

Audi 100 1991 ➤

Running gear, Self-diagnosis

Edition 04.1998

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.

List of Workshop Manual Repair GroupsList of Workshop Manual Repair GroupsList of Workshop Manual Repair Groups Audi 100 1991 ➤

Running gear, Self-diagnosis

Repair Group

01 - Self-diagnosis, Electrical test

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.

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.

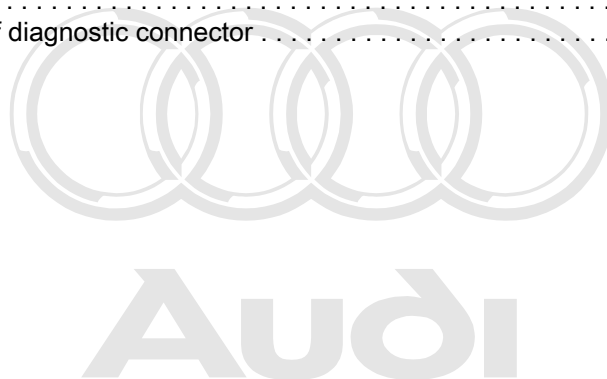
All rights reserved.
No reproduction without prior agreement from publisher.

Contents

01 - Self-diagnosis, Electrical test	1
1 Basic notes on self-diagnosis	1
1.1 Basic notes on self-diagnosis	1
1.2 Safety precautions and basic notes on fault finding	1
2 Anti-lock brake system (ABS) with electronic differential lock (EDL), 1992 model year (chassis No. 4ANN ...)	2
2.1 Anti-lock brake system (ABS) with electronic differential lock (EDL), 1992 model year (chassis No. 4ANN ...)	2
2.2 Self-diagnosis function	2
2.3 Technical data of self-diagnosis	3
2.4 Test requirements	3
2.5 Technical information required	4
2.6 Connecting fault reader V.A.G 1551 and entering address word	4
2.7 Interrogating fault memory	6
2.8 Fault table	6
2.9 Erasing fault memory	14
2.10 Ending output	15
3 Electrical test of ABS with EDL, 1992 model year (chassis No. 4ANN ...)	15
3.1 Electrical test of ABS with EDL, 1992 model year (chassis No. 4ANN ...)	15
3.2 Test requirements	15
3.3 Test table	18
3.4 Testing wiring of diagnostic connector	23
4 Anti-lock brake system (ABS) / anti-lock brake system with electronic differential lock (EDL), 1993 model year (chassis No. 4APN ...)	25
4.1 Anti-lock brake system (ABS) / anti-lock brake system with electronic differential lock (EDL), 1993 model year (chassis No. 4APN ...)	25
4.2 Self-diagnosis function	25
4.3 Technical data of self-diagnosis	26
4.4 Test requirements	27
4.5 Technical information required	27
4.6 Connecting fault reader V.A.G 1551 and entering address word	27
4.7 Interrogating fault memory	29
4.8 Fault table	30
4.9 Erasing fault memory	38
4.10 End output	39
4.11 Reading measured value block	39
5 Electrical test of ABS / ABS with EDL, 1993 model year (chassis No. 4APN ...)	41
5.1 Electrical test of ABS / ABS with EDL, 1993 model year (chassis No. 4APN ...)	41
5.2 Test requirements	41
5.3 Test table	43
5.4 Testing wiring of diagnostic connector	47
6 ABS (Bosch type 5.0 system), 1995 model year (chassis No. 4ASN ...)	50
6.1 ABS (Bosch type 5.0 system), 1995 model year (chassis No. 4ASN ...)	50
6.2 Table of warning lamp functions	51
6.3 Self-diagnosis function	54
6.4 Technical data of self-diagnosis	54
6.5 Test requirements	55
6.6 Technical information required	55
6.7 Connecting fault reader V.A.G 1551 and entering address word	55
6.8 Selecting functions	57
6.9 Interrogating control unit version	57
6.10 Interrogating fault memory	58
6.11 Fault table	59
6.12 Erasing fault memory	67



6.13	Ending output	68
6.14	Coding control unit	68
6.15	Reading measured value block	70
7	Electrical test, (Bosch type 5.0 system), 1995 model year (chassis No. 4ASN ...)	72
7.1	Electrical test, (Bosch type 5.0 system), 1995 model year (chassis No. 4ASN ...)	72
7.2	Test requirements	72
7.3	Identification of contacts of multi-pin connector on wiring harness for control unit -J104 . .	75
7.4	Test table	76
7.5	Testing wiring of diagnostic connector	88



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.

01 - Self-diagnosis, Electrical test

1 - Basic notes on self-diagnosis

1.1 - Basic notes on self-diagnosis

The control unit of a system with self-diagnosis function detects faults and malfunctions during vehicle operation and stores them in a fault memory. The contents of the memory will remain intact if the power supply from the battery is interrupted.

The self-diagnosis function relates to the electrical and electronic parts of a system; in other words it only registers faults which have an effect on the electrical signals.

The self-diagnosis function enables faults to be traced quickly and efficiently using fault reader V.A.G 1551, or the vehicle testing system V.A.G 1552, in operating mode 1 "Rapid data transfer". To do this, the control unit of the system concerned must be able to communicate with the fault reader via the diagnostic link-up.

The diagnostic connector is the interface for communication between the control unit and the fault reader.

To start the fault-finding procedure, connect the fault reader to the diagnostic connector and establish the communication link with the control unit of the system concerned=>Page 55 .

When the communication link has been established, you can then select the required fault-finding functions provided by the on-board system you are testing. These functions are programmed in the form of fixed diagnosis routines, which are described in the relevant sections of this Manual. After first checking the control unit version, start with function 02 "Interrogate fault memory"=>Page 58 .

Any faults which may be stored in the memory will be indicated on the display of the fault reader. The information displayed can then be used in conjunction with a fault table, which enables you to trace the cause of the fault and perform the necessary repair quickly and efficiently.

The self-diagnosis function distinguishes between "static" and "sporadic" faults. If a fault which has been stored in the memory as a "static" fault is no longer present when the ignition is switched on, it is converted into a "sporadic" fault.

Sporadic faults are identified as such by "/SP" appearing in the display on V.A.G 1551.

A sporadic fault is erased automatically if it no longer occurs over a certain number of driving cycles.

Static faults remain stored in the fault memory until the memory is erased with fault reader V.A.G 1551.

If the control unit has to be renewed, first read out the control unit version. This appears in the display of the fault reader together with the coding when communication is established between the control unit and the fault reader => Page 55 .

1.2 - Safety precautions and basic notes on fault finding

Fault finding (general)

- ♦ The ABS is a vehicle safety system; the appropriate knowledge is necessary to work on the system.
- ♦ The connector must not be disconnected from control unit -J104 when the vehicle is being driven.
- ♦ In order to check reported problems and to be able to carry out pin-pointed fault finding, the fault memory must be interrogated before commencing work on the ABS system.
- ♦ Only unplug connectors when the ignition is switched off.
- ♦ ABS faults are indicated by the ABS warning lamp lighting up; certain faults will only be detected at speeds above 12 km/h (carry out road test).



- ♦ Information on eliminating currently occurring faults

=> Technical Service Handbook.

2 - Anti-lock brake system (ABS) with electronic differential lock (EDL), 1992 model year (chassis No. 4ANN ...)

2.1 - Anti-lock brake system (ABS) with electronic differential lock (EDL), 1992 model year (chassis No. 4ANN ...)

From the 1992 model year onwards, an ABS system with EDL was introduced as optional equipment for vehicles with front-wheel drive (in addition to the existing ABS system).

The control unit for ABS with EDL is equipped with a fault memory. This manual describes self-diagnosis procedures using fault reader V.A.G 1551 and the electrical test for this on-board safety system.

The ABS without EDL (1992 model year) has no self-diagnosis capability. It can be tested with the ABS-tester V.A.G 1710 according to fault-finding programme "Bosch anti-lock brake systems, ABS tester V.A.G 1710".

2.2 - Self-diagnosis function

The self-diagnosis function relates to the electrical and electronic parts of the anti-lock brake system; in other words it only registers faults which have an effect on the electrical signals.

Always interrogate contents of fault memory as a first test step.

The ABS control unit with EDL -J104 is equipped with a fault memory. If faults occur in the monitored sensors and components, they are stored in the fault memory together with an indication of the cause of the fault.

Notes:

- ♦ When the ignition is switched on there will be an audible noise from the relay and from the return flow pump in the hydraulic unit as the vehicle starts moving (5 - 6 km/h). The system is performing a self-test routine: this can also be felt from a slight pulsation at the brake pedal. This noise is quite normal, and is not a reason to renew the hydraulic unit.
- ♦ The EDL still remains operative after the ABS has been switched off by means of the ABS switch -E83 (ABS warning lamp -K47 will light up). Therefore, any faults detected while the ABS is switched off will also be stored in the memory.
- ♦ If a fault is detected, the ABS with EDL function will be switched off by the control unit -J104 for the duration of the current driving cycle and the ABS warning lamp -K47 (in the dash panel insert) will light up. The conventional brake system of the vehicle will be unimpaired and remains fully effective.

If a fault (which may have been detected and stored during the last driving cycle) is no longer present after the ignition has been switched off and then on again, or if it cannot be detected with the vehicle stationary (certain faults are only detected above a speed of 12 km/h), the ABS warning lamp -K47 will go out 2 seconds after the ignition is switched on - after the ABS self-test has been completed by control unit -J104, and provided that no fault has been detected.

If a fault which has been stored in the fault memory as a "static" fault is no longer present after the ignition has been switched off and then on again, it is reclassified as a "sporadic" fault.

A sporadic fault is erased automatically if it no longer occurs over a certain number of driving cycles.

Sporadic faults are identified as such by "SP" appearing in the display on V.A.G 1551.

If the EDL operates continuously for 60 seconds it will be switched off by control unit-J104 for a period of at least 80 seconds, to prevent the brakes from overheating under extreme conditions.

Note:

Additionally, an EDL cut-off relay -J263 is installed to prevent misuse. If the ignition is switched off and then on again during or shortly after an EDL control cycle (return flow pump -V39 running for more than 20 seconds), the EDL control function will be suppressed by the cut-off relay -J263 for a period of 3 to 6 minutes after the ignition is switched on again.

By processing the incoming data, the control unit for ABS with EDL -J104 is able to distinguish between 17 different types of faults (=>fault table on Page 6), and stores them in the memory until they are erased by fault reader V.A.G 1551 (after interrogating fault memory).

The self-diagnosis functions can only be performed with the aid of fault reader V.A.G 1551 in operating mode 1: "Rapid data transfer".

Notes:

- ◆ Diagnostic readouts via fault reader V.A.G 1551 are only possible with the ignition switched on and the vehicle stationary. (The self-diagnosis process will be interrupted if the vehicle is driven).
- ◆ In vehicles with ABS and EDL, the self-diagnosis functions are restricted to storing, interrogating and erasing faults. The operating mode 2 "Flash code output" is not available in conjunction with the control unit for ABS with EDL -J104. Further operating modes are described in the operating instructions for V.A.G 1551.

2.3 - Technical data of self-diagnosis

- ◆ Fault memory
 - Permanent memory: contents remain intact when power supply is interrupted.
- ◆ Data output
 - Rapid data transfer (operating mode 1)
 - Flash code output is not provided.
 - The ABS warning lamp in the dash panel lights up when the ABS is switched off.
- ◆ Functions

	Page
01 - Interrogate control unit version (brake electronics)	5
02 - Interrogate fault memory	6
05 - Erase fault memory	14
06 - End output	15

Notes:

- ◆ The self-diagnosis function is only available on front-wheel drive vehicles additionally equipped with EDL.
- ◆ During the self-diagnosis process it is not possible to activate the control function. For this reason self-diagnosis will be terminated as soon as the vehicle is driven at a speed above 2.5 km/h.
- ◆ The functions "Read measured value block" and "Final control diagnosis" are not available during the self-diagnosis process. The relevant tests must be performed with ABS tester V.A.G 1710 according to fault-finding programme (including function test).

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.

=> Fault-finding: Bosch anti-lock brake systems, ABS tester V.A.G 1710

- ◆ Fitting locations of components

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

2.4 - Test requirements

- The vehicle must be fitted with the approved wheels and tyre sizes, which must be the same on all four wheels. Check inflation pressures all round.



- Conventional brake system (including brake light switch and brake lights) must be OK.
- No leaks in the hydraulic connections and pipes (visual check of hydraulic unit, brake cylinders etc.).
- Wheel bearings and wheel bearing play OK.
- Earth connection to hydraulic unit for return flow pump -V39 OK.
- Return flow pump relay -J105 and solenoid valve relay -J106 must be correctly connected.
- Connector on control unit -J104 must be properly fitted, with retainer catch engaged.
- All fuses must be OK (refer to current flow diagram).
- Supply voltage must be OK (not less than 10.5 V).

2.5 - Technical information required

... 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.

- ♦ Current flow diagram "ABS"

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

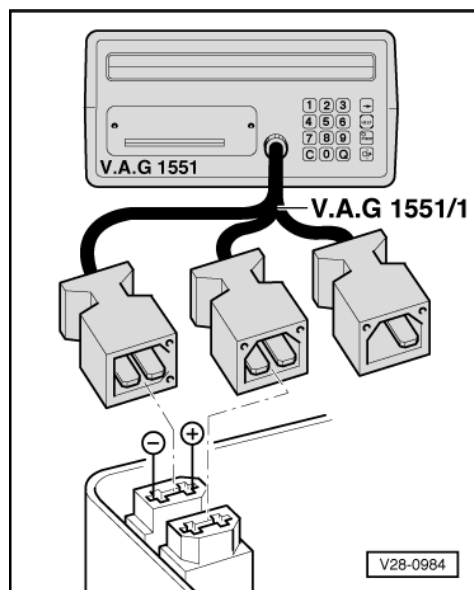
- ♦ Fault-finding programme: ABS with ABS tester V.A.G 1710

=> Fault-finding: Bosch anti-lock brake systems, ABS tester V.A.G 1710

2.6 - Connecting fault reader V.A.G 1551 and entering address word

Note:

During the self-diagnosis process the main program of control unit for ABS with EDL -J104 is switched off. The control function is deactivated.



The vehicle system tester V.A.G 1552 can be used instead of the fault reader V.A.G 1551, however V.A.G 1552 does not have the facility for making a print-out.

- -> With the ignition switched off, connect the fault reader to the diagnostic connectors on relay point I using cable V.A.G 1551/1 as follows:
 - Black plug connected to black diagnostic connector.
 - White plug connected to white diagnostic connector.
 - Blue plug not used.

Switch on the ignition.

Note:

If the display remains blank, test wiring of diagnostic connector=>Page **23**.

-> Indicated on display:

V.A.G - SELF-DIAGNOSIS HELP
1 - Rapid data transfer1)
2 - Flash code output1)

- 1) appears alternately

Notes:

- ◆ The PRINT key is used for switching on the printer (the indicator lamp in the key lights up when the printer is switched on).
- ◆ Depending on the programme, additional operating information can be printed out by pressing the HELP key of V.A.G 1551.
- Switch on printer by pressing Print key of fault reader.
- Press key -1- for "Rapid data transfer" operating mode.

Address word for brake electronics: 03

-> Indicated on display

Rapid data transfer HELP
Enter address word XX

- Press keys -0- and -3- to enter address word 03 for "Brake electronics".

-> Indicated on display

Rapid data transfer Q
03 Brake electronics

- Confirm input with Q key.

-> Control unit version is indicated on display.

4A0 907 379 C Brake electronics

Note:

- ◆ Also refer to the Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted without the prior written consent of Audi AG. The publisher assumes no liability with respect to the correctness of information in this document. Copyright by AUDI AG. **Parts List for the correct control unit -J104 for the vehicle**

K-wire not switching to earth/positive
HELP

Press the HELP key to obtain a print-out of the possible causes of the fault.

No-signal from control unit

Test wiring of diagnostic connectors
=>Page **23**.

- Test power supply and earth connection to control unit -J 104.

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

- After rectifying possible causes of fault, enter address word 03 for brake electronics once again and confirm with Q key.

-> If this display appears:

Fault in communication build-up



- Rectifying fault=>Page 24 .

2.7 - Interrogating fault memory

- Observe "test requirements"=>Page 3 .
- Connect fault reader V.A.G 1551 and select address word 03 for "Brake electronics"=>Page 4 .
- Check control unit version=>Page 5 and press the=>key.
- Switch on printer with the Print key (indicator lamp in key lights up).

-> Indicated on display:

Rapid data transfer	HELP
Select function XX	

- Press keys -0- and -2-.

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.

-> Indicated on display

Rapid data transfer	Q
02 - Interrogate fault memory	

- Confirm input with Q key.

-> The number of faults stored will appear on the display.

X faults recognised!

-> If the message "No fault recognised" is displayed the program can be returned to the starting point by pressing the => key.

No fault recognised!

The stored faults are displayed and printed out one after the other.

- Check printout against fault table and rectify all faults as necessary=>Page 6 .

If the message "No fault recognised", is displayed the program can be returned to the starting point by pressing the=>key.

-> Indicated on display:

Rapid data transfer	HELP
Select function XX	

If something else is displayed:

=> Fault reader operating instructions

- End output (function 06)=>Page 15 .
- Switch off ignition and unplug diagnostic connections.

2.8 - Fault table

Notes on fault table

- ♦ Every fault that can be detected by the system has a 5-digit fault code, which is listed in the left-hand column of the fault table. The message identifying the fault and the fault code will be printed out on the printer of fault reader V.A.G 1551 if the Print key is pressed. The fault code does not appear on the display of V.A.G 1551.
- ♦ The contents of the fault memory remains stored until the memory is erased=>Page 14 .
- ♦ Before replacing components, always test all electrical connections (positive and earth connections) and all connector contacts according to the current flow diagram.
- ♦ After renewing an ABS or EDL component, always test the ABS / EDL system using ABS tester V.A.G 1710 according to fault-finding programme (see Bosch anti-lock brake systems, ABS tester V.A.G 1710)1). Then

interrogate and erase the fault memory and carry out a road test (drive the vehicle for at least once at a speed above 30 km/h). If the ABS warning lamp -K47 does not light up during the road test, the system is in order.

1) All necessary alterations for this fault-finding programme, when performing fault-finding on vehicles with ABS and EDL, have been published in the Supplement, Edition 07.92, for Fault-finding programme: Bosch anti-lock brake systems with ABS tester V.A.G 1710.

- ◆ Sporadically occurring faults are additionally identified as such, with "/SP" appearing on the right of the display =>Page **1**.
- ◆ Static faults which cannot be detected when the vehicle is stationary are also identified with "/SP" after the ignition has been switched off and then on again.
- ◆ The following table includes all the faults which can be detected by the control unit -J104 and displayed and printed out by V.A.G 1551. Faults are listed according to fault codes.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00000 No fault recognised	If this display appears, self-diagnosis is completed If there is a malfunction, although no fault has been detected by control unit -J104: Perform fault-finding using ABS tester V.A.G 1710 => Fault-finding: Bosch anti-lock brake systems, ABS tester V.A.G 1710 and perform Electrical test =>Page 15	

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00277 ABS inlet/outlet valve, front left -N137	- Open circuit, short circuit to positive or earth in wiring between hydraulic unit -N55 and control unit -J104 - Inlet/outlet valve -N137 defective	- Trace and repair open circuit or short in wiring according to current flow diagram 1) - Test hydraulic unit, perform function test with V.A.G 1710 (test steps 1 and 5)
00279 Valve 1 for differential lock -N125 (for EDL)	- Open circuit, short circuit to positive or earth in wiring between hydraulic unit -N55 and control unit -J104 - Valve1 -N125 defective	- Trace and repair open circuit or short in wiring according to current flow diagram - Test hydraulic unit, perform electrical test (test steps 2 and 5) => Page 15

1) Applies for all ABS inlet/outlet valves -N137, -N138, -N139, -N140 ...

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00280 Valve 2 for differential lock -N126 (for EDL)	- Open circuit, short circuit to positive or earth in wiring between hydraulic unit -N55 and control unit -J104 - Valve 2 -N126 defective	- Trace and repair open circuit or short in wiring according to current flow diagram - Test hydraulic unit, perform electrical test (test steps 3 and 6) => Page 15



V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00283 Speed sensor, front left -G47	- Open circuit, short circuit to positive or earth in wiring between speed sensor -G47 and control unit -J104 - Rotor dirty or damaged	- Trace and repair open circuit or short in wiring according to current flow diagram - Check, clean or renew rotor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Checking rotor
Open circuit/short to positive		- Renew wheel bearing => Audi 100, Running gear, Front-wheel drive and 4WD; Repair group 40; Servicing front suspension; Removing and installing wheel bearing Servicing front suspension; Removing and installing wheel bearing
No fault type identified 1)	- Excessive wheel bearing play	- Check installation position of speed sensor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Removing and installing speed sensor - Test speed sensor -G47, perform function test with V.A.G 1710 (test step 6) Renew speed sensor -G47
Note: Diagnosis cannot identify exact fault	- Speed sensor -G47 incorrectly installed - Speed sensor -G47 defective	

Protected by copyright. Copying for private use is 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.

1) This readout may be indicated incorrectly (as a sporadic fault) if one or more wheels are turned at a speed above 6 km/h when the ignition is switched on.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00284 ABS inlet/outlet valve, front right -N138	- Open circuit, short circuit to positive or earth in wiring between hydraulic unit -N55 and control unit -J104 - ABS inlet/outlet valve -N138 defective	- Trace and repair open circuit or short in wiring according to current flow diagram 1) - Test hydraulic unit, perform function test with V.A.G 1710 (test steps 1 and 5)

1) Applicable for all ABS inlet/outlet valves -N137, -N138, -N139, -N140 ...

