

Last Modified: 12-04-2024	6.11:8.1.0	Doc ID: RM100000028ZV8
Model Year Start: 2023	Model: Prius Prime	Prod Date Range: [12/2022 -]
Title: HYBRID / BATTERY CONTROL: HYBRID CONTROL SYSTEM (for M20A-FXS): P0A9300; Inverter "A" Cooling System Performance; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

DTC	P0A9300	Inverter "A" Cooling System Performance
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DTC SUMMARY

MALFUNCTION DESCRIPTION

This DTC indicates when the temperature sensor value inside the inverter has become abnormal. The cause of this malfunction may be one of the following:

Internal inverter malfunction

- Inverter internal circuit malfunction
- Malfunction in ECU that controls the inverter
- Malfunction in sensor for inverter control (coolant temperature sensor)

Hybrid cooling system malfunction

- Coolant is leaking, coolant level is insufficient, coolant is frozen or coolant passage is clogged.
- Grille is blocked.

DESCRIPTION

Refer to the system description for the Cooling System.

Click here [INFO](#)

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P0A9300	Inverter "A" Cooling System Performance	<ul style="list-style-type: none"> • Inverter coolant temperature increases as well as the temperature of any inverter with converter assembly related parts due to an inverter cooling system malfunction. 	<ul style="list-style-type: none"> • Inverter cooling system • Inverter water pump assembly • Inverter with converter assembly • Cooling fan system • Grille shutter system* 	Comes on	Master Warning: Comes on	Hybrid Control	A	SAE Code: P0A93

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
		<ul style="list-style-type: none"> When the actual temperature of the inverter coolant is higher than the sensor value by a certain value or more and the actual temperature is high. (1 trip detection logic)	<ul style="list-style-type: none"> Wire harness or connector 					

*: w/ Grille shutter system

MONITOR DESCRIPTION

If the hybrid vehicle control ECU detects a malfunction of the inverter cooling system, the ECU will illuminate the MIL and store a DTC.

MONITOR STRATEGY

Related DTCs	P0A93 (INF P0A9300): HV cooling system malfunction
Required sensors/components	Water pump, radiator fan, 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	-
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COMPONENT OPERATING RANGE

Hybrid vehicle control ECU

DTC P0A93 (INF P0A9300) 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. With ignition switch 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. Perform a road test according to the freeze frame data item "Vehicle Speed" for approximately 10 minutes. [*3]

NOTICE:

As the state of charge of the HV battery voltage may be low after driving in fail-safe mode, it will automatically be charged for 5 to 10 minutes after repairs have been performed and turn the ignition switch to ON (READY).

HINT:

[*1] to [*3] : Normal judgment procedure.

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

6. Enter the following menus: Powertrain / Hybrid 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, perform the normal judgment procedure again.

WIRING DIAGRAM

Refer to the wiring diagram for 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](#) 

HINT:

- P0A9300 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
		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	
Sensor and actuator circuit malfunction	Hybrid Control System	P0C7396	Motor Electronics Coolant Pump "A" Component Internal Failure
		P314A31	Motor Electronics Coolant Pump "A" No Signal
	Motor Generator Control System	P0A0011	Motor Electronics Coolant Temperature Sensor Circuit Short to Ground
		P0A0015	Motor Electronics Coolant Temperature Sensor Circuit Short to Battery or Open
System malfunction	SFI System	P059A71	Active Grille Air Shutter "A" Actuator Stuck
		P059A79	Active Grille Air Shutter "A" Mechanical Linkage Failure
		P05A212	Active Grille Air Shutter "A" Circuit Short to Battery
		P15AD87	Active Grille Air Shutter "A" Missing Message

PROCEDURE

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

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**

2.	CHECK COOLING SYSTEM
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Click here **HINT:**

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

NEXT  **REPLACE HV COOLANT**