Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM1000000029A44
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [12/2022 -]
Title: HYBRID / BATTERY CONTROL: HYBRID BATTERY SYSTEM (for M20A-FXS): P0ABF28; Hybrid/EV Battery Current Sensor "A" Signal Bias Level Out of Range / Zero Adjustment Failure; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

DTC	**P0ABF28**	**Hybrid/EV Battery Current Sensor "A" Signal Bias Level Out of Range / Zero Adjustment Failure**

DESCRIPTION

Refer to the description for DTC P0ABF11.

Click here INFO

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P0ABF28	Hybrid/EV Battery Current Sensor "A" Signal Bias Level Out of Range / Zero Adjustment Failure	The offset value of the battery current sensor is excessively large. (1 trip detection logic)	• No. 1 traction battery device box • Battery ECU assembly • Wire harness or connector	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0AC0

HINT:

- Make sure to perform Current Sensor Offset Learning after replacing a battery current sensor.
- 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 a battery current sensor, the battery ECU assembly will illuminate the MIL and store a DTC.

MONITOR STRATEGY

Related DTCs	P0AC0 (INF P0ABF28): Current sensor malfunction
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	-

COMPONENT OPERATING RANGE

Battery ECU assembly	DTC P0AC0 (INF P0ABF28) 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 10 minutes.[*1]
4. Turn the ignition switch off and wait for 2 minutes or more.[*2]
5. Turn the ignition switch to ON and turn the GTS on.[*3]
6. With ignition switch ON and wait for 10 seconds or more.[*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.

7. Enter the following menus: Powertrain / HV Battery / Utility / All Readiness.
8. 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 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 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
"P0ABF28" 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
	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)**

CAUTION:

Be sure to wear insulated gloves and protective goggles.

Pre-procedure1

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

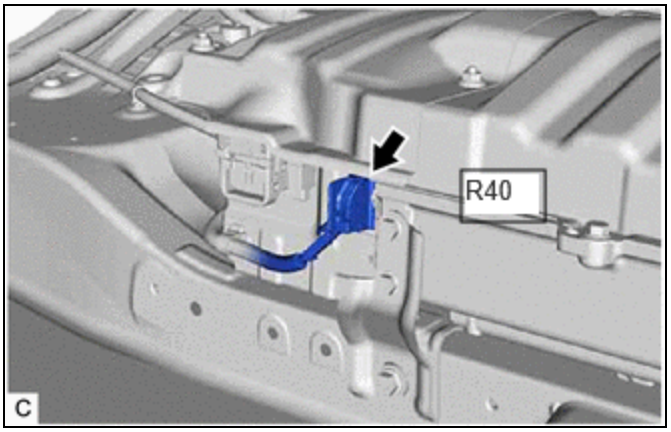
NOTICE:

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) Disconnect the battery ECU assembly connector.

NOTICE:

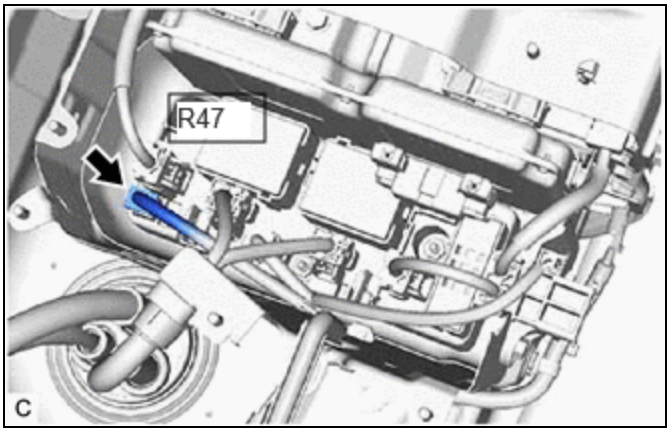
Before disconnecting the connector, check that it is not loose or disconnected.



(c) Disconnect the battery current sensor connector from the No. 1 traction battery device box.

