Workshop Manual
Audi A8 1994 ➢

Automatic gearbox 01V, self-diagnosis

Edition 04.2008

List of Workshop Manual Repair GroupsList of Workshop Manual Repair GroupsList of Workshop Manual Repair Groups

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 activate 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 17 .
- 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.

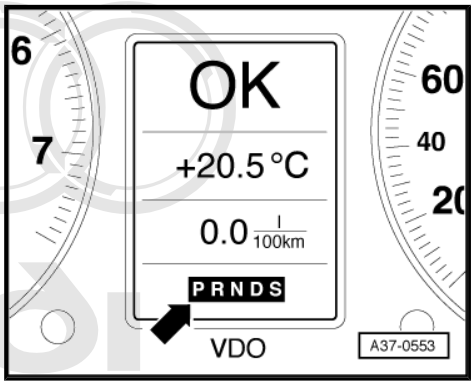
1.2 Safety functions of gearbox control unit

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.

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”.

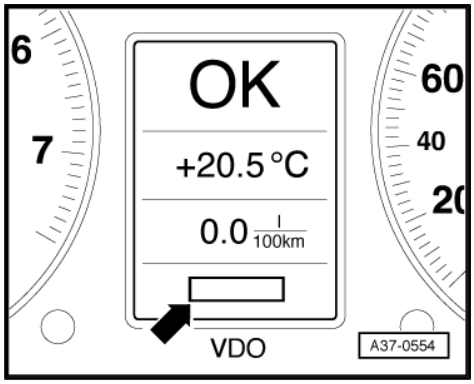
- Gearbox shifts out of whichever of the forward gears is engaged and selects hydraulic 4th gear. Torque converter clutch is released. No electrical signals to solenoid valves.
- Maximum shift pressure applied to power-transmitting components.
- Reverse gear can be engaged. Selector lever lock (in positions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



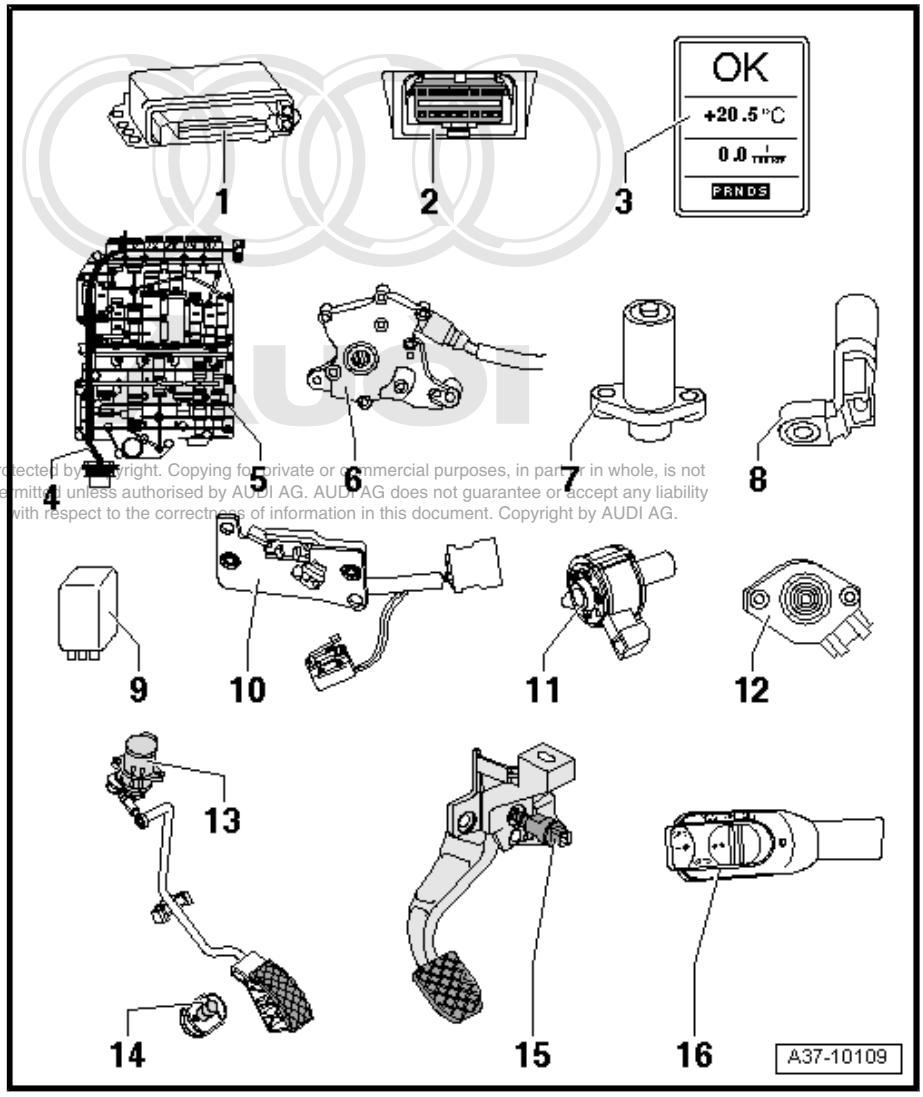
Mechanical emergency running mode with inactive control unit

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 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 display -Y6-

- ❑ Fitting location: In dash panel insert ⇒ page 9
- ❑ 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 - 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

5 - Valve body

- ❑ Fitting location ⇒ page 7
- ❑ 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

6 - Multi-function switch -F125-

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

7 - Gearbox input speed sender -G182-

- ❑ Fitting location: Inductive sender on version with hydraulic control system “Type E17” ⇒ page 8 , Hall sender on version with hydraulic control system “Type E18/2” ⇒ page 8
- ❑ Checked via self-diagnosis

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

- ❑ Component designation depending on vehicle version
- ❑ Fitting location ⇒ page 7
- ❑ Checked via self-diagnosis

9 - Starter inhibitor relay -J207-

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

10 - tiptronic switch -F189-

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

11 - Selector lever lock solenoid -N110-

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

12 - Throttle valve potentiometer -G69-

- ❑ Only on vehicles with throttle cable: Signal from throttle valve potentiometer is used to detect throttle load
- ❑ Fitting location ⇒ page 8
- ❑ 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 110

13 - 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

14 - Kick-down switch -F8-

- ❑ Fitting location ⇒ page 9
- ❑ Can be checked via reading measured value block ⇒ page 110 and can be checked electrically

15 - Brake light switch -F-

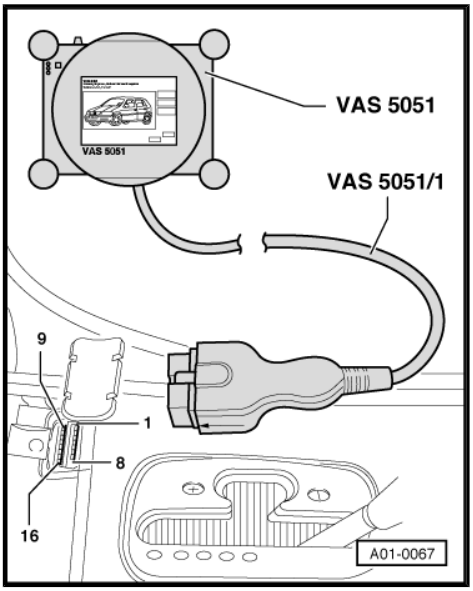
- ❑ Fitting location ⇒ page 10
- ❑ Vehicles with throttle cable: Signal is directly transmitted to automatic gearbox control unit -J217-
- ❑ Vehicles with throttle cable: Can be checked via reading measured value block ⇒ page 110 and can be checked electrically
- ❑ Vehicles with electronic throttle: 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 110

16 - Cruise control system switch -E45-

- ❑ Fitting location ⇒ page 10

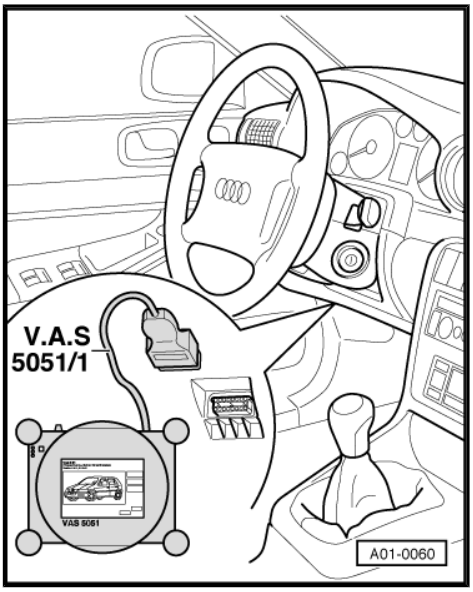
Diagnostic connector (up to the end of 1998)

- ♦ 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.

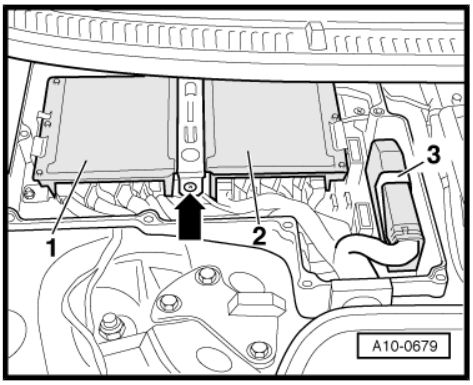


Automatic gearbox control unit -J217-

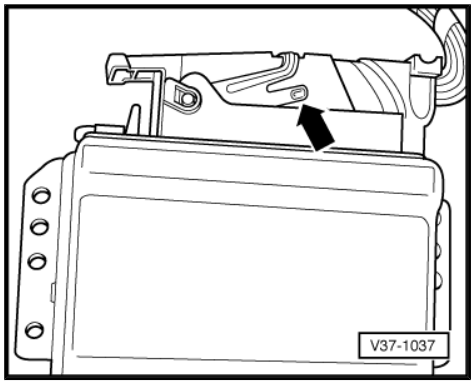
- ♦ Fitting location: In electronics box in plenum chamber (right-side) -3-.
- ♦ Removing and installing ⇒ page 10 .

Note

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

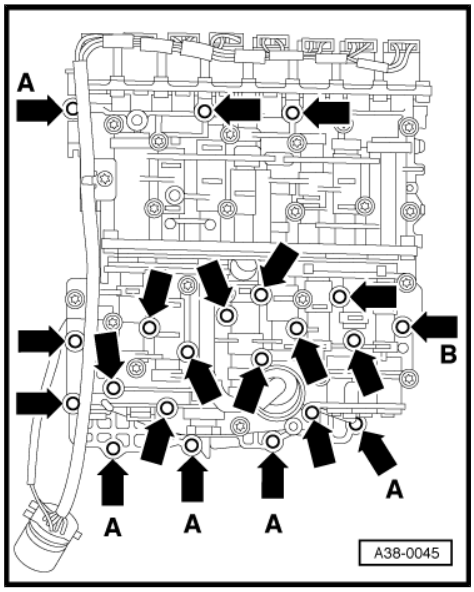


Unplugging multi-pin connector on automatic gearbox control unit -J217-



– 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.
- The solenoid valves -N88- , -N89- , -N90- , -N91- , -N92- , -N93- and -N94- are attached to the valve body.
- Removing and installing valve body ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 .

Note

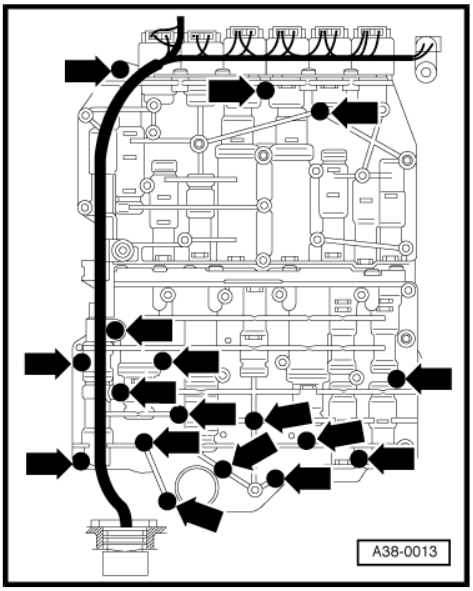
In some current flow diagrams the solenoid valves -N91- , -N92- , -N93- and -N94- are also referred to as pressure regulating valves -N215- , -N216- , -N217- and -N218- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

The automatic gearbox 01V can have different hydraulic control systems, which are distinguished as follows:

- Hydraulic control system “Type E17”: The gearbox input speed sender -G182- is an inductive sender and is fixed to the underside of the valve body.
- Hydraulic control system “Type E18/2”: The gearbox input speed sender -G182- is a Hall sender and is fixed to the gearbox housing behind the valve body.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

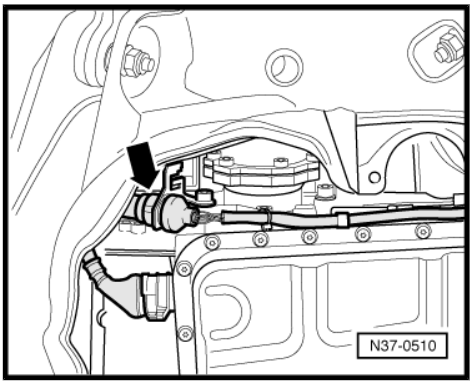
Internal wiring harness in gearbox with integrated gearbox oil (ATF) temperature sender -G93-

- 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 01V, front-wheel drive and 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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38



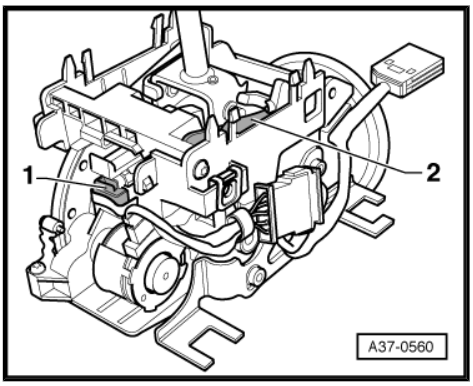
Multi-function switch -F125-

- Fitting location: On gearbox (left-side).
- Up to model year 2000 with 8-pin connector and from model year 2001 onwards with 10-pin connector.
- Removing and installing ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37 .



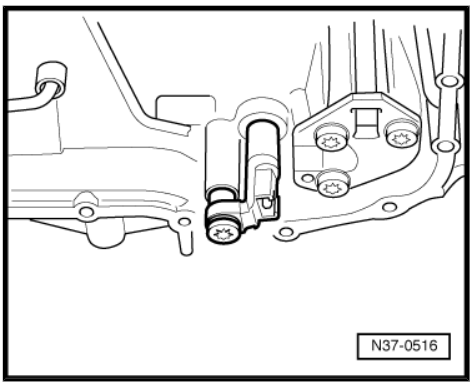
tiptronic switch -F189-

- 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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37 .



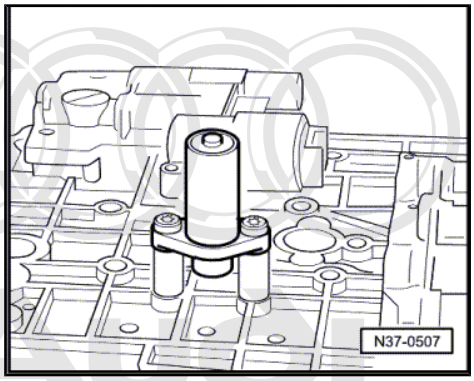
Gearbox speed sender -G38- / gearbox output speed sender -G195-

- Fitting location: On gearbox (rear right).
- Removing and installing gearbox speed sender -G38- / gearbox output speed sender -G195- ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 .



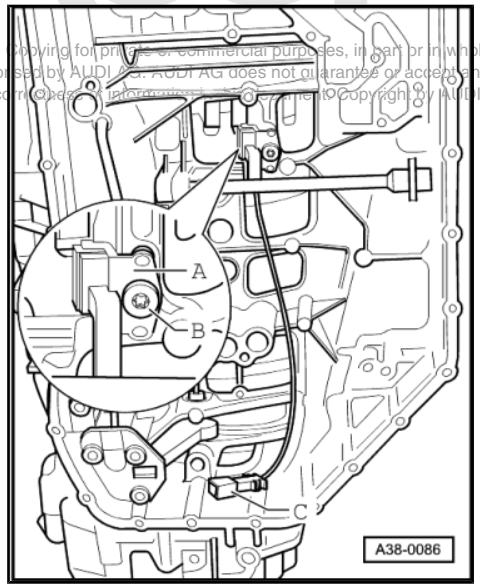
Gearbox input speed sender -G182- (inductive sender on version with hydraulic control system "Type E17")

- Fitting location: Fixed to the underside of the valve body.
- Removing and installing ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 .
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .



Gearbox input speed sender -G182- (Hall sender -A- on version with hydraulic control system "Type E18/2")

- Fitting location: Fixed to the gearbox housing behind the valve body.
- Removing and installing ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 .
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

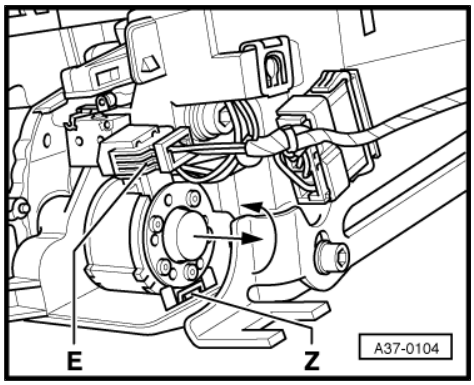


Selector lever lock solenoid -N110-

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

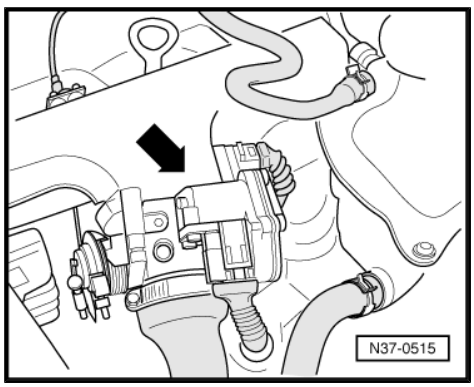
Note

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



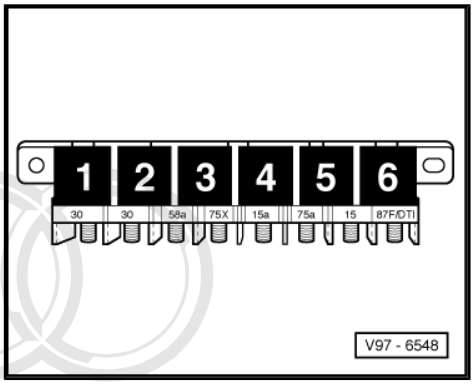
Throttle valve potentiometer -G69-

Only on vehicles with throttle cable: Integrated in throttle valve module -J338- -arrow-.



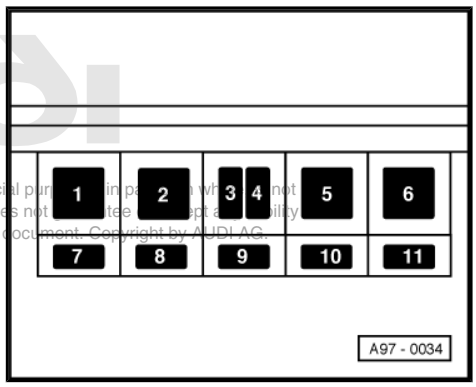
Starter inhibitor relay -J207- up to model year 1998

- 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.



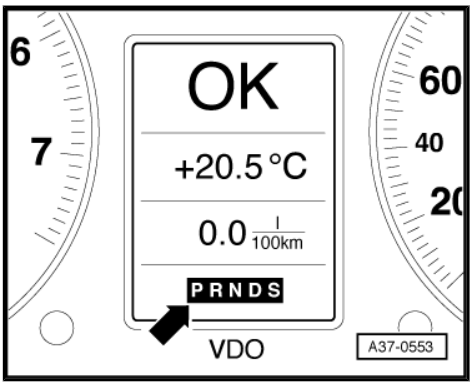
Starter inhibitor relay -J207- from model year 1999 onwards

- 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.



Selector lever position display -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 .



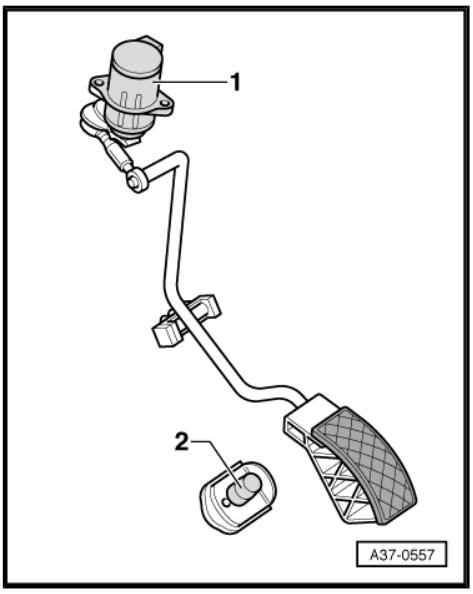
Accelerator position sender -G79- / accelerator position sender 2 -G185- and kick-down switch -F8-

- Fitting location:

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

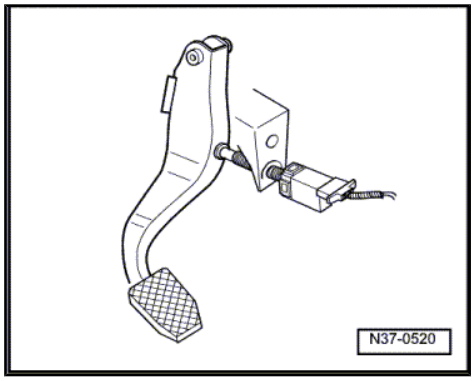
2 - Kick-down switch -F8- is bolted onto floor under pedals.

- Removing and installing ⇒ Rep. Gr. 20 .



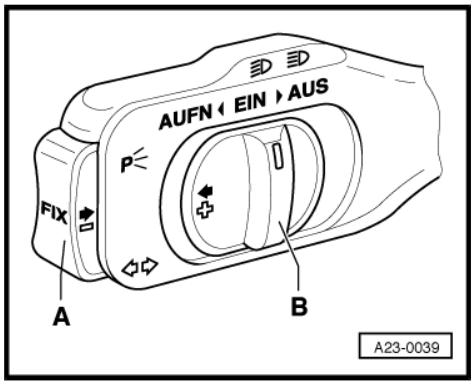
Brake light switch -F-

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



Cruise control system switch -E45-

- Fitting location: On steering column switch.

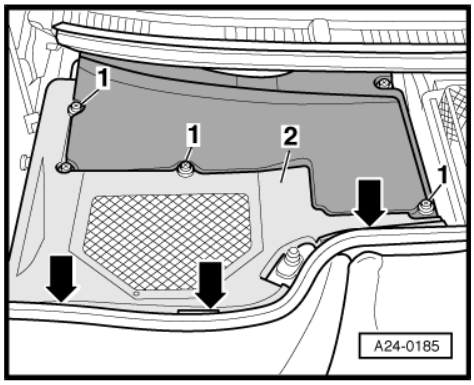


2.1 Removing and installing automatic gearbox control unit -J217-

Removing

– Unscrew bolts -1- a few turns.