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00285 Speed sensor, front right -G45	- Open circuit, short circuit to positive or earth in wiring between speed sensor -G45 and control unit -J104	- Trace and repair open circuit or short in wiring according to current flow diagram

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
Open circuit/short to positive	- Rotor dirty or damaged	- Check, clean or renew rotor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Checking rotor
No fault type identified 1)	- Excessive wheel bearing play	- Renew wheel bearing => Audi 100, Running gear, Front-wheel drive and 4WD; Repair group 40; Servicing front suspension; Removing and installing wheel bearing Servicing front suspension; Removing and installing wheel bearing
Note: Diagnosis cannot identify exact fault	- Speed sensor -G45 incorrectly installed	- Check installation position of speed sensor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Removing and installing wheel speed sensor
	- Speed sensor -G45 defective	- Test speed sensor -G45, perform function test with V.A.G 1710 (test step 6) Renew speed sensor -G45

1) This readout may be indicated incorrectly as a (sporadic fault) if one or more wheels are turned at a speed above 6 km/h when the ignition is switched on.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00286 ABS inlet/outlet valve, rear left -N139	- Open circuit, short circuit to positive or earth in wiring between hydraulic unit -N55 and control unit -J104 - ABS inlet/outlet valve -N139 defective	- Trace and repair open circuit or short in wiring according to current flow diagram 1) - Test hydraulic unit, perform function test with V.A.G 1710 (test steps 1 and 5)

1) Applicable for all ABS inlet/outlet valves -N137, -N138, -N139, -N140 ...

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00287 Speed sensor, rear right -G44	- Open circuit, short circuit to positive or earth in wiring between speed sensor -G44 and control unit -J104	- Trace and repair open circuit or short in wiring according to current flow diagram
Open circuit/short to positive	- Rotor dirty or damaged	- Check, clean or renew rotor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on rear axle, Front-wheel drive; Checking rotor



V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
No fault type identified 1) Continued ▼	- Excessive wheel bearing play	- Adjust wheel bearing play => Audi 100; Running gear, Front-wheel drive and 4WD; Repair group 42; Servicing wheel bearing Repair group 42; Servicing wheel bearing

1) This readout may be indicated incorrectly (as a sporadic fault) if one or more wheels are turned at a speed above 6 km/h when the ignition is switched on.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00287 Speed sensor, rear right -G44	- Speed sensor -G44 incorrectly installed	- Check installation position of speed sensor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on rear axle, Front-wheel drive; Removing and installing speed sensor
Note: Diagnosis cannot identify exact fault	- Speed sensor -G44 defective	- Test speed sensor -G44, perform function test with V.A.G 1710 (test step 6) Renew speed sensor -G44

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00289 ABS inlet/outlet valve, rear right -N140	- Open circuit, short circuit to positive or earth in wiring between hydraulic unit -N55 and control unit -J104	- Trace and repair open circuit or short in wiring according to current flow diagram 1)
	- ABS inlet/outlet valve -N140 defective	- Test hydraulic unit, perform function test with V.A.G 1710 (test steps 1 and 5)

1) Applicable for all ABS inlet/outlet valves -N137, -N138, -N139, -N140 ...

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00290 Speed sensor, rear left -G46	- Open circuit, short circuit to positive or earth in wiring between speed sensor -G44 and control unit -J104	- Trace and repair open circuit or short in wiring according to current flow diagram
Open circuit/short to positive	- Rotor dirty or damaged	- Check, clean or renew rotor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on rear axle, Front-wheel drive; Checking rotor

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.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
No fault type identified 1) Continued ▼	- Excessive wheel bearing play	- Adjust wheel bearing play => Audi 100; Running gear, Front-wheel drive and 4WD; Repair group 42; Servicing wheel bearing Repair group 42; Servicing wheel bearing

1) This readout may be indicated incorrectly (as a sporadic fault) if one or more wheels are turned at a speed above 6 km/h when the ignition is switched on.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00290 Speed sensor, rear left -G46	- Speed sensor -G46 incorrectly installed	- Check installation position of speed sensor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on rear axle, Front-wheel drive; Removing and installing speed sensor
Note: Diagnosis cannot identify exact fault	- Speed sensor -G46 defective	- Test speed sensor -G46, perform function test with V.A.G 1710 (test step 6) Renew speed sensor -G46

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00301 ABS return flow pump -V39	- Open circuit or contact resistance in earth connection or supply voltage to return flow pump -V39 - Open circuit or short to positive/earth in wiring between relay -J105 and control unit -J104 - ABS return flow pump relay -J105, return flow pump -V39 or hydraulic unit defective	- Trace and repair open circuit or contact resistance according to current flow diagram - Trace and repair open circuit or short in wiring according to current flow diagram - Test relay -J105, return flow pump -V39 and hydraulic unit -N55, perform function test with V.A.G 1710 (test step 3)

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00302 Solenoid valve relay -ABS -J106	- Defective wiring or excessive contact resistance in earth connection to solenoid valve relay -J106. - Open circuit or short to positive/earth in wiring between relay -J106 and control unit -J104 - Solenoid valve relay -J106 or hydraulic unit -N55 defective	- Check earth connection for contact resistance and defective wiring according to current flow diagram - Trace and repair open circuit or short in wiring according to current flow diagram - Test relay -J 106 and hydraulic unit, perform function test with V.A.G 1710 (test step 1)



V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00526 Brake light switch -F	- Open circuit or short to positive in wiring between brake light switch, brake light relay -J111 1), brake light bulbs - -M9, -M10 or control unit -J104 - Open circuit in wiring to relay -J111 1) - Brake light bulbs -M9 or -M10 defective - Relay -J111 1) defective - Brake light switch defective	- Trace and repair open circuit or short in wiring according to current flow diagram - Renew bulb - Renew relay -J111 1) - Test brake light switch, perform function test with V.A.G 1710 (test step 2)

1) Only installed in vehicles with automatic gearbox

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00532 Supply voltage Signal too low	- Open circuit or contact resistance in supply voltage to control unit -J104 (via relay -J106 to contact 32 on -J104) or in earth connection to control unit -J104 - Loss of voltage or excessive voltage in electrical system	- Trace and repair open circuit or contact resistance, perform function test with V.A.G 1710 (test step 1) - Test alternator and voltage regulator => Current flow diagrams, Electrical fault-finding and Fitting locations Perform function test with V.A.G 1710 (test steps 1 and 5)

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00597 Differing wheel speed impulses 1) Continued ▼	- One rotor installed with incorrect number of teeth - Rotor dirty or damaged	- Check all rotors => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Checking rotor - Check all rotors, clean or renew faulty component => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Checking rotor

1) This readout may be indicated incorrectly (as a sporadic fault) if one or more wheels are turned at a speed above 6 km/h when the ignition is switched on.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00597		

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
Differing wheel speed impulses 1) Continued ▼	- One of the speed sensors incorrectly installed	- Check installation position of all speed sensors => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Removing and installing speed sensor

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 for errors or omissions. The copyright in this document is reserved. Copyright by AUDI AG.

1) This readout may be indicated incorrectly (as a sporadic fault) if one or more wheels are turned at a speed above 6 km/h when the ignition is switched on.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00597 Differing wheel speed impulses 1)	- Excessive wheel bearing play at one wheel or wheel bearing defective - One of the speed sensors defective	- Check and renew all wheel bearings => Audi 100, Running gear, Front-wheel drive and 4WD; Repair group 40; Servicing front suspension; Removing and installing wheel bearing Repair group 42; Servicing wheel bearing - Test all speed sensors, perform function test with V.A.G 1710 (test step 6)

1) This readout may be indicated incorrectly (as a sporadic fault) if one or more wheels are turned at a speed above 6 km/h when the ignition is switched on.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
01278 EDL cut-off relay -J263 or Cause of fault: 04FE (information in service literature)	- Open circuit, short to positive or earth in wiring to cut-off relay -J263 - No speed signal from speedometer -G21 (will only be detected when speed exceeds 100 km/h) - Cut-off relay -J263 defective	- Trace and repair open circuit or short in wiring according to current flow diagram - Check speed signal => Current flow diagrams, Electrical fault-finding and Fitting locations - Test cut-off relay -J263, perform electrical test => Page 15, test step 4

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
65535 Control unit defective Note: If fault "ABS return flow pump -V39" is displayed at the same time, rectify cause of this fault first.	- Open circuit or contact resistance in supply voltage or earth connection to control unit -J104 - Control unit -J104 defective	- Trace and repair open circuit or contact resistance according to current flow diagram Renew control unit -J104



2.9 - Erasing fault memory

Requirements

- ♦ Fault memory interrogated
- ♦ All faults repaired.

Notes:

- ♦ If the fault memory cannot be erased, interrogate the fault memory once again and rectify the fault.
- ♦ The fault memory will not be erased if, for example, the ignition is switched off or road speed exceeds 20 km/h during the test sequence between interrogating fault memory and erasing fault memory.

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.

After fault memory has been successfully interrogated:

Performing function 05 - "Erase fault memory"

-> Indicated on display:

Rapid data transfer HELP
Select function XX

- Press keys 0 and 5.

-> Indicated on display:

Rapid data transfer Q
05 - Erase fault memory

- Confirm input with Q key.

-> Indicated on display:

Rapid data transfer
Fault memory is erased!

The fault memory is now erased.

- Press ➡key.

-> Indicated on display:

Rapid data transfer HELP
Select function XX

♦ Attention!
Fault memory is not interrogated

-> This message indicates an error in the test sequence:

♦ ->

Rapid data transfer
Fault memory is not interrogated

This message indicates an error in the test sequence:

Keep exactly to test sequence: First interrogate fault memory, if necessary repair faults, then erase.

2.10 - Ending output

Performing function 06 - "End output"

-> Indicated on display:

Rapid data transfer HELP
Select function XX

- Press keys 0 and 6.

-> Indicated on display

Rapid data transfer Q
06 End output

- Confirm input with Q key.

-> Indicated on display:

Rapid data transfer HELP
Enter address word XX

- Switch off ignition.
- Disconnect fault reader V.A.G 1551.

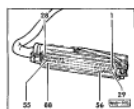
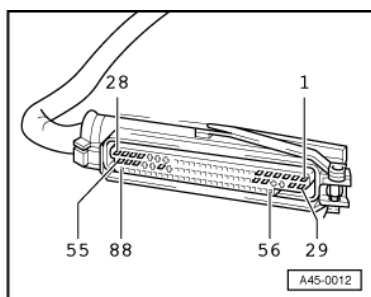
3 - Electrical test of ABS with EDL, 1992 model year (chassis No. 4ANN ...)

3.1 - Electrical test of ABS with EDL, 1992 model year (chassis No. 4ANN ...)

- ◆ If the self diagnosis does not give any indication of the cause of the fault, work through the complete electrical test.
- ◆ If the self diagnosis provides a direct indication of the cause of the fault, only carry out the test steps recommended in the fault table (specific testing).

3.2 - Test requirements

- The fault memory of ABS control unit with EDL -J104 has been interrogated and all faults indicated have been traced and rectified.
- No fault has been found in test steps 1 to 6 of fault-finding procedure (and function test) using ABS tester V.A.G 1710.
- **No gear engaged (the front wheels can be turned freely)**
- **Brake fluid level in reservoir is OK**
- Return flow pump -V39 has not been actuated within the last 7 minutes.





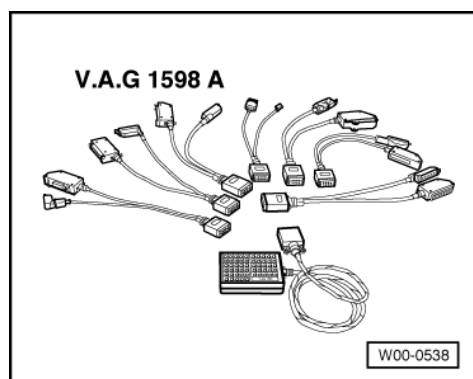
- -> The multi-pin connector between the wiring harness and control unit -J104 must be in proper condition, with no bent, broken or corroded contacts. Replace any damaged contacts using wiring repair kit VAS 1978.

Note:

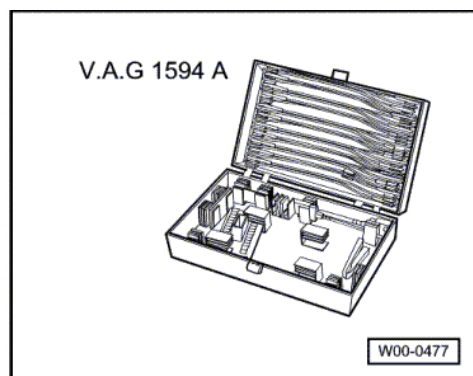
The instructions supplied with wiring repair kit VAS 1978 normally do not permit repairs to the wiring of the ABS and associated systems. However, this only applies to the screened wiring in the system.

- Switch off ignition and electrical equipment before commencing the test (headlights, lighting, fan, etc.).
- For test steps 5 to 7 the vehicle must be raised so that the wheels can turn freely. On vehicles with manual gearbox put the gear lever in neutral. On vehicles with automatic gearbox move the selector lever to position "N".

Special tools and workshop equipment required

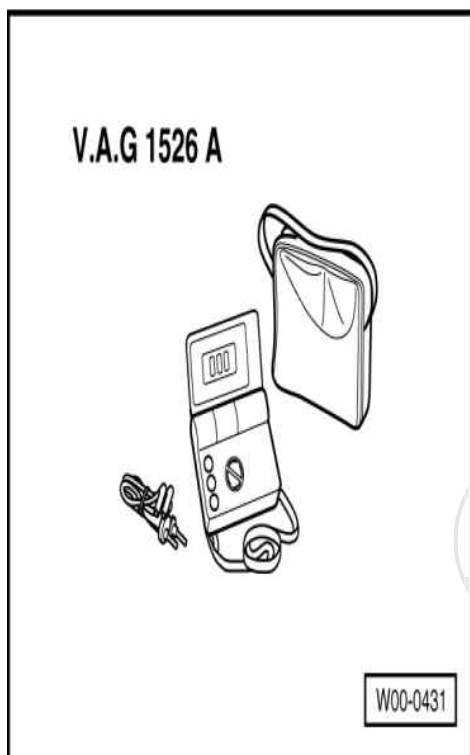


- ♦ Test box V.A.G 1598 A with adapter V.A.G 1598/3



- ♦ -> Auxiliary test set V.A.G 1594 A

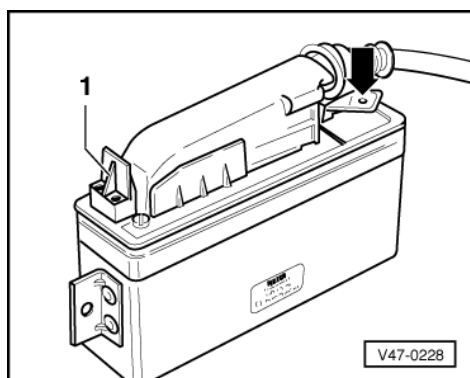
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



- ♦ Hand-held multimeter V.A.G 1526 A

Connecting test box V.A.G 1598 A and testing ABS/EDL system.

- Switch off ignition.

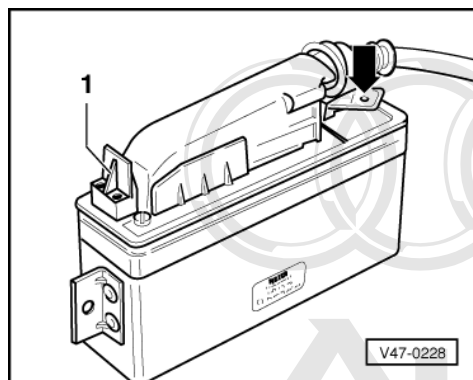


- -> Unplug multi-pin connector from control unit -J104.
- Check multi-pin connection between wiring harness and control unit -J104.

The socket designations on test box V.A.G 1598 A are identical with the contact designations on control unit -J104 and the contact designations of the connector on the wiring harness.

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

- Connect test box V.A.G 1598 A to multi-pin connector on ABS harness using adapter V.A.G 1598/3.

**Notes:**

- ♦ -> Do not connect ABS/EDL control unit J104(-1-) to test box
- ♦ Trace and rectify faults found in the vehicle wiring according to current flow diagram.

3.3 - Test table**Notes on test table**

- ♦ The socket designations of the test box V.A.G 1598 are identical to the contact designations of the control unit -J104 in the current flow diagram. Incorrect test procedures can cause damage to the system: do not make connections between any contacts other than those listed in the table

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

- ♦ The specified values refer to the readings obtained on tester V.A.G 1526 and are not necessarily applicable for other test units.
- ♦ If the readings obtained do not match the specifications, carry out the fault rectification measures in the right-hand part of the table.

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

- ♦ If the specified values are achieved, also check wiring for intermittent loose contacts and short circuit to positive and earth. This applies especially to sporadic faults.
- ♦ Use test leads V.A.G 1594 for checking continuity (bridging leads).
- ♦ If the measured figures only differ slightly from the specifications, clean the sockets and plugs of the testers and test leads (with contact spray G 000 700 04) and repeat the check. Before replacing components, check wiring and connections again, particularly if the specification calls for a resistance reading of less than 10 Ω .

Select voltage test range on V.A.G 1526: 20 V =					
Test step	V.A.G 1598 A sockets	Item tested	Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
1	15 + 20	ABS switch -E83 and connecting wiring	▪ Ignition switched on ▪ Switch -E 83 not operated	0 V	- Test wiring between -E83 and -J104 for short circuit to positive Switch -E83 defective, renew

			▪ Ignition switched on Operate switch -E 83	approx. battery voltage	- Test wiring to switch -E83 and - J104 for open circuit Switch -E83 defective, renew
--	--	--	--	-------------------------------	--

Note:

If the ABS warning lamp -K47 lights up sporadically and then goes out again, or if it goes out after operating ABS switch -E83 once, test switch -E83 and connecting wiring for intermittent short circuit to positive (loose contact) and test wiring to contact 1 of connector for control unit -J104 for open circuit (loose contact).

Select resistance test range on V.A.G 1526 (200 ω)					
Test step	V.A.G 1598 A sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
2	13 + 3	Valve 1 for differential lock (EDL) -N125 and connecting wiring	▪ Ignition switched off	4.5 ω - 6 ω	- Test wiring between -J104 and - N125 for open circuit or contact resistance Valve -N125 defective, renew hydraulic unit
3	13 + 33	Valve 2 for differential lock (EDL) -N126 and connecting wiring	▪ Ignition switched off	4.5 ω - 6 ω	- Test wiring between -J104 and - N126 for open circuit or contact resistance Valve -N126 defective, renew hydraulic unit
4 Continued ▼	13 + 20	EDL cut-off relay - J263 and connecting wiring	▪ Ignition switched off	∞ ω	- Test wiring between -J104 and - J263 for short circuit to earth Test wiring to -J263 (contact 15) for short circuit to positive Cut-off relay -J263 defective, renew

Select resistance test range on V.A.G 1526 (200 ω)					
Test step	V.A.G 1598 A sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification

**Select resistance test range on V.A.G 1526 (200 ω)**

4a Continued ▼	13 + 20	EDL cut-off relay - J263 and connecting wiring	▪ Ignition switched on	less than 10 ω	- Test wiring between -J104 and -J263 for open circuit or contact resistance Test wiring to -J263 (contact 15 or 31) for open circuit in voltage supply or earth connection Test wiring between -J104 (contact 28) and -J263 (contact B) for short circuit to earth Cut-off relay -J263 defective, renew
----------------------	---------	--	------------------------	-----------------------	---

Select voltage test range on V.A.G 1526: 20 V =

Test step	V.A.G 1598 A sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
4b Continued ▼	28 + 20	EDL cut-off relay -J263 and connecting wiring	▪ Ignition switched on	4.5 V-6 V	- Test wiring between -J104, -J106 and -J263 for short circuit to positive or earth Cut-off relay -J263 defective, renew

Select resistance test range on V.A.G 1526 (200 ω)

Test step	V.A.G 1598 A sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
4c	13 + 20	EDL cut-off relay -J263	▪ Ignition switched on Bridge across sockets 28 and 34 Remove bridge connection after 40 seconds Switch off the ignition and then on again	less than 10 ω $\infty \omega$ (EDL off) After 4 to 7 minutes the display value changes from $\infty \omega$ to less than 10 ω (EDL ready for operation)	- Cut-off relay -J263 defective, renew

Notes:

- ♦ If the ignition is switched off and then on again during or shortly after an EDL control cycle, the cut-off relay -J263 (relay contacts 87 and 86) will interrupt the voltage supply to the differential lock valves for 3 to 6 minutes (to prevent misuse).
- ♦ When the vehicle exceeds a speed of 60 km/h the EDL function will be switched off by the cut-off relay -J263 in the same way (open circuit between relay contacts 87 and 86).
- ♦ Testing speed signal

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

No test equipment required					
Test step	V.A.G 1598 A sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
5 1)	Bridge across 1 + 3 2)	Function and correct wiring of differential lock valve 1 (EDL) - N125	▪ Ignition switched on Depress and hold down brake pedal - Remove bridge connection Release brake pedal	Front right wheel can be turned by hand - Front right wheel locked	- Test for fault in wiring between valve -N125 and -J104 Cut-off relay -J263 has switched off EDL function; check (test step 4) Valve -N125 defective, renew hydraulic unit

1) Two operators are required to perform this test.

2) The bridge connection between sockets 1 and 3 must not be left in place for longer than 30 seconds (maximum).

No test equipment required					
Test step	V.A.G 1598 A sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
6 1)	Bridge across 1 + 33 2)	Function and correct wiring of differential lock valve 2 (EDL) - N126	▪ Ignition switched on Depress and hold down brake pedal - Remove bridge connection Release brake pedal	Front right wheel can be turned by hand - Front right wheel locked	- Test for fault in wiring between valve -N126 and -J104 Cut-off relay -J263 has switched off EDL function; check (test step 4) Valve -N126 defective, renew hydraulic unit

1) Two operators are required to perform this test.

