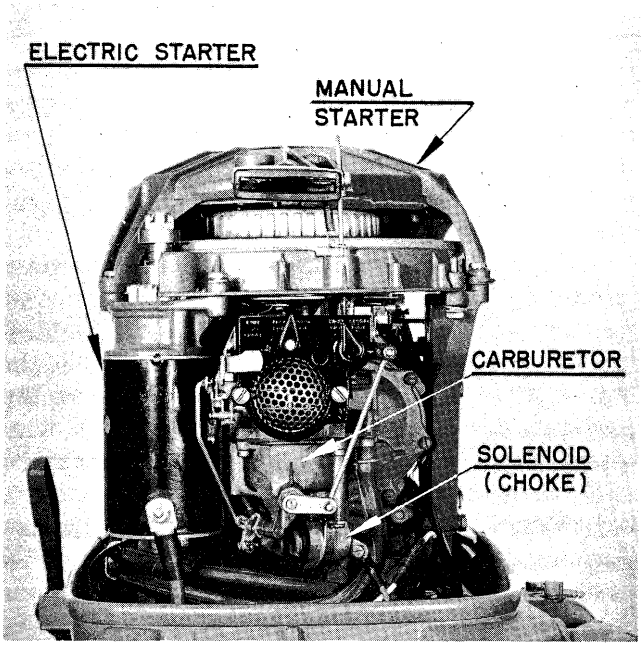
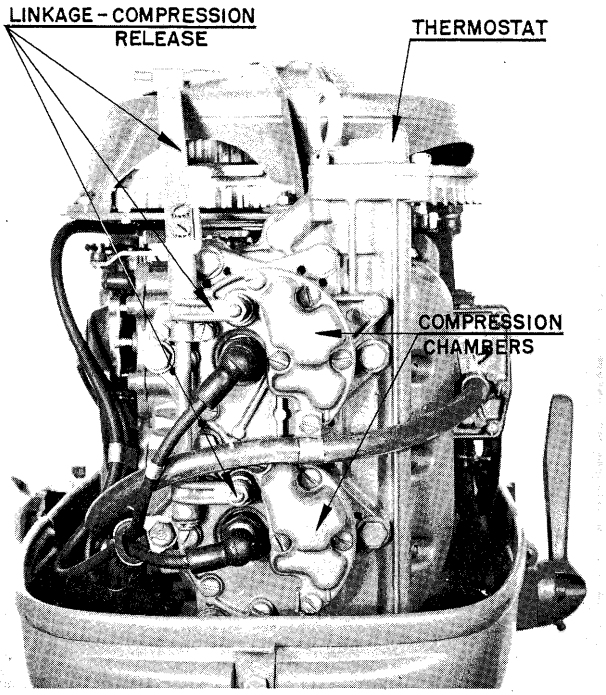
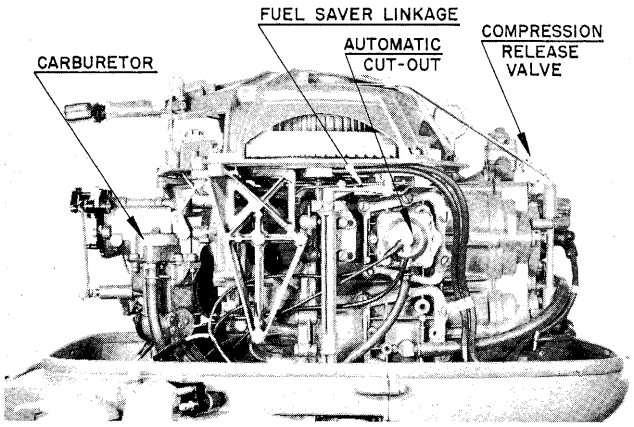
POWERHEAD — MODEL RDS-20



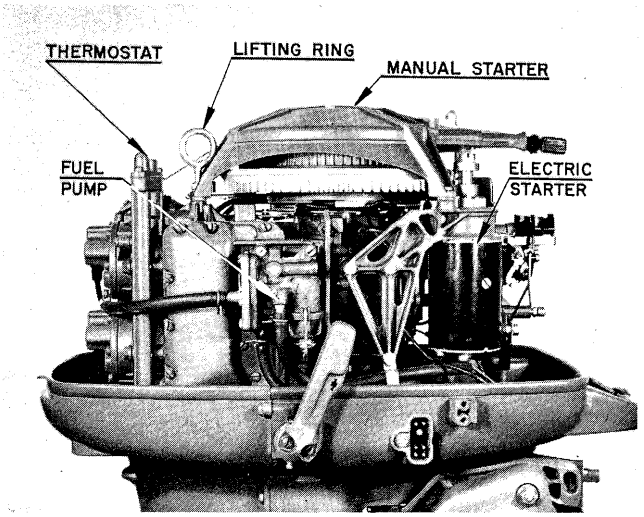
Front view — Powerhead Model RDS-20.



