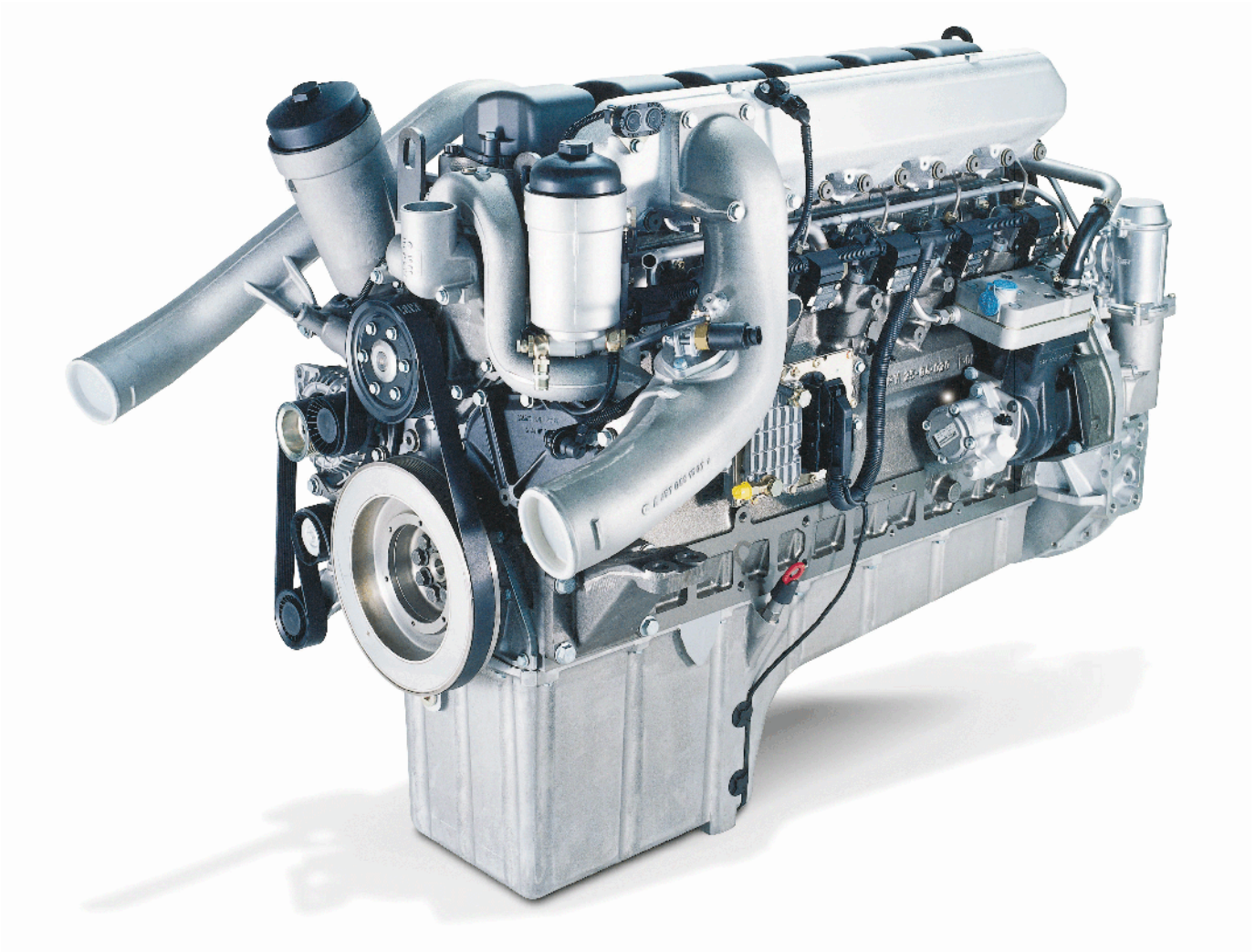


Engine 457 LA

W01.00-1021-06

Characteristics:

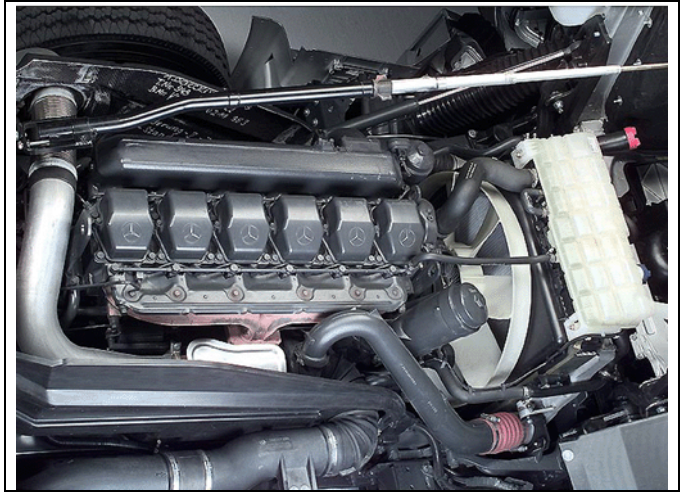
Engine model series OM 457 LA is a new development with optimized power output and torque characteristics.

These engines are suitable for all operational fields in the On/Off-highway modes.

They are characterized by high economy with low fuel consumption and low service requirements.

With its low power/weight ratio, the engine design corresponds to the demands of the market.

Other features of the new engine model series are high reliability in association with long runtime, with low fuel consumption for optimal power output.

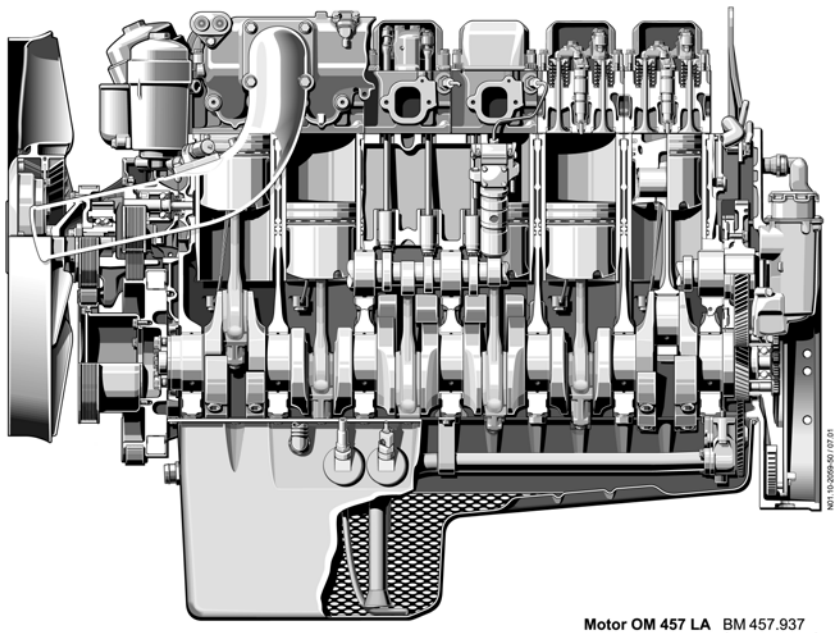


N01.10-2082-01

Main technical characteristics of the BR 457:

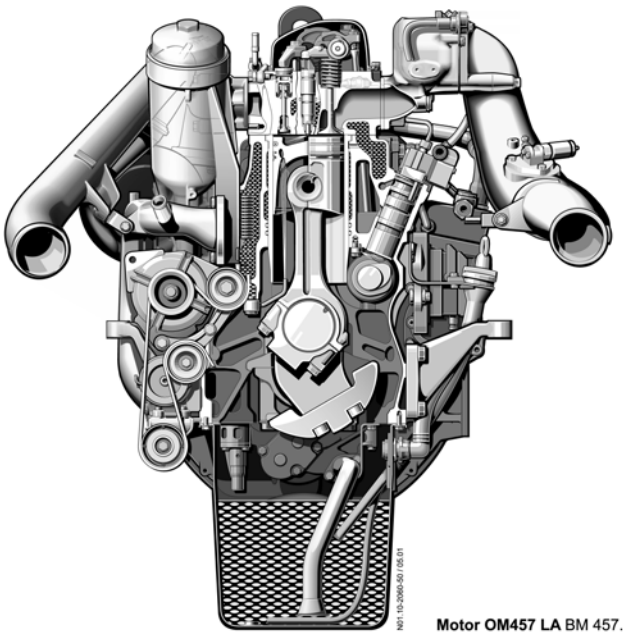
- High-strength, noise-optimised cylinder housing of high-additive cast iron.
- Compact design and high functional reliability through integration of the oil cooler, the unit pumps, and the coolant, fuel and oil ports into the crankcase.
- Engines in three different power categories, which already correspond to the EURO III or Euromot/EPA Level 2 standard from the start of production.
- Highly rigid oil pan of light alloy.
- Seven-journal crankshaft with counterweights bolted on. Induction-hardened bearing points and fillet radius.
- Fitted bearing located at the central bearing support for technical reasons related to vibrations.
- Main and connecting rod bearings consists of three-compound friction bearings. The thrust side is divided (last running layer is vacuum-metalized).

- Crankshaft seal of radial sealing rings with nonwoven dust lip.
- Camshaft drive through flywheel side gear drive.
- Gear-driven air compressor with flange-mounted power steering pump located flywheel side.
- Fuel delivery pump driven by a camshaft on the belt side.
- Oil pump in the oil pan, driven by gears on the flywheel side.
- Maintenance free poly-V-belt drive for all assemblies.
- Planetary gear drive starter on right at the flywheel.
- MR control unit with additional fuel cooler.
- Intake valve seat rings of Tribaloy, a high-carbon tungsten/steel alloy. These have to be smoothed when installed.
- Heat protection sleeve similar to BR 906 and BR 500.
- Piston cooling though oil spray nozzles.
- Camshaft/unit pump lubrication through additional oil spray nozzles.
- Four-valve technology with 2 intake and 2 exhaust valves per cylinder.
- MR engine control with the engine electronics located directly on the engine.
- Pump-line-nozzle system with solenoid-controlled unit pumps.
- Electronically controlled high-pressure direct injection at 1800 bar.
- Direct injection with centrally positioned 6-hole injection nozzle.
- Engine brake with exhaust flap and pneumatically controlled constant throttle valve. The useful engine speed range is above rated rpms.
- Turbocharger with charge air cooling.
- Turbobrake as special equipment.
- Engine power take-off at rear, also possible at front by means of additional belt drive for ancillary assemblies (special equipment).
- Can operate with biodiesel (RME).



Motor OM 457 LA BM 457.937
(Längsschnitt)

N01.10-2059-50



Motor OM457 LA BM 457.937 SKN/C

N01.10-2060-50

Overview of engines with EURO 3 certification

Engine model	No. of cylinders/Location	Power output (engine speed) [kW/HP (at rpm)]	Torque (engine speed) [kW/HP (at rpm)]	Cylinder bore (mm)	Cylinder stroke (mm)	Displacement (l)
OM 457 LA	6 cylinder / in-line	185/252 (2000)	1100 (1100)	128	155	11.97
OM 457 LA	6 cylinder / in-line	220/299 (2000)	1250 (1100)	128	155	11.97
OM 457 LA	6 cylinder / in-line	260/354 (2000)	1600 (1100)	128	155	11.97
OM 457 LA	6 cylinder / in-line	260/354 (2000)	1750 (1100)	128	155	11.97
OM 457 LA	6 cylinder / in-line	260/354 (1900)	1850 (1100)	128	155	11.97
OM 457 LA	6 cylinder / in-line	295/401 (1900)	2000 (1100)	128	155	11.97
OM 457 LA	6 cylinder / in-line	310/421 (2000)	1900 (1100)	128	155	11.97
OM 457 LA	6 cylinder / in-line	315/428 (1900)	2100 (1100)	128	155	11.97
OM 457 hLA	6 cylinder / horizontal	185/253 (2000)	1100 (1100)	128	155	11.97
OM 457 hLA	6 cylinder / horizontal	220/299 (2000)	1250 (1100)	128	155	11.97
OM 457 hLA	6 cylinder / horizontal	260/354 (2000)	1600 (1100)	128	155	11.97
OM 457 hLA	6 cylinder / horizontal	300/408 (2000)	1900 (1100)	128	155	11.97

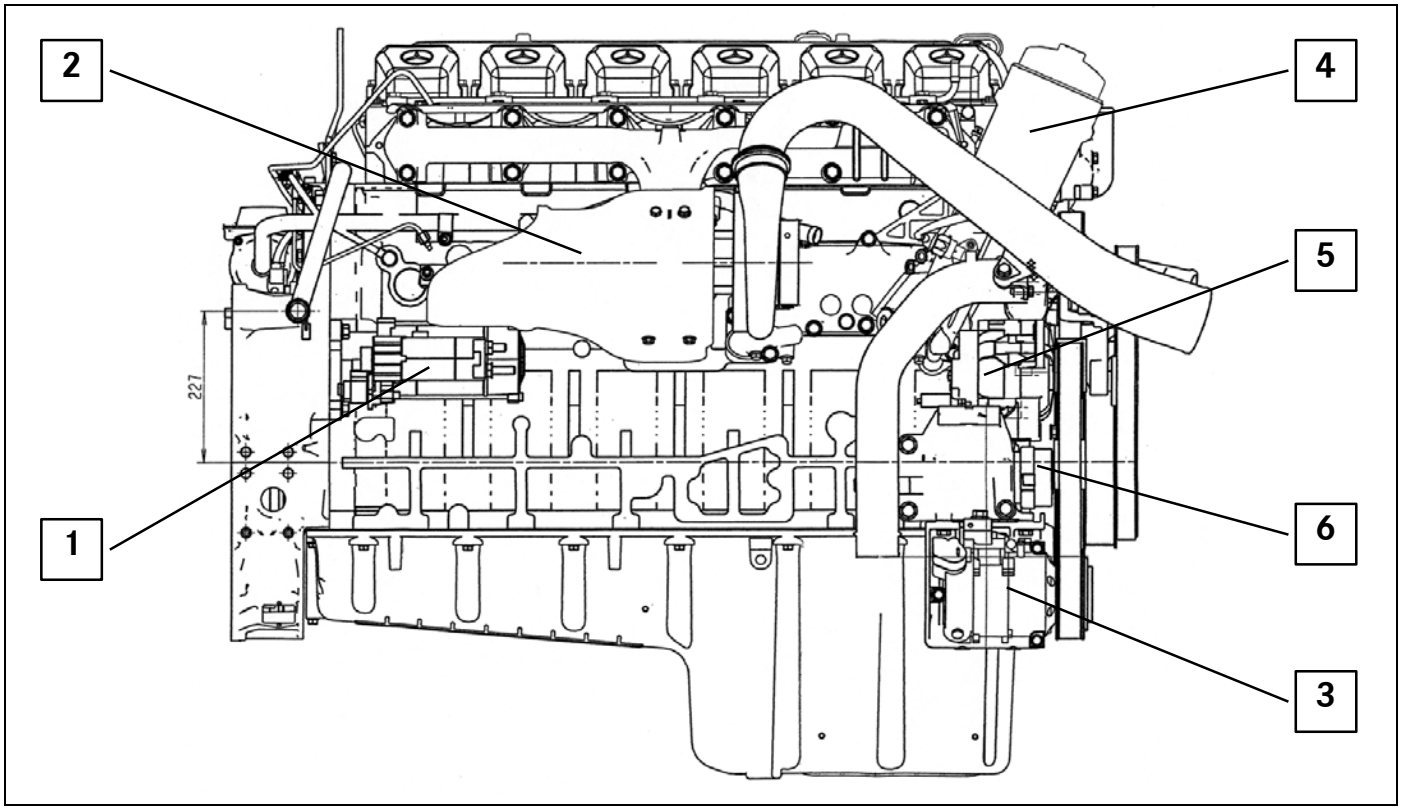
Overview of engines with EUROMOT/EPA Level 2 certification

Engine model	No. of cylinders/ layout	Power output (engine speed) [kW/HP (at rpm)]	Torque (engine speed) [kW/HP (at rpm)]	Cylinder bore (mm)	Cylinder stroke (mm)	Displacement (l)
OM 457 LA	6 cylinder / in-line	242/329 (1800)	1600 (1200)	128	155	11.97
OM 457 LA	6 cylinder / in-line	260/354 (1800)	1750 (1200)	128	155	11.97
OM 457 LA	6 cylinder / in-line	295/401 (1800)	1900 (1200)	128	155	11.97
OM 457 LA	6 cylinder / in-line	315/428 (1800)	2000 (1200)	128	155	11.97
OM 457 LA	6 cylinder / in-line	335/455 (1800)	2000 (1200)	128	155	11.97

Location of components:

Legend:

1 Starter
2 Turbocharger with throttle valve
3 Refrigerant compressor
4 Oil filter / oil cooler combination
5 Alternator
6 Belt tensioner



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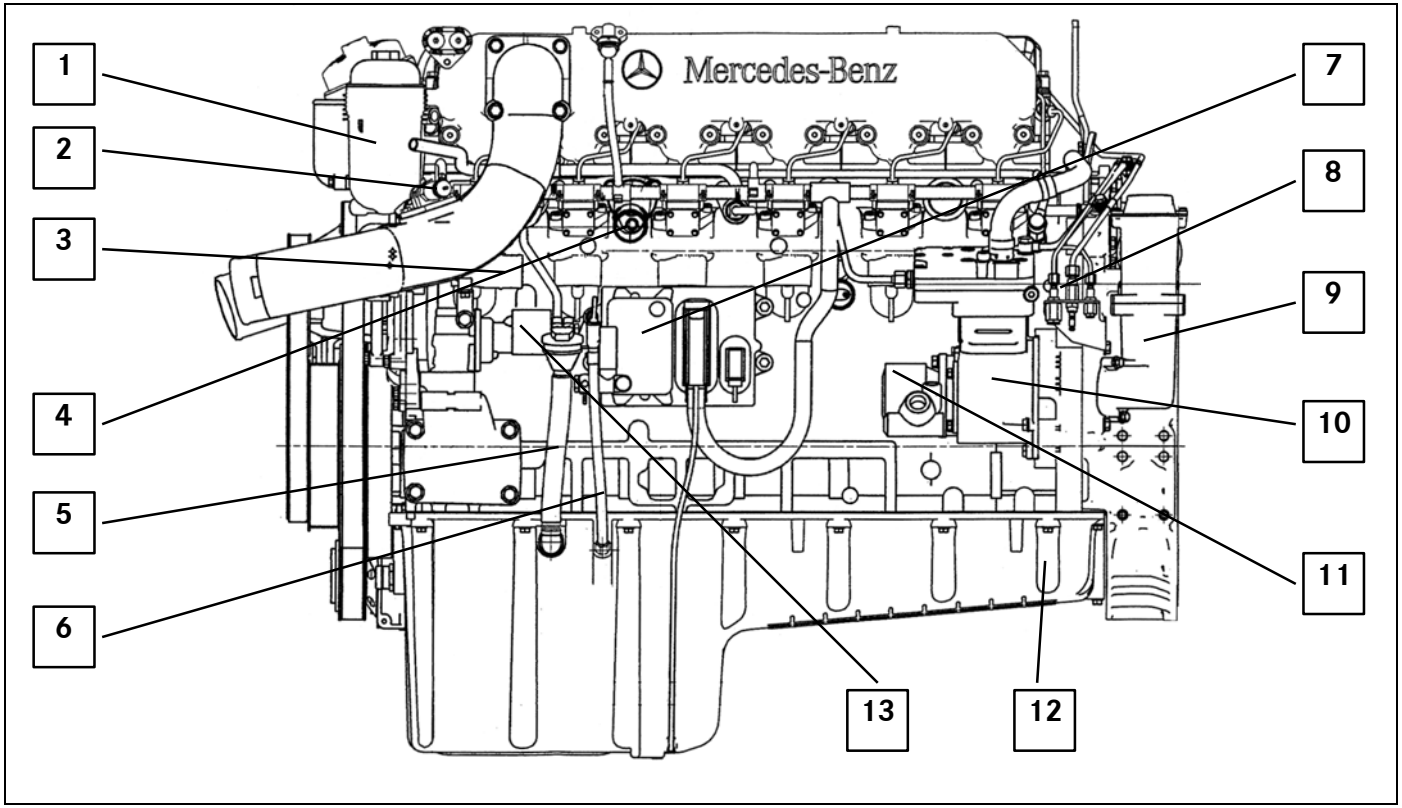
Legend:

