DTC	P0115/22	ENGINE COOLANT TEMPERATURE CIRCUIT

DTC	P0117/22	ENGINE COOLANT TEMPERATURE CIRCUIT LOW INPUT

DTC	P0118/22	ENGINE COOLANT TEMPERATURE CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

A thermistor is built into the engine coolant temperature sensor and changes its 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.

HINT:

If the ECM detects DTC P0115, P0117 or P0118, the ECM enters fail–safe mode in which the engine coolant temperature is assumed to be 80°C (176°F).

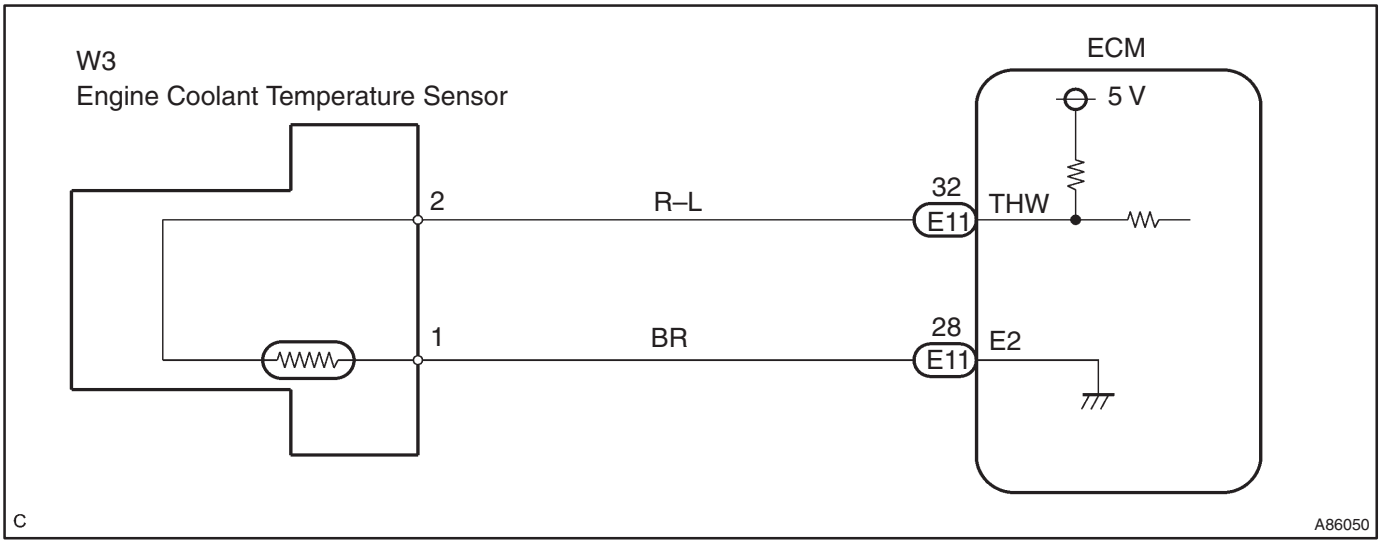
DTC No.	Proceed To	DTC Detection Condition	Trouble Area
P0115/22	Step 1	Open or short in engine coolant temperature sensor circuit for 0.5 seconds (1 trip detection logic)	• Open or short in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM
P0117/22	Step 4	Short in engine coolant temperature sensor circuit for 0.5 seconds (Sensor resistance value is less than 79 Ω) (1 trip detection logic)	• Short in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM
P0118/22	Step 2	Open in engine coolant temperature sensor circuit for 0.5 seconds (Sensor resistance value is more than 156 kΩ) (1 trip detection logic)	• Open in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM

HINT:

When DTC P0115, P0117 or P0118 is detected, check the engine coolant temperature by selecting Powertrain / Engine and ECT / Data List / Coolant Temp on the intelligent tester II.

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester II. Freeze frame data record 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	READ VALUE OF INTELLIGENT TESTER II(ENGINE COOLANT TEMPERATURE)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester II ON.
(c) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(d) Read the value.

Standard:

Temperature value: 80° to 97°C (176° to 207°F) after warming up the engine.

Result:

Temperature Displayed	Proceed To
–40°C (–40°F)	A
140°C (284°F)	B
OK (Same as actual engine coolant temperature)	C

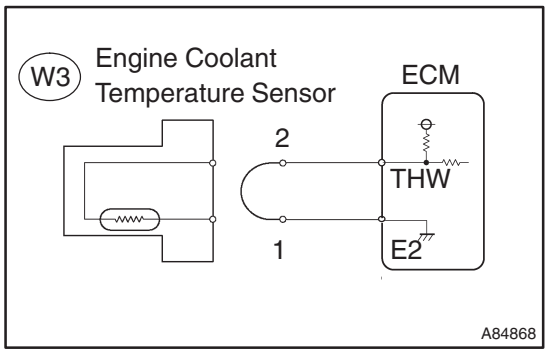
HINT:

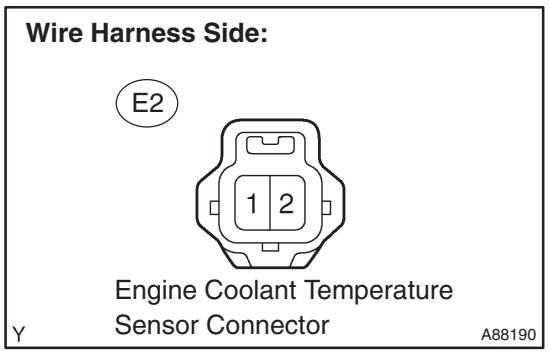
- If there is an open circuit, the intelligent tester II indicates –40°C (–40°F).
- If there is a short circuit, the intelligent tester II indicates 140°C (284°F).

