

**THERMOSTATIC VALVE****DESCRIPTION**

The thermostatic valves covered in this instruction are all similar in construction to the model shown in Fig. 1. Differences between models involve dimensions and the number and sensitivity of thermostatic elements within the valve, but operation is the same for each model. The description and instructions given apply to all models.

The thermostatic valve is a diverting valve that is used to maintain a constant temperature at the diesel engine water outlet. When an engine is started and cold, the valve causes all water to bypass the heat exchanger in the engine cooling system. After warmup, part of the heated water bypasses and part is directed to the heat exchanger. The bypassed water is then mixed with the cold water returning from the heat exchanger before re-entering the engine. Valve action and mixing of water maintains the desired engine water temperature. However, if water from the engine reaches the nominal temperature for the particular valve, see Page 4, the valve will close the bypass side entirely, and all water will flow to the heat exchanger.

The valve is self-contained and self-powered. It contains thermostatic element assemblies that hold valve sleeves in the bypass position by spring tension when cold water from the engine outlet passes over the elements. As water temperature increases, a thermostatic material that

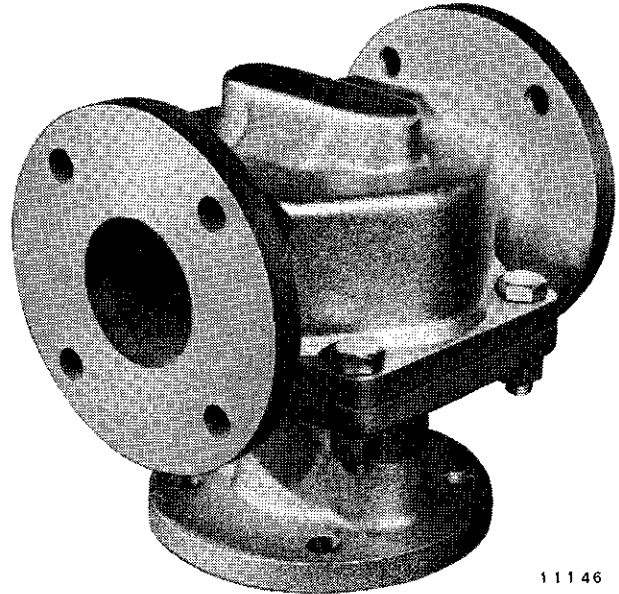


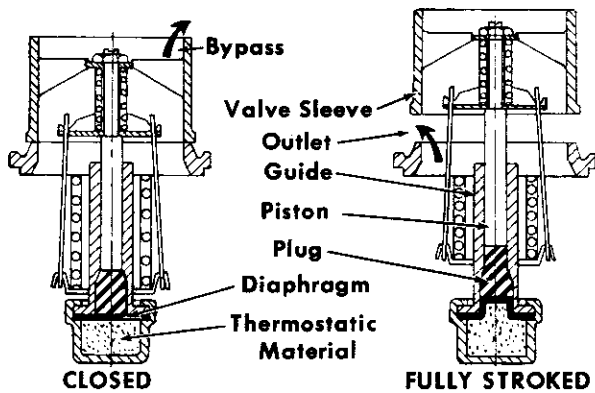
Fig. 1 — Typical Thermostatic Valve

is highly sensitive to temperature changes expands to develop pressure that overcomes the force of the return spring. The thermostatic material drives a molded synthetic rubber plug into a reduced diameter piston guide that by extruding action multiplies the travel of the plug. The plug drives a piston that forces the valve sleeves to open the valve outlet to the heat exchanger and at the same time constrict the bypass opening. This action is illustrated in Fig. 2.

MAINTENANCE

Disassembly and inspection of the thermostatic valve should be performed at intervals prescribed in the applicable Scheduled Maintenance Program or at any

*This bulletin is revised and supersedes previous issues of this number.



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Fig. 2 - Thermostatic Element Assembly

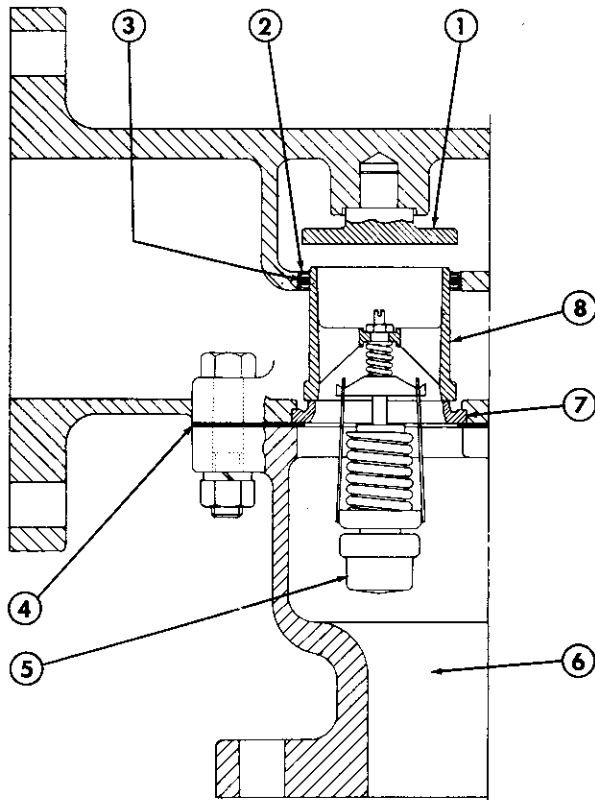
time improper cooling of the engine is evident. Improper cooling may be due to the O-ring deterioration or malfunctioning thermostatic elements.

