

Charge air system with turbocharger, checking

Notes:

- ◆ *For cleanliness rules, see ⇒ [Page 21-44](#) .*
- ◆ *Secure all hose connections with the correct hose clips (same as original equipment):*

⇒ *Parts Catalog*

- ◆ *Before performing a check or repair, all hoses and lines must be checked for tight seating and leaks.*
- ◆ *Always replace seals, gaskets and self-locking nuts.*

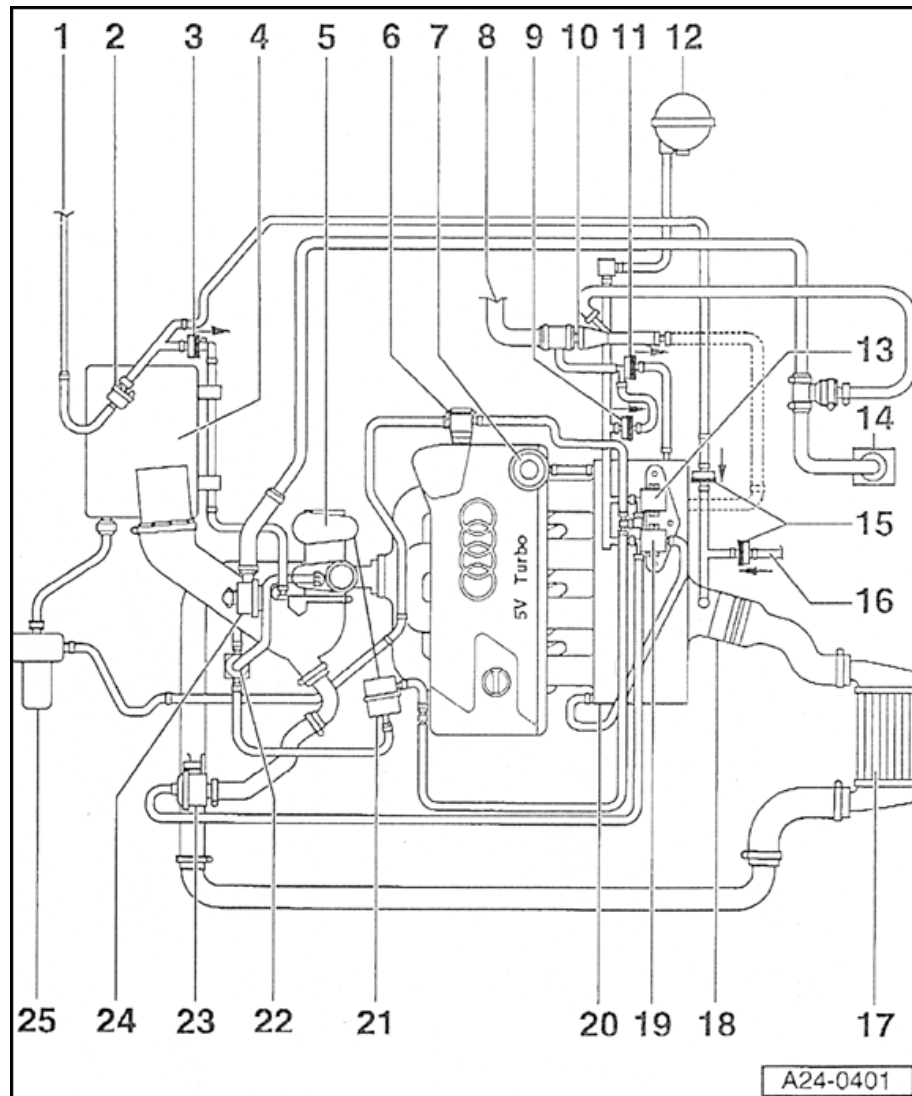
Safety precautions

Note the following points if testers and measuring instruments have to be used during a road test:

WARNING!

