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Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HYBRID / BATTERY CONTROL: HYBRID BATTERY SYSTEM (for PHEV Model): P1AFD00; Flying Capacitor Circuit Voltage Out of Range; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**P1AFD00**	**Flying Capacitor Circuit Voltage Out of Range**

DESCRIPTION

The battery ECU assembly monitors its internal operation and will store a DTC when it detects an internal malfunction.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P1AFD00	Flying Capacitor Circuit Voltage Out of Range	ECU internal malfunction (1 trip detection logic)	• No. 1 HV supply stack sub-assembly • No. 2 HV supply stack sub-assembly • No. 3 HV supply stack sub-assembly • Battery ECU assembly • Battery voltage sensor • Wire harness or connector	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P1AFD

MONITOR DESCRIPTION

The battery ECU assembly monitors its internal operation. If the voltage detection circuit is malfunctioning, the battery ECU assembly illuminates the MIL and stores a DTC.

MONITOR STRATEGY

Related DTCs	P1AFD (INF P1AFD00): Battery stack voltage sense circuit
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 P1AFD (INF P1AFD00) 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. Turn the ignition switch to ON and wait for 30 seconds or more.[*1]

HINT:

[*1]: Normal judgment procedure.

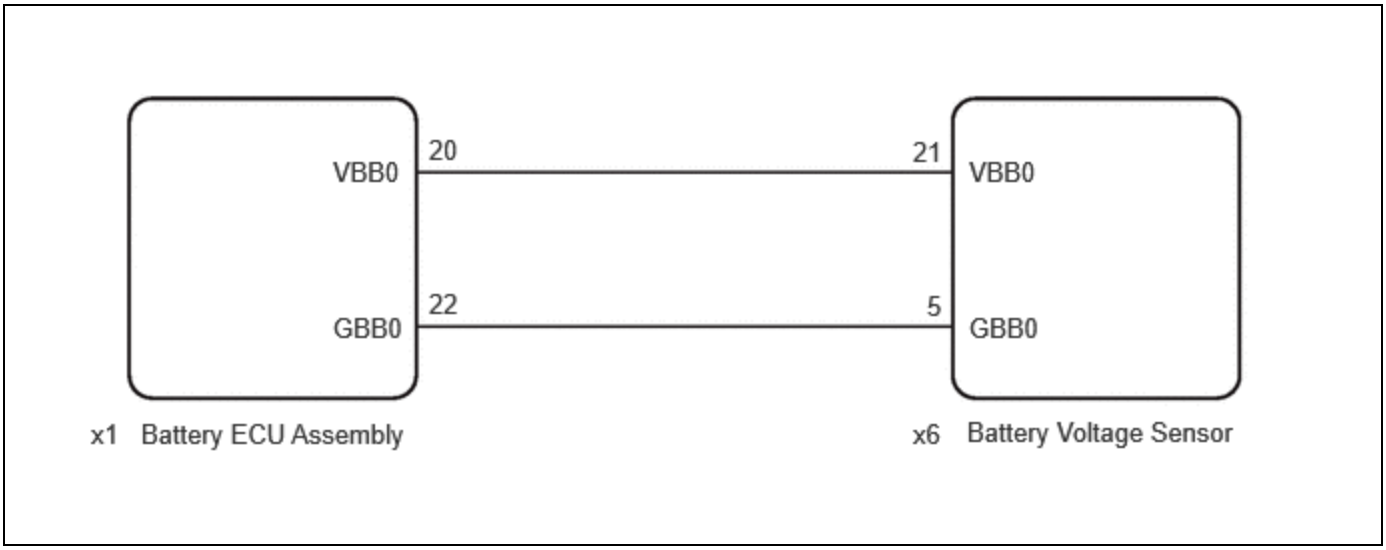
The normal judgment procedure is used to complete DTC judgment and also used when clearing permanent DTCs.

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)**

Pre-procedure1

(a) None

Procedure1

(b) Check for DTCs.

Powertrain > HV Battery > Trouble Codes

RESULT	PROCEED TO
Only P1AFD00 is output	A
P1AFD00 and other DTCs are output	B

Post-procedure1

(c) Turn the ignition switch off.

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

A ▼

2.	**CHECK CONNECTOR CONNECTION CONDITION (BATTERY VOLTAGE SENSOR CONNECTOR)**

CAUTION:

Be sure to wear insulated gloves and protective goggles.

Pre-procedure1

(a) Check that the service plug grip is not installed.

NOTICE:

After removing the service plug grip, do not turn the ignition switch to ON (READY), unless instructed by the repair manual because this may cause a malfunction.

Procedure1

(b) Check the connections of the battery voltage sensor connector.

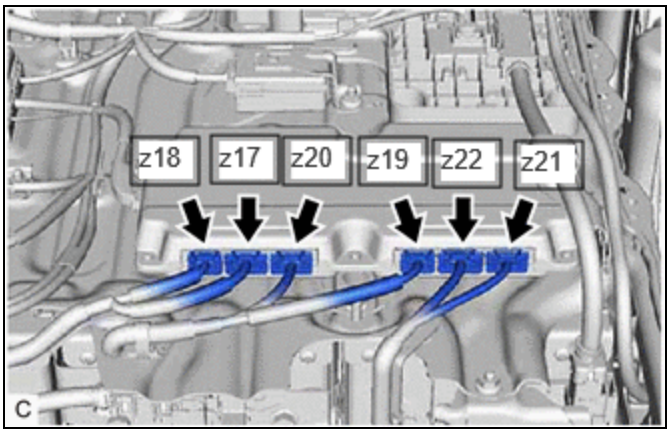
HINT:

Click here INFO

OK:

The connector is connected securely and there are no contact problems.

