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Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM (for PHEV Model): P2D4496; A/C Compressor Component Internal Failure; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**P2D4496**	**A/C Compressor Component Internal Failure**

DESCRIPTION

The compressor with motor assembly runs according to signals from the air conditioning amplifier assembly and circulates refrigerant to each part.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	MEMORY	DTC OUTPUT FROM	PRIORITY	NOTE
P2D4496	A/C Compressor Component Internal Failure	Diagnosis Condition: During battery cooling Malfunction Status: When there is a difference between the actual speed of the compressor with motor assembly and the target speed Detection Time: Continuously for 20 seconds or more Trip: 2 trip detection logic	• Compressor with motor assembly • Air conditioning amplifier assembly	Come on	Memorized	Air Conditioner	B	SAE Code: P2D44

HINT:

Battery cooling control can be performed from the Active Test of the hybrid battery system.

Click here INFO

MONITOR DESCRIPTION

When the difference between the actual speed of the compressor with motor assembly and the target speed from the air conditioning amplifier assembly is continuously below the threshold value, the air conditioning amplifier assembly illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P2D44: A/C Compressor Component Internal Failure
Required Sensors/Components (Main)	Compressor with motor assembly
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	20 seconds
MIL Operation	2 driving cycle
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not stored	B1498 (LIN Lost Communication With A/C Inverter) U0293 (Lost Communication With Hybrid/EV Powertrain Control Module)
Battery voltage	10 V or higher
Refrigerant cycle	Cooling battery cooling or Battery cooling

TYPICAL MALFUNCTION THRESHOLDS

The speed obtained by subtracting the actual speed from the target speed of the compressor.	Higher than 500 rpm

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.
6. Turn the ignition switch to ON (READY). [A].
7. When the air conditioning is operated, check whether the compressor is operating and the air conditioning is operating [B]
8. Turn the GTS on.
9. Check that the following conditions are met and perform the Active Test according to the display on the GTS. [C]

Enter the following menus: Powertrain / HV Battery / Active test / Hybrid/EV Battery Refrigerant Cooling Control.

Condition

Ambient temperature	5 °C or higher
Operation time	10 minutes

HINT:

- In order to perform "Hybrid/EV Battery Refrigerant Cooling Control", the HV battery minimum temperature must be 20°C (68°F) and the refrigerant temperature must be 20°C (68°F) or higher.

  If the above conditions are not established, perform the "Hybrid/EV Battery Heater Relay" Active Test in an environment with an ambient temperature of 5°C (41°F) or higher and increase the HV battery temperature.

  The temperature will drop after the heater is stopped, so increase the values of "Hybrid/EV Battery Temperature 1 to 15, Hybrid/EV Battery Refrigerant Temperature (Duct Outlet 1)" in the Data List to 21°C (70°F) or higher.

  (At an ambient temperature of 5°C (41°F), "Hybrid/EV Battery Heater Relay" will need to be performed for approximately 10 hours.)
- Perform this step with the A/C blower switch off.

10. Wait 30 seconds or more. [D]
11. Enter the following menus: Body Electrical / Air Conditioner / Trouble Codes [E].
12. 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.

13. Enter the following menus: Body Electrical / Air Conditioner / Utility / All Readiness.
14. Input the DTC: P2D4496.
15. 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 [B] through [E] again.
- [A] to [E]: 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.

PROCEDURE

1.	**CHECK FOR DTC**

(a) Check for DTCs.

Body Electrical > Air Conditioner > Trouble Codes

HINT:

Check even when the DTCs detected for temporary failures.

RESULT	PROCEED TO
Only P2D4496 is output	A
P2D4496 and B142200 are output	B
P2D4496 and B14711C are output	C
P2D4496 and B14721C are output	D
P2D4496 and B14744B are output	E
P2D4496 and B147496 are output	F

RELEVANT DTC	
B142200	A/C Inverter Load Malfunction
B14711C	A/C Inverter High Voltage Power Resource Circuit Voltage Out of Range
B14721C	A/C Inverter High Voltage Output Circuit Voltage Out of Range
B14744B	A/C Inverter Cooling/Heating Over Temperature
B147496	A/C Inverter Component Internal Failure

B **GO TO DTC CHART (B142200)**

C **GO TO DTC CHART (B14711C)**

D **GO TO DTC CHART (B14721C)**

E **GO TO DTC CHART (B14744B)**

F **GO TO DTC CHART (B147496)**

A

2.	**CHECK COMPRESSOR WITH MOTOR ASSEMBLY**

(a) Perform the Active Test according to the display on the GTS.

Body Electrical > Air Conditioner > Active Test

TESTER DISPLAY	MEASUREMENT ITEM	CONTROL RANGE	DIAGNOSTIC NOTE
Compressor Target Speed	This test drives the compressor to selected target speed. (Compressor with motor assembly)	800: Min 10000: Max (every 100) **HINT:** The maximum value for the Active Test is 8800.	Operate with the ignition switch ON (READY) and the vehicle stopped.

Body Electrical > Air Conditioner > Active Test

TESTER DISPLAY
Compressor Target Speed

(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
Compressor Target Speed	Compressor target speed	0 to 10000 rpm	Compressor target speed displayed	Compressor operating • Compressor with motor assembly
Compressor Actual Speed	Compressor actual speed	0 to 10000 rpm	Actual compressor speed displayed	Compressor operating • Compressor with motor assembly

Body Electrical > Air Conditioner > Data List

TESTER DISPLAY
Compressor Target Speed
Compressor Actual Speed

HINT:

The Compressor Actual Speed may not run with Compressor Target Speed due to the protection control.In this case, the compressor is working without issues if the compressor actual speed increases with Compressor Target Speed to a certain extent and runs at a constant value.

OK:

The Compressor actual speed is approximately the same as the Compressor target speed.

OK ▶ **REPLACE AIR CONDITIONING AMPLIFIER ASSEMBLY**

NG ▶ **REPLACE COMPRESSOR WITH MOTOR ASSEMBLY**