- ◆ *Always attach testers and measuring instruments to the back seat and have a second person operate them from there.*

- ◆ *If test equipment were operated from the front passenger seat, the person sitting there could be injured if the front passenger airbag were triggered in the event of an accident.*



Connection diagram for charge air control and vacuum pressure control

1 - Activated charcoal filter (ACF)

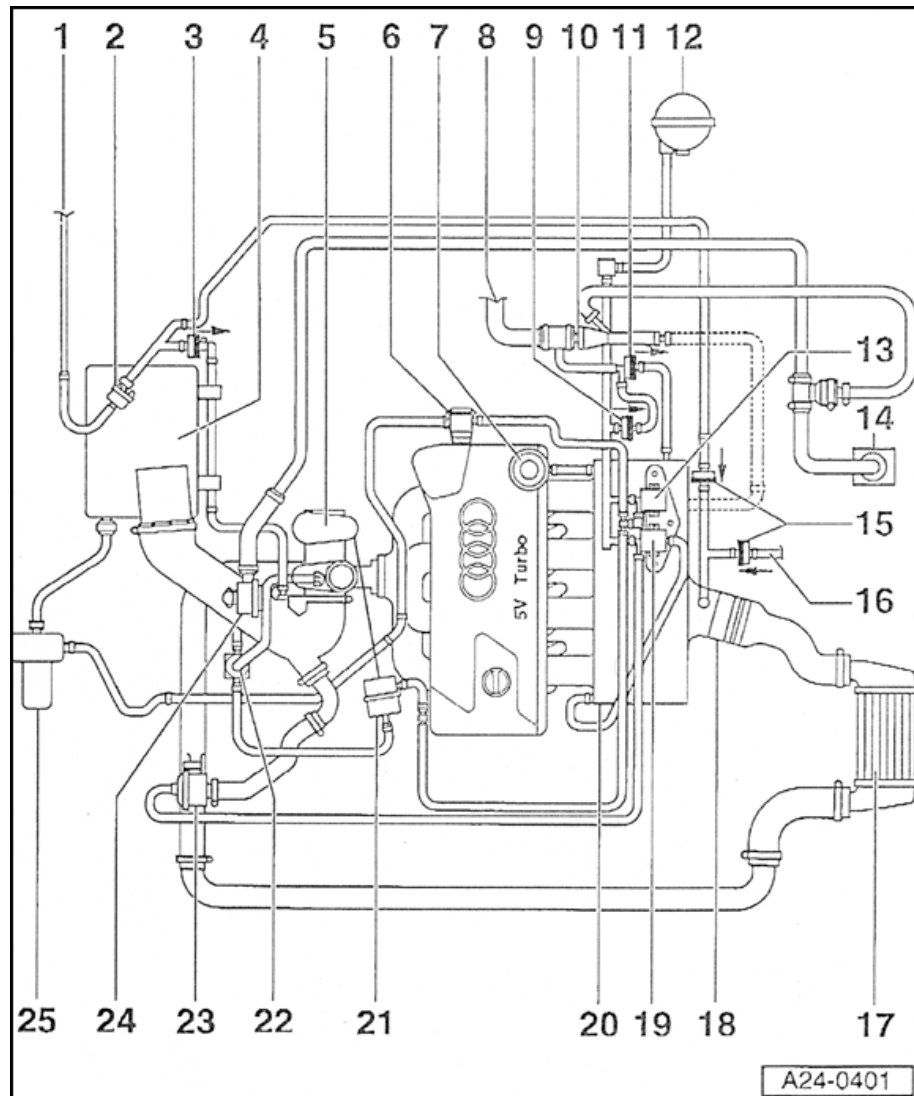
2 - EVAP Canister Purge Regulator valve - N80-

3 - Non return valve for ACF

- ◆ Between ACF container and intake line in front of exhaust turbocharger
- ◆ Note position (light side/ dark side) as shown in Fig; arrow faces in direction of flow