1 Fuel filter
2 Flame starting system
3 Retarder return flow
4 Retarder feed
5 Oil replenishment
6 Oil dipstick
7 MR PLD control module
8 Control connections
9 ZKG ventilation with oil vapor separator
10 Single-cylinder air compressor
11 Power steering unit pump
12 Oil pump (in oil pan)
13 Fuel pump



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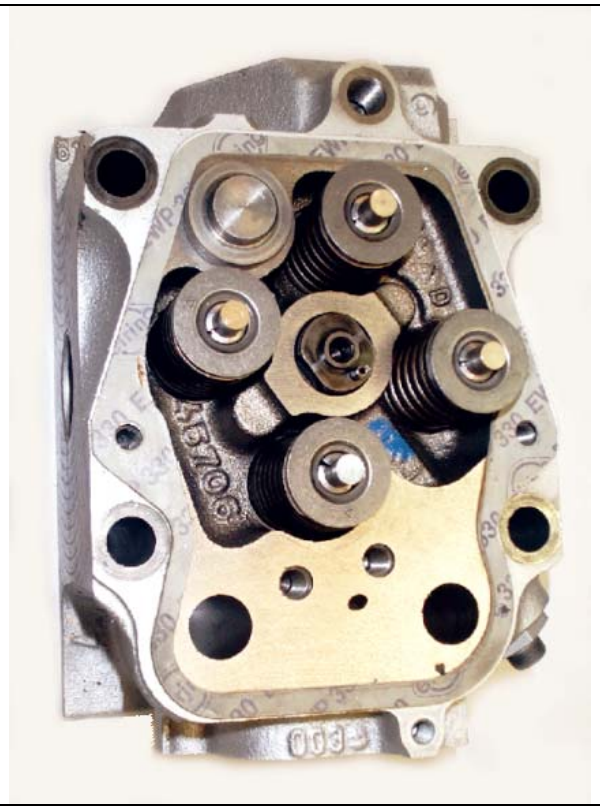

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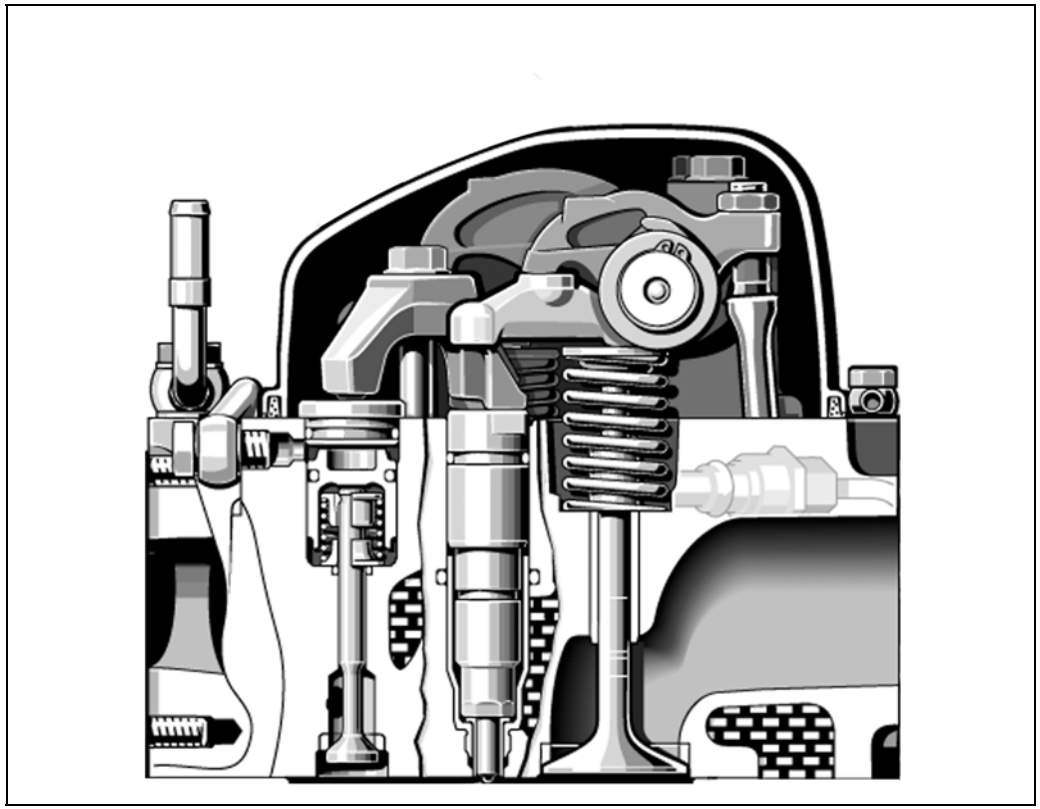
The six individual cylinder heads are of cast iron, each fixed to the crankcase with four stretch-shank bolts.
The package of design and technology measures already present in the BR 500 engine model series has been carried over for the cylinder heads of this model series, in order to meet the EURO III Standards. The 6-hole injection nozzles are located centrally in the combustion chamber. Two intake and outlet valves are arranged symmetrically around each of these, so that the optimal conditions are present for gas exchange that is rapid and as complete as possible.
This has a positive effect on fuel consumption and exhaust gas composition.
The valves are controlled from the camshaft through pairs of push rods, rocker arms and valve bridges.

Series 457<>Cylinder head - cross section (transverse and longitudinal)

07.05.2003



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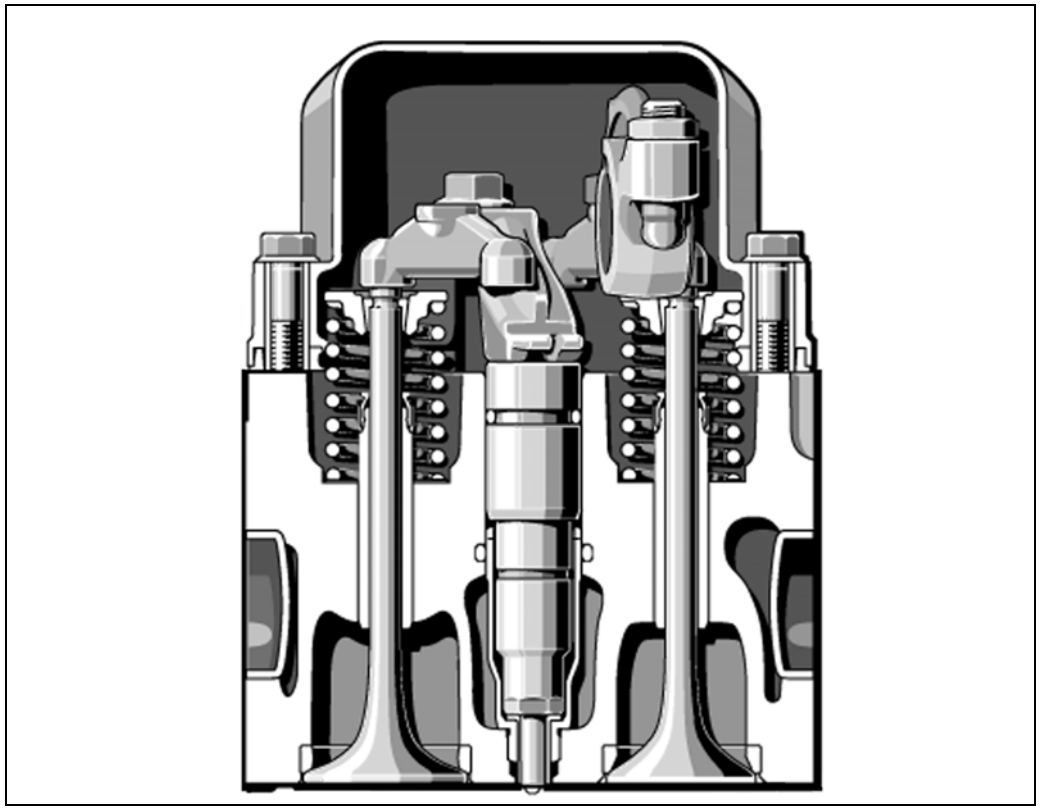

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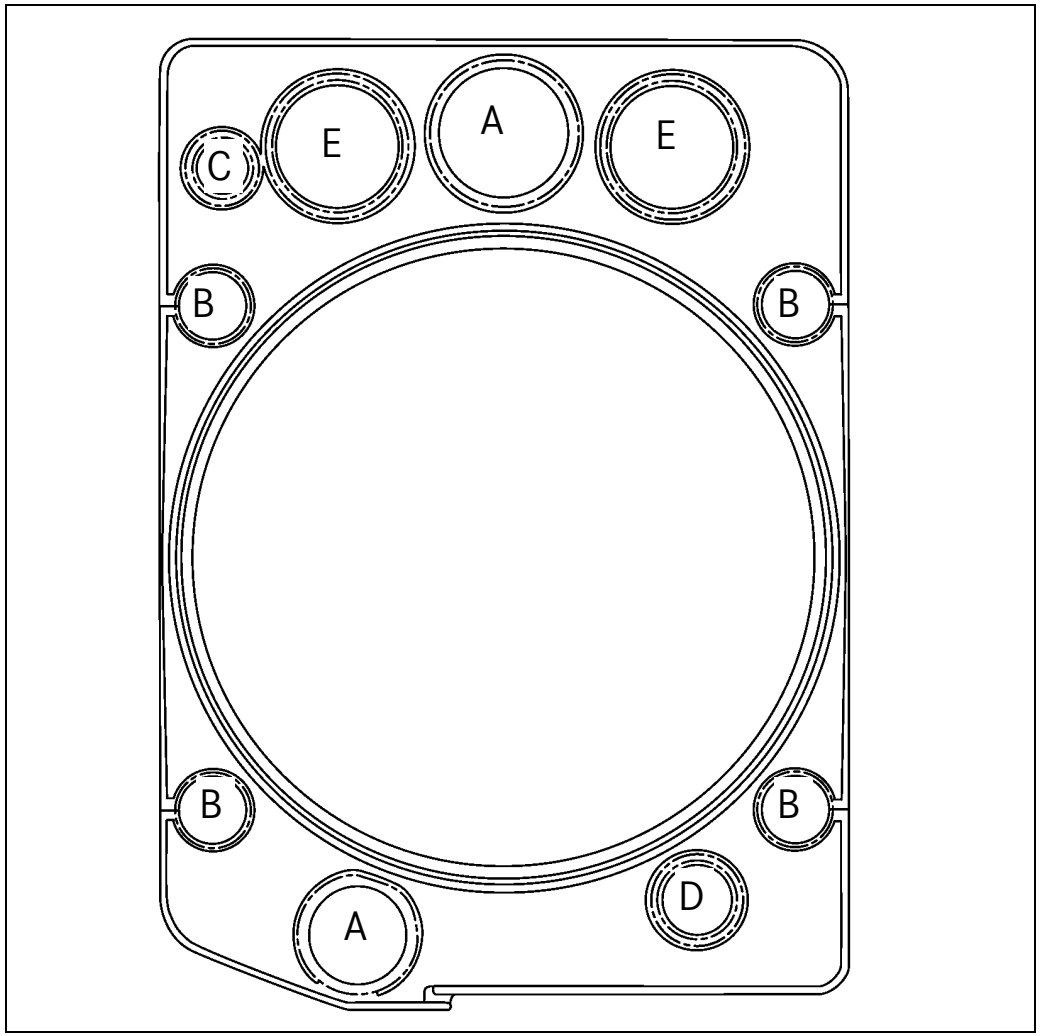
Each cylinder head has two intake and exhaust valves, one pneumatically-operated constant throttle, and the nozzle holder combination with pressure connection.



N01.30-2068-12

A Coolant
B Bolts
C Pressure oil
D Oil return
E Plunger, oil return

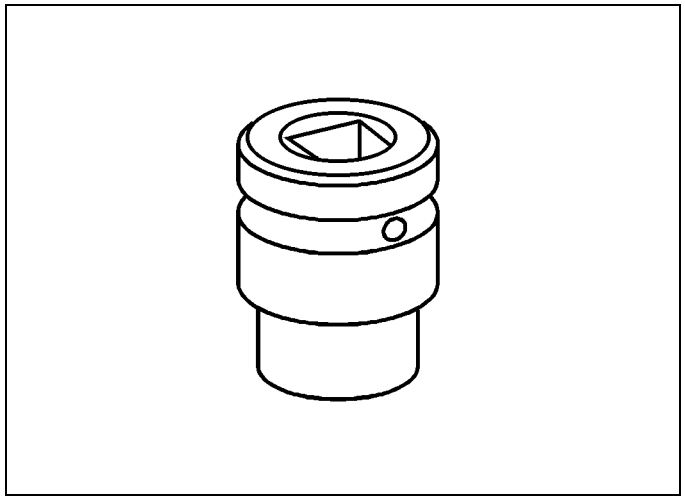
Cylinder head bolt test values

Designation		Engine 457.9
Cylinder head bolt M 15 x 2	Shank length [mm]	≤ 212

Cylinder head bolt tightening torques

Designation		Engine 457.9
Cylinder head bolt to crankcase	Step 1 [Nm]	10
	Step 2 [Nm]	50
	Step 3 [Nm]	100
	Step 4 [Nm]	200
	Step 5 ∡	90°
	Step 6 ∡	90°

Socket wrench bit



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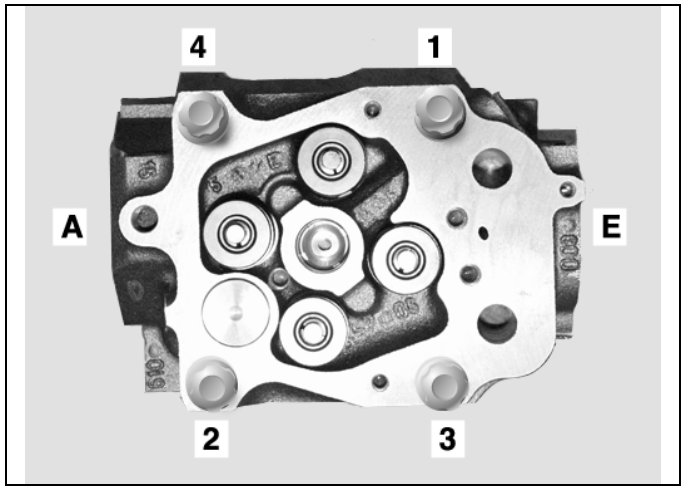
- Screw in the cylinder head bolts and, following the above tightening sequence (1 to 4), tighten to the indicated torque Nm and tightening angle.

  If a bolt has been over-tightened when assembling, then all four bolts should be loosened on the cylinder head concerned, examined for elongation, then tightened again starting from Step 1.

  The cylinder head bolts do not require any further tightening.



