

Engine Lubrication

Job No.
18-5

A. General

On Models 180 a, 180 b, 190 SL, 220 a, 219, 220 S, and 220 SE engine lubrication is of the pressure-circulating type and the oil circulation system is the same as in Model 190.

B. Repair of Oil Pump

The 1st version oil pump on Models 180 a and 190 SL is the same as on Model 190 (Fig. 18-5/1). The 2nd version pump differs only in a modified suction strainer for improved suction which today is installed in Models 180 a, 180 b, and 190 SL as a standard part (on Model 180 b it has been installed in all cars). When repairs are carried out, the new suction strainer can be subsequently installed in the 1st version oil pump.

The 1st version oil pump on Models 220 a, 219, 220 S, and 220 SE has a grey-cast iron housing base which differs from the oil pumps of the 4-cylinder engines; the oil pump shafts are carried directly in the housing base without bushings (Fig. 18-5/2). In addition the suction strainer together with the suction pipe is screwed into the housing base.

The 2nd version pump on Models 219, 220 S, and 220 SE is of the same construction as the oil pump for the 4-cylinder engines.

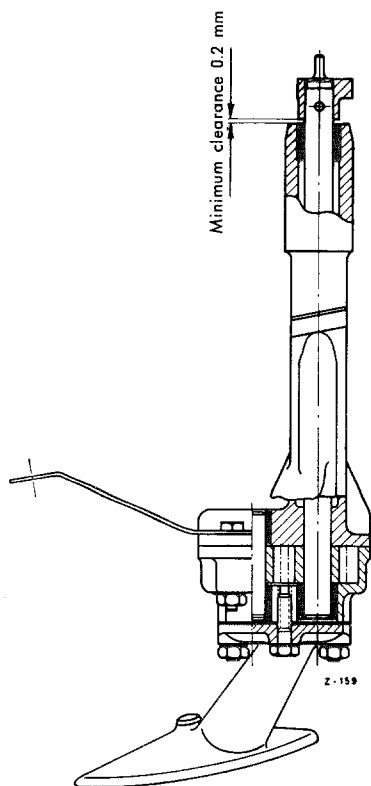


Fig. 18-5/1

Models 180 a and 190 SL 1st version
2nd version the same as 1st version,
but with suction strainer as shown in
Fig. 18-5/3
Model 180 b only with 2nd version

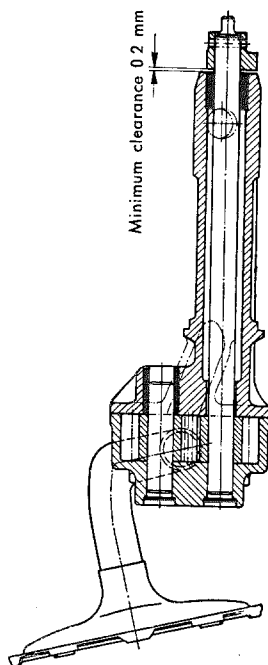


Fig. 18-5/2

Models 220 a, 219, 220 S,
and 220 SE
1st version

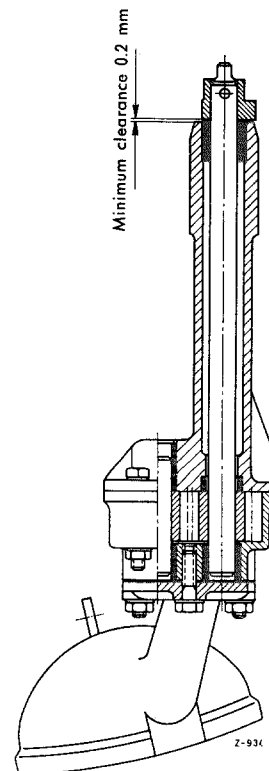


Fig. 18-5/3

Models 219, 220 S,
and 220 SE
2nd version

Note: Model 220 SE has an electrically driven fuel feed pump so that the drive cam on the oil pump shaft is not required.

The repair procedures for the oil pump are practically the same as in the case of Model 190. The diameter of the drive shaft and the oil pump shaft, the bores in the housing top and base, the radial play, end play, and backlash of the gears are identical in all types of pump.