To perform an inspection on the thermostatic valve, it may be necessary to remove the entire valve from the cooling system piping. However on some installations and under some circumstances it may be easier to remove only the bolted housing and its attached piping from the valve. If the entire valve is to be removed, it is advisable to tag or otherwise mark the pipe flanges with the letter appearing at the adjacent valve flange. The letter "A" identifies the valve inlet flange. The letter appears on the bolted housing. The letter "B" identifies the outlet to the bypass piping. The letter "C" identifies the outlet to the heat exchanger.

Due to the differing valve body housing designs, the location of some bolts and flanges are such that the assembly and disassembly sequence may be altered. Fig. 3 gives a general location arrangement.

Referring to Fig. 3, perform the inspection as follows:

1. Unbolt the housing (6) from the valve body, being careful not to drop or



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|-------------------------------|----------------------------------|
| 1. Upper Seat | 5. Thermostatic Element Assembly |
| 2. Channel Type O-Ring Sleeve | 6. Element Housing |
| 3. O-Ring | 7. Lower Seat |
| 4. Gasket | 8. Valve Sleeve |

Fig. 3 - Thermostatic Valve Cutaway View

otherwise damage the thermostatic elements within the valve.

2. Remove the housing gasket (4) and discard it.
3. Remove the thermostatic element assemblies (5) from the valve. Ascertain that the nominal temperature rating stamped on the side strap is the correct rating.
4. Visually inspect the O-rings (3) for deterioration, and replace if necessary.
5. Under exceptional circumstances pitting of brass parts may occur. If the valve sleeve (8) or lower seat (7) is pitted, the thermostatic element as-

sembly should be scrapped. If the press fitted upper valve seat (1) is lightly pitted, a light touch-up is permissible. However, if deep pitting has occurred, consult General Motors Overseas Organization or Electro-Motive Division of General Motors Corporation regarding replacement of the valve seat.

NOTE: The presence of corrosion may indicate the need for treatment of engine cooling water. For information regarding water treatment, refer to Maintenance Instruction 1748.

6. Place the thermostatic elements in a container of water at a temperature 10° F. (5.5° C.) lower than the nominal rating indicated on the side strap. Use the element to stir the water for three to five minutes. The valve sleeve (8) should remain seated tightly against the lower seat (7).
7. Fabricate a support that will allow the thermostatic element to be submerged in water while a dial indicator is mounted to obtain a reading of valve sleeve travel.
8. Place the thermostatic element in a container of water at a temperature 15° F. (8.3° C.) higher than the nominal rating of the element and stir the water. Make certain that the movement of the dial indicator pointer is smooth. If the valve slider rises with decided

jerks, the element can be expected to malfunction completely within a short time, therefore should be scrapped.

9. After 3 to 5 minutes, observe the reading on the dial indicator. If travel (gap between valve sleeve and lower seat) is less than 0.375" (9.525 millimeters), the element should be scrapped.
10. Place the thermostatic element assembly in cool water to verify that it will return to its seated position.

ASSEMBLY

To reassemble the thermostatic valve, perform the following:

1. Insert O-rings in the channel type O-ring sleeves.
2. Place the thermostatic element assembly valve sleeves in through the O-rings. A small amount of grease at the leading edge of the valve sleeves will allow them to enter more easily.
3. Obtain a new housing gasket and place it in position before bolting down the housing.
4. Replace the valve in the cooling system piping (if removed), using new gaskets at each flanged connection.
5. Tighten 1/2" bolts to a torque of 50 ft-lbs (6.9 Kg. M.), 5/8" bolts to a torque of 85 ft-lbs (11.7 Kg. M.).

THERMOSTATIC VALVE ASSEMBLIES

<u>EMD PART NO.</u>	<u>TEMPERATURE DATA</u>	<u>EMD PART NO.</u>	<u>TEMPERATURE DATA</u>
8407382	105° F - Nominal	8326972	175° F - Start to Open 180° F - Nominal 190° F - Fully Open
8393955	170° F - Start to Open 175° F - Nominal 185° F - Fully Open	8344089	170° F - Start to Open 175° F - Nominal 185° F - Fully Open
8411354	155° F - Start to Open 160° F - Nominal 170° F - Fully Open	8320068	180° F - Mid-Position Temp. Setting
8224544	160° F - By-Pass Outlet Close	8394034	165° F - Start to Open 170° F - Nominal 180° F - Fully Open
8261223	160° F - Nominal	8394263	165° F - Start to Open 170° F - Nominal 180° F - Fully Open
8227668	111° F - Start to Open 130° F - Fully Open	8395402	170° F - Start to Open 175° F - Nominal 185° F - Fully Open
8370139	175° F - Start to Open 180° F - Nominal 190° F - Fully Open	8411472	155° F - Start to Open 160° F - Nominal 170° F - Fully Open
8378593	178° F - Start to Open 185° F - Nominal 198° F - Fully Open	8413628	165° F - Start to Open 170° F - Nominal 180° F - Fully Open
3327189	180° F - Mid-Position Temp. Setting		
3324519	170° F - Mid-Position Temp. Setting		
8307024	160° F - Nominal		