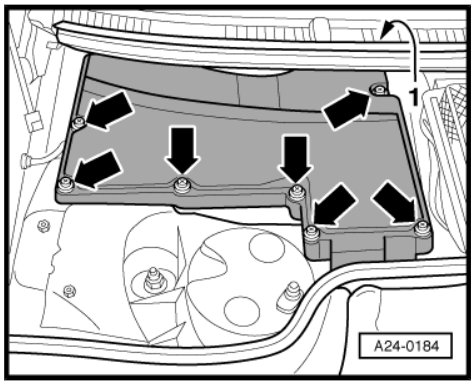
– Unclip plenum chamber cover -2- (right-side) -arrows- and detach cover.



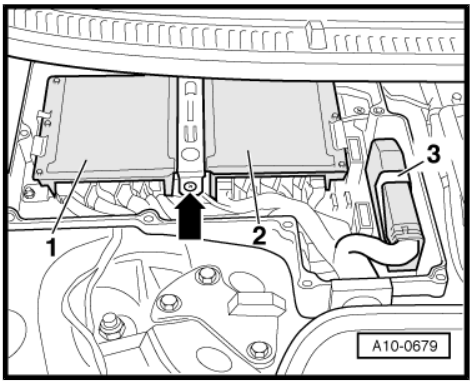
– Remove cross-head bolts -arrows- (for access to bolt at rear left lever out cover -1- in cowl panel trim).

– Detach cover for electronics box in plenum chamber.

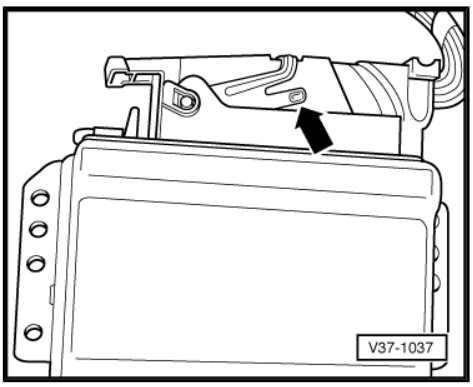
– Unclip control unit from electronics box -arrows-



– 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 test equipment.

♦ 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.

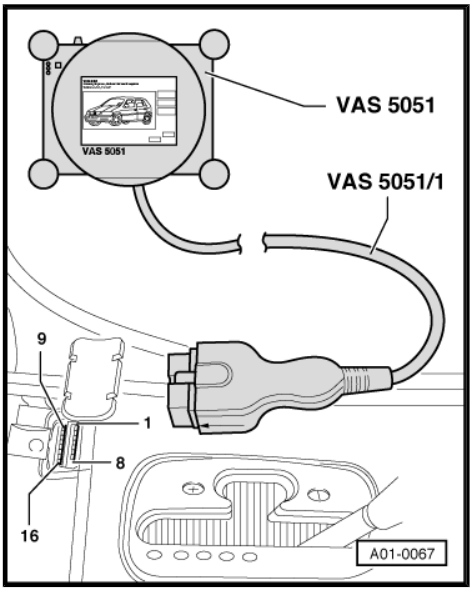
– Check battery earth strap and earth strap between battery and gearbox.

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.

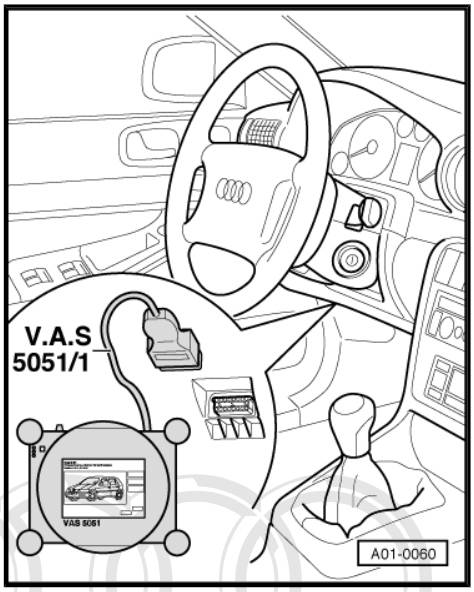


Vehicles from approx. the end of 1998 onwards:

– 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 12 .*



Note

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

– Switch on ignition.

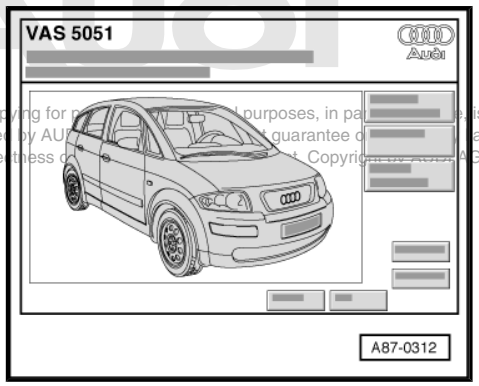
or

– Start engine.

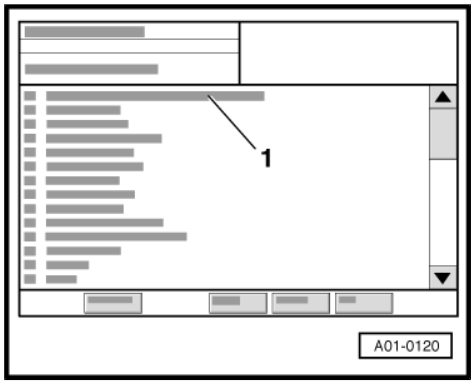
– Depress brake pedal once on vehicles with throttle cable.

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 correct version, refer to ⇒ Electronic parts catalogue
AG5 01V	5-speed automatic gearbox 01V
2.8l5V	2.8 litre engine, 5-valve
RoW market:	Rest of the world (unless otherwise stated, applicable for all countries, except USA and Canada)
1416	Control unit software version (data level)
Coding 1	Control unit coding ⇒ page 93
Workshop code 12345	Workshop code of -VAS 5051- which was used to perform the last coding

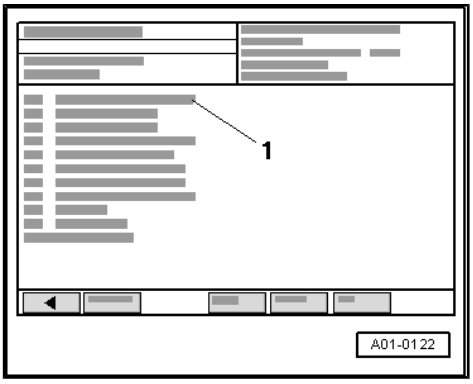
If readout "Vehicle system not available" appears in display zone -1-:

– 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 16
03	Final control diagnosis [1)] ♦ Gearbox with hydraulic control “Type E17” ♦ Gearbox with hydraulic control “Type E18/2”	⇒ page 80 ⇒ page 85
05	Erase fault memory	⇒ page 90
06	End output	⇒ page 91
07	Code control unit	⇒ page 93
08	Read measured value block [1)] ♦ Gearbox with hydraulic control “Type E17” ♦ Gearbox with hydraulic control “Type E18/2”	⇒ page 96 ⇒ page 110

• [1)] Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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

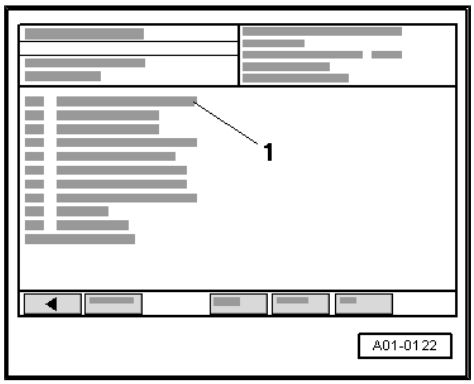
4 Interrogating fault memory

4.1 Interrogating fault memory

– Connect vehicle diagnostic, testing and information system - VAS 5051- ⇒ page 12 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.

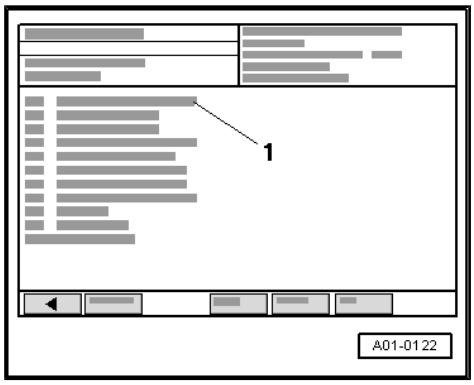
– End function “02 - Interrogate fault memory” by touching ← button.

Display on -VAS 5051- :

– Rectify fault(s) according to fault tables ⇒ page 17 .

– Again select diagnostic function “02 - Interrogate fault memory” from list -1- and erase fault memory ⇒ page 90 .

– From list -1- select diagnostic function “06 - End output” ⇒ page 91 .



B - If no fault has been detected:

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

– Select diagnostic function “06 - End output” ⇒ page 91 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 90 .*
- *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 00258 / P0753 up to fault code 01236 / P1760

Fault code 00258 / P0753

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00258 / P0753 Solenoid valve 1 -N88- Open circuit / short to earth Short to positive	♦ 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: With hydraulic control "Type E17" ⇒ page 80 or with hydraulic control "Type E18/2" ⇒ page 85 – Read measured value block 005: With hydraulic control "Type E17" ⇒ page 103 , with hydraulic control "Type E18/2" ⇒ page 117 – Perform electrical check, test steps No. 9 ⇒ page 132 and No. 10 ⇒ page 132

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.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00260 / P0758

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00260 / P0758 Solenoid valve 2 -N89- Open circuit / short to earth Short to positive	♦ 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: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 005: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117 – Perform electrical check, test steps No. 9 ⇒ page 132 and No. 11 ⇒ page 133

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.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00262 / P0763

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00262 / P0763 Solenoid valve 3 -N90- Open circuit / short to earth Short to positive	♦ 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: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 005: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117 – Perform electrical check, test steps No. 9 ⇒ page 132 and No. 12 ⇒ page 133

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.

- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00264 / P1813

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00264 / P1813 Solenoid valve 4 -N91- Open circuit / short to earth Short to positive	♦ 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 4 -N91- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 006: With hydraulic control “Type E17” ⇒ page 104 , with hydraulic control “Type E18/2” ⇒ page 118 – Perform electrical check, test steps No. 9 ⇒ page 132 and No. 13 ⇒ page 134

Explanatory notes

Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00266 / P1818

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00266 / P1818 Solenoid valve 5 -N92- Open circuit / short to earth Short to positive	♦ 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 5 -N92- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 006: With hydraulic control “Type E17” ⇒ page 104 , with hydraulic control “Type E18/2” ⇒ page 118 – Perform electrical check, test steps No. 9 ⇒ page 132 and No. 14 ⇒ page 135

Explanatory notes

- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00268 / P1823

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00268 / P1823 Solenoid valve 6 -N93- Open circuit / short to earth Short to positive	♦ 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 6 -N93- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 006: With hydraulic control “Type E17” ⇒ page 104 , with hydraulic control “Type E18/2” ⇒ page 118 – Perform electrical check, test steps No. 9 ⇒ page 132 and No. 15 ⇒ page 135

Explanatory notes

Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00270 / P1828

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00270 / P1828 Solenoid valve 7 -N94- Open circuit / short to earth Short to positive	♦ 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 7 -N94- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 007: With hydraulic control “Type E17” ⇒ page 105 , with hydraulic control “Type E18/2” ⇒ page 118 – Perform electrical check, test steps No. 9 ⇒ page 132 and No. 16 ⇒ page 136

Explanatory notes

Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00293 / P0705

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00293 / P0705 Multi-function switch -F125- Implausible signal	♦ Selector lever cable incorrectly adjusted	– Adjust selector lever cable ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37
	♦ Multi-pin connector on multi-function switch not plugged in ♦ Open circuit or short to earth or positive in wiring to component ♦ Open circuit in voltage supply	– Read measured value block 004: With hydraulic control “Type E17” ⇒ page 102 , with hydraulic control “Type E18/2” ⇒ page 116 – Check multi-pin connector for contact corrosion and moisture – Check wiring and connector according to current flow diagram
	♦ Multi-function switch -F125- defective	– Check ⇒ “13.4 Checking multi-function switch F125 with 8-pin connector”, page 142 or ⇒ “13.5 Checking multi-function switch F125 with 10-pin connector”, page 146

Explanatory notes

♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00296 / P1704

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00296 / P1704 Kick-down switch -F8- Short to earth	♦ Open circuit or short to earth in wiring to component	– Check kick-down function and throttle valve value in measured value block 008: With hydraulic control “Type E17” ⇒ page 106 , with hydraulic control “Type E18/2” ⇒ page 119 – Check wiring and connectors according to current flow diagram
	♦ Throttle cable not properly adjusted	– Adjust throttle cable ⇒ Fuel supply system, petrol engines; Rep. Gr. 20
	♦ Kick-down switch -F8- defective	– Perform electrical check, test step No. 5 ⇒ page 130

Explanatory notes

♦ Conditions for fault detection: Throttle valve signal is OK, throttle valve value is less than 25 % and short to earth (equivalent to kick-down signal) at kick-down input on gearbox control unit.

- Short to positive between kick-down switch -F8- and automatic gearbox control unit -J217- cannot be detected by self-diagnosis.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00297 / P0722

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00297 / P0722 Gearbox speed sender -G38- No signal	♦ Open circuit or short to earth or positive in wiring to component	– Read measured value block 001: With hydraulic control “Type E17” ⇒ page 98 , with hydraulic control “Type E18/2” ⇒ page 112 – Check wiring and connector according to current flow diagram. Also check connector for contact corrosion or moisture
	♦ Gearbox speed sender -G38- defective ♦ Screening for gearbox speed sender -G38- defective	– Perform electrical check, test step No. 17 ⇒ page 136
	♦ Engine speed or gearbox input speed signal incorrect	– Rectify fault as described for fault code 00529 / P0727
	♦ ATF level not OK	– Check ATF level ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37
	♦ Torque converter defective or incorrect torque converter fitted	– Check torque converter ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 32 – Check torque converter identification ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00
	♦ Brakes slipping or solenoid valve defective	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 – Check solenoid valves (read measured value block 005 ... 007: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117)

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 and the gearshift has been completed.
- The fault detection process also includes a plausibility check: The ratio of gearbox output speed to engine speed and gearbox input speed with the gear currently engaged is implausible.

- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00300 / P0712

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00300 / P0712 Gearbox oil (ATF) temperature sender -G93- Short to earth	♦ Open circuit or short to earth or positive in wiring to component	– Read measured value block 004: With hydraulic control “Type E17” ⇒ page 101 , with hydraulic control “Type E18/2” ⇒ page 115 – 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
00300 / P0713 Gearbox oil (ATF) temperature sender -G93- Open circuit / short to positive	♦ Gearbox oil (ATF) temperature sender -G93- defective	– Perform electrical check, test step No. 19 ⇒ page 137
	♦ ATF level not OK Faults can also be detected if ATF temperature is below –50 °C (short to earth has occurred) or if ATF temperature exceeds 180 °C (short to positive has occurred)	– Check ATF level ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37

Explanatory notes

- The gearbox oil (ATF) temperature sender -G93- is integrated into the internal gearbox wiring harness (on valve body).
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00518 / P0121 (vehicles with CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00518 / P0121 Throttle valve potentiometer -G69- Implausible signal	♦ Incorrect signal from throttle valve potentiometer -G69- to engine control unit ♦ Open circuit or short to earth or positive in wiring between throttle valve potentiometer -G69- and engine control unit	– Read measured value block 002: With hydraulic control “Type E17” ⇒ page 99 , with hydraulic control “Type E18/2” ⇒ page 113 – 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 150 .

- Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00518 / P0121 (vehicles without CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00518 / P0121 Throttle valve potentiometer -G69- Signal too small Signal too large Implausible signal	♦ Open circuit in wiring between engine control unit and automatic gearbox control unit -J217-	– Read measured value block 002: With hydraulic control “Type E17” ⇒ page 99 , with hydraulic control “Type E18/2” ⇒ page 113 If the fault code 00638 / P0702 or 00638 / P1767 is also displayed: – Rectify fault as described for fault code 17105 / P0721 ⇒ page 43 – Check wiring and connector according to current flow diagram
	♦ Open circuit or short to earth or positive in wiring between throttle valve potentiometer -G69- and engine control unit ♦ Incorrect signal from throttle valve potentiometer to engine control unit	– Rectify fault registered in engine control unit as described for fault codes 16504, 16505 and 16507 ⇒ Rep. Gr. 01
	♦ Throttle valve potentiometer -G69- defective ♦ No signal or incorrect signal transmitted from engine control unit	– Interrogate fault memory of engine control unit 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 are exchanged between the control units via a wiring connection.
- A brief failure (up to 1 second) of the throttle valve signal will not be detected by the engine control unit, however, it will be stored as a fault by the gearbox control unit.
- Conditions for fault detection: The signal frequency to the gearbox control unit is not within the permissible tolerance (signal pulse must occur at least every 30 ms).
- Vehicles without CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00526 / P0703 (only vehicles without CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00526 / P0703 Brake light switch -F- Implausible signal	♦ Open circuit or short to earth or positive in wiring to component	– Read measured value block 003: With hydraulic control “Type E17” ⇒ page 100 , with hydraulic control “Type E18/2” ⇒ page 114 – Check wiring and connectors according to current flow diagram
	♦ Brake light switch -F- defective	– Perform electrical check, test step No. 3 ⇒ page 130

Explanatory notes

- 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 briefly to erase the pre-set fault.
- The signal from brake light switch -F- is directly transmitted to automatic gearbox control unit -J217- .
- Vehicles without CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00529 / P0727 (vehicles with CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00529 / P0727 Speed information missing Implausible signal	♦ 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: With hydraulic control “Type E17” ⇒ page 98 , with hydraulic control “Type E18/2” ⇒ page 112 – Interrogate fault memory of engine control unit ⇒ 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 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 150 .
- Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00529 / P0727 (vehicles without CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00529 / P0727 Speed information missing Open circuit / short to earth Short to positive Implausible signal	♦ Open circuit in wiring between engine control unit and automatic gearbox control unit -J217- ♦ Engine speed signal falsified due to incorrectly routed electrical wiring (e.g. because of retrofitted telephone)	– Read measured value block 001: With hydraulic control “Type E17” ⇒ page 98 , with hydraulic control “Type E18/2” ⇒ page 112 – Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01
	♦ Open circuit or short to earth or positive in wiring between engine speed sender -G28- and engine control unit ♦ Incorrect signal from engine speed sender -G28- to engine control unit ♦ Engine speed sender -G28- defective	– Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01
	♦ Short in on-board computer	– Interrogate fault memory of instrument cluster ⇒ Electrical system, self-diagnosis; Rep. Gr. 01

Explanatory notes

- The signal from engine speed sender -G28- is transmitted to automatic gearbox control unit -J217- by engine control unit.
- The signals are exchanged between the control units via a wiring connection.
- A brief failure (up to 1 second) of the engine speed signal will not be detected by the engine control unit, however, it will be stored as a fault by the gearbox control unit.
- Fault detection is based on a plausibility check relating to the fuel consumption signal (or, if this is not available, to the throttle valve value).
- Conditions for fault detection: Multi-function switch -F125- is OK, fuel consumption signal or throttle valve signal is OK, gearbox speed above 200 rpm, but no engine speed signal detected for a period of 200 ms.
- Vehicles without CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00532 / P1746

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00532 / P1746 Voltage supply Signal too small Output does not switch / short to earth Output does not switch / short to positive	♦ Battery voltage less than 9 V	– Read measured value block 003: With hydraulic control “Type E17” ⇒ page 100 , with hydraulic control “Type E18/2” ⇒ page 114 – Check alternator or voltage regulator ⇒ Electrical System; Rep. Gr. 27
	♦ Fuse defective ♦ Voltage supply for solenoid valves or automatic gearbox control unit -J217- (terminal 15) less than 9 V or above 16 V ♦ Voltage is connected even with the ignition switched off (short to positive)	– Check voltage supply to automatic gearbox control unit -J217- – Check wiring and connectors according to current flow diagram
	♦ Open circuit in wiring or short at contacts 52, 53, 54 or 55 on automatic gearbox control unit -J217-	– Perform electrical check, test steps No. 1 ⇒ page 129 and No. 8 ⇒ page 132

Explanatory notes

- Condition for fault detection: Engine speed is higher than 1600 rpm.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00543 / P0726 (vehicles with CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00543 / P0726 Engine speed has exceeded maximum	♦ Incorrect signal from engine speed sender -G28- to engine control unit ♦ Engine speed signal falsified due to incorrectly routed electrical wiring (e.g. because of retrofitted telephone) ♦ Engine speed sender -G28- defective	– Read measured value block 001: With hydraulic control “Type E17” ⇒ page 98 , with hydraulic control “Type E18/2” ⇒ page 112 – 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 transmission ratios according to engine and gearbox codes
	♦ Engine on vehicle has been tuned	– Check whether engine has been tuned (unauthorised modifications)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ Gearbox has changed down when road speed is too high (e.g. due to mechanical fault in valve body)	– Read measured value block 005: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117 and perform road test to determine which selector elements are defective or not activated

Explanatory notes

- 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 150 .
- Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00543 / P0726 (vehicles without CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00543 / P0726 Engine speed has exceeded maximum	♦ Incorrect signal from engine speed sender -G28- to engine control unit ♦ Open circuit in wiring between engine control unit and automatic gearbox control unit -J217- ♦ Engine speed signal falsified due to incorrectly routed electrical wiring (e.g. because of retrofitted telephone) ♦ Engine speed sender -G28- defective	– Read measured value block 001: With hydraulic control “Type E17” ⇒ page 98 , with hydraulic control “Type E18/2” ⇒ page 112 – 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 transmission ratios according to engine and gearbox codes
	♦ Engine on vehicle has been tuned	– Check whether engine has been tuned (unauthorised modifications)
	♦ Gearbox has changed down when road speed is too high (e.g. due to mechanical fault in valve body)	– Read measured value block 005: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117 and perform road test to determine which selector elements are defective or not activated

Explanatory notes

- The signal from engine speed sender -G28- is transmitted to automatic gearbox control unit -J217- by engine control unit.
- The signals are exchanged between the control units via a wiring connection.
- Vehicles without CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00545 / P0702 or P1781 and P1782 (only vehicles without CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00545 / P0702 Engine/gearbox electrical connection Connector	♦ Open circuit or short to earth or positive in wiring between engine control unit and gearbox control unit for torque reduction/ ignition timing retardation	– Read measured value block 004 ⇒ page 103 – Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01 – Perform electrical check, test step No. 23 ⇒ page 139
00545 / P1781 Engine/gearbox electrical connection Open circuit / short to earth		
00545 / P1782 Engine/gearbox electrical connection Short to positive	♦ Ignition has been switched on with engine control unit connector unplugged ♦ Engine control unit defective	– Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01

Explanatory notes

- The signals are exchanged between the control units via a wiring connection.
- Condition for fault detection: Gearbox control unit is receiving no throttle valve signal or consumption signal, but gearbox input speed is higher than 2000 rpm
- Vehicles without CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00549 (only vehicles without CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00549 Consumption signal Short to earth Open circuit / short to earth Implausible signal	♦ Open circuit or short to earth or positive in wiring for fuel consumption signal/load signal between engine control unit and gearbox control unit	– Read measured value block 009 ⇒ page 107 – Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01 – Perform electrical check, test step No. 21 ⇒ page 138
	♦ Open circuit or short to positive in wiring to other components receiving the same signal (e.g. on-board computer) ♦ Short circuit in components also receiving the same signal (e.g. on-board computer)	– Check wiring and connectors according to current flow diagram – Interrogate fault memory of other components, e.g. dash panel insert ⇒ Electrical system, self-diagnosis; Rep. Gr. 01
	♦ No signal or incorrect signal from engine control unit	– Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01

Explanatory notes

- The signals are exchanged between the control units via a wiring connection.

