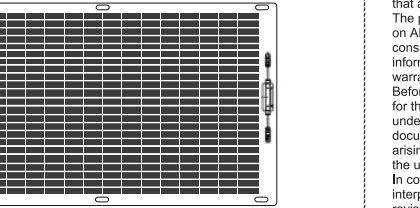




100W Flexible Solar Panel

Model: AP-SF-100



User Manual

Thank you for purchasing our product. In order to use this product correctly and safely, please read the instruction manual and related precautions carefully before use. Any improper use may cause serious injury to the user or others, damage to the product or loss of property. If you have any questions, please feel free to contact us.

Contact Us: [allpowers.com](mailto:support@allpowers.com)

E-mail: support@allpowers.com

1. Disclaimer

As the use of this manual as well as the conditions or methods for the installation, operation, use and maintenance of photovoltaic (PV) products may exceed the control of ALLPOWERS, ALLPOWERS assumes no responsibility for such non-standard installations and operations, and expressly disclaims any loss, damage, and maintenance requirements arising therefrom or in any way related thereto. ALLPOWERS shall not be liable for any infringement of third-party patents or other rights that may result from the adoption of the installation methods, accessories, etc. that are not provided by our company during installation and use. The product information and installation examples in this manual are provided based on ALLPOWERS's and our partners' relevant knowledge and experience and are considered to be reliable; however, the restrictions and recommendations in such information, including product specifications, do not constitute any express or implied warranty.

Before using the product, please read the User Manual and the disclaimer of liability for this product carefully. Once you use this product, it will be deemed that you have understood, acknowledged and accepted all the terms and contents of this document, and the user shall be responsible for their actions and all consequences arising therefrom. ALLPOWERS hereby disclaims any liability for any losses due to the user's failure to use the product according to the User manual. In compliance with laws and regulations, the company shall have the final right to interpret this document and all related documents for this product. Any update, revision or termination of the contents thereof, if necessary, shall be made without prior notice, and users may visit the official website of ALLPOWERS for the latest information on the product.

2. General Safety Information

- Solar photovoltaic systems must only be installed by qualified personnel with relevant professional skills and knowledge. All solar modules are equipped with a permanently connected junction box and 2.5 mm² (0.004 in) wires. Installers shall bear all risk of injury that may occur during installation, including, but not limited to, the risk of electric shock.
- When exposed to direct sunlight, a single module may generate DC voltages greater than 24 V. Exposure to DC voltages of 24V or higher is potentially dangerous. Arcing may occur when disconnecting wires that are connected to the PV components exposed to sunlight. Such arcing may cause burns or a fire. Please operate with special care, otherwise it may give rise to further issues. It is therefore important to protect yourself from electricity!

- The solar modules convert solar energy into DC electricity, and they are designed for outdoor use. Modules can be mounted on top of a fixed outdoor object, and the system designer and installer shall be responsible for the compliance of the design of their supporting structure.
- Do not attempt to disassemble the module, or remove any attached nameplates or components.
- Do not apply paint, adhesives or substances that block the battery cell from light to the light-receiving surface of the module.
- Do not expose the surface of the module to amplified sunlight that is artificially centralized.
- When installing systems, please observe all local, regional and national laws and statutory regulations.
- When installing them on a vehicle or vessel, please observe relevant local and national laws and regulations.

