

Cooling Water Thermostat

Job No.

50-6

A. Steam-Pressure Thermostat

Model 180 and Model 180 D 1" Version

In the case of steam pressure thermostats the valve plate is forced open by the alcohol-filled metal bellows in the direction of flow of the cooling water. The opening phase therefore is dependent on the pressure obtaining in the cooling system, that is to say the steam-pressure thermostat is pressure-sensitive.

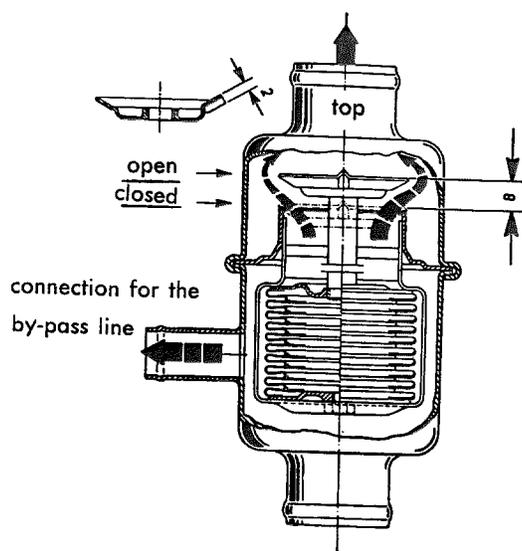


Fig. 50-6/1

Steam Pressure Thermostat

Only wax thermostats are supplied as replacement parts (see Section B). For testing instructions see Section D.

B. Wax Thermostats

a) Wax Thermostats without By-Pass Control

Models 180 (in case of replacement), 180 a, 180 D, 190 SL (thermostat element only), 220 a, 219, 220 S

The wax thermostat is independent of the pressure in the cooling water system, that is to say it is not pressure-sensitive. The thermostat element has a diaphragm (5) which is located between the wax-like mass (4) and the pin (1) soldered to the housing (Fig. 50-6/2).

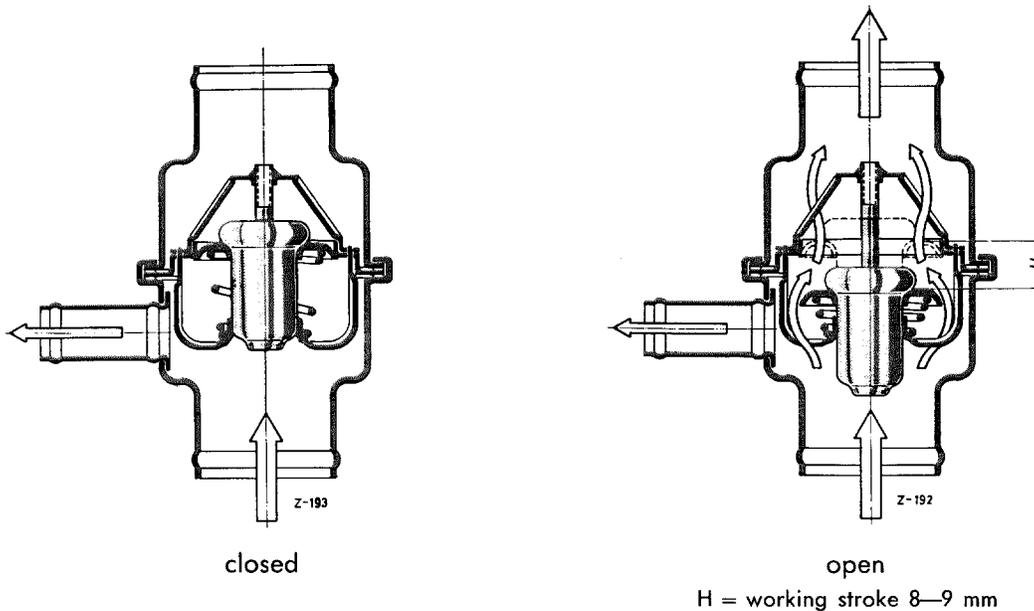


Fig. 50-6/2

Wax thermostat without by-pass control

When the cooling water warms up the wax-like mass (4) expands, which causes the diaphragm to bear upon the soldered pin (1) and the valve opens in the direction opposite to that of the flow of the cooling water. As the temperature of the cooling water drops, the valve is closed by the pressure spring situated between the valve plate and the thermostat guide plate. The by-pass line is open whether the valve is open or closed (see Fig. 50-6/2).