2) The bridge connection between sockets 1 and 33 must not be left in place for longer than 30 seconds (maximum).

No test equipment required					
Test step	V.A.G 1598 A sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification



No test equipment required					
7 1)	Bridge across 16 + 17 2)	Function of charge valve and pressure limiting valve for EDL (in hydraulic unit); leak test	▪ Ignition switched off ▪ Brake system tester V.A.G 1310 A connected to front right brake caliper and tester bled Switch on ignition. Operate brake pedal until pressure rises to 10 bar on pressure gauge. Do not change brake pedal position.		
Continued ▼			- Bridge across sockets 1 and 3 - Bridge across sockets 28 and 20	- Return flow pump -V39 runs	- Perform fault-finding according to fault-finding programme for ABS tester V.A.G 1710 (test step 3)

1) Two operators are required to perform this test.

2) Test step must be completed within 30 seconds (after connecting bridge connection between sockets 1 and 3); remove all bridge connections.

No test equipment required					
Test step	V.A.G 1598 A sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
7 1)	Bridge across 16 + 17 2)	Function of charge valve and pressure limiting valve for EDL (in hydraulic unit); leak test	- Release brake pedal - Remove both bridge connections	- Pressure rises by less than 15 bar - Pressure rises to 40 bar (min.) or 60 bar (max.)	- Charge valve defective, renew hydraulic unit - Check if hose connection for EDL function from brake fluid reservoir to hydraulic unit is kinked or blocked - Pressure limiting valve or charge valve defective, renew hydraulic unit - EDL function has been switched off by cut-off relay - J263; check (test step 4)

1) Two operators are required to perform this test.

2) Test step must be completed within 30 seconds (after connecting bridge connection between sockets 1 and 3); remove all bridge connections.

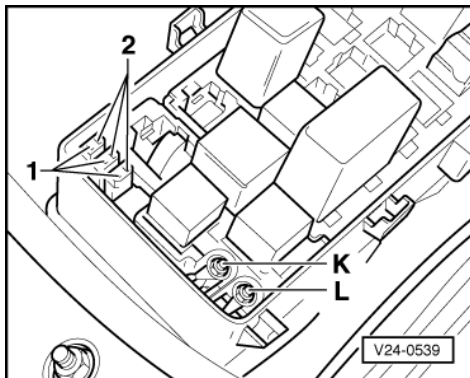
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

3.4 - Testing wiring of diagnostic connector

The diagnostic connectors and junctions "K" and "L" for all on-board systems with self-diagnosis are grouped in relay point 1 in the plenum chamber (left side). For wiring colours and other on-board systems connected to "white" diagnostic connector:

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

- Switch off the ignition before testing the wiring connections.
- Use hand-held multimeter V.A.G 1526 A, auxiliary test set V.A.G 1594 A and test box V.A.G 1598 A with adapter lead V.A.G 1593/3 for testing.



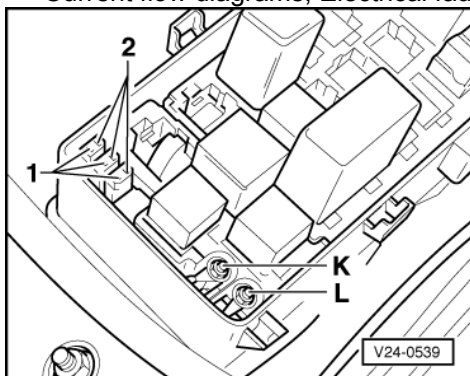
-> Testing voltage supply for fault reader V.A.G 1551, "black" diagnostic connector:

- Contact 1 connected to battery earth.
- Contact 2 connected to positive (via fuse 19 / terminal 30).

- Test wiring.

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 for errors or omissions in this document. Copyright by AUDI AG.

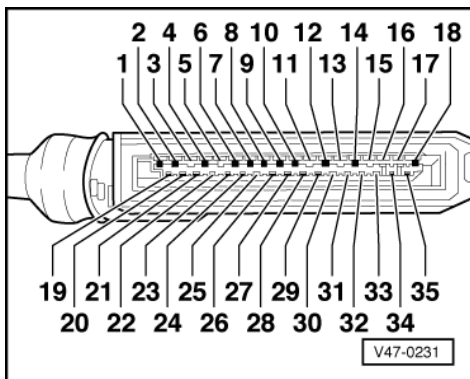
=> Current flow diagrams, Electrical fault finding and Fitting locations



-> Testing diagnostic wiring "L" and "K"; "white" diagnostic connector:

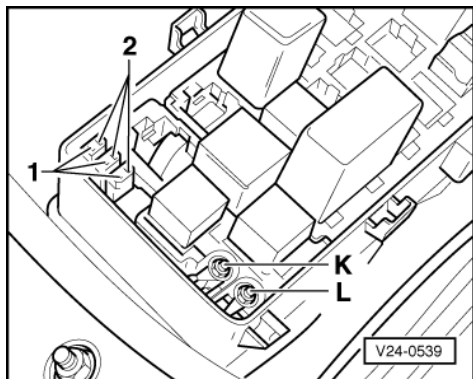
Contact 1, not used for brake electronics.

Contact 2, diagnostic wiring "K" for "Rapid data transfer". The link with the control unit is set up and data are exchanged via the "K" wire. The "K" wire is routed from the "white" diagnostic connector via the junction "K" to the various control units.





- -> Unplug connector from control unit -J104.
 - Connect test box V.A.G 1598 A with adapter lead V.A.G 1598/3 and measure at the corresponding sockets.
- => Current flow diagrams, Electrical fault finding and Fitting locations
- Test wiring connection with V.A.G 1526 A for open circuit and short circuit to positive or earth.



-> "Blue" diagnostic connector is not used for operating mode "Rapid data transfer".

Testing wiring connection if V.A.G 1551 indicates "Fault in diagnostic communication build-up":

If the display on V.A.G 1551 indicates "Fault in communication build-up", the fault may be in control unit -J104 or in other control units which are not relevant for the ABS/EDL system, but which prevent the diagnostic link from being established.

- At junction "K", disconnect the wiring between contact 2 of the "white" diagnostic connector and all on-board systems with self-diagnosis ("Rapid data transfer") in turn.

Note:

Other systems with self-diagnosis:

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

- After disconnecting each of the on-board systems, select address word "03" in operating mode "Rapid data transfer" once again.
- If the display then shows the control unit identification, test the wiring connection to the control unit which was last disconnected (refer to current flow diagram). If no fault can be found, renew the control unit which was last disconnected and reconnect all wiring connections.

Note:

If the display shows "Control unit does not answer", there is an open circuit in the wiring connection to control unit -J104.

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.

4 - Anti-lock brake system (ABS) / anti-lock brake system with electronic differential lock (EDL), 1993 model year (chassis No. 4APN ...)

4.1 - Anti-lock brake system (ABS) / anti-lock brake system with electronic differential lock (EDL), 1993 model year (chassis No. 4APN ...)

From the 1993 model year onwards, a new ABS system with self-diagnosis function was introduced as standard equipment and an improved ABS system with EDL as optional equipment for vehicles with front-wheel drive

The control unit for ABS / ABS with EDL is equipped with a fault memory. This manual describes self-diagnosis procedures using fault reader V.A.G 1551 and the electrical test for this on-board safety system.

4.2 - Self-diagnosis function

Notes:

- ◆ When the ignition is switched on there will be an audible noise from the relay and from the return flow pump in the hydraulic unit when the vehicle starts moving (5 - 6 km/h). The system is performing a self-test.
- ◆ If a fault is detected, the ABS / ABS with EDL will be switched off automatically and the ABS warning lamp -K47 (in the dash panel insert) will light up. The conventional brake system of the vehicle will be unimpaired and remains fully effective. Except in the case of a failure of the supply voltage (in which case the ABS / ABS with EDL will be switched on again as soon as the on-board voltage returns to the required value) the ABS / ABS with EDL will remain switched off for the duration of the current driving cycle.

If a fault (which may have been detected and stored during the last driving cycle) is no longer present after the ignition has been switched off and then on again, or if it cannot be detected with the vehicle stationary (certain faults are only detected above a speed of 12 km/h), the ABS warning lamp -K47 will go out a short time (about 2 seconds) after the ignition is switched on - after the self-test of the ABS / ABS with EDL has been completed by control unit -J104, and provided that no fault has been detected.

If a fault which has been stored in the fault memory as a "static" fault is no longer present after the ignition has been switched off and then on again, it is reclassified as a "sporadic" fault.

A sporadic fault is erased automatically if it no longer occurs over a certain number of driving cycles.

Sporadic faults are identified as such by "/SP" appearing in the display on V.A.G 1551.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted without the express written consent of the copyright holder. Copyright © AUDI AG.

By processing the incoming data, the control unit for ABS / ABS with EDL -J104 is able to distinguish between 15 different types of fault (or 19 in the case of vehicles with ABS and EDL); refer to fault table on Page 30. These faults are stored in the memory until they are erased by fault reader V.A.G 1551 (after interrogating the fault memory).

The self-diagnosis functions can only be performed with the aid of fault reader V.A.G 1551 in operating mode 1 "Rapid data transfer".

Notes:

- ◆ As well as storing, interrogating and erasing faults, the self-diagnosis system in vehicles with ABS / ABS and EDL offers the additional functions "Interrogate control unit version" and "Read measured value block". The operating mode 2 "Flash code output" is not available in conjunction with the control unit for ABS / ABS with EDL -J104. Further operating modes are described in the operating instructions for V.A.G 1551.
- ◆ Diagnostic readouts via fault reader V.A.G 1551 are only possible with the ignition switched on or with the engine running.
- ◆ The diagnosis procedure can only be started with the vehicle stationary (at road speeds above 2.5 km/h control unit -J104 no longer reacts).
- ◆ The functions "Interrogate and erase fault memory", "Interrogate control unit version" and "Read measured value block" are only available up to a road speed of 20 km/h (the self-diagnosis function will be terminated as soon as this speed is exceeded).



Additional function of ABS with EDL

To prevent the brakes from overheating under extreme road conditions, the temperature of the brakes is calculated by the control unit for ABS with EDL -J104 on the basis of the following input data:

- ♦ Duration and number of EDL control cycles
- ♦ Duration and number of brake applications
- ♦ Vehicle retardation during brake applications
- ♦ Road speed

If the brake temperature calculated by the control unit -J104 exceeds a predetermined threshold, the EDL control function will be terminated by the control unit. This ensures that the function of the vehicle brakes and the ABS is always fully effective.

If the brakes are hot, the control unit for ABS with EDL -J104 will remain active after the ignition has been switched off until the calculated temperature of the brakes drops below a fixed value (but not longer than 1 hour). During this time the control unit -J104 has a higher current draw (approx. 220 mA instead of less 2 mA)

=> Fault table, Page 30, Fault code 00668: vehicle voltage, terminal 30

If "Coding XXX" is additionally displayed on fault reader V.A.G 1551 when interrogating the control unit version, this means an attempt has been made to change the coding of the control unit.

Note:

The function "Coding control unit" is not provided for the control unit for ABS with EDL. However, if function 07 is selected, the control unit will answer "Coding control unit; Enter code number XXX". At the present time, the preset coding (currently 000) can in fact be changed, but this has no effect on the operation of the control unit.

4.3 - Technical data of self-diagnosis

- ♦ Fault memory
 - Permanent memory: contents remain intact when power supply is interrupted.
- ♦ Data output
 - Rapid data transfer (operating mode 1)
 - Flash code output is not provided.
 - ABS warning lamp in dash panel lights up when ABS is switched off.
- ♦ Functions

	Page
01 - Interrogate control unit version (brake electronics)	28
02 - Interrogate fault memory	29
05 - Erase fault memory	67
06 - End output	68
08 - Read measured value block	39

Notes:

- ♦ During the self-diagnosis process it is not possible to activate the control function (ABS warning lamp -K47 lights up). For this reason self-diagnosis will be terminated as soon as the vehicle is driven at a speed above 20 km/h=>Page 25.
- ♦ The function "Final control diagnosis" is not available during the self-diagnosis process. The relevant tests must be performed with ABS tester V.A.G 1710 according to fault-finding programme (including function test)

=> Fault-finding: Bosch anti-lock brake systems, ABS tester V.A.G 1710

- ♦ Fitting locations of components

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

4.4 - Test requirements

- The vehicle must be fitted with the approved wheels and tyre sizes, which must be the same on all four wheels. Check inflation pressures all round.
- Conventional brake system (including brake light switch and brake lights) OK.
- No leaks in the hydraulic connections and pipes (visual check of hydraulic unit, brake cylinders etc.).
- Wheel bearings and wheel bearing play OK.
- Earth connection to hydraulic unit for return flow pump -V39 OK.
- Return flow pump relay -J105 and solenoid valve relay -J106 must be correctly connected.
- Connector on control unit -J104 must be properly fitted, with retainer catch engaged.
- When operating fault reader V.A.G 1551, test box V.A.G 1598 should not be connected to control unit for ABS / ABS with EDL -J104.

- All fuses must be OK(refer to current flow diagram).
- Supply voltage must be OK (not less than 10.5 V).

4.5 - Technical information required

- ◆ Current flow diagram "ABS"

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

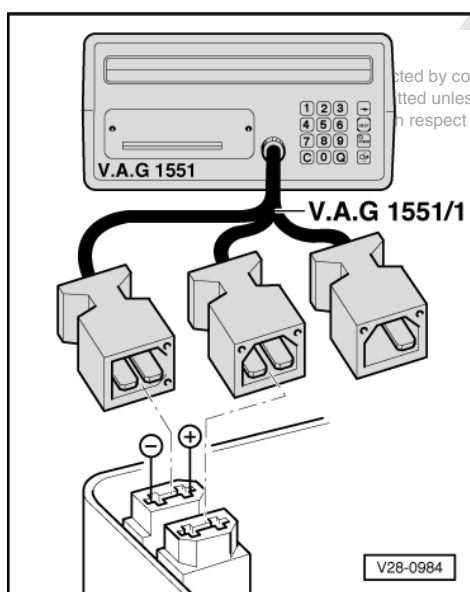
- ◆ Fault-finding programme: ABS with ABS tester V.A.G 1710

=> Fault-finding: Bosch anti-lock brake systems, ABS tester V.A.G 1710

4.6 - Connecting fault reader V.A.G 1551 and entering address word

Note:

During the self-diagnosis process the main program of control unit for ABS with EDL -J104 is switched off. The control function is deactivated.





The vehicle system tester V.A.G 1552 can be used instead of the fault reader V.A.G 1551, however V.A.G 1552 does not have the facility for making a print-out.

- -> With the ignition switched off, connect the fault reader to the diagnostic connectors on relay point I using cable V.A.G 1551/1 as follows:
 - Black plug connected to black diagnostic connector.
 - White plug connected to white diagnostic connector.
 - Blue plug not used.

Switch on the ignition.

Note:

If the display remains blank, check connections of diagnostic connector=>Page 47.

-> Indicated on display:

V.A.G - SELF-DIAGNOSIS HELP
1 - Rapid data transfer1)
2 - Flash code output1)

- 1) appears alternately

Notes:

- ♦ The PRINT key is used for switching on the printer (the indicator lamp in the key lights up when the printer is switched on).
- ♦ Depending on the programme, additional operating information can be printed out by pressing the HELP key of V.A.G 1551.
- Switch on printer by pressing Print key of fault reader.
- Press key -1- for "Rapid data transfer" operating mode.

Address word for brake electronics: 03

-> Indicated on display

Rapid data transfer HELP
Enter address word XX

- Press keys -0- and -3- to enter address word 03 for "Brake electronics".

-> Indicated on display

Rapid data transfer Q
03 Brake electronics

- Confirm input with Q key.

-> Control unit version is indicated on display.

4A0 907 379 X Brake electronics

Index X	Version
none 1)	Control unit without wheel speed outputs
A	Control unit without EDL
D 1)	Control unit with wheel speed outputs
E	Vehicles with EDL

Note:

- ♦ Also refer to the Parts List for the correct control unit -J104 for the vehicle.

or

1) Vehicles with four-wheel drive

-> The additional information "Coding XXX" will be displayed if an attempt has been made to change the preset coding on vehicles equipped with EDL=>Page 26.

4A0 907 379 X	Brake electronics
Coding	XXX

K-wire not switching to earth/positive HELP
--

Press the HELP key to obtain a print-out of the possible causes of the fault.

No-signal from control unit

Test wiring of diagnostic connectors

=>Page 47.

- Test power supply and earth connection to control unit -J 104.

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

- After rectifying possible causes of fault, enter address word 03 for brake electronics once again and confirm with Q key.

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.

-> Indicated in display

Fault in communication build-up

- Rectifying fault=>Page 49.

4.7 - Interrogating fault memory

- Observe "test requirements"=>Page 27.
- Connect fault reader V.A.G 1551 and select address word 03 for "Brake electronics"=>Page 27.
- Check control unit version and press the=>key=>Page 28.
- Switch on printer with the Print key (indicator lamp in key lights up).

-> Indicated on display:

Rapid data transfer	HELP
Select function XX	

- Press keys -0- and -2-.

-> Indicated on display

Rapid data transfer	Q
02 - Interrogate fault memory	

- Confirm input with Q key.

-> The number of faults stored will appear on the display.

X faults recognised!

-> If the message "No fault recognised" is displayed the program can be returned to the starting point by pressing the => key.

No fault recognised!

The stored faults are displayed and printed out one after the other.



- Check printout against fault table and rectify all faults as necessary=>Page 30 .

If the message "No fault recognised" is displayed, the program can be returned to the starting point by pressing the⇒key.

-> Indicated on display:

Rapid data transfer Select function XX	HELP
---	------

If something else is displayed:

=> Fault reader operating instructions

- End output (function 06) => Page 39 .
- Switch off ignition and unplug diagnostic connections.

4.8 - Fault table

Notes on fault table

- ♦ Every fault that can be detected by the system has a 5-digit fault code, which is listed in the left-hand column of the fault table. The message identifying the fault and the fault code will be printed out on the printer of fault reader V.A.G 1551 if the Print key is pressed. The fault code does not appear on the display of V.A.G 1551.
- ♦ The contents of the fault memory remains stored until the memory is erased=>Page 38 .
- ♦ Before replacing components, always test all electrical connections (positive and earth connections) and all connector contacts according to the current flow diagram.
- ♦ After renewing a component of the ABS / ABS with EDL, always test the ABS / ABS with EDL system using ABS tester V.A.G 1710 according to fault-finding programme (see Bosch anti-lock brake systems, ABS tester V.A.G 1710)1). Then interrogate and erase fault memory and carry out road test (drive the vehicle for at least once at a speed above 30 km/h). If the ABS warning lamp -K47 does not light up during the road test, the system is in order.
- ♦ Sporadically occurring faults are additionally identified as such, with "/SP" appearing on the right of the display =>Page 1 .
- ♦ Static faults which cannot be detected when the vehicle is stationary are also identified with "/SP" after the ignition has been switched off and then on again.
- ♦ The following table includes all the faults which can be detected by the control unit -J104 and displayed and printed out by V.A.G 1551. Faults are listed according to fault codes.

1) All necessary alterations for this fault-finding programme, when performing fault-finding on vehicles with ABS / ABS and EDL, have been published in the Supplement, Edition 07.92, for Fault-finding programme: Bosch anti-lock brake systems with ABS tester V.A.G 1710.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code	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.	
00000 No fault recognised	If this display appears, self-diagnosis is completed If there is a malfunction, although no fault has been detected by control unit -J104: Fault-finding with ABS tester V.A.G 1710 => Fault-finding Bosch anti-lock brake systems, ABS tester V.A.G 1710 and perform electrical test =>Page 41	

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00277		

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
ABS inlet/outlet valve, front left -N137	- Open circuit, short to positive or earth in wiring between hydraulic unit -N55 and control unit -J104 - Inlet/outlet valve -N137 defective	- Trace and repair open circuit or short in wiring according to current flow diagram 1) - Test hydraulic unit, perform function test with V.A.G 1710 (test steps 1 and 5)
00279 Valve 1 for differential lock -N125 (for EDL)	- Open circuit, short to positive or earth in wiring between hydraulic unit -N55 and control unit -J104 - Valve 1 -N125 defective	- Trace and repair open circuit or short in wiring according to current flow diagram - Test hydraulic unit, perform electrical test (test steps 2 and 5) => Page 41

1) Applicable for all ABS inlet/outlet valves -N137, -N138, -N139, -N140
This document is a technical document. It is not permitted to be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without prior written permission from 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.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00280 Valve 2 for differential lock -N126 (for EDL)	- Open circuit, short circuit to positive or earth in wiring between hydraulic unit -N55 and control unit -J104 - Valve 2 -N126 defective	- Trace and repair open circuit or short in wiring according to current flow diagram - Test hydraulic unit, perform electrical test (test steps 3 and 6) => Page 41

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00283 Speed sensor, front left -G47 Open circuit/short to positive No fault type identified 1) Note: Diagnosis cannot identify exact fault	- Open circuit, short circuit to positive or earth in wiring between speed sensor -G47 and control unit -J104 - Rotor dirty or damaged - Excessive wheel bearing play - Speed sensor -G47 incorrectly installed	- Trace and repair open circuit or short in wiring according to current flow diagram - Check, clean or renew rotor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Checking rotor - Renew wheel bearing => Audi 100; Running gear, Front-wheel drive and 4WD; Repair group 40; Servicing front suspension; Removing and installing wheel bearing - Check installation position of speed sensor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Removing and installing speed sensor



V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
	- Speed sensor -G47 defective	- Test speed sensor -G47, perform function test with V.A.G 1710 (test step 6) Renew speed sensor -G47

1) This readout may be indicated incorrectly (as a sporadic fault) if one or more wheels are turned at a speed above 6 km/h when the ignition is switched on.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00284 ABS inlet/outlet valve, front right -N138	- Open circuit, short to positive or earth in wiring between hydraulic unit -N55 and control unit -J104 - ABS inlet/outlet valve -N138 defective	- Trace and repair open circuit or short in wiring according to current flow diagram 1) - Test hydraulic unit, perform function test with V.A.G 1710 (test steps 1 and 5)

1) Applicable for all ABS inlet/outlet valves -N137, -N138, -N139, -N140 ...

