

On Board Diagnostic (OBD), general information

Function

The 096 automatic transmission is controlled electro-hydraulically. "On Board Diagnostic" capability refers specifically to the electrical and electronic controls.

The Transmission Control Module (TCM) -J217- receives input signals from components that effect gear selection, and sends output signals to solenoid valves that control gear selection in the valve body.

The TCM -J217- is equipped with Diagnostic Trouble Code (DTC) Memory so that, in the event of an electrical/electronic component malfunction or an open circuit, the cause of the malfunction can be determined quickly.

Malfunctions in the monitored sensors or components are stored in DTC Memory along with an indication of the type of malfunction

Malfunctions that occur only occasionally are defined as "sporadic" malfunctions and are coded as such.

The Transmission Control Module (TCM) -J217- analyzes the information and distinguishes different types of malfunctions. Those that do not

reoccur within 5 to 20 km (3 to 12 miles) or 6 to 24 minutes are stored as sporadic malfunctions.

Electrical malfunctions that affect vehicle performance can be identified using the VAG 1551 Scan Tool (ST). The On Board Diagnostic (OBD) capabilities can only be fully exploited using operating mode 1 ("Rapid data transfer").

Functions of the VAG 1551 Scan Tool (ST) ⇒ [List of selectable functions, page 01-28](#) .

You can check the DTC memory and display the Diagnostic Trouble Codes (DTCs) after initiating the On Board Diagnostic (OBD) program using the VAG 1551 Scan Tool (ST) ⇒ [page 01-29](#) .

Diagnostic Trouble Code (DTC) table ⇒ [page 01-31](#)

Safety functions of the Transmission Control Module (TCM)

If critical malfunctions occur while driving, the transmission will continue to operate in an emergency running mode. If a malfunction occurs while the selector lever is in position "D," "3" or "2," the 3rd gear emergency running mode is activated.

If a malfunction occurs while the selector lever is in position "1," "P," "N" or "R" the emergency running mode for that stage is activated.

If the engine is started again in the emergency

running mode and the malfunction occurs when the selector lever is in position "D", "3" or "2" then 3rd gear is activated hydraulically, until the malfunction is repaired.

If there are malfunctions that result in emergency running, the transmission remains in the emergency running mode until the ignition is switched off.

If there are malfunctions that result in emergency running, the transmission remains in the emergency running mode until the ignition is switched OFF.

Malfunctions that may activate emergency running mode:

Open circuit in wiring, short-circuit, malfunctions in electrical or hydraulic components.

Transmission Control Module (TCM) recognition of malfunctions

If a malfunction exists for a certain time, it is stored as a static malfunction. A malfunction that is recognized but does not occur again within a certain time or distance is stored as a "sporadic malfunction."

Malfunctions that are stored in DTC Memory as sporadic malfunctions will be displayed as such when retrieved by the VAG 1551 Scan Tool (ST). In such cases, the letters "SP" appear on the right side of the Scan Tool display. If the printer is switched on, "sporadic DTC" is printed out after the malfunction is addressed.

Malfunctions that are stored in DTC Memory as sporadic malfunctions are automatically erased after 1,000 km (600 miles) or 20 hours.

Technical data

Memory	
◆ Permanent memory	yes
◆ Volatile memory	no
Data output	
◆ Rapid data transfer	yes
◆ Blink-code output	no
Output Diagnostic Test Mode (DTM)	no
Basic setting	yes
Transmission Control Module (TCM) coding	no
Reading measured value block ((VAG 1551 function 08)	yes
Component locations	⇒ page 01-7

On Board Diagnostic (OBD) program - Guide

Troubleshooting Automatic Transmission with VAG 1551 Scan Tool (ST)

