

Workshop Manual Audi A3 1997 ➤

Automatic gearbox 01M, self-diagnosis

Edition 11.2007



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List of Workshop Manual Repair Groups

Repair Group

01 - Self-diagnosis, electrical checks



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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.

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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 clutches or 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

- ◆ Self-diagnosis compatible systems have a control unit which detects faults during vehicle operation and stores them in a fault memory; this information will remain available even if the battery voltage fails.
- ◆ The self-diagnosis function helps to perform specific fault-finding. With the aid of vehicle diagnostic, testing and information system -VAS 505x- or vehicle diagnosis and service information system -VAS 5052- the self-diagnosis functions available can be used.



Note

The procedure for performing self-diagnosis with the vehicle diagnostic, testing and information system -VAS 505x- is described in this Workshop Manual.

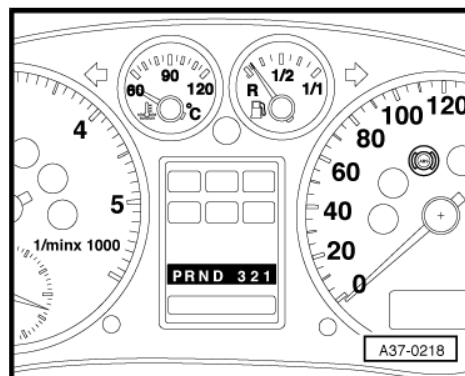
- ◆ After evaluating the information, the control unit differentiates between sporadic and static (currently present) faults and stores them in the memory.
- ◆ When a fault occurs, it is stored as a static (currently present) fault. If the fault does not occur again for a predetermined period or distance 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 after 40 gearbox cold start cycles followed by gearbox warm-up they are automatically erased.
- ◆ 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 ⇒ [page 54](#).

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1.2 Safety functions of gearbox control unit

If one or more of the system components or sensors fail or have 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.

- ◆ If critical faults occur when driving, the gearbox will continue to operate in an emergency running (back-up) mode.
- ◆ If the fault occurs with the selector lever in position "D", "3" or "2", 3rd gear will be activated by the emergency running mode.
- ◆ If the engine speed signal and the vehicle speed signal are missing and the kick-down speed 4 → 3 is exceeded once, the gearbox will shift to gear "N".
- ◆ If the fault occurs with the selector lever in position "1", "P", "N" or "R", then the emergency running mode for this particular gear is activated.
- ◆ If faults occur which active the emergency running mode, the gearbox will remain in emergency running mode until the ignition is switched off.
- ◆ If the engine is restarted in the emergency running mode and the fault occurs when the selector lever is in position "D", "3" or "2", 3rd gear is activated hydraulically until the fault is rectified.
- ◆ If all segments of the selector lever position display -Y6- in the dash panel insert light up, this is indicating a fault or that the gearbox control unit has activated the emergency running mode.
- ◆ If all segments of the selector lever position display -Y6- in the dash panel insert are no longer illuminated, this indicates that the gearbox control unit is defective or has failed and is in the emergency running mode.



Faults activating the emergency running mode

Fault code	
00258	Solenoid valve 1 -N88-
00260	Solenoid valve 2 -N89-
00262	Solenoid valve 3 -N90-
00264	Solenoid valve 4 -N91-
00266	Solenoid valve 5 -N92-
00268	Solenoid valve 6 -N93-
00270	Solenoid valve 7 -N94-
00281	Vehicle speed sender -G68-
00297	Gearbox speed sender -G38-
00529	Speed information missing
00545	Engine/gearbox electrical connection
00652	Gear monitoring
65535	Control unit defective

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2 Electrical/electronic components and fitting locations

1 - Automatic gearbox control unit -J217-

- ☐ Checked via self-diagnosis
- ☐ Fitting location, removing and installing
⇒ [page 8](#)
- ☐ Perform basic setting after renewing
⇒ [page 29](#)

2 - Engine control unit

- ☐ Fitting location
⇒ [page 5](#)
- ☐ Perform basic setting after renewing
⇒ [page 29](#)

3 - 16-pin connector -T16- (diagnostic connector)

Fitting location:

- ◆ Vehicles up to model year 1999 ⇒ [page 5](#)
- ◆ Vehicles from model year 2000 onwards
⇒ [page 5](#)

4 - Valve body

- ☐ Fitting location
⇒ [page 6](#)
- ☐ Attached to valve body:
Solenoid valve 1 -N88-,
solenoid valve 2 -N89-,
solenoid valve 3 -N90-,
solenoid valve 4 -N91-,
solenoid valve 5 -N92-,
solenoid valve 6 -N93-
and solenoid valve 7 -N94-

- ☐ All components are checked via self-diagnosis
- ☐ Removing and installing ⇒ Rep. Gr. 38
- ☐ Perform basic setting after renewing ⇒ [page 29](#)

5 - Conductor strip with integrated gearbox oil temperature sender -G93-

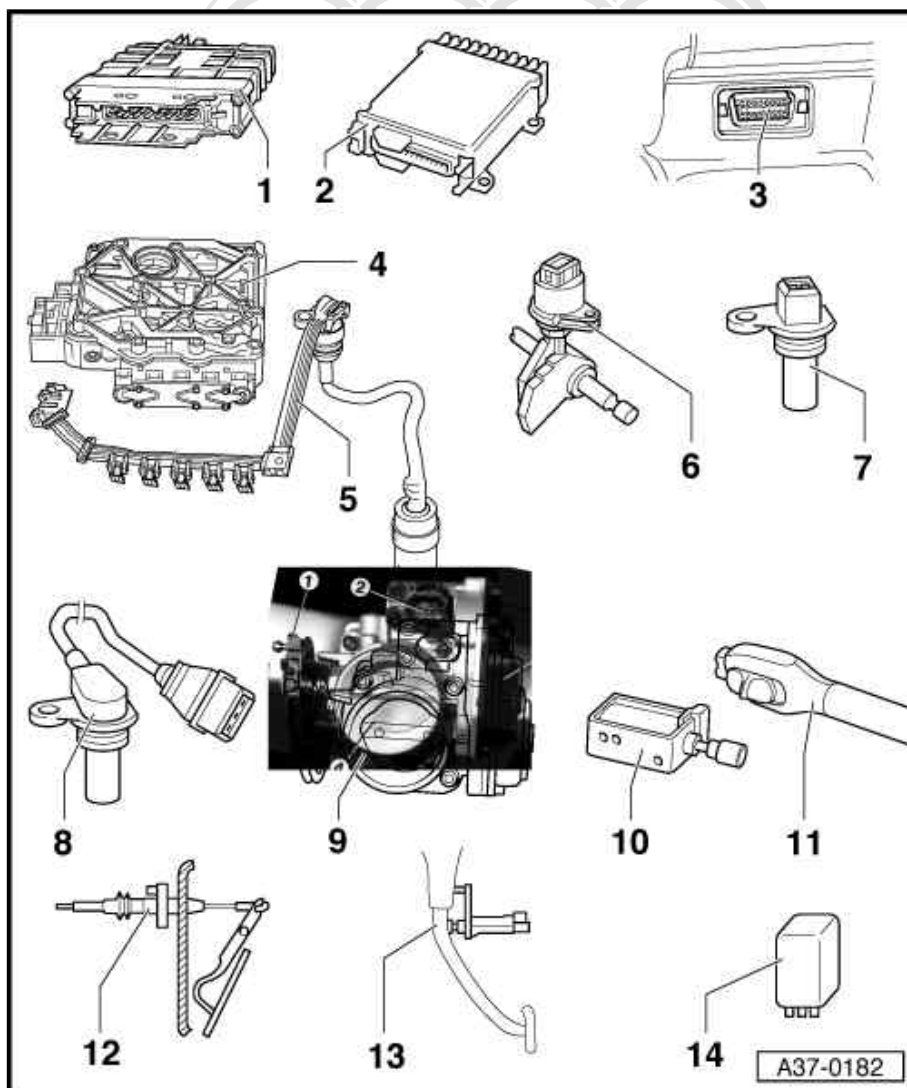
- ☐ Fitting location ⇒ [page 6](#)
- ☐ Gearbox oil temperature sender -G93- is checked by self-diagnosis
- ☐ Removing and installing ⇒ Rep. Gr. 38
- ☐ Do not kink or damage conductor strip

6 - Multi-function switch -F125-

- ☐ Fitting location ⇒ [page 6](#)
- ☐ Removing and installing ⇒ Rep. Gr. 38
- ☐ Checked via self-diagnosis

7 - Gearbox speed sender -G38-

- ☐ Fitting location ⇒ [page 7](#)
- ☐ Checked via self-diagnosis
- ☐ Dirt impairs function; clean if necessary



- ☐ Removing and installing ⇒ Rep. Gr. 38

8 - Vehicle speed sender -G68-

- ☐ Fitting location ⇒ [page 7](#)
- ☐ Checked via self-diagnosis
- ☐ Dirt impairs function; clean if necessary
- ☐ Removing and installing ⇒ Rep. Gr. 38

9 - Throttle valve module -J338-

- ☐ Checked via self-diagnosis
- ☐ Signal is transmitted by engine control unit to automatic gearbox control unit -J217-. If throttle valve module -J338- is displayed as cause of fault, interrogate fault memory of engine control unit
- ☐ Removing and installing ⇒ Rep. Gr. 24
- ☐ Perform basic setting after renewing ⇒ [page 29](#)



Note

On versions with TDI engine the functions of the throttle valve module are performed by the accelerator position sender -G79-.

- ☐ Removing and installing, adjusting ⇒ Rep. Gr. 20

10 - Selector lever lock solenoid -N110-

- ☐ Fitting location: In selector mechanism
- ☐ Removing and installing ⇒ Rep. Gr. 37
- ☐ Can be checked by measured values and in electrical check

11 - Cruise control system switch -E45-

- ☐ Fitting location ⇒ [page 8](#)
- ☐ Removing and installing ⇒ Rep. Gr. 94
- ☐ Can be checked by measured values (vehicles without CAN bus only)

12 - Kick-down switch -F8-

Vehicles with throttle cable:

- ☐ Fitting location: Integrated in throttle cable
- ☐ Checked via self-diagnosis
- ☐ Removing and installing, adjusting ⇒ Rep. Gr. 20

Vehicles with electronic throttle:

- ☐ No separate component
- ☐ On vehicles with TDI engine (depending on version) either integrated in accelerator position sender -G79- or in accelerator pedal module ⇒ [page 7](#)
- ☐ On vehicles with petrol engine the function is performed by accelerator position sender -G79- and accelerator position sender 2 -G185-, both senders are integrated in the accelerator pedal module ⇒ [page 7](#)
- ☐ Signal is transmitted by engine control unit to automatic gearbox control unit -J217-. If kick-down switch -F8- is displayed as cause of the fault, interrogate engine control unit fault memory
- ☐ Signal from kick-down switch -F8- can only be checked by measured values ⇒ [page 32](#)
- ☐ Removing and installing ⇒ Rep. Gr. 20

13 - Brake light switch -F-

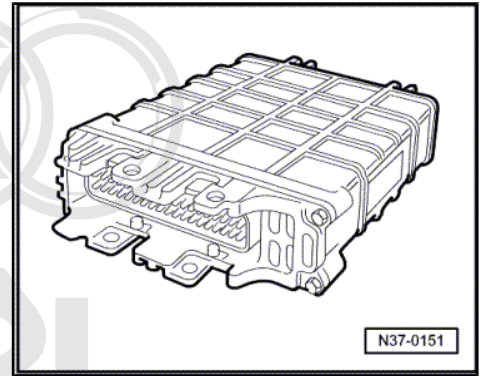
- ☐ Fitting location: In pedal cluster
- ☐ Removing and installing ⇒ Rep. Gr. 45
- ☐ Can be checked by measured values and in electrical check

14 - Starter inhibitor and reversing light relay -J226-

- ☐ Fitting location: In central electrics ⇒ Current flow diagrams, Electrical fault finding and Fitting locations

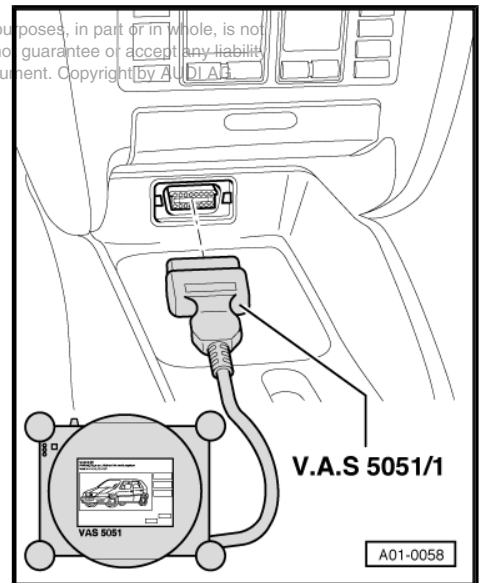
Fitting location of engine control unit

- ◆ Fitting location: In plenum chamber (centre/right).

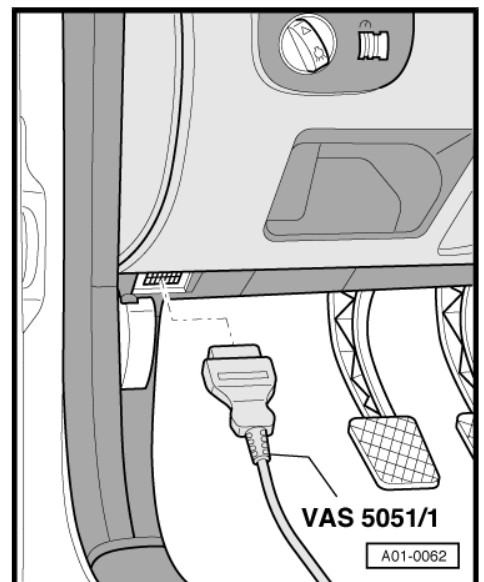


Fitting location of 16-pin connector -T16- (diagnostic connector) - vehicles up to model year 1999

- ◆ Fitting location: In storage compartment recess in front of centre console.

