Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002AQOO
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM (for PHEV Model): P05301C; Refrigerant Pressure Sensor Circuit Voltage Out of Range; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**P05301C**	**Refrigerant Pressure Sensor Circuit Voltage Out of Range**

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
P05301C	Refrigerant Pressure Sensor Circuit Voltage Out of Range	Diagnosis condition: Ignition switch is turned to ON after 1 hour elapses after ignition switch is turned off Malfunction status: When there is a difference between the air conditioning pressure sensor (for air conditioning system) and air conditioning pressure sensor (for hybrid battery control system) Detection Time:	• Air conditioning pressure sensor (for air conditioning system) • Air conditioning pressure sensor (for hybrid battery control system) • Harness or connector • Air conditioning amplifier assembly • Hybrid Control System • Hybrid Battery Control System	Come on	Memorized	Air Conditioner	B	SAE Code: B0531

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	MEMORY	DTC OUTPUT FROM	PRIORITY	NOTE
		Continuously for 3 seconds or more Trip: 2 trip detection logic						

MONITOR DESCRIPTION

When the difference in the pressure signal between the air conditioning pressure sensor in the air conditioning system and the air conditioning pressure sensor in the hybrid battery system is the threshold or more, the air conditioning amplifier assembly illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0531: Refrigerant Pressure Sensor Circuit Voltage Out of Range
Required Sensors/Components (Main)	Air conditioning pressure sensor (for air conditioning system) Air conditioning pressure sensor (for hybrid battery control system)
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	3 seconds
MIL Operation	2 driving cycle
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not stored	P153A (A/C Refrigerant Temperature/Ambient Air Temperature Performance) P0072 (Ambient Air Temperature Sensor Circuit "A" Low) P0073 (Ambient Air Temperature Sensor Circuit "A" High)
Battery voltage	10 V or higher
Ignition switch condition	Ignition switch is turned to ON after 1 hour elapses after ignition switch is turned off

TYPICAL MALFUNCTION THRESHOLDS

Pressure difference between air conditioning pressure sensor (for air conditioning system) and air conditioning pressure sensor (for hybrid battery control system)	0.3 MPa or higher

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 60 minutes. [A]
6. Turn the ignition switch to ON. [B].
7. Turn the GTS on.
8. Wait 13 seconds or more. [C]
9. Enter the following menus: Body Electrical / Air Conditioner / Trouble Codes [D].
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: P05301C.
13. Check the DTC judgment result.

