Installation in a Positive-grounded Battery System

Overview

The Solar Charge Controller’s internal design has a built-in fuse—rated at 1 A, 600 V—which grounds both the PV negative and battery negative conductors and provides PV ground-fault protection (PVGFP) to the system. To avoid a short circuit, ground fault protection must be disabled before grounding the positive battery terminal for negative voltage reference. Disabling the PVGFP circuit in this way opens the negative-to-ground bond within the unit, allowing for a positive battery ground connection. If PVGFP is required, install an external protection circuit that is compatible with a positive-grounded battery system.

⚠️ DANGER

HAZARD OF ELECTRIC SHOCK AND FIRE

PV array terminals and auxiliary terminals must not be grounded in the installed system.

Failure to follow these instructions will result in death or serious injury.

Because there is no isolation between the battery and the PV array, this positive-grounded battery configuration will bias the PV array terminals and the internal auxiliary lines to –Batt V with respect to chassis ground. For example, using a 150 VOC PV array and a 60 V battery bank, grounding the positive battery terminal will make PV(–) sit at -60 V and PV(+) at +90 V. Aux(–) will be biased at -60 V and Aux(+) at +45 V. These voltage levels on both battery and auxiliary outputs are considered safe, extra-low voltages and do not present a hazard as long as the PV terminals are kept floated or ungrounded.
Follow the instructions in the Solar Charge Controller owner’s manual for connecting the PV array and battery to the unit. Next, follow these steps for a safe, negative voltage reference connection:

1. Disable the Solar Charge Controller’s internal PVGFP circuit. See “Disabling the Solar Charge Controller’s Internal PVGFP Circuit” on page 2.
2. Make sure PV array terminals (positive and negative) are ungrounded.
3. Make sure auxiliary terminal lines (positive and negative) are ungrounded.
4. Ground the positive terminal of the battery only.

Disabling the Solar Charge Controller’s Internal PVGFP Circuit

Before grounding the positive battery terminal to obtain a negative reference voltage, you must disable the Solar Charge Controller’s internal PVGFP circuit.

**DANGER**

**HAZARD OF ELECTRIC SHOCK**

Disconnect PV and battery circuits before accessing the Solar Charge Controller's wiring compartment.

Failure to follow these instructions will result in death or serious injury.

To disable the PVGFP circuit, remove the small jumper connector located on the circuit board within the wiring compartment of the unit. See Figure 1 for the jumper location. After removal, the jumper can be stored on a single pin of the 2 pin connector or moved into the location marked for units with a 3-pin connector.
PV Connection and Auxiliary Lines

**WARNING**

HAZARD OF FIRE

Do not ground the negative conductor of the auxiliary circuit.

*Failure to follow these instructions could result in death or serious injury.*

The PV array must not be grounded in either its positive or negative terminal. Do not attempt to ground the PV+ terminal to have a common ground with the battery. A positive ground connection at the PV array will bias both battery and auxiliary terminals to –PV voltage with respect to chassis ground. This will present shock hazardous voltages at the battery terminals and the auxiliary lines.

The internal auxiliary connector lines must not be grounded in either their positive or negative terminal. Grounding the negative terminal of the auxiliary lines will create a short on the battery side outside the reach of the unit's over-current protection.
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Date and Revision
October 2010 Rev. A Part Number 976-0262-01-01

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