DI1ID–07

DTC	P0115/22	Water Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

A thermistor built into the water temp. sensor changes the resistance value according to the water temp. The structure of the sensor and connection to the engine ECU is the same as in the DTC P0110/24 (Intake air temp. circuit malfunction) shown on page DI–25.

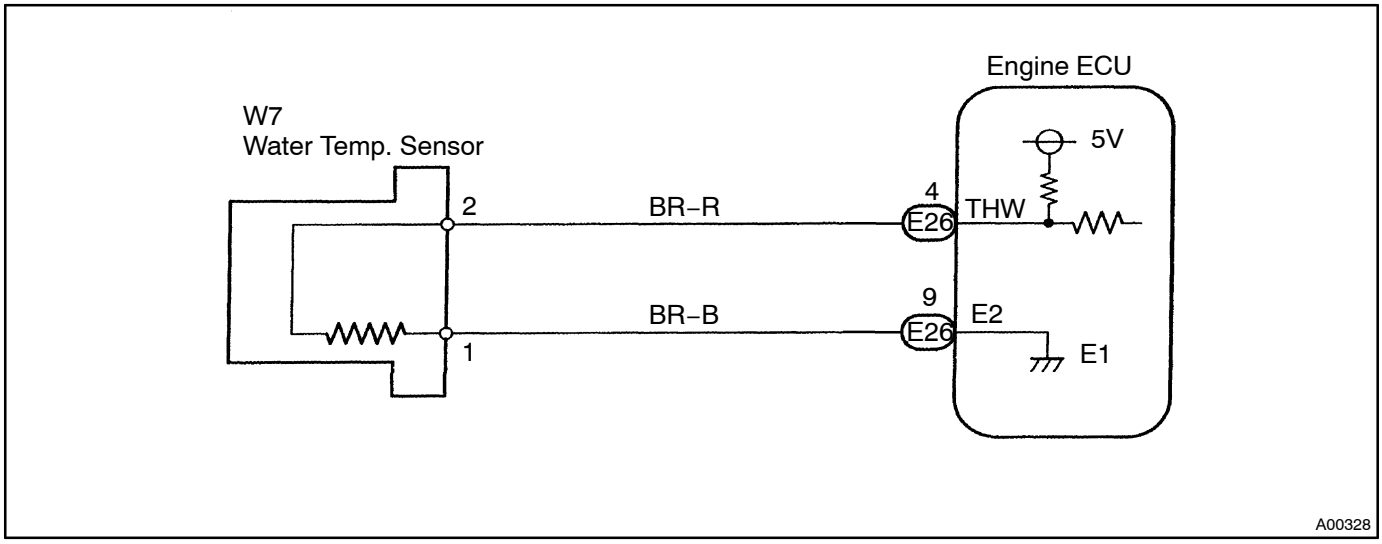
DTC No.	Detection Item	Trouble Area
P0115/22	Open or short in water temp. sensor circuit 0.5 sec or more	• Open or short in water temp. sensor circuit • Water temp. sensor • Engine ECU

HINT:

After confirming DTC P0115/22 use the hand–held tester to confirm the water temp. from CURRENT DATA.

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- Read freed frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.
- If DTC "P0105/31" (Vacuum Sensor Circuit Malfunction), "P0110/24" (Intake Air Temp. Circuit Malfunction), "P0115/22" (Water Temp. Circuit Malfunction), "P0120/41" (Throttle Position Sensor Circuit Malfunction) are output simultaneously, E2 (Sensor Ground) may be open.

When using hand–held tester

1	**Connect the hand–held tester, and read value of water temp.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Read temp. value on the hand–held tester.

OK:

Same as actual water temp.

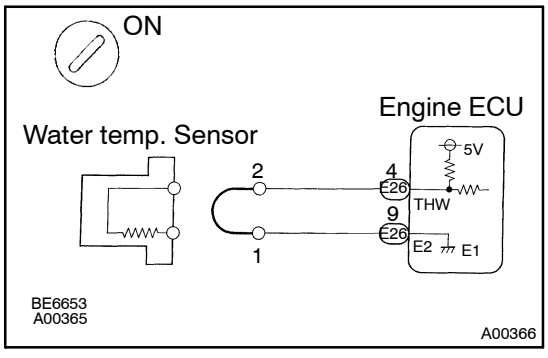
HINT:

- If there is open circuit, hand–held tester indicates – 40°C (– 40°F).
- If there is short hand–held tester indicates 140°C (284°F) or more.

