Charge pressure leak test with VAG 1687

Intake system, checking for leaks using VAG 1687 Diagnostic Tool

Diagnostic trouble codes (DTCs) related to fuel trim, charge pressure or mass air flow (MAF) may be caused by:

- Leaking (worn/torn) intake hoses during charge conditions
- Incorrectly torqued or improperly placed clamps on intake hoses etc. causing leaks during charge conditions

Check the charge air pressure system using the VAG 1687 Charge air system tester.

Special tool VAG 1687 Charge air system tester preliminary set-up

- Back off pressure regulator knob -2- of VAG 1687 fully to protect gauge when shop air supply is applied to assembly.

- Close valve -3- before gauge.
- Close valve -4- after gauge.

The shop air supply line will later be attached to the inlet of VAG 1687.

- Remove female fitting from tester (arrow) and install an appropriate "male" air fitting that will connect to your shop air supply line (⇒WARNING!).

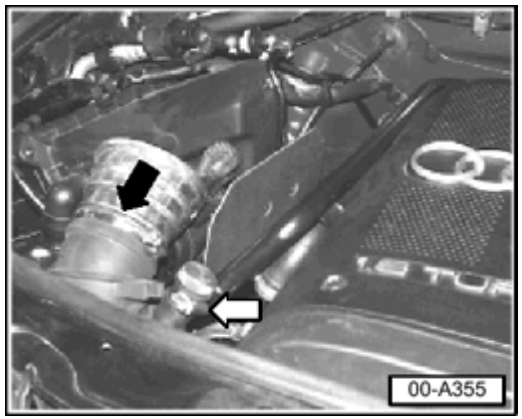
21-17

WARNING!

Use only approved air fittings to adapt shop air supply line to VAG 1687 tester.

Special tool VAG 1687/1 pressure adapter, installing (1.8L Turbo)

- Separate intake hose from Mass Air Flow (MAF) sensor assembly.

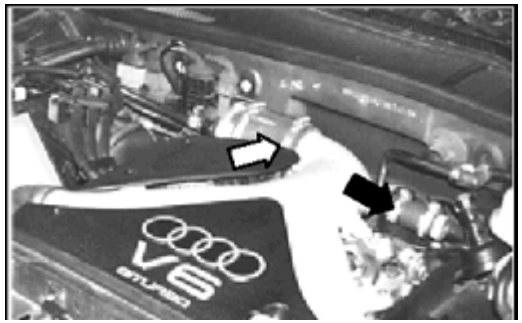


- Insert VAG 1687/1 pressure adapter in intake hose -black arrow- using existing clamp (as shown).
- Remove crankcase ventilation tube from intake hose at -white arrow-.

Special tool VAG 1687/1 pressure adapter, installing (2.7L BiTurbo)

- Remove upper air cleaner housing and hoses to intake manifold as necessary

⇒ *Repair Manual, Maintenance; Air cleaner housing, cleaning; Air cleaner element, replacing*



- Insert VAG 1687/1 pressure adapter in intake hose -white arrow- using existing clamp (as shown).
- Disconnect engine crankcase ventilation hose from intake manifold - black arrow-.
- Plug intake manifold fitting (for crankcase ventilation hose) with appropriate hose and metal plug using clamps supplied with VAG

1687/1 special tool kit.

21-18

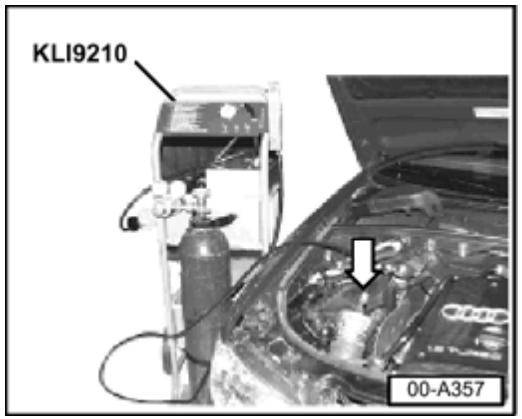
Note:

- *To help find small leaks, BEFORE pressurizing the system fill system with smoke using special tool KLI9210 and adapter KLI9210/50 as described on ⇒ Page 21-18 .*

- *An ultrasonic detector may also be used to detect extremely small leaks where smoke may not be visible.*

Special tool KLI9210 (Evaporative system leak detector), connecting to 1.8L Turbo

- Install optional fitting LKI9210/50 on hose of special tool KLI9210.



- Connect KLI9210 to VAG 1687/1 adapter (KLI9210 is shown attached to VAG 1687/1 at arrow on 1.8L Turbo).

Special tool KLI9210 (Evaporative system leak detector), connecting to 2.7L BiTurbo

- Install optional fitting LKI9210/50 on hose of special tool KLI9210.

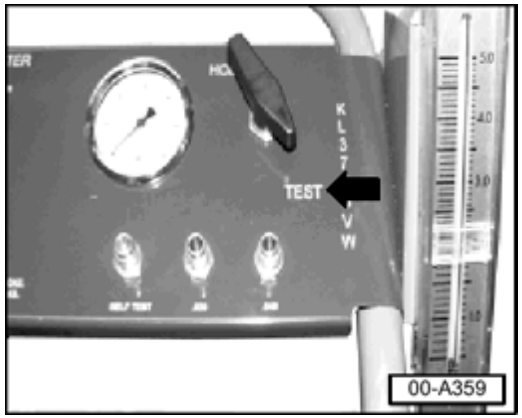
-
Connect KLI9210 to VAG 1687/1 adapter (KLI9210 is shown attached

to VAG 1687/1 at arrow on 2.7L BiTurbo).

