Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM1000000028ZU7
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [12/2022 -]
Title: HYBRID / BATTERY CONTROL: HYBRID CONTROL SYSTEM (for M20A-FXS): P1C8449; High Voltage Power Resource Circuit Short during Ready ON; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

DTC	**P1C8449**	**High Voltage Power Resource Circuit Short during Ready ON**

DTC SUMMARY

MALFUNCTION DESCRIPTION

The hybrid vehicle control ECU monitors the high-voltage wiring between the HV battery and inverter with converter assembly and detects an open circuit malfunction.

HINT:

- This DTC is differentiated from P1C8349 based on detection timing (after ignition switch is turned to ON (READY)). If P1C8349 is also output at the same time, first perform troubleshooting for P1C8349.
- If there is a SMRG stuck open malfunction, only P1C8449 is output.

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

Inverter voltage sensor (VH) internal circuit malfunction

- Voltage sensor (VH) malfunction
- Motor generator control ECU (MG ECU) malfunction
- Communication (wire harness) malfunction

High voltage system malfunction

- HV battery malfunction
- HV battery junction block assembly malfunction
- Inverter with converter assembly malfunction
- High-voltage wire harness malfunction
- High-voltage connector or connection malfunction

Low-voltage circuit (12 V) malfunction

- Hybrid vehicle control ECU malfunction
- HV battery junction block assembly malfunction
- Low voltage wire harness malfunction
- Low voltage connector malfunction

DESCRIPTION

Refer to the description for DTC P0AD911.

Click here INFO

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P1C8449	High Voltage Power Resource	High-voltage circuit malfunctions between the HV	• HV battery junction	Comes on	Master Warning:	Hybrid Control	A	SAE Code:

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
	Circuit Short during Ready ON	battery and inverter with converter assembly. The voltage before boosting continues to be out of the HV battery voltage range or the integrated value of variation amount of the voltage before boosting for a specified period of time is large while the ignition switch is on (READY). The EV electric battery fuse is blown, the service plug grip is removed, SMRB or SMRG remains open, or the high-voltage cable has an open circuit. (1 trip detection logic)	block assembly • Wire harness or connector • Hybrid vehicle control ECU		Comes on			P3004

MONITOR DESCRIPTION

A malfunction is detected and the MIL is illuminated when the following condition is met:

A large fluctuation of DC/DC converter voltage has occurred due to power cable disconnection.

MONITOR STRATEGY

Related DTCs	P3004 (INF P1C8449): Power Cable Malfunction
Required sensors/components	DC/DC converter, HV battery
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

Hybrid vehicle control ECU	P3004 (INF P1C8449) 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 (READY) and wait for 3 minutes or more. [*1]

HINT:

- According to the display on the GTS, read the Data List and monitor the values of "Hybrid/EV Battery Voltage" and "VL-Voltage before Boosting" for 3 minutes. If the difference between "Hybrid/EV Battery Voltage" and "VL-Voltage before Boosting" is always less than 50 V, the vehicle has returned to normal.
- [*1]: Normal judgment procedure.

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

4. Enter the following menus: Powertrain / Hybrid Control / 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 HV Battery High-voltage Line 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:

- P1C8449 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	SYSTEM	RELEVANT DTC	
Microcomputer malfunction	Hybrid control system	P0A1B49	Drive Motor "A" Control Module Internal Electronic Failure
		P060647	Hybrid/EV Powertrain Control Module Processor Watchdog / Safety MCU Failure
	Motor generator control system	P0A1B1F	Generator Control Module Circuit Intermittent
		P0A1A47	Generator Control Module Watchdog / Safety µC Failure
		P0A1A49	Generator Control Module Internal Electronic Failure
		P1C2A1C	Generator A/D Converter Circuit Circuit Voltage Out of Range
		P1C2A49	Generator A/D Converter Circuit Internal Electronic Failure
		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
	Hybrid battery system	P060687	Hybrid/EV Battery Energy Control Module Processor to Monitoring Processor Missing Message
		P060A47	Hybrid/EV Battery Energy Control Module Monitoring Processor Watchdog / Safety MCU Failure
		P060A87	Hybrid/EV Battery Energy Control Module Processor from Monitoring Processor Missing Message
		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
Power source circuit malfunction	Motor generator control system	P06D61C	Generator Control Module Offset Power Circuit Voltage Out of Range

