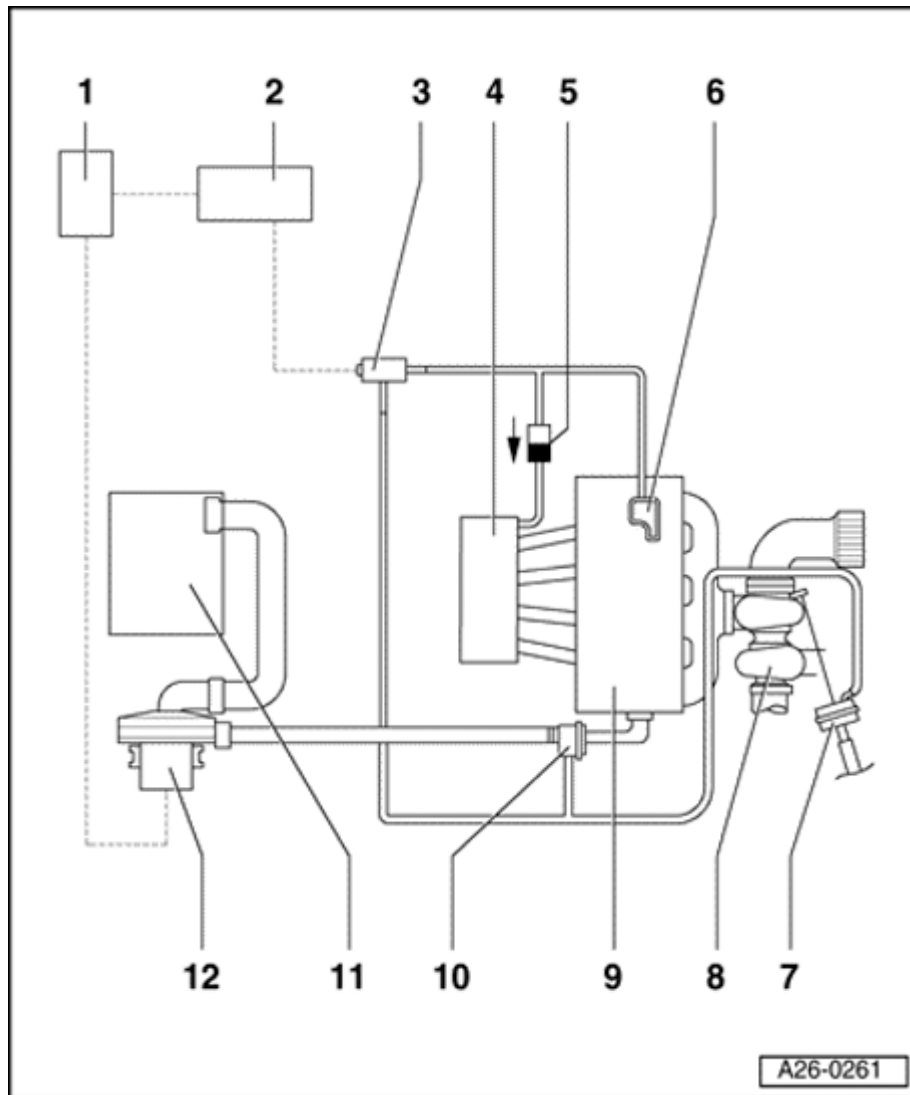


Secondary air system, checking (engine code ATW)

Following a cold start, the secondary air system helps to quickly heat the catalytic converter for quicker operating readiness.

