DI75L–01

DTC	P0115/22	Water Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

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

The structure of the sensor and connection to the engine ECU is the same as in the intake air temperature circuit malfunction shown on page DI–26.

If the engine ECU detects the DTC P0115/22, it operates the fail safe function in which the water temperature is assumed to be 80°C (176°F).

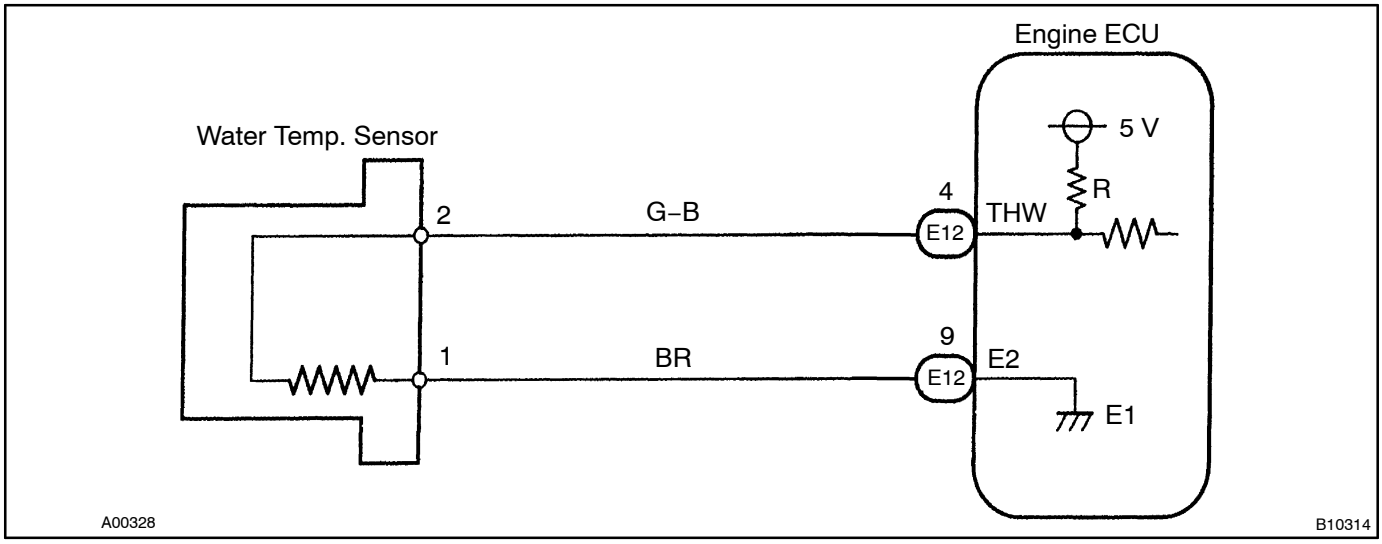
DTC No.	DTC Detection Condition	Trouble Area
P0115/22	Open or short in water temp. sensor circuit 0.5 sec. or more	• Open or short in water temp. sensor circuit • Water temp. sensor • Engine ECU

HINT:

After confirming DTC P0115/22, use the hand–held tester to confirm the water temperature from the CURRENT 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. 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 was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.
- If DTCs P0105/31, P0110/24, P0115/22 and P0120/41 are output simultaneously, E2 (sensor ground) may be open.

When using hand–held tester:

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

PREPARATION:

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

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

CHECK:

Read the temperature value on the hand–held tester.

OK:

Same as actual water temperature.

HINT:

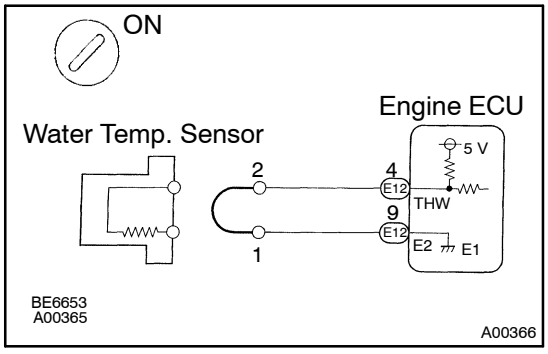
- If there is open circuit, hand–held tester indicates – 40°C (– 40°F).
- If there is short circuit, hand–held tester indicates 140°C (284°F) or more.

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

OK

Check for intermittent problem
(See page DI–4).

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



PREPARATION:

(a) Disconnect the water temperature sensor connector.

(b) Connect the sensor wire harness terminals together.