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00285 Speed sensor, front right -G45	- Open circuit, short to positive or earth in wiring between speed sensor -G45 and control unit -J104	- Trace and repair open circuit or short in wiring according to current flow diagram
Short circuit/short to positive	- Rotor dirty or damaged	- Check, clean or renew rotor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Checking rotor
No fault type identified 1)	- Excessive wheel bearing play	- Renew wheel bearing => Audi 100; Running gear, Front-wheel drive and 4WD; Repair group 40; Servicing front suspension; Removing and installing wheel bearing
Note: Diagnosis cannot identify exact fault	- Speed sensor -G45 incorrectly installed - Speed sensor -G45 defective	- Check installation position of speed sensor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Removing and installing speed sensor - Test speed sensor -G45, perform function test with V.A.G 1710 (test step 6) Renew speed sensor -G45

1) This readout may be indicated incorrectly (as a sporadic fault) if one or more wheels are turned at a speed above 6 km/h when the ignition is switched on.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00286 ABS inlet/outlet valve, rear left -N139	- Open circuit, short to positive or earth in wiring between hydraulic unit -N55 and control unit -J104 - ABS inlet/outlet valve -N139 defective	- Trace and repair open circuit or short in wiring according to current flow diagram 1) - Test hydraulic unit, perform function test with V.A.G 1710 (test steps 1 and 5)

1) Applicable for all ABS inlet/outlet valves -N137, -N138, -N139, -N140 ...

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00287 Speed sensor, rear right -G44 Open circuit/short to positive No fault type identified 1) Continued ▼	- Open circuit, short to positive or earth in wiring between speed sensor -G44 and control unit -J104 - Rotor dirty or damaged - Excessive wheel bearing play	- Trace and repair open circuit or short in wiring according to current flow diagram - Check, clean or renew rotor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on rear axle, Front-wheel drive; Checking rotor - Adjust wheel bearing play => Audi 100; Running gear, Front-wheel drive and 4WD; Repair group 42; Servicing wheel bearing

1) This readout may be indicated incorrectly (as a sporadic fault) if one or more wheels are turned at a speed above 6 km/h when the ignition is switched on.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00287 Speed sensor, rear right -G44 Note: Diagnosis cannot identify exact fault	- Speed sensor -G44 incorrectly installed - Speed sensor -G44 defective	- Check installation position of speed sensor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on rear axle, Front-wheel drive; Removing and installing speed sensor - Test speed sensor -G44, perform function test with V.A.G 1710 (test step 6) - Renew speed sensor -G44

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00289 ABS inlet/outlet valve, rear right -N140	- Open circuit, short to positive or earth in wiring between hydraulic unit -N55 and control unit -J104	- Trace and repair open circuit or short in wiring according to current flow diagram 1)



V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
	- ABS inlet/outlet valve -N140 defective	- Test hydraulic unit, perform function test with V.A.G 1710 (test steps 1 and 5)

1) Applicable for all ABS inlet/outlet valves -N137, -N138, -N139, -N140 ...

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00290 Speed sensor, rear left -G46 Open circuit/short to positive	- Open circuit, short to positive or earth in wiring between speed sensor -G46 and control unit -J104 - Rotor dirty or damaged	- Trace and repair open circuit or short in wiring according to current flow diagram - Check, clean or renew rotor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on rear axle, Front-wheel drive; Checking rotor
No fault type identified 1) Continued ▼	- Excessive wheel bearing play	- Adjust wheel bearing play => Audi 100; Running gear, Front-wheel drive and 4WD; Repair group 42; Servicing wheel bearing Repair group 42; Servicing wheel bearing

1) This readout may be indicated incorrectly (as a sporadic fault) if one or more wheels are turned at a speed above 6 km/h when the ignition is switched on.

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.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00290 Speed sensor, rear left -G46	- Speed sensor -G46 incorrectly installed	- Check installation position of speed sensor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on rear axle, Front-wheel drive; Removing and installing speed sensor
Note: Diagnosis cannot identify exact fault	- Speed sensor -G46 defective	- Test speed sensor -G46, perform function test with V.A.G 1710 (test step 6) Renew speed sensor -G46

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00301 ABS return flow pump -V39	- Open circuit or contact resistance in earth connection or voltage supply to return flow pump -V39 - Open circuit or short to positive/earth in wiring between relay -J105 and control unit -J104	- Trace and repair open circuit or contact resistance according to current flow diagram - Trace and repair open circuit or short in wiring according to current flow diagram

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
	- ABS return flow pump relay -J105, return flow pump -V39 or hydraulic unit defective	- Test relay -J 105, return flow pump -V39 and hydraulic unit -N55, perform function test with V.A.G 1710 (test step 3)

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00302 Solenoid valve relay -ABS -J106 1) 2)	- Defective wiring or excessive contact resistance in earth connection to solenoid valve relay -J106. - Open circuit or short to positive/earth in wiring between relay -J106 and control unit -J104 - Solenoid valve relay -J106 or hydraulic unit -N55 defective	- Test earth connection for contact resistance and defective wiring according to current flow diagram - Trace and repair open circuit or short in wiring according to current flow diagram - Test relay -J106 and hydraulic unit, perform function test with V.A.G 1710 (test step 1)

1) If this fault is indicated on front-wheel drive vehicles with EDL, test EDL valves -N125 and -N126 additionally.

2) If this fault is indicated on four-wheel drive vehicles, test ABS inlet/outlet valve -N160 additionally (fault code 00649).

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00526 Brake light switch -F	- Open circuit or short to positive in wiring between brake light switch, brake light bulbs -M9, -M10 or control unit -J104 - Brake light bulbs -M9 or -M10 defective - Brake light switch defective	- Trace and repair open circuit or short in wiring according to current flow diagram - Renew bulb - Test brake light switch, read measured value block => Page 39 or perform function test with V.A.G 1710 (test step 2)

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00532 Supply voltage	- Open circuit or contact resistance in voltage supply to control unit -J104 (contact 1) or in earth connection to control unit -J104 - Loss of voltage or excessive voltage in electrical system. Notes: The ABS / ABS with EDL system will be switched on again and the warning lamp -K47 will go out as soon as the supply voltage returns to the required level. This fault is only stored in the memory if it occurs at a road speed above 6 km/h	- Trace and repair open circuit or contact resistance, perform function test with V.A.G 1710 (test step 1). - Test alternator and voltage regulator. => Current flow diagrams, Electrical fault-finding and Fitting locations - Perform function test with V.A.G 1710 (test steps 1 and 5).

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorized 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.



V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00597 Differing wheel speed impulses 1) Continued ▼	- One rotor installed with wrong number of teeth - Rotor dirty or damaged	- Check all rotors => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Checking rotor - Check all rotors, clean or renew faulty component => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Checking rotor

1) This readout may be indicated incorrectly(as a sporadic fault) if one or more wheels are turned at a speed above 6 km/h when the ignition is switched on.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00597 Differing wheel speed impulses 1) Continued ▼	- One of the speed sensors incorrectly installed	- Check installation position of all speed sensors => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Removing and installing speed sensor

1) This readout may be indicated incorrectly(as a sporadic fault) if one or more wheels are turned at a speed above 6 km/h when the ignition is switched on.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00597 Differing wheel speed impulses 1)	- Excessive wheel bearing play at one wheel or wheel bearing defective - One of the speed sensors defective	- Check and renew all wheel bearings => Audi 100; Running gear, Front-wheel drive and 4WD; Repair group 40; Servicing front suspension; Removing and installing wheel bearing Repair group 42; Servicing wheel bearing - Test all speed sensors, perform function test with V.A.G 1710 (test step 6)

1) This readout may be indicated incorrectly(as a sporadic fault) if one or more wheels are turned at a speed above 6 km/h when the ignition is switched on.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00649 ABS inlet/outlet valve, rear -N160	- Open circuit, short to positive or earth in wiring between hydraulic unit -N55 and control unit -J104	- Trace and repair open circuit or short in wiring according to current flow diagram 1)

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
	- ABS inlet/outlet valve -N160 defective	- Test hydraulic unit, perform function test with V.A.G 1710 (test steps 1 and 5)

1) Applicable for all ABS inlet/outlet valves -N137, -N138, -N139, -N140 ...

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00668 Vehicle voltage, terminal 30 Note: only for EDL	Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted. The copyright in this document is reserved by AUDI AG. All rights reserved. No part of this document may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without permission in writing from AUDI AG. - When brakes are hot: open circuit in voltage supply to control unit -J104 (contact 16) or connector for control unit -J104 disconnected Notes: Depending on the calculated brake temperature, control unit -J104 remains active with an increased current draw (approx. 220 mA instead of less 2 mA) for a maximum of 1 hour after the ignition has been switched off => Page 26). If control unit -J104 operates with increased current draw although no brake applications occurred before switching off the ignition, test wiring from control unit -J104 (contact 25) for short circuit to positive according to current flow diagram.	- Trace and repair open circuit in wiring according to current flow diagram Perform function test with V.A.G 1710 (test steps 2 and 4)

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
01278 EDL cut-off relay -J263	- Open circuit, short to positive or earth in wiring to cut-off relay -J263 - No speed signal from speedometer -G21 (will only be recognised when road speed exceeds 100 km/h) - Cut-off relay -J263 defective	- Trace and repair open circuit or short in wiring according to current flow diagram - Check speed signal => Current flow diagrams, Electrical fault-finding and Fitting locations - Test cut-off relay -J263, perform electrical test => Page 41 , test step 3

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
65535 Control unit defective Note: If the fault "ABS return flow pump - V39" (or on vehicles with EDL, a fault in one of the ABS inlet/outlet valves) is displayed at the same time, rectify the cause of this fault first.	- Open circuit or contact resistance in voltage supply or earth connection to control unit -J104 - Control unit -J104 defective	- Trace and repair open circuit or contact resistance according to current flow diagram Renew control unit -J104



4.9 - Erasing fault memory

Requirements:

- ♦ Fault memory interrogated
- ♦ All faults rectified

Notes:

- ♦ If the fault memory cannot be erased, interrogate the fault memory once again and rectify the fault.
- ♦ The fault memory will not be erased if, for example, the ignition is switched off or road speed exceeds 20 km/h during the test sequence between interrogating fault memory and erasing fault memory.

After fault memory has been successfully interrogated:

Performing function 05 - "Erase fault memory"

-> Indicated on display:

Rapid data transfer HELP
Select function XX

- Press keys 0 and 5.

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.

-> Indicated on display:

Rapid data transfer Q
05 - Erase fault memory

- Confirm input with Q key.

-> Indicated on display:

Rapid data transfer
Fault memory is erased!

The fault memory is now erased.

- Press ➡key.

-> Indicated on display:

Rapid data transfer HELP
Select function XX

♦ Attention!
Fault memory is not interrogated

-> This message indicates an error in the test sequence:

♦ ->

Rapid data transfer
Fault memory is not interrogated

This message indicates an error in the test sequence:

Keep exactly to test sequence: First interrogate fault memory, if necessary repair faults, then erase.

4.10 - End output

Performing function 06 - "End output"

-> Indicated on display:

Rapid data transfer HELP
Select function XX

- Press keys 0 and 6.

-> Indicated on display

Rapid data transfer Q
06 End output

- Confirm input with Q key.

-> Indicated on display:

Rapid data transfer HELP
Enter address word XX

- Switch off ignition.
- Disconnect fault reader V.A.G 1551.

4.11 - Reading measured value block

The control unit can transfer test data ("measured values") to fault reader V.A.G 1551. These measured values supply information about the operational condition of the system and the sensors connected to it. In many cases the measured values can be used to help trace and repair faults.

- Connect fault reader V.A.G 1551 and select "Brake electronics" (address word 03)=>Page **27** .

Notes:

- ◆ When the printer is switched on, the contents of the display will be printed out on the fault reader log.
- ◆ When "reading measured value block", also check wiring and connectors for intermittent loose contacts.
- Check the control unit version=>Page **28** and press the⇒key.

-> Indicated on display:

Rapid data transfer HELP
Select function XX

- Press keys 0 and 8 for the function "Read measured value block".

-> Indicated on display:

Rapid data transfer Q
08 - Read measured value block

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.

- Confirm input with Q key.

-> Indicated on display:

Read measured value block
Enter display group number XXX

- Press keys 0, 0 and 0.
- Confirm input with Q key.

-> Indicated on display:



Read measured value block

1	2	3	4	5	6	7
8						

Test table: Display Group 0

- Display zones 1 to 4 show the actual wheel speeds (at the tyre circumference) in km/h. These are calculated by control unit -J104 on the basis of the signals received from the wheel speed sensors. If one of the display zones shows no reading, proceed as for fault codes 00283, 00285, 00287, 00290 "Speed sensor" => Fault table, Page 30.
- In order to check that the speed sensor signals are correctly assigned to the four wheels, the vehicle must be raised. On vehicles with manual gearbox put the gear lever in neutral. On vehicles with automatic gearbox move the selector lever to position "N". Turn the relevant wheel by hand, and at the same time prevent the other driven wheels from rotating.
- When the vehicle is accelerated uniformly on a dry surface, the displayed values will increase steadily in rising whole numbers, e.g. 6 km/h, 7 km/h, 8 km/h. The difference between displayed values 1 to 4 should be not be more than ±1 km/h (error from out-of-round-wheels). If the values jump, for instance from ... 6 km/h, 7 km/h, to 12 km/h ... or if the difference between the displayed values is greater than ±1 km/h, check the installation of the wheel speed sensors and rotors.

Read measured value block				0 ⇒	Indicated on display
1 ... 19 1)	1 ... 19 1)	1 ... 19 1)	1 ... 19 1)	1 ... 19 1)	
km/h	km/h	km/h	km/h	km/h	
1	2	3	4		Display zones
Wheel speed, rear right					
Wheel speed, rear left					
Wheel speed, front right					
Wheel speed, front left					

1) The self-diagnosis is terminated by control unit -J104 if road speed exceeds 19 km/h.

Read measured value block				0 ⇒	Indicated on display
0 or 1	0 or 1	0 or 1	0 or 1	0 or 1	
5	6	7	8		Display zones
EDL cut-off relay -J263 (only on vehicles equipped with EDL): - 0 ⇒ Not permissible with vehicle stationary Perform electrical test (test step 3) => Page 41 - 1 ⇒ Relay -J263 has picked up Differential lock switch on rear final drive -F100 (only on vehicles with four-wheel drive, contact 13 on -J104): - 0 ⇒ Differential lock disengaged - 1 ⇒ Differential lock engaged ABS solenoid valve relay -J106 (contact 32 on -J104): - 0 ⇒ Not permissible, relay -J106 has not picked up Perform function test with V.A.G 1710 (test steps 1 and 5) - 1 ⇒ Relay -J106 has picked up Voltage is present at return flow pump motor -V39: On vehicles with front-wheel drive, display moves one display zone to the left. - 0 ⇒ Specification, no voltage is present at return flow pump motor. - 1 ⇒ Not permissible during the function "Read measured value block": voltage is present at return flow pump motor. Perform function test with V.A.G 1710 (test steps 3 and 5)					
Brake light switch -F: signal for front-wheel drive and four-wheel drive models (contact 25 on -J104):					

- 0 ⇒ Brake pedal not operated
- 1 ⇒ Brake pedal operated

- Check brake light switch if displays are not correct.
=> Current flow diagrams, Electrical fault-finding and Fitting locations

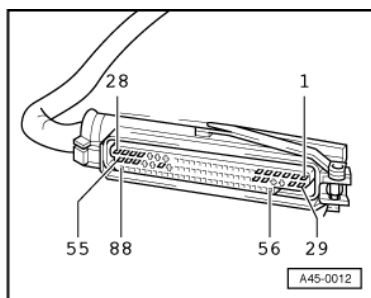
5 - Electrical test of ABS / ABS with EDL, 1993 model year (chassis No. 4APN ...)

5.1 - Electrical test of ABS / ABS with EDL, 1993 model year (chassis No. 4APN ...)

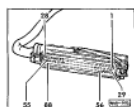
- ◆ If the self diagnosis does not give any indication of the cause of the fault, work through the complete electrical test.
- ◆ If the self diagnosis provides a direct indication of the source of the fault, only carry out the test steps recommended in the fault table (specific testing).

5.2 - Test requirements

- The fault memory of the control unit for ABS / ABS with EDL -J104 has been interrogated and any faults indicated have been traced and rectified.
- No fault has been found in test steps 1 to 6 in fault-finding (and function test) with ABS tester V.A.G 1710.
- No gear selected (front wheels can be turned freely).
- Brake fluid level in reservoir is OK.



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.



- -> The multi-pin connector between the wiring harness and control unit -J104 must be in proper condition, with no bent, broken or corroded contacts. Replace any damaged contacts using wiring repair kit VAS 1978.

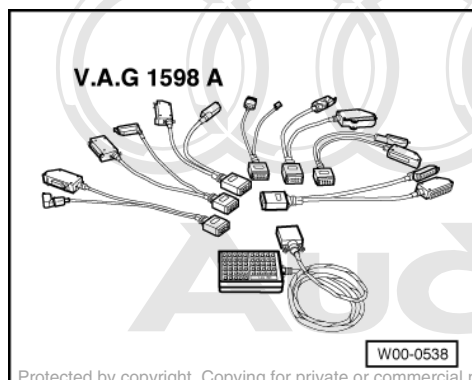
Note:

The instructions supplied with wiring repair kit VAS 1978 normally do not permit repairs to the wiring of the ABS and associated systems. However, this only applies to the screened wiring in the system.

- Before starting the test, switch off the ignition and other electrical equipment (headlights, lighting, fan, etc.).
- For test steps 5 to 7 the vehicle must be raised so that the wheels can turn freely. On vehicles with manual gearbox put the gear lever in neutral. On vehicles with automatic gearbox move the selector lever to position "N".

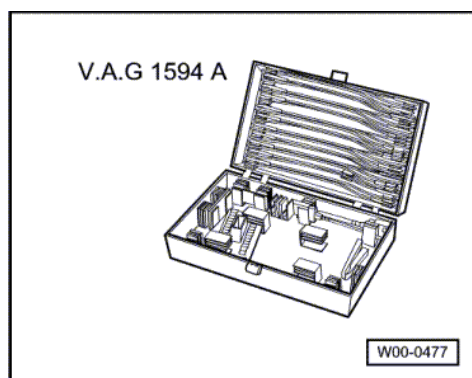


Special tools and workshop equipment required

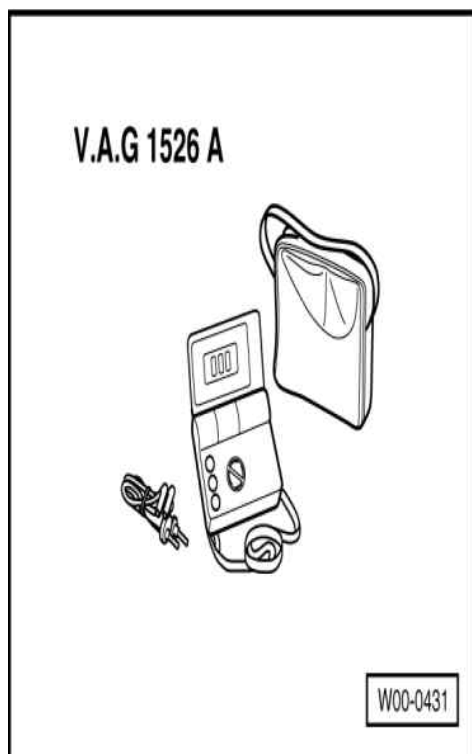


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted without the prior written permission of AUDI AG. AUDI AG does not accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- ♦ Test box V.A.G 1598 A with adapter V.A.G 1598/3



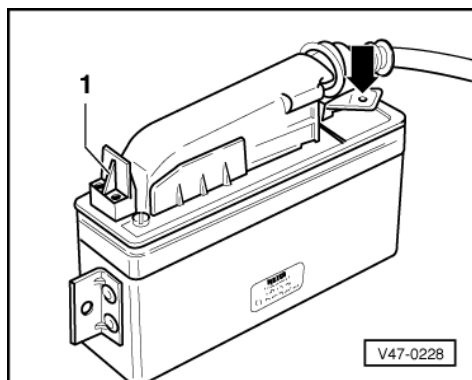
- ♦ Auxiliary test set V.A.G 1594 A



- ♦ Hand-held multimeter V.A.G 1526 A

Connecting test box V.A.G 1598 A and testing ABS or ABS/EDL system

- Switch off ignition.
- Remove rear seat bench.

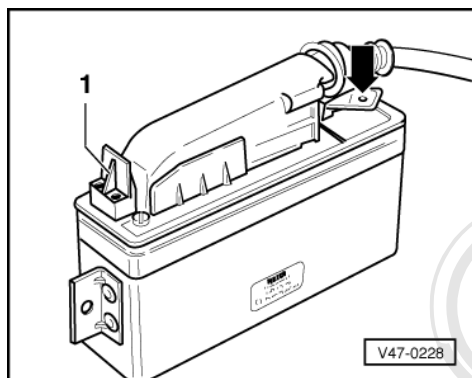


- -> Press spring -arrow- and unplug multi-pin connector from control unit -J104.
- Check multi-pin connection between wiring harness and control unit -J104.

The socket designations on test box V.A.G 1598 A are identical with the contact designations on control unit - J104 and the designations of the connector on the wiring harness.

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

- Connect test box V.A.G 1598 A with adapter V.A.G 1598/3 to multi-pin connector on ABS harness.



