

Workshop Manual Audi A3 1997 ➤

Running gear, self-diagnosis

Edition 05.2007



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List of Workshop Manual Repair Groups

Repair Group

01 - Self-diagnosis, electrical checks



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

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01 – Self-diagnosis, electrical checks

1 Self-diagnosis

1.1 Basic notes on self-diagnosis

- ◆ The control unit of a system with self-diagnosis function detects any faults or malfunctions during vehicle operation and stores them in a fault memory. This information will remain available even if the system voltage fails.
- ◆ The self-diagnosis function enables faults to be traced quickly and efficiently. The self-diagnosis functions available can be implemented via vehicle diagnostic, testing and information system -VAS 5051 A- or vehicle diagnosis and service information system -VAS 5052- .



Note

This Workshop Manual describes how to perform self-diagnosis using vehicle diagnostic, testing and information system -VAS 5051 A- .

- ◆ The respective control unit and the vehicle diagnostic, testing and information system -VAS 5051 A- must be able to exchange data in order to communicate with each other. The diagnostic connector is the interface for communication between the control unit and vehicle diagnostic, testing and information system -VAS 5051 A- .

Fault detection by ABS with EDL control unit -J104-

- ◆ The control unit detects any faults which may occur during vehicle operation and stores them in a fault memory.
- ◆ To commence fault finding, initiate self-diagnosis and interrogate the stored faults. It is necessary to interrogate the fault memories of all on-board systems with self-diagnosis capability, since the ABS with EDL control unit -J104- exchanges data with the engine control unit as well as the steering angle sender -G85- , the four-wheel drive control unit -J492- and the automatic gearbox control unit -J217- (if fitted). This can be done by selecting the function "00 - Interrogate fault memory - Complete system" ⇒ [page 8](#) . If faults are stored in any other systems, check whether the stored faults affect the ABS/EDL/TCS/ESP system by referring to the respective fault tables.
- ◆ After evaluating all received data, the ABS with EDL control unit -J104- distinguishes between sporadic faults (occurring intermittently) and static faults (permanently present for a defined period), and stores these faults in an internal memory.
- ◆ If a fault occurs, it is initially stored as being static. If the fault does not reoccur over a certain period of time or while the vehicle is driven a certain distance, it is then stored as sporadic fault.
- ◆ When interrogating the fault memory, sporadic faults are marked as "sporadic" on the display.
- ◆ A fault is also stored as sporadic if the ignition is switched off and on again while the fault memory is being interrogated, or if the fault memory is not erased after performing repairs.

- ◆ Sporadic faults are erased automatically if they do not occur again within the next 50 vehicle starts and driving off sequences (road speed greater than 20 km/h).
- ◆ The ABS with EDL control unit -J104- is able to detect whether any of the required signals are not being transmitted via the CAN bus. However, defective CAN bus wires (e.g. open circuit) cannot be detected directly. The defective CAN bus wires can only be traced after interrogating the fault memories of all control units ⇒ [page 9](#).
- ◆ Sporadic faults affecting the CAN bus are erased automatically if they do not occur again within the next 15 vehicle starts and driving off sequences (vehicle speed greater than 20 km/h).

1.2 Function of the individual systems

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1.2.1 Anti-lock brake system

The anti-lock brake system (ABS) prevents the wheels from locking when the brakes are applied by the driver. Directional stability and steerability are maintained in spite of high braking effect.

1.2.2 EDL - Electronic differential lock

The EDL system assists pulling away; it acts only on the front wheels, even if the vehicle is equipped with four-wheel drive. An electronically controlled brake application on the spinning driven wheel provides a torque reaction point for the differential. This enables the wheel with better traction to make use of the engine power. The EDL is effective in both forwards and reverse directions. The EDL control process is available up to a road speed of 80 km/h.

1.2.3 EBPD - Electronic brake pressure distribution

The Audi A3 is not fitted with a mechanical brake pressure regulator. Specially developed software in the ABS with EDL control unit -J104- provides electronic brake pressure distribution (EBPD) and limits the brake pressure applied to the rear wheels.

1.2.4 TCS - Traction control system

- ◆ TCS (traction control system) is fitted only on vehicles with front-wheel drive. On these vehicles it is important to check the control unit coding (vehicles not equipped with ESP ⇒ [page 39](#), vehicles with ESP ⇒ [page 104](#)). The TCS limits the engine power in order to prevent the driven wheels from spinning under acceleration. The system operates by reducing engine torque and is active at all speeds. The EDL and TCS functions act together to assist acceleration. The warning lamp flashes at a rate of three times per second when the control function is actually working.
- ◆ The TCS requires an exchange of data between ABS with EDL control unit -J104- and the engine control unit. The control units communicate with each other. The data is transmitted via CAN bus ⇒ [page 9](#).
- ◆ Depending on the engine version, the TCS also incorporates an engine braking control (EBC). EBC prevents the driven wheels from locking up due to excessive engine braking torque, for instance when the driver changes down from 3rd to 2nd gear. The engine braking effect is reduced via the electronic idling stabilisation control.
- ◆ If required, the TCS function can be switched off and then on again by means of the push-button switch (which may be

marked ASR) on the right of the switch for the hazard warning lights. The TCS switch has no influence on the EBC function. The warning lamp lights up when the TCS is switched off. The TCS is re-activated when the ignition is switched on again.

1.2.5 ESP - Electronic Stabilisation Program

The ESP is based on the existing on-board safety systems ABS/EDL and ABS/EDL/TCS, with a number of additional capabilities. ESP enhances the degree of control in critical dynamic conditions. In addition to the existing safety systems, ESP further reduces the risk of skidding and improves steerability.



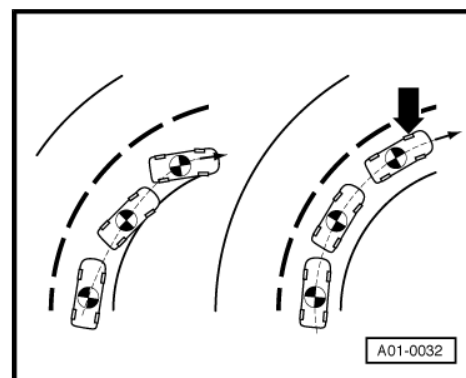
Caution

However, ESP is not able to overcome the physical limits of the available road adhesion.

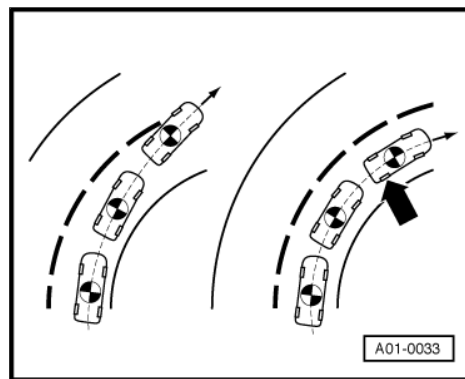
- ◆ The ESP stabilises the vehicle when an oversteering or understeering condition occurs. The functions of EBPD, ABS, EDL and TCS are incorporated in the control system. However, the characteristic function of the ESP is controlled brake application at individual wheels.
- ◆ The ESP function relies on an exchange of signals between the ABS with EDL control unit -J104- and the engine control unit, the steering angle sender -G85- and the automatic gearbox control unit -J217- or the four-wheel drive control unit -J492- (if fitted). The data is transmitted via CAN bus
⇒ [page 9](#).
- ◆ If required, the TCS and ESP functions can be switched off and then on again by means of the push-button switch on the left or right of the switch for the hazard warning lights. The control unit ignores the position of the ESP switch when the driver presses the brake pedal. ESP will remain active at all times during braking. Both functions, TCS and ESP, will be activated again automatically the next time the ignition is switched on.
- ◆ When the TCS and ESP functions are deactivated, the traction control system warning lamp -K86- in the instrument cluster lights up. The warning lamp flashes at a rate of three times per second when the control function is actually working.

Examples: 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.

In an oversteer condition, the rear of the vehicle tends to break away. The vehicle rotates further about its vertical axis than is required to maintain course through the corner. The system counteracts this moment of vehicle oversteer by applying a controlled braking force at the outside front wheel -arrow-.



In an understeer condition the front end of the vehicle does not follow the required corner radius. The vehicle breaks away towards the outside of the bend. The vehicle does not rotate far enough about its vertical axis to maintain course through the corner. The system increases the amount of rotation by applying a controlled braking force at the inside rear wheel -arrow-.



1.3 Safety precautions

- ◆ The ABS/EDL/TCS and ESP are safety systems; knowledge of the systems is essential for performing repair work
- ◆ Always switch off the ignition before carrying out installation or repair work.
- ◆ Ensure that no brake fluid enters electrical connectors.



WARNING

- ◆ *All test equipment must be secured to the rear seat and operated by a 2nd person from this location.*
- ◆ *If the test equipment is operated from the front passenger seat, the person sitting there could be injured if the front passenger airbag were triggered in the event of an accident.*

- ◆ Do not drive the vehicle with the connector unplugged from the control unit.
- ◆ During the final road test ➔ [page 6](#) , ensure that an ABS-controlled brake application is performed at least once ➔ [page 4](#) .

1.4 Requirements for test

- When starting the self-diagnosis procedure, the vehicle must be stationary and the ignition switched on (or engine running). Self-diagnosis will be terminated if road speed exceeds 20 km/h.
- Power supply OK (min. 10.0 V).
- Fuses OK ➔ Current flow diagrams, Electrical fault finding and Fitting locations.
- Connector on ABS with EDL control unit -J104- correctly plugged-in (retainer is engaged).
- The tyres fitted to all wheels must be of the same (approved) size; tyres inflated to prescribed pressure.
- Wheel speed sensors must be installed correctly ➔ Brake system; Rep. Gr. 45 .
- Mechanical/ hydraulic brake system components (including brake light switch and brake lights) OK. Hydraulic connections and pipes not leaking (visual check of hydraulic unit, brake calipers, wheel cylinders, master brake cylinder).
- Wheel bearings and wheel bearing play OK.
- When testing the ABS/EDL/TCS and ESP systems, ensure that the vehicle's electrics are not subjected to electromag-

netic interference: keep the vehicle away from equipment with a high current draw, such as electric welding units.

1.5 Fault finding procedure

If a problem exists on the vehicle, perform the fault-finding procedure in the following sequence:

- First switch on the ignition and observe the warning lamps. This will give an initial indication of what to look for (vehicles without ESP ⇒ [page 15](#) , vehicles with ESP ⇒ [page 61](#)).
- Observe the test requirements detailed on ⇒ [page 4](#) .
- Connect vehicle diagnostic, testing and information system - VAS 5051 A- and select vehicle system "03 - Brake electronics" ⇒ [page 7](#) .
- Check the control unit version ⇒ [page 8](#) .
- Interrogate the fault memory (vehicles without ESP ⇒ [page 18](#) , vehicles with ESP ⇒ [page 64](#)). If a fault is present in the memory: print out the content of the fault memory and then erase the fault memory.
- Conclude the transfer of data with the function "06 - End output".
- Eliminate the fault using the fault tables.
- If a component is indicated as being defective, only renew it if you are sure that the electrical wiring for that component is in proper condition. The wiring must be able to transmit the necessary signals without interference or resistance. Check the wiring for:
 - ◆ Corrosion and loose contacts in the connectors and earth connections. If any of the plug contacts are bent, broken or corroded, use the wiring repair kit -VAS 1978- to fit new contacts.
 - ◆ Open circuit in wiring or short circuit to positive/earth ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Check that the connectors are plugged in correctly (with retainers engaged).
- After completing the repair, select vehicle system "03 - Brake system" for a second time. Interrogate and erase fault memory.
- Conclude the transfer of data with the function "06 - End output".
- Switch off ignition and detach diagnostic connector.
- Perform a road test ⇒ [page 6](#) to check the function of the system. If any of the warning lamps light up during the road test, repeat the fault finding procedure.



WARNING

If the connector is not plugged into the ABS with EDL control unit -J104- when the vehicle is moving, this may result in a spurious (non-existent) fault being registered in the fault memory of another control unit. The function of the brake system will be impaired. The brake pressure at the rear wheels is no longer controlled by the electronic brake pressure distribution function. This can result in excessive braking at the rear, and the tail of the vehicle may break out unexpectedly.

**Note**

For information on repairing common faults, refer to ⇒ *Technical Service Handbook*.

1.6 Road test

Certain faults will only be detected by the self-diagnosis when the vehicle is moving. Perform a road test to check the function of the system.

**WARNING**

- ◆ *To avoid any risk of accident, observe the safety precautions when using test instruments while road testing the vehicle ⇒ ["1.3 Safety precautions", page 4](#).*
- ◆ *If you drive the vehicle after a fault has been detected by the self-diagnosis bear in mind that there is a risk of accident. The function of the brake system will be impaired. The brake pressure at the rear wheels is no longer controlled by the electronic brake pressure distribution function. This can result in excessive braking at the rear, and the tail of the vehicle may break out unexpectedly.*
- ◆ *The ABS/ESP function is deactivated when using vehicle diagnostic, testing and information system -VAS 5051 A- in the mode "vehicle self-diagnosis" while road testing the vehicle. However, this is not indicated by the warning lamps. Self-diagnosis of ABS with EDL control unit -J104- is terminated if a road speed of 20 km/h is exceeded.*

- During the 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.

1.6.1 Special feature for four-wheel drive vehicles with Haldex coupling

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The longitudinal acceleration sender -G251- can be deactivated when testing the brake system on test rollers (vehicles without ESP ⇒ [page 34](#), vehicles with ESP ⇒ [page 91](#)).
- ◆ After completion of the check, the longitudinal acceleration sender -G251- must be reactivated by switching the ignition off and back on again.

1.7 Connecting vehicle diagnostic, testing and information system -VAS 5051 A-

Vehicles up to model year 1999:

- With ignition switched off, connect vehicle diagnostic, testing and information system -VAS 5051 A- with diagnosis lead - VAS 5051 A/1- to diagnostic connection.



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Vehicles from model year 2000 onwards:

- With ignition switched off, connect vehicle diagnostic, testing and information system -VAS 5051 A- with diagnosis lead - VAS 5051 A/1- to diagnostic connection.

All models:



WARNING

Observe the relevant safety precautions ⇒ page 4 .



Note

Refer to ⇒ Operating instructions for vehicle diagnostic, testing and information system -VAS 5051 A- if a fault is indicated on the display.

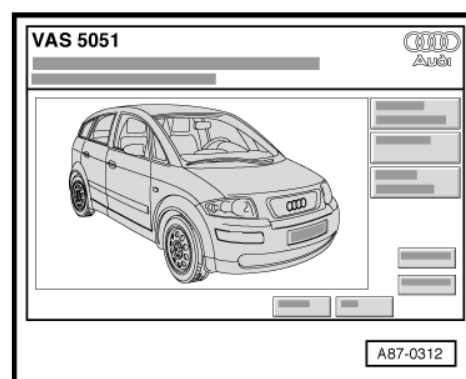
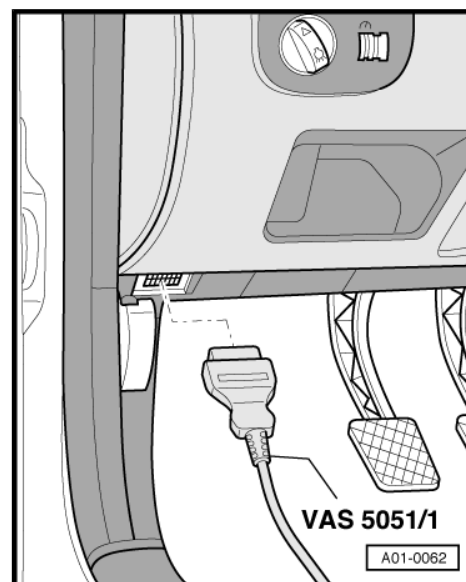
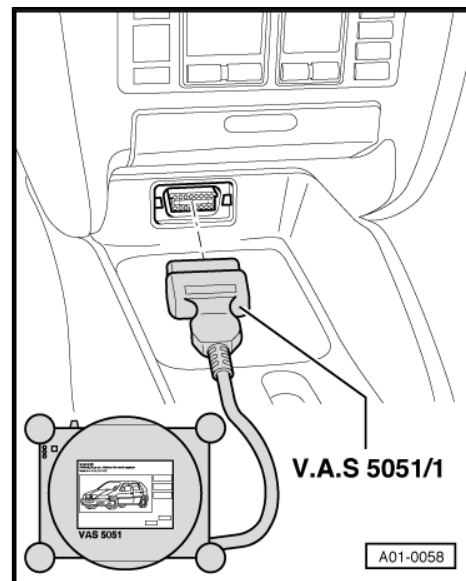
- Switch on ignition.

or

- Start engine.

Indicated on -VAS 5051 A- :

- Touch "Vehicle self-diagnosis" key.





Indicated on -VAS 5051 A- :



Note

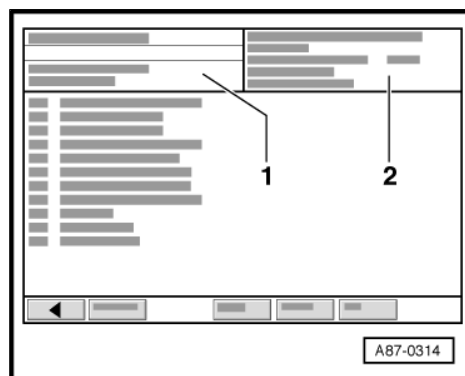
Touching function "00 - Interrogate fault memory - complete system" in list -1- implements the automatic test sequence, i.e. fault memory interrogation takes place for all vehicle systems with self-diagnosis capability.

- From menu -1- select vehicle system "03 - Brake electronics"
- Wait until next readout appears.



Indicated on -VAS 5051 A- :

2 - Control unit identification of ABS with EDL control unit -J104- .



Control unit identification : ABS with EDL control unit -J104- (example)

03 - Brake electronics	Vehicle system
1J0907379..	Part No.; Allocation ⇒ Parts catalogue
ABS EDL	System designation: ABS (ABS only), ABS EDL (ABS with EDL), ESP
20 IE	System generation
CAN	Data bus (CAN) - not on 1997 model year vehicles
Coding 18945	Control unit coding (checking: vehicles without ESP ⇒ page 39 , vehicles with ESP ⇒ page 104).
Dealership number 12345	Dealership identifier of -VAS 5051 A- with which coding was last performed

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

- Check:
 - ♦ Voltage supply to diagnosis connector ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
 - ♦ Wiring connection between diagnosis connector and ABS with EDL control unit -J104- ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

2 CAN bus

Data bus:

A data bus is a system for the transmission and distribution of data signals.

CAN:

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

These control units communicate with each other (i.e. exchange data) via the CAN bus.

2.1 Testing a "two-wire data bus system"

Special tools and workshop equipment required

- ◆ Vehicle diagnostic, testing and information system -VAS 5051 A-

Test sequence:

- Refer to the appropriate current flow diagram to check how many control units are connected to the CAN bus.
- Connect vehicle diagnostic, testing and information system - VAS 5051 A- ⇒ [page 7](#) and select function "00 - Automatic test sequence". When doing this the ignition must be switched on.
- Before testing the data bus wires make sure that there are no faults in any of the control units which are connected to the data bus. If a fault exists, the communication with other the control units is affected.



Note

A fault existing in or related to one of the control units does not affect the data bus system directly, but results from a malfunction of some kind in one of the systems. This may be a defective sensor, for example. The result is that the sensor signal can no longer be processed for transmission via the data bus. A malfunction of this kind has an indirect effect on the data bus system, and will upset the communication with other control units which require the signal from the affected sensor.

Procedure if a fault exists:

- Rectify the fault first.
- Print out the list of faults and erase the fault memories of all control units (refer to "Interrogating fault memory" and "Erasing fault memory" for the relevant control unit.
- Conclude the transfer of data with the function "06 - End output".
- Rectify the faults as described in the fault tables in the relevant Workshop Manual.

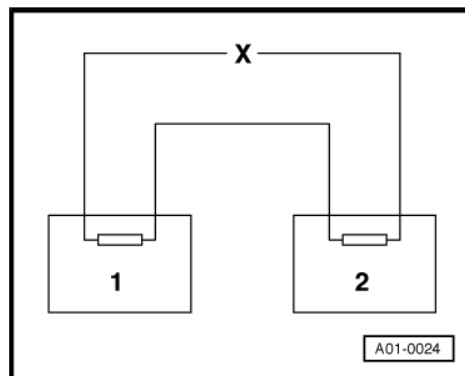
When all faults have been rectified:

- If communication between the control units is still not working properly, test the data bus wires.
- Distinguish between two possible configurations when tracing faults in the bus wires.

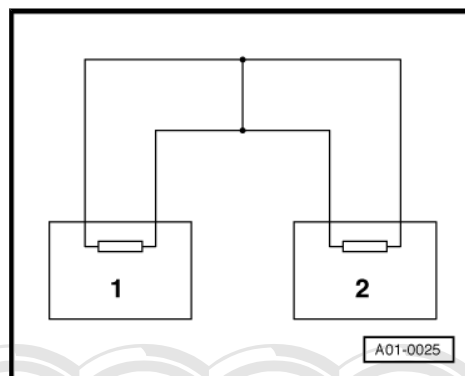
- ◆ Two control units communicating via a “Two-line bus system”
⇒ [page 10](#) .
- ◆ Three or more control units communicating via a “Two-line bus system” ⇒ [page 11](#) .

2.1.1 Two control units communicating via a “Two-line bus system”.

- Switch off ignition.
- Unplug multi-pin connectors at both control units.
- Check for an open circuit in the bus wires ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



- Check for short circuit between the bus wires ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



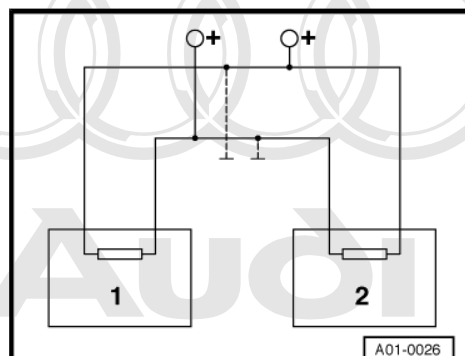
- Check for short to positive and short to earth in the bus wires.

If the cause of the fault cannot be found in the data bus wires:

- As a trial measure, renew the control unit which can be exchanged with the least effort in terms of time and cost.

If the control unit communication via data bus is still not OK:

- Renew the second control unit.



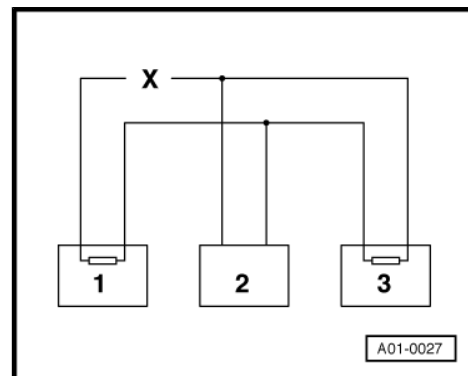
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2.1.2 Three or more control units communicating via a "Two-line bus system".

Example 1:

The faults stored in the fault memories indicate that the control unit -1- has no connection to control units -2- and -3-.

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

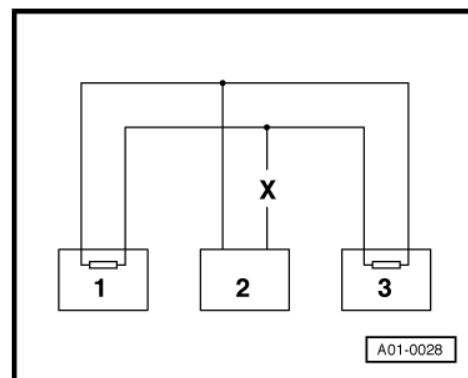


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- Switch off ignition.
 - Unplug electrical connectors on control units linked by data bus wires and check bus wires for open circuit ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Example 2:

The faults stored in the fault memories indicate that the control unit -2- does not communicate with control units -1- and -3-.

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

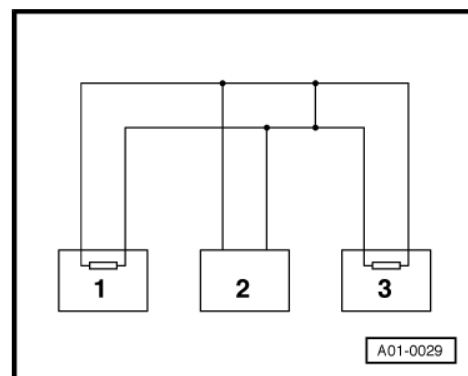


- Switch off ignition.
- Unplug electrical connectors on control units linked by data bus wires and check bus wires for open circuit ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Example 3:

The faults stored in the fault memories indicate that none of the control units can transmit or receive.

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



- Switch off ignition.
- Unplug electrical connectors on control units linked by data bus wires and check bus wires for short circuit ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

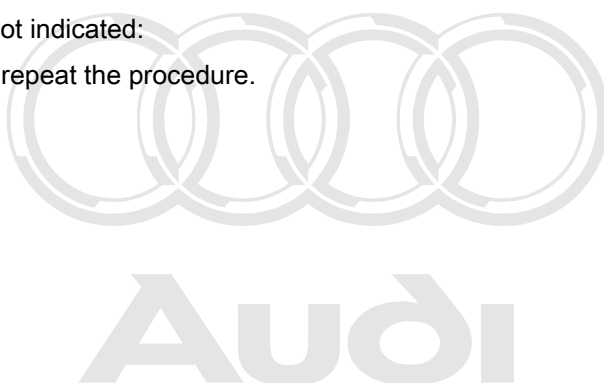
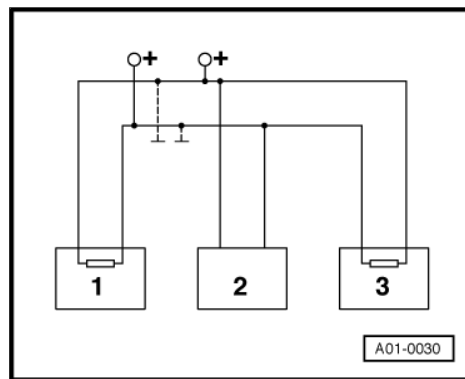
- Check the bus wires for short to positive and short to earth.
- If the cause of the fault “Control unit defective” cannot be found in the data bus wires, check whether one of the control units is responsible for causing the fault.
- Electrical connectors on all control unit that communicate via the CAN data bus are unplugged.
- Ignition switched off
- Connect one of the control units.
- Connect vehicle diagnostic, testing and information system - VAS 5051 A- ➔ [page 7](#) .
- Switch on ignition and select the relevant vehicle system.
- Interrogate and erase the fault memory of the control unit which has been just connected.
- Terminate function “05 - Erasing fault memory” by touching  key.
- Conclude the transfer of data with the function “06 - End output”.
- Switch the ignition off and then on again.
- Leave the ignition switched on for 10 seconds. Then interrogate the fault memory of the control unit that has just been connected.

If the fault “control unit defective” is indicated:

- Renew the control unit which has just been connected.

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

- Connect the next control unit and repeat the procedure.



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3 ABS, ABS/EDL and ABS/EDL/TCS ITT Mark 20 without ESP

Audi A3, model year 1997

- ◆ 1997 model year vehicles without ESP are equipped with ABS or ABS/EDL ITT Mark 20 GI.

Audi A3, from model year 1998 onwards

- ◆ Vehicles from model year 1998 onwards without ESP are equipped with ABS, ABS/EDL or ABS/EDL/TCS ITT Mark 20 IE.
- ◆ The control unit can be coded for active engine braking control function on vehicles with the corresponding engine version [⇒ page 2](#).
- ◆ The data signals are transmitted via CAN bus.

Identification features of vehicles with and without EDL:

-I- Vehicles with ABS, not equipped with EDL:

- ◆ Dimension -a- = 100 mm
- ◆ 8 valve domes

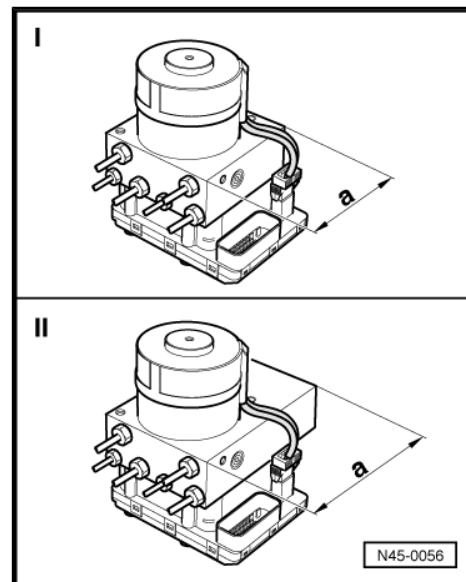
-II- Vehicles with ABS and EDL (and TCS where applicable):

- ◆ Dimension -a- = 130 mm
- ◆ 10 valve domes



Note

The protective sleeves for the valves become visible when the control unit is separated from the hydraulic unit ⇒ Brake system; Rep. Gr. 45.



3.1 Electrical/electronic components and fitting locations



Note

- ◆ *Not included in illustration: traction control system warning lamp -K86- (only for vehicles with TCS).*
- ◆ *Fitting location: in instrument cluster*
- ◆ *Function [⇒ page 15](#)*

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1 - Brake master cylinder and brake servo

2 - Hydraulic control unit

- ❑ The hydraulic control unit comprises the ABS hydraulic pump -V64- and the ABS with EDL control unit -J104- .
- ❑ Fitting location: in engine compartment (left-side)
- ❑ Checked by self-diagnosis
- ❑ Only unplug 25-pin connector when the ignition is switched off
- ❑ Assignment of 25-pin connector ⇒ [page 50](#)
- ❑ Removing and installing ⇒ Brake system; Rep. Gr. 45
- ❑ Perform coding of ABS with EDL control unit - J104- after renewal ⇒ [page 39](#)

3 - Diagnostic connection

- ❑ Fitting location up to model year 1999: In centre console
- ❑ Fitting location from model year 2000 onwards: In footwell (front left), next to bonnet release lever

4 - Cover for diagnostic connection

5 - "Brake warning" symbol

- ☐ Lights up in instrument cluster or in display of driver information system
- ☐ Function ⇒ **page 15**

6 - ABS warning lamp -K47-

- ❑ Fitting location: In instrument cluster
- ❑ Function $\Rightarrow$ [page 15](#)

7 - Speed sensor and speed sensor rotor (rear left and rear right)

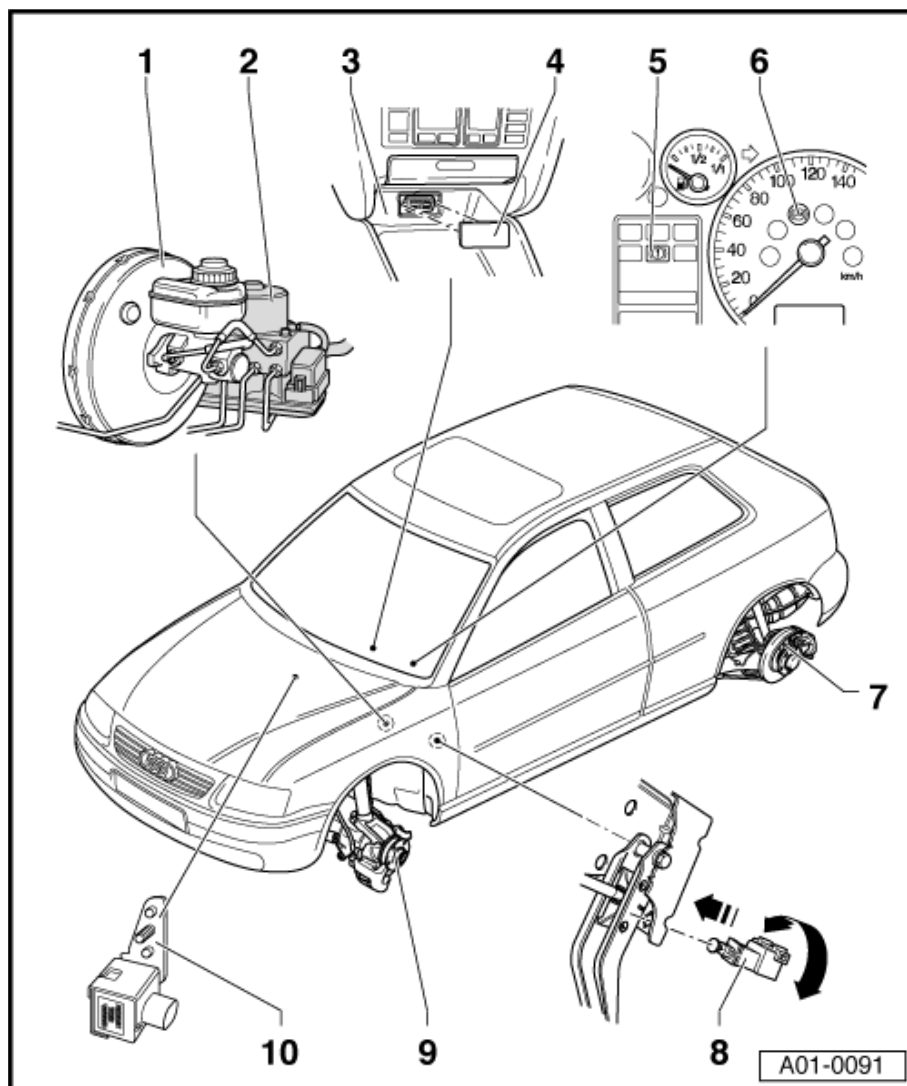
- ❑ Rear left speed sensor -G46- and rear right speed sensor -G44-
- ❑ Removing and installing speed sensor, fitting speed sensor wires ⇒ Brake system; Rep. Gr. 45
- ❑ Checking speed sensor rotor ⇒ Brake system; Rep. Gr. 45
- ❑ Speed sensor rotor is welded to wheel hub; removing and installing wheel hub ⇒ Running gear, front-wheel drive and four-wheel drive; Rep. Gr. 42

8 - Brake light switch -F-

- ☐ Can be checked via reading measured value block ⇒ page 45
- ☐ Removing and installing ⇒ Brake system; Rep. Gr. 45

9 - Front left and front right speed sensor and speed sensor rotor

- ☐ Front left speed sensor -G47- and front right speed sensor -G45-
- ☐ Removing and installing speed sensor, fitting speed sensor wires ⇒ Brake system; Rep. Gr. 45
- ☐ Checking speed sensor rotor ⇒ Brake system; Rep. Gr. 45



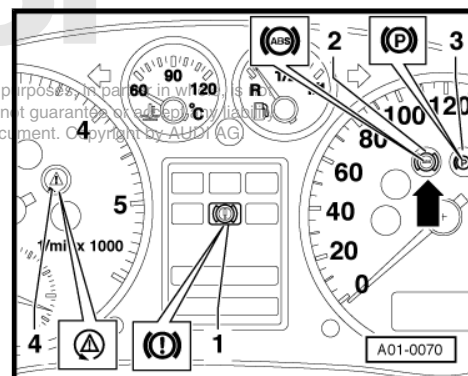
- ☐ Speed sensor rotor is welded to wheel hub; removing and installing wheel hub ⇒ Running gear, front-wheel drive and four-wheel drive; Rep. Gr. 40

10 - Longitudinal acceleration sender -G251-

- ☐ Four-wheel drive vehicles only
- ☐ Fitting location: on A-pillar (passenger side)
- ☐ Can be checked via reading measured value block ⇒ [page 45](#)
- ☐ Refer to ⇒ Brake system; Rep. Gr. 45 for removing and installing, then perform zero compensation in basic setting ⇒ [page 35](#)

3.2 Faults displayed by warning lamps in instrument cluster

- 1 - "Brake warning" symbol
- 2 - ABS warning lamp -K47-
- 3 - Handbrake warning lamp -K14-
- 4 - Traction control system warning lamp -K86- (only on vehicles with TCS)



"Brake warning" symbol	ABS warning lamp -K47-	Traction control system warning lamp -K86- ¹⁾	Explanation
On	On	On	Test sequence after switching on ignition (first two seconds).
Off	Off	Off	System OK (2 seconds after switching on ignition)
Off	Off	On	TCS system failure or TCS system has been switched off via manual switch; ABS, EDL and EBPD systems remain functional.
Off	Off	flashes	TCS control function is operating
Off	On	On	ABS/EDL/TCS system failure (e.g. wheel speed sensor defective), the EBPD remains fully functional.
On	On	On	ABS/EDL/TCS/EBPD system failure (e.g. several wheel speed sensors defective)
On	Off	Off	Brake fluid level too low; all systems remain functional

1) Only on vehicles with TCS system



WARNING

There is a risk of accident if the ABS warning lamp -K47- and the "brake warning symbol" both light up. The function of the brake system will be impaired. As the brake pressure is no longer controlled by the electronic brake force distribution the rear wheels tend to brake excessively. Due to this the rear of the vehicle may break away unexpectedly.

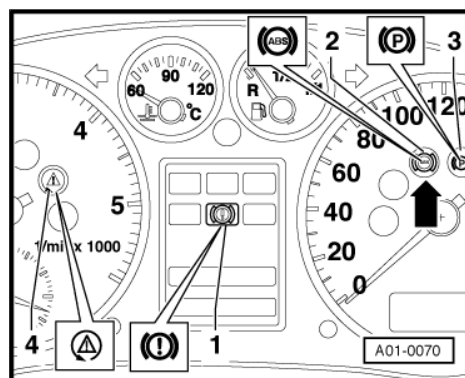
The ABS warning lamp -K47- -item 2- lights up during the test sequence (self-test)

The system runs through an automatic test sequence when the ignition is switched on: the ABS warning lamp -K47- is activated by the ABS with EDL control unit -J104- and lights up for 2 seconds. During this period the control unit tests the following functions via self-test.

- ◆ The voltage supply is checked, at least 10.0 V.
- ◆ The control unit including the valve windings is checked.
- ◆ A speed sensor check (electrical test) is carried out; this is only completed at 20 km/h.
- ◆ Control unit code is checked.

