DTC B1412 AMBIENT TEMPERATURE SENSOR CIRCUIT

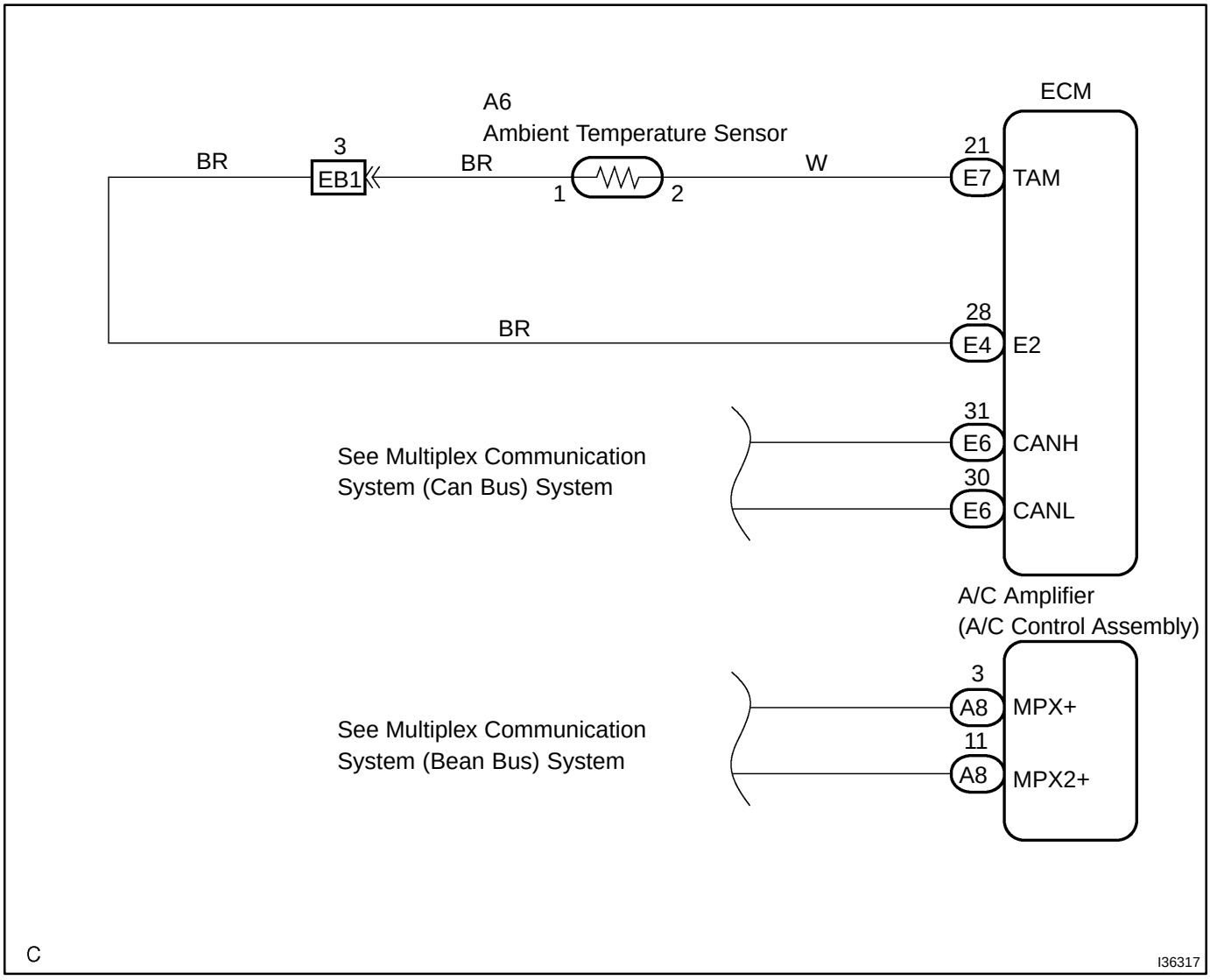
CIRCUIT DESCRIPTION

The A/C ambient temperature sensor is installed in the front part of the condenser to detect the ambient temperature and control the heater and air conditioner ”AUTO” function. The sensor connected to the ECM detects fluctuation in the ambient temperature that is used for controlling the room temperature. The sensor sends a signal to the A/C amplifier via the ECM. The resistance of the A/C ambient temperature sensor changes in accordance with the ambient temperature. As the temperature decreases, the resistance increases. As the temperature increases, the resistance decreases.