If the bearing bushing in the housing top has to be replaced, make sure that the new bushing is pressed in with the correct oversize. To do this measure the base bore and select a bearing bushing with a suitable outside diameter. If the minimum oversize of 0.014 mm is not obtained, the housing top should be replaced.

Assembly Data for Upper Bearing Bushing

Base bore in housing	$\frac{19.000}{19.021}$
Outside diameter of bearing bushing	$\frac{19.048}{19.035}$
Oversize of bearing bushing in housing	$\frac{0.014}{0.048}$

There is a difference in the capacity of the oil pumps of the 4-cylinder and the 6-cylinder engines. The details are listed in the table below.

Delivery

Model	Engine speed r.p.m.	Delivery kg/min.	Vacuum suction side mm Hg	Pressure delivery side atm.	Oil temperature °C	Type of oil
180 a, 180 b, 190, 190 b, 190 SL	5000	24.5	400	5	100°	Engine oil SAE 10
220 a, 219, 220 S, 220 SE	5000	33	400	5	100°	Engine oil SAE 10

An oil pump is still serviceable if the minimum delivery is 80% of the specified delivery. Pumps with a lower delivery must under all circumstances be replaced or repaired.

C. Cleaning and Checking of Oil Relief Valve in Main Oil Flow

The only difference in the oil relief valves on the various models is in the shape of the housing (Figs. 18-5/4 and 18-5/5). The method of operation and the cleaning and checking procedures are the same for both versions of the oil relief valve. The piston spring, the piston and the retainer ring are identical on both valves and are interchangeable.

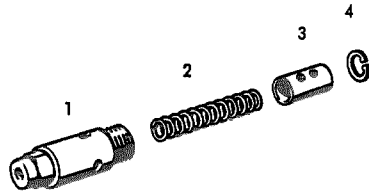


Fig. 18-5/4

Oil relief valve for Models 180 a, 180 b, 190 SL, 220 SE, and 219, 220 S (2nd version)

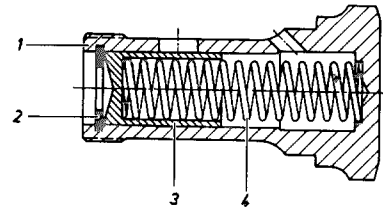


Fig. 18-5/5

Oil relief valve for Models 220 a and 219, 220 S (1st version)

- 1 Oil relief valve
- 2 Retainer ring
- 3 Piston
- 4 Spring

Test Values of the Spring of the Oil Relief Valve

Length L and Pressure P					Wire gage d mm	External diameter D mm
Free length L mm	Valve closed		Valve open			
	L ₁ mm	P ₁ kg	L ₂ mm	P ₂ kg		
43.6	39	2.4	30.5	6.8±0.35	1.4	9.1—9.4

The opening pressure is 6 ± 0.5 kg/cm²

D. Disassembly, Cleaning, and Reassembly of Oil Filter

On Models 180 a, 180 b, 190 SL, 220 a, 219, 220 S, and 220 SE the disassembly, cleaning and re-assembly procedures of the oil filter are the same as described for Model 190.

There is, however, a difference in the shape of the housing top as was mentioned in Job No. 01-4, Section I. In addition attention should be paid to the different number of elements (Figs. 18-5/6 and 7).

Various types of oil filters have been installed and cleaning procedure varies accordingly:

**Oil Filter with Wire Coil Element
and Paper Filter Element**

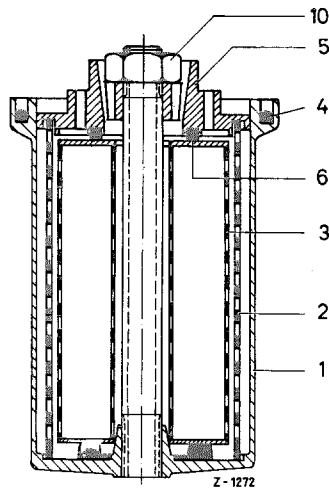


Fig. 18-5/6

- 1 Oil filter base
- 2 Wire coil
- 3 Paper filter element
- 4 Rubber sealing ring
- 5 Discharge ring
- 6 Rubber sealing ring
- 10 Hexagon nut

