

DTC	P0115	Engine Coolant Temperature Circuit
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DTC	P0117	Engine Coolant Temperature Circuit Low Input
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DTC	P0118	Engine Coolant Temperature Circuit High Input
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CIRCUIT DESCRIPTION

A thermistor is built in the Engine Coolant Temperature (ECT) sensor and changes the resistance value according to the engine coolant temperature.

The structure of the sensor and connection to the ECM is the same the Intake Air Temperature (IAT) sensor.

HINT:

If the ECM detects the DTC "P0115, P0117 or P0118", it operates the fail-safe function in which the ECT is assumed to be 80 °C (176 °F).

DTC No.	Proceed to	DTC Detection Condition	Trouble Area
P0115	Step 1	Open or short in engine coolant temperature sensor circuit for 0.5 sec.	• Open or short in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM
P0117	Step 4	Short in engine coolant temperature sensor circuit for 0.5 sec.	
P0118	Step 2	Open in engine coolant temperature sensor circuit for 0.5 sec.	

HINT:

After confirming DTC "P0115, P0117 or P0118," use the OBD II scan tool or the hand-held tester to confirm the engine coolant temperature from the DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL.

Temperature Displayed	Malfunction
–40°C (–40°F)	Open circuit
140°C (284°F) or more	Short circuit

MONITOR DESCRIPTION

The ECT (Engine Coolant Temperature) 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.

Example:

When the ECM calculates that the ECT is less than –40°C (–40°F), or more than 140°C (284°F), and if either the condition continues for 0.5 sec. or more, the ECM will set a DTC.

MONITOR STRATEGY

Related DTCs	P0115	Engine coolant temperature sensor range check (Fluttering)
	P0117	Engine coolant temperature sensor range check (Low resistance)
	P0118	Engine coolant temperature sensor range check (High resistance)
Required sensors/components	Engine coolant temperature sensor	
Frequency of operation	Continuous	
Duration	0.5 sec.	
MIL operation	Immediate	
Sequence of operation	None	

TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page DI-3)
The typical enabling condition is not available	–

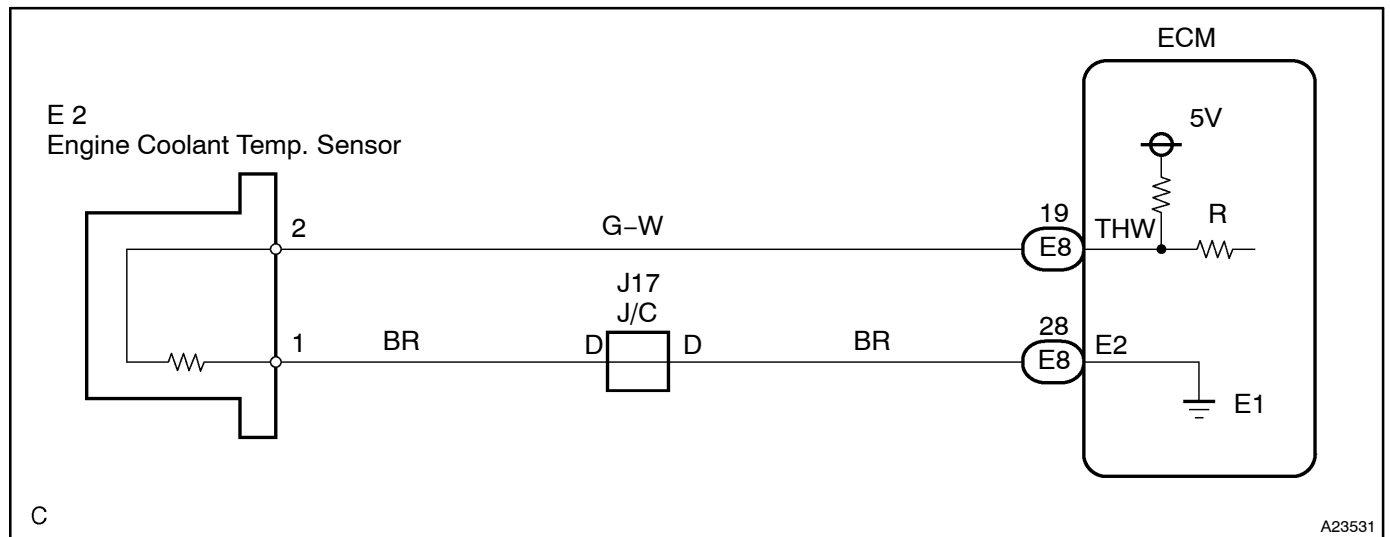
TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
P0115:	
Engine coolant temperature sensor resistance (Coolant temperature)	Less than 79 Ω or more than 156 kΩ (More than 140°C (284°F) or less than –40°C (–40°F))
P0117:	
Engine coolant temperature sensor resistance (Coolant temperature)	Less than 79 Ω (More than 140°C (284°F))
P0118:	
Engine coolant temperature sensor resistance (Coolant temperature)	More than 156 kΩ (Less than –40°C (–40°F))

