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Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HYBRID / BATTERY CONTROL: PLUG-IN CHARGE CONTROL SYSTEM (for PHEV Model): P1EA41C; Solar Charging Voltage Sensor Circuit Voltage Out of Range; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**P1EA41C**	**Solar Charging Voltage Sensor Circuit Voltage Out of Range**

DTC SUMMARY

MALFUNCTION DESCRIPTION

The solar charging voltage (VSOL) sensor is built into the solar energy control ECU assembly and detects the output voltage of the DC high voltage circuit in the solar energy control ECU assembly. Solar charging voltage (VSOL) sensor information is sent from the solar energy control ECU assembly to the plugin charge control ECU assembly. The plugin charge control ECU assembly compares the solar charging voltage signal (VSOL signal) with the HV battery voltage sensor signal (VB signal) and will detect a malfunction if the difference is large.

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

Solar energy control ECU assembly internal voltage sensor (VSOL) circuit malfunction

- Voltage sensor (VSOL) malfunction

Battery ECU assembly internal voltage sensor (VB) circuit malfunction

- Voltage sensor (VB) malfunction

Battery local bus communication malfunction

- Battery ECU assembly - Plugin charge control ECU assembly

High voltage system malfunction

- High voltage circuit open between the solar energy control ECU assembly and HV battery assembly

DESCRIPTION

The solar energy control ECU assembly sends output voltage information to the plugin charge control ECU assembly via CAN communication.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P1EA41C	Solar Charging Voltage Sensor Circuit Voltage Out of Range	When HV battery is being charged by solar charging, the difference between the solar charging voltage (VSOL) signal and HV battery voltage sensor (VB) signal is large.	• Solar energy control ECU assembly • Battery ECU assembly • Plugin charge control	Does not come on	Solar Charging Warning Light: Comes on	Plug-in Control	B	SAE Code: P1EA5

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
		(1 trip detection logic)	ECU assembly					

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. 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. Confirm to start solar charging and wait for 2 minutes or more.
6. Enter the following menus: Powertrain / Plug-in Control / Utility / All Readiness.
7. 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 driving pattern again.

PROCEDURE

1.	**CHECK DTC OUTPUT (HV BATTERY, PLUG-IN CONTROL, SOLAR CHARGING CONTROL)**

Pre-procedure1

(a) Enter the following menus:

Powertrain > HV Battery > Trouble Codes
Powertrain > Plug-in Control > Trouble Codes
Powertrain > Solar Charging Control > Trouble Codes

Procedure1

(b) Check for DTCs.

RESULT	PROCEED TO
P1EA41C only is output, or DTCs except the ones in the table below are also output.	A
DTCs of Hybrid Battery System in the tables below are output.	B
DTCs of Plug-in Charge Control System in the tables below are output.	C

RESULT	PROCEED TO
DTCs of Solar Charging System in the tables below are output.	D

MALFUNCTION CONTENT	SYSTEM	RELEVANT DTC	
Microcomputer malfunction	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
	Plug-in Charge Control System	P06881F	DC Quick Charging Control Module Power Relay Sense Circuit Intermittent
	Solar Charging System	P1EDB49	Solar Charger Control Module A/D Processing Internal Electronic Failure
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	U113A87	Lost Communication with Solar Charging Control Module Missing Message
	Solar Charging System	U115087	Lost Communication with Hybrid Powertrain Control Module (Hybrid/EV Battery Local Bus) Missing Message
		U115387	Lost Communication with Battery Charger Control Module "A" (ch2) Missing Message
		U117B87	Lost Communication with Battery Energy Control Module "A" (ch2) Missing Message
Sensor and actuator circuit malfunction	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
	Solar Charging System	P19A012	Solar Charger DC/DC Converter Current Sensor Circuit Short to Battery
		P19A014	Solar Charger DC/DC Converter Current Sensor Circuit Short to Ground or Open
		P19A962	Solar Charger DC/DC Converter Output Voltage / Auxiliary Battery DC/DC Converter Input Voltage Signal Compare Failure
		P1EA412	Solar Charging Voltage Sensor Circuit Short to Auxiliary Battery

MALFUNCTION CONTENT	SYSTEM	RELEVANT DTC	
		P1EA414	Solar Charging Voltage Sensor Circuit Short to Ground or Open
System malfunction	Solar Charging System	P196762	Solar Charger DC/DC Converter "A" Output Power Signal Compare Failure

HINT:

- P1EA41C 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.)

Post-procedure1

(c) Turn the ignition switch off.

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

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

D ▶ **GO TO DTC CHART (SOLAR CHARGING SYSTEM)**

A ▼

2.	**SIMULATION TEST**

Pre-procedure1

(a) Using the GTS, clear the DTCs and freeze frame data.

Powertrain > Plug-in Control > Clear DTCs

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

(c) Connect the electric vehicle charger cable assembly, and plug-in charge the vehicle for 1 minute or more.

(d) Disconnect the electric vehicle charger cable assembly and wait for 10 seconds or more.

Procedure1

(e) Using the GTS, check for DTCs.

Powertrain > Plug-in Control > Trouble Codes

RESULT	PROCEED TO
P0D4C1C is output.	A

RESULT	PROCEED TO
P0D4C1C is not output.	B

Post-procedure1

(f) Turn the ignition switch off.

A ▶ **GO TO DTC (P0D4C1C)**

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