21-19

Special tool LKI9210 (Evaporative system leak detector), preliminary set-up

- Connect smoke generator leads to vehicle battery.



- Turn valve to test -black arrow-.
- Press smoke generator button to fill system with smoke (see instructions printed on tester).

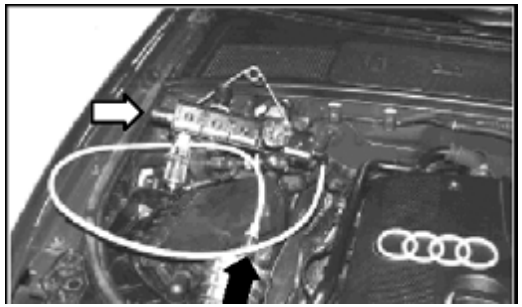
With system filled with smoke:

- Remove smoke generator hose and connect VAG1687 quickly to prevent smoke from leaking out ⇒ Page 21-19 .

Special tool VAG 1687, connecting to pressure adapter VAG 1687/1 (1.8L Turbo)

For illustrations purposes VAG is shown lying in the engine compartment. In practice the tool should be hung from the hood.

- Connect VAG 1687 quickly to prevent smoke from leaking out.



VAG 1687 is shown connected to VAG 1687/1 -black arrow-

Shop air supply will be connected to VAG 1687 -at white arrow-

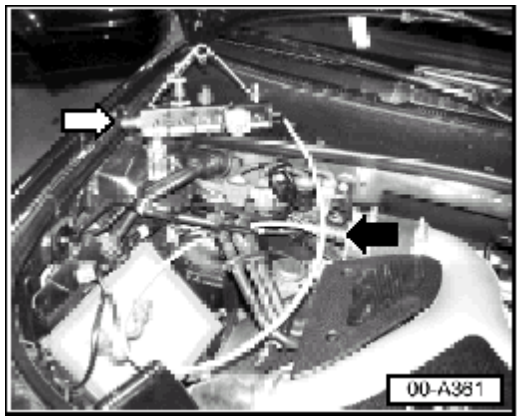
- Perform pressure test ⇒ Page 21-21 .

21-20

Special tool VAG 1687, connecting to pressure adapter VAG 1687/1 (2.7L BiTurbo)

For illustrations purposes VAG is shown lying in the engine compartment. In practice the tool should be hung from the hood.

- Connect VAG 1687 quickly to prevent smoke from leaking out.



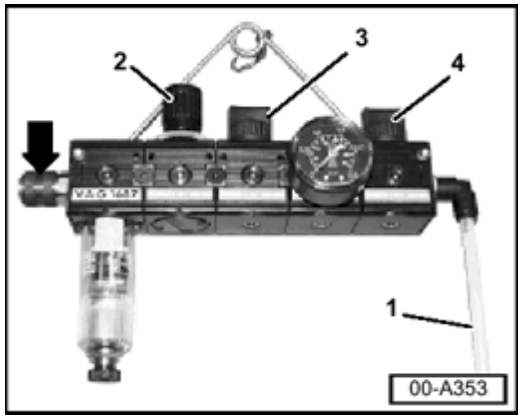
➢ VAG 1687 is shown connected to VAG 1687/1 -black arrow-

Shop air supply will be connected to VAG 1687 -at white arrow-

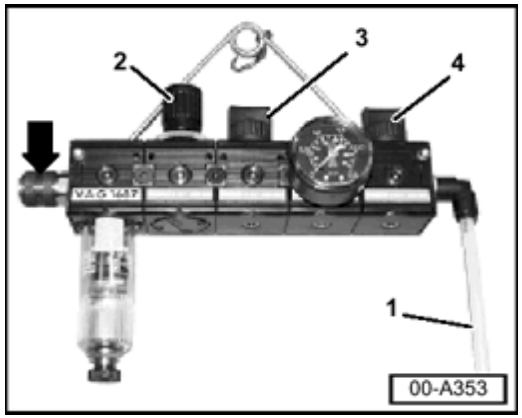
- Perform pressure test ⇒ Page 21-21 .

21-21

Performing pressure test:



- With outlet hose -1- of VAG 1687 connected to air pressure adapter:
- Attach shop air supply line to previously installed male fitting ⇒ Page 21-16 .



- Open valve -3- between regulator valve and gauge.
- Adjust test pressure up to 0.5 bar (⇒CAUTION below) by turning regulator valve -2-.

CAUTION!

- ***DO NOT pressurize the system above 0.5 bar!***
- ***Doing so may force oil into the intake system which can damage the engine.***

- Slowly open outlet valve -4- (after gauge) to test hose connections.
- Observe pressure gauge for a drop in pressure.

Note:

Some pressure will be lost past the throttle plate.

- Readjust test pressure to 0.5 bar (⇒CAUTION above) by turning regulator valve -2-.

- Listen for any very large intake leaks.

If smoke generator was used to fill the system with smoke:

- Inspect intake system connections for smoke at leaks.

Note:

An ultrasonic detector may also be used to detect extremely small leaks where smoke may not be visible.

- Repair any leaks found.

- Remove tester.

- Remove plug from crankcase ventilation hose.

- Remove air pressure adapter.

With VAS 5051 diagnostic tool connected:

- Erase DTC memory.

If smoke generator was not used to fill the system with smoke:

- Apply soapy water solution or equivalent to intake system connections.

