Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM10000000290ZT
Model Year Start: 2023	**Model:** Prius	**Prod Date Range:** [12/2022 -]
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM (for HEV Model): P007015; Ambient Temperature Sensor Circuit Short to Battery or Open; 2023 - 2024 MY Prius [12/2022 -]		

DTC	**P007015**	**Ambient Temperature Sensor Circuit Short to Battery or Open**

DESCRIPTION

The ambient temp. sensor (thermistor assembly) is installed in front of the cooler condenser assembly to detect the ambient temperature, which is used to control the air conditioning system. This sensor is connected to the air conditioning amplifier assembly and detects fluctuations in the ambient temperature. This data is used for controlling the cabin temperature. The sensor sends a signal to the air conditioning amplifier assembly. The resistance of the ambient temp. sensor (thermistor assembly) changes in accordance with the ambient temperature. As the temperature decreases, the resistance increases. As the temperature increases, the resistance decreases.

The air conditioning amplifier assembly applies voltage to the ambient temp. sensor (thermistor assembly) and reads voltage changes due to changes in the resistance of the ambient temp. sensor (thermistor assembly).

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MEMORY	DTC OUTPUT FROM	PRIORITY
P007015	Ambient Temperature Sensor Circuit Short to Battery or Open	Diagnosis Condition: Ignition switch ON Malfunction: Open or short (+B) in ambient temperature sensor circuit Detection Time: Continuously for 4 seconds or more	• Ambient temp. sensor (Thermistor assembly) • Harness or connector • Air conditioning amplifier assembly	Memorized	Air Conditioner	A

DTC Detection Condition Combination Table

		VEHICLE CONDITION	
		PATTERN 1	PATTERN 2
Diagnosis Condition	Ignition switch ON	○	○
Malfunction	Open in ambient temperature sensor circuit	○	-

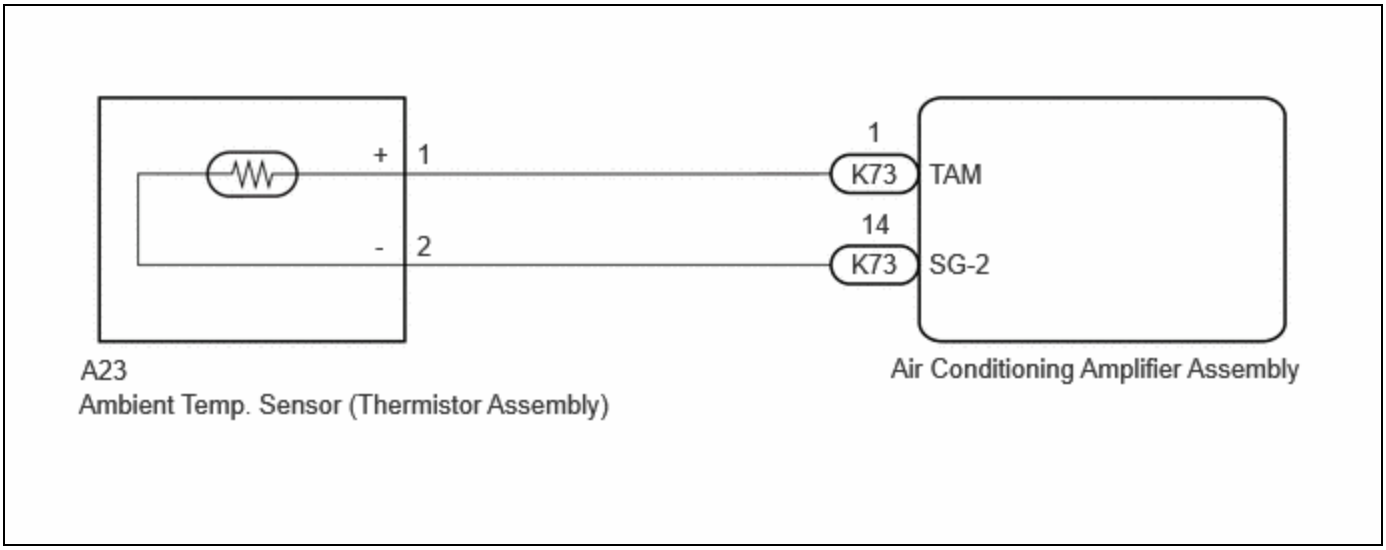
		VEHICLE CONDITION	
		PATTERN 1	PATTERN 2
	Short (+B) in ambient temperature sensor circuit	-	○
Detection Time		Continuously for 4 seconds or more	Continuously for 4 seconds or more
Trip Count		1 trip	1 trip

