



flexible, lightweight, solar module 12V, for the use with 12Volt rechargeable batteries

⚠ This manual includes information about safety, operation, capacity and maintenance of the module, as well as technical instructions which you should make yourself familiar with before you use your solar panel! Please read these instructions carefully before installation!

Safety Warnings

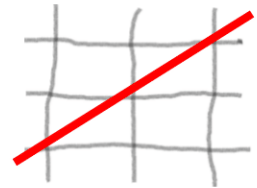
This manual does not list all precautions needed for safe work. Follow local guidelines.

- ⚠ Modules may not be folded or creased during handling and storage
- ⚠ Folding and excessive bending will cause cracks and internal short circuits which will create locally over currents causing overheating and melting the encapsulation materials
- ⚠ Voltage of a single module is not dangerous
- ⚠ Never connect more than 2 modules in series (24V-systems)
- ⚠ Work under dry conditions with dry tools
- ⚠ Modules exposed to sunlight produce DC electricity. Live parts may cause electric shock. Avoid contact with the metal terminal leads in order to reduce the risk of electrical shock
- ⚠ Use electrically insulated tools when wiring modules
- ⚠ Connect your system in a carefully vented environment and make sure there are no highly inflammable gases or vapours existing
- ⚠ Observe proper polarity when connecting the module into an electrical circuit. Reverse connection will damage the module and may result in fire and/or personal injury (Figure1)
- ⚠ Do not use non-rechargeable batteries!
- ⚠ Please observe during work with batteries and electrical equipment the industrial standards and safety instructions of respective manufacturers!
- ⚠ Avoid partially shading modules under load to prevent hot spots and/or reduction in power.
- ⚠ Artificially concentrated sunlight shall not be directed onto the module.
- ⚠ Do not carry the module by the wires.
- ⚠ Do not cut, scratch, or puncture the Module.
- ⚠ Do not stand or walk on the module.
- ⚠ Do not immerse unconnected connectors in liquid
- ⚠ Do not drop or allow objects to fall onto the Module.
- ⚠ Do not attempt to open, or otherwise dismantle the junction box

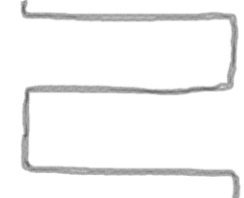
Installation

1. Choose an appropriate position to assemble your panel on a solid surface. If the surface is not stable and could be deformed the module can be damaged by cell cracks.

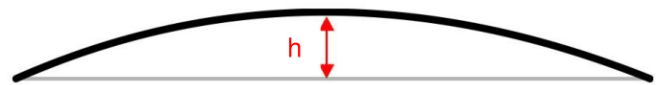
2. if you glue the module it will be important to avoid closed chambers. Water will stay in those chambers for a long time and can freeze in winter. Increasing volume of ice can bend module locally and cause cell cracks.



If you glue in serpentine water can escape. The distance of the turns should be about 8 to 12 cm. The turns should be pulled across the module from one edge to the other. The turns should cover the module from the top to the bottom.



3. never bend the module more than 13% of length. the high "h" should be max. 13% of length of the module. see also diagram 1



4. underground has to be solid and stable. Mechanical deformation will cause cell cracks in the glued module

5. Fix the module in a position that ensures the cell surface is inclined towards the sun and choose a location where the solar module is able to absorb as much sunlight as possible. Direct the panel to the south side to achieve the best possible charging performance.

6. Connect the solar panel over a charge controller (not included in delivery) with your battery

- ⚠ Mind the correct polarity (+) and connect the terminal of the extension cable correspondingly with the positive battery pole, the charge controller, or any other optional 12V device and the (-) terminal with the negative pole
- ⚠ Reverse connection will damage the module and may result in fire and/or personal injury

Cleaning

Clean module surfaces only with alcohol, window cleaner, or a mild soap & water solution and a lint-free cloth

Do not use any aggressive cleansing agents or solvents since they may damage the module. Neither use any pointed, or sharp-edged items on it since they might damage the panel surface!

Troubleshooting

1. Function: You can check the solar panel output with a multimeter.
2. Connections: Check the cabling for loose wires or corrosion. Check the polarity!
3. Voltage: Check the open-circuit voltage between the positive (+) and the negative (-) connections by means of a voltmeter
4. Battery: Make sure your battery is efficient and rechargeable. In case of need consult your battery trader to get the exact details and instructions of battery testing.
5. Capacity: Make sure your system is properly dimensioned and consult your dealer to get more information and advice.



Figure 1

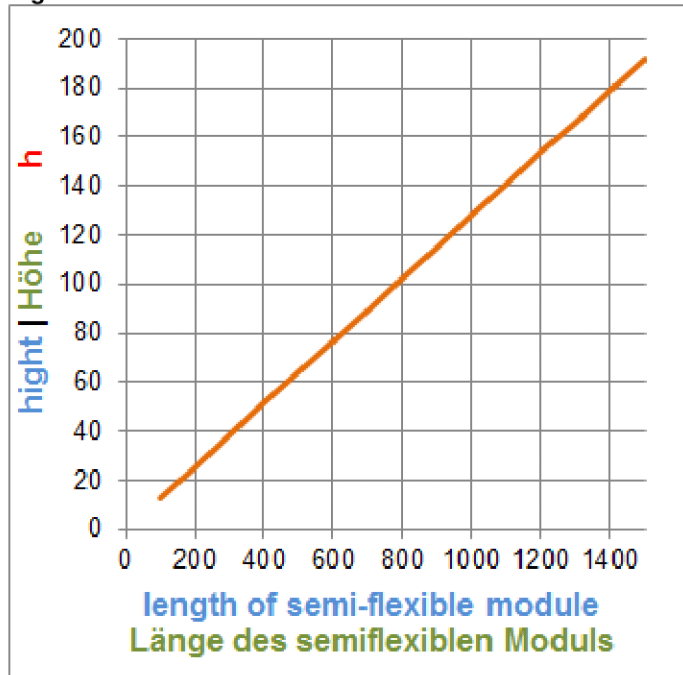


Diagram 1

Warranty

The legal period of warranty shall be applied. In case the product is defect, please consult your manufacturer or dealer. For warranty processing, or repair, please forward an invoice copy and the reason for rejection and/or a description of malfunction.

Phaesun GmbH grants a warranty of two years from the original date of purchase of the new product on provided that it can be excluded that the product has been used inappropriately.

Limitation of Warranty

The warranty does not include any damages to assembly components caused by inappropriate use, handling or assembly, repair, loss in transit, or damages through a mischance or caused by fire, the intervention of third parties or acts of God.

Disclaimer

The liability shall be limited to the repair of the defective product or a replacement delivery for faulty workmanship respectively. The liability of this warranty shall not include damages of any other kind, any loss of profits or any other consequential loss, liability for income which can customarily be achieved with the product(s) sold, shall be ruled out.