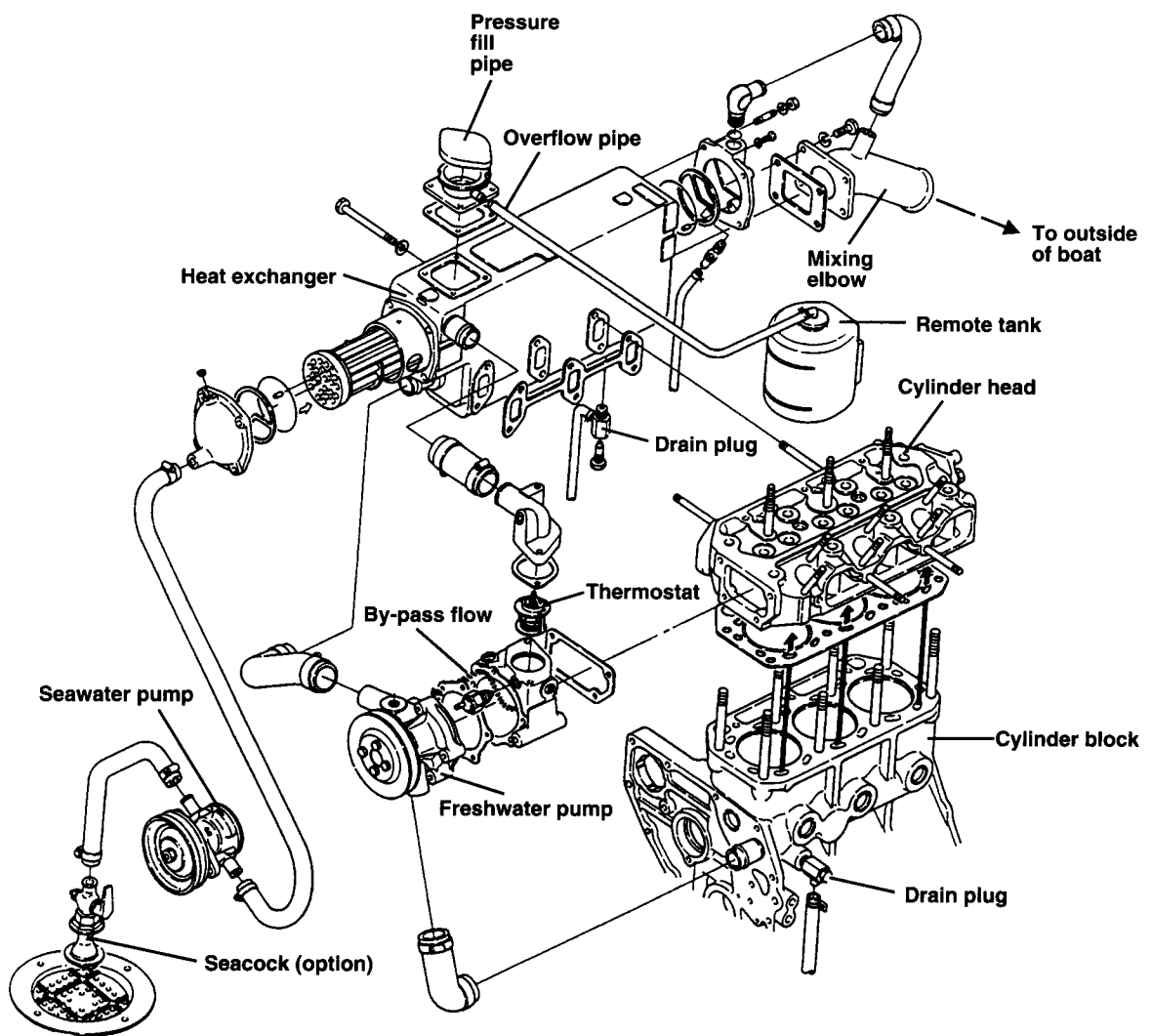
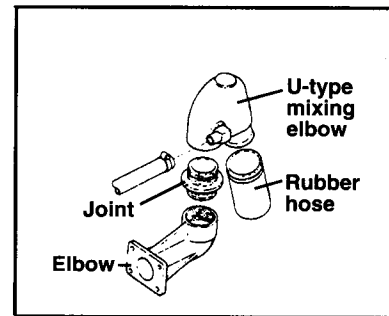