- Condition for fault detection: Engine speed signal and throttle valve signal OK, but no consumption signal detected by automatic gearbox control unit -J217- for a period of 200 ms.
- Vehicles without CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00638 / P0702 (only vehicles without CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00638 / P0702 Engine/gearbox electrical connection 2 Open circuit / short to positive	♦ Open circuit or short to earth or positive in wiring for throttle valve signal between engine control unit and gearbox control unit	– Read measured value block 002 ⇒ page 99 – Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01 – Perform electrical check, test step No. 20 ⇒ page 138
00638 / P1767 Engine/gearbox electrical connection 2 Short to earth	♦ Throttle valve signal is not transmitted to automatic gearbox control unit -J217-	– Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01

Explanatory notes

- The signals are exchanged between the control units via a wiring connection.
- Vehicles without CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00652 / P0732

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00652 / P0732 Gear monitoring Implausible signal	♦ Engine speed, gearbox input speed or gearbox output speed incorrect	– Rectify fault as described for fault codes 00297 / P0722 ⇒ page 22 , 00529 / P0727 ⇒ page 25 and 17116 / P0732 ⇒ page 47
	♦ ATF level not OK	– Check ATF level ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37
	♦ ATF dirty	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38
	♦ Clutch slipping/defective or solenoid valve dirty/defective	– Check solenoid valves (read measured value block 005 ... 007: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117)
	♦ Incorrect automatic gearbox control unit -J217-	– Check control unit identification ⇒ page 14
	♦ Incorrect engine control unit	– Check engine control unit identification ⇒ Rep. Gr. 01

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ Incorrect gearbox (gearbox code and engine version are not compatible)	– Check gearbox code ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00

Explanatory notes

- ♦ The ratio of engine speed to gearbox input speed and gearbox output speed is implausible for the gear which is currently engaged. Condition: Gearbox input speed and gearbox output speed above 64 rpm and engine speed above 1400 rpm.
- ♦ Implausible gear ratio of 2nd gear detected by gearbox control unit.
- ♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00652 / P0733

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00652 / P0733 Gear monitoring Implausible signal	♦ Engine speed, gearbox input speed or gearbox output speed incorrect	– Rectify fault as described for fault codes 00297 / P0722 ⇒ page 22 , 00529 / P0727 ⇒ page 25 and 17117 / P0733 ⇒ page 48
	♦ ATF level not OK	– Check ATF level ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37
	♦ ATF dirty	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38
	♦ Clutch slipping/defective or solenoid valve dirty/defective	– Check solenoid valves (read measured value block 005 ... 007: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117)
	♦ Incorrect automatic gearbox control unit -J217-	– Check control unit identification ⇒ page 14
	♦ Incorrect engine control unit	– Check engine control unit identification ⇒ Rep. Gr. 01
	♦ Incorrect gearbox (gearbox code and engine version are not compatible)	– Check gearbox code ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00

Explanatory notes

- ♦ The ratio of engine speed to gearbox input speed and gearbox output speed is implausible for the gear which is currently engaged. Condition: Gearbox input speed and gearbox output speed above 64 rpm and engine speed above 1400 rpm.
- ♦ Implausible gear ratio of 3rd gear detected by gearbox control unit.

- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00652 / P0734

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00652 / P0734 Gear monitoring Implausible signal	♦ Engine speed, gearbox input speed or gearbox output speed incorrect	– Rectify fault as described for fault codes 00297 / P0722 ⇒ page 22 , 00529 / P0727 ⇒ page 25 and 17118 / P0734 ⇒ page 49
	♦ ATF level not OK	– Check ATF level ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37
	♦ ATF dirty	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 – Check solenoid valves (read measured value block 005 ... 007: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117)
	♦ Clutch slipping/defective or solenoid valve dirty/defective	
	♦ Incorrect automatic gearbox control unit -J217-	– Check control unit identification ⇒ page 14
	♦ Incorrect engine control unit	– Check engine control unit identification ⇒ Rep. Gr. 01
	♦ Incorrect gearbox (gearbox code and engine version are not compatible)	– Check gearbox code ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00

Explanatory notes

- The ratio of engine speed to gearbox input speed and gearbox output speed is implausible for the gear which is currently engaged. Condition: Gearbox input speed and gearbox output speed above 64 rpm and engine speed above 1400 rpm.
- Implausible gear ratio of 4th gear detected by gearbox control unit.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00652 / P0735

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00652 / P0735 Gear monitoring Implausible signal	♦ Engine speed, gearbox input speed or gearbox output speed incorrect	– Rectify fault as described for fault codes 00297 / P0722 ⇒ page 22 , 00529 / P0727 ⇒ page 25 and 17119 / P0735 ⇒ page 49
	♦ ATF level not OK	– Check ATF level ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37
	♦ ATF dirty	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38
	♦ Clutch slipping/defective or solenoid valve dirty/defective	– Check solenoid valves (read measured value block 005 ... 007: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117)
	♦ Incorrect automatic gearbox control unit -J217-	– Check control unit identification ⇒ page 14
	♦ Incorrect engine control unit	– Check engine control unit identification ⇒ Rep. Gr. 01
	♦ Incorrect gearbox (gearbox code and engine version are not compatible)	– Check gearbox code ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00

Explanatory notes

- The ratio of engine speed to gearbox input speed and gearbox output speed is implausible for the gear which is currently engaged. Condition: Gearbox input speed and gearbox output speed above 64 rpm and engine speed above 1400 rpm.
- Implausible gear ratio of 5th gear detected by gearbox control unit.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 00668 / P0560

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
00668 / P0560 Vehicle voltage, terminal 30 Open circuit / short to earth	♦ Open circuit or short to earth in wiring	– Read measured value block 003: With hydraulic control “Type E17” ⇒ page 100 , with hydraulic control “Type E18/2” ⇒ page 114 – Check wiring and connectors according to current flow diagram – Perform electrical check, test steps No. 1 ⇒ page 129 and No. 9 ⇒ page 132
	♦ Fuse defective	– Check voltage supply to automatic gearbox control unit -J217-

Explanatory notes

- ♦ 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.
- ♦ The fault will only be stored if it has occurred five times in succession during a driving cycle.
- ♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 01044 / P1749

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
01044 / P1749 Control unit incorrectly coded	♦ Incorrect coding detected by gearbox control unit	– Check control unit identification ⇒ page 14

Fault code 01045

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
01045 tiptronic switch -F189- Short to earth	♦ Short circuit between tip-up button, tip-down button or in tiptronic switch -F189- (recognition) ♦ Short to earth in tip-up button, tip-down button or in tiptronic switch -F189- (recognition)	– Read measured value block 002: With hydraulic control “Type E17” ⇒ page 99 , with hydraulic control “Type E18/2” ⇒ page 113 – Read measured value block 002: With hydraulic control “Type E17” ⇒ page 99 , with hydraulic control “Type E18/2” ⇒ page 113 – Perform electrical check, test steps No. 25 ⇒ page 140 and No. 26 ⇒ page 140

Explanatory notes

- ♦ Only an implausible short to earth at contacts on gearbox control unit is detected.

Fault code 01166 (only vehicles with CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
01166 Engine torque signal Implausible signal	♦ Fault detected by engine control unit in “actual engine torque”	– Read measured value block 009: With hydraulic control “Type E17” ⇒ page 107 , with hydraulic control “Type E18/2” ⇒ page 122 – 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
	♦ Incorrect or defective automatic gearbox control unit -J217-	– Check control unit identification ⇒ page 14

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 150 .
- Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 01192 / P0741

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
01192 / P0741 Torque converter lock-up clutch Speed difference too great	♦ ATF level not OK	– Check ATF level ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37
	♦ ATF dirty	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38
	♦ Torque converter defective or incorrect torque converter fitted	– Check torque converter ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 32 – Check torque converter identification ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00
	♦ Mechanical fault in solenoid valve 7 -N94- / pressure regulating valve 4 -N218- ♦ Problems with ATF supply to solenoid valve 7 -N94- ♦ Torque converter pressure valve defective ♦ Valve for torque converter clutch defective	– Read measured value block 007: With hydraulic control “Type E17” ⇒ page 105 , with hydraulic control “Type E18/2” ⇒ page 118 and check permissible torque converter slip speed with clutch Tc engaged – Renew pressure regulating valve or valve body ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38
	♦ Torque converter lock-up clutch defective or worn	– Dismantle complete gearbox and clean all parts, renew ATF pipes ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37 – Dismantle and check all brakes ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37 – Renew valve body ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 – Renew torque converter ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 32

Explanatory notes

- The ratio of engine speed to gearbox input speed and gearbox output speed with torque converter clutch engaged is implausible.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 01196 / P1625 (only vehicles with CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
01196 / P1625 Engine/gearbox CAN bus No message from engine control unit	♦ Open circuit or short to earth or positive in CAN bus wiring ♦ Ignition has been switched on while connector for automatic gearbox control unit -J217- is unplugged	– Read measured value block 125 ⇒ page 122 – Check CAN bus wiring ⇒ page 150
	♦ Incorrect automatic gearbox control unit -J217-	– Check control unit identification ⇒ page 14
	♦ Incorrect or defective engine control unit	– Check engine control unit identification; interrogate fault memory and rectify faults ⇒ Rep. Gr. 01

Explanatory notes

- The signals between the control units are exchanged via a CAN bus ⇒ page 150 .
- Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 01236 / P1760

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
01236 / P1760 Selector lever lock solenoid -N110- Open circuit / short to earth Short to positive	♦ Fuse defective ♦ Open circuit in voltage supply	– Read measured value block 003: With hydraulic control “Type E17” ⇒ page 100 , with hydraulic control “Type E18/2” ⇒ page 114
	♦ Open circuit or short to earth in wiring	– Check wiring and connectors according to current flow diagram – Perform electrical check, test step No. 2 ⇒ page 129

Explanatory notes

- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

4.4 Fault tables: Fault code 16987 / P0603 up to fault code 18160 / P1752

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 – Renew control unit ⇒ page 10

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 – Renew control unit ⇒ page 10

Fault code 17086 / P0702

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17086 / P0702 Control unit defective	♦ Automatic gearbox control unit -J217- defective	– Check gearbox for mechanical and hydraulic faults – Check electrical/electronic components and wiring – Renew control unit ⇒ page 10

Fault code 17087 / P0703 (only vehicles with CAN bus)

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: With hydraulic control “Type E17” ⇒ page 100 , with hydraulic control “Type E18/2” ⇒ page 114 – 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 122 – Check CAN bus wiring ⇒ page 150
	♦ Brake light switch -F- defective	– Renew brake light switch ⇒ Brake system; Rep. Gr. 46

Explanatory notes

- 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 150 .
- Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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 01V, front-wheel drive and 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: With hydraulic control “Type E17” ⇒ page 101 , with hydraulic control “Type E18/2” ⇒ page 115 – Check multi-pin connector for contact corrosion and moisture – Check wiring and connector according to current flow diagram
	♦ Multi-function switch -F125- defective	– Check ⇒ “13.4 Checking multi-function switch F125 with 8-pin connector”, page 142 or ⇒ “13.5 Checking multi-function switch F125 with 10-pin connector”, page 146

Explanatory notes

- The term normally used for the electrical component "driving range sensor" is multi-function switch -F125- .
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 101 , with hydraulic control “Type E18/2” ⇒ page 115 – 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 137

Explanatory notes

- The gearbox oil (ATF) temperature sender -G93- is integrated into the internal gearbox wiring harness (on valve body).
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 101 , with hydraulic control “Type E18/2” ⇒ page 115 – 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 137

Explanatory notes

- ♦ This fault will be detected if ATF temperature does not rise or rises abruptly after engine is started.
- ♦ The gearbox oil (ATF) temperature sender -G93- is integrated into the internal gearbox wiring harness (on valve body).
- ♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 101 , with hydraulic control “Type E18/2” ⇒ page 115 – 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 137

Explanatory notes

- ♦ The gearbox oil (ATF) temperature sender -G93- is integrated into the internal gearbox wiring harness (on valve body).
- ♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37
	♦ Open circuit or short to earth or positive in wiring to component	– Read measured value block 004: With hydraulic control “Type E17” ⇒ page 101 , with hydraulic control “Type E18/2” ⇒ page 115 – 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 137

Explanatory notes

- ♦ The gearbox oil (ATF) temperature sender -G93- is integrated into the internal gearbox wiring harness (on valve body).
- ♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 98 , with hydraulic control “Type E18/2” ⇒ page 112 – 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 137
	♦ Gearbox output speed signal incorrect	– Rectify fault as described for fault code 17105 / P0721 ⇒ page 43
	♦ ATF level not OK	– Check ATF level ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ Brakes slipping	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 – Read measured value block 005 … 007 ⇒ page 115 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.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 17101 / P0717

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17101 / P0717 Gearbox input speed sender -G182- No signal	♦ Open circuit or short to earth or positive in wiring to component	– Read measured value block 001: With hydraulic control “Type E17” ⇒ page 98 , with hydraulic control “Type E18/2” ⇒ page 112 – 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 137
	♦ Engine speed signal or gearbox speed signal incorrect	– Rectify fault as described for fault codes 00297 / P0722 ⇒ page 22 , 00529 / P0727 ⇒ page 25 , 17090 / P0706 ⇒ page 39 , 17106 / P0722 ⇒ page 44 and 17110 / P0726 ⇒ page 45
	♦ ATF level not OK	– Check ATF level ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ Brakes slipping or solenoid valve defective	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 – Check solenoid valves (read measured value block 005 ... 007: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117)
	♦ Torque converter defective or incorrect torque converter fitted	– Check torque converter ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 32 – Check torque converter identification ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00

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 fault detection process also includes a plausibility check: The ratio of gearbox input speed to engine speed and gearbox output speed with the gear currently engaged is implausible.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 98 , with hydraulic control “Type E18/2” ⇒ page 112 – 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 136
	♦ Engine speed signal or gearbox speed signal incorrect	– Rectify fault as described for fault code 17100 / P0716 ⇒ page 41
	♦ ATF level not OK	– Check ATF level ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ Brakes slipping or solenoid valve defective	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 – Check solenoid valves (read measured value block 005 ... 007: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117)
	♦ Torque converter defective or incorrect torque converter fitted	– Check torque converter ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 32 – Check torque converter identification ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00

Explanatory notes

♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 17106 / P0722

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17106 / P0722 Gearbox output speed sender - G195- No signal	♦ Open circuit or short to earth or positive in wiring to component	– Read measured value block 001: With hydraulic control “Type E17” ⇒ page 98 , with hydraulic control “Type E18/2” ⇒ page 112 – 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 136
	♦ Engine speed signal or gearbox speed signal incorrect	– Rectify fault as described for fault code 17100 / P0716 ⇒ page 41
	♦ ATF level not OK	– Check ATF level ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ Brakes slipping or solenoid valve defective	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 – Check solenoid valves (read measured value block 005 ... 007: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117)
	♦ Torque converter defective or incorrect torque converter fitted	– Check torque converter ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 32 – Check torque converter identification ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00

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 fault detection process also includes a plausibility check: The ratio of gearbox output speed to engine speed and gearbox input speed with the gear currently engaged is implausible.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 17110 / P0726 (only vehicles with CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17110 / P0726 Engine speed signal from engine control unit Implausible signal	♦ Incorrect signal from engine speed sender -G28- to engine control unit ♦ Engine speed sender -G28- defective ♦ Excessive engine speed detected (engine over-revved)	– Read measured value block 001: With hydraulic control “Type E17” ⇒ page 98 , with hydraulic control “Type E18/2” ⇒ page 112 – 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
	♦ Incorrect or defective automatic gearbox control unit -J217-	– Check control unit identification ⇒ page 14

Explanatory notes

- 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 150 .

- Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 17114 / P0730

Display on -VAS 5051 A-	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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37
	♦ ATF dirty	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 – Check solenoid valves (read measured value block 005 ... 007: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117)
	♦ Brake slipping/defective or solenoid valve dirty/defective	
	♦ Gearbox input speed sender - G182- defective	– Rectify fault as described for fault codes 17100 / P0716 ⇒ page 41 and 17101 / P0717 ⇒ page 42
	♦ Gearbox output speed sender - G195- defective	– Rectify fault as described for fault codes 17105 / P0721 ⇒ page 43 and 17106 / P0722 ⇒ page 43
	♦ Incorrect or incorrectly coded automatic gearbox control unit - J217-	– Check control unit identification ⇒ page 14

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: With hydraulic control “Type E17” ⇒ page 98 , with hydraulic control “Type E18/2 ” ⇒ page 112).
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 17115 / P0731

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17115 / P0731 1st gear Wrong transmission ratio	♦ 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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 – Check solenoid valves (read measured value block 005 ... 007: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117)
	♦ Gearbox input speed sender - G182- defective	– Rectify fault as described for fault codes 17100 / P0716 ⇒ page 41 and 17101 / P0717 ⇒ page 42
	♦ Gearbox output speed sender - G195- defective	– Rectify fault as described for fault codes 17105 / P0721 ⇒ page 43 and 17106 / P0722 ⇒ page 43
	♦ Incorrect or incorrectly coded automatic gearbox control unit - J217-	– Check control unit identification ⇒ page 14

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.
- ♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 17116 / P0732

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17116 / P0732 2nd gear Wrong transmission ratio	♦ 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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 – Check solenoid valves (read measured value block 005 ... 007: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117)
	♦ Gearbox input speed sender - G182- defective	– Rectify fault as described for fault codes 17100 / P0716 ⇒ page 41 and 17101 / P0717 ⇒ page 42
	♦ Gearbox output speed sender - G195- defective	– Rectify fault as described for fault codes 17105 / P0721 ⇒ page 43 and 17106 / P0722 ⇒ page 43
	♦ Incorrect or incorrectly coded automatic gearbox control unit - J217-	– Check control unit identification ⇒ page 14

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.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 17117 / P0733

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17117 / P0733 3rd gear Wrong transmission ratio	♦ 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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 – Check solenoid valves (read measured value block 005 ... 007: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117)
	♦ Gearbox input speed sender - G182- defective	– Rectify fault as described for fault codes 17100 / P0716 ⇒ page 41 and 17101 / P0717 ⇒ page 42
	♦ Gearbox output speed sender - G195- defective	– Rectify fault as described for fault codes 17105 / P0721 ⇒ page 43 and 17106 / P0722 ⇒ page 43
	♦ Incorrect or incorrectly coded automatic gearbox control unit - J217-	– Check control unit identification ⇒ page 14

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.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 17118 / P0734

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17118 / P0734 4th gear Wrong transmission ratio	♦ 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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 – Check solenoid valves (read measured value block 005 ... 007: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117)
	♦ Gearbox input speed sender - G182- defective	– Rectify fault as described for fault codes 17100 / P0716 ⇒ page 41 and 17101 / P0717 ⇒ page 42
	♦ Gearbox output speed sender - G195- defective	– Rectify fault as described for fault codes 17105 / P0721 ⇒ page 43 and 17106 / P0722 ⇒ page 43
	♦ Incorrect or incorrectly coded automatic gearbox control unit - J217-	– Check control unit identification ⇒ page 14

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.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 17119 / P0735

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
17119 / P0735 5th gear Wrong transmission ratio	♦ 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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 – Check solenoid valves (read measured value block 005 ... 007: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117)
	♦ Gearbox input speed sender - G182- defective	– Rectify fault as described for fault codes 17100 / P0716 ⇒ page 41 and 17101 / P0717 ⇒ page 42
	♦ Gearbox output speed sender - G195- defective	– Rectify fault as described for fault codes 17105 / P0721 ⇒ page 43 and 17106 / P0722 ⇒ page 43
	♦ Incorrect or incorrectly coded automatic gearbox control unit - J217-	– Check control unit identification ⇒ page 14

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.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37
	♦ ATF dirty	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38
	♦ Torque converter defective or incorrect torque converter fitted	– Check torque converter ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 32 – Check torque converter identification ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00
	♦ Mechanical fault in solenoid valve 7 -N94- / pressure regulating valve 4 -N218- ♦ Problems with ATF supply to solenoid valve 7 -N94- / pressure regulating valve 4 -N218- ♦ Torque converter pressure valve defective ♦ Valve for torque converter clutch defective	– Read measured value block 007: With hydraulic control “Type E17” ⇒ page 105 , with hydraulic control “Type E18/2” ⇒ page 118 and check permissible torque converter slip speed with clutch Tc engaged – Renew solenoid valve/pressure regulating valve or valve body ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38
	♦ Torque converter lock-up clutch defective or worn	– Dismantle complete gearbox and clean all parts, renew ATF pipes ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37 – Dismantle and check all brakes ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37 – Renew valve body ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 – Renew torque converter ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 32

Explanatory notes

- The ratio of gearbox input speed to engine speed with torque converter clutch engaged is implausible.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .
- In some current flow diagrams the solenoid valve is also referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

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: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 005: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117 and perform road test to determine which selector elements are defective or not activated – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 11 ⇒ page 132

Explanatory notes

- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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
	♦ Solenoid valve 1 -N88- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 005: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117 and perform road test to determine which selector elements are defective or not activated – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 11 ⇒ page 132
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 10

Explanatory notes

♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ Solenoid valve 1 -N88- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 005: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117 and perform road test to determine which selector elements are defective or not activated – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 11 ⇒ page 132
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 10

Explanatory notes

♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 005: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117 and perform road test to determine which selector elements are defective or not activated – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 12 ⇒ page 133

Explanatory notes

♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 005: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117 and perform road test to determine which selector elements are defective or not activated – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 12 ⇒ page 133
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 10

Explanatory notes

♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 005: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117 and perform road test to determine which selector elements are defective or not activated – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 12 ⇒ page 133
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 10

Explanatory notes

♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 005: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117 and perform road test to determine which selector elements are defective or not activated – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 13 ⇒ page 133

Explanatory notes

- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 005: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117 and perform road test to determine which selector elements are defective or not activated – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 13 ⇒ page 133
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 10

Explanatory notes

- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 005: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117 and perform road test to determine which selector elements are defective or not activated – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 13 ⇒ page 133
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 10

Explanatory notes

♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37
	♦ ATF dirty	– Assess wear by checking ATF for colour and contamination ⇒ Servicing automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 – Check solenoid valves (read measured value block 005 ... 007: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117)
	♦ Brake slipping/defective or solenoid valve dirty/defective	
	♦ Gearbox input speed sender -G182- defective	– Rectify fault as described for fault code 17100 / P0716 ⇒ page 41
	♦ Gearbox output speed sender -G195- defective	– Rectify fault as described for fault code 17105 / P0721 ⇒ page 43

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ Incorrect or incorrectly coded automatic gearbox control unit -J217-	– Check control unit identification ⇒ page 14

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: With hydraulic control “Type E17” ⇒ page 98 , with hydraulic control “Type E18/2 ” ⇒ page 112).