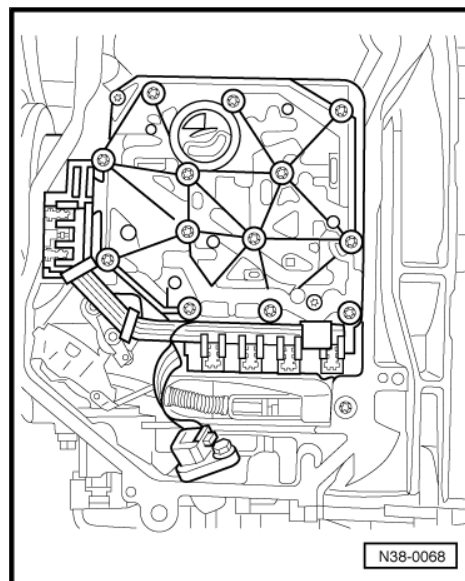


Fitting location of 16-pin connector -T16- (diagnostic connector) - vehicles from model year 2000 onwards



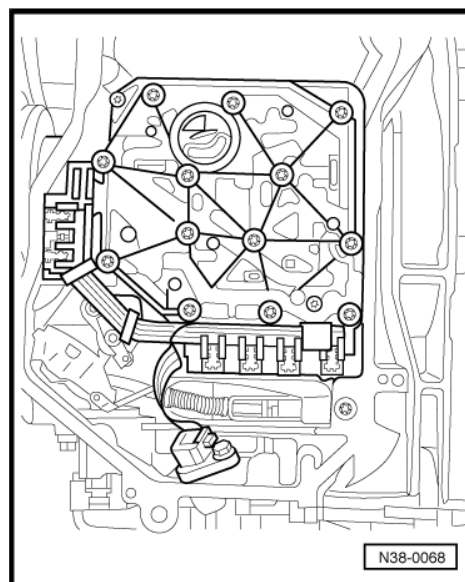
Fitting location of valve body

- ◆ 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 ⇒ Rep. Gr. 38 .



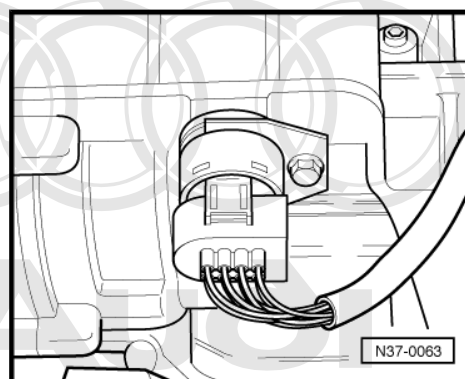
Fitting location of conductor strip with gearbox oil temperature sender -G93-

- ◆ Attached to valve body.
- ◆ Conductor strip can be renewed with gearbox installed and without removing valve body ⇒ Rep. Gr. 38 .
- ◆ Gearbox oil temperature sender -G93- integrated in conductor strip.
- ◆ If gearbox oil temperature sender -G93- is defective, renew conductor strip ⇒ Rep. Gr. 38 .



Fitting location of multi-function switch -F125-

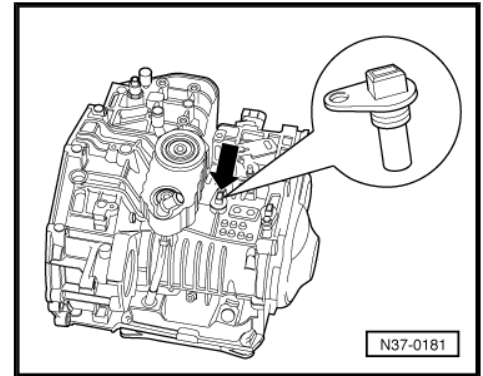
- ◆ At rear of gearbox.



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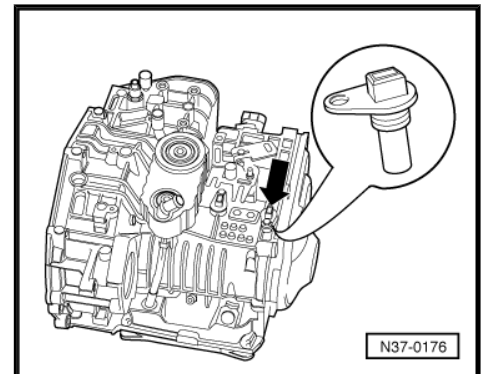
Fitting location of gearbox speed sender -G38-

- ◆ At top of gearbox -arrow-.



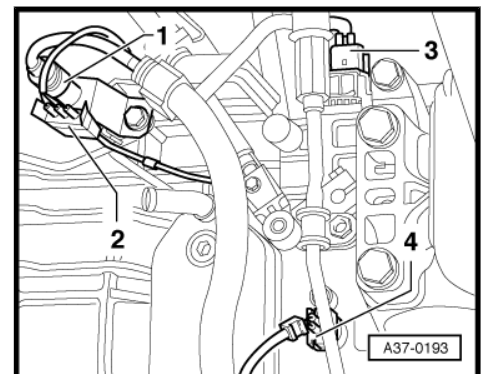
Fitting location of vehicle speed sender -G68-

- ◆ At top of gearbox -arrow-.
- ◆ With gearbox installed concealed by gearbox support.



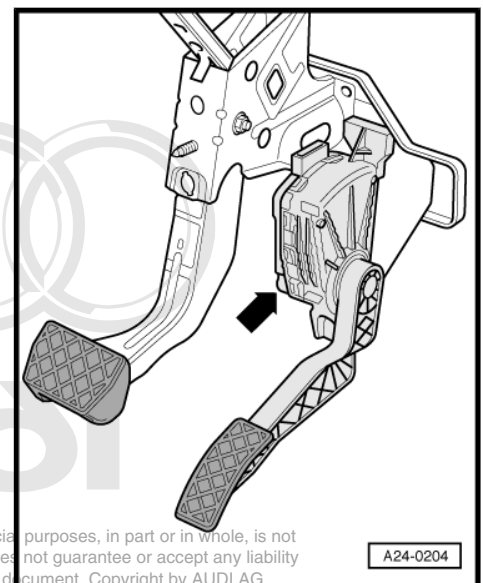
Fitting location of electrical connectors

- 1 - To solenoid valves (10-pin connector)
- 2 - To vehicle speed sender -G68-
- 3 - On multi-function switch -F125-
- 4 - On gearbox speed sender -G38-



Fitting location of accelerator pedal module

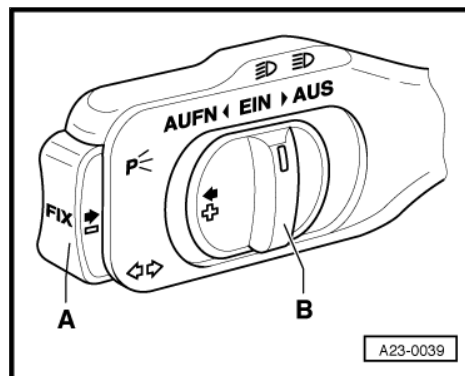
- ◆ At pedal bracket -arrow-.



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Fitting location of cruise control system switch -E45-

- ◆ On steering column switch.



2.1 Removing and installing automatic gearbox control unit -J217-

Removing

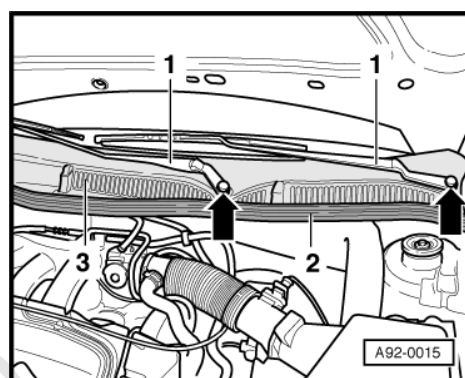
- Remove wiper arms -1- ⇒ Rep. Gr. 92 .
- Pull off seal -2- for plenum chamber cover.
- Raise plenum chamber cover -3- until it is possible to disconnect washer fluid hose going to washer jets.
- If fitted, unplug electrical connector at washer jets.



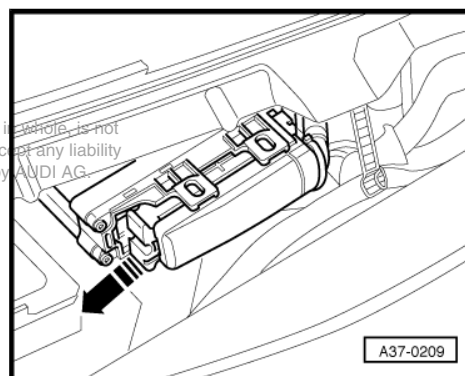
Caution

Risk of damage to plenum chamber cover.

- ◆ *Apply a small quantity of soap solution to transition between windscreen and plenum chamber cover. Then, starting at edge of windscreen, pull plenum chamber cover vertically up and out of retainer at windscreen.*



- Pull off plenum chamber cover.
- Switch off ignition, release multi-pin connector in direction of -arrow- and unplug from automatic gearbox control unit - J217- .



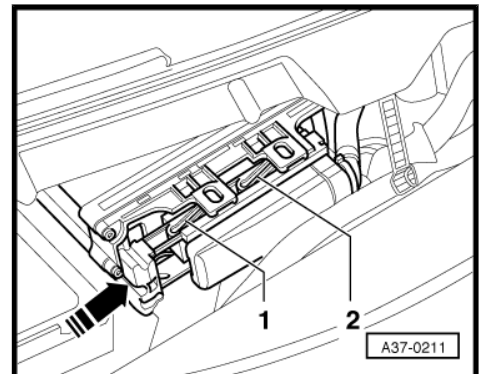
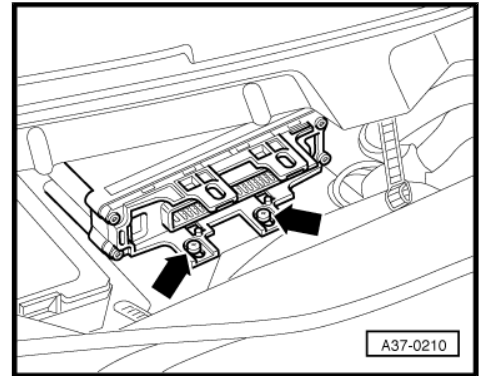
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- Loosen bolts -arrows- and pull off automatic gearbox control unit -J217- .

Installing

The remaining installation steps are carried out in the reverse sequence; note the following points:

- Secure automatic gearbox control unit -J217- .
- Allow guides -1- and -2- at multi-pin connector to slide into pins of control unit and secure connector in direction of -arrow-.
- Install wiper arms and adjust ⇒ Rep. Gr. 92 .



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3 Performing self-diagnosis

3.1 Safety precautions

Observe the following precautions if test equipment has to be used when road-testing the vehicle.



WARNING

Accidents can be caused if the driver is distracted by test equipment or if test equipment is not secured.

Injuries can also be caused if the passenger's airbag is triggered in a collision.

- *The use of test equipment while driving causes distraction.*
- *There is an increased risk of injury if test equipment is not secured.*
- ◆ *Always secure testing equipment to the rear seat with a strap and have them operated from there by a second person.*

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

- ◆ Switch off ignition before disconnecting and connecting electrical wiring (this also applies to wiring for testing 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

When disconnecting the battery there is a risk of serious damage to electronic components:

- ◆ *Observe the correct procedure for disconnecting the battery.*
- ◆ *On vehicles with telematics: activate service mode of telematics control unit before disconnecting battery ⇒ Rep. Gr. 91.*
- ◆ *Always switch off the ignition before disconnecting the battery ⇒ Rep. Gr. 27.*

3.2 Connecting vehicle diagnostic, testing and information system -VAS 505x- and selecting functions

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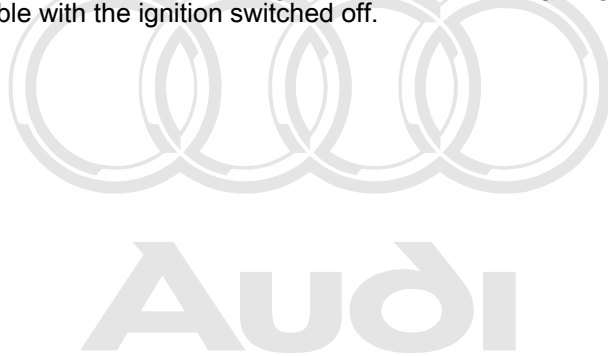
Procedure

- 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.

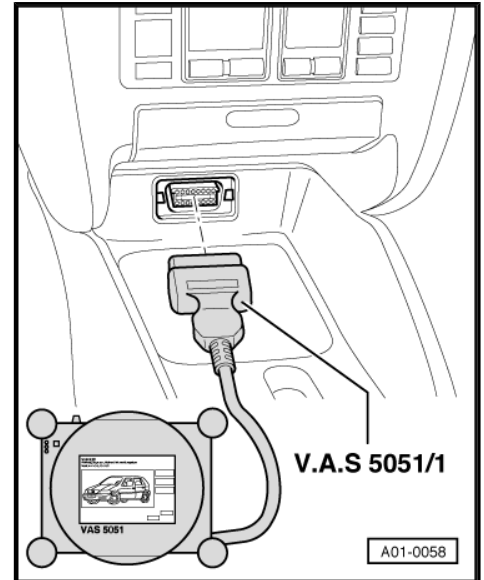
- Check earth connections for corrosion and poor contact, repair if necessary ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Check battery earth strap and earth strap between battery and gearbox.

Vehicles up to model year 1999:

- Connect the vehicle diagnostic, testing and information system -VAS 505x- to the diagnostic connector using diagnostic cable with the ignition switched off.



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Vehicles from model year 2000 onwards:

- Connect the vehicle diagnostic, testing and information system -VAS 505x- to the diagnostic connector using diagnostic cable with the ignition switched off.

All models:



WARNING

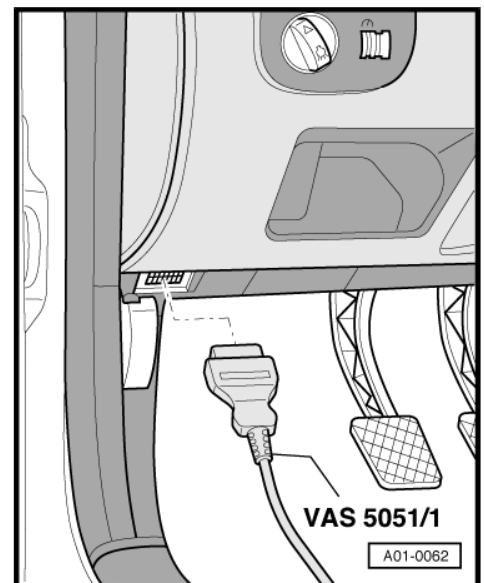
Observe safety precautions ⇒ [page 10](#).