Rear view — Powerhead Model RDS-20 showing thermostat installation.

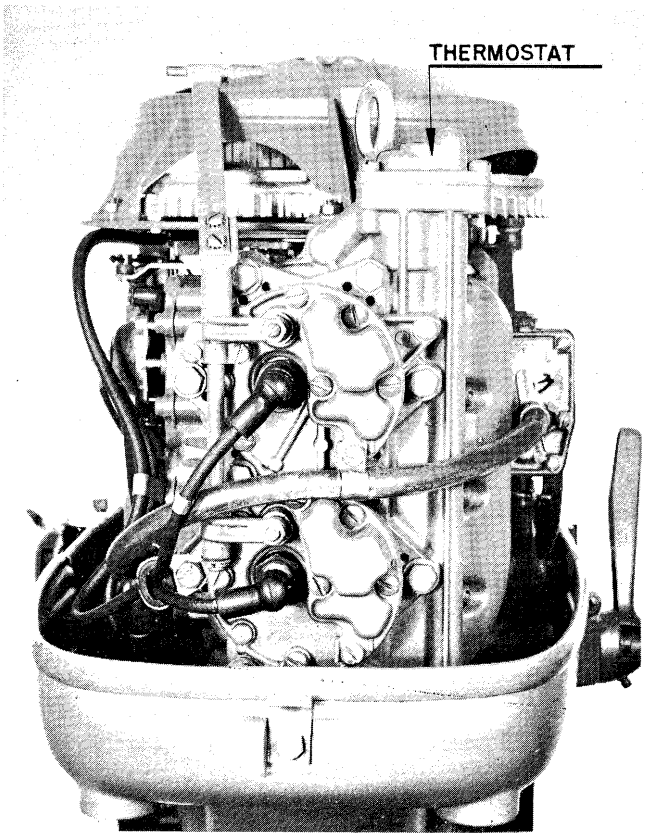


Port view — Model RDS-20 Powerhead.

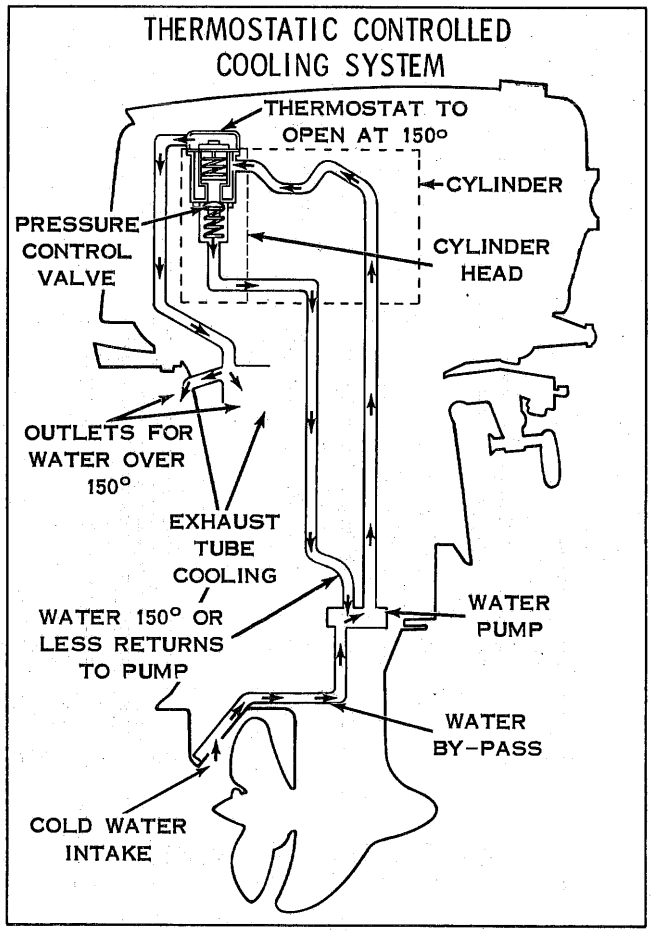


Starboard view — Model RDS-20 Powerhead.

THE COOLING SYSTEM THERMOSTATICALLY CONTROLLED MODEL RDS-20



Rear view of Powerhead (Model RDS-20) showing the thermostat installation.