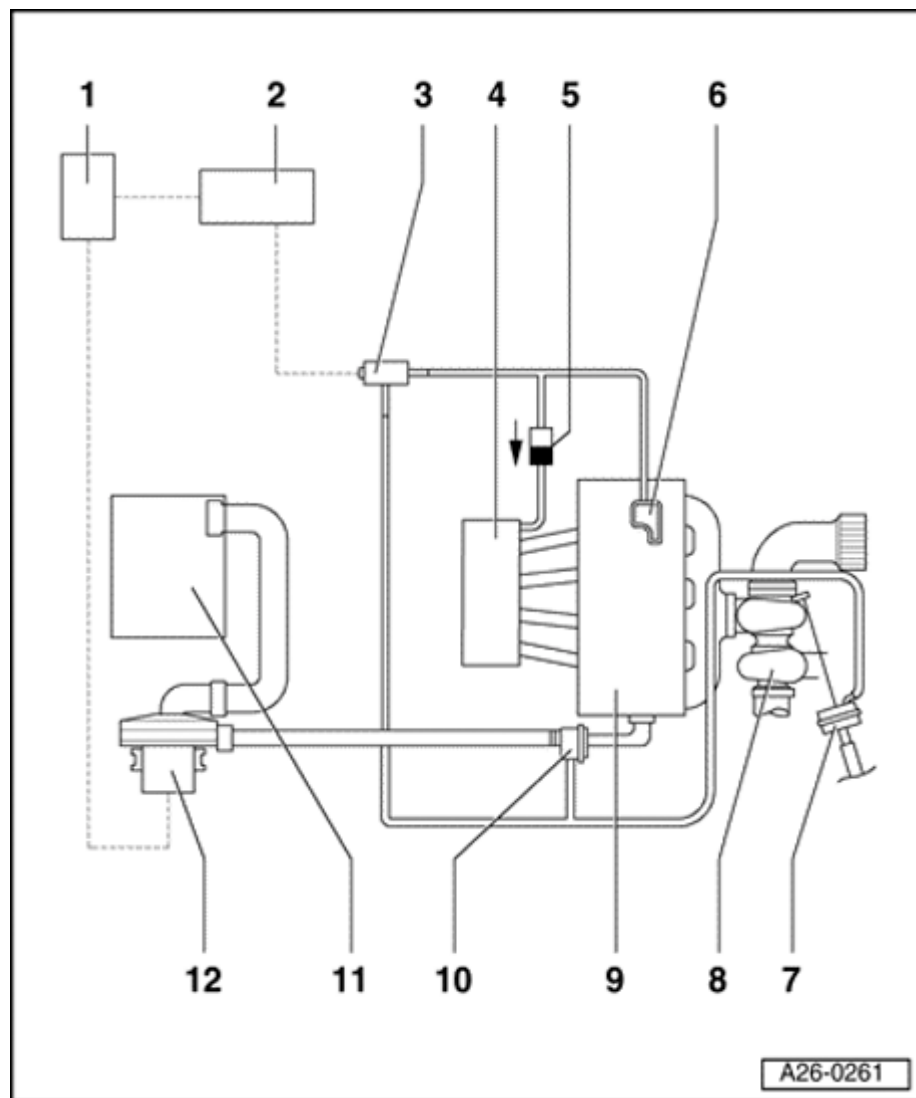
Principle

Due to over-enrichment of the mixture during the cold start phase, there is an increased amount of uncombusted carbon monoxide in the exhaust. Secondary Air Injection (AIR) improves secondary oxidation in the catalytic converter and therefore reduces emissions. The heat produced by secondary oxidation greatly reduces start-up time for the catalytic converter which significantly improves exhaust quality during the cold start phase.

**Function:**

- ◆ In the cold start phase, the ECM -2- activates the secondary air pump -12- via the relay for secondary air pump -1-. Air is supplied to the combination valve for Secondary Air Injection (AIR) -10-.
- ◆ The Secondary Air Injection (AIR) valve -3- is activated in parallel, which allows the vacuum to reach the combination valve for Secondary Air Injection (AIR) -10- and the vacuum diaphragm for charge air pressure regulation -7-. The combination valve for Secondary Air Injection (AIR) thereby opens the path for secondary air to the exhaust channels of the cylinder head.

26-31



◆ To prevent unnecessary heating, the secondary air is diverted past the turbocharger -7-. For this, the charge air pressure regulation pressure unit opens the charge air pressure valve. The pressure unit, designed as a double reservoir, has a vacuum connection for this on the intake side.