21-23

Note:

An ultrasonic detector may also be used to detect extremely small leaks.

- Inspect intake system connections for leaks.
- Repair any leaks found.
- Remove tester.
- Remove plug from crankcase ventilation hose.
- Remove air pressure adapter.

With VAS 5051 diagnostic tool connected:

- Erase DTC memory.

21-24

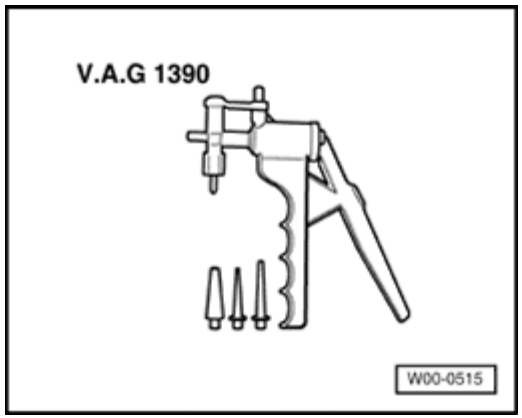
Mechanical air recirculation valve, checking

Note:

- *The mechanical air recirculation valve is upstream of the exhaust turbocharger. It is opened via vacuum by the recirculating valve for turbocharger -N249- under conditions of overrun, idling and partial load. This reduces the charge pressure upstream of the throttle valve. A high turbocharger speed is thus maintained.*

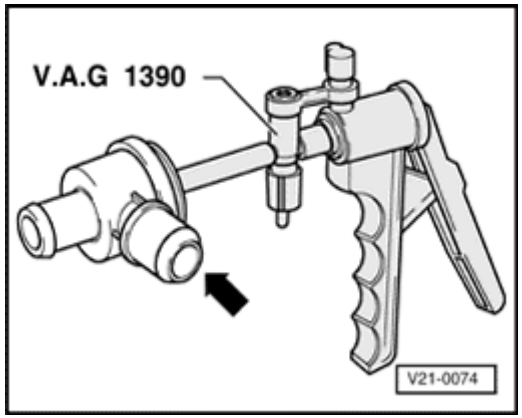
- *Check the air recirculation valve if the engine is not producing full power, or jerking when the throttle is opened and closed.*

Special tools and equipment



- Hand vacuum pump VAG 1390

21-25



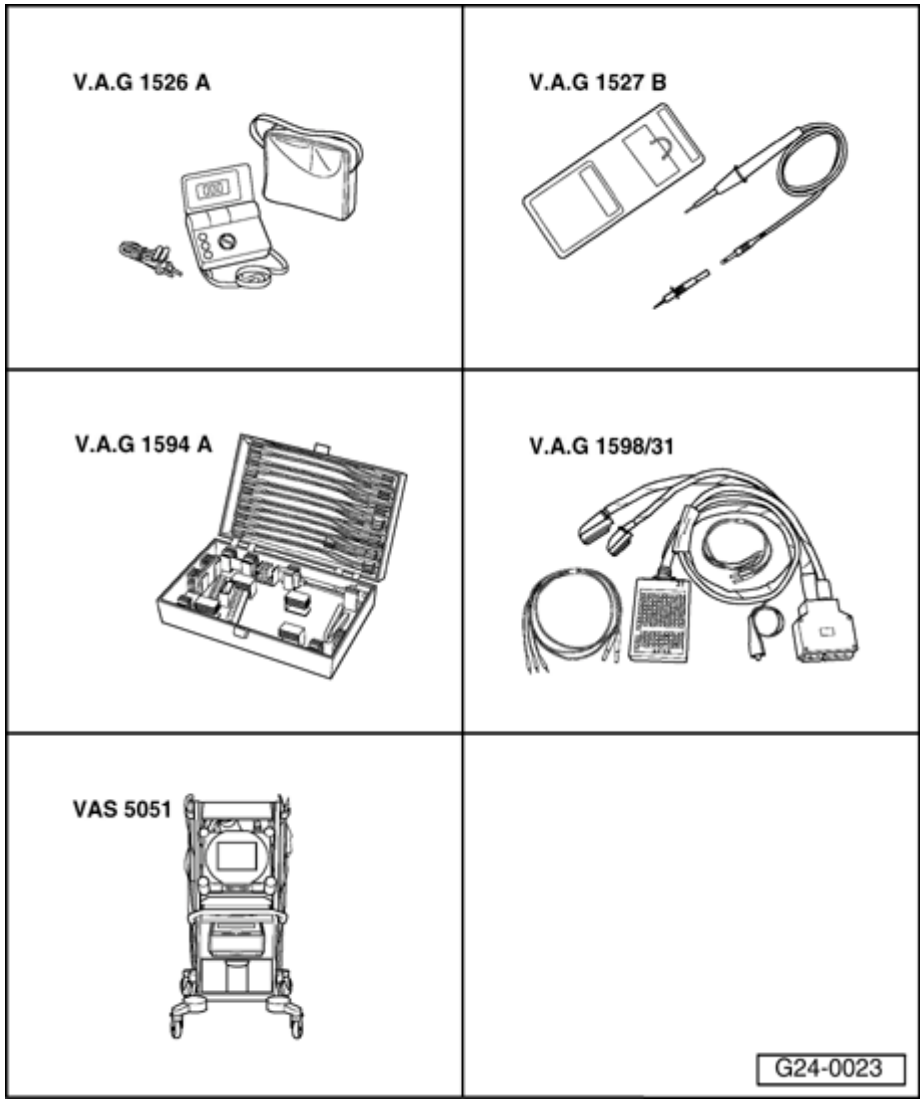
Test sequence

- Attach vacuum pump VAG 1390 to air recirculation valve.
- Actuate hand vacuum pump.
  - Air recirculation valve should open -arrow-
- Operate air vent valve on vacuum pump after about 30 seconds.
  - Air recirculation valve should close -arrow-

If the air recirculation valve does not open and close as specified, or if the valve plate does not seal properly when the valve is closed:

- Replace air recirculation valve and attach hose connections with hose clamps.