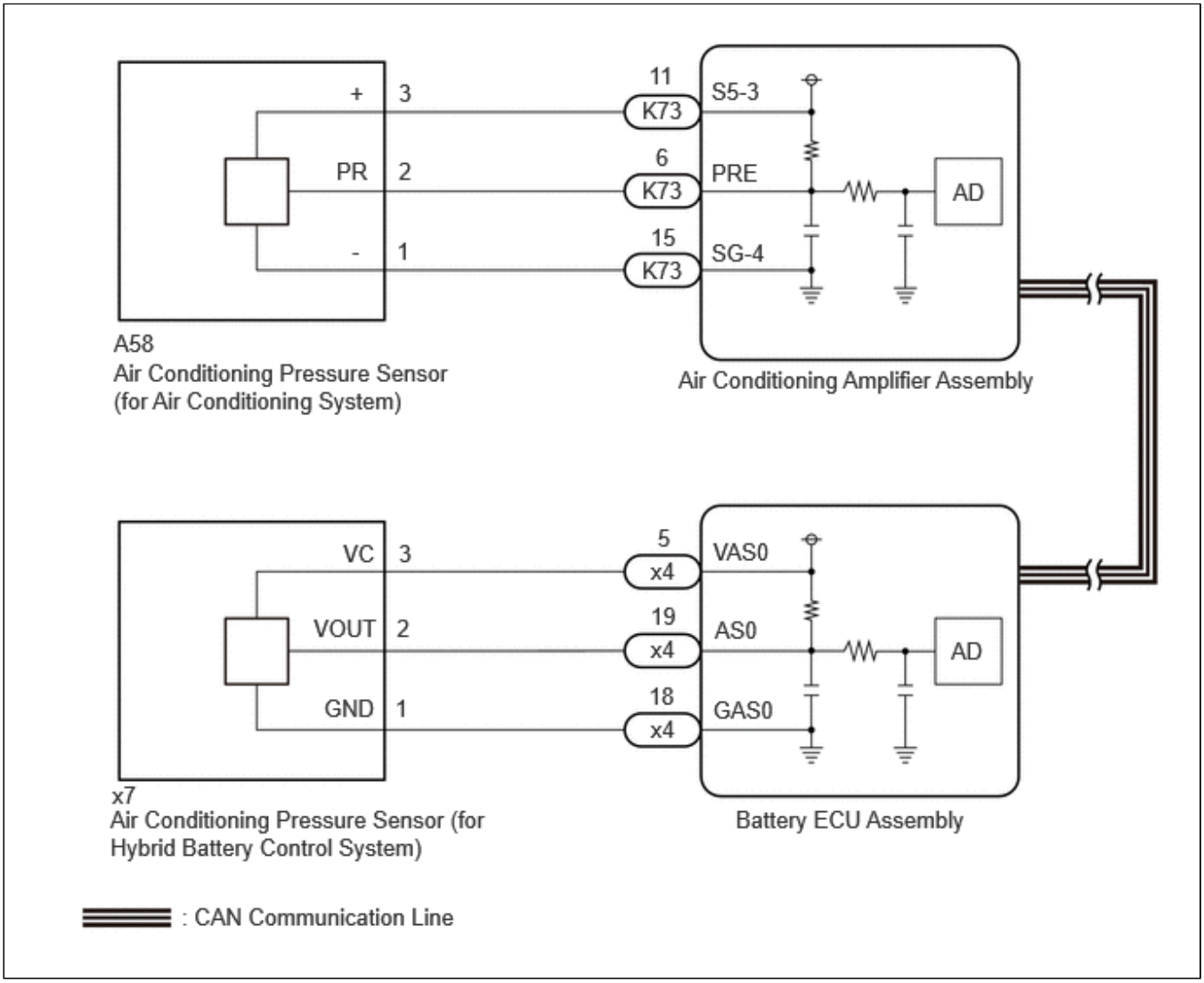
GTS DISPLAY	DESCRIPTION
NORMAL	◦ DTC judgment completed ◦ System normal
ABNORMAL	◦ DTC judgment completed ◦ System abnormal
INCOMPLETE	◦ DTC judgment not completed ◦ Perform driving pattern after confirming DTC enabling conditions

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 [D] again.
- [A] to [D]: 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
Only P05301C is output	A
P053011 and P053015 are not output	B
P05301C and P053011 are output	C

RESULT	PROCEED TO
P05301C and P053015 are output	D

RELEVANT DTC	
P053011	Refrigerant Pressure Sensor Circuit Short to Ground
P053015	Refrigerant Pressure Sensor Circuit Short to Battery or Open

A ▶ **GO TO STEP 2**

C ▶ **GO TO DTC CHART (P053011)**

D ▶ **GO TO DTC CHART (P053015)**

B ▼

2.	**CHECK DTC (HYBRID BATTERY CONTROL SYSTEM)**

(a) Check for DTCs.

Powertrain > HV Battery > Trouble Codes

HINT:

Check even when the DTCs detected for temporary failures.

RESULT	PROCEED TO
P1B8312 is output	A
P1B8314 is output	B
P1B831C is output	C
DTCs are not output	D

RELEVANT DTC	
P1B8312	Hybrid/EV Battery Pack Refrigerant Pressure Sensor "A" Circuit High Circuit Short to Auxiliary Battery
P1B8314	Hybrid/EV Battery Pack Refrigerant Pressure Sensor "A" Circuit Low Circuit Short to Ground or Open
P1B831C	Hybrid/EV Battery Pack Refrigerant Pressure Sensor "A" Circuit Range/Performance Circuit Voltage Out of Range

A ▶ **GO TO DTC CHART (P1B8312)**

B GO TO DTC CHART (P1B8314)

C GO TO DTC CHART (P1B831C)

D

3.	COMPARE REFRIGERANT GAS PRESSURE VALUES SHOWN ON GTS AND MANIFOLD GAUGE SET

HINT:

This check is meant to compare the refrigerant gas pressure with GTS data when the engine is stopped and observed and the air conditioning tool, so do not operate the compressor.