b) Wax Thermostat with By-Pass Control

Models 180 Db, 180 b, 190 D, 190 Db, 220 SE

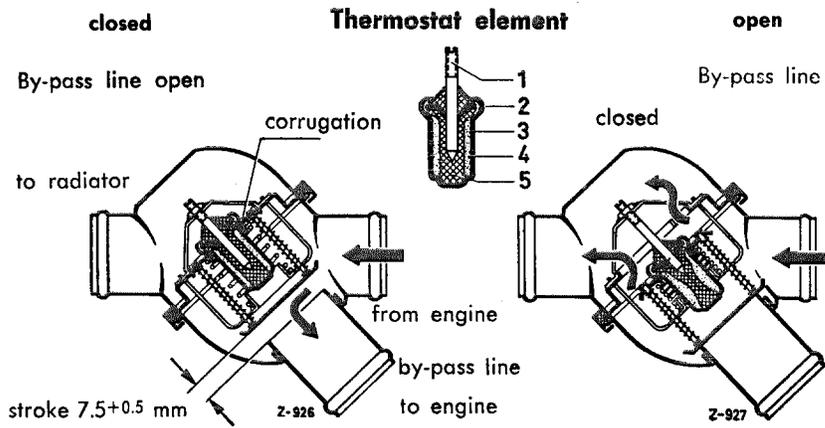


Fig. 50-6/3

Wax thermostat with by-pass control

- 1 Pressure pin
- 2 Cover disk
- 3 Housing
- 4 Wax
- 5 Rubber diaphragm

The element of the wax thermostat with by-pass control works and is designed on the same principle as that of the wax thermostat without by-pass control. The only difference is that the diameter of the connecting branch for the by-pass line has the same size as the diameter of the two connecting branches for the cooling water hoses from the engine to the radiator and this by-pass line is opened and closed by the valve (by-pass control).

When the valve is closed, the cooling water circulation from the engine to the radiator is interrupted. The whole amount of cooling water is returned to the engine via the completely open by-pass line.

When the valve is fully opened, the by-pass line is completely closed and the cooling water inlet to the radiator is completely open.

In the various intermediate positions of the valve the cooling water flows both to the radiator and via the by-pass line to the engine.

As a result the same amount of cooling water flows through the thermostat independent of its varying operating positions and the cooling water in the cylinder crankcase and the cylinder head is heated rapidly and at a uniform rate.

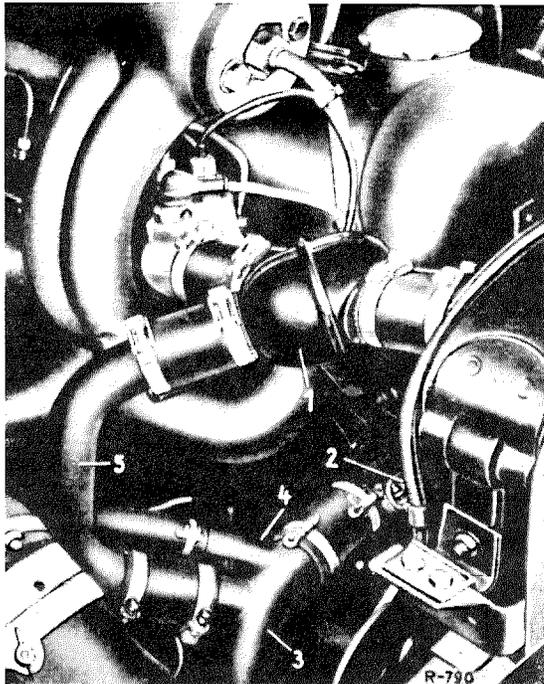


Fig. 50-6/4

Wax thermostat with by-pass control
(Fig. shows Model 220 SE)