1 - Secondary Air Injection (AIR) pump relay - J299-

2 - Motronic Engine Control Module (ECM) - J220-

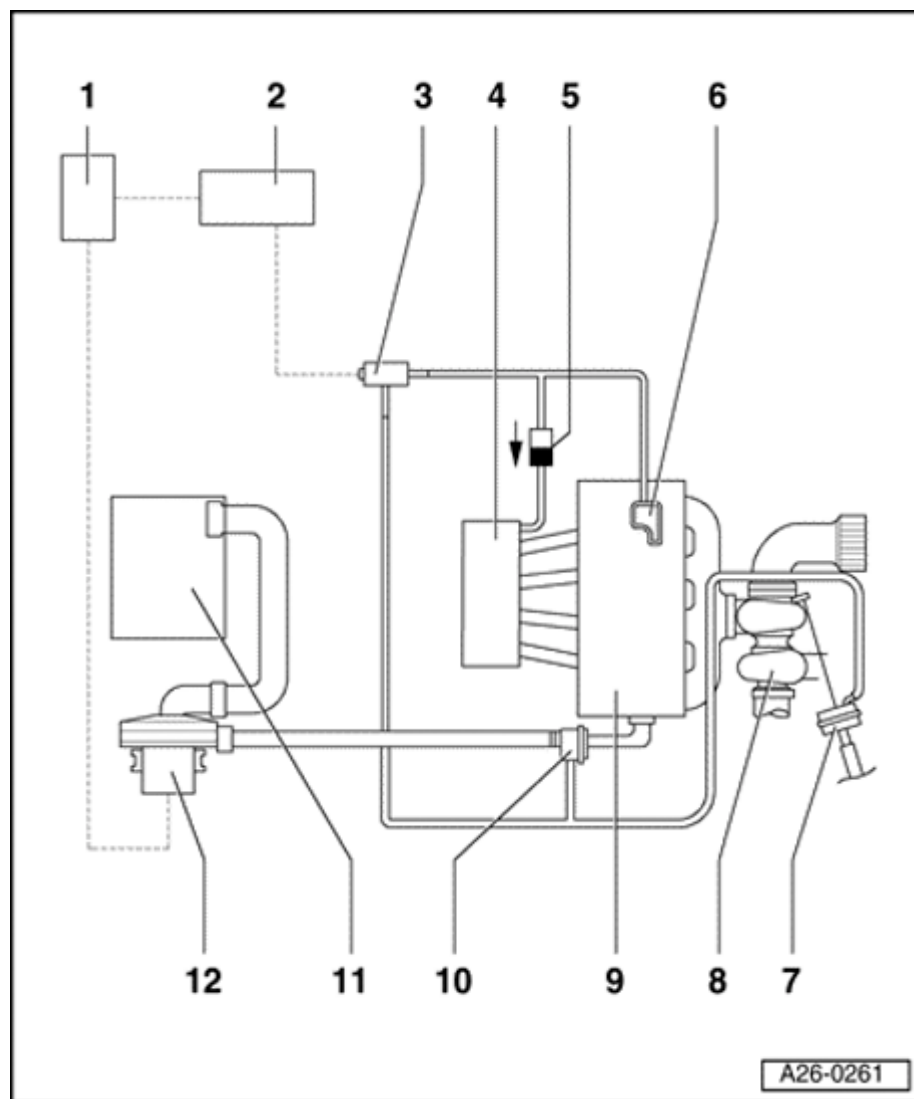
3 - Secondary Air Injection (AIR) solenoid valve -N112-

4 - Intake manifold

5 - Check valve

◆ Installation position (light/dark side): Arrow points in direction of flow, as shown