4 - Air cleaner

- ◆ With Mass Air Flow (MAF) sensor -G70-

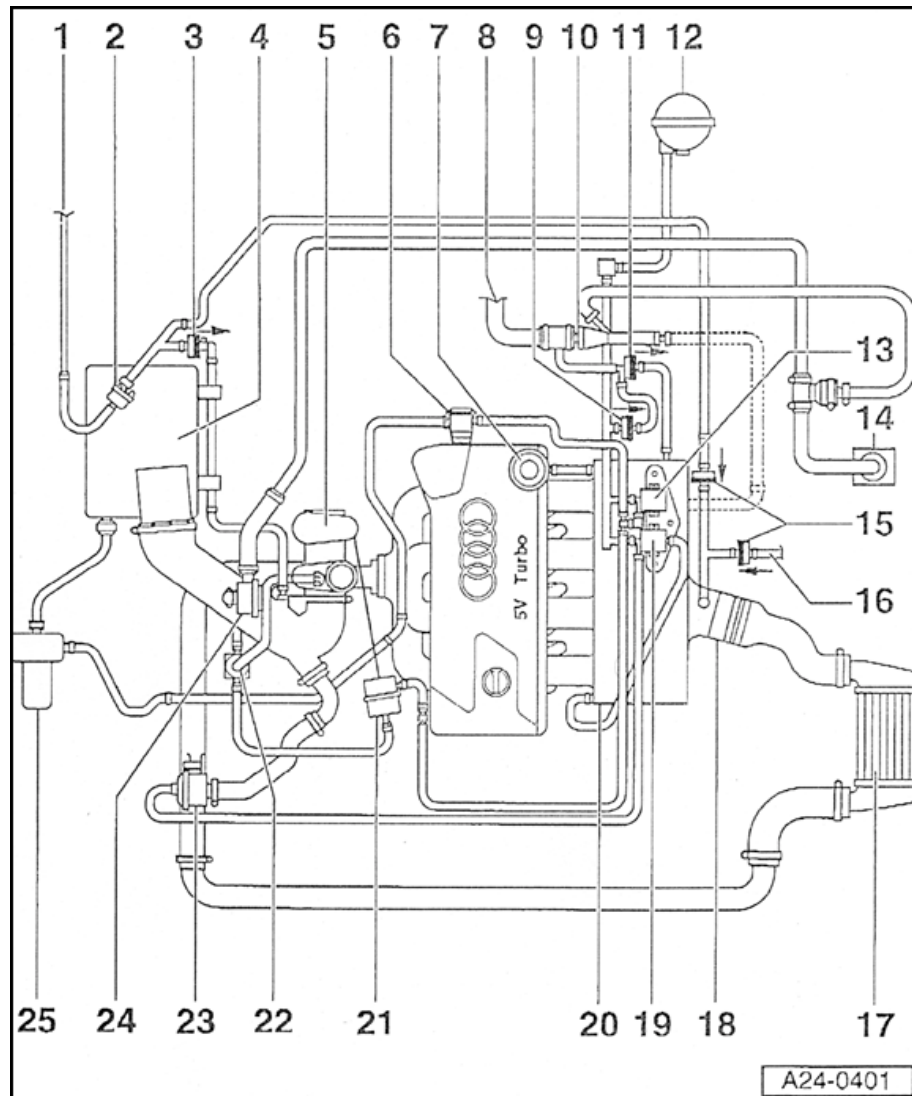
**5 - Turbocharger**

- ◆ Check charge pressure ⇒ [Page 21-8](#)

6 - Combination valve for secondary air inlet**7 - Fuel pressure regulator****8 - To brake servo****9 - Non-return valve**

- ◆ Between brake servo and intake line
- ◆ Note position (light side/ dark side) as shown in Fig; arrow faces in direction of flow

10 - Suction jet pump

**11 - Non-return valve**

- ◆ Between brake servo and intake line
- ◆ Note position (light side/ dark side) as shown in Fig; arrow faces in direction of flow

