1 General information and precautions

General information

The cooling system is of pressurized type, comprising a pump, an aluminum crossflow radiator, cooling fan, and a thermostat. The system functions as follows. Cold coolant from the radiator passes through the hose to the coolant pump where it is pumped around the cylinder block and head passages. After cooling the cylinder bores, combustion surfaces and valve seats, the coolant reaches the underside of the thermostat, which is initially closed. The coolant passes through the heater and is returned through the cylinder block to the coolant pump.

When the engine is cold the coolant circulates only through the cylinder block, cylinder head, expansion tank and heater. When the coolant reaches a predetermined temperature, the thermostat opens and the coolant passes through to the radiator. As the coolant circulates through the radiator it is cooled by the inrush of air when the car is in forward motion. Airflow is supplemented by the action of the cooling fan. Upon reaching the radiator, the coolant is now cooled and the cycle is repeated.

On M42 four-cylinder and all six-cylinder engines, the cooling fan is driven via a viscous coupling. The viscous coupling varies the fan speed, according to engine temperature. At low temperatures, the coupling provides very little resistance between the fan and pump pulley so only a slight amount of drive is transmitted to the cooling fan. As the temperature of the coupling increases, so does its internal resistance therefore increasing drive to the cooling fan.

1996 and later 3-Series models powered by an M44 four-cylinder engine coupled to a manual transmission, and all Z3 models powered by the M44 engine, use a two-speed electric fan mounted behind the radiator. The fan is activated by a thermostatic fan switch when the coolant temperature exceeds the low-speed or high-speed threshold.

Six-cylinder models are also equipped with a two-speed electric auxiliary cooling fan, which is mounted behind the bumper and grille, and in front of the A/C condenser. The auxiliary fan is primarily intended to help cool the radiator and condenser when the air conditioning system is running, but it is also switched on when coolant temperature is high. Two types of auxiliary fan have been used on six-cylinder 3-Series models: Type 1 (up to September 1992), and Type 2 (after September 1992). All six-cylinder Z3 models use the second type.

Refer to Section 11 for information on the air conditioning system.

Precautions

Warning:
Do not attempt to remove the expansion tank filler cap or disturb any part of the cooling system while the engine is hot, as there is a high risk of scalding. If the expansion tank filler cap must be removed before the engine and radiator have fully cooled (even though this is not recommended) the pressure in the cooling system must first be relieved. Cover the cap with a thick layer of cloth, to avoid scalding, and slowly unscrew the filler cap until a hissing sound can be heard. When the hissing has stopped, indicating that the pressure has reduced, slowly unscrew the filler cap until it can be removed; if more hissing sounds are heard, wait until they have stopped before unscrewing the cap completely. At all times keep well away from the filler cap opening.

Warning:
Do not allow antifreeze to come into contact with skin or painted surfaces of the vehicle. Rinse off spills immediately with plenty of water. Never leave antifreeze lying around in an open container or in a puddle in the driveway or on the garage floor. Children and pets are attracted by its sweet smell. Antifreeze can be fatal if ingested.

Warning:
Refer to Section 11 for precautions to be observed when working on models equipped with air conditioning.