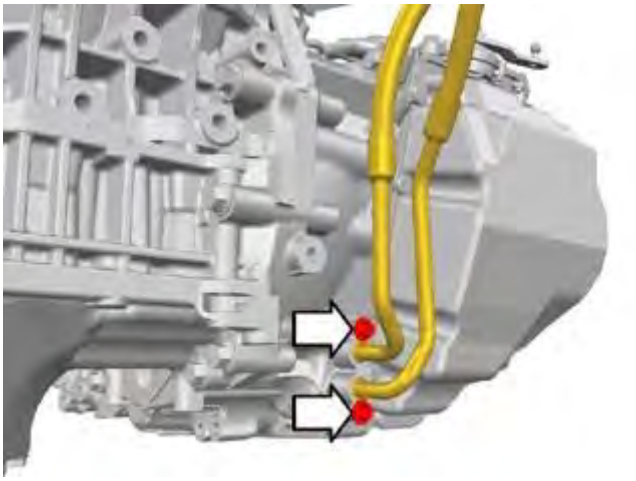


Fig. 801: Locating Cooling Tube Bolts
Courtesy of VOLVO CARS CORPORATION

HINT: To prevent leakage, install a plastic plug in the lower hole of the transmission.

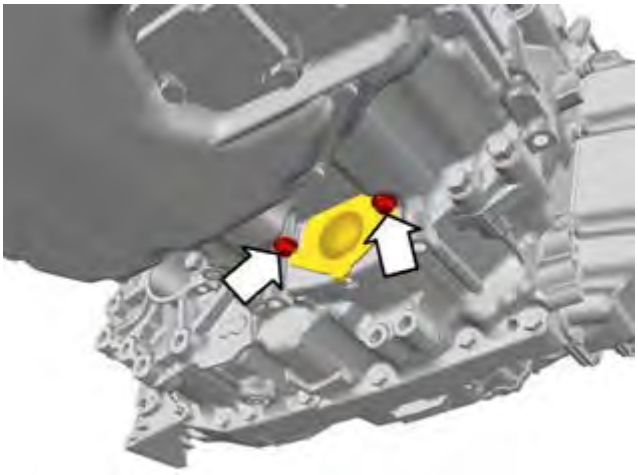


Fig. 802: Identifying Cover Plate
Courtesy of VOLVO CARS CORPORATION

Fig. 803: Locating Torque Converter Bolts (6)
Courtesy of VOLVO CARS CORPORATION

x 6.

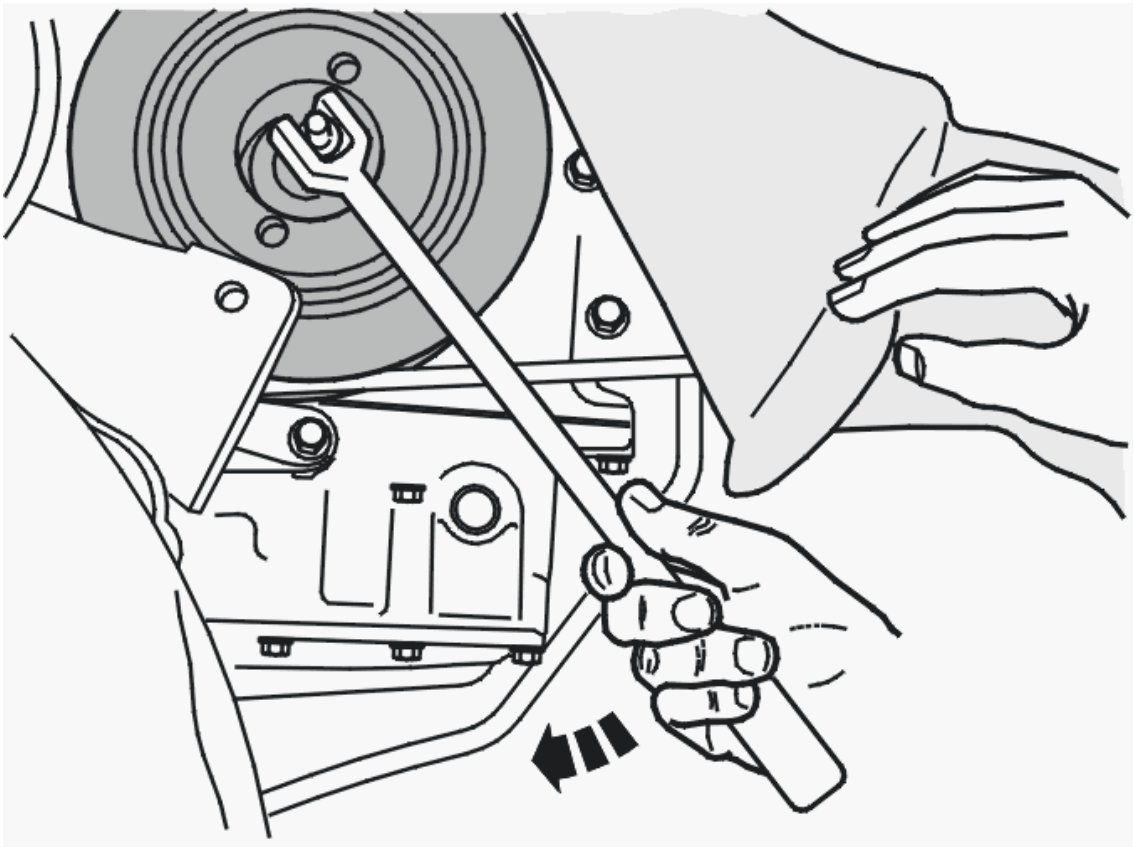


Fig. 804: Rotating Crank To Next Bolt
Courtesy of VOLVO CARS CORPORATION

Turn the next screw forward.

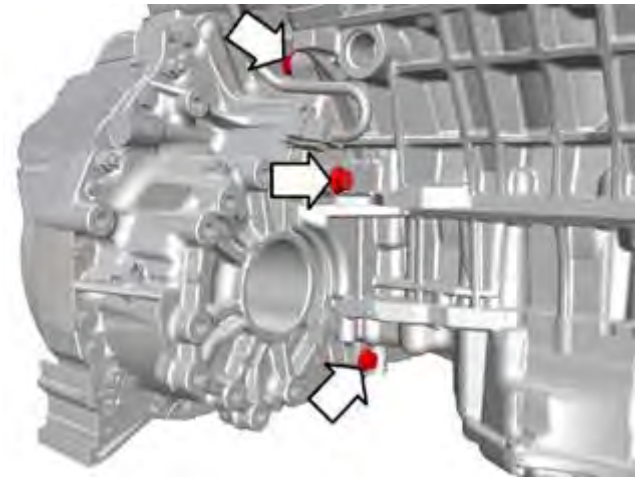


Fig. 805: Locating Engine/Transaxle Bolts
Courtesy of VOLVO CARS CORPORATION

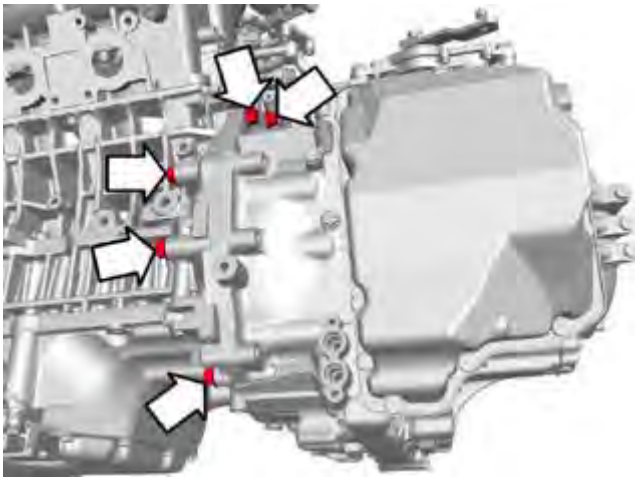


Fig. 806: Locating Engine/Transaxle Bolts
Courtesy of VOLVO CARS CORPORATION

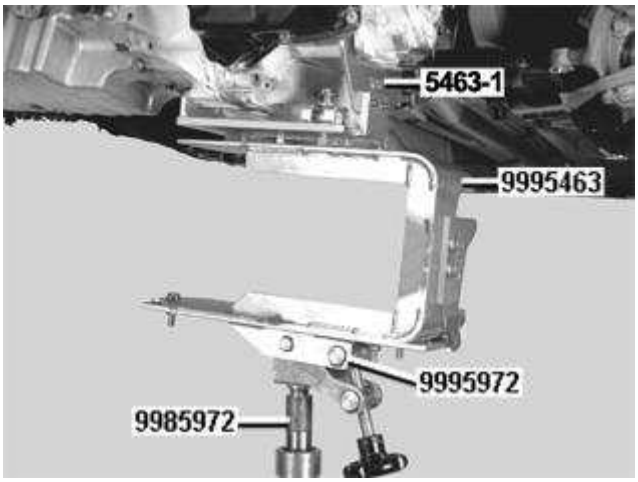


Fig. 807: Identifying Adapters for Transmssion Lift
Courtesy of VOLVO CARS CORPORATION

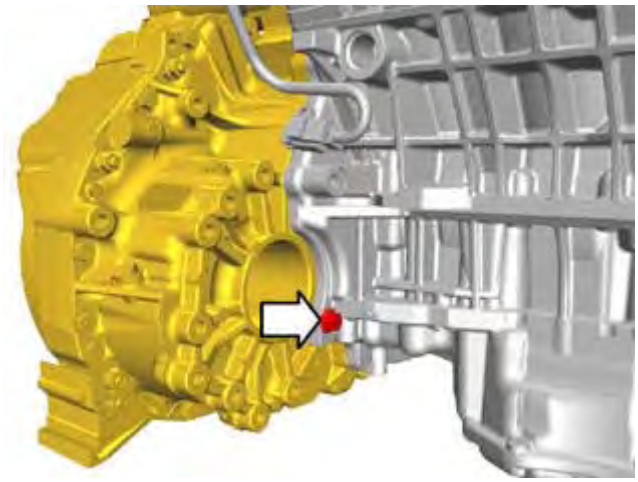


Fig. 808: Removing Final Bolt (1 of 2)
Courtesy of VOLVO CARS CORPORATION

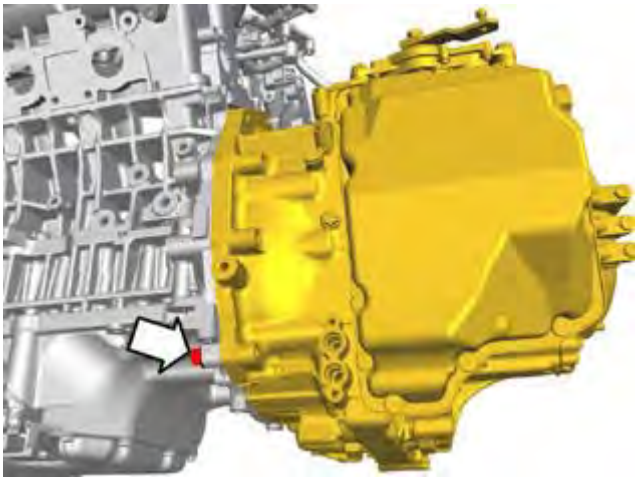


Fig. 809: Removing Final Bolt (2 of 2)
Courtesy of VOLVO CARS CORPORATION

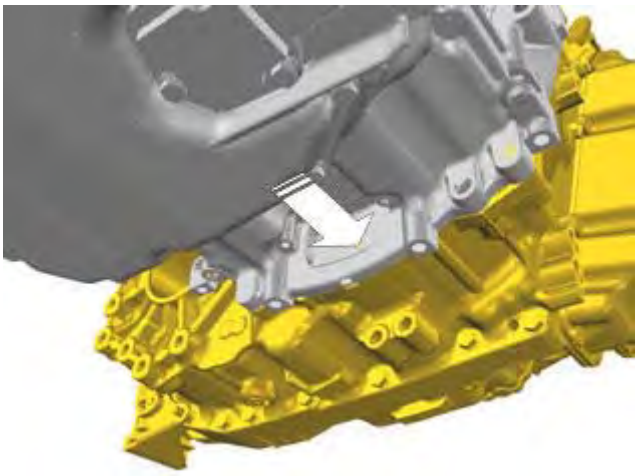


Fig. 810: Ensuring The Torque Converter Accompanies The Transmission
Courtesy of VOLVO CARS CORPORATION

WARNING: Ensure that the torque converter accompanies the transmission and that it does not slide off the stator shaft. Using a screwdriver, press through some of the screw holes.

Prepare the transmission. See: **TRANSMISSION, PREPARATIONS BEFORE INSTALLING** .

INSTALLATION

NOTE: For tightening torques, see: TIGHTENING TORQUE .

INSTALLING THE TRANSMISSION

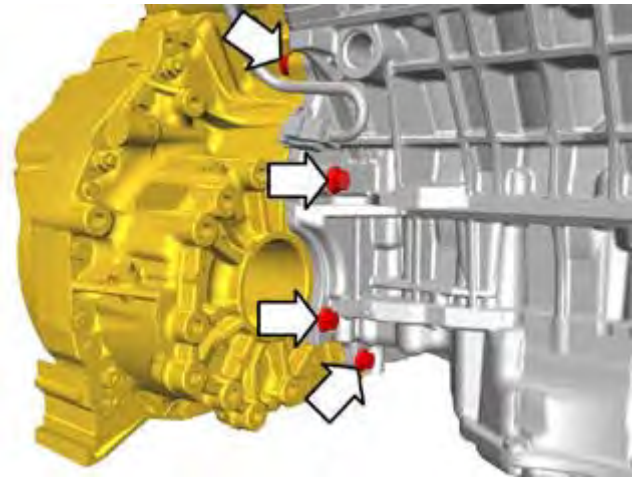


Fig. 811: Locating Engine/Transaxle Bolts
Courtesy of VOLVO CARS CORPORATION

M10

Use: **9997185** for the upper screw.

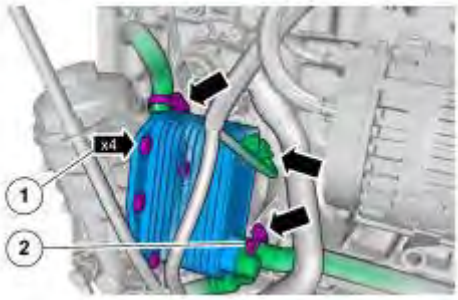


Fig. 812: Identifying Engine/Gearbox Bolts
Courtesy of VOLVO CARS CORPORATION

M10

Fig. 813: Locating Torque Converter Bolts (6)
Courtesy of VOLVO CARS CORPORATION

Install 6 x M10/Torx 50. First lightly tighten all screws.

Tighten, see: **TIGHTENING TORQUE** .

NOTE: Use new screws.

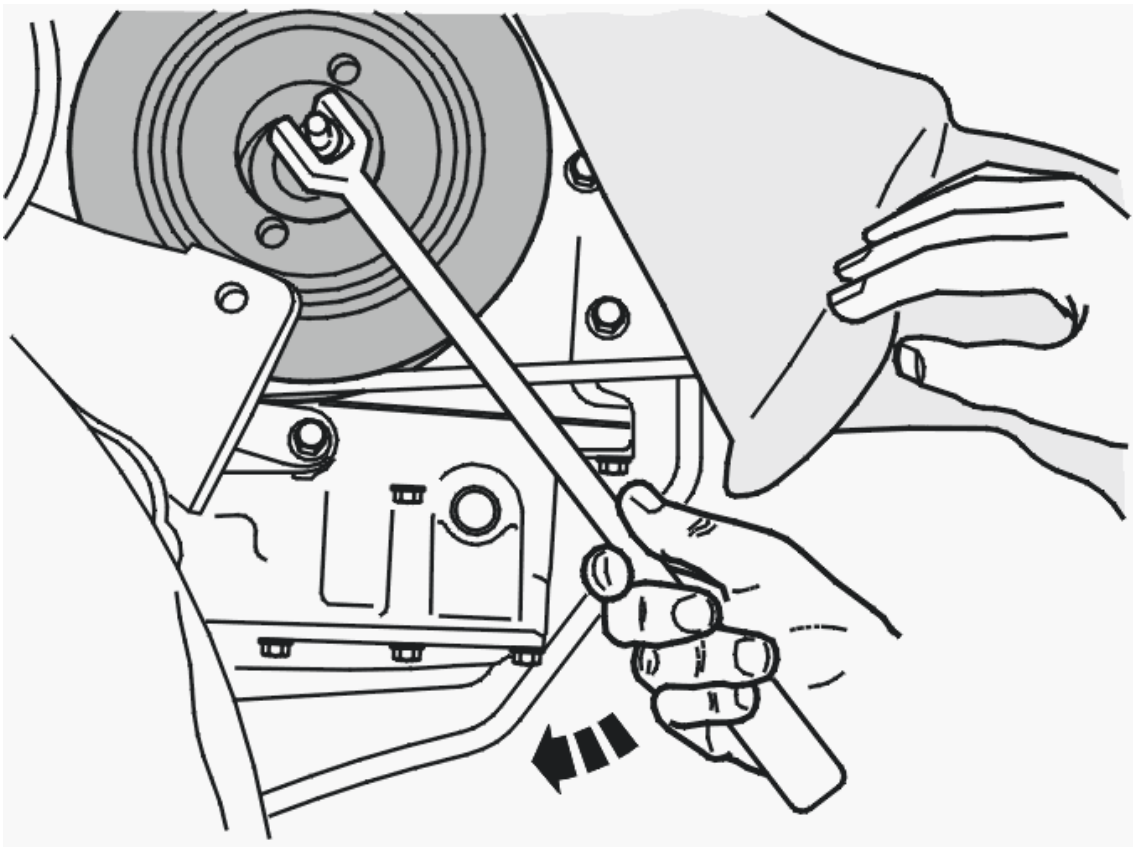


Fig. 814: Rotating Crank To Next Bolt
Courtesy of VOLVO CARS CORPORATION

Turn the next screw forward.

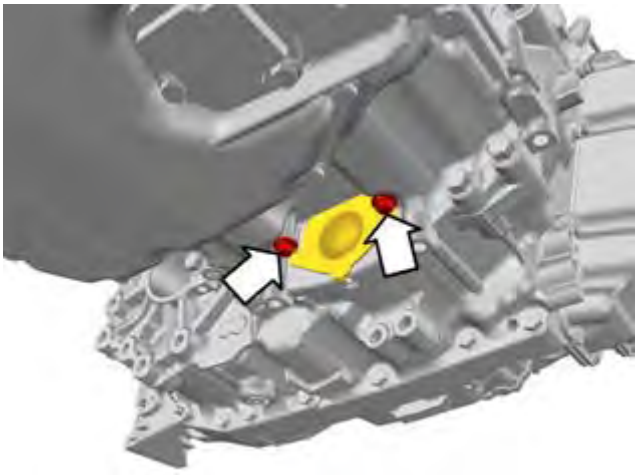


Fig. 815: Identifying Cover Plate
Courtesy of VOLVO CARS CORPORATION

M6

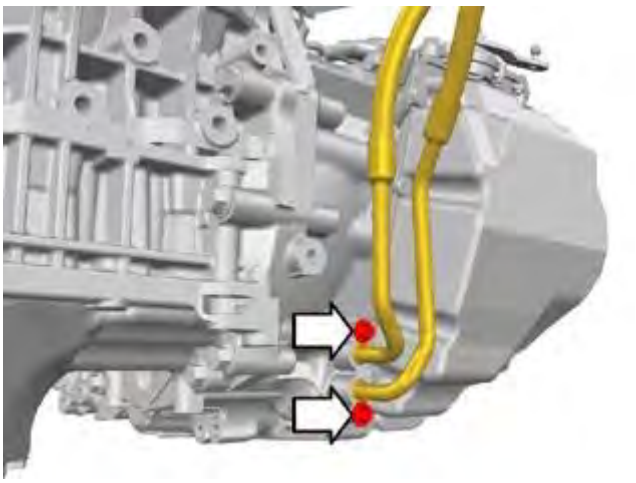


Fig. 816: Locating Cooling Tube Bolts
Courtesy of VOLVO CARS CORPORATION

M6

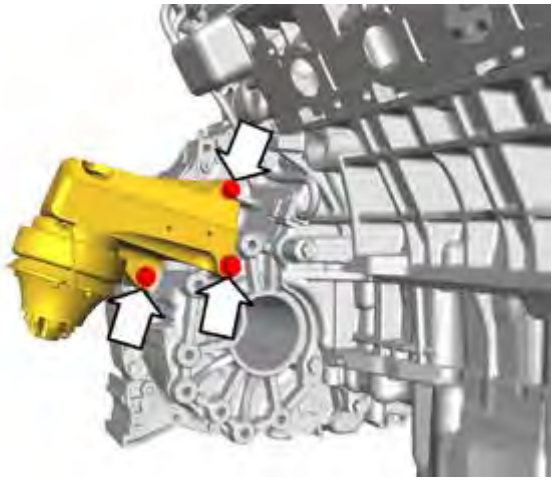


Fig. 817: Identifying Engine Mounting Bracket
Courtesy of VOLVO CARS CORPORATION

M10

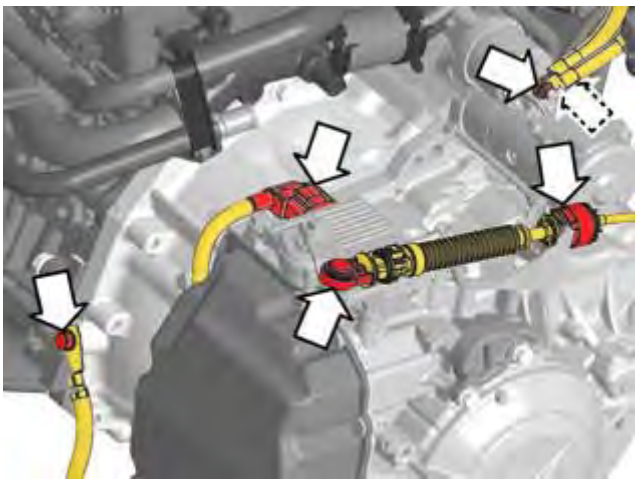


Fig. 818: Removing Identified Components
Courtesy of VOLVO CARS CORPORATION

Install:

- the ground lead, M8
- connection for transmission control module (TCM)
- the transmission cable
- the starter motor, blade terminal and B+. Tighten. See **TIGHTENING TORQUE** .

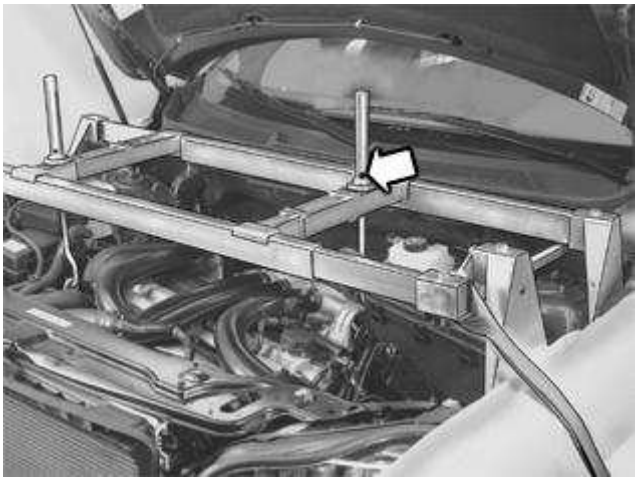


Fig. 819: Identifying Lowering Left Side
Courtesy of VOLVO CARS CORPORATION

Raise the left lifting beam **60 mm** .

Install the bevel gear. See: **BEVEL GEAR, REPLACING**

NOTE: This step is only necessary when installing a new component.

Order and download software 9438291

REPLACING THE GEAR-SHIFT POSITION SENSOR

REPLACING THE GEAR-SHIFT POSITION SENSOR

See **TRANSMISSION CONTROL MODULE (TCM), REPLACING**.

SEALING RING GEAR SHIFT LINKAGE ROD, REPLACING

Special tools:

9995919

9995476

NOTE: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

REMOVING/INSTALLING

Remove/install the transmission control module (TCM). See: **TRANSMISSION CONTROL MODULE (TCM), REPLACING**.

Fig. 820: Identifying Seal Pinion Pulled/Positioned
Courtesy of VOLVO CARS CORPORATION

Use **9995919** .

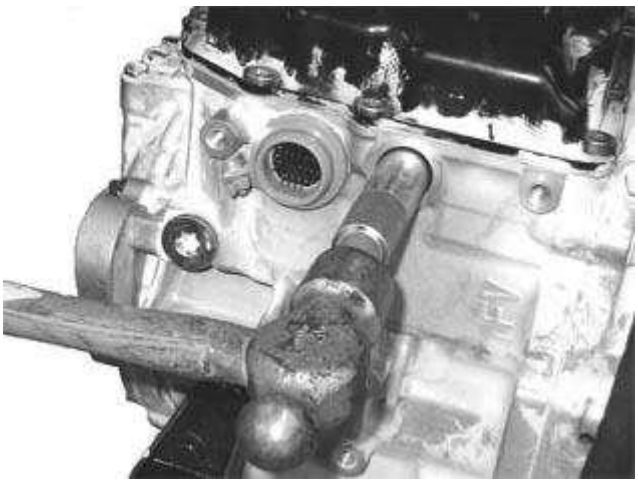


Fig. 821: Identifying Punch Installation
Courtesy of VOLVO CARS CORPORATION

Use **9995476** .

SOLENOID CONTROL SYSTEM, REPLACING (2007-2011)

REMOVAL

REMOVING COVER CONTROL SYSTEM

Remove the cover over the control system. See: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**.

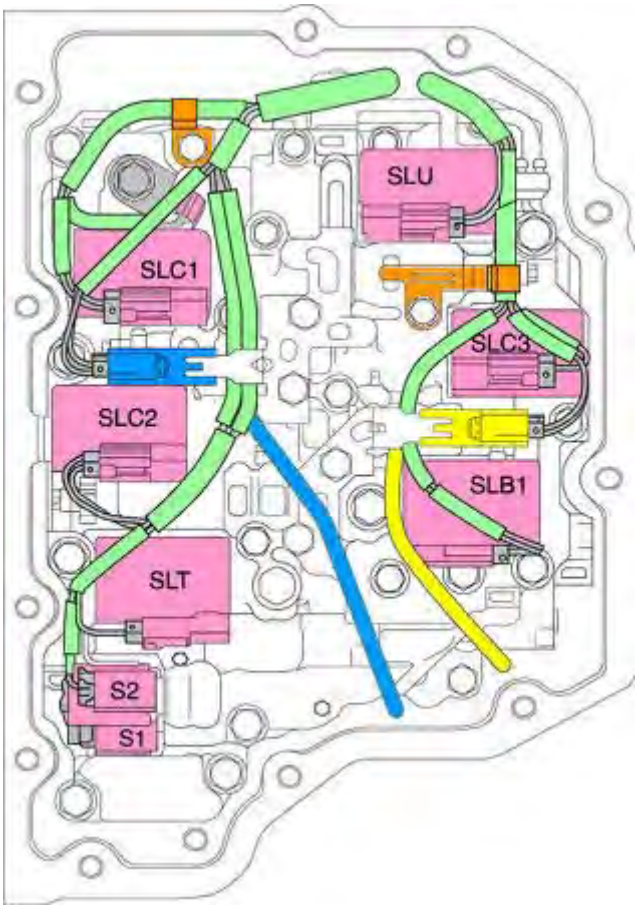


Fig. 822: Identifying Cable Harness
Courtesy of VOLVO CARS CORPORATION

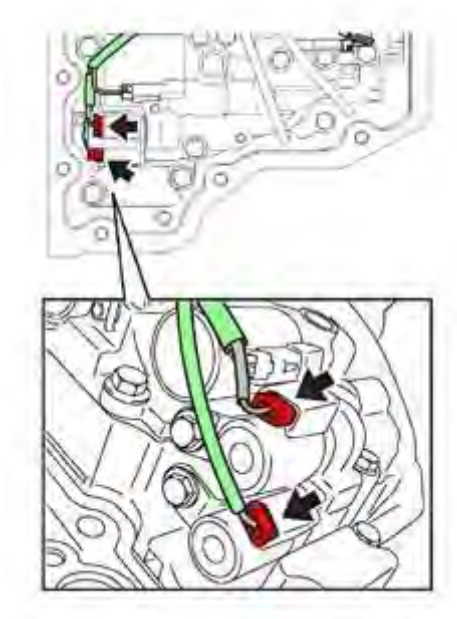


Fig. 823: Identifying Connector
Courtesy of VOLVO CARS CORPORATION

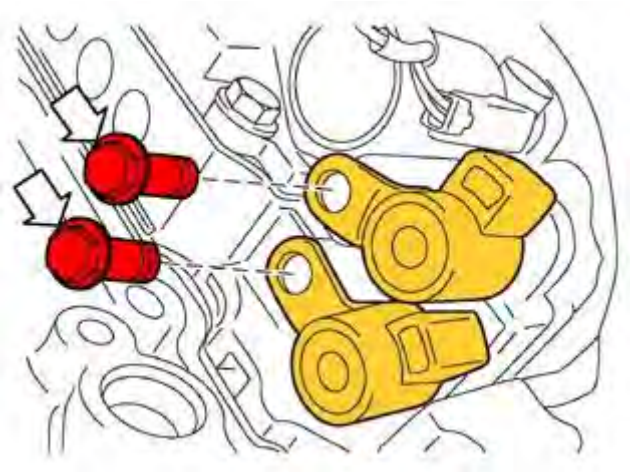


Fig. 824: Identifying Bolts
Courtesy of VOLVO CARS CORPORATION

S1, S2

INSTALLATION

NOTE: For tightening torques, see: TIGHTENING TORQUE .

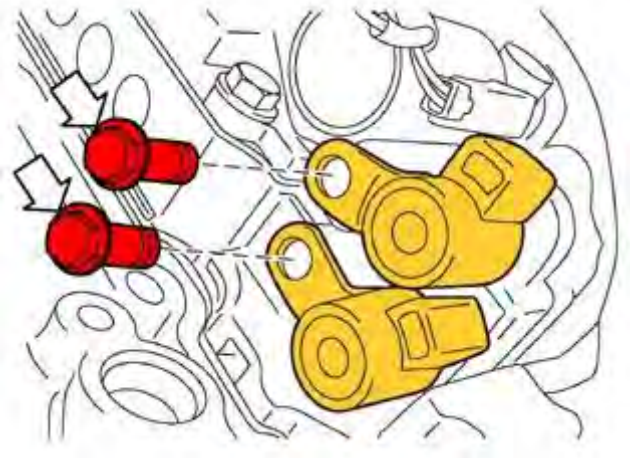


Fig. 825: Identifying Bolts
Courtesy of VOLVO CARS CORPORATION

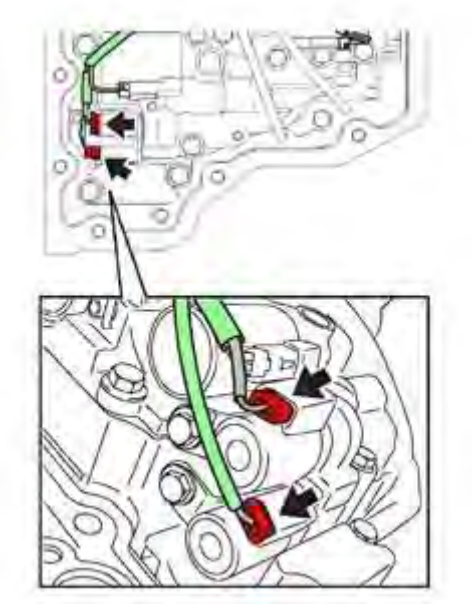


Fig. 826: Identifying Connector
Courtesy of VOLVO CARS CORPORATION

M6

Install the cover over the control system. See: **COVER CONTROL SYSTEM, REPLACING (2007-2011)**.

TRANSMISSION CONTROL MODULE (TCM), REPLACING

NOTE: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

PREPARATORY WORK

INFORMATION

CAUTION: New software can only be ordered when the control module is installed in the vehicle. The new control module identity is read off with ordering, which is required for ordering the correct software.

CAUTION: Wait for one minute after switching off the ignition. The main relay must have discharged the voltage before the control module may be removed from the vehicle. If the engine cooling fan is running after the ignition has been switched off then wait until it has stopped, and then wait for a further minute.

REMOVING THE BATTERY CABLE

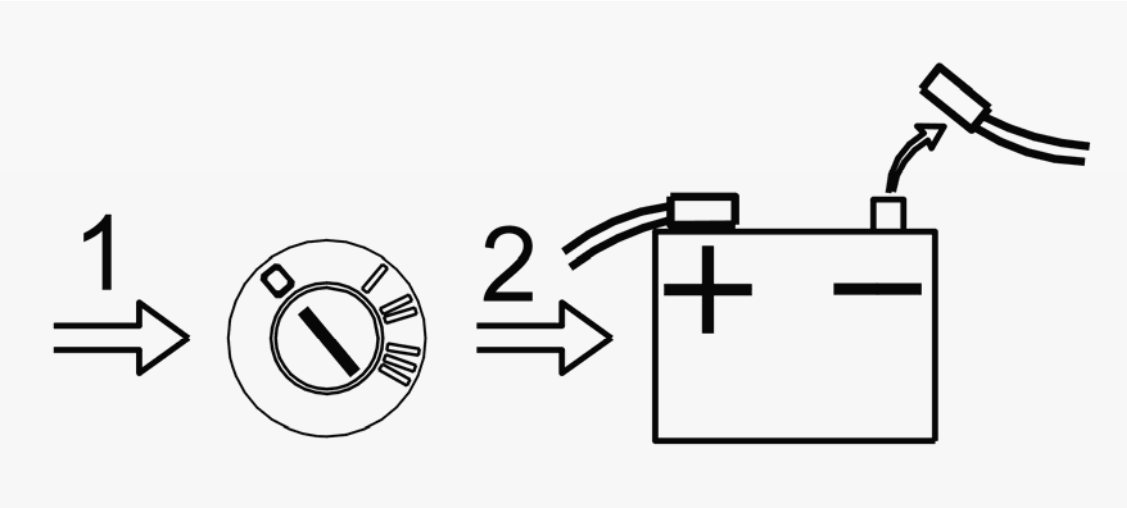


Fig. 827: Disconnecting Battery Negative Cable
Courtesy of VOLVO CARS CORPORATION

NOTE: Shift the gear selector lever to neutral.

Disconnect the battery negative cable. See: **BATTERY, DISCONNECTING** .

REMOVAL

REMOVING THE INLET PIPE

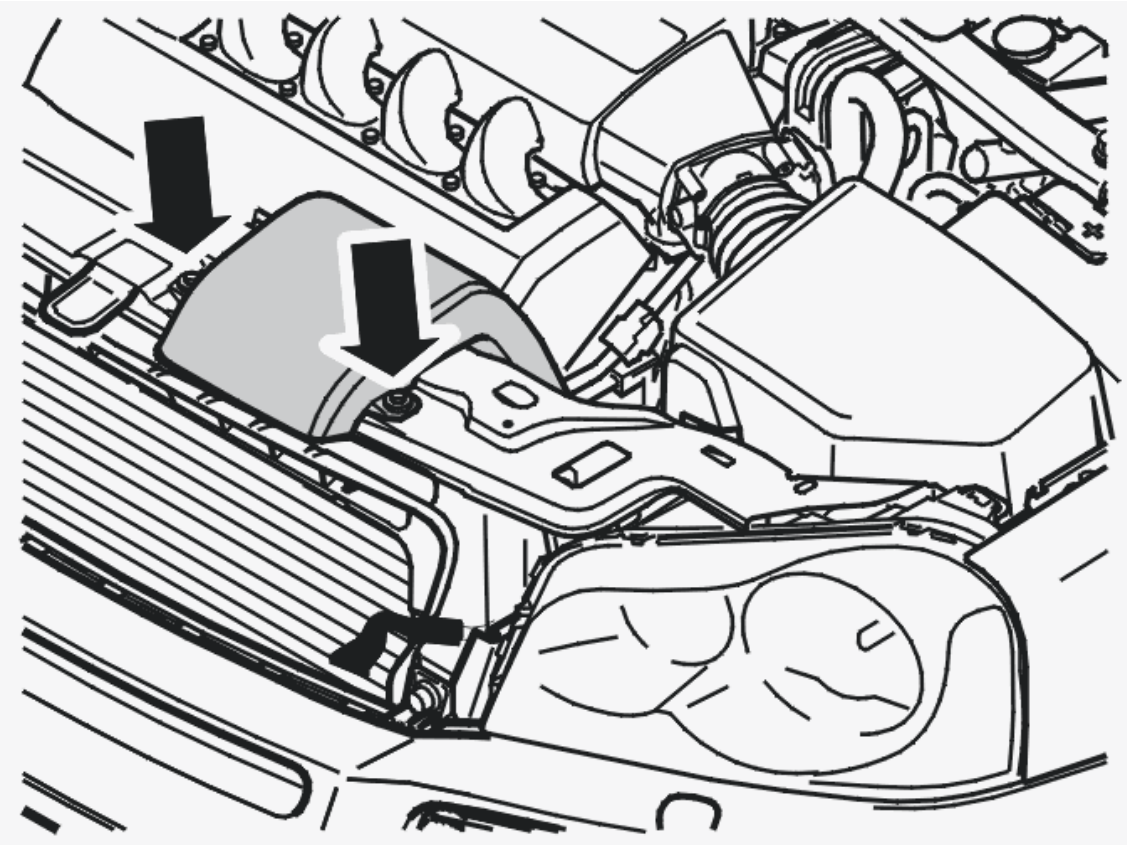


Fig. 828: Identifying Inlet Pipe
Courtesy of VOLVO CARS CORPORATION

Remove the inlet pipe to the air cleaner (ACL) housing.

REMOVING THE TRANSMISSION CONTROL MODULE (TCM)

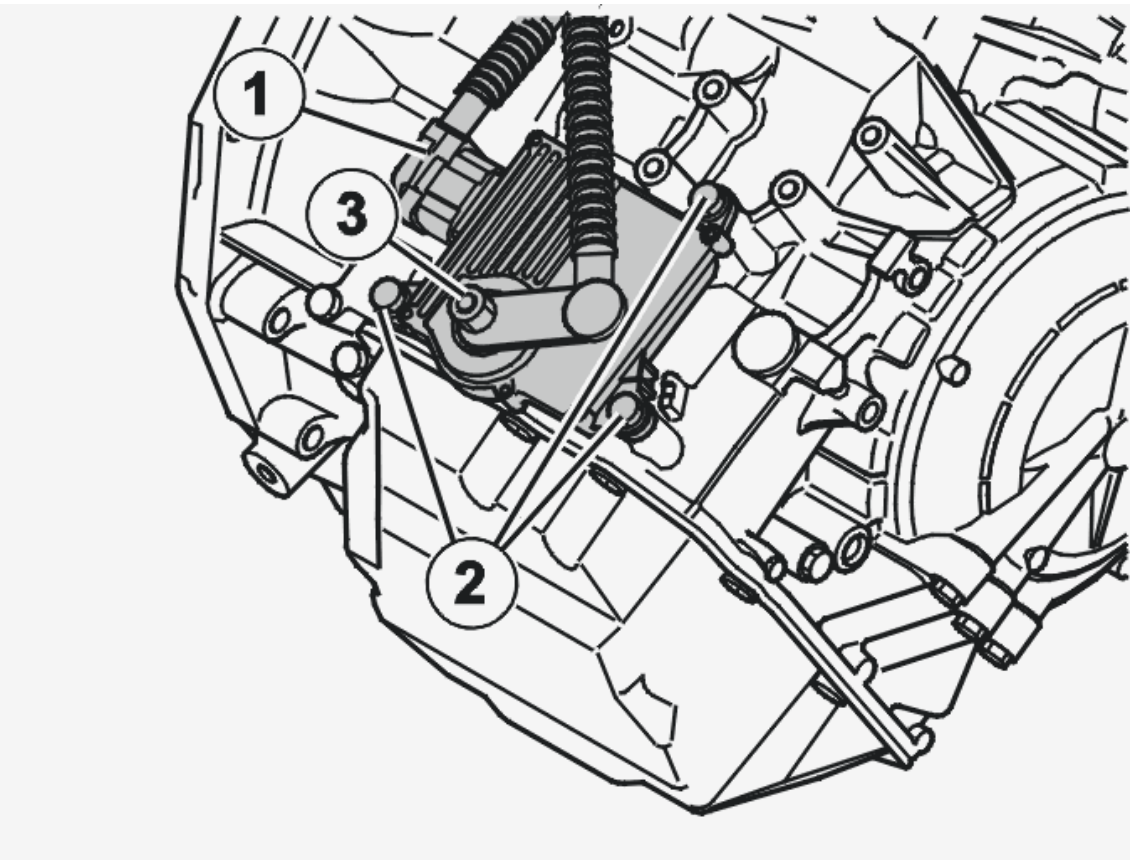


Fig. 829: Identifying Connector, Nut, Bolts And Connector
Courtesy of VOLVO CARS CORPORATION

CAUTION: Do not touch the control module terminal pins with your fingers. Static electricity can damage control module components.

Remove:

- the connector (1), x1
- the nut (3), x1
- the gear selector lever
- the bolts (2), x3
- the control module carefully, so that the pins are not damaged.

INSTALLATION

NOTE: For tightening torques, see: TIGHTENING TORQUE .

INSTALLING THE TRANSMISSION CONTROL MODULE (TCM)

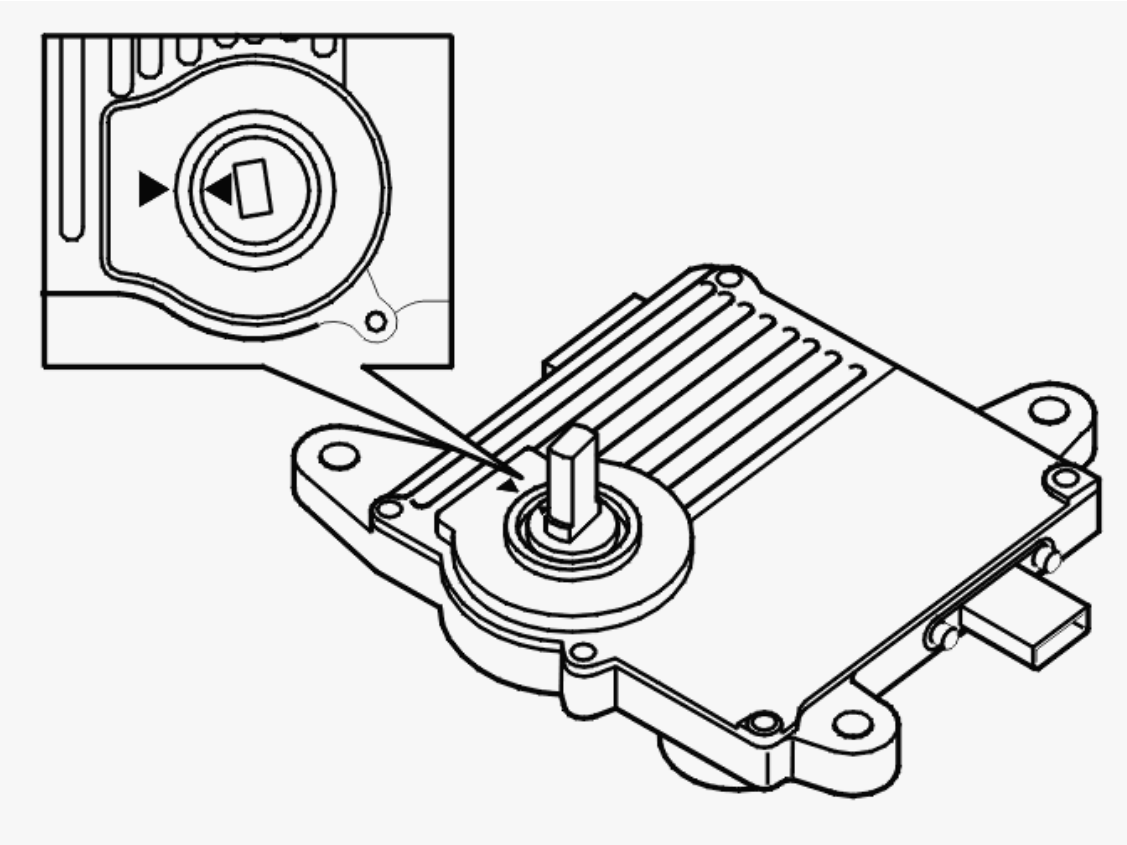


Fig. 830: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

NOTE: Make sure that the arrows correspond with each other and that the gear selector lever is in the neutral position.

Install:

- the control module carefully, so that the pins are not damaged
- the bolts, M8 x3
- the connector, x1
- the gear selector lever, 1 nut, tighten in accordance with: **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS** .

INSTALLING THE INLET PIPE

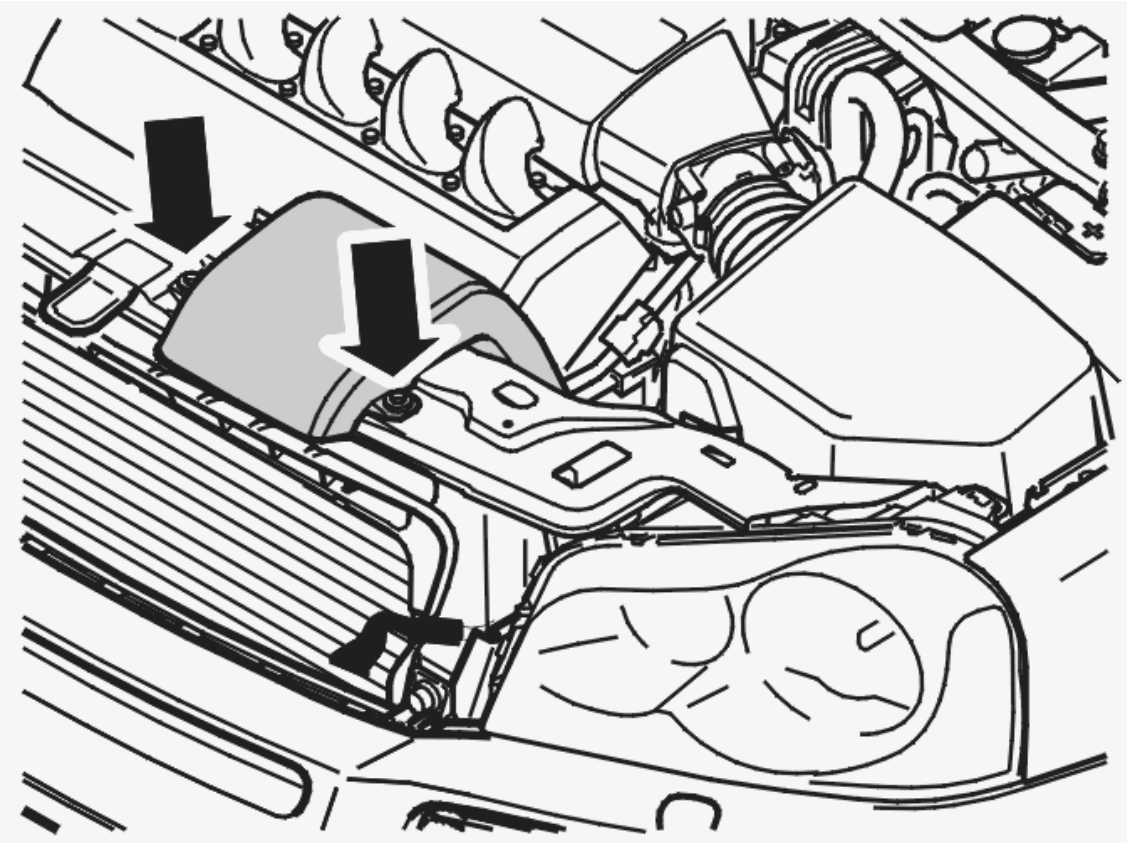


Fig. 831: Identifying Inlet Pipe
Courtesy of VOLVO CARS CORPORATION

Install the inlet pipe to the air cleaner (ACL) housing.

INSTALLING THE BATTERY CABLE

Fit the battery's negative cable in accordance with: **BATTERY, DISCONNECTING** .

FINISHING

ORDERING SOFTWARE

Order the software in accordance with: 9438291 .

CHECKING AND CALIBRATION

Check that no diagnostic trouble codes (DTC) have been stored in the control module during the replacement.

Calibrate the gear position sensor, see VIDA (Volvo scan tool) Vehicle communication.

TRANSMISSION, AUTOMATIC (TF-80SC; 2011-2012)

TRANSMISSION FLUID, CHANGING

Special tools	
	T9997278 WRENCH **Tool number:** T9997278 **Tool description:** WRENCH **Tool boards:**
	T9997363 HOSE **Tool number:** T9997363 **Tool description:** HOSE **Tool boards:**

NOTE: Some variation may occur. However, the essential information in the illustrations is always correct.

CHANGING TRANSMISSION FLUID

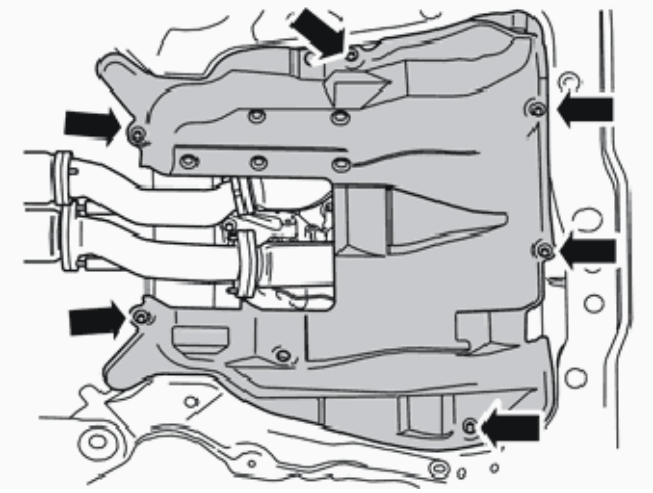


Fig. 832: Identifying Splash Guard
Courtesy of VOLVO CARS CORPORATION

Remove the splash guard.

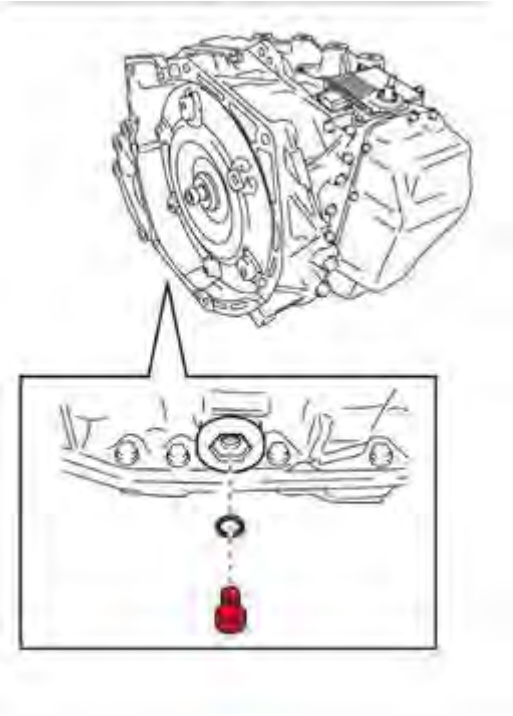


Fig. 833: Identifying Level Plug
Courtesy of VOLVO CARS CORPORATION

WARNING: Avoid skin contact with the specified material.

WARNING: Be prepared to collect escaping fluid.

Remove the integrated level plug (Torx 40).

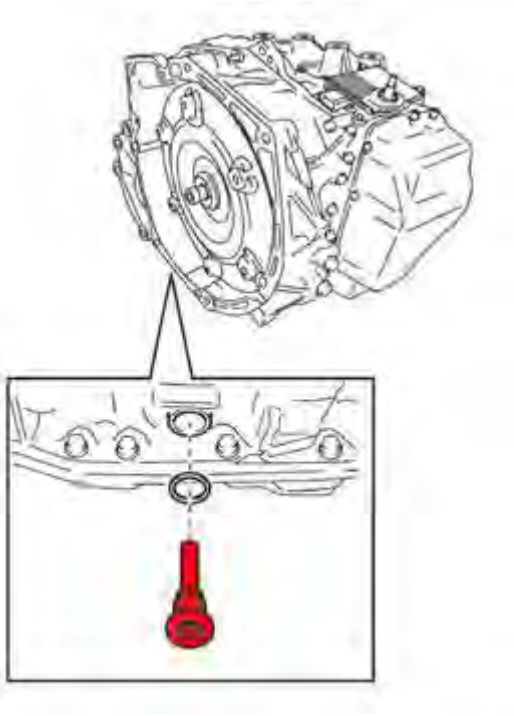


Fig. 834: Identifying Draining Plug
Courtesy of VOLVO CARS CORPORATION

Remove the draining plug.

Drain the transmission fluid.

Install the drain plug. Use a new gasket, lubricate it with ATF oil. Tighten to **TIGHTENING TORQUE**

9997278

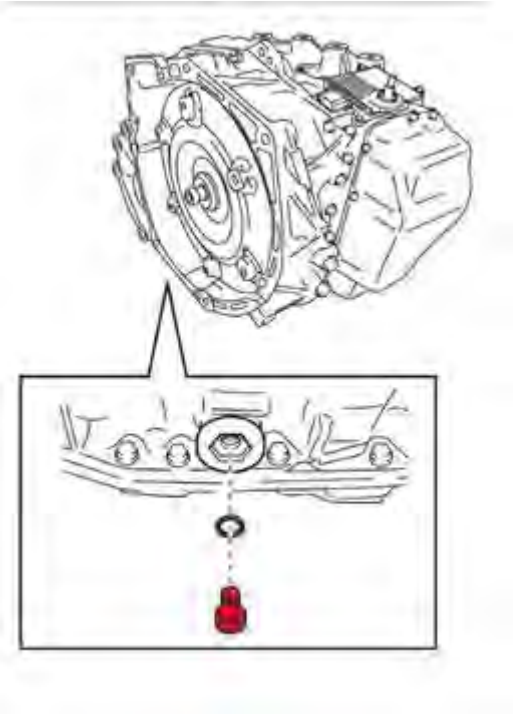


Fig. 835: Identifying Level Plug
Courtesy of VOLVO CARS CORPORATION

Install the level plug by hand, Reuse the O-ring.

Remove the air cleaner (ACL) housing

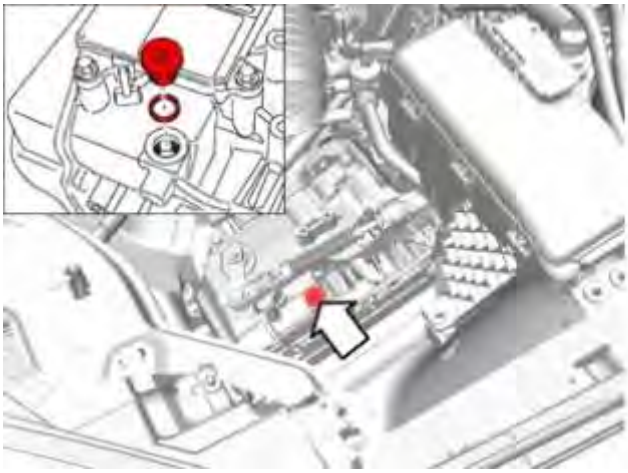


Fig. 836: Locating Transmission Filler Plug
Courtesy of VOLVO CARS CORPORATION

CAUTION: Make sure that tools and equipment are clean, free of foreign material and lubricant.

Remove the filler plug (Torx 55).

Lower a filler nozzle or a hose with funnel into the filler hole.

Install the air cleaner (ACL) housing.

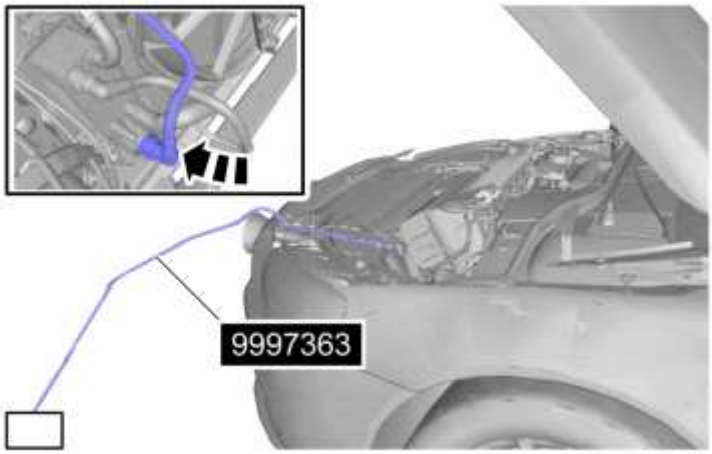


Fig. 837: Identifying Hose 9997363
Courtesy of VOLVO CARS CORPORATION

WARNING: Be prepared to collect escaping fluid.

9997363

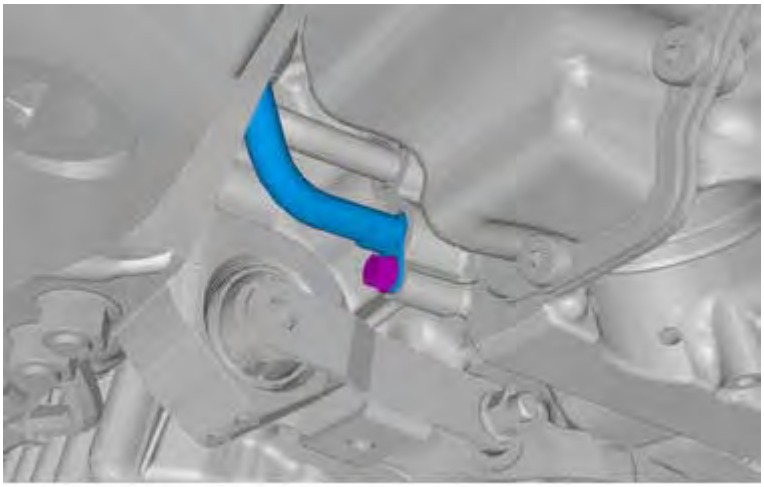


Fig. 838: Identifying Oil Cooler Return Line At Transmission
Courtesy of VOLVO CARS CORPORATION

Remove the oil cooler's return line from the transmission.

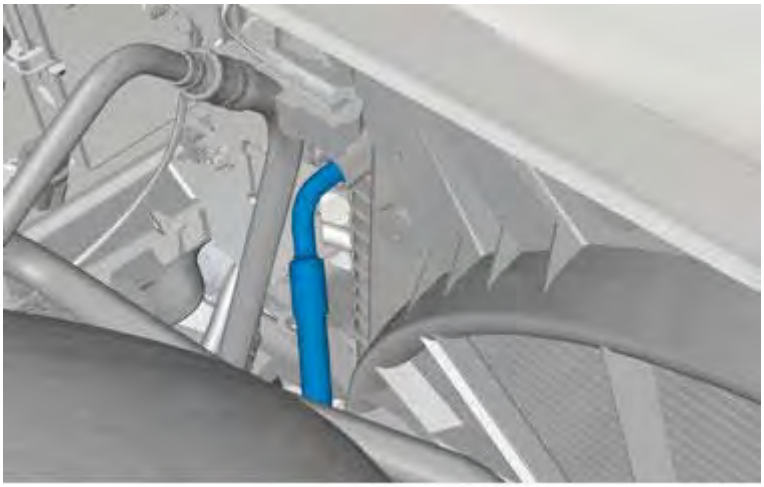


Fig. 839: Identifying Oil Cooler Return Hose At Oil Cooler
Courtesy of VOLVO CARS CORPORATION

Remove the oil cooler's return line from the oil cooler.

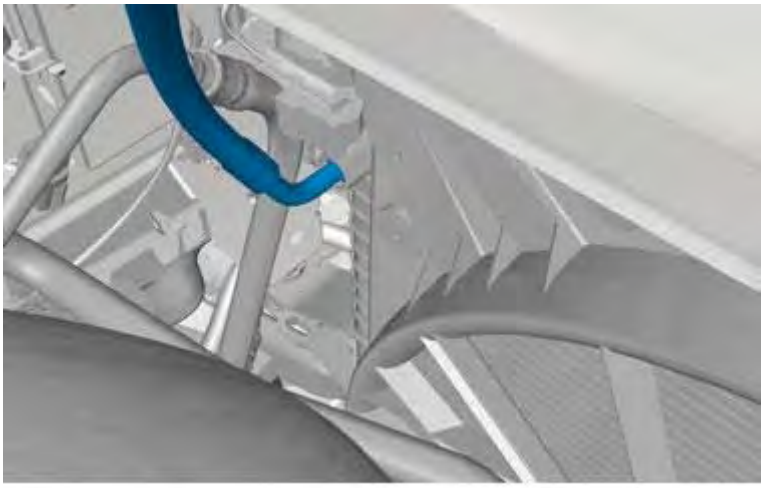


Fig. 840: Identifying Oil Cooler Return Line At Oil Cooler
Courtesy of VOLVO CARS CORPORATION

Install the return line on the oil cooler as shown.

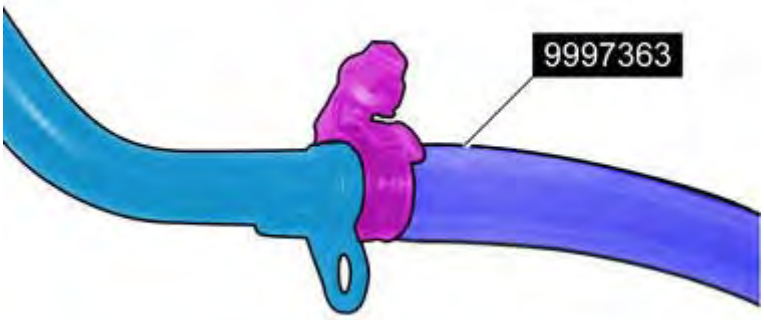


Fig. 841: Identifying Return Line, Hose 9997363, And Hose Clamp
Courtesy of VOLVO CARS CORPORATION

Install hose on the return line with a hose clamp. **9997363**

CAUTION: The plastic hose is quite hard. Tighten the hose clamp hard to avoid leakage in the connection.

WARNING: Be prepared to collect escaping fluid.

Fill with 4l of oil. Use transmission fluid. See **LUBRICANT TRANSMISSION**

Apply the parking brake. Move the gear selector lever to position P.

Start and run the engine at idle.

Shift through all the positions between P and D on the gear selector. Stop for 2 seconds per position. Switch off when air bubbles are visible in the hose.

Fill with 2 liters of oil. Start the engine again and allow it to idle. Switch off when air bubbles are visible in the hose.

Fill with 2 liters of oil again. Start the engine and allow it to idle. Switch off when air bubbles are visible in the hose.

Install return hose to transmission and oil cooler.

Remove the integrated level plug.

Top up with oil until it starts to run out of the transmission.

Install the level plug by hand.

Check the oil level. See **OIL LEVEL, CHECKING**

Reset the counter when replacing the transmission. See **RESETTING THE COUNTER FOR TRANSMISSION OIL, CHANGE**

TRANSMISSION, TRANSFERRING COMPONENTS

TRANSFERRING COMPONENTS

Fig. 842: Transferring Components
Courtesy of VOLVO CARS CORPORATION

Tighten:

- the starter motor. See: **SUMMARY OF TIGHTENING TORQUES FOR SPECIFIC COMPONENTS**
- brackets, M8

Fig. 843: Transferring Components

Courtesy of VOLVO CARS CORPORATION

M8

TRANSMISSION, AUTOMATIC (TF-80SC AWD; 2005-2012)

SEALING RING OIL PUMP, REPLACING

Special tools:

9995069

9997184

NOTE: As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

PREPARATIONS/FINISHING WORK

Remove and install the transmission. See: **REPLACING THE GEARBOX**.

REMOVING/INSTALLING

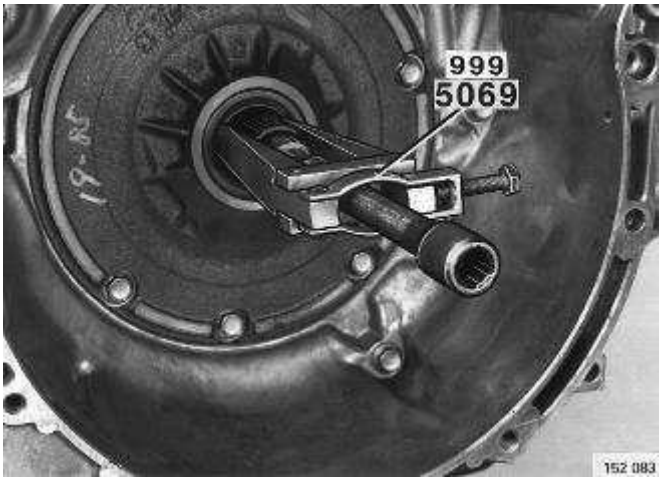


Fig. 844: Identifying Oil Pump Sealing Ring
Courtesy of VOLVO CARS CORPORATION

Use: **9995069** .

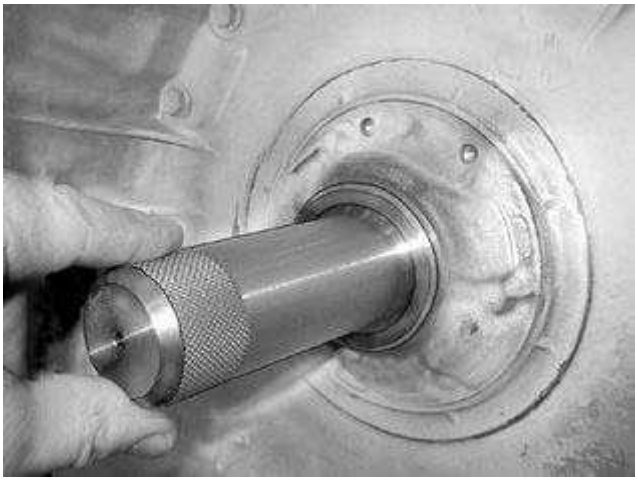


Fig. 845: Identifying Drift Tool 999 7184
Courtesy of VOLVO CARS CORPORATION

Use **9997184** .

TRANSMISSION FLUID, CHANGING

See **TRANSMISSION FLUID, CHANGING**

TRANSMISSION, TRANSFERRING COMPONENTS

TRANSMISSION, TRANSFERRING COMPONENTS

AUXILIARY TRANSMISSION, BEVEL GEAR AND OVERDRIVE (B6324S, TF-80SC AWD; 2007-2010)

SEALING RING, BEVEL GEAR, LEFT

REMOVING BEVEL GEAR

Remove the bevel gear. **BEVEL GEAR**.

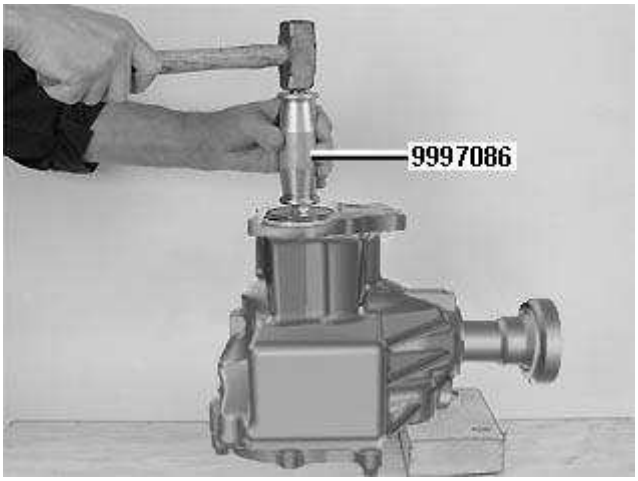


Fig. 846: Identifying Tool 9997086
Courtesy of VOLVO CARS CORPORATION

9997086 .

NOTE: Check thoroughly that no seal residue remains.

Fig. 847: Draining Oil
Courtesy of VOLVO CARS CORPORATION

Position the bevel gear over a receptacle.

Allow the oil to run out through the bearing.

Clean any spilled oil from the seal ring seat in the bevel gear using a lint-free cloth.

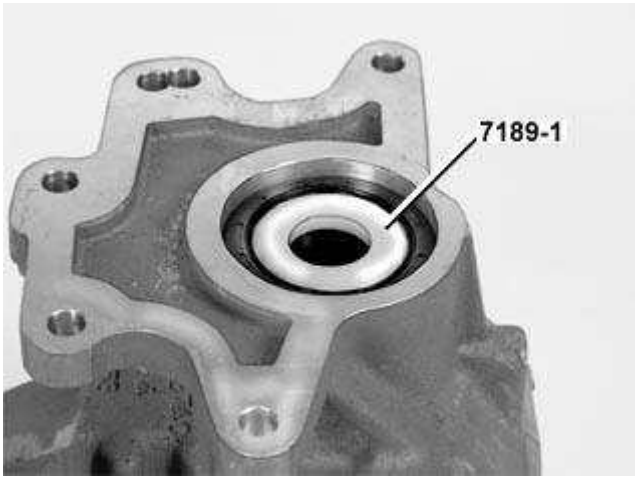


Fig. 848: Identifying Seal Installation Tool 9997086
Courtesy of VOLVO CARS CORPORATION

Install:

- **9997189**
- the gasket.

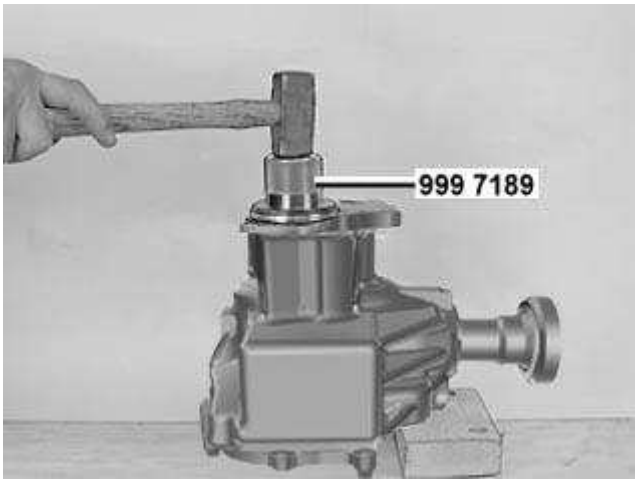


Fig. 849: Driving the Seal
Courtesy of VOLVO CARS CORPORATION

9997189 .

NOTE: When the tool is removed, check that 9997189 was removed with it.

INSTALLING THE ANGLE GEAR

Install the bevel gear. See **BEVEL GEAR**.

FINISHING

CHECKING THE OIL LEVEL

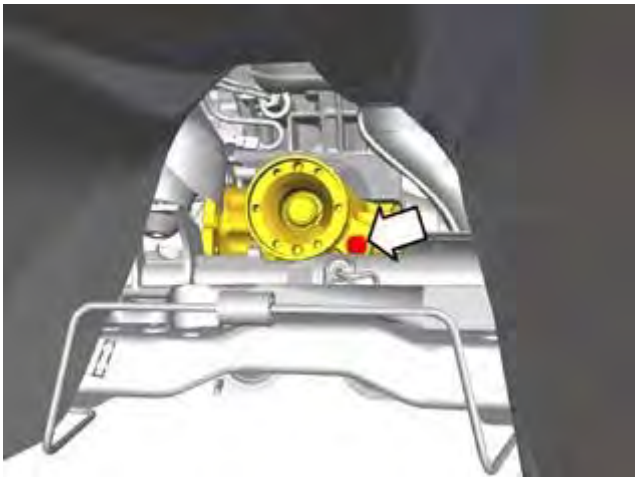


Fig. 850: Tunnel View of Filler
Courtesy of VOLVO CARS CORPORATION

Check the oil level in the bevel gear.

See **LUBRICATION TRANSMISSION** .

SEALING RING, BEVEL GEAR, RIGHT

Special tools:

9995919

9992943

9997190

9991801

REMOVAL

REMOVING DRIVE SHAFT RIGHT SIDE

Remove the right drive shaft. See: **DRIVE SHAFT RIGHT, REPLACING** .

REMOVING THE SEALING RING

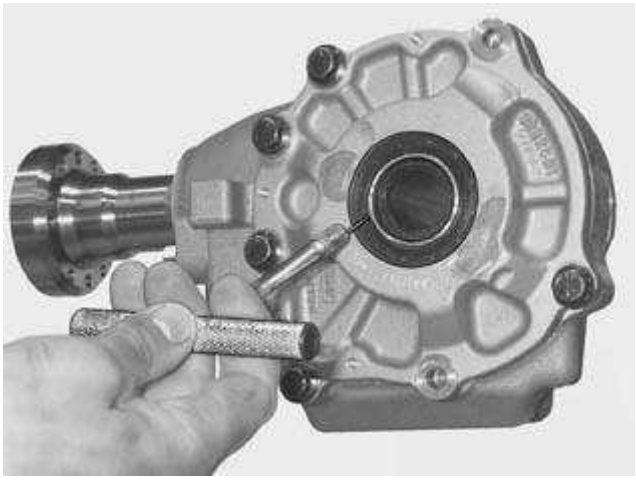


Fig. 851: Removing The Seal With Tool 9995919
Courtesy of VOLVO CARS CORPORATION

Outer sealing ring. Use: **9995919** .

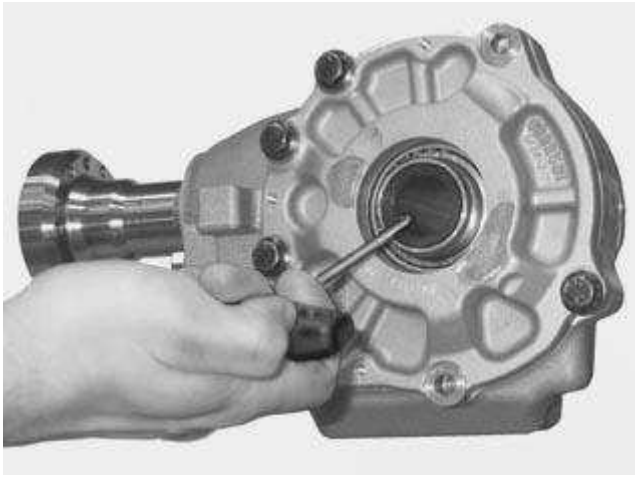


Fig. 852: Using Puller 9992943
Courtesy of VOLVO CARS CORPORATION

Use: **9992943** .

INSTALLATION

INSTALLING A NEW SEALING RING

Fig. 853: Installing A New Seal with Tools 9997190, 9991801
Courtesy of VOLVO CARS CORPORATION

Use **9997190** , extend if necessary using **9991801** .

Fig. 854: Identifying Installing
Courtesy of VOLVO CARS CORPORATION

Use **9997190** , extend if necessary using **9991801** .

FINISHING

CHECKING THE OIL LEVEL IN THE BEVEL GEAR

Check the oil level in the bevel gear. See **TRANSFERCASE REAR SEAL**.

Install the right driveshaft. See **DRIVE SHAFT RIGHT, REPLACING** .

TRANSFERCASE REAR SEAL

Information for this method will be produced at a later date.

TRANSFERCASE VENTILATION VALVE

Remove the bevel gear. See **BEVEL GEAR**.

Fig. 855: Replacing Vent Nipple
Courtesy of VOLVO CARS CORPORATION

Pull out the brass pipe using cutting nippers.

Tap in the nipple using a rubber mallet.

To install, reverse the removal procedure

AUXILIARY TRANSMISSION, BEVEL GEAR AND OVERDRIVE (B6324S5, TF-80SC AWD; 2011-2012)

SEALING RING, BEVEL GEAR, LEFT

SEALING RING, BEVEL GEAR, LEFT

SEALING RING, BEVEL GEAR, RIGHT

SEALING RING, BEVEL GEAR, RIGHT

TRANSFERCASE REAR SEAL

TRANSFERCASE REAR SEAL

TRANSFERCASE VENTILATION VALVE

TRANSFERCASE VENTILATION VALVE

AUXILIARY TRANSMISSION, BEVEL GEAR AND OVERDRIVE (TF-80SC

AWD; 2007-2012)

BEVEL GEAR

NOTE: Removal steps in this procedure may contain installation details.

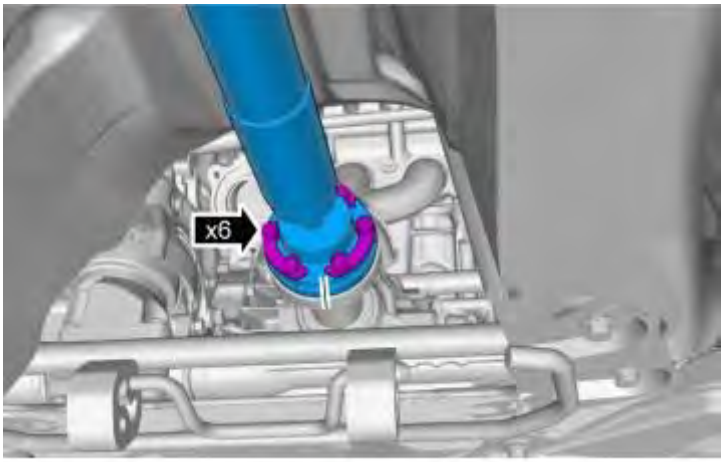


Fig. 856: MarkThe Relation Of The Flanges Before Removal
Courtesy of VOLVO CARS CORPORATION

NOTE: Note the position of the component before removal.

9995743

Tightening torque: Propeller shaft (CV joint, 6 screws). See **TIGHTENING TORQUE**

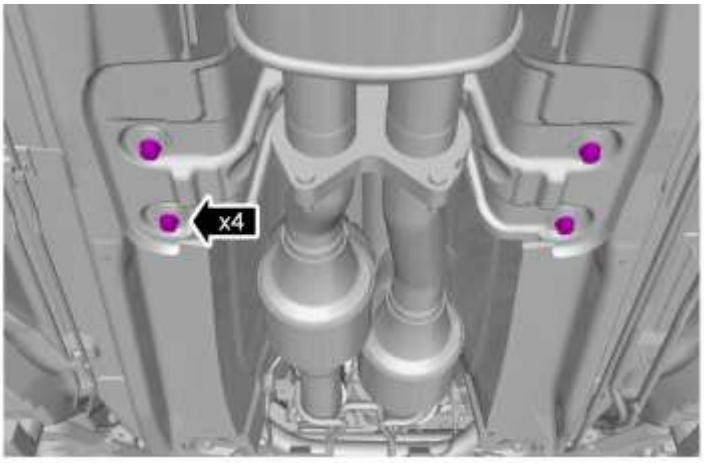


Fig. 857: Identifying Exhaust Hanger Bolts
Courtesy of VOLVO CARS CORPORATION

Tightening torque: M8 **TIGHTENING TORQUE**

Remove the starter motor. See **STARTER MOTOR**

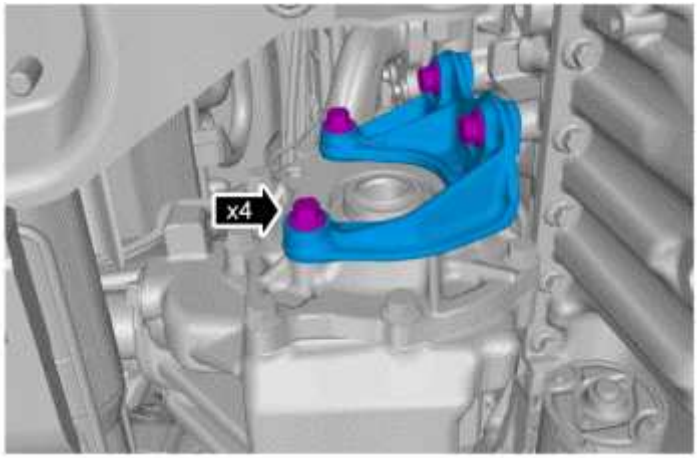


Fig. 858: Identifying Bevel Gear Bracket
Courtesy of VOLVO CARS CORPORATION

Tightening torque: Bevel gear bracket. See **TIGHTENING TORQUE**

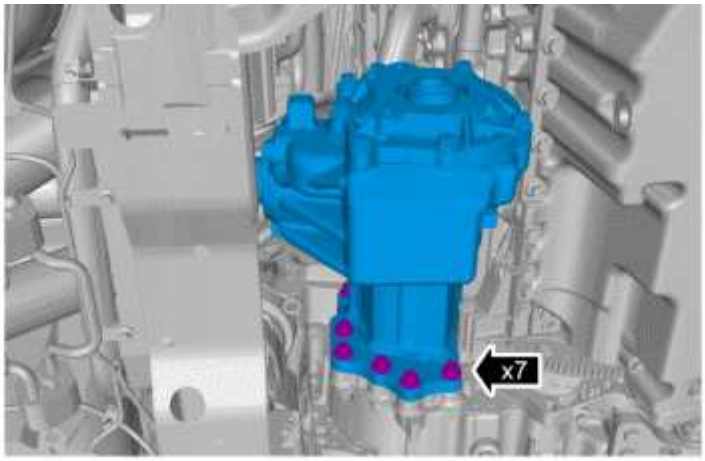


Fig. 859: Identifying Bevel Gear Fasteners
Courtesy of VOLVO CARS CORPORATION

Tightening torque: Bevel gear. See **TIGHTENING TORQUE** .

To install, reverse the removal procedure

TRANSMISSION

Transmission - Specifications, electrical/electronic

COMPONENT SPECIFICATIONS, TRANSMISSION CONTROL MODULE (TCM) (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

COMPONENT SPECIFICATIONS

SHIFT SOLENOIDS

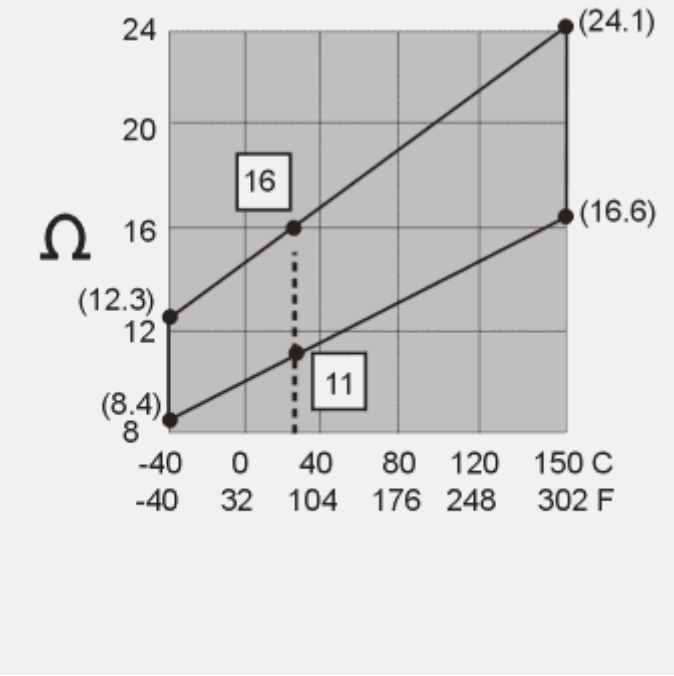


Fig. 1: Identifying Ohms Resistance Temperature Graph
Courtesy of VOLVO CARS CORPORATION

Component	Note	Resistance (ohms)
Gear shift solenoid S1, S2	Resistance between the solenoid pins and the solenoid casing/transmission housing.	+20 °C= 11-16 ohms

Other values, see diagram. When measuring at other temperature than +20 °C the check-measurement shall be performed at +20 °C. This is to ensure if the resistance is correct or not.

LINEAR PRESSURE SOLENOID SLT, SLB1, SLC1, SLC2, SLC3 AND LOCK-UP SOLENOID SLU

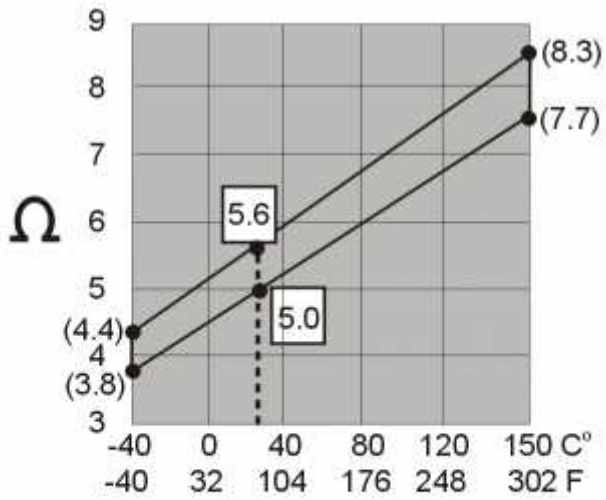


Fig. 2: Identifying Ohms Resistance Temperature Graph
Courtesy of VOLVO CARS CORPORATION

Component	Note	Resistance (ohms)
Lock-up solenoid (SLU) Line pressure solenoids (SLT), (SLB1),(SLC1),(SLC2),(SLC3)	Resistance between solenoid pins.	+20 °C= 5.0-5.6 ohms

Other values, see diagram. When measuring at other temperature than +20 °C the check-measurement shall be performed at +20 °C. This is to ensure if the resistance is correct or not.

OIL TEMPERATURE SENSOR

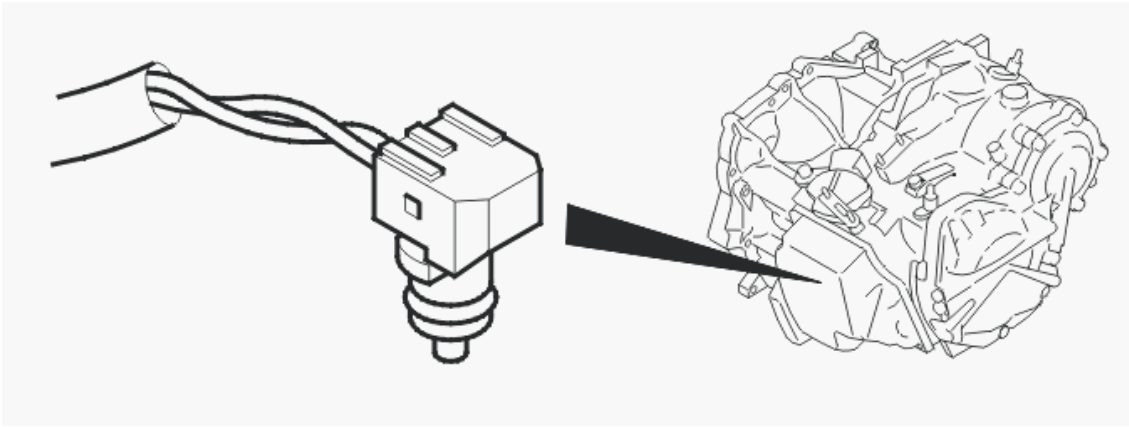


Fig. 3: Locating Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Component	Note	Resistance (ohms)
Oil temperature sensor	Resistance between the temperature sensor terminals.	+10 °C = 5620-7310 ohms
		+25 °C = 3500 ohms
		+110 °C = 220-270 ohms

Resistance decreases with increasing temperature.

A test measurement must be taken at both temperatures. This is to establish if the resistance is correct or not.

SOLENOID P-POSITION LOCKOUT

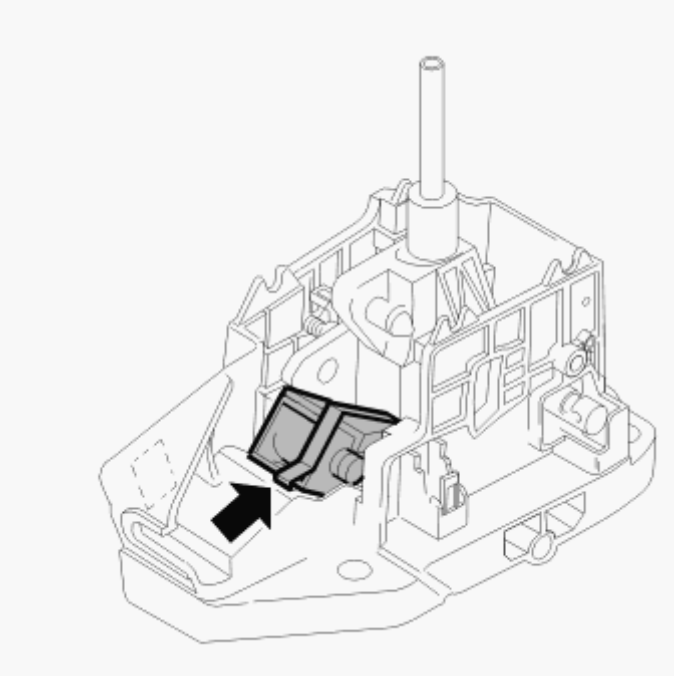


Fig. 4: Identifying Shift-Lock
Courtesy of VOLVO CARS CORPORATION

Component	Note	Resistance (ohms)
Solenoid p-position lockout	Resistance between the solenoid's connections	+20 °C= 24.5 - 29.3 ohms

COMPONENT SPECIFICATIONS, TRANSMISSION CONTROL MODULE (TCM) (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

COMPONENT SPECIFICATIONS

see **COMPONENT SPECIFICATIONS**

COMPONENT SPECIFICATIONS, TRANSMISSION CONTROL MODULE

(TCM) (B8444S, TF-80SC AWD; 2006-2011)

COMPONENT SPECIFICATIONS

SHIFT SOLENOIDS

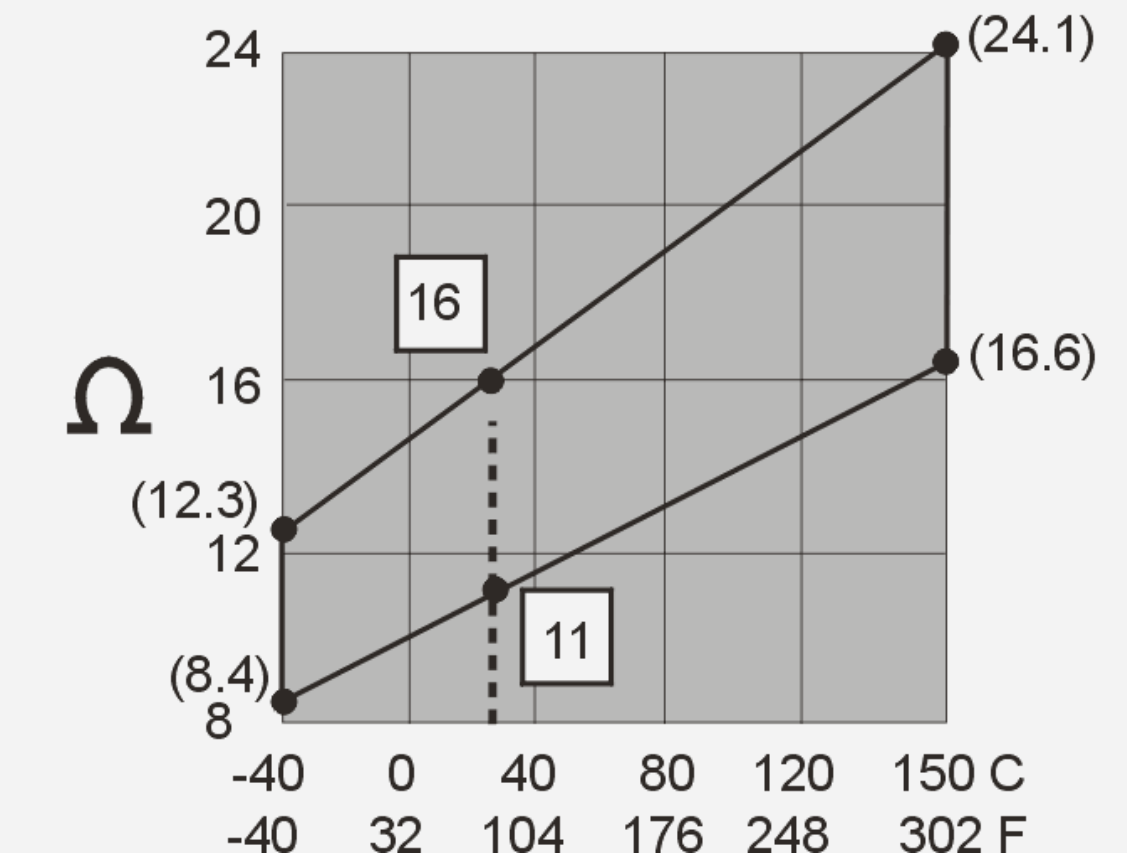


Fig. 5: Identifying Ohms Resistance Temperature Graph
Courtesy of VOLVO CARS CORPORATION

Component	Note	Resistance (ohms)
Gear shift solenoid S1, S2	Resistance between the solenoid pins and the solenoid casing/transmission housing.	+20 °C= 11-16 ohms

Other values, see diagram. When measuring at other temperature than +20 °C the check-measurement shall be performed at +20 °C. This is to ensure if the resistance is correct or not.

LINEAR PRESSURE SOLENOID SLT, SLB1, SLC1, SLC2, SLC3 AND LOCK-UP SOLENOID SLU

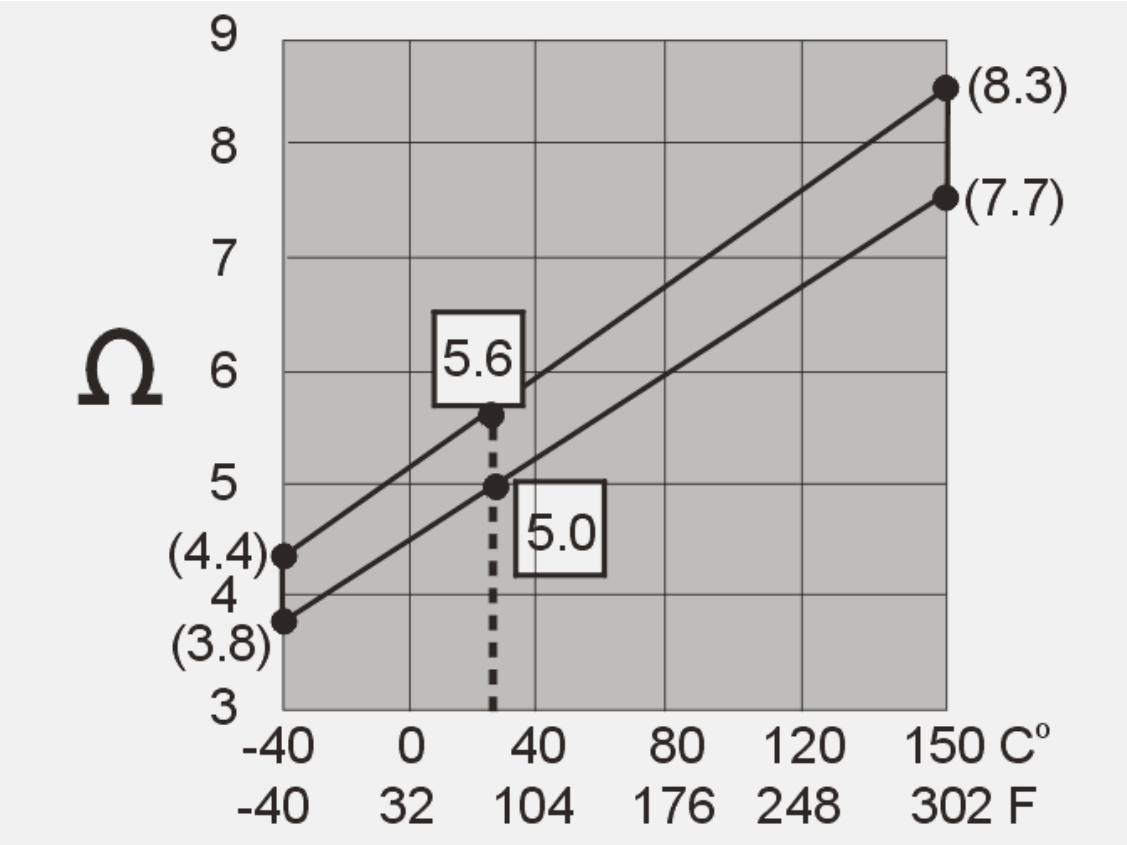


Fig. 6: Identifying Ohms Resistance Temperature Graph
Courtesy of VOLVO CARS CORPORATION

Component	Note	Resistance (ohms)
Lock-up solenoid (SLU) Line pressure solenoids (SLT), (SLB1),(SLC1),(SLC2),(SLC3)	Resistance between solenoid pins.	+20 °C= 5.0-5.6 ohms

Other values, see diagram. When measuring at other temperature than +20 °C the check-measurement shall be performed at +20 °C. This is to ensure if the resistance is correct or not.

OIL TEMPERATURE SENSOR

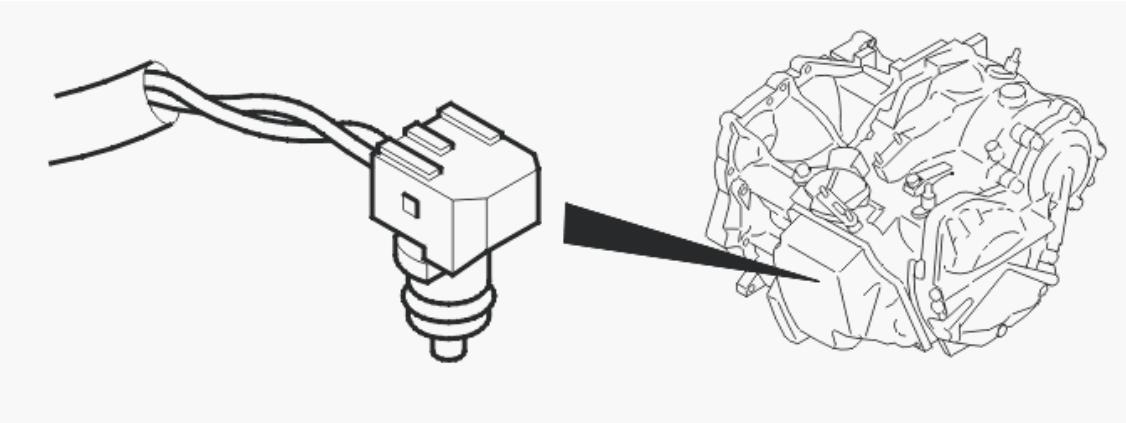


Fig. 7: Identifying Oil Temperature Sensor
Courtesy of VOLVO CARS CORPORATION

Component	Note	Resistance (ohms)
Oil temperature sensor	Resistance between the temperature sensor terminals.	+10 °C= 5620-7310 ohms
		+25 °C= 3500 ohms
		+110 °C= 220-270 ohms

Resistance decreases with increasing temperature.

A test measurement must be taken at both temperatures. This is to establish if the resistance is correct or not.

SOLENOID P-POSITION LOCKOUT

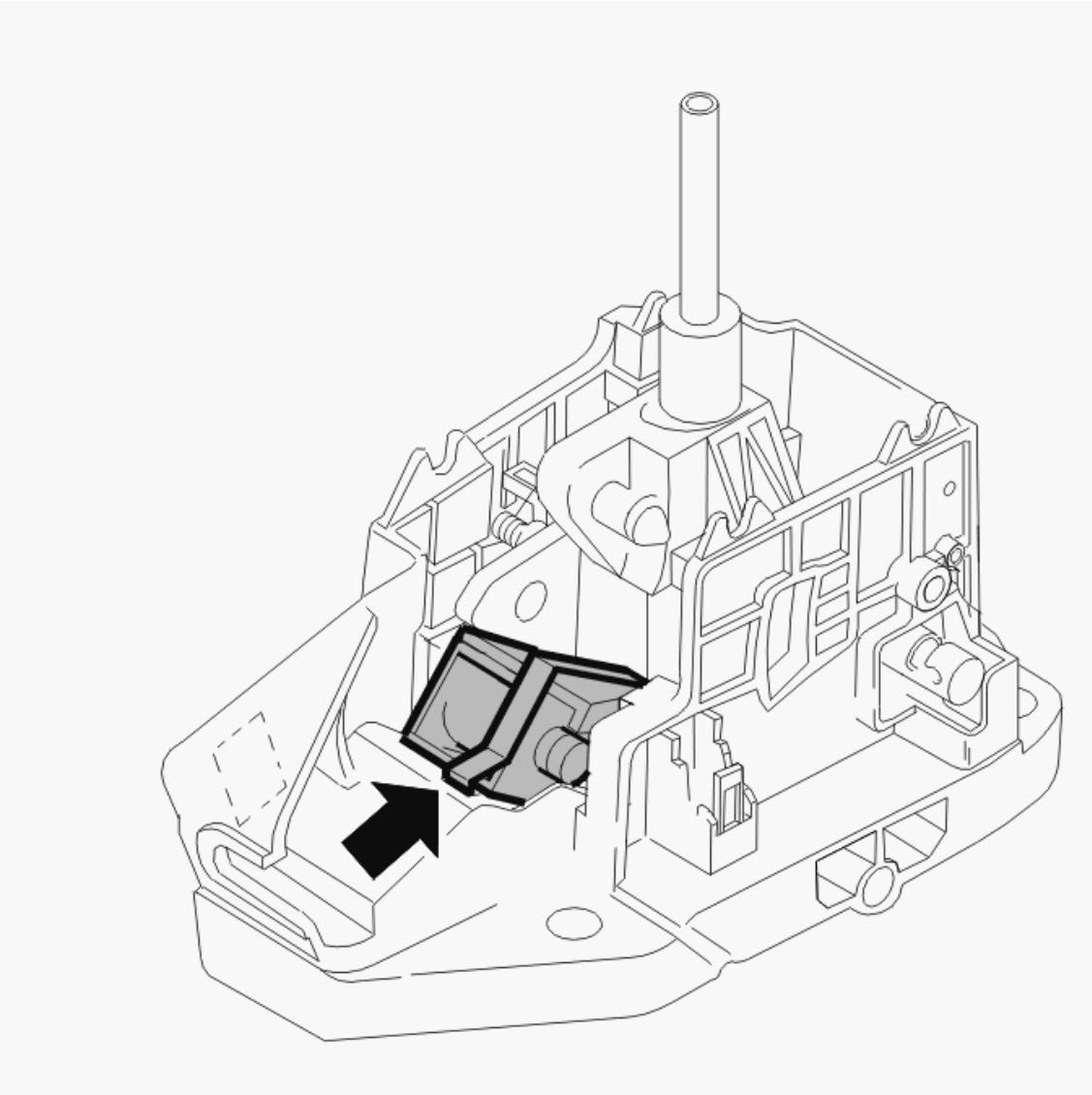


Fig. 8: Identifying Shift-Lock
Courtesy of VOLVO CARS CORPORATION

Component	Note	Resistance (ohms)
Solenoid p-position lockout	Resistance between the solenoid's connections	+20 °C= 24.5 - 29.3 ohms

COMPONENT SPECIFICATIONS, TRANSMISSION CONTROL MODULE (TCM) (TF-80SC AWD; 2005)

COMPONENT SPECIFICATIONS

see **COMPONENT SPECIFICATIONS**

ELECTRICAL / ELECTRONIC SYSTEM SPECIFICATIONS (AW50/51 AWD;

AW55-50/51SN; 2003-2007)

COMPONENT RESISTANCE VALUES

The resistance values assume a temperature of +20°C unless otherwise stated.

Component	Remarks	Resistance (ohms)
Shift solenoid S1	Resistance between the solenoid pin and the solenoid sleeve or transmission housing	12-16
Shift solenoid S2	Resistance between the solenoid pin and the solenoid sleeve or transmission housing	11-15
Shift solenoid S3	Resistance between the solenoid pin and the solenoid sleeve or transmission housing	11-15
Shift solenoid S4	Resistance between the solenoid pin and the solenoid sleeve or transmission housing	11-15
Shift solenoid S5	Resistance between the solenoid pin and the solenoid sleeve or transmission housing	11-15
Lock-up solenoid SLU	Resistance between the solenoid pins	5.0-5.6
Throttle solenoid SLT	Resistance between the solenoid pins	5.0-5.6
Throttle solenoid SLS	Resistance between the solenoid pins	5.0-5.6
Oil temperature sensor, temperature (°C)	0	
20	5800-7900	
40		
80		
100	261-263	
150		

CONNECTOR A, TRANSMISSION

4-PIN CONNECTOR

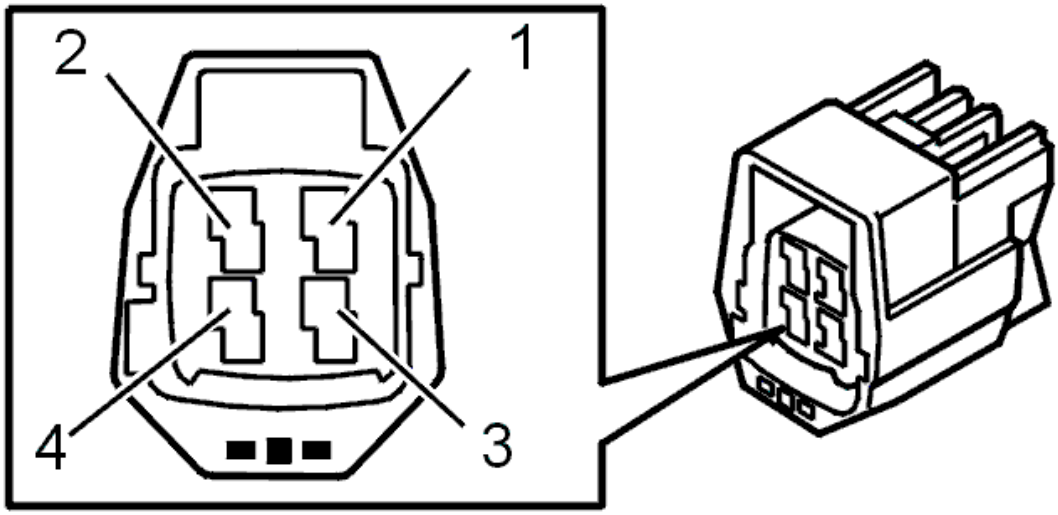


Fig. 9: Connector A, Transmission -- 4-Pin Connector
Courtesy of VOLVO CARS CORPORATION

Control module terminals #A1-#A60 correspond to terminals #A1-#A60 on the breakout box, terminals #A61-#A70 correspond to terminals #B1-#B10 on the breakout box.

Terminal	Signal	Connected to control module terminal #
A1	Signal ground, transmission input speed sensor (SP2)	A41
A2	Power supply, engine speed (RPM) sensor (SP2)	A59
A3	Signal ground, transmission output speed sensor (SP1)	A39
A4	Power supply, speed sensor (SP1)	A57

CONNECTOR B, TRANSMISSION

6-PIN CONNECTOR

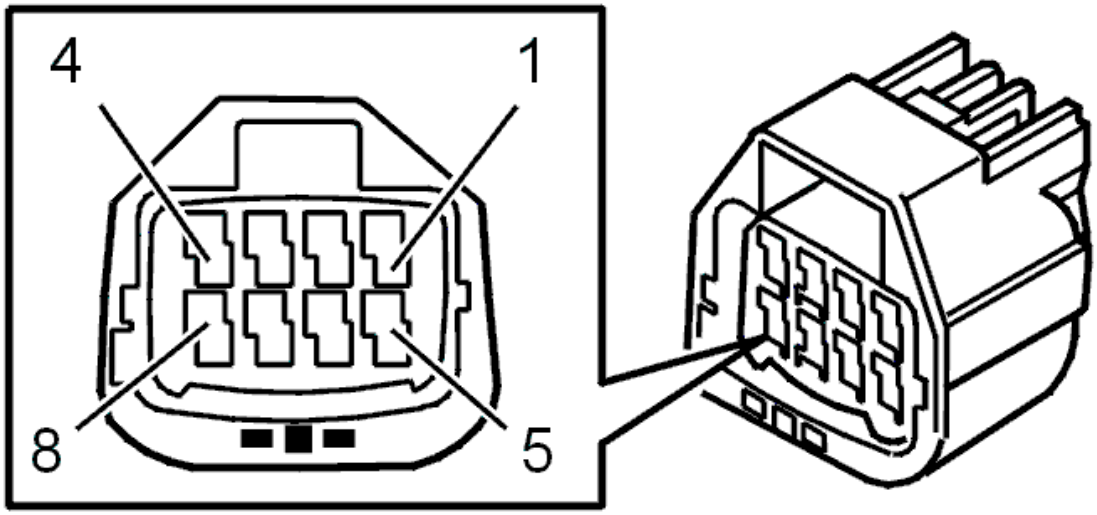


Fig. 10: Connector B, Transmission -- 6-Pin Connector
Courtesy of VOLVO CARS CORPORATION

Control module terminals #A1-#A60 correspond to terminals #A1-#A60 on the breakout box, terminals #A61-#A70 correspond to terminals #B1-#B10 on the breakout box.

Terminal	Signal	Connected to control module terminal #
B1	Shift lock solenoid, replacement	
B2	Shift lock solenoid, replacement	
B4	Ground terminal, gear-shift position sensor	
B5	Gear-shift position sensor, signal A	A46
B6	Gear-shift position sensor, signal B	A64
B7	Gear-shift position sensor, signal C	A45
B8	Gear-shift position sensor, signal PA	A63

CONNECTOR C, TRANSMISSION

6-PIN CONNECTOR

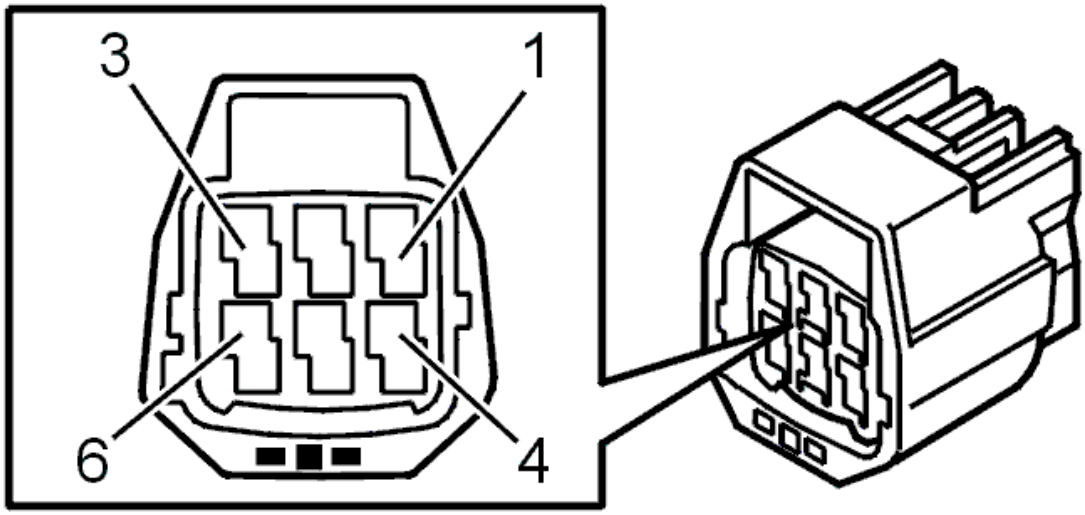


Fig. 11: Connector C, Transmission -- 6-Pin Connector
Courtesy of VOLVO CARS CORPORATION

Control module terminals #A1-#A60 correspond to terminals #A1-#A60 on the breakout box, terminals #A61-#A70 correspond to terminals #B1-#B10 on the breakout box.

Terminal	Signal	Connected to control module terminal #
C1	S1	A50
C2	S2	A68
C3	S3	A48
C4	S4	A47
C5	S5	A66
C6		

CONNECTOR D, TRANSMISSION

8-PIN CONNECTOR

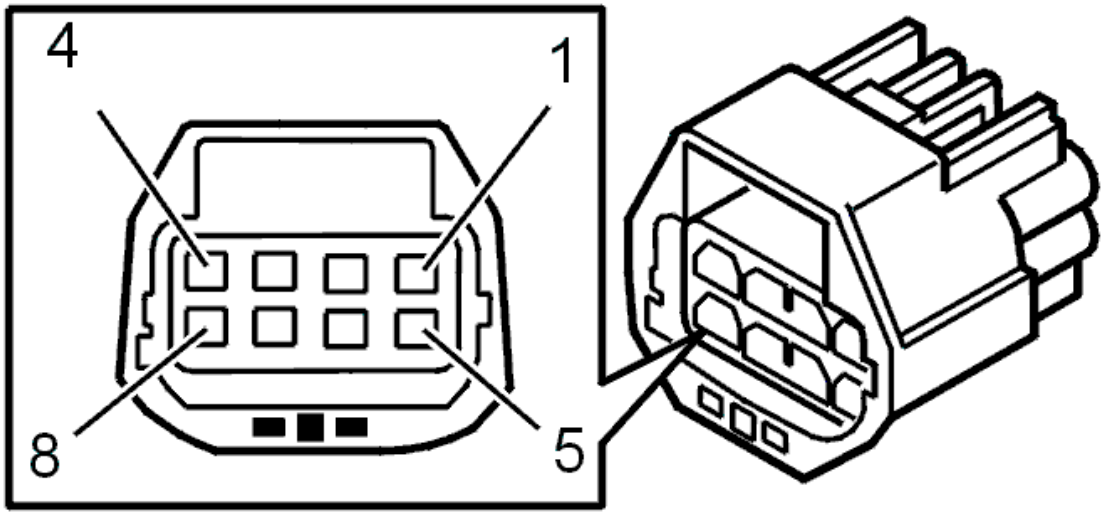


Fig. 12: Connector D, Transmission -- 6-Pin Connector
Courtesy of VOLVO CARS CORPORATION

Control module terminals #A1-#A60 correspond to terminals #A1-#A60 on the breakout box, terminals #A61-#A70 correspond to terminals #B1-#B10 on the breakout box.

Terminal	Signal	Connected to control module terminal #
D1	Control signal, Lock-up solenoid SLU	A51
D2	Signal ground, Lock-up solenoid SLUG	A69
D3	Control signal, line pressure solenoid SLT	A52
D4	Signal ground, line pressure solenoid SLTG	A70
D5	Control signal, line pressure solenoid SLS	A49
D6	Signal ground, line pressure solenoid SLSG	A67
D7	Power supply, oil temperature sensor OT	A37
D8	Signal ground, oil temperature sensor OTG	A55

ELECTRICAL/ELECTRONIC SYSTEM SPECIFICATIONS (4T65 AWD; 2003-2006)

COMPONENT RESISTANCE VALUES

Resistance values at 20 °C unless otherwise stated.

Component	Remarks	Resistance (ohms)
Shift solenoid S1	Resistance between automatic transmission connector #1 and #5	19-24
Shift solenoid S2	Resistance between automatic transmission connector #2 and #5	19-24

Lock-up solenoid SL	Resistance between automatic transmission connector #17 and #5		10.4-10.8
Line pressure solenoid STH	Resistance between automatic transmission connector #3 and #4		3.5-4.6
Oil temperature sensor	Temperature (°C) Resistance between automatic transmission connector #11 and #12	0	9400-9500
		20	3500-3600
		40	1400-1500
		80	330-350
		100	170-180
		150	45-50

SIGNAL DESCRIPTION (4T65 AWD; 2003-2005)

SIGNAL DESCRIPTION. CONNECTOR 4T65 EV/EV-GT

GENERAL

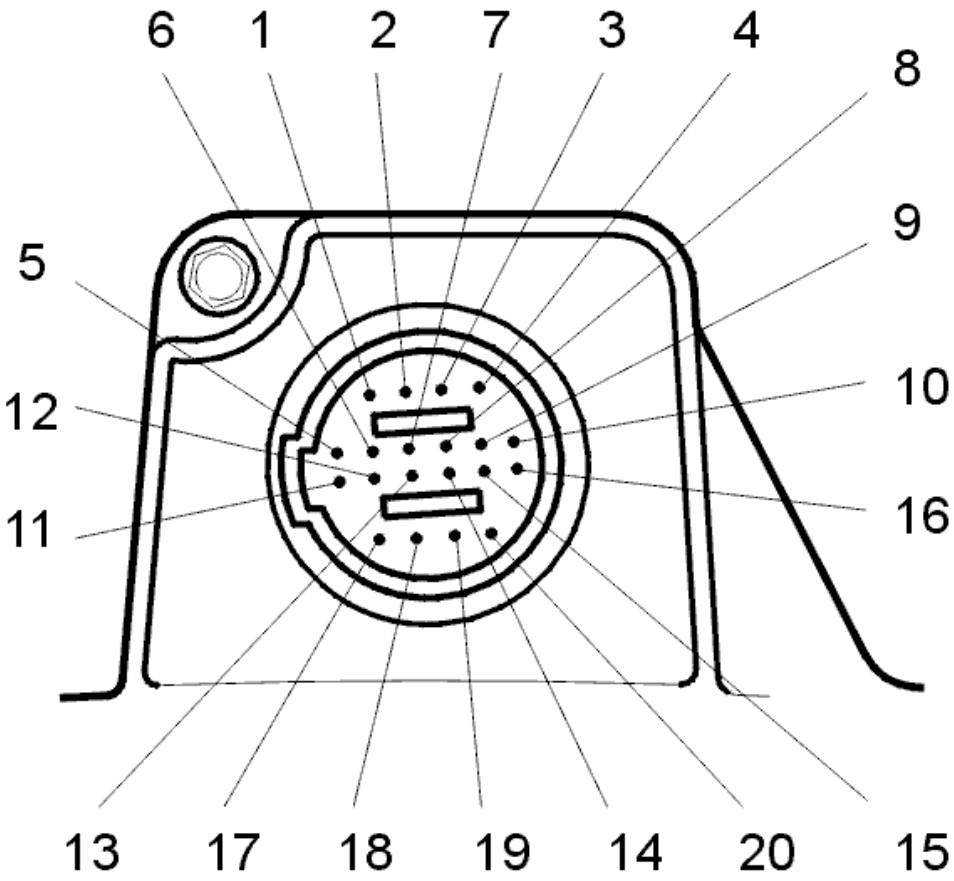


Fig. 13: Identifying Terminals
Courtesy of VOLVO CARS CORPORATION

The letters in parenthesis are the original GM marking for the automatic transmission connector.

#1 (A)

Solenoid S1 signal cable.

#2 (B)

Solenoid S2 signal cable.

#3 (C)

Solenoid STH signal cable.

#4 (D)

Solenoid STH (STHG) signal ground.

#5 (E)

Solenoids S1, S2, SL signal ground.

#6 (F)

Gear-shift position sensor signal cable, signal A.

#7 (G)

Gear-shift position sensor signal cable, signal B.

#8 (H)

Gear-shift position sensor signal cable, signal C.

#9 (J)

Gear-shift position sensor signal cable, signal PA.

#10 (K)

Gear-shift position sensor signal ground.

#11 (L)

Oil temperature sensor (OT) signal cable.

#12 (M)

Oil temperature sensor signal ground (OTG).

#13 (N)

Not used.

#14 (P)

Not used.

#15 (R)

Not used.

#16 (S)

Engine speed (RPM) sensor power supply (NC).

#17 (T)

Solenoid SL signal cable.

#18 (U)

Pressure sensor PS4 signal cable.

#19 (V)

Engine speed (RPM) sensor signal cable (NC).

#20 (X)

Not used.

SIGNAL SPECIFICATION

All the values listed below are between the terminal in column 1 and terminal #A53 (signal ground), unless otherwise indicated in brackets.

NOTE: Connect the breakout box and check the ground connections before starting to measure.

U =	DC voltage in volts (V)	U_{AC} =	AC voltage in volts (V)
U_{bat} =	battery voltage	F =	frequency in Hertz (Hz)
U_{low} =	voltage approximately 0 V	% duty =	duty cycle (pulse ratio) in percent (%)
t =	time in milliseconds (ms)		

CONNECTOR A TERMINALS #A35 - #A70

Breakout box terminal	Control module terminal	Signal type	Ignition on	Engine idling	Miscellaneous
#A35	#A35	Power supply	U_{bat}		Model year dependent: Up to and incl. 2004 Supply from CEM relay CMI21(2/101) From and incl. 2005 Supply from connection #B20 on Central electronic module (CEM)
#A37	#A37	Signal, oil temperature	Cold gearbox (+20°C):		U decreases with

		sensor	U=2.4 V Hot gearbox (+100°C): U=0.3-0.5 V	increasing temperature
#A39	#A39	Signal, gearbox output speed sensor signal	Tooth against sensor: 14 mA Cover against sensor: 7 mA	The sensor generates a pulsed signal (quadratic wave) with fixed pulse ratio when the pulse wheel rotates. Frequency increases with speed
#A41	#A41	Signal, gearbox input speed sensor	Tooth against sensor: 14 mA Cover against sensor: 7 mA	The sensor generates a pulsed signal (quadratic wave) with fixed pulse ratio when the pulse wheel rotates. Frequency increases with speed
#A44	#A44	Signal (-) from gear position sensor via Transmission Control Module (TCM) to Central Electronic Module (CEM)	Gear-shift selector in position P = U_{low} In all other positions U_{bat}	Start immobilizer. The signal is grounded when the gear selector is in position P and N, which makes engine start possible.
#A45	#A45	Signal, gear-shift position sensor C	Gear selector positions D, 3, L: U=0-0.5 V Other positions: U=0-2 V below U_{bat}	The signal is grounded in positions D, 3, L
#A46	#A46	Signal, gear-shift position sensor A	Gear selector position P, R, 3, L: U=0-0.5 V Other positions: U=0-2 V below U_{bat}	Signal is grounded in positions N, D
#A50	#A50	Control signal, shift solenoid S1	Activated: U=0-2 V below Ubat Not activated: U_{low}	The solenoid receives voltage when activated by the control module in 1st and 4th gears
#A51	#A51	Control signal, lock-up solenoid SL	Activated: U=0-2 V below U_{bat} Not activated: U_{low}	The solenoid is supplied with voltage when it is activated by the control module
#A52	#A52	Control signal, line pressure solenoid STH	U=1.6 V	Voltage decreases with increasing throttle opening
#A53	#A53	Signal ground	U_{low}	-
#A54	#A54	Signal ground for the gear selector module (GSM)	U_{low}	From and incl. 2001 Connection #A6 on the gear selector module (GSM)

#A55	#A55	Signal ground oil temperature sensor	U_{low}	Ground
#A57	#A57	Power supply, vehicle speed sensor (VSS)	Uapprox.1 V	-
#A59	#A59	Power supply, engine speed (RPM) sensor	Uapprox.1 V	-
#B3	#A63	Signal, gear-shift position sensor PA	Gear selector positions P, N, 3: U=0-0.5 V Other positions: U=0-2 V below U_{bat}	The signal is grounded in positions P, N, 3
#B4	#A64	Signal, gear-shift position sensor B	Gear selector position R, N, D, 3, L: U=0-0.5 V Other positions: U=0-2 V below U_{bat}	Signal grounded in positions R, N, D, 3
#B5	#A65	Pressure sensor signal PS4	Active = U_{bat} , Not active = 0 V	Pressure sensor PS4 is usually closed. It transmits a signal to the control module indicating the position of solenoid SL. When lock-up is requested, the pressure sensor must be **Not active** . When there is no lock-up, the pressure sensor must be **Active** .
#B8	#A68	Control signal, shift solenoid S2	Activated: U=0-2 V below Ubat Not activated: U_{low}	The solenoid receives voltage when activated by the control module in 1st and 2nd gears
#B10	#A70	Signal ground, line pressure solenoid STH	F=300 Hz Frequency is constant, irrespective of driving conditions. The signal duty cycle is modified when the line pressure is adapted	-

CONNECTOR B TERMINALS #B1 - #B22

Breakout box terminal	Control module terminal	Signal type	Ignition on	Engine idling	Miscellaneous
#B11	#B1	Communication cable for the control modules (CAN)	2-3 V		Between the transmission control module (TCM) and the engine control module (ECM)

#B12	#B2	Communication cable for the control modules (CAN)	2-3 V	Between the transmission control module (TCM) and the anti-lock brake system module (ABS) as well as the central electronic module (CEM)
#B23	#B13	Communication cable for the control modules (CAN)	2-3 V	Between the transmission control module (TCM) and the engine control module (ECM)
#B24	#B14	Communication cable for the control modules (CAN)	2-3 V	Between the transmission control module (TCM) and the anti-lock brake system module (ABS) as well as the central electronic module (CEM)
#B31	#B21	VOLCANO lite communication cable	8-11 V	Between the transmission control module (TCM) and the gear selector module (GSM)

SIGNAL DESCRIPTION (AW50/51 AWD; AW55-50/51SN; 2003-2007)

SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)

All the values listed below are between the terminal in column 1 and terminal #A53 (signal ground), unless otherwise indicated in brackets.

