Workshop Manual

Audi A8 1994 ➢

Automatic gearbox 01L, self-diagnosis

Edition 06.2005

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Repair Group

01 - Self-diagnosis, electrical checks

Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

Contents

01 – Self-diagnosis, electrical checks

1 Self-diagnosis

1.1 Self-diagnosis function

General notes

- The automatic gearbox is controlled electro-hydraulically.
- The automatic gearbox control unit -J217- is supplied with information from components which influence gear selection. With this information the control unit generates signals to control the relevant solenoid valves in the valve body. The solenoid valves direct the fluid pressure produced by the ATF pump to close the appropriate brakes in the gearbox.
- The term “self-diagnosis” relates specifically to the electrical and electronic part of the control system.

Fault detection by gearbox control unit

- The control unit detects faults during vehicle operation and stores them in a fault memory
⇒ “4.2 Fault tables”, page 15 .
- Before starting fault-finding procedure, always initiate self-diagnosis and interrogate the fault memory. For interrogation use the vehicle diagnostic, testing and information system -VAS 5051- or the vehicle diagnostic and service information system -VAS 5052- .

Note

The procedure for performing self-diagnosis with the vehicle diagnostic, testing and information system -VAS 5051- is described in this Workshop Manual.

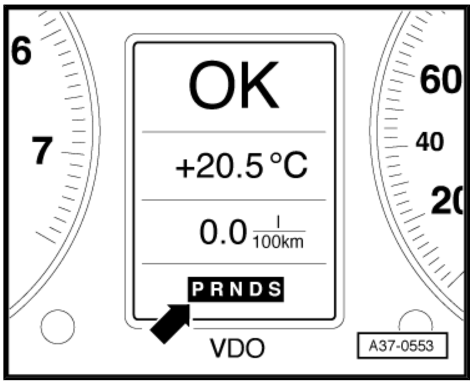
- After evaluating the information, the control unit differentiates between sporadic and static (currently present) faults and stores them in the memory.
- When a fault occurs, it is stored as a static (currently present) fault. If the fault does not occur again for a a predetermined period or distance travelled, the fault will then be reclassified as a sporadic fault.
- Sporadically occurring faults are displayed as “sporadic” when interrogating the fault memory.
- A fault also becomes "sporadic" when the ignition is switched off and on during interrogation or when the fault memory is not erased after repairs.
- When sporadic faults do not occur again they are automatically erased after 40 gearbox cold start cycles (ATF temperature below 71 °C) followed by gearbox warm-up (increase of ATF temperature by at least 21 °C).
- Inoperative CAN bus signals will be detected by the control unit. Defective CAN bus wiring, e.g. open circuits, cannot be directly detected. Conclusions as to where the CAN bus wiring is defective are not possible until all control unit fault memories have been interrogated.

1.2 Safety functions of gearbox control unit

- ♦ If one or more of the system components or sensors fails or has a fault, the automatic gearbox control unit -J217- will switch to a corresponding back-up mode, or emergency running program. This enables the automatic gearbox to continue operating without becoming damaged, but will impair the operation and smoothness of the gearshifts.
- ♦ When short-term implausibilities occur during a gearshift the automatic gearbox control unit -J217- can shift up into the next gear. This particular fault will be stored only if it occurs three times during a driving cycle (engine start; drive and engine off).

Mechanical emergency running mode with active control unit

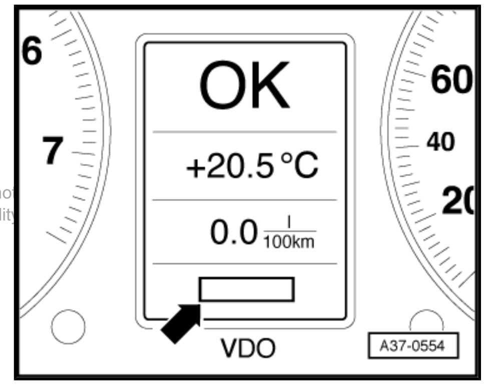
If a critical fault occurs and the automatic gearbox control unit -J217- is active, the gear which is currently selected will initially be maintained. As soon as it is safe to do so (i.e. without damaging the gearbox or affecting driving), the automatic gearbox control unit -J217- will switch to the “Mechanical emergency running mode with active control unit”.



- ♦ Gearbox shifts out of whichever of the forward gears is engaged and selects hydraulic 4th gear. Torque converter lock-up clutch is released. No electrical signals to solenoid valves.
- ♦ Maximum shift pressure applied to power-transmitting components.
- ♦ Reverse gear can be engaged. Selector lever lock (in positions “P” and “N”) is active.
- ♦ All segments of the selector lever position display -Y6- in the dash panel insert light up together -arrow-.

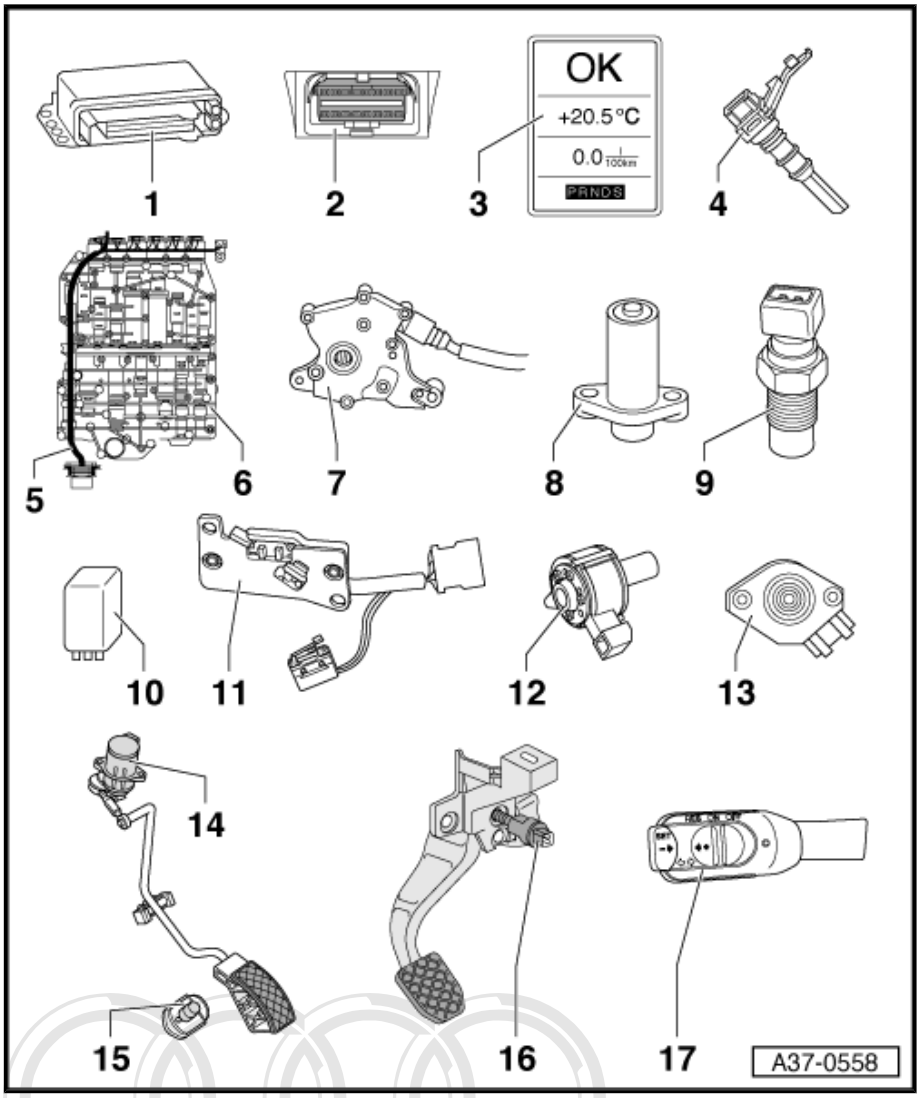
Mechanical emergency running mode with inactive control unit

If the automatic gearbox control unit -J217- fails (e.g. if the voltage supply fails or the connector becomes detached), the gearbox will immediately switch to “Mechanical emergency running mode with inactive control unit” and continue to operate.



- ♦ Gearbox shifts out of whichever of the forward gears is engaged and selects hydraulic 4th gear. Torque converter lock-up clutch is released. No electrical signals to solenoid valves.
- ♦ Maximum shift pressure applied to power-transmitting components.
- ♦ Reverse gear can be engaged. Selector lever lock (in positions “P” and “N”) is inactive.
- ♦ None of the segments of the selector lever position display -Y6- in the dash panel insert light up -arrow-.
- ♦ Automatic gearbox control unit -J217- is not functioning at all, i.e. it is not possible to initiate self-diagnosis.

2 Electrical/electronic components and fitting locations



1 - Automatic gearbox control unit -J217-

- ❑ Checked via self-diagnosis
- ❑ Fitting location ⇒ page 5
- ❑ Removing and installing ⇒ page 10
- ❑ Unplugging multi-pin connector on control unit ⇒ page 6

2 - Diagnostic connector

- ❑ Fitting location up to the end of 1998 ⇒ page 5
- ❑ Fitting location from the end of 1998 onwards ⇒ page 5

3 - Selector lever position indicator -Y6-

- ❑ Fitting location: In dash panel insert ⇒ page 7
- ❑ If selector lever position indicator does not light up, this indicates that gearbox is in emergency running mode with gearbox control unit inactive ⇒ page 2
- ❑ If all segments of selector lever position indicator light up together, this indicates that gearbox is in mechanical emergency running mode with gearbox control unit active ⇒ page 2

4 - Speedometer sender (Hall sender, on gearbox) -G22-

- ❑ Fitting location ⇒ page 8
- ❑ Checked via self-diagnosis

5 - Internal wiring harness in gearbox with integrated gearbox oil (ATF) temperature sender -G93-

- ❑ Fitting location ⇒ page 6
- ❑ Gearbox oil (ATF) temperature sender -G93- is checked via self-diagnosis

6 - Valve body

- ❑ Fitting location ⇒ page 6
- ❑ The following valves are attached to the valve body: solenoid valve 1 -N88- , solenoid valve 2 -N89- , solenoid valve 3 -N90- , automatic gearbox pressure regulating valve 1 -N215- , automatic gearbox pressure regulating valve 2 -N216- , automatic gearbox pressure regulating valve 3 -N217- , automatic gearbox pressure regulating valve 4 -N218- and automatic gearbox pressure regulating valve 5 -N233-
- ❑ All components are checked via self-diagnosis

7 - Multi-function switch -F125-

- ❑ Fitting location ⇒ page 7
- ❑ Checked via self-diagnosis

8 - Gearbox input speed sender -G182-

- ❑ Fitting location ⇒ page 8
- ❑ Checked via self-diagnosis

9 - Gearbox speed sender -G38- / gearbox output speed sender -G195-

- ❑ Component designation depending on vehicle version
- ❑ Fitting location ⇒ page 8
- ❑ Checked via self-diagnosis

10 - Starter inhibitor relay -J207-

- ❑ Fitting location up to model year 1998 ⇒ page 8
- ❑ Fitting location from model year 1999 onwards ⇒ page 9

11 - tiptronic switch -F189-

- ❑ Fitting location ⇒ page 7
- ❑ Checked via self-diagnosis

12 - Selector lever lock solenoid -N110-

- ❑ Fitting location ⇒ page 7
- ❑ Checked via self-diagnosis

13 - Throttle valve potentiometer -G69-

- ❑ Only on vehicles with throttle cable: Signal from throttle valve potentiometer is used to detect throttle load
- ❑ Fitting location: Integrated in throttle valve module -J338-
- ❑ Signal is transmitted from Motronic control unit -J220- to automatic gearbox control unit -J217- . If throttle valve potentiometer -G69- is displayed as cause of the fault, interrogate fault memory of engine control unit
- ❑ Signal from throttle valve potentiometer -G69- can only be checked in measured value block ⇒ page 52

14 - Accelerator position sender -G79- / accelerator position sender 2 -G185-

- ❑ Applies to vehicles with electronic throttle only
- ❑ Accelerator position sender -G79- on vehicles with TDI engine
- ❑ Accelerator position sender -G79- / accelerator position sender 2 -G185- on vehicles with petrol engine
- ❑ Fitting location ⇒ page 9
- ❑ The signal is transmitted from engine control unit to automatic gearbox control unit -J217- . If accelerator position sender -G79- / accelerator position sender 2 -G185- is displayed as cause of the fault, interrogate fault memory of engine control unit

15 - Kick-down switch -F8-

- ❑ Fitting location ⇒ page 9
- ❑ Can be checked via reading measured value block ⇒ page 52 and can be checked electrically

16 - Brake light switch -F-

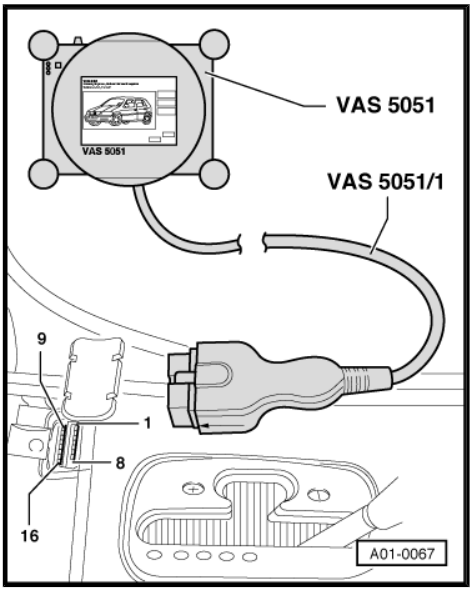
- ❑ Fitting location ⇒ page 9
- ❑ Vehicles with throttle cable: Signal is directly transmitted to automatic gearbox control unit -J217-
- ❑ Vehicles with throttle cable: Can be checked via reading measured value block ⇒ page 52 and can be checked electrically
- ❑ Vehicles with electronic throttle: Signal is transmitted from engine control unit to automatic gearbox control unit -J217- . If brake light switch -F- is displayed as cause of the fault, interrogate fault memory of engine control unit
- ❑ Vehicles with electronic throttle: Signal from brake light switch -F- can only be checked in measured value block ⇒ page 52

17 - Cruise control system switch -E45-

- ❑ Fitting location ⇒ page 9

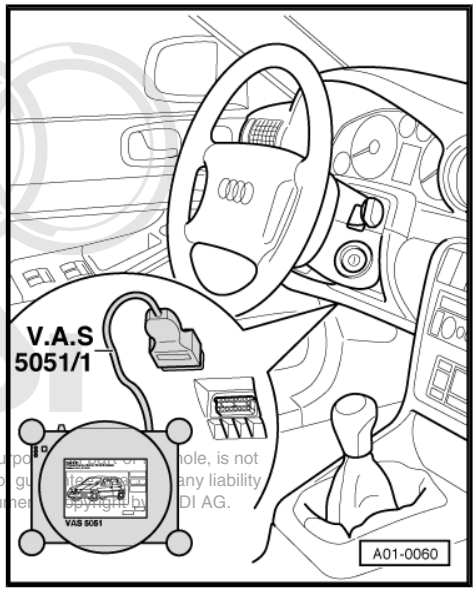
Diagnostic connector (up to the end of 1998)

- ♦ Fitting location: Under ashtray in centre console.
- – Release ashtray from centre console by pressing small lever.
- – Remove ashtray from centre console and detach cover for diagnostic connector.



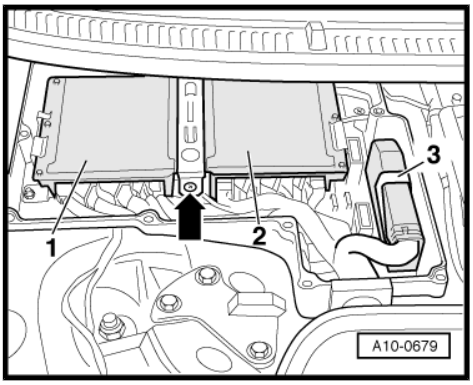
Diagnostic connector (from the end of 1998 onwards)

- ♦ Fitting location: Below knee bolster on left side of steering wheel.



Automatic gearbox control unit -J217-

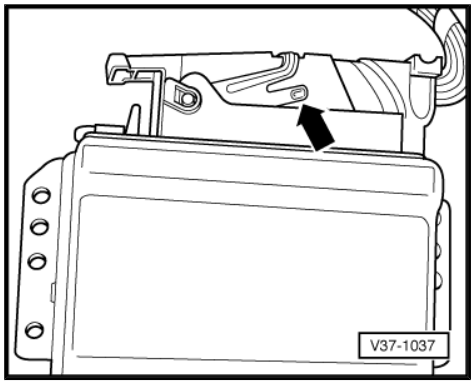
- ♦ Fitting location: In electronics box in plenum chamber (right-side) -3-.
- ♦ Removing and installing ⇒ page 10 .



Note

-Item 1-, -item 2- and -arrow- can be disregarded.

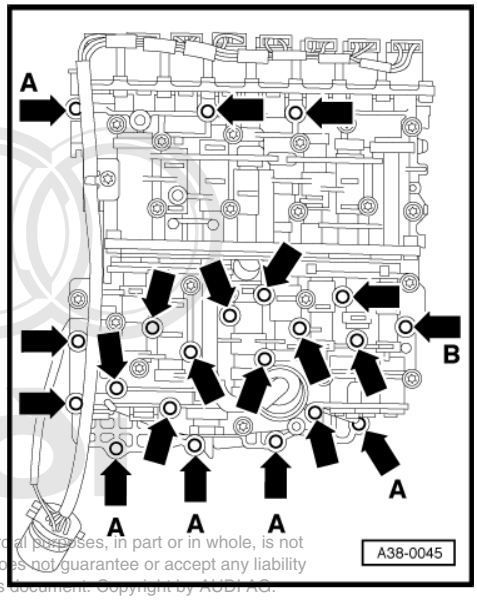
Unplugging multi-pin connector on automatic gearbox control unit -J217-



– Switch off ignition and wait about 30 seconds.

– Release connector by pressing catch in -direction of arrow-.

Valve body

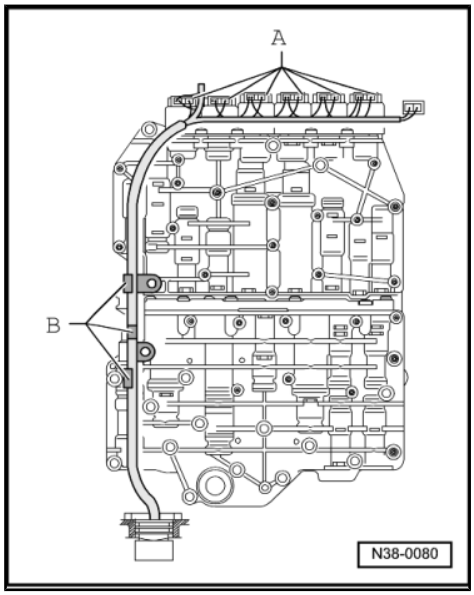


- Fitting location: Bolted to underside of gearbox housing and covered by gearbox oil pan.
- Attached to valve body: Solenoid valve 1 -N88- , solenoid valve 2 -N89- , solenoid valve 3 -N90- , automatic gearbox pressure regulating valve 1 -N215- , automatic gearbox pressure regulating valve 2 -N216- , automatic gearbox pressure regulating valve 3 -N217- , automatic gearbox pressure regulating valve 4 -N218- and automatic gearbox pressure regulating valve 5 -N233- .
- Removing and installing valve body ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38 .

Note

-Arrows- can be disregarded.

Internal wiring harness in gearbox with integrated gearbox oil (ATF) temperature sender -G93-



- Fitting location of internal wiring harness in gearbox: Attached to valve body.
- The wiring harness can be removed and installed with gearbox installed and after removing the valve body ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38 .
- Fitting location of gearbox oil (ATF) temperature sender -G93- : Integrated into wiring harness.
- If gearbox oil (ATF) temperature sender -G93- is defective, the complete wiring harness must be renewed ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38 .

A - Plug-in connections for solenoid valves and pressure regulating valves

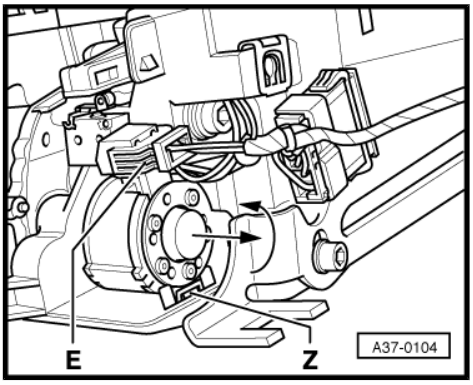
B - Bracket for wiring harness

Selector lever lock solenoid -N110-

- Fitting location: In selector mechanism.
- Removing and installing ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 .

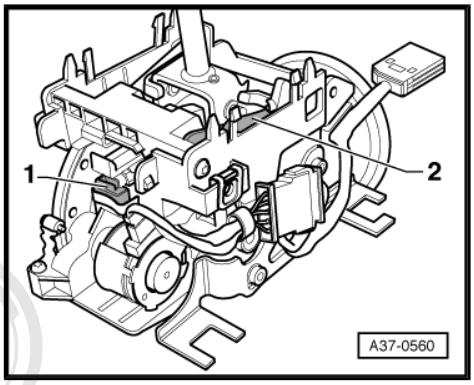
Note

-Item E-, -item Z- and -arrows- can be disregarded.



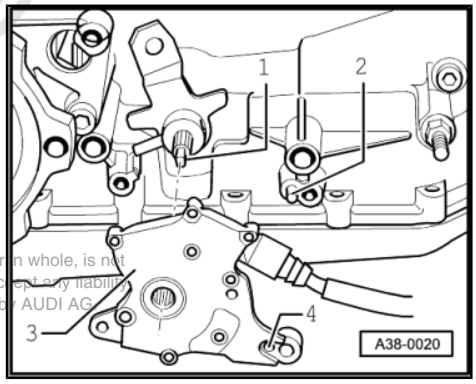
tiptronic switch -F189-

- Fitting location: In selector mechanism.
- tiptronic switch -F189- consists of tiptronic recognition switch -1- and shift-up/shift down switch -2-.
- Removing and installing tiptronic switch -F189- ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 .