3. Safety Precautions

- When light shines on the light-receiving surface of the solar module, the solar module will generate DC electricity with a voltage or over 24 V. If modules are connected in series, the total voltage is equal to the sum of the voltage of each module. If modules are connected in parallel, the total current is equal to the sum of the current of each module.
- When transporting and installing any mechanical and electrical components, please take care to keep children away from the system and installation site.
- It is recommended that the light-receiving surface of the module be completely covered with opaque material during installation and that the positive and negative terminals be disconnected in order to prevent issues arising from power generation.
- When installing or troubleshooting for a PV system, do not wear metal rings, straps, earrings, nose rings, lip rings or other metal devices, and only use insulated tools approved for electrical installation.
- Please comply with safety instructions for all other components utilized in the system, including cables, connectors, controllers, charge regulators, inverters, batteries and other rechargeable batteries, etc.
- Use only the relevant equipment, connectors, wiring and brackets applicable to the installation of this solar module system. Always use modules of the same type in a particular PV system. Bypass diodes have been integrated into the junction box for all modules.
- For any single module or combination of more than one module connected in series or parallel, the cross-sectional area of the cable and the capacity of the connector must suit the maximum system short-circuit current, otherwise the cable and connector will overheat at high currents.
- DC fuses must be appropriate for the module's over current protection rating.

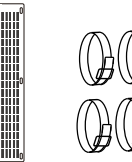
- Under normal outdoor conditions, the currents and voltages generated by the module will be different from those listed in the data sheet, depending on the weather and ambient temperature. Data specified on the nameplate are expected values under standard test conditions (STC).

4. Installation Procedures and Precautions

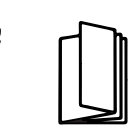
Obtain information on any requirements and pre-approvals for the site, installation and inspection from the relevant authorities prior to installation. When installing the product on the roof of a vehicle, ensure that the roof is protected against fire: The installation site should be free of flammable materials. The solar panel's positive and negative terminals should be fully disconnected before installation. Only use approved insulated tools for electrical installation.

4.1 Unpacking and Precautions

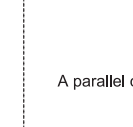
Carefully unpack the solar panel and ensure that all instructions on the package are followed. The contents are listed as follows:



1* Solar Panel



6* straps



1* User Manual

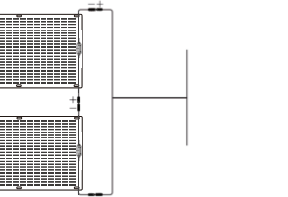
Note:

1. Do not step, walk, stand or jump on any module, as uneven stresses may impact the micro cracks on battery cell, and ultimately the module's reliability and user experience.
2. Do not use sharp tools on the module to score, cut, slice, or slash either the front or back of the panel;
3. Do not carelessly bend, shake, fold or drop the flexible panel;
4. Keep all electrical contacts and connectors clean and dry.

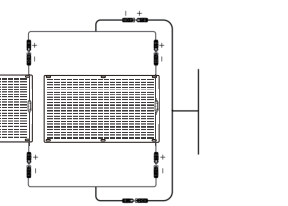
4.2 Pre-installation Requirements

Ensure that modules comply with general system technical requirements and that other system components will not damage the modules mechanically or electrically. Modules can be connected in series to increase voltage or in parallel to increase current. In a series connection, the positive terminal of one module is transferred to the negative terminal of the second module. In a parallel connection, the positive terminals of one module and the second module are connected, so are their negative terminals.

A series connection is shown in the diagram:



A parallel connection is shown in the diagram:



It is recommended that modules with the same electrical output be connected in the same series to prevent mismatching from creating a 1+1<2 effect; Avoid shade, as even a small amount of shade will reduce power output; ensure that the sun will be able to shine on the module even on the shortest day of the year,

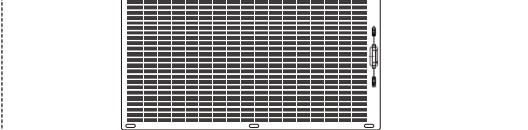
To generate the most electricity, the module should face directly south if it is in the Northern Hemisphere and face directly north if it is in the Southern Hemisphere. For details on the best elevation angle for the installation, refer to the standard PV installation guide of your locality or the installation angle requirements of a well-known solar installer or system integrator.

4.3 Installation Precautions

All of the following installation methods are for reference only. ALLPOWERS only supplies some of the module installation and connection accessories see packaging list for details), but it does not supply accessories for a complete vehicle system installation. Any system installers should ensure that the installation complies with all specifications.