NOTE: Connect the breakout box and check the ground terminals before taking readings.

U =	DC voltage in volts (V)	U_{AC} =	AC voltage in volts (V)
U_{bat} =	battery voltage	f =	frequency in Hertz (Hz)
U_{low} =	voltage approximately 0 V	% duty =	duty cycle (pulse ratio) as a percentage (%)
t =	time in milliseconds (ms)		

CONNECTOR A TERMINALS #A35 - #A70

Breakout box terminal	Control module terminal	Signal type	Ignition on	Engine idling	Other

#A35	#A35	Power supply	Ubat	Supply from relay 2/101 CEM
#A37	#A37	Signal, oil temperature sensor (OT)	Cold gearbox (+20°C): U=2.4 V Hot gearbox (+100°C): U=0.3-0.5 V	U decreases with increasing temperature
#A39	#A39	Signal, vehicle speed sensor (SP1)	Tooth against sensor: 14 mA Cover against sensor: 7 mA	The sensor generates a pulsed signal (quadratic wave) with fixed pulse ratio when the pulse wheel rotates. Frequency increases with speed
#A41	#A41	Signal, engine speed (RPM) sensor (SP2)	Tooth against sensor: 14 mA Cover against sensor: 7 mA	The sensor generates a pulsed signal (quadratic wave) with a fixed pulse ratio when the pulse wheel rotates. Frequency increases with speed
#A45	#A45	Signal, gear-shift position sensor C	Gear selector positions D, 4, 3 and L: U=0-0.5 V Other positions: U=0-2 V below Ubat	The signal is grounded in positions D, 4, 3 and L
#A46	#A46	Signal, gear-shift position sensor A	Gear selector position P, R, 4, 3: U=0-0.5 V Other positions: U=0-2 V below Ubat	The signal is grounded in positions P, R, 4, and 3
#A47	#A47	Control signal, shift solenoid S4	Activated: U=0-2 V below Ubat Not activated: Ulow	The solenoid receives voltage when activated by the control module in 3rd, 4th and 5th gears
#A48	#A48	Control signal, shift solenoid S3	Activated: U=0-2 V below Ubat Not activated: Ulow	The solenoid is supplied with voltage when activated by the control module in 1st, 2nd and 3rd gears
#A49	#A49	Control signal, line pressure solenoid SLS	f=300 Hz Frequency is constant, independent of driving conditions. The signal duty cycle is modified when the line pressure is adapted	Voltage decreases with increasing throttle opening
#A50	#A50	Control signal, shift solenoid S1	Activated: U=0-2 V below Ubat Not activated: Ulow	The solenoid is supplied with voltage when activated by the control module in 1st gear
#A51	#A51	Control signal, lock-up	f=300 Hz Frequency is	The solenoid is supplied

		solenoid SLU	constant, independent of driving conditions. The signal duty cycle is modified when the line pressure is adapted	with voltage when it is activated by the control module
#A52	#A52	Control signal, line pressure solenoid SLT	f=300 Hz Frequency is constant, independent of driving conditions. The signal duty cycle is modified when the line pressure is adapted	The solenoid is supplied with voltage when it is activated by the control module
#A53	#A53	Power ground	Ulow	-
#A54	#A54	Signal ground for the gear selector module (GSM)	Ulow	From 2001 - Connection #6 on the gear selector module (GSM)
#A55	#A55	Signal ground, oil temperature sensor (OTG)	Ulow	Ground
#A57	#A57	Power supply, speed sensor (SP1)	Uapprox.1 V <Ubat	-
#A59	#A59	Power supply, engine speed (RPM) sensor (SP2)	Uapprox.1 V < Ubat	-
#B3	#A63	Signal, gear-shift position sensor PA	Gear selector position P, N, 4, L: U=0-0.5 V Other positions: U=0-2 V below Ubat	The signal is grounded in positions P, N, 4, and L
#B4	#A64	Signal, gear-shift position sensor B	Gear selector position R, N, D, 3: U=0-0.5 V Other positions: U=0-2 V below Ubat	Signal grounded in positions R, N, D, 3
#B6	#A66	Control signal, shift solenoid S5	Activated: U=0-2 V below Ubat Not activated: Ulow	The solenoid is supplied with voltage when it is activated by the control module in position R and during shifting from 2nd to 3rd gear
#B7	#A67	Signal ground, line pressure solenoid (SLSG)	U=Ulow	-
#B8	#A68	Control signal, shift solenoid S2	Activated: U=0-2 V below Ubat Not activated: Ulow	The solenoid is supplied with voltage when activated by the control module in 1st and 5th gears

#B9	#A69	Signal ground, lock-up solenoid (SLUG)	U=Ulow	-
#B10	#A70	Signal ground, throttle solenoid (SLTG)	U=Ulow	-

CONNECTOR B TERMINALS #B1 - #B22

Breakout box terminal	Control module terminal	Signal type	Ignition on	Engine idling	Other
#B11	#B1	Communication cable for the control modules (CAN)	2-3 V		Between the transmission control module (TCM) and the engine control module (ECM)
#B12	#B2	Communication cable for the control modules (CAN)	2-3 V		Between the transmission control module (TCM) and the anti-lock brake system module (ABS) as well as the central electronic module (CEM)
#B23	#B13	Communication cable for the control modules (CAN)	2-3 V		Between the transmission control module (TCM) and the engine control module (ECM)
#B24	#B14	Communication cable for the control modules (CAN)	2-3 V		Between the transmission control module (TCM) and the anti-lock brake system module (ABS) as well as the central electronic module (CEM)
#B31	#B21	VOLCANO lite communication cable	-		Between the transmission control module (TCM) and the gear selector module (GSM)
#B32	#B22	Diagnostic lead C-link	-		-

SIGNAL DESCRIPTION, TRANSMISSION CONTROL MODULE (TCM) (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

SIGNAL SPECIFICATION

All values indicated below are between respective connection in column 1 and #A9 (#39 on the breakout box).

If this is not the case, it is indicated within brackets.

Connector A (16-pin) corresponds to #31 - #46 on the breakout box.

Connector B (22-pin to transmission) corresponds to #1 - #22 on the breakout box.

NOTE: Connect the breakout box and check the ground terminals before taking readings.

U=	DC voltage in volts (V)	U_{AC} =	AC voltage in volts (V)
U_{bat} =	battery voltage	F =	frequency in Hertz (Hz)
U_{low} =	voltage approximately 0 V	% duty =	duty cycle (pulse ratio) in percent (%)
t =	time in milliseconds (ms)		

Connector A

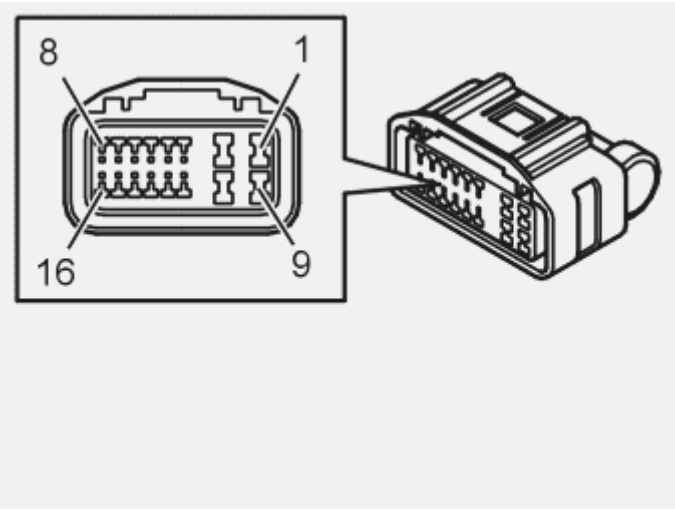


Fig. 14: Identifying Connector A Terminals
Courtesy of VOLVO CARS CORPORATION

CONNECTOR A, #A31 - #A46

Breakout box terminal	Control module terminal	Signal type	Ignition on	Engine idling	Other
#31	#A1	Power supply	U_{bat}		30-feed from fuse
#32	#A2	-	-		-
#33	#A3	-	-		-
#34	#A4	-	-		-
#35	#A5	Signal, start lockout	U_{low} when start is permitted		Signal to engine control module (ECM) if start is permitted

#36	#A6	Control module communication cable CAN_L	During communication the voltage is 1.5 - 2.5 V	-
#37	#A7	Communication cable LIN gear selector module (GSM)	During communication the voltage is 0 V - U_{bat}	-
#38	#A8	Communication cable K-line	-	For serial communication
#39	#A9	Power ground	U = U_{low}	-
#40	#A10	-	-	-
#41	#A11	Power supply	U = U_{bat}	15-feed from ignition via fuse
#42	#A12	-	-	-
#43	#A13	Signal, Shift lock solenoid for gear selector module (GSM)	Shift lock U = U_{bat} when the solenoid is not activated U_{low} when the solenoid is activated	Solenoid not activated = gear selector locked Solenoid activated = gear selector can be moved
#44	#A14	Communication cable, control module CAN_H	During communication the voltage is 2.0-3.5 V	-
#45	#A15	-	-	-
#46	#A16	Voltage feed, gear selector module (GSM)	U = U_{bat}	-

Connector B

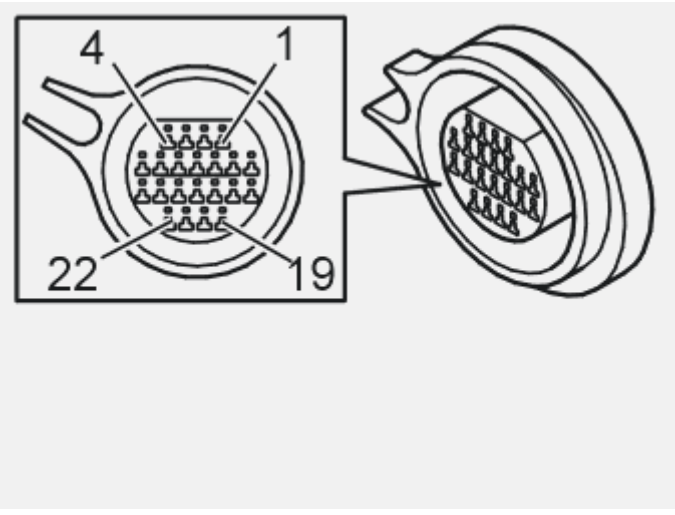


Fig. 15: Identifying 22--Pin Connector
Courtesy of VOLVO CARS CORPORATION

CONNECTOR B, #B1 - #B22

Breakout box terminal	Control module terminal	Signal type	Ignition on	Engine idling	Other
#1	#B1	Signal ground, linear pressure solenoid SLT	$U = U_{low}$		-
#2	#B2	Control signal, shift solenoid S2	Activated: U = 0 - 2 V below U_{bat} Not activated: U_{low}		The solenoid receives voltage when transmission control module (TCM) activates it during engine braking in 1st gear.
#3	#B3	Control signal, linear pressure solenoid SLT	f = 300 Hz. Frequency is constant, regardless of driving conditions. It is the signal's duty cycle that is modified when the system pressure is adapted.		The solenoid receives voltage when transmission control module (TCM) activates it.
#4	#B4	Signal ground Lock-up solenoid SLU	$U = U_{low}$		-
#5	#B5	Control signal, shift solenoid S1	Activated: U = 0 - 2 V below U_{bat} Not activated: U_{low}		The solenoid receives voltage when transmission control module (TCM) activates it during engine braking in 1st gear.
#6	#B6	-	-		-
#7	#B7	Signal ground, oil temperature sensor	U_{low}		Ground
#8	#B8	Signal, oil temperature sensor	Cold transmission (+20° C): U = 2.4 V Warm transmission (+100° C): U = 0.3 - 0.5 V		U decreases with increasing temperature.
#9	#B9	Control signal, lock-up solenoid SLU	f = 300 Hz. Frequency is constant, regardless of driving conditions. It is the signal's duty cycle that is modified when the system pressure is adapted.		The solenoid receives voltage when transmission control module (TCM) activates it.
#10	#B10	Signal ground, linear pressure solenoid SLC1	$U = U_{low}$		-
#11	#B11	Control signal, lock-up solenoid SLC1	f = 300 Hz. Frequency is constant, regardless of driving conditions. It is the signal's duty cycle that is modified when the system		The solenoid receives voltage when transmission control module (TCM) activates it.

			pressure is adapted.	
#12	#B12	Voltage feed, rpm sensor (VSS)	Power supply, rpm sensor approx. 1-3 V < U_{bat}	-
#13	#B13	Signal, rpm sensor	Tooth against sensor: 14 mA Cover against sensor: 7 mA	When the toothed wheel rotates, the sensor generates a pulsating current (square wave) with fixed pulse ratio, the frequency increases with the speed.
#14	#B14	Control signal, linear pressure solenoid SLC3	f = 300 Hz. Frequency is constant, regardless of driving conditions. It is the signal's duty cycle that is modified when the system pressure is adapted.	The solenoid receives voltage when transmission control module (TCM) activates it.
#15	#B15	-	-	-
#16	#B16	Signal ground, linear pressure solenoid SLB1	U = U_{low}	-
#17	#B17	Control signal, linear pressure solenoid SLC2	f = 300 Hz. Frequency is constant, regardless of driving conditions. It is the signal's duty cycle that is modified when the system pressure is adapted.	The solenoid receives voltage when transmission control module (TCM) activates it.
#18	#B18	Signal ground, linear pressure solenoid SLC2	U = U_{low}	-
#19	#B19	Voltage feed, speed sensor	Power supply, speed sensor approx. 1-3 V < U_{bat}	-
#20	#B20	Signal, speed sensor	Tooth against sensor: 14 mA Cover against sensor: 7 mA	When the toothed wheel rotates, the sensor generates a pulsating current (square wave) with fixed pulse ratio, the frequency increases with the speed.
#21	#B21	Control signal, linear pressure solenoid SLB1	f = 300 Hz. Frequency is constant, regardless of driving conditions. It is the signal's duty cycle that is modified when the system pressure is adapted.	The solenoid receives voltage when transmission control module (TCM) activates it.

#22	#B22	Signal ground, linear pressure solenoid SLC3	$U = U_{low}$	-

SIGNAL DESCRIPTION, TRANSMISSION CONTROL MODULE (TCM) (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

SIGNAL SPECIFICATION

see **SIGNAL SPECIFICATION**

SIGNAL DESCRIPTION, TRANSMISSION CONTROL MODULE (TCM) (B8444S, TF-80SC AWD; 2006-2011)

SIGNAL DESCRIPTION

All values indicated below are between respective connection in column 1 and #A9 (#39 on the breakout box). If this is not the case, it is indicated within brackets.

Connector A (16-pin) corresponds to #31 - #46 on the breakout box.

Connector B (22-pin to transmission) corresponds to #1 - #22 on the breakout box.

NOTE: Connect the breakout box and check the ground connections before taking readings.

U =	DC voltage in volts (V)	U_{AC} =	AC voltage in volts (V)
U_{bat} =	battery voltage	F =	frequency in Hertz (Hz)
U_{low} =	voltage approximately 0 V	% duty =	duty cycle (pulse ratio) as a percentage (%)
t =	time in milliseconds (ms)		

Connector A

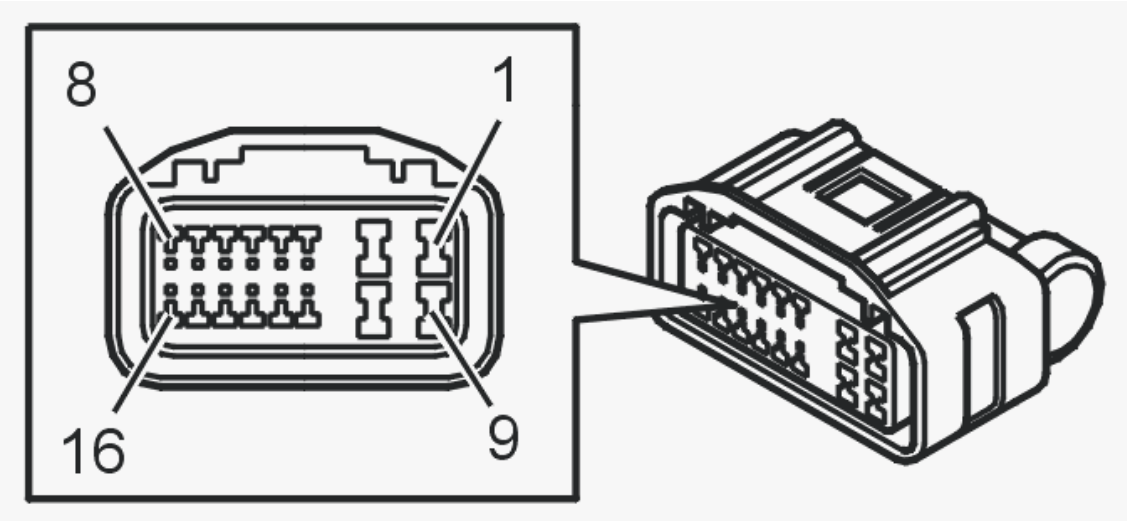


Fig. 16: Identifying Connector A Terminals
Courtesy of VOLVO CARS CORPORATION

CONNECTOR A, #A31 - #A46

Connection breakout box	Connection control module	Signal type	Ignition on	Engine idling	Other
#31	#A1	Voltage feed	U_{bat}		30-feed from fuse
#32	#A2	-	-		-
#33	#A3	-	-		-
#34	#A4	-	-		-
#35	#A5	Signal, start lockout	U_{low} when start is permitted		Signal to engine control module (ECM) if start is permitted
#36	#A6	Communication cable control module CAN_L	During communication the voltage is 1.5 - 2.5 V		-
#37	#A7	Communication cable LIN gear selector module (GSM)	During communication the voltage is 0 V - U_{bat}		-
#38	#A8	Communication cable K-line	-		For serial communication
#39	#A9	Power ground	$U = U_{low}$		
#40	#A10	-	-		-
#41	#A11	Voltage feed	$U = U_{bat}$		15-feed from ignition via fuse
#42	#A12	-	-		-
#43	#A13	Signal, Shift lock solenoid for gear selector module (GSM)	Shift lock $U = U_{bat}$ when the solenoid is not activated U_{low} when the solenoid		Solenoid not activated = gear selector locked Solenoid activated = gear selector can be

			is activated	moved
#44	#A14	Communication cable, control module CAN_H	During communication the voltage is 2.0 - 3.5 V	-
#45	#A15	-	-	-
#46	#A16	Voltage feed, gear selector module (GSM)	$U = U_{bat}$	-

Connector B

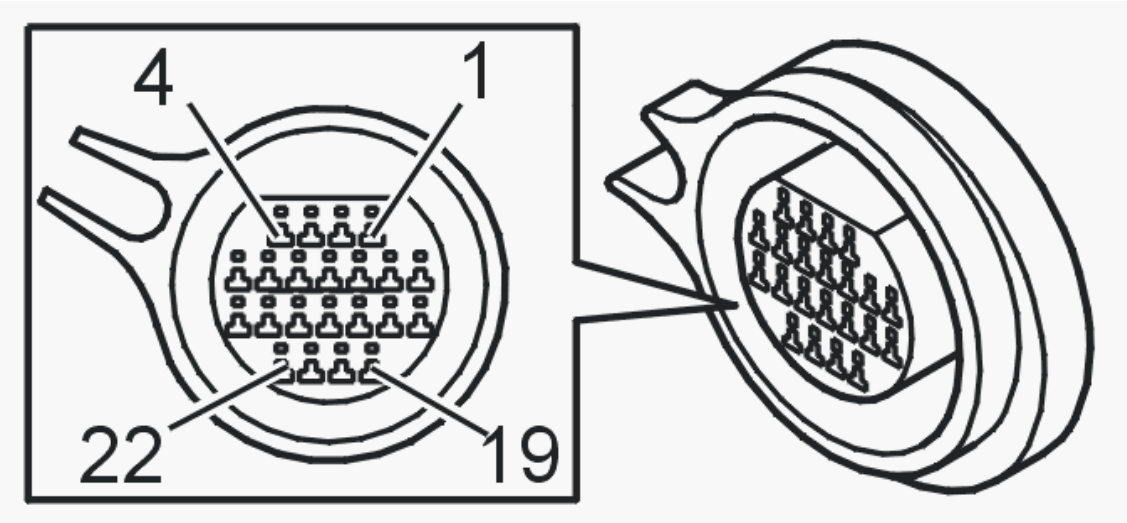


Fig. 17: Identifying Connector B Terminals
Courtesy of VOLVO CARS CORPORATION

CONNECTOR B, #B1 - #B22

Connection breakout box	Connection control module	Signal type	Ignition on	Engine idling	Other
#1	#B1	Signal ground, linear pressure solenoid SLT	$U = U_{low}$		
#2	#B2	Control signal, shift solenoid S2	Activated: U = 0 - 2 V below U_{bat} Not activated: U_{low}		The solenoid receives voltage when transmission control module (TCM) activates it during engine braking in 1st gear.
#3	#B3	Control signal, linear pressure solenoid SLT	f = 300 Hz. Frequency is constant, regardless of driving conditions. It is the signal's duty cycle that is modified when the		The solenoid receives voltage when transmission control module (TCM) activates it.

			system pressure is adapted.	
#4	#B4	Signal ground Lock-up solenoid SLU	U = U_{low}	-
#5	#B5	Control signal, shift solenoid S1	Activated: U = 0 - 2 V below U_{bat} Not activated: U_{low}	The solenoid receives voltage when transmission control module (TCM) activates it during engine braking in 1st gear.
#6	#B6	-	-	-
#7	#B7	Signal ground, oil temperature sensor	U_{low}	Ground
#8	#B8	Signal, oil temperature sensor	Cold transmission (+20° C): U = 2.4 V Warm transmission (+100°C): U = 0.3 - 0.5 V	U decreases with increasing temperature.
#9	#B9	Control signal, lock-up solenoid SLU	f = 300 Hz. Frequency is constant, regardless of driving conditions. It is the signal's duty cycle that is modified when the system pressure is adapted.	The solenoid receives voltage when transmission control module (TCM) activates it.
#10	#B10	Signal ground, linear pressure solenoid SLC1	U = U_{low}	-
# 11	#B11	Control signal, lock-up solenoid SLC1	f = 300 Hz. Frequency is constant, regardless of driving conditions. It is the signal's duty cycle that is modified when the system pressure is adapted.	The solenoid receives voltage when transmission control module (TCM) activates it.
#12	#B12	Voltage feed, rpm sensor (VSS)	Voltage feed rpm sensor approx. 1-3 V < U_{bat}	
#13	#B13	Signal, rpm sensor	Tooth against sensor: 14 mA Cover against sensor: 7 mA	When the toothed wheel rotates, the sensor generates a pulsating current (square wave) with fixed pulse ratio, the frequency increases

				with the speed.
#14	#B14	Control signal, linear pressure solenoid SLC3	f = 300 Hz. Frequency is constant, regardless of driving conditions. It is the signal's duty cycle that is modified when the system pressure is adapted.	The solenoid receives voltage when transmission control module (TCM) activates it.
#15	#B15	-	-	-
#16	#B16	Signal ground, linear pressure solenoid SLB1	$U = U_{low}$	-
#17	#B17	Control signal, linear pressure solenoid SLC2	f = 300 Hz. Frequency is constant, regardless of driving conditions. It is the signal's duty cycle that is modified when the system pressure is adapted.	The solenoid receives voltage when transmission control module (TCM) activates it.
#18	#B18	Signal ground, linear pressure solenoid SLC2	$U = U_{low}$	-
#19	#B19	Voltage feed, speed sensor	Voltage feed speed sensor approx. 1-3 V < U_{bat}	
#20	#B20	Signal, speed sensor	Tooth against sensor: 14 mA Cover against sensor: 7 mA	When the toothed wheel rotates, the sensor generates a pulsating current (square wave) with fixed pulse ratio, the frequency increases with the speed.
#21	#B21	Control signal, linear pressure solenoid SLB1	f = 300 Hz. Frequency is constant, regardless of driving conditions. It is the signal's duty cycle that is modified when the system pressure is adapted.	The solenoid receives voltage when transmission control module (TCM) activates it.
#22	#B22	Signal ground, linear pressure solenoid SLC3	$U = U_{low}$	-

SIGNAL DESCRIPTION, TRANSMISSION CONTROL MODULE (TCM) (TF-80SC AWD; 2005)

SIGNAL DESCRIPTION

see **SIGNAL DESCRIPTION**

TRANSMISSION

Transmission - Specifications, other

VEHICLE COMMUNICATION INFORMATION, TRANSMISSION CONTROL MODULE (TCM) (4T65 AWD; 2003-2006)

DESCRIPTION OF ACTIVATIONS

ACTIVATION OF COMPONENTS

Using this facility, a number of components can be activated to check their function. The following components can be activated:

SHIFT SOLENOID S1

Activating shift solenoid S1.

"Click sound" in the transaxle (use stethoscope) and status shall switch between OFF/ON.

SHIFT SOLENOID S2

Activating shift solenoid S2.

"Click sound" in the transaxle (use stethoscope) and status shall switch between OFF/ON.

LOCK-UP SOLENOID SL

Activating lockup solenoid SL.

Any "Click sounds" in the transaxle (use stethoscope) and status shall switch between OFF/ON.

SYSTEM PRESSURE SOLENOID STH

Activation of system pressure solenoid STH must occur via **VIDA** (Volvo scan tool).

DESCRIPTION OF PARAMETERS

PARAMETERS, STATUS

GENERAL

Certain values deviate from those contained in the signal specifications, see **SIGNAL SPECIFICATION** . This is because read off values are calculated and filtered by the control module. In certain cases the engine must be running to obtain the relevant values.

SHIFTING PROGRAM ACCORDING TO THE GEAR-SHIFT POSITION SENSOR

This value shows the shifting program selected by the gearbox control module (TCM), based on gear-shift position sensor signals. If the signals from the gear-shift position sensor are outside (ERROR) the normal range and a diagnostic trouble code (DTC) is stored, the gearbox control module (TCM) selects Limp home mode.

Depending on what gear selector assembly the car is equipped with:

P/R/N/D/3/L = normal gear positions. (Standard)

P/R/N/D/3/2/1 = normal gear positions. (Standard)

P/R/N/D/Geartronic = normal gear positions (Geartronic)

GEAR-SHIFT POSITION SENSOR POSITION

Depending on what gear selector assembly the car is equipped with:

P/R/N/D/3/L = normal gear positions. (Standard)

P/R/N/D/3/2/1 = normal gear positions. (Standard)

P/R/N/D/Geartronic = normal gear positions (Geartronic)

OR/OD = Undefined R or D positions, which means that the signals from the gear-shift position sensor are outside the normal range but are not interpreted as a fault. This may be because the gear selector is between positions or that the gear-shift position sensor is incorrectly adjusted.

FAULT = the gear-shift position sensor has transmitted the wrong combination of signals and a diagnostic trouble code (DTC) has been stored.

GEAR-SHIFT POSITION SENSOR SIGNAL A

Gear selector assembly with:

6 positions = PRND3L

7 positions = PRND321

Geartronic PRND3

Lever position/signal:

Position P: Signal A= LOW

Position R: Signal A= LOW

Position N: Signal A = HIGH

Position D: Signal A = HIGH

Position 3: Signal A= LOW

Position 2: Signal A = HIGH

Position 1: Signal A = HIGH

Position L: Signal A = HIGH

LOW = The signal is grounded in the gear-shift position sensor

HIGH = The signal is not grounded in the gear-shift position sensor

GEAR-SHIFT POSITION SENSOR SIGNAL B

Gear selector assembly with:

6 positions = PRND3L

7 positions = PRND321

Geartronic PRND3

Lever position/signal:

Position P: Signal B = HIGH

Position R: Signal B = LOW

Position N: Signal B = LOW

Position D: Signal B = LOW

Position 3: Signal B = LOW

Position 2: Signal A = HIGH

Position 1: Signal A = HIGH

Position L: Signal B = HIGH

HIGH = The signal is not grounded in the gear-shift position sensor

LOW = The signal is grounded in the gear-shift position sensor

GEAR-SHIFT POSITION SENSOR SIGNAL C

Gear selector assembly with:

6 positions = PRND3L

7 positions = PRND321

Geartronic PRND3

Lever position/signal:

Position P: Signal C= HIGH

Position R: Signal C= HIGH

Position N: Signal C= HIGH

Position D: Signal C= LOW

Position 3: Signal C= LOW

Position 2: Signal A= LOW

Position 1: Signal A= LOW

Position L: Signal C= LOW

HIGH = The signal is not grounded in the gear-shift position sensor

LOW = The signal is grounded in the gear-shift position sensor

GEAR-SHIFT POSITION SENSOR SIGNAL PA

Gear selector assembly with:

6 positions = PRND3L

7 positions = PRND321

Geartronic PRND3

Lever position/signal:

Position P: Signal PA= LOW

Position R: Signal PA= HIGH

Position N: Signal PA= LOW

Position D: Signal PA= HIGH

Position 3: Signal PA= LOW

Position 2: Signal A = HIGH

Position 1: Signal A= LOW

Position L: Signal PA= HIGH

HIGH = The signal is not grounded in the gear-shift position sensor

LOW = The signal is grounded in the gear-shift position sensor

QUICKSHIFT MODE (GEARTRONIC)

Applies to gear selector assembly with Geartronic.

The value indicates whether the quick shift mode is selected or not.

ON = The gear selector in position P/R/N/D

ON = The gear selector in Geartronic

QUICK SHIFT SHIFTING FROM THE GEAR SELECTOR MODULE (GEARTRONIC)

Applies to gear selector assembly with Geartronic.

The value indicates which function the gear selector module transmits to the gearbox control module (TCM).

No shift = no geartronic function

Increase gear = shift up

Decrease gear = shift down

QUICK SHIFT STATUS ACCORDING TO THE GEARBOX CONTROL MODULE (GEARTRONIC)

Applies to gear selector assembly with Geartronic.

This value indicates the shifting program selected by the control module based on the signal from the gear selector.

Normal = P/R/N/D

Quick shift = Geartronic

WINTER PROGRAM STATUS

This value indicates the shifting program selected by the control module based on the signal from the mode

selector. W = Winter mode.

Engaged = Winter mode engaged

Disengaged = Winter mode disengaged

CURRENT GEAR (ACCORDING TO GEAR RATIO)

- R, no lock-up
- Gear 1, no lock-up
- Gear 2, no lock-up
- Gear 3, no lock-up
- Gear 4, no lock-up
- Gear 5, no lock-up
- Gear 2, lock-up
- Gear 3, lock-up
- Gear 4, lock-up
- Gear 5, lock-up

RECOMMENDED GEAR FROM THE GEARBOX CONTROL MODULE (TCM)

- R, no lock-up
- Gear 1, no lock-up
- Gear 2, no lock-up
- Gear 3, no lock-up
- Gear 4, no lock-up
- Gear 5, no lock-up
- Gear 2, lock-up
- Gear 3, lock-up
- Gear 4, lock-up
- Gear 5, lock-up

SHIFT SOLENOID STATUS S1

OFF = The solenoid is not activated

ON = The solenoid is activated

SHIFT SOLENOID STATUS S2

OFF = The solenoid is not activated

ON = The solenoid is activated

LOCK-UP SOLENOID SL STATUS

OFF = The lock-up solenoid is not activated

ON = The lock-up solenoid is activated

LOCK-UP PRESSURE SWITCH

Applies only to 4T65EV-GT.

The pressure switch is affected by the gearbox line pressure. The control module uses the signal from the pressure switch to check whether the lock-up solenoid is activated when the control module has requested lock-up.

OFF = No lock-up activated

ON = Lock-up activated

BRAKE LAMP SWITCH

The engine control module (ECM) transmits a signal on the Control area network (CAN) indicating whether the brake lamp switch is activated or not. The gearbox control module (TCM) uses the signal for the internal gear functions and diagnosing the gearbox.

OFF = Brake lamp switch unaffected

ON = Brake lamp switch affected

KICKDOWN

If the kickdown function parameter in the accelerator pedal (AP) is passed (approx 87 %) kickdown is activated. During fast acceleration, the accelerator pedal (AP) is depressed to approximately 87 %, the gearbox control module (TCM) gives the signal for kickdown.

OFF = Kickdown is not activated

ON = Kickdown is activated

TCM DIAGNOSTIC TROUBLE CODES (DTCS) STATUS

The value indicates whether there are any diagnostic trouble codes (DTCs) stored in the gearbox control module (TCM).

- At least one diagnostic trouble code (DTC) stored
- No diagnostic trouble code (DTC) stored

TCM DIAGNOSTIC CHECK STATUS

The value indicates whether the gearbox control module (TCM) has carried out a complete diagnosis.

- At least one diagnostic test not completed
- All diagnostic tests complete

IGNITION KEY POSITION

Ignition key position in the ignition switch.

- Ignition key in position "0"
- Ignition key in position "I"
- Ignition key in position "II"
- Ignition key in position "III"

ENGINE IGNITION STATUS

YES = Ignition on

NO = Ignition off

ENGINE RUNNING

YES = Engine running

NO = Engine off

PARAMETERS, VALUE

ENGINE SPEED (RPM)

The engine control module (ECM) transmits the engine speed (RPM) on the Control area network (CAN) from which the gearbox control module (TCM) retrieves the signal which it then compares with its own speed sensor signal. The signal is used when shifting and when diagnosing the gearbox speed sensor.

Measurement range: 0 - 8191 rpm

Idling speed: 850 rpm

GEARBOX SPEED SENSOR, INPUT SPEED

The speed can be generated with the engine idling and the gear selector in P/N position. If the gear selector is in any other position, a gear is engaged and the gearbox input shaft is connected to the output shaft and an RPM will not be indicated until the car is driven. Depending on slippage in the torque converter the gearbox speed and the engine speed will differ when the lock-up function is not engaged. With lock-up engaged the gearbox speed should be the same as engine speed (RPM).

Measurement range (rpm): 0 -

TCM OUTPUT SPEED SENSOR, CALCULATED SPEED

The control module receives a signal from the gearbox speed sensor which is affected by a toothed pulse wheel and calculates the vehicle speed based on the signal. The speed sensor is an "active" sensor, magnet resistive with a current modulated interface. The speed is directly proportional to the frequency.

Measurement range: 0 km/h - top speed

VEHICLE SPEED ABS

The ABS control module transmits a signal indicating the vehicle speed on the Control area network (CAN) from where the gearbox control module retrieves the signal. The gearbox control module (TCM) compares it with the signal from the gearbox speed sensor.

Measurement range: 0 km/h - top speed

THROTTLE, POSITION

The engine control module (ECM) transmits the accelerator pedal (AP) position on the Control area network (CAN) from where the gearbox control module (TCM) retrieves the signal. The signal is used to regulate the system pressure in the gearbox.

Measurement range: 0 - 100 %

>99 % = kickdown

CALCULATED BATTERY VOLTAGE

The value indicates the calculated battery voltage at the control module.

Measurement range: 0.0 -25.5 V

BATTERY VOLTAGE

The value indicates battery voltage at the control module.

Measurement range: 0.0 -25.5 V

THE OIL TEMPERATURE SENSOR SIGNAL

The value indicates the oil temperature sensor signal. Voltage decreases with increased sensor temperature.

Measurement range: 0.0 -5.0 V

AW 50-42:

Cold gearbox (+20°C): approximately 2.4 V

Hot gearbox (+100°C): 0.3 -0.5 V

4T65EV/EV-GT:

Cold gearbox (+20°C): approximately 3-3.5- V

Hot gearbox (+100°C): 0.8-1.2 V

OIL TEMPERATURE

The gearbox control module (TCM) calculates the temperature from the oil temperature sensor signal.

Measurement range: -60 - +180°C

GEAR RATIOS

The value indicates the gearbox gear ratio. The control module uses the input and output speeds to calculate the gear ratio. For the correct gear ratio, see the table below

AW50-42 gearbox	
Gear	**Gear ratios**
R	3.949
1	3.606
2	2.060
3	1.366
4	0.982

Transmission GM (S80, (-06) non turbo, XC90)	
Gear	**Gear ratios**
R	2674
1	3.275
2	1.758
3	1.121
4	0.790

Transmission GM (S80, (-06) turbo)	
Gear	**Gear ratios**
R	2.385
1	2.921
2	1.568
3	1.000
4	0.705

EXPECTED GEAR RATIO

The value indicates the gear ratio anticipated by the gearbox control module (TCM). Compare the values with the "Gear ratio" table.

LINE PRESSURE SOLENOID STH AMPERAGE

The value indicates the amperage passing through the solenoid circuit. A lower amperage gives a higher reference pressure, which gives a higher line pressure. Solenoid control is directly dependent on the throttle sensor signal. The higher the signal from the throttle sensor the lower the amperage through the solenoid and therefore the higher the line pressure.

Measurement range: 0.0-1.5 A

Normal value at closed throttle:

LINE PRESSURE SOLENOID STH, CONTROL

Line pressure solenoid STH controls the reference pressure for the gearbox. The reference pressure in turn controls the system pressure in the gearbox so that the system pressure in gear D varies between 0.055 - 0.5 Mpa. Solenoid control is directly dependent on the signal from the throttle position (TP) sensor. The higher the signal from the throttle position (TP) sensor the greater the reference pressure and therefore line pressure.

Measurement range: 0 - 100 %

0 % control, minimal reference pressure, gives lowest line pressure.

100 % control, maximum reference pressure, gives highest line pressure.

TORQUE CONTROL

Torque reduction occurs through control of the ignition and is used to lower the engine torque while shifting for smoother gearshifts and longer service life. Torque reduction is activated at the same time that shifting starts.

Measurement range: 0 - 511 Nm

ENGINE TORQUE

The signal displays the calculated output torque of the engine.

Measurement range: -512 - +511 Nm

511 = No torque limiting request

TORQUE LIMITING REQUESTED

The signal displays torque limiting and is used to limit the torque of the engine continuously in those cases where the maximum permitted torque limit of the gearbox would otherwise have been exceeded. To reach the desired reduction level the engine control module (ECM) uses a mixture of ignition reduction and throttle control.

Measurement range: -512 - +511 Nm

511 = No torque limiting request

ENGINE CONTROL MODULE (ECM) ENGINE COOLANT TEMPERATURE (ECT)

The engine control module (ECM) transmits a signal indicating the engine coolant temperature (ECT) on the Control area network (CAN). The automatic gearbox uses the signal to govern lock-up.

Measurement range: -60 - +195°C

TEXT TRANSMITTED TO THE DRIVER INFORMATION MODULE

In the event of a service reminder indicator fault, the gearbox control module (TCM) transmits a message to the driver information module. The text is displayed in the combined instrument panel display.

1 = GEARBOX SERVICE URGENT

2 = GEARBOX SERVICE REQUIRED

3 = GEARBOXFIX NEXT SERVICE

4 = GEARBOX OIL TEMP HIGH

5 = CHANGE GEARBOX OIL AT NEXT SERVICE

DESCRIPTION OF READING OFF OF EXTENDED DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

CONTENT

Select type of description:

- see **STATUS IDENTIFIER, DESCRIPTION**
- see **COUNTERS, DESCRIPTION**
- see **FROZEN VALUES FOR THE TRANSMISSION CONTROL MODULE (TCM), DESCRIPTION**

VEHICLE COMMUNICATION INFORMATION, TRANSMISSION CONTROL MODULE (TCM) (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DESCRIPTION OF ACTIVATIONS

ACTIVATING COMPONENTS

This function allows a number of components to be activated so that their functions can be checked. The following components can be activated:

SHIFT SOLENOID S1, S2, S3, S4, S5

Activating shift solenoids S1, S2, S3, S4, S5

"Clicking sound" in the transmission (use a stethoscope) and the status should change between OFF/ON.

LINE PRESSURE SOLENOID SLU, SLS, SLT

Activating line pressure solenoid STH.

"Clicking sound" in the transmission (use a stethoscope) and the current should vary.

DESCRIPTION OF PARAMETERS

PARAMETERS, STATUS

GENERAL

Certain values deviate from those contained in the signal specifications, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)** . This is because read off values are calculated and filtered by the control module. In certain cases the engine must be running to obtain the relevant values.

SHIFTING PROGRAM ACCORDING TO THE GEAR-SHIFT POSITION SENSOR

The value P/R/N/D/4/3/L displays the shifting program selected by the gearbox control module (TCM), based on the signals from the gear-shift position sensor. If the signals from the gear-shift position sensor are outside the normal range and a diagnostic trouble code (DTC) is stored, the gearbox control module (TCM) selects Limp home mode.

Depending on what gear selector assembly the car is equipped with:

P/R/N/D/4/3/L = normal gear positions. (Standard)

P/R/N/D/Geartronic = normal gear positions (Geartronic)

GEAR-SHIFT POSITION SENSOR POSITION

Depending on what gear selector assembly the car is equipped with:

P/R/N/D/4/3/L = normal gear positions. (Standard)

P/R/N/D/Geartronic = normal gear positions (Geartronic)

OR/OD/OL = Undefined R, D or L-positions. The signals from the gearshift position sensor are outside the normal range but are not interpreted as a fault. This may be because the gear selector is between positions or that the gearshift position sensor is incorrectly adjusted.

FAULT = the gear-shift position sensor has transmitted the wrong combination of signals and a diagnostic

trouble code (DTC) has been stored.

GEAR-SHIFT POSITION SENSOR SIGNAL A

Gear selector assembly with:

7 positions = PRND43L

Geartronic = PRND3

LOW = The signal is grounded in the gear-shift position sensor

HIGH = The signal is not grounded in the gear-shift position sensor

Position P: Signal A= LOW

Position R: Signal A= LOW

Position N: Signal A = HIGH

Position D: Signal A = HIGH

Position 4: Signal A= LOW

Position 3: Signal A= LOW

Position L: Signal A = HIGH

GEAR-SHIFT POSITION SENSOR SIGNAL B

Gear selector assembly with:

7 positions = PRND43L

Geartronic = PRND3

LOW = The signal is grounded in the gear-shift position sensor

HIGH = The signal is not grounded in the gear-shift position sensor

Position P: Signal B = HIGH

Position R: Signal B = LOW

Position N: Signal B = LOW

Position D: Signal B = LOW

Position 4: Signal B = LOW

Position 3: Signal B = HIGH

Position L: Signal B = HIGH

GEAR-SHIFT POSITION SENSOR SIGNAL C

Gear selector assembly with:

7 positions = PRND43L

Geartronic = PRND3

LOW = The signal is grounded in the gear-shift position sensor

HIGH = The signal is not grounded in the gear-shift position sensor

Position P: Signal C= HIGH

Position R: Signal C= HIGH

Position N: Signal C= HIGH

Position D: Signal C= LOW

Position 4: Signal B = LOW

Position 3: Signal B = LOW

Position L: Signal C= LOW

GEAR-SHIFT POSITION SENSOR SIGNAL PA

Gear selector assembly with:

7 positions = PRND43L

Geartronic = PRND3

LOW = The signal is grounded in the gear-shift position sensor

HIGH = The signal is not grounded in the gear-shift position sensor

Position P: Signal C= LOW

Position R: Signal C= HIGH

Position N: Signal C= LOW

Position D: Signal C= HIGH

Position 4: Signal C= LOW

Position 3: Signal C= HIGH

Position L: Signal C= LOW

QUICK SHIFT MODE (GEARTRONIC)

Applies to gear selector assembly with Geartronic.

The value indicates whether the quick shift mode is selected or not.

ON = The gear selector in position P/R/N/D

ON = The gear selector in Geartronic

QUICK SHIFT SHIFTING FROM THE GEAR SELECTOR MODULE (GSM) (GEARTRONIC)

Applies to gear selector assembly with Geartronic.

The value indicates which function the gear selector module (GSM) transmits to the gearbox control module (TCM).

No shift = No geartronic function

Increase gear = Shift up

Decrease gear = Shift down

QUICK SHIFT STATUS ACCORDING TO THE GEARBOX CONTROL MODULE (TCM) (GEARTRONIC)

Applies to gear selector assembly with Geartronic.

The value indicates the shifting program that the control module has selected. The control module has selected the program based on the signal from the gear selector.

Normal = P/R/N/D

Quick shift = Geartronic

WINTER MODE

The value indicates the shifting program that the control module has selected. The control module has selected the program based on the signal from the mode selector. W = Winter mode.

Engaged = Winter mode engaged

Disengaged = Winter mode disengaged

SHIFT SOLENOIDS S1, S2, S3, S4, S5

OFF = The solenoid is not activated

ON = The solenoid is activated

BRAKE LAMP SWITCH

The engine control module (ECM) transmits a signal on the Control area network (CAN) indicating whether the brake lamp switch is activated or not. The gearbox control module (TCM) uses the signal for the internal gear functions and diagnosing the gearbox.

OFF = Brake lamp switch unaffected

ON = Brake lamp switch affected

KICKDOWN

If the kickdown function parameter in the accelerator pedal (AP) is passed (approx 87 %) kickdown is activated. During fast acceleration, the accelerator pedal (AP) is depressed to approximately 87 %, the gearbox control module (TCM) gives the signal for kickdown.

OFF = Kickdown is not activated

ON = Kickdown is activated

DIAGNOSTIC TROUBLE CODES (DTCS), GEARBOX CONTROL MODULE (TCM)

The value indicates whether there are any diagnostic trouble codes (DTCs) stored in the gearbox control module (TCM).

- At least one diagnostic trouble code (DTC) stored
- No diagnostic trouble code (DTC) stored.

DIAGNOSTIC CHECKS, GEARBOX CONTROL MODULE (TCM)

The value indicates whether the gearbox control module (TCM) has carried out a complete diagnosis.

- At least one diagnostic test not completed
- All diagnostic tests complete.

PARAMETERS, VALUE

ENGINE SPEED (RPM)

The engine control module (ECM) transmits the engine speed (RPM) on the Control area network (CAN) from which the gearbox control module (TCM) retrieves the signal which it then compares with its own speed sensor signal.

Measurement range: 0 - 8191 rpm

Idling speed: 850 rpm

GEARBOX SPEED SENSOR, INPUT SPEED

The speed can be generated with the engine idling and the gear selector in P/N position. If the gear selector is in any other position, a gear is engaged and the gearbox input shaft is connected to the output shaft and an RPM will not be indicated until the car is driven. Depending on slippage in the torque converter the gearbox speed and the engine speed will differ when the lock-up function is not engaged. With lock-up engaged the gearbox speed should be the same as engine speed (RPM).

Measuring range (rpm): 0 - max. rpm

TCM OUTPUT SPEED SENSOR, CALCULATED SPEED

The control module receives a signal from the gearbox speed sensor which is affected by a toothed pulse wheel and calculates the vehicle speed based on the signal. The speed sensor is an "active" sensor. The signal oscillates between a peak and a trough value. The control module calculates the speed which is directly proportional to the frequency.

Measurement range: 0 km/h - top speed

VEHICLE SPEED ABS

The ABS control module transmits a signal indicating the vehicle speed on the Control area network (CAN) from where the gearbox control module (TCM) retrieves the signal. The gearbox control module (TCM) compares it with the signal from the gearbox speed sensor.

Measurement range: 0 km/h - top speed

THROTTLE, POSITION

The engine control module (ECM) transmits the accelerator pedal (AP) position on the Control area network (CAN) from where the gearbox control module (TCM) retrieves the signal. The signal is used to regulate the system pressure in the gearbox.

Measurement range: 0 - 100 %

>99 % = kickdown

BATTERY VOLTAGE

The value indicates battery voltage at the control module.

Measurement range: 0.0 -25.5 V

THE OIL TEMPERATURE SENSOR SIGNAL

The value indicates the oil temperature sensor signal. Voltage decreases with increased sensor temperature.

Measurement range: 0.0 -5.0 V

AW 55-50:

Cold gearbox (+20°C): approximately 2.4 V

Hot gearbox (+100°C): 0.3 -0.5 V

OIL TEMPERATURE

The gearbox control module (TCM) calculates the temperature from the oil temperature sensor signal.

Measurement range: -60 - +180°C

LOCK-UP SOLENOID SLU, AMPERAGE

The value indicates the amperage passing through the solenoid circuit. A lower amperage gives a higher reference pressure, which gives a higher line pressure.

Measurement range: 0.0-1.5 A

Normal value at closed throttle: approximately 280 mA

LINE PRESSURE SOLENOID SLS, AMPERAGE

The value indicates the amperage passing through the solenoid circuit. A lower amperage gives a higher reference pressure, which gives a higher line pressure.

Measurement range: 0.0-1.5 A

Normal value at closed throttle: 280 mA

LINE PRESSURE SOLENOID SLT, AMPERAGE

The value indicates the amperage passing through the solenoid circuit. A lower amperage gives a higher reference pressure, which gives a higher line pressure. Solenoid control is directly dependent on the throttle sensor signal. The higher the signal from the throttle sensor the lower the amperage through the solenoid and therefore the higher the line pressure.

Measurement range: 0.0-1.5 A

Normal value at closed throttle: approximately 1000 mA

GEAR RATIOS

The value indicates the gearbox gear ratio. The control module uses the input and output speeds to calculate the gear ratio. For the correct gear ratio, see the table below

Gear	AW55-50
R	3.234
1	4.769
2	2.994
3	1.957
4	1.324
5	1.018

EXPECTED GEAR RATIO

The value indicates the gear ratio expected by the transmission control module (TCM). Compare the values with the " Gear ratio" table.

ENGINE TORQUE

The signal displays the calculated output torque of the engine.

Measurement range: -512 - +511 Nm

511 = No torque limiting request

TORQUE CONTROL

Torque reduction occurs through control of the ignition and is used to lower the engine torque while shifting for smoother gearshifts and longer service life. Torque reduction is activated at the same time that shifting starts.

Measurement range: 0 - 511 Nm

TORQUE LIMITING REQUESTED

The signal displays torque limiting and is used to limit the torque of the engine continuously in those cases where the maximum permitted torque limit of the gearbox would otherwise have been exceeded. To reach the desired reduction level the engine control module (ECM) uses a mixture of ignition reduction and throttle control.

Measurement range: -512 - +511 Nm

511 = No torque limiting request

ENGINE CONTROL MODULE (ECM) ENGINE COOLANT TEMPERATURE (ECT)

The engine control module (ECM) transmits a signal indicating the engine coolant temperature (ECT) on the

Control area network (CAN). The automatic gearbox uses the signal to govern lock-up.

Measurement range: -60 - +195°C

TEXT TRANSMITTED TO THE DRIVER INFORMATION MODULE (DIM)

In the event of a service reminder indicator fault, the gearbox control module (TCM) transmits a message to the driver information module (DIM). The text is displayed in the combined instrument panel display.

1 = GEARBOX SERVICE URGENT

2 = GEARBOXSERVICE REQUIRED

3 = GEARBOX FIX NEXT SERVICE

4 = GEARBOX OILTEMP HIGH

5 = CHANGE TRANS OIL AT NEXT SERVICE

DESCRIPTION OF READING OFF OF EXTENDED DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

CONTENT

Select type of description:

- see **STATUS IDENTIFIER, DESCRIPTION**
- see **COUNTERS, DESCRIPTION**
- see **FROZEN VALUES FOR THE TRANSMISSION CONTROL MODULE (TCM), DESCRIPTION**

VEHICLE COMMUNICATION INFORMATION, TRANSMISSION CONTROL MODULE (TCM) (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

DESCRIPTION OF ACTIVATIONS

ACTIVATIONS OF COMPONENTS

With this feature a number of components can be activated for checking its function. Components that can be activated are as follows.

NOTE: The noise level from the solenoids can be high, depending on the temperature of the transmission and the oil. When the transmission is warm or very cold, the noise level can be very low.

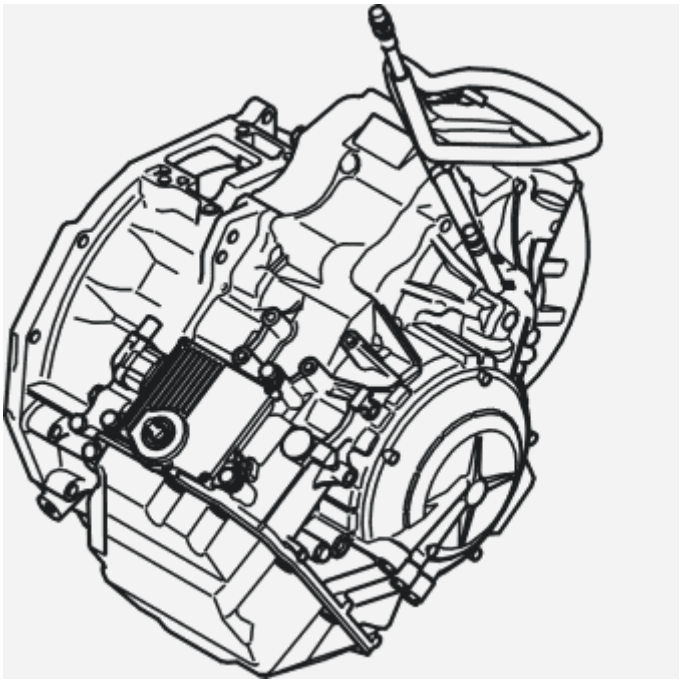


Fig. 1: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

GEAR SHIFT SOLENOID S1, S2

Activation of shift solenoid S1, S2

"Click sound" in the transmission (use stethoscope) and status shall switch between OFF/ON.

SYSTEM PRESSURE SOLENOID SLT, SLU, SLB1, SLC1, SLC2, SLC3

Activation of Linear pressure solenoid.

"Click sound" in the transmission (use stethoscope) and the current shall vary between 0 and approx.950 mA.

DESCRIPTION OF EXTENDED DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

CONTENTS

Select type of description.

- see **DESCRIPTION OF FROZEN VALUES**
- see **DESCRIPTION OF STATUS IDENTIFIER**
- see **DESCRIPTION OF COUNTER**

DESCRIPTION OF FROZEN VALUES

GENERAL

Frozen values are parameter values that are stored when a diagnostic trouble code (DTC) is stored.

Not all the parameters described need to be implemented in the control module. This varies from system to system. Parameters can also vary depending on with which type of transmission the vehicle is equipped.

Certain parameters can be displayed without a value or with unreasonable values. This can occur if the control module has not stored a value, when a basic value has been stored instead or if the parameter is received via the CAN-network when there is an error on the CAN-network. For example, the rpm values may be unreasonable if a malfunction occurs for the transmission's speed sensors.

Definition of an operating cycle

The definition of an operating cycle varies depending on the software version.

Alternative definitions

- Ignition switched off, then switched on and finally switched off again
- Ignition switched off, the engine started and finally the ignition switched off again
- Ignition switched off, engine started, driven at a speed above 30 km/h for more than 3 minutes and finally the ignition switched off again.

DIAGNOSTIC TROUBLE CODE (DTC)

The diagnostic trouble code (DTC) for which the frozen values are stored.

GLOBAL TIME

The value shows the time since the Central Electronic Module (CEM) was supplied with voltage the first time. Transmission Control Module (TCM) obtains the value via the CAN-net from Central Electronic Module (CEM). The value is given in minutes.

OUTSIDE TEMPERATURE

The value indicates the outside temperature when the diagnostic trouble code (DTC) was stored. The transmission control module (TCM) obtains the value via the CAN-net from the central electronic module (CEM). The value is given in °C.

MECU POWER SUPPLY

The value indicates the voltage in volts. The first and last time the diagnostic trouble code (DTC) was stored. The transmission control module (TCM) obtains the value via the CAN-net from the central electronic module (CEM). The value is given in volts (V).

POWER SUPPLY CONTROL MODULE

The value indicates the system voltage. The value is given in volts (V).

DISTANCE

The value indicates the total driving distance of the car when the diagnostic trouble code was stored. The transmission control module (TCM) obtains the value from the central electronic module (CEM) via the CAN network.

POWER SUPPLY MODE

The value indicates the current status of the power supply mode.

GEAR POSITION SENSOR, POSITION

The value indicates the position of the gear selector based on the signal from the gear position sensor. The following values can be displayed: P, R, N, D.

VEHICLE SPEED (TCM)

The value shows the vehicle's speed. The speed is calculated from the transmission's speed, rpm sensor (input and output rpm) as well as speed signal from Brake Control Module (BCM).

CALCULATED SPEED

The value indicates the speed calculated from the signal from the transmission's rpm sensor (output rpm)

ENGINE SPEED (RPM)

The engine control module (ECM) transmits engine speed on the CAN network. The transmission control module (TCM) retrieves the signal from the CAN network and compares it to the signal from its rpm sensor (input rpm).

The value indicates the engine speed (RPM).

ENGINE TORQUE

The value indicates the engine torque. The value is given in Nm.

GEAR ACCORDING TO THE SHIFT SOLENOIDS

The value indicates the selected gear (according to the shift solenoids). The value indicated depends on the transmission type.

The following values can be shown: reverse gear, gear 1, gear 2, gear 3, gear 4, gear 5 and gear 6.

LOCK-UP FUNCTION ACCORDING TO SOLENOIDS

The value indicates the status of the Lock-up function according to how the control module has activated the solenoids.

No Lock-up/Slipping lock-up/Locked lock-up.

OIL TEMPERATURE

The value indicates the temperature of the transmission oil. The value is calculated based on the oil temperature sensor's signal and is given in °C.

EXPECTED GEAR RATIO

The value shows the gear ratio that is expected by transmission's control module (TCM).

CURRENT GEAR RATIO

The value indicates the transmission's gear ratio.

INPUT SPEED

The value indicates the input rpm from the transmission's rpm sensor. Rpm can be generated with the engine idling and the gear selector in P/N position. If the gear selector is in any other position, a gear is engaged and the transmission input shaft is connected to the output shaft and an rpm is first shown when the vehicle is driven. Depending on the slip in the torque converter, the transmission's rpm and the engine rpm will differ when lock-up is not engaged. With lock-up engaged the rpm should be the same as engine rpm.

OUTPUT SPEED

The value indicates the output speed calculated based on the signal from the transmission's rpm sensor (output rpm). The value is given in rpm.

SHIFT SOLENOIDS S1-S2 STATUS

The value indicates the status of shift solenoids S1 - S2.

OFF = Solenoid not activated.

ON = Solenoid activated.

HINT: If the value for shift solenoid S1-S2, which is activated by the transmission control module (TCM), is OFF and the status of shift solenoid S1-S2 is ON, the solenoid circuit is either open or short circuited to supply voltage. If the value for shift solenoid S1-S2, which is activated by the transmission control module (TCM), ON and its status is OFF, the solenoid circuit is short circuited to ground.

LINEAR PRESSURE SOLENOID SLT, SLU, SLB1, SLC1, SLC2, SLC3 CURRENT

The value shows the current through the solenoid and is given in milliampere (mA).

LINEAR PRESSURE SOLENOID SLT, SLU, SLB1, SLC1, SLC2, SLC3 REQUESTED CURRENT

The value shows requested current for activating the solenoid. The value is given in milliampere (mA).

EXPECTED GEAR

The value indicates expected gears 1-6.

LOCK-UP FUNCTION ACCORDING TO SOLENOIDS

The value indicates the status of the Lock-up function.

- No Lock-up function.
- Slipping Lock-up function.
- Locked lock-up function.

EXPECTED LOCK-UP FUNCTION

The value indicates the status of the Lock-up function.

Active = Lock-up function engaged.

Not active = Lock-up function not engaged.

SLIPPING LOCK-UP

The value shows the difference in rpm between the engine and transmission.

START LOCKOUT, STATUS

The value indicates the status of the solenoid for the start lockout function.

Start permitted/Start not permitted.

ACCELERATOR PEDAL (AP) POSITION

The value indicates the position of the accelerator pedal (AP). The transmission control module (TCM) obtains the value via the CAN-net from the engine control module (ECM). The value is given in %.

LIN-COMMUNICATION STATUS

The value shows status of the communication between Gear Selector Module (GSM) and Transmission Control Module (TCM).

GEAR SELECTOR ASSEMBLY FUNCTIONALITY, STATUS

The value indicates the status of gear selector assembly functionality

DESCRIPTION OF PARAMETERS

PARAMETERS, STATUS

GENERAL

Some values differ from those indicated in the signal description, see **SIGNAL SPECIFICATION** . This is because the read values are calculated and filtered by the Transmission Control Module (TCM). In certain

cases, the engine must be running in order to obtain the relevant values.

KICKDOWN, STATUS

The value indicates the status of the kickdown function. If kickdown function's limit value in the accelerator pedal (approx. 87%) is passed, kickdown is activated. Upon quick acceleration (accelerator pedal depressed to approx. 87%), the Transmission Control Module (TCM) transmits a signal for kickdown.

Not active = Kickdown not activated

Active = Kickdown activated

STOP LAMP SWITCH, STATUS

The value indicates the status of the brake light switch. The Engine Control Module (ECM) transmits a signal on the CAN network to indicate the position of the brake light switch: activated or not activated. The Transmission Control Module (TCM) uses the signal for internal shift functions and for transmission diagnostics.

Not active = Stop lamp switch not affected

Active = Brake light switch actuated

LOCK-UP FUNCTION ACCORDING TO SOLENOIDS

The value displays the lock-up function status according to how the solenoids are controlled.

No lock-up

Slipping Lock-up

Lock up (engaged)

GEAR POSITION SENSOR

The values shows the position of the gear position sensor.

Position P/R/N/D can be indicated.

HINT: Position D is indicated in both D mode and Geartronic mode.

GEARTRONIC STATUS

The value indicates whether or not Geartronic is selected. Signal from the Gear Selector Module (GSM) to the Transmission Control Module (TCM).

Not active = Gear selector lever in P/R/N/D

Active = Gear selector lever in Geartronic

GEARTRONIC UPSHIFT (+)

The value displays which function the gear selector module (GSM) transmits to the transmission control module (TCM).

No = No request up shift

Yes = Request up shift

GEARTRONIC DOWNSHIFT (-)

The value displays which function the gear selector module (GSM) transmits to the transmission control module (TCM).

No = No request down shift

Yes = Request down shift

SHIFTLOCK, STATUS REQUEST

The value indicates the status for shiftlock in the shift lever bracket. The Transmission Control Module (TCM) regulates a solenoid in the shift lever bracket. The solenoid locks the gear selector.

Active = Solenoid locks the gear selector.

Not active = Solenoid allows gear selector movement.

IMMOBILIZER, STATUS REQUEST

The value displays the status of the park neutral position (PNP) switch. The transmission control module (TCM) receives a signal from the gear selector module (GSM) about which position the gear selector lever is in. If the gear selector lever is in a position other than P or N the engine is prevented form starting by the transmission control module (TCM) activating the park neutral position (PNP) switch relay.

Start permitted.

Start not permitted.

GEAR ACCORDING TO THE SOLENOIDS

The value indicates the currently engaged gear based on the position of the solenoids.

- R
- Gear 1
- Gear 2

- Gear 3
- Gear 4
- Gear 5
- Gear 6

GEAR SHIFT SOLENOID S1, S2

The value displays the solenoid status.

OFF = Solenoid not activated

ON = The solenoid is activated

REQUEST TO LIGHT MALFUNCTION INDICATOR LAMP (MIL)

The value displays which and in which way transmission control module (TCM) requests the malfunction indicator lamp (MIL) to light.

No = No request.

Yes (continuously) = Request for continuously lit lamp.

Yes (flashing) = Request for flashing lamp.

REQUESTED TEXT MESSAGE

The value displays if the transmission control module (TCM) requests that a text message is displayed in the driver information module (DIM).

No = No request.

Yes = Request to display message.

PARAMETERS, VALUE

ENGINE SPEED (RPM)

The value indicates engine speed. The Transmission Control Module (TCM) obtains the value from the Engine Control Module (ECM) via CAN. The Transmission Control Module (TCM) compares the signal with its own engine speed sensor signal.

Measurement range: 0 - 8191 rpm.

Idling speed: 850 rpm

ENGINE TORQUE

The value indicates current engine torque. The Transmission Control Module (TCM) obtains the value from the Engine Control Module (ECM) via CAN.

Measurement range: -512 - +511 Nm.

ACCELERATOR PEDAL (AP) POSITION

The value indicates the accelerator pedal position. The Transmission Control Module (TCM) obtains the value from the Engine Control Module (ECM) via CAN. The Transmission Control Module (TCM) uses the signal to regulate system pressure in the transmission.

Measurement range: 0-100%.

>87% = kickdown.

ENGINE COOLANT TEMPERATURE (ECT)

The value indicates engine temperature. The Transmission Control Module (TCM) obtains the value from the Engine Control Module (ECM) via CAN. The Transmission Control Module (TCM) uses the signal to regulate lock-up.

Measurement range: 60 - +195 °C.

OIL TEMPERATURE

The value indicates transmission fluid temperature. The Transmission Control Module (TCM) calculates the temperature from the oil temperature sensor signal.

Measurement range: -100 - +200 °C.

VEHICLE SPEED, TRANSMISSION CONTROL MODULE (TCM)

The value indicates vehicle speed. The Transmission Control Module (TCM) receives a signal from the transmission speed sensor, which is actuated by toothed pulse gear and uses the signal to calculate vehicle speed. The speed sensor is a so-called active sensor. The signal oscillates between a peak and a valley value. The Transmission Control Module (TCM) calculates speed, which is in direct proportion to the frequency.

Measurement range: 0 - 655 km/h.

SPEED SIGNAL FROM BRAKE CONTROL MODULE (BCM)

The value indicates output speed. The Transmission Control Module (TCM) obtains the value from the Brake Control Module (BCM) via CAN. The Transmission Control Module (TCM) compares the signal with the signal from the transmission speed sensor.

Measurement range: 0 - 320 km/h.

INPUT SPEED SENSOR, TRANSMISSION

The value displays the input speed (rpm). With the engine at idle speed and the gear selector lever in P/N position the speed (rpm) can be generated. If the gear selector lever is in another position a gear is engaged and the transmission input shaft engages with the output shaft. The speed (rpm) is displayed when the vehicle is driven. Depending on the slippage in the torque converter the transmission speed (rpm) and the engine speed (rpm) will differ when lock-up is not engaged. With lock-up engaged the transmission speed (rpm) must be the same as the engine speed (rpm).

Measurement range: 0 - 10000 rpm.

OUTPUT SPEED, TRANSMISSION SPEED SENSOR

the value displays the output speed (rpm). The transmission control module (TCM) receives a signal from the transmission speed sensor which is affected by a toothed wheel on the output shaft. The value can be compared with the calculated value from the brake control module (BCM).

Measurement range: 0 - 10 000 rpm.

OUTPUT SPEED FROM BRAKE CONTROL MODULE (BCM)

The value indicates output speed. The Transmission Control Module (TCM) converts the speed signal from the Brake Control Module (BCM) to rpm. This value can be compared with the rpm from the transmission speed sensor.

Measurement range: 0 - 10 000 rpm.

LINEAR PRESSURE SOLENOID SLC1, SLC2, SLC3, SLB1 CURRENT

The value indicates the amperage passing through the solenoid circuit. A lower amperage gives a higher reference pressure, which gives a higher line pressure.

Measurement range: 0 - 1000 mA.

LINEAR PRESSURE SOLENOID SLC1, SLC2, SLC3, SLB1 REQUESTED CURRENT

The value indicates requested current strength from the Transmission Control Module (TCM) to the solenoid. The value can be used for comparison with the read value in the circuit.

Measurement range: 0 - 1000 mA.

LOCK-UP SOLENOID SLU, CURRENT

The value displays the current passing through the solenoid circuit. Low current gives a higher control pressure which results in a higher line pressure.

Measurement range: 0 - 1000 mA.

LOCK-UP SOLENOID SLU, REQUESTED CURRENT

The value indicates requested current strength from the Transmission Control Module (TCM) to the solenoid. The value can be used for comparison with the read value in the circuit.

Measurement range: 0 - 1000 mA.

LINEAR PRESSURE SOLENOID SLT, CURRENT

The value indicates the current passing through the solenoid circuit. Low current gives a higher control pressure which results in a higher system pressure. Solenoid control is directly dependent on the accelerator pedal signal. The higher the signal from the accelerator pedal sensor, the lower the current through the solenoid and therefore the higher the system pressure.

Measurement range: 0 - 1000 mA.

Normal value with accelerator pedal released: approx. 1000 mA.

LINEAR PRESSURE SOLENOID SLT, REQUESTED CURRENT

The value indicates requested current strength from the Transmission Control Module (TCM) to the solenoid. The value can be used for comparison with the read value in the circuit.

Measurement range: 0 - 1000 mA.

POWER SUPPLY CONTROL MODULE

The value indicates battery voltage at Transmission Control Module (TCM).

Measurement range: 0 - 25.5 V.

CURRENT GEAR RATIO

The value indicates the transmission's gear ratio. The Transmission Control Module (TCM) uses input speed and output speed (vehicle speed) to calculate the gear ratio. For actual gear ratio, see the table below.

Gear	TF-80SC
R	3.394
1	4.148
2	2.370
3	1.556
4	1.155
5	0.859
6	0.686

EXPECTED GEAR RATIO

The value indicates which gear ratio the Transmission Control Module (TCM) expects. Compare the value with the table for "Current gear ratio."

PASSENGER COMPARTMENT TEMPERATURE

The value displays the passenger compartment temperature. The transmission control module (TCM) obtains the value from the central electronic module (CEM) via the controller area network (CAN).

Measurement range: -60 to +195 °C.

If a temperature of +194 °C or +195 °C is displayed the value from the controller area network (CAN) is faulty according to the transmission control module (TCM).

OUTSIDE TEMPERATURE

The value displays the outside temperature. The transmission control module (TCM) obtains the value from the central electronic module (CEM) via the controller area network (CAN).

Measurement range: -128 to +127 °C.

If a temperature of +126 °C or +127 °C is displayed the value from the controller area network (CAN) is faulty according to the transmission control module (TCM).

MECU POWER SUPPLY

The value indicates battery voltage at the Central Electronic Module (CEM). The Accessory Electronic Module (AEM) obtains the value from the Central Electronic Module (CEM) via CAN.

Measurement range: 5-38 V.

Normal value when alternator is charging: 13.0 - 14.5 V.

If a voltage of 36.75 V or 36.875 V is displayed, the value from the controller area network (CAN) is faulty according to the transmission control module (TCM).

DISTANCE

The value displays the distance driven. The transmission control module (TCM) obtains the value from the central electronic module (CEM) via the controller area network (CAN).

Measurement range: 0 - 1, 048, 575 km (651, 554 miles)

If a distance of 16, 777, 214 km or 16, 777, 215 km is displayed the value from the controller area network (CAN) is faulty according to the transmission control module (TCM).

POWER SUPPLY MODE

The value indicates the current status of the power supply mode.

- Key removed
- Key recently removed

- Key approved
- Ignition off after Accessory position
- Accessory position
- Accessory position after Ignition on
- Ignition on
- Running
- Start attempt
- Signal missing

VEHICLE COMMUNICATION INFORMATION, TRANSMISSION CONTROL MODULE (TCM) (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

DESCRIPTION OF ACTIVATIONS

see **DESCRIPTION OF ACTIVATIONS**

DESCRIPTION OF EXTENDED DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DESCRIPTION OF EXTENDED DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

DESCRIPTION OF PARAMETERS

see **DESCRIPTION OF PARAMETERS**

VEHICLE COMMUNICATION INFORMATION, TRANSMISSION CONTROL MODULE (TCM) (B8444S, TF-80SC AWD; 2006-2011)

DESCRIPTION OF ACTIVATIONS

ACTIVATIONS OF COMPONENTS

With this feature a number of components can be activated for checking its function. Components that can be activated are as follows.

NOTE: The noise level from the solenoids can be high, depending on the temperature of the transmission and the oil. When the transmission is warm or very cold, the noise level can be very low.

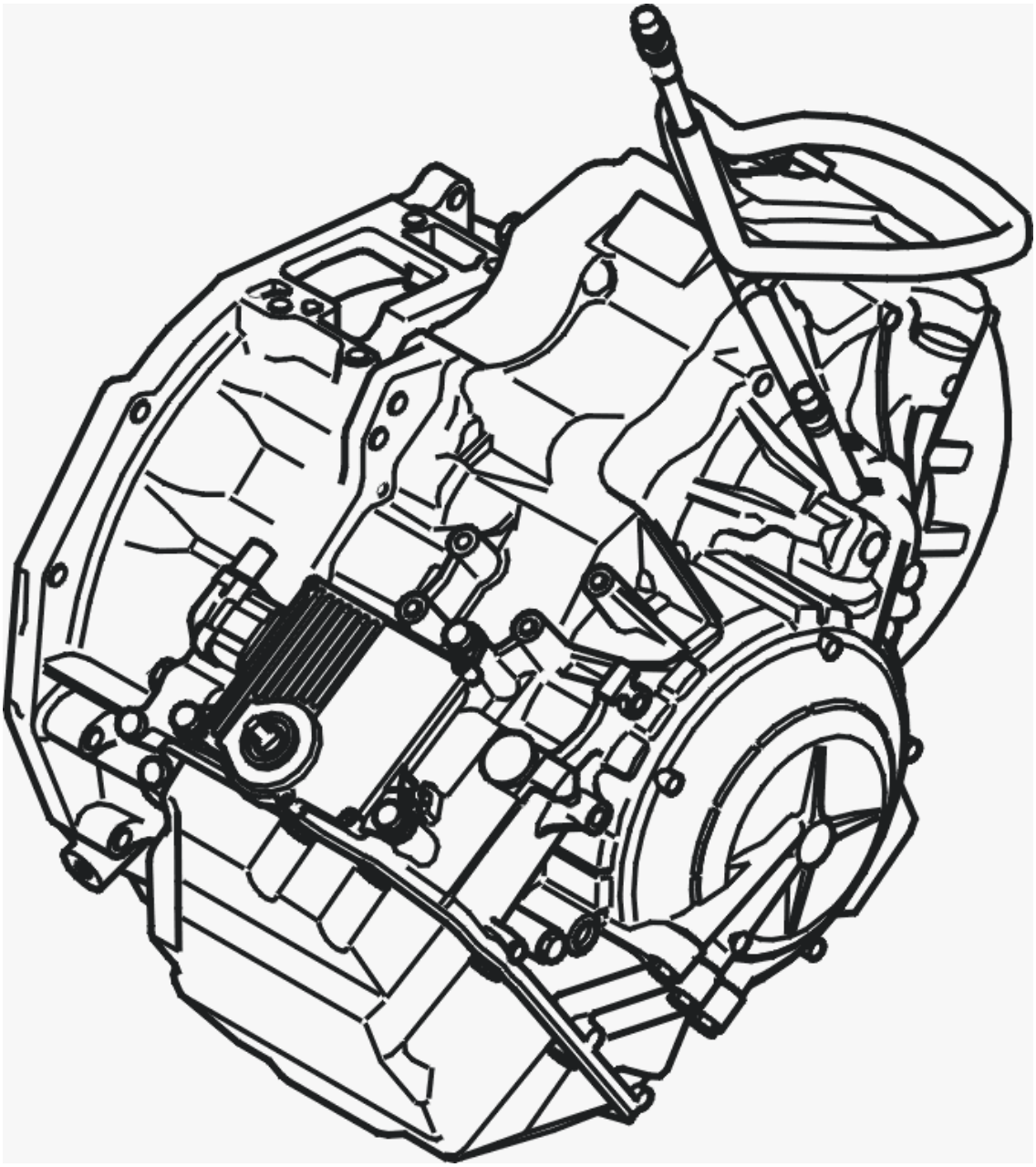


Fig. 2: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

GEAR SHIFT SOLENOID S1, S2

Activation of shift solenoid S1, S2

"Click sound" in the transmission (use stethoscope) and status shall switch between OFF/ON.

SYSTEM PRESSURE SOLENOID SLT, SLU, SLB1, SLC1, SLC2, SLC3

Activation of Linear pressure solenoid.

"Click sound" in the transmission (use stethoscope) and the current shall vary between 0 and approx.950 mA.

DESCRIPTION OF EXTENDED DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

CONTENTS

Select type of description.

- see **DESCRIPTION OF FROZEN VALUES**
- see **STATUS IDENTIFIER, DESCRIPTION**
- see **COUNTERS, DESCRIPTION**

DESCRIPTION OF FROZEN VALUES

GENERAL

Frozen values are parameter values that are stored when a diagnostic trouble code (DTC) is generated.

Not all the parameters described need to be implemented in the control module. This varies from system to system. Parameters can also vary depending on with which type of transmission the car is equipped.

Certain parameters can be displayed without a value or with unreasonable values. This can occur if the control module has not stored a value, when a basic value has been stored instead or if the parameter is received via the CAN-network when there is an error on the CAN-network. For example, the rpm values may be unreasonable if a malfunction occurs for the transmission's speed sensors.

Definition of an operating cycle

The definition of an operating cycle varies depending on the software version.

Alternative definitions

- The ignition has been switched off, then switched on and finally switched off again
- The ignition has been switched off, the engine started and finally the ignition switched off again
- The ignition has been off, the engine started, the car driven at a speed above 30 km/h for more than 3 minutes and finally the ignition switched off again.

DIAGNOSTIC TROUBLE CODE (DTC)

The diagnostic trouble code (DTC) for which the frozen values are stored.

ENGINE, RUNNING

The value indicates the status of the engine when the diagnostic trouble code (DTC) was stored.

OFF = Engine not running.

On = Engine running.

GLOBAL TIME

The value shows the time since the Central Electronic Module (CEM) was supplied with voltage the first time. Transmission Control Module (TCM) obtains the value via the CAN-net from Central Electronic Module (CEM). The value is given in minutes.

OUTSIDE TEMPERATURE

The value indicates the outside temperature when the diagnostic trouble code (DTC) was stored. The transmission control module (TCM) obtains the value via the controller area network (CAN) from the central electronic module (CEM). The value is given in °C.

BATTERY VOLTAGE, CENTRAL ELECTRONIC MODULE (CEM)

The value indicates the voltage in volts. The first and last time the diagnostic trouble code (DTC) was stored. The transmission control module (TCM) obtains the value via the controller area network (CAN) from the central electronic module (CEM). The value is given in volts (V).

VOLTAGE FEED CONTROL MODULE

The value indicates the system voltage. The value is given in volts (V).

MILEAGE

The value indicates the total mileage of the car at the time the diagnostic trouble code (DTC) was stored. The transmission control module (TCM) obtains the value via the controller area network (CAN) from the central electronic module.

START KEY POSITION

The value shows the start key's position.

GEAR POSITION SENSOR, POSITION

The value indicates the position of the gear selector based on the signal from the gear-shift position sensor. The following values can be displayed:

BRAKE PEDAL'S POSITION

The value shows the position of the brake pedal. Transmission Control Module (TCM) obtains the value via the CAN-net from Brake Control Module (BCM). The value is given in %.

VEHICLE SPEED (TCM)

The value shows the vehicle's speed. The speed is calculated from the transmission's speed, speed sensor and rpm sensor as well as speed signal from Brake Control Module (BCM).

ENGINE SPEED (RPM)

Engine Control Module (ECM) sends out the engine's rpm on the CAN-net. Transmission Control Module retrieves the signal via the CAN-net to compare it with the own rpm sensor's signal.

The value indicates the engine speed.

ENGINE TORQUE

The value indicates the engine torque. The value is given in Nm.

GEAR ACCORDING TO THE SHIFT SOLENOIDS

The value indicates the selected gear. The value indicated depends on the transmission type.

The following values can be shown: reverse gear, gear 1, gear 2, gear 3, gear 4, gear 5 and gear 6.

LOCK-UP FUNCTION ACCORDING TO SOLENOIDS

The value indicates the status of the Lock-up function according to how the control module has activated the solenoids.

No Lock-up/Slipping lock-up/Locked lock-up.

OIL TEMPERATURE

The value indicates the temperature of the transmission oil. The value is calculated based on the oil temperature sensor's signal and is given in °C.

EXPECTED GEAR RATIO

The value shows the gear ratio that is expected by transmission's control module.

CURRENT GEAR RATIO

The value indicates the transmission's gear ratio.

INPUT SPEED

The value indicates the input speed from the transmission's speed sensor. Rpm can be generated with the engine idling and the gear selector in P/N position. If the gear selector is in any other position, a gear is engaged and the transmission input shaft is connected to the output shaft and an rpm is first shown when the vehicle is driven. Depending on the slip in the torque converter, the transmission's rpm and the engine rpm will differ when lock-up is not engaged. With lock-up engaged the rpm should be the same as engine rpm.

OUTPUT SPEED

The value shows the output rpm calculated based on the signal from the transmission's speed sensor. The value is given in r/min.

SHIFT SOLENOID STATUS

The value indicates the status of shift solenoid.

OFF = Solenoid not activated.

ON = Solenoid activated.

HINT: If the value for Shift solenoid, is activated by the TCM OFF is displayed and Shift solenoid status displays ON, the circuit for the solenoid is either open or has a short-circuit to supply voltage. If the value for Shift solenoid, is activated by the TCM ON is displayed and Shift solenoid status displays OFF, the circuit for the solenoid has a short-circuit to ground.

LINEAR SOLENOID CURRENT

The value shows the current through the solenoid and is given in milliampere (mA).

LINEAR SOLENOID REQUESTED CURRENT

The value shows requested current for activating the solenoid. The value is given in milliampere (mA).

EXPECTED GEAR

The value indicates expected gears 1-6.

LOCK-UP FUNCTION ACCORDING TO SOLENOIDS

The value indicates the status of the Lock-up function.

- No Lock-up function.
- Slipping Lock-up function.
- Locked lock-up function.

EXPECTED LOCK-UP FUNCTION

The value indicates the status of the Lock-up function.

Active = Lock-up function engaged.

Not active = Lock-up function not engaged.

SLIPPING LOCK-UP

The value shows the difference in rpm between the engine and transmission.

SHIFT-LOCK STATUS

The value indicates the status of the solenoid for the shift-lock function.

Active / Not active.

START LOCKOUT, STATUS

The value indicates the status of the solenoid for the start lockout function.

Start permitted/Start not permitted.

BRAKE PEDAL POSITION

The value shows the brake pedal's position in %.

SPEED SIGNAL FROM THE BRAKE CONTROL MODULE (BCM)

The value displays the vehicle speed. The transmission control module (TCM) obtains the value from the brake control module (BCM) via the controller area network (CAN).

ACCELERATOR PEDAL (AP) POSITION

The value indicates the position of the accelerator pedal (AP). The transmission control module (TCM) obtains the value via the CAN-net from the engine control module (ECM). The value is given in %.

LIN-COMMUNICATION STATUS

The value shows status of the communication between Gear Selector Module (GSM) and Transmission Control Module (TCM).

DESCRIPTION OF PARAMETERS

PARAMETERS, STATUS

GENERAL

Some values differ from those indicated in the signal description, see **SIGNAL DESCRIPTION** . This is because the read values are calculated and filtered by the Transmission Control Module (TCM). In certain cases, the engine must be running in order to obtain the relevant values.

KICKDOWN, STATUS

The value indicates the status of the kickdown function. If kickdown function's limit value in the accelerator pedal (approx. 87%) is passed, kickdown is activated. Upon quick acceleration (accelerator pedal depressed to approx. 87%), the Transmission Control Module (TCM) transmits a signal for kickdown.

Not active = Kickdown not activated

Active = Kickdown activated

STOP LAMP SWITCH, STATUS

The value indicates the status of the brake light switch. The Engine Control Module (ECM) transmits a signal on the CAN network to indicate the position of the brake light switch: activated or not activated. The Transmission Control Module (TCM) uses the signal for internal shift functions and for transmission diagnostics.

Not active = Stop lamp switch not affected

Active = Brake light switch actuated

LOCK-UP FUNCTION ACCORDING TO SOLENOIDS

The value displays the lock-up function status according to how the solenoids are controlled.

No lock-up

Slipping lock up

Lock up (engaged)

GEAR POSITION SENSOR

The values shows the position of the gear position sensor.

Position P/R/N/D can be indicated.

HINT: Position D is indicated in both D mode and Geartronic mode.

GEARTRONIC STATUS

The value indicates whether or not Geartronic is selected. Signal from the Gear Selector Module (GSM) to the Transmission Control Module (TCM).

Not active = Gear selector lever in P/R/N/D

Active = Gear selector lever in Geartronic

GEARTRONIC UPSHIFT (+)

The value displays which function the gear selector module (GSM) transmits to the transmission control module (TCM).

No = No request up shift

Yes = Request up shift

GEARTRONIC DOWNSHIFT (-)

The value displays which function the gear selector module (GSM) transmits to the transmission control module

(TCM).

No = No request down shift

Yes = Request down shift

GEAR SELECTOR, START POSITION

The value indicates the calculated position of the gear selector to permit engine start. Start is permitted in positions P and N.

Position P/R/N/D can be indicated.

HINT: Position D is indicated in both D mode and Geartronic mode.

GEAR SELECTOR, DIAGNOSTICS

The value indicates the calculated position of the gear selector to diagnose a correct gear position.

Position P/R/N/D/undefined R position/undefined D position can be indicated.

HINT: Position D is indicated in both D mode and Geartronic mode.

SHIFTLOCK, STATUS REQUEST

The value indicates the status for shiftlock in the shift lever bracket. The Transmission Control Module (TCM) regulates a solenoid in the shift lever bracket. The solenoid locks the gear selector.

Active = Solenoid locks the gear selector.

Not active = Solenoid allows gear selector movement.

IMMOBILIZER, STATUS REQUEST

The value displays the status of the park neutral position (PNP) switch. The transmission control module (TCM) receives a signal from the gear selector module (GSM) about which position the gear selector lever is in. If the gear selector lever is in a position other than P or N the engine is prevented form starting by the transmission control module (TCM) activating the park neutral position (PNP) switch relay.

Start permitted.

Start not permitted.

WINTER PROGRAM, STATUS

The value displays the shifting program which the transmission control module (TCM) has selected. The control module has a selected program after the signal from the **W** (winter position) program selector. The signal from the gear selector module (GSM) to the transmission control module (TCM).

Active = Winter position engaged.

Not active = Winter position disengaged.

GEAR ACCORDING TO THE SOLENOIDS

The value indicates the currently engaged gear based on the position of the solenoids.

- R
- Gear 1
- Gear 2
- Gear 3
- Gear 4
- Gear 5

SHIFT SOLENOIDS S1, S2, S3, S4, S5

The value displays the solenoid status.

OFF = Solenoid not activated

ON = Solenoid activated

REQUEST TO LIGHT MALFUNCTION INDICATOR LAMP (MIL)

The value displays which and in which way transmission control module (TCM) requests the malfunction indicator lamp (MIL) to light.

No = No request.

Yes (continuously) = Request for continuously lit lamp.

Yes (flashing) = Request for flashing lamp.

REQUESTED TEXT MESSAGE

The value displays if the transmission control module (TCM) requests that a text message is displayed in the driver information module (DIM).

No = No request.

Yes = Request to display message.

ENGINE RUNNING

The value displays the engine status. The transmission control module (TCM) obtains the value from the central electronic module (CEM) via the controller area network (CAN).

Yes = Engine running.

No = Engine switched off.

PARAMETERS, VALUE

ENGINE SPEED (RPM)

The value indicates engine speed. The Transmission Control Module (TCM) obtains the value from the Engine Control Module (ECM) via CAN. The Transmission Control Module (TCM) compares the signal with its own engine speed sensor signal.

Measurement range: 0 - 8191 rpm.

Idling speed: 850 rpm

ENGINE TORQUE

The value indicates current engine torque. The Transmission Control Module (TCM) obtains the value from the Engine Control Module (ECM) via CAN.

Measurement range: -512 - +511 Nm.

CALCULATED TORQUE TO TRANSMISSION

The value indicates engine torque that the Transmission Control Module (TCM) calculates the transmission obtains from the engine.

Measurement range: -512 - +511 Nm.

ACCELERATOR PEDAL (AP) POSITION

The value indicates the accelerator pedal position. The Transmission Control Module (TCM) obtains the value from the Engine Control Module (ECM) via CAN. The Transmission Control Module (TCM) uses the signal to regulate system pressure in the transmission.

Measurement range: 0-100%.

>87% = kickdown.

ENGINE COOLANT TEMPERATURE (ECT)

The value indicates engine temperature. The Transmission Control Module (TCM) obtains the value from the Engine Control Module (ECM) via CAN. The Transmission Control Module (TCM) uses the signal to regulate lock-up.

Measurement range: 60 - +195 °C

OIL TEMPERATURE

The value indicates transmission fluid temperature. The Transmission Control Module (TCM) calculates the temperature from the oil temperature sensor signal.

Measurement range: -100 - +200 °C

TRANSMISSION FLUID TEMPERATURE UPON START

The value indicates the temperature of the transmission fluid when the engine began the current operating cycle.

Measurement range: -100 - + 200 °C

FLUID TEMPERATURE WITHIN THE RANGE 100 - 110 °C / 110 - 120 °C / 120 - 130 °C / 130 - 140 °C / 140 - 150 °C / 150 °C -

The value indicates the total time the fluid temperature was within the current temperature interval.

Time is indicated in hours.

Measurement range: 0 - 29826 h.

VEHICLE SPEED, TRANSMISSION CONTROL MODULE (TCM)

The value indicates vehicle speed. The Transmission Control Module (TCM) receives a signal from the transmission speed sensor, which is actuated by toothed pulse gear and uses the signal to calculate vehicle speed. The speed sensor is a so-called active sensor. The signal oscillates between a peak and a valley value. The Transmission Control Module (TCM) calculates speed, which is in direct proportion to the frequency.

Measurement range: 0 - 655 km/h.

SPEED SIGNAL FROM BRAKE CONTROL MODULE (BCM)

The value indicates output speed. The Transmission Control Module (TCM) obtains the value from the Brake Control Module (BCM) via CAN. The Transmission Control Module (TCM) compares the signal with the signal from the transmission speed sensor.

Measurement range: 0 - 320 km/h.

INPUT SPEED SENSOR, TRANSMISSION

The value displays the input speed (rpm). With the engine at idle speed and the gear selector lever in P/N position the speed (rpm) can be generated. If the gear selector lever is in another position a gear is engaged and the transmission input shaft engages with the output shaft. The speed (rpm) is displayed when the vehicle is driven. Depending on the slippage in the torque converter the transmission speed (rpm) and the engine speed (rpm) will differ when lock-up is not engaged. With lock-up engaged the transmission speed (rpm) must be the same as the engine speed (rpm).

Measurement range: 0 - 10000 rpm.

OUTPUT SPEED, TRANSMISSION SPEED SENSOR

the value displays the output speed (rpm). The transmission control module (TCM) receives a signal from the transmission speed sensor which is affected by a toothed wheel on the output shaft. The value can be compared with the calculated value from the brake control module (BCM).

Measurement range: 0 - 10 000 rpm.

OUTPUT SPEED FROM BRAKE CONTROL MODULE (BCM)

The value indicates output speed. The Transmission Control Module (TCM) converts the speed signal from the Brake Control Module (BCM) to rpm. This value can be compared with the rpm from the transmission speed sensor.

Measurement range: 0 - 10 000 rpm.

LINEAR PRESSURE SOLENOID SLS, CURRENT

The value indicates the current passing through the solenoid circuit. Low current gives a higher control pressure which results in a higher system pressure.

Measurement range: 0 - 1000 mA.

LINEAR PRESSURE SOLENOID SLS, REQUESTED CURRENT

The value indicates requested current strength from the Transmission Control Module (TCM) to the solenoid. The value can be used for comparison with the read value in the circuit.

Measurement range: 0 - 1000 mA.

LOCK-UP SOLENOID SLU, CURRENT

The value displays the current passing through the solenoid circuit. Low current gives a higher control pressure which results in a higher line pressure.

Measurement range: 0 - 1000 mA.

LOCK-UP SOLENOID SLU, REQUESTED CURRENT

The value indicates requested current strength from the Transmission Control Module (TCM) to the solenoid. The value can be used for comparison with the read value in the circuit.

Measurement range: 0 - 1000 mA.

LINEAR PRESSURE SOLENOID SLT, CURRENT

The value indicates the current passing through the solenoid circuit. Low current gives a higher control pressure which results in a higher system pressure. Solenoid control is directly dependent on the accelerator pedal signal. The higher the signal from the accelerator pedal sensor, the lower the current through the solenoid and therefore

the higher the system pressure.

Measurement range: 0 - 1000 mA.

Normal value with accelerator pedal released: approx. 1000 mA.

LINEAR PRESSURE SOLENOID SLT, REQUESTED CURRENT

The value indicates requested current strength from the Transmission Control Module (TCM) to the solenoid. The value can be used for comparison with the read value in the circuit.

Measurement range: 0 - 1000 mA.

VOLTAGE SUPPLY CONTROL MODULE

The value indicates battery voltage at Transmission Control Module (TCM).

Measurement range: 0 - 25.5 V

CURRENT GEAR RATIO

The value indicates the transmission's gear ratio. The Transmission Control Module (TCM) uses input speed and output speed (vehicle speed) to calculate the gear ratio. For actual gear ratio, see the table below.

Gear	**AW55-51**
R	3.234
1	4.769
2	2.994
3	1.957
4	1.324
5	1.018

EXPECTED GEAR RATIO

The value indicates which gear ratio the Transmission Control Module (TCM) expects. Compare the value with the table for "Current gear ratio."

PASSENGER COMPARTMENT TEMPERATURE

The value displays the passenger compartment temperature. The transmission control module (TCM) obtains the value from the central electronic module (CEM) via the controller area network (CAN).

Measurement range: -60 to +195 °C.

If a temperature of +194 °C or +195 °C is displayed the value from the controller area network (CAN) is faulty according to the transmission control module (TCM).

OUTSIDE TEMPERATURE

The value displays the outside temperature. The transmission control module (TCM) obtains the value from the central electronic module (CEM) via the controller area network (CAN).

Measurement range: -128 to +127 °C.

If a temperature of +126 °C or +127 °C is displayed the value from the controller area network (CAN) is faulty according to the transmission control module (TCM).

BATTERY VOLTAGE CENTRAL ELECTRONIC MODULE (CEM)

The value indicates battery voltage at the Central Electronic Module (CEM). The Accessory Electronic Module (AEM) obtains the value from the Central Electronic Module (CEM) via CAN.

Measurement range: 5-38 V.

Normal value when alternator is charging: 13.0 - 14.5 V.

If a voltage of 36.75 V or 36.875 V is displayed, the value from the controller area network (CAN) is faulty according to the transmission control module (TCM).

DISTANCE

The value displays the distance driven. The transmission control module (TCM) obtains the value from the central electronic module (CEM) via the controller area network (CAN).

Measurement range: 0 - 1, 048, 575 km (651, 554 miles)

If a distance of 16, 777, 214 km or 16, 777, 215 km is displayed the value from the controller area network (CAN) is faulty according to the transmission control module (TCM).

VEHICLE COMMUNICATION INFORMATION, TRANSMISSION CONTROL MODULE (TCM) (TF-80SC AWD; 2005)

DESCRIPTION OF ACTIVATIONS

see **DESCRIPTION OF ACTIVATIONS**

DESCRIPTION OF EXTENDED DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION

see **DESCRIPTION OF EXTENDED DIAGNOSTIC TROUBLE CODE (DTC) INFORMATION**

DESCRIPTION OF PARAMETERS

see **DESCRIPTION OF PARAMETERS**

TRANSMISSION

Transmission - Symptom Related Diagnostic Procedures

CHECKING LOCK-UP FUNCTION (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

CHECKING LOCK-UP FUNCTION

If Transmission control module (TCM) receives information from Brake control module (BCM) that a wheel sensor is off, then Transmission control module (TCM) turns off the lock-up function during engine braking. Then the Lock-up function will be constantly open and the engine receives idle rpm during engine braking.

Fault cause

- Look for the cause of the fault in the brake control module (BCM).

Fault symptom

- Automatic transmission/Lockup does not work

CHECKING LOCK-UP FUNCTION (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

CHECKING LOCK-UP FUNCTION

see **CHECKING LOCK-UP FUNCTION**

CHECKING LOCK-UP FUNCTION (B8444S, TF-80SC AWD; 2005-2011)

CHECKING LOCK-UP FUNCTION

see **CHECKING LOCK-UP FUNCTION**

CHECKING AUTOMATIC TRANSMISSION (4T65 AWD; 2003-2006)

CHECKING AUTOMATIC TRANSMISSION

CHECK QUALITY OF TRANSMISSION OIL

CHECK QUALITY OF TRANSMISSION OIL

NOTE: The transmission fluid quality is extremely important for transmission function. Therefore it is imperative that this is correct.

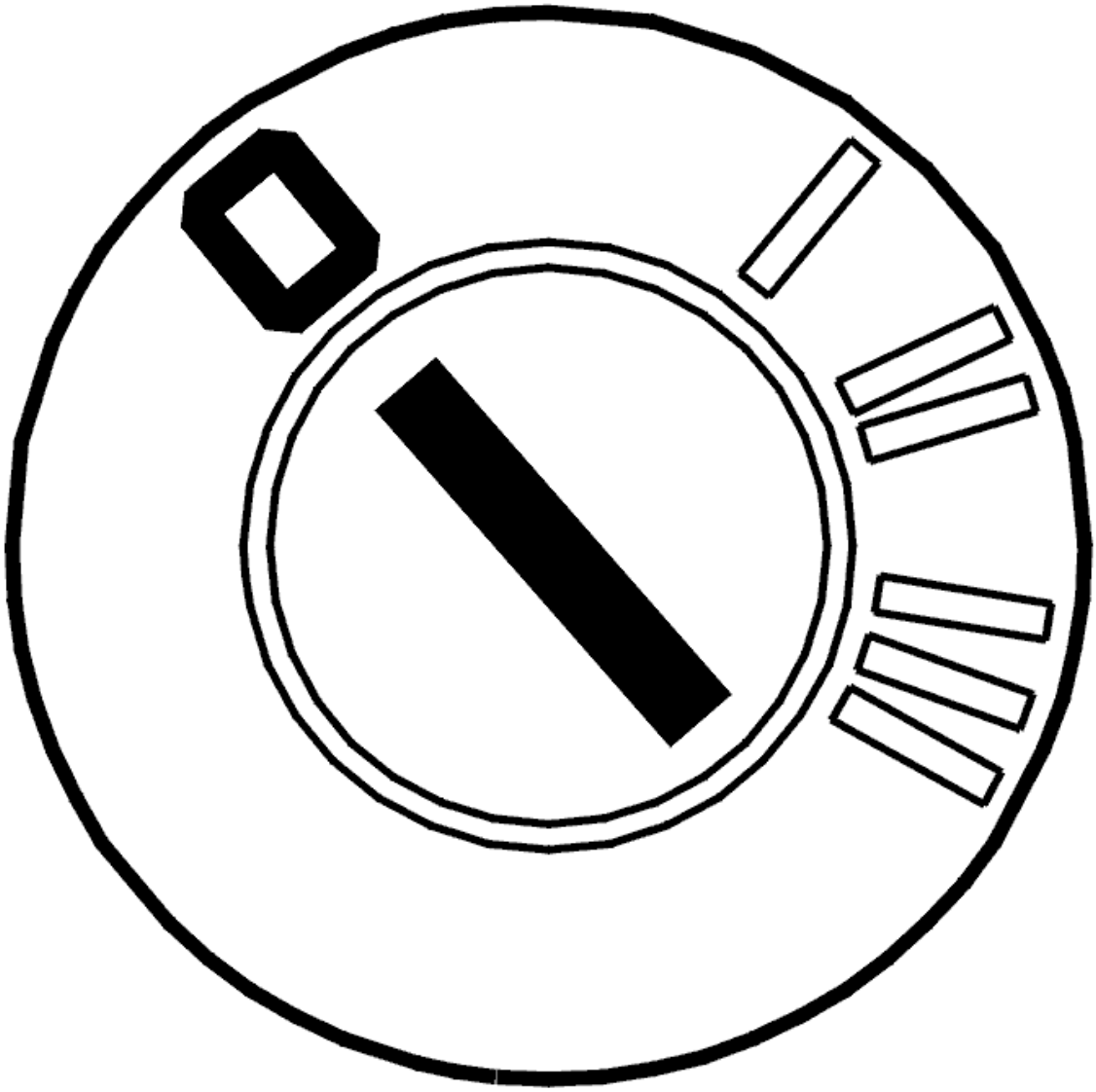


Fig. 1: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission oil quality. Take a sample using the dip stick.

  - Replace the transmission fluid if it smells burnt
  - Replace the fluid and filter if the transmission fluid contains particles
  - Check if there is oil or an oil film in the expansion tank. Oil in the expansion tank indicates leakage from the transmission oil cooler which is positioned in the cooler unit.

  NOTE: The transmission oil is red and must not be confused with black engine oil.

- If the transmission fluid is cloudy or pink, it is contaminated with coolant. In such cases the transmission must be replaced. For checking coolant in transmission oil, see **CHECKING FOR COOLANT IN OIL**

  When replacing the transmission, the cooler unit, including the additional cooler must be replaced if installed. Replace the hoses between the cooler and the transmission.

Other information:

- To replace the transmission fluid and filter, see **TRANSMISSION OIL / OIL FILTER, REPLACING** .

Select an option:

1. The fluid contains water

   Refer to **REPLACING THE TRANSMISSION**

2. The fluid smells burnt or contains particles

   Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

3. No fault detected.

   Refer to **CHECKING OIL LEVEL IN TRANSMISSION**

TEST DRIVING

TEST DRIVING

- Drive the car until the transmission oil reaches normal operating temperature. When test driving the transmission should be at operating temperature, approximately 80-90°C.

  Start in gear position D and accelerate using even throttle application.

  Drive the car to the gearshift from 2nd up to 3rd. Be observant when the transmission shifts up. Check if the car judders, vibrates or shifts harshly during the gearshift. Repeat the shift between 2nd and 3rd gears several times.

  If there are vibrations and judders when gear shifting, the line pressure solenoid STH is defective and the solenoid must be replaced.

  HINT: In order for the transmission control module (TCM) to adapt the gear shifting ratios to the correct level, the same gear shifting must be repeated 5-10 times.

  Other information:

- To replace solenoid STH, see **SOLENOID LINE PRESSURE, REPLACING** .

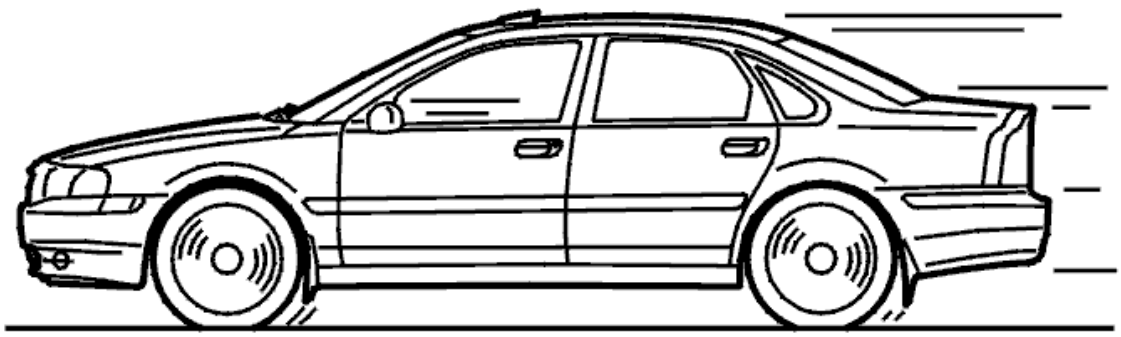


Fig. 2: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Did the transmission operate correctly?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **RESETTING THE ADAPTATION**

TEST DRIVING

HINT: Test the transmission to check that the solenoid STH corrected the fault.

- Drive the car until the transmission oil reaches normal operating temperature. When test driving the transmission should be at operating temperature, approximately 80-90°C.

  Start in gear position D and accelerate using even throttle application.

Drive the car to the gearshift from 2nd up to 3rd. Be observant when the transmission shifts up. Check if the car judders, vibrates or shifts harshly during the gearshift. Repeat the shift between 2nd and 3rd gears several times.

If there are vibrations and judders when gear shifting, the line pressure solenoid STH is defective and the solenoid must be replaced.

HINT: In order for the transmission control module (TCM) to adapt the gear shifting ratios to the correct level, the same gear shifting must be repeated 5-10 times.

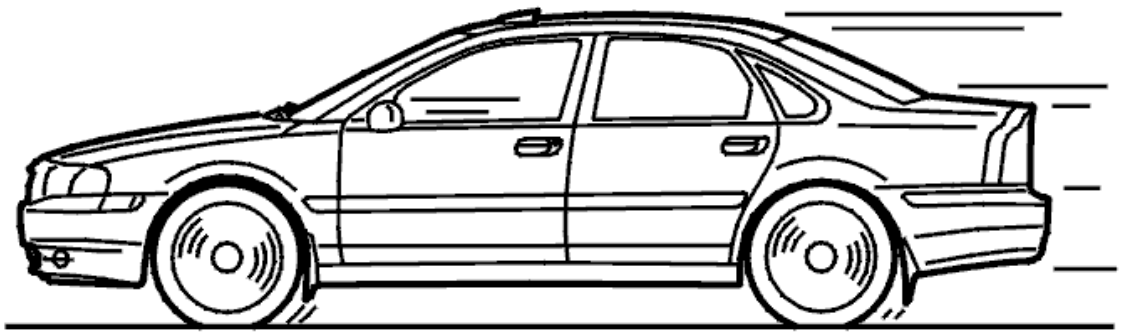


Fig. 3: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the transmission operating correctly?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **REPLACING THE TRANSMISSION**

REPLACING THE TRANSMISSION

Fault-tracing indicates a mechanical fault in the transmission. Replace the transmission.

Other information:

- To remove the transmission, see **TRANSMISSION, REMOVING**
- To install the transmission, see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .

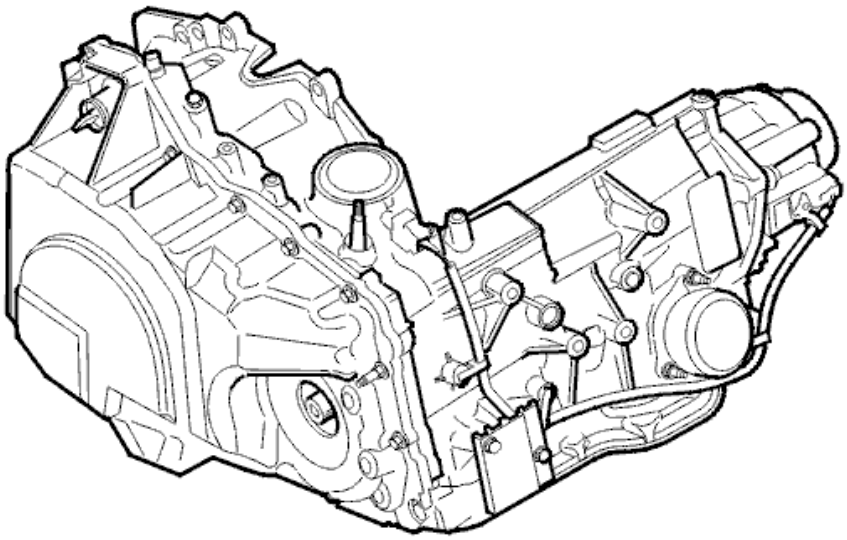


Fig. 4: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

CHECKING OIL LEVEL IN TRANSMISSION

CHECK TRANSMISSION OIL LEVEL

NOTE: The transmission fluid level is extremely important for transmission function. Therefore it is imperative that it is correct. In addition the oil level is dependent on oil temperature.

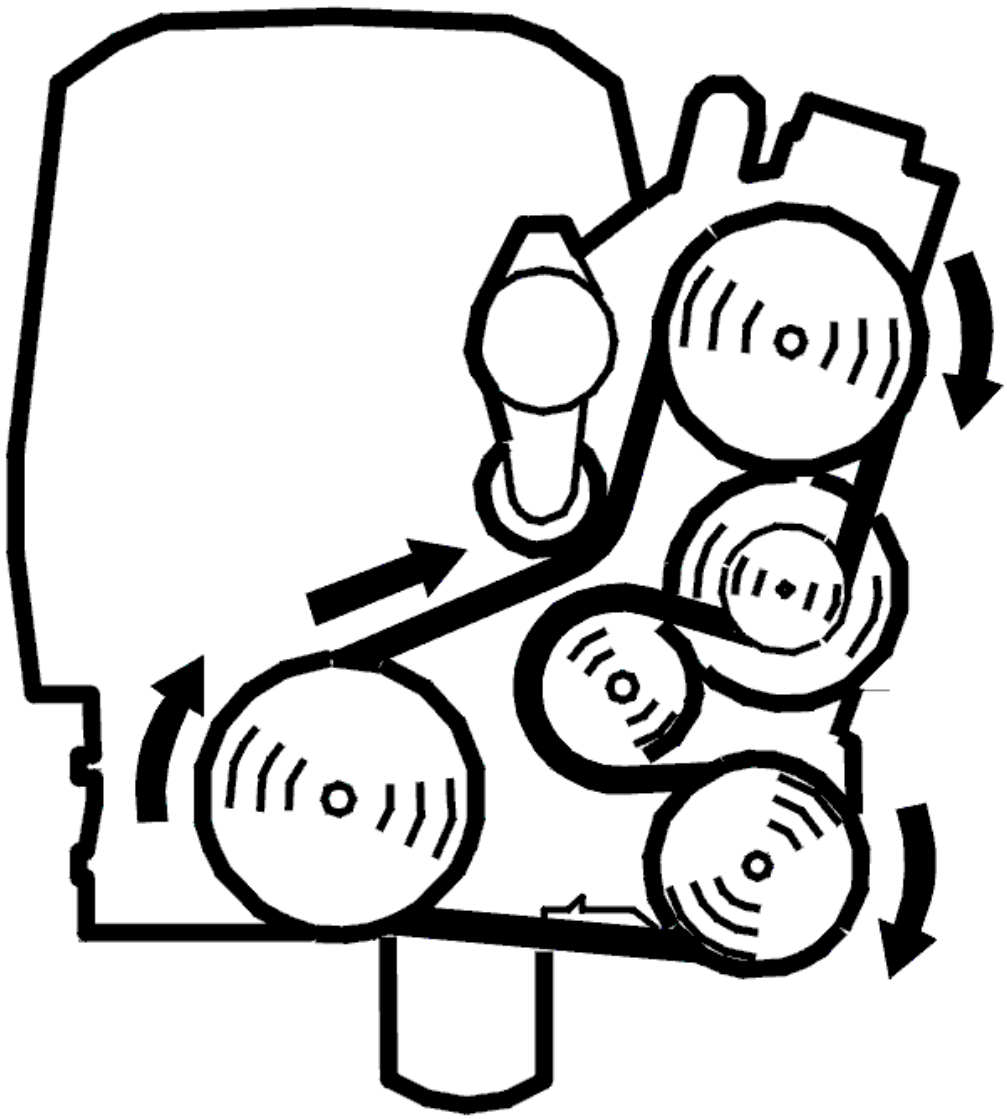


Fig. 5: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the car
- Read off the oil temperature.

When checking the gearbox oil level the oil temperature **must** be **80 °C - 90 °C** .

At the correct temperature, the oil level should be between "Min hot" and "Max hot".

Oil level

Too high: Drain the transmission fluid to the correct level
Too low: Check the transmission for leakage.

Remedy as necessary.

Other information:

- To check and adjust the oil level, see **OIL LEVEL, CHECKING** .

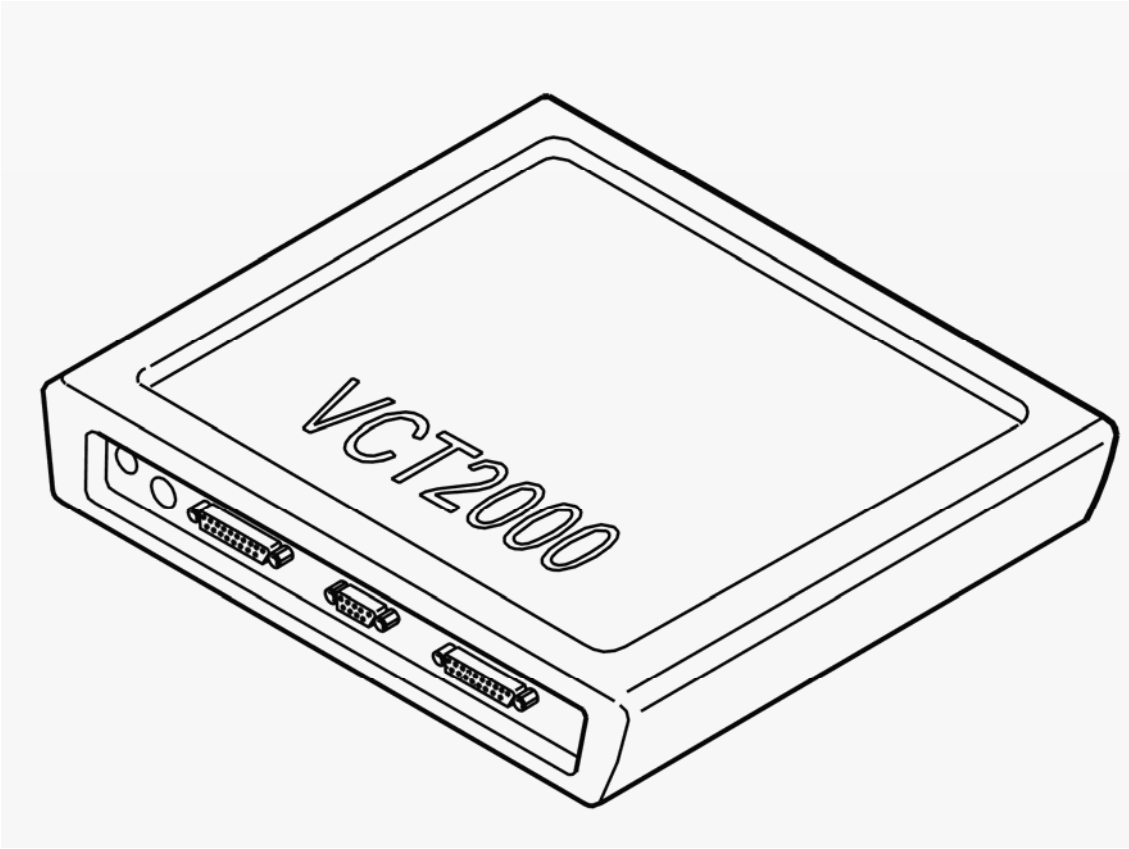


Fig. 6: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

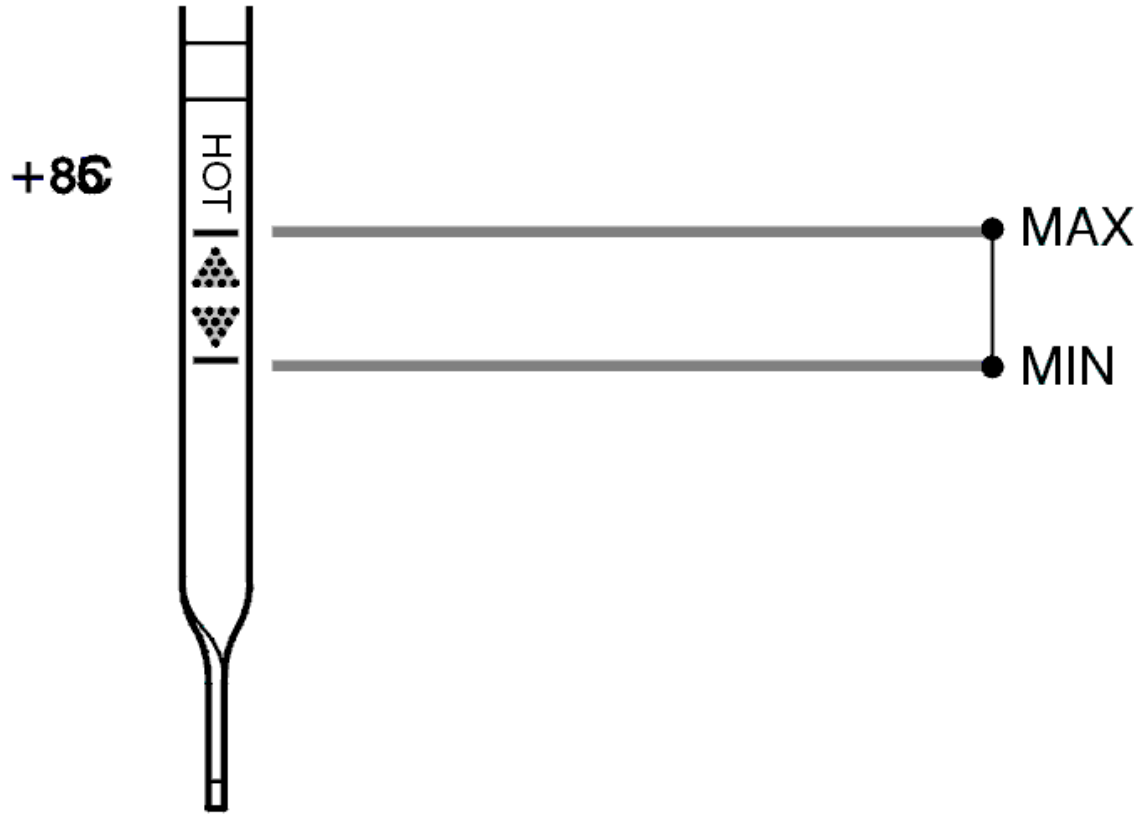


Fig. 7: Identifying Oil Level / Temperature
Courtesy of VOLVO CARS CORPORATION

Was the transmission fluid level correct?

- **YES**

  Refer to **TEST DRIVING**

- **NO**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect

circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

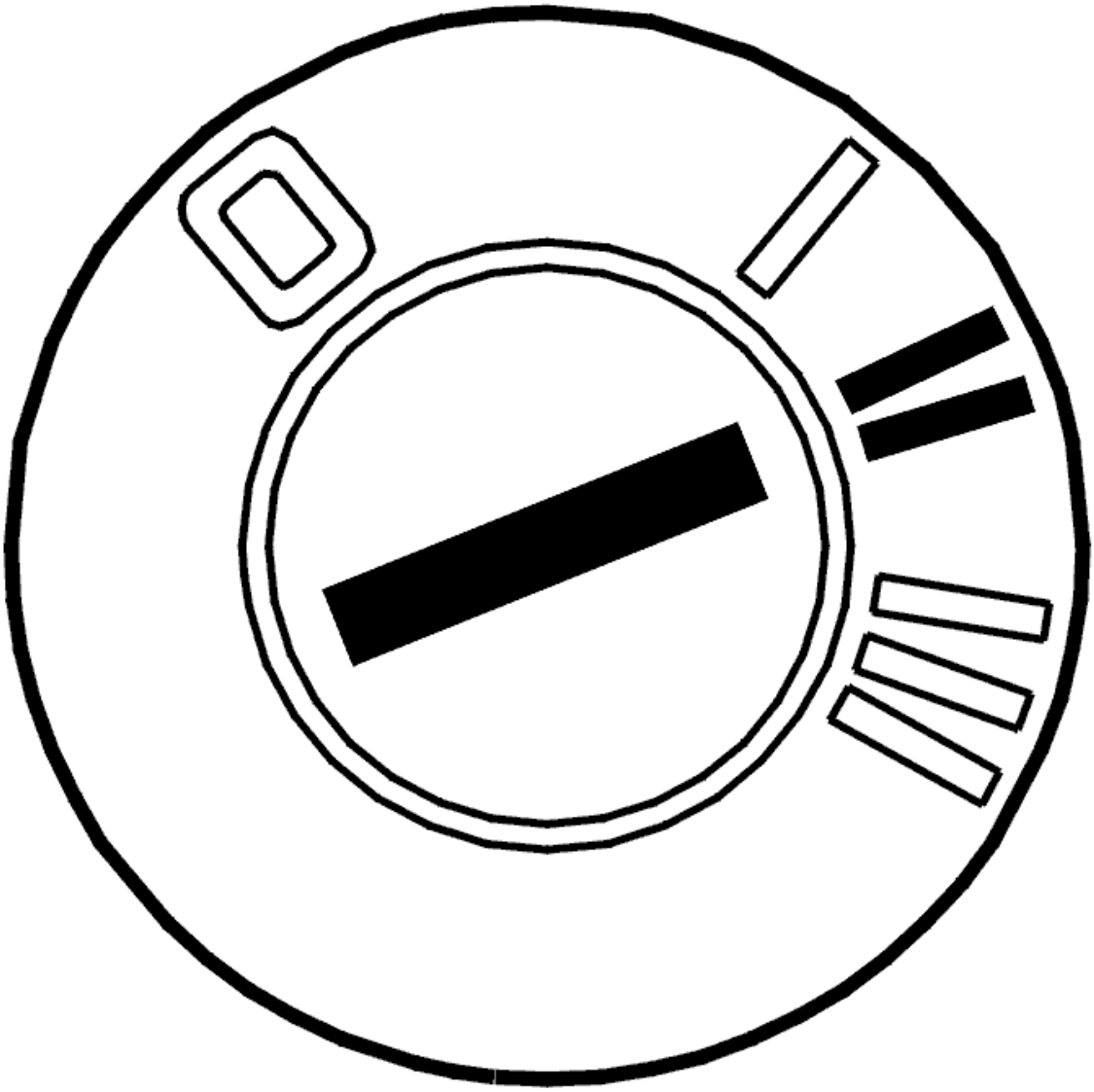


Fig. 8: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

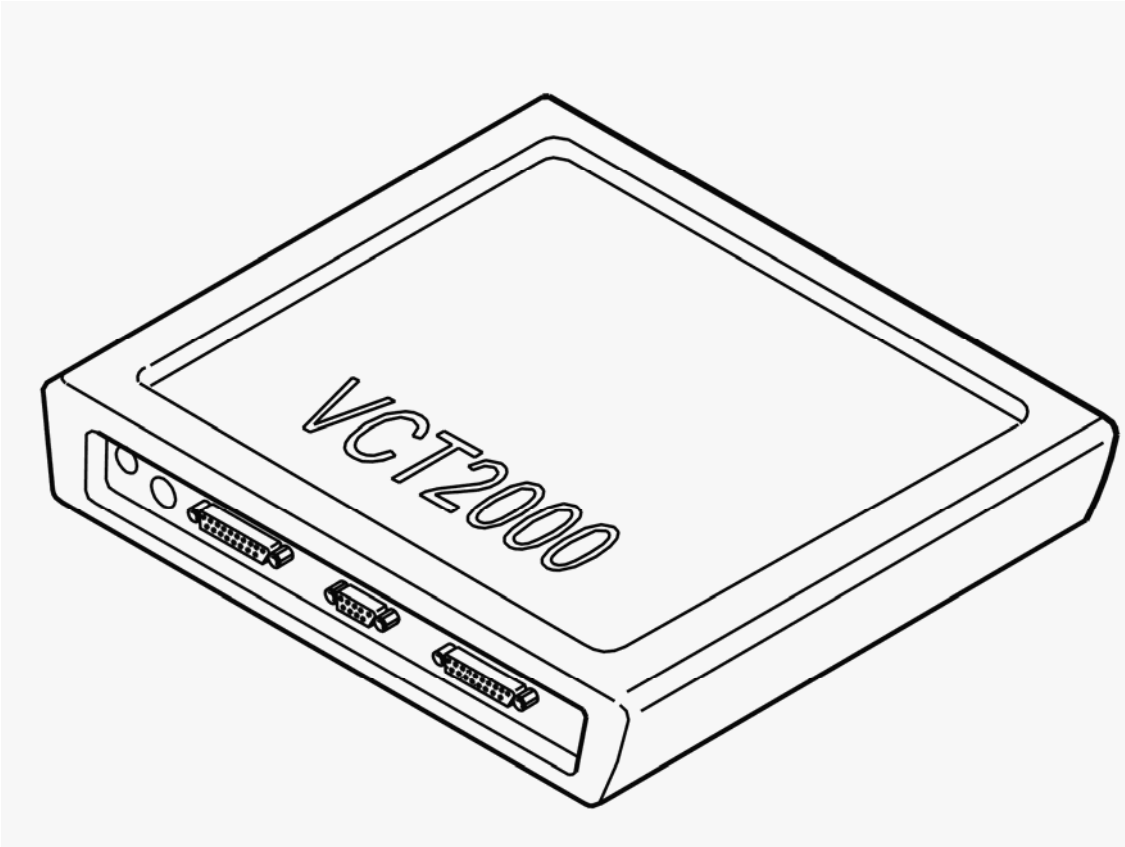


Fig. 9: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.

