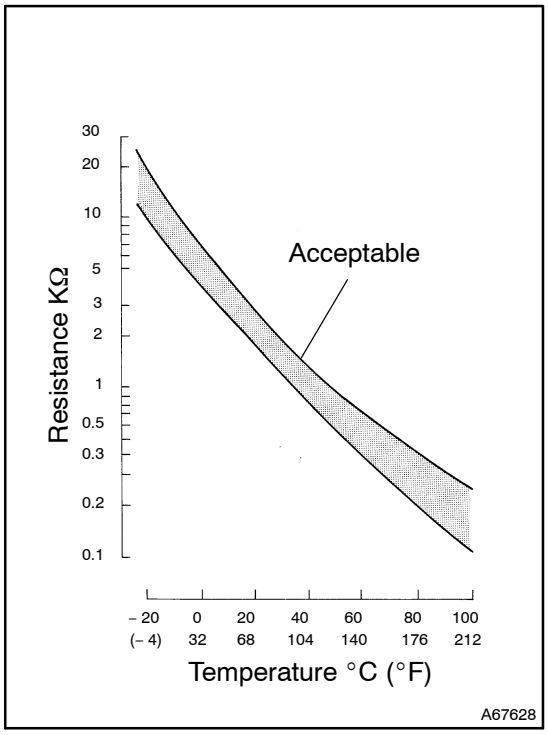
DTC	P0115	ENGINE COOLANT TEMPERATURE CIRCUIT

DTC	P0117	ENGINE COOLANT TEMPERATURE CIRCUIT LOW INPUT

DTC	P0118	ENGINE COOLANT TEMPERATURE CIRCUIT HIGH INPUT

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 as 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 ECT sensor circuit for 0.5 seconds (1 trip detection logic)	• Open or short in ECT sensor circuit • ECT sensor • ECM
P0117	Step 4	Short in ECT sensor circuit for 0.5 seconds (1 trip detection logic)	• Short in ECT sensor circuit • ECT sensor • ECM
P0118	Step 2	Open in ECT sensor circuit for 0.5 seconds (1 trip detection logic)	• Open in ECT sensor circuit • ECT sensor • ECM

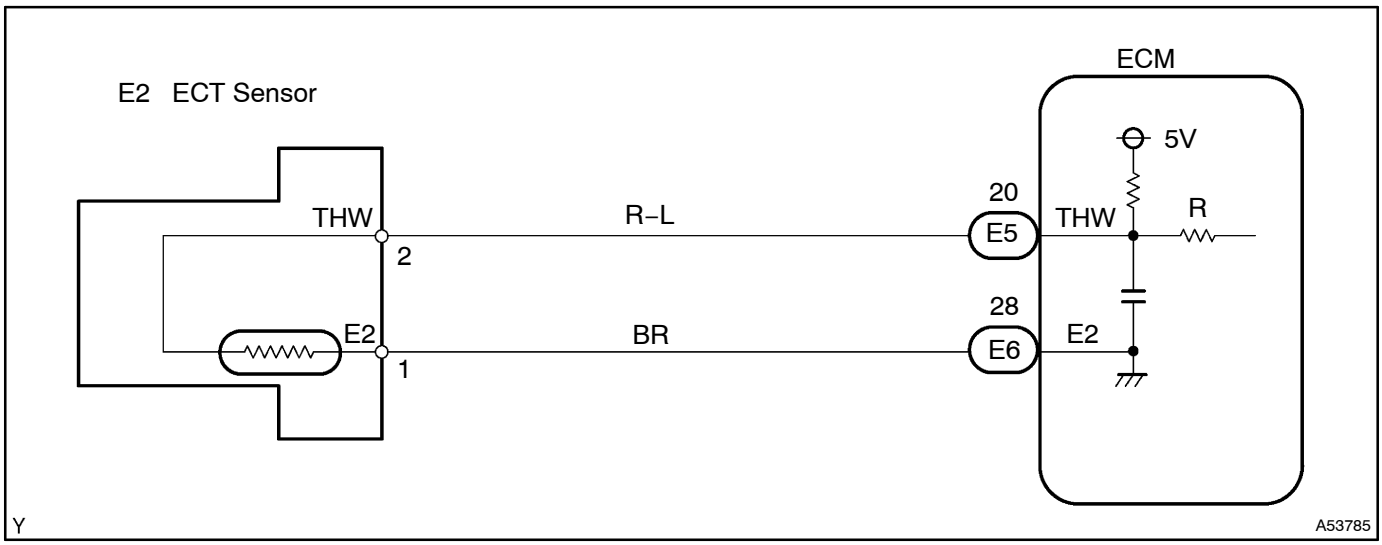
HINT:
After confirming DTC P0115, P0117 or P0118, confirm the engine coolant temperature using Data List on the Intelligent Tester II. Enter the following menus: Enter/ Diagnosis/ OBD·MOBD/ Power train/ Engine and ECT/ Data List.