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: With hydraulic control “Type E17” ⇒ page 98 , with hydraulic control “Type E18/2” ⇒ page 112 – Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01 – Check transmission ratios according to engine and gearbox codes
	♦ Engine on vehicle has been tuned	– Check whether engine has been tuned (unauthorised modifications)
	♦ Gearbox has changed down when road speed is too high (e.g. due to mechanical fault in valve body)	– Read measured value block 005: With hydraulic control “Type E17” ⇒ page 103 , with hydraulic control “Type E18/2” ⇒ page 117 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 (petrol engines) or 5500 rpm (TDI engines).
- 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 150 .
- Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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	– Read/check kick-down switch and throttle valve value in measured value block 008: With hydraulic control “Type E17” ⇒ page 106 , with hydraulic control “Type E18/2” ⇒ page 119 – Perform electrical check, test step No. 5 ⇒ page 130
	♦ Open circuit or short to earth or positive in CAN bus wiring	– Read measured value block 125 ⇒ page 122 – Check CAN bus wiring ⇒ page 150

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: With hydraulic control “Type E17” ⇒ page 108 , with hydraulic control “Type E18/2” ⇒ page 121 – Perform electrical check, test step No. 28 ⇒ page 140

Explanatory notes

- ♦ This fault is displayed if actuation of tip-down switch (-) is detected when selector lever is not in position “D”.
- ♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 108 , with hydraulic control “Type E18/2” ⇒ page 121 – Perform electrical check, test step No. 26 ⇒ page 140

Explanatory notes

- ♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 108 , with hydraulic control “Type E18/2” ⇒ page 121 – Perform electrical check, test step No. 25 ⇒ page 140
	♦ Automatic gearbox control unit -J217- defective due to high voltage	– Perform electrical check, test step No. 1 ⇒ page 129 – If no fault is detected, renew control unit ⇒ page 10

Explanatory notes

♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 100 , with hydraulic control “Type E18/2” ⇒ page 114 – 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. 10 ⇒ page 132
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 10

Explanatory notes

♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 100 , with hydraulic control “Type E18/2” ⇒ page 114 – 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. 10 ⇒ page 132
	♦ Automatic gearbox control unit -J217- defective	– Renew control unit ⇒ page 10

Explanatory notes

♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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 – Renew control unit ⇒ page 10

Fault code 18157 / P1749

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 control unit identification ⇒ page 14 – Read measured value block 013 ⇒ page 122
	♦ 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)

Fault code 18158 / P1750

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18158 / P1750 Voltage supply Voltage too low	♦ Battery voltage less than 9 V	– Read measured value block 003: With hydraulic control “Type E17” ⇒ page 100 , with hydraulic control “Type E18/2” ⇒ page 114
	♦ 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 129 and No. 9 ⇒ page 132
	♦ Fuse defective	– Check voltage supply to automatic gearbox control unit -J217-
	♦ Open circuit/short circuit to permanent positive in automatic gearbox control unit -J217-	– Renew control unit ⇒ page 10

Explanatory notes

♦ The battery monitoring system distinguishes between four different ranges:

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	♦ Alternator or voltage regulator defective	– Read measured value block 003: With hydraulic control “Type E17” ⇒ page 100 , with hydraulic control “Type E18/2” ⇒ page 114 – Check voltage supply to automatic gearbox control unit - J217- – Check wiring and connectors according to current flow diagram – Perform electrical check, test steps No. 1 ⇒ page 129 and No. 9 ⇒ page 132 – 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:

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 .

♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00

Fault code 18160 / P1752

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18160 / P1752 Voltage supply Implausible signal	♦ Excessive fluctuations in voltage or open circuit in voltage supply for automatic gearbox control unit -J217-	– Read measured value block 003: With hydraulic control “Type E17” ⇒ page 100 , with hydraulic control “Type E18/2” ⇒ page 114 – Check voltage supply to automatic gearbox control unit -J217- – Check wiring and connectors according to current flow diagram – Perform electrical check, test steps No. 1 ⇒ page 129 and No. 9 ⇒ page 132
	♦ Voltage regulator defective	– Check voltage regulator ⇒ Electrical system; Rep. Gr. 27

Explanatory notes

♦ The battery monitoring system distinguishes between four different ranges:

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 .

♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00

4.5 Fault tables: Fault code 18161 / P1753 up to fault code 65535

Fault code 18161 / P1753

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18161 / P1753 tiptronic switch -F189- Implausible signal	♦ Selector lever cable not properly adjusted	– Read measured value block 011: With hydraulic control “Type E17” ⇒ page 108 , with hydraulic control “Type E18/2” ⇒ page 121 – Check selector lever cable adjustment ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37
	♦ Connector not attached at selector mechanism ♦ No earth supply at selector mechanism ♦ Open circuit in all 3 tiptronic wires	– Check wiring and connectors according to current flow diagram

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
	♦ tiptronic switch -F189- (recognition) defective	– Perform electrical check, test step No. 25 ⇒ page 140

Fault code 18162 / P1754

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18162 / P1754 tiptronic switch, up -F189- Open circuit / short to positive	♦ Open circuit/short to positive in tip-up sensor or in wiring ♦ Open circuit/short to positive in tiptronic buttons on steering wheel or in wiring	– Read measured value block 011: With hydraulic control “Type E17” ⇒ page 108 , with hydraulic control “Type E18/2” ⇒ page 121 – Perform electrical check, test step No. 26 ⇒ page 140

Explanatory notes

♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 18163 / P1755

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18163 / P1755 tiptronic switch, down -F189- Open circuit / short to positive	♦ Open circuit/short to positive in tip-down sensor or in wiring ♦ Open circuit/short to positive in tiptronic buttons on steering wheel or in wiring	– Read measured value block 011: With hydraulic control “Type E17” ⇒ page 108 , with hydraulic control “Type E18/2” ⇒ page 121 – Perform electrical check, test step No. 26 ⇒ page 140

Explanatory notes

♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 18164 / P1756

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18164 / P1756 tiptronic (recognition) switch -F189- Open circuit / short to positive	♦ Open circuit or short to positive in wiring to component	– Read measured value block 011: With hydraulic control “Type E17” ⇒ page 108 , with hydraulic control “Type E18/2” ⇒ page 121 – Perform electrical check, test step No. 25 ⇒ page 140

Explanatory notes

♦ Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 100 , with hydraulic control “Type E18/2” ⇒ page 114 – Check fuses, wiring and connectors according to current flow diagram
	♦ Selector lever lock solenoid -N110- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Perform electrical check, test step No. 2 ⇒ page 129
	♦ Automatic gearbox control unit -J217- defective	– Renew automatic gearbox control unit -J217-

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.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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	♦ Open circuit or short to positive in wiring to component	– Read measured value block 003: With hydraulic control “Type E17” ⇒ page 100 , with hydraulic control “Type E18/2” ⇒ page 114 – Check wiring and connectors according to current flow diagram
	♦ Selector lever lock solenoid -N110- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Perform electrical check, test step No. 2 ⇒ page 129
	♦ Automatic gearbox control unit -J217- defective	– Renew automatic gearbox control unit -J217-

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.

- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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: With hydraulic control “Type E17” ⇒ page 100 , with hydraulic control “Type E18/2” ⇒ page 114 – Check wiring and connectors according to current flow diagram
	♦ Selector lever lock solenoid -N110- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Perform electrical check, test step No. 2 ⇒ page 129
	♦ Automatic gearbox control unit -J217- defective	– Renew automatic gearbox control unit -J217-

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.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 18179 / P1771 (only vehicles without CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18179 / P1771 Load signal from engine control unit Open circuit / short to positive	♦ Open circuit or short to earth or positive in wiring for load signal between engine control unit and gearbox control unit	– Read measured value block 009 ⇒ page 107 – Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01 – Perform electrical check, test step No. 23 ⇒ page 138
	♦ Open circuit or short to positive in wiring to other components receiving the same signal (e.g. on-board computer) ♦ Short circuit in components also receiving the same signal (e.g. on-board computer)	– Check wiring and connectors according to current flow diagram – Interrogate fault memory of other components, e.g. dash panel insert ⇒ Electrical system, self-diagnosis; Rep. Gr. 01
	♦ No signal or incorrect signal from engine control unit	– Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01

Explanatory notes

- The load signal is transmitted from engine control unit to automatic gearbox control unit -J217- .
- The signals are exchanged between the control units via a wiring connection.
- Condition for fault detection: Engine speed signal and throttle valve signal OK, but no load signal detected for a period of 245 ms.
- Vehicles without CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 18180 / P1772 (vehicles without CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18180 / P1772 Load signal from engine control unit Short to earth	♦ Open circuit or short to earth or positive in wiring for load signal between engine control unit and gearbox control unit	– Read measured value block 009 ⇒ page 107 – Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01 – Perform electrical check, test step No. 23 ⇒ page 138
	♦ Short to earth in wiring to other components receiving the same signal (e.g. on-board computer) ♦ Short circuit in components also receiving the same signal (e.g. on-board computer)	– Check wiring and connectors according to current flow diagram – Interrogate fault memory of other components, e.g. dash panel insert ⇒ Electrical system, self-diagnosis; Rep. Gr. 01
	♦ No signal or incorrect signal from engine control unit	– Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01

Explanatory notes

- The load signal is transmitted from engine control unit to automatic gearbox control unit -J217- .
- The signals are exchanged between the control units via a wiring connection.
- Condition for fault detection: Engine speed signal and throttle valve signal OK, but no load signal detected for a period of 245 ms.
- Vehicles without CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 18192 / P1784 (vehicles without CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18192 / P1784 Upshift/downshift circuit Open circuit / short to earth	♦ Open circuit or short to earth in wiring for upshift/downshift between engine control unit and gearbox control unit	– Read measured value block 004 ⇒ page 101 – Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01 – Perform electrical check, test step No. 26 ⇒ page 139

Explanatory notes

- The signals are exchanged between the control units via a wiring connection.
- Vehicles without CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 18193 / P1785 (vehicles without CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18193 / P1785 Upshift/downshift circuit Short to positive	♦ Short to positive in wiring for upshift/downshift between engine control unit and gearbox control unit	– Read measured value block 004 ⇒ page 101 – Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01 – Perform electrical check, test step No. 26 ⇒ page 139

Explanatory notes

- The signals are exchanged between the control units via a wiring connection.
- Vehicles without CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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
	♦ Solenoid valve 4 -N91- / pressure regulating valve 1 -N215- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 006: With hydraulic control “Type E17” ⇒ page 104 , with hydraulic control “Type E18/2” ⇒ page 118 – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 14 ⇒ page 134

Explanatory notes

- The pressure regulating valve 1 -N215- is the same component as the solenoid valve 4 -N91- . Also in some current flow diagrams the solenoid valve is referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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
	♦ Solenoid valve 4 -N91- / pressure regulating valve 1 -N215- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 006: With hydraulic control “Type E17” ⇒ page 104 , with hydraulic control “Type E18/2” ⇒ page 118 – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 14 ⇒ page 134
	♦ Automatic gearbox control unit -J217- defective	– Renew automatic gearbox control unit -J217-

Explanatory notes

- The pressure regulating valve 1 -N215- is the same component as the solenoid valve 4 -N91- . Also in some current flow diagrams the solenoid valve is referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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
	♦ Solenoid valve 5 -N92- / pressure regulating valve 2 -N216- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 006: With hydraulic control “Type E17” ⇒ page 104 , with hydraulic control “Type E18/2” ⇒ page 118 – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 15 ⇒ page 135

Explanatory notes

- The pressure regulating valve 2 -N216- is the same component as the solenoid valve 5 -N92- . Also in some current flow diagrams the solenoid valve is referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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
	♦ Solenoid valve 5 -N92- / pressure regulating valve 2 -N216- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 006: With hydraulic control “Type E17” ⇒ page 104 , with hydraulic control “Type E18/2” ⇒ page 118 – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 15 ⇒ page 135
	♦ Automatic gearbox control unit -J217- defective	– Renew automatic gearbox control unit -J217-

Explanatory notes

- The pressure regulating valve 2 -N216- is the same component as the solenoid valve 5 -N92- . Also in some current flow diagrams the solenoid valve is referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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
	♦ Solenoid valve 6 -N93- / pressure regulating valve 3 -N217- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 006: With hydraulic control “Type E17” ⇒ page 104 , with hydraulic control “Type E18/2” ⇒ page 118 – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 16 ⇒ page 135

Explanatory notes

- The pressure regulating valve 3 -N217- is the same component as the solenoid valve 6 -N93- . Also in some current flow diagrams the solenoid valve is referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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
	♦ Solenoid valve 6 -N93- / pressure regulating valve 3 -N217- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 006: With hydraulic control “Type E17” ⇒ page 104 , with hydraulic control “Type E18/2” ⇒ page 118 – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 16 ⇒ page 135
	♦ Automatic gearbox control unit -J217- defective	– Renew automatic gearbox control unit -J217-

Explanatory notes

- The pressure regulating valve 3 -N217- is the same component as the solenoid valve 6 -N93- . Also in some current flow diagrams the solenoid valve is referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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
	♦ Solenoid valve 7 -N94- / pressure regulating valve 4 -N218- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 007: With hydraulic control “Type E17” ⇒ page 105 , with hydraulic control “Type E18/2” ⇒ page 118 – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 17 ⇒ page 136

Explanatory notes

- The pressure regulating valve 4 -N218- is the same component as the solenoid valve 7 -N94- . Also in some current flow diagrams the solenoid valve is referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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
	♦ Solenoid valve 7 -N94- / pressure regulating valve 4 -N218- defective	– Perform final control diagnosis: With hydraulic control “Type E17” ⇒ page 80 , with hydraulic control “Type E18/2” ⇒ page 85 – Read measured value block 007: With hydraulic control “Type E17” ⇒ page 105 , with hydraulic control “Type E18/2” ⇒ page 118 – Perform electrical check, test steps No. 10 ⇒ page 132 and No. 17 ⇒ page 136
	♦ Automatic gearbox control unit -J217- defective	– Renew automatic gearbox control unit -J217-

Explanatory notes

- The pressure regulating valve 4 -N218- is the same component as the solenoid valve 7 -N94- . Also in some current flow diagrams the solenoid valve is referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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 14 – Read measured value block 013 ⇒ page 122
	♦ 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 122 – Check CAN bus wiring ⇒ page 150
	♦ 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 150 .
- ♦ Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 18259 / P1851 (only vehicles with CAN bus)

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 122 – Check CAN bus wiring ⇒ page 150
	♦ 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 150 .
- ♦ Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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 automatic gearbox control unit -J217-

Explanatory notes

- ♦ Data bus is also referred to as CAN bus.
- ♦ The signals between the control units are exchanged via a CAN bus ⇒ page 150 .
- ♦ Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 18263 / P1855 (only vehicles with CAN bus)

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 122 – Check CAN bus wiring ⇒ page 150
	♦ Incorrect automatic gearbox control unit -J217-	– Check control unit identification ⇒ page 14

Explanatory notes

- Data bus is also referred to as CAN bus.
- The signals between the control units are exchanged via a CAN bus ⇒ page 150 .
- Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 18264 / P1856 (only vehicles with CAN bus)

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 -G69- to engine control unit ♦ Open circuit or short to earth or positive in wiring between throttle valve potentiometer -G69- and engine control unit ♦ Throttle valve potentiometer -G69- defective ♦ No signal or incorrect signal transmitted from engine control unit	– Read measured value block 002: With hydraulic control “Type E17” ⇒ page 99 , with hydraulic control “Type E18/2” ⇒ page 113 – Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01
	♦ Open circuit or short to earth or positive in CAN bus wiring	– Read measured value block 125 ⇒ page 122 – Check CAN bus wiring ⇒ page 150
	♦ 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 150 .
- Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 18265 / P1857 (only vehicles with CAN bus)

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: With hydraulic control “Type E17” ⇒ page 107 , with hydraulic control “Type E18/2” ⇒ page 122 – 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

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 150 .
- Condition for fault detection: Engine speed signal and throttle valve signal OK, but no load signal detected for a period of 245 ms.
- Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 18266 / P0727 (vehicles with CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18266 / P0727 Engine speed signal from engine control unit Fault message from engine control unit	♦ 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: With hydraulic control “Type E17” ⇒ page 98 , with hydraulic control “Type E18/2” ⇒ page 112 – Interrogate fault memory of engine control unit ⇒ 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 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 150 .
- Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 18266 / P0727 (vehicles without CAN bus)

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
18266 / P0727 Engine speed signal from engine control unit Fault message from engine control unit	♦ Open circuit or short to earth in wiring between engine control unit and gearbox control unit for engine speed signal ♦ Engine speed signal falsified due to incorrectly routed electrical wiring (e.g. because of retrofitted telephone)	– Read measured value block 001: With hydraulic control “Type E17” ⇒ page 98 , with hydraulic control “Type E18/2” ⇒ page 112 – Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01 – Perform electrical check, test step No. 24 ⇒ page 139
	♦ Open circuit or short to earth or positive in wiring between engine speed sender -G28- and engine control unit ♦ Incorrect signal from engine speed sender -G28- to engine control unit ♦ Engine speed sender -G28- defective	– Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01

Explanatory notes

- The signal from engine speed sender -G28- is transmitted to automatic gearbox control unit -J217- by engine control unit.
- The signals are exchanged between the control units via a wiring connection.
- Vehicles without CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .
- Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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 or short circuit in wiring 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 150 .

- Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Fault code 65535

Display on -VAS 5051-	Possible cause of fault	How to rectify fault
65535 Control unit defective	♦ Automatic gearbox control unit -J217- defective	– Check gearbox for mechanical and hydraulic faults – Check electrical/electronic components and wiring – Renew automatic gearbox control unit -J217-

5 Final control diagnosis - gearbox with hydraulic control “Type E17”

The final control diagnosis procedure is different for gearbox with hydraulic control “Type E17” and for gearbox with hydraulic control “Type E18/2”. Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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- is 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 solenoid valves -N91- , -N92- , -N93- and -N94- 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

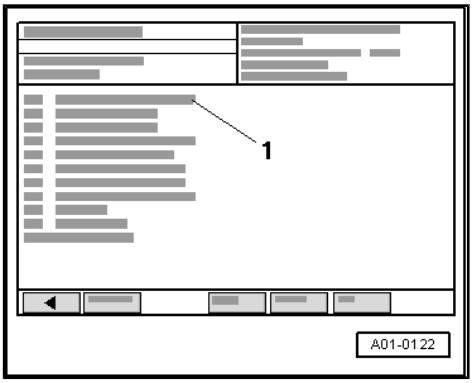
1. Solenoid valve 1 -N88-
2. Solenoid valve 2 -N89-
3. Solenoid valve 3 -N90-
4. Selector lever lock solenoid -N110-
5. Solenoid valve 4 -N91-
6. Solenoid valve 5 -N92-
7. Solenoid valve 6 -N93-
8. Solenoid valve 7 -N94-
9. Kick-down switch -F8- (kick-down for air conditioner)
10. Relay for solenoid valves

Procedure

– Connect vehicle diagnostic, testing and information system - VAS 5051- ⇒ page 12 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”.

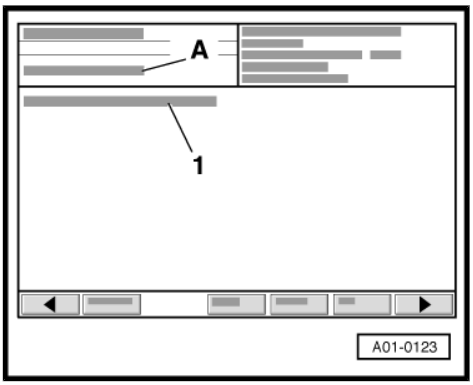


Display on -VAS 5051- :

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 103 .*
- *Any electrical faults will be stored in the fault memory, see fault tables for solenoid valve 1 -N88- ⇒ page 17 and ⇒ page 51 .*

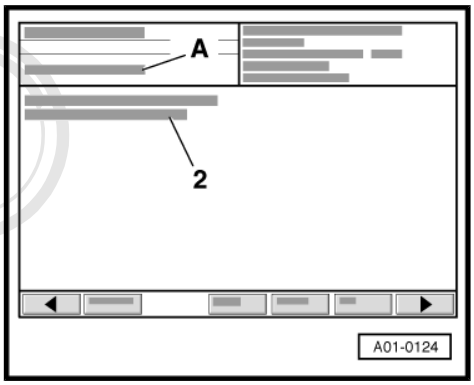
– Final control diagnosis is advanced to the next control element by touching ⇨ button.

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 103 .*
- *Any electrical faults will be stored in the fault memory, see fault tables for solenoid valve 2 -N89- ⇒ page 18 and ⇒ page 53 .*

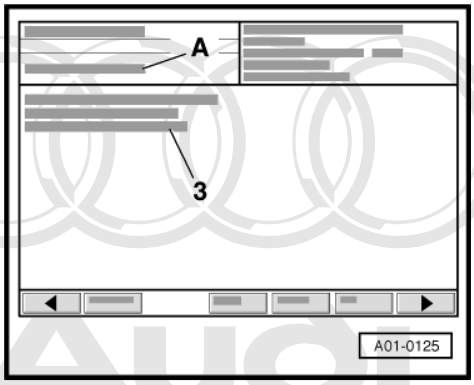
– Final control diagnosis is advanced to the next control element by touching ⇨ button.

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 103 .*
- *Any electrical faults will be stored in the fault memory, see fault tables for solenoid valve 3 -N90- ⇒ page 18 and ⇒ page 55 .*

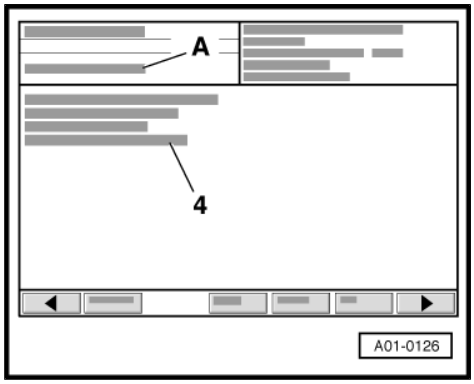
– Final control diagnosis is advanced to the next control element by touching ⇨ button.

