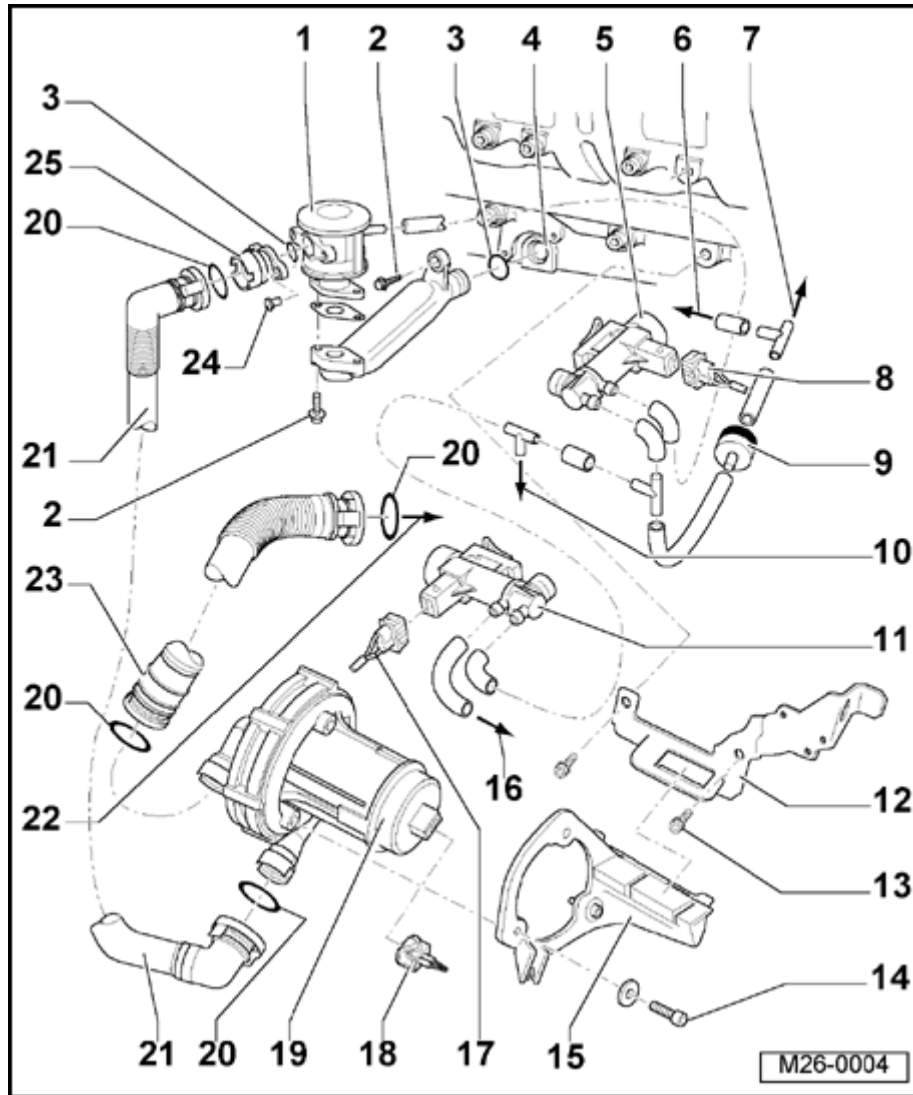




Secondary Air System

Function

During a cold start (+15 ° C to +35 ° C coolant temperature), the secondary air system blows air behind the exhaust valve for 65 seconds. This enriches the exhaust with oxygen, and starts after-burning, thereby reducing the catalytic converter warm-up phase. Control passes from the engine control unit -J220- across the air injector reaction pump relay -J229- to the secondary air valve (-N112-, switch-over valve) and combination valve. In addition, on every subsequent start of the engine (up to a maximum engine temperature of 85 ° C), the secondary air system will idle for 5 seconds after a delay of about 20 seconds and the self-diagnosis is run.



Secondary air system components, removing and installing

Notes:

- ◆ The components labeled with * are checked by self-diagnosis:

⇒ [Repair Manual, 2.8 Liter VR6 2V Fuel Injection & Ignition, Engine Code\(s\): AFP, Repair Group 01](#)

- ◆ The components labeled with ** are checked by output diagnostic test mode:

⇒ [Repair Manual, 2.8 Liter VR6 2V Fuel Injection & Ignition, Engine Code\(s\): AFP, Repair Group 01](#)

- ◆ Air pump relay -J299- ** ⇒ [Page 26-20](#) , Fig. ⇒ [1](#)

