PV Logic®

Solar System Help Sheets

Solar Technology International
Without boundaries

If you believe you may have a problem with your solar system, there are a few things to check first:

1. **Check that all connections are in good condition, clean and mechanically tight. This includes:**
   - **a.** The solar controller/voltage regulator (Fig 1), and
   - **b.** The connection to the battery

2. **Check inline fuse and connections**
   This can be normally be found near the battery you are trying to charge, on the wire from the solar controller/voltage regulator (Fig 2)

3. **Check all the cables are in good condition and haven't been snagged or damaged**
   - **a.** The cable from the solar panel to the solar controller (Fig 3)
   - **b.** The cable from the solar controller to the battery

4. **Ensure the battery is in good condition**
   - **a.** What voltage is your battery when you test it with no loads connected? (Fig 4)
   - **b.** When was the last time you charged your battery?
   - **c.** When was the last time you had your battery tested?
   - **d.** Is your battery over 5 years old?
   - **e.** What type and size of battery do you have?

If the above does not present an obvious reason for the problem, please go through the following tests and along with the information already collected (above). Please take notes of the results before contacting the Solar Technology International service team.

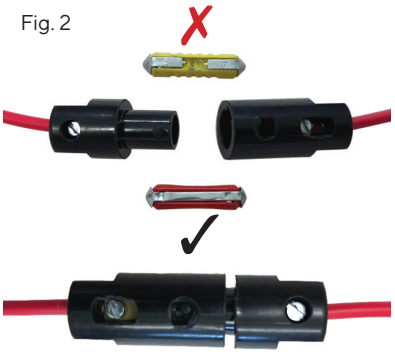
The solar module should always be connected to solar controller/ charge controller (unless you have a 5 or 10watt module, and the battery capacity is 50AHr or 90AHr respectively. The 5 and 10w modules have reverse feed diodes built in, larger modules do not)

The output of the solar controller/charge controller MUST be connected directly to the terminals of the battery you are charging. This will ensure that the energy produced by the solar installation will feed directly into the battery for an efficient charge. Connecting into the vehicle loom or other circuits may result in very poor operation of the solar module.

Fig. 1

Check connections

Fig. 2



Inline fuse near a battery

Fig. 3

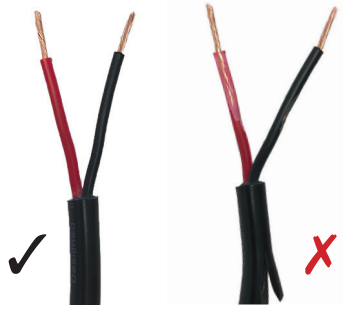
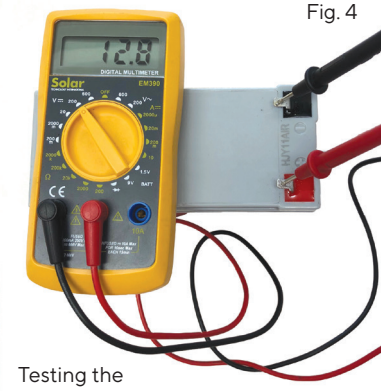


Fig. 4



Testing the voltage of a battery

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Measuring Voc and Isc values (Voltage Open Circuit and Current Short Circuit)

The test instructions below refer to the Solar Technology DVM (Digital Voltmeter) Part code SDGM01 model EM390 (Fig. 5). Other DVMs will be able to test the Voc and Isc, please refer to the relative user manuals.

Please Note – Voc and Isc tests must be carried out with the solar module disconnected from the installation/voltage controller. The solar module can be presented with a short circuit and survive, it will not harm the module in any way. **NO OTHER POWER SOURCE SHOULD EVER BE SHORT CIRCUITED.**

The Voc (Voltage open circuit) and Isc (Current short circuit) values can be found on the solar module data plate (Rear of module) The values stated are at STC (standard test conditions). There is a very good chance you will be testing in conditions that are below STC conditions, therefore the readings taken may be less than stated on the data plate. This is perfectly normal.

1. Measuring Voc (Open Circuit Voltage)

Disconnect the solar module from the voltage controller/charge controller (All module tests must be conducted whilst disconnected from the controller).

Using the test meter, set the black probe into the black socket (1), normally marked COM on your test meter, and the red probe into the red socket (2) (Fig. 6). Set the centre dial switch to 'VDC 200v' range (2 clicks to the left on our meter).

Please Note – Do not set your test meter to 20v DC as the panel may be producing a higher voltage and you will not see the correct reading.

Measure the voltage across the PV module leads – red probe to the red positive wire, black probe to black negative wire.

In good light conditions, a value of 18-22v DC should be measured. This indicates your panel is working fine. A reading less than 12v in sunny conditions could mean you have a problem. Please check your solar panel isn't covered in dirt and/or shaded in anyway.

Please record the reading, because if you require support we will ask for this number. ____ . ____

Please Note – If the figure has minus sign in front, polarity is reversed (Red and Black probe reversed).

2. Measuring Isc (Short Circuit Current)

Normally, on most small test meters you will need to move the red probe for testing current (Amps) – this is also the case with our meter. Please set the black probe into the black socket (1) normally marked COM on your test meter and the red probe into the blue socket (3) which is normally marked up as 10A (Fig. 7).

Now set the centre dial switch to '10A' (six clicks to the right on our meter).

Measure the current across the PV module leads – red probe to the red positive wire, black probe to black negative wire.

Please record the reading, because if you require support we will ask for this number. ____ . ____

The value of the Short Circuit Current will depend upon the following factors: (a) the position of the solar module, (b) the position of the sun (high and low in the sky will affect the air-mass figure, which is the amount of atmosphere the light travels through), and (c) the position of the solar cell (facing south is always best). You may notice that movement of the solar module will affect the measured value, if the module is free standing.

Fig. 5

Fig. 6

Black	Red	Blue
1	2	

Meter connected to a wire with a reading of 20v

Fig. 7

Black	Red	Blue
1		3

Meter connected to a wire with a reading of 4A

Measuring Current flow to the battery

With the module connected to the voltage controller/charge controller. Using the test meter, set the black probe into the black socket (1), normally marked COM on your test meter, and the red probe into the blue socket (3) – this is normally marked up as 10A (Fig. 8).

Set the centre dial switch to '10A' (six clicks to the right on our meter).

Find the inline fuse and its holder. It should be towards the battery end of the output cable from the charge controller/voltage regulator and the battery being charged. Remove the fuse and place it to one side.

Next, place the black probe into the fuse holder connection nearest the battery and the red probe into the other side of the fuse holder nearest the controller.

You should now see a reading showing the current flow in amps (A) going to the battery.

Please Note – If you are getting a zero reading, please check your connections are good. If you are getting a minus reading, the probes are the wrong way around but your system is working.

Please record the reading, because if you require support we will ask for this number.

It is always difficult to say what charge level to expect on any solar device or installation. Things to take into consideration are: (a) light conditions (irradiance), (b) position of the solar module (facing south is always best) and (c) the position of the sun (high and low in the sky will affect the air-mass figure which is the amount of atmosphere the light travels through).

The state of the batteries will also dictate the charge current, as a discharged battery will accept charge at a higher rate than a part charged battery or nearly fully charged battery. Temperature can also affect the charge rate – the colder the battery, the less current will flow. If you are reading a charge current, even if it is very low, it would indicate that the solar installation is working.

Fig. 8

Meter connected to a wire with a reading of 1A

Solar Technology International
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T 01684 774000
F 01684 773000
support@solartechnology.co.uk
solartechnology.co.uk