

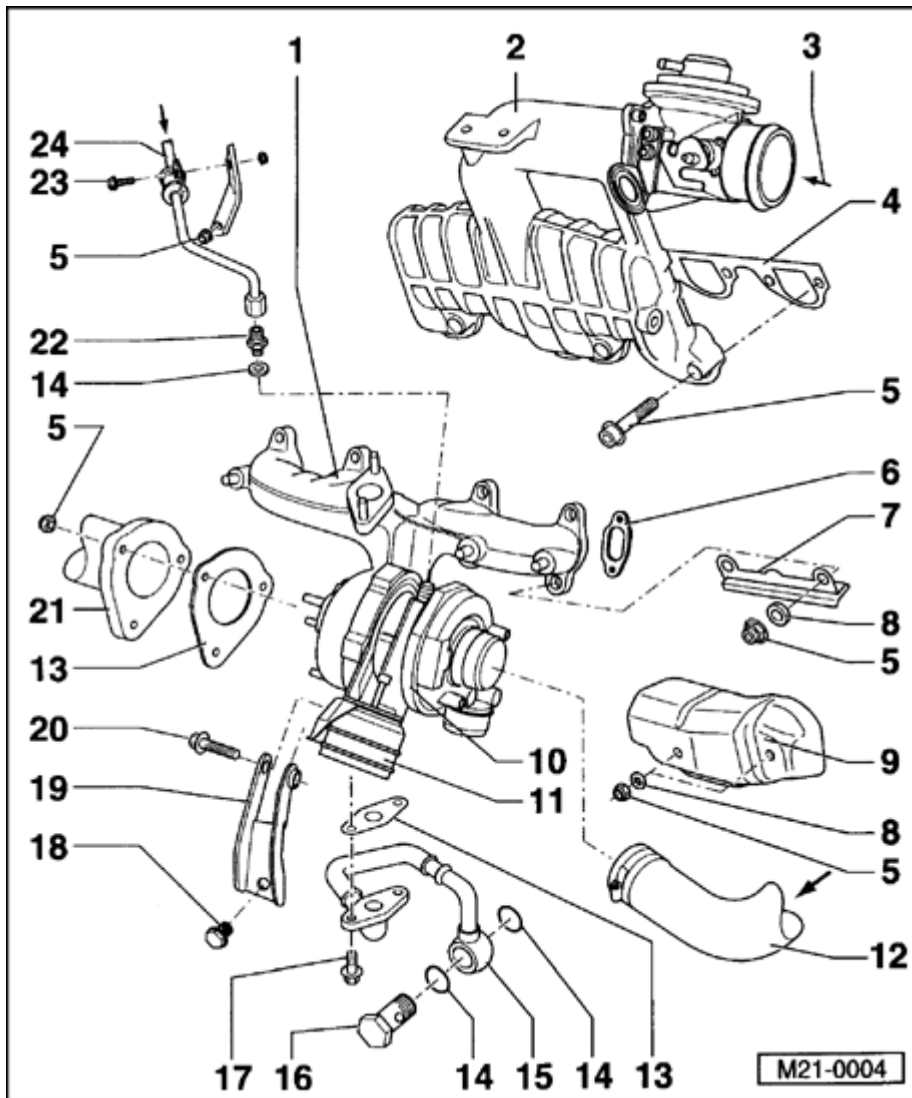
Charge air system and turbocharger

Observe rules for cleanliness ⇒ [Page 21-8](#)

Turbocharger system components, removing and installing

Notes:

- ◆ *All hose connections are secured with clips.*
- ◆ *The use of VAG 1921 spring clip pliers is recommended*
- ◆ *Turbocharger system must be leak free.*
- ◆ *Replace self-locking nuts.*



1 - Exhaust manifold

- ◆ Part of turbocharger
- ◆ Only replace as assembly

2 - Intake manifold

3 - From charge air cooler

4 - Gasket

- ◆ Always replace
- ◆ Coating (beading) toward intake manifold

5 - 25 Nm (18 ft lb)