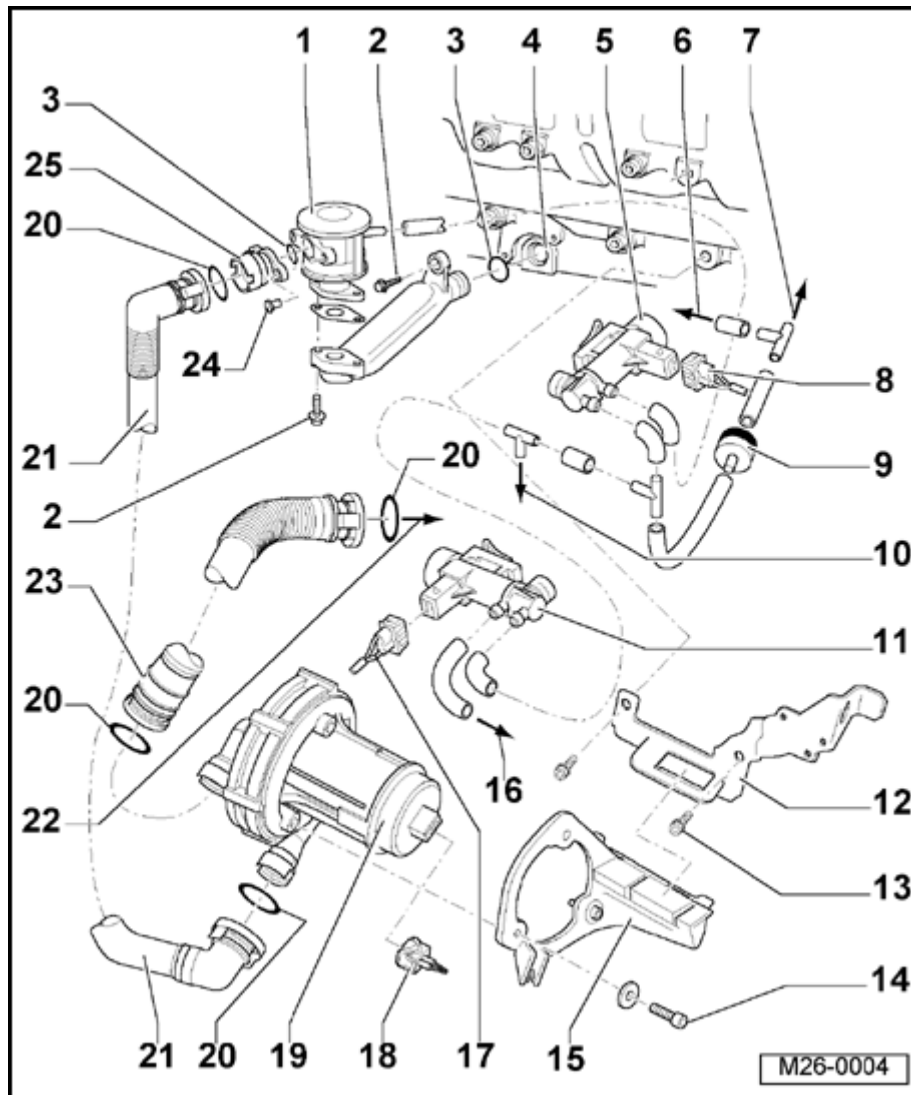
1 - Combination valve

- ◆ Checking ⇒ [Page 26-21](#)
- ◆ Removing and installing ⇒ [Page 26-31](#)