If the system does not perform the test sequence:

- Check voltage supply of ABS with EDL control unit -J104- (perform electrical check, step 3 ➔ [page 51](#)).

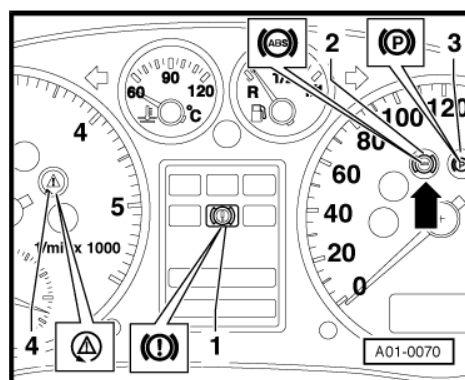


The ABS warning lamp -K47- -item 2- stays on after the test sequence is completed

If a fault affecting only the anti-lock brake system is detected by self-diagnosis, the ABS is switched off. The conventional brake system remains fully functional.

The causes of the fault may be as follows:

- ◆ Voltage supply is below 10 Volts.
- ◆ A fault exists which affects only the ABS.
- ◆ A sensor fault has occurred after the last start (sporadic fault). In this case the ABS warning lamp goes out automatically after the vehicle is started again and the road speed exceeds 20 km/h.
- ◆ Connection between ABS with EDL control unit -J104- and instrument cluster is faulty or instrument cluster faulty (perform electrical check, step 15 ➔ [page 56](#)).

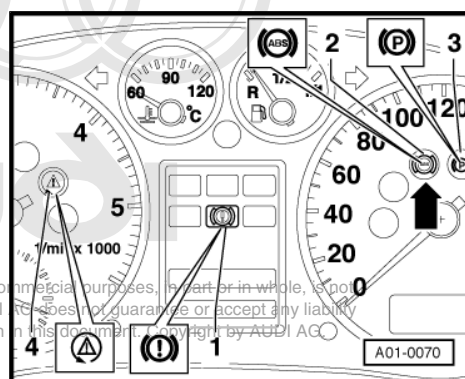


The ABS warning lamp -K47- -item 2- goes out after the test sequence is completed,, but "brake warning symbol" -1- remains on

All systems remain functional.

The causes of the fault may be as follows:

- ◆ Brake fluid level too low.
- ◆ Fault in instrument cluster ➔ Electrical system, self-diagnosis; Rep. Gr. 01 or ➔ Current flow diagrams, Electrical fault finding and Fitting locations.



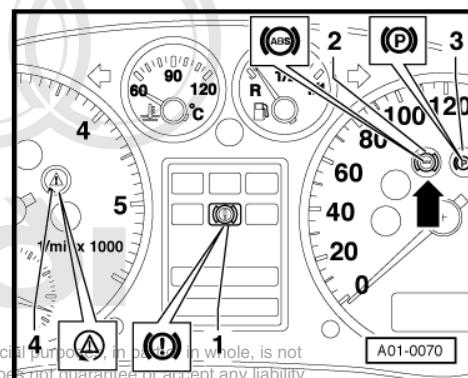
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The ABS warning lamp -K47- -item 2- stays on after the test sequence is completed and "brake warning symbol" -1- lights up when vehicle speed first exceeds 10 km/h or engine speed first exceeds 2000 rpm

The ABS system is defective and the EBPD system deactivated.

 **WARNING**

There is a risk of accident if the ABS warning lamp -K47- and the "brake warning symbol" both light up. The function of the brake system will be impaired. As the brake pressure is no longer controlled by the electronic brake force distribution the rear wheels tend to brake excessively. Due to this the rear of the vehicle may break away unexpectedly.



The causes of the fault may be as follows:

- ◆ The control unit is not coded (Code 00000), or is incorrectly coded. In this case the ABS warning lamp -K47- will flash at a rate of once per second. The "brake warning" symbol will also flash when vehicle speed first exceeds 10 km/h or engine speed first exceeds 2000 rpm after the ignition is switched on.
- ◆ A fault exists which affects the ABS and EBPD.

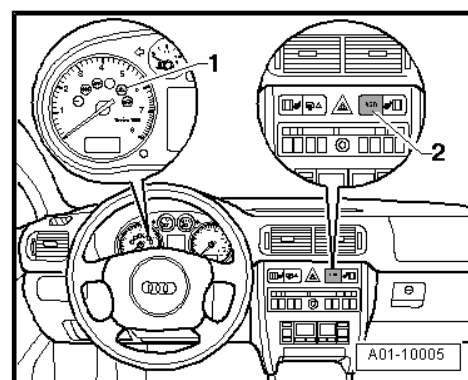
 Note

If the ABS warning lamp -K47- and the "brake warning" symbol do not light up but the brake system is not fully functional, the fault must be traced in the conventional brake system ⇒ Brake system; Rep. Gr. 46 and ⇒ Brake system; Rep. Gr. 47.

Traction control system warning lamp -K86- -item 1- does not light up after TCS is deactivated by pressing the traction control system switch -E132- -item 2-.

The causes of the fault may be as follows:

- ◆ Traction control system warning lamp -K86- defective (perform electrical check, step 17 ⇒ [page 57](#)).
- ◆ Traction control system switch -E132- defective (perform electrical check, step 17 ⇒ [page 57](#) and step 18 ⇒ [page 57](#)).
- ◆ Open circuit in vehicle power supply and wiring from ABS with EDL control unit -J104- to instrument cluster (perform electrical check, step 17 ⇒ [page 57](#) and step 18 ⇒ [page 57](#)).
- ◆ Short circuit to positive in wiring from ABS with EDL control unit -J104- to instrument cluster (perform electrical check, step 17 ⇒ [page 57](#) and step 18 ⇒ [page 57](#)).



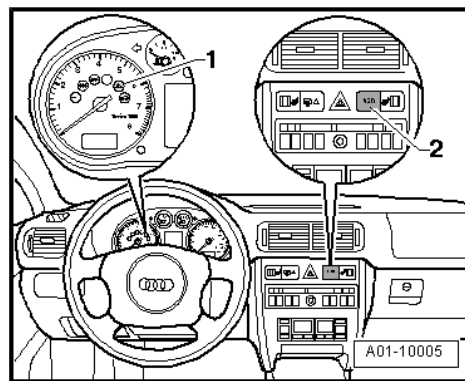
Traction control system warning lamp -K86- -item 1- lights continuously after ignition is switched on, and none of the malfunctions listed above are present

The cause of the fault may be as follows:

- ◆ Short circuit to earth in wiring from ABS with EDL control unit -J104- to instrument cluster (activation of TCS warning lamp) (perform electrical check, step 17 ⇒ [page 57](#) and step 18 ⇒ [page 57](#)).

Vehicle with ABS/EDL has no EDL function

A possible cause of this fault is that the brake light switch is not functioning. Check "measured value block 003" ⇒ [page 45](#) .
Renewing brake light switch ⇒ Brake system; Rep. Gr. 45 .



3.3 Performing self-diagnosis on the ABS, ABS/EDL and ABS/EDL/TCS, ITT Mark 20 without ESP

List of available functions

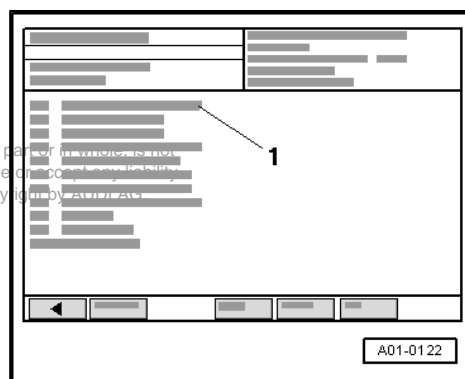
- With ignition switched off, connect vehicle diagnostic, testing and information system -VAS 5051 A- with diagnosis lead - VAS 5051 A/1- to diagnosis connector and select vehicle system "03 - Brake electronics" ⇒ [page 7](#) .

The following functions are available from the list -1-:

Functions	Page
02 Interrogate fault memory	⇒ page 18
03 Final control diagnosis	⇒ page 27
04 Basic setting	⇒ page 31
05 Erase fault memory	⇒ page 37
06 End output	⇒ page 38
07 Code control unit	⇒ page 39
08 Read measured value block	⇒ page 42
11 Login procedure/encoding II ²⁾	⇒ page 46

2) The login procedure/encoding II is only required on four-wheel drive vehicles.

The other functions displayed are currently not available, or can be disregarded.



3.4 Interrogating fault memory

- Connect vehicle diagnostic, testing and information system - VAS 5051 A- ⇒ [page 7](#) and select vehicle system "03 - Brake electronics". When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

- From list -1- select function "02 - Interrogate fault memory".



Indicated on -VAS 5051 A- :

- | | |
|-----------------------------|---|
| -1- Content of fault memory | No faults detected
or
X faults detected |
| -2- Fault | Fault code
Fault location
Type of fault |

A - If a fault was detected:

- Print out information on screen or self-diagnosis log.
- Terminate function “02 - Interrogate fault memory” by touching  key.

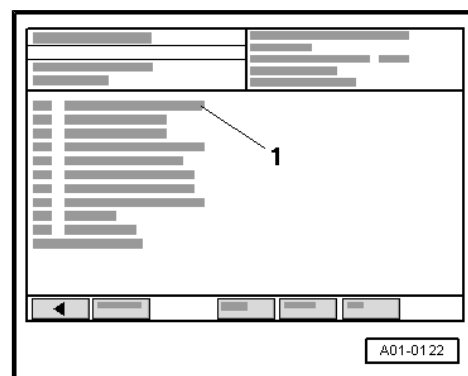


Indicated on -VAS 5051 A- :

- Rectify fault(s) according to fault tables ⇒ [page 19](#) .
- From list -1- select function “02 - Interrogate fault memory” and erase fault memory ⇒ [page 37](#) .
- From list -1- select function “06 - End output” ⇒ [page 38](#) .
- Perform road test and interrogate fault memory again.

B - If no fault was detected:

- Terminate function “02 - Interrogate fault memory” by touching  key.
- Select function “06 - End output” from list ⇒ [page 38](#) .



3.5 Fault tables



Note

- ◆ *Vehicles from 1998 model year onwards: As the control units are interconnected via the CAN data bus, always start by interrogating the fault memories of all the control units in the vehicle as the first step in the fault-finding routine. This can be done by starting the automatic test sequence: Diagnosis function “00 - Interrogate fault memory - Complete system”. You can then check to see if there are faults stored which may affect the ABS.*
- ◆ *The following table includes all faults which can be detected by the ABS with EDL control unit -J104- and displayed by -VAS 5051 A- when interrogating the fault memory.*
- ◆ *The contents of the fault memory remains stored until the memory is erased; Erasing fault memory ⇒ [page 37](#) .*
- ◆ *Faults are listed according to a 5-digit fault code, which appears in the left-hand column of the fault table.*
- ◆ *Sporadic (intermittent) faults are identified as such by the word “sporadic” appearing on the display.*
- ◆ *Check wiring and connectors going to the relevant components according to current flow diagram before renewing components indicated as faulty by -VAS 5051 A- . Also check earth connections according to current flow diagram. This is particularly important if faults are indicated as being “sporadic”.*

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Fault 00283

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00283 Front left speed sensor -G47-		
	♦ Open circuit, loose contact or short to positive or earth in speed sensor wire or speed sensor	– Perform electrical check, step 6 ⇒ page 52 and step 10 ⇒ page 54
	♦ Speed sensor winding defective	
	♦ Speed sensor or rotor damaged	– Check speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	♦ ABS with EDL control unit -J104- defective	– Remove hydraulic control unit, renew control unit ⇒ Brake system; Rep. Gr. 45 , then code control unit ⇒ page 39
00283 Front left speed sensor -G47- Mechanical fault		
• This fault is only detected above 20 km/h (carry out test drive).	♦ Excessive air gap between speed sensor and rotor.	– Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	♦ Outlet valves in hydraulic unit defective	– Check hydraulic unit in final control diagnosis ⇒ page 27
00283 Front left speed sensor -G47- Signal outside tolerance		
• This fault is only detected above 20 km/h (carry out test drive).	♦ Open circuit, loose contact or short to positive or earth in speed sensor wire or speed sensor	– Perform electrical check, step 6 ⇒ page 52 and step 10 ⇒ page 54
	♦ Speed sensor winding defective	
	♦ Electrical interference from external interference sources (high frequency radiation, e.g. non-insulated ignition cable)	– Read measured value block 001 ⇒ page 44
	♦ Excessive air gap between speed sensor and rotor.	– Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	♦ Speed sensor or rotor damaged	– Check speed sensor and rotor ⇒ Brake system; Rep. Gr. 45

Fault 00285

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00285 Front right speed sensor -G45-		
	♦ Open circuit, loose contact or short to positive or earth in speed sensor wire or speed sensor	– Perform electrical check, step 5 ⇒ page 52 and step 9 ⇒ page 53
	♦ Speed sensor winding defective	
	♦ Speed sensor or rotor damaged	– Check speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	♦ ABS with EDL control unit -J104- defective	– Remove hydraulic control unit, renew control unit ⇒ Brake system; Rep. Gr. 45 , then code control unit ⇒ page 39

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00285 Front right speed sensor -G45- Mechanical fault		
This fault is only detected above 20 km/h (carry out test drive).	Excessive air gap between speed sensor and rotor.	Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	Outlet valves in hydraulic unit defective	Check hydraulic unit in final control diagnosis ⇒ page 27
00285 Front right speed sensor -G45- Signal outside tolerance		
This fault is only detected above 20 km/h (carry out test drive).	Open circuit, loose contact or short to positive or earth in speed sensor wire or speed sensor	Perform electrical check, step 5 ⇒ page 52 and step 9 ⇒ page 53
	Speed sensor winding defective	
	Electrical interference from external interference sources (high frequency radiation, e.g. non-insulated ignition cable)	Read measured value block 001 ⇒ page 44
	Excessive air gap between speed sensor and rotor.	Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	Speed sensor or rotor damaged	Check speed sensor and rotor ⇒ Brake system; Rep. Gr. 45

Fault 00287

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00287 Rear right speed sensor -G44-		
	Open circuit, loose contact or short to positive or earth in speed sensor wire or speed sensor	Perform electrical check, step 7 ⇒ page 53 and step 11 ⇒ page 54
	Speed sensor winding defective	
	Speed sensor or rotor damaged	Check speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	ABS with EDL control unit -J104- defective	Remove hydraulic control unit, renew control unit ⇒ Brake system; Rep. Gr. 45 , then code control unit ⇒ page 39
00287 Rear right speed sensor -G44- Mechanical fault		
This fault is only detected above 20 km/h (carry out test drive).	Excessive air gap between speed sensor and rotor.	Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	Outlet valves in hydraulic unit defective	Check hydraulic unit in final control diagnosis ⇒ page 27
00287 Rear right speed sensor -G44- Signal outside tolerance		

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
This fault is only detected above 20 km/h (carry out test drive).	Open circuit, loose contact or short to positive or earth in speed sensor wire or speed sensor	Perform electrical check, step 7 ⇒ page 53 and step 11 ⇒ page 54
	Speed sensor winding defective	
	Electrical interference from external interference sources (high frequency radiation, e.g. non-insulated ignition cable)	Read measured value block 001 ⇒ page 44
	Excessive air gap between speed sensor and rotor.	Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	Speed sensor or rotor damaged	Check speed sensor and rotor ⇒ Brake system; Rep. Gr. 45

Fault 00290

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00290 Rear left speed sensor -G46-		
	Open circuit, loose contact or short to positive or earth in speed sensor wire or speed sensor	Perform electrical check, step 8 ⇒ page 53 and step 12 ⇒ page 55
	Speed sensor winding defective	
	Speed sensor or rotor damaged	Check speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	ABS with EDL control unit -J104- defective	Remove hydraulic control unit, renew control unit ⇒ Brake system; Rep. Gr. 45 , then code control unit ⇒ page 39
00290 Rear left speed sensor -G46- Mechanical fault		
This fault is only detected above 20 km/h (carry out test drive).	Excessive air gap between speed sensor and rotor.	Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	Outlet valves in hydraulic unit defective	Check hydraulic unit in final control diagnosis ⇒ page 27
	Excessive air gap between speed sensor and rotor.	Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
00290 Rear left speed sensor -G46- Signal outside tolerance		
This fault is only detected above 20 km/h (carry out test drive).	Open circuit, loose contact or short to positive or earth in speed sensor wire or speed sensor	Perform electrical check, step 8 ⇒ page 53 and step 12 ⇒ page 55
	Speed sensor winding defective	
	Electrical interference from external interference sources (high frequency radiation, e.g. non-insulated ignition cable)	Read measured value block 001 ⇒ page 44
	Excessive air gap between speed sensor and rotor.	Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
	◆ Speed sensor or rotor damaged	– Check speed sensor and rotor ⇒ Brake system; Rep. Gr. 45

Fault 00668

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
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00668 Vehicle voltage, terminal 30 Signal outside tolerance		
	◆ Fuse defective ◆ Open circuit or short circuit to earth or positive in voltage supply wiring	– Perform electrical check, step 1 ⇒ page 51 and step 2 ⇒ page 51 – After repairing faults, perform final control diagnosis ⇒ page 27

Fault 01044

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01044 Control unit incorrectly coded		
	◆ An incorrect code number has been entered	– Check coding ⇒ page 39
	◆ Coding bridge in wiring harness damaged	– Check wires in wiring harness; perform electrical check, test step 13 ⇒ page 55

Fault 01130

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01130 ABS operation Implausible signal		
• This fault is only detected above 20 km/h (carry out test drive).	◆ Electrical interference from external interference sources (high frequency radiation, e.g. non-insulated ignition cable) ◆ Open circuit, loose contact or short to positive or earth in wiring	– Check all wiring and connections for short to positive or earth. – Erase fault memory – Perform test drive at more than 20 km/h – Interrogate fault memory again If the fault is not rectified: – Remove hydraulic control unit, renew control unit ⇒ Brake system; Rep. Gr. 45, then code control unit ⇒ page 39

Fault 01276

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01276 ABS hydraulic pump -V64- Signal outside tolerance		
This fault is only detected above 20 km/h (carry out test drive).	Open circuit or short circuit to earth or positive in wiring: ABS with EDL control unit -J104- / ABS hydraulic pump -V64-	- Check ABS hydraulic pump -V64- via final control diagnosis ⇒ page 27 - If ABS hydraulic pump -V64- starts running during final control diagnosis: - Perform electrical check, test step 1 ⇒ page 51 - Check all wiring and connections for short to positive or earth according to current flow diagram.
	ABS with EDL control unit -J104- defective	Remove hydraulic control unit, renew control unit ⇒ Brake system; Rep. Gr. 45 , then code control unit ⇒ page 39
	Pump motor defective	Renew hydraulic control unit ⇒ Brake system; Rep. Gr. 45

Fault 01279

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01279 Longitudinal acceleration sender -G251- ³⁾ Electrical fault in circuit		
	Open circuit, loose contact or short to positive or earth in wiring	Perform electrical check, test step 19 ⇒ page 58
	Installation position of longitudinal acceleration sender -G251- not OK	Check installation position ⇒ Brake system; Rep. Gr. 45
	Longitudinal acceleration sender -G251- defective	- Read measured value block 006 ⇒ page 45 - Renew sender ⇒ Brake system; Rep. Gr. 45 , then perform zero compensation in basic setting ⇒ page 35
01279 Longitudinal acceleration sender -G251- ³⁾ Implausible signal		
	Installation position of longitudinal acceleration sender -G251- not OK	Check installation position ⇒ Brake system; Rep. Gr. 45
	Longitudinal acceleration sender -G251- defective	- Read measured value block 006 ⇒ page 45 - Renew sender ⇒ Brake system; Rep. Gr. 45 , then perform zero compensation in basic setting ⇒ page 35

3) Only applies to vehicles with four-wheel drive.

Fault 01312

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01312 Drive train data bus defective ⁴⁾		
	◆ ABS with EDL control unit -J104- incorrectly coded	- Check coding ⇒ page 39
	◆ Engine control unit incorrectly coded	- Check coding of engine control unit ⇒ Rep. Gr. 01
	◆ Gearbox control unit incorrectly coded	- Check coding of gearbox control unit ⇒ Rep. Gr. 01
	◆ Four-wheel drive control unit incorrectly coded	- Check coding of four-wheel drive control unit ⇒ Rep. Gr. 01
	◆ Faults in CAN bus wiring	- Check CAN bus wiring ⇒ page 9

4) If fault is displayed as sporadic fault, can occur when vehicle is started. This is not a fault in the system; ignore and erase fault memory.
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Fault 01314

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01314 Engine control unit		
	◆ Fault in engine control unit	- Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01 , rectify fault if necessary and erase fault memory
01314 Engine control unit No communication		
• Signals are transmitted between ABS with EDL control unit -J104- and engine control unit via CAN data bus	When displayed as static fault: ◆ ABS with EDL control unit -J104- or engine control unit not CAN compatible	- Read measured value block 125 ⇒ page 45 - Refer to control unit identification of ABS with EDL control unit -J104- ⇒ page 8 and engine control unit to check that correct control units are installed. For correct version refer to ⇒ Parts catalogue
	◆ Fault in engine control unit	- Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01 , rectify fault if necessary and erase fault memory
	When displayed as static and sporadic fault: ◆ Faults in CAN bus wiring	- Check CAN bus wiring between engine control unit and ABS with EDL control unit -J104- ⇒ page 9
	◆ High and Low CAN bus wiring interchanged	- Check CAN Bus wiring for interchanged connections according to current flow diagram
	◆ The output of one of the control units communicating via the CAN bus is defective.	- Check CAN bus wiring ⇒ page 9

Fault 01315

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01315 Gearbox control unit ⁵⁾ No communication		
Signals are transmitted between ABS with EDL control unit -J104- and gearbox control unit via CAN data bus	When displayed as static fault: ◆ ABS with EDL control unit -J104- or gearbox control unit not CAN compatible	- Read measured value block 125 ⇒ page 45 - Refer to control unit identification of ABS with EDL control unit -J104- ⇒ page 8 and gearbox control unit to check that correct control units are installed. For correct version refer to ⇒ Parts catalogue
	◆ Fault in gearbox control unit	Interrogate fault memory of gearbox control unit ⇒ Rep. Gr. 01 , rectify fault if necessary and erase fault memory
	When displayed as static and sporadic fault: ◆ Faults in CAN bus wiring	Check CAN bus wiring between gearbox control unit and ABS with EDL control unit -J104- ⇒ page 9
	◆ High and Low CAN bus wiring interchanged	Check CAN Bus wiring for interchanged connections according to current flow diagram
	◆ The output of one of the control units communicating via the CAN bus is defective.	Check CAN bus wiring ⇒ page 9

5) Only applies to vehicles with automatic gearbox

Fault 01324

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01324 Four-wheel drive control unit -J492- ⁶⁾ No communication		
Signals are transmitted between ABS with EDL control unit -J104- and four-wheel drive control unit via CAN data bus	When displayed as static fault: ◆ ABS with EDL control unit -J104- or four-wheel drive control unit not CAN compatible	- Read measured value block 125 ⇒ page 45 - Refer to control unit identification of ABS with EDL control unit -J104- ⇒ page 8 and four-wheel drive control unit to check that correct control units are installed. For correct version refer to ⇒ Parts catalogue
	◆ Fault in four-wheel drive control unit	Interrogate fault memory of four-wheel drive control unit ⇒ Rep. Gr. 01 , rectify fault if necessary and erase fault memory
	When displayed as static and sporadic fault: ◆ Faults in CAN bus wiring	Check CAN bus wiring between four-wheel drive control unit and ABS with EDL control unit -J104- ⇒ page 9
	◆ High and Low CAN bus wiring interchanged	Check CAN Bus wiring for interchanged connections according to current flow diagram
	◆ The output of one of the control units communicating via the CAN bus is defective.	Check CAN bus wiring ⇒ page 9

6) Only applies to vehicles with four-wheel drive.

Fault 65535

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
65535 Control unit defective	◆ ABS with EDL control unit -J104- defective	– Remove hydraulic control unit, renew control unit ⇒ Brake system; Rep. Gr. 45 , then code control unit ⇒ page 39 Do not erase the fault memory of the defective control unit. The data in the fault memory will help to identify the malfunction

3.6 Final control diagnosis

The final control diagnosis can be used to check the ABS hydraulic pump -V64- and the correct functioning of the hydraulic circuits (allocation of brake pipes to wheel brakes and function of valves). This function will also detect interchanged connections and leaks.



Note

- ◆ *The vehicle must be raised until all wheels are free to turn. A 2nd mechanic is required in order to turn the wheels.*
- ◆ *The ABS warning lamp -K47- and the red "brake warning" symbol flash during the final control diagnosis.*
- ◆ *After depressing the brake pedal several times the vacuum in the brake servo will be exhausted. Therefore more pressure must be applied to the brake pedal in order to attain the same fluid pressure in the brake system as that attained with vacuum.*
- ◆ *When vacuum in brake servo is exhausted it can happen that the wheels do not lock: start engine and build up vacuum in brake servo.*

Explanation of abbreviations indicated on display

IFL = Inlet valve (front left)
 IFR = Inlet valve (front right)
 IRL = Inlet valve (rear left)
 IRR = Inlet valve (rear right)
 OFL = Outlet valve (front left)
 OFR = Outlet valve (front right)
 ORL = Outlet valve (rear left)
 ORR = Outlet valve (rear right)
 VBAT = Battery voltage; voltage is applied to valve
 0V = 0 Volt; No voltage at valve
 Hydr-P = ABS hydraulic pump -V64-

Test condition

- The wheels are locked individually during final control diagnosis. For this test the mechanical and hydraulic components of the brake system must be working properly. This means that the master cylinder is able to build up pressure in all four wheel brake cylinders and there are no leaks in the hydraulic pipes, hoses and connections.



Note

If one of the wheels does not lock, perform a visual inspection of the brake fluid reservoir, the master cylinder, the hydraulic unit and the wheel cylinders.

Procedure

- Connect vehicle diagnostic, testing and information system - VAS 5051 A- ➔ [page 7](#) and select vehicle system “03 - Brake electronics”. When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

- Release handbrake.
- Raise vehicle on lifting platform.
- From list -1- select function “03 - Final control diagnosis”.

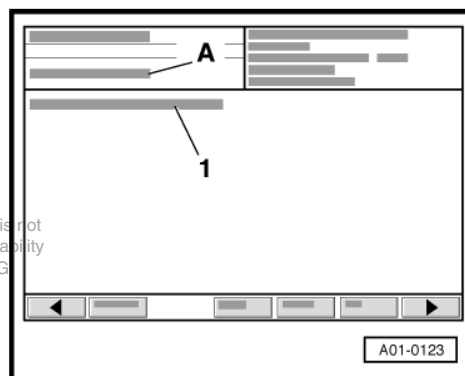


Indicated on -VAS 5051 A- :

A - Final control test waiting, move on to next control element

1 - ABS hydraulic pump V64

- Touch key.



Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

1 - ABS hydraulic pump V64

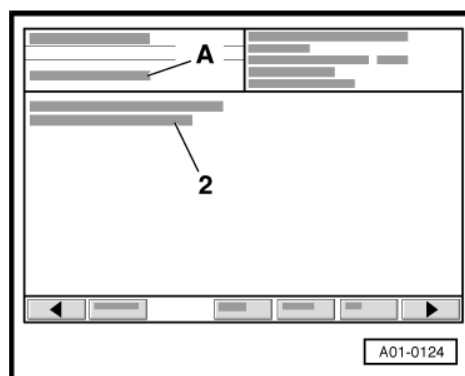
- The ABS hydraulic pump -V64- should start up audibly.
- Touch key within the next 10 seconds.

Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

2 - Operate brakes

- Operate brake pedal.
- Touch key.

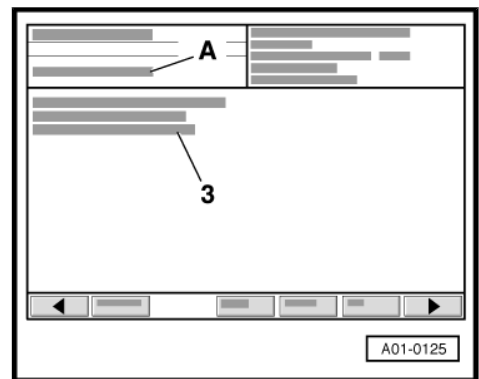


Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

3 - IFL: 0V OFL: 0V Wheel FL locked

- It should not be possible to turn the front left wheel.
- Touch  key.

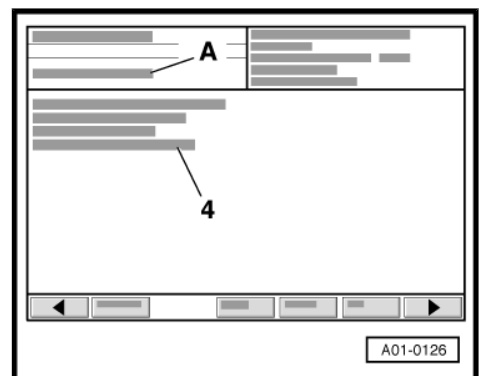


Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

4 - IFL: VBAT OFL: 0V Wheel FL locked

- Keep pressing the brake pedal.
- The ABS hydraulic pump -V64- should start up audibly.
- Brake pedal should not give under foot pressure.



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Note

If the brake pedal gives under foot pressure, there is a fault in the hydraulic unit. Renew hydraulic unit → Brake system; Rep. Gr. 45.

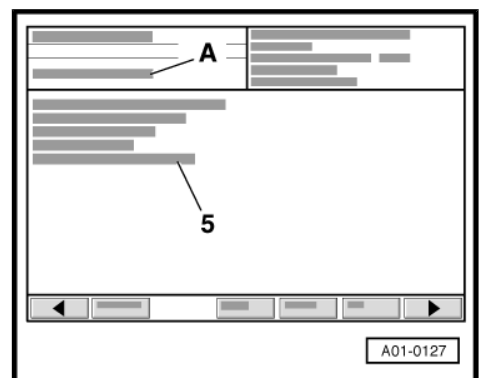
- Touch  key within the next 10 seconds.

Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

5 - IFL: VBAT OFL: VBAT Wheel FL free to turn

- Keep pressing the brake pedal.
- ABS hydraulic pump -V64- will stop running.
- It should now be possible to turn the front left wheel.



Note

If the wheel is locked, it is possible that the connections of the brake lines to the wheels have been interchanged by mistake.

- Touch  key.

Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

6 - IFL: VBAT OFL: 0V Wheel FL free

- Keep pressing the brake pedal.
- The brake pedal should give perceptibly.
- It should now be possible to turn the front left wheel.



Note

If the brake pedal does not give under foot pressure, there is a fault in the hydraulic unit. Renew hydraulic unit ⇒ Brake system; Rep. Gr. 45.

- Touch  key.

Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

7 - IFL: 0V OFL: 0V Wheel FL locked

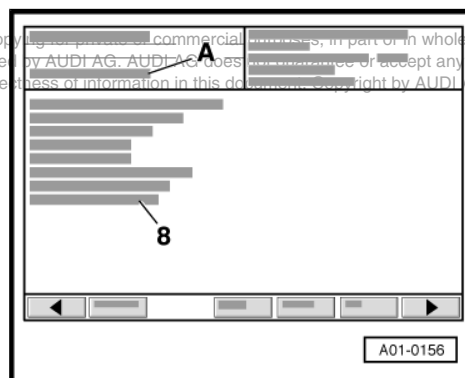
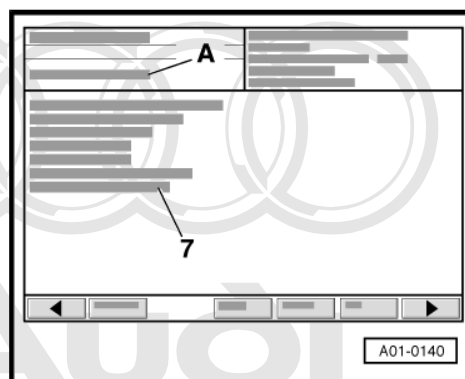
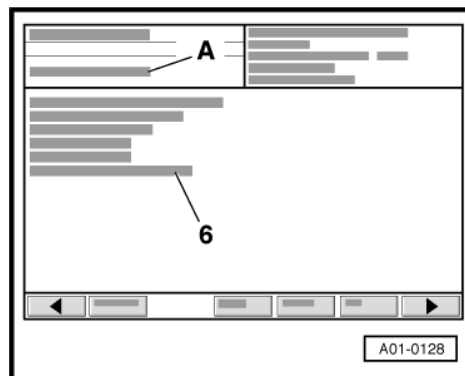
- Keep pressing the brake pedal.
- It should not be possible to turn the front left wheel.
- Touch  key.

Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

8 - Release brakes

- Release brake pedal.
- Touch  key.



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Indicated on -VAS 5051 A- :

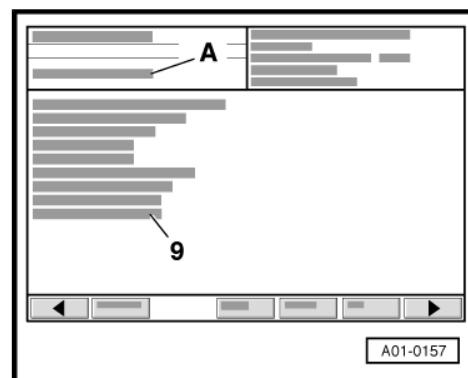
A - Final control diagnosis running, moving on permitted

9 - Operate brakes



Note

- ◆ Continue the final control diagnosis to check the front right, rear left and rear right wheels in turn.
- ◆ The test steps are the same as for the front left wheel, so they are not described in detail.



Vehicles with EDL:

After testing on rear right wheel is completed:

- Touch  key.

Indicated on -VAS 5051 A- :

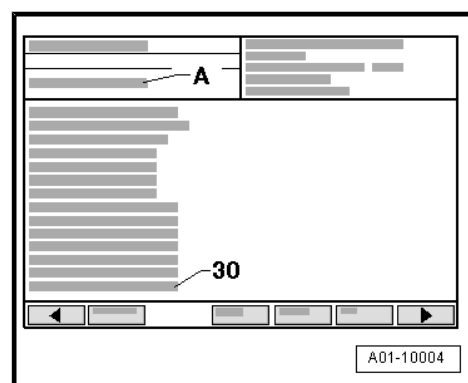
A - Final control diagnosis running, moving on permitted

30 - EDL valves/Hyd-P: VBAT FL/FR wheel locked

- The ABS hydraulic pump -V64- should start up.

All models:

- Touch  key.



Indicated on -VAS 5051 A- :

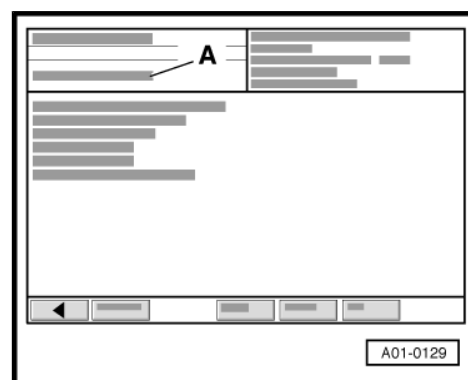
A - Final control diagnosis competed

- Terminate function "03 - Final control diagnosis" by pressing the  key.
- Final control diagnosis is completed. The ABS warning lamp -K47- and the red "brake warning" symbol should go out.



Note

- ◆ There is a fault in the system if the ABS warning lamp -K47- does not go out.
- ◆ Adhere exactly to the test sequence: First interrogate fault memory, then erase.



3.7 Basic setting

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The function "04 - Basic setting" can be used to perform the following procedures:

- ◆ Only applicable to vehicles with EDL and EDL/TCS: Bleeding brake system via "display group 001" if fluid reservoir has run dry ⇒ [page 32](#) . This basic setting is only necessary if one or more of the chambers in the brake fluid reservoir has been completely emptied (e.g. leaks in brake system).
- ◆ Only applicable to four-wheel drive vehicles: Switching off longitudinal acceleration sender -G251- via "display group 040" ⇒ [page 34](#) (e.g. to check the brake system on test rollers).

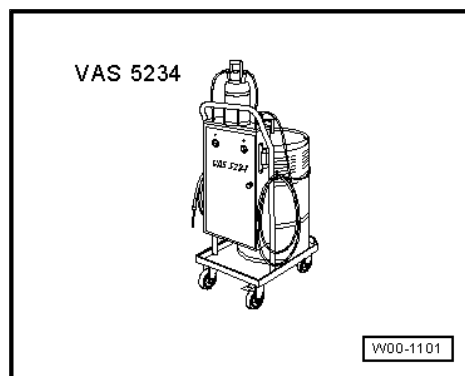
- ◆ Only applicable to four-wheel drive vehicles: Performing zero compensation of longitudinal acceleration sender -G251- via "display group 069" ➔ [page 35](#) (e.g. after renewing the following components: ABS with EDL control unit -J104- or longitudinal acceleration sender -G251-).

3.7.1 Bleeding brake system when brake fluid reservoir has been completely emptied

This basic setting is only necessary on vehicles with EDL if one or more of the chambers in the brake fluid reservoir has been completely emptied (e.g. leaks in brake system).