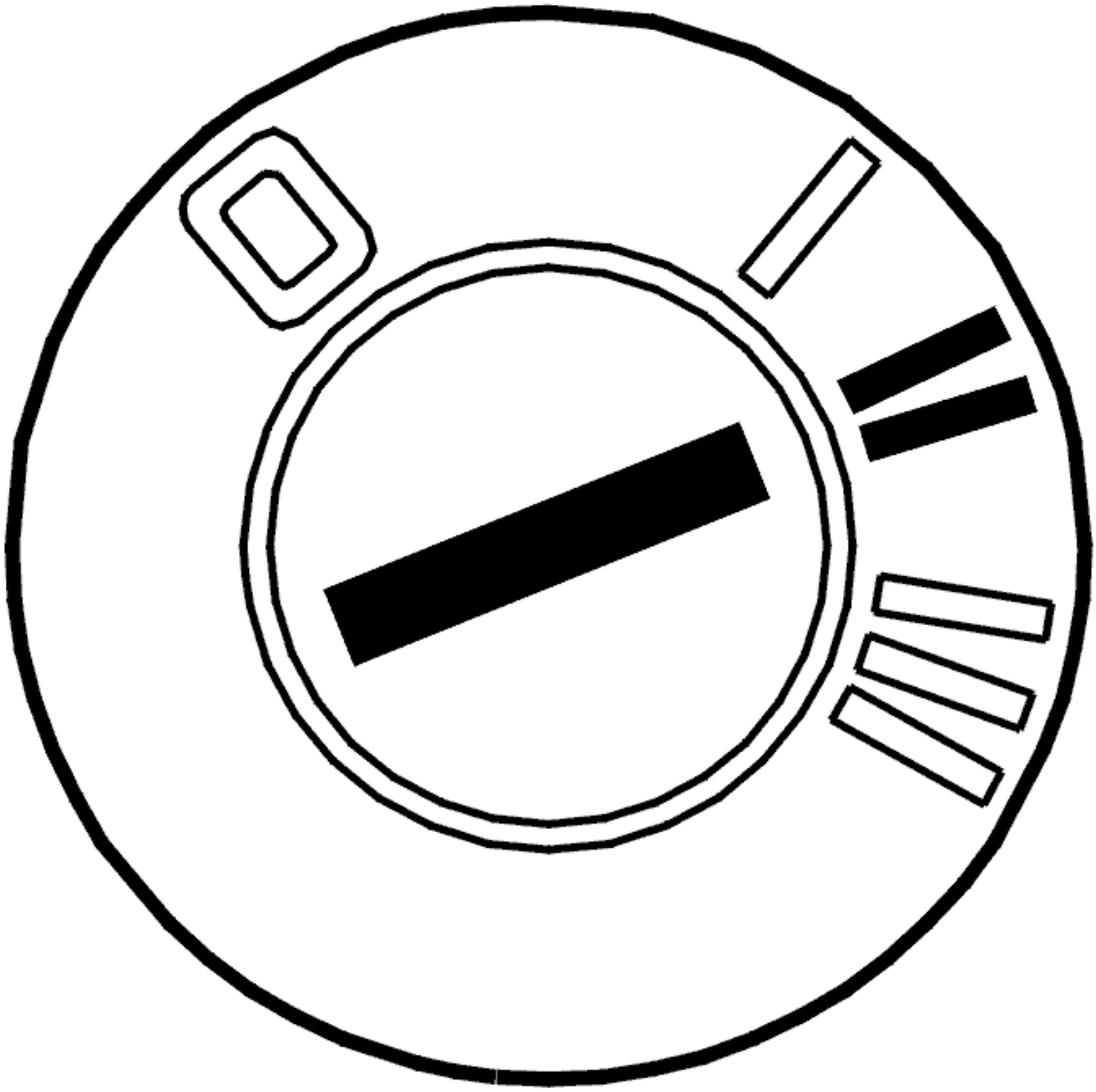


Fig. 10: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

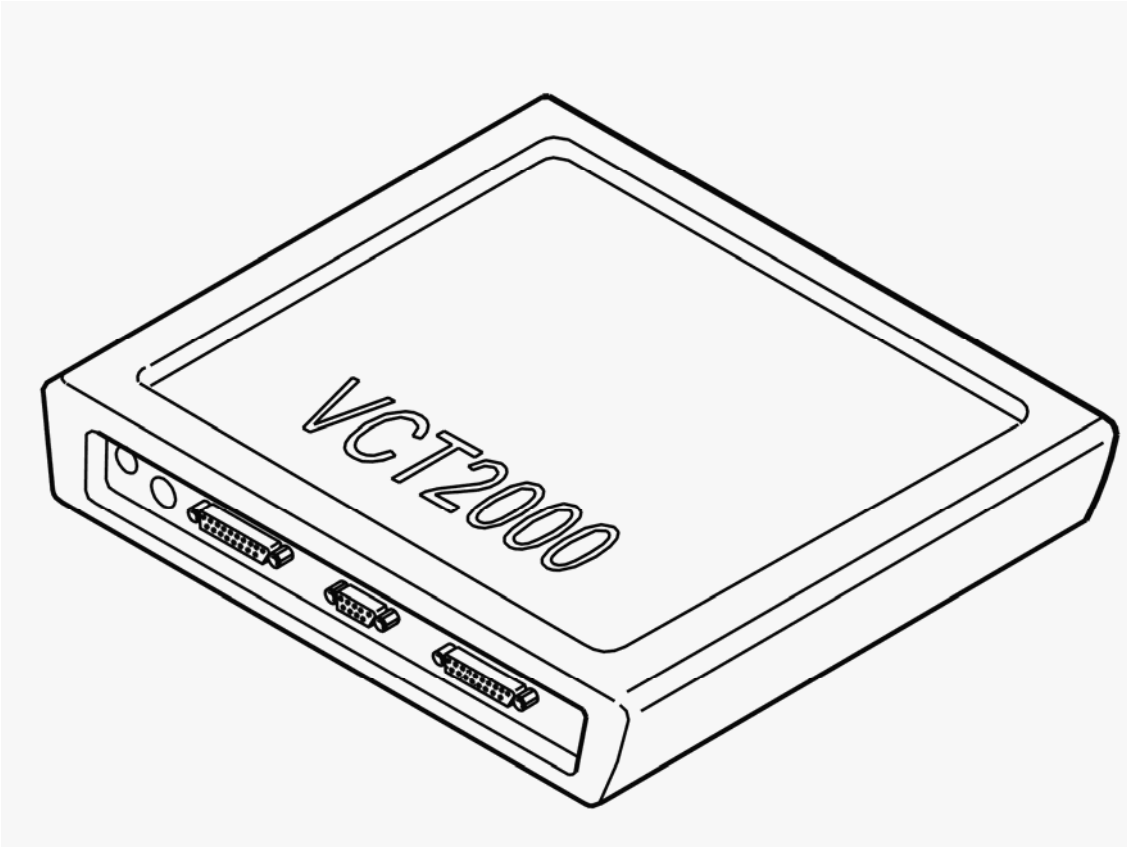


Fig. 11: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

VERIFICATION

VERIFICATION

- Drive the car until the transmission oil reaches normal operating temperature. When test driving the transmission should be at operating temperature, approximately 80-90°C.

  Start in gear position D and accelerate using even throttle application.

  Drive the car to the gearshift from 2nd up to 3rd. Be observant when the transmission shifts up. Check if the car judders, vibrates or shifts harshly during the gearshift. Repeat the shift between 2nd and 3rd gears several times.

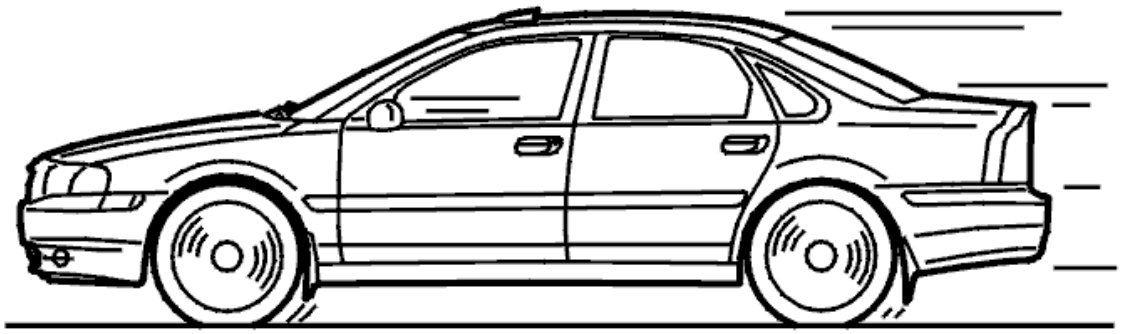


Fig. 12: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the transmission operating correctly?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

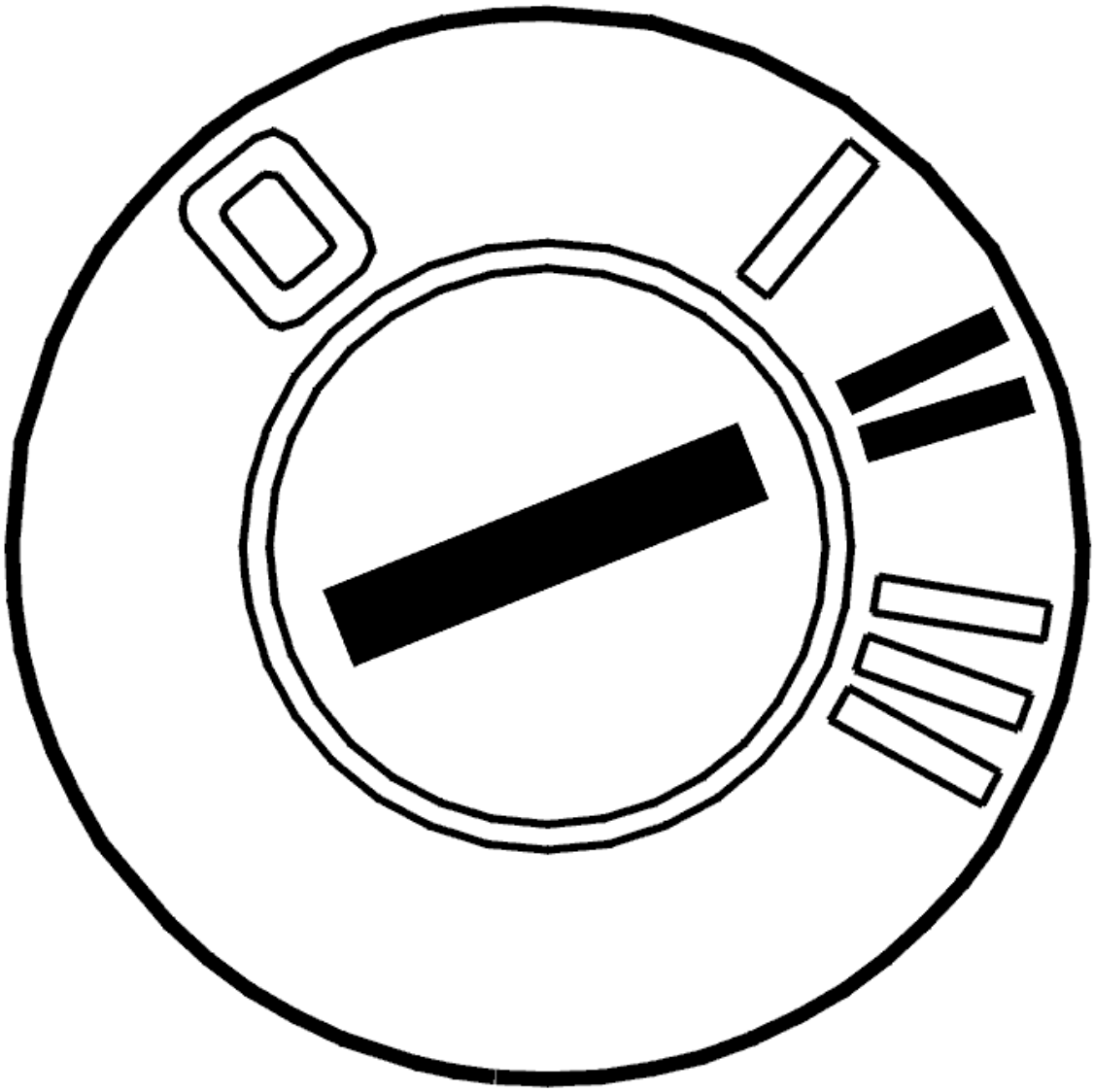


Fig. 13: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

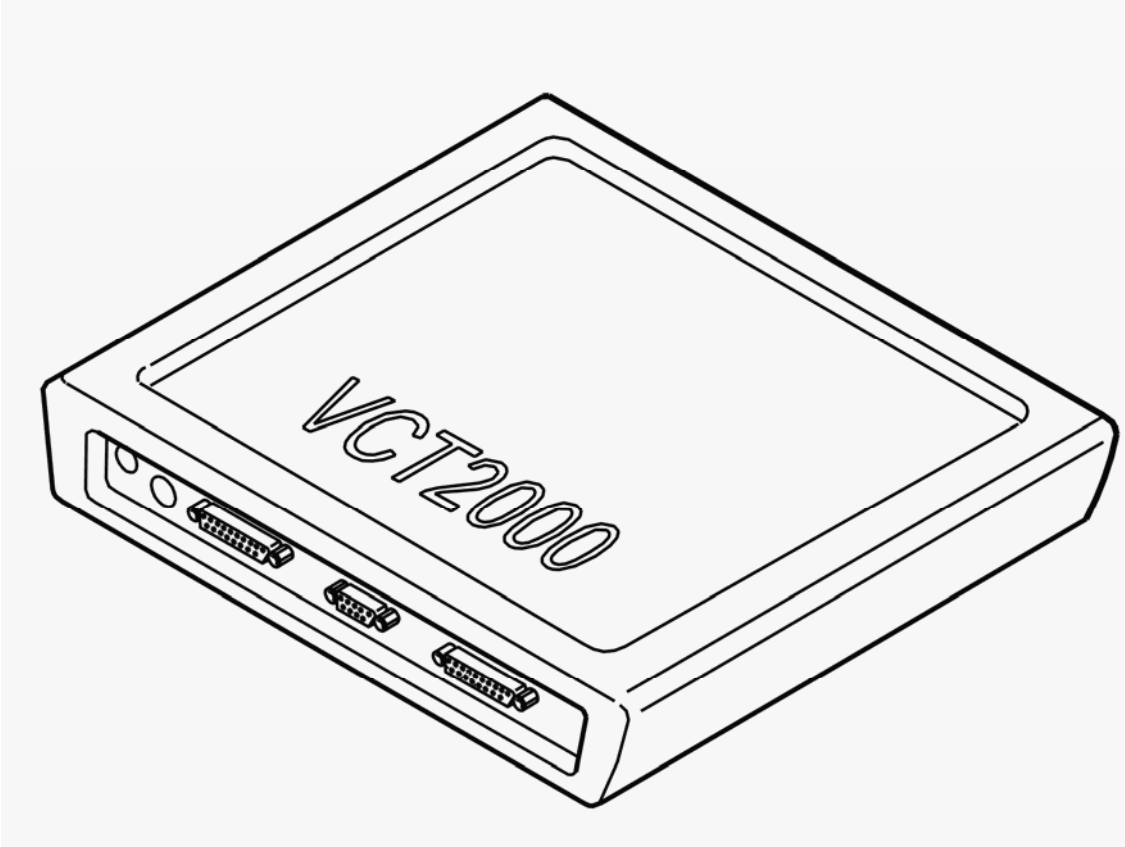


Fig. 14: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

FAULT-TRACING INFORMATION

Condition

- No diagnostic trouble codes (DTCs) stored.

Possible Source

- Defective line pressure solenoid STH
- Particles in the transmission fluid
- Incorrect oil level in the transmission
- Water in the transmission fluid
- Worn or damaged constant velocity joints

- Defective transmission.

Fault symptom[s]

- Vibration and jerking when shifting
- Harsh gear shifting.

CHECKING CARRIER PLATE (4T65 AWD; 2003-2006)

CHECKING CARRIER PLATE

Check that the carrier plate is securely installed and the bolts are fully tightened. Replace the carrier plate if it is damaged.

Check the transmission housing. Replace the transmission it the housing is damaged.

Other information

- To expose and replace the carrier plate, see **CARRIER PLATE, REPLACING**
- To remove the transmission, see **TRANSMISSION, REMOVING**
- To install the transmission, see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .

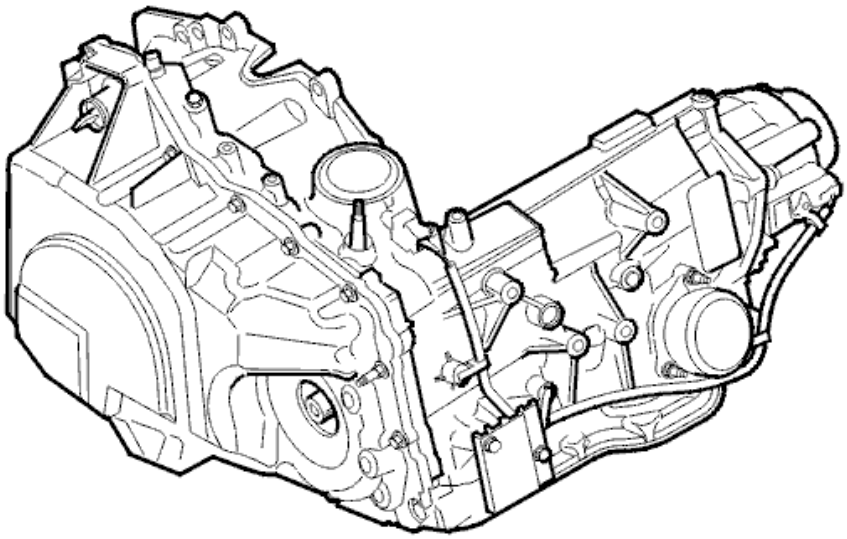


Fig. 15: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **RESETTING THE ADAPTATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is

drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

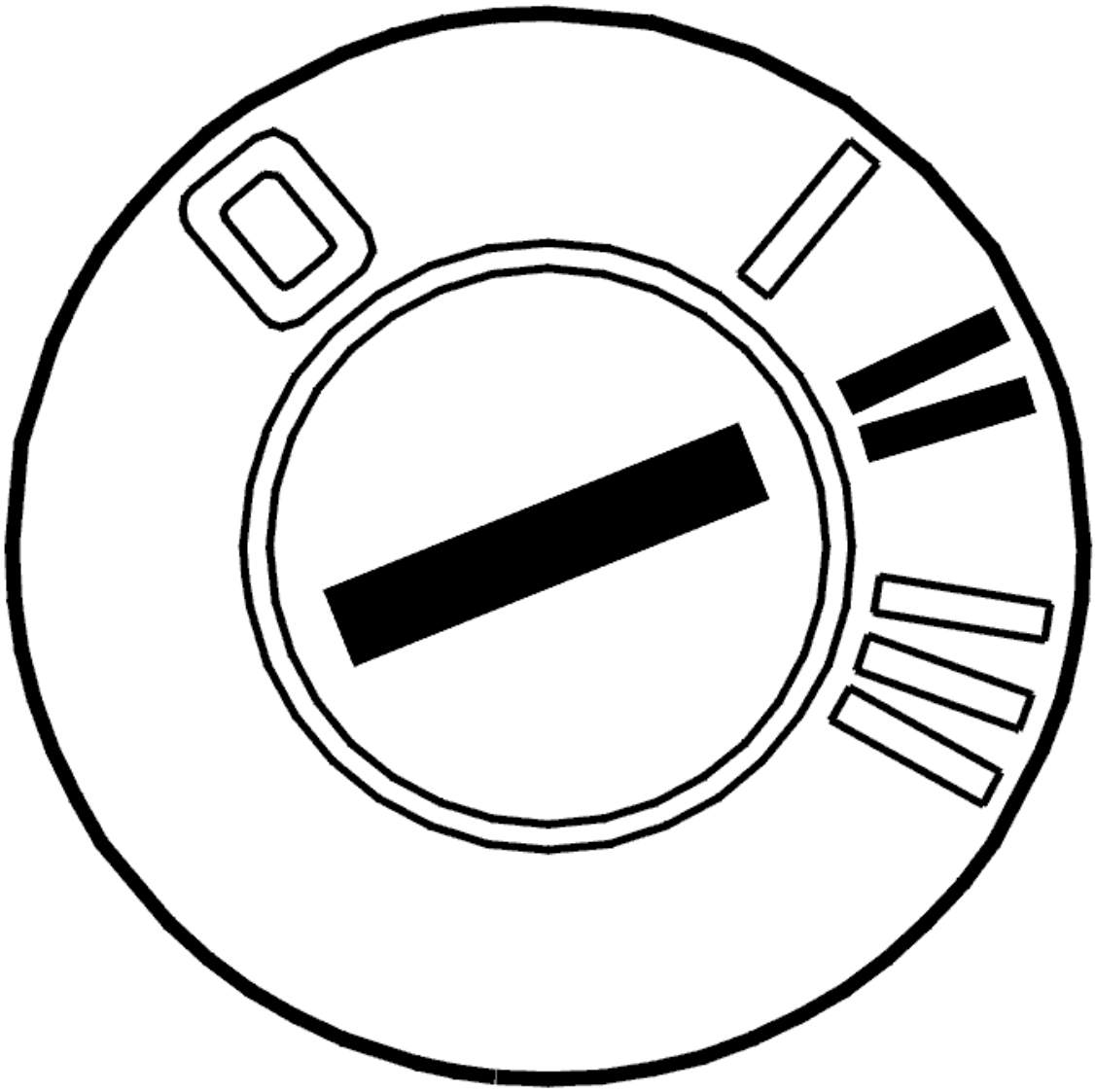


Fig. 16: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

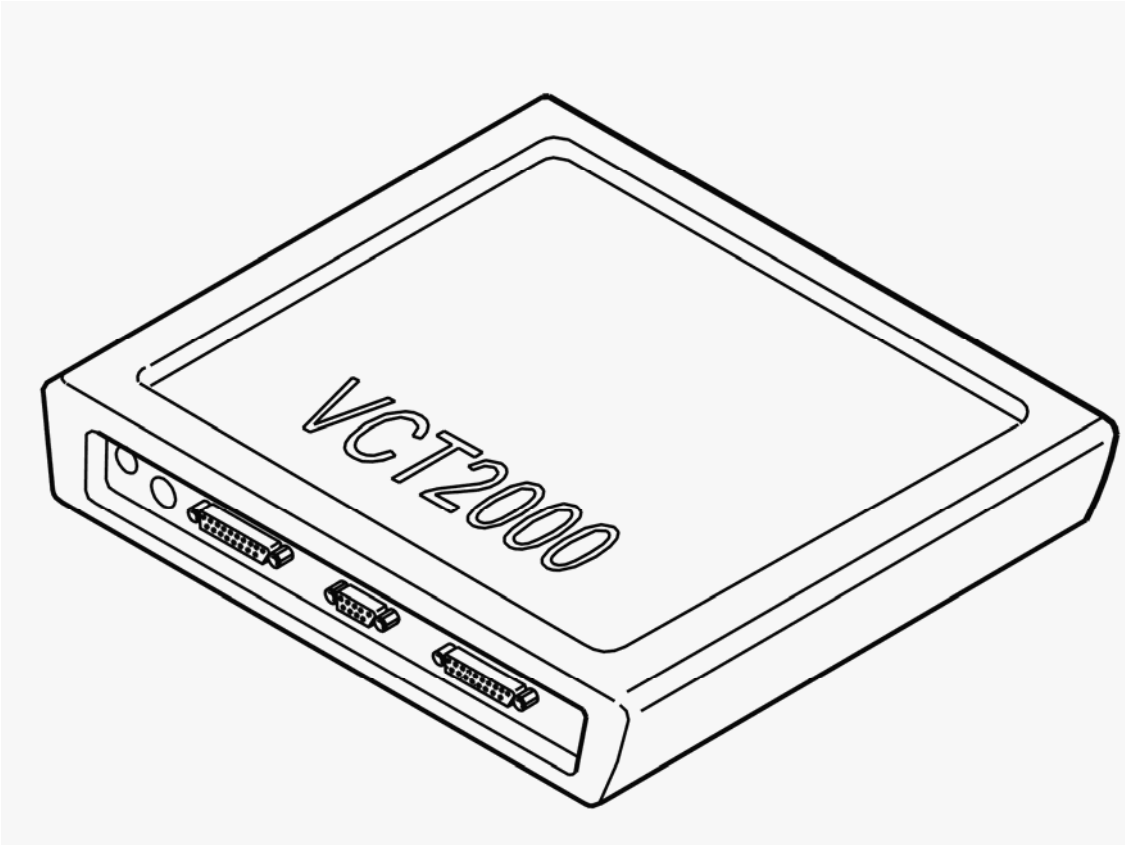


Fig. 17: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING FOR COOLANT IN OIL (B5254T2, AW50/51 AWD; 2003-2007)

CHECKING FOR COOLANT IN OIL

This fault may be due to coolant that has leaked into the transaxle.

Inspect according to: **CHECKING FOR COOLANT IN OIL**

If coolant is detected in the transaxle oil, the transaxle, radiator and hoses between the radiator and transaxle must be replaced.

Other information

- see **TRANSMISSION, REMOVING**
- see **TRANSMISSION, INSTALLING**

Was a fault detected?

- **YES**

Refer to **INFORMATION**

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

In case of this defect, troubleshooting is not followed by verification.

The information can be displayed again or the fault-tracing for this fault can be interrupted.

CHECKING FOR COOLANT IN OIL (B5254T2, AW55-50/51SN; 2004-2007)

CHECKING FOR COOLANT IN OIL

This fault may be due to coolant that has leaked into the transaxle.

Inspect according to: **CHECKING FOR COOLANT IN OIL**

If coolant is detected in the transaxle oil, the transaxle, radiator and hoses between the radiator and transaxle must be replaced.

Other information

- see **TRANSMISSION, REMOVING**
- see **TRANSMISSION, INSTALLING**

Was a fault detected?

- **YES**

  Refer to **INFORMATION**

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

In case of this defect, troubleshooting is not followed by verification.

The information can be displayed again or the fault-tracing for this fault can be interrupted.

CHECKING FOR COOLANT IN OIL (B6294T, 4T65 AWD; 2003-2006)

CHECKING FOR COOLANT IN OIL

This fault may be due to coolant that has leaked into the transaxle.

Inspect according to: **CHECKING FOR COOLANT IN OIL**

If coolant is detected in the transaxle oil, the transaxle, radiator and hoses between the radiator and transaxle must be replaced.

Other information

- see **TRANSMISSION, REMOVING**
- see **TRANSMISSION, INSTALLING (2005, 2006)**

Was a fault detected?

- **YES**

  Refer to **INFORMATION**

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

In case of this defect, troubleshooting is not followed by verification.

The information can be displayed again or the fault-tracing for this fault can be interrupted.

CHECKING OIL LEVEL (4T65 AWD; 2003-2006)

CHECKING OIL LEVEL IN TRANSMISSION

CHECKING OIL LEVEL IN TRANSMISSION

CHECK TRANSMISSION OIL LEVEL

NOTE: The transmission fluid level is extremely important for transmission function. Therefore it is imperative that it is correct. In addition the oil level is dependent on oil temperature.

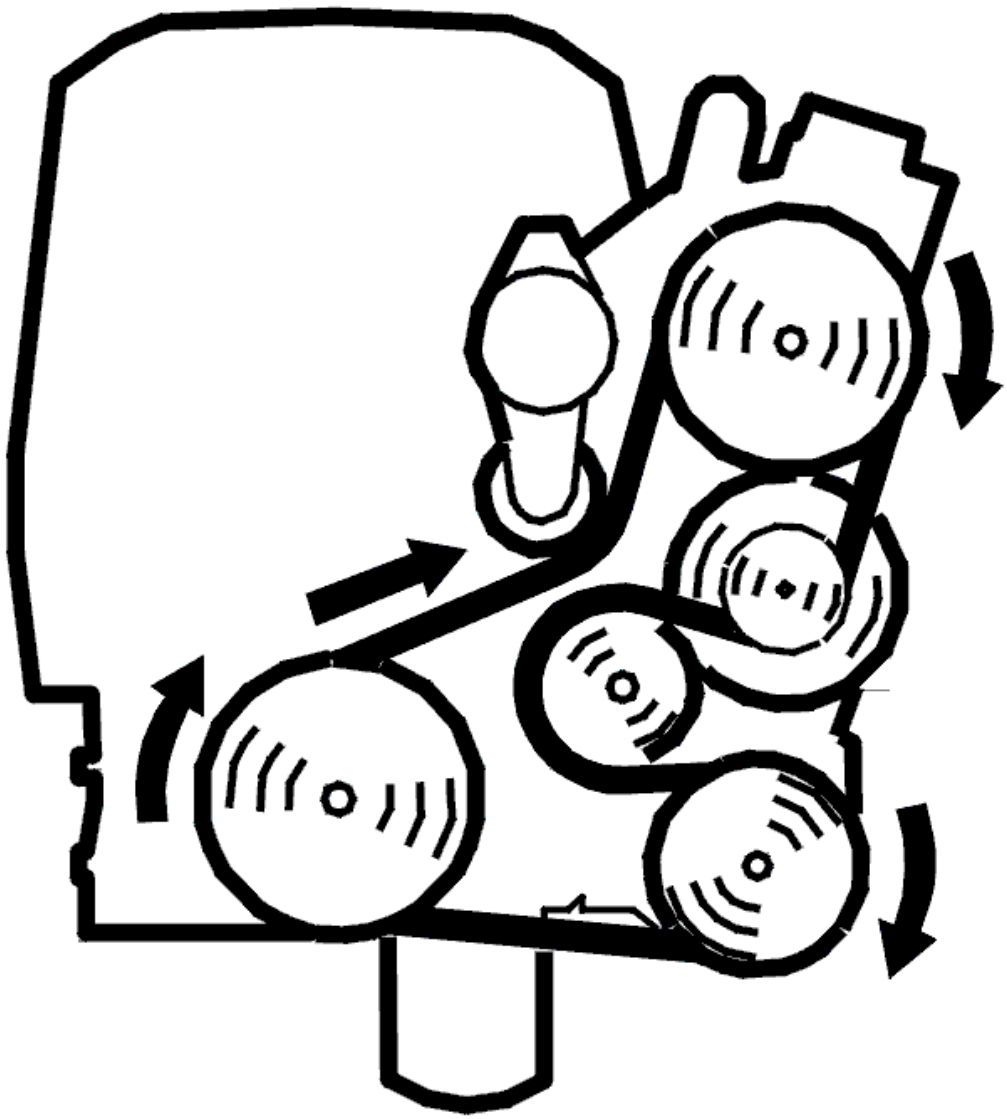


Fig. 18: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the car
- Read off the oil temperature.

When checking the gearbox oil level the oil temperature **must** be **80 °C - 90 °C** .

At the correct temperature, the oil level should be between "Min hot" and "Max hot".

Oil level

Too high: Drain the transmission fluid to the correct level
Too low: Check the transmission for leakage.

Remedy as necessary.

Other information:

- To check and adjust the oil level, see **OIL LEVEL, CHECKING** .

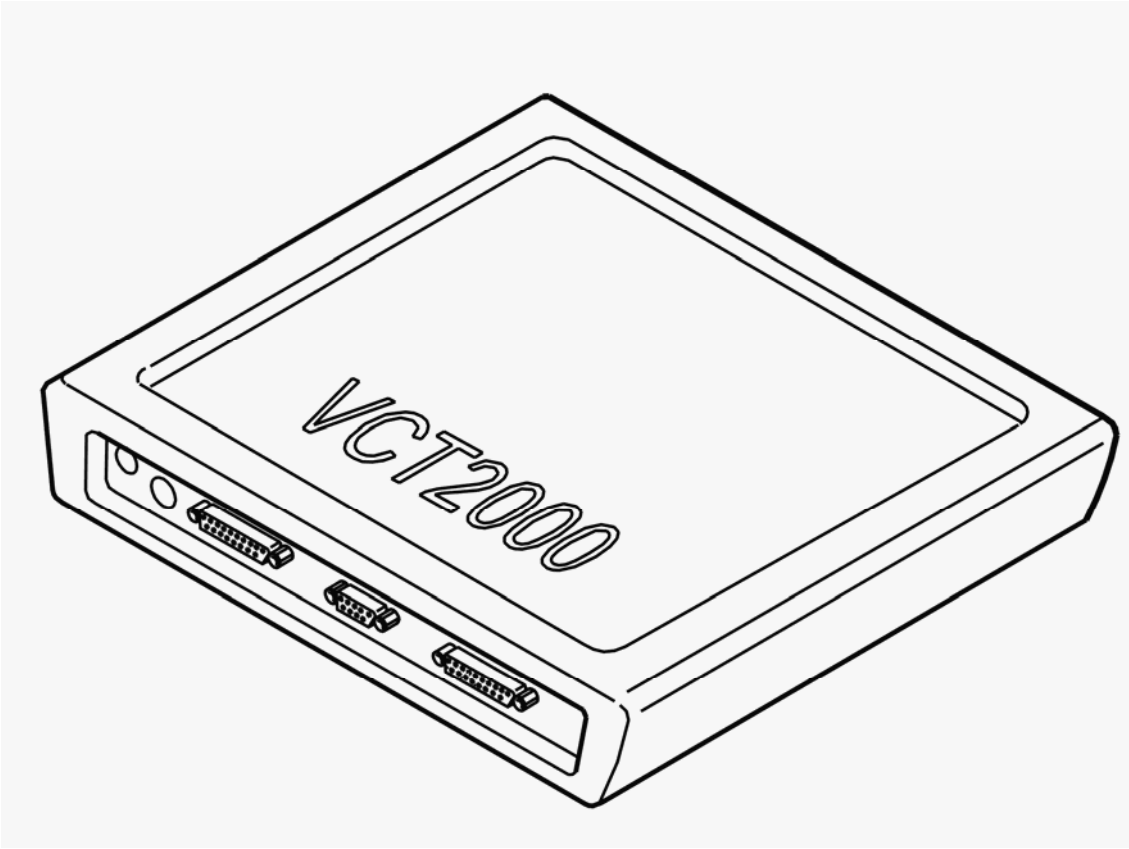


Fig. 19: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

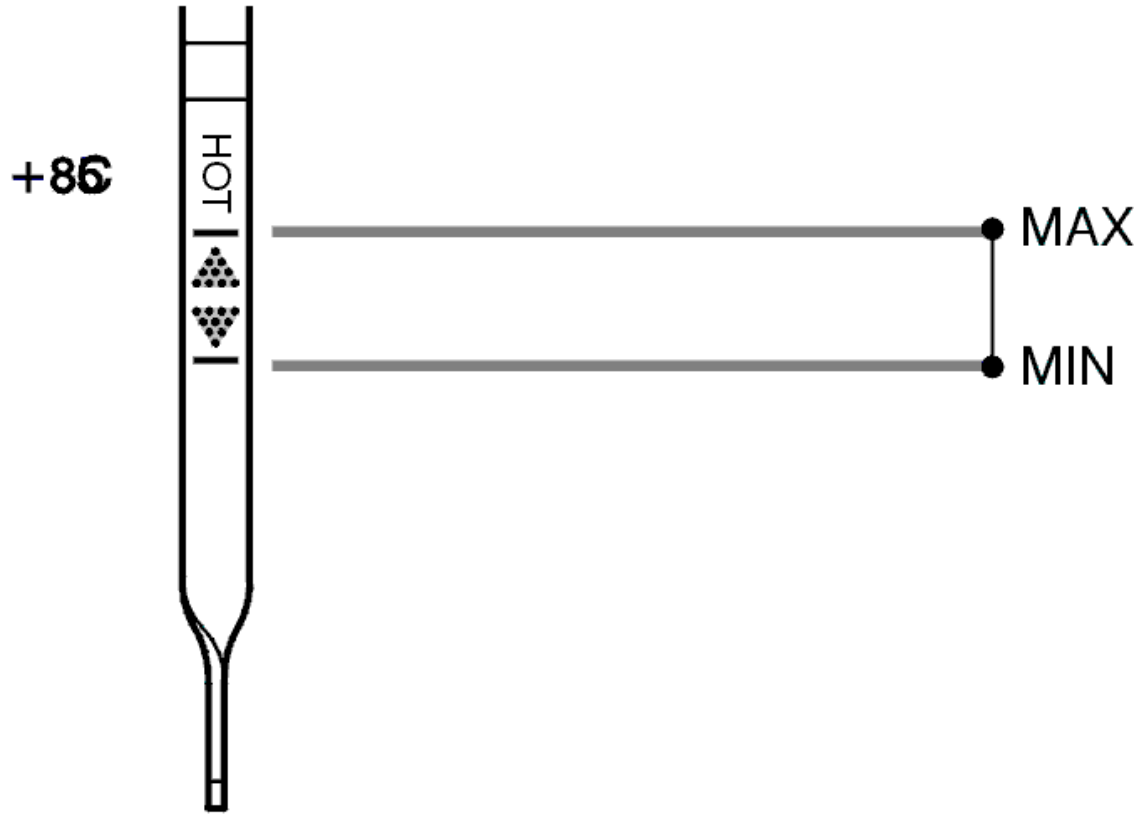


Fig. 20: Identifying Oil Level / Temperature
Courtesy of VOLVO CARS CORPORATION

Was the transmission fluid level correct?

- **YES**

  OK

- **NO**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is

changed when repairs are carried out to the transmission temperature sensor.

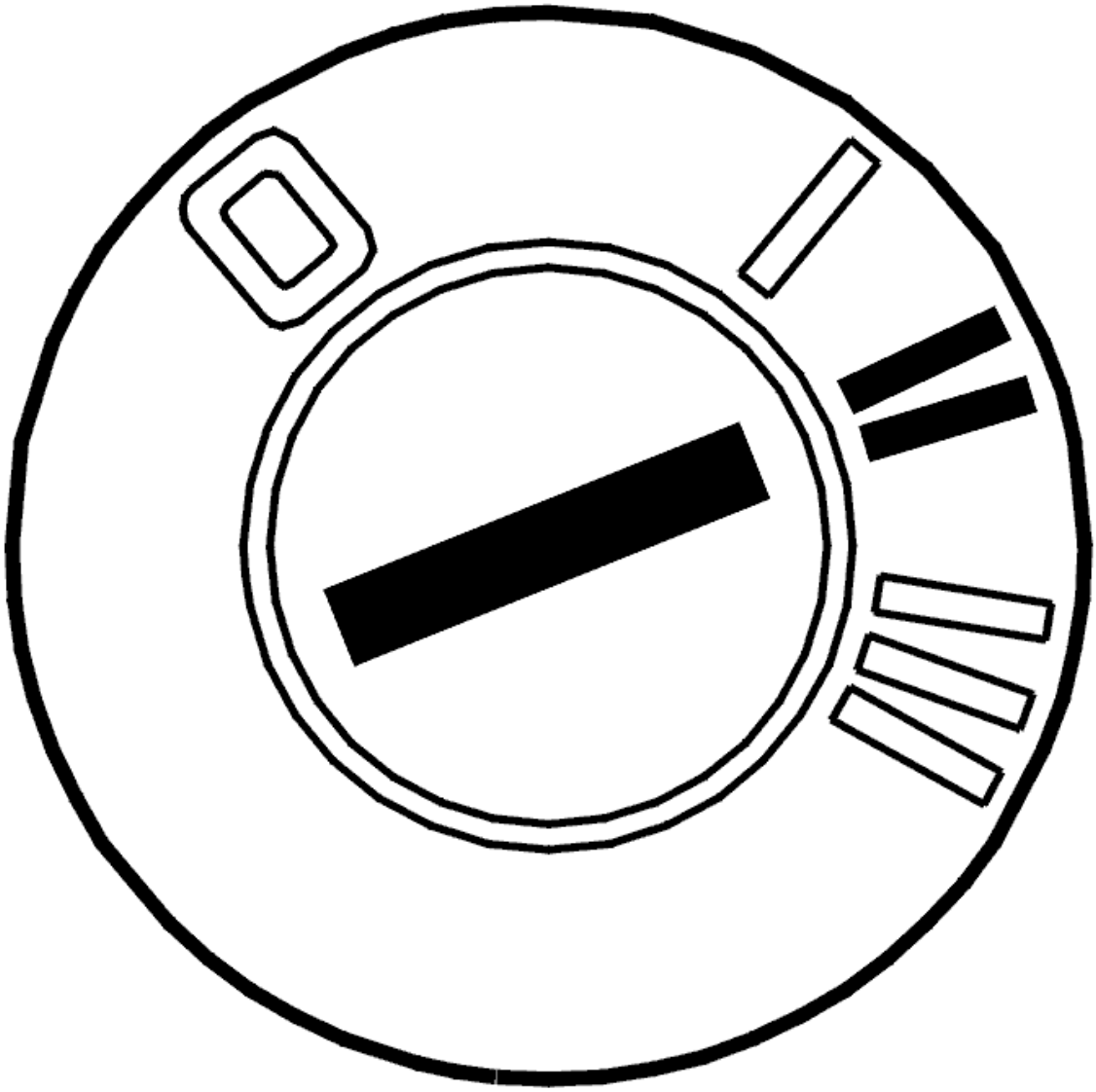


Fig. 21: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

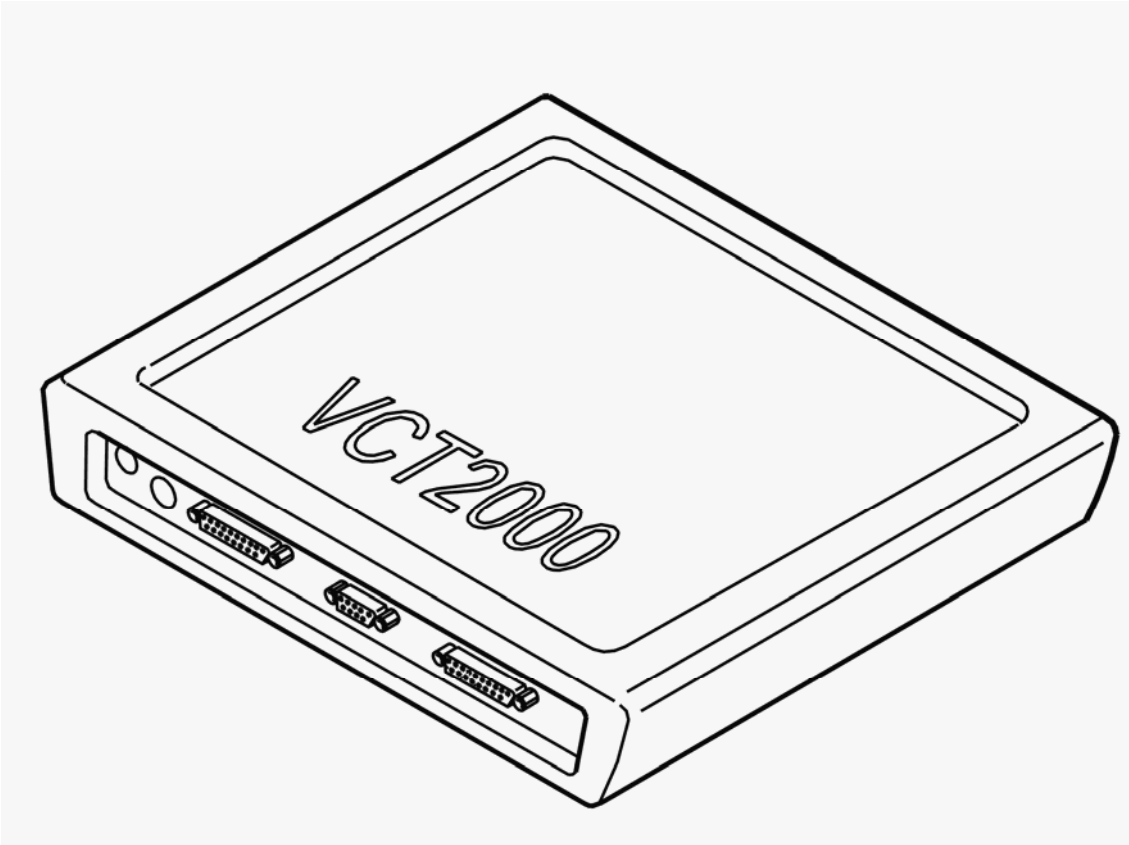


Fig. 22: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING OIL PUMP SEALING RING (4T65 AWD; 2003-2006)

CHECKING SEALING RING, OIL PUMP

CHECKING SEALING RING, OIL PUMP

- If there is a suspicion that the oil pump sealing ring is damaged, replace the transmission. See **TRANSMISSION, REMOVING** and **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .

Was the transmission replaced?

- **YES**

  Refer to **RESETTING THE ADAPTATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

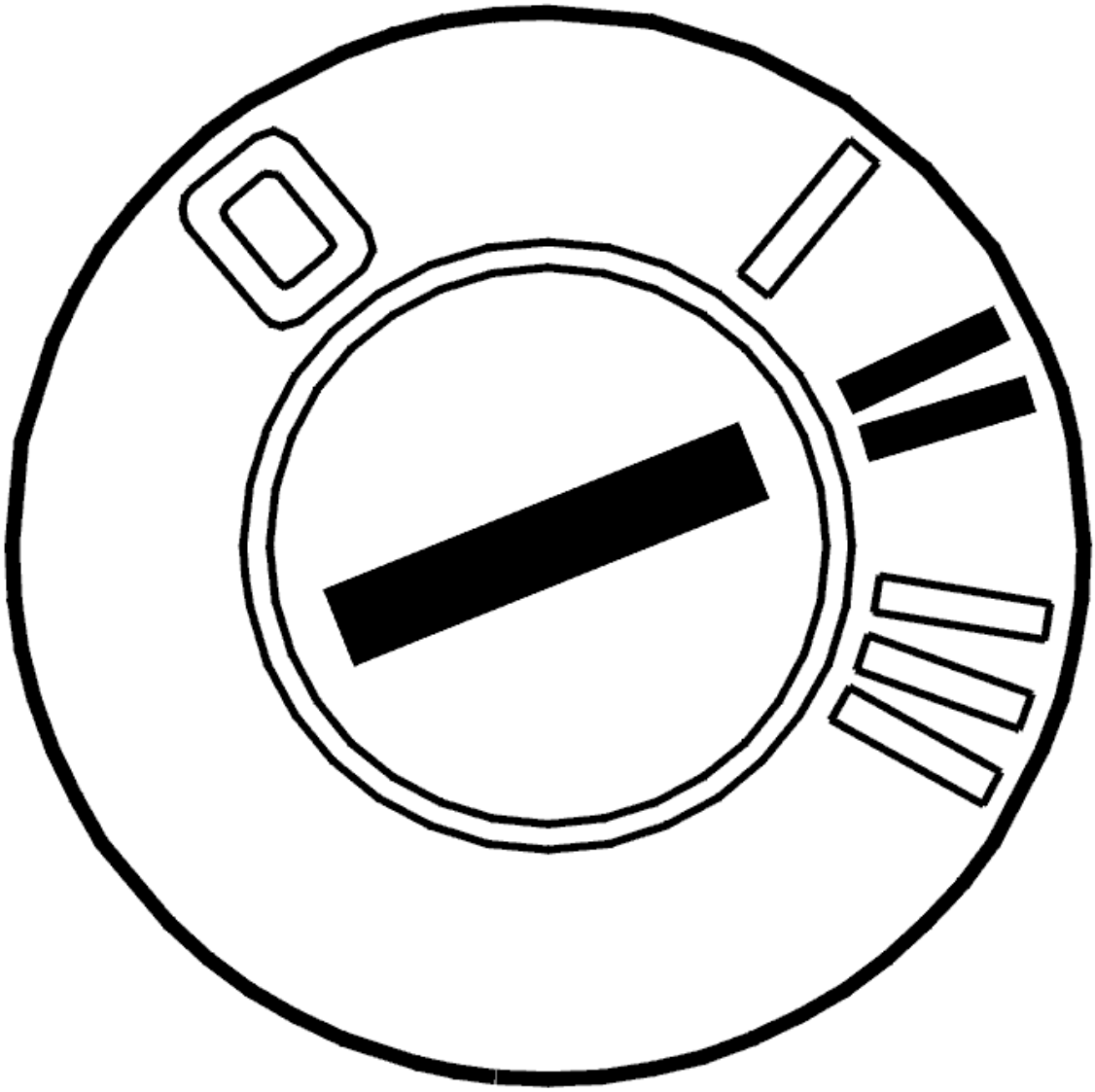


Fig. 23: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

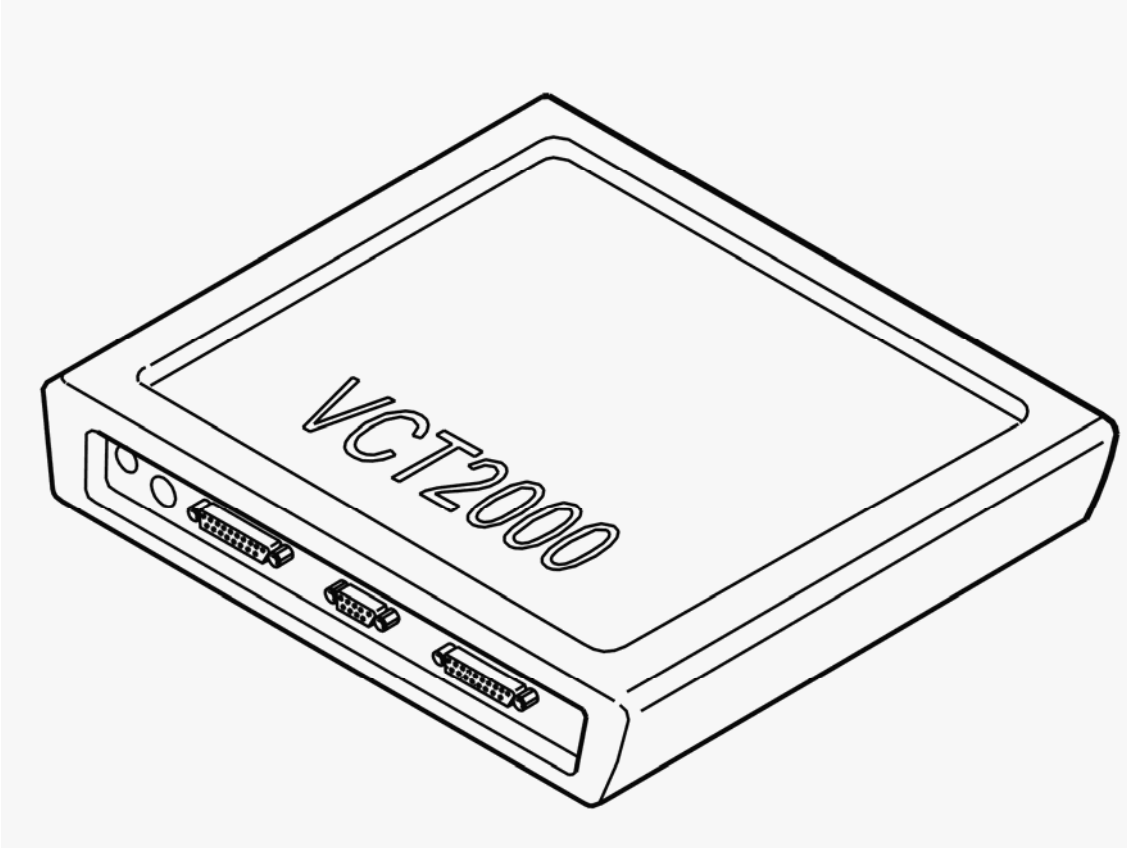


Fig. 24: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING OIL QUALITY (4T65 AWD; 2003-2006)

CHECK TRANSMISSION OIL QUALITY

CHECK QUALITY OF TRANSMISSION OIL

CHECK QUALITY OF TRANSMISSION OIL

NOTE: The transmission fluid quality is extremely important for transmission function. Therefore it is imperative that this is correct.

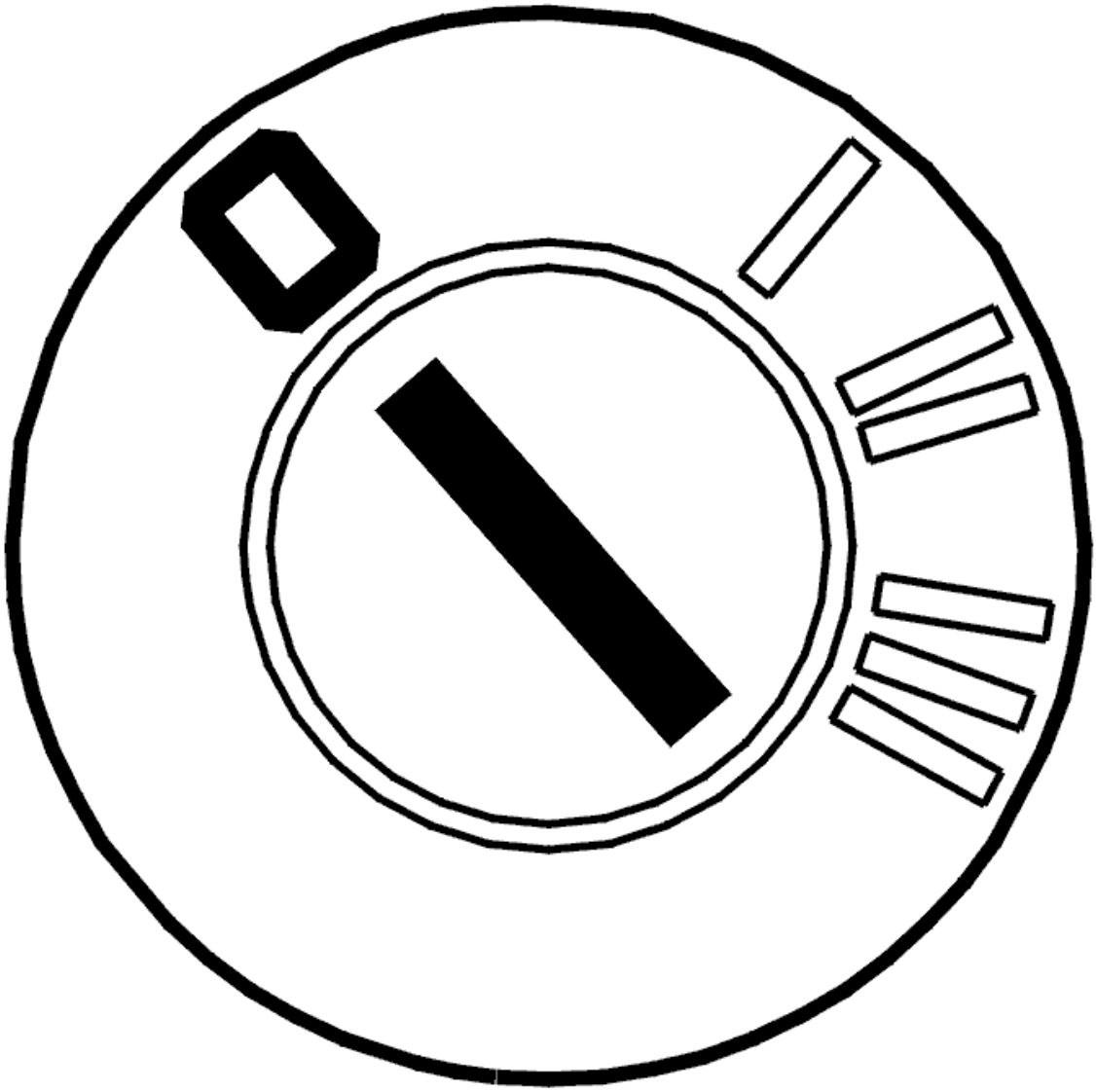


Fig. 25: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the transmission oil quality. Take a sample using the dip stick.

  - Replace the transmission fluid if it smells burnt
  - Replace the fluid and filter if the transmission fluid contains particles
  - Check if there is oil or an oil film in the expansion tank. Oil in the expansion tank indicates leakage from the transmission oil cooler which is positioned in the cooler unit.

  NOTE: The transmission oil is red and must not be confused with black engine oil.

- If the transmission fluid is cloudy or pink, it is contaminated with coolant. In such cases the transmission must be replaced. For checking coolant in transmission oil, see **CHECKING FOR COOLANT IN OIL**

  When replacing the transmission, the cooler unit, including the additional cooler must be replaced if installed. Replace the hoses between the cooler and the transmission.

Other information:

- To replace the transmission fluid and filter, see **TRANSMISSION OIL / OIL FILTER, REPLACING** .

Select an option:

1. The fluid contains water

   Refer to **REPLACING THE TRANSMISSION**

2. The fluid smells burnt or contains particles

   Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

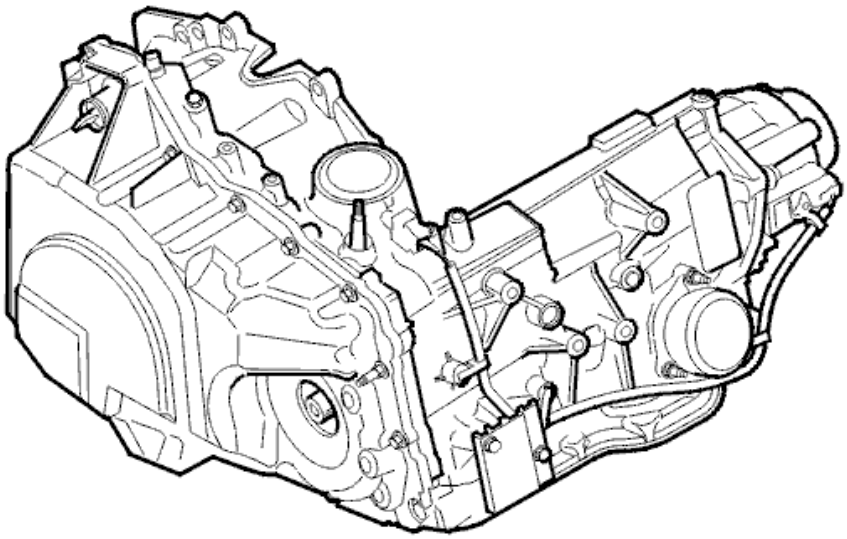
3. No fault detected.

   NO FAULT

REPLACING THE TRANSMISSION

REPLACING THE TRANSMISSION

Replace the transmission. See **TRANSMISSION, REMOVING** and **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .



P2X 43017210 ©VOLVO

Fig. 26: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.

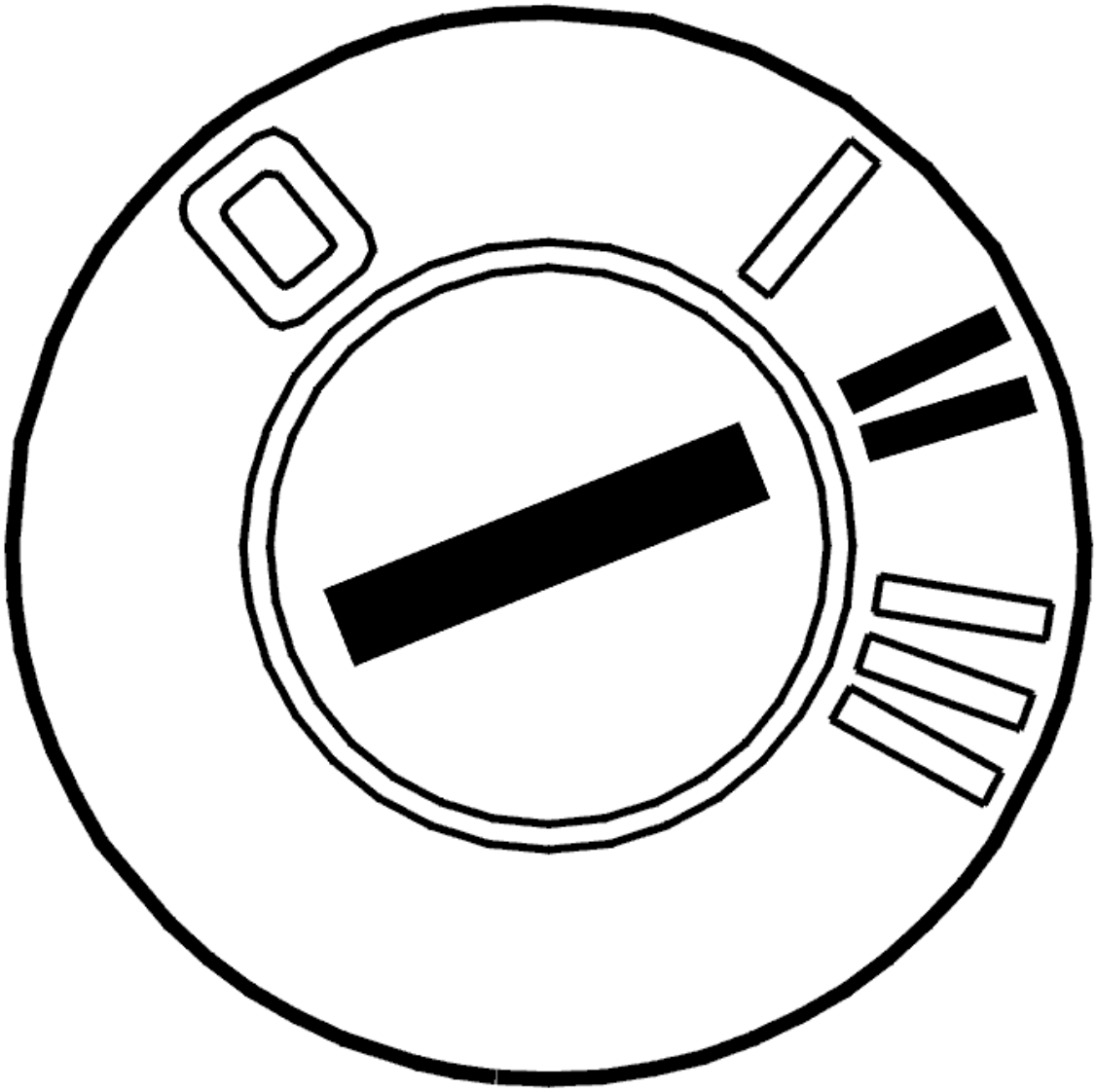


Fig. 27: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

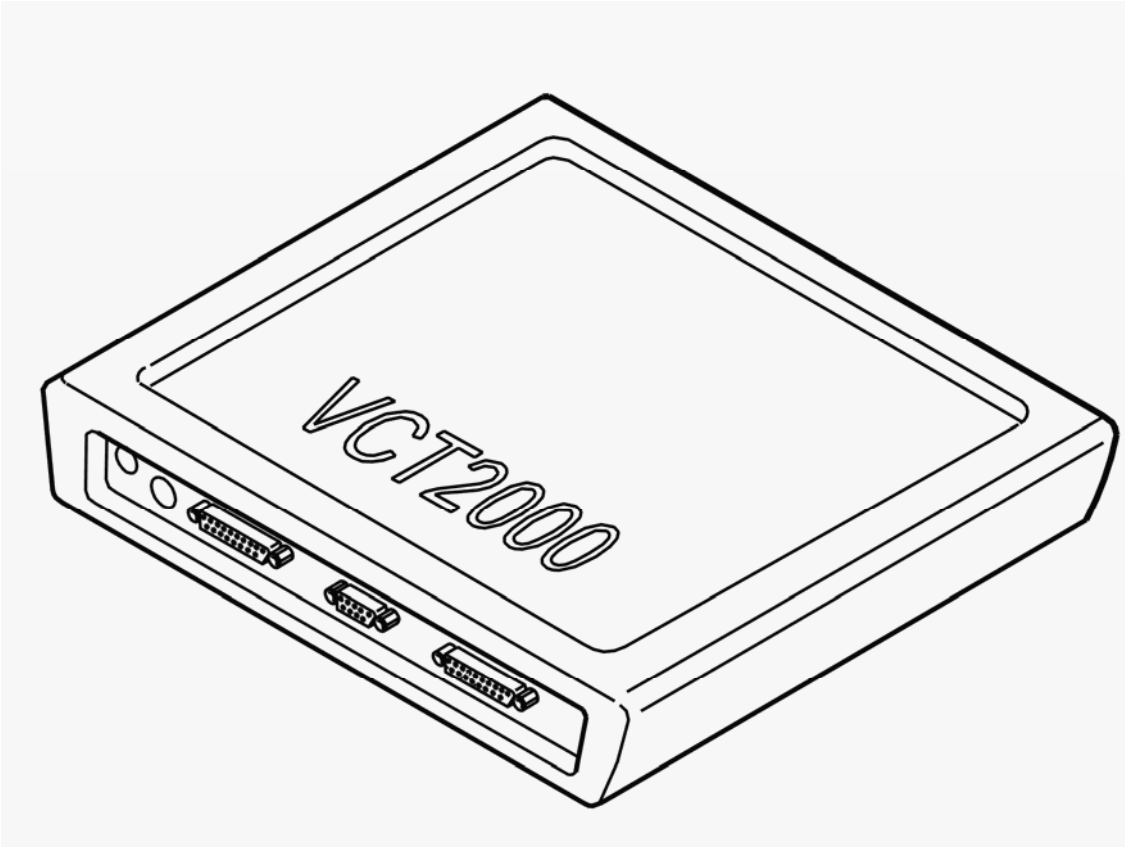


Fig. 28: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

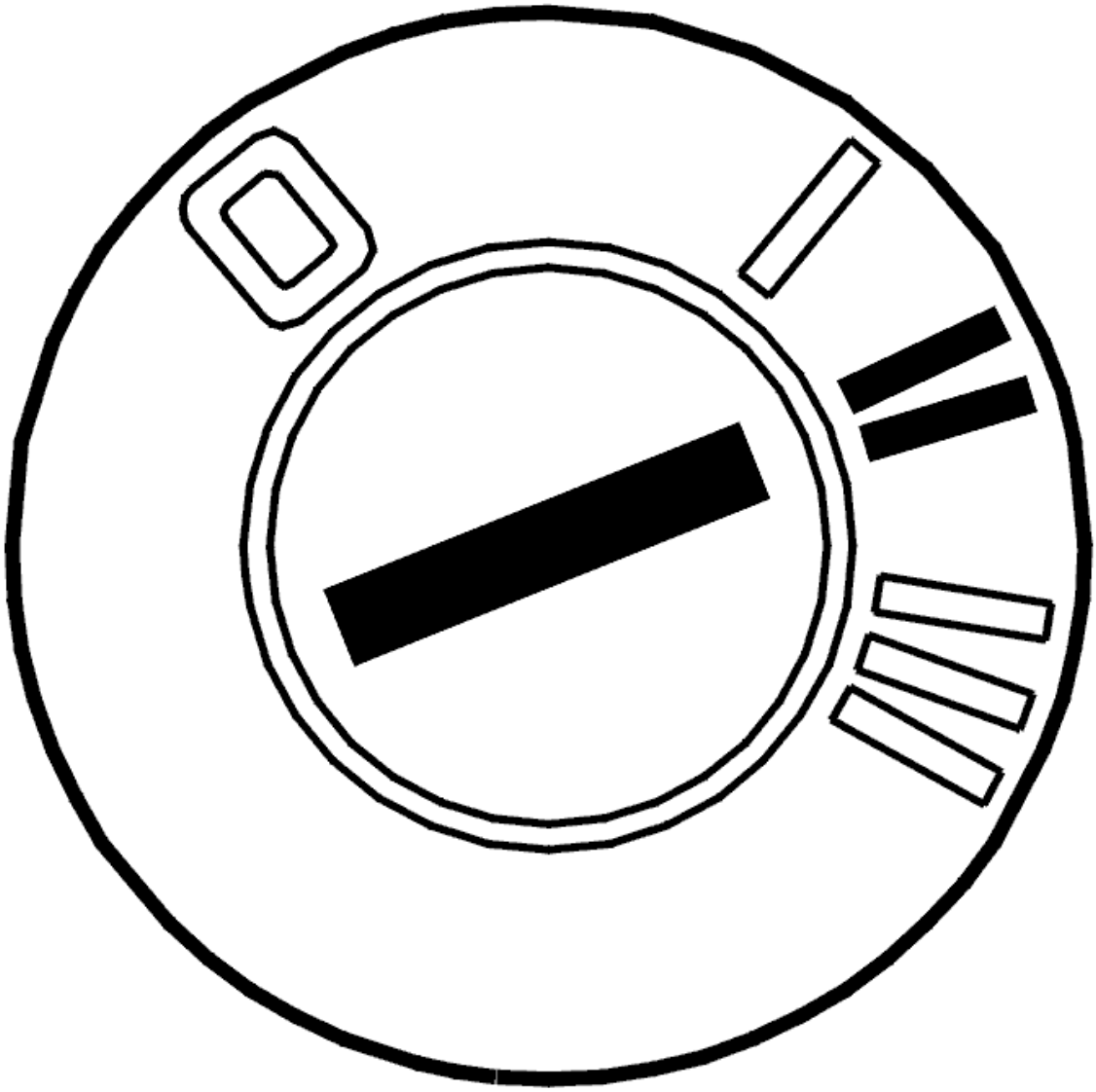


Fig. 29: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

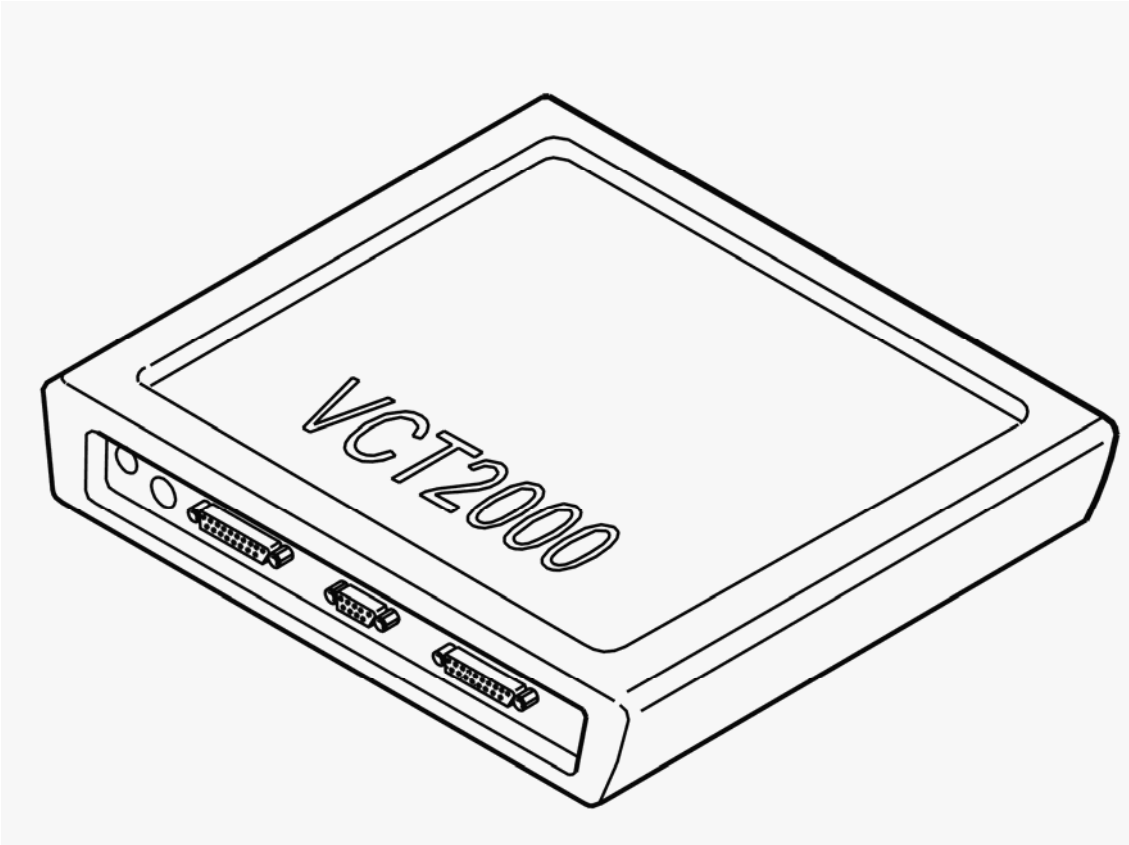


Fig. 30: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

FAULT-TRACING INFORMATION

Condition

Diagnostic trouble codes (DTCs) missing.

The fault is permanent.

Possible Source

- The oil is burnt or discolored
- Water in the oil
- Particles in the oil.
- Glycol in the transmission fluid.

Fault symptom[s]

- Harsh gear shifting
- Irregular shifting

- No shifting
- No lock-up function.

CHECKING PARK/NEUTRAL POSITION (PNP) SWITCH (4T65 AWD; 2003-2006)

CHECKING PARK / NEUTRAL POSITION (PNP) SWITCH

READING OFF DIAGNOSTIC TROUBLE CODES (DTCS)

HINT: If the starter motor does not run, the fault may be due to an internal fault in the gear-shift position sensor. In certain cases the transmission control module (TCM) has been unable to store diagnostic trouble codes (DTCs) because not all the conditions have been met.

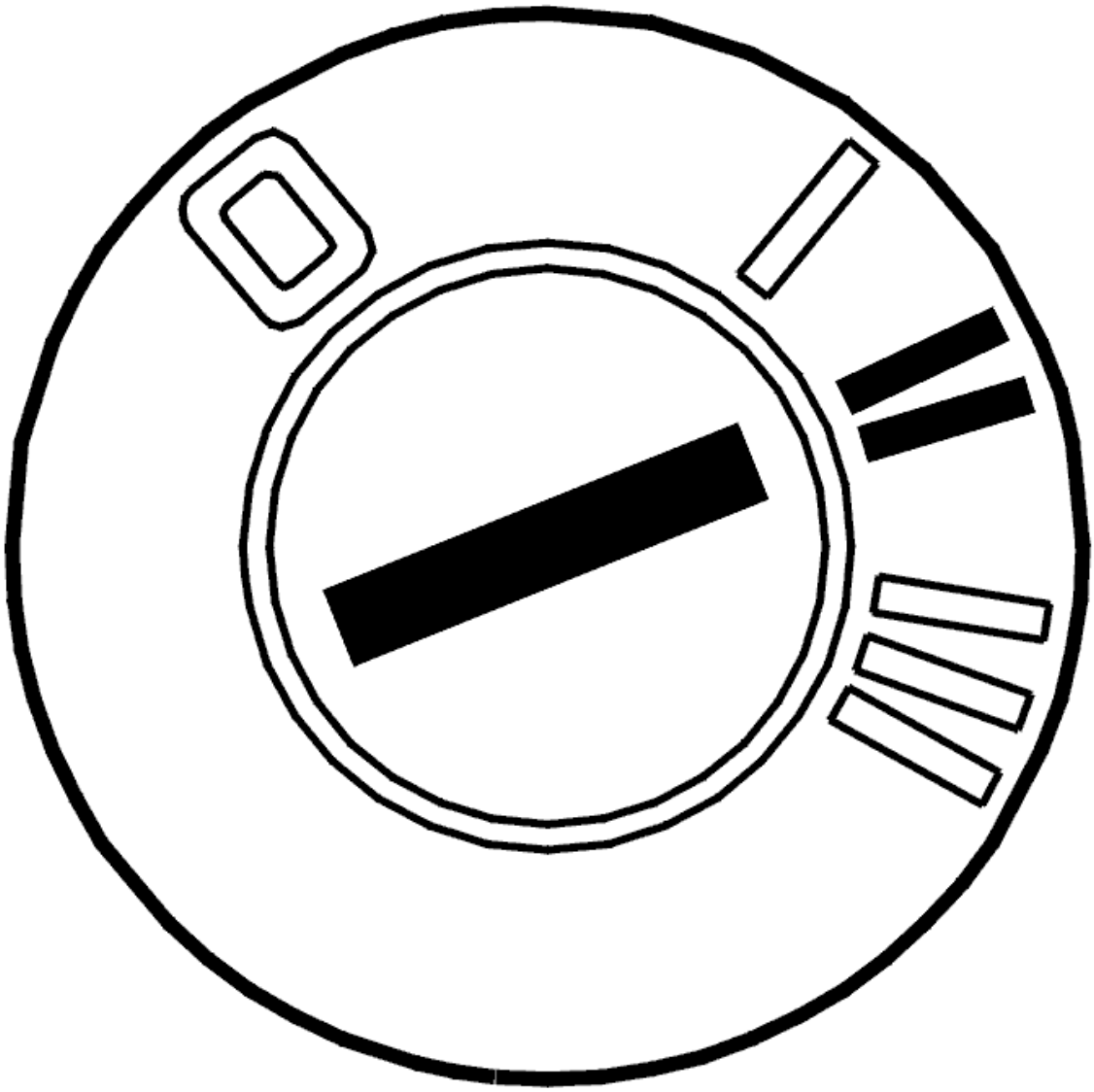


Fig. 31: Identifying Ignition ON

Courtesy of VOLVO CARS CORPORATION

- Ignition on or ignition switch position III for at least five seconds
- Read off diagnostic trouble codes (DTCs).

  Fault trace any stored diagnostic trouble codes (DTCs) before beginning this fault-tracing. Use the VIDA symptom input and select the same symptom as for this fault-tracing.

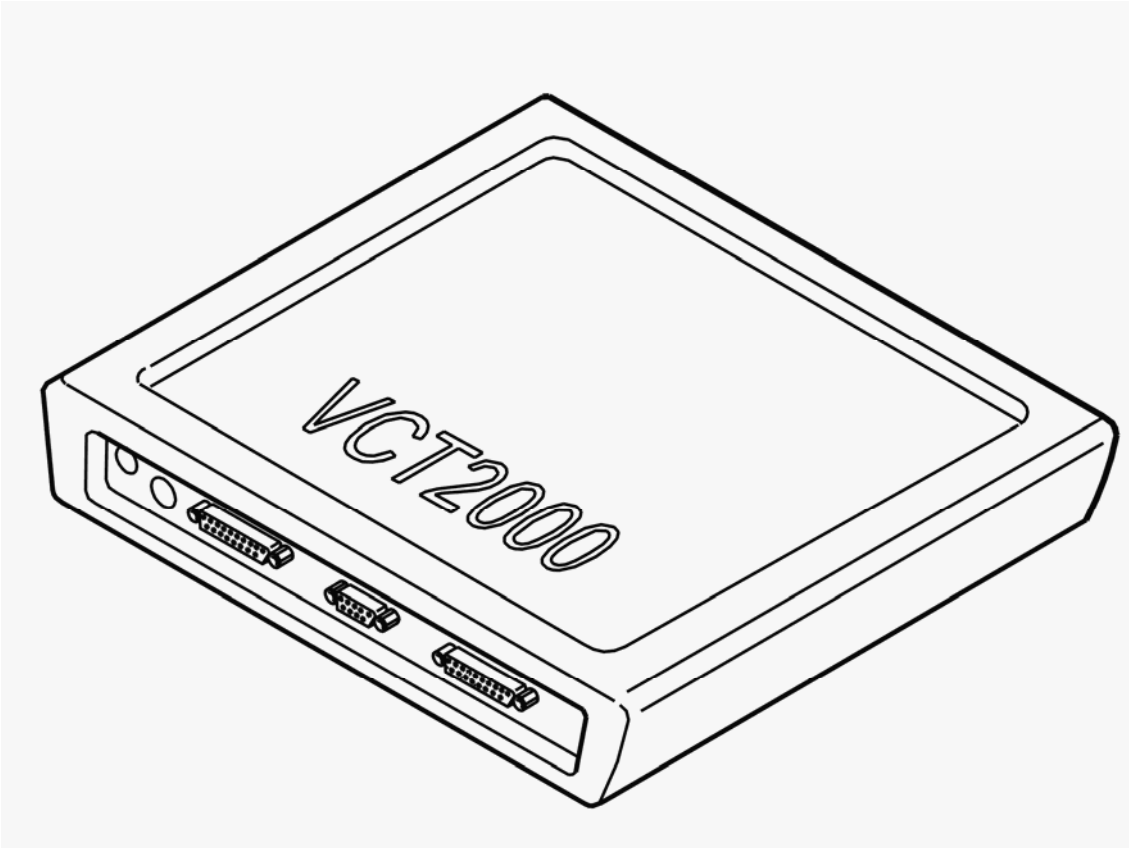


Fig. 32: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Were diagnostic trouble codes (DTCs) stored in the transmission control module (TCM)?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING PARK / NEUTRAL POSITION (PNP) SWITCH**

CHECKING PARK / NEUTRAL POSITION (PNP) SWITCH

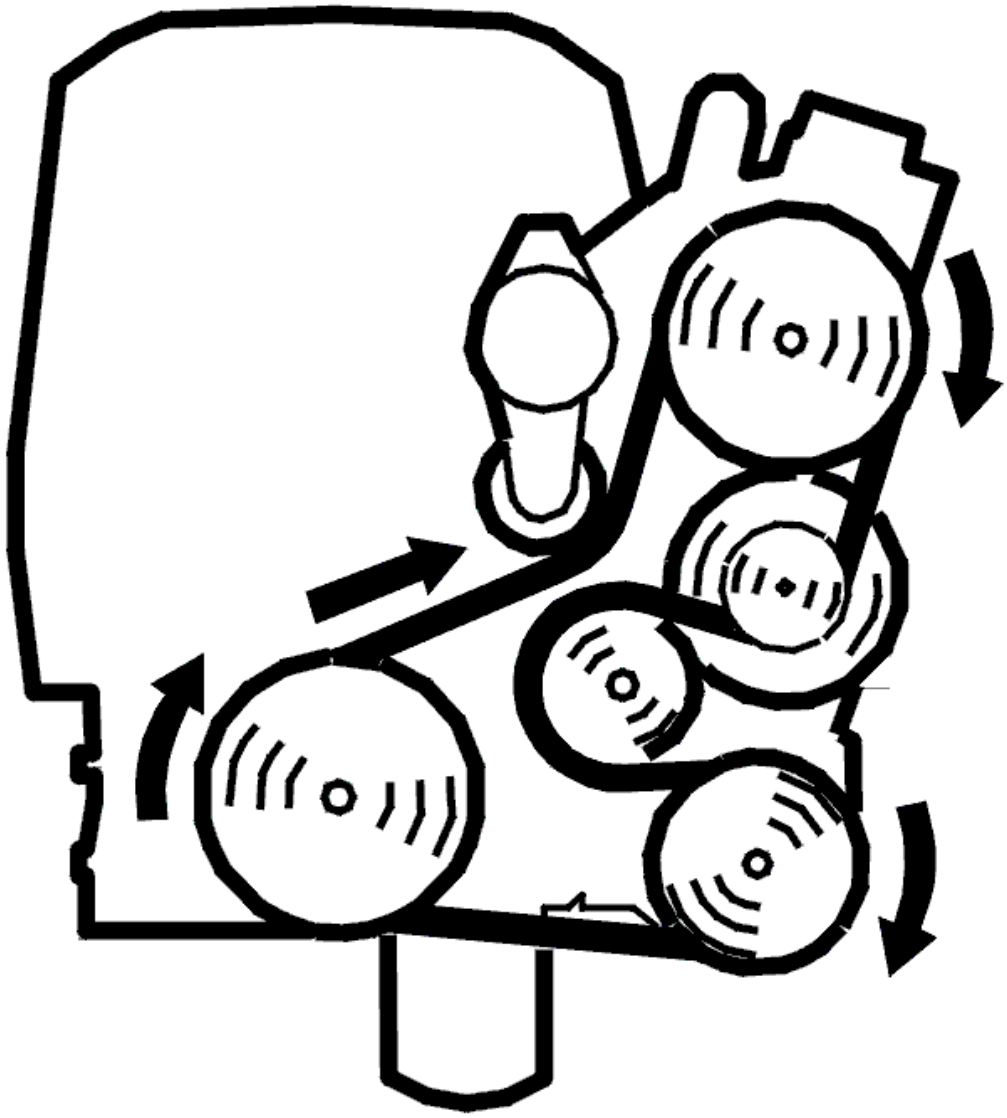


Fig. 33: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Move the gear selector to position D
- Try to start the car. It should not be possible to start the car
- Ignition off
- Move the gear selector to position P or N.

  Try to start the car. It should now be possible to start the car.

Was the function OK?

- **YES**

FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING WIRING AND COMPONENT**

CHECKING WIRING AND COMPONENT

Check the cable between transmission connector terminal #44 (#A44) and central electronic module (CEM) terminal #D9 (#B9). Check for an open-circuit according to **OPEN-CIRCUIT, PERMANENT FAULTS** . Check for a short-circuit to ground according to **SHORT-CIRCUIT TO GROUND, PERMANENT FAULTS** . Check for a short-circuit to supply voltage according to **SHORT-CIRCUIT TO SUPPLY VOLTAGE. PERMANENT FAULTS** .

If no faults are found in the wiring, try a new control module according to **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

Other information

- To connect the breakout box to the transmission control module (TCM), see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the central electronic module (CEM), see **CONNECTING THE BREAKOUT BOX** .

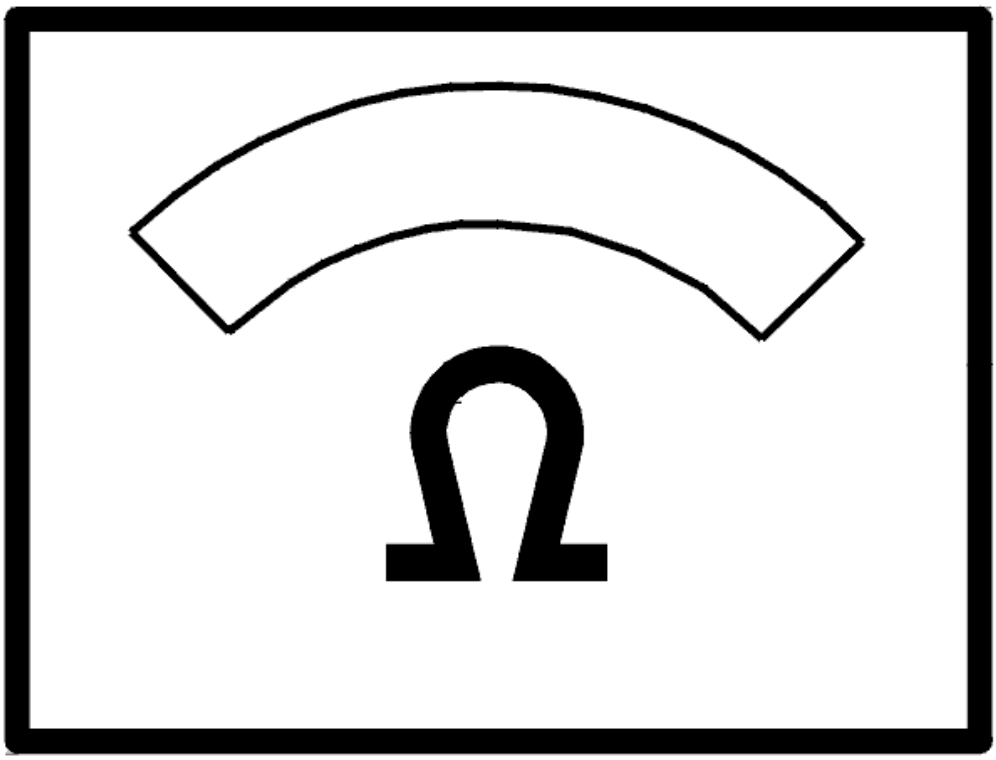


Fig. 34: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Were any faults found in the cable?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **INFORMATION**

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

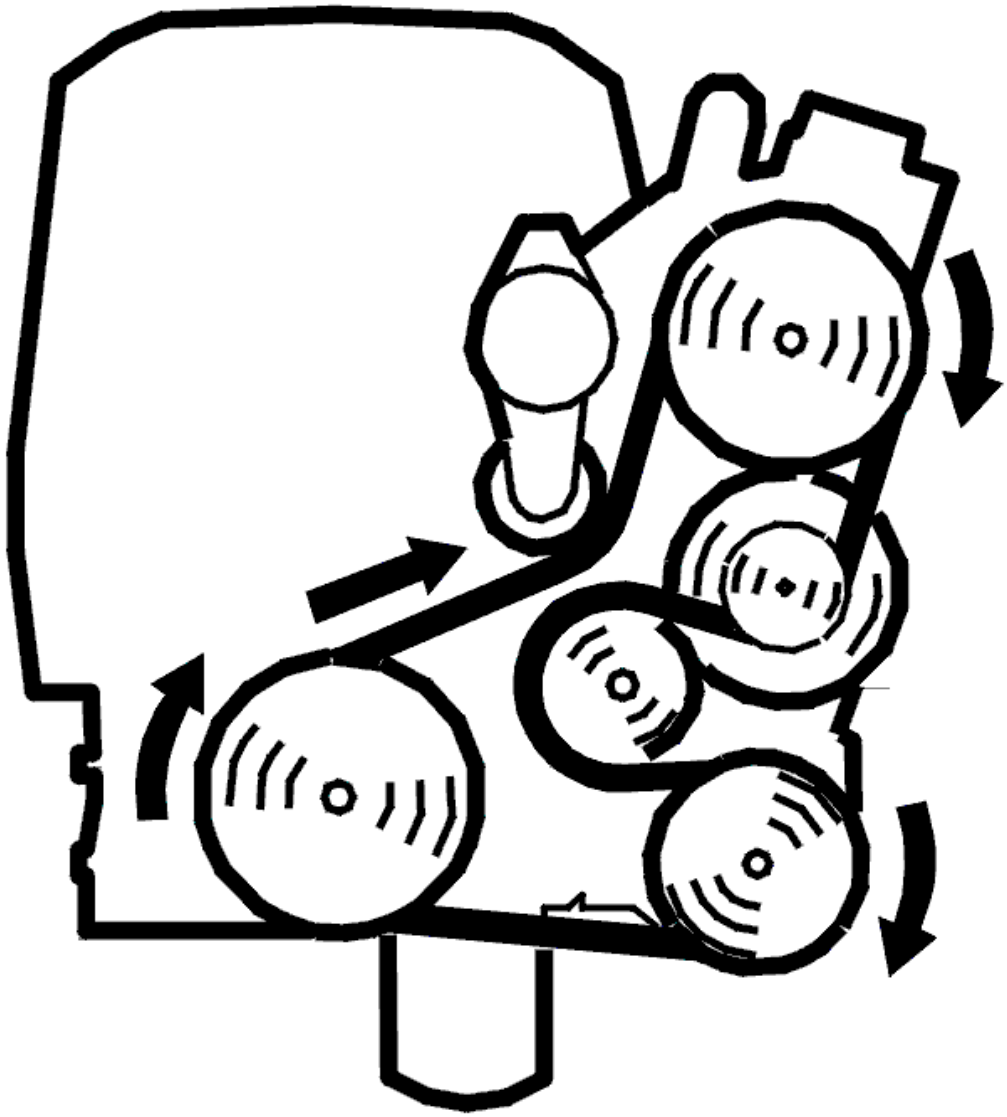


Fig. 35: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Gear-shift position sensor in position D
- Try to start the engine. It should not now be possible to start the engine
- Ignition off
- Gear-shift position sensor in position P or N.

  Try to start the engine. It should now be possible to start the engine.

Was the function OK?

- **YES**

OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

CHECKING POOR SHIFTING QUALITY (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007-2010)

CHECKING POOR SHIFTING QUALITY

FAULT-TRACING INFORMATION

CHECKING GEAR SYSTEM

Problems that the customer may experience are hard shifts or slipping shifts. The following test-drive contains several different driving situations that may provoke these symptoms if the transmission is damaged.

NOTE: It is important that the transmission oil is above 70 °C before the test-drive starts

Test 1

1. Driving at 100 km/h, 6th gear.
2. Perform a kickdown to 4th gear.
3. Let the transmission automatically shift up to 5th gear.
4. Let up the accelerator pedal and let the transmission shift up to 6th gear.

Test 2

1. Driving at 100 km/h, 6th gear.
2. Slight uphill grade, press accelerator pedal until you obtain shifting 6-5, not kickdown.

Test 3

1. Driving at 80 km/h.
2. Move the gear selector to position M and engage 6th gear.

3. Perform a kickdown and shift 6-5, 5-4, 4-3 at the same time.
4. Then upshift immediately to 6th gear.

Test 4

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position R.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

Test 5

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position D.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

If the symptoms hard shifts or slipping shifts arise during the test-drive, the transmission's control system must be replaced.

Other information

- see **CONTROL SYSTEMS**

Is the function OK?

- **YES**

  Refer to **FAULT-TRACING INFORMATION**

- **NO**

  Refer to **REPLACING THE CONTROL SYSTEM**

FAULT-TRACING INFORMATION

FAULT-TRACING INFORMATION

The automatic transmission's shifting quality may in some cases be dependent on the engine's function. If the automatic transmission's shifting quality is poor, troubleshoot the engine system as well.

REPLACING THE CONTROL SYSTEM

The previous test indicates that there is a fault in the transmission control system. Replace the control system.

Other information

- see **CONTROL SYSTEMS**

CHECKING POOR SHIFTING QUALITY (B6324S5, TF-80SC; B6324S5, TF-80SC AWD; 2011-2012)

CHECKING POOR SHIFTING QUALITY

see **CHECKING POOR SHIFTING QUALITY**

CHECKING POOR SHIFTING QUALITY (B8444S, TF-80SC AWD; 2006-2011)

CHECKING POOR SHIFTING QUALITY

FAULT-TRACING INFORMATION

CHECKING GEAR SYSTEM

Problems that the customer may experience are hard shifts or slipping shifts. The following test-drive contains several different driving situations that may provoke these symptoms if the transmission is damaged.

NOTE: It is important that the transmission oil is above 70 °C before the test-drive starts

Test 1

1. Driving at 100 km/h, 6th gear.
2. Perform a kickdown to 4th gear.
3. Let the transmission automatically shift up to 5th gear.
4. Let up the accelerator pedal and let the transmission shift up to 6th gear.

Test 2

1. Driving at 100 km/h, 6th gear.
2. Slight uphill grade, press accelerator pedal until you obtain shifting 6-5, not kickdown.

Test 3

1. Driving at 80 km/h.
2. Move the gear selector to position M and engage 6th gear.
3. Perform a kickdown and shift 6-5, 5-4, 4-3 at the same time.
4. Then upshift immediately to 6th gear.

Test 4

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position R.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

Test 5

1. Stationary vehicle, engine running, parking brake applied, brake activated with left foot, gear selector in position D.
2. Press down the accelerator pedal (brake still activated).

NOTE: Let up the accelerator pedal in case of noise or slipping.

If the symptoms hard shifts or slipping shifts arise during the test-drive, the transmission's control system must be replaced.

Other information

- see **CONTROL SYSTEM, REPLACING**

Is the function OK?

- **YES**

  Refer to **FAULT-TRACING INFORMATION**

- **NO**

  Refer to **REPLACING THE CONTROL SYSTEM**

FAULT-TRACING INFORMATION

FAULT-TRACING INFORMATION

The automatic transmission's shifting quality may in some cases be dependent on the engine's function. If the automatic transmission's shifting quality is poor, troubleshoot the engine system as well.

REPLACING THE CONTROL SYSTEM

The previous test indicates that there is a fault in the transmission control system. Replace the control system.

Other information

- see **CONTROL SYSTEM, REPLACING**

CHECKING POOR SHIFTING QUALITY (TF-80SC AWD; 2005)

CHECKING POOR SHIFTING QUALITY

see **CHECKING POOR SHIFTING QUALITY**

CHECKING POSITION INDICATOR (4T65 AWD; 2003-2006)

CHECKING POSITION INDICATOR

FAULT-TRACING INFORMATION

INFORMATION

Fault-tracing is under development.

For further information about this diagnostic trouble code (DTC), select Information, then DTC information.

CHECKING SEALS AND SEALING JOINTS (4T65 AWD; 2003-2006)

CHECKING SEALS AND SEALING JOINTS

Check the following seals and sealing joints:

- oil pan seal
- oil cooler with hoses and connections
- the speed sensor (O-ring)
- drive shaft seals
- the differential housing cover
- control system cover
- forward and back-up (reverse) servo
- torque converter/seal.

Remedy any leakage.

Other information

- see **TRANSMISSION OIL / OIL FILTER, REPLACING**
- see **AUXILIARY OIL COOLER, REPLACING**
- see **OUTPUT SPEED SENSOR TRANSMISSION, REPLACING**
- see **REPLACING DIFFERENTIAL HOUSING COVER**
- see **PISTON / COVER BACK-UP (REVERSE) SERVO, REPLACING**
- see **SEALING RING AND PISTON WITH O-RING FOR FRONT SERVO, REPLACING** and **SEALING RING AND PISTON WITH O-RING FOR FRONT SERVO, INSTALLING**

- see **GASKET/O RING SERVO CYLINDER, REPLACING**
- see **TORQUE CONVERTER/SEAL, REPLACING**

AUXILIARY OIL COOLER, REPLACING

- See **AUXILIARY OIL COOLER, REPLACING** .

REPLACING DIFFERENTIAL HOUSING COVER

PREPARATIONS

Fig. 36: Identifying Dip Stick Pipe & Oil Suction Device
Courtesy of VOLVO CARS CORPORATION

Collect the transmission fluid.

Remove the dipstick from the dip stick pipe.

Extract the oil (approximately 6 liters). Use an oil suction unit.

RAISE THE CAR. REMOVE THE SPLASH GUARD UNDER THE ENGINE

Fig. 37: Identifying Splash Guard
Courtesy of VOLVO CARS CORPORATION

REMOVE THE RIGHT-HAND SIDE SHAFT

See **DRIVE SHAFT RIGHT, REPLACING** .

REMOVE THE VEHICLE SPEED SENSOR (VSS) FROM THE DIFFERENTIAL HOUSING COVER

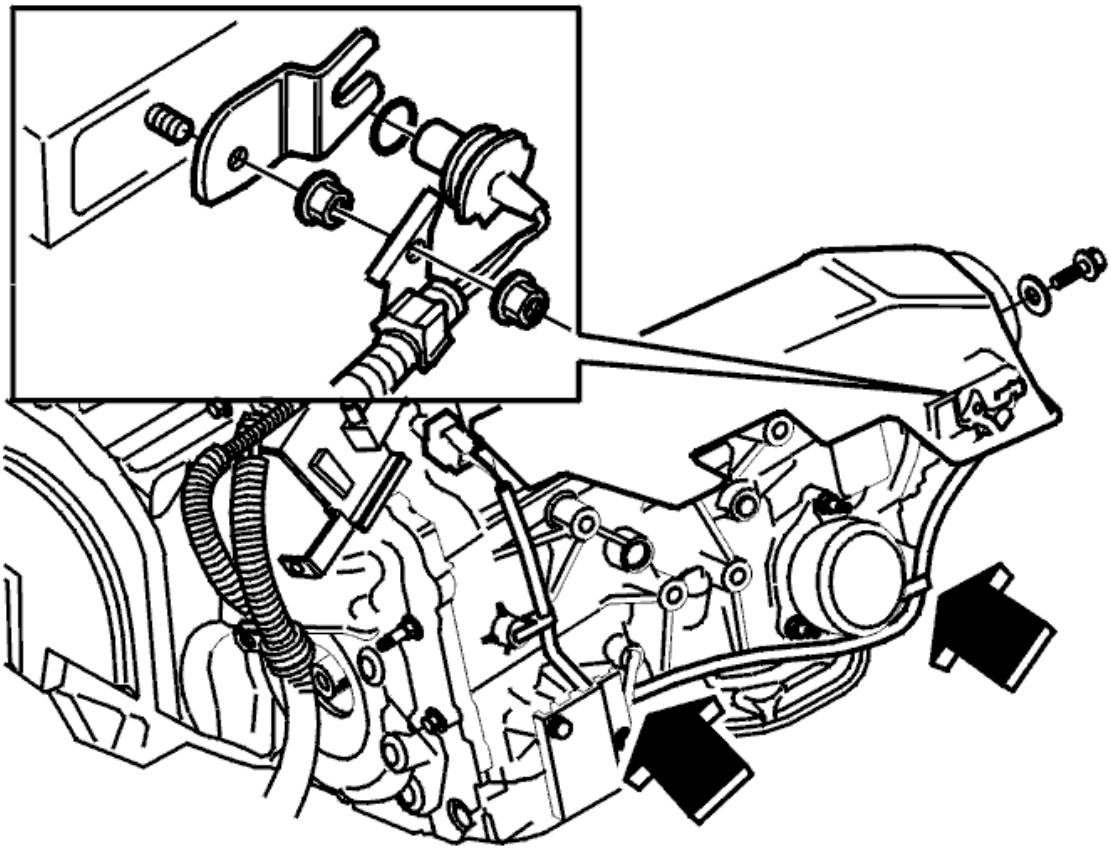


Fig. 38: Identifying Removing/Installing Sensor
Courtesy of VOLVO CARS CORPORATION

Remove the screw for the splash guard. Press up the deflector plate slightly so that the sensor is accessible.

Place a container underneath the transmission.

Remove:

- the screw holding the sensor
- the sensor.

REMOVE THE BRACKET BETWEEN THE TRANSMISSION AND THE ENGINE

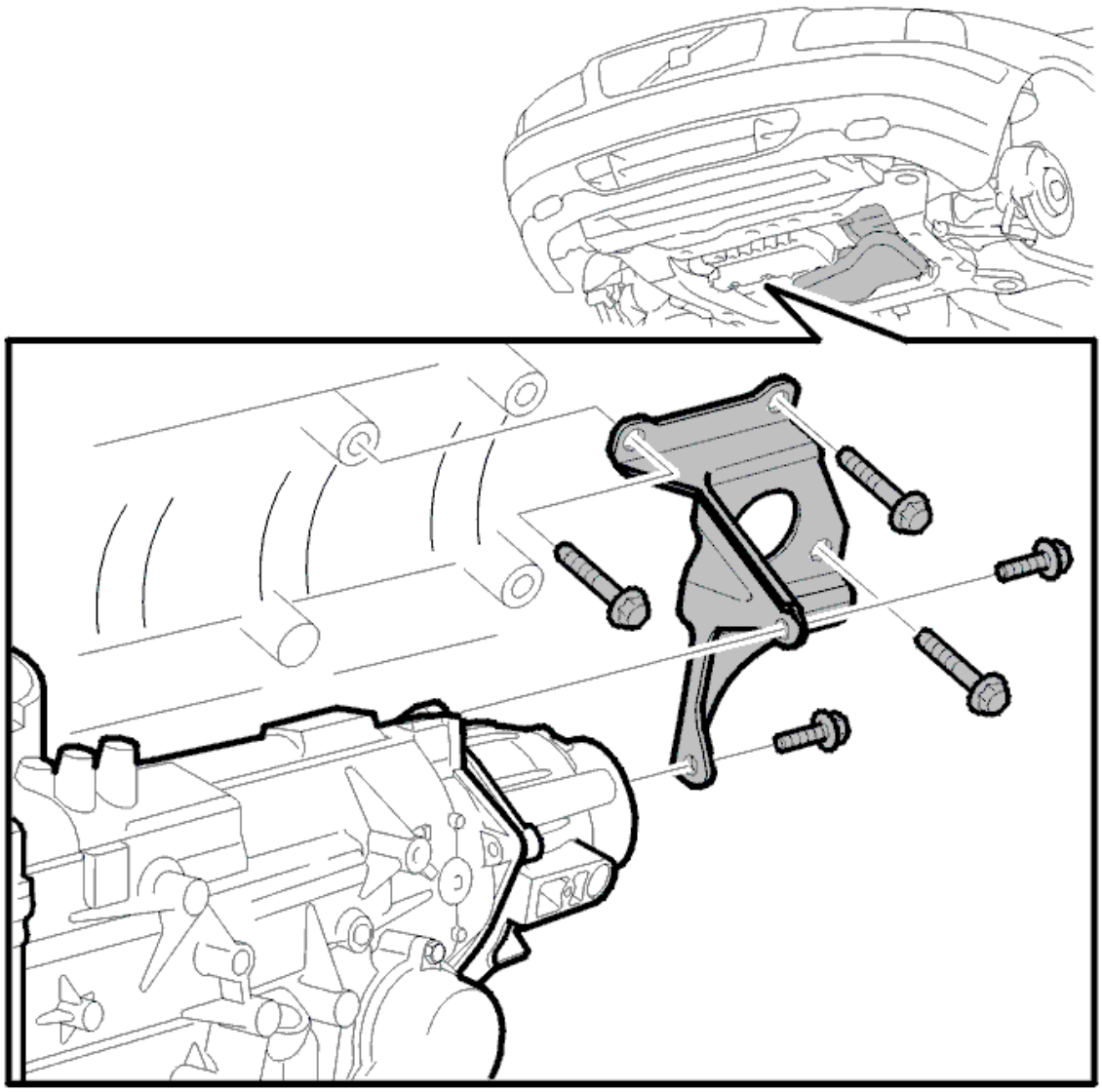


Fig. 39: Identifying Bracket Between Transmission And Engine
Courtesy of VOLVO CARS CORPORATION

Remove:

- the two screws in the differential housing cover
- the three screws for the bracket in the cylinder block
- the bracket.

REMOVE THE DIFFERENTIAL HOUSING COVER

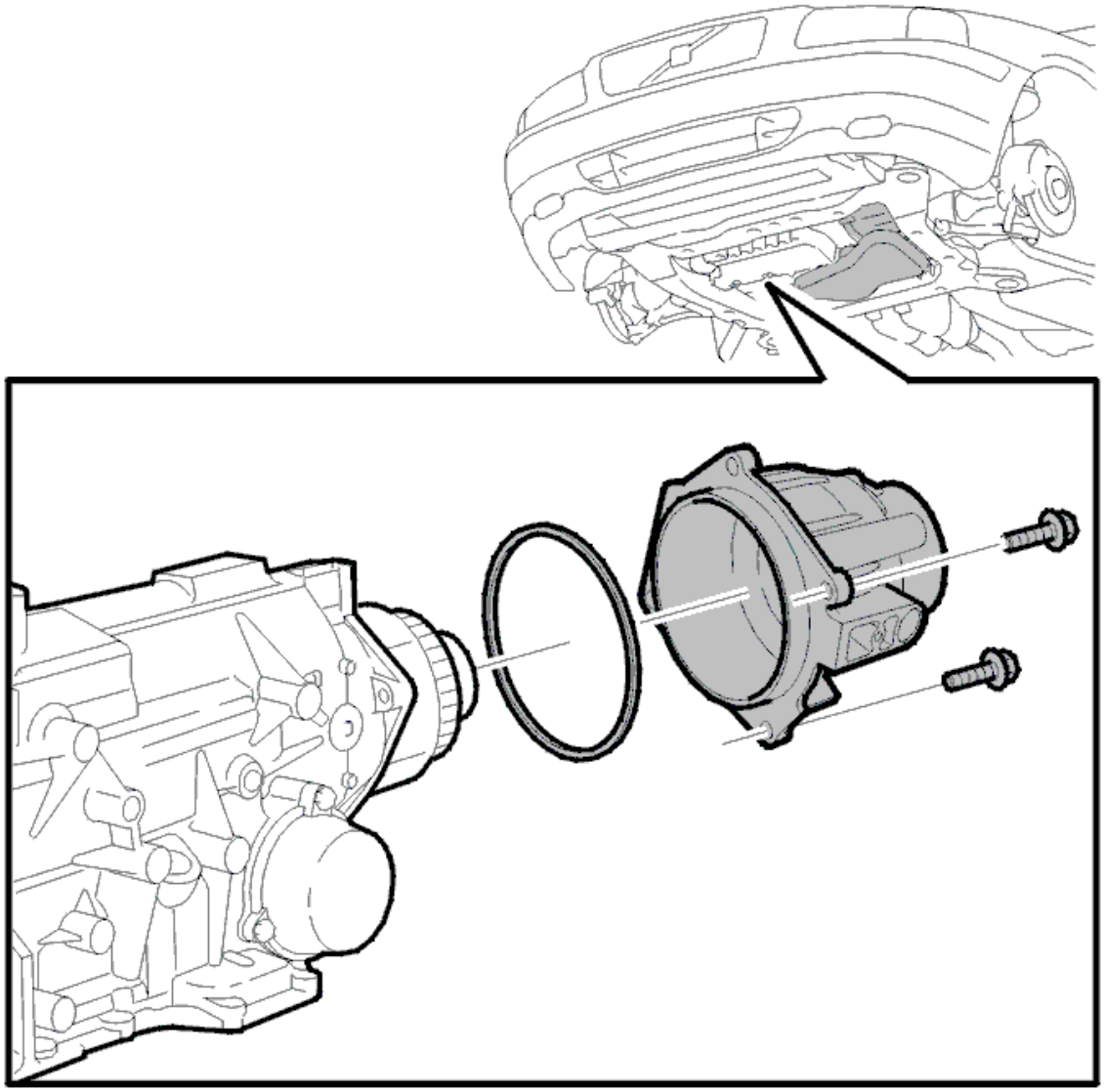


Fig. 40: Identifying Differential Housing Cover
Courtesy of VOLVO CARS CORPORATION

Remove:

- the remaining two screws
- the cover.

NOTE: Remove the throw-out bearing from the differential or the cover if it is still in

place.

CHECK BEARING SURFACE FOR THE DIFFERENTIAL

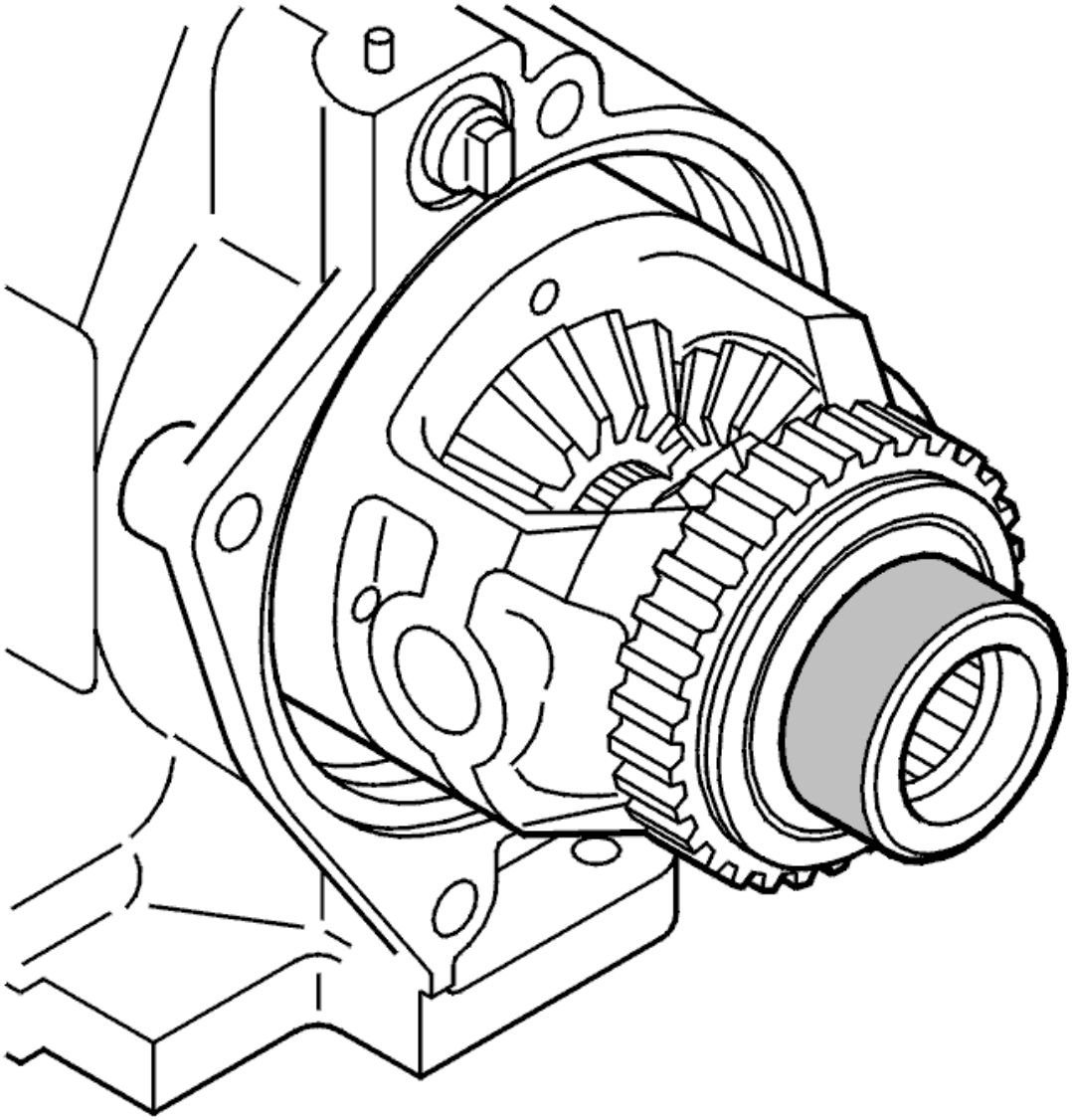


Fig. 41: Identifying Bearing Surface
Courtesy of VOLVO CARS CORPORATION

There must not be any visible scratches or abnormal wear on the bearing surface.

INSTALL THE SPACER WASHER AND THE THROW-OUT BEARING ON THE DIFFERENTIAL

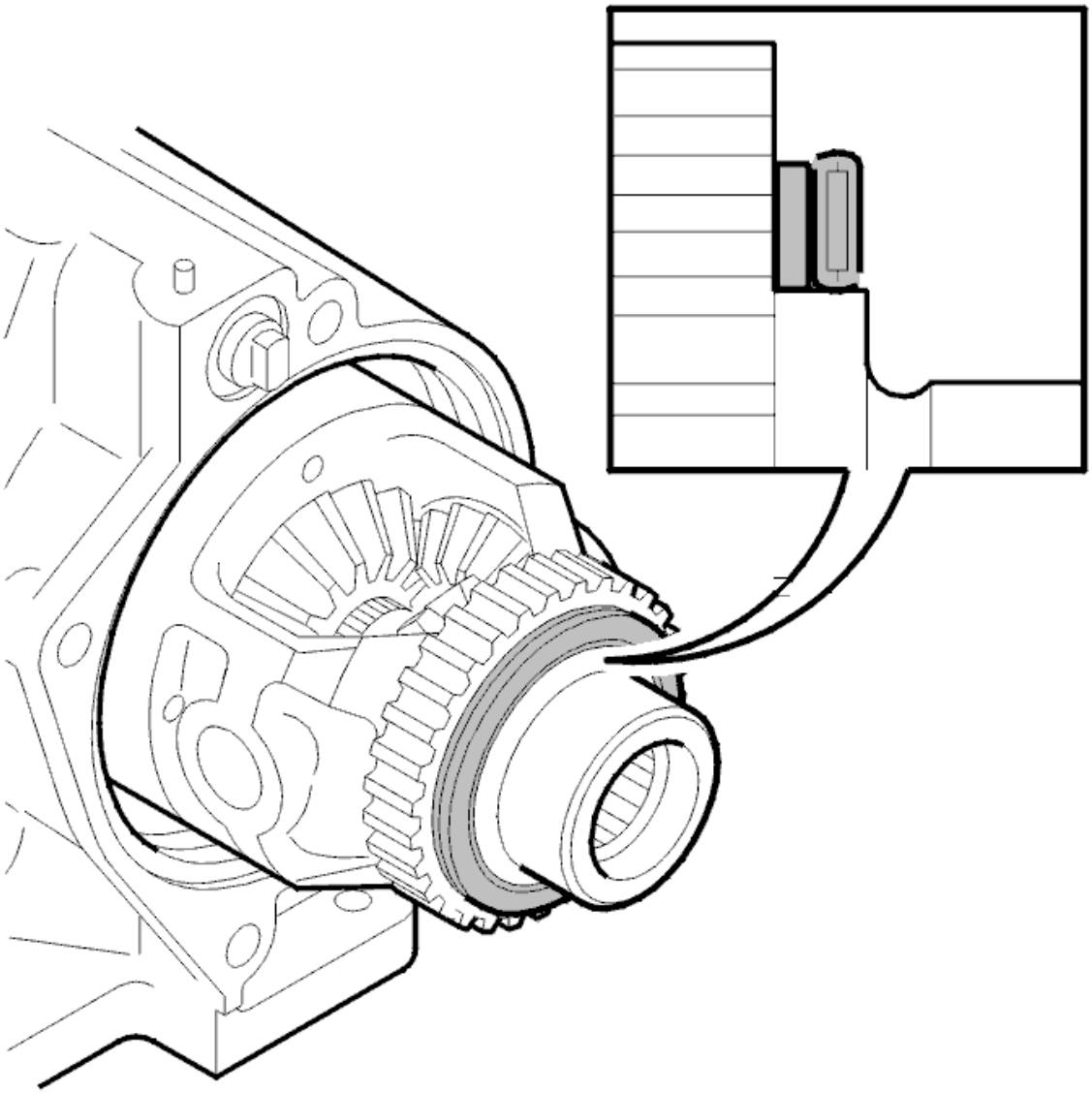


Fig. 42: Identifying Throw-Out Bearing
Courtesy of VOLVO CARS CORPORATION

Apply a little petroleum jelly on the throw-out bearing so that it secures against the spacer washer.

Install:

- the spacer washer against the gear wheel
- the throw-out bearing, see the illustration.

INSTALL THE DIFFERENTIAL HOUSING COVER

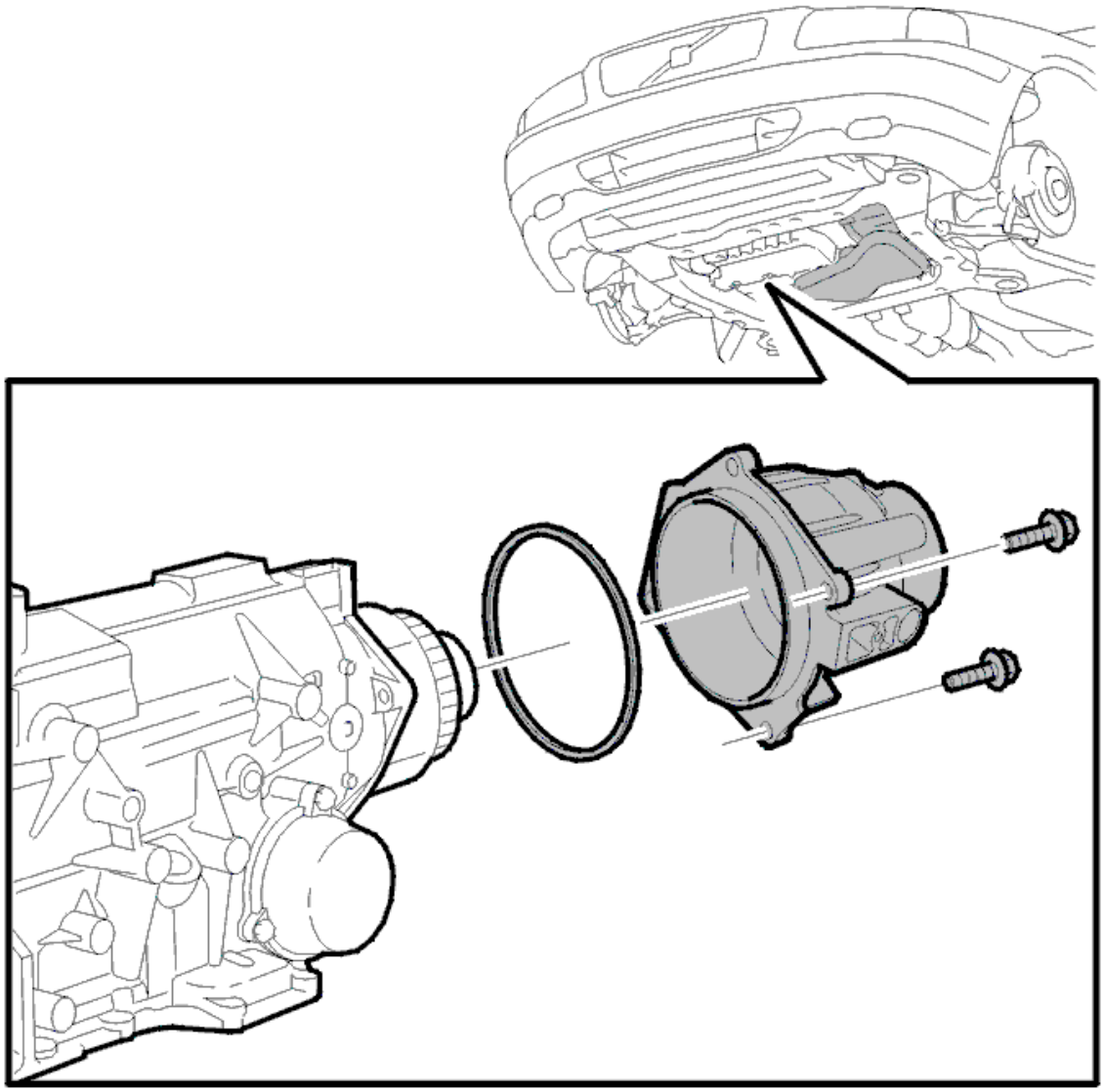


Fig. 43: Identifying Differential Housing Cover
Courtesy of VOLVO CARS CORPORATION

Use a new gasket.