21-26



Recirculating valve for turbocharger - N249-, checking

Special tools and equipment

- VAG 1526 A
- VAG 1527 B
- VAG 1594 A
- VAG 1598/31
- VAS 5051 with VAS 5051/1

- or

- VAG 1551 with VAG 1551/3 A

21-27

Test requirements:

- Vehicle diagnostic, testing and information system VAS 5051 or VAG 1551 Scan Tool connected.

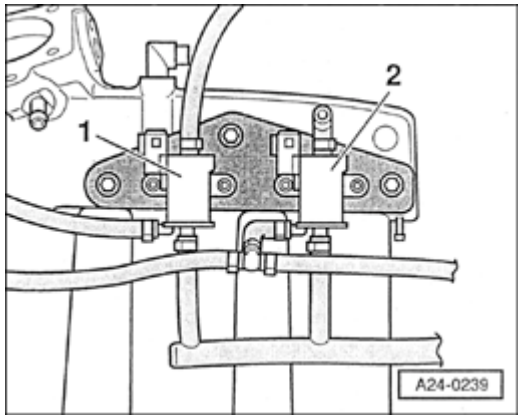
Test sequence

Note:

The recirculating valve for turbocharger -N249- and the wiring connections are monitored by the engine control module.

- Read Diagnostic Trouble Code (DTC) memory of engine control module.

If a DTC relating to the recirculating valve for turbocharger -N249- is displayed:



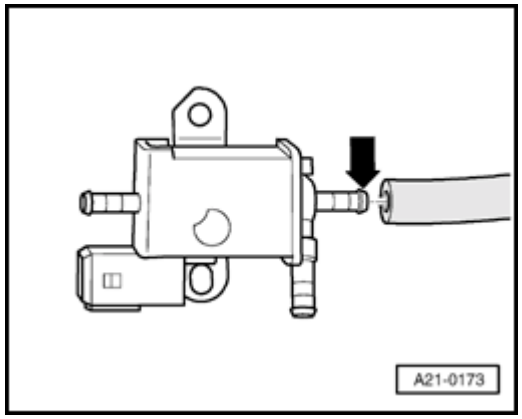
- Remove hoses of recirculating valve for turbocharger -N249- (-1-). The electrical connector remains plugged in.

♦ Location: below intake line

Note:

The illustration shows bottom view of removed intake line.

21-28



Output Diagnostic Test Mode →

Recircul. valve for turbocharger -N249-

- Connect auxiliary hose to valve connector marked with an arrow.
- Initiate output Diagnostic Test Mode (DTM) and activate recirculating valve for turbocharger -N249-.

Display:

- The valve should click ...
- ... and must open and close (check by blowing into the auxiliary hose).

If the injector does not click:

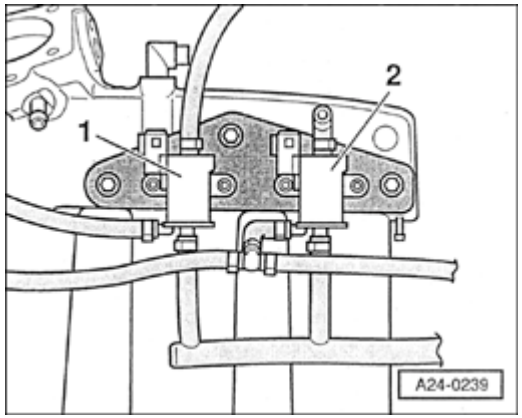
- Check internal resistance of valve.

If valve does not open or close properly:

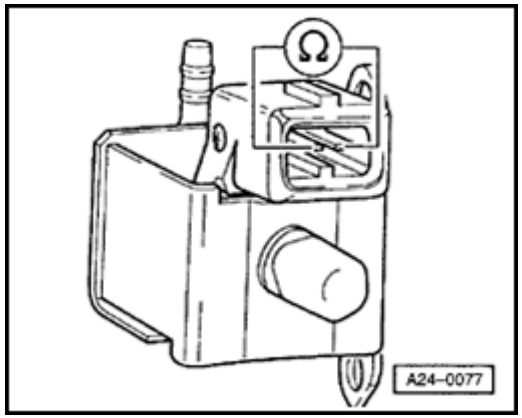
- Replace recirculation valve for turbocharger -N249-.

21-29

Checking internal resistance



- Disconnect connector from recirculation valve for turbocharger -N249- (-1-).



- Connect multimeter to injector to measure resistance.
  - Specified value: 27 to 30 Ω

If specified value is not attained:

- Replace recirculating valve for turbocharger -N249-.

If specified value is attained:

- Check power supply.

21-30

Checking power supply

Note:

The power supply for the recirculating valve is via the fuel pump relay.