2 - 10 Nm

3 - O-Ring

- ◆ Always replace



4 - Air duct

- ◆ In the cylinder head

5 - Secondary air valve (N112)*/**

6 - To fuel pressure regulator

7 - To intake manifold

8 - Connector

- ◆ Black, 2-way
- ◆ For secondary air valve

9 - Check valve

- ◆ White terminal points to the secondary air valve - N112-

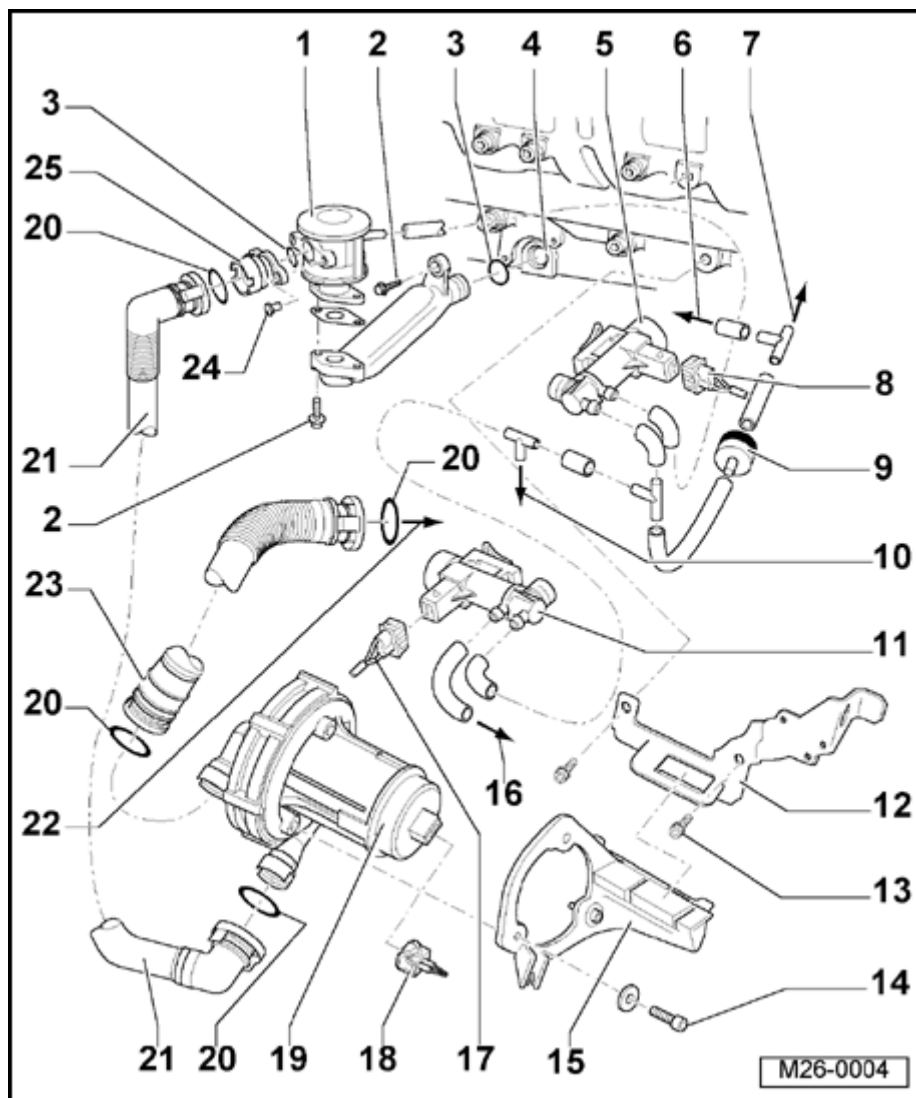
10 - To vacuum tank

- ◆ Fastened to the front oil pan

11 - Intake manifold cross-over valve (N156)

- ◆ Clipped onto the bracket of the oil filter casing
- ◆ Bracket for intake manifold cross-over valve ⇒ [Page 13-24](#), item 23