Pre-procedure1

(a) Blower switch turn off.

(b) Wait for 60 minutes after turning the ignition switch off.

(c) Install a manifold gauge set.

Procedure1

(d) 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

Powertrain > HV Battery > Data List

TESTER DISPLAY	MEASUREMENT ITEM	RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Hybrid/EV Battery Refrigerant Pressure 1	HV battery refrigerant pressure 1	-7.660 to 7.659 MPa	-	-

Powertrain > HV Battery > Data List

TESTER DISPLAY
Hybrid/EV Battery Refrigerant Pressure 1

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

RESULT	PROCEED TO
The Data List value for the air conditioning pressure sensor (for Air conditioning system) does not match the value of the air conditioning tool set	A
The Data List value for the air conditioning pressure sensor (for hybrid battery control system) does not match the value of the air conditioning tool set	B
Data List values and air conditioning tool set values match	C

Post-procedure1

(f) None

B ▶ **GO TO STEP 11**

C ▶ **REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY**

A ▼

4.	CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)

Pre-procedure1

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

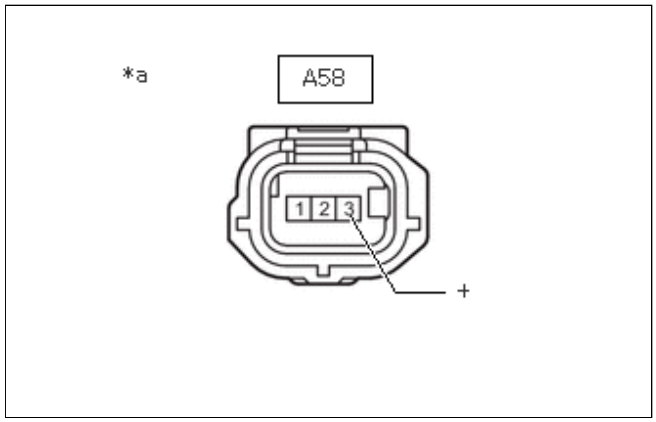
Procedure1

(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

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

Result:

PROCEED TO
OK
NG

Post-procedure1

(c) None

NG ▶ **GO TO STEP 10**

OK ▼

5.	**CHECK HARNESS AND CONNECTOR (AIR CONDITIONING PRESSURE SENSOR (FOR AIR CONDITIONING SYSTEM) - BODY GROUND)**

Pre-procedure1

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

Procedure1

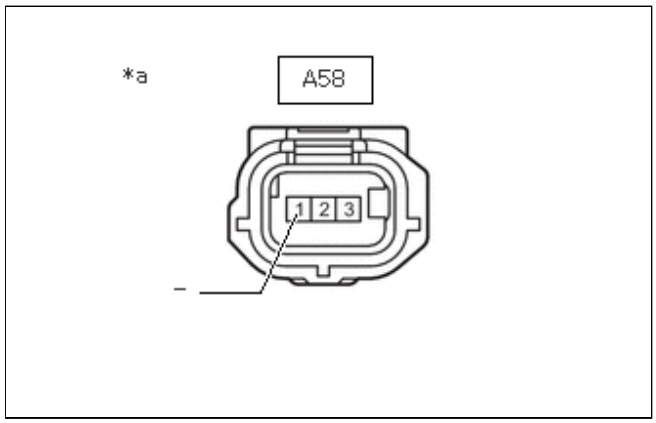
(b) Measure the resistance according to the value(s) in the table below.

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



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

Result:

PROCEED TO
OK
NG

Post-procedure1

(c) None

NG ▶ **GO TO STEP 9**

OK ▼

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

Pre-procedure1

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

(b) Disconnect the A58 air conditioning pressure sensor (for air conditioning system) connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(K73,A58)

Click Connector(K73)
Click Connector(A58)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
K73-6 (PRE) - A58-2 (PR)	Always	Below 1 Ω	Ω
K73-6 (PRE) or A58-2 (PR) - Other terminals and body ground	Always	10 kΩ or higher	kΩ