Engine Coolant Temperature	Malfunction
–40˚C (–40˚F)	Open circuit
140˚C (284˚F) or more	Short circuit

MONITOR DESCRIPTION

The ECT 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 ECT. 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 –40°C (–40°F) (P0118) or more than 140°C (284°F) (P0117) and that either condition continues for 0.5 seconds or more, the ECM will set a DTC.
This monitor runs 0.5 seconds after the ignition switch is turned ON (1 trip detection logic).

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 Intelligent Tester II. 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	READ VALUE OF INTELLIGENT TESTER II (ENGINE COOLANT TEMPERATURE)

(a) Connect the Intelligent Tester II to the DLC3.
(b) Select the item "Enter / Diagnosis / OBD·MOBD / Power train / Engine and ECT / Data List / All Data / Coolant Temp".
(c) Read the Coolant Temp value.
Standard: Same value as actual ECT.
Result:

Engine Coolant Temperature	Proceed to
–40°C (–40°F)	A
140°C (284°F) or more	B
OK (same as present temperature)	C

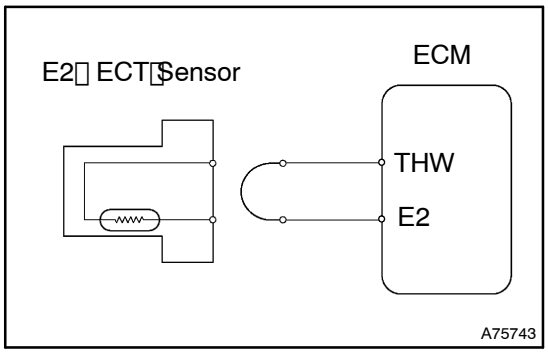
HINT:
- If there is an open circuit, the tester indicates –40°C (–40°F).
- If there is a short circuit, the tester indicates 140°C (284°F) or more.

B → **Go to step 4**

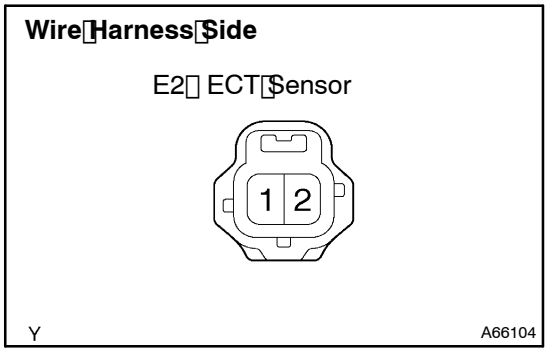
C → **CHECK FOR INTERMITTENT PROBLEMS (See page 05–11)**

A

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



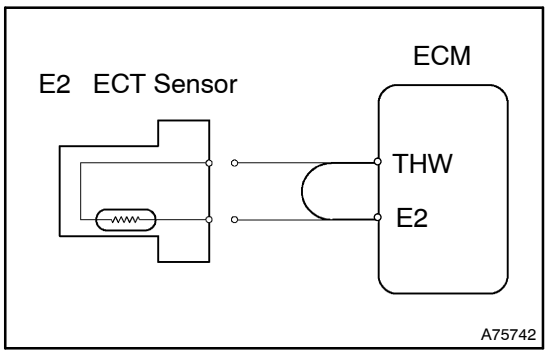
(a) Disconnect the E2 ECT sensor connector.
(b) Connect terminals 1 and 2 of the ECT sensor wire harness side connector.
(c) Turn the ignition switch ON.
(d) Read the Coolant Temp value.
Standard: 140°C (284°F) or more