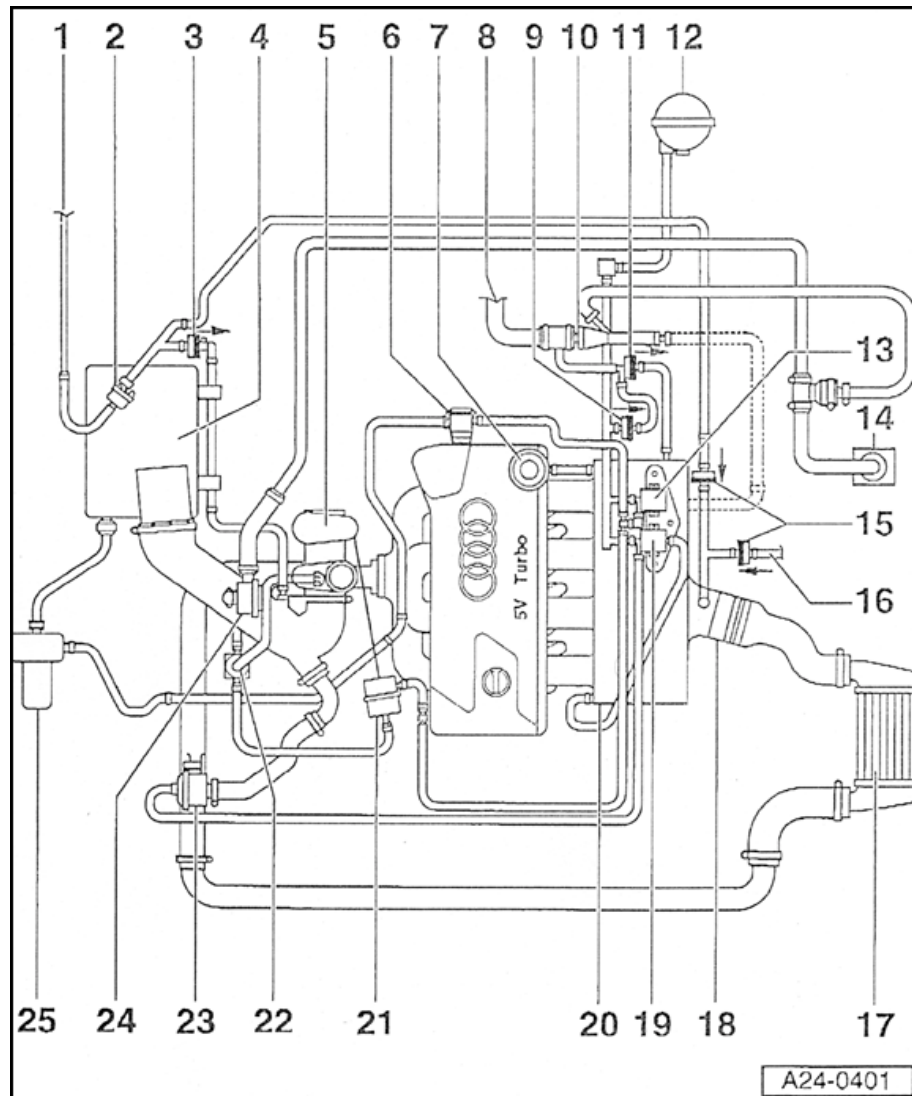
12 - Vacuum reservoir

- ◆ Location: In front left wheel housing beneath wheel housing liner

13 - Secondary Air Injection (AIR) Solenoid valve -N112-

- ◆ Location: Below intake line

14 - Crankcase breather

**15 - Non-return valve**

- ◆ Between ACF container and intake line
- ◆ Note position (light side/ dark side) as shown in Fig; arrow faces in direction of flow

