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Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HYBRID / BATTERY CONTROL: HYBRID BATTERY SYSTEM (for PHEV Model): P0A9B1C,...,P0CB21C; Hybrid/EV Battery Temperature Sensor "A" Voltage Out of Range; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**P0A9B1C**	**Hybrid/EV Battery Temperature Sensor "A" Voltage Out of Range**
DTC	**P0AC51C**	**Hybrid/EV Battery Temperature Sensor "B" Voltage Out of Range**
DTC	**P0ACA1C**	**Hybrid/EV Battery Temperature Sensor "C" Voltage Out of Range**
DTC	**P0AE81C**	**Hybrid/EV Battery Temperature Sensor "D" Voltage Out of Range**
DTC	**P0BC21C**	**Hybrid/EV Battery Temperature Sensor "E" Voltage Out of Range**
DTC	**P0C331C**	**Hybrid/EV Battery Temperature Sensor "F" Voltage Out of Range**
DTC	**P0C7C1C**	**Hybrid/EV Battery Temperature Sensor "G" Voltage Out of Range**
DTC	**P0C811C**	**Hybrid/EV Battery Temperature Sensor "H" Voltage Out of Range**
DTC	**P0C881C**	**Hybrid/EV Battery Temperature Sensor "I" Voltage Out of Range**
DTC	**P0C8D1C**	**Hybrid/EV Battery Temperature Sensor "J" Voltage Out of Range**
DTC	**P0C921C**	**Hybrid/EV Battery Temperature Sensor "K" Voltage Out of Range**
DTC	**P0C971C**	**Hybrid/EV Battery Temperature Sensor "L" Voltage Out of Range**
DTC	**P0CA81C**	**Hybrid/EV Battery Temperature Sensor "M" Voltage Out of Range**

DTC	**P0CAD1C**	**Hybrid/EV Battery Temperature Sensor "N" Voltage Out of Range**

DTC	**P0CB21C**	**Hybrid/EV Battery Temperature Sensor "O" Voltage Out of Range**

DESCRIPTION

Refer to the description for DTC P0A9B11.

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DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P0A9B1C	Hybrid/EV Battery Temperature Sensor "A" Voltage Out of Range	The performance of battery temperature sensor 0 is abnormal; the difference in output between it and other battery temperature sensors is excessively large. (1 trip detection logic)	• No. 1 HV supply stack sub-assembly • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0A9C
P0AC51C	Hybrid/EV Battery Temperature Sensor "B" Voltage Out of Range	The performance of battery temperature sensor 1 is abnormal; the difference in output between it and other battery temperature sensors is excessively large. (1 trip detection logic)	• No. 1 HV supply stack sub-assembly • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0AC6
P0ACA1C	Hybrid/EV Battery Temperature Sensor "C" Voltage Out of Range	The performance of battery temperature sensor 2 is abnormal; the difference in output between it	• No. 1 HV supply stack sub-assembly • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0ACB

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
		and other battery temperature sensors is excessively large. (1 trip detection logic)						
P0AE81C	Hybrid/EV Battery Temperature Sensor "D" Voltage Out of Range	The performance of battery temperature sensor 3 is abnormal; the difference in output between it and other battery temperature sensors is excessively large. (1 trip detection logic)	• No. 1 HV supply stack sub-assembly • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0AE9
P0BC21C	Hybrid/EV Battery Temperature Sensor "E" Voltage Out of Range	The performance of battery temperature sensor 4 is abnormal; the difference in output between it and other battery temperature sensors is excessively large. (1 trip detection logic)	• No. 1 HV supply stack sub-assembly • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0BC3

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P0C331C	Hybrid/EV Battery Temperature Sensor "F" Voltage Out of Range	The performance of battery temperature sensor 5 is abnormal; the difference in output between it and other battery temperature sensors is excessively large. (1 trip detection logic)	• No. 2 HV supply stack sub-assembly • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0C34
P0C7C1C	Hybrid/EV Battery Temperature Sensor "G" Voltage Out of Range	The performance of battery temperature sensor 6 is abnormal; the difference in output between it and other battery temperature sensors is excessively large. (1 trip detection logic)	• No. 2 HV supply stack sub-assembly • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0C7D
P0C811C	Hybrid/EV Battery Temperature Sensor "H" Voltage Out of Range	The performance of battery temperature sensor 7 is abnormal; the difference in output between it and other battery temperature sensors is excessively large. (1 trip detection logic)	• No. 2 HV supply stack sub-assembly • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0C82

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P0C881C	Hybrid/EV Battery Temperature Sensor "I" Voltage Out of Range	The performance of battery temperature sensor 8 is abnormal; the difference in output between it and other battery temperature sensors is excessively large. (1 trip detection logic)	• No. 2 HV supply stack sub-assembly • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0C89
P0C8D1C	Hybrid/EV Battery Temperature Sensor "J" Voltage Out of Range	The performance of battery temperature sensor 9 is abnormal; the difference in output between it and other battery temperature sensors is excessively large. (1 trip detection logic)	• No. 2 HV supply stack sub-assembly • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0C8E
P0C921C	Hybrid/EV Battery Temperature Sensor "K" Voltage Out of Range	The performance of battery temperature sensor 10 is abnormal; the difference in output between it and other battery temperature sensors is excessively large. (1 trip detection logic)	• No. 3 HV supply stack sub-assembly • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0C93

