Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BHUX
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HYBRID / BATTERY CONTROL: HYBRID BATTERY SYSTEM (for PHEV Model): P1A8100,P1A8600,P1A8B00; Hybrid/EV Battery Stack 1 Delta SOC High (Extreme); 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**P1A8100**	**Hybrid/EV Battery Stack 1 Delta SOC High (Extreme)**

DTC	**P1A8600**	**Hybrid/EV Battery Stack 2 Delta SOC High (Extreme)**

DTC	**P1A8B00**	**Hybrid/EV Battery Stack 3 Delta SOC High (Extreme)**

DESCRIPTION

The HV battery is composed of 72 cells (3.7 V each) in series. The battery ECU assembly monitors the difference in capacity of each HV battery cell to detect malfunctions of the HV battery.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P1A8100	Hybrid/EV Battery Stack 1 Delta SOC High (Extreme)	The difference in capacity of each cell of the No. 1 HV supply stack sub-assembly exceeds the specified value excessively. (1 trip detection logic)	• No. 1 HV supply stack sub-assembly • Service plug grip • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P1A81
P1A8600	Hybrid/EV Battery Stack 2 Delta SOC High (Extreme)	The difference in capacity of each cell of the No. 2 HV supply stack sub-assembly exceeds the specified value excessively. (1 trip detection logic)	• No. 2 HV supply stack sub-assembly • Service plug grip • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P1A86
P1A8B00	Hybrid/EV Battery Stack 3 Delta SOC	The difference in capacity of each cell of the No. 3 HV supply stack	• No. 3 HV supply stack sub-assembly	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P1A8B

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
	High (Extreme)	sub-assembly exceeds the specified value excessively. (1 trip detection logic)	• Service plug grip • Battery voltage sensor					

HINT:

These DTCs can be stored after clearing the DTCs and driving the vehicle for approximately 12 minutes.

MONITOR DESCRIPTION

If the battery ECU assembly detects that the difference in capacity of each HV battery cell exceeds the specified value (excessively), the battery ECU assembly illuminates the MIL and stores a DTC.

MONITOR STRATEGY

Related DTCs	P1A81 (INF P1A8100), P1A86 (INF P1A8600), P1A8B (INF P1A8B00): Battery cell malfunction
Required sensors/components	Battery ECU assembly
Frequency of operation	Continuous
Duration	TMC's intellectual property
MIL operation	1 driving cycle
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not stored	TMC's intellectual property
Other conditions belong to TMC's intellectual property	-

TYPICAL MALFUNCTION THRESHOLDS

TMC's intellectual property	-

COMPONENT OPERATING RANGE

Battery ECU assembly	DTC P1A81 (INF P1A8100) is not detected DTC P1A86 (INF P1A8600) is not detected DTC P1A8B (INF P1A8B00) is not detected

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. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
2. Turn the ignition switch off and wait for 2 minutes or more.
3. Drive the vehicle on urban roads for approximately 12 minutes.[*1]

HINT:

[*1]: Normal judgment procedure.

The normal judgment procedure is used to complete DTC judgment and also used when clearing permanent DTCs.

4. Enter the following menus: Powertrain / HV Battery / Utility / All Readiness.
5. Check the DTC judgment result.

HINT:

- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.
- If the judgment result shows INCOMPLETE or N/A, perform the normal judgment procedure again.

WIRING DIAGRAM

Refer to the wiring diagram for DTC P1A001C.

Click here INFO

CAUTION / NOTICE / HINT

CAUTION:

Refer to the precautions before inspecting high voltage circuit.

Click here INFO

NOTICE:

- After the ignition switch is turned off, there may be a waiting time before disconnecting the auxiliary negative (-) battery terminal.

  Click here INFO
- When disconnecting and reconnecting the auxiliary battery.

HINT:

When disconnecting and reconnecting the auxiliary battery, there is an automatic learning function that completes learning when the respective system is used.

Click here INFO

PROCEDURE

1.	**CHECK DTC OUTPUT (HV BATTERY, HYBRID CONTROL)**

Pre-procedure1

(a) None

Procedure1

(b) Check for DTCs.