12 - Bracket



13 - 25 Nm

14 - 10 Nm

15 - Bracket

◆ For air pump motor -V101-

◆ For secondary air valve -N112-

16 - To vacuum adjusting screw for intake manifold cross-over

17 - Connector

◆ Black, 2-way

◆ For register intake manifold cross-over valve -N156-

18 - Connector

◆ Black, 2-way

◆ For air pump motor

19 - Air pump motor -V101-**

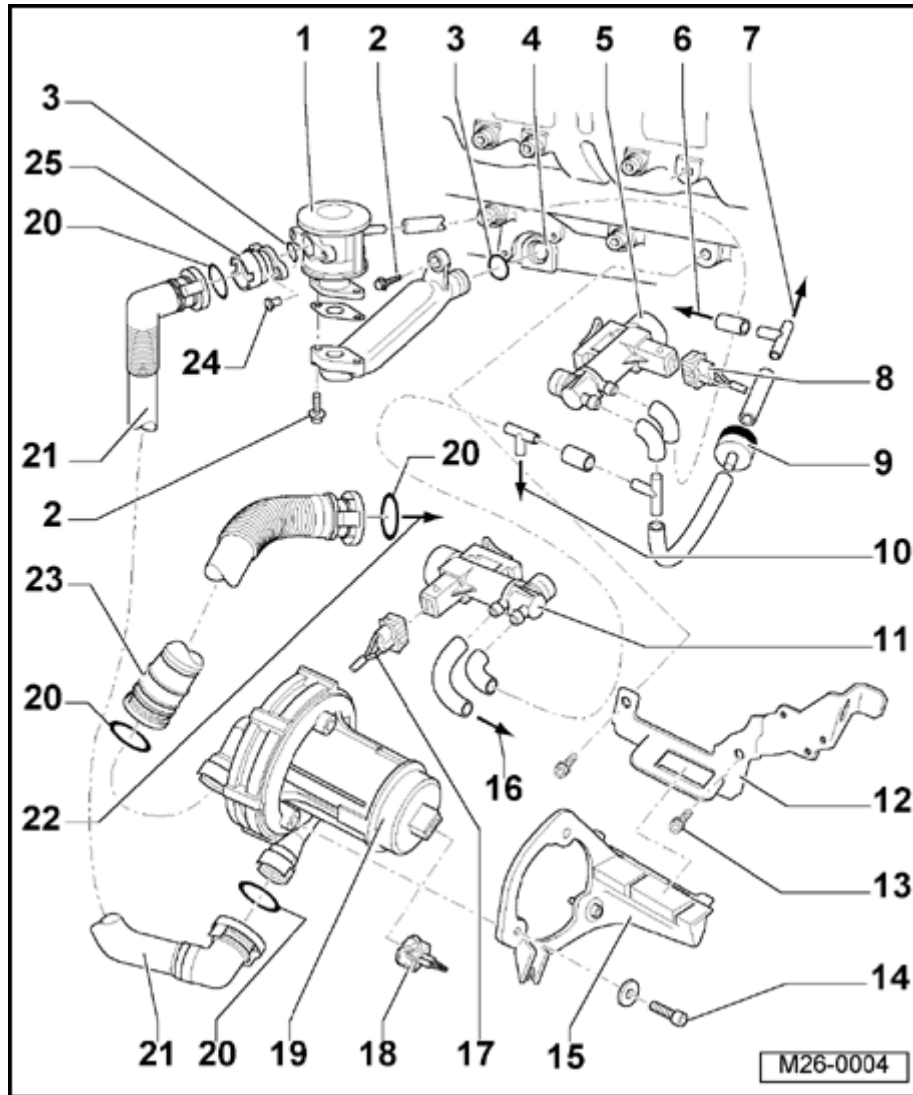
◆ On the front engine block

◆ For removing and installing, put lock carrier into service position:

⇒ [Repair Manual, Body Exterior, Repair Group 50](#)

- ◆ Loosen the air conditioning compressor from its bracket

⇒ [*Repair Manual, Heating & Air Conditioning, Repair Group 87*](#)



20 - O-Ring

- ◆ Replace if damaged

21 - Discharge hose

- ◆ Make sure tight fit

22 - To top of air filter

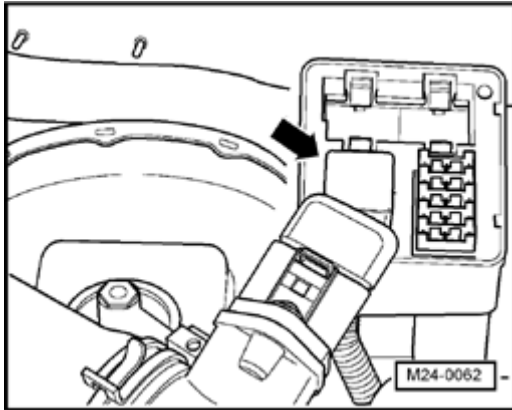
23 - Intake hose

- ◆ Make sure tight fit

24 - 5 Nm

25 - Screw connections

- ◆ For combination valve



A

Fig. 1 Air pump relay -J299- -arrow-

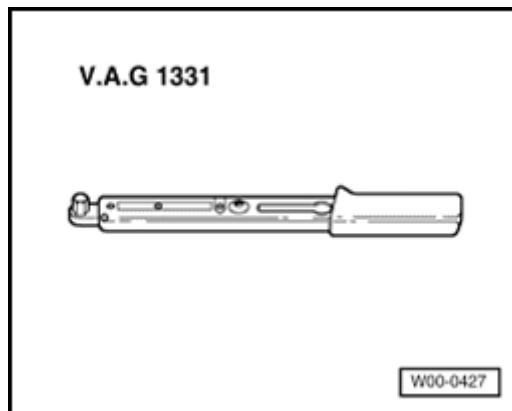
Notes:

- ◆ *First disconnect battery ground strap if tools are needed to pull relay or control units out of the relay board.*
- ◆ *Before disconnecting the battery, disable the radio theft-deterrent feature by entering the appropriate code.*
- ◆ *Mounting location: on the left in the engine compartment, in a protective housing, next to the power brake booster*



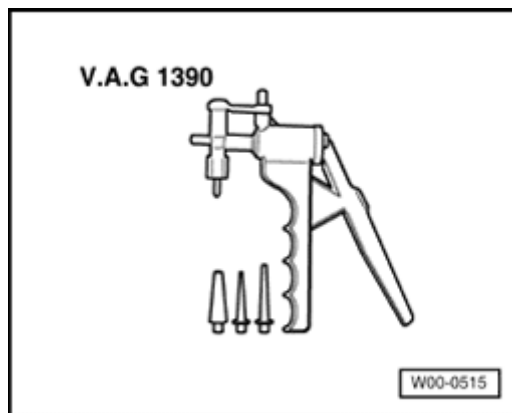
Combination valve, checking

Special tools, equipment, test and inspection devices; required accessories



A

- ◆ VAG 1331 torque wrench (5-50 Nm) or equivalent



A

- ◆ VAG 1390 manual vacuum pump



Test conditions

- No error in fault memory:

⇒ [Repair Manual, 2.8 Liter VR6 2V Fuel Injection & Ignition, Engine Code\(s\): AFP, Repair Group 01](#)

- Output diagnostic test mode completed:

⇒ [Repair Manual, 2.8 Liter VR6 2V Fuel Injection & Ignition, Engine Code\(s\): AFP, Repair Group 01](#)

- Vacuum lines and hose connections tight
- Vacuum lines not clogged or kinked

Test sequence

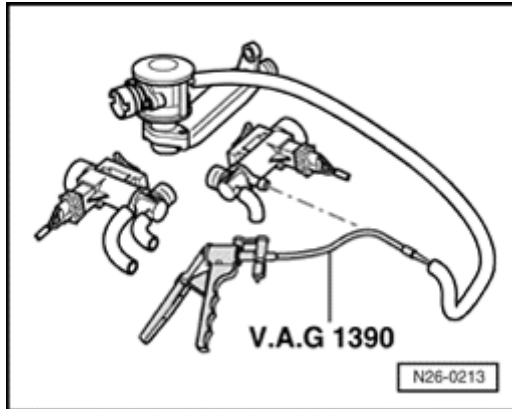
- Remove damping pans:

⇒ [Repair Manual, Body Exterior, Repair Group 50](#)

- Pull vacuum hose off combination valve on secondary air valve -N112-.

Location:

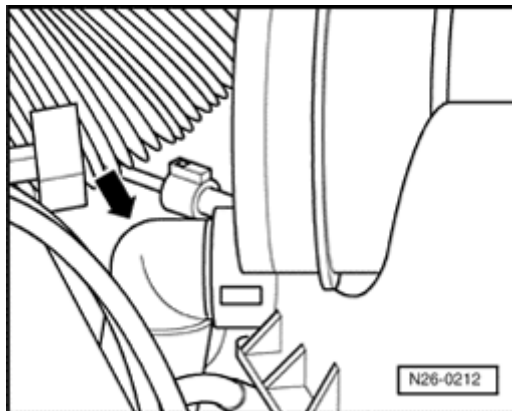
⇒ [Repair Manual, 2.8 Liter VR6 2V Fuel Injection & Ignition, Engine Code\(s\): AFP, Repair Group 24](#)



- A**
- Connect VAG 1390 manual vacuum pump on vacuum hose to combination valve.

Note:

Do not use any compressed air in the following test!



- A**
- Remove intake hose to combination valve on top of air filter -arrow- and blow in with low pressure.

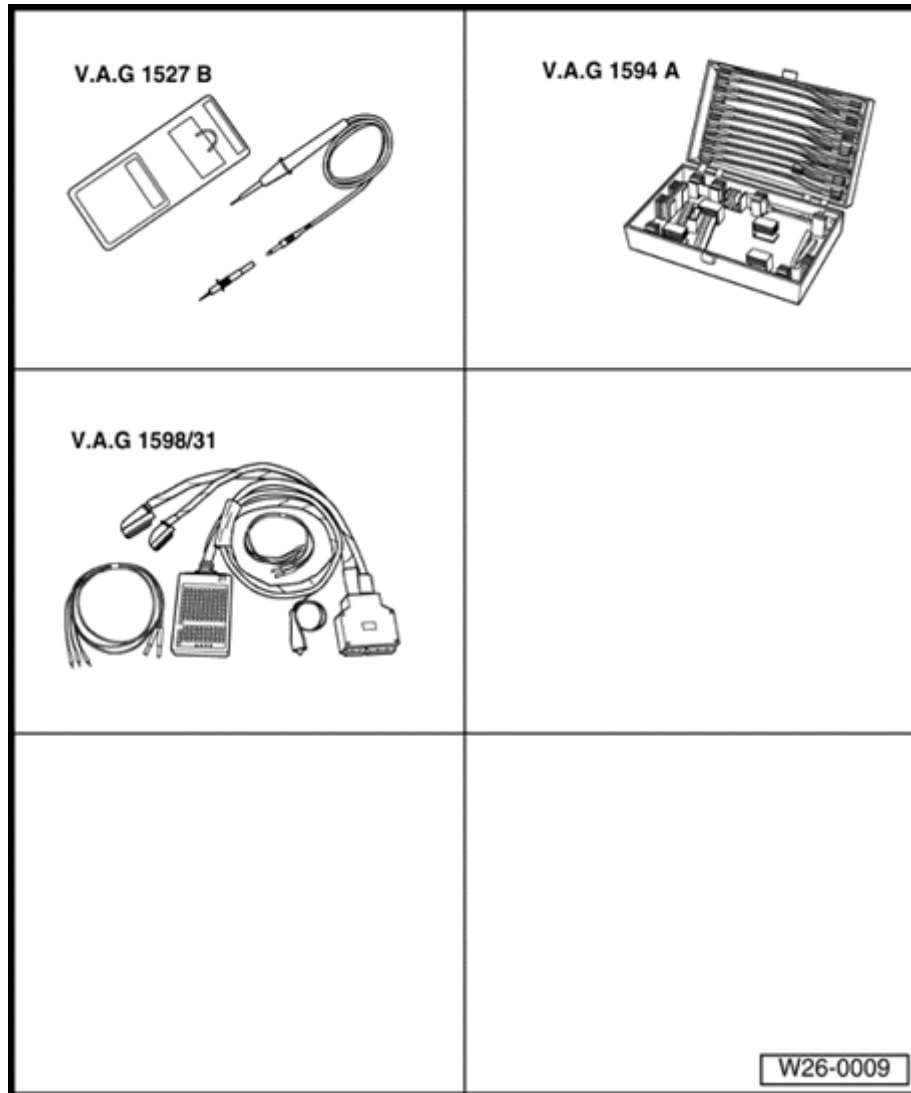
The combination valve must be closed.