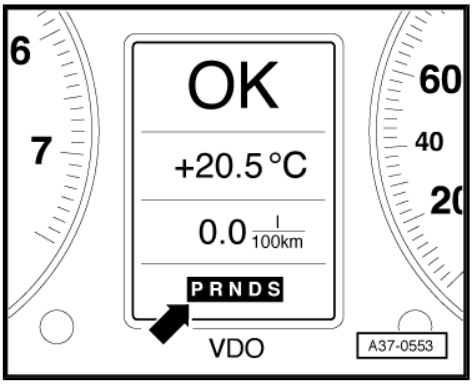
Multi-function switch -F125-

- Fitting location: On gearbox (left-side).
- Removing and installing ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 .



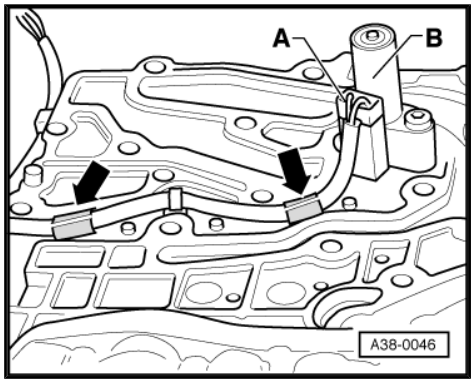
Selector lever position indicator -Y6-

- Fitting location: Integrated into dash panel insert -arrow-.
- If the selector lever position indicator -Y6- is defective, renew complete dash panel insert ⇒ Electrical system; Rep. Gr. 90 .



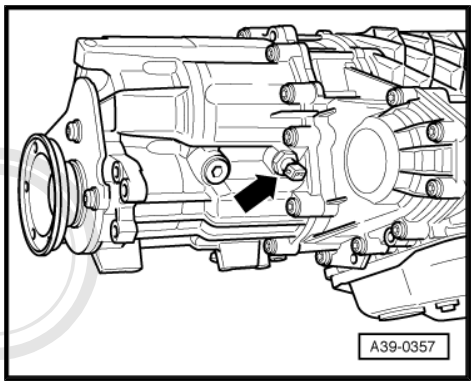
Gearbox input speed sender -G182-

- Fitting location: Fitted on reverse side of valve body.
- Removing and installing ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38 .



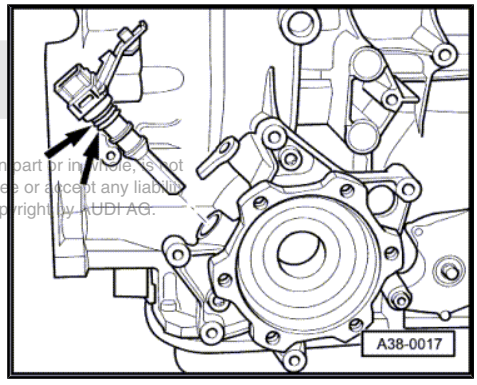
Gearbox speed sender -G38- / gearbox output speed sender -G195-

- Fitting location: The sender -arrow- is fitted on the outer right side of the transfer gearbox housing.
- Removing and installing ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38 .



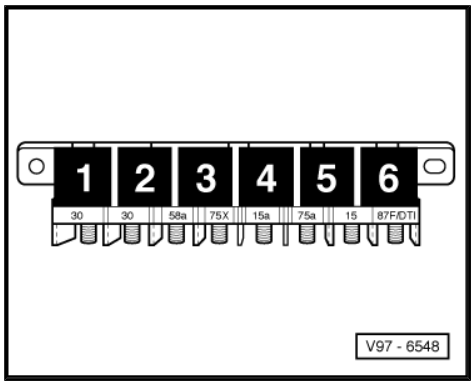
Speedometer sender (Hall sender, on gearbox) -G22-

- Fitting location: In bearing bracket for flange shaft (left-side).
- Removing and installing ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 .



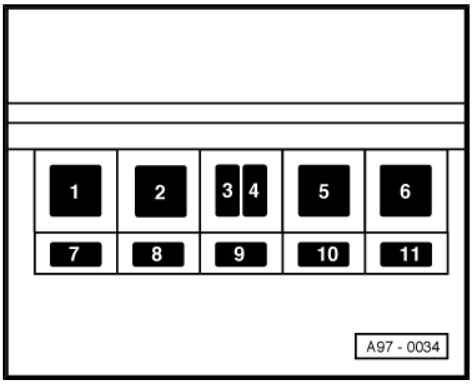
Starter inhibitor relay -J207- up to model year 1998

- Fitting location: On central electrics unit - front side, in electronics box on front passenger side.
- Identification ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



Starter inhibitor relay -J207- from model year 1999 onwards

- Fitting location: On auxiliary fuse and relay carrier in electronics box, in front passenger's footwell.
- Identification ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



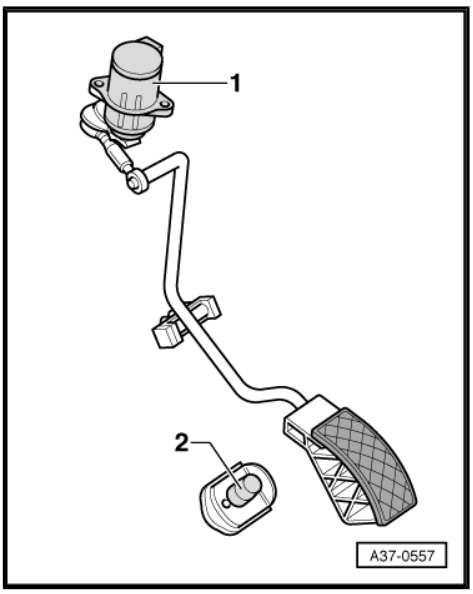
Accelerator position sender -G79- / accelerator position sender 2 -G185- and kick-down switch -F8-

- Fitting location:

1 - Accelerator position sender -G79- / accelerator position sender 2 -G185- is bolted to pedal bracket.

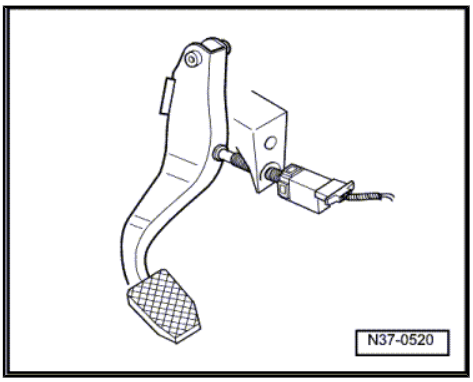
2 - Kick-down switch -F8- is bolted onto floor under pedals.

- Removing and installing ⇒ Rep. Gr. 20 .



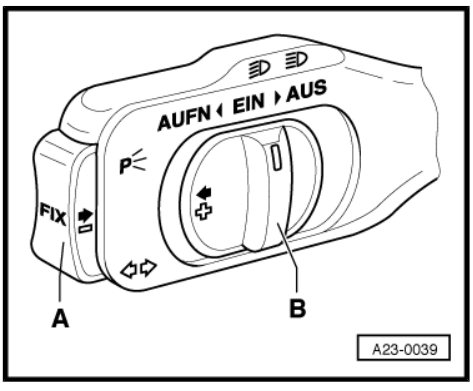
Brake light switch -F-

- Fitting location: On pedal cluster.
- Removing and installing ⇒ Brake system; Rep. Gr. 46 .



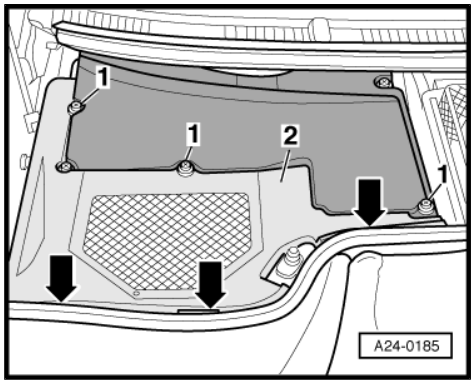
Cruise control system switch -E45-

- Fitting location: On steering column switch.

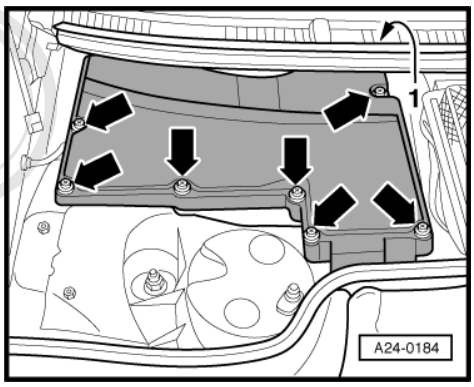


2.1 Removing and installing automatic gearbox control unit -J217-

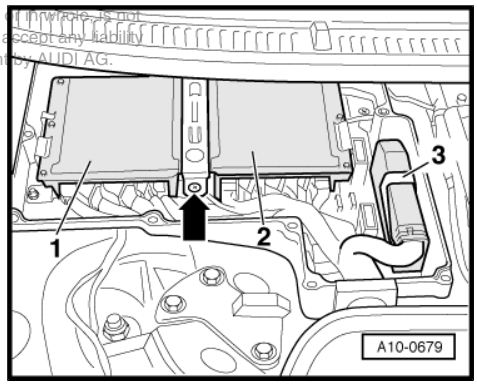
Removing



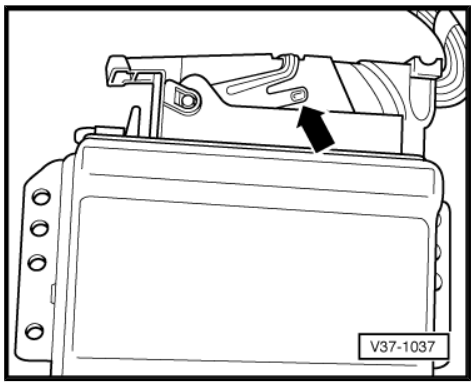
– Unscrew bolts -1- a few turns.
– Unclip plenum chamber cover -2- (right-side) -arrows- and detach cover.



– Remove cross-head bolts -arrows- (for access to bolt at rear left lever out cover -1- in cowl panel trim).
– Detach cover for electronics box in plenum chamber.
– Unclip control unit from electronics box -arrows-



– Unplug multi-pin connector from gearbox control unit -3-.



– To unplug multi-pin connector release connector by pressing catch in -direction of arrow-. In order to do this, switch off the ignition first and wait for at least 30 seconds.
– Remove securing bolts and pull gearbox control unit together with bracket out of electronics box.

Installing

Installation is carried out in reverse sequence; note the following:

– Check electronics box for moisture and seal if necessary.
– Check wiring.

3 Performing self-diagnosis

3.1 Safety precautions

Observe the following precautions if test and measuring instruments are required during a test drive:

> **WARNING**
>
> - *Test equipment must always be secured on the rear seat and operated from that position by a second person.*
> - *If test and measuring instruments are operated from the front passenger's seat and the vehicle is involved in an accident, there is a possibility that the person sitting in this seat may suffer serious injuries when the airbag is triggered.*

Observe the following precautions to avoid possible injury and/or the destruction of electrical and electronic components:

- Switch off ignition before disconnecting and connecting measuring instruments and testers.
- During some of the tests the control unit may detect a fault and store it in the memory. The fault memory should therefore be interrogated and, if necessary, erased after completing all tests and repair work.

> **Caution**
>
> - *On vehicles with telematics: activate service mode of telematics control unit before disconnecting battery ⇒ Radio, telephone, navigation system; Rep. Gr. 91 .*
> - *Always switch off ignition before disconnecting or connecting the battery to ensure gearbox control unit is not damaged.*

3.2 Connecting vehicle diagnostic, testing and information system -VAS 5051- and selecting functions

Requirements:

- Selector lever in position “P” or “N” and handbrake applied.
- Vehicle voltage supply OK.
- Fuses OK ⇒ Current flow diagrams, Electrical fault finding and Fitting locations
- Earth connections for gearbox OK.

– Check earth connections for corrosion and poor contact, repair if necessary ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

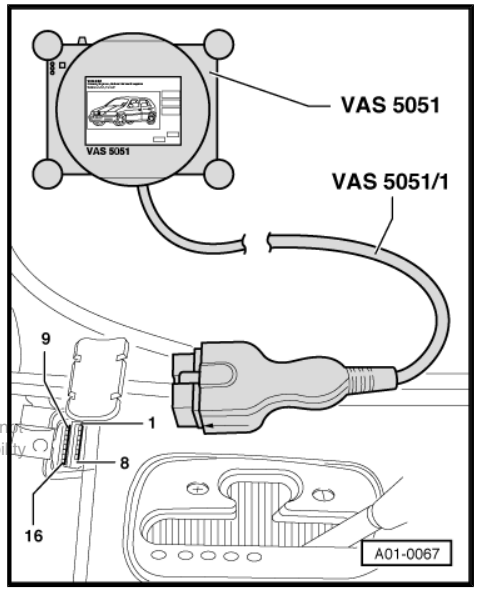
– Check battery earth strap and earth strap between battery and gearbox.

Vehicles up to approx. the end of 1998:

– Release ashtray from centre console by pressing small lever.

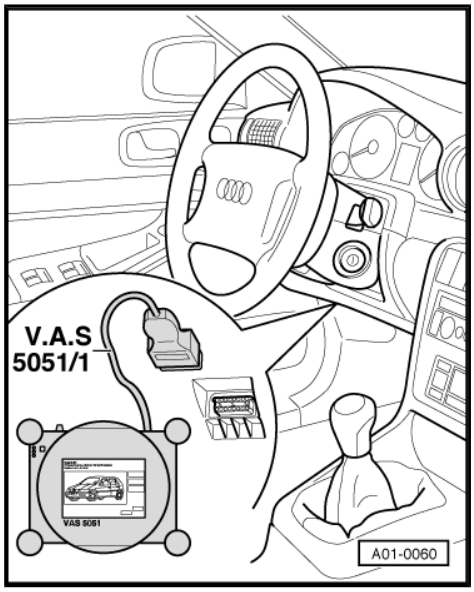
– Remove ashtray from centre console and detach cover for diagnostic connector.

– Connect the vehicle diagnostic, testing and information system -VAS 5051- to the diagnostic connector using diagnostic cable -VAS 5051/1- with the ignition switched off.



Vehicles from approx. the end of 1998 onwards:

– Connect the vehicle diagnostic, testing and information system -VAS 5051- to the diagnostic connector using diagnostic cable -VAS 5051/1- with the ignition switched off.



All models:

WARNING

Observe safety precautions ⇒ page 11 .

Note

If a fault message appears on the display ⇒ Operating instructions for vehicle diagnostic, testing and information system - VAS 5051- .

– Switch on ignition.

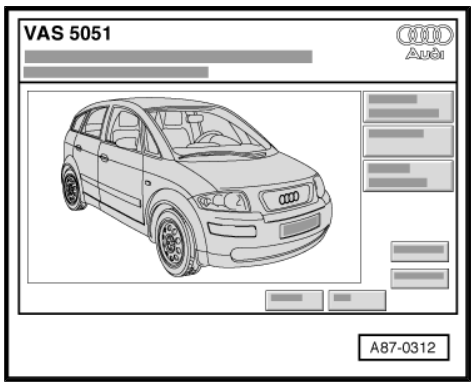
or

– Start engine.

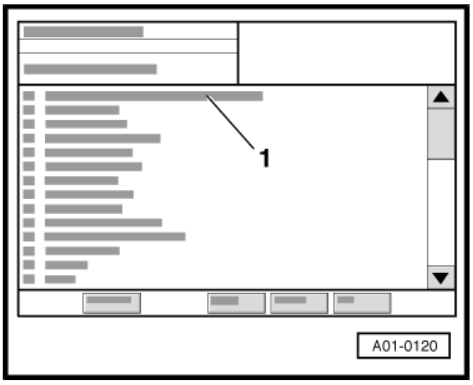
– Depress brake pedal once on vehicles with throttle cable.

Display on -VAS 5051- :

– Touch `Vehicle self-diagnosis` button.



Display on -VAS 5051- :

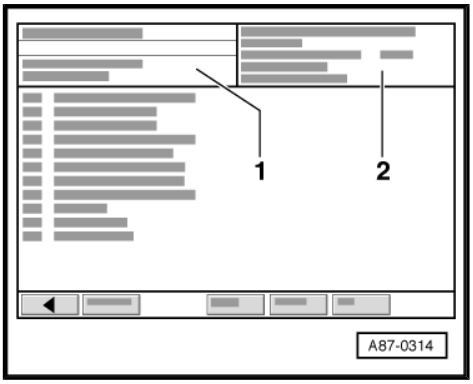


Note

Select the diagnostic function "00 - Interrogate fault memory - complete system" from list -1- to start the automatic test sequence, i.e. fault memories of all vehicle systems with self-diagnosis capability will be interrogated.

– From list -1- select vehicle system "02 - Gearbox electronics".
– Wait until next screen display appears.

Display on -VAS 5051- :



2 - Control unit identification of gearbox control unit.

Control unit identification of gearbox control unit (example)	
02 - Gearbox electronics	Vehicle system
4D0927156..	Part No.; for allocation refer to ⇒ Parts catalogue
AG5 01L	5-speed automatic gearbox 01L
4.2l5V	4.2 litre engine, 5-valve
RoW market:	Rest of the world (unless otherwise stated, applicable for all countries, except USA and Canada)
1009	Control unit software version (data level); 3-digit display, e.g. D26, on versions installed earlier
Coding 1	Control unit coding ⇒ page 50
Workshop code 12345	Workshop code of -VAS 5051- which was used to perform the last coding

If readout "Vehicle system not available" appears in display zone -1-:

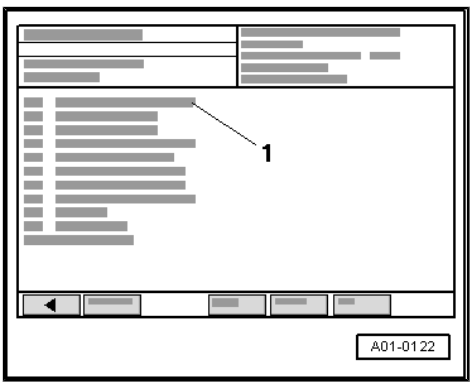
– Check:

♦ Voltage supply to diagnostic connector ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

♦ Wiring connections from diagnostic connector to automatic gearbox control unit -J217- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

3.3 List of selectable functions

– The following diagnostic functions shown in display -1- are available:



Diagnostic functions		Page
02	Interrogate fault memory	⇒ page 14
03	Final control diagnosis	⇒ page 42
05	Erase fault memory	⇒ page 47
06	End output	⇒ page 48
07	Code control unit	⇒ page 50
08	Read measured value block	⇒ page 52

All other diagnostic functions displayed cannot be selected or need not be considered.

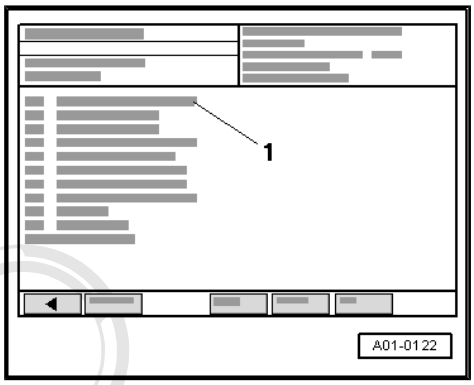
4 Interrogating fault memory

4.1 Interrogating fault memory

– Connect vehicle diagnostic, testing and information system - VAS 5051- ⇒ page 11 and select vehicle system “02 - Gearbox electronics”. The ignition must be switched on.

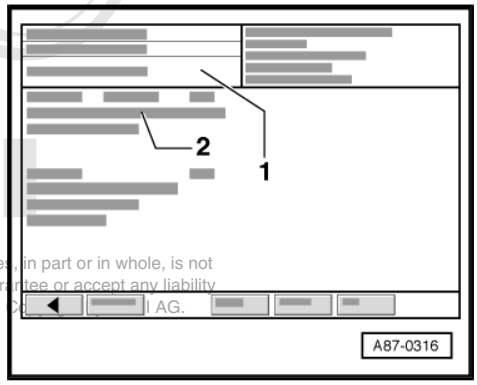
Display on -VAS 5051- :

– From list -1- select diagnostic function “02 - Interrogate fault memory”.



Display on -VAS 5051- :

-1-	Content of fault memory	0 faults detected or X faults detected
-2-	Fault	Fault code Fault location Fault type



A - If one or more faults have been detected:

– Print out information on screen or self-diagnosis log.

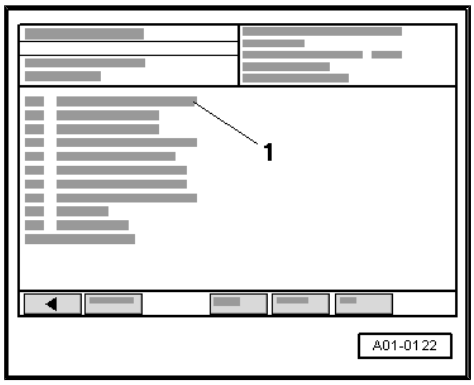
– End function “02 - Interrogate fault memory” by touching ← button.

Display on -VAS 5051- :

– Rectify fault(s) according to fault tables ⇒ page 15 .

– Again select diagnostic function “02 - Interrogate fault memory” from list -1- and erase fault memory ⇒ page 47 .

– From list -1- select diagnostic function “06 - End output” ⇒ page 48 .



B - If no fault has been detected:

– End function “02 - Interrogate fault memory” by touching ← button.

– Select diagnostic function “06 - End output” ⇒ page 48 from the list.

