Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM1000000028ZXN
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [12/2022 -]
Title: HYBRID / BATTERY CONTROL: MOTOR GENERATOR CONTROL SYSTEM (for M20A-FXS): P0BE528,...,P0BED28; Drive Motor A" Phase U Current Sensor Signal Bias Level Out of Range / Zero Adjustment Failure"; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

DTC	**P0BE528**	**Drive Motor A" Phase U Current Sensor Signal Bias Level Out of Range / Zero Adjustment Failure"**

DTC	**P0BE928**	**Drive Motor A" Phase V Current Sensor Signal Bias Level Out of Range / Zero Adjustment Failure"**

DTC	**P0BED28**	**Drive Motor A" Phase W Current Sensor Signal Bias Level Out of Range / Zero Adjustment Failure"**

DTC SUMMARY

MALFUNCTION DESCRIPTION

These DTCs indicate that the current sensor value is abnormal. The cause of this malfunction may be one of the following:

Internal inverter malfunction

- Current sensor malfunction
- Inverter with converter assembly internal circuit malfunction

DESCRIPTION

The motor generator control ECU (MG ECU), which is built into the inverter with converter assembly, monitors the motor inverter current sensor. These DTCs indicate the malfunction of current sensors and do not indicate a malfunction of the high-voltage system.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P0BE528	Drive Motor A" Phase U Current Sensor Signal Bias Level Out of Range / Zero Adjustment Failure"	Motor inverter current sensor U phase offset malfunction: The absolute value of the current sensor output exceeds the threshold when current should not flow,	• Inverter with converter assembly • Wire harness or connector	Comes on	Master Warning: Comes on	Motor Generator	A	SAE Code: P0BE6

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
		such as when the motor inverter is shutdown. (1 trip detection logic)						
P0BE928	Drive Motor A" Phase V Current Sensor Signal Bias Level Out of Range / Zero Adjustment Failure"	Motor inverter current sensor V phase offset malfunction: The absolute value of the current sensor output exceeds the threshold when current should not flow, such as when the motor inverter is shutdown. (1 trip detection logic)	• Inverter with converter assembly • Wire harness or connector	Comes on	Master Warning: Comes on	Motor Generator	A	SAE Code: P0BEA
P0BED28	Drive Motor A" Phase W Current Sensor Signal Bias Level Out of Range / Zero Adjustment Failure"	Motor inverter current sensor W phase offset malfunction: The absolute value of the current sensor output exceeds the threshold when current should not flow, such as when the motor inverter is shutdown. (1 trip detection logic)	• Inverter with converter assembly • Wire harness or connector	Comes on	Master Warning: Comes on	Motor Generator	A	SAE Code: P0BEE

MONITOR DESCRIPTION

If the motor generator control ECU detects a motor inverter current sensor U, V or W phase offset malfunction, it will illuminate the MIL and store a DTC.

MONITOR STRATEGY

Related DTCs	P0BE6 (INF P0BE528): Offset malfunction P0BEA (INF P0BE928): Offset malfunction P0BEE (INF P0BED28): Offset malfunction
Required sensors/components	Motor inverter Phase U Current Sensor Motor inverter Phase V Current Sensor Motor inverter Phase W 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

Motor generator control ECU	DTC P0BE6 (INF P0BE528) is not detected DTC P0BEA (INF P0BE928) is not detected DTC P0BEE (INF P0BED28) 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 5 seconds or more. [*1]
4. Turn the ignition switch to ON (READY) with the shift lever in P and wait for 5 seconds or more. [*2]

   HINT:

   [*1] to [*2]: Normal judgment procedure.

   The normal judgment procedure is used to complete DTC judgment and also used when clearing permanent DTCs.
5. Enter the following menus: Powertrain / Motor Generator / Utility / All Readiness.

6. 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.

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

HINT:

P0BE528, P0BE928 or P0BED28 may be output as a result of the malfunction indicated by the DTCs in table below.

a. The chart above is listed in inspection order of priority.
b. Check DTCs that are output at the same time by following the listed order. (The main cause of the malfunction can be determined without performing unnecessary inspections.)