MALFUNCTION CONTENT	SYSTEM	RELEVANT DTC	
	Hybrid battery system	P1CBB12	Hybrid/EV Battery Current Sensor Power Supply Circuit Short to Auxiliary Battery
		P1CBB14	Hybrid/EV Battery Current Sensor Power Supply Circuit Short to Ground or Open
Communication system malfunction	Hybrid control system	P312387	Lost Communication with Drive Motor Control Module "A" from Hybrid/EV Control Module Missing Message
		U011187	Lost Communication with Hybrid/EV Battery Energy Control Module "A" Missing Message
	Motor generator control system	P313387	Communication Error from Generator to Drive Motor "A" Missing Message
Sensor and actuator circuit malfunction	Hybrid control system	P0ABF00	Hybrid/EV Battery Current Sensor "A" Circuit Range/Performance
		P0AD911	Hybrid/EV Battery Positive Contactor Circuit Short to Ground
		P0AD915	Hybrid/EV Battery Positive Contactor Circuit Short to Auxiliary Battery or Open
		P0ADD11	Hybrid/EV Battery Negative Contactor Circuit Short to Ground
		P0ADD15	Hybrid/EV Battery Negative Contactor Circuit Short to Auxiliary Battery or Open
	Motor generator control system	P0D2D16	Drive Motor "A" Inverter Voltage Sensor(VH) Circuit Voltage Below Threshold
		P0D2D17	Drive Motor "A" Inverter Voltage Sensor(VH) Circuit Voltage Above Threshold
	Hybrid battery system	P0ABF11	Hybrid/EV Battery Current Sensor "A" Circuit Short to Ground
		P0ABF15	Hybrid/EV Battery Current Sensor "A" Circuit Short to Auxiliary Battery or Open
		P0ABF28	Hybrid/EV Battery Current Sensor "A" Signal Bias Level Out of Range / Zero Adjustment Failure
		P0ABF2A	Hybrid/EV Battery Current Sensor "A" Signal Stuck In Range
		P0B0E11	Hybrid/EV Battery Current Sensor "B" Circuit Short to Ground
		P0B0E15	Hybrid/EV Battery Current Sensor "B" Circuit Short to Auxiliary Battery or Open
		P0B1362	Hybrid/EV Battery Current Sensor "A"/"B" Signal Compare Failure
System malfunction	Hybrid control system	P0A1F94	Hybrid/EV Battery Energy Control Module Unexpected Operation
		P0D2D1C	Drive Motor "A" Inverter Voltage Sensor Voltage Out of Range
		P0E311C	Boosting Converter Voltage Sensor "A" Voltage Out of Range
		P1C2D62	Hybrid/EV Battery "A" Voltage Sensor/Boosting Converter Voltage Sensor "A" Signal Compare Failure

MALFUNCTION CONTENT	SYSTEM	RELEVANT DTC	
		P1C8349	High Voltage Power Resource Circuit Voltage Sensor after Boosting Malfunction
		P300449	High Voltage Power Resource Circuit Short during Pre-Charge
	Motor generator control system	P1CB69E	Drive Motor "A" Inverter Voltage Sensor(VH) Stuck On
		P0CA300	DC/DC Converter Step Up Voltage Performance
	Hybrid battery system	P300016	Hybrid/EV Battery Control System Circuit Voltage Below Threshold

PROCEDURE

1.	**CLEAR DTC**

Click here INFO

NEXT

2.	**CHECK DTC OUTPUT (HYBRID CONTROL)**

Pre-procedure1

(a) With the vehicle stopped, apply the parking brake and turn the ignition switch to ON (READY).

NOTICE:

Perform this test with the AUTO function (shift-linked function) of the electric parking brake system off.

