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Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: M20A-FXS (BATTERY / CHARGING): SOLAR CHARGING SYSTEM: P196100,P196200,P19697E; Solar Charger DC/DC Converter "B" Output Power Performance; 2023 - 2024 MY Prius Prius Prime [03/2023 -]		

DTC	**P196100**	**Solar Charger DC/DC Converter "B" Output Power Performance**

DTC	**P196200**	**Solar Charger DC/DC Converter "C" Output Power Performance**

DTC	**P19697E**	**Auxiliary Battery DC/DC Converter Shutdown Relay Actuator Stuck On**

DESCRIPTION

P196100, P196200:

The solar DC/DC converter built into the solar energy control ECU assembly performs charging control to efficiently draw out electrical power according to the characteristics of the solar panel, and outputs electricity. The solar energy control ECU assembly operates each MOS of the solar DC/DC converter, checks whether current is being output as demanded or shut off as demanded, and detects malfunctions in the solar DC/DC converter.

P19697E:

The AMD relay (ideal rectifier) built into the solar energy control ECU assembly functions as a shutoff switch to prevent reverse current from the auxiliary battery. The solar energy control ECU assembly monitors the middle voltage value and auxiliary battery voltage value, which are factors in AMD relay short malfunctions, and detects a malfunction when divergence exceeds a specified threshold value.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY
P196100	Solar Charger DC/DC Converter "B" Output Power Performance	Any of the following conditions are met: • With the middle voltage discharged, when the solar panel voltage is more than the specified voltage, the middle voltage cannot be discharged and is more than the specified value for 3 seconds or more • When middle circuit short switch = ON (Middle voltage = approx. 0 V), solar panel voltage is more than the specified value for 3 seconds or more	Solar energy control ECU assembly	Solar Charging Warning Light: Comes on	Solar Charging Control	A

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY
		• When middle circuit short switch = ON (Middle voltage = approx. 0 V) and solar DC/DC converter input current is the specified value or more, the difference between solar DC/DC converter input current and solar DC/DC converter output current is more than the specified value for 3 seconds or more • When the middle voltage has been precharged, reverse current flow from the middle circuit causes the middle voltage to decrease, and the middle voltage is less than the specified value for 3 seconds or more (1 trip detection logic)				
P196200	Solar Charger DC/DC Converter "C" Output Power Performance	Any of the following conditions are met: • With the middle voltage discharged, when the solar panel voltage is more than the specified voltage, the middle voltage cannot be discharged and is more than the specified value for 3 seconds or more • When middle circuit short switch = ON (Middle voltage = approx. 0 V), solar panel voltage is more than the specified value for 3 seconds or more • When middle circuit short switch = ON (Middle voltage = approx. 0 V) and solar DC/DC converter input current is the specified value or more, the difference between solar DC/DC converter input current and solar DC/DC converter output current is more than the specified value for 3 seconds or more	Solar energy control ECU assembly	Solar Charging Warning Light: Comes on	Solar Charging Control	A

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY
		• When the middle voltage has been precharged, reverse current flow from the middle circuit causes the middle voltage to decrease, and the middle voltage is less than the specified value for 3 seconds or more (1 trip detection logic)				
P19697E	Auxiliary Battery DC/DC Converter Shutdown Relay Actuator Stuck On	Middle voltage discharge has completed, and the voltage differential between the AMD terminal voltage sensor and middle voltage sensor is less than the specified value for 3 seconds or more (1 trip detection logic)	Solar energy control ECU assembly	Solar Charging Warning Light: Comes on	Solar Charging Control	A

*1: Discharge the electrical charge that was charged at the middle point. In normal conditions, the middle line is discharged, and the middle voltage becomes 0 V.

CONFIRMATION DRIVING PATTERN

HINT:

After completing repairs, clear the DTCs and then check that the vehicle has returned to normal by performing the following All Readiness check procedure.

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1. Park the vehicle in an area where the solar radiation will be steady.

Weather	Clear or mostly clear and sunny
Time	Between 11:00 and 14:00
Place	An area where sunlight strikes the solar roof directly

HINT:

- Make sure no part of the solar roof is shaded.
- If the solar roof is dirty, clean it.

2. Turn the ignition switch off and then disconnect the cable from the negative (-) auxiliary battery terminal.
3. Wait for 5 seconds or more, then disconnect the power source connector and then all other low voltage connectors the solar energy control ECU assembly.
4. Wait for 30 seconds or more, then connect the low voltage connectors of the solar energy control ECU assembly except the power source connector and then connect the power source connector.
5. Connect the cable to the negative (-) auxiliary battery terminal.
6. Turn the ignition switch to ON, wait for 5 to 10 seconds, and then turn the ignition switch off.

HINT:

Make sure to turn the ignition switch off within 10 seconds.

7. Wait for 20 minutes and then check for DTCs to check that no DTCs have been stored.

HINT:

- While waiting, the HV battery will be charged by the solar charging system. However, depending on certain conditions, charging may not be performed.
- When the HV battery is fully charged, high voltage charging to the HV battery is not performed.
- If any of the following conditions is met, the HV battery will not be charged by the solar charging system:
  - The HV battery is charged via an external power source.
  - The ignition switch is turned to ACC.
  - The ignition switch is turned to ON.
  - The ignition switch is turned to ON (READY).
  - The HV battery heating system is operating.
  - The remote air conditioning system is operating.

8. Check that solar charging is being performed.

HINT:

Be sure to check that high voltage battery charging is being performed by the solar roof.

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.

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- 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.

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PROCEDURE

1.	**REPLACE SOLAR ENERGY CONTROL ECU ASSEMBLY**

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NEXT END