4.2 Fault tables

Note

- *The following tables list all the possible faults which can be detected by the automatic gearbox control unit -J217- and are displayed on the -VAS 5051- when the fault memory is interrogated.*
- *The content of the fault memory is retained until the memory is erased; erasing fault memory* ⇒ page 47 *.*
- *The fault table is sorted according to the 5-digit fault code and the P code in the left-hand column.*
- *Sporadic faults (which occur intermittently) are displayed as "sporadic".*
- *Components that are indicated as being faulty by the -VAS 5051- should not be renewed immediately. Always start by checking the wiring and connectors to these components according to current flow diagram. Also check the earth connections according to current flow diagram. This is particularly important for faults displayed as "sporadic".*

4.3 Fault tables: Fault code 16987 / P0603 up to fault code 17968 / P1560

Fault code 16987 / P0603

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
16987 / P0603 Control unit defective	♦ Automatic gearbox control unit -J217- defective	– Check gearbox for mechanical and hydraulic faults – Check electrical/electronic components and wiring – Check electronics box of gearbox control unit for moisture and seal if necessary. – Renew control unit ⇒ page 3

Fault code 16989 / P0605

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
16989 / P0605 Control unit defective	♦ Automatic gearbox control unit -J217- defective	– Check gearbox for mechanical and hydraulic faults – Check electrical/electronic components and wiring – Check electronics box of gearbox control unit for moisture and seal if necessary. – Renew control unit ⇒ page 3

Fault code 17084 / P0700

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17084 / P0700 Control unit defective		

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ Automatic gearbox control unit -J217- defective	– Check gearbox for mechanical and hydraulic faults – Check electrical/electronic components and wiring – Check electronics box of gearbox control unit for moisture and seal if necessary. – Renew control unit ⇒ page 10

Fault code 17087 / P0703

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17087 / P0703 Brake light switch -F- Electrical fault in circuit	♦ Wiring from component to engine control unit defective	– Read measured value block 003 ⇒ page 56 – Vehicles up to model year 2000: Perform electrical check, test step No. 8 ⇒ page 73 – Vehicles from model year 2001 onwards: Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01
	♦ Open circuit or short to earth or positive in CAN bus wiring	– Read measured value block 125 ⇒ page 65 – Check CAN bus wiring ⇒ page 89
	♦ Brake light switch -F- defective	– Renew brake light switch ⇒ Brake system; Rep. Gr. 46

Explanatory notes

- Vehicles with throttle cable: The fault is pre-set when the ignition is switched on and will be erased when the brake pedal is pressed once, provided that brake light switch -F- is OK. Before interrogating the fault memory, press the brake pedal once to erase the pre-set fault.
- Vehicles with electronic throttle: The signal from brake light switch -F- is transmitted to automatic gearbox control unit -J217- by engine control unit.
- The signals between the control units are exchanged via a CAN bus ⇒ page 89 .

Fault code 17090 / P0706

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17090 / P0706 Driving range sensor ⇒ -F125- Implausible signal	♦ Selector lever cable incorrectly adjusted	– Adjust selector lever cable ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37
	♦ Multi-pin connector on multi-function switch not plugged in ♦ Open circuit or short to earth in wiring to component ♦ Open circuit in voltage supply	– Read measured value block 004 ⇒ page 58 – Check multi-pin connector for contact corrosion and moisture – Check wiring and connector according to current flow diagram

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ Multi-function switch -F125- defective	– Check ⇒ “11.4 Checking multi-function switch F125 with 8-pin connector”, page 82 or ⇒ “11.5 Checking multi-function switch F125 with 10-pin connector”, page 85

Explanatory notes

♦ The normally used term for the electrical component "driving range sensor" is multi-function switch -F125- .

Fault code 17094 / P0710

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17094 / P0710 Gearbox oil temperature sender -G93- Electrical fault in circuit	♦ Open circuit or short to earth or positive in wiring to component	– Read measured value block 004 ⇒ page 56 – Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Gearbox oil (ATF) temperature sender -G93- defective	– Perform electrical check, test step No. 21 ⇒ page 79

Explanatory notes

♦ The gearbox oil (ATF) temperature sender -G93- is integrated into the internal gearbox wiring harness (on valve body).

Fault code 17095 / P0711

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17095 / P0711 Gearbox oil temperature sender -G93- Implausible signal	♦ Open circuit or short to earth or positive in wiring to component	– Read measured value block 004 ⇒ page 56 – Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Gearbox oil (ATF) temperature sender -G93- defective	– Perform electrical check, test step No. 21 ⇒ page 79

Explanatory notes

♦ This fault will be detected if ATF temperature does not rise or rises abruptly after the engine is started.

♦ The gearbox oil (ATF) temperature sender -G93- is integrated into the internal gearbox wiring harness (on valve body).

Fault code 17096 / P0712

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17096 / P0712 Gearbox oil temperature sender -G93- Signal too small	♦ Open circuit or short to earth or positive in wiring to component	– Read measured value block 004 ⇒ page 56 – Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Gearbox oil (ATF) temperature sender -G93- defective	– Perform electrical check, test step No. 21 ⇒ page 79

Explanatory notes

♦ The gearbox oil (ATF) temperature sender -G93- is integrated into the internal gearbox wiring harness (on valve body).

Fault code 17097 / P0713

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17097 / P0713 Gearbox oil temperature sender -G93- Signal too large	♦ ATF level not OK	– Check ATF level ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37
	♦ Open circuit or short to earth or positive in wiring to component	– Read measured value block 004 ⇒ page 56 – Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Gearbox oil (ATF) temperature sender -G93- defective	– Perform electrical check, test step No. 21 ⇒ page 79

Explanatory notes

♦ The gearbox oil (ATF) temperature sender -G93- is integrated into the internal gearbox wiring harness (on valve body).

Fault code 17100 / P0716

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17100 / P0716 Gearbox input speed sender -G182- Implausible signal	♦ Open circuit or short to earth or positive in wiring to component	– Read measured value block 001 ⇒ page 54 – Check wiring and connector according to current flow diagram. Also check connector for contact corrosion or moisture
	♦ Gearbox input speed sender -G182- defective ♦ Screening for gearbox input speed sender -G182- defective	– Perform electrical check, test step No. 20 ⇒ page 79

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ Gearbox output speed signal incorrect	– Rectify fault as described for fault code 17105 / P0721 ⇒ page 19
	♦ ATF level not OK	– Check ATF level ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37
	♦ Brakes slipping	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. Gr. 38 – Read measured value block 005 … 007 ⇒ page 56 and perform road test to determine which selector elements are defective or not activated

Explanatory notes

- Conditions for fault detection: The selector lever must be positively engaged in a drive gear position (“D”, “S” or “4”, “3” or “2”), i.e. not between two gears. The engine speed must be higher than 608 rpm when driving. The gearbox output speed must be higher than 416 rpm when driving.
- The fault will be displayed if the conditions for fault detection are met and the gearbox input speed is either 0 rpm or higher than 8000 rpm.

Fault code 17105 / P0721

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17105 / P0721 Gearbox output speed sender -G195- Implausible signal	♦ Open circuit or short to earth or positive in wiring to component	– Read measured value block 001 ⇒ page 54 – Check wiring and connector according to current flow diagram. Also check connector for contact corrosion or moisture
	♦ Gearbox output speed sender -G195- defective ♦ Screening for gearbox output speed sender -G195- defective	– Perform electrical check, test step No. 19 ⇒ page 78
	♦ ATF level not OK	– Check ATF level ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37
	♦ Brakes slipping or solenoid valve defective	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. Gr. 38 – Read measured value block 005 … 007 ⇒ page 56 and perform road test to determine which selector elements are defective or not activated

Explanatory notes

- In older current flow diagrams the gearbox output speed sender -G195- is referred to as gearbox speed sender -G38- .

Fault code 17114 / P0730

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17114 / P0730 Gear/transmission ratio monitoring Wrong transmission ratio	♦ ATF level not OK	– Check ATF level ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37
	♦ ATF dirty	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. Gr. 38 – Check solenoid valves (read measured value block 005 … 007 ⇒ page 59)
	♦ Brake slipping/defective or solenoid valve dirty/defective	
	♦ Gearbox input speed sender - G182- defective	– Rectify fault as described for fault code 17100 / P0716 ⇒ page 18
	♦ Gearbox output speed sender - G195- defective	– Rectify fault as described for fault code 17105 / P0721 ⇒ page 19
	♦ Incorrect or incorrectly coded automatic gearbox control unit - J217-	– Check control unit identification ⇒ page 13

Explanatory notes

- The gear monitoring system in the gearbox control unit checks the transmission ratios by comparing the engine output speed and gearbox output speed. This fault is displayed if an incorrect transmission ratio (implausibility) is detected.
- When testing the stall speed, the gearbox input speed in the torque converter should be almost 0 rpm with the vehicle stationary and a gear engaged. If this is not the case, this fault will also be displayed to indicate possible damage to the brakes (read measured value block 001 ⇒ page 54).

Fault code 17115 / P0731

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17115 / P0731 1st gear Wrong transmission ratio	♦ This fault may be displayed in addition to fault code 17114 / P0730	– Rectify fault as described for fault code 17114 / P0730
	♦ Brake of specified gear slipping/ defective or solenoid valve for this gear dirty/defective	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. Gr. 38

Explanatory notes

- The gear monitoring system in the gearbox control unit checks the transmission ratios by comparing the gearbox input and output speeds for whichever gear is engaged.

Fault code 17116 / P0732

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17116 / P0732 2nd gear Wrong transmission ratio	♦ This fault may be displayed in addition to fault code 17114 / P0730	– Rectify fault as described for fault code 17114 / P0730
	♦ Brake of specified gear slipping/ defective or solenoid valve for this gear dirty/defective	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. Gr. 38

Explanatory notes

♦ The gear monitoring system in the gearbox control unit checks the transmission ratios by comparing the gearbox input and output speeds for whichever gear is engaged.

Fault code 17117 / P0733

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17117 / P0733 3rd gear Wrong transmission ratio	♦ This fault may be displayed in addition to fault code 17114 / P0730	– Rectify fault as described for fault code 17114 / P0730
	♦ Brake of specified gear slipping/ defective or solenoid valve for this gear dirty/defective	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. Gr. 38

Explanatory notes

♦ The gear monitoring system in the gearbox control unit checks the transmission ratios by comparing the gearbox input and output speeds for whichever gear is engaged.

Fault code 17118 / P0734

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17118 / P0734 4th gear Wrong transmission ratio	♦ This fault may be displayed in addition to fault code 17114 / P0730	– Rectify fault as described for fault code 17114 / P0730
	♦ Brake of specified gear slipping/ defective or solenoid valve for this gear dirty/defective	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. Gr. 38 – Check solenoid valves (read measured value block 005 … 007 ⇒ page 59)

Explanatory notes

♦ The gear monitoring system in the gearbox control unit checks the transmission ratios by comparing the gearbox input and output speeds for whichever gear is engaged.

Fault code 17119 / P0735

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17119 / P0735 5th gear Wrong transmission ratio	♦ This fault may be displayed in addition to fault code 17114 / P0730	– Rectify fault as described for fault code 17114 / P0730
	♦ Brake of specified gear slipping/ defective or solenoid valve for this gear dirty/defective	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. Gr. 38 – Check solenoid valves (read measured value block 005 … 007 ⇒ page 59)

Explanatory notes

♦ The gear monitoring system in the gearbox control unit checks the transmission ratios by comparing the gearbox input and output speeds for whichever gear is engaged.

Fault code 17125 / P0741

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17125 / P0741 Torque converter lock-up clutch No power transmission	♦ ATF level not OK	– Check ATF level ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37
	♦ ATF dirty	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. Gr. 38
	♦ Torque converter defective or incorrect torque converter fitted	– Check torque converter ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. Gr. 32 – Check torque converter identification ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 00
	♦ Mechanical fault in automatic gearbox pressure regulating valve 4 -N218- ♦ Problems with ATF supply to automatic gearbox pressure regulating valve 4 -N218- ♦ Torque converter pressure valve defective ♦ Valve for torque converter clutch defective	– Read measured value block 007 ⇒ page 61 and with clutch Tc (closed) check permissible torque converter slip speed – Renew pressure regulating valve or valve body ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ Torque converter lock-up clutch defective or worn	– Dismantle complete gearbox and clean all parts, renew ATF pipes ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 – Dismantle and check all brakes ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 – Renew valve body ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38 – Renew torque converter ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 32

Explanatory notes

♦ The ratio of gearbox input speed to engine speed with torque converter lock-up clutch engaged is implausible.

Fault code 17135 / P0751

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17135 / P0751 Switch valve 1 ⇒ Solenoid valve 1 -N88- Open circuit / short to earth	♦ Open circuit or short to earth in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Solenoid valve 1 -N88- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 005 ⇒ page 59 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 10 ⇒ page 74

Explanatory notes

♦ The check for short to positive is made as soon as the ignition is switched on. When the vehicle is moving all faults are detected.

Fault code 17136 / P0752

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17136 / P0752 Switch valve 1 ⇒ Solenoid valve 1 -N88- Short to positive	♦ Short to positive in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ Solenoid valve 1 -N88- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 005 ⇒ page 59 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 10 ⇒ page 74
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Explanatory notes

♦ The check for short to positive is made as soon as the ignition is switched on. When the vehicle is moving all faults are detected.

Fault code 17137 / P0753

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17137 / P0753 Switch valve 1 ⇒ Solenoid valve 1 -N88- Electrical fault in circuit	♦ Open circuit or short to earth or positive in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Solenoid valve 1 -N88- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 005 ⇒ page 59 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 10 ⇒ page 74
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Fault code 17140 / P0756

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17140 / P0756 Switch valve 2 ⇒ Solenoid valve 2 -N89- Open circuit / short to earth	♦ Open circuit or short to earth in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Solenoid valve 2 -N89- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 005 ⇒ page 59 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 11 ⇒ page 74

Explanatory notes

- The check for short to positive is made as soon as the ignition is switched on. When the vehicle is moving all faults are detected.

Fault code 17141 / P0757

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17141 / P0757 Switch valve 2 ⇒ Solenoid valve 2 -N89- Short to positive	♦ Short to positive in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Solenoid valve 2 -N89- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 005 ⇒ page 59 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 11 ⇒ page 74
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Explanatory notes

- The check for short to positive is made as soon as the ignition is switched on. When the vehicle is moving all faults are detected.

Fault code 17142 / P0758

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17142 / P0758 Switch valve 2 ⇒ Solenoid valve 2 -N89- Electrical fault in circuit	♦ Open circuit or short to earth or positive in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Solenoid valve 2 -N89- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 005 ⇒ page 59 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 11 ⇒ page 74
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Fault code 17145 / P0761

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17145 / P0761 Switch valve 3 ⇒ Solenoid valve 3 -N90- Open circuit / short to earth	♦ Open circuit or short to earth in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Solenoid valve 3 -N90- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 005 ⇒ page 59 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 12 ⇒ page 75

Explanatory notes

♦ The check for short to positive is made as soon as the ignition is switched on. When the vehicle is moving all faults are detected.

Fault code 17146 / P0762

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17146 / P0762 Switch valve 3 ⇒ Solenoid valve 3 -N90- Short to positive	♦ Short to positive in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Solenoid valve 3 -N90- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 005 ⇒ page 59 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 12 ⇒ page 75
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Explanatory notes

♦ The check for short to positive is made as soon as the ignition is switched on. When the vehicle is moving all faults are detected.

Fault code 17147 / P0763

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17147 / P0763 Switch valve 3 ⇒ Solenoid valve 3 -N90- Electrical fault in circuit	♦ Open circuit or short to earth or positive in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Solenoid valve 3 -N90- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 005 ⇒ page 59 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 12 ⇒ page 75
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Fault code 17195 / P0811

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17195 / P0811 Severe clutch slip	♦ ATF level not OK	– Check ATF level ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37
	♦ ATF dirty	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01L, four-wheel drive; Rep. Gr. 38 – Check solenoid valves (read measured value block 005 … 007 ⇒ page 59)
	♦ Brake slipping/defective or solenoid valve dirty/defective	
	♦ Gearbox input speed sender -G182- defective	– Rectify fault as described for fault code 17100 / P0716 ⇒ page 18
	♦ Gearbox output speed sender -G195- defective	– Rectify fault as described for fault code 17105 / P0721 ⇒ page 19
	♦ Incorrect or incorrectly coded automatic gearbox control unit -J217-	– Check control unit identification ⇒ page 13

Explanatory notes

- The gear monitoring system in the gearbox control unit checks the transmission ratios by comparing the engine output speed and gearbox output speed. This fault is displayed if an incorrect transmission ratio (implausibility) is detected.
- When testing the stall speed, the gearbox input speed in the torque converter should be almost 0 rpm with the vehicle stationary and a gear engaged. If this is not the case, this fault will also be displayed to indicate possible damage to the brakes (read measured value block 001 ⇒ page 54).

Fault code 17968 / P1560

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17968 / P1560 Maximum engine speed exceeded	♦ Incorrect signal from engine speed sender -G28- to engine control unit ♦ Engine speed sender -G28- defective ♦ Engine speed signal falsified due to incorrectly routed electrical wiring (e.g. because of retrofitted telephone)	– Read measured value block 001 ⇒ page 54 – Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01 – Rectify fault of engine control unit as described for fault code 16706 / P0322 ⇒ Rep. Gr. 01 – Check load signal for maximum engine torque
	♦ Engine on vehicle has been tuned ♦ Incorrect engine/gearbox combination	– Check whether engine has been tuned (unauthorised modifications) – Check transmission ratios according to engine and gearbox codes
	♦ Gearbox has changed down when road speed is too high (e.g. due to mechanical fault in valve body)	– Read measured value block 005 ⇒ page 59 and perform road test to determine which selector elements are defective or not activated

Explanatory notes

♦ The fault will be detected if engine speed is higher than 7400 rpm (vehicles with petrol engine) or 5500 rpm (vehicles with TDI engine).

♦ The signal from engine speed sender -G28- is transmitted to automatic gearbox control unit -J217- by engine control unit.

♦ The signals between the control units are exchanged via a CAN bus ⇒ page 89 .

4.4 Fault tables: Fault code 18112 / P1704 up to fault code 18269 / P1861

Fault code 18112 / P1704

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18112 / P1704 Kick-down switch -F8- Electrical fault in circuit	♦ Wiring from component to engine control unit defective ♦ Wiring from component to automatic gearbox control unit -J217- defective ♦ Kick-down switch -F8- defective	– For kick-down function and throttle valve value, read measured value block 008 ⇒ page 62 – Perform electrical check, test step No. 7 ⇒ page 73
	♦ Open circuit or short to earth or positive in CAN bus wiring	– Read measured value block 125 ⇒ page 65 – Check CAN bus wiring ⇒ page 89

Explanatory notes

♦ This fault may be erroneously displayed if brake pedal is pressed and accelerator pedal is simultaneously floored as far as kick-down (full throttle).

Fault code 18141 / P1733

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18141 / P1733 tiptronic switch, down -F189- Short to earth	♦ Short to earth in tip-down switch or in wiring ♦ Short to earth in tiptronic buttons on multi-function steering wheel or in wiring	– Read measured value block 011 ⇒ page 63 – Perform electrical check, test step No. 23 ⇒ page 80

Explanatory notes

♦ This fault is displayed if actuation of tip-down switch (-) is detected when selector lever is not in position “D”.

Fault code 18147 / P1739

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18147 / P1739 tiptronic switch, up -F189- Short to earth	♦ Short to earth in tip-up switch or in wiring ♦ Short to earth in tiptronic buttons on multi-function steering wheel or in wiring	– Read measured value block 011 ⇒ page 63 – Perform electrical check, test step No. 23 ⇒ page 80

Explanatory notes

♦ This fault is displayed if actuation of tip-up switch (+) is detected when selector lever is not in position “D”.

Fault code 18152 / P1744

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18152 / P1744 tiptronic (recognition) switch -F189- Short to earth	♦ Short to earth in wiring	– Check wiring and connectors according to current flow diagram
	♦ Short to earth in tiptronic switch -F189- (recognition) ♦ tiptronic switch -F189- defective	– Read measured value block 011 ⇒ page 63 – Perform electrical check, test step No. 22 ⇒ page 79
	♦ Automatic gearbox control unit -J217- defective due to high voltage	– Perform electrical check, test step No. 1 ⇒ page 70 – If no fault is detected, renew control unit ⇒ page 3

Explanatory notes

♦ This fault is displayed if the tiptronic switch -F189- (recognition) has been activated with selector lever not in position “D”.

Fault code 18153 / P1745

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18153 / P1745 Voltage supply for solenoid valves Short to positive	♦ Short circuit between positive and contacts 52 and 53 on automatic gearbox control unit -J217-	– Read measured value block 003 ⇒ page 56 – Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness – Check voltage supply to automatic gearbox control unit -J217- – Perform electrical check, test step No. 9 ⇒ page 74
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Fault code 18155 / P1747

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18155 / P1747 Voltage supply for solenoid valves Open circuit / short to earth	♦ Open circuit in wiring or short circuit between earth and contacts 52 and 53 on automatic gearbox control unit -J217-	– Read measured value block 003 ⇒ page 56 – Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness – Check voltage supply to automatic gearbox control unit -J217- – Perform electrical check, test step No. 9 ⇒ page 74
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Fault code 18156 / P1748

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18156 / P1748 Control unit defective	♦ Automatic gearbox control unit -J217- defective	– Check gearbox for mechanical and hydraulic faults – Check electrical/electronic components and wiring – Check electronics box of gearbox control unit for moisture and seal if necessary. – Renew control unit ⇒ page 3

Fault code 18157 / P1749 - Fault description for gearbox control units with all data levels except “D26”, “D29” and “D32”. Check control unit identification ⇒ page 13

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18157 / P1749 Automatic gearbox control unit Incorrect coding	♦ Incorrect coding detected by gearbox control unit	– Check gearbox control unit identification ⇒ page 13 – Read measured value block 013 ⇒ page 64
	♦ Engine control unit incorrectly coded or incorrect engine control unit installed	– Check engine control unit identification ⇒ Rep. Gr. 01
	♦ Engine on vehicle has been tuned	– Check whether engine has been tuned (unauthorised modifications)

Caution

The fault codes “18157 / P1748” and “18265 / P1857” were interchanged when producing the software for gearbox control units with data levels “D26”, “D29” and “D32”. Fault description for gearbox control units with data levels “D26”, “D29” and “D32” ⇒ page 31 *.*

Fault code 18157 / P1749 - Fault description only for gearbox control units with data levels “D26”, “D29” and “D32”. Check control unit identification ⇒ page 13

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18157 / P1749 Automatic gearbox control unit Incorrect coding	♦ Fault in “signal for actual engine torque” detected by engine control unit	– Read out fault memory of engine control unit and rectify fault ⇒ Rep. Gr. 01

18157 / P1749 Automatic gearbox control unit Fault message from engine control unit	♦ Engine control unit incorrectly coded or incorrect engine control unit installed	– Check engine control unit identification ⇒ Rep. Gr. 01
	♦ Gearbox control unit incorrectly coded or incorrect gearbox control unit installed	– Check gearbox control unit identification ⇒ page 13
	♦ Engine on vehicle has been tuned	– Check whether engine has been tuned (unauthorised modifications)

Caution

The fault codes 18157 / P1748 and 18265 / P1857 were interchanged when producing the software for gearbox control units with data levels “D26”, “D29” and “D32”. Fault description for gearbox control units with all data levels except “D26”, “D29” and “D32” ⇒ page 31 *.*

Explanatory notes

- The fault is transmitted to automatic gearbox control unit - J217- by engine control unit.
- The signals between the control units are exchanged via a CAN bus ⇒ page 89 .