HINT:

- If the ignition switch could not be turned to ON (READY), turn the ignition switch off and check for DTCs after turning the ignition switch to ON (READY) again.
- Because P300449 uses 2 trip detection logic, the DTC detection conditions need to be met 2 times.
- When the parking brake indicator (red) is illuminated after the electric parking brake switch assembly has been pulled to the lock side, the maximum amount of braking force is applied if the electric parking brake switch assembly is pulled to the lock side one more time.

(b) Ensure the safety of the areas in front and at the back of the vehicle.

(c) Move the shift lever to D and depress both the accelerator pedal and brake pedal at the same time.

HINT:

Depressing both the accelerator pedal and brake pedal at the same time causes the HV battery current to flow and ensures that there is no problem with the high-voltage wiring.

Procedure1

(d) Check for DTCs.

Powertrain > Hybrid Control > Trouble Codes

RESULT	PROCEED TO
P1C8449 is output, or no DTCs are output.	A
Ignition switch could not be turned to ON (READY) and DTC P1C8349 is output.	B
P0A9563 is also output.	C

Post-procedure1

(e) Turn the ignition switch off.

B ▶ **GO TO DTC CHART (P1C8349)**

C ▶ **GO TO DTC CHART (P0A9563)**

A

▼

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

Click here INFO

NG ▶ **CONNECT SECURELY**

OK

▼

4.	**CHECK CONNECTOR CONNECTION CONDITION (FLOOR WIRE CONNECTOR)**

Click here INFO

RESULT	PROCEED TO
OK	A
NG (The connector is not connected securely.)	B

RESULT	PROCEED TO
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

▼

5.	**CHECK CONNECTOR CONNECTION CONDITION (HV BATTERY JUNCTION BLOCK ASSEMBLY CONNECTOR)**

Click here INFO

NG ▶ **CONNECT SECURELY**

OK

▼

6.	**CHECK HARNESS AND CONNECTOR (HYBRID VEHICLE CONTROL ECU - HV BATTERY JUNCTION BLOCK 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 HV battery junction block 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(K11,R42)
Click Connector(K11)
Click Connector(R42)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
K11-3 (SMRB) - R42-4 (SMRB)	Ignition switch off	Below 1 Ω	Ω
K11-27 (SMRG) - R42-6 (SMRG)	Ignition switch off	Below 1 Ω	Ω

Post-procedure1

(e) Reconnect the hybrid vehicle control ECU connector.

(f) Reconnect the HV battery junction block assembly connector.

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

OK ▼

7.	**CHECK HARNESS AND CONNECTOR (HV BATTERY JUNCTION BLOCK ASSEMBLY - BODY GROUND)**

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 HV battery junction block assembly connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(R42)
Click Connector(R42)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
R42-2 (GND) - Body ground	Ignition switch off	Below 1 Ω	Ω

Post-procedure1

(d) Reconnect the HV battery junction block assembly connector.

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

OK

8.	**REPLACE HV BATTERY JUNCTION BLOCK ASSEMBLY**

HINT:

Click here INFO

NEXT

9.	**CLEAR DTC**

CAUTION:

Be sure to wear insulated gloves.

Pre-procedure1

(a) Install the service plug grip.

Procedure1

(b) Clear the DTCs.

Powertrain > Hybrid Control > Clear DTCs

Post-procedure1

(c) Turn the ignition switch off and wait for 2 minutes or more.

NEXT

10.	**CHECK HYBRID VEHICLE CONTROL ECU (CHECK FOR NORMAL OPERATION)**

Pre-procedure1

(a) Turn the ignition switch to ON (READY).

Procedure1

(b) According to the display on the GTS, read the Data List and monitor the values of "Hybrid/EV Battery Voltage" and "VL-Voltage before Boosting" for 3 minutes.

Powertrain > Hybrid Control > Data List

TESTER DISPLAY
VL-Voltage before Boosting
Hybrid/EV Battery Voltage

RESULT	PROCEED TO
Difference between "Hybrid/EV Battery Voltage" and "VL-Voltage before Boosting" is always less than 50 V.	A
Difference between "Hybrid/EV Battery Voltage" and "VL-Voltage before Boosting" is 50 V or more.	B

Post-procedure1

(c) Turn the ignition switch off.

A ▶ **END**

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