DTC P0115/22 ENGINE COOLANT TEMPERATURE CIRCUIT

CIRCUIT DESCRIPTION

A thermistor built into the engine coolant temperature sensor changes the resistance value according to the engine coolant temperature.

The structure of the sensor and connection to the ECM is the same as those of the intake air temperature sensor.

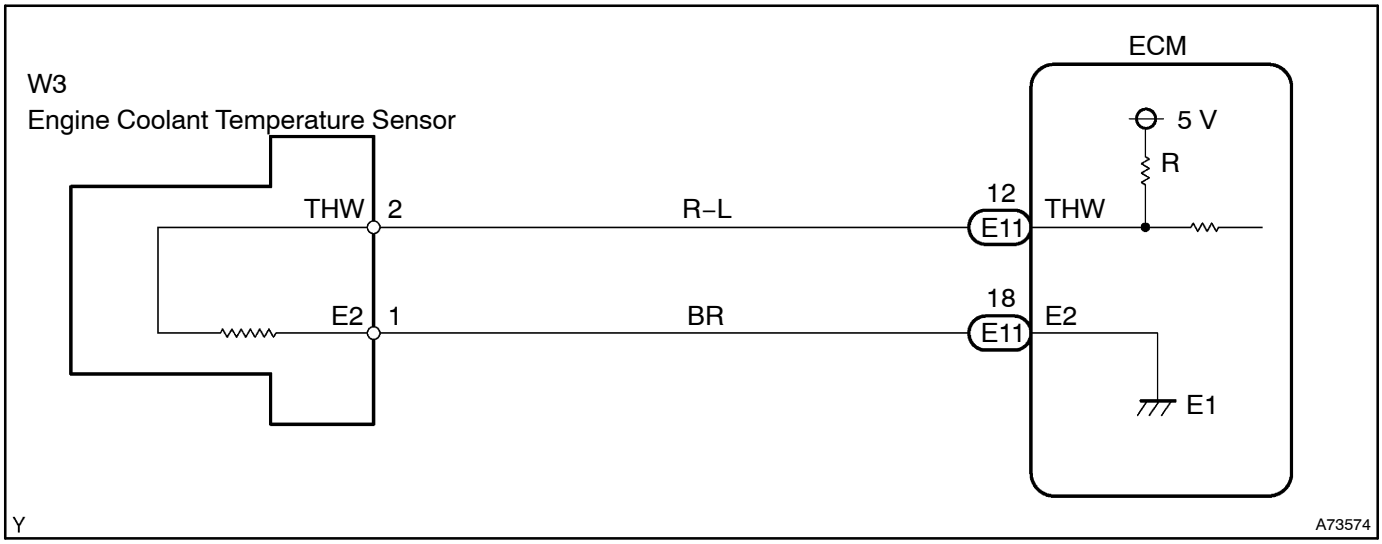
DTC No.	DTC Detecting Condition	Trouble Area
P0115/22	Open or short in engine coolant temperature sensor circuit for 0.5 sec. or more	• Open or short in engine coolant temperature sensor sensor circuit • Engine coolant temperature sensor • ECM

HINT:

After confirming DTC P0115/22 use the hand–held tester to confirm the engine coolant temperature from the ”DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL DATA”.

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- Read freeze frame data using hand–held tester, as 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.
- If different DTCs that are related to different systems are output simultaneously while terminal E2 is used as a ground terminal, terminal E2 may be open.

When using hand–held tester

1	READ VALUE OF HAND–HELD TESTER (COOLANT TEMP)

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the item ”DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL DATA/COOLANT TEMP” and read its value displayed the hand–held tester.