OK → **CONFIRM GOOD CONNECTION AT SENSOR. IF OK, REPLACE ECT SENSOR**

NG

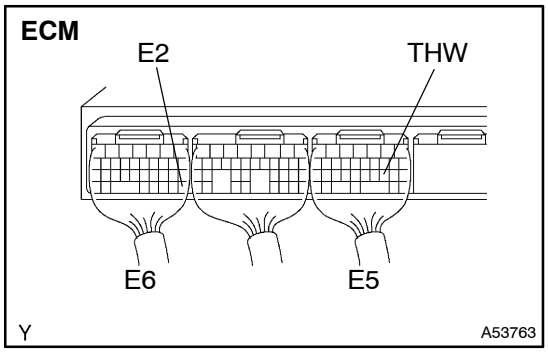
3 READ VALUE OF INTELLIGENT TESTER II (CHECK FOR OPEN IN ECM)



(a) Disconnect the E2 ECT sensor connector.
(b) Connect terminals THW of the E5 ECM connector and and E2 of the E6 ECM connector.

HINT:
Before checking, do a visual and contact pressure check for the ECM connector.

(c) Turn the ignition switch ON.
(d) Read the Coolant Temp value.
Standard: 140°C (284°F) or more

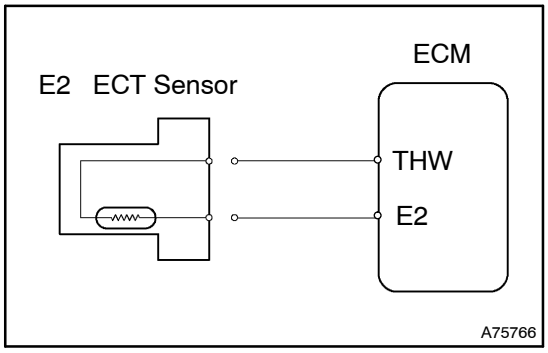


NG → **CONFIRM GOOD CONNECTION AT ECM. IF OK, REPLACE ECM**

OK

REPAIR OR REPLACE HARNESS AND CONNECTOR

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

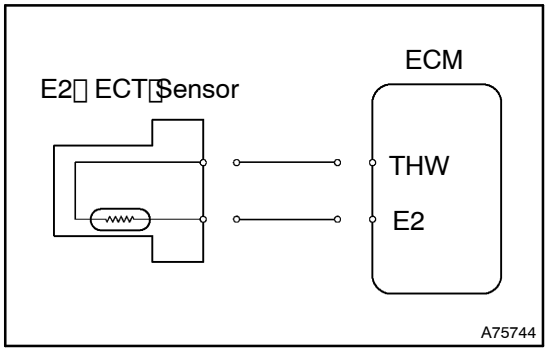


(a) Disconnect the E2 ECT sensor connector.
(b) Turn the ignition switch ON.
(c) Read the Coolant Temp value.
Standard: –40°C (–40°F)
(d) Reconnect the ECT sensor connector.

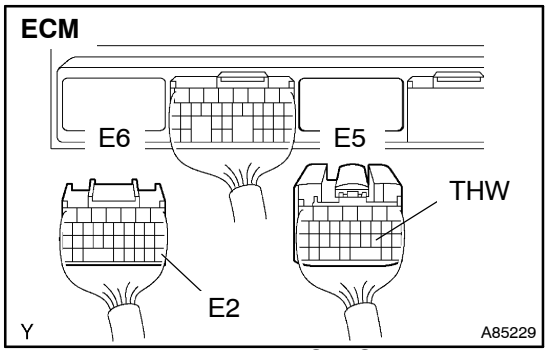
OK → **REPLACE ECT SENSOR**

NG

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



(a) Disconnect the E2 ECT sensor connector.
(b) Disconnect the E5 and E6 ECM connectors.
(c) Turn the ignition switch ON.
(d) Read the Coolant Temp value.
Standard: –40°C (–40°F)
(e) Reconnect the ECM connectors.
(f) Reconnect the ECT sensor connector.



NG → **REPLACE ECM (See page 10–21)**

OK

REPAIR OR REPLACE HARNESS AND CONNECTOR