The ECM applies voltage (5V) to the A/C ambient temperature sensor and reads voltage changes as the resistance of the A/C ambient temperature sensor changes. The ECM sends the read signal to the A/C amplifier via CAN and body multiplex communications.

DTC No.	Detection item	Trouble Area
B1412	Open or short in ambient temperature sensor circuit	• A/C ambient temperature sensor • Harness or connector between A/C ambient temperature sensor and ECM • ECM • Multiplex communication circuit • A/C amplifier

WIRING DIAGRAM



INSPECTION PROCEDURE

1	READ VALUE ON HAND–HELD TESTER

(a) Connect the hand–held tester to DLC3.
(b) Turn the power switch ON and push the hand–held tester main switch ON.
(c) Select the item below in the DATA LIST, and read the display on the hand–held tester.

DATA LIST / AIR CONDITIONER:

Item	Measurement Item/Display (Range)	Normal Condition	Diagnostic Note
AMBI TEMP SENS	Ambient temperature sensor / min.: –23.3°C (–9.94°F) max.: 65.95°C (150.71°F)	Actual ambient temperature is displayed	Open in the circuit: –23.3°C (–9.94°F) Short: in the circuit: 65.95°C (150.71°F)

OK:

The display is as specified in the normal condition.

Result:

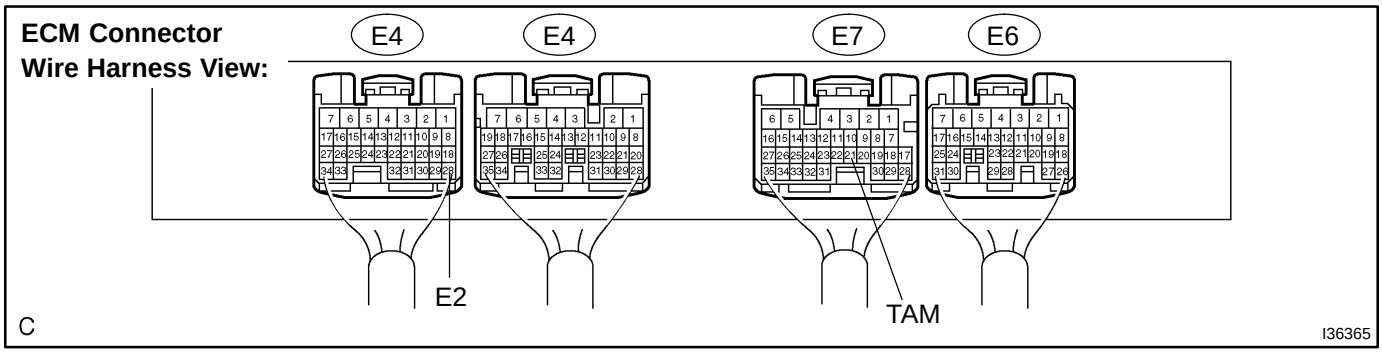
NG	A
OK (Checking from the PROBLEM SYMPTOM TABLE)	B
OK (Checking from the DTC)	C

B → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05–1268)**

C → **REPLACE AIR CONDITIONING AMPLIFIER (SEE PAGE 55–47)**

A

2	INSPECT ECM(TAM – E2)



(a) Remove the ECM with connectors still connected.

(b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
E7–21 (TAM) – E4–28 (E2)	Power switch ON (ON) at 25 °C (77 °F)	1.8 to 2.2 V
E7–21 (TAM) – E4–28 (E2)	Power switch ON (ON) at 40 °C (104 °F)	1.2 to 1.6 V

HINT:

As the temperature increases, the voltage decreases.