HINT:

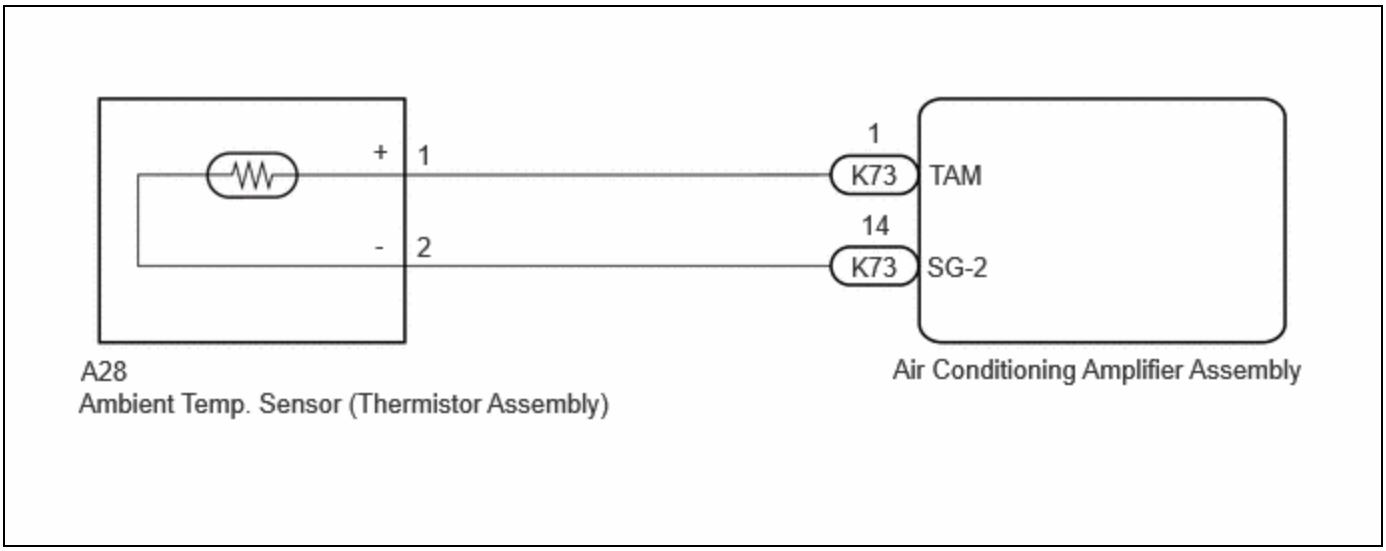
If the conditions of either of these patterns are detected, a DTC will be stored.

WIRING DIAGRAM

for 2ZR-FXE:



for M20A-FXS:



PROCEDURE

1.	**CONFIRM MODEL**

RESULT	PROCEED TO
for 2ZR-FXE	A
for M20A-FXS	B

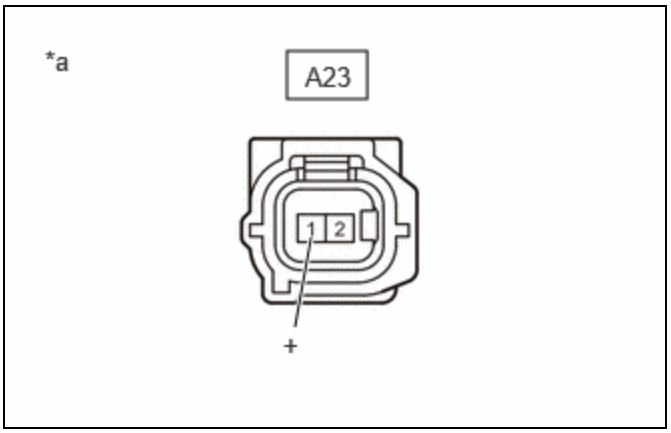
B ▶ **GO TO STEP 7**

A ▼

2.	**CHECK AMBIENT TEMP. SENSOR (THERMISTOR ASSEMBLY) CIRCUIT**

Pre-procedure1

(a) Disconnect the A23 ambient temp. sensor (thermistor assembly) connector.



*a	Front view of wire harness connector (to Ambient Temp. Sensor (Thermistor Assembly))

Procedure1

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

Standard Voltage:

EWD INFO

Click Location & Routing(A23)

Click Connector(A23)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A23-1 (+) - Body ground	Ignition switch ON	0 to 5.5 V	V

Post-procedure1

(c) None

NG ▶ **GO TO STEP 6**

OK ▼

3.	**CLEAR DTC**

(a) Clear the DTCs.

Body Electrical > Air Conditioner > Clear DTCs

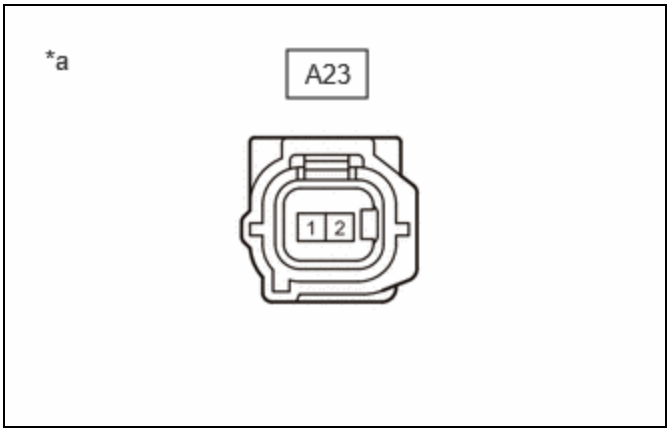
NEXT ▼

4.	**CHECK FOR DTC**

Pre-procedure1

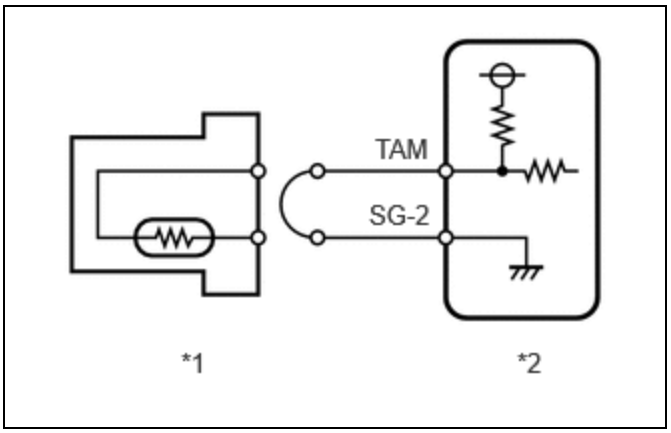
(a) Turn the ignition switch off.

(b) Disconnect the A23 ambient temp. sensor (thermistor assembly) connector.



*a	Front view of wire harness connector (to Ambient Temp. Sensor (Thermistor Assembly))

(c) Connect terminals 1 and 2 of the ambient temp. sensor (thermistor assembly) connector on the wire harness side.



*1	Ambient Temp. Sensor (Thermistor Assembly)
*2	Air Conditioning Amplifier Assembly

(d) Turn the ignition switch to ON and wait for 4 seconds or more.

