Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BIYJ
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HYBRID / BATTERY CONTROL: PLUG-IN CHARGE CONTROL SYSTEM (for PHEV Model): P309F49; High Voltage Charging Circuit Consumption Circuit Short; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**P309F49**	**High Voltage Charging Circuit Consumption Circuit Short**

DTC SUMMARY

MALFUNCTION DESCRIPTION

The plugin charge control ECU assembly monitors the high-voltage wiring between the HV battery and solar energy control ECU assembly and detects a short circuit malfunction.

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

Battery current sensor (IB) circuit malfunction

- Battery current sensor (IB) malfunction
- Communication (wire harness) malfunction

High voltage system malfunction

- HV battery malfunction
- No. 1 traction battery device box malfunction
- Solar energy control ECU assembly malfunction
- High-voltage connector or connection malfunction
- High-voltage wire harness malfunction

Low-voltage circuit (12 V) malfunction

- Plugin charge control ECU assembly malfunction
- Low voltage wire harness malfunction
- Low voltage connector malfunction
- Battery ECU assembly malfunction

DESCRIPTION

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P309F49	High Voltage Charging Circuit Consumption Circuit Short	Malfunction in the high-voltage circuit between the HV battery and the solar energy control ECU assembly. A short circuit or overcurrent is detected during precharging (from when CHRP is turned on until CHRG is turned on). (1 trip detection logic)	• No. 1 traction battery device box • Solar energy control ECU assembly • Wire harness or connector	Comes on	Master Warning: Comes on	Plug-in Control	B	SAE Code: P309F

MONITOR DESCRIPTION

The plugin charge control ECU assembly monitors the current flow during solar charging, and if the current value calculated from the HV battery voltage and limiting resistance exceeds the threshold and the condenser built into the solar energy control ECU assembly is not charged, the plugin charge control ECU assembly judges that there is a malfunction and illuminates the MIL and stores a DTC.

MONITOR STRATEGY

Related DTCs	P309F: High Voltage Charging Circuit Consumption Circuit Short
Required sensors/components	HV battery No. 1 traction battery device box Solar energy control ECU assembly
Frequency of operation	-
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

Plugin charge control ECU assembly	DTC P309F49 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. Connect the GTS to the DLC3.
2. Turn the ignition switch to ON and turn the GTS on.
3. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
4. Turn the ignition switch off and wait for 2 minutes or more.
5. Turn the ignition switch on (READY) and wait for 5 seconds or more. [*1]
6. Turn the ignition switch off and wait for 2 minutes or more. [*2]
7. Confirm to start solar charging and wait for 30 seconds or more. [*3]

HINT:

[*1] to [*3]: Normal judgment procedure.

The normal judgment procedure is used to complete DTC judgment and also used when clearing permanent DTCs.

8. Enter the following menus: Powertrain / Plug-in Control / Utility / All Readiness.
9. 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 or N/A, perform the normal judgment procedure again.

WIRING DIAGRAM

Refer to the wiring diagram for DTC P0D0700.

Click here INFO

CAUTION / NOTICE / HINT

CAUTION:

Refer to the precautions before inspecting high voltage circuit.

Click here INFO

NOTICE:

- After clearing the DTCs (or after disconnecting the cable from the auxiliary battery terminal) before repairs are performed, do not park the vehicle in direct sunlight, etc., as solar charging may be performed which may cause a malfunction of other components.
- 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 (HYBRID CONTROL, HV BATTERY, PLUG-IN CONTROL)**

Pre-procedure1

(a) Enter the following menus:

Powertrain > Hybrid Control > Trouble Codes
Powertrain > HV Battery > Trouble Codes
Powertrain > Plug-in Control > Trouble Codes

Procedure1

(b) Check for DTCs.

RESULT	PROCEED TO
P309F49 only is output, or DTCs except the ones in the table below are also output.	A
DTCs of Hybrid Control System in the tables below are output.	B
DTCs of Hybrid Battery System in the tables below are output.	C
DTCs of Plug-in Charge Control System in the tables below are output.	D

MALFUNCTION CONTENT	SYSTEM	RELEVANT DTC	
Microcomputer malfunction	Hybrid Control System	P060A47	Hybrid/EV Powertrain Control Module Monitoring Processor Watchdog / Safety MCU Failure
		P060B1C	Hybrid/EV Powertrain Control Module A/D Processing Voltage Out of Range
		P060B49	Hybrid/EV Powertrain Control Module A/D Processing Internal Electronic Failure
		P060B71	Hybrid/EV Powertrain Control Module A/D Processing Actuator Stuck
		P06881F	ECM/PCM Power Relay Sense Circuit Intermittent
		P1C9E9F	Hybrid/EV System Reset Stuck Off
		P1CE31C	Hybrid/EV Powertrain Control Module Monitoring Processor A/D Processing Voltage Out of Range
		P1CE349	Hybrid/EV Powertrain Control Module Monitoring Processor A/D Processing Internal Electronic Failure

