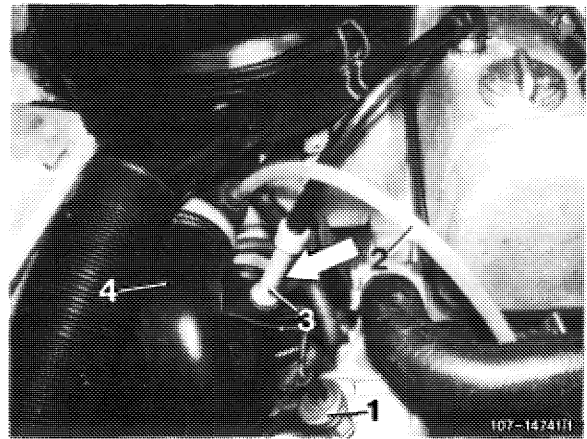
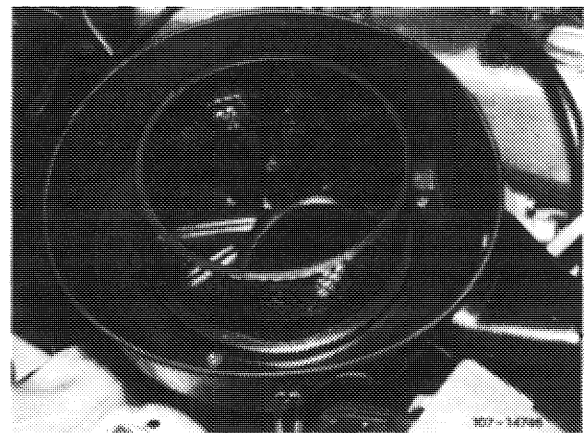


Removal

- 1 Detach intake hose at air filter.
- 2 Remove air filter cover.
- 3 Unscrew vacuum line (2) for vacuum pump.
On vehicles up to model year 1979 only.
- 4 Remove crankcase ventilation pipe (3).
- 5 Release hose clip (arrow) at intake line (4).



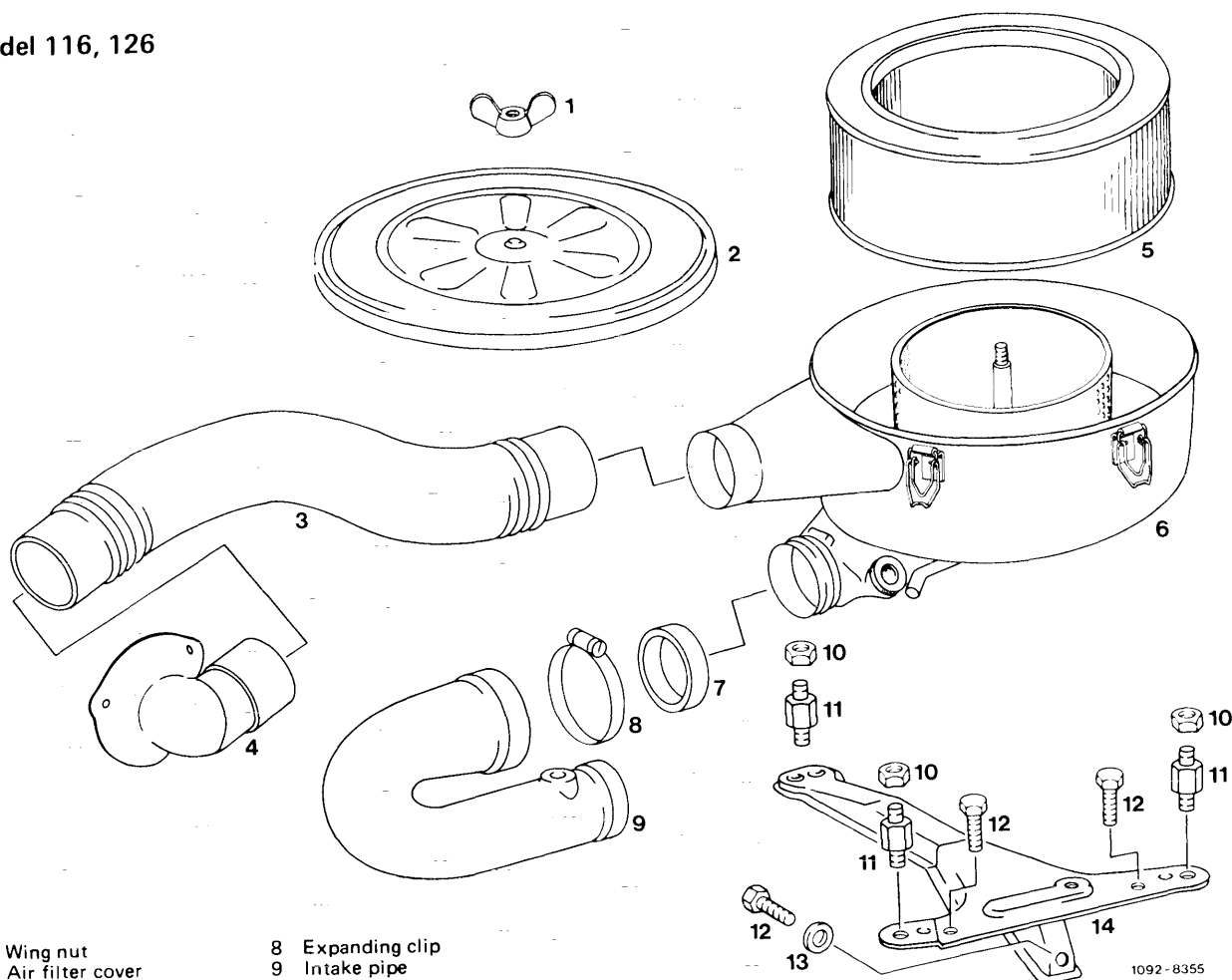
- 6 Unscrew fastening nuts inside air filter housing and withdraw air filter.



Installation

- 7 Install in reverse order, making sure that rubber ring is correctly seated at turbocharger flange.