Connect VAG 1551 Scan Tool (ST) and select

1- Rapid data transfer

↓ ← ← ← ← Enter address word 02 Transmission electronics

↓
↓
Check control module identification → → → ↓

↓
↓
↓
Check DTC Memory (function 02) →

No DTC recognized

↓
↓
↓
Identification NOT OK

↓
Correct malfunction according to DTC table

↓
End

↓
↓
↓
Replace control module

↓
Read measured value block - 08 → → ↓

↓
Replace component

↓
Transmission: Perform electrical tests



A



B



Results as specified



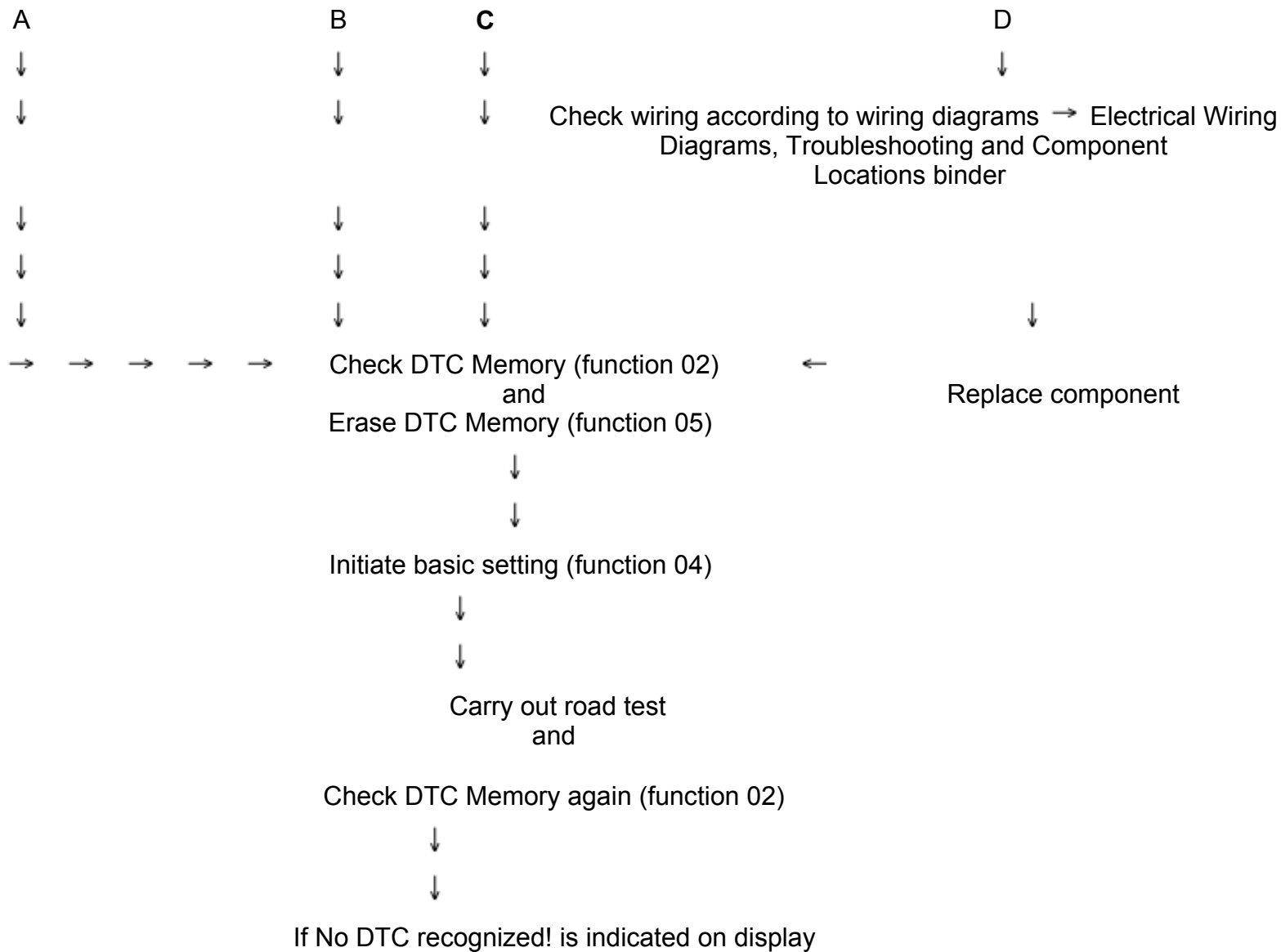
C



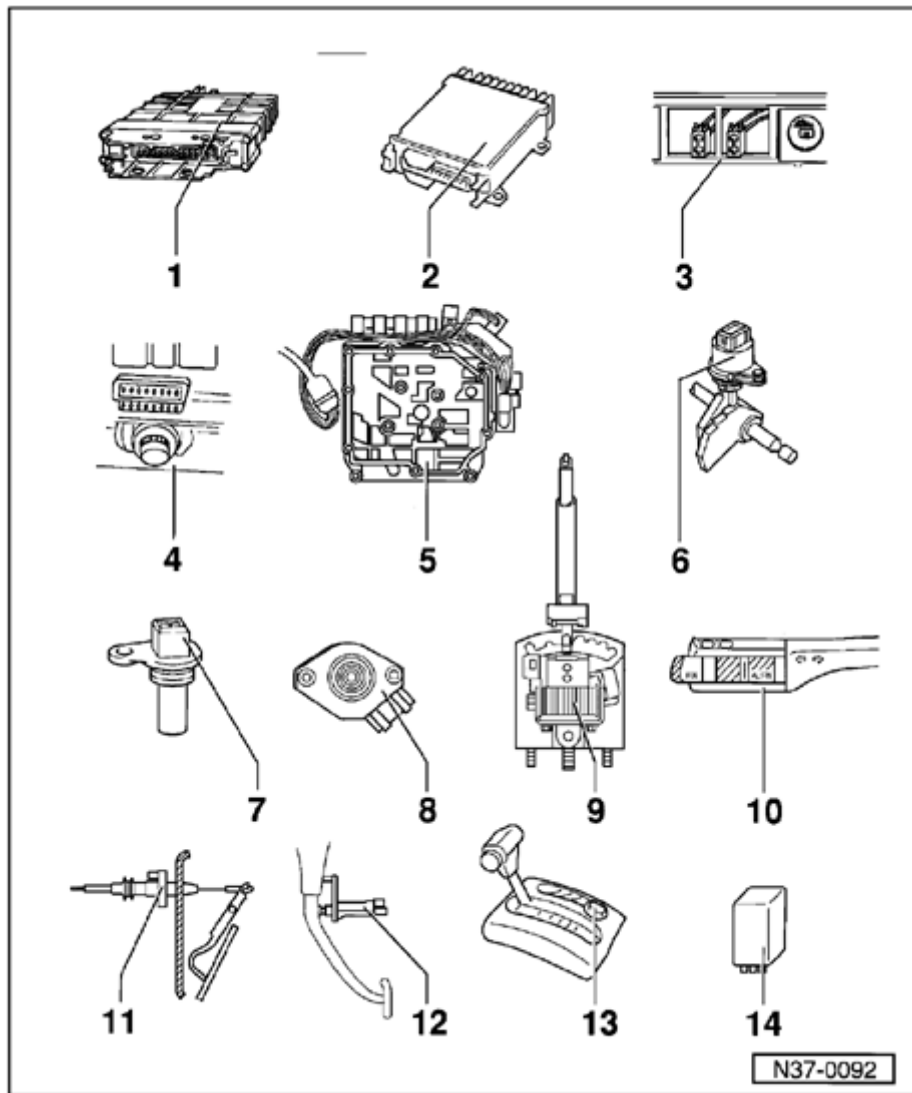
Results not as specified



D



the On Board Diagnostic program has been completed



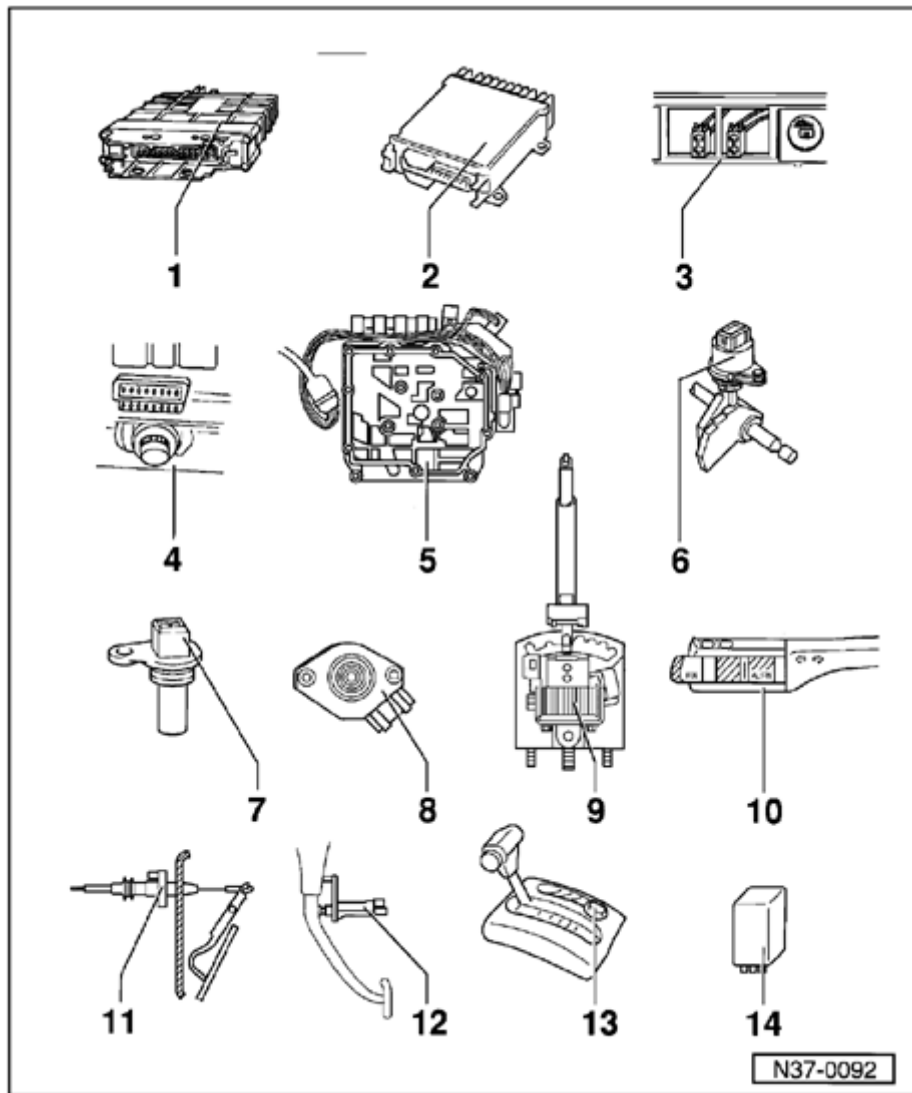
Electronic component locations

Note:

If the Engine Control Module (ECM) or Transmission Control Module (TCM) -J217- is replaced, the system must be brought to basic setting ⇒ [Basic setting, initiating, page 01-43](#) .

1 - Transmission Control Module (TCM) - J217-

- ◆ Location and removing and installing up to 12.92 ⇒ [Fig. 17](#)
- ◆ Location and removing and installing from 1.93 ⇒ [Fig. 16](#)
- ◆ Removing (with 68-pin connector) ⇒ [Fig. 18](#)
- ◆ Installing (with 68-pin connector) ⇒ [Fig. 19](#)
- ◆ Checked by On Board Diagnostic (OBD) program ⇒ [VAG 1551 Scan Tool \(ST\), connecting and selecting functions, page 01-23](#)



2 - Engine Control Module (ECM)

- ◆ Location ⇒ [Fig. 20](#)
- ◆ Removing and installing:

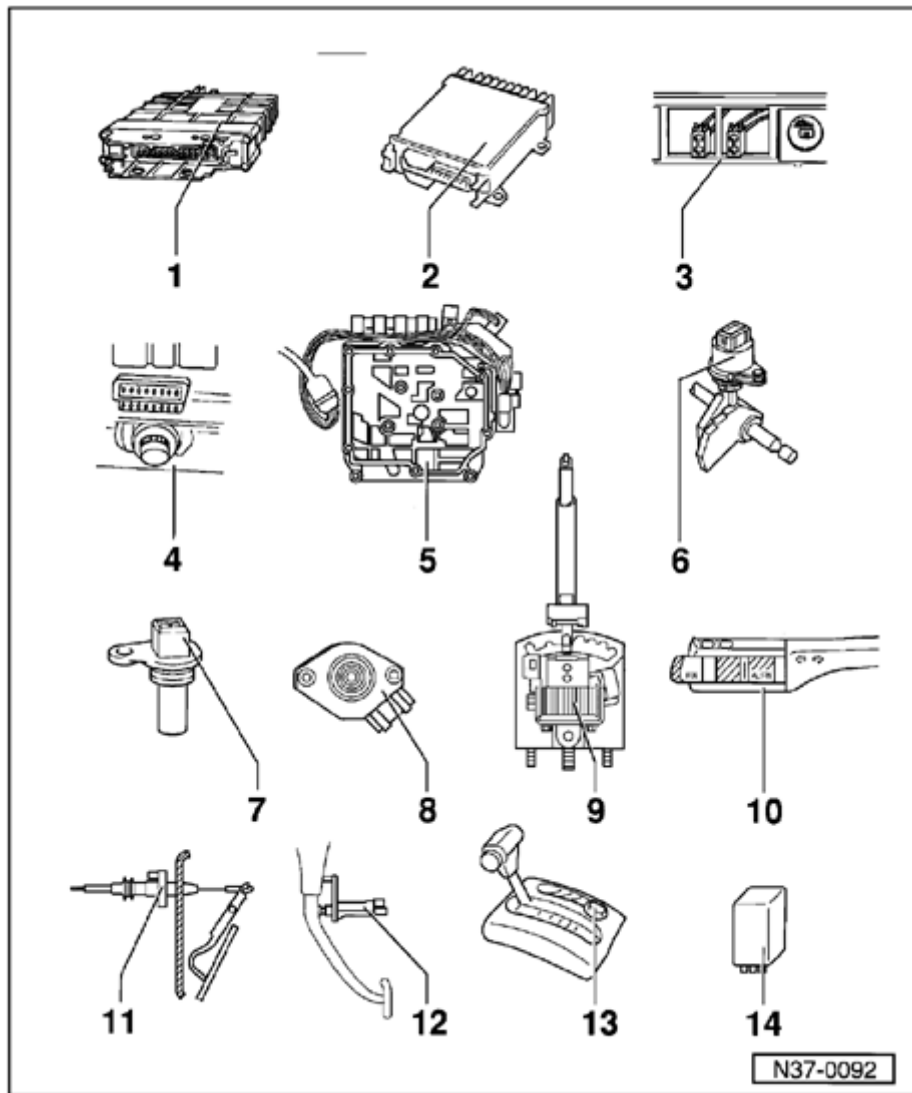
⇒ *Repair Manual, Fuel Injection & Ignition, Repair Group 24*

3 - Data Link Connector (DLC)

- ◆ Vehicles ➤ 07.93 (1993 m.y.)
- ◆ Location: Below heating/ventilation controls, next to Rear Window Defogger Switch (E15) ⇒ [VAG 1551 Scan Tool \(ST\), connecting and selecting functions, page 01-23](#)

4 - Data Link Connector (DLC)

- ◆ Vehicles from 08.93 (1994 m.y.)
- ◆ Location: Behind cover next to ashtray, right side ⇒ [VAG 1551 Scan Tool \(ST\), connecting and selecting functions, page 01-23](#)



5 - Valve body

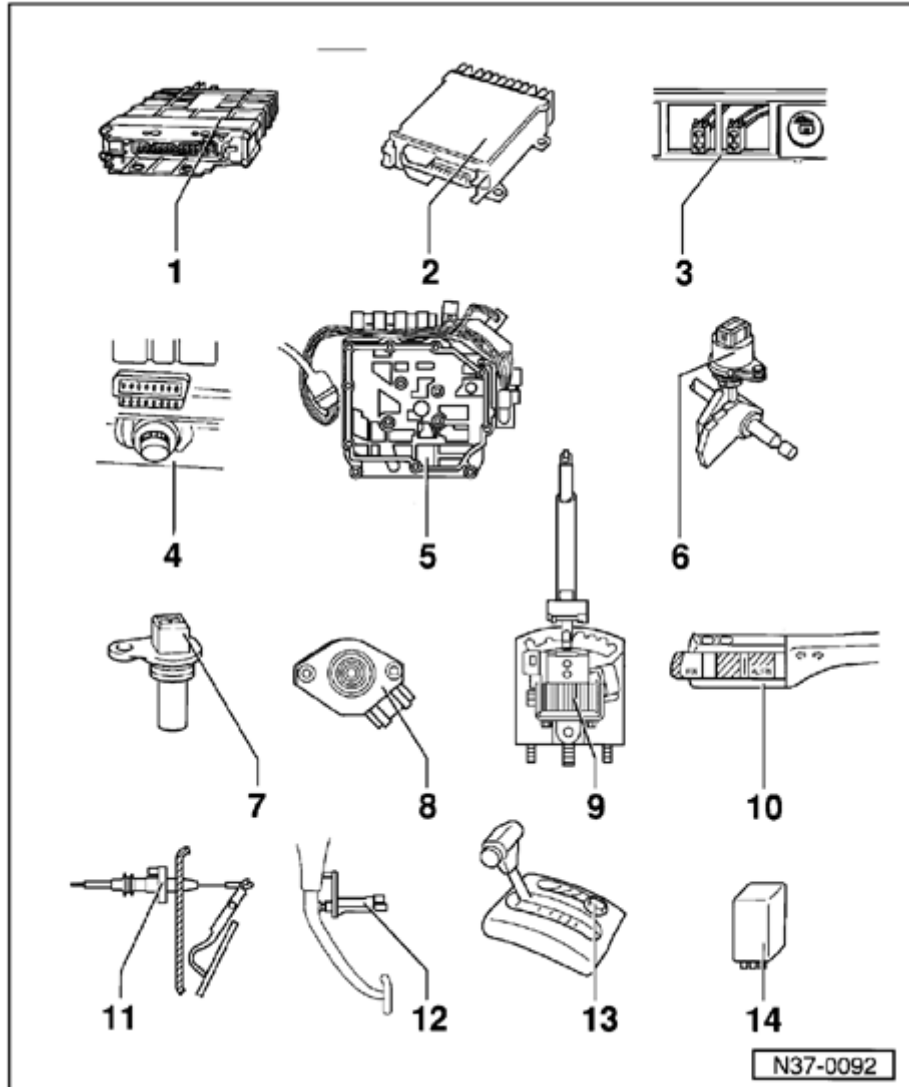
- ◆ Location ⇒ [Fig. 21](#)
- ◆ Removing/installing ⇒ [page 38-36](#)
- ◆ The Solenoid Valves -N88-, -N89-, -N90-, -N91-, -N92-, -N93-, -N94- and the Transmission Fluid Temperature Sensor -G93- are attached to the valve body
- ◆ Components checked by On Board Diagnostic (OBD) program