B	**Go to step 4**
C	**CHECK FOR INTERMITTENT PROBLEMS (See page 05–8)**

A

2	READ VALUE OF INTELLIGENT TESTER II(CHECK FOR OPEN IN WIRE HARNESS)



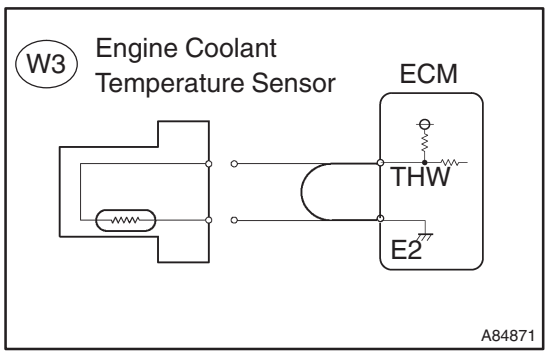


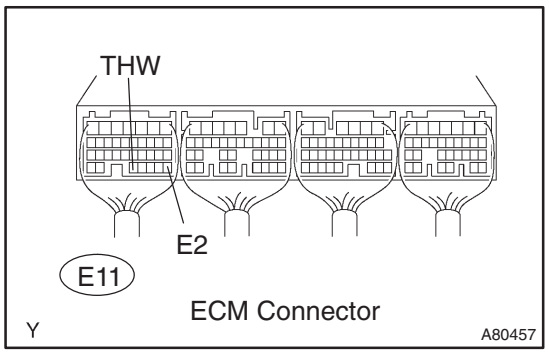
(a) Disconnect the W3 engine coolant temperature sensor connector.
(b) Connect terminals 1 and 2 of the engine coolant temperature sensor wire harness side connector.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester II ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(f) Read the value.
Standard:
Temperature value: 140°C (284°F)
(g) Reconnect the engine coolant temperature sensor connector.

OK	CONFIRM GOOD CONNECTION AT SENSOR. IF OK, REPLACE ENGINE COOLANT TEMPERATURE SENSOR

NG

3	READ VALUE OF INTELLIGENT TESTER II(CHECK FOR OPEN IN ECM)





(a) Disconnect the W3 engine coolant temperature sensor connector.
(b) Connect terminals THW and E2 of the E11 ECM connector.

HINT:
Before checking, do visual and contact pressure checks on the ECM connectors.

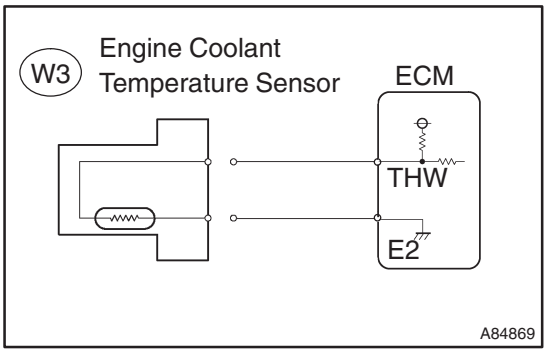
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester II ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(f) Read the value.
Standard:
Temperature value: 140°C (284°F)
(g) Reconnect the engine coolant temperature sensor connector.

OK	REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

CONFIRM GOOD CONNECTION AT ECM. IF OK, REPLACE ECM (See page 10–12)

4	READ VALUE OF INTELLIGENT TESTER II(CHECK FOR SHORT IN WIRE HARNESS)

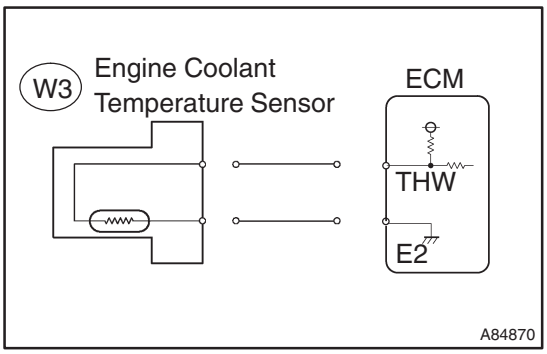


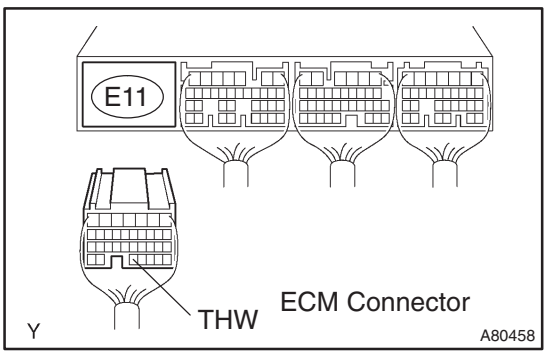
(a) Disconnect the W3 engine coolant temperature sensor connector.
(b) Connect the intelligent tester II to the DLC3.
(c) Turn the ignition switch to ON and turn the intelligent tester II ON.
(d) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(e) Read the value.
Standard:
Temperature value: –40°C (–40°F)
(f) Reconnect the engine coolant temperature sensor connector.

OK	REPLACE ENGINE COOLANT TEMPERATURE SENSOR

NG

5	READ VALUE OF INTELLIGENT TESTER II(CHECK FOR SHORT IN ECM)





(a) Disconnect the W3 engine coolant temperature sensor connector.
(b) Disconnect the E11 ECM connector.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester II ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Data List / Coolant Temp.
(f) Read the value.
Standard:
Temperature value: –40°C (–40°F)
(g) Reconnect the engine coolant temperature sensor connector.
(h) Reconnect the ECM connector.

OK	REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

REPLACE ECM (See page 10–12)