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Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [12/2022 -]
Title: HYBRID / BATTERY CONTROL: MOTOR GENERATOR CONTROL SYSTEM (for M20A-FXS): P0A2A1C,P0A2A1F; Drive Motor "A" Temperature Sensor Voltage Out of Range; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

DTC	**P0A2A1C**	**Drive Motor "A" Temperature Sensor Voltage Out of Range**

DTC	**P0A2A1F**	**Drive Motor "A" Temperature Sensor Circuit Intermittent**

DTC SUMMARY

MALFUNCTION DESCRIPTION

These DTCs are stored when the motor temperature sensor output is abnormal. The cause of this malfunction may be one of the following:

Motor temperature sensor malfunction

- Internal motor temperature sensor malfunction
- Open or short in motor temperature sensor

Wire harness between the motor temperature sensor and motor generator control ECU (MG ECU)

- The connectors are not connected properly
- Foreign matter or water on the connector terminals
- Open or short in wire harness

HINT:

If any of these DTCs are stored, the motor temperature sensor is malfunctioning and the self-protection function may not operate. Therefore under certain high load driving condition, the temperature of the motor (MG2) becomes high. If the self-protection function does not operate, the motor (MG2) may malfunction and cause the vehicle to enter fail-safe mode.

DESCRIPTION

Refer to the description for DTC P0A2A11.

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DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P0A2A1C	Drive Motor "A" Temperature Sensor Voltage Out of Range	After a long soak, the value of the generator (MG2) temperature sensor is different from the value of the other	• Wire harness or connector • Motor temperature sensor (Hybrid vehicle transaxle assembly)	Comes on	Master Warning: Comes on	Motor Generator	A	SAE Code: P0A2B

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
		temperature sensors, or Unusual sudden change in generator temperature sensor output occurs and offset condition continues for a certain period of time. (2 trip detection logic)						
P0A2A1F	Drive Motor "A" Temperature Sensor Circuit Intermittent	Motor temperature sensor hunting: Unusual change in motor temperature sensor output occurs repeatedly. (1 trip detection logic)	• Wire harness or connector • Motor temperature sensor (Hybrid vehicle transaxle assembly)	Comes on	Master Warning: Comes on	Motor Generator	A	SAE Code: P0A2E

MONITOR DESCRIPTION

If the motor generator control ECU detects a malfunction of the motor temperature sensor, it will illuminate the MIL and store a DTC.

MONITOR STRATEGY

Related DTCs	P0A2B (INF P0A2A1C): Drive Motor "A" Temperature Sensor Circuit Range/Performance P0A2E (INF P0A2A1F): Drive Motor "A" Temperature Sensor Circuit Intermittent
Required sensors/components	Motor temperature sensor
Frequency of operation	Continuous
Duration	TMC's intellectual property
MIL operation	2 driving cycles / 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

Motor generator control ECU	DTC P0A2B (INF P0A2A1C) is not detected DTC P0A2E (INF P0A2A1F) 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

DTC P0A2A1C

1. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
2. Turn the ignition switch off.
3. Leave the vehicle as is for 5 hours or more and then check the values of the Data List items "Generator Temperature", "Motor Temperature" and "Inverter Coolant Water Temperature". [*1]
4. Turn the ignition switch to ON and turn the GTS on. [*2]

   HINT:

   [*1] to [*2]: Normal judgment procedure.

   The normal judgment procedure is used to complete DTC judgment and also used when clearing permanent DTCs.
5. Enter the following menus: Powertrain / Motor Generator / Utility / All Readiness.
6. 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.

DTC P0A2A1F

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. With ignition switch ON and wait for 5 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 / 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 DTC P0A2A11.

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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 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 (ENGINE)**

Pre-procedure1

(a) None

Procedure1

(b) Check for DTCs.

Powertrain > Engine > Trouble Codes

RESULT	PROCEED TO
No DTCs are output, or DTCs except the ones in the table below are also output.	A
Any of the following DTCs are also output.	B

RELEVANT DTC	
P261029	ECM/PCM Engine Off Timer Performance Signal Invalid

Post-procedure1

(c) Turn the ignition switch off.

B ▶ **GO TO DTC CHART (SFI SYSTEM)**

Click here INFO

A

2.	**CHECK DTC OUTPUT (MOTOR GENERATOR)**

Pre-procedure1

(a) None

Procedure1

(b) Check for DTCs.

Powertrain > Motor Generator > Trouble Codes

RESULT	PROCEED TO
No DTCs are output, or DTCs except the ones in the table below are also output.	A
Any of the following DTCs are also output.	B

RELEVANT DTC	
P0A2A11	Drive Motor "A" Temperature Sensor Circuit Short to Ground
P0A2A15	Drive Motor "A" Temperature Sensor Circuit Short to Auxiliary Battery or Open

Post-procedure1

(c) Turn the ignition switch off.

B ▶ **GO TO DTC CHART (MOTOR GENERATOR CONTROL SYSTEM)**

A

3.	**CHECK CONNECTOR CONNECTION CONDITION (INVERTER WITH CONVERTER ASSEMBLY CONNECTOR)**

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 ▼

4.	**CHECK CONNECTOR CONNECTION CONDITION (MOTOR TEMPERATURE SENSOR CONNECTOR)**

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 ▼

5.	**INSPECT HYBRID VEHICLE TRANSAXLE ASSEMBLY (MOTOR TEMPERATURE SENSOR)**

Click here INFO

OK ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

NG ▶ **REPLACE HYBRID VEHICLE TRANSAXLE ASSEMBLY**

Click here INFO