

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

Refer to DTC P0115 (see page [ES-105](#)).

DTC No.	DTC Detection Conditions	Trouble Areas
P0116	When either of following conditions met (2 trip detection logic): <ul style="list-style-type: none"> <li>When cold engine started and engine warmed up, Engine Coolant Temperature (ECT) sensor value does not change.</li> <li>After warmed up engine started, ECT sensor value does not change when engine stopped and then next cold engine start performed.</li> </ul>	<ul style="list-style-type: none"> <li>Thermostat</li> <li>ECT sensor</li> </ul>

**MONITOR DESCRIPTION****Engine coolant temperature (ECT) sensor cold start monitor**

When a cold engine start is performed and then the engine is warmed up, if the ECT sensor value does not change, it is determined that a malfunction has occurred. If this is detected in 2 consecutive driving cycles, the MIL is illuminated and a DTC is set.

**ECT sensor soak monitor**

After a warmed up engine is started, if the ECT sensor value does not change when the engine is stopped and then the next cold engine start is performed, it is determined that a malfunction has occurred. If this is detected in 2 consecutive driving cycles, the MIL is illuminated and a DTC is set.

**MONITOR STRATEGY**

Related DTCs	P0116: Engine coolant temperature (ECT) sensor cold start monitor P0116: ECT sensor soak monitor
Required Sensors/Components (Main)	ECT sensor
Required Sensors/Components (Related)	None
Frequency of Operation	Once per driving cycle
Duration	5 hours or more
MIL Operation	2 driving cycles
Sequence of Operation	None

**TYPICAL ENABLING CONDITIONS****ECT Sensor cold start monitor:**

Monitor runs whenever following DTCs not present	P0100 to P0103: Mass Air Flow (MAF) meter P0110 to P0113: Intake Air Temperature (IAT) sensor
Battery voltage	10.5 V or more
Time after engine start	1 second or more
ECT at engine start	Less than 60°C (140°F)
IAT sensor circuit	OK
Soak time	5 hours or more
Accumulated MAF	604.75 g or more
Engine	Running
Fuel cut	OFF
Difference between ECT at engine start and IAT	Less than 40°C (72°F)

**ECT Sensor soak monitor:**

Monitor runs whenever following DTCs not present	P0100 to P0103: MAF meter P0110 to P0113: IAT sensor
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Battery voltage	10.5 V or more
Engine	Running
Soak time	5 hours or more
Either (a) or (b) condition met	-
(a) ECT	60°C (140°F) or more
(b) Accumulated MAF	1128.55 g or more

## TYPICAL MALFUNCTION THRESHOLDS

### ECT Sensor cold start monitor:

ECT sensor value change	Less than 5°C (9°F)
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### ECT Sensor soak monitor:

Difference between current ECT sensor value and previous ECT sensor value when engine stopped	Less than 5°C (9°F)
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## COMPONENT OPERATING RANGE

ECT	ECT sensor value changes in accordance with actual ECT
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## INSPECTION PROCEDURE

### 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 condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, 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 DTCs OUTPUT (IN ADDITION TO DTC P0116)

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

### Result

Display (DTC Output)	Proceed To
P0116	A
P0116 and other DTCs	B

B

GO TO DTC CHART

A

### 2 INSPECT THERMOSTAT

- Remove the thermostat (see page [CO-15](#)).
- Measure the valve opening temperature of the thermostat.

**Standard value:**

**80°C to 84°C (176°F to 183°F)**

HINT:

In addition to the above check, confirm that the valve is completely closed when the temperature is below the standard.

- (c) Reinstall the thermostat (see page [CO-15](#)).

**NG**

**REPLACE THERMOSTAT**

**OK**

**ES**

**REPLACE ENGINE COOLANT TEMPERATURE SENSOR**