Special tools and workshop equipment required

- ◆ Brake charge and bleed equipment -VAS 5234- or upgrade kit and extraction unit -V.A.G 1869 A-



Caution

- ◆ *When using brake charge and bleed equipment -VAS 5234- to replenish the brake fluid, make sure that filling pressure does not exceed 1 bar.*
- ◆ *If the filling pressure exceeds 1 bar, a hydraulically controlled change-over valve for the EDL function prevents unrestricted flushing of the EDL-related parts of the hydraulic unit. Proper bleeding is then no longer ensured.*
- ◆ *For this reason the brake fluid pressure must be reduced to 1 bar on the brake charge and bleed equipment ➔ Operating Manual -VAS 5234- or -V.A.G 1869 A-*
- ◆ *The charge and bleeder unit -V.A.G 1238/B- is not suitable for bleeding the brake system by using the function "04 - Basic setting".*



Note

- ◆ *If only charge and bleeder unit -V.A.G 1238/B- is available, switch the unit on and off as necessary to ensure that sufficient brake fluid is always present in the reservoir.*
- ◆ *A 2nd mechanic is required in order to open and close the bleeder screws.*

Procedure

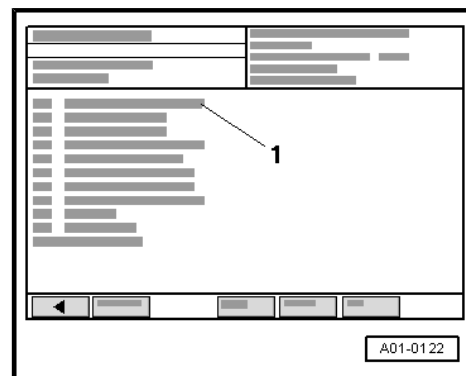
- Connect vehicle diagnostic, testing and information system - VAS 5051 A- ➔ [page 7](#) and select vehicle system "03 - Brake electronics". When doing this the ignition must be switched on.
- Connect the brake charge and bleed equipment -VAS 5234- or -V.A.G 1869 A- .

- Open bleeder screws in prescribed sequence and pre-bleed brake calipers.
- 1. Simultaneously bleed front left and front right brake calipers.
- 2. Simultaneously bleed rear left and rear right brake calipers.
- With bleeder bottle hoses attached, leave bleeder screws open until brake fluid comes out without bubbles.

Bleeding

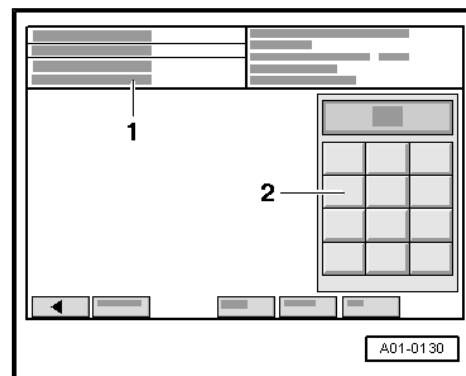
Indicated on -VAS 5051 A- :

- From list -1-, select function “04 - Basic setting”.



Indicated on -VAS 5051 A- :

- 1 - Enter display group
- Use keypad -2- to enter “001” for “display group number 001” and confirm by pressing the  key.



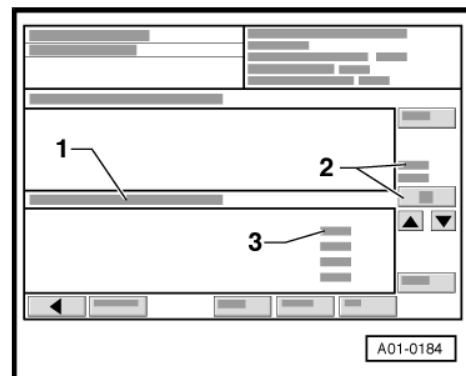
- The ABS warning lamp -K47- flashes.

Indicated on -VAS 5051 A- :

- 1 - Basic setting
- 2 - Display group 1
- 3 - Press and hold pedal ...
- Press pedal with substantial foot pressure and hold.
- Pedal moves down, hydraulic pump starts up briefly, pedal comes back

Indicated on -VAS 5051 A- :

- 1 - Release pedal; FR/FL bleeder screws OPEN <>
- Release pedal, open front bleeder screws.
- Switch to “display group 002” by pressing  button.

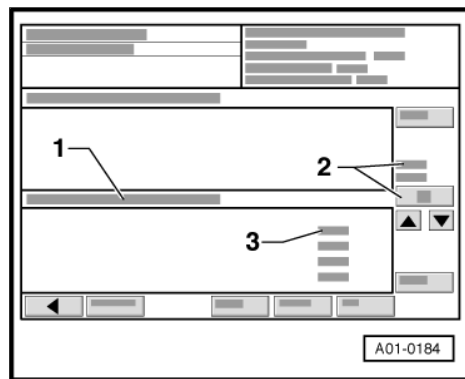


Indicated on -VAS 5051 A- :

- 1 - Basic setting
 - 2 - Display group 2
 - 3 - Please wait ... (10 secs.)
- Wait 10 seconds.
 - Hydraulic pump starts up briefly

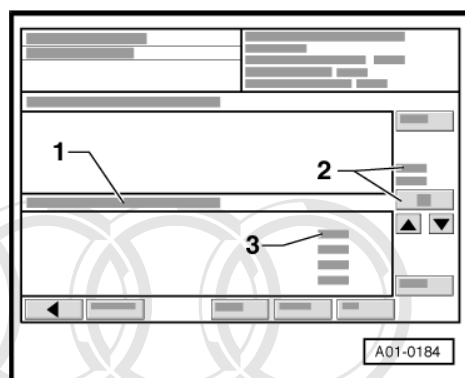
Indicated on -VAS 5051 A- :

- 1 - Press pedal 10X; bleeder screws CLOSED <>
- Press pedal 10 times, close front bleeder screws.
 - Switch to "display group 003" by pressing button.



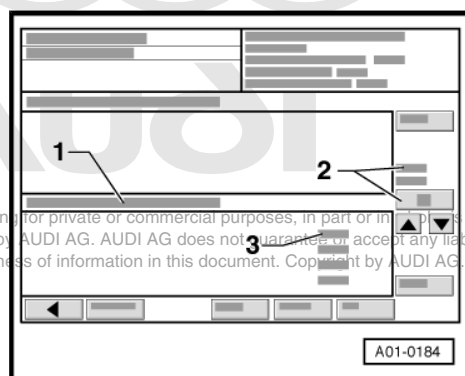
Indicated on -VAS 5051 A- :

- 1 - Basic setting
 - 2 - Display group 3
 - 3 - Press and hold pedal ...
- Repeat bleeding procedure as described above.
 - Press the key each time to advance to the next display group until "display group 017" is reached.



Indicated on -VAS 5051 A- :

- 1 - Basic setting
 - 2 - Display group 17
 - 3 - Part bleeding ended ...
- Terminate function "04 - Basic setting" by pressing the key.
 - The brake system must now be bled ⇒ **Brake system; Rep. Gr. 47**.



3.7.2 Switching off longitudinal acceleration sender -G251- (only vehicles with four-wheel drive)

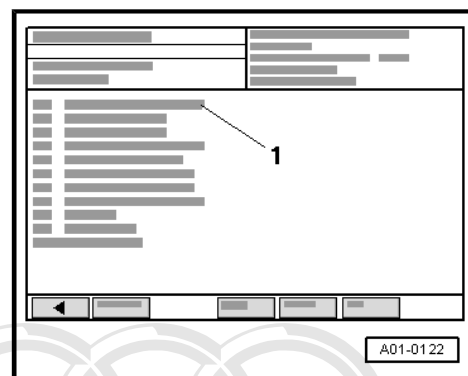
- ◆ The longitudinal acceleration sender -G251- can be switched off via "display group 040" when checking the brake system of a four-wheel drive vehicle on test rollers.
- ◆ After completion of the check, the longitudinal acceleration sender -G251- must be reactivated by switching the ignition off and back on again.

Procedure

- Connect vehicle diagnostic, testing and information system - VAS 5051 A- ⇒ [page 7](#) and select vehicle system "03 - Brake electronics". When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

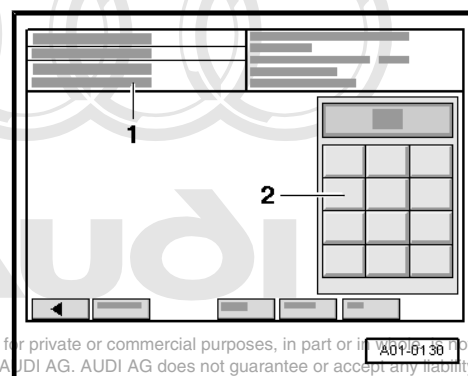
- From list -1-, select function “04 - Basic setting”.



Indicated on -VAS 5051 A- :

1 - Enter display group

- Use keypad -2- to enter “040” for “display group number 040” and confirm by pressing the  key.



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Indicated on -VAS 5051 A- :

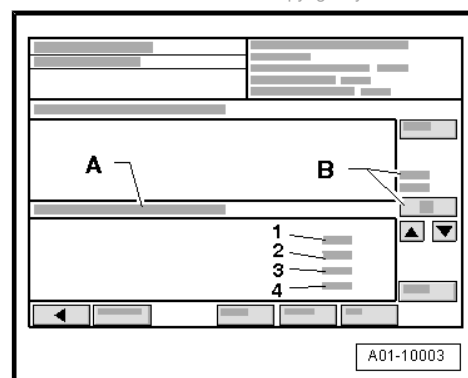
A - Basic setting

B - Display group 40

- The ABS warning lamp -K47- flashes.

The longitudinal acceleration sender -G251- is now deactivated.

- Terminate function “04 - Basic setting” by pressing the  key.
- Select function “06 - End output” from list.
- After completion of the check, the longitudinal acceleration sender -G251- must be reactivated by switching the ignition off and back on again.



3.7.3 Performing zero compensation of longitudinal acceleration sender -G251- (only vehicles with four-wheel drive)

Zero compensation must be performed if the ABS with EDL control unit -J104- or the longitudinal acceleration sender -G251- were renewed, or if required by the fault table.

- Vehicle is standing horizontal on a flat base.
- Connect vehicle diagnostic, testing and information system - VAS 5051 A- [⇒ page 7](#) and select vehicle system “03 - Brake electronics”. When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

- From list -1- select diagnostic function “11 - Login procedure” or “11 - Coding II”.



Indicated on -VAS 5051 A- :

1 - Enter code word

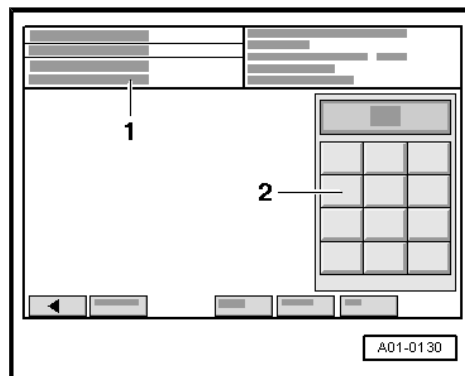
- Use keypad -2- to enter code “40168” and confirm entry by touching key.



Note

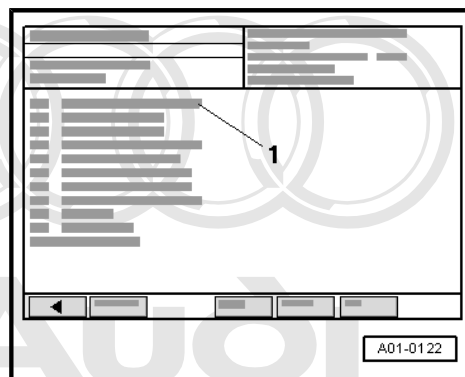
If display on -VAS 5051 A- reads “function unknown or function can not be performed at present” the login procedure or coding II were not successful. Repeat login procedure or coding II.

- Terminate function “11 - Login procedure” or “11 - Coding II” by touching key.



Indicated on -VAS 5051 A- :

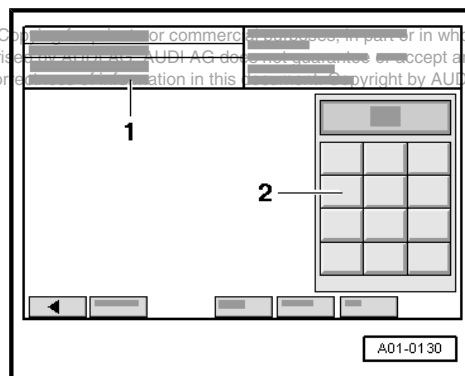
- From list -1-, select function “04 - Basic setting”.



Indicated on -VAS 5051 A- :

1 - Enter display group

- Use keypad -2- to enter “069” for “display group number 069” and confirm by pressing the key.



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- The ABS warning lamp -K47- flashes.

Indicated on -VAS 5051 A- :

A - Basic setting

B - Display group 69

1 - Zero compensation OK

4 - 0.3 m/s²

Zero compensation of longitudinal acceleration sender -G251- is now completed.



Note

The display does not return to 0.00 m/s² after performing zero compensation successfully.

- Terminate function “04 - Basic setting” by pressing the  key.

Possible fault messages:

Indicated on -VAS 5051 A- :

1 - Zero compensation is not possible

4 - 5.0 m/s²

The determined value is outside the tolerance range for zero compensation.

- Proceed as follows to rectify the fault:

1. Check zero position of longitudinal acceleration sender - G251- in measured value block 006 ⇒ [page 45](#) .
2. Interrogate fault memory ⇒ [page 18](#) .
3. Erase fault memory ⇒ [page 37](#) .
4. Conclude the transfer of data with the function “06 - End output”.
5. Switch off ignition.
6. Switch ignition on again.
7. Perform zero compensation again.

3.8 Erasing fault memory

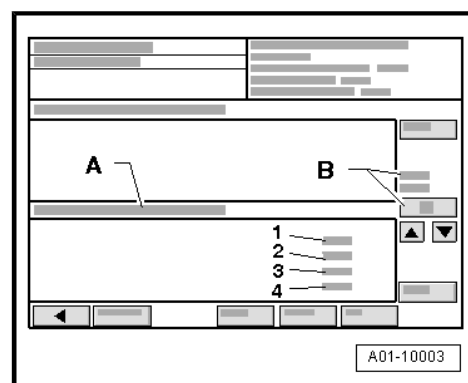
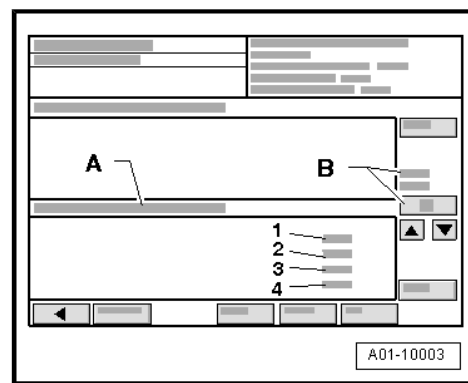


Note

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

Requirements

- Fault memory interrogated ⇒ [page 37](#) .
- All faults rectified.



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After fault memory has been interrogated:

Indicated on -VAS 5051 A- :

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



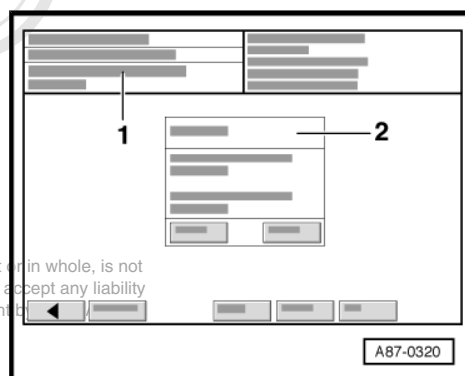
Indicated on -VAS 5051 A- :

- 1 - No display (prior to erasing) or
- Fault memory erased



Note

If the message “Fault memory not yet interrogated” appears in display zone -1-, this means that the test sequence has not been precisely observed. Fault memory cannot be erased until it has been interrogated.



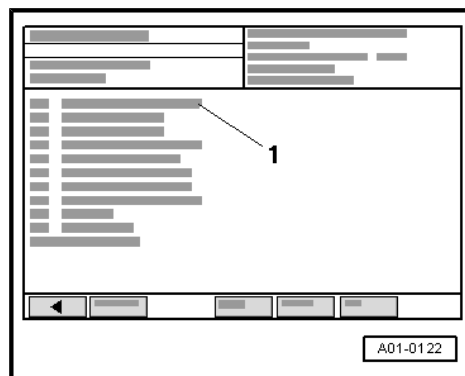
2 - Note: Do you want to execute the function? Note: Data will be erased!

- Touch ☐ OK key in display -2-.
- Terminate function “05 - Erasing fault memory” by touching ☐ key.

3.9 End output

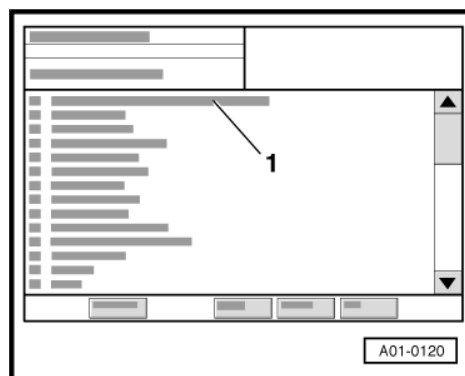
Indicated on -VAS 5051 A- :

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



Indicated on -VAS 5051 A- :

- When this display appears switch off ignition and unplug diagnostic connector.
- Switch on ignition.
- The ABS warning lamp -K47- should go out after approx. 2 seconds.



3.10 Renewing and coding control unit

A new ABS with EDL control unit -J104- supplied as a replacement part is not encoded. The control unit must be coded after installation.

- Removing and installing control unit and hydraulic unit ⇒
Brake system; Rep. Gr. 45 .



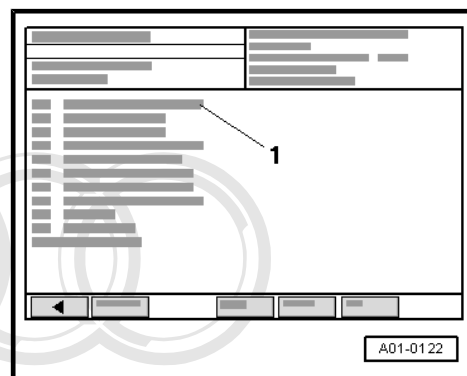
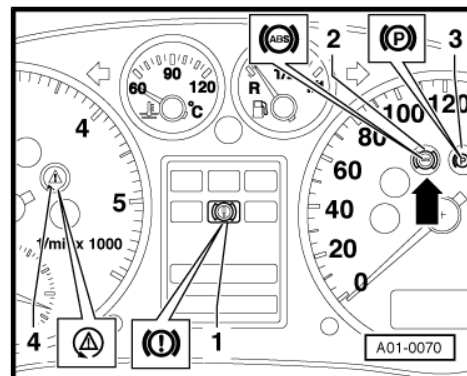
Note

If the ABS with EDL control unit -J104- is not coded (Code 00000), the ABS warning lamp -K47- -item 2- will flash once per second. The red "brake warning" symbol will start flashing when road speed first exceeds 10 km/h or engine speed first exceeds 2000 rpm after the ignition is switched on.

- Connect vehicle diagnostic, testing and information system - VAS 5051 A- ⇒ [page 7](#) and select vehicle system "03 - Brake electronics". When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

- From list -1- select diagnostic function "07 - Code control unit".



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Indicated on -VAS 5051 A- :

1 - Enter code word

Coding table for ABS and ABS/EDL ITT Mark 20 GI	
All engine code letters	Coding 03604

Coding table for ABS ITT Mark 20 IE	
Engine code letters AGR, AHF, ALH, ASV	Coding 03304
Engine code letters: AEH, AGN, AGU, AJQ, AKL, APG, APF, APP, AQA, ARZ	Coding 03504
Engine code letters: APY	Coding 06400

Coding table for ABS/EDL ITT Mark 20 IE	
Engine code letters AGR, AHF, ALH, ASV	Coding 13304
Engine code letters: AEH, AGN, AGU, AJQ, AKL, APG, APF, APP, AQA, ARZ	Coding 13504
Engine code letters: APY	Coding 16400

- Use keypad -2- to enter 5-digit code number according to coding table and confirm entry by touching [Q] key.

Indicated on -VAS 5051 A- :

1 - Coding in progress

- Wait until next readout appears.

1 - Vehicle system coding completed

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



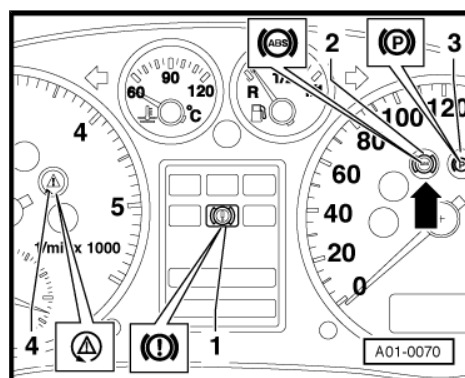
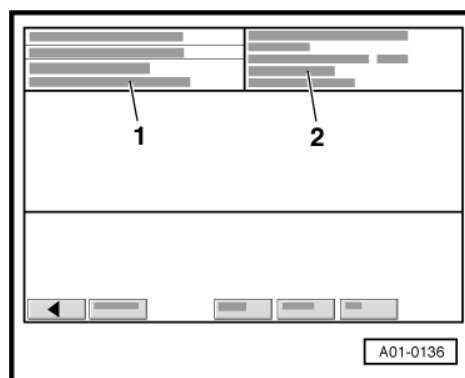
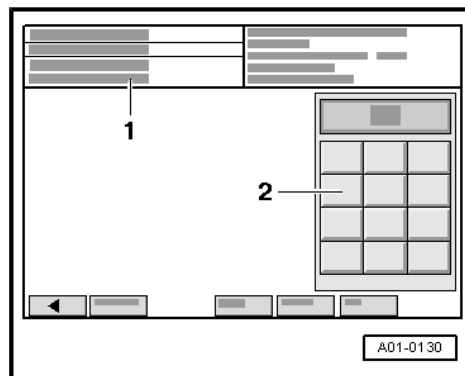
Note

If the control unit is incorrectly coded, the ABS warning lamp -K47- -item 2- will light up continuously. The "brake warning" symbol -1- will light up when road speed first exceeds 10 km/h or engine speed first exceeds 2000 rpm after the ignition is switched on.

- Terminate function "07 Code control unit" by touching [Q] key.

Front-wheel drive vehicles:

The procedure for "Renewing and coding control unit" is completed with this last step.



Four-wheel drive vehicles:

Note

On vehicles with four-wheel drive, zero compensation of the longitudinal acceleration sender -G251- must be performed in addition to the coding procedure.

Indicated on -VAS 5051 A- :

- From list -1- select diagnostic function “11 - Login procedure” or “11 - Coding II”.

Indicated on -VAS 5051 A- :

1 - Enter code word

- Use keypad -2- to enter code “40168” and confirm entry by touching  key.

Note

If display on -VAS 5051 A- reads “function unknown or function can not be performed at present” the login procedure or coding II were not successful. Repeat login procedure or coding II.

- Terminate function “11 - Login procedure” or “11 - Coding II” by touching  key.

Indicated on -VAS 5051 A- :

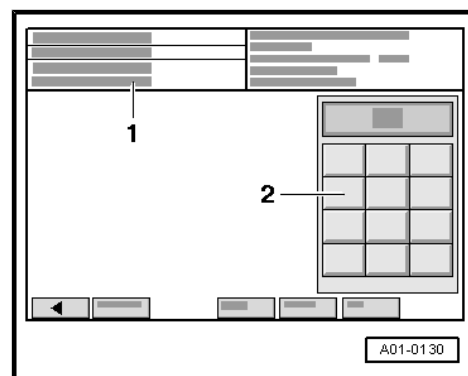
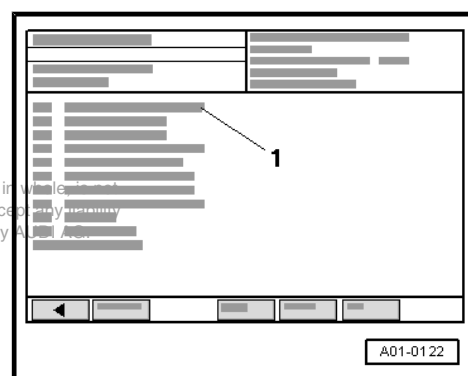
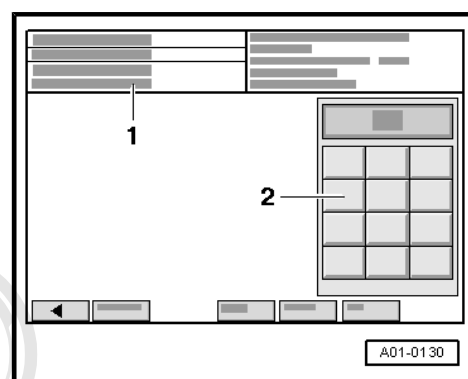
- From list -1-, select function “04 - Basic setting”.

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Indicated on -VAS 5051 A- :

1 - Enter display group

- Use keypad -2- to enter “069” for “display group number 069” and confirm by pressing the  key.



- The ABS warning lamp -K47- flashes.

Indicated on -VAS 5051 A- :

A - Basic setting

B - Display group 69

1 - Zero compensation OK

4 - 0.3 m/s²



Note

The display does not return to 0.00 m/s² after performing zero compensation successfully.

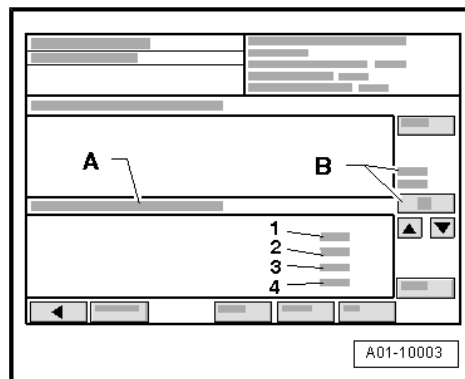
- Terminate function “04 - Basic setting” by pressing the key.

The procedure for “Renewing and coding control unit” is completed with this last step.



Note

If a fault is detected during zero compensation ⇒ [page 37](#) .



3.11 Measured value block

The control unit can transfer a considerable amount of test data. This test data provides information about the operational condition of the system and/or sensors connected. In many cases the transferred test data can be used to assist fault finding and fault rectification. Since all the information cannot be evaluated simultaneously, the test data is categorised in display groups which can be selected individually via the display group numbers.



WARNING

- ◆ To avoid any risk of accident, observe the safety precautions when using test instruments while road testing the vehicle ⇒ [“1.3 Safety precautions”, page 4](#) and ⇒ [“1.6 Road test”, page 6](#) .
- ◆ The ABS or ABS/EDL function is deactivated when using vehicle diagnostic, testing and information system -VAS 5051 A- in the mode “vehicle self-diagnosis” while road testing the vehicle. However, this is not indicated by the warning lamps.



Note

Self-diagnosis of ABS with EDL control unit -J104- is terminated if a road speed of 20 km/h is exceeded.

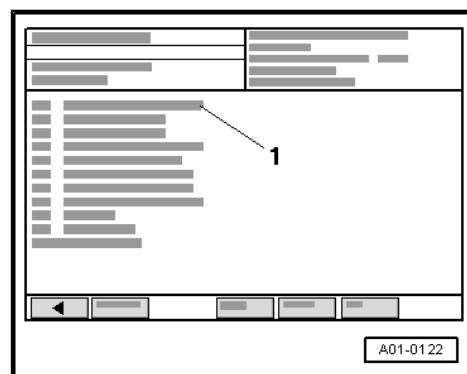
If a fault occurs while function “08 - Reading measured value block” is being performed, it will be detected. This is indicated by the ABS warning lamp -K47- lighting up, and helps to trace “sporadic faults”.

3.11.1 Reading measured value block

- Connect vehicle diagnostic, testing and information system - VAS 5051 A- [⇒ page 7](#) and select vehicle system "03 - Brake electronics". Ignition must be on or engine must be idling.

Indicated on -VAS 5051 A- :

- From list -1- select diagnostic function "08 - Read measured value block".

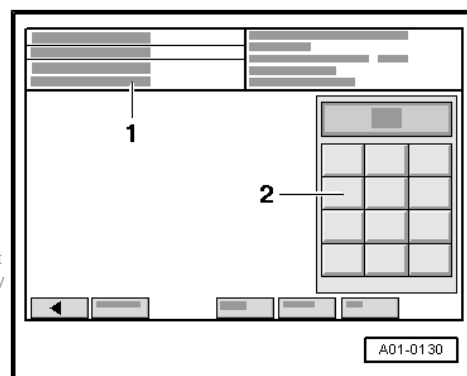


Indicated on -VAS 5051 A- :

1 - Enter display group

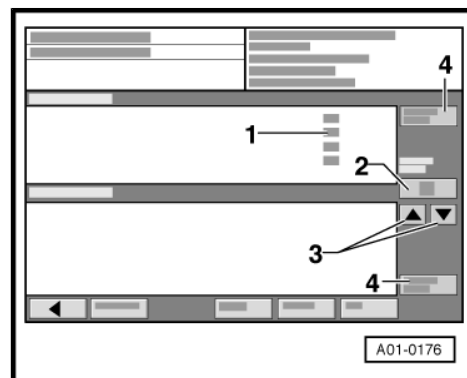
- Use keypad -2- to select the relevant "display group number" [⇒ page 43](#) and confirm by pressing the **[Q]** key.

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Indicated on -VAS 5051 A- :

- Display zones 1 ... 4. If a display zone is vacant the respective line remains blank
- Indicates the selected display group
- Another display group can be selected by pressing one of the keys.
- Another function can be selected by pressing one of the keys (e.g. selecting function "Basic setting" instead of "Read measured value block" and vice versa)



List of available display groups

Display group	Display zone	Signifies	Refer to
001	1	Wheel speed, front left	⇒ page 44
	2	Wheel speed, front right	
	3	Wheel speed, rear left	
	4	Wheel speed, rear right	
002	1	Starting speed, front left	⇒ page 44
	2	Starting speed, front right	
	3	Starting speed, rear left	
	4	Starting speed, rear right	
003	1	Brake light switch -F-	⇒ page 45
	2 ... 4	Vacant	
006 ⁷⁾	1	Longitudinal acceleration sender -G251- ⁸⁾	⇒ page 45

Display group	Display zone	Signifies	Refer to
	2 ... 4	Vacant	
125 ⁷⁾	1	Communication with engine control unit	⇒ page 45
	2	Communication with four-wheel drive control unit -J492- ⁸⁾	
	3	Communication with gearbox control unit ⁹⁾	
	4	Vacant	

7) Does not appear on older versions.

8) Only applies to vehicles with four-wheel drive.

9) Only applies to vehicles with automatic gearbox

3.11.2 Test table

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Display group 001

This display group is used for checking allocation of speed sensors to wheels.

- Raise vehicle on lifting platform.

Display zones	Explanation
1 ... km/h	Wheel speed, front left (turn wheel by hand)
2 ... km/h	Wheel speed, front right (turn wheel by hand)
3 ... km/h	Wheel speed, rear left (turn wheel by hand)
4 ... km/h	Wheel speed, rear right (turn wheel by hand)

Display group 002

This display group is used for the checking wheel speed sensors. The ABS with EDL control unit -J104- stores the first usable voltage signals from the speed sensor when driving away and displays these as set values.



Note

- ◆ A second mechanic is needed for reading the display when the vehicle is moving ⇒ "1.3 Safety precautions", page 4 .
- ◆ The ABS/EDL function is deactivated when using vehicle diagnosis, testing and information system -VAS 5051 A- in the function "Read measured value block" while road testing the vehicle. However, this is not indicated by the warning lamps.
- ◆ Self-diagnosis of ABS with EDL control unit -J104- is terminated if a road speed of 20 km/h is exceeded.

Display zones	Explanation
1 ... km/h ¹⁰⁾	– Drive away slowly until values are displayed on -VAS 5051 A- . • The values appearing in display zones 1 and 2 must NOT be above 6 km/h when driving away slowly. If the values are higher than these figures: – Check wheel speed sensors and rotors on front wheels for damage, proper installation position and secure seating ⇒ Brake system; Rep. Gr. 45 .
2 ... km/h ¹⁰⁾	
3 ... km/h ¹⁰⁾	– Drive away slowly until values are displayed on -VAS 5051 A- . • The values appearing in display zones 3 and 4 must NOT be above 2 km/h when driving away slowly.

Display zones	Explanation
4 ... km/h ¹⁰⁾	If the values are higher than these figures: – Check wheel speed sensors and rotors on rear wheels for damage, proper installation position and secure seating ⇒ Brake system; Rep. Gr. 45 .

10) When the vehicle is stationary the display will read 255 km/h.

Display group 003

Display zones	Explanation
1 ...	Brake light switch -F- : • 0 = Brake pedal not depressed, Brake light switch “OFF” • 1 = Brake pedal depressed, Brake light switch “ON” If readout is not as described: – Perform electrical check, test step 4 ⇒ page 52
2	Vacant
3	Vacant
4	Vacant

Display group 006



Note

- ◆ A second mechanic is needed for reading the display when the vehicle is moving ⇒ [“1.3 Safety precautions”, page 4](#) .
- ◆ The ABS/ESP function is deactivated when using vehicle diagnosis, testing and information system -VAS 5051 A- in the function “read measured value block” while road testing the vehicle. However, this is not indicated by the warning lamps.
- ◆ Self-diagnosis of ABS with EDL control unit J104 is terminated if a road speed of 20 km/h is exceeded.

Display zones	Explanation
1 m/s ²	Only applies to vehicles with four-wheel drive: Specified values for longitudinal acceleration sensor -G251- . • Vehicle stationary: -0.5 ... 0.5 m/s ² • Forward acceleration: value increases continuously • Reverse acceleration: negative (-) value increases continuously If readout is not as described: – Perform electrical check, test step 19 ⇒ page 58
2	Vacant
3	Vacant
4	Vacant

Display group 125

Display zones	Explanation
1	Communication with engine control unit

Display zones		Explanation
	Engine 1	Communication with engine control unit via CAN bus is OK
	Engine 0	
		- No communication with engine control unit via CAN bus If display shows "0" and no faults are stored in fault memory: - Check control unit identification of engine control unit to verify that correct (CAN-compatible) control unit is installed; for correct version refer to ➔ Parts catalogue . Alternatively: Control unit is defective. - Check CAN bus wiring ➔ page 9
2	FWD 1	Only applies to vehicles with four-wheel drive: Communication with four-wheel drive control unit -J492- Communication with four-wheel drive control unit via CAN bus is OK
	FWD 0	
		- No communication with four-wheel drive control unit via CAN bus If display shows "0" and no faults are stored in fault memory: - Check control unit identification of four-wheel drive control unit to verify that correct (CAN-compatible) control unit is installed. For correct version refer to ➔ Parts catalogue . Alternatively: Control unit is defective. - Check CAN bus wiring ➔ page 9
3	Gearbox 1	Only applies to vehicles with automatic gearbox: Communication with automatic gearbox control unit -J217- Communication with automatic gearbox control unit via CAN bus is OK
	Gearbox 0	
		- No communication with automatic gearbox control unit via CAN bus If display shows "0" and no faults are stored in fault memory: - Check control unit identification of automatic gearbox control unit to verify that correct (CAN-compatible) control unit is installed. For correct version refer to ➔ Parts catalogue . Alternatively: Control unit is defective. - Check CAN bus wiring ➔ page 9
4		Vacant

3.12 Login procedure or coding II

The login procedure or coding II is required for zero compensation of several components.

Procedure

- Connect vehicle diagnostic, testing and information system - VAS 5051 A- ➔ [page 7](#) and select vehicle system "03 - Brake electronics". When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

- From list -1- select diagnostic function "11 - Login procedure" or "11 - Coding II".



Indicated on -VAS 5051 A- :

- 1 - Enter code word
- Use keypad -2- to enter code "40168" and confirm entry by touching  key.



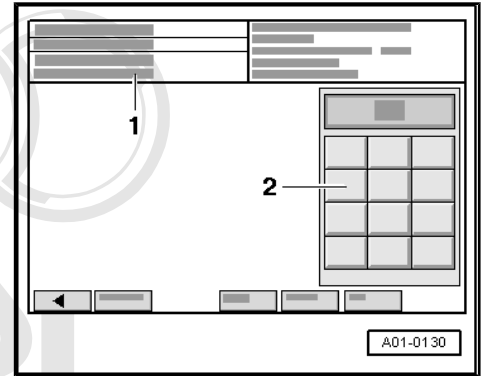
Note

If display on -VAS 5051 A- reads "function unknown or function can not be performed at present" the login procedure or coding II were not successful. Repeat login procedure or coding II.

- Terminate function "11 - Login procedure" or "11 - Coding II" by touching  key.

- Continue in function "04 - Basic setting" = [page 36](#).

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3.13 Electrical check of ABS, ABS/EDL and ABS/EDL/TCS ITT Mark 20 without ESP

Special tools and workshop equipment required

- ◆ Hand-held multimeter - V.A.G 1526 B- or vehicle diagnostic, testing and information system - VAS 5051 A- with test leads -VAS 5051 A/7-
- ◆ Adapter set -V.A.G 1594 C-
- ◆ Test box -V.A.G 1598/21-

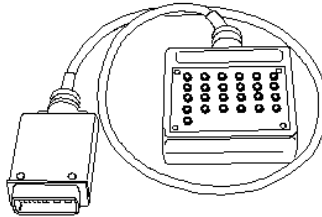
V.A.G 1526 B



V.A.G 1594 C



V.A.G 1598/21



G01-0007

The test steps can be used:

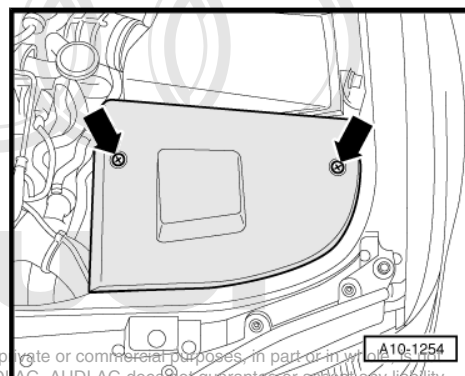
- ◆ For vehicles on which the self diagnosis does not give any indication of the source of the fault. Work through the complete electrical check.
- ◆ For vehicles on which the self diagnosis provides a direct indication of the source of the fault. Only carry out the test steps recommended in the fault table (to trace a specific fault).

