

Audi A8 1994 ➤

Automatic gearbox 018, Self-diagnosis									
Gearbox ID	CML								

Edition 01.1999



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List of Workshop Manual Repair GroupsList of Workshop Manual Repair Groups

Audi A8 1994 ➤

Automatic gearbox 018, Self-diagnosis

Repair Group

01 - Self-diagnosis, Electrical test



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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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Audi Automatic gearbox 018, Self-diagnosis - Edition 01.1999



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01 - Self-diagnosis, Electrical test

1 - Self-diagnosis function

1.1 - Self-diagnosis function

The automatic gearbox is controlled electro-hydraulically.

The control unit for the automatic gearbox -J217 is supplied with information from components which influence gear selection, and generates signals to control the relevant solenoid valves in the valve body. The solenoid valves direct the fluid pressure produced by the ATF pump to close the appropriate clutches or brakes in the gearbox.

Fault detection by gearbox control unit

The term "self-diagnosis" relates specifically to the electrical and electronic part of the control system.

The control unit is equipped with a fault memory so that the fault can be traced quickly in the event of an electronic/electrical component failure or an open circuit.

Faults are detected via electrical signals. If faults occur in the monitored sensors or components, these are stored in the memory together with an identification of the faulty component and an indication of the type of fault.

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When a fault occurs for the first time, it will be stored in the memory as a static fault. If the fault does not occur again, it will then be reclassified initially as a sporadic fault (SP).

Faults which are stored in the memory as sporadically occurring faults, will be displayed as "sporadic faults" when retrieved by fault reader V.A.G 1551. "SP" appears on the right of the display in such cases. If the printer is switched on, "sporadic faults" are printed out after the fault is addressed.

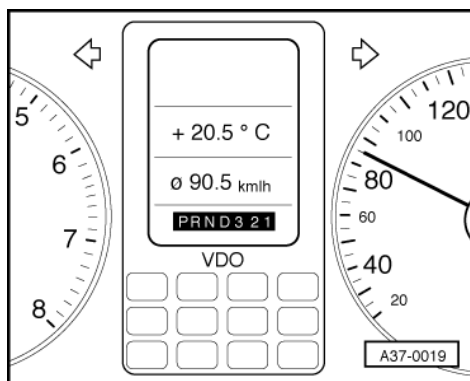
Faults which are stored in the fault memory as sporadic faults are automatically erased after 40 engine cold starts (followed by gearbox warm-up).

The self-diagnosis functions are only available with the vehicle diagnostic, testing and information system VAS 5051 (or with fault reader V.A.G 1551) in operating mode 1, "Rapid data transfer".

For a list of functions that can be performed with fault reader => List of selectable functions, Page 14.

Safety functions of gearbox control unit

If a failure should occur in the automatic gearbox control unit or if certain other faults occur when the vehicle is being driven, the gearbox will remain operative in the "mechanical emergency running mode" (backup mode):





- ♦ -> All segments of the gear display are fully illuminated.
- ♦ When driving, the gearbox shifts from all forward gears into 4th.
- ♦ It is possible to engage reverse gear.
- ♦ After restarting the engine, the gearbox will always engage 3rd gear when one of the forward gears is selected. This applies until the fault is rectified.

When operating in the mechanical emergency running mode, or with certain other backup functions, the automatic gearbox control unit does not activate the cruise control system (CCS). Therefore it is not possible to use the cruise control system when driving the vehicle.

If the emergency running mode has been activated when a fault has occurred, the gearbox will remain in the emergency running mode until the ignition is switched off.

If the gearbox does not shift automatically when a forward gear is selected (remains in 3rd gear) and the mechanical emergency running mode is not displayed, this means there is a fault which has caused the gearbox to go into the "electrical emergency running" mode.

Faults which may lead to emergency running:

Open circuit in wiring, short circuit, electrical or hydraulic components defective.

Faults which may lead to electrical emergency running:

Fault code	
00529	Speed information missing (engine rpm)

Faults which may lead to mechanical emergency running:

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
00293	Multi-function switch -F125
00532	Supply voltage
00789	Reversing switch -F41
65535	Control unit defective

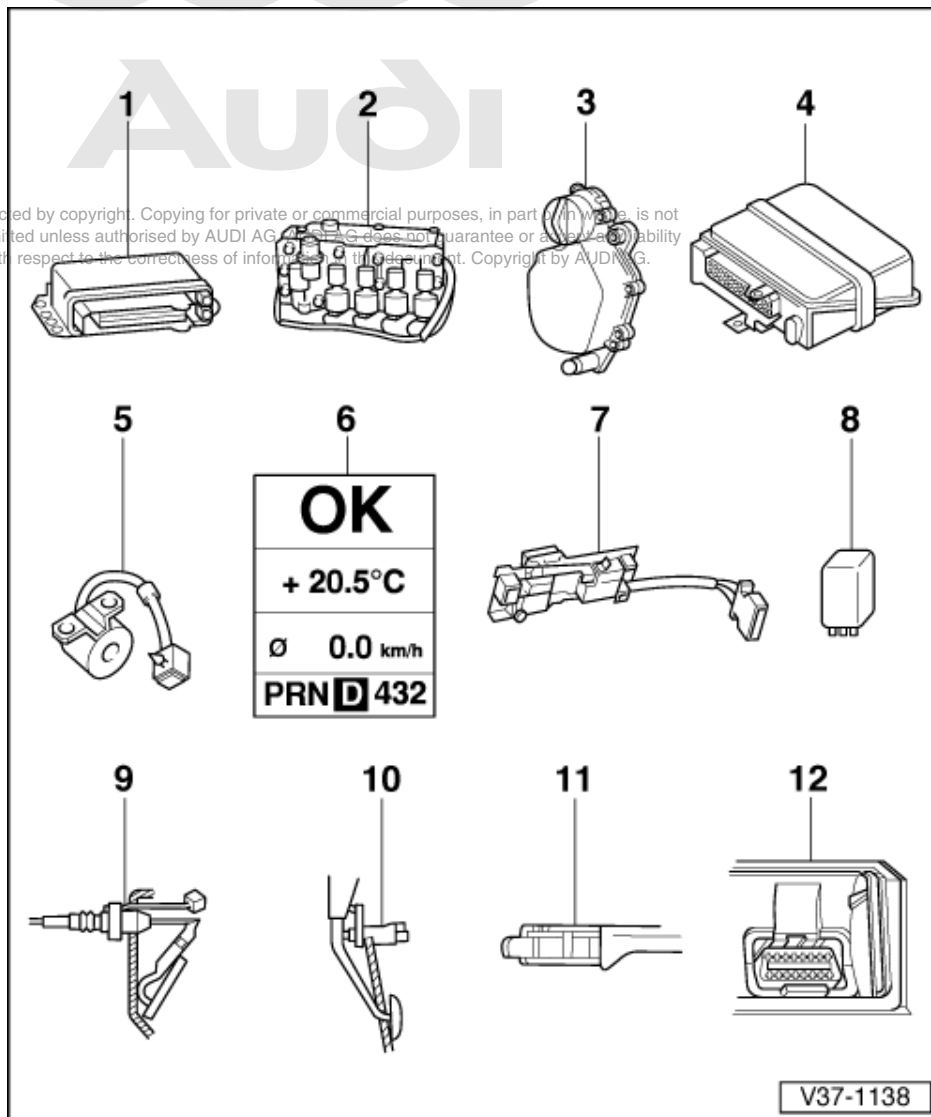
1.2 - Technical data for self-diagnosis

Fault memory	
- Permanent memory	yes
Data output	
- Rapid data transfer	yes
- Flash code output	no
Final control diagnosis	
	yes
Basic setting	
	no
Reading measured value block	
	yes
Electrical/electronic components and fitting locations	
	=> Page 3

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2 - Electrical/electronic

2.1 - Electrical/electronic



2.2 - Electrical/electronic components and fitting locations

Note:

Vehicle allocation and fitting locations

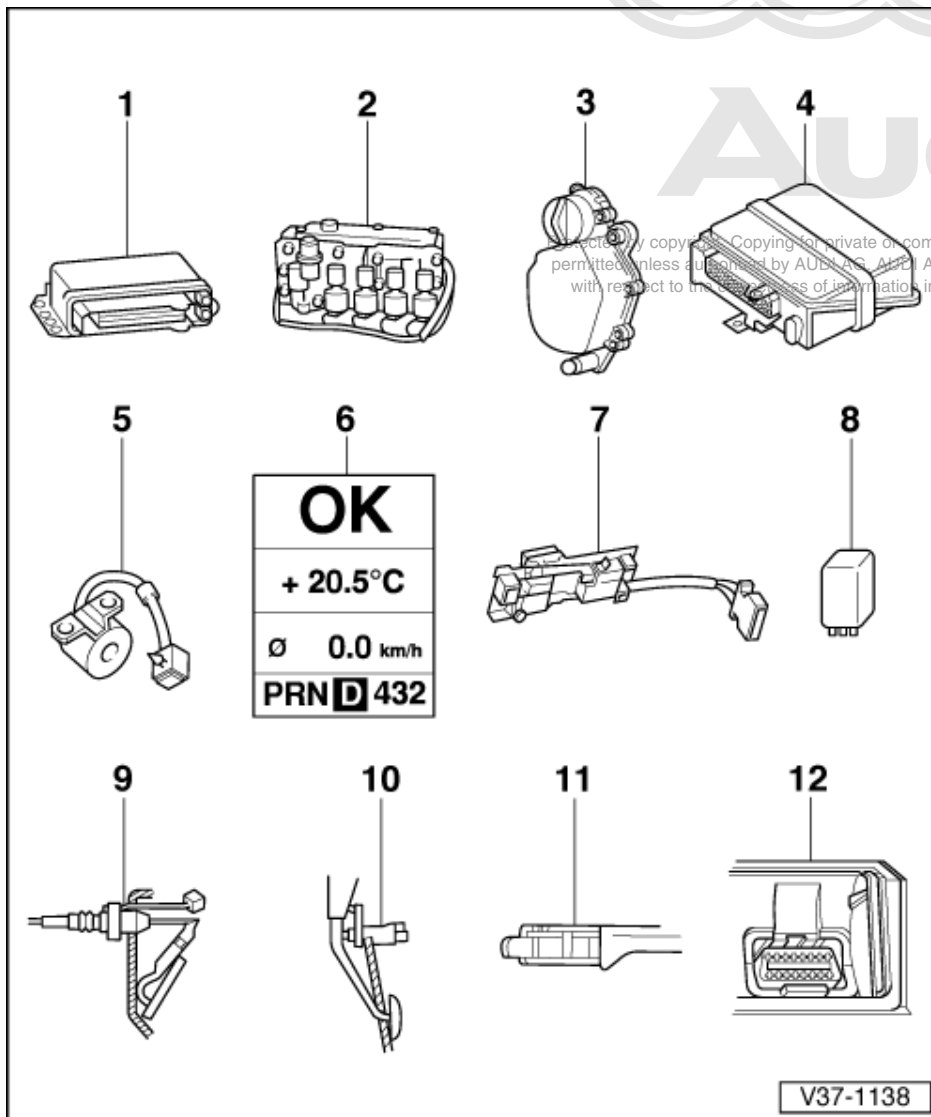
=> "Current Flow Diagrams, Electrical Fault Finding and Fitting Locations" binder

1 Automatic gearbox control unit -J217-

- ◆ In electronics box in plenum chamber (right side)
- ◆ Tested via self-diagnosis
=> from Page 15
- ◆ Removing and installing



