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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): P2BE428; Hybrid/EV Battery Pack Current Sensor "C" Circuit Range/Performance Signal Bias Level Out of Range / Zero Adjustment Failure; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	P2BE428	Hybrid/EV Battery Pack Current Sensor "C" Circuit Range/Performance Signal Bias Level Out of Range / Zero Adjustment Failure
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DESCRIPTION

Refer to the description for DTC P0ABF11.

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DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P2BE428	Hybrid/EV Battery Pack Current Sensor "C" Circuit Range/Performance Signal Bias Level Out of Range / Zero Adjustment Failure	The offset value of the battery current sensor is excessively large. (1 trip detection logic)	<ul style="list-style-type: none"> No. 1 traction battery device box assembly Battery ECU assembly Wire harness or connector 	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P2BE5

When the ignition switch is ON, normally the HV battery current does not flow. If the HV battery current value is above the specification, this DTC will be stored.

HINT:

- Make sure to perform Current Sensor Offset Learning after replacing a battery current sensor.

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- This DTC may be output if Current Sensor Offset Learning has not been completed.

MONITOR DESCRIPTION

If the battery ECU assembly detects a malfunction in the battery current sensor, the battery ECU assembly illuminates the MIL and stores a DTC.

MONITOR STRATEGY

Related DTCs	P2BE5 (INF P2BE428): Hybrid/EV Battery Pack Current sensor malfunction (gain)
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Required sensors/components	Battery current sensor
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 P2BE5 (INF P2BE428) 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 2 minutes or more.
- Drive the vehicle on urban roads for approximately 10 minutes.[*1]
- Turn the ignition switch off and wait for 2 minutes or more.[*2]
- Turn the ignition switch to ON and wait for 10 seconds or more.[*3]

HINT:

[*1] to [*3]: Normal judgment procedure.

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

- 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 or N/A, perform the normal judgment procedure again.

WIRING DIAGRAM

Refer to the wiring diagram for DTC P0ABF11.

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)
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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
"P2BE428" 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

SYSTEM	RELEVANT DTC	
	P062F46	Hybrid/EV Battery Energy Control Module EEPROM Calibration / Parameter Memory Failure
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



2.	CHECK HARNESS AND CONNECTOR (BATTERY ECU ASSEMBLY - NO. 1 TRACTION BATTERY DEVICE BOX ASSEMBLY)
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Click here [INFO](#)

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



3.	CHECK NO. 1 TRACTION BATTERY DEVICE BOX ASSEMBLY (BATTERY CURRENT SENSOR (IBL))
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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.

(b) Connect the SST.

HINT:

Click here [INFO](#)

(c) Connect the cable to the negative (-) auxiliary battery terminal.

(d) Turn the ignition switch to ON.

Procedure1

(e) Using a Toyota electrical tester set to 40 V, measure the VIB voltage according to the value(s) in the table below.



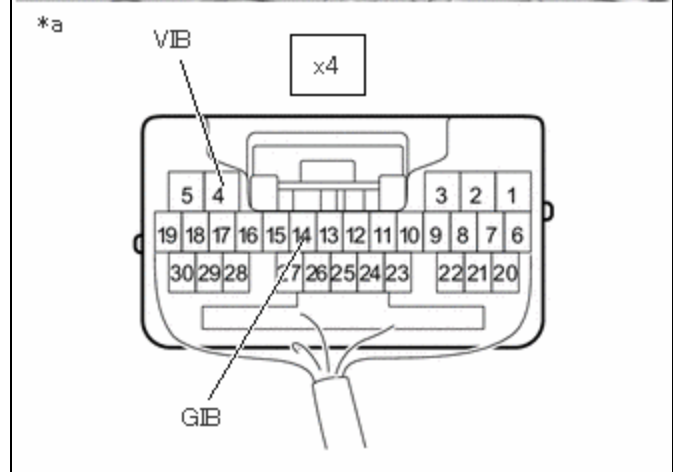
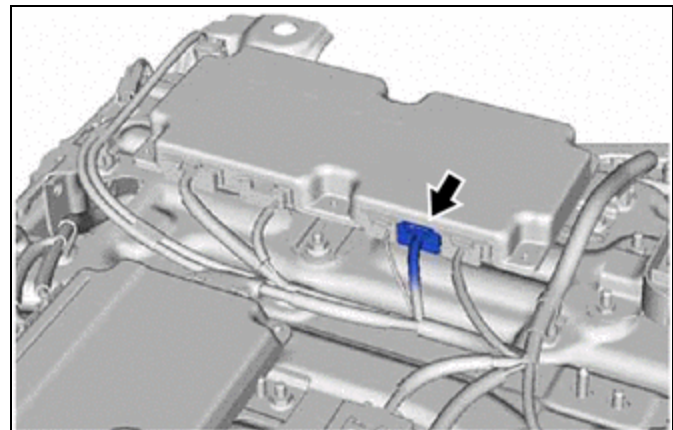
[Click Location & Routing\(x4\)](#)