6 - Multi-Function Transmission Range (TR) Switch -F125-

- ◆ Location, removing and installing ⇒ [Fig. 22](#)
- ◆ Checked by On Board Diagnostic (OBD) program

7 - Vehicle Speed Sensor (VSS) -G68-

- ◆ Location, removing and installing ⇒ [Fig. 23](#)
- ◆ Checked by On Board Diagnostic (OBD) program

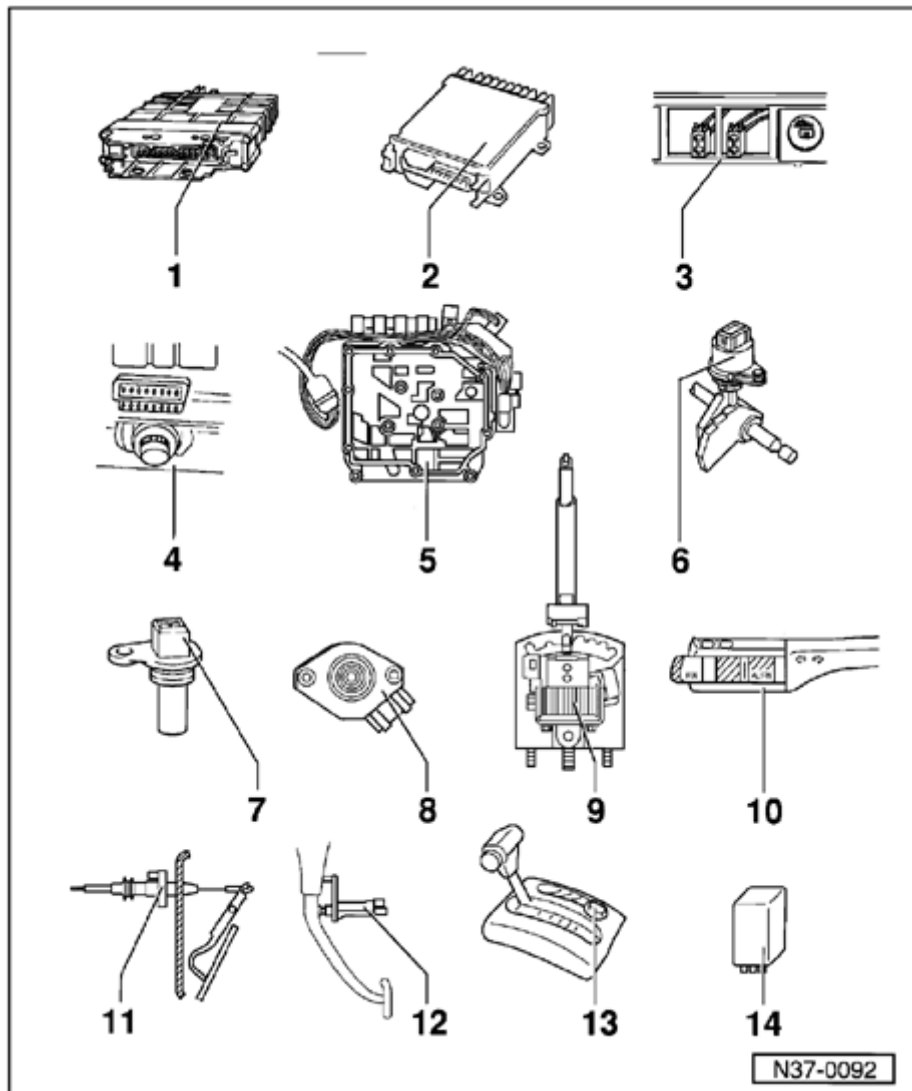


8 - Throttle Position (TP) Sensor -G69-

- ◆ Location ⇒ [Fig. 24](#)
- ◆ Removing and installing:

⇒ *Repair Manual, Fuel Injection & Ignition, Repair Group 24*

- ◆ Various types according to engine version
- ◆ Signal checked by On Board Diagnostic (OBD) program
- ◆ Vehicles from 01.93 with 2.8 liter 6-cylinder engine: Throttle Position (TP) Sensor signal is directed to Transmission Control Module (TCM) via Engine Control Module (ECM); Signal can only be checked by reading measured value block ⇒ [page 01-45](#) ; If a malfunction is indicated then also carry out On Board Diagnostic (OBD) checks of Engine Control Module (ECM)
- ◆ After repairs initiate basic settings ⇒ [Basic setting, initiating, page 01-43](#)



9 - Shiftlock Solenoid -N110-

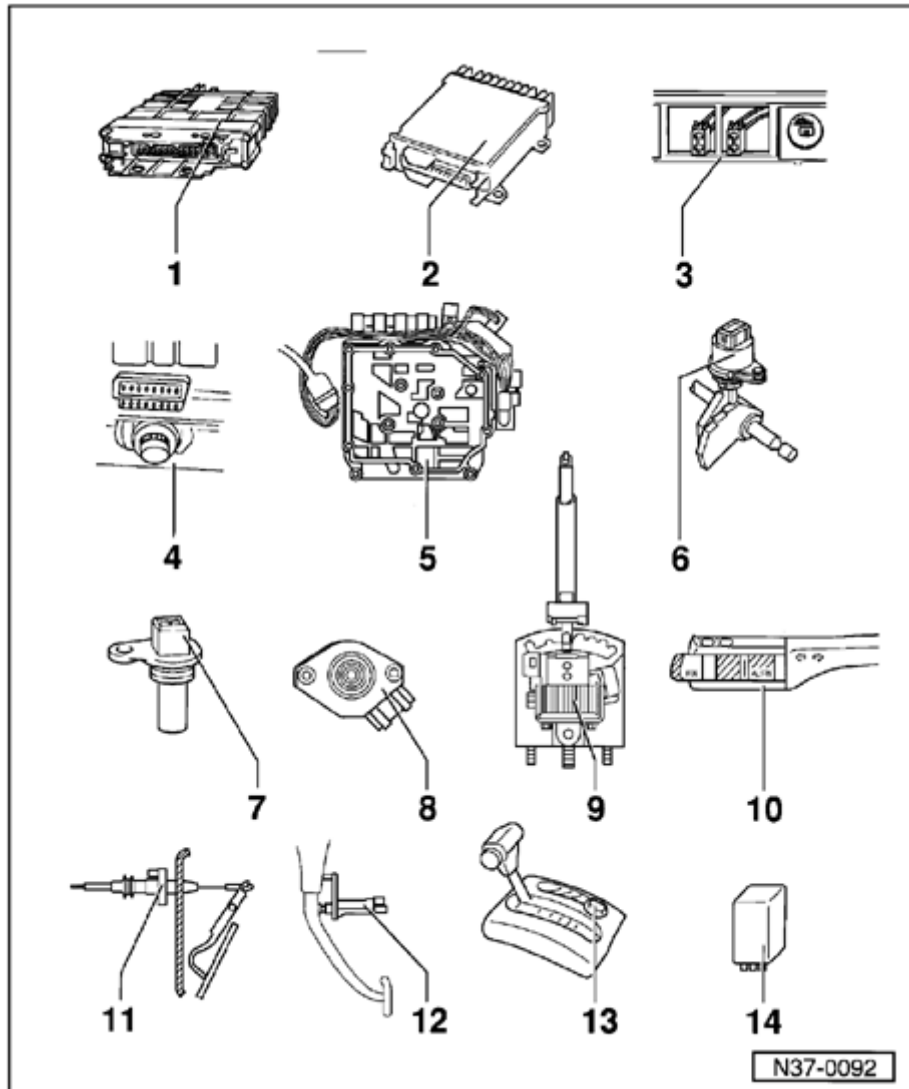
- ◆ Location ⇒ [Fig. 25](#)
- ◆ Removing and installing ⇒ [page 37-1](#)
- ◆ Can be checked electrically ⇒ [page 01-67](#)
and via reading measured value block ⇒ [page 01-45](#)

10 - Cruise Control Switch -E45-

- ◆ Location ⇒ [Fig. 26](#)
- ◆ Removing/installing:

⇒ [Repair Manual, Electrical Equipment, Repair Group 94](#)

- ◆ Can be checked by reading measured value block ⇒ [page 01-45](#)



11 - Kick Down Switch -F8-

- ◆ Location ⇒ [Fig. 27](#)
- ◆ Removing and installing: remove and install Accelerator Pedal cable, then adjust afterward
- ◆ Accelerator Pedal cable, adjusting:

⇒ *Repair Manual, General, Engine, Repair Group 20*

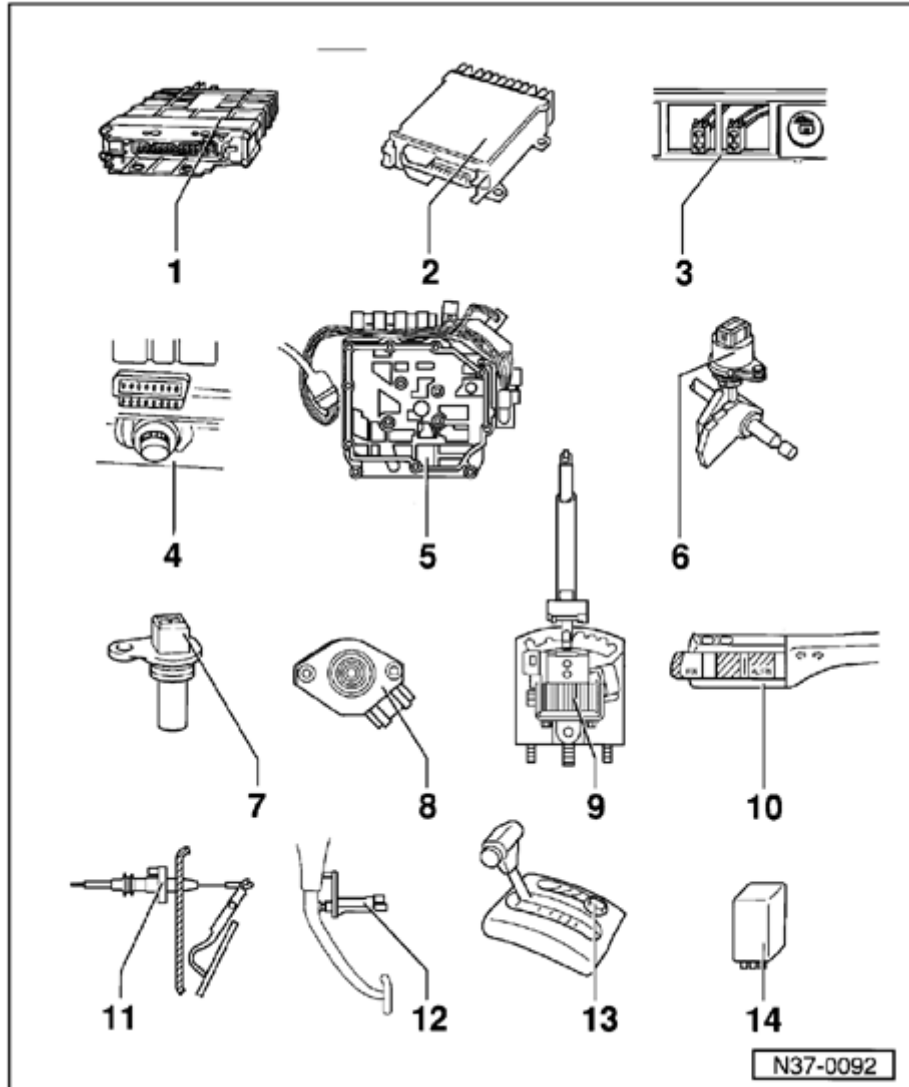
- ◆ Can be checked electrically ⇒ [page 01-67](#) and via reading measured value block ⇒ [page 01-45](#)

12 - Brake Light Switch -F-

- ◆ Location: on pedal cluster ⇒ [Fig. 28](#)
- ◆ Removing/installing

⇒ *Repair Manual, Suspension, Wheels, Brakes, Steering, Repair Group 47*

- ◆ Can be checked electrically ⇒ [page 01-67](#) and via reading measured value block ⇒ [page 01-45](#)

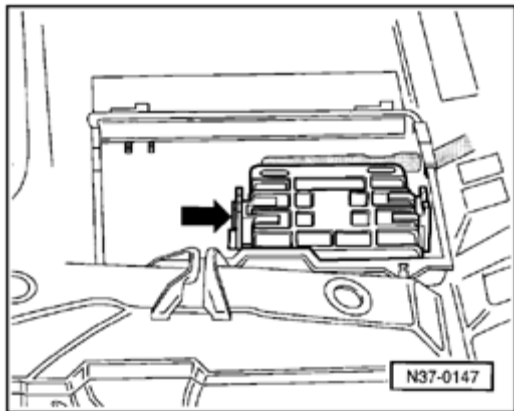


13 - Transmission Range (TR) Program Switch -E122-

- ◆ Location removing and installing ⇒ [Fig. 29](#)
- ◆ May be either push-button or rotary switch (not interchangeable)
- ◆ Can be checked electrically ⇒ [page 01-67](#) and via reading measured value block ⇒ [page 01-45](#)
- ◆ Not used on vehicles with electronic program switch in Transmission Control Module (TCM) ⇒ [page 00-5](#)

14 - Park/Neutral Position (PNP) Relay -J226-

- ◆ Location ⇒ [Fig. 30](#)



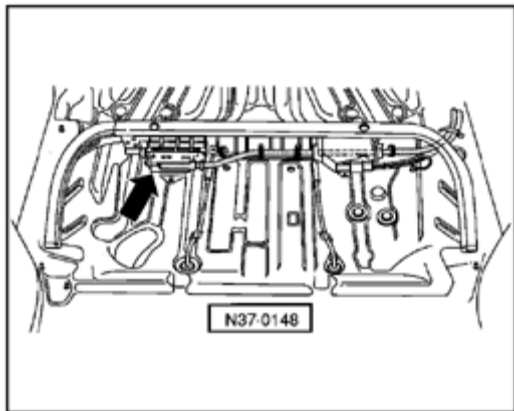
A

Fig. 16 Transmission Control Module (TCM) -J217- up to 12.92

Location: Up to 12.92 the Transmission Control Module (TCM) is located in front of the right-side passenger seat under cover in footwell (shown with seat removed in accompanying illustration).

Removing and installing TCM

- Loosen carpet and fold up with cover.
- Release multi-pin connector lock by pressing off clip, then disconnect multi-pin connector.
- Remove TCM.
- Install in reverse order of removal.



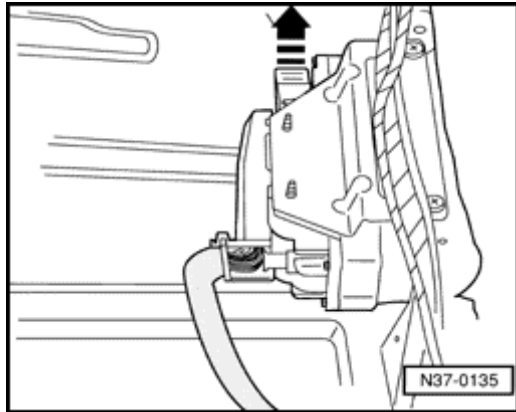
A

Fig. 17 Transmission Control Module (TCM) -J217- from 01.93

Location: From 01.93 the Transmission Control Module (TCM) is located under the rear seat.

Transmission Control Module -J217- (TCM) with 38-pin connector, removing and installing

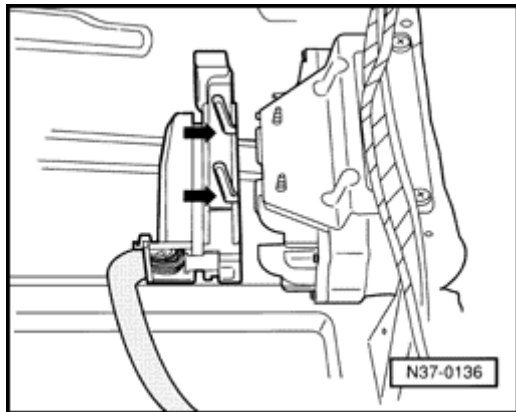
- Fold up rear seat.
- Release multi-pin connector lock by pressing off clip, then disconnect multi-pin connector.
- Remove TCM.
- Install in reverse order of removal.



A

Fig. 18 Transmission Control Module -J217- (TCM) with 68-pin connector, removing

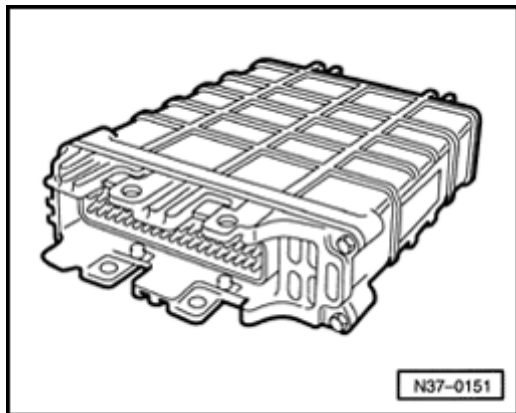
- Release multi-pin connector lock, then disconnect multi-pin connector.
- Remove TCM.



A

Fig. 19 Transmission Control Module -J217- (TCM) with 68-pin connector, installing

- Place multi-pin connector in position on control module locating pins (-arrows-), then lock multi-pin connector.



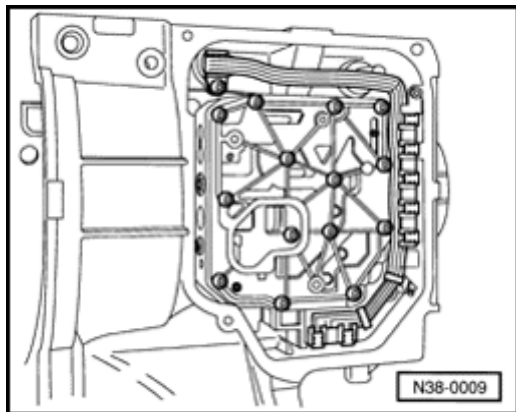
A

Fig. 20 Engine Control Module (ECM)

Location: The Engine Control Module (ECM) is located in the heating/ventilation intake plenum chamber, right side.

Removing and installing ECM

⇒ *Repair Manual, Fuel Injection & Ignition, Repair Group 24*



A

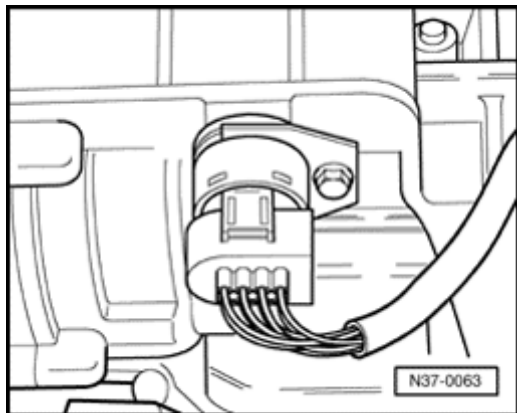
Fig. 21 Valve body

Location: The valve body is located inside the transmission, mounted above the ATF oil pan.

Solenoid Valves -N88-, -N89-, -N90-, -N91-, -N92-, -N93-, -N94- and Transmission Fluid Temperature Sensor -G93- are attached to the valve body.

Removing and installing valve body

⇒ [page 38-36](#)



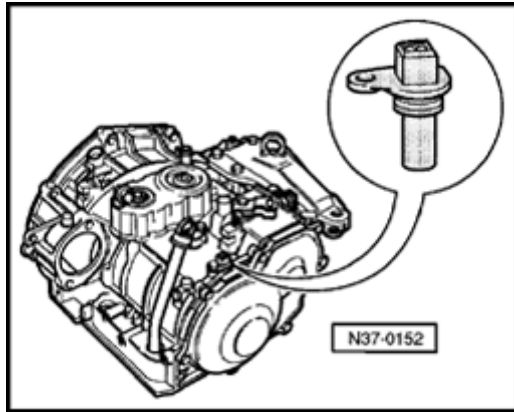
A

Fig. 22 Multi-function Transmission Range (TR) Switch -

Location: The Multi-function Transmission Range (TR) Switch is located on rear of the transmission.