Note

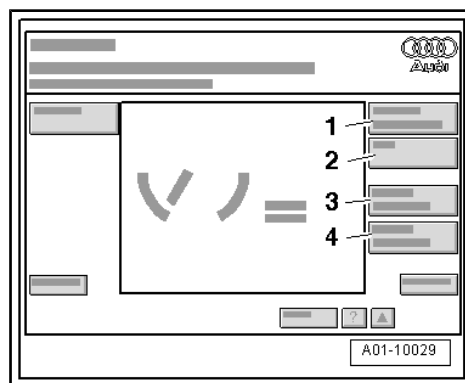
If a fault message appears on the display ⇒ Operating instructions for vehicle diagnostic, testing and information system -VAS 505x-.

- Switch on ignition.
- or
- Start engine.



Display on -VAS 505x- :

- From menu touch **Vehicle self-diagnosis** button -item 1-.



Display on -VAS 505x- :

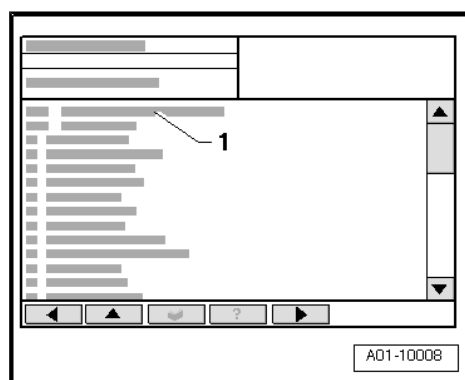
- From menu -1-, select vehicle system “02 - Gearbox electronics” and advance by pressing button.



Note

By selecting “General services” and advancing with the button, the diagnostic function “Interrogate fault memory - all fault menus” will be performed and then the fault memories of all vehicle systems with self-diagnosis capability will be interrogated.

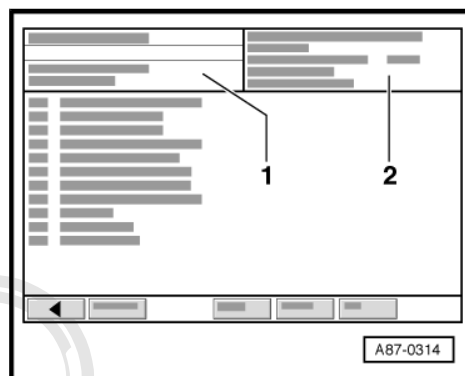
- Wait until next screen display appears.



Display on -VAS 505x- :

2 - Control unit identification of gearbox control unit

Control unit identification of gearbox control unit (example)	
02 - Gearbox electronics	Vehicle system
01M927733..	Part No.; For correct version, refer to ⇒ Electronic parts catalogue
AG4 01M	Automatic 4-speed gearbox 01M
2029	Control unit software version (data level)
00000	Control unit coding (not required)
Workshop code 12345	Workshop code of -VAS 5051B- which was used to perform the last coding



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

- Check:

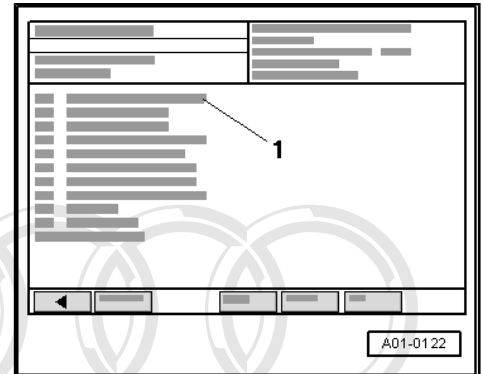
- ♦ Voltage supply to diagnostic connector ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- ♦ Wiring connections from diagnostic connector to automatic gearbox control unit. J217 ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

3.3 List of selectable functions

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

Diagnostic function	Page
Interrogating fault memory	⇒ page 14
Basic setting	⇒ page 29
Erasing fault memory	⇒ page 27
Ending output	⇒ page 28
Measured values	⇒ page 30

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



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4 Interrogating fault memory

4.1 Interrogating fault memory

- Connect the vehicle diagnostic, testing and information system -VAS 505x- to the diagnostic connector using diagnostic cable with the ignition switched off ⇒ [page 10](#) .
- Select vehicle system “02 - Gearbox electronics”. The ignition must be switched on.

Display on -VAS 5051B- :

- From menu -1-, select diagnostic function “Interrogate fault memory” and advance by pressing  button.

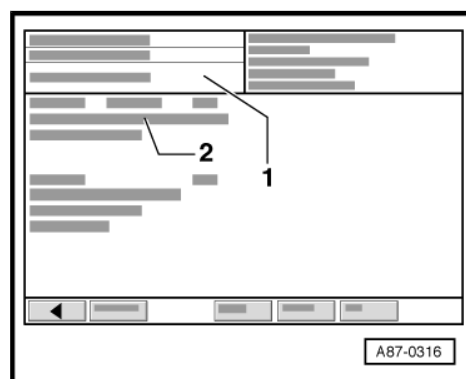


Display on -VAS 5051B- :

- | | |
|-----------------------------|-------------------|
| -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 “Interrogate fault memory” by touching  button.

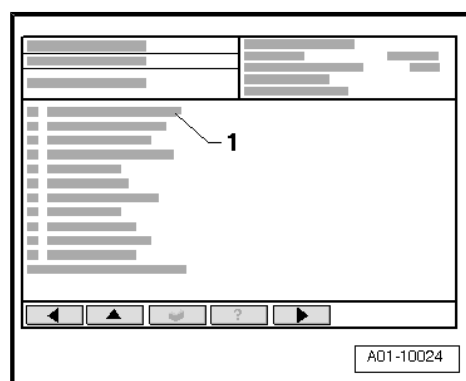


Display on -VAS 5051B- :

- Rectify fault(s) according to fault tables ⇒ [page 15](#) .
- Again select diagnostic function “interrogate fault memory” from list -1- and erase fault memory ⇒ [page 27](#) .
- From list -1- select diagnostic function “End output” ⇒ [page 28](#) .

B - If no fault has been detected:

- End function “Interrogate fault memory” by touching  button.
- Select diagnostic function “End output” ⇒ [page 28](#) 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 5051B- when the fault memory is interrogated.
- ◆ The content of the fault memory is retained until the memory is erased; erasing fault memory ⇒ [page 27](#).
- ◆ The fault table is sorted according to the 5-digit fault 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 5051B- 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".

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4.3 Fault tables: Fault codes 00258 up to 00545

Fault code 00258

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00258 Solenoid valve 1 -N88- Open circuit / short to earth Short to positive	◆ Open circuit or short to earth or positive in wiring	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 10-pin connector on gearbox between conductor strip/valve body and wiring harness
	◆ Solenoid valve 1 -N88- defective	– Read measured values, display group 004 ⇒ page 34 – Perform electrical check, test step No. 6 ⇒ page 45

Fault code 00260

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00260 Solenoid valve 2 -N89- Open circuit / short to earth Short to positive	◆ Open circuit or short to earth or positive in wiring	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 10-pin connector on gearbox between conductor strip/valve body and wiring harness
	◆ Solenoid valve 2 -N89- defective	– Read measured values, display group 004 ⇒ page 34 – Perform electrical check, test step No. 7 ⇒ page 45



Fault code 00262

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00262 Solenoid valve 3 -N90- Open circuit / short to earth Short to positive	♦ Open circuit or short to earth or positive in wiring	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 10-pin connector on gearbox between conductor strip/valve body and wiring harness
	♦ Solenoid valve 3 -N90- defective	– Read measured values, display group 004 ➔ page 34 – Perform electrical check, test step No. 8 ➔ page 45

Fault code 00264

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00264 Solenoid valve 4 -N91- Open circuit / short to earth Short to positive	♦ Open circuit or short to earth or positive in wiring	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 10-pin connector on gearbox between conductor strip/valve body and wiring harness
	♦ Solenoid valve 4 -N91- defective	– Read measured values, display group 004 ➔ page 34 – Read measured values, display group 007 ➔ page 37 – Perform electrical check, test step No. 9 ➔ page 46

Fault code 00266

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00266 Solenoid valve 5 -N92- Open circuit / short to earth Short to positive	♦ Open circuit or short to earth or positive in wiring	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 10-pin connector on gearbox between conductor strip/valve body and wiring harness
	♦ Solenoid valve 5 -N92- defective	– Read measured values, display group 004 ➔ page 34 – Perform electrical check, test step No. 10 ➔ page 46

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Fault code 00268

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00268 Solenoid valve 6 -N93- Open circuit / short to earth Short to positive	◆ Open circuit or short to earth or positive in wiring	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 10-pin connector on gearbox between conductor strip/valve body and wiring harness
	◆ Solenoid valve 6 -N93- defective	– Read measured values, display group 002 ⇒ page 33 – Perform electrical check, test step No. 11 ⇒ page 46

Fault code 00270

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00270 Solenoid valve 7 -N94- Open circuit / short to earth Short to positive	◆ Open circuit or short to earth or positive in wiring	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 10-pin connector on gearbox between conductor strip/valve body and wiring harness
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.	◆ Solenoid valve 7 -N94- defective	– Read measured values, display group 004 ⇒ page 34 – Perform electrical check, test step No. 12 ⇒ page 46

Fault code 00281

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00281 Vehicle speed sender -G68- No signal	◆ Connector not plugged in	– Check multi-pin connector for contact corrosion and moisture
• Drop in voltage is checked via self-diagnosis	◆ Open circuit or short to earth or positive in wiring ◆ Vehicle speed sender -G68- defective ◆ Screening for vehicle speed sender -G68- defective	– Check wiring and connector according to current flow diagram – Perform electrical check, test step No. 15 ⇒ page 47 and test step No. 16 ⇒ page 48
	◆ Impulse wheel for drive wheel loose	– Renew drive wheel ⇒ Rep. Gr. 39

Fault code 00293

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00293 Multi-function switch -F125- Undefined switch status	◆ Connector not plugged in ◆ Open circuit or short to earth or positive in wiring ◆ Multi-function switch -F125- defective	– Read measured values, display group 001 ⇒ page 31 – Check wiring and connector according to current flow diagram. Also check connector for contact corrosion or moisture



Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
		– Perform electrical check, test step No. 4 ➔ page 44 and test step No. 5 ➔ page 45
	◆ Selector lever cable incorrectly adjusted	– Adjust selector lever cable ➔ Rep. Gr. 37

Fault code 00297

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00297 Gearbox speed sender -G38- No signal	◆ Open circuit or short to earth or positive in wiring	– Check wiring and connector according to current flow diagram. Also check connector for contact corrosion or moisture
	◆ Gearbox speed sender -G38- dirty or defective	– Clean or renew gearbox speed sender -G38- ➔ page 7
	◆ Screening for gearbox speed sender -G38- defective	– Perform electrical check, test step No. 17 ➔ page 48 and test step No. 18 ➔ page 48
00297 Gearbox speed sender -G38- Implausible signal	◆ Connectors of gearbox speed sender -G38- interchanged with vehicle speed sender -G68-	– Check connector assignment ➔ page 7

Fault code 00300

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00300 Gearbox oil temperature sender -G93- No faults detected	◆ Open circuit in wiring	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture
• Gearbox oil temperature sender -G93- fault indicated on display.	◆ Gearbox oil temperature sender -G93- defective	– Read measured values, display group 005 ➔ page 35 – Perform electrical check, test step No. 19 ➔ page 48 – Renew conductor strip with integrated gearbox oil temperature sender -G93- ➔ Rep. Gr. 38

Fault code 00518 (vehicles with CAN bus)

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00518 Throttle valve potentiometer -G69- Signal outside tolerance	◆ Incorrect signal from throttle valve module -J338- or accelerator position sender -G79- ◆ Throttle valve module -J338- or accelerator position sender -G79- defective	– Interrogate fault memory of engine control unit and rectify faults ➔ Rep. Gr. 01 – Read measured values, display group 001 ➔ page 31 and display group 003 ➔ page 33 – Check throttle valve module -J338- ➔ Rep. Gr. 24

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Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
- Signals are transmitted via CAN bus from throttle valve module -J338- (vehicles with petrol engine) or from accelerator position sender -G79- (vehicles with TDI engine) and via engine control unit to automatic gearbox control unit -J217- - Faults in accelerator position sender -G79- (vehicles with TDI engine) are only stored in engine control unit		After renewing throttle valve module -J338- perform basic setting ➔ page 29
	♦ Open circuit or short to earth or positive in CAN bus wiring	Check CAN bus wiring ➔ page 54
	♦ Incorrect or defective engine control unit	- Check engine control unit; interrogate fault memory and rectify fault ➔ Rep. Gr. 01 - After renewing engine control unit perform basic setting ➔ page 29

Fault code 00518 (vehicles without CAN bus)

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00518 Throttle valve potentiometer -G69- Signal outside tolerance	♦ Open circuit or short to earth or positive in wiring ♦ Incorrect signal from throttle valve module -J338- or accelerator position sender -G79- ♦ Throttle valve module -J338- or accelerator position sender -G79- defective ♦ Engine control unit defective	- If fault code 00638 is also displayed, rectify fault as described for fault code 00638 ➔ page 22 - Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture - Read measured values, display group 001 ➔ page 31 and display group 003 ➔ page 33 - Interrogate fault memory of engine control unit and rectify faults ➔ Rep. Gr. 01 - After renewing engine control unit perform basic setting ➔ page 29 - Check throttle valve module -J338- ➔ Rep. Gr. 24 - After renewing throttle valve module -J338- perform basic setting ➔ page 29

Fault code 00529 (vehicles with CAN bus)

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00529 Speed information missing	♦ Signal from engine speed sender -G28- to engine control unit incorrect or falsified due to incorrectly routed electrical wiring (e.g. because of retrofitted telephone)	- Interrogate fault memory of engine control unit and rectify faults ➔ Rep. Gr. 01 - Read measured values, display group 003 ➔ page 33



Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
Signals are transmitted via CAN bus from engine speed sender - G28- and via engine control unit to automatic gearbox control unit -J217-	◆ Engine speed sender -G28- defective	
	◆ Open circuit or short to earth or positive in CAN bus wiring	– Check CAN bus wiring ⇒ page 54
	◆ Short circuit in instrument cluster	– Interrogate fault memory of instrument cluster and rectify faults ⇒ Electrical system, self-diagnosis; Rep. Gr. 01

Fault code 00529 (vehicles without CAN bus)

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00529 Speed information missing	◆ Open circuit or short to earth or positive in wiring	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture – Read measured value block 003 ⇒ page 33
Signals are transmitted via a wiring connection from engine speed sender -G28- and via engine control unit to automatic gearbox control unit -J217-	◆ Signal from engine speed sender -G28- to engine control unit incorrect or falsified due to incorrectly routed electrical wiring (e.g. because of retrofitted telephone)	– Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01
	◆ Engine speed sender -G28- defective	
	◆ Short circuit in instrument cluster	– Interrogate fault memory of instrument cluster ⇒ Electrical system, self-diagnosis; Rep. Gr. 01

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Fault code 00532

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00532 Voltage supply	◆ Battery voltage less than 8 V after engine is started	– Read measured values, display group 002 ⇒ page 33 – Check alternator or voltage regulator in "Guided Fault Finding" section "Body/electrical system / 27 - Starter, current supply/electrical components / C - Alternator, checking" ⇒ Vehicle diagnosis, testing and information system VAS 5051

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
	◆ Voltage supply for solenoid valves or automatic gearbox control unit -J217- too low	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture, especially on the 10-pin connector on gearbox between conductor strip/valve body and wiring harness – Perform electrical check, test step No. 1 ⇒ page 43

Fault code 00545 (vehicles with CAN bus)

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00545 Engine/gearbox electrical connection Open circuit / short to earth Short to positive	◆ Signal for ignition timing adjustment/injection quantity reduction incorrectly or not transmitted	– Read measured value block 005 ⇒ page 35 – Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01 – Perform basic setting ⇒ page 29 .
• Signals for ignition timing adjustment/injection quantity reduction are transmitted via CAN bus from engine control unit to automatic gearbox control unit - J217-	◆ Open circuit or short to earth or positive in CAN bus wiring	– Check CAN bus wiring ⇒ page 54

Fault code 00545 (vehicles without CAN bus)

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00545 Engine/gearbox electrical connection Open circuit / short to earth Short to positive	◆ Open circuit or short to earth or positive in wiring ◆ Signal for ignition timing adjustment/injection quantity reduction incorrectly or not transmitted	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture – Read measured value block 005 ⇒ page 35 – Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01 – Perform basic setting ⇒ page 29 .
• Signals for ignition timing adjustment/injection quantity reduction are transmitted via a wiring connection from engine control unit to automatic gearbox control unit -J217-		

4.4 Fault tables: Fault codes 00596 up to 65535

Fault code 00596

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00596 Short circuit between valve wires	◆ Open circuit or short to earth or positive in 10-pin connector on gearbox between conductor strip/valve body and wiring harness ◆ Conductor strip to valve body defective	– Check wiring and connectors according to current flow diagram – Perform electrical check, from test step No. 6 onwards ⇒ page 45

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
		– Renew conductor strip ⇒ Rep. Gr. 38

Fault code 00638 (vehicles with CAN bus)

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00638 Engine/gearbox electrical connection 2 No signal	♦ Signal for throttle valve position/accelerator pedal value incorrectly or not transmitted	– Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01
• Signals for throttle valve position/accelerator pedal value are transmitted via CAN bus from engine control unit to automatic gearbox control unit -J217-	♦ Open circuit or short to earth or positive in CAN bus wiring	– Check CAN bus wiring ⇒ page 54

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Fault code 00638 (vehicles without CAN bus)

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00638 Engine/gearbox electrical connection 2 No signal	♦ Open circuit or short to earth or positive in wiring	– Check wiring and connectors according to current flow diagram
• Signals for throttle valve position/accelerator pedal value are transmitted via a wiring connection from engine control unit to automatic gearbox control unit -J217-		– Read measured value block 005 ⇒ page 35
		– Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01

Fault code 00641

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00641 ATF temperature Signal too large No fault type detected	♦ ATF level not OK	– Check ATF level ⇒ Rep. Gr. 37
• A fault will be detected if automatic gearbox control unit -J217- registers an ATF temperature exceeding 148 °C	♦ Gearbox overheating, because e.g. maximum trailer weight of vehicle is exceeded	– Allow gearbox to cool down, reduce trailer weight
• If automatic gearbox control unit -J217- detects an ATF temperature which is too high it will shift one gear down and, if necessary, torque converter lock-up clutch will also be closed	♦ Defective wiring between automatic gearbox control unit -J217- and gearbox oil temperature sender -G93- or defective gearbox oil temperature sender -G93- not detected by self-diagnosis	– Read measured value block 005 ⇒ page 35
		– Perform electrical check, test step No. 19 ⇒ page 48

Fault code 00652

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00652 Gear monitoring Implausible signal	◆ ATF level not OK	– Check ATF level ⇒ Rep. Gr. 37
The ratio of engine speed to gearbox output speed is implausible for the gear which is currently engaged. A fault will be detected if slip speed must be higher than stall speed with torque converter lock-up clutch open	◆ Incorrect gearbox speed, gearbox output speed or engine speed not detected by self-diagnosis	– Rectify fault as described for fault codes 00281 ⇒ page 17 , 00293 ⇒ page 17 , 00297 ⇒ page 18 and 00529 ⇒ page 19
	◆ Vehicle speed sender -G68- or gearbox speed sender -G38- dirty or defective	– Clean or renew vehicle speed sender -G68- or gearbox speed sender -G38- ⇒ Rep. Gr. 38
	◆ Defective multi-function switch -F125- not detected by self-diagnosis	– Rectify fault as described for fault code 00293 ⇒ page 17
	◆ Drive wheel for vehicle speed sender -G68- or for gearbox speed sender -G38- dirty or not in correct position	– Check drive wheel ⇒ Rep. Gr. 39
	◆ Electrical/hydraulic fault ◆ Clutch or valve body defective ◆ ATF pump defective	– Read measured value block 007 ⇒ page 37 and perform road test to determine in which gear fault occurs – Only renew clutches or valve body after having rectified all causes of fault specified

Fault code 00660 (vehicles with throttle cable)

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00660 Kick-down switch -F8- / throttle valve potentiometer -G69- Implausible signal	◆ Open circuit or short to earth or positive in wiring	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture
- The kick-down switch -F8- is integrated in the throttle cable - A fault will be detected if automatic gearbox control unit -J217- registers a kick-down signal when throttle valve value/ accelerator pedal value is less than 95 %	◆ Throttle valve module -J338- defective	– Rectify fault as described for fault code 00518 ⇒ page 18
	◆ Throttle cable not properly adjusted	– Read measured value block 001 ⇒ page 31
	◆ Kick-down switch -F8- defective	– Adjust throttle cable ⇒ Rep. Gr. 20 – Perform electrical check, test step No. 14 ⇒ page 47

Fault code 00660 (vehicles with electronic throttle)

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
00660 Kick-down switch -F8- / throttle valve potentiometer -G69- Implausible signal	◆ Open circuit or short to earth or positive in wiring	– Interrogate fault memory of engine control unit and rectify faults ⇒ Rep. Gr. 01
Kick-down signal is transmitted by accelerator pedal module (vehicles with petrol engine) or	◆ Accelerator pedal module or accelerator position sender -G79- defective	

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
accelerator position sender - G79- (vehicles with TDI engine) instead of kick-down switch -F8- • A fault will be detected if automatic gearbox control unit - J217- registers a kick-down signal when throttle valve value/ accelerator pedal value is less than 95 %	♦ Throttle valve module -J338- defective ♦ Open circuit or short to earth or positive in CAN bus wiring	– Rectify fault as described for fault code 00518 ⇒ page 18 – Check CAN bus wiring ⇒ page 54

Fault code 01166 (vehicles with CAN bus)

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
01166 Engine torque signal Implausible signal	♦ Fault detected by engine control unit in "actual engine torque"	– 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	– Check CAN bus wiring ⇒ page 54

Fault code 01192

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
01192 Torque converter lock-up clutch Mechanical fault • The ratio of engine speed to gearbox input speed and gearbox output speed with torque converter lock-up clutch engaged is implausible	♦ Open circuit or short to earth or positive in 10-pin connector on gearbox between conductor strip/valve body and wiring harness ♦ Defective conductor strip not detected by self-diagnosis ♦ Incorrect gearbox output speed or engine speed not detected by self-diagnosis ♦ Solenoid valve 4 -N91- or spool valve operated by it sticking ♦ Torque converter lock-up clutch defective or worn ♦ Torque converter defective	– Check wiring and connectors according to current flow diagram. Also check for contact corrosion or moisture – Renew conductor strip ⇒ Rep. Gr. 38 – Rectify fault as described for fault codes 00281 ⇒ page 17 , 00529 ⇒ page 19 – Read measured value block 007 ⇒ page 37 – Renew solenoid valve or valve body ⇒ Rep. Gr. 38 – Renew torque converter ⇒ Rep. Gr. 32

Fault code 01236

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
01236 Selector lever lock solenoid -N110- Open circuit / short to earth	♦ Open circuit or short to earth in wiring ♦ Selector lever lock solenoid - N110- defective	– Check wiring and connectors according to current flow diagram – Read measured value block 005 ⇒ page 35

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
		Perform electrical check, test steps No. 2 ⇒ page 43 and No. 13 ⇒ page 46

Fault code 01312 (vehicles with CAN bus)

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
01312 Data bus drive defective No communication	Open circuit or short to earth or positive in CAN bus wiring	Check CAN bus wiring ⇒ page 54
	ABS control unit -J104- incorrectly coded	Check ABS control unit -J104- and encode if necessary ⇒ Running gear, self-diagnosis; Rep. Gr. 01
	Engine control unit incorrectly coded	Check engine control unit and encode if necessary ⇒ Rep. Gr. 01

Fault code 01314 (vehicles with CAN bus)

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
01314 Engine control unit No communication Wrong equipment	Open circuit or short to earth or positive in CAN bus wiring	Check CAN bus wiring ⇒ page 54
Fault type "Wrong equipment" will be detected if engine control unit has been encoded for manual gearbox	Incorrect or incorrectly coded engine control unit	Check engine control unit and encode if necessary ⇒ Rep. Gr. 01
Fault type "Wrong equipment" will be detected if an automatic gearbox control unit -J217- not matching engine version is installed. As control unit cannot be coded it must be renewed	Incorrect automatic gearbox control unit -J217-	Check automatic gearbox control unit -J217- ⇒ page 12

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Fault code 01316 (vehicles with CAN bus)

Display on -VAS 5051B-	Possible cause of fault	How to rectify fault
01316 Brake control unit No communication	- CAN bus wiring defective - Fault in ABS system	- Check CAN bus wiring ⇒ page 54 - Check ABS control unit -J104- and encode if necessary ⇒ Running gear, self-diagnosis; Rep. Gr. 01
	Incorrect or incorrectly coded ABS control unit -J104-	Check ABS control unit -J104- and encode if necessary ⇒ Running gear, self-diagnosis; Rep. Gr. 01

**Fault code 65535**

Display on -VAS 5051B-	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 control unit, automatic gearbox control unit -J217- – Perform basic setting ⇒ page 29 .



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5 Erasing fault memory



Note

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

Requirements

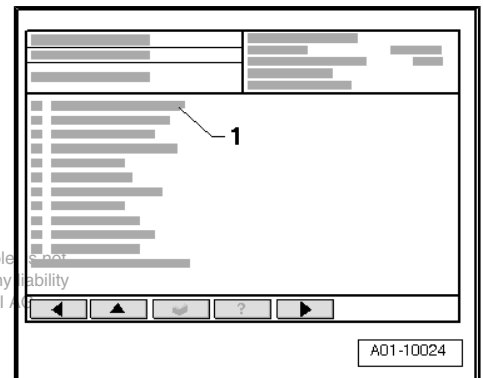
- Fault memory interrogated ⇒ [page 14](#) .
- All faults rectified.

After interrogating fault memory:

Display on -VAS 5051B- :

- From menu -1-, select diagnostic function “Erase fault mem-
ory” and advance by pressing  button.

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Display on -VAS 5051B- :

- 1 - No display (before erasing memory) or
- Fault memory erased

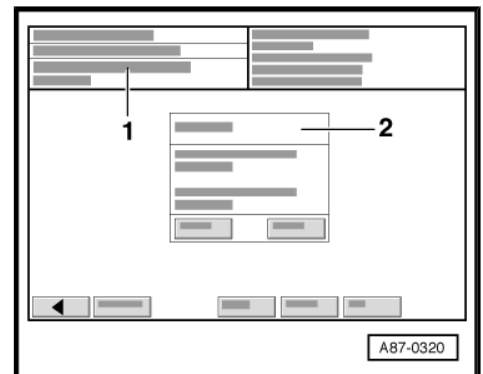


Note

If the following message appears in display zone -1-: “Fault mem-ory has not yet been interrogated”, the procedure was not per-formed 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  button in display -2-.
- End function “Erase fault memory” by touching  button.



6 Ending output

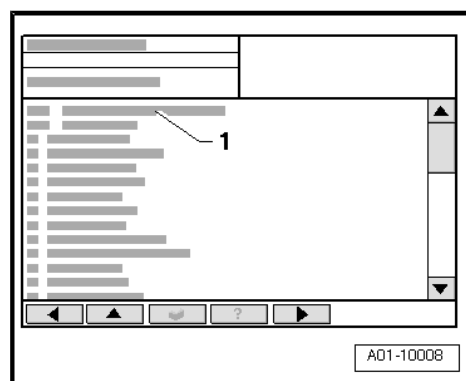
Display on -VAS 5051B- :

- From menu -1-, select diagnostic function “End output” and advance by pressing  button.