=> Page 9

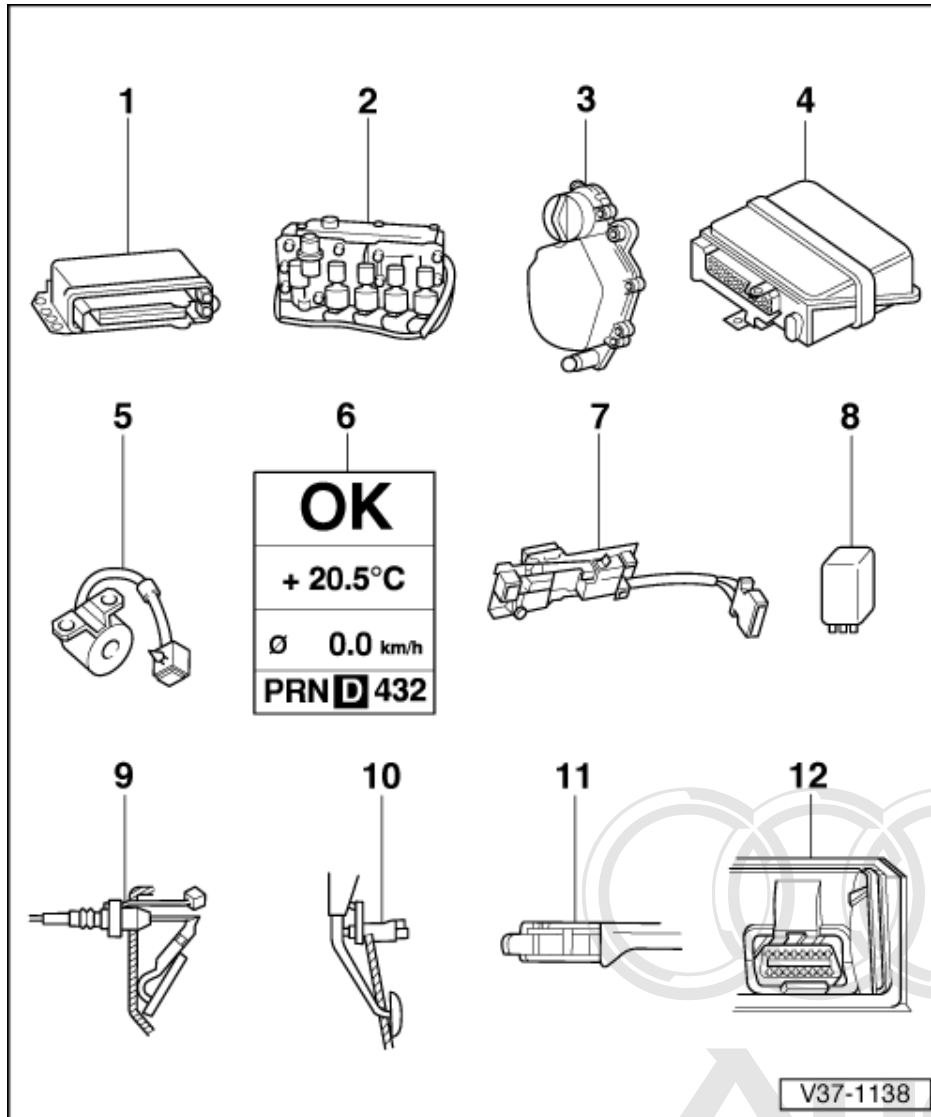
**2 Valve body**

- ◆ Fitting location: under gearbox oil pan
- ◆ Solenoid valves -N88, -N89, -N90, -N91 and -N92 secured to valve body
- ◆ Tested via self-diagnosis
=> from Page 15
- ◆ Removing and installing:

=> Automatic gearbox 018, Four-wheel drive; Repair group 38; Removing and installing oil pan, ATF screen and valve body; Removing and installing valve body Removing and installing oil pan, ATF screen and valve body Removing and installing valve body

3 Multi-function switch -F125

- ◆ Fitting location: on gearbox, left side
- ◆ Tested via self-diagnosis
=> from Page 15
- ◆ For testing: =>Read measured value block (from Page 32



♦ Removing and installing:

=> Automatic gearbox 018, Four-wheel drive; Repair group 37; Dismantling and assembling gearbox; Removing and installing multi-function switch -F125 Dismantling and assembling gearbox Removing and installing multi-function switch -F125
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4 Engine control unit

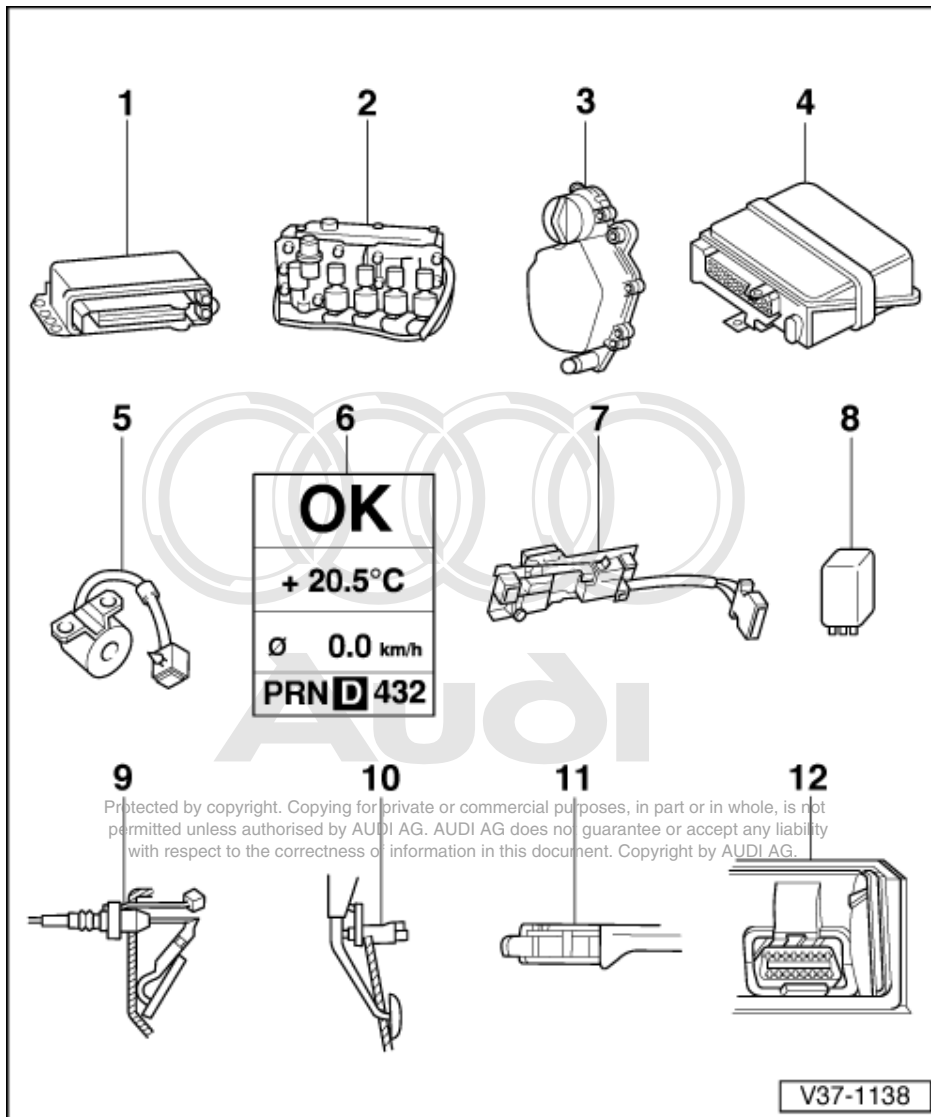
- ♦ Removing and installing
- ♦ In electronics box in plenum chamber (right side)

=> Motronic injection and ignition system; Repair group 24; Servicing Motronic injection system Servicing Motronic injection system

5 Solenoid for selector lever lock -N110

- ♦ Fitting location: on front section of shift mechanism
- ♦ Removing and installing:

=> Automatic gearbox 018, Four-wheel drive; Repair group 37; Servicing shift mechanism; Dismantling and assembling shift mechanism Servicing shift mechanism Dismantling and assembling shift mechanism

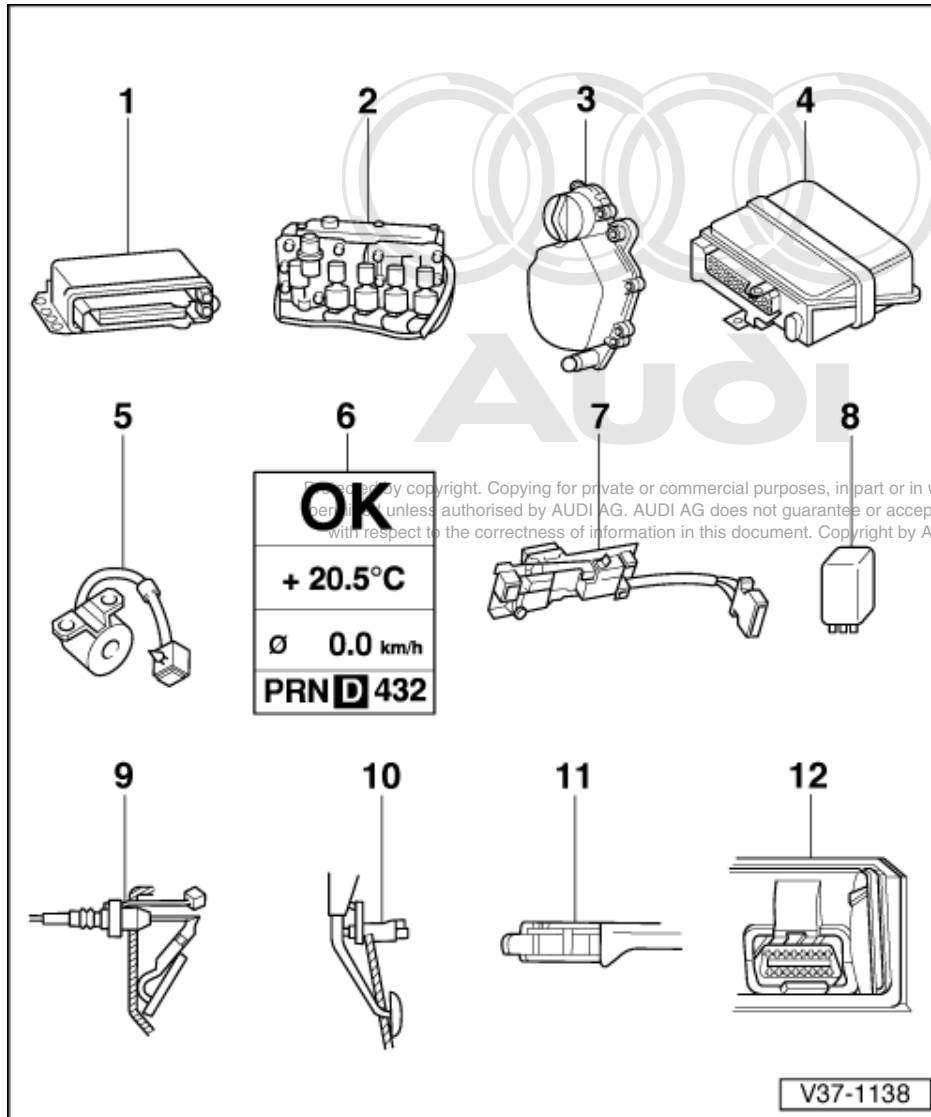
**6 Gear display -G96**

- ◆ Fitting location: in dash panel insert
- ◆ Fully lit gear display indicates that the gearbox is in emergency running mode

7 Tiptronic switch -F189

- ◆ Fitting location: on shift mechanism
- ◆ Tested via self-diagnosis
=> from Page 15
- ◆ For testing: => Read measured value block (from Page 32)
- ◆ Removing and installing:

=> Automatic gearbox 018, Four-wheel drive; Repair group 37; Servicing shift mechanism; Dismantling and assembling shift mechanism Servicing shift mechanism Dismantling and assembling shift mechanism



