SolarGo2 Semi-Flexible Solar Panel instructions

Please read these instructions thoroughly before installation.

Thank you for purchasing a quality solar panel from SolarGo2. This panel will give you many years of trouble-free service. It is important that the panel is installed correctly and by reading and acting on the below instructions it should also be an easy trouble-free install. In this manual we will be using some technical terms and a brief description of these terms can be found at the end of the instruction manual.

If your solar panel has been delivered by courier, please check the solar panel for any damage that may have occurred during transit. If package appears damaged, sign for the package as damaged.

Photograph any damage for future reference and contact your supplier.

Handling a semi-flexible solar panel

- This semi-flexible solar panel must be handled with care. Never pick the panel up by the cable as this will stress the connection point within the junction box and cause failure. Even though it is semi-flexible, do not bend the solar panel on the shortest dimension and on its longest dimension bend up to a maximum of 10°
- Take care unpacking the solar panel. Use the packing to rest the solar panel on flat when installing.
- The solar panel must not be repeatedly flexed or bent. It must be permanently mounted on a solid curved or flat surface, not suspended in free air. Continuous flexing of the panel will damage the cells and shorten the life of the solar panel.
- Always keep the solar panel as straight as possible when handling. (Take extra care when installing in windy conditions). The solar panel can present a large sail area and go with the wind when you're least expecting it.
- Do not put any pressure on the solar panel until it is securely mounted on to a solid surface.
- Do not put sharp or heavy objects on the solar panel that may puncture the surface material.
- The maximum recommended height of the arch of the solar panel is 50mm. The surface curvature must be uniform across the length of the solar panel. Any high spots may cause damage to the solar cells, see fig 1

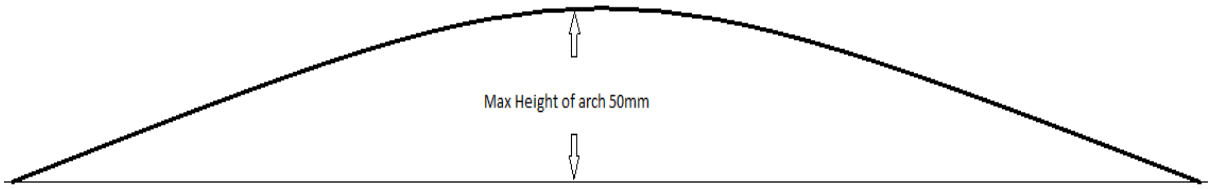

Fig 1

Before you start installation

it is always a good idea to test that the panel is working and giving you both Volts (V) and Amps (A). This can be done by testing the Voc (Voltage open Circuit) and Isc (Current short Circuit)

Always test the panel in the best light conditions possible i.e., outside in natural sunlight. The panel will not work under artificial light or inside, and if tested in this way it will show a false/poor reading on your DVM (Digital Voltmeter).

Fig 2

If needed, prepare the panels cable ends for testing. Remove the outer black insulating sheath and then the conductor insulation (red and black) to gain access to the copper conductor, as per the diagram Fig 2 (The panel will be supplied with the cable ends already prepared and identified)

Voc Test (Voltage open Circuit)

To test Voc, you will need to set your DVM to 200V DC (Please refer to DVM instructions on how to do this). Connect the meter probes to the panels cable, red probe to red conductor, black probe to black conductor (Fig 3). You should now see a voltage reading of 18-26V DC depending on the irradiance from the sun at that time. If you get a reading below 10V please make sure the solar panel is outside and facing up towards the sun. If you are still getting a poor reading i.e., under 10V, please contact us on 01684 607002

Fig 3

If it helps, please enter the value you have just read here _____ volts

Isc Test (Current short Circuit)

Next test the Isc, this will involve rearranging the probes and settings on your DVM (Please refer to DVM Instructions, normally the black probe will stay in the black socket, the red probe will move to the 10A socket, the dial setting will move to read 10A DC). Connect the meter probes to the panel, red probe to red conductor, black probe to black conductor (Fig 4). You should see a current reading. This value will depend upon the rating of the panels Isc and the irradiance from the sun. The fact that you have a reading is a good indication that the panel is in good order