Result:



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

RESULT		PROCEED TO
Connector z18 is not connected securely	The terminals are damaged or corroded	C
Connector z17 is not connected securely	The terminals are damaged or corroded	D
Connector z20 is not connected securely	The terminals are damaged or corroded	E
Connector z19 is not connected securely	The terminals are damaged or corroded	F
Connector z22 is not connected securely	The terminals are damaged or corroded	G
Connector z21 is not connected securely	The terminals are damaged or corroded	H

Post-procedure1

(c) None

B ▶ **CONNECT SECURELY**

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

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

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

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

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

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

A ▼

3.	**CHECK HARNESS AND CONNECTOR (BATTERY ECU ASSEMBLY - BATTERY VOLTAGE SENSOR)**

CAUTION:

Be sure to wear insulated gloves and protective goggles.

NOTICE:

Make sure to use tester probes with a diameter of approximately 0.5 mm (0.0197 in.) when measuring the voltage of each HV battery cell.

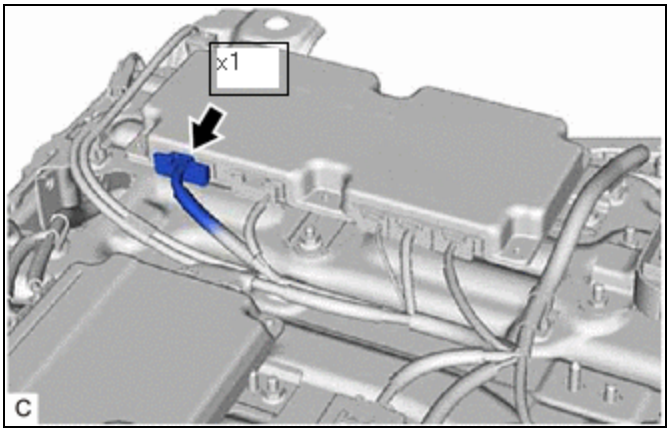
Pre-procedure1

(a) Check that the service plug grip is not installed.

NOTICE:

After removing the service plug grip, do not turn the ignition switch to ON (READY), unless instructed by the repair manual because this may cause a malfunction.

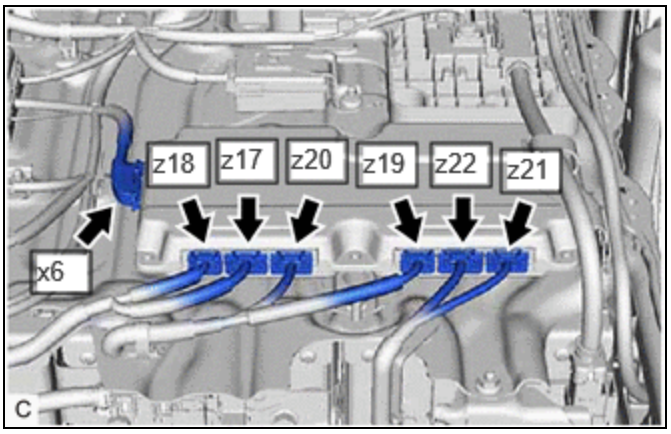
(b) Disconnect the battery ECU assembly connector.



NOTICE:

Before disconnecting the connector, check that it is not loose or disconnected.

(c) Disconnect the x6 battery voltage sensor connector.



CAUTION:

When disconnecting connector x6 of the battery voltage sensor, first disconnect connectors z17, z18, z19, z20, z21 and z22 from the battery voltage sensor.

NOTICE:

- Insulate each disconnected high-voltage connector with insulating tape. Wrap the connector from the wire harness side to the end of the connector.
- Before disconnecting the connector, check that it is not loose or disconnected.

Procedure1

(d) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

EWD INFO

Click Location & Routing(x1,x6)
Click Connector(x1)
Click Connector(x6)

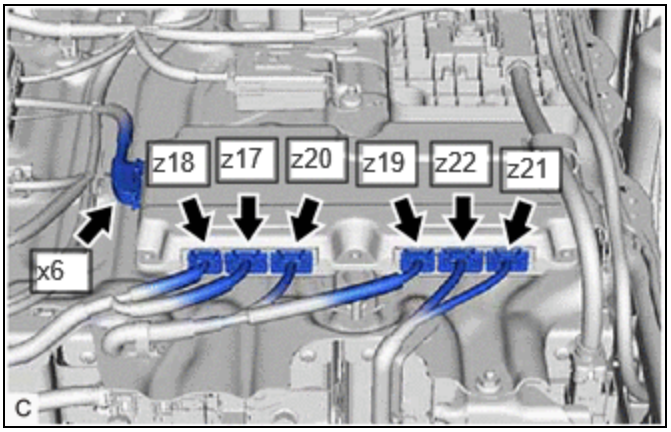
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
x1-20 (VBB0) - x6-21 (VBB0)	Ignition switch off	Below 1 Ω	Ω
x1-22 (GBB0) - x6-5 (GBB0)	Ignition switch off	Below 1 Ω	Ω

Post-procedure1

(e) Reconnect the x6 battery voltage sensor connector.

CAUTION:

When connecting connectors z17, z18, z19, z20, z21 and z22 of the battery voltage sensor, first connect connector x6 to the battery voltage sensor.



(f) Reconnect the battery ECU assembly connector.

OK ▶ **REPLACE BATTERY ECU ASSEMBLY AND BATTERY VOLTAGE SENSOR**

Battery ECU assembly: Click here INFO

Battery voltage sensor: Click here INFO

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**