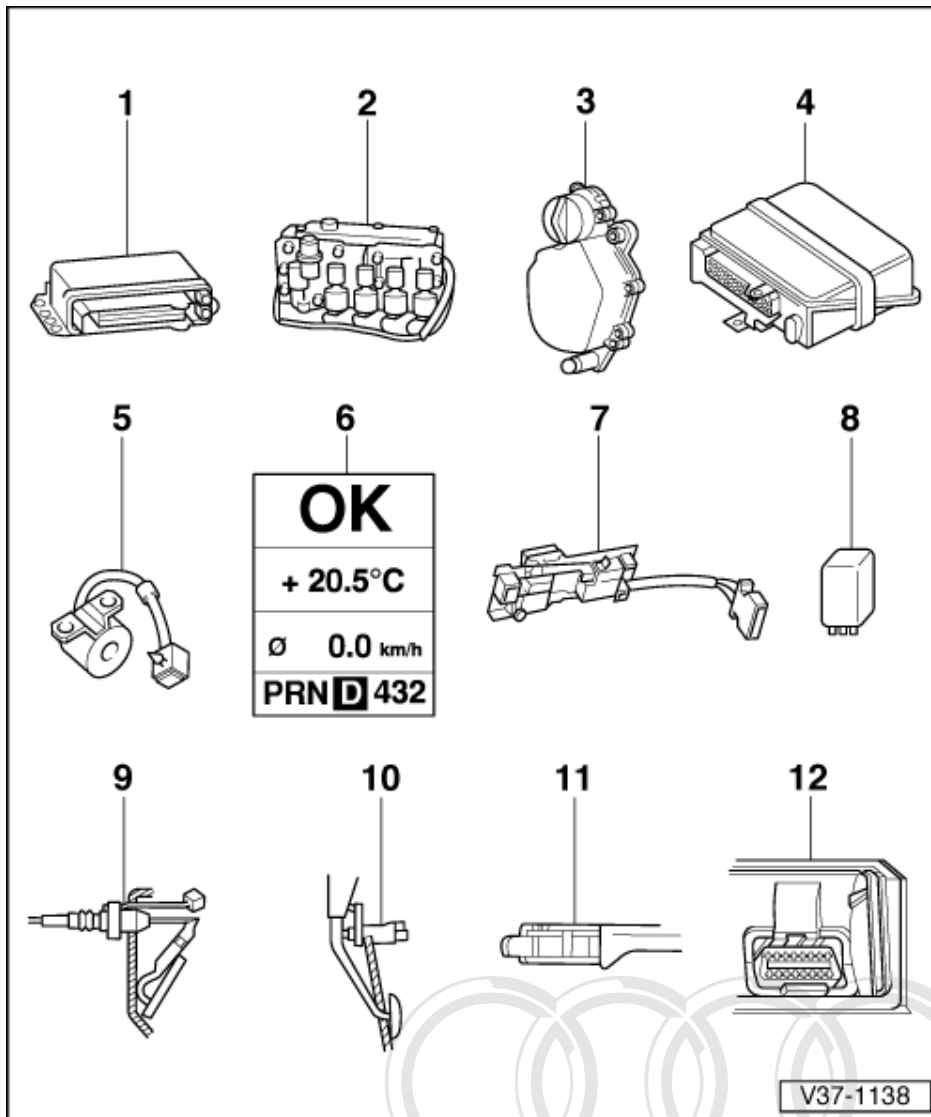
8 Starter inhibitor and reversing light relay -J226

- ◆ Fitting location: in central electrics, relay position 4.

9 Kickdown switch -F8-

- ◆ Location: in front of bulkhead, integrated in throttle cable
- ◆ Tested via self-diagnosis
=> from Page 15
- ◆ For testing: =>Read measured value block (from Page 32
- ◆ To remove and install kickdown switch; remove throttle cable, then reinstall and adjust cable.

=> Fuel supply system, Petrol engines; Repair group 20; Servicing accelerator mechanism on vehicles with mechanical accelerator linkage; Adjusting throttle cable
Servicing accelerator mechanism on vehicles with mechanical accelerator linkage
Adjusting throttle cable

**10 Brake light switch -F-**

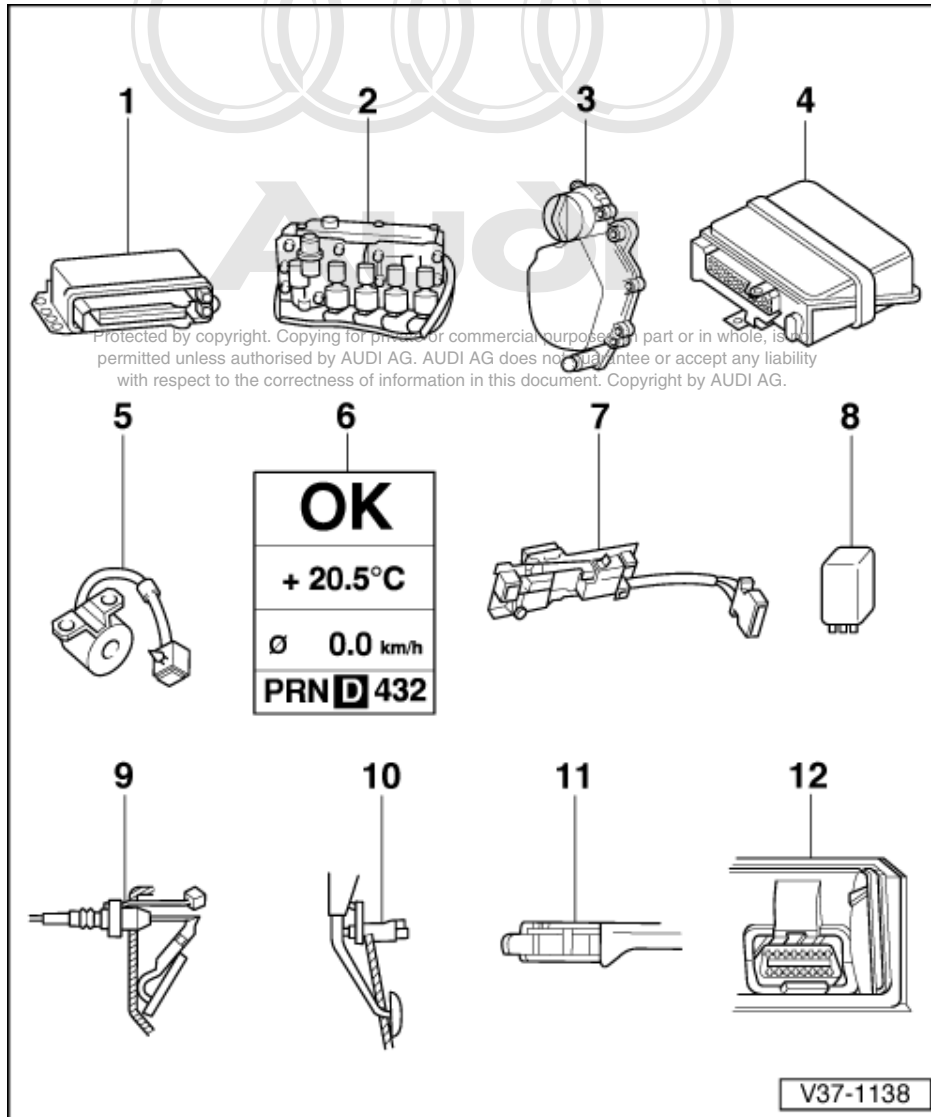
- ♦ Fitting location: in pedal cluster
- ♦ Tested via self-diagnosis
=> from Page 15
- ♦ For testing: => Read measured value block (from Page 32)
- ♦ Removing and installing:

=> Running gear, Front- and Four-wheel drive; Repair group 46; Assembly overview of pedal cluster Assembly overview of pedal cluster

11 Cruise control switch -E45

- ♦ Fitting location: incorporated in steering column switch
- ♦ Removing and installing:

=> Electrical system; Repair group 94; Servicing steering column switch; Removing and installing steering column switch Servicing steering column switch Removing and installing steering column switch



12 Diagnosis connection

- ◆ Fitting location: underneath ashtray
- ◆ Connecting vehicle diagnostic, testing and information system VAS 5051 (or fault reader V.A.G 1551) and selecting functions
=> Page 12

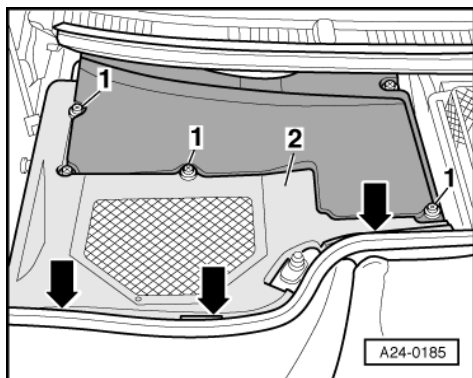
2.3 - Removing and installing automatic gearbox control unit -J217

Notes:

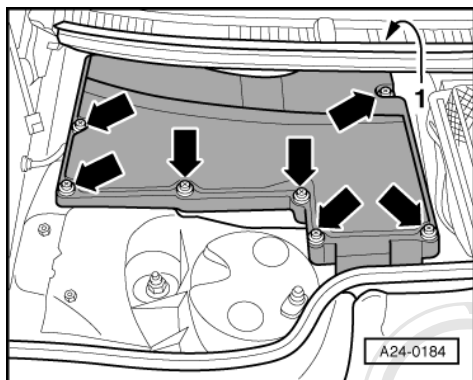
- ◆ If a test indicates that the gearbox control unit is defective and requires replacement, first interrogate (=> Page 24) the fault memory, then repeat the test.
- ◆ Replace the gearbox control unit only after a repeated test again indicates that the gearbox control unit is defective.
- ◆ After switching off the ignition, wait for 30 seconds before unplugging or fitting the connector for the automatic gearbox control unit -J217.



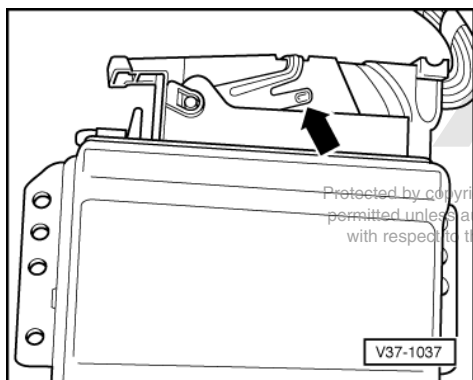
Removing



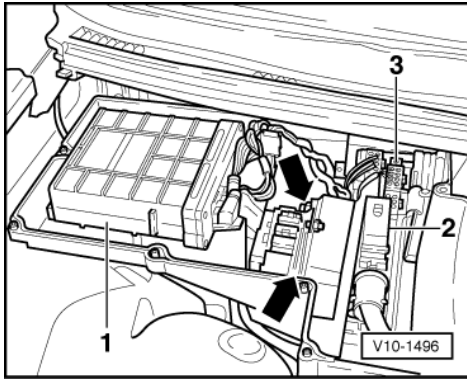
- Switch off ignition.
- -> Loosen cross-head screws -1- on electronics box in plenum chamber
- Unclip plenum chamber cover (front section) -2- at bulkhead -arrows-.
- Take off plenum chamber cover.



- -> Pry out cover -1- in scuttle panel trim and loosen rear cross-head screw -arrow in top-right corner-.
- Loosen the remaining cross-head screws -arrows-.
- Remove cover on electronics box in plenum chamber.



- -> Press lock in direction of arrow to release connector.



- -> Unplug connector -2- from gearbox control unit.

Note:

After switching off the ignition, wait for 30 seconds before unplugging or fitting the connector for the automatic gearbox control unit -J217.

- Unscrew gearbox control unit from electronics box -arrows-.

Installing

Installation is carried out in the reverse order, when doing this note the following:

Note:

After switching off the ignition, wait for 30 seconds before unplugging or fitting the connector for the automatic gearbox control unit -J217.

- Check whether there is water in the electronics box and seal any cracks or openings.
- Check wiring.
- Interrogate fault memory in gearbox control unit =>Page 15 .

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3 - Performing self-diagnosis

3.1 - Performing self-diagnosis

3.2 - Safety precautions

Note the following points if test equipment has to be used during a road test:

Warning

- ◆ Test equipment must always be secured on the rear seat and operated from the rear seat by a second person.
- ◆ If test equipment is operated from the front passenger seat, the occupant could be injured by the passenger's airbag in an accident.

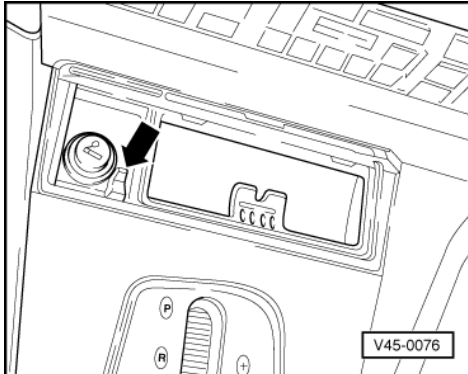


3.3 - Connecting vehicle diagnostic, testing and information system VAS 5051 or fault reader V.A.G 1551 and selecting functions

Requirements for test:

- Vehicle voltage supply okay.
- Voltage supply and fuses for each system okay.
- Earth connections for gearbox okay.