Finger-tighten the screws.

INSTALL THE BRACKET ON THE CYLINDER BLOCK

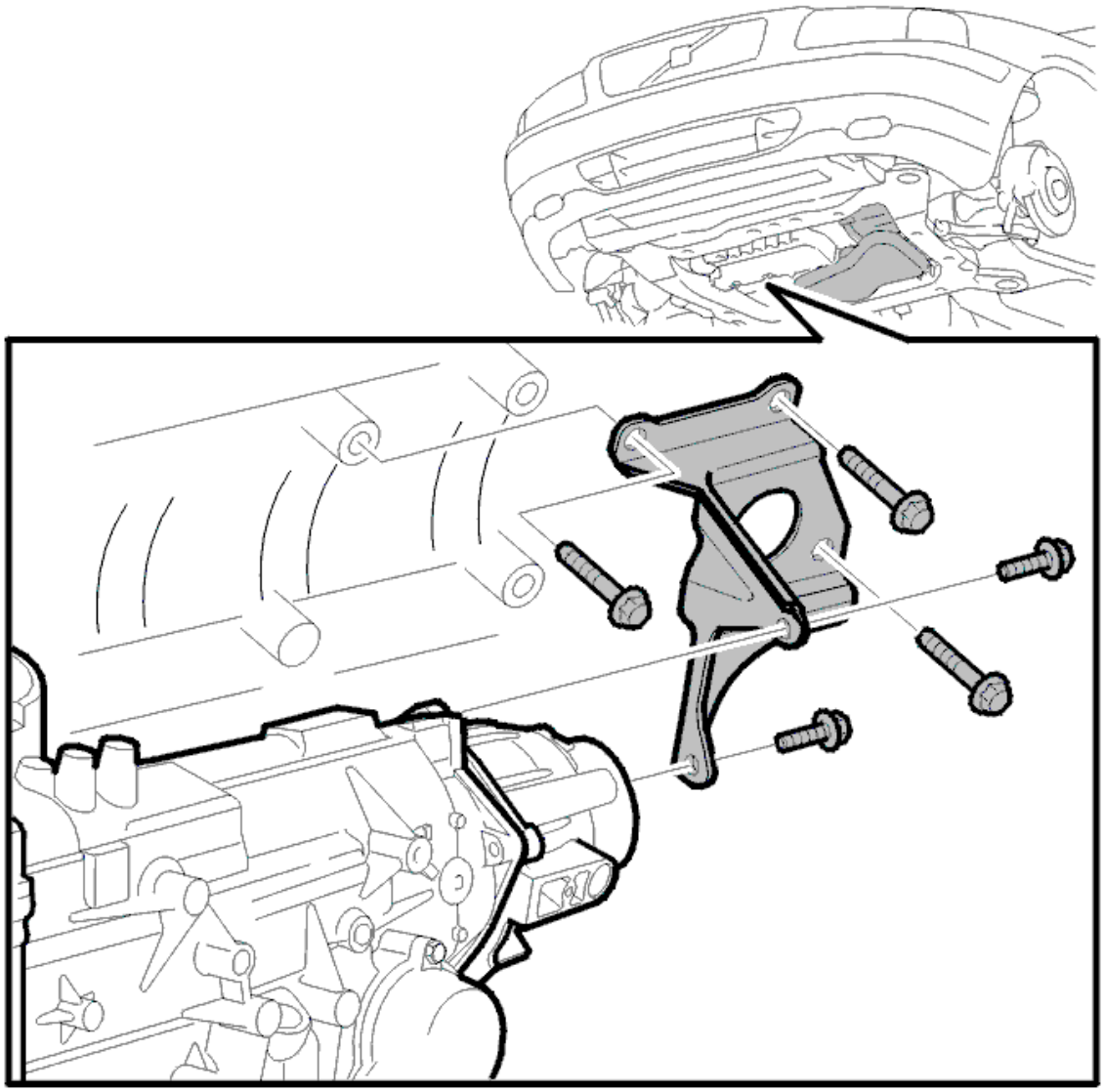


Fig. 44: Identifying Bracket Between Transmission And Engine
Courtesy of VOLVO CARS CORPORATION

Install:

- the three screws for the bracket for the differential housing cover
- the two screws in the differential housing cover.

Tighten all the screws in the differential housing cover. Tighten to **50 Nm** .

Tighten the bracket screws. Tighten to **50 Nm** .

NOTE: **There axial clearance must be 0.12 mm - 0.67 mm between the differential and the differential housing cover.**

INSTALL THE VEHICLE SPEED SENSOR (VSS)

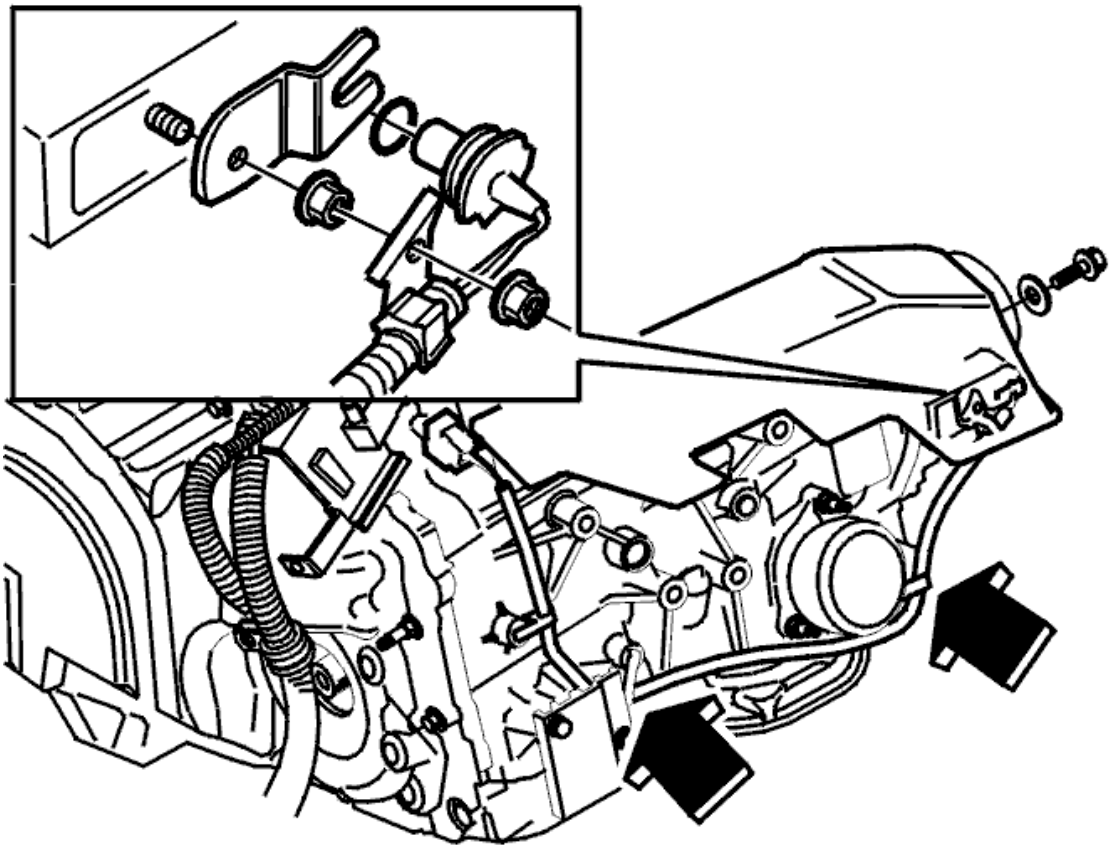


Fig. 45: Identifying Removing/Installing Sensor
Courtesy of VOLVO CARS CORPORATION

Tighten the screw. Tighten to **10 Nm** .

Install the screw for the splash guard. Tighten the screw. Tighten to **25 Nm** .

INSTALL THE RIGHT DRIVE SHAFT

See **DRIVE SHAFT RIGHT, REPLACING** .

FINISHING WORK

Install the right wheel

See **WHEELS** .

Fill the transmission with oil

Measure the amount of oil that was drained. Fill with the same amount of new oil.

CHECK OIL LEVEL

The oil level must be checked at a temperature of 80°C. This is to ensure that the read out is correct

Preparations:

- park the car on a level surface
- apply the parking brake
- let the engine idle
- move the gear selector lever to position P
- move the gear selector to each position. Stop for five seconds in each position
- move the gear selector lever to position P. Wait two minutes before checking the level.

NOTE: Wait two minutes before checking the level.

NOTE: Cars with Geartronic gear selector assemblies: P-R-N-D-Man. Do not shift up in the manual positions. Cars with conventional gear selector assemblies: P-R-N-D-3-2-1, stop for five seconds in each position.

OIL LEVEL / TEMPERATURE

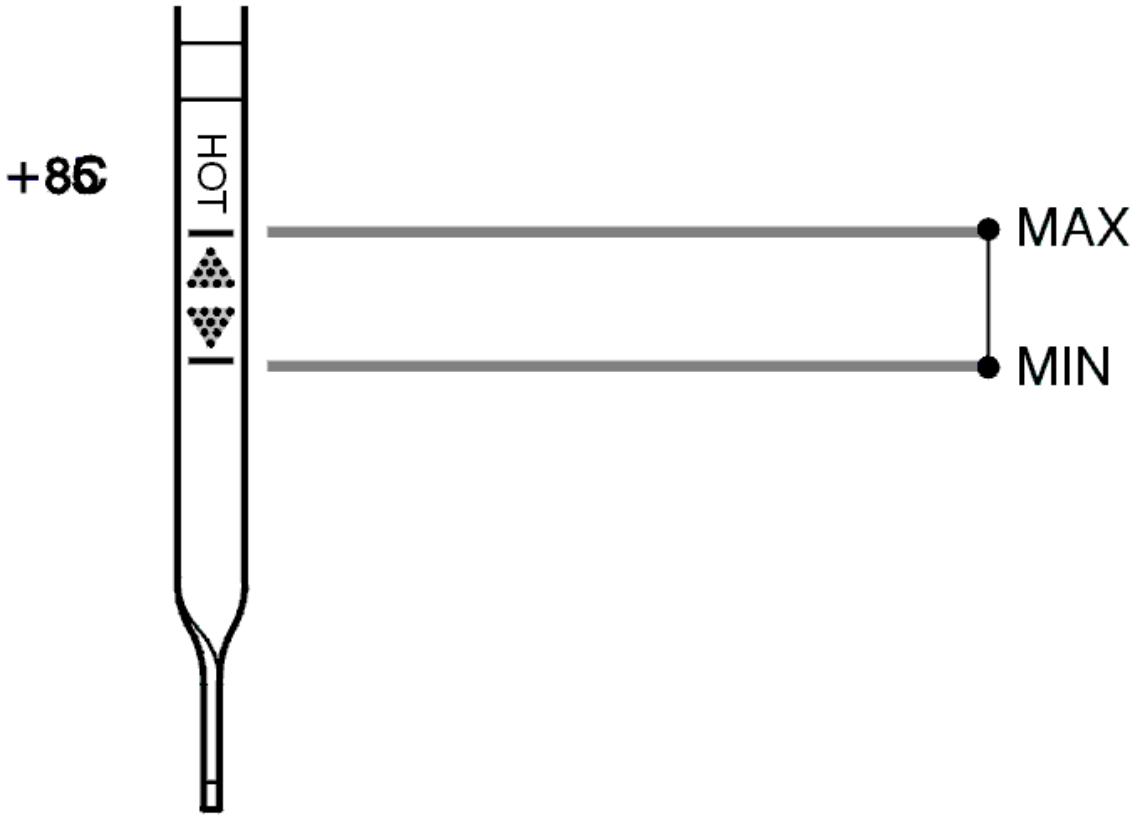


Fig. 46: Identifying Oil Level / Temperature
Courtesy of VOLVO CARS CORPORATION

Maximum level hot 80°C.

Maximum level cold 40°C.

Minimum level hot 80°C.

Minimum level cold 40°C.

Check that there is no oil leakage at the differential housing cover

Install the splashguard under the engine

Tighten the screws. Tighten to **25 Nm** .

CHECKING SEALS AND SEALING JOINTS (AW50/51 AWD; AW55-50/51SN; 2003-2007)

CHECKING SEALS AND SEALING JOINTS

CHECKING SEALS AND SEALING JOINTS

Check the following seals and sealing joints:

- drive shaft seals
- oil cooler hoses and connections
- control system cover
- cover differential
- speed sensor
- side cover.

Remedy as necessary.

Other information:

- For information about removal, see **TRANSMISSION, REMOVING**
- For information about installation, see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .

CHECKING SOFTWARE (B6324S, TF-80SC; B6324S, TF-80SC AWD; 2007)

CHECKING SOFTWARE

HINT: Stated symptom can be solved by upgrading the software in Transmission Control Module (TCM), Engine control module (ECM), and Differential Electronic Module (DEM).

NOTE: **If the control modules mentioned above contain diagnostic trouble codes that may cause a similar symptom, first troubleshoot and fix these diagnostic trouble codes.**

Go to the tab SOFTWARE and order an upgrade for each software.

HINT: All three control modules can be upgraded at the same time, on the condition that they do not already contain the latest software.

Make sure that the new software solved the symptom using the relevant verification procedure.

CHECKING SOFTWARE, TRANSMISSION CONTROL MODULE (TCM) (AW50/51 AWD; AW55-50/51SN; 2005-2007)

CHECKING SOFTWARE

CHECKING SOFTWARE

NOTE: **First investigate the diagnostic trouble codes that are stored in the Transmission Control Module (TCM) and, see if they could be the cause of the symptoms reported by the customer.**

Problems with hard or slipping shifts at low temperatures can be remedied via a software update. Go to the SOFTWARE tab and perform a software update, not reload!

HINT: If it is not possible to order an upgrade this means that the latest available software is already installed in the vehicle. If the software can be updated, this can solve the customer's problem.

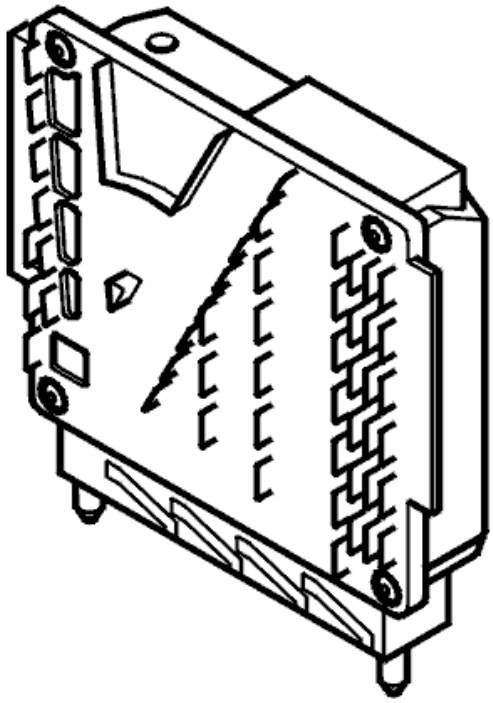


Fig. 47: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

CHECKING THAT COVER FOR THE TORQUE CONVERTER IS CORRECTLY INSTALLED (AW50/51 AWD; AW55-50/51SN; 2003-2007)

CHECKING THAT THE COVER FOR THE TORQUE CONVERTER IS CORRECTLY INSTALLED

Check that the cover is secured to the engine.

Other information:

- For information about removal/installation, see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

Was it properly secured?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

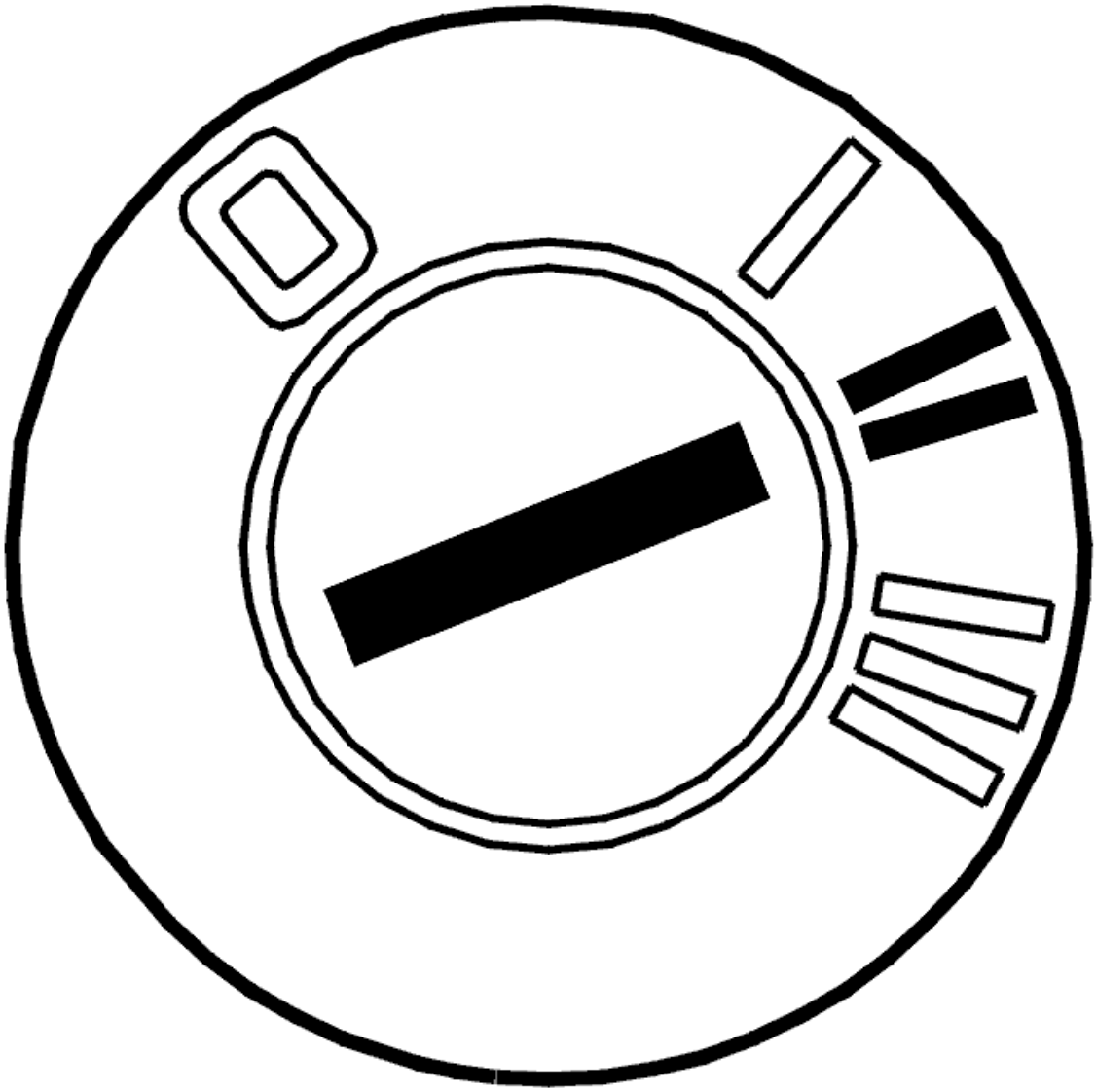


Fig. 48: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

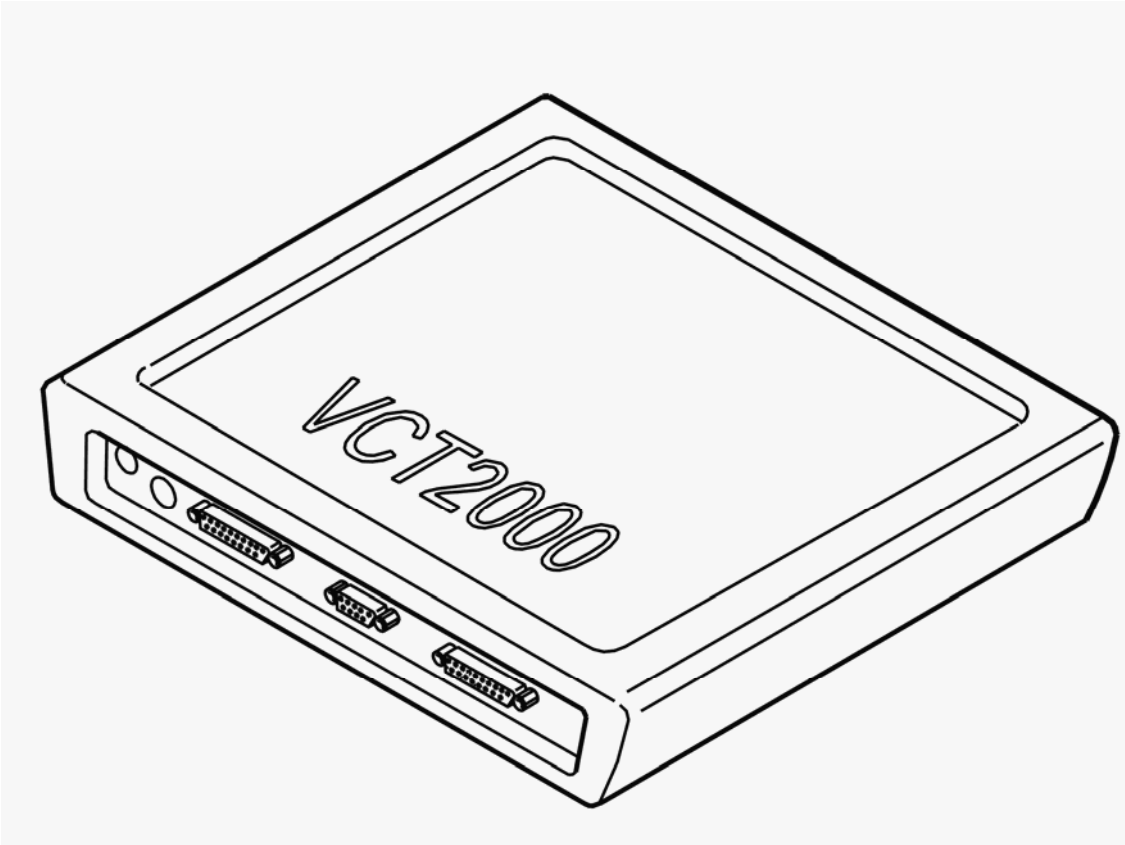


Fig. 49: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING THAT TORQUE CONVERTER IS CORRECTLY INSTALLED (AW50/51 AWD; AW55-50/51SN; 2003-2007)

CHECKING THAT THE TORQUE CONVERTER IS CORRECTLY INSTALLED

- Check whether the screws for the carrier plate are loose
- If this is the case, replace with new screws
- Tighten according to **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

Was it properly secured?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

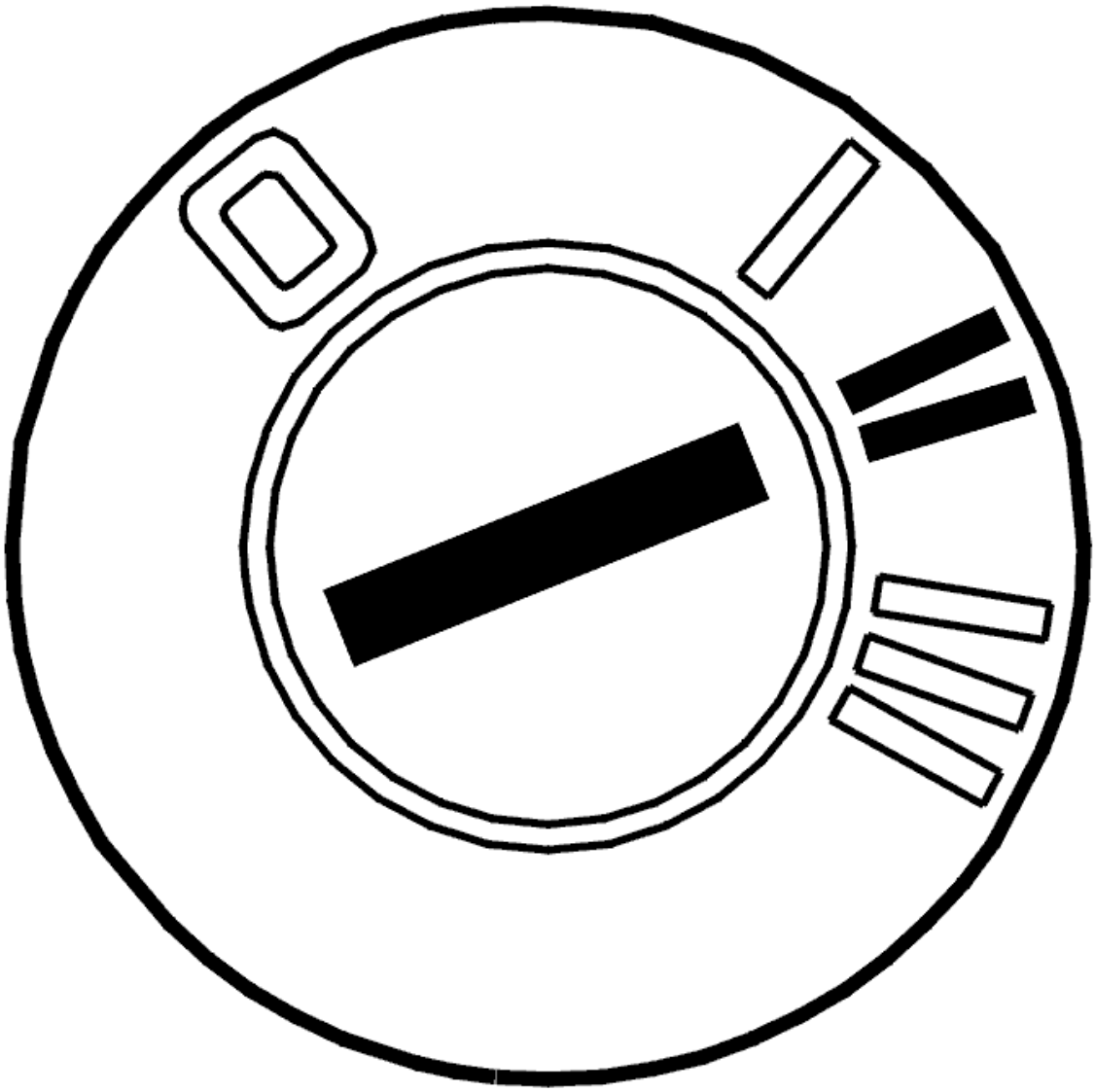


Fig. 50: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

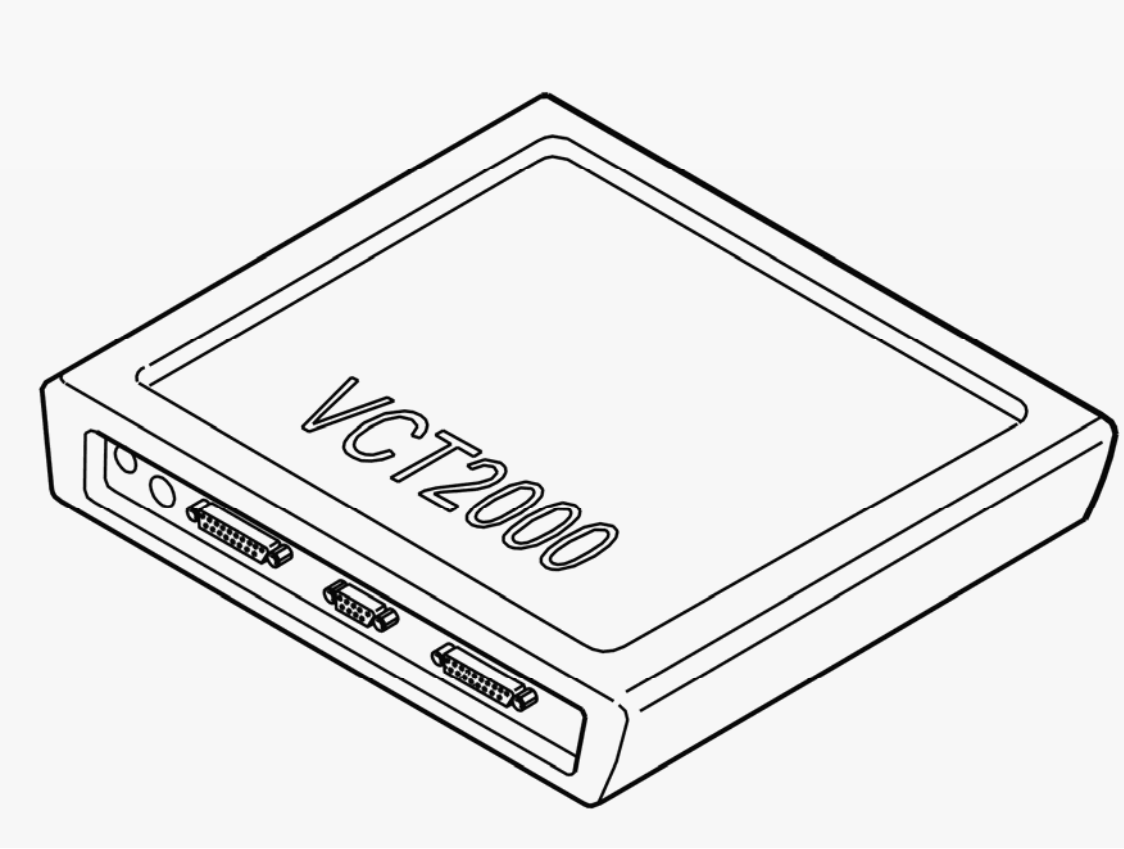


Fig. 51: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING CARRIER PLATE (AW50/51 AWD; AW55-50/51SN; 2003-2007)

CHECKING CARRIER PLATE

Check the carrier plate.

Replace the carrier plate if it is damaged. See **CARRIER PLATE, REPLACING** .

Other information:

- For information about removal/installation, see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

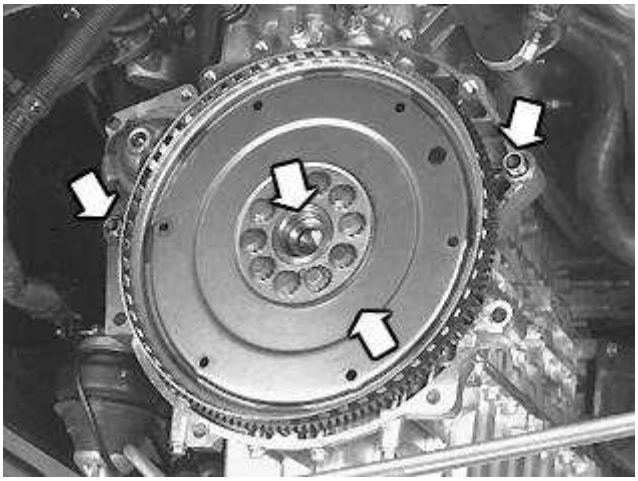


Fig. 52: Identifying Carrier Plate
Courtesy of VOLVO CARS CORPORATION

Was the carrier plate undamaged?

- **YES**

  Refer to **RESETTING THE ADAPTATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

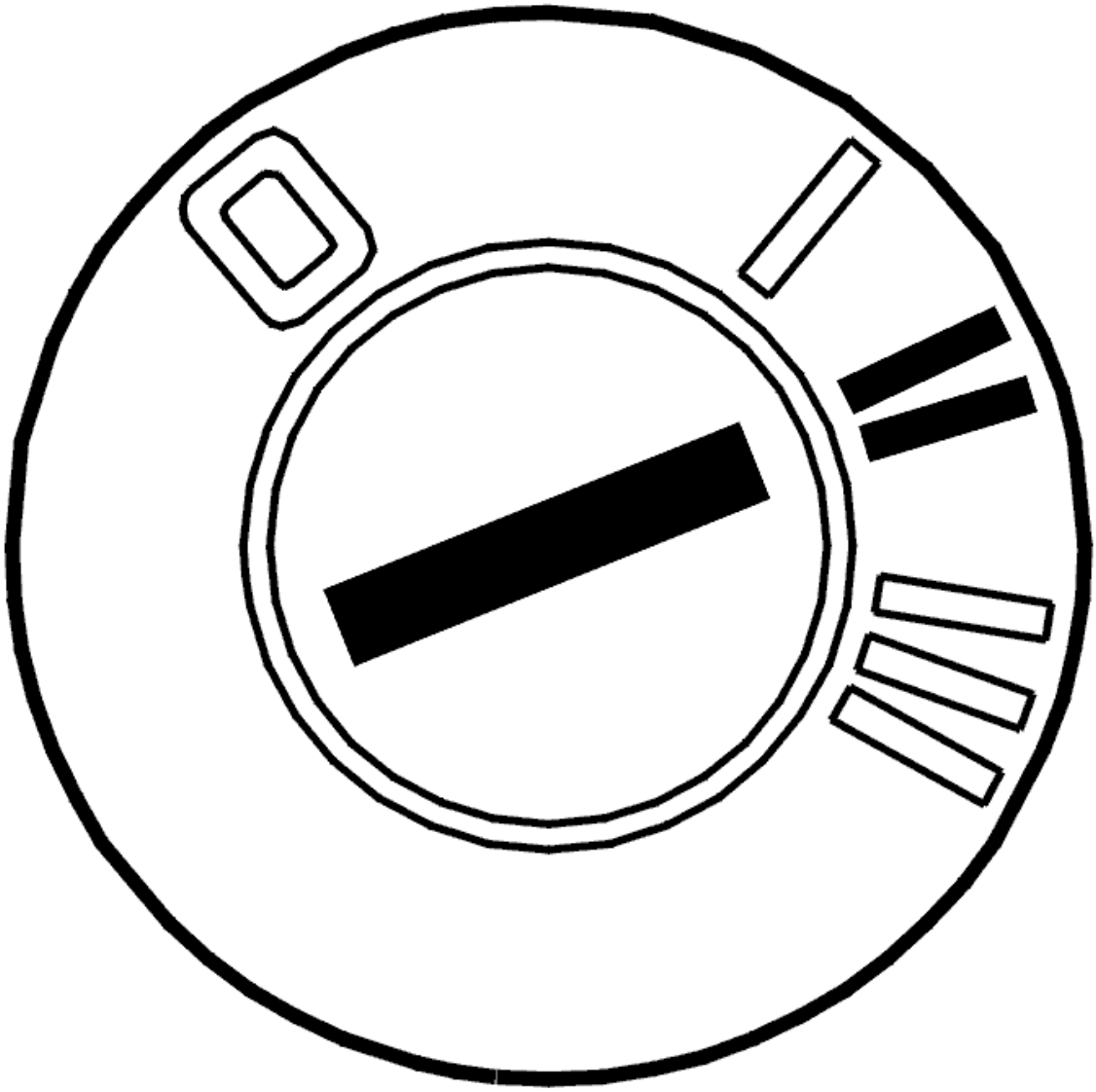


Fig. 53: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

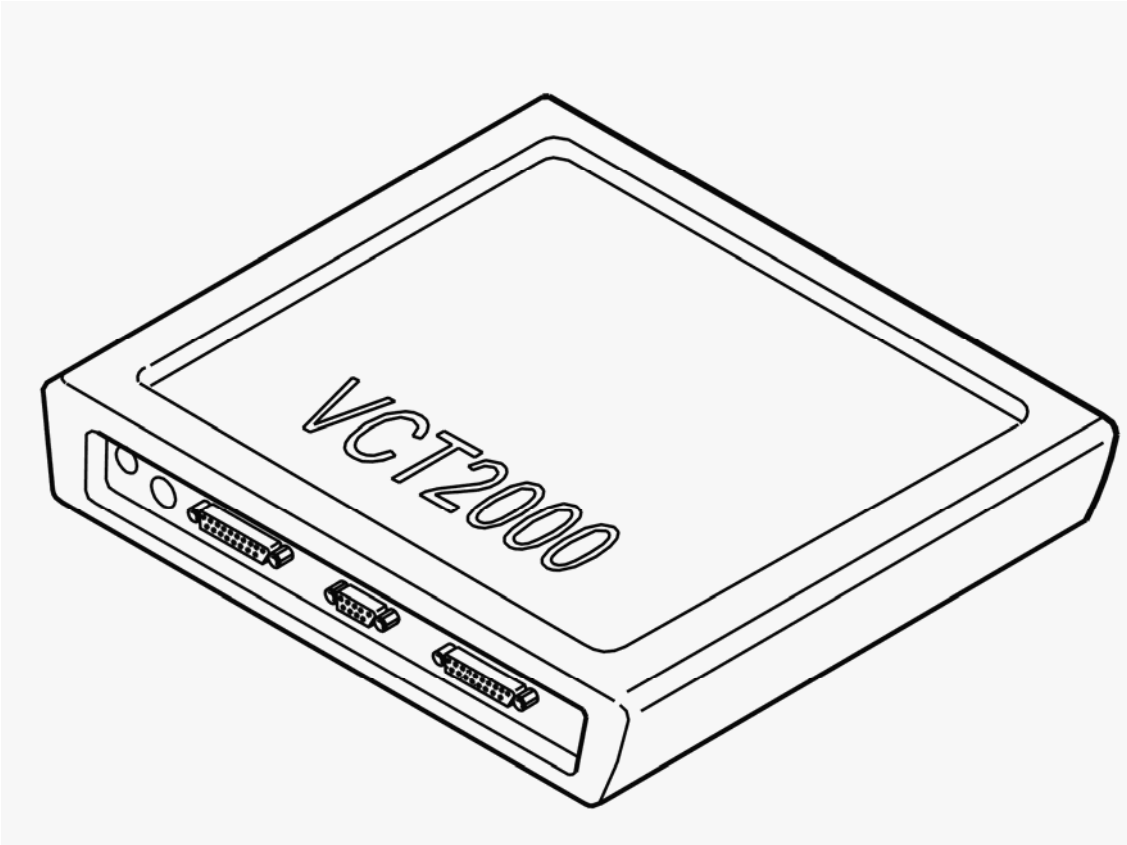


Fig. 54: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING FRONT AND REAR SERVO AND ACCUMULATOR PISTONS (4T65 AWD; 2003-2006)

CHECKING FRONT AND REAR SERVO AND ACCUMULATOR PISTONS

- If there is no second gear or if it slips this could be due to a leaking seal for 1-2 accumulator piston
- If it is difficult to shift from 1st to 2nd gear this may be due to a defective spring on a sticking 1-2 accumulator piston
- If there is no 3rd gear this could be due to a leaking seal for 2-3 accumulator piston
- If it is difficult to shift from 2nd to 3rd gear this may be due to a defective spring on a sticking 2-3 accumulator piston
- If there is no forward drive in manual 3rd gear (Geartronic) but in 1st and 2nd the front servo may be defective.

NOTE: If there is no 4th gear this could be due to a leaking seal for 3-4 accumulator piston. Harsh shifting from 3rd to 4th gear may be due to a sticking 3-4 accumulator piston. In these cases the transmission must be replaced.

Other information

- see **PISTON / COVER BACK-UP (REVERSE) SERVO, REPLACING**
- see **SEALING RING AND PISTON WITH O-RING FOR FRONT SERVO, REPLACING** and **SEALING RING AND PISTON WITH O-RING FOR FRONT SERVO, INSTALLING**
- see **GASKET/O RING SERVO CYLINDER, REPLACING**
- To check/replace the accumulator piston 1-2 and 2-3, see **GASKET / PISTON ACCUMULATOR, REPLACING**
- see **TRANSMISSION, REMOVING**
- see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)**

Was any corrective action taken?

- **YES**

  Refer to **RESETTING THE ADAPTATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

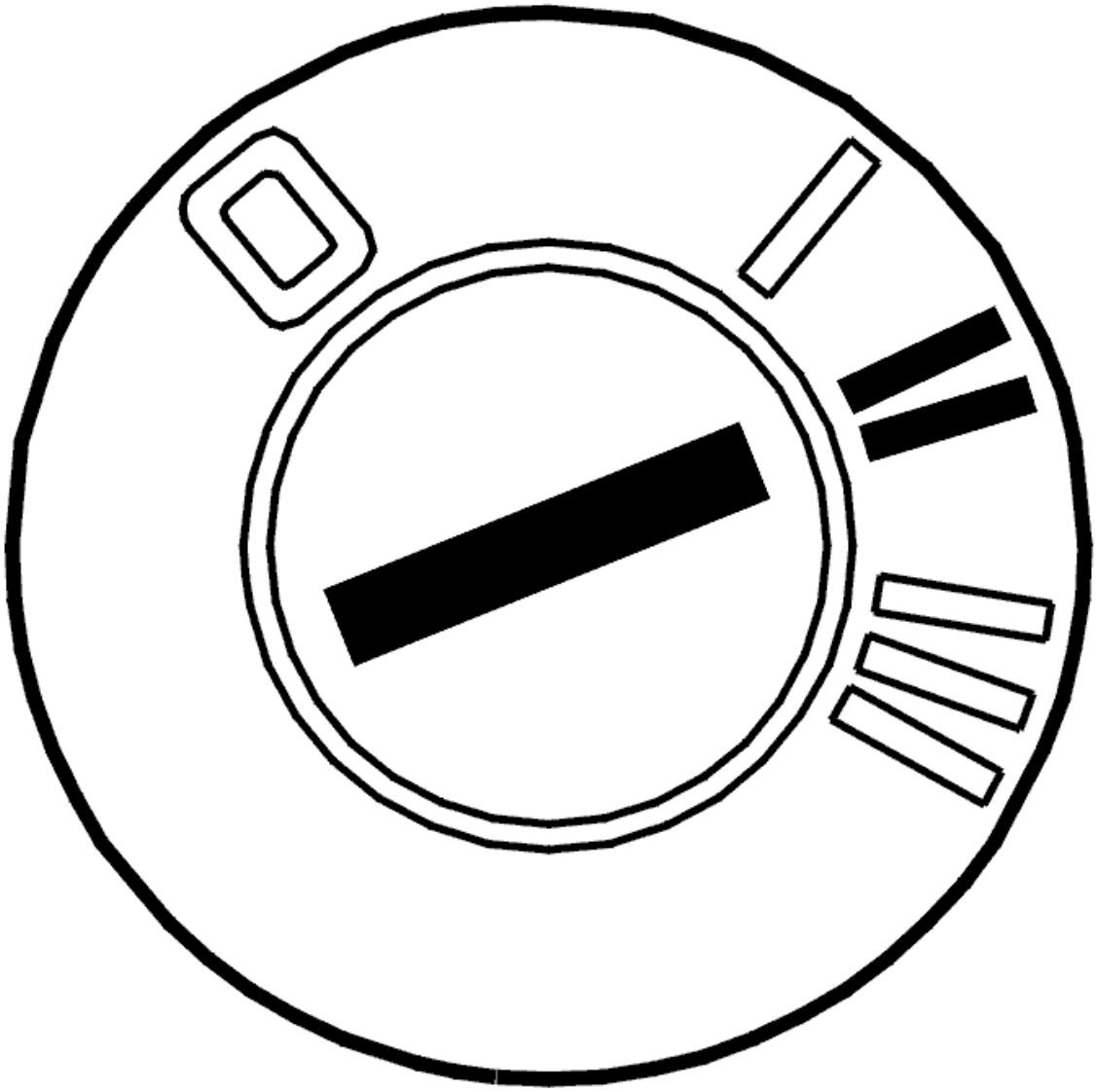


Fig. 55: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

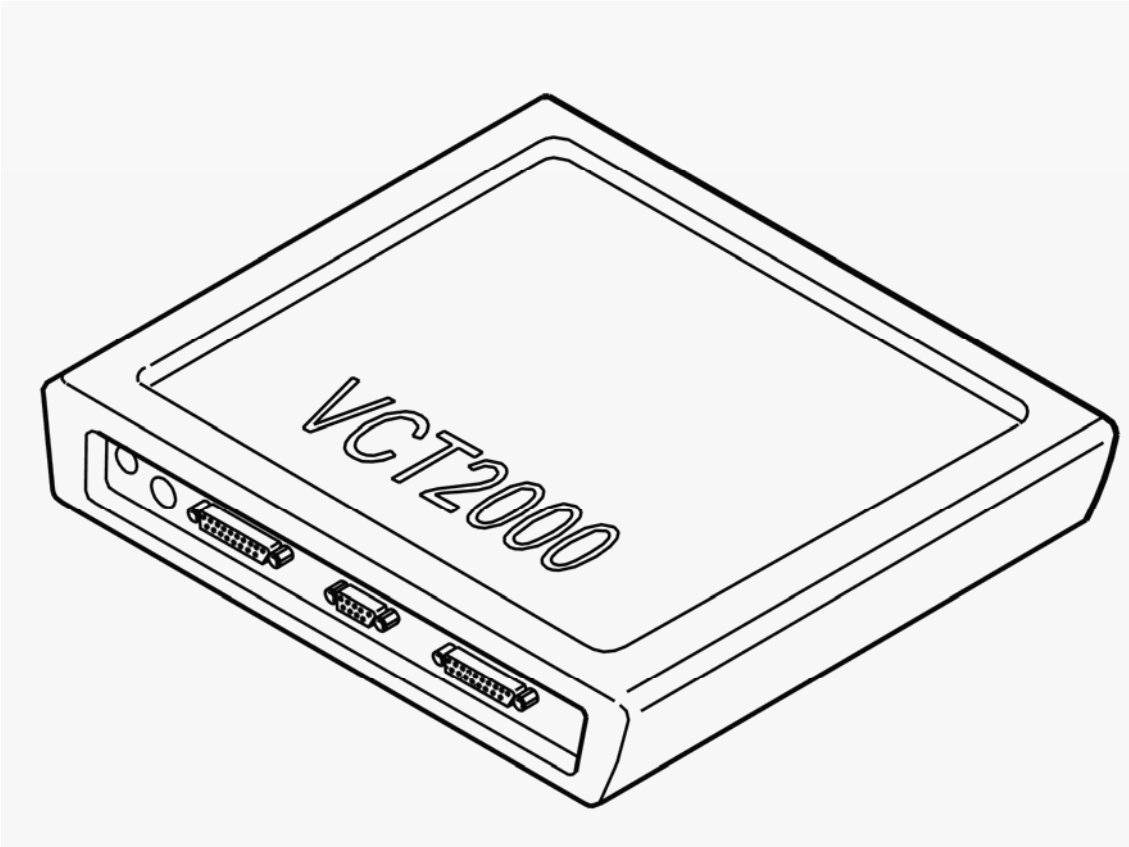


Fig. 56: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING AUTOMATIC TRANSMISSION**

CHECKING AUTOMATIC TRANSMISSION

CHECKING AUTOMATIC TRANSMISSION

NOTE: After carrying out the repair check that the symptom has been remedied.

Check the automatic transmission as follows:

- Test drive the car to test the function of the automatic transmission. See **TEST DRIVE FORM, DESCRIPTION**
- If hydraulic hoses, gaskets or other components have been replaced, check that there is no oil leakage after the test drive.

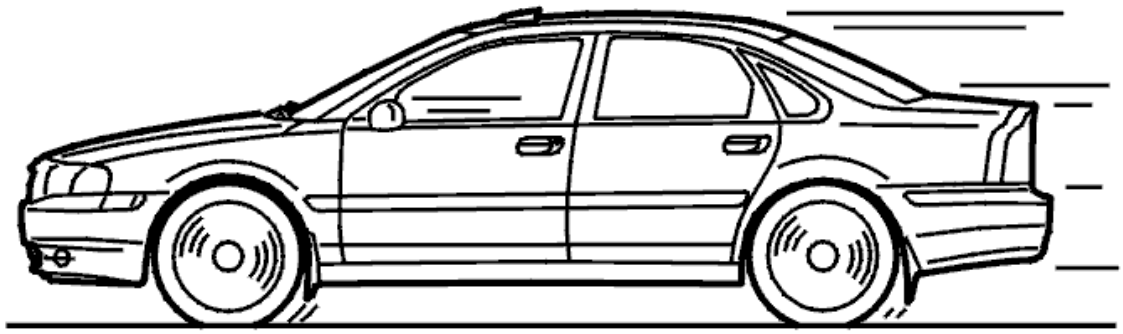


Fig. 57: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

GASKET / PISTON ACCUMULATOR, REPLACING

- See **GASKET / PISTON ACCUMULATOR, REPLACING** .

CHECKING FUNCTION OF TRANSMISSION (AW50/51 AWD; AW55-50/51SN; 2003-2007)

CHECKING FUNCTION OF TRANSMISSION

NOTE: The information can be used when all other troubleshooting has failed and the problem symptoms still remain.

HINT: Information for checking lost drive in other gears than 1st gear and reverse:

Lever carrier, standard

- D = 1st gear.
- L + Winter mode = 2nd gear.
- D + Winter mode = 3rd gear.

Lever carrier, Geartronic (MAN)

- Manual gear position = 3rd gear.

SYMPTOMS

Symptoms	Cause	Action
2nd, 3rd, 4th, and 5th gear not working.	Brake band B2 is defective.	Replace the transmission.
2nd, 3rd, and 4th gear not working.	Free-wheel F1 or brake band B1 defective.	Replace the transmission.
1st gear not working.	Free-wheel F2 is defective.	Replace the transmission.
Reverse gear not working. Engine brake does not work in lever position **L** , 1st gear and 0 % accelerator pedal position. Engine brake does not work in lever position **MAN** , 1st gear and 0 % accelerator pedal position.	Brake band B3 is defective.	Replace the transmission.
No drive in lever position **D** .	Clutch C1 is defective.	Replace the transmission.
No drive in reverse and 5th gear.	Clutch C2 is defective.	Replace the transmission.
No drive in 3rd gear.	Brake band B4 is defective. Anchor bolt for brake band B4 is loose.	Replace the transmission.
No reverse and 1st and 2nd gear.	Brake band B5 is defective.	Replace the transmission.

Other information

- see **COMPONENT/FUNCTION**

COMPONENT/FUNCTION

GEAR POSITION - FUNCTION OF GEAR BOX

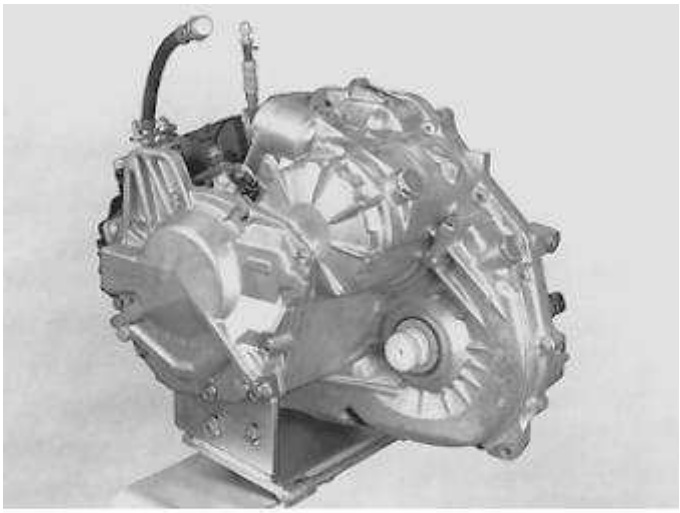


Fig. 58: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

GEAR POSITION/INTERNAL COMPONENTS OF GEAR BOX

Lever position	Gear	S1	S2	S3	S4	S5	B1	B2	B3	B4	B5	C1	C2	C3	F1	F2
Parking	P	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Reverse	R	0	0	X	0	X	0	0	0	0	1	0	1	0	0	0
Reverse	R	X	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Neutral	N	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
D	1	X	0	X	0	0	0	0	0	0	1	1	0	0	0	2
	2	0	X	X	0	0	1	1	0	0	1	1	0	0	2	0
	3	0	X	X	X	0	1	1	0	1	0	1	0	0	2	0
	4	0	X	0	X	0	1	1	0	0	0	1	0	1	2	0
	5	0	0	0	X	0	0	1	0	0	0	1	1	1	0	0
	Emergency mode	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0
4	1	X	0	X	0	0	0	0	0	0	0	1	0	0	0	2
	2	0	X	X	0	0	1	0	0	0	0	1	0	0	2	0
	3	0	X	X	X	0	1	0	0	0	0	1	0	0	2	0
L	1	X	0	X	X	0	0	0	1	0	0	1	0	0	0	2
	2	0	X	X	0	0	0	0	0	0	0	1	0	0	2	0

Explanation:

S1-S5 shift solenoids: 0 = Not active, X = Active.

B1-B5 Brake strap: 0 = Not applied, 1 = Applied.

C1-C3 Clutch: 0 = Not applied, 1 = Applied.

F1-F2 Freewheel: 0 = Not applied, 2 = Applied.

FAULT-TRACING INFORMATION

Condition

No diagnostic trouble codes are stored.

The fault is permanent.

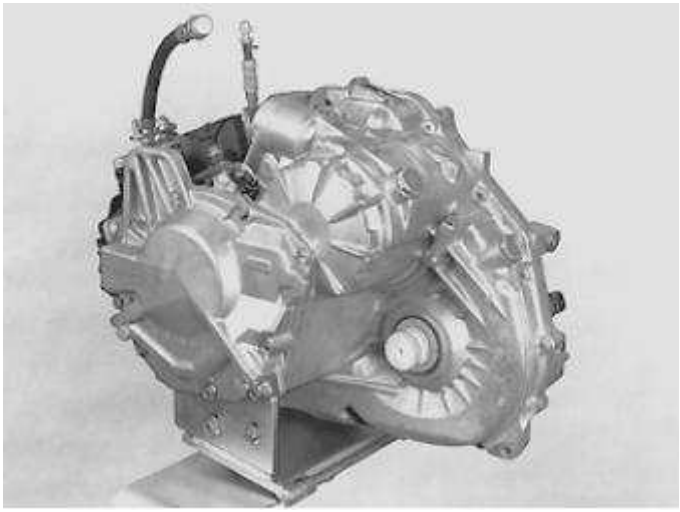


Fig. 59: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Substitute Value

- None.

Possible Source

- Internal malfunction in the transmission

Fault symptom[s]

- Automatic transmission/No automatic gearshift

CHECKING GEAR POSITION INDICATOR (AW50/51 AWD; AW55-50/51SN; 2003-2007)

CHECKING GEAR POSITION INDICATOR

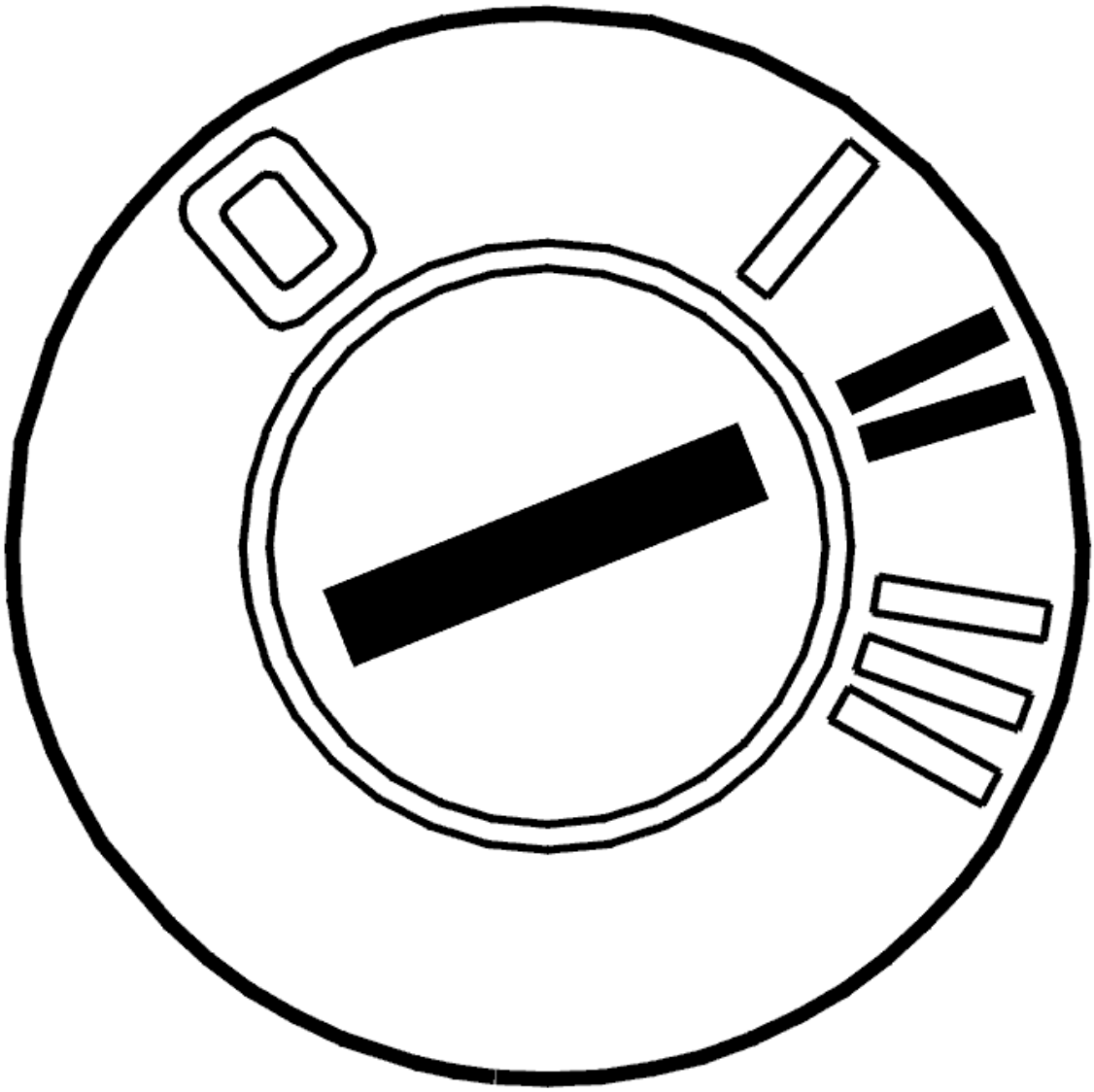


Fig. 60: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Depress the brake pedal. Move the gear shift selector to the different positions. Check that the gear position indicator LED in the gear selector assembly panel displays the selected gear position.

  Replace the printed circuit board in the gear selector assembly if the gear position indicator LED does not display the selected gear.

  Other information:

  - To replace the printed circuit board, see **PRINTED CIRCUIT BOARD GEAR SELECTOR**

ASSEMBLY/TOP PANEL, REPLACING .

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

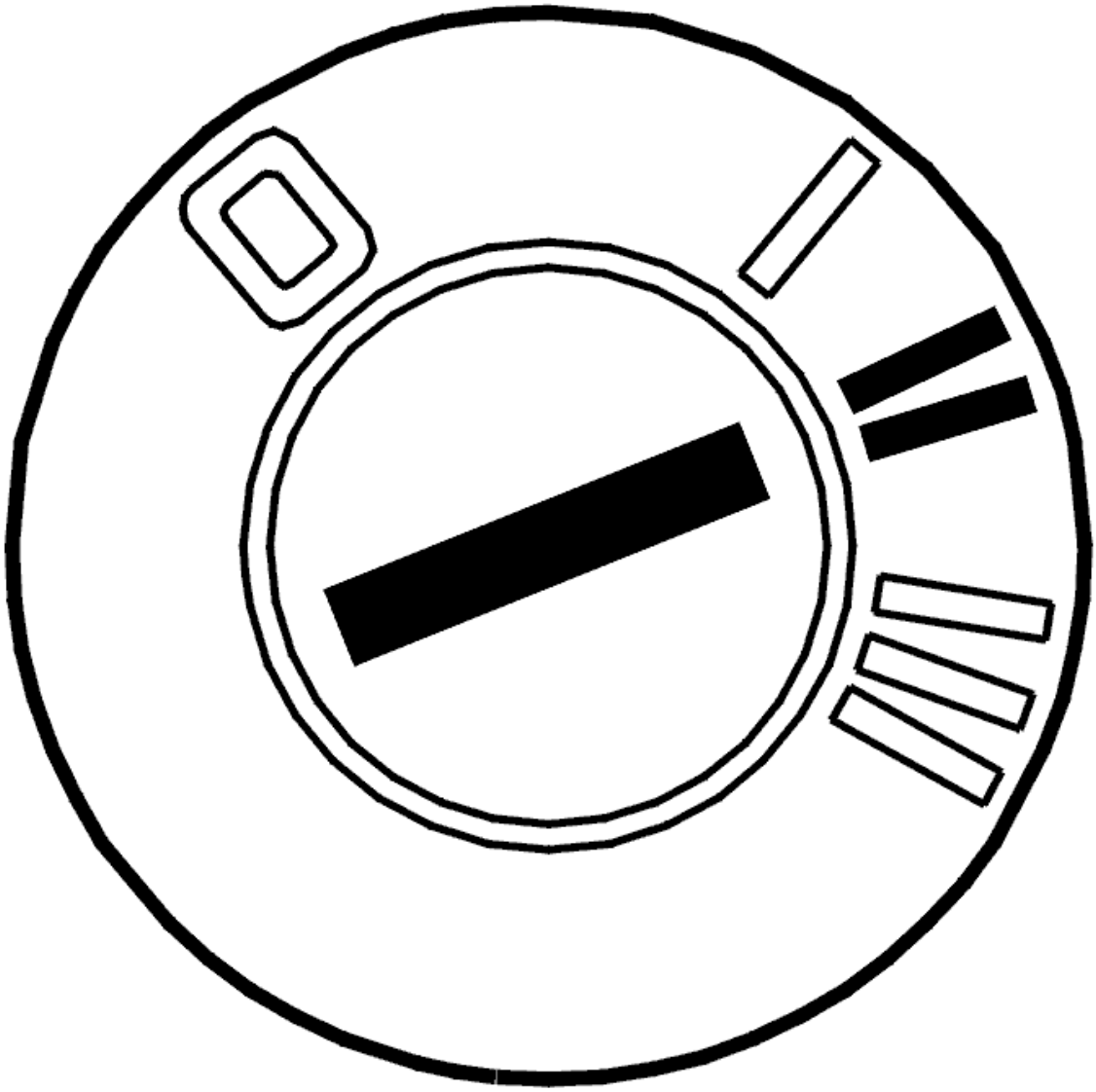


Fig. 61: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Depress the brake pedal. Move the gear shift selector to the different positions. Check that the gear position indicator LED in the gear selector assembly panel displays the selected gear position.

Do the gear indicator LEDs follow the gear position?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

CHECKING GEAR RATIO (4T65 AWD; 2003-2006)

CHECKING GEAR RATIO

NOTE: If the car has STC or DSTC, these functions must be disengaged. Press in the STC/DSTC button on the center console. Hold the button in for at least 2 seconds. The LED on the button must go out.

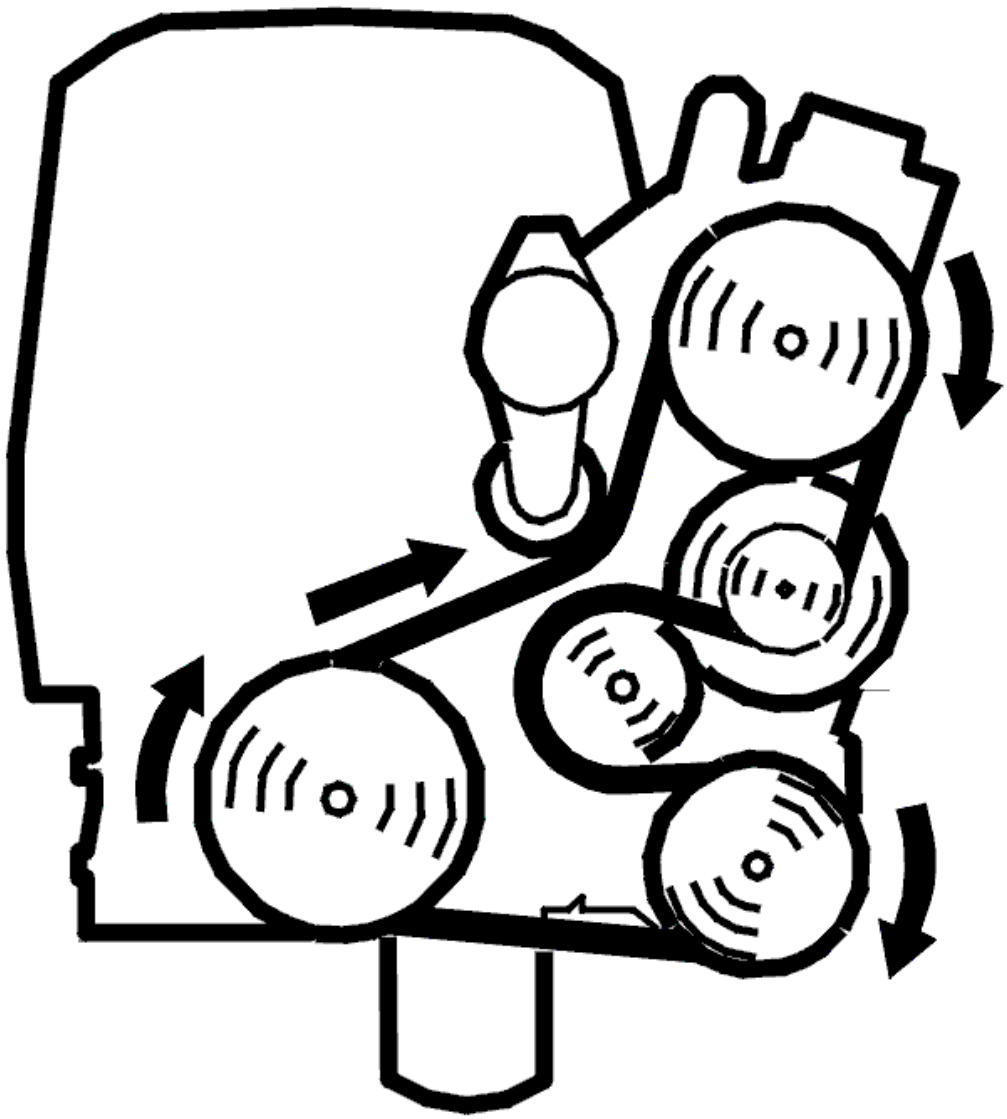


Fig. 62: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Raise the car so that the drive wheels are clear of the ground.

WARNING: Ensure that the car is safely raised.

WARNING: Check that there are no objects caught in the front tire treads.

- Start the engine
- Read off the gear ratio during shifting.

Move the gear shift selector to position 1. Accelerate carefully until the engine speed (RPM) is approximately 2000 rpm.

Try to maintain a constant engine speed throughout the test.

NOTE: The gear ratio varies if a constant vehicle speed and engine speed (RPM) are not maintained. This is because the transmission will free wheel.

Then move the gear selector to position 2 within 10 seconds, to position 3 within a further 10 seconds and then to position D (fourth gear).

Check that the shifts are carried out correctly by comparing the selected gear with the gear ratio.

Make a note of the shifting pattern and then compare with the table.

Gear / gear ratio (during normal function)

- 1 / 2.921 (corresponds to gear 1)
- 2 / 1.568 (corresponds to gear 2)
- 3 / 1.000 (corresponds to gear 3)
- D / 0.705 (corresponds to gear 4).

Table 1	
Obtained gear ratio	Corrective action
Only 2.921 (1)	Internal fault in the transmission - replace the transmission
Only 1.568 (2)	Internal fault in the transmission - replace the transmission
Only 1.000 (3)	Internal fault in the control system - replace the control system
Only 0.705 (4)	Internal fault in the control system - replace the control system
2.921 - 2.921- 0.705 - 0.705	Internal fault in the control system - replace the control system
1.568 - 1.568 - 1.000 - 1.000	Internal fault in the control system - replace the control system
2.921 - 1.568 - 1.568 - 2.921	Internal fault in the control system - replace the control system

0.705 - 1.000 - 1.000 - 0.705	Internal fault in the control system - replace the control system
1.000 - 1.000 - 1.000 - 0.705	Internal fault in the control system - replace the control system
2.921 - 1.568 -1.000 - 1.000	Internal fault in the transmission - replace the transmission
2.921 - 1.568 -1.568 - 1.568	Test drive the car. Test engine braking by selecting 1st gear, accelerate up to approximately 20 km/h and then stop accelerating. If engine braking is OK - replace the control system. If engine braking is **not** OK - replace the transmission.
2.921 - 2.921 - 1.000 - 0.705	If 3rd and 4th gears are OK - replace the control system. If N (neutral) is obtained when shifting to 3rd - replace the transmission.
1.568 - 1.568 - 1.000 - 0.705	Test drive the car. Test engine braking by selecting 3rd gear, accelerate up to approximately 50 km/h and then stop accelerating. If engine braking is OK - replace the control system. If engine braking is **not** OK - replace the transmission.

NOTE: Diagnostic trouble codes (DTCs) may be stored in the ABS system when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

Other information:

- To remove the transmission, see **TRANSMISSION, REMOVING**
- To install the transmission, see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)**
- To replace the control system
  - For removal, see **CONTROL SYSTEM/VALVE HOUSING, REMOVING**

- To install, see **CONTROL SYSTEM / VALVE HOUSING, INSTALLING** .
- For removal, see **CONTROL SYSTEM/VALVE HOUSING, REMOVING**
- To install, see **CONTROL SYSTEM / VALVE HOUSING, INSTALLING** .

.

Select an alternative

1. Replaced control system or transmission
2. Transmission operating normally.

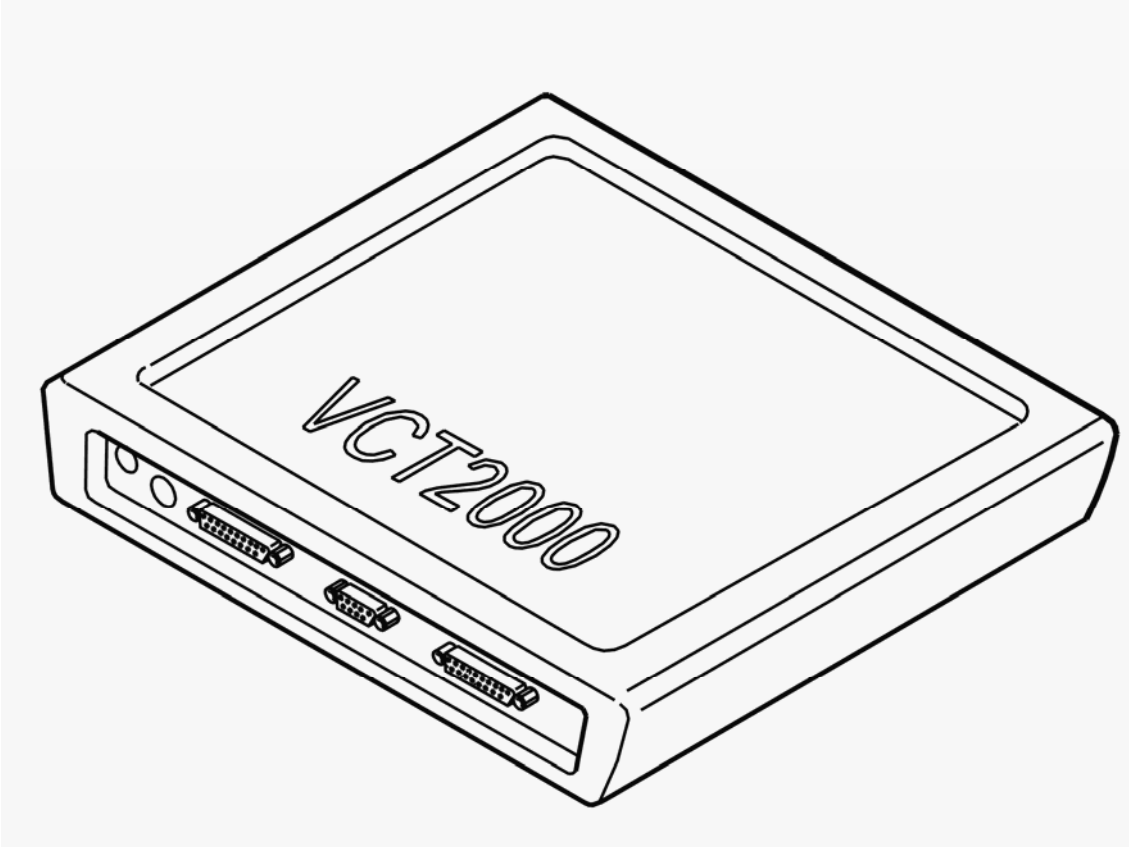


Fig. 63: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **1**

  Refer to **RESETTING THE ADAPTATION**

- **2**

  FAULT NOT FOUND: Troubleshooting has been completed.

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

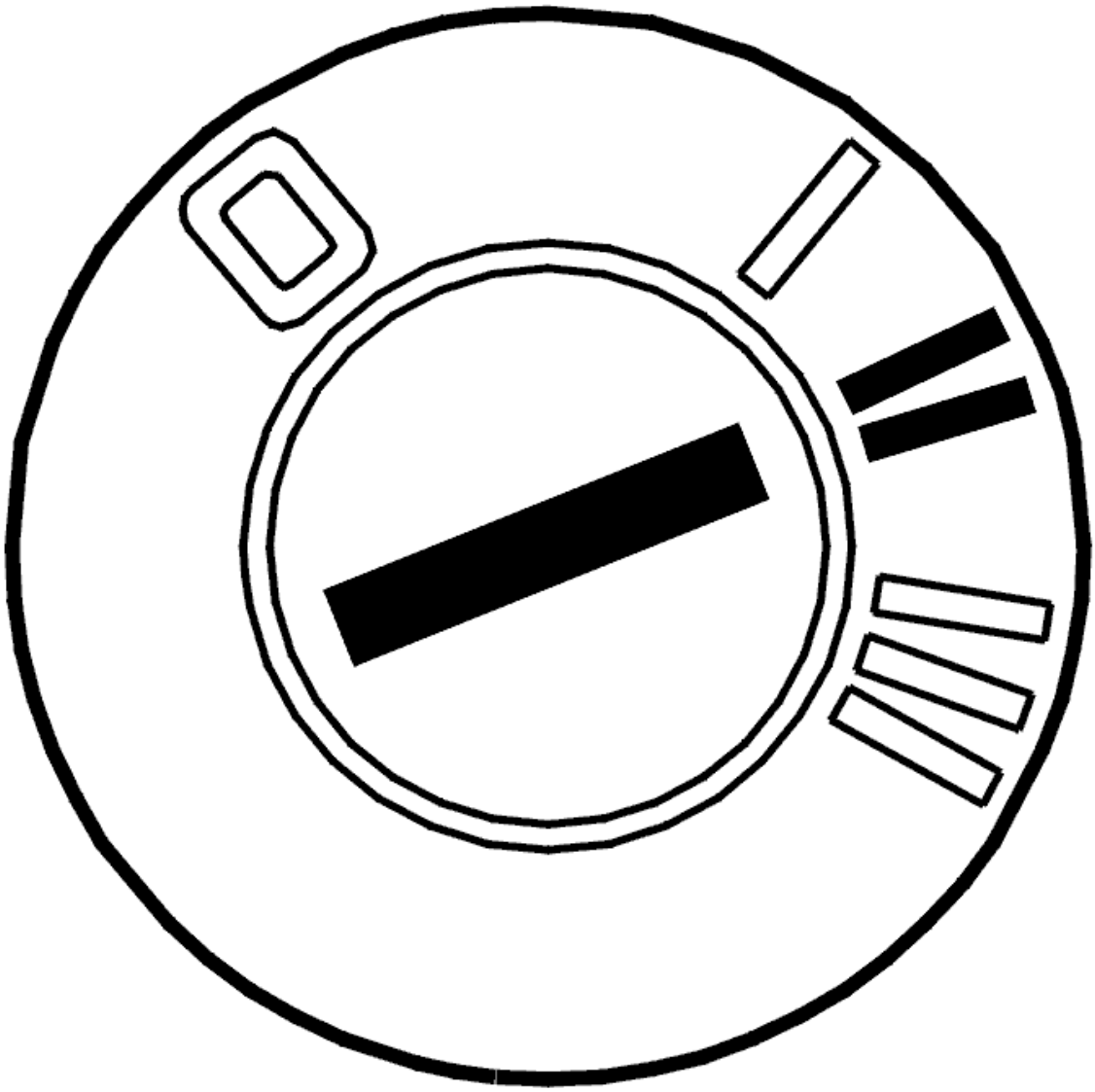


Fig. 64: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

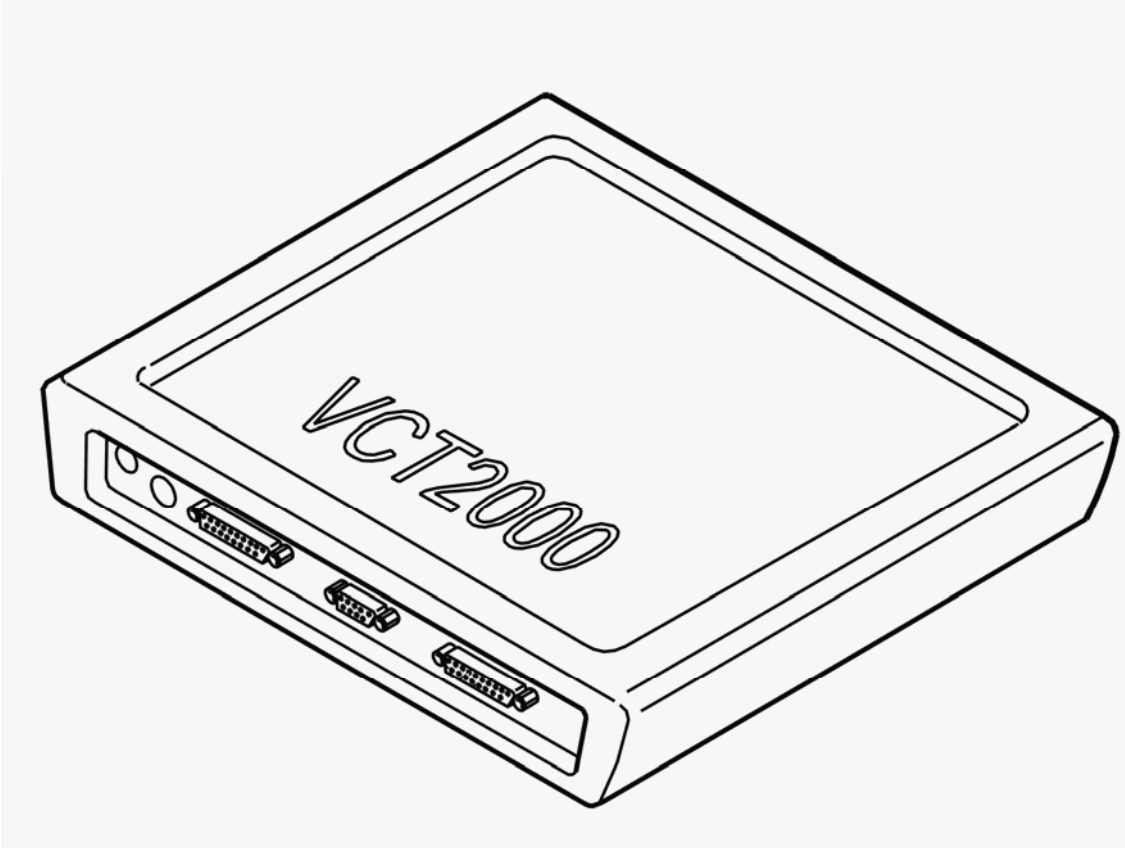


Fig. 65: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

ERASING DIAGNOSTIC TROUBLE CODES (DTCS)

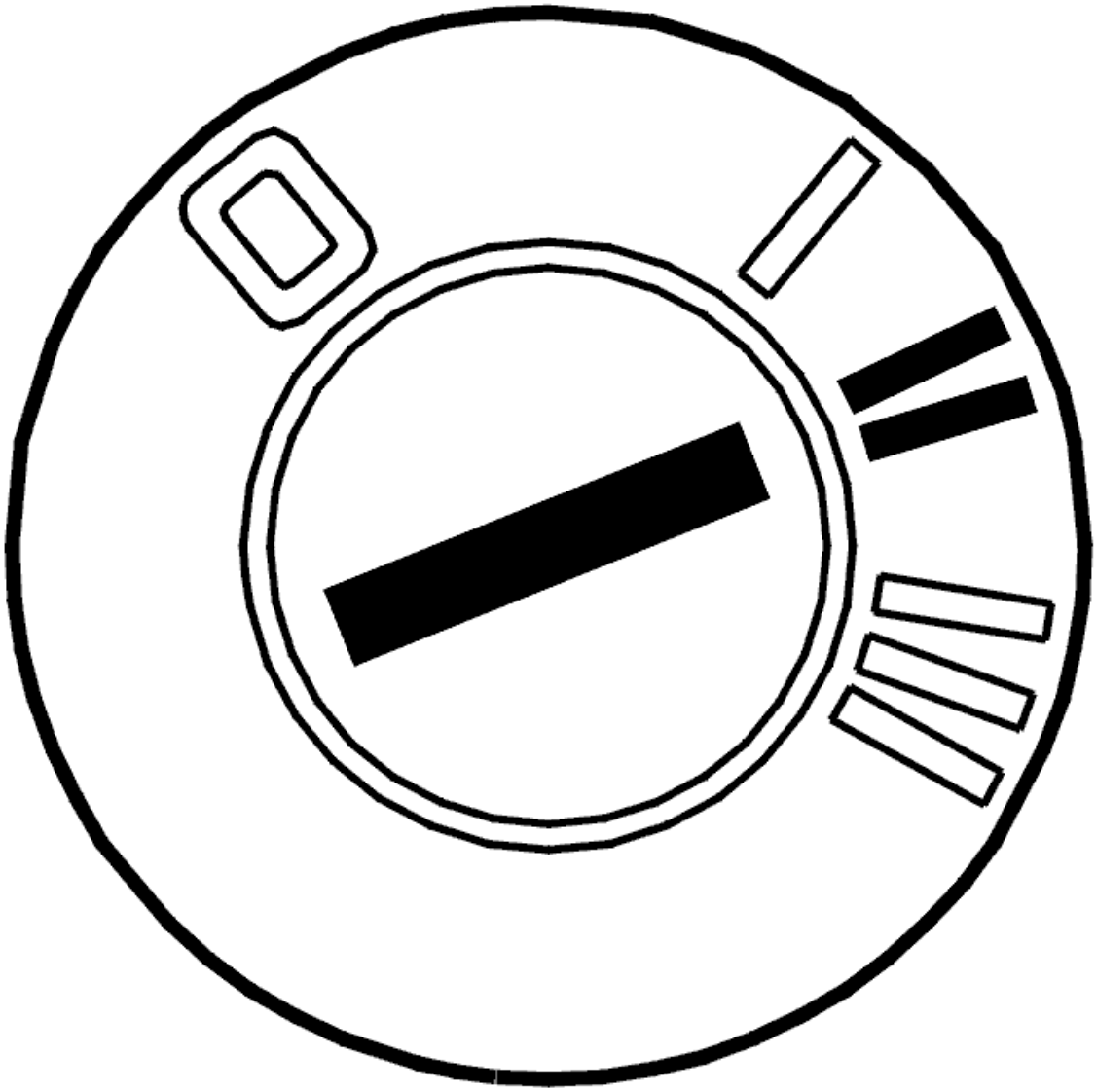


Fig. 66: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Erase diagnostic trouble codes (DTCs).

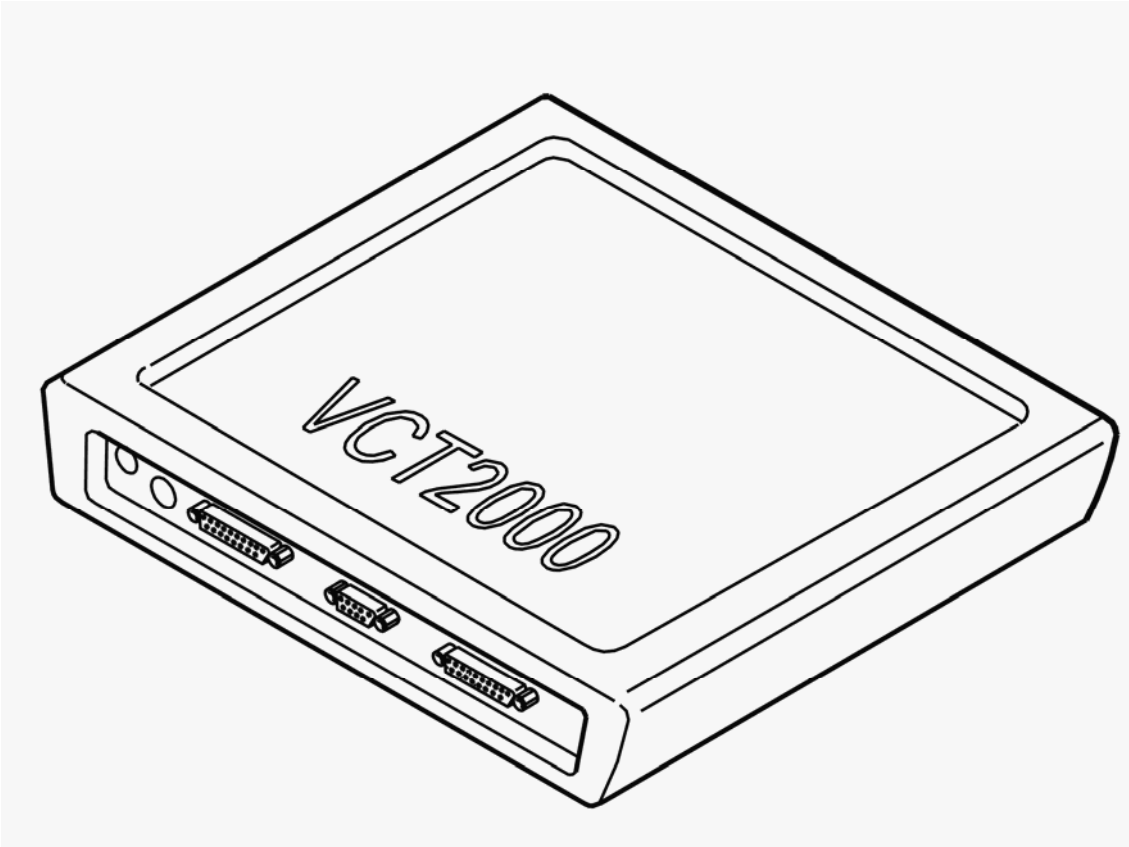


Fig. 67: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING SOFTWARE**

TEST DRIVING

NOTE: **Test drive the car according to the driving schedule below to check whether the fault is still active. The test drive is compiled in order to create the conditions in which the diagnostic trouble code (DTC) will be stored again if the fault is active.**

The TEST MODE function can be used to provoke any diagnostic trouble codes (DTC). The function reduces the conditions for how quickly diagnostic trouble codes (DTCs) are stored in the control module and the test drive becomes easier.

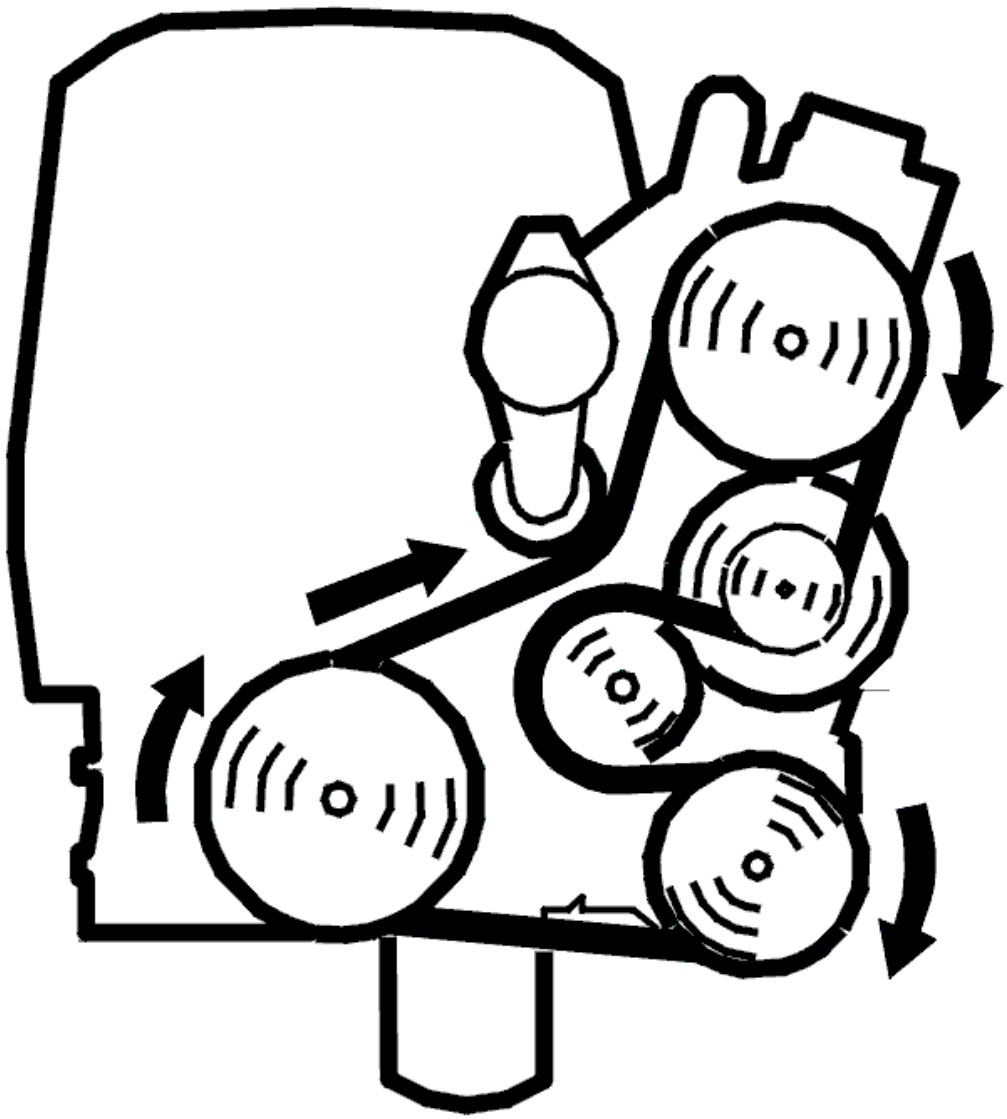


Fig. 68: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Start the engine
- Activate TEST MODE.

NOTE: Do not switch off the engine

- Disconnect the VIDA station. Test drive the car as described below.

WARNING: Please observe traffic regulations.

NOTE: Before test driving, the transmission should be at operating temperature,

approximately 80-90°C.

Move the gear selector to position 1. Accelerate carefully until the speed is just above 55 km/h.

Maintain a steady speed for approximately 20 seconds.

Shift the gear selector to positions 2, 3 and D. Maintain a steady speed for approximately 20 seconds after each up-shift.

Criteria for diagnostic trouble code (DTC):

- The gear selector is in the desired gear position for at least 15 seconds
- Speed above 30 km/h
- Positive engine torque (no engine braking)
- Engine speed in excess of 2000 rpm.

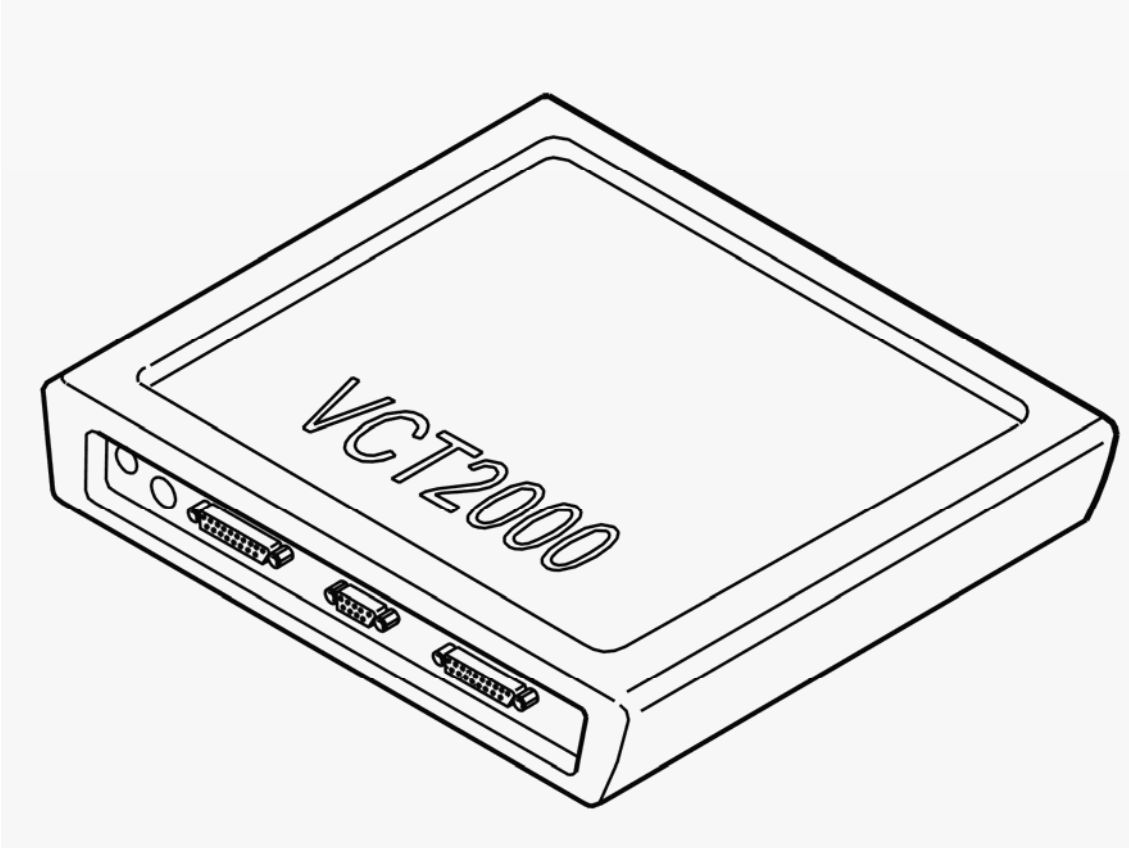


Fig. 69: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

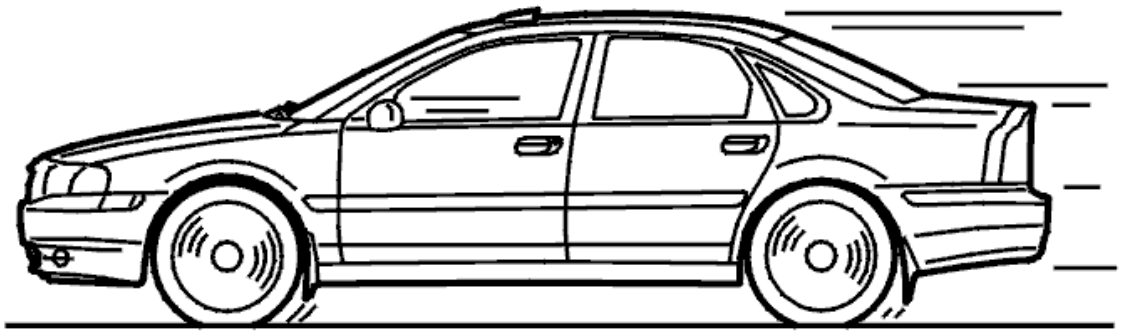


Fig. 70: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)**

CHECKING DIAGNOSTIC TROUBLE CODES (DTCS)

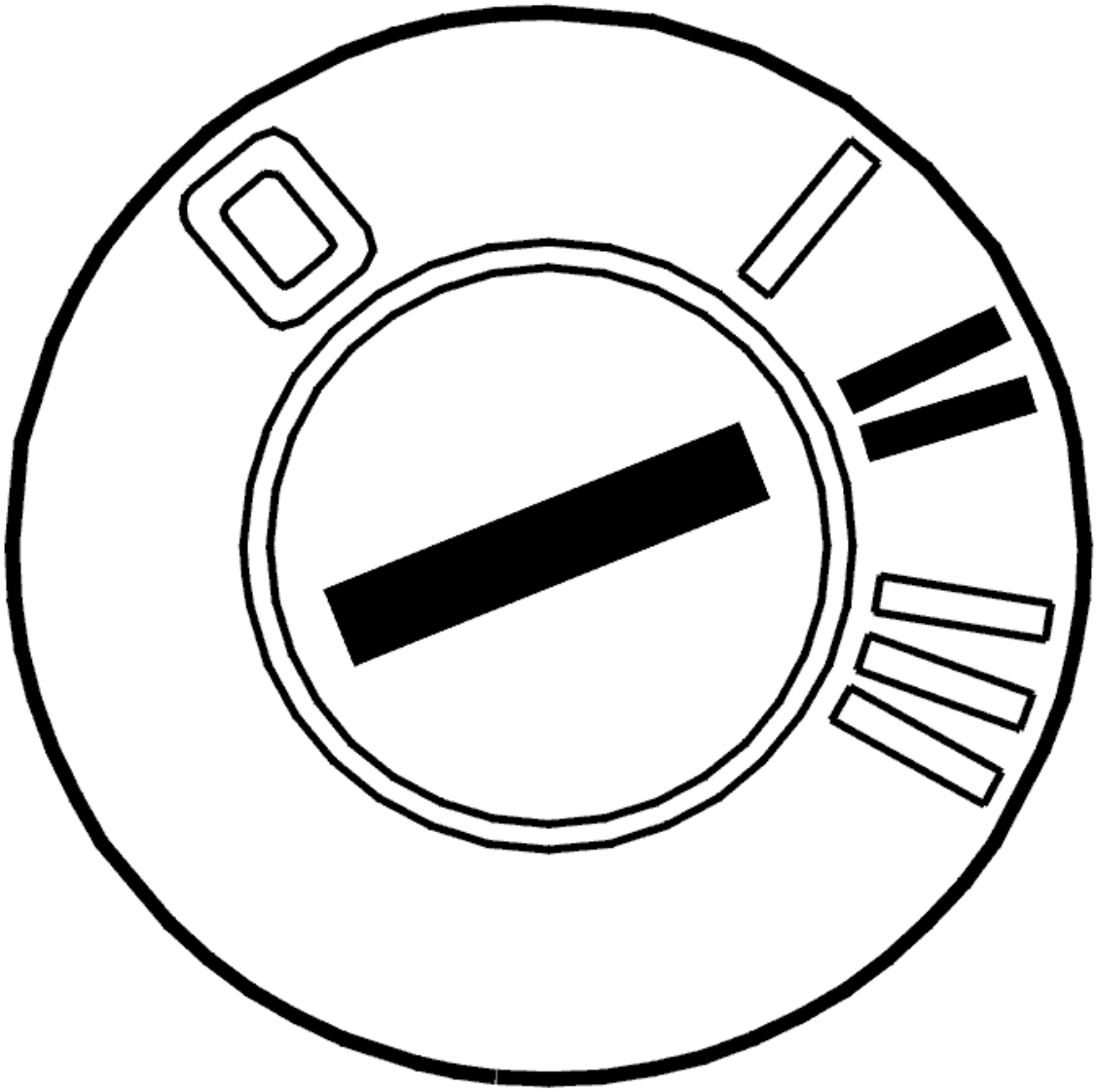


Fig. 71: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off diagnostic trouble codes (DTCs).

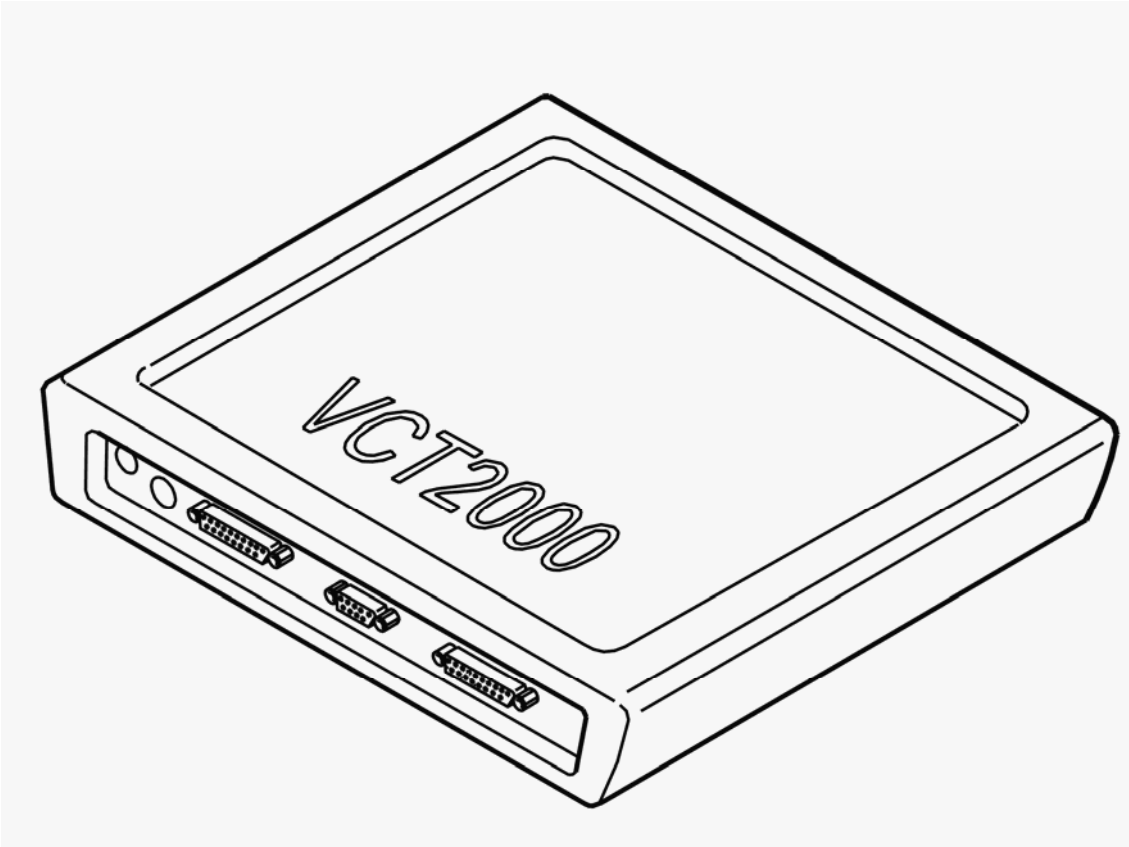


Fig. 72: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is diagnostic trouble code (DTC) TCM 000B or TCM-000C stored?

- **YES**

  Refer to **INFORMATION**

- **NO**

  NO DTC

CHECKING SOFTWARE

CHECKING SOFTWARE

NOTE: To carry out fault-tracing, the transmission control module (TCM) must be programmed with specific software.

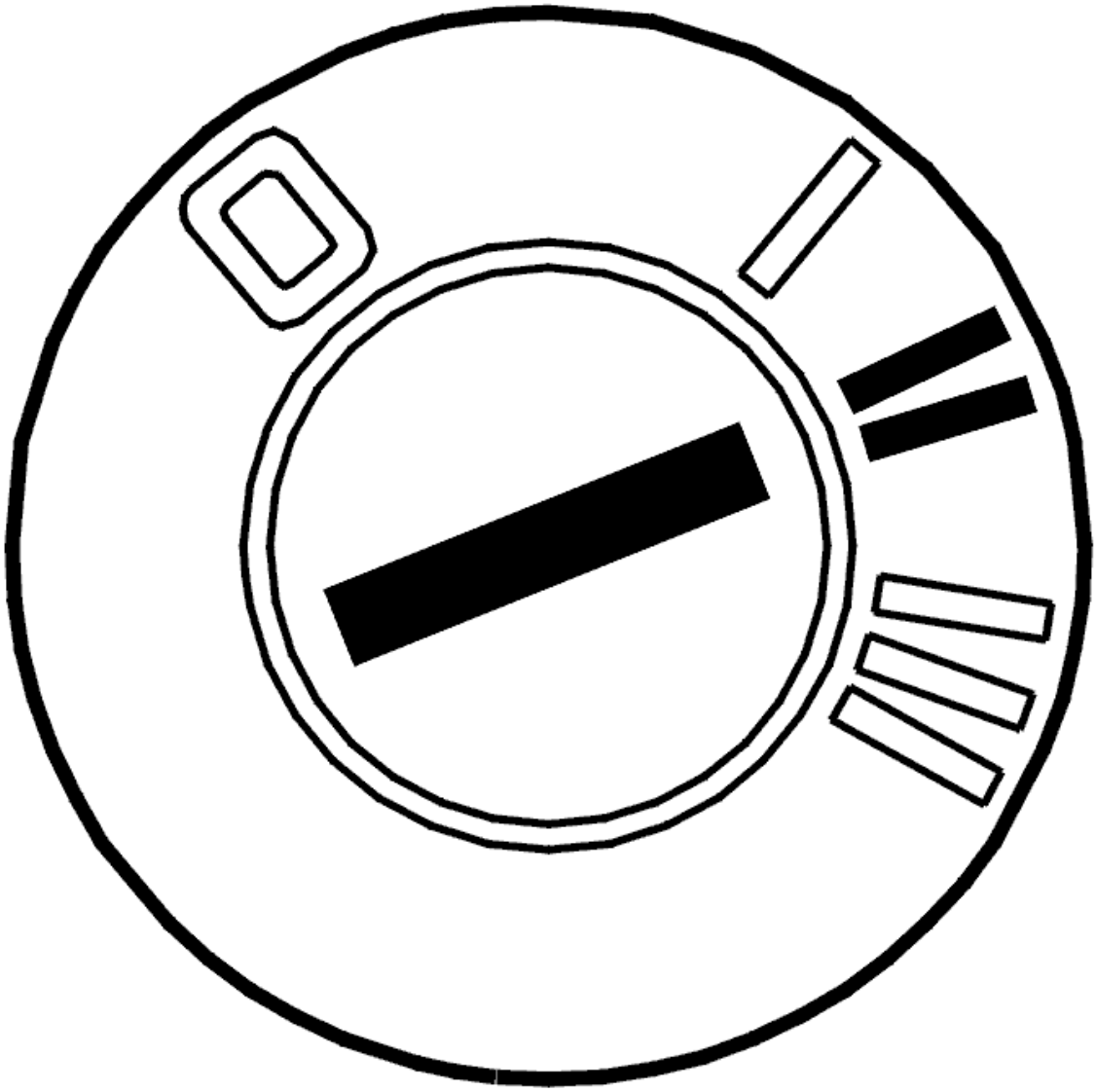


Fig. 73: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the control module diagnostic number.

  Check the read off diagnostic number against the diagnostic numbers given in the center table.

  If the diagnostic number is included in the table, the control module must be programmed with the latest software.

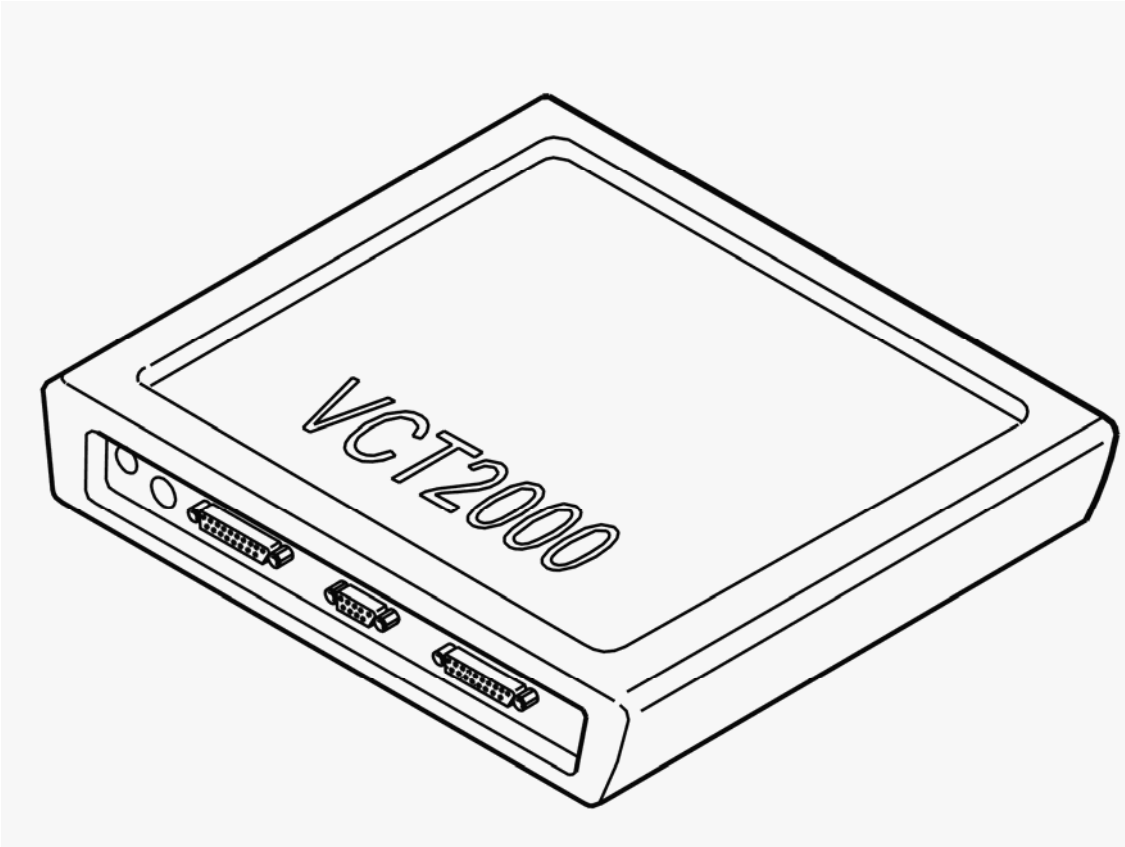


Fig. 74: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

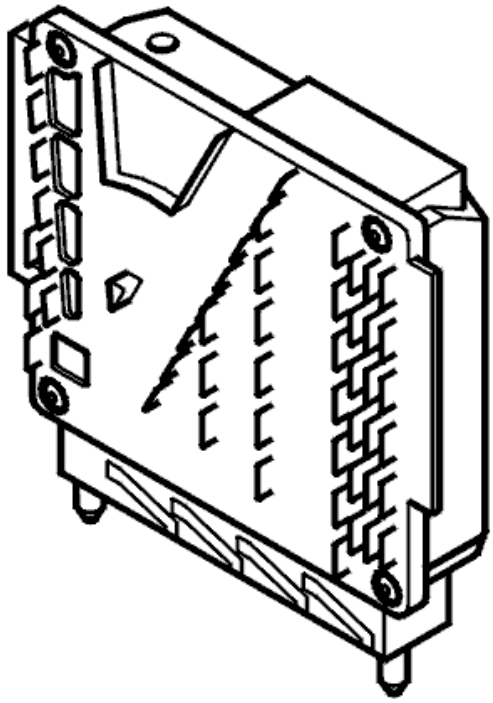


Fig. 75: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

CHECKING GEAR SELECTOR (4T65 AWD; 2003-2006)

CHECKING GEAR SELECTOR

CHECKING MECHANICAL TRANSMISSION CABLE

Check the adjustment of the transmission cable. Adjust if necessary.

Other information

- To adjust the mechanical transmission cable at the gear selector assembly:
  - For B5xx4T2, see **GEAR SELECTOR CABLES, ADJUSTING**
  - For B6xx4T, see **GEAR SELECTOR CABLE, ADJUSTING** .

CHECKING IGNITION SWITCH INTERLOCK (4T65 AWD; 2003-2006)

CHECKING IGNITION SWITCH INTERLOCK

FUNCTION TEST

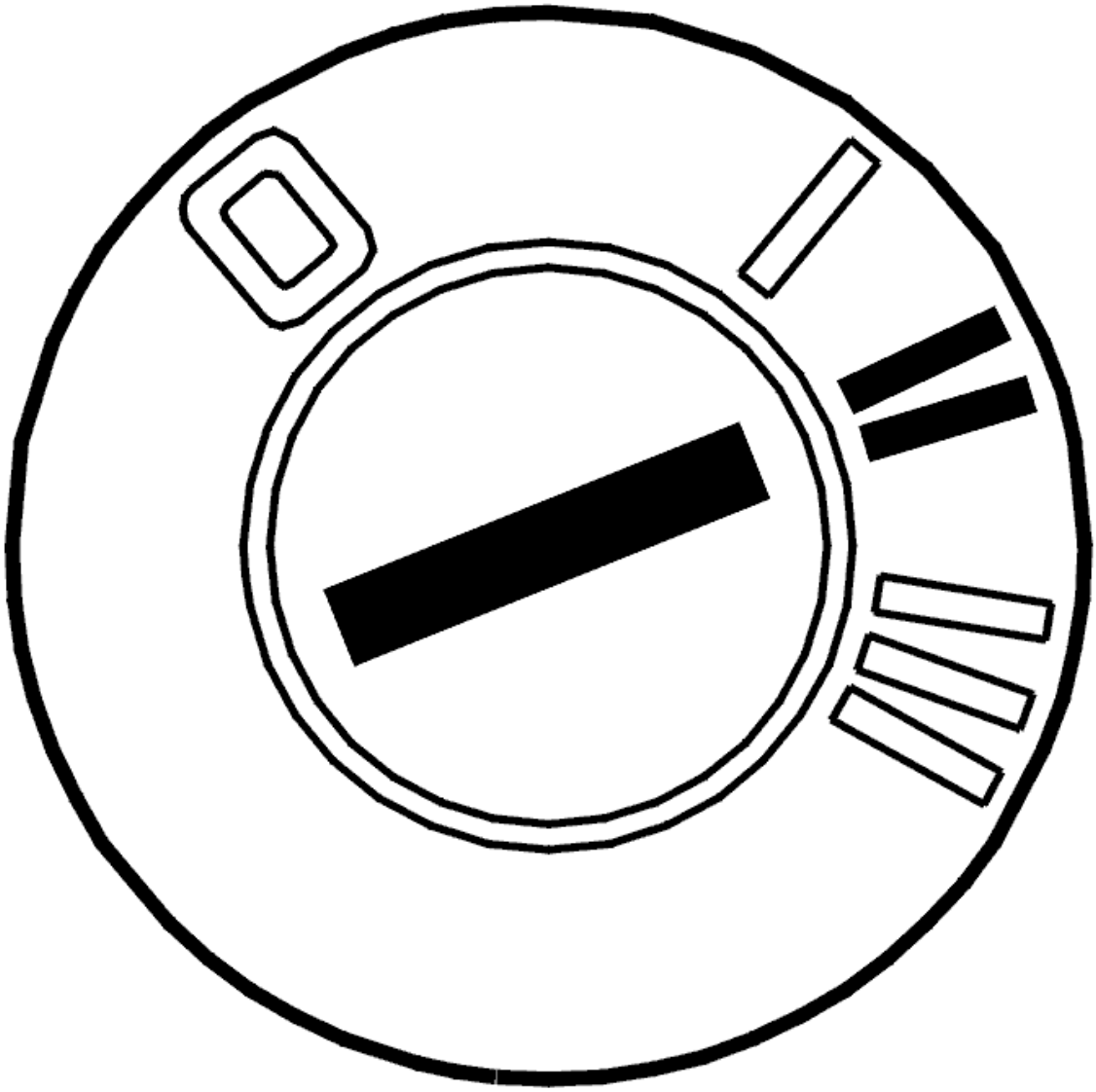


Fig. 76: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Depress the brake pedal.

Check if the gear selector can be moved from gear position P.

Could the gear selector be moved?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING MECHANICAL CABLE FOR THE IGNITION SWITCH INTERLOCK**

CHECKING MECHANICAL CABLE FOR THE IGNITION SWITCH INTERLOCK

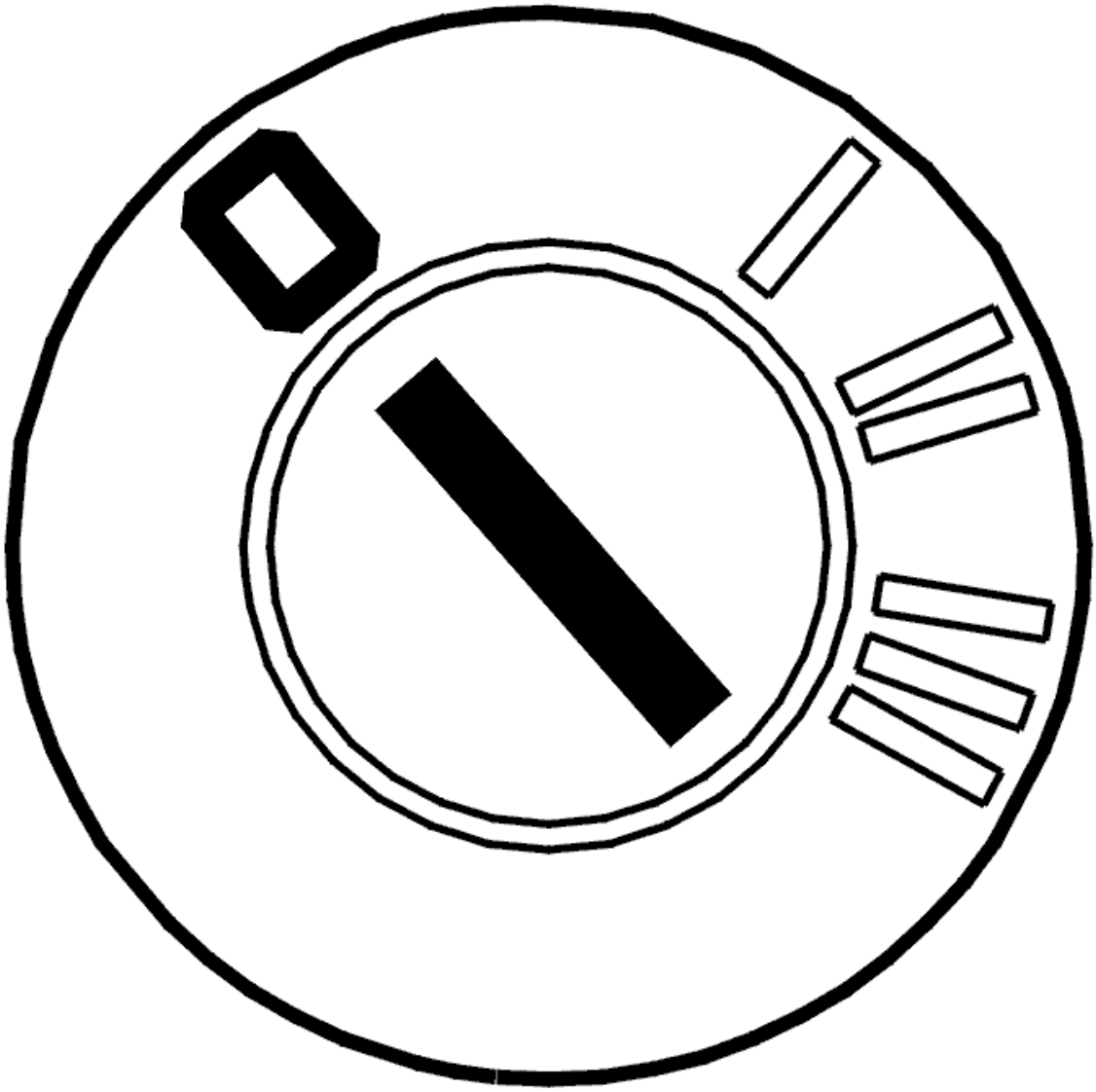


Fig. 77: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check if the mechanical cable for the ignition switch interlock requires adjustment. See **CABLE KEY INTERLOCK, REPLACING** .

  Remedy as necessary.

Was the mechanical cable correctly adjusted?

- **YES**

  Refer to **CHECKING GEAR-SHIFT POSITION SENSOR**

- **NO**

  Refer to **VERIFICATION**

CHECKING GEAR-SHIFT POSITION SENSOR

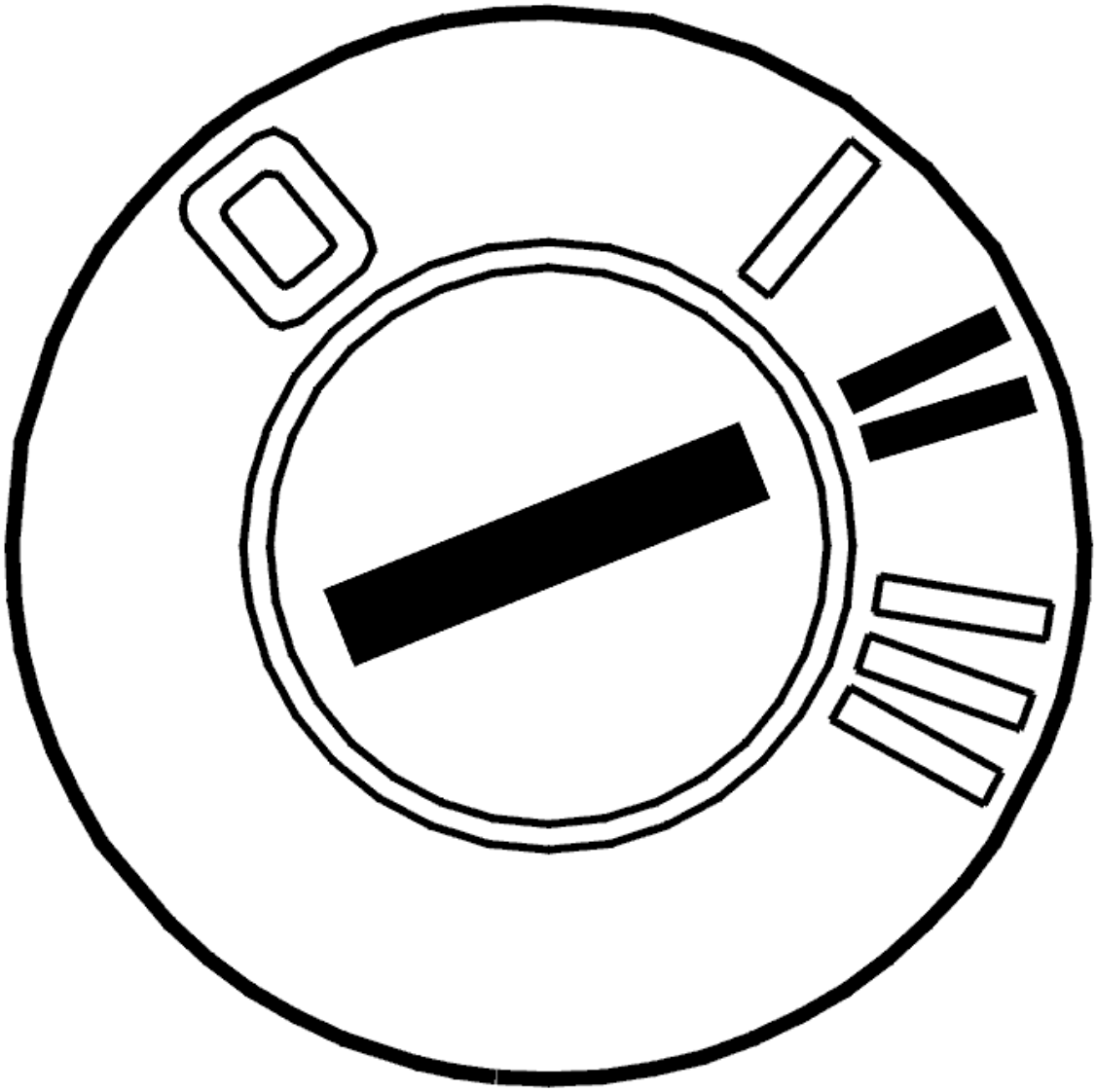


Fig. 78: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the position of the gear-shift position sensor

NOTE: Select the correct gear selector assembly from the list.