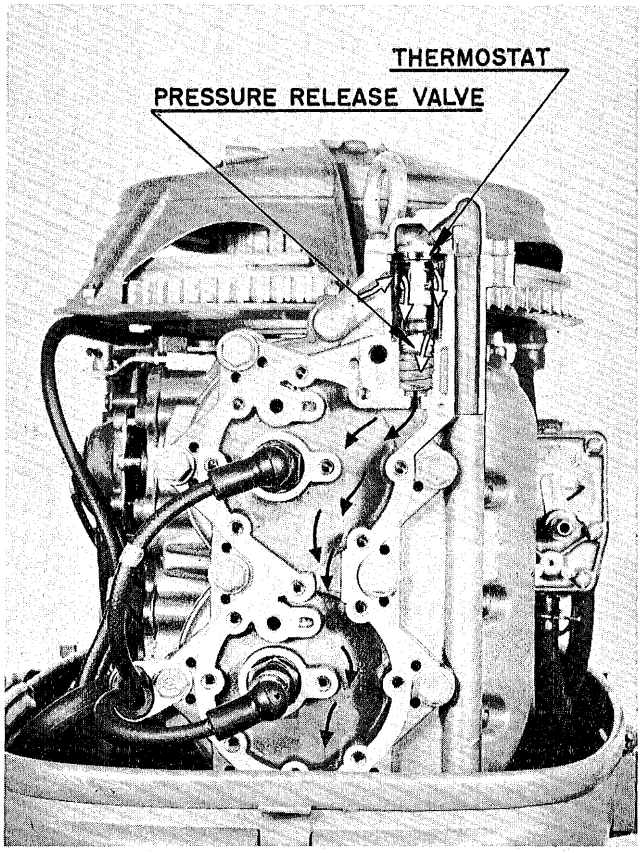
Circulation of water through the cylinder block and cylinder head water jackets for cooling purposes is accomplished by an impeller type of water pump or circulator attached to the upper end of the gear case and driven by the drive shaft.

In construction and assembly, the unit at slow motor speeds, functions as a positive displacement pump while at higher speeds, as a simple circulator. It will be seen from the following illustration that position of drive shaft is offset somewhat from the center of the pump housing to cause an eccentric flexing action of the impeller blades when in motion. Comparatively large volume exists between the impeller blades on "wide" side which compresses progressively as the blades approach the "narrow" side to create a pulsating action. During periods of high speed operation, resistance of water on its way through the pump is sufficient to prevent the impeller blades making contact and following inside periphery of the pump housing and as such, merely flex in toward center of the impeller to perform as a simple circulator. (See page 432.)

During performance, water enters the impeller housing by means of a slotted opening in the pump assembly cover plate and at a point where the volume between the impeller blades commences to expand, thereby creating a displacement effect. Water then rushes in to fill the "void" until the impeller blades begin to compress, thus forcing the "trapped" water out of the pump by way of a properly placed port in the housing. From there it is conducted to the cylinder water jackets for cooling purposes — later to be discharged into the exhaust stack assembly.

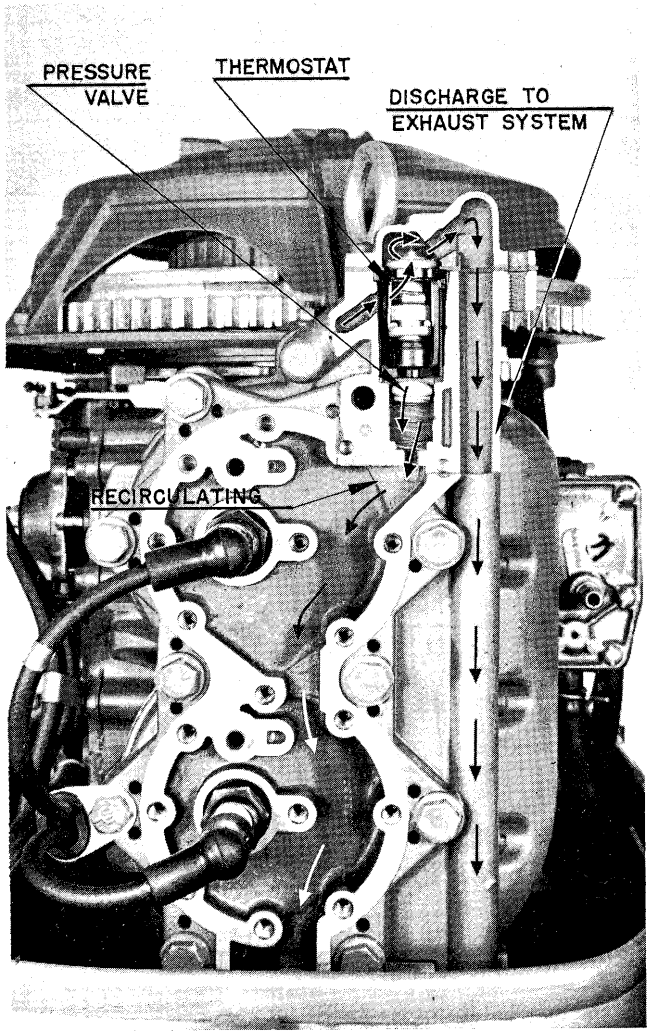
A thermostat has been assembled into the water circulating system to maintain a constant operating temperature, thereby achieving greater flexibility and more efficient operation throughout the entire range of operation. But of significant importance, the maintenance of predetermined operating temperatures particularly in the slow speed and intermediate ranges, results in more complete combustion of the fuel vapors — thus, a "cleaner" burning charge to minimize "sludgy" carbon deposits and the accumulation of petroleum gum or varnish which interfere with performance. In like manner, active life of the spark plug is considerably extended.