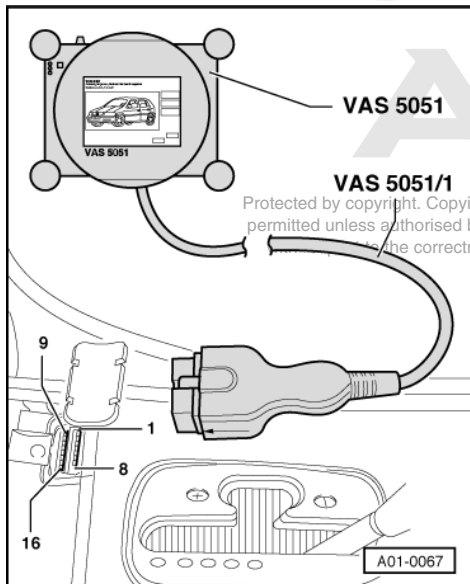
=> Current flow diagrams, Electrical fault finding and Fitting locations



- Multi-function switch -F125 okay, engine speed under 2000 rpm.
- Selector lever must be in position P or N for all functions except for "Reading measured value block".
- Handbrake applied.

Work sequence

- -> Release ashtray in centre console by pressing the small lever -arrow-.
- Take ashtray out of centre console and remove cover for diagnostic connector.



- -> Connect up vehicle diagnostic, testing and information system VAS 5051 with diagnostic cable VAS 5051/1. Alternatively, connect fault reader V.A.G 1551 using diagnostic cable V.A.G 1551/3A.

Warning:

- ◆ When carrying out road tests using vehicle diagnostic, testing and information system VAS 5051 or fault reader V.A.G
- ◆ Always follow the safety precautions => Page **11** .

Note:

The following description only covers the procedure for performing self-diagnosis with fault reader V.A.G 1551.

If using vehicle diagnostic, testing and information system VAS 5051, follow the operating instructions supplied with the equipment.

-> Indicated in display

V.A.G - SELF DIAGNOSIS	HELP
1 - Rapid data transfer 1)	
2 - Flash code output 1)	

- 1) appears alternately

Note:

If the display remains blank:

=> Fault reader operating instructions

- Switch on ignition.
- Press brake pedal once.
- Switch on fault reader printer with the print key. The warning lamp in key must light up.
- Press key 1 for "Rapid data transfer".

-> Indicated on display:

Rapid data transfer	HELP
Insert address word XX	

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Note:

Address word 00 is used to start the automatic test sequence (i.e. interrogation of fault memories of all vehicle systems with self-diagnosis capability in "Rapid data transfer" mode).

- Press keys 0 and 2 for address word "Gearbox electronics" and confirm entry with Q key.

-> The fault reader V.A.G 1551 display will show the control unit identification (example).

4D0927156A AG4 Gearbox 018	D00
Coding 00000	WSC 12345

Note:

The control unit identification can be printed out by pressing the PRINT key on fault reader V.A.G 1551.

Control unit identification (example):

- 4D0 927 156 A	Part No.; Allocation => Parts catalogue
- AG4 Gearbox	4-speed automatic gearbox
- 018:	018
- D00	Data status (software version) of control unit
- Coding 00000	Control unit coding



- WSC 12345 Workshop Code of V.A.G 1551 which was used to perform the last coding

- Press =>key.

-> Indicated on display (function selection):

Rapid data transfer HELP
Select function XX

Notes:

- ♦ By entering "01" ("Interrogate control unit version") and confirming with the Q key, the control unit identification can be displayed again.

Rapid data transfer HELP
Control unit does not answer

-> If this display appears:

- Print out the possible fault causes by pressing the HELP key.
- Test supply voltage of automatic gearbox control unit -J217
=> Electrical test from Page 32 .
- Perform electrical test of multi-function switch -F125=>from Page 32 and check adjustment of multi-function switch -F125

=> Automatic gearbox 018, Four-wheel drive; Repair Group 37; Dismantling and assembling gearbox; Adjusting multi-function switch -F125 Dismantling and assembling gearbox Adjusting multi-function switch -F125

- If automatic gearbox control unit -J217 is defective => Fault table from Page 16 under fault code 65535 "Control unit faulty!"
- Once the possible faults have been rectified, press the 0 and 2 keys for "Gearbox electronics" and confirm entry with the Q key.

-> If this display appears:

Rapid data transfer HELP
Fault in communication build up

or

Rapid data transfer HELP
K wire not switching to earth

or

Rapid data transfer HELP
K wire not switching to positive

- Print out a list of possible fault causes by pressing the HELP key.
- Test wiring of diagnostic connector according to current flow diagram =>Page 45 .
- After rectifying possible faults, press the keys 0 and 2 for "Gearbox electronics" and confirm entry with the Q key.

3.4 - List of selectable functions

Address words	Page
02 Gearbox electronics	12
00 Automatic test sequence	13
Functions	
01 - Interrogate control unit version	14
02 - Interrogate fault memory	15
03 - Final control diagnosis	22

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05 - Erase fault memory	24
06 - End output	
08 - Read measured value block	25

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

After a function has been interrogated, the V.A.G 1551 returns to the following start position:

-> Indicated on display (function selection):

Rapid data transfer	HELP
Select function XX	

4 - Interrogating fault memory

4.1 - Interrogating fault memory

- Connect vehicle diagnostic, testing and information system VAS 5051 (or fault reader V.A.G 1551) and select gearbox electronics control unit by entering address word "02" => Page 12 .
When doing this, the ignition must be on.

-> Indicated on display:

Rapid data transfer	HELP
Select function XX	

- Press brake pedal once.

Note:

The fault "00526 Brake light switch -F" will be displayed when the ignition is switched on. If the brake light switch is okay, this display will then be erased the first time the brake pedal is depressed.

- Press keys 0 and 2 for the function "Interrogate fault memory" and confirm entry with Q key.

-> Indicated on display:

No fault recognised

- Press =>key.

or

-> Indicated on display:

X faults recognised

If the printer on the fault reader is switched on the stored faults will be displayed and printed out in sequence.

- Press =>key after the last fault is displayed and printed.

-> Indicated on display:

Rapid data transfer	HELP
Select function XX	

- Rectify printed faults according to fault table (=> Page 24

After the fault memory has been interrogated, the V.A.G 1551 returns to the following start position:

-> Indicated on display (function selection):

Rapid data transfer	HELP
Select function XX	



4.2 - Fault table

Note:

- ♦ This table lists all possible faults which can be recognised by the automatic gearbox control unit -J217 and displayed on the VAS 5051 or V.A.G 1551 when the fault memory is interrogated. The faults are grouped according to the fault code.
- ♦ The fault table is arranged according to the 5-digit fault codes in the left-hand column.
- ♦ If faults occur only occasionally or the fault memory has not been erased after a fault has been rectified, these faults will be displayed over a specific period of time as "sporadic faults". Please see Fault detection by gearbox control unit => Page 1.
- ♦ Components that are indicated as being faulty by the V.A.G 1551 should not be renewed immediately.
 - Always start by checking the wiring and connectors for the component using the current flow diagram.
 - Also test the earth connections using the current flow diagram. This is particularly important in the case of sporadic faults (indicated by the letters "SP" on the fault reader display).

=> "Current Flow Diagrams, Electrical Fault Finding and Fitting Locations" binder

- ♦ If the fault table refers to "Read measured value block" or "Electrical test", perform only the test step listed for the relevant component.

Printout on V.A.G 1551 printer	
No fault recognised!	<p>If "No fault recognised" appears after repairs have been performed, the self-diagnosis is completed.</p> <p>If the automatic gearbox still does not shift gears properly, even though no faults are displayed:</p> <p>Interrogate control unit identification =>Page 22</p> <p>Continue fault-finding procedure according to Fault finding program</p> <p>=> "Fault finding, Power transmission" binder</p>

Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
00258 Solenoid 1 -N88 Open circuit 1) Short to earth 1) Short to positive 1)	- Open circuit or short to earth/positive - Solenoid valve 1 -N88 defective	- Check wiring and connections according to current flow diagrams 2) - Read measured value block =>from Page 32
00260 Solenoid 2 -N89 Open circuit 1) Short to earth 1) Short to positive 1)	- Open circuit or short to earth/positive - Solenoid valve 2 -N89 defective	- Check wiring and connections according to current flow diagram 2) - Read measured value block =>from Page 32

1) One of these displays will appear in addition to the name of the component.

2) First check connections for contact corrosion or moisture and replace if necessary. If solenoid faults are displayed, then especially check the 8-pin connector on gearbox between valve body and wiring harness.

Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
00262 Solenoid 3 -N90 Open circuit 1) Short to earth 1) Short to positive 1)	- Open circuit or short to earth - Solenoid valve 3 -N90 defective	- Check wiring and connections according to current flow diagram 2) - Read measured value block => from Page 32
00264 Solenoid 4 -N91	- Open circuit or short to earth	- Check wiring and connections according to current flow diagram 2)

Open circuit 1) Short to earth 1) Short to positive 1)	- Solenoid valve 4 -N91 defective	- Read measured value block =>from Page 32
--	-----------------------------------	--

- 1) One of these displays will appear in addition to the name of the component.
- 2) First check connections for contact corrosion or moisture and replace if necessary. If solenoid faults are displayed, then especially check the 8-pin connector on gearbox between valve body and wiring harness.

Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
00266 Solenoid 5 -N92 Open circuit 1) Short to earth 1) Short to positive 1)	- Open circuit or short to earth - Solenoid valve 5 -N92 defective	- Check wiring and connections according to current flow diagram 2) - Read measured value block =>from Page 32

- 1) One of these displays will appear in addition to the name of the component.
- 2) First check connections for contact corrosion or moisture and replace if necessary. If solenoid faults are displayed, then especially check the 8-pin connector on gearbox between valve body and wiring harness.

Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
00283 Speed sensor front left -G47 Implausible signal	- Defect in wiring between gearbox control unit and ABS control unit -J104 - Open circuit between ABS control unit and speed sensor; fuse for ABS control unit defective; dirty rotor; wheel bearing play too large; or speed sensor not installed properly - Wrong ABS control unit installed	- Read measured value block =>from Page 32 1) - Rectifying fault => Running gear, Self-diagnosis; Repair group 01

- 1) First check connections for contact corrosion or moisture. Replace if necessary.

Note:

This fault will only be stored in the memory if the other three speed sensors all indicate approximately the same speed.

Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
00285 Speed sensor front right -G45 Implausible signal	- Defect in wiring between gearbox control unit and ABS control unit -J104 - Open circuit between ABS control unit and speed sensor; fuse for ABS control unit defective; dirty rotor; wheel bearing play too large; or speed sensor not installed properly - Wrong ABS control unit installed	- Read measured value block =>from Page 32 1) - Rectifying fault => Running gear, Self-diagnosis; Repair group 01

- 1) First check connections for contact corrosion or moisture. Replace if necessary.

Note:

This fault will only be stored in the memory if the other three speed sensors all indicate approximately the same speed.



Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
00287 Speed sensor rear right -G44 Implausible signal	<ul style="list-style-type: none"> - Defect in wiring between gearbox control unit and ABS control unit -J104 - Open circuit between ABS control unit and speed sensor; fuse for ABS control unit defective; dirty rotor; wheel bearing play too large; or speed sensor not installed properly - Wrong ABS control unit installed 	<ul style="list-style-type: none"> - Read measured value block =>from Page 32 1) - Rectifying fault => Running gear, Self-diagnosis; Repair group 01

1) First check connections for contact corrosion or moisture. Replace if necessary.

Note:

This fault will only be stored in the memory if the other three speed sensors all indicate approximately the same speed.

Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
00290 Speed sensor rear left -G46 Implausible signal	<ul style="list-style-type: none"> - Defect in wiring between gearbox control unit and ABS control unit -J104 - Open circuit between ABS control unit and speed sensor; fuse for ABS control unit defective; dirty rotor; wheel bearing play too large; or speed sensor not installed properly - Wrong ABS control unit installed 	<ul style="list-style-type: none"> - Read measured value block =>from Page 32 1) - Rectifying fault => Running gear, Self-diagnosis; Repair group 01

1) First check connections for contact corrosion or moisture. Replace if necessary.

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Note:

This fault will only be stored in the memory if the other three speed sensors all indicate approximately the same speed.

Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
00293 Multi-function switch -F125 Input open	<ul style="list-style-type: none"> - Open circuit or short to earth/positive - Multi-function switch -F125 defective - Connector to multi-function switch -F125 not plugged in - Multi-function switch -F125 not adjusted properly - Selector lever cable not adjusted properly 	<ul style="list-style-type: none"> - Check wiring and connections according to current flow diagram 1) - Read measured value block =>from Page 32 - Adjust multi-function switch - Replace multi-function switch -F125 if necessary - => Automatic gearbox 018, Four-wheel drive; Repair group 37; Dismantling and assembling gearbox - Dismantling and assembling gearbox - Adjust selector lever cable - => Automatic gearbox 018, Four-wheel drive; Repair group 37; Servicing shift mechanism - Servicing shift mechanism

1) First check connections for contact corrosion or moisture. Replace if necessary.

Notes:

- ♦ This fault will be stored in the memory if the gearbox control unit detects an open circuit in one or more of the three wiring connections to the multi-function switch -F125, or if the multi-function switch is defective.

- ♦ This fault will be stored as a sporadic fault if the control unit does not register "P" or "N" when starting the engine, or if it registers "D" or "2" with the reversing switch closed.

Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
00296 Kickdown switch -F8 Short to earth	<ul style="list-style-type: none"> - Short to earth between kickdown switch -F8 and gearbox control unit - Open circuit between kickdown switch -F8 and gearbox control unit - Kickdown switch -F8 defective 	<ul style="list-style-type: none"> - Check wiring and connections according to current flow diagram 1) - Read measured value block =>from Page 25 - Perform electrical test =>from Page 32

- 1) First check connections for contact corrosion or moisture. Replace if necessary.

Note:

This fault will be stored in the memory if the kickdown switch is closed and the throttle valve angle exceeds 30°.

Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
00518 Throttle valve potentiometer -G69 Short to positive1) Short to earth1)	<ul style="list-style-type: none"> - Short to positive or earth between engine control unit and gearbox control unit - -G69 defective or not adjusted properly - Open circuit between -G69 and engine control unit - Moisture or corrosion in connection to -G69 	<ul style="list-style-type: none"> - Interrogate fault memory => Motronic injection and ignition system; Repair group 01; Interrogating and erasing fault memory Interrogating and erasing fault memory - Read measured value block =>from Page 32

- 1) One of these displays will appear in addition to the name of the component.

Note:

The fault will be stored in the memory if the engine control unit is transmitting an implausible throttle valve voltage.

Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
00526 Brake light switch -F No signal	<ul style="list-style-type: none"> - Open circuit or short to earth/positive between gearbox control unit and brake light switch -F - Brake light switch -F defective 	<ul style="list-style-type: none"> - Check wiring and connections according to current flow diagram - Read measured value block =>from Page 32 - Replace brake light switch -F if necessary

Notes:

- ♦ The fault is always displayed when the ignition is turned on and is then cancelled by pressing the brake pedal once, providing brake light switch -F is okay.
- ♦ Before interrogating fault memory, press the brake pedal briefly once to erase the displayed fault.

Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
00529 Speed information missing	<ul style="list-style-type: none"> - Defect in wiring between engine or gearbox control units or rev counter - Short in rev counter 	<ul style="list-style-type: none"> - Check wiring and connections according to current flow diagram - Read measured value block =>from Page 25



Open circuit/Short to earth1) Short to positive1)	<ul style="list-style-type: none"> - Engine speed signal is falsified by electrical wiring which has not been properly fitted (e.g. for a retro-fitted telephone) - Engine speed sender -G28 defective - Engine control unit defective 	<ul style="list-style-type: none"> - Perform electrical test =>from Page 32 - Interrogate fault memory and if necessary rectify fault in accordance with engine control unit fault code16706 => Motronic injection and ignition system; Repair group 01; Interrogating and erasing fault memory Interrogating and erasing fault memory
--	---	---

1) One of these displays will appear in addition to the name of the component.

Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
00532 Supply voltage Signal too small	On-board voltage below 9 V <ul style="list-style-type: none"> - Defect in voltage supply wiring for gearbox control unit or solenoid valves - Alternator defective - Current draw with ignition off - Faulty earth connection for gearbox control unit 	<ul style="list-style-type: none"> - Test electrical system and repair if necessary. - Read measured value block =>from Page 32
00543 Maximum revs exceeded Maximum revs exceeded	<ul style="list-style-type: none"> - => Fault code 00529 - Engine speed has exceeded 7200 rpm for a short time 	<ul style="list-style-type: none"> - Check ATF level

Note for fault code 00532:

The fault may be stored as a sporadic fault if the connection for the automatic gearbox control unit has been unplugged.

Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
00545 Engine/Gearbox electrical connection (Ignition timing retard) Open circuit/Short to earth1) Short to positive1)	<ul style="list-style-type: none"> - Ignition has been switched on with engine control unit connector unplugged - Defect in wiring between engine and gearbox control units - Engine control unit defective 	<ul style="list-style-type: none"> ▪ No fault rectification required - Check wiring and electrical connectors according to current flow diagram - Read measured value block =>from Page 32 - Test engine control unit => Motronic injection and ignition system; Repair group 01; Interrogating and erasing fault memory Interrogating and erasing fault memory

1) One of these displays will appear in addition to the name of the component.

Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
00597 Differing wheel speed impulses	<ul style="list-style-type: none"> - At least 2 defects in wiring between gearbox control unit and ABS control unit -J104 	<ul style="list-style-type: none"> - Read measured value block =>from Page 32 1)

Speed difference too great	- At least 2 speed sensors not installed properly or defective - Wrong ABS control unit installed	- Rectifying fault => Running gear, Self-diagnosis; Repair group 01
00789 Reversing light switch -F41	- Open circuit or short to earth/positive between gearbox control unit and reversing switch -F41 - Reversing switch -F41 defective - Multi-function switch -F125 defective	- Read measured value block =>from Page 32 1) - Replace reversing switch -F41 - Replace multi-function switch - F125 if necessary => Automatic gearbox 018, Four-wheel drive; Repair group 37; Dismantling and assembling gearbox Dismantling and assembling gearbox

1) First check connections for contact corrosion or moisture. Replace if necessary.

Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
01045 Tiptronic switch -F189 Short circuit to earth	- Short to earth between gearbox control unit and change-up or change-down switch or manual gate switch - Change-up or change-down switch defective - Manual gate switch defective	- Read measured value block =>from Page 32
01166 Engine torque signal Open/short circuit to positive1) Short circuit to earth1)	- Open circuit or short to positive or earth between engine control unit and gearbox control unit - Engine control unit defective	- Interrogate fault memory => Motronic injection and ignition system; Repair group 01; Interrogating and erasing fault memory Interrogating and erasing fault memory - Perform electrical test =>from Page 32

1) One of these displays will appear in addition to the name of the component.

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Printout on V.A.G 1551 printer	Possible cause of fault	How to rectify fault
65535 Control unit defective	- Defective fuse - Defect in voltage supply wiring for gearbox control unit - Earth connection for gearbox control unit defective - Defect in wiring for gearbox control unit and 8-pin connector - Defect in wiring for gearbox control unit and gear selection indicator - Automatic gearbox control unit - J217 defective	- Check wiring and connections according to current flow diagram - Replace control unit =>Page 3

Notes for fault code 65535:

The automatic gearbox control unit -J217 should only be renewed after the possible cause of the fault has been determined and the following faults have been rectified:

- ◆ mechanical faults;
- ◆ hydraulic faults;
- ◆ affected electric/electronic components and wiring connections;
- ◆ moisture in electronics box or gearbox control unit.



5 - Final control diagnosis

5.1 - Final control diagnosis

Notes:

- ♦ The final control diagnosis can only be performed with the selector lever in position P, the engine not running and the vehicle stationary.
- ♦ If the engine is started the final control diagnosis will be terminated.
- ♦ During the final control diagnosis the operation of solenoid valves 1, 2 and 3 (-N88, -N89 and -N90) and of the cruise control system relay are tested acoustically. Since the switching action (clicking) of the control elements is very quiet, any background noise should be avoided when carrying out this part of the test.
- ♦ Use voltage tester V.A.G 1527 B, adapter leads from V.A.G 1594 A and test box V.A.G 1598 A for testing solenoid valve 4 -N91 and solenoid valve 5 -N92.
- ♦ During the final control diagnosis the control elements are activated until the ➡ key is pressed.
- ♦ When the ignition has been switched on the final control diagnosis can only be performed once. To perform a second final control diagnosis the ignition must be switched off and then on again.

Activation sequence	
1	Solenoid valve 1 -N88
2	Solenoid valve 2 -N89
3	Solenoid valve 3 -N90
4	Solenoid valve 4 -N91
5	Solenoid valve 5 -N92
5	Relay (cruise control system)
7	Relay for solenoid valves

Work sequence

- Unplug connector on automatic gearbox control unit -J217
=>Page 11.
- Connect test box V.A.G 1598 A with adapter lead V.A.G 1598/5 to connector on gearbox wiring harness and to automatic gearbox control unit -J217=>Page 33.
- Connect vehicle diagnostic, testing and information system VAS 5051 (or fault reader V.A.G 1551) and select gearbox electronics control unit by entering address word "02" (=> Page 12.)
When doing this the ignition must be switched on.

-> Indicated on display:

Rapid data transfer	HELP
Select function XX	

- Press keys 0 and 3 for the function "Final control diagnosis" and confirm entry with Q key.

-> Indicated on display:

Final control diagnosis
Solenoid 1 -N88

The solenoid valve must click.

If the solenoid valve does not click:

- Check component=>electrical test from Page 32, test step 12.
- Press the ➡ key to advance to the next control element.

-> Indicated on display:

Final control diagnosis
Solenoid 2 -N89

The solenoid valve must click.

If the solenoid valve does not click:

- Check component=>electrical test from Page 32 , test step 13.
- Press the ➡ key to advance to the next control element.

-> Indicated on display:

Final control diagnosis
Solenoid 3 -N90

The solenoid valve must click.

If the solenoid valve does not click:

- Check component=>electrical test from Page 32 , test step 14.
- Press the ➡ key to advance to the next control element.
- Connect voltage tester V.A.G 1527 B between sockets 19 and 6 on test box V.A.G 1598 A.

-> Indicated on display:

Final control diagnosis
Solenoid 4 -N91

The LED should flash

If the LED lamp does not flash or lights up continuously:

- Check component=>electrical test from Page 32 , test step 15.
- Press the ➡ key to advance to the next control element.
- Connect voltage tester V.A.G 1527 B between sockets 19 and 25 on test box V.A.G 1598 A.

-> Indicated on display:

Final control diagnosis
Solenoid 5 -N92

The LED should flash

If the LED lamp does not flash or lights up continuously:

- Check component=>electrical test from Page 32 , test step 16.
- Press the ➡ key to advance to the next control element.

-> Indicated on display

Final control diagnosis
Relay

Note:

The cruise control system relay is activated in the gearbox control unit.

The relay must click.

If the relay does not click:

- Replace the automatic gearbox control unit -J217 => Page 9 .
- Press the ➡ key to advance to the next control element.

-> Indicated on display:

Final control diagnosis
Solenoid relay

The relay must click.



If the relay does not click:

- Replace the automatic gearbox control unit -J217 => Page 9 .

-> Indicated on display:

Function is unknown or
cannot be carried out at the moment

- Press the ➡key to terminate final control diagnosis.

-> Indicated on display (function selection):

Rapid data transfer HELP
Select function XX

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6 - Erasing fault memory

6.1 - Erasing fault memory

Requirement for test:

- Fault memory interrogated => Page 15 .

After interrogating fault memory:

-> Indicated on display:

Rapid data transfer HELP
Select function XX

- Press keys 0 and 5 for the function "Erase fault memory" and confirm entry with Q key.

-> Indicated on display:

Rapid data transfer
Fault memory is erased!

The fault memory will only be erased approx. 5 seconds after this display appears.

- Press ➡key.
- After interrogating and erasing fault memory, take vehicle for a road test and interrogate fault memory again.
- After completing repair work, interrogate the fault memory again.

Note:

This has the effect of erasing any faults that may have been stored while carrying out repairs (e.g. as a result of unplugging connectors).

Notes for fault displays:

-> Indicated on display:

Attention!
Fault memory is not interrogated

This means that the proper sequence of steps was not followed.