16 - From Leak Detection Pump (LDP) -V144-**17 - Charge air cooler**

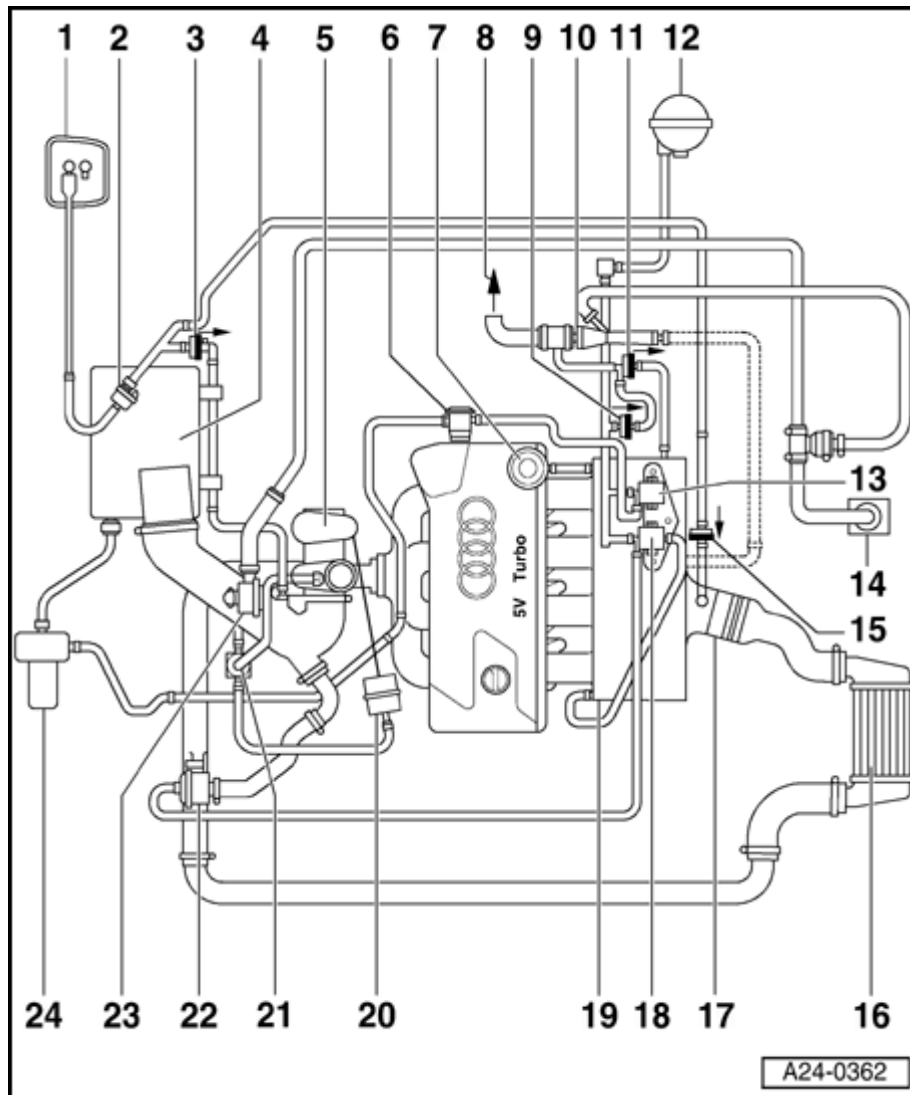
- ◆ With Charge Air Pressure sensor -G31-

18 - Throttle Valve Control Module -J338-**19 - Recirculating valve for turbocharger - N249-**

- ◆ Location: below intake line

20 - Intake manifold

- ◆ With Intake Air Temperature (IAT) sensor - G42-



21 - Vacuum unit for charge pressure control

22 - Wastegate Bypass Regulator valve -N75-

◆ Checking ⇒ [Page 21-33](#)

23 - Mechanical air recirculation valve

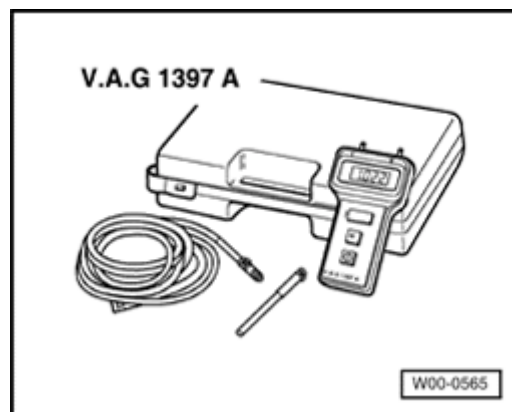
◆ Checking ⇒ [Page 21-24](#)

24 - Crankcase breather pressure regulating valve

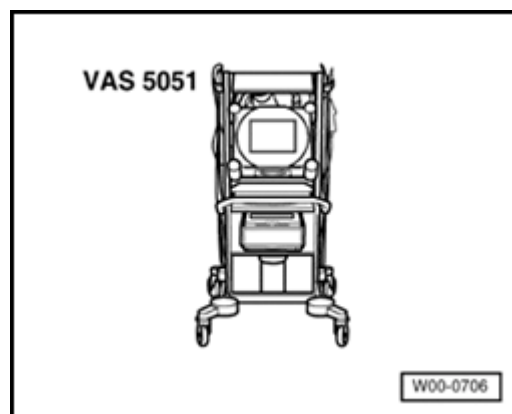
25 - Secondary Air Injection (AIR) Pump motor -V101-