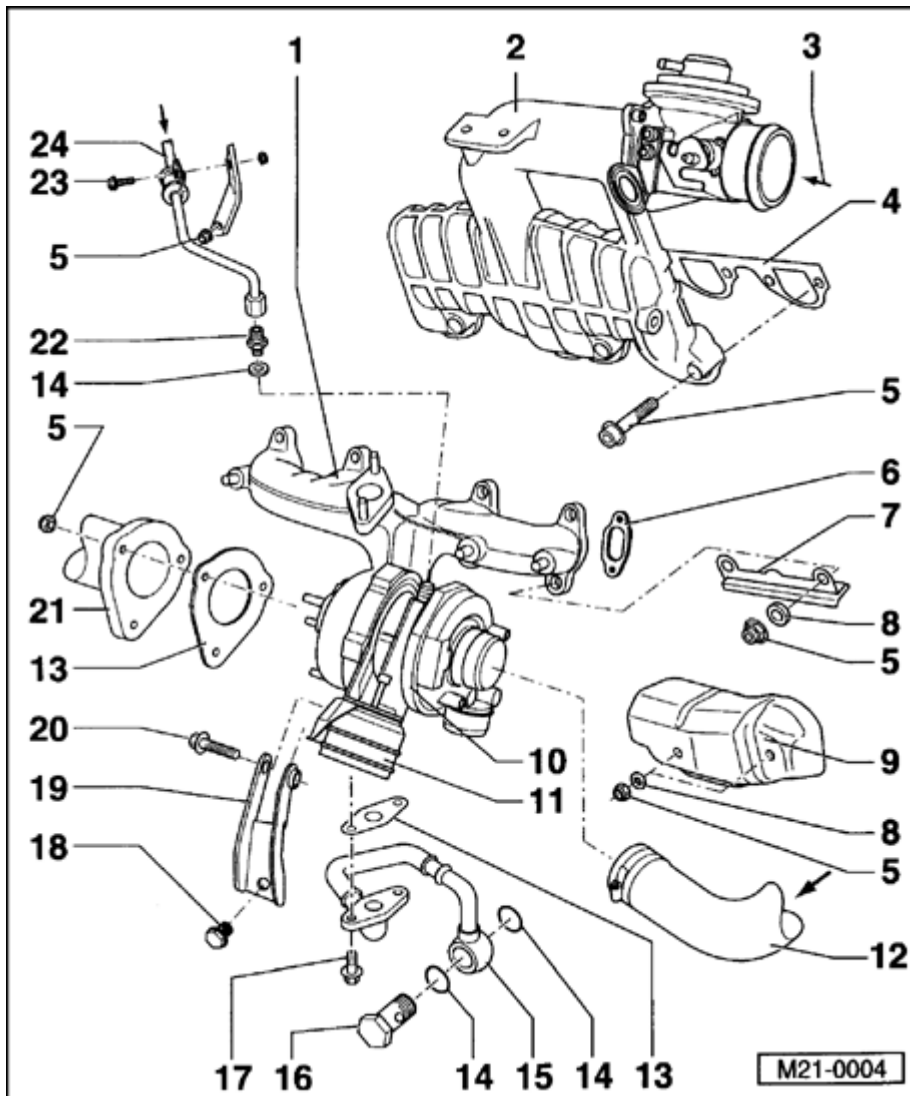
6 - Gasket

- ◆ Note installation position

7 - Bracket

- ◆ For heat shield (item 9)

8 - Washer



9 - Heat shield

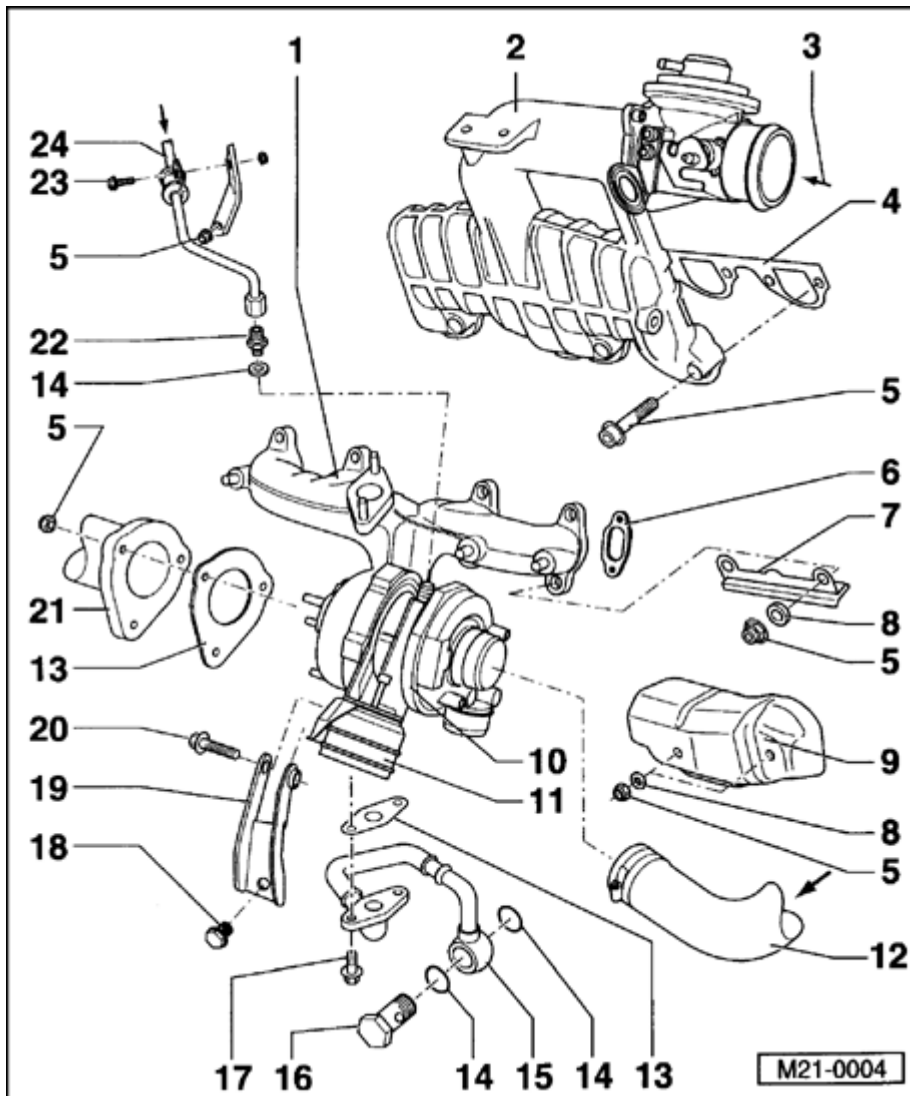
- ◆ Engage in bracket (item - 7 -)

