Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM1000000028ZXX
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [12/2022 -]
Title: HYBRID / BATTERY CONTROL: MOTOR GENERATOR CONTROL SYSTEM (for M20A-FXS): P0C6416,P0C6417,P0C6916,P0C6917; Generator Position Sensor Circuit "A" Circuit Voltage Below Threshold; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

DTC	**P0C6416**	**Generator Position Sensor Circuit "A" Circuit Voltage Below Threshold**

DTC	**P0C6417**	**Generator Position Sensor Circuit "A" Circuit Voltage Above Threshold**

DTC	**P0C6916**	**Generator Position Sensor Circuit "B" Circuit Voltage Below Threshold**

DTC	**P0C6917**	**Generator Position Sensor Circuit "B" Circuit Voltage Above Threshold**

DTC SUMMARY

MALFUNCTION DESCRIPTION

These DTCs indicate an abnormal resolver output signal. The cause of this malfunction may be one of the following:

Internal inverter malfunction

- Inverter with converter assembly internal circuit malfunction

Inverter low-voltage circuit malfunction

- The connectors are not connected properly

HINT:

If any of these DTCs is output, a malfunction of the MG ECU circuit board or poor installation of a low voltage connector is suspected. It is not necessary to inspect the motor resolver.

DESCRIPTION

Refer to the system description for the Generator Resolver Circuit.

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DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P0C6416	Generator Position Sensor Circuit "A" Circuit Voltage Below Threshold	The value of the generator resolver sin phase signal is lower than the low side threshold. (1 trip detection logic)	• Inverter with converter assembly • Wire harness or connector	Comes on	Master Warning: Comes on	Motor Generator	A	SAE Code: P0C66
P0C6417	Generator Position Sensor Circuit "A" Circuit Voltage Above Threshold	The value of the generator resolver sin phase signal is higher than the high side threshold. (1 trip detection logic)	• Inverter with converter assembly • Wire harness or connector	Comes on	Master Warning: Comes on	Motor Generator	A	SAE Code: P0C67
P0C6916	Generator Position Sensor Circuit "B" Circuit Voltage Below Threshold	The value of the generator resolver cos phase signal is lower than the low side threshold. (1 trip detection logic)	• Inverter with converter assembly • Wire harness or connector	Comes on	Master Warning: Comes on	Motor Generator	A	SAE Code: P0C6B
P0C6917	Generator Position Sensor Circuit "B" Circuit Voltage Above Threshold	The value of the generator resolver cos phase signal is higher than the high side threshold. (1 trip detection logic)	• Inverter with converter assembly • Wire harness or connector	Comes on	Master Warning: Comes on	Motor Generator	A	SAE Code: P0C6C

MONITOR DESCRIPTION

The motor generator control ECU monitors the Generator resolver output signal. If the motor generator control ECU detects output signals that are out of the normal range or specification, it will conclude that there is a malfunction in the Generator resolver. If a malfunction is detected, the motor generator control ECU will illuminate the MIL and store a DTC.

MONITOR STRATEGY

Related DTCs	P0C66 (INF P0C6416): Out of range P0C67 (INF P0C6417): Out of range P0C6B (INF P0C6916): Out of range P0C6C (INF P0C6917): Out of range
Required sensors/components	Generator resolver
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 P0C66 (INF P0C6416) is not detected DTC P0C67 (INF P0C6417) is not detected DTC P0C6B (INF P0C6916) is not detected DTC P0C6C (INF P0C6917) 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 5 seconds or more. [*1]
4. Turn the ignition switch to ON (READY) and wait for 5 seconds or more. [*2]
5. Depress the accelerator pedal of the vehicle with the engine stopped and the shift lever in P to start the engine. [*3]
6. Drive the vehicle forward with the shift lever in D for 5 m (16 ft.) or more. [*4]
7. Drive the vehicle backward with the shift lever in R for 5 m (16 ft.) or more. [*5]

HINT:

[*1] to [*5]: Normal judgment procedure.

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

8. Enter the following menus: Powertrain / Motor Generator / Utility / All Readiness.
9. 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.

CAUTION / NOTICE / HINT

CAUTION:

Refer to the precautions before inspecting high voltage circuit.

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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:

- If the problem symptom cannot be reproduced, performing a road test on a road on which the vehicle tends to vibrate will make it easier to reproduce the symptom.
- If the resolver is malfunctioning, the vehicle may not drive smoothly.
- When inspecting the connectors, if it is difficult to judge if a connector was disconnected, deformed or improperly secured, disconnect and reconnect the connector and then check for DTCs again. Check if the same DTC is output. If the same DTC is not output, improper connection of connectors is suspected.
- As a malfunction detection threshold may be exceeded when performing the vibration or heat connector inspections, make sure to perform the following inspection to check that the DTC was not stored due to the malfunction of a part.
- P0C6416, P0C6417, P0C6916 or P0C6917 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.)

Table 1

MALFUNCTION CONTENT	SYSTEM	RELEVANT DTC	
Insulation malfunction	Hybrid control system	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

MALFUNCTION CONTENT	SYSTEM	RELEVANT DTC	
		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	SYSTEM	RELEVANT DTC	
Microcomputer malfunction	Motor generator control system	P0A1A47	Generator Control Module Watchdog / Safety MC 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
		P1C2A71	Generator A/D Converter Circuit Actuator Stuck
		P1C2B1C	Drive Motor "A" Control Module A/D Converter Circuit Voltage Out of Range
		P1C2B49	Drive Motor "A" Control Module A/D Converter Circuit Internal Electronic Failure
		P1C2B71	Drive Motor "A" Control Module A/D Converter Circuit Actuator Stuck
		P1CAF38	Generator Position Sensor REF Signal Cycle Malfunction Signal Frequency Incorrect
		P313483	Communication Error from Drive Motor "A" to Generator Value of Signal Protection Calculation Incorrect
		P313486	Communication Error from Drive Motor "A" to Generator Signal Invalid
		P313487	Communication Error from Drive Motor "A" to Generator Missing Message
	Hybrid control system	P0A1B49	Drive Motor "A" Control Module Internal Electronic Failure
Power source circuit malfunction	Motor generator control system	P19F81C	Generator Control Module Offset Power Circuit Voltage Out of Range
		P26DF1C	Generator Control Module Position Sensor REF Power Source Circuit Voltage Out of Range

PROCEDURE

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

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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

A ▶ **REPLACE INVERTER WITH CONVERTER ASSEMBLY**

B ▶ **CONNECT SECURELY**

C ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**