Notes:

- ◆ -> Do not connect control unit -J104 for ABS / ABS with EDL (-1-) to test box.
- ◆ Trace and rectify faults found in the vehicle wiring according to current flow diagram.

5.3 - Test table

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.

Notes on test table

- ◆ The socket designations of the test box V.A.G 1598 are identical to the contact designations of the control unit -J104 in the current flow diagram. Incorrect test procedures can cause damage to the system: do not make connections between any contacts other than those listed in the table

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

- ◆ The specified values refer to the readings obtained on tester V.A.G 1526 and are not necessarily applicable for other test units.



- ♦ If the readings obtained do not match the specifications, carry out the fault rectification measures in the right-hand part of the table.

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

- ♦ If the specified values are achieved, also check wiring for intermittent loose contacts and short circuit to positive and earth. This applies especially to sporadic faults.
- ♦ Use test leads V.A.G 1594 for checking continuity (bridging leads).
- ♦ If the measured figures only differ slightly from the specifications, clean the sockets and plugs of the testers and test leads (with contact spray G 000 700 04) and repeat the check. Before replacing components, check wiring and connections again, particularly if the specification calls for a resistance reading of less than 10 ω .

Select resistance test range on V.A.G 1526 (200 ω)					
Test step	V.A.G 1598 A sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
1	13 + 3	Valve 1 for differential lock (EDL) - N125 and connecting wiring	▪ Ignition switched off	4.5 ω - 6 ω	- Test wiring between -J104 and -N125 for open circuit or contact resistance Valve -N125 defective, renew hydraulic unit
2	13 + 33	Valve 2 for differential lock (EDL) - N126 and connecting wiring	▪ Ignition switched off	4.5 ω - 6 ω	- Test wiring between -J104 and -N126 for open circuit or contact resistance Valve -N126 defective, renew hydraulic unit
3 Continued ▼	13 + 20	EDL cut-off relay - J263 and connecting wiring	▪ Ignition switched off	∞ ω	- Test wiring between -J104 and -J263 for short circuit to earth Test wiring to -J263 (contact 15) for short circuit to positive Cut-off relay -J263 defective, renew

Select resistance test range on V.A.G 1526 (200 ω)					
Test step	V.A.G 1598 A sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification

Select resistance test range on V.A.G 1526 (200 ω)					
3a	13 + 20	EDL cut-off relay - J263 and connecting wiring	▪ Ignition switched on	less than 10 ω	- Test wiring between -J104 and -J263 for open circuit or contact resistance Test earth connection to control unit -J104 (contact 20) for contact resistance Test wiring to -J263 (contact 15 or 31) for open circuit in voltage supply or earth connection Cut-off relay -J263 defective, renew

Notes:

- ♦ The cut-off relay -J263 also switches off the EDL function when a speed of 60 km/h is exceeded (open circuit between relay contacts 87 and 86).
- ♦ Checking speed signal

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

- ♦ If battery voltage is still being supplied to contact 13 on control unit -J104 at speeds above 100 km/h (via relays -J106 and -J263), this condition is stored in the memory as a fault and the ABS / ABS with EDL will be switched off.

No test equipment required					
Test step	V.A.G 1598 A sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
4 1)	Bridge across 1 + 3 2)	Function and correct wiring of valve 1 for differential lock (EDL) -N125	▪ Ignition switched on Depress and hold down brake pedal - Remove bridge connection Release brake pedal	Front right wheel can be turned by hand - Front right wheel locked	- Test wiring between valve -N125 and -J104 for faults EDL function switched off by cut-off relay -J263, check (test step 3) Valve -N125 defective, renew hydraulic unit

Protected by copyright. Copying for private or commercial purposes, without the written permission of AUDI AG, is prohibited. AUDI AG does not guarantee the correctness of information in this document. Copyright by AUDI AG.

1) Two operators are required to perform this test.

2) The bridge connection between sockets 1 and 3 must not be left in place for longer than 30 seconds (maximum).

No test equipment required					
Test step	V.A.G 1598 A sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification

5 1)	Bridge across 1 + 33 2)	Function and correct wiring of valve 2 for differential lock (EDL) -N126	▪ Ignition switched on Depress and hold down brake pedal - Remove bridge connection Release brake pedal	Front right wheel can be turned by hand - Front right wheel locked	- Test wiring between valve -N126 and -J104 for faults EDL function switched off by cut-off relay -J263, check (test step 3) Valve -N125 defective, renew hydraulic unit
------	----------------------------	--	--	--	---

1) Two operators are required to perform this test.

2) The bridge connection between sockets 1 and 33 must not be left in place for longer than 30 seconds (maximum).

No test equipment required					
Test step	V.A.G 1598 A sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
6 1)	Bridge across 16 + 17 2)	Function of charge valve and pressure limiting valve for EDL (in hydraulic unit); leak test	▪ Ignition switched off ▪ Brake system tester V.A.G 1310 A connected to front right brake caliper and tester bled Switch on ignition. Operate brake pedal until pressure rises to 10 bar on pressure gauge. Do not change brake pedal position.		
Continued ▼			- Bridge across sockets 1 and 3 Bridge across sockets 28 and 20	- Return flow pump - V39 runs	- Perform fault-finding according to fault-finding programme for ABS tester V.A.G 1710 (test step 3)

1) Two operators are required to perform this test.

2) Test step must be completed within 30 seconds (after connecting bridge connection between sockets 1 and 3); remove all bridge connections.

and 3); remove all bridge connections.

No test equipment required					
Test step	V.A.G 1598 A sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification

6 1)	Bridge across 16 + 17 2)	Function of charge valve and pressure limiting valve for EDL (in hydraulic unit); leak test	- Release brake pedal - Remove both bridge connections	- Pressure rises by less than 15 bar - Pressure rises to 40 bar (min.) or 60 bar (max.)	- Charge valve defective, renew hydraulic unit - Check if hose connection for EDL function from brake fluid reservoir to hydraulic unit is kinked or blocked - Pressure limiting valve or charge valve defective, renew hydraulic unit - EDL function switched off by cut-off relay -J263, check (test step 3)
------	--------------------------	---	---	--	---

1) Two operators are required to perform this test.

2) Test step must be completed within 30 seconds (after connecting bridge connection between sockets 1 and 3); remove all bridge connections.

Select voltage test range on V.A.G 1526: 20 V =					
Test step	V.A.G 1598 A sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
7 1)	30 + 20 2)	Wiring between control units -J104 and -J217	▪ Ignition switched on	automatic gearbox 01K: approx. battery voltage automatic gearbox 097: approx. 5 V	- Trace and repair open circuit according to current flow diagram - Test automatic gearbox control unit -J217 => Audi 100; Automatic gearbox 01F and 01K Self-diagnosis; Repair group 01 => Audi 100; Automatic gearbox 097, Self-diagnosis; Repair group 01

1) Only perform this test step on vehicles equipped with EDL and automatic gearbox.

2) The input (contact 30) at control unit -J104 is switched to earth(pulsed) during an EDL control cycle. The control unit -J217 alters the gearshift points during an EDL control cycle(for improved comfort).

5.4 - Testing wiring of diagnostic connector

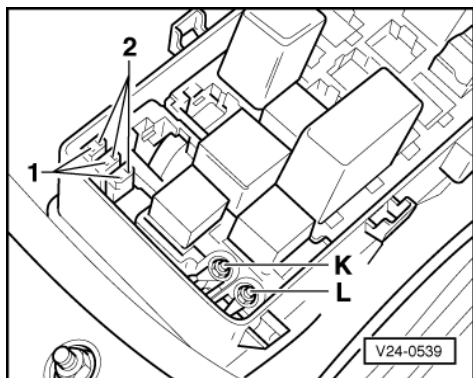
The diagnostic connectors and junctions "K" and "L" for all on-board systems with self-diagnosis are grouped in relay point 1 in the plenum chamber (left side). For wiring colours and other on-board systems connected to "white" diagnostic connector:

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

- Switch off the ignition before testing the wiring connections.



- Use hand-held multimeter V.A.G 1526 A, auxiliary test set V.A.G 1594 A and test box V.A.G 1598 A with adapter lead V.A.G 1593/3 for testing.

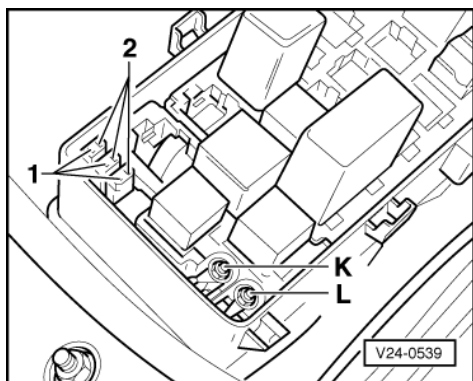


-> Testing voltage supply for fault reader V.A.G 1551, "black" diagnostic connector:

- Contact 1 connected to battery earth.
- Contact 2 connected to positive (via fuse 19 / terminal 30).

- Test wiring.

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

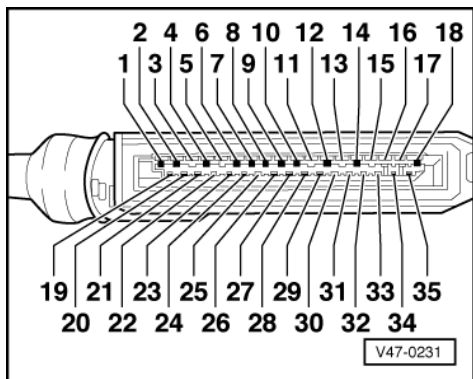


Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

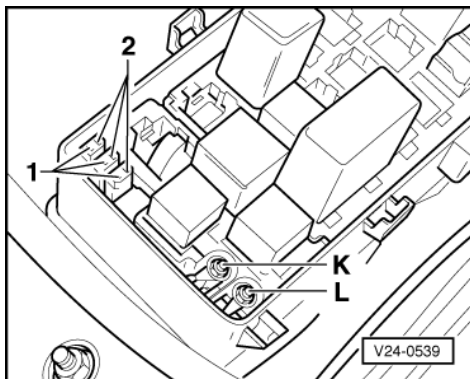
-> Testing diagnostic wiring "L" and "K"; "white" diagnostic connector:

Contact 1, not used for brake electronics.

Contact 2, diagnostic wiring "K" for "Rapid data transfer". The link with the control unit is set up and data are exchanged via the "K" wire. The "K" wire is routed from the "white" diagnostic connector via the junction "K" to the various control units.



- -> Unplug connector from control unit -J104.
 - Connect test box V.A.G 1598 A with adapter lead V.A.G 1598/3 and measure at the corresponding sockets.
- => Current flow diagrams, Electrical fault finding and Fitting locations
- Test wiring connection with V.A.G 1526 A for open circuit, short to positive or earth.



-> "Blue" diagnostic connector is not used for operating mode "Rapid data transfer".

Testing wiring connection if V.A.G 1551 indicates "Fault in communication build-up":

If the display on V.A.G 1551 indicates "Fault in communication build-up", the fault may be in control unit -J104 or in other control units which are not relevant for the ABS/EDL system, but which prevent the diagnostic link from being established.

- At junction "K", disconnect the wiring between contact 2 of the "white" diagnostic connector and all on-board systems with self-diagnosis ("Rapid data transfer") in turn.

Note:

Other systems with self-diagnosis:

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

- After disconnecting each of the on-board systems, select address word "03" in operating mode "Rapid data transfer" once again.
- If the display then shows the control unit identification, test the wiring connection to the control unit which was last disconnected (refer to current flow diagram). If no fault can be found, renew the control unit which was last disconnected and reconnect all wiring connections.

Note:

If the display shows "Control unit does not answer", there is an open circuit in wiring connection to control unit -J104.

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.



6 - ABS (Bosch type 5.0 system), 1995 model year (chassis No. 4ASN ...)

6.1 - ABS (Bosch type 5.0 system), 1995 model year (chassis No. 4ASN ...)

ABS(Bosch type 5.0);

ABS with electronic differential lock (ABS/EDL)(Bosch type 5.0);

ABS/EDL with traction control system (ASR)(Bosch type 5.0), from chassis No. 4ASN ..., EDL suction-side control for vehicles with four-wheel drive

A new anti-lock brake system (ABS) is being introduced as standard equipment for 1995 models onwards. In addition, an ABS/EDL system or traction control system (ASR) together with ABS/EDL are available for front-wheel drive vehicles as an optional extra.

The brake system is split diagonally into two hydraulic circuits: one supplying the front left and rear right brakes and one supplying the front right and rear left brakes.

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.

EDL suction-side control for vehicles with four-wheel drive

The EDL on four-wheel drive vehicles manufactured from 05/95 onwards is actuated via the suction-side of the circuit. The pressure which is built up in the brake system during an EDL control cycle is now controlled via the suction-side of the ABS return flow pump and not via the pressure delivery side, as on previous models. The control process is defined by the control unit.

This feature reduces the noise produced during an EDL control cycle.

The pressure dampers previously employed in the hydraulic unit to reduce the noise produced when the system is operating are no longer fitted. The operating range of the pressure limiting valve in the hydraulic unit has been raised from 90±25 bar to 170±25 bar.

It is not possible to fit the wrong type of hydraulic unit or control unit, because of the coding of the connector on the hydraulic unit and the wiring of the speed sensor inputs on the control unit. The control unit version can be identified by the index letter=>Page 58 .

The components of the Bosch type 5.0 system have the following functions:

Electronic brake force distribution:

The control unit -J104 is programmed with specially designed software for "electronic brake force distribution", which takes over the function of the brake pressure limiter. The brake pressure limiter is no longer required.

In the event of failure of the ABS, the signal which activates the ABS/EDL warning lamp and the red brake warning symbol is sent to the dash panel insert via the wire from contact 32 of control unit -J104. The dash panel insert registers whether or not this signal is present: the red brake warning symbol will light up in addition to the ABS/EDL warning lamp. This indicates that the electronic brake force distribution function is not operating. If the vehicle has to be driven in this condition, extra care is required;=>Page 53 , "Road testing".

Anti-lock brake system (ABS):

The anti-lock brake system (ABS) prevents the wheels from locking when the brakes are applied by the driver.

Electronic differential lock (EDL):

The electronic differential lock (EDL) is an aid when driving away from a standstill. An electronically controlled brake application on the spinning driven wheel provides a torque reaction point for the differential, which enables the wheel with better traction to transmit the engine power onto the road. The EDL is effective in both forwards and reverse directions.

EDL is standard equipment on vehicles with four-wheel drive, where it acts on all four wheels (on vehicles with front-wheel drive it acts only on the front wheels). A mechanical differential lock is not required.

The EDL control function can be initiated at road speeds up to 40 km/h.

To prevent the brakes from overheating, the EDL control function is suppressed if the temperature of the brakes exceeds a certain value which is defined in the control unit -J104. The temperature of the brakes is calculated by the control unit using a simulation formula. The EDL is then reactivated if the calculated temperature drops below a predetermined lower threshold. The operation of the conventional brake system and the ABS and ASR traction control functions are not affected by this automatic cut-off feature.

When the brakes are hot, the control unit still remains active for up to one hour after the ignition is switched off. It switches itself off when the calculated brake temperature drops below the predetermined threshold. During this period the control unit has an increased current draw (approximately 500 mA, compared with 0.5 mA or less when the control unit is not active).

Traction control system (ASR):

ASR (traction control system, also referred to as TCS) is fitted only on vehicles with front-wheel drive. On these vehicles it is important to check the control unit coding=>Page **68** . The traction control function relies on an exchange of signals between control unit -J104, the engine control unit and the gearbox control unit, in other words a communication link between the control units.

The ASR traction control system prevents the driven wheels from spinning under acceleration: the system operates by reducing engine torque and is active at all speeds. The EDL and ASR functions act together to assist acceleration.

If required, the ASR function can be switched off (and on again) by means of the ASR push-button switch in the centre console. The ASR will be reactivated automatically the next time the ignition is switched on. When the system is deactivated, the ASR warning lamp lights up in the dash panel:="Read measured value block", Page **70** . The warning lamp flashes at rate of three times per second when the ASR control function is working (i.e. when engine power is being reduced to maintain traction).

6.2 - Table of warning lamp functions

If a fault is detected by the self-diagnosis function, it is indicated by the warning lamps lighting up when the ignition is switched on.

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.

- ◆ ABS/EDL warning lamp -K47
- ◆ Traction control system warning lamp (ASR) -K86
- ◆ Brake system warning lamp -K118



ABS -K47	Brake system	ASR -K86 1)	Possible reasons for warning lamps lighting up
			If an irregularity occurs in the self-test after the ignition is switched on and the warning lamps -K47 and -K86 do not light up and remain on for 2 seconds, test the warning lamps; Electrical test => Page 72 , perform test steps 19 and 21. If the lamps do not light up, this may be due to the following reasons: - Inadequate battery voltage (none of the warning lamps in the instrument cluster light up). Check state of charge or voltage of battery. => Current flow diagrams, Electrical fault-finding and Fitting locations => Audi 100; Electrical system; Repair group 27; Battery Repair group 27; Battery
		X 1)	- If the ABS warning lamp does not light up during the self-test phase: short to earth in wiring from contact 32 of control unit -J104 to dash panel insert (activation of ABS warning lamp). This fault does not affect the activation of the ASR warning lamp. On vehicles with traction control system (ASR), if the ASR warning lamp lights up during the self-test phase; => "Electrical test" Page 72 , perform test step 19.
X			- Vehicles equipped with traction control system (ASR): if the ABS warning lamp lights up during the self-test phase, but the ASR warning lamp does not light up during the self-test phase; => "Electrical test" Page 72 , perform test step 21.

- 1) The ASR warning lamp is only fitted on vehicles with traction control system (ASR).

ABS -K47	Brake system	ASR -K86 1)	Possible reasons for warning lamps lighting up
X		X 1)	- If the power supply and the activation of the warning lamps are OK, the warning lamps will light up for 2 seconds during the self-test phase after the ignition is switched on. - Applies to vehicles with or without traction control system (ASR): - If the warning lamps do not go out after the self-test phase, but the brake system warning lamp does not light up: perform test step 20 in the "Electrical test", Page 72 , and observe the points listed in the section below.

- 1) The ASR warning lamp is only fitted on vehicles with traction control system (ASR).

ABS -K47	Brake system	ASR -K86 1)	Possible reasons for warning lamps lighting up
X	X	X 1)	Applies to vehicles with or without traction control (ASR): The ABS/EDL warning lamp lights up continuously after the ignition is switched on, and the brake system warning lamp also lights up 3 seconds after the ignition is switched on: Warning There is a risk of accident if the vehicle is driven in this condition. The function of the brake system is impaired because the brake pressure at the rear wheels is no longer controlled by the electronic brake force distribution. This can result in excessive braking at the rear, and the tail of the vehicle may break out unexpectedly. The fault may be caused by the following conditions: - Power supply voltage between 6.5 and 10.5 volts and road speed is above 6 km/h; Electrical test =>Page 58 . - Fault reader V.A.G 1551 is connected and the diagnostic link has been established with control unit -J104.

- 1) The ASR warning lamp is only fitted on vehicles with traction control system (ASR).

ABS -K47	Brake system	ASR -K86 1)	Possible reasons for warning lamps lighting up
		X 1)	Vehicles with traction control system (ASR): - A fault exists which affects only the ASR. The ABS and EDL systems are not switched off. Interrogate fault memory => Page 72 , perform test steps 21 and 22. - The ASR traction control function is operating. The ASR warning lamp flashes at a rate of 3 times per second. - Short to positive in ASR push-button switch: the ASR warning lamp will go out 5 minutes after the ignition is switched on. - The warning lamp lights up continuously after the ignition is switched on, and none of the faults listed in this section of the table are present. Short to earth in wiring from contact 31 of control unit -J104 to dash panel insert (activation of ASR warning lamp).
			If a fault is present on the vehicle, but the warning lamps light up during the self-test phase and then go out in the normal way, this can be caused by the following conditions: - The fault "Brake light switch -F" (Fault code 00526) is stored in the memory; interrogate fault memory => Page 58 . - The EDL has been temporarily deactivated in order to prevent the brakes from overheating.

- 1) The ASR warning lamp is only fitted on vehicles with traction control system (ASR).

ABS -K47	Brake system	ASR -K86 1)	Possible reasons for warning lamps lighting up
X	X		Applies to vehicles with or without traction control system (ASR): No faults are present in the fault memory. The ABS warning lamp lights up continuously after the ignition is switched on, and the brake system warning lamp also lights up 3 seconds after the ignition is switched on. On vehicles with ASR the ASR warning lamp does not light up. - Supply voltage of control unit -J104 below 6.5 V; "Electrical test" => Page 72 , perform test step 19.
	X		No fault is stored in the fault memory. The brake system warning lamp lights up continuously after the ignition is switched on. - Brake fluid level too low - Fault in dash panel insert: perform "Electrical test" => Page 72 , test step 20.

- 1) The ASR warning lamp is only fitted on vehicles with traction control system (ASR).

Road testing

- ◆ Certain faults will only be detected when the car is moving, so the system can be checked by performing a road test. Maintain a speed above 60 km/h for a period of 30 seconds. After ensuring that it is safe to do so, apply the brakes hard enough to activate ABS-controlled braking (this can be felt from the pulsation at the brake pedal).

Warning

If you drive the vehicle after a fault has been detected by the self-diagnosis, bear in mind that the function of the brake system is impaired. Otherwise there is a risk of accident, since the brake pressure at the rear wheels is no longer controlled by the electronic brake force distribution function. This can result in excessive braking at the rear, and the tail of the vehicle may break out unexpectedly.

If test and measuring instruments are required during a test drive, these must always be secured to the rear seat and operated by a second person from this position. If test and measuring instruments are operated from the front passenger's seat and the vehicle is involved in an accident, the occupant of the seat could be seriously injured if the airbag is triggered.