Post-procedure1

(d) None

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

OK ▼

7.	**CHECK HARNESS AND CONNECTOR (AIR CONDITIONING PRESSURE SENSOR (FOR AIR CONDITIONING SYSTEM) - POWER SOURCE)**

Pre-procedure1

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

Procedure1

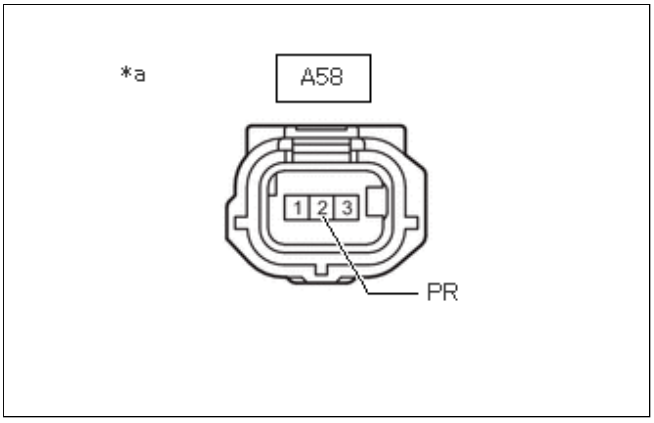
(b) Measure the voltage according to the value(s) in the table below.

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 (for Air Conditioning System))

Result:

PROCEED TO
OK
NG

Post-procedure1

(c) None

NG ▶ **REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY**

OK ▼

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

Pre-procedure1

(a) Disconnect the A58 air conditioning pressure sensor (for air conditioning system) 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)

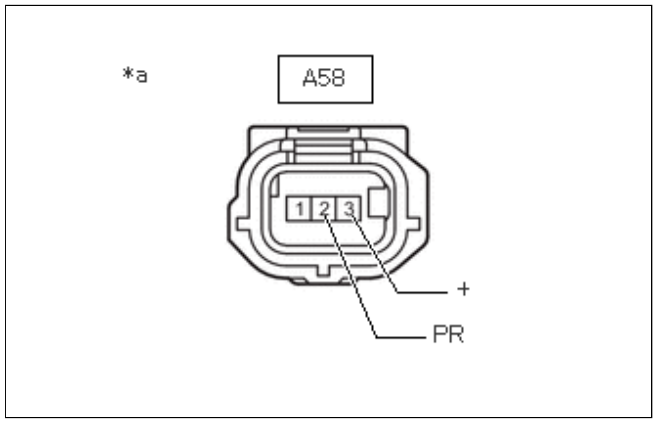
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A58-3 (+) - A58-2 (PR)	Ignition switch off	180 to 220 kΩ	kΩ

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 (for Air Conditioning System))

Post-procedure1

(c) None

OK ▶ **REPLACE AIR CONDITIONING PRESSURE SENSOR (FOR AIR CONDITIONING SYSTEM)**

NG ▶ **REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY**

9.	**CHECK HARNESS AND CONNECTOR (AIR CONDITIONING PRESSURE SENSOR (FOR AIR CONDITIONING SYSTEM) - AIR CONDITIONING AMPLIFIER ASSEMBLY)**

Pre-procedure1

(a) Disconnect the A58 air conditioning pressure sensor (for air conditioning system) 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
A58-1 (-) - K73-15 (SG-4)	Always	Below 1 Ω	Ω
A58-1 (-) or K73-15 (SG-4) - 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**

10.	**CHECK HARNESS AND CONNECTOR (AIR CONDITIONING PRESSURE SENSOR (FOR AIR CONDITIONING SYSTEM) - AIR CONDITIONING AMPLIFIER ASSEMBLY)**

Pre-procedure1

(a) Disconnect the A58 air conditioning pressure sensor (for air conditioning system) 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
A58-3 (+) or K73-11 (S5-3) - 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**

11.	**CHECK HARNESS AND CONNECTOR (POWER SOURCE CIRCUIT)**

NOTICE:

Be sure to wear insulated gloves and protective goggles.

Pre-procedure1

(a) Check that the service plug grip is not installed.

NOTICE:

After removing the service plug grip, do not turn the ignition switch to ON (READY), unless instructed by the repair manual because this may cause a malfunction.

(b) Remove the battery ECU assembly.

HINT:

Click here INFO

(c) Connect the SST.

