Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002AQPE
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM (for PHEV Model): P007015; Ambient Temperature Sensor Circuit Short to Battery or Open; 2023 - 2024 MY Prius Prime [03/2023 -]		

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

DESCRIPTION

The ambient temp. sensor (thermistor assembly) is installed in front of the outer heat exchanger (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	MIL	MEMORY	DTC OUTPUT FROM	PRIORITY	NOTE
P007015	Ambient Temperature Sensor Circuit Short to Battery or Open	Diagnosis Condition: Ignition switch ON Malfunction Status: 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	Come on	Memorized	Air Conditioner	A	SAE Code: P0073

DTC Detection Condition Combination Table

		VEHICLE CONDITION	
		PATTERN 1	PATTERN 2
Diagnosis Condition	Ignition switch ON	○	○

		VEHICLE CONDITION	
		PATTERN 1	PATTERN 2
Malfunction	Open in ambient temperature sensor circuit	○	-
	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.

MONITOR DESCRIPTION

When the signal voltage of the ambient temp. sensor (thermistor assembly) is the threshold or higher, the air conditioning amplifier assembly illuminates the MIL and stores this DTC.

MONITOR STRATEGY

Related DTCs	P0073: Ambient Temperature Sensor Circuit Short to Battery or Open
Required Sensors/Components (Main)	Ambient temp. sensor (thermistor assembly)
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	4 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Battery voltage	10 V or higher
Time after Ignition switch OFF to ON	10 seconds

TYPICAL MALFUNCTION THRESHOLDS

Voltage of ambient temp. sensor (thermistor assembly)	4.913 V more than

CONFIRMATION DRIVING PATTERN

HINT:

- After repair has been completed, clear the DTC and then check that the vehicle has returned to normal by performing the following All Readiness check procedure.

    Click here **INFO**
- When clearing the permanent DTCs, refer to the "CLEAR PERMANENT DTC" procedure.

    Click here **INFO**

    1. Connect the GTS to the DLC3.

2. Turn the ignition switch to ON.
3. Turn the GTS on.
4. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
5. Turn the ignition switch off and wait for at least 30 seconds.
6. Turn the ignition switch to ON. [A].
7. Turn the GTS on.
8. Wait 4 seconds or more.[B]
9. Enter the following menus: Body Electrical / Air Conditioner / Trouble Codes [C].
10. Read the pending DTCs.

   HINT:

   - If a pending DTC is output, the system is malfunctioning.
   - If a pending DTC is not output, perform the following procedure.

11. Enter the following menus: Body Electrical / Air Conditioner / Utility / All Readiness.
12. Input the DTC: P007015.
13. Check the DTC judgment result.

| GTS DISPLAY	DESCRIPTION
NORMAL	- DTC judgment completed - System normal
ABNORMAL	- DTC judgment completed - System abnormal
INCOMPLETE	- DTC judgment not completed - Perform driving pattern after confirming DTC enabling conditions

   HINT:

   - If the judgment result is NORMAL, the system is normal.
   - If the judgment result is ABNORMAL, the system is malfunctioning.
   - If the judgment result is INCOMPLETE, perform steps [A] through [C] again.
   - [A] to [C]: Normal judgment procedure.

       The normal judgment procedure is used to complete DTC judgment and also used when clearing permanent DTCs.
   - When clearing the permanent DTCs, do not disconnect the cable from the auxiliary battery terminal or attempt to clear the DTCs during this procedure, as doing so will clear the universal trip and normal judgment histories.
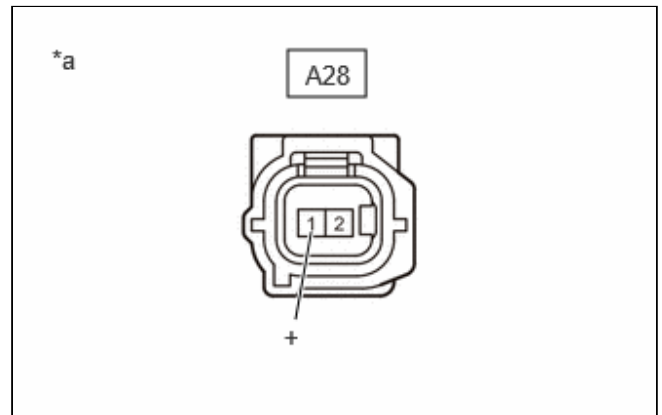
WIRING DIAGRAM

A28
Ambient Temp. Sensor (Thermistor Assembly)