10 - Turbocharger

- ◆ Only replace as assembly
- ◆ Removing: remove right drive shaft at transmission:

⇒ [Repair Manual, Suspension, Wheels, Steering, Repair Group 40](#)

- ◆ Before connecting the oil supply line (item - 18 -), fill turbocharger with engine oil at supply line connection.
- ◆ After installation of the turbocharger, run engine at idle for about 1 minute and do not immediately increase engine speed to first assure oil supply to the turbocharger.
- ◆ Charge air pressure control, checking ⇒ [Page 21-10](#)



11 - Pressure unit

- ◆ Integral part of turbocharger; cannot be replaced
- ◆ Charge air pressure control, checking ⇒ [Page 21-10](#)

12 - Connecting hose

- ◆ Check for proper fit.
- ◆ From air cleaner

13 - Gasket

- ◆ Always replace

14 - O-ring

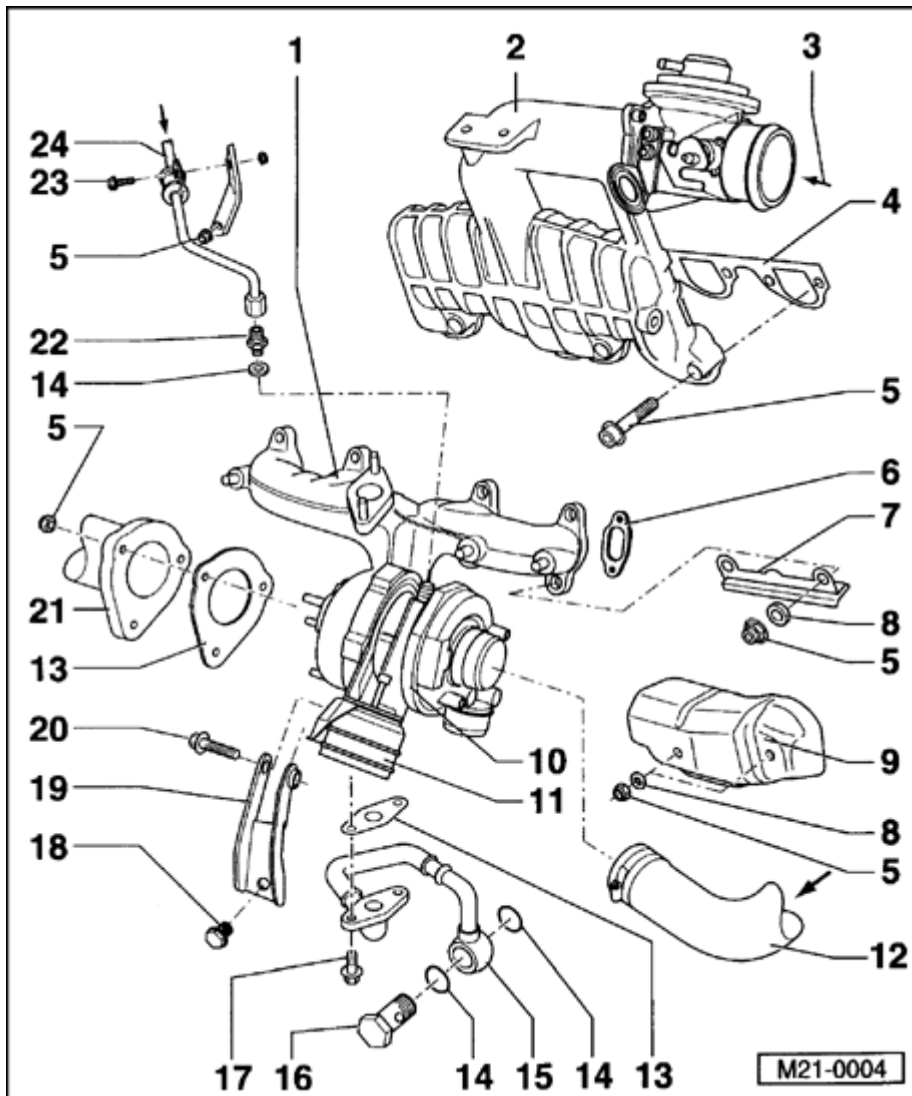
- ◆ Always replace

15 - Oil return line

- ◆ To cylinder block

16 - Banjo bolt 40 Nm (30 ft lb)