Test requirements:

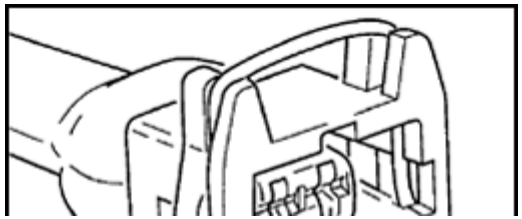
- Fuse for recirculating valve OK.

⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations binder*

- Fuel pump relay OK.

⇒ *Repair Manual, 1.8 Liter 4-Cyl. 5V Turbo Fuel Injection & Ignition, Engine Code(s): AWM, Repair Group 24*

- Disconnect wiring connector from valve.



- Connect voltage tester VAG 1527 B as follows:

Connector	Measure to

contact	
1	Engine Ground

- Operate starter briefly.

- The LED must light up.

21-31

If the LED does not light up:

- Check wiring from contact 1 on connector via fuse to fuel pump relay for an open circuit:

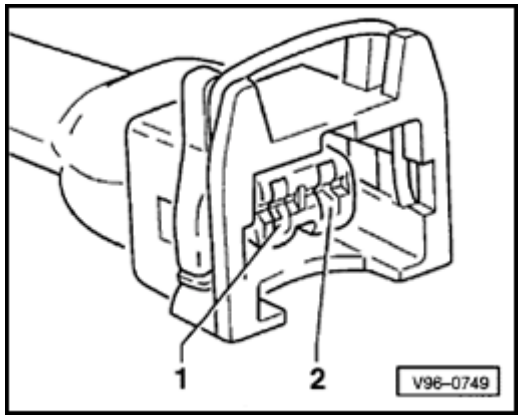
⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations binder*

- Repair open circuit, if necessary.

If the LED lights up:

- Check actuation.

Checking actuation



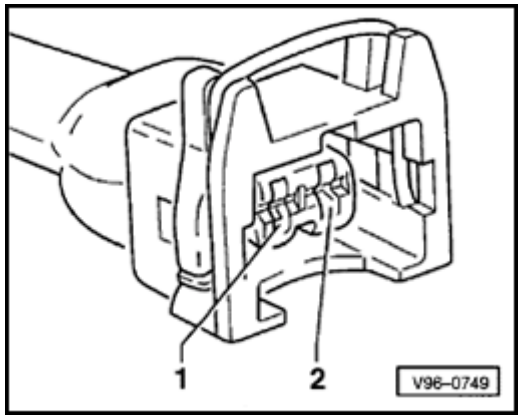
- Connect voltage tester VAG 1527 B to contacts 1 (positive) and 2 of connector.
- Initiate output Diagnostic Test Mode (DTM) and activate recirculatiing valve for turbocharger -N249-.
  - The LED must flash.

21-32

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

- Connect VAG 1598/31 test box to wiring harness leading to engine control module; engine control module should not be connected:

⇒ *Repair Manual, 1.8 Liter 4-Cyl. 5V Turbo Fuel Injection & Ignition, Engine Code(s): AWM, Repair Group 24*



- Check for open circuit and short to positive or Ground in following wiring connection:

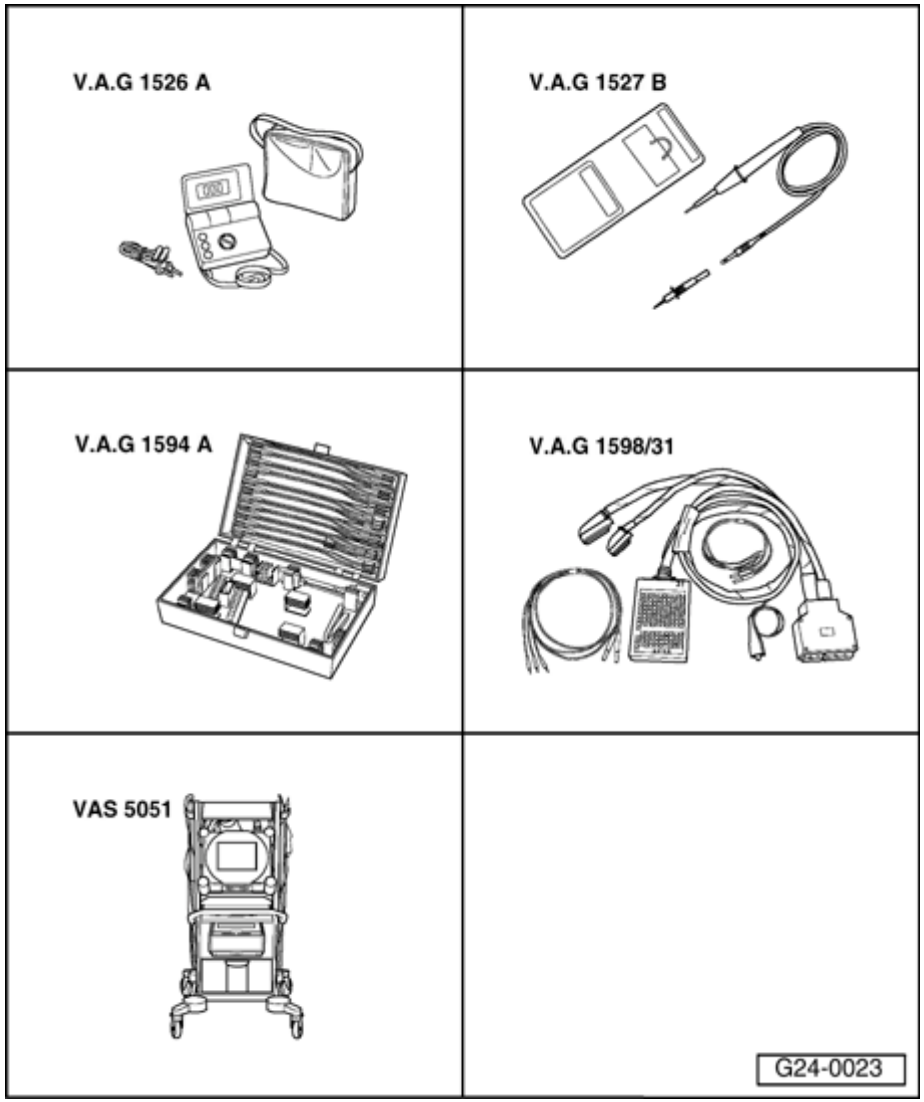
Connector Contact	Test box VAG 1598/31
2	105