MALFUNCTION CONTENT	SYSTEM	RELEVANT DTC	
		P1CE371	Hybrid/EV Powertrain Control Module Monitoring Processor A/D Processing Actuator Stuck
	Hybrid Battery System	P060A47	Hybrid/EV Battery Energy Control Module Monitoring Processor Watchdog / Safety MCU Failure
		P060B16	Hybrid/EV Battery Energy Control Module A/D Processing Circuit Voltage Below Threshold
		P060B49	Hybrid/EV Battery Energy Control Module A/D Processing Internal Electronic Failure
		P0E2D00	Hybrid/EV Battery Energy Control Module Hybrid/EV Battery Monitor Performance
Communication system malfunction	Hybrid Battery System	P060687	Hybrid/EV Battery Energy Control Module Processor to Monitoring Processor Missing Message
		P060A87	Hybrid/EV Battery Energy Control Module Processor from Monitoring Processor Missing Message
	Plug-in Charge Control System	U029387	Lost Communication with Hybrid/EV Powertrain Control Module Missing Message
		U117B87	Lost Communication with Hybrid/EV Battery Energy Control Module "A" (ch2) Missing Message
Sensor and actuator circuit malfunction	Hybrid Control System	P060687	Hybrid/EV Powertrain Control Module Processor to Monitoring Processor Missing Message
		P060A87	Hybrid/EV Powertrain Control Module Processor from Monitoring Processor Missing Message
	Hybrid Battery System	P1A001C	Hybrid Battery Stack 2 Cell Voltage Detection Voltage Out of Range
		P301A1C	Hybrid Battery Stack 1 Cell Voltage Detection Voltage Out of Range
System malfunction	Hybrid Control System	P060647	Hybrid/EV Powertrain Control Module Processor Watchdog / Safety MCU Failure

HINT:

- P309F49 may be output as a result of the malfunction indicated by the DTCs above.

  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.)

Procedure1

(c) Turn the ignition switch off.

B ▶ **GO TO DTC CHART (HYBRID CONTROL SYSTEM)**

C ▶ **GO TO DTC CHART (HYBRID BATTERY SYSTEM)**

D ▶ **GO TO DTC CHART (PLUG-IN CHARGE CONTROL SYSTEM)**

A

2.	INSPECT SOLAR ENERGY CONTROL ECU ASSEMBLY

CAUTION:

Be sure to wear insulated gloves.

Pre-procedure1

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

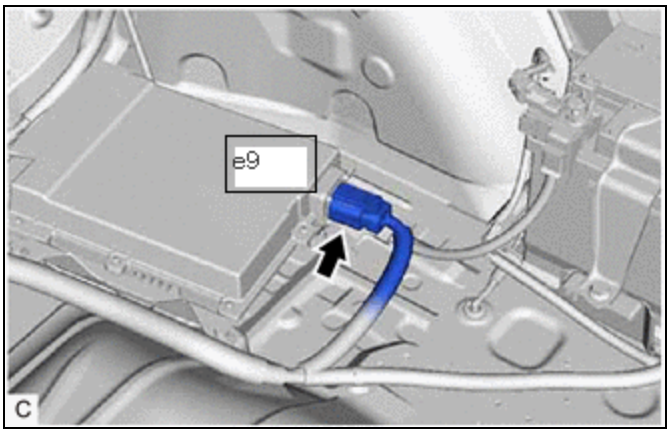
NOTICE:

After removing the service plug grip, do not turn the ignition switch to ON, unless instructed by the repair manual because this may cause a malfunction.

(b) Disconnect the solar energy control ECU assembly connectors.

NOTICE:

As there is a possibility that high voltage battery charging could be performed by the solar roof, make sure to disconnect all the connectors of the solar energy control ECU assembly.



Procedure1

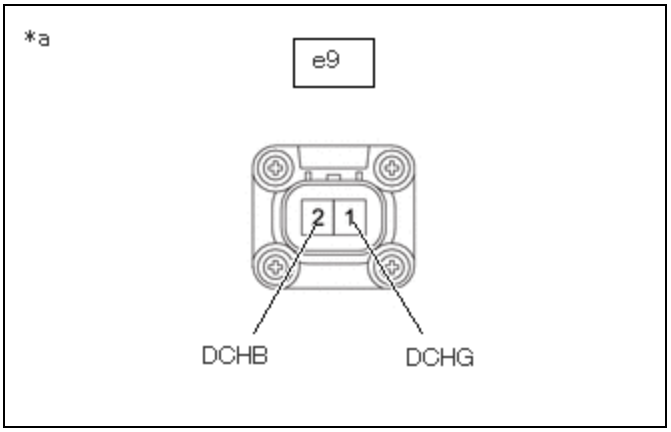
(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

EWD INFO

Click Location & Routing(e9)
Click Connector(e9)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
e9-2 (DCHB) (positive terminal) - e9-1 (DCHG) (negative terminal)	Ignition switch off	600 kΩ or higher



*a	Component without harness connected (Solar Energy Control ECU Assembly)

Result:

PROCEED TO
OK
NG

Post-procedure1

(d) Connect the solar energy control ECU assembly connectors.