Result:

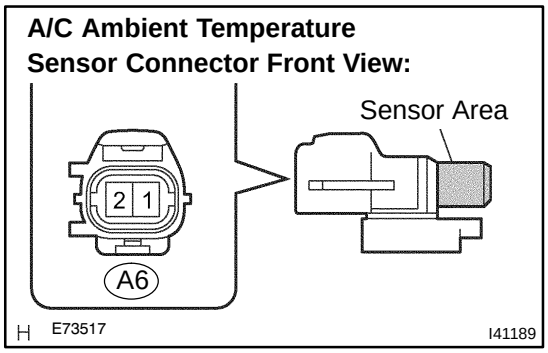
NG	A
OK (Checking from the PROBLEM SYMPTOMS TABLE)	B
OK (Checking from the DTC)	C

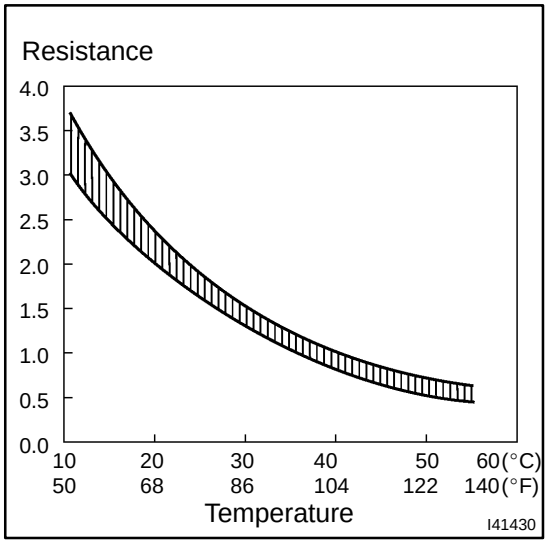
B → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05–1268)**

C → **REPLACE AIR CONDITIONING AMPLIFIER (SEE PAGE 55–47)**

A

3 INSPECT A/C AMBIENT TEMPERATURE SENSOR





(a) Remove the A/C ambient temperature sensor.
(b) Disconnect the connector from A/C ambient temperature sensor.
(c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
A6–1 – A6–2	10°C (50°F)	3.00 to 3.73 kΩ
A6–1 – A6–2	15°C (59°F)	2.45 to 2.88 kΩ
A6–1 – A6–2	20°C (68°F)	1.95 to 2.30 kΩ
A6–1 – A6–2	25°C (77°F)	1.60 to 1.80 kΩ
A6–1 – A6–2	30°C (86°F)	1.28 to 1.47 kΩ
A6–1 – A6–2	35°C (95°F)	1.00 to 1.22 kΩ
A6–1 – A6–2	40°C (104°F)	0.80 to 1.00 kΩ
A6–1 – A6–2	45°C (113°F)	0.65 to 0.85 kΩ
A6–1 – A6–2	50°C (122°F)	0.50 to 0.70 kΩ
A6–1 – A6–2	55°C (131°F)	0.44 to 0.60 kΩ
A6–1 – A6–2	60°C (140°F)	0.36 to 0.50 kΩ

NOTICE:

- **Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.**
- **When measuring, the sensor temperature must be the same as the ambient temperature.**

HINT:

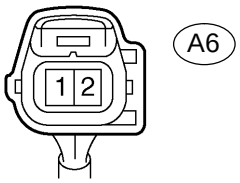
As the temperature increases, the resistance decreases (see the graph below).

NG → **REPLACE A/C AMBIENT TEMPERATURE SENSOR**

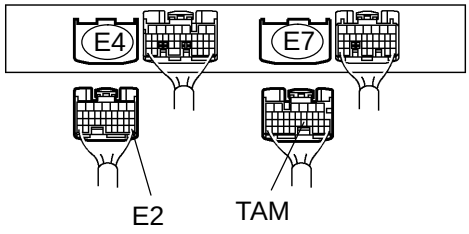
OK

4	CHECK HARNESS AND CONNECTOR(A/C AMBIENT TEMPERATURE SENSOR – ECM) (SEE PAGE 01–47)

A/C Ambient Temperature Sensor Connector Front View:



ECM Connector Wire Harness View:



(a) Disconnect the connector from A/C ambient temperature sensor.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
E7–21 (TAM) – A6–2	Always	Below 1 Ω
E4–28 (E2) – A6–1	Always	Below 1 Ω
E7–21 (TAM) – Body ground	Always	10 kΩ or higher
E4–28 (E2) – Body ground	Always	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE AIR CONDITIONING AMPLIFIER (SEE PAGE 55–47)