- Interrogate fault memory.

In the following cases the fault memory is not erased:

- ♦ If the ignition was switched off after interrogating the fault memory

- ♦ If an existing static fault was not rectified

-> If the display appears:

System not ready for interrogation

- Make sure the printer is switched on and wait for the printout.

-> If a fault has been indicated on the printout:

1 fault recognised
00811 3333
System not ready for interrogation

The gearbox control unit was not given enough time to detect any faults.

- Wait about 1 minute before interrogating the fault memory again.

7 - Reading measured value block

7.1 - Reading measured value block

Warning:
To avoid any risk of accident, observe the safety precautions when using test instruments while road testing the vehicle =>

Work sequence

- Connect vehicle diagnostic, testing and information system VAS 5051 (or fault reader V.A.G 1551) and select gearbox electronics control unit by entering address word "02" (=> Page 12 .)
When doing this the ignition must be switched on.

-> Indicated on display:

Rapid data transfer HELP
Select function XX

- Switch on fault reader printer with the print key. The warning lamp in key must light up.
- Enter "08" to select the function "Read measured value block" and confirm entry with Q key.

-> Indicated on display:

Read measured value block Q
Enter display group number XXX

- Enter the required display group number (=> Display group overview, Page 26).
- Confirm input with Q key.

-> Indicated on display (example) for Display Group 001:

Read measured value block 1
1 2 3 4

Notes:

- ♦ For an explanation of the values in each display zone
=> Test table Page 27 .
- ♦ If the printer is switched on, the current display can be printed out.
- ♦ Other display groups can be selected as follows:

Display group	V.A.G 1551	VAS 5051
Higher	Press key 3	Press skey



Display group	V.A.G 1551	VAS 5051
Lower	Press key 1	Press tkey

- If all the display zones show the specified values, press the ⇒ key.

-> Indicated on display (function selection):

Rapid data transfer HELP
Select function XX

7.2 - Display group overview

Note:

The display group number 000 does not represent any display and should therefore not be selected.

Indicated on display (example)	Display group No.	Display zone	Description
Read measured value block 1 ⇒	001	1 2 3 4	Engine speed Engine temperature Gearbox speed Solenoid valves
Read measured value block 2 ⇒	002	1 2 3 4	Engine torque - actual Throttle valve angle Engine torque - specified Switch position 2
Read measured value block 3 ⇒	003	1 2 3 4	Wheel speed, front left Wheel speed, front right Wheel speed, rear left Wheel speed, rear right

Indicated on display (example)	Display group No.	Display zone	Description
Read measured value block 4 ⇒	004	1 2 3 4	Switch position 1 Wheel slip between front and rear axle Switch position 2 Pressure control current, centre differential lock
Read measured value block 5 ⇒	005	1 2 3 4	Pressure control current, shift pressure Solenoid valves Shift programme Throttle valve angle

Test table

Display group No.	Display zone	Designation	Test conditions	Specified readout on V.A.G 1551	Fault rectification if readout does not match specification
001	1	Engine speed	Engine running	...rpm Increases steadily and in proportion to engine speed	- Perform electrical test => from Page 15 Interrogate fault memory of engine control unit => Motronic injection and ignition system; Repair group 01; Interrogating and erasing fault memory Interrogating and erasing fault memory
Continued ▼	2	Engine temperature		... °C	▪ Can be disregarded
	3	Gearbox speed	Vehicle being driven	...rpm Increases steadily and in proportion to vehicle speed	- Interrogate fault memory => Page 15

Display group No.	Display zone	Designation	Test conditions	Specified readout on V.A.G 1551			Fault rectification if readout does not match specification
001	4	Solenoid valves	Vehicle being driven	N90	N89	N88	- Perform final control diagnosis => Page 22 - Perform electrical test => from Page 32 - Interrogate fault memory => Page 15
			1st gear	1	0	0	
			2nd gear	1	1	0	
			3rd gear	0	1	0	
			4th gear	0	0	0	

Notes:

- ♦ Inactive solenoid valves are displayed as "0" and active solenoid valves as "1".
- ♦ On vehicles fitted with the first control unit versions, the engine speed should not exceed 2000 rpm. If this engine speed is exceeded the function "Read measured value block" will be terminated.

Display group No.	Display zone	Designation	Test conditions	Specified readout on V.A.G 1551	Fault rectification if readout does not match specification
002	1	Engine torque - actual		... Nm	▪ Can be disregarded
	2	Throttle valve angle	Vehicle stationary Accelerator pedal at idling position	0 ... 3 %	- Perform electrical test => from Page 32



			Engine switched off	Accelerator pedal at full throttle	97 ... 100 %	- Test throttle valve potentiometer => Motronic injection and ignition system; Repair group 24; Testing input signals for control unit; Testing and adjusting throttle valve potentiometer Testing input signals for control unit; Testing and adjusting throttle valve potentiometer
Continued ▼	3	Engine torque - specified			... Nm	▪ Can be disregarded

Display group No.	Display zone	Designation		Test conditions		Specified readout on V.A.G 1551	Fault rectification if readout does not match specification
002	4 1)	Switch position 2	Digit in display zone 4				
		Brake light switch	First digit	Brake	Operated	1	- => Fault table from Page 16, fault code 00526 - Test brake light switch -F => Electrical test from Page 32
		-F			Not operated	0	
		Kickdown switch	Second digit	Kickdown	Operated	1	
Continued ▼		-F8			Not operated	0	

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1) The readout on V.A.G 1551 in display zone 4 consists of 5 digits, e.g. 10000. The first digit from the left refers to the brake light switch -F. The second digit from the left refers to the kickdown switch -F8, etc.

Display group No.	Display zone	Designation		Test conditions	Specified readout on V.A.G 1551	Fault rectification if readout does not match specification
002	4 1)	Cruise control system	Third digit	Activated D, 3, 2	1	▪ Can be disregarded
				Not activated P, R, N, 1	0	
		A/C Kickdown	Fourth digit		-	▪ Can be disregarded
		Centre differential lock -N92	Fifth digit	Active	1	▪ Can be disregarded
				Inactive	0	

1) The readout on the V.A.G 1551 in display zone 4 consists of 5 digits.

Display group No.	Display zone	Designation	Test conditions	Specified readout on V.A.G 1551	Fault rectification if readout does not match specification
003	1	Wheel speed, front left	Vehicle being driven	... rpm	<ul style="list-style-type: none"> ▪ Wheel speeds should increase or decrease steadily in proportion to driving speed - Test wiring connections =>Electrical test from Page 32 - => Fault table from Page 16, fault codes 00283, 00285, 00287 and 00290
	2	Wheel speed, front right			
	3	Wheel speed, rear left			
	4	Wheel speed, rear right			

Note:

On vehicles fitted with the first control unit versions, the engine speed should not exceed 2000 rpm. If this engine speed is exceeded the function "Read measured value block" will be terminated.

Display group No.	Display zone	Designation	Test conditions	Specified readout on V.A.G 1551	Fault rectification if readout does not match specification
004	1 1)	Switch position 1	Vehicle stationary		- Check wiring connection and component =>Electrical test from Page 32
		Multi-function switch -F125		<div>Selector lever position P</div> <div>1 1 1 1</div>	

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Display group No.	Display zone	Designation		Test conditions	Specified readout on V.A.G 1551				Fault rectification if readout does not match specification
Continued ▼		Reversing switch - F41	Fourth digit	R	1	0	0	1	- Check selector lever position Make sure position matches display in dash panel insert Adjust selector lever cable if necessary => Automatic gearbox 018, Four-wheel drive; Repair group 37; Servicing shift mechanism; Adjusting selector lever cable Servicing shift mechanism; Adjusting selector lever cable
				N	1	1	0	0/1	
				D	0	1	1	0	
				3	0	0	1	0	
				2	1	0	1	0	
				1	0	1	0	0	

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1) The readout on V.A.G 1551 in display zone 1 consists of 6 digits.

The digits 1...3 from the left refer to the multi-function switch -F125:

display 1 refers to pin 50 on -J217, display 2 refers to pin 14 on -J217, display 3 refers to pin 33 on -J217.

The 4th digit from the left refers to the reversing switch -F41:

display 4 refers to pin 40 on -J217.

Display group No.	Display zone	Designation		Test conditions	Specified readout on V.A.G 1551		Fault rectification if readout does not match specification
004	1 1)	Tiptronic switch -F189	Fifth digit	Vehicle stationary Change-up switch (+)	1	0	- Check wiring connection and component =>Electrical test from Page 32
			Sixth digit	Change-down switch (-)	0	1	

Display group No.	Display zone	Designation	Test conditions	Specified readout on V.A.G 1551	Fault rectification if readout does not match specification
	2	Wheel slip between front and rear axle	Vehicle being driven		▪ Can be disregarded
	3	Switch position 2	=> Display group 002, display zone 4		
	4	Pressure valve control current, centre differential lock	Vehicle being driven	130...800 mA	- Check wiring connection and component =>Electrical test from Page 32

1) The readout on the V.A.G 1551 in display zone 1 consists of 6 digits.

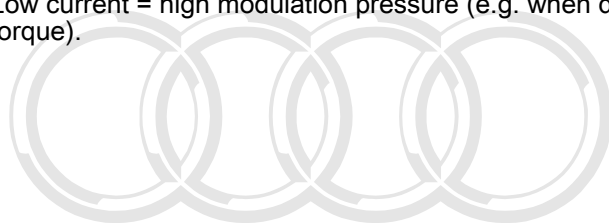
The 5th and 6th digits from the left (display 5 and 6) refer to the Tiptronic switch -F189:

display 5 refers to pin 43 on -J217, display 6 refers to pin 29 on -J217.

Display group No.	Display zone	Designation	Test conditions	Specified readout on V.A.G 1551	Fault rectification if readout does not match specification
005	1	Pressure valve control current, shift pressure -N91		130...800 mA	- Check wiring connection and component => Electrical test from Page 32
	2	Solenoid valves	=> Display group 001, display zone 4		
	3	Shift programme	Vehicle being driven, engine running	SP1...SP11	
	4	Throttle valve angle	=> Display group 002, display zone 2		

Notes for pressure valve control current -N91:

- ♦ High current = low modulation pressure (e.g. when driving at a low engine speed and with low engine torque).
- ♦ Low current = high modulation pressure (e.g. when driving at a high engine speed and with high engine torque).



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8 - Electrical test

8.1 - Electrical test



Special tools and workshop equipment required

- ♦ V.A.G 1526 A
- ♦ V.A.G 1527 B
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A with V.A.G 1598/5

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- Only carry out the relevant test steps for each component or connector (targeted approach).
- Carry out all the steps listed in the column "Fault rectification if readout does not match specification".

Notes:

- ♦ The given specified values are valid for an ambient temperature anywhere between 0 and 40 °C.
- ♦ If the readings obtained differ from the specified values, determine fault on the basis of the current flow diagram.

=> Current flow diagrams, Electrical fault finding and Fitting locations

- ♦ If the readings obtained differ only slightly from the specified values, clean sockets and connectors of the testers and test leads and repeat test. Before replacing the particular components, test wiring and connections and, particularly if specified values are below 10 Ω , repeat resistance measurement on component.
- ♦ If a connector is unplugged while the ignition is on, a fault could be recorded in the gearbox control unit. After completing the test and with connectors plugged in, erase the fault memory => Page 24 .

Warning!

To avoid damaging the electronic components, always set the tester to the correct measuring range before connecting the test leads.

Requirements for test:

- Battery voltage okay
- Fuses okay

=> Current flow diagrams, Electrical fault finding and Fitting locations

- Earth connections for gearbox and gearbox control unit okay.

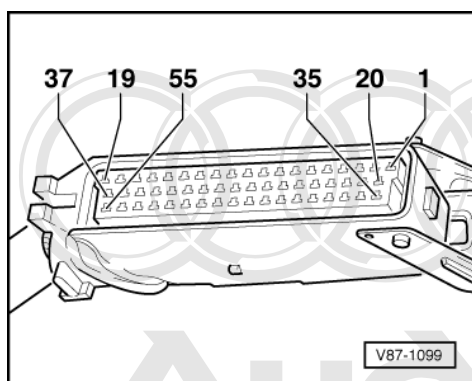
=> Current flow diagrams, Electrical fault finding and Fitting locations

8.2 - Connecting test box V.A.G 1598 A

Notes:

- ♦ After the ignition has been switched off, wait for 30 seconds before unplugging or fitting the connector for the automatic gearbox control unit -J217.
- ♦ By unplugging the connector for the automatic gearbox control unit -J217, the permanent positive supply will be cut off, thus the permanent memory will be erased.
- Turn ignition off.
- Unplug connector on automatic gearbox control unit -J217
=>Page 11 .
- Connect test box V.A.G 1598 A with adapter lead V.A.G 1598/5 to connector on the gearbox wiring harness and if necessary to automatic gearbox control unit -J217.