Result:

Read value	Proceed to
–40°C (–40°F)	A
140°C (284°F) or more	B
OK (Same as present temperature)	C

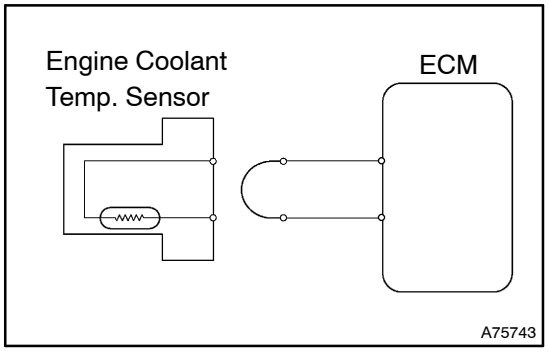
B → **Go to step 4**

C → **CHECK FOR INTERMITTENT PROBLEMS (See page 05–86)**

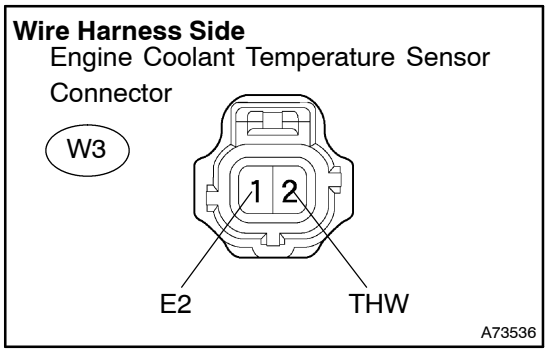
A

2	READ VALUE OF HAND–HELD TESTER (CHECk FOR OPEN IN WIRE HARNESS)

SST 09843–18040



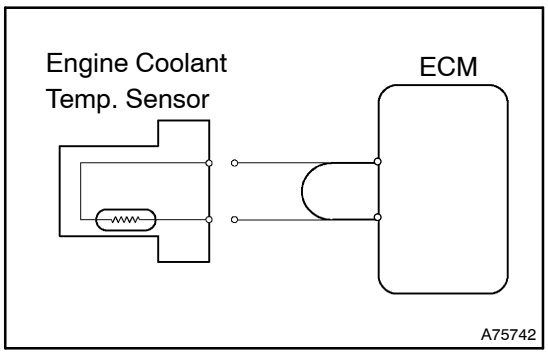
(a) Disconnect the W3 engine coolant temperature sensor connector.
(b) Connect the terminals THW (W3–2) and E2 (W3–1) of the engine coolant temperature sensor connector.
(c) Turn the ignition switch ON.
(d) Select the item ”DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL DATA/COOLANT TEMP” and read its value displayed the hand–held tester.
Temperature: 140°C (284°F) or more



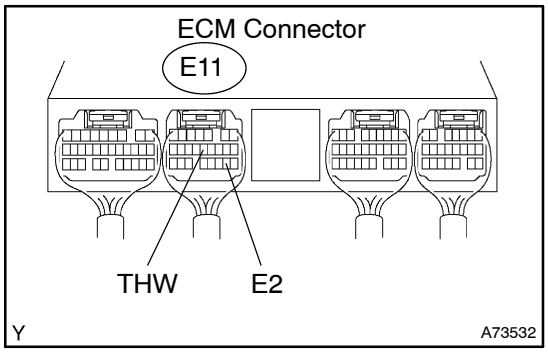
OK → **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

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3 READ VALUE OF HAND–HELD TESTER (CHECK FOR OPEN IN ECM)



(a) Connect the terminals THW (E11–12) and E2 (E11–18) of the ECM connector.
(b) Turn the ignition switch ON.
(c) Select the item "DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL DATA/COOLANT TEMP" and read its value displayed the hand–held tester.
Temperature: 140°C (284°F) or more