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 100 .*
- *Any electrical faults will be stored in the fault memory, see fault tables for selector lever lock solenoid -N110- ⇒ page 37 and ⇒ page 66 .*

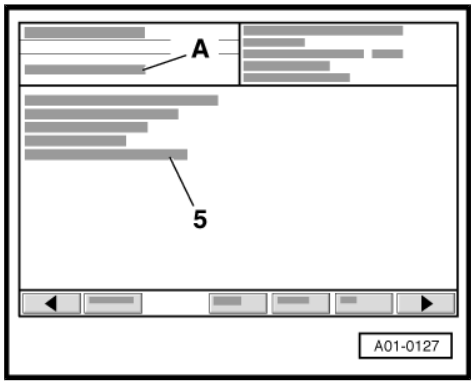
– Final control diagnosis is advanced to the next control element by touching ⇨ button.

Display on -VAS 5051- :

A - 5th control element in test

5 - Solenoid valve 4 -N91-

- The valve is activated.



Note

Any electrical faults will be stored in the fault memory, see fault tables for solenoid valve 4 -N91- ⇒ page 19 and ⇒ page 69 .

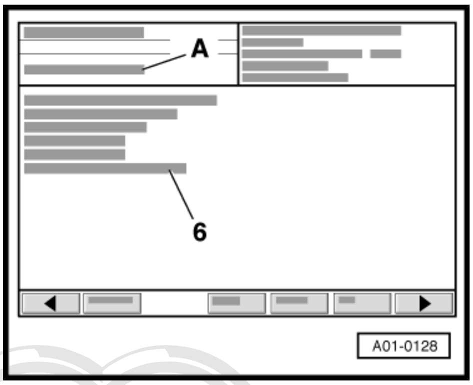
– Final control diagnosis is advanced to the next control element by touching ⇨ button.

Display on -VAS 5051- :

A - 6th control element in test

6 - Solenoid valve 5 -N92-

- The valve is activated.



Note

Any electrical faults will be stored in the fault memory, see fault tables for solenoid valve 5 -N92- *⇒ page 19* *and* *⇒ page 71* .

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

Display on -VAS 5051- :

A - 7th control element in test

7 - Solenoid valve 6 -N93-

- The valve is activated.

Note

Any electrical faults will be stored in the fault memory, see fault tables for solenoid valve 6 -N93- *⇒ page 20* *and* *⇒ page 72* .

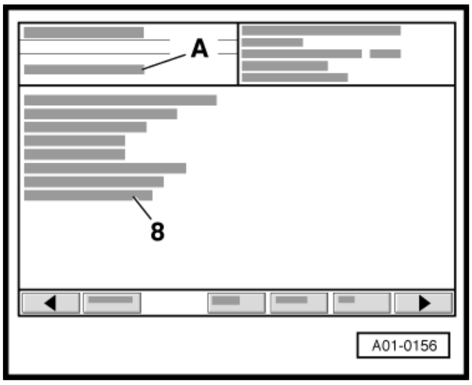
– Final control diagnosis is advanced to the next control element by touching ⇥ button.

Display on -VAS 5051- :

A - 8th control element in test

8 - Solenoid valve 7 -N94-

- The valve is activated.



Note

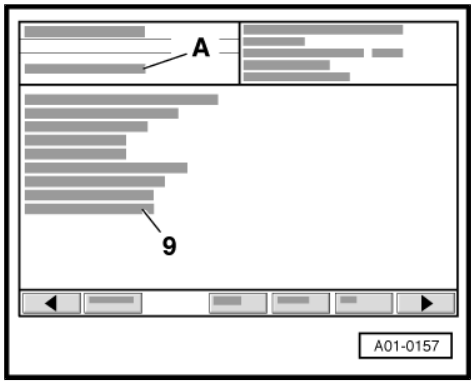
Any electrical faults will be stored in the fault memory, see fault tables for solenoid valve 7 -N94- *⇒ page 20* *and* *⇒ page 73* .

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

Display on -VAS 5051- :

A - 9th control element in test

9 - Kick-down switch -F8-



Note

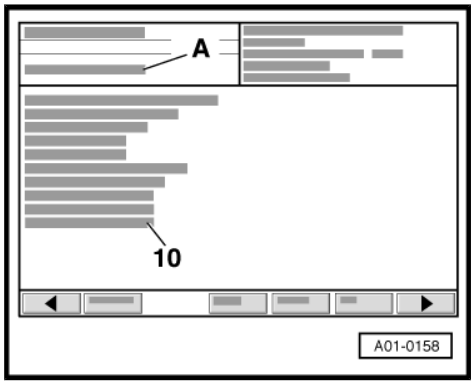
- *The kick-down switch -F8- is not activated; instead the test activates the air conditioner shut-off function in the automatic gearbox control unit -J217- .*
- *When the kick-down switch is operated, the gearbox control unit will connect the air conditioner output to earth. As a result, the air conditioner compressor is shut off briefly.*
- *Ignore control element.*
- *The signal can be checked in measured value block 011 ⇒ page 108 .*
- *To check the function of kick-down switch -F8- perform electrical check, test step No. 5 ⇒ page 130 .*

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

Display on -VAS 5051- :

A - 10th control element in test

10 - Relay for solenoid valves



- The solenoid valves that are active in position “P” are activated at intervals (and should click).

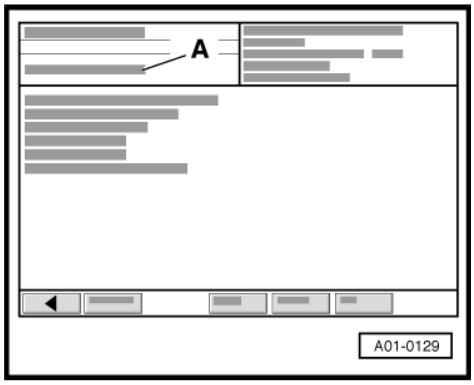
Note

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 Final control diagnosis - gearbox with hydraulic control “Type E18/2”

The final control diagnosis procedure is different for gearbox with hydraulic control “Type E17” and for gearbox with hydraulic control “Type E18/2”. Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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- is 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.*
- *During final control diagnosis for gearbox with hydraulic control “Type E18/2” the solenoid valves -N91- , -N92- , -N93- and -N94- are referred to as pressure regulating valves -N215- , -N216- , -N217- and -N218- .*
- *The pressure regulating valves -N215- , -N216- , -N217- and -N218- 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

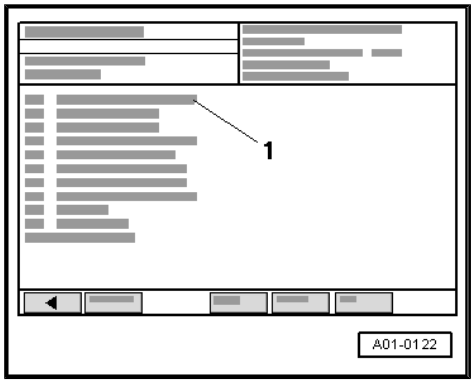
1. Solenoid valve 1 -N88-
2. Solenoid valve 2 -N89-
3. Solenoid valve 3 -N90-
4. Selector lever lock solenoid -N110-
5. Pressure regulating valve 1 -N215-
6. Pressure regulating valve 2 -N216-
7. Pressure regulating valve 3 -N217-
8. Pressure regulating valve 4 -N218-
9. Voltage supply for solenoid valves

Procedure

– Connect vehicle diagnostic, testing and information system - VAS 5051- ⇒ page 12 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

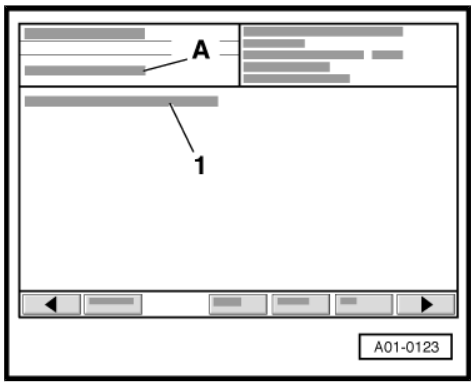
1 - Switch valve 1 ⇒ Solenoid valve 1 -N88-

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

Note

- *If valve is not activated, read measured value block 005 ⇒ page 117 .*
- *Any electrical faults will be stored in the fault memory, see fault tables for solenoid valve 1 -N88- ⇒ page 17 and ⇒ page 51 .*

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



Display on -VAS 5051- :

A - 2nd control element in test

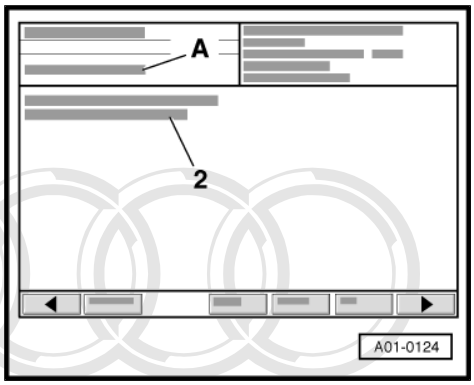
2 - Switch valve 2 ⇒ Solenoid valve 2 -N89-

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

Note

- *If valve is not activated, read measured value block 005 ⇒ page 117 .*
- *Any electrical faults will be stored in the fault memory, see fault tables for solenoid valve 2 -N89- ⇒ page 18 and ⇒ page 53 .*

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

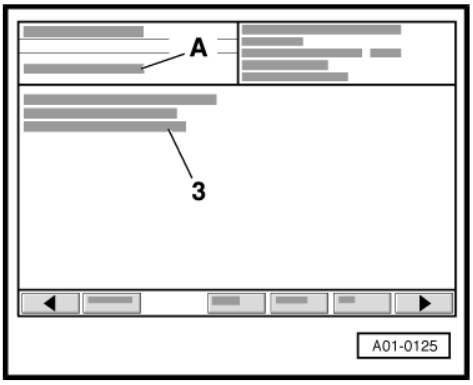


Display on -VAS 5051- :

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 117 .*
- *Any electrical faults will be stored in the fault memory, see fault tables for solenoid valve 3 -N90- ⇒ page 18 and ⇒ page 55 .*

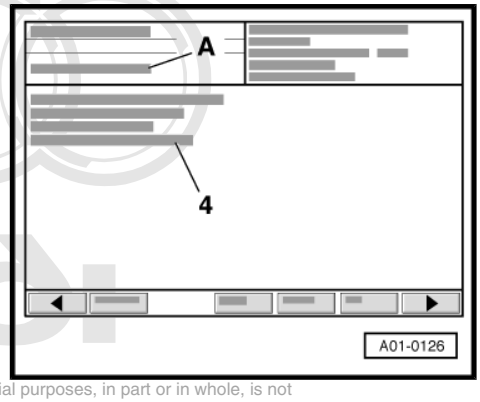
– Final control diagnosis is advanced to the next control element by touching ⇨ button.

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 114 .*
- *Any electrical faults will be stored in the fault memory, see fault tables for selector lever lock solenoid -N110- ⇒ page 37 and ⇒ page 66 .*

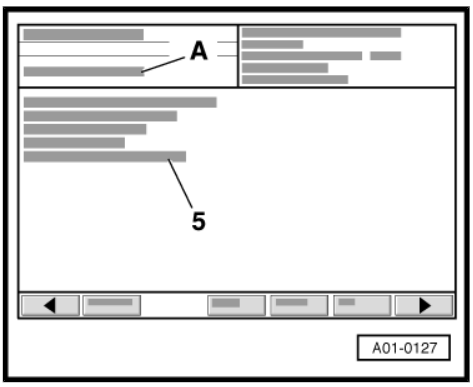
– Final control diagnosis is advanced to the next control element by touching ⇨ button.

Display on -VAS 5051- :

A - 5th control element in test

5 - Pressure regulating valve 1 -N215-

- The pressure regulating valve 1 -N215- is activated.

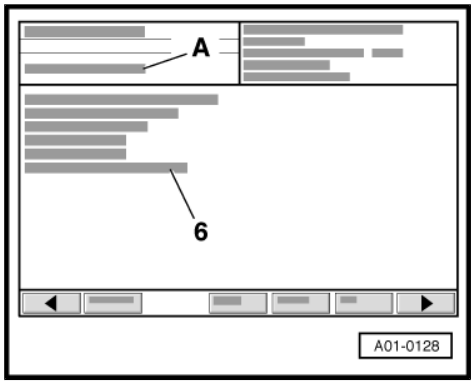


Note

- *The pressure regulating valve 1 -N215- mentioned in the final control diagnosis is the same component as the solenoid valve 4 -N91- . Also in some current flow diagrams the solenoid valve is referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.*
- *Any electrical faults will be stored in the fault memory, see fault tables for solenoid valve 4 -N91- / pressure regulating valve 1 -N215- ⇒ page 19 and ⇒ page 69 .*

– 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-

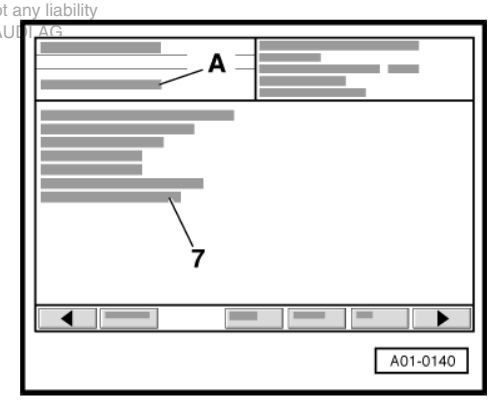
- The pressure regulating valve 2 -N216- is activated.

Note

- *The pressure regulating valve 2 -N216- mentioned in the final control diagnosis is the same component as the solenoid valve 5 -N92- . Also in some current flow diagrams the solenoid valve is referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.*
- *Any electrical faults will be stored in the fault memory, see fault tables for solenoid valve 5 -N92- / pressure regulating valve 2 -N216- ⇒ page 19 and ⇒ page 71 .*

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

Display on -VAS 5051- :



A - 7th control element in test

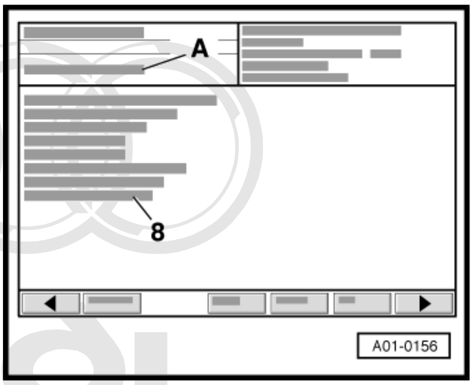
7 - Pressure regulating valve 3 -N217-

- The pressure regulating valve 3 -N217- is activated.

Note

- *The pressure regulating valve 3 -N217- mentioned in the final control diagnosis is the same component as the solenoid valve 6 -N93- . Also in some current flow diagrams the solenoid valve is referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.*
- *Any electrical faults will be stored in the fault memory, see fault tables for solenoid valve 6 -N93- / pressure regulating valve 3 -N217- ⇒ page 20 and ⇒ page 72 .*

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



Display on -VAS 5051- :

A - 8th control element in test

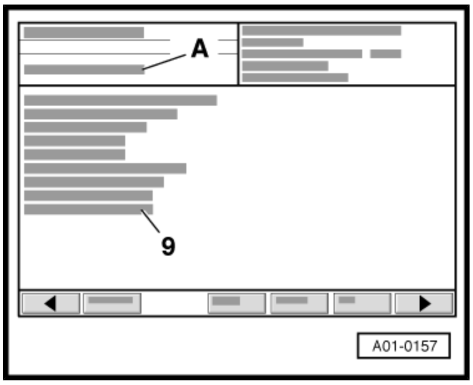
8 - Pressure regulating valve 4 -N218-

- The pressure regulating valve 4 -N218- is activated.

Note

- *The pressure regulating valve 4 -N218- mentioned in the final control diagnosis is the same component as the solenoid valve 7 -N94- . Also in some current flow diagrams the solenoid valve is referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.*
- *Any electrical faults will be stored in the fault memory, see fault tables for solenoid valve 7 -N94- / pressure regulating valve 4 -N218-* *⇒ page 20* and *⇒ page 73* .

– Final control diagnosis is advanced to the next control element by touching [→] button.



Display on -VAS 5051- :

A - 9th control element in test

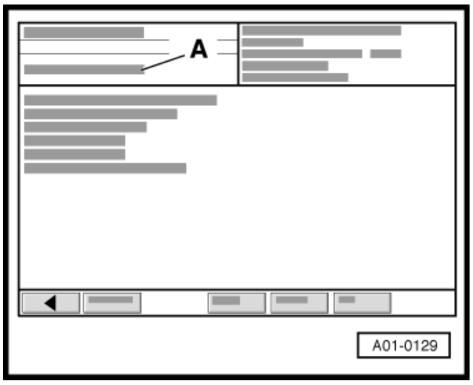
9 - Voltage supply for solenoid valves

- The solenoid valves that are active in position “P” are activated at 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.

7 Erasing fault memory

Note

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

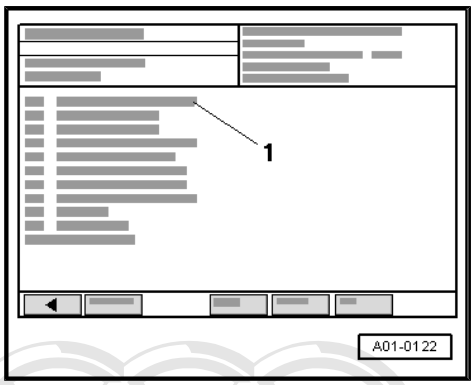
Requirements

- Fault memory interrogated ⇒ page 16 .
- All faults rectified.

After interrogating fault memory:

Display on -VAS 5051- :

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



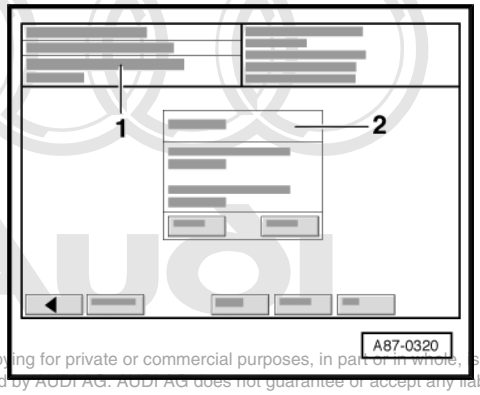
Display on -VAS 5051- :

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.

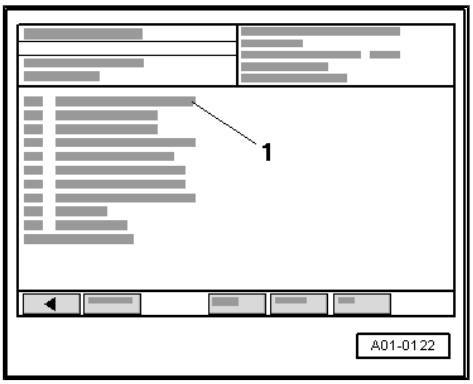
– Touch OK button in display -2-.

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

8 Ending output

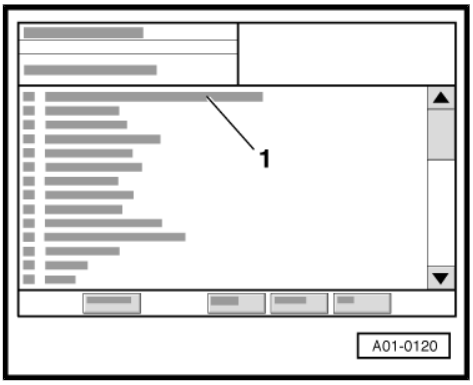
Display on -VAS 5051- :

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



Display on -VAS 5051- :

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



9 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 .

10 Coding control unit

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

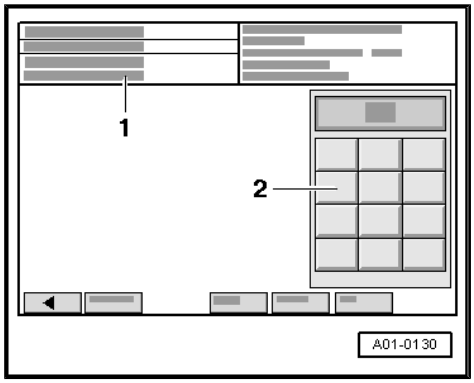
- Vehicle stationary, ignition switched on, engine not running.
- Selector lever in position “P” or “N”.
- Accelerator pedal in idling position.

– Connect vehicle diagnostic, testing and information system - VAS 5051- ⇒ page 12 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 vehicles with throttle cable or with 2.5 ltr. V6 TDI EU II engines (AFB, AKN)	Coding
All models	00000

Coding table for USA/Canada vehicles with electronic throttle	Coding
A8 front-wheel drive (up to model year 2001)	00004
A8 four-wheel drive (up to model year 2001)	00002
A8 front-wheel drive (from model year 2002 onwards)	01004
A8 four-wheel drive (from model year 2002 onwards)	01002

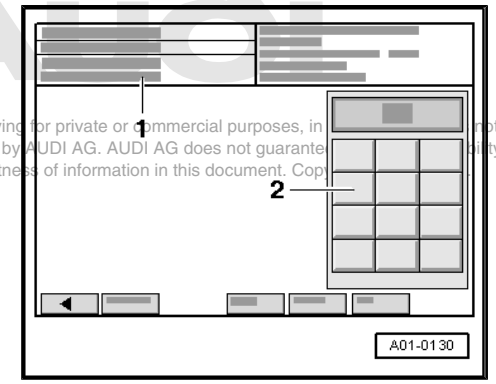
Coding table for RoW vehicles with electronic throttle except 2.5 ltr. V6 TDI EU II engines (AFB, AKN)	Coding
A8 front-wheel drive	00003
A8 four-wheel drive	00001
A8 front-wheel drive: Tip-up/tip down with selector lever in position “D”/“S” disabled on multi-function steering wheel [1)]	01003
S8: Tip-up/tip down with selector lever in position “D”/“S” disabled on multi-function steering wheel [1)]	01001

- [1)] 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 “01003”.

– Confirm entry by touching [Q] button.

Display on -VAS 5051- :

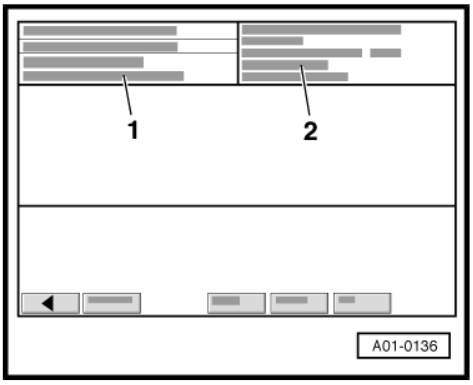
1 - Coding is being performed



– 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.

