Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002AQOW
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM (for PHEV Model): P15017A; Hybrid/EV Battery Cooling Refrigerant Gas Fluid Leak or Seal Failure; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**P15017A**	**Hybrid/EV Battery Cooling Refrigerant Gas Fluid Leak or Seal Failure**

DESCRIPTION

This DTC is stored if the amount of refrigerant in the air conditioning system is insufficient.

The air conditioning amplifier assembly receives the ambient temperature signal, refrigerant pressure signal, etc. from various sensors.

Based on these signals, the air conditioning amplifier assembly detects the amount of refrigerant. The A/C switch indicator is turned off and the air conditioning system is stopped if the amount of refrigerant is insufficient.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	MEMORY	DTC OUTPUT FROM	PRIORITY	NOTE
P15017A	Hybrid/EV Battery Cooling Refrigerant Gas Fluid Leak or Seal Failure	Diagnosis condition: Ignition switch is turned to ON after 1 hour elapses after power Malfunction status: The amount of refrigerant gas is determined to be insufficient under air conditioning control Detection Time: Continuously for 3 seconds or more Trip:	• Air Conditioning Pressure Sensor • Harness or connector • Refrigerant pipe line • Air Conditioning Pressure Sensor	Come on	Memorized	Air Conditioner	B	SAE Code: P1501

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	MEMORY	DTC OUTPUT FROM	PRIORITY	NOTE
		2 trip detection logic						

MONITOR DESCRIPTION

When the refrigerant pressure value is abnormal versus the ambient temperature, the air conditioning amplifier assembly illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P1501: Hybrid/EV Battery Cooling Refrigerant Gas Fluid Leak or Seal Failure
Required Sensors/Components (Main)	Air conditioning pressure sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	3 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None

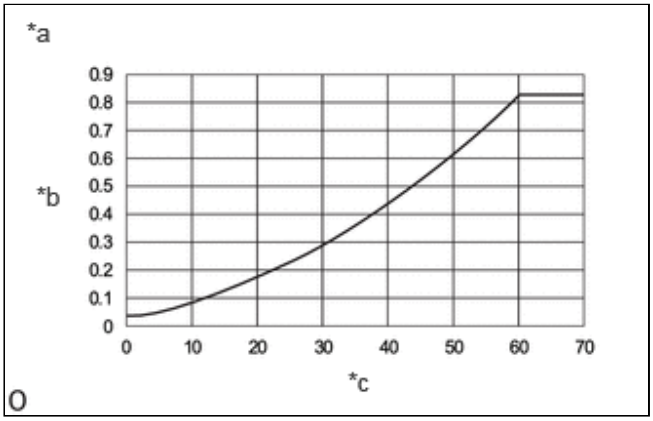
TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not stored	P153A (A/C Refrigerant Temperature/Ambient Air Temperature Performance) P0531 (A/C Refrigerant Pressure Sensor "A" Circuit Range/Performance) 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) 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 power
Ambient temp. sensor (thermistor assembly)	5 °C or higher

TYPICAL MALFUNCTION THRESHOLDS

Refrigerant pressure sensor pressure versus ambient temperature	Standard in Table 1 less than

Table 1



*a	Refrigerant Pressure Map
*b	Refrigerant Pressure Criteria (MPa)
*c	Ambient Temperature Sensor Value (°C)

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 30 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: P15017A.
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

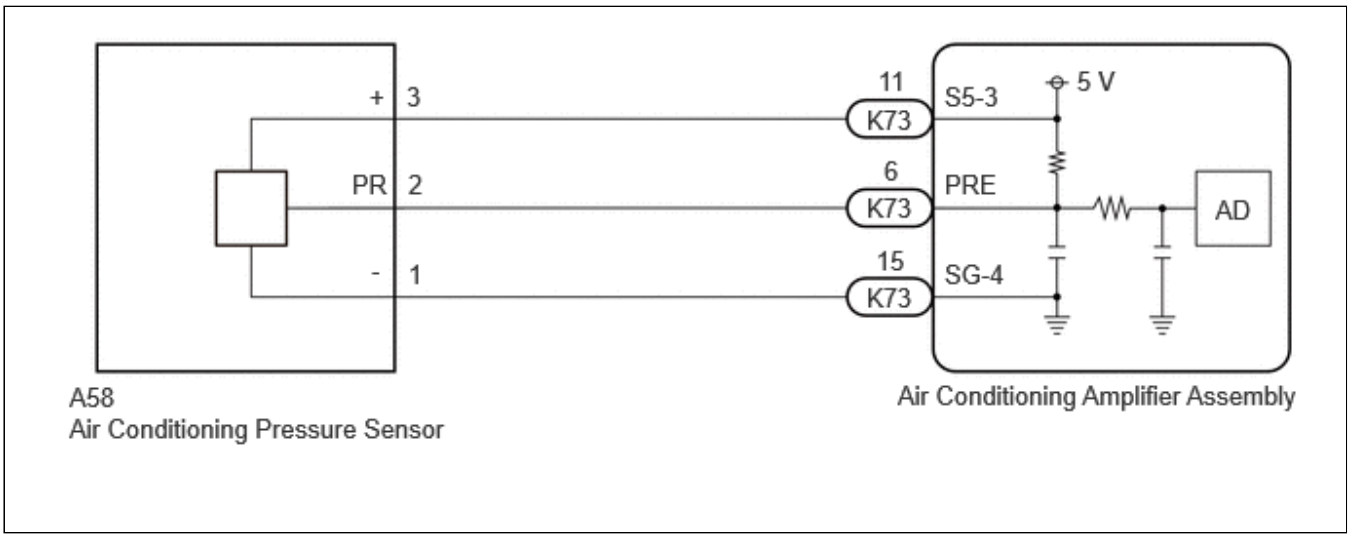
GTS DISPLAY	DESCRIPTION
	◦ Perform driving pattern after confirming DTC enabling conditions