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

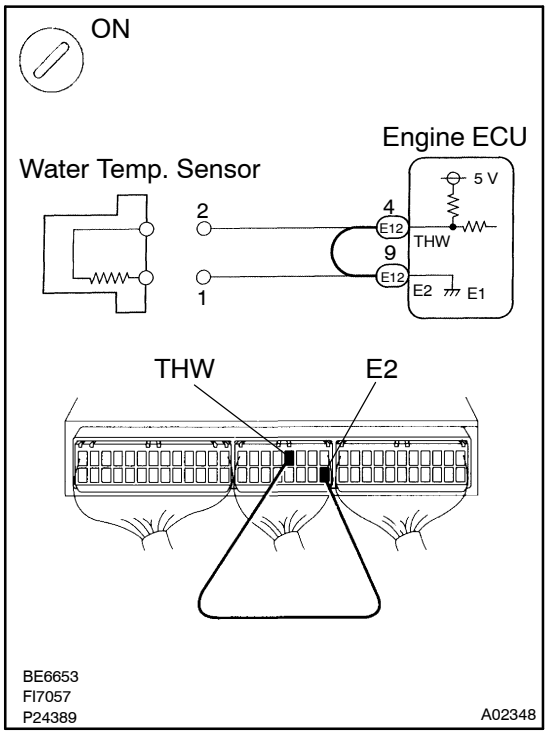
OK:

Temperature value: 140°C (284°F) or more

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

NG

3	Check for open in harness or engine ECU.



PREPARATION:

(a) Remove the glove compartment (See page IN–19).

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

HINT:

The water temperature sensor connector is disconnected. Before checking, do a visual and contact pressure check for the engine ECU connector (See page IN–19).

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

OK:

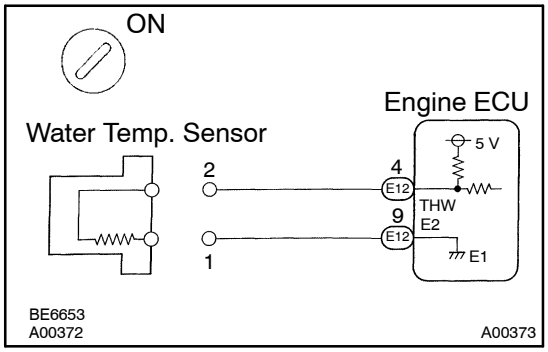
Temperature value: 140°C (284°F) or more

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.

4	Check for short in harness or engine ECU.



PREPARATION:

(a) Disconnect the water temperature sensor connector.

(b) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

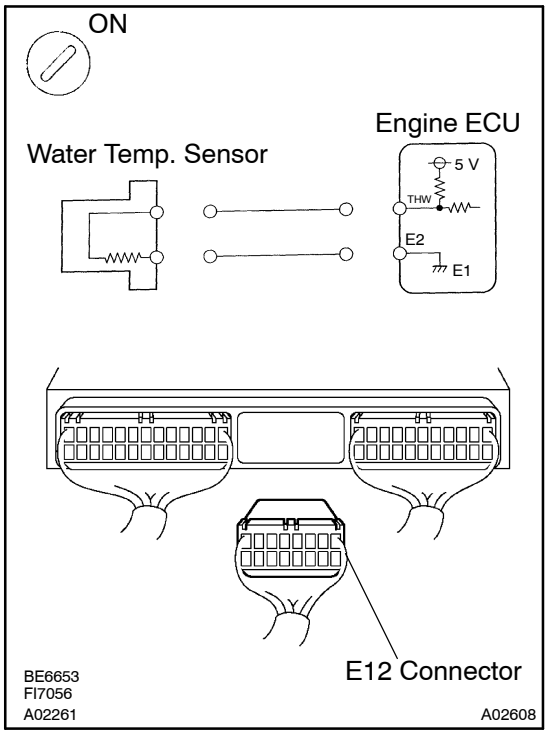
OK:

Temperature value: –40°C (–40°F)

OK	Replace water temperature sensor.

NG

5	Check for short in harness or engine ECU.



PREPARATION:

(a) Remove the glove compartment (See page IN–19).

(b) Disconnect the E12 connector from the engine ECU.

HINT:

The water temperature sensor connector is disconnected.

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

OK:

Temperature value: –40°C (–40°F)

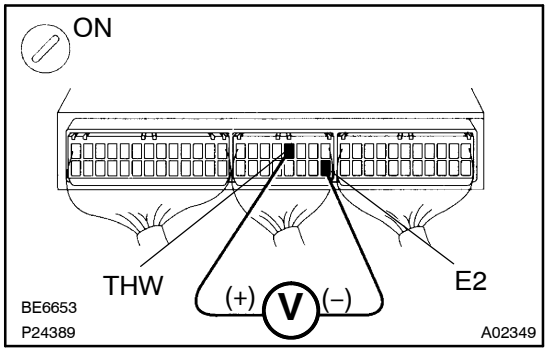
OK	Repair or replace harness or connector.

NG

Check and replace engine ECU (See page IN–19).

When not using hand–held tester:

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



PREPARATION:

(a) Remove the glove compartment (See page IN–19).

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals THW and E2 of the engine ECU connecter.

OK:

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

OK	Check for intermittent problems (See page DI–4).

NG

2	Check water temperature sensor (See Pub. No. RM321E, page EG–275).

NG → Replace water temperature sensor.

OK

3	Check for open and short in harness and connector between engine ECU and water temperature sensor (See page IN–19).

NG → Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–19).