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Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [12/2022 -]
Title: HYBRID / BATTERY CONTROL: HYBRID CONTROL SYSTEM (for M20A-FXS): P321E9F; Motor/Generator Shutdown Signal Stuck Off; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

DTC	**P321E9F**	**Motor/Generator Shutdown Signal Stuck Off**

DTC SUMMARY

MALFUNCTION DESCRIPTION

The hybrid vehicle control ECU detects malfunctions which prevent the inverter with converter assembly emergency shutdown circuit (HSDN) from shutting down the hybrid control system. Detection is performed when the ignition switch is turned to ON and during the shutdown sequence when the ignition switch is turned off.

The cause of this malfunction may be one of the following:

Hybrid vehicle control ECU and inverter with converter assembly shutdown circuit malfunction

- Hybrid vehicle control ECU malfunction
- Connector or wire harness malfunction (between hybrid vehicle control ECU and inverter with converter assembly) malfunction
- Inverter with converter assembly malfunction

DESCRIPTION

The hybrid vehicle control ECU sends a block signal to the motor generator control ECU (MG ECU) to shut down the power supply to the motor. When the system is not in the on (READY) state, it sends an HSDN (MG shutdown signal) signal from the hybrid vehicle control ECU to the motor generator control ECU (MG ECU) to check the function of the HV gate block. When a malfunction is detected in the HV gate block function, DTCs are stored.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P321E9F	Motor/Generator Shutdown Signal Stuck Off	When the HV gate block function check is performed (when the ignition switch is turned from ON (READY) to off), the inverter voltage (VH) drops and current flows in the inverter. (1 trip detection logic)	• Wire harness or connector • Hybrid vehicle control ECU • Inverter with converter assembly	Does not come on	Master Warning: Comes on	Hybrid Control	A	SAE Code: P321E

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

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 (READY) and wait for 30 seconds or more.
4. Turn the ignition switch off and wait for 2 minutes or more.
5. Turn the ignition switch to ON (READY) and wait for 30 seconds or more.
6. Turn the ignition switch off and wait for 2 minutes or more.
7. Enter the following menus: Powertrain / Hybrid Control / 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 driving pattern again.

WIRING DIAGRAM

Refer to the wiring diagram for the Shut Down Signal Circuit.

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

HINT:

- P321E9F 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.)

MALFUNCTION CONTENT	RELEVANT DTC	
Sensor and actuator circuit malfunction	P33B99F	Motor/Generator Shutdown Signal (Hybrid/EV Side) Stuck Off
	P33BF9F	Motor/Generator Shutdown Signal (MG Side) Stuck Off

PROCEDURE

1.	**CHECK CONNECTOR CONNECTION CONDITION (HYBRID VEHICLE CONTROL ECU CONNECTOR)**

Click here INFO

NG ▶ **CONNECT SECURELY**

OK ▼

2.	**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

B ▶ **CONNECT SECURELY**

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

A ▼

3.	**CHECK HARNESS AND CONNECTOR (INVERTER WITH CONVERTER ASSEMBLY - HYBRID VEHICLE CONTROL ECU)**

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) Disconnect the inverter with converter assembly connector.

(c) Disconnect the hybrid vehicle control ECU connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(A88,A57)
Click Connector(A88)
Click Connector(A57)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A88-26 (HSDN) - A57-9 (HSDN)	Ignition switch off	Below 1 Ω	Ω
A88-26 (HSDN) or A57-9 (HSDN) - Body ground and other terminals	Ignition switch off	10 kΩ or higher	kΩ

HINT:

As there might be an intermittent malfunction, inspect the following items even if the measured resistance is as specified.

Check that each connector between the inverter with converter assembly and hybrid vehicle control ECU is not loose or disconnected.

Post-procedure1

(e) Reconnect the hybrid vehicle control ECU connector.

(f) Reconnect the inverter with converter assembly connector.

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

OK ▼

4.	**CHECK INVERTER WITH CONVERTER ASSEMBLY**

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) Disconnect the inverter with converter assembly connector.

Procedure1

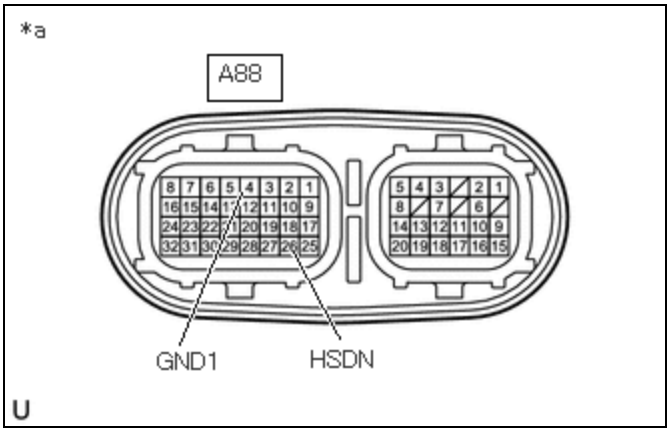
(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

EWD INFO

Click Location & Routing(A88)
Click Connector(A88)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A88-26 (HSDN) - A88-4 (GND1)	Ignition switch off	2.65 to 3.55 kΩ	kΩ



*a	Component without harness connected (Inverter with Converter Assembly)

NOTICE:

Be sure not to damage or deform the terminal being inspected.

Result:

PROCEED TO
OK
NG

Post-procedure1

(d) Reconnect the inverter with converter assembly connector.

OK ▶ **REPLACE HYBRID VEHICLE CONTROL ECU** INFO

NG ▶ **REPLACE INVERTER WITH CONVERTER ASSEMBLY**