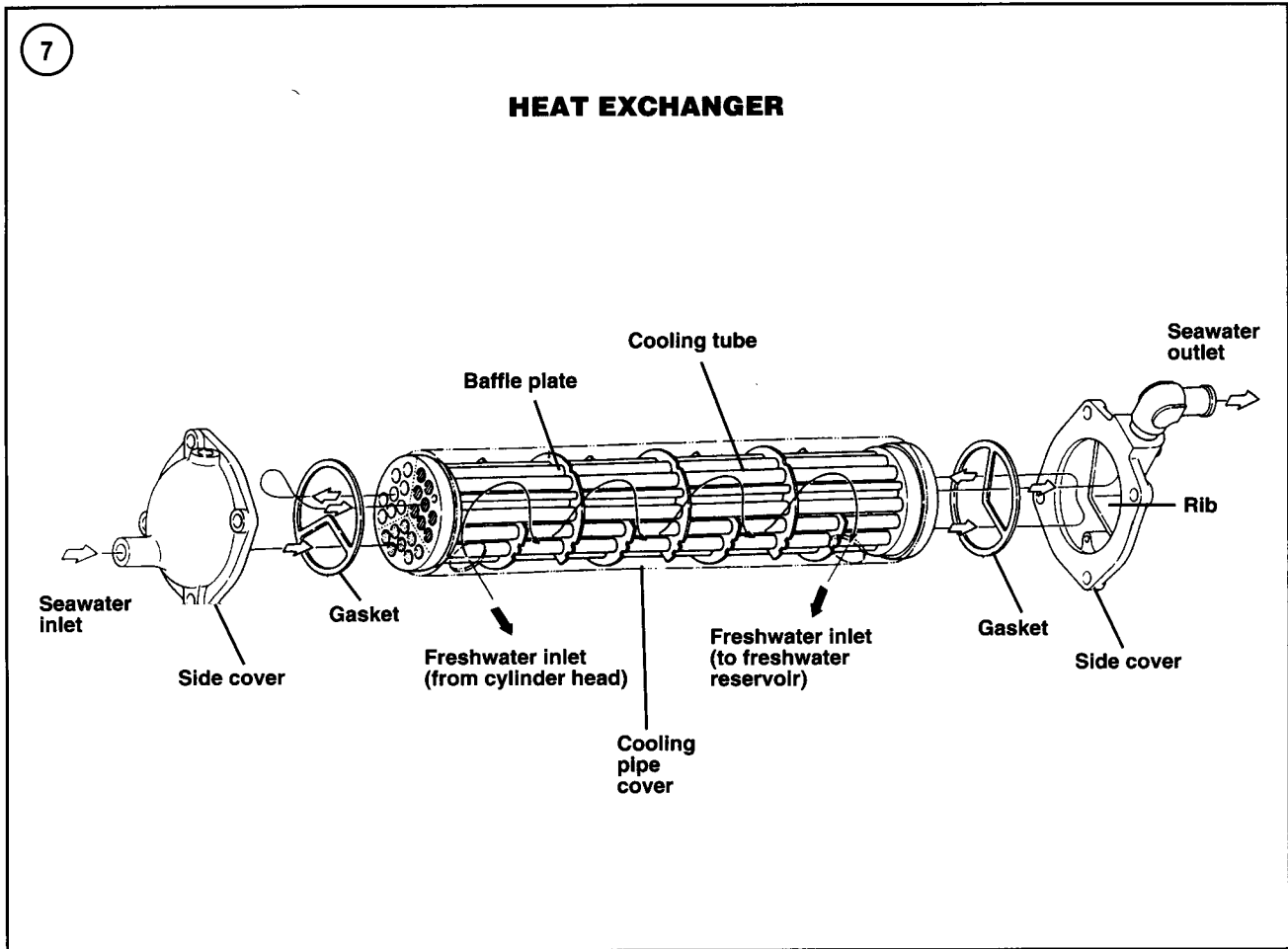