Procedure1

(e) Check for DTCs.

Body Electrical > Air Conditioner > Trouble Codes

RESULT	PROCEED TO
P007011 is output	A
P007015 is output	B

Post-procedure1

(f) None

A ▶ **REPLACE AMBIENT TEMP. SENSOR (THERMISTOR ASSEMBLY)**

B ▼

5.	**CHECK HARNESS AND CONNECTOR (AIR CONDITIONING AMPLIFIER ASSEMBLY - AMBIENT TEMP. SENSOR (THERMISTOR ASSEMBLY))**

Pre-procedure1

(a) Disconnect the A23 ambient temp. sensor (thermistor assembly) connector.

(b) Disconnect the K73 air conditioning amplifier assembly connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(A23,K73)
Click Connector(A23)
Click Connector(K73)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A23-1 (+) - K73-1 (TAM)	Always	Below 1 Ω	Ω
A23-2 (-) - K73-14 (SG-2)	Always	Below 1 Ω	Ω

Post-procedure1

(d) None

OK ▶ **REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY**

Click here INFO

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

6.	**CHECK HARNESS AND CONNECTOR (AIR CONDITIONING AMPLIFIER ASSEMBLY - AMBIENT TEMP. SENSOR (THERMISTOR ASSEMBLY))**

Pre-procedure1

(a) Disconnect the A23 ambient temp. sensor (thermistor assembly) connector.

(b) Disconnect the K73 air conditioning amplifier assembly connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(A23,K73)
Click Connector(A23)
Click Connector(K73)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A23-1 (+) or K73-1 (TAM) - Other terminals and body ground	Always	10 kΩ or higher	kΩ

Post-procedure1

(d) None

OK ▶ **REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY**

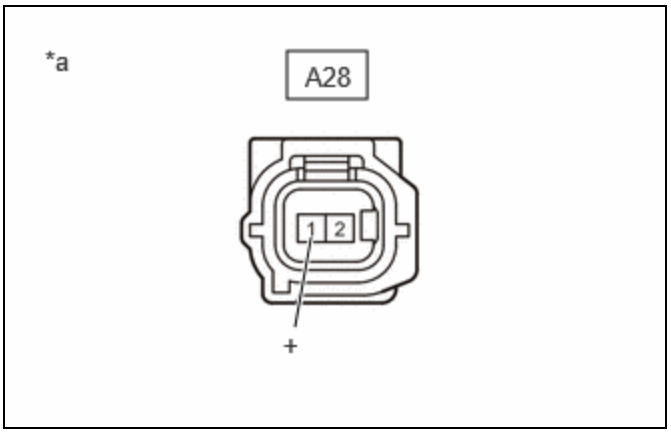
Click here INFO

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

7.	**CHECK AMBIENT TEMP. SENSOR (THERMISTOR ASSEMBLY) CIRCUIT**

Pre-procedure1

(a) Disconnect the A28 ambient temp. sensor (thermistor assembly) connector.



*a	Front view of wire harness connector (to Ambient Temp. Sensor (Thermistor Assembly))

Procedure1

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

Standard Voltage:

EWD INFO

Click Location & Routing(A28)
Click Connector(A28)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A28-1 (+) - Body ground	Ignition switch ON	0 to 5.5 V	V

Post-procedure1

(c) None

NG ▶ **GO TO STEP 11**

OK ▼

8.	**CLEAR DTC**

(a) Clear the DTCs.