Fault code 18158 / P1750

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18158 / P1750 Voltage supply Voltage too low	♦ Fault detected by battery monitoring system ♦ Battery voltage less than 7 V	– Read measured value block 003 ⇒ page 56
	♦ Open circuit or short to earth in wiring	– Check wiring and connectors according to current flow diagram – Perform electrical check, test steps No. 1 ⇒ page 70 and No. 6 ⇒ page 73
	♦ Fuse defective	– Check voltage supply to automatic gearbox control unit - J217-
	♦ Open circuit/short circuit to permanent positive in gearbox control unit	– Renew control unit ⇒ page 3

Explanatory notes

- The battery monitoring system distinguishes between four different ranges (U = battery voltage):

1. U = less than 7 V: Gearbox switches to emergency running mode ⇒ page 2
2. U = 7…9 Volts: Gear which is currently selected will be maintained for about 2.5 seconds and if U (= battery voltage) still remains within this range after this period of time, gearbox switches to emergency running mode ⇒ page 2
3. U = 9…16 Volts: Voltage OK
4. U = higher than 16 V: Gearbox switches to emergency running mode ⇒ page 2

- If the voltage supply from the vehicle's electrical system (terminal 30) fails, certain application values will be lost, i.e. the gearbox control unit must re-learn them the next time the engine is started. During this “learning process” the gear change quality may not be as smooth as usual

Fault code 18159 / P1751

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18159 / P1751 Voltage supply Voltage too high	♦ Battery voltage higher than 16 V ♦ Alternator or voltage regulator defective	– Read measured value block 003 ⇒ page 56 – Check wiring and connectors according to current flow diagram – Check voltage supply to control unit – Perform electrical check, test steps No. 1 ⇒ page 70 and No. 6 ⇒ page 73 – Check alternator or voltage regulator ⇒ Electrical System; Rep. Gr. 27
	♦ Second battery connected in series by mistake (e.g. for jump-starting)	– Erase fault memory

Explanatory notes

♦ The battery monitoring system distinguishes between four different ranges (U = battery voltage):

1. U = less than 7 V: Gearbox switches to emergency running mode ⇒ page 2
2. U = 7…9 Volts: Gear which is currently selected will be maintained for about 2.5 seconds and if U (= battery voltage) still remains within this range after this period of time, gearbox switches to emergency running mode ⇒ page 2
3. U = 9…16 Volts: Voltage OK
4. U = higher than 16 V: Gearbox switches to emergency running mode ⇒ page 2

Fault code 18169 / P1761

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18169 / P1761 Selector lever lock ⇒ solenoid -N110- Short to earth	♦ No voltage supply for selector lever lock solenoid -N110- ♦ Fuse defective ♦ Short to earth	– Read measured value block 003 ⇒ page 56 – Check fuses, wiring and connectors according to current flow diagram
	♦ Selector lever lock solenoid -N110- defective	– Perform final control diagnosis ⇒ page 42 – Perform electrical check, test steps No. 2 ⇒ page 71 and No. 18 ⇒ page 78
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Explanatory notes

♦ The selector lever lock solenoid -N110- cannot be deactivated, i.e. the selector lever cannot be moved out of positions “P” or “D” even though the brake pedal is pressed.

Fault code 18170 / P1762

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18170 / P1762 Selector lever lock ⇒ solenoid -N110- Short to positive	♦ Short to positive in wiring to component	– Read measured value block 003 ⇒ page 56 – Check wiring and connectors according to current flow diagram
	♦ Selector lever lock solenoid -N110- defective	– Perform final control diagnosis ⇒ page 42 – Perform electrical check, test steps No. 2 ⇒ page 71 and No. 18 ⇒ page 78
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Explanatory notes

♦ The selector lever lock solenoid -N110- cannot be activated with the selector lever in positions “P” or “N”, i.e. the selector lever can be moved out of positions “P” or “N” without pressing the brake pedal.

Fault code 18171 / P1763

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18171 / P1763 Selector lever lock ⇒ solenoid -N110- Open circuit	♦ Open circuit in wiring to component	– Read measured value block 003 ⇒ page 56 – Check wiring and connectors according to current flow diagram
	♦ Selector lever lock solenoid -N110- defective	– Perform final control diagnosis ⇒ page 42 – Perform electrical check, test steps No. 2 ⇒ page 71 and No. 18 ⇒ page 78
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Explanatory notes

♦ The selector lever lock solenoid -N110- cannot be activated with the selector lever in positions “P” or “N”, i.e. the selector lever can be moved out of positions “P” or “N” without pressing the brake pedal.

Fault code 18222 / P1814

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18222 / P1814 Pressure regulating valve 1 -N215- Open circuit / short to earth	♦ Open circuit or short to earth in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ Automatic gearbox pressure regulating valve 1 -N215- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 006 ⇒ page 60 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 13 ⇒ page 76

Fault code 18223 / P1815

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18223 / P1815 Pressure regulating valve 1 -N215- Short to positive	♦ Short to positive in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Automatic gearbox pressure regulating valve 1 -N215- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 006 ⇒ page 60 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 13 ⇒ page 76
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Fault code 18227 / P1819

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18227 / P1819 Pressure regulating valve 2 -N216- Open circuit / short to earth	♦ Open circuit or short to earth in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Automatic gearbox pressure regulating valve 2 -N216- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 006 ⇒ page 60 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 14 ⇒ page 76

Fault code 18228 / P1820

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18228 / P1820 Pressure regulating valve 2 -N216- Short to positive	◆ Short to positive in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	◆ Automatic gearbox pressure regulating valve 2 -N216- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 006 ⇒ page 60 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 14 ⇒ page 76
	◆ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Fault code 18232 / P1824

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18232 / P1824 Pressure regulating valve 3 -N217- Open circuit / short to earth	◆ Open circuit or short to earth in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	◆ Automatic gearbox pressure regulating valve 3 -N217- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 006 ⇒ page 60 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 15 ⇒ page 77

Fault code 18233 / P1825

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18233 / P1825 Pressure regulating valve 3 -N217- Short to positive	◆ Short to positive in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	◆ Automatic gearbox pressure regulating valve 3 -N217- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 006 ⇒ page 60 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 15 ⇒ page 77

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Fault code 18237 / P1829

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18237 / P1829 Pressure regulating valve 4 -N218- Open circuit / short to earth	♦ Open circuit or short to earth in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Automatic gearbox pressure regulating valve 4 -N218- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 007 ⇒ page 61 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 16 ⇒ page 77

Fault code 18238 / P1830

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18238 / P1830 Pressure regulating valve 4 -N218- Short to positive	♦ Short to positive in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Automatic gearbox pressure regulating valve 4 -N218- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 007 ⇒ page 61 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 16 ⇒ page 77
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Fault code 18242 / P1834

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18242 / P1834 Pressure regulating valve 5 -N233- Open circuit / short to earth	♦ Open circuit or short to earth in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ Automatic gearbox pressure regulating valve 5 -N233- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 006 ⇒ page 60 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 17 ⇒ page 78

Fault code 18243 / P1835

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18243 / P1835 Pressure regulating valve 5 -N233- Short to positive	♦ Short to positive in wiring to component	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 16-pin connector on gearbox between valve body and wiring harness
	♦ Automatic gearbox pressure regulating valve 5 -N233- defective	– Perform final control diagnosis ⇒ page 42 – Read measured value block 006 ⇒ page 60 – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 17 ⇒ page 78
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Fault code 18249 / P1841

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18249 / P1841 Engine/gearbox control unit Versions are not compatible	♦ Incorrect or defective automatic gearbox control unit -J217-	– Check control unit identification ⇒ page 13 – Read measured value block 013 ⇒ page 64
	♦ Incorrect or defective engine control unit	– Check engine control unit identification; interrogate fault memory and rectify faults ⇒ Rep. Gr. 01

Fault code 18258 / P1850

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18258 / P1850 Drive train data bus No message from engine control unit	♦ Open circuit or short to earth or positive in CAN bus wiring	– Read measured value block 125 ⇒ page 65 – Check CAN bus wiring ⇒ page 89
	♦ Incorrect or defective engine control unit	– Check engine control unit identification; interrogate fault memory and rectify faults ⇒ Rep. Gr. 01

Explanatory notes

- Data bus is also referred to as CAN bus.
- The signals between the control units are exchanged via a CAN bus ⇒ page 89 .

Fault code 18259 / P1851

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18259 / P1851 Drive train data bus No message from ABS control unit	♦ Open circuit or short to earth or positive in CAN bus wiring	– Read measured value block 125 ⇒ page 65 – Check CAN bus wiring ⇒ page 89
	♦ Incorrect or defective ABS with EDL control unit -J104-	– Check control unit identification; interrogate fault memory and rectify fault ⇒ Running gear, self-diagnosis for ABS, ESP; Rep. Gr. 01

Explanatory notes

- Data bus is also referred to as CAN bus.
- The signals between the control units are exchanged via a CAN bus ⇒ page 89 .

Fault code 18262 / P1854

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18262 / P1854 Drive train data bus defective	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 3

Explanatory notes

- Data bus is also referred to as CAN bus.
- The signals between the control units are exchanged via a CAN bus ⇒ page 89 .

Fault code 18263 / P1855

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18263 / P1855 Drive train data bus Software version monitoring	♦ Open circuit or short to earth or positive in CAN bus wiring	– Read measured value block 125 ⇒ page 65 – Check CAN bus wiring ⇒ page 89
	♦ Incorrect automatic gearbox control unit -J217-	– Check control unit identification ⇒ page 13

Explanatory notes

- Data bus is also referred to as CAN bus.
- The signals between the control units are exchanged via a CAN bus ⇒ page 89 .

Fault code 18264 / P1856

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18264 / P1856 Throttle valve potentiometer -G69- Fault message from engine control unit	♦ Incorrect signal from throttle valve potentiometer to engine control unit ♦ Wiring between throttle valve potentiometer and engine control unit defective	– Read measured value block 008 ⇒ page 62 and 009 ⇒ page 63 – Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01
	♦ Incorrect or defective engine control unit	– Check engine control unit identification; interrogate fault memory and rectify faults ⇒ Rep. Gr. 01

Explanatory notes

- The signal from throttle valve potentiometer -G69- is transmitted to automatic gearbox control unit -J217- by engine control unit.
- The signals between the control units are exchanged via a CAN bus ⇒ page 89 .

Fault code 18265 / P1857 - Fault description for gearbox control units with all data levels except “D26”, “D29” and “D32”. Check control unit identification ⇒ page 13

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18265 / P1857 Load signal Fault message from engine control unit	♦ Fault detected by engine control unit in “actual engine torque”	– Read measured value block 009 ⇒ page 63 – Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01
	♦ Incorrect or defective engine control unit ♦ Mechanical fault in engine	– Check engine control unit identification; interrogate fault memory and rectify faults ⇒ Rep. Gr. 01
	♦ Engine on vehicle has been tuned	– Check whether engine has been tuned (unauthorised modifications)

Caution

The fault codes 18157 / P1748 and 18265 / P1857 were interchanged when producing the software for gearbox control units with data levels “D26”, “D29” and “D32”. Fault description for gearbox control units with data levels “D26”, “D29” and “D32” ⇒ page 41 .

Explanatory notes

- The signal for “actual engine torque” is transmitted to automatic gearbox control unit -J217- by engine control unit.
- The signals between the control units are exchanged via a CAN bus ⇒ page 89 .

Fault code 18265 / P1857 - Fault description only for gearbox control units with data levels "D26", "D29" and "D32". Check control unit identification ⇒ page 13

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18265 / P1857 Load signal Fault message from engine control unit	♦ Incorrectly coded or incorrect engine control unit	– Check engine control unit identification ⇒ Rep. Gr. 01

Caution

The fault codes 18157 / P1748 and 18265 / P1857 were interchanged when producing the software for gearbox control units with data levels "D26", "D29" and "D32". Fault description for all other data levels ⇒ page 40 *.*

Explanatory notes

- The signal for "actual engine torque" is transmitted to automatic gearbox control unit -J217- by engine control unit.
- The signals between the control units are exchanged via a CAN bus ⇒ page 89 .

Fault code 18269 / P1861

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18269 / P1861 Accelerator position sender -G79- Fault message from engine control unit	♦ Open circuit in wiring or short between accelerator position sender and engine control unit	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture
	♦ Accelerator position sender defective	– Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01

Explanatory notes

- The signal from accelerator position sender -G79- is transmitted to automatic gearbox control unit -J217- by engine control unit.
- The signals between the control units are exchanged via a CAN bus ⇒ page 89 .

5 Final control diagnosis

Note

- *The final control diagnosis can only be performed with the ignition switched on, the selector lever in position "P", the engine not running and the vehicle stationary.*
- *If the engine is started the final control diagnosis will be terminated.*
- *During the final control diagnosis the operation of solenoid valves -N88- , -N89- and -N90- as well as the selector lever lock solenoid -N110- are tested acoustically. Since the switching action (clicking) of the control elements is very quiet, any background noise should be avoided when carrying out this part of the test.*
- *The pressure regulating valves -N215- , -N216- , -N217- , -N218- and -N233- are activated during final control diagnosis. It is not possible to check operation of each component directly, however, any electrical faults that may occur during the activation process will be stored in the fault memory.*
- *During the final control diagnosis the control elements are activated until the → button is touched.*
- *When the ignition has been switched on the final control diagnosis can only be performed once. To perform a second final control diagnosis the ignition must be switched off and then on again.*

Activation sequence

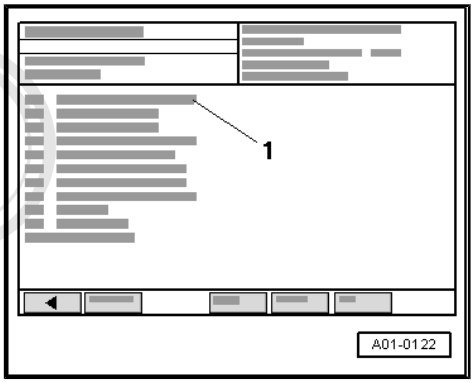
1. Solenoid valve 1 -N88-
2. Solenoid valve 2 -N89-
3. Solenoid valve 3 -N90-
4. Selector lever lock solenoid -N110-
5. Automatic gearbox pressure regulating valve 1 -N215-
6. Automatic gearbox pressure regulating valve 2 -N216-
7. Automatic gearbox pressure regulating valve 3 -N217-
8. Automatic gearbox pressure regulating valve 4 -N218-
9. Automatic gearbox pressure regulating valve 5 -N233-
10. Voltage supply for solenoid valves

Procedure

– Connect vehicle diagnostic, testing and information system - VAS 5051- ⇒ page 11 and select vehicle system "02 - Gearbox electronics". When doing this the ignition must be switched on.

Display on -VAS 5051- :

– From list -1- select diagnostic function “03 - Final control diagnosis”.

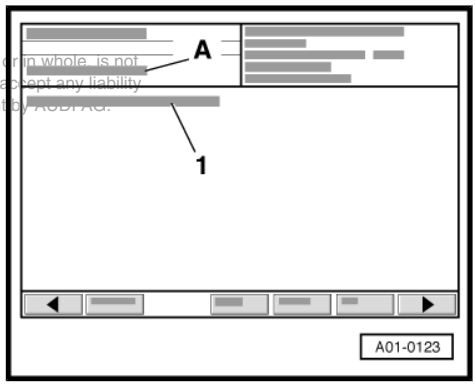


Display on -VAS 5051- :

A - 1st control element in test

1 - Switch valve 1 ⇒ Solenoid valve 1 -N88-

• The valve is activated in intervals (and should click).



Note

♦ *If valve is not activated, read “measured value block 005” ⇒ page 59 .*

♦ *Any electrical faults will be stored in the fault memory, fault tables for solenoid valve 1 -N88- ⇒ page 23 .*

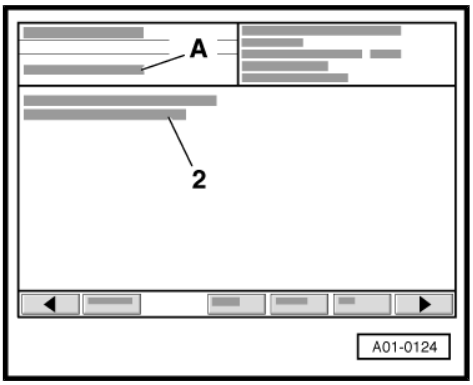
– Final control diagnosis is advanced to the next control element by touching ⊡ button.

Display on -VAS 5051- :

A - 2nd control element in test

2 - Switch valve 2 ⇒ Solenoid valve 2 -N89-

• The valve is activated in intervals (and should click).



Note

♦ *If valve is not activated, read “measured value block 005” ⇒ page 59 .*

♦ *Any electrical faults will be stored in the fault memory, fault tables for solenoid valve 2 -N89- ⇒ page 24 .*

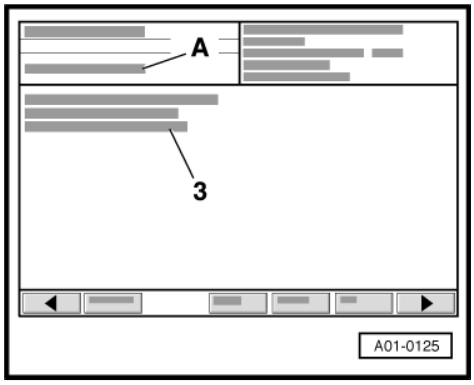
– Final control diagnosis is advanced to the next control element by touching ⊡ button.

Display on -VAS 5051- :

A - 3rd control element in test

3 - Switch valve 3 ⇒ Solenoid valve 3 -N90-

- The valve is activated in intervals (and should click).



Note

- *If valve is not activated, read "measured value block 005" ⇒ page 59 .*
- *Any electrical faults will be stored in the fault memory, fault tables for solenoid valve 3 -N90- ⇒ page 26 .*

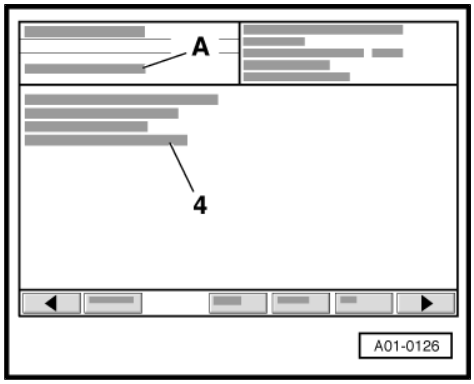
– Final control diagnosis is advanced to the next control element by touching ⇨ button.

Display on -VAS 5051- :

A - 4th control element in test

4 - Selector lever lock ⇒ solenoid -N110-

- The solenoid is activated in intervals (and should click).



Note

- *If solenoid is not activated, read "measured value block 003 " ⇒ page 56 .*
- *Any electrical faults will be stored in the fault memory, fault tables for selector lever lock solenoid -N110- ⇒ page 33 .*

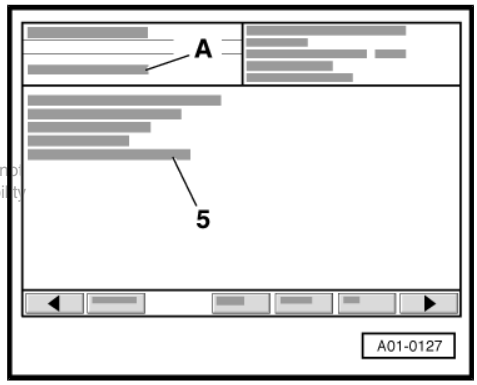
– Final control diagnosis is advanced to the next control element by touching ⇨ button.

Display on -VAS 5051- :

A - 5th control element in test

5 - Pressure regulating valve 1 -N215-

- The valve is activated.



Note

Any electrical faults will be stored in the fault memory, fault tables for automatic gearbox pressure regulating valve 1 -N215- ⇒ page 34 .

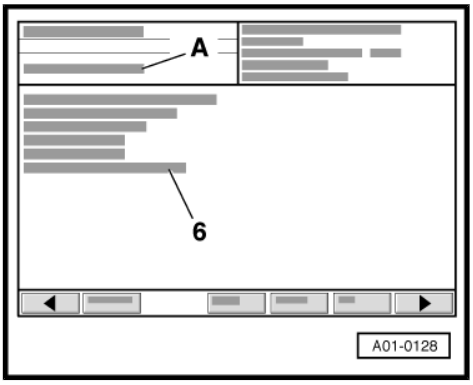
– Final control diagnosis is advanced to the next control element by touching ⇨ button.

Display on -VAS 5051- :

A - 6th control element in test

6 - Pressure regulating valve 2 -N216-

- The valve is activated.



Note

Any electrical faults will be stored in the fault memory, fault tables for automatic gearbox pressure regulating valve 2 -N216- *⇒ page 35* .

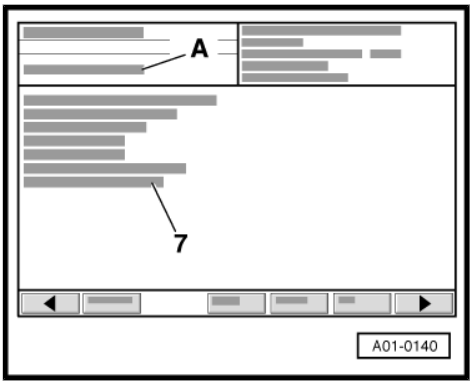
– Final control diagnosis is advanced to the next control element by touching ⊡ button.

Display on -VAS 5051- :

A - 7th control element in test

7 - Pressure regulating valve 3 -N217-

- The valve is activated.



Note

Any electrical faults will be stored in the fault memory, fault tables for automatic gearbox pressure regulating valve 3 -N217- *⇒ page 36* .

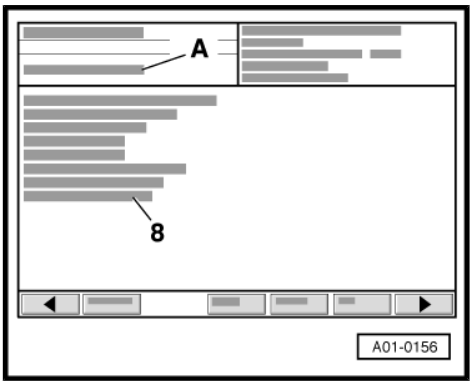
– Final control diagnosis is advanced to the next control element by touching ⊡ button.

Display on -VAS 5051- :

A - 8th control element in test

8 - Pressure regulating valve 4 -N218-

- The valve is activated.



Note

Any electrical faults will be stored in the fault memory, fault tables for automatic gearbox pressure regulating valve 4 -N218- *⇒ page 37* .