17 - 15 Nm (11 ft lb)



18 - 40 Nm (30 ft lb)

19 - Bracket

20 - 25 Nm (18 ft lb)

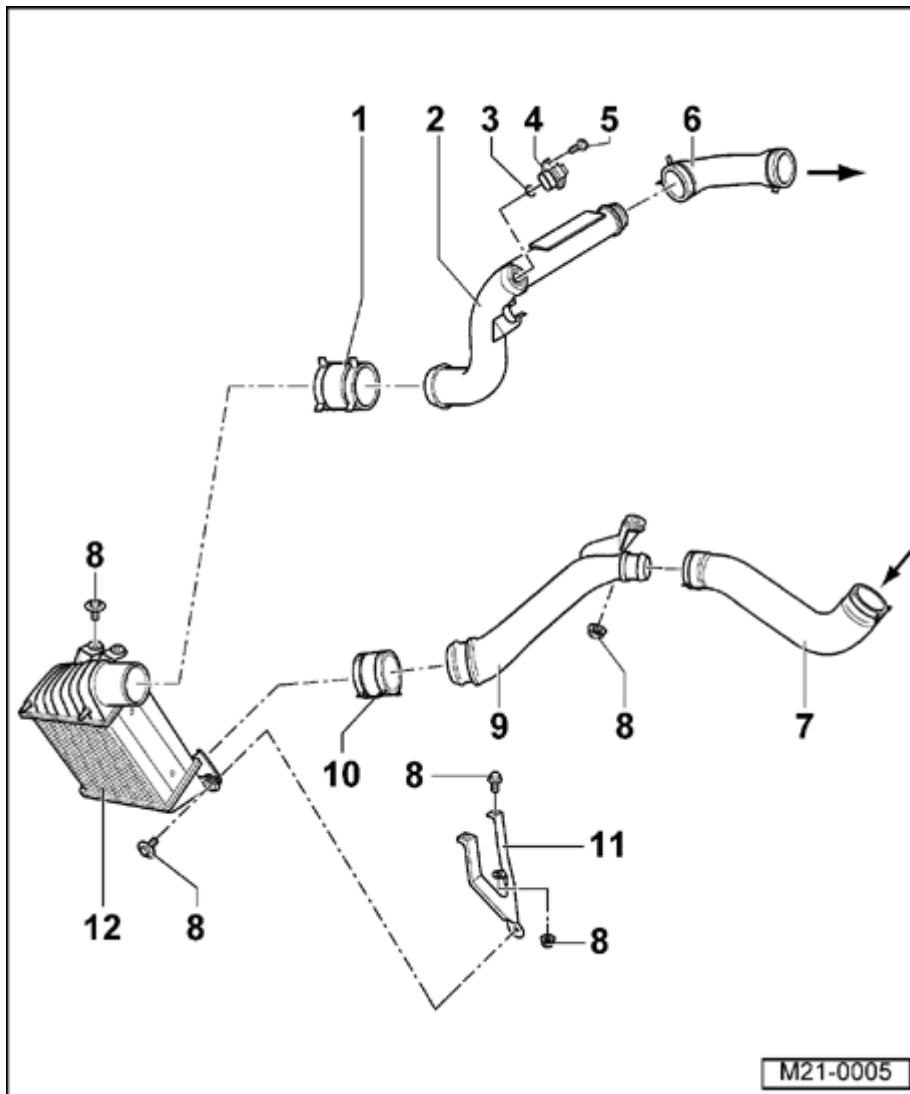
21 - Exhaust pipe, front

22 - Connection

23 - 10 Nm (7 ft lb)

24 - Oil supply line

◆ From oil filter bracket ⇒ [Page 17-8](#) , item 4



Charge air cooler components, removing and installing

Note:

- ◆ All hose connections are secured by clips.
- ◆ Boost system must not leak.

