DTC	P0116	ENGINE COOLANT TEMP. CIRCUIT RANGE/PERFORMANCE PROBLEM

CIRCUIT DESCRIPTION

Refer to DTC P0115 on page 05–80.

DTC No.	DTC Detection Condition	Trouble Area
P0116	If engine coolant temperature (ECT) was between 35°C (95°F) and 60°C (140°F) when starting the engine, and also conditions (a) and (b) are met: (a) Vehicle has run with acceleration and deceleration (b) ETC still remains within 3°C (5.4°F) of the starting temperature (2 trip detection logic) If engine coolant temperature (ECT) was more than 60°C when starting the engine, and also conditions (a) and (b) are met: (a) Vehicle has run with acceleration and deceleration (b) ECT still remains within 1°C (1.8°F) of the starting temperature (6 trip detection logic)	• 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 sensor	
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

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of Disable a Monitor" (On page 05–25)	
Case 1 (when temperature is fixed between 35°C (95°F) and 60°C (140°F)):		
Cumulative idle off period	250 seconds	–
Speed increased more than 19 mph (30 km/h)	10 times	–
Engine coolant temperature	35°C (95°F)	60°C (140°F)
Intake air temperature	−6.7°C (20°F)	–
Case 2 (When temperature is fixed at 60°C (140°F) or more):		
Engine coolant temperature	60°C (140°F)	104.4°C (220°F)
Intake air temperature	−6.7°C (20°F)	–
Stop and go	Stop for 20 seconds or more and accelerate to more than 44 mph (70 km/h)	
44 mph (70 km/h) in less than 40 seconds	Decrease from 40 mph (65 km/h) to 2 mph (3 km/h) in 35 seconds and stop for 10 seconds	

TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Case1 (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)
Case2 (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

Parameter	Standard Value
Engine coolant temperature (ECT) sensor's output	Indicating the same temperature as the actual ECT

WIRING DIAGRAM

Refer to DTC P0115 on page 05–80.

INSPECTION PROCEDURE

HINT:
- If DTCs P0115, P0116, P0117, P0118 and P0125 are output simultaneously, the engine coolant temperature sensor circuit may be open or short. Perform the troubleshooting of 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, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air−fuel ratio was lean or rich, etc. at the time of the malfunction.

REPLACE ENGINE COOLANT TEMPERATURE SENSOR