DI6AR–03

DTC	P0115/22	Water Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

A thermistor built in the water temp. sensor changes the resistance value according to the water temperature. The structure of the sensor and connection to the engine (and ECT) ECU is the same as that in the DTC P0110/24 (See page DI–28).

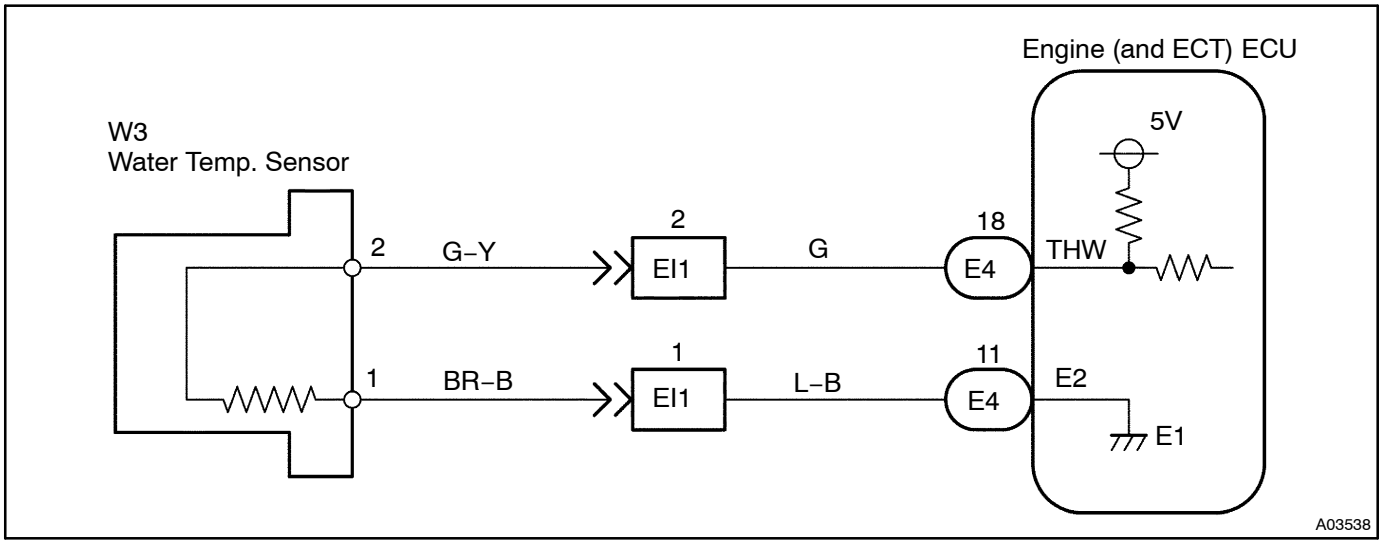
DTC No.	DTC Detecting Condition	Trouble Area
P0115/22	Open or short in water temp. sensor circuit	• Open or short in water temp. sensor circuit • Water temp. sensor • Engine (and ECT) ECU

HINT:

After confirming DTC P0115/22, use the hand–held tester to confirm the engine coolant temperature from the CURRENT DATA.

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0110/24, P0115/22 and P0120/41 are output simultaneously, E2 (sensor ground) may be open.
- Read the freeze frame data on the hand–held tester, which is recorded when a malfunction is detected on the engine. When troubleshooting, it is useful to determine 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.

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:

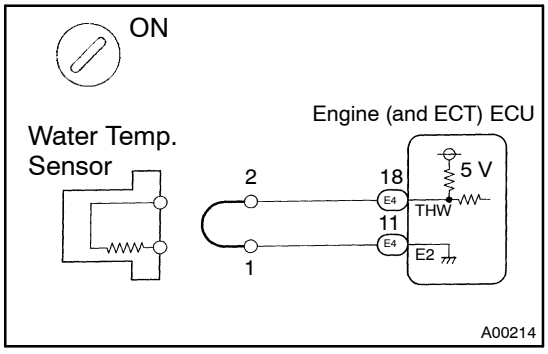
- If there is an open circuit, the hand–held tester indicates –40°C (–40°F).
- If there is a short circuit, the hand–held tester indicates 140°C (284°F) or more.

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

OK

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

2	**Check for open in harness or engine (and ECT) ECU.**



PREPARATION:

(a) Disconnect the water temp. sensor connector.

(b) Connect the sensor wire harness terminals together.

(c) Turn the ignition switch ON.

CHECK:

Read the water temperature on the hand–held tester.

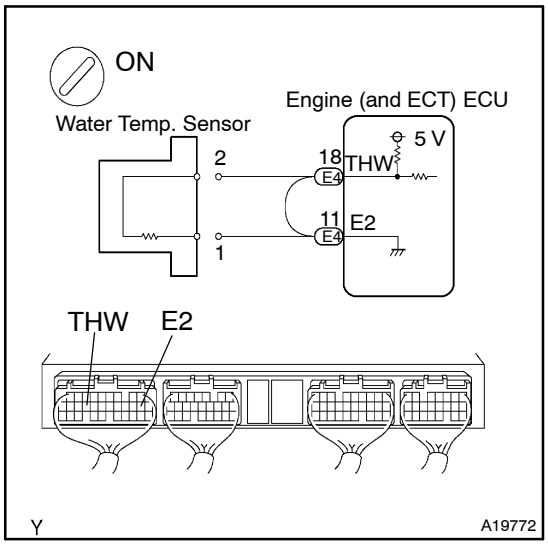
OK:

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 (and ECT) ECU.