E Intake side
A Exhaust side

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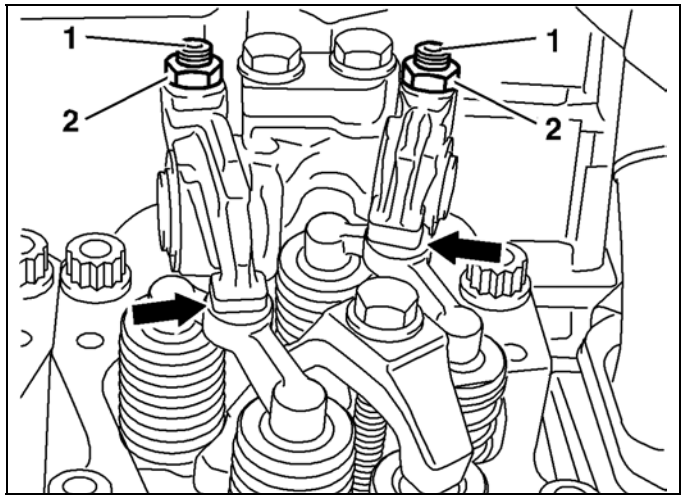
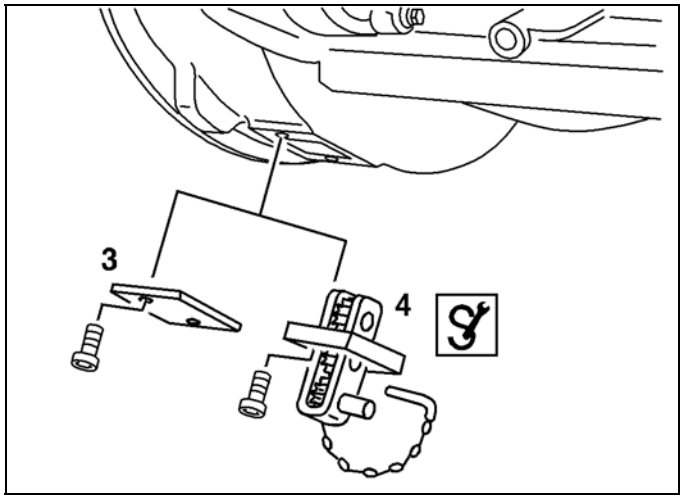


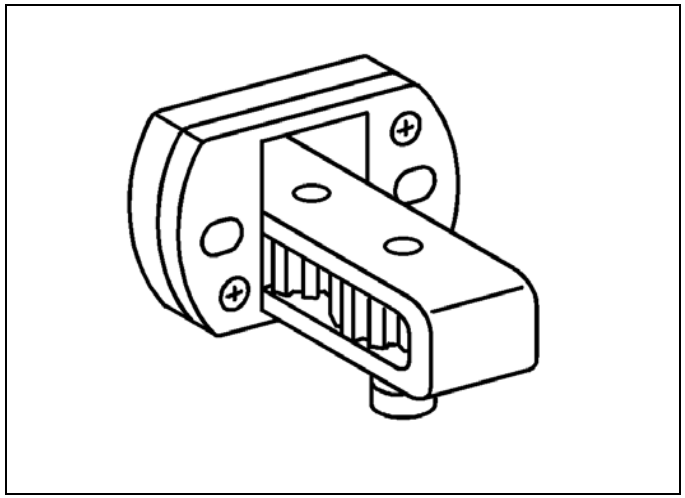
1 Adjusting screw
2...Locknut

N05.30-2071-01



3...Cap
4...Turning device

N03.30-0313-01



Turning device

904 589 04 63 00

Procedure for setting valve play

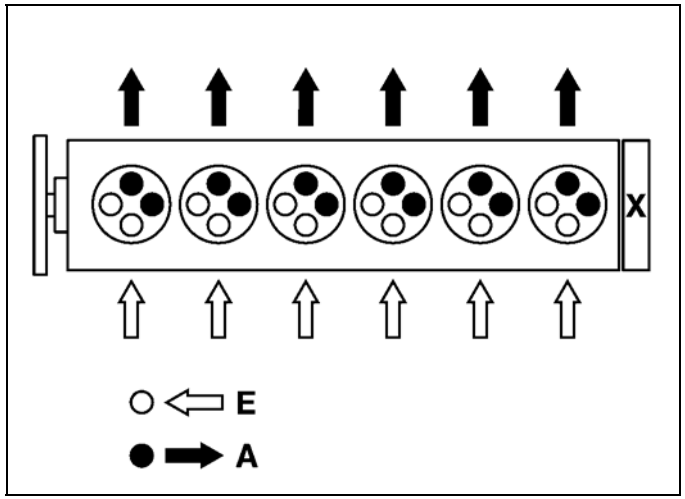
	Check or set the valve play with the engine cold. At least 30 minutes after stopping the engine, even after running for a short period, so that the engine will be warmed up evenly.	
1	Remove the cylinder head cover	
2	Select the valve setting method	Setting according to injection sequence Method 1 Setting in two crankshaft positions Method 2

3	Install turning device (4) at the inspection hole in the timing case and turn the engine to the crankshaft position for the selected setting method.	
4	Check and set valve play (as indicated by arrows).	ℹ The valve play test tolerance applies only for checking, not setting.
5	Remove turning device (4) and fit the cap to the inspection hole in the crankcase.	
6	Fit the cylinder head covers.	

Valve test values

Designation		**Engine 457.9**
Valve play	Intake [mm]	0.40
	Exhaust [mm]	0.60
Test tolerance	[mm]	-0.10/+0.20

Valve play setting methods



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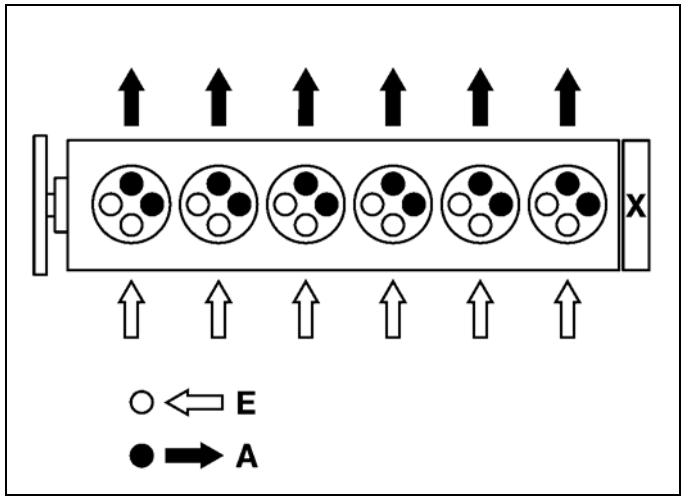
Engine 457
A...Exhaust valve
E...Intake valve
X...Flywheel side



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Method 1:

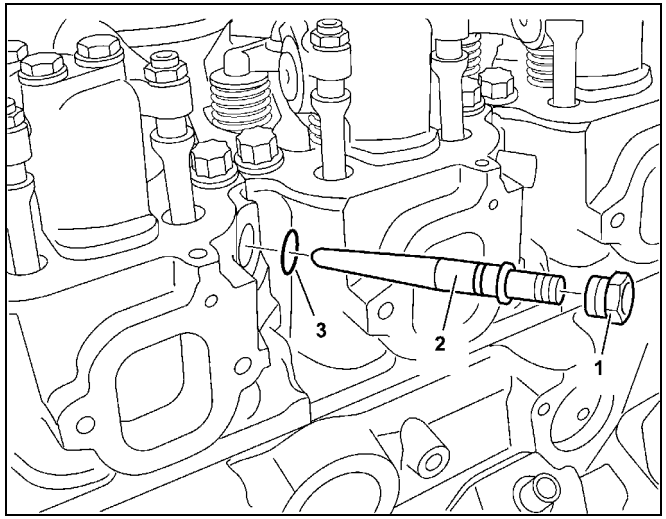
Set intake and exhaust valves for each cylinder, according to the injection sequence.
The cylinder to be set must be at ignition TDC, the parallel cylinder at valve overlap TDC.

Method 2:

Set intake and exhaust valves in two crankshaft positions, as shown in the table.
6-cylinder
First set cylinder 6 at valve overlap TDC (cylinder 1 at ignition TDC), then cylinder 1 at valve overlap TDC (cylinder 6 at ignition TDC).

Engine	Crankshaft position	Cylinder/injection sequence					
6-cylinder	Ignition TDC	1	5	3	6	2	4
	Valve overlap	6	2	4	1	5	3

Engine	Crankshaft position	Cylinder/valves to be set					
		1	2	3	4	5	6
6-cylinder	Cyl. 6 valve overlap	E/A	E	A	E	A	-
	Cyl. 1 valve overlap	-	A	E	A	E	E/A



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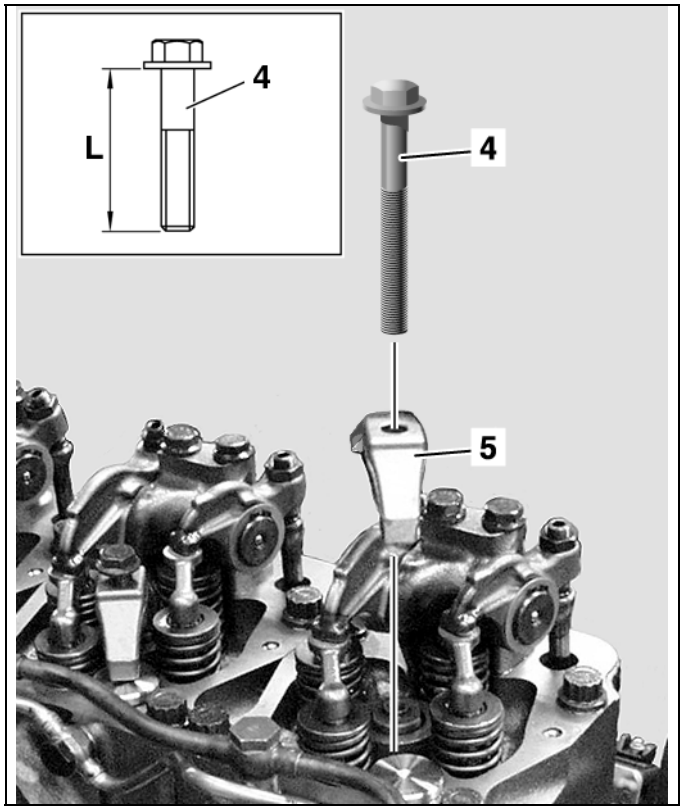

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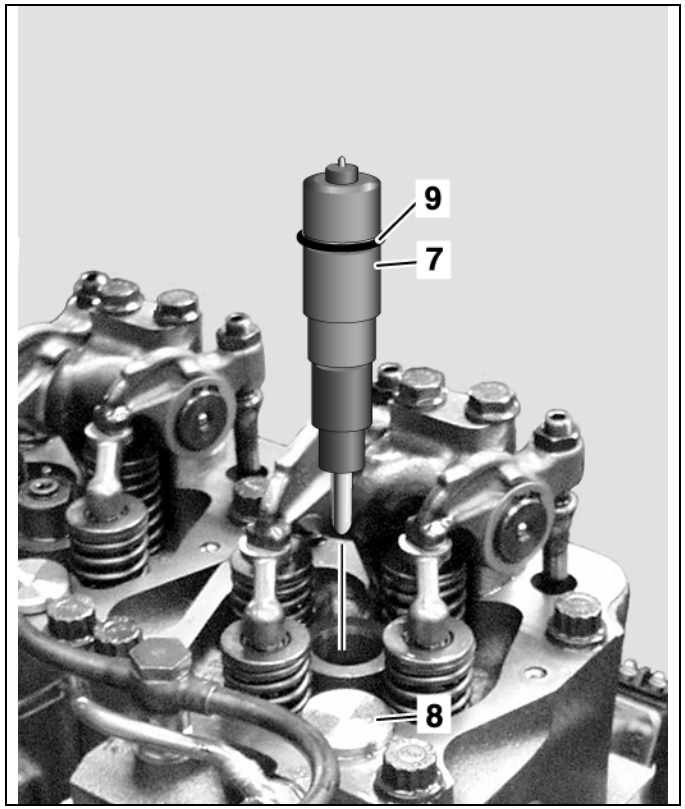

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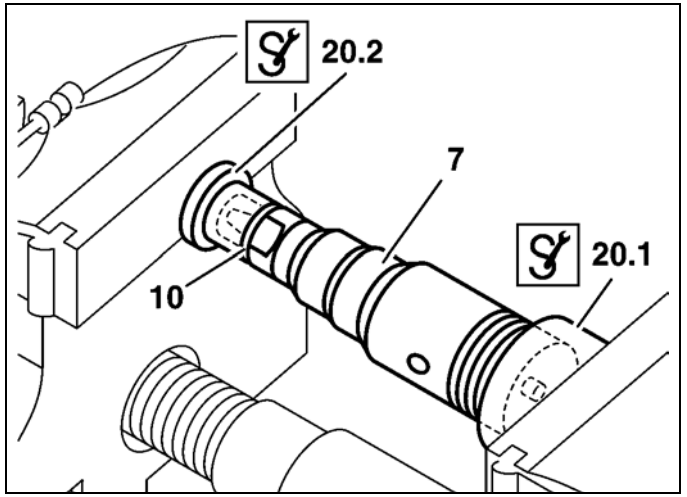
1	Pressure screw
2	Pressure pipe connection
3	O-ring
4	Screw
5	Retaining clip
7	Nozzle holder combination
8	Cap
9	O-ring
10	Sealing sleeve
L	Shank length
20.1	Mounting (for nozzle holder head)
20.2	Press-on sleeve (for sealing sleeve)



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Removal

	To remove	
1	Remove the charge air manifold	
2 ⚠Danger!	Remove the cylinder head cover **Risk of explosion** due to ignition of flammable gases, **Risk of poisoning** by inhaling or absorbing fuel, and **Risk of injury** if fuel comes into contact with skin or eyes	 Fire, sparks, naked flames, smoking are forbidden. Only store fuel in suitable and correctly marked containers. Wear protective clothing if coming into contact with fuel.
3	Remove the injection lines	

4	Unscrew pressure screw (1) and take out pressure pipe connection (2).	
5	Unscrew retaining clip (5)	
6	Take out nozzle holder combination (7)	Fit the adapter and extractor to inside thread (M8) of the nozzle holder combination. The nozzle holder combination should not be disassembled. If worn or faulty, install new nozzle holder combination.
7	Detach sealing sleeve (10) from nozzle holder combination (7)	If the sealing sleeve is stuck: pull sealing sleeve out of cylinder head Extracting tool Threaded insert Extractor

Installation

	To install	
8	Replace O-ring (9) on nozzle holder combination (7)	

9	Press new sealing sleeve (10) onto the nozzle holder combination (7)	  Before pressing on the new sealing sleeve, clean the contact surface of the sealing sleeve to remove combustion residues (using a wire brush for example, or ultrasonic cleaning equipment): Clean the nozzle holder combination
10	Install nozzle holder combination (7)	 Note installation location of nozzle holder combination at pressure pipe connection hole.
11	Screw on the retaining clip (5)	 Note installation location  Check the shank length of screws (4).
12	Place a new O-ring (3) on pressure pipe connection (2).	 Grease the O-ring (3).
13	Mount the pressure pipe connection (2) and tighten pressure screw (1).	
14	Install the injection lines	
15	Fit the cylinder head cover	
16	Fit the charge air manifold.	

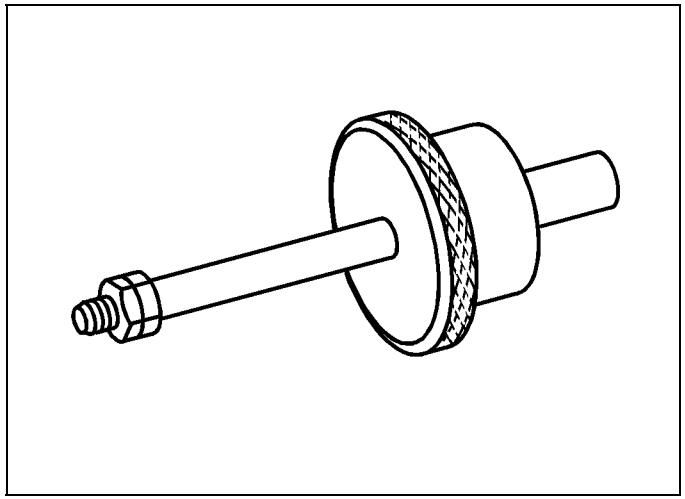
Injection nozzle test/setting values

Designation		Engine 457.9
Screw, nozzle holder combination retaining clip /constant throttle to cylinder head	Shank length [mm]	≤ 91

Nm Diesel injection system with unit pumps

Designation		Engine 457.9
Pressure screw, pressure pipe connection to cylinder head	[Nm]	40
Screw, injection nozzle retaining clip / constant throttle to cylinder head	[Nm]	40+5

Special tools



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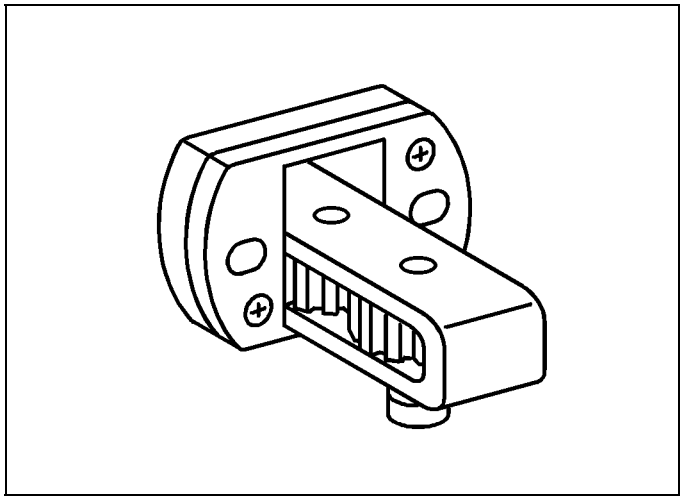

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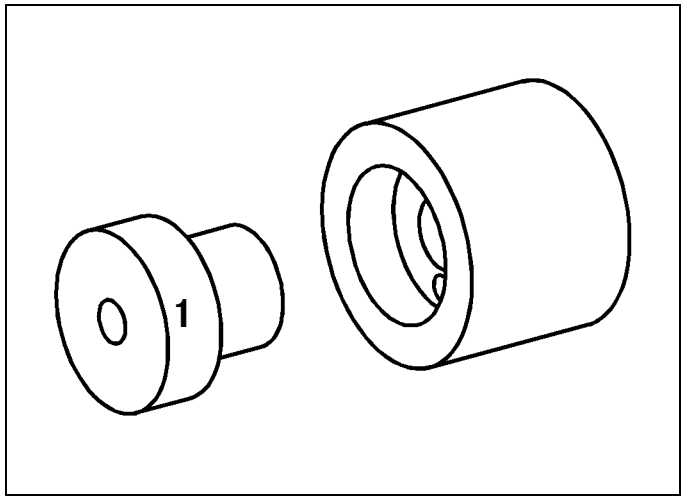

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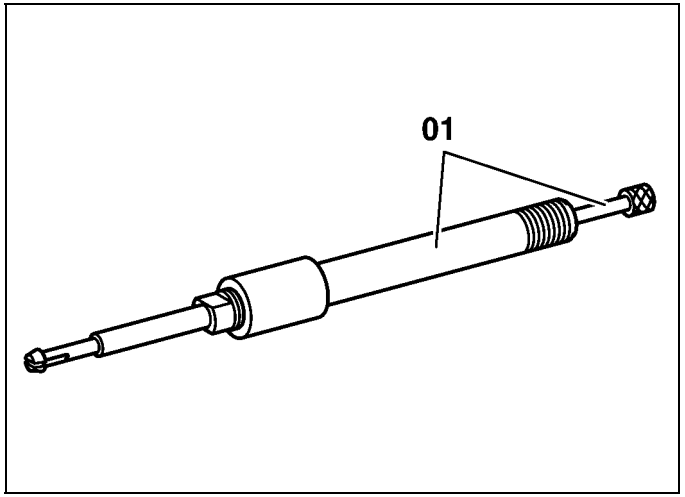
Remarks:

1.) Extracting tool 906 589 02 63 00 is now usually supplied together with the extension.

2.) From April 2003, for new orders under the existing number, special tool 906 589 00 63 00 is supplied with modification to Part 1. To extend existing tools, the modified Part 1 can also be ordered separately under number 906 589 00 63 01.