Removing and installing Multi-function TR Switch

- Disconnect harness connector from Multi-function Transmission Range (TR) Switch.
- Remove bolt and retainer, then remove switch.
- Replace seal.
- Install in reverse order of removal.
 - ◆ Retainer bolt tightening torque: 10 Nm (7 ft lb)



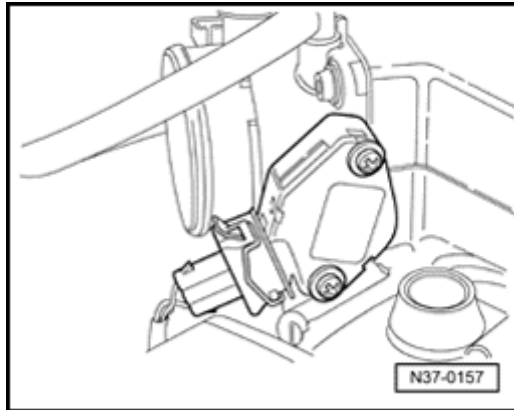
A

Fig. 23 Vehicle Speed Sensor (VSS) -G68-

Location: The Vehicle Speed Sensor (VSS) is located on top of the transmission.

Removing and installing Vehicle Speed Sensor

- Disconnect harness connector from sensor.
- Remove retaining bolt and pull out sensor.
- Install in reverse order of removal.
 - ◆ Retainer bolt tightening torque: 10 Nm (7 ft lb)



A

Fig. 24 Throttle Position (TP) Sensor -G69-

Location: The Throttle Position (TP) Sensor is located on the throttle valve housing (engine). Component design varies depending on engine.

Removing and installing Throttle Position (TP) Sensor

Removal and installation are described in the appropriate fuel injection and ignition booklet. Check engine code.

⇒ *Repair Manual, Fuel Injection & Ignition, Repair Group 24*

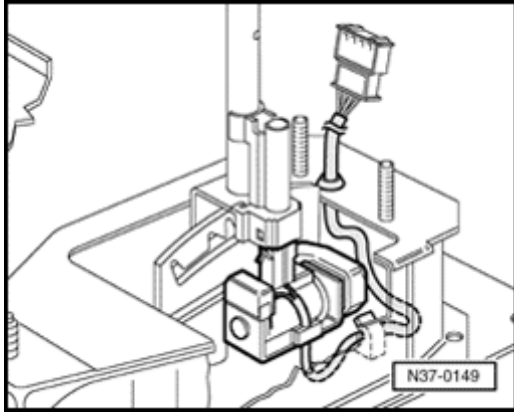


Fig. 25 Shiftlock Solenoid -N110-

Location: The Shiftlock Solenoid is located on the gear selector lever.

Removing and installing Shiftlock Solenoid

⇒ [page 37-1](#)

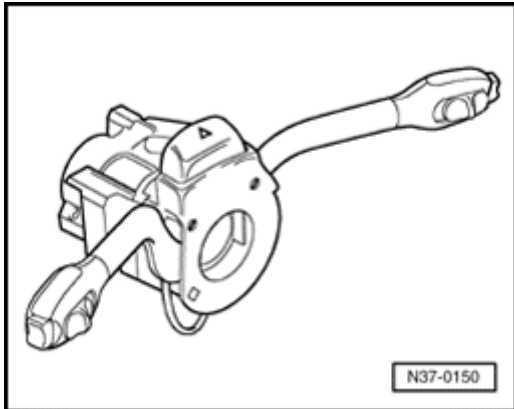
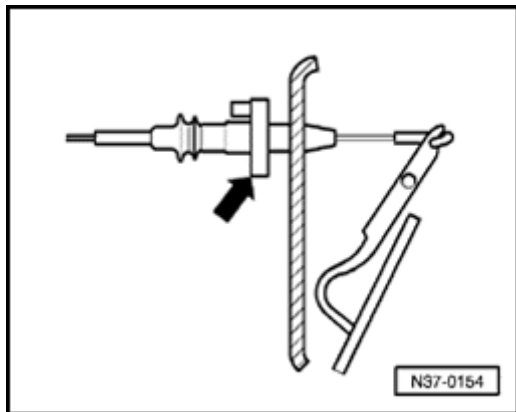


Fig. 26 Cruise Control Switch -E45-

Location: The Cruise Control Switch is located on the steering column switch.

Removing and installing Cruise Control Switch

⇒ [Repair Manual, Electrical Equipment, Repair Group 94](#)



A

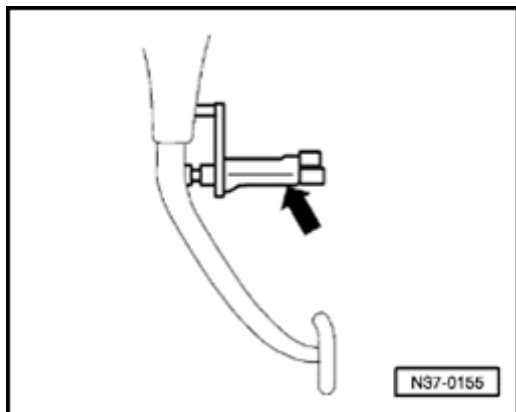
Fig. 27 Kickdown Switch -F8-

Location: The Kickdown Switch (arrow) is integrated with the Accelerator Pedal cable and is located on the bulkhead in the engine compartment.

Removing and installing Kickdown Switch

- Disconnect Accelerator Pedal cable to remove and install Kickdown Switch, then reinstall cable and adjust.

⇒ *Repair Manual, General, Engine, Repair Group 20*



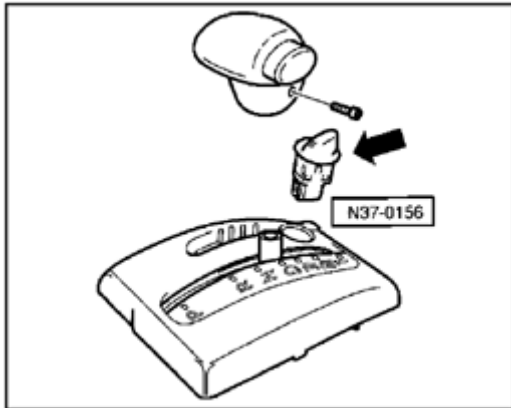
A

Fig. 28 Brake Light Switch -F-

Location: The Brake Light Switch (arrow) is located on the pedal cluster.

Removing and installing Brake Light Switch

⇒ [*Repair Manual, Suspension, Wheels, Brakes, Steering, Repair Group 47*](#)



A

Fig. 29 Transmission Range (TR) Program Switch -E122-

(Not used on vehicles with electronic program switch in Transmission Control Module (TCM) ⇒ [page 00-5](#) .

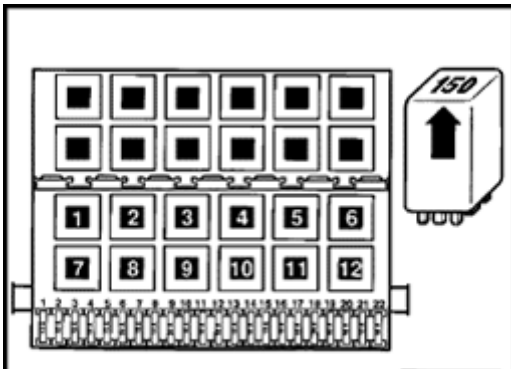
Location: The TR Program Switch (arrow) is located on center console near the gear selector indicator.

Removing and installing TR Program Switch

- Remove selector lever handle.
- Remove cover with cover strip.
- Disconnect harness connector from switch and unclip switch from cover.
- Install in reverse order of removal.

Tightening torque:

- ◆ 1.5 Nm (13 in. lb)



A

Fig. 30 Park/Neutral Position (PNP) Relay -J226-

Location: The PNP Relay is located on the auxiliary relay panel under the instrument panel, left side.

- ◆ Marked with number "150" (arrow)

VAG 1551 Scan Tool (ST), connecting and selecting functions

Test conditions:

- Battery Positive Voltage (B+) OK

- Fuses 14 (S14) and 21 (S21) OK

- Check transmission Ground (GND) connections:
 - Check Ground connections for corrosion and poor contact; repair if necessary.

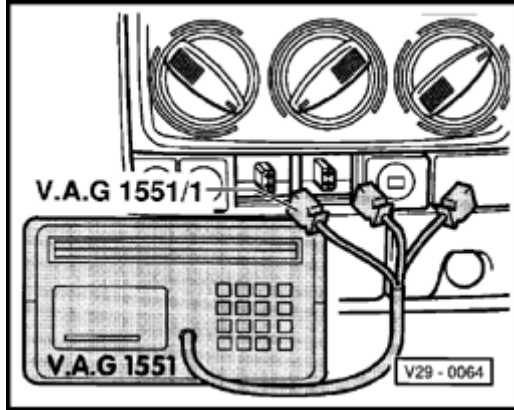
 - ◆ Ground (GND) connection on left next to relay panel

 - Check Battery Ground (GND) strap and Ground (GND) strap between Battery and transmission.

- Selector lever in position "P" and handbrake applied.

Connecting VAG 1551 Scan Tool (ST)

Vehicles ➤ 07.93 (1993 m.y.)



A

- Unclip covers for Data Link Connector (DLC) below heating/ventilation controls.

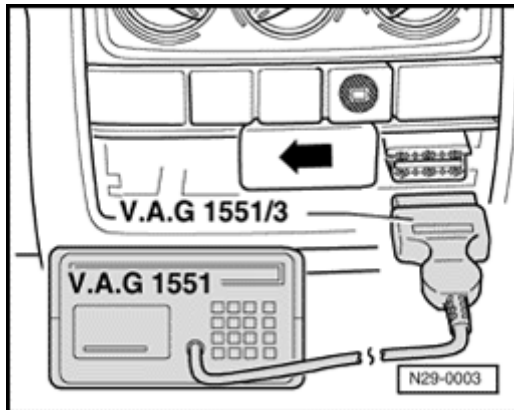
Connect VAG 1551 Scan Tool (ST) with VAG 1551/1 adapter cable as follows:

- First connect black connector for VAG 1551 Scan Tool (ST) voltage supply to black DLC socket.

Note:

The blue connector is not required for this application.

Vehicles 08.93 ➤ (1994 m.y. ➤)



A

- Remove ashtray and slide cover for Data Link Connector (DLC) to left - arrow-.
- With ignition switched OFF, connect VAG 1551 Scan Tool (ST) with VAG 1551/3 adapter cable.

VAG - ON BOARD DIAGNOSTIC HELP

1 - Rapid data transfer 1)

2 - Blink code output 1)



Indicated on display:

1) Operating modes -1- and -2- are displayed alternately

Notes:

- ◆ *Additional operating instructions can be printed out by pressing the HELP button on the VAG 1551 Scan Tool.*
- ◆ *The → button is used to advance the Scan Tool program sequence.*
- ◆ *An automatic check can be carried out in the "Rapid data transfer" operating mode. Then all vehicle control units will be interrogated automatically.*

⇒ VAG 1551 Scan Tool (ST) operating instructions.

- Switch ignition ON.
- Switch printer on with the PRINT button (indicator lamp in button lights up).
- Press button -1- for "Rapid data transfer" operating mode.