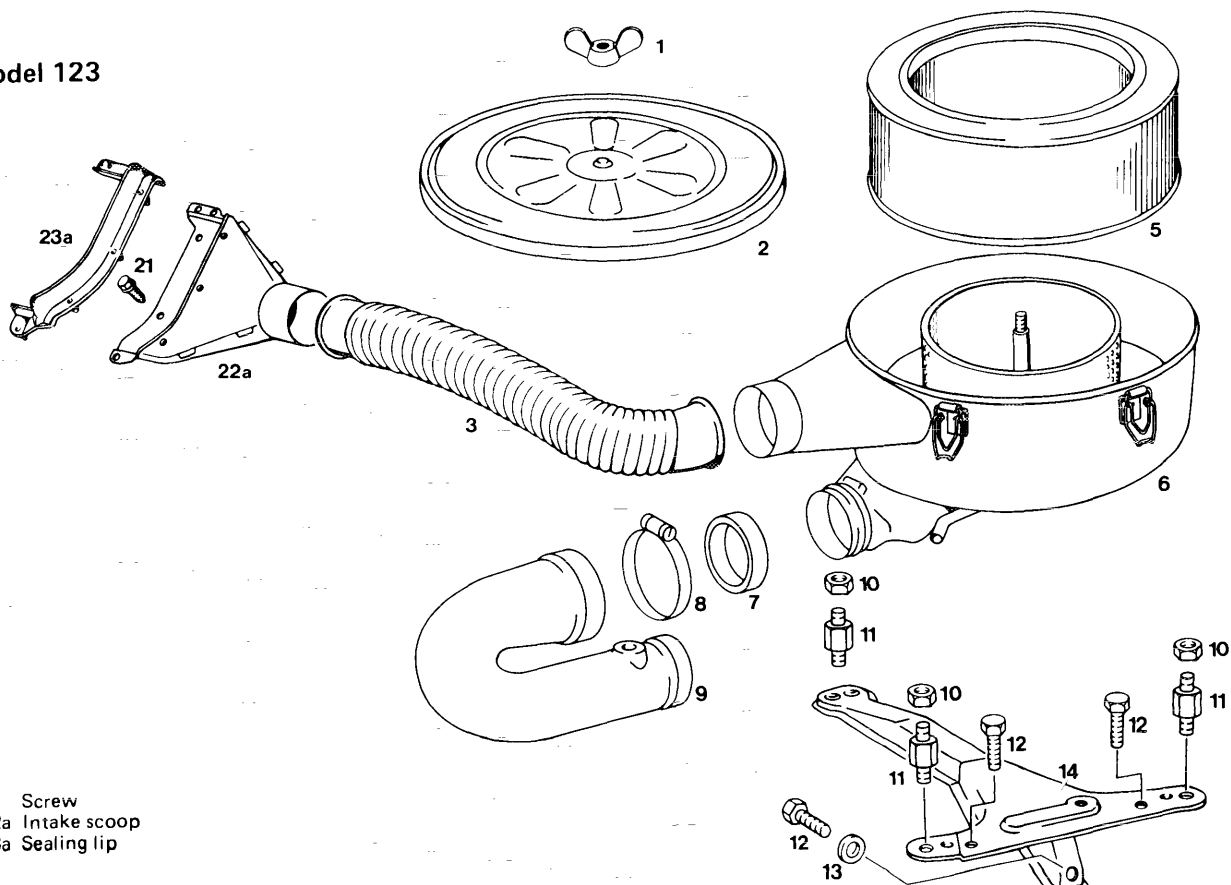
Model 116, 126



- | | |
|-----------------------|---------------------------------------|
| 1 Wing nut | 8 Expanding clip |
| 2 Air filter cover | 9 Intake pipe |
| 3 Hose | 10 Nut |
| 4 Air intake | 11 Rubber-bonded metal shock absorber |
| 5 Air filter element | 12 Bolt |
| 6 Air filter | 13 Washer |
| 7 Rubber sealing ring | 14 Holder |

1092-8355

Model 123



- | |
|------------------|
| 21 Screw |
| 22a Intake scoop |
| 23a Sealing lip |

1092-9959

Test value

Boost pressure at full-load, driving
range position „L” or „S” and $n = 4000/\text{min}$

0.7-0.8 bar
gauge pressure

Special tool

Tester 0—1.6 bar gauge pressure



617 589 02 21 00

Conventional tester

Digital tester (or revolution counter installed
in vehicle)

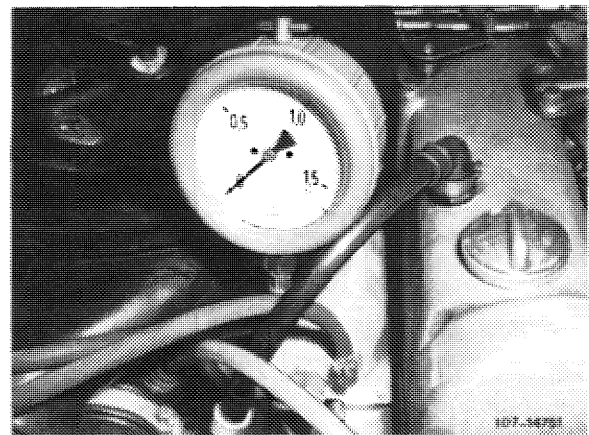
e.g. Bosch, MOT 001.03

Checking

A. On boost air pipe

Connect boost pressure tester to intake manifold,
unscrewing plug for this purpose.

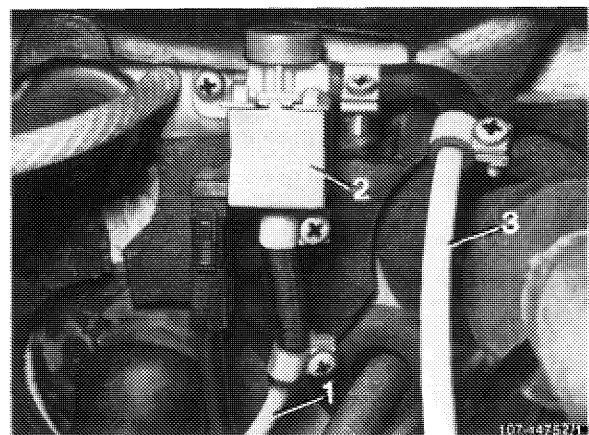
Note: Tester connecting thread M 10 x 1.



B. On switchover valve

Connect boost air tester to switchover valve with
Y-distributor, output of switchover valve.

- 1 Pressure line to boost air pipe
- 2 Switchover valve
- 3 Pressure line to ALDA capsule



1 Test on dynamometer.

Drive vehicle in driving range „S“ at full-load and $n = 4000/\text{min}$. The prescribed boost pressure must be obtained.

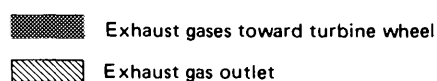
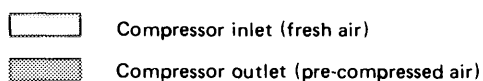
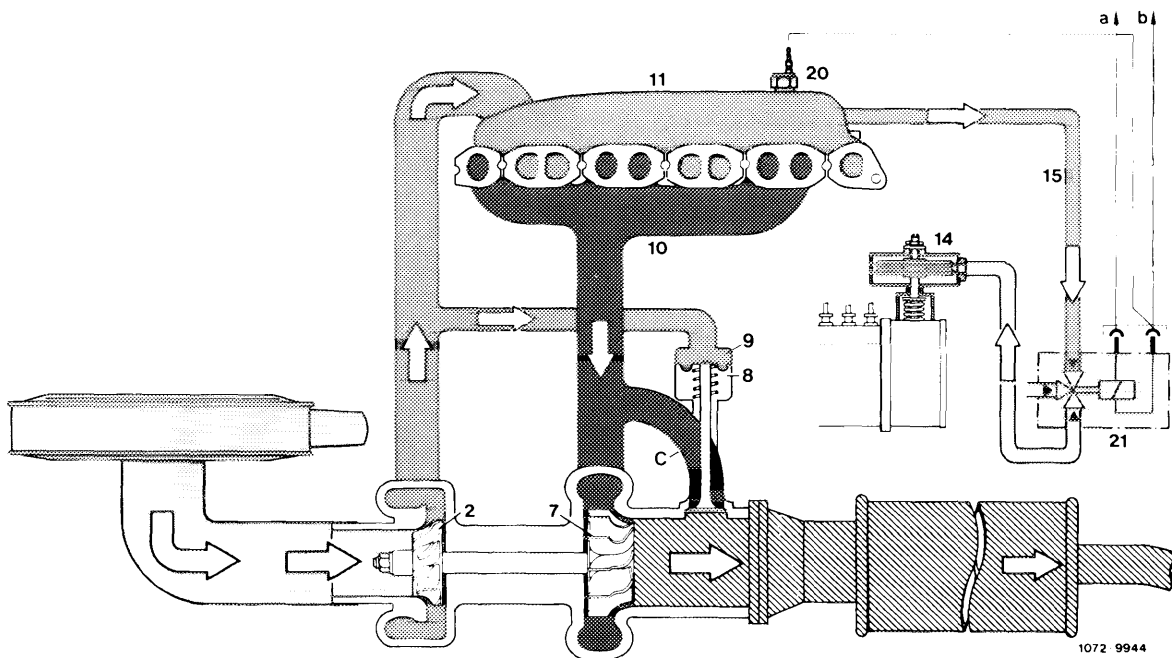
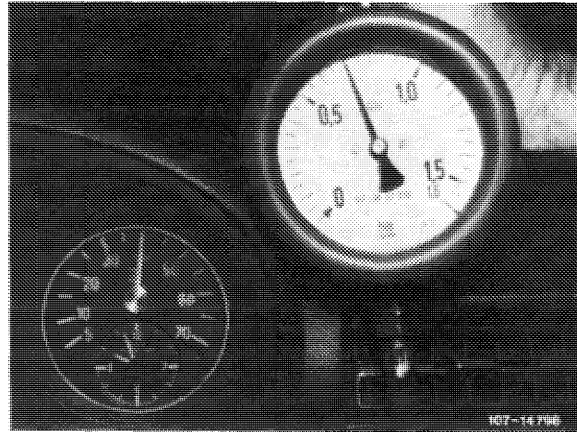
Check the trouble-shooting hints if system fails to reach specified boost pressure.