26-32



6 - Vacuum reservoir

7 - Pressure unit for charge air pressure regulation

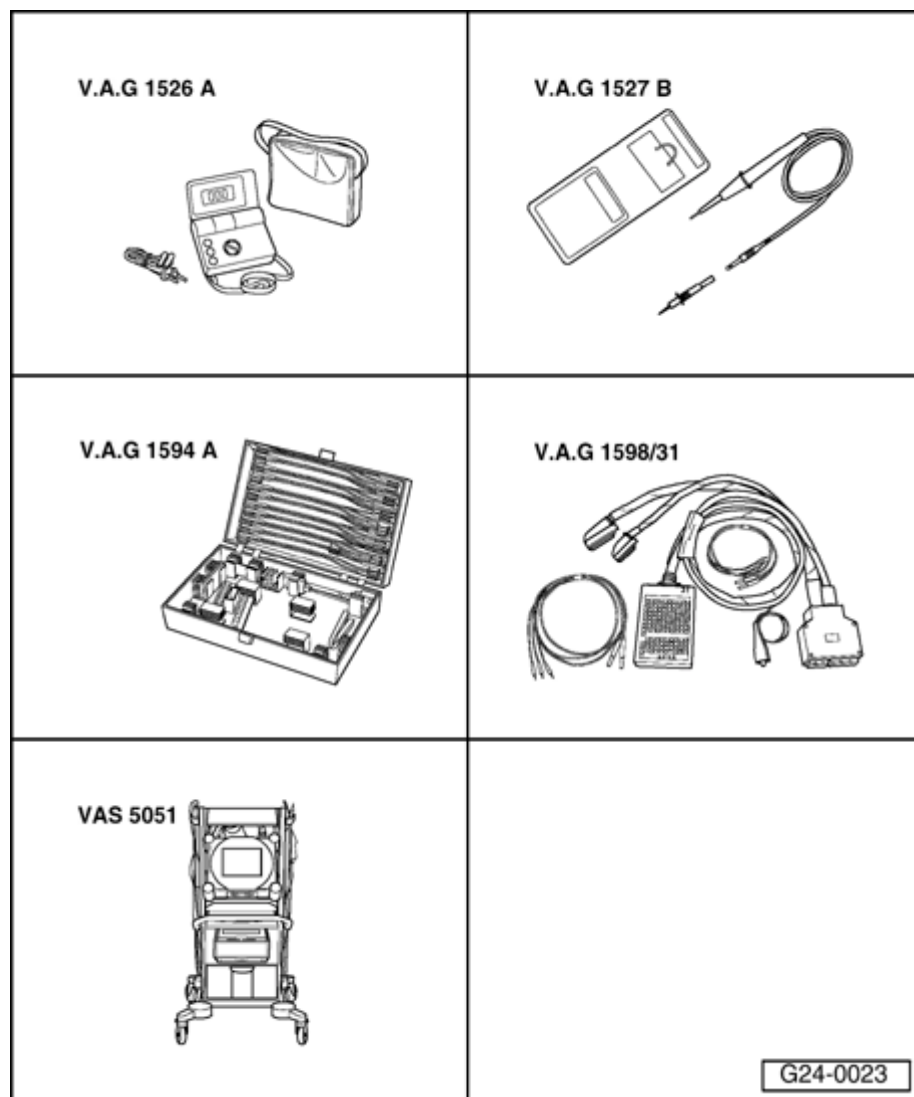
8 - Turbocharger

9 - Cylinder head

10 - Combination valve for secondary air injection (AIR)

11 - Air cleaner

12 - Secondary Air Injection (AIR) pump motor -V101-



Secondary Air Injection (AIR) solenoid valve -N112-, checking

Special tools and equipment

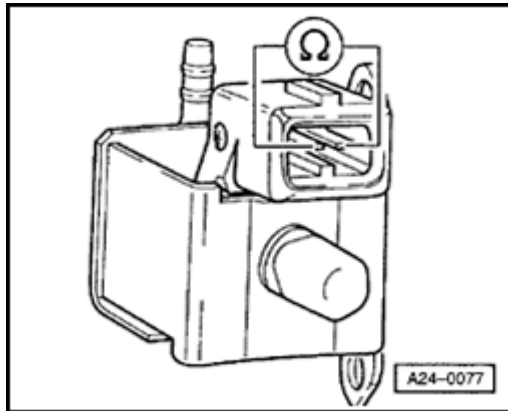
- ◆ VAG1526A
- ◆ VAG1527B
- ◆ VAG1594A
- ◆ VAG1598/31
- ◆ VAS 5051
- or
- ◆ VAG1551 with VAG1551/3A

Test requirement

- Output Diagnostic Test Mode (DTM) performed

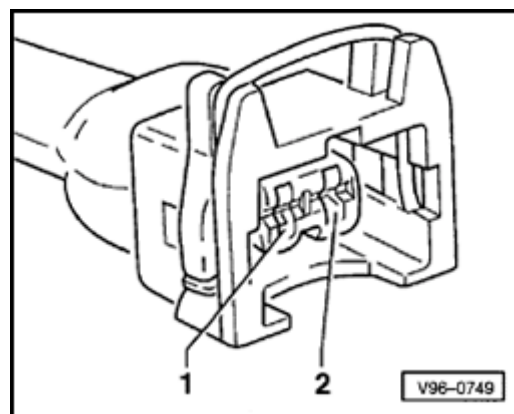
Checking internal resistance

- Disconnect green harness connector from Secondary Air Injection (AIR) solenoid valve - N112-.
- Connect multimeter at valve for resistance measurement.
 - ◆ Specified value: 25-35 Ω
- If specified value is not obtained, replace Secondary Air Injection (AIR) solenoid valve -N112-.