NG → **–40°C (–40°F) Go to step 2.**
140°C (284°F) Go to step 4.

OK

2	**Check for short in harness or engine ECU.**



PREPARATION:

(a) Disconnect the water temp. sensor connector.

(b) Connect sensor wire harness terminals together.

(c) Turn ignition switch ON.

CHECK:

Read temp. value on the hand–held tester.

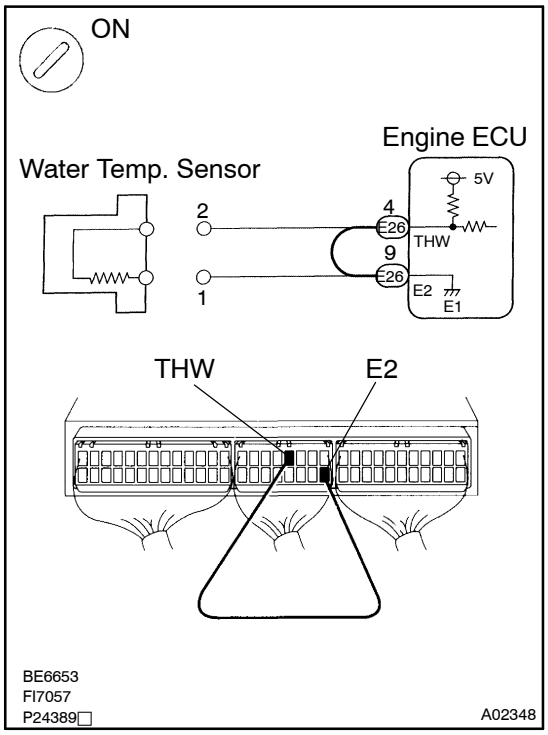
OK:

Temp. value: 140°C (284°F) or more

OK → **Confirm good connection at sensor.**
If OK, replace water temp. sensor.

NG

3	Check for open in harness or engine ECU.



PREPARATION:

(a) Remove the side trim bracket (See page FU–48).

(b) Connect between terminals THW and E2 of engine ECU connector.

HINT:

Water temp. sensor connector is disconnected. Before checking, do a visual and contact pressure check for the engine ECU connector (See page IN–20).

(c) Turn ignition switch ON.

CHECK:

Read temp. value on the hand–held tester.

OK:

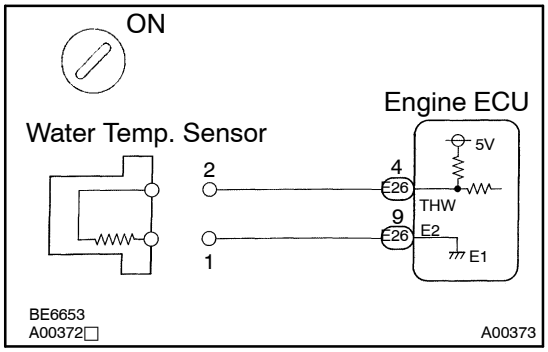
Temp. value: 140°C (284°F) or more

OK	Open in harness between terminals E2 or THW, repair or replace harness.

NG

Confirm good connection at engine ECU. If OK, replace engine ECU (See page IN–20).

4	Check for short in harness or engine ECU.



PREPARATION:

(a) Disconnect the water temp. sensor connector.

(b) Turn ignition switch ON.

CHECK:

Read temp. value on the hand–held tester.