Requirements

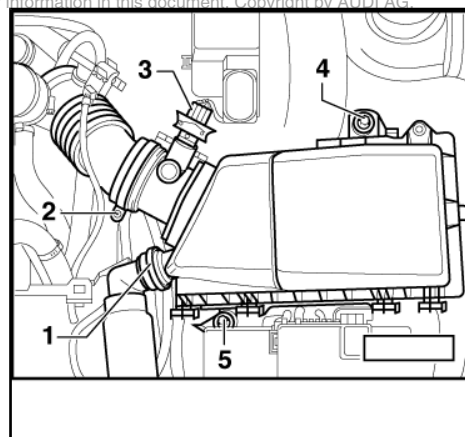
- Voltage supply of vehicle OK.
- Fuses OK ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Earth connections checked for corrosion and loose contact ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- All electrical consumers switched off.

3.14 Connecting adapter -V.A.G 1598/21- (test box) to ABS with EDL control unit - J104-

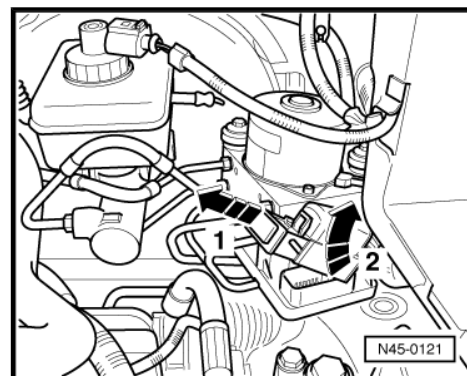
- Switch off ignition.
- If fitted, remove cover at front left of engine compartment -arrows-.



- If fitted, disconnect air intake hose for secondary air pump -1- from air cleaner housing.
- Detach air intake hose -2- at air mass meter.
- Unplug electrical connector at air mass meter -3-.
- Unscrew bolts -4- and -5-.
- Take out air cleaner housing.



- Release 25-pin connector at ABS with EDL control unit -J104- -arrow 1- and detach -arrow 2-.

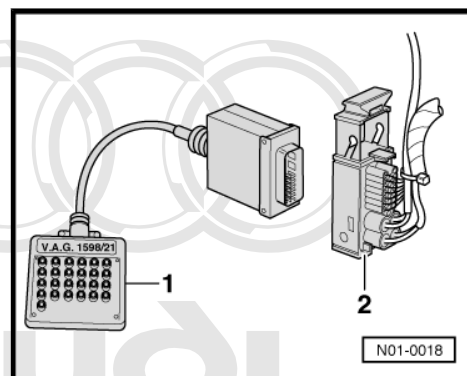


- Connect adapter -V.A.G 1598/21- (test box) -item 1- to unplugged 25-pin connector -2- of ABS with EDL control unit -J104-.



Caution

To prevent damage to the electronic components, select the respective measuring range and note the test requirements prior to connecting test leads.



- Perform all steps listed for “fault rectification if reading does not match specification”.
- Only carry out the test steps recommended in the fault table (to trace a specific fault).
- After performing electrical check, plug 25-pin connector onto pins of ABS with EDL control unit -J104- and secure connector.

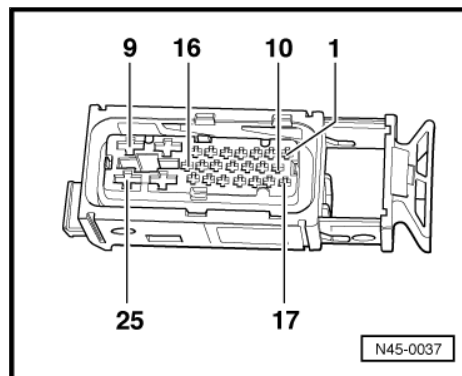
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Note

- ◆ Use hand-held multimeter -V.A.G 1526 B- with test leads from -V.A.G 1594 C- or vehicle diagnostic, testing and information system -VAS 5051 A- with test leads -VAS 5051 A/7- for the electrical check.
- ◆ The socket designations of the adapter -V.A.G 1598/21- (test box) are identical to the contact designations of the ABS with EDL control unit -J104- in the current flow diagram.
- ◆ Incorrect test procedures can cause system damage. Do not make bridging connections between any contacts other than those listed in the test table.
- ◆ The specified values are valid for an ambient temperature between 0 ... 40 °C.
- ◆ If measured values differ from specifications, locate fault according to current flow diagram.
- ◆ If the measured values 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 renewing components, check wiring and connections. Repeat resistance check on the component, particularly where specifications call for a resistance of less than 10Ω.

25-pin connector of ABS with EDL control unit -J104- / sockets on adapter -V.A.G 1598/21- (test box)



1 - Speed sensor, front left -G47- "+"	15 - ♦ Vehicles with TCS: Traction control system switch -E132- and traction control system warning lamp -K86-
2 - Speed sensor, front left -G47- "-"	♦ Vehicles with four-wheel drive: Longitudinal acceleration sender -G251-
3 - Coding bridge to contact 14	16 - ABS warning lamp -K47-
4 - Power supply, terminal 75/75a in dash panel wiring harness (via fuse)	17 - Vehicles with four-wheel drive: Longitudinal acceleration sender -G251-
5 - Speed sensor, rear left -G46- "+"	18 - Brake light switch -F-
6 - Speed sensor, rear left -G46- "-"	19 - Speed sensor, front right -G45- "+"
7 - Diagnosis K-wire	20 - Speed sensor, front right -G45- "-"
8 - Earth point in wiring harness of engine compartment	21 - Vehicles with navigation system: navigation system with CD drive control unit -J401-
9 - Battery "+" via fuse	22 - Speed sensor, rear right -G44- "-"
10 - From model year 1998 onwards: CAN bus Low	23 - Speed sensor, rear right -G44- "+"
11 - From model year 1998 onwards: CAN bus High	24 - Earth terminal 31
12 - Vehicles with navigation system: navigation system with CD drive control unit -J401-	25 - Battery "+" (ABS hydraulic pump -V64- via fuse)
13 - Vehicles with four-wheel drive: Longitudinal acceleration sender -G251-	
14 - Coding bridge to contact 3	

3.15 Test table

Overview of test steps

Item tested	Test step
Power supply (terminal 30) for ABS hydraulic pump -V64-	Perform test step 1 ➔ page 51
Power supply (terminal 30) for ABS hydraulic unit -N55-	– Perform test step 2 ➔ page 51
Power supply (terminal 75/75a) for ABS with EDL control unit -J104-	– Perform test step 3 ➔ page 51
Brake light switch -F-	– Perform test step 4 ➔ page 52
Resistance of speed sensor, front right -G45-	– Perform test step 5 ➔ page 52
Resistance of speed sensor, front left -G47-	– Perform test step 6 ➔ page 52
Resistance of speed sensor, rear right -G44-	– Perform test step 7 ➔ page 53
Resistance of speed sensor, rear left -G46-	– Perform test step 8 ➔ page 53
Voltage signal of speed sensor, front right -G45-	– Perform test step 9 ➔ page 53

Item tested	Test step
Voltage signal of speed sensor, front left -G47-	– Perform test step 10 ➔ page 54
Voltage signal of speed sensor, rear right -G44-	– Perform test step 11 ➔ page 54
Voltage signal of speed sensor, rear left -G46-	– Perform test step 12 ➔ page 55
Coding bridge	– Perform test step 13 ➔ page 55
ABS hydraulic pump -V64-	– Perform test step 14 ➔ page 55
ABS warning lamp -K47-	– Perform test step 15 ➔ page 56
“Brake warning” symbol in instrument cluster or display of driver information system	– Perform test step 16 ➔ page 56
Traction control system warning lamp -K86-	– Perform test step 17 ➔ page 57
Traction control system switch -E132-	– Perform test step 18 ➔ page 57
Wiring for longitudinal acceleration sender -G251-	– Perform test step 19 ➔ page 58

Test step No. 1

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
24 + 25	Power supply, terminal 30 for pump motor of hydraulic control unit	- Ignition off - Select measuring range: voltage measurement	Approx. battery voltage	- Check wiring according to current flow diagram: - Between contact 24 and earth - Between contact 25 and terminal 30

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Test step No. 2

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
8 + 9	Power supply, terminal 30 for hydraulic control unit	- Ignition off - Select measuring range: voltage measurement	Approx. battery voltage	- Check wiring according to current flow diagram: - Between contact 8 and earth - Between contact 9 and terminal 30

Test step No. 3

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
8 + 4	Power supply (terminal 75/75a) for ABS with EDL control unit - J104-	Ignition on		

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
		Select measuring range: voltage measurement	Approx. battery voltage	- Check wiring according to current flow diagram: - Between contact 8 and earth - Between contact 4 and terminal 75/75a

Test step No. 4

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
8 + 18	Brake light switch -F-	- Ignition off - Select measuring range: voltage measurement - Brake pedal not operated - Brake pedal operated	0 V Approx. battery voltage	- Check wiring according to current flow diagram: - Between contact 8 and earth - Between contact 18 and terminal 30

Test step No. 5

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
19 + 20	Resistance of speed sensor, front right -G45-	- Ignition off - Select measuring range: resistance measurement	1.0...1.3 kΩ	- Check connector of speed sensor - Move wiring to speed sensor when checking (loose contact) - Renew speed sensor if wiring is OK.

Test step No. 6

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
1 + 2	Resistance of speed sensor, front left -G47-	Ignition off		

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-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
		Select measuring range: resistance measurement	1.0...1.3 kΩ	- Check connector of speed sensor - Move wiring to speed sensor when checking (loose contact) - Renew speed sensor if wiring is OK.

Test step No. 7

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
22 + 23	Resistance of speed sensor, rear right -G44-	- Ignition off - Select measuring range: resistance measurement	1.0...1.3 kΩ	- Check connector of speed sensor - Move wiring to speed sensor when checking (loose contact) - Renew speed sensor if wiring is OK.

Test step No. 8

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
5 + 6	Resistance of speed sensor, rear left -G46-	- Ignition off - Select measuring range: resistance measurement	1.0...1.3 kΩ	- Check connector of speed sensor - Move wiring to speed sensor when checking (loose contact) - Renew speed sensor if wiring is OK.

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Test step No. 9

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
19 + 20	Voltage signal of speed sensor, front right -G45-	- Vehicle raised - Ignition off - Select measuring range: voltage measurement (alternating voltage)		

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
		– Rotate front right wheel at approx. 1 revolution per second.	Min. 65 mV alternating voltage	– Check speed sensor for interchanged wiring (read measured value block 001 ⇒ page 44) – Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45

Test step No. 10

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
1 + 2	Voltage signal of speed sensor, front left -G47-	• Vehicle raised • Ignition off – Select measuring range: voltage measurement (alternating voltage) – Rotate front left wheel at approx. 1 revolution per second	Min. 65 mV alternating voltage	– Check speed sensor for interchanged wiring (read measured value block 001 ⇒ page 44) – Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45

Test step No. 11

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
22 + 23	Voltage signal of speed sensor, rear right -G44-	• Vehicle raised • Ignition off – Select measuring range: voltage measurement (alternating voltage) – Rotate rear right wheel at approx. 1 revolution per second	190... 1140 mV alternating voltage	– Check speed sensor for interchanged wiring (read measured value block 001 ⇒ page 44) – Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45

Test step No. 12

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
5 + 6	Voltage signal of speed sensor, rear left -G46-	• Vehicle raised • Ignition off – Select measuring range: voltage measurement (alternating voltage) – Rotate rear left wheel at approx. 1 revolution per second	190... 1140 mV alternating voltage	– Check speed sensor for interchanged wiring (read measured value block 001 ⇒ page 44) – Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45

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Test step No. 13

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
3 + 14	Coding bridge	• Ignition off – Select measuring range: resistance measurement	0...1 Ω	– Check wiring and contacts in plug – Renew coding bridge if test result does not match specification

Test step No. 14

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
–	ABS hydraulic pump -V64-	• 25-pin connector connected to ABS with EDL control unit - J104- • Ignition on • Vehicle diagnostic, testing and information system -VAS 5051 A- connected		

-V.A.G 1598/21-Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
		Initiate final control diagnosis ⇒ page 27 and activate ABS hydraulic pump -V64-	Pump motor starts up	- Switch off ignition - Check wiring according to current flow diagram: ◆ Perform test step 1 ◆ Wiring from contact 1 of 2-pin connector at ABS hydraulic pump -V64- to control unit ◆ Wiring from contact 2 of 2-pin connector at ABS hydraulic pump -V64- to control unit - If no fault is found in wiring, remove hydraulic control unit and renew hydraulic pump with valve block ⇒ Brake system; Rep. Gr. 45

Test step No. 15

-V.A.G 1598/21-Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
–	ABS warning lamp -K47-	- Ignition off 25-pin connector connected to ABS with EDL control unit - J104- - Switch on ignition	ABS warning lamp - K47- should light up for 2 seconds and then go out	- Switch off ignition - Connect test box - V.A.G 1598/21- - Check wiring according to current flow diagram: ◆ Perform test step 3 ◆ Check wiring between contact 16 of -V.A.G 1598/21- and instrument cluster. - Interrogate fault memory of instrument cluster (dash panel insert) ⇒ Electrical system, self-diagnosis; Rep. Gr. 01

Test step No. 16

-V.A.G 1598/21-Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
–	“Brake warning” symbol in instrument cluster or display of driver information system	- Ignition off 25-pin connector connected to ABS with EDL control unit - J104- - Electrical connector unplugged from one of the front speed sensors.		

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
		- Switch on ignition, start engine and increase engine speed to above 2000 rpm. - Plug in electrical connector after testing is completed and interrogate and erase fault memory	"Brake warning" symbol lights up	- Switch off ignition - Connect test box - V.A.G 1598/21- - Check wiring according to current flow diagram: ◆ Perform test step 3 ◆ Check wiring between contact 16 of -V.A.G 1598/21- and instrument cluster. - Interrogate fault memory of instrument cluster (dash panel insert) ⇒ Electrical system, self-diagnosis; Rep. Gr. 01

Test step No. 17

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
-	Traction control system warning lamp -K86-	- No faults stored in fault memory - Ignition off 25-pin connector connected to ABS with EDL control unit - J104- - Switch on ignition	Traction control system warning lamp - K86- should light up for 2 seconds and then go out	- Switch off ignition - Connect test box - V.A.G 1598/21- - Check wiring according to current flow diagram: ◆ Perform test step 3 ◆ Check wiring between contact 15 of -V.A.G 1598/21- and instrument cluster. - Interrogate fault memory of instrument cluster (dash panel insert) ⇒ Electrical system, self-diagnosis; Rep. Gr. 01

Test step No. 18

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
-	Traction control system switch - E132-	- Ignition off 25-pin connector connected to ABS with EDL control unit - J104- - Test step 17 performed		



-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
8 + 15		– Switch on ignition	Traction control system warning lamp - K86- lights up	– Switch off ignition – Connect test box - V.A.G 1598/21-
		– Operate traction control system switch - E132-		
		– Operate traction control system switch - E132- again	Traction control system warning lamp - K86- goes out	
		– Select measuring range: voltage measurement		
		– Switch on ignition	Approx. 0 V	– Check fuses and wiring according to current flow diagram: ♦ Between contact 15 of -V.A.G 1598/21- and contact 5 of switch ♦ Between contact 6 of switch and terminal 15 ♦ Between contact 2 of switch and earth
		– Do not operate Traction control system switch -E132-		
		– Operate traction control system switch - E132-	Approx. battery voltage	– Renew switch if wiring is OK.

Test step No. 19

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
13 + 1 ¹¹⁾	Wiring for longitudinal acceleration sender -G251-	• Ignition off • Electrical connector at longitudinal acceleration sender -G251- unplugged		– Repair wiring according to current flow diagram
17 + 2 ¹¹⁾		– Select measuring range: resistance measurement	max. 1.5 Ω	
15 + 3 ¹¹⁾			max. 1.5 Ω	
		– Check wiring for short to positive or earth.	∞ Ω	

11) Contact at connector of longitudinal acceleration sender -G251- .

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4 ABS/EDL/TCS/ESP ITT Mark 20

- ◆ The Audi A3 with ESP is equipped with the ABS/EDL/ESP ITT Mark 20 system or the ABS/EDL/TCS/ESP ITT Mark 20 system.
- ◆ The data signals are transmitted via CAN bus.

4.1 Electrical/electronic components and fitting locations

1 - Speed sensor (front)

- ☐ Front left speed sensor - G47- , front right speed sensor -G45-
- ☐ Removing and installing, fitting speed sensor wiring ⇒ Brake system; Rep. Gr. 45

2 - Brake pressure sender 1 - G201-

- ☐ Can be checked via reading measured value block ⇒ [page 116](#)
- ☐ Refer to ⇒ Brake system; Rep. Gr. 45 for removing and installing, then perform zero compensation in basic setting ⇒ [page 96](#)

3 - Brake pressure sender 2 - G214-

- ☐ Can be checked via reading measured value block ⇒ [page 116](#)
- ☐ Refer to ⇒ Brake system; Rep. Gr. 45 for removing and installing, then perform zero compensation in basic setting ⇒ [page 96](#)

4 - Passage for wiring

5 - 14-pin electrical connector

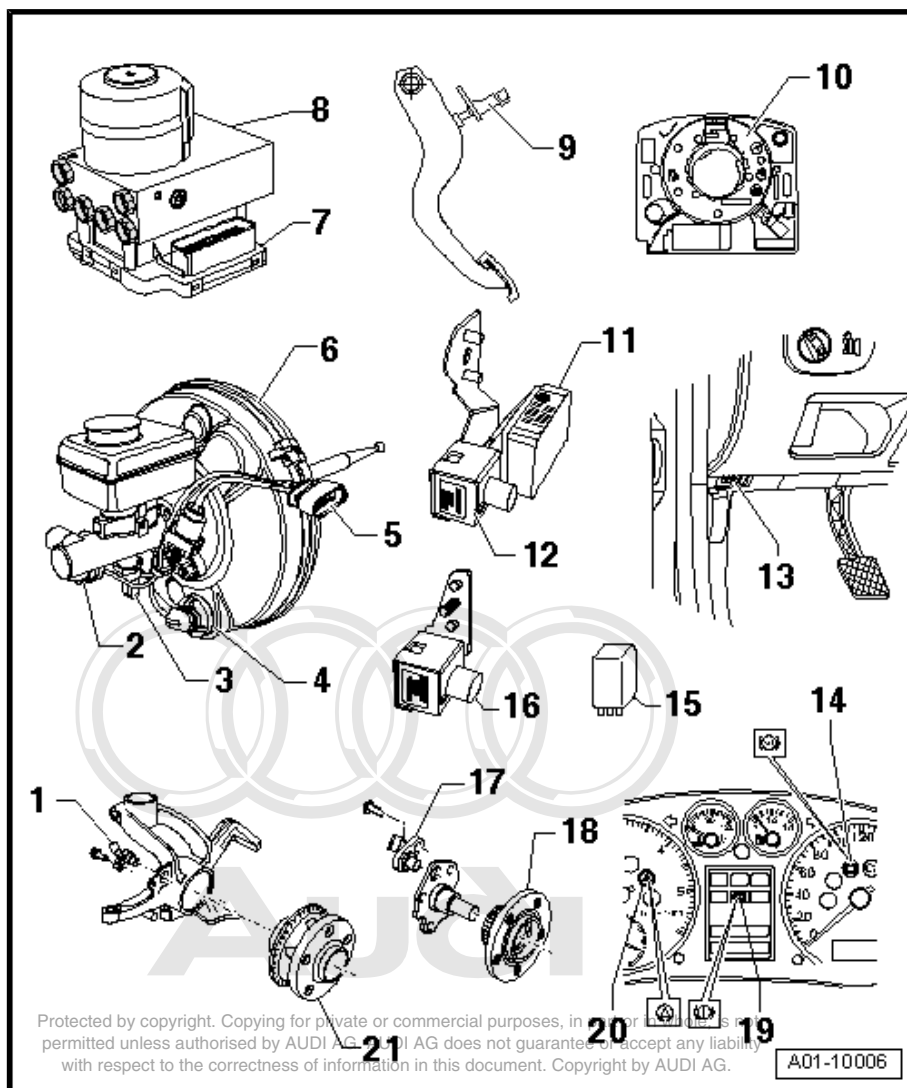
- ☐ For brake detection switch, ESP -F83-
- ☐ For brake pressure sender 1 -G201-
- ☐ For brake pressure sender 2 -G214-

6 - Brake servo with brake detection switch, ESP -F83-

- ☐ Appears in fault display as brake pressure solenoid trip switch -F84- or brake pressure solenoid valve - N247-
- ☐ Brake detection switch can also be checked via basic setting ⇒ [page 89](#) and in measured value block ⇒ [page 115](#)
- ☐ Complete brake servo must be renewed if brake detection switch is defective

7 - ABS with EDL control unit -J104-

- ☐ Is combined with ABS hydraulic pump -V64- ⇒ [Item 8 \(page 60\)](#) to form hydraulic control unit
- ☐ Checked by self-diagnosis
- ☐ Only unplug 47-pin connector when the ignition is switched off



- ☐ Assignment of 47-pin connector ⇒ [page 122](#)
- ☐ Removing and installing ⇒ Brake system; Rep. Gr. 45
- ☐ Perform coding of ABS with EDL control unit -J104- after renewal

8 - ABS hydraulic pump -V64-

- ☐ Is combined with ABS / EDL control unit -J104- ⇒ [Item 7 \(page 59\)](#) to form hydraulic control unit
- ☐ Checked by self-diagnosis
- ☐ Removing and installing ⇒ Brake system; Rep. Gr. 45

9 - Brake light switch -F-

- ☐ Can be checked via reading measured value block ⇒ [page 115](#)
- ☐ Removing and installing ⇒ Brake system; Rep. Gr. 45

10 - Steering angle sender -G85-

- ☐ Fitting location: on steering column between steering wheel and steering column switch
- ☐ Can be checked via reading measured value block ⇒ [page 116](#)
- ☐ Refer to ⇒ Brake system; Rep. Gr. 45 for removing and installing, then perform zero compensation in basic setting ⇒ [page 92](#)

11 - Yaw rate sender -G202-

- ☐ Fitting location: next to steering column
- ☐ Can be checked via reading measured value block ⇒ [page 116](#)
- ☐ Removing and installing ⇒ Brake system; Rep. Gr. 45

12 - Lateral acceleration sender -G200-

- ☐ Fitting location: next to steering column
- ☐ Can be checked via reading measured value block ⇒ [page 116](#)
- ☐ Refer to ⇒ Brake system; Rep. Gr. 45 for removing and installing, then perform zero compensation in basic setting ⇒ [page 94](#)

13 - Diagnostic connection

- ☐ Fitting location: in footwell (front left), next to release lever for bonnet.

14 - ABS warning lamp -K47-

- ☐ Fitting location: In instrument cluster
- ☐ Function ⇒ [page 15](#)

15 - Brake light suppression relay, ESP -J508-

- ☐ Fitting location: in 13-position relay carrier behind driver's storage compartment

16 - Longitudinal acceleration sender -G251-

- ☐ Only four-wheel drive vehicles
- ☐ Fitting location: at A-pillar on passenger's side
- ☐ Can be checked via reading measured value block ⇒ [page 117](#)
- ☐ Refer to ⇒ Brake system; Rep. Gr. 45 for removing and installing, then perform zero compensation in basic setting ⇒ [page 98](#)

17 - Speed sender (rear)

- ☐ Rear left speed sensor -G46- , rear right speed sensor -G44-
- ☐ Removing and installing, fitting speed sensor wiring ⇒ Brake system; Rep. Gr. 45

18 - Rotor for speed sensor (rear)

- ☐ Checking speed sensor rotor ⇒ Brake system; Rep. Gr. 45
- ☐ Speed sensor rotor is welded to wheel hub; removing and installing wheel hub ⇒ Running gear, front-wheel drive and four-wheel drive; Rep. Gr. 42

19 - "Brake warning" symbol

- ☐ Lights up in instrument cluster or in display of driver information system
- ☐ Function ⇒ [page 15](#)

20 - Traction control system warning lamp -K86- (ESP and TCS warning lamp -K155-)

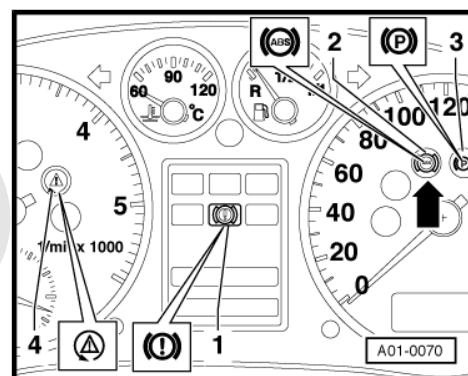
- ☐ Fitting location: In instrument cluster
- ☐ Function ⇒ [page 15](#)

21 - Rotor for speed sensor (front)

- ☐ Checking speed sensor rotor ⇒ Brake system; Rep. Gr. 45
- ☐ Speed sensor rotor is welded to wheel hub; removing and installing wheel hub ⇒ Running gear, front-wheel drive and four-wheel drive; Rep. Gr. 40

4.2 Faults displayed by warning lamps in instrument cluster

- 1 - "Brake warning" symbol
- 2 - ABS warning lamp -K47-
- 3 - Handbrake warning lamp -K14-
- 4 - Traction control system warning lamp -K86-



"Brake warning" symbol	ABS warning lamp -K47-	Traction control system warning lamp -K86-	Explanation
On	On	On	Test sequence after switching on ignition (first two seconds)
Off	Off	Off	System OK (2 seconds after switching on ignition)
Off	Off	On	TCS/ESP failure or TCS/ESP deactivated by manual switch; ABS, EDL and EBPD remain active
Off	Off	flashes	TCS/ESP control function is operating
Off	On	On	ABS/EDL/TCS system failure (e.g. wheel speed sensor defective), the EBPD remains fully functional.
On	On	On	ABS/EDL/TCS/EBPD system failure (e.g. several wheel speed sensors defective)
On	Off	Off	Brake fluid level too low; all systems remain functional



WARNING

There is a risk of accident if the ABS warning lamp -K47- and the "brake warning symbol" both light up. The function of the brake system will be impaired. As the brake pressure is no longer controlled by the electronic brake force distribution the rear wheels tend to brake excessively. Due to this the rear of the vehicle may break away unexpectedly.

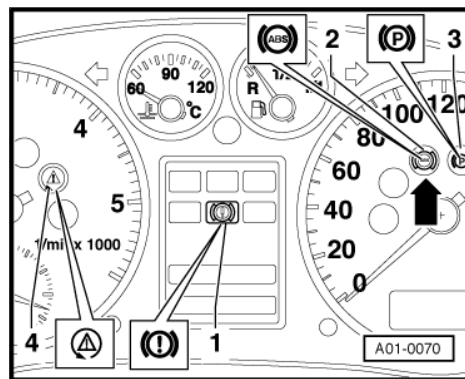
The ABS warning lamp -K47- -item 2- lights up during the test sequence (self-test)

The system runs through an automatic test sequence when the ignition is switched on: the ABS warning lamp -K47- is activated by the ABS with EDL control unit -J104- and lights up for 2 seconds. During this period the control unit tests the following functions via self-test.

- ◆ The voltage supply is checked, at least 10.0 V.
- ◆ The control unit including the valve windings is checked.
- ◆ A speed sensor check (electrical test) is carried out; this is only completed at 20 km/h.
- ◆ Control unit code is checked.

If the system does not perform the test sequence:

- Check voltage supply of ABS with EDL control unit -J104- (perform electrical check, step 3 ⇒ [page 125](#)).

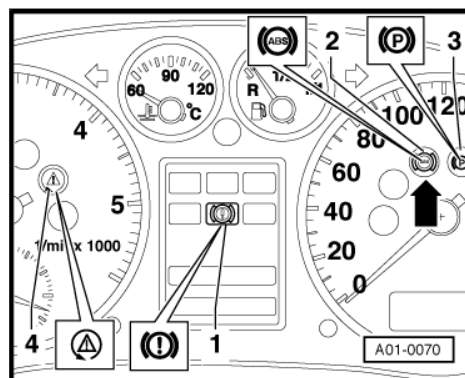


The ABS warning lamp -K47- -item 2- stays on after the test sequence is completed

If a fault affecting only the anti-lock brake system is detected by self-diagnosis, the ABS is switched off. The conventional brake system remains fully functional.

The causes of the fault may be as follows:

- ◆ Voltage supply is below 10 Volts.
- ◆ A fault exists which affects only the ABS.
- ◆ A sensor fault has occurred after the last start (sporadic fault). In this case the ABS warning lamp goes out automatically after the vehicle is started again and the road speed exceeds 20 km/h.
- ◆ Connection between ABS with EDL control unit -J104- and instrument cluster is faulty or instrument cluster faulty (perform electrical check, step 15 ⇒ [page 129](#)).

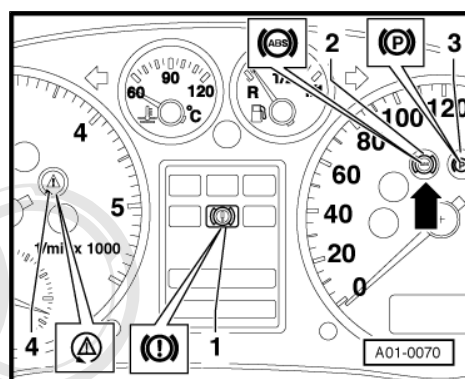


The ABS warning lamp -K47- -item 2- goes out after the test sequence is completed, but "brake warning symbol" -1- remains on and the gong sounds three times

All systems remain functional.

The causes of the fault may be as follows:

- ◆ Brake fluid level too low.
- ◆ Fault in instrument cluster ⇒ Electrical system, self-diagnosis; Rep. Gr. 01 or ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



A - Vehicles without navigation system: the ABS warning lamp -K47- -item 2- does not go out after the test sequence is completed, and "brake warning" symbol -1- is on

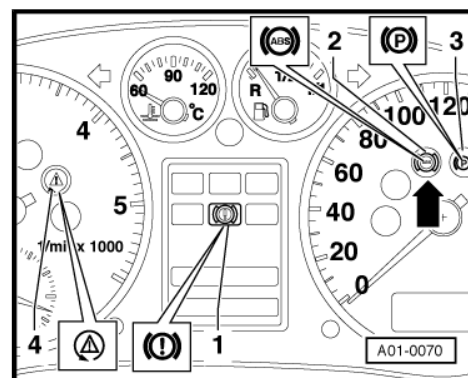
B - Vehicles with navigation system: the ABS warning lamp -K47- -item 2- does not go out after test sequence is completed and handbrake warning lamp -K14- -3- lights up when vehicle speed first exceeds 10 km/h or engine speed first exceeds 2000 rpm, and the gong sounds three times

The ABS system is defective and the EBPD system deactivated.



WARNING

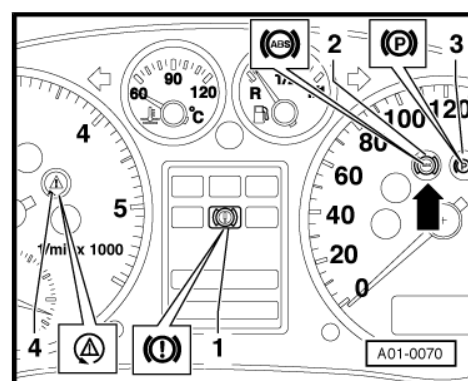
There is a risk of accident if the ABS warning lamp -K47- and the "brake warning symbol" both light up. The function of the brake system will be impaired. As the brake pressure is no longer controlled by the electronic brake force distribution the rear wheels tend to brake excessively. Due to this the rear of the vehicle may break away unexpectedly.



The traction control system warning lamp -K86- -item 4- remains on after the test sequence is completed

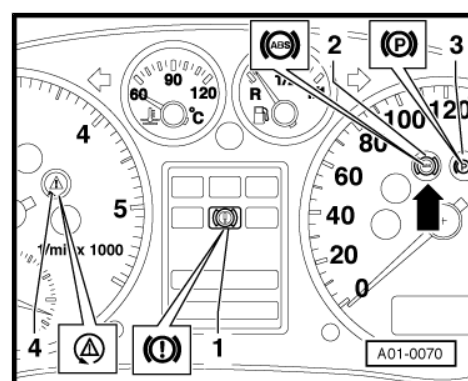
The causes of the fault may be as follows:

- ◆ A fault in the system affecting only the TCS/ESP. ABS/EDL and EBPD remain fully functional.
- ◆ The TCS/ESP system was switched off with the traction control system switch -E132- .
- ◆ Short circuit to positive in traction control system switch -E132-
- ◆ Short circuit to earth for activation of traction control system warning lamp -K86- .
- ◆ Open circuit in wiring for activation of traction control system warning lamp -K86- .



The traction control system warning lamp -K86- -item 4- lights up for 100 milliseconds after the ignition is switched on

- ◆ A coding without TCS/ESP control has been entered.



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The ABS warning lamp -K47- -item 2- and the “brake warning” symbol -1- flash and the traction control system warning lamp -K86- remains on after the test sequence is completed

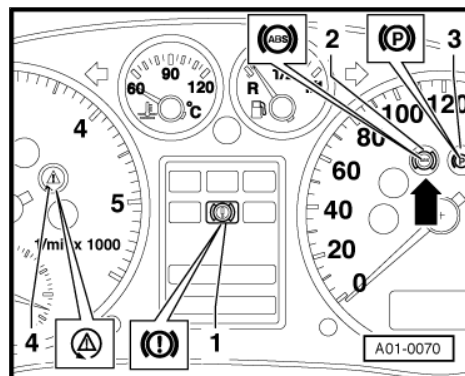
The causes of the fault may be as follows:

- ◆ The control unit is not coded (Code 00000).



Note

If the ABS warning lamp -K47- and the “brake warning” symbol do not light up but the brake system is not fully functional, the fault must be traced in the conventional brake system ⇒ Brake system; Rep. Gr. 46 and ⇒ Rep. Gr. 47.



4.3 Performing self-diagnosis of ABS/EDL/TCS/ESP ITT Mark 20 system

List of available functions

- With ignition switched off, connect vehicle diagnostic, testing and information system -VAS 5051 A- with diagnosis lead -VAS 5051 A/1- to diagnosis connector and select vehicle system “03 - Brake electronics” ⇒ [page 7](#).

The following functions are available from the list -1-:

Functions	Page
02 Interrogate fault memory	⇒ page 64
03 Final control diagnosis	⇒ page 77
04 Basic setting	⇒ page 85
05 Erase fault memory	⇒ page 103
06 End output	⇒ page 104
07 Code control unit	⇒ page 104
08 Read measured value block	⇒ page 112
11 Login procedure or coding II	⇒ page 118



The other functions displayed are currently not available, or can be disregarded.

4.4 Interrogating fault memory

- Connect vehicle diagnostic, testing and information system -VAS 5051 A- ⇒ [page 7](#) and select vehicle system “03 - Brake electronics”. When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

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



Indicated on -VAS 5051 A- :

- 1- Content of fault memory No faults detected
 or
 X faults detected
- 2- Fault Fault code
 Fault location
 Type of fault

A - If a fault was detected:

- Print out information on screen or self-diagnosis log.
- Terminate function "02 - Interrogate fault memory" by touching  key.

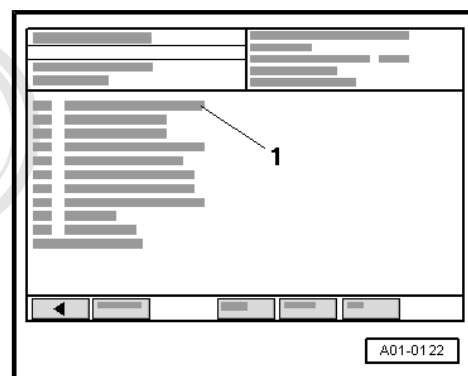


Indicated on -VAS 5051 A- :

- Rectify fault(s) according to fault tables ➔ [page 65](#) .
- From list -1- select function "02 - Interrogate fault memory" and erase fault memory ➔ [page 103](#) .
- From list -1- select function "06 - End output" ➔ [page 104](#) .
- Perform road test and interrogate fault memory again.

B - If no fault was detected:

- Terminate function "02 - Interrogate fault memory" by touching  key.
- Select function "06 - End output" from list ➔ [page 104](#) .