6

CLOSED COOLING SYSTEM (TYPICAL)





coolant travels to the heat exchanger, where the heat absorbed from engine operation passes through the parallel copper tubes to the water in the seawater system.

Engine cooling is thus accomplished without seawater entering the engine. This eliminates the corrosion, deposit buildup and debris accumulation that occurs in a standard cooling system, resulting in longer engine life—especially if the boat is used in saltwater.

Like an automotive cooling system, the freshwater section is pressurized at 13 psi. This raises the boiling point of the coolant to permit higher operating temperatures for increased engine efficiency.

A thermostat controls coolant circulation. When the thermostat closes, it prevents coolant from entering the heat exchanger, rerouting it back to the engine circulating pump. Once the thermostat opens, it closes off the passage to the circulating pump and sends the coolant through the heat exchanger before returning it to the engine pump. This provides quick engine warm-up and maintains a constant operating temperature.

THERMOSTAT

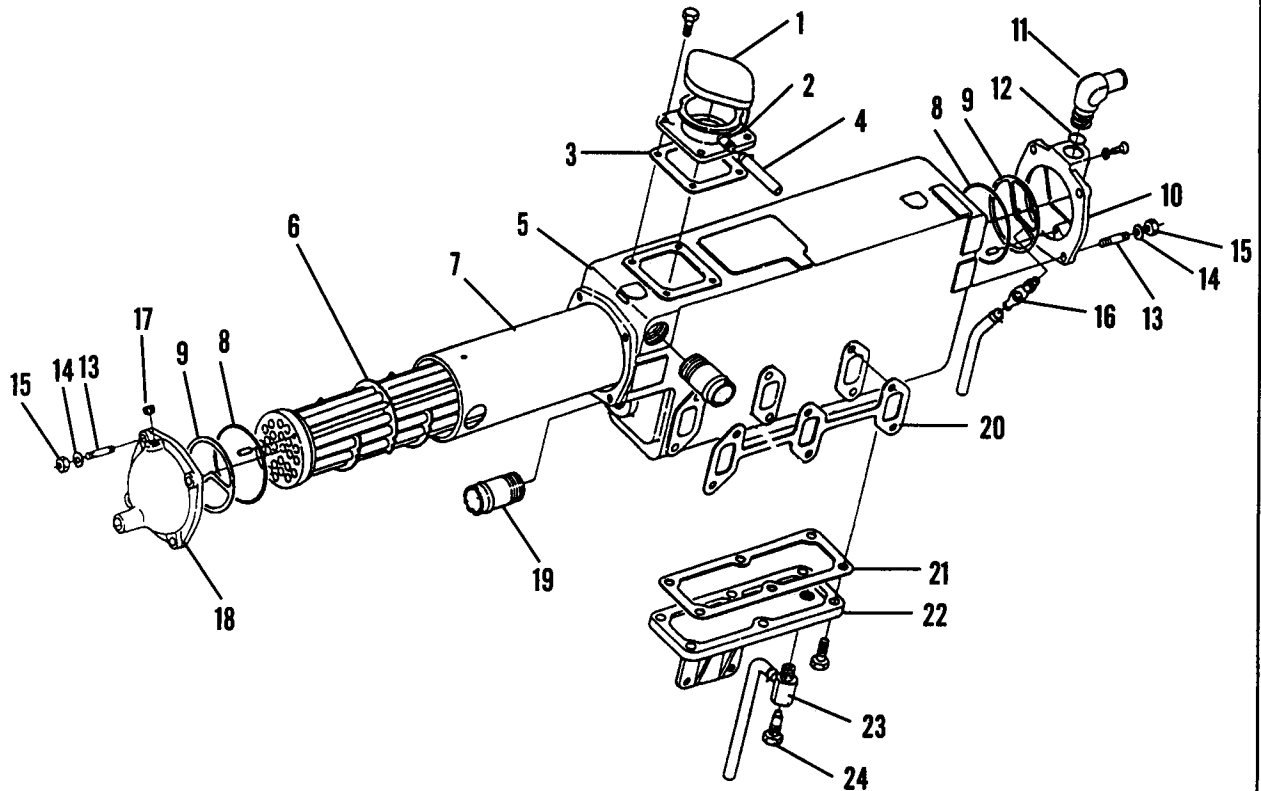
The thermostat blocks coolant flow to the exhaust manifold (standard cooling) or heat exchanger (closed cooling) when the engine is cold. As the engine warms, the thermostat gradually opens, allowing coolant to circulate through the system.

