Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002AQOQ
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM (for PHEV Model): P0EBC15; External Condenser Refrigerant Temperature Sensor Circuit Short to Battery or Open; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**P0EBC15**	**External Condenser Refrigerant Temperature Sensor Circuit Short to Battery or Open**

DESCRIPTION

The outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) is installed to the refrigerant piping after the outer heat exchanger (cooler condenser assembly), and detects the refrigerant temperature after it passes through the outer heat exchanger (cooler condenser assembly).

The resistance of the outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) changes in accordance with the refrigerant gas temperature. Resistance increases as the refrigerant gas temperature drops and decreases as the temperature rises.

The heat pump ECU assembly outputs a voltage to the outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) and reads voltage changes that result from the changes in the resistance of the outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly).

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	MEMORY	DTC OUTPUT FROM	PRIORITY	NOTE
P0EBC15	External Condenser Refrigerant Temperature Sensor Circuit Short to Battery or Open	Diagnosis Condition: Ignition switch ON Malfunction Status: Open or short to +B in outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) circuit Detection Time: Continuously for 4 seconds or more	• Outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) • Harness or connector • Air conditioning amplifier assembly • Heat pump ECU assembly	Come on	Memorized	Air Conditioner	A	SAE Code: P0EBD

DTC Detection Condition Combination Table

		VEHICLE CONDITION	
		PATTERN 1	PATTERN 2
Diagnosis Condition	Ignition switch ON	○	○
Malfunction	Open in outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) circuit	○	-
	Short to +B in outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) 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 outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) is the threshold or higher, the air conditioning amplifier assembly illuminates the MIL and stores this DTC.

MONITOR STRATEGY

Related DTCs	P0EBD: External Condenser Refrigerant Temperature Sensor Circuit Short to Battery or Open
Required Sensors/Components (Main)	Outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning 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 outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly)	4.932 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: P0EBC15.
13. Check the DTC judgment result.

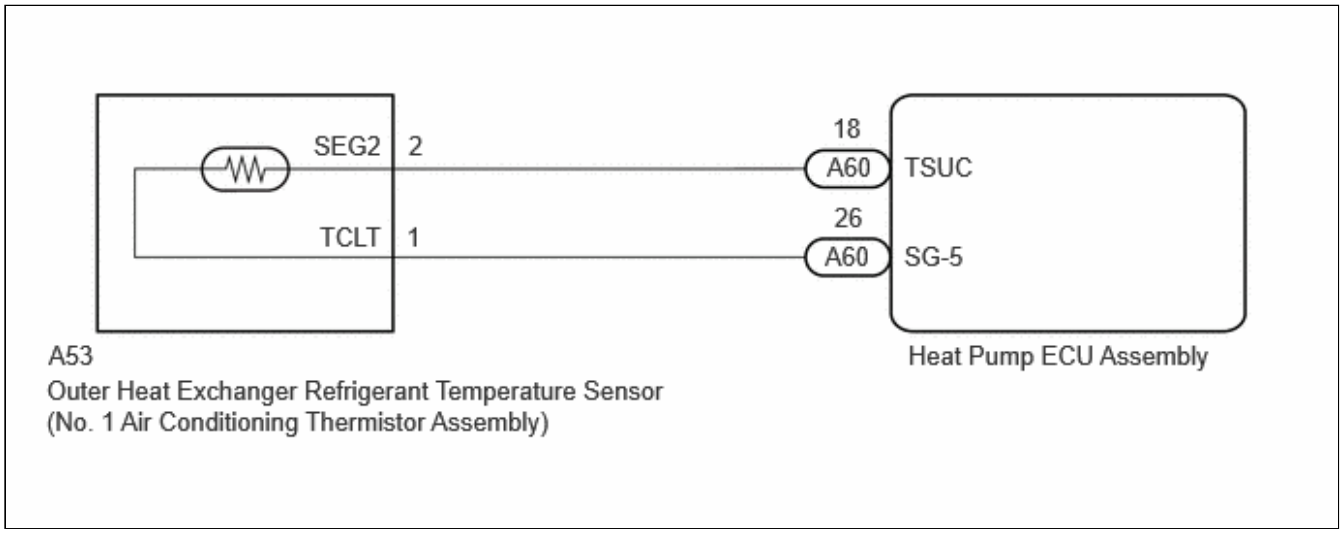
GTS DISPLAY	DESCRIPTION
NORMAL	◦ DTC judgment completed ◦ System normal
ABNORMAL	◦ DTC judgment completed ◦ System abnormal
INCOMPLETE	◦ DTC judgment not completed ◦ Perform driving pattern after confirming DTC enabling conditions

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



PROCEDURE

1.	**CHECK OUTER HEAT EXCHANGER REFRIGERANT TEMPERATURE SENSOR (NO. 1 AIR CONDITIONING THERMISTOR ASSEMBLY) CIRCUIT**

Pre-procedure1

(a) Disconnect the A53 outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) connector.