4.5 Fault tables

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Note

- ◆ *As the control units are interconnected via the CAN data bus, always start by interrogating the fault memories of all the control units in the vehicle as the first step in the fault-finding routine. This can be done by starting the automatic test sequence: Diagnosis function "00 - Interrogate fault memory - Complete system". You can then check to see if there are faults stored which may affect the ABS.*
- ◆ *The following table includes all faults which can be detected by the ABS with EDL control unit -J104- and displayed by -VAS 5051 A- when interrogating the fault memory.*
- ◆ *The contents of the fault memory remains stored until the memory is erased; Erasing fault memory ➔ [page 103](#) .*
- ◆ *Faults are listed according to a 5-digit fault code, which appears in the left-hand column of the fault table.*
- ◆ *Sporadic (intermittent) faults are identified as such by the word "sporadic" appearing on the display.*
- ◆ *Check wiring and connectors going to the relevant components according to current flow diagram before renewing components indicated as faulty by -VAS 5051 A- . Also check earth connections according to current flow diagram. This is particularly important if faults are indicated as being "sporadic".*



Fault 00283

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00283 Front left speed sensor -G47-		
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, loose contact or short to positive or earth in speed sensor wire or speed sensor ♦ Speed sensor winding defective	– Perform electrical check, step 6 ⇒ page 125 and step 10 ⇒ page 127
	♦ Speed sensor or rotor damaged	– Check speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	♦ ABS with EDL control unit -J104- defective	– Remove hydraulic control unit, renew control unit ⇒ Brake system; Rep. Gr. 45 , then code control unit ⇒ page 104
00283 Front left speed sensor -G47- Mechanical fault		
• This fault is only detected above 20 km/h (carry out test drive).	♦ Excessive air gap between speed sensor and rotor.	– Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	♦ Outlet valves in hydraulic unit defective	– Check hydraulic unit in final control diagnosis ⇒ page 77
00283 Front left speed sensor -G47- Signal outside tolerance		
• This fault is only detected above 20 km/h (carry out test drive).	♦ Open circuit, loose contact or short to positive or earth in speed sensor wire or speed sensor ♦ Speed sensor winding defective	– Perform electrical check, step 6 ⇒ page 125 and step 10 ⇒ page 127
	♦ Electrical interference from external interference sources (high frequency radiation, e.g. non-insulated ignition cable)	– Read measured value block 001 ⇒ page 114
	♦ Excessive air gap between speed sensor and rotor.	– Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	♦ Speed sensor or rotor damaged	– Check speed sensor and rotor ⇒ Brake system; Rep. Gr. 45

Fault 00285

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00285 Front right speed sensor -G45-		
	♦ Open circuit, loose contact or short to positive or earth in speed sensor wire or speed sensor	– Perform electrical check, step 5 ⇒ page 125 and step 9 ⇒ page 126
	♦ Speed sensor winding defective	
	♦ Speed sensor or rotor damaged	– Check speed sensor and rotor ⇒ Brake system; Rep. Gr. 45

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
	◆ ABS with EDL control unit -J104- defective	– Remove hydraulic control unit, renew control unit ⇒ Brake system; Rep. Gr. 45 , then code control unit ⇒ page 104
00285 Front right speed sensor -G45- Mechanical fault		
• This fault is only detected above 20 km/h (carry out test drive).	◆ Excessive air gap between speed sensor and rotor.	– Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	◆ Outlet valves in hydraulic unit defective	– Check hydraulic unit in final control diagnosis ⇒ page 77
00285 Front right speed sensor -G45- Signal outside tolerance		
• This fault is only detected above 20 km/h (carry out test drive).	◆ Open circuit, loose contact or short to positive or earth in speed sensor wire or speed sensor	– Perform electrical check, step 5 ⇒ page 125 and step 9 ⇒ page 126
	◆ Speed sensor winding defective	
	◆ Electrical interference from external interference sources (high frequency radiation, e.g. non-insulated ignition cable)	– Read measured value block 001 ⇒ page 114
	◆ Excessive air gap between speed sensor and rotor.	– Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	◆ Speed sensor or rotor damaged	– Check speed sensor and rotor ⇒ Brake system; Rep. Gr. 45

Fault 00287

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00287 Rear right speed sensor -G44-		
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, loose contact or short to positive or earth in speed sensor wire or speed sensor	– Perform electrical check, step 7 ⇒ page 126 and step 11 ⇒ page 127
	◆ Speed sensor winding defective	
	◆ Speed sensor or rotor damaged	– Check speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	◆ ABS with EDL control unit -J104- defective	– Remove hydraulic control unit, renew control unit ⇒ Brake system; Rep. Gr. 45 , then code control unit ⇒ page 104
00287 Rear right speed sensor -G44- Mechanical fault		

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
This fault is only detected above 20 km/h (carry out test drive).	Excessive air gap between speed sensor and rotor.	Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	Outlet valves in hydraulic unit defective	Check hydraulic unit in final control diagnosis ⇒ page 77
00287 Rear right speed sensor -G44- Signal outside tolerance		
This fault is only detected above 20 km/h (carry out test drive).	Open circuit, loose contact or short to positive or earth in speed sensor wire or speed sensor	Perform electrical check, step 7 ⇒ page 126 and step 11 ⇒ page 127
	Speed sensor winding defective	
	Electrical interference from external interference sources (high frequency radiation, e.g. non-insulated ignition cable)	Read measured value block 001 ⇒ page 114
	Excessive air gap between speed sensor and rotor.	Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	Speed sensor or rotor damaged	Check speed sensor and rotor ⇒ Brake system; Rep. Gr. 45

Fault 00290

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00290 Rear left speed sensor -G46-		
	Open circuit, loose contact or short to positive or earth in speed sensor wire or speed sensor	Perform electrical check, step 8 ⇒ page 126 and step 12 ⇒ page 128
	Speed sensor winding defective	
	Speed sensor or rotor damaged	Check speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	ABS with EDL control unit -J104- defective	Remove hydraulic control unit, renew control unit ⇒ Brake system; Rep. Gr. 45 , then code control unit ⇒ page 104
00290 Rear left speed sensor -G46- Mechanical fault		
This fault is only detected above 20 km/h (carry out test drive).	Excessive air gap between speed sensor and rotor.	Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45
	Outlet valves in hydraulic unit defective	Check hydraulic unit in final control diagnosis ⇒ page 77
	Excessive air gap between speed sensor and rotor.	Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00290 Rear left speed sensor -G46- Signal outside tolerance		
This fault is only detected above 20 km/h (carry out test drive).	- Open circuit, loose contact or short to positive or earth in speed sensor wire or speed sensor - Speed sensor winding defective	Perform electrical check, step 8 ➔ page 126 and step 12 ➔ page 128
	Electrical interference from external interference sources (high frequency radiation, e.g. non-insulated ignition cable)	Read measured value block 001 ➔ page 114
	Excessive air gap between speed sensor and rotor.	Check installation of speed sensor and rotor ➔ Brake system; Rep. Gr. 45
	Speed sensor or rotor damaged	Check speed sensor and rotor ➔ Brake system; Rep. Gr. 45

Fault 00538

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00538 Reference voltage		
	Open circuit, loose contact or short circuit to positive or earth in voltage supply wiring for lateral acceleration sender - G200-, brake pressure sender 1 -G201-, yaw rate sender -G202- or brake pressure sender 2 -G214-	Perform electrical check, test step 20 ➔ page 132, test step 21 ➔ page 132, test step 22 ➔ page 133, test step 23 ➔ page 133

Fault 00668

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00668 Vehicle voltage, terminal 30 Signal outside tolerance		
	- Fuse defective - Open circuit, loose contact or short to positive or earth in voltage supply wiring	Perform electrical check, step 1 ➔ page 124 and step 2 ➔ page 124

Fault 00778

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00778 Steering angle sender -G85- No communication		
	Faults in CAN bus wiring	Check CAN bus wiring between ABS with EDL control unit -J104- and steering angle sender -G85- ➔ page 9



Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
	♦ High and Low CAN bus wiring interchanged	– Check CAN Bus wiring for interchanged connections according to current flow diagram
	♦ The output of one of the control units communicating via the CAN bus is defective.	– Check CAN bus wiring ⇒ page 9
	♦ Steering angle sender -G85- defective	– Read measured value block 004 ⇒ page 116 – Renew sender ⇒ Brake system; Rep. Gr. 45 , then perform zero compensation in basic setting ⇒ page 92
00778 Steering angle sender -G85- No setting or wrong setting		
	♦ Steering angle sender -G85- sends no values or incorrect values	– Perform zero compensation ⇒ page 92
00778 Steering angle sender -G85- Mechanical fault		
	♦ Installation position of steering angle sender -G85- not OK	– Check installation position of sender ⇒ Brake system; Rep. Gr. 45
	♦ Running gear geometry not OK	– Perform wheel alignment ⇒ Running gear, front-wheel drive and four-wheel drive; Rep. Gr. 44
	♦ No zero compensation performed after removing and installing steering wheel	– Perform zero compensation ⇒ page 92
00778 Steering angle sender -G85- Implausible signal		
	♦ Installation position of steering angle sender -G85- not OK	– Check installation position of sender ⇒ Brake system; Rep. Gr. 45
	♦ Running gear geometry not OK	– Perform wheel alignment ⇒ Running gear, front-wheel drive and four-wheel drive; Rep. Gr. 44
	♦ Vibrations in steering due to wear	– Renew defective components, then perform zero compensation in basic setting ⇒ page 92
00778 Steering angle sender -G85- defective		
	♦ Steering angle sender -G85- sends no values or incorrect values	– Renew sender ⇒ Brake system; Rep. Gr. 45 , then perform zero compensation in basic setting ⇒ page 92

Fault 00810

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00810 Sender 1/2 for brake pressure Implausible signal		

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
	◆ Open circuit in earth connection to brake pressure sender 1 -G201- or brake pressure sender 2 -G214- ◆ Short circuit in signal wiring to brake pressure sender 1 -G201- or brake pressure sender 2 -G214-	– Perform electrical check, step 22 ➔ page 133 and step 23 ➔ page 133
	◆ Brake pressure sender 1 -G201- or brake pressure sender 2 -G214- defective	– Renew sender ➔ Brake system; Rep. Gr. 45 , then perform zero compensation in basic setting ➔ page 100
	◆ One hydraulic brake circuit has failed	– Check brake system ➔ Brake system; Rep. Gr. 47

Fault 00812

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00812 Brake pressure solenoid trip switch -F84- ¹²⁾		
	◆ Open circuit, loose contact or short circuit to positive or earth in wiring to brake detection switch, ESP -F83-	– Perform electrical check, test step 24 ➔ page 133
	◆ Brake detection switch, ESP -F83- defective	– Perform function test in basic setting ➔ page 89
	◆ Brake servo defective	– Renew brake servo ➔ Brake system; Rep. Gr. 47 , then perform function test in basic setting ➔ page 89

12) The brake pressure solenoid trip switch -F84- referred to in the fault-finding display is designated brake detection switch, ESP -F83- in the Current flow diagram.

Fault 00813

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00813 Brake pressure sender 2 -G214- Electrical fault in circuit		
	◆ Open circuit, loose contact or short circuit to positive or earth in wiring to brake pressure sender 2 -G214-	– Perform electrical check, test step 23 ➔ page 133
	◆ Brake pressure sender 2 -G214- defective	– Renew sender ➔ Brake system; Rep. Gr. 45 , then perform zero compensation in basic setting ➔ page 96

Fault 00814

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
00814 Brake pressure solenoid valve -N247- ¹³⁾		

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
	◆ Open circuit, loose contact or short circuit to positive or earth in wiring to brake detection switch, ESP -F83-	– Perform electrical check, test step 24 ⇒ page 133
	◆ Brake detection switch, ESP -F83- defective	– Perform function test in basic setting ⇒ page 89
	◆ Brake servo defective	– Renew brake servo ⇒ Brake system; Rep. Gr. 47 , then perform function test in basic setting ⇒ page 89
	◆ Output stage in ABS with EDL control unit -J104- defective	– Remove hydraulic control unit, renew control unit ⇒ Brake system; Rep. Gr. 45 , then code control unit ⇒ page 104

13) The brake pressure solenoid valve -N247- referred to in the fault-finding display is designated brake detection switch, ESP -F83- in the Current flow diagram.

Fault 01044

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01044 Control unit incorrectly coded		
	◆ An incorrect code number has been entered	– Check coding ⇒ page 104
	◆ Coding bridges in wiring harness damaged	– Check wires in wiring harness; perform electrical check, test step 13 ⇒ page 128

Fault 01130

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01130 ABS operation Implausible signal		
• This fault is only detected above 20 km/h (carry out test drive).	◆ Electrical interference from external interference sources (high frequency radiation, e.g. non-insulated ignition cable) ◆ Open circuit, loose contact or short to positive or earth in wiring	– Check all electrical wiring and connectors – Erase fault memory – Perform test drive at more than 20 km/h – Interrogate fault memory again If the fault is not rectified: – Remove hydraulic control unit, renew control unit ⇒ Brake system; Rep. Gr. 45 , then code control unit ⇒ page 104

Fault 01276

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01276 ABS hydraulic pump -V64- Signal outside tolerance		

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
This fault is only detected above 20 km/h (carry out test drive).	Open circuit or short circuit to earth or positive in internal wiring: ABS with EDL control unit -J104- / ABS hydraulic pump -V64-	- Check ABS hydraulic pump -V64- via final control diagnosis ➔ page 77 - If ABS hydraulic pump -V64- starts running during final control diagnosis: - Perform electrical check, test step 1 ➔ page 124 - Check all wiring and connections for short to positive or earth according to current flow diagram.
	ABS with EDL control unit -J104- defective	Remove hydraulic control unit, renew control unit ➔ Brake system; Rep. Gr. 45 , then code control unit ➔ page 104
	Pump motor defective	Renew hydraulic control unit ➔ Brake system; Rep. Gr. 45

Fault 01279

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01279 Longitudinal acceleration sender -G251- ¹⁴⁾ Electrical fault in circuit		
	Open circuit, loose contact or short circuit to positive or earth in wiring connection going to longitudinal acceleration sender -G251-	Perform electrical check, test step 25 ➔ page 134
	Longitudinal acceleration sender -G251- defective	- Read measured value block 006 ➔ page 117 - Renew sender ➔ Brake system; Rep. Gr. 45 , then perform zero compensation in basic setting ➔ page 98
01279 Longitudinal acceleration sender -G251- ¹⁴⁾ Implausible signal		
	Installation position of longitudinal acceleration sender -G251- not OK	Check installation position ➔ Brake system; Rep. Gr. 45
	Longitudinal acceleration sender -G251- defective	- Read measured value block 006 ➔ page 117 - Renew sender ➔ Brake system; Rep. Gr. 45 , then perform zero compensation in basic setting ➔ page 98

14) Only applies to vehicles with four-wheel drive.

Fault 01312

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01312 Drive train data bus defective ¹⁵⁾		
	ABS with EDL control unit -J104- incorrectly coded	Check coding ➔ page 104

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
	♦ Engine control unit incorrectly coded	– Check coding of engine control unit ⇒ Rep. Gr. 01
	♦ Faults in CAN bus wiring	– Check CAN bus wiring between engine control unit and ABS with EDL control unit -J104- ⇒ page 9

15) Is displayed together with fault "00778 - Steering angle sender: -G85; No communication".

Fault 01314

Display on -VAS 5051 A-	Possible cause of fault	Fault remedy
01314 Engine control unit		
	♦ Fault in engine control unit	– Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01 , rectify fault if necessary and erase fault memory
01314 Engine control unit No communication		
• Signals are transmitted between ABS with EDL control unit -J104- and engine control unit via CAN data bus	When displayed as static fault: ♦ ABS with EDL control unit -J104- or engine control unit not CAN compatible	– Refer to control unit identification of ABS with EDL control unit -J104- ⇒ page 8 and engine control unit to check that correct control units are installed. For correct version refer to ⇒ Parts catalogue
	♦ Fault in engine control unit	– Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01 , rectify fault if necessary and erase fault memory
	When displayed as static and sporadic fault: ♦ Faults in CAN bus wiring	– Check CAN bus wiring between engine control unit and ABS with EDL control unit -J104- ⇒ page 9
	♦ High and Low CAN bus wiring interchanged	– Check CAN Bus wiring for interchanged connections according to current flow diagram
	♦ The output of one of the control units communicating via the CAN bus is defective.	– Check CAN bus wiring ⇒ page 9

Fault 01315

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01315 Gearbox control unit No communication ¹⁶⁾		

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
Signals are transmitted between ABS with EDL control unit -J104- and gearbox control unit via CAN data bus	When displayed as static fault:	Refer to control unit identification of ABS with EDL control unit -J104- ⇒ page 8 and gearbox control unit to check that correct control units are installed. For correct version refer to ⇒ Parts catalogue
	ABS with EDL control unit -J104- or gearbox control unit not CAN compatible	
	Fault in gearbox control unit	Interrogate fault memory of gearbox control unit ⇒ Rep. Gr. 01 , rectify fault if necessary and erase fault memory
	When displayed as static and sporadic fault:	- Check CAN bus wiring between gearbox control unit and ABS with EDL control unit -J104- ⇒ page 9 - Check CAN Bus wiring for interchanged connections according to current flow diagram - Check CAN bus wiring ⇒ page 9
	Faults in CAN bus wiring	
	- High and Low CAN bus wiring interchanged - The output of one of the control units communicating via the CAN bus is defective.	

16) Only applies to vehicles with automatic gearbox and TCS

Fault 01324

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01324 Four-wheel drive control unit -J492- No communication ¹⁷⁾		
	Faults in CAN bus wiring	- Read measured value block 125 ⇒ page 117 - Check CAN bus wiring ⇒ page 9

17) Only applies to vehicles with four-wheel drive.

Fault 01423

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01423 Lateral acceleration sender -G200- Electrical fault in circuit		
	Open circuit, loose contact or short circuit to positive or earth in wiring connection going to lateral acceleration sender - G200-	Perform electrical check, test step 20 ⇒ page 132
	Lateral acceleration sender -G200- defective	- Read measured value block 004 ⇒ page 116 - Renew sender ⇒ Brake system; Rep. Gr. 45 , then perform zero compensation in basic setting ⇒ page 94
01423 Lateral acceleration sender -G200- Implausible signal		
	Installation position of lateral acceleration sender -G200- not OK	Check installation position ⇒ Brake system; Rep. Gr. 45

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
	◆ Lateral acceleration sender -G200- defective	– Read measured value block 004 ⇒ page 116 – Renew sender ⇒ Brake system; Rep. Gr. 45 , then perform zero compensation in basic setting ⇒ page 94

Fault 01434

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01434 Brake light suppression relay, ESP -J508- Electrical fault in circuit		
	◆ Open circuit, loose contact or short circuit to positive or earth in wiring to brake light suppression relay, ESP -J508-	– Perform electrical check, test step 26 ⇒ page 134
	◆ Brake light suppression relay, ESP -J508- defective	– Renew relay ⇒ Current flow diagrams, Electrical fault finding and Fitting locations

Fault 01435

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01435 Brake pressure sender 1 -G201- Electrical fault in circuit		
	◆ Open circuit, loose contact or short circuit to positive or earth in wiring to brake pressure sender 1 -G201-	– Perform electrical check, test step 22 ⇒ page 133
	◆ Brake pressure sender 1 -G201- defective	– Read measured value block, display group 005 ⇒ page 116 – Renew sender ⇒ Brake system; Rep. Gr. 45 , then perform zero compensation in basic setting ⇒ page 96

Fault 01542

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Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01542 Yaw rate sender -G202- Electrical fault in circuit		
	◆ Open circuit, loose contact or short circuit to positive or earth in wiring to yaw rate sender -G202-	– Perform electrical check, test step 20 ⇒ page 132
	◆ Yaw rate sender -G202- defective	– Read measured value block 004 ⇒ page 116 – Renew sender ⇒ Brake system; Rep. Gr. 45 .

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
01542 Yaw rate sender -G202- Implausible signal		
	◆ Open circuit in earth connection to yaw rate sender -G202-	– Perform electrical check, test step 20 ⇒ page 132
	◆ Installation position of yaw rate sender -G202- not OK	– Check installation position ⇒ Brake system; Rep. Gr. 45
	◆ Yaw rate sender -G202- defective	– Read measured value block 004 ⇒ page 116 – Renew sender ⇒ Brake system; Rep. Gr. 45 .

Fault 18256

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
18256 Please interrogate the engine control unit		
	◆ Fault stored in engine control unit	– Interrogate fault memory of engine control unit ⇒ Rep. Gr. 01 , rectify fault if necessary and erase fault memory

Fault 65535

Display on - VAS 5051 A-	Possible cause of fault	Fault remedy
65535 Control unit defective		
	◆ Control unit defective	– Remove hydraulic control unit, renew control unit ⇒ Brake system; Rep. Gr. 45 , then code control unit ⇒ page 104 Do not erase fault memory of old control unit. The data in the fault memory will help to identify the malfunction

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4.6 Final control diagnosis

The final control diagnosis can be used to check the ABS hydraulic pump -V64- and the correct functioning of the hydraulic circuits (allocation of brake pipes to wheel brakes and function of valves). This function will also detect interchanged connections and leaks.

**Note**

- ◆ *The vehicle must be raised until all wheels are free to turn. A 2nd mechanic is required in order to turn the wheels.*
- ◆ *To avoid overloading the control elements they are only activated for a period of 60 or 90 seconds. The final control test will be terminated if the  key is not pressed within this period.*
- ◆ *The ABS warning lamp -K47- and the red "brake warning" symbol flash during the final control diagnosis.*
- ◆ *After depressing the brake pedal several times the vacuum in the brake servo will be exhausted. Therefore more pressure must be applied to the brake pedal in order to attain the same fluid pressure in the brake system as that attained with vacuum.*
- ◆ *When vacuum in brake servo is exhausted it can happen that the wheels do not lock: start engine and build up vacuum in brake servo.*

Explanation of abbreviations indicated on display

IFL = Inlet valve (front left)

IFR = Inlet valve (front right)

IRL = Inlet valve (rear left)

IRR = Inlet valve (rear right)

OFL = Outlet valve (front left)

OFR = Outlet valve (front right)

ORL = Outlet valve (rear left)

ORR = Outlet valve (rear right)

VBAT = Battery voltage; voltage is applied to valve

0V = 0 Volt; No voltage at valve

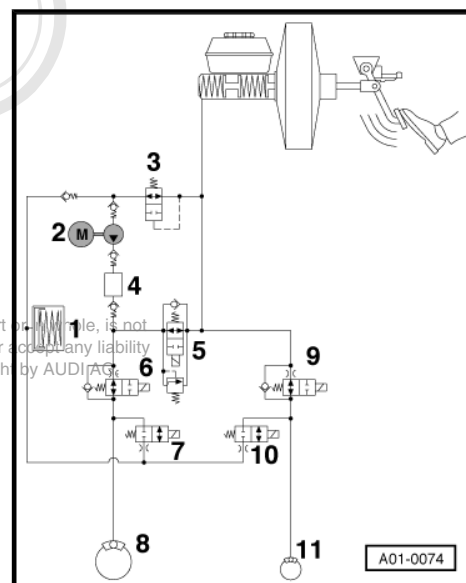
Hydr-P = ABS hydraulic pump -V64-

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Components of the ABS/EDL system

The hydraulic circuit is a schematic diagram of the ABS/EDL system. The diagram shows only one brake circuit.

- 1 - Low pressure accumulator
- 2 - ABS hydraulic pump -V64-
- 3 - EDL inlet valve (hydraulic)
- 4 - Noise damping chamber
- 5 - EDL change-over/separating valve (electrical) with integrated pressure limiting valve
- 6 - Front inlet valve
- 7 - Front outlet valve
- 8 - Front wheel
- 9 - Rear inlet valve
- 10 - Rear outlet valve
- 11 - Rear wheel



Test condition

- The wheels are locked individually during final control diagnosis. For this test the mechanical and hydraulic components of the brake system must be working properly. This means that the master cylinder is able to build up pressure in all four wheel brake cylinders and there are no leaks in the hydraulic pipes, hoses and connections.



Note

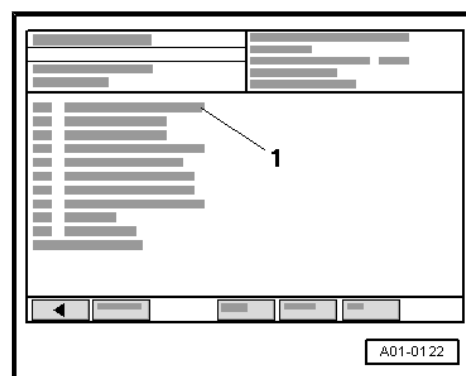
If one of the wheels does not lock, perform a visual inspection of the brake fluid reservoir, the master cylinder, the hydraulic unit and the wheel cylinders.

Procedure

- Connect vehicle diagnostic, testing and information system - VAS 5051 A- ➔ [page 7](#) and select vehicle system "03 - Brake electronics". When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

- Release handbrake.
- Raise vehicle on lifting platform.
- From list -1- select function "03 - Final control diagnosis".



Indicated on -VAS 5051 A- :

A - Final control test waiting, move on to next control element

1 - ABS hydraulic pump V64

– Touch key.

Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

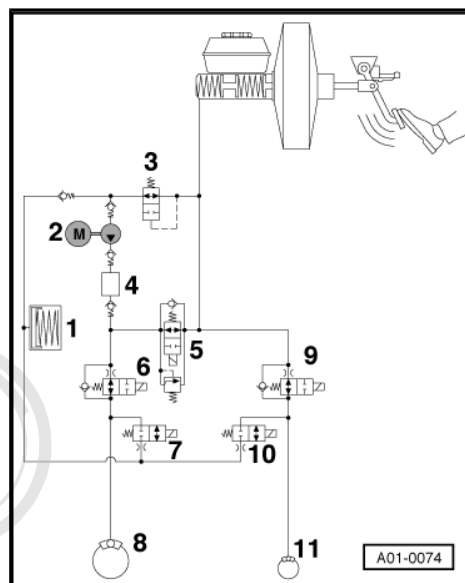
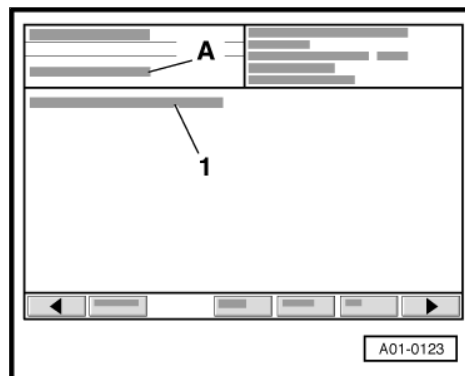
1 - ABS hydraulic pump V64

- The ABS hydraulic pump -V64- - item 2- should start up audibly.



Note

- ◆ *When you put your foot on the brake pedal you can feel it vibrating. This is because the hydraulic pump -V64- is producing pressure pulses in the brake pipes. The pressure pulses induce the vibrations that can be felt at the brake pedal.*
- ◆ *The pressure pulses in the brake pipes are not sufficient to lock the wheels.*
- Touch key.



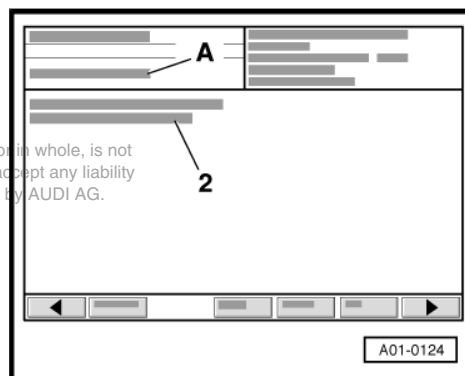
Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

2 - Operate brakes

– Depress brake pedal and and touch within 10 seconds.

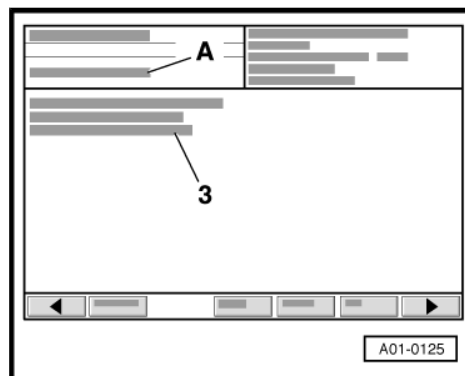
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Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

3 - IFL: 0V OFL: 0V Wheel FL locked



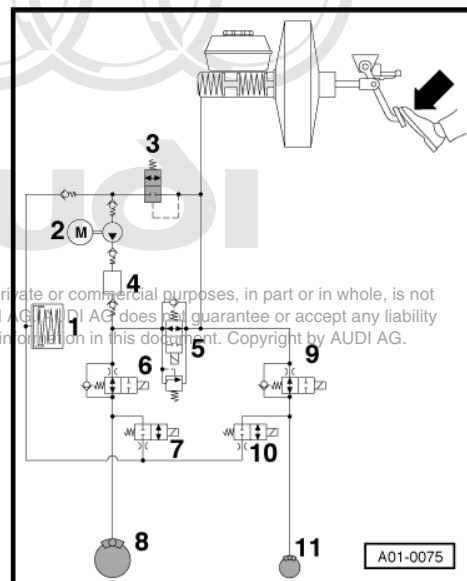
- Brake pedal should not give under foot pressure.
- When you press the brake pedal, brake fluid pressure will be built up in all four wheel brake cylinders.
- The hydraulic EDL valve -3- closes, the front wheels -8- and rear wheels -11- are locked.



Note

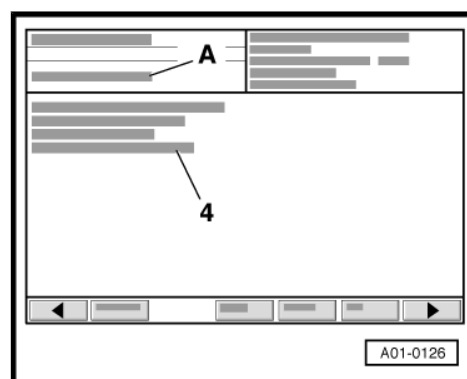
This test step in the final control diagnosis corresponds to the "pressure build-up" phase during ABS-controlled braking.

- Touch  key.



Indicated on -VAS 5051 A- :

- A - Final control diagnosis running, moving on permitted
- 4 - IFL: VBAT OFL: 0V Wheel FL locked



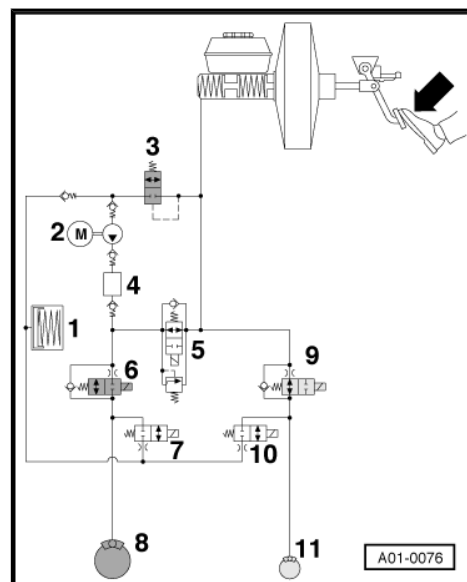
- Keep pressing the brake pedal.
- The hydraulic EDL valve -3- remains closed.
- The front inlet valve -6- is activated, which interrupts the supply to the wheel brake cylinder; however, the fluid pressure is still maintained in the wheel cylinder.
- The front left wheel -8- remains locked.



Note

This test step in the final control diagnosis corresponds to the "maintain pressure" phase during ABS-controlled braking.

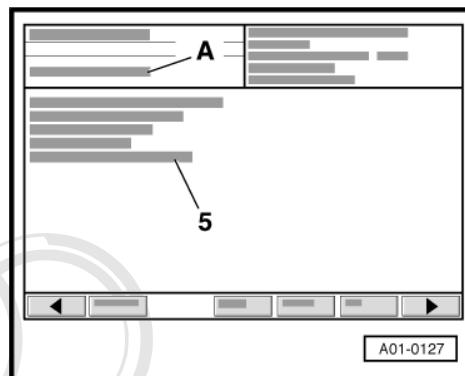
- Touch  key.



Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

5 - IFL: VBAT OFL: VBAT Wheel FL free to turn

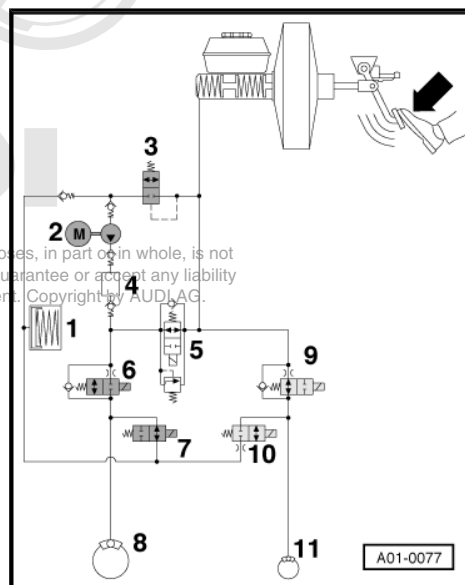


- Keep pressing the brake pedal.
- The inlet valve -6- and the outlet valve -7- for the front left wheel -8- are activated.
- The ABS hydraulic pump -V64- -item 2- starts running and reduces the brake fluid pressure in the wheel brake cylinder via the open outlet valve.
- The brake pedal must not give, and should press back harder against your foot.
- The front left wheel -8- is free to turn.



Note

- ◆ This test step in the final control diagnosis corresponds to the "pressure reduction" phase during ABS-controlled braking.
- ◆ If you cannot turn the front left wheel, check whether the brake line for the front left wheel is correctly connected.
- ◆ If this is the case, this indicates that there is a mechanical fault in one of the valves, providing that there is no electrical fault in the system. Renew the hydraulic control unit ⇒ Brake system; Rep. Gr. 45.
- ◆ If the brake pedal gives under your foot, this means that the inlet valve or the non-return valve connected in parallel with the inlet valve is leaking. Renew the hydraulic control unit ⇒ Brake system; Rep. Gr. 45.

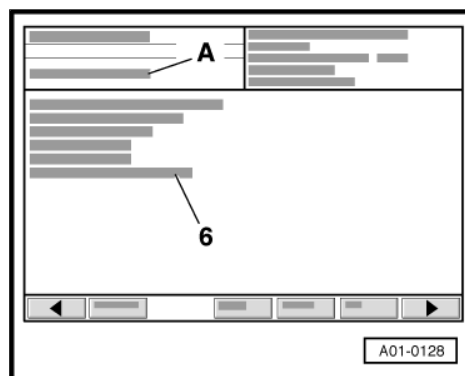


- Touch key within the next 10 seconds.

Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

6 - IFL: VBAT OFL: 0V Wheel FL free



- Keep pressing the brake pedal.
- The hydraulic EDL valve -3- remains closed.
- The ABS hydraulic pump -V64- - item 2- should stop running.
- Only the inlet valve -6- is now activated, and this interrupts the supply to the wheel brake cylinder.
- The front left wheel -8- is free to turn.

 Note

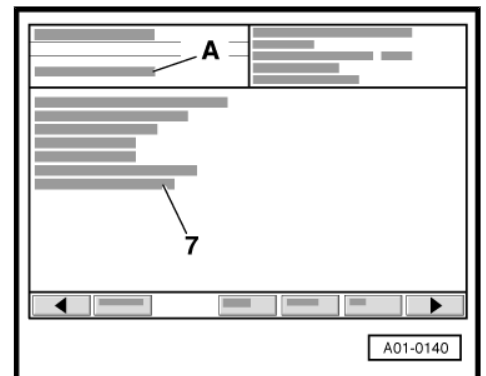
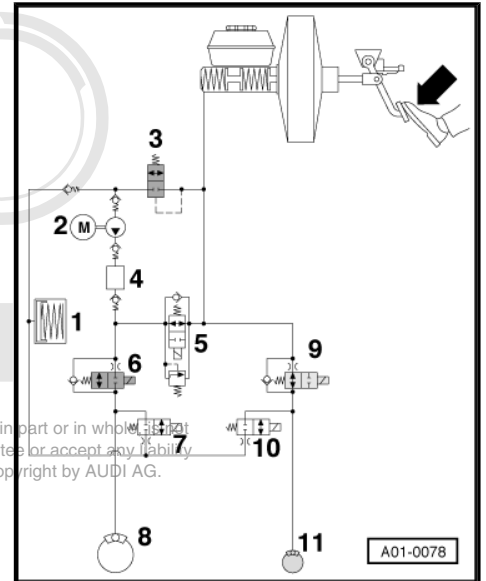
If the wheel is not free to turn, this means that the inlet valve or the non-return valve connected in parallel with the inlet valve is leaking. Renew the hydraulic control unit → Brake system; Rep Gr. 45.

- Touch  key.

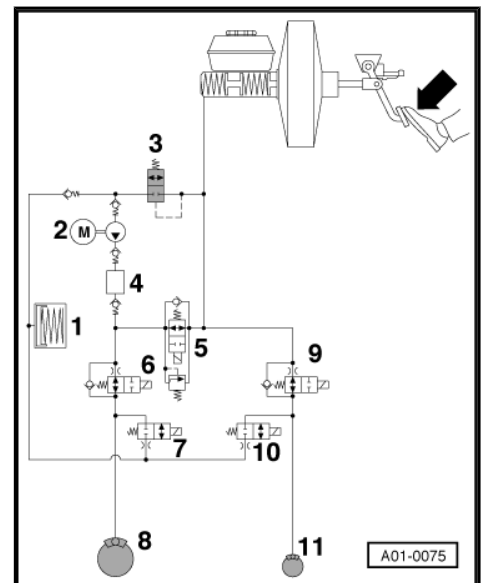
Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

7 - IFL: 0V OFL: 0V Wheel FL locked



- Keep pressing the brake pedal.
- The inlet valve -6- is no longer activated and does not interrupt the supply to the wheel brake cylinder.
- Brake pedal will give perceptibly under your foot.
- Brake fluid pressure is built up again in the front left wheel cylinder -8- - the wheel is locked.
- Touch  key.



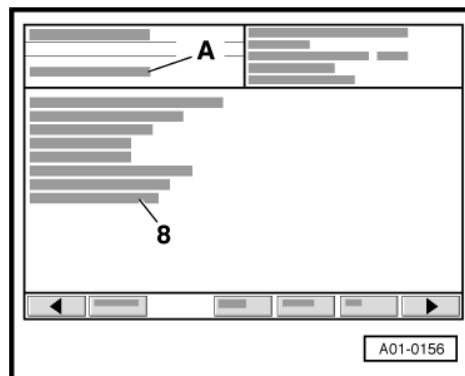
Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

8 - Release brakes

– Release brake pedal.

– Touch  key.



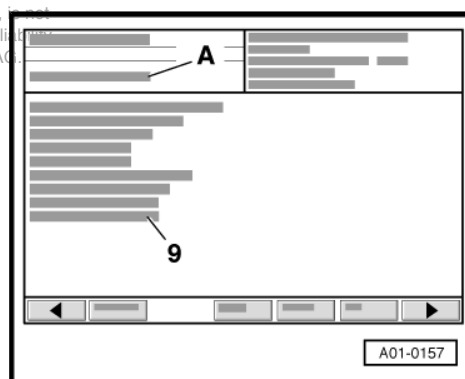
Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

9 - Operate brakes

Note

- ◆ *Continue the final control diagnosis to check the front right, rear left and rear right wheels in turn.*
- ◆ *The test steps are the same as for the front left wheel, so they are not described in detail.*



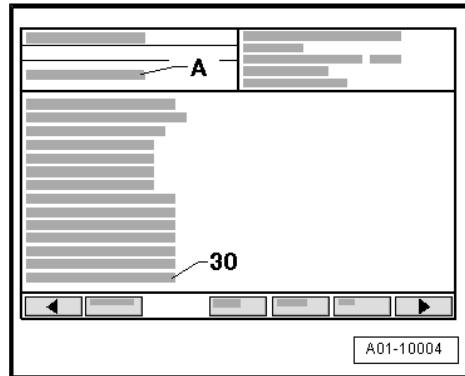
After testing on rear right wheel is completed:

– Touch  key.