NOTE: An undefined position may be displayed between the fixed gear positions. This is not a fault.

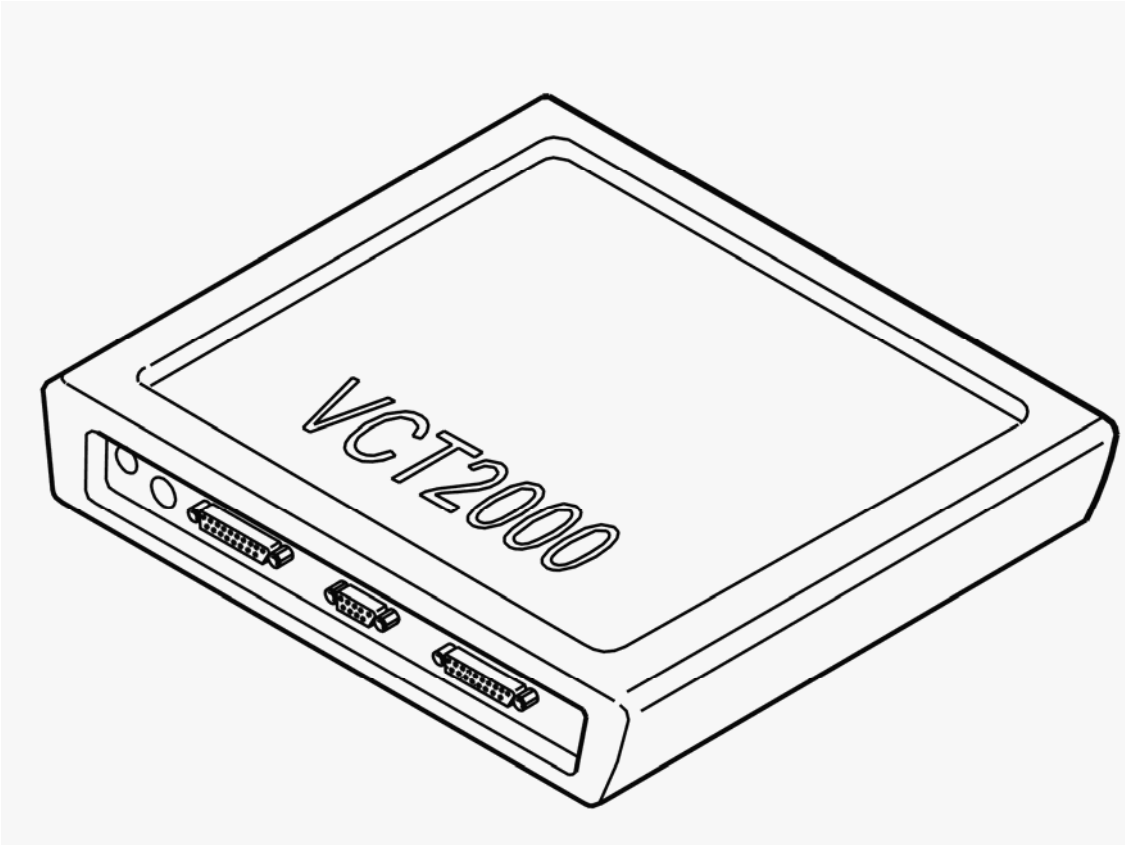


Fig. 79: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

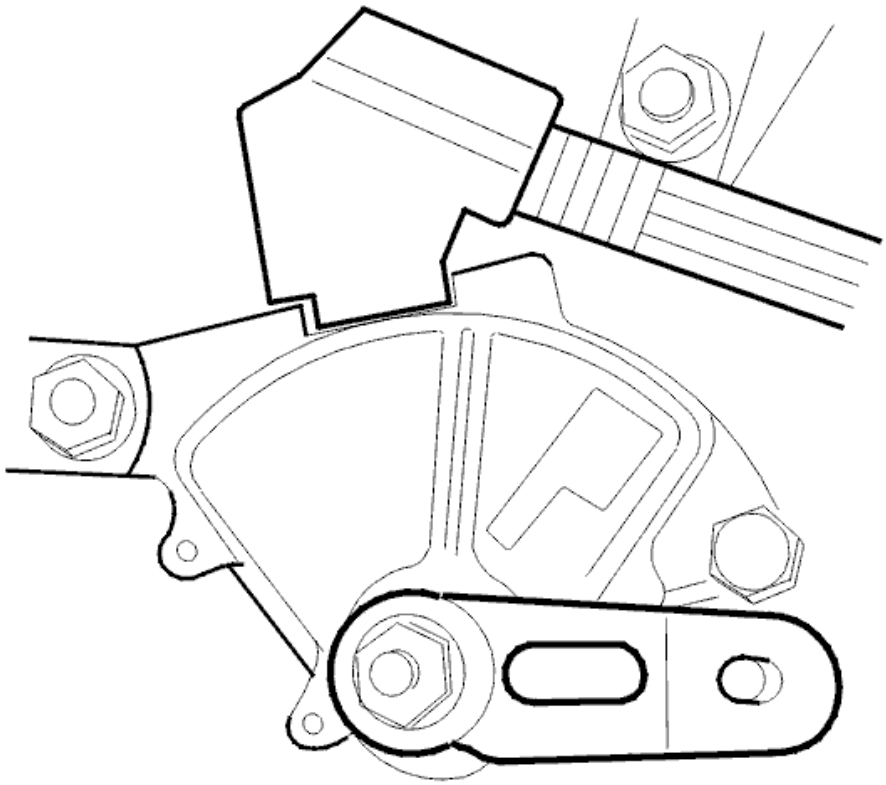


Fig. 80: Identifying Gear-Shift Position Sensor
Courtesy of VOLVO CARS CORPORATION

- Check the gear-shift position sensor by moving the gear selector several times to all the gear positions.

  The selected position must be the same as that displayed in VIDA (Volvo scan tool). If the display shows an undefined position (e. g. OR) when a specific gear is selected, the transmission cable needs adjusting.

  If the mechanical cable is incorrectly adjusted, check that the transmission cable is correctly installed in the mounting on the transmission.

  The transmission cable adjustment should sit upwards.

  Remedy as necessary.

  Other information:

  - To adjust the transmission cable:
    - For B5xx4T2, see **GEAR SELECTOR CABLES, ADJUSTING**
    - For B6xx4T, see **GEAR SELECTOR CABLE, ADJUSTING** .

Was the gear-shift position sensor or the control incorrectly adjusted?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

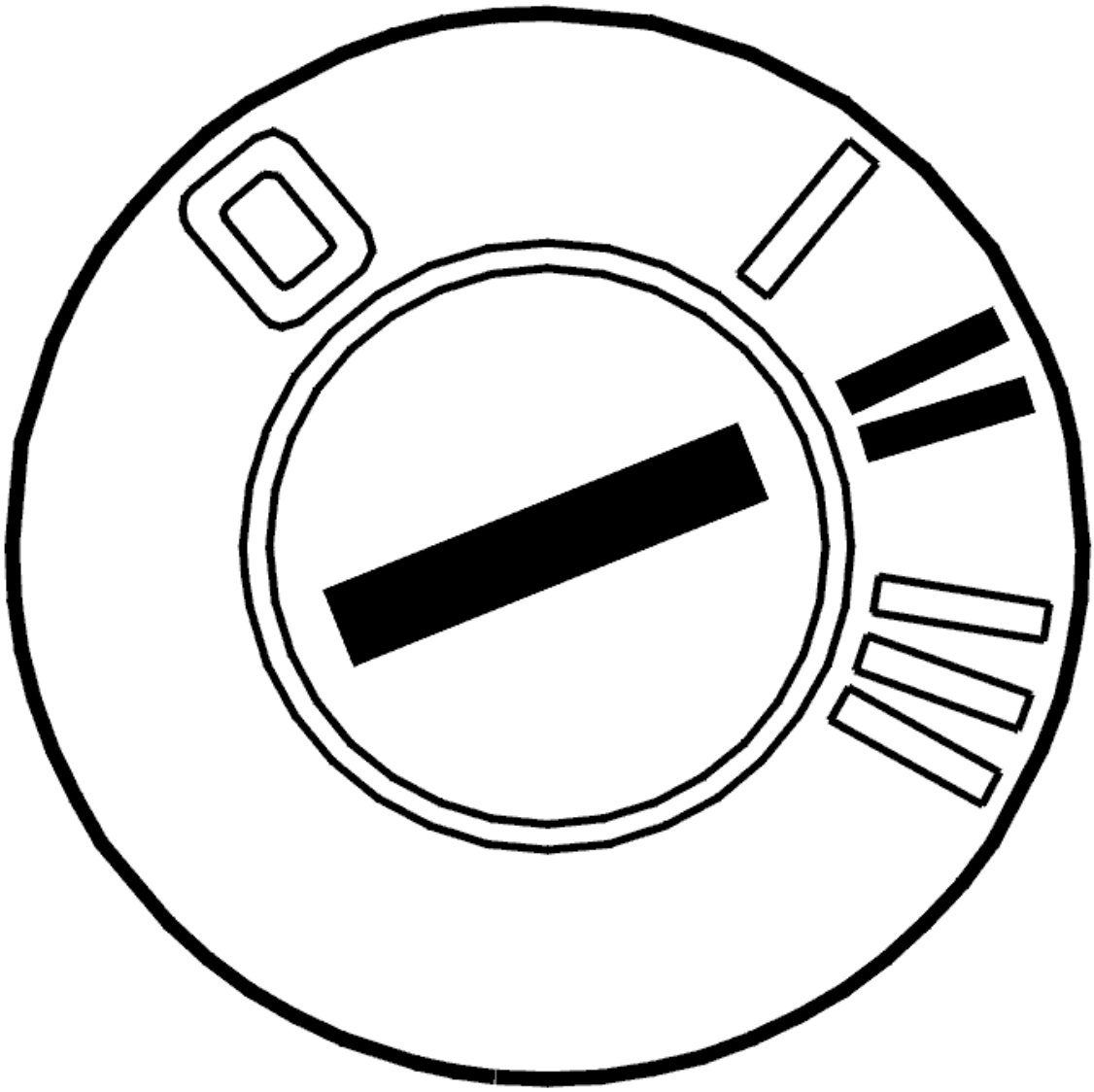


Fig. 81: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Gear selector in position P.

  Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.

  Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

CABLE KEY INTERLOCK, REPLACING

- See **CABLE KEY INTERLOCK, REPLACING** .

FAULT-TRACING INFORMATION

Condition

- No diagnostic trouble codes (DTCs) stored.

Possible Source

- The mechanical cable for the ignition switch interlock cable is incorrectly adjusted
- The transmission cable is incorrectly adjusted.

Fault symptom[s]

- The gear selector is jammed in position P.

CHECKING JOIN BETWEEN THE TRANSMISSION HOUSING AND MATING FLANGE FOR LEAKS (AW50/51 AWD; AW55-50/51SN; 2003-2007)

CHECKING JOIN BETWEEN THE TRANSMISSION HOUSING AND MATING FLANGE FOR LEAKS

CHECKING JOIN BETWEEN THE TRANSMISSION HOUSING AND MATING FLANGE FOR LEAKS

Check the join between the transmission housing and mating flange for leaks.

In case of leakage, replace the transmission.

Other information:

- For information about removal/installation, see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

CHECKING LOCK-UP FUNCTION (4T65 AWD; 2003-2006)

CHECKING LOCK-UP FUNCTION

CHECKING SOFTWARE

CHECKING SOFTWARE

NOTE: To carry out fault-tracing, the transmission control module (TCM) must be programmed with specific software.

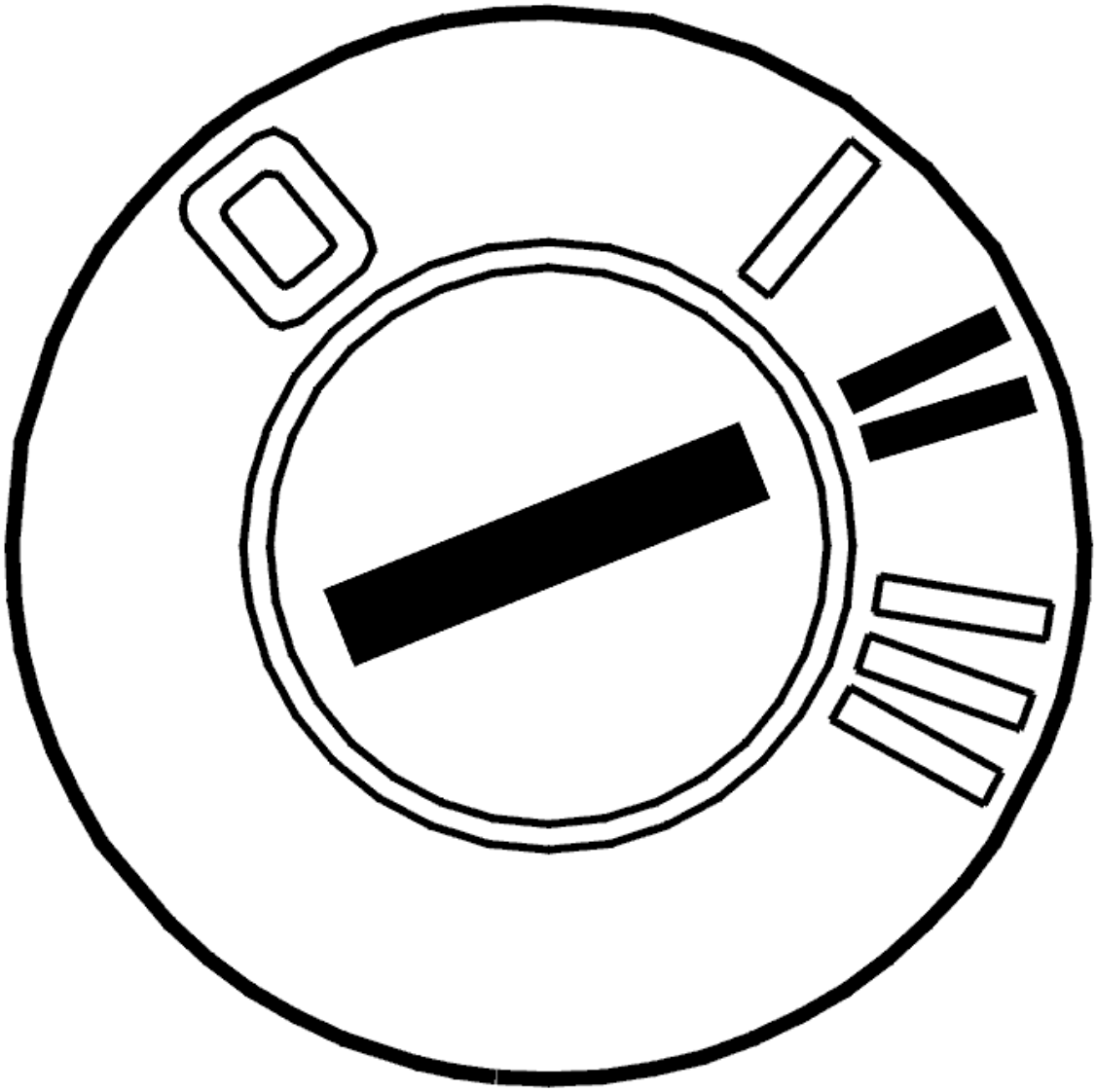


Fig. 82: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the control module diagnostic number.

  Check the read off diagnostic number against the diagnostic numbers given in the center table.

  If the diagnostic number is included in the table, the control module must be programmed with the latest software.

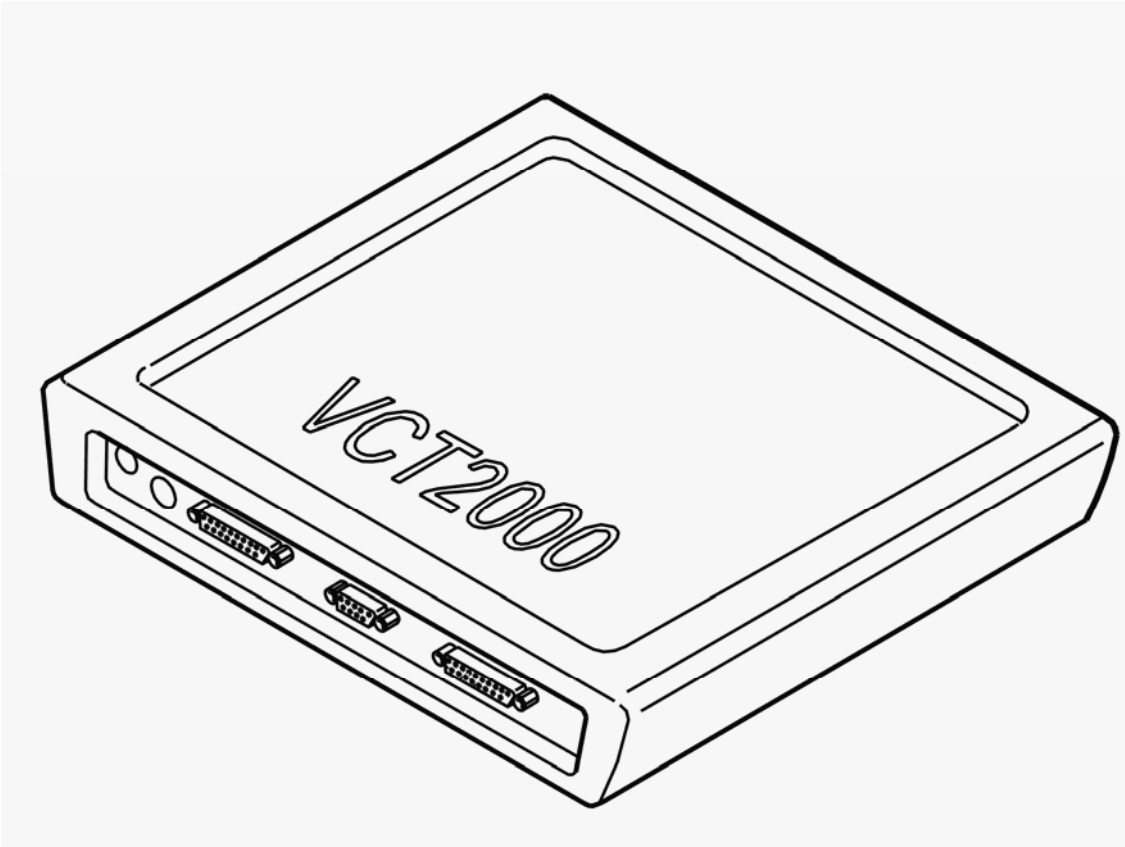


Fig. 83: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

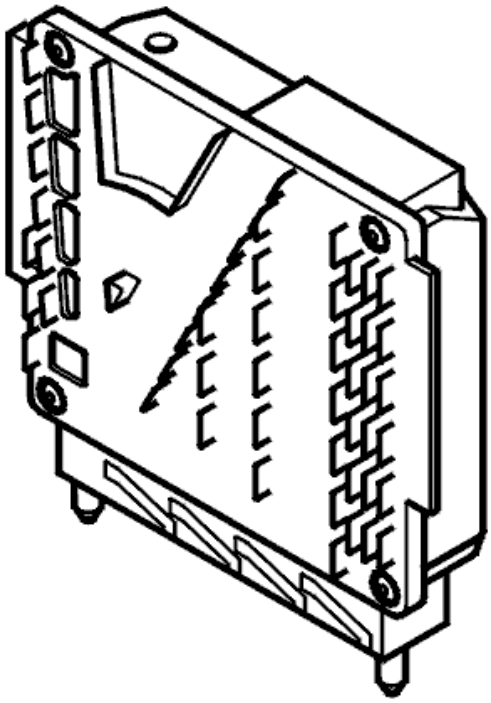


Fig. 84: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CONNECTING THE T PIPE**

CONNECTING THE T PIPE

CONNECTING THE T PIPE

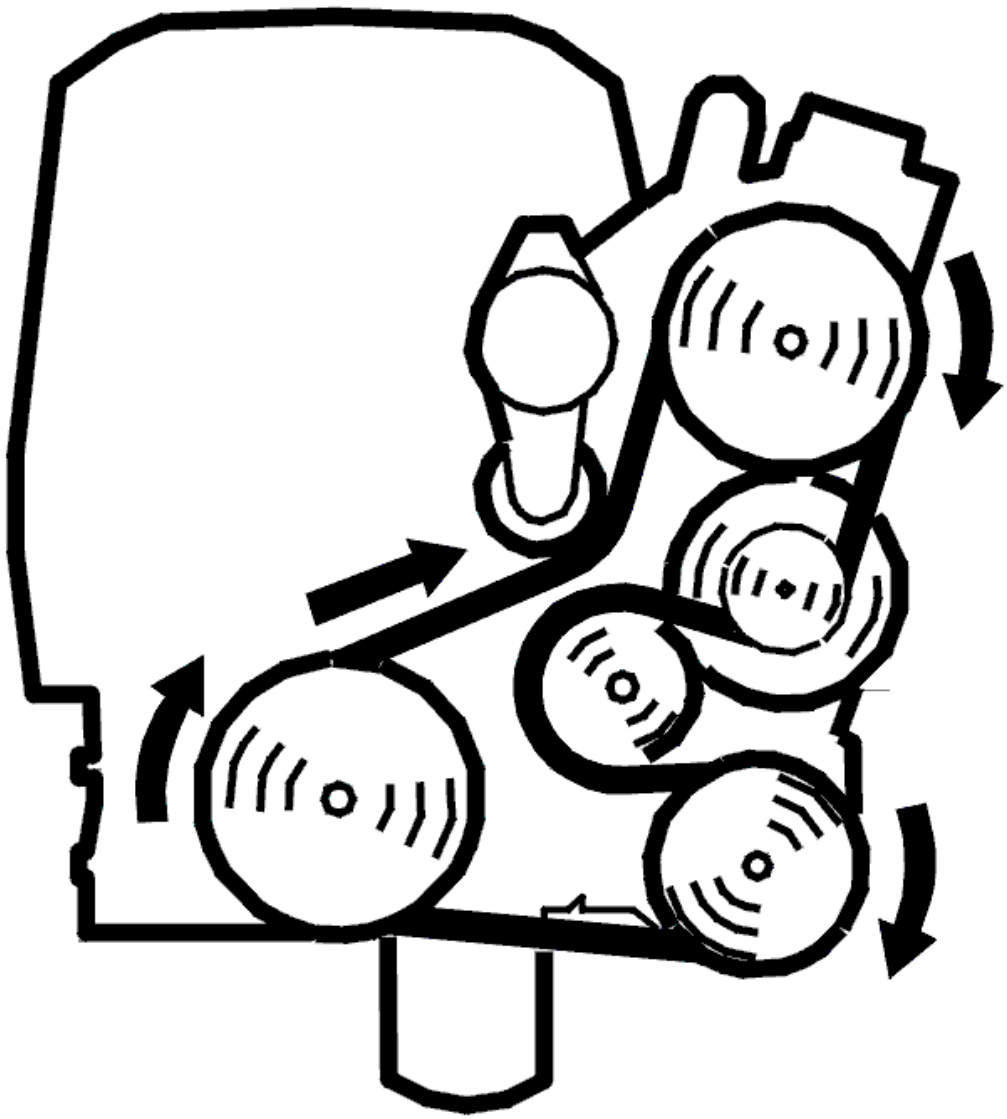


Fig. 85: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Deactivate the function for STC/DSTC by pressing in the button for STC/DSTC for approximately 2 seconds
- Ignition off
- Connect the T-pipe see **9997002** with oil pressure gauge see **9995114** to the coolant hose from the transmission for the oil cooler
- Raise the car so that the drive wheels are clear of the ground.

WARNING: Ensure that the car safely raised. Ensure that there are no objects caught in the front wheels.

- Start the engine

- Gear selector in position P
- Activate the function "Block automatic shifting".

Other information

- To connect the T-pipe to the oil cooler for the transmission. See **T-PIPE, CONNECTION TO OIL COOLER** .

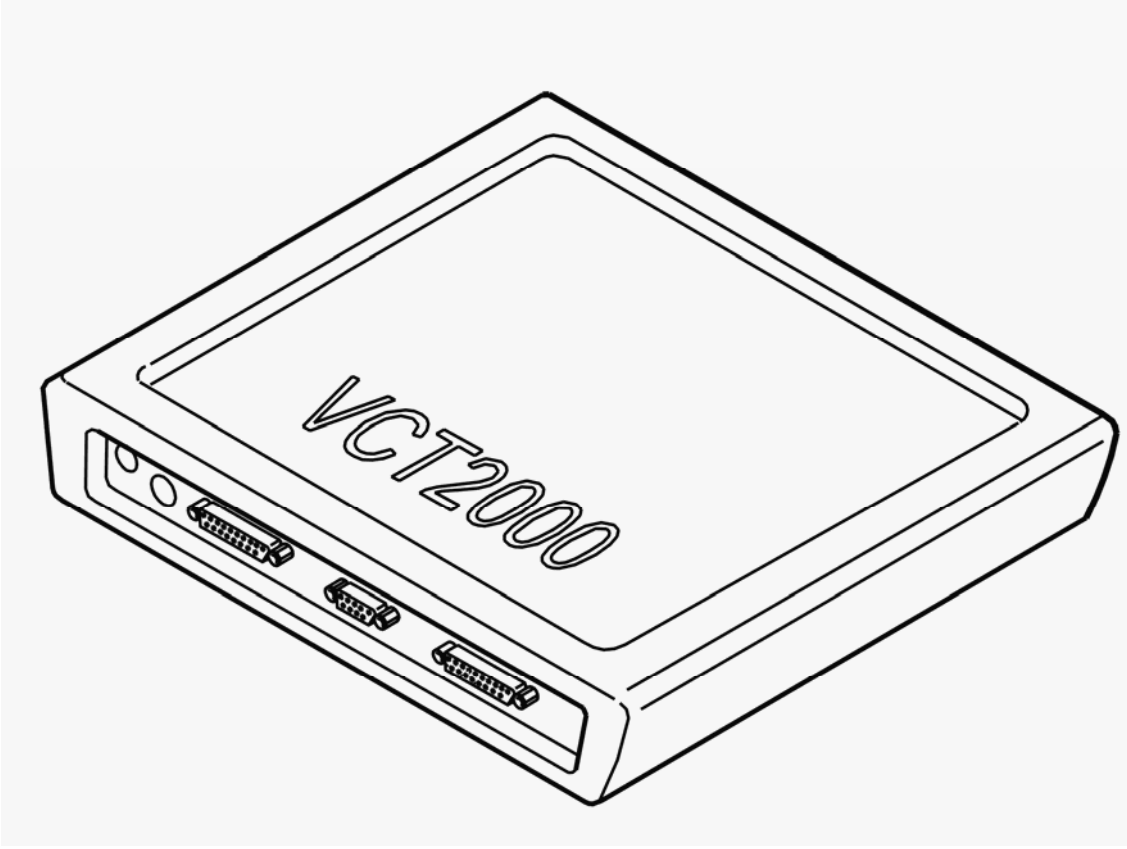


Fig. 86: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Allow the engine to run.

- **Continue**

Refer to **CHECKING SOLENOID SL**

CHECKING SOLENOID SL

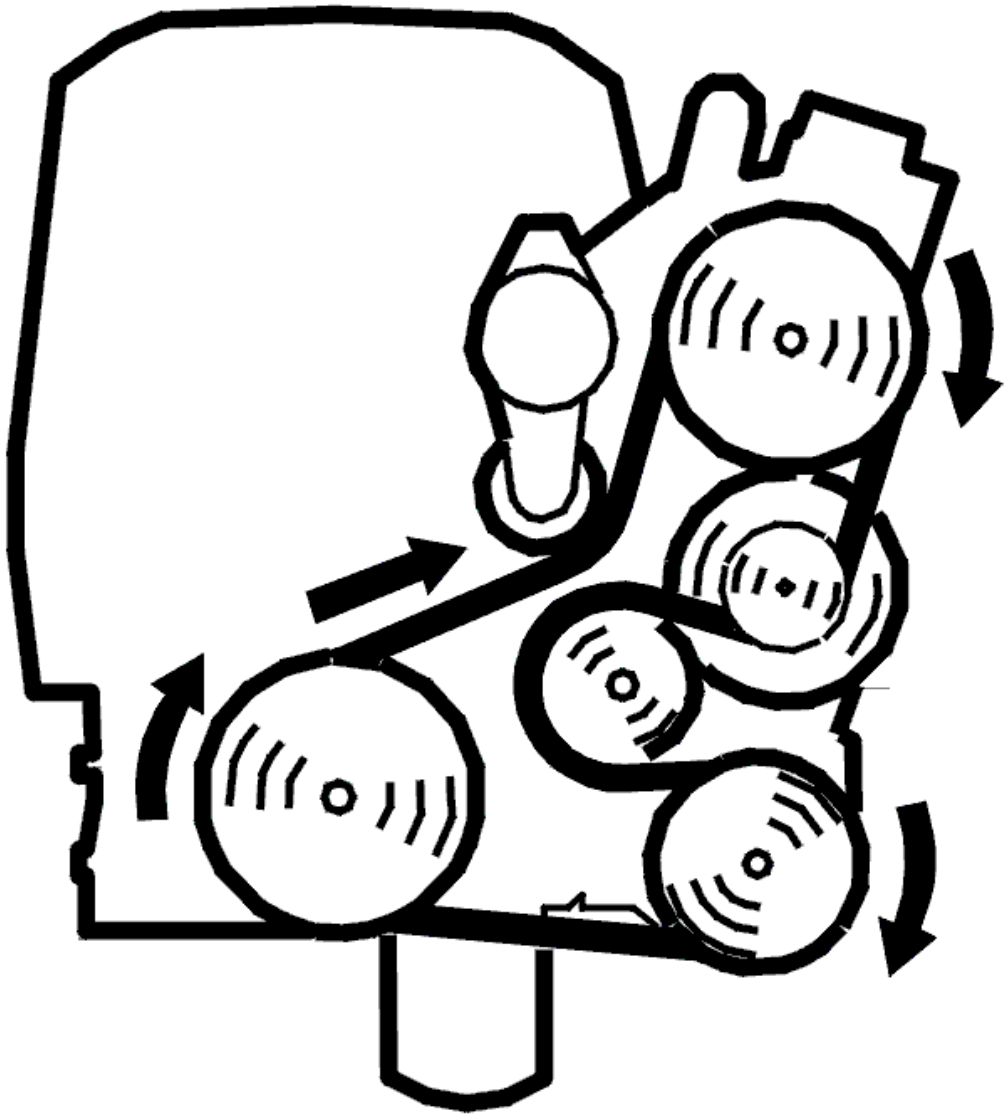


Fig. 87: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Engine running
- Move the gear selector to position D
- Activate the solenoid for gear 2 and then the lock-up function
- Check the pressure change on the oil pressure gauge. A considerable change in pressure should be observed
- Deactivate the lock-up function. Check the pressure change.

  Repeat the activation and deactivation of the lock-up function a few times to ensure accurate results.

  HINT: Unchanged pressure means that the control system is defective.

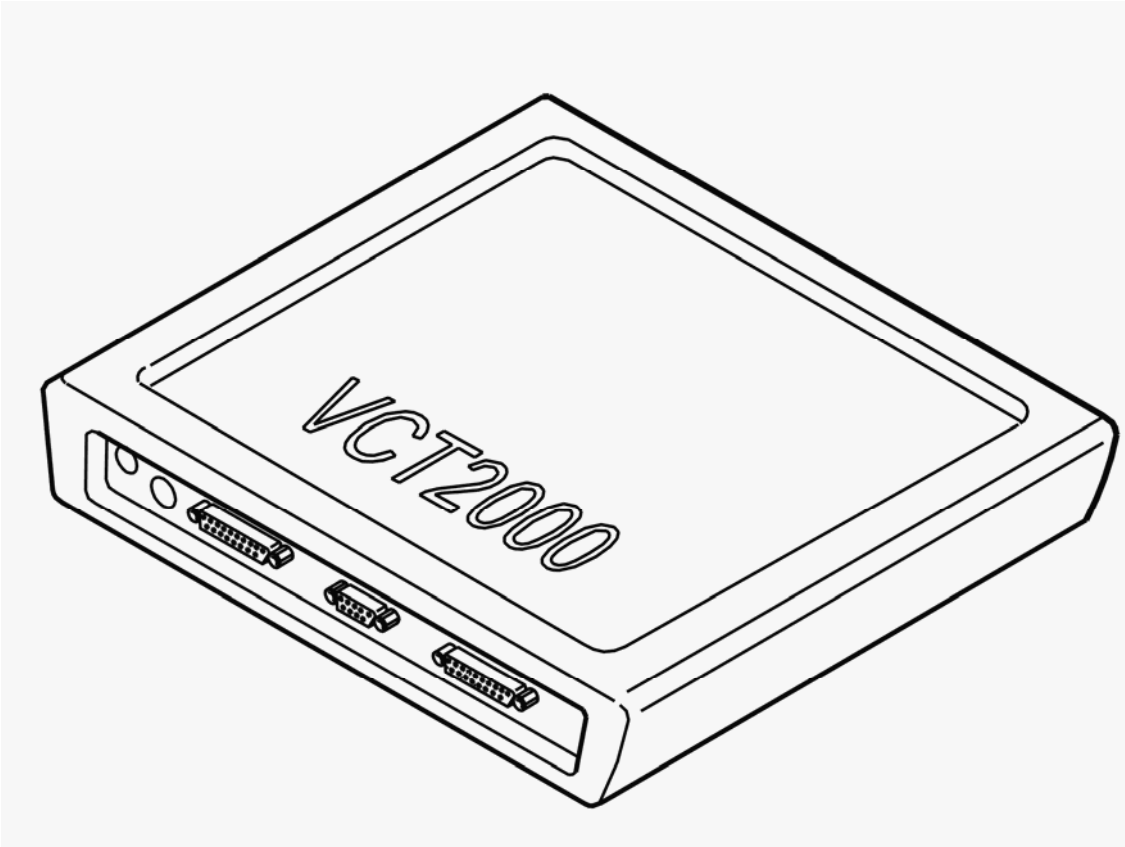


Fig. 88: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Did the pressure change?

- **YES**

  Refer to **CHECKING LOCK-UP FUNCTION**

- **NO**

  Refer to **REPLACING THE TRANSMISSION CONTROL SYSTEM**

CHECKING LOCK-UP FUNCTION

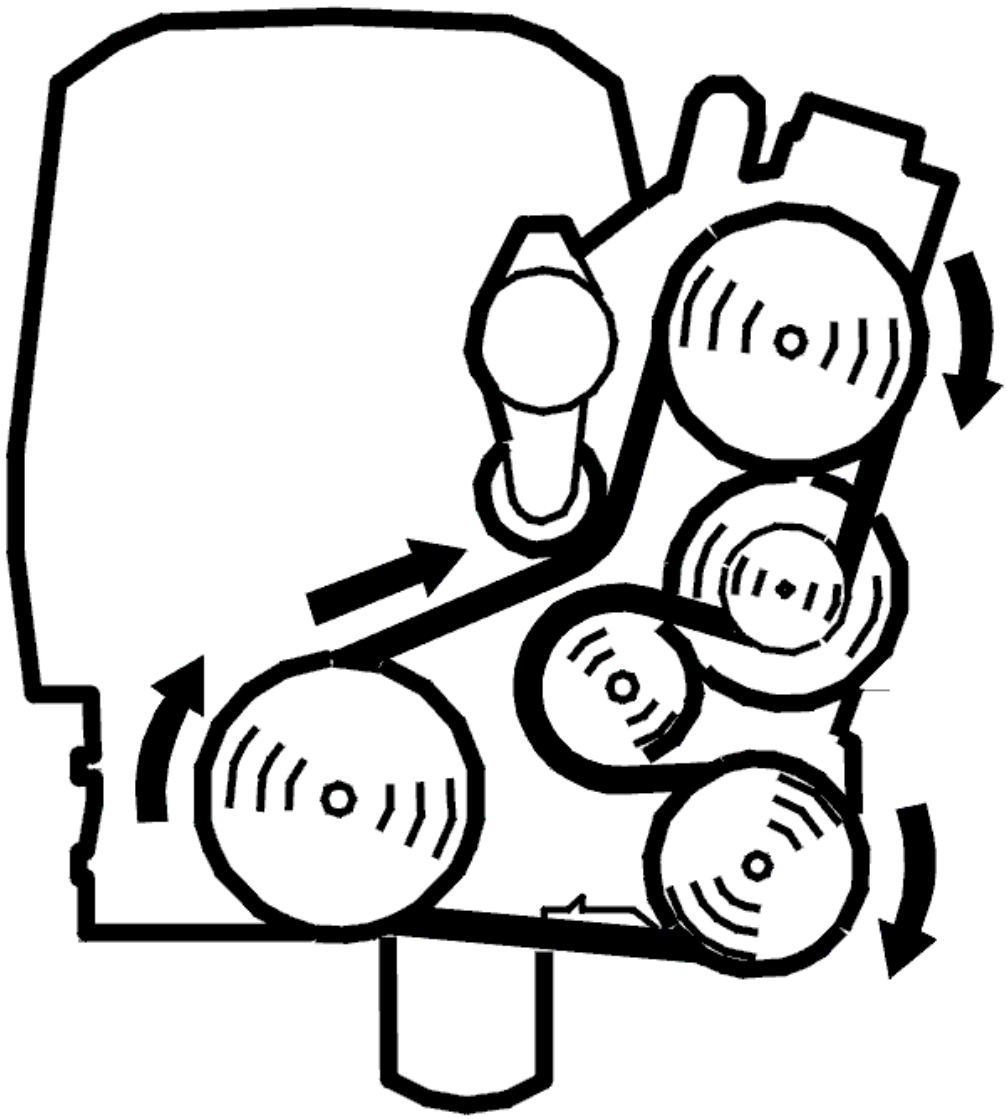


Fig. 89: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Engine running
- Car raised so that the driven wheels hang freely
- Move the gear selector to position D
- Read the transmission input speed, the engine speed (RPM), the status of the lock-up function and the position of the accelerator pedal (AP).

  Depress the accelerator pedal (AP) and check the lock-up function by comparing the input speed of the transmission and the engine speed (RPM). The transmission and the engine speed (RPM) must be approximately the same. The lock-up function is not functioning if the difference is greater than 100 rpm.

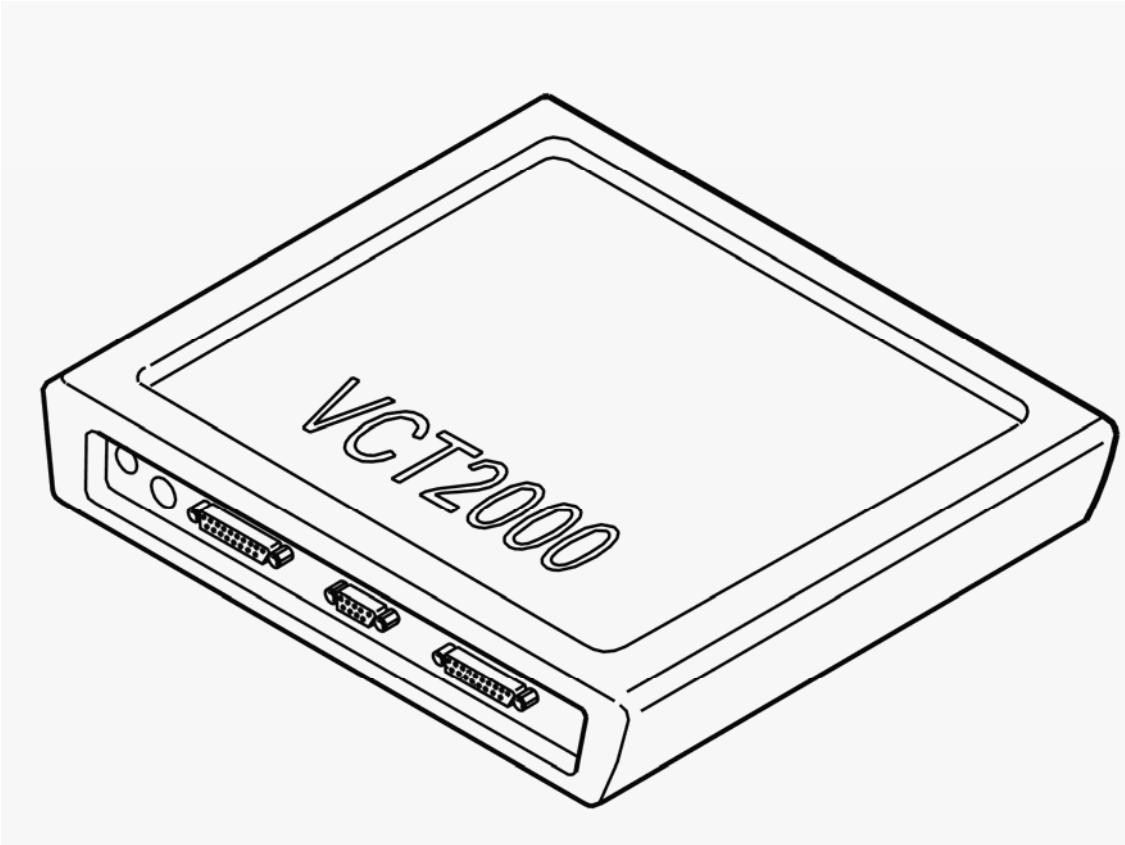


Fig. 90: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the difference in speed (RPM) greater than 100 rpm?

- **YES**

  Refer to **REPLACING A FAULTY TRANSMISSION**

- **NO**

  Refer to **CHECKING RESISTANCE, SOLENOID SL**

CHECKING RESISTANCE, SOLENOID SL

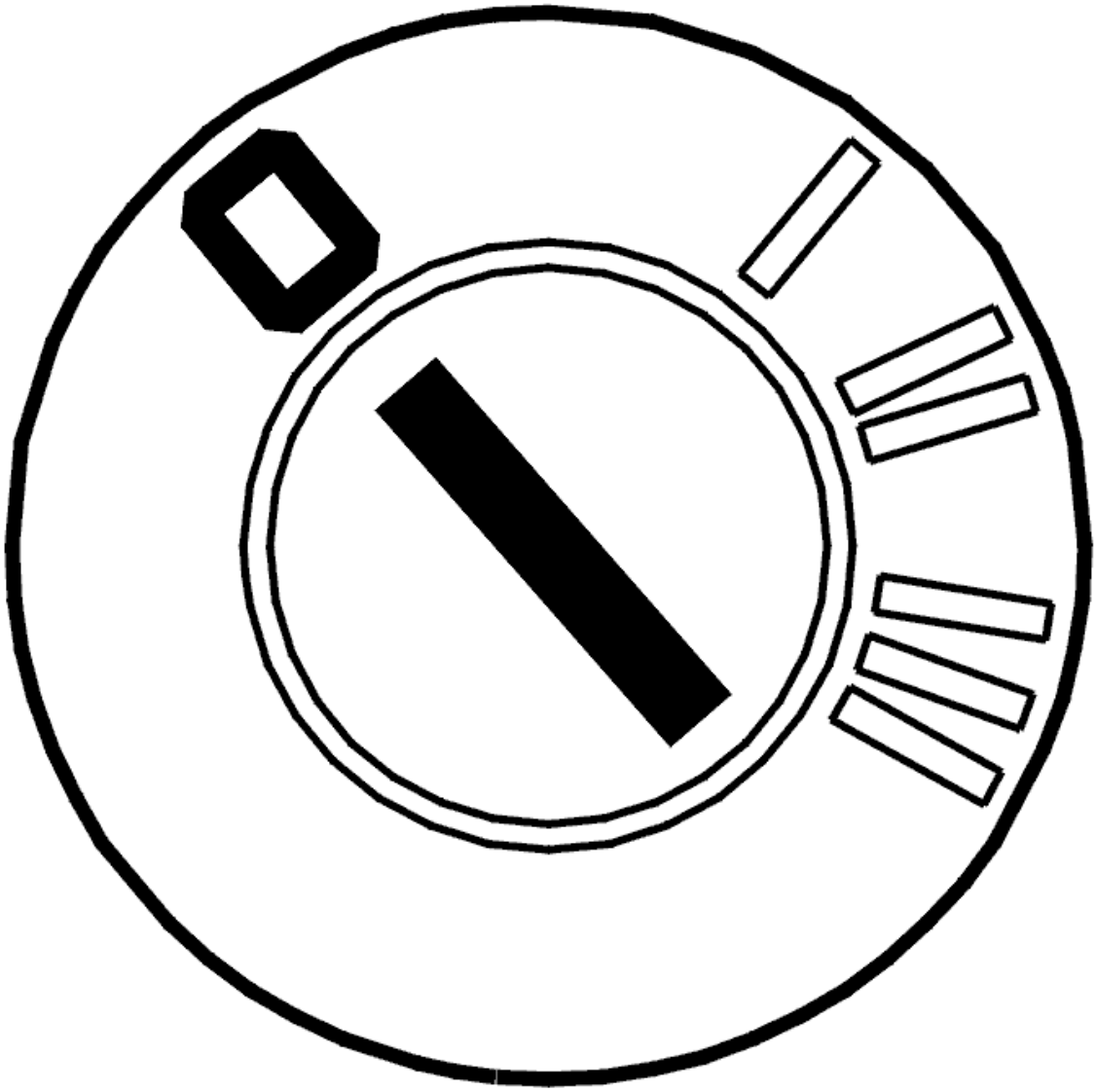


Fig. 91: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect the breakout box to the control module connector (transmission side).

  Check solenoid SL by measuring the resistance between terminals #A51 (#A51) and #A53 (#A53).

  When the transmission is cold (20 °C), the resistance must be 10-11 ohms. When the transmission is at operating temperature (150 °C), the resistance must not exceed 16 ohms.

  Other information

  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
  - For information about signals, see **SIGNAL SPECIFICATION** .

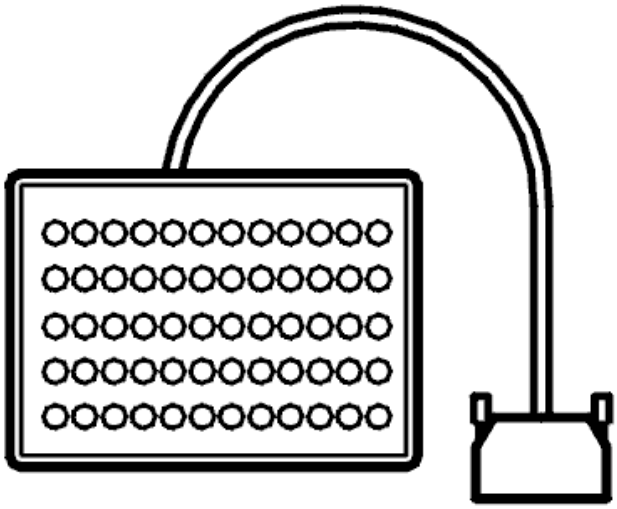


Fig. 92: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

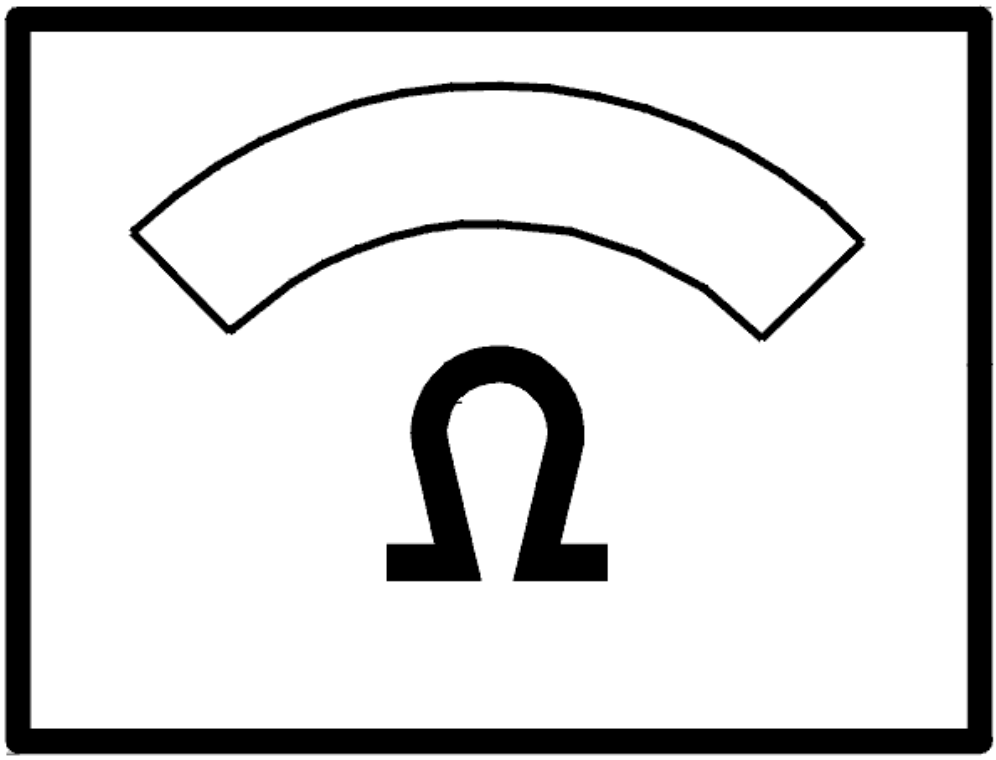


Fig. 93: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

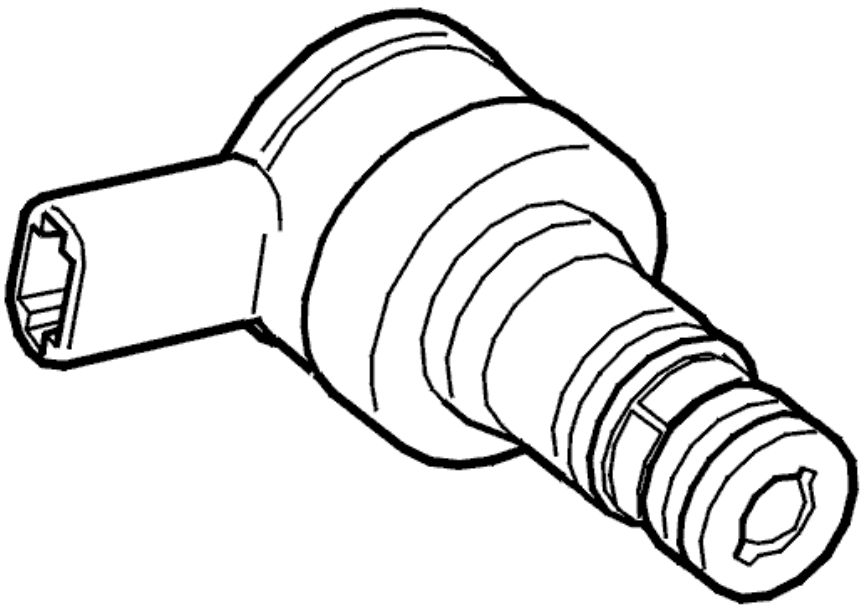


Fig. 94: Identifying Lock-Up Solenoid, SL
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING WIRING**

CHECKING WIRING

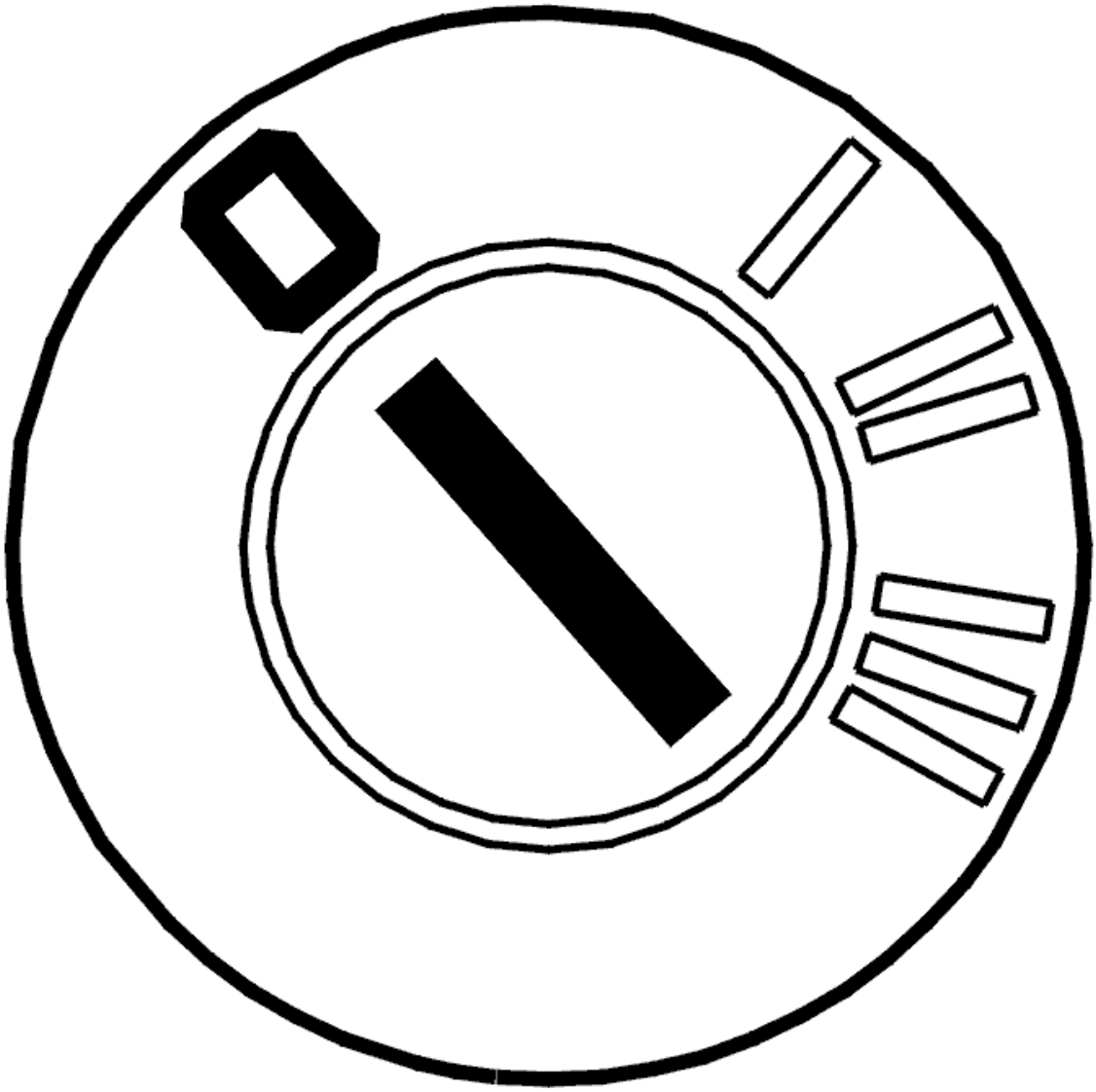


Fig. 95: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

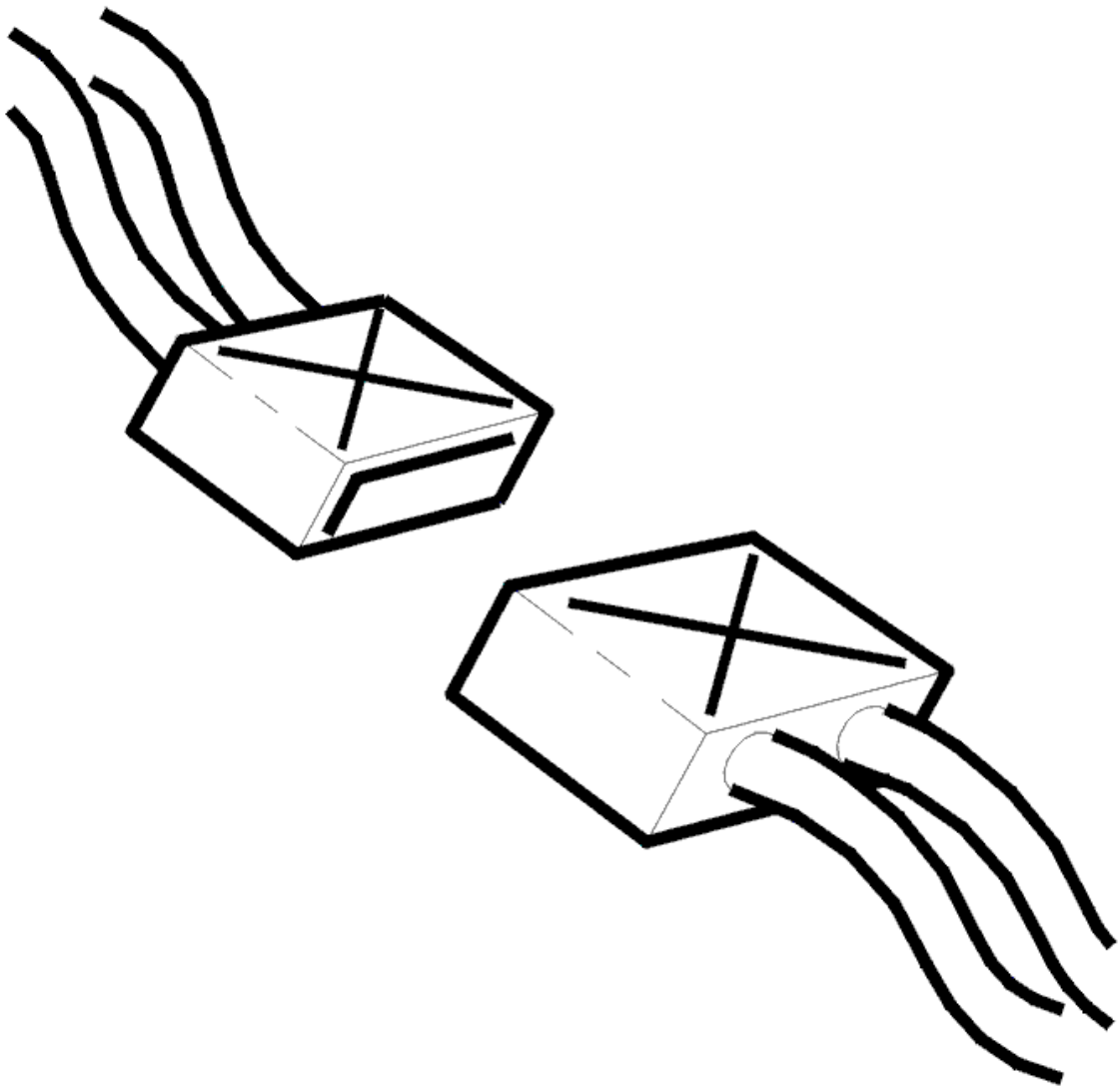


Fig. 96: Identifying Connector
Courtesy of VOLVO CARS CORPORATION

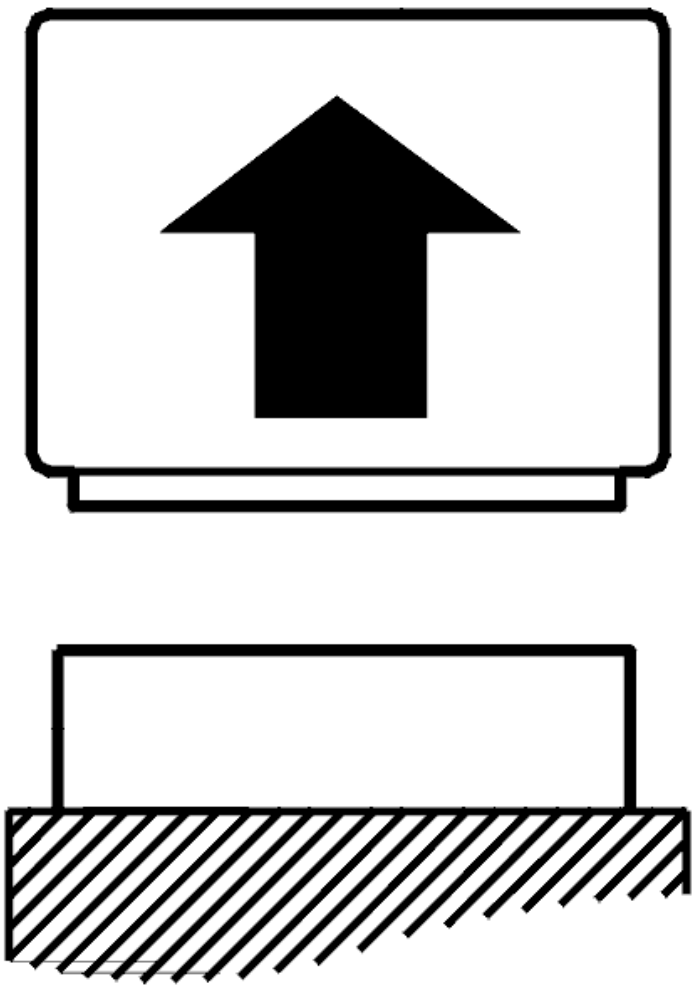


Fig. 97: Disconnecting Connector
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Control module disconnected
- Connect the breakout box to the control module connector (transmission side)
- Disconnect the transmission connector
- Adapter see **9511505** and breakout box see **9511428** connected to the transmission connector (control module side).

  Check the wiring between control module terminal #A51 (#A51) and transmission connector terminal #T (#A17). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

  Check the wiring between control module terminal #A53 (#A53) and transmission connector terminal #E

(#A5). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

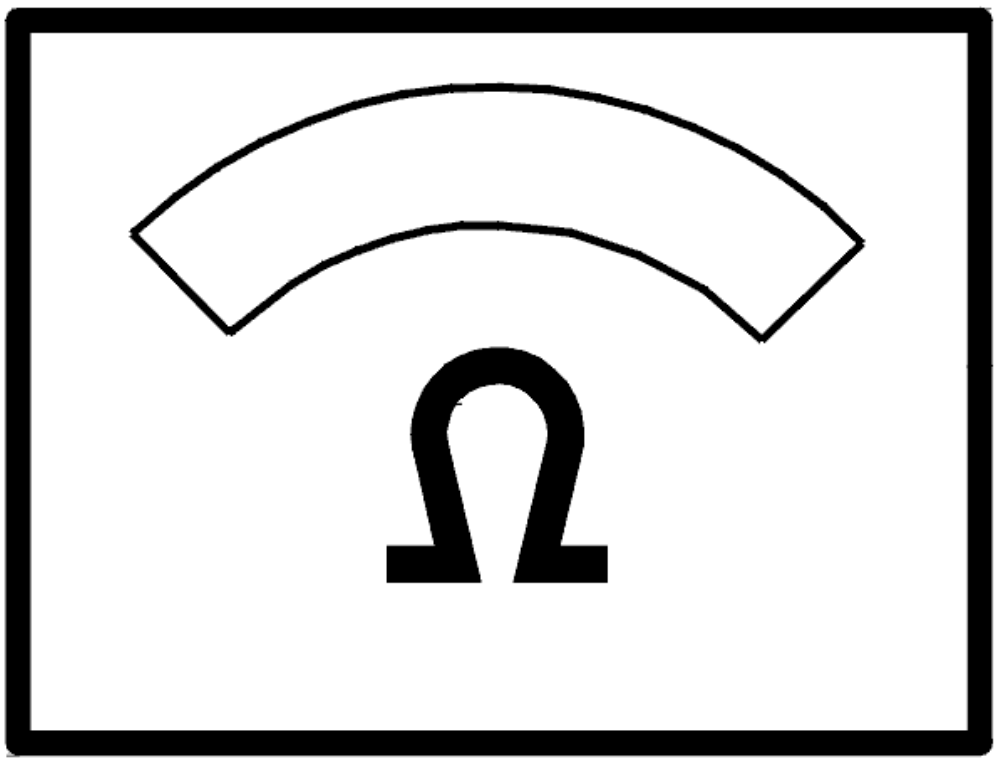


Fig. 98: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING WIRING AND COMPONENT**

CHECKING WIRING AND COMPONENT

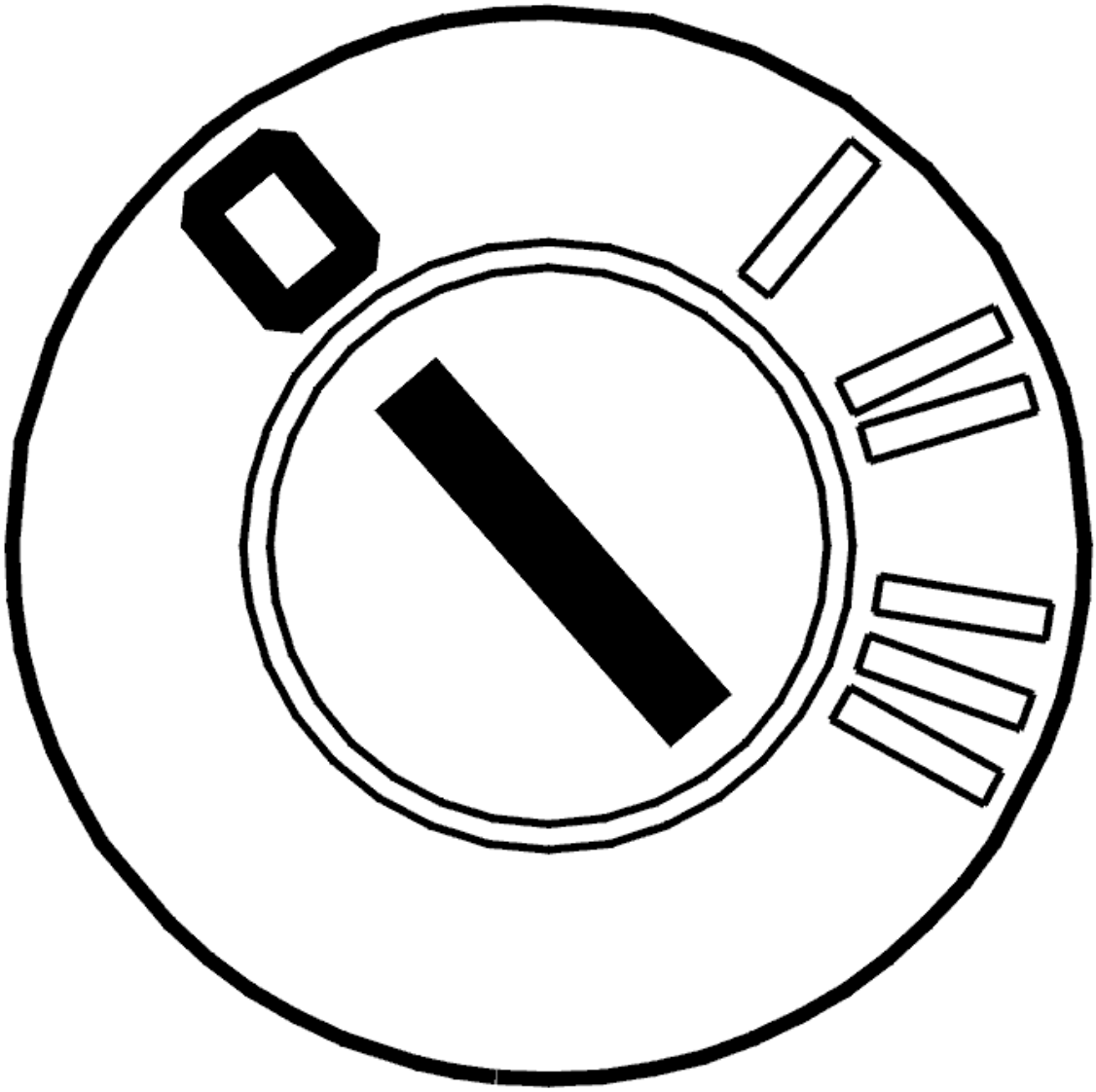


Fig. 99: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off

- Open the transmission control system
- Connect adapter see **9511505** and breakout box see **9511428** to the transmission connector (transmission side).

Check the cable between transmission connector terminal #T (#A17) and solenoid SL terminal #A. Check the cable between transmission connector terminal #E (#A5) and solenoid SL terminal #B. Check these cables for an open-circuit.

HINT: Check solenoid SL by measuring the resistance between solenoid SL terminals #A and #B. When the transmission is cold (approximately 20 °C), the resistance must be 10-11 ohms.

Remedy as necessary.

Other information:

- To open the transmission control system:
  - see **SIDE COVER TRANSMISSION, REMOVING**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace solenoid SL, see **SOLENOID LOCK-UP FUNCTION, REPLACING**
- To replace the cable harness:
  - For AW50/51 AWD or AW55-50/51SN 2003-, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
  - For 4T65AWD 2003-, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)** .
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

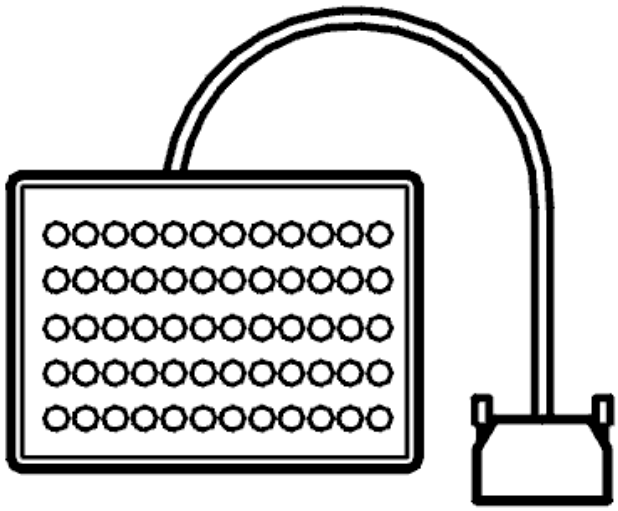


Fig. 100: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

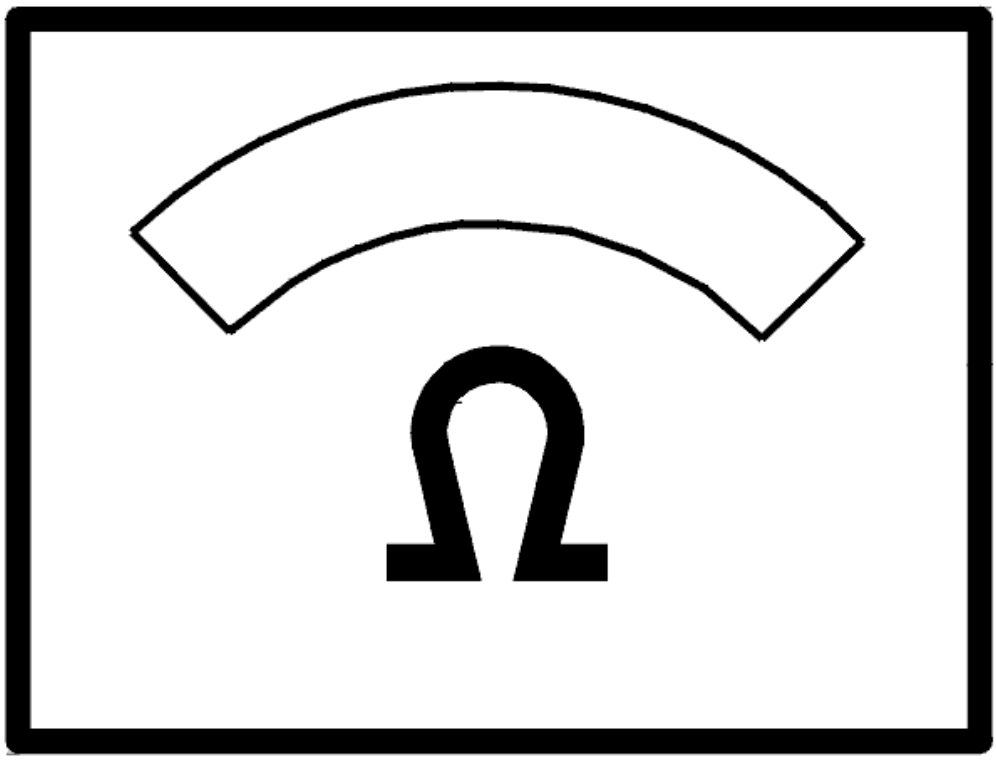


Fig. 101: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

REPLACING THE TRANSMISSION CONTROL SYSTEM

REPLACING THE CONTROL SYSTEM

The fault was probably caused by an internal fault in the transmission control system. Replace the control system.

Other information

- To replace the transmission control system
  - For removal, see **CONTROL SYSTEM/VALVE HOUSING, REMOVING**
  - To install, see **CONTROL SYSTEM / VALVE HOUSING, INSTALLING** .

.

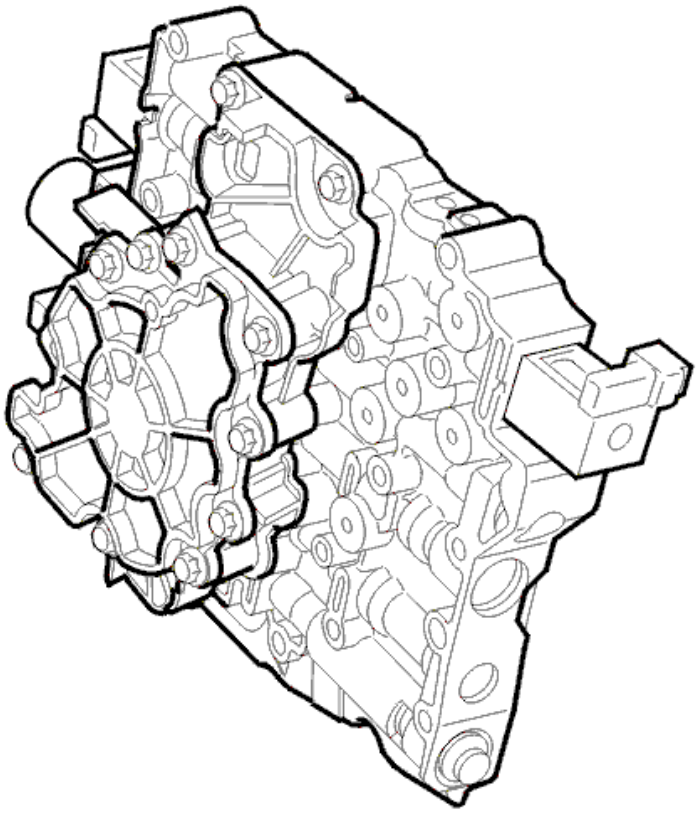


Fig. 102: Identifying Valve Housing
Courtesy of VOLVO CARS CORPORATION

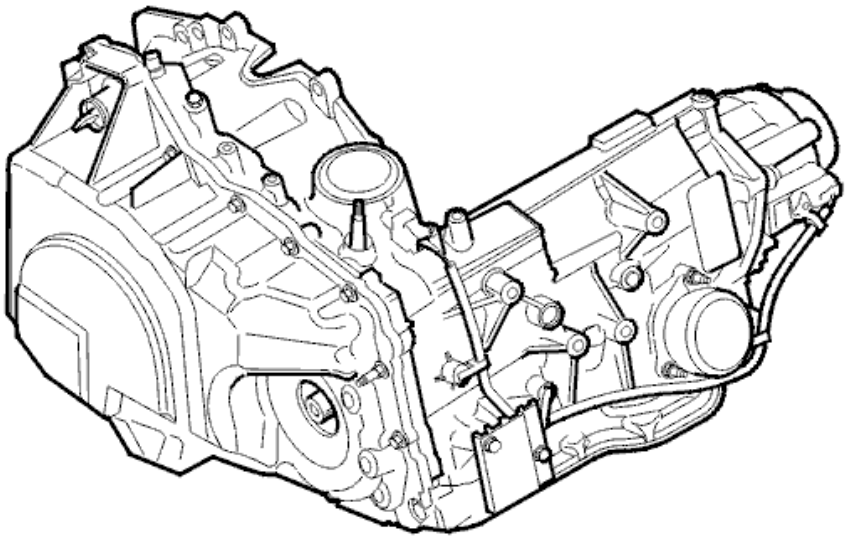
- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

REPLACING A FAULTY TRANSMISSION

REPLACING A FAULTY TRANSMISSION

- In the event of an internal fault in the transmission, replace the transmission. See **TRANSMISSION, REMOVING** and **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .



P2X 43017210 ©VOLVO

Fig. 103: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

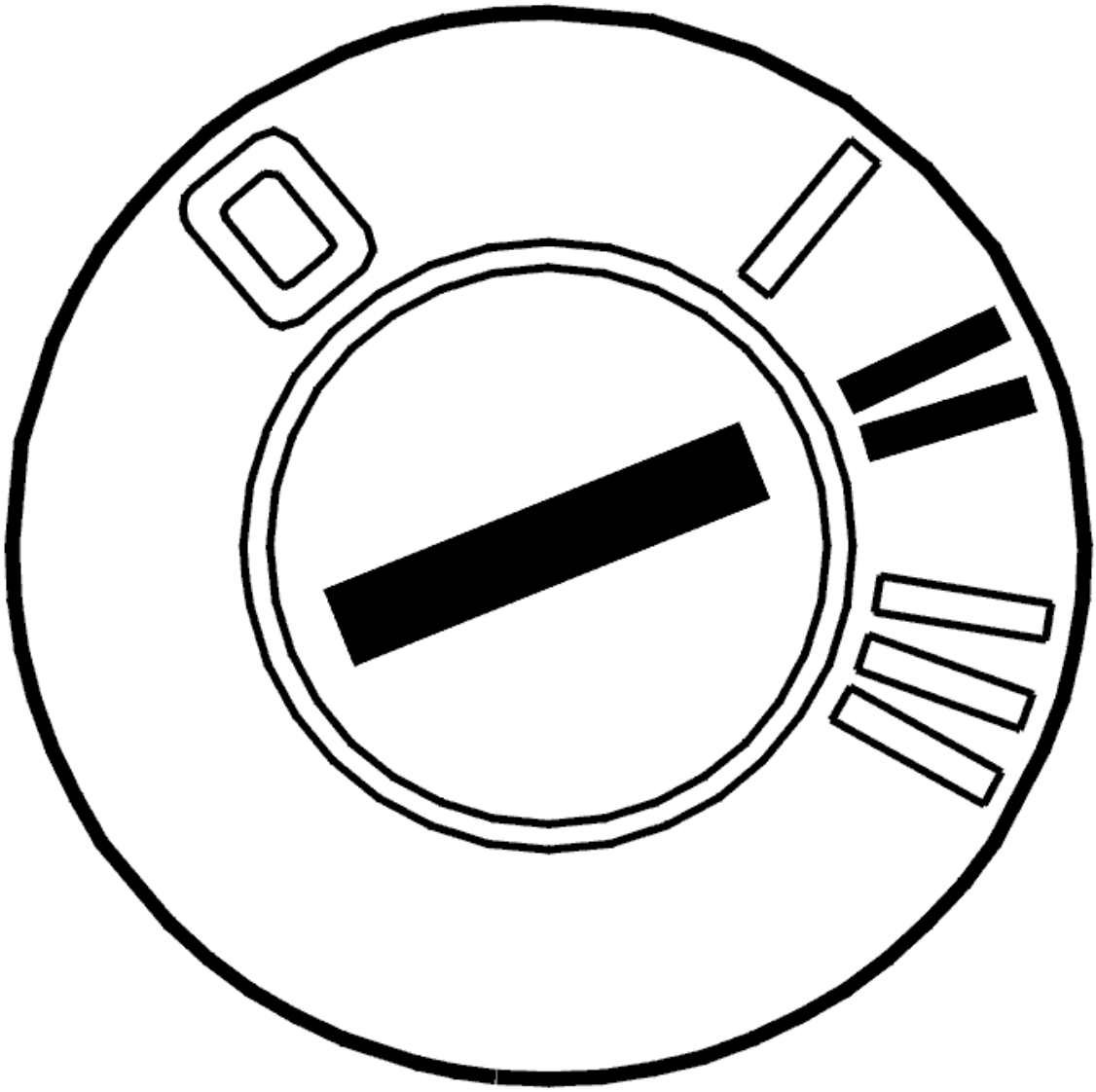


Fig. 104: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

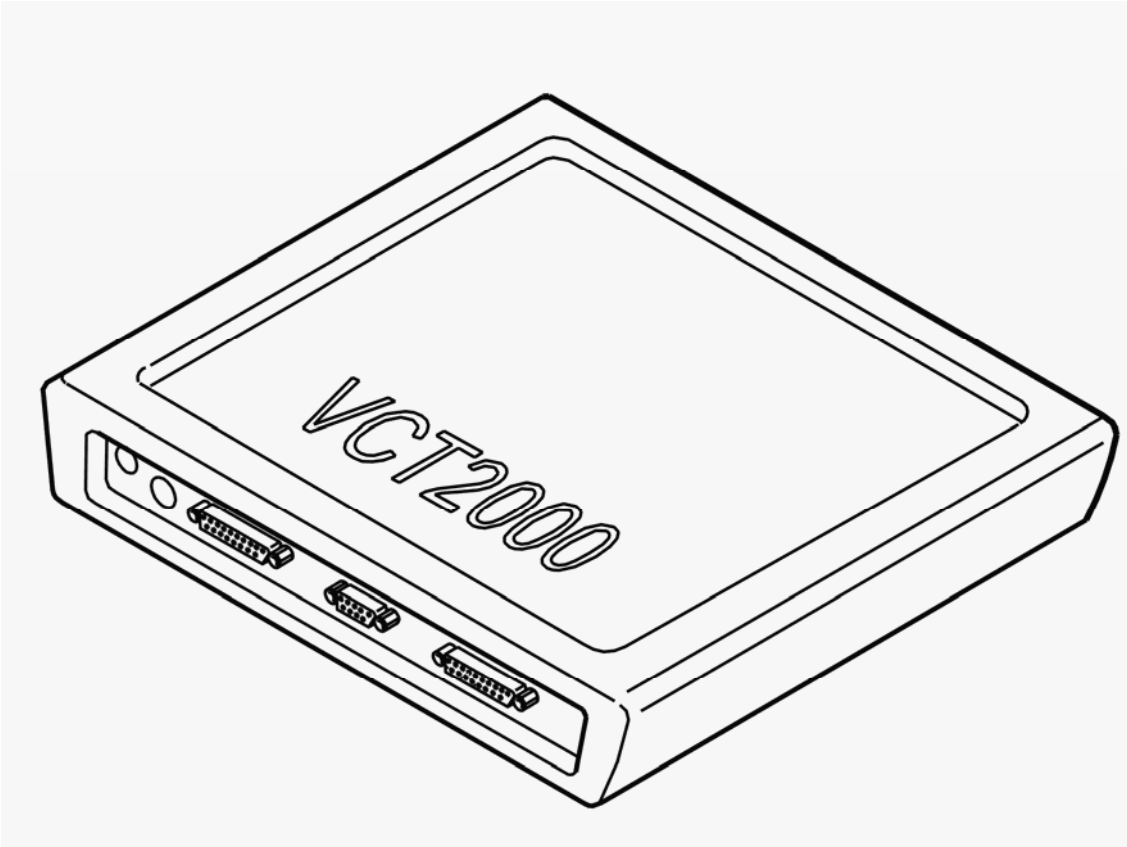


Fig. 105: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.

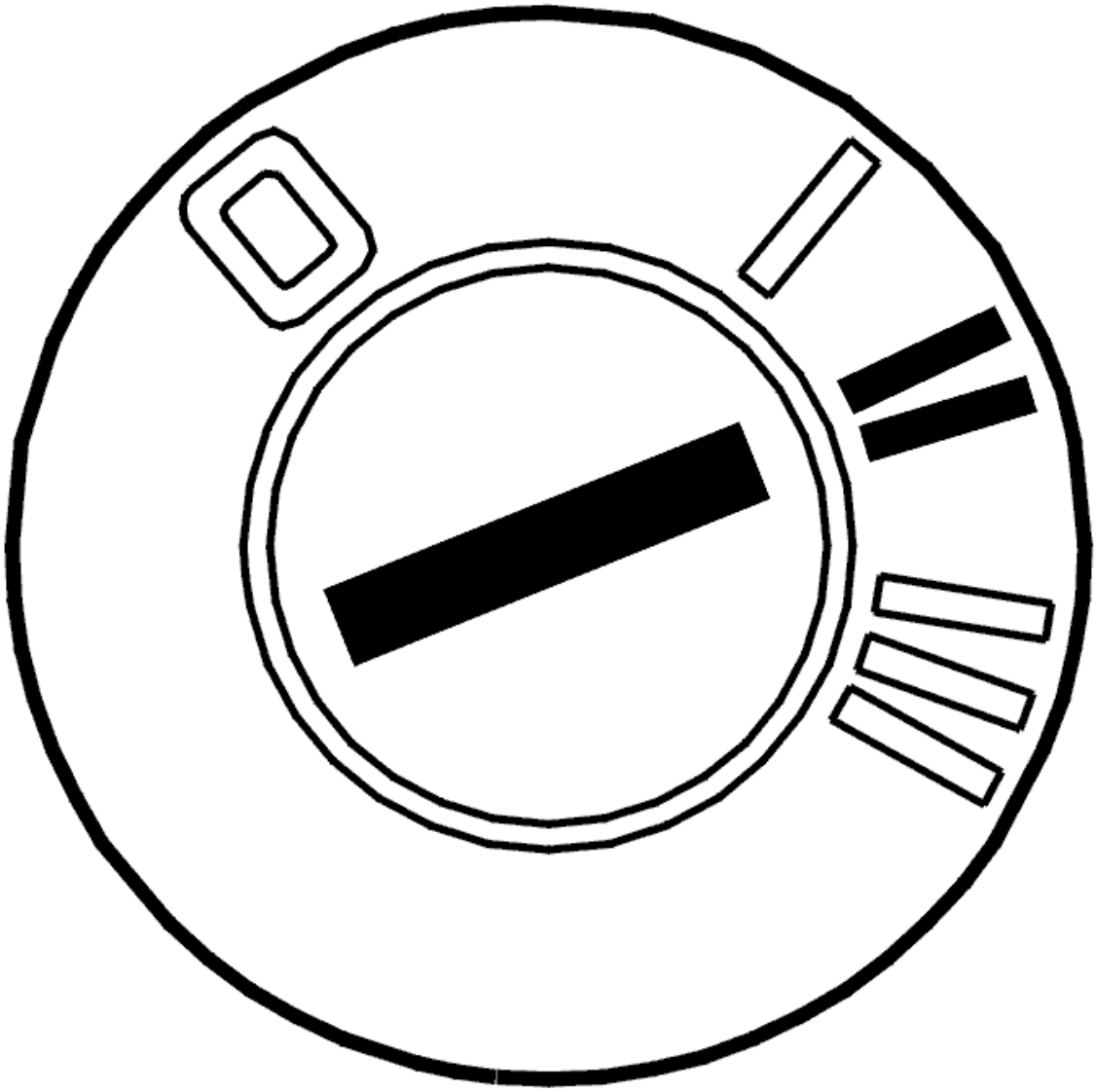


Fig. 106: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

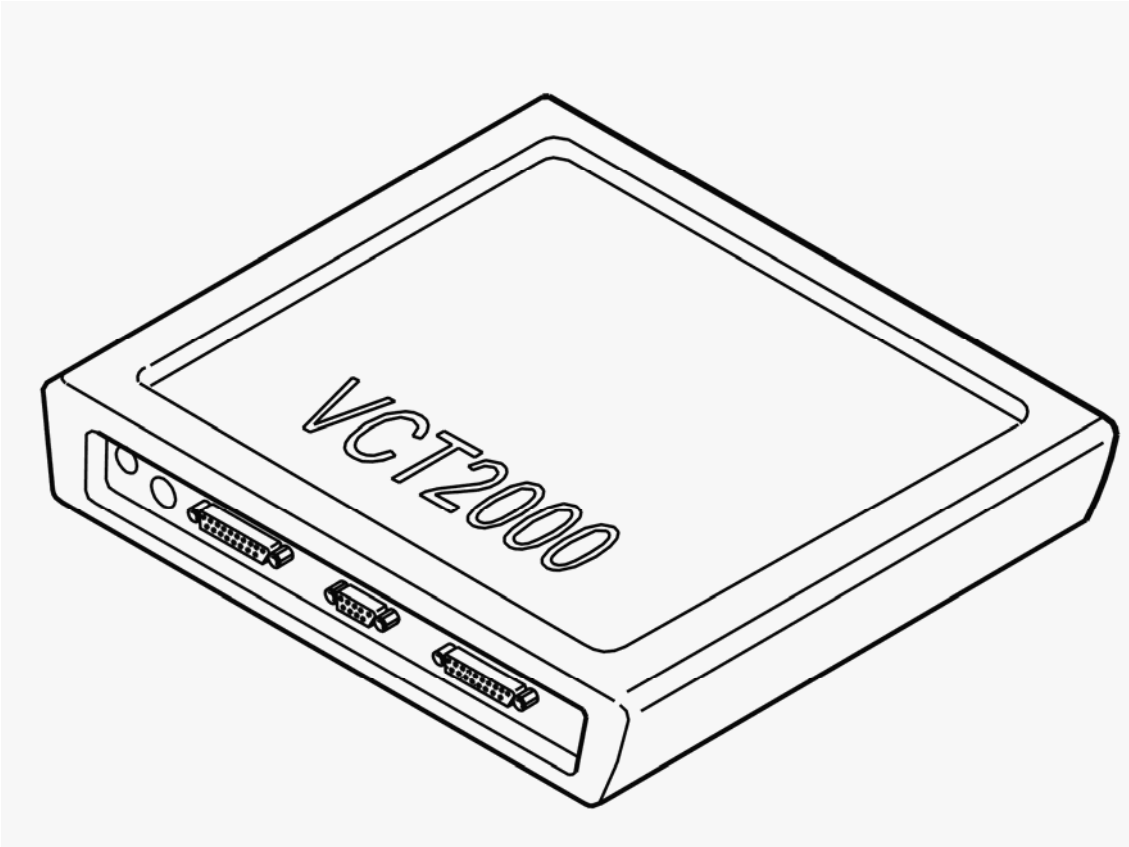


Fig. 107: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

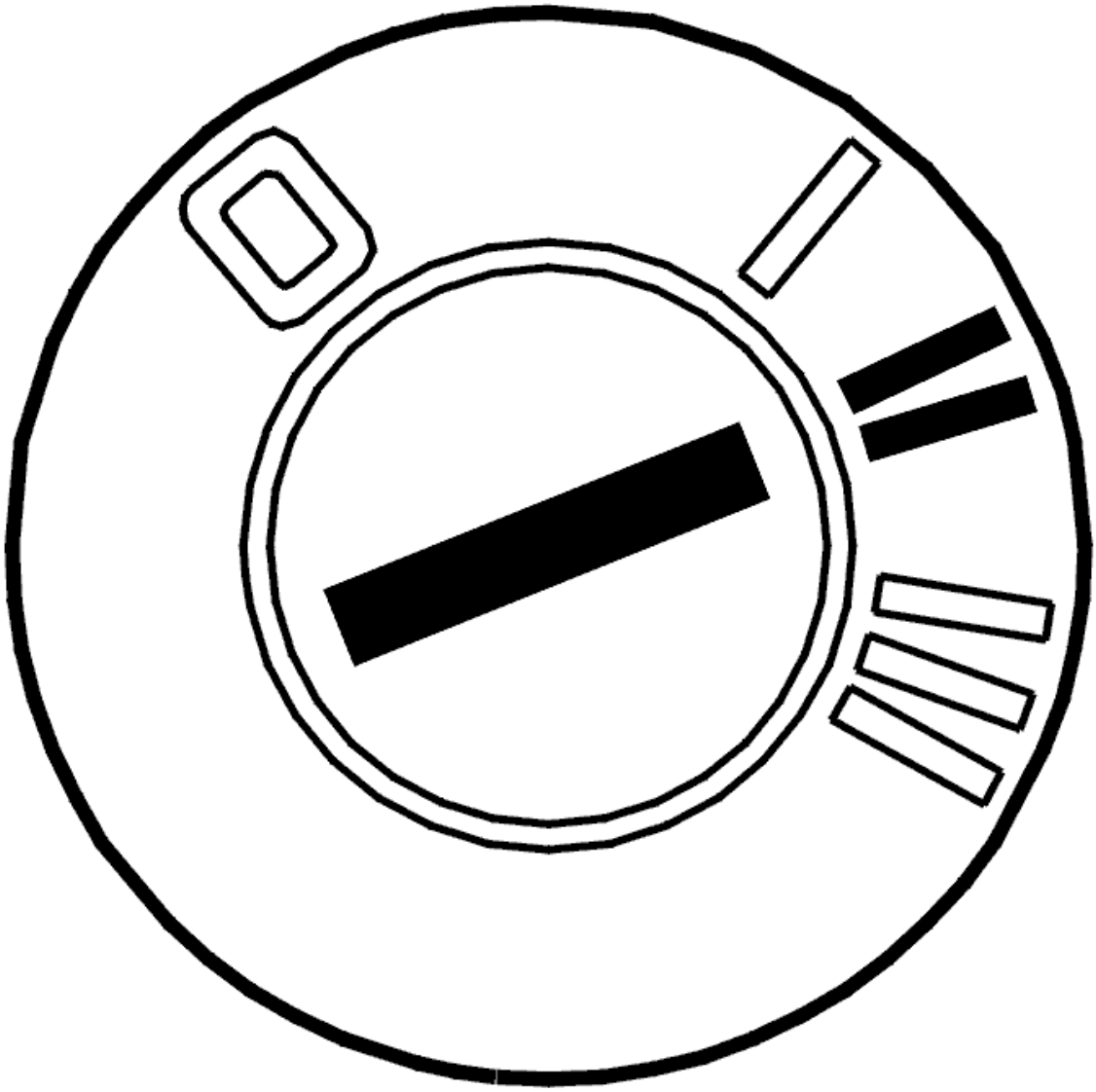


Fig. 108: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

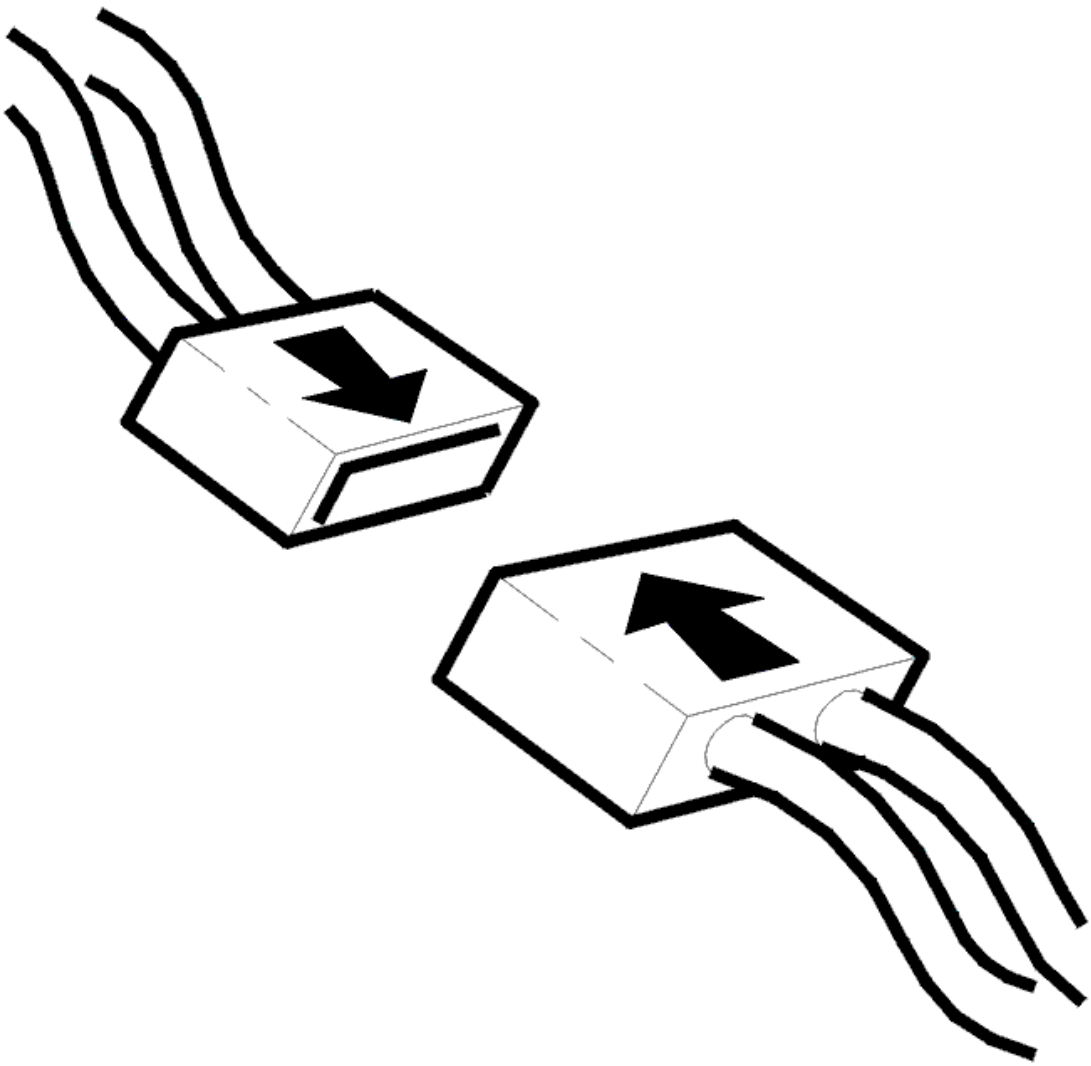


Fig. 109: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following:**TEST DRIVE FORM, DESCRIPTION**

During the test drive, oil temperature should be over 20 °C.

Note any deviations in transmission function.

CHECKING OIL FILTER AND OIL TROUGH (4T65 AWD; 2003-2006)

CHECKING OIL FILTER AND OIL TROUGH

- Drain the transmission fluid
- Remove the transmission oil trough.

If the oil filter is loose, check that the plastic pipe and O-ring are intact and reinstall if possible. Also check whether the oil trough or oil filter are damaged. Replace if necessary.

Check the bottom of the trough and the magnet. Check for contaminants in the fluid. Replace the fluid and the filter if the transmission fluid contains contaminants.

HINT: If there are a lot of contaminants or larger particles, there may be an internal fault in the transmission.

Other information

- To replace the transmission fluid and filter, see **TRANSMISSION OIL / OIL FILTER, REPLACING** .

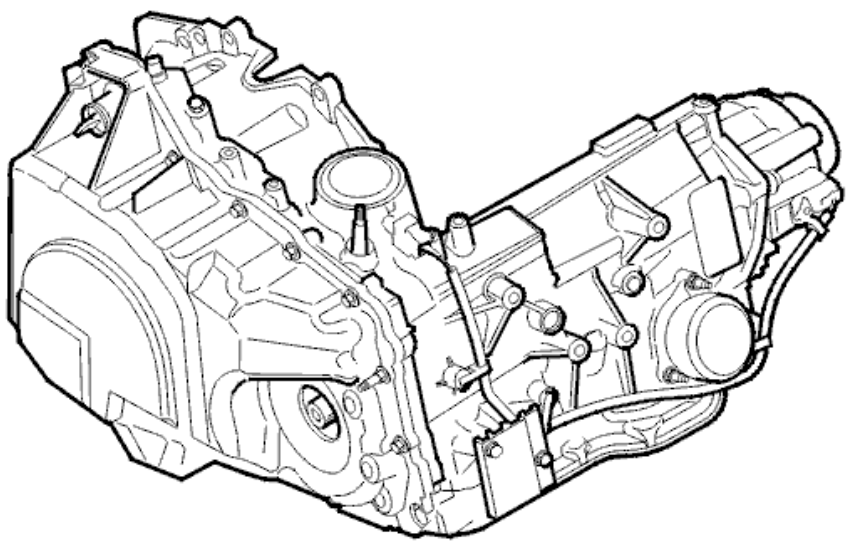


Fig. 110: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.

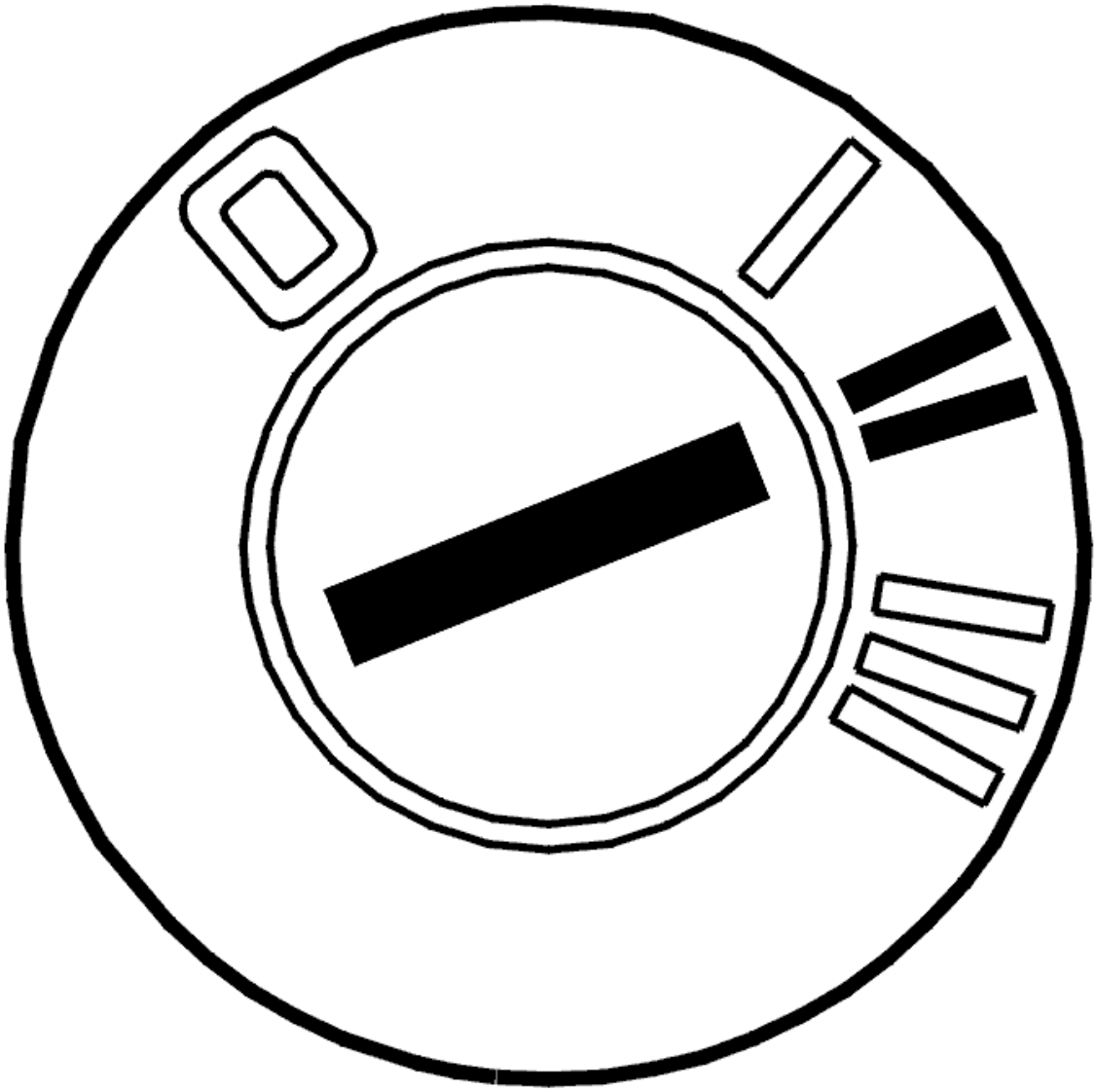


Fig. 111: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

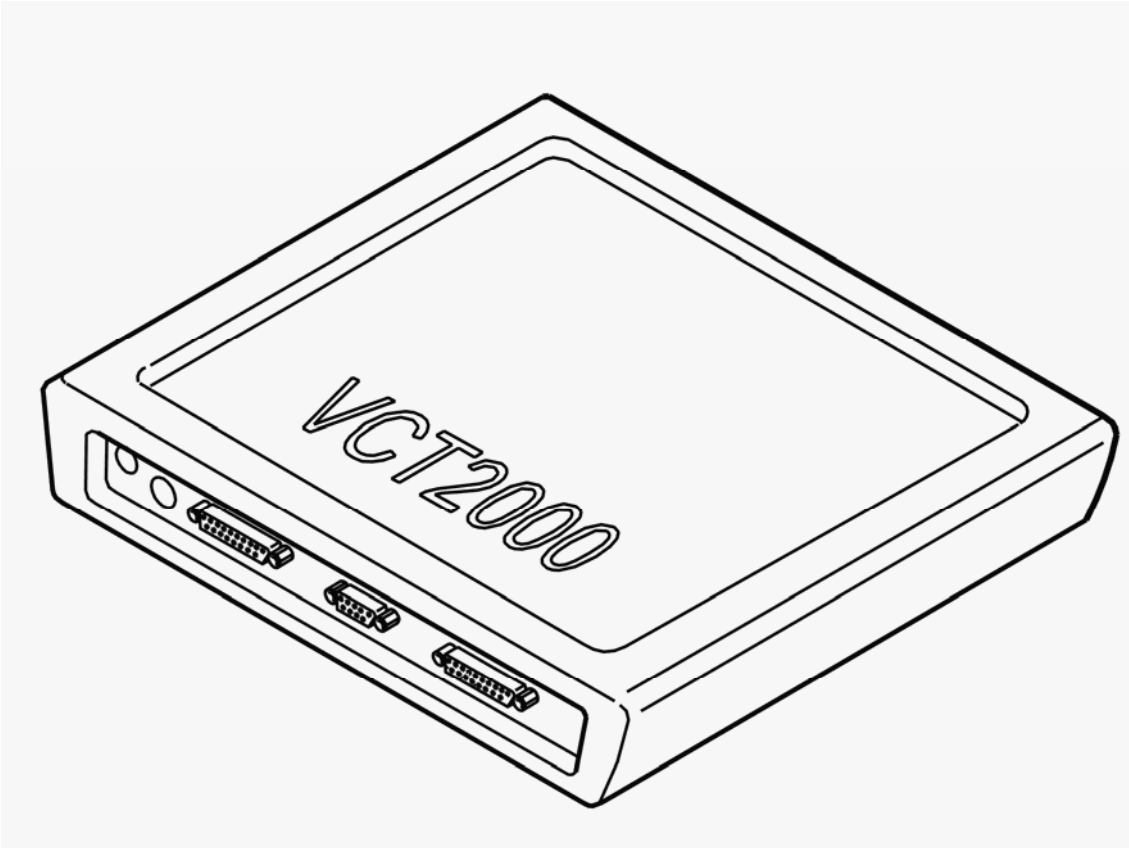


Fig. 112: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING AUTOMATIC TRANSMISSION**

CHECKING AUTOMATIC TRANSMISSION

CHECKING AUTOMATIC TRANSMISSION

NOTE: After carrying out the repair check that the symptom has been remedied.

Check the automatic transmission as follows:

- Test drive the car to test the function of the automatic transmission. See **TEST DRIVE FORM, DESCRIPTION**
- If hydraulic hoses, gaskets or other components have been replaced, check that there is no oil leakage after the test drive.

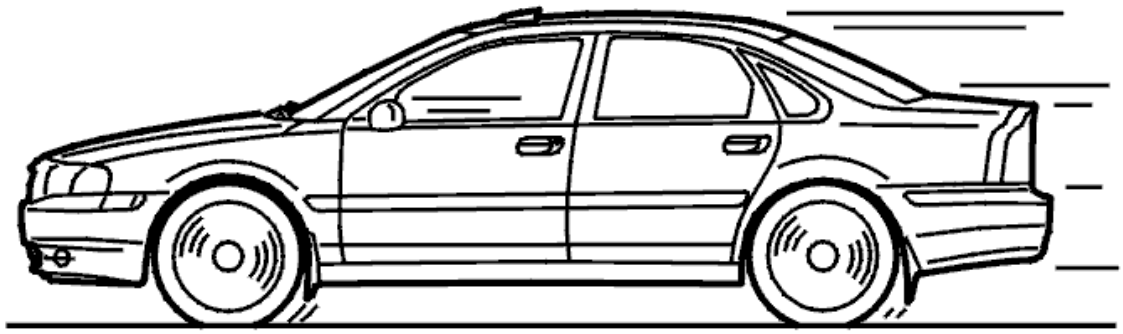


Fig. 113: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the automatic transmission OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

CHECKING OIL LEVEL (AW50/51 AWD; AW55-50/51SN; 2003-2007)

CHECKING OIL LEVEL

- Check the oil level according to **OIL LEVEL, CHECKING** .

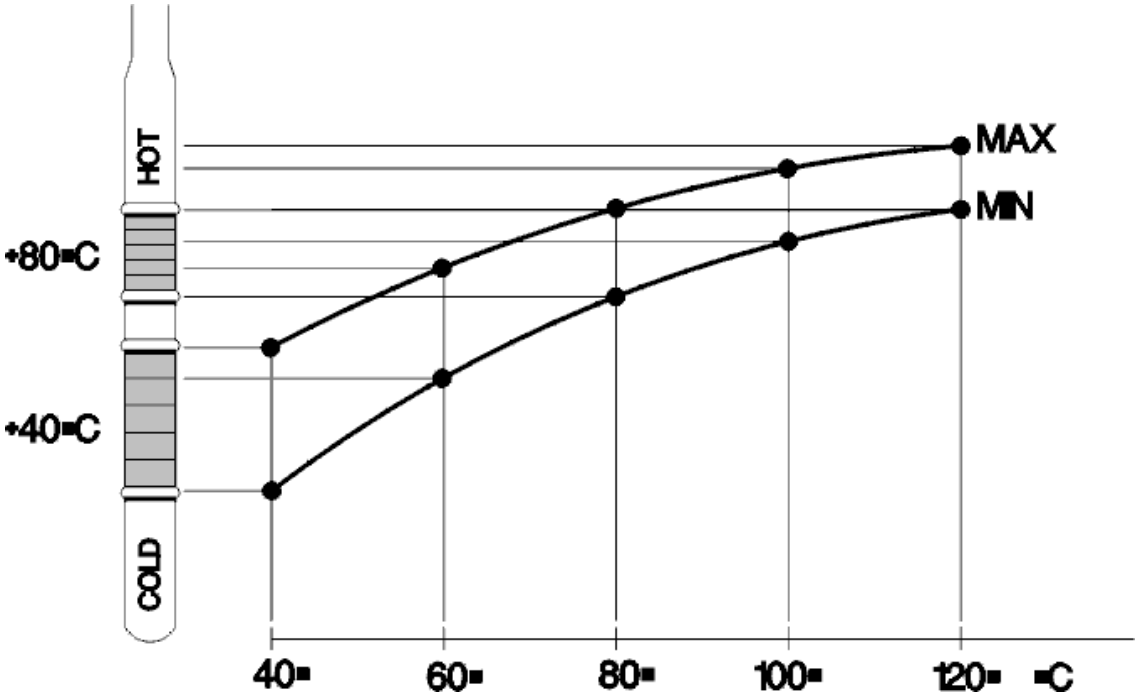


Fig. 114: Identifying Oil Level Temperature Graph
Courtesy of VOLVO CARS CORPORATION

Was the oil level correct?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.

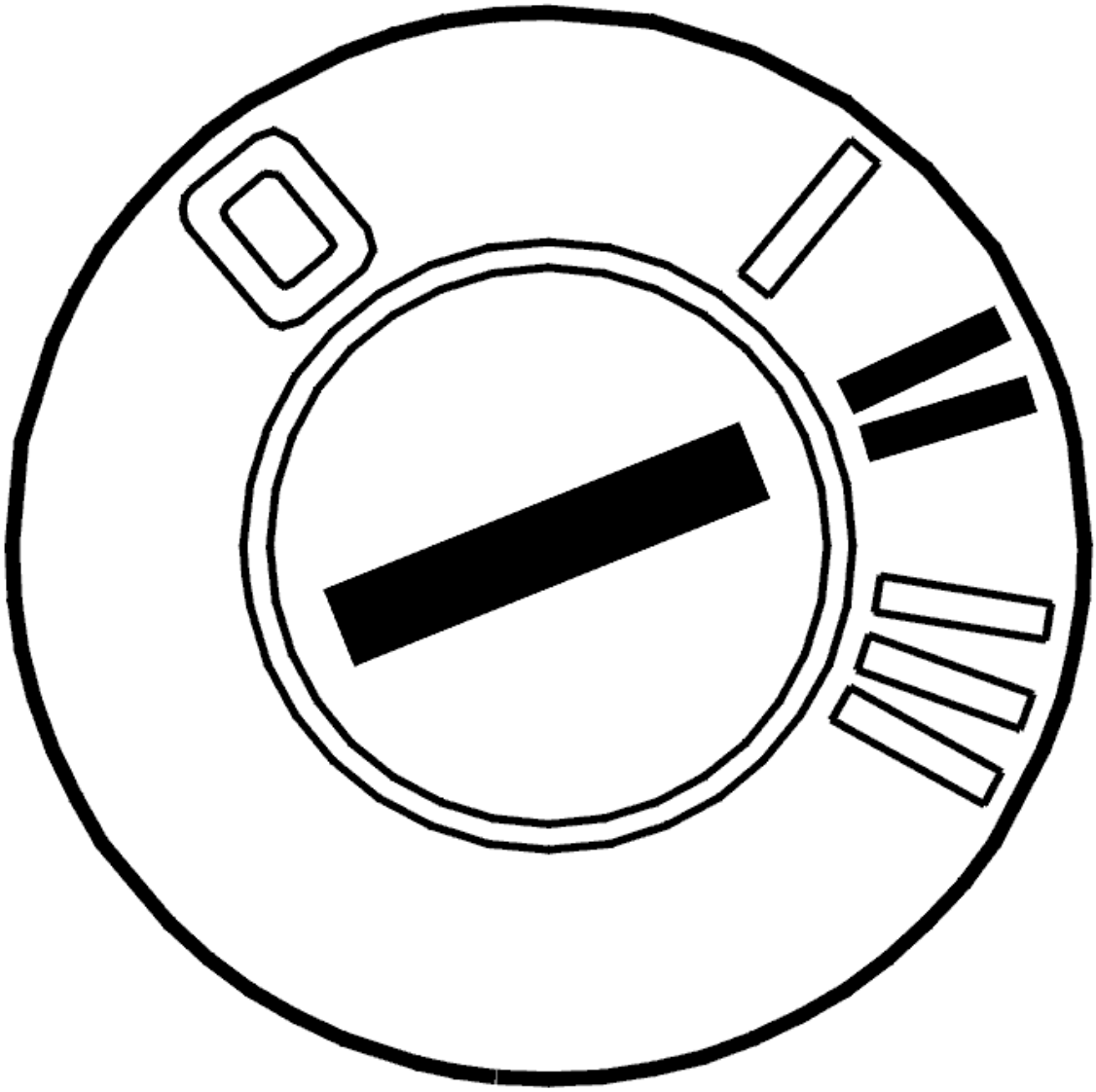


Fig. 115: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

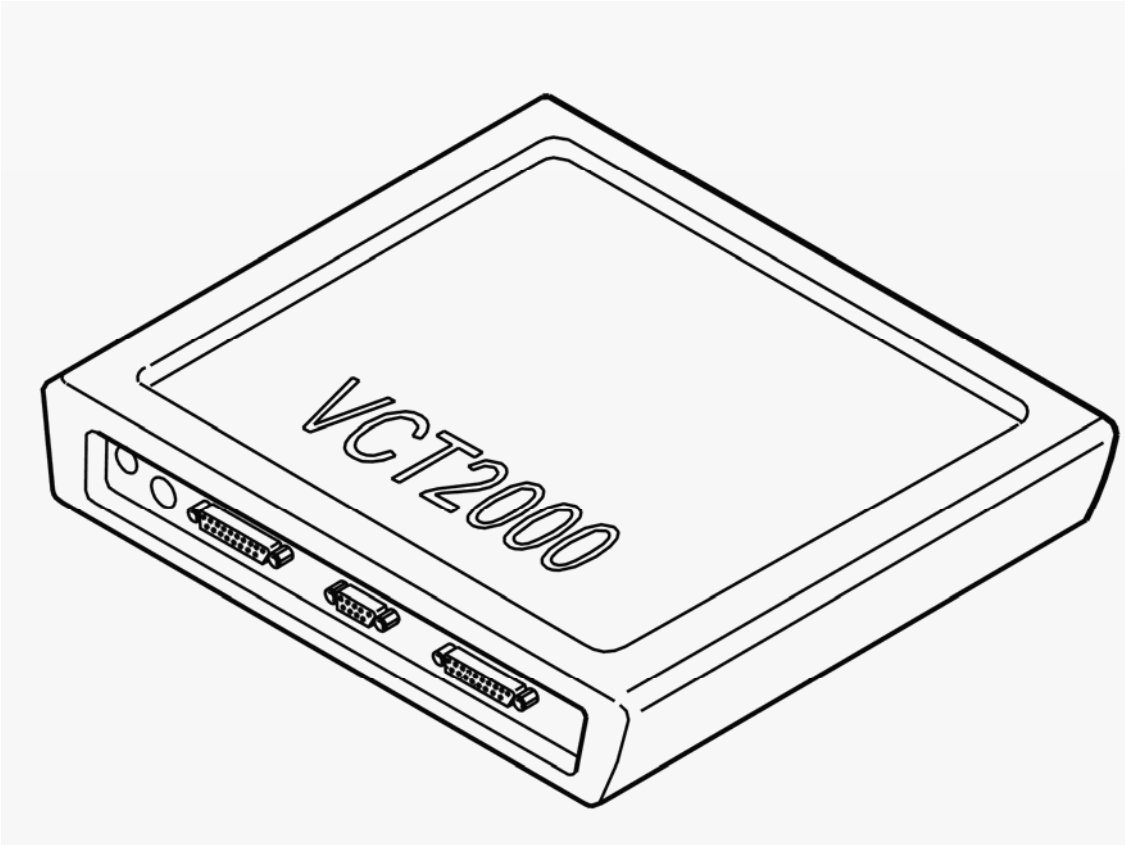


Fig. 116: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING OIL QUALITY (AW50/51 AWD; AW55-50/51SN; 2003-2007)

FAULT-TRACING INFORMATION

Condition

Diagnostic trouble codes (DTCs) missing.

The fault is permanent.

Possible Source

- Oil is burnt or discolored.
- Water in the oil.
- Glycol in the transmission fluid.

Fault symptom[s]

- Harsh gear shifting.
- Irregular shifting.

- No shifting.
- No lock-up function.

CHECKING OIL QUALITY (B5254T2, AW50/51 AWD; 2003-2007)

CHECKING OIL QUALITY

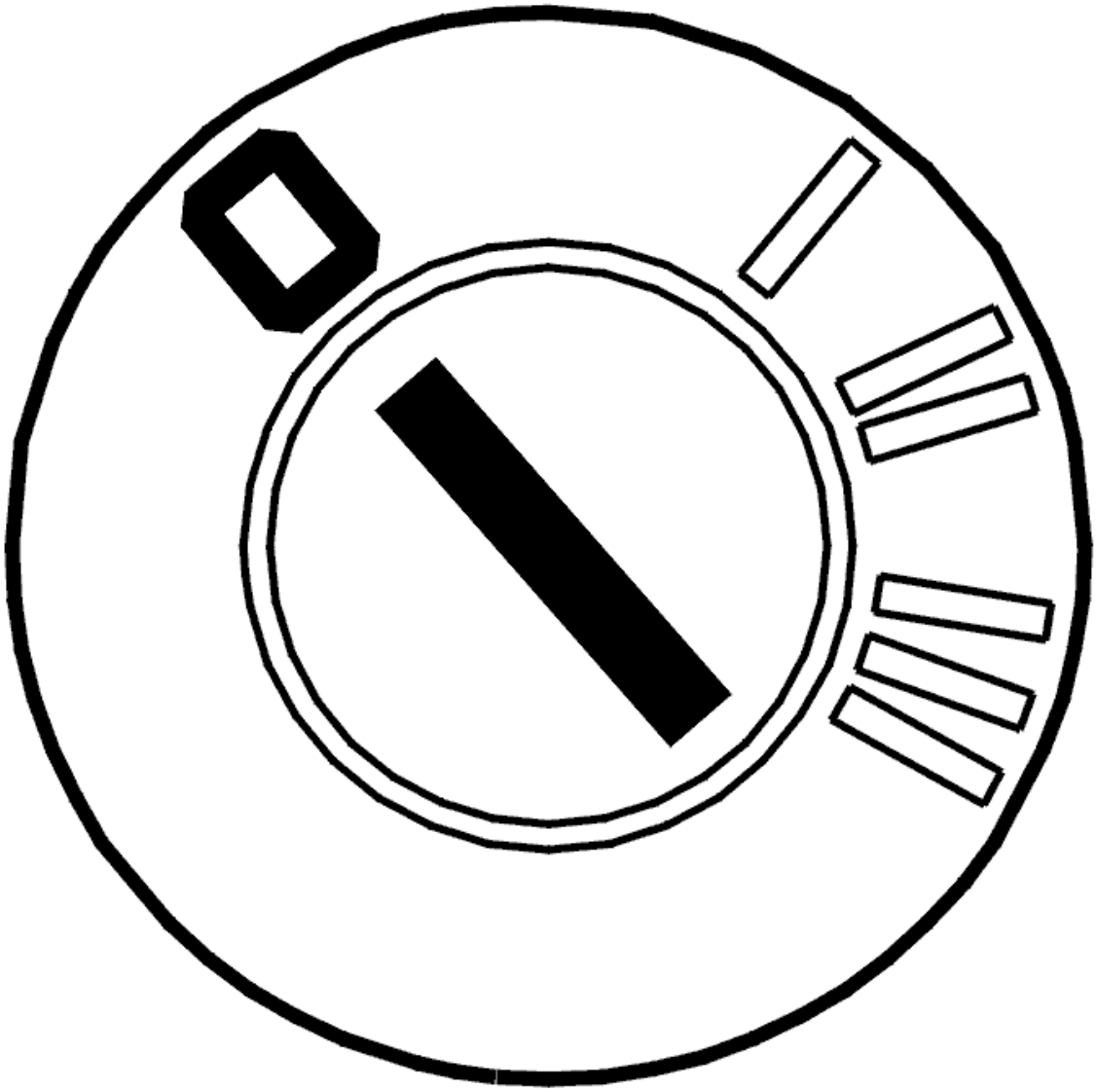


Fig. 117: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the oil. Take a sample with the dipstick.