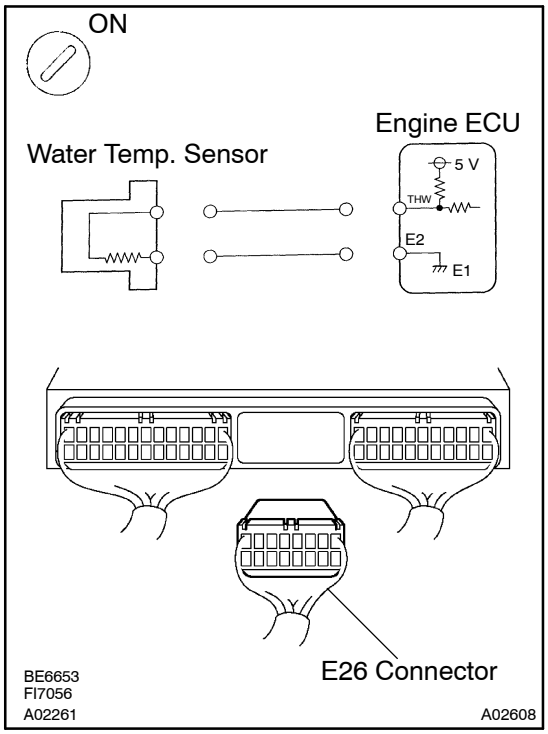
OK:

Temp. value: – 40°C (– 40°F)

OK	Replace water temp. sensor.

NG

5	Check for short in harness of engine ECU.



PREPARATION:

(a) Remove the side trim bracket (See page FU–48).

(b) Disconnect the E26 connector of engine ECU.

HINT:

Water temp. sensor connector is disconnected.

(c) Turn ignition switch ON.

CHECK:

Read temp. value on the hand–held tester.

OK:

Temp. value: – 40°C (– 40°F)

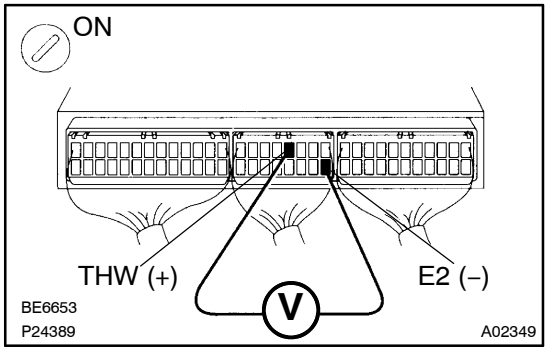
OK → **Repair or replace harness or connector.**

NG

Check and replace engine ECU (See page IN–20).

When not using hand–held tester

1	Check voltage between terminals THW and E2 of engine ECU connector.



PREPARATION:

(a) Remove the side trim bracket (See page FU–48).

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals THW and E2 of engine ECU connector.

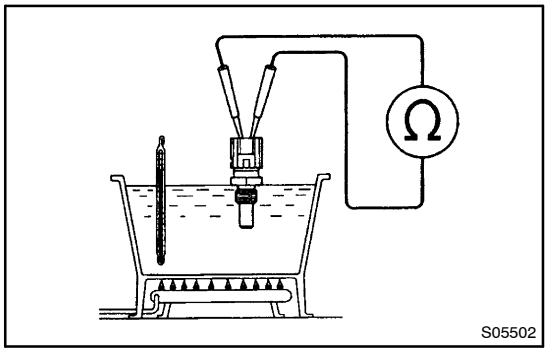
OK:

Water Temp. °C(°F)	Voltage V
20 (68) (Engine is cool)	0.5 – 3.4
80 (176) (Engine is hot)	0.2 – 1.0

OK	Check for intermittent problems (See page DI–18).

NG

2	Check water temp. sensor.



PREPARATION:

Disconnect the water temp. sensor connector.

CHECK:

Measure resistance between terminals.

OK:

Resistance is within Acceptable Zone on chart (See page DI–25).

Water Temp. °C(°F)	Resistance kΩ
20 (68) (Engine is cool)	2.2 – 2.7
80 (176) Engine is hot)	0.29 – 0.35

NG	Replace water temp. sensor.

OK

3	**Check for open and short in harness and connector between engine ECU and water temp. sensor (See page IN–20).**

NG → **Repair or replace harness or connector.**

OK

Check and replace engine ECU (See page IN–20).