Indicated on -VAS 5051 A- :

A - Final control diagnosis running, moving on permitted

30 - EDL valves/Hyd-P: VBAT FL/FR wheel locked



- The EDL change-over valve -5- and the EDL inlet valve -3- are activated.
- The ABS hydraulic pump -V64- - item 2- should start running for one second. The pump draws brake fluid out of fluid reservoir via EDL inlet valve.
- The hydraulic pump builds up brake fluid pressure in the EDL controlled wheel brake cylinders. The front left and front right wheels -8- are locked.



Note

If the front wheels are not locked, this indicates that there is a mechanical fault in one of the valves, providing that there is no electrical fault in the system. Renew the hydraulic control unit → Brake system; Rep. Gr. 45.

- Touch  key.

Indicated on -VAS 5051 A- :

A - Final control diagnosis competed

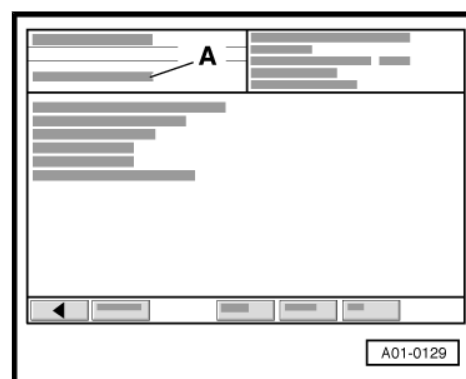
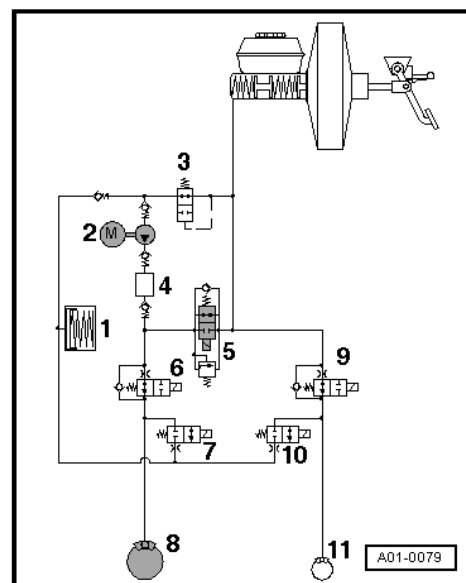
- Terminate function “03 - Final control diagnosis” by pressing the  key.
- Final control diagnosis is completed. The ABS warning lamp -K47- and the red “brake warning” symbol should go out.

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Note

- ◆ *There is a fault in the system if the ABS warning lamp -K47- does not go out.*
- ◆ *Adhere exactly to the test sequence: First interrogate fault memory, then erase.*



4.7 Basic setting

The function “04 - Basic setting” can be used to perform the following procedures:

- ◆ Bleeding brake system via “display group 001” if brake fluid reservoir has run dry ⇒ [page 86](#) . This basic setting is only necessary if one or more of the chambers in the brake fluid reservoir has been completely emptied (e.g. leaks in brake system).
- ◆ Checking function of brake detection switch, ESP -F83- via “display group 031” ⇒ [page 89](#) .
- ◆ Only four-wheel drive vehicles: switching off longitudinal acceleration sender -G251- via display group 040 ⇒ [page 91](#) (e.g. to check the brake system on test rollers).
- ◆ Performing zero compensation of steering angle sender -G85- via “display group 060” ⇒ [page 92](#) , e.g. after removing steering wheel, after performing adjustment on the running gear during wheel alignment and after renewing the following components: ABS with EDL control unit -J104- , steering angle sender -G85- , steering column, or if zero compensation is required according to fault tables.
- ◆ Performing zero compensation of lateral acceleration sender -G200- via “display group 063” ⇒ [page 94](#) , e.g. after renewing the following components: ABS with EDL control unit -

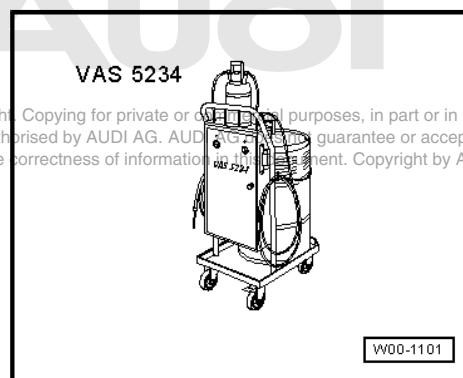
- J104- and lateral acceleration sender -G200- , or if zero compensation is required according to fault tables.
- ◆ Performing zero compensation of brake pressure sender 1 - G201- and brake pressure sender 2 -G214- via “display group 066” ➔ [page 96](#) , e.g. after renewing the following components: ABS with EDL control unit -J104- , brake pressure sender 1 -G201- , brake pressure sender 2 -G214- , or if zero compensation is required in fault tables.
- ◆ Only applicable to four-wheel drive vehicles: Performing zero compensation of longitudinal acceleration sender -G251- via “display group 069” ➔ [page 98](#) (e.g. after renewing the following components: ABS with EDL control unit -J104- or longitudinal acceleration sender -G251-).

4.7.1 Bleeding brake system when brake fluid reservoir has been completely emptied

This basic setting is only necessary if one or more of the chambers in the brake fluid reservoir has been completely emptied (e.g. leaks in brake system).

Special tools and workshop equipment required

- ◆ Brake charge and bleed equipment -VAS 5234- or upgrade kit and extraction unit -V.A.G 1869 A-



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Caution

- ◆ *When using brake charge and bleed equipment -VAS 5234- to replenish the brake fluid, make sure that filling pressure does not exceed 1 bar.*
- ◆ *If the filling pressure exceeds 1 bar, a hydraulically controlled change-over valve for the EDL function prevents unrestricted flushing of the EDL-related parts of the hydraulic unit. Proper bleeding is then no longer ensured.*
- ◆ *For this reason the brake fluid pressure must be reduced to 1 bar on the brake charge and bleed equipment ➔ Operating Manual -VAS 5234- or -V.A.G 1869 A-*
- ◆ *The charge and bleeder unit -V.A.G 1238/B- is not suitable for bleeding the brake system by using the function “04 - Basic setting”.*

 Note

- ◆ *If only charge and bleeder unit -V.A.G 1238/B- is available, switch the unit on and off as necessary to ensure that sufficient brake fluid is always present in the reservoir.*
- ◆ *A 2nd mechanic is required in order to open and close the bleeder screws.*

Procedure

- Connect vehicle diagnostic, testing and information system - VAS 5051 A- ➔ [page 7](#) and select vehicle system "03 - Brake electronics". When doing this the ignition must be switched on.
- Connect the brake charge and bleed equipment -VAS 5234- or -V.A.G 1869 A- .
- Open bleeder screws in prescribed sequence and pre-bleed brake calipers.
 1. Simultaneously bleed front left and front right brake calipers.
 2. Simultaneously bleed rear left and rear right brake calipers.
- With bleeder bottle hoses attached, leave bleeder screws open until brake fluid comes out without bubbles.

Bleeding

Indicated on -VAS 5051 A- :

- From list -1-, select function "04 - Basic setting".

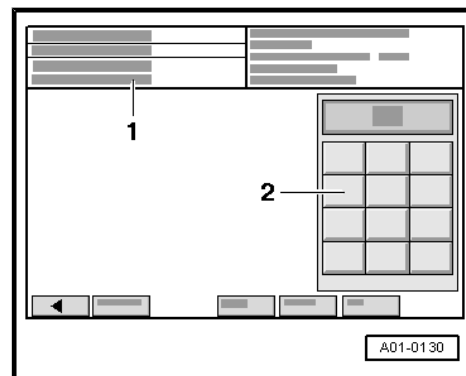
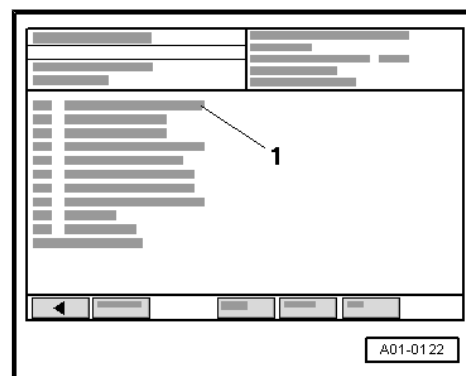


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Indicated on -VAS 5051 A- :

1 - Enter display group

- Use keypad -2- to enter "001" for "display group number 001" and confirm by pressing the  key.



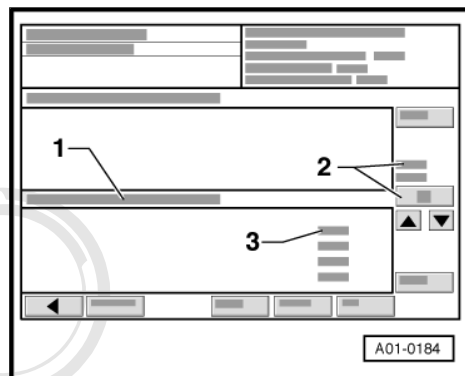
- The ABS warning lamp -K47- flashes.

Indicated on -VAS 5051 A- :

- 1 - Basic setting
 - 2 - Display group 1
 - 3 - Press and hold pedal ...
 - Press pedal with substantial foot pressure and hold.
- Pedal moves down, hydraulic pump starts up briefly, pedal comes back

Indicated on -VAS 5051 A- :

- 1 - Release pedal; FR/FL bleeder screws OPEN <>
- Release pedal, open front bleeder screws.
- Switch to “display group 002” by pressing button.

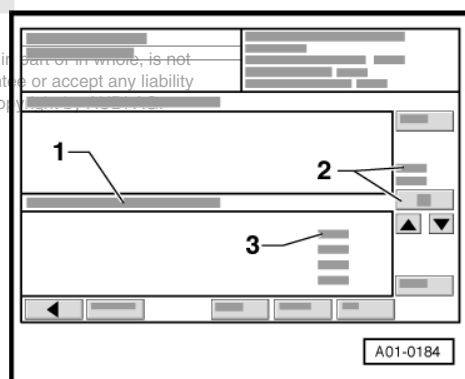


Indicated on -VAS 5051 A- :

- 1 - Basic setting
 - 2 - Display group 2
 - 3 - Please wait ... (10 secs.)
 - Wait 10 seconds.
- Hydraulic pump starts up briefly

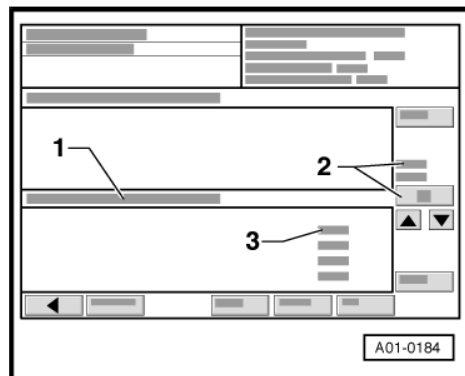
Indicated on -VAS 5051 A- :

- 1 - Press pedal 10X; bleeder screws CLOSED <>
- Press pedal 10 times, close front bleeder screws.
- Switch to “display group 003” by pressing button.



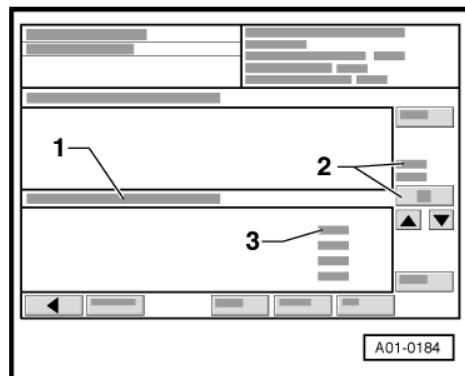
Indicated on -VAS 5051 A- :

- 1 - Basic setting
 - 2 - Display group 3
 - 3 - Press and hold pedal ...
 - Repeat bleeding procedure as described above.
- Press the key each time to advance to the next display group until “display group 017” is reached.



Indicated on -VAS 5051 A- :

- 1 - Basic setting
 - 2 - Display group 17
 - 3 - Part bleeding ended ...
 - Terminate function “04 - Basic setting” by pressing the key.
- The brake system must now be bled ⇒ Brake system; Rep. Gr. 47 .



4.7.2 Checking function of brake detection switch, ESP -F83-

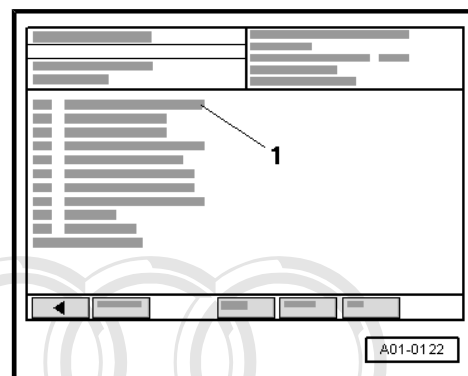
The function test is required if the brake servo is renewed, or if the test is required in the fault tables.

Procedure

- Connect vehicle diagnostic, testing and information system - VAS 5051 A- → [page 7](#) and select vehicle system "03 - Brake electronics". When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

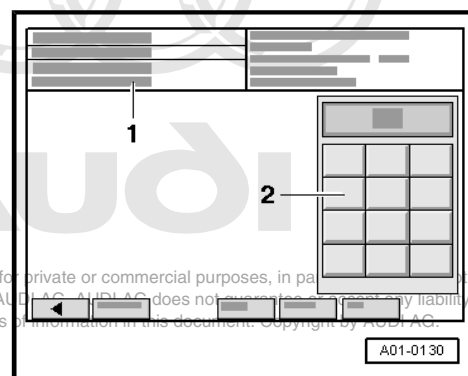
- From list -1-, select function "04 - Basic setting".



Indicated on -VAS 5051 A- :

1 - Enter display group

- Use keypad -2- to enter "031" for "display group number 031" and confirm by pressing the key.



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- The ABS warning lamp -K47- flashes.

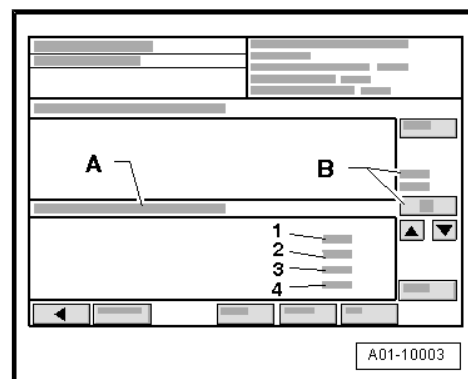
Indicated on -VAS 5051 A- :

A - Basic setting

B - Display group 31

1 - Solenoid active

- Switch to "display group 032" by pressing button.



Indicated on -VAS 5051 A- :

A - Basic setting

B - Display group 32

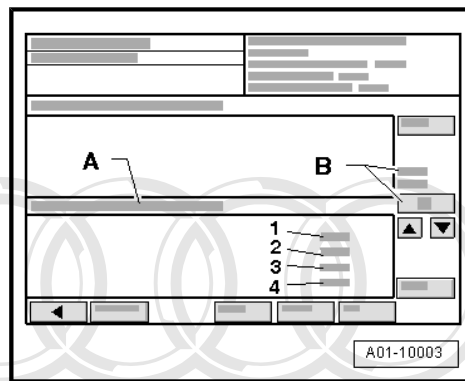
1 - 9.13 bar

2 - 7.43 bar

3 - Not operated

– Do not press brake pedal.

– Switch to “display group 033” by pressing  button.



Indicated on -VAS 5051 A- :

A - Basic setting

B - Display group 33

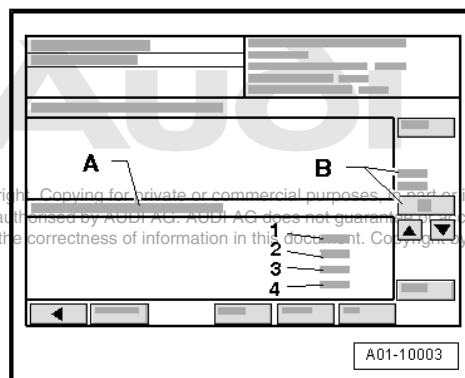
1 - Press and hold pedal ...

– Press pedal with substantial foot pressure and hold.

• The brake lights must be on.

– Switch to “display group 034” by pressing  button.

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Indicated on -VAS 5051 A- :

A - Basic setting

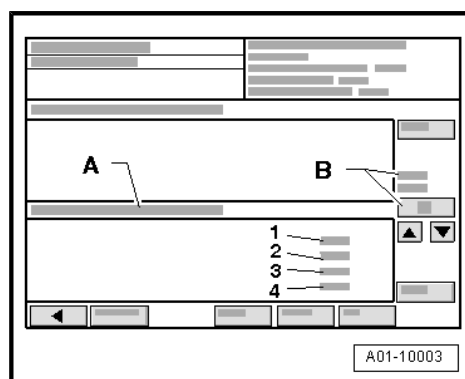
B - Display group 34

1 - 86.27 bar

2 - 7.43 bar

3 - Operated

– Switch to “display group 035” by pressing  button.



Indicated on -VAS 5051 A- :

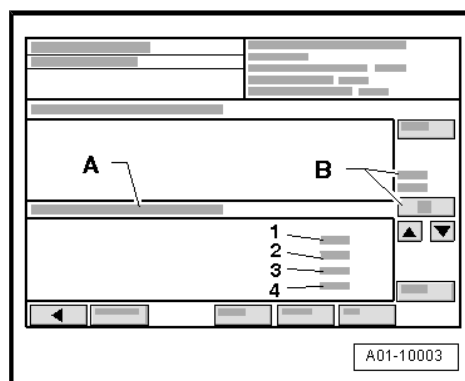
A - Basic setting

B - Display group 35

1 - Release pedal

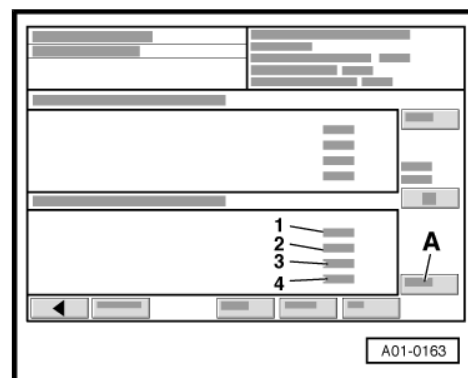
– Release brake pedal.

– Switch to “display group 036” by pressing  button.



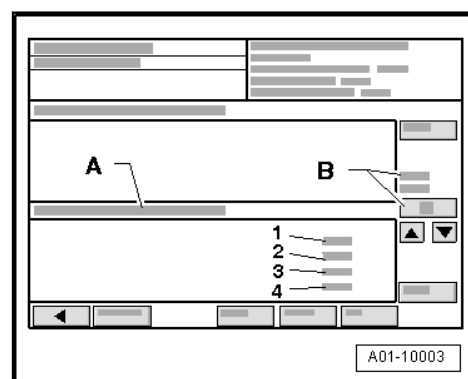
Indicated on -VAS 5051 A- :

- A - Basic setting
- B - Display group 36
- 1 - -0.85 bar
- 2 - -1.91 bar
- 3 - Not operated
- Switch to "display group 037" by pressing  button.



Indicated on -VAS 5051 A- :

- A - Basic setting
- B - Display group 37
- 1 - Solenoid test completed
- Terminate function "04 - Basic setting" by pressing the  key.



4.7.3 Switching off longitudinal acceleration sender -G251- (only vehicles with four-wheel drive)

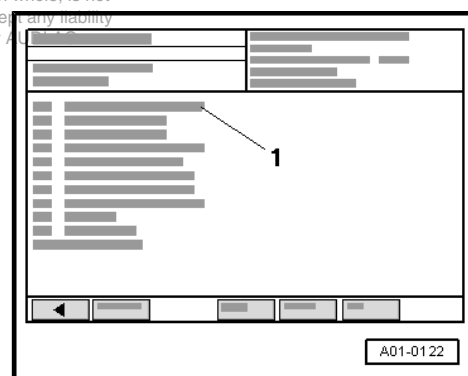
- ◆ The longitudinal acceleration sender -G251- can be switched off via "display group 040" when checking the brake system of a four-wheel drive vehicle on test rollers.
- ◆ After completion of the check, the longitudinal acceleration sender -G251- must be reactivated by switching the ignition off and back on again.

Procedure

- Connect vehicle diagnostic, testing and information system - VAS 5051 A- => [page 7](#) and select vehicle system "03 - Brake electronics". When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

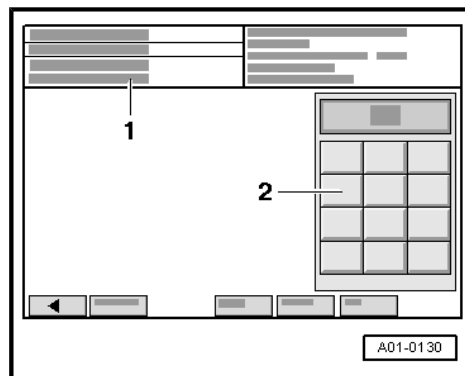
- From list -1-, select function "04 - Basic setting".



Indicated on -VAS 5051 A- :

1 - Enter display group

- Use keypad -2- to enter "040" for "display group number 040" and confirm by pressing the  key.



Indicated on -VAS 5051 A- :

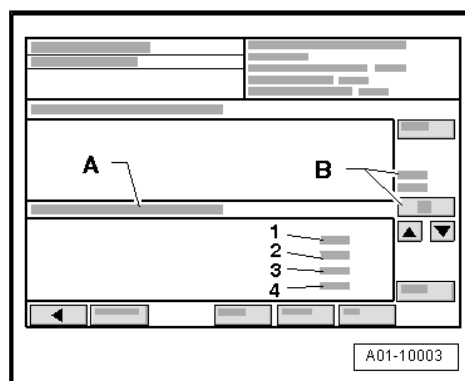
A - Basic setting

B - Display group 40

- The ABS warning lamp -K47- flashes.

The longitudinal acceleration sender -G251- is now deactivated.

- Terminate function "04 - Basic setting" by pressing the  key.
- Select function "06 - End output" from list.
- After completion of the check, the longitudinal acceleration sender -G251- must be reactivated by switching the ignition off and back on again.



4.7.4 Performing zero compensation of steering angle sender -G85-

Perform zero compensation of steering angle sender after removing steering wheel, after performing adjustment on the running gear during wheel alignment and after renewing the ABS with EDL control unit -J104- , the steering angle sender -G85- or the steering column, or if zero compensation is required in fault tables.

Procedure

- Requirement: ABS with EDL control unit -J104- properly coded ⇒ [page 104](#) .
- Start the engine.
- Turn the steering wheel approx. 60° to left or right and back again until the front wheels are in straight-ahead position and the steering wheel is positioned horizontally (tolerance $\pm 4.5^\circ$).
- Perform short road test on a level surface. Drive in a straight line and not faster than 20 km/h and observe the following points.

If the steering wheel is not horizontal:

- Make the necessary adjustments by checking wheel alignment and fit steering wheel in correct position ⇒ Running gear, front-wheel drive and four-wheel drive; Rep. Gr. 44 , then perform zero compensation.

If the steering wheel is horizontal during the road test:

- Bring the vehicle to a standstill - still keeping it in a straight line.
- Do not change position of steering wheel!
- Do not switch off ignition!

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- Connect vehicle diagnostic, testing and information system - VAS 5051 A- => [page 7](#) and select vehicle system “03 - Brake electronics”. When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

- From list -1- select diagnostic function “11 - Login procedure” or “11 - Coding II”.



Indicated on -VAS 5051 A- :

1 - Enter code word

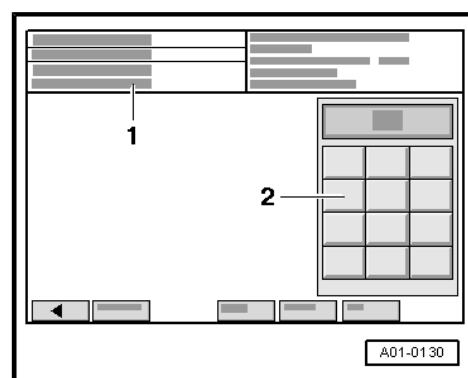
- Use keypad -2- to enter code “40168” and confirm entry by touching  key.



Note

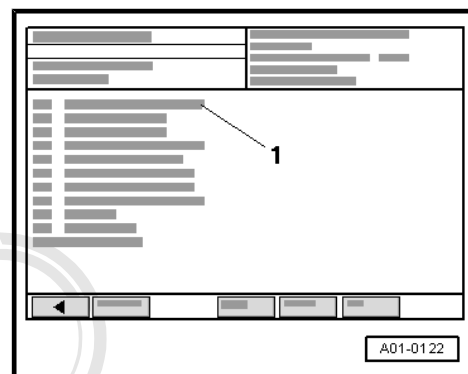
If display on -VAS 5051 A- reads “function unknown or function can not be performed at present” the login procedure or coding II were not successful. Repeat login procedure or coding II.

- Terminate function “11 - Login procedure” or “11 - Coding II” by touching  key.



Indicated on -VAS 5051 A- :

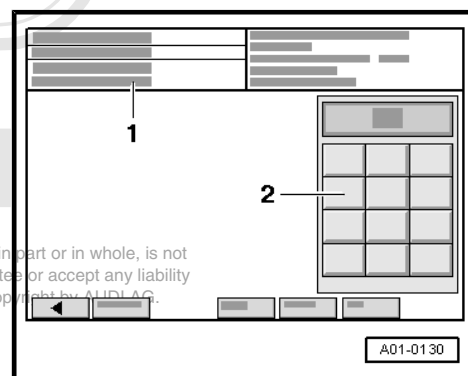
- From list -1-, select function “04 - Basic setting”.



Indicated on -VAS 5051 A- :

1 - Enter display group

- Use keypad -2- to enter “060” for “display group number 060” and confirm by pressing the  key.



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- The ABS warning lamp -K47- flashes.

Indicated on -VAS 5051 A- :

A - Basic setting

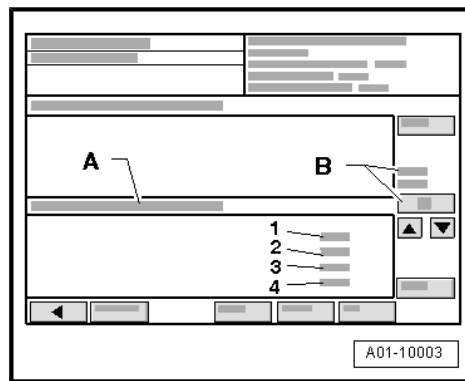
B - Display group 60

1 - Zero compensation OK

4 - 0.0°

Zero compensation of steering angle sender -G85- is now completed.

- Terminate function "04 - Basic setting" by pressing the key.



Note

After you press function "06 - End output", the ABS warning lamp -K47- and the traction control system warning lamp -K86- light up for approx. two seconds.

Possible fault messages:

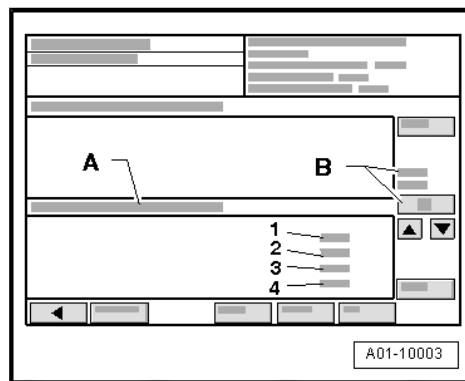
Indicated on -VAS 5051 A- :

1 - Zero compensation is not possible

4 - 12.3°

The determined value is outside the tolerance range for zero compensation.

- Proceed as follows to rectify the fault:
 1. Check zero position of steering angle sender -G85- in measured value block 004 ⇒ [page 116](#) .
 2. Interrogate fault memory ⇒ [page 64](#) .
 3. Erase fault memory ⇒ [page 103](#) .
 4. Conclude the transfer of data with the function "06 - End output".
 5. Switch off ignition.
 6. Switch ignition on again.
 7. Perform zero compensation again.



4.7.5 Performing zero compensation of lateral acceleration sender -G200-

Zero compensation must be performed if the ABS with EDL control unit -J104- or the lateral acceleration sender -G200- were renewed, or if required by the fault table.

Procedure

- Vehicle is standing horizontal on a flat base.
- Connect vehicle diagnostic, testing and information system - VAS 5051 A- ⇒ [page 7](#) and select vehicle system "03 - Brake electronics". When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

- From list -1- select diagnostic function “11 - Login procedure” or “11 - Coding II”.



Indicated on -VAS 5051 A- :

1 - Enter code word

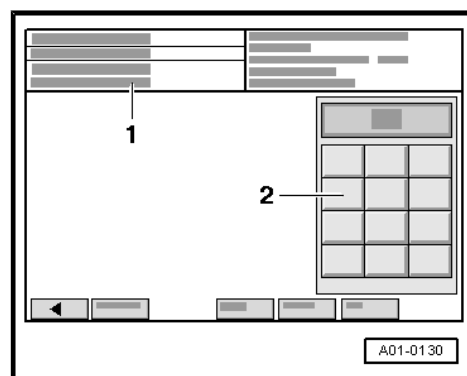
- Use keypad -2- to enter code “40168” and confirm entry by touching  key.



Note

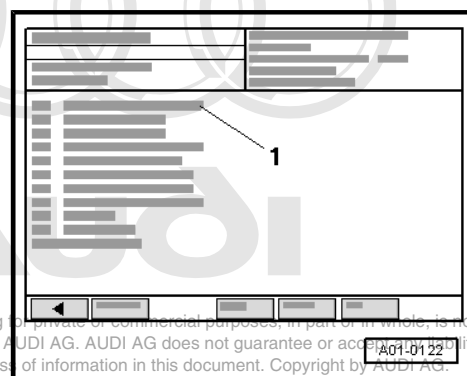
If display on -VAS 5051 A- reads “function unknown or function can not be performed at present” the login procedure or coding II were not successful. Repeat login procedure or coding II.

- Terminate function “11 - Login procedure” or “11 - Coding II” by touching  key.



Indicated on -VAS 5051 A- :

- From list -1-, select function “04 - Basic setting”.

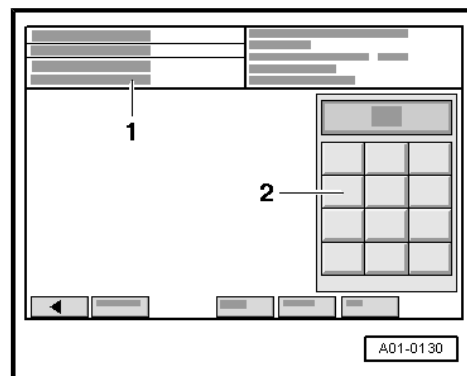


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Indicated on -VAS 5051 A- :

1 - Enter display group

- Use keypad -2- to enter “063” for “display group number 063” and confirm by pressing the  key.



- The ABS warning lamp -K47- flashes.

Indicated on -VAS 5051 A- :

A - Basic setting

B - Display group 63

1 - Zero compensation OK

4 - 0.6 m/s²

Zero compensation of lateral acceleration sender -G200- is now completed.



Note

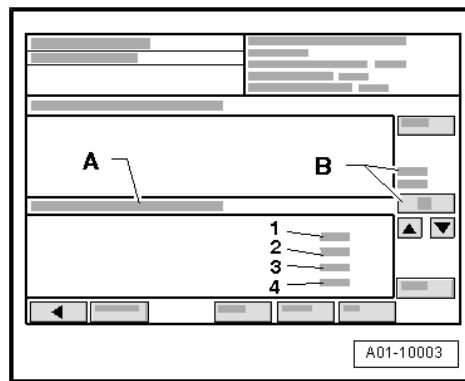
The display does not return to 0.00 m/s² after performing zero compensation successfully.

- Terminate function "04 - Basic setting" by pressing the key.



Note

After you press function "06 - End output", the ABS warning lamp -K47- and the traction control system warning lamp -K86- light up for approx. two seconds.



Possible fault messages:

Indicated on -VAS 5051 A- :

1 - Zero compensation is not possible

4 - 5.0 m/s²

The determined value is outside the tolerance range for zero compensation.

- Proceed as follows to rectify the fault:
 1. Check zero position of lateral acceleration sender -G200- in measured value block 004 ⇒ [page 116](#) .
 2. Interrogate fault memory ⇒ [page 64](#) .
 3. Erase fault memory ⇒ [page 103](#) .
 4. Conclude the transfer of data with the function "06 - End output".
 5. Switch off ignition.
 6. Switch ignition on again.
 7. Perform zero compensation again.



4.7.6 Performing zero compensation of brake pressure sender 1 -G201- and brake pressure sender 2 -G214-

Zero compensation must be performed if the ABS with EDL control unit -J104- , brake pressure sender 1 -G201- or brake pressure sender 2 -G214- were renewed, or if required by the fault tables.

Procedure

- Brake pedal not depressed.

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- Connect vehicle diagnostic, testing and information system - VAS 5051 A- => [page 7](#) and select vehicle system “03 - Brake electronics”. When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

- From list -1- select diagnostic function “11 - Login procedure” or “11 - Coding II”.

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Indicated on -VAS 5051 A- :

1 - Enter code word

- Use keypad -2- to enter code “40168” and confirm entry by touching  key.



Note

If display on -VAS 5051 A- reads “function unknown or function can not be performed at present” the login procedure or coding II were not successful. Repeat login procedure or coding II.

- Terminate function “11 - Login procedure” or “11 - Coding II” by touching  key.

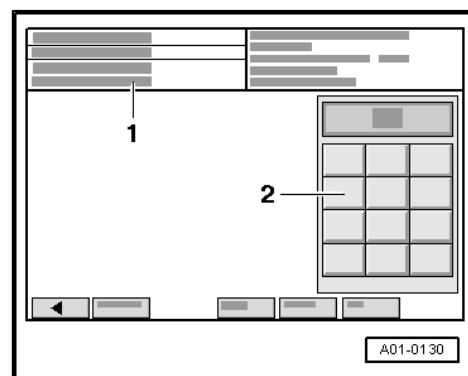
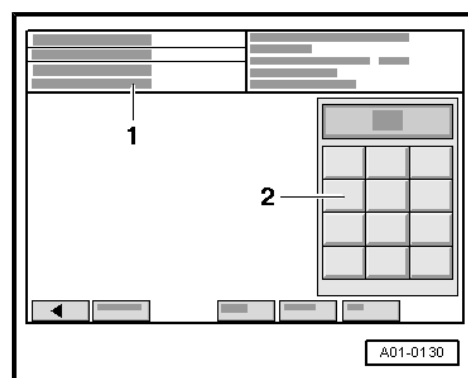
Indicated on -VAS 5051 A- :

- From list -1-, select function “04 - Basic setting”.

Indicated on -VAS 5051 A- :

1 - Enter display group

- Use keypad -2- to enter “066” for “display group number 066” and confirm by pressing the  key.



- The ABS warning lamp -K47- flashes.

Indicated on -VAS 5051 A- :

A - Basic setting

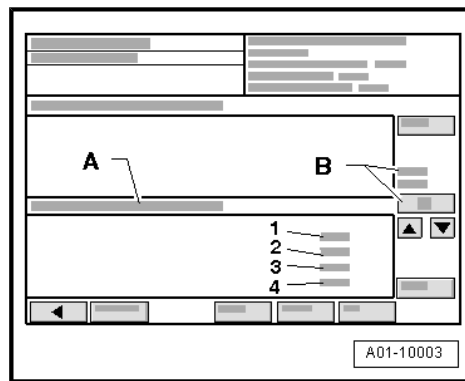
B - Display group 66

1 - Zero compensation OK

3 - 0.85 bar

4 - 2.12 bar

Zero compensation of brake pressure sender 1 -G201- and brake pressure sender 2 -G214- is now completed.



Note

The display does not return to 0.00 bar after performing zero compensation successfully.

- Terminate function "04 - Basic setting" by pressing the key.



Note

After you press function "06 - End output", the ABS warning lamp -K47- and the traction control system warning lamp -K86- light up for approx. two seconds.

Possible fault messages:

Indicated on -VAS 5051 A- :

1 - Zero compensation is not possible

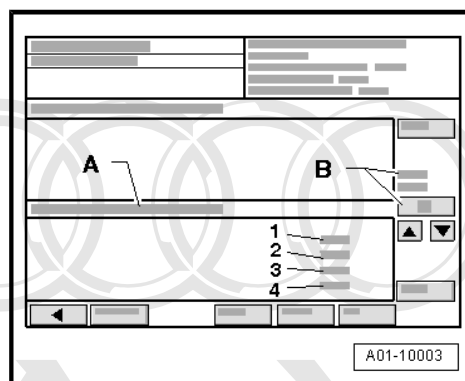
3 - 10.85 bar

4 - 12.12 bar

The determined value is outside the tolerance range for zero compensation.

- Proceed as follows to rectify the fault:

1. Check zero position of brake pressure sender 1 -G201- and brake pressure sender 2 -G214- in measured value block 005 ⇒ [page 116](#) .
2. Interrogate fault memory ⇒ [page 64](#) .
3. Erase fault memory ⇒ [page 103](#) .
4. Conclude the transfer of data with the function "06 - End output".
5. Switch off ignition.
6. Switch ignition on again.
7. Perform zero compensation again.



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4.7.7 Performing zero compensation of longitudinal acceleration sender -G251- (only vehicles with four-wheel drive)

Zero compensation must be performed if the ABS with EDL control unit -J104- or the longitudinal acceleration sender -G251- were renewed, or if required by the fault table.