2 Road test.

Note: The full-load test must be kept as short as possible because the total driving energy has to be absorbed by the vehicle's own brakes.

Road-test the vehicle in driving range „L“ or „S“ at full-load and $n = 4000/\text{min}$, placing tester in vehicle interior for this purpose. Accelerate to full throttle while holding at 4000/min with the aid of service brakes (No. 2 in illustration). The prescribed boost pressure must be reached.

Check the trouble-shooting hints if system fails to reach specified boost pressure.



Function diagram

- | | | |
|--------------------------------|---|--------------------------------------|
| 2 Compressor wheel | 11 Boost air pipe | a Fuse terminal 15 |
| 7 Turbine wheel | 14 ALDA-capsule | b Switching unit overload protection |
| 8 Boost pressure control valve | 15 Pressure line | c Exhaust gas toward bypass duct |
| 9 Connecting hose | 20 Pressure switch boost air pipe | |
| 10 Exhaust manifold | 21 Switchover valve overload protection | |

Turbocharger designation

Garret TA 0301

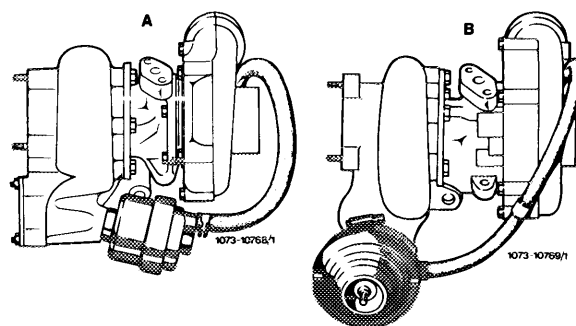
Kühnle Kopp and Kausch KKK 532 679 60 31¹⁾

¹⁾ Start of production

World-wide except (USA): January 1983

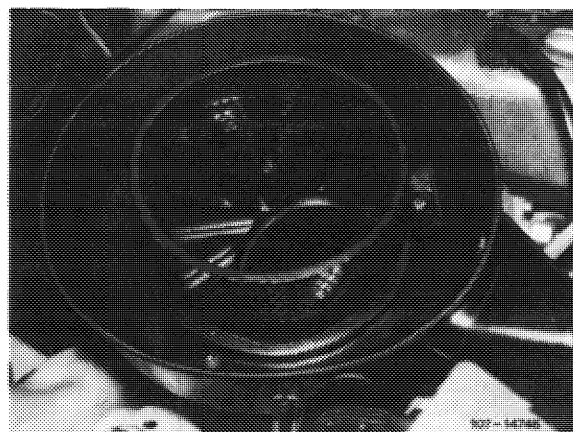
(USA): February 1983

A Garret turbocharger
B KKK turbocharger



Removal

1 Remove air filter, detaching air filter cover and unscrewing 3 fastening nuts.

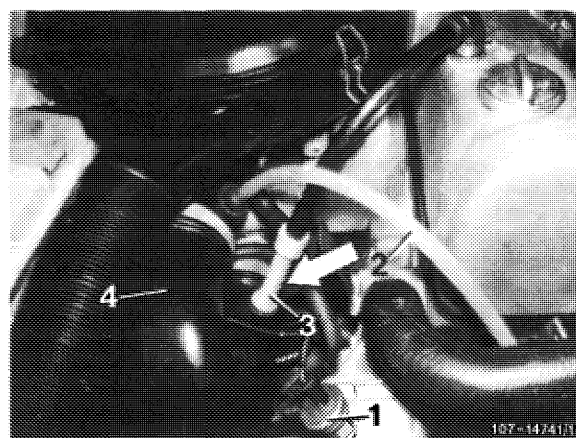


2 On vehicles with automatic climate control or air-conditioning remove electric line for 100° C temperature switch (1).

3 Release lower hose clip (arrow) on intake line (4) from air filter to compressor housing. On vehicles up to model 1979 only.

4 Remove vacuum line (2) and crankcase ventilation pipe (3).

5 Remove air filter with intake line (4).

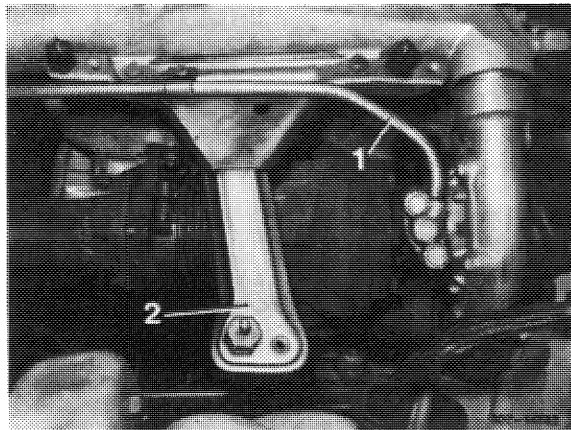


- 1 Temperature switch 100° C
- 2 Vacuum line
- 3 Crankcase ventilation pipe
- 4 Intake line

6 Unscrew engine oil supply line (1).

7 Unscrew air filter holder (2). To do so, release 3 hex-head bolts (2 from above, 1 from below) and remove holder.

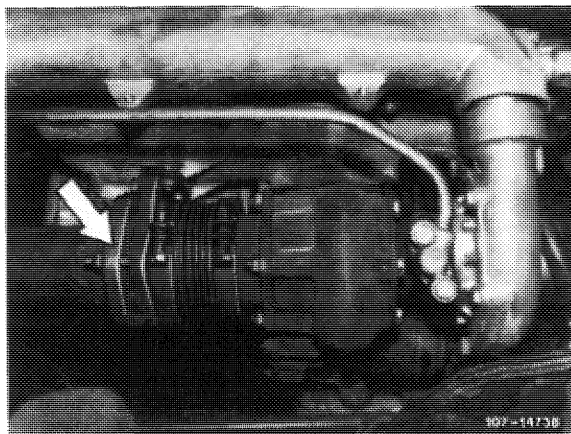
- 1 Engine oil supply line
- 2 Air filter holder