If a problem exists on the vehicle, perform the fault-finding procedure as follows:

- First switch on the ignition and observe the warning lamps. The table in the section on "Warning lamp functions" => Page **51** will give an initial indication of what to look for.
- Check that test requirements are met => Page **55** .



- Connect fault reader V.A.G 1551 and select address word 03 for "Brake electronics" => Page 55 .
- Check the control unit version => Page 57 and press the → key.
- Interrogate the fault memory => Page 67 .
- Terminate the transfer of data with the function "End output" => Page 68 .
- Repair the fault by referring to the fault table =>Page 58 . Select "Brake electronics" once again with address word 03. Interrogate and erase the fault memory.
- Terminate the transfer of data with the function "End output". Disconnect fault reader V.A.G 1551.
- Make sure that all connectors are properly connected. Perform a road test=>Page 53 . The warning lamps should not light up during the road test. If they do, perform fault-finding once again.

6.3 - Self-diagnosis function

On vehicles with ABS the self-diagnosis function can detect 19 different faults; on vehicles with ABS/EDL self-diagnosis can detect 24 different faults; on vehicles additionally equipped with ASR it will detect a total of 29 faults.

- ♦ The system performs a self-test routine before every trip when the ignition is switched on. This process is indicated by the yellow ABS/EDL warning lamp -K47. On vehicles with ASR the ASR warning lamp -K86 will also light up. The warning lamps will go out after about 2 seconds. The self-test routine continues for a short time when the vehicle is moving, as some faults can only be detected above a certain speed. During the self-test process there will be some audible noise from the relays and the return flow pump in the hydraulic unit, and a slight pulsation at the brake pedal. This is unavoidable, and is not a fault which requires rectification.
- ♦ If a fault is detected by the self-diagnosis function, the system concerned is switched off automatically for the duration of the current driving "cycle". This is indicated by the relevant warning lamp in the dash panel insert. For further details refer to the section on "Warning lamp functions" =>Page 51 .
- ♦ The above does not apply to either of the two faults "00526 Brake light switch" and "00668 Vehicle voltage, terminal 30"; refer to Fault table=>from Page 59 . If one of these faults is detected, only the EDL function will be suppressed and no warning lamps will light up.

Warning
If fault reader V.A.G

6.4 - Technical data of self-diagnosis

- ♦ Fault memory
 - Permanent memory: contents remain intact when power supply is interrupted.
- ♦ Data output
 - Rapid data transfer (operating mode 1)
 - The warning lamp for ABS/EDL -K47, the brake system warning lamp -K118 and the ASR warning lamp -K86 light up in the dash panel if a fault is detected and the ABS, ABS/EDL and ASR systems are switched off.
- ♦ Functions

	Page
01 - Interrogate control unit versions	57
02 - Interrogate fault memory	58
05 - Erase fault memory	67
06 - End output	68
07 - Code control unit	68
08 - Read measured value block	70

6.5 - Test requirements

- The vehicle must be fitted with the approved wheels and tyre sizes, which must be the same on all four wheels. Check inflation pressures all round.
- Mechanical and hydraulic parts of the brake system must be in order: no leaks in hydraulic pipes and connections (visual inspection of hydraulic unit, brake calipers, wheel cylinders, tandem master brake cylinder).
- Wheel bearings and wheel bearing play OK.
- Wheel speed sensors must be installed correctly

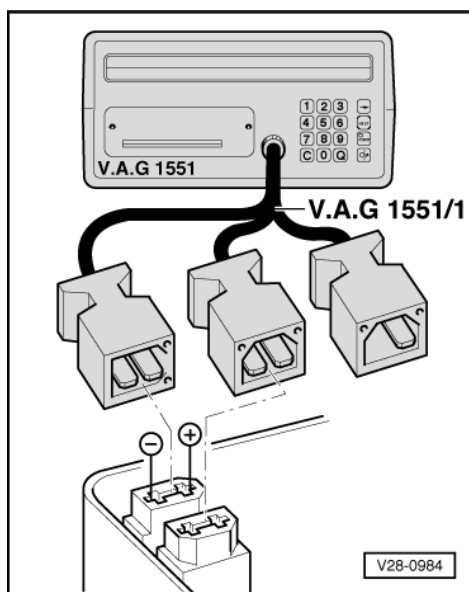
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted without the express permission of AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- **Supply voltage must be OK (not less than 10.5 V).**
- **Ignition switched on.**
- Connector on control unit -J104 must be properly fitted, with retainer catch engaged.
- The diagnosis procedure can only be started with the vehicle stationary and the ignition switched on (or with engine running). The diagnosis cannot be started if wheel speed exceeds 2.75 km/h, and will be terminated if the speed exceeds 20 km/h.
- When testing the ABS/EDL and ASR systems, ensure that the vehicle's electrics are not subjected to electromagnetic interference: keep the vehicle away from equipment with a high current draw, such as electric welding units.

6.6 - Technical information required

- ◆ Applicable current flow diagram
- => Current flow diagrams, Electrical fault finding and Fitting locations
- ◆ Fitting locations of electrical components
 - ◆ Brakes, brake mechanics
 - ◆ Brakes, brake hydraulics
 - ◆ Notes on repairing common faults on current models
- => Technical Service Handbook.

6.7 - Connecting fault reader V.A.G 1551 and entering address word





The vehicle system tester V.A.G 1552 can be used instead of the fault reader V.A.G 1551, however V.A.G 1552 does not have the facility for making a print-out.

- -> With ignition switched off, connect the fault reader to the diagnostic connectors on relay point I using cable V.A.G 1551/1 as follows:
 - Black plug connected to black diagnostic connector.
 - White plug connected to white diagnostic connector.
 - Blue plug not used.

Note:

If the display remains blank, check connections of diagnostic connector=>Page 88.

-> Indicated on display:

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

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.

- 1) appears alternately

Notes:

- ♦ The PRINT key is used for switching on the printer (the indicator lamp in the key lights up when the printer is switched on).
 - ♦ Depending on the programme, additional operating information can be printed out by pressing the HELP key of V.A.G 1551.
- Switch on printer by pressing Print key of fault reader.
 - Press key -1- for "Rapid data transfer" operating mode.

-> Indicated on display

Rapid data transfer HELP
Enter address word XX

Note:

The address word selects the control unit of the on-board system that you wish to test with the fault reader. It is made up of two digits, which are given in the relevant sections of this Manual.

For instance, press keys 03 to enter the address word for "Brake electronics".

-> Indicated on display

Rapid data transfer Q
03 Brake electronics

- Confirm input with Q key.

-> Indicated on display after entering address word 03

Rapid data transfer
Tester sends address word 03

Note:

If a fault occurs in the diagnostic communication between the fault reader and the control unit, the display will show one of the four following messages:

K-wire not switching to earth/positive
HELP

Press the HELP key to obtain a print-out of the possible causes of the fault.

No-signal from control unit

Test wiring of diagnostic connectors=>Page 88.

- Test power supply and earth connection to control unit -J104.

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

- After rectifying possible causes of fault, enter address word 03 for brake electronics once again and confirm with Q key.

-> Indicated in display

Fault in communication build-up

- Rectifying fault=>Page **90** .

-> If the diagnostic communication between the fault reader and the control unit is established and works properly, the display will now show the control unit identification (X), the system designation (Y), the hardware and software version (Z), the coding (V) and the workshop code (W)=>Page **57** , Interrogating control unit version.

XXX XXX XXX	YYY YYY YY YY YY
ZZZ	□
Coding VVVVV	WSC WWWW

Notes:

- ◆ The =>key is used for moving forward within the programme
- ◆ The control unit index can only be changed by fitting a new control unit

=> Parts list

- ◆ If the control unit identification number does not appear in the display, check diagnostic wiring

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

- Press =>key.

-> Indicated on display

Rapid data transfer	HELP
Select function XX	

6.8 - Selecting functions

After establishing diagnostic communication, checking the control unit version and pressing the =>key, proceed as follows:

-> Indicated on display

Rapid data transfer	HELP
Select function XX	

Selecting functions=>Page **54** , Technical data of self-diagnosis

Excluded 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.

6.9 - Interrogating control unit version

- Connect fault reader V.A.G 1551 and select address word 03 for "Brake electronics" => Page **55** .
- Go to start position of program by pressing the =>key:

-> Indicated on display

Rapid data transfer	HELP
Select function XX	

- Press keys 0 and 1 for the function "Interrogate control unit version" and confirm entry with Q key.

**Note:**

- ♦ The control unit version can only be altered by fitting a new control unit.
- ♦ Also refer to the Parts List for the correct control unit -J104 for the vehicle.

-> Indicated on display:

4D0 907 379 1)	2)	3)
Coding 00000	WSCXXXX	

The coding is only shown on vehicles with traction control system (ASR).

The workshop code, WSC XXXXX, identifies the workshop which performed the last coding of the control unit.

- 1) Control unit index
- 2) System designation
- 3) Software status

Control unit versions

System designation	Control unit Part No.:	Index	Coding
Front-wheel drive; ABS (Bosch 5.0)	4D0 907 379	D	Not codable
Front-wheel drive; ABS/EDL (Bosch 5.0)	4D0 907 379	G 1)	Not codable
Front-wheel drive; ABS/ASR (Bosch 5.0)	4D0 907 379	H, M, N	Can be coded => Page 68
Four-wheel drive; ABS/EDL (Bosch 5.0) Pressure-side control	4D0 907 379	J 2), F	Not codable
Four-wheel drive; ABS/EDL (Bosch 5.0) Suction-side control	4D0 907 379	K, L 2)	Not codable

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.

Notes:

- ♦ The control unit index can only be altered by fitting a new control unit.
- ♦ For the correct ABS/EDL/ASR control unit -J104 for the vehicle

=> also refer to the Parts List

- 1) Control unit with rough-road signal for on-board diagnosis (USA)
- 2) Control units with speed sensor outputs for automatic gearbox and rough-road signal for on-board diagnosis (USA)

6.10 - Interrogating fault memory

- Observe test requirements=>Page 55 .
- Connect fault reader V.A.G 1551 and select address word 03 for "Brake electronics" => Page 55 .
- Check the control unit version=>Page 57 and press the→key.
- Switch on printer with the Print key (indicator lamp in key lights up).

-> Indicated on display:

Rapid data transfer	HELP
Select function XX	

- Press keys -0- and -2-.

-> Indicated on display

Rapid data transfer Q
 02 - Interrogate fault memory

- Confirm input with Q key.

-> The number of faults stored will appear on the display.

X faults recognised!

-> If the message "No fault recognised" is displayed the program can be returned to the starting point by pressing the => key.

No fault recognised!

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.

The stored faults are displayed and printed out one after the other.

- Check print-out against fault table and rectify all faults as necessary=>Page 59 .

If the message "No fault recognised", is displayed the program can be returned to the starting point by pressing the=>key.

-> Indicated on display:

Rapid data transfer HELP
 Select function XX

If something else is displayed:

=> Fault reader operating instructions

- End output (function 06) => Page 68 .
- Switch off ignition and separate diagnostic connections.

6.11 - Fault table

Notes on fault table

- ◆ Every fault that can be detected by the system has a 5-digit fault code, which is listed in the left-hand column of the fault table. The message identifying the fault and the fault code will be printed out on the printer of fault reader V.A.G 1551 if the Print button is pressed. The fault code does not appear on the display of V.A.G 1551.
- ◆ The contents of the fault memory remains stored until the memory is erased => Page 67 .
- ◆ Sporadically occurring faults are additionally identified as such, with "/SP" appearing on the right of the display =>Page 1 .
- ◆ Static faults which cannot be detected when the vehicle is stationary are also identified with "/SP" after the ignition has been switched off and then on again.
- ◆ The following table includes all the faults which can be detected by the control unit -J104 and displayed and printed out by V.A.G 1551. Faults are listed according to fault codes.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00000 No fault recognised If this display appears, self-diagnosis is completed. No faults are stored in the fault memory. If relevant warning lamps light up, in spite of this display appearing, check the following points.	- Supply voltage for control unit - J104 below 10.5 V at a road speed of less than 6 km/h - Open circuit in wiring for warning lamp -K47 between control unit - J104 and dash panel insert -J218	- Refer to "Warning lamp functions" =>Page 51 .



V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
	If no fault can be traced, and the problem continues to exist, there may be a mechanical malfunction (solenoid valve sticking).	- Proceed to the "Electrical test"; Function test => Page 72 .

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00257 ABS inlet valve, front left -N101	- Open circuit, short to positive/earth in wiring between hydraulic unit -N55 and control unit -J104. - Inlet valve -N101 defective.	- "Electrical test" => Page 72 , perform test steps 1 + 13. If no fault is traced by performing the "Electrical test", test all wiring and connections for intermittent loose contacts. If the fault cannot be traced by any of these steps, fit a new control unit.
00259 ABS inlet valve, front right -N99	- Open circuit, short to positive or earth in wiring between hydraulic unit -N55 and control unit -J104. - ABS inlet valve -N99 defective.	- "Electrical test" => Page 72 , perform test steps 2 + 14. If no fault is traced by performing the "Electrical test", test all wiring and connections for intermittent loose contacts. If the fault cannot be traced by any of these steps, fit a new control unit.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00265 ABS outlet valve, front left -N102	- Open circuit, short to positive or earth in wiring between hydraulic unit -N55 and control unit -J104. - Outlet valve -N102 defective.	- "Electrical test" => Page 72 , perform test step 1. If no fault is traced by performing the "Electrical test", test all wiring and connections for intermittent loose contacts. If the fault cannot be traced by any of these steps, fit a new control unit.
00267 ABS outlet valve, front right -N100	- Open circuit, short to positive or earth in wiring between hydraulic unit -N55 and control unit -J104. - ABS outlet valve -N100 defective.	- "Electrical test" => Page 72 , perform test step 2. If no fault is traced by performing the "Electrical test", test all wiring and connections for intermittent loose contacts. If the fault cannot be traced by any of these steps, fit a new control unit.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00273		

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
ABS inlet valve, rear right -N133	- Open circuit, short to positive or earth in wiring between hydraulic unit -N55 and control unit -J104. - ABS inlet valve -N133 defective.	- "Electrical test" => Page 72, perform test steps 4 + 16. If no fault is traced by performing the "Electrical test", test all wiring and connections for intermittent loose contacts. If the fault cannot be traced by any of these steps, fit a new control unit.
00274 ABS inlet valve, rear left -N134	- Open circuit, short to positive or earth in wiring between hydraulic unit -N55 and control unit -J104. - ABS inlet valve -N134 defective.	- "Electrical test" => Page 72, perform test steps 3 + 15. If no fault is traced by performing the "Electrical test", test all wiring and connections for intermittent loose contacts. If the fault cannot be traced by any of these steps, fit a new control unit.

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.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00275 ABS outlet valve, rear right -N135	- Open circuit, short to positive or earth in wiring between hydraulic unit -N55 and control unit -J104. - ABS outlet valve -N135 defective.	- "Electrical test" => Page 72, perform test step 4. If no fault is traced by performing the "Electrical test", test all wiring and connections for intermittent loose contacts. If the fault cannot be traced by any of these steps, fit a new control unit.
00276 ABS outlet valve, rear left -N136	- Open circuit, short to positive or earth in wiring between hydraulic unit -N55 and control unit -J104. - ABS outlet valve -N136 defective.	- "Electrical test" => Page 72, perform test step 3. If no fault is traced by performing the "Electrical test", test all wiring and connections for intermittent loose contacts. If the fault cannot be traced by any of these steps, fit a new control unit.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00283 Speed sensor, front left -G47 or: Speed sensor, front left -G47 Open circuit/short to positive Continued ▼	- Rotor dirty or damaged. - Excessive wheel bearing play. - Speed sensor -G47 incorrectly installed. - Speed sensor -G47 defective. - Short to earth.	- Check, clean or renew rotor. => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Checking rotor 72, perform test step 7. If no fault is traced by "Reading measured value block" or performing the "Electrical test", test all wiring and connections for intermittent loose contacts.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00283		



V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
Speed sensor, front left -G47 or: Speed sensor, front left -G47 Open circuit/short to positive	- Incorrect control unit version. - Open circuit, short to positive in wiring between speed sensor -G47 and control unit -J104.	- Check control unit version => Page 57. If the fault cannot be traced by any of these steps, fit a new control unit.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00285 Speed sensor, front right -G45 or: Speed sensor, front right -G45 Open circuit/short to positive Continued ▼	- Rotor dirty or damaged. - Excessive wheel bearing play. - Speed sensor -G45 incorrectly installed. - Speed sensor -G45 defective. - Short to earth.	- Check, clean or renew rotor => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Checking rotor 72, perform test step 8. If no fault is traced by "Reading measured value block" or performing the "Electrical test", test all wiring and connections for intermittent loose contacts.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00285 Speed sensor, front right -G45 or: Speed sensor, front right -G45 Open circuit/short to positive	- Incorrect control unit version. - Open circuit, short to positive in wiring between speed sensor -G45 and control unit -J104.	- Check control unit version => Page 57. If the fault cannot be traced by any of these steps, fit a new control unit.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00287 Speed sensor, rear right -G44 or: Speed sensor, rear right -G44 Open circuit/short to positive Continued ▼	- Rotor dirty or damaged. - Excessive wheel bearing play. - Speed sensor -G44 incorrectly installed. - Speed sensor -G44 defective. - Short to earth.	- Check, clean or renew rotor. => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on rear axle, Front-wheel drive; Checking rotor 72, perform test step 10.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00287 Speed sensor, rear right -G44 or: Speed sensor, rear right -G44 Open circuit/short to positive	- Open circuit, short to positive in wiring between speed sensor -G44 and control unit -J104.	- If no fault is found by "Reading measured value block" or performing the "Electrical test", test all wiring and connections for intermittent loose contacts. If the fault cannot be traced by any of these steps, fit a new control unit.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00290		

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
Speed sensor, rear left -G46 or: Speed sensor, rear left -G46 Open circuit/short to positive Continued ▼	- Rotor dirty or damaged. - Excessive wheel bearing play. - Speed sensor -G46 incorrectly installed. - Speed sensor -G46 defective. - Short to earth.	- Check, clean or renew rotor. => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on rear axle, Front-wheel drive; Checking rotor 72 , perform test step 10.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00290 Speed sensor, rear left -G46 or: Speed sensor, rear left -G46 Open circuit/short to positive	- Open circuit, short to positive in wiring between speed sensor -G46 and control unit -J104.	- If no fault is traced by "Reading measured value block" or performing the "Electrical test", test all wiring and connections for intermittent loose contacts. If the fault cannot be traced by any of these steps, fit a new control unit.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00301 ABS return flow pump -V39	- Open circuit or contact resistance in earth connection or voltage supply to return flow pump -V39. - Open circuit or short to positive/earth in wiring between relay -J105 and control unit -J104. - ABS return flow pump relay -J105, return flow pump -V39 or hydraulic unit defective.	- Trace and repair open circuit or contact resistance. => Current flow diagram, Electrical fault-finding and Fitting locations Trace and repair open circuit or short in wiring. => Current flow diagram, Electrical fault-finding and Fitting locations Test relay -J 105, return flow pump -V39 and hydraulic unit -N55, "Electrical test" => Page 71 .

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00302 Solenoid valve relay -ABS -J106	- Defective wiring or excessive contact resistance in earth connection to solenoid valve relay -J106. - Open circuit or short to positive/earth in wiring between relay -J106 and control unit -J104. - Solenoid valve relay -J106 or hydraulic unit -N55 defective.	- Check earth connection for contact resistance and defective wiring. => Current flow diagram, Electrical fault-finding and Fitting locations Trace and repair open circuit or short in wiring. => Current flow diagram, Electrical fault-finding and Fitting locations Test relay -J 106 and hydraulic unit, "Electrical test" => Page 71 .

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00526 Brake light switch -F		

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.



V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
Front-wheel drive: Open circuit	- Both brake lights -M9, -M10 or control unit -J104 defective. - Wiring from brake lights to control unit defective.	- Trace and repair open circuit or short in wiring. => Current flow diagram, Electrical fault-finding and Fitting locations - Renew bulbs. - Test brake light switch, "Read measured value block", Display group 2 => Page 71 .
Four-wheel drive: Implausible signal	- Open circuit or short to positive/earth in wiring between brake light switch and brake light bulbs -M9, -M10 or control unit -J104. - Brake light bulbs -M9 or -M10 defective. - Brake light switch defective.	