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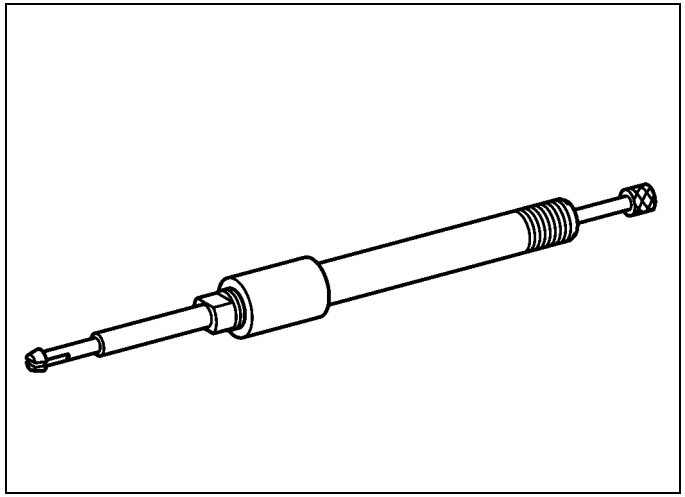

Extracting tool extension

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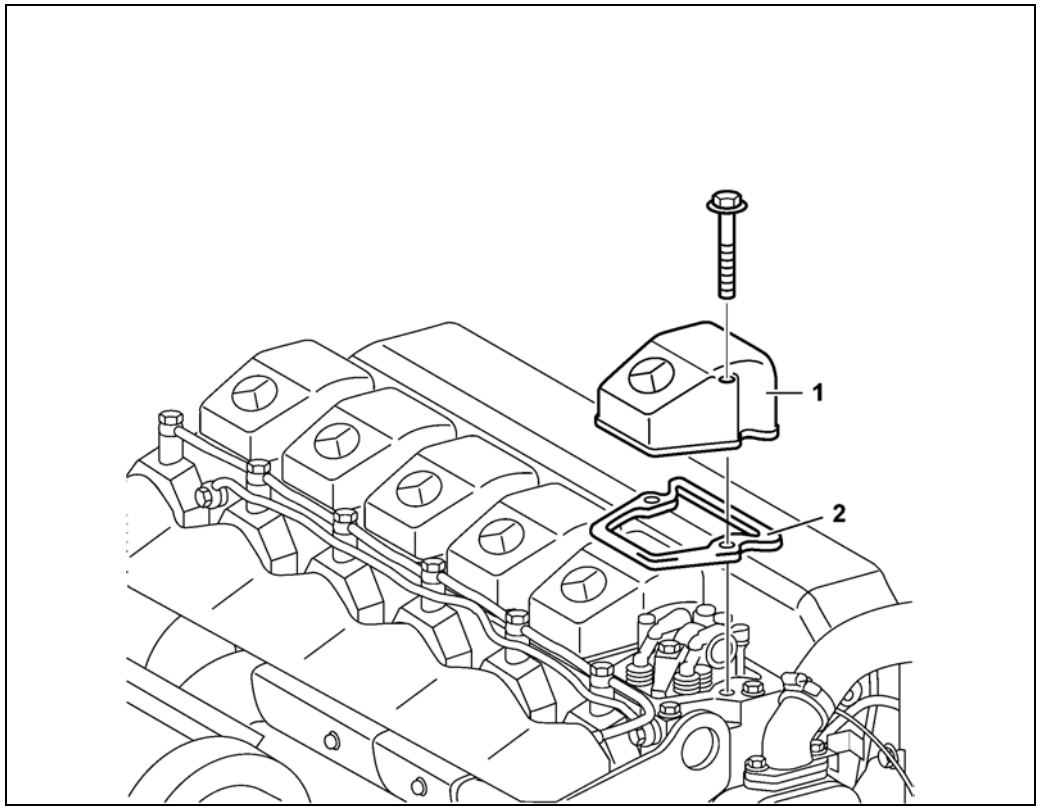


W01.20-1008-12

The six separate valve covers on the new engine development are made of special plastic (or aluminum on special request), which provides further noise reduction and optimised vibration response /resonance characteristics. To prevent deformation due to stress, the specified tightening torque for the valve cover screws must be observed scrupulously.
For the cover gasket on engine OM 457, a shaped silicone rubber seal is used.
These silicone rubber seals are to be fitted exclusively in conjunction with the special plastic valve covers.
They can be used several times, if thoroughly cleaned and inspected. They are fitted exactly into the groove on the valve cover.

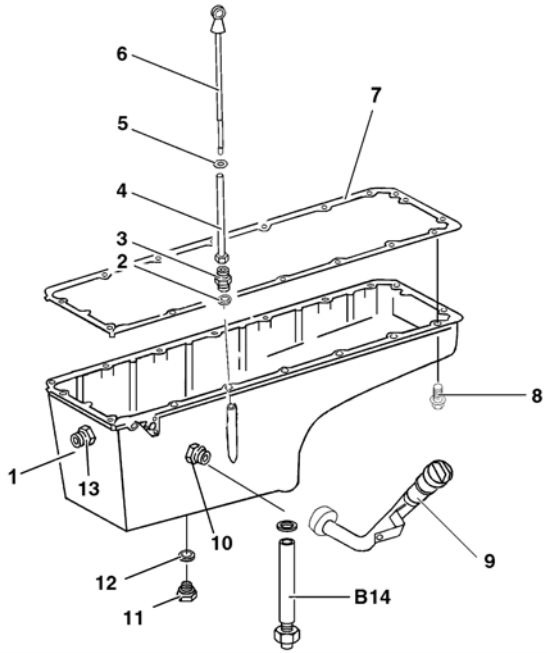
The oil pan has been newly developed.

It is made of high-strength aluminum alloy and is characterized by very high rigidity.

When installing, the seal should be always be replaced as well.
Tightening sequence and torques must be applied meticulously.

Step 1 = 10 Nm

Step 2 = 35 Nm



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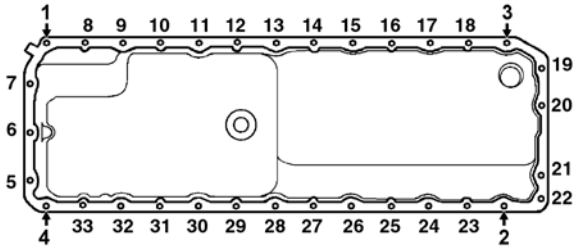

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Location of the unit pump

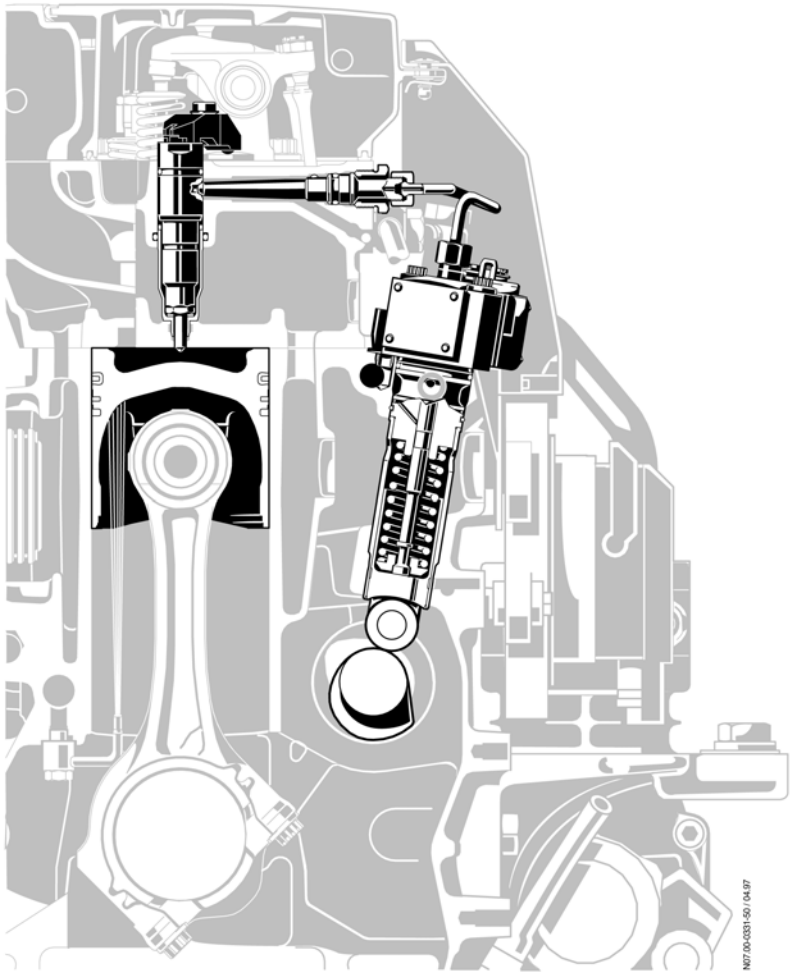
The injection process is performed by the newly developed pump-line-nozzle system, controlled by the Telligent® electronic engine management system.

In the MR system, fuel is delivered to the injection nozzle by individual unit pumps over short, relatively rigid high-pressure injection lines, and through the pressure pipe connection screwed into the cylinder head.

A unit pump fitted to the crankcase is assigned to each cylinder. This is driven by another timing cam on the camshaft. The camshaft therefore also has the task of driving the unit pumps, besides the traditional function of driving the intake and exhaust valves.

The operating principle of the unit pump is based on the same principle as the piston pump, as in the in-line injection pumps used till now, but without control edges at the pump plunger.

The quantity injected is determined individually per cylinder by solenoid valves, which control the start and end of injection.



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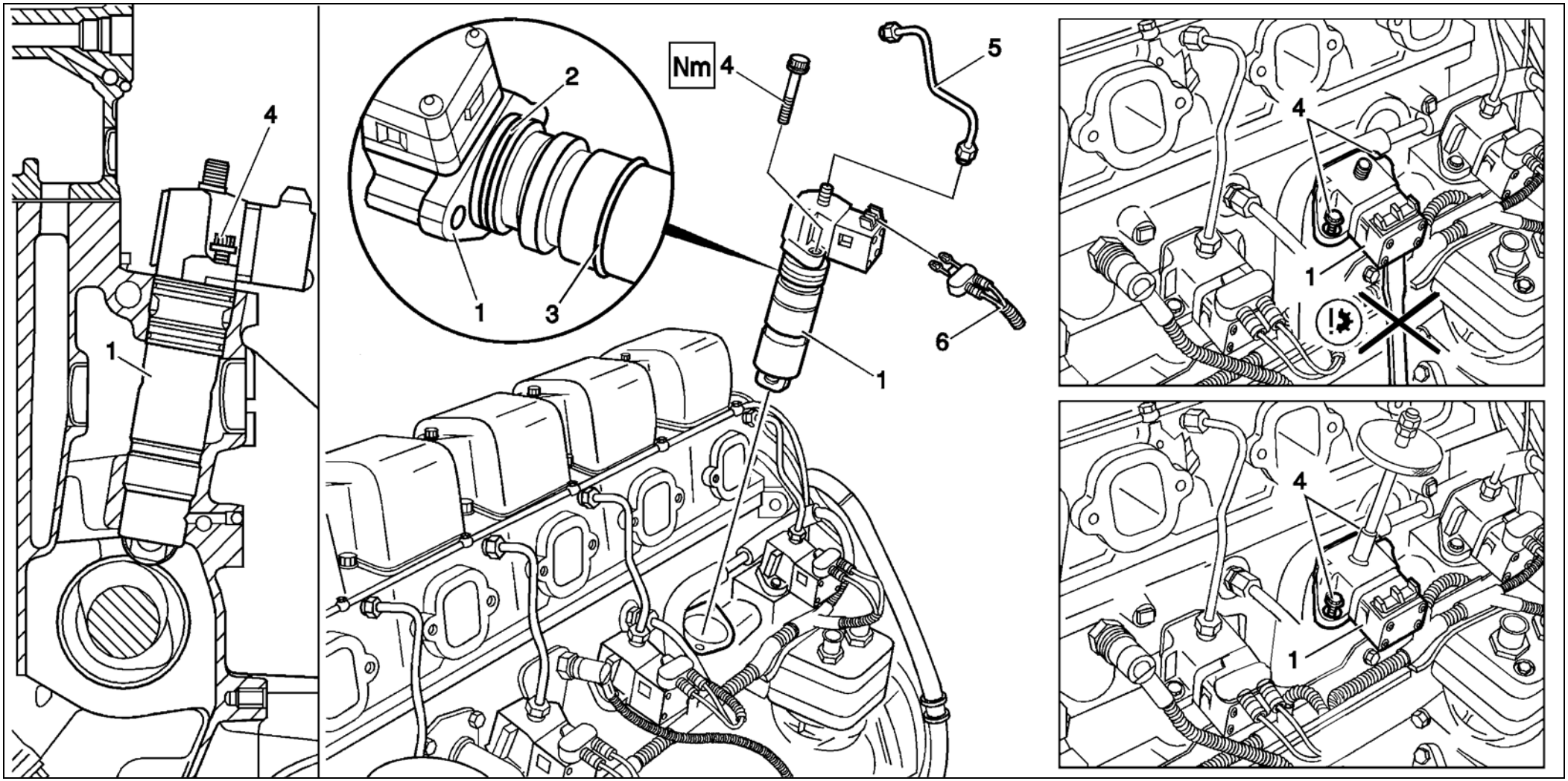
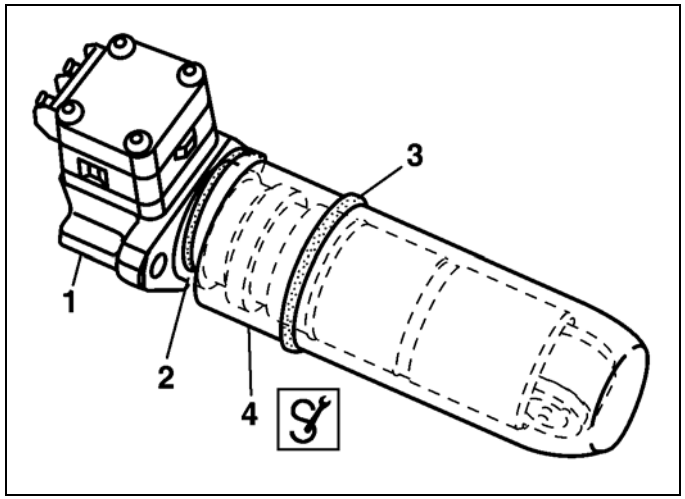


W07.15-1108-09

1 MR/PLD unit pump
2 O-ring (black)
3 O-ring (green)
4 Splined bolt
5 Injection line
6 Engine wiring harness

1 MR/PLD unit pump
2 O-ring (black)
3 O-ring (green)
4 Protective sleeve



W07.15-1107-01

Removal/installation

	Removing/installing	
1 Danger!	Remove the charge air manifold **Risk of explosion** due to ignition of flammable gases, **Risk of poisoning** by inhaling or absorbing fuel, and **Risk of injury** if fuel comes into contact with skin or eyes	Fire, sparks, naked flames, smoking are forbidden. Only store fuel in suitable and correctly marked containers. Wear protective clothing if coming into contact with fuel.
2	Remove injection line (5)	Stop up the orifices in the nozzle holder combination and the MR/PLD unit pump. Nm
3	Remove engine wiring harness (6) at MR unit pump (1)	To do this, loosen the screws on the solenoid valve and detach both clip fasteners.

4 ⚠Danger!	Identify the MR/PLD unit pump (1) for the cylinder concerned **Risk of injury** to skin and eyes due to scalding, as hot coolant may spurt out. **Risk of poisoning** if coolant is swallowed.	ℹ Only if removing more than one or all MR/PLD unit pumps Only open the cooling system at coolant temperatures below 90°C. Turn the cap slowly and release the pressure. Do not store the coolant in drink containers. Wear protective gloves, protective clothing and safety glasses.
5 (!)	Unscrew coolant pipe from crankcase Notes on coolant	ℹ Only for the unit pumps of cylinders 1 to 3 All engines
6	Loosen the splined bolts (4)	(!) For reasons of safety, the splined bolts should only be unscrewed by about 4-5 mm, as the MR/PLD unit pump is under spring load. ℹ **Installation:** Mount the MR/PLD unit pump with the splined bolts, screwing the bolts slowly into the crankcase, and tightening alternately. Nm
7	Fit the extractor to the MR/PLD unit pump (1) and pull out the MR/PLD unit pump up to the bolt heads.	 (!) Firmly attached MR/PLD unit pumps should not be extracted at the solenoid valve or the housing flange. ℹ **Installation:** Thinly coat the unit pump body, surface of the O-rings (2, 3), and the drilling in the crankcase with lubricating grease. Insert the MR/PLD unit pump in the crankcase using the shop-made assembling pins.

☞ **WF**	Assembling pins for installing the unit pump	Carefully press the MR/PLD unit pump in by hand against the spring load, by about 4 mm. If the unit pump cam is up at the camshaft, and the MR/PLD unit pump cannot be pressed in far enough, turn the engine about a ½ revolution in the direction of rotation.
8	Unscrew the splined bolts (4) and pull out the MR/PLD unit pump (1)	ⓘ **Installation:** Carefully clear any dirt or paint residues away from the sealing surface of the MR/PLD unit pump and the crankcase.
9	Check the MR/PLD unit pump for scoring, scratches, and sanding spots.	ⓘ If there is only slight scoring or scratching on the tappet roller, the MR/PLD unit pump can be used again. If there is deep scoring, scratching, or sanding spots: Install a new MR/PLD unit pump
10	Remove O-rings (2, 3) from the MR/PLD unit pump (1)	ⓘ **Installation:** Clean the radial groove in the unit pump body. Coat the new o-rings with lubricating grease. Push protective sleeve (8) over the unit pump body First slide the black O-ring (2) over the protective sleeve (8) into the groove, then the green O-ring (3). Avoid twisting the O-rings (2, 3) when fitting into the grooves.
11	Install in the reverse order	

Unit pump classification

The BR 457, 500 and 900 unit pumps are classified at manufacture.

When each pump is installed in the engine on the assembly line at Mannheim, its classification is registered and stored in the MR electronic system.
To ensure smooth engine running, the classification values are taken into account when distributing the fuel quantity (injection timing).

To ensure that smooth engine running continues after unit pumps are replaced or modified for diagnostic purposes, the unit pump classification must be assigned to the cylinder.

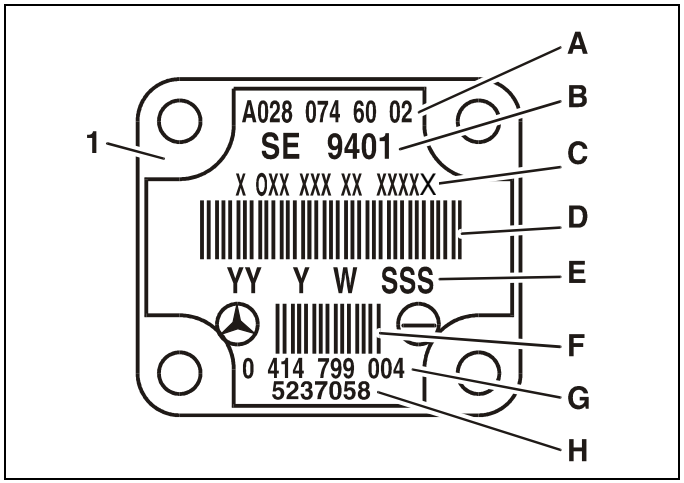
An input error may lead to rough engine running and overloading of individual cylinders.