Display on -VAS 5051B- :

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



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7 Basic setting

After carrying out the following repair work always perform basic setting:

- ◆ Renewing engine
- ◆ Renewing gearbox
- ◆ Renewing engine control unit
- ◆ Renewing throttle valve module -J338-
- ◆ Renewing automatic gearbox control unit -J217-
- ◆ Renewing clutches and valve body



Note

- ◆ ***Voltage supply OK and all electrical equipment has been switched off***
- ◆ ***Throttle cable adjustment OK***
- ◆ ***Fault memory interrogated, any faults rectified and fault memory erased***

- Connect the vehicle diagnostic, testing and information system -VAS 505x- to the diagnostic connector using diagnostic cable with the ignition switched off ⇒ [page 10](#) .
- Select vehicle system "02 - Gearbox electronics". The ignition must be switched on.

Display on -VAS 5051B- :

- From menu -1-, select diagnostic function "Basic setting" and advance by pressing  button.



Note

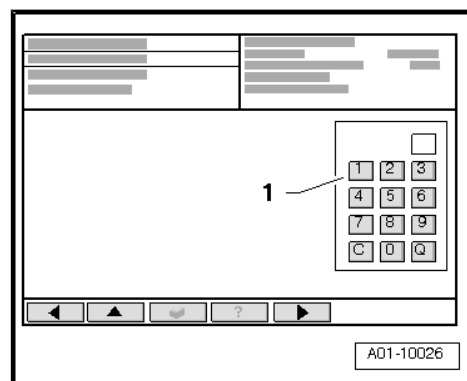
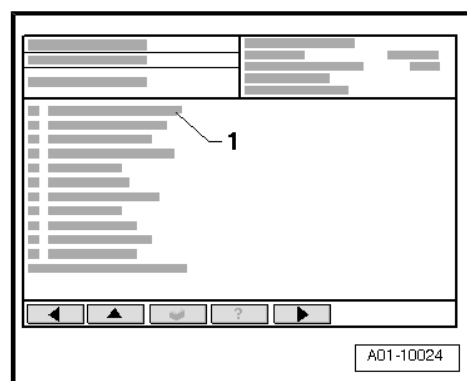
Accelerator pedal must remain in idling position.

Display on -VAS 5051B- :

- Using keypad -1- press button  for "Display group 000" and confirm entry by pressing  button.

System is now in basic setting.

- Press down accelerator pedal as far as kick-down and hold in this position for 3 seconds.
- End function "Basic setting" by touching  button.



8 Measured values

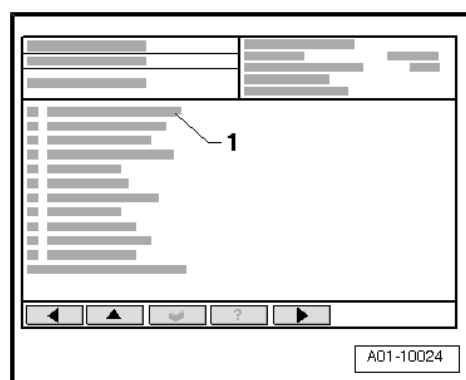
The control unit can provide a large number of measured values delivering information on the operating status of the system and/or the sensors connected to it. In many cases the transferred measured values can be used to assist fault finding and to rectify faults. As all these measured values cannot be evaluated at the same time, they are summarised in individual display groups, which can be selected via display group numbers.

8.1 Reading measured values

- Connect the vehicle diagnostic, testing and information system -VAS 505x- to the diagnostic connector using diagnostic cable with the ignition switched off ⇒ [page 10](#) .
- Select vehicle system “02 - Gearbox electronics”. The ignition must be switched on.

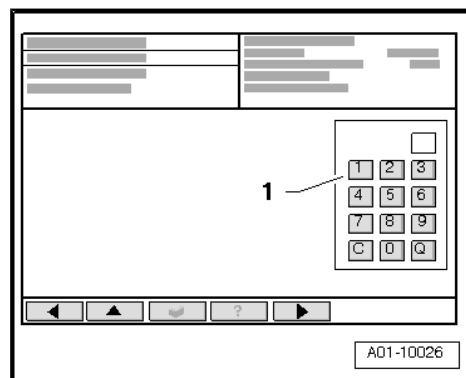
Display on -VAS 5051B- :

- From menu -1-, select diagnostic function “Measured values” and advance by pressing button.



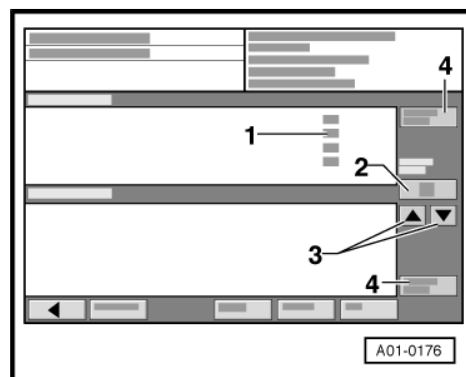
Display on -VAS 5051B- :

- Use keypad -2- to enter required “display group number” ⇒ [page 30](#) and confirm entry by touching button.



Display on -VAS 5051B- :

- 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 “Measured values” by touching button.



8.2 Overview of selectable display groups

Display group	Display zone	Designation	Further details
001	1	Selector lever position	⇒ page 31

Display group	Display zone	Designation	Further details
	2	Signal voltage	
	3	Throttle valve value	
	4	Accelerator pedal position	
002	1	Actual current of solenoid valve 6 -N93-	⇒ page 33
	2	Specified current of solenoid valve 6 -N93-	
	3	Voltage supply	
	4	Voltage at vehicle speed sender -G68-	
003	1	Speed	⇒ page 33
	2	Engine speed	
	3	Gear engaged	
	4	Accelerator pedal value	
004	1	Solenoid valves	⇒ page 34
	2	Gear engaged	
	3	Selector lever position	
	4	Speed	
005	1	ATF temperature	⇒ page 35
	2	Gearshift outputs	
	3	Gear engaged	
	4	Engine speed	
006	1	Disregard	⇒ page 36
	2	Disregard	
	3	Performance driving factor	
	4	Accelerator pedal value	
007	1	Gear engaged	⇒ page 37
	2	Lock-up clutch slip	
	3	Engine speed	
	4	Accelerator pedal value	

8.3 Test table

Display zones 1, 2 and 3 in display group 001

Display zones	Explanatory notes
1	P R N D 3 2 1 Selector lever position from multi-function switch -F125- , vehicle stationary • Selector lever in position “P” • Selector lever in position “R” • Selector lever in position “N” • Selector lever in position “D” • Selector lever in position “3” • Selector lever in position “2” • Selector lever in position “1” If the display readout does not appear as described: – Rectify fault as described for fault code 00293 ⇒ page 17
2	... V Signal voltage of throttle valve module or accelerator position sender with vehicle stationary and engine not running – voltage value rises continuously when pedal is moved from idling speed to full throttle

Display zones	Explanatory notes
	Specification: • With accelerator pedal in idling position: 0.0 ... 0.8 V (coolant temperature 80 °C) • With accelerator pedal in full throttle position: 3.5 ... 4.9 V If the display readout does not appear as described: – Rectify fault as described for fault code 00518 ⇒ page 18
3	... % Accelerator pedal 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 % (coolant temperature 80 °C) • With accelerator pedal in full throttle position: 99 ... 100 % If the display readout does not appear as described: – Rectify fault as described for fault code 00518 ⇒ page 18

Display zone 4 in display group 001

Display	Explanatory notes
1	Switch positions Brake light switch -F- , vehicle stationary • 0 = Brake pedal not depressed • 1 = Brake pedal depressed If the display readout does not appear as described: – Perform electrical check, test step No. 3 ⇒ page 44
2	Traction control system on vehicles with ASR (TCS). A second mechanic is required for reading out the values when vehicle is driven ⇒ "3.1 Safety precautions", page 10 • 0 = Not activated • 1 = Activated
3	Disregard
4	Kick-down switch -F8- with vehicle stationary on vehicles with mechanical accelerator mechanism, accelerator position sender on vehicles with electronic throttle • 0 = Kick-down not operated • 1 = Kick-down operated If the display readout does not appear as described: – Check wiring according to current flow diagram
5	Signal from multi-function switch -F125- Terminal 63 • 0 = Selector lever in position "P" or "1" • 1 = Selector lever in position "R", "N", "D", "3" or "2"
6	Terminal 40 • 0 = Selector lever in position "N" "D" or "3" • 1 = Selector lever in position "P", "R", "2" or "1"
7	Terminal 62 • 0 = Selector lever in position "3", "2" or "1" • 1 = Selector lever in position "P", "R", "N" or "D"

Display	Explanatory notes
8	Terminal 18 • 0 = Selector lever in position "D", "3", "2" or "1" • 1 = Selector lever in position "P", "R" or "N" If the display readout does not appear as described: – Rectify fault as described for fault code 00293 ➤ page 17

Display group 002

Display zones	Explanatory notes
1 ... A	Actual current of solenoid valve 6 -N93- (regulates ATF main pressure) with vehicle stationary Actual current and specified current must not differ by more than 0.050 A from each other Specification: • At full throttle: at least 0.0 A • At idling speed: not exceeding 1.1 A If the display readout does not appear as described: – Perform electrical check, test step No. 11 ➤ page 46 – Return system to basic setting ➤ page 29
2 ... A	Specified current of solenoid valve 6 -N93- (regulates ATF main pressure) with vehicle stationary Actual current and specified current must not differ by more than 0.050 A from each other Specification: • At full throttle: at least 0.0 A • At idling speed: not exceeding 1.1 A If the display readout does not appear as described: – Perform electrical check, test step No. 11 ➤ page 46 – Return system to basic setting ➤ page 29
3 ... V	Battery voltage (terminal 15) with vehicle stationary Specification: • At least 10.8 V • Not exceeding 16.0 V If the specified value is not displayed: – Perform electrical check, test step No. 1 ➤ page 43
4 ... V	Vehicle speed sender -G68- , vehicle stationary Specification: • At least 2.2 V • Not exceeding 2.52 V If the specified value is not displayed: – Perform electrical check, test step No. 16 ➤ page 48

Display group 003

Display zones	Explanatory notes
1 ... km/h	Vehicle speed when driving. A second mechanic is required for reading out the values ➤ "3.1 Safety precautions", page 10. Speedometer reading may be slightly different from values on display -VAS 505x-

Display zones		Explanatory notes
		If no value is displayed: – Check speedometer sender -G22-
2	... rpm	Engine speed when vehicle is driven. A second mechanic is required for reading out the values ⇒ “3.1 Safety precautions”, page 10 If no value or an implausible value is displayed: – Rectify fault as described for fault code 00529 ⇒ page 19
3	0	Gear engaged in gearbox. A second mechanic is required for reading out the values when vehicle is driven ⇒ “3.1 Safety precautions”, page 10 • Neutral
	R	
	1H	
	1M	
	2H	
	2M	
	3H	
	3M	
	4H	
	4M	• 4 Mechanical If the display readout does not appear as described: – Back-up programmes activated by automatic gearbox control unit -J217- may prevent gearshifts. Interrogate fault memory ⇒ page 14 ; rectify fault – If gearshifts are not carried out, even though they are displayed, a hydraulic fault may be the cause. To check solenoid valves, perform electrical check, from test step No. 6 onwards ⇒ page 45
4	... %	Accelerator pedal value ⇒ page 31 , Display group 001, display zone 3

Display zone 1 in display group 004

Display zone 1 (from left to right)					
Solenoid valve 1 - N88-	Solenoid valve 2 -N89-	Solenoid valve 3 -N90-	Solenoid valve 4 -N91-	Solenoid valve 5 -N92-	Solenoid valve 7 -N94-
◆ In display zone 1 solenoid valve specifications can be checked while vehicle is driven, however specifications may vary from actual solenoid valve positions. It is only possible to check solenoid valves accurately in “Electrical check” from test step No. 6 onwards ⇒ page 45 . ◆ The table shows the activated solenoid valves -N88- , -N89- and -N90- in the individual selector lever positions. These solenoid valves control the selector valves for the relevant gears. ◆ Solenoid valve -N91- controls selector valve for torque converter lock-up clutch. ◆ Solenoid valves -N92- and -N94- are supplementary valves influencing gearshifts and are only activated when changing a gear. ◆ Non-activated solenoid valves are displayed with “0” and activated solenoid valves are displayed with “1”. ◆ Variably activated solenoid valves are indicated by “X” in the following tables.					

Display zone 1	Explanatory notes
	Activation of solenoid valves. A second mechanic is required for reading out the values when vehicle is driven ⇒ “3.1 Safety precautions”, page 10
101000	• Selector lever in position “P”
X01000	• Selector lever in position “R”
101000	• Selector lever in position “N”
110001	• Selector lever in position “D” with gear “4H” or “4M” engaged
X00000	• Selector lever in position “3” with gear “3H” or “3M” engaged ¹⁾
X11000	• Selector lever in position “2” with gear “2H” or “2M” engaged ¹⁾
0010X0	• Selector lever in position “2” with gear “1H” or “1M” engaged
0010X0	• Selector lever in position “1” with gear “1H” or “1M” engaged
◆ ¹⁾ When travelling at speeds above 30 km/h and shifting down by hand into selector lever position “1” gearbox does not engage gear 1 to avoid excessive gearbox load. This is achieved by activating solenoid valve -N88- (status “1XXXXX”).	