Turbocharger and charge pressure regulating valve, checking

Special tools and equipment



- ◆ Turbocharger tester VAG 1397 A



- ◆ VAS 5051 with VAS 5051/1

or

- ◆ VAG 1551 with VAG 1551/3 A

Test requirements:

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

⇒ [Repair Manual, 1.8 Liter 4-Cyl. 5V Turbo Fuel Injection & Ignition, Engine Code\(s\): AWM, Repair Group 01](#)

- All hoses and lines must be checked for correct seating and leaks.
- Diagnostic Trouble Code (DTC) memory has been checked:

⇒ [Repair Manual, 1.8 Liter 4-Cyl. 5V Turbo Fuel Injection & Ignition, Engine Code\(s\): AWM, Repair Group 01](#)

- Output Diagnostic Test Mode (DTM) has been performed:

⇒ [Repair Manual, 1.8 Liter 4-Cyl. 5V Turbo Fuel Injection & Ignition, Engine Code\(s\): AWM,](#)

[Repair Group 01](#)

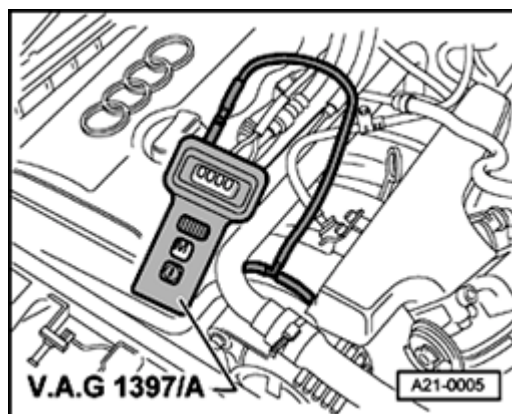
Test sequence

WARNING!

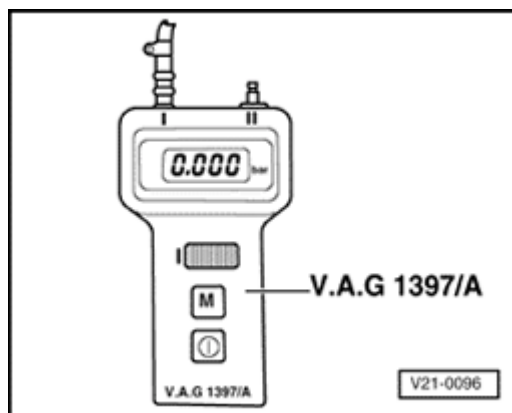
- ◆ ***Always attach testers and measuring instruments to the back seat and have a second person operate them from there.***

- ◆ ***If test equipment were operated from the front passenger seat, the person sitting there could be injured if the front passenger airbag were triggered in the event of an accident.***

21-10



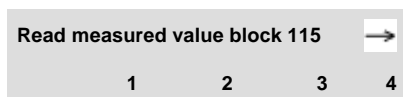
- A
- Connect T piece and measuring hose of turbocharger tester VAG 1397 A to intake manifold (front).
 - Route measuring hose under rear edge of hood and into passenger compartment via right hand window.



- A
- Switch on turbocharger tester and set measuring range selector switch to position -I- (absolute pressure).
 - Connect measuring hose to connection -I-.

Note:

- ◆ *Hose connections must be completely airtight, otherwise measurements will not be correct.*
- ◆ *Ensure that measuring hose is not pinched at hood or side window.*
- ◆ *Pressing memory key M on turbocharger tester will store the last measured value until memory key M is pressed again or tester is switched off.*
- ◆ *The decimal point in the display flashes to indicate that the value is being stored.*
- ◆ *If the battery voltage of the turbocharger tester drops below the minimum level, an arrow will appear at the top left of the display.*
- ◆ *Before checking, drive vehicle quickly for at least 3 km (choose a safe route that does not include stopping).*
- ◆ *A second mechanic is required to note readings with the vehicle moving.*