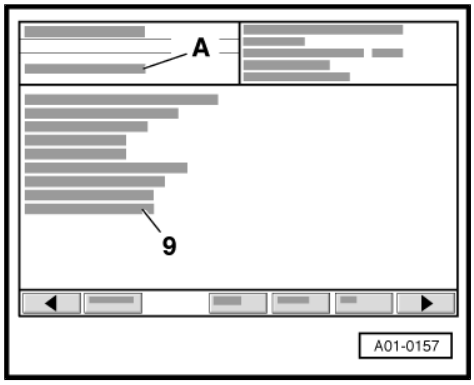
– Final control diagnosis is advanced to the next control element by touching ⊡ button.

Display on -VAS 5051- :

A - 9th control element in test

9 - Pressure regulating valve 5 -N233-

- The valve is activated.



Note

Any electrical faults will be stored in the fault memory, fault tables for automatic gearbox pressure regulating valve 5 -N233- ⇒ page 37 .

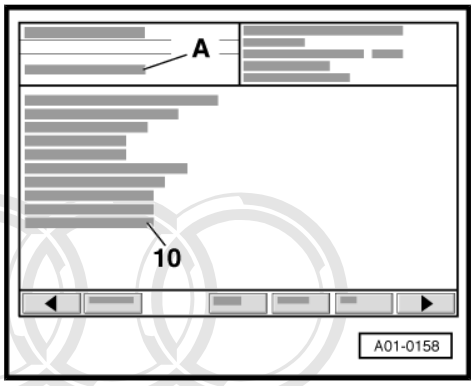
– Final control diagnosis is advanced to the next control element by touching ⇨ button.

Display on -VAS 5051- :

A - 10th control element in test

10 - Voltage supply for solenoid valves

- In position “P” the solenoid valves are activated in intervals (and should click).



Note

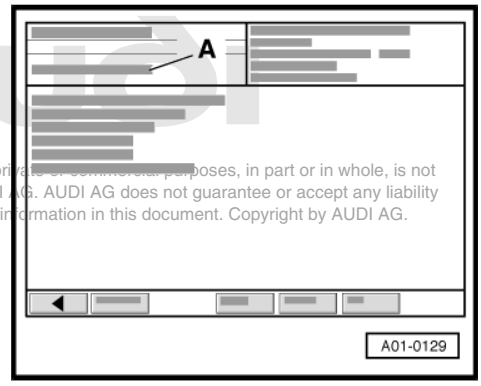
Ignore control element.

– Touch ⇨ button.

Display on -VAS 5051- :

A - Control element test is completed

– Exit from function “03 - Final control diagnosis” by touching ⇦ button.



Note

To perform a second final control diagnosis the ignition must be switched off and then on again and function “03 - Final control diagnosis” selected once again.

6 Erasing fault memory

Note

If fault memory cannot be erased, interrogate fault memory once again and rectify any faults.

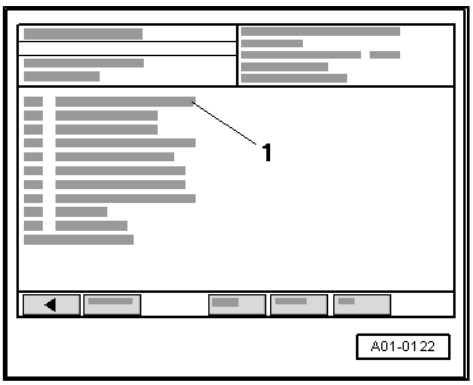
Requirements

- Fault memory interrogated ⇒ page 14 .
- All faults rectified.

After interrogating fault memory:

Display on -VAS 5051- :

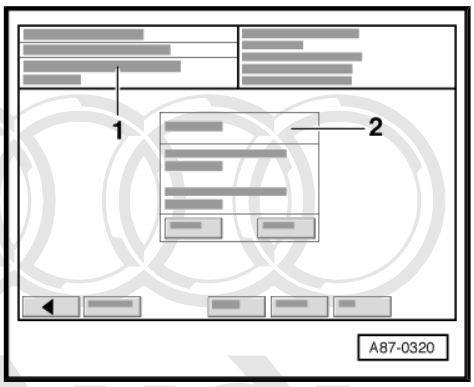
– From list -1- select function “05 - Erase fault memory”.



Display on -VAS 5051- :

1 - No display (before erasing memory) or

- Fault memory erased



Note

If the following message appears in display zone -1-: “Fault memory has not yet been interrogated”, the procedure was not performed properly. The fault memory must first be interrogated before it can be erased.

2 - Note: Is this function to be carried out? Note: Data will be erased.

– Touch OK button in display -2-.

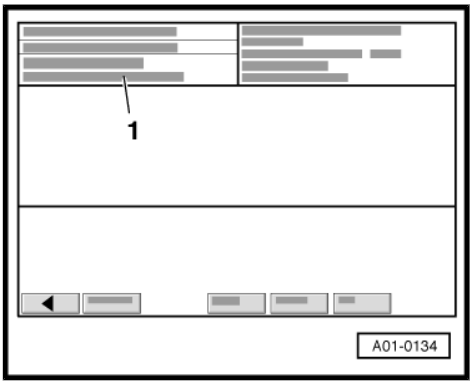
– Exit function “05 - Erase fault memory” by touching ← button.

– After interrogating and erasing fault memory, road-test vehicle and interrogate fault memory once again.

Display on -VAS 5051- :

When the fault memory is interrogated the following display should appear:

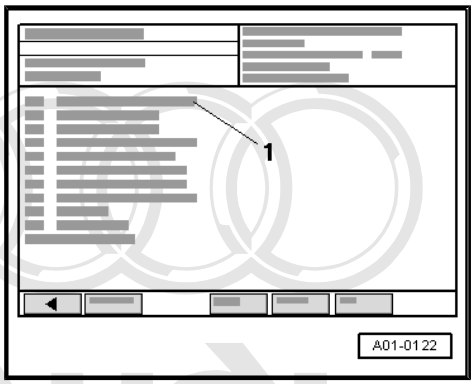
1 - “0 fault detected”



7 Ending output

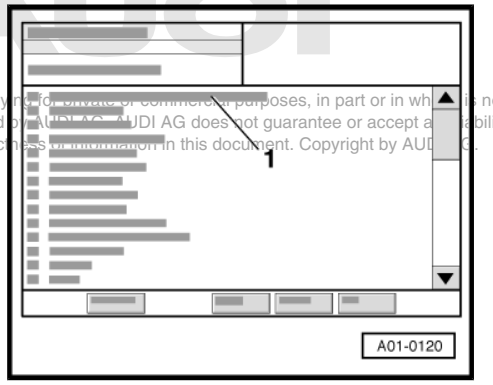
Display on -VAS 5051- :

– From list -1- select function “06 - End output”.



Display on -VAS 5051- :

– When this display is indicated, switch off ignition and unplug diagnostic connector.



8 Resetting adaption values for gearbox control unit (basic setting)

The adaption values in the gearbox control unit should be reset after repairing valve body (e.g renewing solenoid valves), renewing valve body, torque converter or gearbox. This enables the gearbox control unit to relearn these adaption values under normal operating conditions more quickly when it is put back into operation.

The adaption values in the gearbox control unit will be reset:

- If multi-pin connector at gearbox control unit is disconnected for at least 15 minutes ⇒ page 10 .
- If battery is disconnected for at least 15 minutes ⇒ Electrical system; Rep. Gr. 27 .

9 Coding control unit

The automatic gearbox control unit -J217- can only be coded if the following requirements are met:

- Vehicle stationary, ignition switched on, engine not running.
- Selector lever in position “P” or “N”.
- Accelerator pedal in idling position.

– Connect vehicle diagnostic, testing and information system - VAS 5051- ⇒ page 11 and select vehicle system “02 - Gearbox electronics”. When doing this the ignition must be switched on.

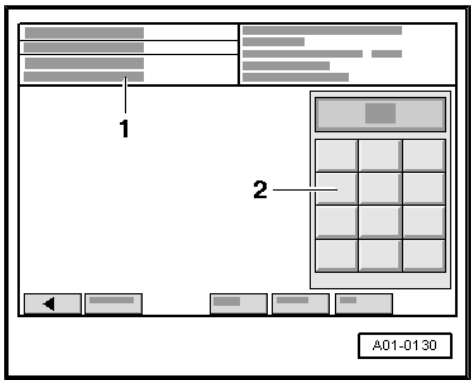
Display on -VAS 5051- :

– From list -1- select function “07 - Code control unit”.

Display on -VAS 5051- :

1 - Enter code word

– Use keypad -2- to enter 5-digit coding according to coding table.



Coding table for USA/Canada vehicles	Coding
A8 (up to model year 2001)	00002
S8 (up to model year 2001)	00102
A8 (from model year 2002 onwards)	01002
S8 (from model year 2002 onwards)	01102

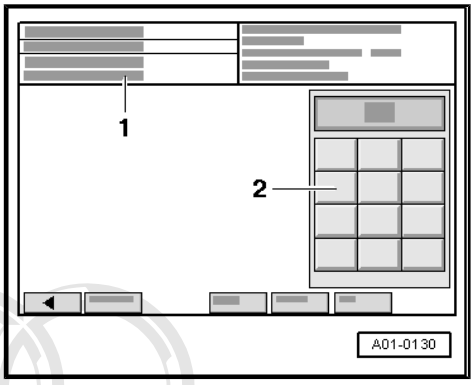
Coding table for rest of the world vehicles	Coding
A8	00001
S8 [1)]	00101
A8: Tip-up/tip down with selector lever in position “D”/“S” disabled on multi-function steering wheel [2)]	01001
S8: Tip-up/tip down with selector lever in position “D”/“S” disabled on multi-function steering wheel [2)]	01101

- [1)] Some S8 models are coded to “00001” because of a new control unit version. If it is not possible to change coding to “00101”, do not renew control unit. Coding “00001” is correct for these control units.
- [2)] On vehicles with multi-function steering wheel it is possible to shift up or shift down with selector lever in position “D” or “S” by touching button [+] or [-]. This function can be disabled with coding “01001” or on S8 models “01101”.

– Confirm entry by touching Q button.

Display on -VAS 5051- :

1 - Coding is being performed



– Wait until next screen display appears.

1 - Vehicle system coding completed

2 - Control unit identification with new coding (previous coding in brackets)

Note

- *If the control unit is coded with a coding which is invalid for this vehicle model, the following display will appear "Coding XXXXX not accepted".*
- *If an incorrect code number is entered the control unit retains the old coding.*
- *If the control unit is coded under conditions not permitting coding (e.g. when driving), the following display will appear: "Function unknown or cannot be performed at the moment".*
- *Once the coding operation has been completed the fault memory in the control unit is automatically erased.*

– Exit from function "07 - Code control unit" by touching ⏎ button.

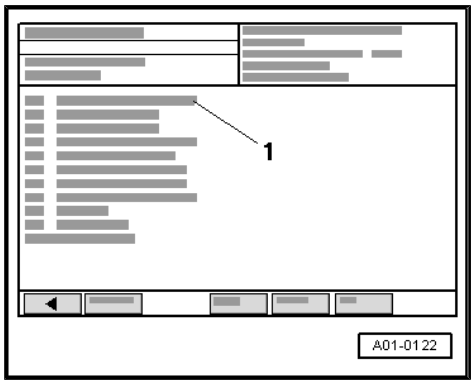
10 Measured value block

10.1 Reading measured value block

– Connect vehicle diagnostic, testing and information system - VAS 5051- ⇒ page 11 and select vehicle system “02 - Gearbox electronics”. When doing this the ignition must be switched on or the engine must be running at idling speed.

Display on -VAS 5051- :

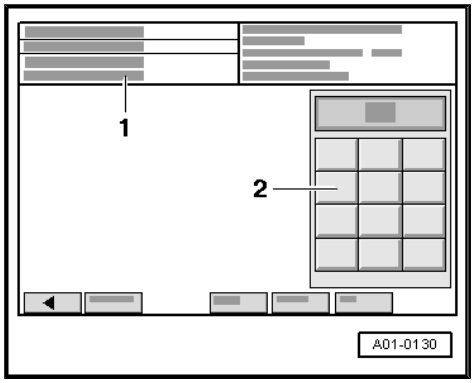
– From list -1-, select diagnostic function “08 - Read measured value block”.



Display on -VAS 5051- :

1 - Enter display group (max. input value = 255).

– Use keypad -2- to enter required “display group number” ⇒ page 52 and confirm entry by touching Q button.



Display on -VAS 5051- :

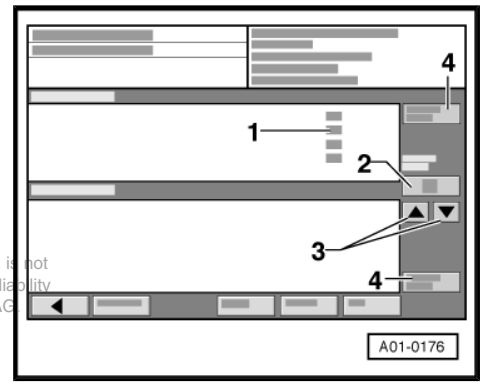
1 - Display zones 1 ... 4. If a display zone is vacant, the display in this line remains blank.

2 - The selected display group is indicated in this field.

3 - Touch these buttons to switch to other display groups.

4 - Touch these buttons to change to a different function (e.g. from “Read measured value block” to “Basic setting” and vice versa).

– Exit from diagnostic function “08 - Read measured value block” by touching ← button.



10.2 Overview of selectable display groups

Display group	Display zone	Designation	Further details
001	1	Engine speed	⇒ page 54
	2	Gearbox input speed	
	3	Gearbox output speed	
	4	Gear engaged in gearbox	

Display group	Display zone	Designation	Further details
002	1	Presently used shift program	⇒ page 55
	2	Throttle valve value or accelerator pedal position	
	3	Gearbox output speed	
	4	Gear engaged in gearbox	
003	1	Brake light switch -F-	⇒ page 56
	2	P/N lock	
	3	Speed	
	4	Voltage supply	
004	1	ATF temperature	⇒ page 56
	2	Selector lever position	
	3	Multi-function switch -F125- position	
	4	Depending on version: Torque reduction or On-board diagnosis information	
005	1	Solenoid valve 1 -N88-	⇒ page 59
	2	Solenoid valve 2 -N89-	
	3	Solenoid valve 3 -N90-	
	4	Gear engaged in gearbox	
006	1	Specified current of automatic gearbox pressure regulating valve 1 -N215-	⇒ page 60
	2	Specified current of automatic gearbox pressure regulating valve 2 -N216-	
	3	Specified current of automatic gearbox pressure regulating valve 3 -N217-	
	4	Specified current of automatic gearbox pressure regulating valve 5 -N233-	
007	1	ATF temperature	⇒ page 61
	2	Specified current of automatic gearbox pressure regulating valve 4 -N218-	
	3	Torque converter lock-up clutch	
	4	Torque converter slip speed	
008	1	Kick-down switch	⇒ page 62
	2	Throttle valve value or accelerator pedal position	
	3	Overrun/acceleration	
	4	Vacant	
009	1	Engine torque (actual)	⇒ page 64
	2	Engine speed	
	3	Throttle valve value or accelerator pedal position	
	4	Gearbox input torque	
010	1	Torque increase in torque converter	⇒ page 63
	2	Engine speed	
	3	Gear engaged in gearbox	
	4	Actual vehicle acceleration rate	
011	1	Selector lever position	⇒ page 63
	2	tiptronic switch -F189- (recognition)	
	3	tiptronic switch -F189- (shift up/shift down)	
	4	Vacant	
012	1	Type of driving, under load	⇒ page 64
	2	Driving dynamics index	
	3	Motion resistance index	
	4	Driving style factor	

Display group	Display zone	Designation	Further details
013 1)	1	CAN bus calibration torque	⇒ page 64
	2	CAN bus engine code	
	3	CAN bus gearbox code	
	4	CAN bus software version code	
125 1)	1	CAN bus for engine control unit	⇒ page 65
	2	CAN bus for ABS with EDL control unit -J104-	
	3	CAN bus for steering angle sender -G85-	
	4	Vacant	

• 1) Display in display groups 013 and 125 according to vehicle version.

10.3 Test table

Display group 001

Display zones		Explanatory notes
1	… rpm	Engine speed when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 If no value or an implausible value is displayed: – Rectify fault as described for fault code 17968 / P1560 ⇒ page 28
2		Gearbox input speed when vehicle is driven (from gearbox input speed sender -G182-). A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 – Gearshift must be completed, vehicle is not rolling downhill and not in overrun after accelerating
	0 ... 8200 rpm	• Gear “R” engaged
	0 ... 2000 rpm	• Gear “1”, “1m” engaged
	0 ... 8200 rpm	• Gear “2” engaged
	0 ... 8200 rpm	• Gear “3” engaged
	0 ... 8200 rpm	• Gear “4” engaged
	0 ... 8200 rpm	• Gear “5” engaged If no value or an implausible value is displayed: – Rectify fault as described for fault code 17100 / P0716 ⇒ page 18 – Check values in measured value block 007 ⇒ page 61 and perform road test to determine which selector elements are defective or not activated
3		Gearbox output speed when vehicle is driven (from gearbox speed sender -G38- / gearbox output speed sender -G195-). A second mechanic is required for reading out the values when vehicle is driven ⇒ “3.1 Safety precautions”, page 11 – Gearshift must be completed, vehicle is not rolling downhill and not in overrun after accelerating
	0 ... 2000 rpm	• Gear “R” engaged
	0 ... 2000 rpm	• Gear “1”, “1m” engaged
	0 ... 4000 rpm	• Gear “2” engaged
	0 ... 5800 rpm	• Gear “3” engaged
	0 ... 8200 rpm	• Gear “4” engaged
	0 ... 8200 rpm	• Gear “5” engaged

Display zones		Explanatory notes
		If no value or an implausible value is displayed: – Rectify fault as described for fault code 17100 / P0716 ⇒ page 18 – Check values in measured value block 007 ⇒ page 61 and perform road test to determine which selector elements are defective or not activated
4	1 … 5	Gear engaged in gearbox when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 • Selector lever in position “N” The automatic gearbox control unit -J217- has an automatic gear pre-select display function. The display shows the forwards gear that the control unit would activate if the selector lever were to be moved into selector lever position “D”
	R	• Selector lever in position “R”
	“1m” “2” “3” “4” “5”	• Selector lever in position “D”
	“1m” “2” “3” “4”	• Selector lever in position “S” or “4” 1)
	“1m” “2” “3”	• Selector lever in position “3” 1)
	“1m” “2”	• Selector lever in position “2” 1) Defective solenoid valves or other faults may prevent a particular gear from being engaged. If the display readout does not appear as described: – Check values for solenoid valves in measured value block 005 ⇒ page 59 , 006 ⇒ page 60 and 007 ⇒ page 61 – Check values for selector lever position in measured value block 004 ⇒ page 56
• 1) Selector mechanism up to model year 2001.		

Display group 002

Display zones		Explanatory notes
1	DS	Presently used shift program in normal driving conditions – depends on driving style and road conditions (acceleration, accelerator pedal movement, vehicle speed and load). A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 • Dynamic shift program is activated – gearshifts are avoided as far as possible
	WL	• Warm-up program is activated – gearbox shifts up earlier to avoid high engine speeds If warm-up program is not activated after cold start: – Check on-board diagnosis in measured value block 004 ⇒ page 58
	AS	• Traction control system activated
	TT	• tiptronic recognition activated If tiptronic recognition is not activated with selector lever in appropriate position: – Rectify fault as described for fault codes 18141 / P1733 ⇒ page 29 , 18147 / P1739 ⇒ page 29 and 18152 / P1744 ⇒ page 29
2	… %	Throttle valve value with vehicle stationary and engine not running – the % value rises continuously when the pedal is moved from idling speed to full throttle • Specification - with accelerator pedal in idling position: 0 … 1 % • Specification - with accelerator pedal in full throttle position: 99 … 100 %

Display zones		Explanatory notes
		If the display readout does not appear as described: – Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01 – Check CAN bus wiring ⇒ page 89
3	… rpm	Gearbox output speed ⇒ page 54 , measured value block 001, display zone 3
4	…	Gear engaged in gearbox ⇒ page 54 , measured value block 001, display zone 4

Display group 003

Display zones		Explanatory notes
1	…	Brake light switch -F- , vehicle stationary – Press brake pedal • Display should show: “Brakes” – Release brake pedal • Specification: No display readout If the display readout does not appear as described: – Vehicles up to model year 2000: Perform electrical check, test step No. 8 ⇒ page 73 – Vehicles from model year 2001 onwards: Interrogate fault memory of engine control unit and rectify fault ⇒ Rep. Gr. 01
2	…	Selector lever lock solenoid -N110- , vehicle stationary – Press brake pedal – Shift selector lever to position “P” or “N” • Specification: “P N inactive” – Release brake pedal • Specification: “P N active” If the display readout does not appear as described: – Perform electrical check, test steps No. 2 ⇒ page 71 and No. 18 ⇒ page 78
3	… km/h	Vehicle speed when driving. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 . Speedometer reading may be slightly different from values on display -VAS 5051- If no value is displayed: – Check speedometer sender -G22-
4	… V	Voltage supply, vehicle stationary • Min. 10.0 V • Max. 16.0 V If the specified value is not displayed: – Perform electrical check, test step No. 1 ⇒ page 70

Display zones 1 and 2 in display group 004

Display zones		Explanatory notes
1	… °C	ATF temperature with vehicle stationary and engine running (from gearbox oil temperature sender -G93- (ATF))

Display zones		Explanatory notes
		If an implausible value is displayed (e.g. display readout –50 °C indicates a short to earth, display readout 180 °C indicates a short to positive or open circuit): – Perform electrical check, test step No. 21 ⇒ page 79
2		Selector lever position (from multi-function switch -F125-), vehicle stationary
	P	• Selector lever in position “P”
	R	• Selector lever in position “R”
	N	• Selector lever in position “N”
	D	• Selector lever in position “D”
	4	• Selector lever in position “S” or “4” 1)
	3	• Selector lever in position “3” 1)
	2	• Selector lever in position “2” 1)
	Z1 2)	• Selector lever between positions “P” and “R” or between positions “R” and “D”
	Z2 2)	• Selector lever between positions “N” and “D”
	Z3 2)	• Selector lever between positions “D” and “S” or “4” 1)
	Z4 2)	• Selector lever between positions “4” and “3” or between positions “3” and “2” 1) If the display readout does not appear as described: – Check multi-function switch -F125- in display zone 3 – Perform electrical check, test steps No. 4 ⇒ page 71 and No. 5 ⇒ page 72 – If necessary, adjust selector lever cable ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37

- 1) Selector mechanism up to model year 2001.
- 2) Intermediate positions are displayed according to vehicle version. When the selector lever is moved into one of these intermediate positions, “Z1”, “Z2”, “Z3” or “Z4” will be displayed on -VAS 5051- . However, the display in the dash panel insert should not indicate that a gear has been selected, i.e. the display should only show “PRND432” or “PRNDS”, without any of the gear positions being highlighted.

