Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002AQON
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM (for PHEV Model): P053016; Refrigerant Pressure Sensor Circuit Voltage Below Threshold; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**P053016**	**Refrigerant Pressure Sensor Circuit Voltage Below Threshold**

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
P053016	Refrigerant Pressure Sensor Circuit Voltage Below Threshold	Diagnosis Condition: Ignition switch ON Malfunction Status: When there is an open in the air conditioning pressure sensor circuit or the gauge pressure is negative Detection Time: Continuously for 4 seconds or more Trip: 2 trip detection logic	• Refrigerant pressure • Refrigerant line • Air conditioning amplifier assembly • Air conditioning pressure sensor • Harness or connector	Come on	Memorized	Air Conditioner	B	SAE Code: P0531

MONITOR DESCRIPTION

When the signal voltage of the air conditioning pressure sensor is the threshold or lower, the air conditioning amplifier assembly illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0531: Refrigerant Pressure Sensor Circuit Voltage Below Threshold
Required Sensors/Components (Main)	Air conditioning pressure sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	4 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not stored	P0531 (A/C Refrigerant Pressure Sensor "A" Circuit Range/Performance (Vcc)) P0532 (A/C Refrigerant Pressure Sensor "A" Circuit Low) P0533 (A/C Refrigerant Pressure Sensor "A" Circuit High) U0111 (Lost Communication With Battery Energy Control Module "A") P1B84 (Hybrid/EV Battery Pressure Sensor Range/Performance)
Battery voltage	10 V or higher
Thermistor Assembly (Ambient Temperature Sensor) value	-20 °C or higher

TYPICAL MALFUNCTION THRESHOLDS

Voltage of air conditioning pressure sensor	0.35 V or less

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: P053016.
13. Check the DTC judgment result.

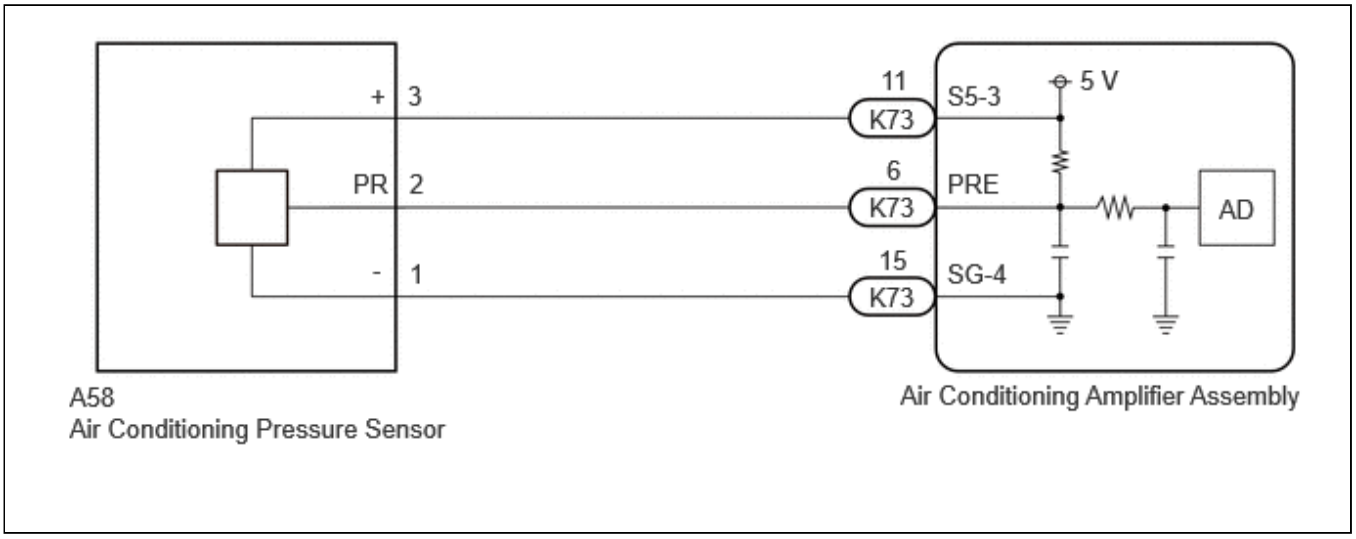
GTS DISPLAY	DESCRIPTION
NORMAL	◦ DTC judgment completed ◦ System normal
ABNORMAL	◦ DTC judgment completed ◦ System abnormal
INCOMPLETE	◦ DTC judgment not completed ◦ Perform driving pattern after confirming DTC enabling conditions

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 DTC (AIR CONDITIONING SYSTEM)**

(a) Check for DTCs.

Body Electrical > Air Conditioner > Trouble Codes

HINT:

Check even when the DTCs detected for temporary failures.

RESULT	PROCEED TO
P053011 is not output	A
P053011 is output	B

RELEVANT DTC	
P053011	Refrigerant Pressure Sensor Circuit Short to Ground

B **GO TO DIAGNOSTIC TROUBLE CODE CHART (P053011)**

A

2.	**CHECK REFRIGERANT PRESSURE**

Pre-procedure1

(a) Install a manifold gauge set.

Procedure1

(b) Read the Data List according to the display on the GTS.

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

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

RESULT	PROCEED TO
The values displayed in the Data List and on the manifold gauge set does not match	A
Data List values and air conditioning tool set values match but the pressure is low	B

Post-procedure1

(d) None

B ▶ **CHARGE SYSTEM WITH REFRIGERANT**

A ▼

3.	CHECK TERMINAL VOLTAGE (AIR CONDITIONING PRESSURE SENSOR)

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:

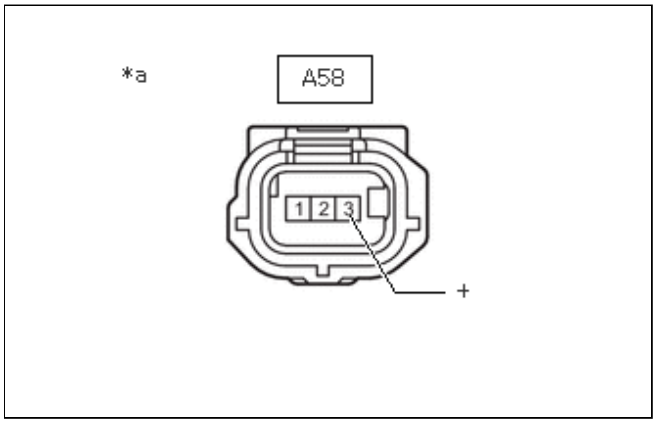
EWD INFO

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

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A58-3 (+) - Body ground	Ignition switch ON	4.75 to 5.25 V	V

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 ▼

4.	**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
A58-3 (+) - K73-11 (S5-3)	Always	Below 1 Ω	Ω

Post-procedure1

(d) None

OK ▶ **REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY**

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