NOTICE:

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



Procedure1

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

Standard Resistance (Check for Open):

EWD INFO

Click Location & Routing(R40,R47)
Click Connector(R40)
Click Connector(R47)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
R40-6 (IB1) - R47-2 (IB1)	Ignition switch off	Below 1 Ω
R40-18 (GIB) - R47-3 (GIB)	Ignition switch off	Below 1 Ω
R40-5 (IB0) - R47-4 (IB0)	Ignition switch off	Below 1 Ω
R40-17 (VIB) - R47-1 (VIB)	Ignition switch off	Below 1 Ω

Standard Resistance (Check for Short):

EWD INFO

Click Location & Routing(R40,R47)
Click Connector(R40)
Click Connector(R47)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
R40-6 (IB1) or R47-2 (IB1) - Body ground and other terminals	Ignition switch off	10 kΩ or higher
R40-18 (GIB) or R47-3 (GIB) - Body ground and other terminals	Ignition switch off	10 kΩ or higher
R40-5 (IB0) or R47-4 (IB0) - Body ground and other terminals	Ignition switch off	10 kΩ or higher
R40-17 (VIB) or R47-1 (VIB) - Body ground and other terminals	Ignition switch off	10 kΩ or higher

Post-procedure1

(e) Reconnect the battery current sensor connector to the No. 1 traction battery device box.

(f) Reconnect the battery ECU assembly connector.

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

OK ▼

3.	**CHECK NO.1 TRACTION BATTERY DEVICE BOX (BATTERY CURRENT SENSOR (IB0))**

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 cable to the negative (-) auxiliary battery terminal.

(c) Turn the ignition switch to ON.

Procedure1

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

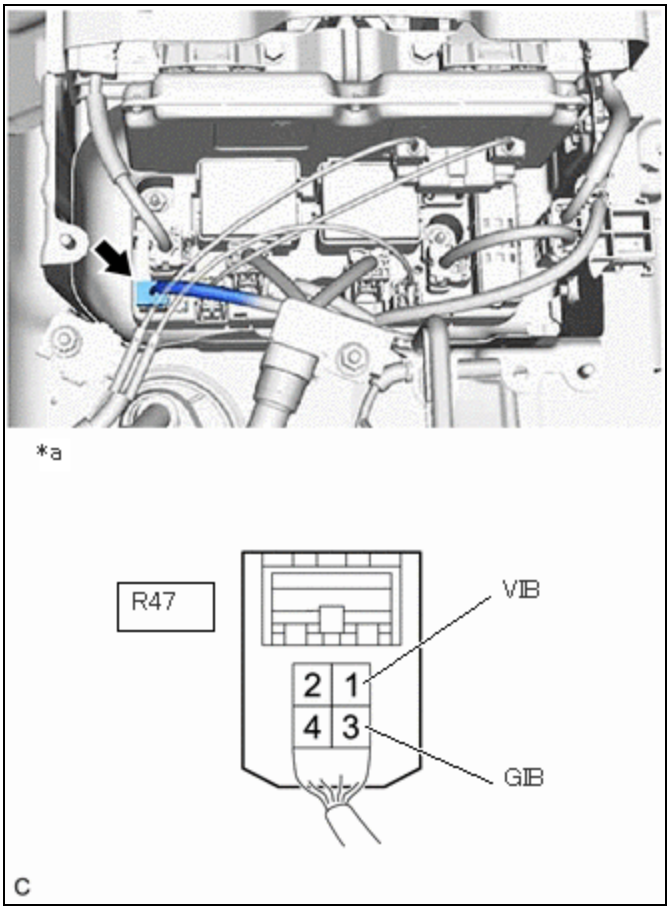
EWD INFO

Click Location & Routing(R47)
Click Connector(R47)

TESTER CONNECTION	TESTER CONNECTION
R47-1 (VIB) - R47-3 (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 (No. 1 Traction Battery Device Box (Battery Current Sensor))

(e) Using a toyota electrical tester set to 4 V, measure the IB0 voltage according to the value(s) in the table below.