Procedure1

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

Standard Voltage:

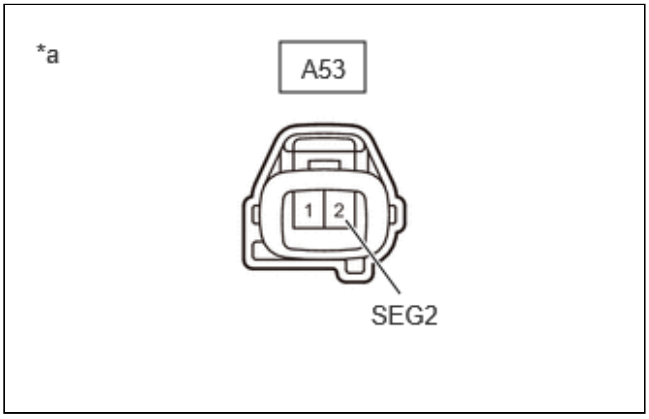
EWD INFO

Click Location & Routing(A53)
Click Connector(A53)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A53-2 (SEG2) - Body ground	Ignition switch ON	0 to 5.5 V	V

Result:

PROCEED TO
OK
NG



*a	Front view of wire harness connector (to Outer Heat Exchanger Refrigerant Temperature Sensor (No. 1 Air Conditioning Thermistor Assembly))

Post-procedure1

(c) None

NG ▶ **GO TO STEP 5**

OK
▼

2.	**CLEAR DTC**

(a) Clear the DTCs.

Body Electrical > Air Conditioner > Clear DTCs

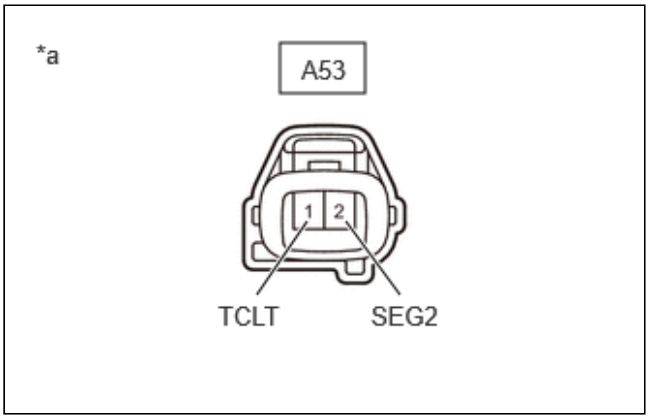
NEXT
▼

3.	**CHECK FOR DTC**

Pre-procedure1

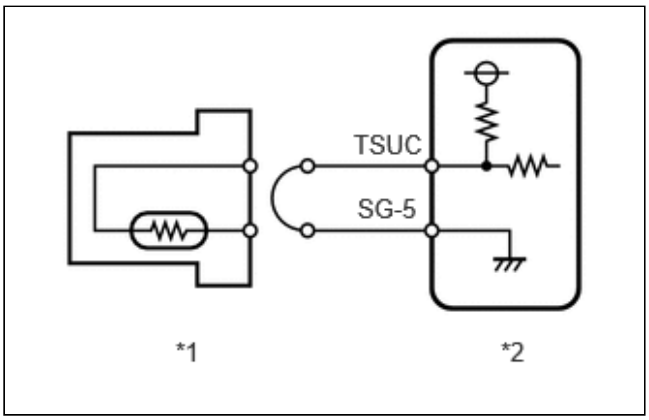
(a) Turn the ignition switch off.

(b) Disconnect the A53 outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) connector.



*a	Front view of wire harness connector (to Outer Heat Exchanger Refrigerant Temperature Sensor (No. 1 Air Conditioning Thermistor Assembly))

(c) Connect terminals 1 and 2 of the outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) connector on the wire harness side.



*1	Outer Heat Exchanger Refrigerant Temperature Sensor (No. 1 Air Conditioning Thermistor Assembly)
*2	Heat Pump ECU 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
P0EBC11 is output	A
P0EBC15 is output	B

Post-procedure1

(f) None

A ▶ **REPLACE OUTER HEAT EXCHANGER REFRIGERANT TEMPERATURE SENSOR (NO. 1 AIR CONDITIONING THERMISTOR ASSEMBLY)**

B ▼

4.	**CHECK HARNESS AND CONNECTOR (OUTER HEAT EXCHANGER REFRIGERANT TEMPERATURE SENSOR - HEAT PUMP ECU ASSEMBLY)**

Pre-procedure1

(a) Disconnect the A53 outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) connector.

(b) Disconnect the A60 heat pump ECU assembly connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(A53,A60)
Click Connector(A53)
Click Connector(A60)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A53-2 (SEG2) - A60-18 (TSUC)	Always	Below 1 Ω	Ω
A53-1 (TCLT) - A60-26 (SG-5)	Always	Below 1 Ω	Ω

Post-procedure1

(d) None

OK ▶ **REPLACE HEAT PUMP ECU ASSEMBLY**

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

5.	**CHECK HARNESS AND CONNECTOR (OUTER HEAT EXCHANGER REFRIGERANT TEMPERATURE SENSOR - HEAT PUMP ECU ASSEMBLY)**

Pre-procedure1

(a) Disconnect the A53 outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) connector.

(b) Disconnect the A60 heat pump ECU assembly connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(A53,A60)
Click Connector(A53)
Click Connector(A60)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A53-2 (SEG2) or A60-18 (TSUC) - Other terminals and body ground	Always	10 kΩ or higher	kΩ

Post-procedure1

(d) None

OK ▶ **REPLACE HEAT PUMP ECU ASSEMBLY**

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