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<b>Model Year Start:</b> 2023	<b>Model:</b> Prius Prime	<b>Prod Date Range:</b> [03/2023 - ]
<b>Title:</b> HYBRID / BATTERY CONTROL: MOTOR GENERATOR CONTROL SYSTEM (for PHEV Model): P31241F; Lost Communication between Drive Motor "A" and HV/EV ECU Circuit Intermittent; 2023 - 2024 MY Prius Prime [03/2023 - ]		

<b>DTC</b>	<b>P31241F</b>	<b>Lost Communication between Drive Motor "A" and HV/EV ECU Circuit Intermittent</b>
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## DESCRIPTION

The motor generator control ECU, which is built into the inverter with converter assembly, controls the motor (MG2) based on commands from the hybrid vehicle control ECU.

The motor generator control ECU (MG ECU) monitors communication data and detects malfunctions.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P31241F	Lost Communication between Drive Motor "A" and HV/EV ECU Circuit Intermittent	Error in reception from hybrid vehicle control ECU via serial communication (out of communication standard) detected when DTC P0C7917, P0E5717, P0D3319, P1C5D19, P1C5F19 or P1C5E19 is stored.  (1 trip detection logic)	<ul style="list-style-type: none"> <li>Inverter with converter assembly</li> <li>Hybrid vehicle control ECU</li> <li>Wire harness or connector</li> </ul>	Does not come on	Master Warning: Does not come on	Motor Generator	A	SAE Code: P3124

## 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 and wait for 2 minutes or more.
4. Enter the following menus: Powertrain / Motor Generator / Utility / All Readiness.
5. 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 the Inverter Low-voltage 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](#)

## PROCEDURE

<b>1.</b>	<b>CLEAR DTC</b>
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Pre-procedure1

(a) None

Procedure1

(b) Clear the DTCs.

**Powertrain > Motor Generator > Clear DTCs**

Post-procedure1

(c) Turn the ignition switch off.

## **NEXT**



<b>2.</b>	<b>CHECK DIAGNOSIS RELATED INFORMATION AND DTC OUTPUT (MOTOR GENERATOR)</b>
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Pre-procedure1

(a) Turn the ignition switch to ON and wait for 2 minutes or more.

Procedure1

(b) Check for DTCs.

**Powertrain > Motor Generator > Utility**

TESTER DISPLAY
Diagnosis Related Information

**Powertrain > Motor Generator > Trouble Codes**

RESULT	PROCEED TO
P31241F is listed in Diagnosis Related Information or P31241F is output.	A
P31241F are not listed in Diagnosis Information and P31241F is not output.	B

Post-procedure1

(c) Turn the ignition switch off.

**B**  **CHECK FOR INTERMITTENT PROBLEMS**

**A**



<b>3.</b>	<b>CHECK HYBRID VEHICLE CONTROL ECU (CHECK WAVEFORM)</b>
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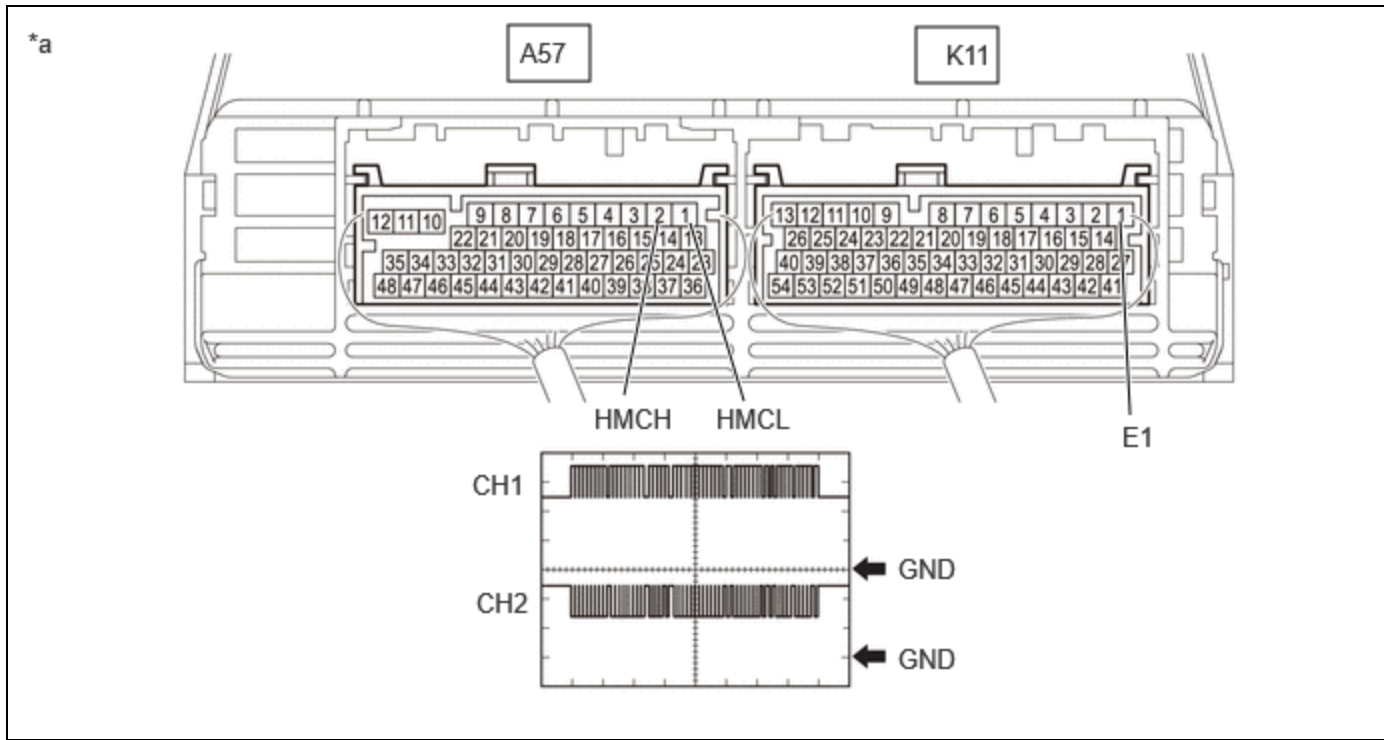
Pre-procedure1