- Start hand pump.

The combination valve should open.

If the combination valve does not open:

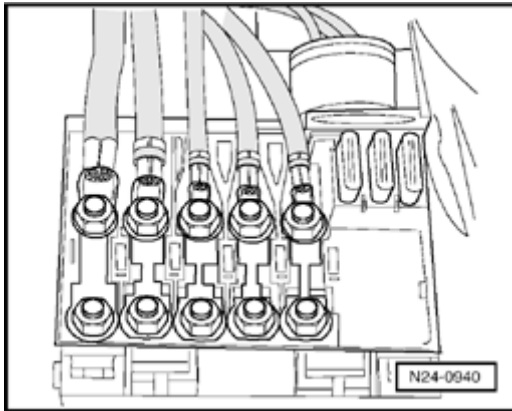
- Replace combination valve ⇒ [Page 26-31](#) .



Motor for secondary air injection pump, checking

Special tools, equipment, test and inspection devices; required accessories

- ◆ VAG 1527 B diode test lamp
- ◆ VAG 1594 A auxiliary measuring tool set
- ◆ VAG 1598/31 test box

**A****Test condition**

- The main fuses must be OK.
- The battery voltage must be at least 11.5 V.

Test sequence

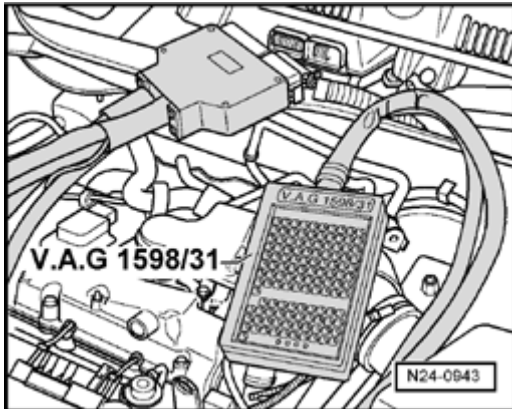
- Remove engine cover.
- Remove discharge hose on air pump motor ⇒ [Page 26-19](#) , item 21 .

Note:

Press the buttons on the hose couplings together.

- Remove windshield wiper arms and cowl:

⇒ [Repair Manual, Electrical Equipment, Repair Group 92](#)



A

- Connect VAG 1598/31 test box to control unit wiring.
 - Switch ignition on.
 - Bypass jacks 3 + 46 on test box using auxiliary cables from VAG 1594.
- The air pump motor should run and air should be coming out the exhaust nozzles.

