CAN-bus

CAN-bus, function

Bus:

The term bus refers to a system that transports and distributes data.

CAN:

The Controller Area Network is a bus system that uses two wires. These are called bus wires. Data is transferred to the connected control modules serially (one after the other) across the bus wires.

Data is transferred via the CAN-bus. For information and test procedure, see ⇒ page 01-27 . The CAN-bus only contains two lines. These are called bus wires. These transfer all required data. Two bus wires are used so that malfunctions in the wires can be recognized.

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The CAN-bus terminates in a resistor. It prevents the transmitted data from returning as an echo from the ends and corrupting data.

The terminal resistances of the CAN-bus have a value of 120 Ω and are located in the ABS control module (w/EDL) -J104- and the Engine Control Module (ECM) -item 3-. This results in an overall terminal resistance of approx. 60 Ω.

The steering angle sensor -G85- transmits its data to the control module via the CAN-bus. It does not have a terminal resistance.

As of implementation of control module 8D0 907 389 D/E, the CAN-bus is connected centrally in the Engine Control Module (ECM) with a resistance of approximately 66 Ω. All other control modules connected to the CAN system (for example the ABS control module -J104-) are connected with a high ohm resistance of 2.6 kΩ.

01-27

CAN-bus system, checking

The DTC table indicated you needed to check the bus:

- Using the relevant wiring diagram, determine how many control modules are connected to the CAN-bus.

- Check that the multiple connectors of the control modules are properly connected (unobstructed).

- Connect the VAG1551 (or VAG1552) scan tool and press the -0- button twice to select the "Automatic Check" function 00.

- Before checking the bus wires, make sure that none of the control modules connected have a function malfunction.

Note:

In this context, a function malfunction means a malfunction that doesn't directly affect the bus system, but that interrupts the functioning of a system. This could be a malfunctioning sensor, for example. A malfunctioning sensor would mean that the sensor signal could no longer be used for data transfer in the bus system. This type of malfunction indirectly affects the bus system. Communication to the control modules

that use the relevant sensor signal is interrupted.

01-28

Is there is a function malfunction?

- Fix the malfunction before proceeding.

- Note DTCs and erase DTC memory in all control modules ⇒ page 01-15 .

- Press buttons -0- and -6- to select "End Output" function 06. Press -Q- button to confirm input.

- End Scan Tool (ST) output using the "End Output" function ⇒ page 01-16 .

- Refer to the DTC table in the relevant repair manual for help in fixing the malfunction.

You have fixed all malfunctions:

- Check bus wires if communication to the control modules is still malfunctioning.

While checking the bus wires, make a distinction between the following two situations:

- Two control modules communicate via a "two-line bus system"

- Three or more control modules communicate via a "two-line bus system"

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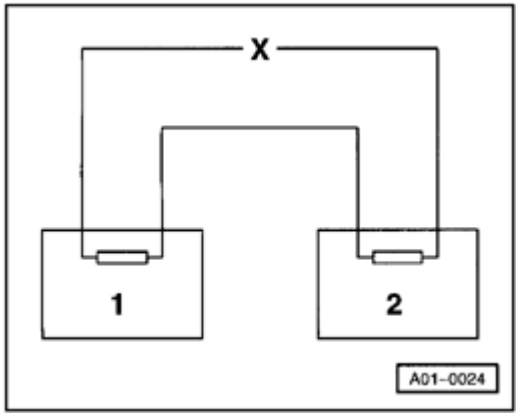
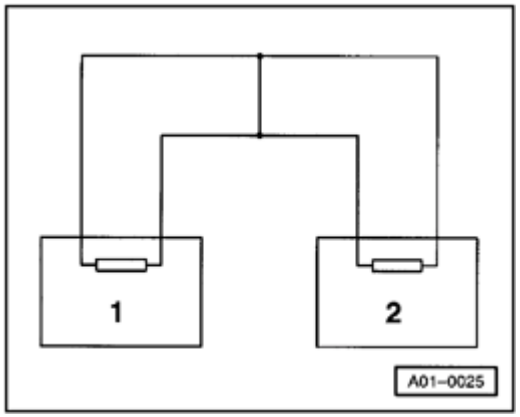
Two control modules communicate via a "two-line bus system".

- Switch ignition off.



- Disconnect both control modules.
- Check the bus wires for an open circuit.

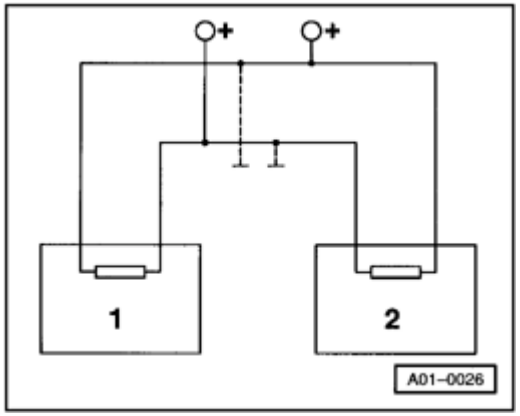
⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations*



- Check whether there is a short circuit between the bus wires.

⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations*

01-30



- Check the bus wires for a short circuit to B+ or Ground (GND).

If no malfunctions could be found in the bus wires:

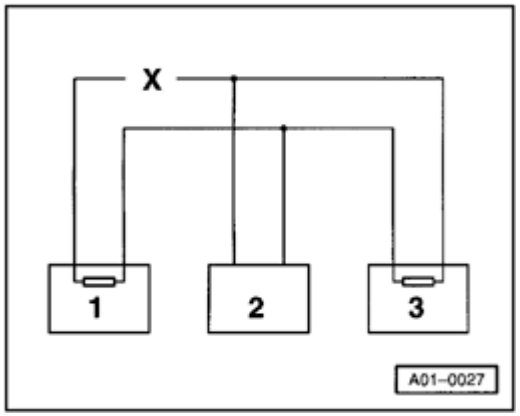
- As a test, replace one of the control modules. Select a control module that will take the least amount of time, and cost the least amount of money to replace.
- If communication between the control modules across the bus is still interrupted, replace the second control module.

01-31

Three or more control modules are communicating across a "two-line bus system".

- Analyze the DTCs stored in the memories of the control modules.

Example 1:



From the DTCs stored in the memories, you have determined that control module 1 is not communicating with control modules 2 and 3.

Control module	DTCs stored in DTC memories:
1	♦ Missing signal from control module 2 ♦ Missing signal from control module 3
2	♦ Missing signal from control module 1
3	♦ Missing signal from control module 1

- Switch ignition off.
- Disconnect the control modules connected across the bus wires and check the bus wires for an open circuit.

⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations*

- Replace control module 1 if no malfunctions can be found in the bus wires.

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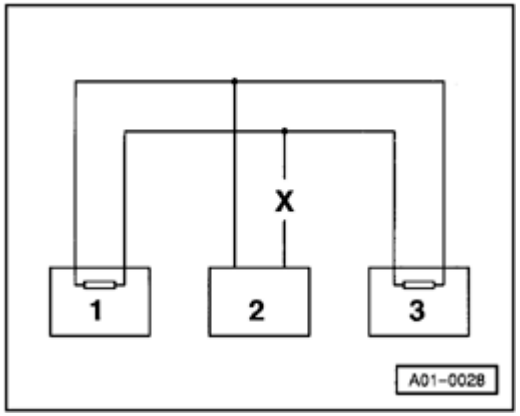


Example 2:

From the DTCs stored in the memories, you have determined that control module 2 is not communicating with control modules 1 and 3.

Control module	DTCs stored in DTC memories:
1	♦ Missing signal from control module 2
2	♦ Missing signal from control module 1 ♦ Missing signal from control module 3
3	♦ Missing signal from control module 2

- Switch ignition off.
- Disconnect the control modules connected across the bus wires and check the bus wires for an open circuit.

⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations*

- Replace control module 2 if no malfunctions can be found in the bus wires.

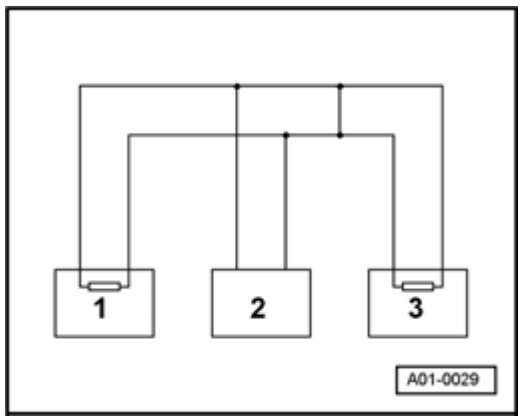
01-33

Example 3:

Using the DTCs stored in the memories, you have determined that none of the control modules are sending or receiving signals.

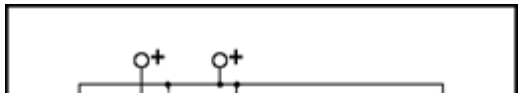
Control module	DTCs stored in DTC memories:
1	♦ Hardware malfunctioning
2	♦ Hardware malfunctioning
3	♦ Hardware malfunctioning

- Switch ignition off.



- Disconnect the control modules connected across the bus wires and check for a short circuit between the bus wires.

⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations*



- Check the bus wires for short circuit to B+ or Ground (GND).

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- If you cannot determine a cause for the DTC "Hardware malfunction", check whether the DTC is caused by one of the control modules.

All control modules that use the CAN-bus are still disconnected. The ignition is switched off.

- Connect one of the control modules.

- Connect the VAG1551 Scant Tool (ST) or the VAG1552 mobile scan tool. Switch ignition on, and erase the DTC memory of the control module you just connected. End scan tool output using the "End Output" function 06.

- Switch ignition off and then on.

- Leave ignition on for 10 seconds. Then, read the DTC memory of the control module you just connected.

- If the DTC "Hardware malfunction" is displayed, replace the control module you just connected.

- If the DTC "Hardware malfunction" is not displayed, connect the next control module and repeat the procedure.