Powertrain > HV Battery > Trouble Codes
Powertrain > Hybrid Control > Trouble Codes

RESULT	PROCEED TO
"P1A8100, P1A8600 or P1A8B00" only is output, or DTCs except the ones in the table below are also output.	A
DTCs of hybrid battery system in the table below are output.	B
DTCs of hybrid control system in the table below are output.	C

SYSTEM	RELEVANT DTC	
Hybrid battery system	P060A47	Hybrid/EV Battery Energy Control Module Monitoring Processor Watchdog / Safety MCU Failure
	P060B49	Hybrid/EV Battery Energy Control Module A/D Processing Internal Electronic Failure
	P060687	Hybrid/EV Battery Energy Control Module Processor to Monitoring Processor Missing Message
	P0ABF28	Hybrid/EV Battery Current Sensor "A" Signal Bias Level Out of Range / Zero Adjustment Failure
	P0ABF2A	Hybrid/EV Battery Current Sensor "A" Signal Stuck In Range
	P1AC413	Hybrid/EV Battery Stack 1 Current Interrupt Device Circuit Open
	P1AC513	Hybrid/EV Battery Stack 2 Current Interrupt Device Circuit Open
	P1AC613	Hybrid/EV Battery Stack 3 Current Interrupt Device Circuit Open
	P1AC713	Hybrid/EV Battery Stack 4 Current Interrupt Device Circuit Open
	P1AC49E	Hybrid/EV Battery Stack 1 Current Interrupt Device Stuck On
	P1AC59E	Hybrid/EV Battery Stack 2 Current Interrupt Device Stuck On
	P1AC69E	Hybrid/EV Battery Stack 3 Current Interrupt Device Stuck On
	P1AC79E	Hybrid/EV Battery Stack 4 Current Interrupt Device Stuck On
	P1CBB12	Hybrid/EV Battery Current Sensor Power Supply Circuit Short to Auxiliary Battery
	P1CBB14	Hybrid/EV Battery Current Sensor Power Supply Circuit Short to Ground or Open
	P1CC81E	Hybrid/EV Battery Stack 1 Voltage Difference Out of Range
	P1CC91E	Hybrid/EV Battery Stack 2 Voltage Difference Out of Range
	P1CCA1E	Hybrid/EV Battery Stack 3 Voltage Difference Out of Range
	P1CCB1E	Hybrid/EV Battery Stack 4 Voltage Difference Out of Range
Hybrid control system	P0B231C	Hybrid/EV Battery "A" Voltage Sensor Voltage Out of Range
	P1C2D62	Hybrid/EV Battery "A" Voltage Sensor/ Boosting Converter Voltage Sensor "A" Signal Compare Failure

Post-procedure1

(c) Turn the ignition switch off.

B ▶ **GO TO DTC CHART (HYBRID BATTERY SYSTEM)**

C ▶ **GO TO DTC CHART (HYBRID CONTROL SYSTEM)**

A

2.	**CHECK DTC**

(a) Check the DTCs that were output when the vehicle was brought to the workshop.

RESULT	PROCEED TO
"P1A8100" is also output.	A
"P1A8600" is also output.	B
"P1A8B00" is also output.	C

B ▶ **GO TO STEP 7**

C ▶ **GO TO STEP 11**

A

3.	**CHECK FREEZE FRAME DATA**

Pre-procedure1

(a) None

Procedure1

(b) Read the value of freeze frame data items "Hybrid/EV Battery Cell 1 Voltage" through "Hybrid/EV Battery Cell 24 Voltage" for DTC P1A8100 and make a note if the value of any is the lowest voltage value.

Powertrain > HV Battery > Trouble Codes

Post-procedure1

(c) Turn the ignition switch off.

NEXT

4.	**CHECK BATTERY VOLTAGE SENSOR (VA1 - VA24)**

Click here INFO

RESULT	PROCEED TO
The resistance between the terminals is 50 kΩ or more.	A
Other than above	B

B ▶ **REPLACE BATTERY VOLTAGE SENSOR**

A

5.	**CHECK TOTAL DISTANCE DRIVEN**

(a) Read the odometer to check the total distance the vehicle has been driven.

