Published: Dec 17, 2007

Engine Cooling

Inspection and verification

1 . Verify the customer concern.

2 . Visually inspect for obvious mechanical or electrical faults.

Mechanical	Electrical
• Coolant leaks • Coolant Hoses • Coolant expansion tank • Radiator • Heater core • Accessory drive belt • Viscous fan	• Fuses • Harnesses • Loose or corroded connector(s) • Engine coolant temperature (ECT) sensor

3 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4 . Use the approved diagnostic system or a scan tool to retrieve any diagnostic trouble codes (DTCs) before moving onto the symptom chart or DTC index.

Make sure that all DTCs are cleared following rectification

Symptom chart

Symptom	Possible cause	Action
Coolant loss	• Hoses • Hose connections • Radiator • Water pump • Heater core • Gaskets • Engine casting cracks • Engine block core plugs	Carry out a visual inspection. If there are no obvious leaks, carry out a pressure test using your workshop tester. Rectify as necessary. Refer to the relevant section of the workshop manual.
Overheating	• Low/Contaminated coolant • Thermostat • Viscous fan • ECT sensor • Restricted air flow over the radiator	Check the coolant level and condition. Check the thermostat and rectify as necessary. Carry out a cooling system pressure test. Refer to the relevant section of the workshop manual. Check the viscous fan operation, make sure the viscous fan rotates freely. Check for obstructions to the air flow over the radiator.
Engine not reaching normal temperature	• Thermostat • Viscous fan • Thermostat • Electric fan • Fan speed module	Check the thermostat operation. Check the viscous fan operation, make sure the viscous fan is not seized.

DTC index

DTC	Description	Possible causes	Action
P011600	Engine Coolant Temperature Sensor 1 Circuit Range/Performance	• Engine coolant temperature (ECT) sensor circuit high resistance • ECT sensor circuit short circuit to ground • ECT sensor circuit short circuit to power • ECT sensor failure	Check the ECT sensor and circuits. Refer to the electrical guides. With the engine cold, read the coolant temperature sensor using a data logger function and start the engine. Record the value and allow the engine to idle for 20 minutes. After 20 minutes, recheck the value. If the value has not increased by more than 10°C, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.
P011700	Engine Coolant Temperature Sensor 1 Circuit Low	• ECT sensor disconnected • Engine coolant temperature (ECT) sensor sensing circuit high resistance, short circuit to power • ECT sensor failure	Refer to the guided diagnostic routine for this code on the approved diagnostic system.
P011800	Engine Coolant Temperature Sensor 1 Circuit High	• Engine overheat condition/cooling fan failure • ECT sensor wiring short circuit to ground • ECT sensor failure	Check the coolant level and the thermostat operation (stuck closed). Check for cooling fan DTCs. Refer to the guided diagnostic routine for this code on the approved diagnostic system.
P011900	Engine Coolant Temperature Sensor 1 Circuit Intermittent/Erratic	• Engine coolant temperature (ECT) sensor circuit high resistance • ECT sensor circuit short circuit to ground • ECT sensor circuit short circuit to power • ECT sensor failure	Check the ECT sensor and circuits. Refer to the electrical guides. With the engine cold, read the coolant temperature sensor using a data logger function and start the engine. Record the value and allow the engine to idle for 20 minutes. After 20 minutes, recheck the value. If the value has not increased by more than 10°C, install a new sensor. Refer to the relevant section of the workshop manual. Clear the DTCs and test for normal operation.