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 P15017A is output	A
P15017A and P007011 are output	B
P15017A and P007015 are output	C

RESULT	PROCEED TO
P15017A and P053011 are output	D
P15017A and P053015 are output	E
P15017A and P05301C are output	F
P15017A and P153A62 are output	G

RELEVANT DTC	
P007011	Ambient Temperature Sensor Circuit Short to Ground
P007015	Ambient Temperature Sensor Circuit Short to Battery or Open
P053011	Refrigerant Pressure Sensor Circuit Short to Ground
P053015	Refrigerant Pressure Sensor Circuit Short to Battery or Open
P05301C	Refrigerant Pressure Sensor Circuit Voltage Out of Range
P153A62	Ambient Temperature Sensor / External Condenser Refrigerant Temperature Sensor Signal Compare Failure

B ▶ **GO TO DTC CHART (P007011)**

C ▶ **GO TO DTC CHART (P007015)**

D ▶ **GO TO DTC CHART (P053011)**

E ▶ **GO TO DTC CHART (P053015)**

F ▶ **GO TO DTC CHART (P05301C)**

G ▶ **GO TO DTC CHART (P153A62)**

A ▼

2.	**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

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

RESULT	PROCEED TO
Data List values and air conditioning tool set values match	A
Data List values and air conditioning tool set values does not match	B

Post-procedure1

(f) None

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

B ▼

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

Pre-procedure1

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

Procedure1

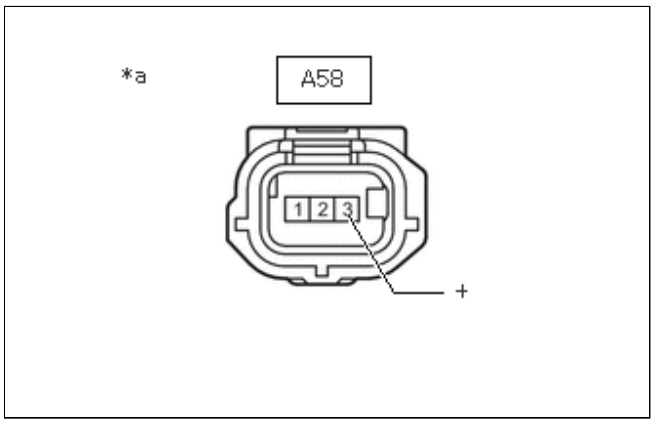
(b) Measure the voltage according to the value(s) in the table below.

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



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

Result:

PROCEED TO
OK
NG

Post-procedure1

(c) None

NG ▶ **GO TO STEP 9**

OK ▼

4.	**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

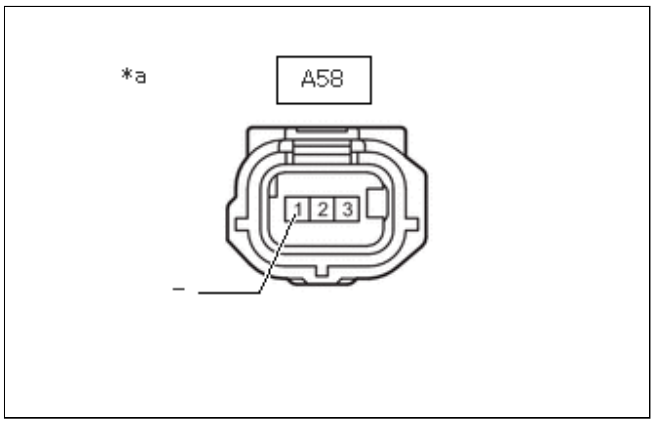
Click Location & Routing(A58)

Click Connector(A58)

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

Result:

PROCEED TO
OK
NG



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

Post-procedure1

(c) None

NG ▶ **GO TO STEP 8**

OK ▼

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

Pre-procedure1

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

(b) Disconnect the A58 air conditioning pressure sensor 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 ▼

6.	**INSPECT AIR CONDITIONING PRESSURE SENSOR (SENSOR SIGNAL CIRCUIT)**

NOTICE:

- If refrigerant pressure on the high pressure side becomes extremely high during the inspection (if the voltage exceeds 4.61 V), a fail-safe function will stop compressor operation. In this case, make sure to measure the voltage before the fail-safe function operates.
- It is necessary to measure the voltage for a certain amount of time (approximately 10 minutes) because the malfunction may recur after a while.

