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<b>Model Year Start:</b> 2023	<b>Model:</b> Prius Prime	<b>Prod Date Range:</b> [12/2022 - ]
<b>Title:</b> HYBRID / BATTERY CONTROL: HYBRID BATTERY SYSTEM (for M20A-FXS): P1CC81E,P1CC91E; Hybrid/EV Battery Stack 1 Voltage Difference Out of Range; 2023 - 2024 MY Prius Prius Prime [12/2022 - ]		

<b>DTC</b>	<b>P1CC81E</b>	<b>Hybrid/EV Battery Stack 1 Voltage Difference Out of Range</b>
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<b>DTC</b>	<b>P1CC91E</b>	<b>Hybrid/EV Battery Stack 2 Voltage Difference Out of Range</b>
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## DESCRIPTION

The HV battery is composed of 60 cells (3.7 V each) in series. The battery ECU assembly monitors difference in voltage 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
P1CC81E	Hybrid/EV Battery Stack 1 Voltage Difference Out of Range	The difference in voltage of each cell of the No. 1 HV supply stack sub-assembly exceeds the specified value.  (1 trip detection logic)	<ul style="list-style-type: none"> <li>• HV battery</li> <li>• No. 1 traction battery device box</li> <li>• Battery ECU assembly</li> </ul>	Comes on	Master Warning:  Comes on	HV Battery	A	SAE Code: P33DA
P1CC91E	Hybrid/EV Battery Stack 2 Voltage Difference Out of Range	The difference in voltage of each cell of the No. 2 HV supply stack sub-assembly exceeds the specified value.  (1 trip detection logic)	<ul style="list-style-type: none"> <li>• HV battery</li> <li>• No. 1 traction battery device box</li> <li>• Battery ECU assembly</li> </ul>	Comes on	Master Warning:  Comes on	HV Battery	A	SAE Code: P33DB

## MONITOR DESCRIPTION

If the difference in voltage between each HV battery cell exceeds the specified value, the battery ECU assembly determines that a malfunction has occurred. When the malfunction detection condition is satisfied, the battery ECU assembly will illuminate the MIL and store a DTC.

## MONITOR STRATEGY

Related DTCs	P33DA (INF P1CC81E), P33DB (INF P1CC91E): Battery cell malfunction
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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	-
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## COMPONENT OPERATING RANGE

Battery ECU assembly	DTC P33DA (INF P1CC81E) is not detected DTC P33DB (INF P1CC91E) is not detected
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## 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](#)

- Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
- Turn the ignition switch off and wait for 1 hour or more.[\*1]
- Turn the ignition switch to ON and turn the GTS on.[\*2]
- With ignition switch ON and wait for 10 seconds or more.[\*3]
- Drive the vehicle on urban roads for approximately 10 minutes.[\*4]

### HINT:

- [\*1] to [\*4]: Normal judgment procedure.

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

- This DTC may not be stored if the vehicle is stopped or being driven at a constant speed.

- Enter the following menus: Powertrain / HV Battery / Utility / All Readiness.
- 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

<b>1.</b>	<b>CHECK DTC OUTPUT (HV BATTERY, HYBRID CONTROL)</b>
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Pre-procedure1

(a) None

Procedure1

(b) Check for DTCs.

**Powertrain > HV Battery > Trouble Codes**

**Powertrain > Hybrid Control > Trouble Codes**

RESULT	PROCEED TO
"P1CC81E or P1CC91E" 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

SYSTEM	RELEVANT DTC	
	P060687	Hybrid/EV Battery Energy Control Module Processor to Monitoring Processor Missing Message
Hybrid control system	P0A1F94	Hybrid/EV Battery Energy Control Module Unexpected Operation

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**



<b>2.</b>	<b>CHECK DTC</b>
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(a) Check the DTCs that were output when the vehicle was brought to the workshop.

RESULT	PROCEED TO
"P1CC81E" is also output.	A
"P1CC91E" is also output.	B

**B** ► GO TO STEP 15

**A**



<b>3.</b>	<b>CHECK CONNECTOR CONNECTION CONDITION (BATTERY ECU ASSEMBLY CONNECTOR)</b>
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Click here [INFO](#)

RESULT	PROCEED TO
OK	A

RESULT		PROCEED TO
Not connected securely	The terminals are not damaged or corroded	B
Not connected securely	The terminals are damaged or corroded	C

**B** ► **CONNECT SECURELY**

**C** ► **REPLACE HV BATTERY**

**A**



<b>4.</b>	<b>CHECK FREEZE FRAME DATA (HYBRID/EV BATTERY CELL VOLTAGE)</b>
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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 P1CC81E 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**



<b>5.</b>	<b>CHECK BATTERY ECU ASSEMBLY (GA0 - VA30)</b>
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Click here [INFO](#)

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

**B** ► **GO TO STEP 14**



<b>6.</b>	<b>CHECK TOTAL DISTANCE DRIVEN</b>
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(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			
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Total distance driven is 200000 km (124280 mile) or more</td> <td>Current total distance driven - total distance driven when No. 1 traction battery device box replaced = less than 200000 km (124280 mile) *1</td> </tr> <tr> <td></td> <td>Other than above</td> </tr> </table>		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	
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			
	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.

