Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002AQPG
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM (for PHEV Model): P053015; Refrigerant Pressure Sensor Circuit Short to Battery or Open; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**P053015**	**Refrigerant Pressure Sensor Circuit Short to Battery or Open**

DESCRIPTION

The air conditioning pressure sensor, which is installed to the high pressure side pipe to detect refrigerant pressure, sends a refrigerant pressure signal to the air conditioning amplifier assembly. The air conditioning amplifier assembly converts this signal to a pressure value according to the sensor characteristics and uses it to control the compressor.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	MEMORY	DTC OUTPUT FROM	PRIORITY	NOTE
P053015	Refrigerant Pressure Sensor Circuit Short to Battery or Open	Diagnosis Condition: Ignition switch ON Malfunction Status: Open or short in air conditioning pressure sensor circuit Detection Time: Continuously for 4 seconds or more Trip: 1 trip detection logic	• Air conditioning pressure sensor • Harness or connector • Air conditioning amplifier assembly	Come on	Memorized	Air Conditioner	A	SAE Code: P0533

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 air conditioning pressure sensor circuit	○	-
	Short in air conditioning pressure 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 air conditioning pressure sensor is the threshold or higher, the air conditioning amplifier assembly illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0533: Refrigerant Pressure Sensor Circuit Short to Battery or Open
Required Sensors/Components (Main)	Air conditioning pressure sensor
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 air conditioning pressure sensor	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: P053015.
13. Check the DTC judgment result.

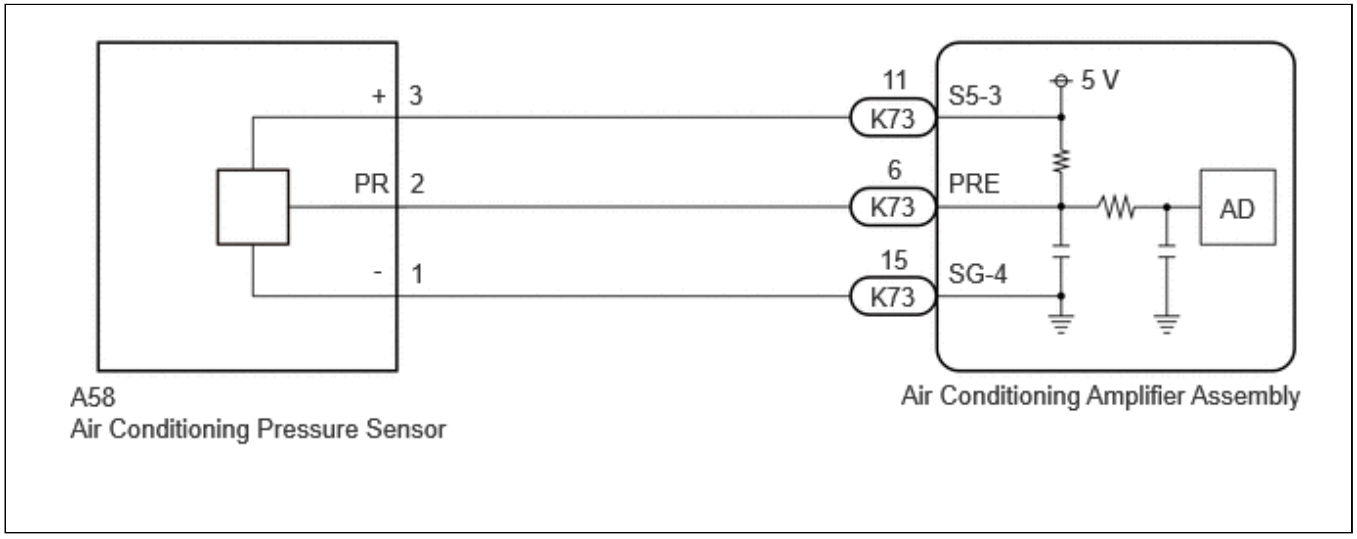
GTS DISPLAY	DESCRIPTION
NORMAL	◦ DTC judgment completed ◦ System normal
ABNORMAL	◦ DTC judgment completed ◦ System abnormal
INCOMPLETE	◦ DTC judgment not completed ◦ Perform driving pattern after confirming DTC enabling conditions

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



CAUTION / NOTICE / HINT

NOTICE:

If DTC P05347A is output at the same time, perform troubleshooting for DTC P05347A first.