  Options:

1. The oil is OK.

   Refer to **CHECKING OIL LEVEL**

2. The oil is discolored or smells burnt.

   Refer to **CHANGING OIL**

3. The oil contains water (the oil is colored gray)

   Refer to **REPLACING A COMPONENT**

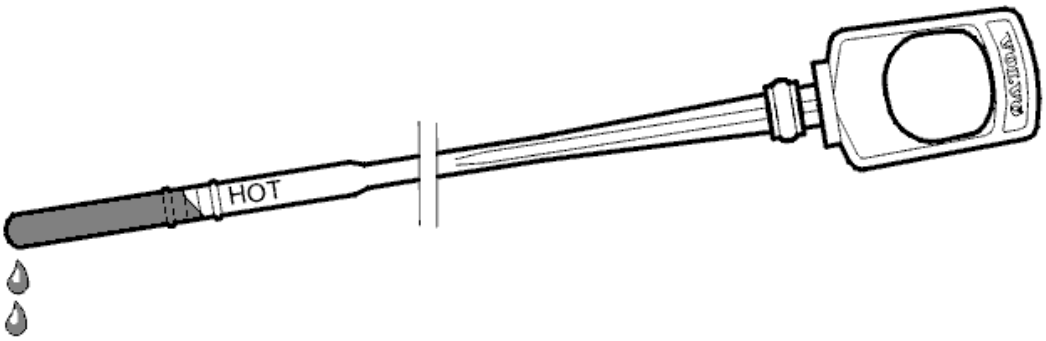


Fig. 118: Identifying Oil Dipstick
Courtesy of VOLVO CARS CORPORATION

CHECKING FOR COOLANT IN OIL

This fault may be due to coolant that has leaked into the transaxle.

Inspect according to: **CHECKING FOR COOLANT IN OIL**

If coolant is detected in the transaxle oil, the transaxle, radiator and hoses between the radiator and transaxle must be replaced.

Other information

- see **TRANSMISSION, REMOVING**
- see **TRANSMISSION, INSTALLING**

Was a fault detected?

- **YES**

  Refer to **INFORMATION**

- **NO**

Refer to **INFORMATION**

CHANGING OIL

Changing oil according to: **TRANSMISSION OIL / OIL FILTER, REPLACING**

- **Continue**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

REPLACING A COMPONENT

Find out the reason and remedy the cause of water in the oil.

Replace the transmission.

Flush clean the oil cooler, pipes and hoses according to: **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

Other information

- see **TRANSMISSION, REMOVING**
- see **TRANSMISSION, INSTALLING**

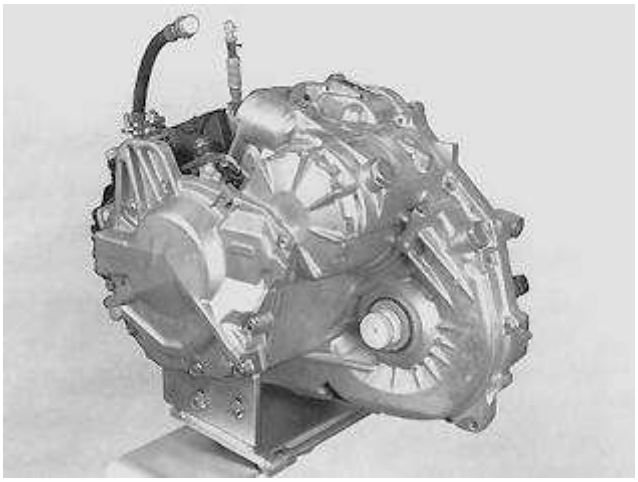


Fig. 119: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

CHECKING OIL LEVEL

Check the oil level. See **OIL LEVEL, CHECKING**

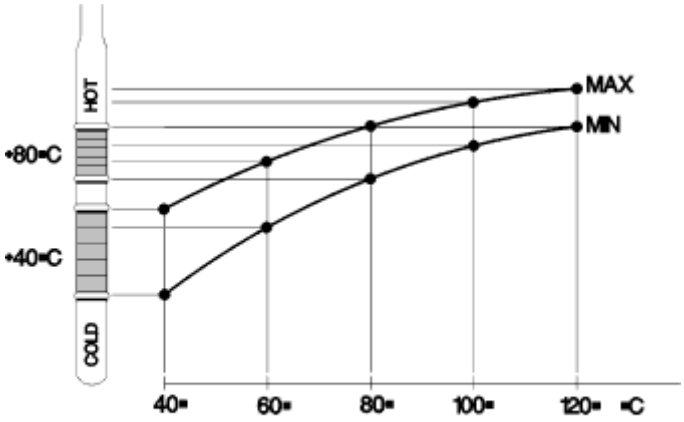


Fig. 120: Identifying Oil Level Graph
Courtesy of VOLVO CARS CORPORATION

Was the oil level correct?

- **YES**

  Refer to **CHECKING FOR COOLANT IN OIL**

- **NO**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

TEST DRIVING THE TRANSMISSION

Test drive the car as follows: **TEST DRIVE SCHEDULE, DESCRIPTION**

If the function of the transaxle is OK, the fault has been traced and rectified and fault tracing can stopped. If not, select continue to advance with fault tracing.

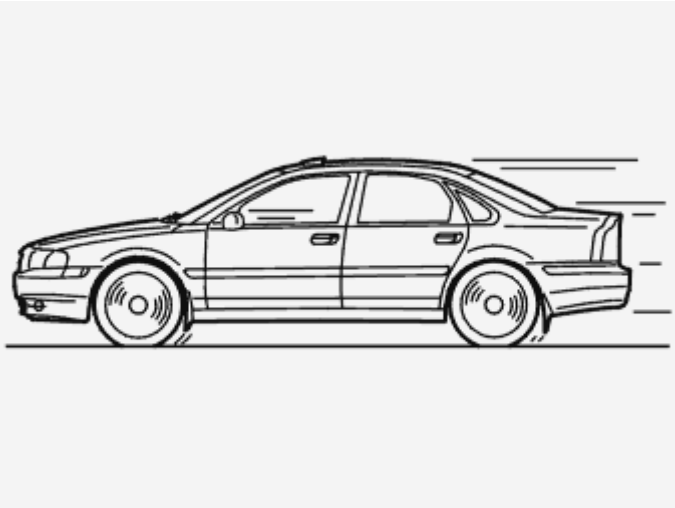


Fig. 121: Identifying Test Driving
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING FOR COOLANT IN OIL**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.

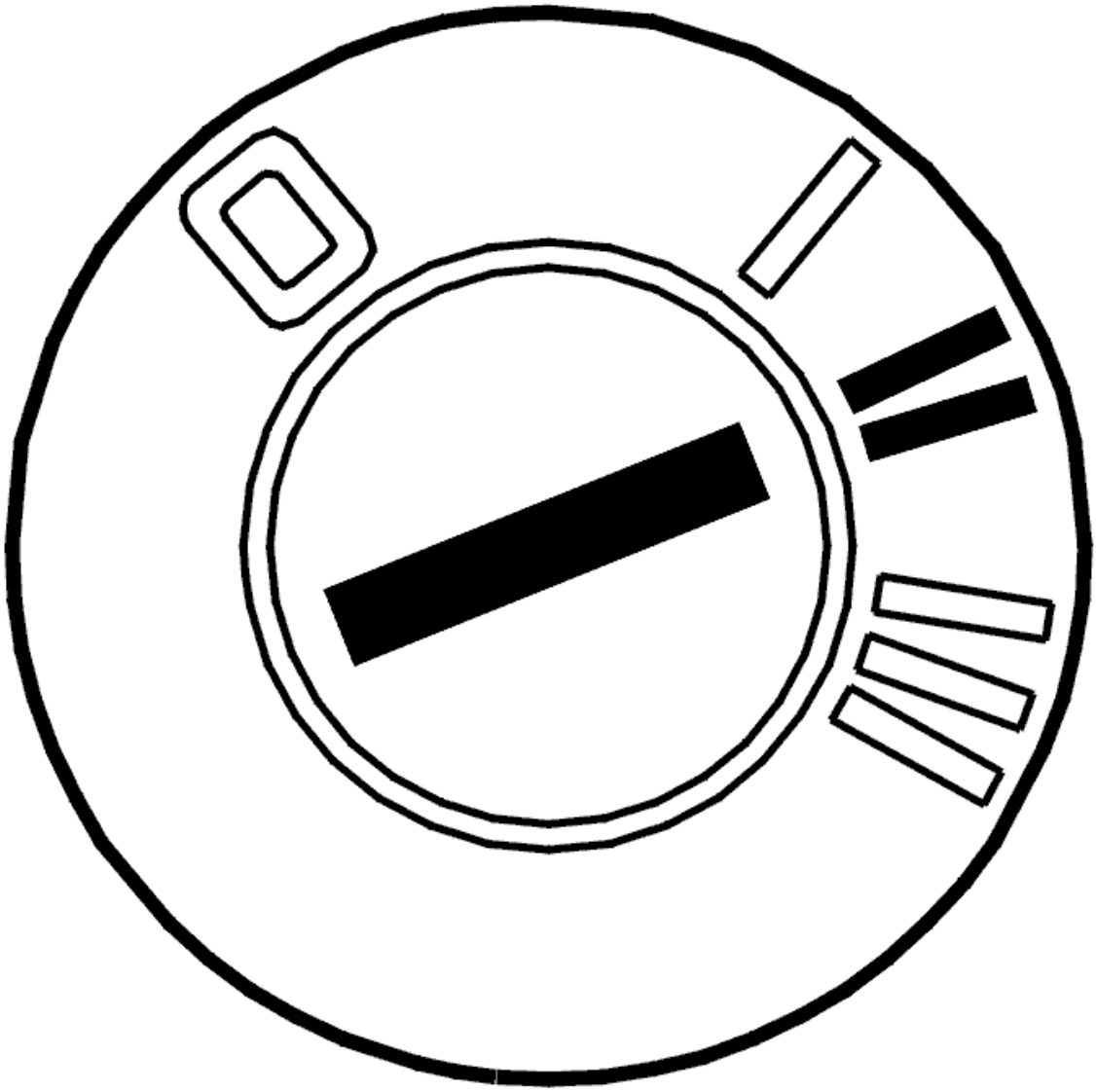


Fig. 122: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

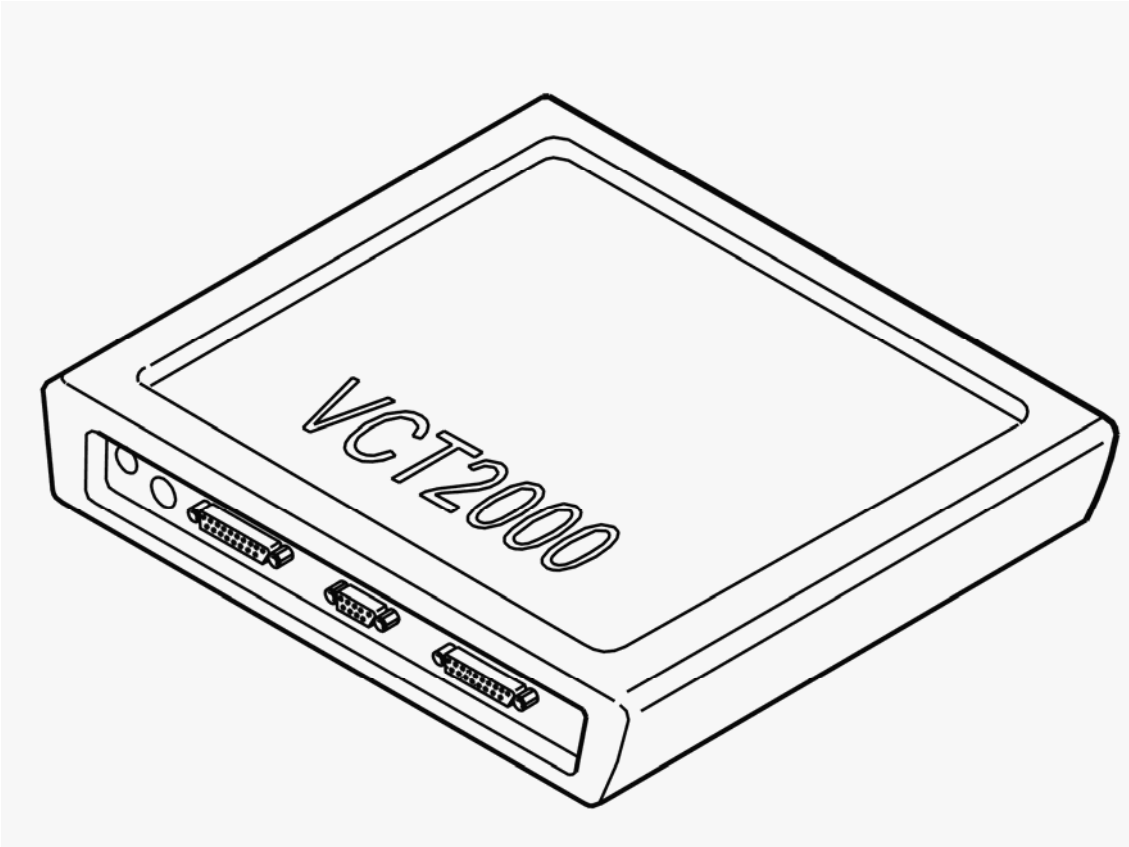


Fig. 123: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING THE TRANSMISSION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

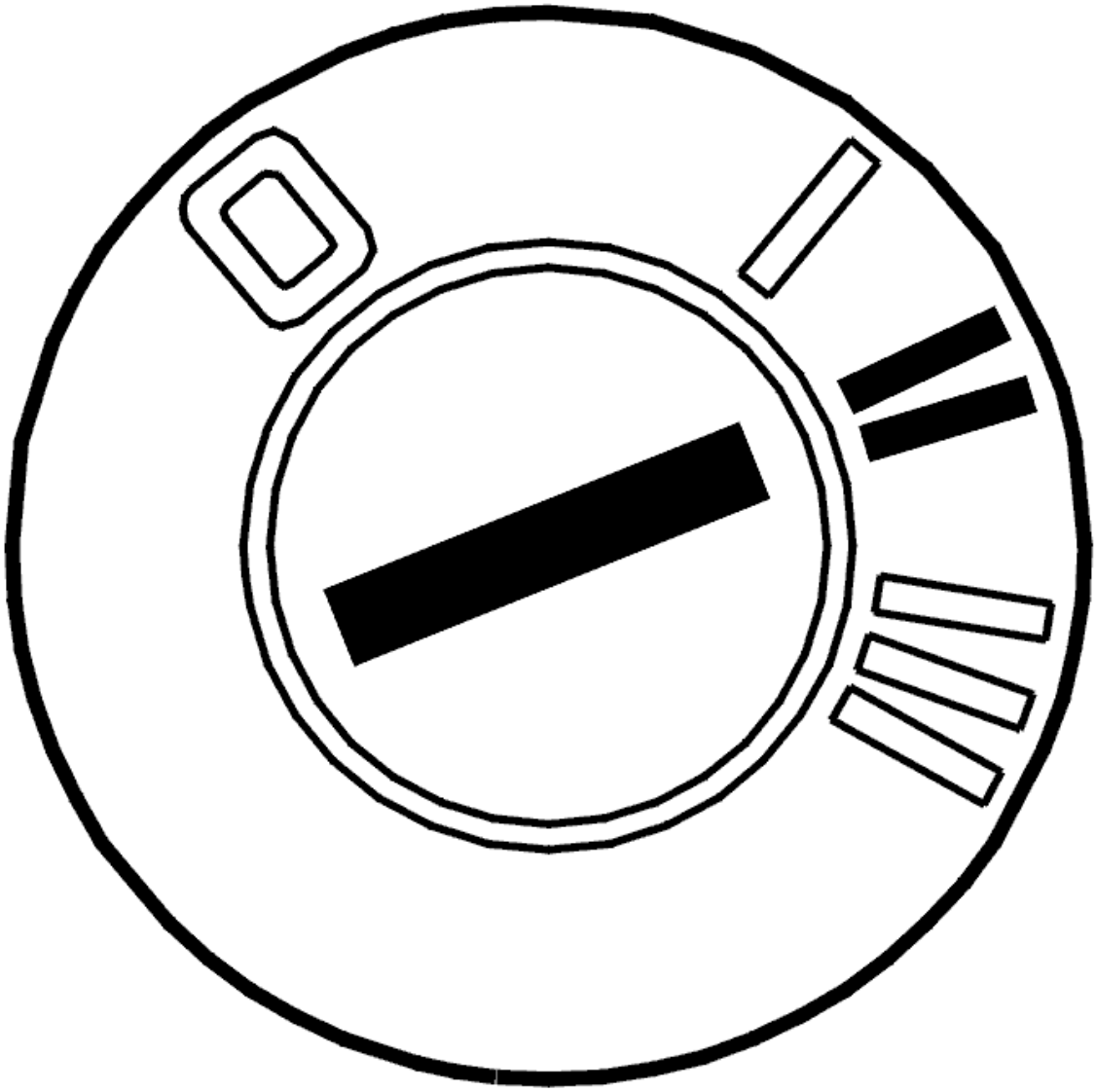


Fig. 124: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

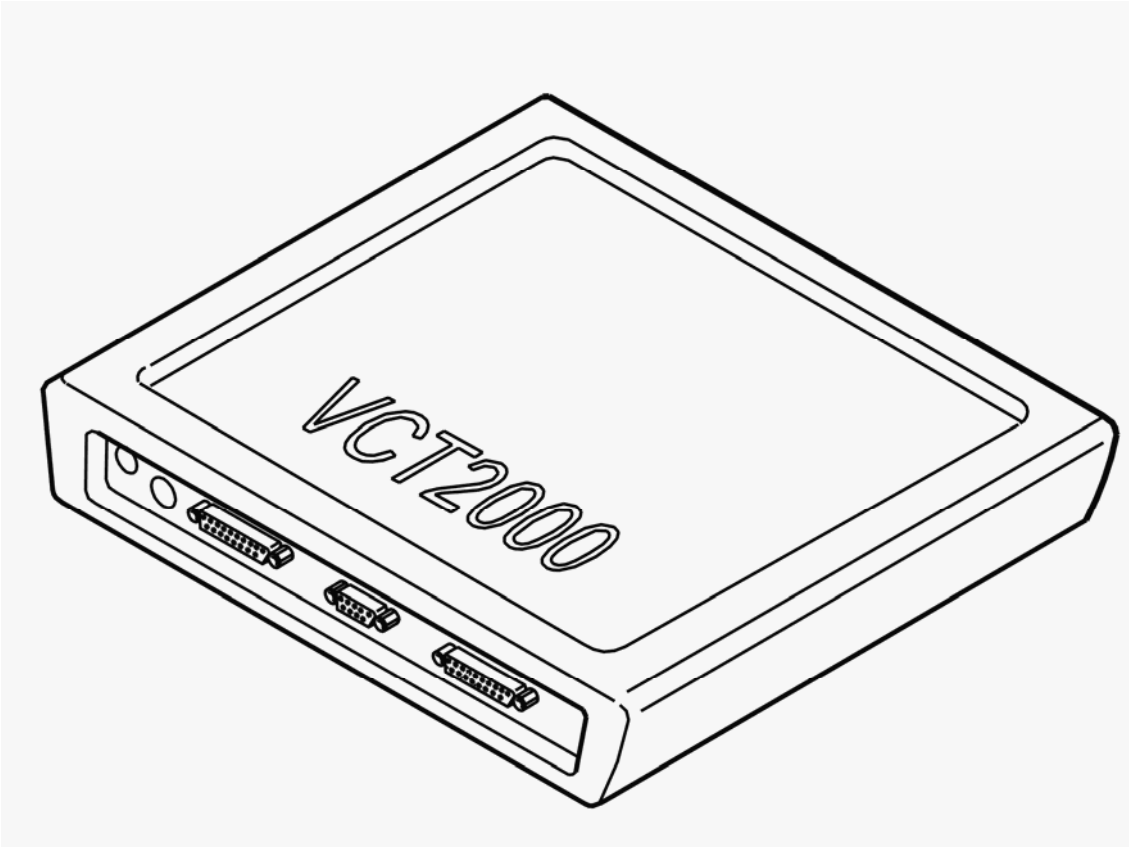


Fig. 125: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

In case of this defect, troubleshooting is not followed by verification.

The information can be displayed again or the fault-tracing for this fault can be interrupted.

CHECKING OIL QUALITY (B5254T2, AW55-50/51SN; 2004-2007)

CHECKING OIL QUALITY

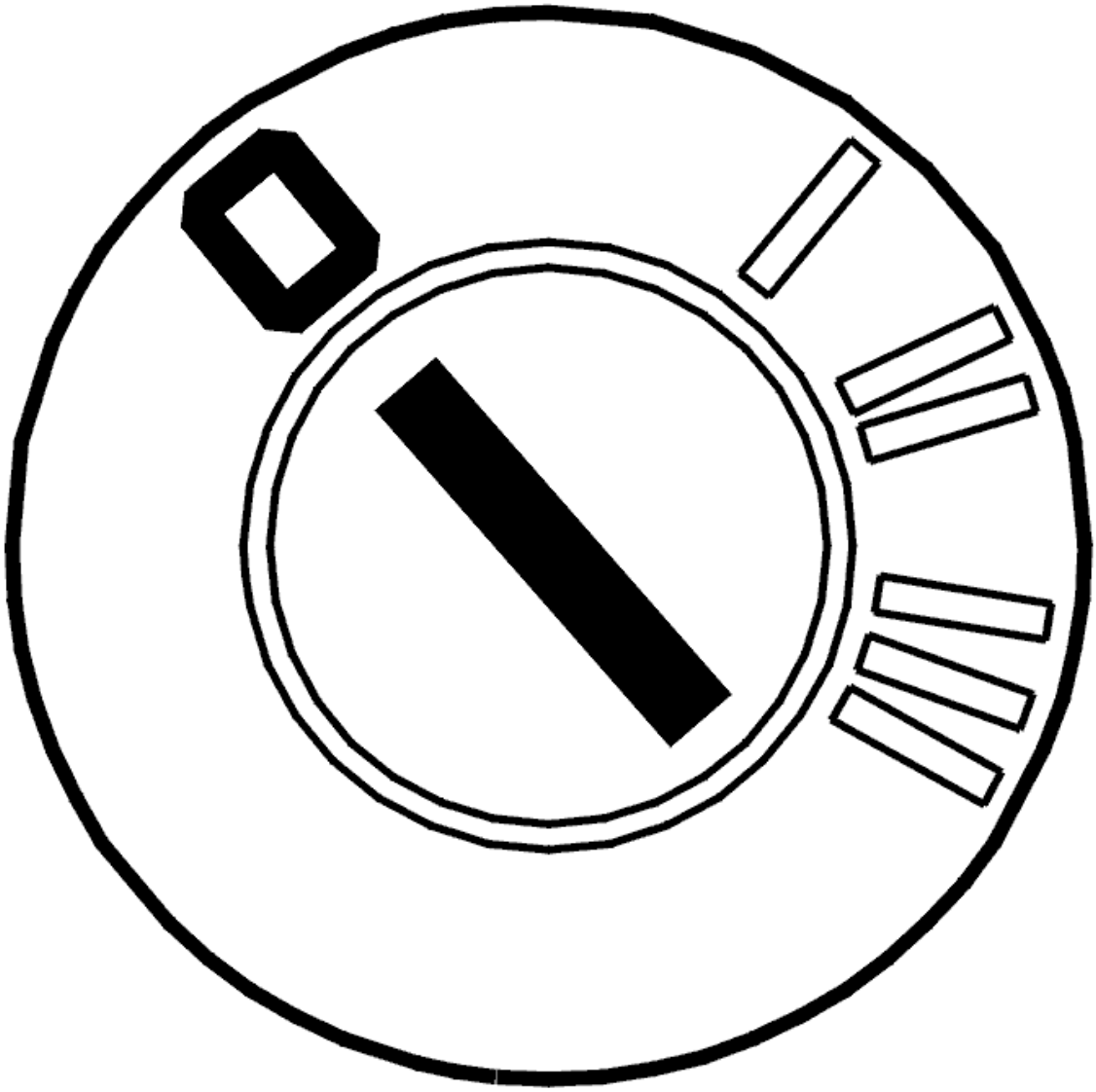


Fig. 126: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off.

  Check the oil. Take a sample with the dipstick.

  Options:

  1. The oil is OK.

     Refer to **CHECKING OIL LEVEL**

  2. The oil is discolored or smells burnt.

     Refer to **CHANGING OIL**

3. The oil contains water (the oil is colored gray)

   Refer to **REPLACING A COMPONENT**

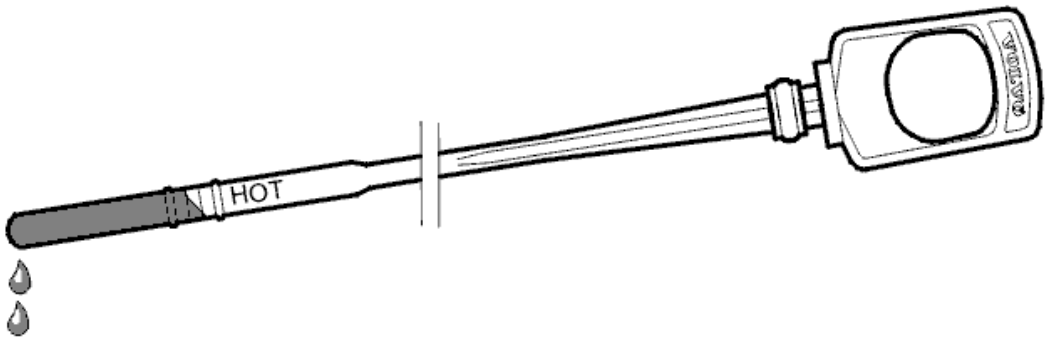


Fig. 127: Identifying Oil Dipstick
Courtesy of VOLVO CARS CORPORATION

CHECKING FOR COOLANT IN OIL

This fault may be due to coolant that has leaked into the transaxle.

Inspect according to: **CHECKING FOR COOLANT IN OIL**

If coolant is detected in the transaxle oil, the transaxle, radiator and hoses between the radiator and transaxle must be replaced.

Other information

- see **TRANSMISSION, REMOVING**
- see **TRANSMISSION, INSTALLING**

Was a fault detected?

- **YES**

  Refer to **INFORMATION**

- **NO**

  Refer to **INFORMATION**

CHANGING OIL

Changing oil according to: **TRANSMISSION OIL / OIL FILTER, REPLACING**

- **Continue**

Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

REPLACING A COMPONENT

Find out the reason and remedy the cause of water in the oil.

Replace the transmission.

Flush clean the oil cooler, pipes and hoses according to: **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

Other information

- see **TRANSMISSION, REMOVING**
- see **TRANSMISSION, INSTALLING**

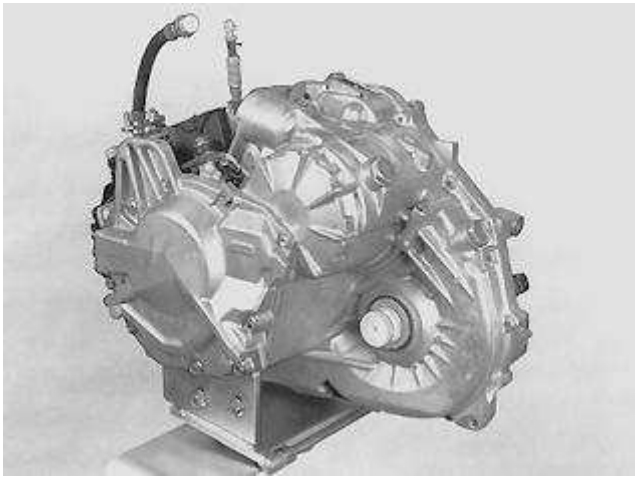


Fig. 128: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

CHECKING OIL LEVEL

Check the oil level. See **OIL LEVEL, CHECKING**

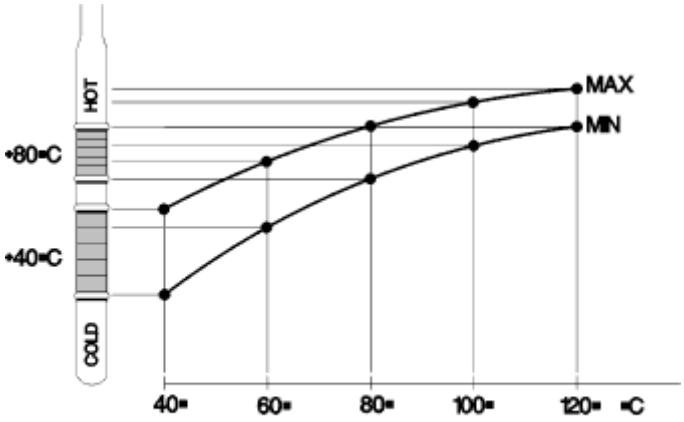


Fig. 129: Identifying Oil Level Graph
Courtesy of VOLVO CARS CORPORATION

Was the oil level correct?

- **YES**

  Refer to **CHECKING FOR COOLANT IN OIL**

- **NO**

  Refer to **RESETTING TRANSMISSION FLUID CHANGE COUNTER**

TEST DRIVING THE TRANSMISSION

Test drive the car as follows: **TEST DRIVE SCHEDULE, DESCRIPTION**

If the function of the transaxle is OK, the fault has been traced and rectified and fault tracing can stopped. If not, select continue to advance with fault tracing.

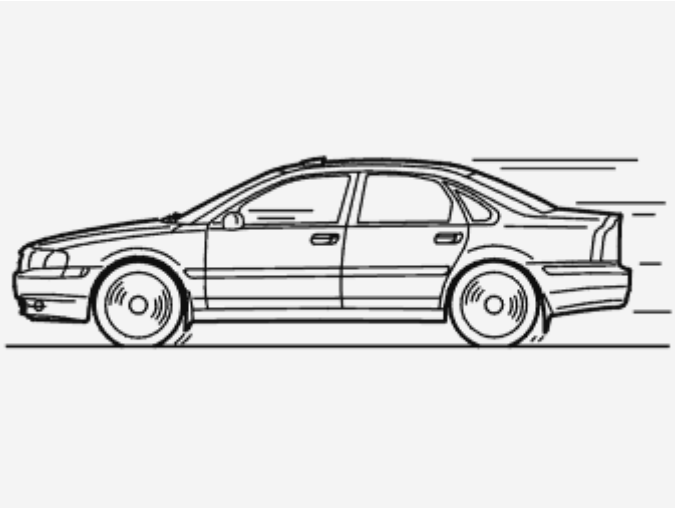


Fig. 130: Identifying Test Driving
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING FOR COOLANT IN OIL**

RESETTING TRANSMISSION FLUID CHANGE COUNTER

RESETTING TRANSMISSION FLUID CHANGE COUNTER

HINT: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

NOTE: This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.

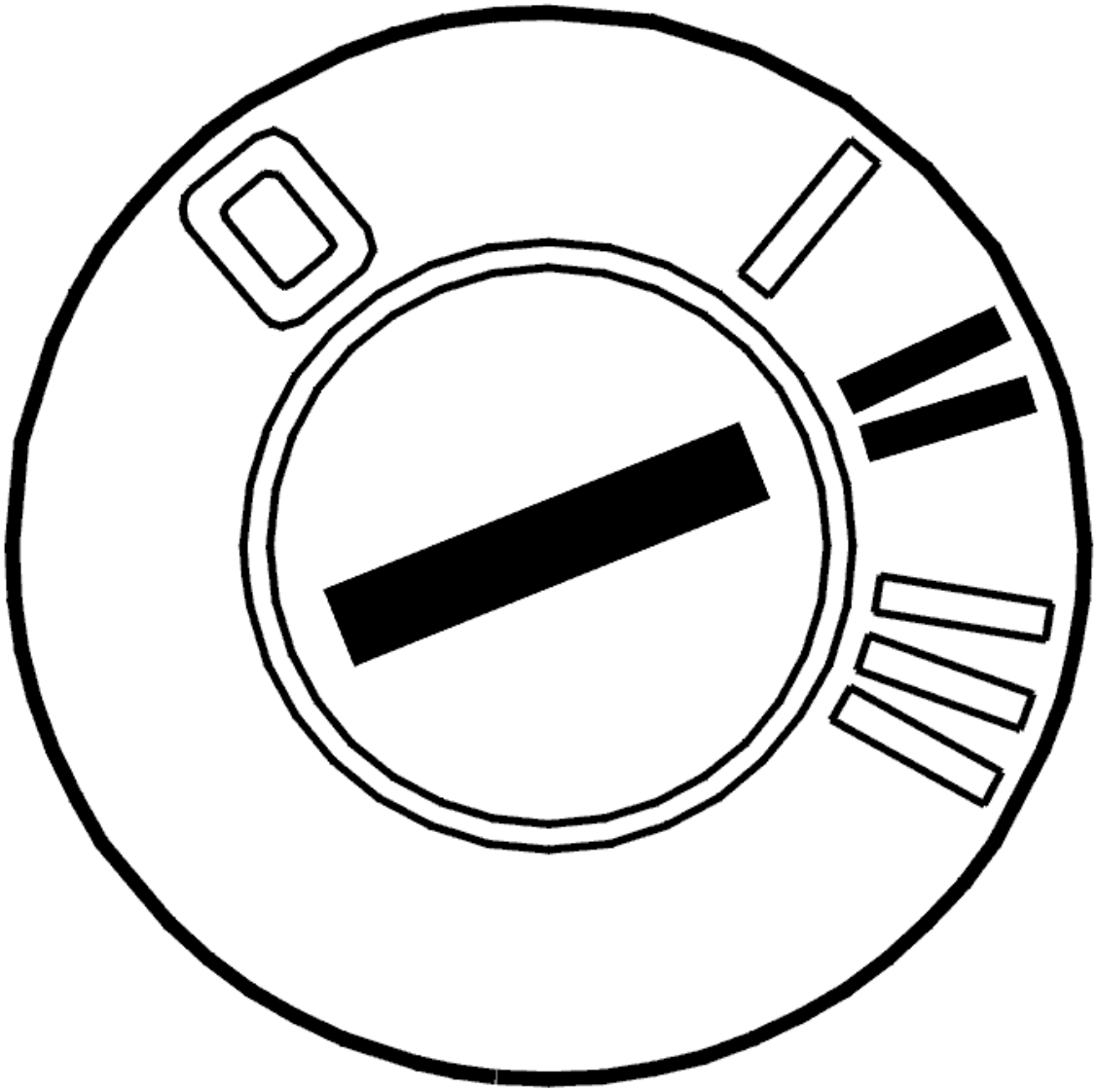


Fig. 131: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Reset the counter by clicking on the VCT 2000 symbol.

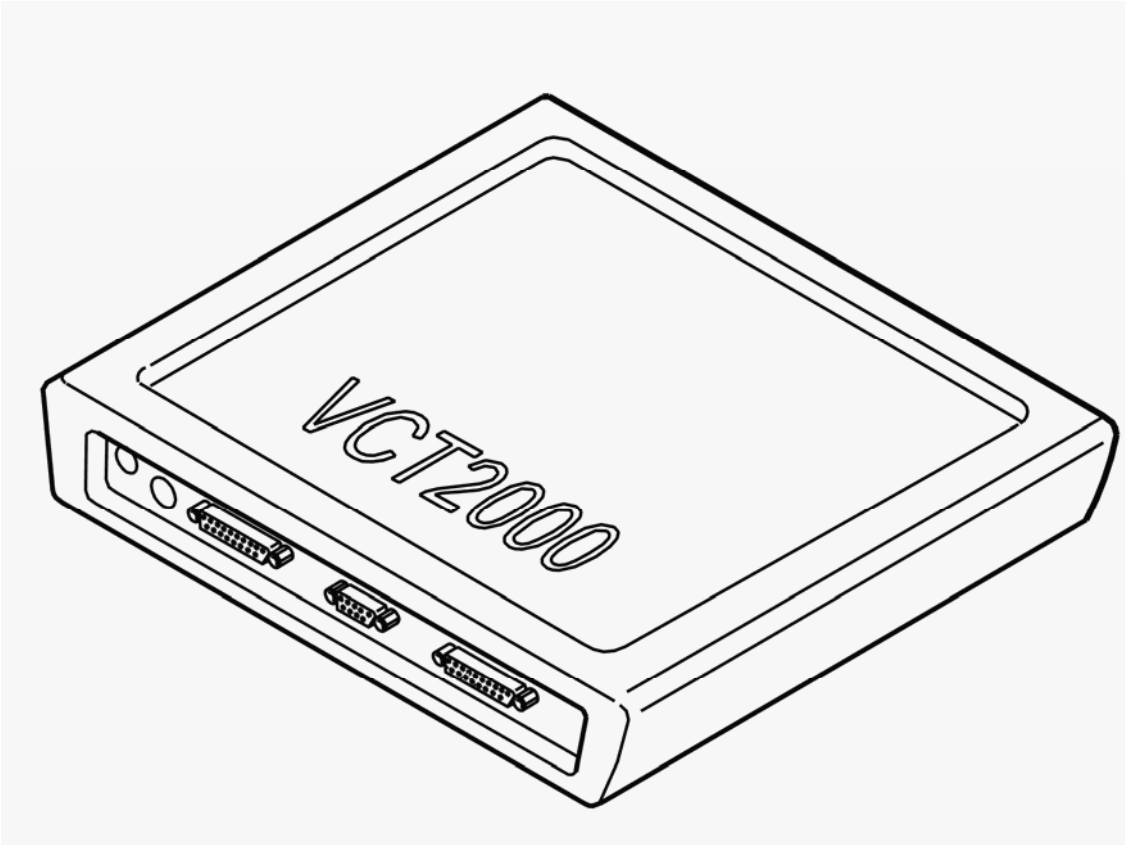


Fig. 132: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **TEST DRIVING THE TRANSMISSION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

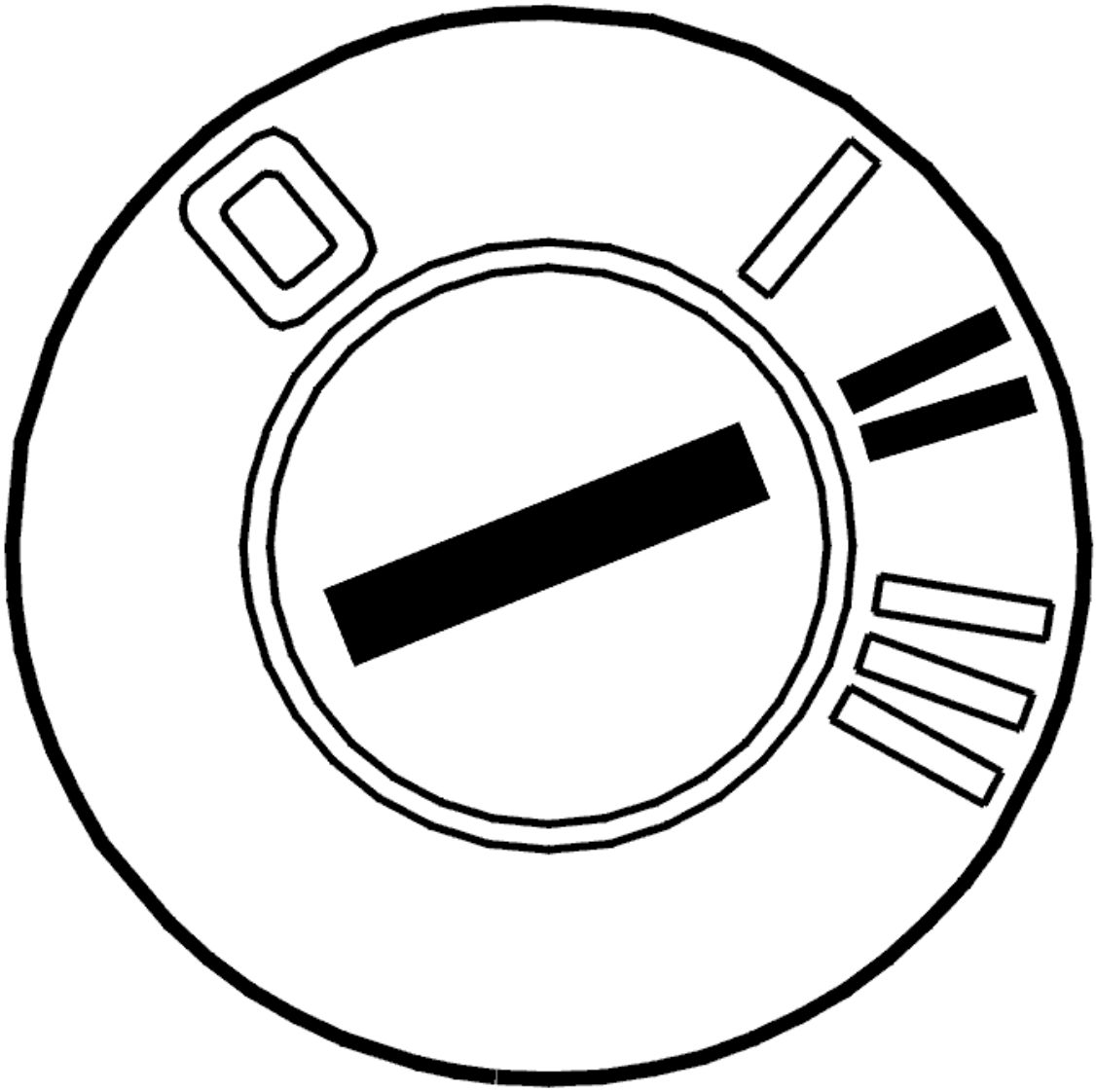


Fig. 133: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

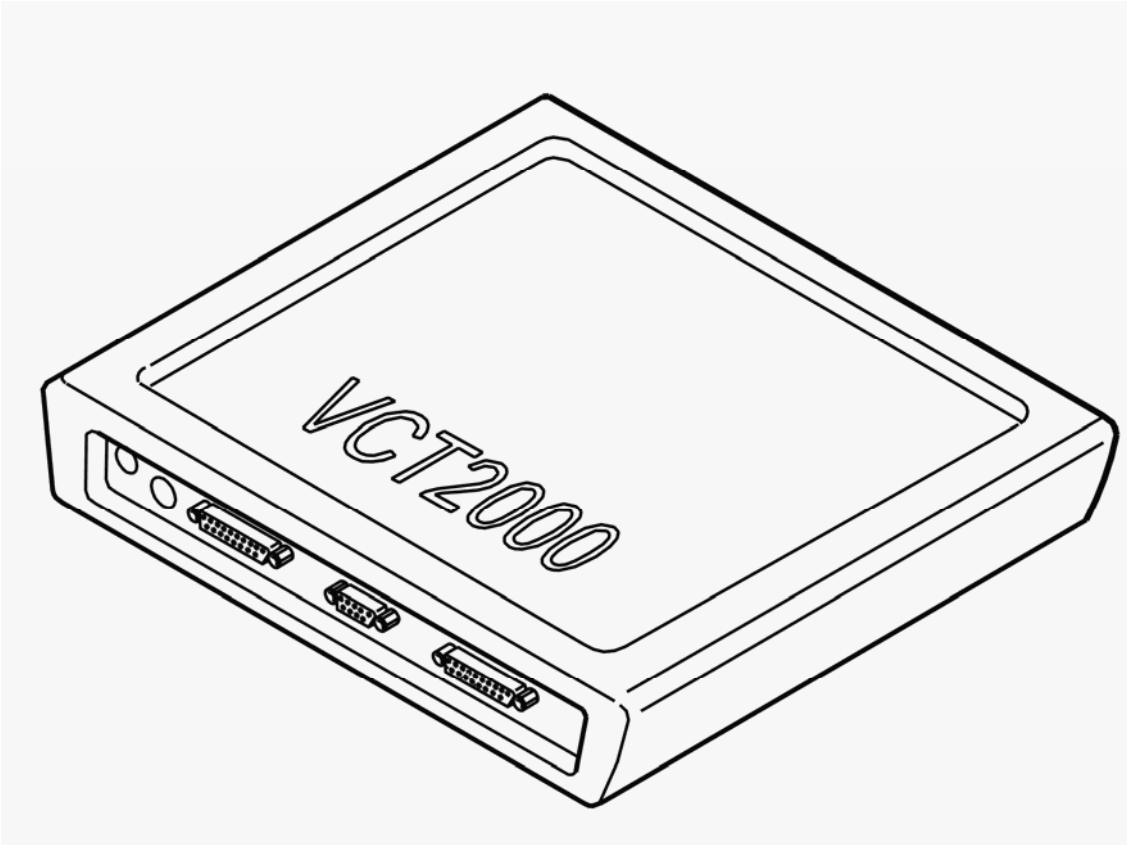


Fig. 134: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

INFORMATION

FAULT-TRACING INFORMATION

In case of this defect, troubleshooting is not followed by verification.

The information can be displayed again or the fault-tracing for this fault can be interrupted.

CHECKING PARK LOCK, DRIVE SHAFT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

CHECKING PARK LOCK, DRIVE SHAFT

FAULT-TRACING INFORMATION

Check that the drive shaft is engaged in the transmission. This determines whether the park lock in the transmission is not functioning.

If one of the drive shafts is out of position, this can result in the symptom "park lock not working".

Causes of interference can be:

- that one or both of the drive shafts is not in position, so that there is no engagement in the transmission.
- **Continue**

  Refer to **CHECKING PARK LOCK, DRIVE SHAFT**

CHECKING PARK LOCK, DRIVE SHAFT

Checking the Park lock, drive shaft

With the car on a flat surface, shift the gear selector to position P. Release the brake. Can the car be rolled forwards or backwards? The drive shafts may be out of position if the car moves.

Remedy as necessary

CHECKING P-SHIFT LOCK SOLENOID (4T65 AWD; 2003-2006)

CHECKING P-SHIFT LOCK SOLENOID

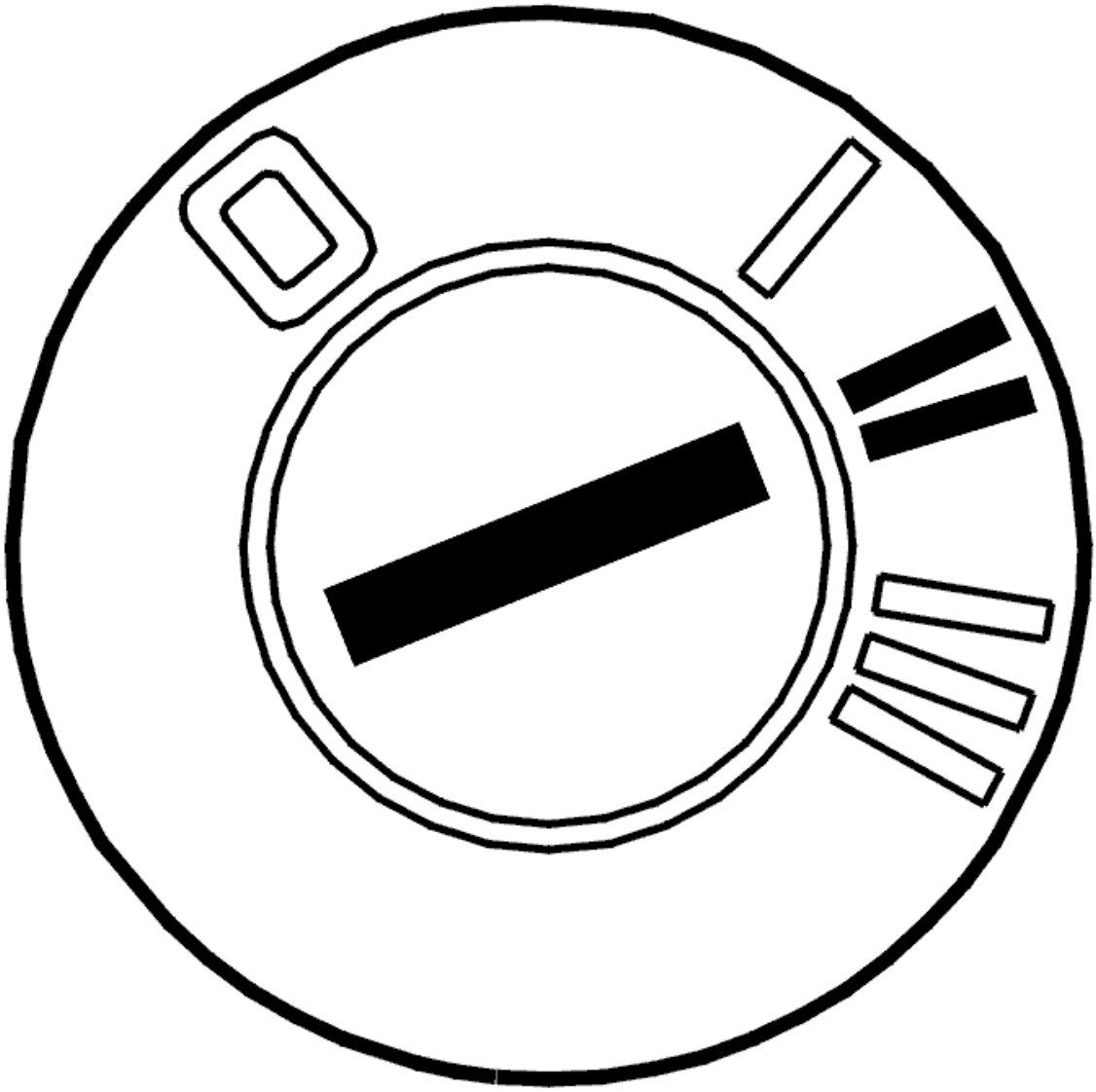


Fig. 135: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Gear selector in position P.

  Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.

  Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

- **YES**

FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING WIRING AND COMPONENT**

CHECKING WIRING AND COMPONENT

Check the cable between the control module for the gear selector and solenoid connectors. Check for an open-circuit, short-circuit to ground and a short-circuit to supply voltage.

HINT: The resistance must be 15 -25 ohms with an ohmmeter connected to the solenoid connector terminals #1 and #2 (solenoid side). Replace the solenoid if the resistance is incorrect

Remedy as necessary.

Other information

- To check or replace the shift lock solenoid, see **SOLENOID SHIFT LOCK, REPLACE**
- To check the wiring and connections, see **CHECKING WIRING AND TERMINALS** .

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair, check that the fault has been remedied.

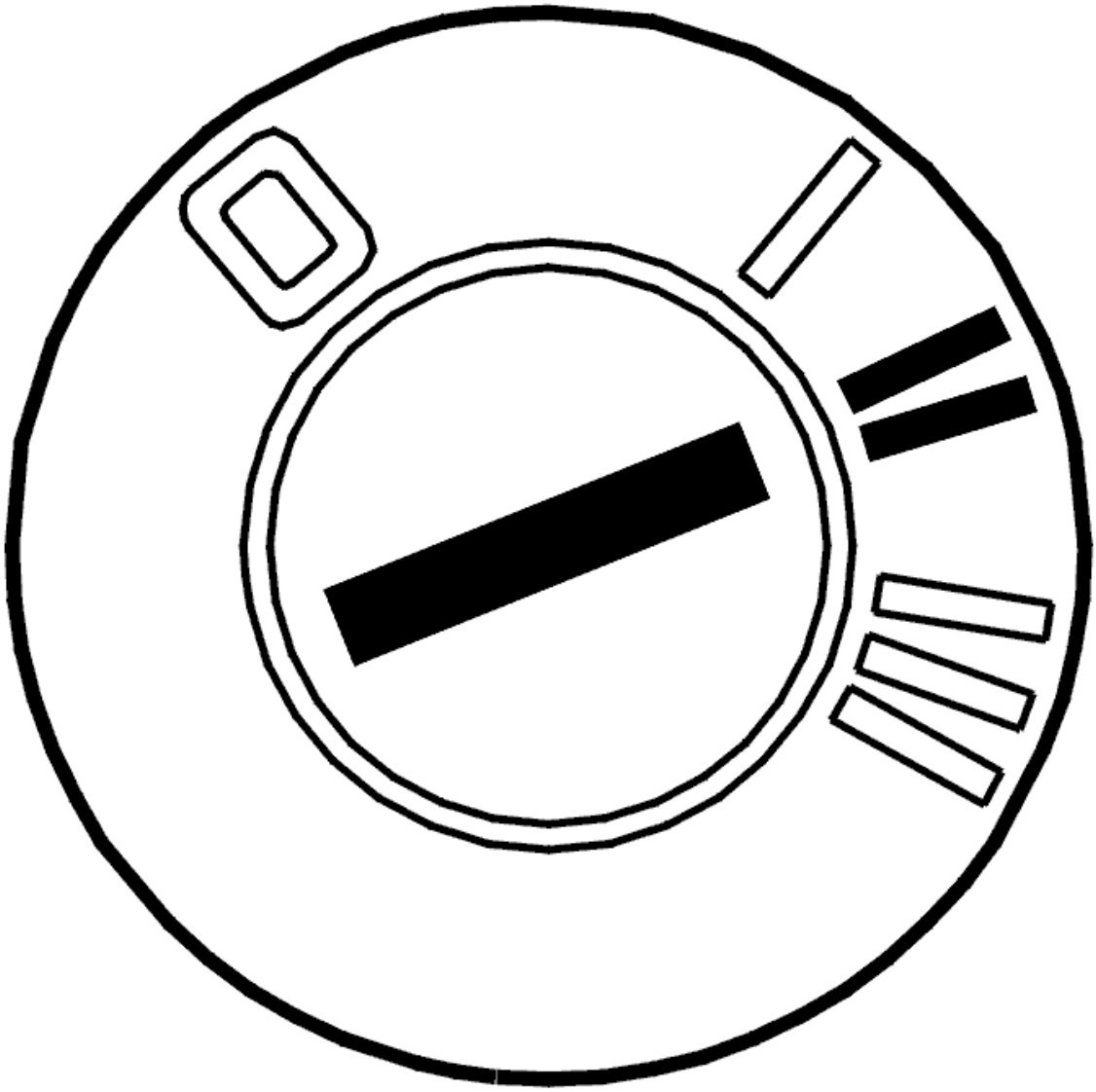


Fig. 136: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.
- Gear selector in position P.

  Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.

  Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

- **YES**

VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

CHECKING SEALING RING FOR THE OIL PUMP (AW50/51 AWD; AW55-50/51SN; 2003-2007)

CHECKING SEALING RING IN OIL PUMP

Check the oil pump sealing ring for damage.

Replace the sealing ring if it is damaged. See **REPLACING THE SEALING RING FOR THE OIL PUMP** .

Other information:

- For information about removal/installation, see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

Was the sealing ring damaged?

- **YES**

  Refer to **RESETTING THE ADAPTATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during

repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

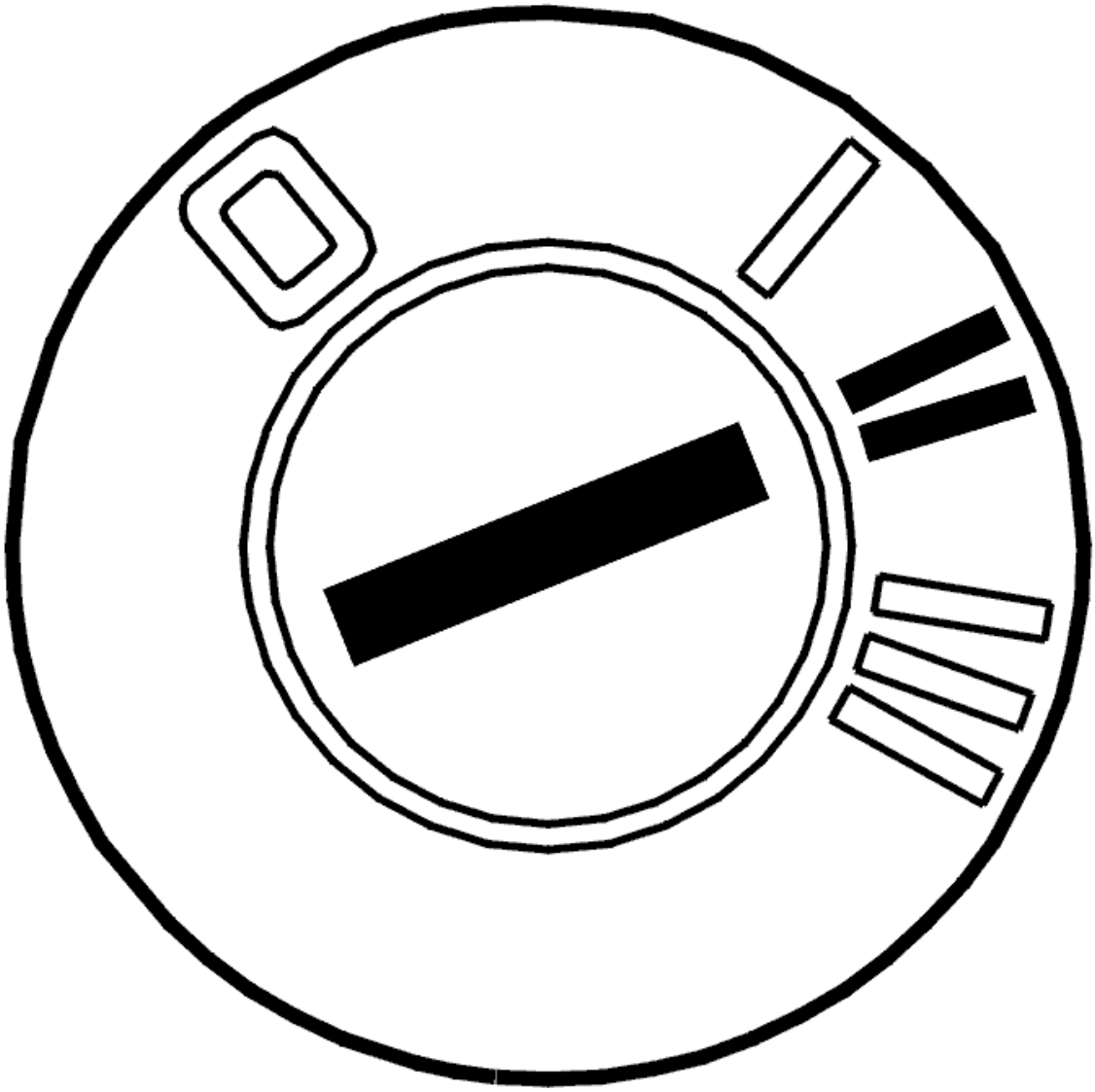


Fig. 137: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

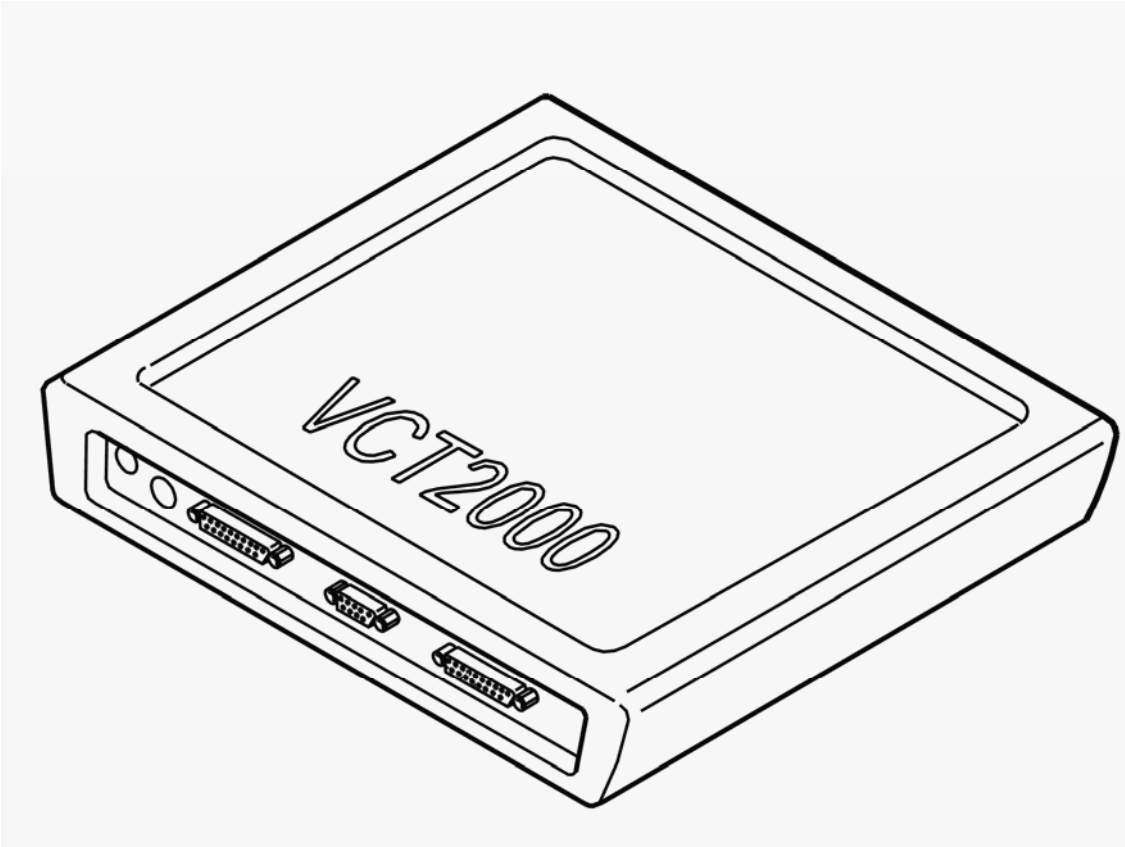


Fig. 138: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING STATUS, SLT (AW50/51 AWD; AW55-50/51SN; 2003-2007)

CHECKING STATUS, SLT

CHECKING STATUS

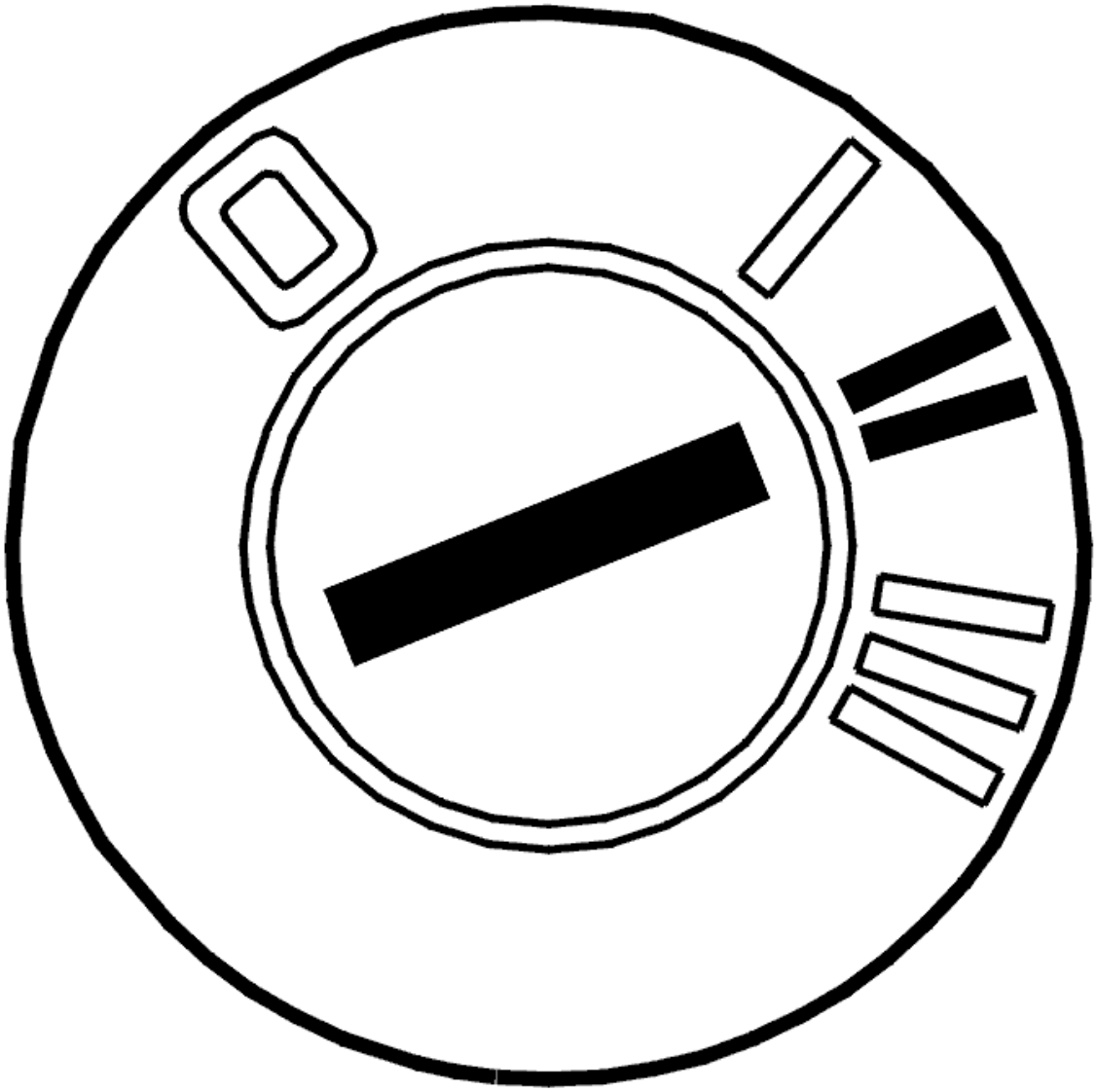


Fig. 139: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

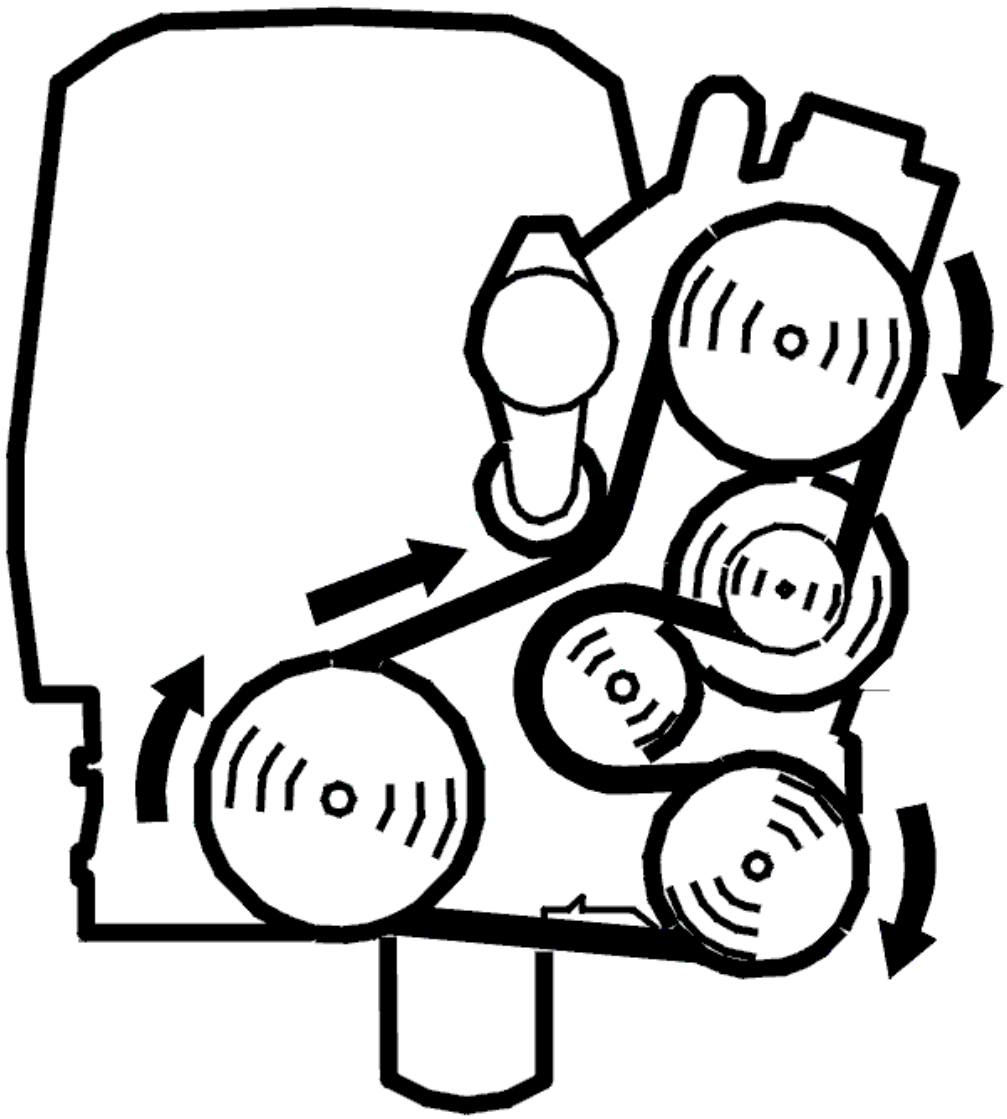


Fig. 140: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Check the resistance of the throttle solenoid (SLT).

  Check that the resistance of the solenoid is between 4.5-5.5 ohms.

  Other information:

  - For information about signal specifications, see **SIGNAL DESCRIPTION. TRANSMISSION CONTROL MODULE (TCM)**
  - To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**

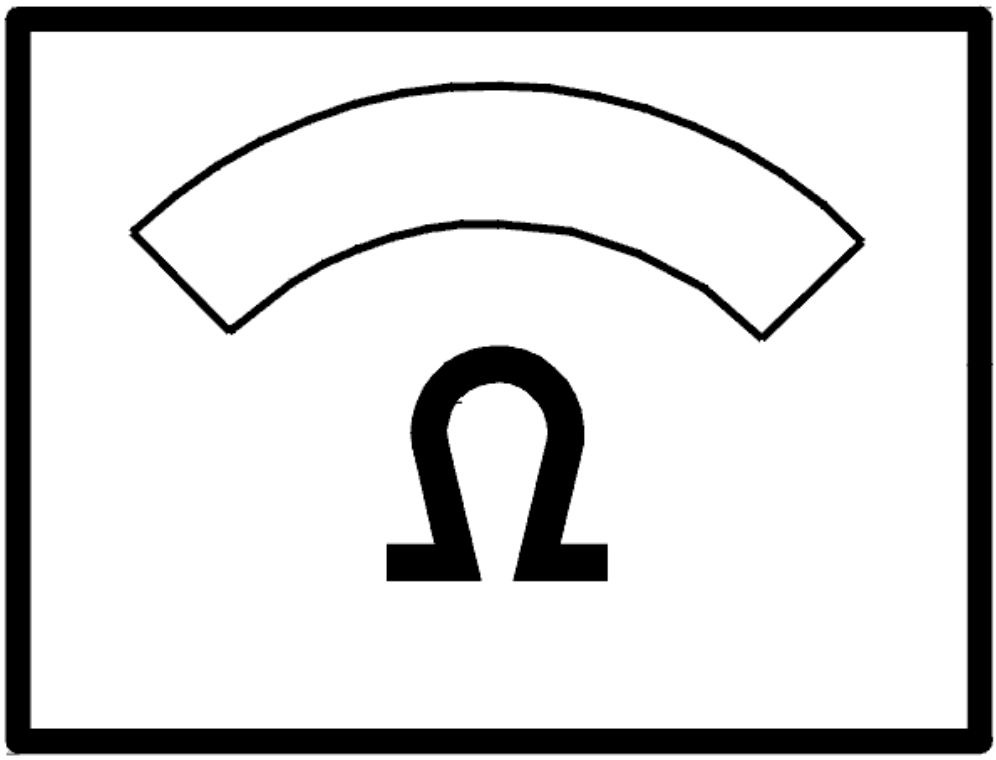


Fig. 141: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Is the resistance between 4.5-5.5 ohms?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **INCORRECT RESISTANCE VALUE**

INCORRECT RESISTANCE VALUE

Replace the control system solenoid.

Other information:

- To access and replace the control system solenoid, see **SOLENOIDS, CONTROL SYSTEM, REPLACING**.

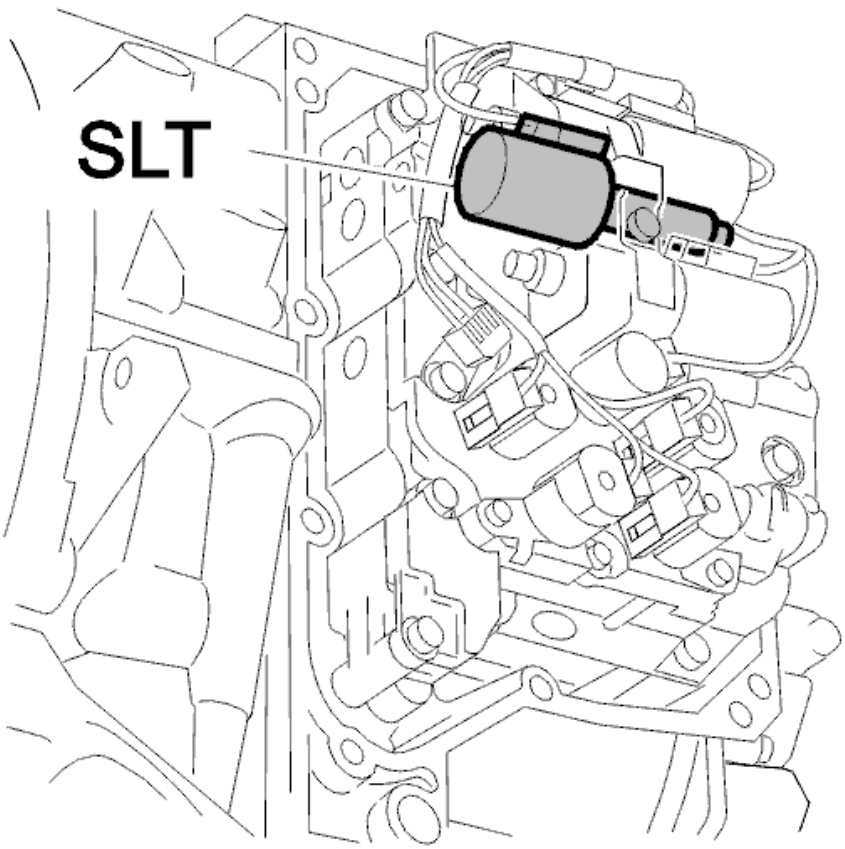


Fig. 142: Identifying Line Pressure Solenoid
Courtesy of VOLVO CARS CORPORATION

SOLENOIDS, CONTROL SYSTEM, REPLACING

REPLACING AND CHECKING SOLENOIDS

PREPARATIONS

NOTE: The operations which affect the cable harness and connectors and mountings for the control system solenoids must not be carried out when replacing the solenoids or the control system.

Remove.

- For AW50/51 AWD or AW55-50/51SN 2003-, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For 4T65AWD 2003-, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)** .

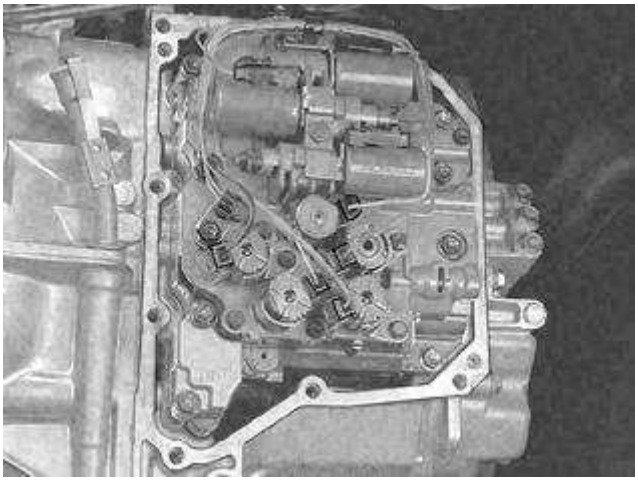


Fig. 143: Identifying Solenoid Connectors
Courtesy of VOLVO CARS CORPORATION

Disconnect the connectors from the solenoids.

CHECK RESISTANCE IN S1-S5

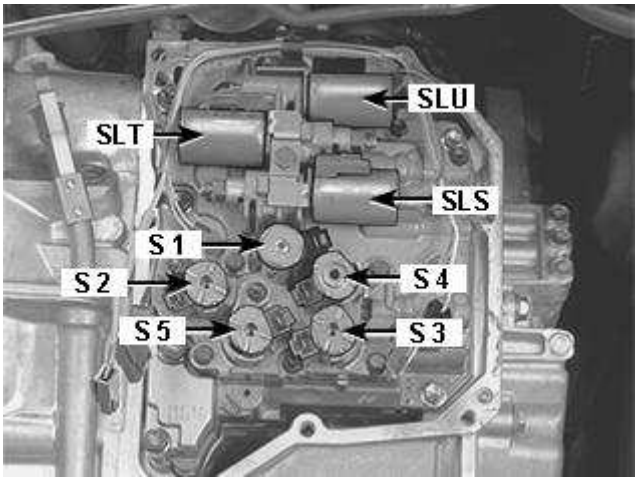


Fig. 144: Identifying S1-S5, SLT, SLU And SLS Solenoids
Courtesy of VOLVO CARS CORPORATION

NOTE: Readings should be taken at approximately 20°C.

Solenoid S1

Measure the resistance between the pin in the solenoid connector and the transmission ground terminal.

Correct value: 12-16 ohms.

Solenoids S2-S5

Measure the resistance between the pin in the solenoid connector and the transmission ground terminal.

Correct value: 11-15 ohms.

If the resistance of any of solenoids S1-S5 is incorrect

Replace the solenoid. See **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

CHECKING RESISTANCE OF SLT, SLS AND SLU

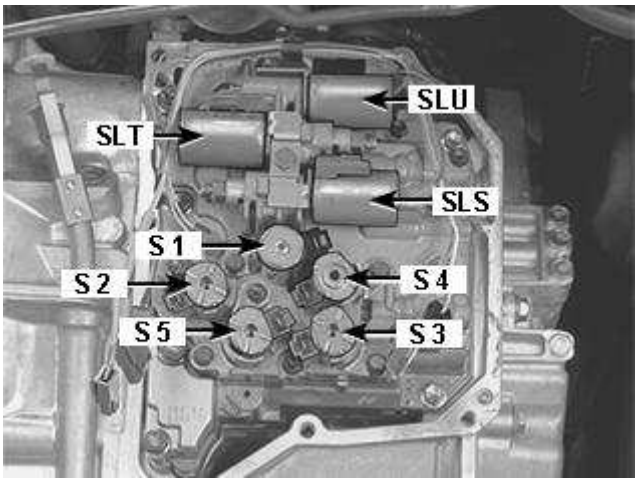


Fig. 145: Identifying S1-S5, SLT, SLU And SLS Solenoids
Courtesy of VOLVO CARS CORPORATION

NOTE: Readings should be taken at approximately 20°C.

Solenoid SLT, SLS and SLU

Measure the resistance between both the pins in the solenoid connector.

Correct value: 5.0-5.6 ohms.

If the value of any of solenoids SLT, SLS and SLU is incorrect

Replace the control system. See **SOLENOIDS, CONTROL SYSTEM, REPLACING**.

The control system is calibrated together with the solenoids.

REPLACING SOLENOIDS S1-S5

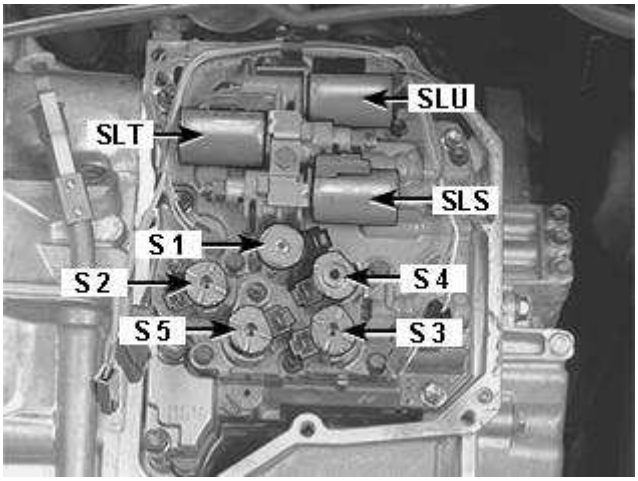


Fig. 146: Identifying S1-S5, SLT, SLU And SLS Solenoids
Courtesy of VOLVO CARS CORPORATION

Remove the screw from the solenoid. Remove the solenoid from the control system.

Lubricate the O-ring on the new solenoid. Use automatic transmission fluid.

Install the solenoid. Tighten the screw. Tighten to **7 Nm** .

FINISHING

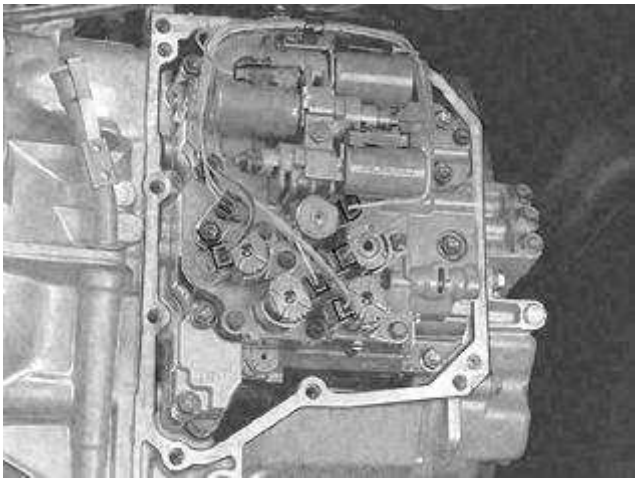


Fig. 147: Identifying Solenoid Connectors
Courtesy of VOLVO CARS CORPORATION

Connect the connectors to the solenoids.

Reinstall.

- For AW50/51 AWD or AW55-50/51SN 2003-, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**

- For 4T65AWD 2003-, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)** .

REPLACING THE CONTROL SYSTEM

PREPARATIONS

Remove.

- For AW50/51 AWD or AW55-50/51SN 2003-, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For 4T65AWD 2003-, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)** .

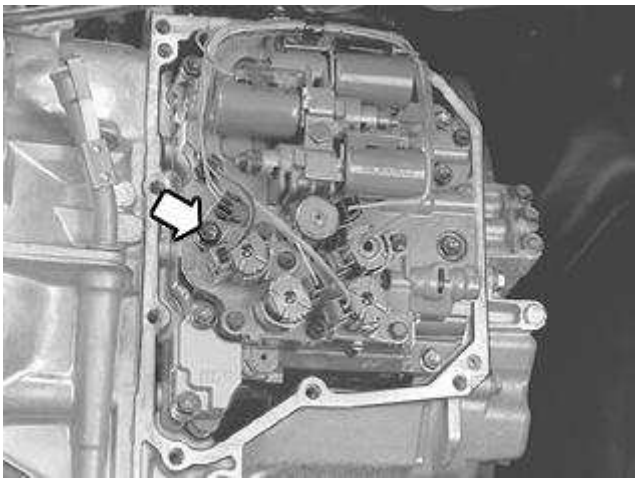


Fig. 148: Identifying Oil Temperature Sensor And Holder Screw
Courtesy of VOLVO CARS CORPORATION

Remove:

- the connectors for the solenoid valves
- the screw for the oil temperature sensor holder. Remove the sensor from the control system
- the cable harness from the holders on the control system.

Push the cable harness to one side.

REMOVING THE CONTROL SYSTEM

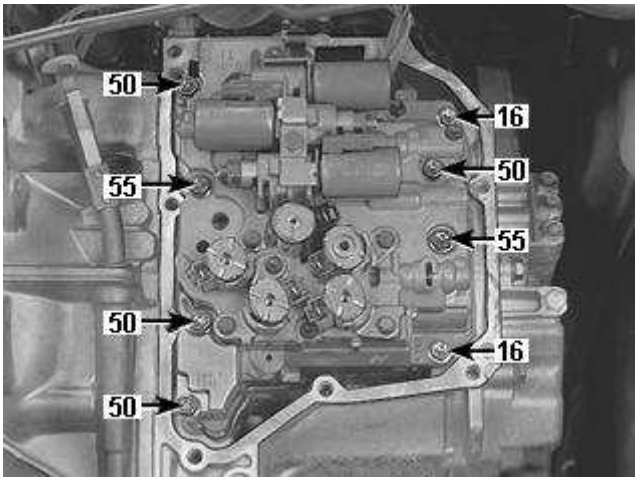


Fig. 149: Identifying Control System Screws
Courtesy of VOLVO CARS CORPORATION

Remove the screws from the control system. Remove the cover from the transmission.

NOTE: Ensure that there are no cracks on the top of the lever for the gear selector slider.

REPLACING SEALING RINGS

Fig. 150: Identifying Control System Sealing Rings
Courtesy of VOLVO CARS CORPORATION

Remove the sealing rings from the transmission.

NOTE: Ensure that no debris enters the transmission.

Install **new** sealing rings in the transmission

Use petroleum jelly to hold the seals in position.

CHECKING GEAR SELECTOR SLIDER

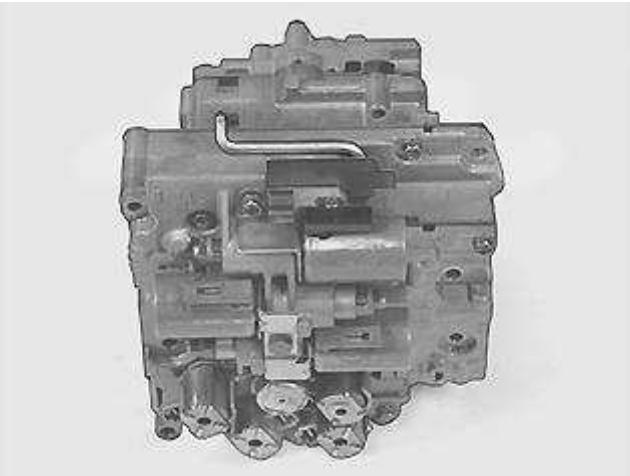


Fig. 151: Identifying Gear Selector Slider
Courtesy of VOLVO CARS CORPORATION

Check that the lever for the gear selector slider is correctly positioned.

INSTALLING THE CONTROL SYSTEM

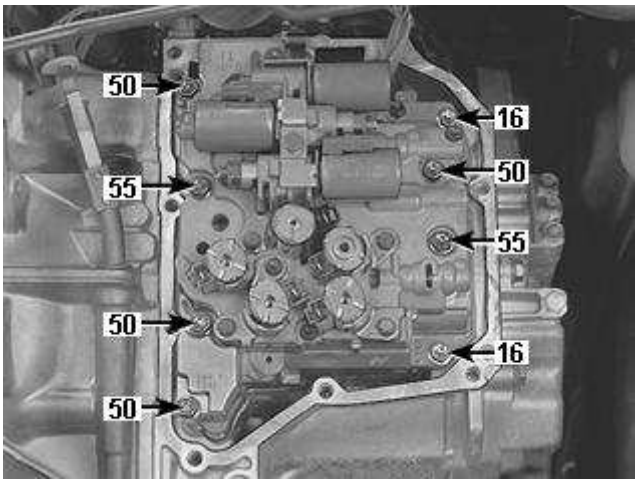


Fig. 152: Identifying Control System Screws
Courtesy of VOLVO CARS CORPORATION

NOTE: Ensure the lever for the gear selector is set to neutral.

Align the control system on the lever for the gear selector.

Install:

- the screws for the control system
- a new gasket for the cover on the control system. Note that the screws are of different lengths (measured

in mm).

Tighten the screws alternately to light contact. Then tighten alternately. Tighten to **10 Nm** .

FINISHING

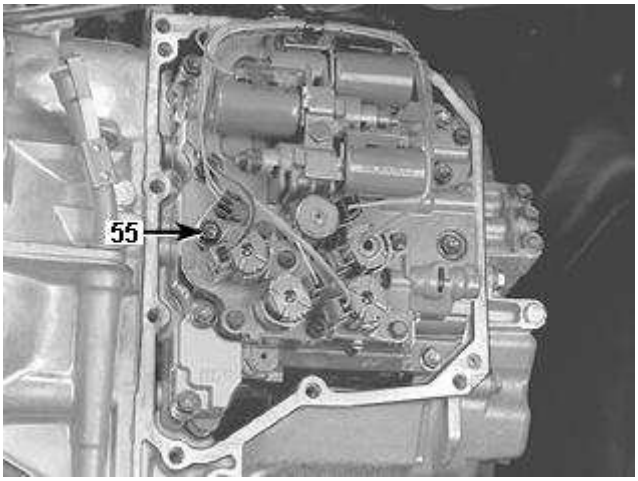


Fig. 153: Identifying Oil Temperature Sensor Screw
Courtesy of VOLVO CARS CORPORATION

Install the cable harness. Connect the connectors to the solenoids.

Install the oil temperature sensor with the holder and the screw. Note that the length of the screw is given in mm. Tighten to **10 Nm** .

Install the cable harness on the holder. Check that the cable harness is correctly positioned.

Reinstall.

- For AW50/51 AWD or AW55-50/51SN 2003-, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
- For 4T65AWD 2003-, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)** .

CHECKING STEERING SHAFT BOOT (4T65 AWD; 2003-2006)

CHECKING STEERING SHAFT BOOT

CHECKING STEERING SHAFT BOOT

HINT: If the steering shaft boot is not correctly located or is damaged noise from the engine compartment can penetrate the passenger compartment.

- Fold the floor carpet out of the way.

  Check that the steering shaft boot which seals at the base of the lower steering shaft is correctly located

and not damaged.

Remedy as necessary.

Other information:

- see **STEERING SHAFT, LOWER, REPLACING**

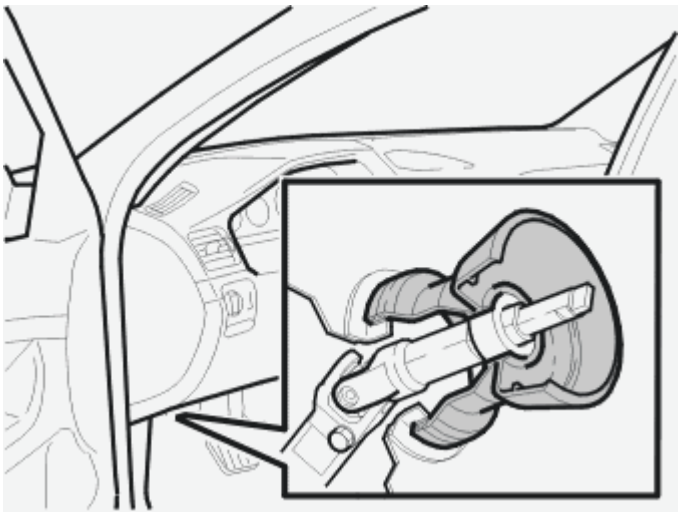


Fig. 154: Identifying Steering Shaft Boot
Courtesy of VOLVO CARS CORPORATION

FAULT-TRACING INFORMATION

Condition

- No diagnostic trouble codes (DTCs) stored.

Possible Source

- The steering shaft boot is damaged or does not seal correctly.

Fault symptom[s]

- Undefined engine noise.

CHECKING TORQUE CONVERTER (AW50/51 AWD; AW55-50/51SN; 2003-2007)

CHECKING TORQUE CONVERTER

Check the torque converter throat for damage.

If it is damaged, replace the torque converter according to **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

If it is damaged, also replace the sealing ring in the oil pump according to **REPLACING THE SEALING RING FOR THE OIL PUMP** .

Install the torque converter according to **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

Other information:

- For information about removal/installation, see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

Was the torque converter throat damaged?

- **YES**

  Refer to **RESETTING THE ADAPTATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

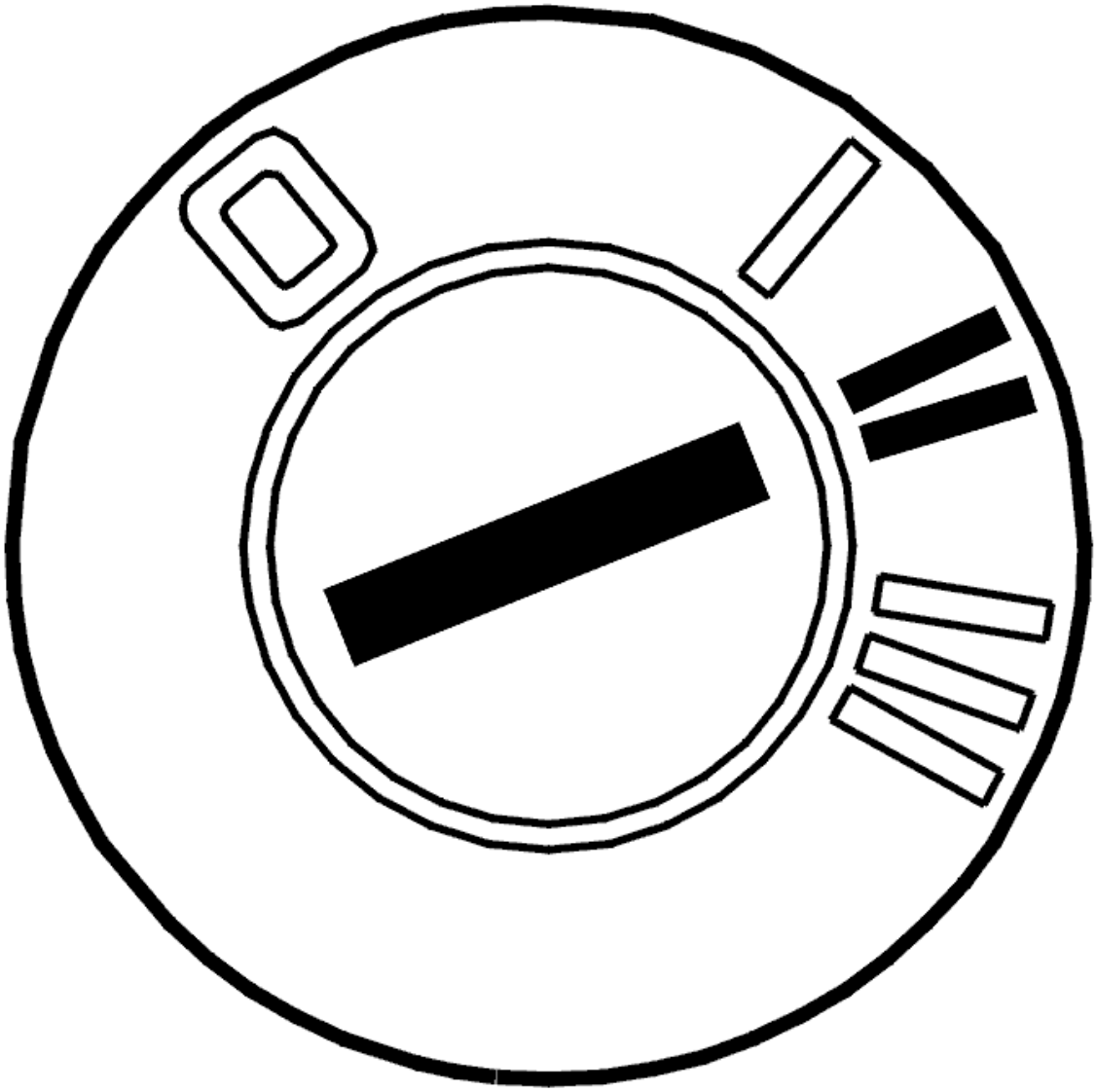


Fig. 155: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

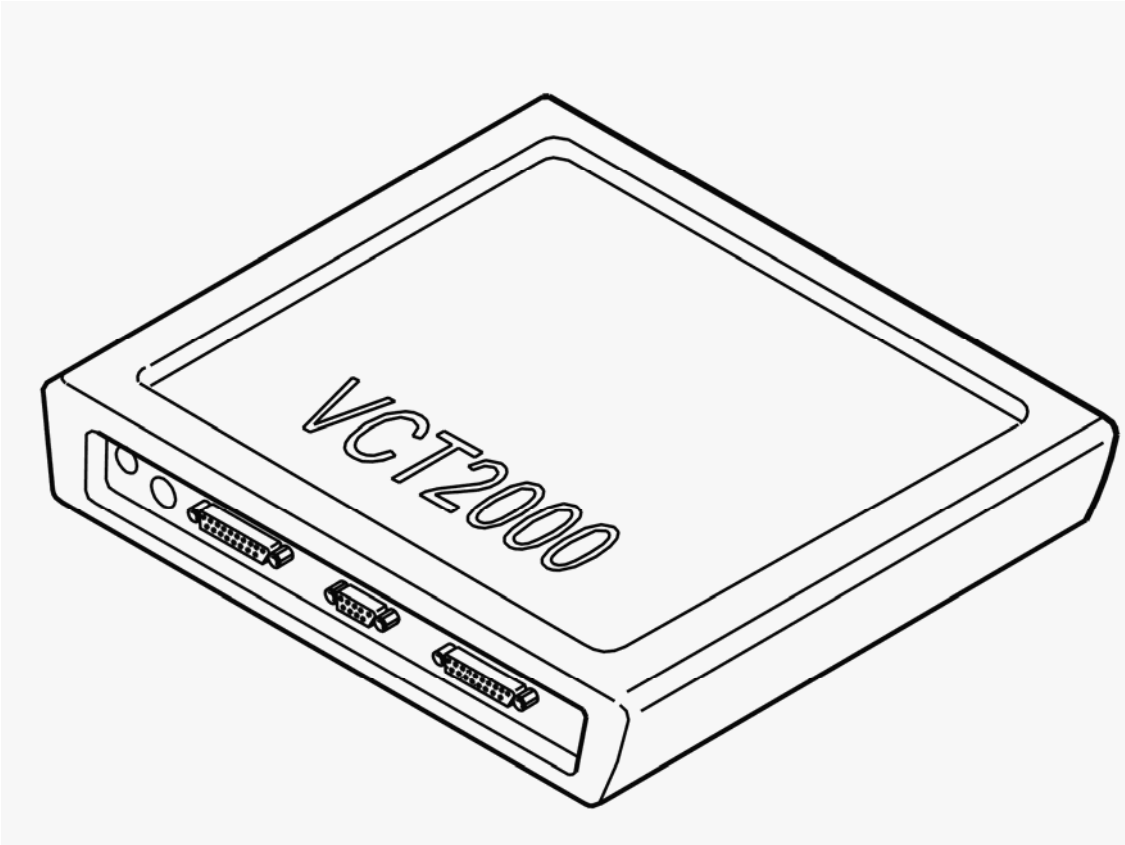


Fig. 156: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING TORQUE CONVERTER PLAY (AW50/51 AWD; AW55-50/51SN; 2003-2007)

CHECKING TORQUE CONVERTER PLAY

Check whether the torque converter catches on the housing.

If this is the case, replace the transmission.

Other information:

- For information about removal/installation, see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

Did the torque converter run free?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

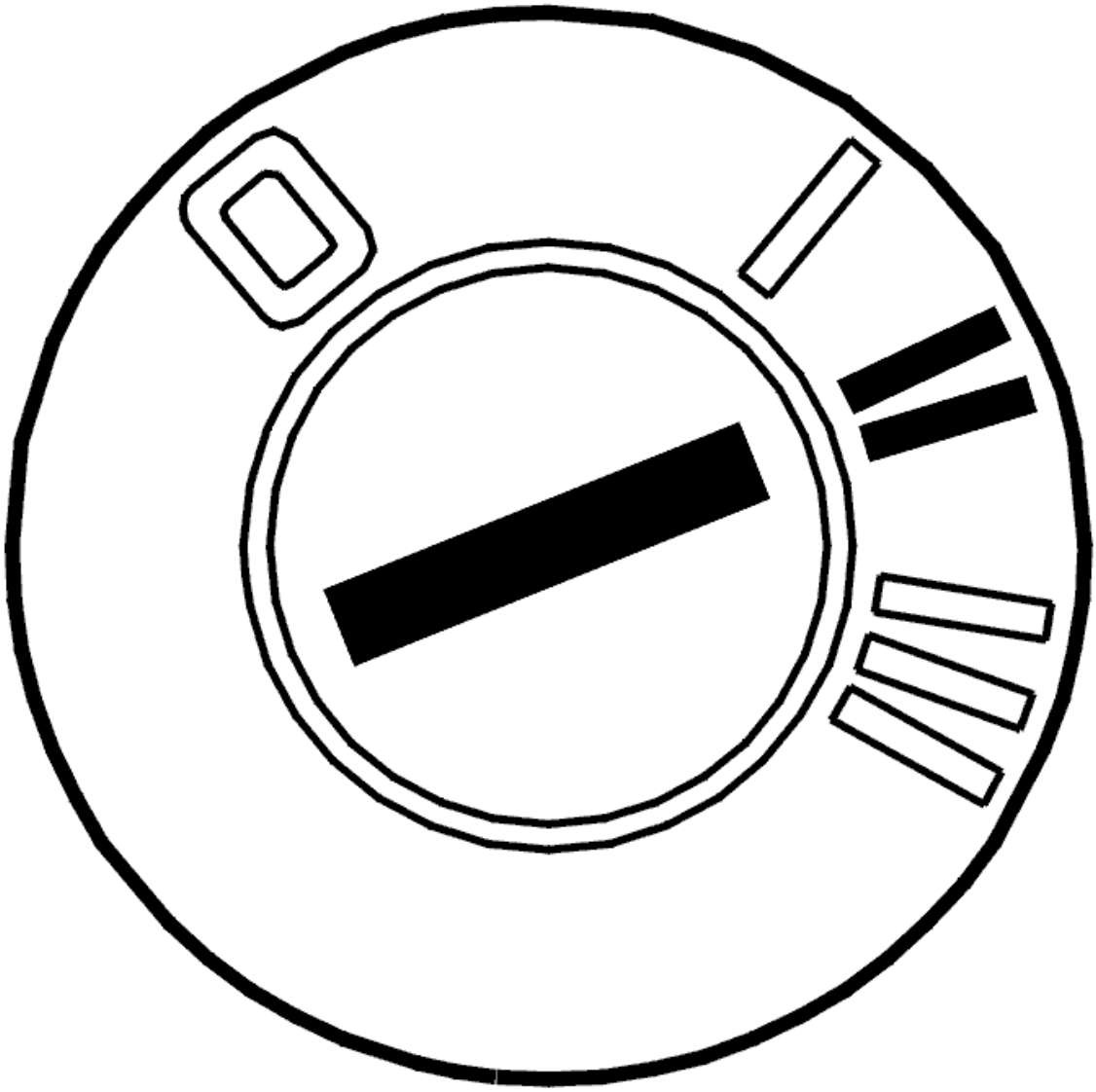


Fig. 157: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

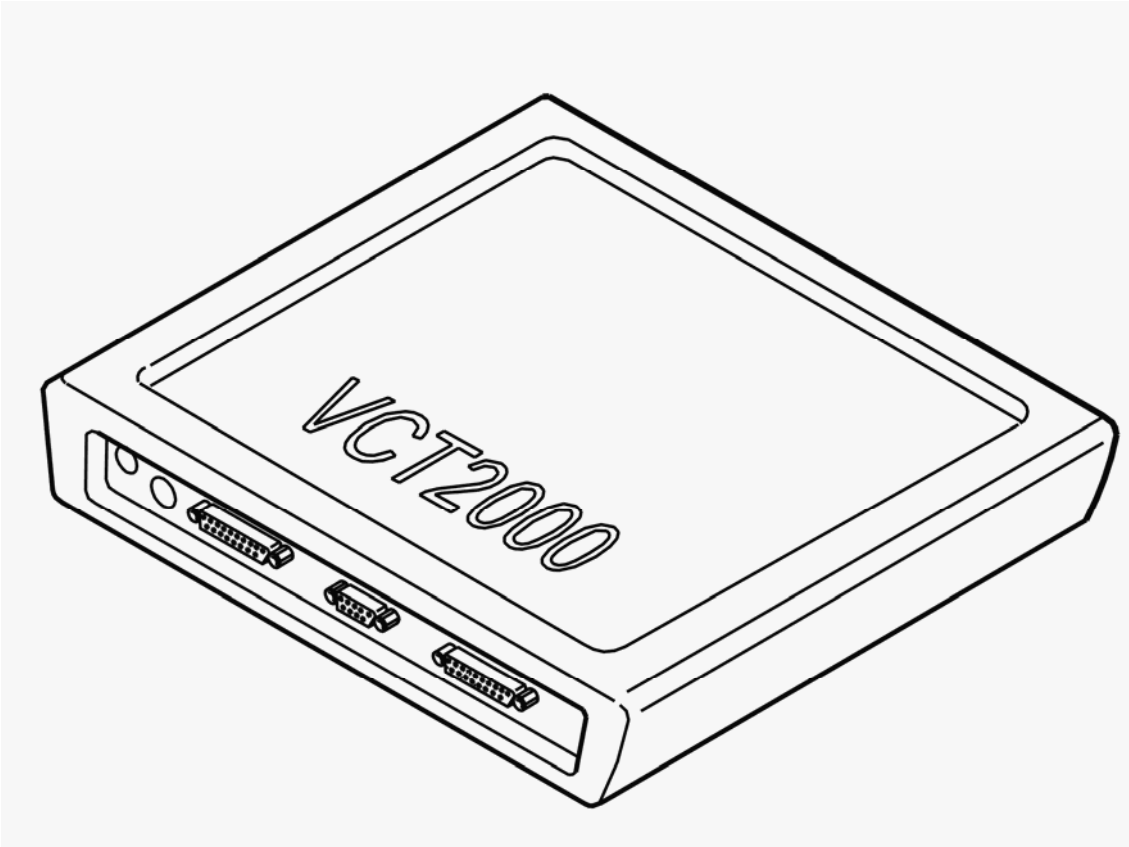


Fig. 158: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING TRANSMISSION CONTROL MODULE (TCM) POWER SUPPLY AND GROUND TERMINALS (4T65 AWD; 2003-2006)

CHECKING TRANSMISSION CONTROL MODULE (TCM) POWER SUPPLY AND GROUND TERMINALS

CHECKING POWER SUPPLY AND GROUND TERMINALS

Check the power supply cable for the transmission control module (TCM). Check for an intermittent open-circuit.

Check the transmission control module (TCM) connector. Check for damaged terminal pins. Check for contact resistance and oxidation.

Check the ground terminal between the transmission control module (TCM) and ground terminal. Check for an intermittent open-circuit. Check for contact resistance and oxidation.

Other information

- see **CHECKING WIRING AND TERMINALS**

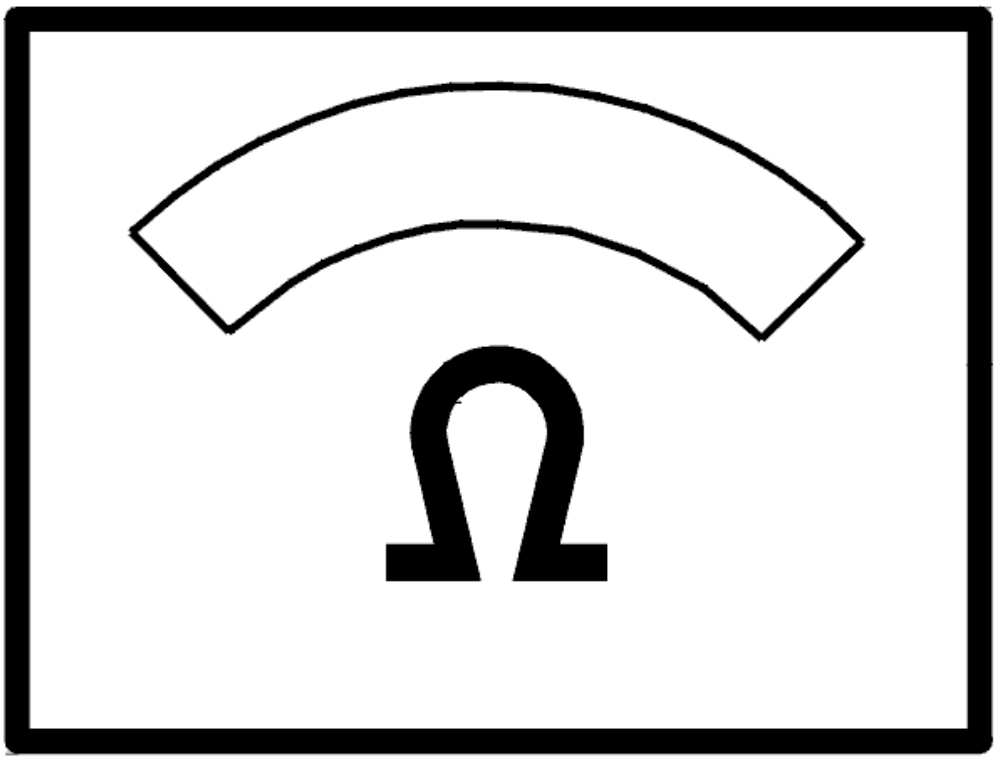


Fig. 159: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

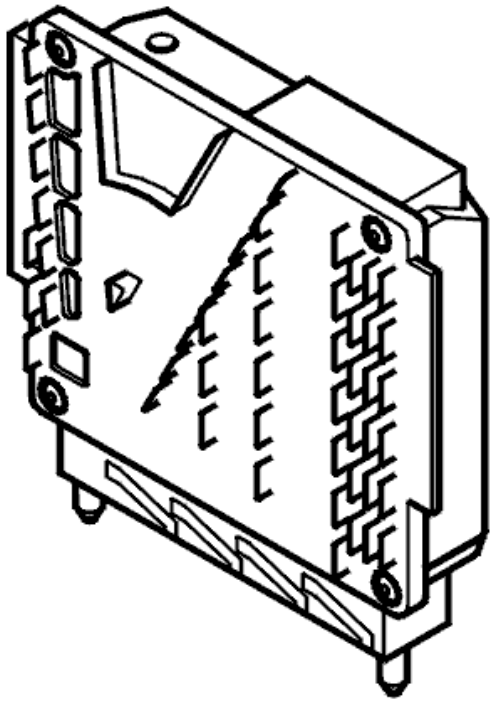


Fig. 160: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR (4T65 AWD; 2003-2006)

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

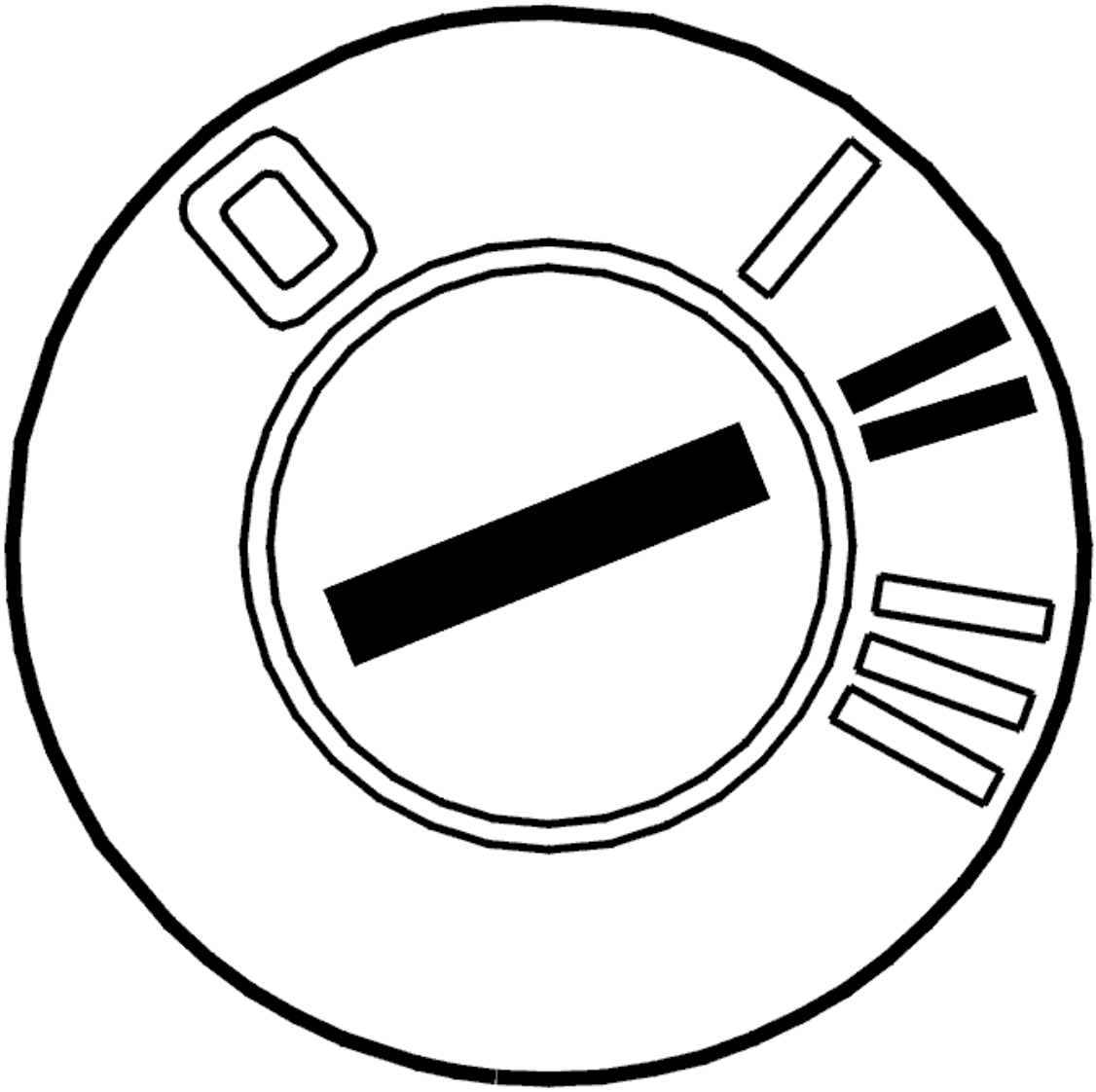


Fig. 161: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

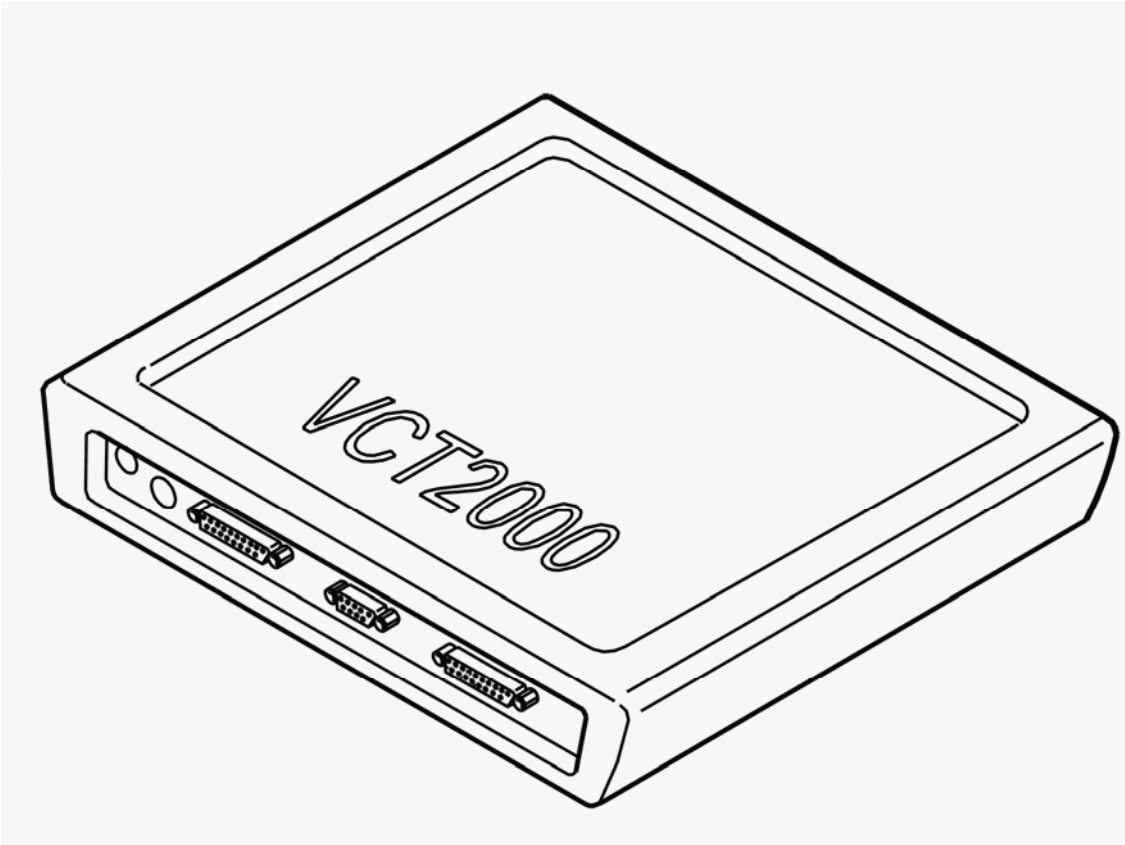


Fig. 162: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the transmission temperature within its permitted range?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR**

CHECKING TRANSMISSION FLUID TEMPERATURE SENSOR

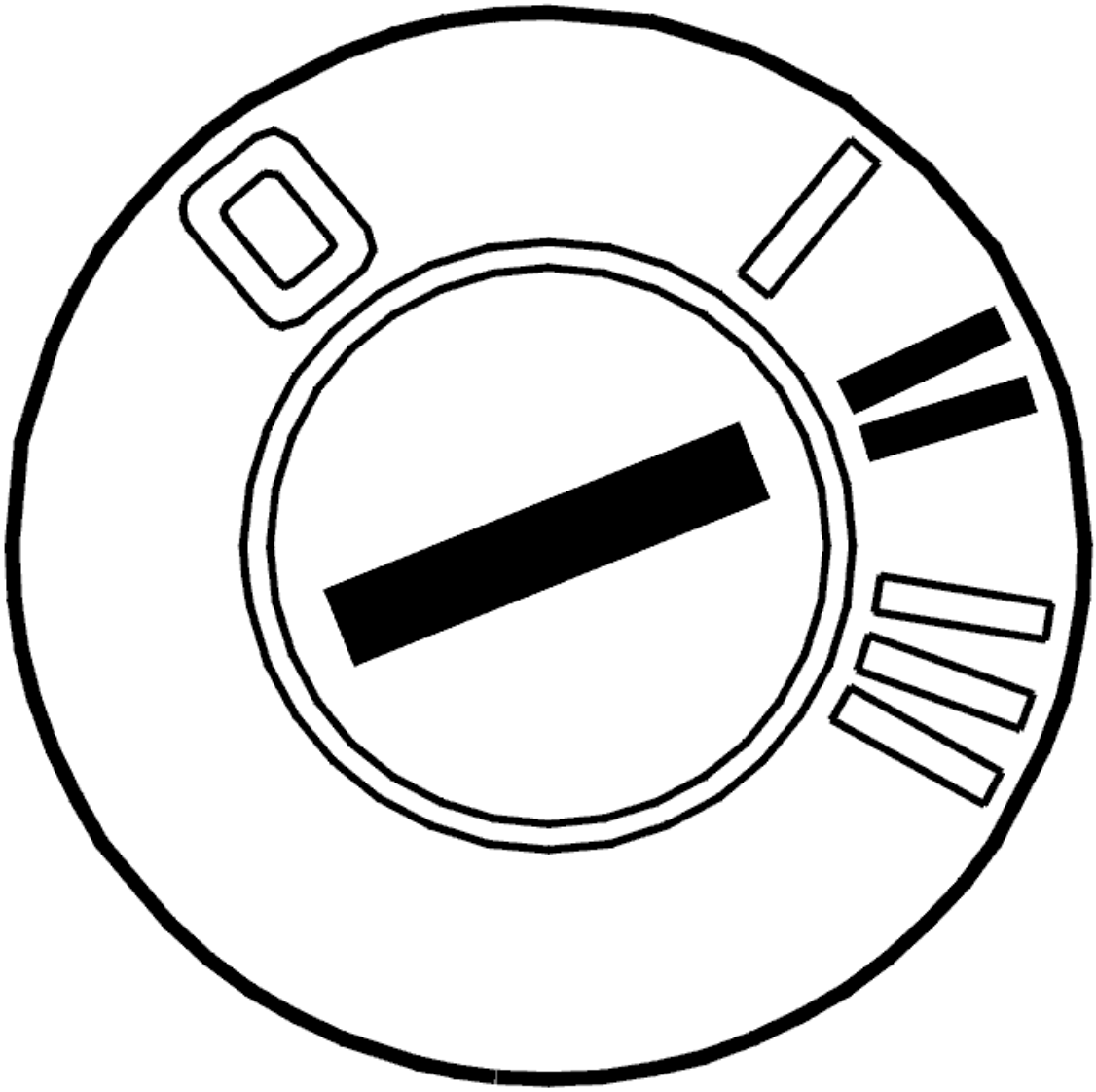


Fig. 163: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

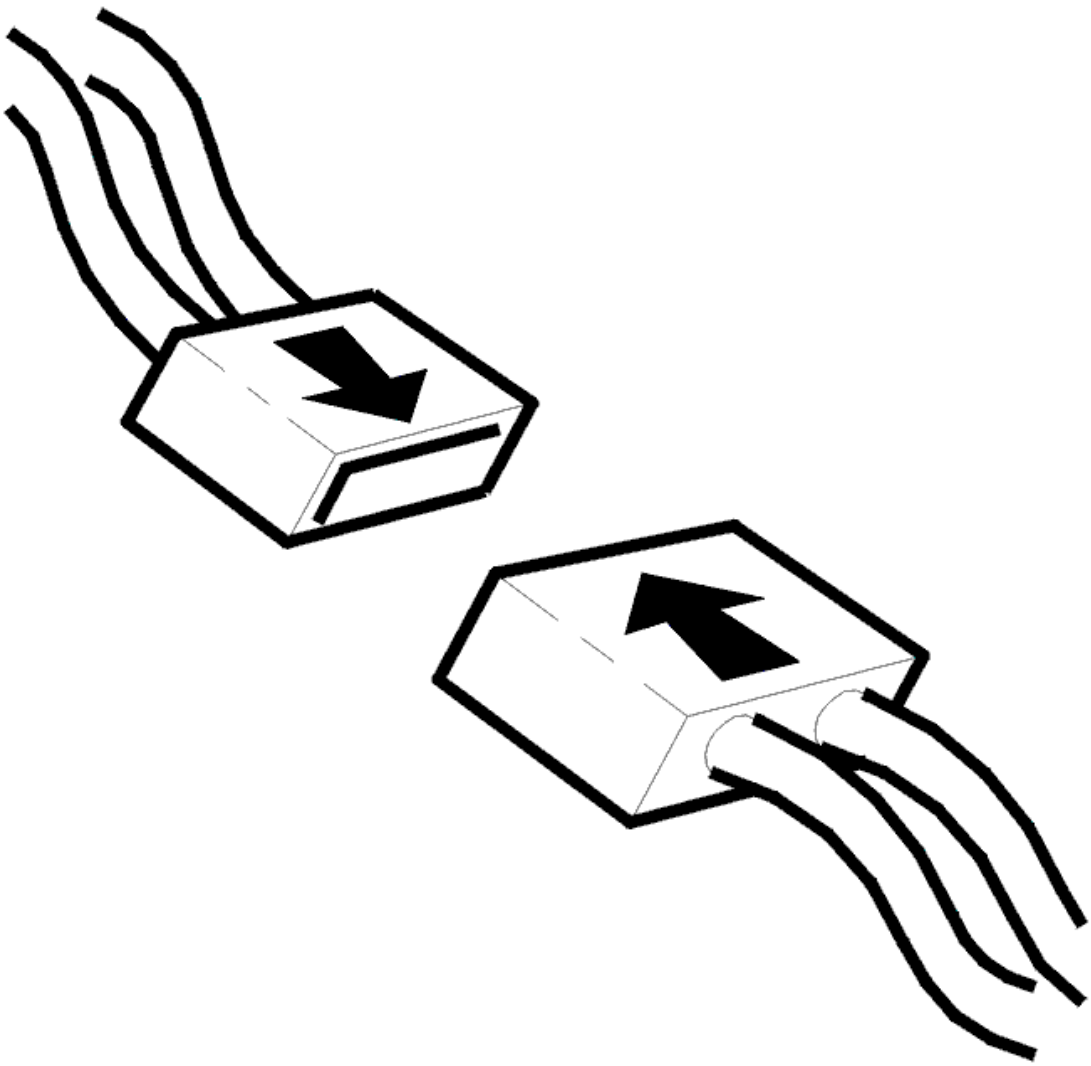


Fig. 164: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation
- Reconnect control module and transmission connector
- Ignition on
- Read off the oil temperature.