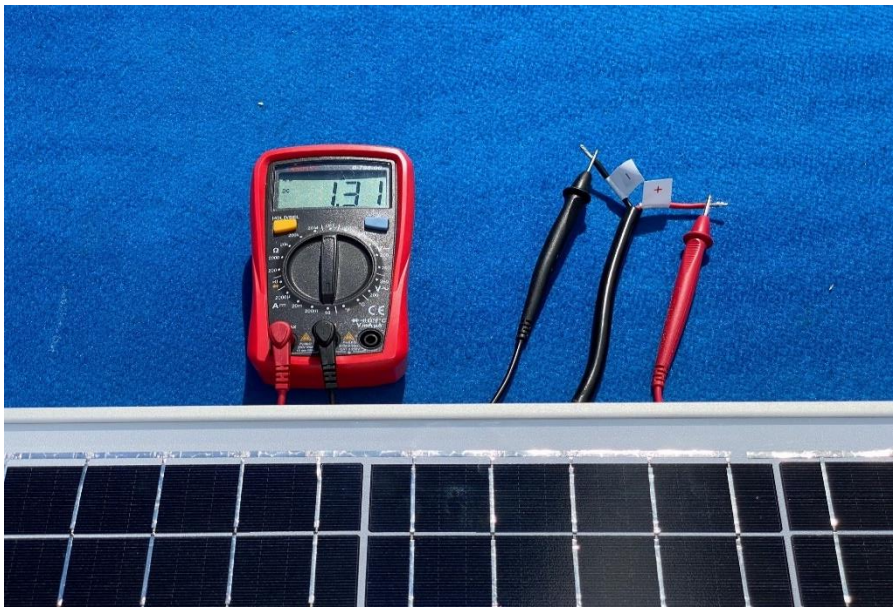

Fig 4

If it helps, please enter the value you have just read here _____ Amps

All panels technical specifications and performance values can be found on the panel data plate on the reverse of the panel, or the technical specification area for that panel on our website.
www.solargo2.com

This test procedure is very useful for future reference and may help on diagnostics of the PV system.

You are now ready to install your solar panel.

Please read the following instructions thoroughly

Note: please measure your battery terminal voltage using your DVM, record the measured voltage below. We will then use this to compare once you have fully installed your solar panel.

Battery voltage before install of solar panels _____V

The installation is simple, the components comprise of the solar panel, and an inline fuse (included with your solar panel as standard)

1. Solar panel
2. Inline fuse and holder (included with your solar panel as standard)
3. Charge controller/voltage regulator (not included with your solar panel as standard)
4. Battery (not included with your solar panel as standard)

We now need to decide on panel position, and how the panel is to be secured. Always make sure that you have enough area on the roof to accommodate the panel.

The solar panel can be bonded (preferable) or fastened to the surface via screws or rivets. Holes can be drilled into the edge of the solar panel. Take care not to drill anywhere near the solar cells or any contacts. Holes must be sealed with a bonding agent / adhesive to avoid the solar panel delaminating and to protect against water ingress.

The semi flexible solar panel has a pre-drilled hole near the cable terminal box. This will allow the cable to be installed directly through and underneath of the solar panel as a rear exit installation.

Please Note. Check the instructions for your chosen bonding agent for any extra steps required (if any) before continuing to install your SolarGo2 semi-flexible solar panel.

The main considerations of the installation will be, panel position, charge controller position, cable gland position, cable run and access.

Panel position

Site the panel to avoid shade as much as possible (shading will have an adverse effect on performance) for example on a caravan roof you might have a TV aerial or air-conditioning unit that during the day can cause shadows onto the panel. This will have a dramatic effect of reducing the power produced by the panel, so it's something best to avoid.

When bonding the semi flexible solar panel to a surface, the area must be clean and grease free. Remove any loose or flaking material and clean the area with a preparatory cleaner such as an alcohol wipe.

Please consider that the solar panel will always try to reform back to its original form, so on curved surfaces the solar panel will need to be held securely while the bonding agent sets. Weights can be used but take care not to crush or puncture the solar panel surface.

Take time with the installation, be precise with the position. This is a permanent installation method and does not allow for repositioning.

Apply bonding agent to the back of the solar panel on all four edges in a continuous line 6-10mm thick, a further serpentine line can then be applied to the centre of the solar panel. (Bonding agent shown as a white line) Please see Fig 5

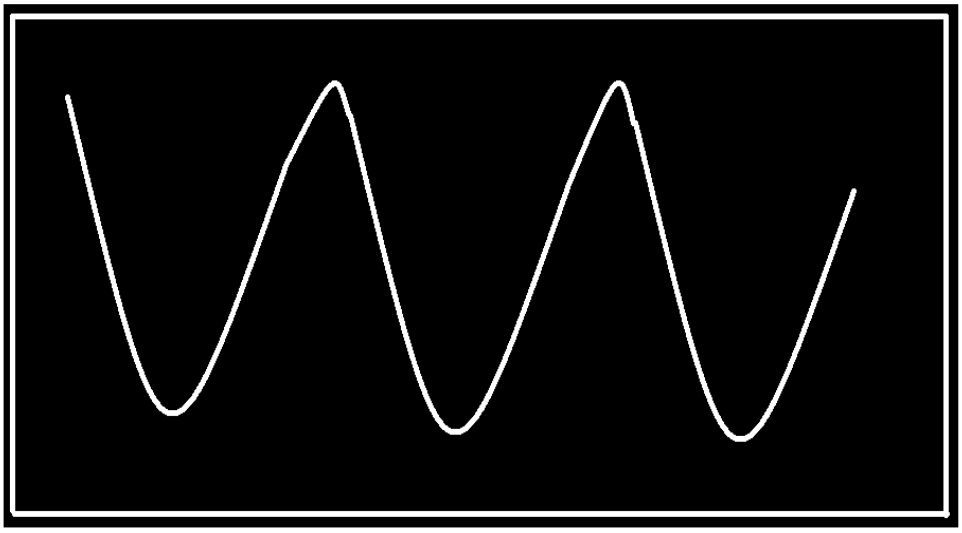

Fig 5

Alternatively, the method shown in Fig 6 can be used. The gaps will allow even pressure and allow air and water to escape if the edges of the solar panel are not to be bonded or sealed.