8 Unscrew exhaust flange (arrow).

9 Release and remove exhaust holder on automatic transmission.

10 Force exhaust pipe toward rear.

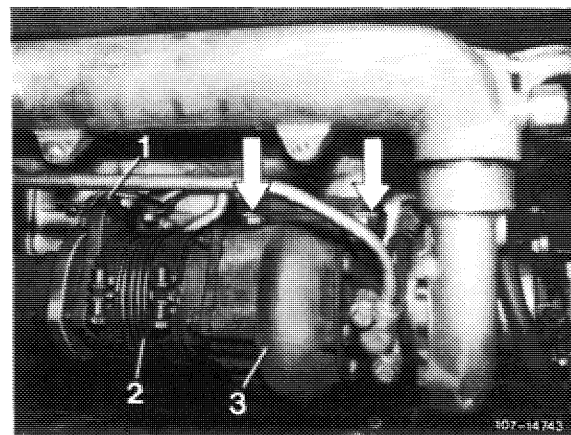


11 Unscrew holder (1) for adapter fitting (2).

12 Unscrew 4 fastening nuts (arrows) at exhaust-driven turbocharger and remove turbocharger.

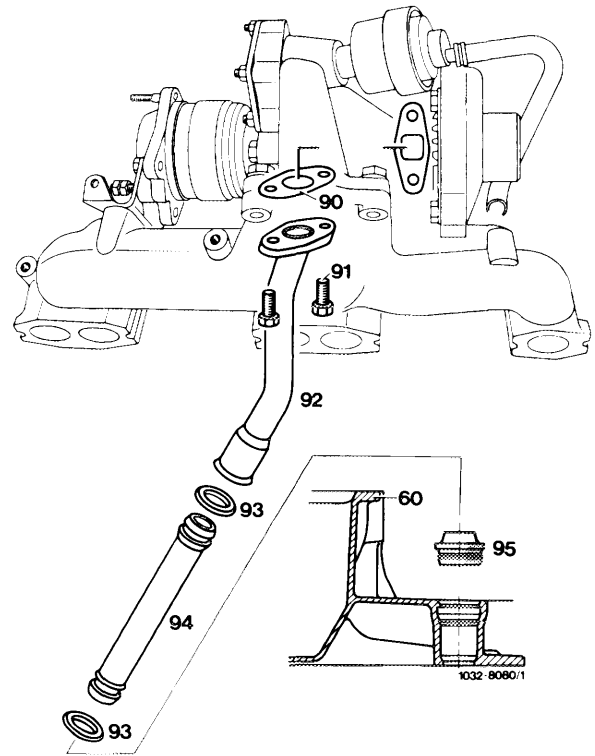
13 Unscrew adapter fitting (2) at exhaust-driven turbocharger (3).

- 1 Holder
- 2 Adapter fitting
- 3 Turbocharger



- 14 Unscrew oil return pipe (92) at turbocharger.

- 60 Oil pan, upper part
- 90 Gasket
- 91 2 bolts M 8 x 20
- 92 Oil return pipe (upper part)
- 93 O-ring
- 94 Oil return pipe (lower part)
- 95 Sectional seal



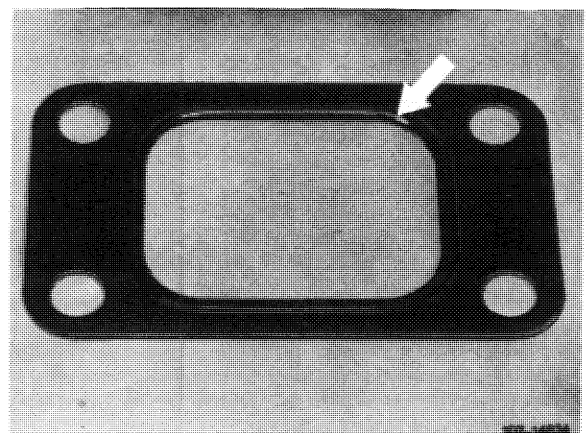
Installation

Install in reverse order, using new gaskets (repair set). Please note the following points:

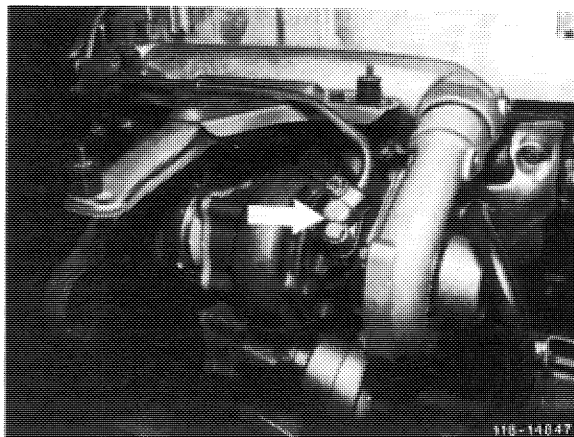
15 Prior to installing turbocharger, attach adapter fitting and oil return pipe. Correct positioning is absolutely essential.