Then reset the individual cylinder torque control to "0".

AXOR		MR
Replace unit pump		
Cylinder		**Code**
1	**Cylinder 1**	**X-XXX-XXX-XX-XXXXX**
2	**Cylinder 2**	**X-XXX-XXX-XX-XXXXX**
3	**Cylinder 3**	**X-XXX-XXX-XX-XXXXX**
4	**Cylinder 4**	**X-XXX-XXX-XX-XXXXX**
5	**Cylinder 5**	**X-XXX-XXX-XX-XXXXX**
6	**Cylinder 6**	**X-XXX-XXX-XX-XXXXX**
	Note: The user must read off the unit pump number on the unit pump, and enter it for the corresponding cylinder. Only enter the unit pump number for pumps being replaced. To confirm, press F3.	

The classification is coded as a 14-digit number **(C)** on the unit pump model plate. The code is entered through the "Replace Unit Pump" menu in DAS.

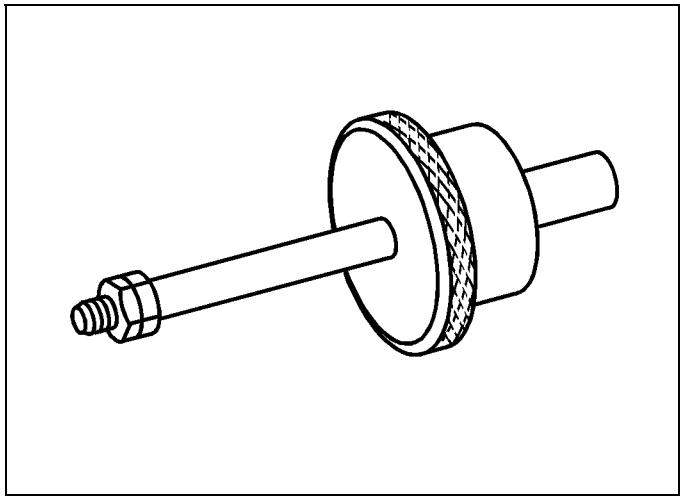
A = MB number
B = Certification number
C = Unit pump number (classification)
D = Bar code
E, G, H = Manufacturer information
F = Manufacturer bar code



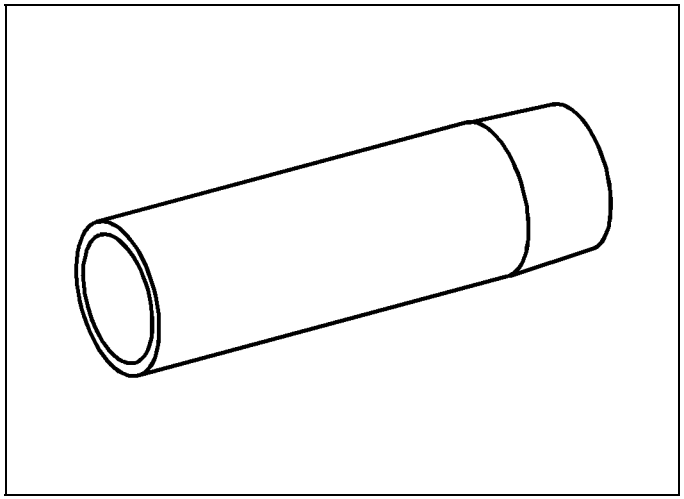
N07.02-2028-01

Nm MR/PLD unit pump		Engine 457.9
Union nut, injection line to pressure pipe connection/unit pump	[Nm]	30
Bolt, MR/PLD unit pump to crankcase	[Nm]	60

Special tools

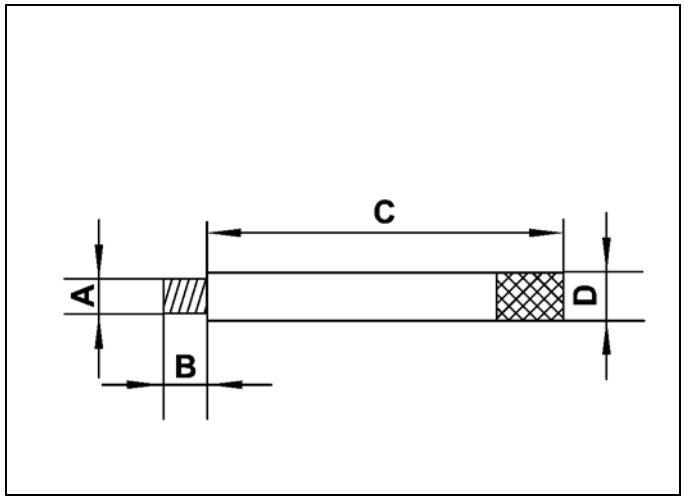


Extractor 355_589_01_63_00



Sleeve 541_589_01_14_00

The assembling pins (2 pieces) are shop-made from round material (St 37), to the specified dimensions:

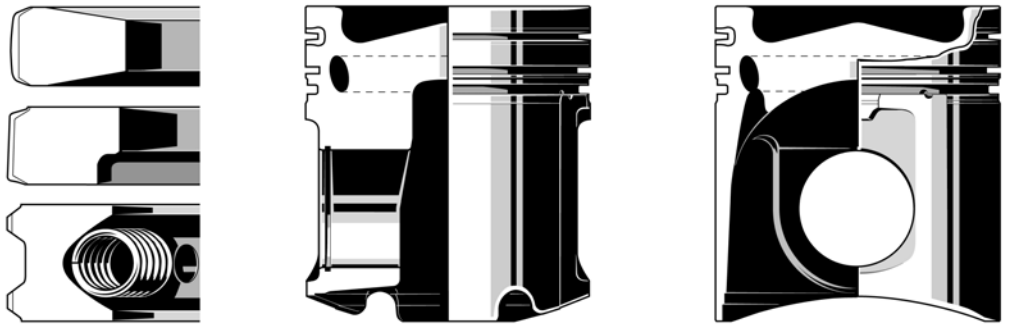


Assembling pin W58.50-1005-01

A	M10x1.5	B	10.0 mm ± 0.5 mm
C	80.0 mm ± 1.0 mm	D	10.6 mm ± 0.1 mm

The pistons have a diameter of 128 mm, with a height of 140 mm. They meet the requirements of the EURO III Standard. They weigh 2470±30 g, are made of high temperature aluminum alloy, and have a graphite-coated stem.

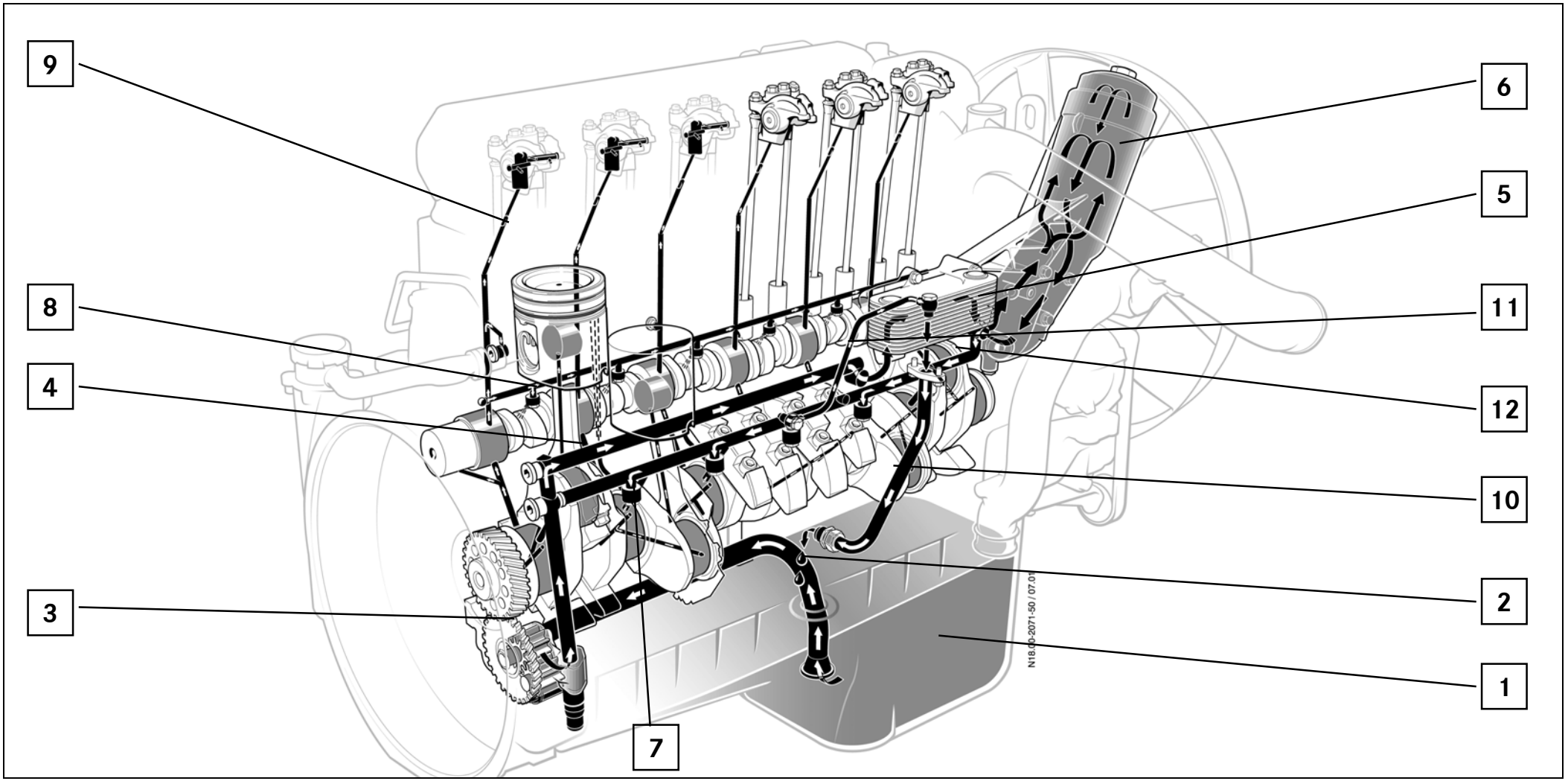
They have a shallow combustion chamber recess of about 93.6 cm^3 capacity, an inner cooling duct, and a cast-in reinforced ring groove for the first ring. The first ring consists of a cast-iron keystone ring with a chrome-ceramic coated contact surface. The second ring is a chrome-plated taper-faced ring and the underlying internal angle is of cast-iron. The third ring is a cast-iron roof bevel ring with garter spring.



Kolben und Kolbenringe (Motor OM457LA)

N03.10-2049-50

Unlike the BR 500 engines, bushings are not used as bearing for the piston pin. Also, the connecting rod separating surfaces are not cracked, but have a gearing instead.
The piston crown is cooled in the usual way by means of oil spray nozzles in the crankcase.
The piston pin diameter is 52 mm.



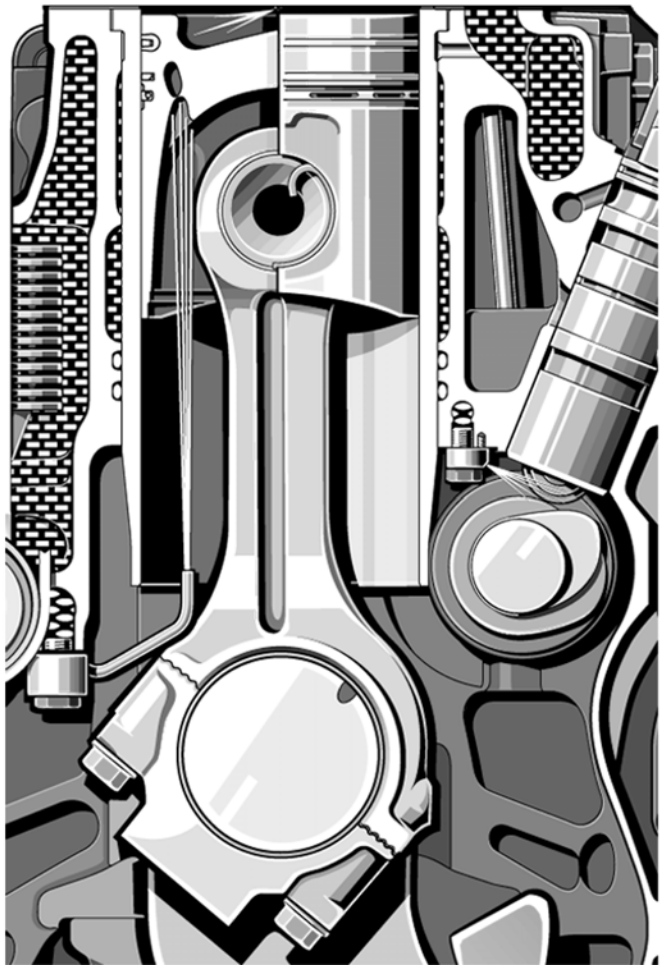
N18.00-2071-50

No.	Stations on the oil circuit	Notes
1	Oil sump	
2	Intake manifold with fine-mesh filter	
3	Oil pump	
4	Main lubricating oil duct (unfiltered)	
5	Oil cooler (oil/water heat exchanger)	
6	Oil filter	
7	Oil spray nozzle for piston cooling	
8	Oil spray nozzle for camshaft	
9	Oil duct for valve assembly	
10	Turbocharger return line	
11	Turbocharger feed line	
12	Main lubricating oil duct (filtered)	

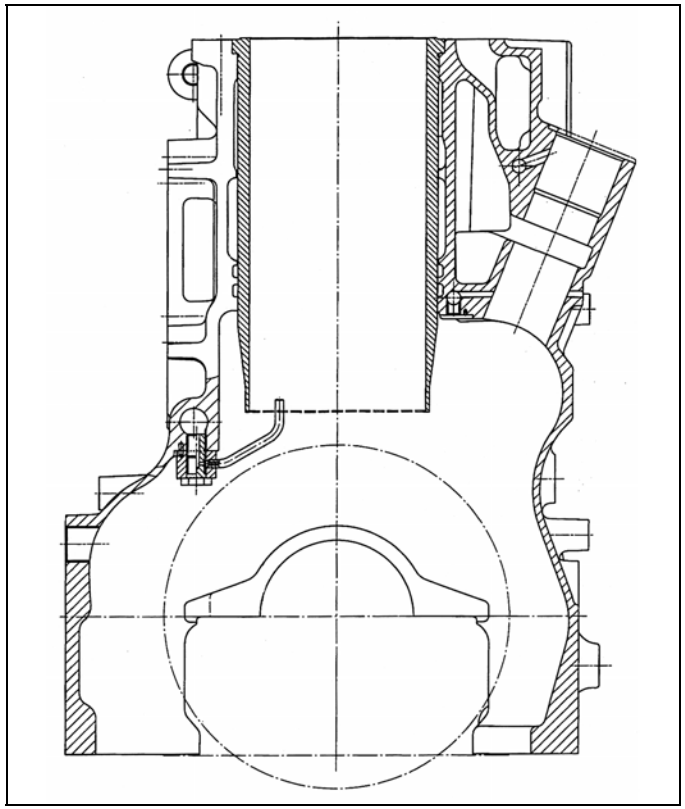
Unlike the familiar BR 500, the newly designed 457 model series has two oil spray nozzles per cylinder. One of these (on the right in direction of travel) performs the traditional task of piston cooling, while the other is placed separately (on the left in the direction of travel) and has the task of lubricating the camshaft.

Note:

It is no longer permitted to adjust the oil spray nozzle.
The oil splasher pipe is soldered in, and the adjustment process could cause initial damage.



N01.10-2081-12



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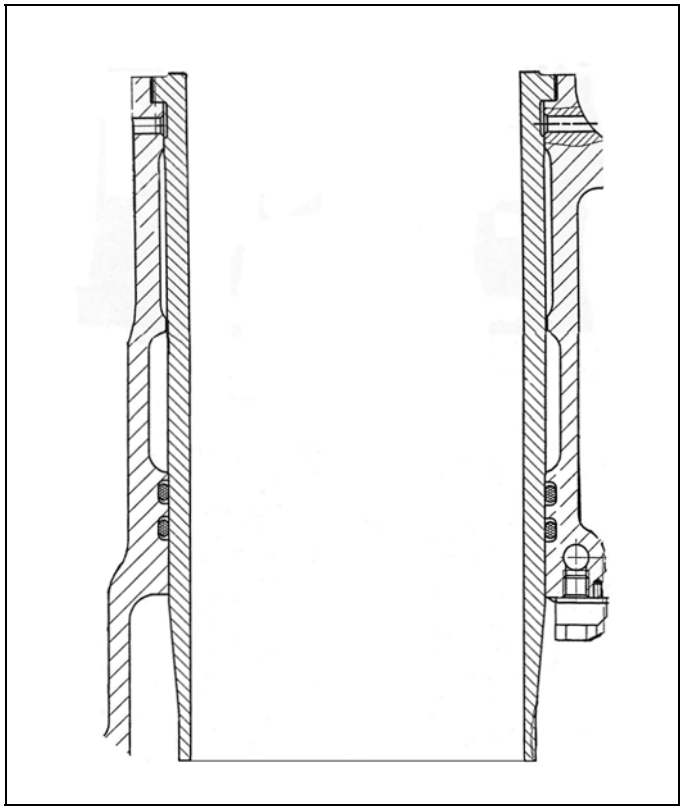

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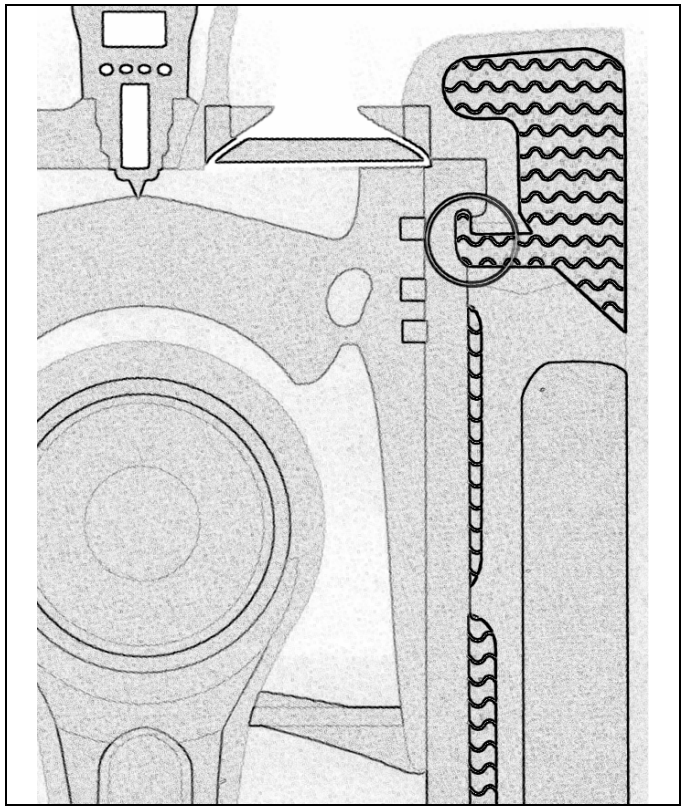