HINT:

Click here INFO

(d) Disconnect the x7 air conditioning pressure sensor (for hybrid battery control system) connector.

NOTICE:

Before disconnecting the connector, check that it is not loose or disconnected.

(e) Reconnect the battery ECU assembly connector.

(f) Connect the cable to the negative (-) auxiliary battery terminal.

(g) Turn the ignition switch to ON.

Procedure1

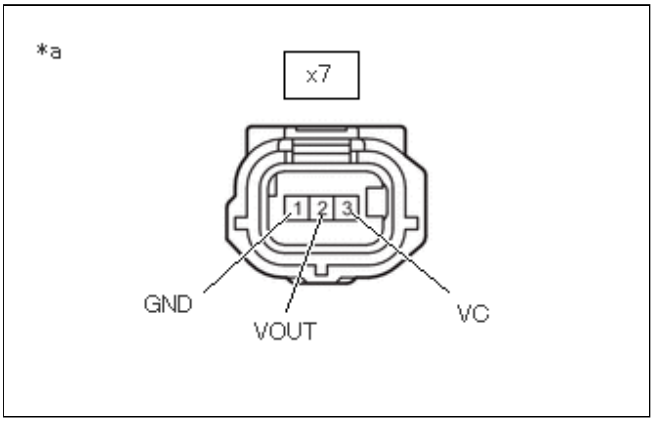
(h) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

EWD INFO

Click Location & Routing(x7)
Click Connector(x7)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
x7-3 (VC) - x7-1 (GND)	Ignition switch ON	4.75 to 5.25 V	V
x7-2 (VOUT) - x7-1 (GND)	Ignition switch ON	4.75 to 5.25 V	V
x7-3 (VC) - body ground	Ignition switch ON	4.75 to 5.25 V	V
x7-2 (VOUT) - body ground	Ignition switch ON	4.75 to 5.25 V	V



*a	Front view of wire harness connector (to Air Conditioning Pressure Sensor (for Hybrid Battery Control System))

NOTICE:

- Turning the ignition switch to ON with the service plug grip removed causes other DTCs to be stored. Clear the DTCs after performing this inspection.
- If the ignition switch is turned to ON with the connectors disconnected, other DTCs will be stored. Be sure to clear the DTCs after the inspection.

Result:

PROCEED TO
OK
NG

Post-procedure1

(i) None

OK ▶ **REPLACE AIR CONDITIONING PRESSURE SENSOR (FOR HYBRID BATTERY CONTROL SYSTEM)**

NG ▼

12.	CHECK HARNESS AND CONNECTOR (AIR CONDITIONING PRESSURE SENSOR (FOR HYBRID BATTERY CONTROL SYSTEM) - BATTERY ECU ASSEMBLY)

NOTICE:

Be sure to wear insulated gloves and protective goggles.

Pre-procedure1

(a) Check that the service plug grip is not installed.

NOTICE:

After removing the service plug grip, do not turn the ignition switch to ON (READY), unless instructed by the repair manual because this may cause a malfunction.

(b) Remove the No. 1 traction battery cover.

HINT:

Click here INFO

(c) Disconnect the x4 battery ECU assembly connector.

NOTICE:

Before disconnecting the connector, check that it is not loose or disconnected.

(d) Disconnect the x7 air conditioning pressure sensor (for hybrid battery control system) connector.

NOTICE:

Before disconnecting the connector, check that it is not loose or disconnected.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(x7,x4)
Click Connector(x7)
Click Connector(x4)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
x7-3 (VC) - x4-5 (VAS0)	Always	Below 1 Ω	Ω
x7-2 (VOUT) - x4-19 (AS0)	Always	Below 1 Ω	Ω
x7-1 (GND) - x4-18 (GAS0)	Always	Below 1 Ω	Ω
x7-3 (VC) or x4-5 (VAS0) - Other terminals and body ground	Always	10 kΩ or higher	kΩ
x7-2 (VOUT) or x4-19 (AS0) - Other terminals and body ground	Always	10 kΩ or higher	kΩ
x7-1 (GND) or x4-18 (GAS0) - Other terminals and body ground	Always	10 kΩ or higher	kΩ

Post-procedure1

(f) None

OK ▶ REPLACE BATTERY ECU ASSEMBLY

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