16 Insert flange gasket between turbocharger and exhaust manifold so that bead (arrow) is at exhaust manifold side.

17 Always use heat-resistant nuts and bolts to attach the turbocharger.

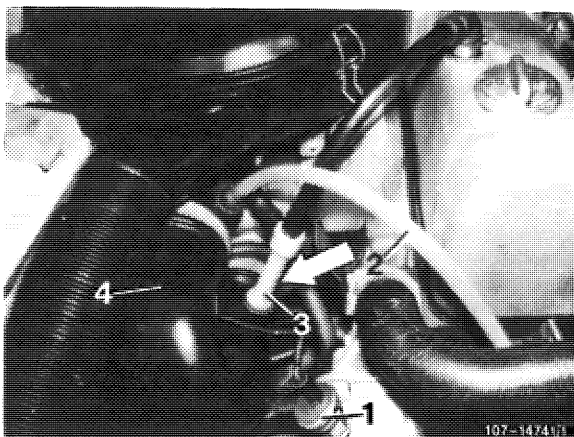


18 Prior to using a replacement turbocharger, fill with approx. 1/8 l engine oil through engine oil supply hole (arrow).

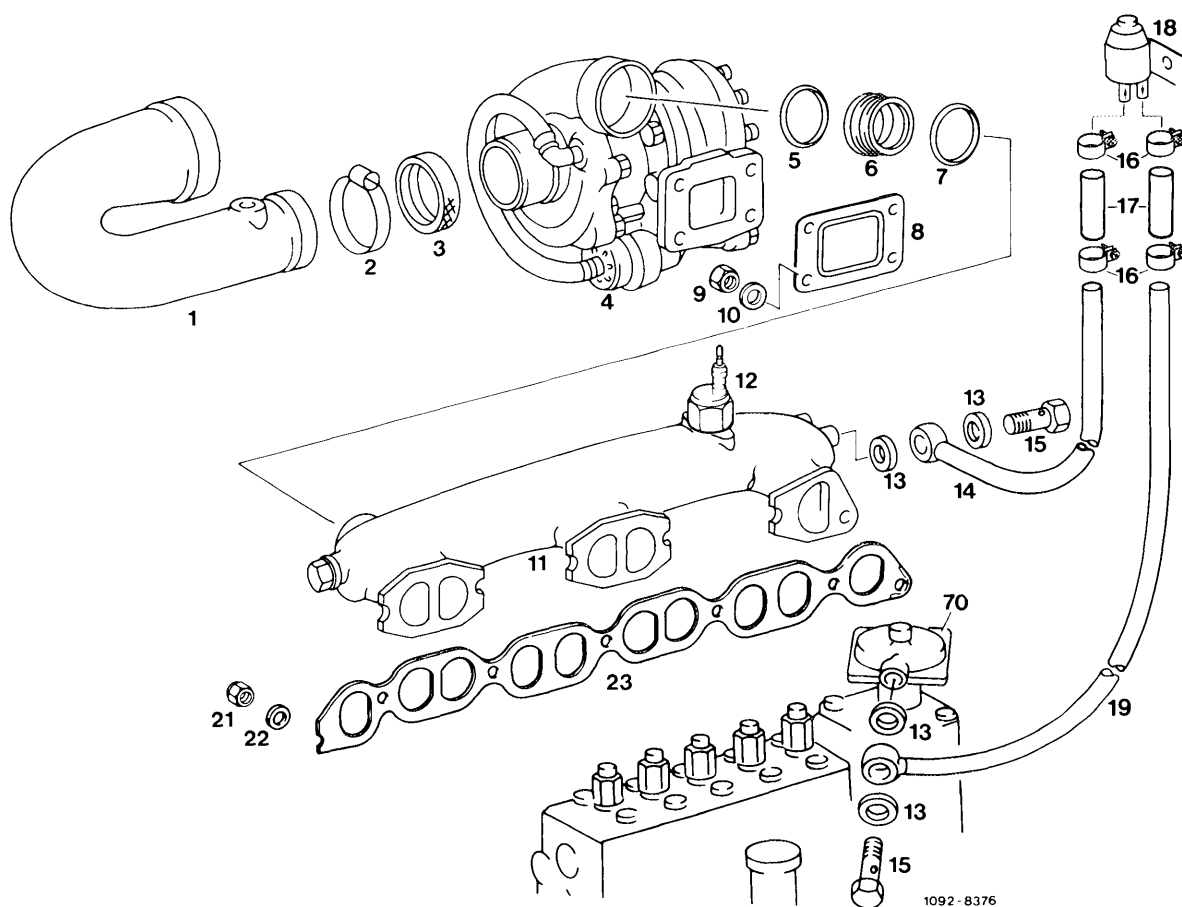


19 Make sure that intake line (4) is fitted in such a way that rubber sealing rings are correctly positioned.

- 1 Temperature switch
- 2 Vacuum line
- 3 Ventilation pipe
- 4 Intake line



A. Exhaust Gas Turbocharger



- | | | |
|-----------------------|---------------------------------------|---|
| 1 Intake line | 9 Heat-resistant nut | 17 Connecting hose |
| 2 Hose clip | 10 Washer | 18 Switchover valve |
| 3 Rubber sealing ring | 11 Intake manifold | 19 Delivery line to aneroid compensator |
| 4 Turbocharger | 12 Pressure switch | 21 Nut |
| 5 Rubber sealing ring | 13 Sealing ring | 22 Washer |
| 6 Adapter fitting | 14 Delivery line from intake manifold | 23 Gasket |
| 7 Rubber sealing ring | 15 Union screw | 70 Aneroid compensator |
| 8 Flange gasket | 16 Hose clip | |

A. Exhaust Gas Turbocharger

Exhaust gas turbocharger designation

Garret	TA 0301
Kühnle Kopp and Kausch	KKK 532 679 60 31

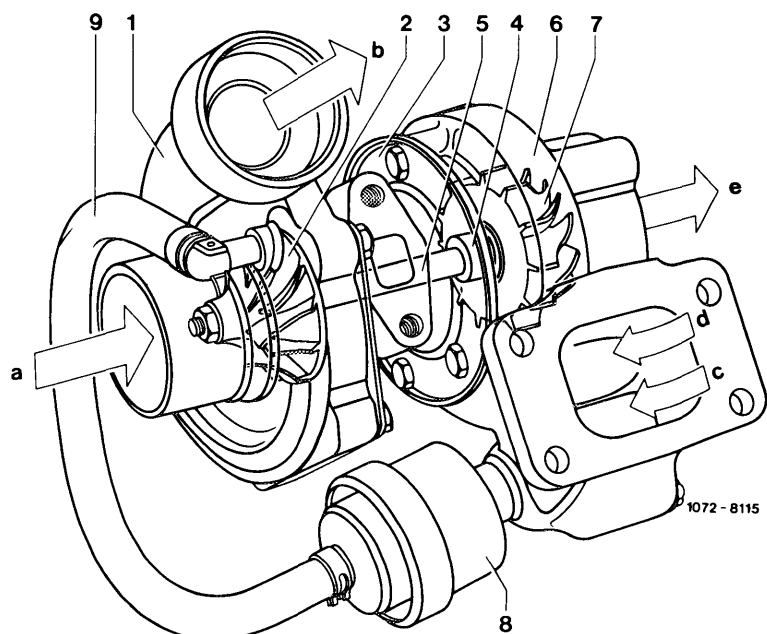
General

The exhaust gas turbocharger is a machine using the aerodynamic energy of the exhaust gases to drive a turbine which in turn propels a compressor via a shaft. The turbocharger is located between the exhaust manifold and exhaust pipe, being connected to the engine oil cycle for lubrication and cooling.

A boost pressure control valve on the turbine housing prevents a given boost pressure from being exceeded. In the event of a defective boost pressure control valve, an engine or an engine-transmission overload protection prevents breakdown of engine or transmission.

Layout of exhaust gas turbocharger with boost pressure control valve

- 1 Compressor housing
- 2 Compressor wheel
- 3 Center housing
- 4 Bearings
- 5 Shaft
- 6 Turbine housing
- 7 Turbine wheel
- 8 Boost pressure control valve
- 9 Connecting hose
- a Compressor intake (fresh air)
- b Compressor discharge (compressed air)
- c Exhaust gases to bypass duct
- d Exhaust gases to turbine wheel
- e Exhaust gas discharge

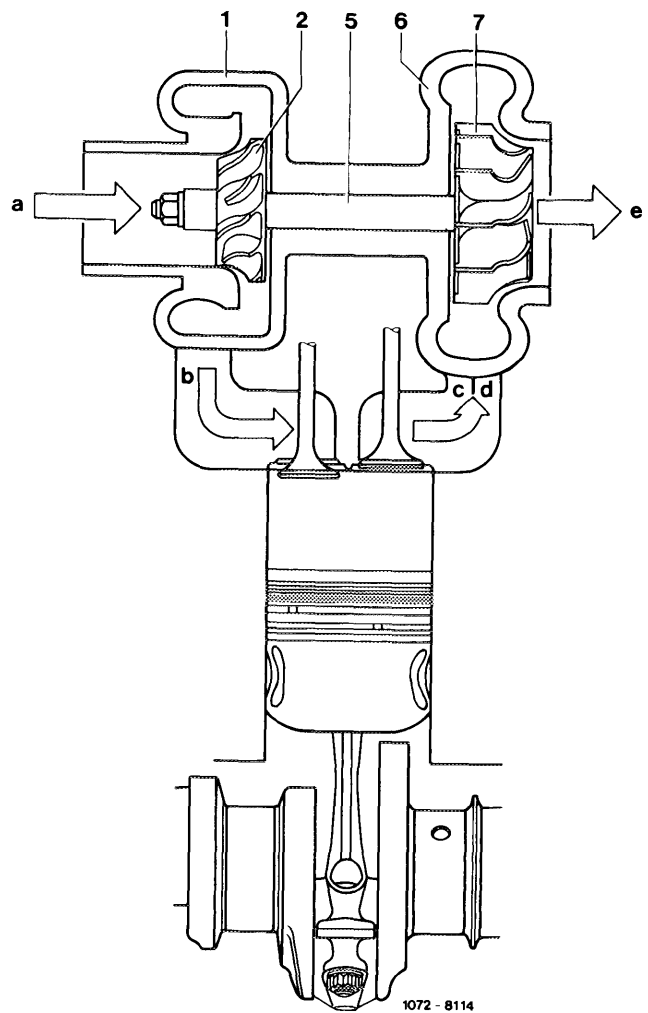


Functional Description

The engine exhaust gases are routed via the exhaust manifold straight to the turbine housing (6) and the turbine wheel (7). The aerodynamic energy of the exhaust gases makes the turbine wheel (7) rotate, driving the compressor wheel (2) which is joined to the turbine wheel (7) via the shaft (5). Maximum speed amounts to about 100,000/min. The fresh air induced by the compressor wheel (2) is compressed and delivered to the engine.

