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 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, it operates the fail–safe function in which the engine coolant temperature is assumed to be 80 °C (176 °F).

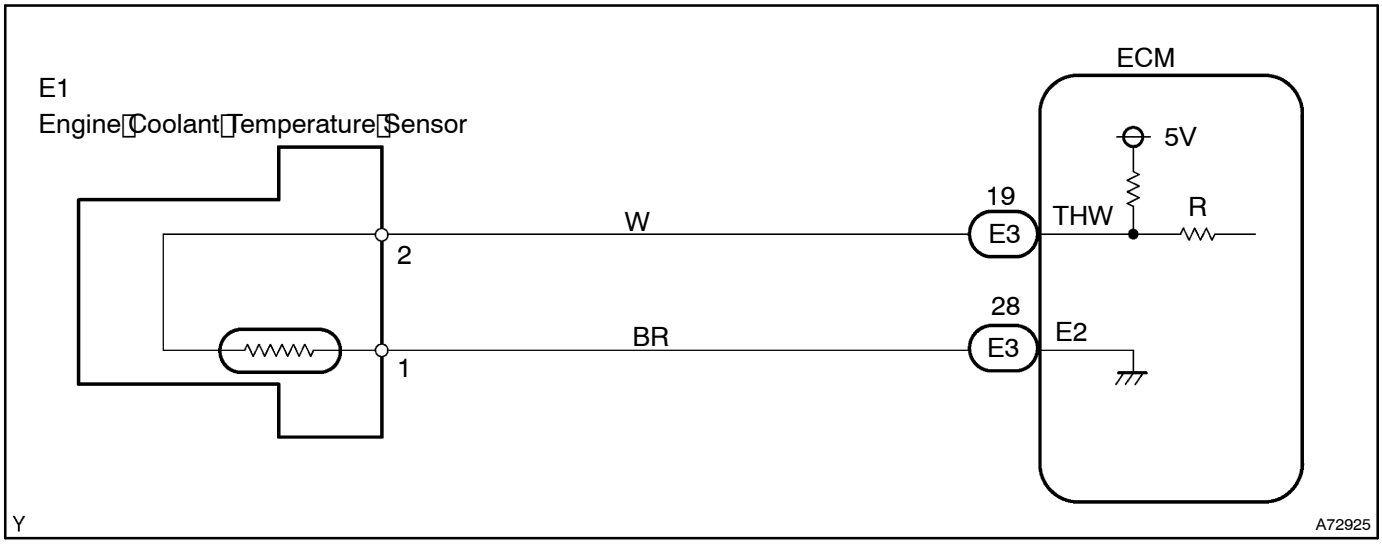
DTC No.	Proceed to	DTC Detection Condition	Trouble Area
P0115	Step 1	Open or short in engine coolant temperature sensor circuit for 0.5 second	• Open or short in engine coolant temperature sensor circuit • Engine coolant temperature sensor • ECM
P0117	Step 4	Short in engine coolant temperature sensor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

HINT:

After confirming DTC P0115, P0117 or P0118, confirm the engine coolant temperature in Powertrain / Engine and ECT / Data List / Coolant Temp using 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 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 records the engine condition 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.

1	READ VALUE OF INTELLIGENT TESTER II (ENGINE COOLANT TEMPERATURE)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the power switch ON (IG).
(c) Turn the intelligent tester II ON.
(d) On the intelligent tester II, select the item: Powertrain / Engine and ECT / Data List / Coolant Temp.
(e) Read the values.
(f) Measure the coolant temperature using a thermometer and compare the value with the value displayed on the intelligent tester II.
Temperature value: Almost same value as the actual engine coolant temperature.
Result:

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

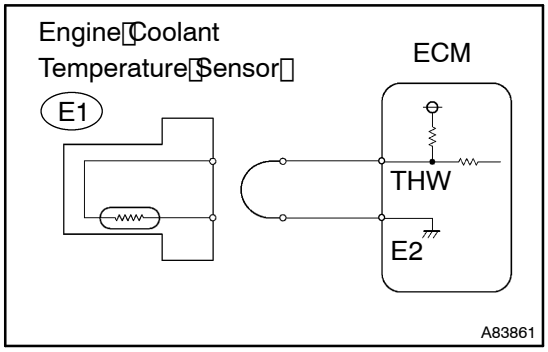
HINT:

- 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).

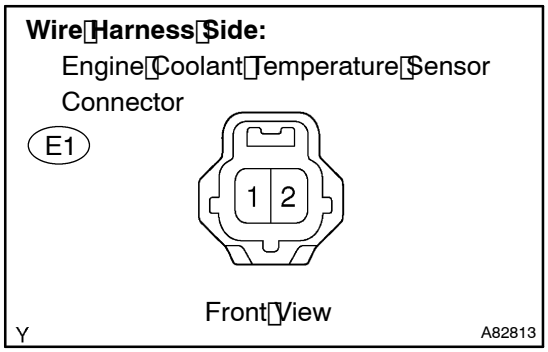
B	**Go to step 4**
C	**CHECK FOR INTERMITTENT PROBLEMS (See page 05–14)**

