Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002AQOX
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM (for PHEV Model): P153A62; Ambient Temperature Sensor / External Condenser Refrigerant Temperature Sensor Signal Compare Failure; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**P153A62**	**Ambient Temperature Sensor / External Condenser Refrigerant Temperature Sensor Signal Compare Failure**

DESCRIPTION

The ambient temp. sensor (thermistor assembly) is installed on the front of the outer heat exchanger (cooler condenser assembly), and is used to detect the ambient temperature and control the air conditioning system.

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) to detect the refrigerant gas temperature from the outer heat exchanger (cooler condenser assembly) and is used to control the air conditioning system.

When there is a difference in the temperature signals of the ambient temp. sensor (thermistor assembly) and 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
P153A62	Ambient Temperature Sensor / External Condenser Refrigerant Temperature Sensor Signal Compare Failure	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 in the temperature signals of the ambient temp. sensor (thermistor assembly) and outer heat exchanger	• Ambient temp. sensor (thermistor assembly) • Outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) • Harness or connector • Air conditioning amplifier assembly	Come on	Memorized	Air Conditioner	B	SAE Code: P153A

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	MEMORY	DTC OUTPUT FROM	PRIORITY	NOTE
		refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) Detection Time: Continuously for 3 seconds or more Trip: 2 trip detection logic						

MONITOR DESCRIPTION

When the value obtained by subtracting the temperature detected by the outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) from the temperature detected from the ambient temp. sensor (thermistor assembly) is the threshold or more, the air conditioning amplifier assembly illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P153A: Ambient Temperature Sensor / External Condenser Refrigerant Temperature Sensor Signal Compare Failure
Required Sensors/Components (Main)	Ambient temp. sensor (thermistor assembly) or outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly)
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	P0072 (Ambient Air Temperature Sensor Circuit "A" Low) P0073 (Ambient Air Temperature Sensor Circuit "A" High) P0EBD (A/C Refrigerant Temperature Sensor "A" Circuit High) P0EBE (A/C Refrigerant Temperature Sensor "A" Circuit Low) B14B0 (Lost Communication With Heat Pump Control Module)
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

The value obtained by subtracting the temperature detected by the outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) from the temperature detected by the ambient temp. sensor (thermistor assembly)	25 °C 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 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 ◦ Perform driving pattern after confirming DTC enabling conditions

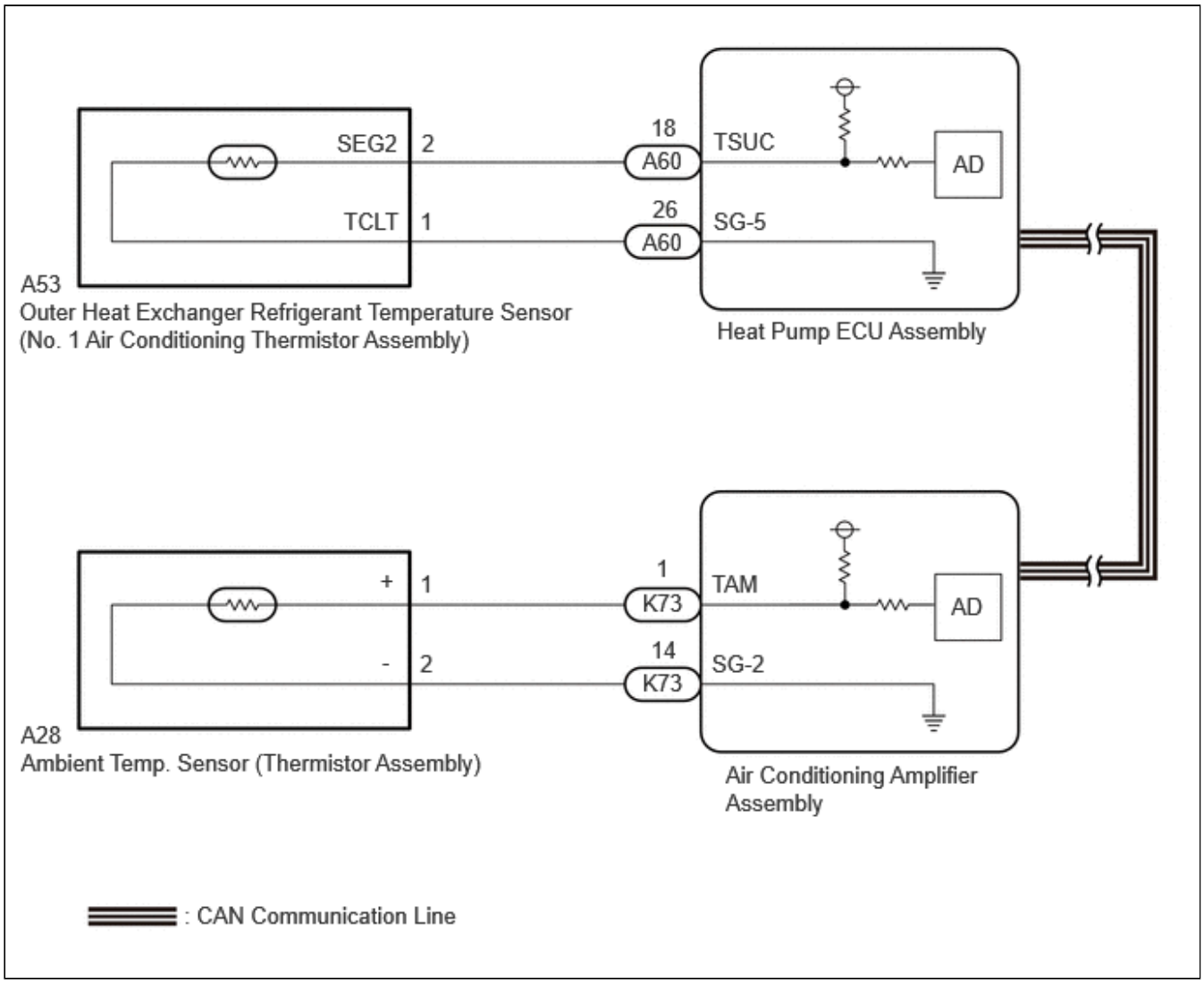
HINT:

- 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 if air conditioning system DTCs are output.

Body Electrical > Air Conditioner > Trouble Codes

HINT:

Check even when the DTCs detected for temporary failures.

RESULT	PROCEED TO
No DTCs in the table below are output	A

RESULT	PROCEED TO
Any of the DTCs in the table below are output	B

RELEVANT DTC	
P007011	Ambient Temperature Sensor Circuit Short to Ground
P007015	Ambient Temperature Sensor Circuit Short to Battery or Open
P0EBC11	External Condenser Refrigerant Temperature Sensor Circuit Short to Ground
P0EBC15	External Condenser Refrigerant Temperature Sensor Circuit Short to Battery or Open

B **GO TO DIAGNOSTIC TROUBLE CODE CHART (AIR CONDITIONING SYSTEM)**

A

2.	READ VALUE USING GTS

Pre-procedure1

(a) Place the thermometer in a well-ventilated location in the shade.

(b) Move the vehicle to a well-ventilated location in the shade.

(c) Blower switch turned off.

(d) Wait for 1 hour after turning the ignition switch off.

Procedure1

(e) 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
Ambient Temperature Sensor	Ambient temp. sensor (thermistor assembly)	-327.68 to 327.67°C	Actual ambient temperature displayed	Ambient temp. sensor (thermistor assembly) circuit malfunction
External Condenser Refrigerant Temperature Sensor	Refrigerant temperature after passing through the outer heat exchanger (cooler condenser assembly)	-327.68 to 327.67°C	Ambient temperature of the outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly)	Outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) circuit malfunction

Body Electrical > Air Conditioner > Data List

TESTER DISPLAY
Ambient Temperature Sensor
External Condenser Refrigerant Temperature Sensor

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

RESULT	PROCEED TO
The Data List value for the cooler ambient temp. sensor (thermistor assembly) does not match the value of the thermometer	A
The Data List value for the outer heat exchanger refrigerant temperature sensor (No. 1 air conditioning thermistor assembly) does not match the value of the thermometer	B
Data List values and thermometer values match	C

Post-procedure1

(g) None

B ▶ **GO TO STEP 5**

C ▶ **REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY**

A ▼

3.	**INSPECT AMBIENT TEMP. SENSOR (THERMISTOR ASSEMBLY)**

Click here INFO

NG ▶ **REPLACE AMBIENT TEMP. SENSOR (THERMISTOR ASSEMBLY)**

OK ▼

4.	**CHECK HARNESS AND CONNECTOR (AIR CONDITIONING AMPLIFIER ASSEMBLY - AMBIENT TEMP. SENSOR (THERMISTOR ASSEMBLY))**

Pre-procedure1

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

(b) Disconnect the A23 ambient temp. sensor (thermistor assembly) connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(K73,A23)
Click Connector(K73)
Click Connector(A23)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
K73-1 (TAM) - A23-1 (+)	Always	Below 1 Ω	Ω
K73-14 (SG-2) - A23-2 (-)	Always	Below 1 Ω	Ω
K73-1 (TAM) or A23-1 (+) - Other terminals and body ground	Always	10 kΩ or higher	kΩ
K73-14 (SG-2) or A23-2 (-) - 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.	**INSPECT OUTER HEAT EXCHANGER REFRIGERANT TEMPERATURE SENSOR (NO. 1 AIR CONDITIONING THERMISTOR ASSEMBLY)**

Click here INFO

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

OK ▼

6.	**CHECK HARNESS AND CONNECTOR (OUTER HEAT EXCHANGER REFRIGERANT TEMPERATURE SENSOR (NO. 1 AIR CONDITIONING THERMISTOR ASSEMBLY - 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:

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
A53-2 (SEG2) or A60-18 (TSUC) - Other terminals and body ground	Always	10 kΩ or higher	kΩ
A53-1 (TCLT) or A60-26 (SG-5) - 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**