Body Electrical > Air Conditioner > Clear DTCs

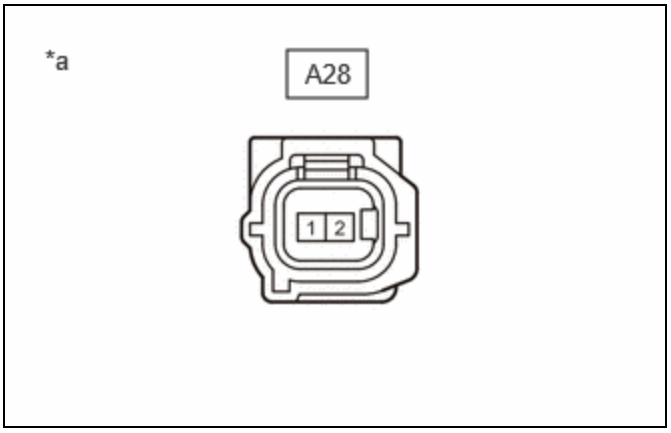
NEXT ▼

9.	**CHECK FOR DTC**

Pre-procedure1

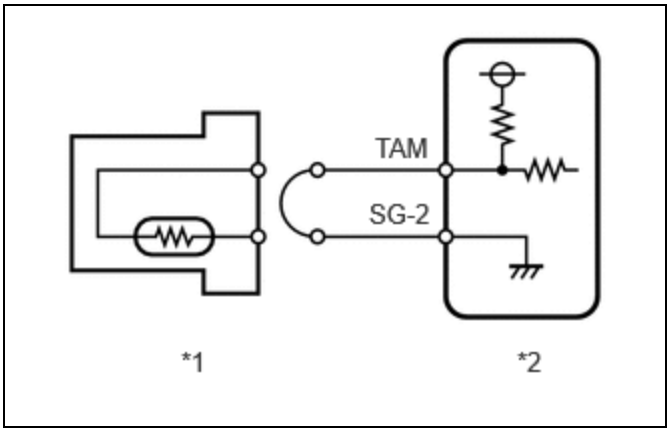
(a) Turn the ignition switch off.

(b) Disconnect the A28 ambient temp. sensor (thermistor assembly) connector.



*a	Front view of wire harness connector (to Ambient Temp. Sensor (Thermistor Assembly))

(c) Connect terminals 1 and 2 of the ambient temp. sensor (thermistor assembly) connector on the wire harness side.



*1	Ambient Temp. Sensor (Thermistor Assembly)
*2	Air Conditioning Amplifier Assembly

(d) Turn the ignition switch to ON and wait for 4 seconds or more.

Procedure1

(e) Check for DTCs.

Body Electrical > Air Conditioner > Trouble Codes

RESULT	PROCEED TO
P007011 is output	A
P007015 is output	B

Post-procedure1

(f) None

A ▶ **REPLACE AMBIENT TEMP. SENSOR (THERMISTOR ASSEMBLY)**

B ▼

10.	**CHECK HARNESS AND CONNECTOR (AIR CONDITIONING AMPLIFIER ASSEMBLY - AMBIENT TEMP. SENSOR (THERMISTOR ASSEMBLY))**

Pre-procedure1

(a) Disconnect the A28 ambient temp. sensor (thermistor assembly) connector.

(b) Disconnect the K73 air conditioning amplifier assembly connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(A28,K73)
Click Connector(A28)
Click Connector(K73)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A28-1 (+) - K73-1 (TAM)	Always	Below 1 Ω	Ω
A28-2 (-) - K73-14 (SG-2)	Always	Below 1 Ω	Ω

Post-procedure1

(d) None

OK ▶ **REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY**

Click here INFO

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

11.	**CHECK HARNESS AND CONNECTOR (AIR CONDITIONING AMPLIFIER ASSEMBLY - AMBIENT TEMP. SENSOR (THERMISTOR ASSEMBLY))**

Pre-procedure1

(a) Disconnect the A28 ambient temp. sensor (thermistor assembly) connector.

(b) Disconnect the K73 air conditioning amplifier assembly connector.

Procedure1

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

Standard Resistance:

Click Location & Routing(A28,K73)
Click Connector(A28)
Click Connector(K73)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A28-1 (+) or K73-1 (TAM) - Other terminals and body ground	Always	10 kΩ or higher	kΩ

Post-procedure1

(d) None

OK ▶ **REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY**

Click here INFO

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**