Display zones 2, 3, 4 in display group 004

Display zone	Explanatory notes
2 ...	Gear engaged in gearbox ➔ page 33 , Display group 003, display zone 4
3 ...	Selector lever position ➔ page 31 , Display group 001, display zone 1
4 ... km/h	Vehicle speed ➔ page 33 , Display group 003, display zone 1

Display zone 1 in display group 005

Display zone	Explanatory notes
1 ... °C	ATF temperature with vehicle stationary and engine running from gearbox oil temperature sender -G93- (ATF). The exact temperature is only displayed at temperatures of 30 °C and above If an implausible value is displayed: – Perform electrical check, test step No. 19 ➔ page 48

Display zone 2 in display group 005

Display	Explanatory notes
1 2	Gearshift outputs Ignition timing adjustment or injection quantity reduction (TDI) during a gearshift. A second mechanic is required for reading out the values when vehicle is driven ➔ "3.1 Safety precautions", page 10 . The same value is shown in display 1 and display 2 • 00 = Switched off • 11 = Switched on If the display readout does not appear as described: – Check wiring according to current flow diagram – Interrogate fault memory of engine control unit ➔ Rep. Gr. 01 – Renew automatic gearbox control unit -J217- ➔ page 29



Display	Explanatory notes
3 4	Selector lever lock solenoid -N110-. The same value is shown in display 3 and display 4 • 00 = Switched off Brake pedal depressed. Voltage at appropriate contact of automatic gearbox control unit -J217- above 3.5 V • 11 = Switched on Brake pedal not depressed. Voltage at appropriate contact of automatic gearbox control unit -J217- below 1.5 V If the display readout does not appear as described: – Check wiring according to current flow diagram – Perform electrical check, test step No. 13 ➔ page 46
5	Voltage supply for cruise control system on vehicles with mechanical accelerator mechanism. A second mechanic is required for reading out the values when vehicle is driven ➔ "3.1 Safety precautions", page 10 • 0 = Switched off • 1 = Switched on If the display readout does not appear as described: – Check wiring according to current flow diagram – Check cruise control system ➔ Current flow diagrams, Electrical fault finding and Fitting locations
6	Air conditioner compressor shut-off function when kick-down is operated. A second mechanic is required for reading out the values when vehicle is driven ➔ "3.1 Safety precautions", page 10 • 0 = Not shut off • 1 = Shut off If the display readout does not appear as described: – Check wiring according to current flow diagram – Interrogate fault memory of air conditioning system ➔ Rep. Gr. 01
7	Park/neutral signal • 0 = Selector lever in "P" or "N" • 1 = Selector lever in "R" If the display readout does not appear as described: – Check wiring according to current flow diagram

Display zones 3, 4 in display group 005

Display zone	Explanatory notes
3 ...	Gear engaged in gearbox ➔ page 33 ; Measured value block 003, display zone 4
4 ... rpm	Engine speed ➔ page 33 , Display group 003, display zone 4

Display group 006

Display zone	Explanatory notes
1 ... %	Gradients. A second mechanic is required for reading out the values ➔ "3.1 Safety precautions", page 10 . Depending on software version "°C" instead of "%" may be displayed

Display zone		Explanatory notes
		– Uphill gradients • Maximum + 32 % – Downhill gradients • Maximum – 32 % Value is calculated by signals from vehicle speed sender, accelerator pedal value and engine speed (can be disregarded, however). Value may also rise when towing a trailer or carrying excessively heavy loads (increased payload).
2	... %	Hill factor. A second mechanic is required for reading out the values ➔ “3.1 Safety precautions”, page 10 • 0 ... 100 % Can be ignored
3	... %	Performance driving factor. A second mechanic is required for reading out the values ➔ “3.1 Safety precautions”, page 10 • 0 ... 100 % Value is determined by driving style and road conditions (driving speed, acceleration, accelerator pedal movement and engine speed)
4	... %	Accelerator pedal value ➔ page 31 , Display group 001, display zone 3

Display group 007

Display zones		Explanatory notes
1	0	Gear engaged and torque converter slip. A second mechanic is required for reading out the values when vehicle is driven ➔ “3.1 Safety precautions”, page 10
	R	Neutral
	1, 2, 3 or 4H+ 1, 2, 3 or 4M+	Reverse
	1, 2, 3 or 4H– 1, 2, 3 or 4M–	Gear 1, 2, 3, 4 (hydraulic or mechanical) • Positive torque converter slip (engine speed higher than gearbox input speed) Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted. Audi AG does not guarantee or accept any liability for the content of this document. Copyright © Audi AG Gear 1, 2, 3, 4 (hydraulic or mechanical) • Negative torque converter slip (engine speed identical/less than gearbox input speed) If specified value is not displayed: – Check solenoid valves: perform electrical check, from test step No. 6 onwards ➔ page 45 If gearshifts are not carried out, a clutch or brake may be defective
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 10 With torque converter lock-up clutch open, torque converter slip can rise up to stall speed. Torque converter lock-up clutch is open in hydraulic gears (e.g. 3H) and closed in mechanical gears (e.g. 3M) • Torque converter lock-up clutch open Display on -VAS 505x- is limited to 1900 rpm although actual torque converter slip speed may be higher
	20 ... 130 rpm	• Engine speed 2000 ... 3000 rpm Gearshift must be completed, torque converter lock-up clutch must be closed and accelerator pedal value must be constant
	0 ... 10 rpm	• Maximum engine speed Gearshift must be completed, torque converter lock-up clutch must be closed and accelerator pedal value must be constant



Display zones		Explanatory notes
		If the display readout does not appear as described: – Check ATF level ⇒ Rep. Gr. 37 – Rectify fault as described for fault codes 00281 ⇒ page 17 and 00529 ⇒ page 19 – Solenoid valve -N91- or spool valve operated by it sticking, perform electrical check, test step No. 9 ⇒ page 46 – Excessively high torque converter slip speeds may also be an indication of slipping clutch or brake. Determine which selector element is defective or not activated ⇒ Rep. Gr. 37 – Torque converter defective or incorrect torque converter fitted. Code letters, allocation ⇒ Rep. Gr. 00
3	... rpm	Engine speed ⇒ page 33 , Display group 003, display zone 4
4	... %	Accelerator pedal value ⇒ page 31 , Display group 001, display zone 3

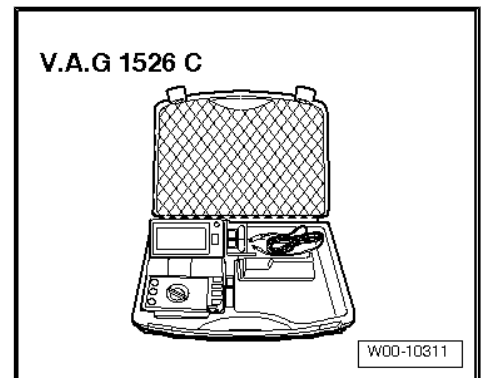


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9 Electrical check

Special tools and workshop equipment required

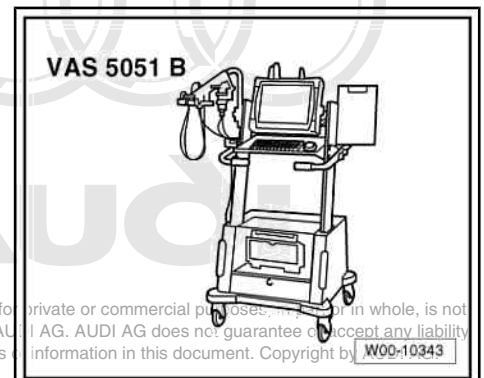
- ◆ Hand-held multimeter -V.A.G 1526C- with



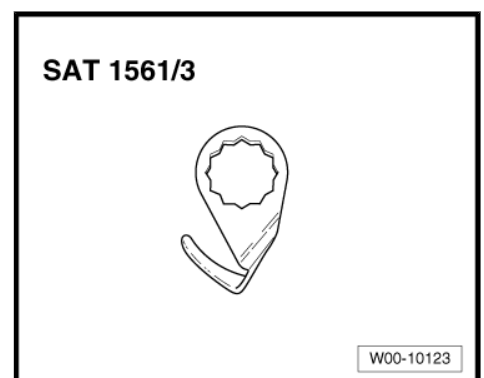
- ◆ Auxiliary measuring set -V.A.G 1594C- or



- ◆ Vehicle diagnostic, testing and information system -VAS 505x- with

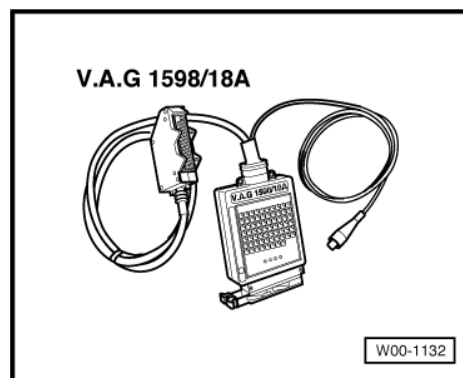


- ◆ Multimeter cables -VAS 5051/7-



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- ◆ Adapter cable, (68-pin) -V.A.G 1598/18A-



The test steps apply to:

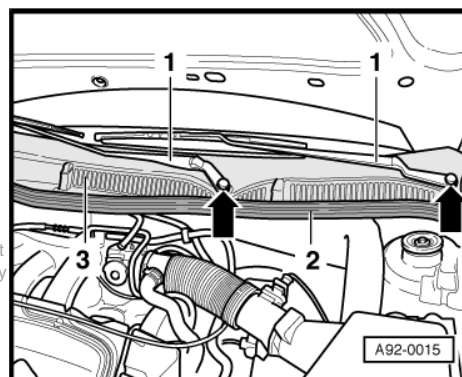
- ◆ Vehicles for which self-diagnosis does not indicate the source of the fault. In this case it is necessary to perform the complete electrical check.
- ◆ Vehicles for which self-diagnosis indicates the specific source of the fault. Then only perform the test steps recommended in the fault table (selective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

9.1 Connecting adapter cable, (68-pin) - V.A.G 1598/18A- (test box) to automatic gearbox control unit -J217-

- Remove wiper arms -1- ⇒ Rep. Gr. 92 .
- Pull off seal -2- for plenum chamber cover.
- Raise plenum chamber cover -3- until it is possible to disconnect washer fluid hose going to washer jets.
- If fitted, unplug electrical connector at washer jets.



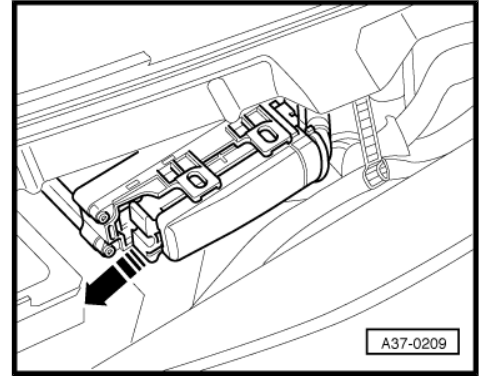
Caution

Risk of damage to plenum chamber cover.

- ◆ *Apply a small quantity of soap solution to transition between windscreen and plenum chamber cover. Then, starting at edge of windscreen, pull plenum chamber cover vertically up and out of retainer at windscreen.*

- Pull off plenum chamber cover.

- Switch off ignition, release multi-pin connector in direction of -arrow- and unplug from automatic gearbox control unit -J217-.



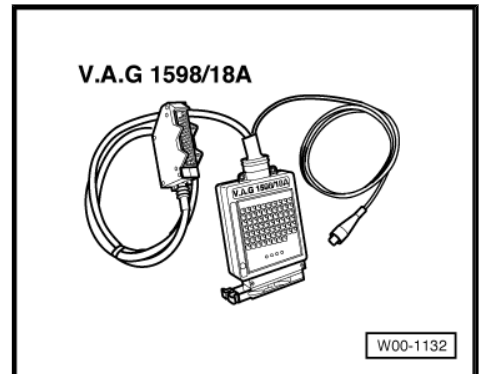
- Connect adapter cable, (68-pin) -V.A.G 1598/18A- (test box) to automatic gearbox control unit -J217-.



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 68-pin connector onto pins of automatic gearbox control unit -J217- and then lock in place.

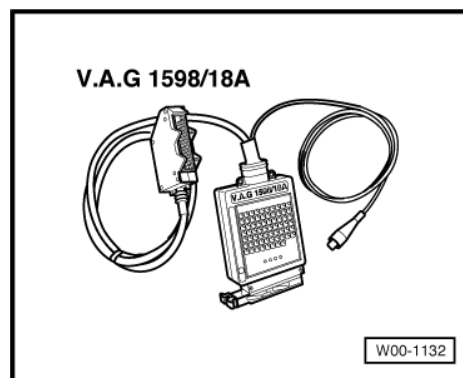


Note

- ◆ Use hand-held multimeter -V.A.G 1526B- with test leads from -V.A.G 1594 C- or vehicle diagnostic, testing and information system -VAS 505x- with multimeter cables -VAS 5051/7- for checking.
- ◆ The socket designations of the adapter cable, (68-pin) -V.A.G 1598/18A- (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.

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68-pin connector on automatic gearbox control unit -J217- / sockets on adapter cable, (68-pin) -V.A.G 1598/18A- (test box)



1 - Earth (terminal 31)	29 - Selector lever lock solenoid -N110-
2 - Vacant	30 - Sockets 30 ... 39 are vacant
3 - CAN Low only vehicles with CAN bus CAN bus description ➤ page 54	39 -
4 - Vacant	40 - Multi-function switch -F125-
5 - Vacant	41 - Accelerator pedal value from engine control unit only vehicles without CAN bus
6 - Gearbox oil temperature sender -G93-	42 - Vacant
7 - Vacant	43 - Vehicle speed sender -G68- (screening)
8 - Vacant	44 - Gearbox speed sender -G38- (screening)
9 - Solenoid valve 3 -N90-	45 - Voltage supply (terminal 30)
10 - Solenoid valve 7 -N94-	46 - Vacant
11 - Park/neutral signal	47 - Solenoid valve 4 -N91-
12 - Air conditioner system shut-off function when kick-down is operated	48 - Sockets 48 ... 53 are vacant
13 - Ignition timing retardation/injection quantity reduction only vehicles without CAN bus	53 -
14 - Vacant	54 - Solenoid valve 2 -N89-
15 - Brake light switch -F- signal voltage	55 - Solenoid valve 1 -N88-
16 - Kick-down switch -F8-	56 - Solenoid valve 5 -N92-
17 - Vacant	57 - Selector lever position display
18 - Multi-function switch -F125-	58 - Solenoid valve 6 -N93-
19 - Engine speed signal only vehicles without CAN bus	59 - Vacant
20 - Vehicle speed sender -G68-	60 - Vacant
21 - Gearbox speed sender -G38-	61 - Voltage supply for cruise control system only vehicles without CAN bus
22 - Voltage supply for solenoid valve 6 -N93-	62 - Multi-function switch -F125-
23 - Voltage supply (terminal 15)	63 - Multi-function switch -F125-
24 - Diagnosis K wire	64 - Vacant
25 - CAN High only vehicles with CAN bus CAN bus description ➤ page 54	65 - Vehicle speed sender -G68-
26 - Vacant	66 - Gearbox speed sender -G38-
27 - Vacant	67 - Voltage supply for solenoid valves
28 - Vacant	68 - Vacant