Table 1

MALFUNCTION CONTENT	SYSTEM	RELEVANT DTC	
Insulation malfunction	Hybrid control system	P1C7C49	Hybrid/EV Battery Voltage System Isolation (A/C Area) Internal Electronic Failure
		P1C7D49	Hybrid/EV Battery Voltage System Isolation (Hybrid/EV Battery Area) Internal Electronic Failure
		P1C7E49	Hybrid/EV Battery Voltage System Isolation (Transaxle Area) Internal Electronic Failure
		P1C7F49	Hybrid/EV Battery Voltage System Isolation (Direct Current Area) Internal Electronic Failure
		P1C8049	Hybrid/EV Battery Voltage System Isolation (Rear Motor Area) Internal Electronic Failure
High voltage system malfunction	Hybrid control system	P0AA649	Hybrid/EV Battery Voltage System Isolation Internal Electronic Failure

Table 2

MALFUNCTION CONTENT	SYSTEM	RELEVANT DTC	
Microcomputer malfunction	Motor generator control system	P0A1A47	Generator Control Module Watchdog / Safety MC Failure
		P0A1A49	Control Module Internal Electronic Failure
		P0A1B47	Drive Motor "A" Control Module Watchdog / Safety MC Failure
		P1C2A1C	Generator A/D Converter Circuit Circuit Voltage Out of Range
		P1C2A49	Generator A/D Converter Circuit Internal Electronic Failure
		P1C2A71	Generator A/D Converter Circuit Actuator Stuck
		P1C2B1C	Drive Motor "A" Control Module A/D Converter Circuit Voltage Out of Range
		P1C2B49	Drive Motor "A" Control Module A/D Converter Circuit Internal Electronic Failure
		P1C2B71	Drive Motor "A" Control Module A/D Converter Circuit Actuator Stuck
		P313383	Communication Error from Generator to Drive Motor "A" Value of Signal Protection Calculation Incorrect
		P313386	Communication Error from Generator to Drive Motor "A" Signal Invalid
		P313387	Communication Error from Generator to Drive Motor "A" Missing Message
	Hybrid control system	P0A1B49	Drive Motor "A" Control Module Internal Electronic Failure
Power source circuit malfunction	Motor generator control system	P06B01C	Generator Control Module Position Sensor REF Power Source Circuit Voltage Out of Range
		P06D61C	Generator Control Module Offset Power Circuit Voltage Out of Range
Communication malfunction	Motor generator control system	U11B387	Lost Communication with Hybrid/EV Powertrain Control Module (ch5) Missing Message
Sensor and actuator circuit malfunction	Motor generator control system	P0A3F16	Drive Motor "A" Position Sensor Circuit Voltage Below Threshold
		P0A3F21	Drive Motor "A" Position Sensor Signal Amplitude < Minimum
		P0A3F22	Drive Motor "A" Position Sensor Signal Amplitude > Maximum
		P0C5013	Drive Motor "A" Position Sensor Circuit "A" Circuit Open
		P0C5016	Drive Motor "A" Position Sensor Circuit "A" Circuit Voltage Below Threshold
		P0C5017	Drive Motor "A" Position Sensor Circuit "A" Circuit Voltage Above Threshold
		P0C5A13	Drive Motor "A" Position Sensor Circuit "B" Circuit Open

MALFUNCTION CONTENT	SYSTEM	RELEVANT DTC	
		P0C5A16	Drive Motor "A" Position Sensor Circuit "B" Circuit Voltage Below Threshold
		P0C5A17	Drive Motor "A" Position Sensor Circuit "B" Circuit Voltage Above Threshold
		P0D2D16	Drive Motor "A" Inverter Voltage Sensor (VH) Circuit Voltage Below Threshold
		P0D2D17	Drive Motor "A" Inverter Voltage Sensor (VH) Circuit Voltage Above Threshold
		P1CAD49	Drive Motor "A" Position Sensor Internal Electronic Failure
		P1CB038	Drive Motor "A" Position Sensor REF Signal Frequency Incorrect
System malfunction	Motor generator control system	P0A7873	Drive Motor "A" Inverter Actuator Stuck Closed

PROCEDURE

1.	**CHECK CONNECTOR CONNECTION CONDITION (INVERTER WITH CONVERTER ASSEMBLY CONNECTOR)**

Click here INFO

RESULT	PROCEED TO
OK	A
NG (The connector is not connected securely.)	B
NG (The terminals are not making secure contact or are deformed, or water or foreign matter exists in the connector.)	C

A ▶ **REPLACE INVERTER WITH CONVERTER ASSEMBLY**

B ▶ **CONNECT SECURELY**

C ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**