Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002AQOK
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HEATING / AIR CONDITIONING: AIR CONDITIONING SYSTEM (for PHEV Model): B3A0A71; A/C Heating Electric Expansion Valve Actuator Stuck; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**B3A0A71**	**A/C Heating Electric Expansion Valve Actuator Stuck**

DESCRIPTION

When the valve opening angle does not change even though the heating electric expansion valve (magnet valve assembly) received a signal from the heat pump ECU assembly, this DTC is stored.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	MEMORY	DTC OUTPUT FROM	PRIORITY	NOTE
B3A0A71	A/C Heating Electric Expansion Valve Actuator Stuck	Diagnosis condition: During battery cooling Malfunction status: Heating electric expansion valve (magnet valve assembly) close stuck Detection time: **Condition 1** Continuously for 5 minutes or more **Condition 2** Continuously for 5 minutes or more Trip: 2 trip detection	• Heating electric expansion valve (magnet valve assembly) • Heat pump ECU assembly	Come on	Memorized	Air Conditioner	A	SAE Code: B3A0A

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

HINT:

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

Click here INFO

MONITOR DESCRIPTION

This DTC is stored when it is detected that the heating electric expansion valve (magnet valve assembly) is stuck open.

When any of the conditions shown in Typical Malfunction Thresholds are met, the air conditioning amplifier assembly illuminates the MIL and stores this DTC.

MONITOR STRATEGY

Related DTCs	B3A0A: A/C Heating Electric Expansion Valve Actuator Stuck
Required Sensors/Components (Main)	Heating electric expansion valve (magnet valve assembly)
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	5 minutes*1 5 minutes*2
MIL Operation	2 driving cycle
Sequence of Operation	None
*1: Condition 1 *2: Condition 2	

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not stored	B1385 (A/C Refrigerant Expansion Valve Actuator "B" Stuck/Open) P0EC9 (A/C Refrigerant Distribution Valve "A" Stuck/Open) 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) P0EBD (A/C Refrigerant Temperature Sensor "A" Circuit High) P0EBE (A/C Refrigerant Temperature Sensor "A" Circuit Low) P2612 (A/C Refrigerant Distribution Valve "A" Control Circuit Low) P2613 (A/C Refrigerant Distribution Valve "A" Control Circuit High) B3A0C (A/C Refrigerant Expansion Valve Actuator Control Circuit Low) B3A0D (A/C Refrigerant Expansion Valve Actuator Control Circuit High) B1388 (A/C Refrigerant Expansion Valve Actuator "B" Control Circuit Low)

	B1389 (A/C Refrigerant Expansion Valve Actuator "B" Control Circuit High) U0111 (Lost Communication With Battery Energy Control Module "A") B14B0 (Lost Communication With Heat Pump Control Module) P0C43 (Hybrid/EV Battery Refrigerant temperature Sensor "A" Circuit Range/Performance) P0CD6 (Hybrid/EV Battery Refrigerant temperature Sensor "B" Circuit Range/Performance) P1B7A (Hybrid/EV Battery Refrigerant temperature Sensor "C" Circuit Range/Performance) P1B7F (Hybrid/EV Battery Refrigerant temperature Sensor "D" Circuit Range/Performance)
Battery voltage	11 V or higher

TYPICAL MALFUNCTION THRESHOLDS

A malfunction is detected if any of the following conditions apply.

Condition 1

Refrigerant cycle	Cooling Battery cooling or Battery Alone
Battery cooling after test mode	OFF
High pressure failsafe mode	ON
After high pressure protection recorded	Recorded 10 times or more
The battery cooling refrigerant temperature sensor (inlet) (No. 1 traction battery cooler tube) when the compressor is operating dropped 3°C or more compared with when the compressor is stopped	Cannot detect 3 times or more

Condition 2

Refrigerant cycle	A/C Cooling and Battery Cooling
Battery cooling after test mode	ON
High pressure failsafe mode	OFF
Outer heat exchanger (cooler condenser assembly) temperature	20 °C or higher
Opening angle of cooling electric expansion valve (cooler expansion valve)	38.5 % or higher
Opening angle of battery cooling expansion valve (No. 1 traction battery cooler tube)	10 % or higher
Temperature of battery cooling refrigerant temperature sensor (outlet) (No. 1 traction battery cooler conductor)	200 °C or higher

Refrigerant Cycle	Battery Cooling
Battery Cooling after Test Mode	ON
High Pressure Failsafe Mode	OFF
Outer heat exchanger (cooler condenser assembly) temperature	20 °C or higher

Opening angle of battery cooling expansion valve (No. 1 traction battery cooler tube)	38.5 % or higher
Temperature of battery cooling refrigerant temperature sensor (outlet) (No. 1 traction battery cooler conductor)	200 °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 30 seconds.
6. Turn the ignition switch to ON (READY) [A].
7. Turn the GTS on.
8. Check that the following conditions are met and perform the Active Test according to the display on the GTS. [B]

   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.
9. Wait 5 minutes or more. [C]
10. Enter the following menus: Body Electrical / Air Conditioner / Trouble Codes [D].
11. 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.
12. Enter the following menus: Body Electrical / Air Conditioner / Utility / All Readiness.
13. Input the DTC: B3A0A71.

14. 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 [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.

PROCEDURE

1.	**CHECK HEATING ELECTRIC EXPANSION VALVE (MAGNET VALVE ASSEMBLY)**

Pre-procedure1

(a) Install a manifold gauge set.

HINT:

Click here INFO

Procedure1

(b) 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
Heating Electric Expansion Valve	This test activates heating electric expansion valve to a target position. (Heating electric expansion valve (magnet valve assembly))	0%: Min. 100%: Max.	• Ignition switch ON (READY) • EV Mode • Blower: Manual Hi • Set Temperature: Manual Hi • Ambient Temperature: -10°C (14.0°F) or more than -10°C (14.0°F) • A/C Switch: OFF • Air Inlet Mode: Outside Air

TESTER DISPLAY	MEASUREMENT ITEM	CONTROL RANGE	DIAGNOSTIC NOTE
			• Engine Coolant Temperature: 40°C (104°F) or less than 40°C (104°F)

Body Electrical > Air Conditioner > Active Test

TESTER DISPLAY
Heating Electric Expansion Valve

OK:

Read the gauge of the manifold gauge set and check that the value is changing.

Post-procedure1

(c) None

NG ▶ **REPLACE HEATING ELECTRIC EXPANSION VALVE (MAGNET VALVE ASSEMBLY)**

OK ▼

2.	**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
P15017A is not output	A
P15017A is output	B

B ▶ **GO TO DTC CHART (P15017A)**

A ▼

3.	**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
P0D1A71 is not output	A
P0D1A71 is output	B

RELEVANT DTC	
P0D1A71	Hybrid/EV Battery Pack Coolant Control Valve "B" Performance/Stuck Off Actuator Stuck

A ▶ **REPLACE HEAT PUMP ECU ASSEMBLY**

B ▶ **GO TO DTC CHART (P0D1A71)**