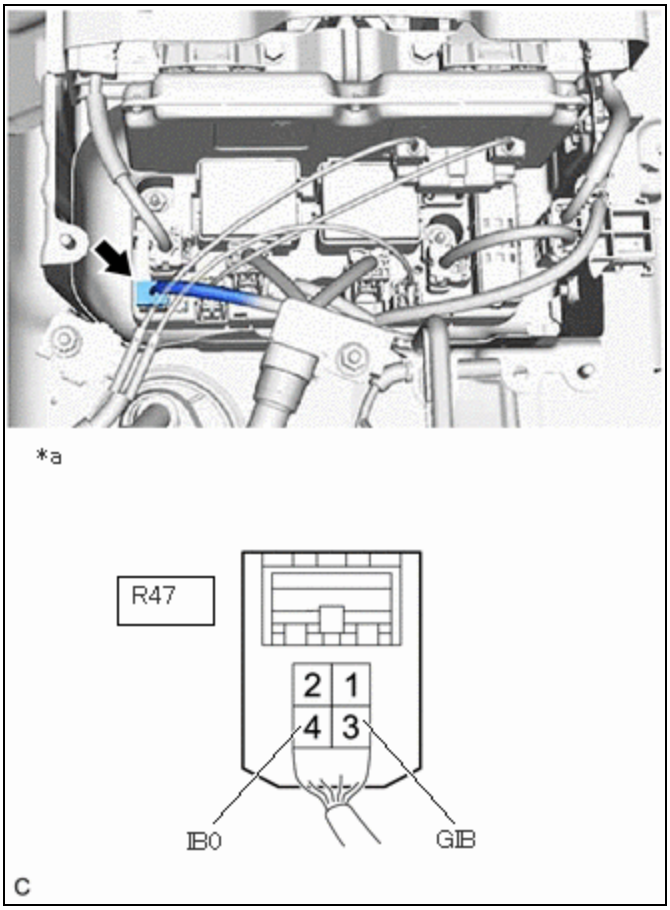
EWD INFO

Click Location & Routing(R47)
Click Connector(R47)

TESTER CONNECTION	TESTER CONNECTION
R47-4 (IB0) - R47-3 (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 (No. 1 Traction Battery Device Box (Battery Current Sensor))

(f) Compare the measured values of the IB0 terminal voltage and VIB terminal voltage using the following formula:

IB0 voltage - 0.584 X VIB Voltage = less than 0.060 V
IB0 voltage - 0.584 X VIB Voltage = -0.060 V or higher

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

Post-procedure1

(g) Turn the ignition switch off.

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

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

A

4.	**CHECK NO.1 TRACTION BATTERY DEVICE BOX (BATTERY CURRENT SENSOR (IB1))**

CAUTION:

Be sure to wear insulated gloves.

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 cable to the negative (-) auxiliary battery terminal.

(c) Turn the ignition switch to ON.