The solar panel is made of flexible material with six holes (8 mm inside diameter) arranged at its edges, and can be fixed using optional adapter bolts through the spare holes or by using a structural adhesive or gluing double-sided adhesive foam tape on the back of the panel. Regardless of the installation method used, care should be taken to leave gaps between the panels and the roof to maintain airflow and ensure good heat dissipation for prolonged service life and power generation output.

As shown below:



Caution:

1. Modules should be securely mounted to withstand all expected loads, including wind and snow loads.
2. Dow Corning is the recommended structural adhesive brand and 3M is the recommended brand for double-sided adhesive foam tape. Different types of materials can be used depending on the material of the adhesive surface of the panel.

5. Commissioning and Troubleshooting

ALLPOWERS recommends that all commissioning and maintenance of the solar module system be carried out by qualified PV technicians! Test connected modules before connecting them to the system; always test all electrical and electronic components of the system before commissioning the system, and always follow the instructions supplied together with each part and piece of equipment.

To test the electrical performance of the module, the module is generally exposed to sunlight and must not be connected to a load. Pay attention to your personal safety when taking these measurements.

Should abnormal power generation occur, troubleshoot the issue by following the steps below:

- Check all wiring to ensure that there are no open circuits or poor connections;
- Check the open circuit voltage of each module;
- Check the open circuit voltage with the module completely covered with opaque material; then remove the opaque material and measure the open circuit voltage at its terminals and compare.

If the voltage between the terminals differs by more than 5% from the nominal value at an irradiance of 2700 W/m²(65.0 W/ft²), this indicates a poor electrical connection.

6. Product Specifications

Maximum output (ppm)	100W ±5%
Open voltage (V _{oc})	30.6V ±5%
Short circuit current (I _{sc})	4.58A ±5%
Maximum output voltage (V _m)	25.5V ±5%
Maximum output current (I _m)	4.17A ±5%
Maximum system voltage (V _m)	120V
Cell material	Monocrystalline silicon+ETFE
Maximum conversion rate (EFF)	22%-25%
Operating environment temperature (TEMP)	-20°C ~ 85°C (-4°F ~ 185°F)
Pressure resistance	When installed flat, it can withstand pressure up to 50KG.
Distortion angle	It is possible to bend into a "U" shape
Water resistant	IP68

Height (L)	1008±2mm/39.68inch
Width (W)	580±2mm/22.83inch
Thickness (H)	3±0.5mm /0.11inch
Weight	2.4KG/5.29lbs

Notes:

1. Avoid contact with corrosive substances.
2. Do not scratch the surface.

*All tests are carried out under standard conditions (STD): 1000W/square meter, AM1.5, 25°C (38000-40000LUX)
Data under standard testing conditions(STC): 1000W/square meter, AM1.5, 25°C(38000-40000LUX)

7. FAQ

Q:Why does the 100W solar panel fail to deliver as much as stated when in actual use?
A:In most cases, it is normal for a solar panel not to deliver its full nominal power. Some of the reasons why this happens, as well as some suggestions for getting closer to the nominal power figure, are given below.

1. Light Intensity. The amount of light shining on the panel will result in fluctuations to the power output. You are more likely to achieve nominal power output figures closer to those obtained under test conditions when using the product on a clear day during the midday sun, than when using the product in the morning or later in the afternoon. Weather conditions will also affect the amount of sunlight that shines on the panel. For example, you are much less likely to achieve the figures for nominal power in hazy, cloudy or rainy conditions.

2. Surface Temperature. The temperature of the solar panel surface will also affect the amount of power generated. The lower the surface temperature of the panel, the more power will be produced. For example, solar panels generate more power when used during the winter than during the summer, and this is completely normal. Solar panels generally reach temperatures close to 60 °C (140°F) during summer. This reduces nominal power by 10-15%, despite the higher levels of light shining on the panel.