- 1 Thermostat
- 2 Connection to heat feeler on injection pump
- 3 Cooling water line from radiator to engine
- 4 Heater connection
- 5 By-pass line

C. Subsequent Installation of a Wax Thermostat with By-Pass Control

I. Model 180 D

The cooling water line from the radiator to the engine (3) must be replaced by the cooling water line Part No. 636 200 12 53 (see Fig. 50-6/4). When this line is installed, the diameter of the pipe socket of the line is 28 mm. The thermostat is connected to the cooling water system by two hoses and the new by-pass line (5) Part No. 635 501 00 24 which has to be installed.

II. Model 180 a

The arrangement of the wax thermostat with by-pass control (1) and the by-pass line (5) is shown in Fig. 50-6/4. The subsequent installation requires the cooling water line (3) Part No. 121 500 14 91 from the radiator to the engine with a diameter of the connection for the by-pass line of 32 mm and the by-pass line (5) Part No. 121 500 15 91.

D. Survey of Thermostats and Testing Instructions

Testing instructions for the thermostat are essentially the same as described for Model 190. When testing the wax thermostat with by-pass control the by-pass line must be closed when the amount of flow is being checked.

Model	Part No.	Type	Opens - at °C	Working stroke of valve		Flow when closed liters/mm	Diameter of connection branch from engine to radiator in mm	Diameter of connection branch for by-pass line in mm
				in mm	at C°			
180 180 D (1st vers.)	181 203 00 75 181 203 01 75	Steam-pressure thermostat	71—74 77—80 ¹⁾	8	80—81 87—88	0.7—1.2	28	13
180 D (2nd vers.)	000 203 97 75 optional 000 203 98 75	Wax thermostat without by-pass control	78—79	8—9	91—94			
180 Db	001 203 19 75 optional 001 203 20 75	Wax thermostat with by-pass control		7.5—8			28	
220 a, 219, 220 S 180 (in case of replacement) 180 a 190 (1st version)	000 203 65 75 optional 000 203 75 75	Wax thermostat without by-pass control		8—9			32	13
190 SL	000 203 64 75	Wax thermostat element (in cooling water outlet connection)	—	—	—			
180 b 190 b 190 D and 190 Db, 220 SE (1st version)	001 203 08 75 optional 001 203 23 75	Wax thermostat with by-pass control	74—76	7.5—8	94		32	32
220 SE (2nd vers.)	001 203 21 75							

¹⁾ winter driving

E. Removal and Installation of Thermostat

I. Models 180, 180 a, 180 b, 180 D, 180 Db, 190 D, 190 Db, 220 a, 219, 220 S, and 220 SE

The removal and installation procedures are the same as for Model 190.

II. Model 190 SL

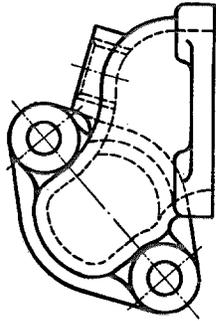
Removal:

1. Drain off part of the cooling water, collecting additives if present.
2. Unfasten the hose clamp on the cooling water outlet connection and remove the hose.
3. Unscrew the four hexagon socket screws fastening the cover of the outlet connection and remove the cover, the gaskets, and the thermostat element.
4. Check the thermostat.

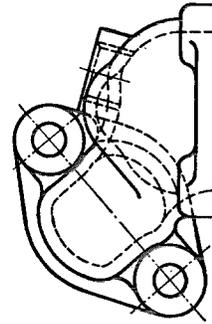
5. If the element has to be replaced, please note that on cars with Engine End No. up to 45 01 020 the cooling water outlet connection has to be replaced as well. This is necessary because the new cooling water outlet connection increases the range of the thermostat.

Installation:

Installation is the reverse of the removal procedure. The thermostat element must be installed in the outlet connection in such a way that the vent corrugation is situated at the top. Replace the gaskets between the outlet connection, the thermostat element and the cover.



1st version



2nd version

Fig. 50-6/5

Cooling water outlet connection