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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): Inverter Low-voltage Circuit; 2023 - 2024 MY Prius Prime [12/2022 -]		

Inverter Low-voltage Circuit

DESCRIPTION

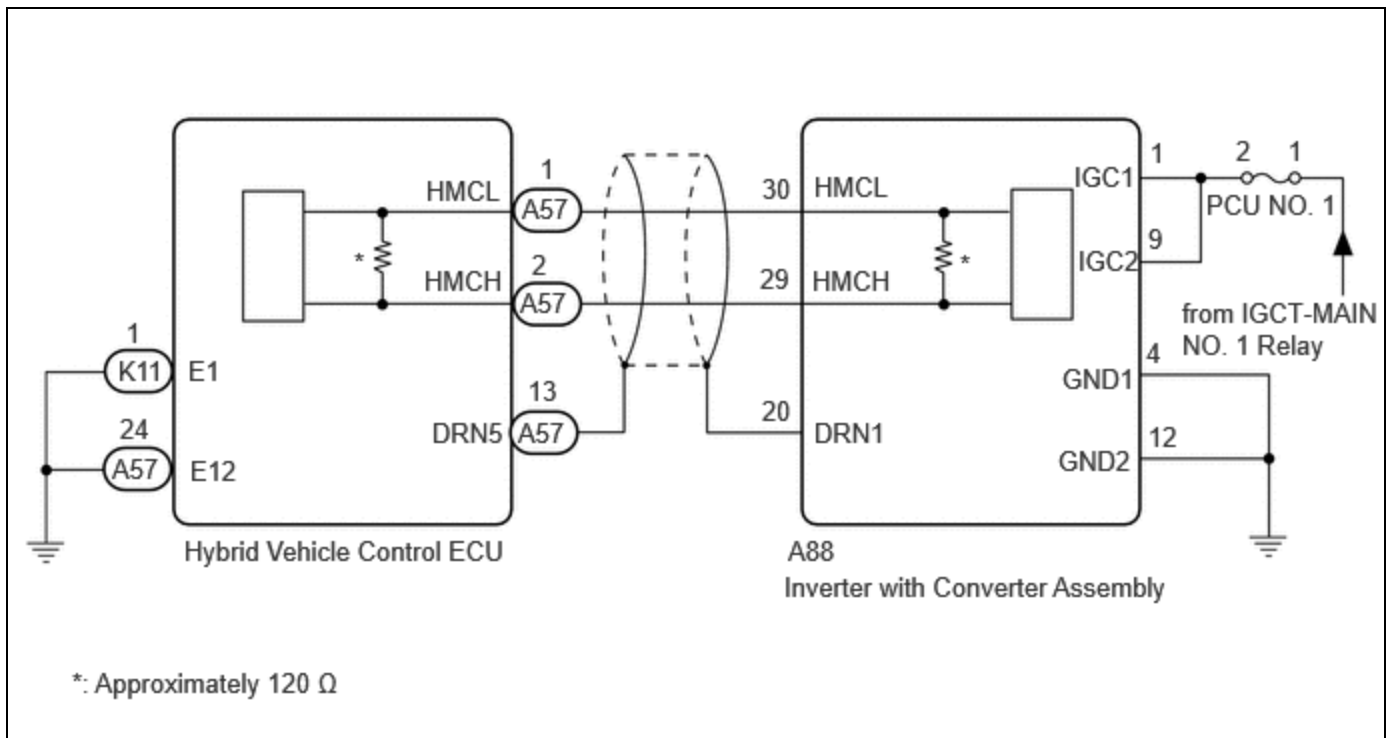
The cause of the malfunction may be the low-voltage circuit.

Check whether there is an open circuit in the inverter +B low-voltage power source system or a problem in the communication between the hybrid vehicle control ECU and inverter.

Related Parts Check

AREA	INSPECTION
Inverter +B low-voltage power source system check	Check for inverter overcurrent malfunction.
Communication malfunction between hybrid vehicle control ECU and MG-ECU inside inverter with converter assembly	Check for inverter overcurrent malfunction due to communication malfunction.
Check for short to ground in inverter +B low-voltage power source system	-

WIRING DIAGRAM



CAUTION / NOTICE / HINT

This diagnostic procedure is referenced to in the diagnostic procedure of several DTCs.