- Repair any open/short circuit as necessary.

If the wiring is OK:

- Replace engine control module.

21-33



Wastegate Bypass Regulator valve -N75-, checking

Special tools and equipment

- VAG 1526 A
- VAG 1527 B
- VAG 1594 A
- VAG 1598/31
- VAS 5051 with VAS 5051/1

- or

- VAG 1551 with VAG 1551/3 A

21-34

Test requirements:

- Vehicle diagnostic, testing and information system VAS 5051 or VAG 1551 Scan Tool connected.

Test sequence

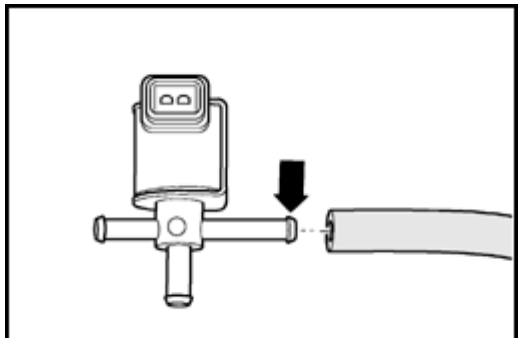
Note:

The Wastegate Bypass Regulator valve -N75- and the wiring connections are monitored by the engine control module.

- Read Diagnostic Trouble Code (DTC) memory of engine control module.

If a DTC relating to the Wastegate Bypass Regulator valve -N75 is displayed:

- Disconnect hoses from valve but leave electrical connector attached.



- Connect auxiliary hose to valve connector marked with an arrow.
- Initiate output Diagnostic Test Mode (DTM) and actuate Wastegate Bypass Regulator valve -N75-.

21-35

Output Diagnostic Test Mode →

-N75- wastegate bypass regulator valve

➢ Display

- The valve must click ...
- ... and must open and close (check by blowing into the auxiliary hose).

If the injector does not click:

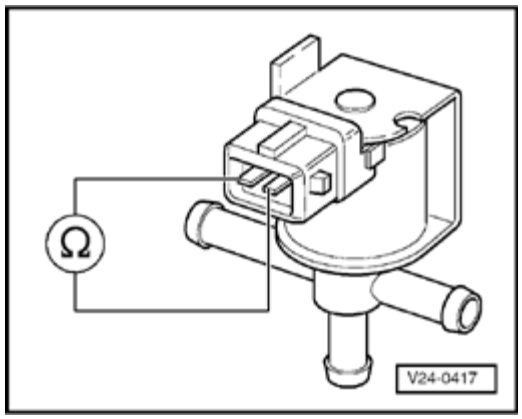
- Check internal resistance of valve.

If valve does not open or close properly:

- Replace Wastegate Bypass Regulator valve -N75-.

Checking internal resistance

- Disconnect connector from valve.



➢
- Connect multimeter to injector to measure resistance.
- Specified value: 25 to 35 Ω

If specified value is not attained:

- Replace Wastegate Bypass Regulator valve -N75-.

If specified value is attained:

- Check power supply.

21-36

Checking power supply

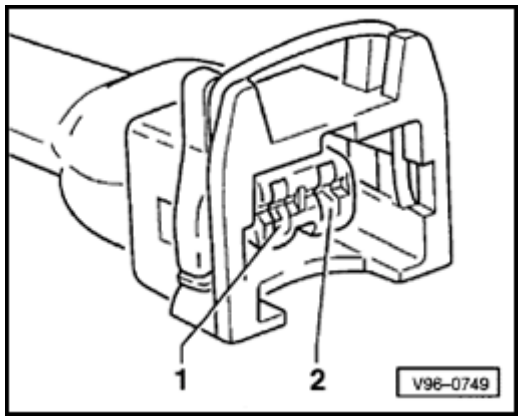
Test requirements:

- Fuse for wastegate bypass regulator valve OK

⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations binder*

- Fuel pump relay OK.

⇒ *Repair Manual, 1.8 Liter 4-Cyl. 5V Turbo Fuel Injection & Ignition, Engine Code(s): AWM, Repair Group 24*



- Connect voltage tester VAG 1527 B as follows:

Connector contact	Measure to
1	Engine Ground

- Operate starter briefly.
  - ♦ LED must light up.