3. The Angle of the Sunlight. Under good lighting conditions, the solar panel is able to stay where light hits perpendicular to the surface to achieve better light performance. However, most solar panels installed on the roof of an RV can only be installed in a tiled configuration, which prevents the panel(s) from being installed at the optimal angle, and this difference will result in a power output loss of approximately 5%-10%.

4. Panel Shading. The surface of the solar panel should not be shaded during use. Shading caused by shadows, foreign objects and glass can all greatly reduce power

output. Performance Issues caused by Malfunctioning Panels: If the panel still isn't generating power or its output remains far below expected nominal power figures after addressing the issues above, there may be an issue with the panel itself. Please contact Customer Support for assistance.

Q:What are the usage temperature range and precautions for use for the 100W solar panel?
A:The operating temperature range of the solar panel is -20°C to 85°C (-4°F to 185°F). Please read the instructions carefully before using the solar panel and minimize large bends during use to avoid damage to the battery core. The panels are made of a special composite material, which is lightweight and able to bend to a certain degree, allowing them to be used flexibly on different surfaces of the roof. However, the 100W solar panel are made of monocrystalline silicon wafers, and despite their flexibility, they should not be slammed on the ground during installation and use or stepped on or struck with foreign objects. Do not sit on the surface of the panels and do not bend the panels too far in order to prevent the monocrystalline wafers from breaking and affecting use. Damage caused by human force is not covered under the free warranty.

Q:Does the bend of the 100W solar panel have a large impact on power?
A:The solar panel can be bent on certain surfaces, but the more the panel bends, the less efficient it is. This is because panel power generation is best only when the entire panel has a consistent light source. When bent, different areas of the flexible solar panel are exposed to different amounts of light, reducing power generation efficiency.

Q:Can I use 100W solar panel together in series?
A:Yes. Please read the description of in series and parallel connections in the User manual carefully, paying particular attention to energy storage controller requirements and limitations on solar panel output, so as not to cause solar panels with different currents to be used in series without releasing their power and creating a 1+1<2 effect.

Q:Can I connect 100W solar panel in parallel?
A:Yes. Connecting panels in parallel increases power through doubling the current. The maximum number of 100W panels allowed in a parallel connection depends on the controller and energy storage equipment of your recreational vehicle. Please ensure that the energy storage system used in your vehicle supports a higher input current, and you should use wires with a diameter suitable to the output current to securely connect the panels in parallel.

Q:Do I need to clean the 100W solar panel regularly?
A:Yes. There can be a lot of dust and foreign objects on the surface of the solar panel after the panel has been used outdoors for a long time, which block the light to a certain extent, reducing the power output. Regular cleaning can help keep the surface of the solar panel clean and free from obstructions and generate a higher power output. However, when cleaning, be careful to wipe the surface with soft materials to prevent hard materials scratching the surface of the panel and affecting the output.

8. Maintenance

We recommend that you carry out the following maintenance to ensure optimal performance of the module:

1. Clean the flexible surface of the module with water and a soft sponge or cloth when necessary. Stubborn dirt can be removed with mild detergent. Avoid using sharp and/or hard cleaning tools. It is recommended that you only clean in the morning and evening when the sun is weak (irradiance <200 W/m² (18.6 W/ft²);
2. Inspect electrical and mechanical connections every six months to confirm that they are clean, secure and undamaged.
3. Prevent leaves and other objects from covering the surface of the solar panel. Partially shading the solar panel will not only affect the efficiency of power generation, but may also cause excessive current at some places and burn out the components.

In case of any issues, always have a qualified expert investigate and follow the maintenance instructions for all components used in the system, such as brackets, charge regulators, inverters, batteries, etc.

9. Disposal Guide

If circumstances permit, ensure that the product is disposed of in a designated recycling bin. Please follow local laws for more details.

10. Contact Us

We have 18 months warranty on this product, if you have any concern regarding our products or services, please email us to support@allpowers.com, we will feedback with our assistance within 1-2 working day. website: www.allpowers.com