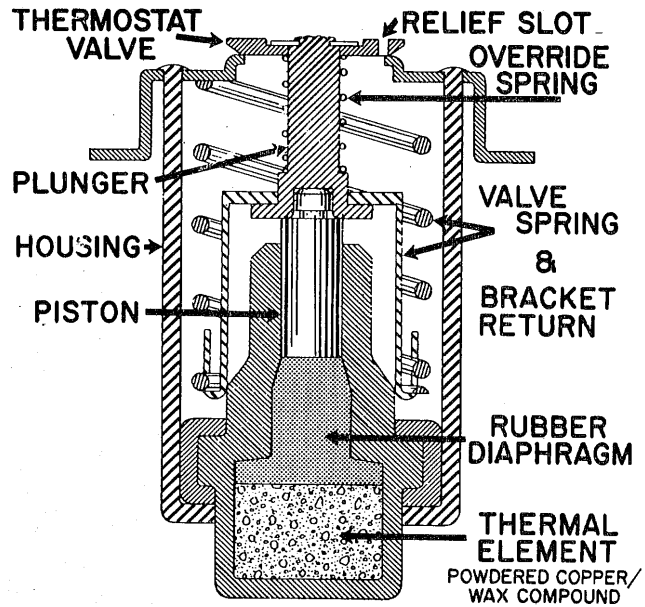
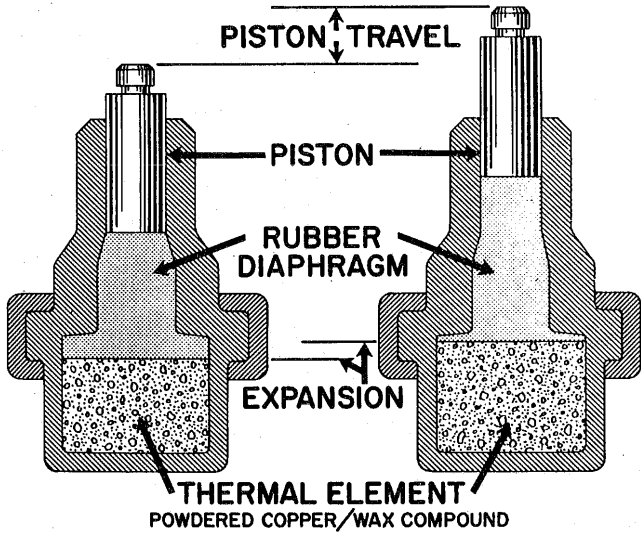