Note:



-> The pin numbering on the connector for automatic gearbox control unit -J217 is identical to the numbering of the test box sockets.

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Requirements for test:

- Measuring resistance:
Adapter V.A.G 1598/5 removed from gearbox control unit
- Measuring voltage:



Adapter V.A.G 1598/5 connected to gearbox control unit.

8.3 - Test table

Identification of contacts on control unit and 55-pin connector; sockets on V.A.G 1598 A.

1 - Supply voltage (terminal 15)	10 - Tiptronic switch -F189; manual gate switch
2 - Vacant	11 - Front left wheel speed signal from -G47
3 - Engine speed signal	12 - Rear right wheel speed signal from -G44
4 - Brake light switch -F	13 - Vacant
5 - Solenoid valve 1 -N88	14 - Multi-function switch -F125
6 - Solenoid valve 4 -N91 (pressure control valve)	15 - Vacant
7 - Earth	16 - Vacant
8 - Vacant	17 - Supply voltage for cruise control system control unit - J213
9 - Vacant	18 - Vacant
(Cntd.) ▼	

19 - Supply voltage for solenoid valves	30 - Front right wheel speed signal from -G45
20 - Vacant	31 - Gear display -G96
21 - Engine torque - actual	32 - Engine torque - specified
22 - Vacant	33 - Multi-function switch -F125
23 - Vacant	34 - Vacant
24 - Solenoid valve 2 -N89	35 - Vacant
25 - Solenoid valve -5 (pressure control valve, centre differential lock)	36 - Vacant
26 - Vacant	37 - Vacant
27 - Vacant	38 - Vacant
28 - Vacant	39 - Vacant
29 - Tiptronic switch -F189; change-down position	40 - Reversing switch -F41
(Cntd.) ▼	

41 - Kick-down switch -F8	49 - Vacant
42 - Solenoid valve 3 -N90	50 - Multi-function switch -F125
43 - Tiptronic switch -F189 change-up position	51 - K-wire for diagnosis
44 - Vacant	52 - Vacant
45 - Vacant	53 - Vacant
46 - Vacant	54 - Cruise control system supply voltage for gearbox control unit
47 - Accelerator pedal value from engine control unit	55 - Vacant
48 - Rear left wheel speed signal from -G46	

Overview of test steps

Perform only those steps listed for the relevant component in the fault table and measured value block.

Component to be tested	Test steps to be performed	Component to be tested	Test steps to be performed
------------------------	----------------------------	------------------------	----------------------------

Supply voltage to control unit -J217	▪ Test steps 1 and 2	Solenoid valve 2 -N89	▪ Test step 13
Multi-function switch - F125	▪ Test step 3	Solenoid valve 3 -N90	▪ Test step 14
Reversing switch -F41	▪ Test step 4	Solenoid valve 4 -N91	▪ Test step 15
Tiptronic switch -F189	▪ Test step 5	Solenoid valve 5 -N92	▪ Test step 16
Kick-down switch -F8	▪ Test step 6	Input signal for accelerator pedal value (throttle)	▪ Test step 17
Brake light switch -F	▪ Test step 7	Engine rpm	▪ Test steps 18 and 19
Speed sensors -G44 ... - G47	▪ Test steps 8, 9, 10 and 11	Engine torque - specified	▪ Test step 20
Solenoid valve 1 -N88	▪ Test step 12	Engine torque - actual	▪ Test step 21

Notes and test requirements => Page 32.

Switch to voltage measuring range					
Test step	V.A.G 1598 A sockets	Test of	▪ Test requirements - Additional steps	Specification	Fault rectification if readout does not match specification
1	1 + 7	Supply voltage (terminal 15)	▪ Control unit -J217 disconnected ▪ Ignition on	Approx battery voltage	- Perform test step 2 Test wiring connections according to current flow diagram
Switch to resistance measuring range					
2	7 + earth	Earth connection	▪ Control unit -J217 disconnected ▪ Ignition off	≤1.5Ω	- Test wiring according to current flow diagram

Switch to voltage measurement range					
Test step	V.A.G 1598 A sockets	Test of	▪ Test requirements - Additional steps	Specification	Fault rectification if readout does not match specification
3	7 + 50	Multi-function switch -F125	▪ Control unit -J217 disconnected ▪ Ignition on Selector lever in P, R, N, 2	Approx. battery voltage	- Test wiring connection of multi-function switch If the measured values do not correspond to the selector lever position:



Switch to voltage measurement range					
Test step	V.A.G 1598 A sockets	Test of	▪ Test requirements - Additional steps	Specification	Fault rectification if readout does not match specification
Continued ▼			- Selector lever in D, 3, 1	0 V	- Adjust selector lever cable => Automatic gearbox 018, Four-wheel drive; Repair group 37; Servicing shift mechanism; Adjusting selector lever cable Servicing shift mechanism; Adjusting selector lever cable

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Switch to voltage measurement range					
Test step	V.A.G 1598 A sockets	Test of	▪ Test requirements - Additional steps	Specification	Fault rectification if readout does not match specification
3	7 + 14	Multi-function switch -F125	▪ Control unit -J217 disconnected ▪ Ignition on Selector lever in P, N, D, 1	Approx. battery voltage	- Test wiring connection of multi-function switch
			- Selector lever in R, 3, 2	0 V	If the measured values do not correspond to the selector lever position: Adjust selector lever cable
	7 + 33		- Selector lever in P, D, 3, 2	Approx. battery voltage	=> Automatic gearbox 018, Four-wheel drive; Repair group 37; Servicing shift mechanism; Adjusting selector lever cable
			- Selector lever in R, N, 1	0 V	

Switch to voltage measurement range					
Test step	Connector contact 1)	Test of	▪ Test requirements - Additional steps	Specification	Fault rectification if readout does not match specification
4	1 + 40	Reversing switch -F41	▪ Control unit -J217 disconnected ▪ Ignition on - Selector lever in P, R	0 V	- Test wiring connection according to current flow diagram

Switch to voltage measurement range					
Test step	Connector contact 1)	Test of	▪ Test requirements - Additional steps	Specification	Fault rectification if readout does not match specification
			- Selector lever in D, 3, 2, 1	Approx. battery voltage	
5	1 + 10	Tiptronic switch -F189 Manual gate switch	▪ Control unit -J217 disconnected ▪ Ignition on - Move selector lever from D to Tiptronic gate (finger-tip control)	Approx. battery voltage	- Test wiring connection according to current flow diagram
	1 + 43	Change-up position	- Change-up with finger-tip control (+)	Approx. battery voltage	
	1 + 29	Change-down position	- Change-down with finger-tip control (-)	Approx. battery voltage	

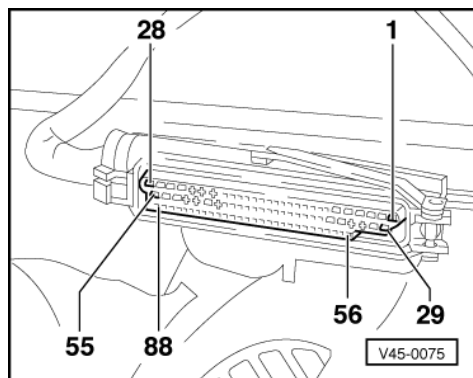
Switch to resistance measurement range					
Test step	V.A.G 1598 A sockets	Test of	▪ Test requirements - Additional steps	Specification	Fault rectification if readout does not match specification
6	7 + 41	Kick-down switch -F8	▪ Ignition off ▪ Control unit -J217 disconnected Accelerator pedal not depressed	$\infty \omega$	- Test wiring according to current flow diagram Adjust or replace throttle cable as necessary
			- Accelerator pedal depressed to kick-down	$\leq 1.5 \omega$	=> Fuel supply system, Petrol engines; Repair group 20; Servicing accelerator mechanism on vehicles with mechanical accelerator linkage
Switch to voltage measurement range					
7	4 + 7	Brake light switch -F	▪ Control unit -J217 disconnected Brake pedal not depressed	0 V	- Test wiring connection according to current flow diagram
			- Brake pedal depressed	Approx. battery voltage	- Replace brake light switch => Running gear, Front and Four-wheel drive; Repair group 46; Pedal cluster - assembly overview Pedal cluster - assembly overview



Switch to resistance measurement range					
Test step	V.A.G 1598 A sockets	Test of	▪ Test requirements - Additional steps	Specification	Fault rectification if readout does not match specification
8	7 + 11	Front left speed sensor -G47	▪ Control unit -J217 disconnected ▪ Ignition off	$\infty\omega$	- This test checks the wiring connections to the anti-lock brake system control unit -J104 - Test wiring according to current flow diagram
	xx1) + 11			$\leq 1.5\omega$	
9	7 + 30	Front right speed sensor - G45		$\infty\omega$	
	xx1) + 30			$\leq 1.5\omega$	
10	7 + 48	Rear left speed sensor - G46		$\infty\omega$	
	xx1) + 48			$\leq 1.5\omega$	
11	7 + 12	Rear right speed sensor - G44		$\infty\omega$	
	xx1) + 12			$\leq 1.5\omega$	

1) Contact on detached connector of ABS control unit -J104 => Page 38 .

Notes for test steps 8, 9, 10 and 11:



- ♦ -> Identification of contacts on 88-pin connector for ABS control unit.
- ♦ Fitting location:
LHD vehicles: behind storage compartment on driver's side);
RHD vehicles: in electronics box in plenum chamber

- Connect test box V.A.G 1598/20

=> Running gear, Self-diagnosis; Repair group 01; Electrical test Electrical test

- ♦ The numbering of the contacts on the connector and the sockets of test box V.A.G 1598/20 is the same.
- ♦ Contacts for wiring connections of gearbox control unit

=> Current flow diagrams, Electrical fault finding and Fitting locations

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Switch to resistance measurement range					
Test step	V.A.G 1598 A sockets	Test of	▪ Test requirements - Additional steps	Specification	Fault rectification if readout does not match specification
12	5 + 19	Solenoid valve 1 -N88	▪ Control unit -J217 disconnected ▪ Ignition off	30 ... 40 ω	- Test wiring between 8-pin connector and gear-box control unit=> Page 41
	5 + 1 5 + 7			$\infty\omega$	- Check wiring harness in gear-box=> Page 43
13	24 + 19	Solenoid valve 2 -N89	▪ Control unit -J217 disconnected ▪ Ignition off	30 ... 40 ω	- Test wiring between 8-pin connector and gear-box control unit => Page 41
	24 + 1 24 + 7			$\infty\omega$	- Check wiring harness in gear-box=> Page 43

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Switch to resistance measurement range					
Test step	V.A.G 1598 A sockets	Test of	▪ Test requirements - Additional steps	Specifications	Fault rectification if readout does not match specification
14	42 + 19	Solenoid valve 3 -N90	▪ Control unit -J217 disconnected ▪ Ignition off	30 ... 40 ω	- Test wiring between 8-pin connector and gear-box control unit => Page 41
	42 + 1 42 + 7			$\infty\omega$	- Check wiring harness in gear-box=> Page 43
15	6 + 19	Solenoid valve 4 -N91	▪ Control unit -J217 disconnected ▪ Ignition off	5 ... 8 ω	- Test wiring between 8-pin connector and gear-box control unit=> Page 41
	6 + 1 6 + 7			$\infty\omega$	- Check wiring harness in gear-box=> Page 43

Switch to resistance measurement range					
Test step	V.A.G 1598 A sockets	Test of	▪ Test requirements - Additional steps	Specification	Fault rectification if readout does not match specification
16	25 + 19	Solenoid valve 5 -N92	▪ Control unit -J217 disconnected ▪ Ignition off	5 ... 8 ω	- Test wiring between 8-pin connector and gear-box control unit=> Page 41