Rapid data transfer

HELP

Enter address word XX



Indicated on display:

- Press buttons -0- and -2- (enter address word 02 for "Transmission Electronics").

Rapid data transfer Q
02 Transmission electronics



Indicated on display:

- Press -Q- button to confirm input.

096927731AD AG4 Gearbox 096 1283
Coding 00000 WSC 131071



Indicated on display:

The Transmission Control Module (TCM) identification, TCM coding and VAG 1551 Scan Tool dealership number are displayed.

Transmission Control Module (TCM) identification

Depending upon version (program level), the Transmission Control Module (TCM) can indicate an identification number different from that shown in the example. Control Module applications ⇒ Parts catalog microfiche.

- ◆ 096 927 731 AD: Part number
- ◆ AG4 Gearbox 096: 4-speed automatic transmission 096
- ◆ 1283: EPROM (Program level)
- ◆ Coding 00000: Not required at present
- ◆ WSC 131071: Dealership number of the VAG 1551 Scan Tool (ST) with which the most recent coding was carried out (example).

Control module does not answer! HELP



Indicated on display:

- A list of possible malfunction causes can be printed out by pressing the HELP button.
- After eliminating possible causes of malfunctions, again enter the address word 02 for "Transmission Electronics" and press -Q- to confirm.

If "Control module does not answer!" appears again:

Control module does not answer! HELP



Indicated on display:

Check Battery Positive Voltage (B+) supply to Transmission Control Module (TCM):

- Perform electrical test step 1 ⇒ [page 01-67](#) .
- Check wiring connections to Data Link Connector (DLC)

⇒ *Electrical Wiring Diagrams, Troubleshooting and Component Locations binder.*

⇒ [Diagnostic Trouble Code \(DTC\) table under DTC 65535 for control module malfunctioning, page 01-31](#) .

- Press → button.

Rapid data transfer

HELP



Indicated on display:

- After pressing the HELP button, a list of the possible functions is printed out.

Select function XX

List of selectable functions

Function	Page
01 Check Transmission Control - Module version ⇒ On Board Diagnostic (OBD) program	⇒ Page 01-23
02 Check DTC Memory -	⇒ Page 01-29
04 Initiate basic setting -	⇒ Page 01-43
05 Erase DTC Memory -	⇒ Page 01-41
06 End output -	
08 Read measured value block -	⇒ Page 01-45

Further functions, which can be printed out by pressing the HELP button, need not be considered.

- After checking and completing a function, the VAG 1551 Scan Tool (ST) returns to the following start condition:



Diagnostic Trouble Code (DTC) Memory, checking

- Connect VAG 1551 Scan Tool and enter address word 02 for "Transmission Electronics" and advance program until "Select function XX" appears in display ⇒ [from page 01-23](#) .

Rapid data transfer
Select function XX

HELP



Indicated on display:

- Press buttons -0- and -2-. (The function "Check DTC Memory" is selected with 02).

Rapid data transfer
02 - Check DTC Memory

Q



Indicated on display:

- Press -Q- button to confirm input.

X DTC recognized!



The number of stored Diagnostic Trouble Codes (DTC) or "No DTC recognized" appears in the display.

Stored malfunctions are displayed in turn and printed out.

- Press → button.

After the last malfunction has been displayed and printed out, the malfunctions should be corrected as described in the Diagnostic Trouble Code (DTC) table ⇒ [page 01-31](#) .

- Press → button.

Rapid data transfer
Select function XX

HELP



Indicated on display:

Note:

After checking DTC Memory and correcting malfunctions:

- Erase DTC memory ⇒ [page 01-41](#) .

Diagnostic Trouble Code (DTC) table

Note:

- ◆ Malfunctions are recognized by the Transmission Control Module (TCM) -J217-, displayed by the VAG 1551 ScanTool (ST) and printed (with the printer switched ON) when the Diagnostic Trouble Code (DTC) Memory is checked.
- ◆ All the possible malfunctions that are recognized by the TCM -J217-, and displayed and printed by the VAG 1551 ScanTool (ST) are listed below, grouped according to the Diagnostic Trouble Code (DTC) number.
- ◆ If malfunction occurs only occasionally, or if the DTC Memory was not erased after making repairs to correct the malfunctions, these malfunctions will be displayed as "sporadic DTC" for a stipulated period of time ⇒ [Transmission Control Module recognition of malfunctions, page 01-3](#) .
- ◆ If component malfunctions are detected when checking Diagnostic Trouble Code (DTC) Memory, also test the wiring to the components for short circuits and open circuits according to the wiring diagram ⇒ *Electrical Wiring Diagrams, Troubleshooting and Component Locations binder*.
- ◆ The DTCs are printed out in the "Rapid data transfer" mode only when the VAG 1551 Scan Tool printer is switched ON.
Example: Diagnostic Trouble Code (5-digit) 65535

Diagnostic program, make repairs according to the Repair Manual.

VAG 1551 print-out	Possible cause of malfunction	Repairing malfunction
00264 Solenoid Valve 4 -N91- Open circuit1) Short to Ground (GND)1)	Open circuit or short to Ground (GND) Solenoid Valve 4 -N91- malfunctioning	- Check wiring and connections according to wiring diagram 2) - Read measured value block ⇒ page 01-45 ; display group number 04 - Carry out electrical tests ⇒ from page 01-67
00266 Solenoid Valve 5 -N92- Open circuit1) Short to Ground (GND)1)	Open circuit or short to Ground (GND) Solenoid Valve 5 -N92- malfunctioning	- Check wiring and connections according to wiring diagram 2) - Read measured value block ⇒ page 01-45 ; display group number 04 - Carry out electrical tests ⇒ from page 01-67
00268 Solenoid Valve 6 -N93- Open circuit1)	Open circuit or short to Ground (GND) Solenoid Valve 6 -N93- malfunctioning	- Check wiring and connections according to wiring diagram 2) - Read measured value block ⇒ page 01-45 ; display group number 02 - Carry out electrical tests ⇒ from page 01-67

Short to Ground (GND) ¹⁾		
--	--	--

1) One of these displays appears in addition to the relevant component.

2) First check connections for contact corrosion or water contamination and replace if necessary. When the display indicates solenoid malfunctions, especially check the 10-pin harness connector at the transmission between the valve body conductor strip and the wiring harness.

VAG 1551 print-out	Possible cause of malfunction	Repairing malfunction
00270 Solenoid Valve 7 -N94- Open circuit1) Short to Ground (GND)1)	Open circuit or short to Ground (GND) Solenoid Valve 7 -N94- malfunctioning	- Check wiring and connections according to wiring diagram 2) - Read measured value block ⇒ page 01-45 ; display group number 04 - Carry out electrical tests ⇒ from page 01-67
00281 Vehicle Speed Sensor - G68- No signal	Open circuit in wiring Vehicle Speed Sensor (VSS) -G68- malfunctioning	- Check wiring and connections according to wiring diagram 2) - Read measured value block ⇒ page 01-45 ; display group number 02 - Carry out electrical tests ⇒ from page 01-67 - Replace Vehicle Speed Sensor (VSS) -G68- ⇒ page 01-19 , ⇒ 23
		- Replace input gear ⇒ page 39-8

1) One of these displays appears in addition to the relevant component.

2) First check connections for contact corrosion or water contamination and replace if necessary. When the display indicates solenoid malfunctions, especially check the 10-pin harness connector at the transmission between the valve body conductor strip and the wiring harness.

VAG 1551 print-out	Possible cause of malfunction	Repairing malfunction
00293 Multi-Function TR Switch -F125- Undefined switch condition	Open circuit in wiring Multi-Function Transmission Range (TR) Switch -F125- malfunctioning	- Check wiring and connections according to wiring diagram 3) - Read measured value block ⇒ page 01-45 ; display group number 01 - Carry out electrical tests ⇒ from page 01-67 - Replace Multi-Function TR Switch -F125- ⇒ page 01-18 , ⇒ 22
00300 Transm. Fluid Temperature Sensor -G93- 1) No malfunction identified	Open circuit in wiring Transmission Fluid Temperature Sensor -G93- malfunctioning	- Check wiring and connections according to wiring diagram 2) - Read measured value block ⇒ page 01-45 ; display group number 05 - Carry out electrical tests ⇒ from page 01-67

1) A malfunctioning Transmission Fluid Temperature Sensor is indicated.

2) First check connections for contact corrosion or water contamination and replace if necessary. When the display indicates solenoid malfunctions, especially check the 10-pin harness connector at the transmission between the valve body conductor strip and the wiring harness.

3) First check connections for contact corrosion or water contamination and replace if necessary.

VAG 1551 print-out	Possible cause of malfunction	Repairing malfunction
00518 Throttle Position Sensor -G69-	Open or short circuit Throttle Position (TP) Sensor -G69- malfunctioning	<ul style="list-style-type: none"> - If DTC 00638 is also displayed, then repair this first - Check wiring and connections according to wiring diagram - Read measured value block ⇒ page 01-45 ; display group numbers 01 and 03 - Carry out electrical tests ⇒ from page 01-67 - Replace Throttle Position (TP) Sensor -G69- <p>⇒ <i>Repair Manual, 2.0 Liter General, Engine or 1.8 Liter General, Engine or 2.8 Liter VR6 General, Engine, Repair Group 24</i></p> <ul style="list-style-type: none"> - Bring system to basic settings ⇒ page 01-43
Signal outside tolerances	On vehicles with 6-cylinder engine from 01.93: Motronic Engine Control Module (ECM) malfunctioning (signal from the Throttle Position (TP) Sensor -G69- is routed to Transmission Control Module (TCM) -J217- via ECM)	<ul style="list-style-type: none"> - Vehicles with 6-cylinder engine: Replace Motronic Engine Control Module (ECM) - J220-

⇒ *Repair Manual, 2.8 Liter VR6
Fuel Injection & Ignition, Repair
Group 24*

- Bring system to basic settings
⇒ [page 01-43](#)

VAG 1551 print-out	Possible cause of malfunction	Repairing malfunction
00529 RPM information missing	Open circuit in wiring	<ul style="list-style-type: none"> - Check wiring and connections according to wiring diagram - Read measured value block ⇒ page 01-45 ; display group number 03 - Check Engine Control Module <p>⇒ <i>Repair Manual, Fuel Injection & Ignition, Repair Group 01 for relevant engine code</i></p>
00532 Supply Voltage (B+)	Battery malfunctioning Insufficient system voltage	<ul style="list-style-type: none"> - Test Battery Positive Voltage (B+) ⇒ Repair Manual, Electrical Equipment, Repair Group 27 - Read measured value block ⇒ page 01-45 ; display group number 02 - Test voltage supply to Transmission Control Module - J217- - Carry out electrical tests ⇒ page 01-67

VAG 1551 print-out	Possible cause of malfunction	Repairing malfunction
<p>00545</p> <p>Engine/trans. electrical connection</p> <p>Open circuit¹⁾</p> <p>Short to Ground (GND)¹⁾</p>	<p>Open circuit or short to Ground (GND)</p> <p>No connection between Engine Control Module (ECM) and Transmission Control Module (TCM)</p>	<ul style="list-style-type: none"> - Check wiring and connections according to wiring diagram - Read measured value block ⇒ page 01-45 ; display group number 05 - Check Engine Control Module <p>⇒ <i>Repair Manual, Fuel Injection & Ignition, Repair Group 01 for relevant engine code</i></p> <ul style="list-style-type: none"> - Bring system to basic settings ⇒ page 01-43
<p>00596</p> <p>Short circuit between solenoid valve lines</p>	<p>10-pin connector between valve body conductor strip and wiring loom</p> <p>Conductor strip to valve body defective</p>	<ul style="list-style-type: none"> - Check wiring and connections according to wiring diagram - Carry out electrical tests ⇒ from page 01-67 - Replace valve body ⇒ page 38-36

¹⁾ One of these displays appears in addition to the relevant component.