POWERHEAD GROUP  
Models CD-19 Up

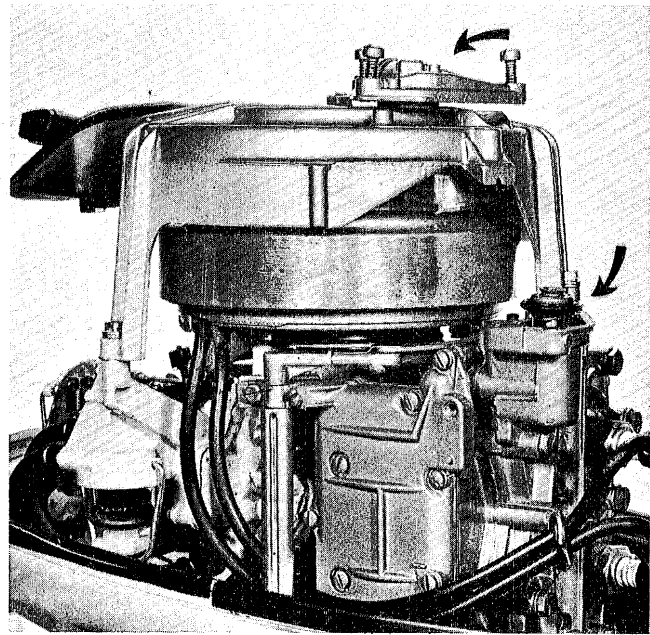


**THE THERMOSTAT**  
Models CD, QD and FD

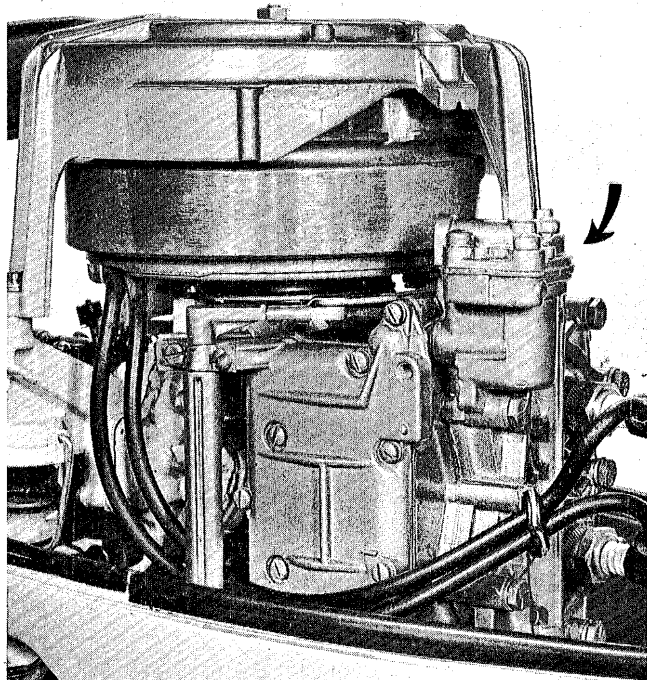


The cooling systems of Models CD, QD and FD (1959 and up) are thermostatically controlled to achieve improved performance and as such, a thermostat is installed in the cylinder head of each — conveniently located and readily accessible.

The thermostat unit consists of a thermal element composed of a powdered copper-wax compound, a rubber diaphragm and piston enclosed in a housing as revealed in the drawing above.



Cover Removed to Expose the Thermostat Element.



Thermostat Installation.

The thermostat assembly includes a housing in which the thermostat unit is inserted, a bracket and plunger assembly activated by the thermostat piston, valve return and override springs.

In operation with rising of water temperature, the copper-wax compound in the thermal unit is caused to expand. The expanding thermal unit, acting against the rubber diaphragm and simultaneously against tension of the valve return spring, forces the piston upward to "open" the valve. With the valve now raised off its seat, water is permitted to circulate thru the water jacket of

the cylinder assembly and as such, maintains predetermined operating temperature. The thermostat unit is calibrated to open at water jacket temperature 145 to 150°F. Resultant degree of valve opening is obviously in proportion to cooling system requirements, since function of the cooling system is to dissipate heat.

Heat generation is by the motor running at various speeds. At high motor R.P.M.'s and under full load heat generation is at its maximum; consequently, a higher rate of water coolant flow is required, than when operating at slow or intermediate speeds when heat generation is less. The thermostatically controlled valve acts to proportionately meter flow of water thru the water jacket at all motor speeds to maintain as nearly as possible constant operating temperature — of particular significance when operating at slow and intermediate speeds. Activity of the thermostat is affected to some extent naturally by the temperature of the body of water on which the unit is being operated—governed ordinarily by seasonal changes and geographical locations.

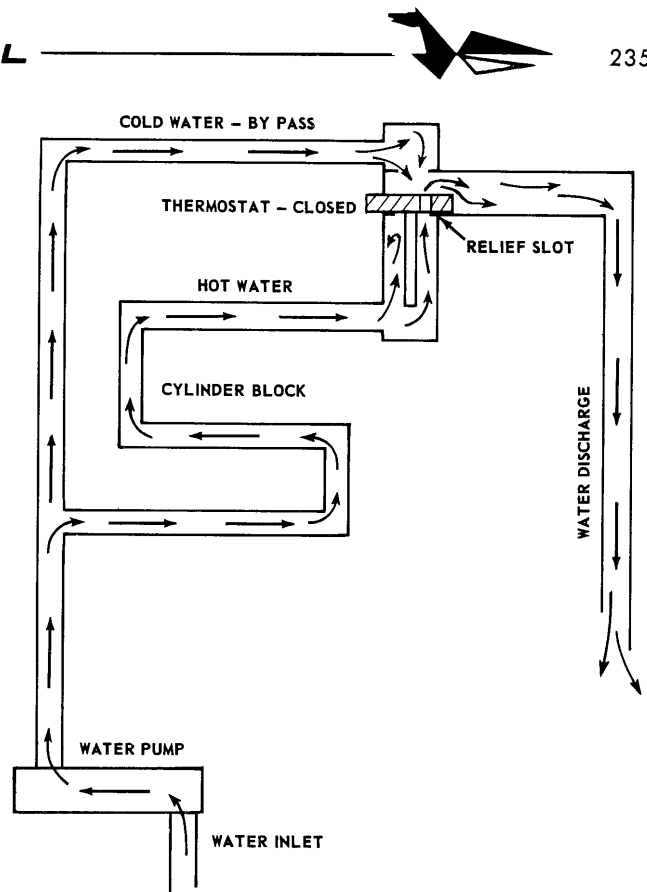
Since a rubber diaphragm, installed between the thermal element and the piston, is employed to “open” the valve, return to closed position, on contraction of the thermal element as it cools, is accomplished by tension of the valve return spring acting against the plunger bracket — see drawing.