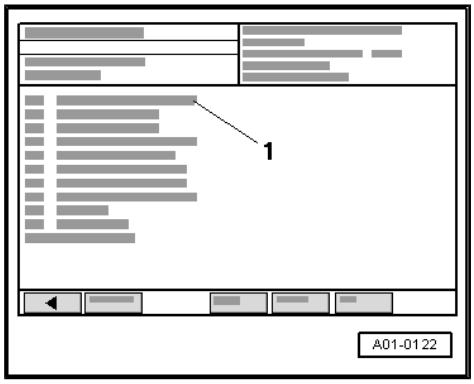
11 Measured value block - gearbox with hydraulic control “Type E17”

The measured value blocks are different for gearbox with hydraulic control “Type E17” and for gearbox with hydraulic control “Type E18/2”. Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

– Connect vehicle diagnostic, testing and information system -VAS 5051- ⇒ page 12 and select vehicle system “02 - Gearbox electronics”. When doing this the ignition must be switched on or the engine must be running.

Display on -VAS 5051- :

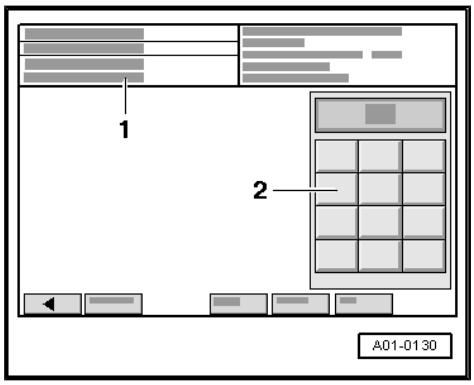
– From list -1-, select diagnostic function “08 - Read measured value block”.



Display on -VAS 5051- :

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

– Use keypad -2- to enter required “display group number” ⇒ page 97 and confirm entry by touching Q button.



Display on -VAS 5051- :

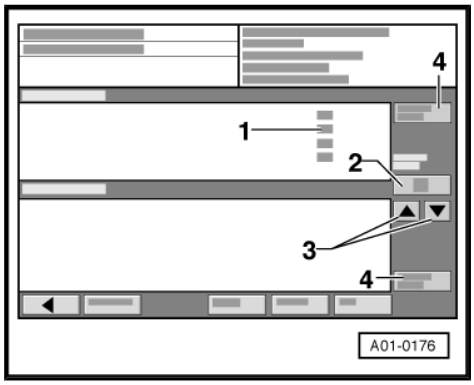
1 - Display zones 1 ... 4. If a display zone is vacant, the display in this line remains blank.

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.



11.1 Overview of selectable display groups - gearbox with hydraulic control “Type E17”

Display group	Display zone	Designation	Further details
001	1	Engine speed	⇒ page 98
	2	Gearbox input speed	
	3	Gearbox output speed	
	4	Gear engaged in gearbox	
002	1	Presently used shift program	⇒ page 99
	2	Throttle valve value or accelerator pedal position	
	3	Gearbox output speed	
	4	Gear engaged in gearbox	
003	1	Brake light switch -F-	⇒ page 100
	2	P/N lock	
	3	Speed	
	4	Voltage supply	
004	1	ATF temperature	⇒ page 101
	2	Selector lever position	
	3	Multi-function switch -F125- position	
	4	Vehicles with CAN bus: On-board diagnosis information Vehicles without CAN bus: Torque reduction/ignition timing retardation request	
005	1	Solenoid valve 1 -N88-	⇒ page 103
	2	Solenoid valve 2 -N89-	
	3	Solenoid valve 3 -N90-	
	4	Gear engaged in gearbox	
006	1	Specified current of solenoid valve 4 -N91-	⇒ page 104
	2	Specified current of solenoid valve 5 -N92-	
	3	Specified current of solenoid valve 6 -N93-	
	4	Gear engaged in gearbox	
007	1	ATF temperature	⇒ page 105
	2	Specified current of solenoid valve 7 -N94-	
	3	Torque converter clutch	
	4	Torque converter slip speed	
008	1	Kick-down switch -F8-	⇒ page 106
	2	Throttle valve value or accelerator pedal position	
	3	Vehicles with CAN bus: Engine torque Vehicles without CAN bus: Throttle valve duty cycle	
	4	Overrun/acceleration	
009 Vehicles with CAN bus	1	Engine torque (actual)	⇒ page 107
	2	Maximum torque	
	3	Engine speed	
	4	Throttle valve value	
009 Vehicles without CAN bus	1	Engine torque (actual)	⇒ page 107
	2	Engine speed	
	3	Throttle valve value	
	4	Fuel consumption signal	

Display group	Display zone	Designation	Further details
010	1	Torque increase in torque converter	⇒ page 108
	2	Engine speed	
	3	Gear engaged in gearbox	
	4	Traction control system (TCS)	
011	1	Selector lever position	⇒ page 108
	2	tiptronic switch -F189- (recognition)	
	3	tiptronic switch -F189- (shift up/shift down)	
	4	A/C kick-down	

11.2 Test table - gearbox with hydraulic control “Type E17”

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 12 If no value or an implausible value is displayed: – Rectify fault as described for fault codes 00529 / P0727 ⇒ page 25 or 17968 / P1560 ⇒ page 58
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 12 . The display readout should vary with the engine speed in display zone 1, i.e. when engine speed rises or drops, the gearbox input speed should also rise or drop accordingly – Gearshift must be completed, vehicle is not rolling downhill and not in overrun after accelerating
	0 ... 10 rpm	• Gear “R” engaged
	0 ... 10 rpm	• Gear “1m” engaged
	0 ... 10 rpm	• Gear “1” engaged (with throttle applied)
	0 ... 300 rpm	• Gear “1” engaged (on overrun)
	0 ... 4000 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 codes 17100 / P0716 ⇒ page 41 and 17101 / P0717 – Check values in measured value block 007 ⇒ page 105 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 12 – Gearshift must be completed, vehicle is not rolling downhill and not in overrun after accelerating
	0 ... 2000 rpm	• Gear “R” engaged
	0 ... 1200 rpm	• Gear “1”, “1m” engaged
	0 ... 4000 rpm	• Gear “2” engaged

Display zones		Explanatory notes
	0 ... 5800 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 codes 00297 / P0722 ⇒ page 22 , 17105 / P0721 ⇒ page 43 and 17106 / P0722 – Check values in measured value block 007 ⇒ page 105 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 12 • 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”
	1 2 3 4 5	• Selector lever in position “D”
	1 2 3 4	• Selector lever in position “4”
	1 2 3	• Selector lever in position “3”
	1m 2	• Selector lever in position “2” 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 103 , 006 ⇒ page 104 and 007 ⇒ page 105 – Check values for selector lever position in measured value block 004 ⇒ page 101

Display group 002

Display zones		Explanatory notes
1	0 … 240	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 12 • Driving dynamics index of dynamic shift program • Min. 0 (very economical) • Max. 240 (very "sporty")
	241	If warm-up program is not activated after cold start: – Check on-board diagnosis in measured value block 004 ⇒ page 102 - only vehicles with CAN bus
	242	• Traction control system activated
	243	• 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 59 , 18147 / P1739 and 18152 / P1744

Display zones		Explanatory notes
	244	Only for USA • GRA (cruise control system) timing map Can be ignored
2	… %	Throttle valve value or accelerator pedal position 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 % If the display readout does not appear as described: – Rectify fault as described for fault codes 00518 / P0121 ⇒ page 23 and 18269 / P1861 ⇒ page 78
3	… rpm	Gearbox output speed ⇒ page 98 , measured value block 001, display zone 3
4	…	Gear engaged in gearbox ⇒ page 98 , 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: – Rectify fault as described for fault codes 00526 / P0703 ⇒ page 25 and 17087 / P0703 ⇒ page 38
2	…	Selector lever lock solenoid -N110- , vehicle stationary – Press brake pedal – Shift selector lever to position “P” or “N” • Specification: “PN inactive” – Release brake pedal • Specification: “PN active” If the display readout does not appear as described: – Perform electrical check, test step No. 2 ⇒ page 129
3	… km/h	Vehicle speed when driving. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 . Speedometer reading may be slightly different from values on display -VAS 5051- If no value is displayed: – Check speedometer sender -G22-
4	… V	Terminal 15 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 129

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)) 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 137
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 “4”
	3	• Selector lever in position “3”
	2	• Selector lever in position “2”
	Z1 1)	• Selector lever between positions “P” and “R” or between positions “R” and “D”
	Z2 1)	• Selector lever between positions “N” and “D”
	Z3 1)	• Selector lever between positions “D” and “4”
	Z4 1)	• Selector lever between positions “4” and “3” or between positions “3” and “2” If the display readout does not appear as described: – Check multi-function switch -F125- in display zone 3 – Perform electrical check, test steps No. 6 ⇒ page 131 and No. 7 ⇒ page 131 – If necessary, adjust selector lever cable ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37

• 1) 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”, 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 “4”
0	0	0	1	• Selector lever in position “3”
0	0	1	0	• Selector lever in position “2”
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 “4”
0	0	1	1	• Selector lever between positions “4” and “3” or between positions “3” and “2”
				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. 7 ⇒ page 131 and No. 8 ⇒ page 131 – If necessary, adjust selector lever cable ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37

Display zone 4 in display group 004 (vehicles with CAN bus) [1)]

Display zone 4				Explanatory notes
1	2	3	4	
				On-board diagnosis information when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12
X				• “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

• [1)] Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

Display zone 4 in display group 004 (vehicles without CAN bus)
1)

Display zone		Explanatory notes
4	…	Torque reduction/ignition timing retardation during a gearshift. Depending on the driving conditions, the period of activation may be very brief, and because the signal to the -VAS 5051- is relatively slow there may be situations where a brief torque reduction is not displayed. – Gearshift under load • Specification: “Torque reduction” – No gearshift • Specification: No display readout
• 1) Vehicles without CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .		

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 12
	0	• Not activated (inactive) with gear “3” or “4” engaged
	X	• Activated (active) with gear “R”, “5”, “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. 10 ⇒ page 132 and No. 11 ⇒ page 132
2		Solenoid valve 2 -N89- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12
	0	• Not activated (inactive) with gear “R”, “1m”, “4” or “5” engaged
	X	• Activated (active) with gear “3”, “2” or “1” 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. 10 ⇒ page 132 and No. 12 ⇒ page 133
3		Solenoid valve 3 -N90- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12
	0	• Not activated (inactive) with gear “R”, “1”, “1m” or “2” engaged
	X	• Activated (active) with gear “3”, “4” or “5” 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. 10 ⇒ page 132 and No. 13 ⇒ page 133
4	…	Gear engaged in gearbox ⇒ page 98 , measured value block 001, display zone 4

Display group 006

Display zones		Explanatory notes
1	… A	Specified current of solenoid valve 4 -N91- / pressure regulating valve 1 -N215- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 . In some current flow diagrams the solenoid valve is also referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations. Various faults including defective solenoid valves/pressure regulating valves or brakes may prevent a particular gear from being engaged • Min. 0.1 A • Max. 0.8 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. 10 ⇒ page 132 and No. 14 ⇒ page 134
2	… A	Specified current of solenoid valve 5 -N92- / pressure regulating valve 2 -N216- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 . In some current flow diagrams the solenoid valve is also referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations. Various faults including defective solenoid valves/pressure regulating valves or brakes may prevent a particular gear from being engaged • Min. 0.1 A • Max. 0.8 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. 10 ⇒ page 132 and No. 15 ⇒ page 135
3	… A	Specified current of solenoid valve 6 -N93- / pressure regulating valve 3 -N217- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 . In some current flow diagrams the solenoid valve is also referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations. Various faults including defective solenoid valves/pressure regulating valves or brakes may prevent a particular gear from being engaged • Min. 0.1 A • Max. 0.8 A

Display zones		Explanatory notes
		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. 10 ⇒ page 132 and No. 16 ⇒ page 135
4	…	Gear engaged in gearbox ⇒ page 98 , measured value block 001, display zone 4

Display group 007

Display zones		Explanatory notes
1	… °C	ATF temperature ⇒ page 101 , measured value block 004, display zone 1
2	… A	Specified current of solenoid valve 7 -N94- / pressure regulating valve 4 -N218- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 . In some current flow diagrams the solenoid valve is also referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations. Various faults including defective solenoid valves/pressure regulating valves or brakes may prevent a particular gear from being engaged • Min. 0.1 A • Max. 0.8 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. 10 ⇒ page 132 and No. 17 ⇒ page 136
3	TC open	Torque converter clutch when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 • 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 50
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 12 • When “TC open”
	20 ... 120 rpm	• When “TC ctrl.”. The values specified apply when the “control phase” of torque converter 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 ... 10 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.

Display zones		Explanatory notes
		If the display readout does not appear as described: – Check ATF level ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37 – Rectify fault as described for fault codes 01192 / P0741 ⇒ page 36 , 17105 / P0721 ⇒ page 43 , 17106 / P0722 and 17125 / P0741 ⇒ page 50 – 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 01V, front-wheel drive and 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 98

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: – Vehicles with throttle cable: Rectify fault as described for fault code 00296 / P1704 ⇒ page 21 – Vehicles with electronic throttle: Rectify fault as described for fault code 18112 / P1704 ⇒ page 59
2	…%	Throttle valve value ⇒ page 99 , measured value block 002, display zone 2
3	... Nm	Vehicles with CAN bus [1]: Engine torque when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 The actual engine torque signal is transmitted from engine control unit to gearbox control unit via CAN bus
3	…%	Vehicles without CAN bus [2]: Throttle valve duty cycle 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: below 30 % • Specification - with accelerator pedal in full throttle position: above 70 % If the display readout does not appear as described: – Rectify fault as described for fault codes 00518 / P0121 ⇒ page 23 and 00638 / P0702 / P1767 ⇒ page 30
4	…	Overrun/acceleration signal when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 – 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 zones	Explanatory notes
• 1) Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 . • 2) Vehicles without CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .	

Display group 009 (vehicles with CAN bus) 1)

Display zones		Explanatory notes
1	... Nm	Actual engine torque when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 . When the vehicle is being driven with a 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 14 – Check CAN bus wiring ⇒ page 150
2	... Nm	Maximum torque when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 . Reduced engine torque required by gearbox control unit during gearshift
3	… rpm	Engine speed ⇒ page 98 , measured value block 001, display zone 1
4	…%	Throttle valve value ⇒ page 99 , measured value block 002, display zone 2
• 1) Vehicles with CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .		

Display group 009 (vehicles without CAN bus) 1)

Display zones		Explanatory notes
1	... Nm	Actual engine torque when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 . The actual engine torque is calculated by the gearbox control unit on the basis of the fuel consumption signal and the engine speed signal. When the vehicle is being driven with a gear engaged, the displayed engine torque required during gearshift remains at a constant level, since no torque reduction is required If no value or an implausible value is displayed: – Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01
2	… rpm	Engine speed ⇒ page 98 , measured value block 001, display zone 1
3	…%	Throttle valve value ⇒ page 99 , measured value block 002, display zone 2
4	... ms	Fuel consumption signal ("high" time). A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 . Vehicles with Motronic injection and ignition system: No fuel consumption signal will be displayed or display will show “00 ms” continuously Can be ignored
• 1) Vehicles without CAN bus ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .		

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 12 • 1 … 2.17 (calculated by gearbox control unit on the basis of the torque converter slip speed)
2	… rpm	Engine speed ⇒ page 98 , measured value block 001, display zone 1
3	…	Gear engaged in gearbox ⇒ page 98 , measured value block 001, display zone 4
4	…	Traction control system when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 – The ABS with EDL control unit -J104- cannot detect slipping drive wheels, traction control system is not activated • Specification: No display readout – The ABS with EDL control unit -J104- detects slipping drive wheels, traction control system is activated • Display should show: ASR active Can be ignored

Display group 011

Display zones		Explanatory notes
1	…	Selector lever position ⇒ page 101 , measured value block 004, display zone 2
2	…	tiptronic switch -F189- (recognition), vehicle stationary – 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. 27 ⇒ page 140
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. 28 ⇒ page 140
4	…	Air conditioner compressor shut-off function when kick-down is operated while vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12

Display zones		Explanatory notes
		– Press down accelerator pedal past kick-down point • Display should show: “Compressor OFF” – Release accelerator pedal • Display should show: “Compressor ON”

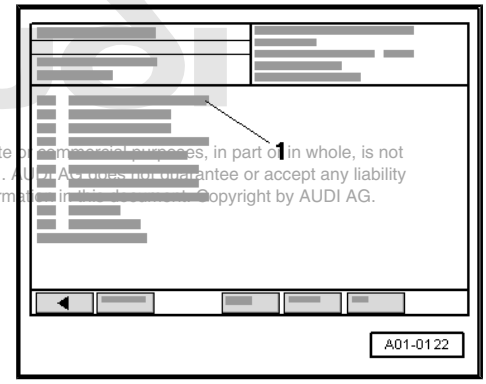
12 Measured value block - gearbox with hydraulic control “Type E18/2”

The measured value blocks are different for gearbox with hydraulic control “Type E17” and for gearbox with hydraulic control “Type E18/2”. Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

– Connect vehicle diagnostic, testing and information system - VAS 5051- ⇒ page 12 and select vehicle system “02 - Gearbox electronics”. When doing this the ignition must be switched on or the engine must be running.

Display on -VAS 5051- :

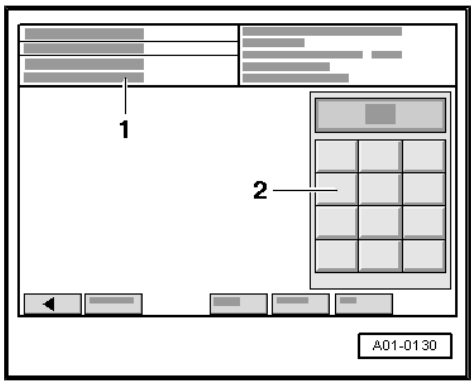
– From list -1-, select diagnostic function “08 - Read measured value block”.



Display on -VAS 5051- :

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

– Use keypad -2- to enter required “display group number” ⇒ page 111 and confirm entry by touching Q button.



Display on -VAS 5051- :

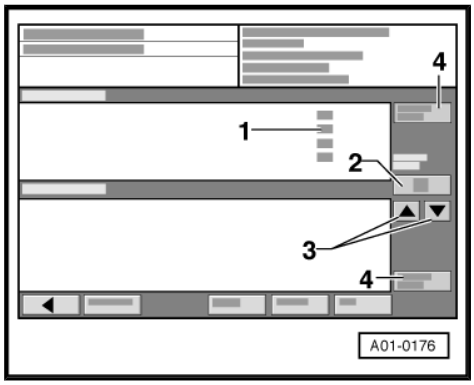
1 - Display zones 1 ... 4. If a display zone is vacant, the display in this line remains blank.

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.



12.1 Overview of selectable display groups - gearbox with hydraulic control “Type E18/2”

Display group	Display zone	Designation	Further details
001	1	Engine speed	⇒ page 112
	2	Gearbox input speed	
	3	Gearbox output speed	
	4	Gear engaged in gearbox	
002	1	Presently used shift program	⇒ page 113
	2	Throttle valve value or accelerator pedal position	
	3	Gearbox output speed	
	4	Gear engaged in gearbox	
003	1	Brake light switch -F-	⇒ page 114
	2	P/N lock	
	3	Speed	
	4	Voltage supply	
004	1	ATF temperature	⇒ page 115
	2	Selector lever position	
	3	Multi-function switch -F125- position	
	4	On-board diagnosis information	
005	1	Solenoid valve 1 -N88-	⇒ page 117
	2	Solenoid valve 2 -N89-	
	3	Solenoid valve 3 -N90-	
	4	Gear engaged in gearbox	
006	1	Specified current of solenoid valve 4 -N91- / pressure regulating valve 1 -N215-	⇒ page 118
	2	Specified current of solenoid valve 5 -N92- / pressure regulating valve 2 -N216-	
	3	Specified current of solenoid valve 6 -N93- / pressure regulating valve 3 -N217-	
	4	Vacant	
007	1	ATF temperature	⇒ page 118
	2	Specified current of solenoid valve 7 -N94- / pressure regulating valve 4 -N218-	
	3	Torque converter clutch	
	4	Torque converter slip speed	
008	1	Kick-down switch -F8-	⇒ page 119
	2	Throttle valve value or accelerator pedal position	
	3	Overrun/acceleration	
	4	Vacant	
009	1	Engine torque (actual)	⇒ page 120
	2	Engine speed	
	3	Throttle valve value or accelerator pedal position	
	4	Gearbox input torque	
010	1	Torque increase in torque converter	⇒ page 120
	2	Engine speed	
	3	Gear engaged in gearbox	
	4	Actual vehicle acceleration rate	

Display group	Display zone	Designation	Further details
011	1	Selector lever position	⇒ page 121
	2	tiptronic switch -F189- (recognition)	
	3	tiptronic switch -F189- (shift up/shift down)	
	4	Vacant	
012	1	Type of driving, under load	⇒ page 121
	2	Driving dynamics index	
	3	Motion resistance index	
	4	Driving style factor	
013	1	CAN bus calibration torque	⇒ page 122
	2	CAN bus engine code	
	3	CAN bus gearbox code	
	4	CAN bus software version code	
125	1	CAN bus for engine control unit	⇒ page 122
	2	CAN bus for ABS with EDL control unit -J104-	
	3	CAN bus for steering angle sender -G85-	
	4	Vacant	

12.2 Test table - gearbox with hydraulic control “Type E18/2”

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 12 If no value or an implausible value is displayed: – Rectify fault as described for fault codes 17968 / P1560 or 17968 / P0219 ⇒ page 58
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 12 . The display readout should vary with the engine speed in display zone 1, i.e. when engine speed rises or drops, the gearbox input speed should also rise or drop accordingly – 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 codes 17100 / P0716 ⇒ page 41 and 17101 / P0717 – Check values in measured value block 007 ⇒ page 118 and perform road test to determine which selector elements are defective or not activated
3		Gearbox output speed when vehicle is driven (from gearbox output speed sender -G195-). A second mechanic is required for reading out the values when vehicle is driven ⇒ “3.1 Safety precautions”, page 12 – Gearshift must be completed, vehicle is not rolling downhill and not in overrun after accelerating

Display zones		Explanatory notes
	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 If no value or an implausible value is displayed: – Rectify fault as described for fault codes 00297 / P0722 ⇒ page 22 , 17105 / P0721 ⇒ page 43 and 17106 / P0722 – Check values in measured value block 007 ⇒ page 118 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 12 • 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 “4”
	1m 2 3	• Selector lever in position “3”
	1m 2	• Selector lever in position “2” 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 117 , 006 ⇒ page 118 and 007 ⇒ page 118 – Check values for selector lever position in measured value block 004 ⇒ page 115

Display group 002

Display zones		Explanatory notes
1		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 12
	DS	• 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 116
	AS	• Traction control system activated

Display zones		Explanatory notes
	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 59 , 18147 / P1739, 18152 / P1744 and 18161 / P1753 ⇒ page 64 , 18162 / P1754, 18163 / P1755
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 % 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 150
3	… rpm	Gearbox output speed ⇒ page 112 , measured value block 001, display zone 3
4	…	Gear engaged in gearbox ⇒ page 112 , 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: – Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01
2	…	Selector lever lock solenoid -N110- , vehicle stationary – Press brake pedal – Shift selector lever to position “P” or “N” • Specification: “PN inactive” – Release brake pedal • Specification: “PN active” If the display readout does not appear as described: – Perform electrical check, test step No. 2 ⇒ page 129
3	… km/h	Vehicle speed when driving. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 . 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 129

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)) 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 137
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. 6 ⇒ page 131 and No. 7 ⇒ page 131 – If necessary, adjust selector lever cable ⇒ Automatic gearbox 01V, front-wheel drive and 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. 3 ⇒ page 131 and No. 4 ⇒ page 131 – If necessary, adjust selector lever cable ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37

• 1) Selector mechanism up to model year 2001.