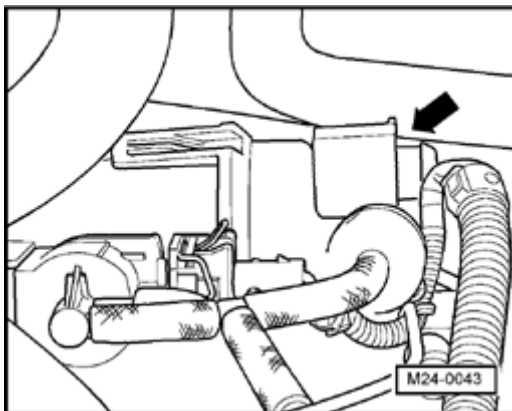
If the motor is running, but no air is coming out:

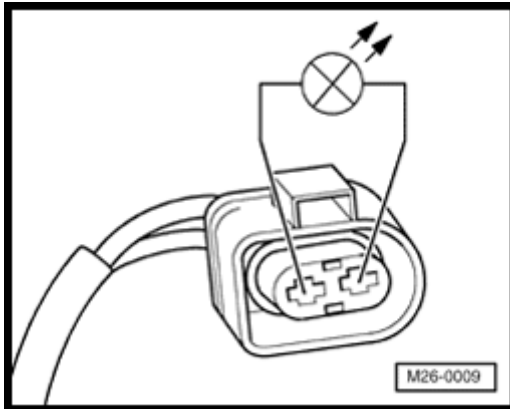
- Switch ignition off.
- Replace air pump motor -V101- ⇒ [Page 26-18](#) , item 19 .

If the motor does not start:

A

- Disconnect 2-pin connector from motor -arrow-.





A

- Connect VAG 1527B diode test lamp to disconnected attachment plug using auxiliary cables from VAG 1594.

The LED should illuminate.

If the LED illuminates (power supply OK):

- Turn off ignition.
- Replace air pump motor (V101) ⇒ [Page 26-18](#) , item 19 .

If the LED does not illuminate:

- Clip on 2-terminal attachment plug.
- Start control element diagnosis and trigger air pump relay -J299-:

⇒ [Repair Manual, 2.8 Liter VR6 2V Fuel Injection & Ignition, Engine Code\(s\): AFP, Repair Group 01](#)

- Check DTC memory:

⇒ [Repair Manual, 2.8 Liter VR6 2V Fuel Injection & Ignition, Engine Code\(s\): AFP, Repair Group 01](#)

- Read-out readiness code:

⇒ [Repair Manual, 2.8 Liter VR6 2V Fuel Injection & Ignition, Engine Code\(s\): AFP, Repair Group 01](#)

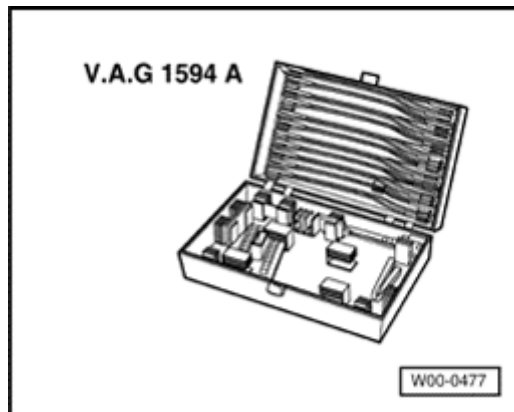
- If fault memory was erased or engine control unit was separated from positive voltage supply, readiness code must be regenerated:

⇒ [Repair Manual, 2.8 Liter VR6 2V Fuel Injection & Ignition, Engine Code\(s\): AFP, Repair Group 01](#)



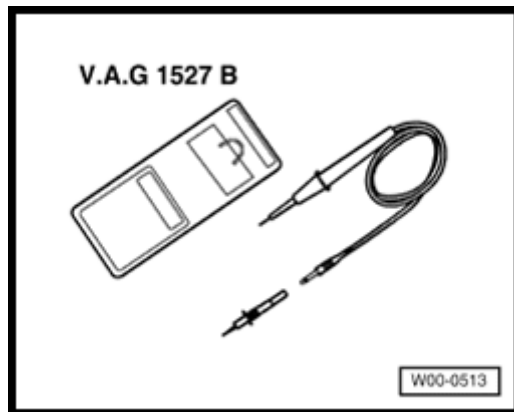
Secondary air valve, checking

Special tools, equipment, test and inspection devices; required accessories



A

- ◆ VAG 1594 A auxiliary measuring tool set

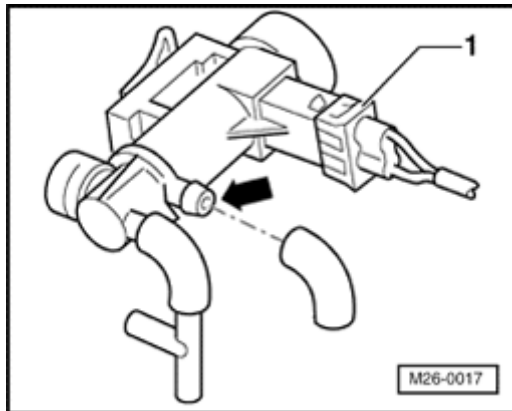


A

- ◆ VAG 1527 B diode test lamp

Test condition

- Coolant temperature 5-33 ° C
- Air pump motor OK; checking ⇒ [Page 26-24](#)



