



SOLAR STIK®

# Solar Stik Technical Bulletin 22

Effective Date: 20191001

## PAM TROUBLESHOOTING PROCEDURES

This document contains troubleshooting information for locating and correcting operating issues that may develop with the PAM. Each issue is followed by a list of instructions to help you to determine probable causes and what corrective actions to take. You should perform the tests/inspections and corrective actions in the order listed. This document cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or cannot be corrected by listed corrective actions, contact Solar Stik Technical Support.

### Required Tools

- Digital Multimeter

**Note:** Instructions for measuring  $V_{oc}$  and  $V_{mp}$  are on pages 3 and 4 of this document.

**Equipment Condition Statement:** The Power Pak or Power Hub is fully functional and operating normally.

### Power Hub User Interface Reports No Voltage from the PAM

**Step 1.** Verify that the PAM is oriented for maximal sun exposure.

- a. If PAM is oriented for maximal sun exposure go to step 2.
- b. If not, orient the PAM for maximal sun exposure.

**Step 2.** Check Solar Leash connection at the Power Pak or Power Hub.

- a. If Solar Leash is properly connected to the Power Pak or Power Hub go to step 3.
- b. If loose or not connected, tighten or connect properly.

**Step 3.** Check the H4 PV connections between the Solar Leash and the PAM.

- a. If the H4 PV connections between the Solar Leash and the PAM are secure, go to step 4.
- b. If loose or not connected, tighten or connect properly.

**Step 4.** Check H4 PV series connections between each PV panel.

- a. If the H4 PV connections between each PV panel are secure, go to step 5.
- b. If loose or not connected, tighten or connect properly.

**Step 5.** If the no-voltage problem persists, contact Solar Stik Technical Support.



Figure 1. Exposed filter and vent



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## Power Hub User Interface Reports Low Voltage from the PAM

**Step 1.** Verify that the PAM is oriented for maximal sun exposure and is NOT shaded.

- a. If the PAM is oriented for maximal sun exposure and NOT shaded, go to step 2.
- b. If not, remove the shading obstruction or move the PAM to eliminate the shading,
- c. Orient the PAM for maximal sun exposure.

**Step 2.** Measure PAM  $V_{oc}$  at pins A and C of the bayonet connector of the Solar Leash.

- a. If the PAM  $V_{oc}$  at pins A and C of the bayonet connector of the Solar Leash is within acceptable limits (see Measuring Maximum Power and Open Circuit Voltages section), the PAM is operating normally. Contact Solar Stik Technical Support for further assistance.
- b. If  $V_{oc}$  measured at pins A and C of the bayonet connector is below  $\sim 30 V^*$ , go to step 3.

**Step 3.** Check the H4 PV connections between the Solar Leash and the PAM.

- a. If H4 PV connections between the Solar Leash and the PAM are connected properly, go to step 4.
- b. If loose or not connected, tighten or connect properly.

**Step 4.** Check the  $V_{oc}$  at the H4 PV PAM output leads (see Measuring Maximum Power and Open Circuit Voltages section).

- a. If the  $V_{oc}$  is within acceptable limits, replace the Solar Leash.
- b. If the  $V_{oc}$  at the H4 PV PAM output leads is equal to the  $V_{oc}$  measured at pins A and C of the bayonet connector, go to step 5.

**Step 5.** Check H4 PV series connections between each PV panel.

- a. If the H4 PV connections between each PV panel are secure, go to step 6.
- b. If loose or not connected, tighten or connect properly.

**Step 6.** Check  $V_{oc}$  at the positive and negative terminals of the H4 PV connections of each PV panel.

- a. If the  $V_{oc}$  measured at the H4 PV connections of all panels is within acceptable limits\* (see Measuring Maximum Power and Open Circuit Voltages section), contact Solar Stik Technical Support for further assistance.
- b. If the  $V_{oc}$  measured at the H4 PV connections of any panel is not within acceptable limits\*, replace the panel.

\*This value may vary depending on weather/environmental conditions (i.e., lower if overcast).





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## Measuring Maximum Power and Open Circuit Voltages

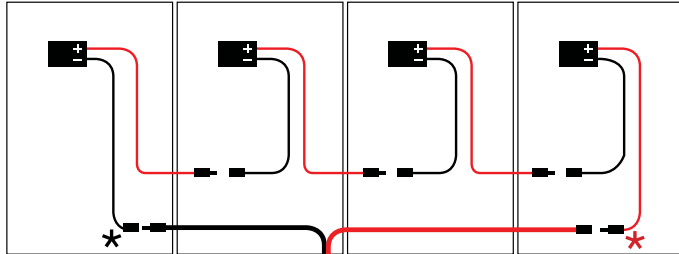
### Introduction

Voltage “open circuit” ( $V_{oc}$ ) is unregulated panel voltage and measured directly from the leads of a panel or an array when not connected to a “load” such as a charge controller (Power Hub or Power Pak). Voltage “maximum power” ( $V_{mp}$ ) is the voltage at which the maximum power of a panel or array is produced when connected to a charge control, or when the panel is considered “under load”.

The  $V_{oc}$  of a single PAM panel is approximately 15.72 V under standard test conditions (STC). In a PAM, four (4) panels are connected in series; therefore, the  $V_{oc}$  for the four (4) panels could theoretically be as high as 62.88 V. Once the panels are connected to the Power Hub or Power Pak (i.e., the panels are connected to a “load”), it is more likely that the operator will see voltages around 50  $V_{mp}$  reported on the user interface.

The  $V_{oc}$  and  $V_{mp}$  should be measured for each PAM or panel under “ideal solar conditions” if possible. This means that the panels should be oriented directly at the sun and unshaded on a clear day in order to identify the maximum  $V_{mp}$  and  $V_{oc}$ .

### Procedure to Measure $V_{oc}$ of a PAM



In the PAM, four (4) PAM panels are connected in series. The rated  $V_{oc}$  for the array in this configuration is 62.88; however, the voltage may vary.

\* \* Positive and negative PAM output leads (respectively)

30' Solar Leash



To measure  $V_{oc}$  from a single PAM, carefully place the leads of the voltmeter on pins A and C in the bayonet connector at the end of the Solar Leash. Pin B is unused. Under ideal conditions, the reading should be 50 V or more.



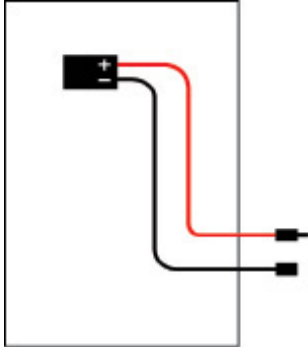


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## Procedure to Measure $V_{oc}$ of a Single PAM Panel



The voltage measurement across the terminals of the two PAM panel leads is the  $V_{oc}$  of the panel. The reading should be approximately 15 V under ideal conditions.

