The cooling system of the engine is designed as a forced circulation cooling. Depending on the intended use, the engine is equipped with the cooling system:

Circulation **C**ooling (only by means of a water pump)	(Uk)
Circulation **C**ooling with **F**an and Water Pump	(UkV)
Circulation **C**ooling with **R**adiator and **F**an and Water Pump	(UkKV)
Circulation **C**ooling with **H**eat **E**xchanger and Water Pump	(UkWt)
Circulation **C**ooling with **H**eat **E**xchanger and **C**entrifugal Pump and Water Pump	(UkWtKr)

(also see Job No. 20–3).

The schematic diagram (20–1/1) shows the cooling system with radiator and fan (ventilator).

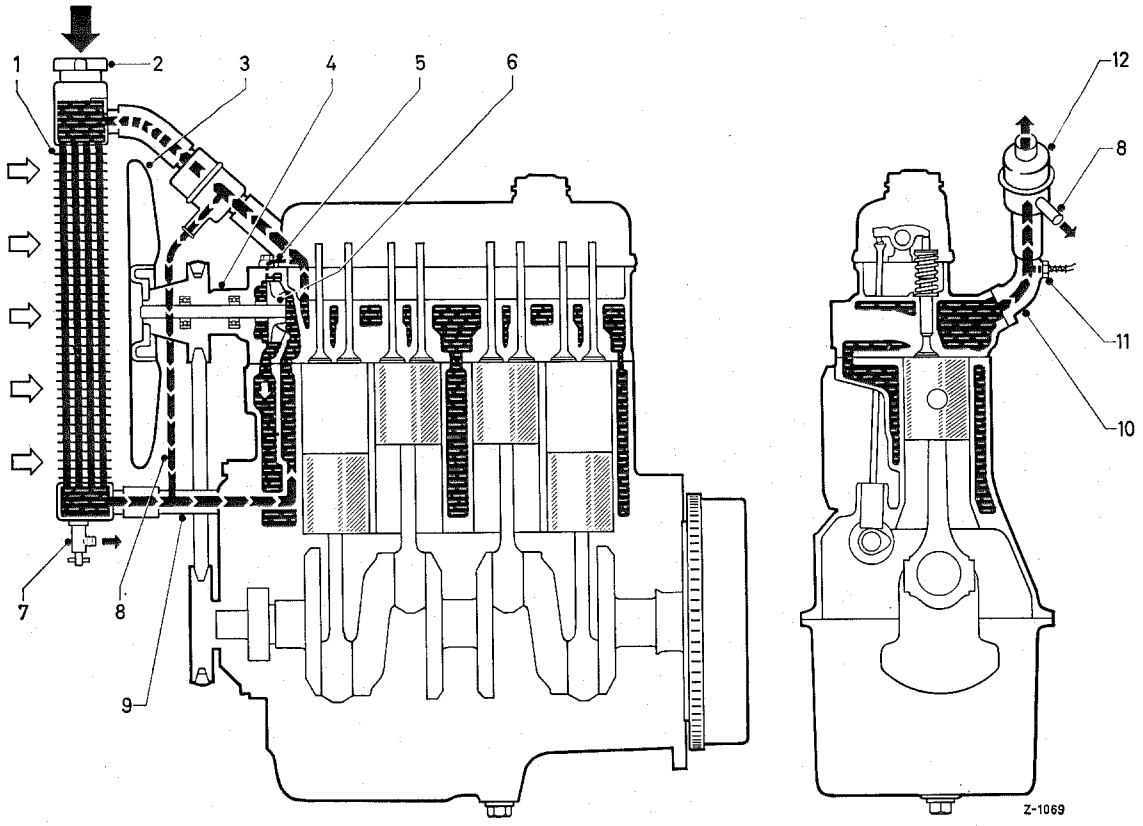

Figure 20–1/1

Schematic Cooling System of the Engine Model OM 636

1 Radiator core
2 Cooling water filler cap
3 Fan
4 Water pump
5 Vent line
6 Impeller
7 Drain cock (cooling water drain tap)
8 By-pass line
9 Cooling water line from radiator to engine
10 Cooling water outlet pipe
11 Sensitive element for remote thermometer
12 Cooling water control (thermostat)

The water pump presses the cooling water into the cooling spaces of the cylinder block, the cylinder head and into the cooling water thermostat installed in the return line to the radiator core. If the thermostat is closed, the cooling water by-passes the radiator and returns to the water pump through the by-pass line. In this case the radiator is cut off and the cooling water circulates inside the engine only. If the thermostat is opened, the cooling water flows into the radiator core, is cooled there, and is returned to the water pump via the radiator outlet pipe and the engine inlet pipe.