Pre-procedure1

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

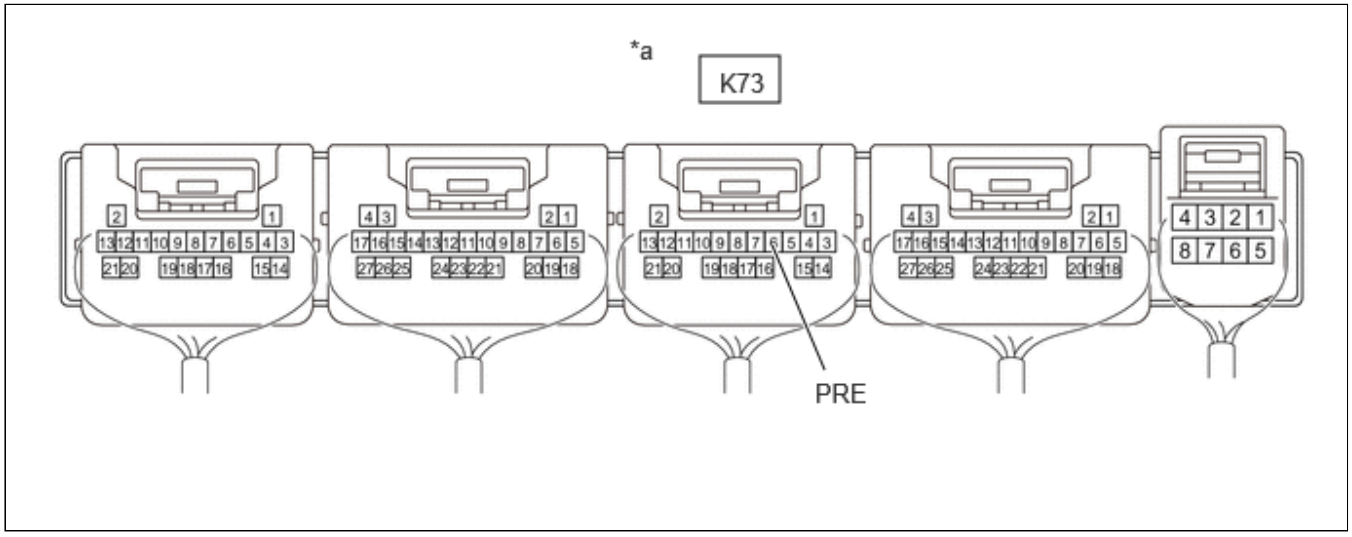
(b) Measure the voltage with the following conditions met.

Measurement Condition:

ITEM	CONDITION
Vehicle doors	Fully open
Temperature setting	MAX COLD
Blower speed	HI
A/C switch	On
Recirculation/fresh switch	Recirculation
Interior temperature	25 to 35°C (77 to 95°F)

Procedure1

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



*a	Component with harness connected (Air Conditioning Amplifier Assembly)	-	-

Standard Voltage:

EWD INFO

Click Location & Routing(K73)
Click Connector(K73)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
K73-6 (PRE) - Body ground	A/C switch on (Compressor operating)	0.62 to 4.73 V

HINT:

When the ambient air temperature is low (below -1.5°C (29.3°F)), the compressor will be stopped, due to inputs of the thermistor assembly and No. 1 cooler thermistor, to prevent the evaporator from freezing. In this case, perform the inspection in a warm indoor environment.

OK:

The voltage value changes.

Post-procedure1

(d) None

NG ▶ **REPLACE AIR CONDITIONING PRESSURE SENSOR**

OK ▼

7.	**INSPECT AIR CONDITIONING PRESSURE SENSOR (SENSOR SIGNAL CIRCUIT)**

NOTICE:

- If refrigerant pressure on the high pressure side becomes extremely high during the inspection (if the voltage exceeds 4.61 V), a fail-safe function will stop compressor operation. In this case, make sure to measure the voltage before the fail-safe function operates.

- It is necessary to measure the voltage for a certain amount of time (approximately 10 minutes) because the malfunction may recur after a while.

Pre-procedure1

(a) Measure the voltage with the following conditions met.

Measurement Condition:

ITEM	CONDITION
Vehicle doors	Fully open
Temperature setting	MAX COLD
Blower speed	HI
A/C switch	On
Recirculation/fresh switch	Recirculation
Interior temperature	25 to 35°C (77 to 95°F)

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

HINT:

When the ambient air temperature is low (below -1.5°C (29.3°F)), the compressor will be stopped, due to inputs of the thermistor assembly and No. 1 cooler thermistor, to prevent the evaporator from freezing. In this case, perform the inspection in a warm indoor environment.

OK:

The value displayed in the Data List changes.

Post-procedure1

(c) None

OK ▶ **USE SIMULATION METHOD TO CHECK**

NG ▶ **REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY**

8.	**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
A58-1 (-) - 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**

9.	**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
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**