  Check that the temperature is within its permitted range.

  Compare with the transmission temperature.

  If the transmission temperature is within its permitted range, the cause of the diagnostic trouble code

(DTC) was contact resistance or oxidation in the control module or transmission connector.

Other information

- see **CHECKING WIRING AND TERMINALS**

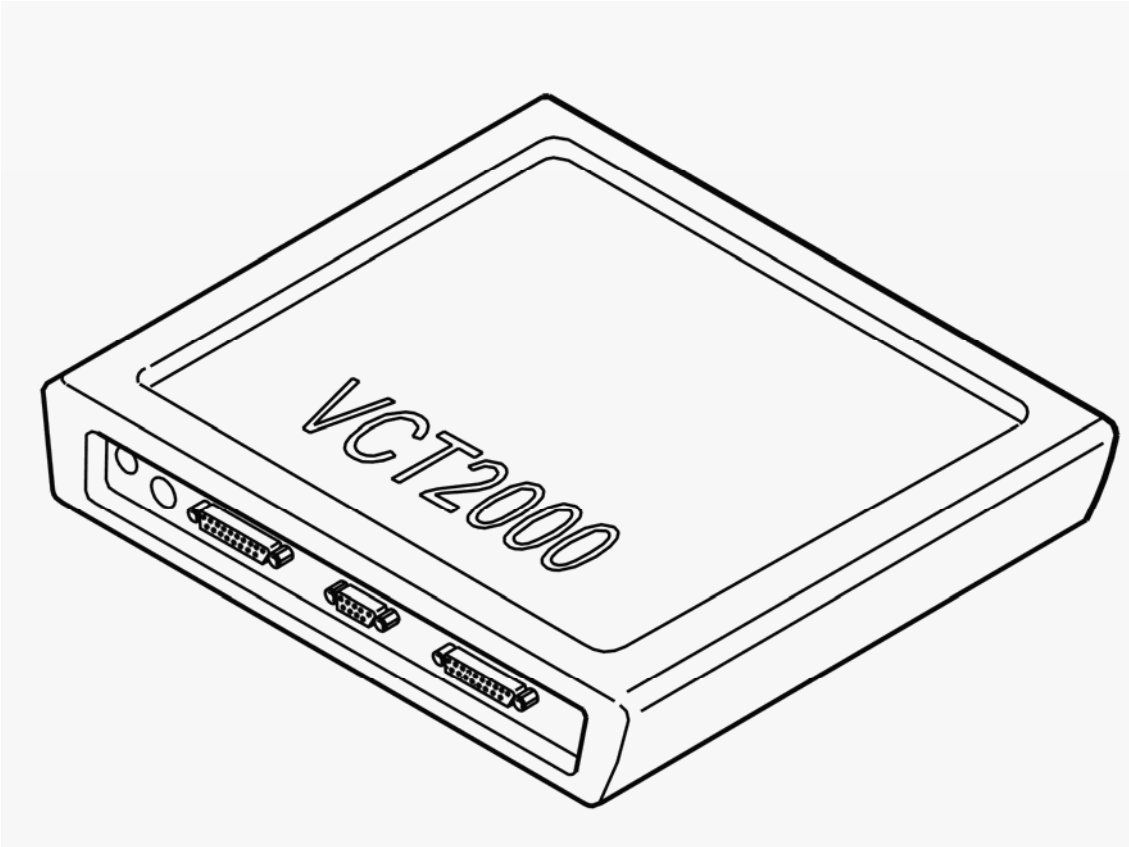


Fig. 165: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Was the transmission temperature within its permitted range?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **CHECKING TEMPERATURE SENSOR**

CHECKING TEMPERATURE SENSOR

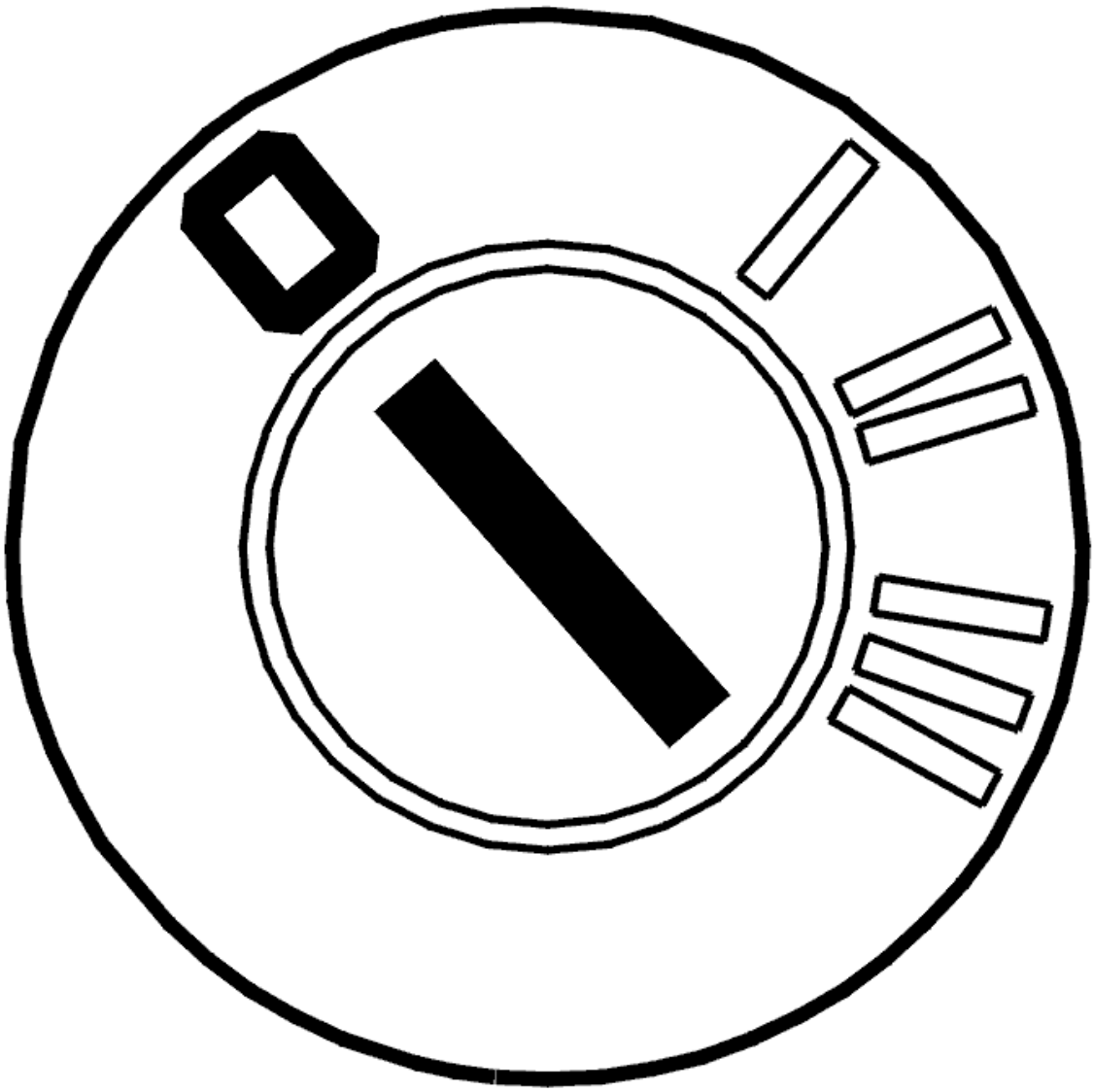


Fig. 166: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Disconnect the transmission connector
- Connect adapter see **9511505** and see **9813190** to the transmission connector (transmission side)
- Connect an ohmmeter between terminals #L (terminal #A11) and #M (terminal #A12).

  The resistance must be 3.4-3.6 kohms at 20 °C.

  Other information

  - To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
  - For information about signals, see **SIGNAL SPECIFICATION**

- For information about the resistance values, see **COMPONENT RESISTANCE VALUES** .

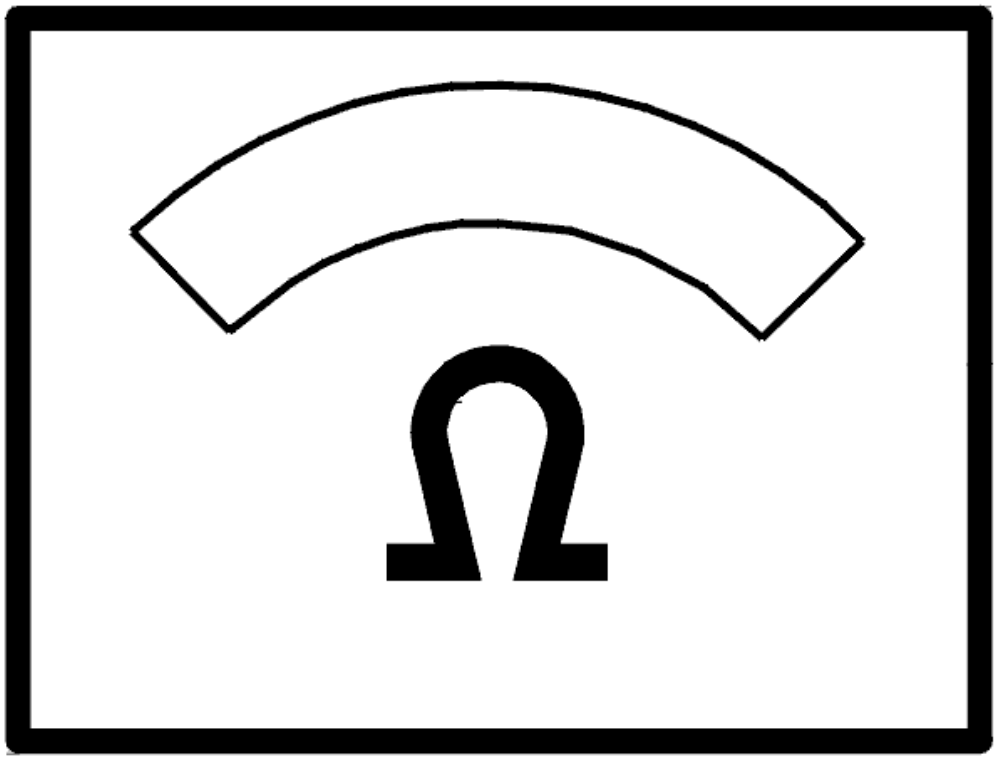


Fig. 167: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was the resistance OK?

- **YES**

  Refer to **CHECKING SIGNAL CABLE**

- **NO**

  Refer to **CHECKING WIRING AND COMPONENT**

CHECKING SIGNAL CABLE

Check the cable between control module terminal #37 (terminal #A37) and transmission connector (control module side) terminal #L (terminal #11). Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

HINT: With the ignition on, the transmission connector disconnected and a voltmeter connected between terminal #L (terminal #A11) and ground, the voltage should be 5 V.

NOTE: Diagnostic trouble codes (DTCs) for the gear-shift position sensor and the solenoids may be stored when disconnecting the transmission connector.

Remedy as necessary.

Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- For information about signals, see **SIGNAL SPECIFICATION**
- see **CHECKING WIRING AND TERMINALS**

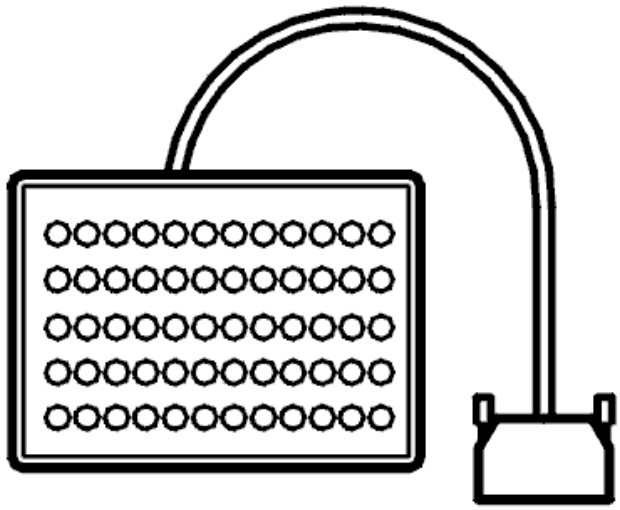


Fig. 168: Identifying Breakout Box
Courtesy of VOLVO CARS CORPORATION

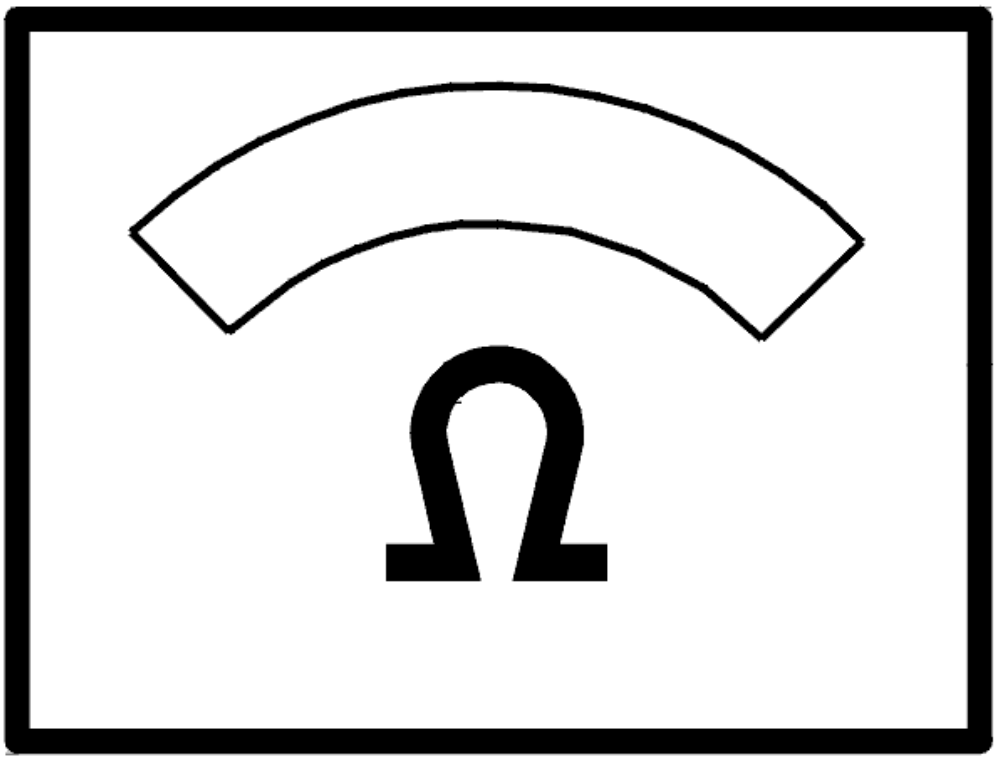


Fig. 169: Identifying Ohms Display
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **VERIFICATION**

- **NO**

  Refer to **CHECKING WIRING AND COMPONENT**

CHECKING WIRING AND COMPONENT

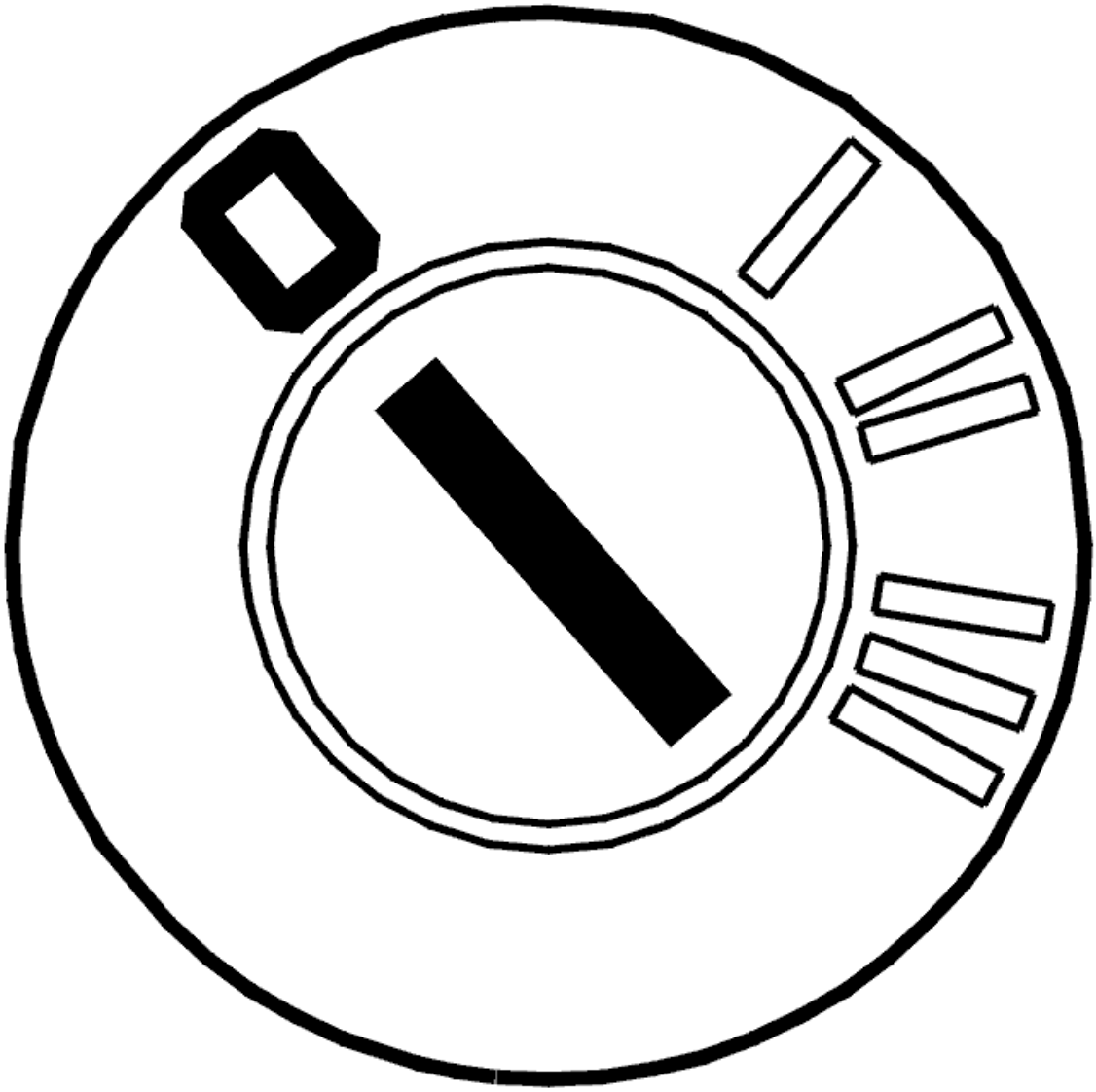


Fig. 170: Identifying Ignition OFF
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Open the transmission control system.

  Check the cable between transmission terminal #L (terminal #A11) and temperature sensor terminal #A. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

  HINT: Check the temperature sensor: Measure the resistance between temperature sensor connector terminals #A and #B. The resistance should be between 3.5-3.6 kohms at 20 °C.

  Remedy as necessary.

  Other information:

- To connect the breakout box, see **CONNECTING THE BREAKOUT BOX**
- To connect the breakout box to the transmission connector, see **CONNECTING THE BREAKOUT BOX, GM AUTOMATIC TRANSMISSIONS**
- To replace the cable harness:
  - For AW50/51 AWD or AW55-50/51SN 2003-, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)**
  - For 4T65AWD 2003-, see **TEMPERATURE SENSOR FLUID, TRANSAXLE, (TFT)** .
- To replace the temperature sensor, see **TEMPERATURE SENSOR FLUID GEARBOX, REPLACING**
- For information about signals, see **SIGNAL SPECIFICATION**
- For information about the resistance values, see **COMPONENT RESISTANCE VALUES**
- see **CHECKING WIRING AND TERMINALS**

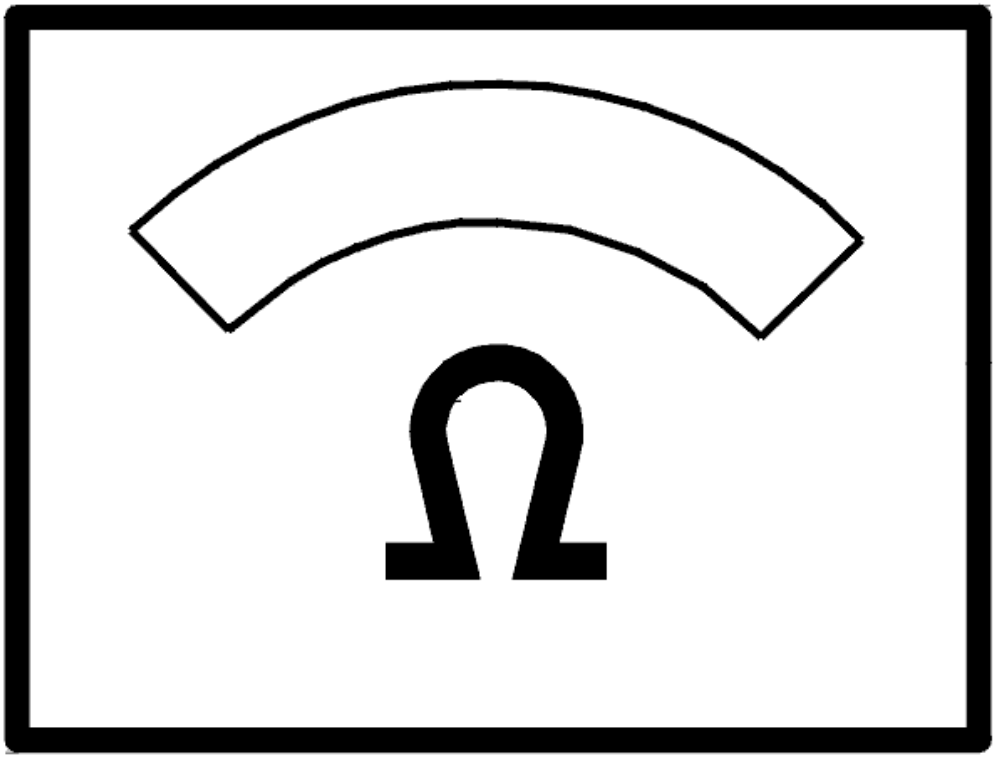


Fig. 171: Identifying Ohms Display

Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

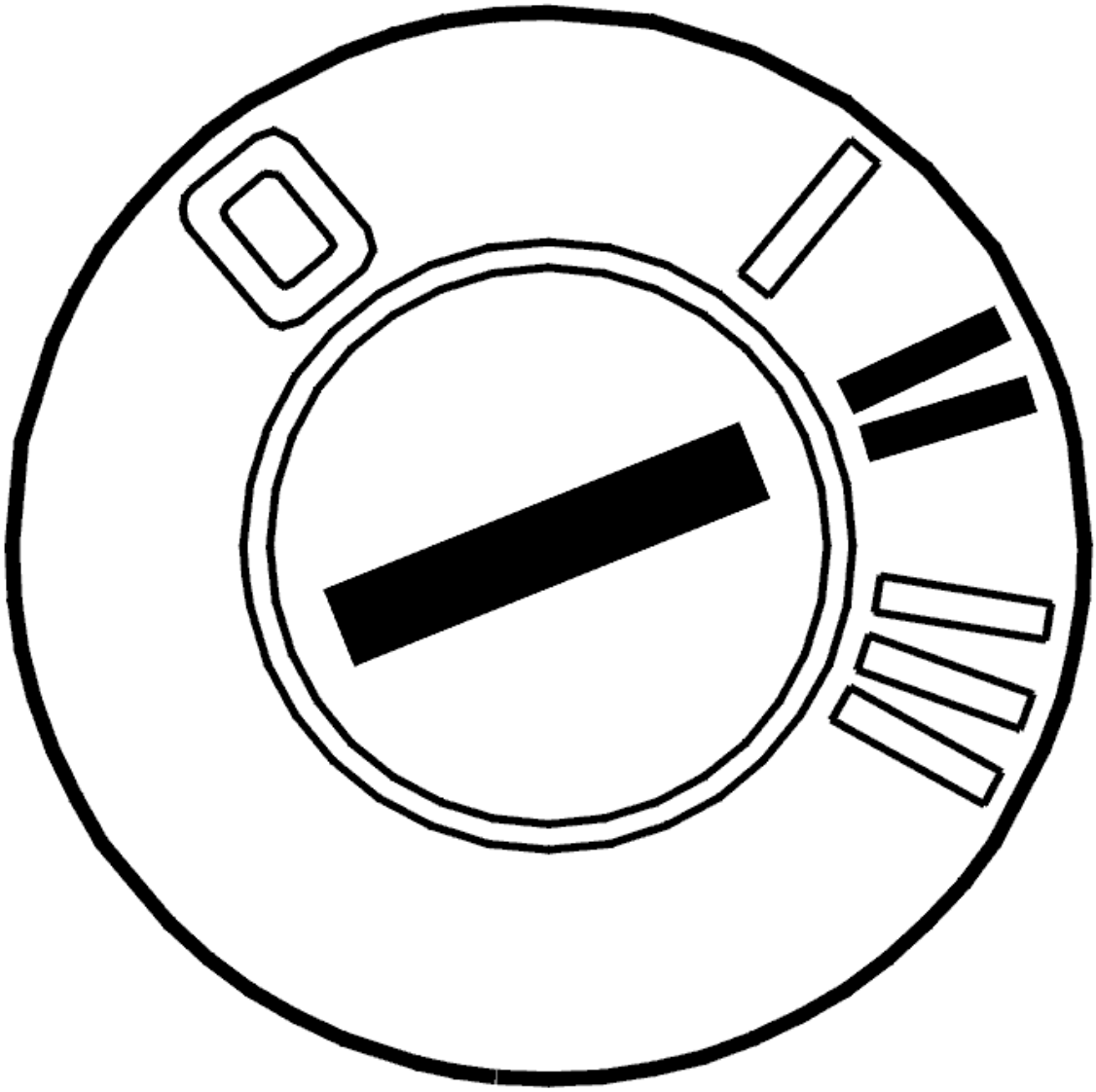


Fig. 172: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

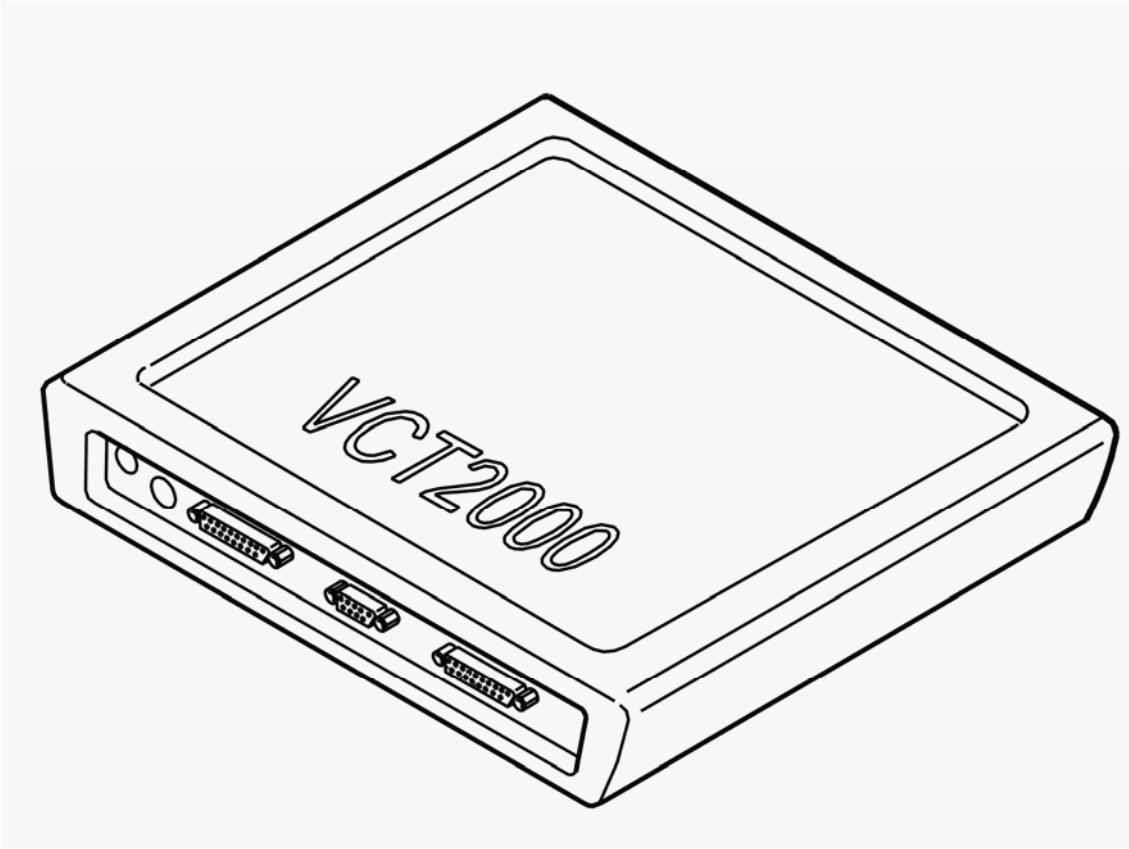


Fig. 173: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **VERIFICATION**

VERIFICATION

VERIFICATION

HINT: After carrying out the repair check that the fault has been remedied.

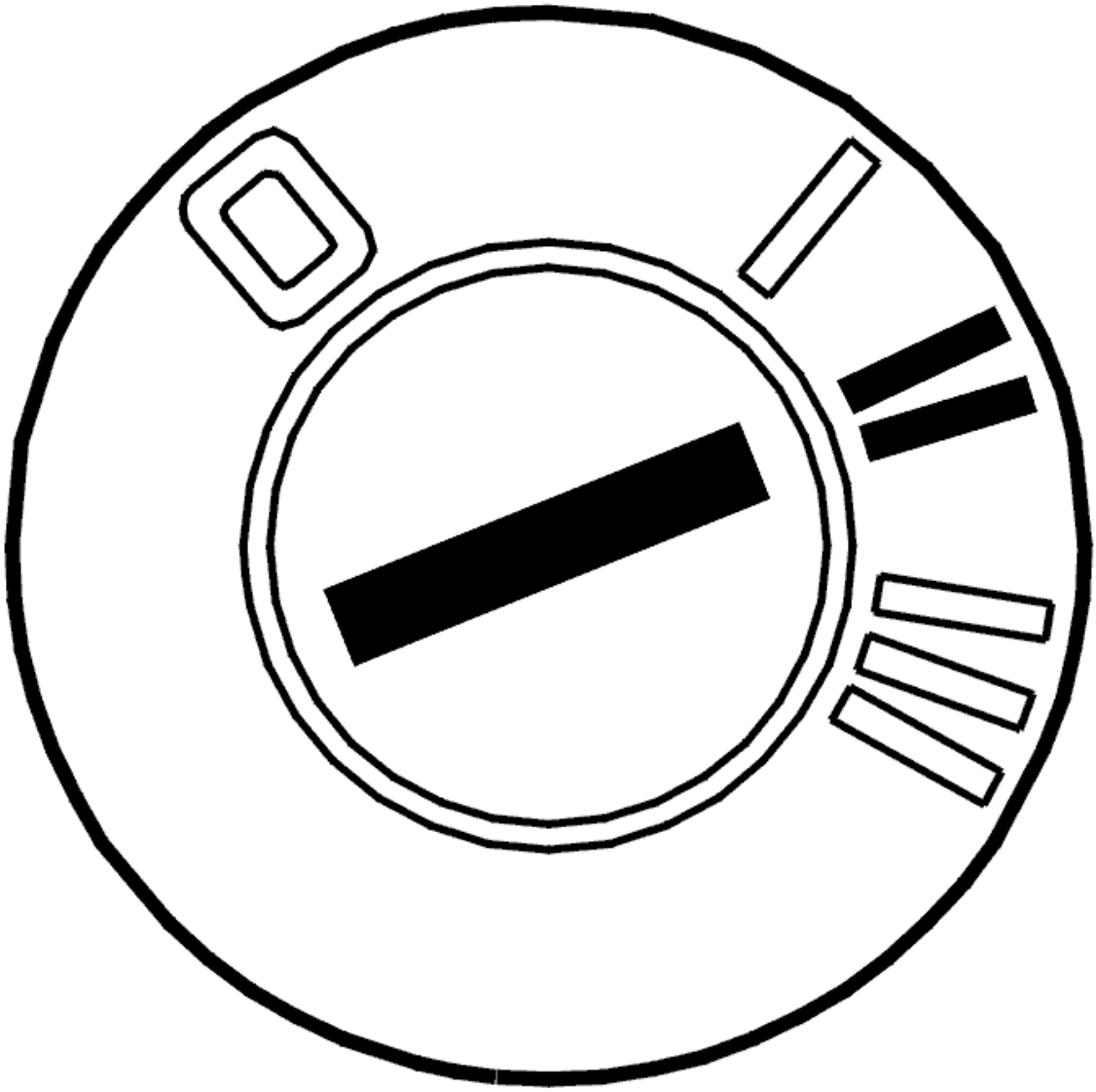


Fig. 174: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

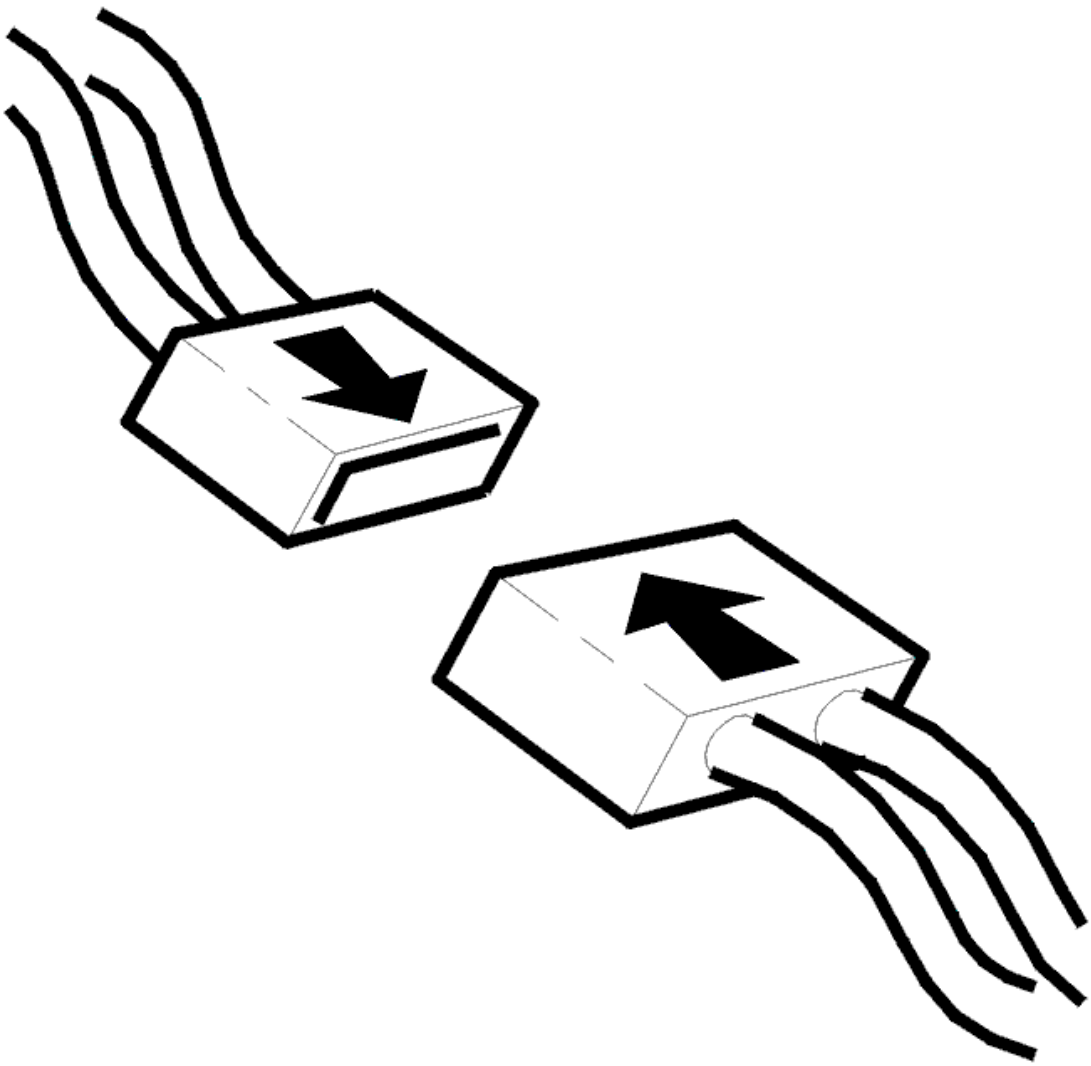


Fig. 175: Identifying Connector(s) Reinstallation
Courtesy of VOLVO CARS CORPORATION

- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.
- Read off oil temperature.

  Check that the transmission oil temperature is within its permitted range. Compare with the transmission temperature.

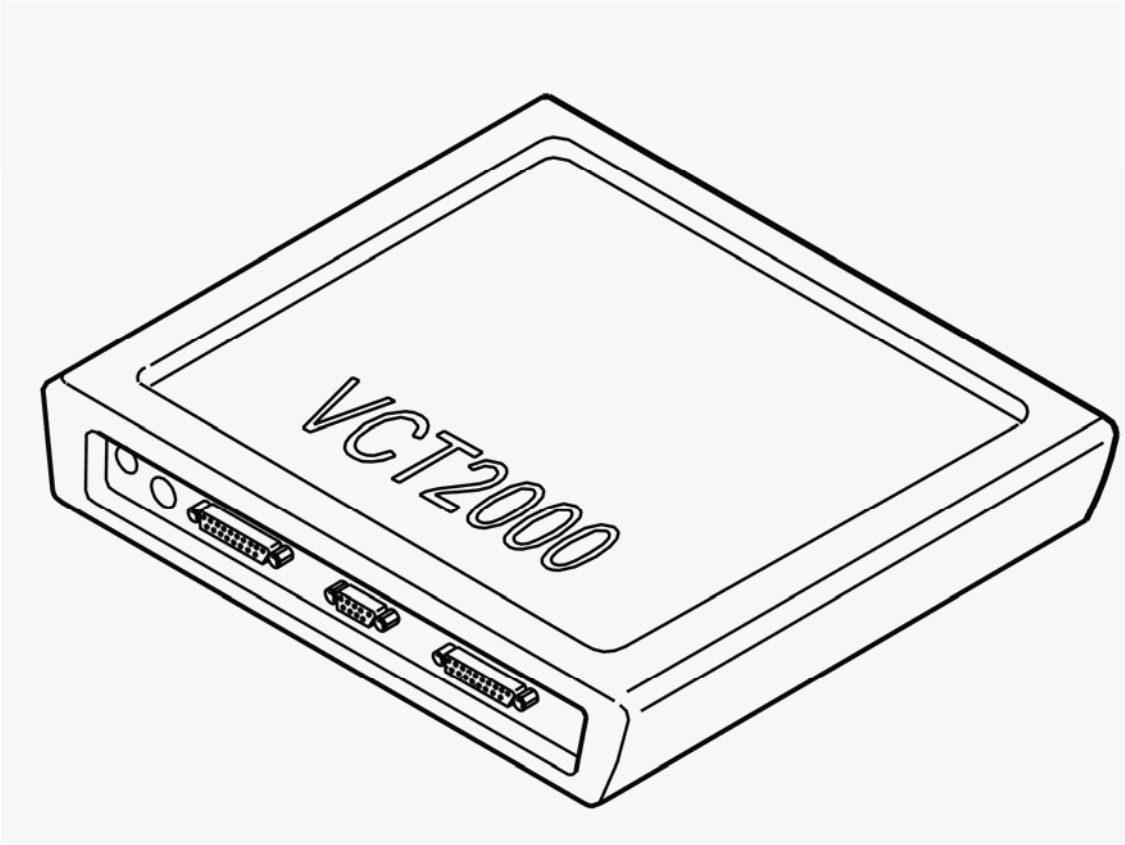


Fig. 176: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Is the oil temperature within its permitted range?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

CHECKING TRANSMISSION LINE PRESSURE (4T65 AWD; 2003-2006)

CHECKING TRANSMISSION LINE PRESSURE

FUNCTION TEST

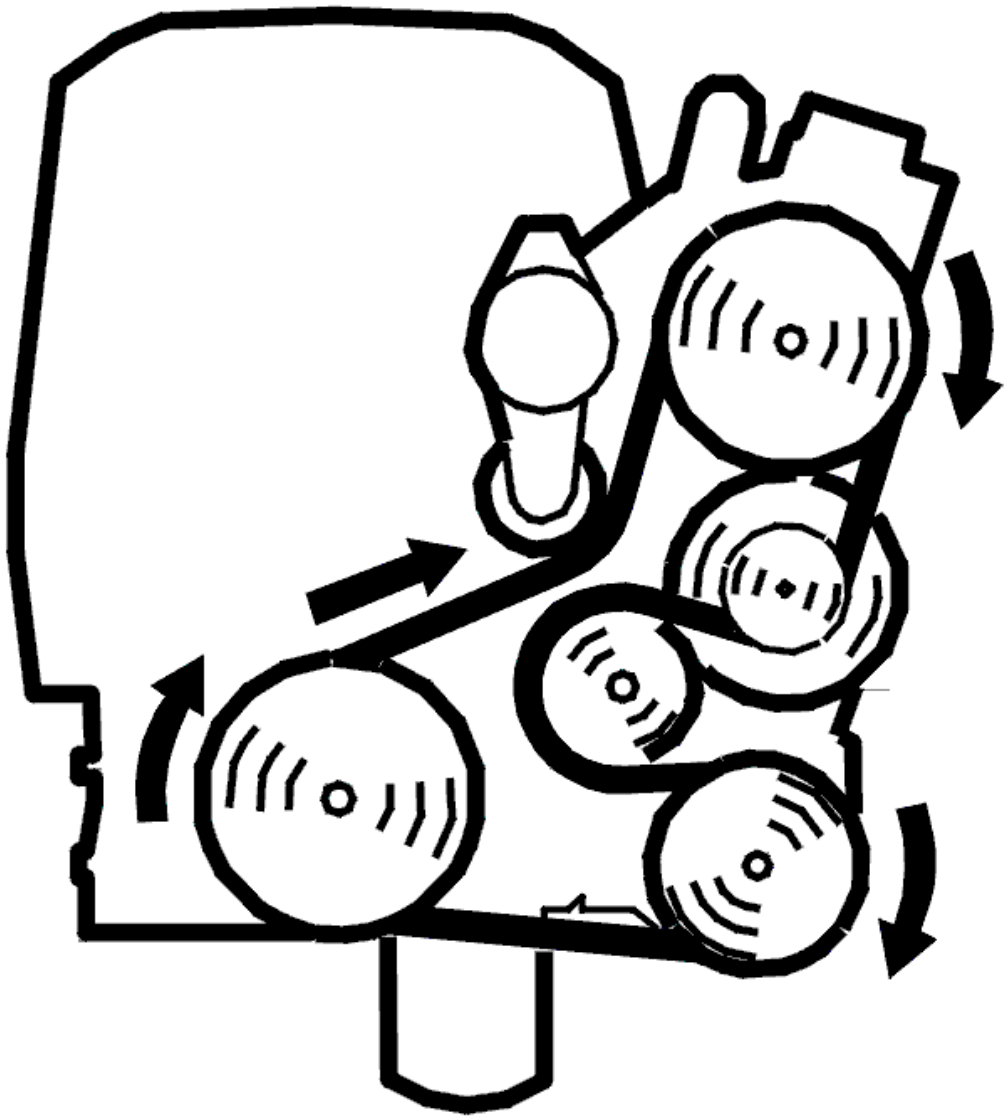


Fig. 177: Identifying Belt Routing
Courtesy of VOLVO CARS CORPORATION

- Ignition off
- Connect a manometer to the transmission test output
- Block all four wheels
- Start the engine
- Switch off the air conditioning (A/C).

Check that the transmission line pressure reaches 0.5 MPa at idle (650 rpm).

Check the transmission line pressure at maximum rpm:

NOTE: Apply the parking brake. Press down hard on the brake pedal with your left foot.

- Move the gear selector to position D
- Fully depress the accelerator pedal (AP) for a maximum of 5 seconds
- Read off the highest engine speed (RPM) and the line pressure. Compare to the table.

ENGINE B6XXXS

Maximum engine speed (rpm)	Gear shift position	Line pressure
2600- 2800 rpm	D	1.0 MPa
2600- 2800 rpm	R	1.1 MPa

ENGINE B6XXXT

Maximum engine speed (rpm)	Gear shift position	Line pressure
2100- 2400 rpm	D	1.1 MPa
2100- 2400 rpm	R	1.2 MPa

Check the transmission for leakage if the line pressure is too low. If there is no leakage, replace the transmission oil pump.

If the line pressure is too high, replace the control system.

Other information

- To connect the manometer to the transmission test output, see **LINE PRESSURE/STALL SPEED, CHECK**
- To replace the control system,
  - For removal, see **CONTROL SYSTEM/VALVE HOUSING, REMOVING**
  - To install, see **CONTROL SYSTEM / VALVE HOUSING, INSTALLING** .

Is the line pressure OK?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

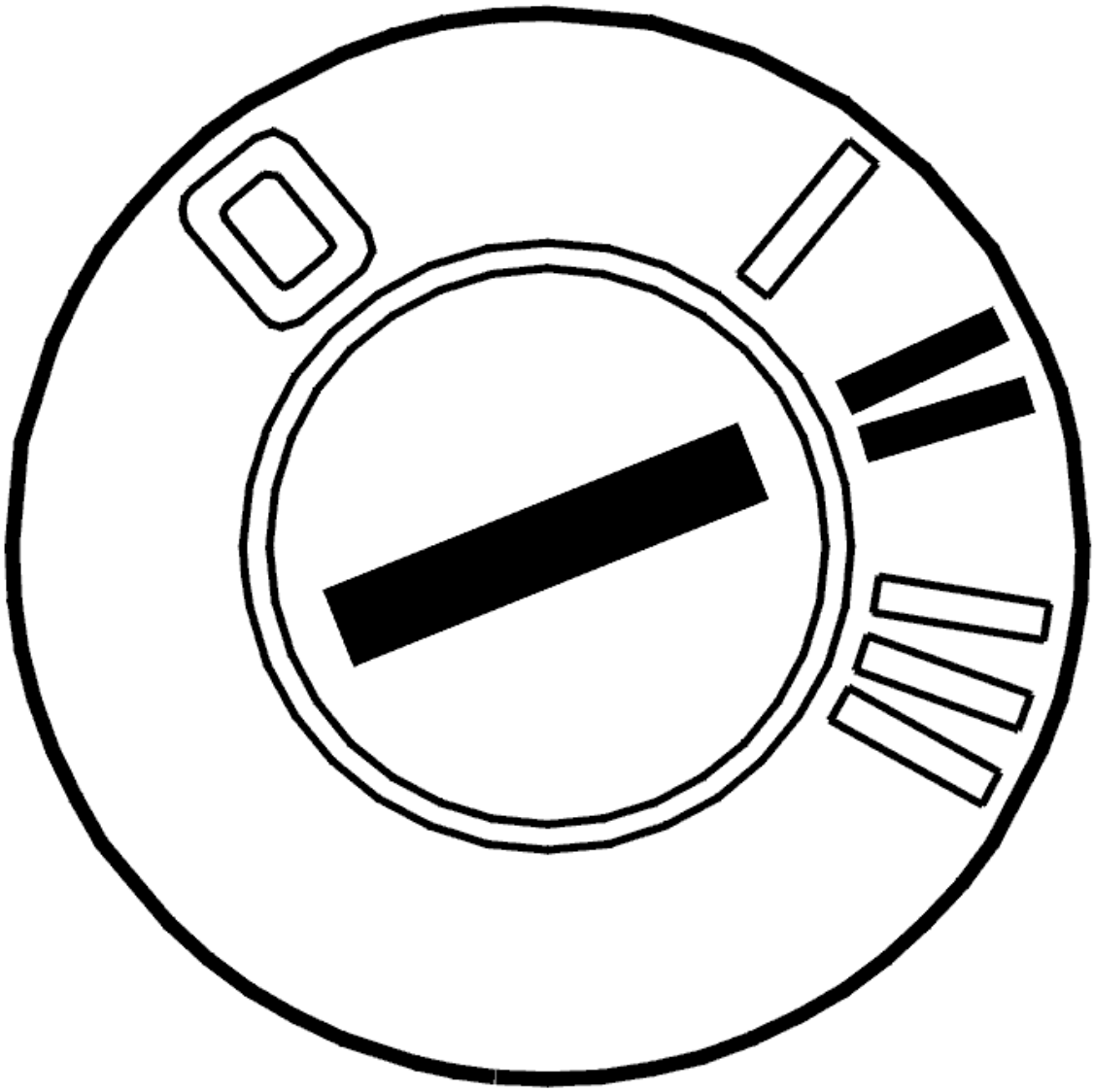


Fig. 178: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

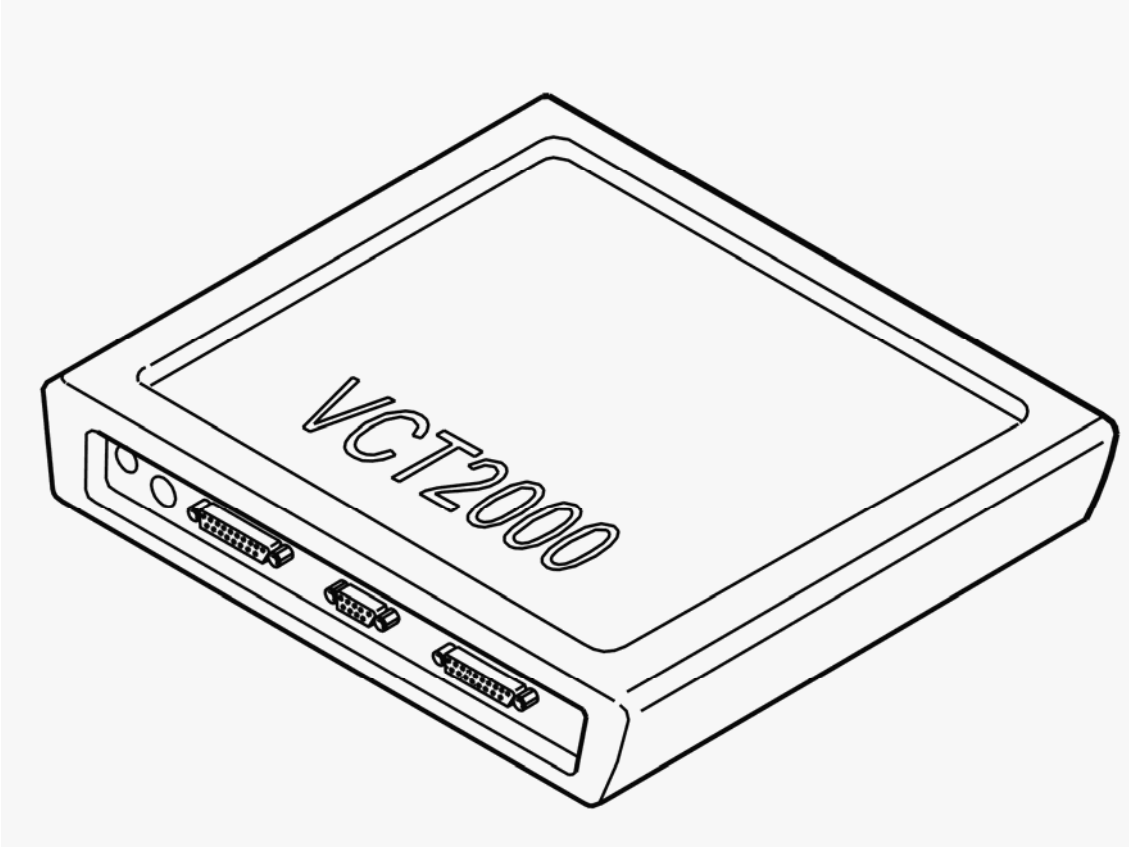


Fig. 179: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING AUTOMATIC TRANSMISSION**

CHECKING AUTOMATIC TRANSMISSION

CHECKING AUTOMATIC TRANSMISSION

NOTE: After carrying out the repair check that the symptom has been remedied.

Check the automatic transmission as follows:

- Test drive the car to test the function of the automatic transmission. See **TEST DRIVE FORM, DESCRIPTION**
- If hydraulic hoses, gaskets or other components have been replaced, check that there is no oil leakage after the test drive.

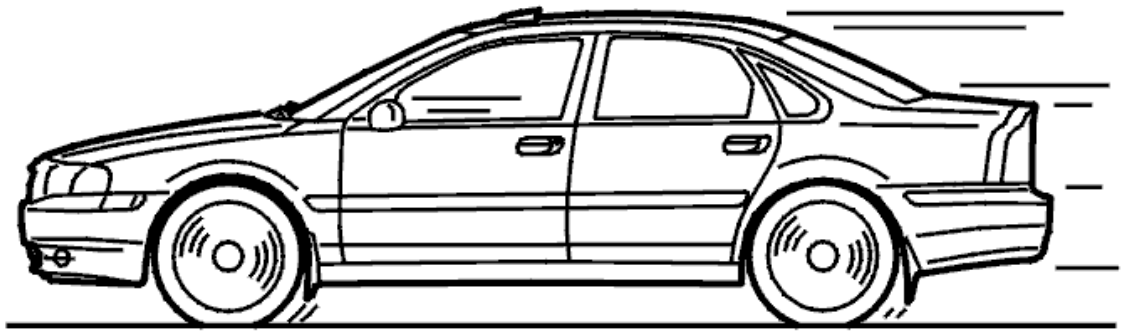


Fig. 180: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the automatic transmission OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

OIL PUMP, REPLACING

- See **OIL PUMP, REPLACING** .

LINE PRESSURE/STALL SPEED, CHECK

- For gearbox 4T65EV/-GT, see **LINE PRESSURE/STALL SPEED, CHECKING**
- For gearbox AW50AWD, see **LINE PRESSURE/STALL SPEED, CHECK** .
- For TF-80SCAWD D5244TX 2006-, see **LINE PRESSURE/STALL SPEED, CHECKING** .

CHECKING TRANSMISSION P/N (4T65 AWD; 2003-2006)

CHECKING TRANSMISSION P/N

CHECKING P/N

NOTE: Only applies if the transmission has been replaced.

Check that the transmission identification plate and the transmission P/N correspond to the specification of the car. If the incorrect transmission has been installed, for example, 4T65EV instead of 4T65EV-GT, the transmission will not function correctly Replace the transmission if it is the incorrect type.

Other information

- To remove the transmission, see **TRANSMISSION, REMOVING**
- To install the transmission, see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .

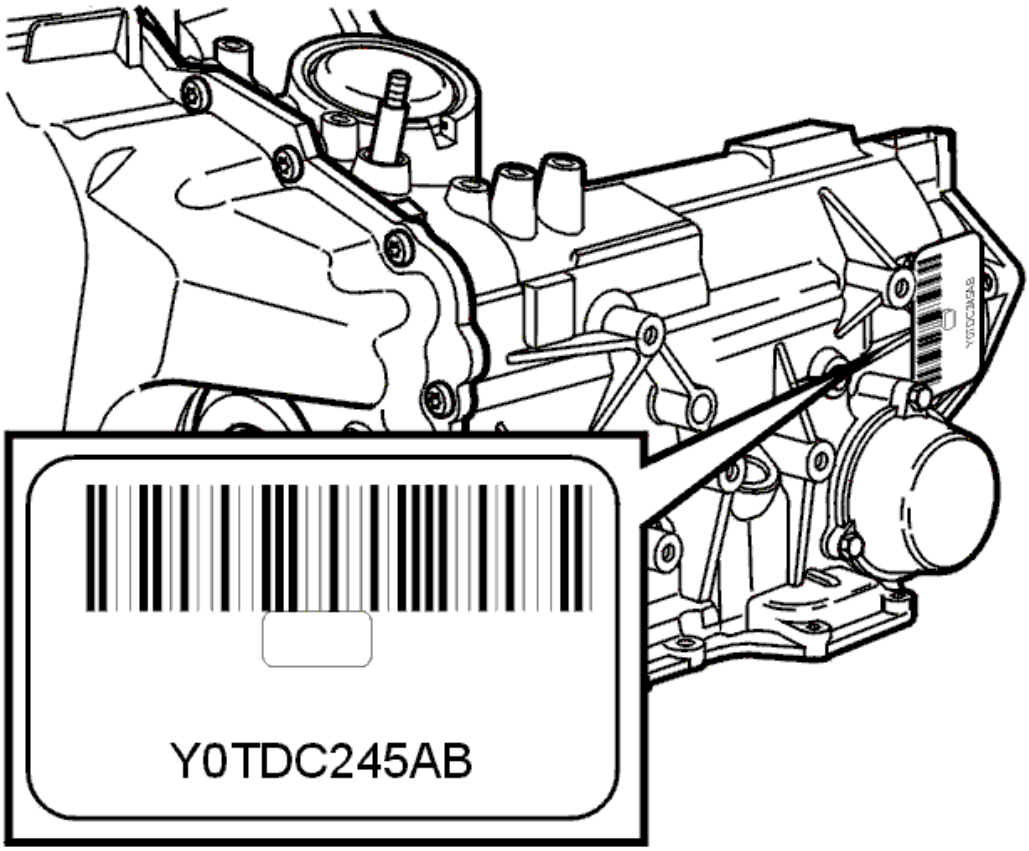


Fig. 181: Identification Plate On Transmission
Courtesy of VOLVO CARS CORPORATION

CHECKING TORQUE CONVERTER (4T65 AWD; 2003-2006)

CHECKING TORQUE CONVERTER

If there is a suspicion that the torque converter is damaged, replace the torque converter. See **TORQUE CONVERTER/SEAL, REPLACING** .

Remedy as necessary.

Other information

- To remove the transmission, see **TRANSMISSION, REMOVING**
- To install the transmission, see **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .

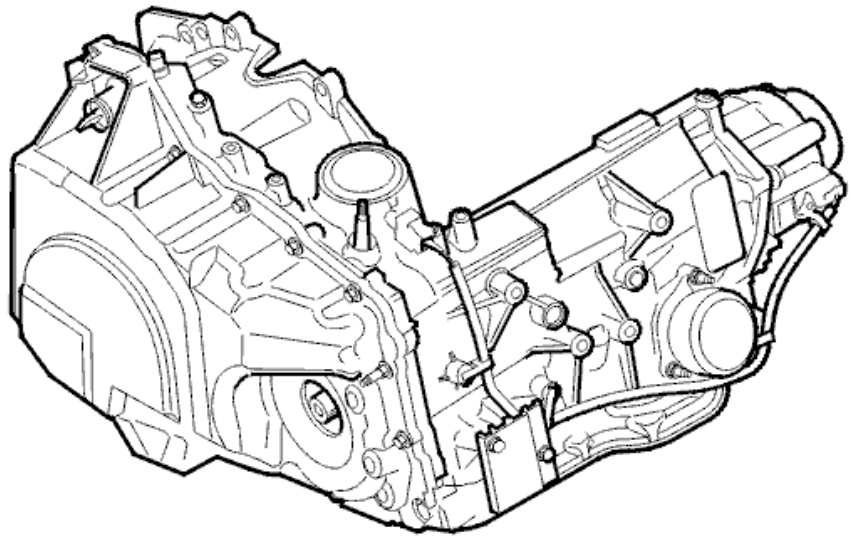


Fig. 182: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

Was a fault detected?

- **YES**

  Refer to **RESETTING THE ADAPTATION**

- **NO**

  FAULT NOT FOUND: Troubleshooting has been completed.

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is

drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

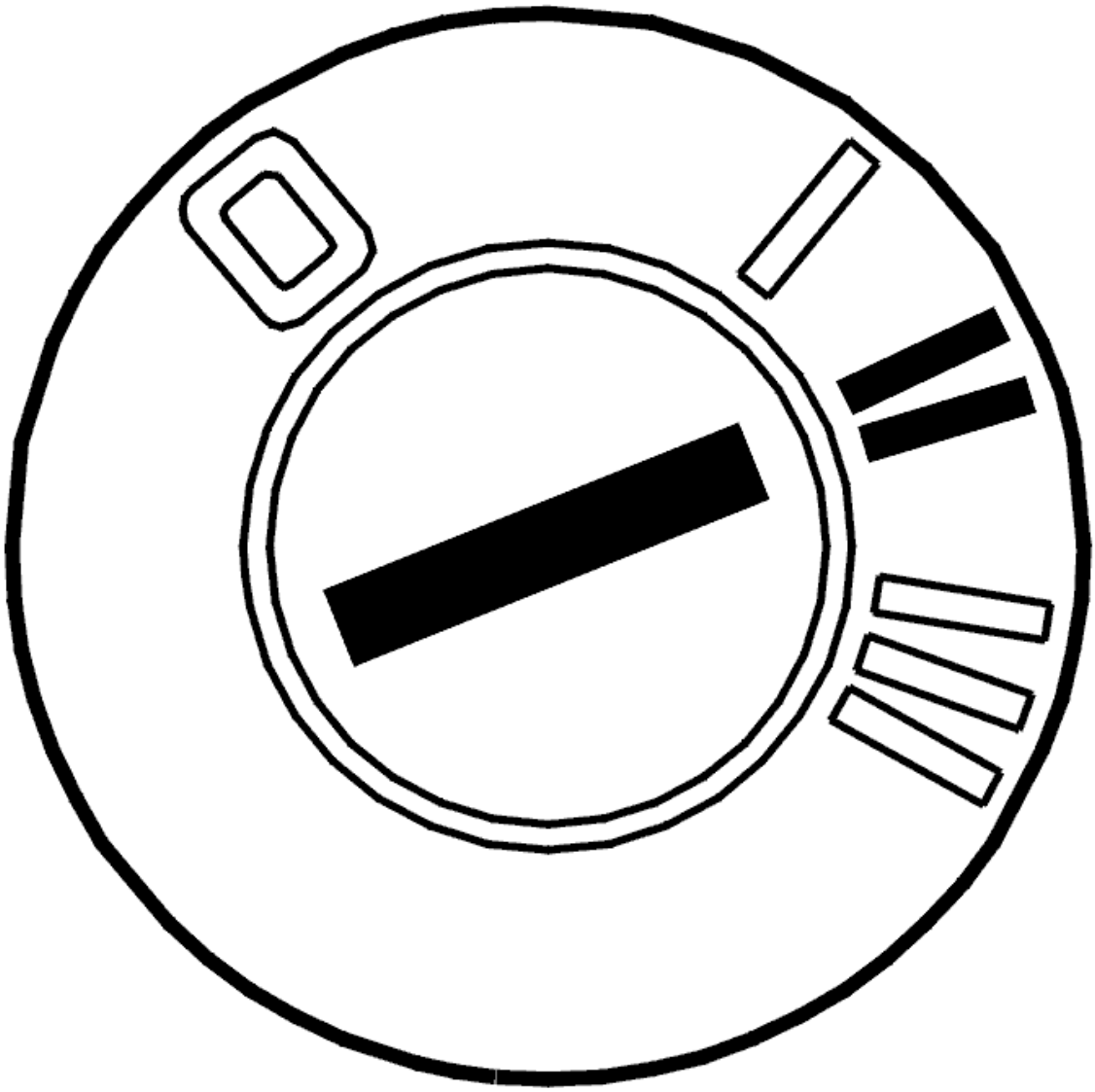


Fig. 183: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

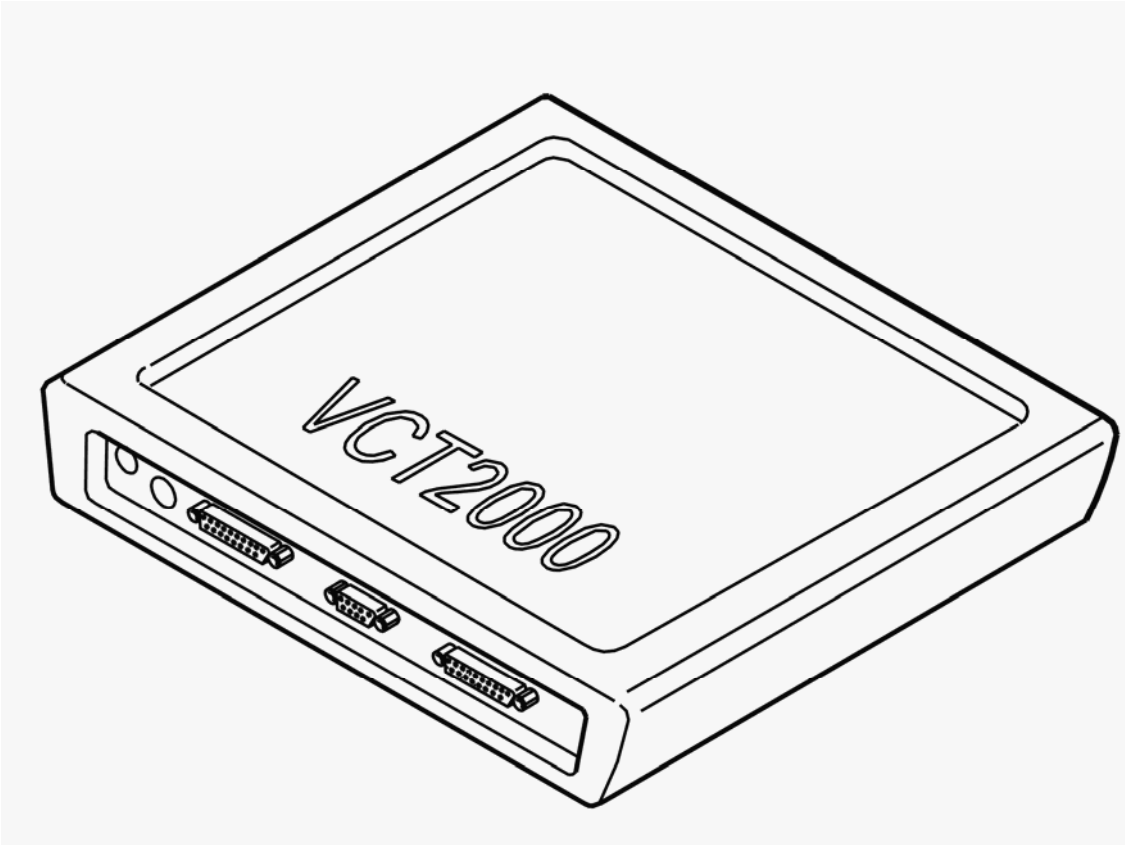


Fig. 184: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING TORQUE CONVERTER HOUSING MOUNTING (4T65 AWD; 2003-2006)

CHECKING THAT THE COVER FOR THE TORQUE CONVERTER IS CORRECTLY INSTALLED

Check that the cover is secured.

- See **SIDE COVER TRANSMISSION, INSTALLING** .

Was it properly secured?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

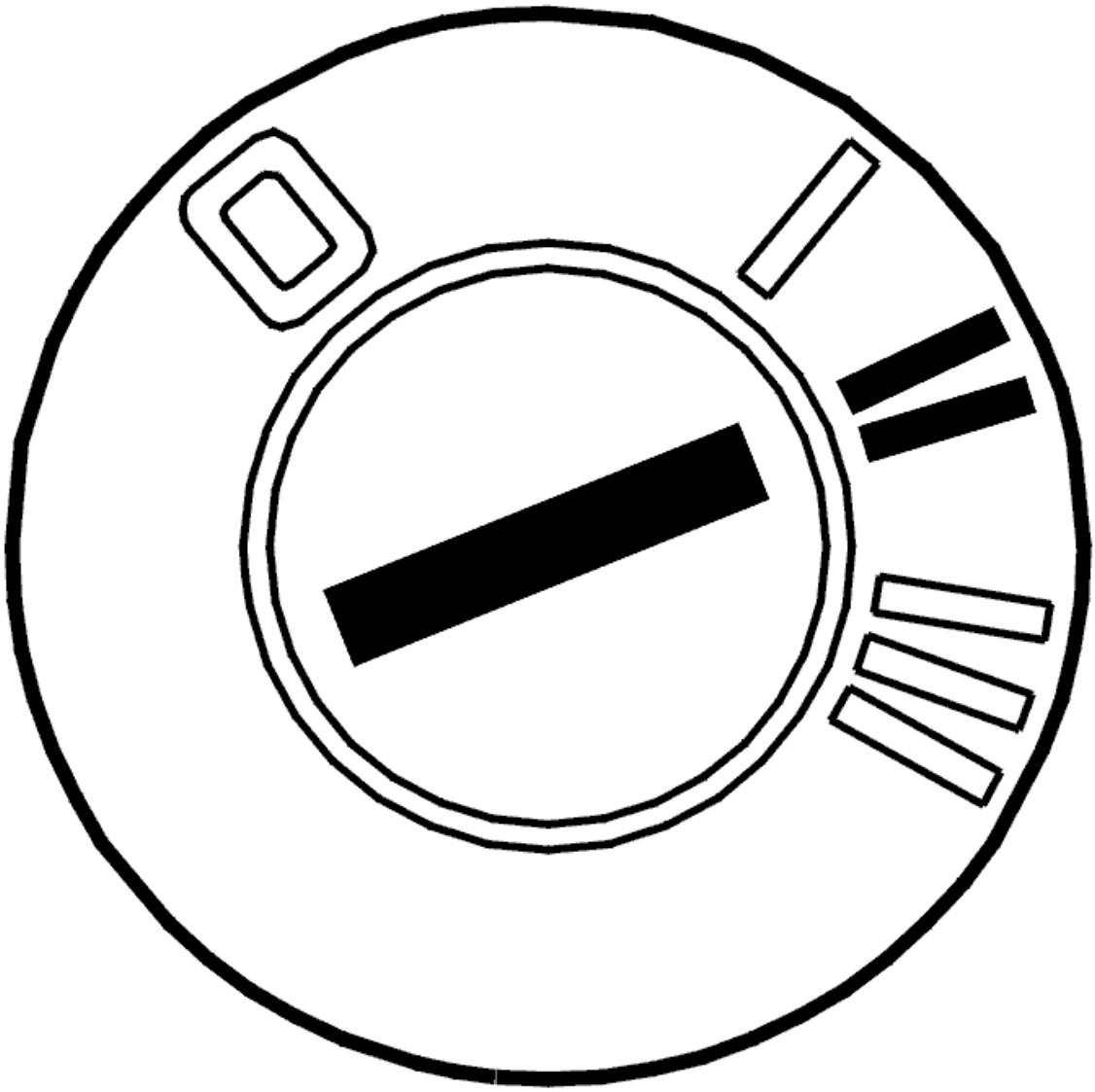


Fig. 185: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

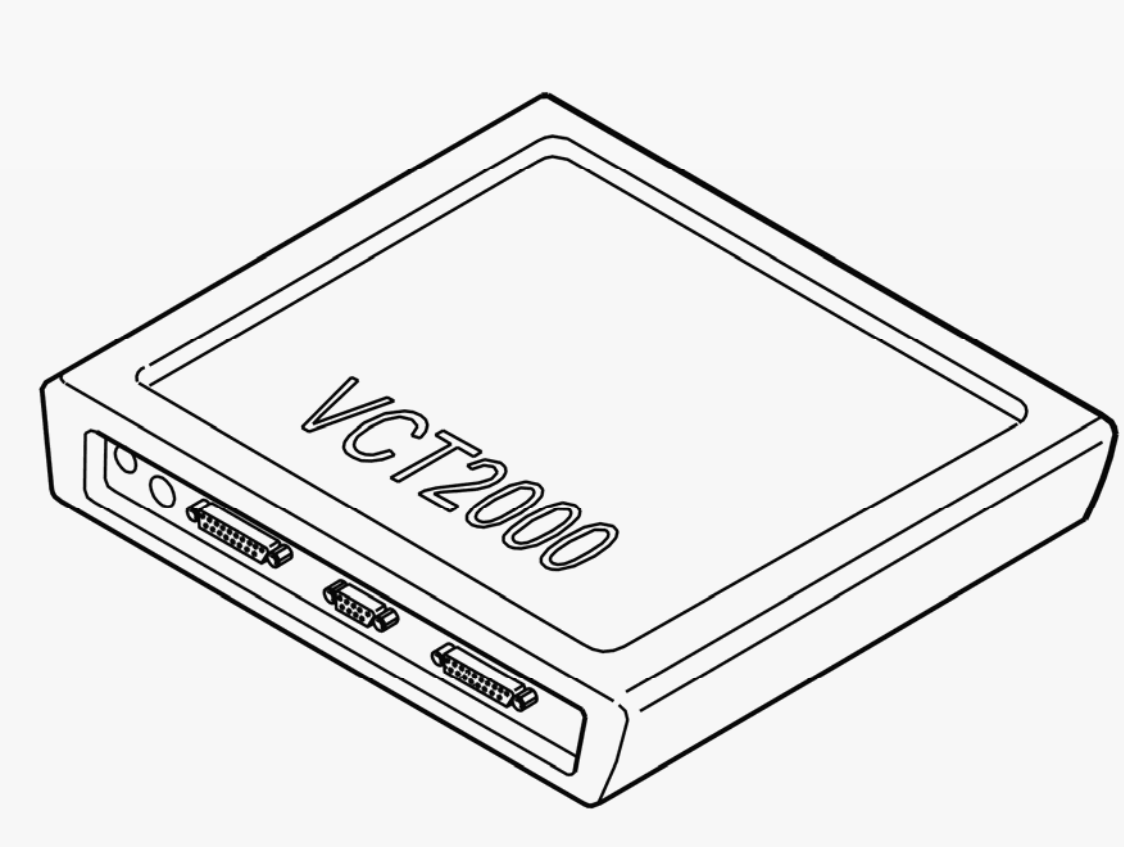


Fig. 186: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING TORQUE CONVERTER MOUNTING (4T65 AWD; 2003-2006)

CHECKING TORQUE CONVERTER MOUNTING

- Check to, see if the carrier plate screws are loose.
- If this is the case, replace the screws.

Was it properly mounted?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

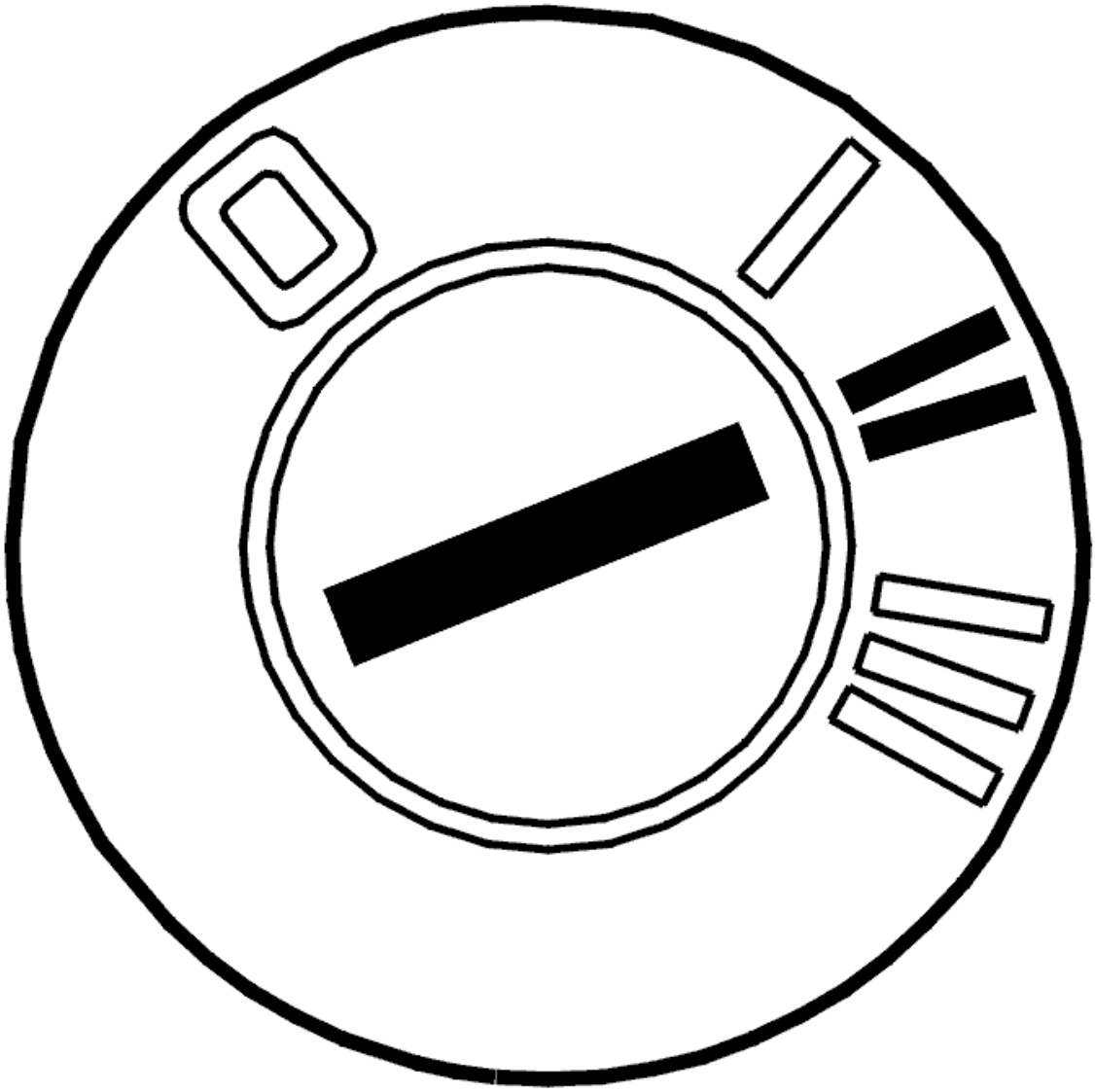


Fig. 187: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

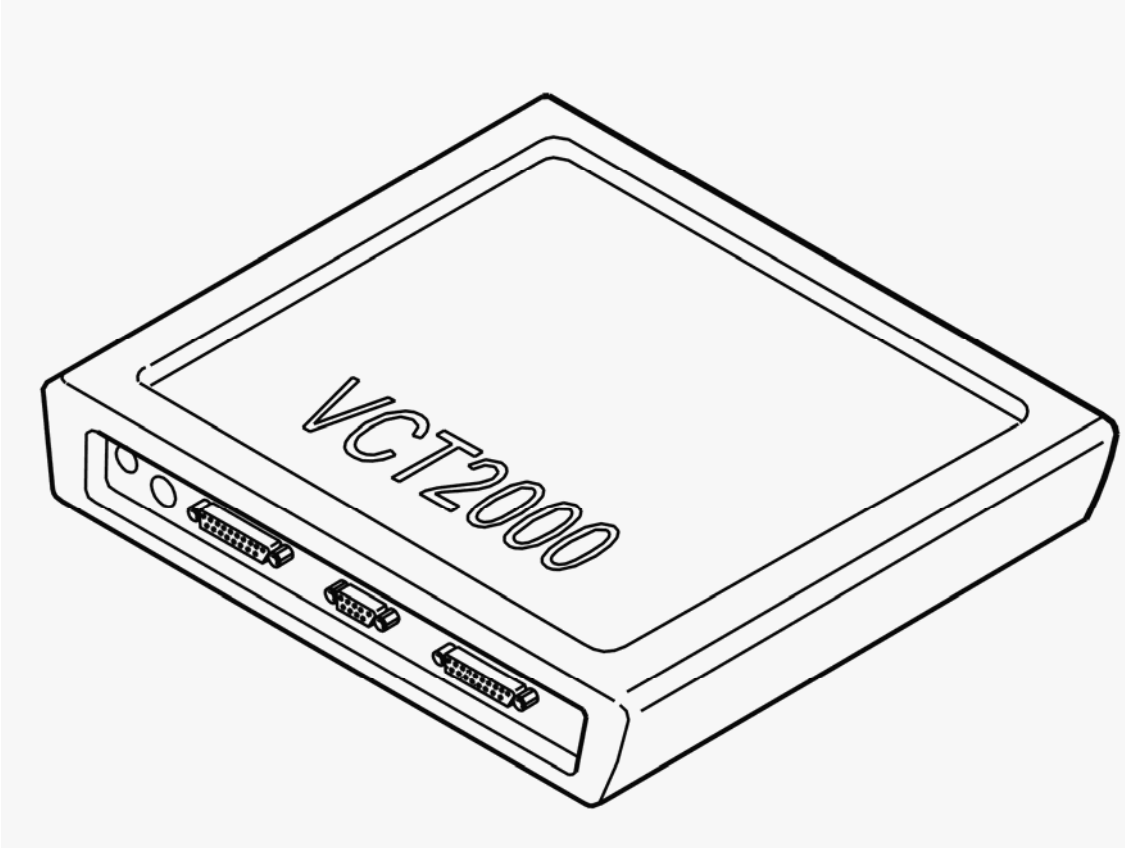


Fig. 188: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

CHECKING WINTER POSITION (4T65 AWD; 2003-2006)

CHECKING WINTER MODE

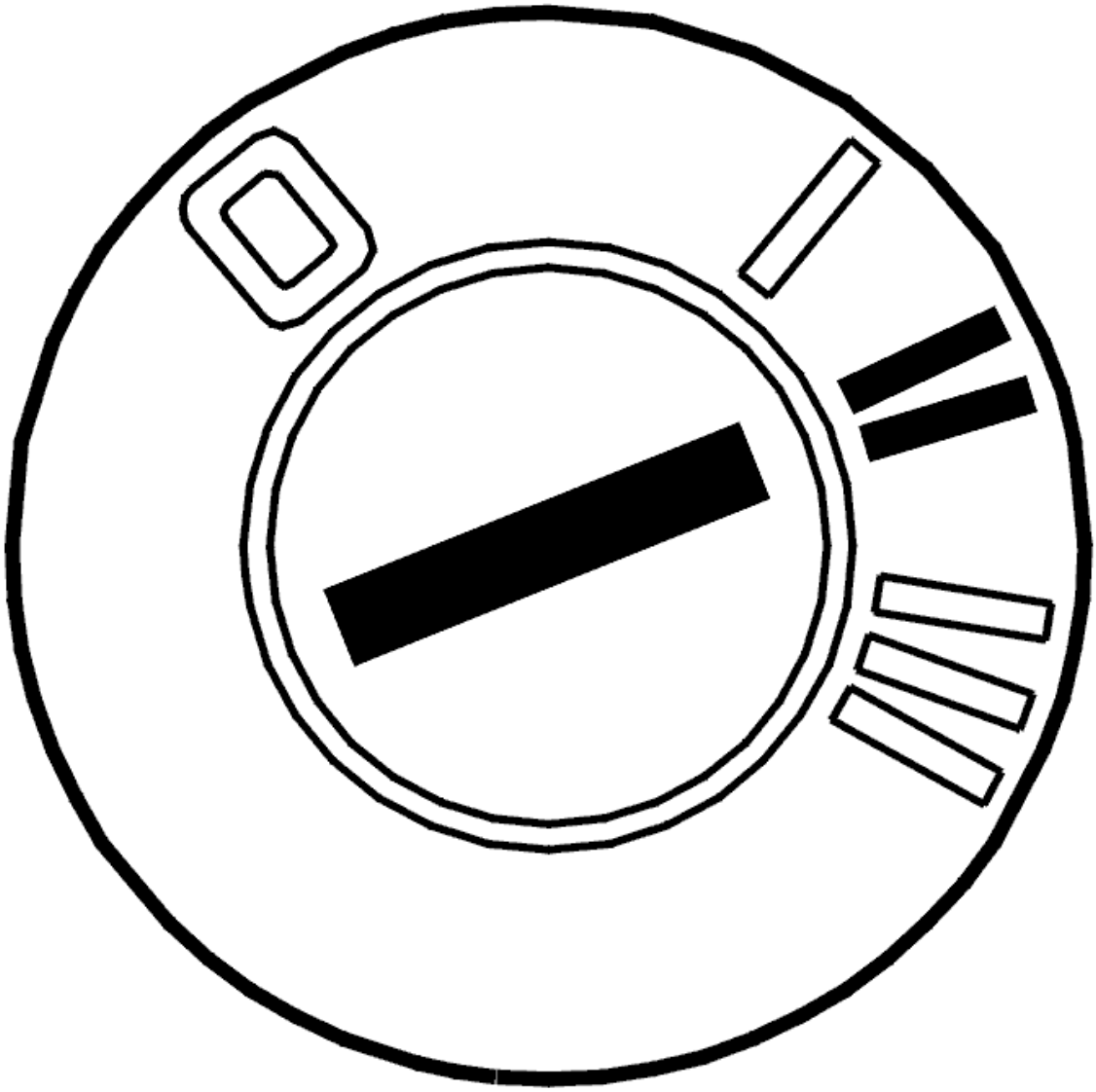


Fig. 189: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Check the winter mode function by clicking on the VCT2000 symbol
- Start reading off the winter mode status
- Press in the winter position (W) button.

The status must change between Normal mode / Winter mode.

If the status does not change, try replacing the printed circuit board in the gear selector assembly. See **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, GEARTRONIC, REPLACING** .

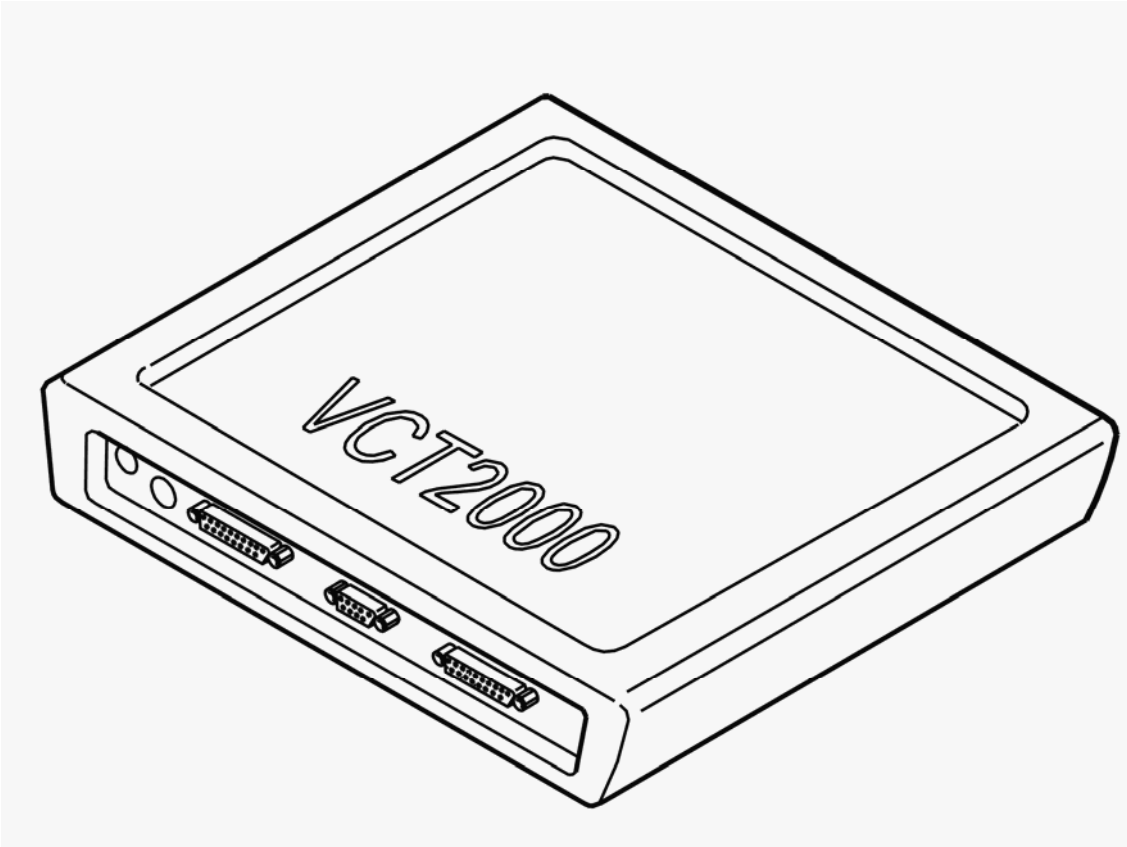


Fig. 190: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the status change?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

VERIFICATION

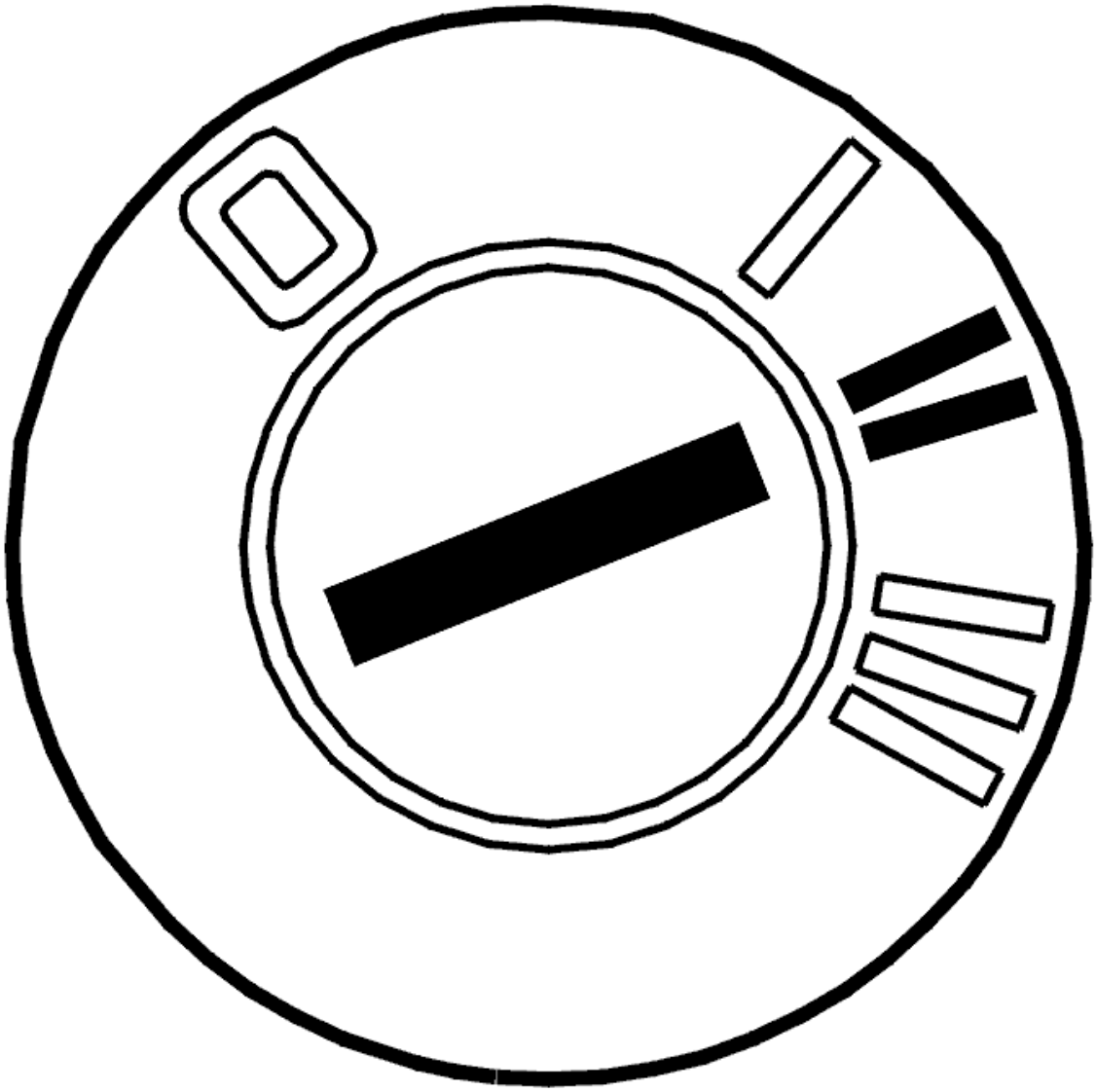


Fig. 191: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Check the winter mode function by clicking on the VCT2000 symbol
- Press in the winter position (W) button.

  The status must change between Normal mode / Winter mode.

  If the status does not change, try replacing the printed circuit board in the gear selector assembly. See **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, GEARTRONIC, REPLACING** .

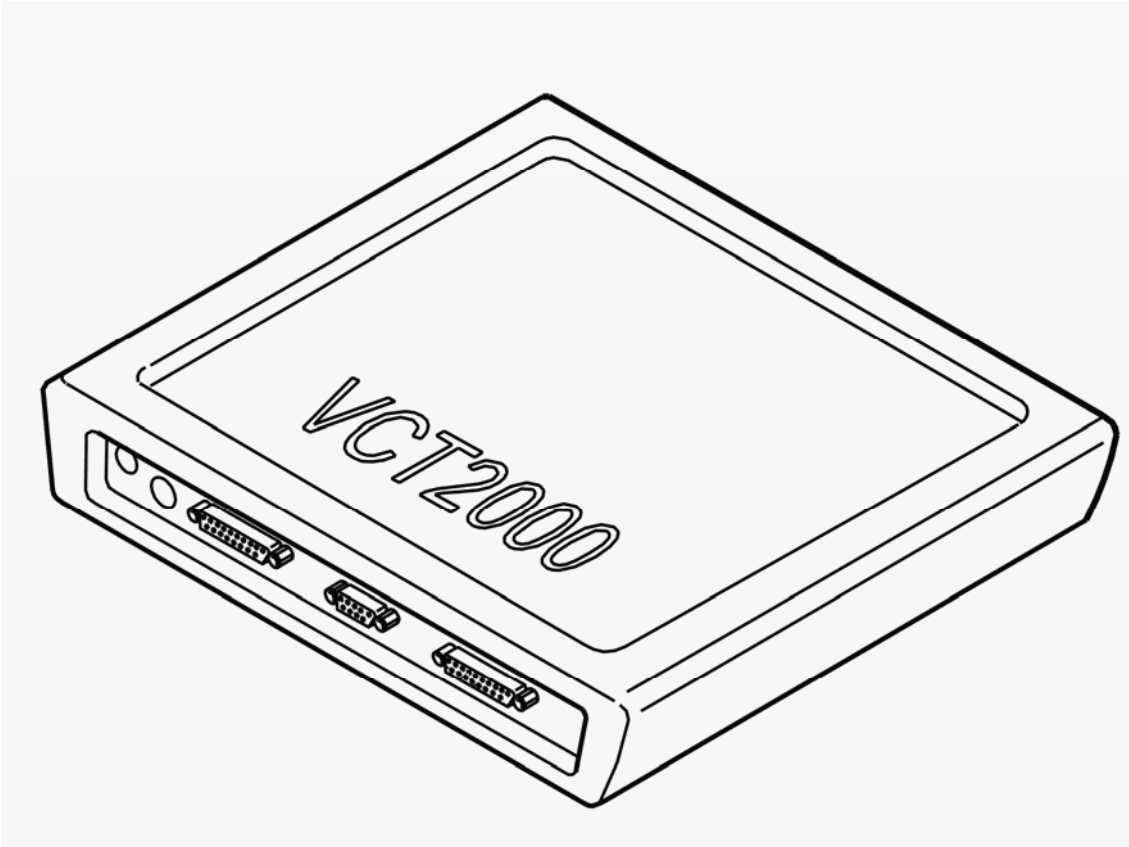


Fig. 192: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the status change?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

FAULT-TRACING INFORMATION

Condition

The fault is permanent, no diagnostic trouble code (DTC) is stored

Possible Source

- Defective Winter (W) mode selector position.
- Open-circuit in signal cable or ground lead.

Fault symptom[s]

- Winter mode does not function.

CHECKING WINTER POSITION (4T65 AWD; 2003-2006)

CHECKING WINTER MODE

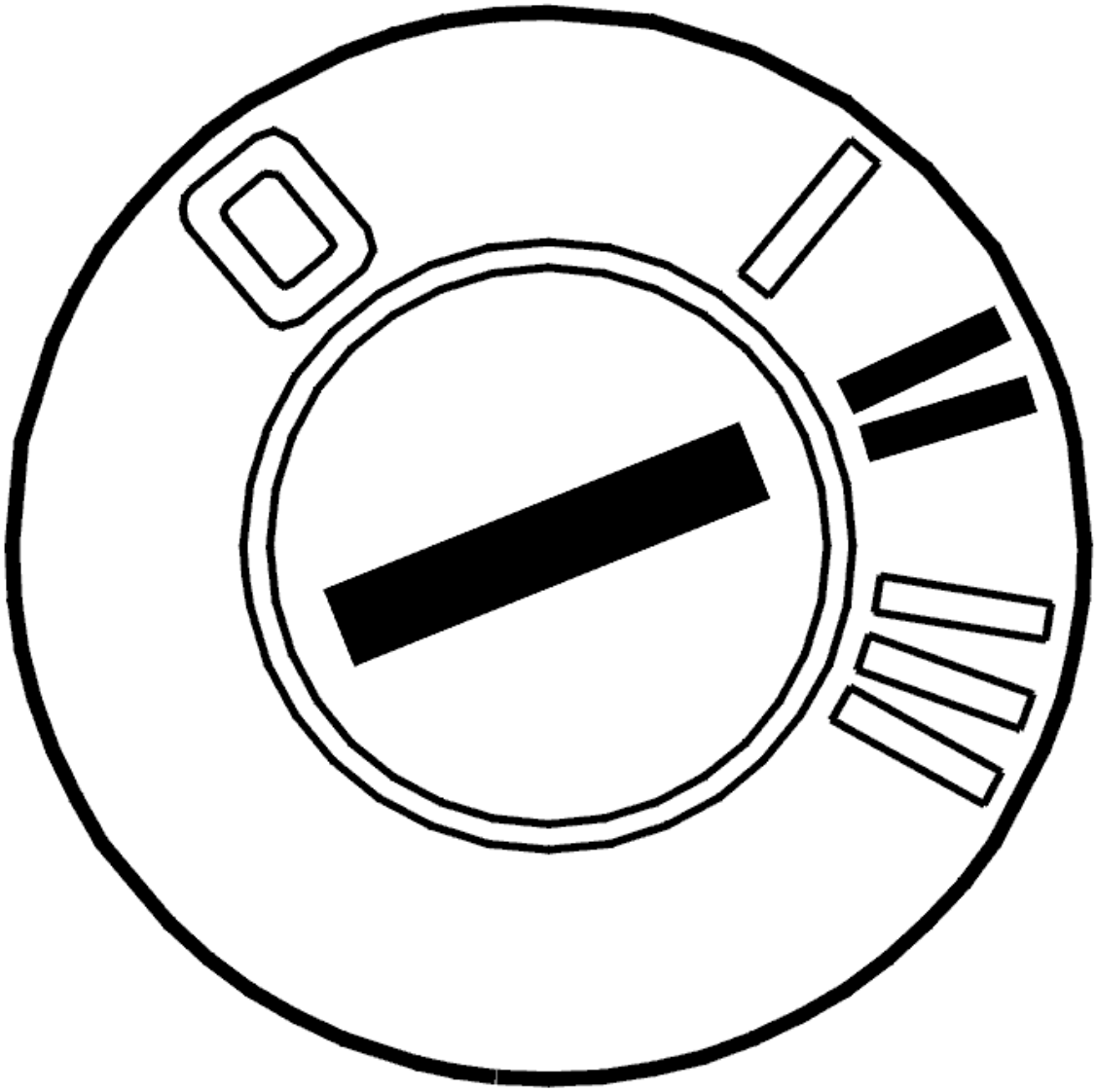


Fig. 193: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Check the winter mode function by clicking on the VCT2000 symbol
- Start reading off the winter mode status
- Press in the winter position (W) button.

  The status must change between Normal mode / Winter mode.

  If the status does not change, try replacing the printed circuit board in the gear selector assembly. See **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, REPLACING** .

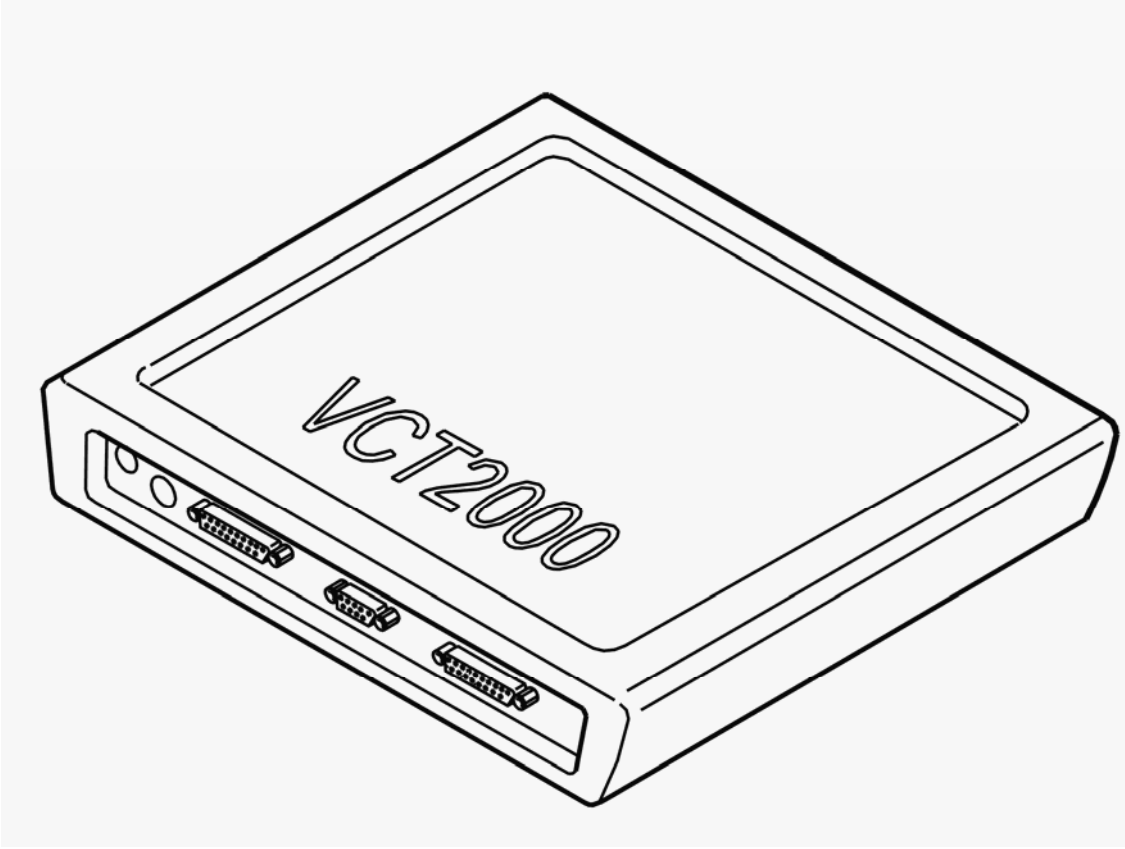


Fig. 194: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the status change?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

Refer to **VERIFICATION**

VERIFICATION

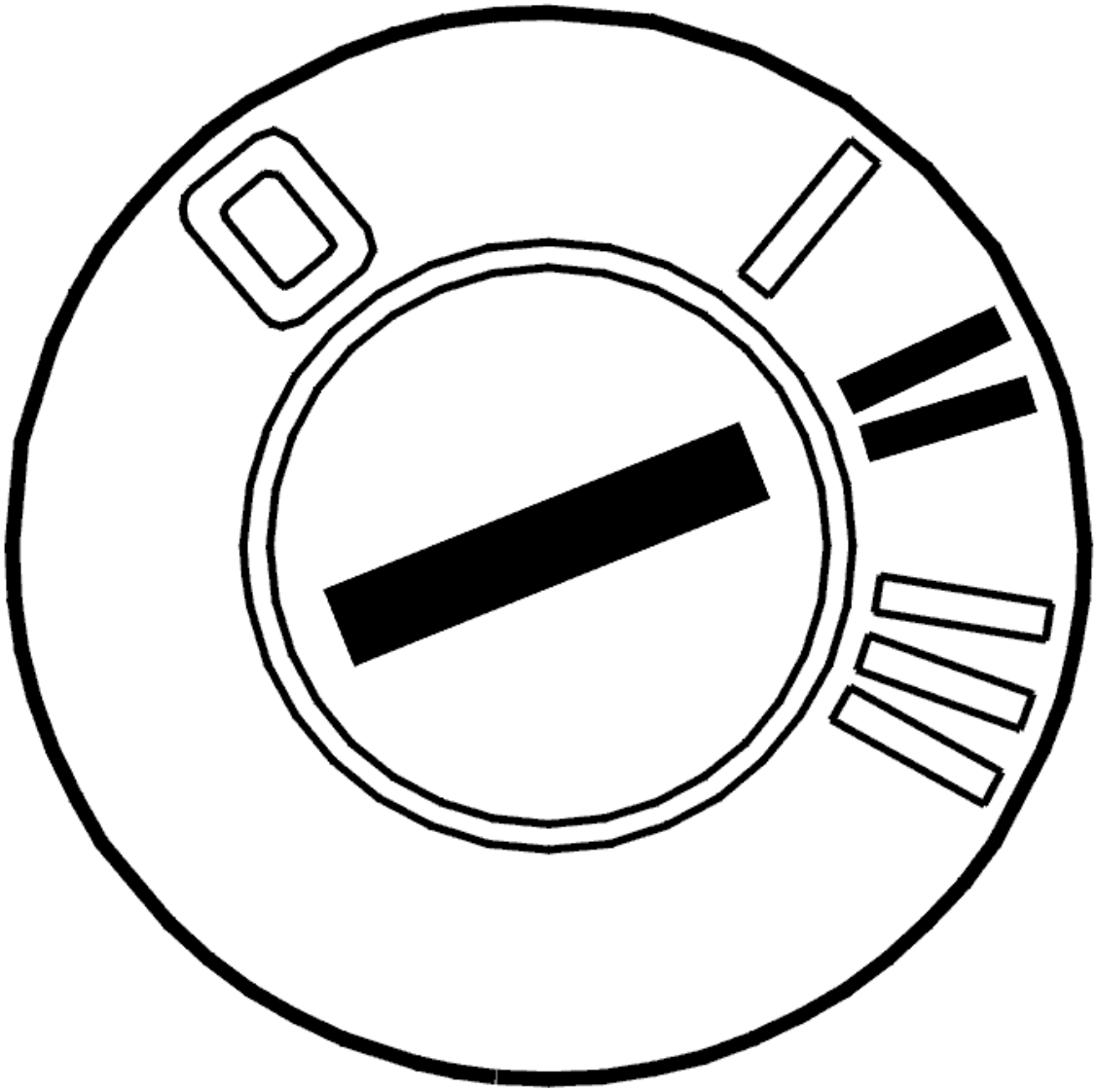


Fig. 195: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Check the winter mode function by clicking on the VCT2000 symbol
- Press in the winter position (W) button.

The status must change between Normal mode / Winter mode.

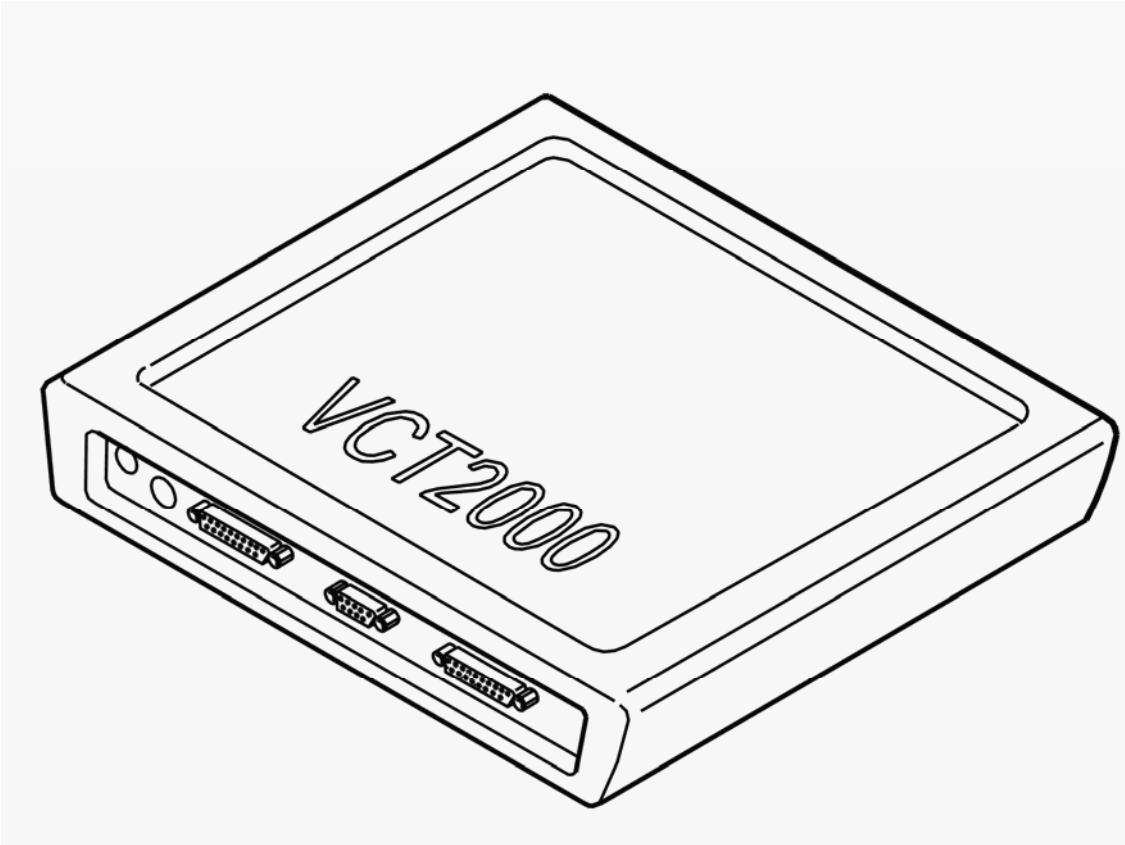


Fig. 196: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the status change?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

see **FAULT-TRACING INFORMATION**

CHECKING WINTER POSITION (AW50/51 AWD; AW55-50/51SN; 2003-2007)

CHECKING WINTER MODE

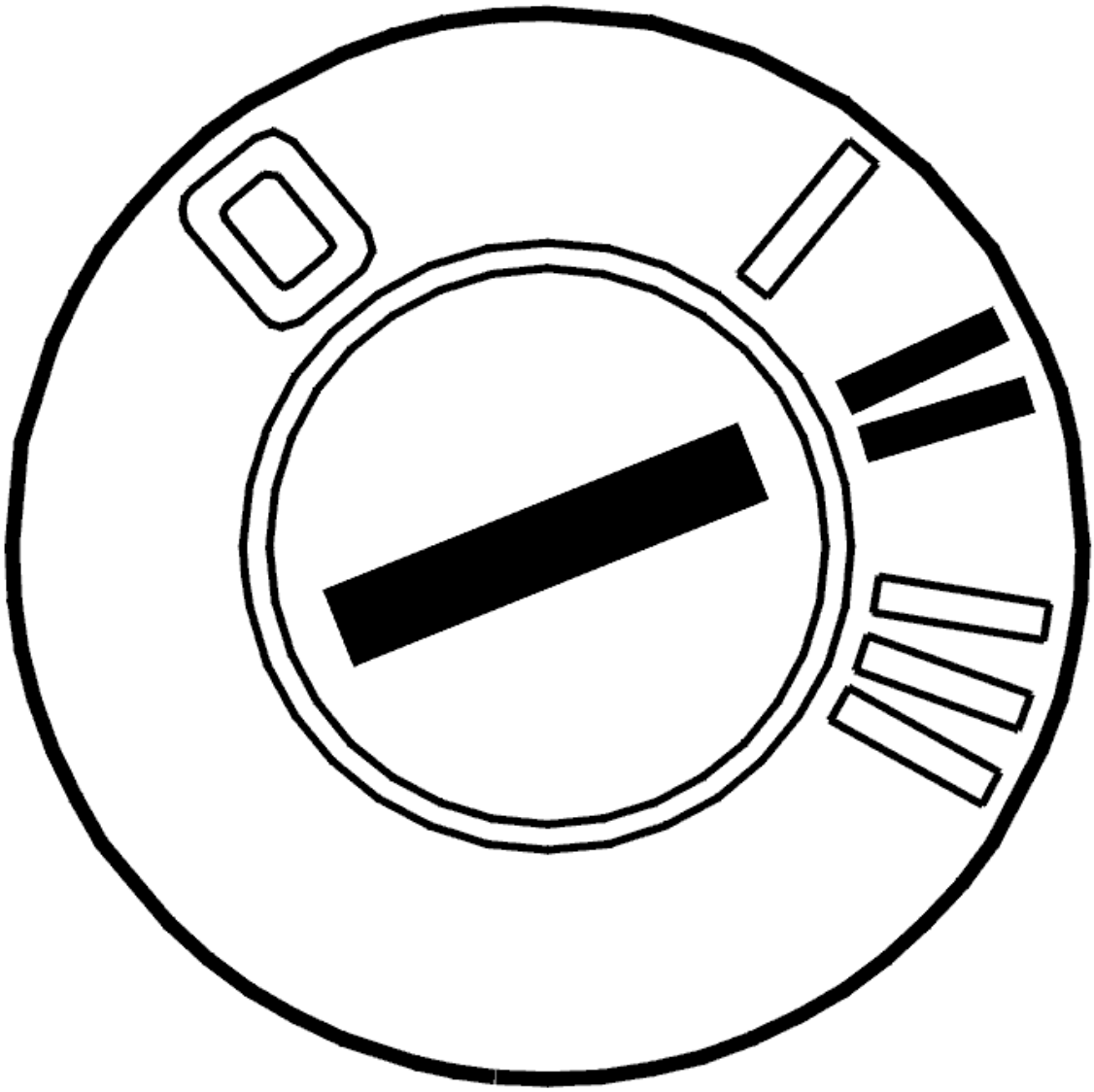


Fig. 197: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Check the winter mode function by clicking on the VCT2000 symbol
- Start reading off the winter mode status
- Press in the winter position (W) button.

The status must change between Normal mode / Winter mode.

If the status does not change, try replacing the printed circuit board in the gear selector assembly. See **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, REPLACING** .

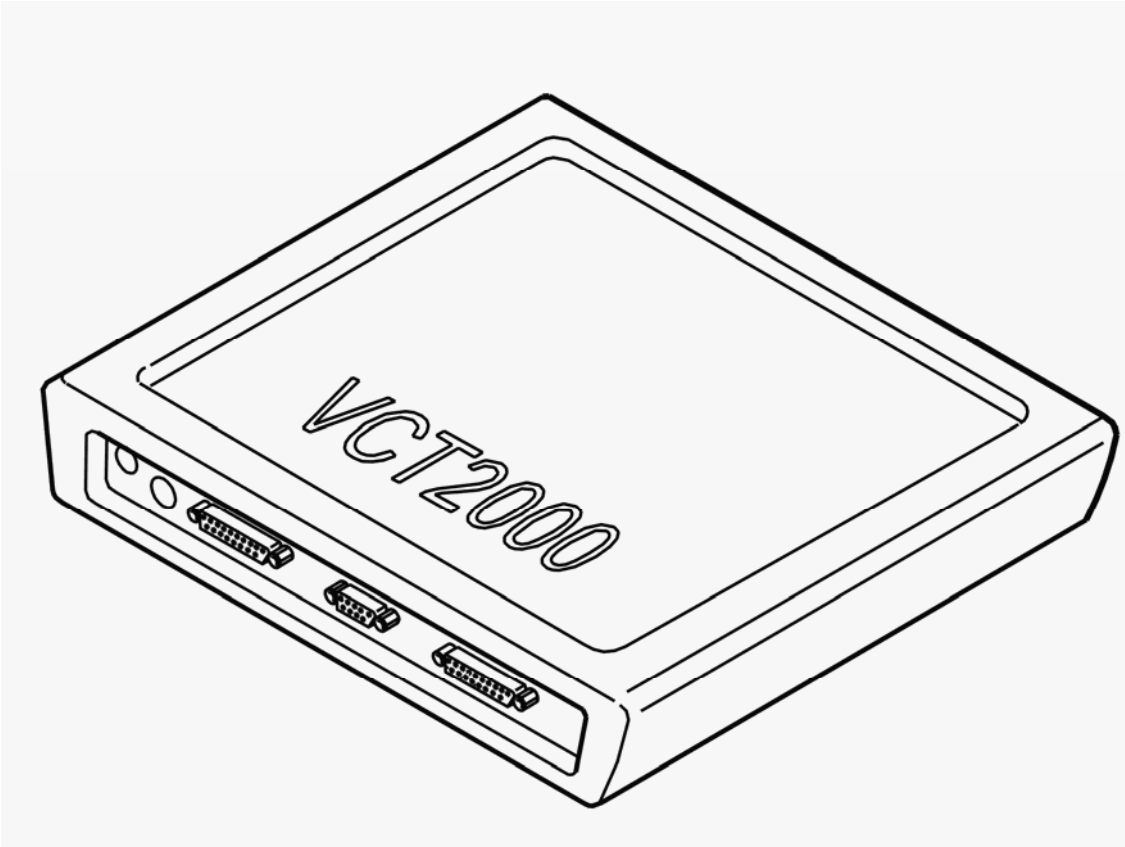


Fig. 198: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the status change?

- **YES**

  FAULT NOT FOUND: Troubleshooting has been completed.

- **NO**

  Refer to **VERIFICATION**

VERIFICATION

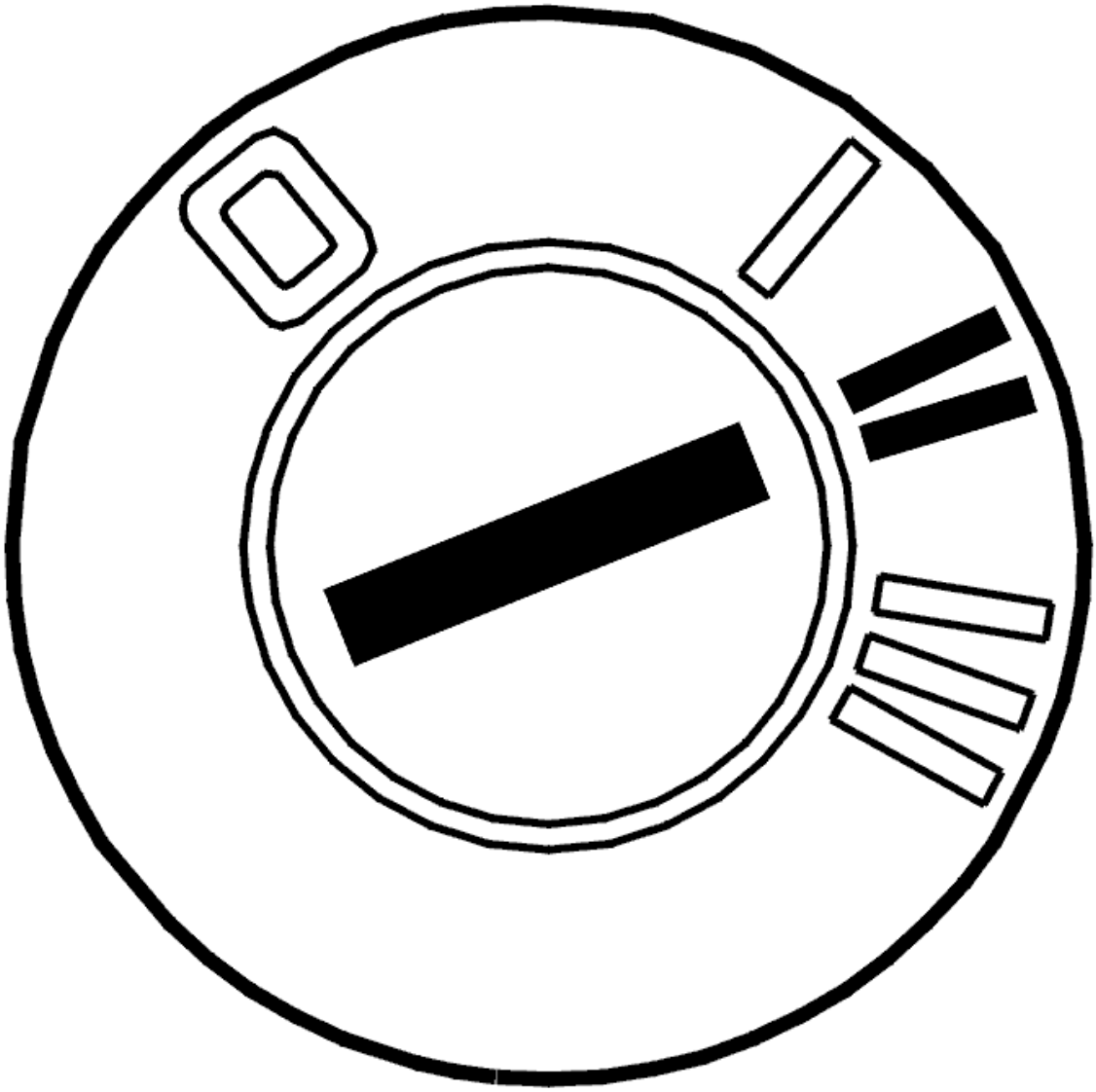


Fig. 199: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on
- Check the winter mode function by clicking on the VCT2000 symbol
- Press in the winter position (W) button.

  The status must change between Normal mode / Winter mode.