Oil Filter with Paper Filter Element

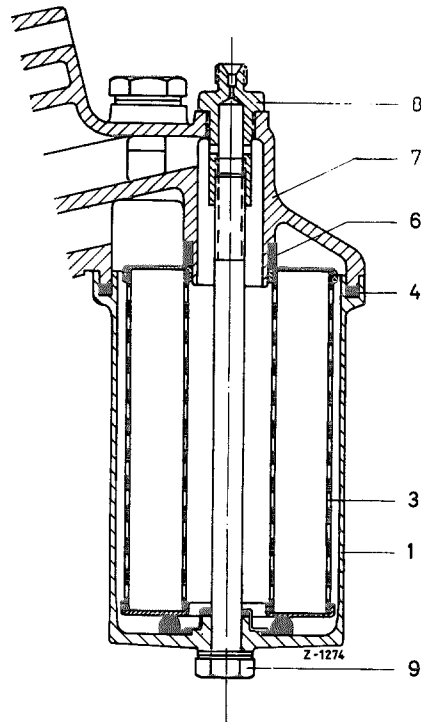


Fig. 18-5/7

- 1 Oil filter base
- 3 Paper filter element
- 4 Rubber sealing ring
- 6 Rubber sealing ring
- 7 Oil filter top
- 8 Threaded union
- 9 Hexagon screw with seal

The wire coil and strainer elements should be cleaned in a parts washer. If no parts washer is available, both the wire coil elements and the strainer elements must be cleaned in trichloroethylene. To do this soak the element for some time in trichloroethylene and afterwards clean it with a brush.

Wire elements and strainer elements cannot be cleaned satisfactorily with gasoline.

The element should be cleaned **very carefully** and should be carefully inspected after cleaning. Hold the wire coils or strainer elements against the light and make sure that they are actually quite clean. Remaining traces of dirt can be removed by knocking the element against a flat surface.

Explanation of Symbols and Remarks

Symbols: ○ = oil change
P = replace paper element
D = clean wire coil element

Remarks: P = replace paper element.

In the case of oil filters which have a **paper element only** use paper filter element Knecht designation EH 256/1, Part No. 000 184 43 25 (paper type 233).

In the case of filters with both **paper and wire coil element** use paper filter element Part No. 000 184 22 25.

If an oil filter element shows unusual sludge formation, this is an indication that cooling water has mixed with the oil. Examine the engine and stop the leak.

The sealing ring in the oil filter base needs particular attention. **For reasons of safety always replace the sealing ring when the filter has been opened.** When inserting the sealing ring make sure that air pads do not form in the groove of the oil filter base.

The following tables indicate after what mileage the oil filter elements must be replaced or cleaned.

Oil Change under Normal Running Conditions

500 km	3000 km	6000 km	12000 km	18000 km	24000 km	etc.
Oil filter type: Paper element and wire coil element Models 180, 220 a, 219, 220 S, 220 S Convertible and Coupé, 220 SE and 1st version Models 180 a, 190, 190 SL, 220 SE Convertible and Coupé						
○ D	○	○ P D	○ P D	○ P D	○ P D	etc.
Oil filter type: Paper element only Models 180 b, 190 b, and 2nd version in Models 180 a, 190, 190 SL, 220 SE Convertible and Coupé						
○ P	○	○	○ P	○	○ P	etc.

The test values of the oil relief valve springs in the housing top are also the same as for Model 190.

Test Values of the Oil Relief Valve Springs

Length L and Pressure P					Wire Gage d	External diameter D
Free length L mm	Valve closed		Valve open			
	L ₁ mm	P ₁ kg	L ₂ mm	P ₂ kg	mm	mm
49	32	2.6	24	3.30	1.25	12.25

The opening pressure of the relief valve is

for oil filter shown in fig. 18-5/6
(2 oil relief valves)

for metal filter $2 \pm 0.2 \text{ kg/cm}^2$
for paper filter $1.2 \pm 0.2 \text{ kg/cm}^2$

for oil filter shown in fig. 18-5/7
(1 oil relief valve)

paper filter only $2.5 - 0.3 \text{ kg/cm}^2$