Checking voltage supply

- Disconnect harness connector from Secondary Air Injection (AIR) solenoid valve -N112-.



- Connect VAG1527B voltage tester as follows:

Harness connector terminal	Measure to
1	Engine Ground (GND)

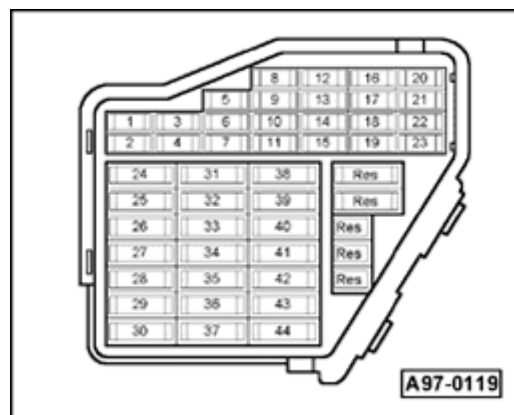
- Operate starter briefly.
 - ◆ LED must light.

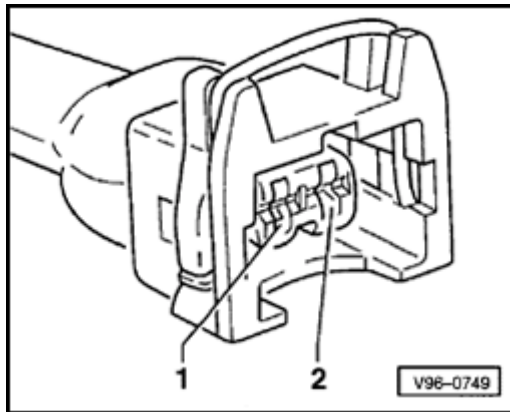
If LED does not light:

- Perform the following tests marked with dots:



- Check fuse S234 (in fuse holder, position 34).





A

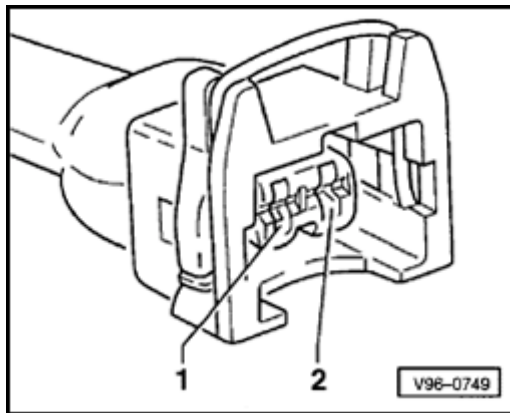
- Check wire connection from terminal 1 of connector via fuse S234 (in fuse holder, socket 34) to Fuel Pump (FP) relay for open circuit:

⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations*

- Check Fuel Pump (FP) relay

⇒ [Repair Manual, Fuel Supply System, Repair Group 20](#)

Checking activation



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- Connect VAG1527B voltage tester between terminals 1 and 2 using test leads from VAG1594A.
- Connect VAG1551 scan tool.
- Initiate output Diagnostic Test Mode (DTM) and activate Secondary Air Injection (AIR) solenoid valve -N112-.

Output Diagnostic Test Mode →
Secondary Air Inj. Solenoid Valve -N112

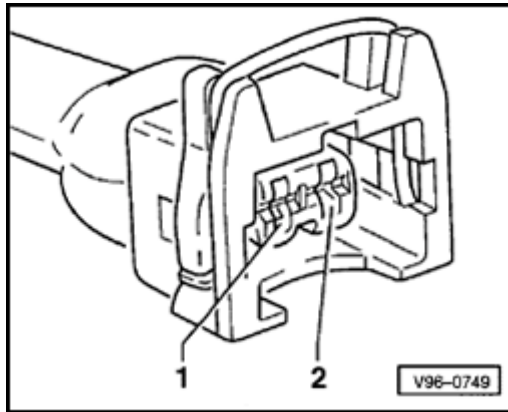
A

Indicated on display

- ◆ LED must blink.

If LED does not blink or if it remains constantly lit:

- Connect VAG1598/31 test box at wiring harness to ECM, do not connect ECM.