VAG 1551 print-out	Possible cause of malfunction	Repairing malfunction
00638 Engine/trans. electrical connection 2 No signal	Open circuit or short to Ground (GND) No connection between Engine Control Module (ECM) and Transmission Control Module (TCM)	<ul style="list-style-type: none"> - Check wiring and connections according to wiring diagram - Read measured value block ⇒ page 01-45 ; display group number 05 - Check Engine Control Module, replace if necessary <p>⇒ <i>Repair Manual, Fuel Injection & Ignition, Repair Group 01 for relevant engine code</i></p> <ul style="list-style-type: none"> - Bring system to basic settings <p>⇒ page 01-43</p>
00641 Transmission fluid temperature Signal too large	Transmission becomes too hot, max. 148 ° C (298 ° F). If ATF temperature is too high, transmission shifts down into next lower gear. Trailer load of vehicle too high ATF level not correct	<ul style="list-style-type: none"> - Check ATF level ⇒ page 37-47 - Read measured value block ⇒ page 01-45 ; display group number 05; read transmission fluid temperature
00652 Transmission range controller	Electrical/hydraulic malfunction Clutch or valve body defective	<ul style="list-style-type: none"> - Read measured value block ⇒ page 01-45 ; display group number 04 and determine gear in which malfunction occurs

Incorrect signal

VAG 1551 print-out	Possible cause of malfunction	Repairing malfunction
00660 Kickdown Sw./Throttle Position Sensor Incorrect signal	Open circuit in wiring	- Check wiring and connections according to wiring diagram
	Throttle Position (TP) Sensor - G69- malfunctioning	- Carry out repairs for Throttle Position (TP) Sensor -G69- described under Repairing malfunction, DTC 00518
	Kick Down Switch -F8- malfunctioning	- Read measured value block ⇒ page 01-45 ; display group number 01 - Carry out electrical tests ⇒ from page 01-67 - Adjust Accelerator Pedal cable or replace if necessary ⇒ <i>Repair Manual, Fuel Injection & Ignition, Repair Group 24</i>
65535 Control Module malfunctioning	Transmission Control Module (TCM) -J217- malfunctioning	- Replace Transmission Control Module (TCM) - J217- ⇒ page 01-7
- Bring system into basic settings ⇒ page 01-43		

Note:

The Transmission Control Module (TCM) -J217- should NOT be replaced and brought into the basic setting until the cause of

the malfunction has been determined and the following malfunctions have been corrected:

- ◆ *Mechanical malfunctions*
- ◆ *Hydraulic malfunctions*
- ◆ *All affected electrical components and cable connections*

If the Transmission Control Module (TCM) -J217- is replaced (⇒ [page 01-7](#)) the system must also be brought into basic settings(⇒ [page 01-43](#))

Diagnostic Trouble Code (DTC) Memory, erasing

Requirement:

- DTC Memory checked ⇒ [page 01-29](#)

After DTC Memory has been checked:

Rapid data transfer

HELP



Indicated on display:

Select function XX

- Press buttons -0- and -5- (to select function 05, "Erase DTC

Rapid data transfer

Q



Indicated on display:

05 Erase DTC Memory

- Press -Q- button to confirm input.

Attention!



Indicated on display:

DTC Memory is not interrogated.

Note:

If the ignition was switched OFF, between checking and erasing the DTC Memory for example, then the DTC Memory will not be erased.

- Adhere strictly to the sequence of operations, i.e. always check DTC Memory first before attempting to erase.

Rapid data transfer



DTC Memory is erased



Indicated on display:

(DTC Memory will be erased approx. 5 seconds after the message is displayed.)

DTC Memory is now erased.

Note:

Wait about 1 minute before checking DTC Memory again.

System cannot be interrogated!



Indicated on display:

1 DTC recognized

00811 3333

System cannot be interrogated



Print-out with printer switched on:

Transmission Control Module (TCM) -J217- given too little time to recognize malfunctions.

- Wait about 1 minute before checking DTC Memory again.
- After checking and erasing DTC Memory, carry out a test drive and checking DTC Memory again.

When the DTC Memory is interrogated, the following message should be displayed:

"No DTC recognized"

Basic setting, initiating

Note:

The basic setting should be initiated after performing the following repairs:

- ◆ *Replacing engine*
 - ◆ *Replacing Engine Control Module (ECM)*
 - ◆ *Replacing or altering throttle valve*
 - ◆ *Adjusting throttle valve (setting idle speed).*
 - ◆ *Replacing Throttle Position (TP) Sensor - G69-*
 - ◆ *Altering setting of Throttle Position (TP) Sensor -G69- (e.g. when adjusting Closed Throttle Position Switch)*
 - ◆ *Replacing Transmission Control Module (TCM) -J217-*
- Connect VAG 1551 Scan Tool (ST), enter address word 02 for "Transmission Electronics," and advance Scan Tool program until "Select

Rapid data transfer

HELP

Select function XX

function XX" appears in the display ⇒ [page 01-23](#) .



Indicated on display:

- Press buttons -0- and -4- (to select function 04 "Basic setting").

Note:

Accelerator Pedal must remain in Closed Throttle Position.

Rapid data transfer 04 Basic setting	Q	←	Indicated on display: - Press -Q- button to confirm input.
Basic setting Input display group number XX	HELP	←	Indicated on display: - Press button -0- twice (to input display group 00). - Press -Q- button to confirm input.
System in basic setting	→	←	Indicated on display: ◆ System is now in basic setting. - Depress Accelerator Pedal as far as kickdown and hold in this position for 3 seconds. - Press → button.
Rapid data transfer Select function XX	HELP	←	Indicated on display:

Reading measured value block

- Connect VAG 1551 Scan Tool (ST), enter address word 02 for "Transmission Electronics" and advance Scan Tool program until "Select function XX" is indicated on display ⇒ [from page 01-23](#) .

Rapid data transfer HELP
Select function XX



Indicated on display:

Press buttons -0- and -8- (to select function 08 "Read measuring value block")

Rapid data transfer Q
08 - Read measuring value block



Indicated on display:

- Press -Q- button to confirm input.

Read measuring value block
Input display group number XX



Indicated on display:

- Enter display group number ⇒ [List of selectable display groups, page 01-46](#) .
- Press -Q- button to confirm input.

Reading measured value block 1 →



Indicated on display:

→ 1 → 2 → 3 → 4

There are always 4 display fields in the measured value block (displayed in physical units if necessary).

Key to interpreting individual values in display fields 1 through 4 ⇒ [Test table, page 01-48](#) .

List of selectable display groups

Reading measured value block 1 → P 0.8V 0 % 00000111	↖	Display group No. 01
Reading measured value block 2 → 0.983 A 0.985 A 12.76 V 2.50 V	↖	Display group No. 02
Reading measured value block 3 → 0 km/h 900 rpm 0 0%	↖	Display group No. 03
Reading measured value block 4 → 1001 00 0 P 0 km/h	↖	Display group No. 04
Reading measured value block 5 → 45 °C 0011011 0 900 rpm	↖	Display group No. 05

Display group No.	Display field	Designation
01	1	Selector lever position
	2	Throttle Position (TP) Sensor voltage
		Accelerator Pedal value
	3	Switch positions
	4	

02	1	Actual Solenoid Valve 6 -N93- voltage
	2	Specified Solenoid Valve 6 -N93- voltage
	3	Battery Positive Voltage (B+)
	4	Voltage at Vehicle Speed Sensor (VSS) -G68-
03	1	Vehicle speed
	2	Engine speed
	3	Gear selected
	4	Accelerator Pedal value
04	1	Solenoid valves
	2	Gear selected
	3	Selector lever position
	4	Vehicle speed
05	1	Transmission fluid (ATF) temperature
	2	Switch output
	3	Gear to select
	4	Engine speed

Notes:

◆ *If the printer is switched ON, the current display is printed out on the log.*

◆ *If the values in all the display fields are as specified:*

- Press button → .

Rapid data transfer

HELP



Indicated on display:

Select function XX

Test table

Display Group No.	Display field	Designation	Test conditions	Specified display on VAG 1551	Repairing malfunction
01	1	Selector lever position - Multi-Function Transmission Range (TR) Switch -F125-	Stationary P	P	- Check Multi-Function Transmission Range (TR) Switch -F125-: Carry out electrical tests ⇒ from page 01-67
			Selector R	R	
			lever N	N	
			in: D	D	
			3	3	
			2	2	
			1	1	
cont'd					

			Throttle - min.	3.5 V	
			- max.	4.680 V	
cont'd					

1) Engine with Mono-Motronic: Engine Coolant Temperature (ECT) min. 80° C (176° F).

Display Group No.	Display field	Designation	Test conditions	Specified display on VAG 1551	Repairing malfunction	
01	3	Accelerator Pedal value	Stationary Idling 1)	0-1%	When accelerating from idle to Wide Open Throttle, percent (%) value increases constantly - Bring system into basic settings ⇒ page 01-43	
			Wide Open Throttle	99-100%		
	4	Switch positions Brake Light Switch -F- Display 1	Brake Operated	1	- Check Brake Light Switch - F-: Carry out electrical tests ⇒ from page 01-67	
			Not operated	0		
		Traction control system	2	Activated	1	Not applicable for vehicles covered by this manual
				Not activated	0	

1) Engine with Mono-Motronic: Engine Coolant Temperature (ECT) min. 80 ° C (176 ° F).