Test sequence

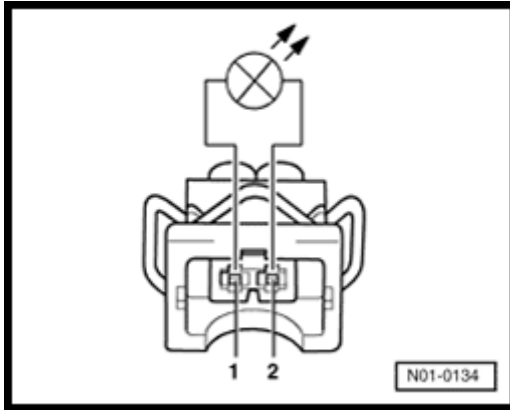
A

- Pull upper vacuum hose -arrow- of secondary air valve.
- Start motor and let it idle.

If the motor starts, it will be possible to feel a vacuum at the secondary air valve inlet nozzles.

If no vacuum can be detected:

- Switch ignition off.
- Remove 2-pin connector from secondary air valve -1- .



A

- Connect VAG 1527 diode test lamp to disconnected attachment plug using auxiliary cables from VAG 1594.

If the LED illuminates (power supply OK):

- Turn off ignition.
- Replace secondary air valve -N112- ⇒ [Page 26-17](#) , item 5 .

If the LED does not illuminate:

- Clip on 2-terminal attachment plug.
- Start the control element diagnosis and trigger the secondary air valve -N112-:

⇒ [Repair Manual, 2.8 Liter VR6 2V Fuel Injection & Ignition, Engine Code\(s\): AFP, Repair Group 01](#)

- Check DTC memory:

⇒ [Repair Manual, 2.8 Liter VR6 2V Fuel Injection & Ignition, Engine Code\(s\): AFP, Repair Group 01](#)

- Read-out readiness code:

⇒ [Repair Manual, 2.8 Liter VR6 2V Fuel Injection & Ignition, Engine Code\(s\): AFP, Repair Group 01](#)

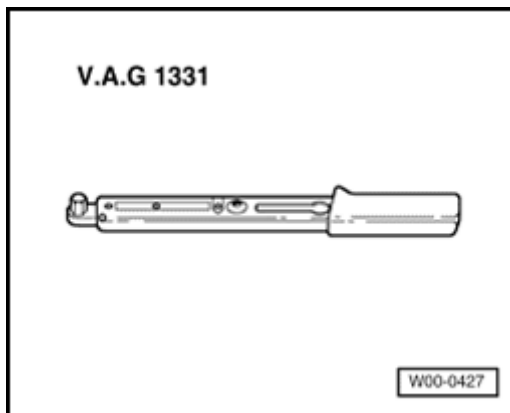
- If fault memory was erased or engine control unit was separated from positive voltage supply, readiness code must be regenerated:

⇒ [Repair Manual, 2.8 Liter VR6 2V Fuel Injection & Ignition, Engine Code\(s\): AFP, Repair Group 01](#)



Combination valve, removing and installing

Special tools, equipment, test and inspection devices; required accessories



A

- ◆ VAG 1331 torque wrench (5-50 Nm) or equivalent

Removing

Note:

The battery ground strap must eventually be disconnected in the further course of work. Check whether the vehicle has a coded radio system. It may be necessary to disable the theft-deterrent feature by entering the appropriate code.

- With ignition off, disconnect battery.
- Remove damping pans:

⇒ [Repair Manual, Body Exterior, Repair Group 50](#)

- Put lock carrier into service position:

⇒ [Repair Manual, Body Exterior, Repair Group 50](#)

Vehicles with air conditioning

- Remove poly V-belt ⇒ [Page 13-28](#) .
- Remove air conditioning compressor:

⇒ [Repair Manual, Heating & Air Conditioning, Repair Group 87](#)



- Remove refrigerant line retention strap(s).

CAUTION!

The A/C refrigerant circuit must not be opened!

Notes:

- ◆ *The refrigerant circuit may only be opened in workshops which have both the trained personnel and the proper tools and equipment.*
- ◆ *To prevent damage to the condenser and the refrigerant lines/hoses, be careful that the lines and hoses are not overextended, creased, or bent.*

Procedure for all vehicles

- Remove discharge hose on combination valve between combination valve and air pump.
- Remove vacuum hose on combination valve.
- Remove combination valve from bottom of intake manifold and pull it out along with

connection nozzles.

Install

Installation is in reverse sequence.