COMPONENT OPERATING RANGE

Parameter	Standard Value
Engine coolant temperature sensor resistance	79 Ω (140°C (284°F)) to 156 kΩ (–40°C (–40°F))

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs related to different system that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- 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.

1	Connect OBD II scan tool or hand-held tester, and read value of engine coolant temperature.
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PREPARATION:

- (a) Connect the OBD II scan tool or the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the OBD II scan tool or hand-held tester main switch ON.
- (c) When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.

CHECK:

Read the temperature value on the OBD II scan tool or the hand-held tester.

OK:

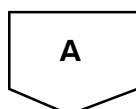
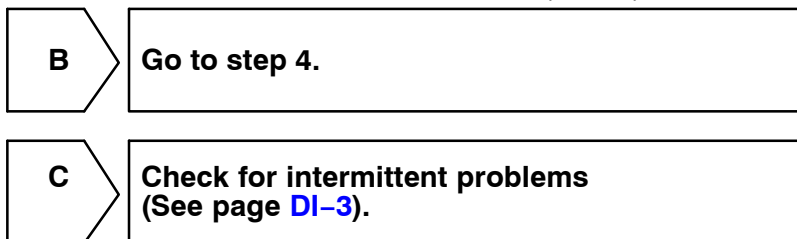
Same value as actual engine coolant temperature.

RESULT:

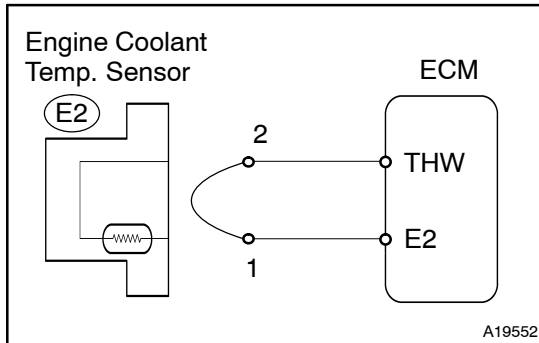
Temperature Displayed	Proceed to
-40°C (-40°F)	A
140°C (284°F) or more	B
OK (Same as present temperature)	C

HINT:

- If there is an open circuit, OBD II scan tool or hand-held tester indicates -40°C (-40°F).
- If there is a short circuit, OBD II scan tool or hand-held tester indicates 140°C (284°F) or more.



2 Check for open in harness or ECM.



PREPARATION:

- Disconnect the E2 engine coolant temperature (ECT) sensor connector.
- Connect terminals 1 and 2 of the engine coolant temperature sensor wire harness side connector.
- Turn the ignition switch ON.
- When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.

CHECK:

Read the temperature value on the OBD II scan tool or the hand-held tester.

