

Normal operation and Fault Conditions

The engine cooling system maintains engine temperature during operation. Correct coolant flow through the engine, radiator and remainder of cooling system passages and components is essential to maintaining a correct engine temperature.

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 head. A separate circuit from the engine also feeds the heater core with coolant. The coolant pump 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 in order to transfer engine generated heat to the outside air.

Concerns of engine inability to reach normal operating temperature typically occur when the rate of coolant flow through some coolant circuits (radiator, heater core) is more than expected given the conditions. Heat is not allowed to build in the engine because a heat exchanger is removing too much heat, including the radiator, heater core and oil cooler. In addition, perceived concerns that the engine does not reach normal operating temperature can be related to a low coolant level or trapped air which does not allow for hot coolant to be available at the heater core, an inoperative climate control system, or for concerns perceived or related to an incorrect engine temperature gauge indication.

Possible Sources

- Low coolant level
- Thermostat
- Temperature gauge
- CHT

Diagnostic Trouble Code (DTC) Fault Trigger Conditions

DTC	Description	Fault Trigger Conditions
P0125	Insufficient Coolant Temp for Closed Loop Fuel Control	Sets in the PCM when the CHT sensor has not achieved the required temperature level to enter closed loop operating conditions within a specified amount of time after starting the engine.
P0128	Coolant Thermostat (Coolant Temp Below Thermostat Regulating Temperature)	Sets in the PCM when the thermostat monitor has not achieved the required engine operating temperature within a specified amount of time after starting the engine.

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 **WARNING:** Always allow the engine to cool before opening the cooling system. Do not unscrew the coolant pressure relief cap when the engine is operating or the cooling system is hot. The cooling system is under pressure; steam and hot liquid can come out forcefully when the cap is loosened slightly. Failure to follow these instructions may result in serious personal injury.

C1 CARRY OUT INSPECTION AND VERIFICATION

Carry out the Inspection and Verification .

Were any concerns found?

Yes	REPAIR as needed.
No	GO to C2

C2 CHECK FOR DTC P0125 OR P0128

Using a scan tool, perform the PCM self-test.

Is DTC P0125 or P0128 present?

Yes	GO to C3
No	The cooling system is operational. If an inoperative temperature gauge is suspected, CHECK the temperature gauge operation. REFER to: Instrumentation, Message Center and Warning Chimes . If an inoperative climate control system is suspected, CHECK the climate control system operation. For Dual Automatic Temperature Control (DATC), REFER to: Climate Control System - Vehicles With: Dual Automatic Temperature Control (DATC) . For Electronic Manual Temperature control (EMTC), REFER to: Climate Control System - Vehicles With: Electronic Manual Temperature Control (EMTC) . If any other Diagnostic Trouble Codes (DTCs) are retrieved, REFER to: ELECTRONIC ENGINE CONTROLS - 5.0L 32V Ti-VCT/5.0L Ti-VCT V8 (308kW/418PS).



NOTE: Allow the engine to cool before checking the coolant expansion tank.

C3 CHECK THE COOLANT LEVEL

Visually check the engine coolant level in the coolant expansion tank

Is the engine coolant level within specification?

Yes	INSTALL a new thermostat. REFER to: Thermostat . CLEAR Diagnostic Trouble Codes (DTCs). If the DTC returns check for correct CHT sensor operation.
No	GO to Pinpoint Test A