Display zone 4 in display group 004

Display zone 4				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 12 • “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

Display zone 4				Explanatory notes
1	2	3	4	
			X	• “0” = Engine start not detected • “1” = Engine start detected

Display group 005

Display zones		Explanatory notes
1	0	Solenoid valve 1 -N88- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 • Not activated (inactive) with gear “R”, “3”, “4” or “5” engaged
	X	• Activated (active) with gear “N”, “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. 10 ⇒ page 132 and No. 11 ⇒ page 132
2	0	Solenoid valve 2 -N89- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 • Not activated (inactive) with gear “N”, “1”, “1m” or “5” engaged
	X	• Activated (active) with gear “R”, “2”, “3” or “4” 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. 10 ⇒ page 132 and No. 12 ⇒ page 133
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 12 • Not activated (inactive) with gear “R”, “1”, “1m”, “2”, “3”, “4” or “5” engaged
	X	• Activated (active) with gear “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. 10 ⇒ page 132 and No. 13 ⇒ page 133
4	…	Gear engaged in gearbox ⇒ page 112 , measured value block 001, display zone 4

Display group 006

Display zones		Explanatory notes
1	… A	Specified current of solenoid valve 4 -N91- / pressure regulating valve 1 -N215- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 . In some current flow diagrams the solenoid valve is also referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations. Various faults including defective solenoid valves/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. 10 ⇒ page 132 and No. 14 ⇒ page 134
2	… A	Specified current of solenoid valve 5 -N92- / pressure regulating valve 2 -N216- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 . In some current flow diagrams the solenoid valve is also referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations. Various faults including defective solenoid valves/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. 10 ⇒ page 132 and No. 15 ⇒ page 135
3	… A	Specified current of solenoid valve 6 -N93- / pressure regulating valve 3 -N217- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 . In some current flow diagrams the solenoid valve is also referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations. Various faults including defective solenoid valves/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. 10 ⇒ page 132 and No. 16 ⇒ page 135

Display group 007

Display zones		Explanatory notes
1	… °C	ATF temperature ⇒ page 115 , measured value block 004, display zone 1

Display zones		Explanatory notes
2	… A	Specified current of solenoid valve 7 -N94- / pressure regulating valve 4 -N218- when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 . In some current flow diagrams the solenoid valve is also referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations. Various faults including defective solenoid valves/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. 10 ⇒ page 132 and No. 17 ⇒ page 136
3	TC open	Torque converter clutch when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 • 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 50
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 12 • When “TC open”
	20 ... 120 rpm	• When “TC ctrl.”. The values specified apply when the “control phase” of torque converter 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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37 – Rectify fault as described for fault codes 17105 / P0721 ⇒ page 43 and 17125 / P0741 ⇒ page 50 – 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 01V, front-wheel drive and 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 112

Display group 008

Display zones		Explanatory notes
1	…	Kick-down switch -F8- , vehicle stationary

Display zones		Explanatory notes
		– 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: – Rectify fault as described for fault code 18112 / P1704 ⇒ page 59
2	…%	Throttle valve value ⇒ page 113 , 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 12 – 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	Actual engine torque when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 . When the vehicle is being driven with a 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 14 – Check CAN bus wiring ⇒ page 150
2	… rpm	Engine speed ⇒ page 112 , measured value block 001, display zone 1
3	…%	Throttle valve value ⇒ page 113 , 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 12 • Should match display zone 1 Can be ignored
• [1] Display readout in display zone 4 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 12 • 0 … 3.2 (calculated by gearbox control unit on the basis of the torque converter slip speed)
2	… rpm	Engine speed ⇒ page 112 , measured value block 001, display zone 1

Display zones		Explanatory notes
3	…	Gear engaged in gearbox ⇒ page 112 , measured value block 001, display zone 4
4	... m/s^2	Actual vehicle acceleration rate [1] when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 • Min. –10 m/s^2 • Max. 10 m/s^2 Can be ignored
• [1] Display readout in display zone 4 depends on vehicle version.		

Display group 011

Display zones		Explanatory notes
1	…	Selector lever position ⇒ page 115 , measured value block 004, display zone 2
2	…	tiptronic switch -F189- (recognition), vehicle stationary – 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. 19 ⇒ page 140
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. 20 ⇒ page 140

Display group 012

Display zones		Explanatory notes
1	E	Type of driving, load condition when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 12 • 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 12 Can be ignored
3	0 … 255	Motion resistance index - required for calculation of driving dynamics index

Display zones		Explanatory notes
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 14
3	1	CAN bus gearbox code 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 14
• [1)] Measured value block 013 is displayed according to vehicle version.		

Display group 125 [1)]

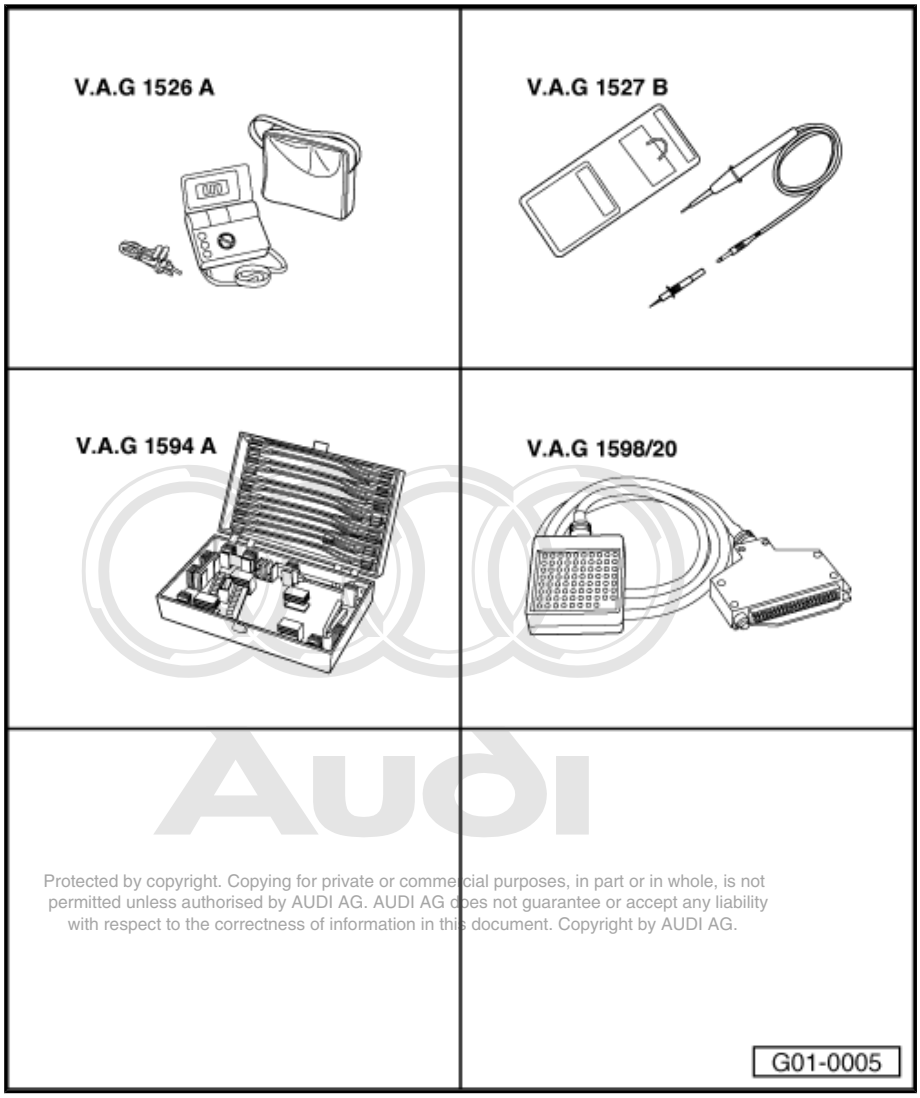
Display zones		Explanatory notes
1	Engine 1	Communication with Motronic control unit -J220- • Information is received from engine control unit via CAN bus
	Engine 0	• No information is received from engine control unit via CAN bus If “0” is displayed and no fault is entered in the fault memory: – Check 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 ⇒ Electronic parts catalogue . Or if control unit is defective – Check CAN bus wiring ⇒ page 150
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 ⇒ Electronic parts catalogue . Or if control unit is defective – Check CAN bus wiring ⇒ page 150
3	Steering wheel 1	Communication with steering angle sender -G85- (only vehicles with ESP) • Information is received from steering angle sender via CAN bus

Display zones		Explanatory notes
	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 ⇒ Electronic parts catalogue . Or if control unit is defective – Check CAN bus wiring ⇒ page 150
• 1) Measured value block 013 is displayed according to vehicle version.		

13 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-



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).

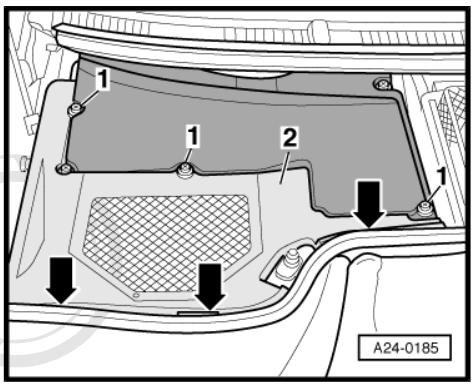
Requirements

- 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 equipment has been switched off.

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

– Unscrew bolts -1- a few turns.

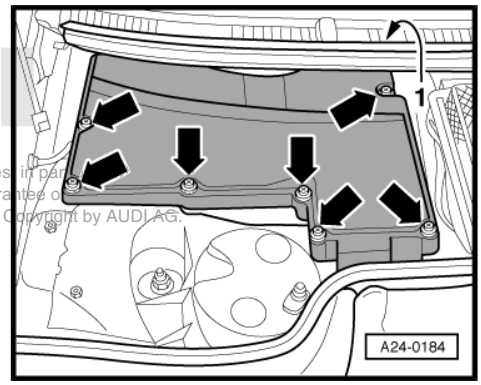
– Unclip plenum chamber cover -2- (right-side) -arrows- and detach cover.



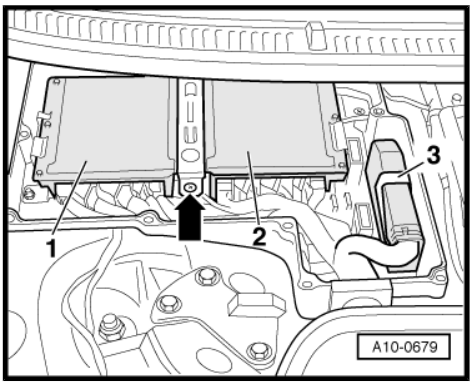
– Remove cross-head bolts -arrows- (for access to bolt at rear left lever out cover -1- in cowl panel trim).

– Detach cover for electronics box in plenum chamber.

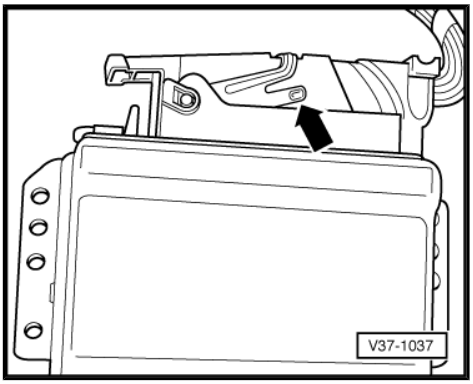
– Unclip control unit from electronics box -arrows-



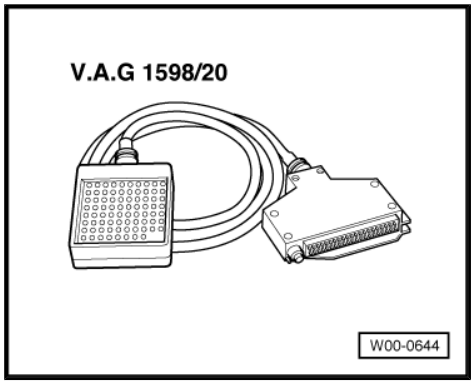
– Unplug multi-pin connector from gearbox control unit -3-.



– 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.



– 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”.

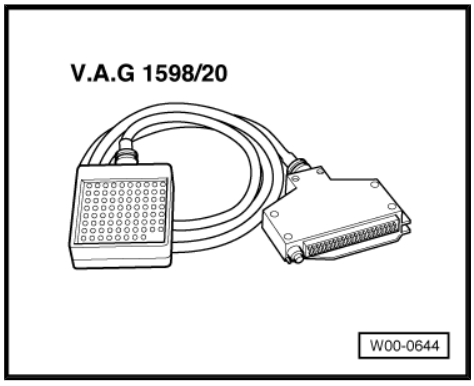
– Only perform the test steps recommended in the fault table (selective fault-finding).

– 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 - Solenoid valve 5 -N92- / pressure regulating valve 2 -N216- [1)]	32 - Solenoid valve 3 -N90-
2 - Selector lever lock solenoid -N110-	33 - Solenoid valve 2 -N89-
3 - Vacant	34 - Earth (terminal 31)

4 - Solenoid valve 7 -N94- / pressure regulating valve 4 -N218- 1)	35 - Vehicles with CAN bus: Vacant Vehicles without CAN bus: Fuel consumption signal
5 - Solenoid valve 4 -N91- / pressure regulating valve 1 -N215- 1)	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 - Vehicles with CAN bus: Vacant Vehicles without CAN bus: Engine speed signal
10 - Vehicles from model year 2001 onwards: Vacant Vehicles up to model year 2000: Brake light switch -F-	41 - Vehicles with CAN bus: Vacant Vehicles without CAN bus: Throttle valve value (load signal)
11 - Vacant	42 - Gearbox speed sender -G38- / gearbox output speed sender -G195-
12 - Vacant	43 - Vacant
13 - tiptronic switch -F189- (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-	46 - tiptronic switch -F189- upshift
16 - Gearbox input speed sender -G182-	47 - tiptronic switch -F189- downshift
17 - Vehicles with CAN bus: Vacant Vehicles without CAN bus: On-board diagnosis signal	48 - Vacant
18 - Kick-down switch -F8-	49 - Vacant
19 - Vehicles with CAN bus: Vacant Vehicles without CAN bus: Signal from ABS with EDL control unit -J104-	50 - Vacant
20 - Vehicles with CAN bus: Vacant Vehicles without CAN bus: Torque reduction (ignition timing retardation)	51 - Vehicles with CAN bus: Vacant Vehicles without CAN bus: Upshift/downshift signal
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 - Vehicles with CAN bus: Vacant Vehicles without CAN bus: To selector lever position indicator -Y6-	56 - Sockets 56 ... 84 are vacant
26 - Voltage supply (terminal 30)	84 -
27 - Vehicles with CAN bus: Vacant Vehicles without CAN bus: AC kick-down	85 - CAN bus Low
28 - Vehicles from model year 2001 onwards: Vacant Vehicles up to model year 2000: Earth for electronics (terminal 31)	86 - CAN bus High
29 - Solenoid valve 5 -N92- / automatic gearbox pressure regulating valve 3 -N217- 1)	87 - Vacant
30 - Solenoid valve 1 -N88-	88 - Diagnosis K wire
31 - Vacant	

- 1) In some current flow diagrams the solenoid valve is also referred to as pressure regulating valve ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- 2) In older current flow diagrams also referred to as gearbox speed sender -G38- .

13.2 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 129 and No. 8 ⇒ page 132
Selector lever lock solenoid -N110-	– Perform test step No. 2 ⇒ page 129
Brake light switch -F- - only vehicles up to model year 2000	– Perform test step No. 3 ⇒ page 130
Voltage supply for cruise control system - only vehicles with throttle cable	– Perform test step No. 4 ⇒ page 130
Kick-down switch -F8-	– Perform test step No. 5 ⇒ page 130
Multi-function switch -F125-	– Perform test steps No. 6 ⇒ page 131 and No. 7 ⇒ page 131
Solenoid valve 1 -N88-	– Perform test steps No. 9 ⇒ page 132 and No. 10 ⇒ page 132
Solenoid valve 2 -N89-	– Perform test steps No. 9 ⇒ page 132 and No. 11 ⇒ page 133
Solenoid valve 3 -N90-	– Perform test steps No. 9 ⇒ page 132 and No. 12 ⇒ page 133
Solenoid valve 4 -N91- / automatic gearbox pressure regulating valve 1 -N215-	– Perform test steps No. 9 ⇒ page 132 and No. 13 ⇒ page 134
Solenoid valve 5 -N92- / automatic gearbox pressure regulating valve 2 -N216-	– Perform test steps No. 9 ⇒ page 132 and No. 14 ⇒ page 135
Solenoid valve 6 -N93- / automatic gearbox pressure regulating valve 3 -N217-	– Perform test steps No. 9 ⇒ page 132 and No. 15 ⇒ page 135
Solenoid valve 7 -N94- / automatic gearbox pressure regulating valve 4 -N218-	– Perform test steps No. 9 ⇒ page 132 and No. 16 ⇒ page 136
Gearbox speed sender -G38- / gearbox output speed sender -G195-	– Perform test step No. 17 ⇒ page 136
Gearbox input speed sender -G182- - only vehicles with hydraulic control “Type E17” 1)	– Perform test step No. 18 ⇒ page 137
Gearbox oil temperature sender -G93- (ATF)	– Perform test step No. 19 ⇒ page 137
Wiring connections to engine control unit	– Perform test steps No. 20 ⇒ page 138 , No. 21 ⇒ page 138 , No. 22 ⇒ page 139 , No. 23 ⇒ page 139 and No. 24 ⇒ page 139
tiptronic switch -F189-	– Perform test steps No. 25 ⇒ page 140 and No. 26 ⇒ page 140

- 1) Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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 on vehicles up to model year 2000 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 ⇒ “13.4 Checking multi-function switch F125 with 8-pin connector”, page 142 and ⇒ “13.5 Checking multi-function switch F125 with 10-pin connector”, page 146 – Check selector lever lock solenoid -N110- for short circuit
2 + 54		• 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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37

Test step No. 3 - only applies to vehicles up to model year 2000

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
10 + 6	Brake light switch -F-	• Ignition switched on • Switched to voltage measuring range		
		– Brake pedal not depressed	Less than 1 V	– Check wiring according to current flow diagram
		– Brake pedal depressed	Approx. battery voltage	– If the wiring is OK, renew brake light switch ⇒ Brake system; Rep. Gr. 46

Test step No. 4 - only vehicles with throttle cable

-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
6 + 9	Voltage supply for cruise control system via cruise control switch -E45-	• Ignition switched on • Switched to voltage measuring range		
		– Selector lever in “D”, “S” or “4”, “3”	Approx. battery voltage	– Check wiring according to current flow diagram
		– Selector lever in “P”, “R”, “N”, “2”	Less than 1 V	– Perform test step No. 6 ⇒ page 131

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
18 + 54	Kick-down switch -F8-	• Ignition switched on • Switched to voltage measuring range		
		– Accelerator pedal not operated	Less than 5 V	– 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 pressed down past kick-down point	Approx. battery voltage	
		• Ignition switched off • Switched 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. 6

-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 • Switched to voltage measuring range		
		– Selector lever in “P”, “N”, “D”	Approx. battery voltage	– Check multi-function switch connector for contact corrosion – Check multi-function switch ⇒ “13.4 Checking multi-function switch F125 with 8-pin connector”, page 142 or ⇒ “13.5 Checking multi-function switch F125 with 10-pin connector”, page 146 – Perform test step No. 7 ⇒ page 131
		– 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. 7

-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 • Switched 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 ⇒ “13.4 Checking multi-function switch F125 with 8-pin connector”, page 142 or ⇒ “13.5 Checking multi-function switch F125 with 10-pin connector”, page 146 – Perform test step No. 6 ⇒ page 131
		– 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. 8

-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 on vehicles up to model year 2000 only.				

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	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 140 – Perform test step No. 1 ⇒ page 129 – Check wiring harness in gearbox according to current flow diagram; renew if necessary

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		

-V.A.G 1598/20-sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
30 + 34		– Switch to resistance measuring range	25 … 35 Ω ∞ Ω	– Check 16-pin connector to gearbox for contact corrosion – Perform test step No. 9 ⇒ page 132 – Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 140 – Check wiring harness in gearbox according to current flow diagram; renew if necessary – Renew solenoid valve ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38

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 33 + 34	Solenoid valve 2 -N89-	• Ignition switched off – Switch to resistance measuring range	25 … 35 Ω ∞ Ω	– Check 16-pin connector to gearbox for contact corrosion – Perform test step No. 9 ⇒ page 132 – Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 140 – Check wiring harness in gearbox according to current flow diagram; renew if necessary – Renew solenoid valve ⇒ Automatic gearbox 01V, front-wheel drive and 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		

-V.A.G 1598/20-sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
32 + 34		– Switch to resistance measuring range	25 … 35 Ω ∞ Ω	– Check 16-pin connector to gearbox for contact corrosion – Perform test step No. 9 ⇒ page 132 – Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 140 – Check wiring harness in gearbox according to current flow diagram; renew if necessary – Renew solenoid valve ⇒ Automatic gearbox 01V, front-wheel drive and 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 5 + 34	Solenoid valve 4 -N91- / pressure regulating valve 1 -N215-	• Ignition switched off – Switch to resistance measuring range	6 … 8 Ω ∞ Ω	– Check 16-pin connector to gearbox for contact corrosion – Perform test step No. 9 ⇒ page 132 – Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 140 – Check wiring harness in gearbox according to current flow diagram; renew if necessary – Renew solenoid valve ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38

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	Solenoid valve 5 -N92- / pressure regulating valve 2 -N216-	• Ignition switched off – Switch to resistance measuring range	6 … 8 Ω	– Check 16-pin connector to gearbox for contact corrosion – Perform test step No. 9 ⇒ page 132 – Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 140 – Check wiring harness in gearbox according to current flow diagram; renew if necessary – Renew solenoid valve ⇒ Automatic gearbox 01V, front-wheel drive and 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	Solenoid valve 6 -N93- / pressure regulating valve 3 -N217-	• Ignition switched off – Switch to resistance measuring range	6 … 8 Ω	– Check 16-pin connector to gearbox for contact corrosion – Perform test step No. 9 ⇒ page 132 – Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 140 – Check wiring harness in gearbox according to current flow diagram; renew if necessary – Renew solenoid valve ⇒ Automatic gearbox 01V, front-wheel drive and 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	Solenoid valve 7 -N94- / pressure regulating valve 4 -N218-	• Ignition switched off – Switch to resistance measuring range	6 … 8 Ω	– Check 16-pin connector to gearbox for contact corrosion – Perform test step No. 9 ⇒ page 132 – Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 140 – Check wiring harness in gearbox according to current flow diagram; renew if necessary – Renew solenoid valve ⇒ Automatic gearbox 01V, front-wheel drive and 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
14 + 42	Gearbox speed sender -G38- / gearbox output speed sender -G195-	• Ignition switched off – Switch to resistance measuring range	Min. 0.80 kΩ	– Check wiring according to current flow diagram – Renew gearbox output speed sender ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38
			Max. 1.20 kΩ	
14 + 34 14 + 54 42 + 54 42 + 34			∞ Ω	
15 + 34 15 + 54	Screening for gearbox speed sender -G38- / gearbox output speed sender -G195-		∞ Ω	– Check wiring according to current flow diagram

Test step No. 18 - only vehicles with hydraulic control "Type E17"
2)

-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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38
23 + 34 23 + 54	Screening for gearbox input speed sender - G182- 1)		∞ Ω	– Check wiring according to current flow diagram

- 1) Screening for gearbox input speed sender -G182- not fitted on all versions.
- 2) Allocation of hydraulic control system to gearbox ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 00 .