The thermostat serves to cut off the radiator while the engine is cold, so that the favorable hot running temperature is obtained as soon as possible. Therefore, the thermostat opens only after a temperature of approx. 79° C has been reached. Below this temperature the thermostat will remain closed.

The thermostat not only serves to reach the operating temperature quickly but also prevents excessive cooling, e.g. during prolonged down-hill coasting. This is especially important as far as the wear of the cylinders is concerned.

The cooling water temperature is normally 70 to 95° C.

Coolants and additives for coolants, cleaning cooling system, see Job No. 0–6.

Measures for winter operation, see Job No. 0–7.

A relief valve (3) has been installed in the filler cap of the radiator. The relief valve limits the overpressure in the cooling system (see Figure 20–1/2).

Maximum permissible overpressure in the cooling water system

in the types 636 912, 914, 915, 916, 918 and 931 = 0.25 kg/cm²
in the types 636 917, 919, 930, 932, 933 and 936 = 0.40 kg/cm².
in the type 621.910 = 1.00 kg/cm²

If the overpressure is higher, the relief valve opens the overflow line (1).

In order to limit the vacuum in the cooling system, the filler cap (2) also contains a vacuum valve (4) which opens at a vacuum of 0.1 atm. gauge pressure and is also connected with the overflow line (1) (see Figure 20–1/2).

In the vehicles, the different radiator filler caps are marked with punched-in numbers (see Figure 20–1/3). The numbers have the following meaning:

25 = the relief valve opens at 0.25 kg/cm²,
40 = the relief valve opens at 0.40 kg/cm²,
100 = the relief valve opens at 1.0 kg/cm².

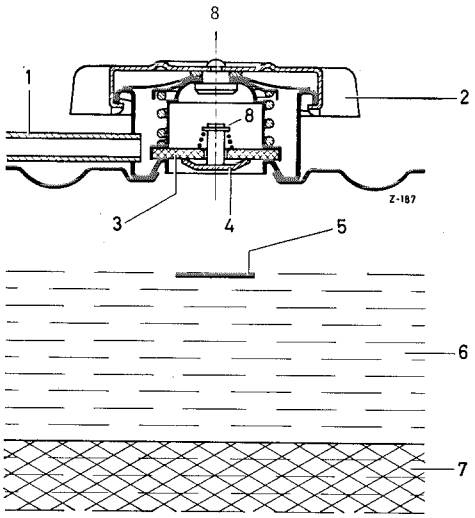

Figure 20–1/2

1 Overflow line
2 Filler cap
3 Relief valve (rubber gasket)
4 Vacuum valve (valve cone)
5 Water level plate mark
6 Cooling water
7 Radiator core
8 Guard

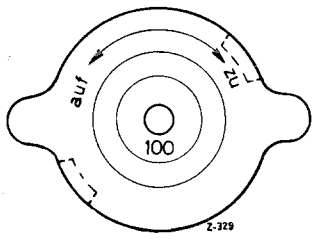

Figure 20–1/3

Check operating ease of the valves (3) and (4) in the radiator filler cap. The vacuum valve (4) should not stick, because the upper tank of the radiator can be contracted by the existing vacuum (Figure 20–1/2).

Therefore, check especially whether the rubber gasket (3) is swollen thus preventing the opening of the vacuum valve. If necessary, replace rubber gasket (3). To do this, pull the rubber gasket out of the groove at the circumference with knife or screwdriver.

Then force out the guard (8) and remove the pressure spring and valve cone (4) from the rubber gasket (3).

Install the new rubber gasket in the reverse order. Check again the operating ease of the valves.

In various built-in engines the design of the cooling system deviates from the version used in our vehicles, depending on the intended use of the engines.