If the result of this diagnostic procedure is normal, proceed as directed in the procedure for the DTC.

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 FUSE (PCU NO. 1)
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Pre-procedure1

(a) Remove the PCU NO. 1 fuse from the No. 1 engine room relay block and No. 1 junction block assembly.

Procedure1

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

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
PCU NO. 1 fuse	Always	Below 1 Ω	Ω

Post-procedure1

(c) Install the PCU NO. 1 fuse.

NG  **GO TO STEP 5**

OK



2.	CHECK HARNESS AND CONNECTOR (INVERTER WITH CONVERTER ASSEMBLY POWER SOURCE CIRCUIT)
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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:



[Click Location & Routing\(A88\)](#)

[Click Connector\(A88\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A88-4 (GND1) - Body ground	Ignition switch off	Below 1 Ω
A88-12 (GND2) - Body ground	Ignition switch off	Below 1 Ω

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

- (e) Turn the ignition switch to ON.

- (f) Measure the voltage according to the value(s) in the table below.

Standard Voltage:



[Click Location & Routing\(A88\)](#)

[Click Connector\(A88\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A88-1 (IGC1) - Body ground	Ignition switch ON	Same as auxiliary battery voltage
A88-9 (IGC2) - Body ground	Ignition switch ON	Same as auxiliary battery voltage

NOTICE:

Turning the ignition switch to ON with the inverter with converter assembly connector disconnected causes other DTCs to be stored. Clear the DTCs after performing this inspection.

Post-procedure1

- (g) Turn the ignition switch off.
- (h) Disconnect the cable from the negative (-) auxiliary battery terminal and wait for 2 minutes or more.
- (i) Reconnect the inverter with converter assembly connector.

NG  **REPAIR OR REPLACE POWER SOURCE CIRCUIT**



3.	CHECK HARNESS AND CONNECTOR (HYBRID VEHICLE CONTROL ECU - INVERTER WITH CONVERTER ASSEMBLY)
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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 (Check for Open):



[Click Location & Routing\(A88,A57\).](#)

[Click Connector\(A88\).](#)

[Click Connector\(A57\).](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A88-29 (HMCH) - A57-2 (HMCH)	Ignition switch off	Below 1 Ω	Ω
A88-30 (HMCL) - A57-1 (HMCL)	Ignition switch off	Below 1 Ω	Ω

Standard Resistance (Check for Short):



[Click Location & Routing\(A88,A57\).](#)

[Click Connector\(A88\).](#)

[Click Connector\(A57\).](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A88-29 (HMCH) or A57-2 (HMCH) - Body ground and other terminals	Ignition switch off	10 kΩ or higher	kΩ
A88-30 (HMCL) or A57-1 (HMCL) - Body ground and other terminals	Ignition switch off	10 kΩ or higher	kΩ

- (e) Connect the cable to the negative (-) auxiliary battery terminal.
- (f) Turn the ignition switch to ON.
- (g) Measure the voltage according to the value(s) in the table below.

Standard Voltage:



[Click Location & Routing\(A88,A57\)](#)

[Click Connector\(A88\)](#)

[Click Connector\(A57\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A88-29 (HMCH) or A57-2 (HMCH) - Body ground and other terminals	Ignition switch ON	Below 1 V	V
A88-30 (HMCL) or A57-1 (HMCL) - Body ground and other terminals	Ignition switch ON	Below 1 V	V

NOTICE:

Turning the ignition switch to ON with the hybrid vehicle control ECU and inverter with converter assembly connectors disconnected causes other DTCs to be stored. Clear the DTCs after performing this inspection.

Post-procedure1

- (h) Turn the ignition switch off.
- (i) Disconnect the cable from the negative (-) auxiliary battery terminal and wait for 2 minutes or more.
- (j) Reconnect the hybrid vehicle control ECU connector.
- (k) Reconnect the inverter with converter assembly connector.

