DTC	P0116	ENGINE COOLANT TEMPERATURE CIRCUIT RANGE/PERFORMANCE PROBLEM

CIRCUIT DESCRIPTION

Refer to DTC P0115 on page .

DTC No.	DTC Detection Condition	Trouble Area
P0116	If the engine coolant temperature (ECT) was between 35°C (95°F) and 60°C (140°F) when starting the engine, and conditions (a) and (b) are met (2 trip detection logic): (a) Vehicle is driven at varying speeds (acceleration and deceleration) for more than 250 seconds (b) ECT remains within 3°C (5.4°F) of the engine starting temperature	• Engine coolant temperature sensor
P0116	If the engine coolant temperature was more than 60 °C (140 °F) at engine start, and conditions (a) and (b) are met (6 trip detection logic): (a) Vehicle is driven at varying speeds (under acceleration and deceleration) (b) Engine coolant temperature remains within 1 °C (1.8 °F) of the engine starting temperature, and this is successively recorded 6 times	• Engine coolant temperature sensor

MONITOR DESCRIPTION

The engine coolant temperature (ECT) sensor is used to monitor the engine coolant temperature. The ECT sensor has a thermistor that varies its resistance depending on the temperature of the engine coolant. When the coolant temperature is low, the resistance in the thermistor increases. When the temperature is high, the resistance drops. The variations in resistance are reflected in the voltage output from the sensor. The ECM monitors the sensor voltage and uses this value to calculate the engine coolant temperature. When the sensor output voltage deviates from the normal operating range, the ECM interprets this as a fault in the ECT sensor and sets a DTC.

Examples:

1) Upon starting the engine, the coolant temperature (ECT) was between 35°C (95°F) and 60°C (140°F). If after driving for 250 seconds, the ECT still remains within 3°C (5.4°F) of the staring temperature, a DTC will be set (2 trip detection logic).

2) Upon starting the engine, the coolant temperature (ECT) was over 60°C (140°F). If, after driving for 250 seconds, the ECT still remains within 1°C (1.8°F) of the starting temperature, a DTC will be set (6 trip detection logic).

MONITOR STRATEGY

Related DTCs	P0116: Engine coolant temperature sensor range check (stuck)
Required sensors/components	Main sensors: Engine coolant temperature sensor Related sensors: Intake air temperature sensor, crankshaft position sensor,mass air flow meter
Frequency of operation	Continuous
Duration	250 seconds
MIL operation	2 driving cycles: when temperature is fixed between 35°C (95°F) and 60°C (140°F) 6 driving cycles: when temperature is fixed at 60°C (140°F) or more
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

Case 1

The monitor will run whenever the following DTCs are not present	See page 05–20
Cumulative idle off period	250 seconds or more
Speed increase by ≧ 19 mph (30 km/h)	10 times or more
Engine coolant temperature	35°C (95°F) or more, and less than 60°C (140°F)
Intake air temperature	–6.7°C (20°F) or more

Case 2

Engine coolant temperature	60°C (140°F) or more
Intake air temperature	–6.7°C (20°F) or more
Stop and go	Stop for 20 seconds or more and accelerate to more than 43.5 mph (70 km/h)
44 mph (70 km/h) in less than 40 seconds	Decelerate from 40.4 mph (65 km/h) to 1.86 mph (3 km/h) within 35 seconds and stop for 10seconds

TYPICAL MALFUNCTION THRESHOLDS

Case 1

When temperature is fixed between 35°C (95°F) and 60°C (140°F)

Change of engine coolant temperature value	Less than 3°C (5.4°F)

Case 2

When temperature is fixed at 60°C (140°F) or more

Change of engine coolant temperature value	1°C (1.8°F) or less

COMPONENT OPERATING RANGE

Engine coolant temperature	Changing with the actual engine coolant temperature

WIRING DIAGRAM

Refer to DTC P0115 on page 05–103.

INSPECTION PROCEDURE

HINT:
- If DTCs P0115, P0116, P0117, P0118 and P0125 are output simultaneously, engine coolant temperature sensor circuit may be open or short. Perform troubleshooting on DTC P0115, P0117 or P0118 first.
- Read freeze frame data using the hand−held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.

REPLACE ENGINE COOLANT TEMPERATURE SENSOR