**B** **GO TO STEP 10**



<b>7.</b>	<b>REPLACE HV BATTERY</b>
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**HINT:**

Click here [INFO](#)

**NEXT**



<b>8.</b>	<b>SIMULATION TEST</b>
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Pre-procedure1

(a) Clear the DTCs and freeze frame data.

**Powertrain > HV Battery > Clear DTCs**

Procedure1

(b) Drive the vehicle on urban roads for approximately 10 minutes.

Post-procedure1

(c) None

## NEXT



### 9. CHECK DTC OUTPUT (HV BATTERY)

Pre-procedure1

(a) None

Procedure1

(b) Check if DTCs are output.

**Powertrain > HV Battery > Trouble Codes**

RESULT	PROCEED TO
"P1CC81E" is output.	A
"P1CC81E" is not output.	B

Post-procedure1

(c) Turn the ignition switch off.

**A** ► REPLACE BATTERY ECU ASSEMBLY

**B** ► END

### 10. REPLACE HV BATTERY

#### HINT:

Click here [INFO](#)

## NEXT



### 11. REPLACE NO.1 TRACTION BATTERY DEVICE BOX

**HINT:**

[Click here](#) 

**NEXT****12. SIMULATION TEST**

Pre-procedure1

(a) Clear the DTCs and freeze frame data.

**Powertrain > HV Battery > Clear DTCs**

Procedure1

(b) Drive the vehicle on urban roads for approximately 10 minutes.

Post-procedure1

(c) None

**NEXT****13. CHECK DTC OUTPUT (HV BATTERY)**

Pre-procedure1

(a) None

Procedure1

(b) Check if DTCs are output.

**Powertrain > HV Battery > Trouble Codes**

RESULT	PROCEED TO
"P1CC81E" is output.	A
"P1CC81E" is not output.	B

Post-procedure1

(c) Turn the ignition switch off.

**A**  **REPLACE BATTERY ECU ASSEMBLY**



**B** ▶ **END**

<b>14.</b>	<b>REPLACE HV BATTERY</b>
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**HINT:**

Click here [INFO](#)

**NEXT** ▶ **REPLACE BATTERY ECU ASSEMBLY**

<b>15.</b>	<b>CHECK CONNECTOR CONNECTION CONDITION (BATTERY ECU ASSEMBLY CONNECTOR)</b>
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Click here [INFO](#)

RESULT		PROCEED TO
OK		A
Not connected securely	The terminals are not damaged or corroded	B
Not connected securely	The terminals are damaged or corroded	C

**B** ▶ **CONNECT SECURELY**

**C** ▶ **REPLACE HV BATTERY**

**A**  
▼

<b>16.</b>	<b>CHECK FREEZE FRAME DATA (HYBRID/EV BATTERY CELL VOLTAGE)</b>
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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 P1CC91E 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**



<b>17.</b>	<b>CHECK BATTERY ECU ASSEMBLY (VAD - VA60)</b>
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Click here [INFO](#)

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

**B** **GO TO STEP 26**

**A**



<b>18.</b>	<b>CHECK TOTAL DISTANCE DRIVEN</b>
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(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			
<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;">Total distance driven is 200000 km (124280 mile) or more</td> <td>Current total distance driven - total distance driven when No. 1 traction battery device box replaced = less than 200000 km (124280 mile) *1</td> </tr> <tr> <td></td> <td>Other than above</td> </tr> </table>		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	
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			
	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.

**B** **GO TO STEP 22**

**A**



**19. REPLACE HV BATTERY****HINT:**

Click here [INFO](#)

**NEXT****20. SIMULATION TEST**

Pre-procedure1

(a) Clear the DTCs and freeze frame data.

**Powertrain > HV Battery > Clear DTCs**

Procedure1

(b) Drive the vehicle on urban roads for approximately 10 minutes.

Post-procedure1

(c) None

**NEXT****21. CHECK DTC OUTPUT (HV BATTERY)**

Pre-procedure1

(a) None

Procedure1

(b) Check if DTCs are output.

**Powertrain > HV Battery > Trouble Codes**

RESULT	PROCEED TO
"P1CC91E" is output.	A
"P1CC91E" is not output.	B

Post-procedure1

(c) Turn the ignition switch off.

**A** ▶ **REPLACE BATTERY ECU ASSEMBLY**

**B** ▶ **END**

## 22. REPLACE HV BATTERY

### HINT:

[Click here](#) **INFO**

### NEXT



## 23. REPLACE NO.1 TRACTION BATTERY DEVICE BOX

### HINT:

[Click here](#) **INFO**

### NEXT



## 24. SIMULATION TEST

Pre-procedure1

(a) Clear the DTCs and freeze frame data.

**Powertrain > HV Battery > Clear DTCs**

Procedure1

(b) Drive the vehicle on urban roads for approximately 10 minutes.

Post-procedure1

(c) None

### NEXT



## 25. CHECK DTC OUTPUT (HV BATTERY)

Pre-procedure1

(a) None

Procedure1

(b) Check if DTCs are output.

**Powertrain > HV Battery > Trouble Codes**

RESULT	PROCEED TO
"P1CC91E" is output.	A
"P1CC91E" is not output.	B

Post-procedure1

(c) Turn the ignition switch off.

**A** ► **REPLACE BATTERY ECU ASSEMBLY****B** ► **END**

<b>26.</b>	<b>REPLACE HV BATTERY</b>
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**HINT:**Click here [INFO](#)**NEXT** ► **REPLACE BATTERY ECU ASSEMBLY**