OK:

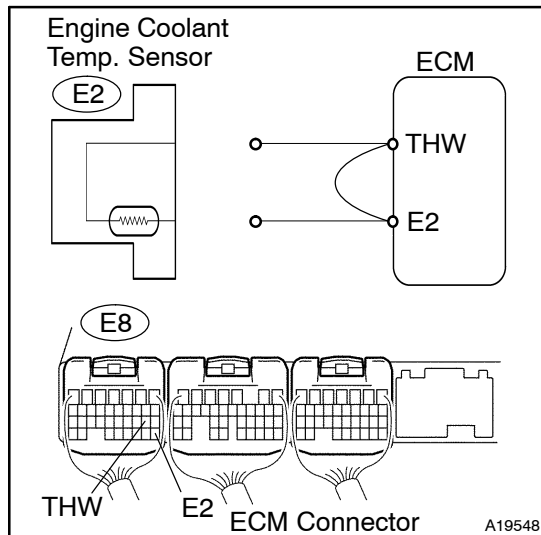
Temperature value: 140°C (284°F) or more

OK

Confirm good connection at sensor. If OK, replace engine coolant temperature sensor.

NG

3 Check for open in harness or ECM.



PREPARATION:

(a) Disconnect the E2 engine coolant temperature sensor connector.

(b) Connect terminals THW and E2 of the E8 ECM connector.

HINT:

Before checking, do a visual and contact pressure checks for the ECM connector.

(c) Turn the ignition switch ON.

(d) When using hand-held tester, enter the following menus:
DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.

CHECK:

Read the temperature value on the OBD II scan tool or the hand-held tester.

OK:

Temperature value: 140°C (284°F) or more

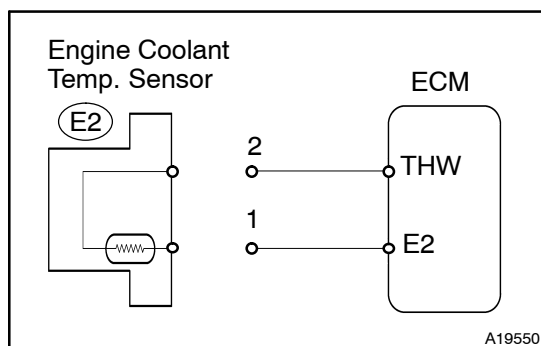
OK

Repair or replace harness or connector.

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Confirm good connection at ECM. If OK, check and replace ECM (See page [IN-36](#)).

4 Check for short in harness and ECM.



PREPARATION:

(a) Disconnect the E2 engine coolant temperature sensor connector.

(b) Turn the ignition switch ON.

(c) When using hand-held tester, enter the following menus:
DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.

CHECK:

Read the temperature value on the OBD II scan tool or the hand-held tester.

OK:

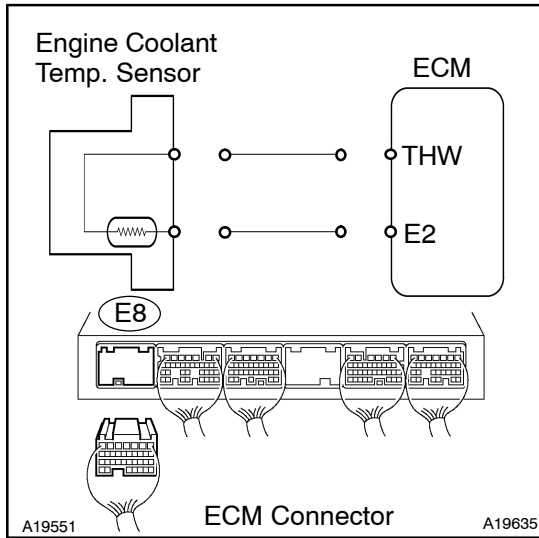
Temperature value: -40°C (-40°F)

OK

Replace engine coolant temperature sensor.

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5 Check for short in harness or ECM.



PREPARATION:

- Disconnect the E8 ECM connector.
- Turn the ignition switch ON.
- When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.

CHECK:

Read the temperature value on the OBD II scan tool or the hand-held tester.

OK:

Temperature value: -40°C (-40°F)

OK

Repair or replace harness or connector.

NG

Replace ECM (See page [SF-60](#)).