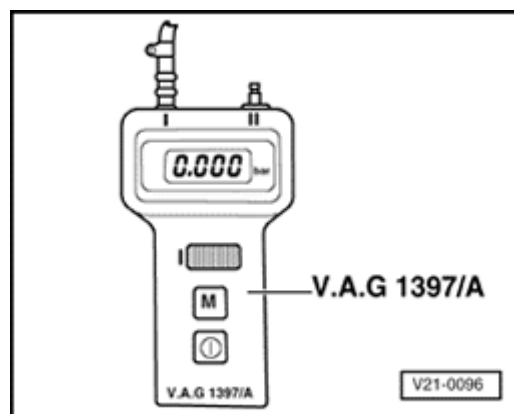


A

- Read measured value block Display group 115, engine idling.
- Accelerate vehicle from 2000 rpm at wide open throttle in third gear, and observe rev counter.
- At approx. 2500 rpm press print key on VAS 5051 or PRINT key on VAG 1551 and at same time press recall button -M- on VAG 1397 A.

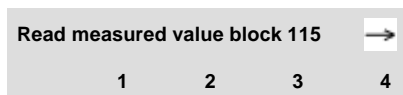
Note:

The charge pressure level is measured with turbocharger tester VAG 1397/A. The vehicle diagnostic, measuring and information system VAS 5051 or the VAG 1551 Scan Tool is used to check whether the charge pressure is being registered by the control module.



A

- Specified value on VAG 1397 A: 1.700 to 1.800 bar



A

- Specified value on VAG 1551 or on VAS 5051 in display zone 4: 1700 to 1800 mbar

If specified value not attained ⇒ table, ⇒ [Page 21-13](#)

Charge air pressure control malfunctions

Malfunction	Possible causes
Charge air pressure below specified value	<ul style="list-style-type: none"> ◆ Wastegate Bypass Regulator valve -N75- faulty ⇒checking, ⇒ Page 21-33 ◆ Hose connection to Wastegate Bypass Regulator valve -N75- faulty ⇒Connection diagram, ⇒ Page 21-3 ◆ Wastegate bypass regulator valve in turbocharger stuck open ◆ Leak between exhaust turbocharger and intake hose ⇒Effects, ⇒ Page 21-14 ◆ Mechanical air recirculation valve faulty ⇒checking, ⇒ Page 21-24 ◆ Recirculating valve for turbocharger -N249- faulty ⇒checking, ⇒ Page 21-26 ◆ Exhaust turbocharger faulty ⇒replacing, ⇒ Page 21-51
Charge air pressure above specified value ¹⁾	<ul style="list-style-type: none"> ◆ Vacuum unit for wastegate bypass regulator valve faulty ⇒Replacing exhaust turbocharger, ⇒ Page 21-51 ◆ Hose connection to vacuum unit for charge air pressure limiter (above -N75-) leaks ⇒Connection diagram, ⇒ Page 21-3 ◆ When in closed position wastegate bypass regulator valve in exhaust turbocharger sticks ⇒replacing exhaust turbocharger, ⇒ Page 21-51

¹⁾ If the charge air pressure is too high the fuel supply will be interrupted in order to protect the engine. This results in misfiring at high engine speeds.

Effects of leaks in intake or exhaust system

Leak downstream of mass air flow sensor

◆ Effect: Loss of power

Possible malfunction sources:

1 - Connection hoses between mass air flow sensor and exhaust turbocharger

2 - Connection hose for crankcase vent

3 - Connection hose to mechanical air recirculation valve

Leak downstream of exhaust turbocharger

◆ Effect: Charge pressure too low

Possible malfunction sources:

1 - Connection hoses and line between exhaust turbocharger and charge air cooler

2 - Hose between charge air cooler and intake line

3 - Charge air cooler

4 - Seal of Charge Air Pressure sensor -G31- (in charge air cooler)

5 - Sealing between throttle valve control module and intake line

6 - Sealing between intake line and cylinder head

Effects of leaks on exhaust side

◆ Effect: Charge air pressure too low, possible exhaust smell, soot traces in engine compartment

Possible malfunction sources:

1 - Exhaust turbocharger /exhaust manifold connection

2 - Exhaust manifold/cylinder head connection