1 - Connecting hose

- ◆ Check for proper fit

2 - Connecting pipe

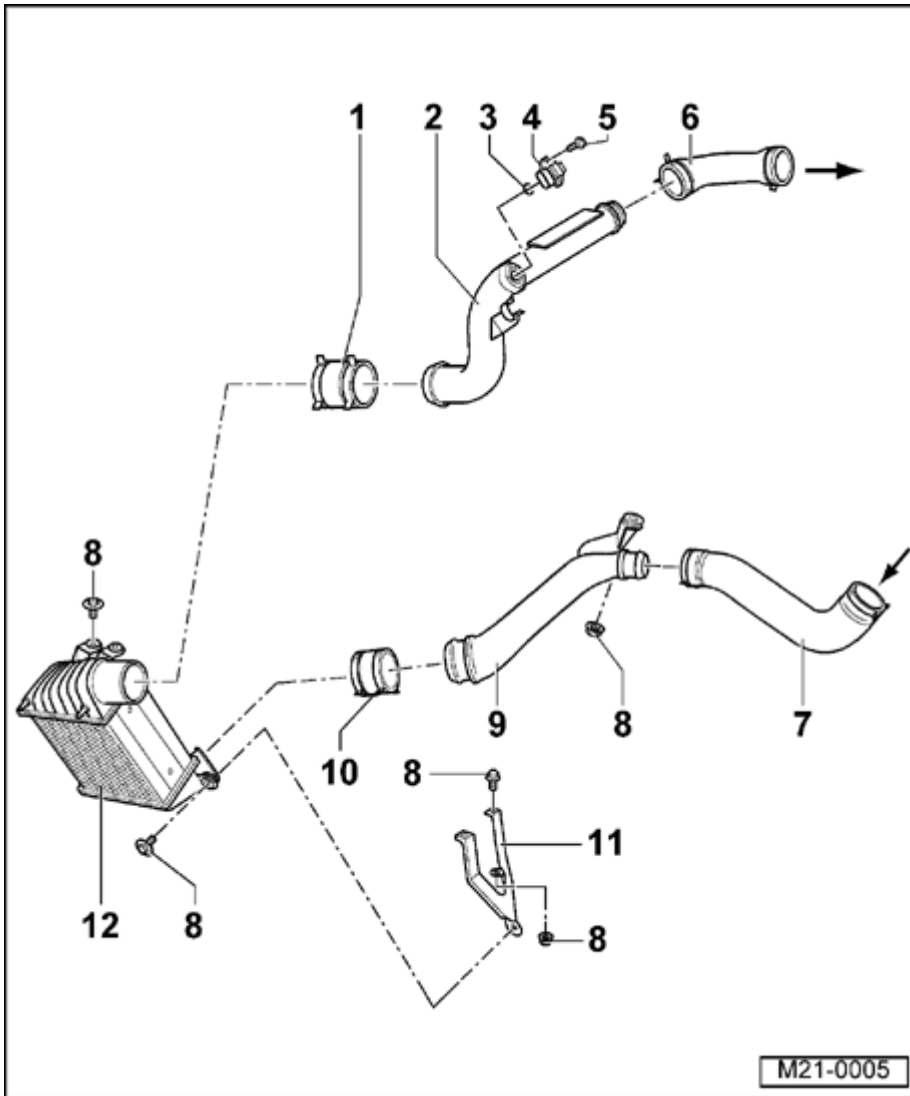
- ◆ Charge air cooler/intake manifold
- ◆ To remove, remove right headlight

⇒ [Repair Manual, Electrical Equipment, Repair Group 94](#)

3 - O-ring

- ◆ Always replace

4 - Intake Air Temperature (IAT) sensor -G72-



5 - 5 Nm (44 in. lb)

6 - Hose

- ◆ To intake manifold
- ◆ Check for tight fit

7 - Hose

- ◆ from turbocharger
- ◆ Check for tight fit

8 - 10 Nm (7 ft. lb)

9 - Boost intake air line

10 - Hose

- ◆ Check for tight fit

11 - Bracket

12 - Boost intake air cooler



Rules for cleanliness

When working on the turbocharger system be sure to follow these rules:

- ◆ Thoroughly clean all connections and surrounding areas before disconnecting.
- ◆ Place parts that have been removed on a clean surface and cover them. Do not use fluffy rags, use paper or plastic foil.
- ◆ Carefully cover opened components or cap lines if the repair cannot be done immediately.
- ◆ Only install clean components. Only unpack replacement parts immediately before installation. Do not use parts that have been stored loose (e.g. in tool boxes etc.).
- ◆ When the system is open do not work with compressed air if at all possible. Do not move the vehicle unless absolutely necessary.