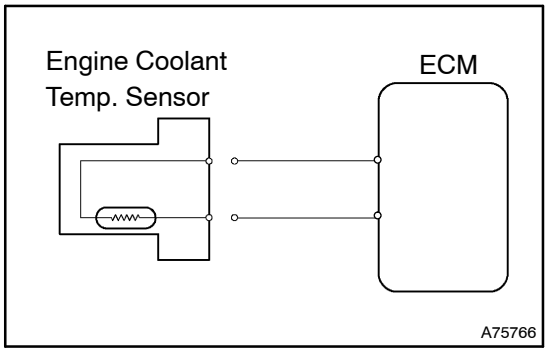


OK → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

NG

CHECK AND REPLACE ECM (See page 01-36)

4 READ VALUE OF HAND–HELD TESTER (CHECK FOR SHORT IN WIRE HARNESS)

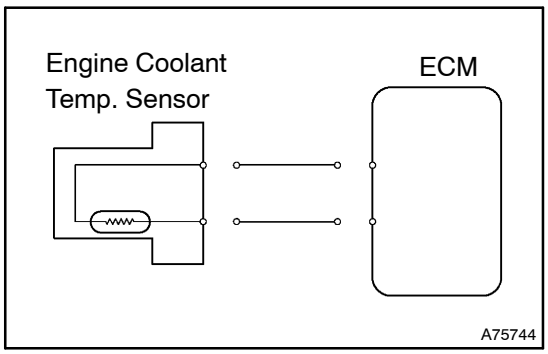


(a) Disconnect the W3 engine coolant temperature sensor connector.
(b) Turn the ignition switch ON.
(c) Read the engine coolant temperature value on the hand–held tester.
Temperature: –40°C (–40°F)

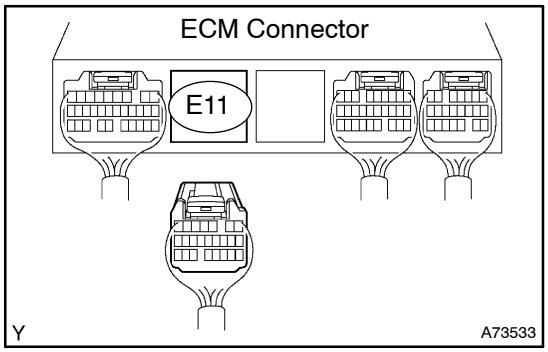
OK → **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

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5	READ VALUE OF HAND–HELD TESTER (CHECK FOR SHORT IN ECM)



(a) Disconnect the E11 ECM connector.
(b) Turn the ignition switch ON.
(c) Read coolant temp. value on the hand–held tester.
Temperature value: –40°C (–40°F)



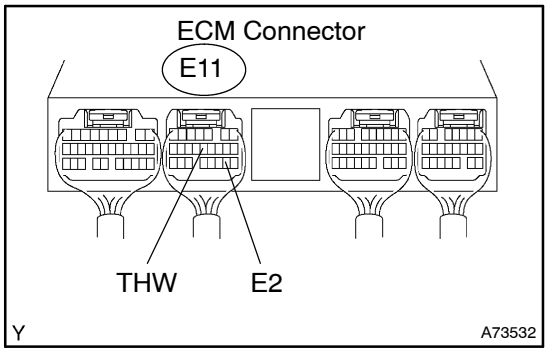
OK → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

NG

CHECK AND REPLACE ECM (See page 01-36)