Display Group No.	Display field	Designation	Test conditions	Specified display on VAG 1551	Repairing malfunction
01	4	Transmission Range (TR) Program Switch - E122- (transmissions up to 12.92) Display 3	"S" selected	1	- Check Transmission Range (TR) Program Switch -E122- ⇒ electrical tests, from page 01-67
			"E" selected	0	
cont'd	cont'd	Electronic program switch (transmissions from 01.93) 3	"S" selected	1	Electronic program switch is integrated in control unit and activates the "E" or "S" program automatically Transmissions for vehicles with electronic program switch ⇒ page 00-5
			"E" selected	0	

Display Group No.	Display field	Designation	Test conditions	Specified display on VAG 1551	Repairing malfunction		
01	4	Kick Down Switch -F8-	Display 4	Operated	1	- Check Kick Down Switch -F8-: Carry out electrical tests ⇒ from page 01-67	
				Not operated	0		
		Multi-Function Transmission Range (TR) Switch -F125-	5	Selector lever in: R, N, D, 3, 2		1	- Check Multi-Function Transmission Range (TR) Switch -F125-: Carry out electrical tests ⇒ from page 01-67
						P, 1	
			6	Selector lever in: P, R, 2, 1		1	
				N, D, 3		0	
cont'd	cont'd						

Display Group No.	Display field	Designation	Test conditions	Specified display on VAG 1551	Repairing malfunction
01	4	Multi-Function Transmission Range (TR) Switch -F125-	7 Selector lever in: P, R, N, D	1	- Check Multi-Function Transmission Range (TR) Switch -F125-: Carry out electrical tests ⇒ from page 01-67
			3, 2, 1	0	
			8 Selector lever in: P, R, N,	1	
			D, 3, 2, 1	0	

Display Group No.	Display field	Designation	Test conditions	Specified display on VAG 1551	Repairing malfunction
02	1	Actual current of Solenoid Valve 6 - N93-	Stationary	0.0 A	- Check Solenoid Valve -N93-: Carry out electrical tests ⇒ from page 01-67
			Wide Open Throttle		
	2	Specified current of Solenoid Valve 6 - N93-	Stationary	0.0 A	
			Wide Open Throttle		
	3	Battery Positive Voltage (B+)	Stationary	10.8 V	
			min.		

			max.	16.0 V	
4	Vehicle Speed Sensor -G68-	Stationary	min.	2.20 V	- Check Vehicle Speed Sensor - G68-: Carry out electrical tests ⇒ from page 01-67
			max.	2.52 V	

Display Group No.	Display field	Designation	Test conditions	Specified display on VAG 1551	Repairing malfunction	
03	1	Vehicle speed	Driving 1)	km/h	Speedometer reading and VAG 1551 Scan Tool (ST) display may differ slightly	
	2	Engine Speed (RPM)	With engine running	RPM	- Tune engine if necessary ⇒ <i>Repair Manual, 2.0 Liter Fuel Injection & Ignition, 1.8 Liter Fuel Injection & Ignition or 2.8 Liter VR6 Fuel Injection & Ignition, Repair Group 24</i>	
cont'd	3	Gear selected	Driving1)	Neutral	0	- Check Solenoid Valves: Carry out electrical tests ⇒ from page 01-67
				Reverse	R	
				1 hydraulic	1	
				2 hydraulic	2	
				3 hydraulic	3H	
				4 mechanical	4	

1) While driving with drive gear selected a second technician is needed for reading the specified values

Display Group No.	Display field	Designation	Test conditions	Specified display on VAG 1551	Repairing malfunction
03	4	Accelerator Pedal value	Driving 1)		When accelerating from idle to Wide Open Throttle, percent (%) value increases constantly - Bring system into basic settings ⇒ Page 01-43
			Idle	0-1%	
			Wide Open Throttle	99-100%	

1) While driving with drive gear selected a second technician is needed for reading the specified values

Reading measured value block, display group 04 - Checking Solenoid Valves while driving

- ◆ *The Solenoid Valves can be checked while driving with the "Read measuring value block" function (08), display group number 04.*
- ◆ *The table shows how the Solenoid Valves -N88-, -N89-, -N90- and -N91- are controlled in each selector lever position. The Solenoid Valves control the switching valves to the relevant gears.*
- ◆ *The Solenoid Valves -N92- and -N94- are supplementary valves that affect gear selection changes and are only controlled during gear changes. They are displayed in positions 5 and 6.*
- ◆ *VAG 1551 Scan Tool display field 1 is made up of 6 characters (0000 00) and is read as follows:*

Display on VAG 1551 Scan Tool (ST)	Display field 1:					
	Display 1	Display 2	Display 3	Display 4	Display 5	Display 6
	-N88-	-N89-	-N90-	-N91-	-N92-	-N94-

- ◆ *Non-activated Solenoid Valves are displayed by a "0"*
- ◆ *Activated Solenoid Valves are displayed by a "1"*

Checking solenoid valves while driving

- ◆ *Transmissions up to 12.92 ⇒ [page 01-58](#)*

◆ *Transmissions from 01.93* ⇒ [page 01-59](#)

Transmissions up to 12.92

Display Group No.	Display field	Designation	Test conditions	Specified display on VAG 1551	Repairing malfunction if not to specification	
04	1	Solenoid Valve activation indicated by VAG 1551 display: -N88- position 1 -N89- position 2 -N90- position 3 -N91- position 4 -N92- position 5 -N94- position 6	Selector lever in:			
			P	1 0 0 1 00	Solenoid Valves are selected according to driving conditions. - Check Solenoid Valves ⇒ electrical tests, from page 01-67	
			R1)	0 0 0 0 00		
			N	1 0 0 1 00		
			D1)	1	0 0 0 1 00	

				2	0 1 0 1 00
				3H	0 0 0 0 00
				3M	0 0 0 0 00
				4	1 1 1 1 00
			31)	1	0 0 0 1 00
				2	0 1 0 1 00
				3H	0 0 0 0 00
			21)	1	0 0 0 1 00
				2	0 1 0 1 00
			11)	1	0 0 0 1 00

1) While driving with drive gear selected a second technician is needed for reading the specified values.

Transmissions from 01.93

Display Group No.	Display field	Designation	Test conditions Selector lever in:	Specified display on VAG 1551	Repairing malfunction if not to specification		
04	1	Solenoid Valve activation indicated by VAG 1551 display: -N88- position 1 -N89- position 2 -N90- position 3 -N91- position 4 -N92- position 5 -N94- position 6	P	1 0 0 1 00	Solenoid Valves are selected according to driving conditions. - Check Solenoid Valves ⇒ electrical tests, from page 01-67		
						R1)	0 0 0 0 00
						N	1 0 0 1 00

			D1)	1	0 0 0 1 00
				2	0 1 0 1 00
				3H	0 0 0 0 00
				4	1 1 1 1 00
			31)	1	0 0 0 1 00
				2	0 1 0 1 00
				3H	0 0 0 0 00
			21)	1	0 0 0 1 00
				2	0 1 0 1 00
			11)	1	0 0 0 1 00

1) While driving with drive gear selected a second technician is needed for reading the specified values.

Display Group No.	Display field	Designation	Test conditions	Specified display on VAG 1551	Repairing malfunction
04	2	Gear selected	Driving 1)		- Check Solenoid Valves ⇒ electrical tests, from page 01-67
			Neutral	0	
			Reverse	R	
			1 hydraulic	1	
			2 hydraulic	2	
			3 hydraulic	3H	
			3 mechanical ²⁾	3M	
cont'd			4 mechanical	4	

1) While driving with drive gear selected a second technician is needed for reading the specified values

2) "3M" not applicable to transmissions with modified shift program (from 01.93) ⇒ [page 00-5](#)

Display Group No.	Display field	Designation	Test conditions	Specified display on VAG 1551	Repairing malfunction	
04	3	Selector lever position	Driving 1)	P	P	- Check Multi-Function Transmission Range (TR) Switch -F125- ⇒ electrical tests, from page 01-67
				R	R	
				N	N	
				D	D	
				3	3	
				2	2	
				1	1	
				4	Vehicle speed	

1) While driving with drive gear selected a second technician is needed for reading the specified values

Display Group No.	Display field	Designation	Test conditions	Specified display on VAG 1551	Repairing malfunction
05	1	Transmission fluid (ATF) temperature is checked at approx. 50-70 ° C	Stationary with engine running. Exact temperature is displayed from approx. 40 ° C	° C	- Check Transmission Fluid Temperature Sensor -G93- ⇒ electrical tests, from page 01-67
	2	Selector outputs	Driving 1) Engine management		- Check wiring according to wiring diagram - Replace Engine Control Module (ECM) ⇒ <i>Repair Manual, 2.0 Liter Fuel Injection & Ignition, 1.8 Liter Fuel Injection & Ignition or 2.8 Liter VR6 Fuel Injection & Ignition, Repair Group 24</i> - Replace Transmission Control Module (TCM) -J217- ⇒ page 01-7 - Bring system into basic settings ⇒ page 01-43
		Display 1	is	1	

			switched on	
			is switched off	0
		2	switched on	1
cont'd	cont'd		switched off	0

1) While driving with drive gear selected a second technician is needed for reading the specified values

Display Group No.	Display field	Designation	Test conditions	Specified display on VAG 1551	Repairing malfunction	
05	2	Selector outputs	Shiftlock Solenoid -N110-		<ul style="list-style-type: none"> - Check wiring according to wiring diagram - Check Shiftlock Solenoid -N110- ⇒ electrical tests, from page 01-67	
			Display 3	is switched on		1
			is switched off	0		
		4	switched on	1		
			switched off	0		
		5	Cruise control			<ul style="list-style-type: none"> - Check wiring according to wiring diagram - Check cruise control ⇒ <i>Electrical Wiring Diagrams, Troubleshooting and Component Locations binder</i>
			switched on	1		
		cont'd	cont'd			switched off

Display Group No.	Display field	Designation	Test conditions	Specified display on VAG 1551	Repairing malfunction	
05	2	Display 6	Air conditioner was switched off	1	- Check routing of wiring according to wiring diagram - Check air conditioner ⇒ Repair Manual, Heating and Air Conditioning, Repair Group 87	
			was not switched off	0		
		7	Park/Neutral signal	1		- Check routing of wiring according to wiring diagram
			Selector lever in: P, N			
cont'd			1, 2, 3, D	0		

Display Group No.	Display field	Designation	Test conditions	Specified display on VAG 1551	Repairing malfunction	
05	3	Gear to select	Driving 1)	Neutral	0	<p>- Check Solenoid Valves: Carry out electrical tests ⇒ from page 01-67</p> <p>- If no gearshifts are completed, a clutch or brake may be malfunctioning</p> <p>- Replace Transmission Control Module (TCM) -J217- ⇒ page 01-7</p>
				Reverse	R	
				1 hydraulic	1	
				2 hydraulic	2	
				3 hydraulic	3H	
				3 mechanical	3M	
				4 mechanical	4	

Display Group No.	Display field	Designation	Test conditions	Specified display on VAG 1551	Repairing malfunction
	4	Engine Speed (RPM)	Driving 1) with engine running	RPM	<p>- Tune engine if necessary</p> <p>⇒ <i>Repair Manual, 2.0 Liter Fuel Injection & Ignition, 1.8 Liter Fuel Injection & Ignition or 2.8 Liter VR6 Fuel Injection & Ignition, Repair Group 24</i></p>

1) While driving with drive gear selected a second technician is needed for reading the specified values