A

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



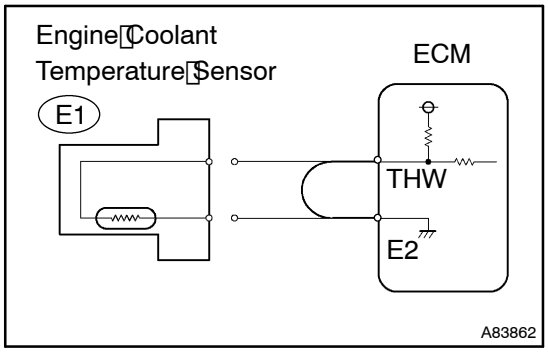
(a) Disconnect the E1 engine coolant temperature sensor connector.
(b) Connect terminals 1 and 2 of the engine coolant temperature sensor wire harness side connector.
(c) Turn the power switch ON (IG).
(d) On the intelligent tester II, select the item: Powertrain / Engine and ECT / Data List / Coolant Temp. Read the values.
OK:
Temperature value: 140°C (284°F)
(e) Reconnect the engine coolant temperature sensor connector.



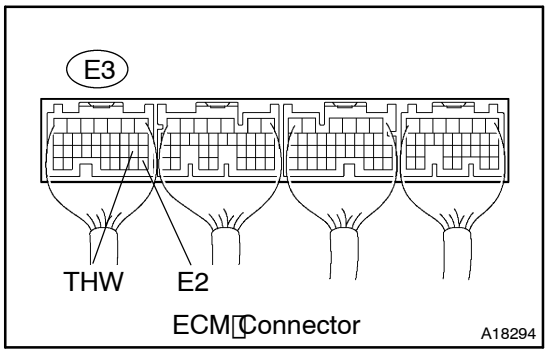
OK	CONFIRM GOOD CONNECTION AT SENSOR. IF OK, REPLACE ENGINE COOLANT TEMP. SENSOR

NG

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



(a) Disconnect the E1 engine coolant temperature sensor connector.
(b) Connect terminals THW and E2 of the E3 ECM connector.
HINT:
Before checking, do a visual and contact pressure check on the ECM connector.
(c) Turn the power switch ON (IG).
(d) On the intelligent tester II, select the item: Powertrain / Engine and ECT / Data List / Coolant Temp. Read the values.
OK:
Temperature value: 140°C (284°F)
(e) Reconnect the engine coolant temperature sensor connector.

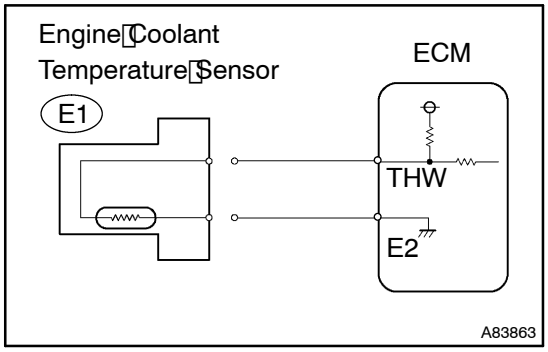


OK	REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

CONFIRM GOOD CONNECTION AT ECM. IF OK, REPLACE ECM (See page 10–24)

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

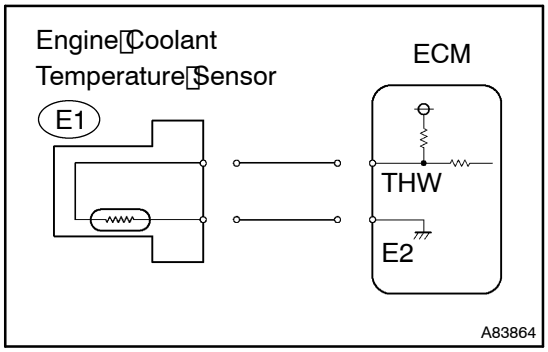


(a) Disconnect the E1 engine coolant temperature sensor connector.
(b) Turn the power switch ON (IG).
(c) On the intelligent tester II, select the item: Powertrain / Engine and ECT / Data List / Coolant Temp. Read the values.
OK:
Temperature value: –40°C (–40°F)
(d) Reconnect the engine coolant temperature sensor connector.

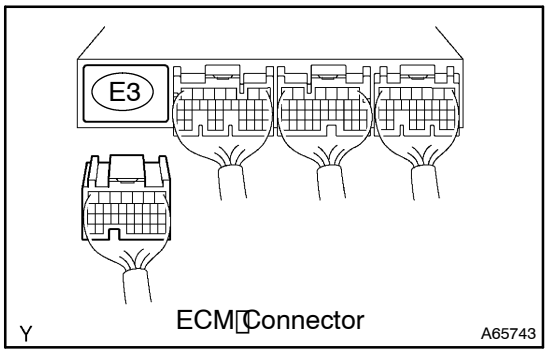
OK	REPLACE ENGINE COOLANT TEMPERATURE SENSOR

NG

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



(a) Disconnect the E3 ECM connector.
(b) Turn the power switch ON (IG).
(c) On the intelligent tester II, select the item: Powertrain / Engine and ECT / Data List / Coolant Temp. Read the values.
OK:
Temperature value: –40°C (–40°F)
(d) Reconnect the ECM connector.



OK	REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

REPLACE ECM (See page 10–24)