CAUTION

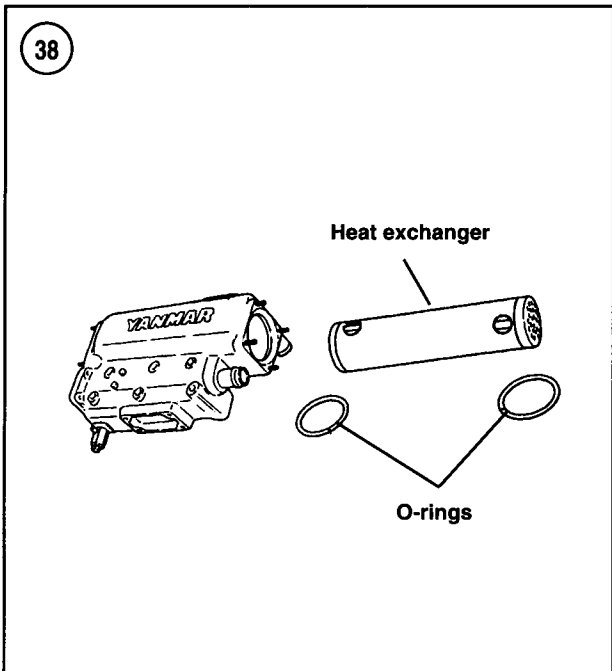
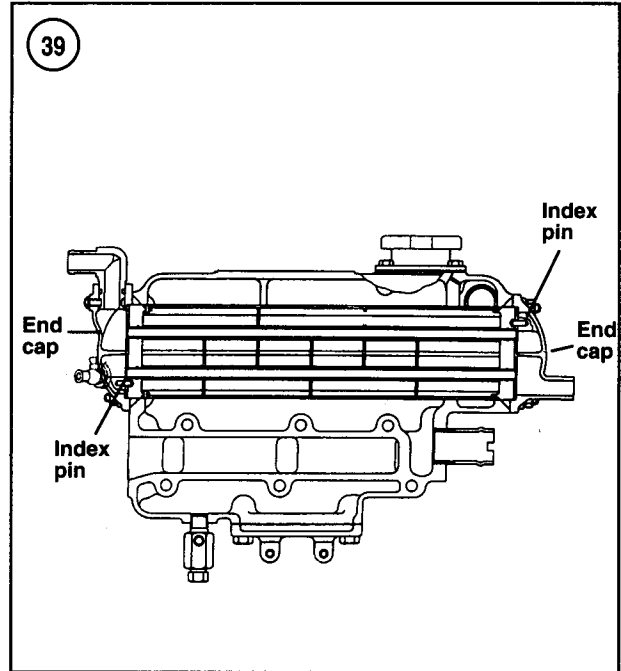
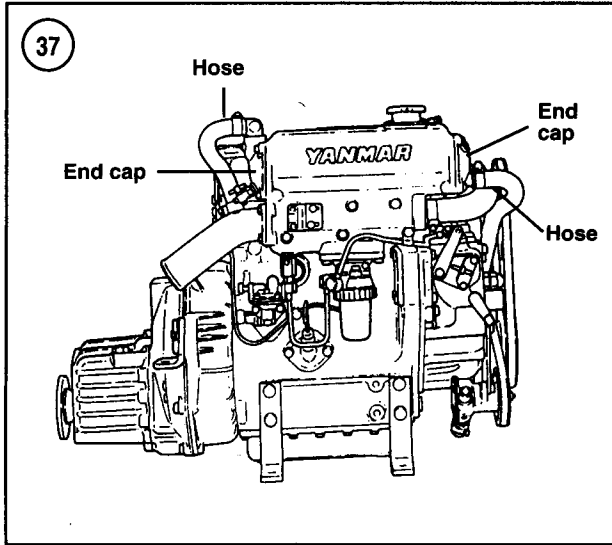
Do not operate the engine without a thermostat. This can lead to serious engine damage.

Thermostats are rated according to their opening temperature. The opening temperature value is stamped on the thermostat. The thermostat should start to open at the temperature stamped on the thermostat and should be fully open at 25° F (14° C) above that temperature. Check the thermostat rating after removing the thermostat and compare it to the specifications in **Table 2**.

36

FRESHWATER EXHAUST MANIFOLD/HEAT EXCHANGER

- | | |
|------------------------------------|-------------------|
| 1. Pressure cap | 13. Stud |
| 2. Filler neck | 14. Washer |
| 3. Gasket | 15. Nut |
| 4. Overflow tube | 16. Drain valve |
| 5. Exhaust manifold/heat exchanger | 17. Plug |
| 6. Heat exchanger core | 18. End cap |
| 7. Cover | 19. Fitting |
| 8. O-ring | 20. Gasket |
| 9. Gasket | 21. Gasket |
| 10. End cap | 22. Cover |
| 11. Elbow | 23. Drain fitting |
| 12. O-ring | 24. Drain valve |



heating. It is recommended to remove and clean the heat exchanger whenever the coolant is changed. Refer to **Figure 36**.

1. Drain both sections of the cooling system. Refer to Chapter Four. Loosen the hose clamps and disconnect the seawater inlet and outlet hoses from the end caps (**Figure 37**).
2. Remove the end cap retaining bolts.
3. Remove the heat exchanger end caps. Remove and discard the gaskets.

4. Remove the heat exchanger (**Figure 38**).

NOTE

If the heat exchanger is plugged or contains heavy scale deposits, take it to a marine dealership or automotive radiator repair shop for proper cleaning to avoid potential damage to the unit.

5. Clean all gasket residue from the end caps and heat exchanger sealing surfaces.
6. Insert an appropriate-size wire brush into each passage in the heat exchanger. Work the brush back and forth with a vigorous motion, but work carefully to avoid damage to the soldered joints.
7. Remove the brush, hold the heat exchanger vertically and blow loosened particles out with compressed air.
8. Repeat Step 6 and Step 7 as necessary to remove as much of the accumulated deposits as possible.
9. Reinstall the heat exchanger by reversing the removal procedure. Position the heat exchanger so the index pins (**Figure 39**) in both ends fit in the holes in the end caps.
10. Fill the freshwater section with coolant. Refer to Chapter Three. Start the engine and check for leaks.

SEAWATER COOLING SYSTEM MAINTENANCE

The only maintenance required for the seawater cooling system is periodic flushing. Refer to Chapter Three.