9.2 Test table

Overview of test steps

Component to be checked	Test step
Voltage supply for automatic gearbox control unit - J217-	– Perform test step No. 1 ➤ page 43
Selector lever lock solenoid -N110-	– Perform test steps No. 2 ➤ page 43 and No. 13 ➤ page 46
Brake light switch -F-	– Perform test step No. 3 ➤ page 44
Multi-function switch -F125-	– Perform test steps No. 4 ➤ page 44 and No. 5 ➤ page 45
Solenoid valve 1 -N88-	– Perform test step No. 6 ➤ page 45
Solenoid valve 2 -N89-	– Perform test step No. 7 ➤ page 45
Solenoid valve 3 -N90-	– Perform test step No. 8 ➤ page 45
Solenoid valve 4 -N91-	– Perform test step No. 9 ➤ page 46
Solenoid valve 5 -N92-	– Perform test step No. 10 ➤ page 46
Solenoid valve 6 -N93-	– Perform test step No. 11 ➤ page 46
Solenoid valve 7 -N94-	– Perform test step No. 12 ➤ page 46
Kick-down switch -F8-	– Perform test step No. 14 ➤ page 47
Vehicle speed sender -G68-	– Perform test steps No. 15 ➤ page 47 and No. 16 ➤ page 48
Gearbox speed sender -G38-	– Perform test steps No. 17 ➤ page 48 and No. 18 ➤ page 48
Gearbox oil temperature sender -G93-	– Perform test step No. 19 ➤ page 48

Test step No. 1

-V.A.G 1598/18A-sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
23 + 1	Voltage supply for automatic gearbox control unit -J217-	- Ignition switched on – Switch to voltage measuring range	Approx. battery voltage	– Check wiring according to current flow diagram: ◆ From contact 1 to earth ◆ From contact 23 to terminal 15, central electrics
45 + 1		Ignition switched on/off		– Check wiring according to current flow diagram: ◆ From contact 1 to earth ◆ From contact 45 to terminal 30, central electrics

Test step No. 2

-V.A.G 1598/18A-sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
29 + 1	Voltage supply for selector lever lock solenoid - N110-	Ignition switched on		



-V.A.G 1598/18A- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
		Switch to voltage measuring range	Approx. battery voltage	- Check wiring according to current flow diagram - Perform test step No. 13 ⇒ page 46

Test step No. 3

-V.A.G 1598/18A- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
15 + 1	Brake light switch -F-	- Ignition switched on - Switched to voltage measuring range - Brake pedal not depressed - Brake pedal depressed	Less than 1 V Approx. battery voltage	- Check wiring according to current flow diagram - Check brake light switch ⇒ Running gear, self-diagnosis; Rep. Gr. 01

Test step No. 4

-V.A.G 1598/18A- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
18 + 1	Voltage supply for multi-function switch -F125-	- Ignition switched on - Switched to voltage measuring range - Selector lever in "P", "R", "N" - Selector lever in "D", "3", "2", "1"	Approx. battery voltage Less than 3 V	- Check fuse ⇒ Current flow diagrams, Electrical fault finding and Fitting locations - Unplug starter inhibitor and reversing light relay -J226- and repeat measurement - Perform test step No. 5 ⇒ page 47 - Check wiring from automatic gearbox control unit -J217- to -F125- ⇒ page 50

Test step No. 5

-V.A.G 1598/18A- sockets	Items tested	Test conditions and additional steps	Specifica- tion	Fault rectification if readout does not match specification
63 + 1 63 + 23 40 + 1 40 + 23 62 + 1 62 + 23 18 + 1 18 + 23	Short to earth and terminal 15 in wiring from automatic gearbox control unit -J217- to multi-function switch -F125-	• Test step No. 4 performed • Ignition switched off • Switched to resistance measuring range – Connector unplugged from -F125- and -J226-	$\infty \Omega$	– Check wiring according to current flow diagram – Check wiring from automatic gearbox control unit -J217- to multi-function switch -F125- ➤ page 50

Test step No. 6

-V.A.G 1598/18A- sockets	Items tested	Test conditions and additional steps	Specifica- tion	Fault rectification if readout does not match specification
55 + 67	Solenoid valve 1 - N88-	• Ignition switched off – Switch to resistance measuring range	55 ... 75 Ω	– Check wiring between automatic gearbox control unit -J217- and gearbox ➤ page 49
55 + 1 67 + 1			$\infty \Omega$	

Test step No. 7

-V.A.G 1598/18A- sockets	Items tested	Test conditions and additional steps	Specifica- tion	Fault rectification if readout does not match specification
54 + 67	Solenoid valve 2 - N89-	• Ignition switched off – Switch to resistance measuring range	55 ... 75 Ω	– Check wiring between automatic gearbox control unit -J217- and gearbox ➤ page 49
54 + 1 67 + 1			$\infty \Omega$	

Test step No. 8

-V.A.G 1598/18A- sockets	Items tested	Test conditions and additional steps	Specifica- tion	Fault rectification if readout does not match specification
9 + 67	Solenoid valve 3 - N90-	• Ignition switched off – Switch to resistance measuring range	55 ... 75 Ω	– Check wiring between automatic gearbox control unit -J217- and gearbox ➤ page 49
9 + 1 67 + 1			$\infty \Omega$	

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**Test step No. 9**

-V.A.G 1598/18A- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
47 + 67	Solenoid valve 4 - N91-	- Ignition switched off - Switch to resistance measuring range	4 ... 7 Ω	Check wiring between automatic gearbox control unit -J217- and gearbox ➔ page 49
47 + 1 67 + 1			$\infty \Omega$	

Test step No. 10

-V.A.G 1598/18A- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
56 + 67	Solenoid valve 5 - N92-	- Ignition switched off - Switch to resistance measuring range	55 ... 75 Ω	Check wiring between automatic gearbox control unit -J217- and gearbox ➔ page 49
56 + 1 67 + 1			$\infty \Omega$	

Test step No. 11

-V.A.G 1598/18A- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
58 + 22	Solenoid valve 6 - N93-	- Ignition switched off - Switch to resistance measuring range	4 ... 7 Ω	Check wiring between automatic gearbox control unit -J217- and gearbox ➔ page 49
58 + 1 22 + 1			$\infty \Omega$	

Test step No. 12

-V.A.G 1598/18A- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
10 + 67	Solenoid valve 7 - N94-	- Ignition switched off - Switch to resistance measuring range	55 ... 75 Ω	Check wiring between automatic gearbox control unit -J217- and gearbox ➔ page 49
10 + 1 67 + 1			$\infty \Omega$	

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
23 + 29	Selector lever lock solenoid - N110-	Ignition switched off		

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-V.A.G 1598/20- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
		– Switch to resistance measuring range	25 ... 35 Ω	– Unplug connector for selector lever position display and repeat measurement; renew illumination if necessary ➔ Rep. Gr. 96 – Check wiring according to current flow diagram – Renew selector lever lock solenoid -N110- ➔ Rep. Gr. 37

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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 + 16	Kick-down switch -F8- on vehicles with petrol engine and throttle cable	• Ignition switched off • Switched to resistance measuring range – Accelerator pedal not operated – Accelerator pedal pressed down past kick-down point	$\infty \Omega$ Less than 1.5 Ω	– Check wiring and connectors according to current flow diagram – Adjust throttle cable and renew if necessary ➔ Rep. Gr. 20
1 + 16	Kick-down switch -F8- on vehicles with TDI engine without CAN bus	• Ignition switched on • Switched to voltage measuring range – Accelerator pedal not operated – Accelerator pedal pressed down past kick-down point	Approx. battery voltage Less than 3 V	– Check wiring and connectors according to current flow diagram – Renew accelerator position sender -G79- or accelerator pedal module ➔ Rep. Gr. 20

Test step No. 15

-V.A.G 1598/18A- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
20 + 65	Vehicle speed sender -G68-	• Ignition switched off • Switched to resistance measuring range	Min. 0.75 k Ω Max. 1 k Ω	– Check wiring from automatic gearbox control unit -J217- to vehicle speed sender -G68- ➔ page 52

Test step No. 16

-V.A.G 1598/18A- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
1 + 43 23 + 43	Screening for vehicle speed sender -G68-	- Ignition switched off - Switch to resistance measuring range	$\infty \Omega$	Check wiring from automatic gearbox control unit -J217- to vehicle speed sender -G68- ⇒ page 52

Test step No. 17

-V.A.G 1598/18A- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
21 + 66	Gearbox speed sender -G38-	- Ignition switched off - Switch to resistance measuring range	Min. 0.75 k Ω Max. 1 k Ω	Check wiring from automatic gearbox control unit -J217- to gearbox speed sender -G38- ⇒ page 53

Test step No. 18

-V.A.G 1598/18A- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
1 + 44 23 + 44	Screening for gearbox speed sender -G38-	- Ignition switched off - Switch to resistance measuring range	$\infty \Omega$	Check wiring from automatic gearbox control unit -J217- to gearbox speed sender -G38- ⇒ page 53

Test step No. 19

-V.A.G 1598/18A- sockets	Items tested	Test conditions and additional steps	Specification	Fault rectification if readout does not match specification
6 + 67	Gearbox oil temperature sender -G93-	• Ignition switched off • Switched to resistance measuring range		– Check wiring from automatic gearbox control unit -J217- to valve body ⇒ page 49
		– Measure ATF temperature		
		Approx. 20 °C	Approx. 250 kΩ	
		Approx. 60 °C	Approx. 48.8 kΩ	
		Approx. 120 °C	Approx. 7.4 kΩ	

9.3 Overview of connectors between automatic gearbox control unit -J217- and gearbox

1 - 10-pin connector

- ☐ To valve body
- ☐ Checking ⇒ [page 49](#)

2 - 3-pin connector

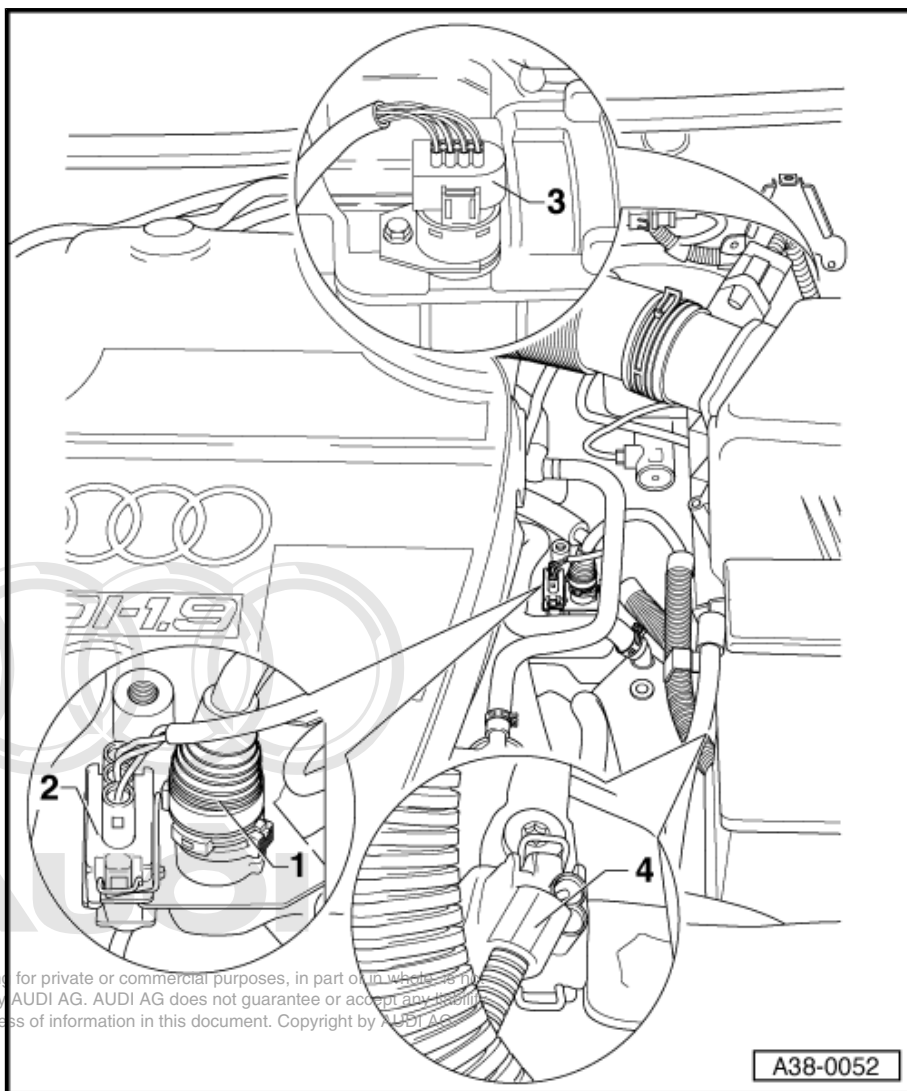
- ☐ To vehicle speed sender -G68-
- ☐ Checking ⇒ [page 52](#)

3 - 8-pin connector

- ☐ On multi-function switch -F125-
- ☐ Checking ⇒ [page 50](#)

4 - 2-pin connector

- ☐ On gearbox speed sender -G38-
- ☐ Checking ⇒ [page 53](#)

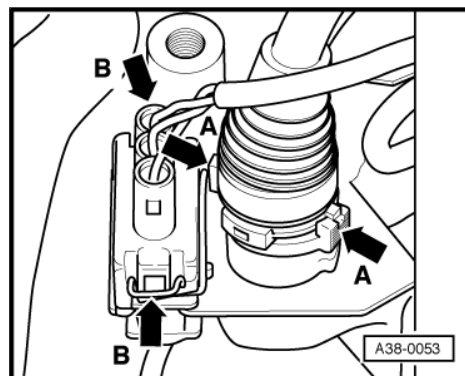


9.4 Checking wiring between automatic gearbox control unit -J217- and gearbox

Carry out the following test if the electrical check indicates a fault between gearbox and automatic gearbox control unit -J217- .

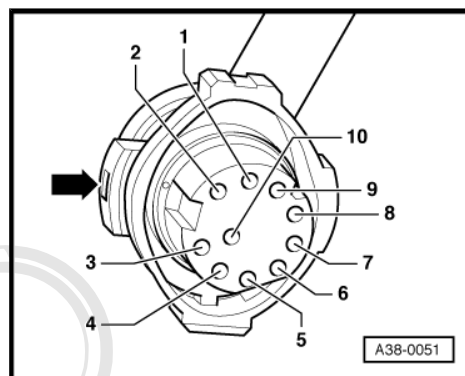
- Connect adapter cable, (68-pin) -V.A.G 1598/18A- (test box) to automatic gearbox control unit -J217- ⇒ [page 40](#) .