Note

The input signals from multi-function switch -F125- can be checked on automatic gearbox control unit -J217- .

Display zone 3: (from left to right)	L 1	L 2	L 3	L 4
Wiring to -J217- , contact	36	8	37	9

Display zone 3 in display group 004

Display				Explanatory notes
1	2	3	4	
L1	L2	L3	L4	Multi-function switch -F125- , vehicle stationary
1	0	0	0	• Selector lever in position “P”
0	1	0	0	• Selector lever in position “R”
1	1	1	0	• Selector lever in position “N”
1	0	1	1	• Selector lever in position “D”
0	1	1	1	• Selector lever in position “S” or “4” 1)
0	0	0	1	• Selector lever in position “3” 1)
0	0	1	0	• Selector lever in position “2” 1)
1	1	0	0	• Selector lever between positions “P” and “R” or between positions “R” and “D”
1	0	1	0	• Selector lever between positions “N” and “D”
1	1	1	1	• Selector lever between positions “D” and “S” or “4” 1)
0	0	1	1	• Selector lever between positions “4” and “3” or between positions “3” and “2” 1) If the display readout does not appear as described: – Check multi-pin connector for contact corrosion and moisture – Check wiring and connector according to current flow diagram – Perform electrical check, test steps No. 4 ⇒ page 71 and No. 5 ⇒ page 72 – If necessary, adjust selector lever cable ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37
• 1) Selector mechanism up to model year 2001.				

Display zone 4 in display group 004 “torque reduction” (depending on vehicle version)

Display	Explanatory notes
...	Torque reduction (ignition timing retardation) when vehicle is driven; Requirement: engine speed signal OK. The torque reduction is only activated during a gearshift. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 – Accelerate vehicle rapidly from a standstill to make gearbox shift from one gear to the other several times • Specification: “ME” – No gearshift • Specification: No display readout

Display	Explanatory notes
	If the display readout does not appear as described: The torque reduction may be actuated only very briefly depending on driving conditions. This means because the signal to the -VAS 5051- is relatively slow there may be situations where a brief torque reduction is not registered – Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01 – Check CAN bus wiring ⇒ page 89

Display zone 4 in display group 004 “on-board diagnosis” (depending on vehicle version)

Display				Explanatory notes
1	2	3	4	
X				On-board diagnosis information when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 • “0” = Malfunction display switched off • “1” = Malfunction display switched on
	X			• “0” = Trip not completed • “1” = Trip completed
		X		• “0” = Gearbox warm-up not completed • “1” = Gearbox warm-up completed
			X	• “0” = Engine start not detected • “1” = Engine start detected

Display group 005

Display zones		Explanatory notes
1		Solenoid valve 1 -N88- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11
	0	• Not activated (inactive) with gear “3”, “4” or “5” engaged
	X	• Activated (active) with gear “P”, “R”, “N”, “D”, “2”, “1” or “1m” engaged If the display readout does not appear as described: – Check connectors for contact corrosion or moisture. Especially check the 16-pin connector on gearbox between valve body and wiring harness – Check wiring and connector according to current flow diagram – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 10 ⇒ page 74
2		Solenoid valve 2 -N89- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11
	0	• Not activated (inactive) with gear “R”, “N”, “1”, “1m” or “5” engaged
	X	• Activated (active) with gear “2”, “3” or “4” engaged

Display zones		Explanatory notes
		If the display readout does not appear as described: – Check connectors for contact corrosion or moisture. Especially check the 16-pin connector on gearbox between valve body and wiring harness – Check wiring and connector according to current flow diagram – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 11 ⇒ page 74
3	0	Solenoid valve 3 -N90- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 • Not activated (inactive) with gear “R”, “1”, “1m”, “2”, “3”, “4” or “5” engaged
	X	• Activated (active) with gear “P” or “N” engaged If the display readout does not appear as described: – Check connectors for contact corrosion or moisture. Especially check the 16-pin connector on gearbox between valve body and wiring harness – Check wiring and connector according to current flow diagram – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 12 ⇒ page 75
4	…	Gear engaged in gearbox ⇒ page 54 , measured value block 001, display zone 4

Display group 006

Display zones		Explanatory notes
1	… A	Specified current of automatic gearbox pressure regulating valve 1 -N215- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 . Various faults including defective pressure regulating valves or brakes may prevent a particular gear from being engaged • Min. 0.0 A • Max. 2.0 A If specified value is not displayed: – Check connectors for contact corrosion or moisture. Especially check the 16-pin connector on gearbox between valve body and wiring harness – Check wiring and connector according to current flow diagram – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 13 ⇒ page 76
2	… A	Specified current of automatic gearbox pressure regulating valve 2 -N216- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 . Various faults including defective pressure regulating valves or brakes may prevent a particular gear from being engaged • Min. 0.0 A • Max. 2.0 A If specified value is not displayed: – Check connectors for contact corrosion or moisture. Especially check the 16-pin connector on gearbox between valve body and wiring harness – Check wiring and connector according to current flow diagram – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 14 ⇒ page 76

Display zones		Explanatory notes
3	… A	Specified current of automatic gearbox pressure regulating valve 3 -N217- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 . Various faults including defective pressure regulating valves or brakes may prevent a particular gear from being engaged • Min. 0.0 A • Max. 2.0 A If specified value is not displayed: – Check connectors for contact corrosion or moisture. Especially check the 16-pin connector on gearbox between valve body and wiring harness – Check wiring and connector according to current flow diagram – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 15 ⇒ page 77
4	… A	Specified current of automatic gearbox pressure regulating valve 5 -N233- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 . Various faults including defective pressure regulating valves or brakes may prevent a particular gear from being engaged • Min. 0.0 A • Max. 2.0 A If specified value is not displayed: – Check connectors for contact corrosion or moisture. Especially check the 16-pin connector on gearbox between valve body and wiring harness – Check wiring and connector according to current flow diagram – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 17 ⇒ page 78

Display group 007

Display zones		Explanatory notes
1	… °C	ATF temperature ⇒ page 56 , measured value block 004, display zone 1
2	… A	Specified current of automatic gearbox pressure regulating valve 4 -N218- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 . Various faults including defective pressure regulating valves or brakes may prevent a particular gear from being engaged • Min. 0.0 A • Max. 2.0 A If specified value is not displayed: – Check connectors for contact corrosion or moisture. Especially check the 16-pin connector on gearbox between valve body and wiring harness – Check wiring and connector according to current flow diagram – Perform electrical check, test steps No. 9 ⇒ page 74 and No. 16 ⇒ page 77
3	TC open	Torque converter lock-up clutch when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 • TC = Torque converter lock-up clutch open
	TC ctrl.	• TC = Torque converter lock-up clutch in “control phase”
	TC closed	• TC closed = Torque converter lock-up clutch closed – Rectify fault as described for fault code 17125 / P0741 ⇒ page 22

Display zones		Explanatory notes
4	0 rpm … stall speed	Torque converter slip speed when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 • When “TC open”
	20 ... 120 rpm	• When “TC ctrl.”. The values specified apply when the “control phase” of torque converter lock-up clutch is concluded. Under unfavourable conditions (e.g. accelerating up a hill) this state will not be reached until 20 seconds after the gearshift has been completed. During this control phase the slip speeds can reach up to 350 rpm
	0 ... 20 rpm	• When “TC closed”: The gearshift must be completed (wait at least 1 second), the torque converter lock-up clutch (TC) must be closed (engaged) and the accelerator pedal value must be constant. If the display readout does not appear as described: – Check ATF level ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 – Rectify fault as described for fault codes 17105 / P0721 ⇒ page 19 and 17125 / P0741 ⇒ page 22 – Excessively high torque converter slip speeds may also be an indication of slipping brakes or non-activation of selector elements. Determine which selector element is defective or not activated ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 – Check comparative plausibility of engine speed, gearbox input speed and gearbox output speed in measured value block 001 ⇒ page 54

Display group 008

Display zones		Explanatory notes
1	…	Kick-down switch -F8- , vehicle stationary, engine switched off – Press down accelerator pedal past kick-down point • Display should show: “Kick-down” ("100%" should be displayed in display zone “2” at the same time) – Release accelerator pedal from kick-down point • Specification: No display readout If the display readout does not appear as described: – Perform electrical check, test step No. 7 ⇒ page 73
2	…%	Throttle valve value ⇒ page 55 , measured value block 002, display zone 2
3	…	Overrun/acceleration signal when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 – Allow vehicle to roll downhill or to roll in overrun after accelerating; do not press accelerator pedal • Specification: “Overrun” – Accelerate the vehicle • Specification: No display readout

Display group 009

Display zones		Explanatory notes
1	... Nm	Engine torque when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 . When the vehicle is being driven with gear engaged, the displayed engine torque required during gearshift remains at a constant level, since no torque reduction is required The actual engine torque signal is transmitted from engine control unit to gearbox control unit via CAN bus If no value or an implausible value is displayed: – Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01 – Check identification of automatic gearbox control unit -J217- ⇒ page 13 – Check CAN bus wiring ⇒ page 89
2	… rpm	Engine speed ⇒ page 54 , measured value block 001, display zone 1
3	…%	Throttle valve value ⇒ page 55 , measured value block 002, display zone 2
4	… Nm 1)	Gearbox input torque when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 • Should match display zone 1 Can be ignored
• 1) Display of gearbox input torque depends on vehicle version.		

Display group 010

Display zones		Explanatory notes
1	…	Torque increase in torque converter when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 • 0 … 3.2 (calculated by gearbox control unit on the basis of the torque converter slip speed)
2	… rpm	Engine speed ⇒ page 54 , measured value block 001, display zone 1
3	…	Gear engaged in gearbox ⇒ page 54 , measured value block 001, display zone 4
4	... m/s^2 1)	Actual vehicle acceleration rate when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 • Min. –10 m/s^2 • Max. 10 m/s^2 Can be ignored
• 1) Display of actual vehicle acceleration rate depends on vehicle version.		

Display group 011

Display zones		Explanatory notes
1		Selector lever position ⇒ page 56 , measured value block 004, display zone 2
2	…	tiptronic switch -F189- (recognition), vehicle stationary

Display zones		Explanatory notes
		– Move selector lever into tiptronic gate • Specification: “M switch” – Move selector lever out of tiptronic gate • Specification: No display readout If the display readout does not appear as described: – Perform electrical check, test step No. 22 ⇒ page 79
3	…	tiptronic switch -F189- (shift up/shift down), vehicle stationary – Move selector lever into tiptronic gate – Operate shift up function (+) and keep selector lever pressed forwards or press and hold [+] button on multi-function steering wheel • Specification: “UP button” – Operate shift down (–) function and keep selector lever pressed towards the rear or press and hold [–] button on multi-function steering wheel • Specification: “DOWN button” If the display readout does not appear as described: – Perform electrical check, test step No. 23 ⇒ page 80

Display group 012

Display zones		Explanatory notes
1		Type of driving, load condition when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11
	E	• Driving without engine load, e.g. on level road
	B	• Driving with engine load, e.g. uphill Can be ignored
2	0 … 255	Driving dynamics index when vehicle is driven – calculation based on motion resistance index and driving style factor. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 11 Can be ignored
3	0 … 255	Motion resistance index – required for calculation of driving dynamics index
4	0 … 255	Driving style factor – required for calculation of driving dynamics index

Display group 013 [1)]

Display zones		Explanatory notes
1	... Nm	CAN bus calibration torque Can be ignored
2	0 … 63	CAN bus engine code. After renewing the engine control unit the same display readout should appear as for the old control unit. If this display readout does not appear, an incorrect engine control unit has been installed or the control unit is incorrectly coded If the specified value is not displayed: – Check engine control unit identification; interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01 – Check identification of automatic gearbox control unit -J217- ⇒ page 13
3	1	CAN bus gearbox code

Display zones		Explanatory notes
		If the specified value is not displayed: – Check coding of engine control unit ⇒ Rep. Gr. 01
4	0 … 63	CAN bus software version code. After renewing the engine control unit the same display readout should appear as for the old control unit. If this display readout does not appear, an incorrect engine control unit has been installed or the control unit is incorrectly coded If the specified value is not displayed: – Check engine control unit identification ⇒ Rep. Gr. 01 – Check identification of automatic gearbox control unit -J217- ⇒ page 13
• 1) Measured value block 013 is displayed according to vehicle version.		

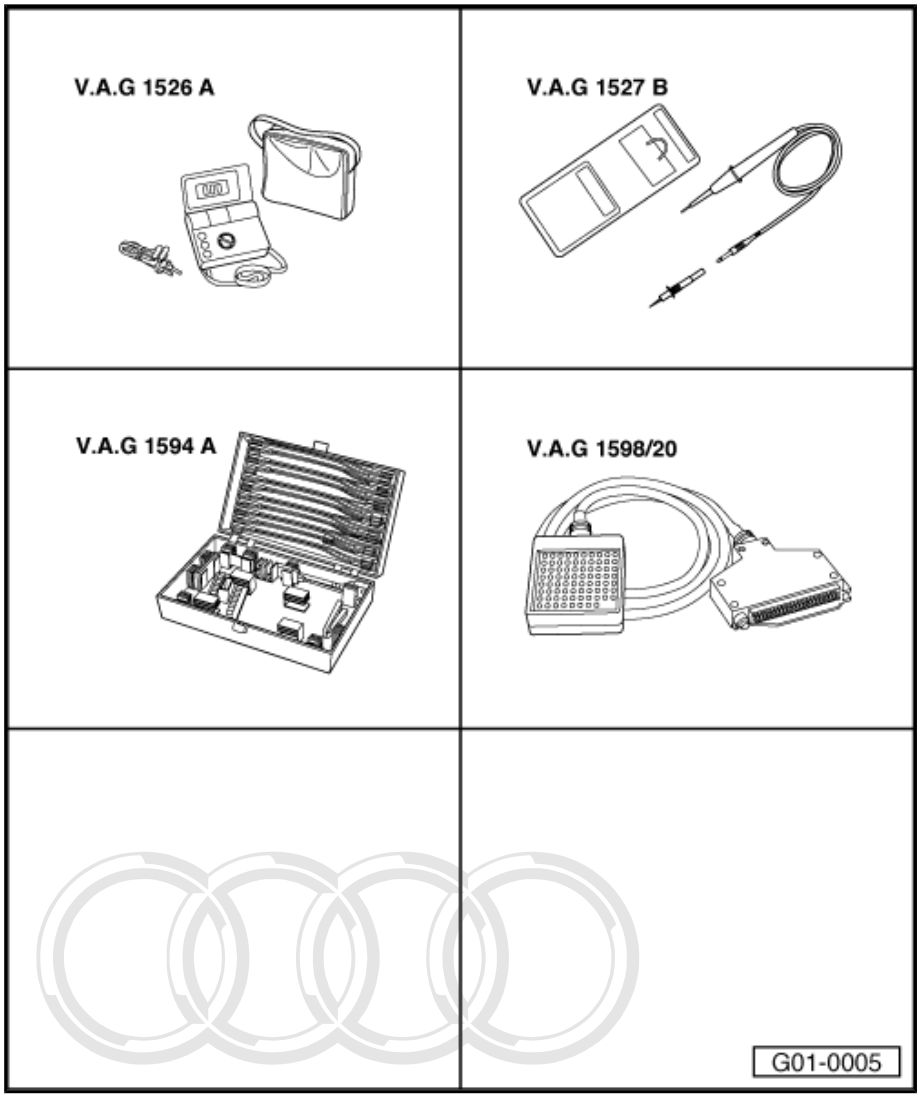
Display group 125 1)

Display zones		Explanatory notes
1	Engine 1	Communication with Motronic control unit -J220- or diesel direct injection system control unit -J248-: • Information is received from engine control unit via CAN bus
	Engine 0	• No information is received from engine control unit via CAN bus If “0” is displayed and no fault is entered in the fault memory: – Check engine control unit identification and make sure that correct control unit capable of transmitting data via CAN bus is fitted: For correct version refer to ⇒ Parts catalogue . Or if control unit is defective – Check CAN bus wiring ⇒ page 89
2	ABS 1	Communication with ABS with EDL control unit -J104- : • Information is received from ABS control unit via CAN bus
	ABS 0	• No information is received from ABS control unit via CAN bus If “0” is displayed and no fault is entered in the fault memory: – Check ABS control unit identification and make sure that correct control unit capable of transmitting data via CAN bus is fitted. For correct version refer to ⇒ Parts catalogue . Or if control unit is defective – Check CAN bus wiring ⇒ page 89
3	Steering wheel 1	Communication with steering angle sender -G85- 2): • Information is received from steering angle sender via CAN bus
	Steering wheel 0	• No information is received from steering angle sender via CAN bus If “0” is displayed and no fault is entered in the fault memory: – Check control unit identification for steering angle sender and make sure that correct control unit capable of transmitting data via CAN bus is fitted. For correct version refer to ⇒ Parts catalogue . Or if control unit is defective – Check CAN bus wiring ⇒ page 89
• 1) Measured value block 125 is displayed according to vehicle version. • 2) The display for steering angle sender will only appear as of model year 2002.		

11 Electrical check

Special tools and workshop equipment required

- Hand-held multimeter -V.A.G 1526 A- , -V.A.G 1526 B- or vehicle diagnostic, testing and information system -VAS 5051- with test leads -VAS 5051/7-
- Voltage tester -V.A.G 1527 B-
- Adapter set -V.A.G 1594 A- or -V.A.G 1594 C-
- Adapter -V.A.G 1598/20- (test box)



The test steps apply to:

- Vehicles for which self-diagnosis does not indicate the source of the fault. In this case it is necessary to perform the complete electrical check.
- Vehicles for which self-diagnosis indicates the specific source of the fault. Then only perform the test steps recommended in the fault table (selective fault-finding).

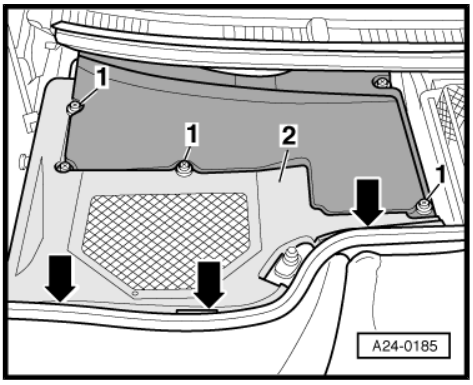
Requirements

- Vehicle voltage supply OK.
- Fuses OK ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Earth connections have been checked for corrosion and poor contact ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Battery earth strap and earth strap between gearbox and body have been checked for corrosion and poor contact.
- All electrical consumers have been switched off.

11.1 Connecting adapter -V.A.G 1598/20- (test box) to automatic gearbox control unit -J217-

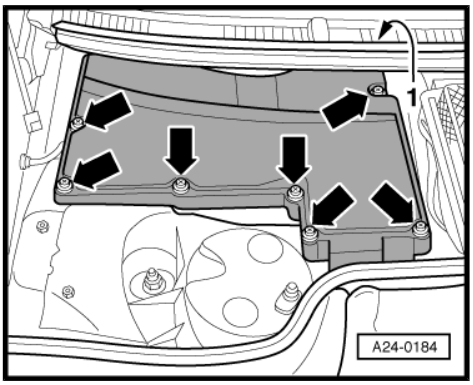
– Unscrew bolts -1- a few turns.

– Unclip plenum chamber cover -2- (right-side) -arrows- and detach cover.

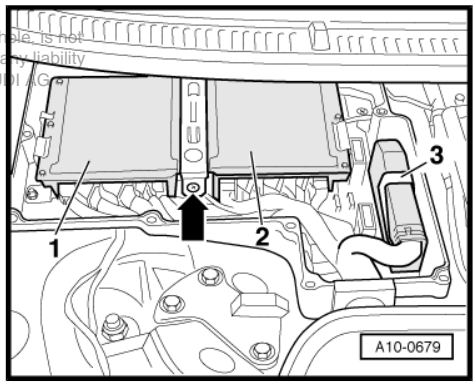


– Remove cross-head bolts -arrows- (for access to bolt at rear left lever out cover -1- in cowl panel trim).

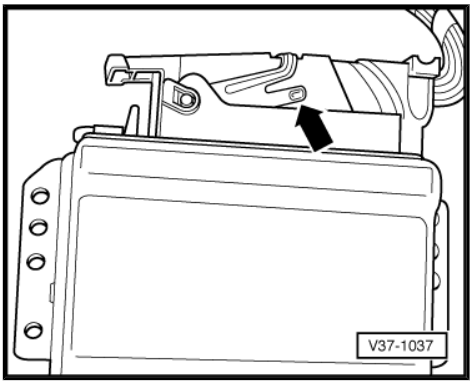
– Detach cover for electronics box in plenum chamber.



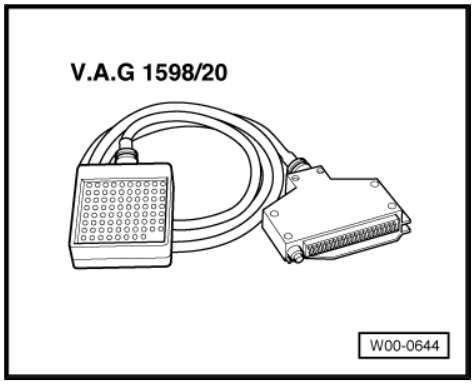
– Unclip gearbox control unit -3- from electronics box.



– To unplug multi-pin connector on gearbox control unit, release connector by pressing catch in direction of -arrow-. Before doing this, switch off the ignition and wait for at least 30 seconds.



– Connect adapter -V.A.G 1598/20- (test box) to automatic gearbox control unit -J217- .



Caution

To avoid damaging the electronic components, always select the appropriate measuring range on the tester before connecting the test leads and observe the test requirements.

– Carry out all the test steps listed in the column headed “Fault rectification if readout does not match specification”.

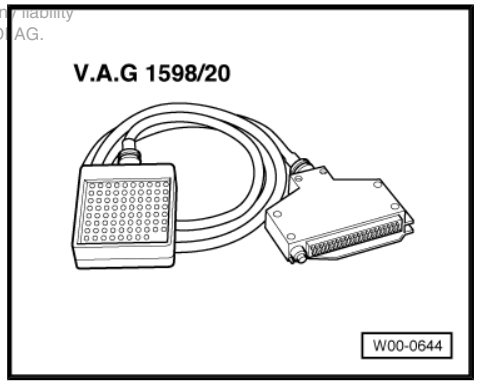
– Only perform the test steps recommended in the fault table (selective fault-finding).