(a) Connect an oscilloscope between the hybrid vehicle control ECU terminals specified in the following table.

(b) Turn the ignition switch to ON.

Procedure1

(c) Measure the waveform.



*a	Component with harness connected (Hybrid Vehicle Control ECU)	-	-
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ITEM	CONTENTS
Tester Connection	CH1: A57-2 (HMCH) - K11-1 (E1) CH2: A57-1 (HMCL) - K11-1 (E1)
Equipment Setting	1 V/DIV., 200 μs./DIV.
Condition	Ignition switch ON

RESULT	PROCEED TO
The waveform appears as shown in the illustration.	A
The waveform differs from the one shown in the illustration.	B

**HINT:**

- Perform this inspection with the connector connected.
- If pulses are generated, the shape of the waveform can be assumed to be normal.
- The shape of the waveform may vary according to communication conditions.

Post-procedure1

(d) Turn the ignition switch off.

**A** **REPLACE INVERTER WITH CONVERTER ASSEMBLY**

**B**  
▼

<b>4.</b>	<b>CHECK CONNECTOR CONNECTION CONDITION (HYBRID VEHICLE CONTROL ECU CONNECTOR)</b>
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Click here [INFO](#)

**NG** ► **CONNECT SECURELY**

**OK**  
▼

<b>5.</b>	<b>CHECK CONNECTOR CONNECTION CONDITION (INVERTER WITH CONVERTER ASSEMBLY CONNECTOR)</b>
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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**  
▼

<b>6.</b>	<b>CHECK HARNESS AND CONNECTOR (HYBRID VEHICLE CONTROL ECU - INVERTER WITH CONVERTER ASSEMBLY)</b>
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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 $\Omega$	$\Omega$
A88-30 (HMCL) - A57-1 (HMCL)	Ignition switch off	Below 1 $\Omega$	$\Omega$

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 k $\Omega$ or higher	k $\Omega$
A88-30 (HMCL) or A57-1 (HMCL) - Body ground and other terminals	Ignition switch off	10 k $\Omega$ or higher	k $\Omega$

## Pre-procedure2

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

(f) Turn the ignition switch to ON.

## Procedure2

(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.

**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

- (h) Turn the ignition switch off.
- (i) Reconnect the hybrid vehicle control ECU connector.
- (j) Reconnect the inverter with converter assembly connector.

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

**OK**



<b>7.</b>	<b>CHECK INVERTER WITH CONVERTER ASSEMBLY</b>
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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.

Standard Resistance:



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

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

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

Post-procedure1

(c) Reconnect the hybrid vehicle control ECU connector.

**OK** ► REPLACE HYBRID VEHICLE CONTROL ECU

**NG** ► REPLACE INVERTER WITH CONVERTER ASSEMBLY