[Click Connector\(x4\)](#)

TESTER CONNECTION	CONDITION
x4-4 (VIB) - x4-14 (GIB)	Ignition switch ON

NOTICE:

- Turning the ignition switch to ON with the service plug grip removed causes other DTCs to be stored. Clear the DTCs after performing this inspection.
- Be sure to set the Toyota electrical tester to 40 V when performing this test.



*a	Component with harness connected (Battery ECU Assembly)
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Procedure2

(f) Using a Toyota electrical tester set to 4 V, measure the IBL voltage according to the value(s) in the table below.



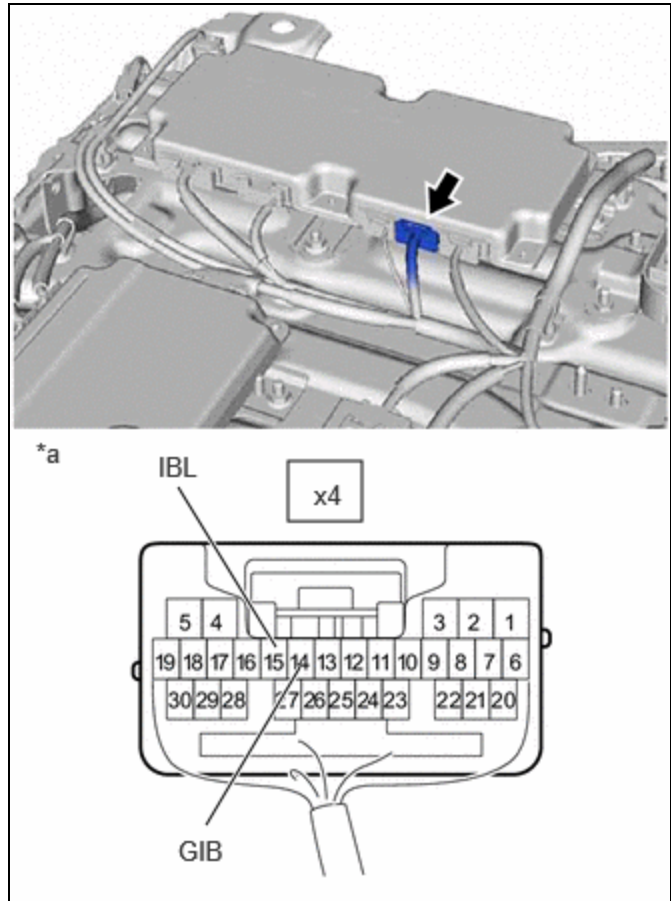
[Click Location & Routing\(x4\)](#)

[Click Connector\(x4\)](#)

TESTER CONNECTION	CONDITION
x4-15 (IBL) - x4-14 (GIB)	Ignition switch ON

NOTICE:

Be sure to set the Toyota electrical tester to 4 V when performing this test.



*a	Component with harness connected (Battery ECU Assembly)
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Procedure3

(g) Compare the measured values of the IBL terminal voltage and VIB terminal voltage using the following formula:

CONDITION
IBL voltage - 0.5 X VIB voltage = less than 0.05 V
IBL voltage - 0.5 X VIB voltage = -0.05 V or higher

RESULT	PROCEED TO
Within the specified range above	A
Other than above	B

Post-procedure1

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) auxiliary battery terminal.

(j) Disconnect the SST.

B  **REPLACE NO. 1 TRACTION BATTERY DEVICE BOX ASSEMBLY**

A



4. REPLACE BATTERY ECU ASSEMBLY

HINT:

[Click here](#) 

NEXT



5. SIMULATION TEST

Pre-procedure1

(a) None

Procedure1

(b) Clear the DTCs and freeze frame data.

Powertrain > HV Battery > Clear DTCs

Post-procedure1

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

(d) Turn the ignition switch off and wait for 2 minutes or more.

(e) Turn the ignition switch to ON and wait for 10 seconds or more.

NEXT



6. CHECK DTC OUTPUT (HV BATTERY)

(a) Check for DTCs.

Powertrain > HV Battery > Trouble Codes

RESULT	PROCEED TO
DTCs are not output.	A
P2BE428 is also output.	B

A ► END

B ► REPLACE NO. 1 TRACTION BATTERY DEVICE BOX
ASSEMBLY