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
21 + 22	Gearbox oil temperature sender - G93- (ATF)	• Ignition switched off • Switched to resistance measuring range – Measure ATF temperature Approx. 20 °C	Approx. 0.83 kΩ1)	– Check wiring from automatic gearbox control unit -J217- to 16-pin connector ⇒ page 140 – 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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38
		Approx. 60 °C	Approx. 1.28 kΩ1)	
		Approx. 120 °C	Approx. 1.88 kΩ1)	
21 + 34 22 + 34			∞ Ω	
21 + 54 22 + 54			∞ Ω	

- 1) Permissible tolerance: ± 0.1 kΩ.

Test step No. 20 - only vehicles without CAN bus

-V.A.G 1598/20-sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
41 + 34 41 + 55 41 + 26	Wiring to engine control unit (throttle valve signal)	• Ignition switched off • Multi-pin connector disconnected from engine control unit – Switch to resistance measuring range	∞ Ω	– Check wiring according to current flow diagram
41 + xx [1]			Less than 1.5 Ω	
• [1] For contact assignment on multi-pin connector of engine control unit ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.				

Test step No. 21 - only vehicles without CAN bus

-V.A.G 1598/20-sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
35 + 34 35 + 55 35 + 26	Wiring to engine control unit (fuel consumption signal/load signal)	• Ignition switched off • Multi-pin connector disconnected from engine control unit – Switch to resistance measuring range	Higher than 40 kΩ	– Check wiring according to current flow diagram – Unplug connectors to components also receiving the same signal and repeat measurement – If necessary, check these components for short circuit (e.g. on-board computer) ⇒ Electrical system, self-diagnosis; Rep. Gr. 01
35 + xx [1]			Less than 1.5 Ω	
35 + 34		• Ignition switched on • Multi-pin connector disconnected from engine control unit – Switch to voltage measuring range	Approx. 5 V	
• [1] For contact assignment on multi-pin connector of engine control unit ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.				

Test step No. 22 - only vehicles without CAN bus

-V.A.G 1598/20-sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
40 + 34	Wiring to engine control unit (engine speed signal)	• Ignition switched off • Multi-pin connector disconnected from engine control unit – Switch to resistance measuring range	15 … 80 kΩ	– Check wiring according to current flow diagram – Check on-board computer ⇒ Electrical system, self diagnosis; Rep. Gr. 01
40 + xx [1]			Less than 1.5 Ω	

• [1] For contact assignment on multi-pin connector of engine control unit ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Test step No. 23 - only vehicles without CAN bus

-V.A.G 1598/20-sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
20 + 34 20 + 55 20 + 26	Wiring to engine control unit (torque reduction/ignition timing retardation)	• Ignition switched off • Multi-pin connector disconnected from engine control unit – Switch to resistance measuring range	∞ Ω	– Check wiring according to current flow diagram
20 + xx [1]			Less than 1.5 Ω	

• [1] For contact assignment on multi-pin connector of engine control unit ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Test step No. 24 - only vehicles without CAN bus

-V.A.G 1598/20-sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
51 + 34 51 + 55 51 + 26	Wiring to engine control unit (upshift/downshift signal)	• Ignition switched off • Multi-pin connector disconnected from engine control unit – Switch to resistance measuring range	∞ Ω	– Check wiring according to current flow diagram
51 + xx [1]			Less than 1.5 Ω	

• [1] For contact assignment on multi-pin connector of engine control unit ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Test step No. 25

-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 • Switched to voltage measuring range		
		– Selector lever not in tiptronic gate	Less than 1 V	– Check wiring according to current flow diagram
		– Selector lever in tiptronic gate	Approx. battery voltage	– Renew tiptronic switch ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37

Test step No. 26

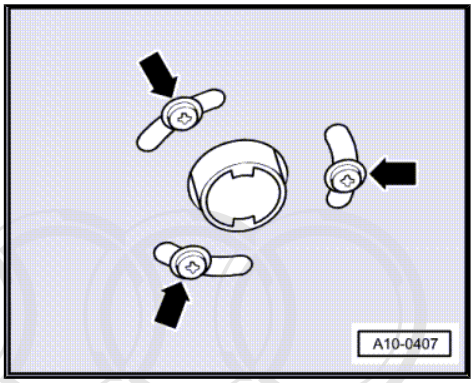
-V.A.G 1598 A- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
46 + 54 47 + 54	tiptronic switch - F189- (shift up/ shift down)	• Ignition switched on • Switched to voltage measuring range		
		– Shift up button (+) or shift down button (–) not operated	Less than 1 V	– Check wiring according to current flow diagram
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	– Renew tiptronic switch ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37
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	

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

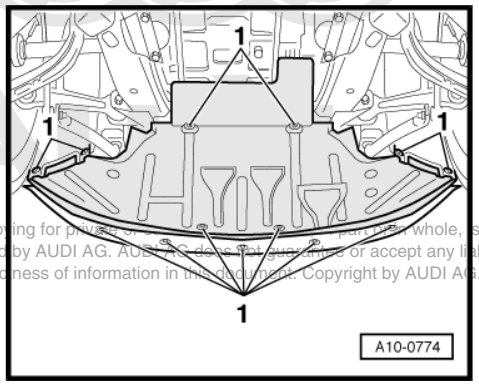
Carry out the following test if the final control diagnosis or the electrical check indicate a fault between gearbox and automatic gearbox control unit -J217- .

– Connect adapter -V.A.G 1598/20- (test box) to automatic gearbox control unit -J217- ⇒ page 125 .

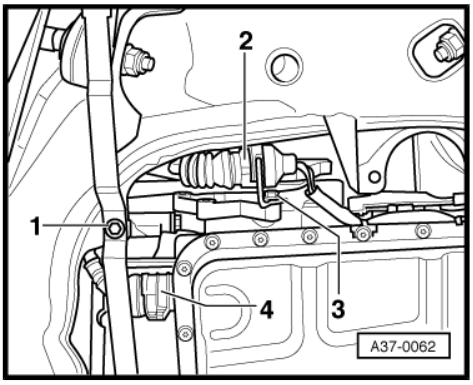
– On vehicles fitted with auxiliary heater, remove screws -arrows- securing exhaust pipe of auxiliary/ additional heater to noise insulation.



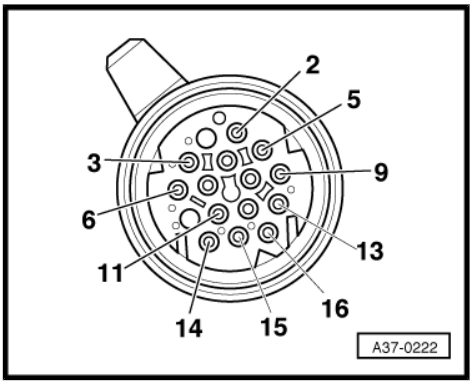
– Release fasteners -1- and detach noise insulation.



– 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

Connector Contact	-V.A.G 1598/20- Socket	Connector Contact	-V.A.G 1598/20- Socket
6	44	14	21
7	29	15	51
8	30	16	53

Note

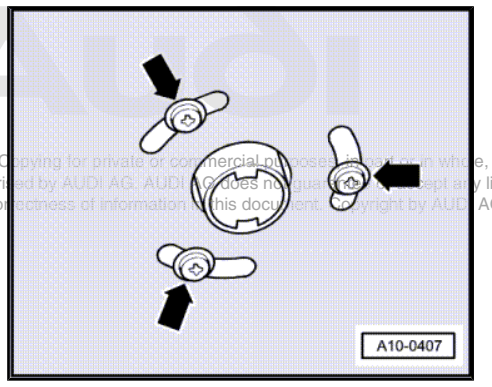
- *If readout does not match specification, rectify open circuit in wiring according to current flow diagram and check connector for contact corrosion, moisture and leaks.*
- *If readout obtained in this wiring check matches specification, the wiring harness in the gearbox must be checked. In order to do this, remove valve body ⇒ Automatic gearbox 01V, front-wheel drive and 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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 38 .*

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

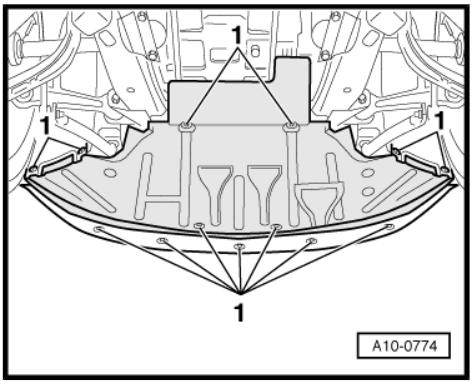
Note

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

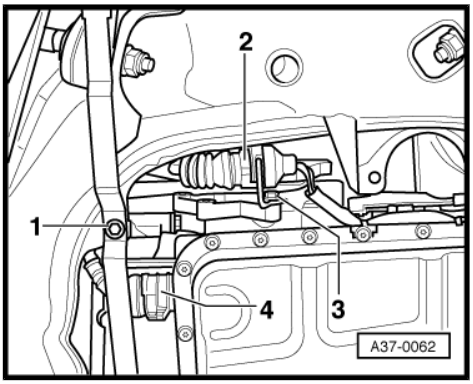
– On vehicles fitted with auxiliary heater, remove screws -arrows- securing exhaust pipe of auxiliary/ additional heater to noise insulation.



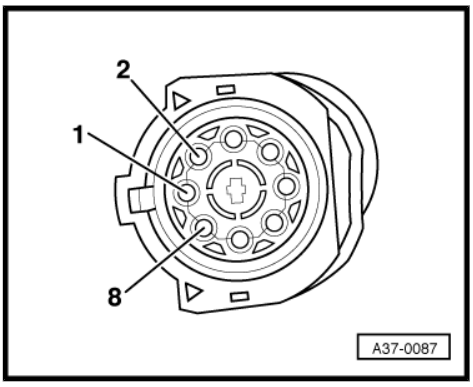
– Release fasteners -1- and detach noise insulation.



– 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 • Switched to resistance measuring range		

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

Contacts on -F125-	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
		– 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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37 – Renew multi-function switch ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37
		– Selector lever in “R”	Less than 1 Ω	

Checking voltage supply of multi-function switch

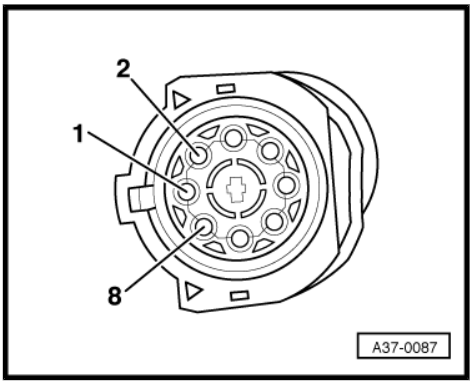
– Connect multimeter for voltage measurement between contacts -1- and -6- of the 8-pin connector.

– Switch on ignition.

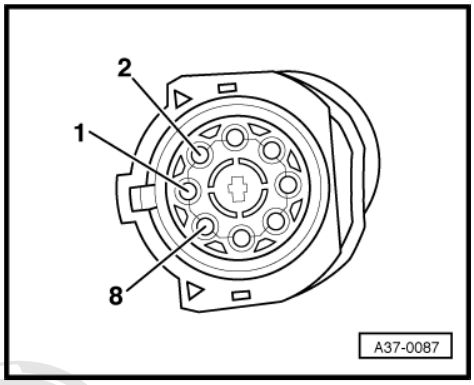
• Specification: approx. battery voltage.

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 125 .

– 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 144 , Test step No. 2	
8	⇒ page 144 , Test step No. 3	

Note

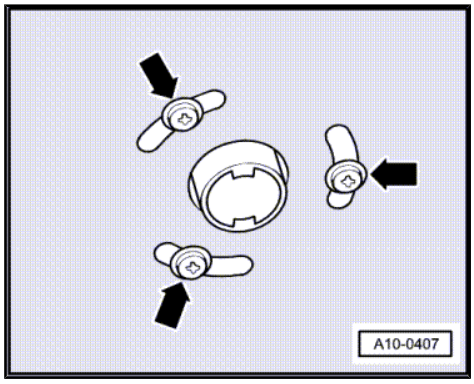
- *If readout does not match specification, rectify open circuit in wiring according to current flow diagram and check connector for contact corrosion, moisture and leaks.*
- *If readout obtained in this wiring check matches specification, the multi-function switch -F125- must be renewed ⇒ Automatic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

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

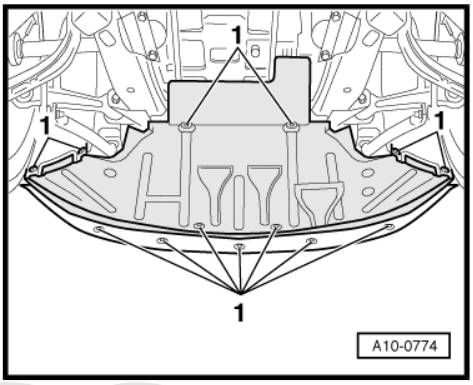
Note

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

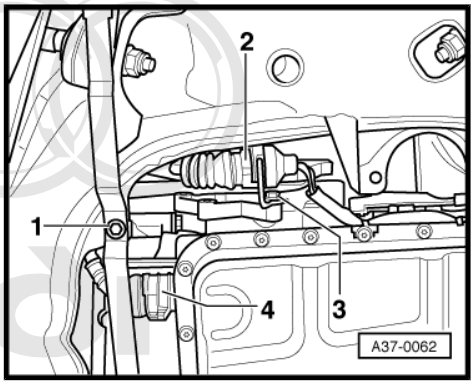
– On vehicles fitted with auxiliary heater, remove screws -arrows- securing exhaust pipe of auxiliary/ additional heater to noise insulation.



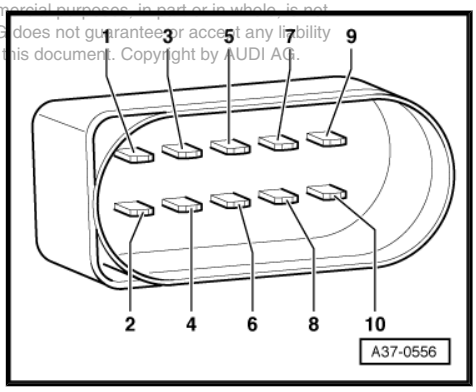
– Release fasteners -1- and detach noise insulation.



– 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 • Switched to resistance measuring range		– Check connector at multi-function switch for contact corrosion, moisture or loose fitting – Check selector lever cable adjustment ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37 – Renew multi-function switch ⇒ Automatic gearbox 01V, front-wheel drive and 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	

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

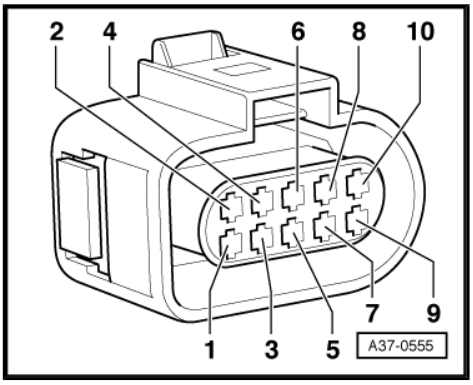
Test step No. 2

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 • Switched 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
		– Selector lever in “P”, “N”	Less than 1 Ω	– Check selector lever cable adjustment ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37 – Renew multi-function switch ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37

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 • Switched 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
		– Selector lever in “R”	Less than 1 Ω	– Check selector lever cable adjustment ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37 – Renew multi-function switch ⇒ Automatic gearbox 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37

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.

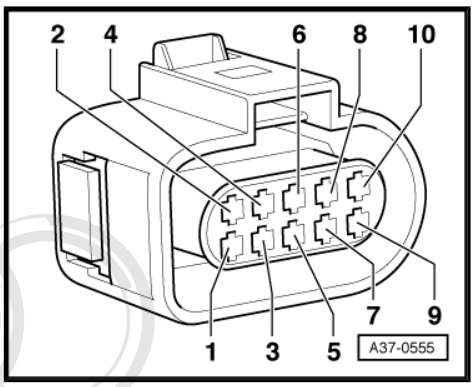
– Switch on ignition.

• Specification: approx. battery voltage.

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 125 .

– 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 148 , Test step No. 2	
8		
9	⇒ page 148 , 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 01V, front-wheel drive and four-wheel drive; Rep. Gr. 37 .*

14 CAN bus

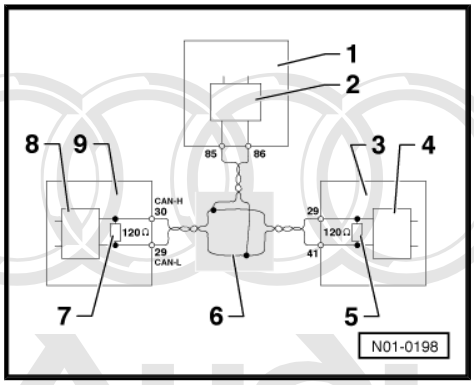
Bus:

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-

14.1 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 12 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 151 .

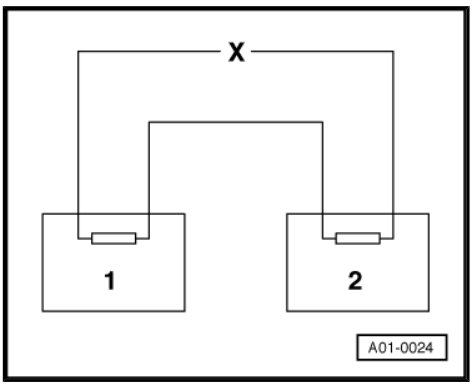
♦ Three or more control units are communicating via a “two-wire bus system” ⇒ page 152 .

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

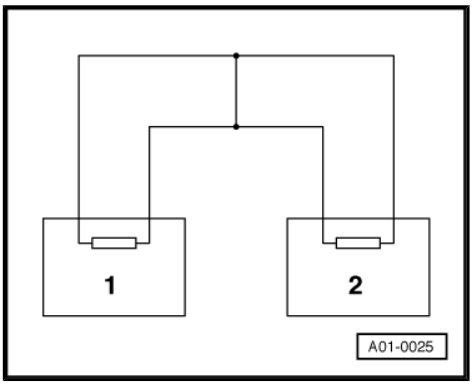
– Switch off ignition.

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

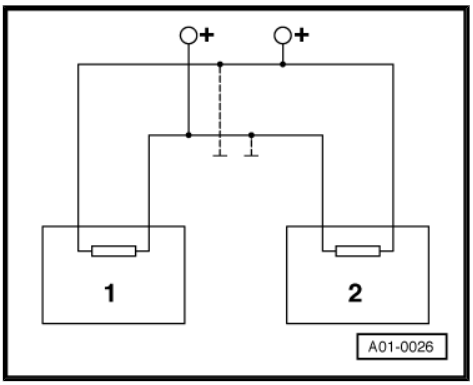
– Check whether there is an open circuit in one of the bus wires ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



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



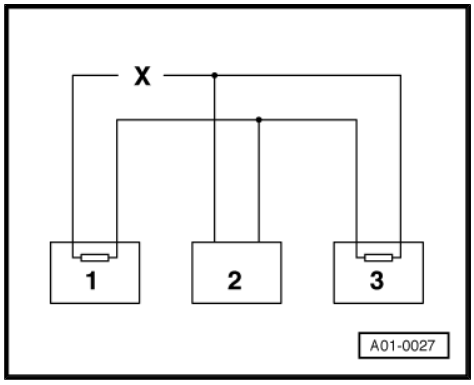
– Check whether there is a short to positive or short to earth in one of the bus wires.



14.3 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-.



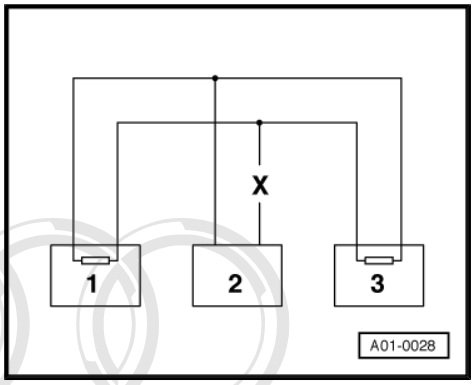
Control unit	Faults stored in fault memory
-1-	♦ No message from control unit -2- ♦ No message from control unit -3-
-2-	♦ No message from control unit -1-
-3-	♦ No message from control unit -1-

– 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-.



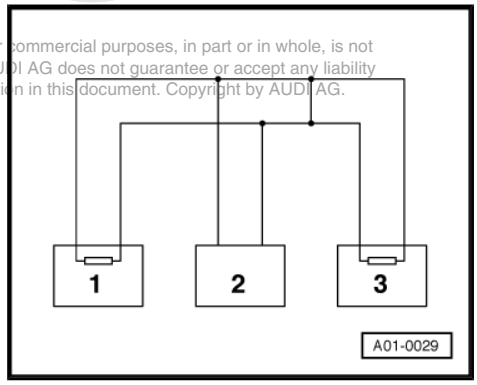
Control unit	Faults stored in fault memory
-1-	♦ No message from control unit -2-
-2-	♦ No message from control unit -1- ♦ No message from control unit -3-
-3-	♦ No message from control unit -2-

– 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 12 .

– 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 ignition off and 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.