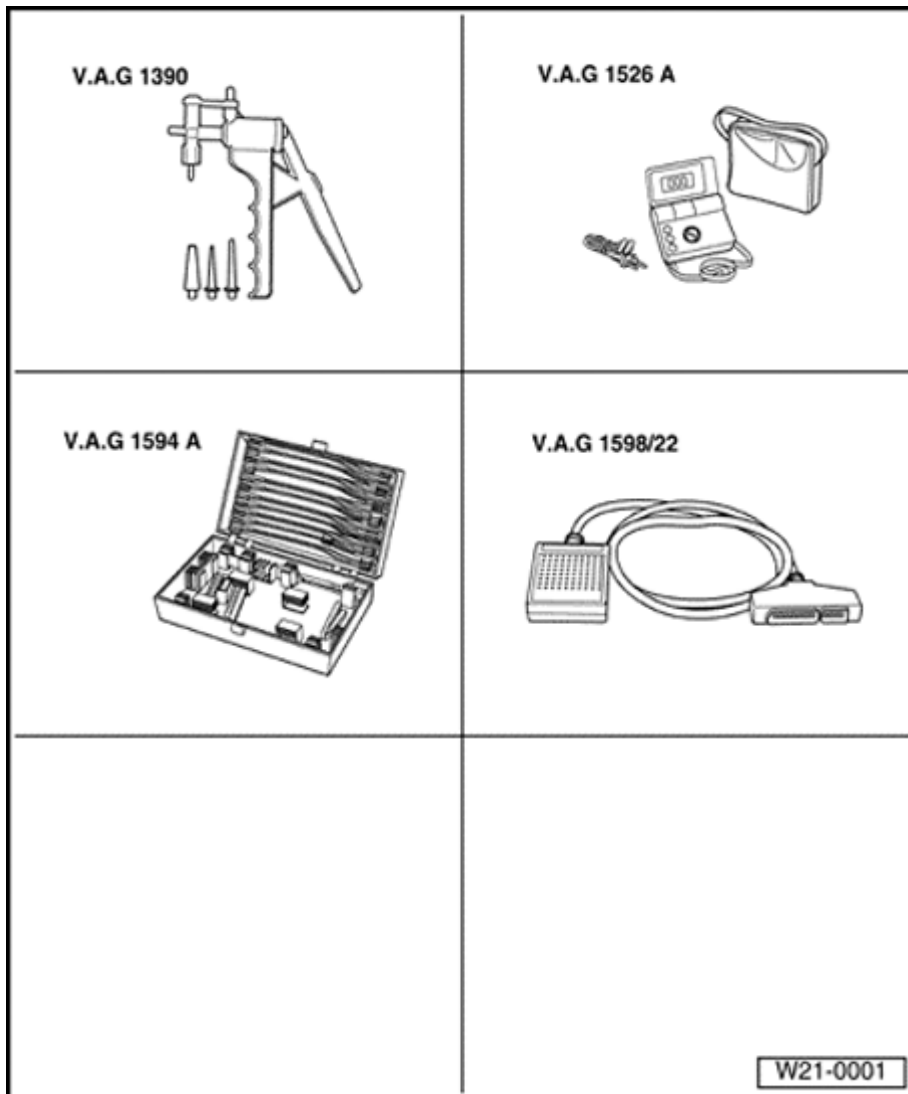
Safety precautions

When test equipment is used during road test, observe the following:

- ◆ Always firmly secure test equipment in the back seat and have it operated by a second technician.

WARNING!

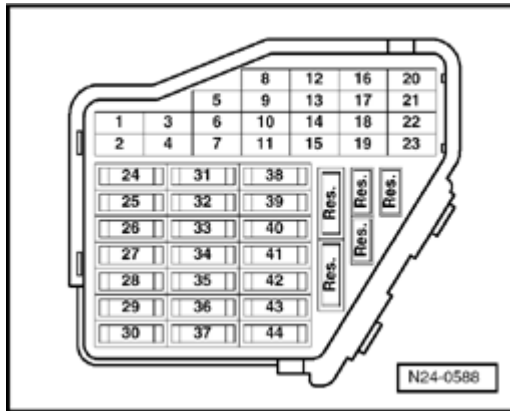
If test equipment is operated from the front passenger's seat, the person sitting in the passenger's seat could be injured in an accident by a possible deployment of the airbag.



Charge air pressure system, checking

Special tools and equipment

- ◆ VAG 1390 Hand vacuum pump or equivalent
- ◆ Fluke 83 Multimeter or equivalent
- ◆ VAG 1594 A Test kit
- ◆ VAG 1598/22 Test box
- ◆ VAG 1551/1552 Scan Tool with adapter cable VAG 1551/3
- ◆ Wiring diagram



Requirements

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- ◆ Fuse No. 34 OK
- ◆ Battery voltage must be at least 11.5 V
- ◆ No leaks in intake and exhaust system.
- ◆ No malfunctions in the engine or fuel injection system such as start of injection, injectors, compression pressures.
- ◆ The engine coolant temperature must be at least 85 ° C (185 ° F)

Test sequence

Observe caution notes ⇒ [Page 21-9](#)

- Connect VAG 1551/1552 Scan Tool and select engine control module, address word 01. The engine must run at idle.