If the LED does not light up:

- Check wiring from contact 1 on connector via fuse to fuel pump relay for open circuit:

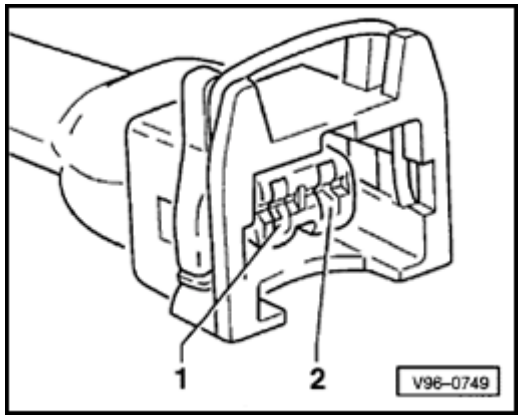
⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations binder*

- Repair open circuit, if necessary

If the LED lights up:

- Check actuation.

Checking actuation



Output Diagnostic Test Mode

- Connect voltage tester VAG 1527 B to contacts 1 (positive) and 2 of connector.
- Initiate output Diagnostic Test Mode (DTM) and actuate Wastegate Bypass Regulator valve -N75-.

Display

→ **-N75- wastegate bypass regulator valve**

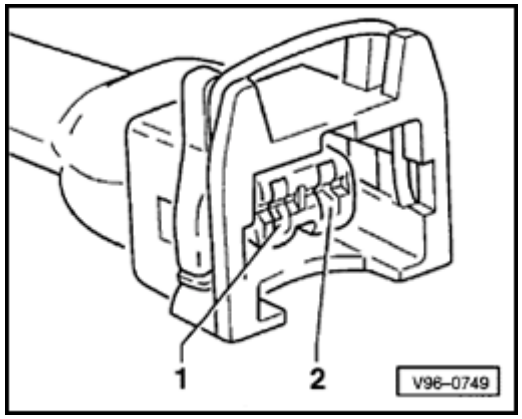
- LED must flash.

21-38

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

- Connect VAG 1598/31 test box to wiring harness leading to engine control module; engine control module should not be connected:

⇒ *Repair Manual, 1.8 Liter 4-Cyl. 5V Turbo Fuel Injection & Ignition, Engine Code(s): AWM, Repair Group 24*



- Check for open circuit and short to positive or Ground in following wiring connection:

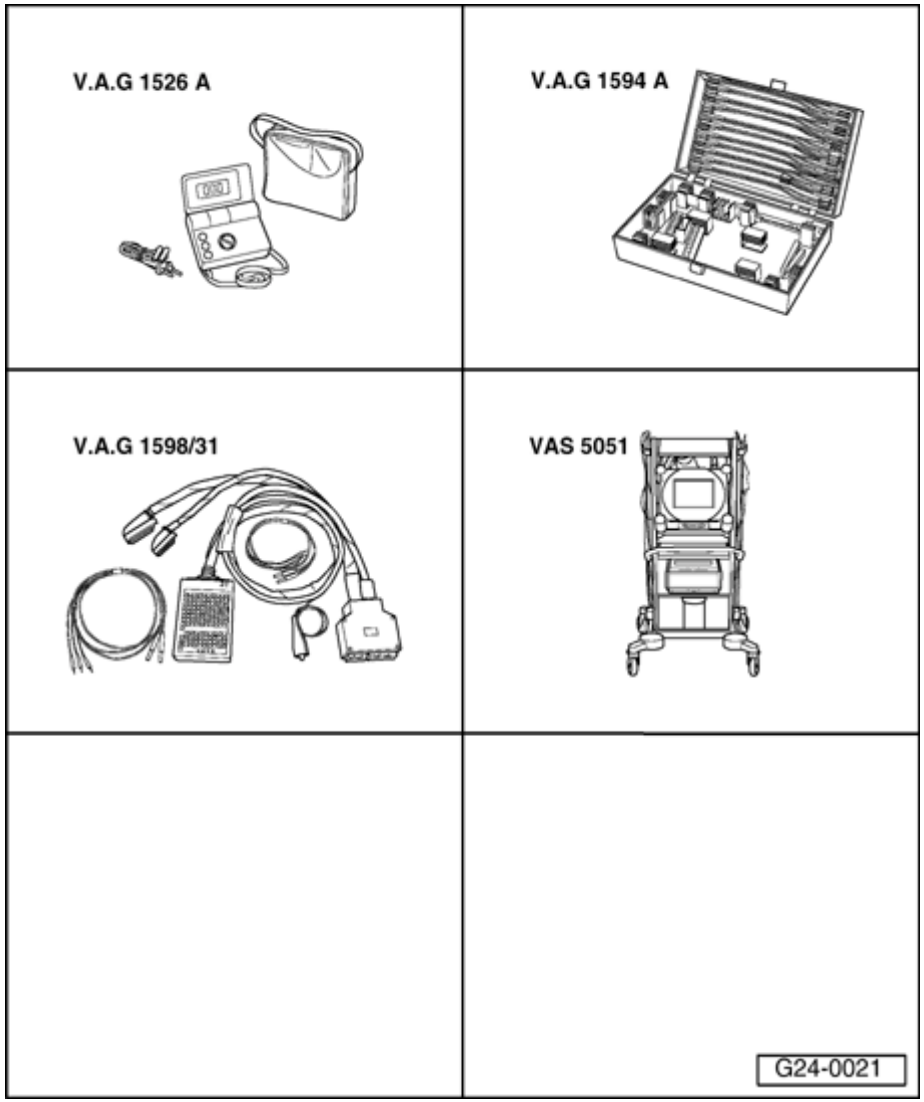
Connector Contact	Test box VAG 1598/31
2	104

- Repair any open/short circuit as necessary.

If the wiring is OK:

- Replace engine control module.