A

- Check the following wire connections for open circuit and short circuit to Ground (GND) and B+:

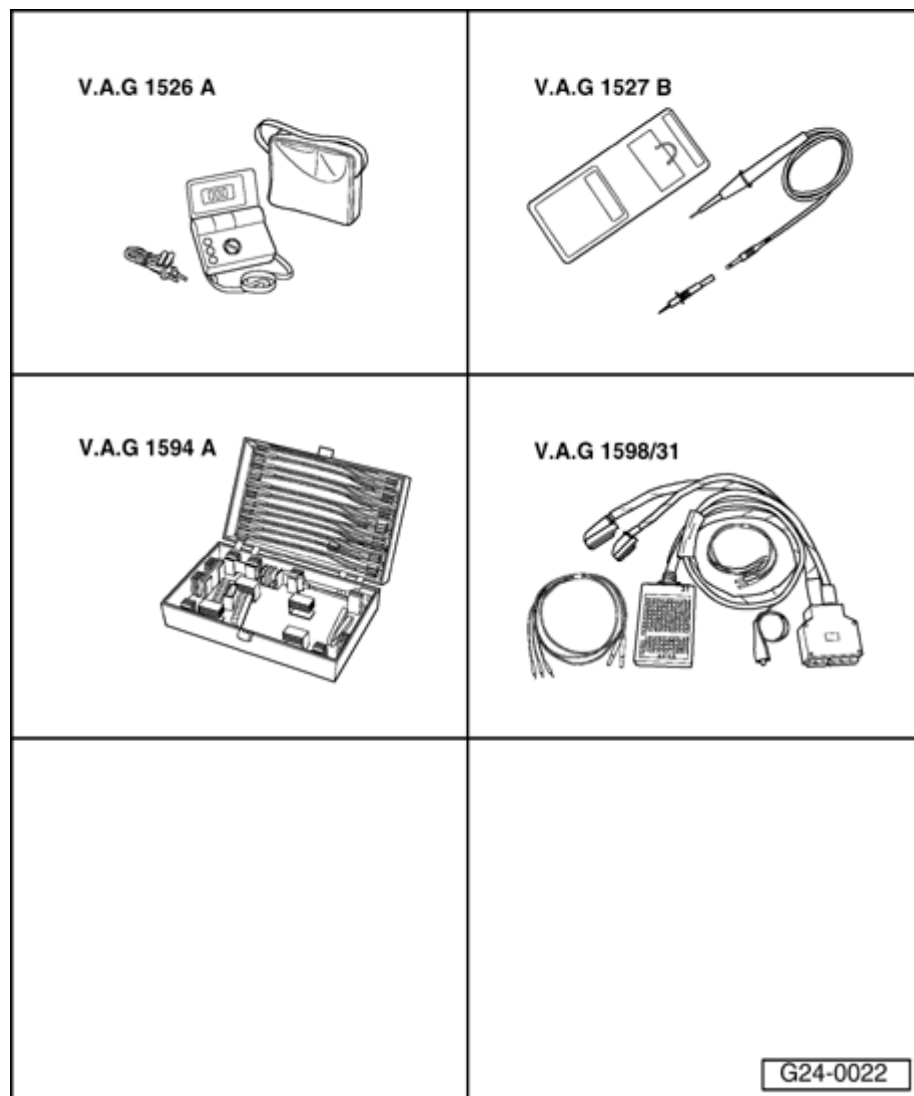
Harness connector	VAG1598/31 test box
terminal	socket
2	44

- Repair open circuit or short circuit if necessary.

If wire connection is OK:

- Replace Engine Control Module (ECM).

26-38



Secondary Air Injection (AIR) pump relay - J299-, checking activation

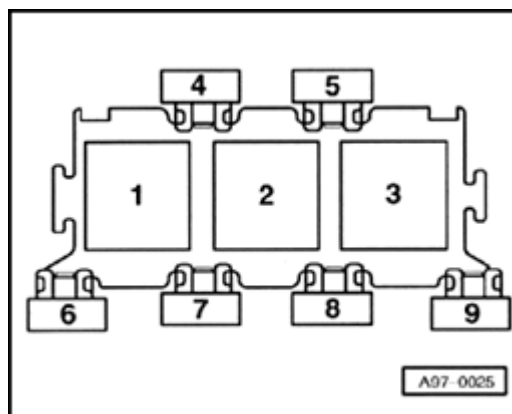
Special tools and equipment

- ◆ VAG1526A
- ◆ VAG1527B
- ◆ VAG1594A
- ◆ VAG1598/31

Installation location:

⇒ *Repair Manual, 1.8 Liter 4-Cyl. 5V Turbo Fuel Injection & Ignition, Repair Group 24*

- Initiate output Diagnostic Test Mode (DTM) and activate Secondary Air Injection (AIR) pump relay -J299-.