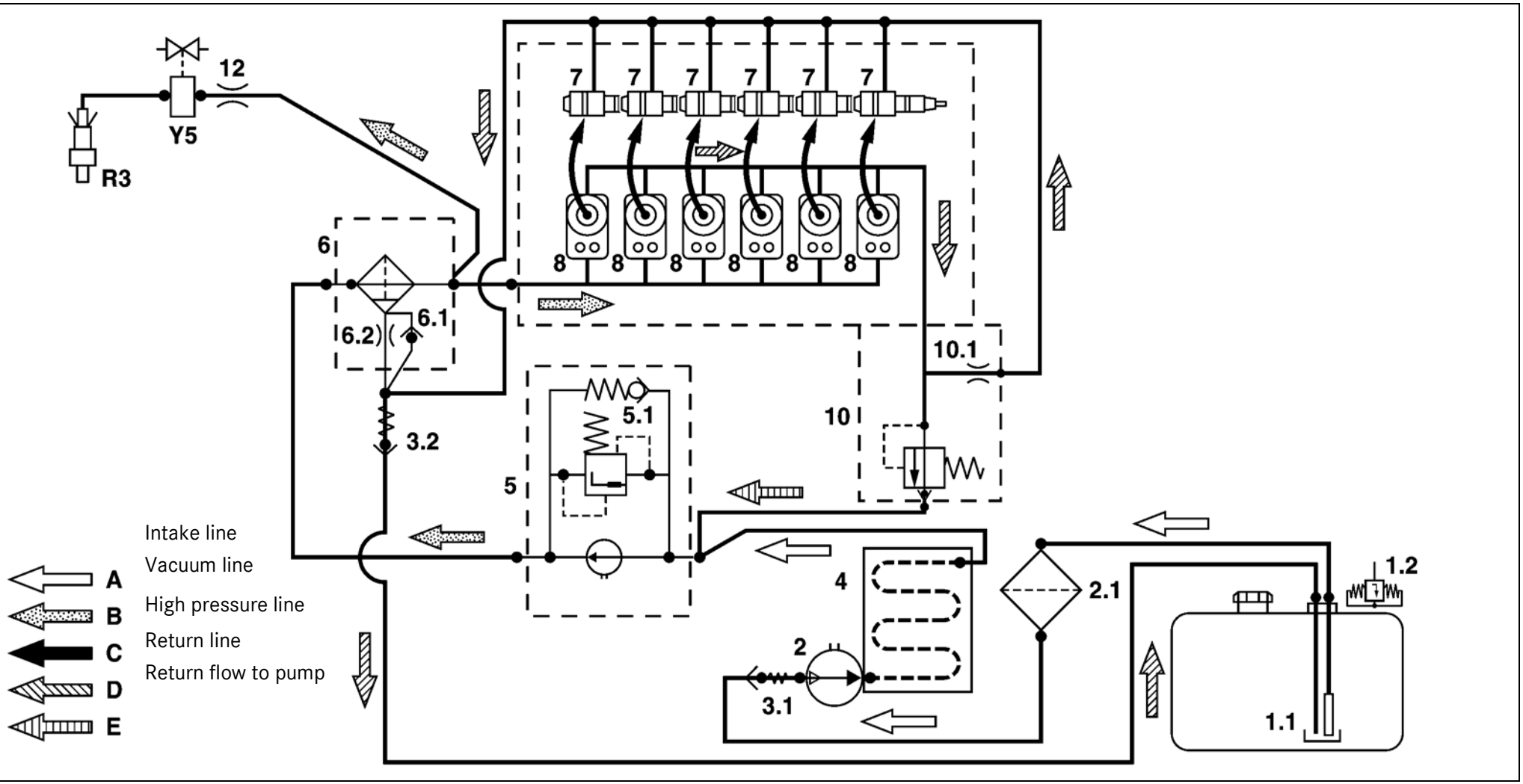
GT_20_10_0005_C02_00_300_8

The crankcase is made of high-additive cast iron. This gives it a high level of strength and stability, while producing lower noise emissions. The side walls of the crankcase extend well below the center of the crankshaft. This gives it even greater rigidity. Integration of the oil cooler, the unit pumps, and the coolant and fuel ports into the crankcase, gives the engine a very compact design. Exchangeable wet cylinder liners are used. One special feature of these is an induction-hardened raised bead in the upper piston return range.
Cylinder liner cooling has been further optimised through an additional coolant duct in the upper range where the thermal load is particularly high.
On the left on the flywheel side, an assembling lug is provided for attaching the compressor coupled with the power steering pump.

The rigid, seven-journal camshaft has one intake and one exhaust cam per cylinder, and also the cam that drives the unit pumps.

Other important facts:

- The engine control drive, consisting of the crankshaft and camshaft timing gear, is located at the rear of the engine.
- An additional gear fixed to the camshaft sprocket drives the air compressor, and through this the power steering pump.
- A gear located at the front end of the camshaft drives the fuel pump.
- The cams on the camshaft are lubricated by separate oil spray nozzles bolted to the crankcase.



W47.00-1008-79

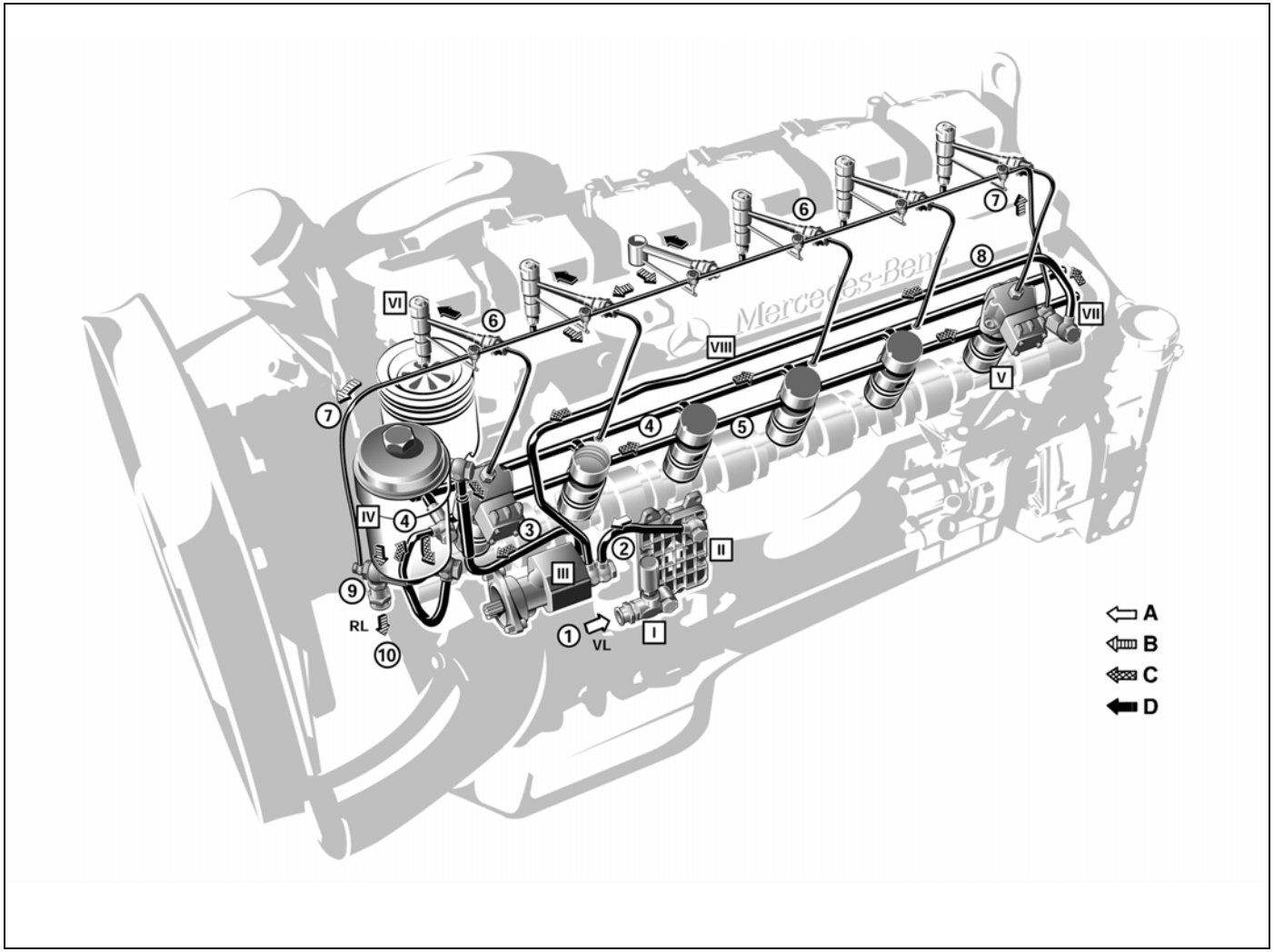
1	Fuel tank
1.1	Fuel strainer (800 µm)
1.2	Air admission valve
2	Manual fuel feed pump
2.1	"RACOR" fuel prefilter (special equipment
3.1	Plug-on valve in fuel feed (locked open)
3.2	Plug-on valve in fuel return (locked open)
4	Fuel heat exchanger
5	Fuel pump
5.1	Pressure relief valve (7.0 - 8.0 bar)
6	Fuel filter (KF 3 µm)
6.1	Fuel filter drain valve
6.2	Constant balance hole
7	Nozzle holder combination
8	PLD unit pumps (Y6 to Y11)
10	Overflow valve
10.1	Throttle in overflow valve (banjo bolt)
12	Throttle in flame starting system fuel line
R3	Flame glow plug
Y5	Flame starting system solenoid valve
E	Fuel feed /intake vacuum side
B	Fuel feed / pressure side
C	Fuel high pressure side (injection line) after PLD unit pumps
D	Fuel return after unit pump / leak fuel
E	Fuel flush quantity (fuel short circuit)

Note: Component designation

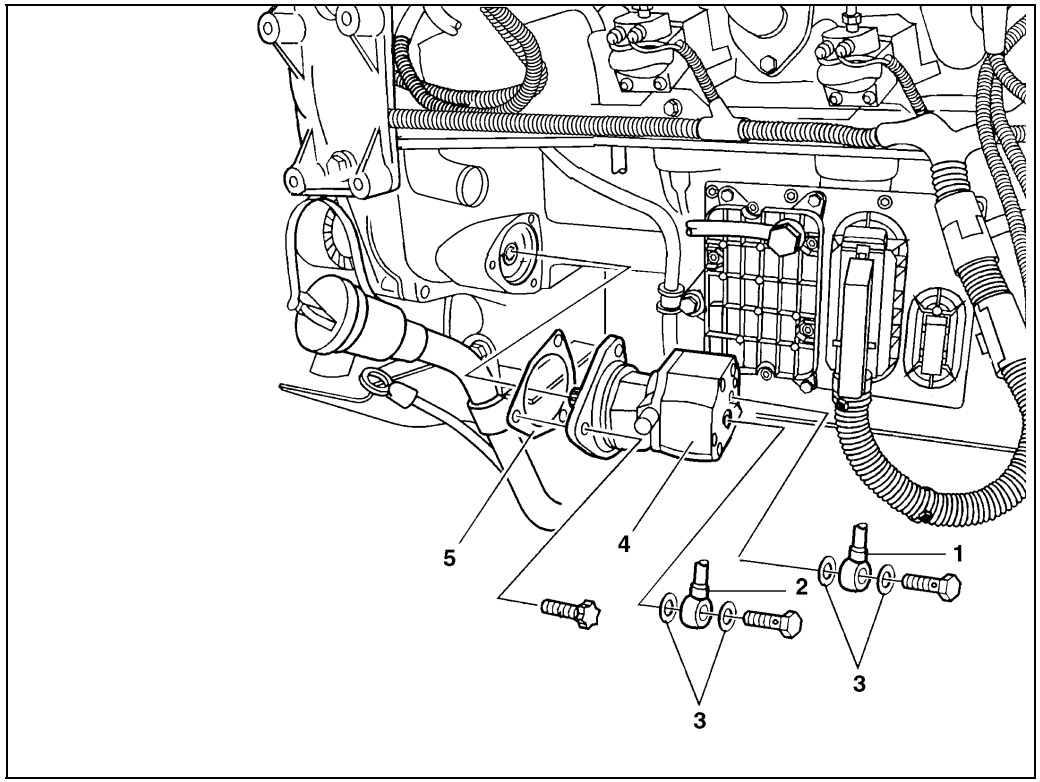
I	Manual feed pump
II	Fuel cooler
III	Fuel pump
IV	Fuel filter
V	Unit pump
VI	Injection nozzle
VII	Pressure maintaining valve
VIII	Overflow tube

1	from tank through manual feed pump to fuel cooler
2	to fuel pump
3	to fuel filter
4	to unit pumps
5	from unit pumps
6	to injection nozzles
7	Leak fuel line
8	from pressure maintaining valve to fuel pump
9	Fuel filter drain line (at filter change)
10	to tank

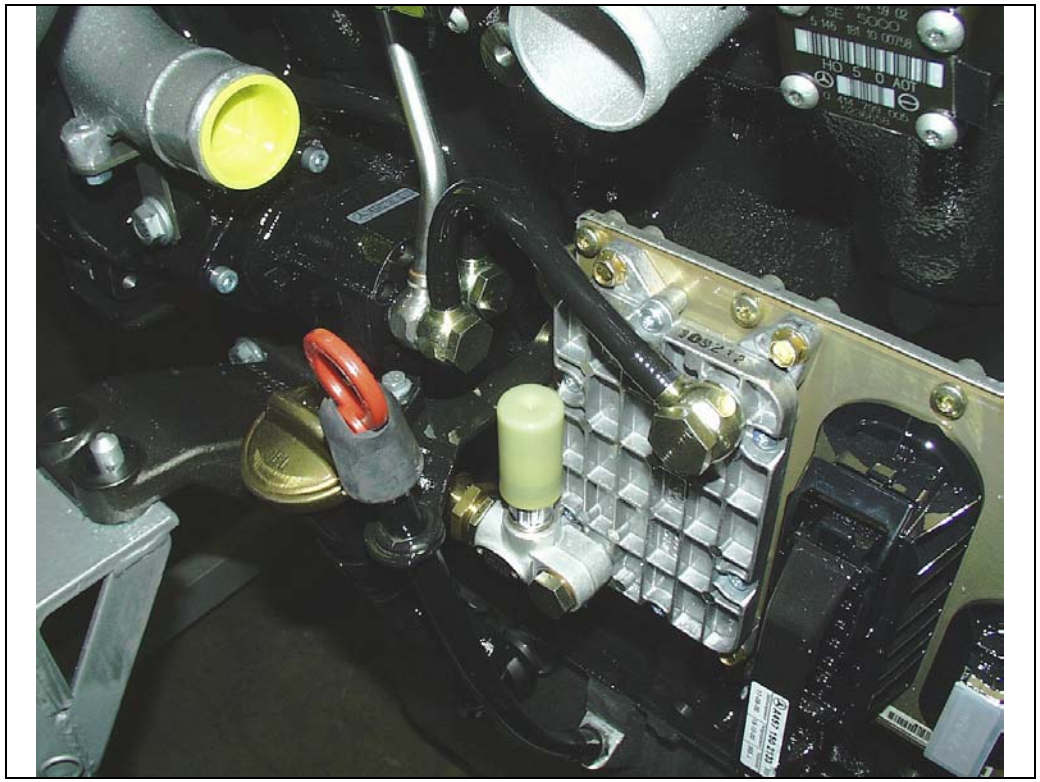
A	**Intake line**
B	**Return line**
C	**Vacuum line**
D	**High pressure line**



N07.00-2083-09



W47.20-1013-06



GT30.33-0001-11

Legend:

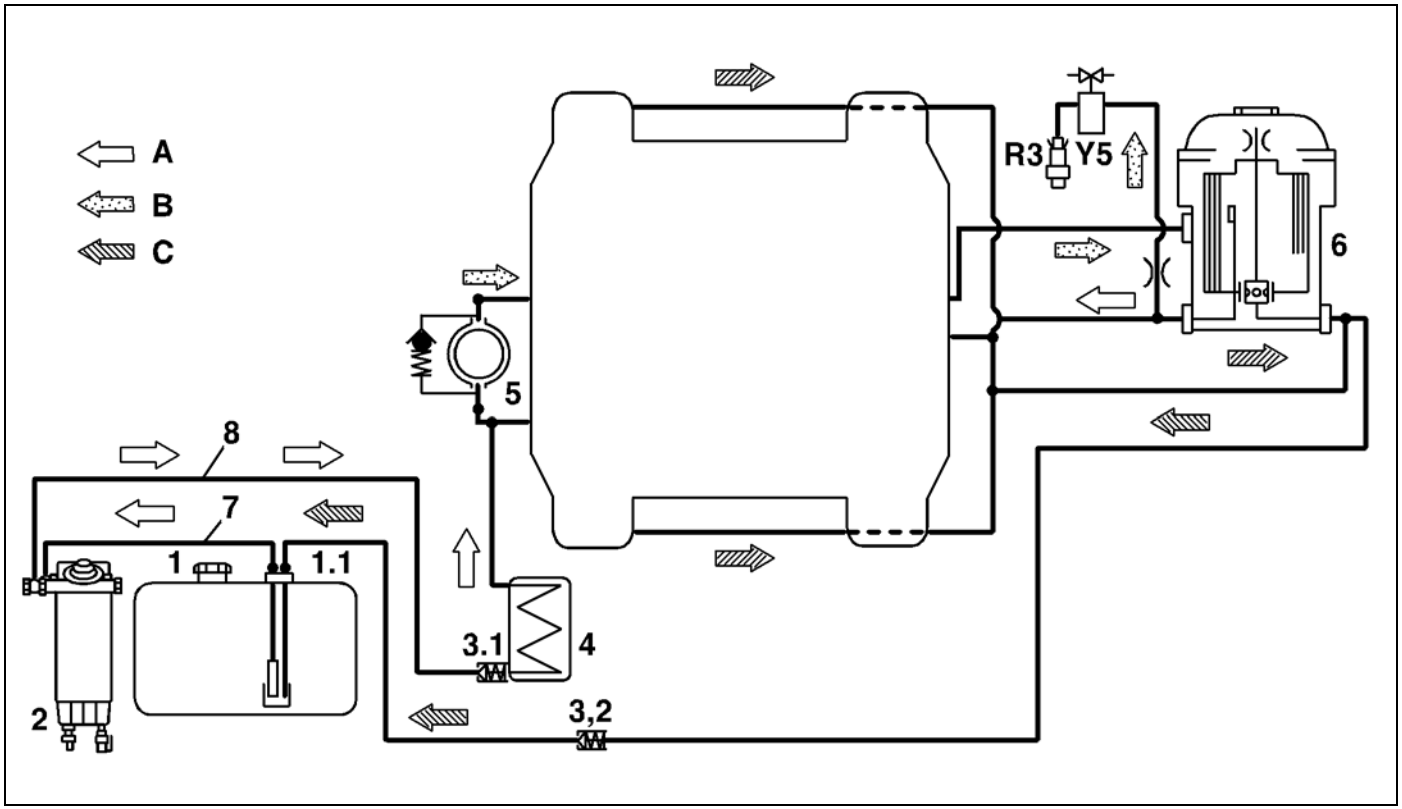
1. Fuel pressure line
2. Fuel intake line
3. Sealing ring
4. Fuel pump
5. Seal

Unlike the BR 500 engines, the fuel pump driven by the camshaft gear in BR 457 engines is located on the left at the front of the engine.