	25 + 1 25 + 7			∞Ω	- Check wiring harness in gearbox=> Page 43
Connect voltage tester V.A.G 1527 B					
17	47 + 7	Input signal for accelerator pedal value (throttle)	<ul style="list-style-type: none"> ▪ Ignition on ▪ Fault memory of engine control unit interrogated Depress accelerator pedal	LED should glow weakly and become brighter when the accelerator pedal is depressed	- Test wiring according to current flow diagram Test throttle valve potentiometer => Motronic injection and ignition system; Repair group 24; Testing auxiliary signals; Testing output signal for throttle valve position Testing auxiliary signals; Testing output signal for throttle valve position

Test step	V.A.G 1598 A Sockets	Test of	▪ Test requirements - Additional steps	Specification	Fault rectification if readout does not match specification
18		Input signal for engine speed	<ul style="list-style-type: none"> ▪ Fault memory of engine control unit interrogated ▪ Selector lever in P or N ▪ Engine idling Depress accelerator pedal	Rpm indicated on rev counter matches actual engine speed	- Check wiring connection according to current flow diagram Unplug gearbox control unit connector and repeat test If engine speed is now indicated on the rev counter, replace gearbox control unit If engine speed is not indicated on rev counter now, proceed with test step 19

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Switch to resistance measurement range					
Test step	V.A.G 1598 A sockets	Test of	▪ Test requirements - Additional steps	Specification	Fault rectification if readout does not match specification

19	3 + xx 1)	Wiring connection for engine speed input signal between gearbox control unit and engine control unit	<ul style="list-style-type: none"> ▪ Ignition off ▪ Connectors on engine and gearbox control units, rev counter and other components unplugged (as necessary; refer to current flow diagram) ▪ Adapter cable V.A.G 1598/5 connected only to wiring harness of gearbox control unit 	≤ 1.5 ω	- Test wiring according to current flow diagram If readout matches specification in this test: Test activation of rev counter => Current flow diagrams, Electrical fault finding and Fitting locations binder
	3 + 1 3 + 7			∞ ω	

1) Corresponding contacts of connector for engine control unit
 => "Current Flow Diagrams, Electrical Fault Finding and Fitting Locations" binder

Switch to resistance measurement range					
Test step	V.A.G 1598 A sockets	Test of	Test requirements - Additional steps	Specification	Fault rectification if readout does not match specification
20	32 + xx 1)	Engine torque - specified	<ul style="list-style-type: none"> ▪ Control unit -J217 disconnected ▪ Ignition off 	≤ 1.5ω	- Check wiring connection according to current flow diagram
	32 + 1 32 + 7			∞ ω	
21	21 + xx 1)	Engine torque - actual	<ul style="list-style-type: none"> ▪ Control unit -J217 disconnected ▪ Ignition off 	≤ 1.5ω	- Check wiring connection according to current flow diagram
	21 + 1 21 + 7			∞ ω	

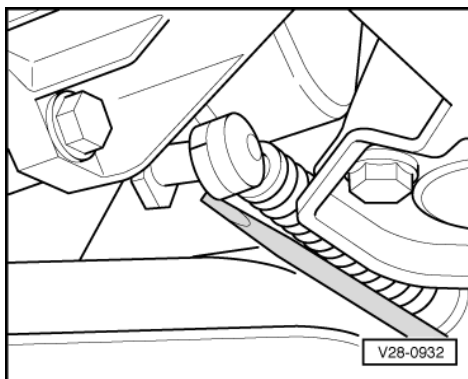
1) Corresponding contacts of connector for engine control unit
 => "Current Flow Diagrams, Electrical Fault Finding and Fitting Locations" binder

8.4 - Testing wiring connection between automatic gearbox control unit -J217 and gearbox

- Disconnect connection to lambda probe on left-hand side.
- Remove front left exhaust pipe together with lambda probe:

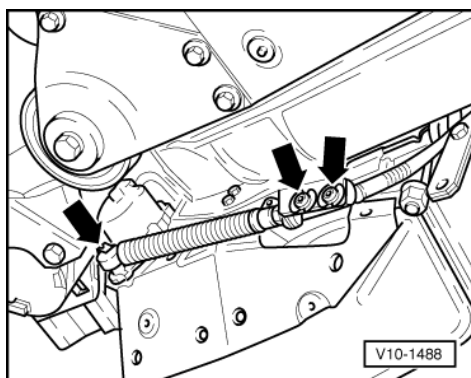
=> 8-Cylinder engine, Mechanics; Repair group 26; Removing and installing exhaust system, Engine codes ABZ, AHC Removing and installing exhaust system, Engine codes ABZ, AHC

- Unbolt heat shield for selector lever cable on gearbox.

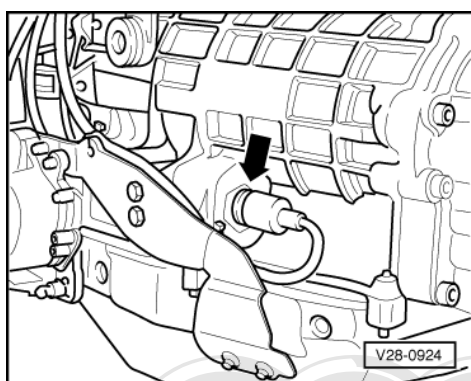




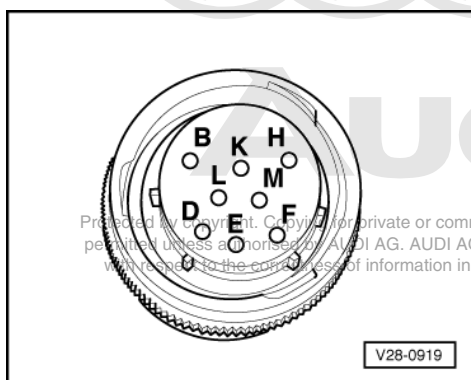
- -> Detach securing clip and press off ball socket of selector lever cable with a screwdriver.



- -> Slacken bolts -right arrows-.



- -> Release bayonet fitting on 8-pin connector -arrow- by turning anti-clockwise. Remove connector from gearbox.
- With the ignition switched off, connect test box V.A.G 1598 A with adapter V.A.G 1598/5 only to connector for gearbox control unit (control unit not connected)=> Page 33 .
- Set down the test box outside of vehicle.



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- -> Test for open circuit in the following wiring connections:

Connector contact	Test box V.A.G 1598 A socket
B	6
D	25
H	5
K	24
L	42

Connector contact	Test box V.A.G 1598 A socket
M	19

Note:

Pay special attention to possible contact corrosion, leaks and moisture in connectors.

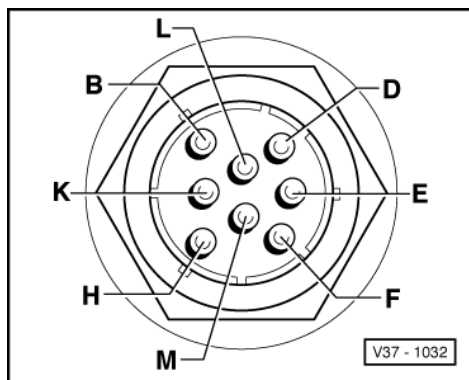
If no wiring fault is detected:

- Test wiring harness in gearbox => Page 43 .

Testing wiring harness in gearbox

Note:

Perform this test if the solenoid valves do not click during final control diagnosis or the electrical test of the solenoid valves via test box V.A.G 1598 A detects a fault, but the wiring connections between the gearbox control unit and the 8-pin connector are in order.



- -> Connect multimeter (resistance measurement range) as follows:

Component	Connector contacts	Specification ω
Solenoid valve 1 - N88	M + H	30 ... 40
Solenoid valve 2 - N89	M + K	30 ... 40
Solenoid valve 3 - N90	M + L	30 ... 40
Solenoid valve 4 - N91	M + B	5 ... 8
Solenoid valve 5 - N92	M + D	5 ... 8

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If a specification is not met:

- Disconnect wiring harness from relevant solenoid valve and test wiring connection from 8-pin connector to solenoid valve. If necessary, replace wiring harness.
- Measure resistance at solenoid valve again and replace solenoid valve if necessary.

=> Automatic gearbox 018, Four-wheel drive; Repair group 38; Removing and installing oil pan, ATF screen and valve body; Removing and installing valve body Removing and installing oil pan, ATF screen and valve body Removing and installing valve body



Installing

Installation is carried out in the reverse order, when doing this note the following:

- Align exhaust system free of stress




=> 8-cylinder engine, Mechanics; Repair Group 26; Aligning exhaust system free of stress Aligning exhaust system free of stress

Tightening torques

Component	Nm
Support bracket for selector lever cable to gearbox	10
Heat shield to gearbox	10

9 - Checking wiring of diagnostic connector

9.1 - Checking wiring of diagnostic connector

V.A.G 1526 A 	V.A.G 1594 A  <small>Protected by copyright. Copying for private use only. No reproduction for advertising or promotional 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 this document. Copyright by AUDI AG.</small>
V.A.G 1598 A 	
	G24-0015

Special tools and workshop equipment required

- ◆ V.A.G 1526 A
- ◆ V.A.G 1594 A
- ◆ V.A.G 1598 A with V.A.G 1598/5

Test sequence

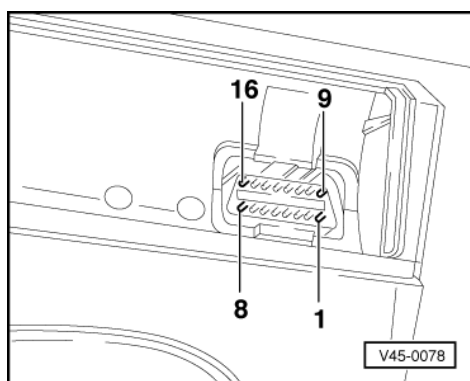
Caution
Turn ignition off before checking wiring connections

Note:

The diagnostic connector is located in the front part of the centre console underneath the ashtray. The diagnosis lead (K wire) is connected via a junction point in the wiring harness:

=> Current flow diagrams, Electrical fault finding and Fitting locations

Identification of contacts in diagnostic connector



- 4 - -> Earth connection for V.A.G 1551/1552
- 7 - K wire
- 16 - Voltage supply to V.A.G 1551/1552

Note:

This test must be carried out if any of the following displays appears on fault reader V.A.G 1551 when connected:

-> If the following message appears on the display:

Rapid data transfer *HELP*
Control unit does not answer!

or

Rapid data transfer *HELP*
K wire not switching to earth

or

Rapid data transfer *HELP*
K wire not switching to positive

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- With the ignition switched off, connect test box V.A.G 1598 A with adapter V.A.G 1598/5 only to connector for gearbox control unit (control unit not connected)=> Page 33 .
- Test for open circuit and short to earth or positive in the following wiring connections:



Diagnosis wire	Diagnostic connector Contact	Gearbox control unit Contact	Test box 1598 A Contact
K	7	51	51

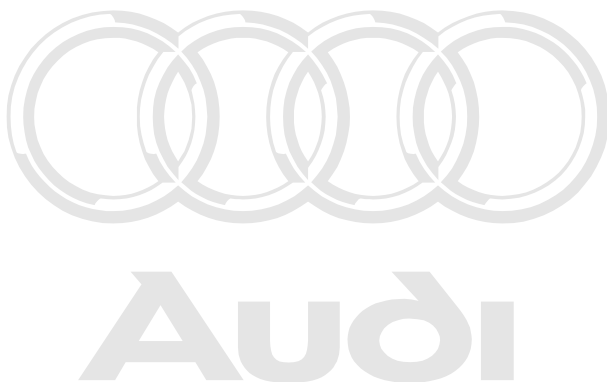
Notes:

- ♦ Diagnosis wire K is linked to the various control units via a junction point in the wiring harness:

=> Current flow diagrams, Electrical fault finding and Fitting locations

♦ Rapid data transfer
Fault in communication build up

- > If this message appears on the display when starting the diagnosis procedure or during self-diagnosis:
 - Turn ignition off.
 - One-by-one detach the connectors from the control units of other on-board systems with self-diagnosis capability.
 - Each time after a connector for a specific vehicle system has been detached, turn on the ignition and re-enter address word "02" for gearbox electronics.
 - If the control unit identification now appears on the display, fit a new control unit in place of the control unit which was last disconnected from the diagnosis lead.



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