Air Conditioning Amplifier Assembly
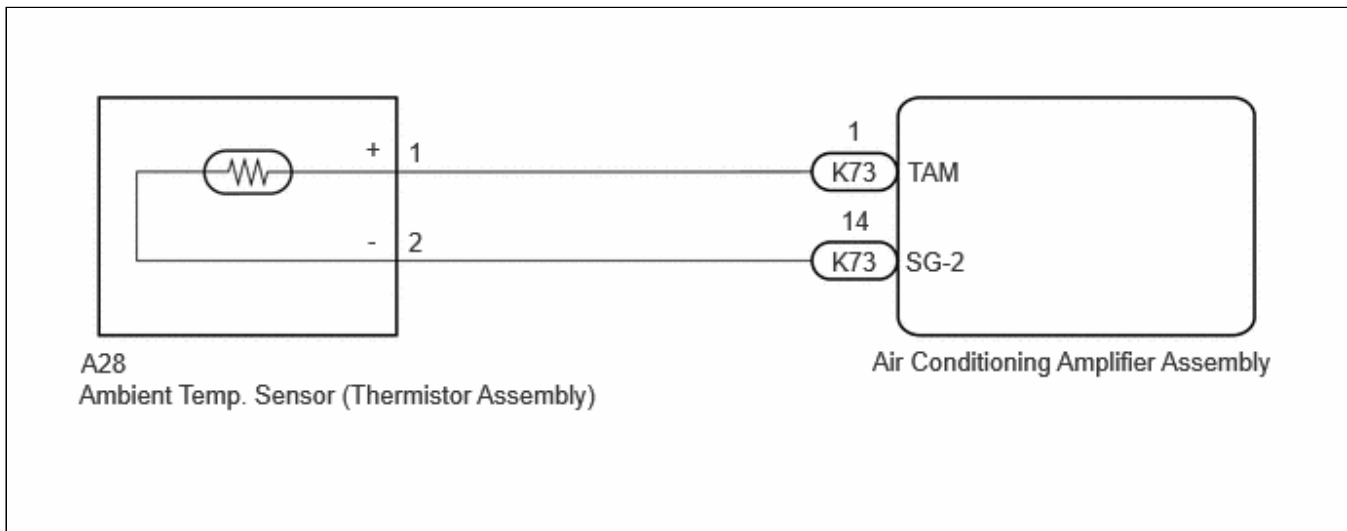
PROCEDURE

1.	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 5**

OK
▼

2.	CLEAR DTC

(a) Clear the DTCs.

Body Electrical > Air Conditioner > Clear DTCs

NEXT
▼

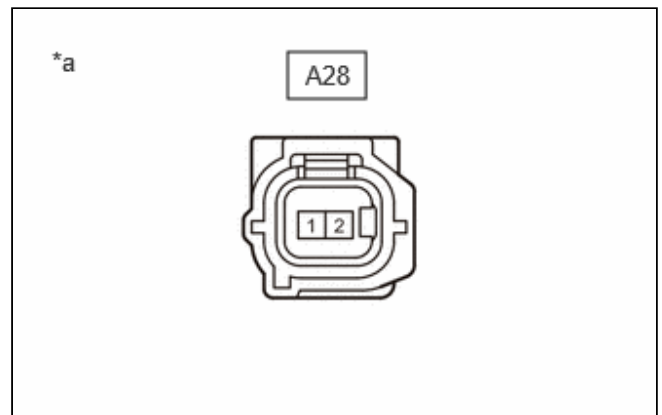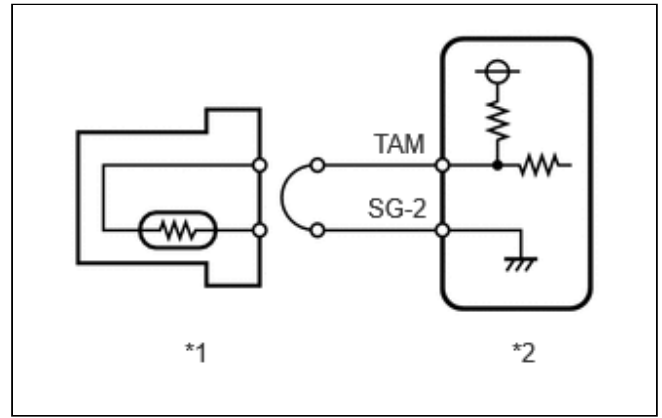| 3.	CHECK FOR DTC

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
▼

4.	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**

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

5.	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 (+) 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**

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