The thermostat valve “floats” on the plunger shaft but is held in position by the small override spring.

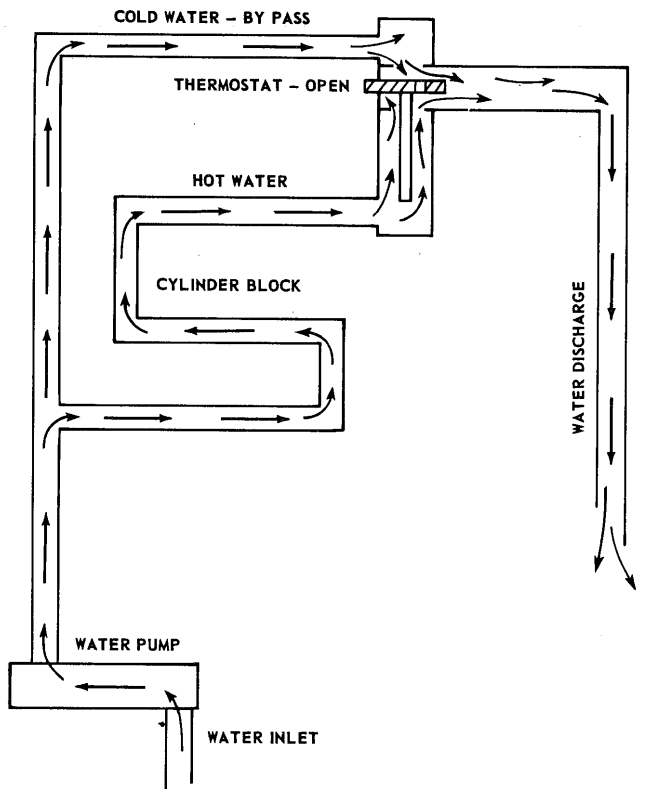
The schematics shown illustrate the plan of the cooling system, including the water pump, a cold water bypass, water jacket channels (cylinder), the thermostat installation, water discharge from the cooling system and conditions when running cold and at normal predetermined temperature.

Starting cold, the thermostat valve is “closed.” Note relief slot machined into the valve plate. Water enters the pump and is subsequently directed into the cooling system — separately at junction of the water jacket and cold water bypass channels. A major portion of the circulating water at this time is directed to the upper portion of the cylinder head, bypassing the thermostat valve and flowing on out thru the discharge channel — cold water circulation not affected by rising water jacket temperature. A lesser portion of the circulating water simultaneously flows thru the water jacket of the cylinder block assembly and on thru the relief slot in the thermo slot valve to eventually enter the cold water bypass stream as shown.

Purpose of the relief slot is to purge the cylinder water jacket of air and to permit limited circulation. Naturally, with restricted water jacket circulation, the resulting temperature rise is quite hasty. Sub-



Schematic to illustrate Cooling System with Thermostat Valve closed (cold).



Schematic to illustrate Cooling System with Thermostat Valve open (normal operating temperature).

sequent expansion of the thermal unit causes the thermostat valve to open. Circulation thru the water jacket is now considerably greater, however,