21-39



Charge Air Pressure sensor -G31-, checking

Special tools and equipment

- VAG 1526 A
- VAG 1594 A
- VAG 1598/31
- VAS 5051 with VAS 5051/1

- or

- VAG 1551 with VAG 1551/3 A

21-40

Test requirements:

- Vehicle diagnostic, testing and information system VAS 5051 or VAG 1551Scan Tool connected.

Test sequence

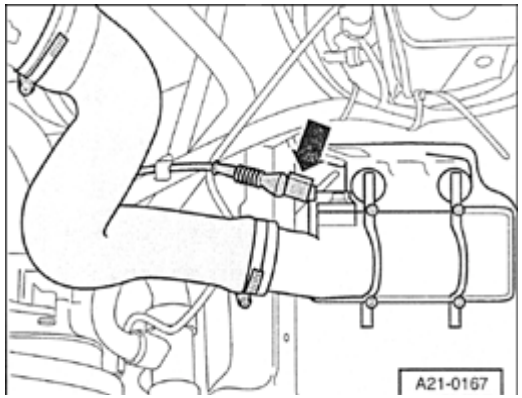
Note:

The Charge Air Pressure sensor -G31- and the wiring connections are monitored by the engine control module.

- Read Diagnostic Trouble Code (DTC) memory of engine control module.

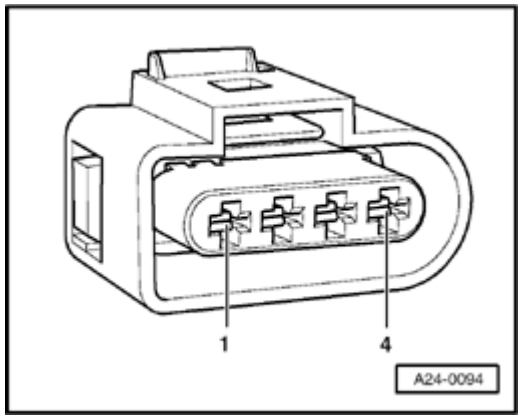
If a DTC relating to the Charge Air Pressure sensor -G31- is displayed:

Checking power supply



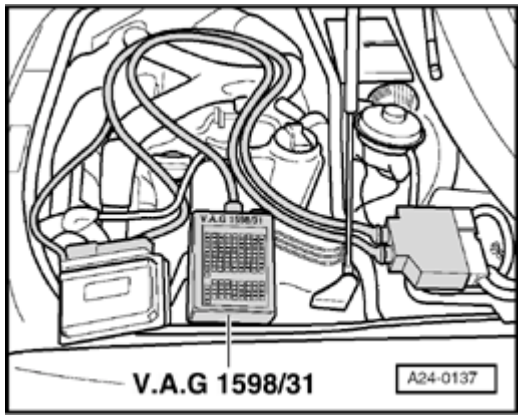
- Disconnect connector -arrow- on charge pressure sender.

21-41



- Connect multimeter between contacts 1 and 3 of connector to measure voltage.
- Switch ignition on.
  - Specified value: approx. 5 V

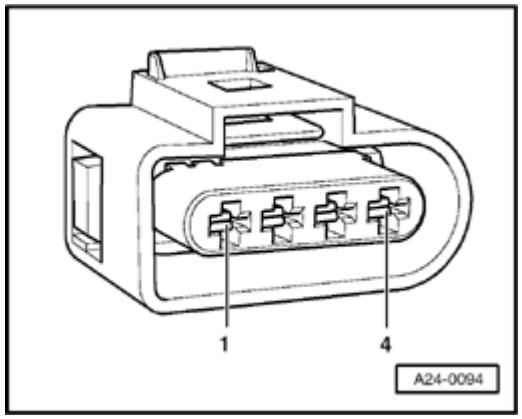
If specified value is not attained:



- Connect VAG 1598/31 test box to wiring harness leading to engine control module; engine control module must also be connected.

⇒ *Repair Manual, 1.8 Liter 4-Cyl. 5V Turbo Fuel Injection & Ignition, Engine Code(s): AWM, Repair Group 24*

21-42



- Check for open circuit and short to positive or Ground in following wiring connections:

Connector contact	Test box VAG 1598/31
1	108
3	98

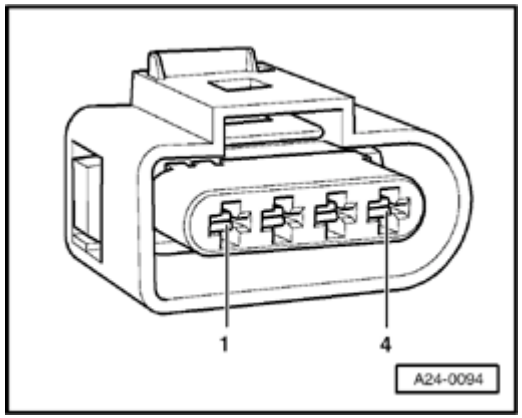
- Repair any open/short circuit as necessary.

If specified value is attained:

Checking signal wire

- Attach connector from charge air pressure sensor.
- Attach multimeter for voltage test to socket 101 and socket 108 of test box.
- Start engine and run at idling speed.
  - Specified value: approx. 1.90 V
- Bring engine to speed by spontaneous acceleration.
  - Specified value: 2.00...3.00 V

21-43



If specified values are not attained:

- Check for open circuit and short to positive or Ground in following wiring connection:

Connector contact	**Test box VAG 1598/31**
4	101

- Repair any open/short circuit as necessary.

If the wiring is OK:

- Replace Charge Air Pressure sensor -G31-.