– After performing electrical check, fit 88-pin connector onto pins of automatic gearbox control unit -J217- and then lock in place.

Note

- *Use hand-held multimeter -V.A.G 1526 B- with test leads from -V.A.G 1594 C- or vehicle diagnostic, testing and information system -VAS 5051- with test leads -VAS 5051/7- for checking.*
- *The socket designations of the adapter -V.A.G 1598/20- (test box) are identical to the contact designations of the automatic gearbox control unit -J217- in the current flow diagram.*
- *Adhere to correct test procedure to avoid damage to the system. Apart from the connectors listed in the test table, no other bridges may be connected.*
- *The given specifications are valid for an ambient temperature from 10 … 40 °C.*
- *If the measured values differ from the specifications, determine fault using current flow diagram.*
- *If the measured values differ only slightly from the specifications, clean sockets and connectors of the testers and test leads (use contact spray -G 000 700 04-) and repeat test.*
- *Before renewing components it is necessary to check the wiring and connectors first. Particularly if specifications are below 10 Ω, repeat resistance measurement at component.*

88-pin connector on automatic gearbox control unit -J217- / sockets on adapter -V.A.G 1598/20- (test box)



1 - Automatic gearbox pressure regulating valve 2 -N216-	32 - Solenoid valve 3 -N90-
2 - Selector lever lock solenoid -N110-	33 - Solenoid valve 2 -N89-
3 - Vacant	34 - Earth (terminal 31)

4 - Automatic gearbox pressure regulating valve 4 -N218-	35 - Vacant
5 - Automatic gearbox pressure regulating valve 1 -N215-	36 - Multi-function switch -F125- L1
6 - Earth (terminal 31)	37 - Multi-function switch -F125- L3
7 - Vacant	38 - Vacant
8 - Multi-function switch -F125- L2	39 - Vacant
9 - Multi-function switch -F125- L4 Vehicles with throttle cable: Voltage supply for cruise control system	40 - Vacant
10 - Up to model year 2000: Brake light switch -F- From model year 2001 onwards: Vacant	41 - Vacant
11 - Vacant	42 - Gearbox speed sender -G38- / gearbox output speed sender -G195-
12 - Vacant	43 - Vacant
13 - tiptronic recognition	44 - Gearbox input speed sender -G182-
14 - Gearbox speed sender -G38- / gearbox output speed sender -G195-	45 - Vacant
15 - Gearbox speed sender -G38- / gearbox output speed sender -G195- (screening)	46 - tiptronic upshift
16 - Gearbox input speed sender -G182-	47 - tiptronic downshift
17 - Vacant	48 - Vacant
18 - Vacant	49 - Vacant
19 - Vacant	50 - Vacant
20 - Vacant	51 - Automatic gearbox pressure regulating valve 5 -N233-
21 - Gearbox oil temperature sender -G93- (ATF)	52 - Voltage supply for solenoid valves
22 - Gearbox oil temperature sender -G93- (ATF)	53 - Voltage supply for solenoid valves
23 - Gearbox input speed sender -G182- (screening)	54 - Voltage supply (terminal 15)
24 - Vacant	55 - Voltage supply (terminal 15)
25 - Up to model year 1998: Selector lever position display -Y6- From model year 1999 onwards: Vacant	56 - Sockets 56 ... 83 are vacant
26 - Voltage supply (terminal 30)	83 -
27 - Vacant	85 - CAN bus (screening)
28 - Up to model year 1999: Earth for electronics (terminal 31) From model year 2000 onwards: Vacant	85 - CAN bus Low
29 - Automatic gearbox pressure regulating valve 3 -N217-	86 - CAN bus High
30 - Solenoid valve 1 -N88-	87 - Vacant
31 - Vacant	88 - Diagnosis K wire

11.2 Test table

Overview of test steps

Component to be checked	Test step
Voltage supply for automatic gearbox control unit -J217-	– Perform test steps No. 1 ⇒ page 70 and No. 6 ⇒ page 73
Selector lever lock solenoid -N110-	– Perform test steps No. 2 ⇒ page 71 and No. 18 ⇒ page 78

Component to be checked	Test step
Voltage supply for cruise control system	– Perform test step No. 3 ⇒ page 71
Multi-function switch -F125-	– Perform test steps No. 4 ⇒ page 71 and No. 5 ⇒ page 72
Kick-down switch -F8-	– Perform test step No. 7 ⇒ page 73
Brake light switch -F-	– Perform test step No. 8 ⇒ page 73
Solenoid valve 1 -N88-	– Perform test steps No. 9 ⇒ page 74 and No. 10 ⇒ page 74
Solenoid valve 2 -N89-	– Perform test steps No. 9 ⇒ page 74 and No. 11 ⇒ page 74
Solenoid valve 3 -N90-	– Perform test steps No. 9 ⇒ page 74 and No. 12 ⇒ page 75
Automatic gearbox pressure regulating valve 1 -N215-	– Perform test steps No. 9 ⇒ page 74 and No. 13 ⇒ page 76
Automatic gearbox pressure regulating valve 2 -N216-	– Perform test steps No. 9 ⇒ page 74 and No. 14 ⇒ page 76
Automatic gearbox pressure regulating valve 3 -N217-	– Perform test steps No. 9 ⇒ page 74 and No. 15 ⇒ page 77
Automatic gearbox pressure regulating valve 4 -N218-	– Perform test steps No. 9 ⇒ page 74 and No. 16 ⇒ page 77
Automatic gearbox pressure regulating valve 5 -N233-	– Perform test steps No. 9 ⇒ page 74 and No. 17 ⇒ page 78
Gearbox output speed sender -G195-	– Perform test step No. 19 ⇒ page 78
Gearbox input speed sender -G182-	– Perform test step No. 20 ⇒ page 79
Gearbox oil temperature sender -G93- (ATF)	– Perform test step No. 21 ⇒ page 79
tiptronic switch -F189-	– Perform test steps No. 22 ⇒ page 79 and No. 23 ⇒ page 80

Test step No. 1

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
26 + 6 26 + 28 [1)] 26 + 34	Voltage supply (terminal 30) for automatic gearbox control unit -J217-	• Ignition switched off – Switch to voltage measuring range	Approx. battery voltage	– Check wiring according to current flow diagram: ♦ From contact 26 to terminal 30 ♦ From contacts 6, 28 and 34 to earth
55 + 6 55 + 28 [1)] 55 + 34	Voltage supply (terminal 15) for automatic gearbox control unit -J217-	– Switch on ignition	Approx. battery voltage	– Check wiring according to current flow diagram: ♦ From contacts 55 or 54 to terminal 15 ♦ From contacts 6, 28 and 34 to earth
55 + 54			0 V	

• [1)] Terminal 28 is used up to model year 1999 only.

Test step No. 2

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
2 + 6	Selector lever lock solenoid - N110-	• Ignition switched on – Switch to voltage measuring range	Approx. battery voltage	– Check wiring according to current flow diagram – Check multi-function switch - F125- for short circuit – Check selector lever lock solenoid -N110- for short circuit – Perform test step No. 18 ⇒ page 78

Test step No. 3

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
9 + 6	Only vehicles with throttle cable: Voltage supply for cruise control system	• Ignition switched on • Switch to voltage measuring range – Selector lever in “D”, “4” or “3”	Approx. battery voltage	– Check wiring according to current flow diagram
		– Selector lever in “P”, “R”, “N” or “2”	Less than 5 V	– Perform test step No. 4 ⇒ page 71

Test step No. 4

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
36 + 6	Multi-function switch -F125-	• Ignition switched on • Switch to voltage measuring range		

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
		– Selector lever in “P”, “N”, “D”	Approx. battery voltage	– Check multi-function switch connector for contact corrosion – Check multi-function switch ⇒ “11.4 Checking multi-function switch F125 with 8-pin connector”, page 82 or ⇒ “11.5 Checking multi-function switch F125 with 10-pin connector”, page 85 – Perform test step No. 5 ⇒ page 72
		– Selector lever in “R”, “S” or “4”, “3”, “2”	Less than 1 V	
8 + 6		– Selector lever in “R”, “N”, “S” or “4”	Approx. battery voltage	
		– Selector lever in “P”, “D”, “3”, “2”	Less than 1 V	
37 + 6		– Selector lever in “N”, “D”, “S” or “4”, “2”	Approx. battery voltage	
		– Selector lever in “P”,“R”, “3”	Less than 1 V	
9 + 6		– Selector lever in “D”, “S” or “4”, “3”	Approx. battery voltage	
		– Selector lever in “P”, “R”, “N”, “2”	Less than 1 V	

Test step No. 5

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
36 + 55	Multi-function switch -F125-	• Ignition switched off • Switch to resistance measuring range		
		– Selector lever in “P”, “N”, “D”	Less than 1 Ω	– Check multi-function switch connector for contact corrosion – Check multi-function switch ⇒ “11.4 Checking multi-function switch F125 with 8-pin connector”, page 82 or ⇒ “11.5 Checking multi-function switch F125 with 10-pin connector”, page 85 – Perform test step No. 4 ⇒ page 71
		– Selector lever in “P”, “R”, “D”, “S” or “4”, “3”, “2”	∞ Ω	
8 + 55		– Selector lever in “R”, “N”, “S” or “4”	Less than 1 Ω	
		– Selector lever in “P”, “D”, “3”, “2”	∞ Ω	
37 + 55		– Selector lever in “N”, “D”, “S” or “4”, “2”	Less than 1 Ω	
		– Selector lever in “P”,“R”, “3”	∞ Ω	
9 + 55		– Selector lever in “D”, “S” or “4”, “3”	Less than 1 Ω	
		– Selector lever in “P”, “R”, “N”, “2”	∞ Ω	

Test step No. 6

-V.A.G 1598/20-sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
6 + earth at battery	Earth connections for automatic gearbox control unit -J217-	• Ignition switched off – Switch to resistance measuring range	Less than 1 Ω	– Check wiring according to current flow diagram
28 [1] + earth at battery			Less than 1 Ω	
34 + earth at battery			Less than 1 Ω	
• [1] Terminal 28 is used up to model year 1999 only.				

Test step No. 7

-V.A.G 1598/20-sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
18 + 54	Kick-down switch -F8-	• Ignition switched on • Switch to voltage measuring range		– Check wiring and connectors according to current flow diagram – Vehicles with throttle cable: Adjust throttle cable; renew if necessary ⇒ Rep. Gr. 20 – Renew kick-down switch ⇒ Rep. Gr. 20
		– Accelerator pedal not operated	Less than 5 V	
		– Accelerator pedal pressed down past kick-down point	Approx. battery voltage	
		• Ignition switched off • Switch to resistance measuring range		
		– Accelerator pedal not operated	∞ Ω	
		– Accelerator pedal pressed down past kick-down point	Less than 1.5 Ω	

Test step No. 8

-V.A.G 1598/20-sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
10 + 6	Only vehicles up to model year 2000: Brake light switch -F-	• Ignition switched off • Switch to voltage measuring range		– Check wiring and connectors according to current flow diagram – Renew brake light switch -F- ⇒ Brake system; Rep. Gr. 46
		– Brake pedal not depressed	Less than 1 V	
		– Brake pedal depressed	Approx. battery voltage	

Test step No. 9

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
52 + 53	Voltage supply wires to solenoid valves	• Ignition switched off – Switch to resistance measuring range Up to model year 2001	Less than 1.5 Ω	– Check wiring according to current flow diagram – Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 80 – Perform test step No. 1 ⇒ page 70 – Check wiring harness in gearbox according to current flow diagram; renew if necessary
		From model year 2002 onwards	∞ Ω	

Test step No. 10

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
30 + 52	Solenoid valve 1 -N88-	• Ignition switched off – Switch to resistance measuring range	25 … 35 Ω	– Check 16-pin connector to gearbox for contact corrosion – Perform test step No. 9 ⇒ page 74 – Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 80 – Check wiring harness in gearbox according to current flow diagram; renew if necessary – Renew solenoid valve ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38
30 + 34			∞ Ω	

Test step No. 11

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
33 + 52	Solenoid valve 2 -N89-	• Ignition switched off		

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
		– Switch to resistance measuring range	25 … 35 Ω	– Check 16-pin connector to gearbox for contact corrosion
33 + 34			∞ Ω	– Perform test step No. 9 ⇒ page 74 – Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 80 – Check wiring harness in gearbox according to current flow diagram; renew if necessary – Renew solenoid valve ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38

Test step No. 12

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
32 + 52	Solenoid valve 3 - N90-	• Ignition switched off – Switch to resistance measuring range	25 … 35 Ω	– Check 16-pin connector to gearbox for contact corrosion
32 + 34			∞ Ω	– Perform test step No. 9 ⇒ page 74 – Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 80 – Check wiring harness in gearbox according to current flow diagram; renew if necessary – Renew solenoid valve ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38

Test step No. 13

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
5 + 52	Automatic gearbox pressure regulating valve 1 - N215-	• Ignition switched off – Switch to resistance measuring range	6 … 10 Ω	– Check 16-pin connector to gearbox for contact corrosion – Perform test step No. 9 ⇒ page 74 – Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 80 – Check wiring harness in gearbox according to current flow diagram; renew if necessary – Renew solenoid valve ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38
5 + 34			∞ Ω	

Test step No. 14

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
1 + 53	Automatic gearbox pressure regulating valve 2 - N216-	• Ignition switched off – Switch to resistance measuring range	6 … 10 Ω	– Check 16-pin connector to gearbox for contact corrosion – Perform test step No. 9 ⇒ page 74 – Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 80 – Check wiring harness in gearbox according to current flow diagram; renew if necessary – Renew solenoid valve ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38
1 + 34			∞ Ω	

Test step No. 15

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
29 + 53	Automatic gearbox pressure regulating valve 3 - N217-	• Ignition switched off – Switch to resistance measuring range	6 … 10 Ω	– Check 16-pin connector to gearbox for contact corrosion – Perform test step No. 9 ⇒ page 74 – Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 80 – Check wiring harness in gearbox according to current flow diagram; renew if necessary – Renew solenoid valve ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38
29 + 34			∞ Ω	

Test step No. 16

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
4 + 52	Automatic gearbox pressure regulating valve 4 - N218-	• Ignition switched off – Switch to resistance measuring range	6 … 10 Ω	– Check 16-pin connector to gearbox for contact corrosion – Perform test step No. 9 ⇒ page 74 – Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 80 – Check wiring harness in gearbox according to current flow diagram; renew if necessary – Renew solenoid valve ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38
4 + 34			∞ Ω	

Test step No. 17

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
51 + 53	Automatic gearbox pressure regulating valve 5 - N233-	• Ignition switched off – Switch to resistance measuring range	6 … 10 Ω	– Check 16-pin connector to gearbox for contact corrosion – Perform test step No. 9 ⇒ page 74 – Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 80 – Check wiring harness in gearbox according to current flow diagram; renew if necessary – Renew solenoid valve ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38
51 + 34			∞ Ω	

Test step No. 18

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
2 + 54	Selector lever lock solenoid - N110-	• Ignition switched off • Selector lever at position “P” – Switch to resistance measuring range	14 … 28 Ω	– Check wiring according to current flow diagram – Renew selector lever lock solenoid ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37

Test step No. 19

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
14 + 42	Gearbox output speed sender - G195-	• Ignition switched off – Switch to resistance measuring range	Min. 0.8 kΩ Max. 1.2 kΩ	– Check wiring according to current flow diagram
14 + 34 14 + 54 42 + 54 42 + 34			∞ Ω	– Renew gearbox output speed sender ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38
15 + 34 15 + 54	Screening for gearbox output speed sender - G195-		∞ Ω	– Check wiring according to current flow diagram

Test step No. 20

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
16 + 44	Gearbox input speed sender - G182-	• Ignition switched off • 88-pin connector disconnected from control unit – Switch to resistance measuring range	Min. 230 Ω Max. 300 Ω	– Check wiring according to current flow diagram
44 + 34 44 + 54 16 + 54 16 + 34			∞ Ω	– Renew gearbox input speed sender ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38
23 + 34 23 + 54	Screening for gearbox input speed sender - G182-		∞ Ω	– Check wiring according to current flow diagram

Test step No. 21

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
21 + 22	Gearbox oil temperature sender - G93- (ATF)	• Ignition switched off – Switch to resistance measuring range – Measure ATF temperature Approx. 20 °C	Approx. 0.83 kΩ[1)]	– Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 80 – Check wiring harness in gearbox according to current flow diagram; renew if necessary (the gearbox oil (ATF) temperature sender is integrated in wiring harness) ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38
		Approx. 60 °C	Approx. 1.28 kΩ[1)]	
		Approx. 120 °C	Approx. 1.88 kΩ[1)]	
21 + 34 22 + 34			∞ Ω	
21 + 54 22 + 54			∞ Ω	

• [1)] Permissible tolerance: ± 0.1 kΩ.

Test step No. 22

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
13 + 54	tiptronic switch - F189- (recognition)	• Ignition switched on • Switch to voltage measuring range		

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
		– Selector lever not in tiptronic gate	Less than 1 V	– Check wiring according to current flow diagram – Renew tiptronic switch ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37
		– Selector lever in tiptronic gate	Approx. battery voltage	

Test step No. 23

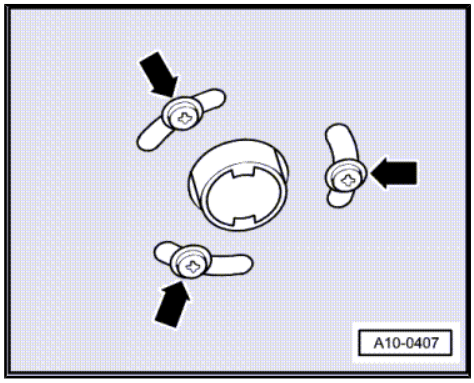
-V.A.G 1598 A- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
46 + 54 47 + 54	tiptronic switch -F189- (shift up/ shift down)	• Ignition switched on • Switch to voltage measuring range – Shift up button (+) or shift down button (–) not operated	Less than 1 V	– Check wiring according to current flow diagram – Renew tiptronic switch ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37
46 + 54		– Operate shift up function (+) and keep selector lever pressed forwards or press and hold [+] button on multi-function steering wheel	Approx. battery voltage	
47 + 54		– Operate shift down (–) function and keep selector lever pressed towards the rear or press and hold [–] button on multi-function steering wheel	Approx. battery voltage	

11.3 Checking wiring between automatic gearbox control unit -J217- and gearbox

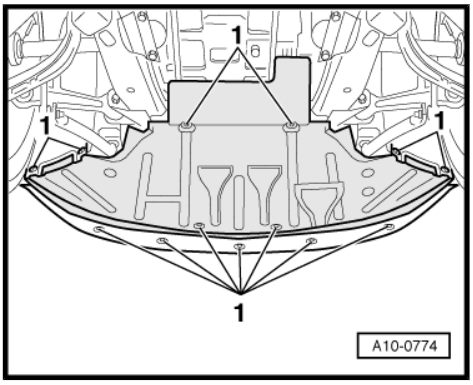
Carry out the following test if the final control diagnosis or the electrical check indicate a fault between gearbox and automatic gearbox control unit -J217- .

– Connect adapter -V.A.G 1598/20- (test box) to automatic gearbox control unit -J217- ⇒ page 67 .

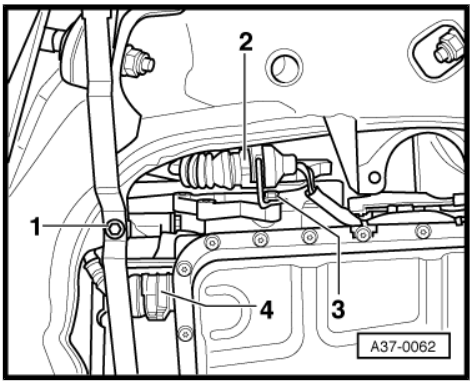
– On vehicles fitted with auxiliary heater, remove screws -arrows- securing exhaust pipe of auxiliary/ additional heater to noise insulation.



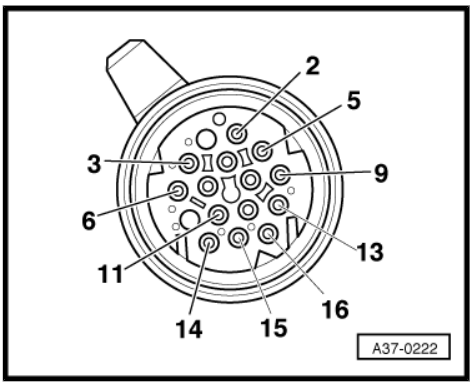
– Release fasteners -1- and detach noise insulation.



– Fold out release tab -4- and disconnect gearbox wiring harness connector.
– If necessary, detach bracket -1- for noise insulation.



– Connect multimeter for resistance measurement between contacts on the 16-pin connector and the sockets on adapter -V.A.G 1598/20- (test box), as shown in the following table.
• Specification: in each case less than 1.5 Ω.



Connector Contact	-V.A.G 1598/20- Socket	Connector Contact	-V.A.G 1598/20- Socket
1	Contact vacant	9	33
2	5	10	Contact vacant
3	1	11	4
4	32	12	52
5	16	13	22
6	44	14	21
7	29	15	51
8	30	16	53

Note

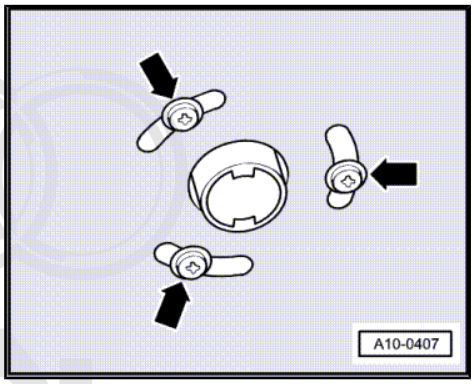
- *If readout does not match specification, rectify open circuit in wiring according to current flow diagram and check connector for contact corrosion, moisture and leaks.*
- *If readout obtained in this wiring check matches specification, the wiring harness in the gearbox must be checked. In order to do this, remove valve body ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38 .*
- *If no faults are detected in the wiring harness in the gearbox, renew relevant solenoid valves or pressure regulating valves, in order to do this, remove valve body ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 38 .*

11.4 Checking multi-function switch -F125- with 8-pin connector

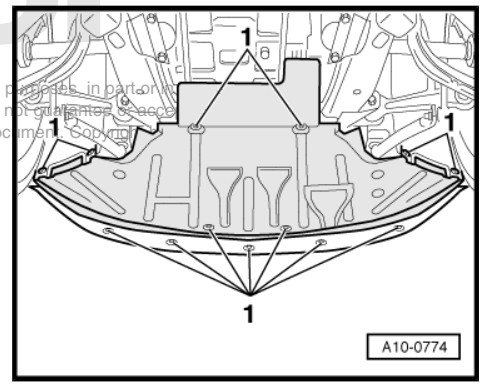
Note

- *Read measured value block 004 for multi-function switch before performing electrical check.*
- *Make sure that selector lever cable is properly adjusted ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 .*

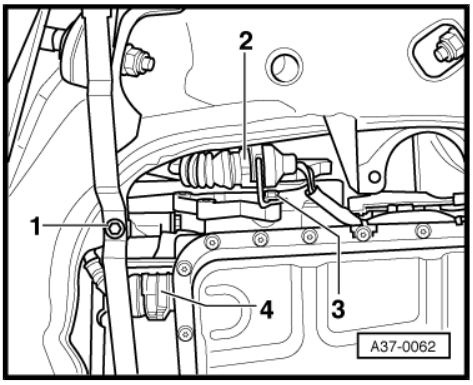
– On vehicles fitted with auxiliary heater, remove screws -arrows- securing exhaust pipe of auxiliary/ additional heater to noise insulation.



