

DTC	P0116	ENGINE COOLANT TEMP. CIRCUIT RANGE/PERFORMANCE PROBLEM
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CIRCUIT DESCRIPTION

Refer to DTC P0115 on page [05-77](#).

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 also conditions (a) and (b) are met: (a) Vehicle has run with acceleration and deceleration for more than 250 second (b) ECT still remains within 3°C (37.4°F) of the initial temperature (2 trip detection logic)	• Engine coolant temperature sensor
	If the engine coolant temperature (ECT) was more than 60°C (140°F) when starting the engine, and also conditions (a) and (b) are met: (a) Vehicle has run with acceleration and deceleration for more than 250 second (b) ECT still remains within 1°C (33.8°F) of the initial temperature (6 trip detection logic)	

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 starting 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 sec	
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" table (On page 05-24)	
Case 1 (when temperature is fixed between 35°C (95°F) and 60°C (140°F)):		
Cumulative idle off period	250 sec	–
Speed increase by \geq 30 km/h (19 mph)	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 sec or more and accelerate to more than 44 mph (70 km/h)	
70 km/h (44 mph) in less than 40 sec	Decelerate from 40 mph (65 km/h) to 2 mph (3 km/h) within 35 sec and stop for 10sec	

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

Standard Value
Engine coolant temperature changes with the actual engine coolant temperature

WIRING DIAGRAM

Refer to DTC P0115 on page 05-77.

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 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.

1	REPLACE ENGINE COOLANT TEMPERATURE SENSOR
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