Operation

Coolant flow - Engine warm up
Refer to illustration.
☞ **COOLING SYSTEM - V8, DESCRIPTION AND OPERATION, Cooling system coolant flow.**

During warm-up the coolant pump moves fluid through the cylinder block and it emerges from the inlet manifold outlet pipe. From the outlet pipe, the warm coolant flow is prevented from flowing through the radiator because the thermostat is closed. The coolant is directed into the heater circuit.

Some coolant from the by-pass pipe can pass through small sensing holes in the flow valve. The warm coolant enters a tube in the thermostat housing and surrounds 90% of the thermostat sensitive area. Cold coolant returning from the radiator bottom hose conducts through 10% of the thermostat sensitive area. In cold ambient temperatures the engine temperature can be raised by up to 10°C (50°F) to compensate for the heat loss of the 10% exposure to the cold coolant returning from the radiator bottom hose.

At engine idle speed, the by-pass valve is closed only allowing the small flow through the sensing holes. As the engine speed increases above idle, the greater flow and pressure from the pump overcomes the light spring and opens the by-pass flow valve. The flow valve opens to meet the engines cooling needs at higher engine speeds and prevents excess pressure in the system. With the thermostat closed, maximum flow is directed through the heater circuit.

The heater matrix acts as a heat exchanger reducing coolant temperature as it passes through the matrix. Coolant emerges from the matrix and flows into the coolant pump feed pipe and recirculated around the heater circuit. In this condition the cooling system is operating at maximum heater performance.

Coolant flow - Engine hot
As the coolant temperature increases the thermostat opens. This allows some coolant from the outlet housing to flow through the top hose and into the radiator to be cooled. The hot coolant flows from the left tank in the radiator, along the tubes to the right tank. The air flowing through the fins between the tubes cools the coolant as it passes through the radiator.

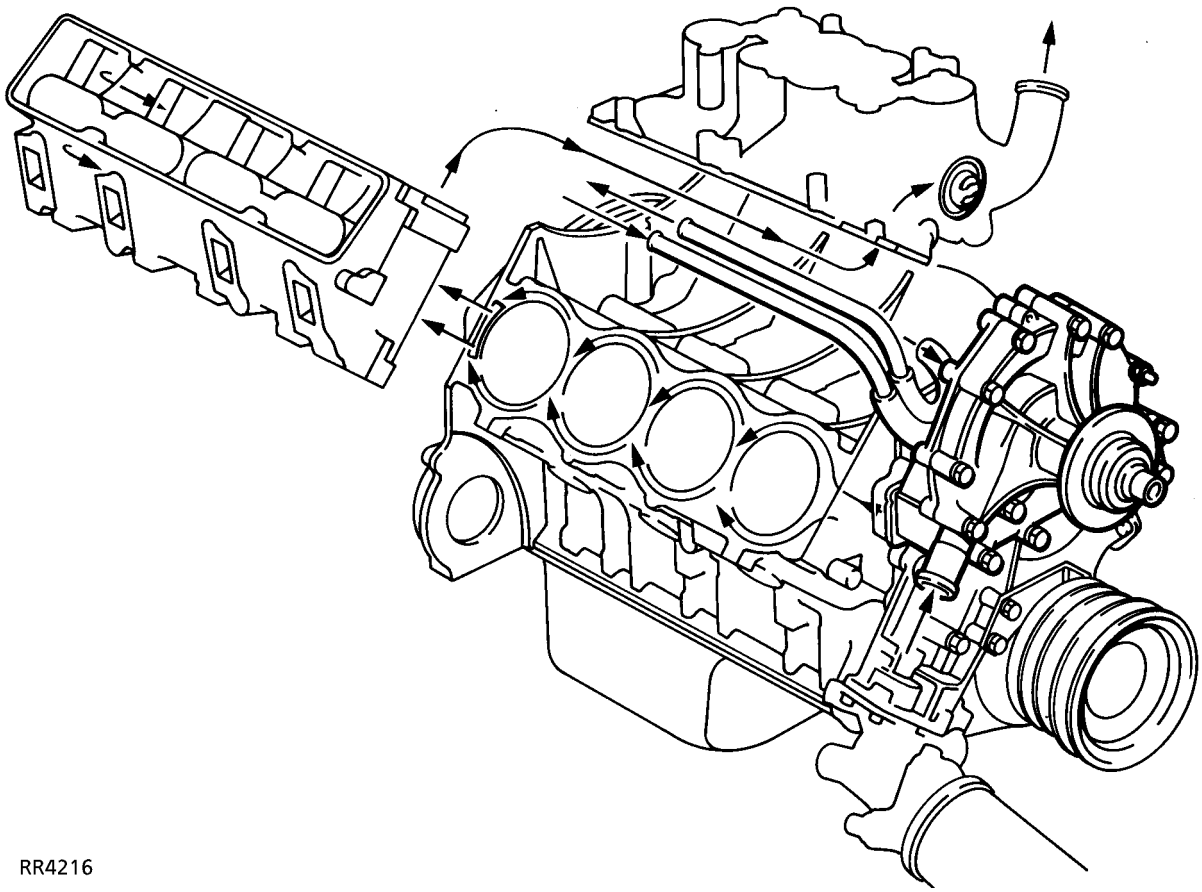
A controlled flow of the lower temperature coolant is drawn by the pump and blended with hot coolant from the by-pass and the heater return pipes in the pump feed pipe. The pump then passes this coolant into the cylinder block to cool the cylinders.

COOLANT CIRCULATION

Operation

When the engine is started from cold the thermostat prevents any coolant circulation through the radiator by closing off the top hose. During the engine warm up period, the water pump, pumps coolant around the cylinders to the rear of the cylinder block along the main galleries in both cylinder banks. At the rear of the cylinder block the coolant rises through a large port in each cylinder head/block joint face, and then flows forward to connect with ports at the front of the inlet manifold. From the manifold the coolant is carried by an external pipe to the heater unit and from the heater through another external pipe to the pump inlet.

The coolant circulation through the cylinder block and heads, does not change when normal running temperature is reached and the thermostat opens. But with the thermostat open, coolant flows through the top hose to the radiator where it is cooled and drawn back into the pump via the bottom hose.



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