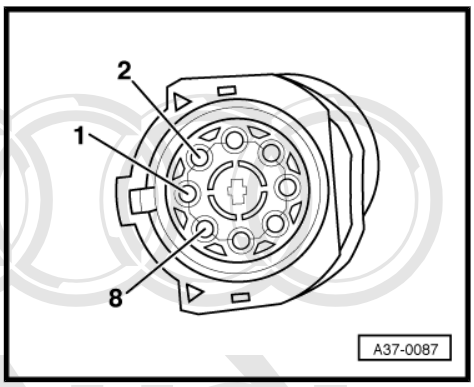
– Release fasteners -arrows- and detach noise insulation.



– Unplug connector -2- of multi-function switch -F125- at front left of gearbox.



Contact assignment at 8-pin connector of multi-function switch -F125- .



Test step No. 1

Contacts on -F125-	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
1 + 2	Multi-function switch -F125-	• Ignition switched off • Switch to resistance measuring range		– Check connector at multi-function switch for contact corrosion, moisture or loose fitting – Check selector lever cable adjustment ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 – Renew multi-function switch ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37
		– Selector lever in “P”, “N”, “D”	Less than 1 Ω	
		– Selector lever in “R”, “4”, “3”, “2”	∞ Ω	
1 + 3		– Selector lever in “R”, “N”, “4”	Less than 1 Ω	
		– Selector lever in “P”, “D”, “3”, “2”	∞ Ω	
1 + 4		– Selector lever in “N”, “D”, “4”, “2”	Less than 1 Ω	
		– Selector lever in “P”, “R”, “3”	∞ Ω	
1 + 5		– Selector lever in “D”, “4”, “3”	Less than 1 Ω	
		– Selector lever in “P”, “R”, “N”, “2”	∞ Ω	

Test step No. 2

Contacts on -F125-	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
6 + 7	P/N signal from multi-function switch -F125-	• Ignition switched off • Switch to resistance measuring range		
		– Selector lever in “R”, “D”, “4”, “3”, “2”	∞ Ω	– Check connector at multi-function switch for contact corrosion, moisture or loose fitting – Check selector lever cable adjustment ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 – Renew multi-function switch ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37
		– Selector lever in “P”, “N”	Less than 1 Ω	

Test step No. 3

Contacts on -F125-	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
1 + 8	Reversing light signal from multi-function switch -F125-	• Ignition switched off • Switch to resistance measuring range		
		– Selector lever in “P”, “N”, “D”, “4”, “3”, “2”	∞ Ω	– Check connector at multi-function switch for contact corrosion, moisture or loose fitting – Check selector lever cable adjustment ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 – Renew multi-function switch ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37
		– Selector lever in “R”	Less than 1 Ω	

Checking voltage supply of multi-function switch

– Connect multimeter for voltage measurement between contacts -1- and -6- of the 8-pin connector.

– Switch on ignition.

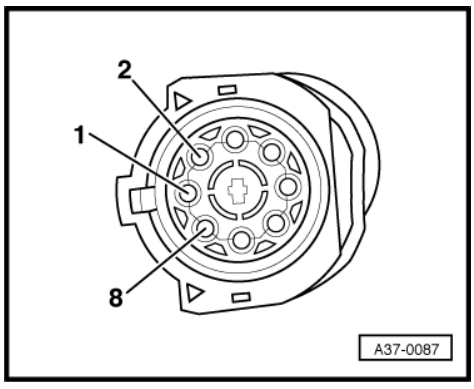
• Specification: approx. battery voltage.

If readout does not match specification:

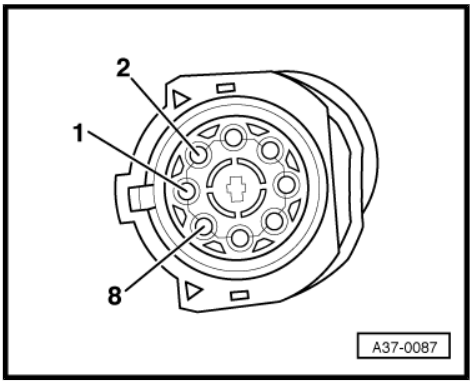
– Repair wiring ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Checking wiring between 8-pin connector for multi-function switch and gearbox control unit

– Connect adapter -V.A.G 1598/20- (test box) to automatic gearbox control unit -J217- ⇒ page 67 .



– Connect multimeter for resistance measurement between contacts on the 8-pin connector and the sockets on adapter -V.A.G 1598/20- (test box), as shown in the following table.



Connector Contact	Adapter -1598/20- (test box) Socket	Specification
1	54 and 55	Less than 1.5 Ω
2	36	Less than 1.5 Ω
3	8	Less than 1.5 Ω
4	37	Less than 1.5 Ω
5	9	Less than 1.5 Ω
6	6, 34 and 28 if necessary	Less than 1.5 Ω
7	⇒ page 84 , Test step No. 2	
8	⇒ page 84 , Test step No. 3	

Note

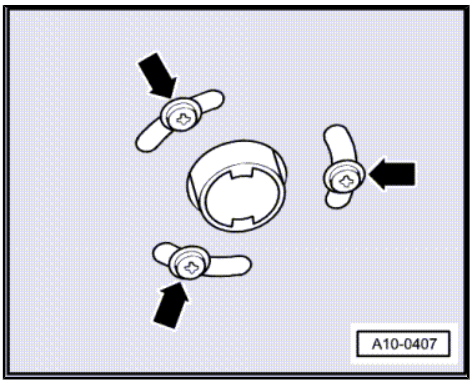
- *If readout does not match specification, rectify open circuit in wiring according to current flow diagram and check connector for contact corrosion, moisture and leaks.*
- *If readout obtained in this wiring check matches specification, the multi-function switch -F125- must be renewed ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 .*

11.5 Checking multi-function switch -F125- with 10-pin connector

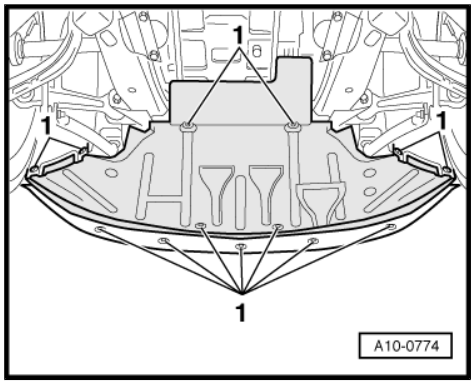
Note

- *Read "measured value block 004" for multi-function switch before performing electrical check.*
- *Make sure that selector lever cable is properly adjusted ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 .*

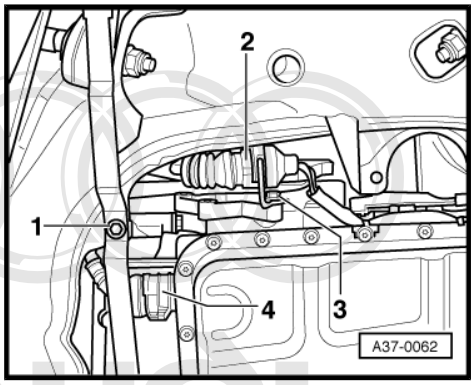
– On vehicles fitted with auxiliary heater, remove screws -arrows- securing exhaust pipe of auxiliary/ additional heater to noise insulation.



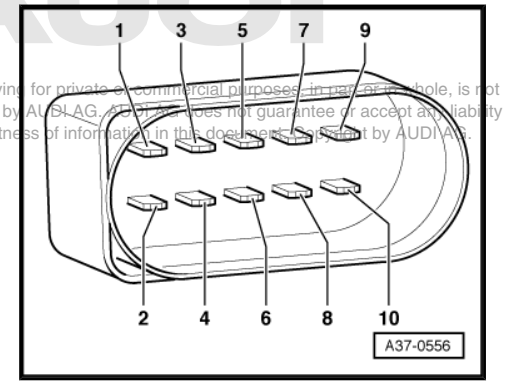
– Release fasteners -arrows- and detach noise insulation.



– Unplug connector -2- of multi-function switch -F125- at front left of gearbox.



Contact assignment at 10-pin connector of multi-function switch -F125- .



Test step No. 1

Contacts on -F125-	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
1 + 2	Multi-function switch -F125-	• Ignition switched off • Switch to resistance measuring range		– Check connector at multi-function switch for contact corrosion, moisture or loose fitting – Check selector lever cable adjustment ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 – Renew multi-function switch ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37
		– Selector lever in “P”, “N”, “D”	Less than 1 Ω	
		– Selector lever in “R”, “S” or “4”, “3”, “2”	∞ Ω	
1 + 3		– Selector lever in “R”, “N”, “S” or “4”	Less than 1 Ω	
		– Selector lever in “P”, “D”, “3”, “2”	∞ Ω	
1 + 4		– Selector lever in “N”, “D”, “S” or “4”, “2”	Less than 1 Ω	
		– Selector lever in “P”,“R”, “3”	∞ Ω	

Contacts on -F125-	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
1 + 5		– Selector lever in “D”, “S” or “4”, “3”	Less than 1 Ω	
		– Selector lever in “P”, “R”, “N”, “2”	∞ Ω	

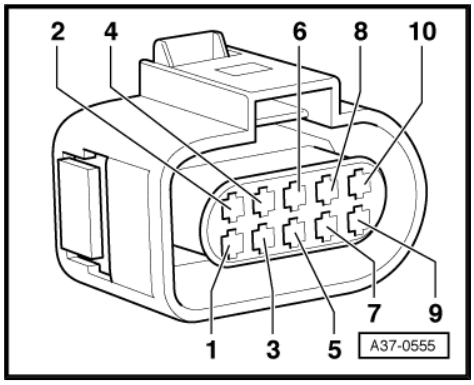
Test step No. 2

Contacts on -F125-	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
9 + 10	P/N signal from multi-function switch -F125-	• Ignition switched off • Switch to resistance measuring range		
		– Selector lever in “R”, “D”, “S” or “4”, “3”, “2”	∞ Ω	– Check connector at multi-function switch for contact corrosion, moisture or loose fitting – Check selector lever cable adjustment ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 – Renew multi-function switch ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37
		– Selector lever in “P”, “N”	Less than 1 Ω	

Test step No. 3

Contacts on -F125-	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
7 + 8	Reversing light signal from multi-function switch -F125-	• Ignition switched off • Switch to resistance measuring range		
		– Selector lever in “P”, “N”, “D”, “S” or “4”, “3”, “2”	∞ Ω	– Check connector at multi-function switch for contact corrosion, moisture or loose fitting – Check selector lever cable adjustment ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 – Renew multi-function switch ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37
		– Selector lever in “R”	Less than 1 Ω	

Checking voltage supply of multi-function switch



– Connect multimeter for voltage measurement between contacts -1- and -10- and between contacts -7- and -10- of the 10-pin connector.

– Switch on ignition.

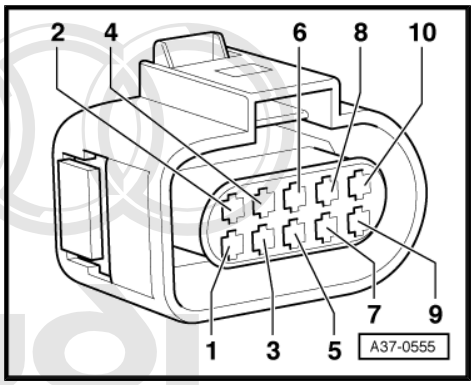
• Specification: approx. battery voltage each time.

If a readout does not match specification:

– Repair wiring ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Checking wiring between 10-pin connector for multi-function switch and gearbox control unit

– Connect adapter -V.A.G 1598/20- (test box) to automatic gearbox control unit -J217- ⇒ page 67 .



– Connect multimeter for resistance measurement between contacts on the 10-pin connector and the sockets on adapter -V.A.G 1598/20- (test box), as shown in the following table.

Connector Contact	Adapter -1598/20- (test box) Socket	Specification
1	54 and 55	Less than 1.5 Ω
2	36	Less than 1.5 Ω
3	8	Less than 1.5 Ω
4	37	Less than 1.5 Ω
5	9	Less than 1.5 Ω
6	Contact vacant	
7	⇒ page 87 , Test step No. 2	
8		
9	⇒ page 87 , Test step No. 3	
10		

Note

- *If readout does not match specification, rectify open circuit in wiring according to current flow diagram and check connector for contact corrosion, moisture and leaks.*
- *If readout obtained in this wiring check matches specification, the multi-function switch -F125- must be renewed ⇒ Automatic gearbox 01L, four-wheel drive; Rep. Gr. 37 .*

12 CAN bus

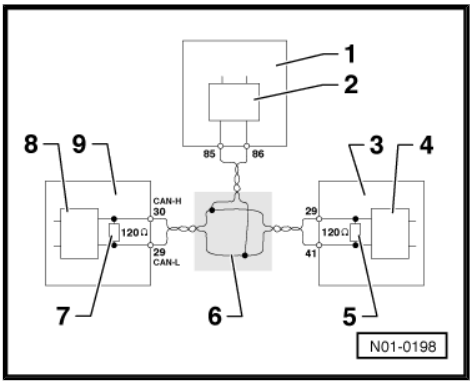
Bus:

Bus is the term used to describe a data transfer and distribution system.

CAN:

A Controller Area Network is a bus system operating with two wires. They are called bus wires. The bus wires transmit data signals in serial form (one after the other) to the control units connected to the system.

The following control units communicate via the bus, i.e. data exchange between the various control units is carried out via the CAN data bus.



1 - Automatic gearbox control unit -J217-

2 - BUS driver

3 - Motronic control unit -J220- or diesel direct injection system control unit -J248-

4 - BUS driver

5 - Matching resistor

6 - Drivetrain data bus (CAN bus, two wires twisted together)

7 - Matching resistor

8 - BUS driver

9 - ABS with EDL control unit -J104-

12.1 Checking a “two-wire bus system”

Test sequence

– Refer to the appropriate current flow diagram to check how many control units communicate via the bus.

– Connect vehicle diagnostic, testing and information system - VAS 5051- ⇒ page 11 and select function “00 - Automatic test sequence”. The ignition must be switched on.

– Before checking the bus wires, make sure that there is no malfunction in any of the control units connected to the bus. A malfunction will cause interference in the communication with other control units.

Note

In this context "malfunction" does not mean a fault occurring in the bus system itself, but refers to a fault which is impairing the correct functioning of a particular system (e.g. defective sensor). As a result of the malfunction, the bus system can no longer process the sensor signal for data transmission. Such a malfunction has an indirect influence on the bus system, as communication with the other control units requiring this particular sensor signal is impaired.

If a malfunction exists

– Repair it first.

– Print out the fault list and erase the fault memories of all control units, see “Interrogate fault memory” and “Erase fault memory” for each control unit.

– Select function “06 - End output”.

– Rectify malfunctions as described in the fault tables in the relevant Workshop Manuals.

Have all malfunctions been eliminated?

– If the communication between the control units is still not working properly, check the bus wires.

– When tracing faults in the bus wires, distinguish between two possible cases:

♦ Two control units are communicating via a “two-wire bus system” ⇒ page 90 .

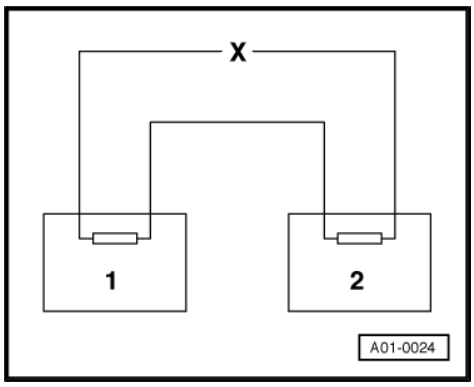
♦ Three or more control units are communicating via a “two-wire bus system” ⇒ page 91 .

12.2 Two control units communicating via a “two-wire bus system”

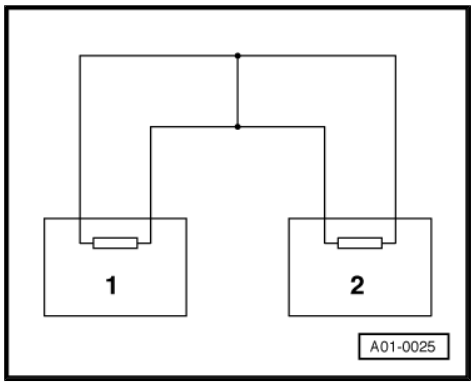
– Switch off ignition.

– Detach the multi-pin connectors at both control units.

– Check whether there is an open circuit in one of the bus wires ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



– Check whether there is a short circuit between the bus wires ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



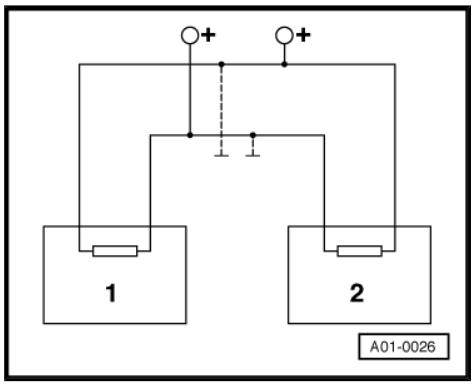
– Check whether there is a short to positive or short to earth in one of the bus wires.

If no fault is detected in the bus wires:

– As a trial measure, renew whichever control unit is easier (or less expensive) to change.

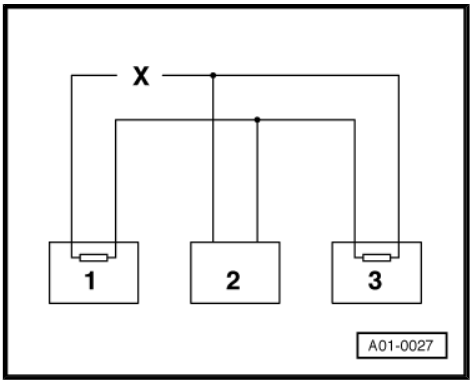
If the control units are still not communicating via the bus:

– Renew the second control unit.



12.3 Three or more control units communicating via a “two-wire bus system”

Example 1:



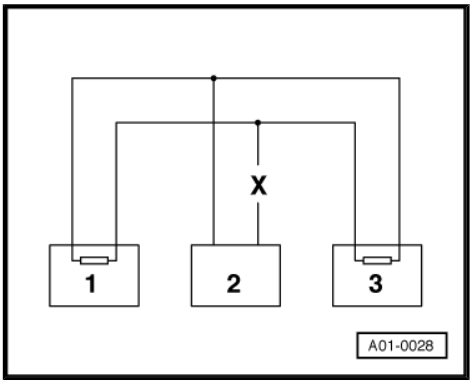
From the faults stored in the fault memories you can see that control unit -1- is not connected to control units -2- and -3-.

Control unit	Faults stored in fault memory
-1-	♦ No message from control unit -2- ♦ No message from control unit -3-
-2-	♦ No message from control unit -1-
-3-	♦ No message from control unit -1-

– Switch off ignition.

– Detach the electrical connectors at the control units which are linked by the bus wires and check whether there is an open circuit in one of the bus wires ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Example 2:



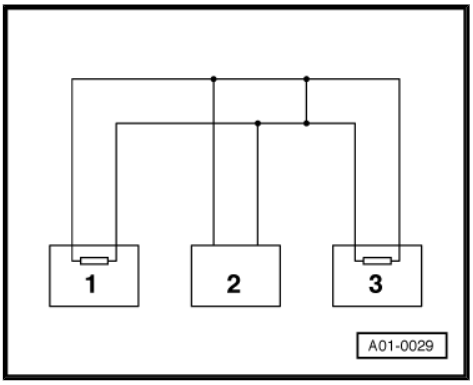
From the faults in the fault memories you can see that control unit -2- is not connected to control units -1- and -3-.

Control unit	Faults stored in fault memory
-1-	♦ No message from control unit -2-
-2-	♦ No message from control unit -1- ♦ No message from control unit -3-
-3-	♦ No message from control unit -2-

– Switch off ignition.

– Detach the electrical connectors at the control units which are linked by the bus wires and check whether there is an open circuit in one of the bus wires ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Example 3:



From the faults stored in the fault memories, you can see that none of the control units are able to transmit or receive signals.

Control unit	Faults stored in fault memory
-1-	♦ Control unit defective
-2-	♦ Control unit defective
-3-	♦ Control unit defective

– Switch off ignition.

– Detach the electrical connectors at the control units which are linked by the bus wires and check whether there is a short circuit between the bus wires ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

– Check the bus wires for short to positive or earth.
– If the cause of the fault “control unit defective” cannot be found in the bus wires, check whether one of the control units is causing the fault.

• The connectors at all control units which communicate via the CAN bus are detached.
• Ignition switched off.

– Connect one of the control units.
– Connect vehicle diagnostic, testing and information system - VAS 5051- ⇒ page 11 .
– Switch on ignition and select the relevant vehicle system.
– Interrogate and erase the fault memory of the control unit which has just been connected.
– Exit function “05 - Erase fault memory” by touching ← button.
– Select function “06 - End output”.
– Switch the ignition off and then on again.
– Leave the ignition switched on for 10 seconds. Then interrogate the fault memory of the control unit that has just been connected.

If the fault “control unit defective” is displayed:

– Renew the control unit that has just been connected.

If the fault “control unit defective” is not displayed:

– Connect the next control unit and repeat the above procedure.