Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM1000000028ZX2
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [12/2022 -]
Title: HYBRID / BATTERY CONTROL: MOTOR GENERATOR CONTROL SYSTEM (for M20A-FXS): P0A001C; Motor Electronics Coolant Temperature Sensor Circuit Voltage Out of Range; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

DTC	**P0A001C**	**Motor Electronics Coolant Temperature Sensor Circuit Voltage Out of Range**

DTC SUMMARY

MALFUNCTION DESCRIPTION

These DTCs indicate that the temperature sensor value is abnormal. The cause of this malfunction may be one of the following:

AREA	MAIN MALFUNCTION DESCRIPTION
Inverter low-voltage circuit	The connectors are not connected properly
Hybrid cooling system	Coolant circulation abnormal (frozen or leaking, etc.)
Inside of inverter	Inverter with converter assembly internal circuit malfunction

DESCRIPTION

The motor generator control ECU detects the HV coolant temperature using the HV coolant temperature sensor built into the inverter with converter assembly. The motor generator control ECU uses signals from the coolant temperature sensor to check the effectiveness of the inverter cooling system. If necessary, the motor generator control ECU will limit inverter output to help prevent inverter overheating. The motor generator control ECU also detects malfunctions in the sensor based on the HV coolant temperature sensor values.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P0A001C	Motor Electronics Coolant Temperature Sensor Circuit Voltage Out of Range	The actual inverter coolant temperature is high and the difference between the estimated inverter coolant temperature and the actual temperature exceeds a threshold for 10 seconds, or after a long soak, the inverter coolant temperature sensor value differs from the values of other sensors. (1 trip detection logic)	• Inverter cooling system • Cooling fan system • Inverter with converter assembly • Wire harness or connector	Comes on	Master Warning: Comes on	Motor Generator	A	SAE Code: P0A01

MONITOR DESCRIPTION

If the motor generator control ECU detects a malfunction of the Motor Electronics Coolant Temperature Sensor, the ECU will illuminate the MIL and store a DTC.

MONITOR STRATEGY

Related DTCs	P0A01 (INF P0A001C): Motor electronics coolant temperature sensor circuit malfunction (deviation)
Required sensors/components	Inverter, boost converter
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

Motor generator control ECU	DTC P0A01 (INF P0A001C) 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). [*1]
4. Drive the vehicle for approximately 10 minutes with the value of Data List item "Inverter Coolant Temperature" 25°C (77°F) or more. [*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.

WIRING DIAGRAM

Refer to the wiring diagram for the Cooling System.

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:

P0A001C may be output as a result of the malfunctions 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.)

Table 1

MALFUNCTION CONTENT	RELEVANT DTC	
Insulation malfunction	P1C7C49	Hybrid/EV Battery Voltage System Isolation (A/C Area) Internal Electronic Failure
	P1C7D49	Hybrid/EV Battery Voltage System Isolation (Hybrid/EV Battery Area) Internal Electronic Failure
	P1C7E49	Hybrid/EV Battery Voltage System Isolation (Transaxle Area) Internal Electronic Failure
	P1C7F49	Hybrid/EV Battery Voltage System Isolation (Direct Current Area) Internal Electronic Failure
	P1C8049	Hybrid/EV Battery Voltage System Isolation (Rear Motor Area) Internal Electronic Failure

Table 2

MALFUNCTION CONTENT	RELEVANT DTC	
Sensor and actuator circuit malfunction	P0C7396	Motor Electronics Coolant Pump "A" Component Internal Failure
	P314A31	Motor Electronics Coolant Pump "A" No Signal
System malfunction	P0A9300	Inverter "A" Cooling System Performance

PROCEDURE

1.	**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

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

2.	**CHECK COOLING SYSTEM**

Click here INFO

HINT:

If the "Cooling System" inspection results are normal, perform the next step.

NEXT ▶ **REPLACE INVERTER WITH CONVERTER ASSEMBLY**