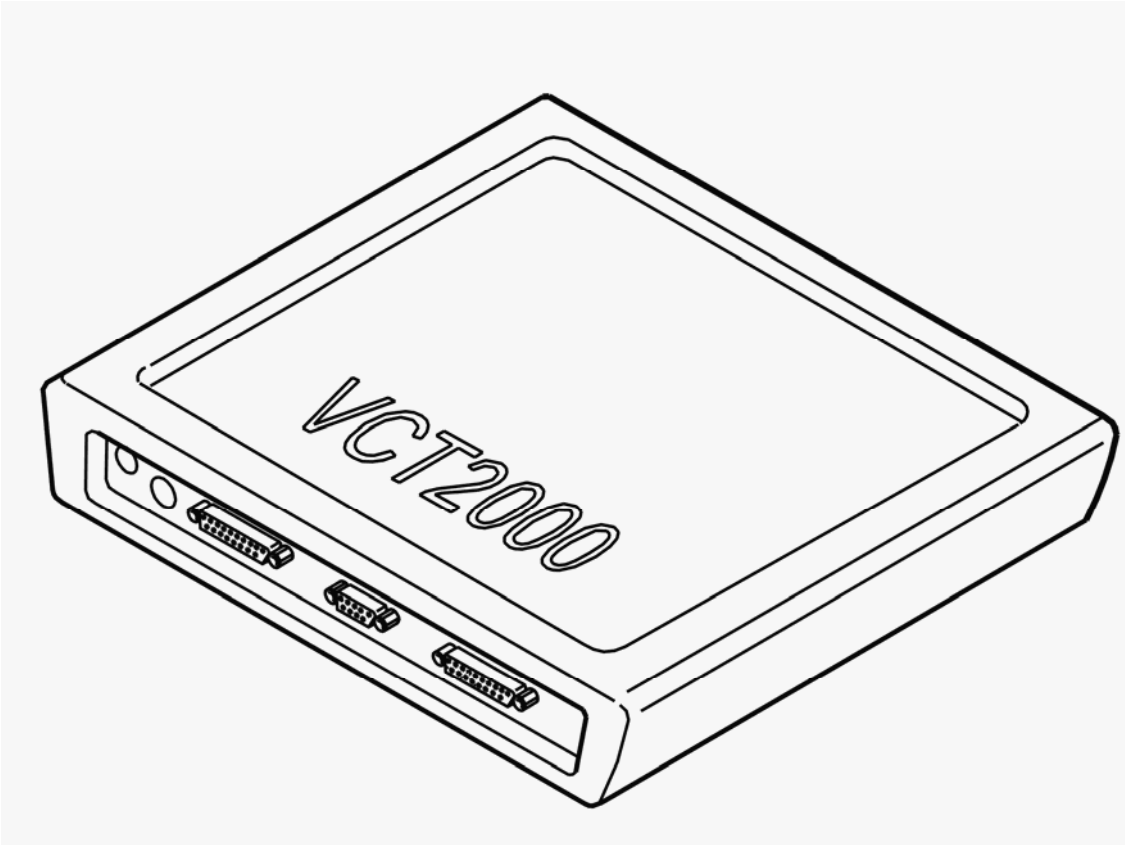


Fig. 200: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

Does the status change?

- **YES**

  OKAY: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

see **FAULT-TRACING INFORMATION**

CHECKING WIRING AND CONNECTORS (GEAR SELECTOR MODULE)

(4T65 AWD; 2003-2006)

CHECKING WIRING AND CONNECTORS (GEAR SELECTOR MODULE (GSM)

CHECKING WIRING AND CONNECTORS (GEAR SELECTOR MODULE (GSM)

- Ignition off
- Detach the panel on the gear selector assembly top panel.

  Check the connectors for the gear selector module (GSM). Check for damaged pins. Check the wiring between the gear selector module (GSM) and the transmission control module (TCM). Check for damage, open-circuits and short-circuits.

  Other information:

  - To check or replace the printed circuit board (standard), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, REPLACING**
  - To check or replace the printed circuit board (Geartronic), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, GEARTRONIC, REPLACING** .

DOWNLOADING SOFTWARE (4T65 AWD; 2003-2006)

DOWNLOADING SOFTWARE

HINT: The fault may be due to incorrect or damaged software in the transmission control module (TCM). The fault can be remedied by downloading new software.

Select "PAUSE" and save as a bookmark.

Then cancel the fault-tracing and select the software manager.

Download the latest software into the transmission control module (TCM). Then resume the fault tracing.

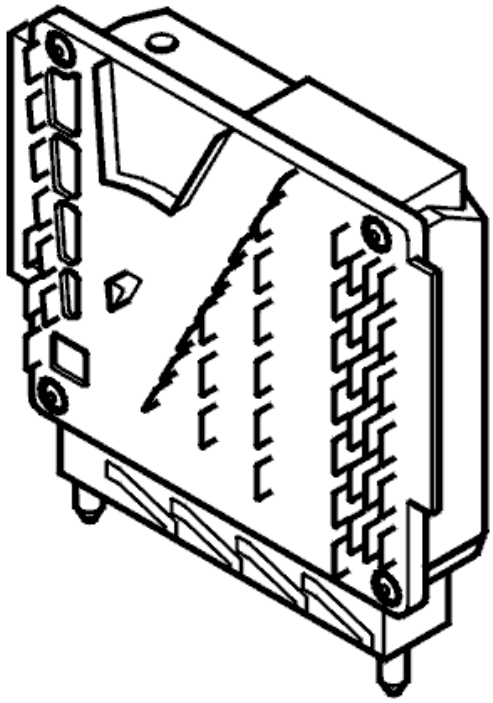


Fig. 201: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING AUTOMATIC TRANSMISSION**

CHECKING AUTOMATIC TRANSMISSION

CHECKING AUTOMATIC TRANSMISSION

NOTE: After carrying out the repair check that the symptom has been remedied.

Check the automatic transmission as follows:

- Test drive the car to test the function of the automatic transmission. See **TEST DRIVE FORM, DESCRIPTION**
- If hydraulic hoses, gaskets or other components have been replaced, check that there is no oil leakage after the test drive.

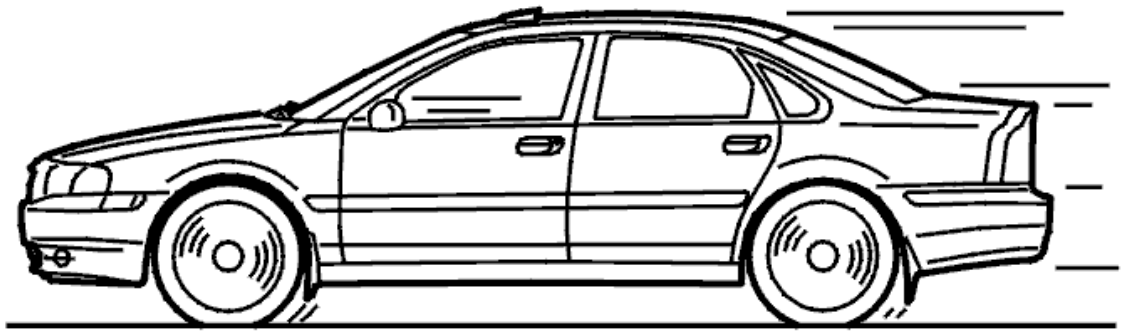


Fig. 202: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the automatic transmission OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

DOWNLOADING SOFTWARE (AW50/51 AWD; AW55-50/51SN; 2003-2005)

DOWNLOADING SOFTWARE

DOWNLOADING SOFTWARE

HINT: The fault may be due to incorrect or corrupted software in the Transmission control module (TCM). The fault may be rectified by downloading new software.

Select the tab Software and reprogram the control module with the latest software.

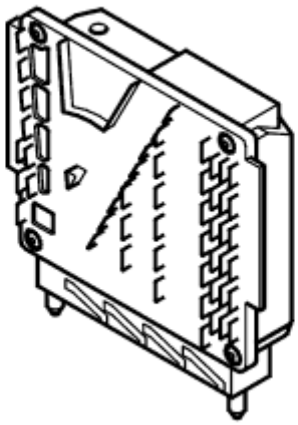


Fig. 203: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

DOWNLOADING SOFTWARE (AW50/51 AWD; AW55-50/51SN; 2003-2007)

DOWNLOADING SOFTWARE

HINT: The fault may be due to incorrect or damaged software in the transmission control module (TCM). The fault can be remedied by downloading new software.

Cancel fault-tracing.

Download the latest software into the transmission control module (TCM). Then resume the fault tracing.

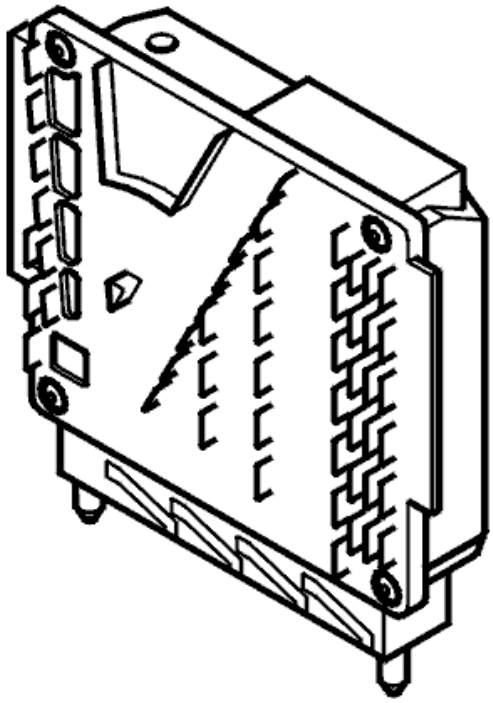


Fig. 204: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **CHECKING AUTOMATIC TRANSMISSION**

CHECKING AUTOMATIC TRANSMISSION

CHECKING AUTOMATIC TRANSMISSION

NOTE: After carrying out the repair check that the symptom has been remedied.

Check the automatic transmission as follows:

- Test drive the car to test the function of the automatic transmission. See **TEST DRIVE SCHEDULE, DESCRIPTION**
- If hydraulic hoses, gaskets or other components have been replaced, check that there is no oil leakage after the test drive.

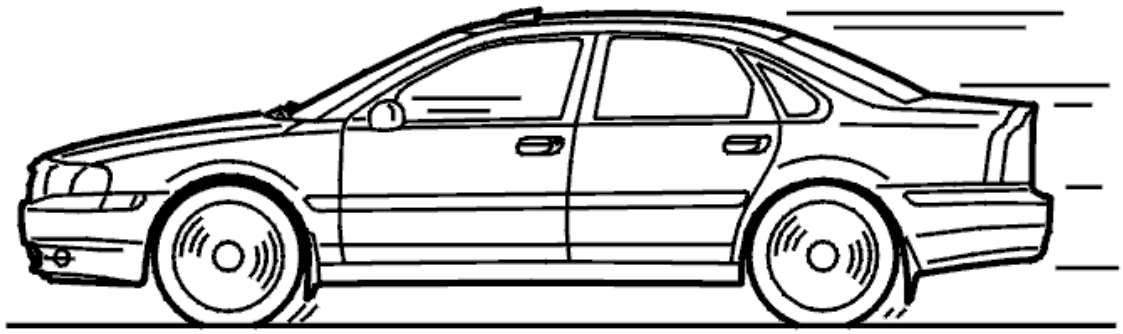


Fig. 205: Identifying Test Drive
Courtesy of VOLVO CARS CORPORATION

Is the automatic transmission OK?

- **YES**

  VERIFIED: Troubleshooting has been completed.

- **NO**

  Refer to **INFORMATION**

INFORMATION

FAULT-TRACING INFORMATION

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

REPLACING A FAULTY TORQUE CONVERTER (4T65 AWD; 2003-2006)

REPLACING A FAULTY TORQUE CONVERTER

- Replace the transmission. See **TRANSMISSION, REMOVING** and **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .
- **Continue**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

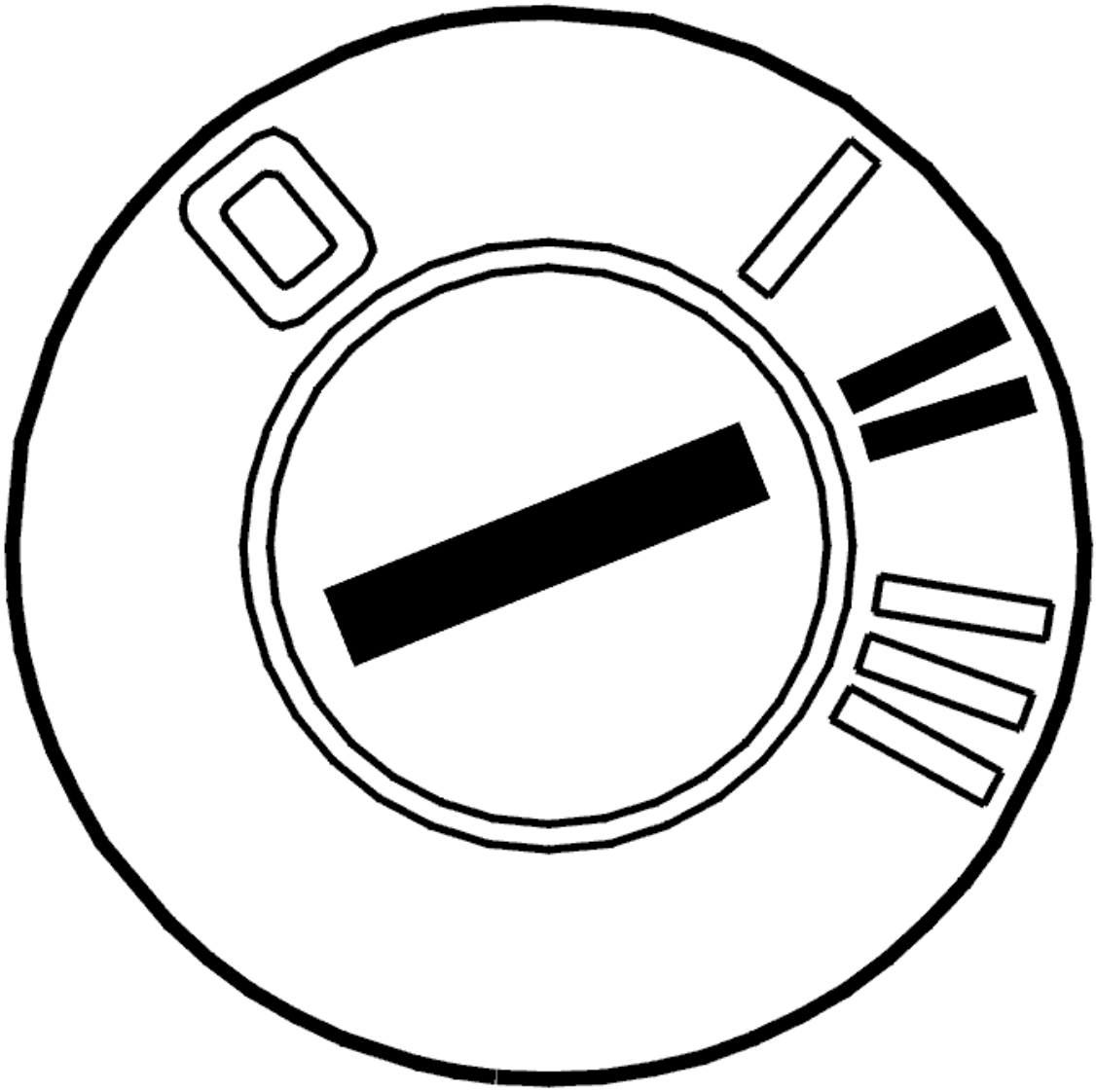


Fig. 206: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

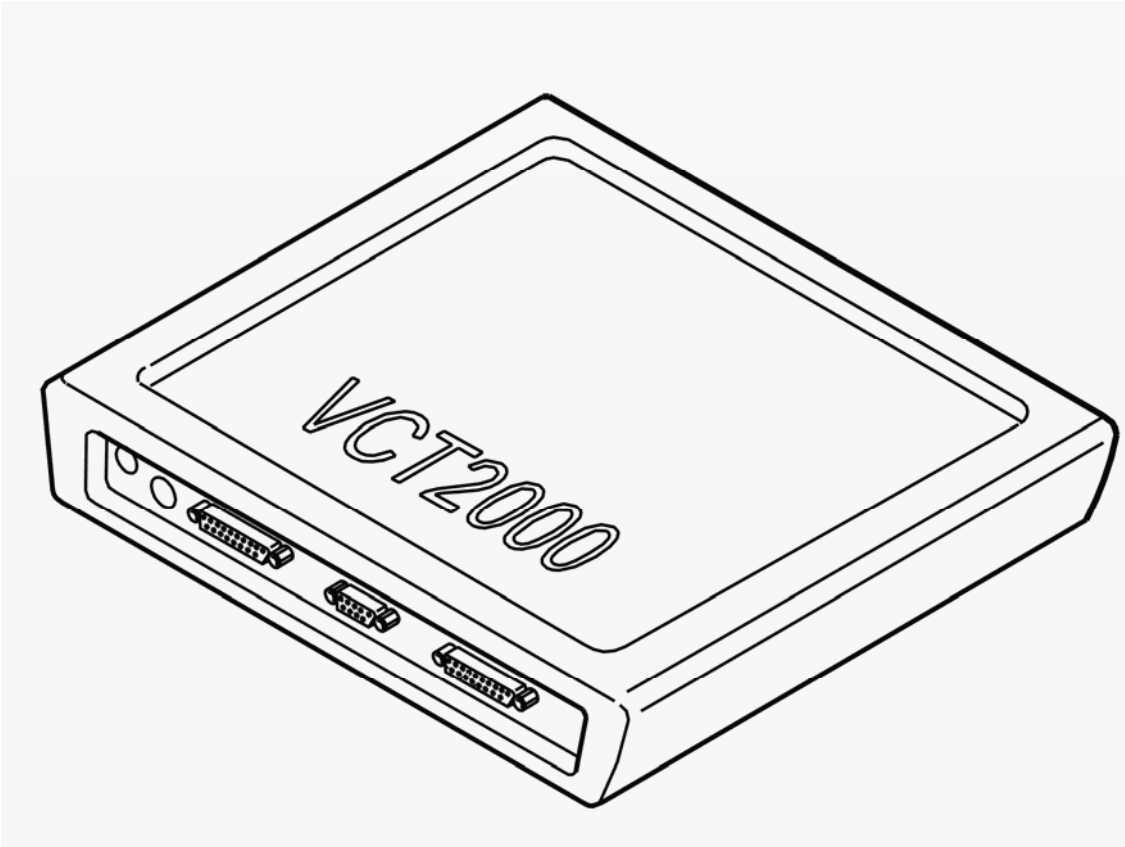


Fig. 207: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

REPLACING A FAULTY TRANSMISSION (4T65 AWD; 2003-2006)

REPLACING A FAULTY TRANSMISSION

- In the event of an internal fault in the transmission, replace the transmission. See **TRANSMISSION, REMOVING** and **TRANSMISSION, INSTALLING (2003, 2004)** or **TRANSMISSION, INSTALLING (2005, 2006)** .

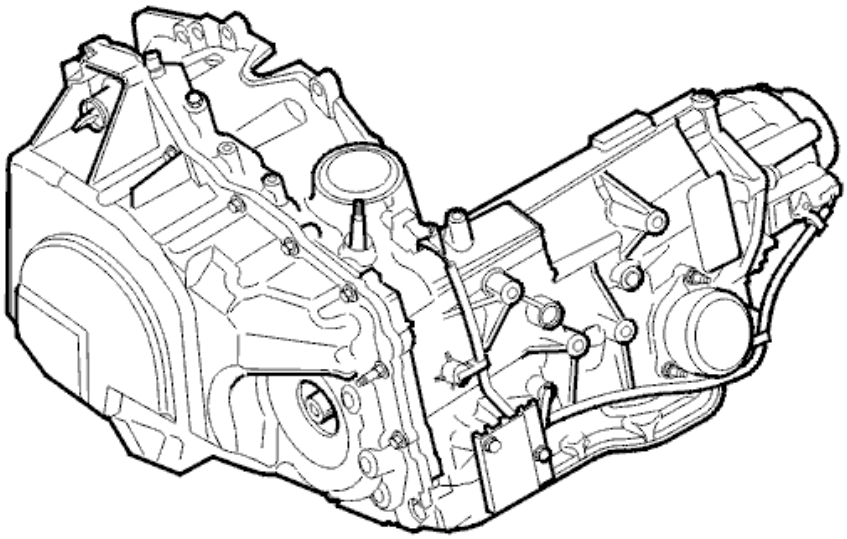


Fig. 208: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

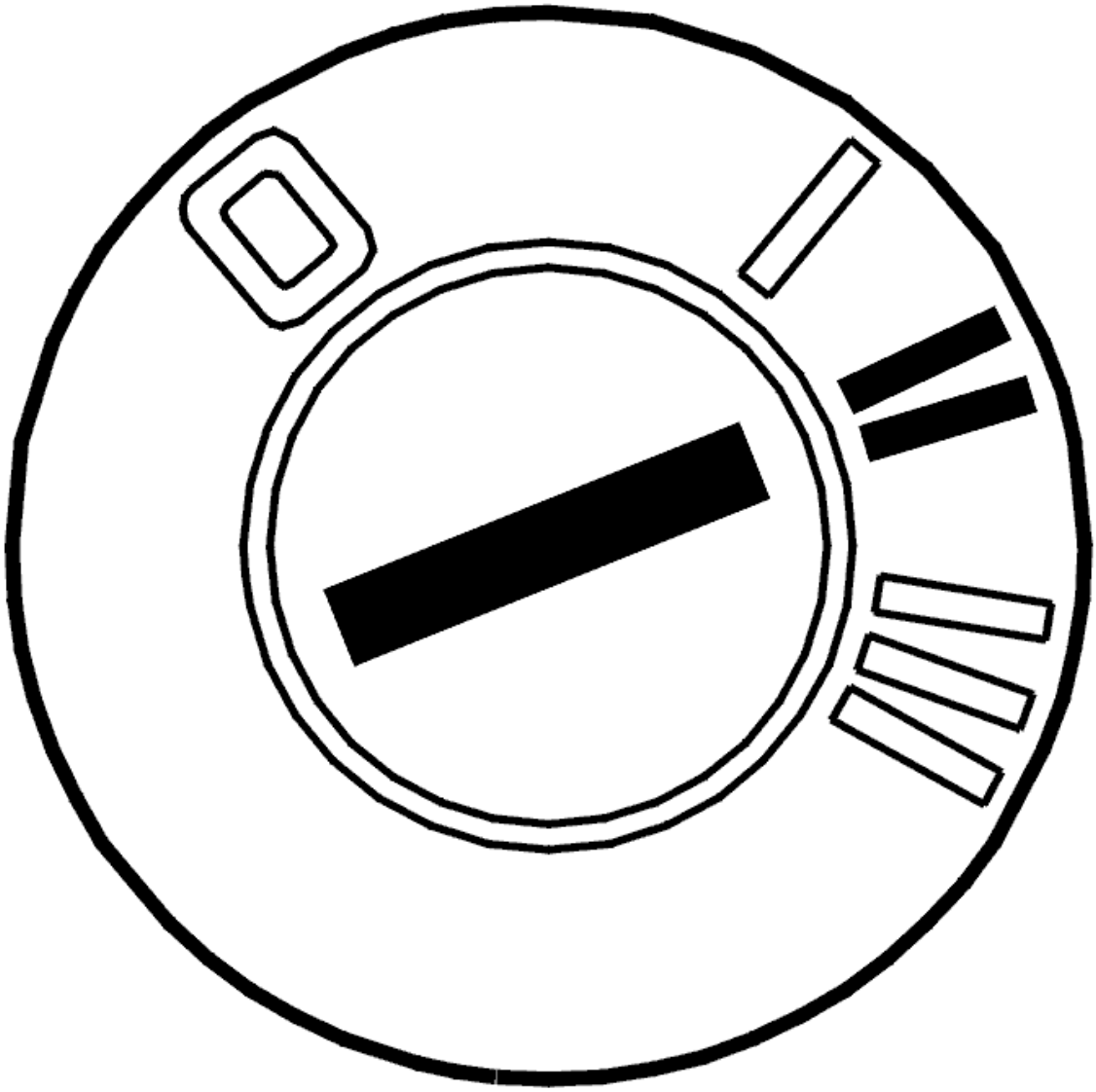


Fig. 209: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

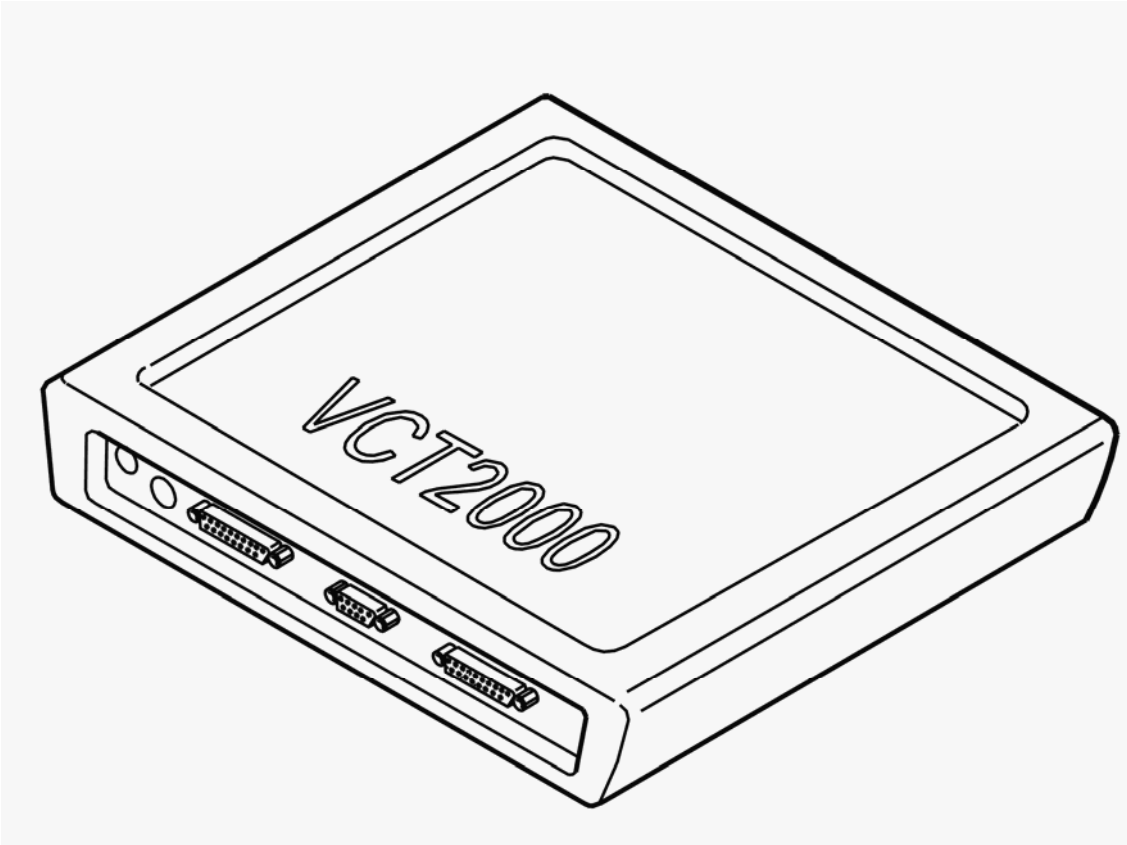


Fig. 210: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

REPLACING THE GEAR SELECTOR CONTROL MODULE (4T65 AWD; 2003-2006)

REPLACING THE GEAR SELECTOR CONTROL MODULE

REPLACING THE GEAR SELECTOR CONTROL MODULE

Replacing the printed circuit board in the top panel (gear selector module (GSM).

Other information:

- To check or replace the printed circuit board (Geartronic), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, GEARTRONIC, REPLACING**
- To check or replace the printed circuit board (standard), see **PRINTED CIRCUIT BOARD GEAR SELECTOR ASSEMBLY/TOP PANEL, REPLACING** .

REPLACING THE TORQUE CONVERTER (AW50/51 AWD; AW55-50/51SN; 2003-2007)

REPLACING THE TORQUE CONVERTER

Replace the torque converter according to **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION** .

Other information:

- For information about removal/installation, see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**
- **Continue**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

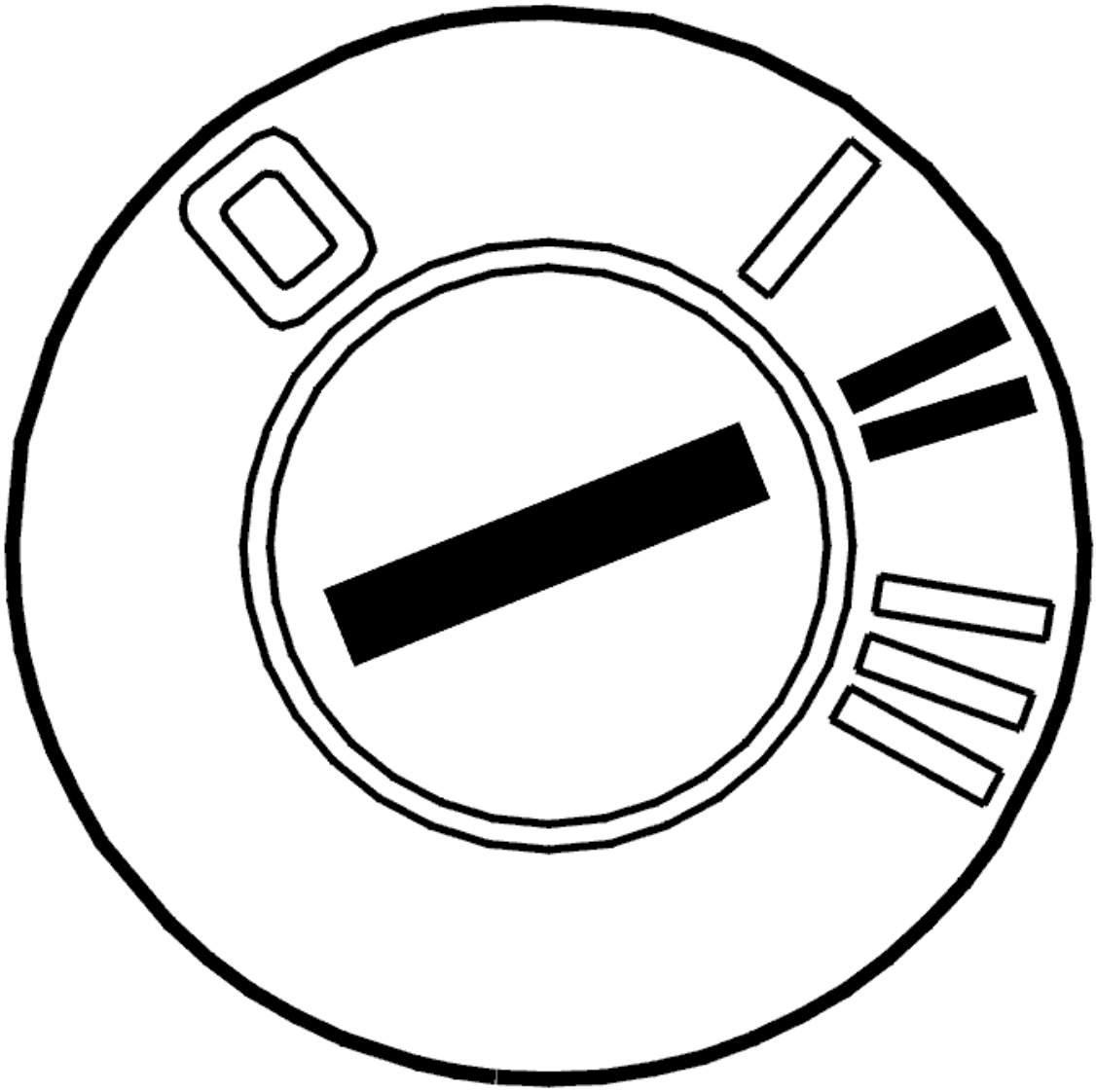


Fig. 211: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

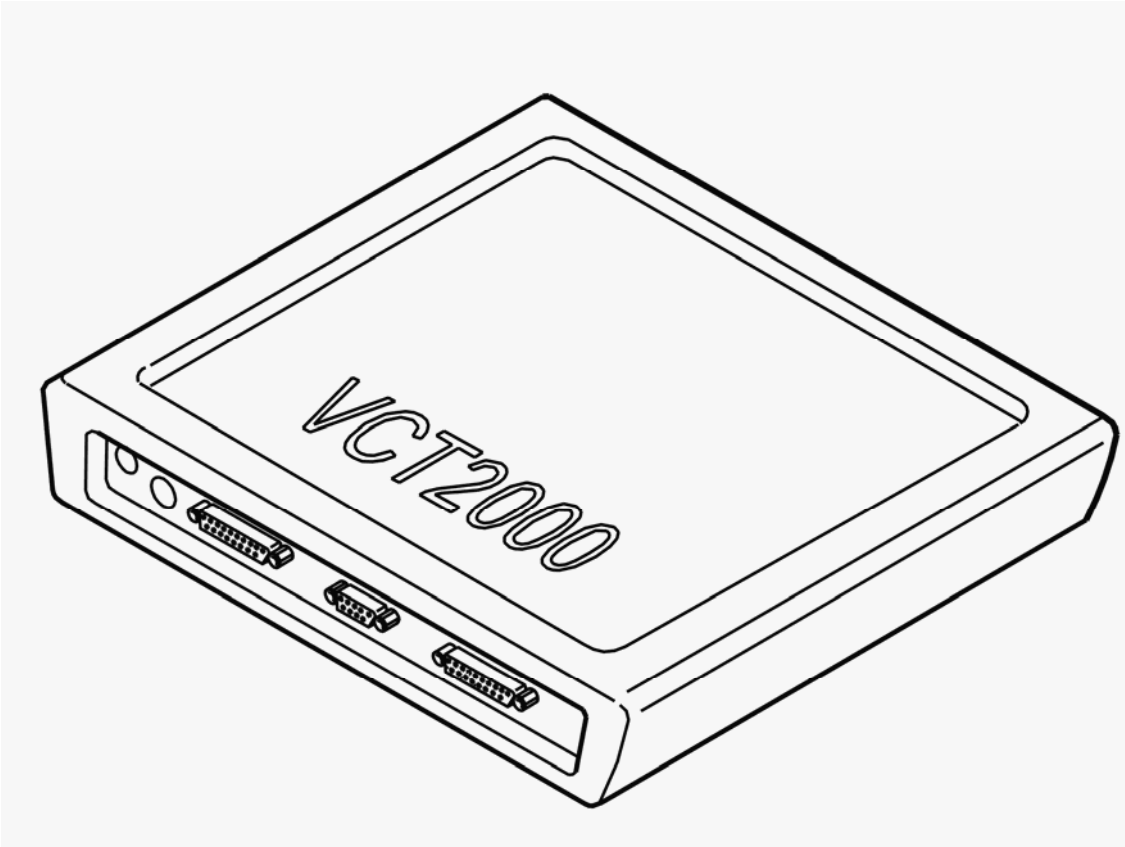


Fig. 212: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

REPLACING THE TRANSMISSION (AW50/51 AWD; AW55-50/51SN; 2003-2007)

REPLACING THE TRANSMISSION

In the event of an internal fault in the gearbox.

- see **TRANSMISSION - REMOVAL, REPLACEMENT AND INSTALLATION**

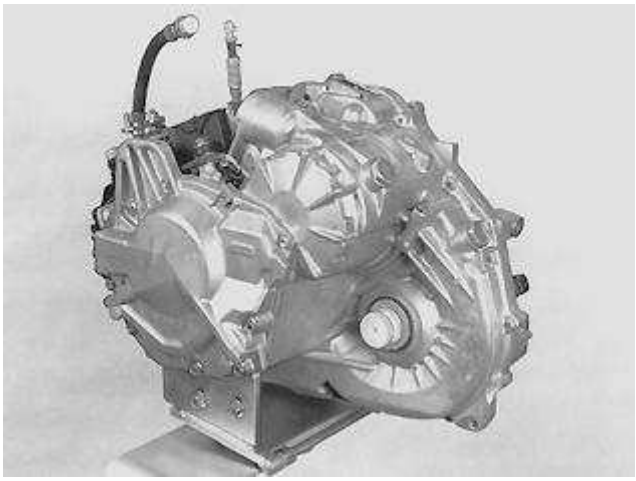


Fig. 213: Identifying Transmission
Courtesy of VOLVO CARS CORPORATION

- **Continue**

  Refer to **RESETTING THE ADAPTATION**

RESETTING THE ADAPTATION

RESETTING ADAPTATION AND THE COUNTER FOR "TRANSMISSION OIL CHANGE"

HINT: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

NOTE: This applies only if the transmission or one of the components in the transmission have been replaced.

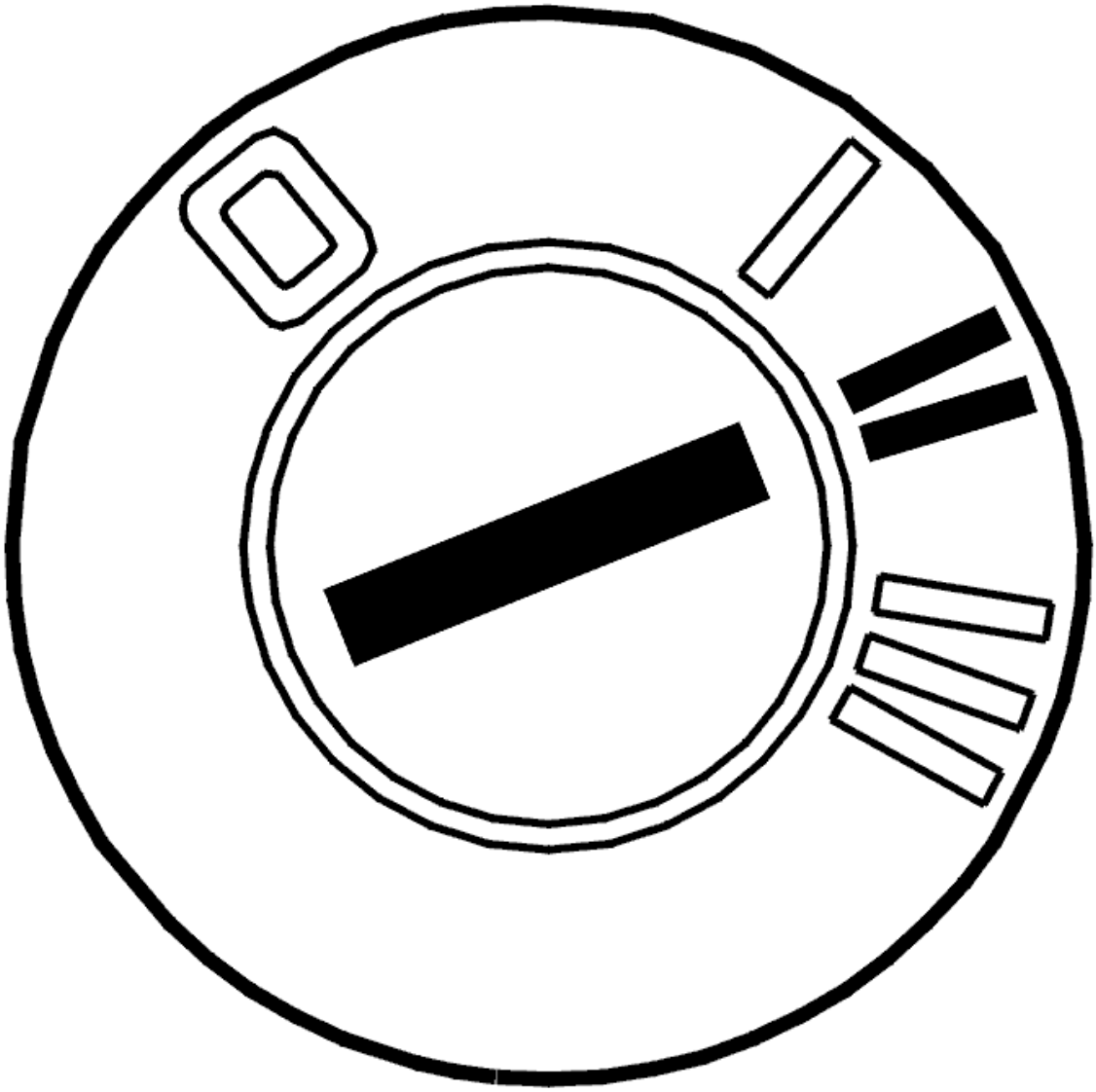


Fig. 214: Identifying Ignition ON
Courtesy of VOLVO CARS CORPORATION

- Ignition on.

  Click on the VCT2000 symbol to reset the adaptation and counter.

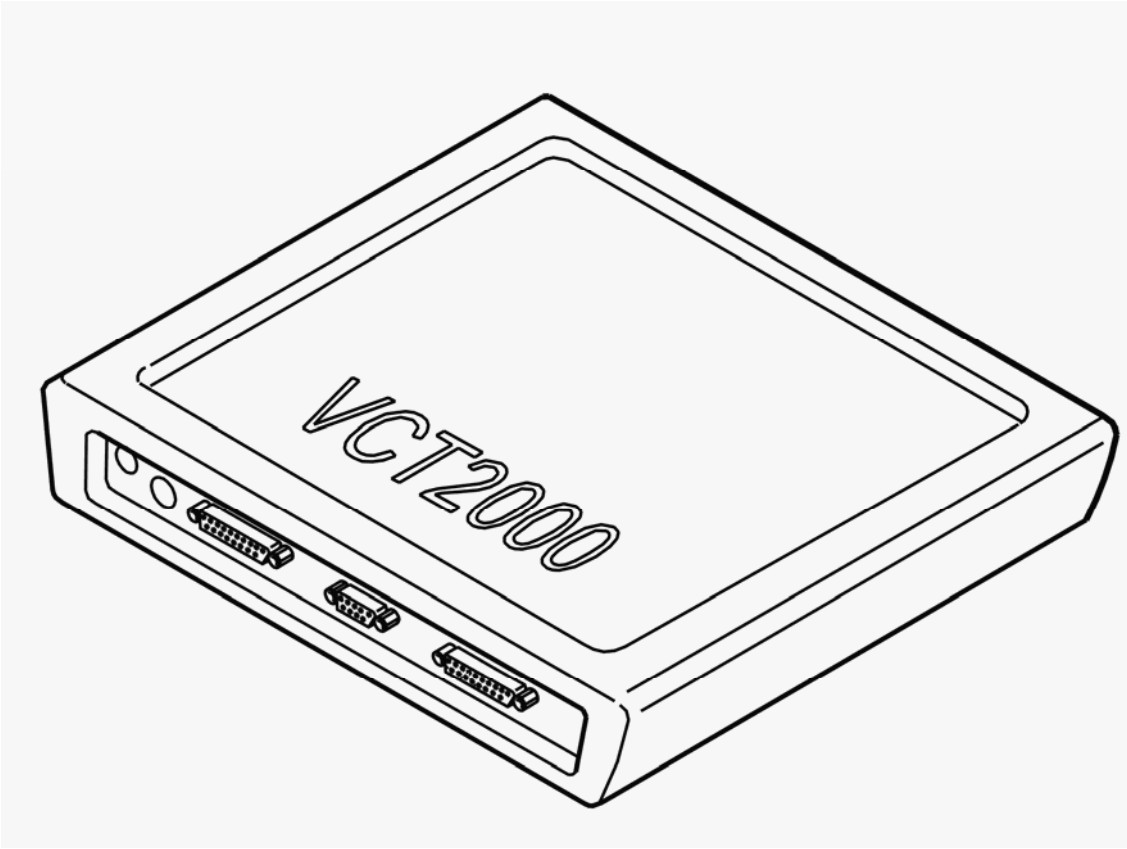


Fig. 215: Identifying VCT2000 Diagnostic Tool Symbol In VIDA
Courtesy of VOLVO CARS CORPORATION

REPLACING THE TRANSMISSION CONTROL MODULE (TCM) (4T65 AWD; 2003-2006)

REPLACING THE TRANSMISSION CONTROL MODULE (TCM)

REPLACING THE TRANSMISSION CONTROL MODULE (TCM)

The control module probably has an internal fault. Replace the transmission control module.

Other information

- To replace the transmission control module (TCM), see **TRANSMISSION CONTROL MODULE (TCM), REPLACING** .

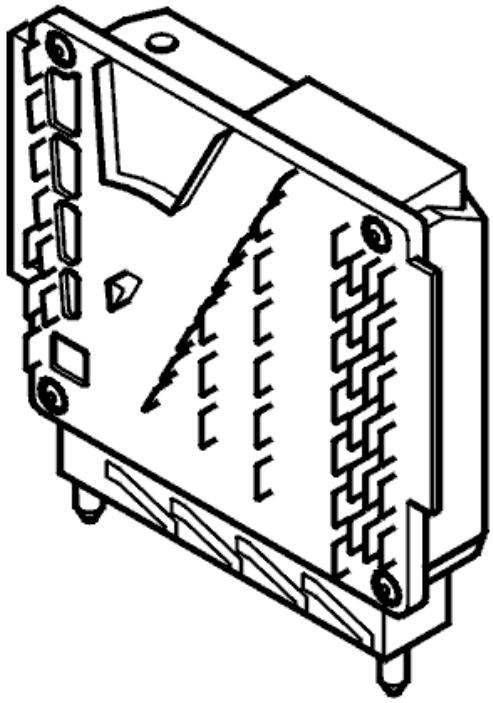


Fig. 216: Identifying Transmission Control Module (TCM)
Courtesy of VOLVO CARS CORPORATION

REPLACING THE TRANSMISSION CONTROL SYSTEM (4T65 AWD; 2003-2006)

REPLACING THE TRANSMISSION CONTROL SYSTEM

REPLACING THE CONTROL SYSTEM

The fault was probably caused by an internal fault in the transmission control system. Replace the control system.

Other information

- To replace the transmission control system, see
  - For removal, see **CONTROL SYSTEM/VALVE HOUSING, REMOVING**
  - To install, see **CONTROL SYSTEM / VALVE HOUSING, INSTALLING** .

.

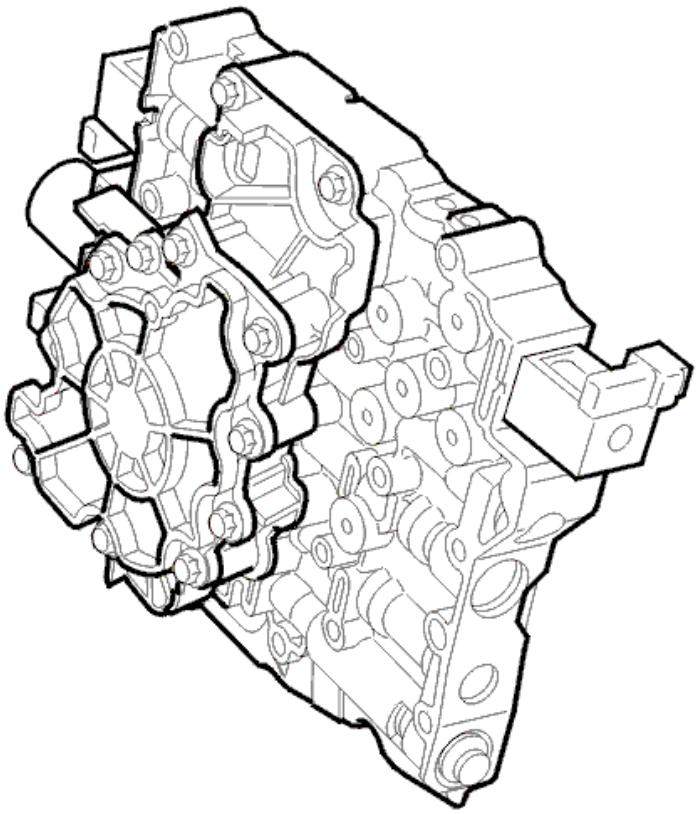


Fig. 217: Identifying Valve Housing
Courtesy of VOLVO CARS CORPORATION

GENERAL INFORMATION

Power transmission

TRANSMISSION

TRANSMISSION CONTROL MODULE (TCM), REPLACING

POINTS TO OBSERVE WHEN REPLACING THE CONTROL MODULE

CAUTION: Software can only be ordered when the control module is installed in the vehicle. VIDA (Volvo scan tool) reads off the new control module identity which is required to order the correct software.

CAUTION: Wait two minutes after the ignition has been switched off. The main relay must be voltage-free before the control module can be removed from the car. If the engine cooling fan runs on after the ignition has been switched off, wait until it stops. Then wait another two minutes.

CAUTION: Always check that the control module and control module box connector pins and sleeves are not bent or damaged. This may have caused the fault.

PREPARATIONS FOR REPLACEMENT

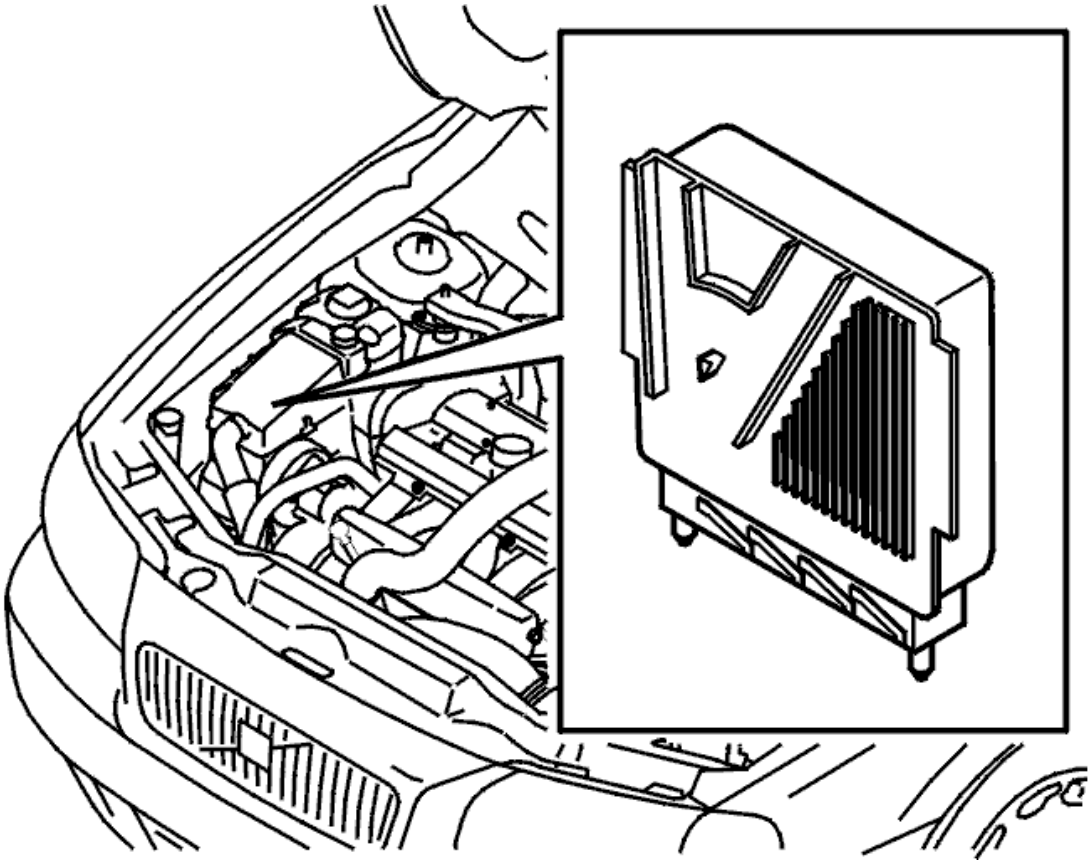


Fig. 1: Identifying Transmission Control Module
Courtesy of VOLVO CARS CORPORATION

Remove:

- the cable from the battery negative terminal. See **BATTERY, DISCONNECTING**
- the cover over the control module.

REMOVING THE CONTROL MODULE

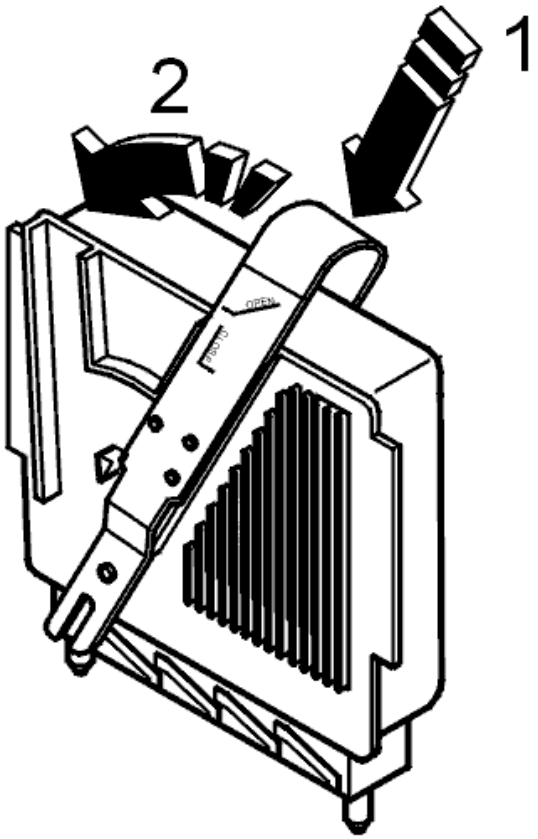


Fig. 2: Identifying Control Module Removal
Courtesy of VOLVO CARS CORPORATION

NOTE: Do not touch the control module terminal pins with your fingers. Static electricity may damage components in the control module.

Insert tool see **9995722** (1) in the car around the control module. Move the upper section of the tool backwards as far as it will go (2). Pull up the tool.

Carefully pull up the control module.

INSTALLING THE CONTROL MODULE

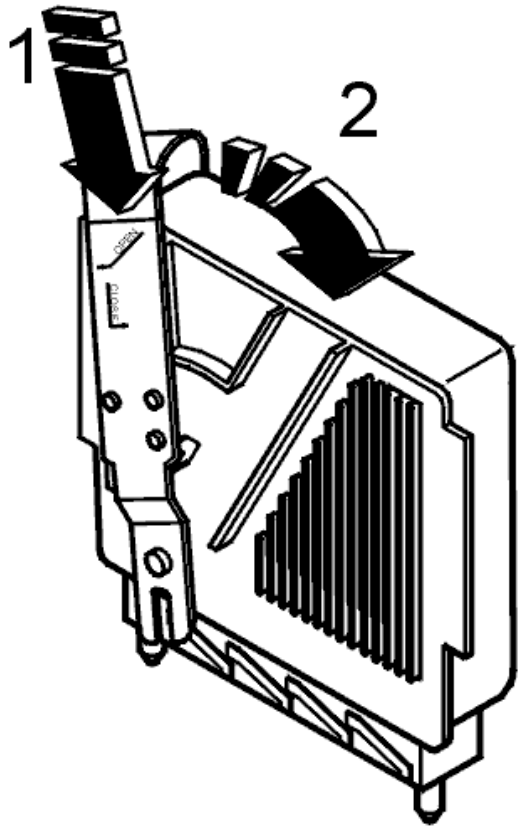


Fig. 3: Identifying Control Module Installation
Courtesy of VOLVO CARS CORPORATION

Carefully press the control module down into the grooves on the inside of the control module box. Press down all the way.

Insert tool see **9995722** around the control module.

Move the upper section of the tool forwards to stop and pull it up.

Press the cover into place over the control modules.

Check that the air ducts are correctly positioned.

Connect the battery negative lead. First read, see **BATTERY, DISCONNECTING** .

ORDERING SOFTWARE

Order software. See: 9438291

FINISHING

Check that no diagnostic trouble codes have been stored during the repair.

TRANSMISSION CONTROL UNIT WIRING HARNESS

REMOVING COVER CONTROL SYSTEM

Remove the cover over the control system. See **COVER CONTROL SYSTEM, REPLACING** .

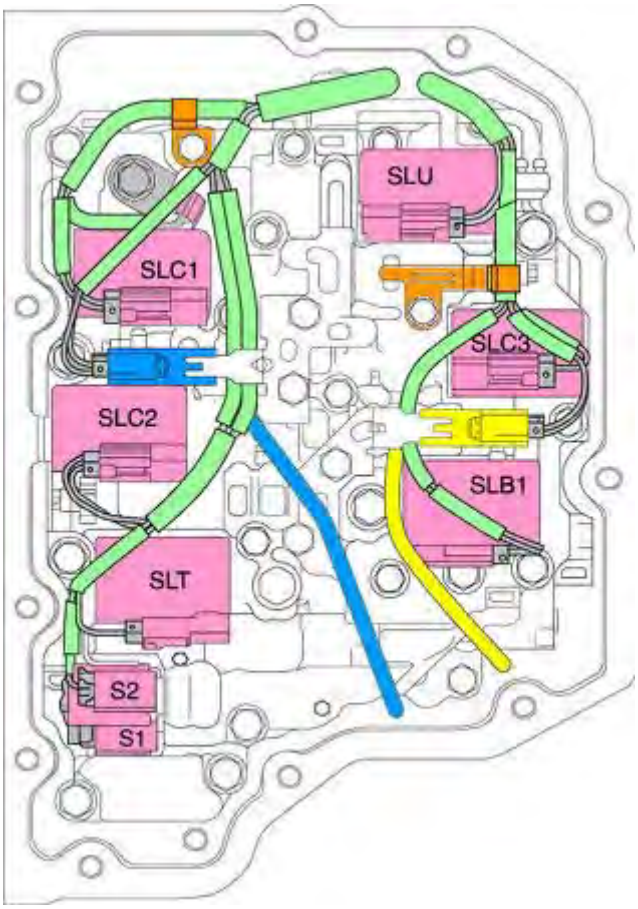


Fig. 4: Identifying Cable Harness
Courtesy of VOLVO CARS CORPORATION

TEMPERATURE SENSOR, FLUID TRANSMISSION

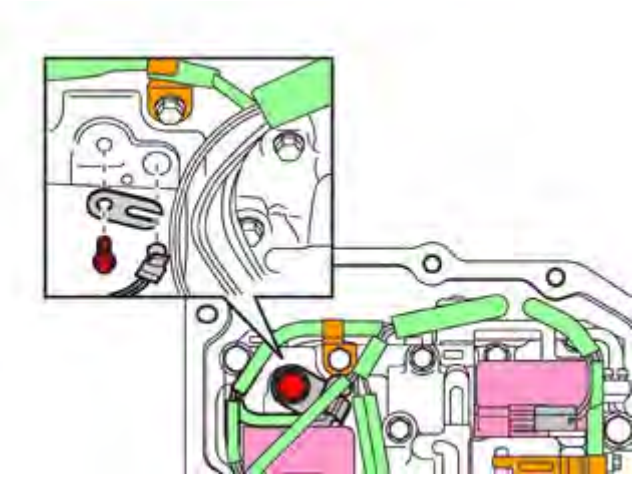


Fig. 5: Identifying Temperature Sensor & Connector
Courtesy of VOLVO CARS CORPORATION

CONNECTING TO TRANSMISSION INPUT SPEED SENSOR

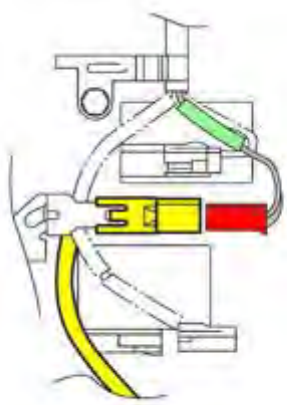


Fig. 6: Identifying Transmission Input Speed Sensor And Connector
Courtesy of VOLVO CARS CORPORATION

CONNECTING TO VEHICLE SPEED SENSOR

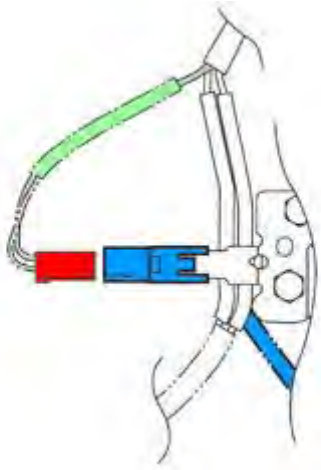


Fig. 7: Identifying Vehicle Speed Sensor And Connector
Courtesy of VOLVO CARS CORPORATION

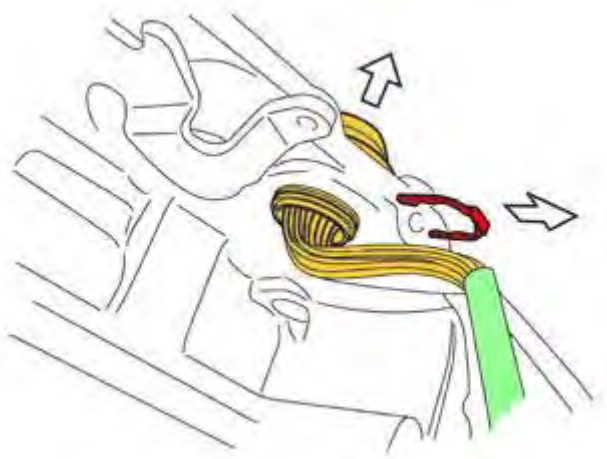


Fig. 8: Identifying Wire Harness Clip & Connector
Courtesy of VOLVO CARS CORPORATION

Fig. 9: Identifying Cable And Connector
Courtesy of VOLVO CARS CORPORATION

Fig. 10: Identifying Cable, Connector, And Clip
Courtesy of VOLVO CARS CORPORATION

TEMPERATURE SENSOR, FLUID TRANSMISSION

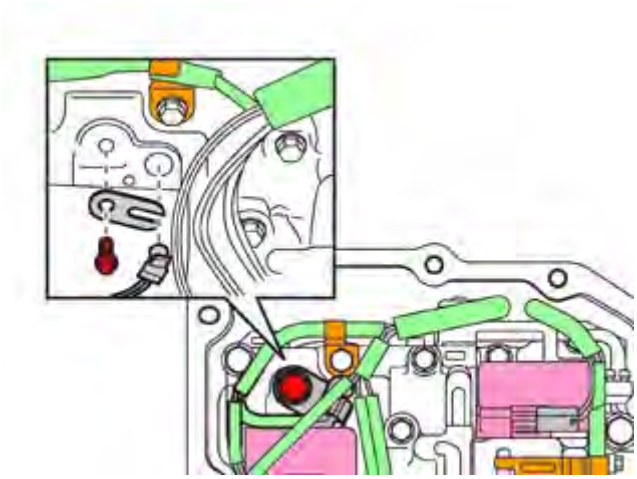


Fig. 11: Identifying Temperature Sensor & Connector
Courtesy of VOLVO CARS CORPORATION

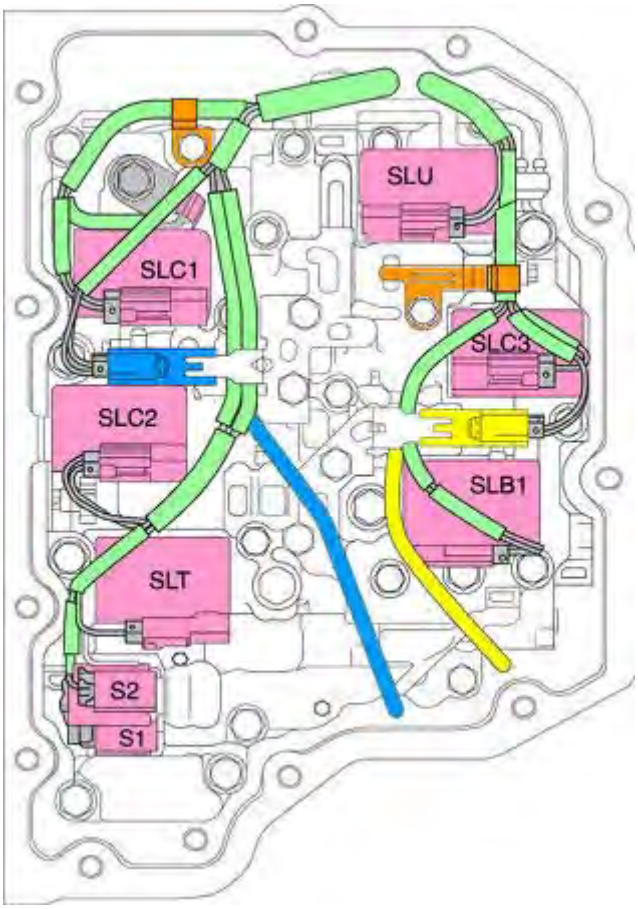


Fig. 12: Identifying Cable Harness
Courtesy of VOLVO CARS CORPORATION

INSTALLING COVER CONTROL SYSTEM

Install the cover over the control system. See **COVER CONTROL SYSTEM, REPLACING** .

TRANSMISSION FLUID, REPLACING

NOTE: Oil grade: Only automatic transmission fluid (ATF). Dexron III (the fluid must have a G license). This is usually given as "Dexron III (G-xxxxx)" where xxxxx is a 5 digit serial number. "Dexron III-G" (without a number) may also occur. The Volvo P/N for this oil is 1161521-8 (1 liter container).

WARNING: Avoid skin contact with the transmission fluid.

CONDITIONS

The oil should be replaced only in the two following instances:

Where diagnostic trouble codes (DTCs) TCM 0042 and TCM 0046 are stored, in which case the diagnostic function activates the warning lamp in the following circumstances.

The transmission control module (TCM) receives data about the operating temperature of the transmission fluid while the car is being driven. TCM 0042 is stored after an accumulated amount of time.

Diagnostic trouble code (DTC) TCM 0046 is stored if the transmission fluid temperature exceeds 150° C for more than two minutes.

In cars used in continuous taxi service or used for towing a trailer or caravan for most of its mileage, the oil must be replaced at a service interval of 75, 000 km ± 5000 km. This is to conform to the regular service program.

WARNING: The oil may be very hot if the car has just been driven. Avoid skin contact.

DRAINING

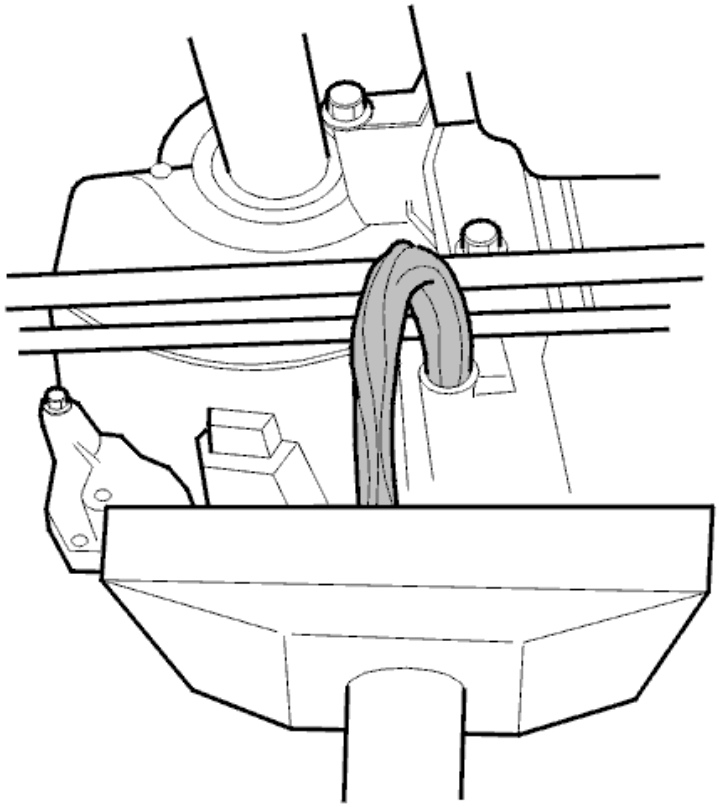


Fig. 13: Draining Off Oil
Courtesy of VOLVO CARS CORPORATION

Remove:

- the splash guard under the engine
- the oil plug. Drain the transmission oil.

INSTALLING THE OIL PLUG

Use a new gasket.

Tighten the plug. Tighten to **40 Nm** .

Install the protective cover.

DRAINING OIL

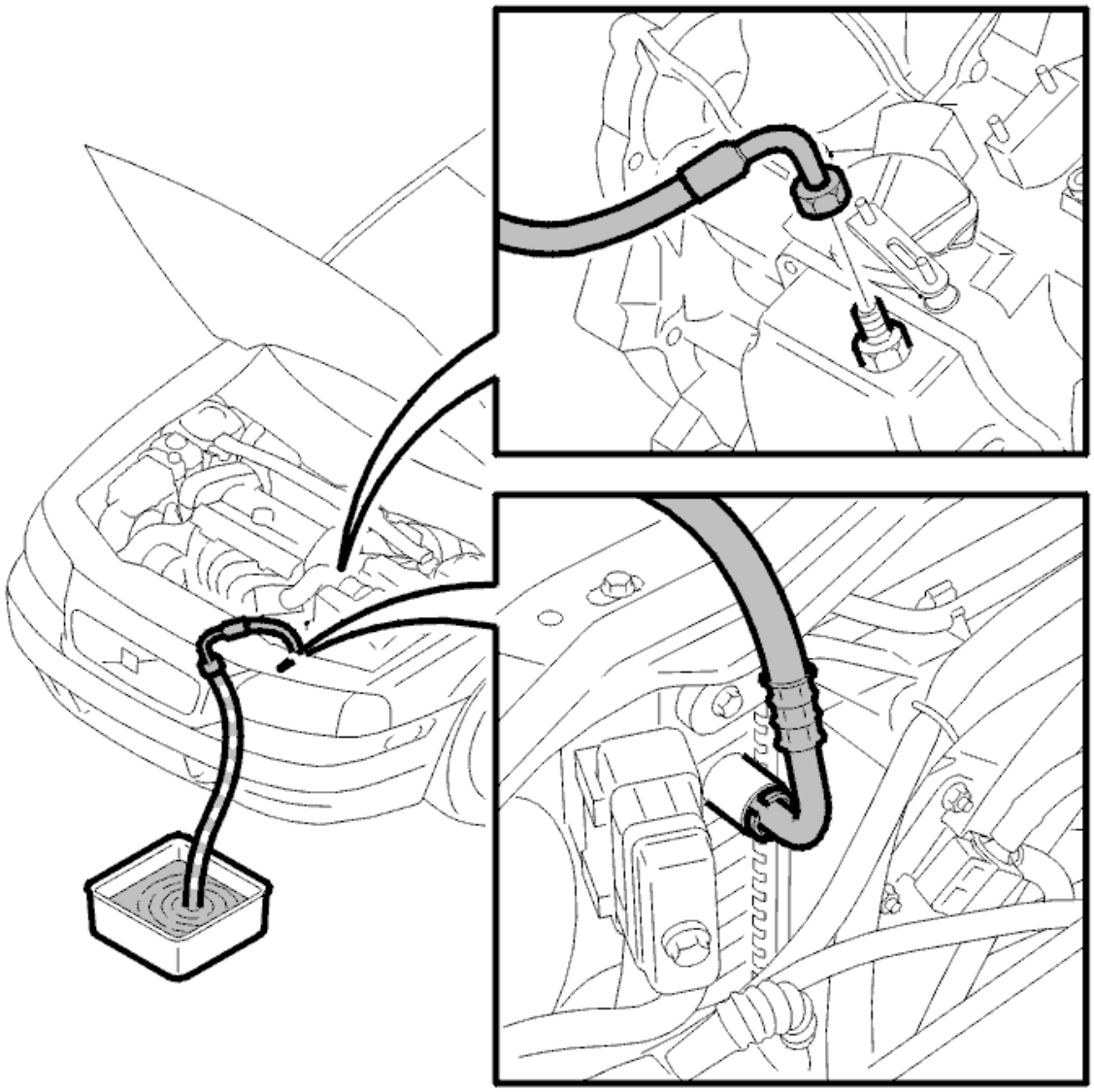


Fig. 14: Draining Cooler
Courtesy of VOLVO CARS CORPORATION

Remove the return hose on the control system cover.

Install a plastic plug in the connection on the cover.

Detach the return hose in the cooler. Align the hose upwards and reconnect it to the cooler.

Install a transparent plastic hose on the oil return hose connection.

Place a container beneath the hose to catch the oil.

REFILLING

Apply the parking brake. Move the gear selector lever to position P.

Fill with approximately 2 liters of oil.

Start the engine. Allow the engine to idle.

Turn the engine off when air bubbles start to become visible in the hose.

Fill with approximately 2 liters of oil.

Start the engine again and let it idle.

Turn the engine off when air bubbles start to become visible in the hose.

Remove the hose from the oil cooler hose. Detach it from the connection to the cooler. Install the hose in the normal position on the cooler and the transmission.

FURTHER FILLING

Fill with approximately 2 liters of oil.

Apply the parking brake.

Start the engine. Allow the engine to idle. Move the gear selector through all the gear positions. Wait 4-5 seconds in each gear.

CHECKING THE OIL LEVEL

See **OIL LEVEL, CHECKING** .

The capacity of the transmission is 7.6± 0.25 liters. (MAX, MIN).

NOTE: After replacing the transmission, the adaptation and the "Transmission oil change" counter must be reset. See RESETTING TRANSMISSION FLUID CHANGE COUNTER .

TRANSMISSION OIL LEVEL - CHECKING

NOTE: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

WARNING: Take great care when the vehicle is raised, the splashguard under the engine is removed and the engine is running. Watch out for rotating components on the engine and the radiator fan. Be especially careful with your hair and fingers.

WARNING: Avoid skin contact with the oil.

NOTE: Only use transmission oil with Volvo part no.: 116 1540-8 (1-litre), 116 1640-6 (4-litre).

CHECK

CONDITIONS

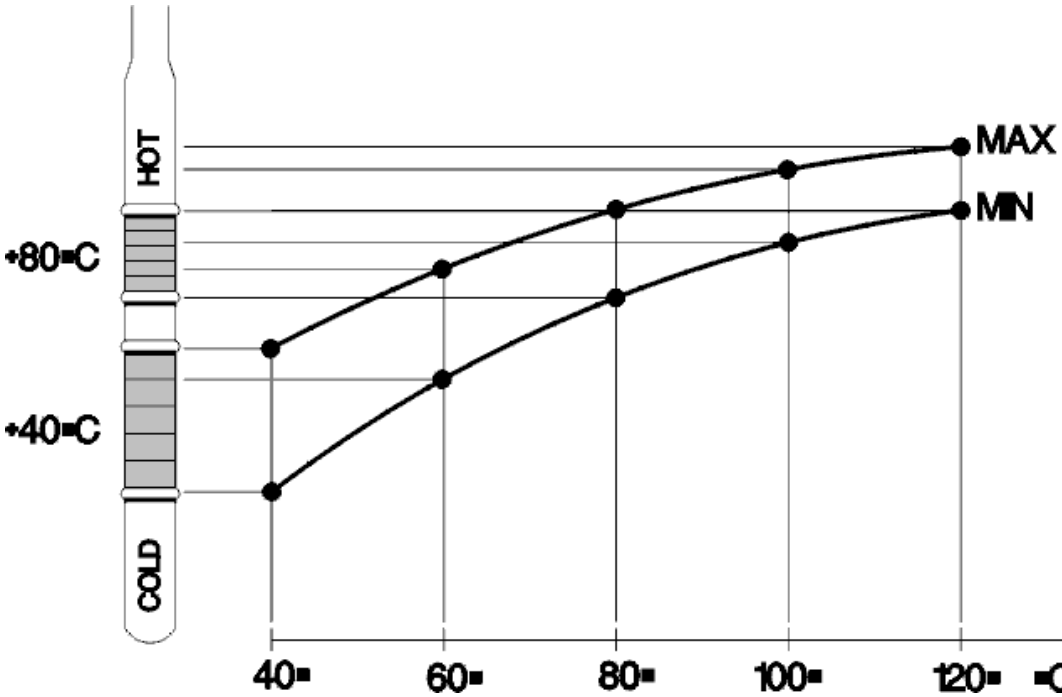


Fig. 15: Identifying Oil Level Graph
Courtesy of VOLVO CARS CORPORATION

The difference between MAX and MIN volume is 0.3 liters. Check the oil temperature in the transmission.

At room temperature (+20 °C) the oil level is near the MIN marking on the "cold area".

At room temperature (+20 °C) and **low oil level** the oil barely reaches the dipstick.

The "cold range" (+40 °C) is reached after approximately 15 minutes idling in the workshop, while the "hot range" (+80 °C) is reached after approximately 30 minutes highway driving at an air temperature above +15 °C.

NOTE: Carry out the check at an oil temperature of +80 °C. Go to car communication function group 4. Select the digital display parameter. Select the parameter for the transmission oil temperature.

PREPARING TO CHECK THE OIL LEVEL

Position the car on a hoist.

Apply the parking brake.

Apply the foot brake.

Let the engine idle.

Set the gear selector in position P. Move the gear selector through the various gear positions, stopping for approximately 3 seconds in each position.

Return the gear selector to position P. Wait 2 minutes before checking the oil level.

CHECKING OIL LEVEL

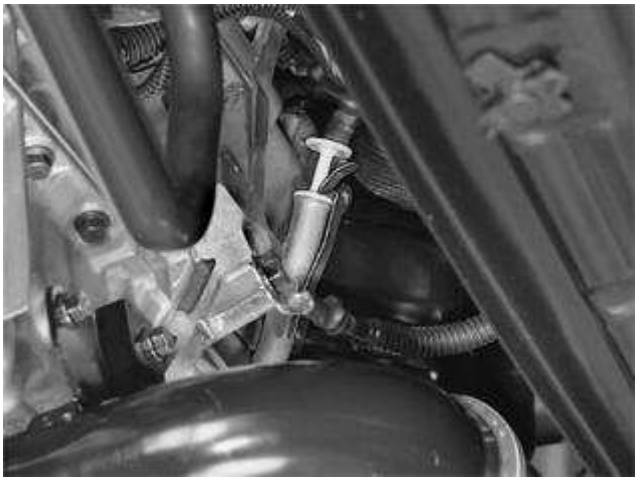


Fig. 16: Identifying Dipstick Position
Courtesy of VOLVO CARS CORPORATION

Allow the engine to idle with the gear selector in position P.

Raise the vehicle. Remove the splashguard from under the engine.

The dipstick must be pushed down completely in the dipstick tube.

CAUTION: Wipe off the dipstick with a nylon cloth or similar. Do not use a rag which may leave lint or threads.

LOW LEVEL (TOPPING UP)

Top up with oil through the dipstick pipe. Take the temperature into account when topping up with oil.

Check the oil level again.

HIGH LEVEL (OVERFILLING)

WARNING: The oil may be very hot if the vehicle has just been driven. Avoid skin contact with the transmission oil.

WARNING: The transmission must not be operated if the oil level is too high. This can cause increased operating temperatures and oil leakage.

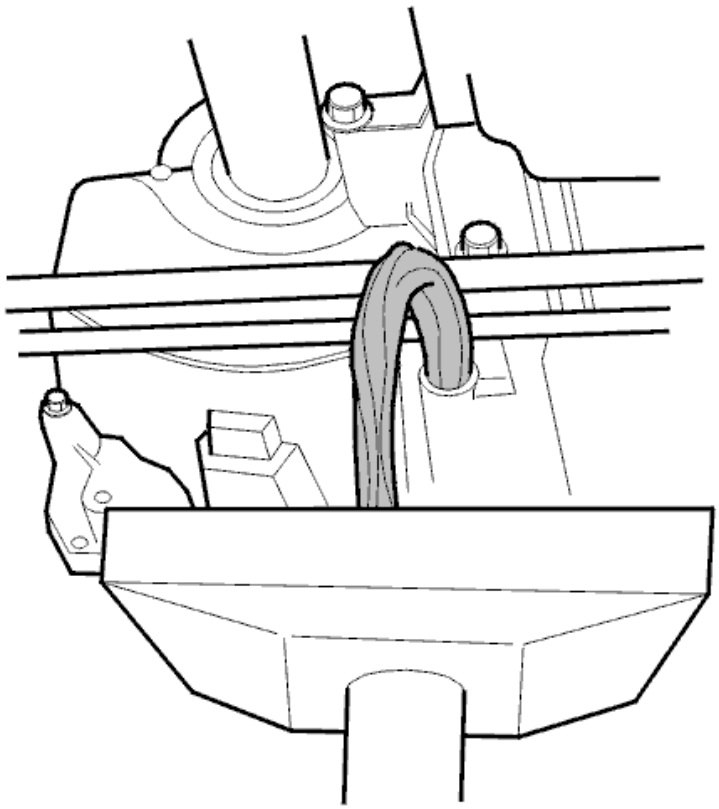


Fig. 17: Draining Off Oil
Courtesy of VOLVO CARS CORPORATION

NOTE: Strict cleanliness is important.

Drain off oil.

Undo the drain plug.

Allow some of the oil to drain out and reinstall the plug. Tighten. See: **TIGHTENING TORQUE** .

HINT: The oil can also be sucked out through the dipstick pipe using an oil suction syringe with a narrow gauge hose.

Check the oil level again.

FINISHING

INSTALLING THE SPLASH GUARD

After checking, install the splashguard under the engine.

TRANSMISSION

Power transmission

TRANSMISSION

VALVE HOUSING

Special tools	
	999 7426 Position setting **Tool number:** 999 7426 **Tool description:** Position setting **Tool boards:** 43

Materials	
Designation	**Part number**
Transmission oil	1161838

REMOVAL

NOTE: **Removal steps in this procedure may contain installation details.**

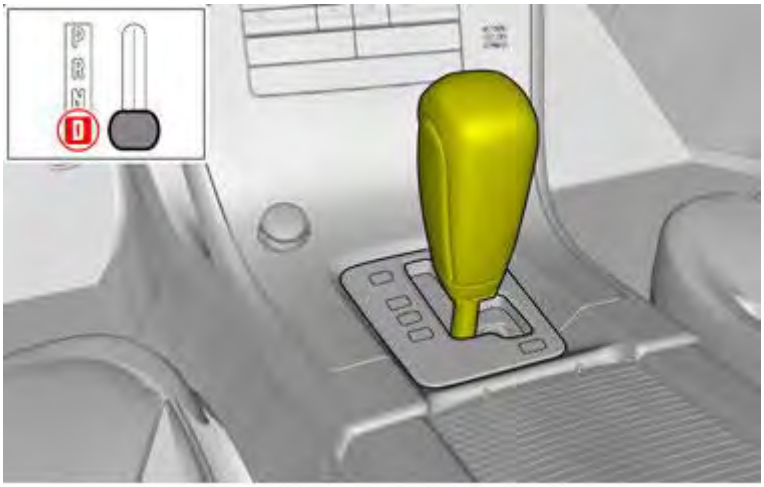


Fig. 1: Setting Gear Selector To Drive Position
Courtesy of VOLVO CARS CORPORATION

Perform battery disconnecting and connecting, see **BATTERY - DISCONNECTING AND CONNECTING**

Remove the engine cooling fan (FC). See **COOLING SYSTEM - REMOVAL, REPLACEMENT AND INSTALLATION** .

Drain the cooling system, see **COOLING SYSTEM - DRAINING, CHARGING AND BLEEDING**

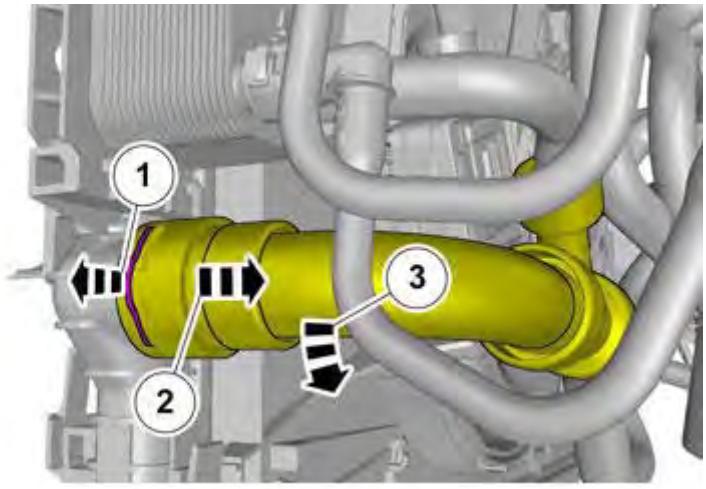


Fig. 2: Removing Lower Radiator Hose
Courtesy of VOLVO CARS CORPORATION

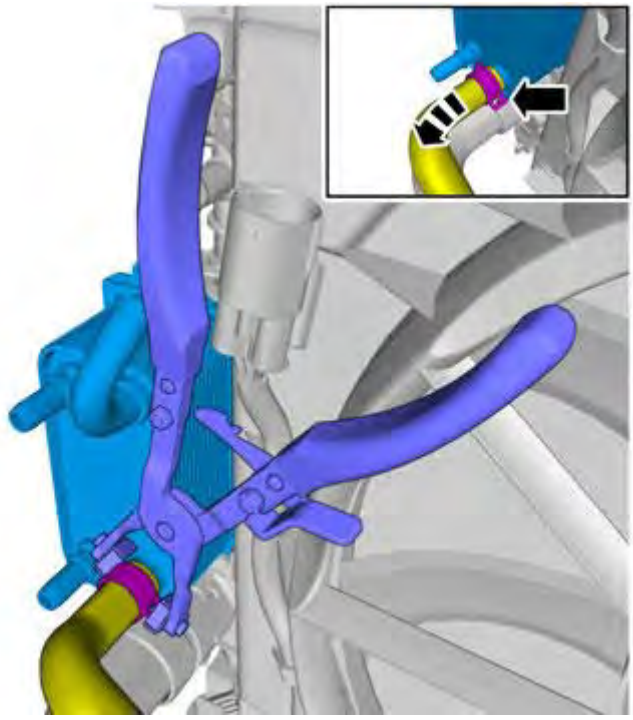


Fig. 3: Removing Cooler Line
Courtesy of VOLVO CARS CORPORATION

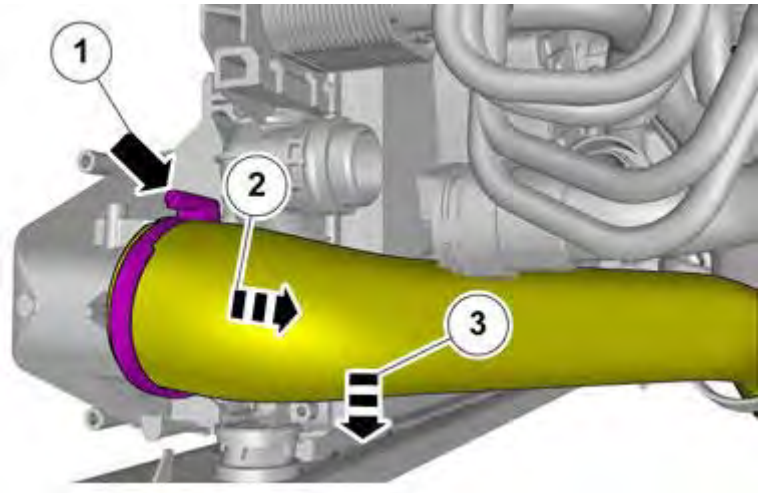


Fig. 4: Removing Upper Radiator Hose
Courtesy of VOLVO CARS CORPORATION

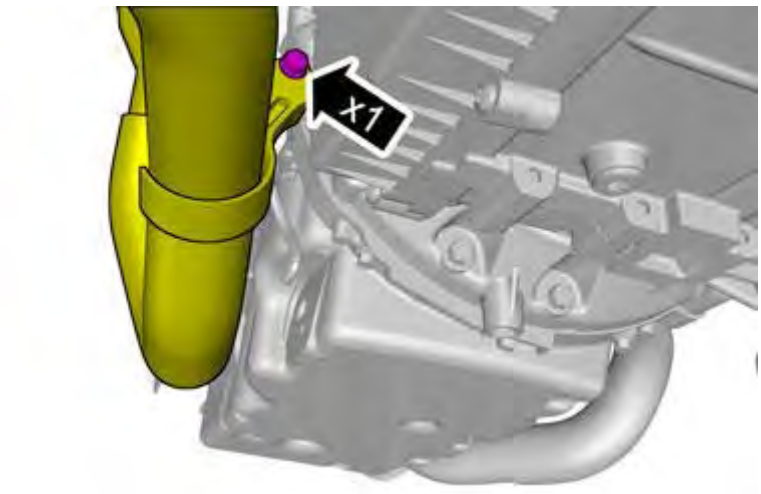


Fig. 5: Locating Hose Clamp Mounting Bolt
Courtesy of VOLVO CARS CORPORATION

Torque: M8

24 Nm

Remove cover control system, see **COVER CONTROL SYSTEM, REPLACING**

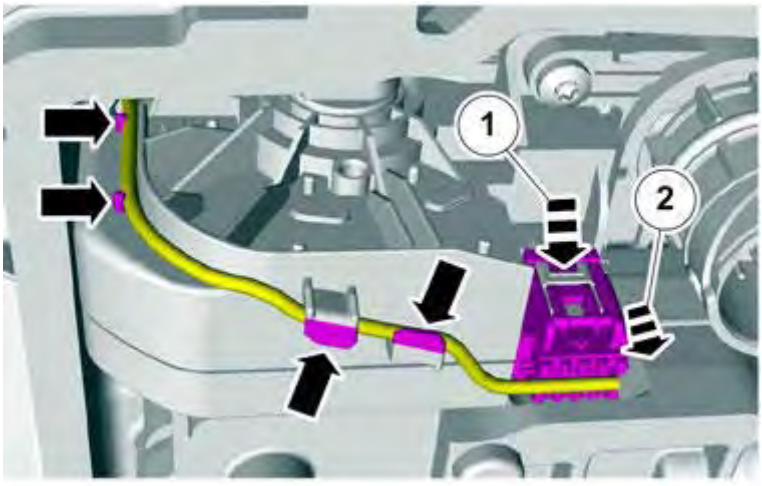


Fig. 6: Identifying Cable, Connector, And Clips
Courtesy of VOLVO CARS CORPORATION

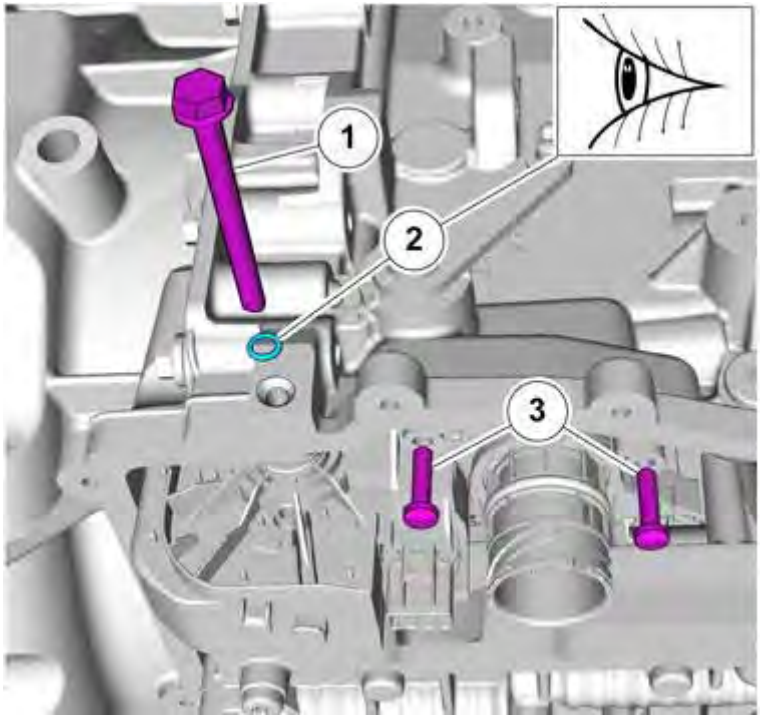


Fig. 7: Identifying Mounting Bolts
Courtesy of VOLVO CARS CORPORATION

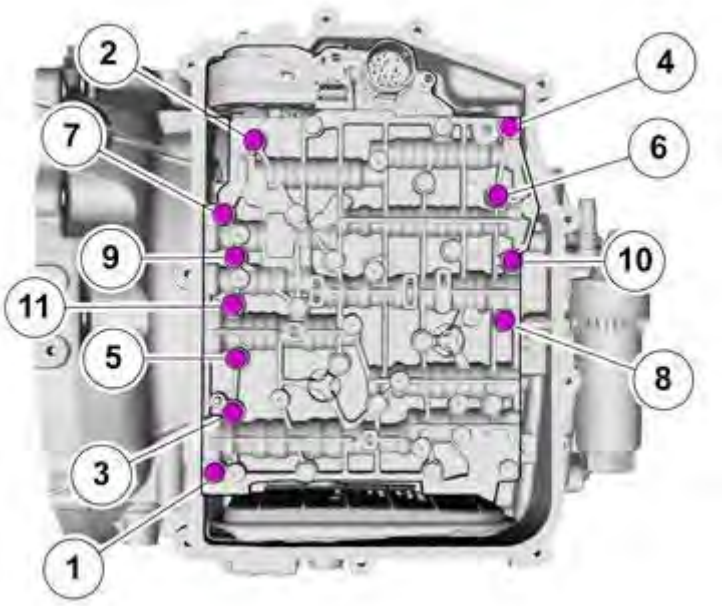


Fig. 8: Locating Bolts
Courtesy of VOLVO CARS CORPORATION

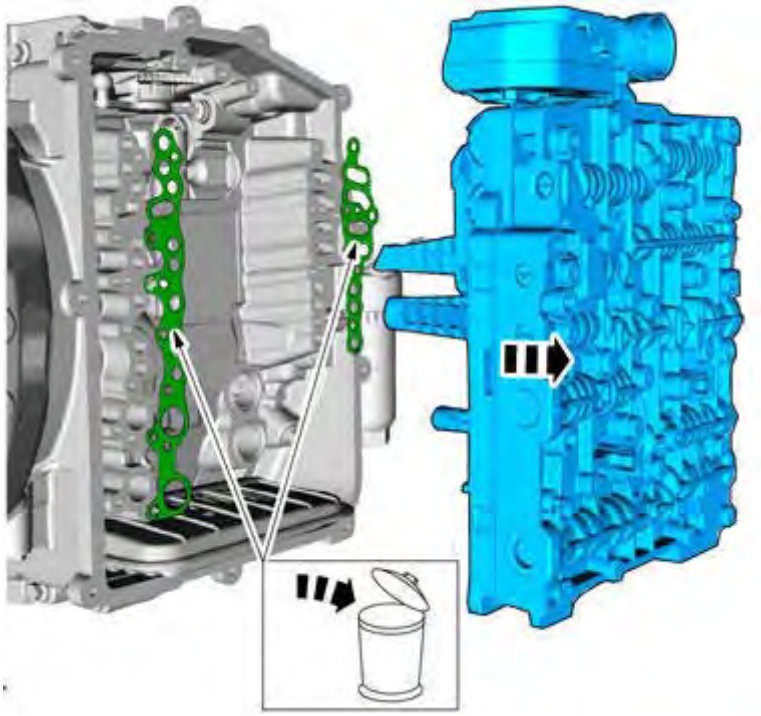


Fig. 9: Removing And Discarding Gaskets
Courtesy of VOLVO CARS CORPORATION

WARNING: Be prepared to collect escaping fluid.

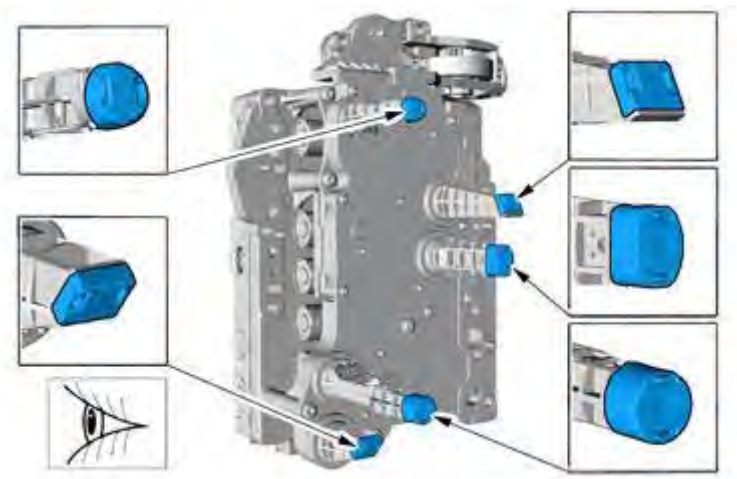


Fig. 10: Visual Check (1 Of 2)
Courtesy of VOLVO CARS CORPORATION

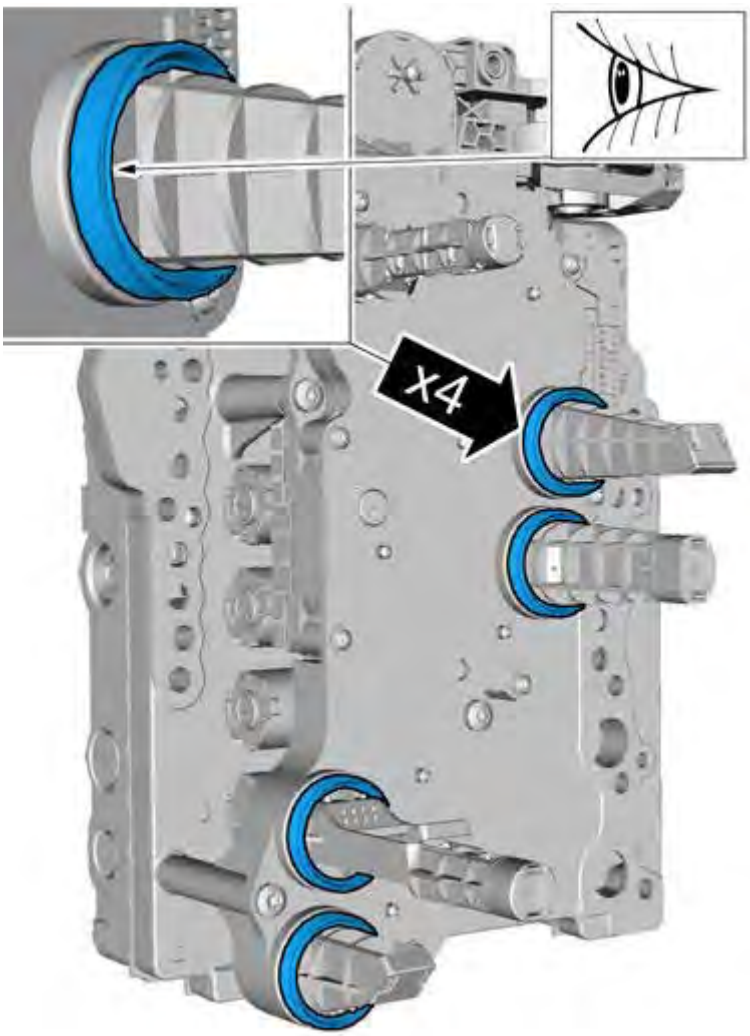


Fig. 11: Visual Check (2 Of 2)
Courtesy of VOLVO CARS CORPORATION

INSTALLATION

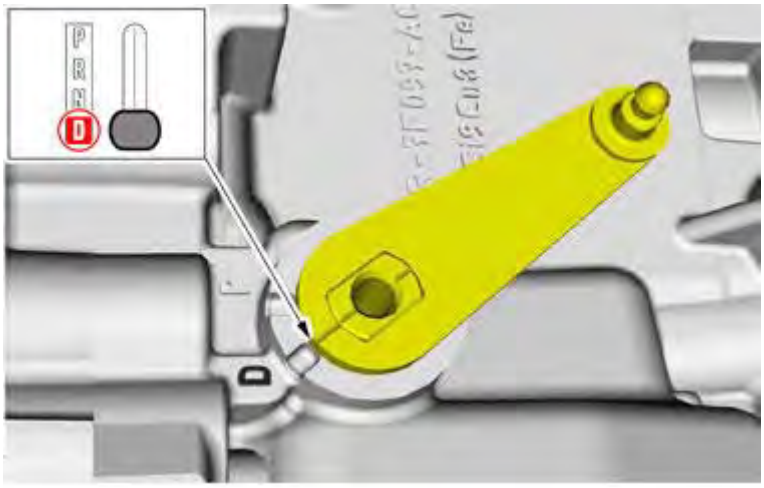


Fig. 12: Identifying Shift Lever Drive Position
Courtesy of VOLVO CARS CORPORATION

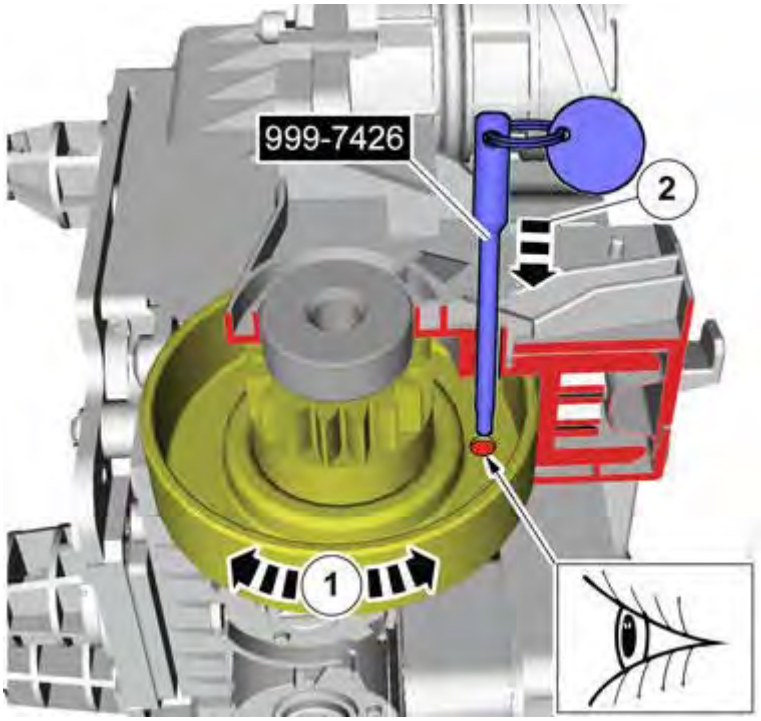


Fig. 13: Inspecting Pin
Courtesy of VOLVO CARS CORPORATION

see **9997426**

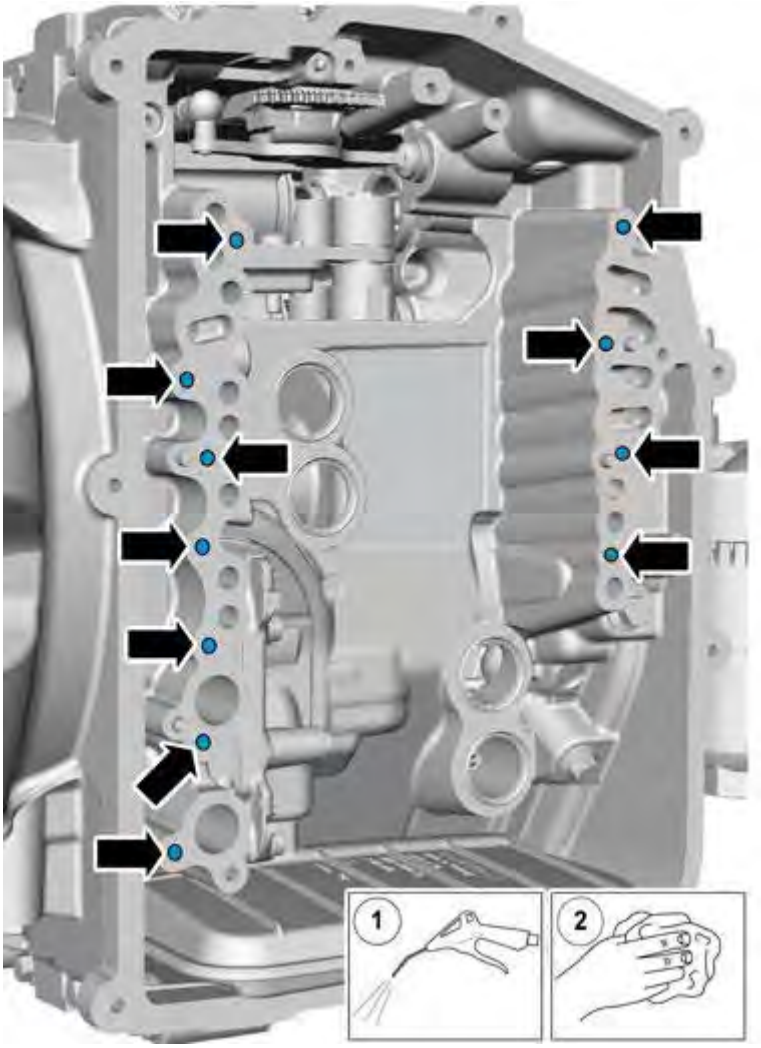


Fig. 14: Locating Bolt Holes
Courtesy of VOLVO CARS CORPORATION

CAUTION: Use lint free cloth.

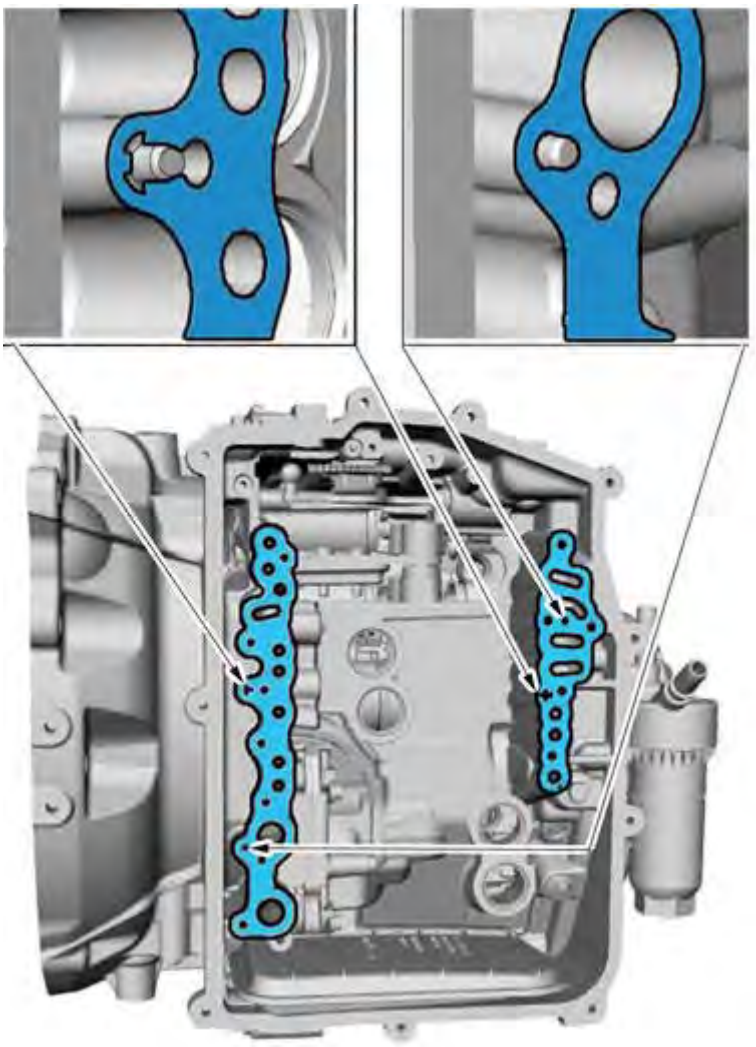


Fig. 15: Installing New Gaskets
Courtesy of VOLVO CARS CORPORATION

NOTE: **Use new seals.**

NOTE: **Make sure that the seal is correctly located.**

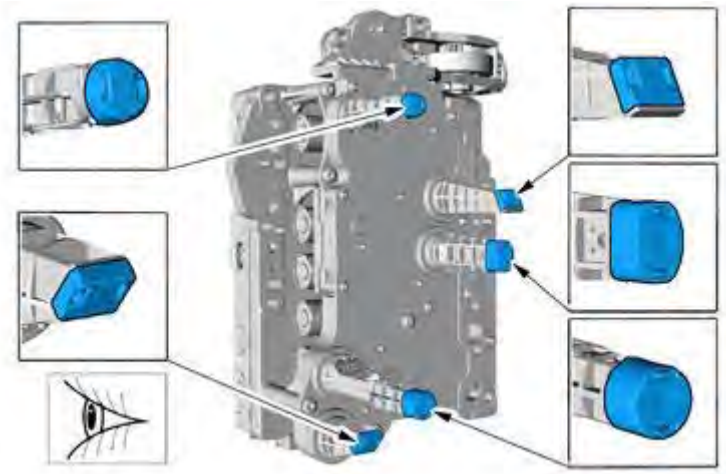


Fig. 16: Visual Check (1 Of 2)
Courtesy of VOLVO CARS CORPORATION

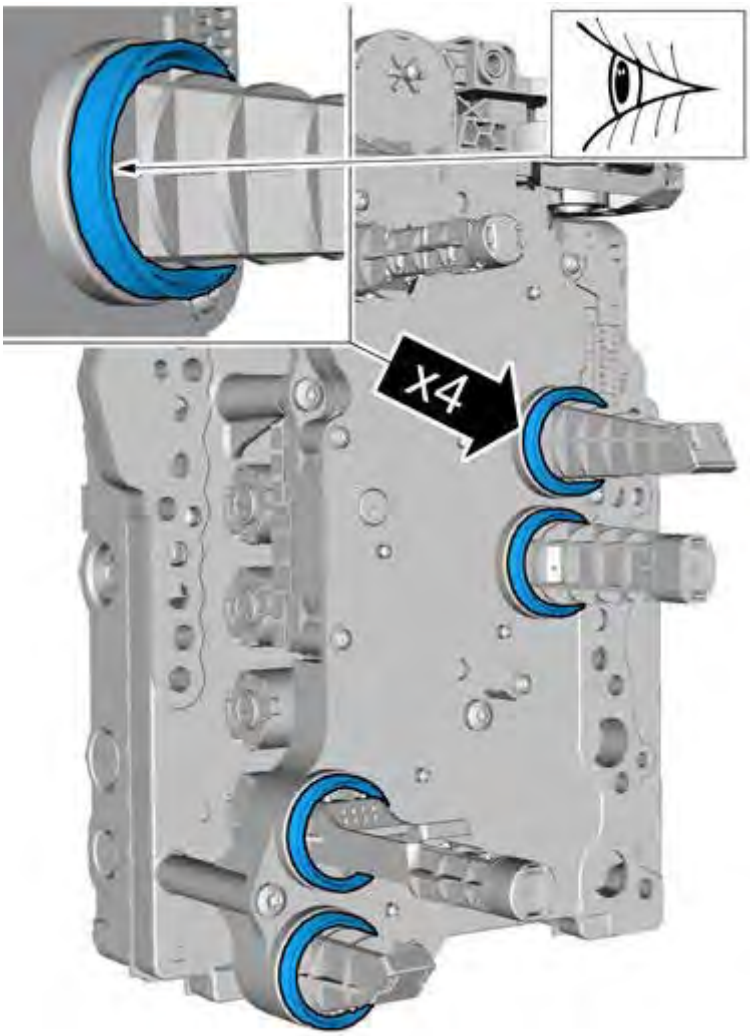


Fig. 17: Visual Check (2 Of 2)
Courtesy of VOLVO CARS CORPORATION

NOTE: Make sure that the seal is correctly located.

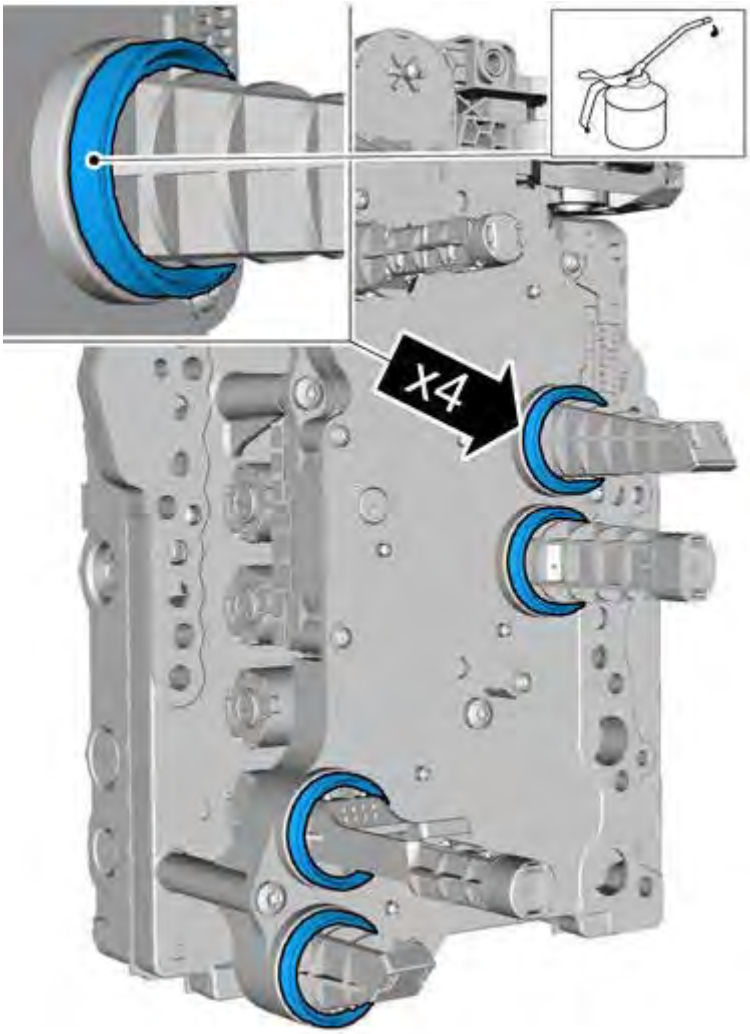


Fig. 18: Transmission Oil, 1161838
Courtesy of VOLVO CARS CORPORATION

CAUTION: Only use the specified material to lubricate the seals.

Use: Transmission oil, 1161838

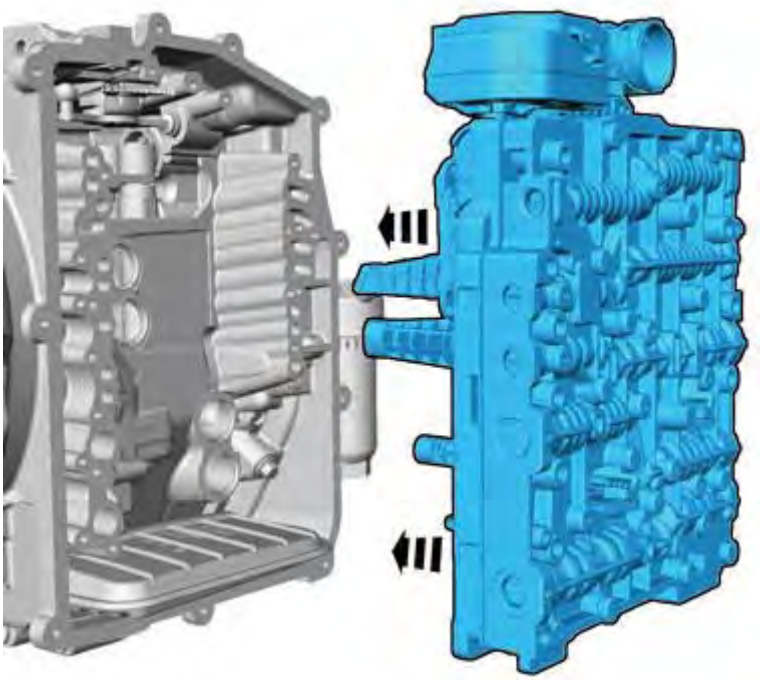


Fig. 19: Installing Valve Housing
Courtesy of VOLVO CARS CORPORATION

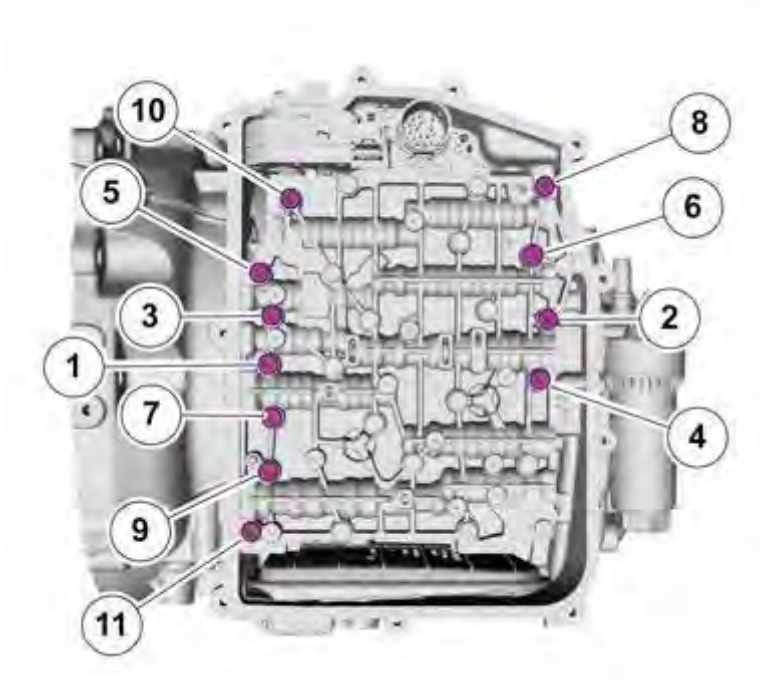


Fig. 20: Locating Bolts
Courtesy of VOLVO CARS CORPORATION

Torque: M6

10 Nm

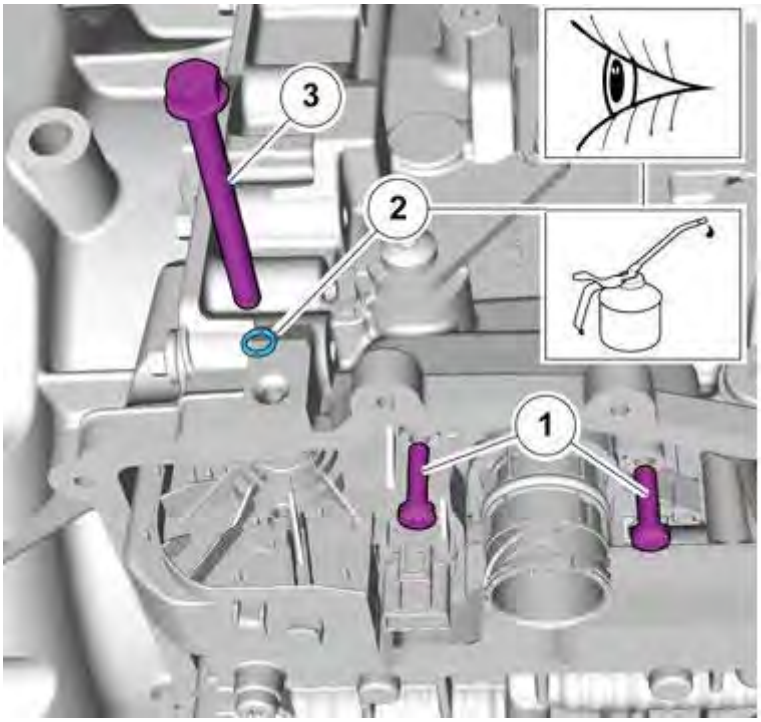


Fig. 21: Transmission Oil, 1161838
Courtesy of VOLVO CARS CORPORATION

1. **Torque:** M5

   5 Nm

2. **Use:** Transmission oil, 1161838
3. **Torque:** Screw gear position sensor

   7 Nm

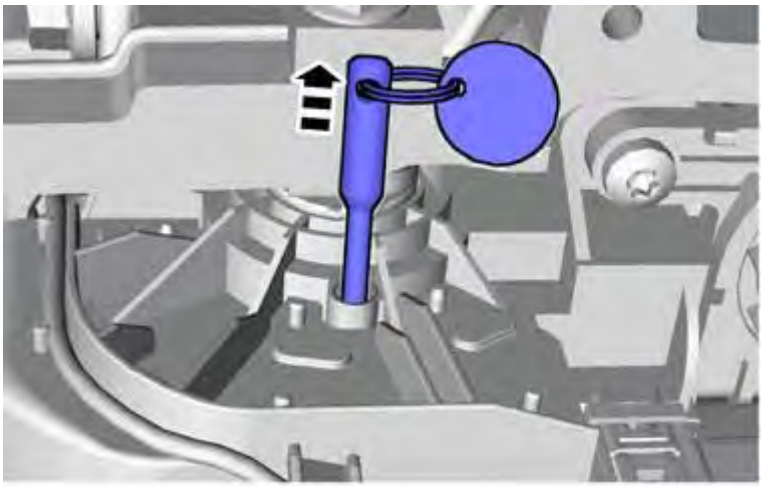


Fig. 22: Pulling Out Pin
Courtesy of VOLVO CARS CORPORATION

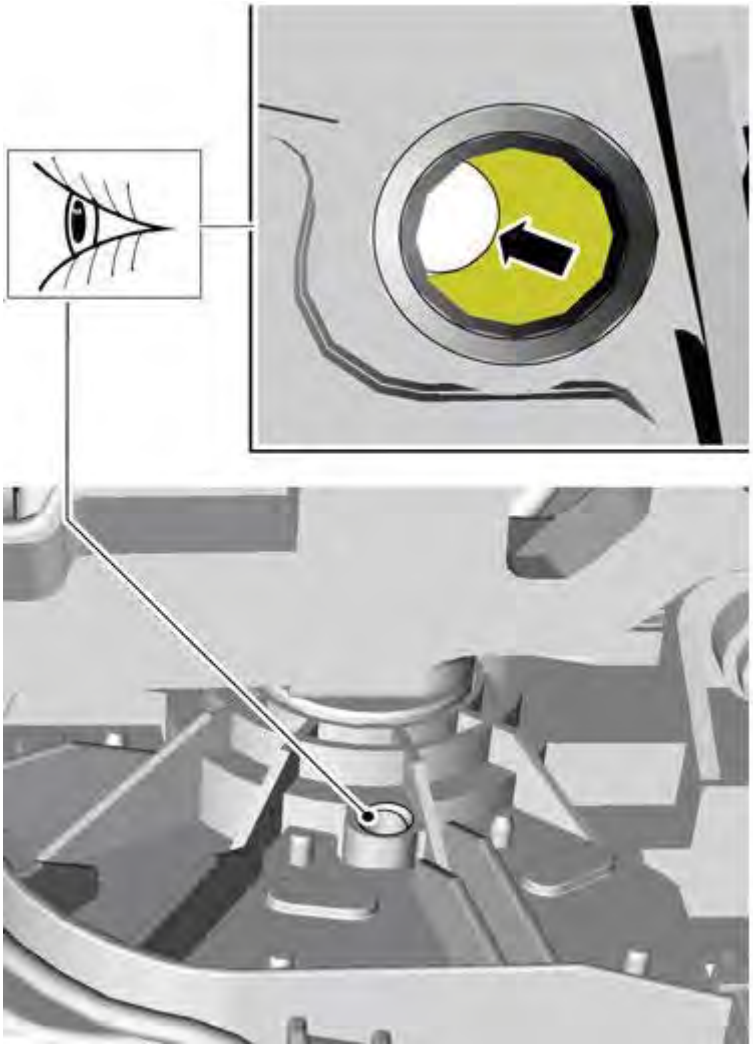


Fig. 23: Visual Inspection
Courtesy of VOLVO CARS CORPORATION

To install, reverse the removal procedure.

Fill the cooling system. See **COOLING SYSTEM - DRAINING, CHARGING AND BLEEDING**

Order and download software according to: 30788939

Adapt according to "Initial adaption" using VIDA (Volvo scan tool)