Procedure1

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

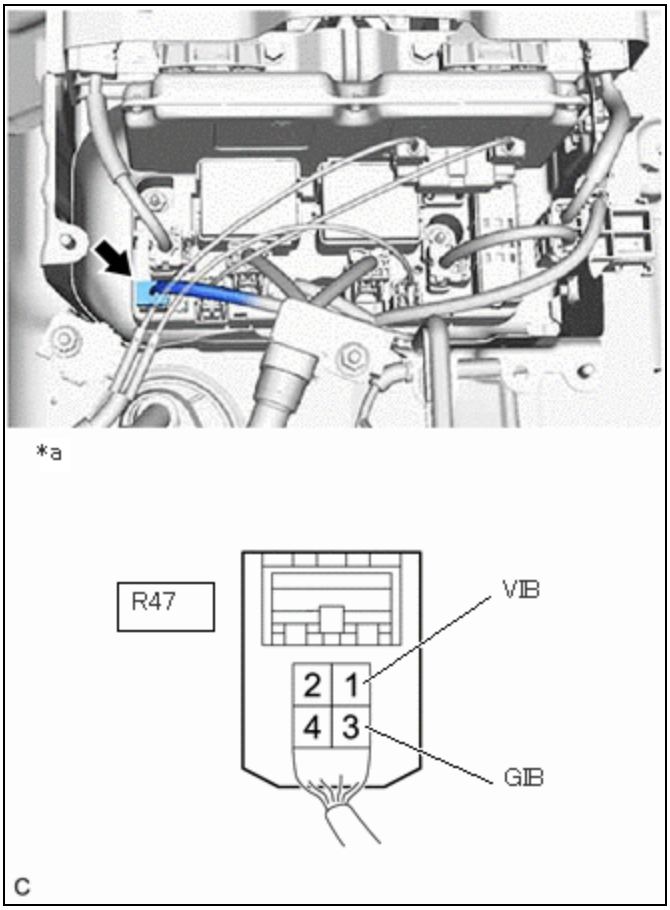
EWD INFO

Click Location & Routing(R47)
Click Connector(R47)

TESTER CONNECTION	TESTER CONNECTION
R47-1 (VIB) - R47-3 (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 (No. 1 Traction Battery Device Box (Battery Current Sensor))

(e) Using a toyota electrical tester set to 4 V, measure the IB1 voltage according to the value(s) in the table below.

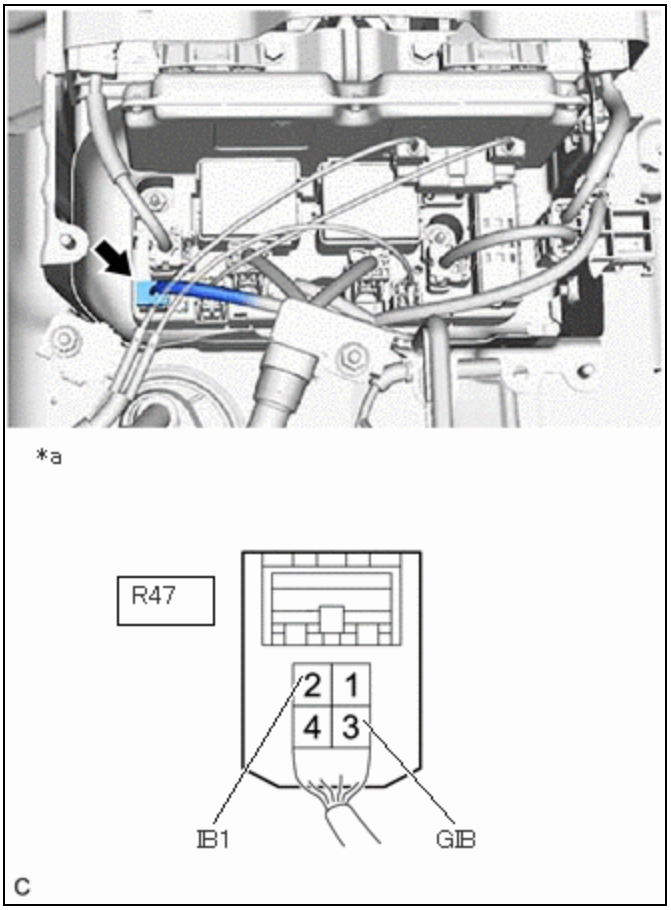
EWD INFO

Click Location & Routing(R47)
Click Connector(R47)

TESTER CONNECTION	TESTER CONNECTION
R47-2 (IB1) - R47-3 (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 (No. 1 Traction Battery Device Box (Battery Current Sensor))

(f) Compare the measured values of the IB1 terminal voltage and VIB terminal voltage using the following formula:

CONDITION
IB1 voltage - 0.416 X VIB Voltage = less than 0.060 V
IB1 voltage - 0.416 X VIB Voltage = -0.060 V or higher

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

Post-procedure1

(g) Turn the ignition switch off.

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

B REPLACE NO.1 TRACTION BATTERY DEVICE BOX

A

5.	REPLACE BATTERY ECU ASSEMBLY

HINT:

Click here INFO

NEXT

6.	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

7.	CHECK DTC OUTPUT (HV BATTERY)

Pre-procedure1

(a) None

Procedure1

(b) Check for DTCs.

Powertrain > HV Battery > Trouble Codes

RESULT	PROCEED TO
DTCs are not output.	A
P0ABF28 is also output.	B

Post-procedure1

(c) Turn the ignition switch off.

(d) None

A ▶ **END**

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