<table>
<tr><th colspan="2">RESULT</th><th>PROCEED TO</th></tr>
<tr><td colspan="2">Total distance driven is less than 200000 km (124280 mile)</td><td rowspan="3">A</td></tr>
<tr><td rowspan="2">Total distance driven is 200000 km (124280 mile) or more</td><td>Current total distance driven - total distance driven when service plug grip replaced = less than 200000 km (124280 mile) *1</td></tr>
<tr><td>Other than above</td><td>B</td></tr>
</table>

HINT:

*1: If the service plug grip has been replaced, use the total distance driven since it was replaced.

A ▶ **REPLACE NO. 1 HV SUPPLY STACK SUB-ASSEMBLY**

B

6.	**REPLACE NO. 1 HV SUPPLY STACK SUB-ASSEMBLY**

HINT:

Click here INFO

NEXT ▶ **REPLACE SERVICE PLUG GRIP**

7.	**CHECK FREEZE FRAME DATA**

Pre-procedure1

(a) None

Procedure1

(b) Read the value of freeze frame data items "Hybrid/EV Battery Cell 25 Voltage" through "Hybrid/EV Battery Cell 48 Voltage" for DTC P1A8600 and make a note if the value of any is the lowest voltage value.

Powertrain > HV Battery > Trouble Codes

Post-procedure1

(c) Turn the ignition switch off.

NEXT ▼

8.	**CHECK BATTERY VOLTAGE SENSOR (VA25 - VA48)**

Click here INFO

RESULT	PROCEED TO
The resistance between the terminals is 50 kΩ or more.	A
Other than above	B

B ▶ **REPLACE BATTERY VOLTAGE SENSOR**

A ▼

9.	**CHECK TOTAL DISTANCE DRIVEN**

(a) Read the odometer to check the total distance the vehicle has been driven.

<table>
<tr><th colspan="2">RESULT</th><th>PROCEED TO</th></tr>
<tr><td colspan="2">Total distance driven is less than 200000 km (124280 mile)</td><td rowspan="2">A</td></tr>
<tr><td rowspan="2">Total distance driven is 200000 km (124280 mile) or more</td><td>Current total distance driven - total distance driven when service plug grip replaced = less than 200000 km (124280 mile) *1</td></tr>
<tr><td>Other than above</td><td>B</td></tr>
</table>

HINT:

*1: If the service plug grip has been replaced, use the total distance driven since it was replaced.

A ▶ **REPLACE NO. 2 HV SUPPLY STACK SUB-ASSEMBLY**

B

▼

10.	**REPLACE NO. 2 HV SUPPLY STACK SUB-ASSEMBLY**

HINT:

Click here INFO

NEXT ▶ **REPLACE SERVICE PLUG GRIP**

11.	**CHECK FREEZE FRAME DATA**

Pre-procedure1

(a) None

Procedure1

(b) Read the value of freeze frame data items "Hybrid/EV Battery Cell 49 Voltage" through "Hybrid/EV Battery Cell 72 Voltage" for DTC P1A8B00 and make a note if the value of any is the lowest voltage value.

Powertrain > HV Battery > Trouble Codes

Post-procedure1

(c) Turn the ignition switch off.

NEXT

12.	**CHECK BATTERY VOLTAGE SENSOR (VA49 - VA72)**

Click here INFO

RESULT	PROCEED TO
The resistance between the terminals is 50 kΩ or more.	A
Other than above	B

B ▶ **REPLACE BATTERY VOLTAGE SENSOR**

A

13.	**CHECK TOTAL DISTANCE DRIVEN**

(a) Read the odometer to check the total distance the vehicle has been driven.

RESULT		PROCEED TO
Total distance driven is less than 200000 km (124280 mile)		A
Total distance driven is 200000 km (124280 mile) or more	Current total distance driven - total distance driven when service plug grip replaced = less than 200000 km (124280 mile) *1	A
	Other than above	B

HINT:

*1: If the service plug grip has been replaced, use the total distance driven since it was replaced.

A ▶ **REPLACE NO. 3 HV SUPPLY STACK SUB-ASSEMBLY**

B

14.	**REPLACE NO. 3 HV SUPPLY STACK SUB-ASSEMBLY**

HINT:

Click here INFO

NEXT REPLACE SERVICE PLUG GRIP