A

- ◆ The Secondary Air Injection (AIR) pump relay (in 3-socket relay carrier in the E-box, at left in plenum chamber, position 2) must trigger and the Secondary Air Injection (AIR) pump motor -V101- must run in intervals

A - If relay does not trigger:

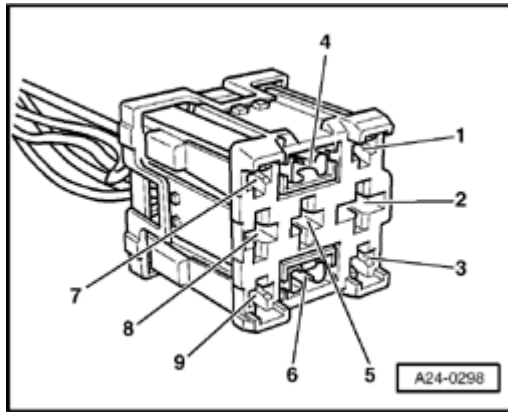
- Check voltage supply of Secondary Air Injection (AIR) relay ⇒ [Page 26-40](#) .
- Checking activation of Secondary Air Injection (AIR) relay ⇒ [Page 26-42](#) .

B - If relay triggers, but Secondary Air Injection (AIR) pump does not run:

- Check voltage supply for Secondary Air Injection (AIR) pump ⇒ [Page 26-43](#) .

Checking voltage supply of Secondary Air Injection (AIR) pump relay

- Remove Secondary Air Injection (AIR) pump relay.



A

- Connect multimeter for voltage measurement as follows.

3-socket relay carrier in E-box, plenum chamber, position 2 terminal	Measure to
8	Engine Ground (GND)

◆ Specified value: approx. battery voltage

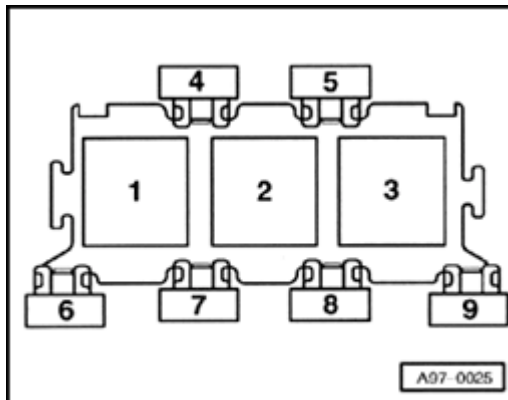
If specified value is not obtained:

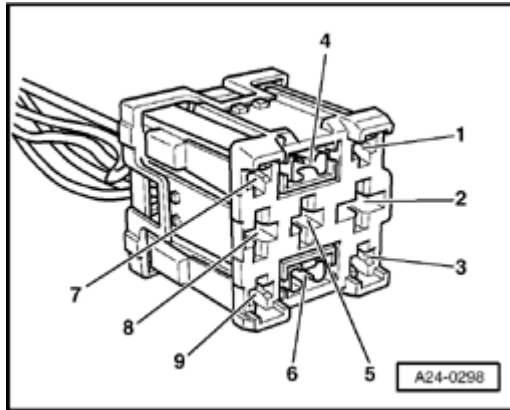
- Perform the following tests marked with dots:

A

- Check fuse S130 (40 A) in 3-socket relay carrier in E-Box, plenum chamber, position 7.
- Check wire connection from Battery (B+) (terminal 30) to Secondary Air Injection (AIR) pump relay -J299- (in 3-socket relay carrier in E-Box, plenum chamber, position 2) for open circuit.

⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations*





A

- Connect multimeter for voltage measurement as follows.

3-socket relay carrier in E-box, plenum chamber, position 2 terminal	Measure to
4	Engine Ground (GND)

- Operate starter briefly.

