

26	Cylinder head LH
27	Heater core

DESCRIPTION AND OPERATION > ENGINE COOLING - SYSTEM OPERATION AND COMPONENT DESCRIPTION

System Operation

Engine coolant flows primarily from the engine to the radiator circuit and back to the coolant pump. Coolant is sent from the coolant pump through the engine block and cylinder heads. A separate circuit from the engine also feeds the heater core and turbochargers with coolant. The coolant pump, operated by engine rotation through the accessory drive belt, circulates the coolant. The coolant thermostat is a control valve actuated by coolant temperature. When the thermostat is closed, coolant flow bypasses the radiator circuit and returns to the coolant pump. When the thermostat is opened, coolant flows through the radiator circuit to transfer engine-generated heat to the outside air.

On 3.5L GTDI (Gasoline Turbocharged Direct Injection) engines, a channel cover plate is located behind the front cover. It contains a timing chain idler and press in place gaskets separating engine coolant and engine oil. A weep hole is provided on the front left side of the engine behind the generator. If oil or coolant is leaking from the weep hole, then a gasket has failed and the channel cover plate must be replaced. Refer to the appropriate Engine article.

The engine uses a cold side thermostat. This means the thermostat is located at the lower radiator hose connection to the engine, where coolant enters the engine after being cooled by the radiator. During initial warm-up, the cooler coolant from the radiator quickly closes the thermostat after the warm coolant in the engine opens the thermostat slightly. The thermostat opens and closes several times before the coolant coming from the radiator is warm enough to allow the thermostat to remain open. The engine must run much longer than a vehicle with a hot side thermostat before the thermostat remains fully opened.

The degas bottle holds surplus coolant and removes air from the cooling system. It also allows for coolant expansion and system pressurization, replenishes coolant to the cooling system and serves as the location for service fill.

The thermostat monitor is a function of the PCM and is designed to verify correct thermostat operation. The monitor executes once per drive cycle and has a monitor run duration of 300-800 seconds. If a malfunction occurs, DTC P0125 or P0128 sets, and the MIL illuminates.

DESCRIPTION AND OPERATION > ENGINE COOLING - SYSTEM OPERATION AND COMPONENT DESCRIPTION > FAIL SAFE COOLING

A strategy called Fail Safe Cooling is built into the PCM that will control the engine if it starts to overheat.

Stage 1 of the strategy commences if the engine starts to overheat. The CHT sensor transmits a signal to the PCM, which moves the temperature gauge pointer into the red zone.

If the engine is not switched off and the temperature continues to rise, the Powertrain Check Lamp is illuminated. This indicates to the driver that the engine is approaching critical limits and should be stopped. At this point DTC P1285 is set in the PCM which can be retrieved using a scan tool.