Procedure

- Vehicle is standing horizontal on a flat base.
- Connect vehicle diagnostic, testing and information system - VAS 5051 A- => [page 7](#) and select vehicle system "03 - Brake electronics". When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

- From list -1- select diagnostic function "11 - Login procedure" or "11 - Coding II".



Indicated on -VAS 5051 A- :

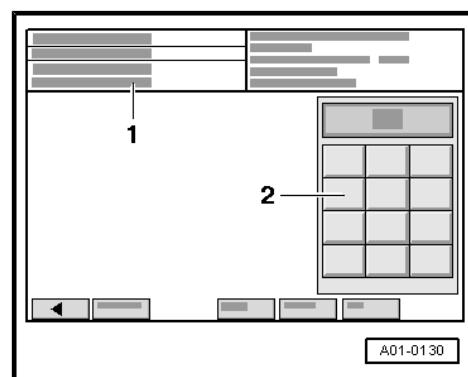
1 - Enter code word

- Use keypad -2- to enter code "40168" and confirm entry by touching  key.



Note

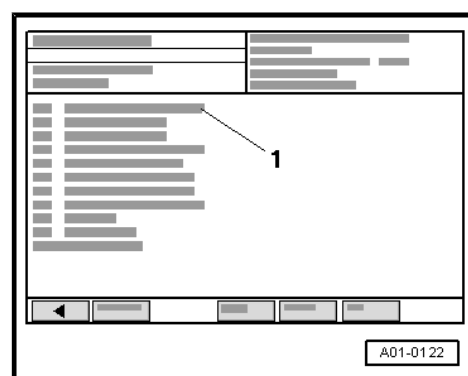
If display on -VAS 5051 A- reads "function unknown or function can not be performed at present" the login procedure or coding II were not successful. Repeat login procedure or coding II.



– Terminate function "11 - Login procedure" or "11 - Coding II" by touching  key.

Indicated on -VAS 5051 A- :

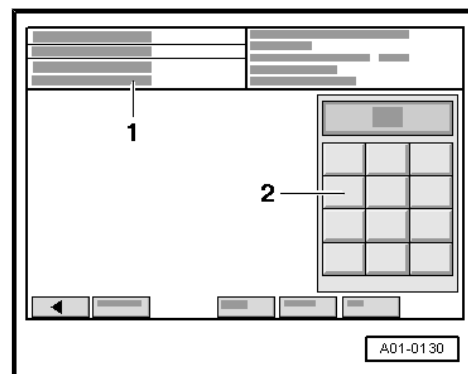
- From list -1-, select function "04 - Basic setting".



Indicated on -VAS 5051 A- :

1 - Enter display group

- Use keypad -2- to enter "069" for "display group number 069" and confirm by pressing the  key.



- The ABS warning lamp -K47- flashes.

Indicated on -VAS 5051 A- :

A - Basic setting

B - Display group 69

1 - Zero compensation OK

4 - 0.3 m/s²

Zero compensation of longitudinal acceleration sender -G251- is now completed.



Note

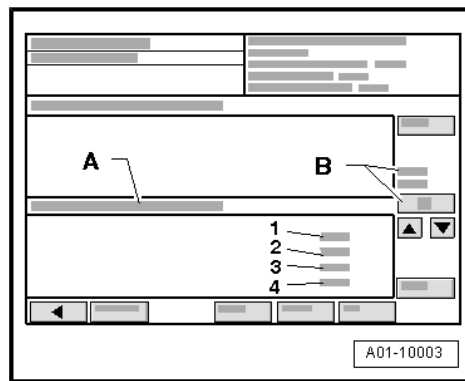
The display does not return to 0.00 m/s² after performing zero compensation successfully.

- Terminate function "04 - Basic setting" by pressing the key.



Note

After you press function "06 - End output", the ABS warning lamp -K47- and the traction control system warning lamp -K86- light up for approx. two seconds.



Possible fault messages:

Indicated on -VAS 5051 A- :

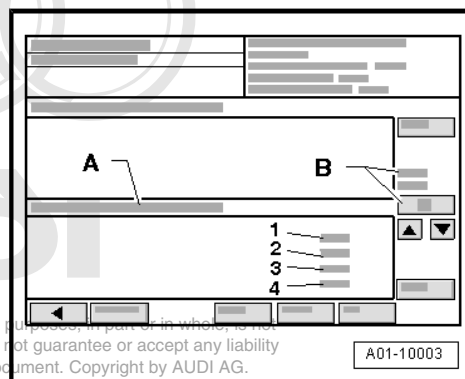
1 - Zero compensation is not possible

4 - 15.0 m/s²

The determined value is outside the tolerance range for zero compensation.

- Proceed as follows to rectify the fault:

1. Check zero position of longitudinal acceleration sender -G251- in measured value block 006 ⇒ [page 117](#)
2. Interrogate fault memory ⇒ [page 64](#) .
3. Erase fault memory ⇒ [page 103](#) .
4. Conclude the transfer of data with the function "06 - End output".
5. Switch off ignition.
6. Switch ignition on again.
7. Perform zero compensation again.



4.8 Performing zero compensation of steering angle sender -G85-

Perform zero compensation of steering angle sender after removing steering wheel, after performing adjustment on the running gear during wheel alignment and after renewing the ABS with EDL control unit -J104- , the steering angle sender -G85- or the steering column, or if zero compensation is required in fault tables.

Procedure

- Requirement: ABS with EDL control unit -J104- properly coded ➔ [page 104](#).
- Start the engine.
- Turn the steering wheel approx. 60° to left or right and back again until the front wheels are in straight-ahead position and the steering wheel is positioned horizontally (tolerance $\pm 4.5^\circ$).
- Perform short road test on a level surface. Drive in a straight line and not faster than 20 km/h and observe the following points.

If the steering wheel is not horizontal:

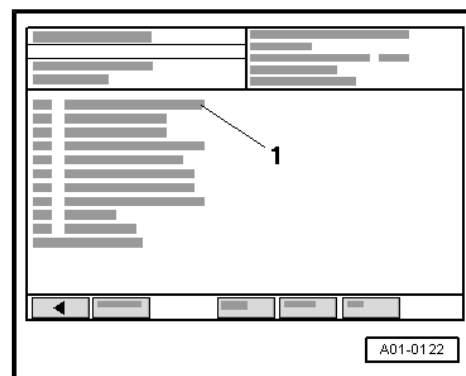
- Make the necessary adjustments by checking wheel alignment and fit steering wheel in correct position ➔ Running gear, front-wheel drive and four-wheel drive; Rep. Gr. 44, then perform zero compensation.

If the steering wheel is horizontal during the road test:

- Bring the vehicle to a standstill - **still keeping it in a straight line**.
- Do not change position of steering wheel!
- Do not switch off ignition!
- Connect vehicle diagnostic, testing and information system - VAS 5051 A- ➔ [page 7](#) and select vehicle system "03 - Brake electronics". When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

- From list -1- select diagnostic function "11 - Login procedure" or "11 - Coding II".



Indicated on -VAS 5051 A- :

1 - Enter code word

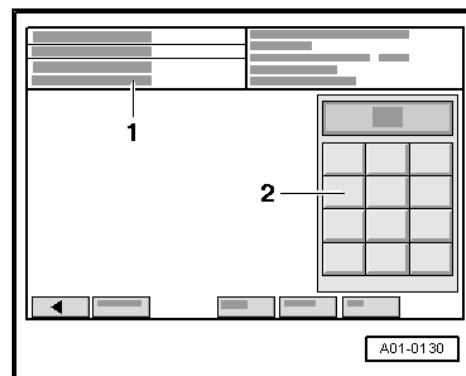
- Use keypad -2- to enter code "40168" and confirm entry by touching  key.



Note

If display on -VAS 5051 A- reads "function unknown or function can not be performed at present" the login procedure or coding II were not successful. Repeat login procedure or coding II.

- Terminate function "11 - Login procedure" or "11 - Coding II" by touching  key.



Indicated on -VAS 5051 A- :

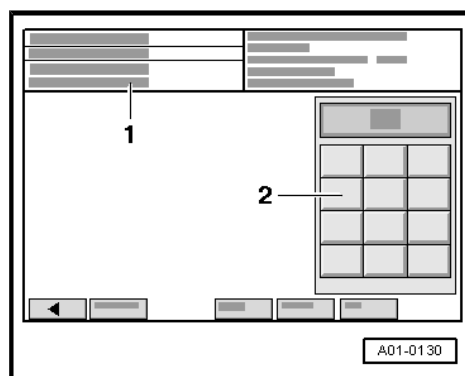
- From list -1-, select function “04 - Basic setting”.



Indicated on -VAS 5051 A- :

1 - Enter display group

- Use keypad -2- to enter “060” for “display group number 060” and confirm by pressing the key.



- The ABS warning lamp -K47- flashes.

Indicated on -VAS 5051 A- :

A - Basic setting

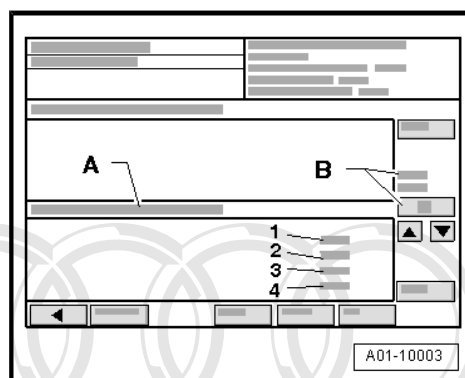
B - Display group 60

1 - Zero compensation OK

4 - 0.0°

Zero compensation of steering angle sender -G85- is now completed.

- Terminate function “04 - Basic setting” by pressing the key.



Note

After you press function “06 - End output”, the ABS warning lamp -K47- and the traction control system warning lamp -K86- light up for approx. two seconds.

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Possible fault messages:

Indicated on -VAS 5051 A- :

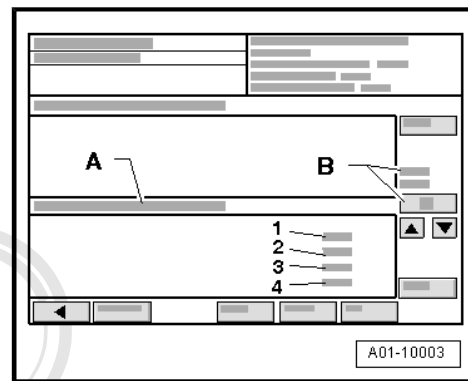
1 - Zero compensation is not possible

4 - 12.3°

The determined value is outside the tolerance range for zero compensation.

– Proceed as follows to rectify the fault:

1. Check zero position of steering angle sender -G85- in measured value block 004 ⇒ [page 116](#) .
2. Interrogate fault memory ⇒ [page 64](#) .
3. Erase fault memory ⇒ [page 103](#) .
4. Conclude the transfer of data with the function “06 - End output”.
5. Switch off ignition.
6. Switch ignition on again.
7. Perform zero compensation again.



4.9 Erasing fault memory



Note

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

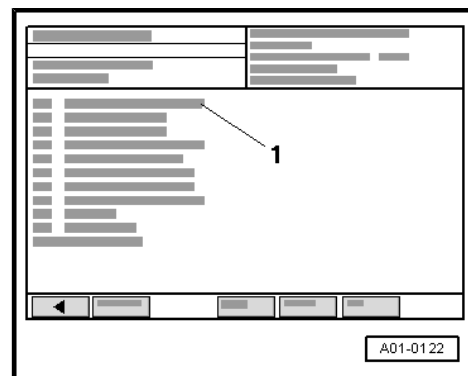
Requirements

- Fault memory interrogated ⇒ [page 37](#) .
- All faults rectified.

After fault memory has been interrogated:

Indicated on -VAS 5051 A- :

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



Indicated on -VAS 5051 A- :

- 1 - No display (prior to erasing) or
- Fault memory erased



Note

If the message "Fault memory not yet interrogated" appears in display zone -1-, this means that the test sequence has not been precisely observed. Fault memory cannot be erased until it has been interrogated.

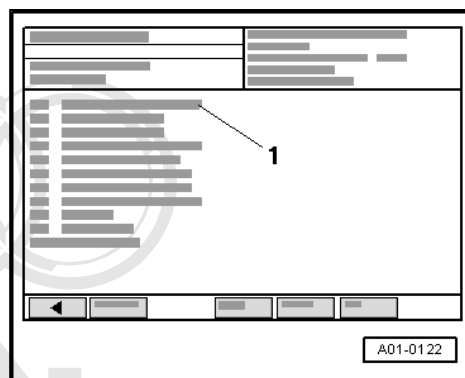
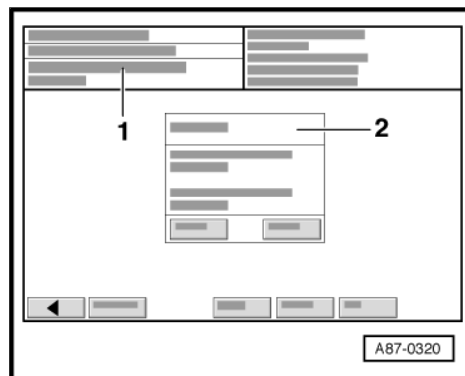
2 - Note: Do you want to execute the function? Note: Data will be erased!

- Touch **OK** key in display -2-.
- Terminate function "05 - Erasing fault memory" by touching **ESC** key.

4.10 End output

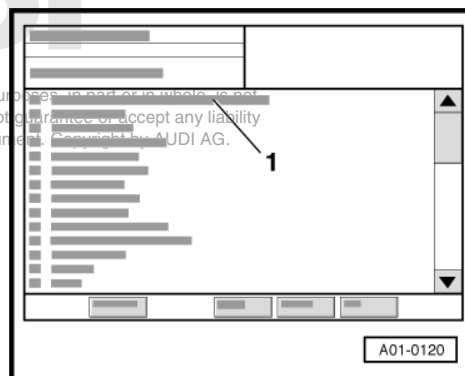
Indicated on -VAS 5051 A- :

- From list -1- select function "06 - End output".



Indicated on -VAS 5051 A- :

- When this display appears switch off ignition and unplug diagnostic connector.
- Switch on ignition.
- The ABS warning lamp -K47- should go out after approx. 2 seconds.



4.11 Renewing and coding control unit

A new ABS with EDL control unit -J104- supplied as a replacement part is not encoded. The control unit must be encoded according to the type of drive train after fitting.

- Removing and installing control unit and hydraulic unit ⇒ Brake system; Rep. Gr. 45 .

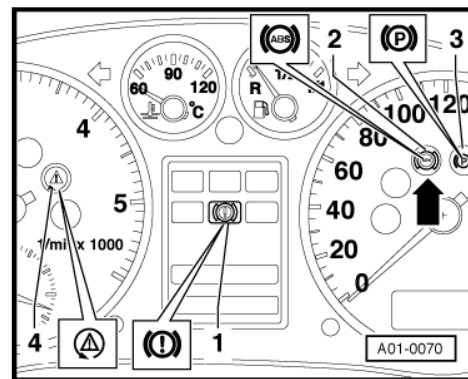
 Note

If the control unit is not encoded (coding 00000), the ABS warning lamp -K47- -item 2- and the "brake warning" symbol -item 1- flash continuously and the traction control system warning lamp -K86- -item 4- lights up constantly.



Caution

Do not exit self-diagnosis mode or switch off ignition when performing procedures "Coding control unit" and "Zero compensation of steering angle sender". Otherwise the entire process will have to be repeated.



Coding control unit

- Connect vehicle diagnostic, testing and information system - VAS 5051 A- → [page 7](#) and select vehicle system "03 - Brake electronics". When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

- From list -1- select diagnostic function "07 - Code control unit".



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Indicated on -VAS 5051 A- :

1 - Enter code word

Coding table for vehicles with petrol engine and not equipped with electronic throttle

Engine code letters: AEH, AGN, AKL	Coding 10241
Engine code letters: AGU	Coding 18433

Coding table for vehicles with petrol engine and electronic throttle

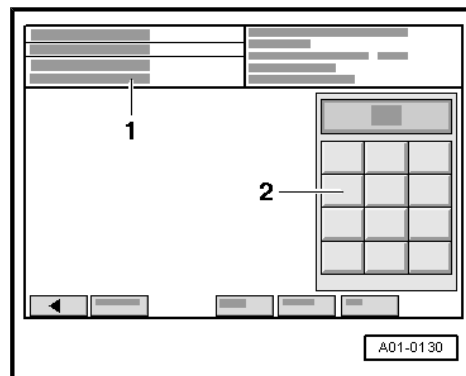
Engine code letters: APF, APG	Coding 10753
Engine code letters: S3 APY, BAM	Coding 18448
Engine code letters: AJQ, AQA, ARZ	Coding 18945

Coding table for vehicles with TDI engine

Engine code letters: AGR, AHF, ALH, ASV, ASZ	Coding 18945
---	--------------

Coding table for vehicles with four-wheel drive

Engine code letters: all versions except S3	Coding 00214
--	--------------



Vehicles with front-wheel drive

- Use keypad -2- to enter 5-digit code number according to coding table and confirm entry by touching **Q** key.

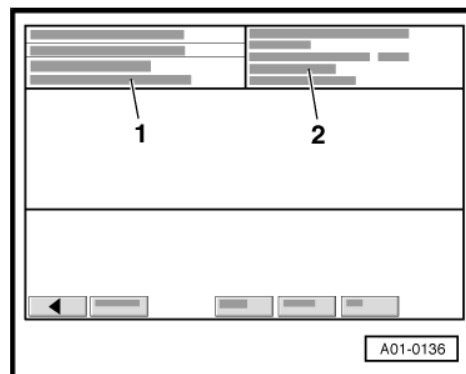
Indicated on -VAS 5051 A- :

1 - Coding in progress

- Wait until next readout appears.

1 - Vehicle system coding completed

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



 Note

- ◆ If the control unit is coded with a code not appropriate to the vehicle, the display "coding XXXXX not accepted" is indicated.
- ◆ If the traction control system warning lamp -K86- -item 4- lights up for only 100 milliseconds after the ignition is switched on, a coding without TCS/ESP control function has been entered.
- Terminate function "07 - Code control unit" by touching  key.

Performing zero compensation of steering angle sender -G85-

- Start the engine.
- Turn the steering wheel approx. 60° to left or right and back again until the front wheels are in straight-ahead position and the steering wheel is positioned horizontally (tolerance $\pm 4.5^\circ$).
- Perform short road test on a level surface. Drive in a straight line and not faster than 20 km/h and observe the following points.

If the steering wheel is not horizontal:

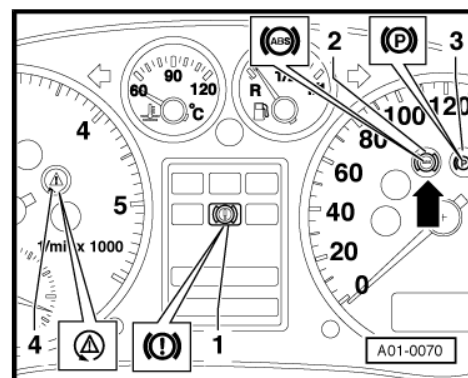
- Make the necessary adjustments by checking wheel alignment and fit steering wheel in correct position $\Rightarrow$ Running gear, front-wheel drive and four-wheel drive; Rep. Gr. 44, then perform zero compensation.

If the steering wheel is horizontal during the road test:

- Bring the vehicle to a standstill - still keeping it in a straight line.
- Do not change position of steering wheel!
- Do not switch off ignition!
- Vehicle diagnosis, testing and information system -VAS 5051 A- connected and vehicle system "03 - Brake electronics" selected.

Indicated on -VAS 5051 A- :

- From list -1- select diagnostic function "11 - Login procedure" or "11 - Coding II".



Indicated on -VAS 5051 A- :

- 1 - Enter code word
- Use keypad -2- to enter code "40168" and confirm entry by touching key.



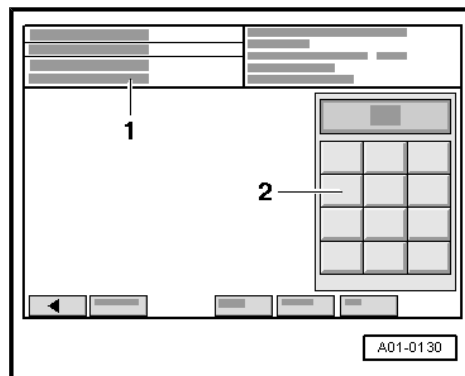
Note

If display on -VAS 5051 A- reads "function unknown or function can not be performed at present" the login procedure or coding II were not successful. Repeat login procedure or coding II. This also applies to all further zero compensation procedures.

- Terminate function "11 - Login procedure" or "11 - Coding II" by touching key.

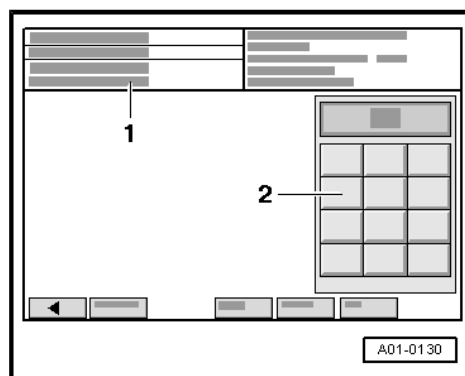
Indicated on -VAS 5051 A- :

- From list -1-, select function "04 - Basic setting".



Indicated on -VAS 5051 A- :

- 1 - Enter display group
- Use keypad -2- to enter "060" for "display group number 060" and confirm by pressing the key.



- The ABS warning lamp -K47- flashes.

Indicated on -VAS 5051 A- :

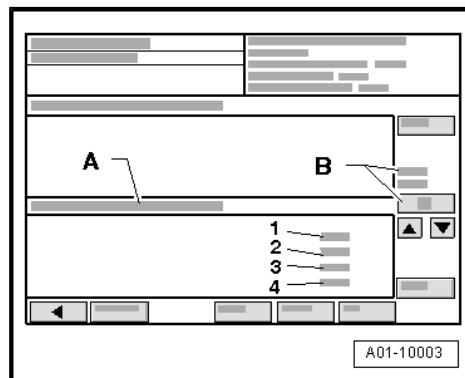
A - Basic setting

B - Display group 60

1 - Zero compensation OK

4 - 0.0°

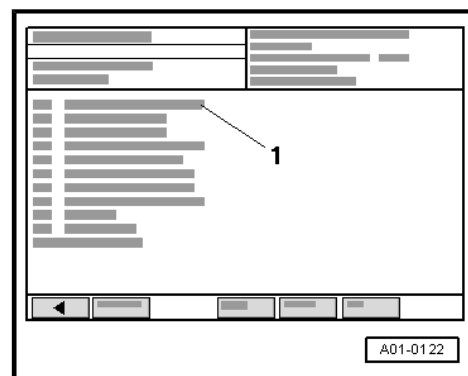
- Terminate function "04 - Basic setting" by pressing the key.



Performing zero compensation of lateral acceleration sender - G200-

Indicated on -VAS 5051 A- :

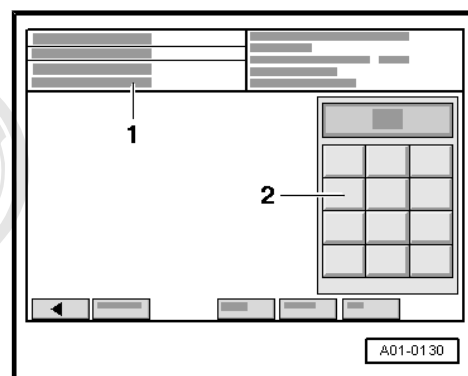
- From list -1- select diagnostic function “11 - Login procedure” or “11 - Coding II”.



Indicated on -VAS 5051 A- :

1 - Enter code word

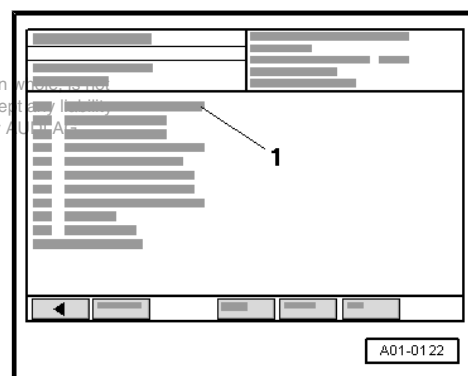
- Use keypad -2- to enter code “40168” and confirm entry by touching key.
- Terminate function “11 - Login procedure” or “11 - Coding II” by touching key.



Indicated on -VAS 5051 A- :

- From list -1-, select function “04 - Basic setting”

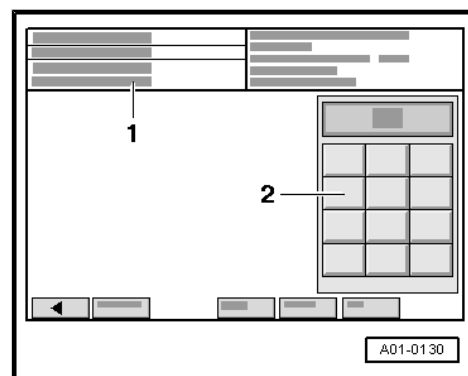
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Indicated on -VAS 5051 A- :

1 - Enter display group

- Use keypad -2- to enter “063” for “display group number 063” and confirm by pressing the key.



- The ABS warning lamp -K47- flashes.

Indicated on -VAS 5051 A- :

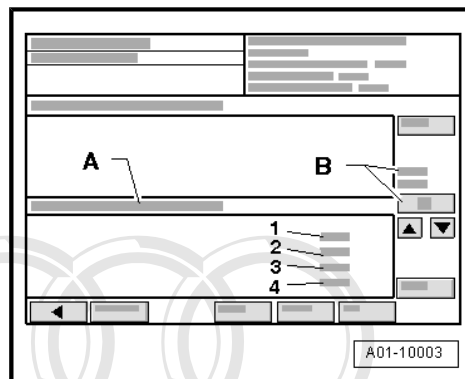
A - Basic setting

B - Display group 63

1 - Zero compensation OK

4 - 0.6 m/s²

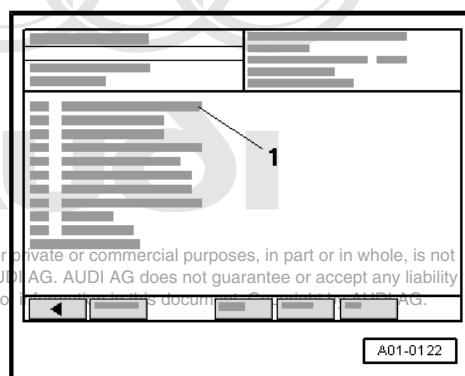
- Terminate function "04 - Basic setting" by pressing the key.



Performing zero compensation of brake pressure sender 1 - G201- and brake pressure sender 2 -G214-

Indicated on -VAS 5051 A- :

- From list -1- select diagnostic function "11 - Login procedure" or "11 - Coding II".

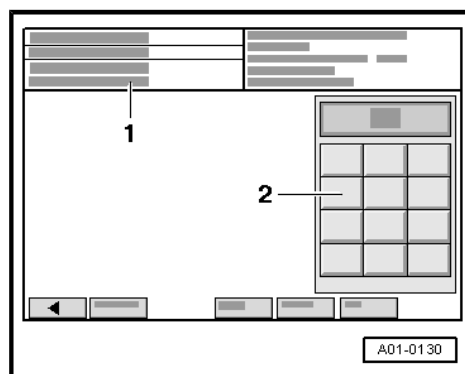


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Indicated on -VAS 5051 A- :

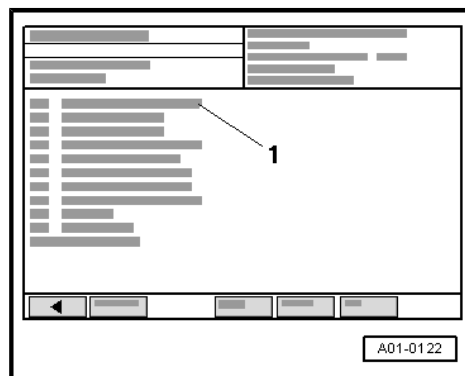
1 - Enter code word

- Use keypad -2- to enter code "40168" and confirm entry by touching key.
- Terminate function "11 - Login procedure" or "11 - Coding II" by touching key.



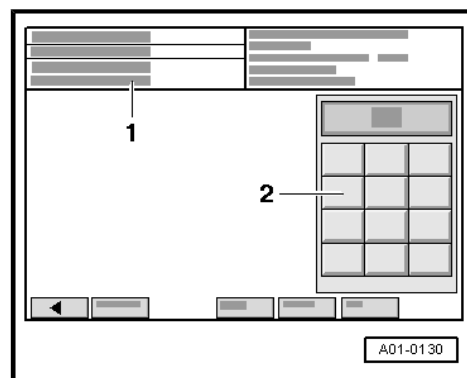
Indicated on -VAS 5051 A- :

- From list -1-, select function "04 - Basic setting".



Indicated on -VAS 5051 A- :

- 1 - Enter display group
- Use keypad -2- to enter "066" for "display group number 066" and confirm by pressing the  key.



- The ABS warning lamp -K47- flashes.

Indicated on -VAS 5051 A- :

A - Basic setting

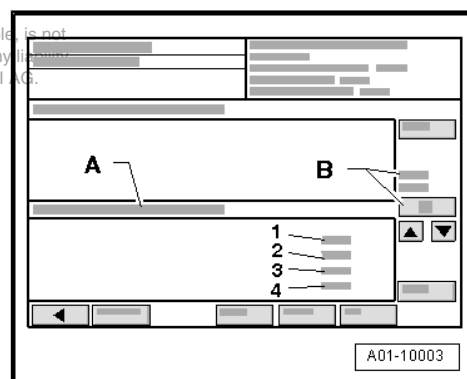
B - Display group 66

1 - Zero compensation OK

3 - 0.85 bar

4 - 2.12 bar

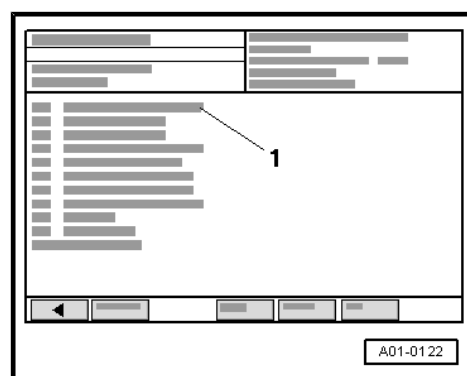
- Terminate function "04 - Basic setting" by pressing the  key.



Performing zero compensation of longitudinal acceleration sender -G251- (only vehicles with four-wheel drive)

Indicated on -VAS 5051 A- :

- From list -1- select diagnostic function "11 - Login procedure" or "11 - Coding II".

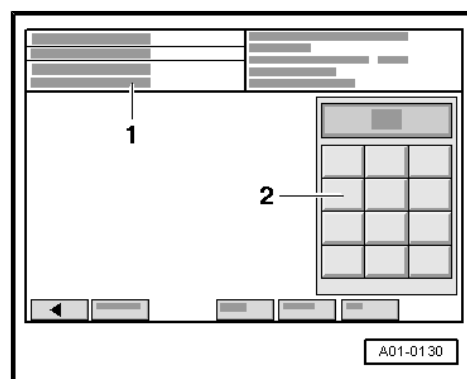


Indicated on -VAS 5051 A- :

1 - Enter code word

- Use keypad -2- to enter code "40168" and confirm entry by touching  key.

- Terminate function "11 - Login procedure" or "11 - Coding II" by touching  key.



Indicated on -VAS 5051 A- :

- From list -1-, select function “04 - Basic setting”.



Indicated on -VAS 5051 A- :

1 - Enter display group

- Use keypad -2- to enter “069” for “display group number 069” and confirm by pressing the key.

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- The ABS warning lamp -K47- flashes.

Indicated on -VAS 5051 A- :

A - Basic setting

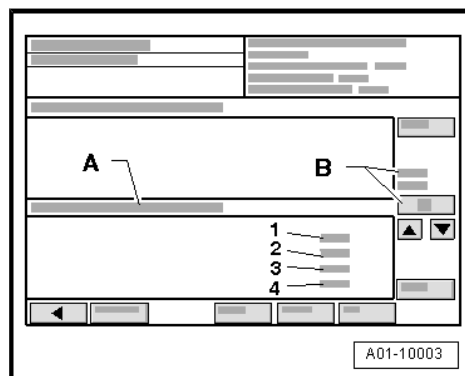
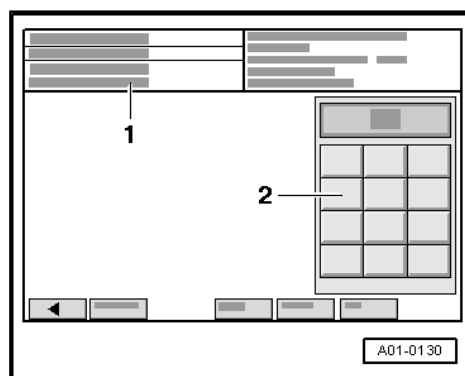
B - Display group 69

1 - Zero compensation OK

4 - 0.3 m/s²

- Terminate function “04 - Basic setting” by pressing the key.

The procedure for “Renewing and coding control unit” is completed with this last step.



Note

- ◆ If a fault is detected during zero compensation:
- ◆ Steering angle sender -G85- → [page 94](#)
- ◆ Lateral acceleration sender -G200- → [page 96](#)
- ◆ Brake pressure sender 1 -G201- and brake pressure sender 2 -G214- → [page 98](#)
- ◆ Longitudinal acceleration sender -G251- → [page 100](#).

4.12 Measured value block

The control unit can transfer a considerable amount of test data. This test data provides information about the operational condition of the system and/or sensors connected. In many cases the transferred test data can be used to assist fault finding and fault rectification. Since all the information cannot be evaluated simultaneously, the test data is categorised in display groups which can be selected individually via the display group numbers.



WARNING

- ◆ *To avoid any risk of accident, observe the safety precautions when using test instruments while road testing the vehicle ⇒ "1.3 Safety precautions", page 4 and ⇒ "1.6 Road test", page 6 .*
- ◆ *The ABS/ESP function is deactivated when using vehicle diagnostic, testing and information system -VAS 5051 A- in the mode "vehicle self-diagnosis" while road testing the vehicle. However, this is not indicated by the warning lamps.*



Note

Self-diagnosis of ABS with EDL control unit -J104- is terminated if a road speed of 20 km/h is exceeded.

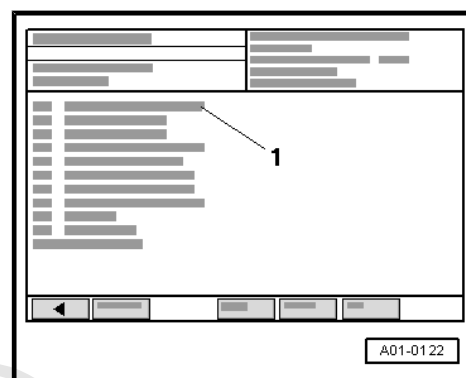
If a fault occurs while function "08 - Reading measured value block" is being performed, it will be detected. This is indicated by the ABS warning lamp -K47- lighting up, and helps to trace "sporadic faults".

4.12.1 Reading measured value block

- Connect vehicle diagnostic, testing and information system - VAS 5051 A- ⇒ [page 7](#) and select vehicle system "03 - Brake electronics". Ignition must be on or engine must be idling.

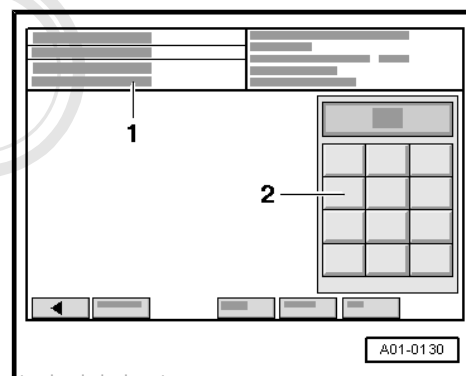
Indicated on -VAS 5051 A- :

- From list -1- select diagnostic function "08 - Read measured value block".



Indicated on -VAS 5051 A- :

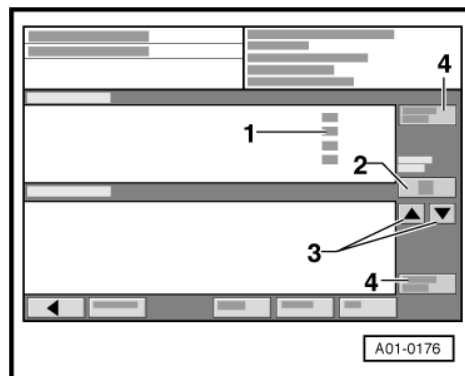
- 1 - Enter display group
- Use keypad -2- to select the relevant "display group number" ⇒ [page 114](#) and confirm by pressing the  key.



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Indicated on -VAS 5051 A- :

- 1 - Display zones 1 ... 4. If a display zone is vacant the respective line remains blank
- 2 - Indicates the selected display group
- 3 - Another display group can be selected by pressing one of the keys.
- 4 - Another function can be selected by pressing one of the keys (e.g. selecting function "Basic setting" instead of "Read measured value block" and vice versa)



List of available display groups

Display group	Display zone	Signifies	Refer to
001	1	Wheel speed, front left	⇒ page 114
	2	Wheel speed, front right	
	3	Wheel speed, rear left	
	4	Wheel speed, rear right	
002	1	Starting speed, front left	⇒ page 115
	2	Starting speed, front right	
	3	Starting speed, rear left	
	4	Starting speed, rear right	
003	1	Brake light switch -F-	⇒ page 115
	2	Brake detection switch, ESP -F83-	
	3, 4	Vacant	
004	1	Steering angle sender -G85-	⇒ page 116
	2	Lateral acceleration sender -G200-	
	3	Yaw rate sender -G202-	
	4	Vacant	
005	1	Brake pressure sender 1 -G201-	⇒ page 116
	2	Brake pressure sender 2 -G214-	
	3, 4	Vacant	
006	1	Longitudinal acceleration sender -G251- ¹⁸⁾	⇒ page 117
	2 ... 4	Vacant	
125	1	CAN bus for engine control unit	⇒ page 117
	2	CAN bus for steering angle sender -G85-	
	3	CAN bus for four-wheel drive control unit -J492- ¹⁸⁾	
	4	CAN bus for automatic gearbox control unit -J217- ¹⁹⁾	

18) Only applies to vehicles with four-wheel drive.