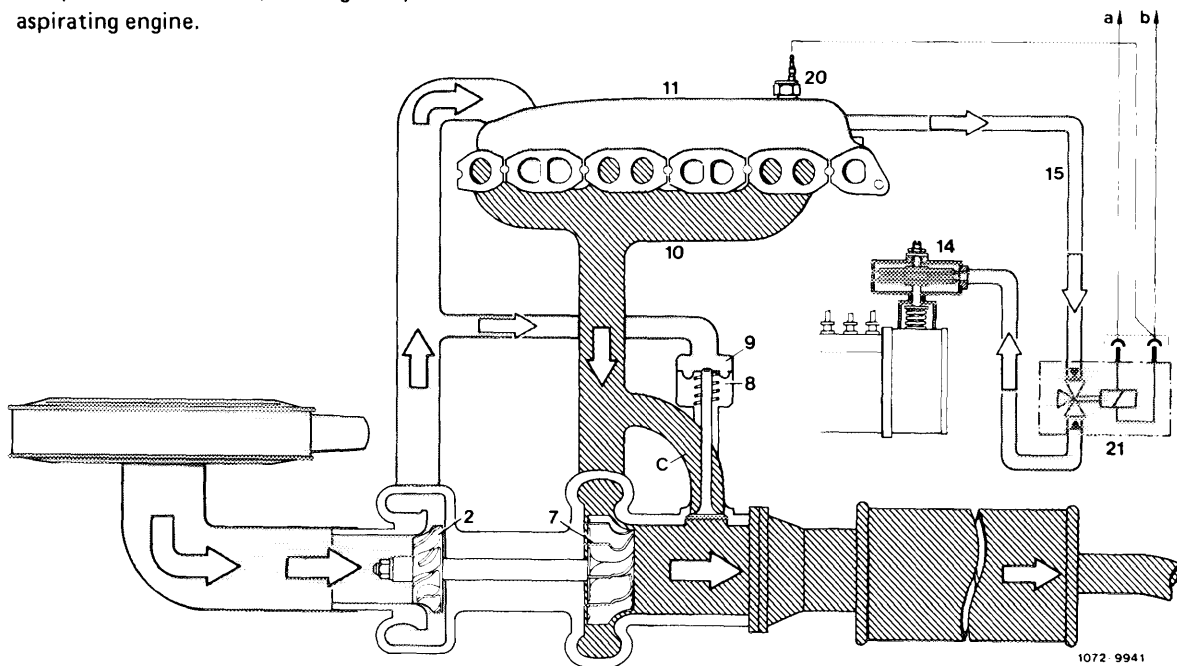
Diagram of fresh air and exhaust gas flow

- 1 Compressor housing
- 2 Compressor wheel
- 5 Shaft
- 6 Turbine housing
- 7 Turbine wheel
- a Compressor intake (fresh air)
- b Compressor discharge (compressed air)
- c Exhaust gases from exhaust manifold
- d Exhaust gases from exhaust manifold
- e Exhaust gas discharge (to exhaust pipe)



Idle speed and lower partial load

At idle and lower partial load no worthwhile pre-compression will occur, the engine operates as an aspirating engine.



Compressor inlet (fresh air)



Exhaust gas outlet

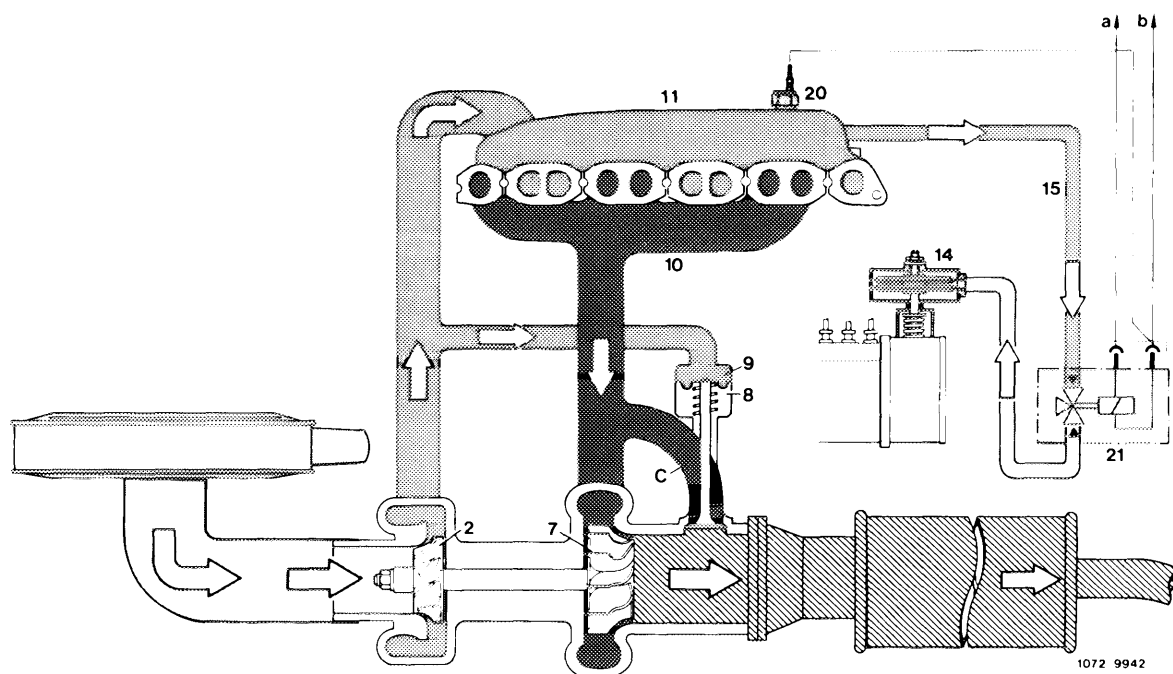
- 2 Compressor wheel
- 7 Turbine wheel
- 8 Boost pressure control valve
- 9 Connecting hose
- 10 Exhaust manifold
- 11 Boost air pipe
- 14 ALDA capsule
- 15 Pressure line
- 20 Pressure switch boost air pipe
- 21 Changeover valve

- a Fuse terminal 15
- b Switching unit overload protection
- c Exhaust gas to bypass duct

Upper partial load and full load

With increasing load and speed, that is, with increasing exhaust gas flow, the turbine wheel (7) is accelerated and the compressor wheel (2) will then generate a boost pressure up to a given value. The compressed charge-air is fed to the individual cylinders by way of the boost air (charge-air) pipe. The boost pressure adds increased fuel quantities by way of the ALDA unit on injection pump.

During deceleration, boost pressure is available but fuel injection is stopped due to position of control rod.



Compressor inlet (fresh air)
Compressor outlet (pre-compressed air)

Exhaust gases to turbine wheel
Exhaust gas outlet

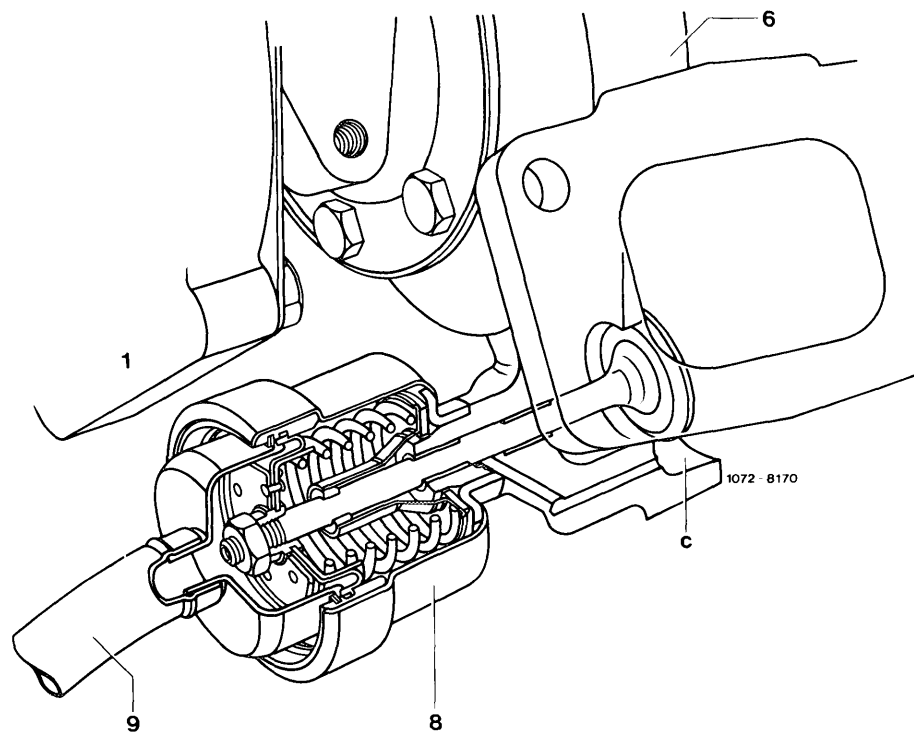
2 Compressor wheel
7 Turbine wheel
8 Boost pressure control valve
9 Connecting hose
10 Exhaust manifold