To make it easier to bleed the fuel system, a hand pump is located at the fuel cooler of the MR/PLD control unit.

To prevent premature damage to the standard filter, an additional fuel prefilter can be ordered as an option. The prefilter is fitted to the line between the fuel tank and fuel feed pump, and filters out coarse contaminants ahead of the standard filter.
Any water mixed with the fuel is retained in the lower part of the prefilter bowl, and must be periodically drained off. The water collector is heated to prevent freezing when outside temperatures are low.

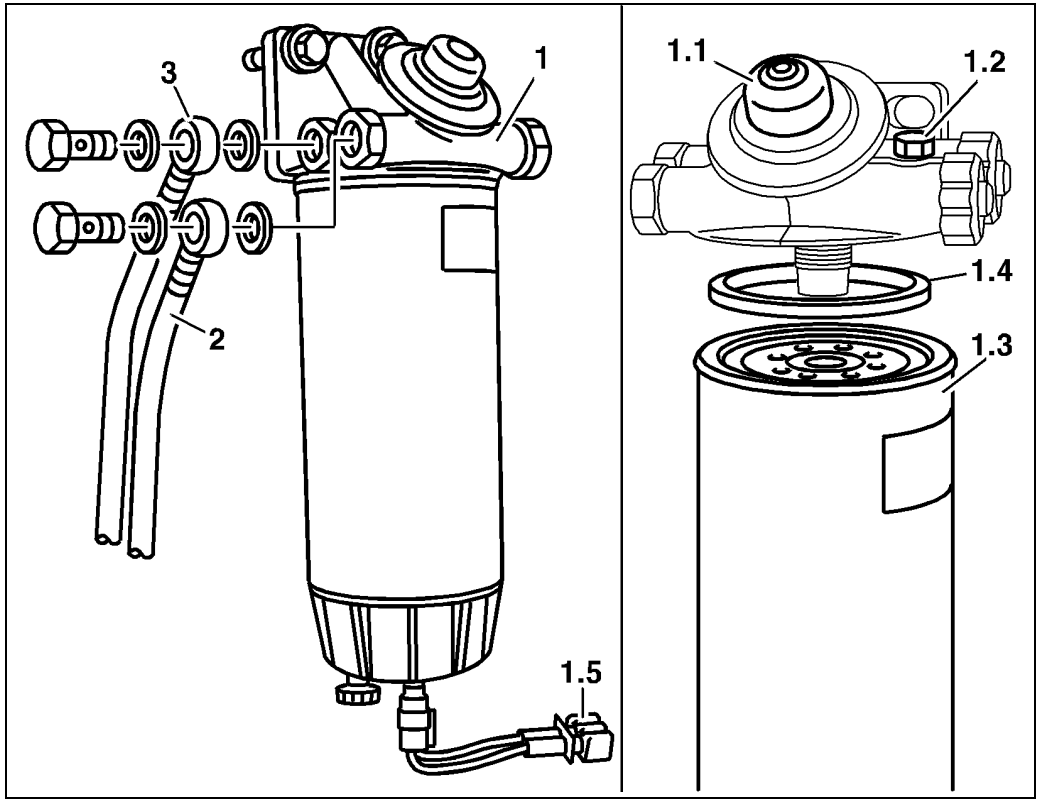
A Intake line
B Low-pressure line
C Return line



W47.20-1011-05

Fuel prefilter with heated water separator

In countries where the fuel is considered to be heavily contaminated and to have a high water content, an additional fuel filter with integrated water separator (including manual feed pump) is **highly recommended**.
Vehicles that are operated in countries of Eastern Europe, or filled with fuel from those countries, **must** be fitted with a prefilter.



W47.20-1006-11

Advantages to the customer:

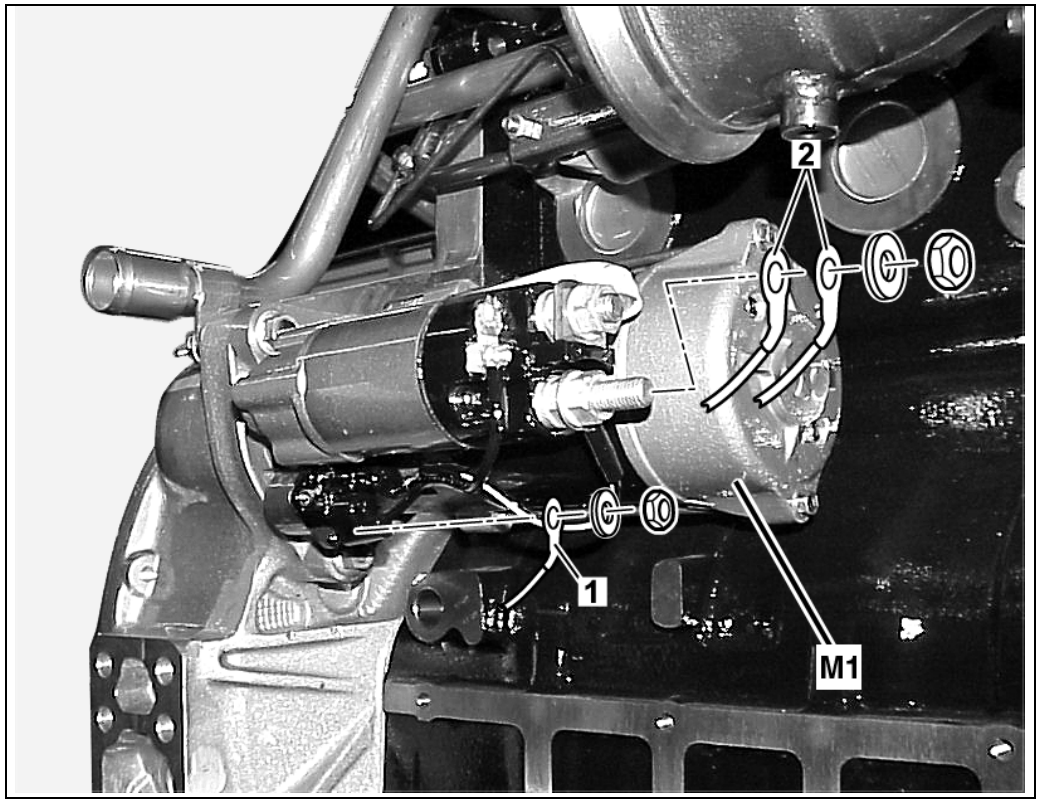
- Increased durability of the injection system
- Long maintenance intervals despite difficult operating conditions
- Greater economy through shorter vehicle downtimes.

As part of the measures for reducing vehicle dead weight, the OM 457 LA engine model series is equipped with a powerful planetary gear/countershaft driven starter, newly developed by DELCO-REMY (model 39 MT/500), and installed as standard.

This starter has a minimum power output of 6 kW at an ambient temperature of -20°C.

It is characterized by compact design, a weight of 13 kg (about 5 kg lighter than conventional designs with comparable characteristics), lower battery load, and longer useful life.

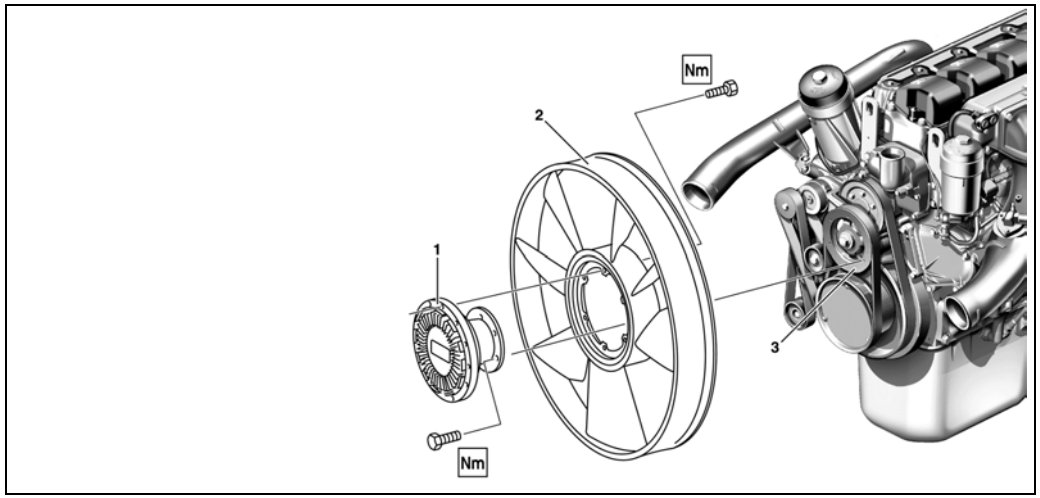
The starter is on the right of the engine on the flywheel side.



W15.30-1013-11

Fan with viscous clutch

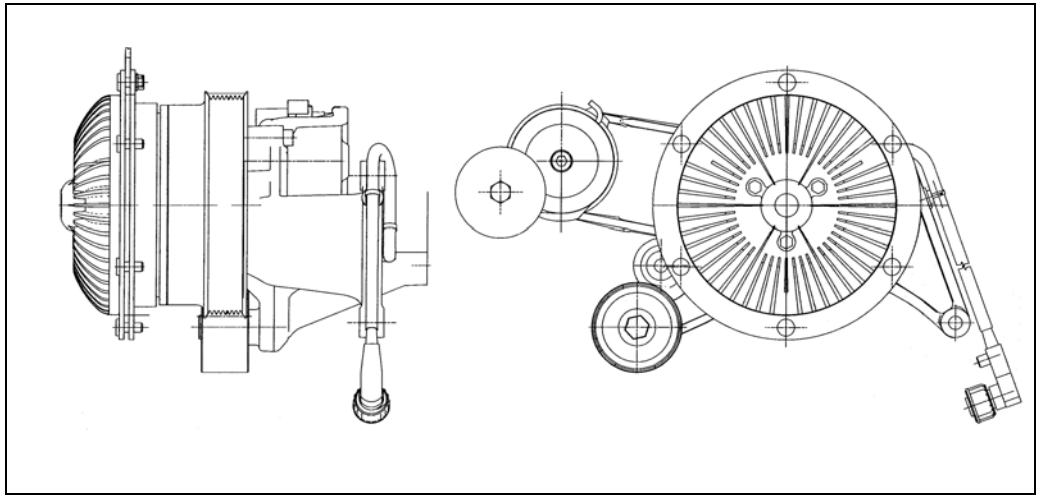
- As the temperature rises, the viscosity of the fluid medium in the viscous clutch alters, thus changing the resulting slip at the fan drive.
- In consequence, the jet ring fan runs at varying speeds depending on engine temperature.
- Cooling air quantity is adapted to engine temperature, but relatively slowly.



W20.40-1018-10

Electromagnetic fan clutch, Linnig type

- Engine temperature is kept relatively constant by the electronically controlled electromagnetic Linnig clutch.
  Advantages include the following:
  - Lower fuel consumption/pollutant emission;
  - Temperature of the cooling medium is kept approximately at specified values;
  - Rapid engine warm-up from cold;
  - Fast fan reaction times through rapid two-stage speed adaptation, and low system inertia through rapidly varied cooling power requirement;

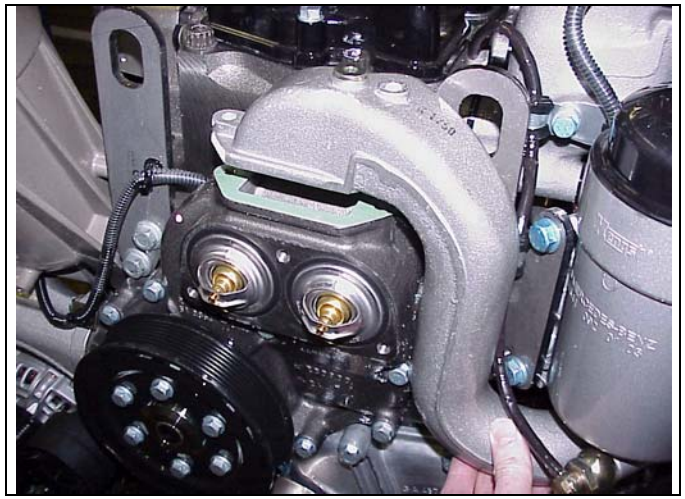


GT_20_40_0001_00_C08_300_sw

Location of thermostats

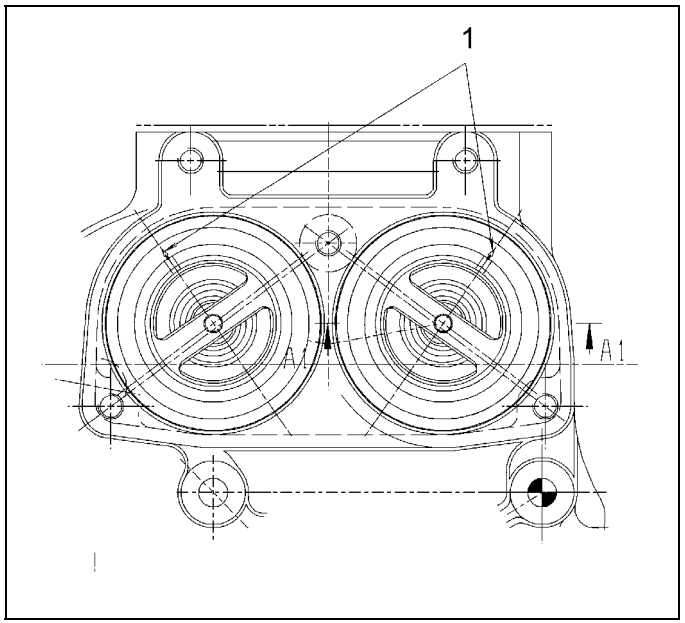
Both thermostats are easily accessible after the thermostat housing is removed.

GT20.10-0001-01

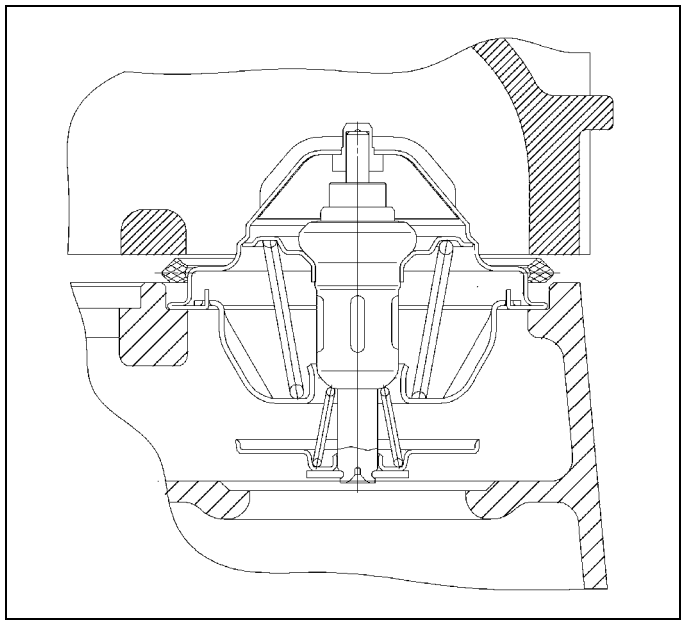


GT20.10-0002-01

When installing new thermostats, follow the positioning identified by the "1" markings, as shown in the illustration opposite.



GT20.10-0004-01



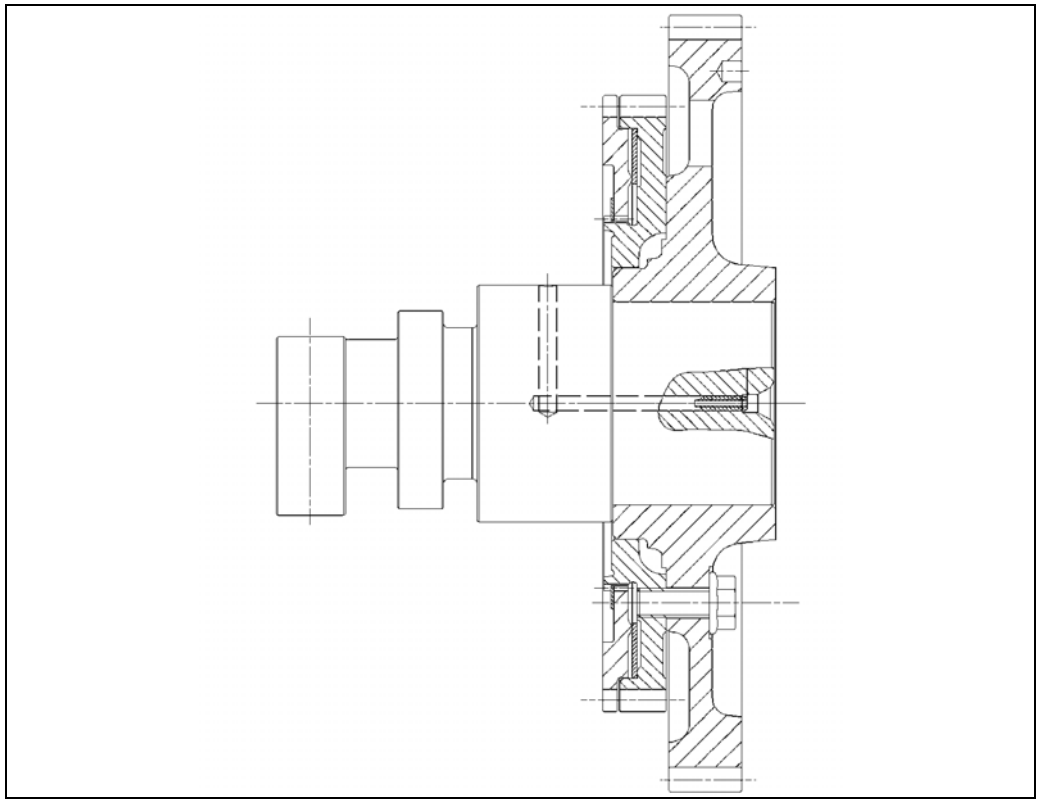
GT20.10-0003-01

Air compressor drive

An improved, gear-driven, single-cylinder air compressor was specially developed for the new vehicle. The compressor is driven by the camshaft on the flywheel side, and is located on the right of the engine.
It has a Power and Temperature Reduction control, and is identifiable on the outside of the smooth, generously sized cylinder head.

