

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

Refer to DTC P0115 on page [05-98](#).

DTC No.	DTC Detection Condition	Trouble Area
P0116	If ECT is between 35°C (95°F) and 60°C (140°F) when engine is started, and if conditions (a) and (b) are met: (a) Vehicle has accelerated and decelerated (b) ECT remains within 3°C (5.4°F) of the initial engine coolant temperature (2 trip detection logic)	<ul style="list-style-type: none"> • Cooling system • ECT sensor
	<ul style="list-style-type: none"> • If ECT is more than 60°C (140°F) when engine is started and vehicle has accelerated and decelerated • If the ECT sensor records a temperature variation below 1°C (1.8°F) successively 6 times (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 ECT is 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 ECT is 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: ECT Sensor Stuck at Low ECT P0116: ECT Sensor Stuck at High ECT
Required sensors/ components (Main)	ECT sensor
Required sensors/ components (Related)	Crankshaft position sensor, IAT sensor, MAF meter
Frequency of operation	Continuous
Duration	1 second: ECT Sensor Stuck at Low ECT 0.032 seconds: ECT Sensor Stuck at High ECT
MIL operation	2 driving cycles: ECT Sensor Stuck at Low ECT 6 driving cycles: ECT Sensor Stuck at High ECT
Sequence operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever this DTC is not present	See page 05-16
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ECT Sensor Stuck at Low ECT:

Cumulative idle off period	4 minutes and 10 seconds or more
Speed increase by 18.6 mph (30 km/h) or more	10 times or more
ECT	35 to 60°C (95 to 140°F)
IAT	-6.7°C (20°F) or more

ECT Sensor Stuck at High ECT:

ECT	60°C (140°F) or more
IAT	-6.7°C (20°F) or more
"Stop and go"* ¹	Once or more
"Steady driving and stop"* ²	Once or more Engine running and time after engine start \geq 0.3 seconds

*¹ Vehicle is stopped for 20 seconds or more and accelerated to more than 43.5 mph (70 km/h) within 40 seconds.

*² Vehicle is driven by 40.4 mph (65 km/h) or more for 30 seconds or more and the vehicle speed reaches 43.5 mph (70 km/h). The vehicle is decelerated from 40.4 mph (65 km/h) to 1.86 mph (3 km/h) or less within 35 seconds and stopped for 10 seconds.

TYPICAL MALFUNCTION THRESHOLDS**ECT Sensor Stuck at Low ECT:**

ECT change	Less than 3°C (5.4°F)
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ECT sensor Stuck at High ECT:

ECT change	1°C (1.8°F) or less
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COMPONENT OPERATING RANGE

ECT	Varies with actual ECT
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INSPECTION PROCEDURE**HINT:**

- If DTCs P0115, P0116, P0117, P0118 and P0125 are output simultaneously, ECT sensor circuit may be open or shorted. 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, 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