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK



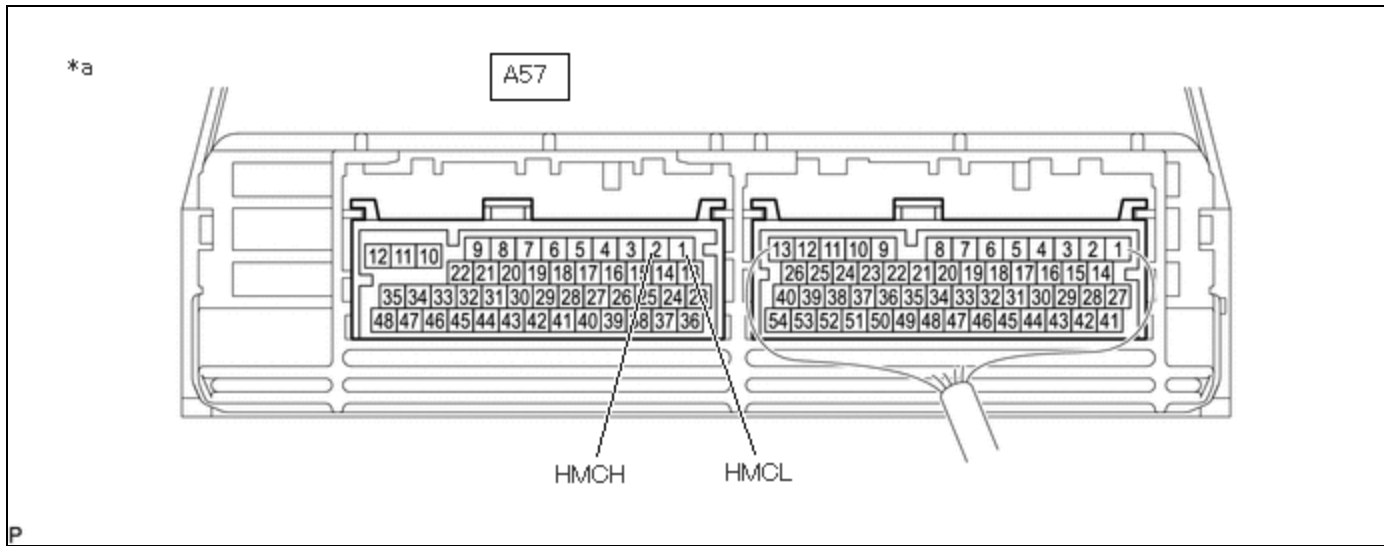
4.	CHECK HYBRID VEHICLE CONTROL ECU
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Pre-procedure1

- (a) Disconnect the hybrid vehicle control ECU connector.

Procedure1

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



*a	Component without harness connected (Hybrid Vehicle Control ECU)	-	-
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Standard Resistance:



[Click Location & Routing\(A57\).](#)

[Click Connector\(A57\).](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A57-1 (HMCL) - A57-2 (HMCH)	Ignition switch off	80 to 170 Ω	Ω

Post-procedure1

(c) Reconnect the hybrid vehicle control ECU connector.

OK ▶ **INVERTER LOW-VOLTAGE CIRCUIT NORMAL
(PERFORM NEXT STEP FOR REFERENCED DTC)**

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

5.	CHECK HARNESS AND CONNECTOR (INVERTER WITH CONVERTER ASSEMBLY - PCU FUSE)
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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:



[Click Location & Routing\(A88\)](#)

[Click Connector\(A88\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A88-1 (IGC1) - Body ground	Ignition switch off	10 kΩ or higher	kΩ
A88-9 (IGC2) - Body ground	Ignition switch off	10 kΩ or higher	kΩ

Post-procedure1

(d) Reconnect the inverter with converter assembly connector.

NG ► **GO TO STEP 7**

OK



6.	REPLACE INVERTER WITH CONVERTER ASSEMBLY
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HINT:

Click here [INFO](#)

NEXT ► **REPLACE FUSE (PCU NO. 1)**

7.	REPAIR OR REPLACE HARNESS OR CONNECTOR
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NEXT ► **REPLACE FUSE (PCU NO. 1)**