NG ▶ **REPLACE SOLAR ENERGY CONTROL ECU ASSEMBLY**

OK ▼

3.	**INSPECT NO. 1 TRACTION BATTERY DEVICE BOX**

CAUTION:

Be sure to wear insulated gloves.

Pre-procedure1

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

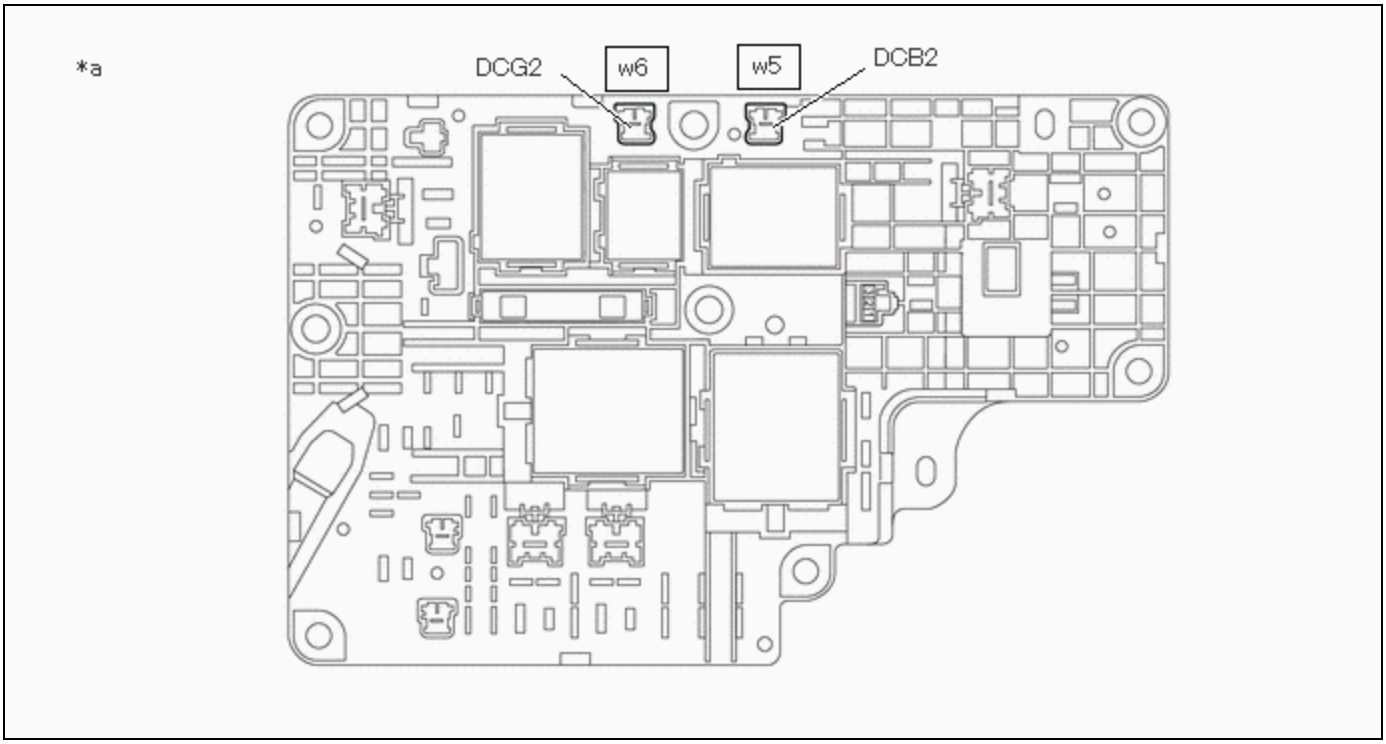
NOTICE:

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 No. 1 traction battery device box connector.

Procedure1

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



*a	Component without harness connected (No. 1 Traction Battery Device Box)	-	-

Standard Resistance:

EWD INFO

Click Location & Routing(w5,w6)
Click Connector(w5)
Click Connector(w6)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
w5-1 (DCB2) - w6-1 (DCG2)	Ignition switch off	10 kΩ or higher

Post-procedure1

(d) Reconnect the No. 1 traction battery device box connector.

OK ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (NO. 1 TRACTION BATTERY DEVICE BOX - SOLAR ENERGY CONTROL ECU ASSEMBLY)**

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