⇒ [Repair Manual, 1.9 Liter 4-Cyl. 2V TDI Fuel Injection & Glow Plug, Engine Code\(s\): ALH, Repair Group 01](#)

**Note:**

Instead of VAG 1551 Scan Tool also VAG 1552 Scan Tool can be used, however, no print-out can be made.

Rapid data transfer HELP
Select function XX



Display will appear as shown

- Press -0- and -8- buttons to select "Read measuring value block" function 08.
- Press -Q- button to enter input

Read measuring value block HELP
Input display group number XXX



Display will appear as shown

- Press -0-, -1- and -1- buttons to select Display Group 11
- Press -Q- button to enter input.

Read measuring value block 11 →
840 rpm 938 mbar 978 mbar 92 %



Display will appear as shown

- Accelerate vehicle in 3rd gear from about 1500 rpm to wide open throttle.
- Press VAG 1551 PRINT button at approx. 3000 rpm.

Read measuring value block 11 →
3090 rpm 1866 mbar 1917 mbar 62 %



Specification: 1700 to 2200 mbar (in display field 3)

If specification was obtained:

- Press → button.



- Press buttons -0- and -6- to select "End output" function 06.

- Press -Q- button to enter input

If specification was not obtained:

- Perform Output Diagnostic Test Mode (function 03) to activate the Wastegate Bypass Regulator Valve -N75-.

⇒ [Repair Manual, 1.9 Liter 4-Cyl. 2V TDI Fuel Injection & Glow Plug, Engine Code\(s\): ALH, Repair Group 01](#)

Output Diagnostic Test Mode →

Wastegate Bypass Regulator valve N75-



Display will appear as shown

The valve must function and the charge air pressure control rod must move back and forth (at least 3 to 4 times), as long as there is a vacuum in the vacuum reservoir.

- Press → button.
- Press buttons -0- and -6- to select "End output" function 06.
- Switch ignition off.

If the charge air pressure control rod does not move and the specifications are not obtained, replace the turbocharger ⇒ [Page 21-3](#) , item 10



If the rod does not move because Wastegate Bypass Regulator valve -N75- is not working:

- Check Wastegate Bypass Regulator valve -N75-
⇒ [Page 21-15](#) .
- Check vacuum hoses ⇒ [Page 21-10](#) .

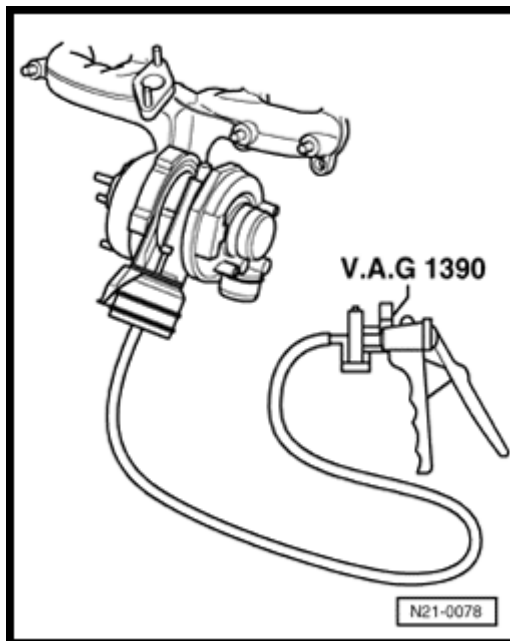
If rod does not move but bypass regulator valve works:

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- Connect VAG 1390 or equivalent vacuum pump to wastegate bypass regulator valve and check rod for ease of movement.

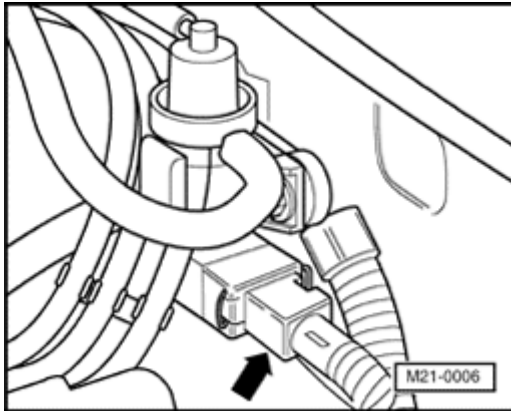
If rod does not move easily:

- Replace turbocharger assembly.



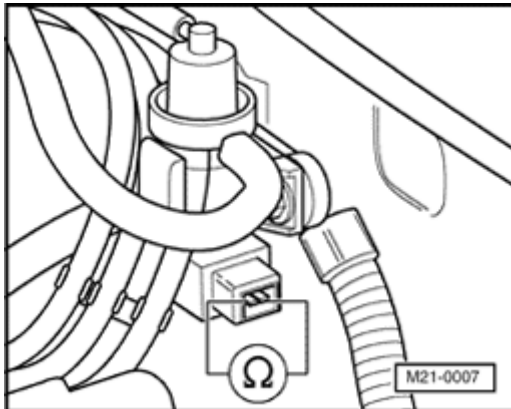


Wastegate Bypass Regulator valve -N75-, checking



- A Disconnect 2-pin electrical connector from wastegate bypass regulator valve (arrow).