Click here INFO

HINT:

If a connector is disconnected or not installed correctly, securely connect it and check for DTCs.

PROCEDURE

1.	**CHECK COMPARE REFRIGERANT GAS PRESSURE VALUES SHOWN ON GTS AND MANIFOLD GAUGE SET**

Pre-procedure1

(a) Install a manifold gauge set.

HINT:

Click here INFO

Procedure1

(b) Compare the values displayed in the Data List and on the manifold gauge.

Body Electrical > Air Conditioner > Data List

TESTER DISPLAY	MEASUREMENT ITEM	RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Regulator Pressure Sensor	Air conditioning pressure sensor	-32768 to 32767 kPa(gauge) (-32.768 to 32.767 MPaG)	Actual refrigerant pressure displayed	• Refrigerant line (gas leak etc.) • Air conditioning pressure sensor circuit malfunction

Body Electrical > Air Conditioner > Data List

TESTER DISPLAY
Regulator Pressure Sensor

RESULT	PROCEED TO
Data List value and manifold gauge set value do not match	A
Data List value matches manifold gauge set value	B

Post-procedure1

(c) None

B ▶ **INSPECT REFRIGERANT PRESSURE WITH MANIFOLD GAUGE SET**

A ▼

2.	**CHECK HARNESS AND CONNECTOR (AIR CONDITIONING PRESSURE SENSOR - BODY GROUND)**

Pre-procedure1

(a) Disconnect the A58 air conditioning pressure sensor connector.

Procedure1

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

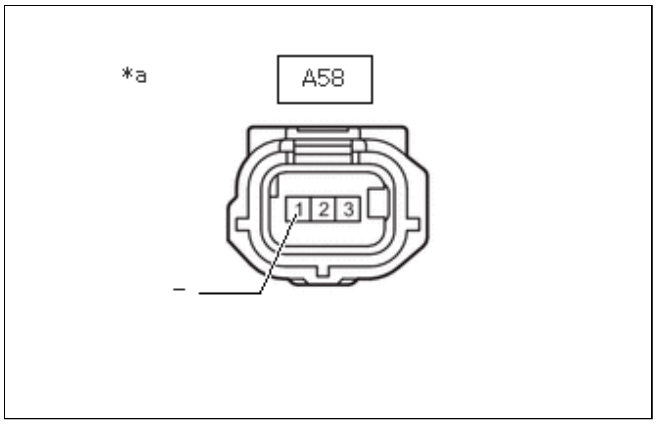
Standard Resistance:

EWD INFO

Click Location & Routing(A58)
Click Connector(A58)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A58-1 (-) - Body ground	Always	Below 1 Ω	Ω

Result:



*a	Front view of wire harness connector (to Air Conditioning Pressure Sensor)

PROCEED TO
OK
NG

Post-procedure1

(c) None

NG ▶ **GO TO STEP 8**

OK ▼

3.	**CHECK HARNESS AND CONNECTOR (AIR CONDITIONING PRESSURE SENSOR - BODY GROUND)**

Pre-procedure1

(a) Disconnect the A58 air conditioning pressure sensor connector.

Procedure1

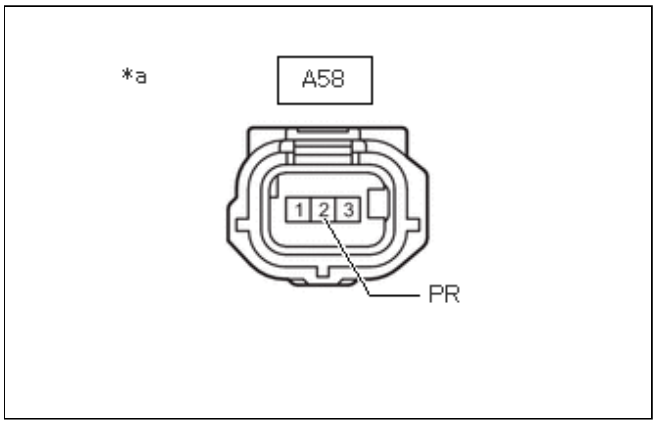
(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

EWD INFO

Click Location & Routing(A58)
Click Connector(A58)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A58-2 (PR) - Body ground	Ignition switch ON	3.0 to 5.25 V	V