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P0C971C	Hybrid/EV Battery Temperature Sensor "L" Voltage Out of Range	The performance of battery temperature sensor 11 is abnormal; the difference in output between it and other battery temperature sensors is excessively large. (1 trip detection logic)	• No. 3 HV supply stack sub-assembly • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0C98
P0CA81C	Hybrid/EV Battery Temperature Sensor "M" Voltage Out of Range	The performance of battery temperature sensor 12 is abnormal; the difference in output between it and other battery temperature sensors is excessively large. (1 trip detection logic)	• No. 3 HV supply stack sub-assembly • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0CA9
P0CAD1C	Hybrid/EV Battery Temperature Sensor "N" Voltage Out of Range	The performance of battery temperature sensor 13 is abnormal; the difference in output between it and other battery temperature sensors is excessively large. (1 trip detection logic)	• No. 3 HV supply stack sub-assembly • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0CAE

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P0CB21C	Hybrid/EV Battery Temperature Sensor "O" Voltage Out of Range	The performance of battery temperature sensor 14 is abnormal; the difference in output between it and other battery temperature sensors is excessively large. (1 trip detection logic)	• No. 3 HV supply stack sub-assembly • Battery voltage sensor	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0CB3

HINT:

If the vehicle as is left as is for 24 hours, the value of "Hybrid/EV Battery Temperature" will be almost the same as the ambient temperature.

MONITOR DESCRIPTION

If the battery ECU assembly detects a malfunction in the HV battery temperature sensor, the battery ECU assembly illuminates the MIL and stores a DTC.

MONITOR STRATEGY

Related DTCs	P0A9C (INF P0A9B1C), P0AC6 (INF P0AC51C), P0ACB (INF P0ACA1C), P0AE9 (INF P0AE81C), P0BC3 (INF P0BC21C), P0C34 (INF P0C331C), P0C7D (INF P0C7C1C), P0C82 (INF P0C811C), P0C89 (INF P0C881C), P0C8E (INF P0C8D1C), P0C93 (INF P0C921C), P0C98 (INF P0C971C), P0CA9 (INF P0CA81C), P0CAE (INF P0CAD1C), P0CB3 (INF P0CB21C): Battery temperature sensor malfunction (stuck)
Required sensors/components	Battery temperature sensor
Frequency of operation	Continuous
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

Battery ECU assembly	DTC P0A9C (INF P0A9B1C) is not detected DTC P0AC6 (INF P0AC51C) is not detected DTC P0ACB (INF P0ACA1C) is not detected DTC P0AE9 (INF P0AE81C) is not detected DTC P0BC3 (INF P0BC21C) is not detected DTC P0C34 (INF P0C331C) is not detected DTC P0C7D (INF P0C7C1C) is not detected DTC P0C82 (INF P0C811C) is not detected DTC P0C89 (INF P0C881C) is not detected DTC P0C8E (INF P0C8D1C) is not detected DTC P0C93 (INF P0C921C) is not detected DTC P0C98 (INF P0C971C) is not detected DTC P0CA9 (INF P0CA81C) is not detected DTC P0CAE (INF P0CAD1C) is not detected DTC P0CB3 (INF P0CB21C) 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 and wait for 10 seconds or more.[*1]

HINT:

[*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 / HV Battery / 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 or N/A, perform the normal judgment procedure again.

WIRING DIAGRAM

Refer to the wiring diagram for DTC P0A9B11.

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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 auxiliary negative (-) 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 (HV BATTERY, HYBRID CONTROL)**

(a) Check for DTCs.

Powertrain > HV Battery > Trouble Codes

Powertrain > Hybrid Control > Trouble Codes

RESULT	PROCEED TO
"P0A9B1C, P0AC51C, P0ACA1C, P0AE81C, P0BC21C, P0C331C, P0C7C1C, P0C811C, P0C881C, P0C8D1C, P0C921C, P0C971C, P0CA81C, P0CAD1C or P0CB21C" only is output, or DTCs except the ones in the table below are also output.	A
DTCs of hybrid battery system in the table below are output.	B
DTCs of hybrid control system in the table below are output.	C

SYSTEM	RELEVANT DTC	
Hybrid battery system	P060A47	Hybrid/EV Battery Energy Control Module Monitoring Processor Watchdog / Safety MCU Failure
	P060B49	Hybrid/EV Battery Energy Control Module A/D Processing Internal Electronic Failure
	P060687	Hybrid/EV Battery Energy Control Module Processor to Monitoring Processor Missing Message
Hybrid control system	P0A1F94	Hybrid/EV Battery Energy Control Module Unexpected Operation

(b) Turn the ignition switch off.

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

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

A

2.	**CHECK DTC**

(a) Check the DTCs that were output when the vehicle was brought to the workshop.

RESULT	PROCEED TO
"P0A9B1C, P0AC51C, P0ACA1C, P0AE81C or P0BC21C" is also output.	A
"P0C331C, P0C7C1C, P0C811C, P0C881C or P0C8D1C" is also output.	B
"P0C921C, P0C971C, P0CA81C, P0CAD1C or P0CB21C" is also output.	C

B ▶ **GO TO STEP 4**

C ▶ **GO TO STEP 5**

A

3.	**CHECK HV BATTERY (BATTERY TEMPERATURE SENSOR 0 to 4)**

Click here INFO

OK ▶ **REPLACE BATTERY VOLTAGE SENSOR**

NG ▶ **REPLACE NO. 1 HV SUPPLY STACK SUB-ASSEMBLY**

4.	**CHECK HV BATTERY (BATTERY TEMPERATURE SENSOR 5 to 9)**

Click here INFO

OK ▶ **REPLACE BATTERY VOLTAGE SENSOR**

NG ▶ **REPLACE NO. 2 HV SUPPLY STACK SUB-ASSEMBLY**

5.	**CHECK HV BATTERY (BATTERY TEMPERATURE SENSOR 10 to 14)**

Click here INFO

OK ▶ **REPLACE BATTERY VOLTAGE SENSOR**

NG ▶ **REPLACE NO. 3 HV SUPPLY STACK SUB-ASSEMBLY**