When not using hand–held tester

1	CHECK ECM (CHECK VOLTAGE)



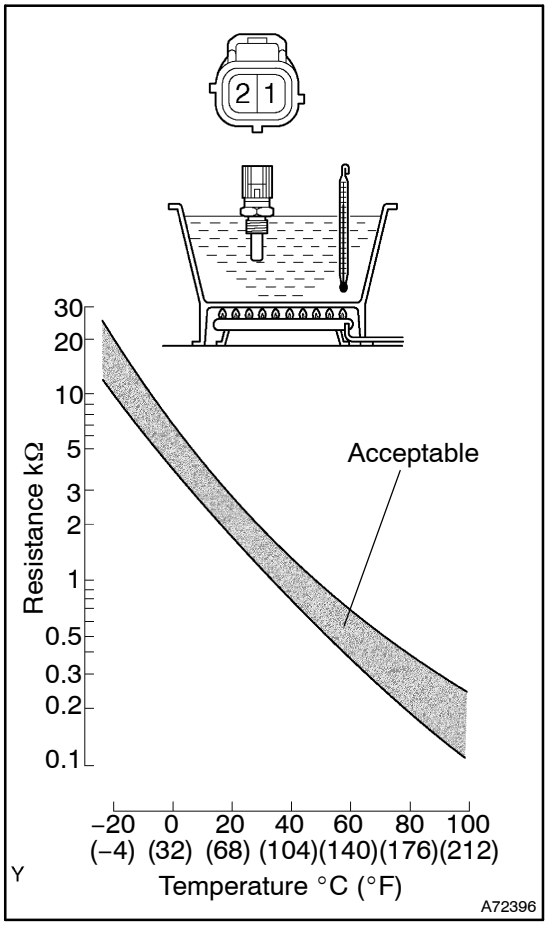
(a) Turn the ignition switch ON.
(b) Measure the voltage between the terminals of the E11 ECM connector.
Voltage:

Symbols (Terminal No.)	Condition	Specified condition
THW (E11–12) ⇔ E2 (E11–18)	20°C (68°F)	0.5 – 3.4 V
	80°C (176°F)	0.2 – 1.0 V

OK → **CHECK FOR INTERMITTENT PROBLEMS (See page 05–86)**

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2 INSPECT ENGINE COOLANT TEMPERATURE SENSOR



(a) Measure the resistance between the terminals.
Resistance:

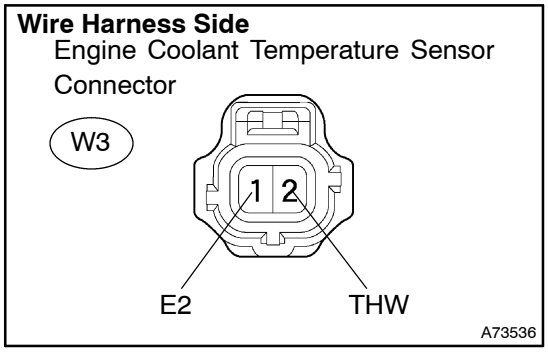
Terminal No.	Specified condition
1 ⇔ 2	2.32 – 2.59 kΩ at 20°C (68°F)
	0.310 – 0.326 kΩ at 80°C (176°F)

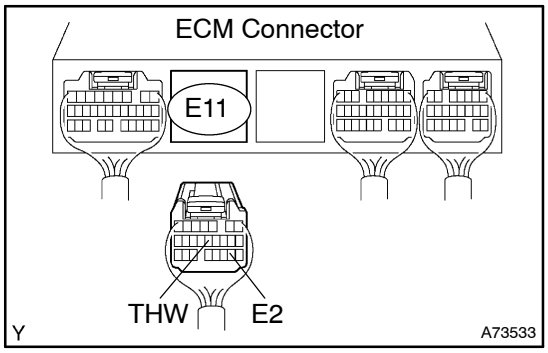
NOTICE:
In case of checking the engine coolant temperature sensor in the water, be careful not to allow water to go into the terminals, and after checking, wipe out the sensor.

NG → **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

OK

3	CHECK HARNESS AND CONNECTOR (ENGINE COOLANT TEMPERATURE SENSOR ⇔ ECM)





(a) Disconnect the W3 engine coolant temperature sensor connector.
(b) Disconnect the E11 ECM connector.
(c) Check the continuity between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
THW (W3–2) ⇔ THW (E11–12)	Continuity
E2 (W3–1) ⇔ E2 (E11–18)	

Standard (Check for short):

Symbols (Terminal No.)	Specified condition
THW (W3–2) or THW (E11–12) ⇔ Other terminals and body ground	No continuity

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

CHECK AND REPLACE ECM (See page 01–36)