Fig 6

***Please note**. The maximum recommended height of the arch of the solar panel is 50mm.The surface curvature must be uniform across the length of the solar panel. Any high spots may cause damage to the solar cells.*

Place the solar panel in the desired position, bed the panel down firmly but do not press down so hard that all bonding agent is expelled. Leave 2-3mm of bonding agent between surfaces.

The Bonding agent will take 24 hours to cure, do not move the vehicle until the bonding agent has set.

Cable gland

Position the cable gland as near to the solar panel as possible for example, on a caravan over an internal floor to ceiling cupboard so the cable can be hidden away (please refer to the instructions supplied with the cable gland on the best way to seal this to your roof).

Charge controller position

The charge controller needs to be sited close to where the battery you want to charge is located, in a well-ventilated position, and easily accessible. Options would be in a cupboard that's being used for

the cable run from the roof or even under the seat next to the battery box. Please remember this controller will need to have room around it for ventilation and to keep cool. Don't place in a small, confined area! (Please refer to the charge controller instructions for more information on this).

Cable run and Charge controller. (Please refer to the charge controller manual for more information)

The installation wiring is straight forward; the panel comes with 5M of cable already connected. Run the cable from the panel, through the gland and to the charge controller position, any spare cable can be cut off. It is good practice to keep cable runs to a minimum to avoid volt drop and unnecessary circuit resistance. The solar panel wires (Red & Black, red = positive & black = negative) are connected to the solar connections on the controller. This will be indicated on the controller (PV / Solar input). Be sure to observe the correct polarity of the wires.

Any spare cable (if you have any left) is then used to connect the controller to the battery; The battery connection on the controller is clearly identified "BATT". Connect the battery using these terminals via an inline fuse placed as near to the battery as possible on the positive red wire (Please refer to controller instructions for more information on this connection).

The terminals indicated LOAD can be used to run an appliance. These terminals will be energised once the battery has reached full charge. When the battery goes into a discharged state the terminals will be de-energised and will not be re-energised until the battery reaches full charge again. This is designed to protect the battery from being discharged.

Please note: The connection between the charge controller and the battery must be fused on the red wire as close to the battery positive terminal as possible and must be connected directly to the battery and NOT connected into part of a wiring loom. Please see Fig 7

Fig 7

We recommend direct connection from the charge controller to the battery via the inline fuse. Integration into the existing wiring can lead to power loss and erratic voltage and poor performance and problems may not be supported.

When you have completed the installation and the solar panel and controller are connected to the battery, wait for 30 mins to 1 hour and measure the battery terminal voltage again with a DVM. You should see a slight rise in voltage. This will depend entirely on the amount of irradiance the panel is receiving, but this is a good indicator that everything is now working.

Terminology used/abbreviations

PV = (Photo Voltaic, sunlight energy, converted to electrical energy))

Module or PV Module = (Solar Panel) = a number of cells (Typically 36/72) connected together and built into a frame)

DVM = (Digital Voltmeter)

Irradiance = (Natural sunlight light level)

Voc = (Voltage open Circuit)

Isc = (Current short Circuit)

Vmp = (Voltage Max power)

Imp = (Current Max Power)

STC = (Standard Test Conditions) the data on the module data plate is taken at STC, this is an industry standard used by PV module manufactures. STC conditions are stated on the module data plate

The data has been derived from three conditions.

1) Irradiance = 1000Wm^2
2) Air Mass = 1.5 (Position of the sun in the sky)
3) Temperature = 25^{0c}

The module data has been derived through a laboratory test called flash testing. Any deviation from the STC conditions will lead to different test results. So, any change in irradiance, angle/orientation of the panel, or temperature.

General Health and safety

With any electrical installation the dangers can be electric shock and fire. The main potential danger with low voltage DC/Battery energy source, will be more fire than electric shock, but as more solar panels are added to installation the risk of shock increases. Always install protection devices of the correct rating.

Take care when handling the solar panel. The solar panel will produce voltage and current when exposed to daylight. If multiple solar panels are connected, higher currents and voltages can be achieved. Insulate bare connections or cover the solar panel when installing.

If you have installed an inverter, please read the inverter manual and instructions. Even though the inverter is powered by 12V DC, the inverter will produce the same voltage as the grid power supply in your house. The amount of current that it can deliver will depend on the rating of the inverter, so the health and safety protocols are the same as grid derived power.