◆ Specified value: approx. battery voltage

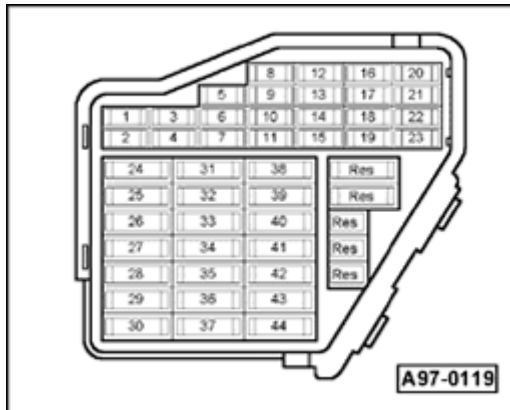
If specified value is not obtained:

- Perform the following tests marked with dots:

A

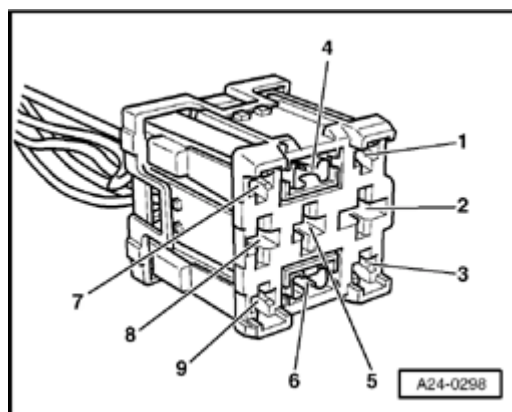
- Check fuse S234 (in fuse holder, position 34).
- Check wire connection from Secondary Air Injection (AIR) pump relay -J299- (in 3-socket relay carrier in E-box, plenum chamber) via fuse S234 (in fuse holder, position 34) to Fuel Pump (FP) relay for open circuit:

⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations*



Checking activation of the Secondary Air Injection (AIR) pump relay

- Switch ignition off.
- Remove Secondary Air Injection (AIR) pump relay.
- Connect VAG1527B voltage tester as follows:



3-terminal relay carrier in E-box, plenum chamber, position 2

terminal

Measure to

6

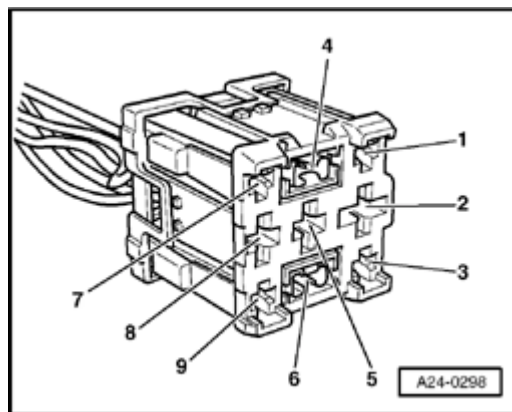
Engine Ground (GND)

- Initiate output Diagnostic Test Mode (DTM) and activate Secondary Air Injection (AIR) pump relay -J299-.
 - ◆ LED must blink.

If LED does not blink:

- Switch ignition off.
- Connect VAG1598/31 test box at wiring harness to ECM, do not connect ECM.

26-43



A

- Check the following wire connection for open circuit and short circuit to Ground (GND) and B+:

3-terminal relay carrier in E-box, plenum chamber, position 2	VAG1598/31 test box
terminal	socket
6	46

- Repair open circuit or short circuit if necessary.

If no malfunctions are detected:

- Replace Secondary Air Injection (AIR) pump relay -J299-.

Checking voltage supply of the Secondary Air Injection (AIR) pump motor

- Remove harness connector for Secondary Air Injection (AIR) pump motor -V101-.
- Connect VAG1527B voltage tester between terminals 1 and 2.
- Initiate output Diagnostic Test Mode (DTM) and activate Secondary Air Injection (AIR) pump relay -J299- ⇒ [Page 26-42](#) .
 - ◆ LED must light.

If LED does not light:

- Perform the following tests marked with dots:

- Check wire connection from harness connector at Secondary Air Injection (AIR) pump motor -V101- to Secondary Air Injection (AIR) pump relay -J299- (in 3-socket relay carrier in E-Box, plenum chamber, position 2) for open circuit.

⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations*

- Check wire connection from harness connector at Secondary Air Injection (AIR) pump motor -V101- to Ground (GND) connection 1 in engine compartment wiring harness for open circuit:

⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations*

If no malfunctions are detected:

- Replace Secondary Air Injection (AIR) pump motor -V101-.