- Press release tabs -arrows A- on the sides to unplug electrical connector and pull off upwards.



- Connect multimeter for resistance measurement between contacts on the 10-pin connector and the sockets on adapter cable, (68-pin) -V.A.G 1598/18A- (test box), as shown in the following table.

- Specification: in each case less than 1.5 Ω .



Connector Contact	-V.A.G 1598/18A- Socket	Connector Contact	-V.A.G 1598/18A- Socket
1	67	6	47
2	22	7	56
3	55	8	58
4	54	9	6
5	9	10	10

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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 conductor strip ⇒ Rep. Gr. 38.
- ♦ If no faults are detected in the wiring harness in the gearbox, renew valve body ⇒ Rep. Gr. 38.

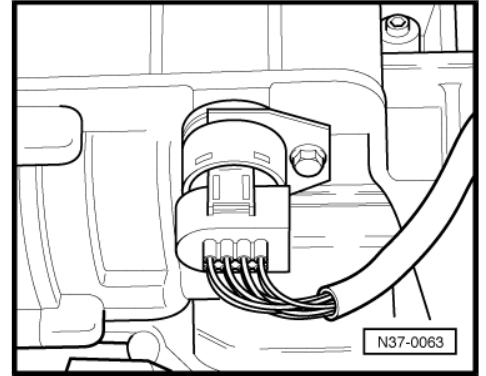
9.5 Checking multi-function switch -F125- with 8-pin connector



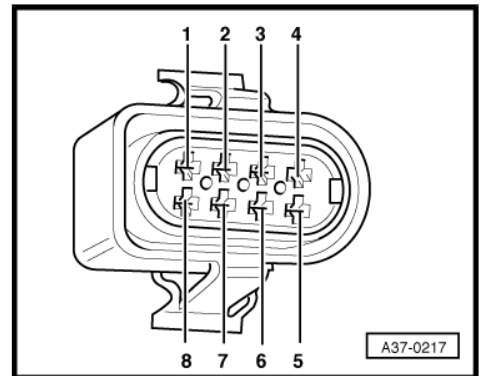
Note

- ♦ Read measured values in display group 001 for multi-function switch before performing electrical check.
- ♦ Make sure that selector lever cable is properly adjusted ⇒ Rep. Gr. 37.

- Unplug electrical connector at multi-function switch -F125- .



- Connect multimeter for resistance measurement between contacts on the 8-pin connector and the sockets on adapter cable, (68-pin) -V.A.G 1598/18A- (test box), as shown in the following table.
- Specification: in each case less than 1.5 Ω.



Connector Contact	-V.A.G 1598/18A- Socket	Connector Contact	-V.A.G 1598/18A- Socket
1	63	5	18
2	40	6	62
3	1	7	23
4	Contact vacant	8	Contact vacant



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, multi-function switch must be renewed ⇒ Rep. Gr. 38 .

Checking voltage supply of multi-function switch

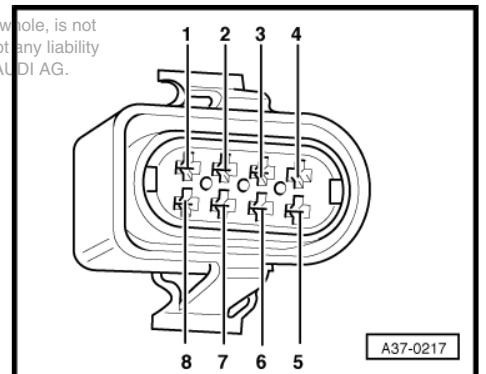
- Connect multimeter for voltage measurement between contacts -1- and -7- of the 8-pin connector.

- Switch on ignition.

- Specification: approx. battery voltage.

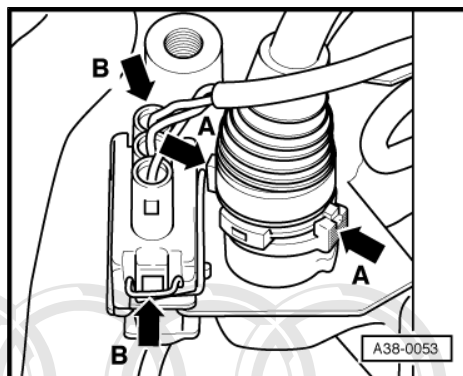
If readout does not match specification:

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



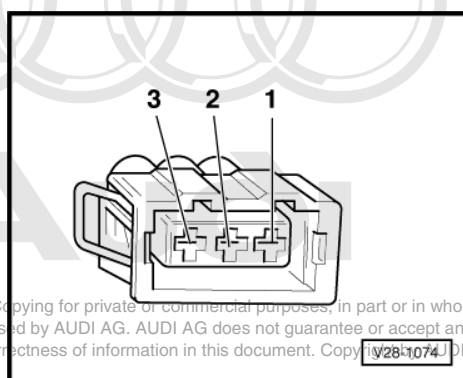
9.6 Checking vehicle speed sender -G68- with 3-pin connector

- Press release tabs -arrows B- on the sides to unplug electrical connector and pull off upwards.



- Connect multimeter for resistance measurement between contacts on the 3-pin connector and the sockets on adapter cable, (68-pin) -V.A.G 1598/18A- (test box), as shown in the following table.

- Specification: in each case less than 1.5 Ω.



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Connector Contact	-V.A.G 1598/18A- Socket	Connector Contact	-V.A.G 1598/18A- Socket
1	65	3	43
2	20		

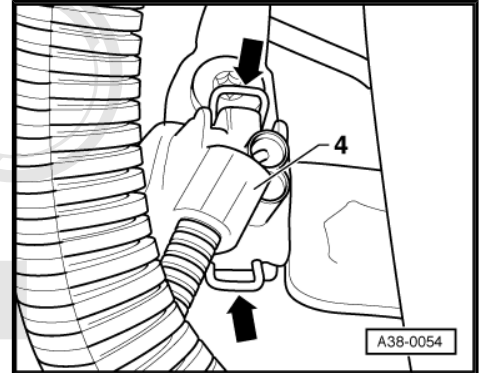


Note

- ◆ 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, vehicle speed sender -G68- must be renewed ⇒ Rep. Gr. 38.

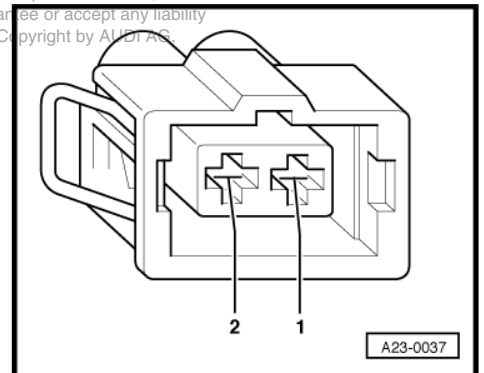
9.7 Checking gearbox speed sender -G38- with 2-pin connector

- Press release tabs -arrows- on the sides to unplug electrical connector-4- and pull off upwards.



- Connect multimeter for resistance measurement between contacts on the 2-pin connector and the sockets on adapter cable, (68-pin) -V.A.G 1598/18A- (test box), as shown in the following table.

- Specification: in each case less than 1.5 Ω.



Connector Contact	-V.A.G 1598/18A- Socket	Connector Contact	-V.A.G 1598/18A- Socket
1	21	2	66



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, gearbox speed sender -G38- must be renewed ⇒ Rep. Gr. 38.

10 CAN bus

Bus:

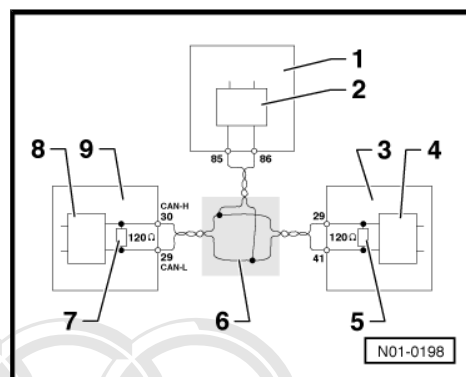
Bus is the term used to describe a data transfer and distribution system.

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 - Engine control unit
- 4 - BUS driver
- 5 - Matching resistor
- 6 - Drivetrain data bus (CAN bus, two wires twisted together)
- 7 - Matching resistor
- 8 - BUS driver
- 9 - ABS control unit -J104-



10.1 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 505x- ➔ [page 10](#) 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.

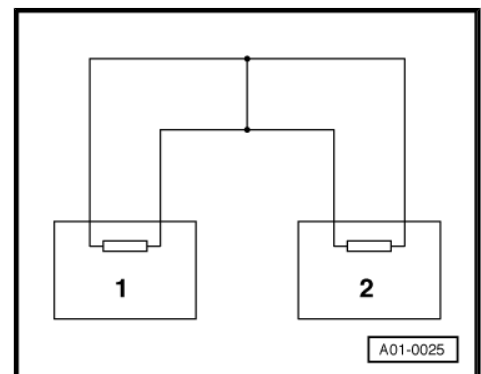
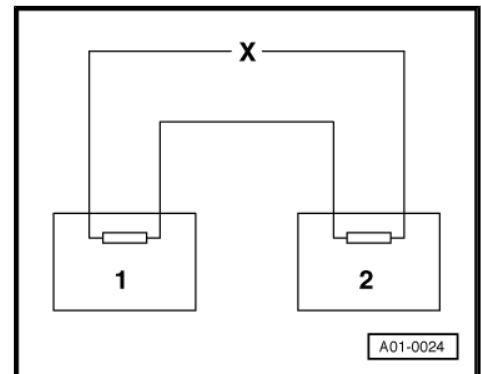
- Rectify malfunctions as described in the fault tables in the relevant Workshop Manuals.

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 55](#).
 - ◆ Three or more control units are communicating via a “two-wire bus system” ⇒ [page 56](#).

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

- Switch off ignition.
- Detach the multi-pin connectors at both control units.
- Check whether there is an open circuit in one of the bus wires
⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Check whether there is a short circuit between the bus wires
⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



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

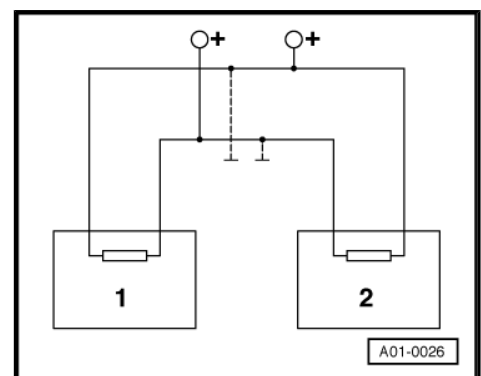
If no fault is detected in the bus wires:



Note

A defective voltage supply may also be the cause of an impaired CAN bus communication.

- Check voltage supply for both control units.

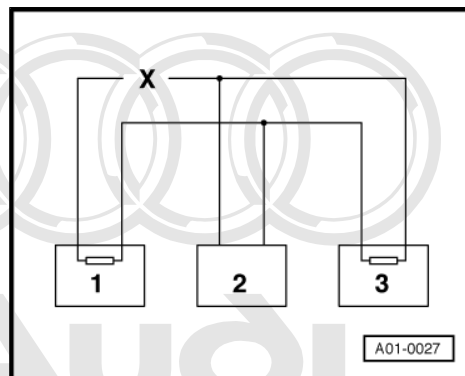


10.3 Three or more control units communicating via a "two-wire bus system"

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-



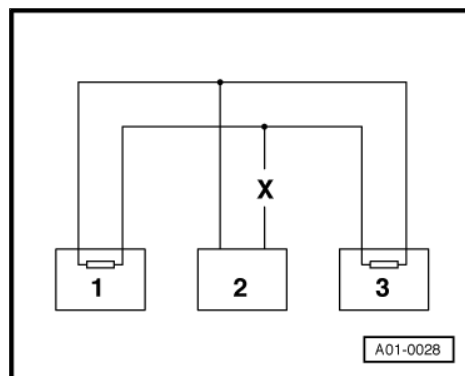
- Switch off ignition.
- Detach the electrical connectors at the control units which are linked by the bus wires and check whether there is an open circuit in one of the bus wires ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

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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-

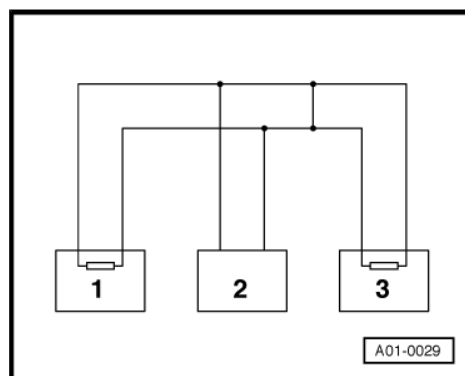


- Switch off ignition.
- Detach the electrical connectors at the control units which are linked by the bus wires and check whether there is an open circuit in one of the bus wires ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

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.

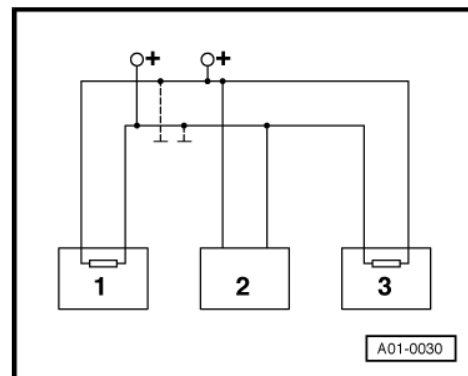
- Check the bus wires for short to positive or earth.
- If the cause of the fault “control unit defective” cannot be found in the bus wires, check whether one of the control units is causing the fault.
- Unplug electrical connectors at all control units which communicate via the CAN bus.
- Ignition switched off.
- Connect one of the control units.
- Connect vehicle diagnostic, testing and information system - VAS 505x- ➔ [page 10](#) .
- Switch on ignition and select the relevant vehicle system.
- Interrogate and erase the fault memory of the control unit which has just been connected.
- 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.



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