

<b>DTC</b>	<b>P0116</b>	<b>Engine Coolant Temperature Circuit Range / Performance Problem</b>
------------	--------------	---

**DESCRIPTION**

Refer to DTC P0115 (See page [ES-102](#)).

DTC No.	DTC Detection Condition	Trouble Area
P0116	Case 1: Engine Coolant Temperature (ECT) between 35°C and 60°C (95°F and 140°F) when engine started, and conditions (a) and (b) met (2 trip detection logic): (a) Vehicle driven at varying speeds (accelerated and decelerated) (b) ECT remains within 3°C (5.4°F) of initial ECT Case 2: ECT more than 60°C (140°F) when engine started, and conditions (a) and (b) met (6 trip detection logic): (a) Vehicle driven at varying speeds (accelerated and decelerated) (b) ECT measurements remain within 1°C (1.8°F) of initial ECT on 6 successive occasions	<ul style="list-style-type: none"> <li>• ECT sensor</li> </ul>

**ES****MONITOR DESCRIPTION**

The ECT sensor is used to monitor the ECT. The ECT sensor has a built-in thermistor with a resistance that varies according to the temperature of the engine coolant. When the ECT is low, the resistance of the thermistor increases. When the temperature is high, the resistance drops. These variations in the resistance are reflected in the voltage output from the ECT sensor. The ECM monitors the sensor voltage and uses this value to calculate the ECT. If the sensor voltage output deviates from the normal operating range, the ECM interprets this deviation as a malfunction in the ECT sensor and sets the DTC.

Examples:

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

**MONITOR STRATEGY**

Related DTCs	P0116: Engine coolant temperature sensor output stuck at low engine coolant temperature P0116: Engine coolant temperature sensor output stuck at high engine coolant temperature
Required Sensors/Components (Main)	ECT sensor
Required Sensors/Components (Related)	Crankshaft position sensor, IAT sensor, MAF meter
Frequency of Operation	Continuous
Duration	1 second
MIL Operation	2 driving cycles: ECT sensor stuck (low ECT) 6 driving cycles: ECT sensor stuck (high ECT)
Sequence of Operation	None

**TYPICAL ENABLING CONDITIONS**

Monitor runs whenever following DTCs not present	P0100 - P0103 (MAF meter)
--	---------------------------

**ECT sensor stuck (low ECT):**

Cumulative idle off period	250 seconds or more
Speed increase of 30 km/h (19 mph) 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 (high ECT):**

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

**HINT:**

\*1: Vehicle is stopped for 20 seconds or more and accelerated to more than 70 km/h (44 mph) within 40 seconds.

\*2: Follow these steps: 1) vehicle is driven at 65 km/h (40 mph) or more for 30 seconds or more and the vehicle speed reaches 70 km/h (44 mph); 2) vehicle is decelerated from 65 km/h (40 mph) to 3 km/h (2 mph) or less within 35 seconds; and 3) vehicle is stopped for 10 seconds.

**TYPICAL MALFUNCTION THRESHOLDS****ECT sensor stuck (low ECT):**

ECT change	Less than 3°C (5.4°F)
------------	-----------------------

**ECT sensor stuck (high ECT):**

ECT change	1°C (1.8°F) or less
------------	---------------------

**COMPONENT OPERATING RANGE**

ECT	Varies with actual ECT
-----	------------------------

**WIRING DIAGRAM**

Refer to DTC P0115 (See page [ES-103](#)).

**HINT:**

- If any of DTCs P0115, P0117, P0118 or P0125 are set simultaneously with DTC P0116, the ECT sensor may have an open or a short circuit. Troubleshoot those DTCs first.
- Read freeze frame data using the intelligent tester. 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.

**1****CHECK ANY OTHER DTC OUTPUT (IN ADDITION TO DTC P0116)**

- Connect a intelligent tester to the DLC3.
- Turn the ignition switch to ON.
- Turn the tester ON.
- Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- Read DTCs.

**Result**

Display (DTC output)	Proceed to
P0116 and other DTCs	B
P0116	A

HINT:  
If any DTCs other than P0116 are output, troubleshoot those DTCs first.

**B**  **GO TO DTC CHART**

**A**

**REPLACE ENGINE COOLANT TEMPERATURE SENSOR**