19) Only applies to vehicles with automatic gearbox

4.12.2 Test table

Display group 001

This display group is used for checking allocation of speed sensors to wheels.

- Raise vehicle on lifting platform.

Display zones	Explanation
1 ... km/h	Wheel speed, front left (turn wheel by hand)

Display zones	Explanation
2 ... km/h	Wheel speed, front right (turn wheel by hand)
3 ... km/h	Wheel speed, rear left (turn wheel by hand)
4 ... km/h	Wheel speed, rear right (turn wheel by hand)

Display group 002

This display group is used for the checking wheel speed sensors. The ABS with EDL control unit -J104- stores the first usable voltage signals from the speed sensor when driving away and displays these as set values.



Note

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- ◆ *A second mechanic is needed for reading the display when the vehicle is moving ⇒ "1.3 Safety precautions", page 4.*
 - ◆ *The ABS/ESP function is deactivated when using vehicle diagnosis, testing and information system -VAS 5051 A- in the function "read measured value block" while road testing the vehicle. However, this is not indicated by the warning lamps.*
 - ◆ *Self-diagnosis of ABS with EDL control unit -J104- is terminated if a road speed of 20 km/h is exceeded.*

Display zones	Explanation
1 ... km/h ²⁰⁾	– Drive away slowly until values are displayed on -VAS 5051 A- . • The displayed values in display zones 1 and 2 must on no account be above 6 km/h when driving away slowly. If the values are higher than these figures: – Check wheel speed sensors and rotors on front wheels for damage, proper installation position and secure seating ⇒ Brake system; Rep. Gr. 45 .
2 ... km/h ²⁰⁾	
3 ... km/h ²⁰⁾	– Drive away slowly until values are displayed on -VAS 5051 A- . • The values appearing in display zones 3 and 4 must NOT be above 2 km/h when driving away slowly. If the values are higher than these figures: – Check wheel speed sensors and rotors on rear wheels for damage, proper installation position and secure seating ⇒ Brake system; Rep. Gr. 45 .
4 ... km/h ²⁰⁾	

20) When the vehicle is stationary the display will read 255 km/h.

Display group 003

Display zones	Explanation
1 ...	Brake light switch -F- : • 0 = Brake pedal not depressed, Brake light switch "OFF" • 1 = Brake pedal depressed, Brake light switch "ON" If readout is not as described: – Perform electrical check, test step 4 ⇒ page 125
2 ...	Brake detection switch, ESP -F83- : • 0 = Brake pedal not depressed, switch "not oper." • 1 = Brake pedal depressed, switch "operated" If readout is not as described: – Perform electrical check, test step 23 ⇒ page 133
3	Vacant

Display zones	Explanation
4	Vacant

Display group 004



Note

- ◆ A second mechanic is needed for reading the display when the vehicle is moving ⇒ ["1.3 Safety precautions", page 4](#).
- ◆ The ABS/ESP function is deactivated when using vehicle diagnosis, testing and information system -VAS 5051 A- in the function "read measured value block" while road testing the vehicle. However, this is not indicated by the warning lamps.
- ◆ Self-diagnosis of ABS with EDL control unit -J104- is terminated if a road speed of 20 km/h is exceeded.

Display zones	Explanation
1	...° Specification for steering angle sender -G85- ²¹⁾: • With vehicle moving in straight line: $\pm 4.5^\circ$ If readout is not as described: – Perform electrical check, test step 18 ⇒ page 131
2	m/s² Specification for lateral acceleration sender -G200- : • Vehicle stationary: $\pm 0.5 \text{ m/s}^2$ • When turning steering wheel all the way to left at 20 km/h: value increases continuously • When turning steering wheel all the way to right at 20 km/h: negative value (-) increases continuously If readout is not as described: – Perform electrical check, test step 19 ⇒ page 132
3	... °/s Specification for yaw rate sender -G202- : • With vehicle stationary: $\pm 2.5 \text{ °/s}$ • When turning steering wheel all the way to left at 20 km/h: value increases continuously • When turning steering wheel all the way to right at 20 km/h: negative value (-) increases continuously If readout is not as described: – Perform electrical check, test step 20 ⇒ page 132
4	Vacant

21) If the steering angle sender -G85- is checked with vehicle moving in straight line, zero compensation must also be performed ⇒ [page 98](#).

Display group 005

Display zones	Explanation
1	... bar Specification for brake pressure sender 1 -G201- : • Brake pedal not depressed: $\pm 7 \text{ bar}$ If readout is not as described: – Perform electrical check, test step 22 ⇒ page 133
2	... bar Specification for brake pressure sender 2 -G214- : • Brake pedal not depressed: $\pm 7 \text{ bar}$ If readout is not as described: – Perform electrical check, test step 23 ⇒ page 133

Display zones	Explanation
3	Vacant
4	Vacant

Display group 006



Note

- ◆ A second mechanic is needed for reading the display when the vehicle is moving ⇒ ["1.3 Safety precautions", page 4](#).
- ◆ The ABS/ESP function is deactivated when using vehicle diagnosis, testing and information system -VAS 5051 A- in the function "read measured value block" while road testing the vehicle. However, this is not indicated by the warning lamps.
- ◆ Self-diagnosis of ABS with EDL control unit -J104- is terminated if a road speed of 20 km/h is exceeded.

Display zones	Explanation
1	m/s^2 Only applies to vehicles with four-wheel drive: Specifications for longitudinal acceleration sensor -G251- . • Vehicle stationary: $\pm 0.5 \text{ m/s}^2$ • Forward acceleration: value increases continuously • Reverse acceleration: negative (-) value increases continuously If readout is not as described: - Perform electrical check, test step 25 ⇒ page 134
2	Vacant
3	Vacant
4	Vacant

Display group 125

Display zones	Explanation				
1	<table border="1"> <tr> <td>Engine 1</td><td>Communication with engine control unit • Communication with engine control unit via CAN bus is OK </td></tr> <tr> <td>Engine 0</td><td> • No communication with engine control unit via CAN bus If display shows "0" and no faults are stored in fault memory: - Check control unit identification of engine control unit to verify that correct (CAN-compatible) control unit is installed; for correct version refer to ⇒ Parts catalogue . Alternatively: Control unit is defective. - Check CAN bus wiring ⇒ page 9 </td></tr> </table>	Engine 1	Communication with engine control unit • Communication with engine control unit via CAN bus is OK	Engine 0	• No communication with engine control unit via CAN bus If display shows "0" and no faults are stored in fault memory: - Check control unit identification of engine control unit to verify that correct (CAN-compatible) control unit is installed; for correct version refer to ⇒ Parts catalogue . Alternatively: Control unit is defective. - Check CAN bus wiring ⇒ page 9
Engine 1	Communication with engine control unit • Communication with engine control unit via CAN bus is OK				
Engine 0	• No communication with engine control unit via CAN bus If display shows "0" and no faults are stored in fault memory: - Check control unit identification of engine control unit to verify that correct (CAN-compatible) control unit is installed; for correct version refer to ⇒ Parts catalogue . Alternatively: Control unit is defective. - Check CAN bus wiring ⇒ page 9				
2	<table border="1"> <tr> <td>Steering angle 1</td><td>Communication with steering angle sender -G85- • 1 = Communication with steering angle sender -G85- via CAN bus is OK </td></tr> <tr> <td>Steering angle 0</td><td> • 0 = No communication with steering angle sender -G85- via CAN bus If display reads "0": - Check CAN bus wiring ⇒ page 9 </td></tr> </table>	Steering angle 1	Communication with steering angle sender -G85- • 1 = Communication with steering angle sender -G85- via CAN bus is OK	Steering angle 0	• 0 = No communication with steering angle sender -G85- via CAN bus If display reads "0": - Check CAN bus wiring ⇒ page 9
Steering angle 1	Communication with steering angle sender -G85- • 1 = Communication with steering angle sender -G85- via CAN bus is OK				
Steering angle 0	• 0 = No communication with steering angle sender -G85- via CAN bus If display reads "0": - Check CAN bus wiring ⇒ page 9				
3	<table border="1"> <tr> <td>FWD 1</td><td>Only applies to vehicles with four-wheel drive: Communication with four-wheel drive control unit -J492- • Communication with four-wheel drive control unit via CAN bus is OK </td></tr> </table>	FWD 1	Only applies to vehicles with four-wheel drive: Communication with four-wheel drive control unit -J492- • Communication with four-wheel drive control unit via CAN bus is OK		
FWD 1	Only applies to vehicles with four-wheel drive: Communication with four-wheel drive control unit -J492- • Communication with four-wheel drive control unit via CAN bus is OK				

Display zones		Explanation
	FWD 0	- No communication with four-wheel drive control unit via CAN bus If display shows "0" and no faults are stored in fault memory: - Check control unit identification of four-wheel drive control unit to verify that correct (CAN-compatible) control unit is installed. For correct version refer to ⇒ Parts catalogue . Alternatively: Control unit is defective. - Check CAN bus wiring ⇒ page 9
4	Gearbox 1	Only applies to vehicles with automatic gearbox: Communication with automatic gearbox control unit -J217- Communication with automatic gearbox control unit via CAN bus is OK
	Gearbox 0	- No communication with automatic gearbox control unit via CAN bus If display shows "0" and no faults are stored in fault memory: - Check control unit identification of automatic gearbox control unit to verify that correct (CAN-compatible) control unit is installed. For correct version refer to ⇒ Parts catalogue . Alternatively: Control unit is defective. - Check CAN bus wiring ⇒ page 9

4.13 Login procedure or coding II

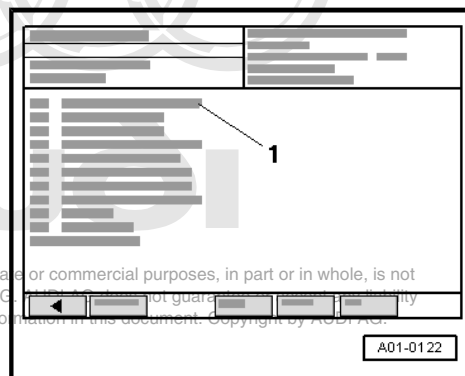
The Login procedure is required for zero compensation of several components.

Procedure

- Connect vehicle diagnostic, testing and information system - VAS 5051 A- ⇒ [page 7](#) and select vehicle system "03 - Brake electronics". When doing this the ignition must be switched on.

Indicated on -VAS 5051 A- :

- From list -1- select diagnostic function "11 - Login procedure" or "11 - Coding II".



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Indicated on -VAS 5051 A- :

- 1 - Enter code word
- Use keypad -2- to enter code "40168" and confirm entry by touching  key.

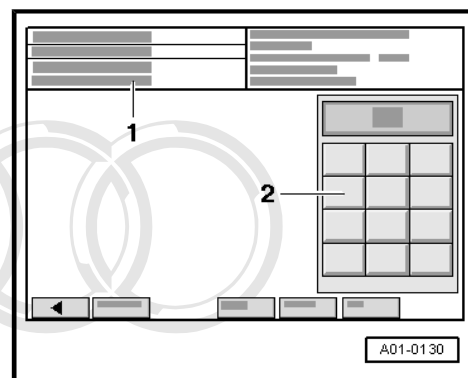


Note

If display on -VAS 5051 A- reads "function unknown or function can not be performed at present" the login procedure or coding II were not successful. Repeat login procedure or coding II.

- Terminate function "11 - Login procedure" or "11 - Coding II" by touching  key.
- Continue in function "04 - Basic setting" with the relevant display group.

- ◆ Display Group 060: zero compensation of steering angle sender -G85- ⇒ [page 93](#) .
- ◆ Display Group 063: zero compensation of lateral acceleration sender -G200- ⇒ [page 95](#) .
- ◆ Display Group 066: zero compensation of brake pressure sender 1 -G201- and brake pressure sender 2 -G214- ⇒ [page 95](#)
- ◆ Display Group 069: zero compensation of longitudinal acceleration sender -G251- ⇒ [page 99](#) .



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4.14 Electrical check of ABS/EDL/TCS/ESP ITT MARK 20

Special tools and workshop equipment required

- ◆ Hand-held multimeter - V.A.G 1526 B- or vehicle diagnostic, testing and information system - VAS 5051 A- with test leads -VAS 5051 A/7-
- ◆ Adapter set -V.A.G 1594 C-
- ◆ Test box -V.A.G 1598 A-
- ◆ Adapter cable (47-pin) - V.A.G 1598/33-

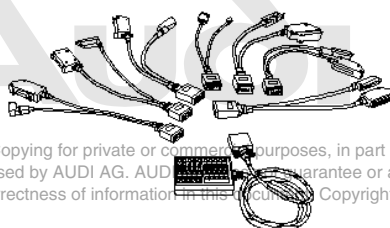
V.A.G 1526 B



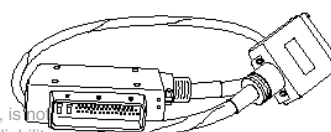
V.A.G 1594 C



V.A.G 1598 A



V.A.G 1598/33



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G01-0006

The test steps can be used:

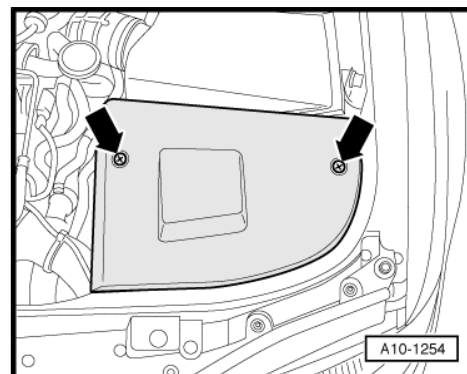
- ◆ For vehicles on which the self diagnosis does not give any indication of the source of the fault. Work through the complete electrical check.
- ◆ For vehicles on which the self diagnosis provides a direct indication of the source of the fault. Only carry out the test steps recommended in the fault table (to trace a specific fault).

Requirements

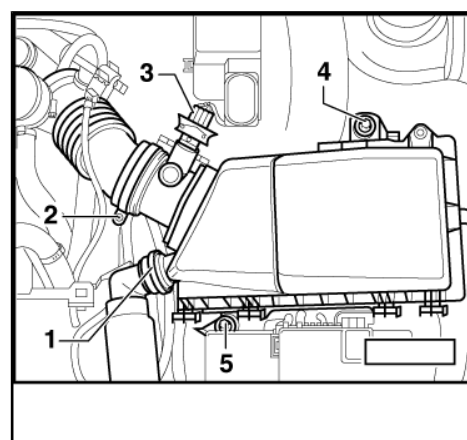
- Voltage supply of vehicle OK.
- Fuses OK ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Earth connections checked for corrosion and loose contact ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- All electrical consumers switched off.

4.15 Connecting test box -V.A.G 1598 A- with adapter cable (47-pin) -V.A.G 1598/33- to ABS with EDL control unit -J104-

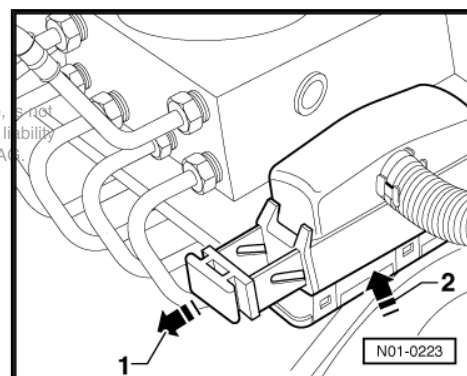
- Switch off ignition.
- If fitted, remove cover at front left of engine compartment -arrows-.



- If fitted, disconnect air intake hose for secondary air pump -1- from air cleaner housing.
- Detach air intake hose -2- at air mass meter.
- Unplug electrical connector for air mass meter -3-.
- Unscrew bolts -4- and -5-.
- Take out air cleaner housing.



- Release 47-pin connector at ABS with EDL control unit -J104- -arrow 1- and detach -arrow 2-.



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- Connect test box -V.A.G 1598 A- with adapter cable (47-pin) -V.A.G 1598/33- item 1- to unplugged 47-pin connector -2- of ABS with EDL control unit -J104- .



Caution

To prevent damage to the electronic components, select respective measuring range and note test requirements prior to connecting test leads.

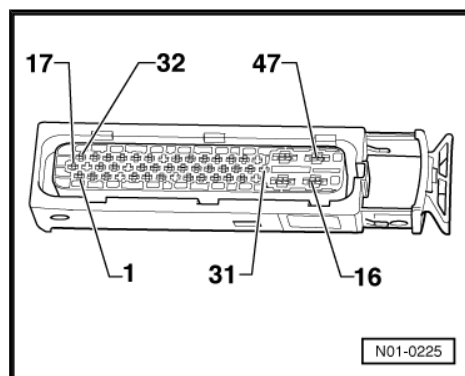
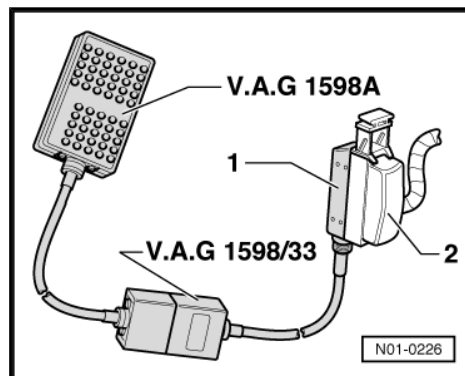
- Perform all steps listed for “fault rectification if reading does not match specification”.
- Only carry out the test steps recommended in the fault table (to trace a specific fault).
- After performing electrical check, plug 47-pin connector onto pins of ABS with EDL control unit -J104- and secure connector.



Note

- ◆ Use hand-held multimeter -V.A.G 1526 B- with test leads from -V.A.G 1594 C- or vehicle diagnostic, testing and information system -VAS 5051 A- with test leads -VAS 5051 A/7- for the electrical check.
- ◆ The socket designations of the test box -V.A.G 1598 A- are identical to the contact designations of the ABS with EDL control unit -J104- in the current flow diagram.
- ◆ Incorrect test procedures can cause system damage. Do not make bridging connections between any contacts other than those listed in the test table.
- ◆ The specified values are valid for an ambient temperature between 0 ... 40 °C.
- ◆ If measured values differ from specifications, locate fault according to current flow diagram.
- ◆ If the measured values 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 renewing components, check wiring and connections. Repeat resistance check on the component, particularly where specifications call for a resistance of less than 10Ω.

47-pin connector of ABS with EDL control unit -J104- / sockets on test box -V.A.G 1598 A-



1 - Brake detection switch, ESP -F83-	25 - Lateral acceleration sender -G200-
2 - Earth terminal 31	26 - Brake pressure sender 2 -G214-

3 - Speed sensor, front right -G45- “-”	27 - Yaw rate sender -G202-
4 - Speed sensor, front right -G45- “+”	28 - Brake pressure sender 1 -G201-
5 - Vacant	29 - Brake detection switch, ESP -F83-
6 - Speed sensor, rear right -G44- “+”	30 - Longitudinal acceleration sender -G251- ²²⁾
7 - Speed sensor, rear right -G44- “-”	31 - Brake light suppression relay, ESP -J508-
8 - Coding bridge to contact 18 ²³⁾	32 - Brake detection switch, ESP -F83-
9 - Lateral acceleration sender -G200-	33 - Speed sensor, front left -G47- “-”
10 - Brake pressure sender 2 -G214-	34 - Speed sensor, front left -G47- “+”
11 - Yaw rate sender -G202-	35 - Vacant
12 - Brake pressure sender 1 -G201-	36 - Speed sensor, rear left -G46- “+”
13 - Brake detection switch, ESP -F83-	37 - Speed sensor, rear left -G46- “-”
14 - Longitudinal acceleration sender -G251- ²²⁾	38 - Coding bridge to contact 18 ²²⁾
15 - Earth point in engine compartment (left-side)	39 - Diagnosis K-wire
16 - Battery “+” via fuse	40 - Lateral acceleration sender -G200-
17 - Brake detection switch, ESP -F83-	41 - Brake pressure sender 2 -G214-
18 - Coding bridge to contact 8 ²³⁾ or contact 38 ²²⁾	42 - Yaw rate sender -G202-
19 - CAN bus High	43 - Brake pressure sender 1 -G201-
20 - CAN bus Low	44 - Power supply, terminal 75a in dash panel wiring harness (via fuse)
21 - Vacant	45 - Longitudinal acceleration sender -G251- ²²⁾
22 - ABS warning lamp -K47-	46 - Earth point in engine compartment (left-side)
23 - Brake light switch -F-	47 - Battery “+” via fuse
24 - Traction control system switch -E132-	

22) Only applies to vehicles with four-wheel drive.

23) Front wheel drive vehicles only.

4.16 Test table

Overview of test steps

Item tested	Test step
Power supply, terminal 30 for ABS hydraulic pump -V64-	- Perform test step 1 ⇒ page 124
Power supply, terminal 30 for valves	- Perform test step 2 ⇒ page 124
Power supply, terminal 75a for ABS with EDL control unit -J104-	- Perform test step 3 ⇒ page 125
Brake light switch -F-	- Perform test step 4 ⇒ page 125
Resistance of speed sensor, front right -G45-	- Perform test step 5 ⇒ page 125
Resistance of speed sensor, front left -G47-	- Perform test step 6 ⇒ page 125
Resistance of speed sensor, rear right -G44-	- Perform test step 7 ⇒ page 126
Resistance of speed sensor, rear left -G46-	- Perform test step 8 ⇒ page 126
Voltage signal of speed sensor, front right -G45-	- Perform test step 9 ⇒ page 126
Voltage signal of speed sensor, front left -G47-	- Perform test step 10 ⇒ page 127
Voltage signal of speed sensor, rear right -G44-	- Perform test step 11 ⇒ page 127
Voltage signal of speed sensor, rear left -G46-	- Perform test step 12 ⇒ page 128
Coding bridges	- Perform test step 13 ⇒ page 128
ABS hydraulic pump -V64-	- Perform test step 14 ⇒ page 128
ABS warning lamp -K47-	- Perform test step 15 ⇒ page 129



Item tested	Test step
"Brake warning" symbol in instrument cluster or display of driver information system	– Perform test step 16 ⇒ page 129
Traction control system warning lamp -K86-	– Perform test step 17 ⇒ page 130
Traction control system switch -E132-	– Perform test step 18 ⇒ page 130
Wiring for steering angle sender -G85-	– Perform test step 19 ⇒ page 131
Wiring for lateral acceleration sender -G200-	– Perform test step 20 ⇒ page 132
Wiring for yaw rate sender -G202-	– Perform test step 21 ⇒ page 132
Wiring for brake pressure sender 1 -G201-	– Perform test step 22 ⇒ page 133
Wiring for brake pressure sender 2 -G214-	– Perform test step 23 ⇒ page 133
Wiring for brake detection switch, ESP -F83-	– Perform test step 24 ⇒ page 133
Wiring for longitudinal acceleration sender -G251-	– Perform test step 25 ⇒ page 134
Brake light suppression relay, ESP -J508-	– Perform test step 26 ⇒ page 134

Test step No. 1

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
15 + 47	Power supply, terminal 30 for pump motor of hydraulic control unit	• Ignition off – Select measuring range: voltage measurement	Approx. battery voltage	– Check wiring according to current flow diagram: ◆ Between contact 15 and earth ◆ Between contact 47 and terminal 30

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Test step No. 2

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
46 + 16	Power supply, terminal 30 for hydraulic control unit valves	• Ignition off – Select measuring range: voltage measurement	Approx. battery voltage	– Check wiring according to current flow diagram: ◆ Between contact 46 and earth ◆ Between contact 16 and terminal 30

Test step No. 3

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
46 + 44	Power supply, terminal 75a for ABS with EDL control unit - J104-	- Ignition on - Select measuring range: voltage measurement	Approx. battery voltage	- Check wiring according to current flow diagram: - Between contact 46 and earth - Between contact 44 and terminal 75a

Test step No. 4

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
46 + 23	Brake light switch -F-	- Ignition off - Select measuring range: voltage measurement - Brake pedal not operated - Brake pedal operated	0 V Approx. battery voltage	- Check wiring according to current flow diagram: - Between contact 46 and earth - Between contact 23 and terminal 30

Test step No. 5

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
3 + 4	Resistance of speed sensor, front right -G45-	- Ignition off - Select measuring range: resistance measurement	1.0...1.3 kΩ	- Check connector of speed sensor - Move wiring to speed sensor when checking (loose contact) - Renew speed sensor if wiring is OK.

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Test step No. 6

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
33 + 34	Resistance of speed sensor, front left -G47-	Ignition off		

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
		Select measuring range: resistance measurement	1.0...1.3 kΩ	- Check connector of speed sensor - Move wiring to speed sensor when checking (loose contact) - Renew speed sensor if wiring is OK.

Test step No. 7

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
7 + 6	Resistance of speed sensor, rear right -G44-	- Ignition off - Select measuring range: resistance measurement	1.0...1.3 kΩ	- Check connector of speed sensor - Move wiring to speed sensor when checking (loose contact) - Renew speed sensor if wiring is OK.

Test step No. 8

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
37 + 36	Resistance of speed sensor, rear left -G46-	- Ignition off - Select measuring range: resistance measurement	1.0...1.3 kΩ	- Check connector of speed sensor - Move wiring to speed sensor when checking (loose contact) - Renew speed sensor if wiring is OK.

Test step No. 9

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
3 + 4	Voltage signal of speed sensor, front right -G45-	- Vehicle raised - Ignition off - Select measuring range: voltage measurement (alternating voltage)		

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specifica- tion	Fault rectification if reading does not match specification
		– Rotate front right wheel at approx. 1 revolution per second.	Min. 65 mV alternating voltage	– Check speed sensor for inter-changed wiring (read measured value block 001; Display group ➔ page 114) – Check installation of speed sensor and rotor ➔ Brake system; Rep. Gr. 45

Test step No. 10

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specifica- tion	Fault rectification if reading does not match specification
33 + 34	Voltage signal of speed sensor, front left -G47-	• Vehicle raised • Ignition off – Select measuring range: voltage measurement (alternating voltage) – Rotate front left wheel at approx. 1 revolution per second	Min. 65 mV alternating voltage	– Check speed sensor for inter-changed wiring (read measured value block 001 ➔ page 114) – Check installation of speed sensor and rotor ➔ Brake system; Rep. Gr. 45

Test step No. 11

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specifica- tion	Fault rectification if reading does not match specification
7 + 6	Voltage signal of speed sensor, rear right -G44-	• Vehicle raised • Ignition off – Select measuring range: voltage measurement (alternating voltage) – Rotate rear right wheel at approx. 1 revolution per second	Min. 190 mV alternating voltage	– Check speed sensor for inter-changed wiring (read measured value block 001 ➔ page 114) – Check installation of speed sensor and rotor ➔ Brake system; Rep. Gr. 45

Test step No. 12

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specifica- tion	Fault rectification if reading does not match specification
37 + 36	Voltage signal of speed sensor, rear left -G46-	• Vehicle raised • Ignition off – Select measuring range: voltage measurement (alternating voltage) – Rotate rear left wheel at approx. 1 revolution per second	Min. 190 mV alternating voltage	– Check speed sensor for interchanged wiring (read measured value block 001 ⇒ page 114) – Check installation of speed sensor and rotor ⇒ Brake system; Rep. Gr. 45

Test step No. 13

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specifica- tion	Fault rectification if reading does not match specification
18 + 8 ²⁴⁾	Coding bridge	• Ignition off – Select measuring range: resistance measurement	0...1 Ω	– Check wiring and contacts in plug – Renew coding bridge if test result does not match specification
18 + 38 ²⁵⁾			0...1 Ω	

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24) Vehicles with front-wheel drive.

25) Vehicles with four-wheel drive.

Test step No. 14

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specifica- tion	Fault rectification if reading does not match specification
–	ABS hydraulic pump -V64-	• 47-pin connector connected to ABS with EDL control unit - J104- • Ignition on • Vehicle diagnostic, testing and information system -VAS 5051 A- connected		

-V.A.G 1598/21- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
		Initiate final control diagnosis ➔ page 77 and activate ABS hydraulic pump -V64-	Pump motor starts up	- Switch off ignition - Check wiring according to current flow diagram: ◆ Perform test step 1 ◆ Wiring from contact 1 of 2-pin connector at ABS hydraulic pump -V64- to control unit ◆ Wiring from contact 2 of 2-pin connector at ABS hydraulic pump -V64- to control unit - If no fault is found in wiring, remove hydraulic control unit and renew hydraulic pump with valve block ➔ Brake system; Rep. Gr. 45

Test step No. 15

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
–	ABS warning lamp -K47-	- Ignition off 47-pin connector connected to ABS with EDL control unit - J104- - Switch on ignition	ABS warning lamp - K47- should light up for 2 seconds and then go out	- Switch off ignition - Connect test box -V.A.G 1598 A- with -V.A.G 1598/33- - Check wiring according to current flow diagram: ◆ Perform test step 3 ◆ Check wiring between contact 22 of -V.A.G 1598 A- and instrument cluster. - Interrogate fault memory of instrument cluster (dash panel insert) ➔ Electrical system, self-diagnosis; Rep. Gr. 01

Test step No. 16

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
–	“Brake warning” symbol in instrument cluster or display of driver information system	- Ignition off 47-pin connector connected to ABS with EDL control unit - J104- - Electrical connector unplugged from one of the front speed sensors.		

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-V.A.G 1598 A-Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
		- Switch on ignition, start engine and increase engine speed to above 2000 rpm. - Plug in electrical connector after testing is completed and interrogate and erase fault memory	"Brake warning" symbol lights up	- Check wiring according to current flow diagram ◆ Perform test step 3 ◆ Check wiring between contact 22 of -V.A.G 1598 A- and instrument cluster. - Interrogate fault memory of instrument cluster (dash panel insert) ⇒ Electrical system, self-diagnosis; Rep. Gr. 01

Test step No. 17

-V.A.G 1598 A-Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
-	Traction control system warning lamp -K86-	- Ignition off 47-pin connector connected to ABS with EDL control unit -J104- - Switch on ignition	Traction control system warning lamp -K86- should light up for 2 seconds and then go out	- Switch off ignition - Connect test box -V.A.G 1598 A- with -V.A.G 1598/33- - Check wiring according to current flow diagram: ◆ Perform test step 3 ◆ Check wiring between contact 24 of -V.A.G 1598 A- and instrument cluster. - Interrogate fault memory of instrument cluster (dash panel insert) ⇒ Electrical system, self-diagnosis; Rep. Gr. 01

Test step No. 18

Test box - V.A.G 1598 A- , sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
-	Traction control system switch - E132-	- Ignition off 47-pin connector connected to ABS with EDL control unit - J104- - Test step 16 performed - Switch on ignition and operate traction control system switch - E132-	Traction control system warning lamp -K86- lights up	

Test box - V.A.G 1598 A- , sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
		Operate traction control system switch - E132- again	Traction control system warning lamp - K86- goes out	- Switch off ignition - Connect test box -V.A.G 1598 A- with -V.A.G 1598/33-
2 + 24		- Select measuring range: voltage measurement - Switch on ignition - Do not operate Traction control system switch -E132-	Approx. 0 V	- Check fuses and wiring according to current flow diagram: - Between contact 24 of - V.A.G 1598 A- and contact 5 of switch - Between contact 6 of switch and terminal 75a - Between contact 2 of switch and earth
		Operate traction control system switch - E132-	Approx. battery voltage	Renew switch if wiring is OK.

Test step No. 19

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
-	Wiring for steering angle sender - G85-	- Ignition off 47-pin connector unplugged from ABS with EDL control unit - J104- - Electrical connector unplugged from steering angle sender - G85- - Select measuring range: voltage measurement - Measure between contact 1 and 4 of connector for steering angle sender -G85-	Approx. battery voltage	- Check wiring according to current flow diagram: - Between connector contact 4 and terminal 30a - Between connector contact 1 and earth
		- Switch on ignition - Measure between contact 1 and 5 of connector for steering angle sender -G85-	Approx. battery voltage	- Check wiring according to current flow diagram: - Between connector contact 5 and terminal 75a - Between connector contact 1 and earth - If wiring is OK, connect test box -V.A.G 1598 A- with -V.A.G 1598/33- .



-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
19 + 3 ²⁶⁾		Ignition off Electrical connector unplugged from steering angle sender -G85- – Select measuring range: resistance measurement	max. 1.5 Ω	– Repair wiring according to current flow diagram
20 + 2 ²⁶⁾			max. 1.5 Ω	
		– Check wiring for short to positive or earth.	∞ Ω	

26) Contact at connector of steering angle sender -G85- .

Test step No. 20

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
40 + 1 ²⁷⁾	Wiring for lateral acceleration sender -G200-	- Ignition off - Electrical connector unplugged from lateral acceleration sender -G200- – Select measuring range: resistance measurement	max. 1.5 Ω	– Repair wiring according to current flow diagram
9 + 2 ²⁷⁾			max. 1.5 Ω	
25 + 3 ²⁷⁾			max. 1.5 Ω	
		– Check wiring for short to positive or earth.	∞ Ω	

27) Contact at connector of lateral acceleration sender -G200- .

Test step No. 21

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
42 + 1 ²⁸⁾	Wiring for yaw rate sender -G202-	- Ignition off - Electrical connector unplugged from yaw rate sender -G202- – Select measuring range: resistance measurement	max. 1.5 Ω	– Repair wiring according to current flow diagram
11 + 2 ²⁸⁾			max. 1.5 Ω	
27 + 3 ²⁸⁾			max. 1.5 Ω	
		– Check wiring for short to positive or earth.	∞ Ω	

28) Contact at connector of yaw rate sender -G202- .

Test step No. 22

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specifica- tion	Fault rectification if reading does not match specification
28 + 1 ²⁹⁾	Wiring for brake pressure sender 1 -G201-	- Ignition off 14-pin electrical connector at brake servo unplugged - Select measuring range: resistance measurement	max. 1.5 Ω	– Repair wiring according to current flow diagram
12 + 2 ²⁹⁾			max. 1.5 Ω	
43 + 3 ²⁹⁾			max. 1.5 Ω	
		– Check wiring for short to positive or earth.	∞ Ω	

29) Contact of 14-pin connector at brake servo.

Test step No. 23

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specifica- tion	Fault rectification if reading does not match specification
26 + 12 ³⁰⁾	Wiring for brake pressure sender 2 -G214-	- Ignition off 14-pin electrical connector at brake servo unplugged - Select measuring range: resistance measurement	max. 1.5 Ω	– Repair wiring according to current flow diagram
10 + 13 ³⁰⁾			max. 1.5 Ω	
41 + 14 ³⁰⁾			max. 1.5 Ω	
		– Check wiring for short to positive or earth.	∞ Ω	

30) Contact of 14-pin connector at brake servo.

Test step No. 24

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specifica- tion	Fault rectification if reading does not match specification
1 + 8 ³¹⁾	Wiring for brake detection switch, ESP -F83-	- Ignition off 14-pin electrical connector at brake servo unplugged - Select measuring range: resistance measurement	max. 1.5 Ω	– Repair wiring according to current flow diagram
13 + 5 ³¹⁾			max. 1.5 Ω	
17 + 7 ³¹⁾			max. 1.5 Ω	
29 + 6 ³¹⁾			max. 1.5 Ω	
32 + 9 ³¹⁾			max. 1.5 Ω	
		– Check wiring for short to positive or earth.	∞ Ω	

31) Contact of 14-pin connector at brake servo.

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Test step No. 25

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
14 + 1 ³²⁾	Wiring for longitudinal acceleration sender -G251-	- Ignition off - Electrical connector at longitudinal acceleration sender -G251- unplugged - Select measuring range: resistance measurement	max. 1.5 Ω	Repair wiring according to current flow diagram
30 + 2 ³²⁾			max. 1.5 Ω	
45 + 3 ³²⁾			max. 1.5 Ω	
		Check wiring for short to positive or earth.	∞ Ω	

32) Contact at connector of longitudinal acceleration sender -G251- .

Test step No. 26

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
-	Voltage supply for brake light suppression relay, ESP -J508-	- Ignition off - Brake light suppression relay, ESP -J508- disconnected from 13-position relay carrier behind driver's storage compartment - Voltage measurement range selected - Measure between contact 6 of relay socket and earth - Switch on ignition	Approx. battery voltage	- Read measured value block 003 ⇒ page 115 - Check wiring according to current flow diagram: - Between contact 6 of relay socket and terminal 75a - Between contact 2 of relay socket and terminal 30 - If wiring is OK, connect test box -V.A.G 1598 A- with -V.A.G 1598/33- .
		- Ignition off - Brake light suppression relay, ESP -J508- disconnected from 13-position relay carrier behind driver's storage compartment - Voltage measurement range selected - Brake pedal not depressed - Measure between contact 2 of relay socket and earth - Brake pedal operated	Approx. 0 V	
			Approx. battery voltage	

-V.A.G 1598 A- Sockets	Item tested	Test conditions and additional operations	Specification	Fault rectification if reading does not match specification
23 + 5 ³³⁾	Wiring for brake light suppression relay, ESP -J508-	- Ignition off - Brake light suppression relay, ESP -J508- disconnected from 13-position relay carrier behind driver's storage compartment - Select measuring range: resistance measurement	max. 1.5 Ω	– Repair wiring according to current flow diagram
31 + 4 ³³⁾			max. 1.5 Ω	
44 + 6 ³³⁾			max. 1.5 Ω	
		– Check wiring for short to positive or earth.	∞ Ω	

33) Contact in relay socket for brake light suppression relay, ESP -J508-



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5 ABS/ESP, MK 60 Continental Teves Mark 60; Electronic Stabilisation Pro- gram, Continental Teves Mark 60

5.1 This self-diagnosis system is described exclusively in the "Guided fault finding"



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