11 Boost air pipe
14 ALDA capsule
15 Pressure line
20 Pressure switch boost air pipe
21 Changeover valve overload protection

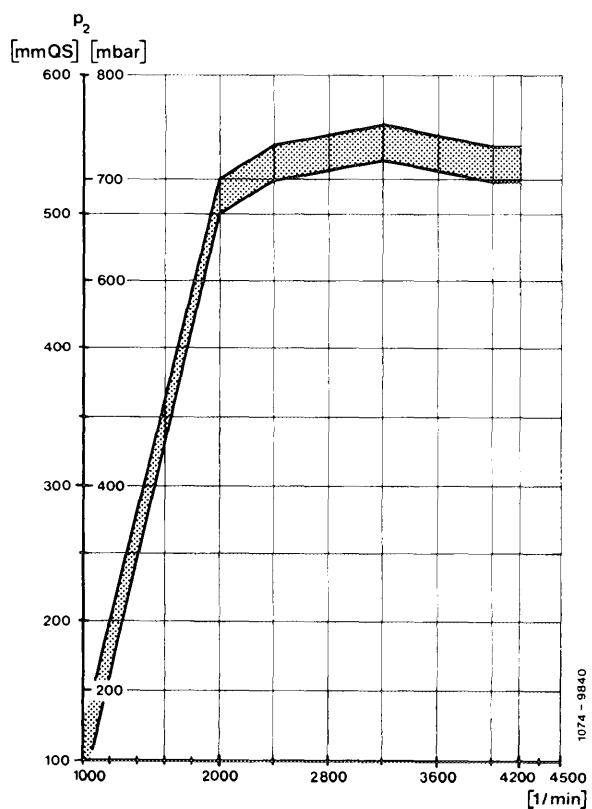
a Fuse terminal 15
b Switching unit overload protection
c Exhaust gas to bypass duct

Boost Pressure Control Valve

The turbine housing (6) bears a boost pressure control valve (8) designed to prevent the boost pressure from exceeding a given value. The boost pressure is tapped at the compressor housing (1) and passed to the boost pressure control valve (8) via the connecting hose (9). Once a given boost pressure is reached, the boost pressure control valve (8) begins to open the bypass duct (c). Some of the exhaust gases are now able to flow directly into exhaust pipe, keeping the boost pressure at a constant level



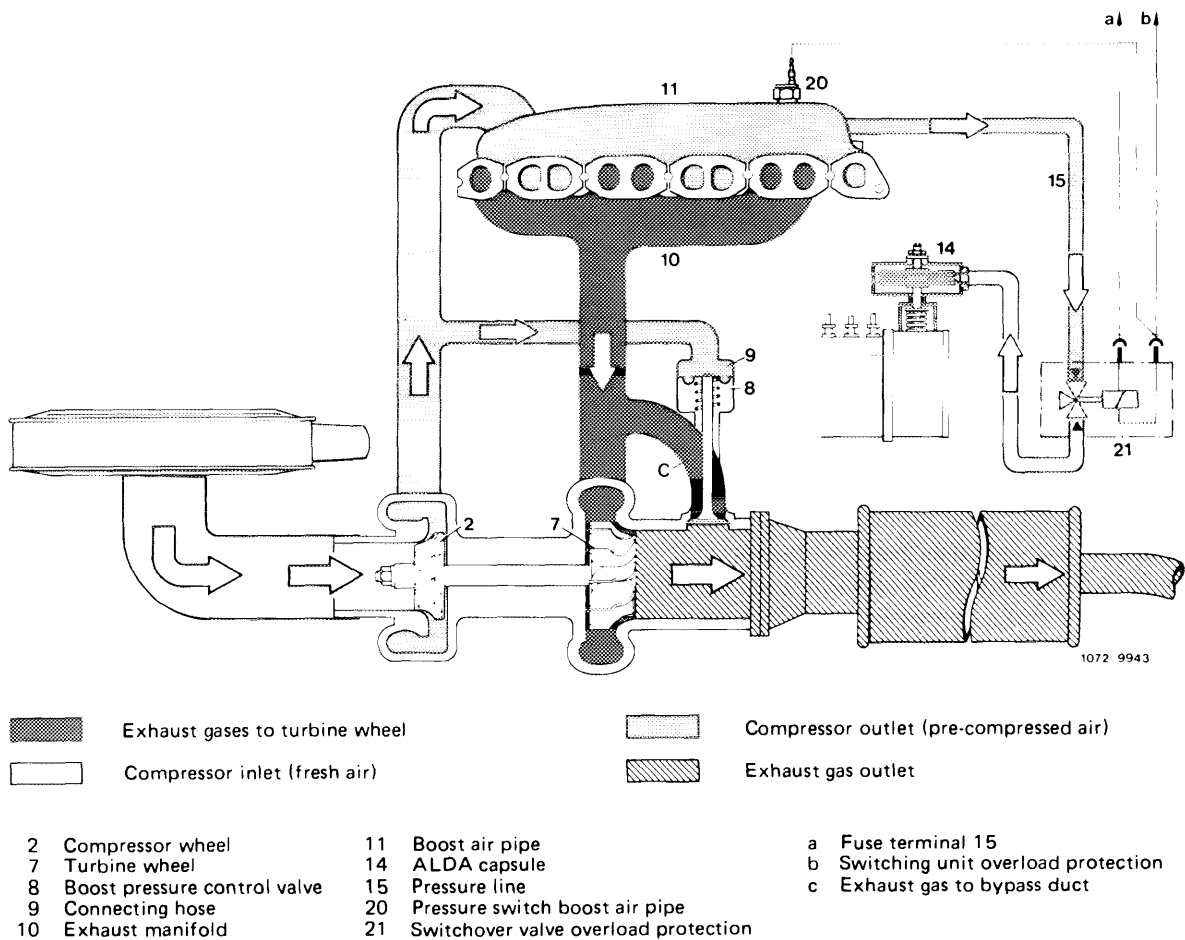
- 1 Compressor housing
- 6 Turbine housing
- 8 Boost pressure control valve
- 9 Connecting hose
- c Bypass duct



Boost pressure diagram at full load.

Engine overload protection

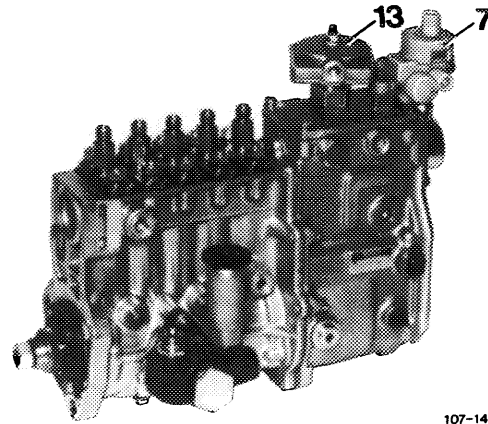
For overload protection of mechanical engine components a pressure switch is mounted in boost air pipe. If the boost pressure increases above 1.1 ± 0.15 bar gauge pressure, the ALDA diaphragm capsule is positively vented via changeover valve and the fuel quantity is restricted to that of an aspirating engine.



