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Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [12/2022 -]
Title: HYBRID / BATTERY CONTROL: HYBRID BATTERY SYSTEM (for M20A-FXS): P1A8000,P1A8500; Hybrid/EV Battery Stack 1 Delta SOC High; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

DTC	**P1A8000**	**Hybrid/EV Battery Stack 1 Delta SOC High**

DTC	**P1A8500**	**Hybrid/EV Battery Stack 2 Delta SOC High**

DESCRIPTION

The HV battery is composed of 60 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
P1A8000	Hybrid/EV Battery Stack 1 Delta SOC High	The difference in capacity of each cell of the No. 1 HV supply stack sub-assembly exceeds the specified value. (2 trip detection logic)	• HV battery • No. 1 traction battery device box • Battery ECU assembly	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P1A80
P1A8500	Hybrid/EV Battery Stack 2 Delta SOC High	The difference in capacity of each cell of the No. 2 HV supply stack sub-assembly exceeds the specified value. (2 trip detection logic)	• HV battery • No. 1 traction battery device box • Battery ECU assembly	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P1A85

HINT:

- These DTCs can be stored after clearing the DTCs and driving the vehicle for approximately 12 minutes.
- In order to ensure HV battery performance, appropriate cooling performance must be maintained. Perform the following items as necessary. If cooling performance has decreased and "Maintenance Required for Traction Battery Cooling Parts See Owner's Manual" is displayed on the multi-information display, make sure to perform the following items:
  - Make sure the air intake port for HV battery is not blocked.
  - Make sure there are no gaps between the connecting parts of the ducts.
  - Clean the No. 1 HV battery intake filter.

- Clear the DTCs to reset the learning values even if no DTCs are stored.

MONITOR DESCRIPTION

If the battery ECU assembly detects that the difference in capacity of each HV battery cell exceeds the specified value, the battery ECU assembly will illuminate the MIL and store a DTC.

MONITOR STRATEGY

Related DTCs	P1A80 (INF P1A8000), P1A85 (INF P1A8500): Battery cell malfunction
Required sensors/components	Battery ECU assembly
Frequency of operation	Continuous
Duration	TMC's intellectual property
MIL operation	2 driving cycles
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 P1A80 (INF P1A8000) is not detected DTC P1A85 (INF P1A8500) 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]

   (As 2 trip detection logic is used, check for DTCs including pending DTCs.)

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, 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 negative (-) auxiliary 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
"P1A8000 or P1A8500" only is output, or DTCs except the ones in the table below are also output.	A

RESULT	PROCEED TO
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
	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
Hybrid control system	P0A1F94	Hybrid/EV Battery Energy Control Module Unexpected Operation
	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
"P1A8000" is also output.	A
"P1A8500" is also output.	B

B ▶ **GO TO STEP 7**

A

▼

3.	CHECK FREEZE FRAME DATA (HYBRID/EV BATTERY CELL VOLTAGE)

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 30 Voltage" for DTC P1A8000 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 ECU ASSEMBLY (GA0 - VA30)

Click here INFO

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

B ▶ **REPLACE BATTERY ECU ASSEMBLY**

A

5.	**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 No. 1 traction battery device box replaced = less than 200000 km (124280 mile) *1	A
	Other than above	B

HINT:

*1: If the No. 1 traction battery device box has been replaced, use the total distance driven since it was replaced.

A ▶ **REPLACE HV BATTERY**

B

6.	**REPLACE HV BATTERY**

HINT:

Click here INFO

NEXT ▶ **REPLACE NO.1 TRACTION BATTERY DEVICE BOX**

7.	**CHECK FREEZE FRAME DATA (HYBRID/EV BATTERY CELL VOLTAGE)**

Pre-procedure1

(a) None

Procedure1

(b) Read the value of freeze frame data items "Hybrid/EV Battery Cell 31 Voltage" through "Hybrid/EV Battery Cell 60 Voltage" for DTC P1A8500 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 ECU ASSEMBLY (VAD - VA60)**

Click here INFO

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

B ▶ **REPLACE BATTERY ECU ASSEMBLY**

A

9.	**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 No. 1 traction battery device box replaced = less than 200000 km (124280 mile) *1	A
	Other than above	B

HINT:

*1: If the No. 1 traction battery device box has been replaced, use the total distance driven since it was replaced.

A ▶ **REPLACE HV BATTERY**

B

10.	**REPLACE HV BATTERY**

HINT:

Click here INFO

NEXT **REPLACE NO.1 TRACTION BATTERY DEVICE BOX**