Assembly of the thermostat consists of a pressure release valve and a thermostatic control element enclosed in the cylinder head as shown here.

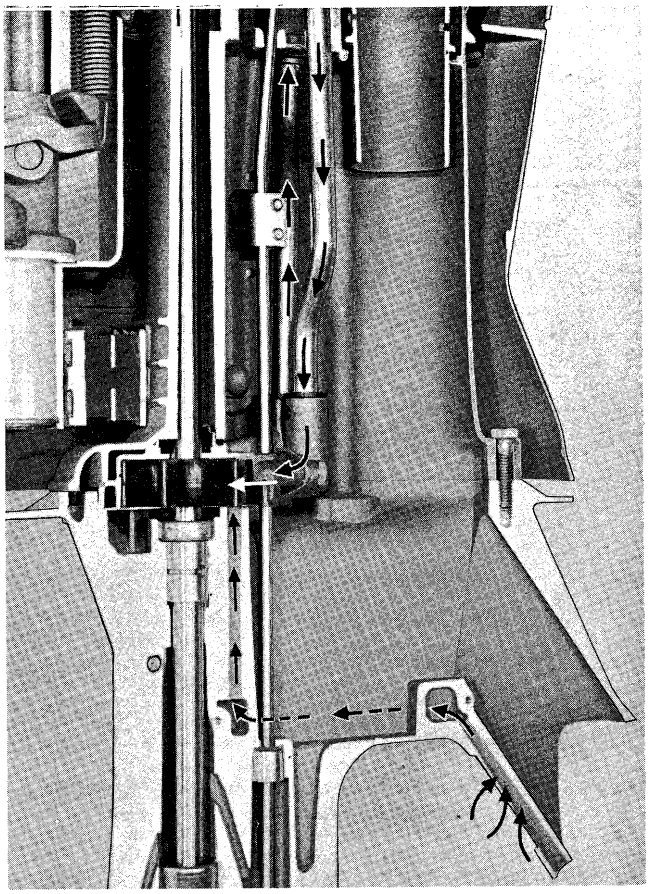


Showing path of water circulation prior to reaching normal operation temperature. During period of "warm-up," path of water is through the recirculation system as indicated by arrows and described in text.

In operation — upon starting of the motor, water is "pumped" into the water jacket system until a pressure of approximately one pound has been established. Then since tension of the spring acting against the pressure valve, is preset to "break" at one pound, the pressure valve is forced off its seat to commence water circulation. Water thus released by the pressure valve is directed by means of a second water tube "back" to the water pump to be recirculated. Recirculation continues in this manner until water jacket temperature has reached 130-150°F when the thermostatic valve is caused to open by action of the thermostat. Resulting overflow is conducted into the exhaust assembly where it circulates to cool the exhaust stack after which a portion is discharged immediately below the powerhead assembly (above the water line) with remainder of the water jacket discharge overflowing into the exhaust stream and on out through the underwater exhaust.



Showing path of water circulation when normal operating temperature of approximately 150°F has been reached. While some water continues to recirculate, main discharge is into the exhaust system.



Sectional view — Pump installation. Arrows indicate path of water through pump, to cylinder block and recirculating.

A "V" slot is formed into the thermostatic valve face, allowing air to escape and later, water to rinse the valve assembly — free of salt crystals, etc. When first starting and during period of warm-up but a few drops of water and steam (vapor) will be observed to discharge from the outlet above the water line, since water for cooling is being recirculated between the pump and water jacket at this time.

On having reached predetermined operating temperature, the thermostatic valve opens when a sudden spurt of water will be noted discharging from the discharge outlet. Failing to note "spurting" of water at the discharge after having operated the motor for a reasonable length of time, indicates possible pump failure. The motor should be immediately stopped and an investigation of the cooling system conducted. Under some circumstances, little water will be seen to emit from the water discharge due to suction created in the exhaust stack when operating at comparatively high boat speeds.

To check functioning of the thermostat, simply insert thermometer into the water discharge (after motor has reached running temperature).

Reading should not exceed 170°F.