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00529 Speed information missing No signal - This fault can only occur on vehicles with ASR/TCS.	- Open circuit or short to positive/earth in wiring between control unit -J104 and engine control unit. - Engine control unit defective. - Control unit -J104 defective.	- "Read measured value block", Display group 3 => Page 72 . - Trace and repair open circuit or short in wiring. => Current flow diagram, Electrical fault-finding and Fitting locations - If the rev counter in the instrument cluster is not working, and no fault can be found in the wiring, this means that the engine control unit is defective and must be renewed. - If the rev counter in the instrument cluster is working, and no fault can be found in the wiring, this means that control unit -J104 is defective and must be renewed.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00532 Supply voltage Signal too low Notes: - This fault affects the voltage supply for the control unit. - This fault is only stored in memory if it occurs at a road speed above 6 km/h. - The ABS, ABS/EDL and ASR system will be switched on again and the warning lamps will go out as soon as the supply voltage returns to the required level.	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 - Open circuit or excessive contact resistance in voltage supply from terminal 15 to control unit -J104 (contact 1). - Loss of voltage in electrical system. - Battery defective.	- "Electrical test" => Page 72 , perform test step 22. - Trace and repair open circuit or contact resistance. - Test alternator and voltage regulator. => Current flow diagram, Electrical fault-finding and Fitting locations - Check battery => Audi 100; Electrical system; Repair group 27; Battery Repair group 27; Battery

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00597		

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
Differing wheel speed impulses	- Rotor dirty or damaged.	- Check rotor. => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Checking rotor
Continued ▼	- Excessive wheel bearing play.	- Check wheel bearing. => Audi 100; Running gear, Front-wheel drive and 4WD; Repair group 40; Servicing front suspension; Removing and installing wheel bearing Repair group 42; Servicing wheel bearing

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00597		
Differing wheel speed impulses	- Speed sensors -G44, -G45, -G46, -G47 incorrectly installed. - Speed sensors -G44, -G45, -G46, -G47 defective.	- Test speed sensors. => Audi 100; Brake system; Repair group 45; Removing and installing parts of ABS system on front axle; Removing and installing speed sensor 72 , perform test steps 7 to 10.
	- Wheels or tyre sizes not the same on all four wheels	- Check wheels and tyre sizes

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00623		
ABS/gearbox electrical connection	Manual gearbox	- Check coding of ABS/EDL/ASR control unit -J104 => Page 68 .
- This fault can only occur on vehicles with ASR/TCS.	- ABS/EDL/ASR control unit -J104 incorrectly coded.	Trace and repair short circuit.
	- Short circuit to positive at contact 45	=> Current flow diagram, Electrical fault-finding and Fitting locations
	Automatic gearbox	
	- Open circuit or short to earth between ABS/EDL/ASR control unit -J104 and gearbox control unit -J217.	- Check coding of ABS/EDL/ASR control unit -J104 => Page 68 .
	- ABS/EDL/ASR control unit -J104 incorrectly coded.	Trace and repair open circuit or short in wiring. => Current flow diagram, Electrical fault-finding and Fitting locations

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00642		
EDL change-over valve, front right -N166	- Open circuit, short to positive/earth in wiring between hydraulic unit -N55 and control unit -J104.	- "Electrical test" => Page 72 , perform test steps 5 + 18.
This fault can only occur on vehicles with EDL or ASR/TCS.	- EDL change-over valve -USV2 -N166 defective.	If no fault is traced by performing the "Electrical test", test all wiring and connections for intermittent loose contacts. If the fault cannot be traced by any of these steps, fit a new control unit.
00643		



V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
EDL outlet valve, front right -N167 This fault can only occur on vehicles with EDL or ASR/TCS.	- Open circuit, short to positive/earth in wiring between hydraulic unit -N55 and control unit -J104. - EDL outlet valve -ASV2 -N167 defective.	- "Electrical test" => Page 72 , perform test steps 6 + 18. If no fault is traced by performing the "Electrical test", test all wiring and connections for intermittent loose contacts. If the fault cannot be traced by any of these steps, fit a new control unit.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00644 EDL change-over valve, front left -N168 This fault can only occur on vehicles with EDL or ASR/TCS.	- Open circuit, short to positive/earth in wiring between hydraulic unit -N55 and control unit -J104. - EDL change-over valve -USV1 -N168 defective.	- "Electrical test" => Page 72 , perform test steps 5 + 17. If no fault is traced by performing the "Electrical test", test all wiring and connections for intermittent loose contacts. If the fault cannot be traced by any of these steps, fit a new control unit.
00645 EDL outlet valve, front left -N169 This fault can only occur on vehicles with EDL or ASR/TCS.	- Open circuit, short to positive/earth in wiring between hydraulic unit -N55 and control unit -J104. - EDL outlet valve -ASV1 -N169 defective.	- "Electrical test" => Page 72 , perform test steps 6 + 17. If no fault is traced by performing the "Electrical test", test all wiring and connections for intermittent loose contacts. If the fault cannot be traced by any of these steps, fit a new control unit.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00646 ABS-TCS/engine electrical connection 1 This fault can only occur on vehicles with EDL or ASR/TCS. Note: The following signal is sent from control unit -J104 to engine control unit via this connection: - MMS signal (engine torque - - specified)	- Open circuit or short to positive/earth in wiring between control unit -J104, contact 18 and engine control unit. - Control unit -J104 defective. - Engine control unit defective.	- Trace and repair open circuit or short in wiring. => Current flow diagram, Electrical fault-finding and Fitting locations - Renew control unit -J104. - Renew engine control unit.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00647 ABS-TCS/engine electrical connection 2	- Open circuit or short to positive/earth in wiring between control unit -J104, - contact 47 and engine control unit.	- "Read measured value block", Display Group 3 =>Page 72 Trace and repair open circuit or short => Current Flow Diagrams, Electrical Fault-Finding and Fitting Locations

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
Note: The following signal is sent from the engine control unit to control unit - J104 via this connection: - MMI signal - (engine torque - actual)	- Engine control unit defective. - ABS/EDL/ASR control unit -J104 defective.	- Renew engine control unit. Renew ABS/EDL/ASR control unit - J104.

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00668 Vehicle voltage, terminal 30 Open circuit - On vehicles with EDL, control unit - J104 requires this power supply after the ignition is switched off to calculate brake temperature (cool-down) => Page 50 .	- Open circuit or short to earth in power supply to control unit -J104 (contact 50)	- Test wiring => Current Flow Diagrams, Electrical Fault-Finding and Fitting Locations

V.A.G 1551 print-out	Possible cause of fault	Rectifying fault
Fault code		
00761 Fault stored in engine control unit - This fault can only occur on vehicles with ASR/TCS	- A fault has been stored in the engine control unit. The engine control unit is not able to reduce engine torque.	- Rectify fault in engine management as described in relevant Workshop Manual (engine). Erase fault memory of engine control unit.
65535 Control unit defective	- Control unit -J104 defective.	- Renew control unit -J104. Note: Do not erase the fault memory of the old control unit. The information in the memory will help to identify the malfunction and make the necessary improvements in the design of the product.

6.12 - Erasing fault memory

Requirements:

- Fault memory has been interrogated
- Press =>key.

-> Indicated on display

Rapid data transfer HELP
Select function XX

- Press keys 0 and 5 for the function "Erase fault memory".

-> Indicated on display

Rapid data transfer Q
05 - Erase fault memory



- Confirm input with Q key.

-> Indicated on display

Rapid data transfer
Fault memory is erased!

- Press =>key.

-> Indicated on display

Rapid data transfer HELP
Select function XX

Notes:

Attention!
Fault memory has not been interrogated

- > If this appears in the display, the test sequence has not been performed correctly.
- ♦ Adhere exactly to test sequence:
First interrogate fault memory, then erase
- ♦ The fault memory is not erased if
 - the ignition was switched off between "Interrogate fault memory" and "Erase fault memory"
 - the vehicle has been moved at more than 2.5 km/h (1.56 mph).

6.13 - Ending output

-> Indicated on display

Rapid data transfer HELP
Select function XX

- Press keys 0 and 6 for the function "End output".

-> Indicated on display

Rapid data transfer Q
06 End output

- Confirm input with Q key.

-> Indicated on display

Rapid data transfer Help
Enter address word XX

- Switch off ignition.
- Disconnect fault reader V.A.G 1551
- Switch on ignition.

ABS warning lamp (K47) must go out after about 2 seconds.

- Carry out a road test at a speed which briefly exceeds 30 km/h (19 mph).

The ABS warning lamp must not light up again.

6.14 - Coding control unit

If a control unit with traction control function (ASR) is replaced, or if the following fault is stored in the fault memory of the control unit

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.

♦ "ABS/EDL/gearbox - electrical connection"

... the control unit must be coded according to the type of engine and gearbox.

Note:

- ♦ The coding can only be performed if a workshop code is stored in V.A.G 1551

=> V.A.G 1551 Operating Manual.

- Connect fault reader V.A.G 1551 and select address word 03 for "Brake electronics" => Page 55 .
- Check the control unit version => Page 57 and press the =>key.

Notes:

- ♦ A 5-digit code must always be displayed during the control unit identification.
- ♦ The control unit must coded as follows if the display does not show the correct code for the vehicle or if a new control unit has been fitted.

-> Indicated on display

Rapid data transfer HELP
Select function XX

- Press keys 0 and 7 for the function "Code control unit".

-> Indicated on display:

Rapid data transfer Q
07 - Code control unit

- Confirm input with Q key.

-> Indicated on display:

Code control unit Q
Enter code number XXXXX

- Enter the required code number and confirm with Q key.

Coding table

Gearbox fitted	Coding	Specification
Manual gearbox	00000	Pin 45 on control unit -J104 not used. No volt- age supplied to pin 45.
Automatic gearbox	00001	Control unit -J104 con- nected to gearbox control unit -J217 via pin 45. Volt- age supplied to pin 45.

-> The display will show the control unit identification and the coding that has been entered (e.g. 00000).

4D0 907 379 X System. Software
status
Coding 00000 WSCXXXX

- Press =>key.

-> Indicated on display

Rapid data transfer HELP
Select function XX

- Press keys 0 and 6 for the function "End output" and confirm entry with the Q key.

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.



6.15 - Reading measured value block

The control unit can transfer test data ("measured values") to fault reader V.A.G 1551. These measured values supply information about the operational condition of the system and the sensors connected to it. In many cases the measured values can be used to help trace and repair faults. The measured values available from the Bosch type 5.0 system are grouped in three Display Groups, which can be called up via Display Group numbers.

- Connect fault reader V.A.G 1551 and select address word 03 for "Brake electronics" => Page 55 .

Notes:

- ♦ When the printer is switched on, the contents of the display will be printed out on the fault reader log.
- ♦ When "reading measured value block", also check wiring and connectors for intermittent loose contacts.
- Check the control unit version => Page 57 and press the ➔key.

-> Indicated on display

Rapid data transfer
Select function XX

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.

- Press keys 0 and 8 for the function "Read measured value block".

-> Indicated on display:

Rapid data transfer Q
08 - Read measured value block

- Confirm input with Q key.

-> Indicated on display:

Read measured value block
Enter display group number XXX

- Press keys 0, 0 and 1
- Confirm input with Q key.

Test table: Display Group 1

- ♦ Display zones 1 to 4 show the actual wheel speeds (at the tyre circumference) in km/h. These are calculated by control unit -J104 on the basis of the signals received from the wheel speed sensors. If one of the display zones shows no reading, proceed as for fault codes 00283, 00285, 00287, 00290 "Speed sensor" => Fault table, Page 59 .
- ♦ In order to check that the speed sensor signals are correctly assigned to the four wheels, the vehicle must be raised. On vehicles with manual gearbox put the gear lever in neutral. On vehicles with automatic gearbox move the selector lever to position "N". Turn the relevant wheel by hand, and at the same time prevent the other driven wheels from rotating.
- ♦ When the vehicle is accelerated uniformly on a dry surface, the displayed values will increase steadily in rising whole numbers, e.g. ... 6km/h, 7km/h, 8 km/h The difference between displayed values 1 to 4 should be not be more than ±1 km/h(error from out-of-round-wheels). If the values jump, for instance from ... 6km/h, 7km/h, to 12 km/h ... or if the difference between the displayed values is greater than ±1 km/h, check the installation of the wheel speed sensors and rotors.

Read measured value block				1 ➔	• Indicated on display
1 ... 19 1)	1 ... 19 1)	1 ... 19 1)	1 ... 19 1)	1 ... 19 1)	
km/h	km/h	km/h	km/h	km/h	
Wheel speed, rear right					
Wheel speed, rear left					
Wheel speed, front right					

Wheel speed, front left

1) The self-diagnosis is terminated by control unit -J104 if road speed exceeds 19 km/h.

The display group numbers can be selected in sequence by pressing keys <-1 and 3-> (V.A.G 1551) or keys ↑ and ↓ (V.A.G 1552).

- Press key C in order to enter the display group number manually.

-> Indicated on display

Read measured value block
Enter display group number XXX

- Press keys 0, 0 and 2.
- Confirm input with Q key.

Test table: Display Group 2

Read measured value block			2 ⇒	Indicated on display
0 or 1	0 or 1	0 or 1	0 or 1	
			Solenoid valve relay: On vehicles with front-wheel drive this display is shifted one zone to the left. - 0 ⇒ Not permissible during the function "Read measured value block": the relay was not activated when the ignition was switched on. "Electrical test" => Page 72, perform test step 11. - 1 ⇒ Specified value: the relay was activated by control unit -J104 when the ignition was switched on.	
			Voltage at return flow pump motor: On vehicles with front-wheel drive this display is shifted one zone to the left. - 0 ⇒ Specified value: no voltage present at return flow pump motor. - 1 ⇒ Not permissible during the function "Read measured value block": voltage is present at return flow pump motor. "Electrical test" => Page 72, perform test step 12.	
			Brake light switch: additional signal for 4WD models only: - 0 ⇒ Brake pedal not depressed - 1 ⇒ Brake pedal depressed	Check brake light switch if displays are not correct => Current Flow Diagrams, Electrical Fault-Finding and Fitting Locations
Brake light switch: signal for front-wheel drive and 4WD models: - 0 ⇒ Brake pedal not depressed - 1 ⇒ Brake pedal depressed			Check brake light switch if displays are not correct => Current Flow Diagrams, Electrical Fault-Finding and Fitting Locations	

The display group numbers can be selected in sequence by pressing keys <-1 and 3-> (V.A.G 1551) or keys ↑ and ↓ (V.A.G 1552).

- Press key C in order to enter the display group number manually.

Protected by Copyright. Copying for private or commercial purposes, in particular in printed form, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability for errors or omissions in this document. Copyright by AUDI AG.

-> Indicated on display

Read measured value block
Enter display group number XXX

Note for Display Group 3:

If you wish to read out the display zones for engine speed and actual engine torque with the engine running, you must first break off the diagnostic link between the fault reader and the control unit using the function "End



output", => Page 68 . Then start the engine and set up the diagnostic link between fault reader and control unit once again.

- Press keys 0 and 8 for the function "Read measured value block".
- Confirm input with Q key.
- Press keys 0, 0 and 3.
- Confirm input with Q key.

Test table: Display Group 3

Read measured value block			3 =>	Indicated on display
60 ... 8000 rpm	0 ... 100 %	0 or 1	---	
ASR switch: (only on vehicles with traction control system (ASR/TCS): - 0 => ASR switch not operated - 1 => ASR switch is operated: condition of ASR system changes from "ASR OFF" to "ASR ON" or vice versa. - The ASR warning lamp will light up if the ASR is switched off with the ASR push-button switch. If the display is not correct, test the ASR push-button switch: "Electrical test" => Page 72 , test step 21. Actual engine torque (MMI) (only on vehicles with traction control system (ASR/TCS)): - 0% => the vehicle is running on overrun. - 20% - 30% => equivalent to engine idling - 100% => engine delivering maximum torque. If no display appears, proceed as described for fault code 00647 "ABS-TCS/engine electrical connection 2": fault table => Page 59 . Engine speed: (only on vehicles with traction control system (ASR/TCS)): - The display indicates engine speed in steps of 60 rpm, starting at 60 rpm. If no display appears, proceed as described for fault code 00529 "Speed information missing. No signal": fault table => Page 59 .				

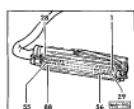
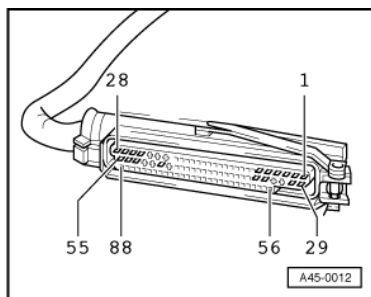
7 - Electrical test, (Bosch type 5.0 system), 1995 model year (chassis No. 4ASN ...)

7.1 - Electrical test, (Bosch type 5.0 system), 1995 model year (chassis No. 4ASN ...)

- ♦ If the self diagnosis does not give any indication of the source of the fault, work through the complete electrical test.
- ♦ If the self diagnosis provides a direct indication of the source of the fault, only carry out the test steps recommended in the fault table (specific testing).

7.2 - Test requirements

- An "Automatic test sequence" must first be performed to establish that any faults present in the gearbox and engine control units can only originate from the ABS.
 - Connect fault reader V.A.G 1551 and select address word 00 with ignition switched on;=>Page 27 .
 - After completing the "Electrical test", interrogate and erase the fault memories of the gearbox and engine control units.



- -> The multi-pin connector between the wiring harness and control unit -J104 must be in proper condition, with no bent, broken or corroded contacts. Replace any damaged contacts using wiring repair kit VAS 1978.

Note:

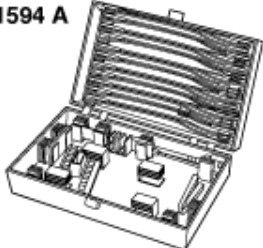
The instructions supplied with wiring repair kit VAS 1978 normally do not permit repairs to the wiring of the ABS and associated systems. However, this only applies to the screened wiring in the system.

- Switch off ignition and other electrical equipment (headlights, lighting, fan, etc.) before starting the test.
- For test steps 13 to 16 the vehicle must be raised so that the wheels can turn freely. On vehicles with manual gearbox put the gear lever in neutral. On vehicles with automatic gearbox move the selector lever to position "N".



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.



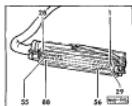
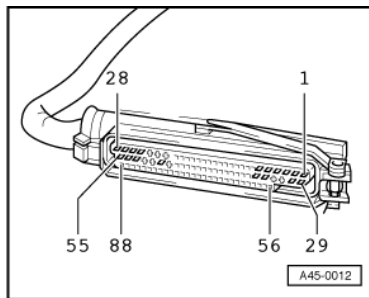
V.A.G 1526 A 	V.A.G 1594 A 
V.A.G 1598/20 	V.A.G 1310 A 
Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG. W01-0010	

Special tools and workshop equipment required

- ♦ V.A.G 1526 A Hand multimeter
- ♦ V.A.G 1594 A Adapter set
- ♦ V.A.G 1598/20 Test box
- ♦ V.A.G 1310 A Brake system tester

Connecting test box V.A.G 1598/20 and testing the ABS, ABS/EDL and ASR systems.

- Switch off ignition.
- Remove control unit-J104
- Unplug multi-pin connector from control unit -J104.
- Check multi-pin connector between wiring harness and control unit -J104.



-> The socket designations on test box V.A.G 1598/20 are identical with the contact designations on control unit -J104 and the designations of the connector on the wiring harness

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

- Connect test box V.A.G 1598/20 to multi-pin connector on ABS harness.

7.3 - Identification of contacts of multi-pin connector on wiring harness for control unit -J104

Contact	Connection to component ...
1	Power supply, terminal 15
2	Hydraulic unit; activation of return flow pump relay -J105
3	Hydraulic unit; change-over valve (secondary piston circuit) -N168
4	Hydraulic unit; outlet valve (secondary piston circuit) -N169
5	Hydraulic unit; inlet valve, front left -N101
6	Hydraulic unit; inlet valve, rear right -N133
7	Hydraulic unit; activation of return flow pump relay -J105
9	Speed sensor, front left -G47 - Vehicles with front-wheel drive and ABS/EDL - Vehicles with front-wheel drive and ABS/EDL/ASR (traction control)
10	Speed sensor, front left -G47
11	Speed sensor, rear right -G44
12	Speed sensor, rear left -G46
13	Speed sensor, rear left -G46
14	Speed sensor, front right -G45
15	Speed sensor, front right -G45 - Vehicles with front-wheel drive and ABS - Vehicles with front-wheel drive and ABS/EDL - Vehicles with four-wheel drive and ABS/EDL

Contact	Connection to component ...
18	Engine control unit; MAD signal (masking of engine misfire monitoring) - On vehicles with front-wheel drive and ABS/EDL/ASR (traction control): this connection is also used to transmit the MMS signal (engine torque - specified)
19	Hydraulic unit; monitoring connection for return flow pump -V39
20	Engine control unit; engine speed - Vehicles with front-wheel drive and ABS/EDL/ASR (traction control)



Contact	Connection to component ...
25	Hydraulic unit; outlet valve, rear left -N136
26	Hydraulic unit; outlet valve, front right -N100
27	Hydraulic unit; outlet valve, (primary piston circuit) -N167
28	Earth, terminal 31 (control unit -J104)
29	Earth, terminal 31 (control unit -J104)
31	Dash panel insert; ASR warning lamp activation - Vehicles with front-wheel drive and ABS/EDL/ASR (traction control)
32	Dash panel insert; ABS/EDL warning lamp activation (active)
33	Hydraulic unit; outlet valve, front left -N102
34	Hydraulic unit; outlet valve, rear right -N135
35	Speed sensor, front left -G47 - Vehicles with four-wheel drive and ABS/EDL
35	Speed sensor, front left -G47 - Vehicles with front-wheel drive and ABS

Contact	Connection to component ...
37	Hydraulic unit; activation of solenoid valve relay -J106
38	Speed sensor, rear right -G44
42	Speed sensor, front right -G45 - Vehicles with front-wheel drive and ABS/EDL/ASR (traction control) - Vehicles with four-wheel drive and ABS/EDL
44	ASR switch - Vehicles with front-wheel drive and ABS/EDL/ASR (traction control)
45	GB (gearbox control signal) - Vehicles with front-wheel drive and ABS/EDL/ASR (traction control)
46	K-wire
47	Engine control unit; MMI (engine torque - actual) - Vehicles with front-wheel drive and ABS/EDL/ASR (traction control)
47	Brake light switch -F - Vehicles with four-wheel drive and ABS/EDL
48	Brake light switch -F
50	Battery + (terminal 30)
53	Hydraulic unit; inlet valve, rear left -N134
54	Hydraulic unit; inlet valve, front right -N99
55	Hydraulic unit; change-over valve (primary piston circuit) -N166

7.4 - Test table

Notes on test table

- ♦ The socket designations of the test box V.A.G 1598 are identical to the contact designations of the control unit -J104 in the current flow diagram. Incorrect test procedures can cause damage to the system: do not make connections between any contacts other than those listed in the table

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

- ♦ The specified values refer to the readings obtained on tester V.A.G 1526 and are not necessarily applicable for other test units.

- ♦ If the readings obtained do not match the specifications, carry out the fault rectification measures in the right-hand part of the table.