B. Absolute-measuring boost pressure stop (ALDA)

The MW injection pump is provided with an absolute-measuring boost pressure stop (ALDA) and a vacuum control valve (7) for the modulating pressure of the automatic transmission.

The ALDA equipment adapts the injected fuel quantity to the prevailing boost pressure and the respective altitude. As a result, the combustion chambers will always be provided with the correct injected fuel quantity of the respective cylinder charge to provide the best possible efficiency during the various operating modes. The ALDA capsule (13) is connected to the boost pressure pipe by means of a pressure line.



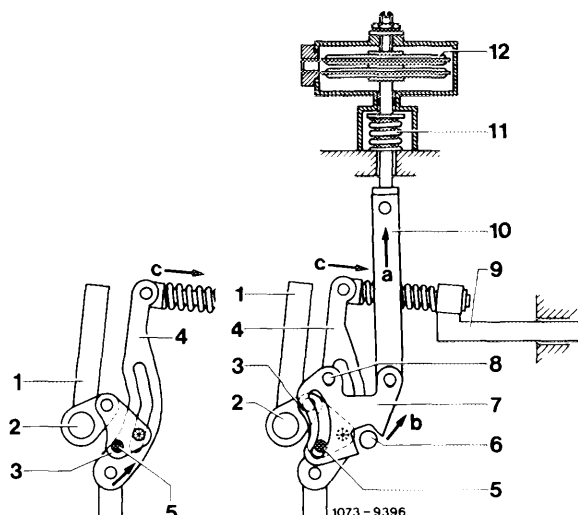
107-14791/1

Enrichment by means of boost pressure

The ALDA unit comprises 2 aneroid capsules (12), a compression spring (11), a connecting rod (10) and the slotted lever (7). Connecting rod (10) is connected to control rod (9) by way of the slotted lever (7), lever (3) and control lever (4). When the boost pressure increases, the aneroid capsules (12) are compressed and, assisted by compression spring (11), will move the connecting rod (10) in direction "a". This in turn will move the slotted lever (7) within its adjusting range in direction "b" and will push the control rod (9) in direction "c" via coupling lever (3) and control lever (4). The injected fuel quantity is increased.

ALDA with control linkage

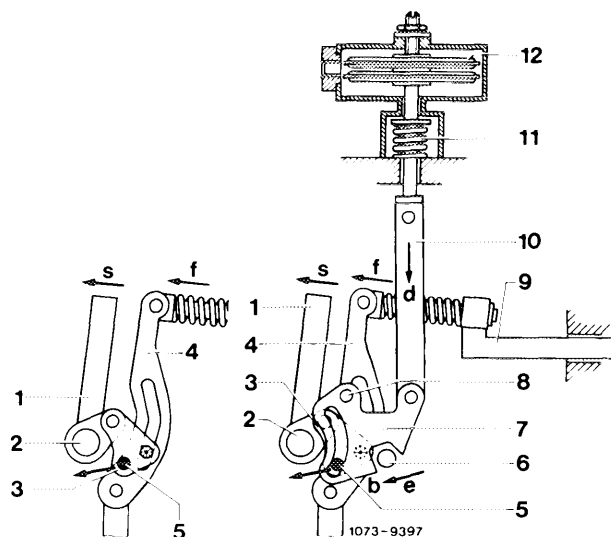
- | | |
|-------------------------|-------------------------|
| 1 Adjusting lever | 7 Slotted lever |
| 2 Adjusting lever shaft | 8 Pivot (slotted lever) |
| 3 Coupling lever | 9 Control rod |
| 4 Control lever | 10 Connecting rod |
| 5 Bolt | 11 Compression spring |
| 6 Stop | 12 Aneroid capsules |



Correction at high altitudes

During operation at high altitudes the aneroid capsules (12) begin to expand due to the increasing atmospheric pressure and force the connecting rod (10) in direction "d" against the compression spring (11).

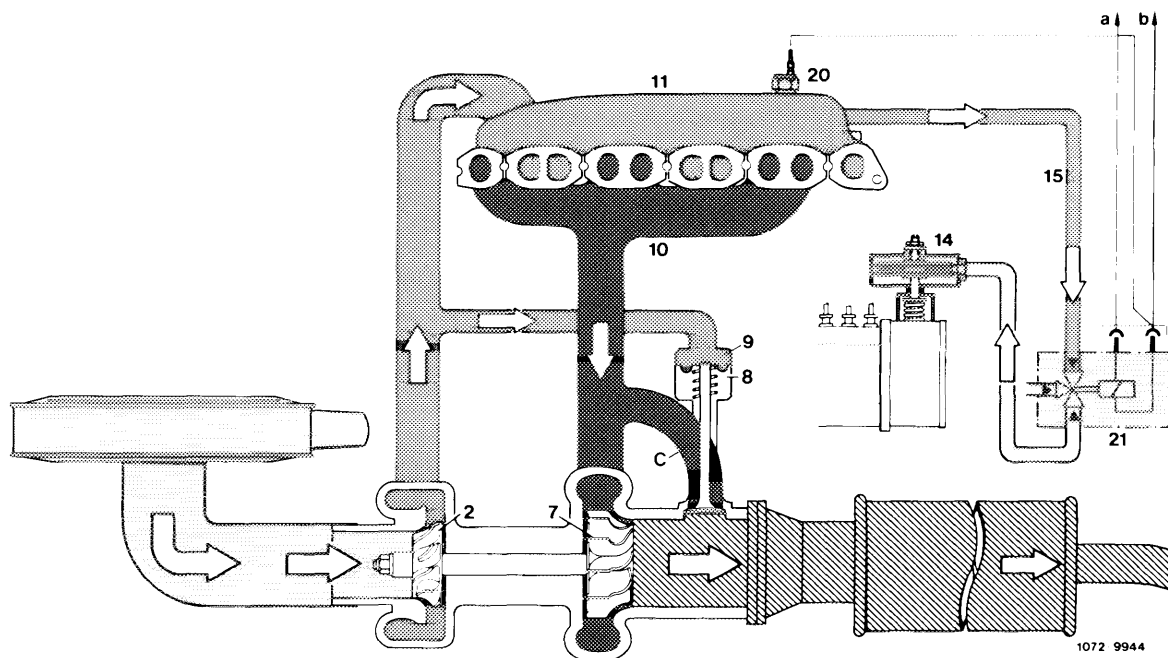
The slotted lever (7) then moves in direction "e" and hence pushes the control rod (9) in direction "f" via the coupling lever (3) and the control lever (4). The amount of fuel injected begins to drop.



Transmission overload protection

For overload protection of automatic transmission in extreme cases, e.g., moving-off uphill with a trailer, two values are decisive in influencing pressure conditions in ALDA aneroid capsule.

Below a modulating pressure of 0.3 bar gauge pressure and at engine speeds $> 2000/\text{min}$, the changeover valve will positively vent the ALDA aneroid capsule and will thereby limit the fuel quantity.



	Compressor inlet (fresh air)		Exhaust gases to turbine wheel	
	Compressor outlet (pre-compressed air)		Exhaust gas outlet	
2	Compressor wheel	11	Boost air pipe	a Fuse terminal 15
7	Turbine wheel	14	ALDA capsule	b Switching unit overload protection
8	Boost pressure control valve	15	Pressure line	c Exhaust gas to bypass duct
9	Connecting hose	20	Pressure switch boost air pipe	
10	Exhaust manifold	21	Changeover valve overload protection	