Resistance, checking



- A - Measure resistance between terminals of bypass regulator valve.

Engine code ALH

- Specification: 14.0 to 20.0 Ω

Note:

At room temperature the resistance value is at the lower tolerance range, at operating temperature the resistance is in the upper tolerance range.

If specification not obtained:

- Replace Wastegate Bypass Regulator valve -N75-.



- Check Diagnostic Trouble Code (DTC) memory.

⇒ [Repair Manual, 1.9 Liter 4-Cyl. 2V TDI Fuel Injection & Glow Plug, Engine Code\(s\): ALH, Repair Group 01](#)

- Read readiness code.

⇒ [Repair Manual, 1.9 Liter 4-Cyl. 2V TDI Fuel Injection & Glow Plug, Engine Code\(s\): ALH, Repair Group 01](#)

If DTC memory was erased or engine control module is subject to low voltage with ignition ON, reset readiness code.

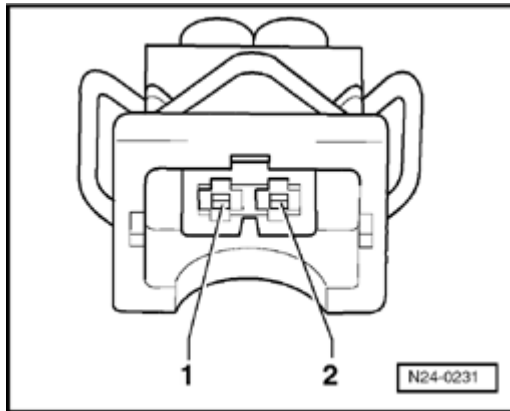
⇒ [Repair Manual, 1.9 Liter 4-Cyl. 2V TDI Fuel Injection & Glow Plug, Engine Code\(s\): ALH, Repair Group 01](#)

If the specification was obtained:

- Check voltage supply of Wastegate Bypass Regulator valve -N75- ⇒ [Page 21-17](#)



Voltage supply, checking



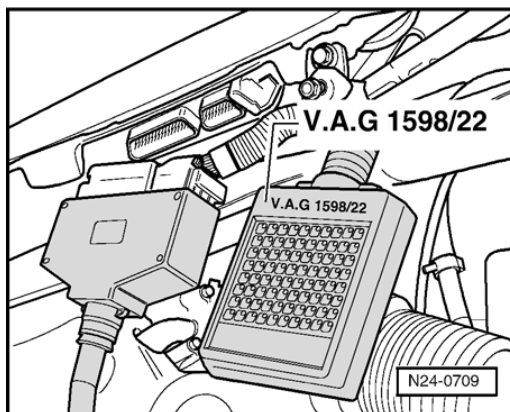
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- Connect multimeter and check voltage supply.
- Connect jumper wire from test kit VAG 1594 to terminal 1 and engine ground
- Switch ignition on.
 - Specification: 11.5 V

If specification was not obtained:

- Switch ignition off.
- Remove windshield wiper arms and plenum cover.

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



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Connect test box VAG 1598/22 to harness connector of engine control module.

- Check wiring between test box and contact terminals for open circuits according to wiring diagram:

Terminal no.	Test box socket no.	
	Through MY 1999	From MY 2000
1	2	1
1	28	2
2	15	62

- Wiring resistance: max. 1.5 Ω



- Check wires for short circuit one against another, to vehicle ground and to battery B+.

- Wiring resistance: $\infty \Omega$

If no malfunctions and if voltage between terminal 1 + ground:

- Replace Diesel Direct Fuel Injection (DFI) Engine Control Module (ECM).

⇒ [Repair Manual, 1.9 Liter 4-Cyl. 2V TDI Fuel Injection & Glow Plug, Engine Code\(s\): ALH, Repair Group 23](#)

- Check DTC memory.

⇒ [Repair Manual, 1.9 Liter 4-Cyl. 2V TDI Fuel Injection & Glow Plug, Engine Code\(s\): ALH, Repair Group 01](#)

- Read readiness code.

⇒ [Repair Manual, 1.9 Liter 4-Cyl. 2V TDI Fuel Injection & Glow Plug, Engine Code\(s\): ALH, Repair Group 01](#)

If the DTC memory was erased or the engine control module is subject to low voltage with ignition ON, reset the readiness code.

⇒ [Repair Manual, 1.9 Liter 4-Cyl. 2V TDI Fuel Injection & Glow Plug, Engine Code\(s\): ALH, Repair Group 01](#)