PREPARATION:

(a) Remove the glove compartment door.
(b) Connect between terminals THW and E2 of the engine (and ECT) ECU connector.
(c) Disconnect the water temp. sensor connector.
(d) Do a visual check and a contact pressure check for the engine (and ECT) ECU connector (See page IN–20).
(e) Turn the ignition switch ON.

CHECK:

Read the water temperature on the hand–held tester.

OK:

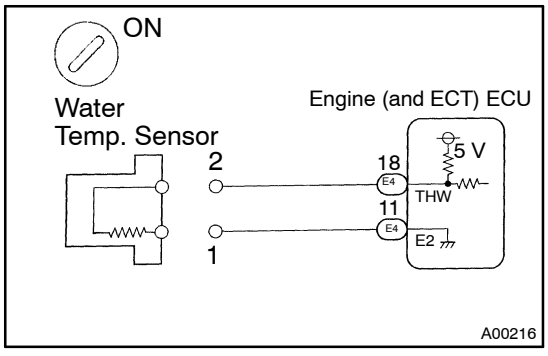
140°C (284°F) or more

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

NG

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

4	Check for short in harness and engine (and ECT) ECU.



PREPARATION:

(a) Disconnect the water temp. sensor connector.
(b) Turn the ignition switch ON.

CHECK:

Read the water temperature on the hand–held tester.

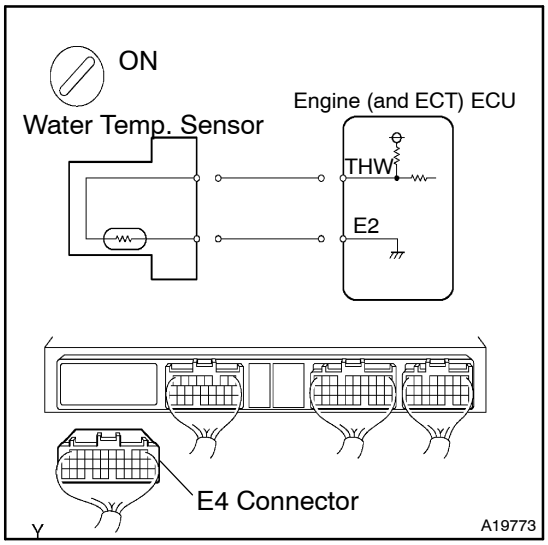
OK:

–40°C (–40°F)

OK	Replace water temp. sensor.

NG

5	Check for short in harness or engine (and ECT) ECU.



PREPARATION:

(a) Remove the glove compartment door.
(b) Disconnect the E4 connector from the engine (and ECT) ECU.
(c) Disconnect the water temp. sensor connector.
(d) Turn the ignition switch ON.

CHECK:

Read the water temperature on the hand–held tester.

OK:

–40°C (–40°F)

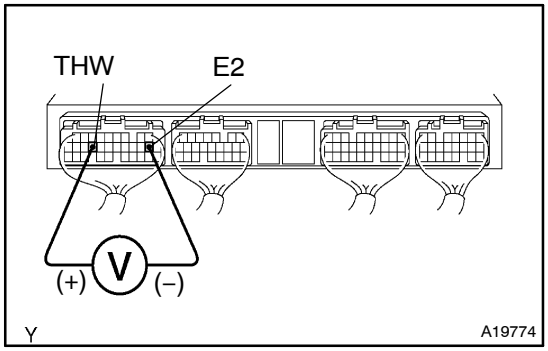
OK → **Repair or replace harness or connector.**

NG

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

When not using hand–held tester

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



PREPARATION:

(a) Remove the glove compartment door.
(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals THW and E2 of the engine (and ECT) ECU connector.

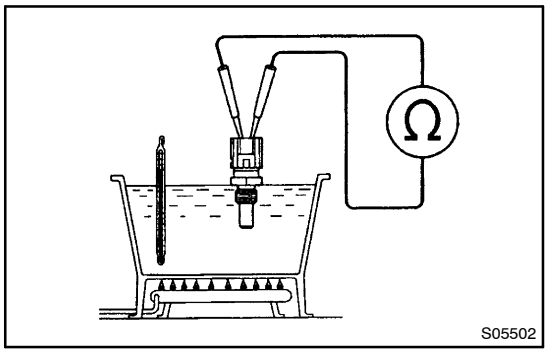
OK:

Water temperature	Voltage
20°C (68°F)	0.5 – 3.4 V
60°C (140°F)	0.2 – 1.0 V

OK → **Check for intermittent problems (See page IN–20).**

NG

2	Check water temp. sensor.



PREPARATION:
Remove the water temp. sensor.
CHECK:
Measure the resistance between terminals as shown in the illustration.
OK:

Water temperature	Resistance
20°C (68°F)	2 – 3 kΩ
60°C (140°F)	0.2 – 0.4 kΩ

NG → **Replace water temp. sensor.**

OK

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

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

OK

Check and replace engine (and ECT) ECU.