The air compressor is mounted directly on the crankcase and is driven by an additional gear on the camshaft.
The compressor crankshaft drives the power steering pump.
The air compressor drive gear is shrunk onto, and screwed to, the drive gear on the camshaft.

If damaged, the whole camshaft must be replaced.
The heat generated in the water-cooled compressor head is dissipated through the engine cooling system.



N13.10-2045-11

Air compressor - Cylinder head

Compressor cylinder head with PR (Power Reduction) control:
PR control has the following advantages:

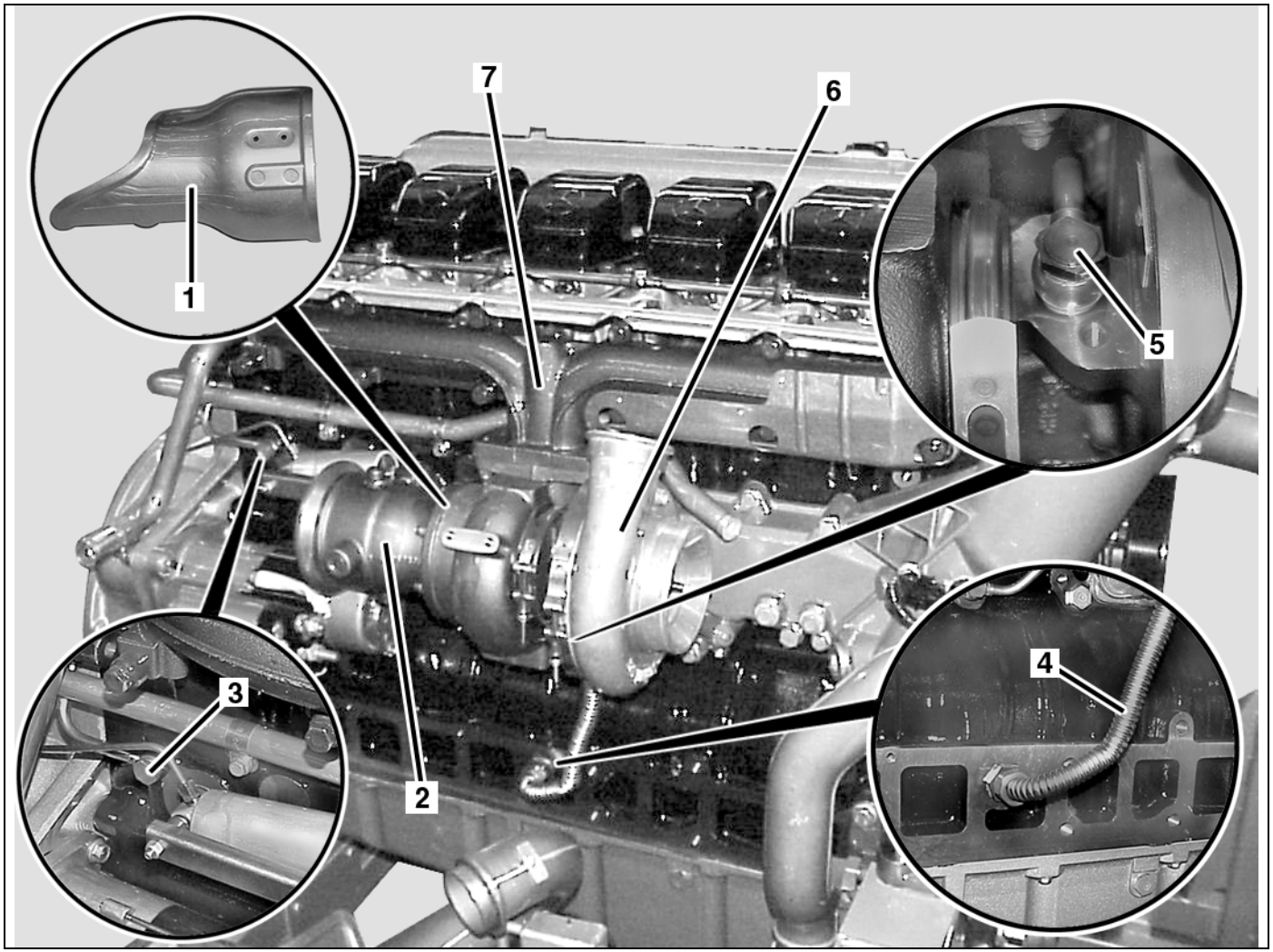
- Power reduction in compressor idle operation
- Reduced vacuum in the compressor intake area through lowering of the feed volume in idle operation
- Considerably lower temperature in idle operation, but also lower temperature peaks under load, since loaded operation begins at a considerably lower temperature.

The engine is supercharged by a turbocharger made by Borg Warner Systems Ltd. Bradford (UK), through a charge air cooling system.

The turbocharger belongs to the BR S-400, which is already familiar from the OM 501 LA engine model range.

The functional principle, characteristics, and power output of the turbocharger are essentially the same.
For this application, the aerodynamic characteristics of the turbine and compressor have been modified.

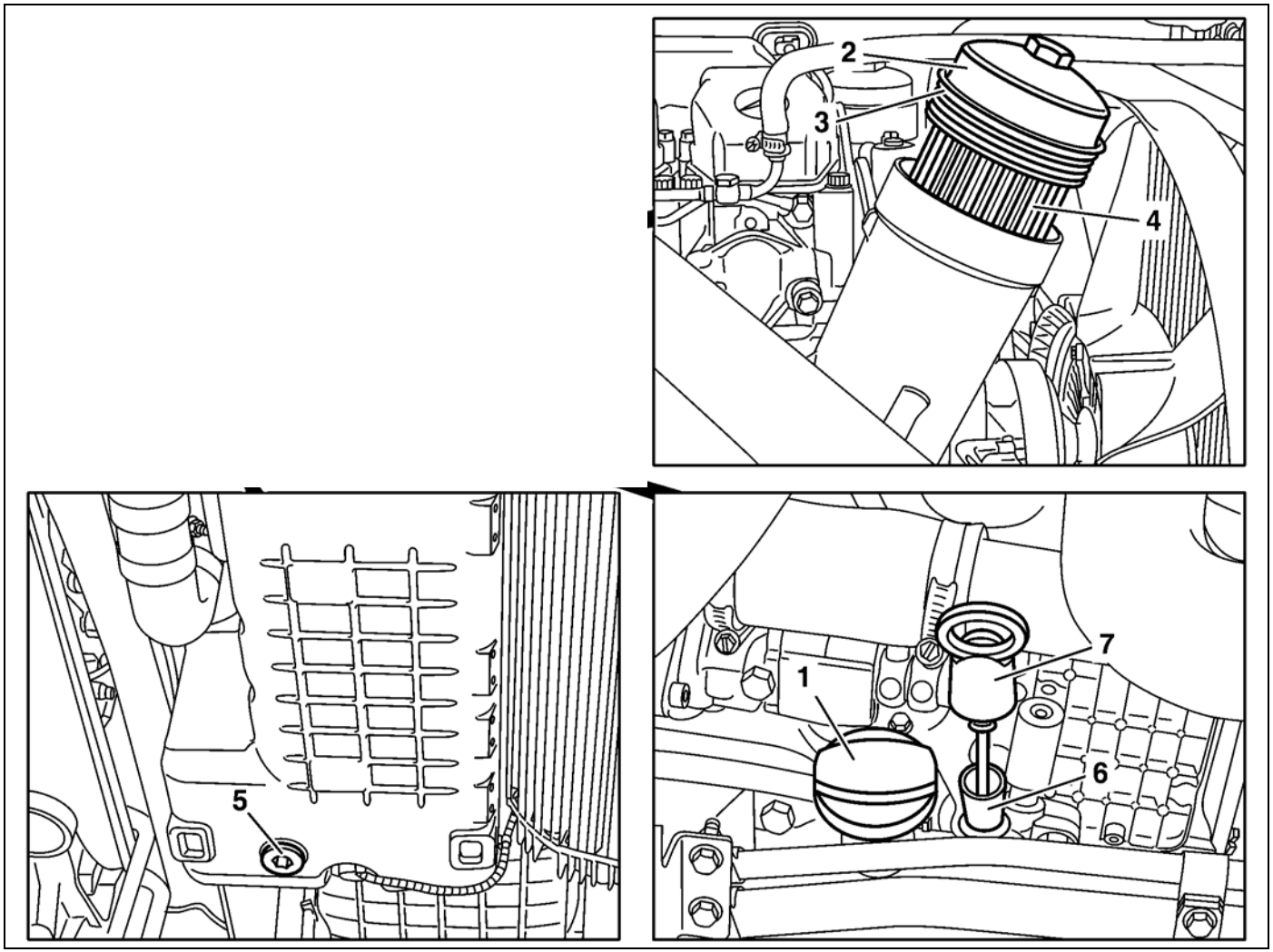
When operating, the turbocharger is covered by a heat shield.



W14.10-1008-06

Legend:

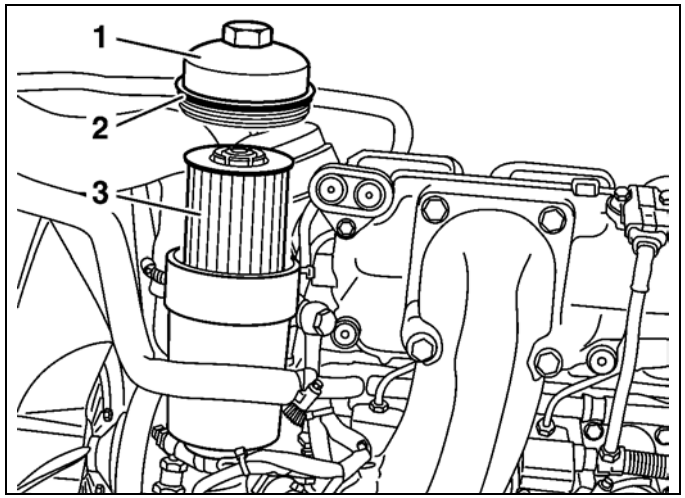
1	Heat shield
2	Engine brake flap fitting
3	Compressed air line
4	Oil return line
5	Oil pressure line
6	Turbocharger
7	Exhaust manifold



N18.00-2070-06

1 Cap (oil replenishment)
2 Screw cap
3 Sealing ring
4 Oil filter
5 Oil pan drain plug
6 Oil dipstick-guide tube
7 Oil dipstick

i	**Only change the engine oil with the engine warm**	
1	Install new oil filter element (4)	Nm Oil filter cover to oil filter housing 40 Nm
2.1 2.2 i	Suction off engine oil through the dipstick guide tube (6) or Drain off the engine oil at the oil drain plug (5) on the oil pan. Screw in the oil drain plug (5) and tighten Pay attention to oil quality	 i Fit new sealing ring to the drain plug
3 ⚠ Danger!	Pour in the specified quantity of engine oil at the filler hole (1). **Checking** **Risk of accident** due to vehicle starting off while engine is running. **Risk of injury** due to crushing or burns if components are touched during the starting procedure or while the engine is running	 Secure the vehicle to prevent starting off. Wear closed and snug-fitting work clothes. Do not touch hot or rotating parts.
4	Start engine	**Watch the engine oil pressure gauge!** It should indicate pressure after several seconds. Do not rev the engine until oil pressure is indicated.
5	Stop the engine after oil pressure is indicated.	
6	Wait at least 5 minutes, then check the oil level and adjust if necessary	i The waiting time must be observed.



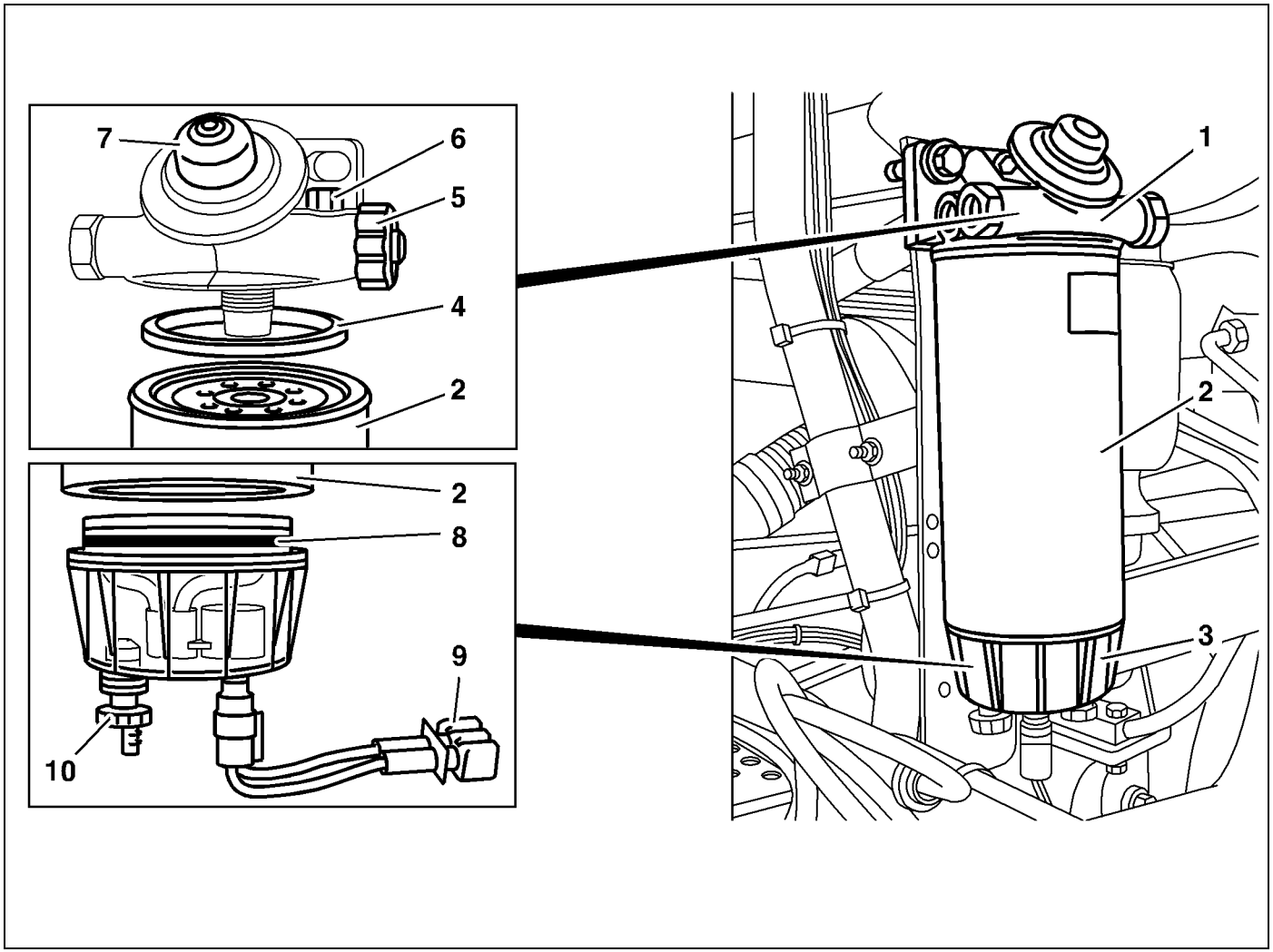
N47.20-2072-01

⛶	**To remove**	
1	Unscrew the fuel filter screw cap (1) using a socket wrench bit (36)	ℹ Only remove screw cap (1) of filter element (3) after the fuel has run out of the filter bowl.
2	Take off screw cap (1) of filter element (3) and press filter element (3) at the sides to unclip.	ℹ Take care not to let any foreign matter into the filter bowl. In no circumstances wipe the filter bowl.

	To install	
3	Replace the sealing ring (2)	Lightly grease the sealing ring.
4	Insert new filter element (3) in screw cap (1)	
5 Danger!	Screw on the screw cap (1) with filter element (3), and tighten. **Risk of accident** due to vehicle starting off while engine is running. **Risk of injury** due to crushing or burns if components are touched during the starting procedure or while the engine is running	Engine 457 Wear closed and snug-fitting work clothes. Do not touch hot or rotating parts.
6	Start the engine and bleed the fuel system	Let the engine run for about 1 minute. The filter is bled automatically. If the engine remains off or will not start: bleed the fuel system manually
7	Check the filter for leaktightness with the engine running	

Fuel filter

Designation		**Engine 457.9**
Cap on fuel filter housing	[Nm]	25



N47.20-2032-05

1	Filter head
2	Filter element
3	Separator
4	Sealing ring
5	Shutoff valve
6	Bleed screw
7	Fuel pump
8	Sealing ring
9	Heater plug
10	Drain valve

⛶	**To remove**	
1	Place the separator under the prefilter	
2	Open the drain valve (10) and bleed screw (6)	Let the filter element (2) run dry ⓘ Dispose of the water/fuel mixture in an environmentally acceptable manner.
3	Pull out the heater plug (9)	
4	Unscrew filter element (2)	ⓘ Dispose of the filter element in an environmentally acceptable manner.
5	Unscrew the separator (3) from the filter element (2)	If damaged, replace the separator
6	Clean the separator (3)	Ensure that the sealing ring groove is clean!

⛶	**To install**	
7	Moisten the new sealing rings (4 and 8) with engine oil.	
8	Screw the separator (3) with new sealing ring (8) onto the filter element (2) and finger-tighten.	
9	Screw the filter element (2) with new sealing ring (4) onto filter head (1) and finger-tighten.	ⓘ Do not use tools to tighten!
10	Close drain valve (10).	
11	Fill the prefilter with a manual fuel feed pump (6).	
12 ⚠ Danger!	Close the bleed screw (6). **Risk of accident** due to vehicle starting off while engine is running. **Risk of injury** due to crushing or burns if components are touched during the starting procedure or while the engine is running.	Wear closed and snug-fitting work clothes. Do not touch hot or rotating parts.
13	Start the engine and bleed the fuel system.	ⓘ Let the engine run for about 1 minute. The fuel system is bled automatically.
14	Check the prefilter for leaktightness.	

Air cleaner service

- Remove the air filter and check for dirt and damage
- Clean the inside of the air cleaner housing if necessary
- It is forbidden to clean the air cleaner cartridge with air.
- **Air cleaner cartridges must be replaced every 3 years at least.**

Engine coolant

The engine coolant must be replaced every 3 years at least.