*a	Front view of wire harness connector (to Air Conditioning Pressure Sensor)

Result:

RESULT	PROCEED TO
A58-2 (PR) - Body ground is more than 5.25 V	A
A58-2 (PR) - Body ground is more than or equal to 3.0 and less than or equal to 5.25 V	B

RESULT	PROCEED TO
A58-2 (PR) - Body ground is less than 3.0 V	C

Post-procedure1

(c) None

B ▶ **GO TO STEP 5**

C ▶ **GO TO STEP 7**

A ▼

4.	**CHECK HARNESS AND CONNECTOR (AIR CONDITIONING AMPLIFIER ASSEMBLY - AIR CONDITIONING PRESSURE SENSOR)**

Pre-procedure1

(a) Disconnect the A58 air conditioning pressure sensor 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(A58,K73)
Click Connector(A58)
Click Connector(K73)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A58-2 (PR) or K73-6 (PRE) - 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**

5.	**CHECK AIR CONDITIONING AMPLIFIER ASSEMBLY (INTERNAL CIRCUIT RESISTANCE)**

Pre-procedure1

(a) Disconnect the A58 air conditioning pressure sensor connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(A58)
Click Connector(A58)

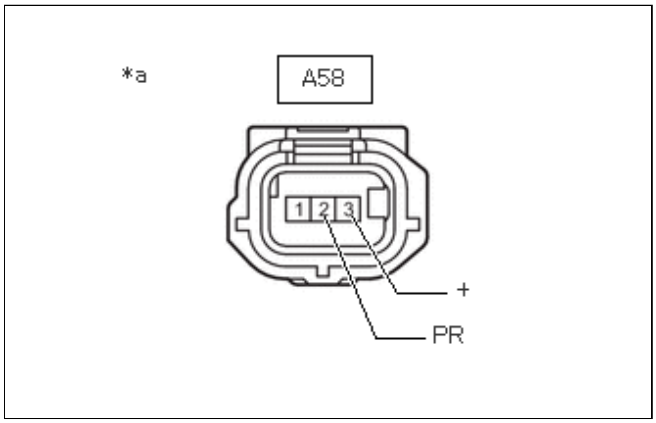
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A58-3 (+) - A58-2 (PR)	Ignition switch off	180 to 220 kΩ	kΩ

HINT:

After turning the ignition switch off, wait at least 30 seconds before performing the measurement.

Result:

PROCEED TO
OK
NG



*a	Front view of wire harness connector (to Air Conditioning Pressure Sensor)

Post-procedure1

(c) None

OK ▶ **REPLACE AIR CONDITIONING PRESSURE SENSOR**

NG ▼

6.	**CHECK HARNESS AND CONNECTOR (AIR CONDITIONING PRESSURE SENSOR - AIR CONDITIONING AMPLIFIER ASSEMBLY)**

Pre-procedure1

(a) Disconnect the A58 air conditioning pressure sensor 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(A58,K73)
Click Connector(A58)
Click Connector(K73)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A58-2 (PR) - A58-3 (+)	Always	10 kΩ or higher	kΩ
K73-6 (PRE) - K73-11 (S5-3)	Always	10 kΩ or higher	kΩ

Post-procedure1

(d) None

OK ▶ **REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY**

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

7.	**CHECK HARNESS AND CONNECTOR (AIR CONDITIONING AMPLIFIER ASSEMBLY - AIR CONDITIONING PRESSURE SENSOR)**

Pre-procedure1

(a) Disconnect the A58 air conditioning pressure sensor 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(A58,K73)
Click Connector(A58)
Click Connector(K73)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A58-2 (PR) - K73-6 (PRE)	Always	Below 1 Ω	Ω

Post-procedure1

(d) None

OK ▶ **REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY**

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

8.	**CHECK HARNESS AND CONNECTOR (AIR CONDITIONING AMPLIFIER ASSEMBLY - AIR CONDITIONING PRESSURE SENSOR)**

Pre-procedure1

(a) Disconnect the A58 air conditioning pressure sensor 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(A58,K73)
Click Connector(A58)
Click Connector(K73)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A58-1 (-) - K73-15 (SG-4)	Always	Below 1 Ω	Ω

Post-procedure1

(d) None

OK ▶ **REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY**

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