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

- ♦ If the specified values are achieved, also check wiring for intermittent loose contacts and short circuit to positive and earth. This applies especially to sporadic faults.
- ♦ Use test leads V.A.G 1594 for checking continuity (bridging leads).
- ♦ If the measured figures only differ slightly from the specifications, clean the sockets and plugs of the testers and test leads (with contact spray G 000 700 04) and repeat the check. Before replacing components, check wiring and connections again, particularly if the specification calls for a resistance reading of less than 10 ω .

Select resistance test range on V.A.G 1526 (200 ω)					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
1	5 + 33	Inlet valve -N101, outlet valve -N102, front left	▪ Electrical wiring between control unit and hydraulic unit must be OK	9 ω - 22 ω	- Test electrical wiring between control unit and hydraulic unit for short to earth or short to positive => Current flow diagrams, Electrical fault-finding and Fitting locations - If electrical wiring is OK renew hydraulic unit.
2	54 + 26	Inlet valve -N99, outlet valve -N100, front right			
3	53 + 25	Inlet valve -N134, outlet valve -N136, rear left			
4	6 + 34	Inlet valve -N133, outlet valve -N135, rear right			

Select resistance test range on V.A.G 1526 (200 ω)					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
5 Note: Only for vehicles with ABS/EDL or ASR system	3 + 55	Change-over valve (secondary piston circuit) -N168, change-over valve (primary piston circuit) -N166	▪ Electrical wiring between control unit and hydraulic unit must be OK	12 ω - 28 ω	- Test electrical wiring between control unit and hydraulic unit for short to earth or short to positive => Current flow diagrams, Electrical fault-finding and Fitting locations If electrical wiring is OK renew hydraulic unit.

Protected by copyright. Copying, in part or in whole, is not permitted unless authorized 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.



6 Note: Only for vehicles with ABS/EDL or ASR system	4 + 27	Outlet valve (sec- ondary piston cir- cuit) -N169, outlet valve (pri- mary piston circuit) -N167	▪ Electrical wir- ing between con- trol unit and hy- draulic unit must be OK.	12ω- 28ω	- Test electrical wir- ing between con- trol unit and hy- draulic unit for short to earth or short to positive => Current flow di- agrams, Electrical fault-finding and Fitting locations If electrical wiring is OK renew hydraul- ic unit.
---	--------	---	---	----------	--

Select resistance test range on V.A.G 1526 (2 kw or 20 kw)

Test step	V.A.G 1598/20 sock- ets	Item tested	▪ Test conditions - Additional opera- tions	Specification	Fault rectification if reading does not match specification
7	9 + 10 1) 9 + 10 2) 35 + 10 3) 5) 36 + 10 4)	Speed sensor -G47, front left	▪ Electrical wiring between control unit and speed sensor must be OK	400ω- 2300ω	- Test electrical wiring between control unit and speed sensor for short to earth or short to positive => Current flow dia- grams, Electrical fault- finding and Fitting lo- cations - If the electrical wiring is OK, renew the rele- vant speed sensor.
8	15 + 14 42 + 14 2) 5)	Speed sensor -G45, front right			
9	13 + 12	Speed sensor -G46, rear left			
10	11 + 38	Speed sensor -G44, rear right			

The output connections on control unit -J104 are wired differently for the various different versions.

- 1) Only for front-wheel drive versions with ABS/EDL (Bosch 5.0)
- 2) Only for front-wheel drive versions with ABS/ASR (Bosch 5.0)
- 3) Only for four-wheel drive versions with ABS/EDL (Bosch 5.0), pressure-side control
- 4) Only for front-wheel drive versions with ABS (Bosch 5.0)
- 5) Only for four-wheel drive versions with ABS/EDL (Bosch 5.0), suction-side control

without ABS/EDL (Bosch 5.0) as suction-side control 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.

Select resistance test range on V.A.G 1526 (200 ω)

Test step	V.A.G 1598/20 sock- ets	Item tested	▪ Test conditions - Additional opera- tions	Specification	Fault rectification if reading does not match specification
11	2 + 37	Solenoid valve re- lay -J106	▪ Electrical wiring between control unit and hydraulic unit must be OK	30ω- 80ω	- Test electrical wiring between control unit and hydraulic unit for short to earth or short to positive => Current Flow Dia- grams, Electrical Fault-Finding and Fit- ting Locations If electrical wiring is OK, renew relay.

12	2 + 7	Return flow pump relay -J105	▪ Electrical wiring between control unit and hydraulic unit must be OK	30ω- 80ω	- Test electrical wiring between control unit and hydraulic unit for short to earth or short to positive => Current Flow Diagrams, Electrical Fault-Finding and Fitting Locations If electrical wiring is OK, renew relay.
----	-------	---------------------------------	--	----------	--

Functional check + test for correct connections					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
13 1)	Bridge across 1 + 2, 28 + 37	Inlet valve -N101 and brake line connection, front left	▪ Ignition on. - Move selector lever to "N" on vehicles with automatic gearbox. Bridge across sockets 5 + 28. Depress and hold down brake pedal. - Remove bridge connection between 5 + 28. - Release brake pedal	- Front left wheel can be turned by hand - Front left wheel locked	- If the wheel is locked, check whether one of the other wheels can be turned. If so, the hydraulic brake lines have been connected the wrong way round. Check brake pipe connections and unions. Ensure that brakes are working properly. Repeat test step 13. - If all the wheels are locked, this means the inlet valve is not working properly => Fault table, Page 59, Fault code 00257.

1) Two operators are required to perform this test.

Functional check + test for correct connections					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
14 1)	Bridge across 1 + 2, 28 + 37	Inlet valve -N99 and brake line connection, front right	▪ Ignition on.		



			- Move selector lever to "N" on vehicles with automatic gearbox. Bridge across sockets 54 + 28. Depress and hold down brake pedal. - Remove bridge connection between 54 + 28. - Release brake pedal	- Front right wheel can be turned by hand. - Front right wheel locked	- If the wheel is locked, check whether one of the other wheels can be turned. If so, the hydraulic brake lines have been connected the wrong way round. Check brake pipe connections and unions. Ensure that brakes are working properly. Repeat test step 14. - If all the wheels are locked, this means the inlet valve is not working properly => Fault table, Page 59, Fault code 00259.
--	--	--	--	--	---

1) Two operators are required to perform this test.

Functional check + test for correct connections					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
15 1)	Bridge across 1 + 2, 28 + 37	Inlet valve -N134 and brake line connection, rear left	▪ Ignition on. - Move selector lever to "N" on vehicles with automatic gearbox. Bridge across sockets 53 + 28. Depress and hold down brake pedal. - Remove bridge connection between 53 + 28.	- Rear left wheel can be turned by hand. - Rear left wheel locked	- If the wheel is locked, check whether one of the other wheels can be turned. If so, the hydraulic brake lines have been connected the wrong way round. Check brake pipe connections and unions. Ensure that brakes are working properly. Repeat test step 15. - If all the wheels are locked, this means the inlet valve is not working properly => Fault table, Page 59, Fault code 00274.

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.

Functional check + test for correct connections					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
			- Release brake pedal		

1) Two operators are required to perform this test.

Functional check + test for correct connections					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
16 1)	Bridge across 1 + 2, 28 + 37	Inlet valve -N133 and brake line connection, rear right	▪ Ignition on. ▪ Move selector lever to "N" on vehicles with automatic gearbox. Bridge across sockets 6 + 28 Depress and hold down brake pedal. - Remove bridge connection between 6 + 28. - Release brake pedal	- Rear right wheel can be turned by hand. - Rear right wheel locked	If the wheel is locked, check whether one of the other wheels can be turned. If so, the hydraulic brake lines have been connected the wrong way round. Check brake pipe connections and unions. Ensure that brakes are working properly. Repeat test step 16. If all the wheels are locked, this means the inlet valve is not working properly => Fault table, Page 59, Fault code 00273.

1) Two operators are required to perform this test.

Functional check + leak test					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification



17 Only for vehicles with ABS/EDL or ASR system	Bridge across 1 + 2, 7 + 37, 37 + 28	- Return flow pump -V39 - EDL change-over valve - -N168 - EDL outlet valve -N169	- Connect brake system tester V.A.G 1310 A to front left brake caliper and bleed tester => Audi 100; Brake system ; Repair group 47; Bleeding brake system, vehicles with and without ABS; Bleeding brake system with brake filling and bleeding appliance V.A.G 1869 - Bridge across sockets 3 + 28		- Return flow pump defective, renew hydraulic unit -N55 => Audi 100; Brake system; Repair group 45; Anti-lock brake system (ABS) Bosch 5.0, 1995 model year (chassis No. 4ASN...); Hydraulic unit and brake pipes
Continued ▼		- Pressure limiting valve in hydraulic unit -N55 - Outlet valve, front left -N102	- Switch on ignition for not longer than 10 seconds; switch off ignition.	- Change-over valve -N168 switches - Return flow pump -V39 runs - Pressure at pressure gauge not more than 5 bar	- Test change-over valve -N168 and outlet valve -N169 by measuring resistance => test steps 5 + 6. If valves are defective, renew hydraulic unit -N55.

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.

Functional check + leak test

Test step	V.A.G 1598/20 sockets	Item tested	Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
17 (continued)		- Outlet valve, rear right - -N135	- Bridge across sockets 4 + 28 - Switch on ignition for not longer than 10 seconds, switch off ignition.	- Outlet valve-N169 switches - Pressure at pressure gauge rises: Front-wheel drive: 170 ±25 bar - Four-wheel drive, pressure side control: 90 ± 25 bar - Four-wheel drive, suction-side control: 170 ± 25 bar	- Pressure limiting valve and/or outlet valve, front left -N102 and/or outlet valve, rear right -N135 defective. Renew hydraulic unit -N55.

Functional check + leak test					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations - Disconnect brake system tester V.A.G 1310 A and bleed brakes => Audi 100; Brake system ; Repair group 47; Bleeding brake system, vehicles with and without ABS; Bleeding brake system with brake filling and bleeding appliance V.A.G 1869	Specification	Fault rectification if reading does not match specification

Functional check and leak test					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
18 Only for vehicles with ABS/EDL or	Bridge across 1 + 2, 7 + 37, 37 + 28	- Return flow pump -V39 - EDL change-over valve - -N166 - EDL outlet valve -N167	- Connect brake system tester V.A.G 1310 A to front right brake caliper and bleed tester => Audi 100; Brake system; Repair group 47; Bleeding brake system, vehicles with and without ABS; Bleeding brake system with brake filling and bleeding appliance V.A.G 1869 Bridge across sockets 55 + 28		- Return flow pump defective, renew hydraulic unit -N55 => Audi 100; Brake system; Repair group 45; Anti-lock brake system (ABS) Bosch 5.0, 1995 model year (chassis No. 4ASN...); Hydraulic unit and brake pipes
ASR system Continued ▼		- Pressure limiting valve in hydraulic unit -N55 - Outlet valve, front right - -N100	- Switch on ignition for not longer than 10 seconds; switch off ignition.	- Change-over valve -N166 switches - Return flow pump -V39 runs - Pressure at pressure gauge not more than 5 bar	- Test change-over valve -N166 and outlet valve -N167 by measuring resistance => test steps 5 + 6. If valves are defective, renew hydraulic unit -N55.

Functional check and leak test					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification



18 (continued)		- Outlet valve, rear left -N136	- Bridge across sockets 27 + 28 Switch on ignition for not longer than 10 seconds; switch off ignition. Disconnect brake system tester V.A.G 1310 A and bleed brakes => Audi 100; Brake system; Repair group 47; Bleeding brake system, vehicles with and without ABS; Bleeding brake system with brake filling and bleeding appliance V.A.G 1869	- Outlet valve-N167 switches - Pressure at pressure gauge rises: Front-wheel drive: 170±25 bar Four-wheel drive, pressure-side control: 90 ± 25 bar Four-wheel drive, suction-side control: 170 ± 25 bar	- Pressure limiting valve and/or outlet valve, front right - N100 and/or outlet valve, rear left -N136 defective. Renew hydraulic unit -N55. => Audi 100; Brake system; Repair group 45; Anti-lock brake system (ABS) Bosch 5.0, 1995 model year (chassis No. 4ASN...); Hydraulic unit and brake pipes
-------------------	--	---------------------------------	---	--	---

Functional check: ABS warning lamp -K47

Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
19 Continued ▼	-	Function of ABS warning lamp -K47	▪ Fault memory has been interrogated and no fault is present in fault memory of control unit - J104. ▪ Ignition off ▪ Multi-pin connector plugged into control unit -J104 and retainer catch engaged.		

Functional check: ABS warning lamp -K47

Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if test result does not match specification

Functional check: ABS warning lamp -K47					
19 (continued)	-	Function of ABS warning lamp - K47.	- Switch on ignition	Warning lamp - K47 should light up for 2 seconds and then go out.	- If the ABS warning lamp does not light up, check voltage of electrical system and test wiring from contact 32 of control unit -J104 to dash panel insert for short to earth. If the ABS warning lamp does not go out after 2 seconds, test the wiring from contact 32 of control unit -J104 to dash panel insert for short to positive and open circuit => Current flow diagrams, Electrical fault-finding and Fitting locations - If the voltage of the electrical system is OK and wiring from contact 32 of control unit -J104 to dash panel insert is intact (fault in dash panel insert) => Audi 100; Electrical system; Repair group 01; Self-diagnosis of dash panel insert Repair group 01; Self-diagnosis of dash panel insert

Protected by copyright. Copying for private or commercial purposes, or reproducing in whole or 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 © AUDI AG.

Functional check: red brake warning symbol					
Test step	V.A.G 1598/20 sockets	Item tested	- Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
20 Continued ▼	-	Function of brake system warning lamp -K118	- Brake fluid level OK => Audi 100; Brake system; Repair group 47; Bleeding brake system, vehicles with and without ABS; Changing brake fluid (every 2 years) - Function of ABS warning lamp -K47 checked in test step 19. - Multi-pin connector plugged into control unit -J104 and retainer catch engaged. - Switch on ignition		



Functional check: red brake warning symbol					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if test result does not match specification
20 (continued)		Function of brake system warning lamp -K118	- Connect V.A.G 1551, select address word 03 => Page 27. - On vehicles with automatic gearbox, press brake pedal and engage a gear.	ABS/EDL warning lamp and red brake warning lamp should light up. ASR warning lamp will also light up, if fitted and if it is working properly.	Fault in dash panel insert => Audi 100; Electrical system; Repair group 01; Self-diagnosis of dash panel insert Repair group 01; Self-diagnosis of dash panel insert

Functional check: ASR warning lamp -K86 (only fitted on vehicles with traction control system (ASR))					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
21 Continued ▼	-	Function of ASR warning lamp -K86	- Fault memory has been interrogated and no faults present in fault memory of control unit -J104. - Ignition switched off - Multi-pin connector plugged into control unit -J104 and retainer catch engaged.		

Functional check: ASR warning lamp -K86 (only fitted on vehicles with traction control system (ASR))					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if test result does not match specification
21 (continued)	-	Function of ASR warning lamp -K86	Switch on ignition	Warning lamp - K86 should light up for 2 seconds and then go out.	- If the ASR warning lamp does not light up, check voltage of electrical system and test wiring from contact 31 of control unit -J104 to dash panel insert for open circuit and short to positive. - If the ASR warning lamp stays on continuously, test wiring from contact 31 of control unit -J104 to dash panel insert for short to earth => Current flow diagrams, Electrical fault-finding and Fitting locations

Functional check: ASR warning lamp -K86 (only fitted on vehicles with traction control system (ASR))					
					- If the voltage of the electrical system is OK and wiring from contact 31 of control unit -J104 to dash panel insert is intact (fault in dash panel insert) => Audi 100; Electrical system; Repair group 01; Self-diagnosis of dash panel insert Repair group 01; Self-diagnosis of dash panel insert

Functional check: ASR push-button switch; select voltage test range on V.A.G 1526: 20 V =					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if test result does not match specification
22	-	Function of ASR push-button switch	▪ Ignition switched off ▪ Function of ASR warning lamp -K86 checked in test step 21 ▪ Multi-pin connector plugged into control unit -J104 and retainer catch engaged Switch on ignition. - Operate ASR push-button switch.	ASR warning lamp -K86 should light up.	- Switch off ignition Release retainer catch and unplug multi-pin connector from control unit - J104.
Continued ▼			- Operate ASR push-button switch again	ASR warning lamp -K86 should go out.	- Connect test box V.A.G 1598/20.

Functional check: ASR push-button switch; select voltage test range on V.A.G 1526: 20 V =					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
22 (continued)	28 + 44	Function of ASR push-button switch	▪ Ignition switched on - ASR push-button switch not pressed	0.0 - 0.5 V	

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.



Functional check: ASR push-button switch; select voltage test range on V.A.G 1526: 20 V =					
			- ASR push-button switch pressed	approx. battery voltage	- Test wiring from contact 28 to earth. Test wiring from contact 44 to ASR push-button switch, contact 6. Test voltage supply at contact 5 of ASR push-button switch via terminal 15. => Current flow diagrams, Electrical fault-finding and Fitting locations If no fault has been found in the previous test steps, renew ASR push-button switch.

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 publication. Copyright 1998 AUDI AG.

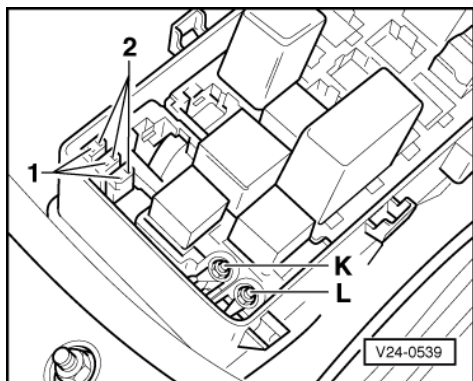
Select voltage test range on V.A.G 1526: 20 V =					
Test step	V.A.G 1598/20 sockets	Item tested	▪ Test conditions - Additional operations	Specification	Fault rectification if reading does not match specification
23	1 + 28 1 + 29	Voltage supply at control unit via terminal 15	▪ Ignition switched on	approx. battery voltage	- Test wiring of contacts 28 and 29 to earth. Test wiring from contact 1 to terminal 15. => Current flow diagrams, Electrical fault-finding and Fitting locations

7.5 - Testing wiring of diagnostic connector

The diagnostic connectors and junctions "K" and "L" for all on-board systems with self-diagnosis are grouped in relay point 1 in the plenum chamber (left side). For wiring colours and other on-board systems connected to "white" diagnostic connector:

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

- Switch off the ignition before testing the wiring connections.
- Use hand-held multimeter V.A.G 1526, auxiliary test set V.A.G 1594 and test box V.A.G 1598/20 for testing.

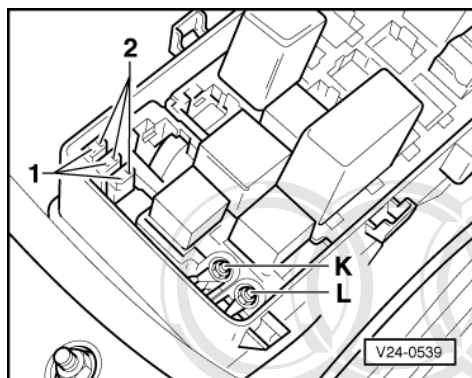


-> Testing voltage supply for fault reader V.A.G 1551, "black" diagnostic connector:

- Contact 1 connected to battery earth.
- Contact 2 connected to positive

- Test wiring.

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



-> Testing diagnostic wiring "L" and "K"; "white" diagnostic connector:

Contact 1, diagnosis wire "L", is not used for ABS, ABS/EDL or ASR systems

Contact 2, diagnostic wire "K" for "Rapid data transfer". The link with the control unit is set up and data are exchanged via the "K" wire. The "K" wire is routed from the "white" diagnostic connector via the junction "K" to the various control units.

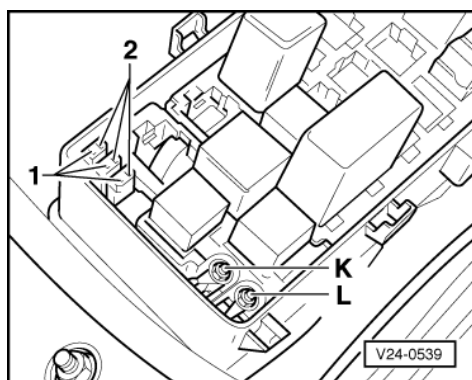
- Connect test box V.A.G 1598/20 to connector of control unit -J104=>Page 74 .
- Test for open circuit in wiring between socket 46 of test box and contact 2 of diagnostic connector. It is not normally possible to trace a short to earth or short to positive. At junction "K", disconnect the wiring to all on-board systems with self-diagnosis ("Rapid data transfer") in turn. Test the corresponding "K" wires.

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

- Test the wiring connection to the control unit which was last disconnected according to current flow diagram

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

- If no fault is found in the wiring and the supply voltage at the control unit is OK (not less than 10.5 V), renew the control unit.



-> "Blue" diagnostic connector is not used for operating mode "Rapid data transfer".



Testing wiring connection if V.A.G 1551 indicates "Fault in communication build-up":

If the display on V.A.G 1551 indicates "Fault in communication build-up", the fault may be in control unit -J104 or in other control units which are not relevant for the ABS, ABS/EDL or ASR system, but which prevent the diagnostic link from being established.

- At junction "K", disconnect the wiring between contact 2 of the "white" diagnostic connector and all on-board systems with self-diagnosis ("Rapid data transfer") in turn.

Note:

Other systems with self-diagnosis:

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

- After disconnecting each of the on-board systems, select address word "03" in operating mode "Rapid data transfer" once again.
- If the display then shows the control unit identification of control unit -J104, renew the control unit which was last disconnected and reconnect all wiring connections.

Note:

If the display shows "Control unit does not answer", there is an open circuit in the wiring connection to control unit -J104.



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.